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SAMPLING AND ANALYSIS PLAN (SAP) UNDERGROUND STORAGE TANK (UST) AT BUILDING 650 CNC CHARLESTON SC

06/26/1997

ENVIRONMENTAL DETACHMENT CHARLESTON

Li 7.31.97
Lo 10.13.97

Letter 10.14v

SAMPLING AND ANALYSIS PLAN

UST at Building 650
(SCDHEC GWPD SITE ID # 17781)

NAVAL BASE CHARLESTON
CHARLESTON SC

Prepared for:

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

Prepared by:

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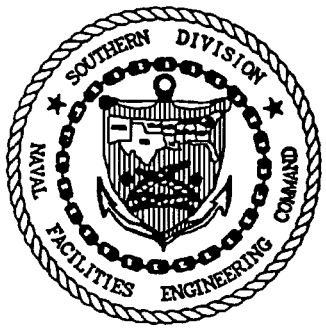
June 26, 1997



FORWARD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (UST) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The Program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirement for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 281 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This plan was prepared to satisfy the requirements of South Carolina R.61-92, Part 280 (*Underground Storage Tank Control Regulations*), Section 280.65 to determine the extent and location of soils contaminated by a release from a UST system.

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ACRONYMS, ABBREVIATIONS AND SYMBOLS

bgs	below the ground surface
CFR	Code of Federal Regulations
CHASP	Comprehensive Health and Safety Plan
CIA	Controlled Industrial Area
CSAP	Comprehensive Sampling and Analysis Plan
DET	Environmental Detachment Charleston
USEPA	U.S. Environmental Protection Agency
ft/day	feet per day
ft^2/day	square feet per day
gpm	gallons per minute
GWPD	Ground Water Protection Division
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSWA	Hazardous and Solid Waste Amendments
IDW	Investigative Derived Wastes
MSDS	Material Safety Data Sheet
NAVBASE	former Charleston Naval Base
PAH	Polynuclear Aromatic Hydrocarbon
RBC	Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAP	Sampling and Assessment Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SOPQAM	*Standard Operating Procedures and Quality Assurance Manual*
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSHSP	Site-Specific Health and Safety Plan
SWDA	Solid Waste Disposal Act
UST	Underground Storage Tanks

1.0 INTRODUCTION

1.1 GENERAL. A UST located beside the former Charleston Naval Base Building 650 was removed by Environmental Detachment Charleston (DET). Soil samples taken during UST removal contained Polynuclear Aromatic Hydrocarbons (PAHs). A groundwater sample taken at the same time contained PAH contamination in excess of United States Environmental Protection Agency (USEPA) Region Three Risk Based Concentrations (RBCs). The Sampling and Analysis Plan (SAP) outlines a field investigation and sampling program that will assess the source(s) of soil contamination at the site of the removed tank and evaluate the horizontal and vertical extent of the petroleum contamination detected. The field investigation will also determine the extent of groundwater contamination at the Building 650 UST site. The following report presents the site location and develops the rationale for the proposed field investigation.

1.2 USE OF RFI DATA. The former Charleston Naval Base is the site of an ongoing RCRA Facility Investigation (RFI); the former Building 650 UST location is in Zone H of the RFI. Data taken as part of the RFI, including geological information, hydrogeological information, well drilling logs and groundwater sampling data was used in the preparation of this SAP.

2.0 BACKGROUND

2.1 SITE DESCRIPTION. The former Charleston Naval Base (NAVBASE) is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina. The developed portion of the NAVBASE occupies the west bank of the Cooper River starting at a boundary 2300 feet upstream of Noisette Creek and ending at Shipyard Creek. The northern section of the NAVBASE (RFI Zones A, B, C and D) contains a mixture of warehouses, offices and former Navy housing areas. The central section of the NAVBASE (RFI Zones E and F) was occupied primarily by the controlled industrial area (CIA) of the former Naval shipyard and its associated offices and warehouses. The southern section of the NAVBASE (RFI Zones G, H and I) along the Cooper River is occupied by piers, barracks, training buildings, offices, storehouses and fuel tanks which formerly supported naval vessels homeported at Charleston. The north bank of Shipyard Creek in the southern part of the base is largely undeveloped and consists of recreational areas and a large dredge spoil area.

The removed UST supplied fuel oil to Building 650, which is located in the southern section of the NAVBASE at the intersection of Dyess Avenue and Halsey Street. Building 650 is the former Naval Station Post Office and is unoccupied as of 17 June 1997. Viewed from Dyess Avenue, the former UST location is beside the far left corner of the building beyond an asphalt parking lot. A shallow, neglected drainage ditch runs from the south end of the parking lot past the former UST location to a storm sewer inlet at a culvert under Halsey Street (see Figure 2-3).

2.2 SITE HISTORY. The UST at Building 650 (South Carolina Department of Health and Environmental Control (SCDHEC) Ground Water Protection Division (GWPD) Site Identification Number 17781) was a 1000 gallon unregulated fuel oil tank installed in 1969 and used until an unknown date. The tank was constructed of steel and was connected to Building 650 by two 3/8" copper supply and return lines. Between 27 September 1996 and 4 October 1996, the UST was removed, drained, cleaned and cut up for recycling as scrap. The copper fuel lines and a 2" steel vent pipe were removed at the same time.

There were no recorded releases while the tank was in service. When removed, the tank appeared to be in good condition; the steel vent line, although corroded, contained no holes, and no petroleum stained soil or petroleum odors were noted during tank removal. However, free product was observed floating on a puddle of water in the base of the excavation. Soil and ground water samples taken from the excavation contained PAH contamination (see Figure 2-2).

2.3 GEOLOGY. Charleston South Carolina is located in the southern Atlantic Coastal Plain. The surficial geology of the region consists of the Quaternary-age sands, silts and clays of the Wando Formation. Below the Wando Formation are the Oligicene-age Ashley Formation and the Eocene-age Parkers Ferry and Harleyville Formations, Known collectively as the Cooper Group. Below the Cooper Group is the Eocene-age Santee Limestone.

At the NAVBASE, the upper surface of the Ashley Formation is an erosional surface ranging from 35 feet to 77 feet below the ground surface (bgs). Overlaying the Ashley Formation is the

Wando Formation which at the NAVBASE typically consists of upper and lower sand layers divided by a layer of "marsh clay". The surface contours of the NAVBASE area were extensively changed by fill operations during the base's life, particularly in the lower portion of the NAVBASE, which was originally tidal marsh.

2.4 HYDROGEOLOGY.

2.4.1 Regional. (Excerpted from Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996.) Groundwater occurs under water table or poorly confined conditions within the Pleistocene deposits overlying the Ashley Formation. Transmissivities in the Pleistocene aquifer are generally less than 1,000 square feet per day (ft^2/day) and well yield are variable, ranging from 0 to 200 gallons per minute (gpm). This groundwater contains high concentrations of iron and is commonly acidic at shallow depth (Park, 1985).

The Cooper Group is hydrogeologically significant mainly because of its low permeability. In most locales, its sandy, finely granular limestones produce little or no water and act as confining material that produces artesian condition in the underlying Santee Limestone.

2.4.2 Site Specific. Typically, above the Ashley Formation at the entire NAVBASE are two sand layers divided by a clay layer described as "marsh clay" in the RFI Reports. The vertical hydraulic conductivity of the Ashley Formation beneath the NAVBASE is 0.0027 feet per day (ft/day), based on measurements taken during the Zone H RFI. The vertical hydraulic conductivity of the marsh clay layer is 0.001 ft/day, based on measurements taken during the Zone I RFI. The Ashley Formation acts as a lower confining layer, while the marsh clay functions as an aquitard separating the upper and lower sand layers. At the NAVBASE, rainwater absorbed into the ground will flow downward to the marsh clay and then flow toward a discharge point into a body of surface water.

Parts of the southern portion of NAVBASE are drained by Shipyard Creek while some northern areas are drained by Noisette Creek The drainage basins of both waterways include areas other than NAVBASE. These waterways are tributaries of the Cooper River. Surface Drainage Over the remainder of NAVBASE flows directly into the Cooper River, which discharges into Charleston Harbor.

The former Building 650 UST site is located in the southern portion of the NAVBASE in Zone H. Based on potentiometric maps included in the final Zone H RFI Report dated July 5, 1996, groundwater beneath the UST location flows north toward the Cooper River. From drilling logs for nearby monitoring wells, the depth to groundwater is 4 to 5 feet bgs.

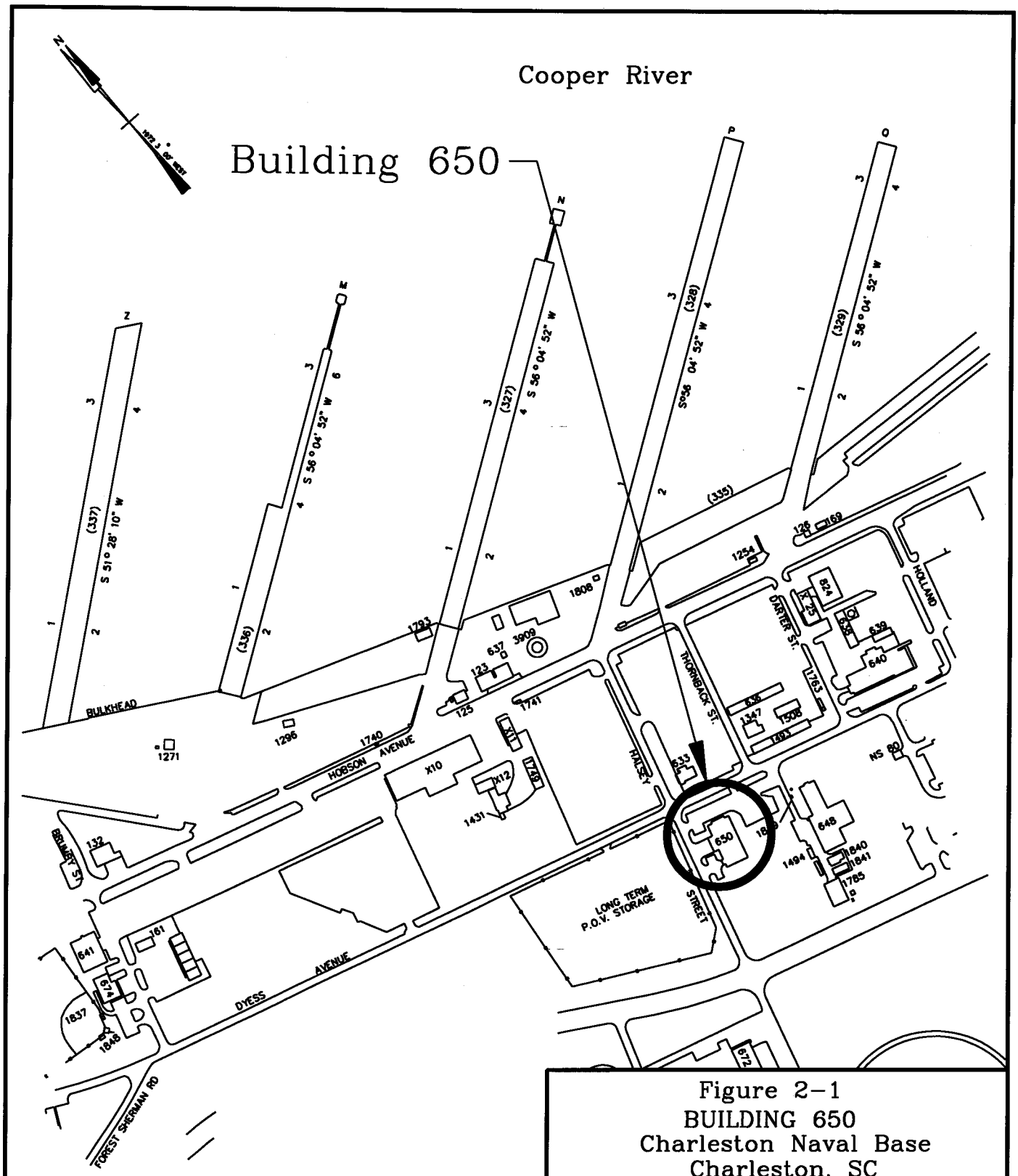


Figure 2-1
BUILDING 650
Charleston Naval Base
Charleston, SC

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

DWG NAME: 650_21	DWG DATE: 16 JUNE 97

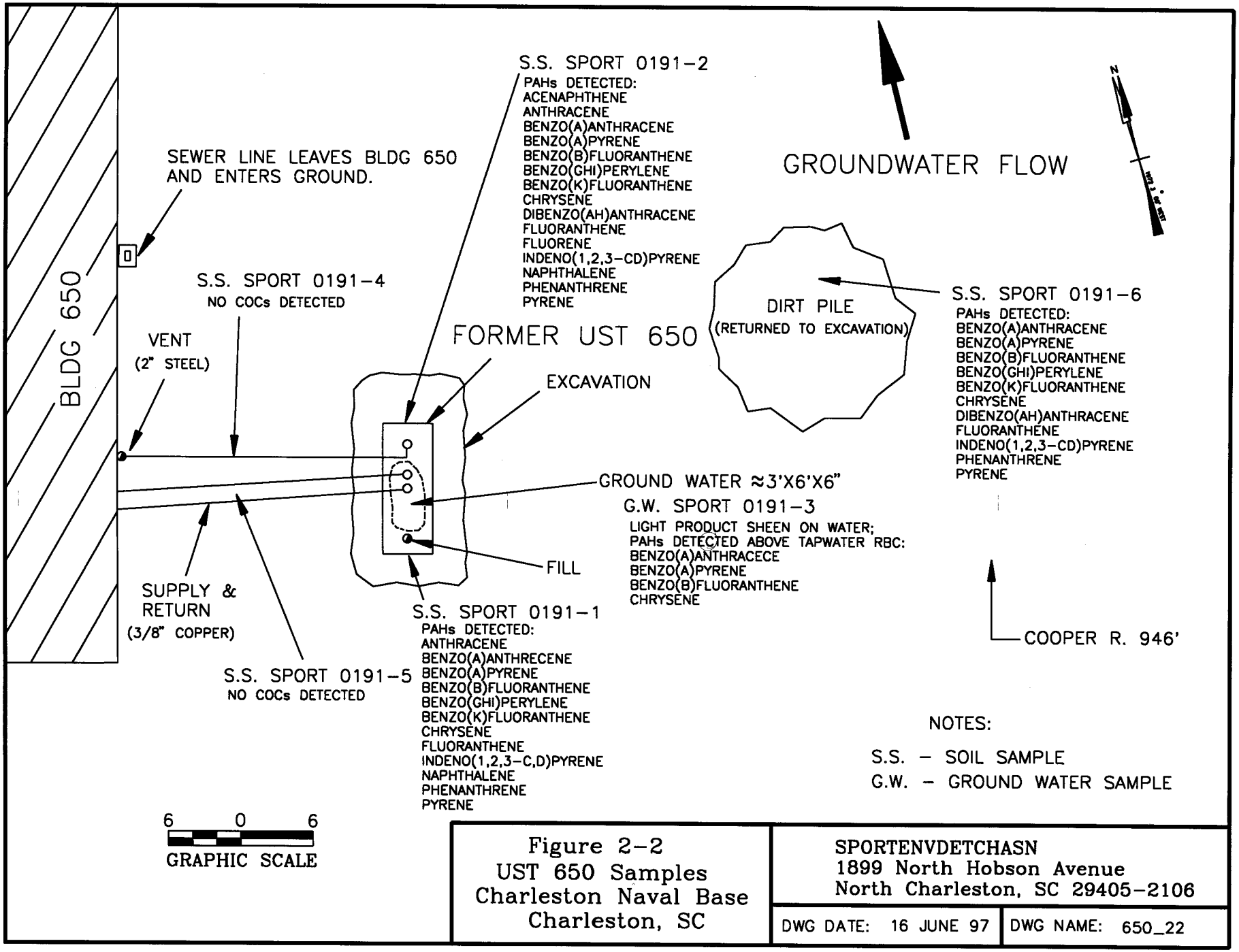


Figure 2-2
UST 650 Samples
Charleston Naval Base
Charleston, SC

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

DWG DATE: 16 JUNE 97 | DWG NAME: 650_22

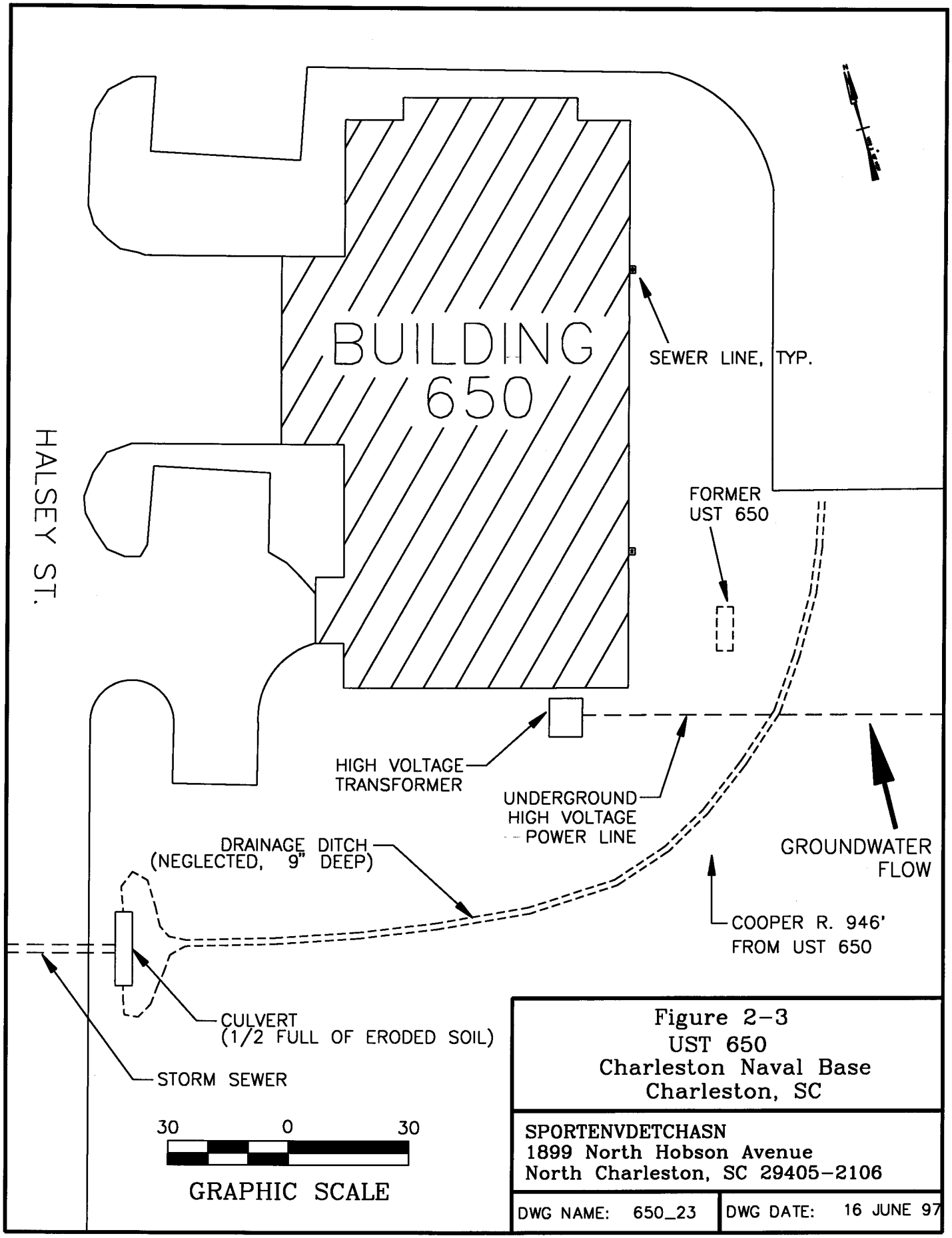


Figure 2-3
UST 650
Charleston Naval Base
Charleston, SC

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

DWG NAME: 650_23 | DWG DATE: 16 JUNE 97

3.0 INVENTORY OF PROXIMATE POTABLE WATER WELLS

There are no potable water wells on the NAVBASE. Groundwater in the surficial aquifer at the NAVBASE discharges into the Cooper River and its tributaries and so flows away from any potable water wells in residential areas nearby.

4.0 BACKGROUND

4.1 FIELD INVESTIGATION. Prior to the beginning of the field investigation, a pre-work briefing will be held. All DET personnel associated with the investigation will review the scope of work in the SAP and the Site Specific Health and Safety Plan (SSHSP). Scheduling, logistics and special precautions will be discussed.

The field investigation has three objectives. The first objective is to evaluate the horizontal and vertical extent of the petroleum soil contamination at the overall site. The second objective is to determine the areal extent of the petroleum contaminant plume in groundwater and install monitoring wells to detect plume movement off the site. The third objective is to collect site-specific background information required to prepare the contamination assessment report.

Fifteen soil borings will be made, of which two will be completed as temporary monitoring wells (see Figure 4-1). Borings will be made around a perimeter outside the suspected extent of contamination and immediately outside the four walls of the excavation to determine soil contamination levels. The shallow drainage ditch beside the former tank site will not be investigated unless sampling indicates that surface drainage of overspill may have occurred at the site. The borings completed as monitoring wells will be advanced using a portable drill rig and soil samples will be collected using a split-spoon sampling device. Remaining soil borings will be advanced with a hand auger. In all soil borings, samples will be collected in 2-foot intervals until the water table is reached. Water samples will be taken from all temporary monitoring wells. All sampling will be performed in accordance with the RFI Comprehensive Sampling and Analysis Plan (CSAP). All monitoring wells will be installed in accordance with South Carolina R. 61-71, *Well Standards and Regulations*. The proposed soil boring locations are shown in Figure 4-1. Actual locations of soil borings will be determined by the field team as more information is obtained about the contaminant plume during soil sampling.

Where the initial 15 soil borings are not sufficient to define the extent of soil and groundwater contamination, SCDHEC will be notified that the sampling grid needs to be extended in those directions where the plume is undefined. Any additional soil borings will be advanced using the same methods as the initial borings.

Once the extent of soil and groundwater contamination has been determined, a background soil boring will be made in nearby uncontaminated soil. A permanent monitoring well will be installed upgradient of the former UST site.

Detailed information including lithologic descriptions, split-spoon samples, groundwater elevations and other pertinent data for each monitoring well will be presented in the Assessment Report. Soil will be classified in accordance with the unified Soil Classification System.

All wastes shall be disposed of in accordance with the Investigation Derived Waste (IDW) procedures included in Section 16 of the RFI CSAP.

4.2 PREPARATION OF REPORTS. After completion of the field investigation, an assessment report will be prepared and submitted to Southern Division Naval Facilities Engineering Command (SOUTHDIV) for review and approval. The report will discuss site background information, site conditions, findings and recommendations for the former UST site at Building 650. Recommendations will also be made as to the need for any follow-up investigations. Site location maps, locations of soil borings and soil contamination delineation maps will be included with the report.

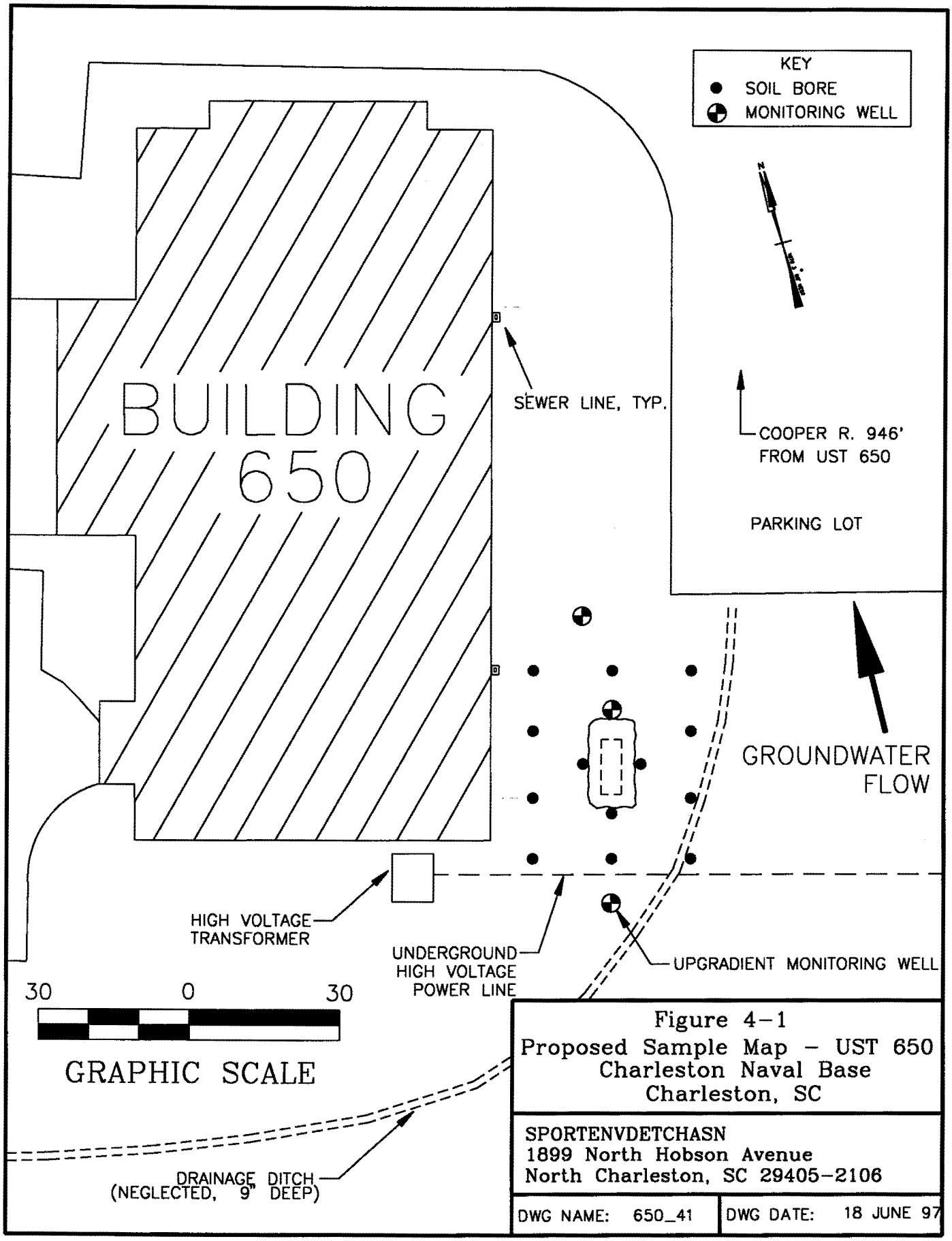


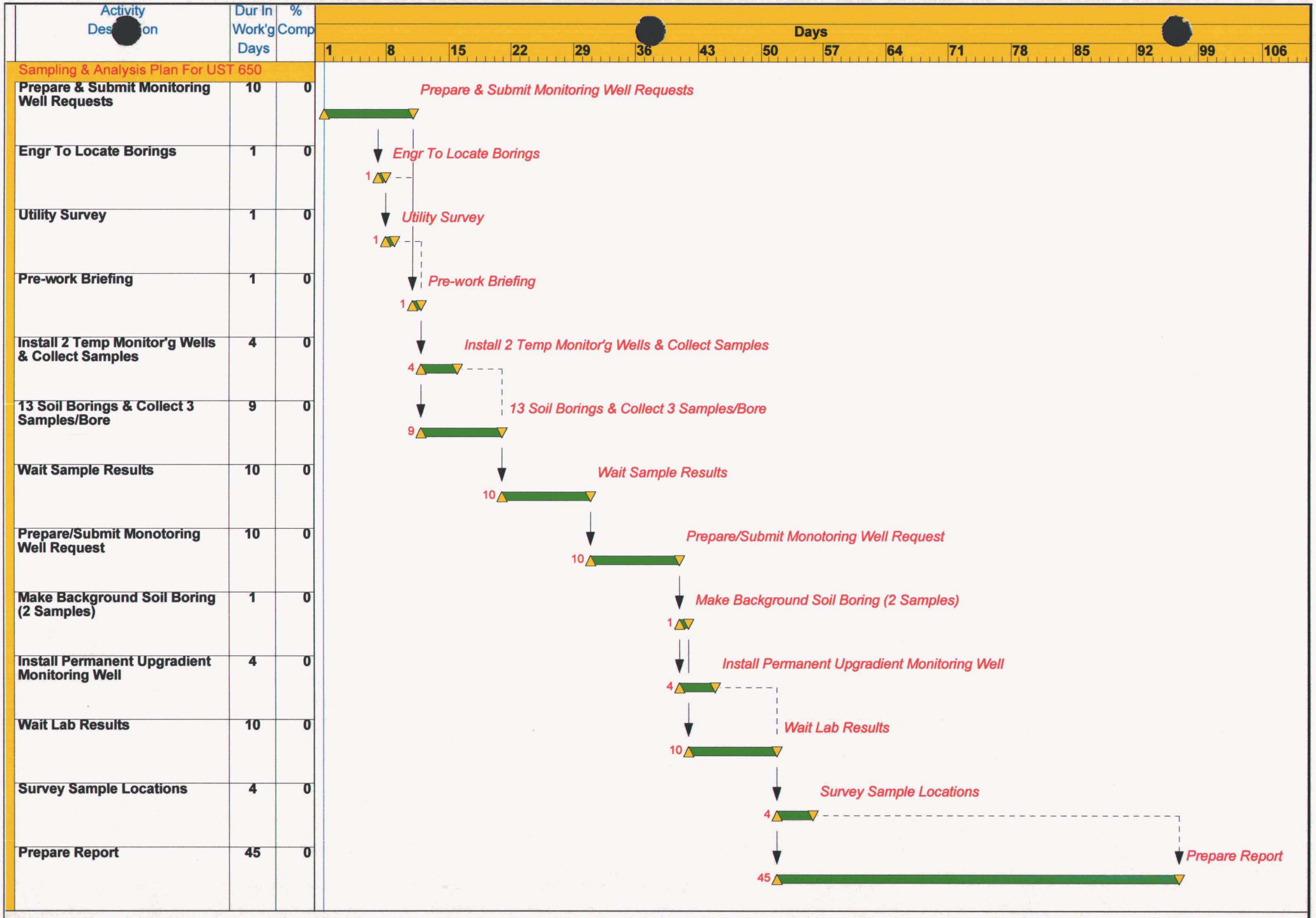
Figure 4-1
Proposed Sample Map - UST 650
Charleston Naval Base
Charleston, SC

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

DWG NAME: 650_41 | DWG DATE: 18 JUNE 97

5.0 SCHEDULE

A projected schedule to complete the SAP field investigation at the UST 650 site is approximately nine weeks (see Figure 5-1). This includes mobilization, drilling, sampling, surveying and demobilization.. An Assessment Report for the site is scheduled for delivery to 45 days after completion of field investigation.



Project Start	01-APR-96
Project Finish	23-AUG-96
Data Date	01-APR-96
Plot Date	27-JUN-97

(c) Primavera Systems, Inc.

Early Bar
Progress Bar
Critical Activity

Sheet 1 of 1

Sample & Analysis Plan For UST 650
Figure 5-1
Environmental Detachment Charleston

Environmental Detachment Charleston

REFERENCES

Ensafe/Allen & Hoshall, Final Comprehensive Sampling and Analysis Plan (CSAP) RCRA Facility Investigation dated August 30, 1994

Ensafe/Allen & Hoshall, Draft Zone I RCRA Facility Investigation Report NAVBASE Charleston dated January 1996

Ensafe/Allen & Hoshall, Final RCRA Facility Investigation Report for Zone H Naval Base Charleston dated July 5, 1996

SCDHEC Underground Storage Tank Assessment Guidelines for Permanent Closure, Change-in Owner and Change-in-Service dated June 1995

SCDHEC Risk-Based Corrective Action for Petroleum Releases

South Carolina R. 61-71 South Carolina Well Regulations and Standards

SUPSHIP Portsmouth Va., Environmental Detachment Charleston, Base Realignment and Closure Tank Management Plan

United States Environmental Protection Agency (USEPA) Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual* (SOPQAM)

SITE SPECIFIC HEALTH AND SAFETY PLAN

1.0 Purpose

This plan provides supplemental site specific information and is to be used with the Detachment Comprehensive Health and Safety Plan.

2.0 Work Location

Former petroleum oil underground storage tank locations.

3.0 Work Scope Brief (refer to the work document for full details)

The work scope is to perform a sampling program that will evaluate the horizontal and vertical extent of petroleum contamination in soil and determine the extent of ground water contamination.

4.0 Hazards

The primary health hazard is from petroleum oils which are a primary irritant. Dermatitis, a defatting of the skin, can result from continued skin contact. Some individuals develop hypersensitivity.

Safety hazards include the personal injury hazards of heavy equipment operation, and the dangers of underground and above ground utility installations.

5.0 Personal Protective Equipment

Gloves and coveralls (either tyvek or cloth). If oil soaked soil is encountered, shoe covers or boots should be worn. At the employee's option an organic vapor respirator may worn, although it is not required.

6.0 Special Personnel Training Qualifications

Hazwoper training.

7.0 Occupational Safety and Health Precautions

Prior to the start of work the area must be checked for the presence of above or below ground utilities, and they must be marked and secured by lockout tagout if they will be endangered. Follow the detachment policy and procedures for location and evaluation of these utilities.

Wash hands before eating or smoking.

If work requires entry into a confined space, contact the project engineer for additional instructions, as a confined space entry permit and gas testing may be required.

Work that involves sewage exposure (e.g. standing sewage liquid or broken sewer pipes), will require the use of workers who are in the NavHospChas C5 medical surveillance program. These workers shall avoid skin exposure by using appropriate protective equipment such as aprons, tyvek suits, boots, and latex or plastic gloves worn under heavier protective gloves. If splashing is a hazard, wear face shields over goggles. Sewage wetted clothing should be removed promptly and the person should then wash with soap and water. Wet clothing should be bagged and then washed separately with hot soap and water and one cup of bleach per wash load. Sewage contaminated equipment should be washed with soap, water, and bleach. Wash hands and face after any contact or sewage work and prior to eating, smoking or going home.

Sewage work also has a risk of fire, explosion, and oxygen deficiency due to the possibility of gases. Cutting of sewer pipes, or the repair of accidentally damaged pipes, should be done only after an assessment of the work by the team leader or project engineer. Typically, gas testing and the use of a confined space entry permit will be required.

8.0 Material safety data sheets

A typical MSDS for fuel oil is included as part of the official folder.

9.0 Medical Surveillance

Hazardous waste worker, (B27,711). This code refers to a NAVHOSPCHASN Medical Surveillance Classification