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FINAL ENVIRONMENTAL SITE SUMMARIES NSA PANAMA CITY FL  
3/28/2016  
ADANTA

**Final**

**Environmental Site Summaries**

**Naval Support Activity Panama City  
Panama City Beach, Florida**

**Naval Facilities Engineering Command  
Southeast**

**Contract Number N69450-15-D-0113**

**Contract Task Order 0001**

**March 2016**

**Final  
Environmental Site Summaries  
for  
Naval Support Activity Panama City  
Panama City Beach, Florida**

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**Prepared Under:  
Contract N69450-15-D-0113  
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## ACRONYMS AND ABBREVIATIONS FOR ALL SITES

**Note:** This is a complete list of acronyms and abbreviations for all sites. Each Site Summary uses a subset of these.

µg/L	Micrograms per Liter
AAS/SVE	Air Sparging/Soil Vapor Extraction
ABB-ES	ABB Environmental Services, Inc.
Aerostar	Aerostar Environmental Services, Inc.
AFVR	Aggressive Fluid Vapor Recovery
AOC	Area of Concern
AST	Aboveground Storage Tank
B&RE	Brown and Root Environmental
BAP TEQ	Benzo(a)pyrene Toxicity Equivalent
Bechtel	Bechtel, Inc.
bls	Below Land Surface
BTEX	Benzene, Ethylbenzene, Toluene, and Xylenes
CA	Contamination Assessment
CAR	CA Report
CCR	Construction Completion Report
CH2M Hill	CH2M HILL Constructors, Inc.
CLEAN	Comprehensive Long-term Environmental Action Navy
CMI	Corrective Measures Implementation
CMIP	CMI Plan
CMS	Corrective Measures Study
CO <sub>2</sub>	Carbon Dioxide
COC	Contaminant of Concern
CRDL	Contract-Required Detection Limit
CSS	Coastal Systems Station
CTL	Cleanup Target Level
CTO	Contract Task Order
CWG	Florida Criteria Working Group
DNF	Discharge Notification Form
DRO-TPH	Diesel Range Organics-Total Petroleum Hydrocarbon
EDB	1,2-Dibromoethane
ESE	Environmental Science and Engineering, Inc.
FAC	Florida Administrative Code
FDEP	Department of Environmental Protection
FDEP	Florida Department of Environmental Protection
FID	Flame Ionization Detector
FL-PRO	Florida Residual Petroleum Organic
FRP	Fiberglass Reinforced Plastic

FSRC	Florida Spill Response Corporation
GAG	Gasoline Analytical Groups
GCTL	Groundwater CTL
GEM	Gas Extraction Monitor
gpd	Gallons per Day
HEA	Health and Environmental Assessment
HI	Hazard Index
HRS	Health Rehabilitative Services
HSWA	Hazardous and Solid Waste Amendment
IAS	Initial Assessment Study
IMR	Interim Measures Remediation
IR	Installation Restoration
IRA	Interim Remedial Action
KAG	Kerosene Analytical Group
LNAPL	Light Non-Aqueous Phase Liquid
LTM	Long-Term Monitoring
LUC	Land Use Control
LUCIP	LUC Implementation Plan
MCL	Maximum Contaminant Level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MGD	Million Gallons per Day
MNA	Monitored Natural Attenuation
MOP	Monitoring Only Plan/Program
MTBE	Methyl-tert-Butyl Ether
NAM	Natural Attenuation Monitoring
NAMP	Natural Attenuation Monitoring Plan
NAVFAC	Naval Facilities Engineering Command
NAVFAC SE	NAVFAC Southeast
NEDU	Navy Experimental Diving Unit
NEESA	Naval Energy and Environmental Support Activity
NFA	No Further Action
NIRIS	Naval Installation Restoration Information System
NIRP	Navy Installation Restoration Program
NOSC	Naval Operations Support Center
NSA	Naval Support Activity
O <sub>2</sub>	Oxygen
OHC	OHC Environmental Engineering, Inc.
OVA	Organic Vapor Analyzer
OWS	Oil-Water Separator
PAH	Polycyclic Aromatic Hydrocarbon
PAR	Preliminary Assessment Letter Report
PARM	Post-Active Remediation Monitoring

PCAR	Pipeline Closure Assessment Report
PCB	Polychlorinated Biphenyl
PID	Photo Ionization Detector
ppm	Parts per Million
PWC	Navy Public Works Center
PWC	Public Works Center
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SACAL	SACAL Environmental & Management Company, Inc.
SAR	Site Assessment Report
SCTL	Soil CTL
SRCO	Site Rehabilitation Completion Order
SRCR	Site Rehabilitation Completion Report
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
SWCTLs	Surface Water Cleanup Target Levels
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
TRPH	Total Recoverable Petroleum Hydrocarbons
TS	Treatability Study
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VE	Vapor Extraction
VEE	Vacuum Enhanced Extraction
VOC	Volatile Organic Compound
VSI	Visual site Inspection
WWTF	Wastewater Treatment Facility

## EXECUTIVE SUMMARY

This document, prepared by Adanta, Inc., for Naval Facilities Engineering Command Southeast (NAVFAC SE) under Contract Number N69450-15-D-0113, Contract Task Order Number 0001, is a compilation of summaries describing environmental activities conducted at various Naval Support Activity (NSA) Panama City environmental sites. Each summary pertains to a single site.

NSA Panama City is located in the panhandle of Florida (see Figure ES-1). The NSA Panama City environmental sites described herein are grouped as follows:

- Four Areas of Concern (AOCs)
- Nine Petroleum Sites
- 12 Solid Waste Management Units (SWMUs)

The locations of the sites and additional graphical details are provided, as appropriate, on figures associated with individual site summaries. Supplemental information may be found in various documents referenced in each summary. The reference documents are accessible via the Naval Installation Restoration Information System (NIRIS) and NSA Panama City Administrative Record File (ARF). Other reference documents containing information about these sites also may be found in NIRIS and the ARF. The investigations described herein have transpired over multiple decades, with numerous detailed reports being prepared for many of the sites, so these site summaries necessarily emphasize major environmental activities conducted and accomplishments achieved at each site. Emphasis was placed on describing in greatest detail the more recently investigated sites and sites that are subject to current investigation or corrective actions. Sites with no further action (NFA) status per the NSA Panama City Corrective Action Permit, Number 66255-HH-003, issued on November 18, 2013, are generally described in less detail.

Several site summaries in this compilation are identified in the NSA Panama City Corrective Action Permit as requiring NFA. Those sites are no longer being investigated, and do not require any corrective action. The remaining sites summarized herein, most of which also are listed in the Corrective Action Permit, are currently being investigated to determine whether they are currently suitable for NFA status or whether they require corrective actions before achieving NFA status.

Two sites included in this compilation are not listed in the NSA Panama City Correct Action Permit: Naval Operations Support Center Tank 2-B located in Tallahassee, Florida; and South Dock, which was originally considered to be part of AOC 2 but is being investigated separately. Site summaries were not prepared for Sites 307 and 333, which are referenced in at least one site summary, and these two sites are not listed in the NSA Panama City Corrective Action Permit. Site 327 is listed in the NSA Panama City Corrective Action Permit but is not included in this compilation. Additional sites may be identified in the future for inclusion in these site summaries.

The current status of each environmental site included in this compilation is listed in the rightmost column of the respective site summary and is presented in Table ES-1. A list of acronyms and abbreviations is provided at the end of the document.

**TABLE ES-1**  
**NSA PANAMA CITY SITE STATUS SUMMARY**

Site	Status
<b>Areas of Concern</b>	
AOC 1	Corrective actions are in place to implement a January 2008 Statement of Basis
AOC 2	Currently being investigated
AOC 3	NFA based on 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) Report
AOC 4	NFA based on 1997 Interim Measures Report
<b>Petroleum Sites</b>	
Naval Operations Support Center (NOSC)	Currently being investigated
Site G9	NFA based on NSA Panama City Corrective Action Permit renewal application letter dated May 26, 1995
Site G300	Corrective actions are in place in accordance with a Site Rehabilitation Completion Order issued by FDEP on July 1, 2011
Site 98	Currently being investigated
Site 278	NFA based on a Site Rehabilitation Completion Order issued by FDEP on March 18, 2011
Site 323	NFA based on NSA Panama City Corrective Action Permit renewal application letter dated May 26, 1995
Site 325	Corrective actions are in place
Site 362	NFA based on NSA Panama City Corrective Action Permit renewal application letter dated May 26, 1995
South Dock	Currently being investigated
<b>Solid Waste Management Units</b>	
SWMU 1	NFA based on 1997 Interim Measures Report
SWMU 2	Corrective actions are in place to implement a 2007 Statement of Basis
SWMU 3	Corrective actions are in place to implement a January 2008 Statement of Basis
SWMU 4	NFA based on a 1996 RCRA Facility Investigation (RFI)
SWMU 5	NFA based on a 1997 Interim Measures Report
SWMU 6	NFA based on a 1987 RFA Report
SWMU 7	NFA based on a 1987 RFA Report
SWMU 8	NFA based on a 1996 RFI
SWMU 9	NFA based on an October 2006 RFI Report Addendum, Revision 1
SWMU 10	Corrective actions are in place to implement a January 2008 Statement of Basis
SWMU 11	NFA based on a 1987 RFA Report
SWMU 12	NFA based on a 1987 RFA Report

FIGURE ES-1  
LOCATION OF NAVAL SUPPORT ACTIVITY PANAMA CITY



**AREAS OF CONCERN 1 TO 4**

## AREA OF CONCERN 1

Site Name	Site Description	Completed Activities	Current Status
<p>Area of Concern (AOC) 1, [Old] Fire Training Area No. 1.</p> <p>Originally called Navy Installation Restoration Program (NIRP) Site #3 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p><b>Notes:</b> All AOC 1 documents and data are filed under Solid Waste Management Unit (SWMU) 13 in the Naval Installation Restoration Information System (NIRIS).</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>AOC 1 is a former fire fighter training area at Naval Support Activity (NSA) Panama City that was operational from about 1955 to 1978. Waste fuel and oil were poured directly into an unlined earthen pit and ignited as part of training activities, resulting in groundwater and soil contamination. Light non-aqueous phase liquid (LNAPL) (heavy fuel oil or waste oil with chlorinated solvents) accumulated in soil directly beneath the pit. Contaminants also included petroleum products and other volatile organic compounds (VOCs); and combustion products, particularly polycyclic aromatic hydrocarbons (PAHs).</p> <p>In 1978 AOC 1 was graded, paved, and used as an open storage area. AOC 1 is currently a fenced and paved open area bordered by parking to the west and south, by NSA Panama City's</p>	<p><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including AOC 1, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight NIRP sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May. Contamination, including visible staining, was found in soils at the former burn pit and this contamination was resulting in contamination of the underlying surficial aquifer. Further characterization of soil and groundwater was recommended.</p> <p>E.C. Jordan conducted and reported in October 1987 on an RFA to identify potentially contaminated sites throughout NSA Panama City. This report recommended that a RCRA Facility Investigation (RFI) be conducted at AOC 1 to delineate contamination.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RFI from April 1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> A “Final Pilot Scale Results and Full Scale Conceptual Design Report for Bioslurper System for AOC 1” was submitted to the Florida Department of Environmental Protection (FDEP) in May and states that bio-slurp pilot testing was conducted in October</p>	<p>Groundwater is contaminated with VOCs; Soil contains free petroleum product and is contaminated with VOCs and other petroleum-related chemicals, primarily PAHs.</p> <p>CMIP Revision 3 (dated May 18, 2012), indicates that LUCs are in effect for all soil and groundwater within the soil and groundwater LUC boundaries (Figure 4). Under current industrial land use there is no unacceptable risk from exposure to contaminated AOC 1 surface or subsurface soil. However, intrusive activities involving excavation, well installation, etc., that cause soil within the AOC 1 Soil LUC Boundary to be disturbed or suspended in the air must be conducted only with the approval of the Director, NSA Panama City Environmental Office.</p> <p>Disturbance of soil deeper than 2.5 feet bls within the</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>shipping and receiving facilities to the east, and by woodland and SWMU 9 to the north. St. Andrew Bay is visible east of Solomons Drive, approximately 700 feet away. See Figure 1 for the site location. SWMU 3 lies partially between AOC 1 and the western edge of St. Andrew Bay. Figures 2 and 3 show the overall site layout and a detail of the contaminated soil area, respectively.</p>	<p>1996. The greatest LNAPL recovery was achieved when extracting from wells MW5, MW6, MW7, and MW2 simultaneously. Significant free product was noted in soil cuttings from MW5, MW6, and MW7 and little contamination was noted in soil cuttings from MW1, MW2, and MW3.</p> <p>During the RFI free product, which had similar characteristics to waste oil or heavy fuels, was identified in the groundwater. The Navy proactively began a study to identify the extent of free product at the site.</p> <p>An RFI report for AOCs 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4) was prepared by ABB-ES and approved by the United States Environmental Protection Agency (USEPA) in 1996. Petroleum-based fuel-related contaminants were found in soil and groundwater. Low concentrations of semivolatle organic compounds (SVOCs) (mainly PAHs) were found in surface soil and attributed to vehicle and heavy equipment operation and the asphalt paving of the area. Because the site had been graded, the RFI report asserts that compounds detected in surface soil samples may not have been related to the site. The following constituent concentrations exceeded their respective Groundwater Cleanup Target Levels (GCTLs) [Florida Administrative Code (FAC) 62-770.600]: benzene; toluene; ethylbenzene, xylenes (BTEX); ethylene dibromide; total petroleum hydrocarbons (TPH); and naphthalene. The likely sources of PAH contamination were concluded to be vehicles, heavy equipment, and the asphalt paving of the area. The human health risk assessment (HHRA) identified potential unacceptable cancer risks for the domestic use of groundwater at AOC 1 due to ingestion of 1,1-dichloroethene (1,1-DCE) and inhalation of trichloroethene (TCE) while showering. No ecological risks were identified for AOC 1. A Corrective Measures Study (CMS) was recommended for media other than free product, which was already being addressed.</p> <p><b>1997:</b> A Closure Assessment Report, Underground Storage Tank Building 98, Naval Surface Warfare Center Costal Systems Station, Panama City, Florida, was prepared by Navy Public Works, during 1997, December.</p>	<p>Soil LUC Boundary for any reason shall be prohibited unless prior written approval is obtained from the Navy and the FDEP because contaminants remain in the "smear zone" within this LUC Boundary.</p> <p>Occasional replacement/repair (but not removal) of pavement as deemed necessary by NSA Panama City may be possible if prior written authorization is obtained from the FDEP. The pavement is a barrier that virtually prevents infiltration of precipitation that could otherwise mobilize contaminants.</p> <p>LUCs prohibit the development and use of property within the soil LUC boundary for residential and residential-like use unless prior written approval is obtained from the Commanding Officer of NSA Panama City and FDEP.</p> <p>The quarterly free product monitoring frequency approved</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>A CMS Report for AOC 1 and SWMUs 3, 9, and 10 also was prepared and approved by USEPA. Soil Vapor extraction with Enhanced Bioremediation, was the recommended corrective action for subsurface soil and monitoring natural attenuation was recommended groundwater. For soil, a pilot bioslurping study to evaluate LNAPL removal effectiveness was recommended.</p> <p>A bioslurping/bioventing system was installed to remove subsurface contamination. The CMS report identified corrective action objectives (CAO), media of concern, and corrective action alternatives to address the CAOs. The corrective action alternatives were compared with one another based on specific evaluation criteria and as a result of the comparison, one corrective action for each medium was recommended for implementation.</p> <p>A Draft Statement of Basis was submitted to the FDEP on March 27, 1997. This document summarized a risk assessment that found no predicted unacceptable non-cancer effects and no unacceptable effects to ecological receptors. The report also states the two alternatives for AOC1 were bioventing for subsurface soil and natural attenuation for groundwater. In April 1997, the Navy completed a natural attenuation study for AOC 1, which recommended natural attenuation as a viable remedial action.</p> <p>An underground storage tank (UST) west of Building 98 and approximately 2 cubic yards of soil contaminated with petroleum product were removed in 1997, leaving residual contamination in the soil. The following fuel oil-related constituents were detected in groundwater at concentrations greater than their respective GCTLs: benzene, toluene, ethylbenzene, xylenes, ethylene dibromide, total petroleum hydrocarbons (TPH), and naphthalene. Chlorinated solvent chemicals were also detected during the tank closure assessment; their presence was attributed to AOC 1 and SWMU 9, located about 500 feet north of AOC 1. Building 98 was subsequently transferred from the FDEP Petroleum Program to the Installation Restoration (IR) Program because groundwater contamination was detected upgradient of the former UST.</p>	<p>in the May 2012 CMIP Rev. 3 conflicts with the recommendation to conduct biannual free product monitoring that was approved in August 2013 Biennial groundwater LTM Report for 2012. The biennial frequency, being the most recently approved, is the currently used frequency.</p> <p>Annual LUC inspections are required.</p> <p>2015 groundwater LTM and free product monitoring by Adanta is planned during Fall/Winter 2015/2016.</p> <p><b>Note:</b> All AOC 1 documents and data are filed under SWMU 13 in NIRIS.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p><b>1997 to 1999:</b> A bioslurping system was installed west of Building 399 to recover free product from the firefighting training area. The full-scale system operated successfully from August 1997 until October 1999, and was restarted in 2000 as described below.</p> <p>A technical memorandum summarizing site conditions for Area of Concern 1 and SWMUs 9 and 10 was issued by ABB-ES. The report asserted that natural attenuation of AOC 1 groundwater VOCs by the anaerobic pathway appeared to be viable.</p> <p>A Corrective Measure Implementation Plan (CMIP) for AOC1, and SWMU 3, 9, and 10 was prepared in October, 1998 to govern long-term groundwater monitoring. The plan did not include bioslurping, which already was in progress. The long term monitoring plan at AOC 1 was comprised of three components: groundwater monitoring, groundwater modeling, and land use controls (LUCs).</p> <p>A Performance/Status Report Through June 21, 1999 summarizes activities performed in May and June 1999. These activities included continued operation of the full-scale bioslurper system. The recovery rate in May and June was approximately one gallon per day for free-phase and emulsified fuel combined. This is about half of the amount recorded for the period from February through April.</p> <p><b>2000 and 2001:</b> The 1996 RFI Report and 1997 CMS Report EPA approvals were rescinded in an Oct. 4, 2000 letter from USEPA because the extent of contamination at SWMU 10 was found to be incompletely delineated and monitoring had not been conducted as required by the Hazardous and Solid Wastes Amendment (HSWA) portion of the RCRA permit. In addition, the presence or status of other SWMUs and AOCs was asserted to be unknown and Navy was directed to submit a work plan designed to fully delineate the scope and extent of contamination, both onsite and offsite, associated with all of the facility's SWMUs.</p> <p>The bioslurping/bioventing system installed in 1997 was restarted. This system ultimately removed about 53,000 pounds of free petroleum product from soil between 1997 and 2001. When no more significant product was recoverable, the system was</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>shut down with the understanding that, over time, greater quantities of free product could appear as residual product coalesced. A Performance/Status Report was submitted to the Navy stating the activities performed from November 1999 to April 7, 2000, including the bailing of wells on a weekly basis in November, then bailing on a monthly basis in February and March 2000. The combined total volume of product inside the wells was estimated to range from 0.22 to 1.67 gallons.</p> <p><b>2002:</b> A Project Report for Free Product Recovery with a Full-Scale Bioslurper System at the Coastal Systems Station Panama City, Florida was prepared by Battelle and approved by FDEP.</p> <p><b>2002 and 2003:</b> 1,1-dichloroethane (DCA), 1,1-DCE, and benzene had migrated laterally to the edge of St. Andrew Bay. It was determined that additional monitoring wells were needed at AOC1. Groundwater samples were collected on April 9 to 15, 2002, and perchloroethene (PCE), TCE, toluene, ethylbenzene, xylene, 3- &amp;4-methylphenol, and naphthalene showed GCTL exceedances in the source zone wells (PCY-13-3S and PCY-13-10S), but no exceedances elsewhere. At the edges of the plume, exceedances occurred with 1,1-DCE, benzene, arsenic, and bis(2-ethylhexyl)phthalate, but all of the reported values were close to the cleanup targets. Dissolved oxygen measurements suggested that conditions were aerobic for the majority of AOC1 groundwater. A Final RFI report addendum for AOC 1 and SWMUs 2, 3, 9, 10 (Initial Version) was prepared to update status of these sites based on sampling between 1997 and 2002. This report was submitted to the FDEP on May 22, 2003.</p> <p><b>2004:</b> In January 2004, a CMS report addendum was approved and finalized for SWMU 10 and AOC 1. This addendum updated the status of AOC 1 and SWMU 10 based on sampling in 2003, and further evaluated corrective measures alternatives.</p> <p><b>2005:</b> A groundwater contaminant migration study was completed and concluded that groundwater, which travels vertically downward near the AOC 1 contaminant source area, migrates eastward toward the bay, and then migrates vertically upward immediately west of the edge of the bay, was not</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>transporting contaminants into the bay. Instead, it is believed that the travel distance along this migration pathway is long enough to support natural attenuation of the groundwater contaminants. Potentially site-related groundwater contaminants with concentrations that have ever been greater than GCTLs or surface water cleanup target levels (SWCTLs) are a relatively small number of chlorinated and non-chlorinated organic compounds.</p> <p><b>2005/2006:</b> OHC Environmental Engineering, Inc. (OHC) prepared for Naval Support Activity Panama City a Groundwater Monitoring [Plan] for SWMU 10 &amp; AOC 1 under Project Number N62467-05-R-4009 prior to November 2006 sampling.</p> <p><b>2006 to 2008:</b> The initial version of the RFI report addendum was approved and finalized in May 2003. At that time, additional investigation was needed for SWMU 3 and an additional round of groundwater sampling was needed at SWMU 9 to verify achievement of remedial goals. Thus, the RFI remained open for SWMU 3 and SWMU 9, while SWMU 10 and AOC 1 moved forward to the 2004 CMS Addendum. The additional investigations for SWMU 3 and SWMU 9 were completed, and this work was documented by revising the initial 2003 RFI Addendum. Hence, an RFI Addendum Revision 1 was issued in 2006 to update status of SWMUs 3 and 9 only, based on sampling conducted in 2004 for SWMU 3, and 2003 to 2004 for SWMU 9. The report is called "Resource Conservation and Recovery Act Facility Investigation Addendum for Area of Concern 1 and Solid Waste Management Units 3, 9, and 10 Revision 01," 2006; Southern Division of the Naval Facilities Engineering Command and Tetra Tech NUS, Inc. and approved by FDEP.</p> <p><b>2007:</b> A RCRA CMIP for AOC 1, Revision 0 (September), was prepared by Tetra Tech and approved by FDEP. This document was later revised multiple times (see below).</p> <p><b>2008:</b> An RFI report addendum (Revision 2) was issued in January, 2008 for 3, 9, and 10 and AOC 1. Human health risks were re-evaluated for AOC 1 to verify that data collected through 2004 did not alter the estimates of risk at these sites. Risks based on data collected prior to 2010 were estimated for</p>	

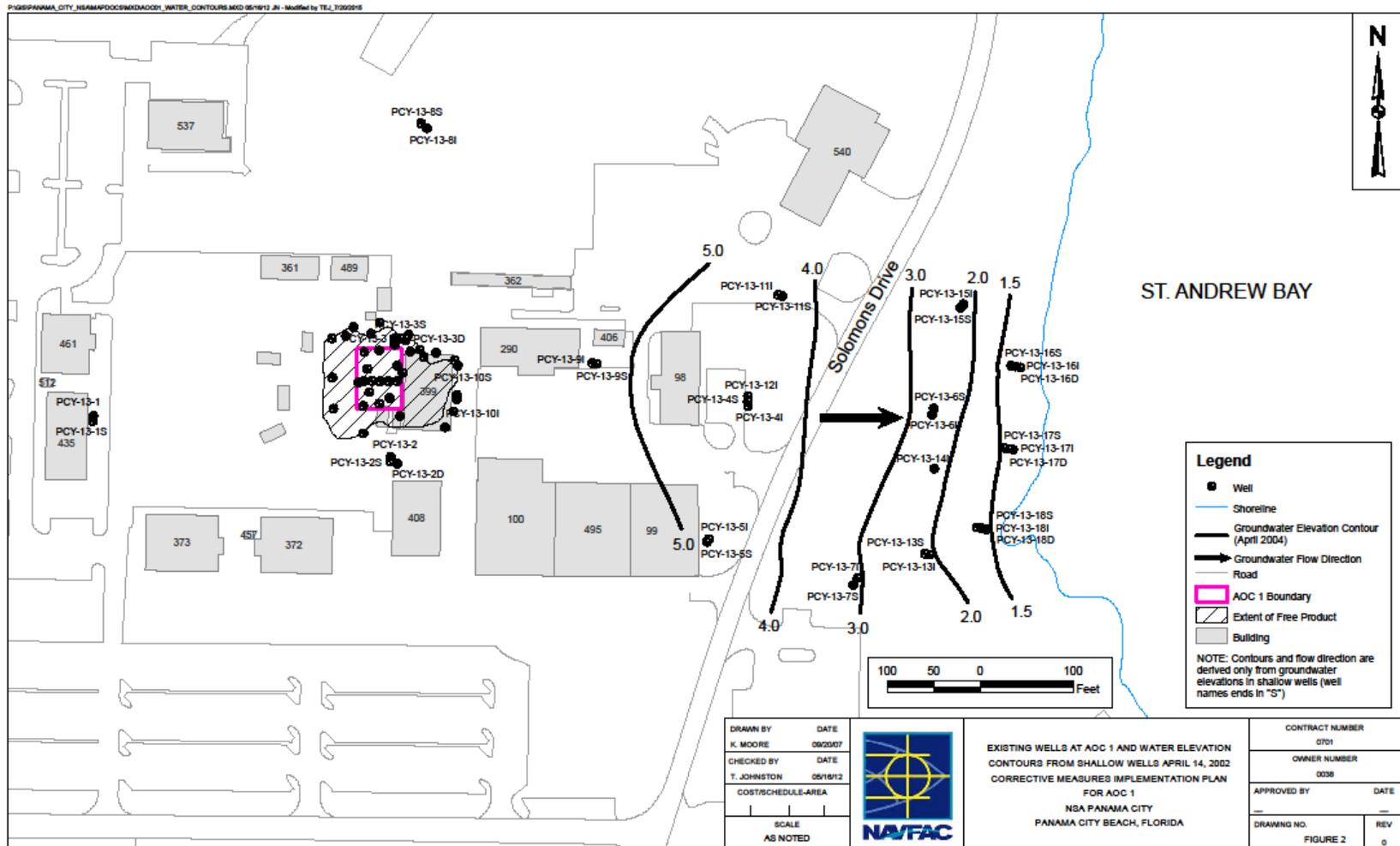
Site Name	Site Description	Completed Activities	Current Status
		<p>current and future potential land uses, including a future hypothetical residential land use scenario. Combined with the data in the original RFI, the most recently collected data were sufficient to delineate the nature and extent of contamination at AOC 1. Under the current land use, no unacceptable cancer or non-cancer human health risks were identified for receptors exposed to any AOC 1 environmental media. Under the hypothetical future residential land use, which involves drinking the groundwater and dermal contact with soil and groundwater, a cancer risk of 7 in 1,000,000 from exposure to surface soil and a cancer risk of 8 in 10,000 from exposure to groundwater were estimated. No unacceptable ecological risks have been identified.</p> <p>A Statement of Basis was prepared for AOC 1 and SWMU 10, was subjected to public scrutiny, and was approved by FDEP in 2008. The Statement of Basis identified (i) proposed corrective measures to address the remaining contamination, (ii) an explanation for the particular choice of corrective measures, (iii) alternative corrective measures, (iv) a need for public comment and (v) information regarding the public involvement process. Contaminants of concern (COCs) were identified as chemical groups rather than individual chemicals in the Statement of Basis, but they were identified as individual chemicals in subsequent monitoring plans and reports.</p> <p>For calculating risk under current military land use, exposures were assessed for adult and child transients. Future land-use conditions were assumed to be residential for surface soil and groundwater. For subsurface soil, risk associated with future land use was calculated for an adult excavation worker. The Statement of Basis identified the following unacceptable human health risks (no ecological risks or non-cancer human health risks were identified):</p> <p>Under current land-use conditions, no unacceptable cancer effects were predicted.</p> <p>Under future land use conditions (residential), risks were not identified for humans exposed to contaminants in subsurface soil. Under future land use conditions, a potential cancer risk was predicted based on exposure to surface soil (7 in 1,000,000) and groundwater (8 in 10,000).</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>The selected corrective actions documented in the Statement of Basis are long-term monitoring (LTM) to verify effectiveness of natural attenuation of groundwater contaminants, and implementation of LUCs designed to prevent unacceptable exposure to contaminated environmental media. The Statement of Basis indicates that LUC specifics would be presented in a Corrective Measures Implementation Plan.</p> <p>A CMIP was developed to implement the 2008 Statement of Basis requirements: LUCs, groundwater LTM, and free product level monitoring. Since the original implementation, changes have been incorporated to reflect decreasing site contaminant levels and, hence, improving conditions. The plan currently is in Revision 3 (submittal date of June 25, 2012).</p> <p>Residential soil and groundwater LUCs are designed to prevent unacceptable or unauthorized exposure to AOC 1 contaminants in soil within the soil LUC boundary, and to prohibit use of groundwater from within the groundwater LUC boundary. Annual LUC inspections are required.</p> <p><b>2010 to 2012:</b> Baseline long-term groundwater monitoring was conducted to establish a point of reference for future monitoring. The results were documented in a 2012 Baseline Long-term Groundwater Monitoring Report for AOC 1. Multiple recommendations were made that changed the wells to be monitored and the list of chemicals to be analyzed. Continued free product thickness monitoring was included in the recommendations.</p> <p><b>2013:</b> The most recent Tetra Tech LTM report, the RCRA 2012 Biennial Groundwater Long-Term monitoring Report for AOC 1, was completed in August 2013 and replacement pages designed to render it final were issued in October 2013. Six VOCs are currently scheduled for biennial monitoring in 10 wells. SVOCs are not routinely monitored but monitoring of SVOC COCs would be required prior to a change in land use that leads to unrestricted use or a disturbance of soil that could lead to an increase in groundwater contamination. The soil LUC boundary was expanded in May 2012 to encompass the entire contaminated soil source area (see Revision 3 to the AOC 1 CMIP). Select wells and piezometers are currently scheduled to be</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>monitored periodically for free petroleum product levels. Additional details regarding the monitoring program are provided in the AOC 1 Round 3 CMIP, Revision 3, dated May 2012. Biannual (twice per year) free product monitoring was recommended in the August 2013 biennial groundwater LTM report.</p> <p>J2 conducted additional groundwater LTM on November 21 and 22, 2013 in accordance with the Sept 19, 2013 LTM SAP, Revision 1. LTM results were reported in the J2 2/212014 LTM report for Area of Concern 1 at Naval Support Activity Panama City. Minor COC concentration changes were noted and continued LTM was recommended.</p> <p><b>2015:</b> Additional groundwater and free petroleum product monitoring is planned for AOC 1 in Fall/Winter of 2015/2016, pending approval of the 2015 LTM SAP, submitted by Adanta, Inc.</p>	



**FIGURE 2  
AREA OF CONCERN 1 SITE LAYOUT**



**FIGURE 3**  
**AREA OF CONCERN 1 SITE LAYOUT DETAIL (SOIL CONTAMINATION SOURCE AREA)**

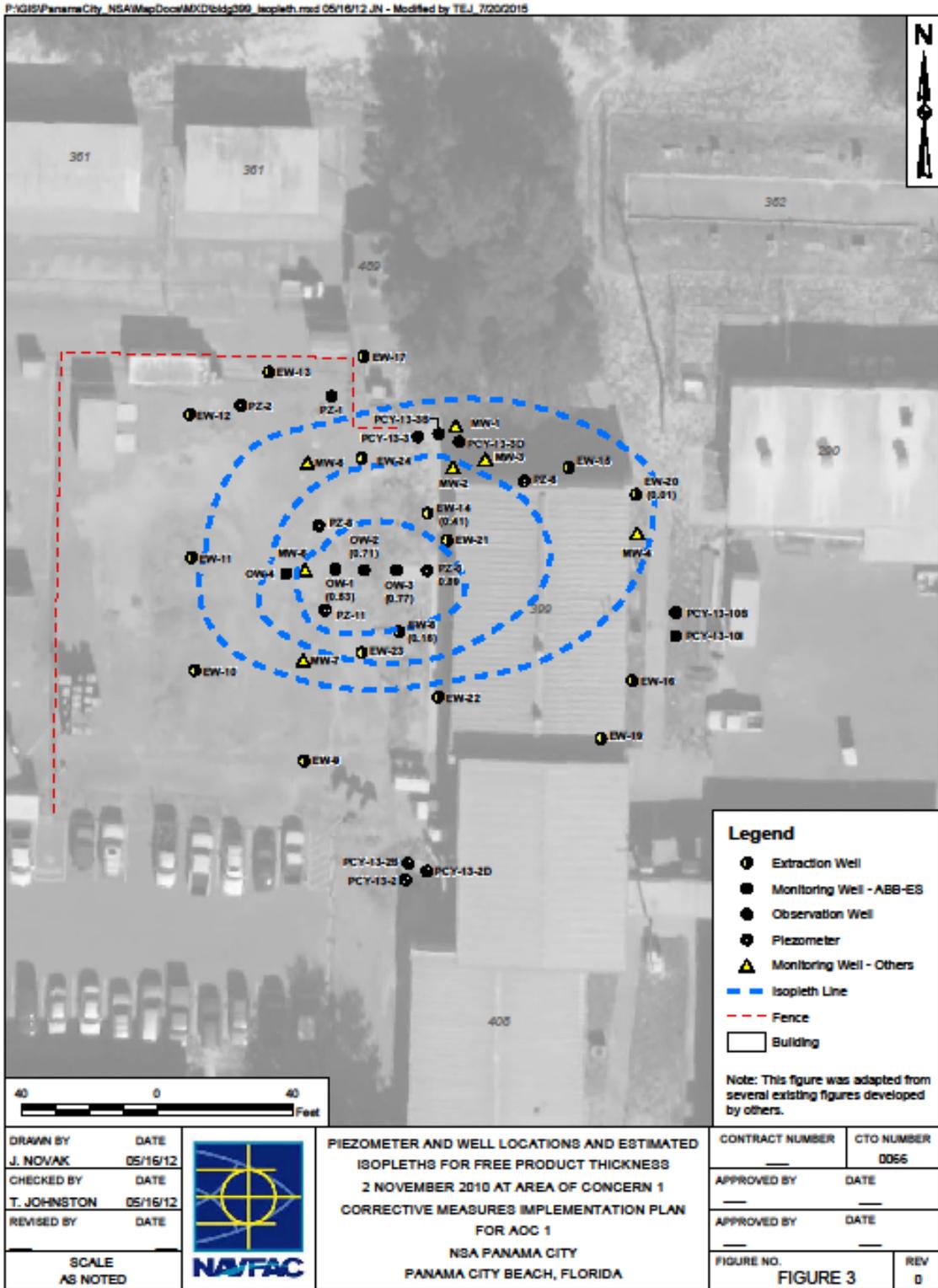
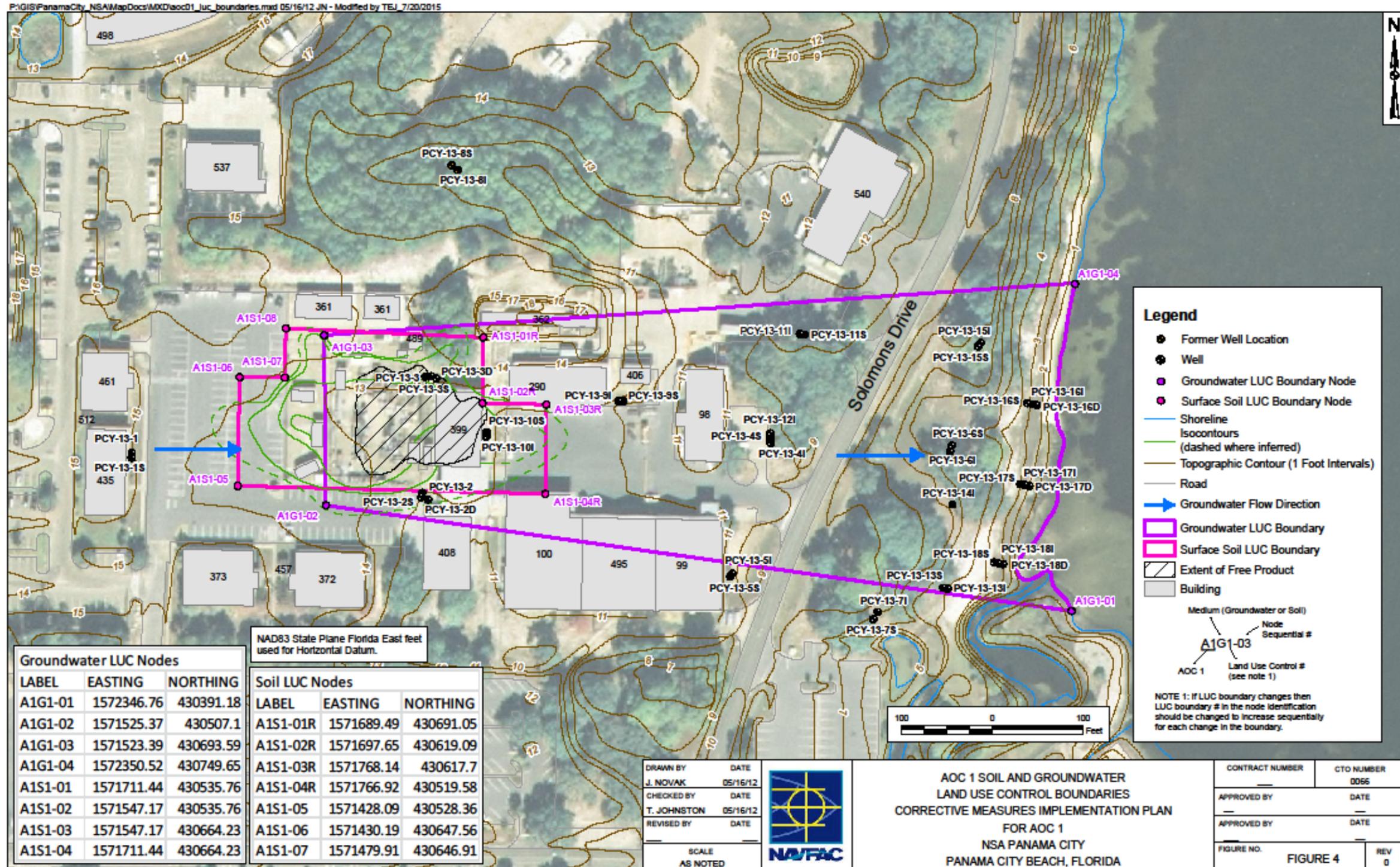


FIGURE 4  
 AREA OF CONCERN 1 SOIL AND GROUNDWATER LAND USE CONTROL BOUNDARIES



## AREA OF CONCERN 2

Site Name	Site Description	Completed Activities	Current Status
<p>Area of Concern (AOC) 2, Underground Oil Contaminated Area.</p> <p>Originally called Navy Installation Restoration Program (NIRP) Site #4 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p><b>Notes:</b> All AOC 2 documents and data are filed under Solid Waste Management Unit (SWMU) 14 in the Naval Installation Restoration Information System (NIRIS).</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>AOC 2 is located in an intensely developed area at the southern end of the Naval Support Activity (NSA) Panama City facility (see Figure 1). The original site includes a large asphalt and concrete paved parking area and is surrounded by offices, and maintenance, and storage buildings (see Figure 2).</p> <p>The site area includes SWMU 1 and Site 333, both previously investigated under the RCRA program. Former aboveground storage tank (AST) 11 is also located at AOC 2.</p> <p>AST 11 was a 420,000 gallon AST constructed in 1943 and was originally used to store diesel fuel. Petroleum products were transferred to AST 11 from the South Dock via a 6-inch underground transfer line connected to a pump house at the South Dock. A smaller 3-inch transfer line connected AST 11</p>	<p><b>1957:</b> The former tank was refurbished in 1957 by complete dismantling, cleaning, and re-assembly with new bolts and gaskets, and replacement of 28 bottom plates. The tank was then used to store gasoline, aviation fuel, diesel fuel, and waste oil. Numerous small leaks, primarily at the tank seams, were reported to have occurred both before and after the tank had been refurbished</p> <p><b>Mid-1960s:</b> An estimated 10,000 gallons of oil was released from ruptured fuel transfer lines located between the dock and storage tank. Following the rupture, seepage of diesel oil was observed in Alligator Bayou at the South Dock's steel bulkhead. South Dock is the dock along the northern edge of Alligator Bayou located south of SWMU 12 and AOC 3 (see Figure 1).</p> <p><b>1979:</b> The tank was removed in 1979. Transfer piping from the tank wall to an earthen berm was removed. The earthen berm provided secondary containment at a distance of 60 feet around the tank. The remaining piping was capped and abandoned in place.</p> <p><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including AOC 2, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight NIRP sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May, 1987.</p>	<p>As of September 2015, this site is still under active investigation with possible implementation of soil LUCs. Groundwater is no longer a concern for this site. A soil LUC boundary has not been established.</p> <p><b>Note:</b> All AOC 2 documents and data are filed under SWMU 14 in NIRIS.</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>to a fuel pump house located approximately 100 feet northwest of the tank, which is the current location of Building 543. A circular earthen berm spaced approximately 60 feet from the tank provided secondary containment.</p> <p>The pump house associated with AST 11 was used to distribute fuel from AST 11 and tanks associated with the former fuel dispensing facility located approximately 200 feet northwest of AST 11, which is the current location of Building 400. Two parallel 3-inch transfer lines distributed diesel fuel and gasoline from the pump house to the South Dock. Additional smaller diameter fuel lines may have been used to distribute fuel to other locations in the vicinity of AST 11.</p> <p>Approximately 50,000 gallons of diesel fuel were lost from the AOC 2 tank system in 1953. The exact location of the leak, and whether</p>	<p>Residual petroleum contamination was found at high levels in the subsurface soils near the former location of the tank. Contaminants included volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs).</p> <p>E.C. Jordan conducted an RFA to identify potentially contaminated sites throughout NSA Panama City. The findings were documented in an October 1987 RFA report by E.C. Jordan. This report recommended that geophysics and soil and groundwater sampling (or soil gas sampling) be conducted to delineate contaminant source zones and locations for installation of additional wells, if necessary.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RFI from April 1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings were described in the ensuing 1996 RFI report.</p> <p><b>1996.</b> An RFI report for AOCs 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4) was prepared by ABB-ES and approved by the United States Environmental Protection Agency (EPA) in 1996. The data collected during the RFI were considered to be sufficient to characterize the nature and distribution of contaminants and evaluate human health and ecological risks. Risks were evaluated for AOC 2/SWMU 1, including nearby Alligator Bayou. For current and future land use at AOC 2, the calculated human health risks associated with surface soil, subsurface soil; surface water, and sediment were all within the EPA acceptable cancer risk range. Additionally, non-cancer risks for industrial land use were less than the EPA guidance value. Non-cancer risks associated with the potential future domestic uses of AOC 2 groundwater exceeded the EPA guidance HI of 1, and was primarily attributed to risk calculated for ingestion of antimony (Hazard Quotient, HQ=2.4), manganese (HQ=1.6), and thallium (HQ=0.75). The estimated human health risks were considered to be overestimates and thallium did not appear to be a site-related contaminant.</p> <p>Ecological risks were identified for aquatic receptors exposed to PAHs, arsenic, and</p>	

Site Name	Site Description	Completed Activities	Current Status
	<p>or not the underground piping had failed, was unknown.</p>	<p>vanadium; and terrestrial wildlife exposed to copper via sediment ingestion.</p> <p>No further action was required for AOC 2. Instead, a separate investigation was recommended to evaluate the potential free product behind the seawall at the South Dock and the possibly related contaminants detected in sediment samples in the adjacent part of Alligator Bayou (this area was considered not to be related to AOC 2). Although no further action was required, a removal action for arsenic in surface soil at sample location 14SS01 was recommended.</p> <p><b>1997:</b> On February 26, 1997 Bechtel, Inc. (Bechtel) excavated and disposed offsite approximately 180 pounds of soil from AOC 2 that was contaminated with arsenic. This action is documented in a Project Completion Report for RCRA Interim Measures Remediation at SWMU 2, SWMU 5, AOC 2, and AOC 4, Coastal System Station Panama City, Florida prepared by Bechtel dated May, 1997.</p> <p><b>1998:</b> Assessment work at the site prior to 1998 had focused on evaluating the source of a fuel release detected by NSA Panama City personnel in Alligator Bayou in July 1997. According to NSA Panama City personnel, the fuel release observed entering Alligator Bayou in July 1997 was from a storm water drain which has an outfall located within the concrete seawall of the West Dock, which is along the eastern edge of Alligator Bayou west of Sites AOC 1 and 333 (see Figure 1). A direct push technology (DPT) investigation was conducted in May 1998. Monitoring well installation and sampling was conducted in September and October 1998. A Preliminary Assessment Letter Report (PAR) was submitted by Tetra Tech on December 28, 1998. Hydrocarbons were detected in soil gas and PAHs, VOCs, and total recoverable petroleum hydrocarbons (TRPH) were detected in groundwater upgradient of Site 333 at AOC 2. Site 333 was situated within SWMU 1.</p> <p><b>1999:</b> Additional groundwater sampling was conducted in September 1 and 2, 1999. Tetra Tech submitted a PAR addendum (in the form of a letter report) to Navy on November 4, 1999 to document the findings. Free product in monitoring well PCY-AOC2-MW07 was interpreted to indicate the possible presence of an upgradient source for the</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p data-bbox="639 239 1182 583">fuel release in Alligator Bayou. Groundwater data confirmed the presence of PAHs, VOCs, and TRPH parameters in groundwater upgradient of Site 333 at AOC 2 identified during the December 1998 preliminary assessment investigation. The PAR Addendum recommended that Site 333 and AOC 2 be combined into one site investigation and that a closure assessment be performed on the AOC 2 product line and additional assessment be performed to delineate the extent of free product. The following recommendations were made:</p> <ul data-bbox="639 594 1182 1915" style="list-style-type: none"> <li data-bbox="639 594 1182 1035">• Additional soil and groundwater assessment work should be conducted to assess the areal extent of free product near monitoring well PCY-AOC2-MW07, and the areal extent of dissolved TRPH in the groundwater. In the area where free product was detected (PCY-AOC2-MW07), soil samples should be collected for laboratory analysis to evaluate soil quality. The assessment should be conducted to assess the extent of petroleum contamination from the AOC 2 fuel distribution lines located in the parking lot of the AOC 2/SWMU 1 study area and in the grass area south of the parking lot, north of Site 333.</li> <li data-bbox="639 1045 1182 1224">• A product line closure should be completed to verify that free product had been removed from the former fuel distribution fuel lines for AOC 2 (parking lot of the AOC 2/SWMU 1 study area and in the grass area south of the parking lot and north of Site 333.</li> <li data-bbox="639 1234 1182 1455">• The assessment efforts for Site 333 and AOC 2 should be combined into one investigation due to commingled petroleum plumes as identified from diesel range organics-total petroleum hydrocarbon (DRO-TPH) field-screening groundwater concentrations and soil vapor concentrations.</li> <li data-bbox="639 1465 1182 1518">• Free product recovery should be implemented for well PCY-AOC2-MW07.</li> <li data-bbox="639 1528 1182 1623">• Free product removal from wells PCY-333-MW04 and PCY-333-TCW at Site 333 should continue.</li> <li data-bbox="639 1633 1182 1812">• An additional piezometer well should also be installed to confirm whether free product was released from the floor drain at Building 307, which is located adjacent to Site 333 and monitoring wells PCY-333-MW04 and PCY-333-TCW.</li> <li data-bbox="639 1822 1182 1915">• Findings from the investigations should be compiled into a Site Assessment Report (SAR) in accordance with Chapter 62-770 of the</li> </ul>	

Site Name	Site Description	Completed Activities	Current Status
		<p>Florida Administrative Code and submitted to the Florida Department of Environmental Protection for review and approval.</p> <ul style="list-style-type: none"> <li>An aggressive interim remedial action should be implemented to prohibit product films from entering the storm water junction box.</li> </ul> <p><b>2000:</b> Additional assessment activities, including soil headspace screening and onsite laboratory soil and groundwater analyses, were conducted in August 2000 to further delineate the extent of petroleum contamination. A PAR was submitted in September 2000, indicating that the dissolved hydrocarbon plume and free product plume were more extensive than originally estimated. A pipeline closure assessment was recommended, followed by additional groundwater assessment to delineate the extent of free petroleum product and dissolved hydrocarbons.</p> <p><b>2001:</b> A geophysical survey was conducted by Florida Spill Response Corporation (FSRC) in February 2001 to locate buried portions of the fuel lines associated with Tank 11. The survey identified an abandoned 6 inch transfer line and two 3 inch transfer lines. Following the geophysical survey, the ends of the identified pipelines were excavated for cleaning and capping. During the pipeline cleaning process, a vacuum truck was used to remove the contents of lines. Water was recovered from the 6 inch transfer line, but no petroleum product was present. One of the two 3-inch transfer lines was empty but the other 3-inch line contained approximately 100 gallons of diesel fuel. The exposed ends of the pipelines were grouted and the excavations filled. Following the pipeline cleaning, a closure assessment was conducted on the portions of the pipeline identified during the geophysical survey. A Pipeline Closure Assessment Report (PCAR) was submitted by Tetra Tech to the Bay County Health Department in December, 2001. The PCAR indicated that petroleum product contaminants of concern exceeded the target levels in soil and groundwater in the vicinity of the former location of Tank 11. The PCAR concluded that the contamination was likely the result of releases from Tank 11 and not associated with the transfer lines. The PCAR recommended that additional assessment be conducted to delineate the petroleum impacted soil and groundwater in the vicinity of Tank 11.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>2002:</b> In May, 2002, 37 DPT soil borings and 26 hand auger soil borings were advanced to collect soil samples for headspace screening. Soil and groundwater samples were collected from select borings for screening by an onsite mobile laboratory. In addition, 10 shallow monitoring wells and 1 deep monitoring well were installed to further delineate the dissolved hydrocarbon plume. The results indicated that the vadose zone soil at the site had been impacted by petroleum products and the extent of soil contamination had been delineated around Tank 11. Groundwater also had been impacted by petroleum products. The horizontal extent of the dissolved hydrocarbon plume appeared to be delineated north, east, and west of Tank 11; however, it had not been delineated south of Tank 11.</p> <p>An area of petroleum impacted soil and groundwater was present northwest of the site, south of Building 400. This area of contamination appeared to correlate with the reported former location of USTs associated with a former gas station near Building 400. The extent of vadose zone soil contamination in this area appeared to be delineated; however, the horizontal extent of the dissolved hydrocarbon plume had not been delineated in this area. Therefore, additional assessment was recommended to further delineate the extent of the dissolved hydrocarbon plume in the areas described above. An additional recommendation was made to collect a complete round of groundwater samples from all new and existing monitoring wells at the site after the dissolved hydrocarbon and free product plumes had been delineated and to prepare a Site Assessment Report prepared that would be submitted to the Florida Department of Environmental Protection</p> <p><b>2003:</b> To complete the delineation of the dissolved hydrocarbon plume, additional DPT groundwater samples were collected in May and June, 2003. Three additional monitoring wells were installed on the western side of the site, and one additional monitoring well was installed West of Building 400. In addition, groundwater samples were collected from 14 existing monitoring wells that had not been sampled since they were initially installed in 1999. The groundwater sampling results from these wells indicated that the horizontal western extent of the dissolved hydrocarbon plume had been delineated.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>However, the concentrations of contaminants of concern (COCs) exceeded the Groundwater Cleanup Target Levels (GCTLs) in one shallow monitoring well on the southern side of the site and one monitoring well in the central portion of the site installed to establish the vertical extent of contamination.</p> <p><b>2004:</b> One additional shallow monitoring well and one additional vertical extent monitoring well were installed at the site in March 2004. In addition, 15 shallow piezometers were installed to complete the delineation of free product at the site.</p> <p>Tetra Tech prepared a SAR describing site conditions and documenting the following conclusions and recommendations.</p> <ul style="list-style-type: none"> <li>• Free phase petroleum product (thickness of 0.01 feet or greater) was detected in monitoring wells PCY-AOC2-MW07 and PCY-14-2S and piezometers PCY-AOC2-P02, PCY-AOC2-P03, PCY-AOC2-P07, PCY-AOC2-P08, PCY-AOC2-P09, PCY-AOC2-P10, PCY-AOC2-P13, PCY-AOC2-P14, PCY-AOC2-P17, and PCY-AOC2-P20, and has been delineated in all directions.</li> <li>• Concentrations of petroleum product COCs exceed the Soil Cleanup Target Levels (SCTLs) and GCTLs specified in Chapter 62-770, Florida Administrative Code (FAC).</li> <li>• The concentrations of COCs in groundwater were less than the natural attenuation default concentrations for a source well specified in Chapter 62-770, FAC, in all monitoring wells except PCY-AOC2-MW6D.</li> <li>• The horizontal and vertical extent of petroleum impacted soil had been delineated. The “excessively contaminated soil” is approximately 34,763 square feet in area and extends to a depth of approximately 6 feet below land surface (bls) for a total volume of approximately 209,000 cubic feet.</li> <li>• The horizontal and vertical extent of petroleum impacted groundwater had been delineated. The dissolved hydrocarbon plume is approximately 89,660 square feet in area and extended to a depth of approximately 28 feet bls for a total volume of approximately 2,510,000 cubic feet.</li> <li>• Exposure pathways to human receptors via surface water or supply wells are incomplete.</li> </ul>	

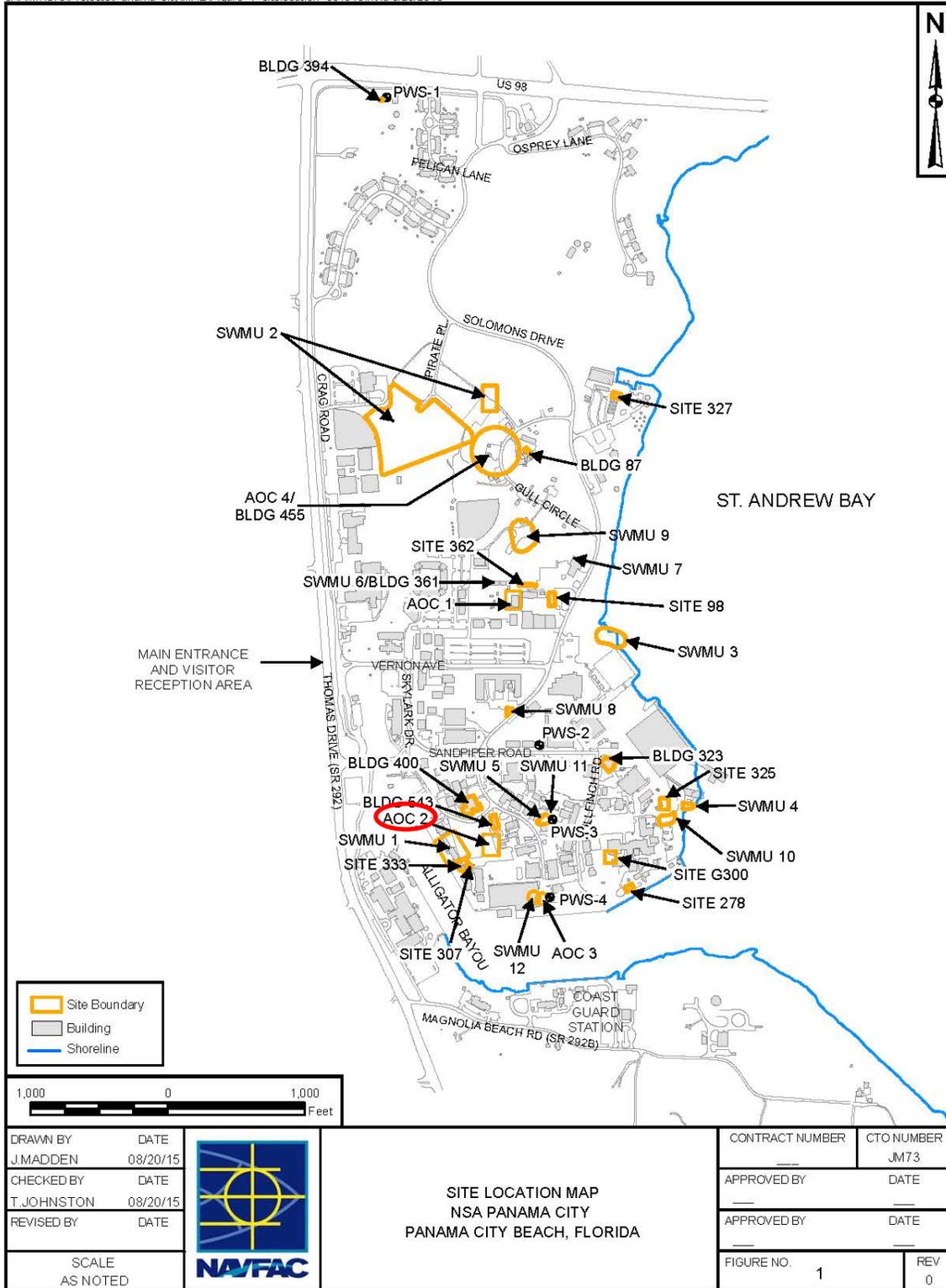
Site Name	Site Description	Completed Activities	Current Status
		<ul style="list-style-type: none"> <li>• Preparation of a Remedial Action Plan (RAP) to address free product and petroleum impacted soil and groundwater at the site was recommended.</li> </ul> <p><b>2008:</b> In January 2008 Tetra Tech conducted baseline monitoring involving installation of several soil borings accompanied by field screening of soil for petroleum hydrocarbons, installation of eight groundwater monitoring wells, and preparation of a baseline monitoring report. Soil samples were not collected but groundwater samples were collected from six new monitoring wells and eight existing wells. Water samples were analyzed for benzene, toluene ethylbenzene and xylenes (BTEX); methyl-tert-butyl ether (MTBE); PAHs; and Florida Residual Petroleum Organic (FL-PRO) analysis method petroleum hydrocarbons. One well, PCY-AOC2-MW08, could not be found so another existing monitoring well, PCY-AOC2-MW25, was sampled instead. PCY-AOC2-MW08 has since been determined to have been destroyed during construction of Building 543.</p> <p>No target analyte concentrations exceeded GCTLs for any of the 14 wells sampled.</p> <p>Based on the results of the baseline monitoring event, and a review of the historical data for this site, Tetra Tech recommended that the monitoring program be continued.</p> <p>From April to August 2008 CH2M Hill performed hot spot soil and water removal to recover free product within boundaries established by Tetra Tech in a 2007 RAP and supplemented with field measurements and observations. Activities included but were not limited to:</p> <ol style="list-style-type: none"> <li>1) Pre-remediation soil and groundwater samples from temporary soil borings and piezometers to determine soil and groundwater quality, and to create waste profiles.</li> <li>2) Removal of petroleum impacted soil to a depth approximately 2 feet below the water table;</li> <li>3) Recovery of free product/groundwater entering the excavation area.</li> <li>4) Application of bioremediation agent</li> <li>5) Removal of petroleum-impacted groundwater.</li> <li>6) Removal of a concrete vault approximately 6 feet long, 6 feet wide, and 16 feet in length and</li> </ol>	

Site Name	Site Description	Completed Activities	Current Status
		<p>containing approximately 3,000 gallons of a water and petroleum product mixture.</p> <p>7) Confirmation sampling to demonstrate that TRPH concentrations in soil outside the excavation were less than the FDEP leachability SCTL.</p> <p><b>2009:</b> On August 4 and 5, 2009 five groundwater monitoring wells were sampled during a first quarter monitoring event in and around the 2008 excavation. During the second quarterly monitoring event conducted on November 16 and 17, 2009 the same wells were sampled. Analysis of all samples from each event revealed detectable concentrations of petroleum-related contaminants, but all concentrations were less than GCTLs.</p> <p><b>2010:</b> During the third quarterly monitoring event conducted on February 18, 2010 and the fourth quarter monitoring event on June 10, 2010 the usual fives wells were sampled and again all target analyte concentrations were less than GCTLs. Tetra Tech prepared an annual groundwater monitoring report to summarize findings from the quarterly sampling. In that report Tetra Tech recommended that Risk Management Option I (no further action without controls) be implemented for groundwater in the area of the 14 wells involved in the 2008 baseline groundwater monitoring.</p> <p><b>2012 to 2015:</b> In October 2013, Tetra Tech prepared a draft Technical Memorandum, Area of Concern 2, and South Dock, Naval Support Activity Panama City. This memorandum was revised and resubmitted as a draft technical memorandum to the FDEP in April 2015. According to that memorandum, in April 2012, SACAL Environmental &amp; Management Company, Inc. (SACAL) sampled soils at AOC 2 because AOC 2 soils had exhibited widespread but sparsely distributed contamination from petroleum hydrocarbons. It was thought that natural degradation may have reduced the concentrations to acceptable levels. Field work was completed in accordance with the Final Sampling Work Plan for Buildings 98, Site 325, and AOC 2/South Dock, NSA Panama City, Panama City Beach, Florida, dated March 2012 and prepared by Naval Facilities Engineering Command Southeast. The investigation included soil borings, soil gas headspace screening, and soil sampling for offsite laboratory analysis at AOC 2 and groundwater</p>	

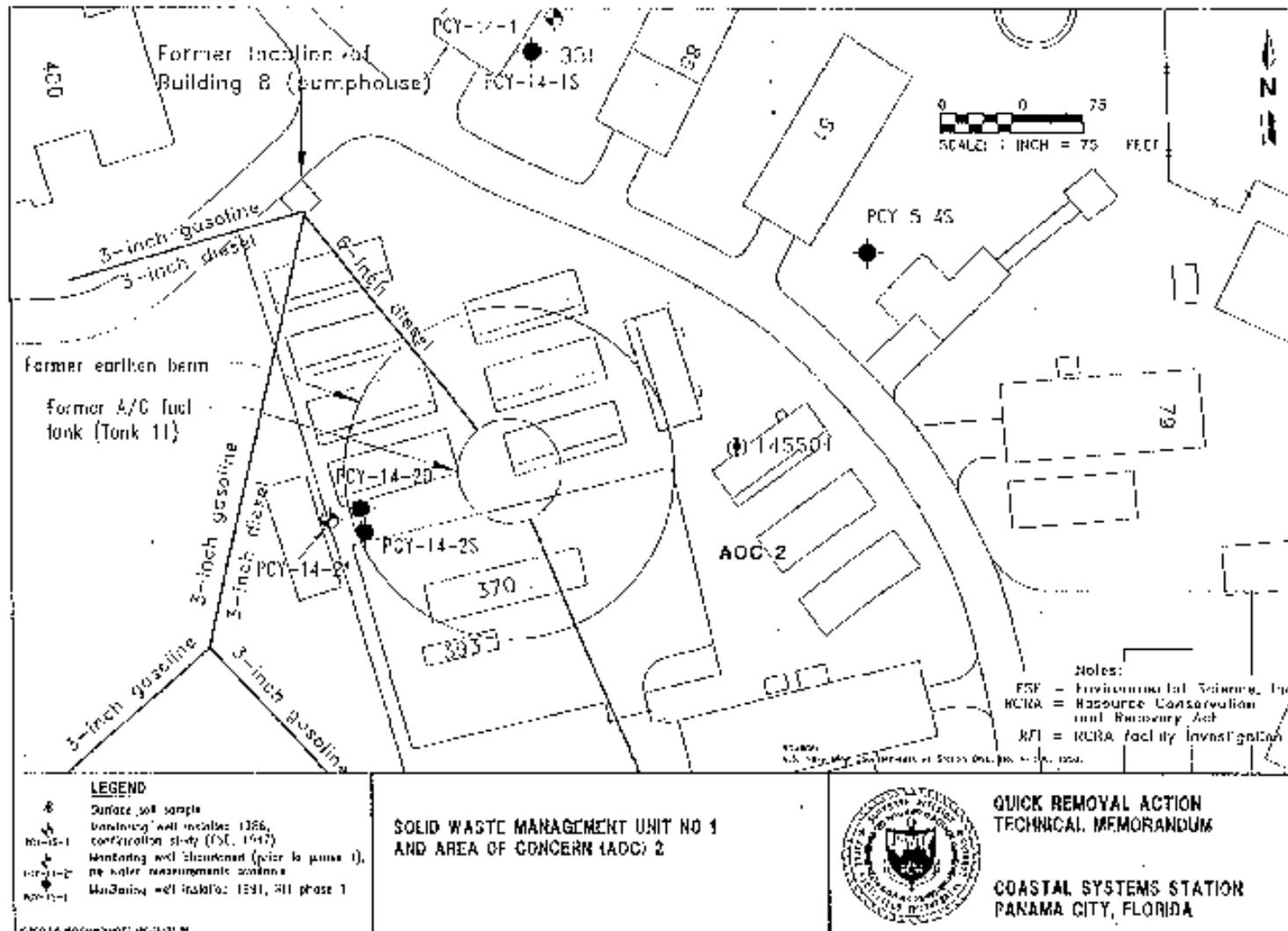
Site Name	Site Description	Completed Activities	Current Status
		<p>sampling at South Dock. The South Dock results are described in a separate South Dock site summary.</p> <p>Three soil borings (PCY-AOC2-SB22, PCY-AOC2-811, and PCY-AOC2-SB11) contained samples exceeding FDEP's 50 parts per million (ppm) limit for the kerosene analytical group. Except for a single shallow elevated measurement in soil boring PCY-AOC2-SB22 (2 to 3 feet below land surface; 63.2 ppm), elevated hydrocarbon measurements were obtained immediately above the water table (about 5 feet bls) indicating the possible presence of a contaminant smear zone.</p> <p>No VOCs were detected, but 18 PAHs were detected. Except for soil sample PCY-AOC2-4-6-SB816, PAH concentrations were less than their respective SCTLs. In sample PCY-AOC2-SB816, benzo(a)anthracene [2.80 milligrams per kilogram (mg/kg)], benzo(a)pyrene (2.60 mg/kg), and benzo(b)fluoranthene (3.50 mg/kg) concentrations exceeded one or more SCTLs. The calculated benzo(a)pyrene toxicity equivalent (3.8 mg/kg) also exceeded the Residential Direct Exposure SCTL of 0.1 mg/kg and the Florida Industrial direct exposure SCTL of 0.7 mg/kg.</p> <p>Some soil samples exhibited elevated TRPH concentrations so speciation of the hydrocarbon chain lengths was conducted on samples PCY-AOC2-4-6-SB-002, PCY-AOC2-4-6-SB-SB22 and PCY-AOC2-4-6-SB-811. Only the concentration of C16-C21 aromatic hydrocarbons in soil sample PCY-AOC2-4-6-SB-811 (1,400 mg/kg) exceeded the Florida Residential Direct Exposure SCTL of 1,300 mg/kg.</p> <p>Collection of additional soil step-out samples in the vicinity of PCY-AOC2-4-6-SB816 and PCY-AOC2-4-6-SB811 was recommended for the purpose of determining the extent of PAH and TRPH contamination, respectively. Following a review of the analytical data, it will be determined whether an excavation will be conducted or non-residential Land Use Controls (LUCs) will be applied to the site.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2  
AREA OF CONCERN 2 SITE LAYOUT  
(extracted from the 1997 Interim Measures Report prepared by Bechtel)**



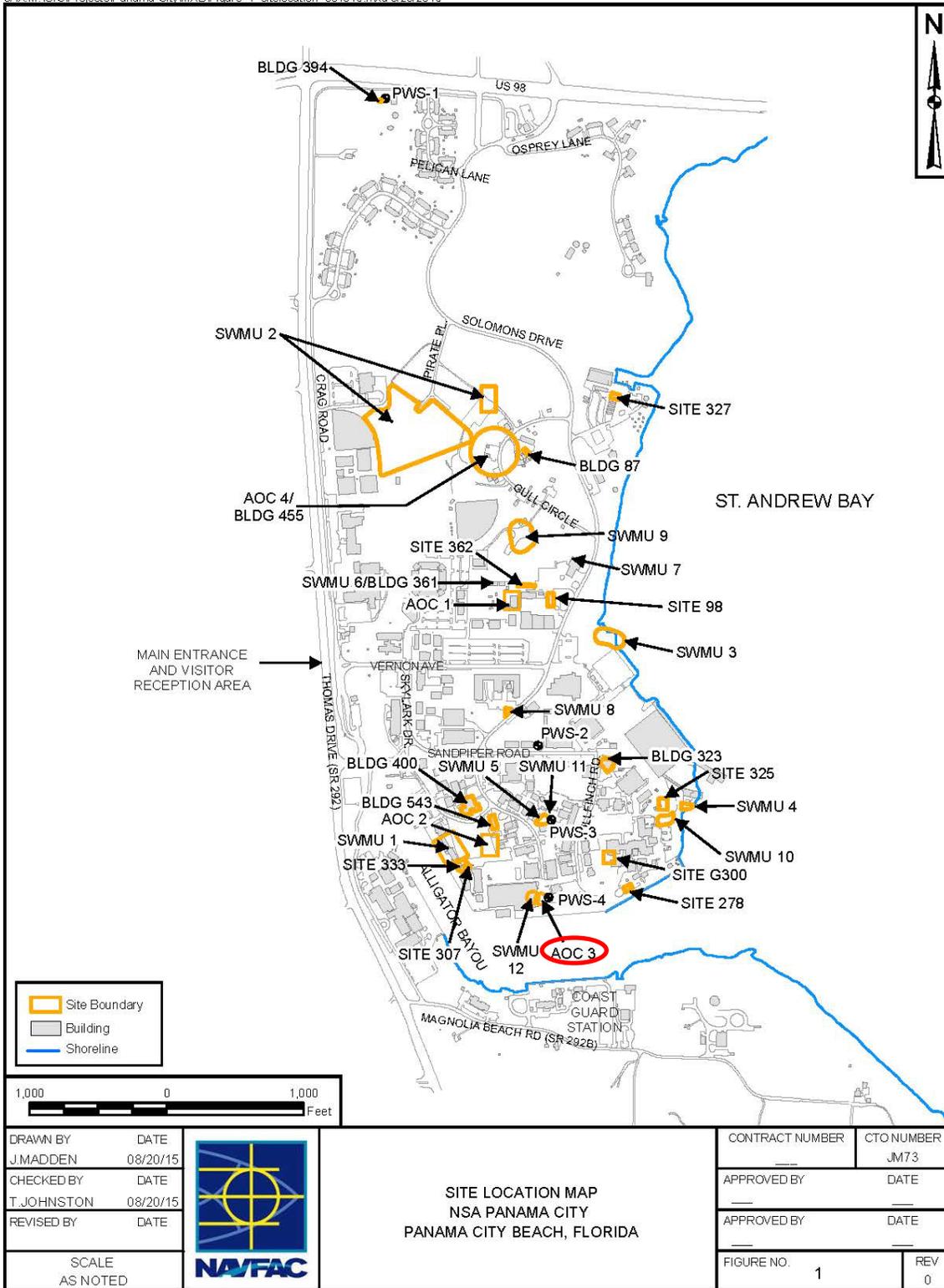
### AREA OF CONCERN 3

Site Name	Site Description	Completed Activities	Current Status
<p>Area of Concern (AOC) 3, Solvent Disposal Area – Building 40.</p> <p>AOC 3 was originally called Navy Installation Restoration Program (NIRP) Site #8 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p><b>Notes:</b> All AOC 3 data are filed under Solid Waste Management Unit (SWMU) 15 in the Naval Installation Restoration Information System (NIRIS). There are no AOC 3/SWMU 15 documents in NIRIS as of 10/29/2015.</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>AOC 3 was located behind Building 40, the Plating Shop at Naval Support Activity (NSA) Panama City. Approximately 55-gallons of trichloroethene (TCE) were anecdotally reported to have been disposed in an area of about 20 square feet in 1973. The release was reported to have been a one-time operation in which solvent was poured onto the ground.</p> <p>Figure 1 shows the layout of NSA Panama City and the location of AOC 3. No figures showing the layout of AOC 3 could be found but some old photographs that are barely legible are presented in the 1985 IAS report.</p>	<p><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including AOC 3, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow-on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight NIRP sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May 1987. The contamination assessment did not indicate residual contamination by trichloroethene, its degradation by-products, or any other volatile organic compounds (VOCs) and further characterization was not recommended.</p> <p>E. C. Jordan prepared a 1987 RFA report documenting findings of an RFA conducted at SWMUs 1 through 12 and AOCs 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. AOC 3 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RCRA Facility Investigation (RFI) from April 1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings were described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> Evidence of the reported TCE release was solely anecdotal based upon personal interviews conducted by C.C. Johnson and Associates, Inc. in</p>	<p>No further action (NFA), based on 1987 RFA Report.</p> <p>Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p> <p><b>Note:</b> All AOC 3 data are filed under SWMU 15 in NIRIS. There are no AOC 3/SWMU 15 documents in NIRIS as of 10/29/2015</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>1985. As of 1996, no analytical data existed to support or refute a release. No documented evidence of a release of TCE to soil was found. The 1996 RFI report for AOCs 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4) prepared by ABB-ES in 1996, states that detection of a slug of contamination indicative of a release that had that occurred approximately 15 years prior was considered to be difficult [currently interpreted to mean unlikely], therefore, no further action was recommended in the 1996 RFI report.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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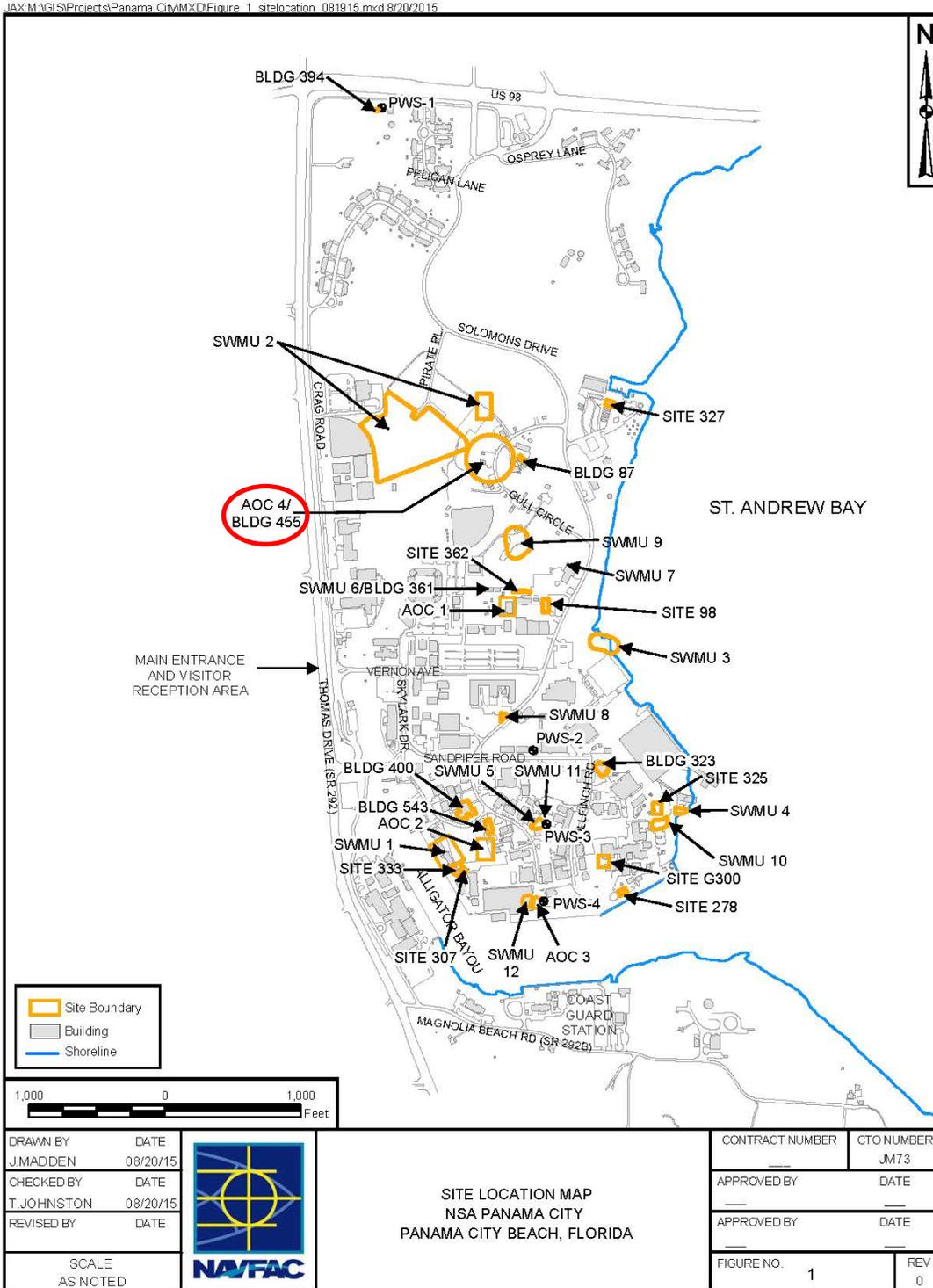
### AREA OF CONCERN 4

Site Name	Site Description	Completed Activities	Current Status
<p>Area of Concern (AOC) 4, Paint Stripping Area. Also known as Building 455.</p> <p><b>Notes:</b> All AOC 4 documents and data are filed under Solid Waste Management Unit (SWMU) 16 in the Naval Installation Restoration Information System (NIRIS).</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>AOC 4 was located adjacent to Building 455 at Naval Support Activity (NSA) Panama City (see Figure 1). Operations at AOC 4 predated 1978.</p> <p>NSA Panama City reported a potential release to soil around the Building 455 sand blast area in the form of rinse from a chemical stripping operation containing a listed hazardous waste</p> <p>Figure 2 shows the layout of AOC 4.</p>	<p><b>1993:</b> On June 10, 1993, NSA Panama City reported to the Florida Department of Environmental Protection (FDEP) a suspected chemical release to the environment. On July 6, 1993, the release was confirmed in a letter from NSA Panama City to FDEP but the quantity of release could not be confirmed. The letter stated an intent to add the site to the Navy Installation Restoration Program (NIRP) as a SWMU.</p> <p>In a September 1, 1993 memorandum from D. Clowes to E. Nuzi, both of FDEP, the chemical rinse was identified to contain methylene chloride and "possibly other hazardous wastes," and identified soil and groundwater as having been contaminated. This memorandum expressed FDEP disagreement with construction planned to occur at Building 455 and a grave concern about the practice prior to 1993 of "...washing methylene chloride onto the ground and associated soil/groundwater contamination..." The memorandum goes on to assert that FDEP was considering requiring a Resource Conservation and Recovery Act (RCRA) Part 264 Closure permit for this site."</p> <p><b>1994:</b> A memorandum was prepared by ABB Environmental Services, Inc. (ABB-ES) to document a conference call among NAVY, United States Environmental Protection Agency (USEPA), FDEP, and ABB-ES personnel regarding whether data collected during the RCRA Facility Investigation (RFI) Phase 2 field program for SWMU 10 or Building 455 at NSA Panama City was sufficient to complete a Health and Environmental Assessment (HEA) or Corrective Measures Study (CMS), if required. These two sites had not previously been investigated under the facility's Installation Restoration (IR) program prior to the RFI Phase 2. Results for SWMU 10 are described in a separate SWMU 10 site summary.</p> <p>Contamination had been detected in the surface soils at Building 455, however, the contamination did not appear to extend to subsurface soil or groundwater. The source of surface soil contamination was not the solvent paint stripping operations that made Building 455 a site for the RFI. There were no gaps in the characterization of Building 455 regarding the use of methylene</p>	<p>No further action (NFA), based on the Bechtel 1997 Project Completion Report (the version currently in NIRIS is missing several pages).</p> <p>Documented in current NSA Panama City Corrective Action permit No. 66255-HH-003.</p> <p><b>Note:</b> All AOC 4 documents and data are filed under SWMU 16 in NIRIS.</p>

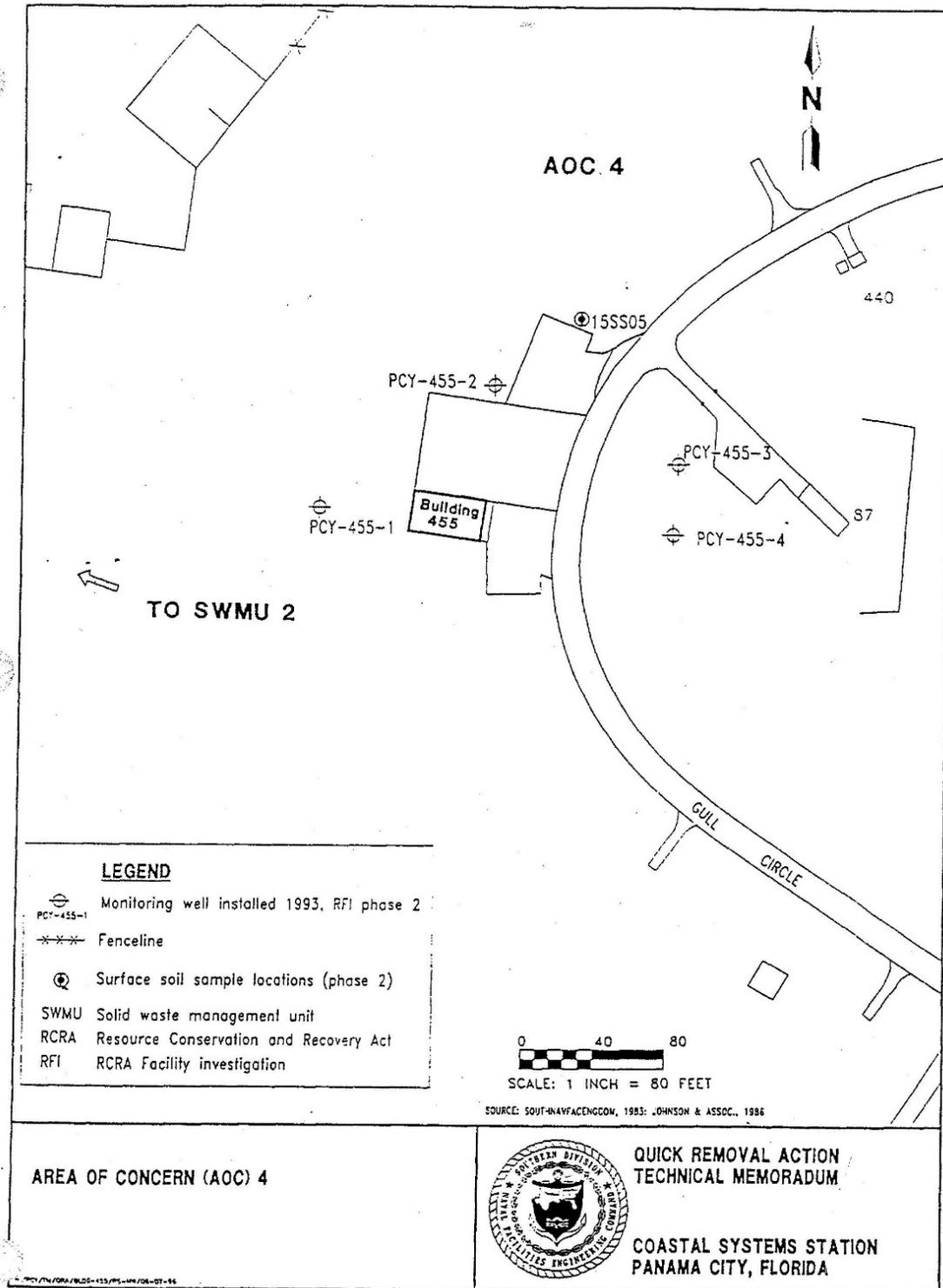
Site Name	Site Description	Completed Activities	Current Status
		<p>chloride; the data indicated that it was not present. The contamination appeared to relate to windblown dispersal of blasting sand and associated paint chips, and to unknown, non-point sources of pesticides, and unknown sources of polychlorinated biphenyls (PCBs). The contamination was limited to surface soils. The existing set of samples was sufficient to quantify the risks posed by those contaminants. However, the areal extent of those contaminants was not defined by the existing set of surface soil samples.</p> <p>It was stated that, if a CMS became necessary for Building 455, additional soil samples could be collected and analyzed during the Corrective Measures Implementation (CMI). Alternatively, because the contamination appeared to be related to the presence and distribution of black sandblasting sand, the areal extent could also be considered to be the areal extent of visible sandblasting sand.</p> <p><b>1995:</b> A March 6, 1995 letter from Naval Facilities Engineering Command (NAVFAC) to FDEP indicated that the sand blasting operation rather than a release of rinsate was the likely source of contamination at Building 455. Elevated inorganic chemical concentrations were attributed to paint chips at the site and reference was made to inclusion of Building 455 (AOC 4) in the ensuing 1996 RCRA Facility Investigation (RFI) report.</p> <p><b>1996:</b> A two-phase RFI Report for AOCs 1 and 2, Solid Waste Management Units (SWMUs) 1 through 5, SWMUs 8 through 10, and Building 455 was prepared by ABB-ES and approved by the USEPA in 1996. This report accounts for Phase I and II activities conducted from April 1991 to September 1994. Findings are described in the ensuing 1996 RFI report.</p> <p>The human health risk assessment identified unacceptable cancer risks for potential future land use from exposure to surface soil by ingestion of and dermal contact with dieldrin and beryllium; and the inhalation of chromium. It also identified unacceptable risk for the potential future use of groundwater due to chromium and thallium. In addition, a non-cancer risk was identified for the child resident due to ingestion of and dermal contact with pesticides and inorganics. The</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>ecological risk assessment identified potential unacceptable risks to terrestrial plants due to the exposure to inorganic chemicals. A removal action was recommended for surface soil</p> <p><b>1997:</b> On February 26, 1997 Bechtel, Inc. (Bechtel) excavated and disposed offsite approximately 7,300 pounds of soil from AOC 4 that was contaminated with arsenic. This action is documented in a Project Completion Report for RCRA Interim Measures Remediation (IMR) at SWMU 2, SWMU 5, AOC 2 and AOC 4 prepared by Bechtel dated May, 1997.</p> <p><b>2000:</b> EPA approvals of the 1996 RFI Report and 1997 CMS report, were rescinded in an Oct. 4, 2000 letter from the USEPA because the extent of contamination at SWMU 10 was found to be incompletely delineated and monitoring had not been conducted as required by the Hazardous and Solid Wastes Amendment (HSWA) portion of the RCRA permit. In addition the presence or status of other SWMUs and AOCs was asserted to be unknown and Navy was directed to submit a work plan designed to fully delineate the scope and extent of contamination, both onsite and offsite, associated with all of the facility's SWMUs.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**



**FIGURE 2**  
**AREA OF CONCERN 4 SITE LAYOUT**  
(extracted from the 1997 Interim Measures Report prepared by Bechtel)



## **PETROLEUM SITES**

**UNDERGROUND STORAGE TANK 2-B, NAVAL OPERATIONS SUPPORT CENTER, TALLAHASSEE,  
FLORIDA**

Site Name	Site Description	Completed Activities	Current Status
<p>Underground Storage Tank (UST) 2-B, located at the Naval Operations Support Center (NOSC), 2910 Roberts Avenue, in Tallahassee, Florida.</p>	<p>The NOSC UST 2-B was a 1,000-gallon asphalt-coated steel tank installed in 1955 and used for the storage of diesel fuel. The NOSC is located in Tallahassee, Florida but is affiliated with Naval Support Activity (NSA) Panama City in Panama City Beach, Florida. Figure 1 shows the location of the NOSC within Tallahassee, Florida. Figure 2 shows the layout of the NOSC Tank 2-B area and Figure 3 shows the location of UST 2-B within the NOSC.</p>	<p><b>1955:</b> According to Appendix A of a Contamination Assessment Report (CAR) prepared by Cherokee Groundwater Consultants (Cherokee) in 1991, Tank 2-B was installed in 1955 under a concrete pad with 6-inch curbing. A pump station also was installed. The purpose of the tank was to store diesel fuel. The associated piping was unprotected metal.</p> <p><b>1991:</b> On October 2, 1991, UST 2-B and its associated piping were excavated and removed. The Tank 2-B excavation floor was 12 feet below land surface (bls). Soil samples were collected continuously during excavation and the soil headspace was analyzed using an organic vapor analyzer (OVA). All results were less than 1 part per million (ppm). Groundwater encountered at a depth of 17 ft bls was sampled and analyzed for polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), petroleum hydrocarbons, and lead. The samples were extremely turbid. Three analytes [1,1-dichloroethene, total lead, and methyl-tert-butyl ether (MTBE)] were detected at concentrations greater than Florida Primary Drinking Water Standards. The analytical data were documented in the 1991 CAR. Cherokee asserted that, because benzene, toluene, ethylbenzene, xylenes (i.e., BTEX), and PAHs were not detectable, Tank 2-B was not a major groundwater contamination source and the presence of the detectable contaminants may have been caused by another [non-diesel] source or previous storage of chlorinated organic compounds. The only other detectable chemicals were 1,1,1-trichloroethane and 1,1-dichloroethane (a degradation product of 1,1,1-trichloroethane). MTBE is a component of gasoline but not diesel fuel. Because of the detection of contaminants in groundwater, additional site characterization was later described as “required,” according to a September 28, 2102 Project Note submitted by Naval Facilities Engineering Command (NAVFAC) Southeast (NAVFAC SE) to the Florida Department of Environmental Protection (FDEP) on October 4, 2012.</p> <p><b>2010:</b> According to a September 2013 final Site Assessment Report (SAR) prepared by Tetra Tech for NAVFAC SE, in 2010, FDEP requested that the</p>	<p>FDEP and Navy are discussing options for a path leading toward site closure.</p> <p>Because of arsenic and vanadium GCTL exceedances, FDEP has concerns about closing the site. Most of the arsenic detections are in the clay layer, and there appears to be no connection of elevated metal concentrations with site activities, which were related to management of petroleum product. The arsenic is believed to be naturally occurring. FDEP suggests that it might be possible to defensibly argue that arsenic concentrations are within the background range and the detections are not connected to NOSC activities; also, a possible need for confirmation sampling has been identified because of the elevated groundwater manganese concentrations. FDEP also agrees that a more</p>

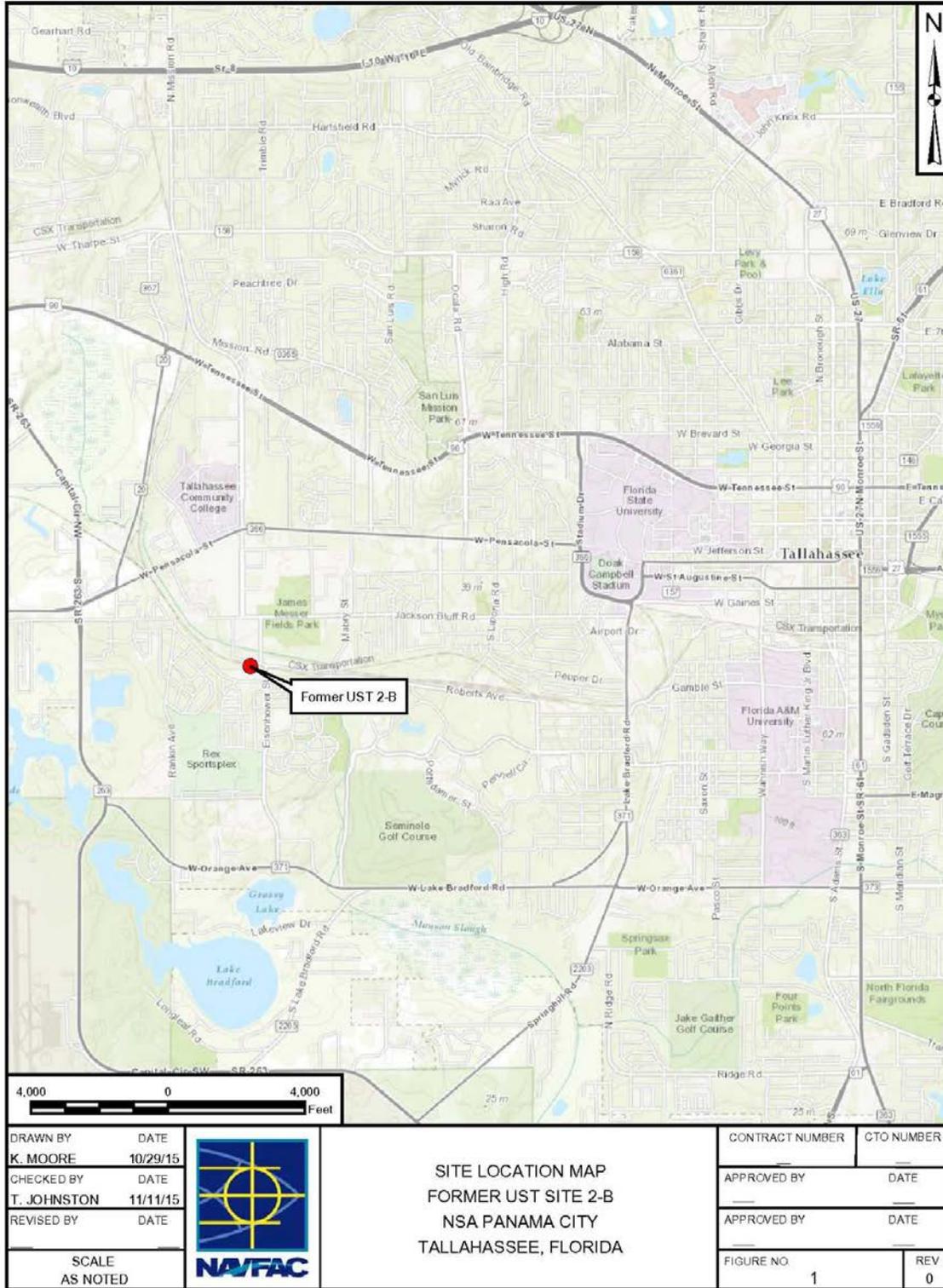
Site Name	Site Description	Completed Activities	Current Status
		<p>Navy perform site characterization activities to determine the nature and extent of contamination at the NOSC. This would include finalizing closure of the UST and identification of other potential contamination sources (due to the presence of dichloroethene, which is not a typical contaminant associated with USTs).</p> <p><b>2011:</b> A Tier II Sampling and Analysis Plan (SAP) was developed in October 2011 for NAVFAC SE by Eco Strategies Corporation. FDEP reviewed and concurred with the plan in a letter dated November 16, 2011, but asked for clarification as to whether the plan was draft-final or final so that appropriate follow-up approval could be issued to the final version, if necessary.</p> <p><b>2012:</b> The sampling plan was finished and in February 2012, well NOSC-1-MW-01 was completed at 60 ft bls near the former UST location. Limestone was encountered at approximately 49 ft bls and perched groundwater was measured at 43.7 ft bls, which was in an impermeable clay layer above the limestone.</p> <p>Subsurface soil samples between 17.5 and 18 ft bls from two locations (i.e., BH03 and BH04) and one groundwater sample from NOSC-1-MW-01 were collected during a June 14/15, 2012 sampling event. Location BH-03 is downgradient from the former UST and location BH-04 is near the former UST. No organic vapors were detected in the field but the samples were shipped to a fixed based laboratory for analysis. Piezometers also were installed to the first wet interval located immediately above a plastic clay layer encountered at approximately 20 ft bls to collect groundwater level measurements only.</p> <p>A project note dated September 28, 2012 and summarizing findings to date was submitted to FDEP by NAVFAC SE via email on October 4, 2012 in support of site closure. Except for manganese [present at 988 micrograms per liter (µg/L)], all analyte concentrations in the groundwater sample were less than the applicable Florida residential Groundwater Cleanup Target Levels (GCTLs) and all analyte concentrations in the soil samples were less than Florida residential direct contact and leachability Soil Cleanup Target Levels (SCTLs). The manganese GCTL (50 µg/L)</p>	<p>extensive explanation of why metals were analyzed would be helpful. As of May 9, 2015, FDEP was in the process of preparing the review letter.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>is the same as the Primary Drinking Water Standard. The elevated manganese concentration was not considered to be attributable to any waste disposal practices at the NOSC. FDEP responded to the Project Note via email (Winters to Schoolfield) that a site assessment had not been completed per Chapter 62-770 of the Florida Administrative Code (FAC) and additional sampling would be necessary.</p> <p><b>2013:</b> A project note describing additional sampling and analyses to be conducted in the April/May 2013 timeframe was prepared on April 12, 2013. The analyte list included lead, BTEX, MTBE, PAHs and VOCs. Additional soil samples (17 samples from six borings) and one groundwater sample from NOSC-1-MW-01 were collected in May 2013.</p> <p>NAVFAC SE submitted a Final SAR for UST Site 2-B, dated September 2013, summarizing findings to date. Arsenic, barium, chromium, thallium, and vanadium each were detected in at least one sample at a concentration greater than the applicable SCTL, however, the SCTL exceedances generally occurred at least 12 ft bls and did not pose an exposure risk. No chlorinated solvents or petroleum related compounds were found in any of the 17 soil or two groundwater samples. Conclusions were that the contamination found in 1991 is not currently present where it was first detected. Additionally, the contaminants were not detected in any of the biased sampling locations where they would likely be detected [if present]. The NOSC Site 2-B was recommended for No Further Action (NFA) status.</p> <p>FDEP reviewed the Final SAR and documented the following observations and conclusions in a letter dated June 20, 2014:</p> <ul style="list-style-type: none"> <li>• Arsenic [concentrations] exceeded the residential SCTL in eight soil samples, vanadium [concentrations] in two samples, and [the] barium [concentration] in one sample.</li> <li>• Chromium and thallium were reported at concentrations slightly greater than leachability-based SCTLs at two locations.</li> <li>• Except for one arsenic detection at 2.8 mg/kg in the 2-3 ft depth interval, all of these SCTL exceedances occurred at depths greater than 20 ft [bls].</li> </ul>	

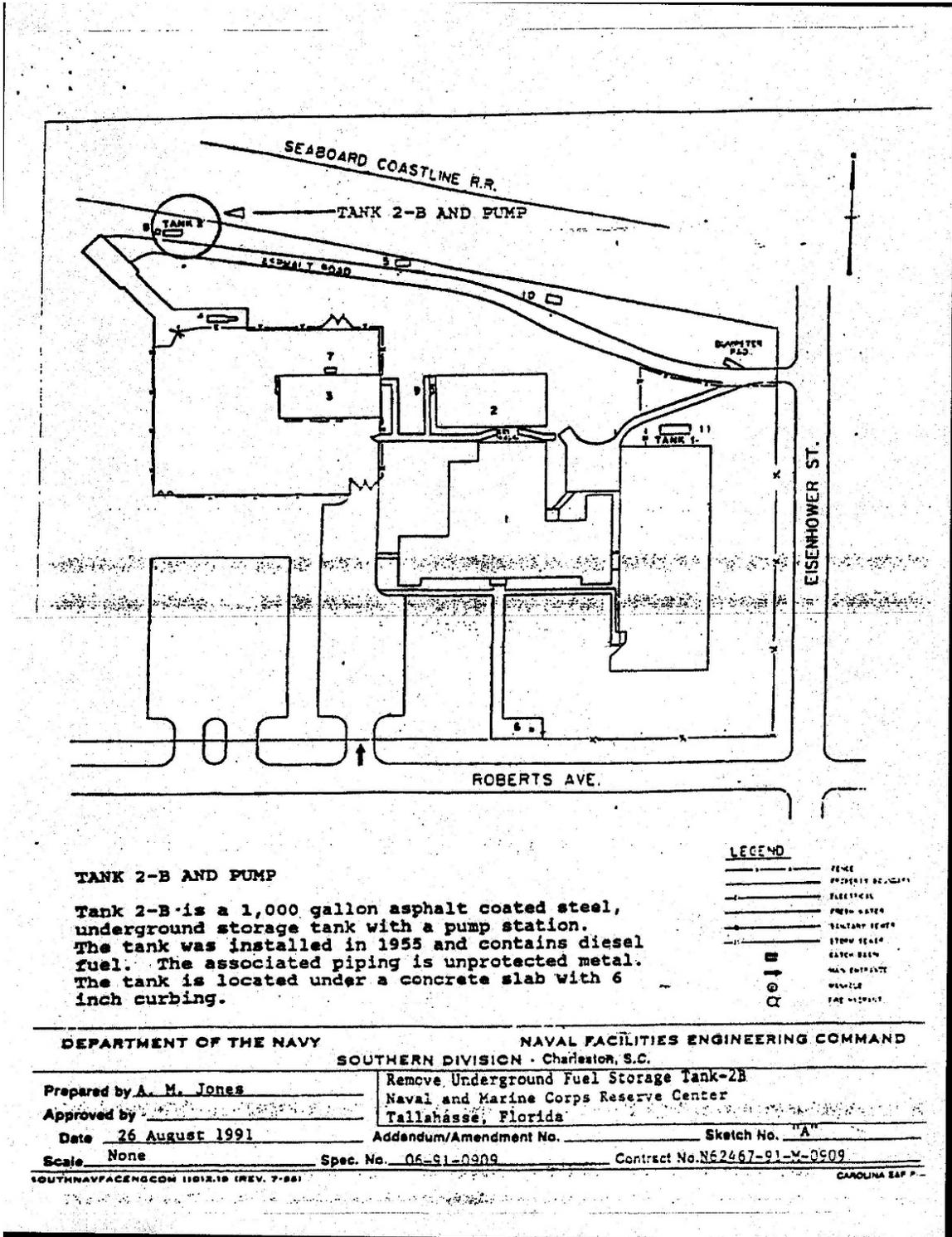
Site Name	Site Description	Completed Activities	Current Status
		<ul style="list-style-type: none"> <li>• In groundwater, manganese had been detected at concentrations of 988 and 1,100 µg/L in two sampling events at NOSC-1-MW-01.</li> <li>• The former oil-water separator (OWS) represents a potential source of some of the metals contaminants and its location needs to be researched and reported.</li> <li>• An evaluation of background metals concentrations would be needed to support the assertion that these metals are naturally occurring at the site. As discussed at the [NSA Panama City partnering] meeting, a minimum of three groundwater samples should be collected in an east-west orientation along the southern portion of the site (the parking area in front of the new NOSC building). Because the likely source for the metals is to the north, at least one of these samples should be in the undeveloped area west of the NOSC building/parking area.</li> <li>• [FDEP] understands that pyrotechnic munitions have been stored and/or utilized on the site. This could account for the high concentrations of manganese in groundwater at NOSC-1-MW-01, as the reported concentrations are 20 times over the GCTL. Further assessment of groundwater is needed around NOSC-1-MW-01.</li> </ul> <p><b>2014:</b> During the February 2014 NSA Panama City partnering meeting, the location of the former OWS was reported. The area where the oil-water separator was had been filled with concrete.</p>	

**FIGURE 1**  
**LOCATION OF THE NAVAL OPERATIONS SUPPORT CENTER**  
**WITHIN TALLAHASSEE, FLORIDA**

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**FIGURE 2**  
**LAYOUT OF THE**  
**NAVAL OPERATIONS SUPPORT CENTER TANK 2-B AREA**



**FIGURE 3**  
**AERIAL VIEW OF FORMER TANK 2-B LOCATION**

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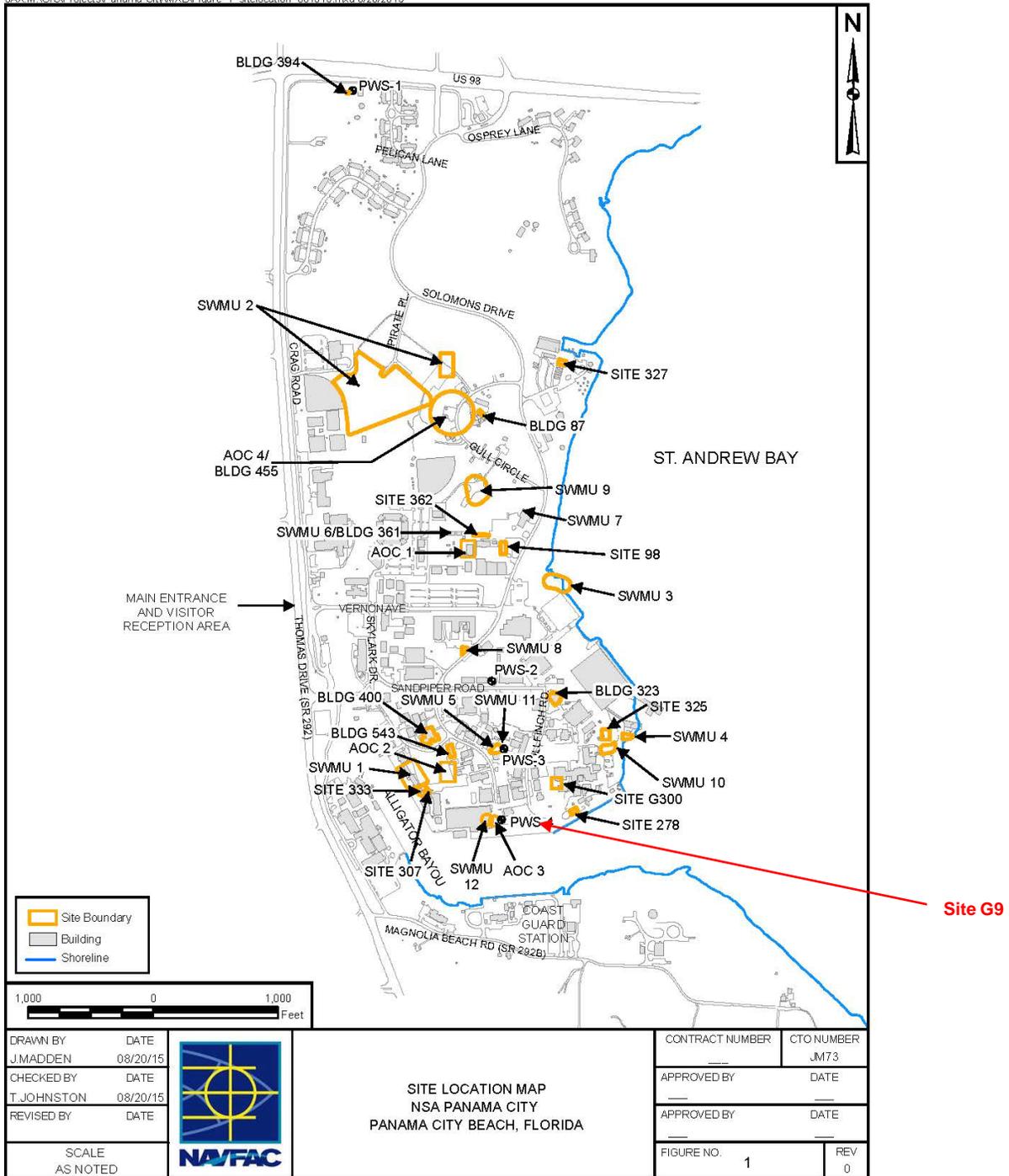
**SITE G9**

Site Name	Site Description	Completed Activities	Current Status
<p>Site G9, also known as Building G9.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>Former Site G9, located adjacent to Building G9 at the northern edge of what is currently known as South Dock at Naval Support Activity (NSA) Panama City (see Figure 1), contained one 1,200-gallon steel underground storage tank (UST). Figure 2 shows the layout of Site G9.</p> <p>The UST contained diesel fuel for an emergency backup generator located in Building G9. The UST was supplied fuel from a 10,000 gallon aboveground storage tank (AST) for diesel fuel located approximately 70 feet southeast of the UST. The AST was removed prior to 1996 and the assessment of the AST and fuel line were addressed as part of the early Installation Restoration Program.</p>	<p><b>1994:</b> The Site G9 UST and product lines were removed in March 1994. The product lines were cut, capped, and abandoned in place, where lines entered beneath structures. During removal of the UST system, Southern Earth Sciences, Inc. screened soil headspace for samples for hydrocarbons but found no excessively contaminated soil.</p> <p>A groundwater sample collected on March 24, 1994 from a temporary well located in the tank excavation identified total naphthalenes and polycyclic aromatic hydrocarbons (PAHs) at 113 and 48 micrograms per liter (µg/L), respectively. These concentrations exceeded Florida Department of Environmental Protection (FDEP) Groundwater Cleanup Target Levels (GCTLs) of 100 micrograms per liter (µg/L) for total naphthalenes and 10 µg/L for PAHs.</p> <p>On May 20, 1994, NSA Panama City submitted a Discharge Notification Form (DNF) to the Bay County Health and Environmental Health Rehabilitative Services (HRS), under the Environmental Health Services Pollution Storage Tank Program. The discharge was reported based on groundwater analysis from a temporary well installed during removal of the Site G9 UST. The DNF listed the type of substance discharged as diesel fuel. The suspected source of the dissolved hydrocarbons was identified on the DNF as an adjacent site. The adjacent site, which is not identified, evidently had an AST which contained diesel fuel and was being investigated separately. No further action was recommended.</p> <p><b>1996:</b> In May, 1996, Brown and Root Environmental (B&amp;RE) prepared a Site Assessment Plan to determine the nature and extent of petroleum hydrocarbon impacted soil and groundwater at Site G9. B&amp;RE completed the contamination assessment and, in December 1996, prepared a Contamination Assessment Report (CAR) for Site 9 to summarize the findings. The CAR includes a copy of the 1994 DNF.</p> <p>The 1996 contamination assessment revealed no "excessively contaminated" soil or free product at the site. The total recoverable petroleum hydrocarbons (TRPH) concentration [10.7 milligrams per liter (mg/L)] in a groundwater sample</p>	<p>NFA, based on permit renewal application letter - 5/26/1995</p> <p>Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>collected from a monitoring well installed at the former UST location was greater than the state action level of 5 mg/L. The total lead concentration (20.1 µg/L) was less than the state action level of 50 µg/L. All other dissolved petroleum constituents were less than laboratory detection limits. Based on the contamination assessment, B&amp;RE proposed the site be assigned a No Further Action (NFA) status.</p> <p>A Closure Assessment Form and Storage Tank Closure Assessment report were provided in Appendix D of the 1996 CAR.</p> <p><b>1997:</b> In response to FDEP comments on the 1996 CAR, on April 21, 1997, B&amp;R Environmental collected an additional groundwater sample from monitoring well PCY-G9-MW01. Analysis revealed that the TRPH concentration of the sample was 2.62 µg/L, which was less than the 5 µg/L criterion and a 77% reduction in TRPH concentration from the previously reported result.</p> <p>On June 24, 1997, B&amp;RE submitted a CAR Addendum letter report to address FDEP questions regarding the 1996 CAR. Based on the 1996 and 1997 analytical results, B&amp;RE recommended in the CAR Addendum that the site be granted NFA Status.</p>	

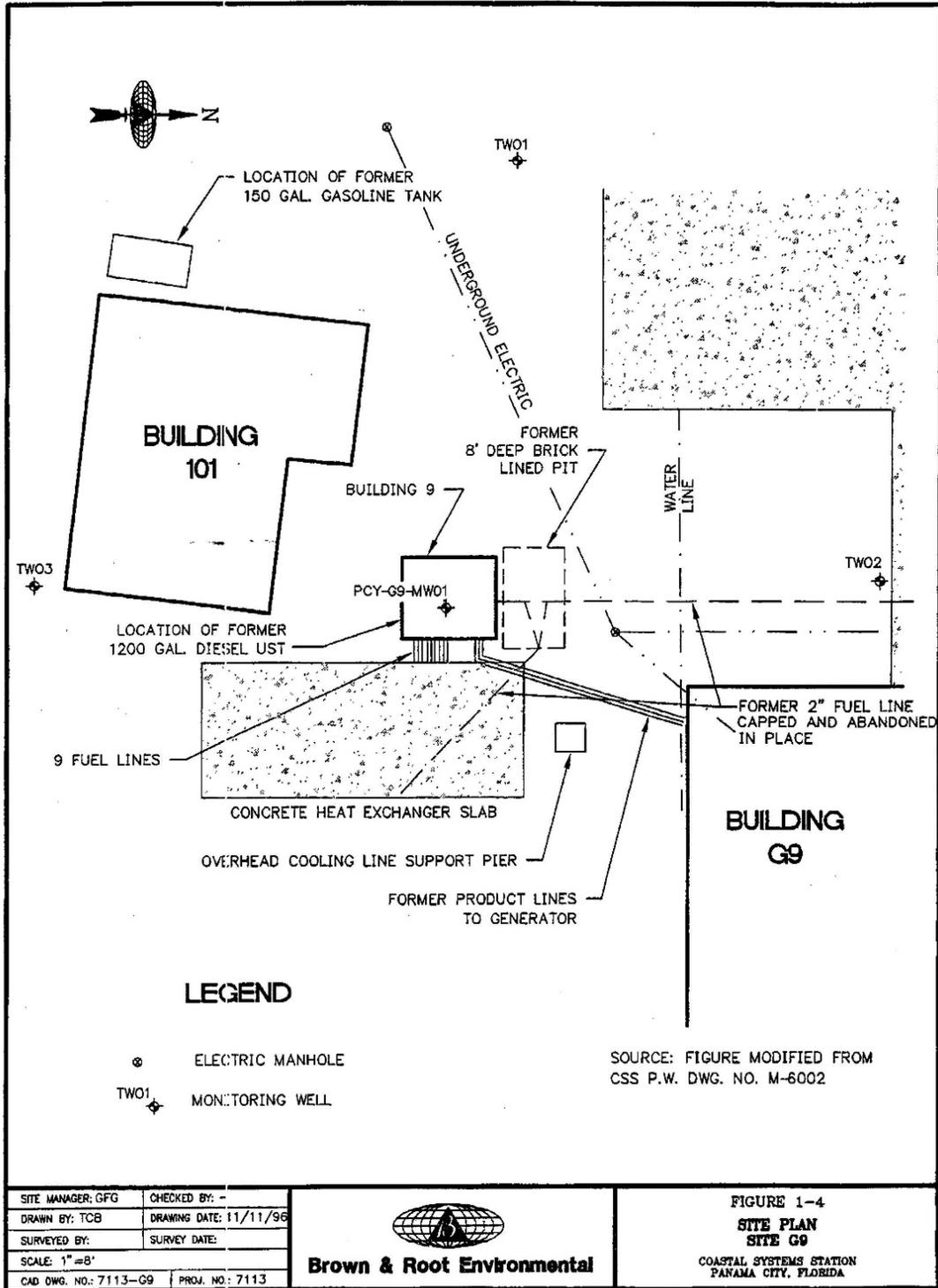
**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2  
SITE G9 LAYOUT**

(extracted from the 1996 Contamination Assessment Report for Site G9 by Brown and Root Environmental)



**SITE G300**

Site Name	Site Description	Completed Activities	Current Status
<p>Site G300, also known as Building G300.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>Building G300 is part of the Navy Experimental Diving Unit (NEDU) Ocean Simulation Facility located at Naval Support Activity (NSA) Panama City. This site is the location of a release of petroleum product adjacent to Building 300. Figure 1 shows the site location and Figure 2 shows the site layout.</p>	<p><b>September 1996:</b> The diesel fuel day tank for an emergency generator located in Building G300 was overfilled during refueling. Excess fuel was displaced into the day tank vent pipe, which extends outside the southwest corner of the building. The Navy estimates that approximately 132 gallons of oil were spilled onto the ground at the southwest corner of Building G300. The spill was discovered on 16 September, 1996, by an inspector from the Florida Department of Environmental Protection (FDEP) who was at the facility to oversee removal of the nearby unused underground storage tank (UST).</p> <p>According to an April 1997 Site Closure Report, UST system removal occurred on September 17, 1996 during which time the United States Navy Public Works Center (PWC) collected seven soil samples for hydrocarbon vapor screening using an organic vapor analyzer (OVA). Soil samples were collected at depths of 2 feet, 4 feet, and 8 feet below land surface (bls) from within the excavation. Soil vapor screening samples were collected from each side and the bottom of the excavation. Results of the soil screening identified no soil hydrocarbon vapors in soil samples collected from the vadose zone.</p> <p><b>September 20, 1996:</b> Southern Earth Science Company collected soil samples from each of 17 soil borings for field screening with an OVA. The results indicated "excessively contaminated soil," as defined by Chapter 62-770, Florida Administrative Code (FAC), at the southwestern corner of Building G300. The contaminated area of soil was approximately 4 feet wide by 25 feet long and extended along the southwestern corner of the building, sidewalk, and possibly under the building.</p> <p>An Initial Remedial Action (IRA) was started to remove "excessively contaminated soil," as defined by Chapter 62-770, FAC, however, the IRA was abandoned on September 23, 1996 after it became apparent that the amount of "excessively contaminated soil" may have been the result of various day tank overfills since 1972. NSA Panama City indicated in a September 26, 1996 email to FDEP that the intent was to fill the excavation with clean fill and initiate a Contamination Assessment Report (CAR).</p> <p><b>March 1997:</b> The PWC installed a temporary monitoring well at the center of the UST excavation and groundwater samples were collected on March 25, 1997. The samples were analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). There were no indications of petroleum contamination noted above the</p>	<p>A conditional SRCO was issued by FDEP on 1 July, 2011 and includes LUCs and free product monitoring, among other requirements.</p> <p>LUCs on groundwater, and on soil in the capillary fringe, are in place per the SRCO. Biennial shallow surficial groundwater monitoring is required in 4 wells for 4 years for TRPH and PAHs, with a LUC review to occur in year 5 so data can be evaluated and a path forward determined.</p> <p>The SRCO also requires quarterly monitoring for free petroleum product in well PCY-300-MW01, with no stated termination date. Proper disposal of free product is required if encountered. All monitoring wells not needed for monitoring must be abandoned within 60 days of NSA Panama</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>state target levels for storage tank closures. Concentrations of chloroform, bromodichloromethane, and dibromochloromethane were reported at levels less than the State of Florida Drinking Water Standards. No further action (NFA) was recommended.</p> <p>A soil hydrocarbon vapor assessment was conducted at the site by Brown and Root Environmental (B&amp;RE) from March 17 through March 21, 1997. On April 23, 1997, B&amp;RE advanced three soil borings. Monitoring wells were installed in conjunction with the soil borings. The well screens intersected the water table. Soil and groundwater samples were analyzed at an offsite laboratory and soil sample headspaces were screened for organic vapors. Results were reported in an August 1997 CAR.</p> <p><b>August 1997:</b> An IRA was initiated to remove contaminated soil. B&amp;RE prepared a CAR and submitted the CAR to FDEP on Navy's behalf. Groundwater data indicated that the dissolved hydrocarbon concentrations met the criteria established for NFA, as established in the FDEP's, October 1990, "No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites", for all constituents of the Kerosene Analytical Group (KAG). Soil data indicated that "excessively contaminated" soil, as defined by Chapter 62-770.200, FAC, was present at the site. The areal extent of the excessively contaminated soil was limited to a small area adjacent to the southwestern corner of building 300. The report noted that the proximity to the building footer made it impracticable to remove the soil without adversely impacting the structural integrity of the building. A Monitoring Only Program (MOP) was recommended, to include at least six months of quarterly monitoring for VOCs and polycyclic aromatic hydrocarbons (PAHs).</p> <p><b>December 1998 – November 1999:</b> According to a technical memorandum prepared by Tetra Tech on January 3, 2013, the following activities occurred from December 1998 to November 1999:</p> <ul style="list-style-type: none"> <li>• A Site Assessment Report (SAR) Addendum recommending Natural Attenuation Monitoring (NAM) was submitted to FDEP in December 1998.</li> <li>• FDEP concurred with the SAR and issued a NAM Plan (NAMP) Approval Order.</li> <li>• The first semi-annual groundwater monitoring event was conducted during June 1999 and a second event was conducted during November 1999.</li> <li>• Diesel fuel was detected in the source monitoring well and, as a result, the monitoring program was discontinued.</li> </ul>	<p>City's receipt of the SRCO. See the SRCO for additional details, such as maintaining Building G30 intact to act as an engineering control to prevent exposure to contaminants). Figures 2 and 3 show current (i.e., in accordance with the July 2011 SRCO) and proposed groundwater and soil LUC Boundaries. The LUC boundary was first proposed during an NSA Panama City partnering team meeting and is being considered by FDEP. A document formally describing the proposed boundary change will likely need to be developed. Recentl</p>

Site Name	Site Description	Completed Activities	Current Status
		<p><b>February 25, 2000:</b> In a letter to NSA Panama City, FDEP indicated, among other items, that free product recovery should continue and a complete round of groundwater samples from all wells on site should be collected and analyzed for the KAG and the gasoline analytical group (GAG). Depending on the results, this action should be followed by either further assessments or preparation of a Remedial Action Plan.</p> <p><b>April 2001:</b> An interim diesel fuel recovery was initiated.</p> <p><b>March 2003:</b> A Remedial Action Plan (RAP) was submitted to FDEP. The RAP recommended Aggressive Fluid Vapor Recovery (AFVR) using a Navy owned trailer-mounted dual-phase extraction system.</p> <p><b>May 2003:</b> A RAP Approval Order was issued by FDEP, concurring with the recommendations proposed in the RAP and directing the Navy to proceed with implementation of remedial action to address diesel fuel remaining at the site.</p> <p><b>July-September 2003:</b> Interim diesel fuel recovery was performed while awaiting funding to implement the RAP.</p> <p><b>May-November 2004:</b> Funding for implementing the AFVR was received in May 2004 and diesel fuel recovery and diesel fuel monitoring events were conducted from August to November on an alternating two-week schedule. During the two events conducted in October 2004 (October 7 and October 21, 2004), the petroleum product thickness was less than 0.01 foot in monitoring well PCY-300-MW01 and no petroleum product was detected in any other well. No product was detected in any monitoring well during the November 8, 2004 monitoring event, and the product thickness was less than 0.01 foot in PCY-300-MW01 during the November 18, 2004 event.</p> <p>In accordance with specifications provided in the RAP, if no diesel fuel was observed two months after an AVFR event, then Post-Active Remediation Monitoring (PARM) per 62-770.750 FAC shall be implemented. Because no diesel fuel was detected at the site since November 18, 2004, the AFVR operation was discontinued, with an agreement to conduct PARM.</p> <p><b>May 2005:</b> A Treatability Study (TS) Evaluation Report recommending implementation of a PARM program was submitted to FDEP.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>July-August 2005:</b> PARM begin in July, 2005. According to the August 2005 monitoring report, during the 1st quarter (July 1, 2005) PARM event benzene was detected in the groundwater sample from monitoring well PCY-300-MW01 at a concentration of 1.5 micrograms per liter (<math>\mu\text{g/L}</math>). This was greater than the benzene Groundwater Cleanup Target Level (GCTL) of 1.0 <math>\mu\text{g/L}</math>. Xylenes also were detected, but their concentrations did not exceed the GCTL. Additionally, concentrations of the PAHs naphthalene, 1-methylnaphthalene, and, 2-methylnaphthalene exceeded their GCTLs (the GCTL was 20 <math>\mu\text{g/L}</math>) in groundwater samples collected from PCY-300-MW01.</p> <p>The 1st Quarter Groundwater Monitoring Report recommended further groundwater monitoring.</p> <p><b>December 2005:</b> The results of a second quarter (September 29, 2005) PARM event were reported. Benzo(a)anthracene was detected at 0.2 <math>\mu\text{g/L}</math> (the GCTL was 20 <math>\mu\text{g/L}</math>), in a sample collected from PCY-300-MW02 during the 2nd quarter sampling. Benzo(a)anthracene and dibenzo(a,h)anthracene, were detected at 0.2 <math>\mu\text{g/L}</math> (the GCTLs were 20 <math>\mu\text{g/L}</math>) and indeno(1,2,3)pyrene was detected at 0.2 <math>\mu\text{g/L}</math> (the GCTL was 0.2 <math>\mu\text{g/L}</math>), in PCY-300-MW04 during the second quarter sampling. No contaminants of concern (COCs) exhibited concentrations greater than GCTLs in groundwater samples collected from PCY-300-MW04. Naphthalene, 1-methylnaphthalene, and, 2-methylnaphthalene concentrations exceeded their GCTLs (the GCTLs were 20 <math>\mu\text{g/L}</math>) in groundwater samples collected from PCY-300-MW01.</p> <p>The 2nd Quarter Groundwater Monitoring Report recommended further monitoring.</p> <p><b>March 2006:</b> Results from samples collected during the 3rd quarter (December 21, 2005) PARM event were reported. They showed that VOCs, PAHs, and total recoverable petroleum hydrocarbons (TRPH) constituents were detected in the contaminant source monitoring well PCY-300-MW01 and in downgradient perimeter well PCY-300-MW02. The VOCs benzene, ethylbenzene, and xylene were detected in monitoring well PCY-300-MW01 at a concentration of 1.0 <math>\mu\text{g/L}</math> (the GCTL was 1.0 <math>\mu\text{g/L}</math>), 24.0 <math>\mu\text{g/L}</math> (the GCTL was 30 <math>\mu\text{g/L}</math>) and 3.0 <math>\mu\text{g/L}</math> (the GCTL was 20 <math>\mu\text{g/L}</math>), respectively. TRPH was detected at a concentration of 4.5 milligrams per liter (mg/L) (the GCTL was 5.0 mg/L). Naphthalene, 1-methylnaphthalene, and, 2-methylnaphthalene exceeded their GCTLs in groundwater samples collected from PCY-300-MW01.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>The 3rd Quarter Groundwater Monitoring Report recommended further monitoring.</p> <p><b>May 19, 2006:</b> An Annual Groundwater Monitoring Report based on the fourth quarter (March 28, 2006) and previous three quarters of sampling was issued. During the fourth quarterly event, 0.33 foot of petroleum product thickness was detected in the source well (PCY-300-MW01). Because of the presence of free product in this well, PARM was no longer in effect at this site.</p> <p>In response to these events, data from previous investigations were reviewed. Groundwater contaminant concentrations had been less than GCTLs during the last four quarterly events in well PCY-300-MW03. Benzene, ethylbenzene, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene had been detected at concentrations greater than GCTLs in at least one well during at least one monitoring event, although COC concentrations tended to decrease. Xylenes were detected but their concentrations did not exceed GCTLs during any of the last four events. The selected path forward was to perform 10 weeks of bailing groundwater from PCY-300-MW01 to draw free product to the well, if possible, and to begin quarterly sampling anew to determine whether petroleum-related contamination was still present.</p> <p>Tetra Tech recommended that the site revert to "NFA with controls" status as defined in the Risk-Based Corrective Action (RBCA) 62-770 FAC, Option IIA. This option allows free product to remain within the property boundary if it is infeasible to remove it, and institutional and/or engineering controls are in place to protect human health, public safety, and the environment.</p> <p><b>October 12, 2007:</b> Bailing, monitoring, and sampling activities were conducted as the first of the new quarterly monitoring event activities; free product was not detected in PCY-300-MW01 during the first event.</p> <p>Prior to the start of monitoring, a well boom designed to promote rapid biodegradation of free product had been installed in PCY-300-MW01, where free product had been observed. The well boom was ineffective at removing contamination and, according to the June 16, 2009 fourth quarter/annual report described below, interfered with accurate free product measurements. The boom was removed.</p> <p><b>2008:</b> Quarterly sampling events were conducted in February 2008; June 2008; and November 2008. The</p>	

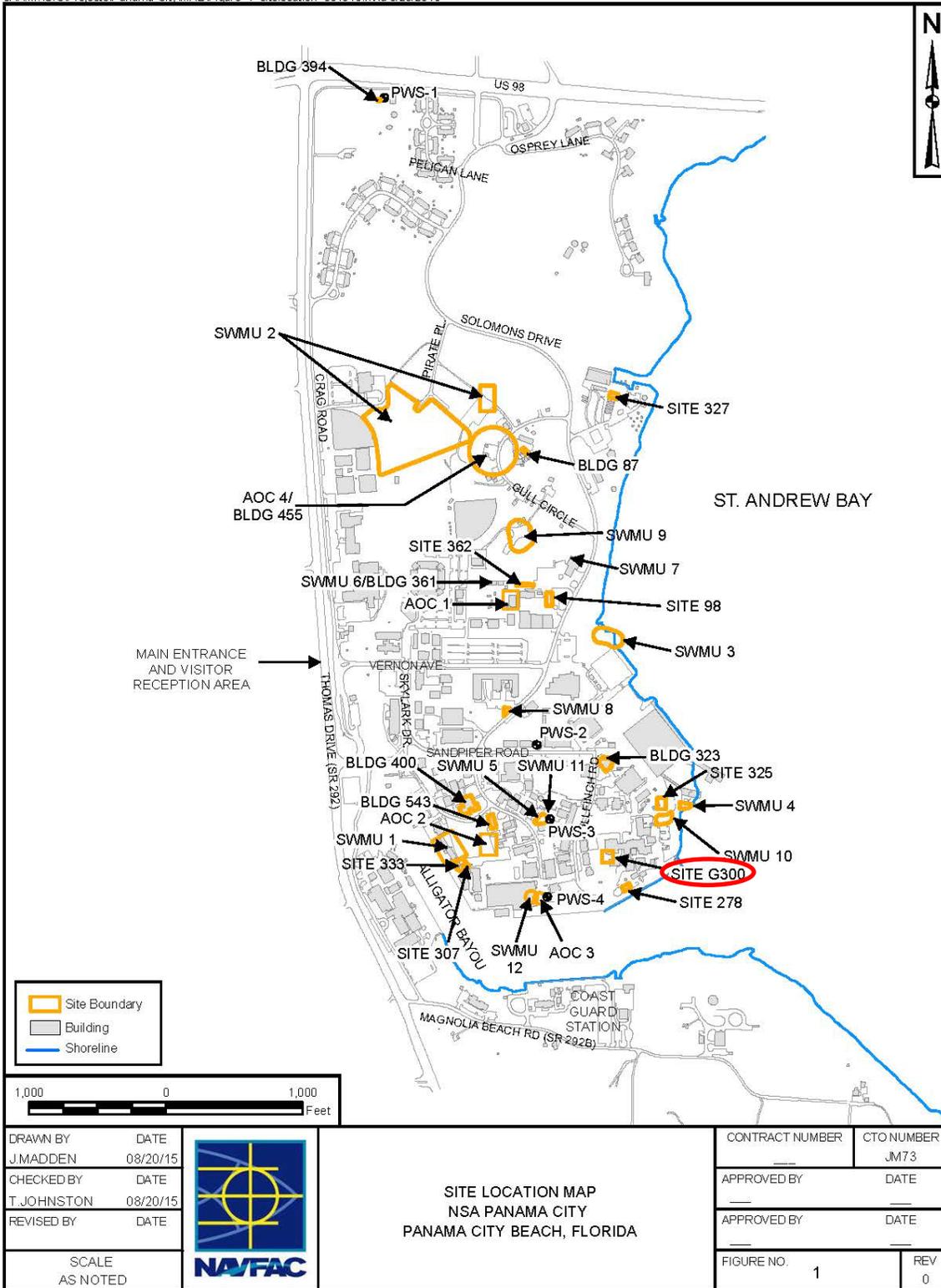
Site Name	Site Description	Completed Activities	Current Status
		<p>groundwater flow direction was indicated to be toward the southeast. Free product was detected in PCY-300-MW01 during the third event, but not the first two events.</p> <p><b>January 2009:</b> A fourth quarterly groundwater sampling event occurred on January 20, 2009 and free product was again detected in PCY-300-MW01. Chemicals that had been detected in well PCY-300-MW01 were concluded to represent petroleum product contamination. Concentrations of COCs greater than GCTLs, including PAHs, VOCs, and TRPH persisted in PCY-300-MW01 and free product was noted to be frequently encountered in the well. Remedial action for this well had included ten weeks of bailing in an attempt to remove free product and draw the free product toward the well.</p> <p>Groundwater contaminants in the remaining study area monitoring wells were less than FDEP regulatory criteria and the extent of petroleum related chemical contamination at unacceptable concentrations in groundwater appeared to be limited in spatial extent to the area near PCY-300-MW01.</p> <p><b>June 16, 2009:</b> A fourth quarter/annual groundwater monitoring report (mentioned above) was submitted to FDEP, which summarized previous findings. A roughly inverse correlation between free product thickness in PCY-300-MW01 and water table elevations was tentatively established. Also described was the 10 weeks of bailing that had occurred at PCY-300-MW01. The report recommended that the monitoring program be stopped due to the difficulty in accessing the plume beneath the foundation of Building G300 and that land use controls (LUCs) be applied. The following monitoring recommendations were proposed:</p> <ul style="list-style-type: none"> <li>• Quarterly free product monitoring of well PCY-300-MW01 and removal of floating free product, if found. In the absence of these conditions, LUCs with conditions was recommended.</li> <li>• Annual groundwater monitoring for VOC, PAH, and TRPH COCs in contaminant source well PCY-300-MW01; and in downgradient wells PCY-300-MW02 and PCY-300-MW05.</li> <li>• Review of site status after one year of monitoring the free product and groundwater chemical data. Additional details are provided in the 2009 annual monitoring report.</li> <li>• To assess the impact of soil contamination leaching to groundwater, collection of soil samples to delineate the lateral extent of soil VOC, PAH, and TRPH COC contamination..</li> </ul>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>2009 to 2011:</b> A new, one-year long, quarterly monitoring program was started at Site G300 under a new Contract Task Order (CTO), 161. The dates of the monitoring events were November 17, 2009; and February 18, June 11, and September 9, 2010. Bailing and water level measurements were to occur when diesel fuel was present and weekly thereafter until no more diesel fuel was present.</p> <p>Free product had not been detected for more than one year (the last detection was Jan 20, 2009, with 0.04 foot of free product thickness in PCY-300-MW01).</p> <p><b>2011:</b> An annual monitoring report summarizing results of the 2009-2010 monitoring was submitted to FDEP on January 12, 2011. No free petroleum product had been detected in any well during this sampling period. Only TRPH in well PCY-300-MW01 slightly exceeded its GCTL, and naphthalene in a field duplicate sample from PCY-300-MW01 exceeded its GCTL; otherwise no other GCTL exceedances were observed. The groundwater flow direction was toward the southeast, as opposed to flowing toward the southwest, which was the previously determined flow direction.</p> <p>Soil samples collected during this monitoring period indicated that petroleum contamination was located at the groundwater table smear zone but not in shallower soils.</p> <p>The January 12, 2011 annual report recommended submittal to FDEP of a Site Rehabilitation Completion Report (SRCR) with request for a conditional Site Rehabilitation Completion Order (SRCO). The annual report also proposed that monitoring wells PCY-300-MW01, PCY-300-MW02, PCY-300-MW03 and PCY-300-MW05 be sampled and the groundwater be analyzed for TRPH and PAHs every two years for four years, and that the analytical data be reviewed during a five year LUC review.</p> <p>According to a letter dated July 5, 2011 from Winters to Latham (both of FDEP), another annual report for 2010 monitoring was submitted to FDEP on June 7, 2011 by Tetra Tech with a recommendation that an SRCO be issued, and requesting FDEP to close the site with LUCs in place. This July 5, 2011 letter approved the June 7, 2011 proposal.</p> <p>A Conditional (SRCO was issued July 1, 2011, attached to the July 5, 2011 letter. The SRCO includes LUCs and periodic free product monitoring, among other requirements. A June 7, 2011 LUC Implementation plan</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>(LUCIP) is attached to the SRCO and is evidently the "other annual report" described above. Apparently, the original January 12, 2011 annual report proposing a conditional SRCO was approved after being supplemented with a June 7, 2011 LUCIP.</p> <p><b>2013:</b> A Technical Memorandum Regarding the Path Forward for Site G300 was prepared by Tetra Tech for the NSA Panama City partnering team. This memorandum described TRPH concentrations in well PCY-300-MW01 as slightly exceeding GCTLs. The memorandum also described removal of contamination under and adjacent to the deep ocean engineering building as being technically infeasible. Soils associated with surficial groundwater contamination were noted to contain contaminant concentrations greater than SCTLs. This technical memorandum is consistent with the SRCO and should be viewed as a summary of Site G300 history, with some inaccuracies that are resolved by this Site Summary.</p> <p>Text from the January 12, 2011 annual report was copied into the 2013 technical memorandum. The text recommends issuance of an SRCR with LUCs to protect potential human receptors from exposure to contaminated soil and groundwater. Monitoring for TRPH and PAHs also was recommended, with a recommendation to consider the effectiveness of monitoring and LUCs during a five-year LUC review.</p> <p><b>2015:</b> Additional groundwater and free petroleum product monitoring is planned for Site G300 in Winter/Spring of 2015/2016 by Adanta, Inc.</p>	

**FIGURE 1  
NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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DRAWN BY	DATE
J.MADDEN	08/20/15
CHECKED BY	DATE
T.JOHNSTON	08/20/15
REVISED BY	DATE
SCALE	AS NOTED



SITE LOCATION MAP  
NSA PANAMA CITY  
PANAMA CITY BEACH, FLORIDA

CONTRACT NUMBER	CTO NUMBER
	JM73
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
1	0

**FIGURE 2**  
**SITE G300 SITE LAYOUT AND CURRENT SOIL /GROUNDWATER**  
**LAND USE CONTROL BOUNDARIES**  
**(PER THE JULY 2011 CONDITIONAL SITE REHABILITATION COMPLETION ORDER)**

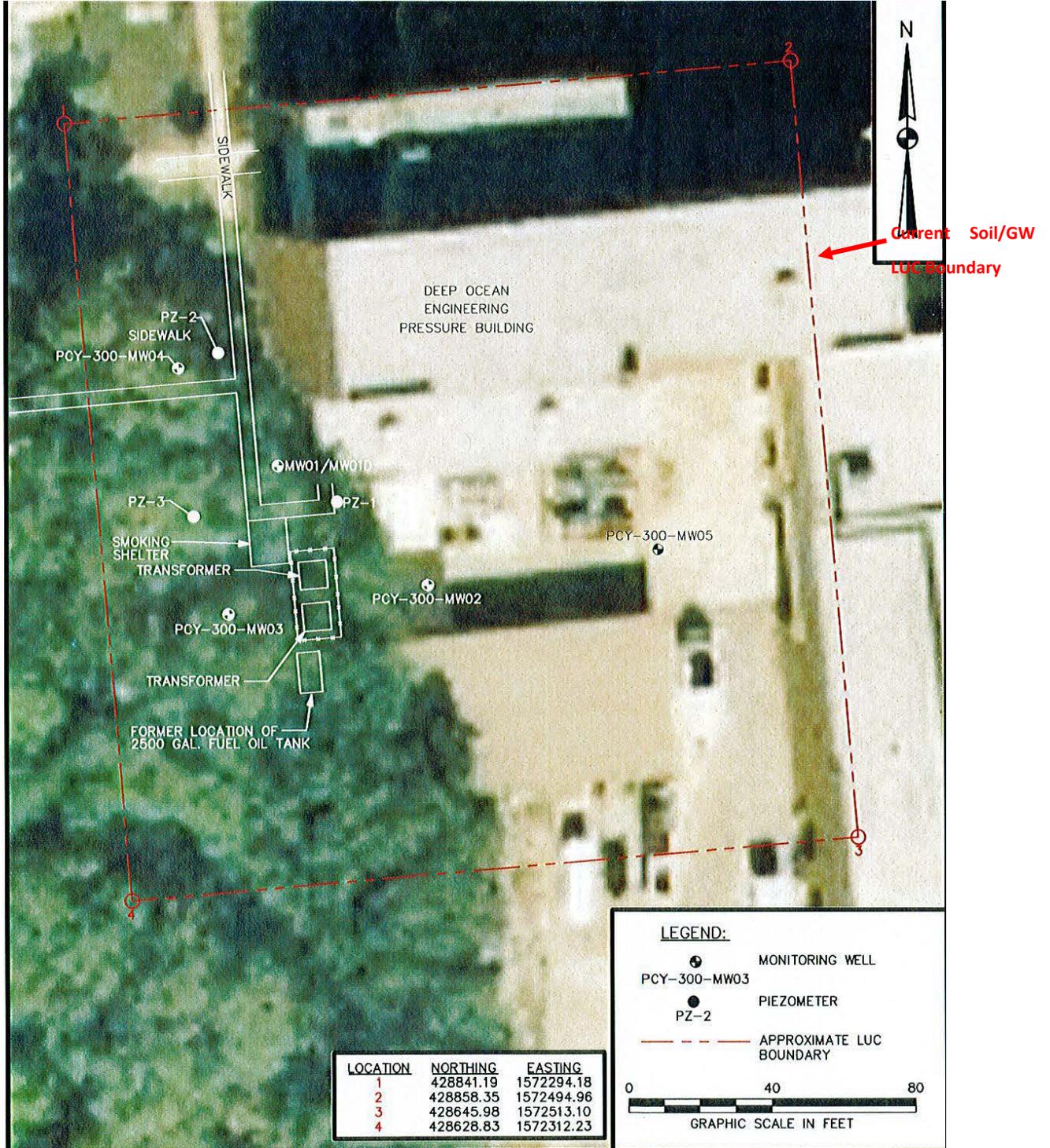
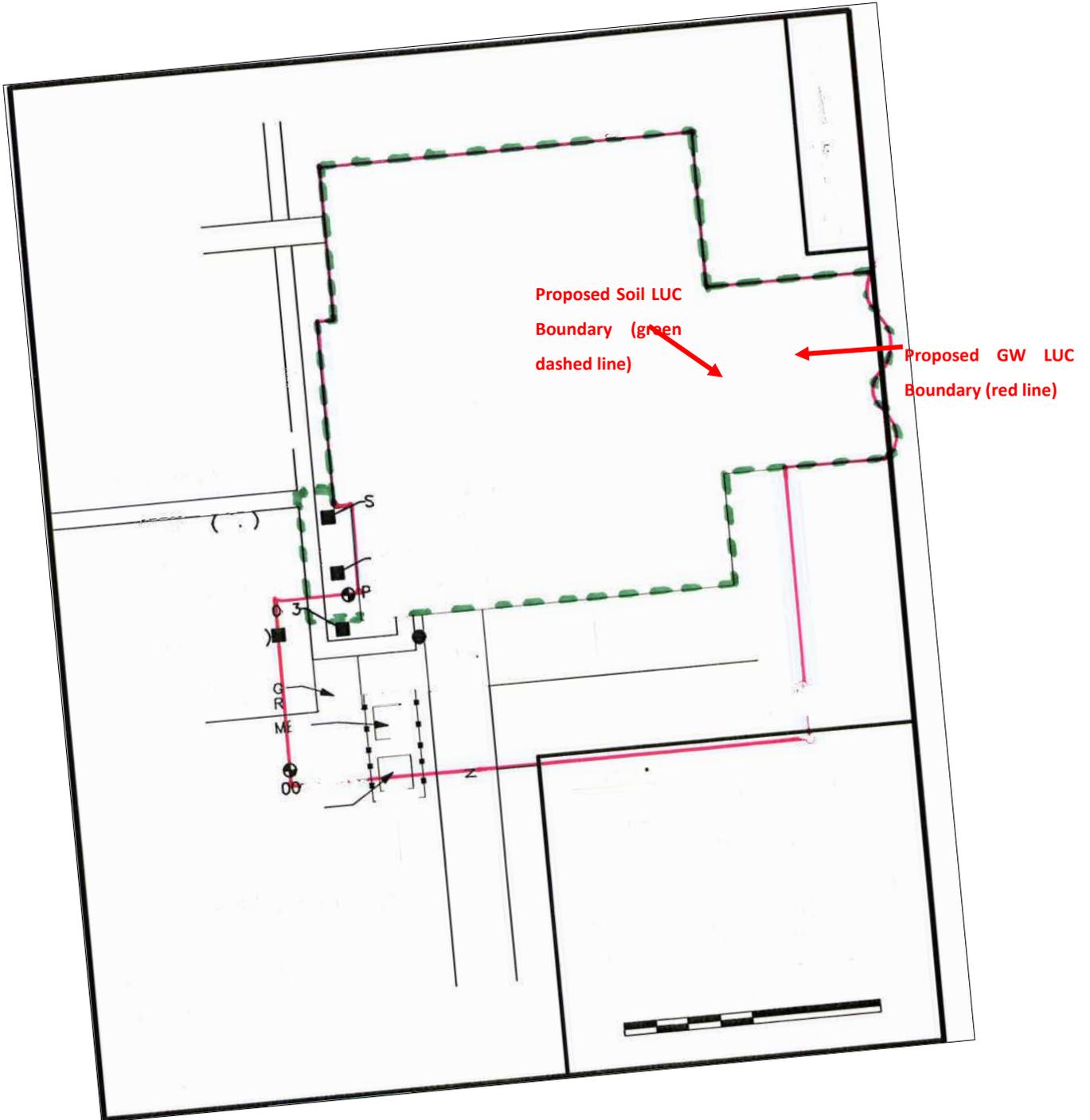


FIGURE 3  
SITE G300 SITE LAYOUT AND PROPOSED SOIL /GROUNDWATER  
LAND USE CONTROL BOUNDARIES



### SITE 98

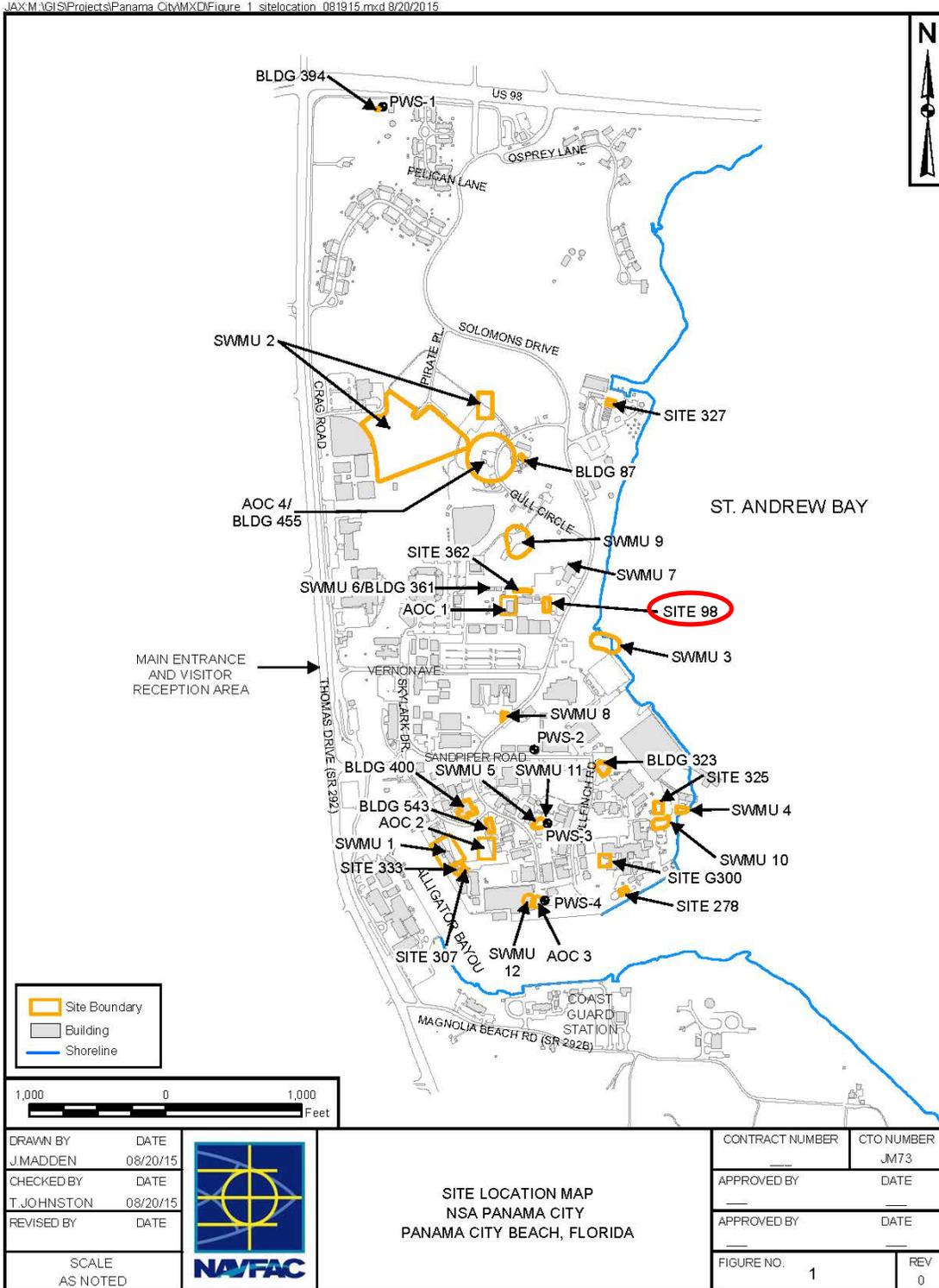
Site Name	Site Description	Completed Activities	Current Status
<p>Site 98, also known as Building 98.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>Site 98 is a former 560 gallon unregulated cylindrical steel underground storage tank (UST) system located west of Building 98 near the center of Naval Support Activity (NSA) Panama City and east of Area of Concern (AOC) 1. The UST was used to store diesel fuel for onsite heating. See Figure 1 for the site location. Figure 2 shows the site layout.</p>	<p><b>1997:</b> After emptying the contents of the UST, the UST and approximately 2 cubic yards of soil contaminated with petroleum product were removed in 1997 by the Navy Public Works Center (PWC), Pensacola Florida. The UST product line was cut, capped, and abandoned in place, where the line entered Building 98. Lateral excavation involved removal of all soil until hydrocarbon levels in the remaining soil were less than 50 ppm (based on headspace screening). Vertical excavation extended to the top of the water table. The excavation was approximately 8 feet wide by 10 feet long by 5 feet deep. The excavation was filled with clean fill, compacted to grade, and paved with concrete.</p> <p>A temporary well, screened to span the groundwater table surface, was installed adjacent to the tank excavation and sampled for volatile organic compounds (VOCs), including 1,2-dibromoethane (EDB); semivolatile organic compounds (SVOCs); and lead. The following fuel oil-related constituents were detected in groundwater at concentrations greater than their respective Groundwater Cleanup Target Levels (GCTLs): benzene, toluene, ethylbenzene, xylenes, ethylene dibromide, total petroleum hydrocarbons (TPH), and naphthalene. Chlorinated solvent chemicals were also detected during the tank closure assessment; their presence was attributed to AOC 1 (located west of Site 98); and Solid Waste Management Unit (SWMU) 9, which was located about 500 feet north of AOC 1.</p> <p>A Closure Assessment Report, Underground Storage Tank Building 98, Naval Surface Warfare Center Coastal Systems Station, Panama City, Florida, was prepared by Navy Public Works, in December 1997 to summarize the removal activities. The conclusions were that the site was contaminated, that contaminated soil shallower than the groundwater elevation had been removed, and groundwater remained contaminated with high levels of petroleum hydrocarbons. The report recommended that a contamination assessment report be prepared.</p> <p><b>1998:</b> Tetra Tech conducted a site assessment to determine the nature and extent of petroleum hydrocarbon contamination in soil and groundwater. Sampling locations are not shown on attached figures. The ensuing Site Assessment Report (SAR) indicated that no "excessively contaminated" or "contaminated"</p>	<p>Soil contamination has been completely delineated and a recommendation was made in the September 2015 Final Technical Memorandum to remove contaminated soil and confirm that groundwater remains clean after the removal.</p> <p><b>Note:</b> Upon completion of the recommended contaminated soil removal, the soil at Building 98 would satisfy FDEP requirements and would allow Building 98 soil to be approved for site closure with no further action (NFA) and unrestricted use.</p> <p>To satisfy all FDEP requirements for site closure with NFA, groundwater sampling in conjunction with soil excavation is recommended to verify that disturbance of the soil has not resulted exceedances of groundwater PAH GCTLs.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>soil, as defined by Chapter 62-770.200, Florida Administrative Code (FAC)., was present in vadose zone and capillary fringe soils. Detected groundwater VOCs included 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and chloroethane; but only the 1,1-dichloroethene concentration was greater than the primary drinking water standard maximum contaminant level [17 micrograms per liter (µg/L)].</p> <p>Analytical results indicated that benzene, ethylbenzene, toluene, xylenes, 1,2-dibromoethane, total recoverable petroleum hydrocarbons (TRPH), and naphthalene concentrations exceeded GCTLs. The VOCs, chlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethene; and polycyclic aromatic hydrocarbons (PAHs), acenaphthene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, and phenanthrene also were detected.</p> <p>The presence of chlorinated groundwater contaminants was attributed to AOC 1 and SWMU 9, both of which were located upgradient of Site 98. A Monitoring Only Plan (MOP) for Natural Attenuation was recommended for implementation at the site, to include one year of monitoring for benzene, toluene, xylenes, total petroleum hydrocarbons and 1,2-dibromoethane.</p> <p>Comparison of water quality data collected in 1997 and 1998 from the contaminant source well indicated that key groundwater contaminant concentrations had decreased 3- to nearly 100-fold, and indicated that natural attenuation of contamination would ultimately support no further action.</p> <p>Petroleum hydrocarbons were not detected in groundwater samples collected from the vertical contamination delineation well (PCY-98-MW5D) screened from 25 to 30 feet below land surface (bls). No free petroleum product was detected during the site assessment.</p> <p><b>1999:</b> The Navy submitted a letter to the Florida Department of Environmental Protection (FDEP) indicating that Site 98 was being transferred from the UST program to the Installation Restoration Program (IR). The transfer was based on dissolved hydrocarbons being detected in upgradient monitoring wells at concentrations greater than the downgradient wells, and VOCs not attributed to Site 98 being detected in groundwater samples. The letter states that</p>	

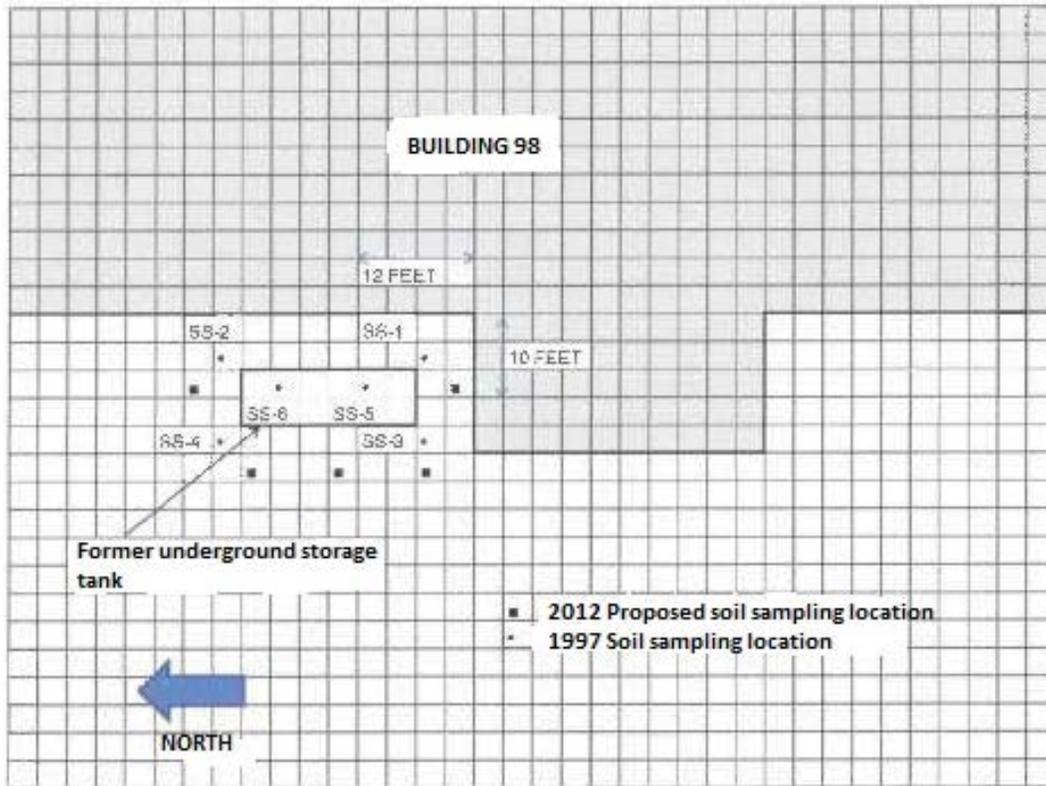
Site Name	Site Description	Completed Activities	Current Status
		<p>the AOC 1 investigation and remedial action would address Site 98 groundwater contamination. Groundwater monitoring near Site 98 continued under the IR program as part of the AOC 1 investigation.</p> <p><b>2012:</b> An additional step-out soil investigation was completed in April 12, 2012. Soil headspace samples from designated step-out locations were screened with a flame ionization detector (FID) in 1-foot intervals until the water table was encountered. No VOCs were detected. Tetra Tech prepared a Technical Memorandum summarizing the findings and the memorandum was approved by FDEP on September 16, 2013.</p> <p>Fifteen PAHs were detected in soil, however, only benzo(a)pyrene (0.290 milligrams per kilogram [mg/kg]) and the benzo(a)pyrene toxicity equivalent (BAP TEQ) (equal to 0.4 mg/kg) exceeded the FDEP Residential Direct Exposure Soil Cleanup Target Level (SCTL) of 0.1 mg/kg, between 4 to 6 feet bls. TRPH also was analyzed and was detected in soil samples PCY-0098-4-6-SB-SS2 and PCY-0098-4-6-SS3 at concentrations less than the FDEP SCTLs. The vertical and lateral extent of soil contamination had not been fully defined</p> <p>Additional soil contamination delineation, followed by limited soil excavation to remove the soil PAH concentrations in excess of residential SCTLs, was recommended.</p> <p>To satisfy all FDEP requirements for site closure with no further action, sampling of groundwater in conjunction with the soil excavation also was recommended to verify that disturbance of the soil did not result in groundwater PAH exceedances of GCTLs.</p> <p><b>2015:</b> Soil sampling was conducted on April 28, 2015 to complete the delineation of soil contamination in the 4- to 6-foot bls depth interval. All site-related contaminant concentrations were less than their respective direct exposure and leachability SCTLs, indicating that delineation of soil contamination was complete. Removal of the residual contaminated soil (approximately 21 tons) was recommended.</p> <p>A groundwater sample was collected from monitoring well PCY-98-MW06 on May 7, 2015 and analyzed for Low-Level PAHs to provide data for determining whether site closure could be supported. Four PAHs (fluorene, 1-methylnaphthalene, 2-methylnaphthalene,</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>and naphthalene) were detected in groundwater sample PCY-98-MW06 at concentrations less than their respective GCTLs. Additional groundwater monitoring was recommended for the purpose of verifying that groundwater contaminant concentrations remain less than GCTLs and the site meet all closure requirements. Tetra Tech prepared a Technical Memorandum summarizing these findings and the draft final Technical Memorandum was approved by FDEP on August 17, 2015.</p> <p>The final Technical Memorandum for Site 98 describing final soil delineation and a recommendation for one more round of groundwater sampling to confirm clean groundwater (as approved by FDEP) was submitted to Navy and FDEP on 9/17/2015.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**



**FIGURE 2**  
**SITE 98 LAYOUT (from 1997 Closure Assessment Report)**



**SITE 278**

Site Name	Site Description	Completed Activities	Current Status
<p>Site 278 (also known as Facility 278).</p> <p><b>Notes:</b> Some Site 278 documents are filed under "UST 3" in the Naval Installation Restoration Information System (NIRIS).</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>Located at the east dock alongside Alligator Bayou at Naval Support Activity (NSA) Panama City. The site is the former location of four 7,500-gallon underground storage tanks (USTs) used for diesel fuel storage. See Figure 1 for the location of this site and Figure 2 for the Site Layout.</p>	<p><b>1989:</b> Four USTs were replaced with two 15,000-gallon double walled steel tanks. During excavation petroleum vapors exceeded explosive limits. Stained soil was observed under the tank pads. An unknown amount of stained soil was removed and disposed of while the remaining visibly contaminated soil was aerated over Visqueen. No groundwater samples were collected. A Tank Closure Report was not submitted by the contractor and no waste manifest copies were provided for soil transportation.</p> <p><b>1993:</b> A Contamination Assessment (CA) of Site 278 was conducted and a CA Report (CAR) was submitted to FDEP in July by ABB Environmental Services, Inc. (ABB-ES). Free product was found in one well (MW-5). Soil organic vapor analyzer (OVA) readings indicated excessively contaminated soil per Chapter 62-770.200, Florida Administrative Code (FAC) and groundwater contaminants in the kerosene analytical group (KAG) were detected. The CAR stated that natural attenuation was likely occurring and that that soil and groundwater at the site exceed Chapter 62-770, F.A.C. target levels for KAG. ABB-ES performed additional work at the site and provided data clarification in a CAR Addendum submitted to the FDEP in November 1993.</p> <p><b>1994 to 1995:</b> FDEP requested additional assessment and information in March, 1994. ABB-ES performed a supplemental investigation to complete the CA and submitted a CAR Addendum in May 1995. The addendum revealed that groundwater contamination [benzene, toluene, ethylbenzene, and xylenes (BTEX); polycyclic aromatic hydrocarbons (PAH); and total recoverable petroleum hydrocarbons (TRPH)] exceeding groundwater cleanup target levels (GCTLs) was limited to a small area south of the USTs around monitoring wells MW-4, MW-5, and MW-6; and the plume was stable. The decline in groundwater contaminant concentrations was likely the result of contaminant source abatement and an interim remedial action (IRA) conducted to remove free product. Chlorinated compounds and lead detected previously in groundwater at low concentrations were not detected again and appeared not to be a concern at Site 278. Historical and current analytical results indicated that the groundwater contaminant plume appeared to have stabilized.</p>	<p>No further action (NFA), based on the Site Rehabilitation Completion Report – 8/27/2010. Site Rehabilitation Completion Order Issued 3/18/2011. Documented in current NSA Panama City Corrective Action permit No. 66255-HH-003.</p> <p><b>Note:</b> Some Site 278 documents are filed under "UST 3" in NIRIS.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>Petroleum contaminants from Site 278 apparently were not impacting Alligator Bayou. Elevated PAH, TRPH, and lead concentrations detected in sediment samples collected adjacent to Site 278 were similar to concentrations detected in sediment samples elsewhere in the bayou. The source of contamination was attributed to naval vessel activities and operations.</p> <p>ABB-ES recommended continuing the IRA to remove free product to abate the source of groundwater contamination and preparing a remedial action plan in accordance with Chapter 62-770, FAC. In September 1995, FDEP recommended submission of a Remedial Action Plan (RAP).</p> <p><b>Note:</b> Two separate copies of the CAR Addendum are provided in NIRIS.</p> <p><b>1996 to 2001:</b> The RAP was submitted in April recommending continued groundwater monitoring and installation of a vacuum enhanced extraction (VEE) recovery system to remove free petroleum product in groundwater and soil. The VEE system operated on a bimonthly schedule from March 1998 through December 2001, with quarterly groundwater monitoring.</p> <p>Four quarters of monitoring from March to December 1998, documented in individual quarterly reports and a January 1999 annual report prepared by Harding Lawson Associates, showed that groundwater at Site 278 had detectable concentrations of PAHs (fluoranthene, fluorene, and naphthalene) not detected during the baseline sampling event, but generally continued to be less than State of Florida cleanup goals. In addition, measurable amounts of free product were no longer present in site monitoring wells. Continued annual groundwater monitoring and free product recovery were recommended, with cessation of VEE system operations.</p> <p><b>2002:</b> EnSafe reported in 2002 that no free product had been recorded since June 2001. According to a presentation given during the April 2002 partnering team meeting, the March 2002 monitoring event had been missed but monitoring occurred in April 2002. In May, soil and groundwater monitoring was conducted to assess conditions at the site since VEE system operation. No measurable free product was detected. VOC analysis revealed low concentrations of</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>ethylbenzene and cis-1,2-dichloroethylene. All VOC concentrations were less than GCTLs. PAH GCTL exceedances were limited to 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in well CSS-278-MW-06. Total recoverable petroleum hydrocarbon (TRPH) concentrations levels exceeded the GCTL in five of nine monitoring wells. Soil boring samples also had TRPH concentrations exceeding their SCTLs. In August, CH2M Hill submitted a "Work Plan Addendum for Remediation System Optimization." Installation of an aquifer air sparging (AAS) system with passive soil vapor extraction (SVE) was recommended to address both the groundwater and soil contamination. Semiannual groundwater monitoring was recommended. Submittal of a Construction Completion Report (CCR) along with the first monitoring report was proposed. In an August 2002 partnering meeting presentation BTEX compounds, 1-methylnaphthalene, and 2-methylnaphthalene, and naphthalene were listed as current chemicals of concern (COCs) for groundwater; and TRPH was listed as a current COC for soil and groundwater.</p> <p><b>2003 to 2004:</b> On-site wells (278-MW05 and 278-MW06) continued to exhibit levels of petroleum constituents above their respective GCTLs. As of May 2004, the SVE system had removed approximately 20 pounds of volatile hydrocarbons, which was less than anticipated. The AAS/SVE system effectively removed petroleum hydrocarbons from the water table and vadose zone, but the rate of removal was less than anticipated. On July 28 and November 12, 2004, Aerostar collected groundwater samples from seven wells. Light non-aqueous phase liquid (LNAPL) was not detected. Slight GCTL exceedances in MW-6 (referred to as 278-MW06 in earlier reports, but labeled as MW-6 hereafter) of naphthalene [0.021 milligrams per liter (mg/L)] and 1-methylnaphthalene (0.033 mg/L) were observed on July 28. The GCTLs for both of these PAHs were 0.020 mg/L. BTEX, PAH, and TRPH concentrations were less than GCTLs in all other wells. In October 2004, CH2M Hill issued a construction completion report to describe site conditions.</p> <p><b>2005:</b> On March 15 and June 21, 2005 Aerostar collected groundwater samples from six wells. LNAPL was detected in MW-5 and Total BTEX and PAH concentration were less than GCTLs in both sampling events. On March 15, TRPH concentrations exceeded the 5 mg/L GCTL in wells MW-6 (10 mg/L), MW-7 (7 mg/L), and MW-8 (5.2 mg/L). On</p>	

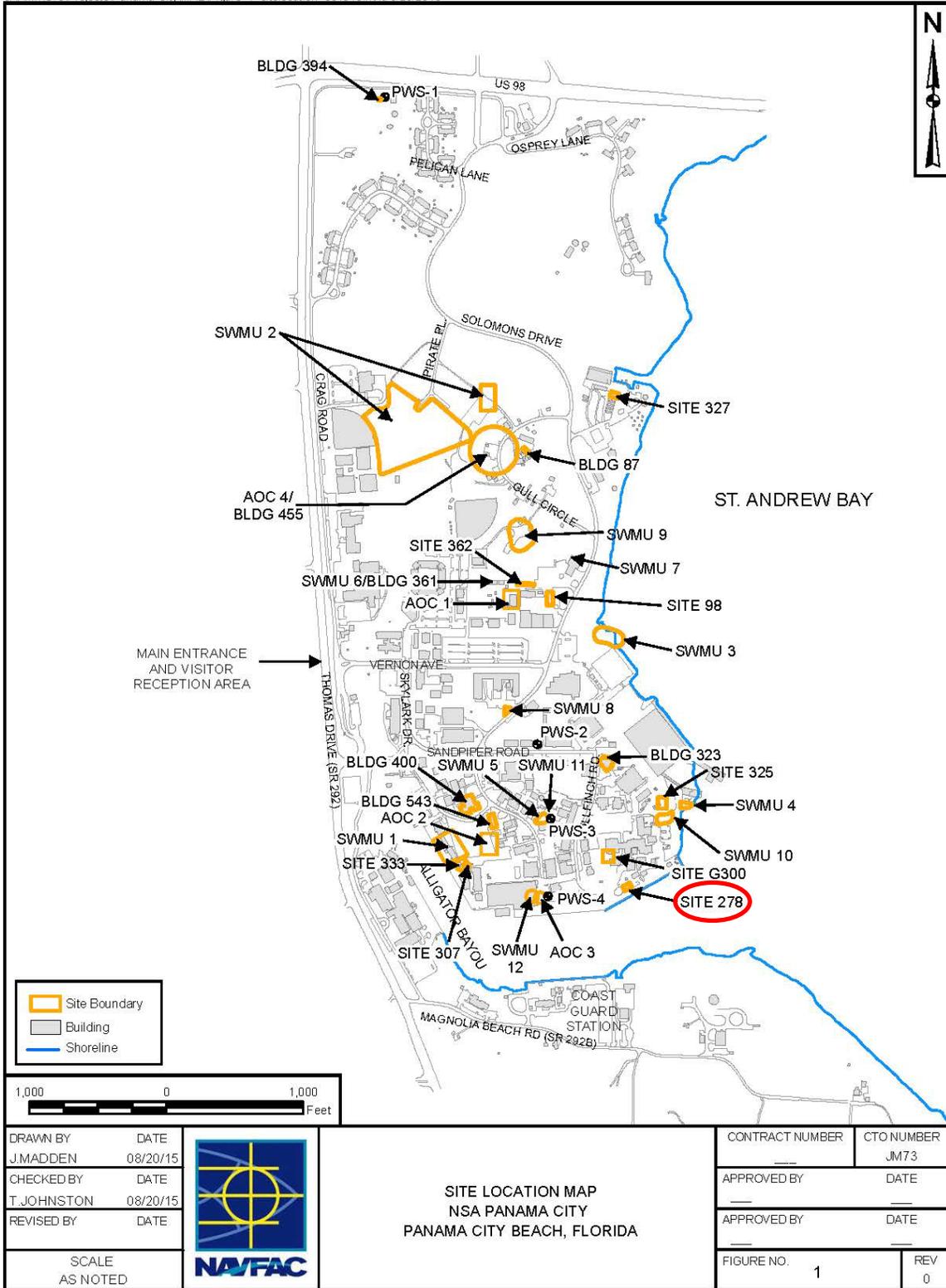
Site Name	Site Description	Completed Activities	Current Status
		<p>September 7 and November 9, 2005, LNAPL was detected in MW-5; therefore, a groundwater sample was not collected from MW-5. BTEX, PAH, and TRPH concentrations in all other wells were less than GCTLs. Results for the 3<sup>rd</sup> and 4<sup>th</sup> quarter 2004 monitoring were provided by Aerostar in a May 2005 semi-annual operation and maintenance (O&amp;M) report. In August 2005 a semiannual O&amp;M report was submitted by Aerostar for 12t and 2<sup>nd</sup> quarter 2005 monitoring.</p> <p><b>2006:</b> On February 23, 2006 Aerostar collected groundwater samples from six wells. LNAPL again was detected in MW-5. BTEX, PAH, and TRPH concentrations in all other wells were less than GCTLs. On June 6, Aerostar collected groundwater samples from seven wells. LNAPL was not present in MW-5 but MW-5 was the only well that exhibited GCTL exceedances. The TRPH concentration (9.5 mg/L) in MW-5 also exceeded its GCTL. On August 22 and November 20, 2006, Aerostar again collected groundwater samples, from seven monitoring wells. LNAPL was not detected. Analytical results for these 3<sup>rd</sup> and 4<sup>th</sup> quarter sampling showed BTEX and PAH concentrations to be less than GCTLs in all wells. During the 3<sup>rd</sup> quarter, the TRPH concentration (30 mg/L) exceeded the 5 mg/L GCTL in MW-5. During the 4<sup>th</sup> quarter, the TRPH concentration in MW-5 was 1.4 mg/L. Results are provided in periodic O&amp;M reports by Aerostar.</p> <p><b>2007:</b> On March 26, 2007 Aerostar collected groundwater samples from seven wells. On May 11, 2007, Aerostar collected groundwater samples from thirteen wells. LNAPL was not detected. PAH, BTEX, and TRPH concentrations were less than detectable levels or their respective GCTLs in all wells. On September 26 and November 20, 2007, Aerostar collected groundwater samples from seven wells. Analytical results for the 3<sup>rd</sup> and 4<sup>th</sup> quarters, year 2007 sampling events showed BTEX and PAH concentrations to be less than GCTLs in all wells. During the 3<sup>rd</sup> quarter, TRPH concentrations were less than GCTLs in all wells; however, during the 4<sup>th</sup> quarter, the TRPH concentration (5.1 mg/L) slightly exceeded the GCTL of 5 mg/L in MW-6. Ten soil borings were installed and soil samples were collected from them on November 20. BTEX and PAH concentrations were less than residential and industrial SCTLs. TRPH concentrations exceeded the 460 mg/kg residential SCTL in soil samples SB-6 (1700 mg/kg), SB-7 (890 mg/kg), SB-8 (9,000 mg/kg),</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>SB-9 (3,400 mg/kg), SB-10 (1,000 mg/kg). TRPH concentrations exceeded the 2,700 mg/kg residential SCTL in soil samples SB-8 and SB-9. All SCTL exceedances were observed between 5 to 7 feet below land surface (bls).</p> <p><b>2008:</b> On December 8 and 9, Aerostar collected groundwater samples from 6 wells. LNAPL was not detected. BTEX and TRPH concentrations were less than GCTLs in all monitoring wells. With the exception of 1-methylnaphthalene and naphthalene, all PAH concentrations were less than GCTLs in all wells. The 1-Methylnaphthalene concentration (0.033 mg/L) slightly exceeded the 0.028 mg/L GCTL in MW-6. The Naphthalene concentration (0.0143 mg/L) also slightly exceeded the 0.014 mg/L GCTL in MW-6. On December 8 and 9, Aerostar advanced seven soil borings at the site. The TRPH SCTL of 340 mg/kg was exceeded in soil samples SB-8R (4 to 5 feet bls) and SB 9-R (4 to 5 feet bls) with concentrations of 18,800 mg/kg and 608 mg/kg, respectively. Soil sample SB-8R (4 to 5 feet bls) exceeded the SCTL for industrial/commercial direct contact soil of 2,700 mg/kg. These soil samples were further analyzed by the Florida Criteria Working Group (CWG) method and all detections were less than their respective SCTLs for TRPH Fraction.</p> <p><b>2009:</b> On March 19, and August 21, Aerostar collected groundwater samples from six wells. LNAPL was not detected. BTEX, PAH, and TRPH concentrations were less than GCTLs in all wells. There were no FDEP GCTL exceedances in any of the monitoring wells sampled over the last two monitoring events.</p> <p><b>2010:</b> CH2M Hill conducted a dock renovation project. This project and additional subsequent excavations involved removal of soil and construction of a new sea wall along the East and South Docks. Nearly 700 tons soil contaminated with petroleum product were removed from Site 278 and nearby Area of Concern 2. This soil was disposed in an offsite licensed landfill and constituted removal of nearly all contaminated soil from Site 278.</p> <p>Tetra Tech/Navy submitted to FDEP an August 27, 2010 Technical Memorandum summarizing the Site 278 site history and current conditions with a recommendation for issuance of a Site Rehabilitation Completion Order (SRCO). The Technical</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>Memorandum included historical documents such as CARs and periodic monitoring reports.</p> <p><b>2011:</b> A Site Rehabilitation Completion Order (SRCO) for No Further Action in accordance with Rule 62-782.680 FAC was issued on 18 March 2011.</p> <p><b>2012:</b> Groundwater monitoring wells were abandoned throughout Site 278 and the ensuring well abandonment report was approved by FDEP on 18 March, 2011.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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DRAWN BY	DATE
J.MADDEN	08/20/15
CHECKED BY	DATE
T.JOHNSTON	08/20/15
REVISED BY	DATE
SCALE	AS NOTED



SITE LOCATION MAP  
 NSA PANAMA CITY  
 PANAMA CITY BEACH, FLORIDA

CONTRACT NUMBER	CTO NUMBER
	JM73
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
1	0



**SITE 323**

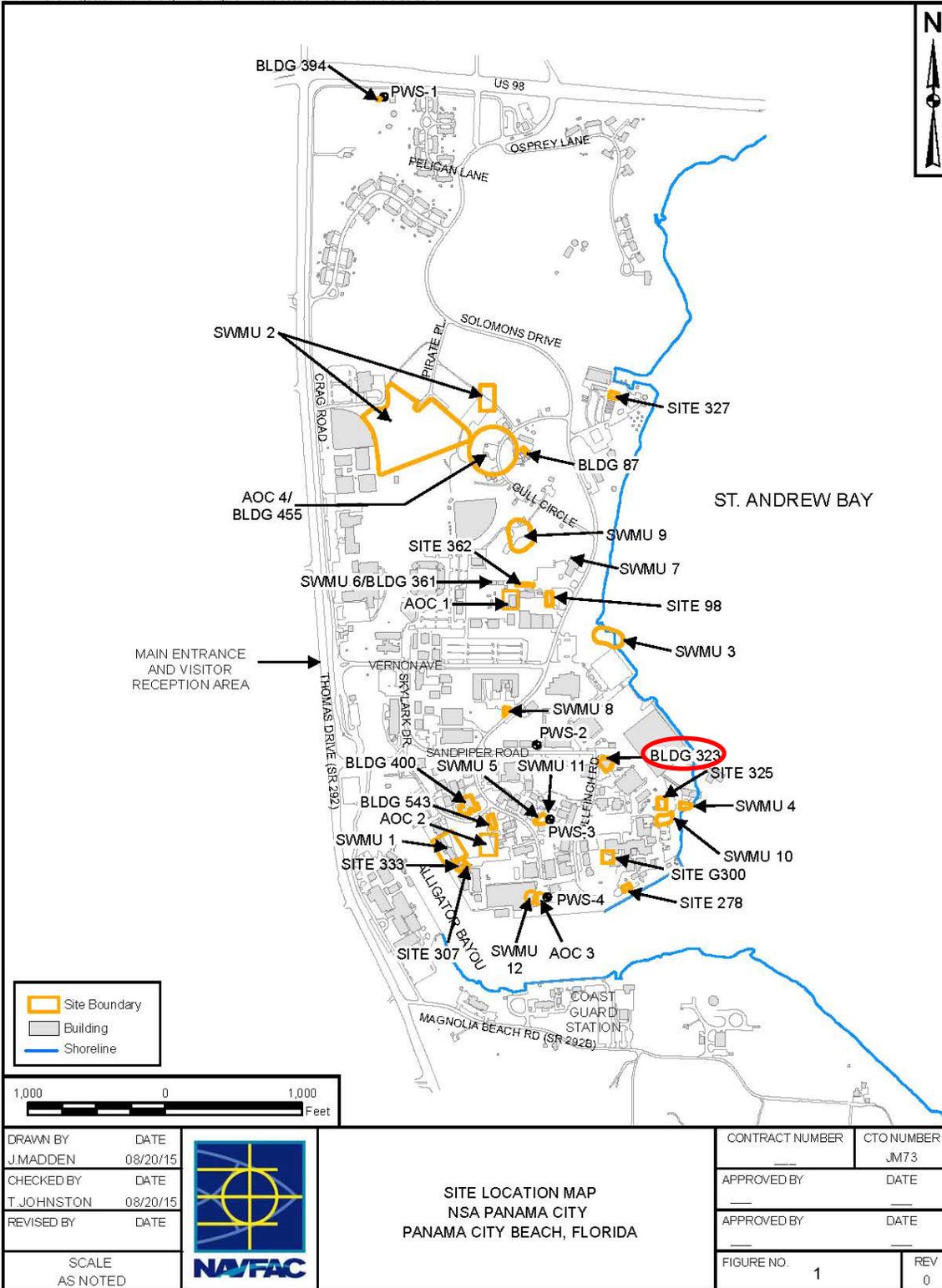
Site Name	Site Description	Completed Activities	Current Status
<p>Site 323, also known as Building 323.</p>	<p>Site 323 was located adjacent to Building 323 in the southeastern quadrant of Naval Support Activity (NSA) Panama City, approximately halfway between Solid Waste Management Unit (SWMU) 8 and SWMU 14.</p> <p>Site 323 consisted of an unregulated oil/water separator (OWS) tank which was located on the northeast side of Building 323 (see Figure 1). The OWS was removed during March 1994 to accommodate an addition to Building 323. A new OWS was installed at the site and was located northeast of the former OWS location, as shown on Figure 2.</p>	<p><b>1994:</b> On February 16, 1994, Southern Earth Sciences, Inc. screened soil samples for hydrocarbon vapors using an organic vapor analyzer (OVA). The soil samples were collected from around the perimeter of the OWS excavation and from the center of the tank excavation. The soil vapor screening identified excessively contaminated soil, as defined by Chapter 62-770.200 Florida Administrative Code (FAC) in the area of the tank excavation. During tank removal, a sludge sample was collected from inside the OWS and analyzed for Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) metals, volatile organics, semivolatile organics, herbicides, and pesticides. All constituent concentrations were less than detection limits.</p> <p>On March 9, 1994, Southern Earth Sciences screened additional soil samples at the former OWS location. These soil samples were collected after 16 cubic yards of soil had been removed from the former OWS excavation and disposed offsite. Excessive hydrocarbon vapor readings were reported in each of the samples. The highest hydrocarbon vapor concentrations were reported at the northeastern and western sides of the excavation at 238 and 240 parts per million (ppm), respectively.</p> <p>After removal of the OWS, an addition was constructed onto Building 323. Part of the building addition covered the southeastern end of the area where the former OWS had been located.</p> <p><b>1996:</b> Brown and Root Environmental (B&amp;RE) conducted a contamination assessment and produced a Contamination Assessment Report (CAR) for Site 323 dated December 1996.</p> <p>The highest concentrations of hydrocarbon vapors were detected in soils at the water table interface located at approximately 6 feet below land surface (bls). A composite soil sample collected from 6 to 8 feet bls, showed that all constituents analyzed for the Gasoline and Kerosene Analytical Groups (GAG and KAG), including used oil constituents, met the concentration criteria for clean soil as established in Chapter 17-775.400 Florida Administrative Code (FAC), and Florida Department of Environmental Protection (FDEP) Soil Clean-up Target Levels</p>	<p>NFA, based on the permit renewal application letter dated 5/26/1995.</p> <p>Documented in the in current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>(SCTLs). Free product was not encountered during the contamination assessment.</p> <p>Groundwater sample analyses showed low levels of volatile organic compounds (VOCs) and total recoverable petroleum hydrocarbons (TRPH) to be present in the groundwater. Trace amounts of lead, arsenic, and chromium also were detected in groundwater. The soil contamination appeared to originate from OWS overflows as evident from soil vapor data collected during removal of the tank.</p> <p>The total dissolved solids content in the surficial aquifer in the area of NSA Panama City was noted to qualify the aquifer for classification as a G-II aquifer (Chapter 62-3.403 FAC).</p> <p>Well fields and surface water intakes which supply drinking water to the local area are located outside a 0.50-mile radius of the site. Domestic water wells were not identified within 0.25 mile of the site. Surface water bodies and freshwater aquifers utilized in the study appeared not likely to be threatened by the levels of hydrocarbons detected at the site</p> <p>Based upon the hydrogeological and chemical data presented in the CAR, and the criteria for No Further Action (NFA) status as described in Rule 62-770.600(5) FAC and the FDEP Publication FDER-10/90, B&amp;RE proposed an NFA status for the site.</p> <p><b>1997:</b> On April 3, 1997 a meeting was held at with FDEP to review CAR comments and to agree upon a scope of work for confirming site conditions.</p> <p>On April 21, 1997 B&amp;RE conducted confirmation subsurface soil sampling at site 323 and reported the results in a CAR addendum letter report dated June 24, 1997.</p> <p>No soil vapor contamination was detected in the 2 and 4 feet bls depths. Hydrocarbon vapor concentrations of 240 ppm and 40 ppm were measured in soil samples collected at 6 feet bls at two different borings (SB15 and SB16). The hydrocarbon vapor concentration detected at boring SB16 indicated the soil vapors at the water table/vadose zone interface had decreased to less than "excessively contaminated" levels. Therefore,</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>no temporary monitoring well was installed at the location of nearby SB11. However, detection of "excessively contaminated" soil at the water table/vadose zone interface at SB15 warranted resampling of monitoring well PCY-323-MW01, within the area where the highest concentrations of soil hydrocarbon vapors were detected.</p> <p>On April 21, 1997 B&amp;RE collected an additional groundwater sample from monitoring well PCY-323-MW01. Sampling for used oil constituents included analysis for lead, arsenic, cadmium, and chromium, Purgeable Halocarbons, Purgeable Aromatics, Polycyclic Aromatic Hydrocarbons, VOCs, Semivolatile Organic Compounds (SVOCs) and TRPH.</p> <p>Groundwater laboratory analysis from the most recent sampling event for GAG and KAG, including used oil constituents, reported concentrations of total volatile organics, TRPH, naphthalene, total naphthalene, and arsenic at levels meeting the criteria for NFA status as described in Chapter 62-770.600(5) FAC. All other petroleum constituents analyzed in groundwater were less than detection limits and did not exceed FDEP NFA criteria for a G-II aquifer.</p>	

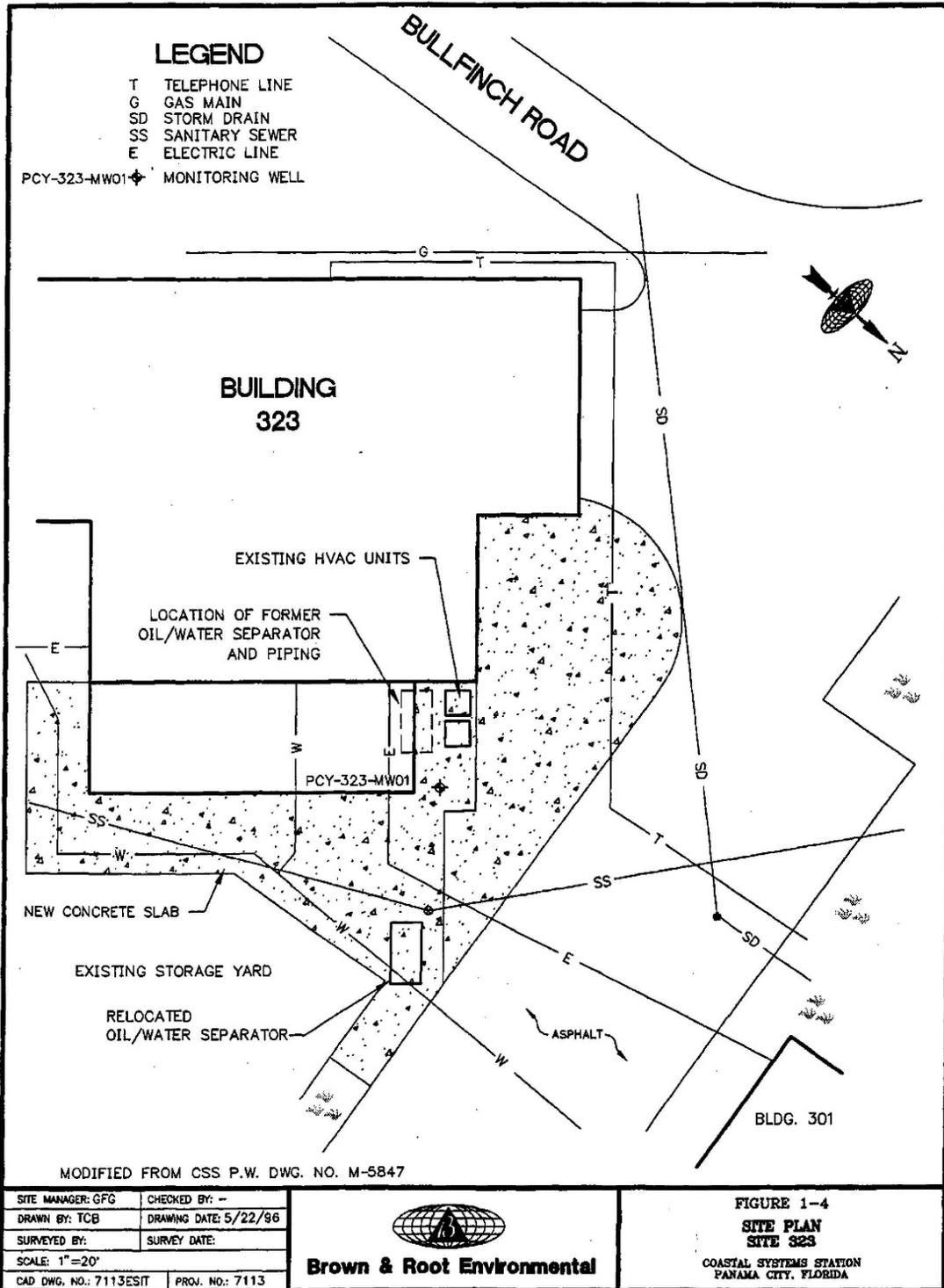
**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2**  
**SITE 323 LAYOUT**

(extracted from the 1996 Contamination Assessment Report for Site 323 by Brown and Root Environmental)



**SITE 325**

Site Name	Site Description	Completed Activities	Current Status
<p>Site 325 (also known as Building 325), Aviation Fuel Storage Underground Storage Tanks (USTs)/Aboveground Storage Tanks (ASTs)</p> <p><b>Notes:</b> Some Site 325 documents are filed under UST 1 in the Naval Installation Restoration Information System (NIRIS).</p> <p>What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>This site is located in an intensely developed area at the eastern side of Naval Support Activity (NSA) Panama City (see Figures 1 and 2). Three 20,000 gallon fiberglass USTs were installed in 1976 and one 300 gallon UST was installed in 1984; all tanks were used for storage of JP-5 jet fuel but were replaced in 1995 after finding a fuel leak. The site includes a large asphalt/concrete paved parking lot surrounded by office, storage buildings, warehouse buildings, and three above ground storage tanks that replaced the USTs.</p>	<p><b>1989:</b> Four compliance wells were installed around the USTs as part of the Navy Release Detection Program. Petroleum-contaminated soil was detected.</p> <p><b>1992 to 1993:</b> ABB Environmental Services, Inc. (ABB-ES) initiated a contamination assessment (CA) at the site in September 1992. As part of the CA, 10 soil borings and three monitoring wells were installed. Several groundwater samples exceeded Florida Groundwater Cleanup Target Levels (GCTLs) for benzene and total naphthalenes, and free product was detected in several wells. In August 1993, approximately 9 inches of free product were discovered in a second monitoring well, MW-6. A leak was identified in underground pipelines associated with the middle UST.</p> <p><b>Note:</b> Two different but similar (not identical) 1993 contamination assessment presentations by ABB-ES with the same title are available in NIRIS.</p> <p><b>1994:</b> In July 1994 ABB-ES installed free product recovery wells. Fourteen soil borings were advanced at the site to locate the area of greatest free product thickness. One recovery well was installed on the north side of the tank pad, and two recovery wells were installed along the east side of the tank pad. Only one well contained measurable free product. The Activity made a decision to abandon the leaking system and replace it with a similar system. The Navy decided to remove the USTs and free product from the site. The plan was later revised to include UST, pipelines, and soil removal oversight.</p> <p><b>1995:</b> In July and August Florida Petroleum Services removed the USTs and piping. Approximately 490 cubic yards of excessively contaminated soil (total hydrocarbon readings &gt;50 parts per million) were replaced with clean fill. Only contaminated soil associated with the tanks and piping removal was excavated; leaving some contaminated soil on site. The groundwater surface was vacuumed to remove residual free product but the amount of free product removed was not measureable.</p> <p><b>1996:</b> ABB-ES submitted a Contamination Assessment Report (CAR) in January based on additional contamination assessment work, and</p>	<p>Establishment of LUCs was approved by FDEP for petroleum-related contamination in soil (deeper than 3 feet below land surface) and entire groundwater column within the groundwater LUC boundary. Approval came in the form of a Conditional Site Rehabilitation Completion Order (SRCO) dated 9/29/2014. The SRCO incorrectly references the March 2014 version of the Technical Memorandum/LU CIP and should have referenced the September 2014 version, which is correctly attached to the SRCO. Figures 3 and 4 show the Soil and groundwater LUC boundaries, respectively.</p> <p><b>Note:</b> Some Site 325 documents are filed under UST 1 in NIRIS.</p>

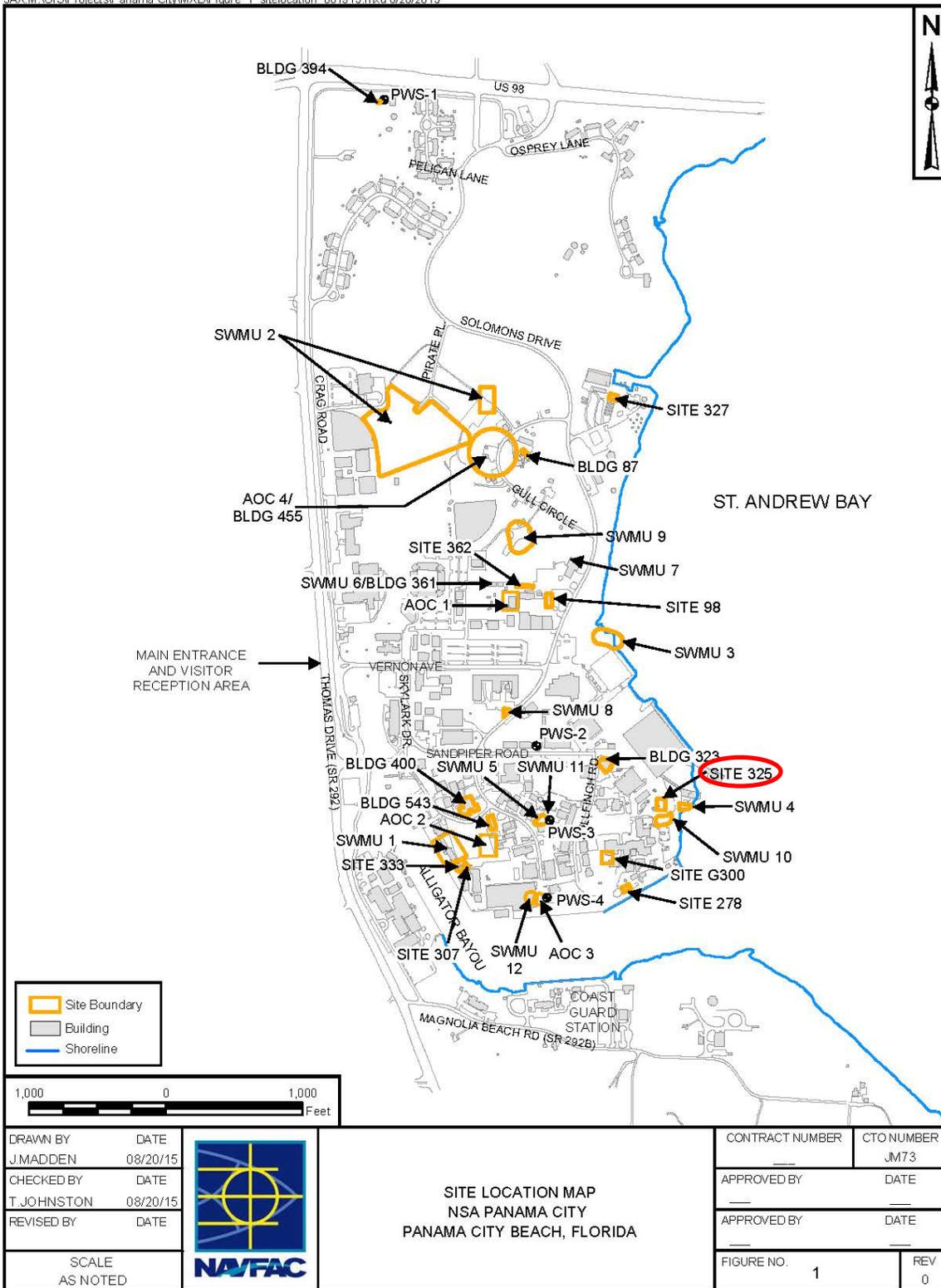
Site Name	Site Description	Completed Activities	Current Status
		<p>recommended an Interim Removal Action (IRA). In May, ABB-ES submitted a Remedial Action Plan (RAP) identifying the following contaminants of concern:</p> <ul style="list-style-type: none"> <li>• volatile organic compounds (VOCs)</li> <li>• polycyclic aromatic hydrocarbons (PAHs)</li> <li>• Petroleum Hydrocarbon (measured as total recoverable petroleum hydrocarbons (TRPH))</li> <li>• ethylene dibromide</li> <li>• lead</li> </ul> <p>In addition, the extent of contamination, potential exposure pathways, limitations to site cleanup, and remedial treatment options (source abatement through free product monitoring and recovery and/or soil vapor extraction [SVE] with groundwater monitoring) were documented.</p> <p><b>1996 to 2004:</b> In accordance with the 1996 RAP, groundwater was monitored quarterly or annually, depending on the timeframe, and a vacuum enhanced extraction (VEE) system successfully reduced subsurface petroleum product contamination. PAH concentrations in groundwater also were shown to be decreasing in a 1999 annual monitoring report prepared by Harding Lawson Associates. During that time the Comprehensive Long-term Environmental Action Navy (CLEAN) contract changed hands from Ensaf to CH2M Hill in 2002. In 2002, CH2M Hill performed baseline sampling events for soil and groundwater and replaced the Aquifer Air Sparging/Soil Vapor Extraction (AAS/SVE) system in October 2002. System startup and monitoring occurred until May 2004. The construction completion report for the SVE system and the AAS was submitted and included a summary of the Vapor Extraction (VE) system that was installed in 1997 and completed in 1998. The system operated bimonthly through December 2001.</p> <p>In an August 2002 partnering meeting presentation sampling results were described. Detected concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX) compounds were listed as current contaminants of concern (COCs) for groundwater; and 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and TRPH was listed as a current COC for soil and groundwater.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>2004 to 2006:</b> Quarterly operation and maintenance (O&amp;M) and groundwater sampling was conducted. Detected concentrations of BTEX and PAHs remained less than method detection limits (MDLs) or their respective GCTLs. With the exception of a groundwater sample collected from monitoring well MW-23 in September 2005, TRPH concentrations remained below the GCTL of 5 milligrams per liter (mg/L). The locations of MW-23, other wells, and soil borings are shown on Figure 3.</p> <p><b>2007:</b> The AAS/SVE system was shut down in 2007. A site-wide groundwater sampling event was conducted by Tetra Tech during the second and third calendar quarters. BTEX, PAHs, and TRPH were detected at concentrations less than their respective MDLs or GCTLs. Quarterly groundwater monitoring continued with similar results until the 4th quarter. During the 4th Quarter 2007, the TRPH concentration was greater than its GCTL in wells MW-8 and MW-23 only. BTEX and PAH concentrations in soil were less than their respective Soil Cleanup Target Levels (SCTLs) for Residential and Industrial Direct Exposure. TRPH concentrations exceeded the Residential Direct Exposure SCTL in three soil samples and exceeded the Industrial Direct Exposure SCTL in two soil samples.</p> <p><b>2008:</b> TRPH speciation was conducted using the Criteria Working Group (CWG) method to determine if the TRPH fractions exceeded the respective standards for the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) fractions. TRPH concentrations detected in soil sample SB-13, exceeded the leachability to groundwater criterion, Residential Direct Exposure SCTL and the Industrial Direct Exposure SCTL; however, results of the TPHCWG analysis indicated that concentrations were less than their respective SCTLs for all TRPH fractions. TRPH concentrations in groundwater samples collected from wells MW-8 and MW-23 were greater than the GCTL.</p> <p><b>2009:</b> During quarterly groundwater sampling in March 2009, BTEX and PAH concentrations remained less than their respective MDLs and/or CTLs. The TRPH concentration was greater than its GCTL in groundwater samples collected from wells MW-8 and MW-23 only. In September, five additional wells (MW-7, MW-10, MW-15, MW-19 and MW-21) were added to the sampling schedule. BTEX and</p>	

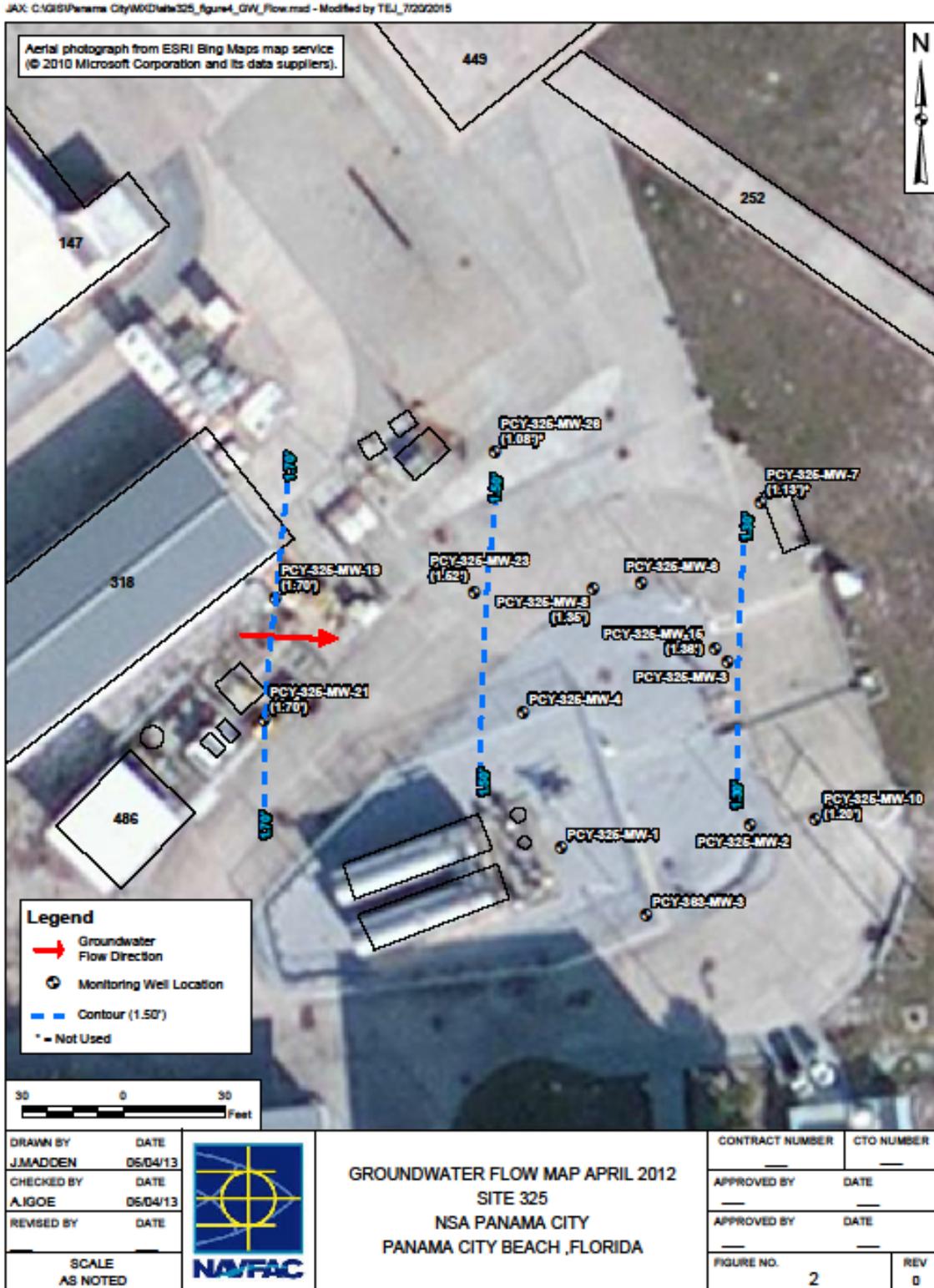
Site Name	Site Description	Completed Activities	Current Status
		<p>PAH concentrations remained less than their respective MDLs or GCTLs. The detected TRPH concentration in the groundwater sample collected from well MW-23 exceeded its GCTL.</p> <p><b>2010:</b> A semiannual groundwater sampling event was conducted in March, 2010. Eight wells (MW-7, MW-8, MW-10, MW-15, MW-19, MW-21, MW-23 and MW-26) were sampled and the groundwater samples were analyzed for BTEX, PAHs, and TRPH. BTEX and PAH concentrations remained less than their respective MDLs or CTLs. The TRPH concentration in well MW-23 exceeded its GTCTL.</p> <p><b>April 2012:</b> SACAL Environmental &amp; Management Company, Inc. (SACAL) collected soil samples to determine the extent of soil contamination near wells MW-8 and MW-23. TRPH concentrations in soil sample PCY-0325-4-5-SB001 [1,000 milligrams per kilogram (mg/kg)] exceeded the Leachability to Groundwater Criterion of 340 mg/kg, the Residential Direct Exposure SCTL of 460 mg/kg, and the Industrial Direct Exposure SCTL of 2,700 mg/kg. TRPH concentrations detected in soil sample PCY-0325-3-4-SB005 (890 mg/kg) exceeded the Leachability to Groundwater and the Residential Direct Exposure SCTLs. Soil samples PCY-0325-4-5-SB001 and PCY-0325-3-4-SB005 were selected for total petroleum hydrocarbon speciation. The concentration of C8-C10 aliphatic hydrocarbons in soil samples PCY-0325-4-5-001 (2,800 mg/kg) exceeded the Residential Direct Exposure SCTL of 1,700 mg/kg. The concentration of C12-C16 aliphatic hydrocarbons in soil samples PCY-0325-4-5-SB-001 (9,200 mg/kg) and PCY-0325-3-4-SB-005 (5,100 mg/kg) exceeded the Residential Direct Exposure SCTL of 2,900 mg/kg. TRPH concentrations in groundwater samples collected from wells MW-8 [5,600 micrograms per liter (µg/L)] and MW-23 (6,500 µg/L) exceeded its respective Florida CTL of 5,000 µg/L.</p> <p><b>2013 to 2014:</b> Based on April 2012 results, Tetra Tech issued a Technical Memorandum in September 2013 with a recommendation to implement groundwater and soil land use controls (LUCs). In March 2014, a LUC Implementation Plan (LUCIP) was incorporated into the Technical Memorandum, which was later approved by the Florida Department of Environmental Protection (FDEP).</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

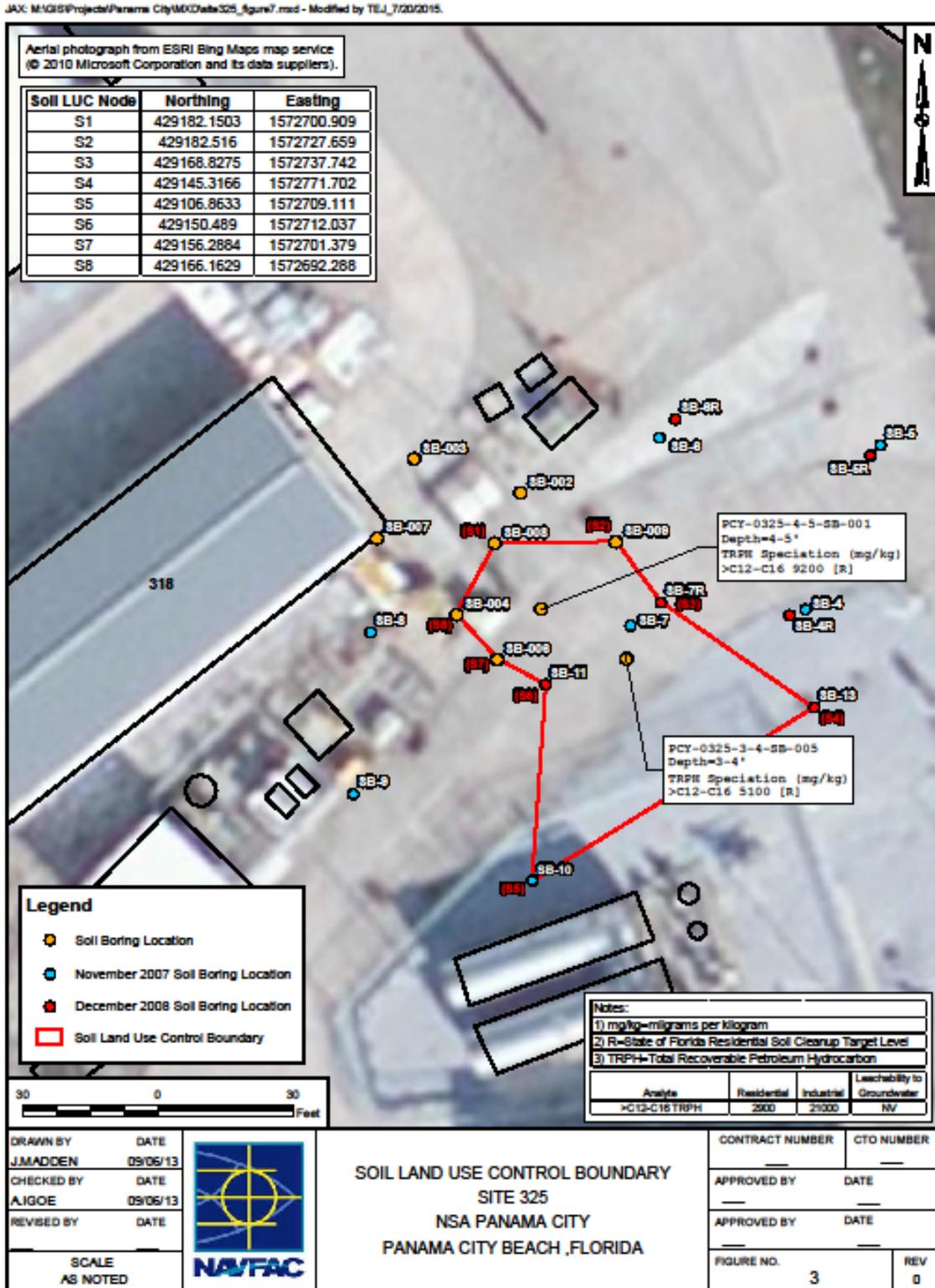
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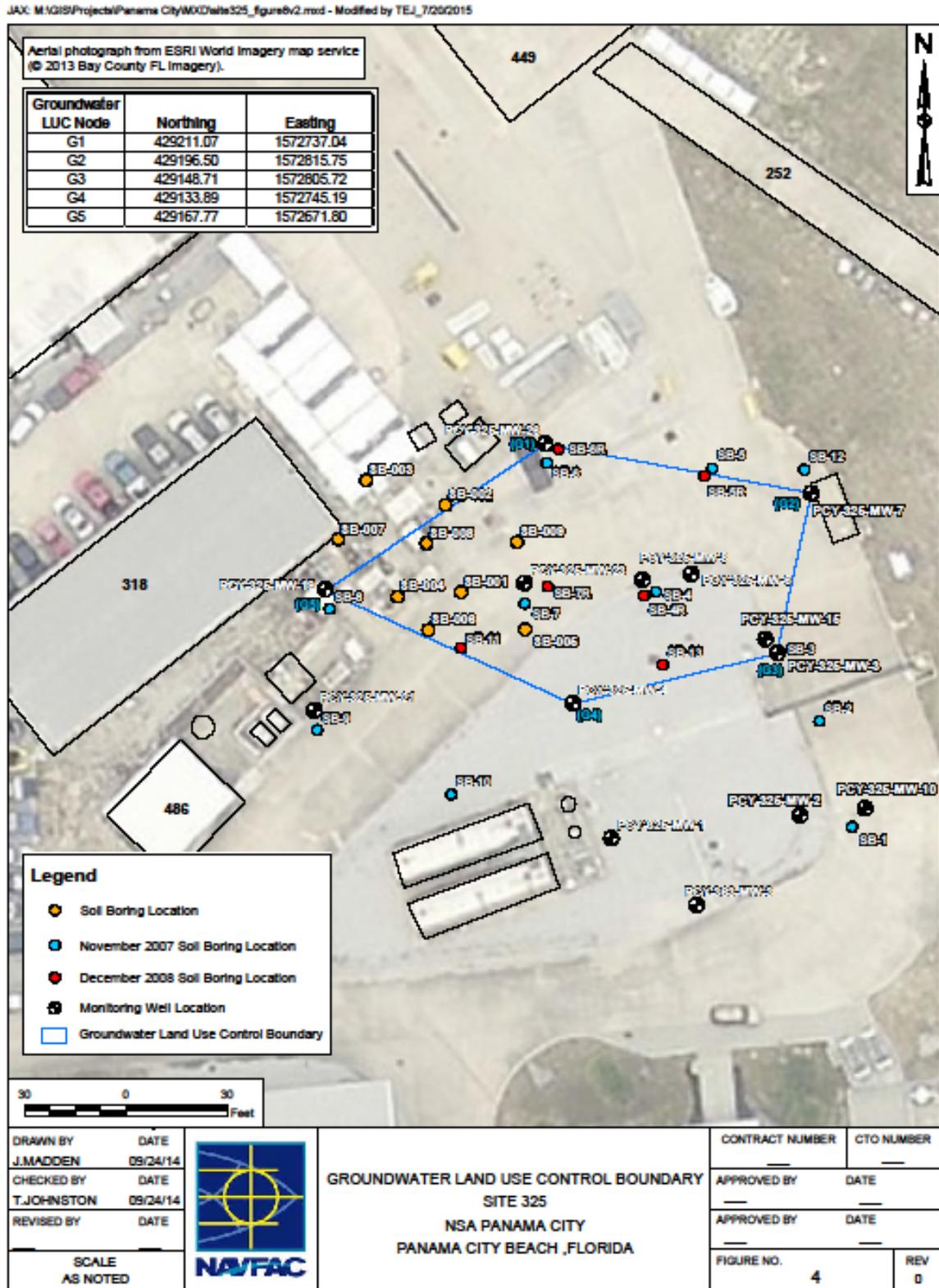
**FIGURE 2**  
**SITE 325 GROUNDWATER FLOW DIRECTION**



**FIGURE 3**  
**SITE 325 SOIL LAND USE CONTROL BOUNDARY**



**FIGURE 4**  
**SITE 325 GROUNDWATER LAND USE CONTROL BOUNDARY**

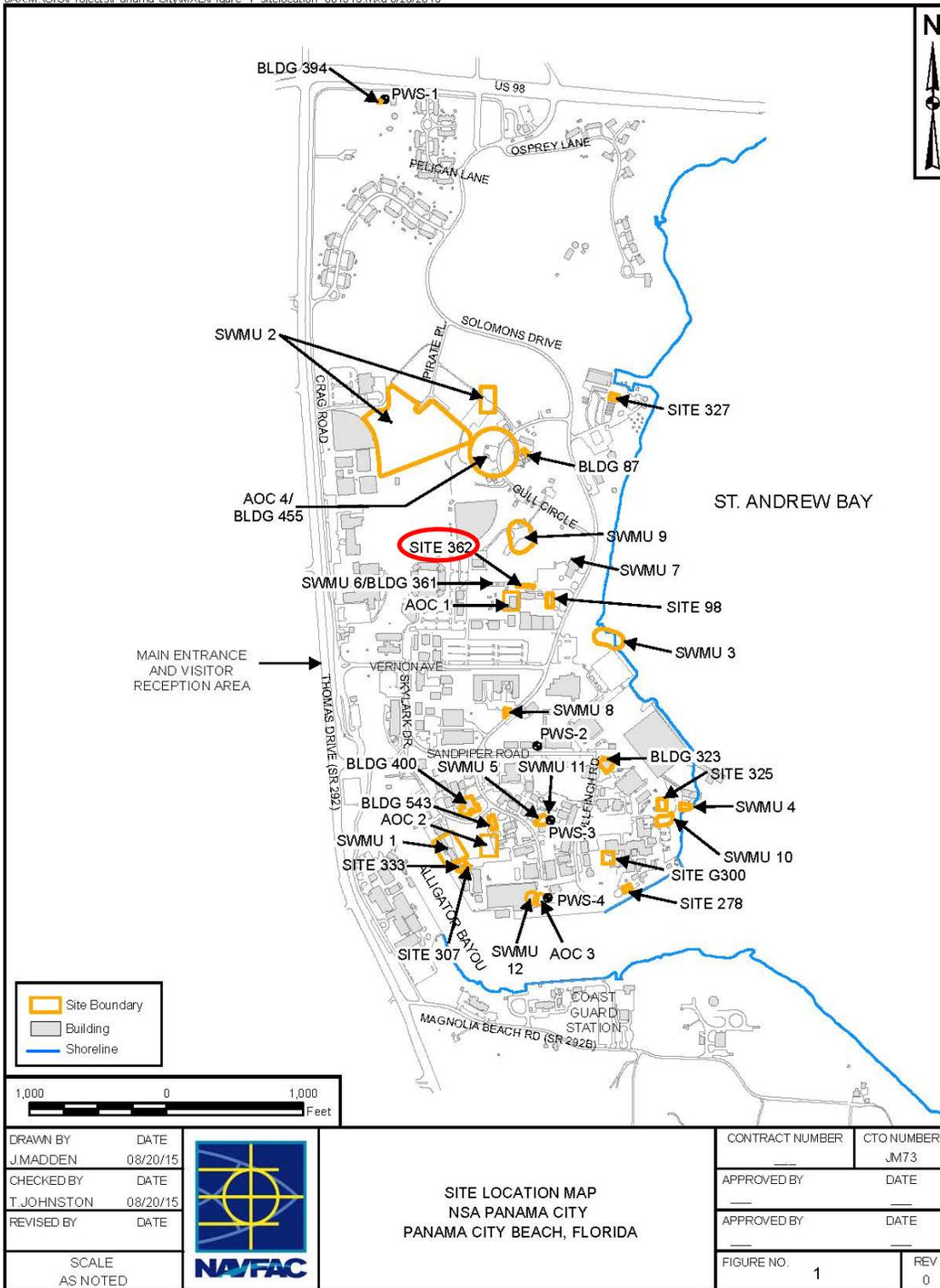


**SITE 362**

Site Name	Site Description	Completed Activities	Current Status
<p>Site 362, also known as Building 362.</p>	<p>Site 362 was a fuel delivery system consisting of four 12,000-gallon fiberglass underground storage tanks (UST) and a dispenser island at Naval Support Activity (NSA) Panama City. The USTs were installed in 1981 and the system was retrofitted in May 1995, to include double-walled product piping and overspill containment buckets.</p> <p>Tank 1 contained JP-5 fuel; Tanks 2 and 3 contained diesel fuel; and Tank 4 contained unleaded gasoline. An underground holding tank was located east of the UST area. The underground holding tank was part of a collection system used to contain surface spills at the fuel delivery system.</p> <p>Figure 1 shows the layout of NSA Panama City and the location of Site 362; Figure 2 shows the Site 362 layout. Tank numbers are not shown on Figure 2.</p>	<p><b>1995:</b> During an upgrade of the fuel delivery system in May 1995, soil samples were collected and screened for hydrocarbon vapors using an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Soil samples were collected along the underground product lines and from beneath the dispensers. Results of the soil assessment indicated that soils adjacent to the gasoline UST had been impacted by gasoline. On June 6, 1995, a soil hydrocarbon vapor survey was conducted on soil samples collected adjacent to the southeastern side of the gasoline tank. Results of the soil vapor survey identified excessively contaminated soil near the fill port of this tank. Approximately 18 cubic yards of soils were excavated from the area near the fill port for disposal as part of an Initial Remedial Action.</p> <p><b>2011:</b> According to an NSA Panama City Cleanup Report dated May 18, 2011, an automatic shut-off valve did not operate correctly allowing approximately 75 gallons of diesel fuel to be released out of the vent pipe onto the concrete curbed loading ramp. The diversion valves for the containment area were misaligned, diverting the fuel to the ground north of B-362 instead of to the spill containment tank.</p> <p>Excavation of contaminated soil occurred between May 23 to June 2, 2011 based on visual and olfactory screening supplemented with use of a Photo Ionization Detector (PID) until all soil headspace concentrations were less than 10 parts per million (ppm) on PID. The final excavation was approximately 3 to 4 feet deep at the northern end near the drain pipe and as deep as 6 feet at the southern end. Approximately 90 cubic yards of contaminated soil were excavated from the spill area and disposed at an approved landfill. Figure 3 is an aerial view of the affected area.</p>	<p>No further action (NFA), based on the permit renewal application letter dated 5/26/1995.</p> <p>Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p> <p><b>Note:</b> Additional work may be required in response to a more recent release at Building 362. As of 1 November 2015, This action is being tracked in NSA Panama City Partnering Team meeting minutes.</p>

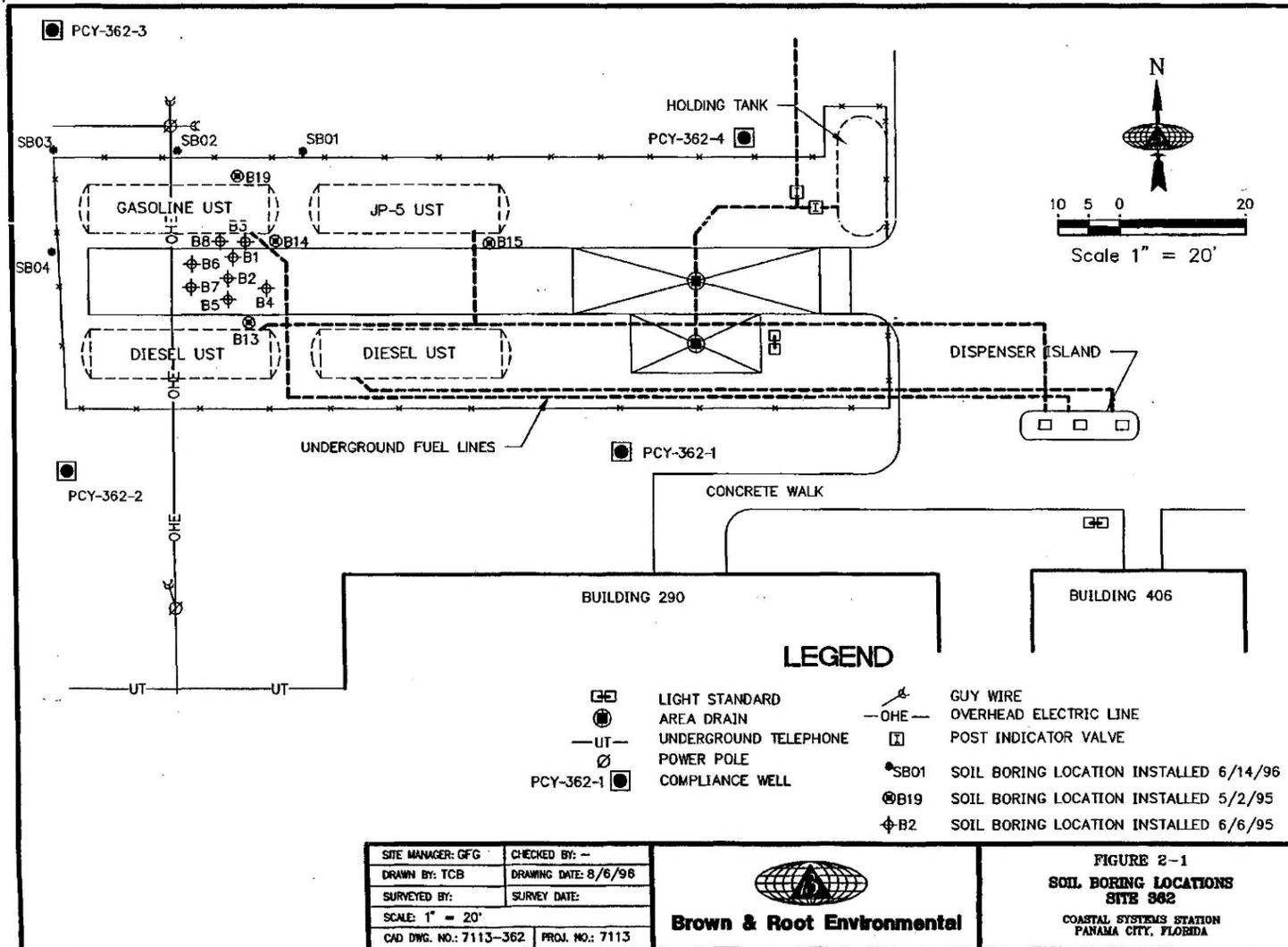
**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2  
SITE 362 LAYOUT**

(extracted from the 1996 Contamination Assessment Report for Site 362 by Brown and Root Environmental)



**FIGURE 3**  
**SITE 362 AERIAL VIEW**  
(extracted from the NSA Panama City Cleanup Report dated May 18, 2011)



## SOUTH DOCK

Site Name	Site Description	Completed Activities	Current Status
<p>South Dock.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>South Dock is a linear feature in the southern-most reach of Area of Concern (AOC) 2 at Naval Support Activity (NSA) Panama City. The site consists of contiguous asphalt and concrete paved areas. It is bordered by a pier to the south and bounded by office, storage, and ship maintenance buildings to the north. The water front dock consists of a continuous interlocked sheet pile Barrier 40 feet long that extends a minimum of 38 feet below mean sea level. The surface of the dock area includes 12 inches of stabilized sub-base with 8 inches of concrete. Figure 1 shows the location of South Dock and Figure 2 shows an aerial view of the site.</p> <p>Petroleum products were transferred from the South Dock to AST 11 (located at AOC 2) via a 6-inch underground transfer line that was connected to a pump house at the South Dock.</p>	<p><b>Mid-1960s:</b> Prior to 2009, South Dock investigations were conducted incidentally as part of AOC 2 investigations. In the mid-1960s an estimated 10,000 gallons of oil was released from ruptured fuel transfer lines located between the dock and Tank 11 at AOC 2. Following the rupture, seepage of diesel oil was observed in Alligator Bayou at the South Dock's steel bulkhead. The tank and transfer piping from the tank wall to an earthen berm were removed. The earthen berm provided secondary containment at a distance of 60 feet around the tank. The remaining piping was capped and abandoned in place.</p> <p><b>1987:</b> A Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was conducted to identify potentially contaminated sites throughout NSA Panama City. No environmental samples were collected. The RFA Report described oil slicks forming under the South Dock despite repeated cleanups in 1976. Reportedly, the dock's steel bulkhead had numerous small pits and holes. During periods of low tide, the elevation of the floating oil layer beneath the dock was low enough to allow oil to escape to Alligator Bayou through the holes. The bulkhead was cleaned and all holes and pits were repaired. In addition, fourteen boreholes were drilled through the dock's concrete deck and into the soil below. Based on available soil boring data the groundwater level was found to range from 8 to 10 feet below the paved deck of the dock. Soils with an oily odor were identified at depths of 5 to 8 feet below the deck.</p> <p>An oil recovery well was installed at the South Dock. After removing the oil, the frequency of seeing oil slicks in Alligator Bayou decreased, however, oil was expected to continue to collect behind the South Dock's bulkhead. The partial asphalt paving of South Dock and the former location of Tank 11 and its associated piping was considered to prevent most surface water from coming into contact with spilled oil or oil contaminated soil. Groundwater flowing through the site was considered to have a potential for contacting spilled oil and contaminated soil. Because soil in the area, based on borings through the dock, is sandy and fairly permeable, oil-contaminated groundwater was thought to collect under South Dock where its release to Alligator Bayou is restricted by the dock's bulkhead. Most of the oil collected in a floating layer above the</p>	<p>As of March 2016, this site is still under investigation with proposed implementation of groundwater LUCs. Soil is not an environmental concern for this site.</p> <p>The proposed groundwater LUCs will serve to maintain the dock structure to prevent exposure to free product that is located beneath the relieving platform and prevent groundwater use because the free product will continue to act as a source of dissolved chemicals to groundwater.</p> <p>Approval of the groundwater LUC boundary is pending FDEP review and approval. No LUCs have been proposed for soil or other environmental media.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>groundwater with some leaking into the bay through holes in the bulkhead.</p> <p>The report recommended geophysics and installation of additional monitoring wells to delineate groundwater contaminant plumes and soil sampling or soil gas analysis to identify source areas.</p> <p><b>1996:</b> A RCRA Facility Investigation (RFI) report for AOCs 1 and 2, Solid Waste Management Units (SWMUs) 1 through 5, SWMUs 8 through 10, and Building 455 (Also known as AOC 4) was prepared by ABB-Environmental Services, Inc. (ABB-ES) and approved by the United States Environmental Protection Agency (USEPA) in 1996. The data collected during the RFI were considered to be sufficient to characterize the nature and distribution of contaminants and evaluate human health and ecological risks. Risks were evaluated for AOC 2/SWMU 1, including nearby Alligator Bayou. Risks were identified for aquatic receptors in Alligator Bayou along the South Dock based on sediment toxicity and impairment of the benthic community. Detected concentrations of PAHs, arsenic, and vanadium in the sediment may be associated with mortality in the toxicity test, reductions in benthic species diversity, and reductions in the number of taxa. Similar concentrations of PAHs and vanadium found at the South Dock were detected in sediment at sampling station 01-SD-06, located along the West Dock.</p> <p>No further action was required for AOC 2. Instead, a separate investigation was recommended to evaluate the potential free product behind the seawall at the South Dock and the possibly related contaminants detected in sediment samples in the adjacent part of Alligator Bayou. (The South Dock area was considered not to be related to AOC 2.).</p> <p><b>2009:</b> During a pier reconstruction project, floating petroleum product was observed beneath the relieving platform of the old pier at a depth of approximately 6 feet below land surface. The relieving platform is a concrete structure located 7 feet below the deck of the South Dock and adjoins the head wall. The platform runs the length of the headwall, and extends 25 feet inland from the head wall.</p>	

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		<p>CH2M HILL Constructors, Inc. (CH2M Hill) and Aerostar Environmental Services, Inc. (Aerostar) performed soil sampling and disposal of petroleum contaminated soil at the AOC 2/South Dock area in July, August, and November, 2009. The objective was to assess petroleum-impacted soils within the excavation at the AOC 2/South Dock area and to support waste disposal. Oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) readings also were measured along the seawall during this event.</p> <p>On July 21, 2009 Aerostar installed six soil borings (SB-1 through SB-6) via hand auger to a total depth of 8 feet below land surface (bls) in the area of impacted soil.</p> <p>On August 21, 2009, CH2M Hill installed nine additional soil borings (SB-7 through SB-15) via hand auger to a total depth of 7 feet bls. The soil headspace again was field screened. Soil samples were collected from the nine new soil borings at the 4- to 6-foot bls interval and at the 6 to 7 feet bls interval to allow for comparison between soil above the water table and soil at the water table.</p> <p>Using a gas extraction monitor (GEM), CH2M Hill found Relatively high molecular O<sub>2</sub> and CO<sub>2</sub> readings along the seawall, indicative of aerobic conditions. These conditions are conducive to degradation of non-chlorinated hydrocarbons.</p> <p>On November 5, 2009, CH2M HILL again used hand augering to install eight additional soil borings (SB-16 through SB-23) to total depths ranging from 6 to 9 feet bls. Again, soil headspace measurements were obtained and readings of greater than 50 parts per million (ppm) were measured in five (SB-16, SB-17, SB-18, SB-19, and SB-22) of the eight new soil borings. To prevent delay of construction, no off-site analytical soil samples were collected in November.</p> <p><b>2010:</b> CH2M Hill prepared a technical memorandum in April 29, 2010 to summarize the 2009 soil sampling results.</p> <p>Samples from five of the six soil borings installed in July (SB-1, SB-3, SB-4, SB-5, and SB-6) had methane-corrected headspace readings greater than 50 ppm, with SB-1 and SB-6 showing the highest readings at the 6- to 8-foot interval. Samples from the 6- to 8-foot interval (bracketing the water table) of</p>	

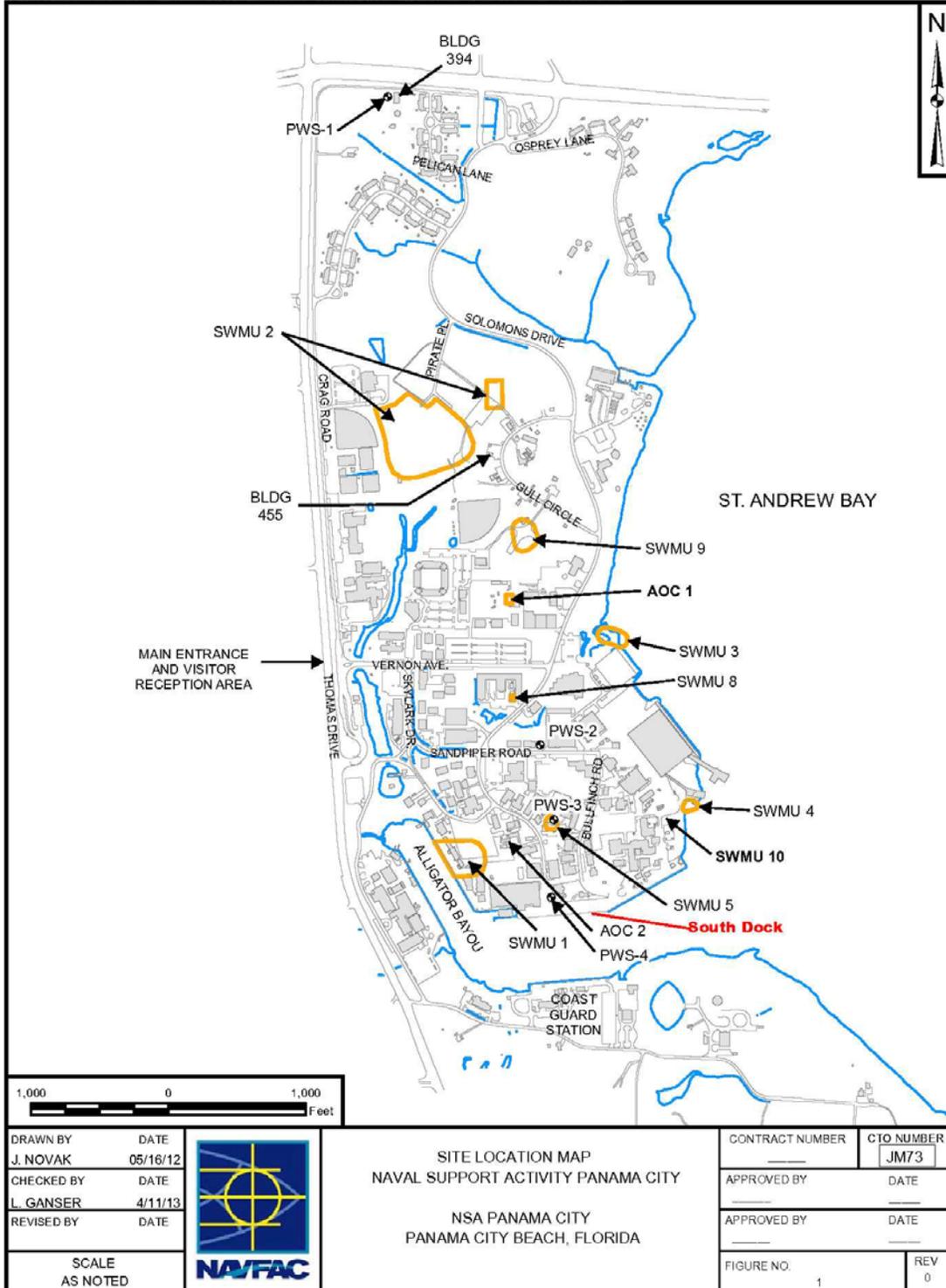
Site Name	Site Description	Completed Activities	Current Status
		<p>each boring were analyzed offsite for total petroleum hydrocarbons (TPH) speciation analysis. Florida Department of Environmental Protection (FDEP) Soil Cleanup Target Level (SCTLs) were exceeded in two borings. The sample from SB-1 exceeded the residential and leachability criteria; and the sample from SB-6 exceeded the residential criterion.</p> <p>Six (SB-7, SB-8, SB-9, SB-11, SB-12, and SB-13) of the nine soil borings installed in August showed methane-corrected headspace readings of greater than 50 ppm, with SB-7 showing the highest reading at the 6- to 7-foot interval. Analytical data showed the sample collected 6- to 7-foot bls from SB-7 to exceed the leachability SCTL for C12 to C16 Aromatics. Although other samples exceeded the total hydrocarbons SCTLs, individual speciation results were all less than the associated SCTLs. The soil from this area, measuring approximately 120 feet long by 20 feet wide and 7 feet deep, was excavated and stockpiled.</p> <p>No sample analysis results exceeded the SCTL for industrial land use. A total of 695.6 tons of non-hazardous petroleum-impacted soil were transported and disposed offsite. The majority of petroleum-impacted soil has been removed from the South Dock area. Natural attenuation of contaminants in soil and groundwater along the seawall was considered to be likely to occur, based on oxygen and carbon dioxide soil gas readings.</p> <p><b>2010:</b> In a May 20, 2010 Technical Memorandum to the NSA Panama City partnering team, Tetra Tech indicated that the relieving platform and all other support structures were left in place without alteration with the exception of a few temporary holes drilled through the relief platform used to connect the platform to the new pier structure. This memorandum reported that "...petroleum product found beneath the relieving platform was inaccessible and technically impractical to address due to the presence of the numerous and complex beams, support cables, cathodic protection wiring, and pilings that provide the structural integrity of the dock and relief platform. Additionally, it was not considered feasible that the product would migrate through the new headwall to Alligator Bayou; therefore the product could be left in place if land use controls ((LUCs) would be established." This memorandum also asserted that the residual product "...would continue to act as a</p>	

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		<p>[contaminant] source to the local groundwater and this dissolved groundwater contamination may form a dissolved front which will migrate to the north (inland) away from the dock.”</p> <p><b>April 2012:</b> SACAL Environmental &amp; Management Company, Inc. (SACAL) installed seven temporary monitoring wells (TMW-1 through TMW-7). The field work was completed in accordance with the Final “Sampling Work Plan for Buildings 98, Site 325, and Area of Concern (AOC) -2 / South Dock, NSA Panama City, Panama City Beach, Florida,” dated March 2012 and prepared by Naval Facilities Engineering Command (NAVFAC) Southeast (NAVFAC SE). The investigation included soil borings, soil gas headspace screening, and soil sampling for laboratory analysis at AOC 2; and installation of seven temporary monitoring wells and groundwater sampling for laboratory analysis at South Dock. Results of AOC 2 soil sample analyses are described in a separate AOC 2 site summary.</p> <p>Groundwater samples were collected only from temporary monitoring wells TMW-1, TMW-3 and TWM-6. Well locations TMW-1, TMW-3 and TWM-6 are shown on Figure 2. The groundwater samples were reported not to contain detectable volatile organic compounds (VOCs), including 1,2-dibromoethane (EDB); semivolatile organic compounds (SVOCs); total recoverable petroleum hydrocarbons (TRPH); or lead. However, the presence of free product was confirmed to exist west of South Dock in the shallow subsurface material.</p> <p><b>2013:</b> In October 8, 2013 a draft Technical Memorandum summarizing groundwater sampling events was prepared by Tetra Tech in October 2013. The memorandum was updated in April 2015 and was submitted to FDEP for review. The memorandum documented the lack of detections of SVOCs, VOCs (including EDB), TRPH, and lead; and recommended that a LUC boundary be implemented to encompass the dock area south of the temporary monitoring wells. This memorandum also documents that the Navy, in consultation with FDEP, determined that it is impracticable to remove free product from the South Dock area because of the complexity of the dock structure and operations, because the dock is a high activity area that is mission critical for the Navy, because an engineering control exists in the form of the continuous interlocked sheet pile barrier</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>extending approximately 38 feet below mean sea level and serves as a continuous concrete cover. The proposed groundwater LUC boundary is shown in Figure 2. The LUC would serve to maintain the dock structure to prevent exposure to free product that is located beneath the relieving platform and prevent groundwater use because the free product will continue to act as a source of dissolved chemicals to groundwater.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

BASED ON:  
 PGHP:GIS/PANAMACITY\_NSAWAPDOCS/WXDAOC01\_CORRECTIVE\_MEASURES\_SITE\_MAP.MXD 4/11/2013 KM



**FIGURE 2  
SOUTH DOCK LAYOUT WITH PROPOSED GROUNDWATER LAND USE CONTROL BOUNDARY**

JAX: C:\GIS\PANAMA CITY\MXD\AOC02\_SOUTHDOCK.MXD 05/12/13

Aerial photograph from ESRI Bing Maps map service  
(© 2010 Microsoft Corporation and its data suppliers).



**Legend**  
 ● Temporary Monitoring Well Location  
 - - - LUC Boundary Extent

DRAWN BY	DATE
S. PAXTON	01/07/13
CHECKED BY	DATE
L. SMITH	01/07/13
REVISED BY	DATE
J.MADDEN	05/12/13
SCALE AS NOTED	



LAND USE CONTROL BOUNDARY  
SOUTH DOCK  
NSA PANAMA CITY  
PANAMA CITY BEACH, FLORIDA

CONTRACT NUMBER	CTO NUMBER
	JM73
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO. 2	REV 0

**SOLID WASTE MANAGEMENT UNITS 1 TO 12**

### SOLID WASTE MANAGEMENT UNIT 1

Site Name	Site Description	Completed Activities	Current Status
<p data-bbox="203 285 380 961">Solid Waste Management Unit (SWMU) 1, Landfill A.</p> <p data-bbox="203 491 380 961">Originally called Navy Installation Restoration Program (NIRP) Site #1 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p data-bbox="203 1010 380 1287"><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p data-bbox="402 285 618 982">SWMU 1 was a marshy area located on the eastern shore of the northwestern part of Alligator Bayou at Naval Support Activity (NSA) Panama City (Figure 1). The SWMU spanned approximately 1 acre and was bordered by Buildings 92 and 94 on the south, Skylark Drive on the north, and Buildings 51 and 52 on the east. Figure 2 shows the site layout.</p> <p data-bbox="402 1031 618 1686">The disposal area at SWMU 1 was in operation from approximately 1945 to 1953 and was used for municipal and industrial waste disposal and burning of combustible waste. The part of SWMU 1 nearest to Alligator Bayou is now under the concrete deck of the West Dock. The area of the SWMU 1 used for disposal is reported to extend beneath Site 333. Reportedly, general household wastes, food scraps, scrap metal, scrap lumber, and small quantities of paint,</p>	<p data-bbox="641 285 1192 856"><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including SWMU 1, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p data-bbox="641 905 1192 1150"><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight Navy Installation Restoration Program (NIRP) sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May. Closure was recommended for SWMU 1.</p> <p data-bbox="641 1199 1192 1318">E.C. Jordan conducted an RFA to identify potentially contaminated sites throughout NSA Panama City. This report recommended RCRA closure of SWMU 1.</p> <p data-bbox="641 1367 1192 1455"><b>Note:</b> SWMU1 and Area of Concern (AOC) 2 investigations originally occurred in concert but diverged later.</p> <p data-bbox="641 1503 1192 1877"><b>1991 to 1996:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a RCRA Facility Investigation (RFI) of AOCs 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4), and prepared the ensuing RFI report. The report included a human health risk assessment for exposure of current/future receptors to surface soil, subsurface soil, surface water, sediment, and groundwater at SWMU 1 and AOC 2; and an ecological risk assessment of surface soil, groundwater, surface water, and sediment. Nearby Alligator bayou was included.</p>	<p data-bbox="1214 285 1416 604">No further action (NFA), based on a 1997 Interim Measures Report. Documented in current NSA Panama City Corrective Action permit No. 66255-HH-003.</p> <p data-bbox="1214 653 1416 1182"><b>Note:</b> In 2000, a letter was written to recommend that Site 333 be investigated along with AOC 2. However, because Site 333 was so closely associated with SWMU 1 physically, Site 333 documents are filed with SWMU 1 documents in NIRIS.</p>

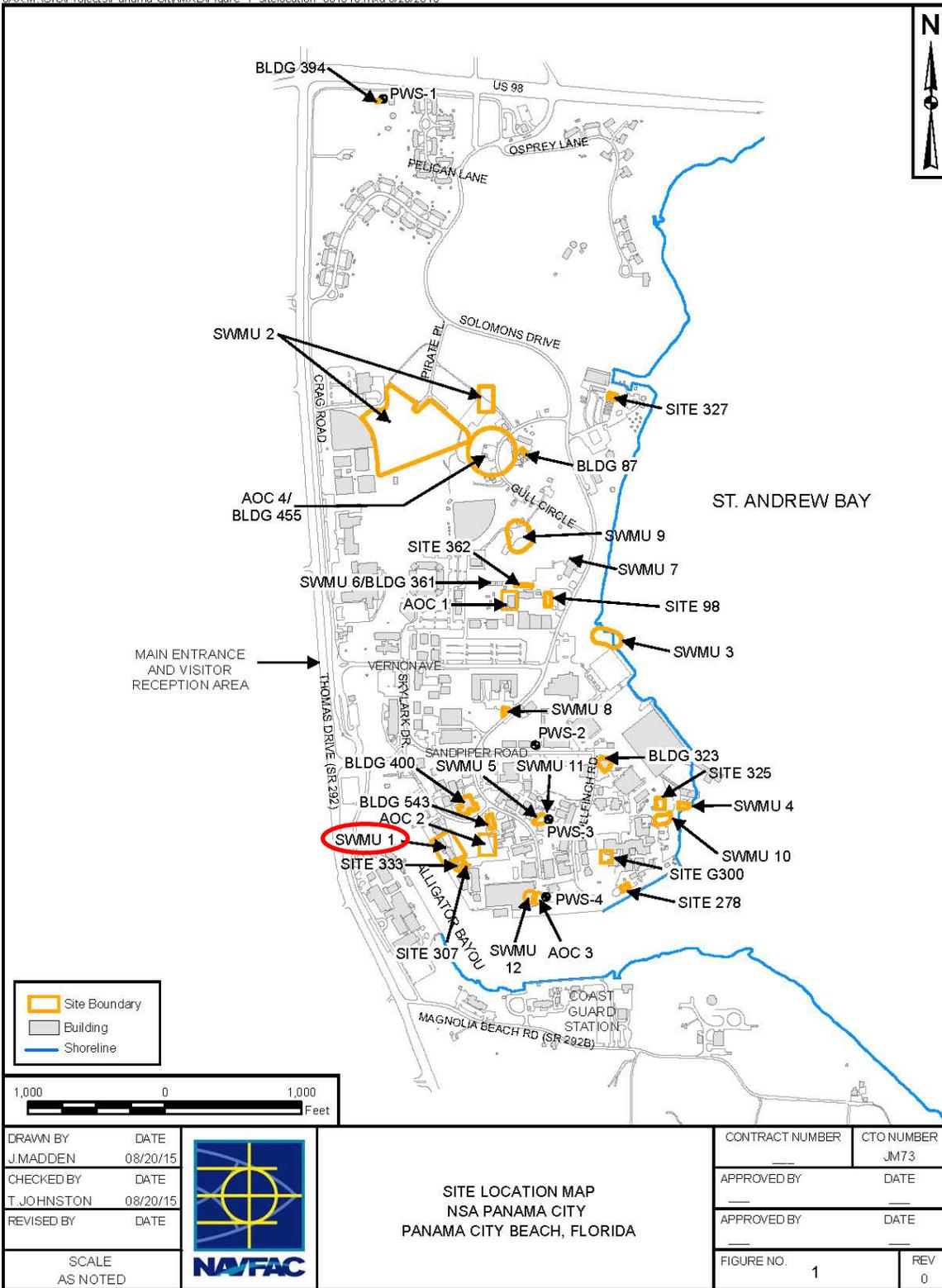
Site Name	Site Description	Completed Activities	Current Status
	<p>paint thinner, battery acids, solvents, and photographic chemicals were disposed of in this area. Waste oil and bilge water were also poured on the ground and burned. Buried waste in this area may have been removed during dock construction in the early 1950s and dock reconstruction in the late 1970s.</p>	<p>The calculated current and future human health risks for surface soil, subsurface soil, surface water, and sediment were all within the United States Environmental Protection Agency (USEPA) acceptable cancer risk range. An unacceptable non-cancer risk was identified for potential future use of groundwater due to inorganic chemicals, primarily antimony and manganese; but the risk estimate was considered to be an overestimate. Unacceptable ecological risks were identified for aquatic receptors in Alligator Bayou along the South Dock based on exposure to polycyclic aromatic hydrocarbons (PAHs) and inorganic chemicals. A separate investigation of the South Dock area was recommended and removal of soil contaminated with arsenic at one location was recommended. No further action was required for SWMU 1.</p> <p><b>1997:</b> The NSA Panama City Corrective Action permit refers to a 1997 Interim Measures Report as the basis for NFA but that report could not be found in Naval Installation Restoration Information System (NIRIS).</p> <p><b>1998:</b> Sampling was conducted by Tetra Tech personnel at AOC 2/SWMU 1, and a Preliminary Assessment Letter Report (PAR) for Site AOC 2/SWMU 1 dated December 28, 1998 was prepared. Hydrocarbons were detected in soil gas and PAHs, volatile organic compounds (VOCs), and total recoverable petroleum hydrocarbons (TRPH) were detected in groundwater upgradient of Site 333 at AOC 2. Site 333 was situated within SWMU 1.</p> <p><b>1999:</b> On September 1 and September 2, 1999, additional groundwater samples were collected by Tetra Tech personnel from two piezometer wells and 11 monitoring wells located in the AOC 2/SWMU 1 study area. Free product was detected in monitoring well PCY-AOC2-MW07. Tetra Tech prepared and submitted to Navy on 11/4/1999 a PAR Addendum in the form of a letter report to document the findings. Groundwater data confirmed the presence of PAHs, VOCs, and TRPH parameters in groundwater upgradient of Site 333 at AOC 2 identified during the December 1998 preliminary assessment investigation. The PAR Addendum recommended that Site 333 and AOC 2</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>be combined into one site investigation and that a closure assessment be performed on the AOC 2 product line and additional assessment be performed to delineate the extent of free product. The following recommendations were made:</p> <ul style="list-style-type: none"> <li>• Additional soil and groundwater assessment work should be conducted to assess the areal extent of free product near monitoring well PCY-AOC2-MW07, and the areal extent of dissolved TRPH in the groundwater. In the area where free product was detected (PCY-AOC2-MW07), soil samples should be collected for laboratory analysis to evaluate soil quality. The assessment should be conducted to assess the extent of petroleum contamination from the AOC 2 fuel distribution lines located in the parking lot of the AOC 2/SWMU 1 study area and in the grass area south of the parking lot, north of Site 333.</li> <li>• A product line closure should be completed to verify that free product had been removed from the former fuel distribution lines for AOC 2 (parking lot of the AOC 2/SWMU 1 study area), in the grass area south of the parking lot, and north of Site 333.</li> <li>• The assessment efforts for Site 333 and AOC 2 should be combined into one investigation due to commingled petroleum plumes as identified from diesel range organic-total petroleum hydrocarbon (DRO-TPH) field-screening groundwater concentrations and soil vapor concentrations.</li> <li>• Free product recovery should be implemented for well PCY-AOC2-MW07.</li> <li>• Free product removal from wells PCY-333-MW04 and PCY-333-TCW at Site 333 should continue.</li> <li>• An additional piezometer well should also be installed to confirm whether free product was released from the floor drain at Building 307, which is located adjacent to Site 333, and monitoring wells PCY-333-MW04 and PCY-333-TCW.</li> <li>• Findings from the investigations should be compiled into a Site Assessment Report (SAR) in accordance with Chapter 62-770 of the Florida Administrative Code (FAC) and submitted to the Florida Department of Environmental Protection (FDEP) for review and approval.</li> </ul>	

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		<ul style="list-style-type: none"> <li>• An aggressive interim remedial action should be implemented to prohibit product films from entering the storm water junction box.</li> </ul> <p><b>2002:</b> According to the 2002 PAR prepared by Tetra Tech, in May, 2002, additional assessment activities were conducted by Tetra Tech at AOC 2 and SWMU 1 to further delineate the extent of petroleum contamination. Although the report seems to include SWMU 1 as part of the investigation, the investigation really focused on assessing conditions at AOC 2. During this additional assessment, 37 DPT soil borings and 26 hand auger soil borings were advanced to collect soil samples for headspace screening. Soil and groundwater samples were collected from select borings for screening by an onsite mobile laboratory. In addition, 10 shallow monitoring wells and 1 deep monitoring well were installed to further delineate the dissolved hydrocarbon plume at AOC 2.</p> <p>See the site history for AOC 2 for the findings.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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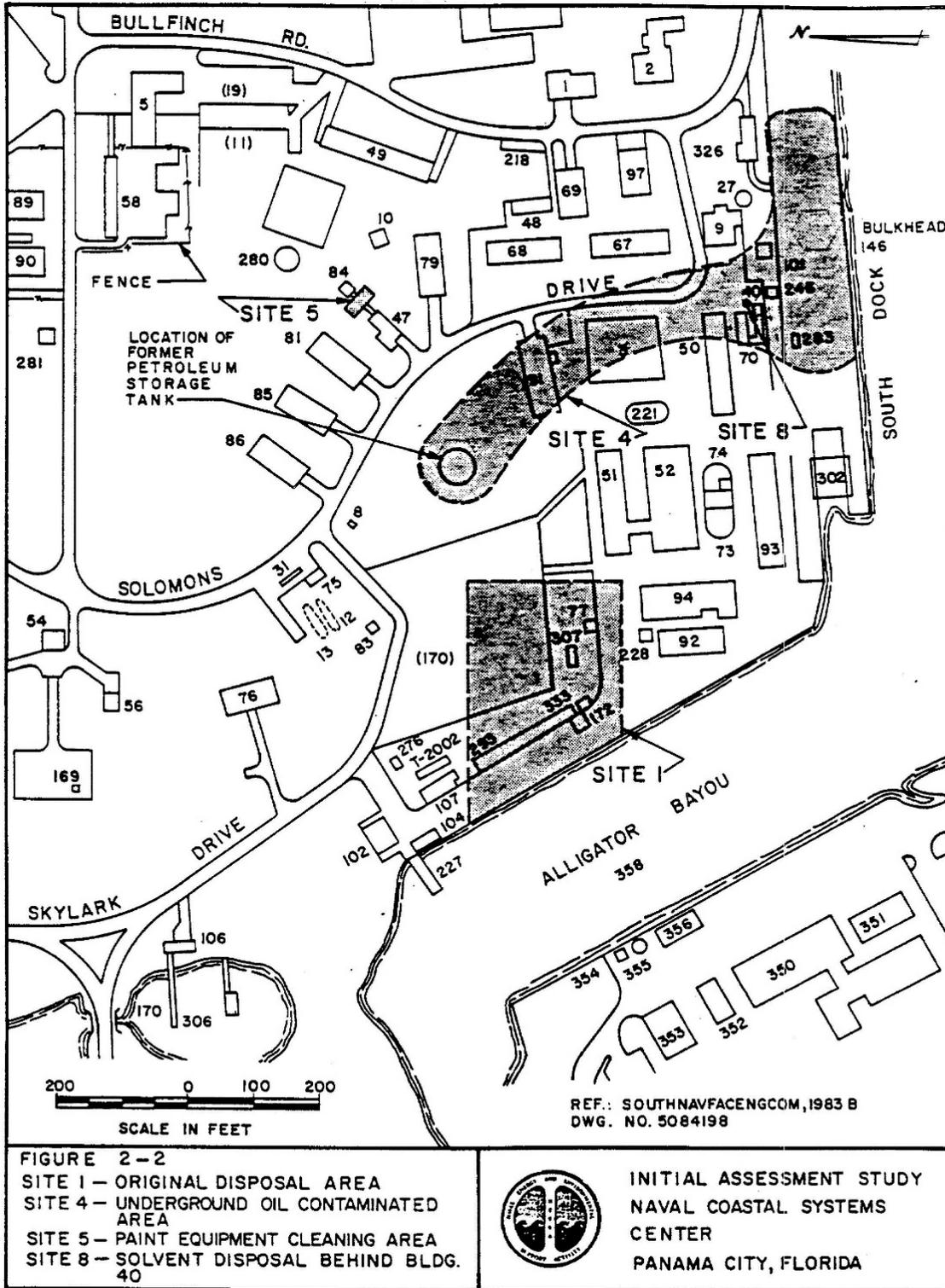
DRAWN BY	DATE
J.MADDEN	08/20/15
CHECKED BY	DATE
T.JOHNSTON	08/20/15
REVISED BY	DATE
SCALE	AS NOTED



SITE LOCATION MAP  
 NSA PANAMA CITY  
 PANAMA CITY BEACH, FLORIDA

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

**FIGURE 2**  
**SOLID WASTE MANAGEMENT UNIT 1 LAYOUT**  
 (extracted from the 1985 Initial Assessment Study)



**SOLID WASTE MANAGEMENT UNIT 2**

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management unit (SWMU) 2, Landfill B Burn and Disposal Area</p> <p>Originally called Navy Installation Restoration Program (NIRP) Site #2 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 2 spans approximately 11 acres in central Naval Support Activity (NSA) Panama City (see Figures 1 and 2).</p> <p>Wastes disposed there included paint, solvents, ash, general household food and non-food waste, and bilge water.</p> <p>Waste disposal started in late 1940s but increased from 1957 to mid-1970s</p> <p>Five areas, one of which was never found, were reported to have been used at SWMU 2 for waste disposal. Wet household waste was disposed in one area; the Burn Area apparently received household garbage, tires, wood, metal, etc. An ash disposal area is presumed to have received ash of unknown origin. A red lead paint area was reportedly used for the burial of 2 to 4 tons of read lead-based paint in 1946 and 1947 but after a thorough</p>	<p><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including SWMU 2, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p><b>1987:</b> In May 1987, Environmental Science and Engineering, Inc. (ESE) conducted and reported on a Confirmation Study – Verification Step for Southern Division, Naval Facilities Engineering Command (NAVFAC), North Charleston, South Carolina. Benzene was detected at high concentrations in soil and was also detectable in groundwater. The only other volatile organic compound (VOC) detected in the ground water was chlorobenzene in the former burn area. Further characterization of site soil and groundwater was recommended, as well as removal of visibly contaminated surface soils located along the fence around the open storage area.</p> <p>An RFA was conducted to identify potentially contaminated sites throughout NSA Panama City, as reported by E.C. Jordan, October 1987. Surface and subsurface soil sampling with monitoring well placement based on the analytical results of the soil samples was recommended. Soil gas analysis was identified as a possible alternative to soil sampling for the placement of monitoring wells.</p> <p><b>1992 to 1992:</b> ABB Environmental Services, Inc. (ABB-ES) completed a Phase I RCRA Facility Investigation (RFI) that included monitoring well installation, groundwater sampling, and subsurface soil sampling.</p> <p><b>1993 to 1994:</b> A September 1994 Technical Memorandum Initial Screening of Corrective Action</p>	<p>Waste remains in place although the majority of surface soil contamination has been removed. Soil and groundwater iron concentrations are elevated, presumably due to chemically reducing conditions induced by organic waste degrading in the soil. Iron is the only groundwater COC but groundwater iron concentrations are not a threat to surface water. COCs in soil are more numerous for a residential or residential-like exposure scenario.</p> <p>Soil and groundwater LUCs are in effect, as presented in the SWMU 2 CMIP Revision. 3, dated 4/23/2010 and approved by FDEP on May 14, 2010. FDEP-approved LUC boundaries are shown in Figure 3 and pertain to all soil and groundwater within the boundary footprints. The groundwater LUC boundary represents a</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>search for this area it was not found. A one-time base cleanup disposal area located east of the present open storage area is non-contiguous with the rest of SWMU 2. Wastes from a general base cleanup were disposed there between 1970 and 1975. In 1982, approximately 30 miles of cable and other wastes including tin, copper, wood and cardboard boxes were removed from all areas to a depth of about 2 feet and SWMU 2 was graded.</p>	<p>Alternatives, Corrective Measures Study Solid Waste Management units 2 and 9 was prepared by ABB-ES for Sothern Division NAVFAC. This memorandum was required to address concerns that soil data used to evaluate the risks identified to ecological receptors did not include the uppermost 6 inches of surface soil. A Corrective Measures Study (CMS) was not conducted. This memorandum documented the first phase of the CMS but did not complete the corrective measures because of changes in site characterization requirements required by the United States Environmental Protection Agency (USEPA). ABB-ES completed Phase II of the RFI in 1993 and 1994.</p> <p><b>1996:</b> An RFI report was prepared for Areas of Concern (AOCs) 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4) by ABB-ES. This report documented RFI Phases I and II and identified the presence of contaminants in select environmental media. Unacceptable human health risks were identified for exposure to SWMU 2 groundwater. The 1996 RFI report indicated that human health exposure to surface soil in the Household Garbage Disposal Area and in the one-Time Base Cleanup disposal Area, and to sediment, subsurface soil and surface water throughout SWMU 2 under current (industrial) and future residential land use were within the USEPA acceptable cancer risk range.</p> <p>In addition, non-cancer risks were acceptable for current (industrial) land use. Non-cancer human health risks exceeded a Hazard Index (HI) of 1 for potential future residents exposed to surface soil in the Ash Disposal Area and the Burn Area; and for a potential future adult resident exposed to groundwater used as drinking water. Various pesticides, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals were selected as contaminants of concern (COCs) in surface soil; and chromium, manganese, thallium and vanadium were selected as COCs in groundwater. Surface soil unacceptable risks were attributed largely to a single sampled location and risks from exposure to thallium in groundwater were reported to be likely overestimates. Confirmation of PCB contamination was recommended followed by spot removal of soil contaminated with PCBs, and other chemicals in various locations.</p>	<p>contraction of the original boundary.</p> <p>LUCs prohibit residential development or use of the SWMU property, including exposure to contaminated groundwater within the SWMU 2 groundwater LUC Boundary, until concentrations of COCs are low enough to support unrestricted use and unlimited exposure, and prior written approval is obtained from the Navy and FDEP.</p> <p>Human exposure to site contaminants under an industrial risk scenario is acceptable. Risks associated with a higher degree of exposure such as residential or residential-like land use, have not been re-characterized since risks were first identified as unacceptable and the soil removals were completed. Exposure to groundwater within the groundwater LUC boundary is not allowed except with prior written</p>

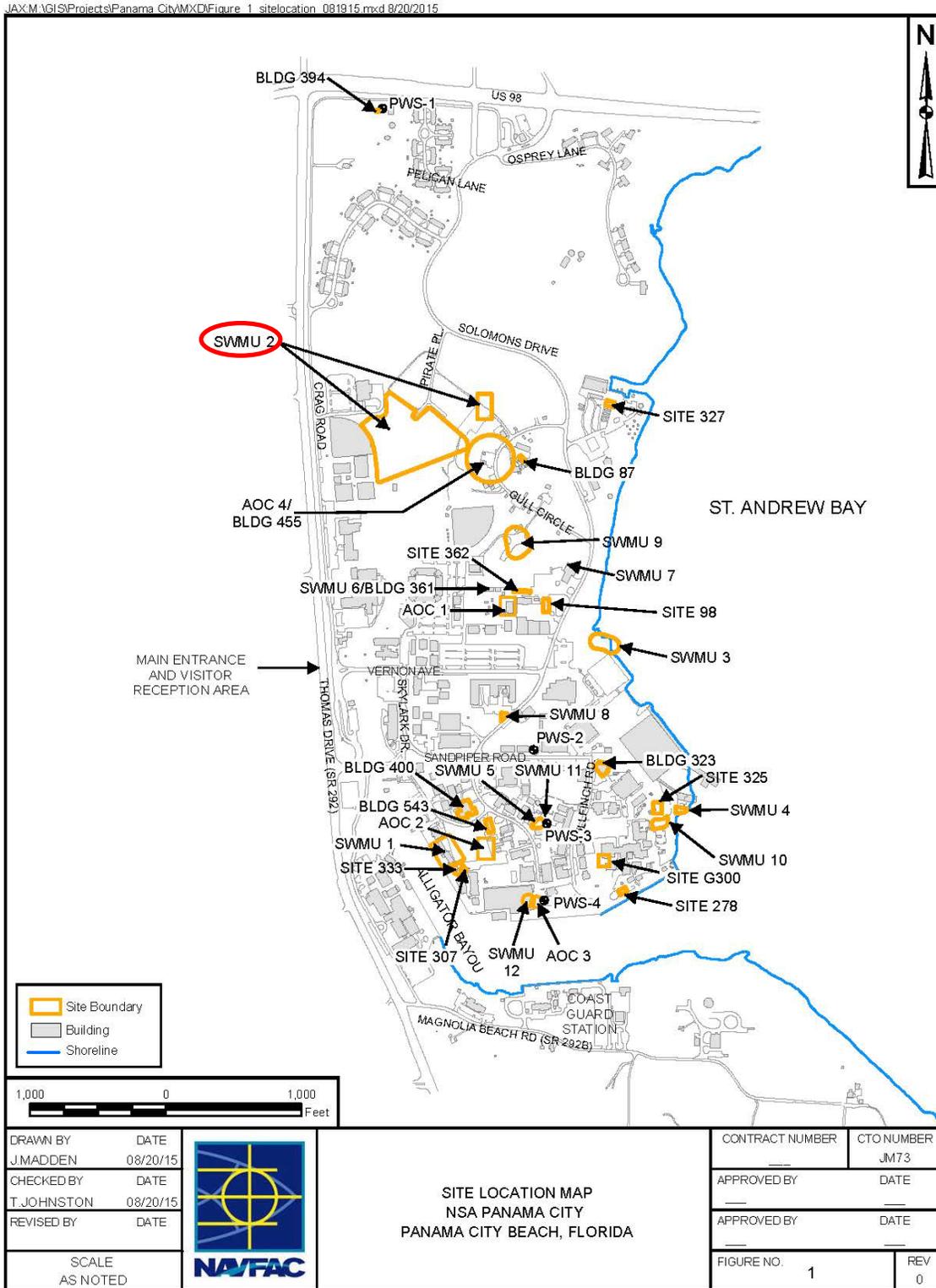
Site Name	Site Description	Completed Activities	Current Status
		<p><b>1997:</b> On February 25 and 26, 1997 Bechtel, Inc. excavated and disposed offsite nearly 7,000 pounds of contaminated surface soil identified in the RFI and reported the findings in a Project Completion Report for RCRA Interim Measures Remediation at SWMU 2, SWMU 5, AOC 2, and AOC 4, Coastal System Station Panama City, Florida. Contaminants removed were arsenic, lead, benzo(a)pyrene, dieldrin, and PCBs.</p> <p>Because of this removal, SWMU 2 was not included in a subsequent 1997 Corrective Measures Study conducted and reported by ABB-ES for multiple sites. Following a review of the historic data collected at SWMU 2, however, NAVFAC Southeast determined that additional assessment of the site was warranted to determine whether site conditions were protective of human health and the environment.</p> <p><b>2004 and 2005:</b> Tetra Tech collected soil and groundwater data, primarily to determine whether previous soil remediation was effective at reducing risks identified in the RFI and to determine whether groundwater contaminants remained at acceptable levels. Six relatively small areas of soil contaminated with pesticides and PCBs were delineated for subsequent removal.</p> <p><b>2006:</b> The six soil hot spots referenced above were removed by Tetra Tech NUS and additional soil and groundwater sampling was completed and summarized in a 2006 RFI Report Addendum. The RFI Report Addendum concluded that residual PCB, PAH, and possibly metals and other contaminants were believed to remain in the surface soil at concentrations that could pose unacceptable levels of risk to humans if the land were used for residential or residential-like purposes. Benzene, aluminum, antimony, iron, and manganese were detected at concentrations that exceeded Florida Department of Environmental Protection (FDEP) Cleanup Target Levels (CTLs) and also were thought to pose potential risk of impacts to nearby surface water. Groundwater and surface water monitoring was recommended.</p> <p><b>2007:</b> Tetra Tech issued a RCRA SWMU 2 Technical Memorandum for May 2007 Well Installation and Sampling which was approved by FDEP, then conducted a groundwater monitoring</p>	<p>approval of Navy and FDEP.</p> <p>Annual LUC inspections are required.</p> <p><b>Note:</b> As of March 2016, the Administrative Record contains no documents between 1999 and 2004 for SWMU 2 and the only documents dated 2004 are work plans.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>event (Round 0) in May 2007 to verify groundwater conditions and to evaluate potential groundwater discharge impacts to surface water. The results of this event were reported in a technical memorandum in August, 2007. This memorandum documents that, based on prior investigations and removal actions, soil, surface water, and sediment did not present unacceptable risks to any receptors under a military/industrial land use scenario.</p> <p>Tetra Tech completed a CMS and Statement of Basis in 2007. The CMS indicated that as a result of the surface soil removals conducted in 1997, 2004, and 2006, unacceptable risks from exposure to surface soil had been eliminated for an industrial land use scenario. No unacceptable risks were identified for exposure to subsurface soil, surface water, or sediment. Under a hypothetical future residential land use, risks are presumably unacceptable but less than originally estimated in the RFI because contaminated soil had been removed and replaced with clean fill.</p> <p>Corrective measures recommended in the CMS report and selected in the Statement of Basis were land use controls (LUCs), groundwater monitoring, and surface water monitoring. The Statement of Basis states that after removals of contaminated soil to reduce risks from exposures to surface soil, unacceptable cancer risk persists only in the following scenarios:</p> <ul style="list-style-type: none"> <li>• Hypothetical future residents exposed to surface soil containing residual levels of Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and arsenic.</li> <li>• Current workers using groundwater as potable water.</li> <li>• Hypothetical future residents using groundwater as potable water. The most current data indicated that cancer risks for benzene, tetrachloroethene, trichloroethene, and arsenic exceeded acceptable levels. The maximum detected concentrations of benzene, tetrachloroethene, trichloroethene, and arsenic, however, were less than their respective drinking water standards known as USEPA Maximum Contaminant Levels (MCLs), and only the maximum benzene concentration [1.8 micrograms per liter (µg/L)] exceeded the 1 µg/L FDEP Groundwater CTL (GCTL). Based on</li> </ul>	

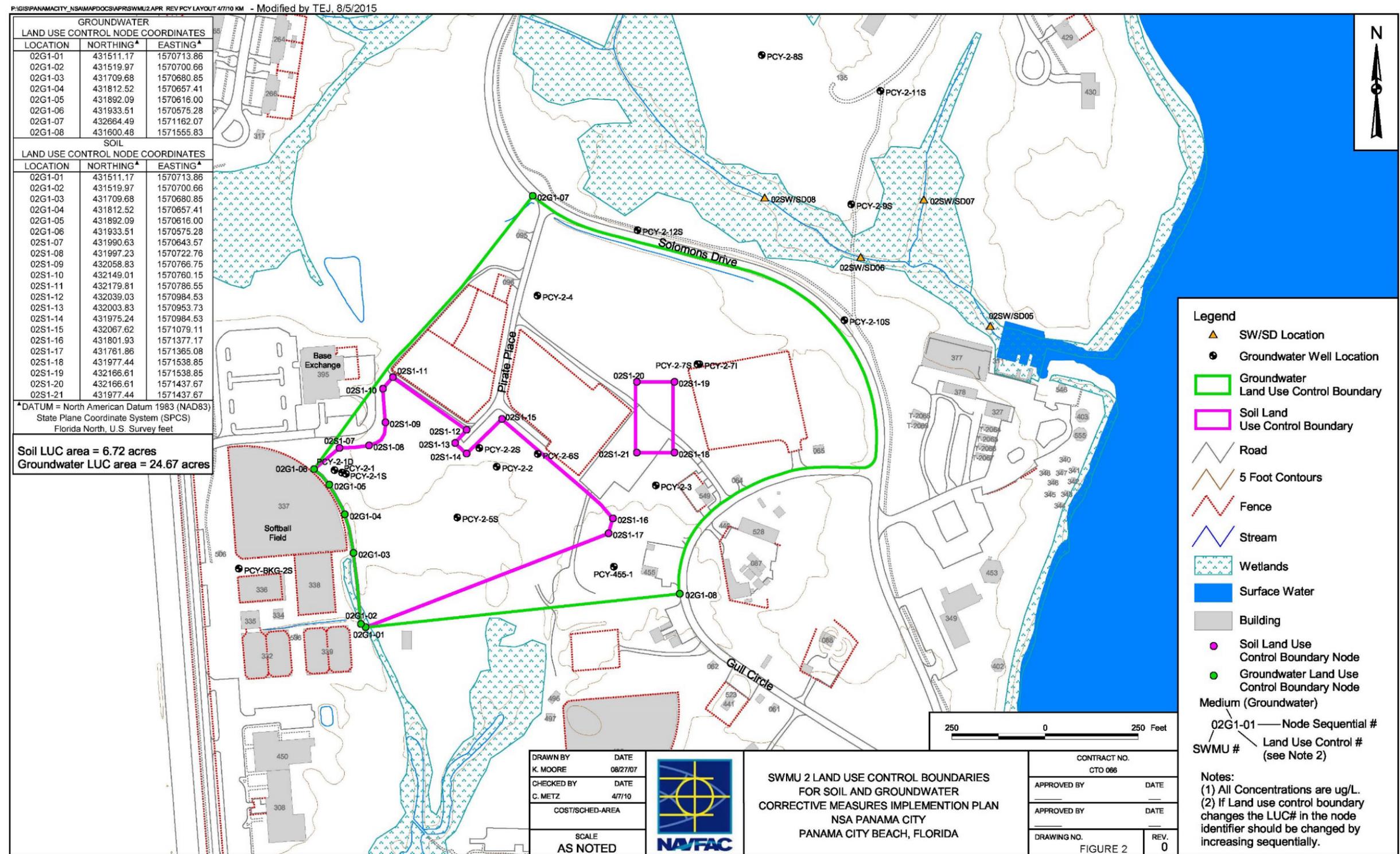
Site Name	Site Description	Completed Activities	Current Status
		<p>these findings, benzene was identified as the only organic chemical (i.e., COC) requiring continued evaluation.</p> <p>Potential non-cancer risks for a hypothetical adult and child resident exposed to surface soil in the Ash Disposal and Burn Areas also were unacceptable. Aroclor-1248 was the overwhelming single contributor to unacceptable non-cancer risk for exposure to SWMU 2 surface soil.</p> <p>All other human health and ecological risk were within acceptable limits.</p> <p>A Corrective Measures Implementation Plan (CMIP) was prepared by Tetra Tech NUS in September 2007 and semi-annual groundwater and surface water monitoring also were initiated in September 2007 with long-term monitoring (LTM) Round 1. This CMIP included a LUC Implementation Plan (LUCIP) to prevent exposure to contaminated SWMU 2 soil and groundwater underlying SWMU 2. Annual LUC inspections are required.</p> <p><b>2008 to 2009:</b> Tetra Tech conducted LTM Rounds 2 and 3 in March and September of 2008, respectively, and also prepared Revision 2 to the CMIP in June 2008 to address comments from FDEP. The Round 2 results were reported in a December 2008 Round 2 LTM report and Round 3 results are reported in a Round 3 LTM Report in April 2009.</p> <p>Aluminum, antimony, and benzene were eliminated as COCs for groundwater, leaving iron as the only COC for groundwater. The round 3 LTM data showed that the iron contamination is not a threat to surface water and only wells within or immediately downgradient of the SWMU exhibited exceedances of GCTLs. Current LUCs prevent unacceptable levels of exposure to iron in groundwater. FDEP concurred with the LTM Round 3 recommendation that groundwater and surface water monitoring were no longer required and the LUC boundary for groundwater should be reduced to reflect current site conditions. LUCs will be maintained until the concentrations of COCs in the soil and groundwater are at such levels to allow for the unrestricted use and unlimited exposure of the SWMU 2 property as determined by the FDEP. A recommendation was</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>made in the LTM Round 3 monitoring report to abandon wells at SWMU 2.</p> <p>Groundwater and surface water monitoring were discontinued following the Round 3 sampling event in September 2008.</p> <p><b>2010 to Present:</b> Annual LUC inspections are conducted to verify that LUCs remain effective at protecting human health and the environment.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**



**FIGURE 2**  
**SOLID WASTE MANAGEMENT UNIT 2 LAYOUT WITH SOIL AND GROUNDWATER LAND USE CONTROL BOUNDARIES**



### SOLID WASTE MANAGEMENT UNIT 3

Site Name	Site Description	Completed Activities	Current Status
<p data-bbox="203 285 380 470">Solid Waste Management unit (SWMU) 3, Landfill C Burn and Disposal Area.</p> <p data-bbox="203 516 380 989">Originally called Navy Installation Restoration Program (NIRP) Site #6 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p data-bbox="203 1035 380 1314"><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p data-bbox="402 285 618 852">This site is located northeast of the Amphibious Assault Landing Craft Area on the beach of St. Andrew Bay at Naval Support Activity (NSA) Panama City (see Figure 1). The site is bordered on the east by St. Andrew Bay, on the north by a small tidal inlet and pond leading to St. Andrew Bay, and on the west by Building 292.</p> <p data-bbox="402 898 618 1877">SWMU 3 was used for waste disposal from 1953 to 1959. The wastes included general household garbage, scrap lumber and metal, tree limbs, paint, paint thinner and solvent cans (mostly empty or with residue), bilge water, and waste oil [possibly transformer oil containing polychlorinated biphenyls (PCBs)]. Twenty-four to 48 cubic yards of waste were estimated to have been disposed daily and mounded to a height of approximately 25 feet using bulldozers. Monthly, the piles were doused with gasoline and</p>	<p data-bbox="641 285 1192 852"><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including SWMU 3, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p data-bbox="641 898 1192 1371"><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight NIRP sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May 1987. The contamination assessment did not indicate the presence of residual contamination in the ground water and adjacent surface water, nor contaminant migration; however, continued groundwater monitoring was recommended to ensure that future contaminant migration would be detectable. In addition, cleanup of soil that was visibly contaminated with paint and preparation of a site closure plan were recommended.</p> <p data-bbox="641 1417 1192 1602">E.C. Jordan conducted an RFA to identify potentially contaminated sites throughout NSA Panama City. The findings were documented in a 1987 RFA report by E.C. Jordan. E.C. Jordan concurred with the ESE recommendation to close this site.</p> <p data-bbox="641 1648 1192 1864"><b>1991 to 1994:</b> ABB Environmental Services (ABB-ES) conducted a two-phase RCRA Facility Investigation (RFI) from April 1991 to September 1994 at eight SWMUs, two Areas of Concern (AOCs), and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p>	<p data-bbox="1214 285 1414 470">Surface soil/sediment residential LUCs are in effect. See Figure 2 for the LUC boundaries.</p> <p data-bbox="1214 516 1414 863">Based on NSA Panama City Partnering Team discussions and follow up sampling in 2004, ecological risk was determined not to be a concern for SWMU 3.</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>ignited. Resulting ash piles were covered with sand. When the Amphibious Assault Landing Craft Area was constructed, a natural wetland was destroyed. Under the requirements of the National Wetlands Protection Act, it was replaced by constructing the tidal inlet visible today.</p>	<p><b>1996:</b> ABB-ES issued the RFI report. Samples of soil, sediment, and groundwater had been analyzed. The 1996 RFI report indicates that cancer and non-cancer human health risks from exposure to surface and subsurface soil, surface water, and sediment were acceptable under the current land use (industrial). Potential future residential exposure to groundwater, however, was determined to pose unacceptable levels of cancer and non-cancer risk. The cancer risk was attributed to beryllium, and the non-cancer risk was attributed to the cumulative effects of antimony, manganese, and vanadium although the cumulative effect was stated to have been potentially overestimated. A potentially unacceptable non-cancer risk for the child resident scenario from ingestion and dermal contact with antimony and arsenic in surface soil also was identified. The ecological risk assessment identified unacceptable risk for exposure to surface water and sediment because of benzo(b)fluoranthene in surface water and inorganic chemicals in surface water and sediment. Potential unacceptable ecological risks also were identified for groundwater due to the presence of pesticides (found only in the upgradient monitoring well).</p> <p>A Corrective Measures Study (CMS) was recommended for surface water and sediment. Also, sampling the storm water outfall as a possible contamination source was recommended. It was recommended that additional surface water and sediment samples be obtained from the Saint Andrew Bay shoreline north of SWMU 3.</p> <p><b>1997:</b> ABB-ES conducted a CMS for AOC 1 and SWMUs 3, 9, and 10 to evaluate potential corrective actions at SWMU 3. The recommended corrective action for SWMU 3 surface soil was "Limited Action." The risks posed to a human receptor under an industrial land use scenario were within the same order of magnitude as the Florida Department of Environmental Protection (FDEP) acceptable risk threshold. Furthermore, calculated risks were acceptable to United States Environmental Protection Agency (USEPA), and no unacceptable risks were predicted for ecological receptors.</p>	

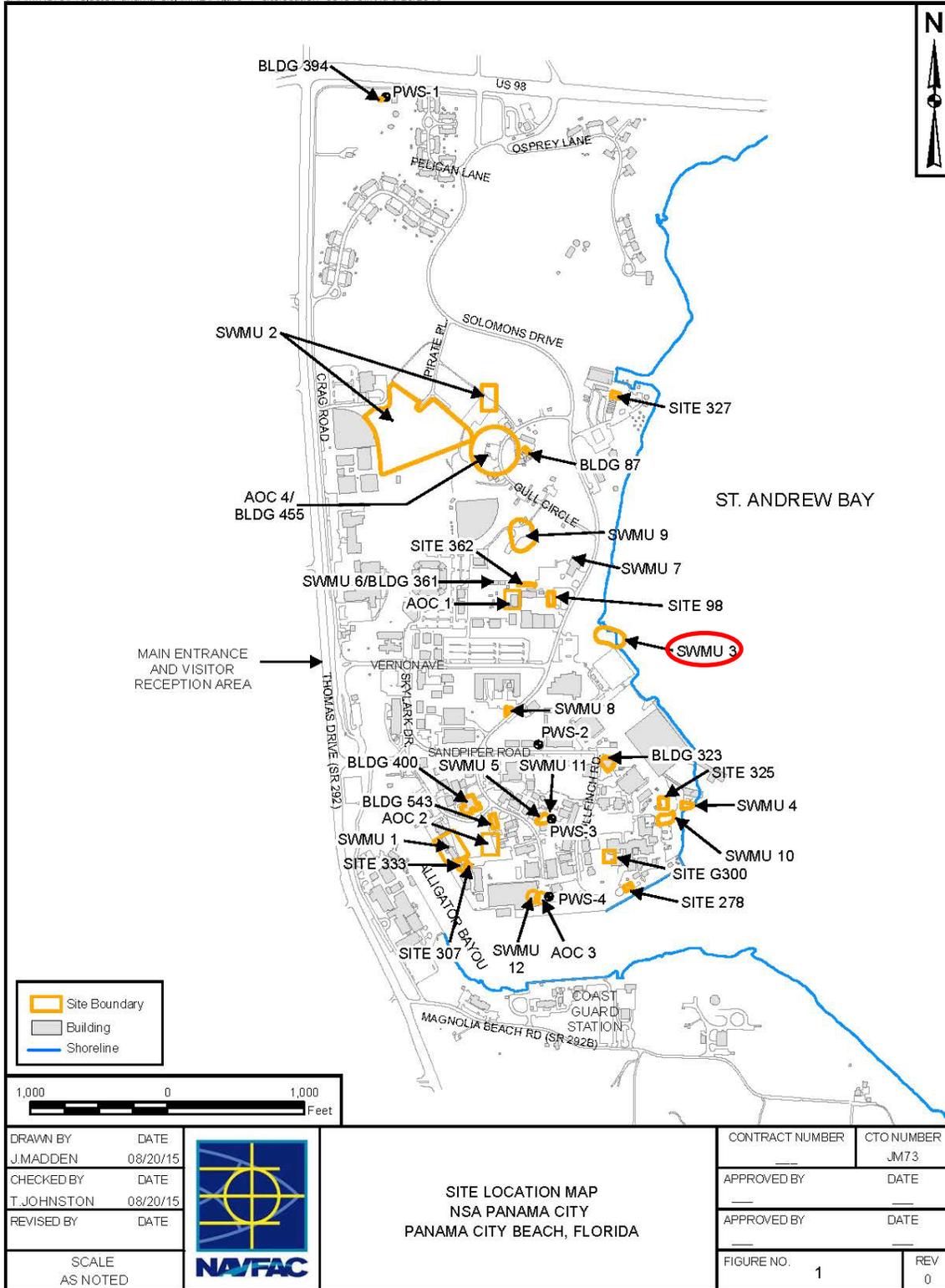
Site Name	Site Description	Completed Activities	Current Status
		<p>In November 1997, a removal action was performed by the Navy Public Works Center (PWC) Pensacola. The action included the removal of debris (metal parts, concrete, etc.) from the SWMU 3 shoreline, as recommended in the CMS. Debris was removed manually without the use of heavy mechanical equipment along 250 linear feet of shoreline and extending from the shoreline approximately 15 to 32 feet into Saint Andrews Bay. The depth of the removal was six inches below the Saint Andrew Bay bottom surface. Approximately 5 tons of non-hazardous debris was removed and disposed at a Subtitle D landfill. These actions were documented in a 1997 report prepared by the Navy PWC. Sampling and analysis of soils, sediment, or groundwater was not included in this removal action.</p> <p><b>1998:</b> A Corrective Measures Implementation Plan (CMIP) for AOC1, and SWMU 3, 9, and 10 was prepared in October, 1998. This CMIP governed monitoring of wetland sediment, and raking and collection of debris from shoreline sediment were recommended.</p> <p><b>2000:</b> The 1996 RFI Report and 1997 CMS Report USEPA approvals were rescinded in an Oct. 4, 2000 letter from USEPA because the extent of contamination at SWMU 10 was found to be incompletely delineated and monitoring had not been conducted as required by the Hazardous and Solid Wastes Amendment (HSWA) portion of the RCRA permit. In addition, the presence or status of other SWMUs and AOCs was asserted to be unknown and Navy was directed to submit a work plan designed to fully delineate the scope and extent of contamination, both onsite and offsite, associated with all of the facility's SWMUs</p> <p><b>2002:</b> Additional sampling was conducted to refine the understanding of site contamination conditions. Following the 1994 investigation, and based on the RFI human health and ecological risk assessments at SWMU 3, stakeholders had agreed that additional investigation should focus on ecological risk. Therefore, toxicity testing was conducted to evaluate the toxicity of sediments to representative ecological receptors. The results are presented in the Tetra Tech October 2002 Ecological Risk Analysis for Solid Waste Management Unit 3 Landfill C Burn and Disposal Area. Conflicting</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>indications were obtained but the results did not demonstrate the existence of unacceptable risks to benthic invertebrates in the areas of highest contamination. It appeared that low organism counts were associated with non-site-related factors and not site contamination. Very conservative food chain modeling indicated that chronic ecological risk could exist but more realistic modeling did not.</p> <p>Earlier conclusions that groundwater is not a significant migration pathway for inorganic chemicals was validated. Based on the results of the Screening-Level Ecological Risk Assessment, it was recommended that no further action was warranted to address potential ecological risk at SWMU 3.</p> <p>The original RFI prepared by ABB-ES in 1996 indicates potential unacceptable human health risk from direct exposure to SWMU 3 surface soil, and the original CMS report prepared by ABB-ES in 1997 recommends institutional controls to address this risk. The RFI Addendum recommended No Further Action with institutional controls (Risk Management Option Level II in 62-780.680(2) Florida Administrative Code (FAC).</p> <p><b>2003:</b> An RFI Report Addendum for AOC 1 and SWMUs 2, 3, 9, 10 was prepared to update the status of these sites based on sampling between 1997 and 2002.</p> <p><b>2004:</b> Follow up sampling for PCBs was conducted to determine whether a detection of Aroclor-254 in 2002 was representative of site conditions, and if so, the extent of the impacted area. The results are presented in a 2006 RFI Addendum. Results identified negligible ecological risk, and the only potentially unacceptable human health risk was determined to be from direct exposure to surface soil. Therefore, No Further Action with institutional controls (Risk Management Option Level II in 62-780.680(2) FAC) was recommended for SWMU 3.</p> <p><b>2005:</b> Based on additional partnering team meetings and the follow up sampling in 2004, ecological risk questions were resolved and documented in a Screening Level Ecological Risk Assessment, prepared by Tetra Tech in 2005.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>2006:</b> An RFI Addendum Revision 1 was prepared by Naval Facilities Engineering Command (NAVFAC) Southeast (SE) and Tetra Tech to update the status of SWMUs 3 and 9 only, based on sampling conducted in 2004 for SWMU 3 and from 2003 to 2004 for SWMU 9. The detailed screening level ecological risk assessment prepared by Tetra Tech in 2005 was included in this report. This report concluded that “the potential for ecological impacts from site-related contaminants is considered negligible under current conditions.”</p> <p><b>2007:</b> A CMIP was drafted for SWMU 3 in October 2007. This plan establishes land use controls (LUCs) to be implemented for this site.</p> <p><b>2008:</b> In January, 2008 Tetra Tech updated the RFI Report Addendum for AOC 1, and SWMUs 3, 9, and 10 by preparing Revision No. 2. This document updated human health risk evaluations for SWMU 3 using site-specific exposure assumptions to accurately estimate risks under the applicable industrial land use scenario. Combined with the data in the original RFI, the most recently collected data were sufficient to delineate the nature and extent of contamination at SWMU 3. The updated risk assessment showed that current risks associated with industrial land use were acceptable and only future risks would be unacceptable for residents or trespassers exposed directly to surface soil or sediment.</p> <p>A Statement of Basis was issued in January 2008 to document corrective actions, i.e., LUCs to prevent future exposure of humans to residual contamination in surface soil and sediment at SWMU 3.</p> <p>The CMIP was revised (Revision 1) to reflect the LUCs current at that time.</p> <p>In September 2008 another revision (Revision 2) of the CMIP was issued to reflect minor LUC changes.</p> <p><b>2009 to Present:</b> Annual LUC inspections are conducted to verify that they remain effective at protecting human health and the environment.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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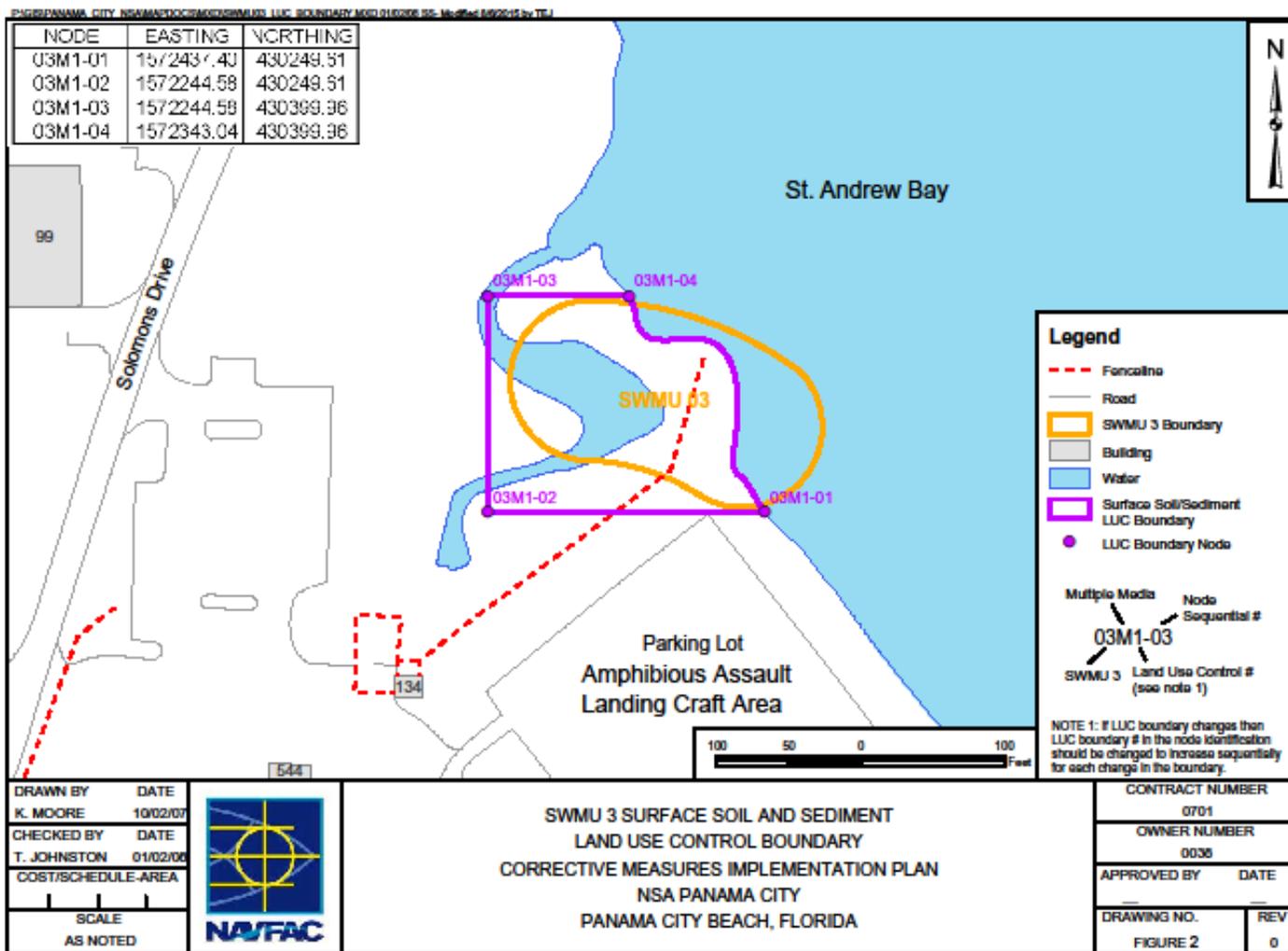


**FIGURE 2  
SOLID WASTE MANAGEMENT UNIT LAYOUT**

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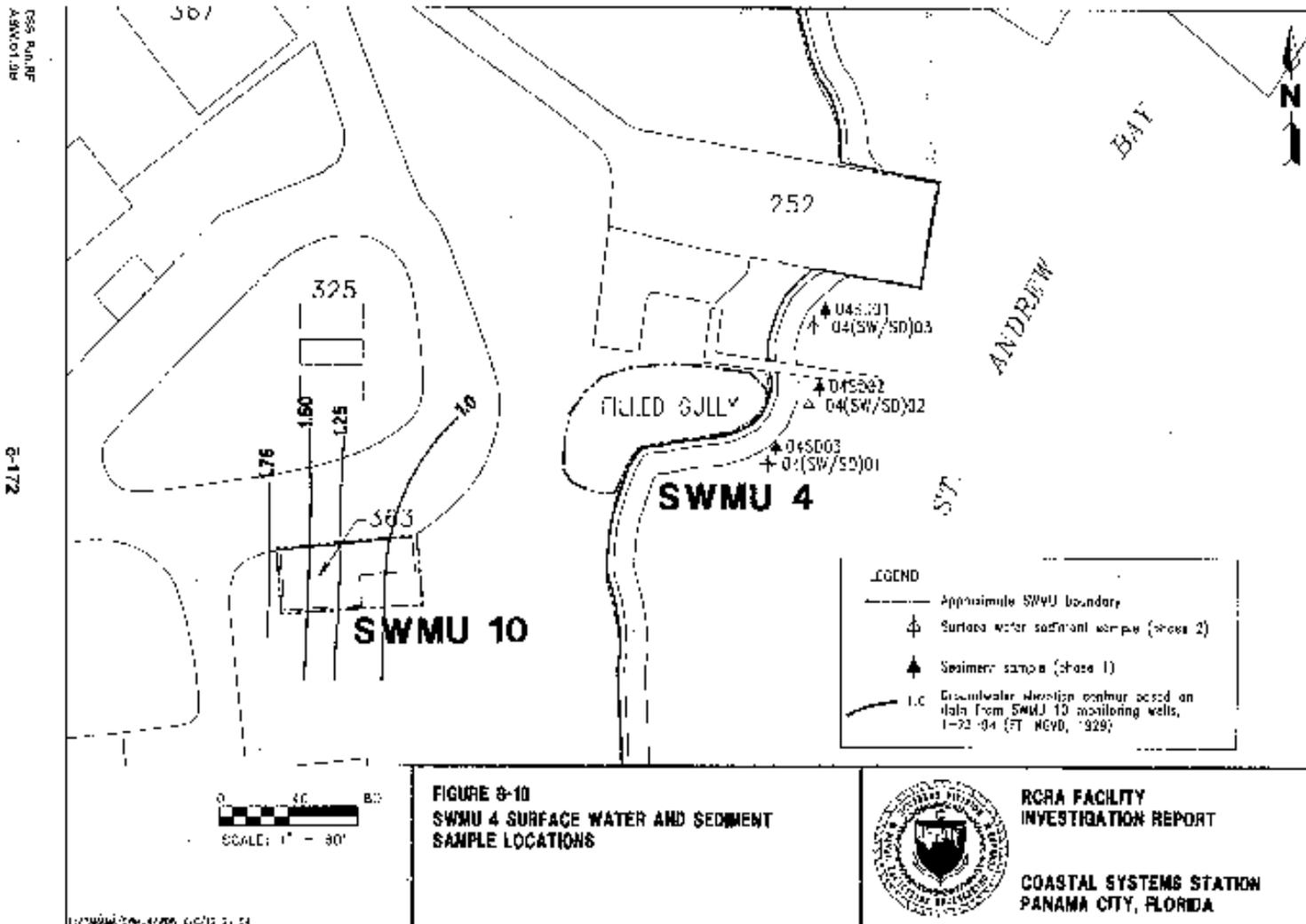
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### SOLID WASTE MANAGEMENT UNIT 4

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 4, Filled Gully, Landfill D.</p> <p>Originally called Navy Installation Restoration Program (NIRP) Site #7 in the 1987 Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 4 was an area encompassing less than 0.25 acre near Building 295 at Naval Support Activity (NSA) Panama City (Figure 1). This area (see Figure 2), which was originally a ravine carrying surface water runoff to St. Andrew Bay and later filled with construction Rubble, was apparently sporadically active through the mid-1960s. It appeared to have received little or no additional fill material after 1970.</p> <p>Between 1954 and 1958, concrete blocks, pieces of broken concrete and hardened asphalt, tires and other inert materials were deposited in the ravine. Reportedly, this area was not a general waste disposal area and received only construction rubble fill materials, mostly from the demolition of buildings, roads and other structures.</p> <p>It is unknown whether any materials disposed of at SWMU 4 contained asbestos.</p>	<p><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including SWMU 4, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p><b>1987:</b> E. C. Jordan prepared an RFA report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. SWMU 4 was found to present little or no potential for release to the environment and was therefore not recommended for further action. Rubble could be seen at the site but an absence of ongoing fill operation was noted during the 1987 IAS site visit conducted by C.C. Johnson and Associates, and during the 1987 Visual Site Inspection (VSI) conducted by E.C. Jordan Company in June 1987.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RCRA Facility Investigation (RFI) from April 1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> ABB-ES prepared an RFI report documenting findings of the two-phase RFI. No unacceptable human health or ecological risks were found for any receptors exposed to any environmental media and a recommendation of No Further Action (NFA) was recommended for SWMU 4.</p>	<p>NFA, based on the 1996 RFI. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>



**FIGURE 2**  
**SOLID WASTE MANAGEMENT UNIT 4 LAYOUT**  
 (extracted from the 1996 RFI Report prepared by ABB-ES)



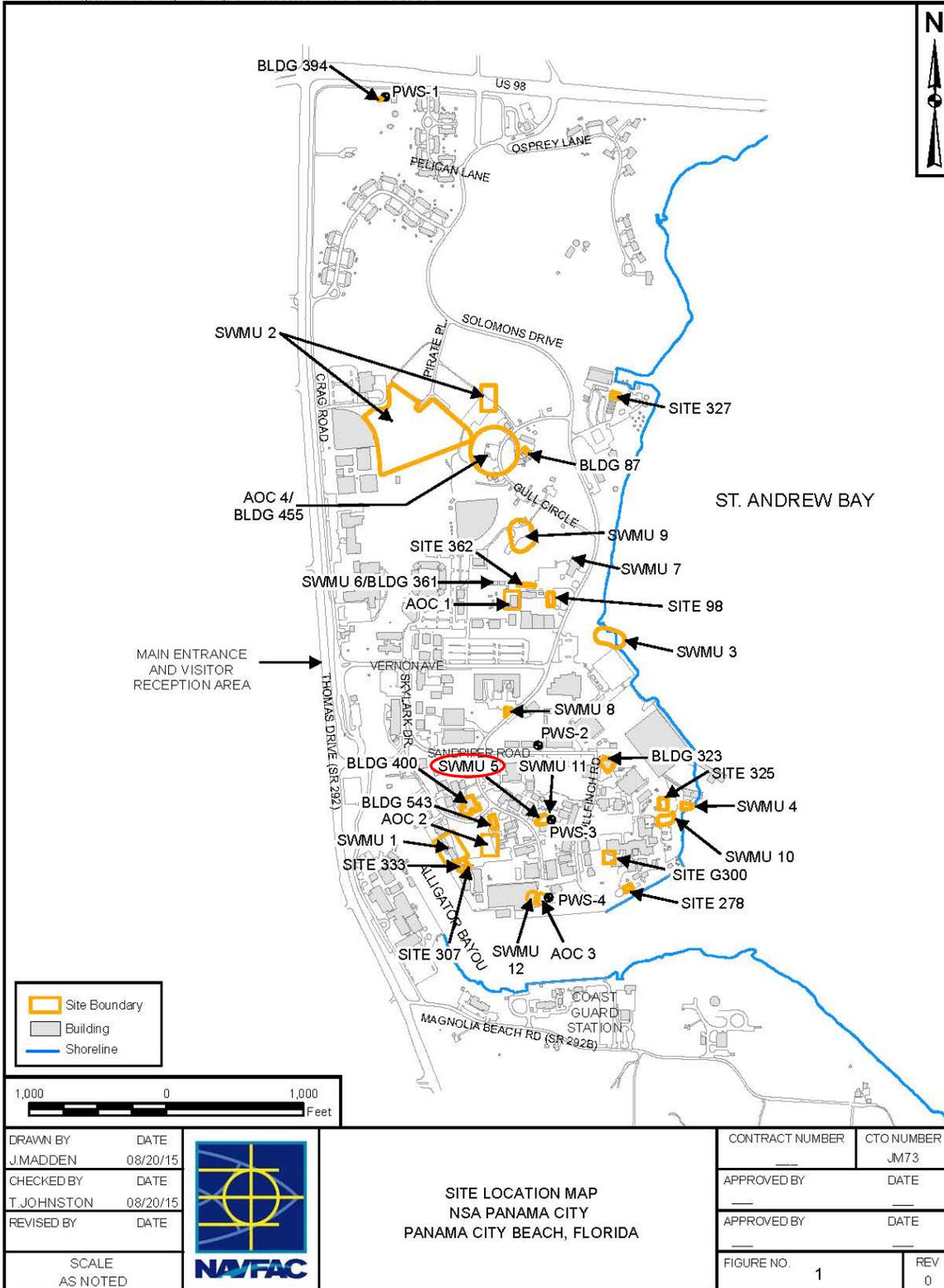
### SOLID WASTE MANAGEMENT UNIT 5

Site Name	Site Description	Completed Activities	Current Status
<p data-bbox="201 287 367 474">Solid Waste Management Unit (SWMU) 5, Paint Equipment Cleaning Area.</p> <p data-bbox="201 520 367 989">Originally called Navy Installation Restoration Program (NIRP) Site #5 in the 1987 RFA Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report by E.C. Jordan.</p> <p data-bbox="201 1035 367 1314"><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p data-bbox="401 287 609 1014">SWMU 5, a sand pit where painting equipment was cleaned with mineral spirits, methyl ethyl ketone, acetone, and paint thinner, was located behind the Paint Shop (Building 47) and was estimated to have been approximately 100 square feet in size. Figure 1 shows the location of SWMU 5 within Naval Support Activity (NSA) Panama City and Figure 2 shows the SWMU 5 layout.</p> <p data-bbox="401 1060 609 1724">The site was operational from at least the early 1950s to 1979. Paint and cleaning wastes were poured directly onto the ground. A project undertaken in 1979 to prevent further use of the sand pit provided a concrete brush cleaning pad with spill containment adjacent to Building 87. The original sand pit used for disposal has since been paved with asphalt.</p>	<p data-bbox="633 287 1193 821"><b>1985:</b> An Initial Assessment Study (IAS) was conducted at NSA Panama City by the Naval Energy and Environmental Support Activity (NEESA). This study consisted of records searches and personnel interviews to collect and evaluate evidence supporting the existence of any potential contamination problems at NSA Panama City. The IAS report contains background information on the chemicals used and on specific sites where chemical wastes were known to have been stored or disposed or where such activities were suspected to have occurred. Eight sites, including SWMU 5, were identified in the IAS report as NIRP sites. Seven of the eight sites were selected by the Navy for a follow on Confirmation Study, three of which were recommended for study under the Characterization Phase of the Confirmation Study.</p> <p data-bbox="633 867 1193 1339"><b>1987:</b> A Confirmation Study – Verification Step was conducted by Environmental Science and Engineering, Inc. (ESE) for eight NIRP sites numbered 1 through 8. The findings were documented in a Confirmation Study – Verification Step report prepared by ESE in May 1987. The contamination assessment did not indicate the presence of significant levels of trace metal or volatile organic contamination in the ground water; however, continued groundwater monitoring was recommended to ensure that future contaminant migration would be detectable. In addition, cleanup of soil visibly that was contaminated with paint and preparation of a site closure plan were recommended.</p> <p data-bbox="633 1386 1193 1791">E. C. Jordan prepared an RFA report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. A recommendation was made to conduct a RCRA Facility Investigation (RFI) to investigate soil and groundwater contamination at SWMU 5. The report recommended that, due to the nature of waste reportedly disposed at SWMU 5, surface and subsurface soil sampling should be conducted. Soil gas analysis was identified as a possibly viable alternative to soil sampling for location of new wells.</p> <p data-bbox="633 1837 1193 1892"><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RFI from April</p>	<p data-bbox="1218 287 1417 600">No further action (NFA), based on the 1997 Interim Measures Report. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

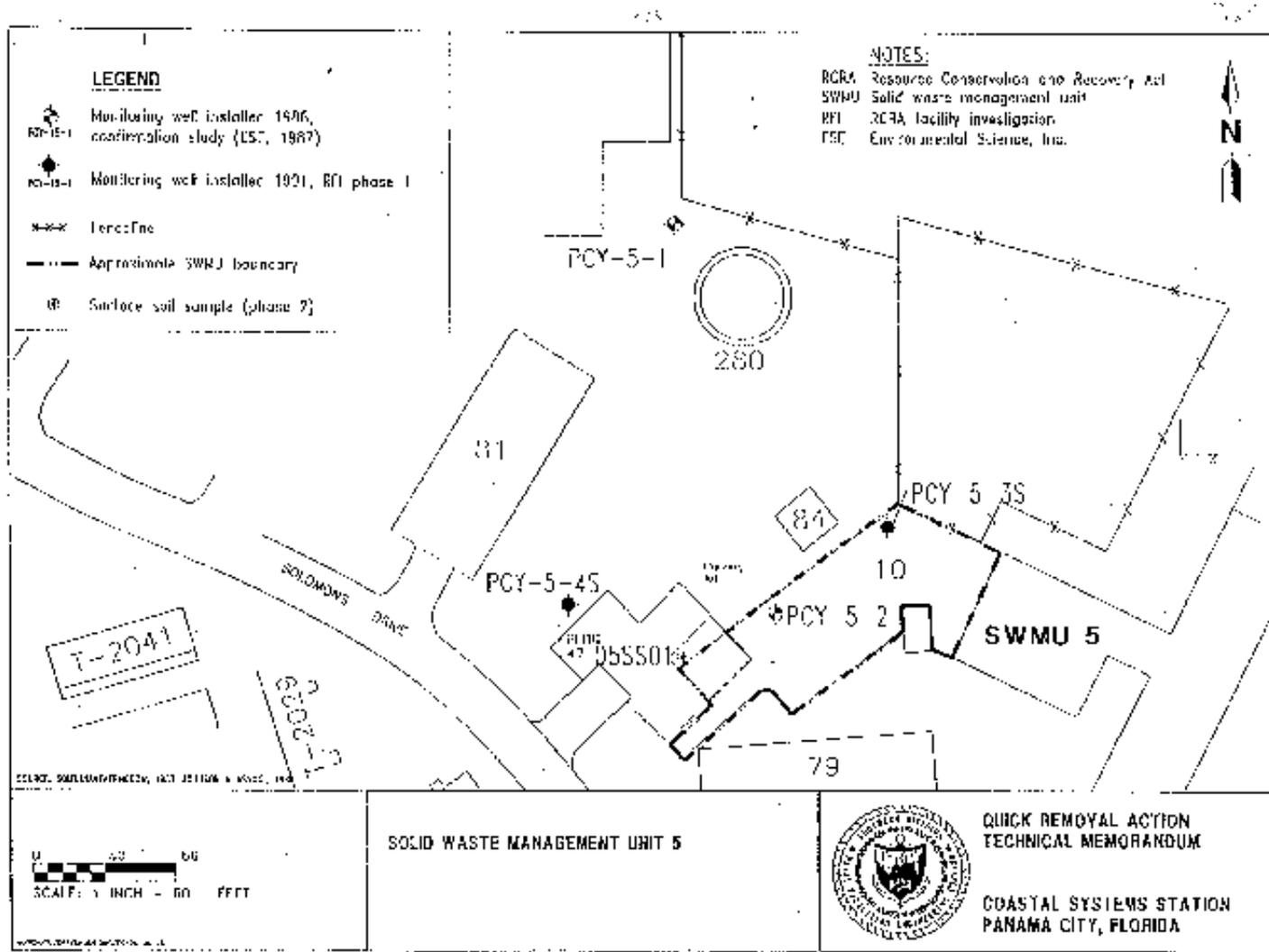
Site Name	Site Description	Completed Activities	Current Status
		<p>1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> ABB-ES prepared the RFI report. The data collected during the RF1 were considered to be sufficient to characterize the nature and distribution of contaminants at SWMU 5 and to evaluate human health and ecological risks. All current and future cancer risks were within the acceptable range. The non-cancer Hazard Indices (HIs) associated with surface soil ingestion, dermal contact, and inhalation of fugitive dust for the current land use were acceptable but for potential future land use, the child resident HI (HI=3) exceeded 1 and was therefore unacceptable but was considered to be an overestimate. Manganese in groundwater also was estimated to result in unacceptable future residential non-cancer risk but indications were that the estimated risk was an overestimate. Other metals detected in groundwater were within the background concentration ranges.</p> <p>A removal action for surface soil contamination was recommended.</p> <p><b>1997:</b> On February 26, 1997 Bechtel, Inc. excavated and disposed offsite approximately 180 pounds of soil from SWMU 5 that was contaminated with cadmium. This action is documented in a Project Completion Report for RCRA Interim Measures Remediation at SWMU 2, SWMU 5, AOC 2 and AOC 4 prepared by Bechtel and dated May, 1997.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2**  
**SWMU 5 SITE LAYOUT (extracted from the 1997 Interim Removal Report prepared by Bechtel)**

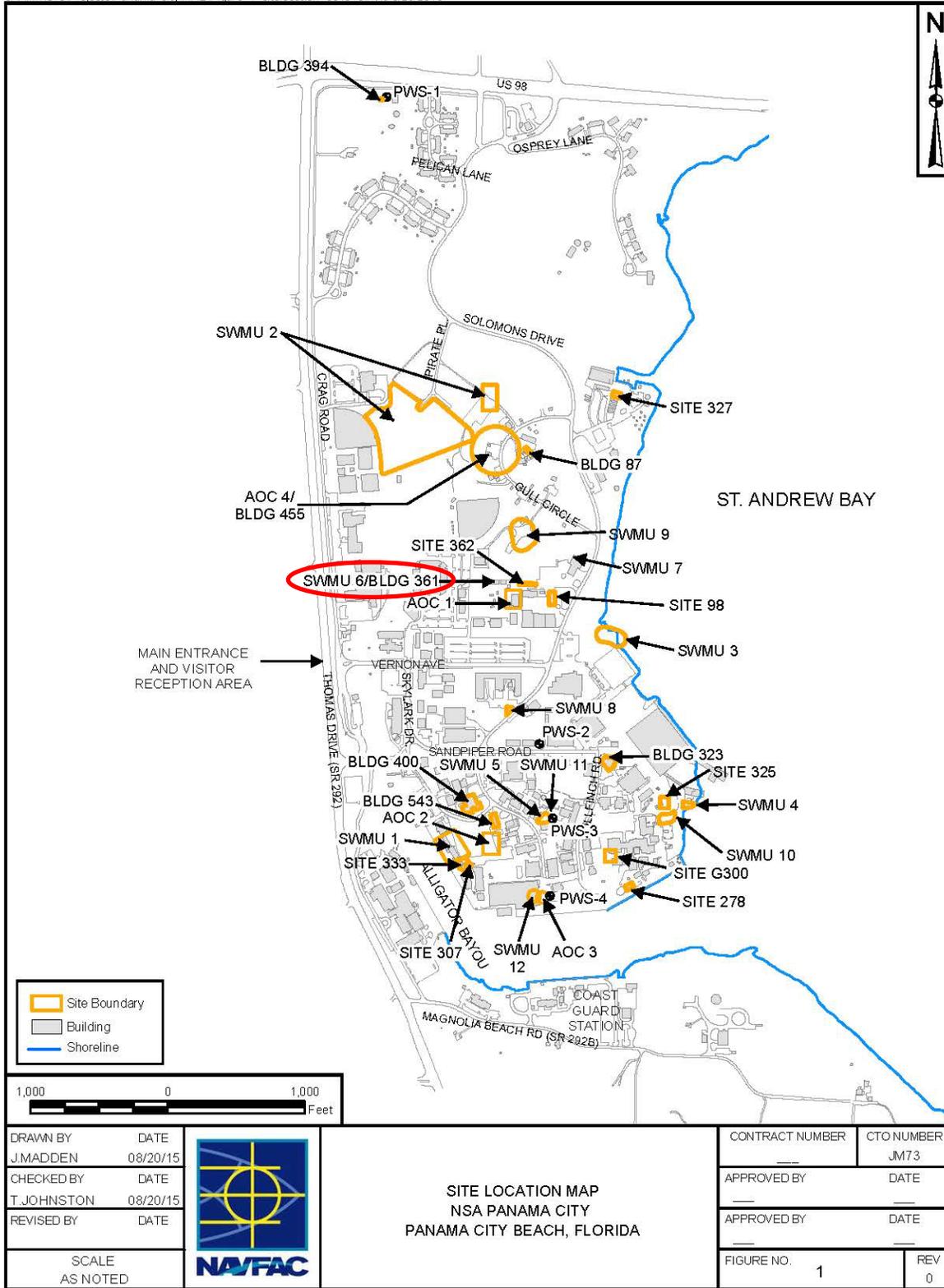


**SOLID WASTE MANAGEMENT UNIT 6**

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 6, Hazardous Waste Storage Area.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 6 was a permitted hazardous waste storage facility located near Building 361 southeast of SWMU 9 near the center of Naval Support Activity (NSA) Panama City (see Figure 1). No figures of the SWMU 6 site layout are available.</p>	<p><b>1987:</b> E.C. Jordan prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report documenting findings of an RFA conducted at SWMUs 1 through 12 and AOCs 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. Potentially incompatible wastes were found to be segregated at SWMU 6. A contaminant migration pathway from the storage facility to soil, groundwater, or surface water was not found and the construction of the storage facility was found to preclude a release to these media. The potential for airborne releases was considered to be limited and would be mitigated by the emergency response plan. No evidence of contaminant releases could be found nor were they expected.</p> <p>SWMU 6 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p>	<p>No further action (NFA), based on the 1987 RFA Report. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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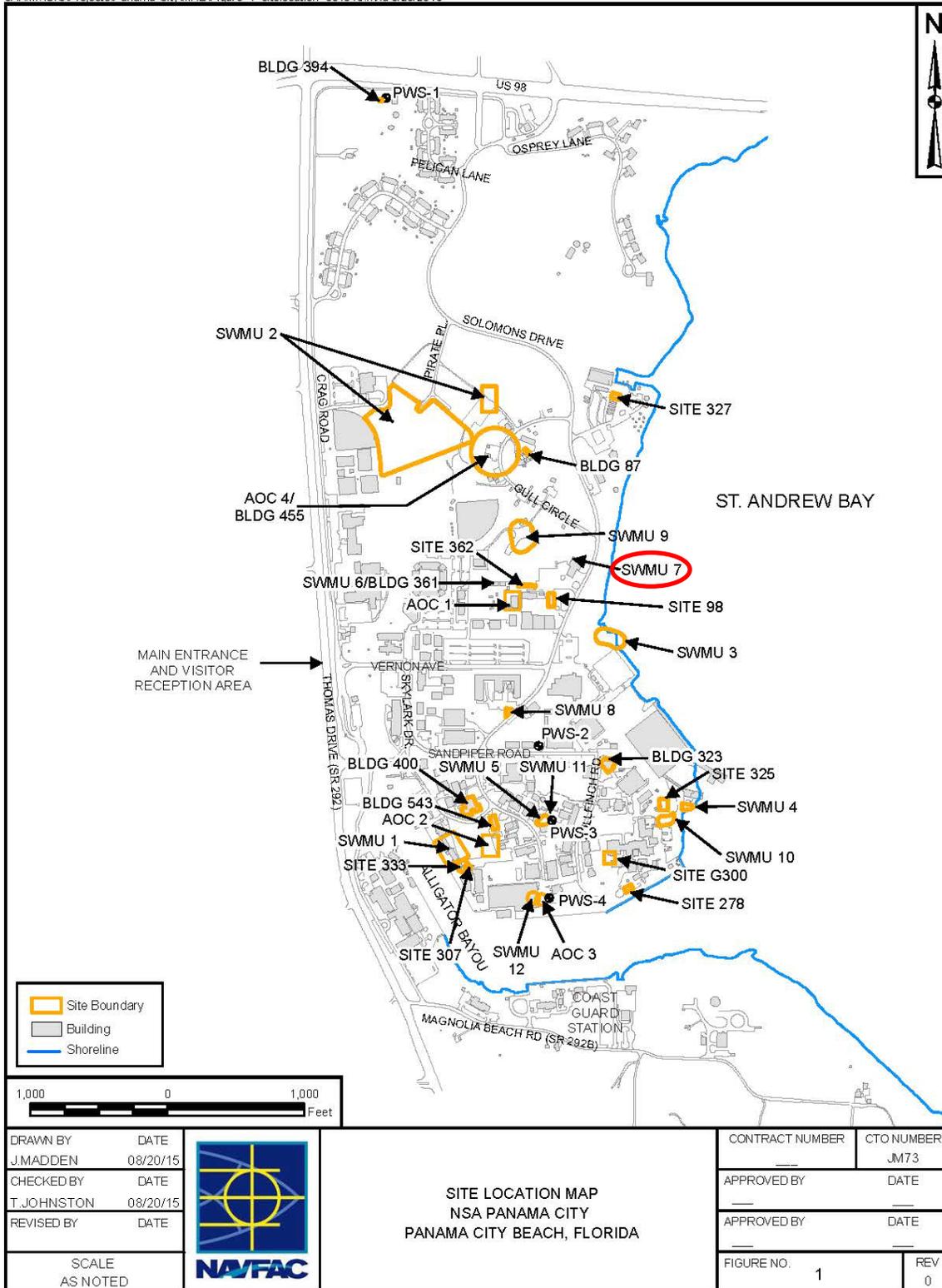


### SOLID WASTE MANAGEMENT UNIT 7

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 7, Wastewater Treatment Plant.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 7 was a wastewater treatment facility (WWTF) constructed in about 1956 to provide primary and secondary treatment of 250,000 gallons per day (gpd) maximum daily flow. The location of SWMU 7 within Naval Support Activity (NSA) Panama City is presented on Figure 1. Wastewater is described as collecting in sewers and being conveyed to one of the center's five lift stations. Wastewater is pumped from the stations to the secondary treatment facility employing a trickling filter process. The treated effluent is discharged through a conduit to St. Andrew Bay, located 100 feet east of the treatment facility.</p> <p>As of 1987, Plans for expansion of the facility to 0.300 million gallons per day (MGD) had been completed.</p> <p>The plant was reported to have experienced periodic overloads due to normal base flow, rain induced inflow, and short-term infiltration. During overload periods, adequate treatment is not possible and inadequately treated water is discharged to Saint Andrew Bay.</p>	<p><b>1987:</b> E. C. Jordan prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. SWMU 7 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p>	<p>No further action (NFA), based on the 1987 RFA Report. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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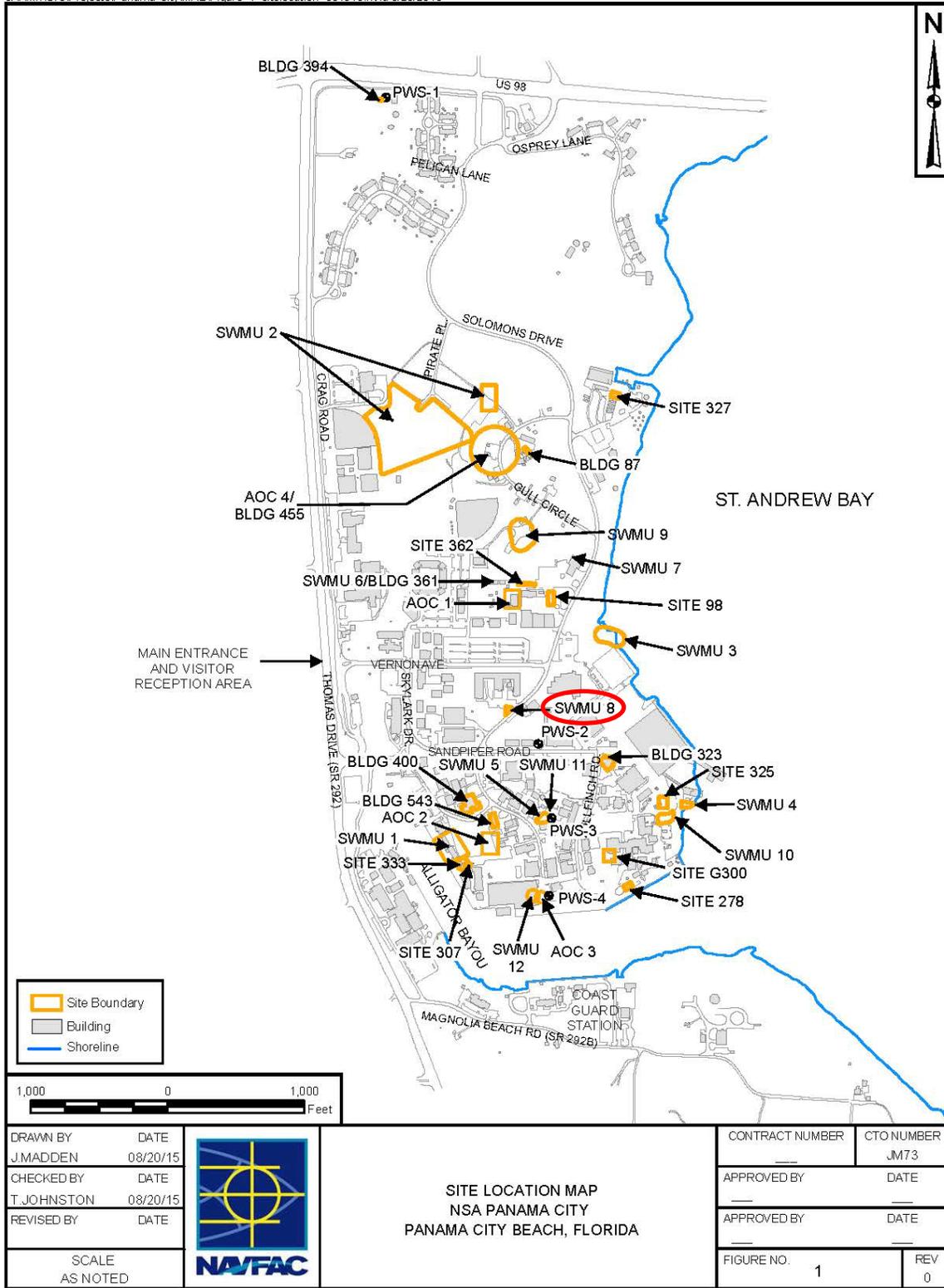


**SOLID WASTE MANAGEMENT UNIT 8**

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 8, Classified Document Incinerator.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 8 was the Naval Support Activity (NSA) Panama City Classified Documents Incinerator. This natural gas-fired solid waste incinerator was located on the back deck area for the B-wing of Building 110 (see Figure 1). The incinerator was used exclusively for destruction of classified material, which reportedly included primarily paper documents but also some photographs and photographic negatives. It had a 300-pound capacity and operated twice per week with an approximate burn time of 8 hours. Ash from the incinerator was disposed of offsite. No figures showing the layout of SWMU 8 are available.</p>	<p><b>1987:</b> E. C. Jordan prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. SWMU 8 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RCRA Facility Investigation (RFI) from April 1991 to September 1994 at eight SWMUs, two AOCs, and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> ABB-ES prepared the RFI. The data collected during the RF1 were considered to be sufficient to characterize the nature and distribution of contaminants and evaluate human health and ecological risks. The results of the Toxicity Characteristic Leaching Procedure (TCLP) analysis for the ash sample collected from the current classified document incinerator indicated that only barium was present at concentrations above the contract-required detection limit (CRDL), and its concentration was well below the concentrations that may contribute to leaching to groundwater. No further action (NFA) was recommended.</p>	<p>NFA, based on the 1996 RFI. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**SOLID WASTE MANAGEMENT UNIT 9**

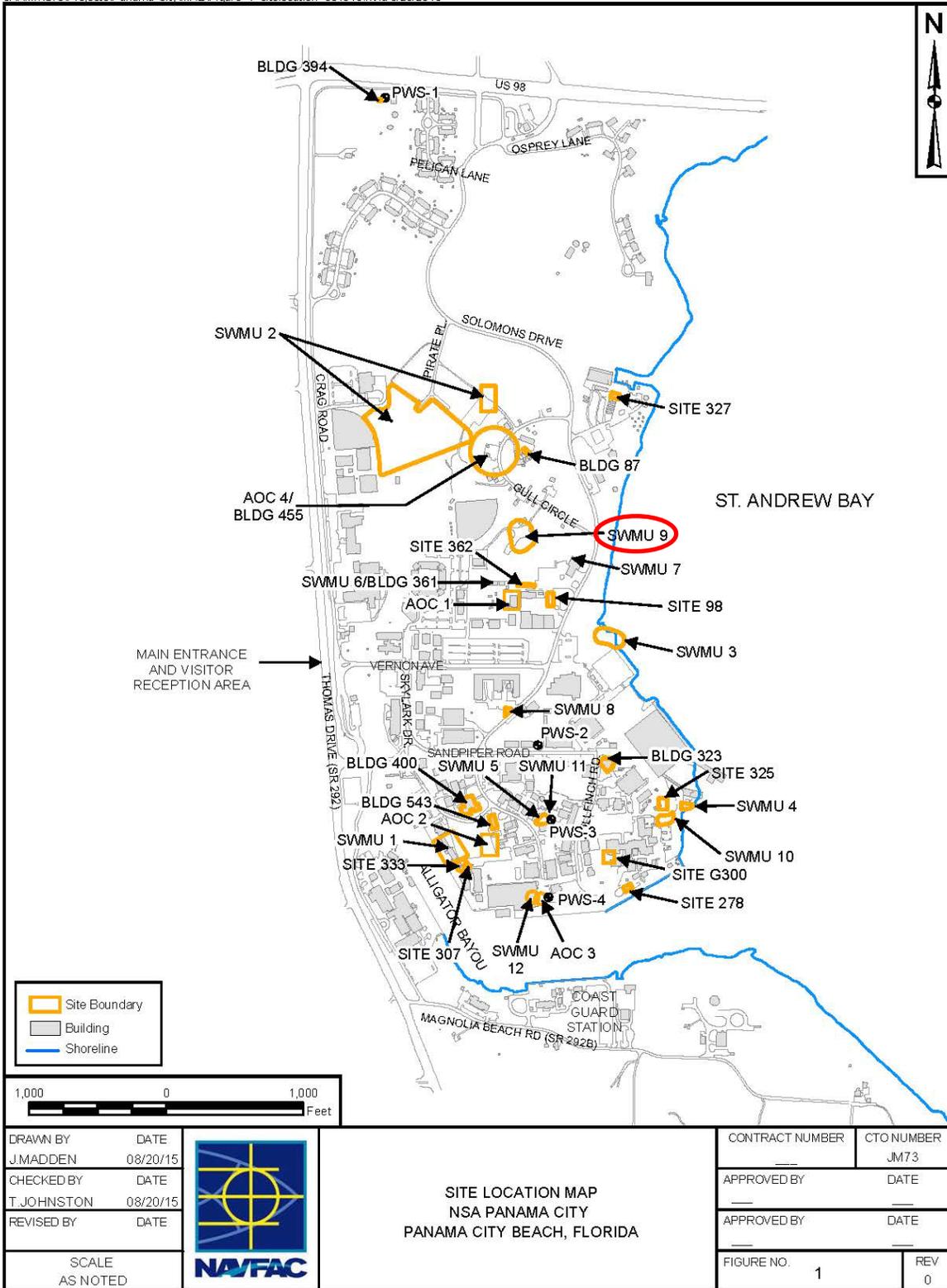
Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 9, Fire Training Area No. 2.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 9 is a former fire fighter training area that was located south of Gull Circle (Figure 1-1) in the central part of Naval Support Activity (NSA) Panama City. The area was first used for fire training in 1980, and live training was suspended in 1986.</p> <p>The primary wastes used for fuel in the fire training area were contaminated fuels including JP-5 helicopter fuel, diesel fuel, and gasoline. According to base personnel, it is possible that flammable waste solvents also had been used. Approximately 100 to 500 gallons were used for each of the 18 to 20 training fires conducted per year. It was estimated that between 1980 and 1985 approximately 14,000 gallons of fuel had been ignited for training exercises. The percentage of unburned fuel remaining is unknown.</p>	<p><b>1987:</b> A Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was conducted for Areas of Concern 1 through 3 and SWMUs 1 through 12 and was documented in a report by E.C. Jordan in October 1987 RFA report. Jordan personnel had observed small areas of stained soil around a trash pile in the center of the fire training area during the visual site inspection (VSI), and referred to independent collection and analysis of soil samples indicated surface contamination by petroleum products. Because contaminated fuels and possibly waste solvents were used in this area, Jordan recommended that soil and groundwater sampling be conducted to characterize the nature and extent of contamination.</p> <p><b>1991 to 1994:</b> ABB Environmental Services, Inc. (ABB-ES) conducted a two-phase RCRA Facility Investigation (RFI) from April 1991 to September 1994 at eight SWMUs, two Areas of Concern (AOCs), and Building 455 (also known as AOC 4). Findings are described in the ensuing 1996 RFI report.</p> <p><b>1996:</b> ABB-ES prepared the RFI report. All cancer and non-cancer current and future human health risks calculated for surface soil, subsurface soil, and groundwater were within the acceptable range, except for potential future child residents exposed to surface soil and adult residents ingesting groundwater. The human health risk assessment identified a non-cancer risk for the child resident exposure to surface soil due to ingestion of and dermal contact with antimony and arsenic (from one source area sample). It also identified a non-cancer risk for the adult resident ingestion of thallium in groundwater but the thallium could not be linked to site operations. The ecological risk assessment identified risk for surface water and sediment due to the presence of benzo(b)fluoranthene in surface water and inorganic chemicals in surface water and sediment. In addition, potential risks were identified for groundwater due to the presence of pesticides (found only in the upgradient monitoring well). A Corrective Measures Study (CMS) for soil, free product investigation, and groundwater monitoring plan were recommended.</p> <p><b>1997:</b> ABB-ES conducted a CMS for AOC 1 and SWMUs 3, 9, and 10 and reported the findings in a</p>	<p>NFA, in accordance with the NSA Panama City Corrective Action permit. The current NSA Panama City Corrective Action Permit No. is 66255-HH-003.</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>Soil and groundwater in this area were contaminated with waste fuel, solvents, and oils, which were poured directly in a central unlined burn pit to start fires. Concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in soils beneath the pit suggested that non-aqueous phase liquid may have been present. VOCs and SVOCs were detected in SWMU 9 groundwater at very low concentrations</p>	<p>CMS report dated April 4, 1997. The CMS report indicated that there were no unacceptable ecological risks and dismissed groundwater as a human health exposure concern. The recommended corrective action for SWMU 9 contaminated surface soil was excavation with offsite disposal.</p> <p>Prior to implementing a corrective action for SWMU 9 subsurface soil, an assessment of groundwater was recommended. A flow chart for interpreting the data and whether or not corrective action for subsurface soil was warranted was prepared. The preferred corrective action, if needed, was reported to be excavation and treatment via thermal desorption.</p> <p><b>1998:</b> A technical memorandum summarizing site conditions for AOC 1 and SWMUs 9 and 10 was issued by ABB-ES on April 3, 1998. The concern regarding the potential presence of a free product source near the former firefighter training area appeared to be unwarranted. There was evidence of hydrocarbon contamination remaining in soils within the pit, and low concentrations of benzene, ethylbenzene, toluene, and xylene (BTEX) were detected in groundwater along the margin of the pit. The source of benzene in well PCY-9-6S was not determined but AOC 1 was implicated. Groundwater quality along the edge of the pit had degraded as evidenced by the presence of colloidal material (likely iron organic complexes that may or may not also contain droplets of free product). Long-term monitoring was recommended, as proposed in the 1997 ABB-ES CMS. The monitoring program would include the three newly installed wells and sampling for SVOCs until analyses indicated otherwise. No other corrective actions were recommended.</p> <p>A Corrective Measures Implementation Plan (CMIP) for AOC 1, and SWMUs 3, 9, and 10 was prepared in October, 1998. The CMIP governed excavation and offsite management of surface soil, an assessment of groundwater which would be used to determine the appropriate corrective action for subsurface soil, and long-term groundwater monitoring.</p> <p><b>2000:</b> United States Environmental Protection Agency (USEPA) approvals of the 1996 RFI report and 1997 CMS report were rescinded in an Oct. 4, 2000 letter from USEPA because the extent of contamination at SWMU 10 was found to be</p>	

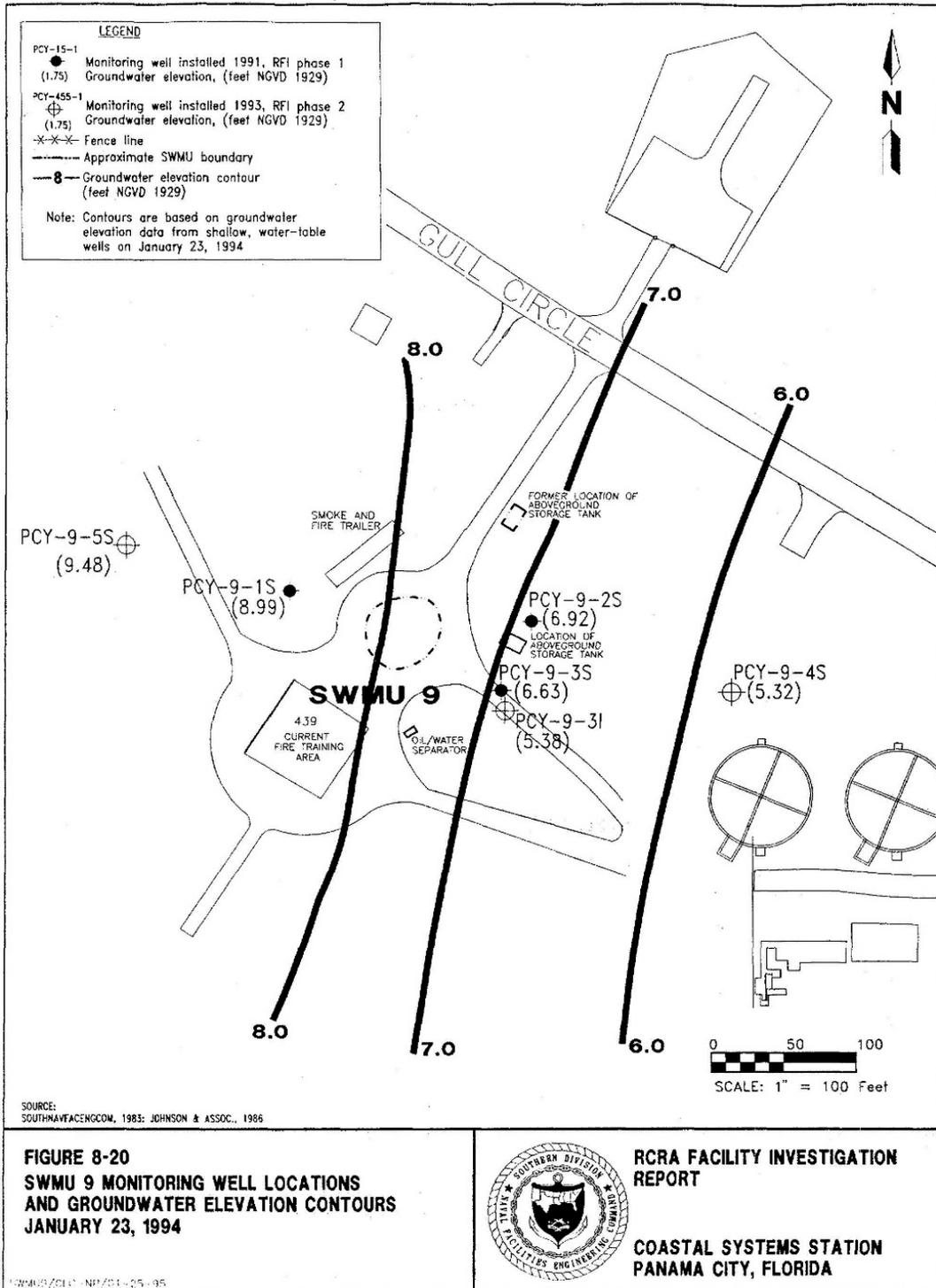
Site Name	Site Description	Completed Activities	Current Status
		<p>incompletely delineated and monitoring had not been conducted as required by the Hazardous and Solid Waste Amendment (HSWA) portion of the RCRA permit. In addition, the presence or status of other SWMUs and AOCs was asserted to be unknown and Navy was directed to submit a work plan designed to fully delineate the scope and extent of contamination, both onsite and offsite, associated with all of the facility's SWMUs</p> <p><b>2008:</b> In January, 2008 Tetra Tech updated the RFI Report Addendum for AOC 1 and SWMUs 3, 9, and 10 by preparing Revision No. 2 to the RFI report. This revision documented current contamination conditions for SWMU 9. Combined with data in the original RFI, the data presented in RFI Addendum Revision 2 demonstrated that the nature and extent of contamination at SWMU 9 had been delineated and that unacceptable conditions at SWMU 9 had been corrected and no further action (NFA) was recommended.</p> <p><b>Note:</b> No corrective action was required at this site and no Statement of Basis was prepared. Instead, the NFA status was documented directly in the Corrective Action Permit.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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**FIGURE 2**  
**SOLID WASTE MANAGEMENT UNIT 9 LAYOUT**  
 (extracted from the 1996 RFI report by ABB-ES)



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**SOLID WASTE MANAGEMENT UNIT 10**

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 10, Oil-Water Separator (OWS) Facility.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 10 was an OWS system located in the southeast corner of the northern section of Naval Support Activity (NSA) Panama City near Building 363, just north of Alligator Bayou and west of St. Andrew Bay (see Figures 1 and 2). The OWS was primarily used to treat bilge water, but early reports indicated that chlorinated solvents had been discharged to the separator unit. The OWS system began operation during or before 1968 and consisted of a 6,000 gallon underground waste oil tank; a 10,000 gallon fiberglass reinforced plastic (FRP) oily waste holding tank; and the OWS pumps, controls, and associated piping.</p> <p>Light non-aqueous phase liquid (LNAPL) (diesel fuel) was detected in one SWMU 10 monitoring well (PCY-363-MW-1). Fuel- and solvent-contaminated water were released to</p>	<p><b>1987:</b> Environmental Science and Engineering, Inc. (ESE) conducted and reported on a 1987 Confirmation Study – Verification Step in 1987 for Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina. May.</p> <p>SWMU 10 was investigated as part of a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) conducted by E. C. Jordan designed to identify potentially contaminated sites throughout NSA Panama City. No action was recommended in the ensuing 1987 RFA report because no evidence of a release of contaminants to groundwater, surface water, air, or soil had been documented.</p> <p><b>1992:</b> Two releases of oil and bilge water from the OWS were reported by NSA Panama City personnel in 1992. Furthermore, information obtained by the Florida Department of Environmental Protection (FDEP) during a hazardous waste compliance inspection suggested that waste chlorinated solvents (and possibly polychlorinated biphenyls) had been disposed of in the OWS. Sampling performed at the OWS during a Contamination Assessment in 1992 was documented in a report prepared by ABB Environmental Services, Inc. (ABB-ES) in 1993 and confirmed the presence of chlorinated solvents in soil and groundwater.</p> <p><b>1991 to 1994:</b> ABB-ES conducted Phase I (in 1991 and 1992) and Phase II (in 1993 and 1994) of a RCRA Facility investigation (RFI) to establish the extent of contamination and to evaluate human and ecological risks from exposure to environmental media at SWMU 10.</p> <p><b>1994:</b> A memorandum was prepared by ABB-ES to document a conference call among Navy, United States Environmental Protection Agency (EPA), FDEP, and ABB-ES personnel regarding whether data collected during the RFI Phase 2 field program for SWMU 10 or Building 455 at NSA Panama City was sufficient to complete a Health and Environmental Assessment (HEA) or Corrective Measures Study (CMS), if required. These two sites had not been investigated under the facility's Installation Restoration (IR) program</p>	<p>LUCs remain active for groundwater (entire water column within the groundwater LUC boundary); and for soil (2.5 feet below land surface and deeper within the Soil LUC boundary). See Figure 3 for the soil and groundwater boundaries. Current (i.e., industrial) human health and ecological risks are acceptable.</p> <p>Detection of free petroleum product has not been reported at SWMU 10 since 1999 but residual petroleum-related soil contamination in the area of the former underground storage tanks may persist despite past excavations to remove the most contaminated soil.</p> <p>Before the SWMU 10 land use can become unrestricted, additional monitoring is required to determine whether site conditions have changed</p>

Site Name	Site Description	Completed Activities	Current Status
	<p>surrounding soil. Groundwater flow is eastward, toward St. Andrew Bay, located approximately 80 feet from the well containing free product.</p>	<p>prior to the RFI Phase 2. Results for Building 455 are not described here.</p> <p>Significant contamination had been detected at SWMU 10. The RFI Phase 2 sampling was considered adequate to complete the RFI and to perform the HEA. The sampling locations were effective in defining the nature of contamination and areas of highest contamination. Groundwater sampling also was sufficient to determine the extent of groundwater contamination. Although exact areal extent of soil contamination could not be determined from the RFI Phase 2 data, this data gap was considered not to require further sampling at that time. The scale of the site is small, and enough information was available from existing data to make reasonable assumptions in the RFI report. If a CMS would become necessary for SWMU 10, additional soil samples could be collected and analyzed during the Corrective Measures Implementation (CMI).</p> <p><b>1996:</b> In January 2006, ABB-ES documented the RFI findings in an RFI report for AOCs 1 and 2, SWMUs 1 through 5, SWMUs 8 through 10, and Building 455 (also known as AOC 4). The report was approved by the EPA. Fuel-related contaminants in soil and groundwater were reported. Under current land-use conditions, no unacceptable human health cancer or non-cancer effects were predicted. No unacceptable risks were identified for humans exposed to contaminants in subsurface soil or sediment under future (i.e., residential) land use. A potential cancer risk was predicted, however, based on exposure of hypothetical future residents to surface soil (8 in 1,000,000), groundwater (5 in 1,000), and surface water (7 in 1,000,000). Non-cancer effects were also predicted for an adult resident ingesting groundwater [Hazard Index (HI) = 10.4]. Soil throughout most of SMUW 10 is currently covered with pavement. This pavement prevents exposure and limits the potential for contamination to migrate deeper under the influence of precipitation.</p> <p><b>1997:</b> A CMS was conducted for AOC 1 and SWMUs 3, 9, and 10; and was documented in a CMS report. The CMS Report was approved by EPA. The CMS identified and evaluated various remedies for addressing contamination detected at SWMU 10. The recommended corrective action for</p>	<p>sufficiently to cause arsenic concentrations to decrease to acceptable levels. The additional monitoring would include soil verification samples to verify whether soil meets FDEP Soil Cleanup Target Levels (SCTLs), especially in the former UST area.</p> <p>Annual LUC inspections are required.</p>

Site Name	Site Description	Completed Activities	Current Status
		<p>SWMU 10 was Vapor-Enhanced Extraction of petroleum-related contamination. The frequency of LNAPL monitoring and recovery was expected to vary according to the flow scheme presented on Figure 5-1 of the CMS report.</p> <p><b>1998:</b> A Technical Memorandum summarizing site conditions for AOC 1 and SWMUs 9 and 10 was issued by ABB-ES. Chlorinated compounds detected three years earlier were not detected during the most recent round of groundwater sampling. This suggested that biodegradation was ongoing and previously detected compounds had degraded completely or the contaminant plume had migrated beyond the sampling locations. Natural attenuation appeared to be a viable corrective action.</p> <p>A Corrective Measures Implementation Plan (CMIP) for AOC1, and SWMU 3, 9, and 10 was prepared in October, 1998. The CMIP described and governed vacuum enhanced extraction of LNAPL and groundwater monitoring.</p> <p><b>1999:</b> Dames and Moore, Inc., issued a Quarterly LNAPL Measurement and Sampling Report SWMU 10 in July that culminated in recommendations to cease LNAPL monitoring and a Technical Memorandum summarizing site conditions for AOC 1 and SWMUs 9 and 10 was issued by ABB-ES.</p> <p><b>2000:</b> The 1996 RFI Report and 1997 CMS Report approvals were rescinded in an October 4, 2000 letter from EPA because the extent of contamination was found to be incompletely delineated and monitoring had not been conducted as required by the Hazardous and Solid Waste Amendment (HSWA) portion of the RCRA permit. In addition, the presence or status of other SWMUs and AOCs was asserted to be unknown and Navy was directed to submit a work plan designed to fully delineate the scope and extent of contamination, both onsite and offsite, associated with all of the facility's SWMUs.</p> <p><b>2002:</b> One of the underground storage tanks was ruptured during removal and groundwater made contact with residues in the tank. Several SWMU 10 wells were destroyed or damaged, and the remaining wells were thought not to be adequate for future groundwater monitoring.</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p><b>2003:</b> An RFI report addendum for AOC 1 and SWMUs 2, 3, 9, 10 was prepared to update the statuses of these sites based on sampling between 1997 and 2002.</p> <p><b>2004:</b> In January 2004, a CMS report addendum was approved and finalized for SWMU 10 and AOC 1. This addendum updated the status of AOC 1 and SWMU 10 based on sampling in 2003, and further evaluated corrective measures alternatives.</p> <p><b>2005/2006:</b> OHC Environmental Engineering, Inc. (OHC), prepared a Groundwater Monitoring [plan], SWMU 10 &amp; AOC 1, for NSA Panama City under Project Number N62467-05-R-4009 prior to November 2006 sampling.</p> <p><b>2006:</b> An RFI report addendum for AOC 1 and SWMUs 3, 9, and 10, Revision 01, 2008 was compiled by Southern Division of the Naval Facilities Engineering Command (NAVFAC SE) and Tetra Tech, and was approved by FDEP.</p> <p><b>2007:</b> A CMIP was prepared by Tetra Tech in September 2007 to govern long-term monitoring (LTM) of groundwater and implementation of land use controls (LUCs) and the CMIP was approved by FDEP.</p> <p><b>2008:</b> In January, 2008 Tetra Tech and NAVFAC SE updated the RFI report addendum for AOC 1, and SWMUs 3, 9, and 10 by preparing Revision No. 2. The most recently collected data, combined with the data in the original RFI Report, were concluded to be sufficient to delineate the nature and extent of contamination at SWMU 10. RFI Addendum Revision 02 documented a re-evaluation of human health risks for SWMU 10 and AOC 1 to verify that data collected through 2004 did not alter estimates of risk. This report reinforced expectations that monitored natural attenuation (MNA) would be effective at reducing contaminant concentrations to acceptable levels. The RFI report addendum Revision No. 2 asserted that groundwater contamination was not migrating beyond the source zone but that additional monitoring would be required to monitor effects from the tank ruptured in 2002.</p> <p>For calculating risk under the current military land use, exposures were assessed for adult and child</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>transients and documented in the Statement of Basis. Future land-use conditions were assumed to be residential for surface soil, groundwater, surface water, and sediment. For subsurface soil, risk associated with future land use was calculated for an adult excavation worker. Under the current industrial land use scenario, no unacceptable cancer or non-cancer effects were predicted at SWMU 10, and under hypothetical future residential land use, no unacceptable risks were identified for humans exposed to contaminants in subsurface soil or sediment at SWMU 10.</p> <p>Under a hypothetical future residential land use scenario, unacceptable cancer risk predictions were confirmed for residents based on exposure to surface soil (8 in 1,000,000), groundwater (5 in 1,000), and surface water (7 in 1,000,000). The unacceptable non-cancer hazard (HI=10.4) was predicted for the adult resident ingesting groundwater.</p> <p>Sediments in the wetland near SWMU 10 were identified to exert possible impairment of the benthic community or toxicity to certain aquatic organisms, but the correlation between these effects and chemicals detected at the site could not be determined. Possible adverse effects from exposure of terrestrial plants to chemicals in surface soil was also identified.</p> <p>The selected corrective measure for SWMU 10 is Monitored Natural Attenuation (MNA) and Land Use Controls designed to prevent unacceptable exposure to potentially contaminated soil and groundwater. Groundwater at SWMU 10 contained 1-methylnaphthalene, 2-methylnaphthalene, 4-methylphenol, and naphthalene with concentrations greater than the FDEP Groundwater Target Cleanup Levels (GCTLs). Concentrations of bis(2-ethylhexyl)phthalate, arsenic, and manganese exceeded GCTLs during 2002 and/or 2003, but they were not attributed to the SWMU 10 releases. The most recent LTM data showed all targeted groundwater Contaminant of Concern (COC) concentrations to be less than the FDEP GCTLs and Surface Water Cleanup Target Levels (SWCTLs). Arsenic (a non-COC) was noted to have elevated concentrations compared to the arsenic GCTL, but the elevated arsenic concentrations were attributed to geochemically</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>reducing conditions created by the presence of organic contaminants that cause leaching of naturally occurring arsenic from soil to groundwater. Over time, as organic contaminant concentrations decrease, the geochemical conditions are expected to become less favorable to leaching.</p> <p>A Statement of Basis was prepared for AOC 1 and SWMU 10 to document the preferred corrective action. The Statement of Basis was subjected to public scrutiny and was approved by FDEP in 2008.</p> <p>Under current land use no unacceptable human health or ecological risks are anticipated and no future ecological risks are anticipated. Based on data obtained prior to 2008, unacceptable cancer risks were estimated for a hypothetical future residential land use that involves drinking the groundwater, dermal contact with soil, and incidental soil ingestion.</p> <p>In January 2008 a Revision 01 was issued to the CMIP and in September 2008 a Revision 2 was issued to ensure the CMIP was current.</p> <p><b>2010 to 2012:</b> Routine baseline LTM of groundwater began in 2010 and was documented in a 2012 Baseline Long-Term Monitoring Report for AOC 1 and SWMU 10 report issued by Tetra Tech. The original list of five monitoring wells was PCY-363-MW-3, PCY-10-1R, PCY-10-4R, PCY-363-MW-2, and PCY-10-MW-2. Target analytes were originally arsenic, manganese, 1,2,4-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, 4-methylphenol, and naphthalene, but this list had been pared down by 2010 to just arsenic and manganese because all other COC concentrations were consistently less than GCTLs and marine SWCTLs. According to the SWMU 10 May 2012 CMIP, however, arsenic is considered not to be a site-related contaminant. Furthermore, wells PCY-10-1R and PCY-10-4R have been eliminated from the monitoring program because COC concentrations were less than GCTLs and SWCTLs for at least two consecutive sampling rounds in those wells.</p> <p>The purposes of LTM are to ensure that groundwater COCs are not migrating to St. Andrew</p>	

Site Name	Site Description	Completed Activities	Current Status
		<p>Bay at concentrations greater than marine SWCTLs and to verify continued decreases of groundwater COC concentrations. The LTM continued to demonstrate these characteristics. Except for arsenic, all chemical concentrations in groundwater underneath and downgradient of SWMU 10 had been shown to be less than GCTLs and SWCTLs. Therefore, routine groundwater monitoring has ceased.</p> <p><b>2012:</b> Revision 3 of the CMIP was issued in May 2012 to reflect changes in the groundwater LTM program, specifically, cessation of groundwater LTM. LUCs remain in effect. The May 2012 CMIP also indicates that, prior to releasing SWMU 10 for unrestricted use or unlimited exposure, monitoring would be necessary to verify whether site conditions have changed sufficiently to cause arsenic concentrations to decrease to levels less than GCTLs.</p> <p><b>2013:</b> A Resource Conservation and Recovery Act 2012 Biennial Groundwater Long-Term Monitoring Report for AOC 1, August, was prepared by Tetra Tech and approved by FDEP.</p> <p><b>Post-2013:</b> Annual LUC inspections are conducted to ensure LUCs remain effective at protection of human health and the environment. Because COC concentrations have decreased since 2008, cancer risks are expected to be less in 2016 than in 2008, but these risks have not been re-estimated. The 1996 non-cancer Hazard Index under the hypothetical future residential land use was estimated to be 10.4 (as compared to a maximum acceptable HI of 1). Because of the decreased COC concentrations, the HI estimate would be expected to be less if estimated in 2016.</p>	

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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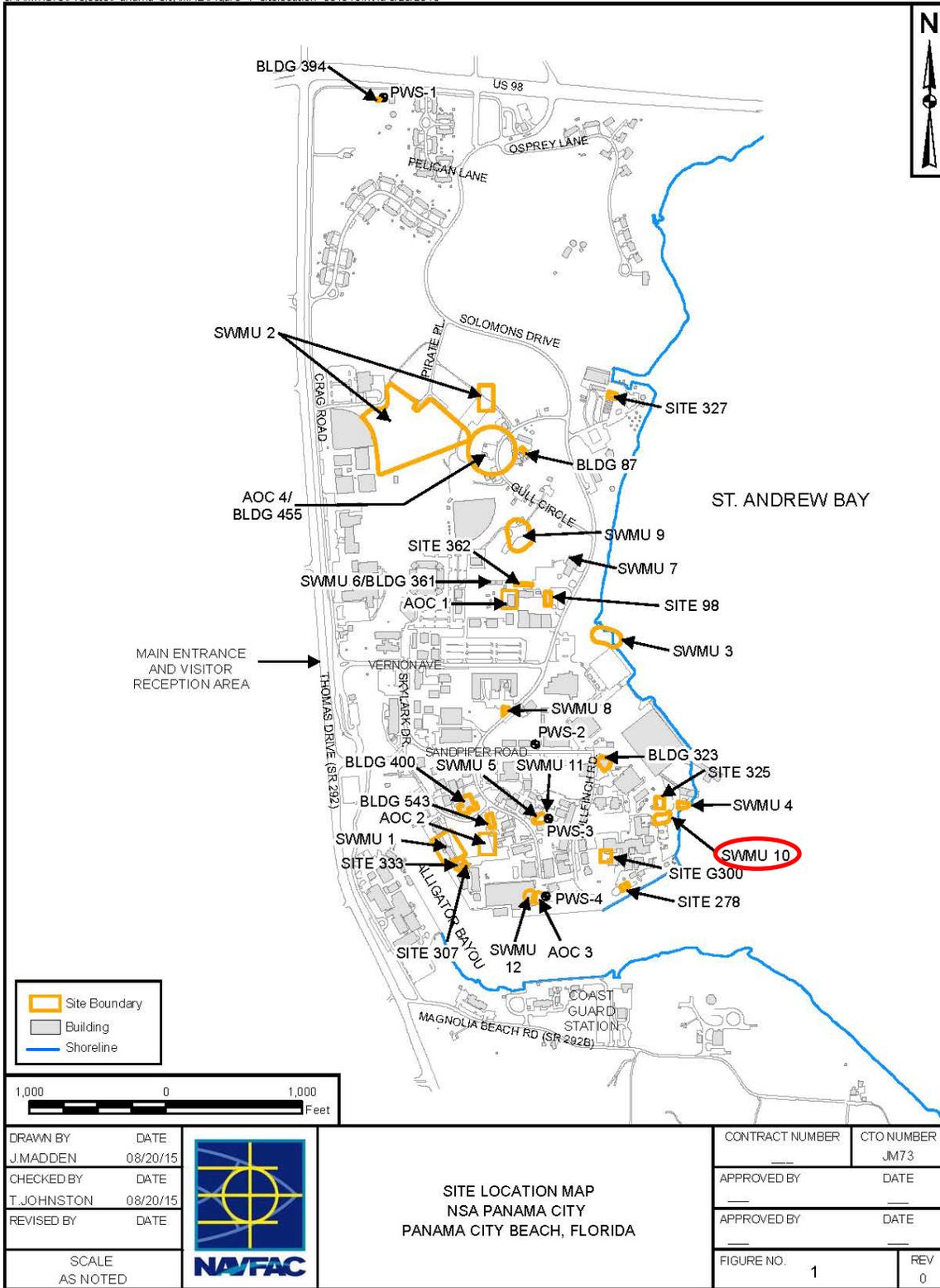
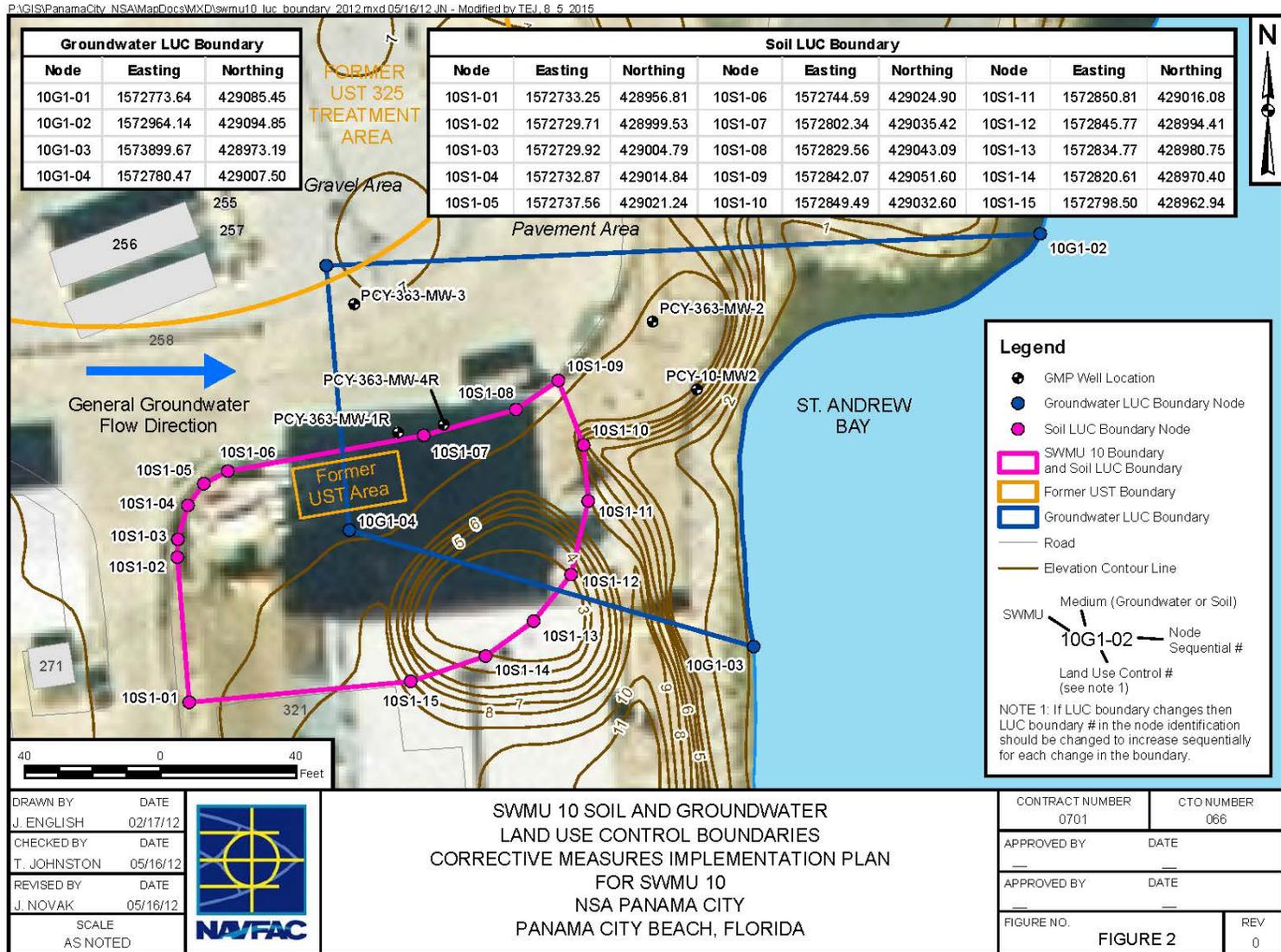


FIGURE 2

SOLID WASTE MANAGEMENT UNIT 10 LAYOUT, WITH SOIL AND GROUNDWATER LAND USE CONTROL BOUNDARIES



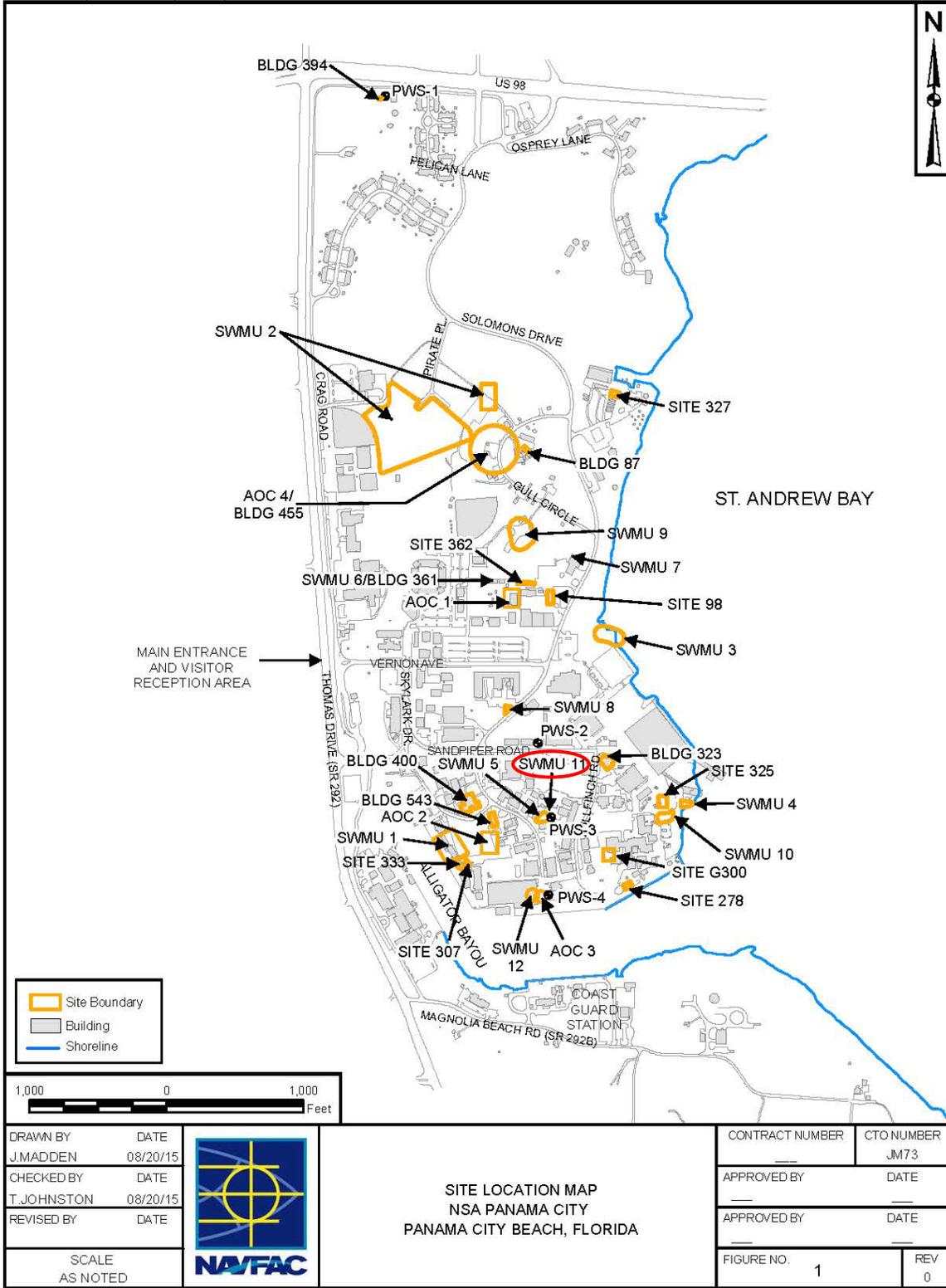
### SOLID WASTE MANAGEMENT UNIT 11

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 11, Temporary Hazardous Waste Storage Area at Building 87.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 11 was a temporary storage facility located at Naval Support Activity (NSA) Panama City on the southeast side of Building 84. It consisted of a sloping concrete pad with spill containment curbing and a collection sump. The sump discharged directly to the sanitary sewer. The location of SWMU 11 is provided in Figure 1. No site layout figures could be found for SWMU 11.</p> <p>Since 1978, cleanup of painting equipment had been conducted at SWMU 11. Chemicals used for cleaning were collected in buckets and waste solvents were poured into 550 gallon drums. The drums were stored on the pad until a sufficient volume had accumulated, then the drums were transferred to the hazardous waste storage facility to await offsite disposal.</p> <p>Waste materials generated and stored at this site consisted of mineral spirits, paint, methyl ethyl ketone, paint thinner and acetone. Volumes varied with paint shop activity but</p>	<p><b>1987:</b> E. C. Jordan prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. SWMU 11 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p> <p>Although further investigative action was not recommended for SWMU 11, the following concern was raised: SWMU 11 employed a sump that drained directly to the sewer system. If a spill would have occurred in that area, hazardous chemicals could have been introduced to the wastewater treatment facility (WWTF). Installation of a valve or other type of preventative action to avoid shocking the biological treatment system of the WWTF was recommended.</p>	<p>No further action (NFA) based on the 1987 RFA Report. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

<b>Site Name</b>	<b>Site Description</b>	<b>Completed Activities</b>	<b>Current Status</b>
	were estimated to average 78 gallons per month.		

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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DRAWN BY	DATE
J.MADDEN	08/20/15
CHECKED BY	DATE
T.JOHNSTON	08/20/15
REVISED BY	DATE

SCALE  
AS NOTED



SITE LOCATION MAP  
 NSA PANAMA CITY  
 PANAMA CITY BEACH, FLORIDA

CONTRACT NUMBER	CTO NUMBER
	JM73
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
1	0

**SOLID WASTE MANAGEMENT UNIT 12**

Site Name	Site Description	Completed Activities	Current Status
<p>Solid Waste Management Unit (SWMU) 12, Temporary Hazardous Waste Storage Area at Building 40.</p> <p><b>Note:</b> What is now known as NSA Panama City was previously known as Coastal Systems Station (CSS).</p>	<p>SWMU 12 was an area approximately 5 feet x 5 feet, in the parking lot behind Building 40 at Naval Support Activity (NSA) Panama City where, beginning in 1978, plastic 550 gallon barrels containing plating wastes are temporarily stored before being transported to the Hazardous Waste Storage Facility (SWMU 6). Figure 1 shows the location of SWMU 12. No site layout figures could be found for SWMU 12.</p> <p>The drums sat on the pavement next to the building and were not otherwise contained. When the holding barrels become full, or at least monthly, they were removed.</p> <p>Building 40 was a metal plating shop. It contained a nickel plating area, another area for plating with a variety of metals, a small darkroom, a vapor degreasing unit, and an etching machine. Various chemicals were used there, including mineral acids, chromic acid, and cyanide.</p>	<p><b>1987:</b> E. C. Jordan prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) report documenting findings of an RFA conducted at SWMUs 1 through 12 and Areas of Concern (AOCs) 1 through 3 to identify potentially contaminated sites throughout NSA Panama City. SWMU 12 was found to present little or no potential for release to the environment and was therefore not recommended for further action.</p> <p>Although investigative action was not recommended for SWMU 12, the following concern was raised: In the event of a spill, contaminants could migrate to Alligator Bayou. Installation of curbing around the temporary hazardous waste storage area behind Building 40 (SWMU 12) was recommended to prevent this migration. Imminent removal of the plating shop in late 1987 also was noted, which would result in discontinuation of plating operations.</p>	<p>No further action (NFA), based on the 1987 RFA Report. Documented in the current NSA Panama City Corrective Action permit No. 66255-HH-003.</p>

**FIGURE 1**  
**NAVAL SUPPORT ACTIVITY PANAMA CITY SITE LOCATIONS**

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