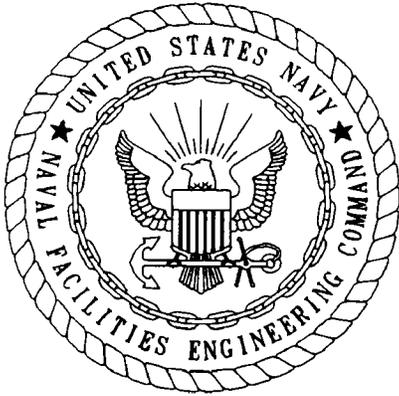


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SUPPLEMENTAL SITE SCREENING WORK PLAN FOR STUDY AREA 17 MCCOY ANNEX
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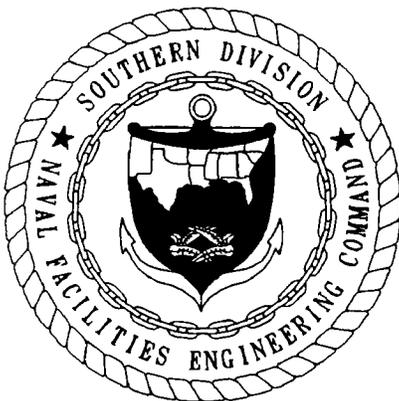
SUPPLEMENTAL SITE SCREENING WORKPLAN

**STUDY AREA 17
MCCOY ANNEX**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

**UNIT IDENTIFICATION CODE: N65928
CONTRACT NO.: N62467-89-D-0317/107**

JUNE 1997



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010**

SUPPLEMENTAL SITE SCREENING WORKPLAN

**STUDY AREA 17
MCCOY ANNEX**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Unit Identification Code: N65928

Contract No.: N62467-89-D-0317/107

Prepared by:

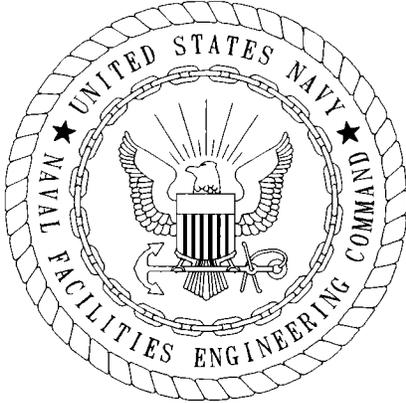
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North Charleston, South Carolina 29418**

Barbara Nwokike, Code 1873, Engineer-in-Charge

June 1997



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: June 26, 1997

NAME AND TITLE OF CERTIFYING OFFICIAL: John Kaiser
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Richard Allen
Project Technical Lead

(DFAR 252.227-7036)

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Naval Training Center
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REFERENCES

ATTACHMENTS

- Attachment A: Summary of Detections in Groundwater Analytical Results
- Attachment B: Complete Analytical Results, Previous Screening Investigation

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Supplemental Site Screening Workplan
Study Area 17, McCoy Annex
Naval Training Center
Orlando, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CHC	chlorinated hydrocarbons
CPT	cone penetrometer testing
DCE	dichloroethene
DPDO	Defense Property Disposal Office
DPT	direct-push technology
FID	flame ionization detector
GC	gas chromatograph
$\mu\text{g}/\ell$	micrograms per liter
POP	Project Operations Plan
QA/QC	quality assurance and quality control
SA	Study Area
SM	service mark
TCE	trichloroethene
USEPA	U.S. Environmental Protection Agency
VC	vinyl chloride

1.0 INTRODUCTION

This workplan establishes the rationale and field program to further evaluate the occurrence of chlorinated volatile organic compound(s) at Study Area (SA) 17 at the Naval Training Center in Orlando, Florida. The objectives of the supplemental screening program are to further assess the extent of impact to the shallow (surficial) aquifer.

1.1 SITE DESCRIPTION AND USE. SA 17 is located in the central part of the McCoy Annex (Figure 1-1), and encompasses an approximately 10-acre complex that formerly served as the Defense Property Disposal Office (DPDO) for the Annex. The site is bounded on the southeast side by Avenue "C", on the southwest and northwest by a shallow drainage ditch, and on the northeast by the rail line that dissects the Annex (Figure 1-2).

The northern half of SA 17 encompasses the land occupied by Buildings 7178, 7191, 7193, and 7190, which are currently used for storage by the grounds maintenance contractor. The southwest corner of the site is undeveloped and open except for a small band of woods along the drainage ditch. The southeast part of the site is occupied by a fenced compound that was formerly utilized for vehicle storage for the DPDO. The compound is currently being utilized by the grounds maintenance contractor for the storage and maintenance of mowing equipment.

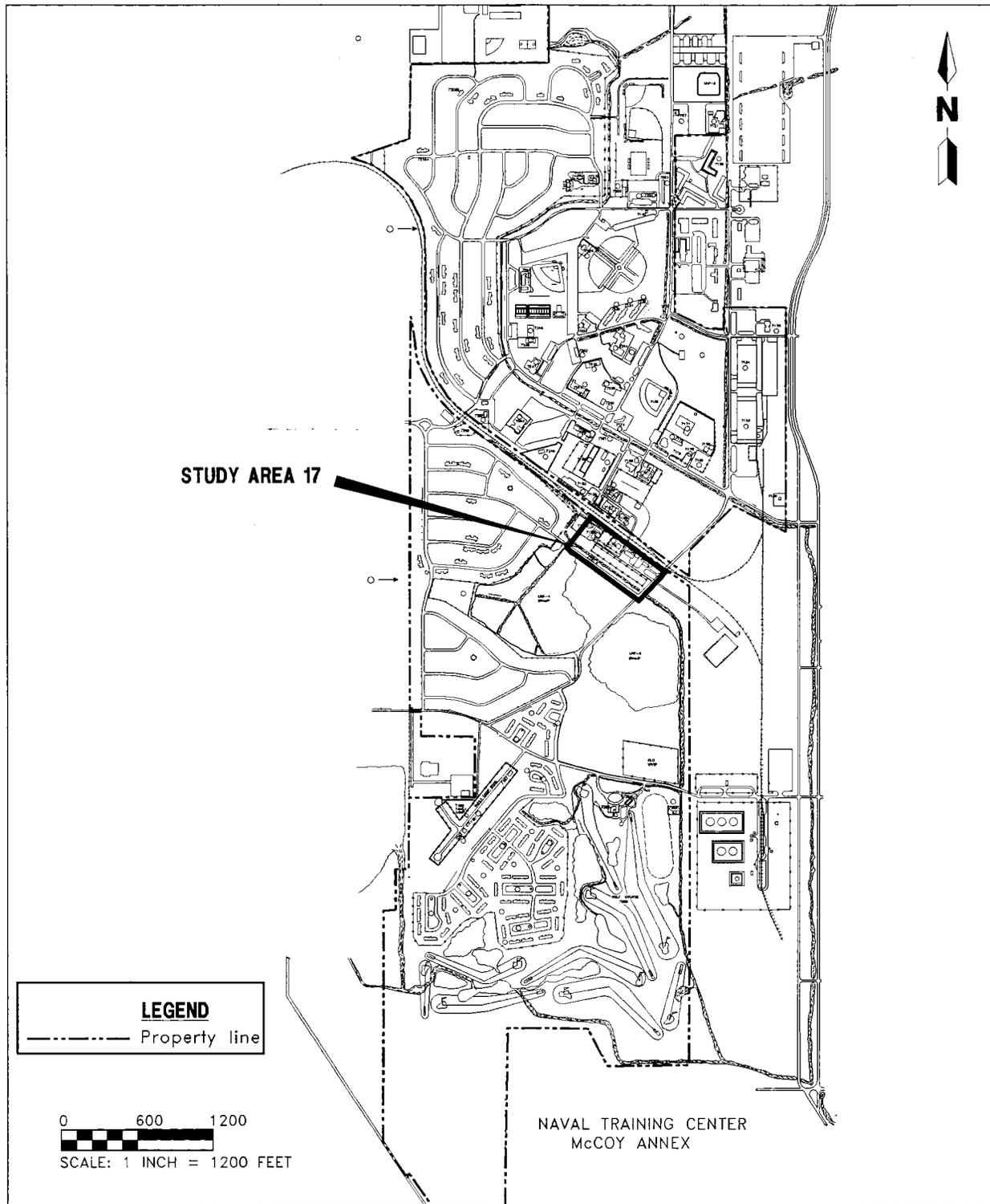
1.2 RESULTS OF PREVIOUS SITE SCREENING ACTIVITIES. The initial phase of site screening at SA 17 was performed in 1995 as part of the Group III screening activities. The field program included the following activities:

- a geophysical survey,
- a passive soil gas survey,
- soil and groundwater sampling and analysis, and
- surface water and sediment sampling and analysis.

The results of the geophysical survey identified several anomalies on the west side of the site that, following a test-pitting operation in August 1996, proved to be buried construction debris. For further details regarding the test-pitting operation and results, refer to Technical Memorandum, Test-Pitting Results, Study Area 17 (ABB Environmental Services, Inc. [ABB-ES], 1996).

The soil gas survey results showed only a petroleum hydrocarbon detection at one location on the west side of the site. The soil gas results had been intended to be used to target areas for soil and groundwater sampling. However, because of the limited detections, areas located downgradient of potential source areas (i.e., aboveground storage areas and drum storage areas) were targeted. Five shallow (screened to bracket the water table) monitoring wells (OLD-17-01A through OLD-17-05A) were installed. Surface water and sediment samples were collected from random locations placed at regular, widely spaced intervals along the entire length of the drainage ditch.

All of the media samples were submitted to a laboratory for a full suite Contract Laboratory program target compound list and target analyte list analysis. All of the media sampled during the original screening investigation showed an



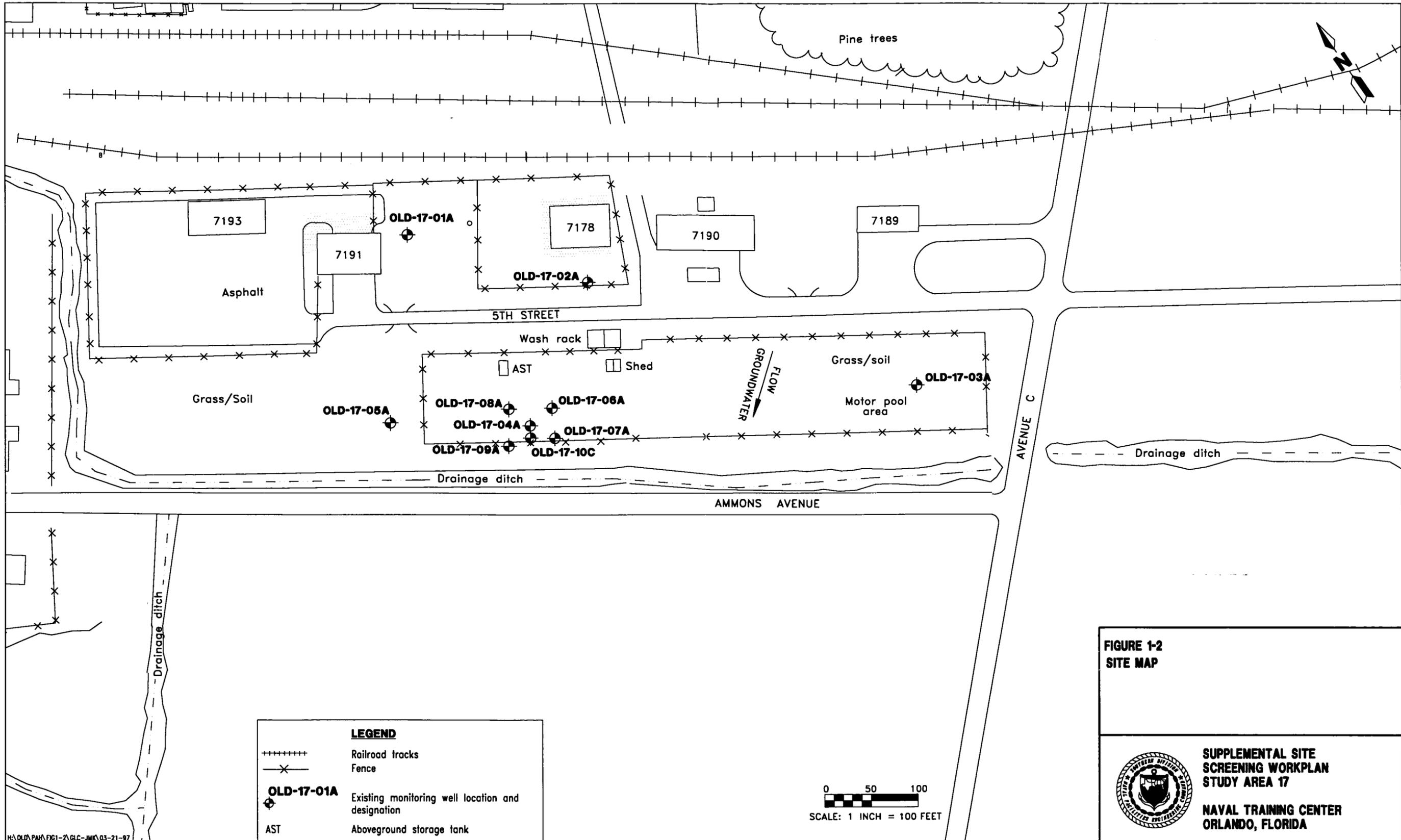
**FIGURE 1-1
 STUDY AREA LOCATION**



**SUPPLEMENTAL SITE
 SCREENING WORKPLAN
 STUDY AREA 17**

**NAVAL TRAINING CENTER
 ORLANDO, FLORIDA**

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LEGEND

+++++	Railroad tracks
-x-	Fence
⊕	Existing monitoring well location and designation
AST	Aboveground storage tank

**FIGURE 1-2
SITE MAP**

**SUPPLEMENTAL SITE
SCREENING WORKPLAN
STUDY AREA 17**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

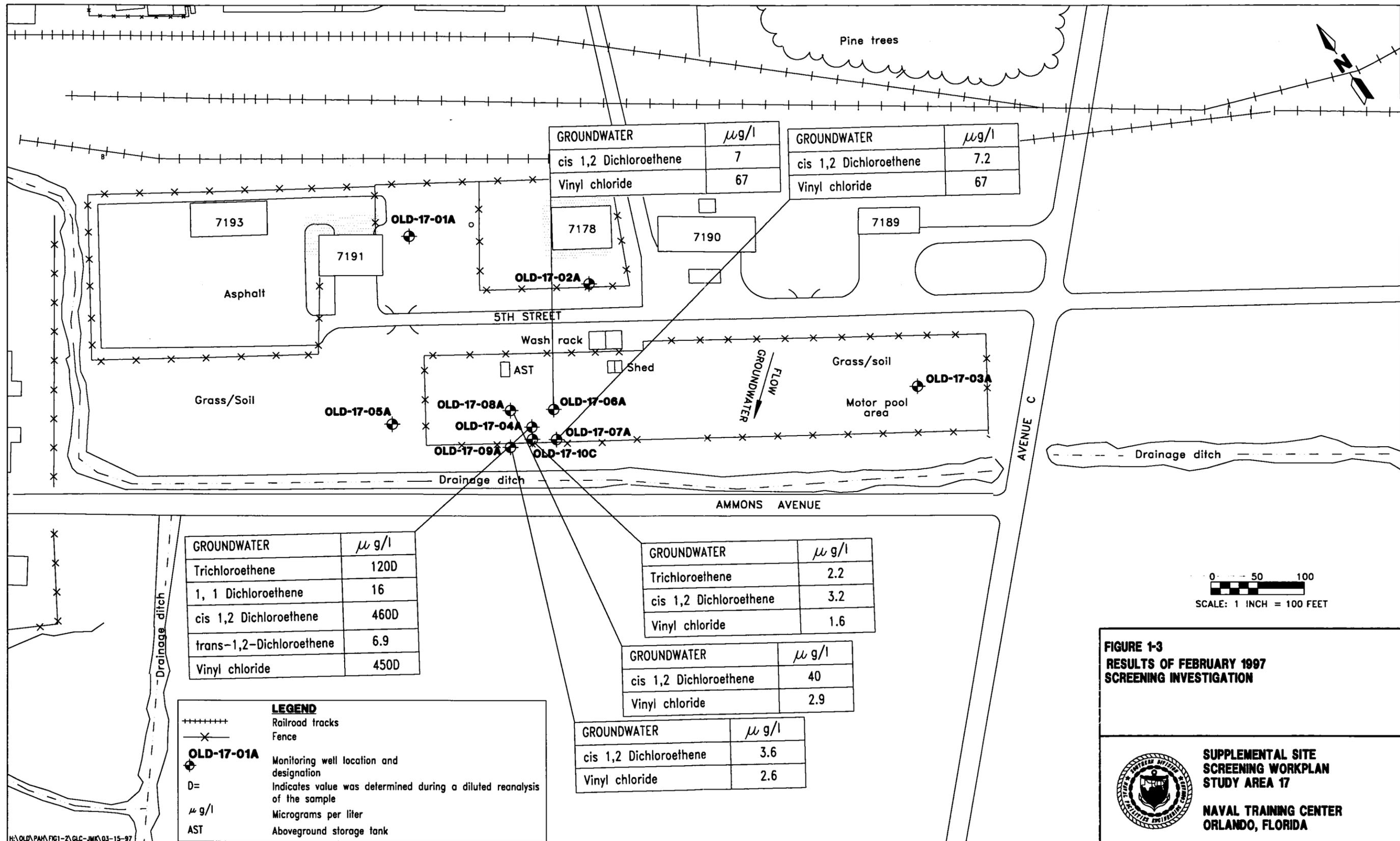
exceedance of screening criteria by one or more analytes. The only volatile organic compounds detected were chlorinated hydrocarbons (CHCs) in the groundwater sample from monitoring well OLD-17-04. Trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) were detected at concentrations of 42 micrograms per liter ($\mu\text{g}/\ell$), 200 $\mu\text{g}/\ell$, and 190 $\mu\text{g}/\ell$, respectively. For complete results regarding the original screening investigation, please refer to the Group III Site Screening Report (ABB-ES, 1995). A second sample was collected and analyzed from OLD-17-04 in June 1996 to confirm the finding. The laboratory results indicated that TCE, cis-1,2-DCE, and VC were present at concentrations of 100 $\mu\text{g}/\ell$, 600 $\mu\text{g}/\ell$, and 610 $\mu\text{g}/\ell$, respectively. For further details regarding the results of the original screening investigation, refer to the Group III Site Screening Report (ABB-ES, 1995).

Following review of the screening results, the Orlando Partnering Team requested further evaluation of the degree of impact to the groundwater resulting from the CHCs. In response to this request, four shallow and one deep monitoring wells were installed in the vicinity of OLD-17-04A in January 1997. One of the shallow wells (OLD-17-06A) was placed approximately 30 feet in the upgradient direction (north-northeast) of groundwater flow from OLD-17-04A; a second well (OLD-17-09A) was placed approximately 30 feet in the downgradient direction (south-southwest); and two wells (OLD-17-08A and OLD-17-09A) were placed approximately 30 feet from and on either side of OLD-17-04A lateral to the direction to groundwater flow. The deep monitoring well (OLD-17-10C) was placed approximately 10 feet from OLD-17-04A in the downgradient direction.

The shallow wells were constructed with their screens bracketing the water table, and the deep well was constructed with the screen placed at the base of the surficial aquifer (approximately 50 feet below land surface [bls]).

In February 1997, a groundwater sample was collected from each the five new wells and from OLD-17-04A. TCE, cis-1,2-DCE, and VC were again detected at OLD-17-04A, at concentrations of 150 $\mu\text{g}/\ell$, 460 $\mu\text{g}/\ell$, and 430 $\mu\text{g}/\ell$, respectively (Attachment A, Table 1; Figure 1-3). Trans-1,2-DCE and 1,1-DCE were also detected in the sample at concentrations of 8 $\mu\text{g}/\ell$ and 21 $\mu\text{g}/\ell$, respectively. The sample collected at the upgradient well (OLD-17-06A) showed cis-1,2-DCE and VC at concentrations of 11 $\mu\text{g}/\ell$ and 15 $\mu\text{g}/\ell$, respectively. The samples collected at the two lateral wells (OLD-17-07A and OLD-17-08A) showed cis-1,2-DCE at concentrations of 7 $\mu\text{g}/\ell$ and 40 $\mu\text{g}/\ell$, respectively, and VC at concentrations of 67 $\mu\text{g}/\ell$ and 2.9 $\mu\text{g}/\ell$, respectively. The sample collected at the downgradient well (OLD-17-09A) contained cis-1,2-DCE and VC at concentrations of 3.6 $\mu\text{g}/\ell$ and 2.6 $\mu\text{g}/\ell$, respectively. The sample collected from the deep well (OLD-17-10C) contained TCE, cis-1,2-DCE, and VC at concentrations of 2.3 $\mu\text{g}/\ell$, 3.4 $\mu\text{g}/\ell$, and 1.4 $\mu\text{g}/\ell$, respectively. The complete analytical results from this most recent round of sampling are provided in Attachment B.

Based on these results, in December 1996, the OPT requested that ABB-ES further characterize both the lateral and vertical limits of impact to the groundwater resulting from the CHCs. The following workplan was developed in response to that request.



GROUNDWATER	µg/l
cis 1,2 Dichloroethene	7
Vinyl chloride	67

GROUNDWATER	µg/l
cis 1,2 Dichloroethene	7.2
Vinyl chloride	67

GROUNDWATER	µg/l
Trichloroethene	120D
1, 1 Dichloroethene	16
cis 1,2 Dichloroethene	460D
trans-1,2-Dichloroethene	6.9
Vinyl chloride	450D

GROUNDWATER	µg/l
Trichloroethene	2.2
cis 1,2 Dichloroethene	3.2
Vinyl chloride	1.6

GROUNDWATER	µg/l
cis 1,2 Dichloroethene	40
Vinyl chloride	2.9

GROUNDWATER	µg/l
cis 1,2 Dichloroethene	3.6
Vinyl chloride	2.6

LEGEND

+++++ Railroad tracks

× Fence

⊕ OLD-17-01A Monitoring well location and designation

D= Indicates value was determined during a diluted reanalysis of the sample

µg/l Micrograms per liter

AST Aboveground storage tank

FIGURE 1-3
RESULTS OF FEBRUARY 1997
SCREENING INVESTIGATION



SUPPLEMENTAL SITE
SCREENING WORKPLAN
STUDY AREA 17
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

2.0 PROPOSED SUPPLEMENTAL SCREENING FIELD PROGRAM

The objectives of the supplemental screening investigation are as follows:

- Evaluate the CHC (TCE, DCE, and VC) distribution in surficial aquifer groundwater at the site.
- Evaluate the presence of CHCs in site soil above the water table.
- Assess the interaction of surface water in the drainage ditch with shallow aquifer groundwater.

The technical approach and rationale for the individual field investigation tasks are discussed in the following sections. The proposed locations for supplemental screening activities are shown on Figure 2-1.

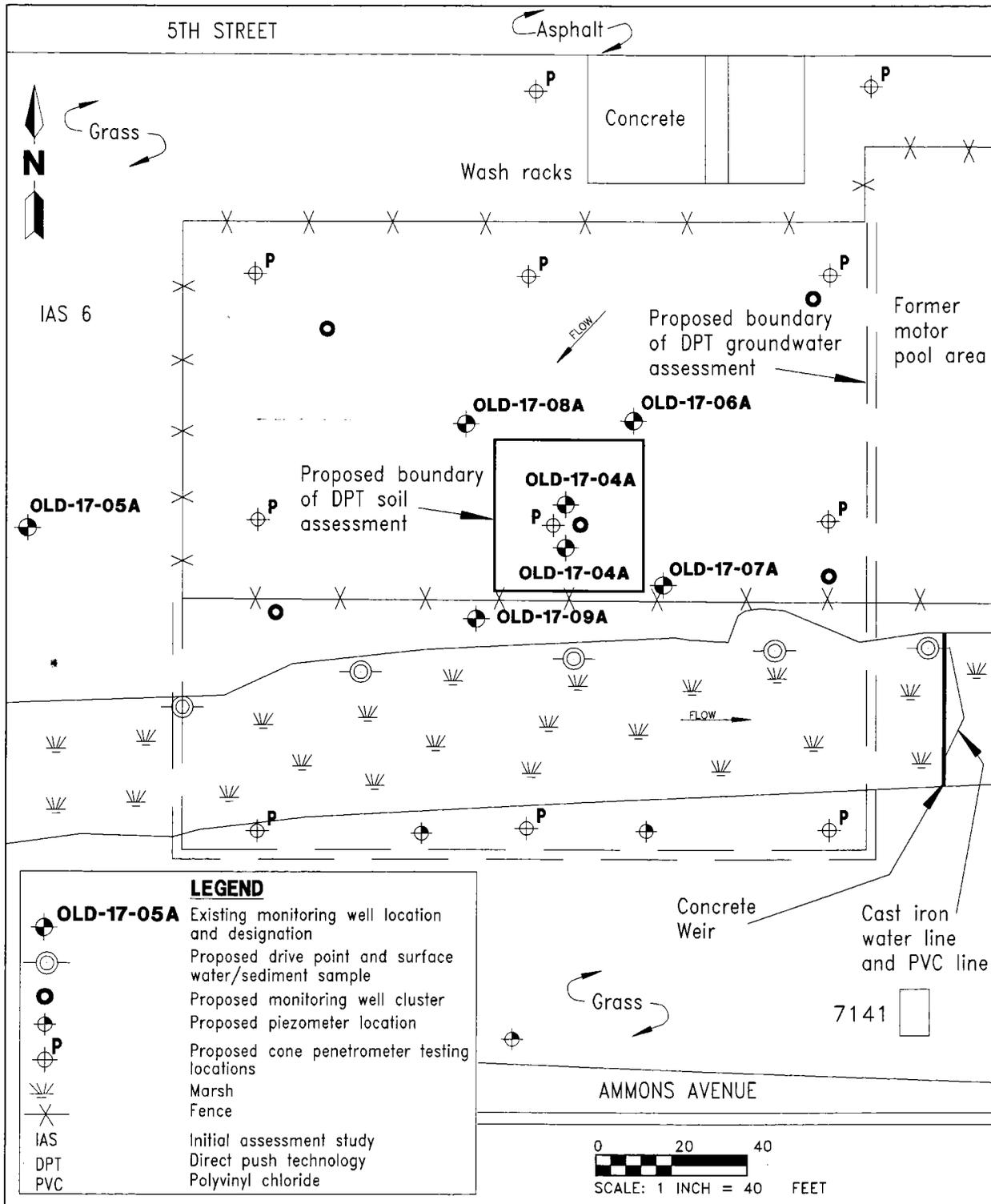
2.1 GROUNDWATER EVALUATION. The groundwater assessment for SA 17 will include tasks to evaluate the horizontal and vertical distribution of VC and other CHCs present in the groundwater. Data will also be collected to evaluate the hydrogeologic conditions in the surficial aquifer that may influence the distribution of compounds present in the subsurface. To provide the necessary data, the following tasks will be performed:

- shallow groundwater screening with direct-push technology (DPT),
- cone penetrometer test (CPT) penetrations,
- deep groundwater screening with DPT,
- monitoring well installation and sampling, and
- an aquifer evaluation.

2.1.1 Shallow Groundwater Screening Existing data indicate that VC, DCE, and TCE are present in the shallow surficial aquifer at SA 17 above Florida groundwater guidance concentrations. The first phase of the supplemental field investigation will focus on assessing the extent of groundwater impact in the shallow surficial aquifer. For this investigation, the shallow surficial aquifer is defined as the saturated zone between the water table surface and approximately 30 feet bls.

Groundwater screening samples will be collected from discrete depth intervals at selected locations to determine the vertical and horizontal distribution of contaminants in the shallow surficial aquifer. The groundwater screening samples will be collected using a TerraProbeSM groundwater sampler. The TerraProbeSM utilizes a screen point sampler that is driven to the selected sampling depth and opened by pulling back on the drive rods, thus exposing the screen. The water sample is then collected by inserting tubing down the rods and purging the sampler with a peristaltic pump. The full tubing is brought to the surface following purging, and the groundwater sample is decanted into the sample containers.

Shallow groundwater samples will be collected for onsite screening from approximately 15 locations in the area shown on Figure 2-1. Sample spacing will be on approximately 50-foot centers, and locations will be based on the screening



**FIGURE 2-1
PROPOSED INVESTIGATION PROGRAM**



**SUPPLEMENTAL SITE
SCREENING WORKPLAN
STUDY AREA 17**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

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results. The first exploration will be placed adjacent to monitoring well OLD-17-04A since this location has historically shown the highest CHC concentrations. Groundwater samples will be collected from each location at 5-foot intervals from the water table to a depth of 30 feet bls.

The groundwater samples will be analyzed on site with a field gas chromatograph (GC). Duplicates of approximately 10 percent of the samples will be submitted to a certified laboratory for confirmatory analysis using U.S. Environmental Protection Agency (USEPA) Test Method 524.2. The analytical data obtained during these activities are considered Level II and will be used for selecting monitoring well locations and characterizing hydrogeologic conditions at SA 17. Quality control analyses will consist of a three-point calibration of each analyte, method blank, matrix spike, and matrix spike duplicate and a continuing check calibration standard at a minimum of one per day.

2.1.2 Cone Penetrometer Test Penetrations Following the shallow groundwater screening investigation, a CPT survey will be conducted. The CPT penetrations will provide data on the lithology of the surficial aquifer in the study area. The tip pressure and sleeve friction values recorded during the CPT penetrations will be used to create vertical profiles of soil properties at each CPT location. These data, along with soil pore pressure measurements, allow detailed interpretation of site hydrogeology. Given the tendency of the contaminants of concern to pool along aquitard surfaces, the CPT logs will be used to map the configuration of these units where present at the site. These data will be used to target areas for sample collection during the groundwater screening investigation, as well as to design the monitoring well network. If lower permeable units are encountered during the CPT penetrations, dissipation tests designed to evaluate the permeability of clay units may be conducted. A dissipation test measures the return of elevated pore pressures to hydrostatic levels.

The eleven locations selected for CPT penetrations are shown on Figure 2-1. Depending on site conditions, lithology, and contaminant distribution, additional CPT work may be required. The CPT soundings will be pushed from the surface to the shallowest significant clay lens encountered within the Hawthorn Formation.

2.1.3 Deep Groundwater Screening The results of the shallow groundwater screening and the CPT penetrations will be used to direct the deep groundwater screening investigation. The CPT rig will be used to collect groundwater samples at discrete depth intervals to evaluate the vertical distribution of contaminants at selected locations. The selection of sampling locations will be based on the results of the shallow groundwater screening. The sampling intervals at each location will be determined from the CPT data. The initial deep sampling locations will coincide with the shallow locations which showed the highest CHC concentrations. The initial samples will be collected below the maximum depth of the shallow groundwater screening and continue to the top of the shallowest Hawthorn clay. Sample spacing will depend upon location-specific lithology, with a maximum vertical separation of 10 feet. Based on previous data, the shallowest Hawthorn clay should be situated between 45 and 50 feet bls. It is anticipated that an average of five samples per exploration will be collected during the deep groundwater screening investigation. Depending upon plume geometry, 10 to 15 sampling locations may be required to adequately define conditions at the site.

The deep groundwater samples will also be analyzed onsite with a field GC. Duplicates of approximately 10 percent of the samples will be submitted to a certified laboratory for confirmatory analysis using USEPA Test Method 524.2. The analytical data obtained during these activities are considered Level II and will be used for selecting monitoring well locations and characterizing hydrogeologic conditions at SA 17. Quality control analyses will be identical to the shallow groundwater screening and will consist of a three-point calibration of each analyte, method blank, matrix spike, and matrix spike duplicate and a continuing check calibration standard at a minimum of one per day.

2.1.4 Monitoring Well Installation and Sampling Following the groundwater screening and CPT investigations, adequate data should be available to select monitoring well locations. The objectives of the monitoring well installation are to confirm the geochemical, lithologic, and hydrogeologic data collected by DPT methods. The locations and screened intervals for monitoring well installations at SA 17 will be based on an evaluation of the data provided by the direct push screening program. For purposes of this workplan, the following scenario is considered likely. Five well clusters within the surficial aquifer system (shallow, intermediate, and deep) will be required to fully characterize groundwater quality. One cluster will be located upgradient, two on either side of the plume, one downgradient, and one south of the drainage ditch to evaluate the influence of the drainage ditch on contaminant migration. The existing shallow (OLD-17-04A) and deep (OLD-17-10C) wells can serve as characterization wells within the plume, and only an intermediate well will be required to complete the characterization cluster.

For this program, 6½-inch inner diameter hollow-stem augers will be used to advance the hole to the desired depth. Soil samples will be collected continuously from the water table surface to the base of the surficial aquifer at each deep well location using a split-spoon sampler. The samples will be classified using the Unified Soil Classification System and screened for any organic vapors using a flame-ionization detector (FID). All wells will be installed with 2-inch polyvinyl chloride screen and riser, and well installation details will be in accordance with the Project Operations Plan (POP), Subsection 4.4.6, Exploratory Drilling (ABB-ES, 1994).

The shallow wells will be constructed with 10 feet of 0.010-inch slotted screen set to bracket the water table surface. The intermediate and deep wells will be constructed with 5 feet of 0.010-inch slotted screen. The base of the screen of the intermediate well will be set above the upper surface of any potential aquitard encountered within the surficial aquifer. If no aquitard is encountered, then the intermediate wells will be set at the mid-point of the aquifer. The screens of the deep wells will be set above the shallowest significant clay encountered within the Hawthorn Formation.

Each well will be developed upon installation to maximize performance of the filter pack. Following development, the wells will be purged and sampled using the low-flow method. Monitoring well development, purging, and sampling activities will be accomplished in accordance with the guidelines prescribed in Section 4.5 of the POP. The groundwater samples will be sent to a certified laboratory for analysis. Each sample will be analyzed for the volatile organic compounds included in USEPA Method 524.2. Samples will also be collected to

evaluate intrinsic bioremediation activities that will be used to support natural attenuation scenarios.

2.1.5 Aquifer Evaluation In order to determine the hydrogeologic properties of the surficial aquifer at the site and to determine the nature of potential interaction with the surface water in the drainage ditch, the following data will be collected and assessed. Groundwater elevation data will be measured from each of the monitoring wells at SA 17 to allow analysis of groundwater flow direction and hydraulic gradient. Three shallow piezometers will be installed on the south side of the drainage ditch so that water-level data will be available for both sides of the ditch. If warranted by the groundwater screening data, intermediate and deep piezometers may be installed south of the ditch as well. An *in situ* hydraulic conductivity test will be performed on each monitoring well to provide data regarding aquifer permeability and flow velocities when used in conjunction with the gradient data.

2.2 SOIL EVALUATION. Data collected to date suggest that CHCs detected in the shallow groundwater at SA 17 may have originated from a surface release. The objective of the soil assessment is to determine whether or not CHCs are present in the soil at SA 17 at concentrations greater than screening criteria. Soil samples will be collected in the area(s) of highest CHC detections from the shallow groundwater screening. The soil samples will be collected using a TerraProbeSM soil coring sampler. The soil sampler has a 4-foot-long sample barrel that is driven into the soil. Upon retrieval, the soil sampler will be opened and the sample screened with a FID. The soil collected from the depth interval that shows the highest FID reading will be submitted to a certified laboratory for volatile organic compounds analysis by USEPA Method 8010. If no FID reading above the ambient air conditions is measured, then the soil sample collected immediately above the water table surface will be submitted for analysis.

Historically, depth to groundwater at the site has measured approximately 3 to 5 feet bls. Therefore, at each location the sampler will be driven from 1 to 5 feet bls. Saturated soil collected from below the water table will not be analyzed during this investigation. Depending on the results of the shallow groundwater screening, approximately 15 sample locations should be adequate to evaluate site soil quality.

2.3 DRAINAGE DITCH EVALUATION. The drainage ditch evaluation for SA 17 will include tasks to determine if surface water and sediment in the ditch have been affected by site activities and to evaluate potential hydrogeologic influence on the surficial aquifer. To provide the necessary data, the following tasks will be performed:

- surface water and sediment sampling,
- drive point installation and groundwater sampling, and
- a water-level elevation survey.

2.3.1 Surface Water and Sediment Sampling Given the proximity of the drainage ditch to the impacted groundwater, it is possible that the groundwater has impacted the quality of the surface water in the ditch. During the original site screening investigation, surface water and sediment samples were collected from

the drainage ditch to determine if runoff from SA 17 was influencing surface water quality. For logistical reasons, the samples were collected from the southern bank of the ditch. For the supplemental investigation, however, surface water and sediment samples will be collected from the north side in the area of the ditch where groundwater migration into the ditch is most probable. Five surface water and sediment samples will be collected at approximately 50-foot spacing from the northwestern edge of the fenced area to the upstream side of the concrete weir that traverses the ditch (Figure 2-1). The surface water samples will be submitted to a certified laboratory for analysis using USEPA Test Method 524.2. The sediment samples will be analyzed using USEPA Method 8010.

2.3.2 Groundwater Sampling Shallow groundwater samples will be collected from drive point wells screened immediately below the surface water and sediment interface in the drainage ditch. A drive point well will be installed at each of the surface water and sediment sampling locations. The drive point wells will be sampled using low-flow methods. The groundwater samples will be submitted to a certified laboratory for analysis using USEPA Test Method 524.2.

2.3.3 Water-Level Survey The hydrogeologic relationship between the groundwater and the drainage ditch will be evaluated from water-level measurements made at the drive point wells, the monitoring wells, and piezometers. Paired measurements at each drive point location will be used to determine the relative elevation of the water surface in the ditch to the elevation of the groundwater potentiometric surface measured in the drive point wells. Data from the ditch, when combined with water-level measurements from the monitoring wells and piezometers, will be used to interpret groundwater flow direction and gradient in and around the drainage ditch.

3.0 DATA MANAGEMENT

The approach to providing reliable data that meet the Data Quality Objectives will include Quality Assurance and Quality Control (QA/QC) requirements for each of the analytical data types generated during the field investigation. The QA/QC efforts for laboratory analyses will include collection and submittal of QC samples and the assessment and validation of data from the subcontract laboratories. Analytical data will be subjected to independent data validation by a subcontractor as described in the POP, Section 8.2, "Validation" (ABB-ES, 1994).

For QA/QC efforts for onsite analysis, the field chemist will review each chromatogram before analyzing the next sample or batch of samples. The review will include calculation of surrogate standard recoveries, comparison of sample retention times to calibration standards for compound identification, and evaluation of potential sample carryover. All field chemistry data will be reviewed by an independent ABB-ES project chemist to demonstrate compliance with the analytical criteria specified.

Samples collected for offsite laboratory analysis will be used to confirm the analytical data collected in the onsite field laboratory. The data will be used to evaluate immediate risks to human health and to evaluate intrinsic bioremediation activity, and to prepare the site screening report. The data will be collected and entered into a computer database for appropriate statistical analysis.

Samples will be tracked from the field collection activities to the analytical laboratories through return of sample residuals from the laboratories (if not disposed of by the laboratory) following standard ABB-ES chain-of-custody procedures. These procedures are described in the POP, Chapter 5.0, "Sample Handling and Custody Procedures" (ABB-ES, 1994). Samples will be labeled and identified following the ABB-ES Standard Operating Procedures, Identification of Environmental Samples, for the Comprehensive Long-Term Environmental Action, Navy program. Sample information recorded from chain-of-custody forms will be transferred (electronically or manually) into the sample tracking portion of the database management system (Fast Retrieval of Environmental Data), thus enabling the samples to be tracked through final disposition. The sample tracking system will produce reports to inform the project team of potential delays or problems related to sample analysis and validation.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1994, Project Operations Plan for Site Investigations and Remedial Investigations, Naval Training Center (NTC), Orlando: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, March.

ABB-ES, 1995, Site Screening Report for Group III Study Areas, NTC, Orlando, Florida: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina.

ABB-ES, 1996, Technical Memorandum, Test-Pitting Results, Study Area 17: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina.

ATTACHMENT A

SUMMARY OF DETECTIONS IN GROUNDWATER ANALYTICAL RESULTS

Table A-1

Summary of Detections in Groundwater Analytical Results, Volatile Organics by USEPA Method 524.2

Supplemental Sampling,
Study Area 17
Naval Training Center
Orlando, Florida

Identifier	FDEPG	FEDMCL	RBC for Tap Water	17G00403	17G00601	17G00701	17G00801	17G00901	17G01001	17G01001D
Sampling Date				12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97
Volatile Organics, µg/l										
1,1-Dichloroethene	7	7	0.044 c	16						
cis-1,2-Dichloroethene	70	70	61 n	460 D	11	7.2	40	3.6	3.4	3.2
trans-1,2-Dichloroethene	100	100	120 n	6.9						
Trichloroethene	3	5	1.6 c	120 D					2.3	2.2
Vinyl chloride	1	2	0.019 c	450 D	15	67	2.9	2.6	1.4	1.6
<p>Notes: FDEPG and FEDMCL values indicated are primary standards . Bold/shaded numbers indicate exceedance of regulatory guidance. Blank space indicates analyte/compound was not detected at the reporting limit.</p> <p>USEPA = U.S. Environmental Protection Agency. FDEPG = Florida Department of Environmental Protection, Groundwater Guidance Concentrations, June 1994 FEDMCL= Federal Maximum Contaminant Levels, Primary Drinking Water Regulations and Health Advisories, October 1996. RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith. n = noncarcinogenic pathway. c = carcinogenic pathway. D = Reported concentration is from a dilution/reanalysis of the sample. µg/l = micrograms per liter.</p>										

ATTACHMENT B

COMPLETE ANALYTICAL RESULTS, PREVIOUS SCREENING INVESTIGATION

Table B-1

Summary of Groundwater Analytical Results, Volatile Organics

Supplemental Sampling
Study Area 17
Naval Training Center
Orlando, Florida

Sample ID	17G00403		17G00601	17G00701	17G00801	17G00901	17G01001	17G01001D
Lab ID	C7B130145008	C7B130145008R2	C7B130145003	C7B130145005	C7B130145004	C7B130145009	C7B130145006	C7B130145007
Sampling Date	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97
Volatile organics, µg/l								
1,1,1,2-Tetrachloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	16	21	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorodibromomethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	1 U	1 U

Table B-1 (Continued)

Summary of Groundwater Analytical Results, Volatile Organics

Supplemental Sampling
Study Area 17
Naval Training Center
Orlando, Florida

Sample ID	17G00403		17G00601	17G00701	17G00801	17G00901	17G01001	17G01001D	
	Lab ID	C7B130145008	C7B130145008R2	C7B130145003	C7B130145005	C7B130145004	C7B130145009	C7B130145006	C7B130145007
Sampling Date	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97	12-Feb-97
Chloromethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	670 E	460	11	7.2	40	3.6	3.4	3.2	
cis-1,3-Dichloropropene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	7.5 U	0.5 U	1.1 U	1.1 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	6.9	8	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	150 E	120 B	0.5 U	0.84 U	0.5 U	0.5 U	2.3	2.2	
Trichlorofluoromethane	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	430 E	450	15	67	2.9	2.6	1.4	1.6	
Xylenes (total)	0.5 U	7.5 U	0.5 U	0.84 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Notes: ID = identifier.									
µg/l = micrograms per liter.									