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SAMPLING AND ANALYSIS PLAN FOR ZONE G BUILDING NS 2 FORMER UNDERGROUND
STORAGE TANK NS 2A CNC CHARLESTON SC

9/1/2002
CH2M HILL

**SAMPLING AND ANALYSIS PLAN
FOR
ZONE G; BUILDING NS 2
Former Underground Storage Tank NS 2A
SCDHEC No: 17595**

**Charleston Naval Complex
North Charleston, South Carolina**

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

Contract Number N62467-99-C-0960

September 2002

**SAMPLING AND ANALYSIS PLAN
FOR
Zone G; Former UST NS 2A**

**Charleston Naval Complex
North Charleston, South Carolina**

**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29406**

**Submitted by:
CH2M-JONES, LLC.
Charleston Naval Complex
1849 Avenue F
North Charleston, South Carolina 29405**



J.A. JONES
ENVIRONMENTAL
SERVICES



CH2MHILL

Contract Number: N62467-99-C-0960

September 2002

ACRONYMS

bls	below land surface
BTEX	benzene, toluene, ethylbenzene and xylenes
BRAC	Defense Base Realignment and Closure Act
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
COC	Chemical of Concern
DPT	Direct Push Technology
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
GEL	General Engineering Laboratories
µg/kg	microgram per kilogram
µg/L	microgram per liter
NAVFAC	Naval Facilities Engineering Command
OVA	Organic Vapor Analyzer
PAH	Polycyclic Aromatic Hydrocarbons
QA	Quality Assurance
QC	Quality Control
RA	Rapid Assessment
RAR	Rapid Assessment Report
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SPORTENDETCHASN	Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston
SSTL	Site-Specific Target Level
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Underground Storage Tank (UST) NS2; located adjacent to Building NS2 and NS3 at the Charleston Naval Complex (CNC), Charleston, South Carolina. This site contained an unregulated 560 gallon underground waste oil holding tank.

Originally this site was under the RCRA program as AOC 676, however a letter dated 5 February 2002, transferred the site to the UST program.

This SAP was developed using the information provided in the Zone I RCRA Facility Investigation Report (IR).

1.1 General Site Description

The CNC is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina, as shown on **Figure 1**. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River.

The site is located within the developed portion of the base. The area surrounding CNC is "mature urban," having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek.

1.2 Site Background

The CNC began operations in 1901, when the Navy acquired the property. In 1993, the CNC was added to the list of bases schedule for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure of the base and transition of the property back to the community. With the scheduled closure of the base, environmental cleanup has proceeded to make the property available for redevelopment after closure.

Former UST NS 2A was an unregulated 560 gallon underground waste oil holding tank for a oil/water separator. It was located in a area between Buildings NS 2 and NS 3. This tank was closed by removal in April 1996. During removal it was noted that the tank was intact with no holes or pitting. The oil/water separator which was associated with the waste oil UST and is currently identified as NS 2A is located immediately east of the former waste oil UST. The oil/waste separator was left in place and its lines were plugged and capped.

2.0 PROPOSED SAMPLING PLAN

This SAP provides a method for evaluating the impact of groundwater in the vicinity of Former UST NS 2A. A total of two soil samples and one groundwater sample was collected during the removal of the UST NS 2A. Each sample (soils and groundwater) was sampled for BTEX, SVOCs, and metals (see **Appendix I** for the UST Assessment Report).

Based on the historical analytical results CH2M-Jones, LLC recommends that a sampling plan be implemented to confirm that groundwater and or soils in this area have not been impacted by the former operations. If analytical results indicate that levels are below the RBSLs, a No Further Action may be recommended for this site.

2.1 Sampling and Analysis Plan

Groundwater DPTs will be collected in the vicinity of the former UST. In addition to the proposed DPT locations, permanent monitoring well 676GW001 will also be analyzed. If Groundwater analytical from the DPTs and monitoring well indicates that there are COCs above the RBSLs, then a request for permanent monitoring wells will be submitted to SCDHEC.

The samples collected will be analyzed for VOC, SVOC, and metals in accordance with the *South Carolina Risk-Based Corrective Action for Petroleum Releases*.

All sampling procedures will be conducted in accordance with EPA EISOPQAM and Ensafe/Allen & Hoshall, Comprehensive Sampling and Analysis Plan, 1996.

2.2 DPT Collection

A total of one existing monitoring well and three DPTs will be collected adjacent to former UST NS 2A (see **Figure 2** for locations). Groundwater is typically located between 4-5 feet below land surface (bls) in this area so samples will be collected approximately 12 feet bls.

2.3 Surveying

All new sampling locations will be surveyed after collection.

2.4 Soil Boring Schedule

No other soils borings are scheduled for the SAP unless site conditions change and warrant otherwise.

2.5 Reporting

A Groundwater Monitoring Report will be submitted to SCDHEC following the sampling event. The report will summarize and include copies of field and laboratory analytical data and COC distribution and trends.

2.6 Equipment Decontamination

If needed, all drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the EPA EISOPQAM.

2.7 Sample Handling

Sample handling will be conducted in accordance to the following references: EPA EISOPQAM, Code of Federal Regulations 136, 1990, and EPA Users Guide to Contract Laboratory Program, 1988. The following forms will be completed for packing/shipping process: sample labels, chain-of-custody labels, appropriate labels applied to shipping coolers, and chain-of-custody forms.

2.8 Quality Control

In addition to periodic calibration of field equipment and the completions of the appropriate documentation, quality control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EPA EISOPQAM:

- **Field Blank:** A sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.
- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.
- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

2.9 Field Quality Assurance / Quality Control (QA/QC)

All sampling procedures will be conducted in accordance with EPA EISOPQAM.

QA/QC specifications for selected field measurements are summarized below.

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH = 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

2.10 Record Keeping

In addition to required sampling documentation, standardized forms, log sheets and logbooks will be completed during all field activities.

3.0 SITE MANAGEMENT AND BASE SUPPORT

Throughout the investigation activities, work on the CNC will be coordinated through SOUTHDIV and SCDHEC.

The primary contacts for each are as follows:

1. SOUTHDIV point of contact
Gabe Magwood
Southern Division Engineering Command
2155 Eagle Drive
North Charleston, SC 29406
(843) 820-7307

2. SOUTHDIV point of contact
Tony Hunt
Southern Division Engineering Command
2155 Eagle Drive
North Charleston, SC 29406
(843) 820-5525

3. SCDHEC point of contact
Michael Bishop
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
(843) 898-4300

4.0 REFERENCES

South Carolina Department of Health and Environmental Control 2001. Risk-Based Corrective Action.

United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.

SPORTENVDETHASN. 1996. UST Assessment Report for NS 2A.

NOTE: Original figure created in color

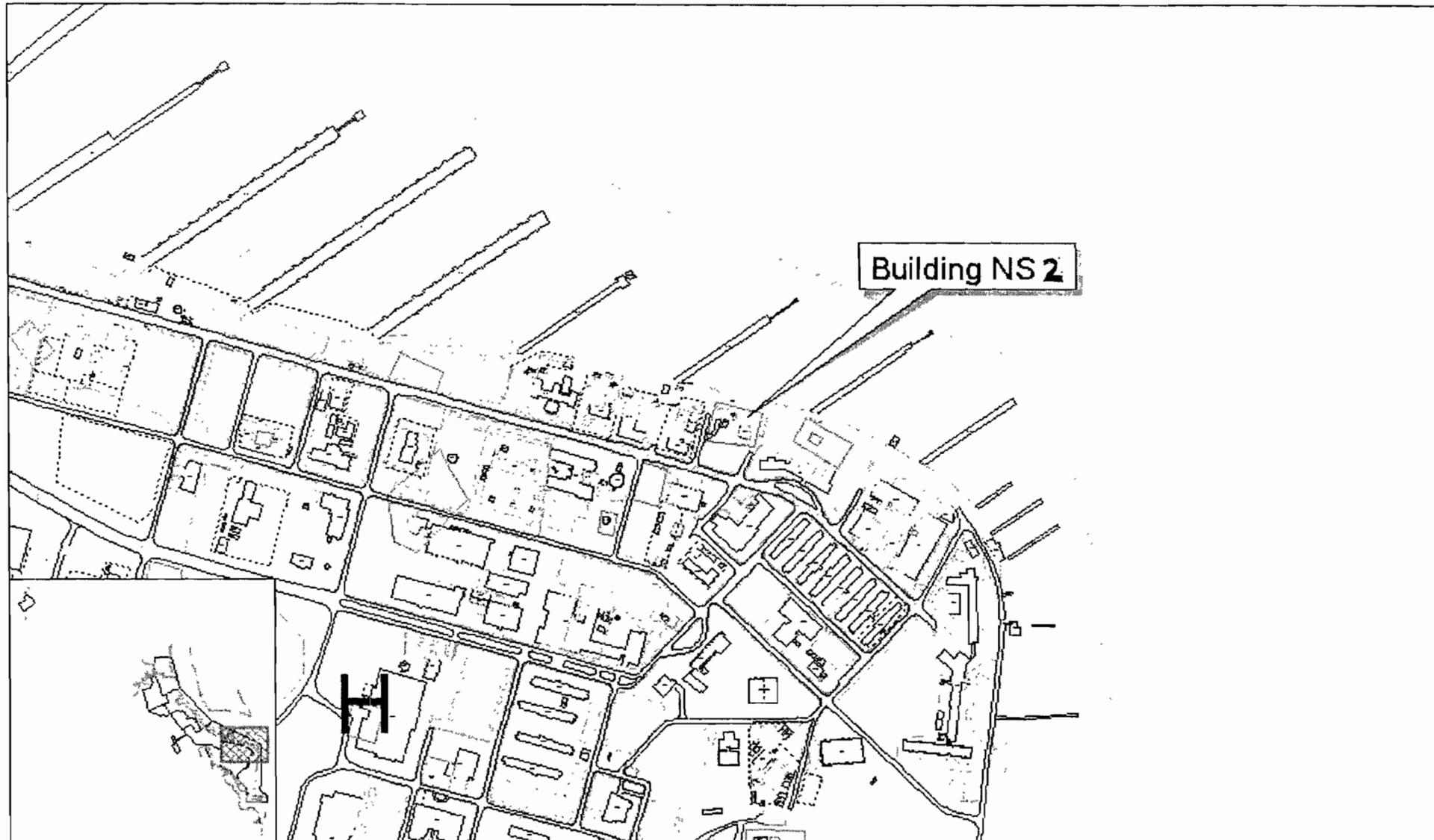
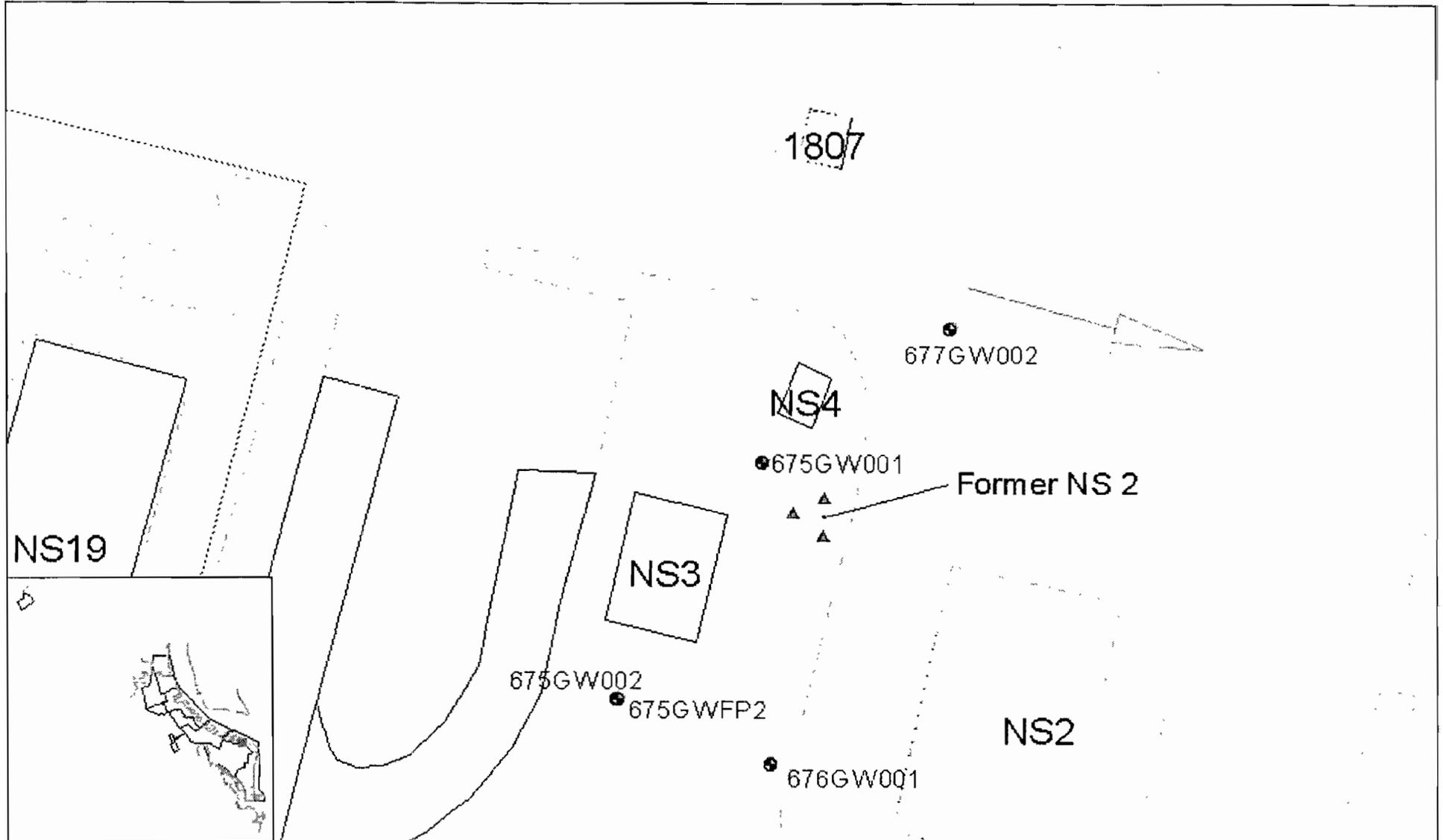


Figure 1
Site Location Map
Building NS 2
Charleston Naval Complex

CH2MHILL

NOTE: Original figure created in color



- | | |
|--------------------|-----------------------|
| ● Groundwater Well | SEWER-LINE/MANHOLE-NS |
| ▲ Proposed DPT | SEWER-LINE/MANHOLE |
| --- Fence | SEWER-FLOW-ARROW |
| --- Railroads | □ Buildings |
| --- Pavement | |
| --- Sidewalk | |

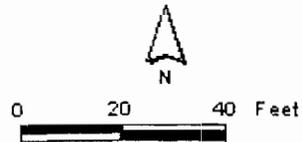
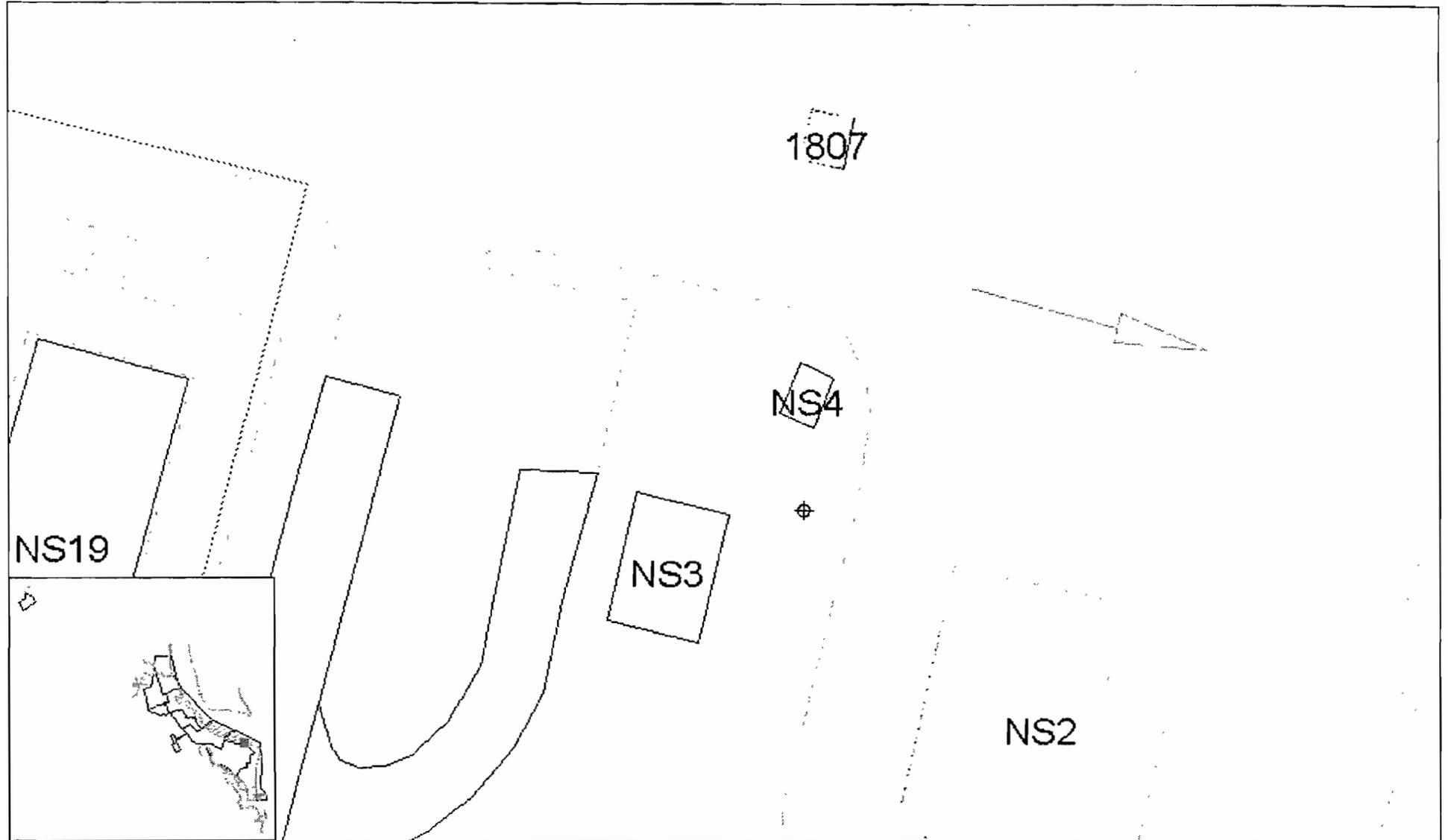


Figure 2
Proposed DPTs
NS 2
Charleston Naval Complex

NOTE: Original figure created in color



- ⊕ UST
- ⚡ Fence
- ⚡ Railroads
- ⚡ Roads - Lines
- ⚡ Pavement
- ⚡ Sidewalk
- SEWER-LINE/MANHOLE-NS
- SEWER-LINE/MANHOLE
- SEWER-FLOW-ARROW
- Buildings

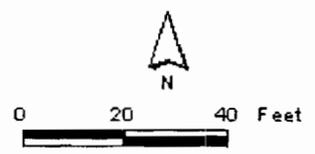
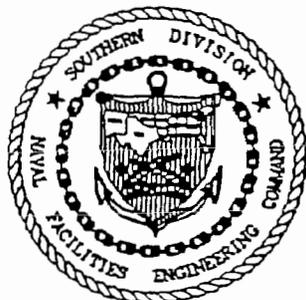


Figure 3
UST Location Map
NS 2
Charleston Naval Complex

APPENDIX I



UST ASSESSMENT REPORT
UST NS 2A
NAVAL BASE CHARLESTON
CHARLESTON SC



Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON SC



Prepared by:

SUPERVISOR OF SHIPBUILDING, CONVERSION
AND REPAIR, USN, PORTSMOUTH DETACHMENT
ENVIRONMENTAL CHARLESTON, SC
1899 NORTH HOBSON AVE.
NORTH CHARLESTON SC 29405-2106

July 31, 1996

South Carolina Department of Health and Environmental Control (S.C.D.H.E.C.)
Underground Storage Tank (UST) Assessment Report

Date Received

State Use Only

Submit Completed Form to:
UST Regulatory Section
SCDHEC
2600 Bull Street
Columbia, South Carolina 29201
Telephone (803) 734-5331

I OWNERSHIP OF UST(S)

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office

Mailing Address: P.O. Box 190010

City: N. Charleston State: SC Zip Code: 29419-9010

Area Code: 803 Telephone Number: 743-9985 Contact Person: Mr. Joseph Camp

II SITE IDENTIFICATION AND LOCATION

Site I.D. #: N/A Unregulated

Facility Name: Charleston Naval Base, NS 2A

Street Address: South Hobson Avenue

City: North Charleston, 29405-2413 County: Charleston

III CLOSURE INFORMATION

Closure Started: 9 April 1996

Closure Completed: 24 April 1996

Number of USTs Closed: 1

N/A
Consultant

SPORTENVDETHASN
UST Removal Contractor

IV. CERTIFICATION (Read and Sign after completing entire submittal)

I certify that I have personally examined and am familiar with the information submitted in this and all attached documents and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate and complete.

Name (Type or Print)

Signature

V. UST INFORMATION

- A. Product
- B. Capacity
- C. Age
- D. Construction Material
- E. Month/Year of Last Use
- F. Depth (ft.) To Base of Tank
- G. Spill Prevention Equipment Y/N
- H. Overfill Prevention Equipment Y/N
- I. Method of Closure Removed/Filled
- J. Visible Corrosion or Pitting Y/N
- K. Visible Holes Y/N

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Waste Oil						
560 gal.						
< 20 years						
Steel						
Unknown						
9'						
N						
N						
RG						
N						
N						

- L. Method of disposal for any USTs removed from the ground (attach disposal manifests).

UST NS 2A was removed, drained and cleaned. It was then cut up for recycling as scrap metal. See Attachment III.

- M. Method of disposal for any liquid petroleum, sludges, or waste waters removed from the USTs (attach disposal manifests).

Residual waste oil was pumped into a 55 gallon drum and disposed of by Chem-Met Services, Inc; 1855 Allen Road; Wyandotte, MI 48192. (See Attachment III, manifest number 13105, paragraph 11a.)

- N. If any corrosion, pitting, or holes were observed, describe the location and extent for each UST.

UST NS 2A was found intact with no holes and no pitting. Its exterior surface was coated with a rubberized paint approximately 1/8" thick.

VI. PIPING INFORMATION

- A. Construction Material.....
- B. Distance from UST to Dispenser.....
- C. Number of Dispensers.....(oil holding tank).....
- D. Type of System P/S.....
- E. Was Piping Removed from the Ground? Y/N...
- F. Visible Corrosion or Pitting Y/N.....
- G. Visible Holes Y/N.....
- H. Age.....

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
Steel						
N/A						
N/A						
N/A						
Y						
N						
N						
Unknown						

- I. If any corrosion, pitting, or holes were observed, describe the location and extent for each line.

N/A

VII. BRIEF SITE DESCRIPTION AND HISTORY

UST NS 2A was an unregulated underground holding tank for an oil/water separator. It was located on the Charleston Naval Base in Charleston, South Carolina in a grass-covered patch of ground between buildings NS 2 and NS 3. NS 2 is a one and one-half story, red brick powerhouse substation at the south end of the base. UST NS 2A was approximately 120' from the Cooper River.

The area which includes UST NS 2A, Building NS 2, Building NS 3, and UST NS 4 (see site map 3) is under investigation by the Navy under the Resource Conservation and Recovery Act (RCRA) program. Specifically, site UST NS 2A is adjacent to Building NS 2 and UST NS 4. These sites are listed as areas of concern (AOC 677 and AOC 675) and will be assessed as a part of the Navy's RCRA Facility Investigation.

IX. SAMPLE INFORMATION

S C.D H.E C. Lab Certification Number 10120

Sample #	Location	Sample Type (Soil/Water)	Depth*	Date/Time of Collection	Collected By	OVA#
NS2-1.	Bottom of pit, river end of tank.	Soil	8'	4/12/96 @ 10:45AM	Randy Atkins	Not taken.
NS2-2.	Bottom of pit, opposite river	Soil	8'	4/12/96 @ 10:55AM	Randy Atkins	Not taken.
NS2-3.	Bottom of pit, center of excavation.	Water	8'	4/12/96 @ 11:05AM	Randy Atkins	Not taken.
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

Provide a detailed description of the methods used to collect and store (preserve) the samples.

After the removal of UST NS 2A, soil samples NS 2-1, NS 2-2, and ground water sample NS 2-3 were taken. The soil samples were taken from the bottom of the excavation from native soils at a depth of eight feet below land surface as shown in Site Map Number 3. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines

The samples are identified as follows:

Soil Sample NS 2-1 = SPORT - 0005-3
Soil Sample NS 2-2 = SPORT - 0005-4
Ground water NS 2-3 = SPORT - 0005-1

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Samples NS 2-1 and NS 2-2 were extracted where the ends of the tank had rested; ground water sample NS 2-3 was taken from beneath it.

The samples were marked, logged, and immediately placed in sample coolers packed with ice to maintain an approximate temperature of 4° C. Tools were thoroughly cleaned and decontaminated with organic-free soap and water after each sample.

The samples remained in the custody of SPORTENVDETECTHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

XI. RECEPTORS

Yes No

A.	<p>Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system?</p> <p style="text-align: right;">[*Cooper River]</p> <p>If yes, indicate type of receptor, distance, and direction on site map.</p>	X*	
B.	<p>Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system?</p> <p>If yes, indicate type of well, distance, and direction on site map.</p>		X
C.	<p>Are there any underground structures (e.g., basements) located within 100 feet of the UST system?</p> <p style="text-align: right;">[*NS 2A oil/water separator]</p> <p>If yes, indicate the type of structure, distance, and direction on site map.</p>	X*	
D.	<p>Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination?</p> <p style="text-align: right;">[*sewer & electricity]</p> <p>If yes, indicate the type of utility, distance, and direction on the site map.</p>	X*	
E.	<p>Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete?</p> <p>If yes, indicate the area of contaminated soil on the site map.</p>		X

SITE MAP

You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information.

Site Maps 1, 2, and 3.
Photographs

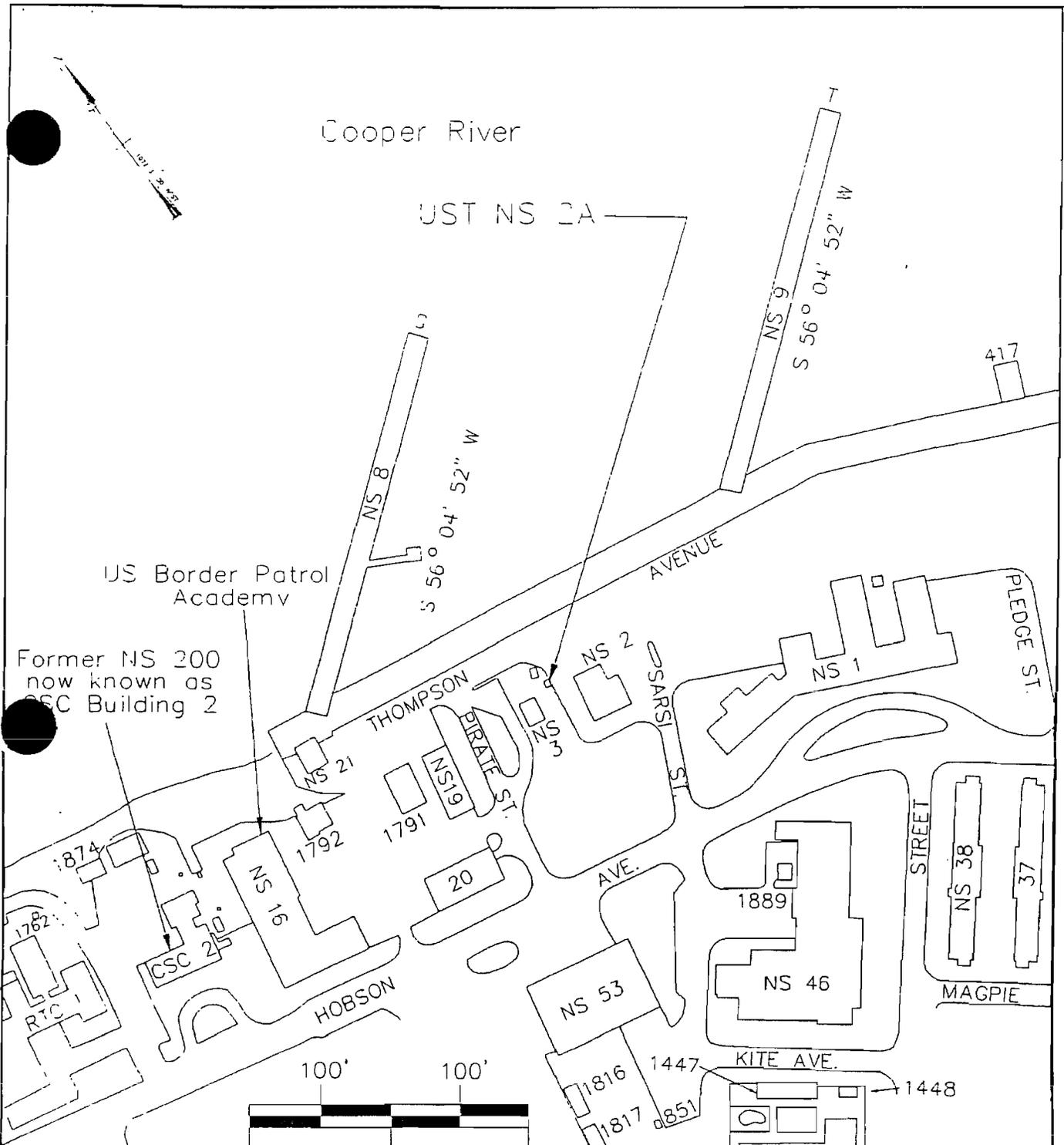
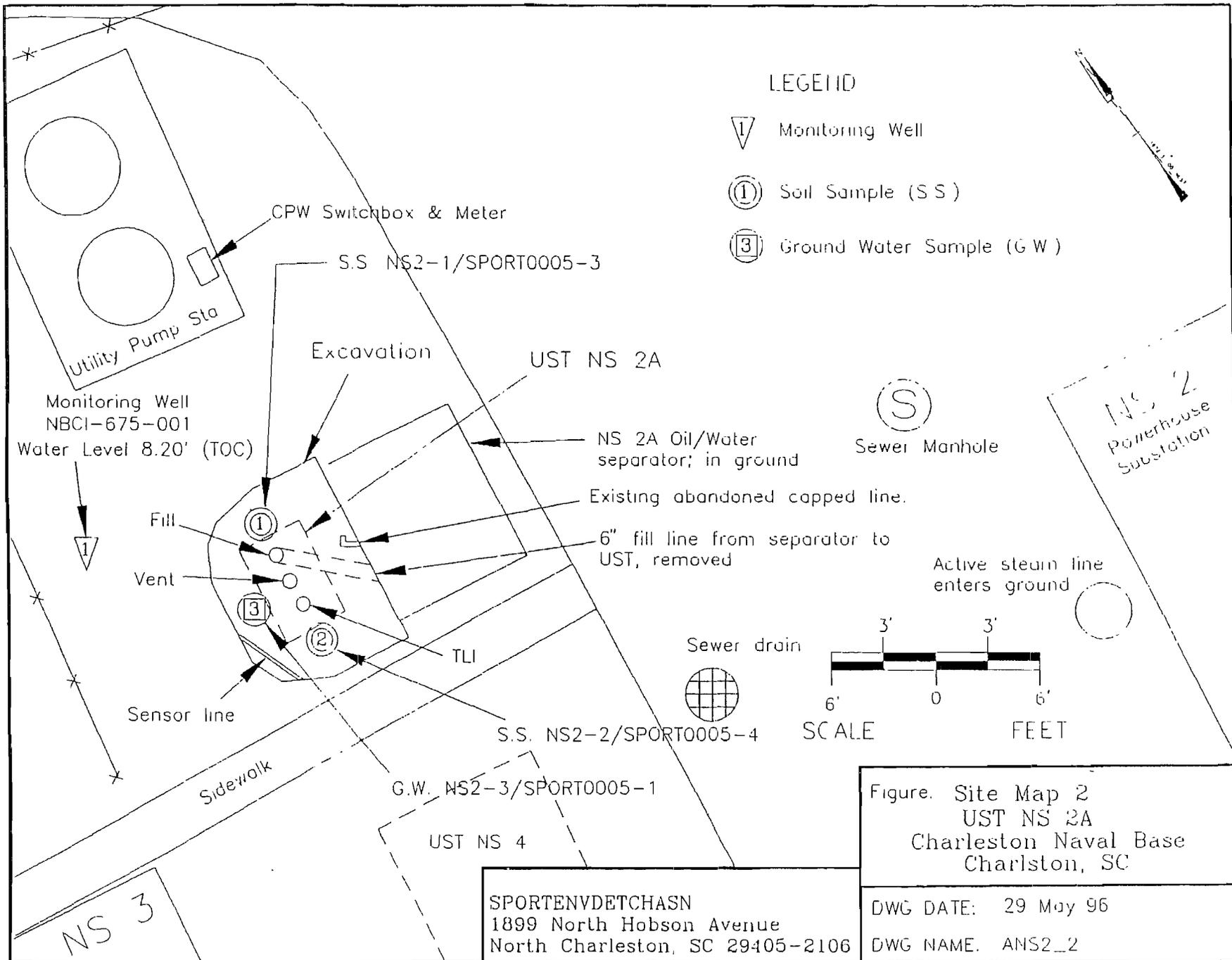
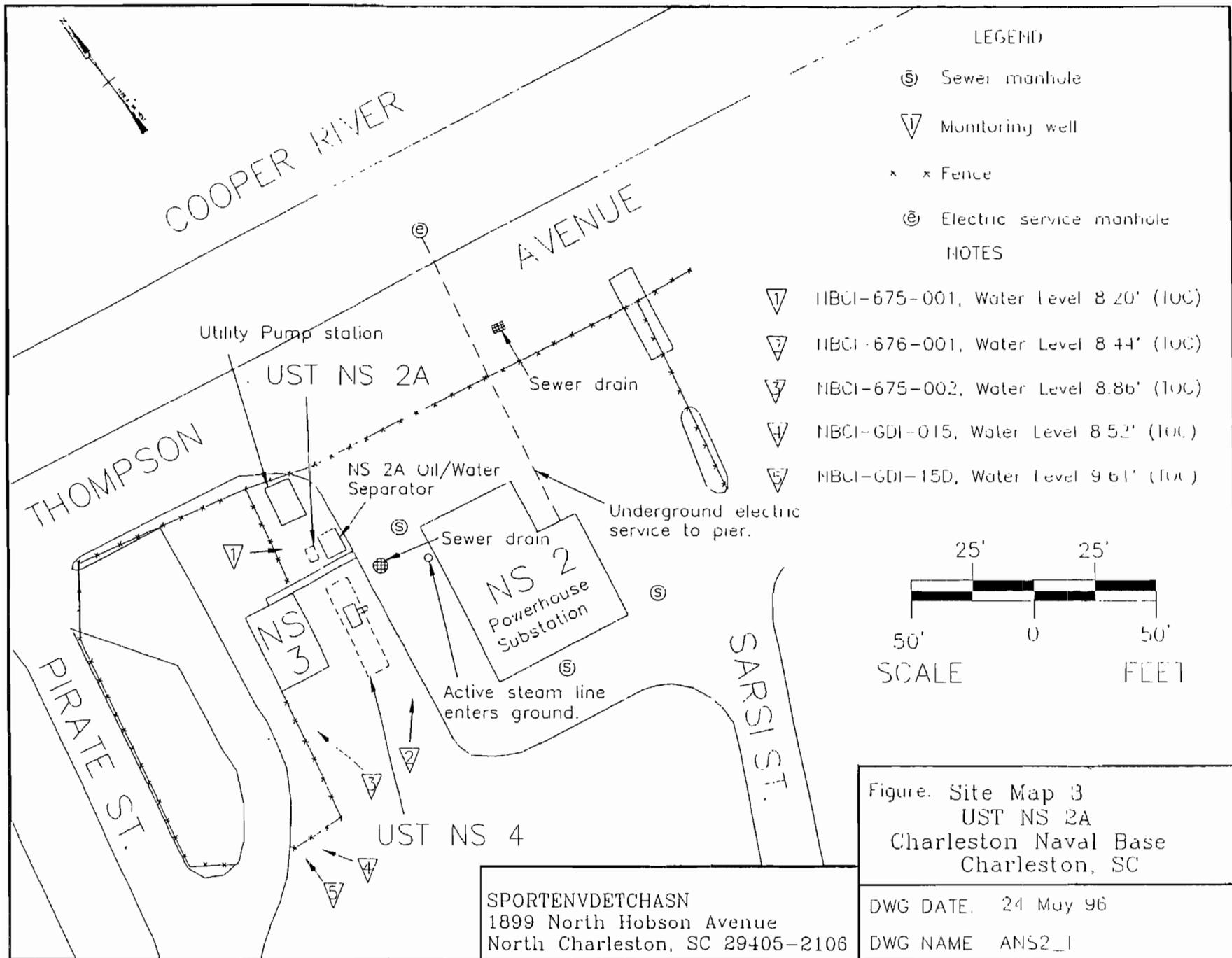


Figure: Site Map 1
UST at NS 2A
Naval Base Charleston
Charleston, SC

SPORTENVDETHASN
1899 North Hobson Avenue
North Charleston, SC 29405-2106

DWG DATE: 23 May 96
DWG NAME: ANS20_1





NS 2A REMOVAL



NS 2A CLEANING AND DISPOSAL

