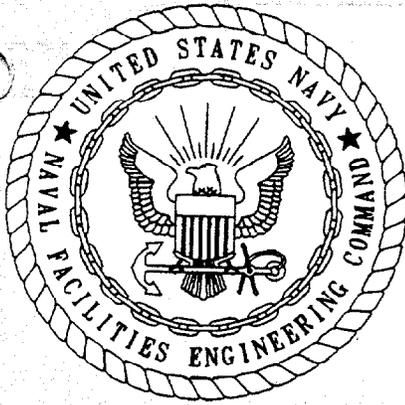


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FINAL BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING  
REPORT STUDY AREA 22 NTC ORLANDO FL  
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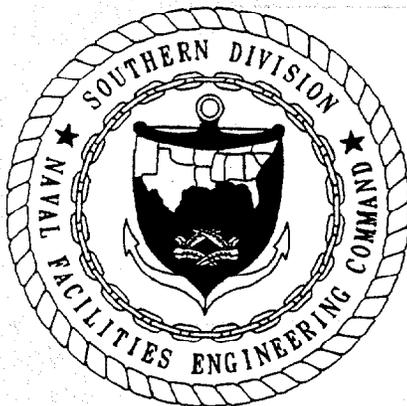
**BASE REALIGNMENT AND CLOSURE  
ENVIRONMENTAL SITE SCREENING REPORT**

**STUDY AREA 22  
FORMER GOLF COURSE (UNF-1)**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

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

**MAY 1997**



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

**BASE REALIGNMENT AND CLOSURE  
ENVIRONMENTAL SITE SCREENING REPORT**

**STUDY AREA 22  
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**Prepared by:**

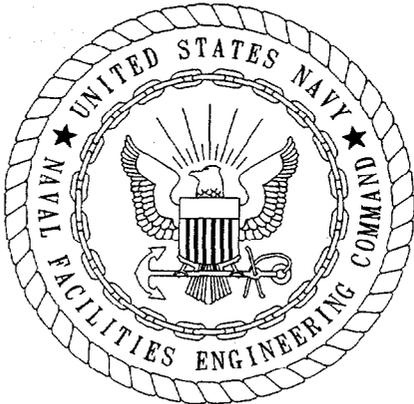
**ABB Environmental Services, Inc.  
2590 Executive Center Circle, East  
Tallahassee, Florida 32301**

**Prepared for:**

**Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29418**

**Barbara Nwokike, Code 1873, Engineer-in-Charge**

**May 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: May 13, 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  
Orlando, Florida

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GLOSSARY

ABB-ES            ABB Environmental Services, Inc.  
GPR                ground penetrating radar  
J                    estimated value  
 $\mu\text{g}/\ell$                 micrograms per liter  
pCi                 picocuries per liter  
RBC                 risk-based concentration  
SA                  Study Area  
TC                  terrain conductivity  
USEPA              U.S. Environmental Protection Agency  
UNF                 unnumbered facility  
UXO                 unexploded ordnance  
VOC                 volatile organic compound

## BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT

### 1.0 STUDY AREA (SA) 22, FORMER GOLF COURSE (UNF-1), MCCOY ANNEX

This report contains information gathered as a result of site screening activities conducted at Study Area 22. The draft Site Screening Report was submitted in December 1995 (ABB Environmental Services, Inc. [ABB-ES], 1995). Concerns regarding unexploded ordnance (UXO) prevented all planned site screening activities from being completed. A UXO investigation was completed in February 1996 and the remaining investigatory activities were completed thereafter. The results are reported below.

1.1 SA 22 UNNUMBERED FACILITY (UNF-1), BACKGROUND AND CONDITIONS. UNF-1 is a 30-acre open grass field with scattered trees divided by Daetwyler Drive (Figures 1 and 2). Prior to 1975, it was part of the McCoy Annex golf course. Two ponds and at least one surface drainage feature are present in the study area and may have served as water traps and/or provided drainage control while the golf course was active. One of the ponds, Lake Stanley, may have received spent engines, bomb shells, and ordnance in 1945 and 1946. An UXO and geophysical survey was conducted in this area in 1994 to confirm allegations of UXO disposal. At that time, a number of magnetic and ground penetrating radar (GPR) anomalies were delineated and the area was posted with signs warning of potential UXO.

1.2 SA 22, INVESTIGATION SUMMARY. The objectives of screening activities in SA 22 were to evaluate the alleged disposal of hazardous materials in Lake Stanley and vicinity. The investigation consisted of a geophysical survey; a passive soil-gas survey; an UXO survey; and the collection of surface water, sediment and groundwater samples in and downgradient of Lake Stanley. In addition, a limited test-pitting program was completed at two locations in the eastern portion of SA 22 to investigate anomalies mapped during the geophysical survey.

1.2.1 Geophysical Survey A geophysical survey was completed in the portion of SA 22 west of Daetwyler Drive in March and April of 1995. The survey was completed with a vertical gradiometer (magnetometer) and terrain conductivity (TC) meter, a Geonics EM31D with electronic data logger. Measurements were taken on a 20- by 20-foot grid.

Concerns of potential buried UXO forced postponement of geophysical surveys in the parcel east of Daetwyler Drive around Lake Stanley. In February 1996, a UXO survey was completed in the vicinity of Lake Stanley. No evidence of UXO was reported. The remaining geophysical investigations were completed east of Daetwyler Drive in July 1996. Ground penetrating radar was used to further investigate three magnetometer/TC anomalies.

1.2.2 Passive Soil-Gas Survey A passive soil-gas survey was conducted to identify any shallow subsurface areas with elevated concentrations of volatile organic compounds (VOCs) and to focus the sampling investigation for confirmatory sampling of environmental media. The survey consisted of the deployment of passive soil-gas samplers spaced 50 feet apart at 16 locations around Lake Stanley in June 1995. EMFLUX™ samplers were chosen for this application because they are among the only commercially available passive soil-gas devices that can

be deployed on the ground surface without implanting the device in a drilled or driven hole.

Soil-gas data are always semiquantitative because multiple sources in soil and/or groundwater cannot be differentiated. Further, compound concentrations in each collector are compared on a relative basis, depending on whether or not the data are interpreted to be of high, moderate to high, moderate, etc., intensity. These qualitative soil gas values do not represent actual concentrations of the reported compounds. Efforts to relate soil-gas response directly to groundwater or soil contaminant concentrations are generally not regarded as productive owing to the assumptions that are required for heterogeneity and source distribution.

1.2.3 Surface Water, Sediment, and Groundwater Investigation Two surface water samples (22W002 and 22W003) were collected in the wettest portions of Lake Stanley which, at the time of the sampling (mid-May, 1995), was better described as a bog than as a lake. No flame ionization detector deflections were noted during sample collection. The samples were submitted for full suite Contract Laboratory program target compound list and target analyte list analyses plus herbicides, nitroaromatics, radionuclides, and alkalinity in accordance with U.S. Environmental Protection Agency (USEPA) Level IV data quality objective.

Concerns about UXO forced postponement of the collection of sediment and groundwater samples until the completion of the UXO survey by the Mayport Detachment in February 1996. The remaining environmental sampling was completed in June 1996 and consisted of the collection of two sediment samples (22D001 and 22D002) in Lake Stanley, and a groundwater sample (22G001) from a temporary well, OLD-22-01T, installed in a direction assumed to be downgradient from the lake.

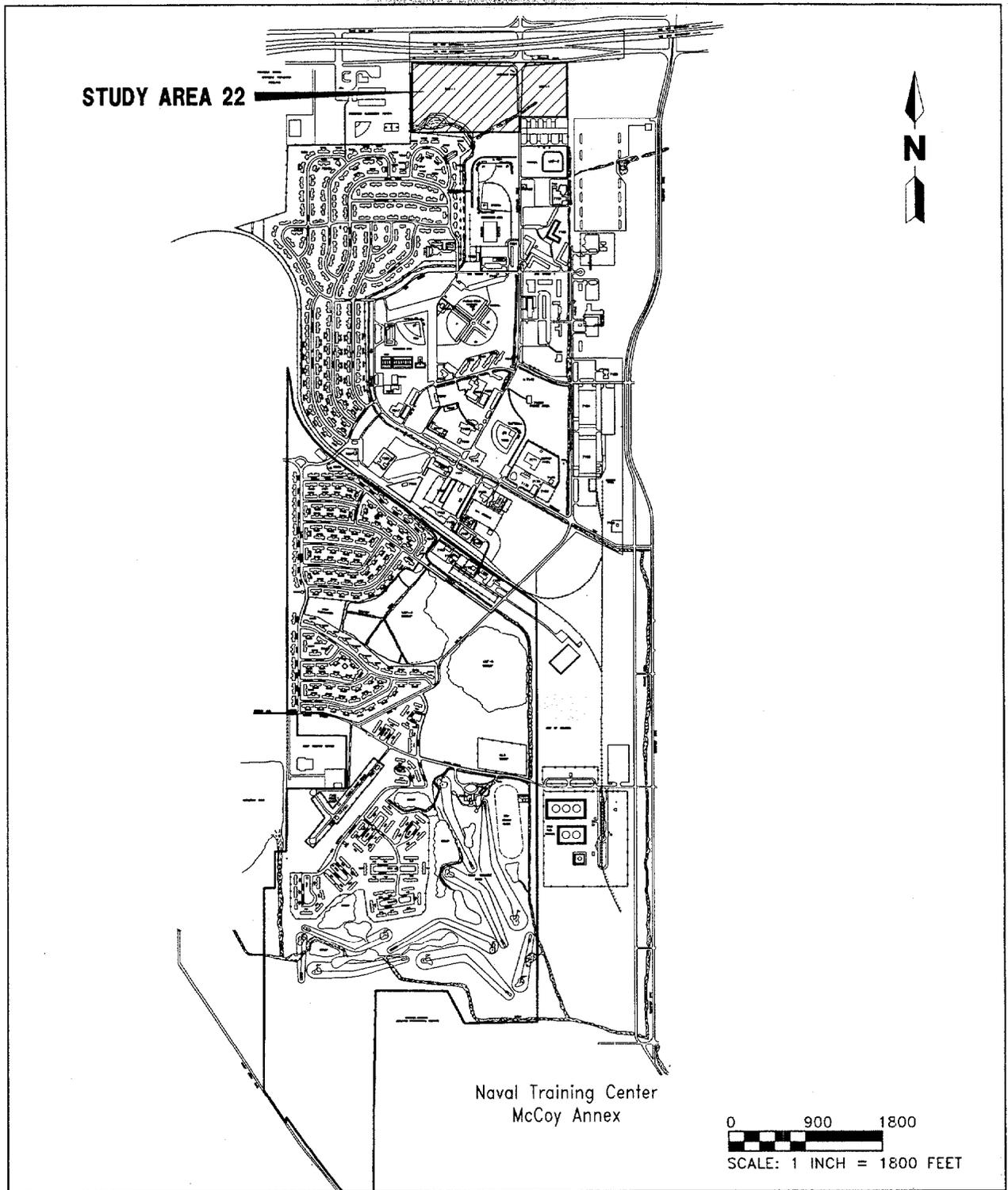
1.2.4 UXO Investigation In February 1996, a UXO survey was completed in the vicinity of Lake Stanley by the Explosive Ordnance Disposal Mobile Unit SIX, Detachment Mayport. The study was conducted to determine whether the 1994 UXO and geophysical surveys had mapped ordnance-related objects or buried materials of environmental concern.

1.2.5 Test-Pitting Investigation A limited test-pitting program was completed at the locations of two geophysical anomalies, one of which was located along the southern shore of Lake Stanley.

### 1.3 SA 22, RESULTS.

1.3.1 Geophysical Survey Results The geophysical data in the area west of Daetwyler Drive indicate the presence of a number of small geophysical anomalies. Most of the anomalous magnetic and conductivity anomalies can be explained by surface debris observed in the field at the time of the survey. Where anomalous data could not be readily explained by surface debris, a confirmatory GPR survey was completed to further evaluate several magnetic/TC anomalies. We conclude that the survey area west of Daetwyler drive (UNF-1) has had systematic surface dumping of demolition debris, with no systematic disposal of significant quantities of refuse. Such dumping is restricted almost entirely to the southern third of UNF-1.

In the area east of Daetwyler Drive, three magnetometer and TC anomalies were mapped and also investigated with GPR. Two of the three anomalies were also



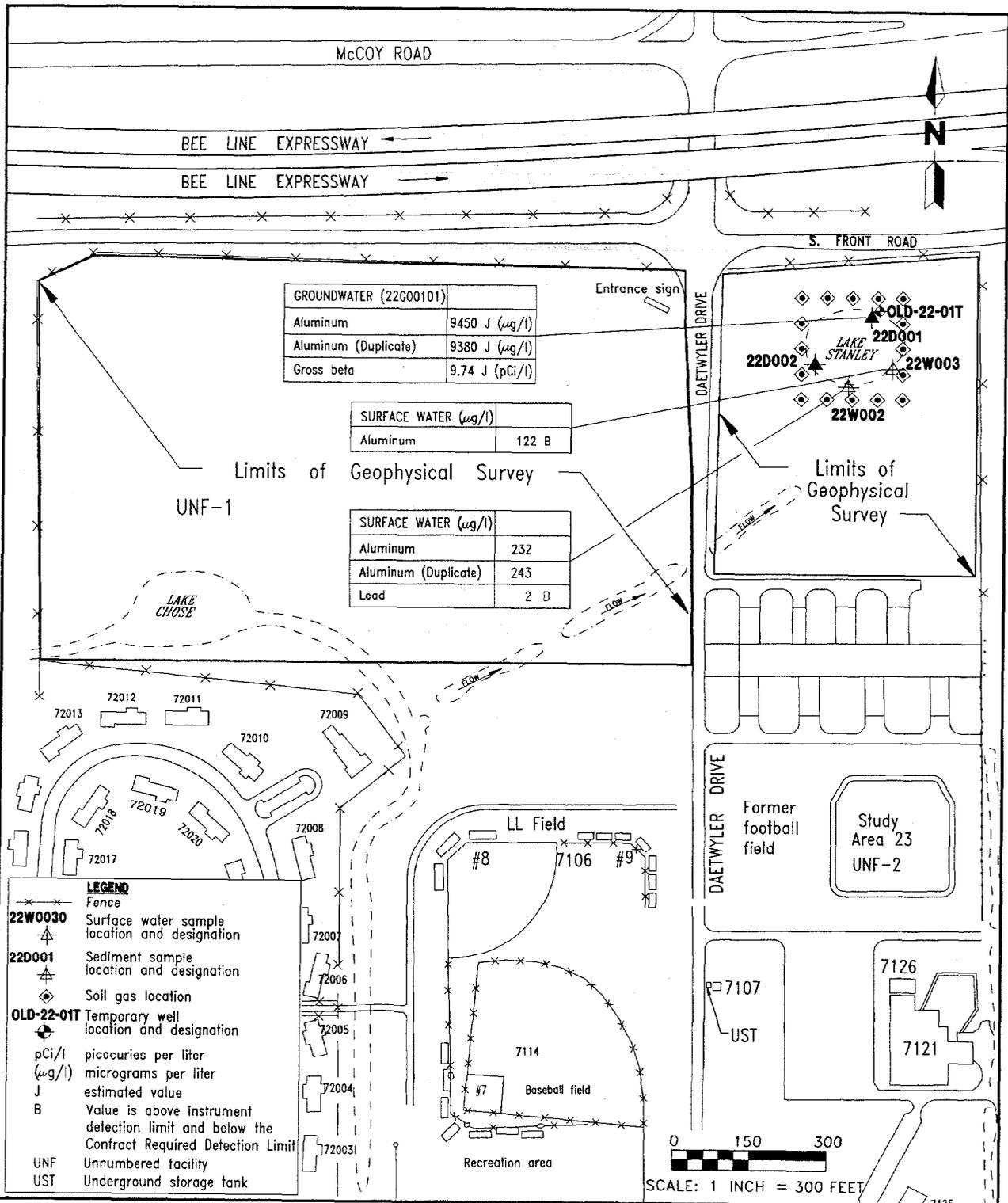
**FIGURE 1**  
**LOCATION OF STUDY AREA 22**



**BASE REALIGNMENT AND CLOSURE,  
 ENVIRONMENTAL SITE SCREENING  
 REPORT**

**NAVAL TRAINING CENTER  
 ORLANDO, FLORIDA**

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**FIGURE 2**  
**SEDIMENT, GROUNDWATER AND SURFACE**  
**WATER SAMPLE LOCATIONS,**  
**GEOPHYSICAL SURVEY AREAS**  
**AND SOIL GAS LOCATIONS, MCCOY ANNEX UNF-1,**  
**FORMER GOLF COURSE, STUDY AREA 22**



**BASE REALIGNMENT AND CLOSURE,**  
**ENVIRONMENTAL SITE SCREENING**  
**REPORT**

**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDA**

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further investigated with a limited test-pitting program (discussion below). No evidence of landfilling or disposal of UXO was determined during the geophysical and test-pitting activities. The results of the magnetometer, TC, and GPR surveys are presented in Appendix A.

**1.3.2 Soil-Gas Survey Results** Sixteen passive soil gas collectors were installed around Lake Stanley for the purpose of determining whether or not organic compounds were present in the shallow soils or groundwater. The soil-gas collectors were analyzed for the target compounds, which included benzene, toluene, ethylbenzene, and xylenes, perchloroethylene, trichloroethene, methylene chloride, and several others. All analytes were below the detection limit for the analysis (Modified USEPA Method 8240 for VOCs).

The results of the soil-gas survey are presented in Appendix B.

**1.3.3 Sediment, Groundwater, and Surface Water Analytical Results** Analytical results from the sediment, groundwater, and surface water are presented in Appendix C, Summary of Positive Detections in Analytical Results as Tables C-1 through C-3, respectively. Exceedances of background or regulatory guidance concentrations (shaded on the Summary of Detections Analytical Results Tables) are displayed in chem-boxes near their respective explorations on Figure 2. A complete set of analytical results is presented in Appendix D.

Analytical results of the sediment samples include detections of several VOCs at very low (estimated) concentrations, one semivolatile organic compound, N-nitrosodiphenylamine, and a number of inorganic analytes. N-nitrosodiphenylamine, an accelerator in vulcanizing rubber, was detected in the field duplicate sample at 54 micrograms per liter ( $\mu\text{g}/\text{l}$ ), but not in the field sample (22D001). The concentrations of all detected analytes did not exceed any of the sediment screening values.

Groundwater analytical results (Summary of Detections for unfiltered, filtered and field duplicates) from the single downgradient temporary well include detections of gross beta and aluminum above background screening values. A gross beta concentration of 9.74 picocuries per liter ( $\text{pCi}/\text{l}$ ) was reported, which slightly exceeds the background screening value of 9.5  $\text{pCi}/\text{l}$ . Aluminum concentrations of up to 9,450  $\mu\text{g}/\text{l}$  exceed the background screening value of 4,067  $\mu\text{g}/\text{l}$ . The concentrations of all other detected analytes were below background screening values, Florida Department of Environmental Protection guidance concentrations for groundwater, Federal maximum contaminant levels, and tap water risk-based concentrations (RBCs).

Secondary standards have been established for Class G-I and G-II aquifers by the State of Florida, largely along Federal guidelines, to assure that groundwater meets at least minimum criteria for taste, odor, and color, and does not pose a health risk. The State secondary standard for aluminum is 200  $\mu\text{g}/\text{l}$ .

A description of past site activities is included in Section 1.1, above. Based on records reviews and interviews, site activities that may have contributed to the observed exceedances of the secondary standard for aluminum in well OLD-22-01T (a temporary well) include the former site use as an area of limited disposal, as evidenced by the results of the geophysical survey. Surface water concentrations of aluminum also exceeded the Federal Ambient Water Quality Criteria, chronic values (USEPA, 1991; 1988).

The groundwater sample from well OLD-22-01T was very turbid (greater than 200 nephelometric turbidity units), suggesting that suspended solids probably contributed to the observed secondary standard exceedance. Analytes exceeding Florida secondary standards should also be compared with RBCs for tapwater published by the USEPA, Region III, 1996. The tapwater guidance concentration for aluminum is 37,000  $\mu\text{g}/\ell$ . Other groundwater parameters measured during sampling were within normal limits: the pH was 5.44, temperature 82 degrees Fahrenheit, and conductivity 71 micromhos per centimeter. ABB-ES concludes that the aluminum exceeding the State secondary standard is most likely naturally occurring and does not pose a risk to human health or the environment.

Analytical results of the surface water samples include detections of acetone, phenol, and several inorganics. The acetone detections are interpreted to be artifacts of the sampling and/or laboratory analytical process because it is unlikely to be present in surface water samples because of its high volatility. The surface water screening values for aluminum (22W002 and 22W003), and lead (22W002) were exceeded. Aluminum concentrations ranged from 122 to 232  $\mu\text{g}/\ell$  versus a screening value of 87  $\mu\text{g}/\ell$ . The lead concentration in 22W00200 was 2  $\mu\text{g}/\ell$  versus a screening value of 0.5  $\mu\text{g}/\ell$ .

**1.3.4 UXO Investigation** In February 1996, a UXO survey was completed in the vicinity of Lake Stanley by the Explosive Ordnance Disposal Mobile Unit SIX, Detachment Mayport. The study was conducted to determine whether the UXO and geophysical surveys performed in 1994 had mapped ordnance-related objects or buried materials of environmental concern. The survey resulted in the excavation of 45 potential UXO anomalies to depths of up to 4 feet below land surface. Items retrieved during excavation activities included railroad spikes, beverage cans, piping, hardware items, and pieces of welding rod. There was no physical evidence that any ordnance or ordnance-related materials were buried or discarded at SA 22.

The results of the UXO investigation are included as Appendix E.

**1.3.5 Test-Pitting Investigation** The geophysical investigation in the eastern portion of SA 22 in July 1996 resulted in the mapping of three geophysical anomalies. Two of the anomalies were investigated with a limited test-pitting program, completed in September 1996. The source of one of the anomalies was an 8-inch-diameter steel pipe. The source of the second anomaly was not determined. No evidence of landfilling or disposal of UXO was determined during the geophysical and test-pitting activities.

The details of the investigation are included in Appendix F.

**1.4 SA 22, CONCLUSIONS AND RECOMMENDATIONS.** Based on the results of all site screening activities, ABB-ES concludes that this parcel is ready for lease or transfer. There is no evidence of UXO at SA 22. Furthermore, the environmental media that were sampled do not have concentrations of contaminants that would pose an environmental concern, although aluminum and gross beta concentrations in groundwater and aluminum and lead concentrations in surface water slightly exceed screening criteria. ABB-ES recommends that SA 22 be reclassified from 7/Gray to 1/White.

The undersigned members of the Base Realignment and Closure cleanup team concur with the findings of the preceding investigation.

<u>STUDY AREA 49</u>	
<u>Nancy Rodriguez</u> U.S. Environmental Protection Agency, Region IV	<u>6/19/97</u> Date
<u>John Mitchell</u> Florida Department of Environmental Protection	<u>6/19/97</u> Date
<u>Walter J. Howard</u> U.S. Department of the Navy	<u>6/19/97</u> Date

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U.S. Environmental Protection Agency (USEPA), 1988, Ambient Water Quality Criteria for Aluminum, Office of Water Regulations and Standards, Criteria and Standards Division, Washington, D.C., EPA 440/5-86-008.

USEPA, 1991, Office of Science and Technology, Health and Ecological Criteria Division, Ecological Risk Assessment Branch (WH-585), Human Health Risk Assessment Branch (WH-550 D), Washington, D.C., May.

USEPA, 1996, Region III Risk-Based Concentration Table, Philadelphia, Pennsylvania, June.

**APPENDIX A**

**TECHNICAL MEMORANDUM, GEOPHYSICAL SURVEYS, STUDY AREA 22**

TECHNICAL MEMORANDUM  
GEOPHYSICAL SURVEYS  
STUDY AREA 22

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

**INTRODUCTION.** The following is a summary of the significant findings of the geophysical surveys that took place at Study Area (SA) 22, Naval Training Center (NTC), Orlando. Initial surveys took place in the western portion of SA 22 between March 3 and April 14, 1995. The geophysical surveys were conducted to evaluate potential subsurface debris disposal and to aid in clearing utilities for the subsurface investigations. The techniques used were magnetometry, terrain conductivity (TC), and ground penetrating radar (GPR).

Studies of the eastern portion (near Lake Stanley) were put on hold pending completion of an unexploded ordnance (UXO) investigation. The UXO investigation was conducted by the Explosive Ordnance Disposal Mobile Unit SIX, Detachment Mayport, Mayport, Florida between February 5 to February 16, 1996. Geophysical surveys took place in the eastern portion of SA 22 where there were allegations of UXO disposal. These surveys took place prior to any environmental sampling of soil and sediment in the area. Geophysical surveys took place between July 3 and August 3, 1996, to evaluate potential subsurface debris disposal.

**GEOPHYSICAL TECHNIQUES.** The magnetic method is a versatile geophysical technique used for evaluating shallow geologic structures and for locating buried manmade objects and buried debris by mapping local distortions in the earth's magnetic field produced by buried magnetic objects (steel and other magnetic materials). Vertical gradient measurements of the earth's magnetic field are often taken during environmental magnetic surveys because they are more sensitive to the presence of near-surface metal objects than total field values alone.

TC surveys, also referred to as EMI (electro-magnetic induction) surveys, have traditionally been used in mineral exploration for tracing conductive ore bodies (i.e., massive sulfides). More recently, conductivity surveys have been used in environmental studies for mapping buried debris and former structures, and for tracing conductive contaminant plumes in groundwater. TC instruments record two parameters: the quadrature phase and the in-phase components of an induced magnetic field. The quadrature-phase component is a measure of the ground conductivity value expressed in millimhos per meter. The in-phase component is significantly more sensitive to metallic objects and is useful for looking for buried tanks and drums and other manmade objects.

The GPR technique uses high frequency radio waves to determine the presence of subsurface objects and structures. The radio wave energy is reflected from surfaces where there is a contrast in the electrical properties of subsurface materials, such as naturally-occurring geologic horizons or manmade objects (e.g., buried utilities, tanks, drums). Typical applications for GPR include mapping buried utilities and delineating the boundaries of buried materials and abandoned landfills.

Following is a discussion of the results of this investigation.

**RESULTS - SA 22, FORMER GOLF COURSE (UNF-11), WESTERN PORTION.** A geophysical survey was completed in the portion of UNF-1 west of Daetwyler Drive (Figure 1). The survey area is 1,200 feet long (east to west) by 720 feet wide (north to south), or approximately 20 acres. A geophysical survey grid with an arbitrary origin and oriented approximately true north was established. Subsequently, a magnetometer and TC survey were completed concurrently in the area shown on Figure 1, a total area of approximately 20 acres. A total of 2,254 data points were acquired on a 20-foot by 20-foot measurement grid with each instrument. Contour data are presented as Figures 2 through 4. Figure 2 presents the vertical magnetic gradient contours, and Figures 3 and 4 present the quadrature (conductivity) and inphase (equivalent to a metal detector) contours of the magnetic field induced by the transmitter of the TC instrument. The data indicate the presence of a number of small geophysical anomalies. Most of the anomalous magnetic and conductivity anomalies can be explained by surface debris observed in the field at the time of the survey (Figure 5). The magnetic contours have been superimposed over the annotations for clarity. Debris included concrete rubble with steel wire reinforcing mesh and disposed and partially buried metal culvert.

GPR traverses were completed in the vicinity of several of the magnetic and conductivity anomalies that could not be explained readily by surface debris. These features were located at grid coordinates (X=1340E, Y=1120N), (X=1560E, Y=1080N to 1140N), (X=1620E, Y=1100N [a TC anomaly]), (X=1660E, Y=1420N), (X=1800E, Y=1060N), and (X=2140E, Y=1020N). The GPR data indicate that the anomalies at (X=1660E, Y=1420N) and (X=1800E, Y=1060N) may have some shallow buried debris causing chaotic shallow reflections on the recordings.

We conclude that the survey area has had systematic dumping of demolition debris, probably with no deep excavations with systematic disposal of large amounts of debris. Surface dumping has taken place almost entirely in the southern third of the survey area in the area indicated on Figure 5.

**RESULTS - SA 22, LAKE STANLEY, EASTERN PORTION.** After completion of the UXO survey by the Mayport Explosive Ordnance Disposal Mobile Unit SIX Detachment, a geophysical survey was completed in the portion of UNF-1 east of Daetwyler Drive in the vicinity of Lake Stanley (Figure 1). The survey area is 550 feet wide (east to west) by 600 feet wide (north to south), or approximately 7.6 acres. A geophysical survey grid with an arbitrary origin and oriented approximately true north was established. Subsequently, a magnetometer and TC survey were completed concurrently in the area shown on Figure 1. During the TC survey, more than 800 data points were acquired on a 20-foot by 20-foot measurement grid (the survey grid was closed down to 10-foot by 10-foot in the area adjacent to Lake Stanley). The TC instrument was a Geonics EM-31DL with digital data logger.

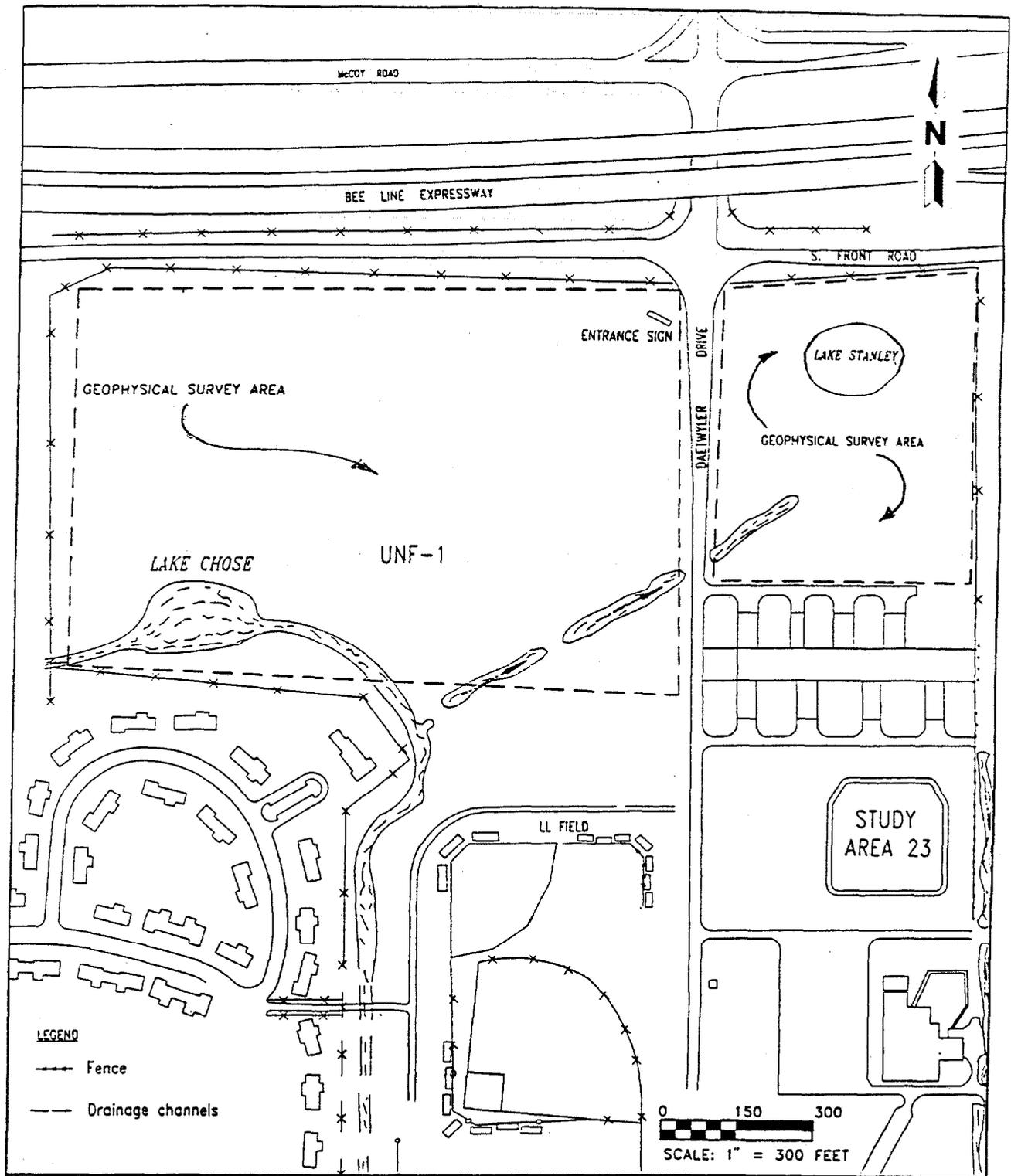
During the MAG survey, more than 22,000 data points were acquired along north-south traverses either 10 feet or 20 feet apart (traverses were 10 feet apart near Lake Stanley). The magnetometer, a Geometrics G858G Cesium magnetic gradiometer, acquired magnetic data every 0.3 seconds along each traverse.

Contour data are presented as Figures 6 through 8. Figure 6 presents the vertical magnetic gradient contours, and Figures 7 and 8 present the quadrature (conductivity) and inphase (equivalent to a metal detector) contours of the magnetic field induced by the transmitter of the TC instrument.

Most of the features can be explained by comparing the contours to existing site and utility maps. For example, a water main can be clearly noted as a prominent east-west lineament on Figures 7 and 8 at approximately 1040N. A second east-west feature, a sewer main, is discernible on Figure 8 at approximately 1215N.

There are three geophysical anomalies that cannot be explained by surface debris or buried utilities (Figure 9). These are located at (X=1070E, Y=1300N), (X=1300E, Y=1300N), and (X=1250E to X=1440E, Y=1420N to Y=1560N). Accordingly, a GPR survey was completed in the vicinity of the three geophysical anomalies. The GPR survey consisted of several east-west and several north-south traverses separated by 10 feet (Figure 9). The GPR data indicate that the anomaly at (X=1070E, Y=1300N) has no obvious source or explanation. The geophysical anomaly at (X=1300E, Y=1300N) had a number of chaotic subsurface reflections, and was located along the southern shoreline of Lake Stanley. The third geophysical anomaly (X=1250E to X=1440E, Y=1420N to Y=1560N) appears to be caused by two buried utilities: one oriented northwest-southeast and the other northeast-southwest, which intersect at 1345E and 1485N. Figure 9 shows the GPR traverses superimposed over the TC contours, along with the utilities that were mapped.

A limited test-pitting program was conducted at two of the geophysical anomalies (anomalies at [X=1070E, Y=1300N] and [X=1300E, Y=1300N]). No explanation was determined for the first anomaly. The cause of the second anomaly revealed an 8-inch-diameter metal pipe. No evidence of UXO or UXO-related objects were found during the test-pitting.



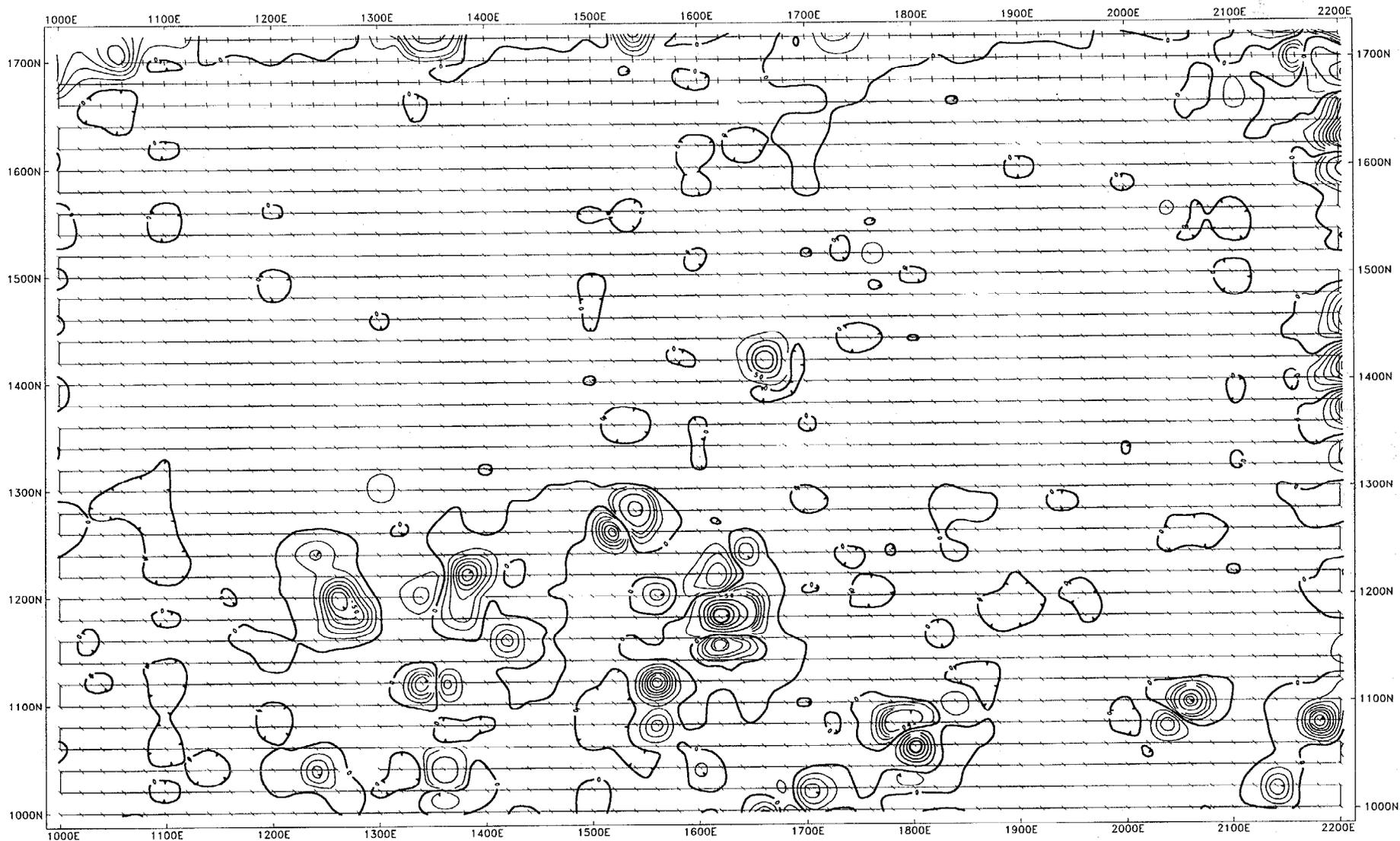
**FIGURE 1**  
**GEOPHYSICAL SURVEY AREAS**  
**MCCOY ANNEX UNF-1**  
**FORMER GOLF COURSE, STUDY AREA 22**



**SITE SCREENING**

**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDA**

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CONTOUR INTERVAL: 10/50 GAMMAS PER METER

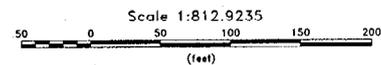
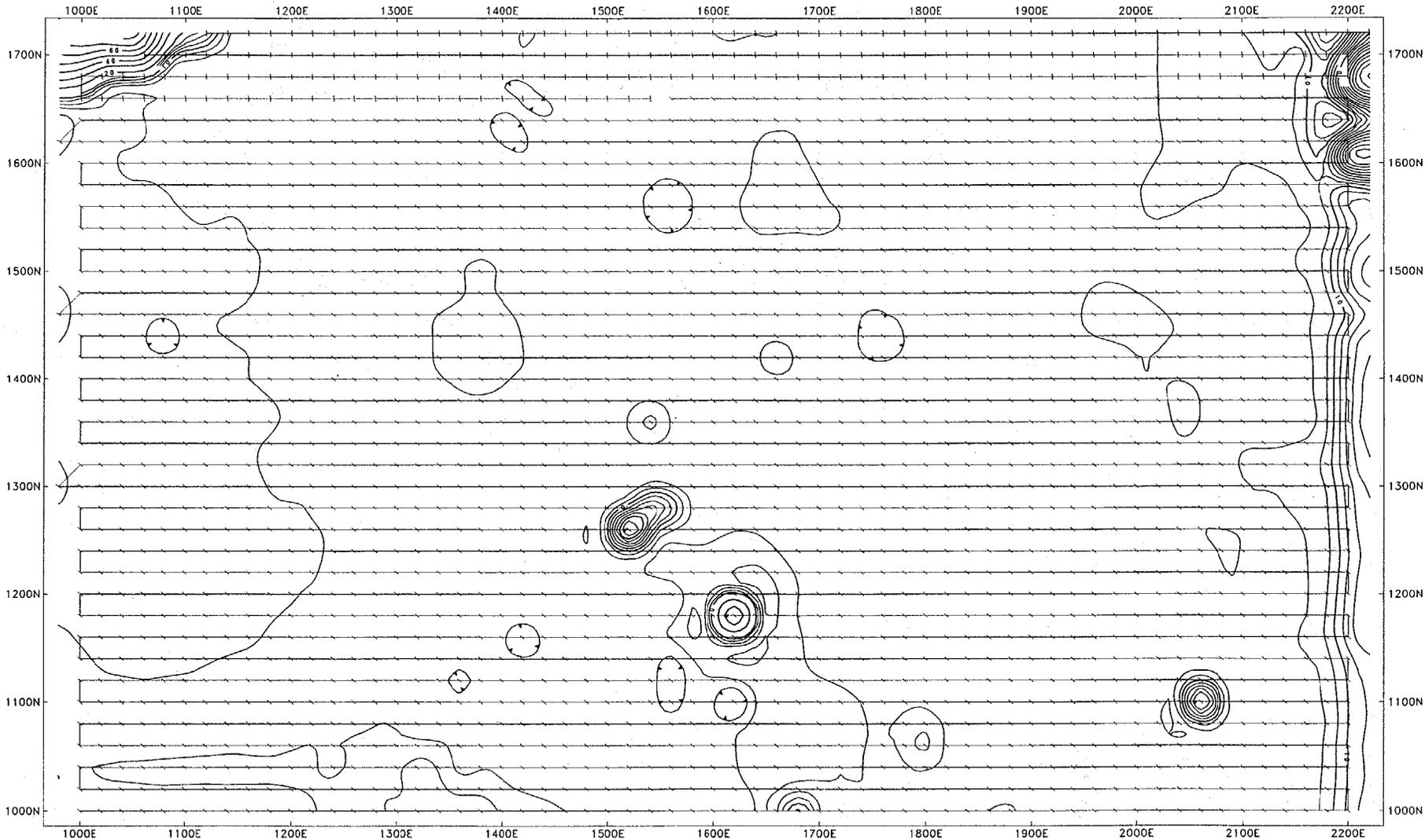


FIGURE 2  
**SOUTHERN DIVISION**  
 VERTICAL GRADIENT CONTOURS  
 STUDY AREA 22  
 GROUP III SITE SCREENING  
 ABB ENVIRONMENTAL SERVICES, INC.



CONTOUR INTERVAL: 2/10 MILLIMHOS PER METER

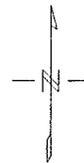
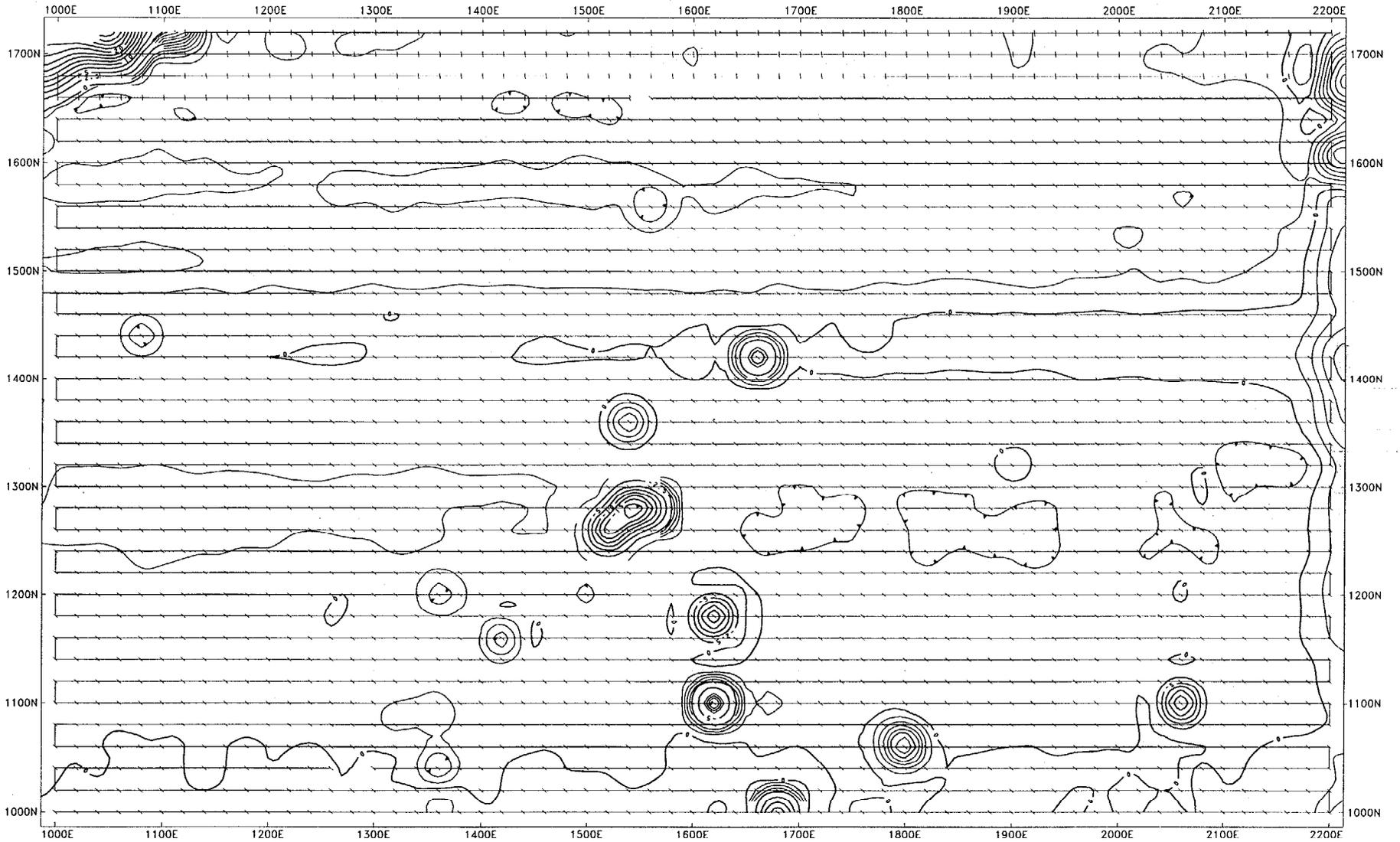
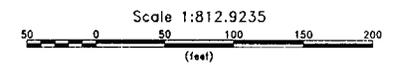


FIGURE 3  
 SOUTHERN DIVISION  
 QUADRATURE (TC) CONTOURS  
 STUDY AREA 22  
 GROUP III SITE  
 ABB ENVIRONMENTAL SERVICES, INC.



CONTOUR INTERVAL: 1/5 (UNITLESS)



Scale 1:812,9235  
 (feet)

FIGURE 4  
 SOUTHERN DIVISION  
 INPHASE (TC) CONTOURS  
 STUDY AREA 22  
 GROUP III SITE SCREENING  
 ABB ENVIRONMENTAL SERVICES, INC.

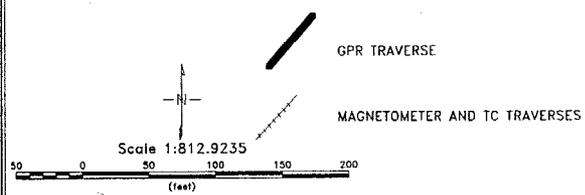
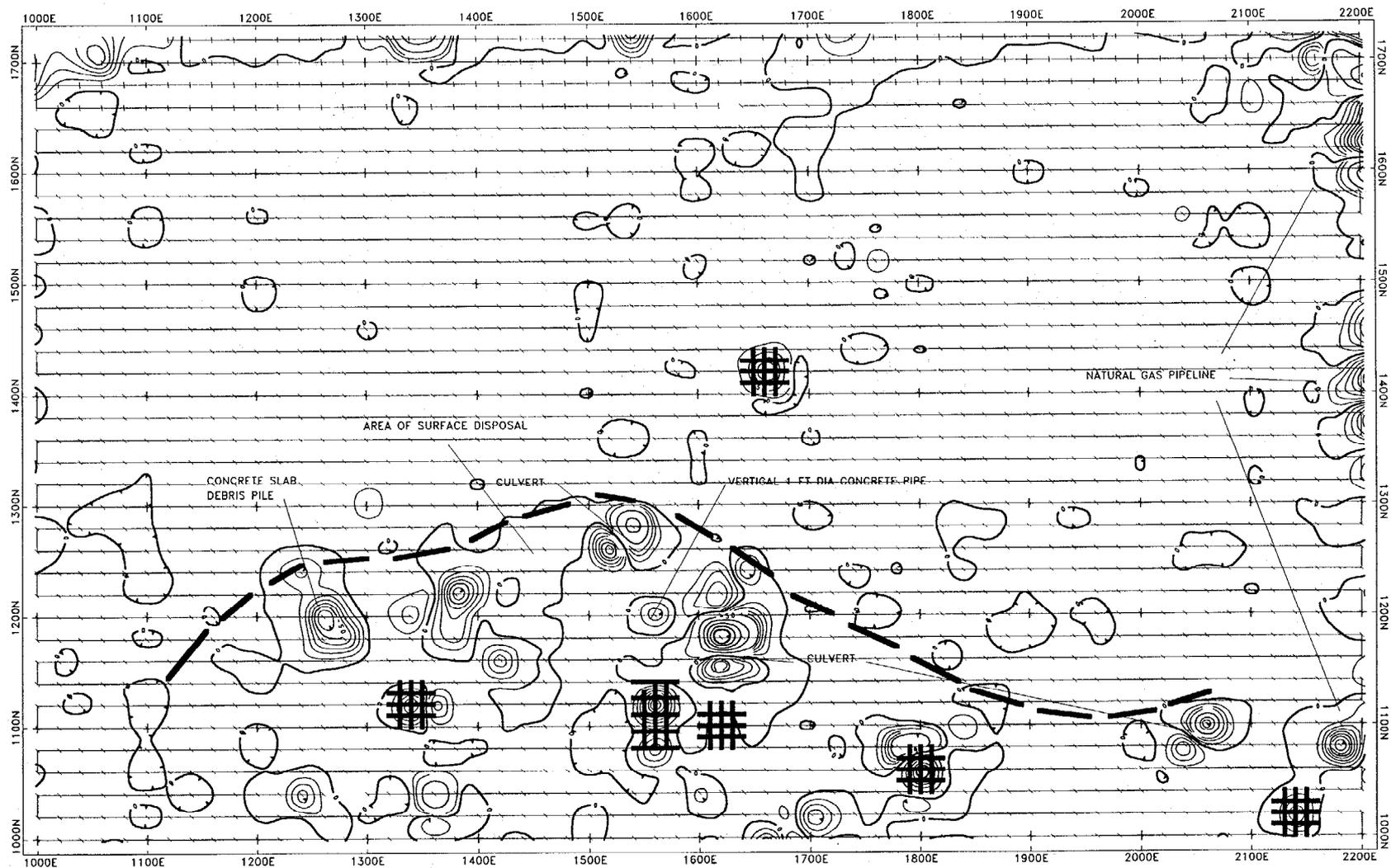
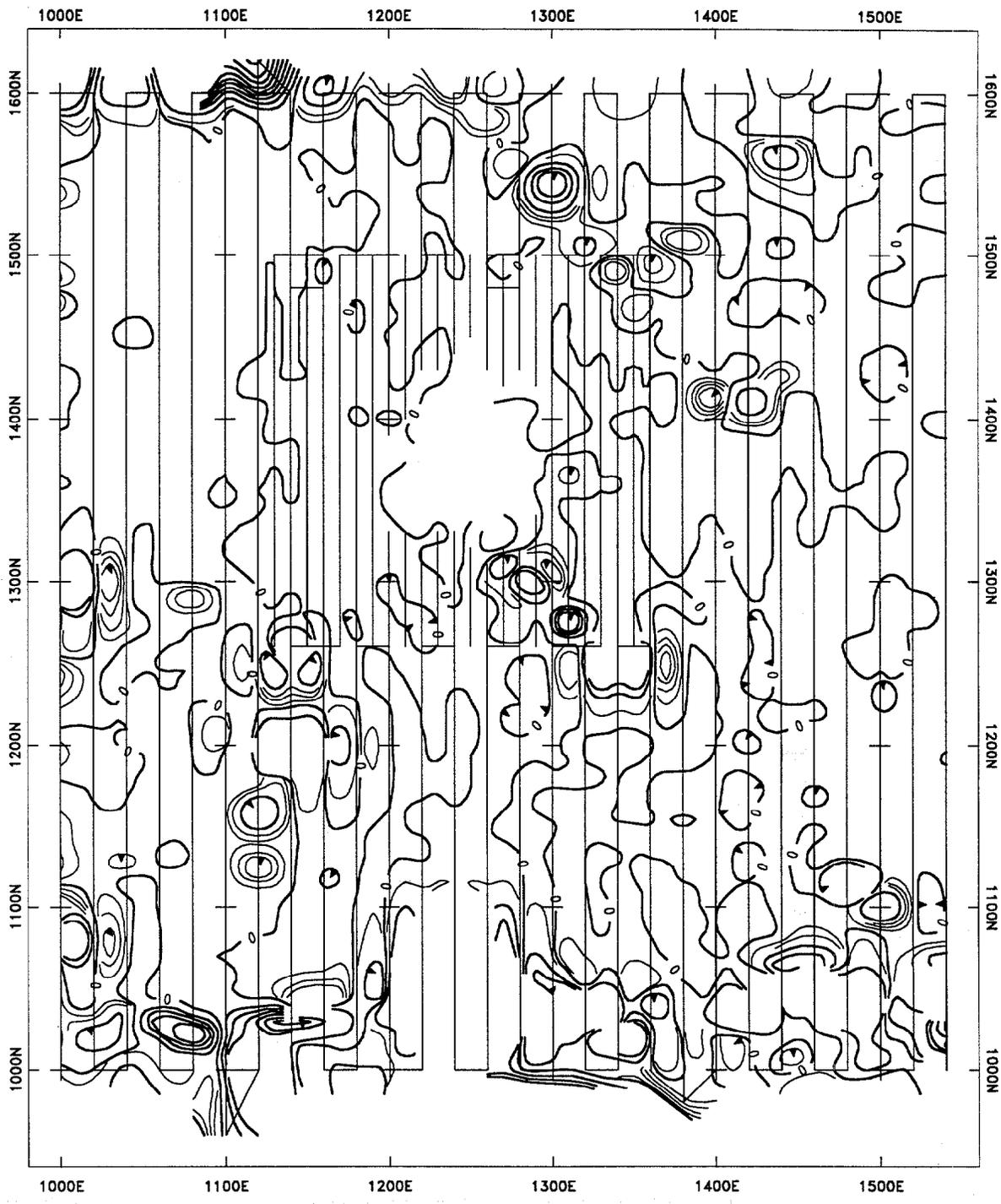


FIGURE 5

SOUTHERN DIVISION
VERTICAL GRADIENT CONTOURS
STUDY AREA 22
GROUP III SITE SCRE
ABB ENVIRONMENTAL SER INC.



CONTOUR INTERVAL:  
20/100 GAMMAS/METER

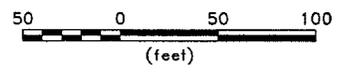
FIGURE 6

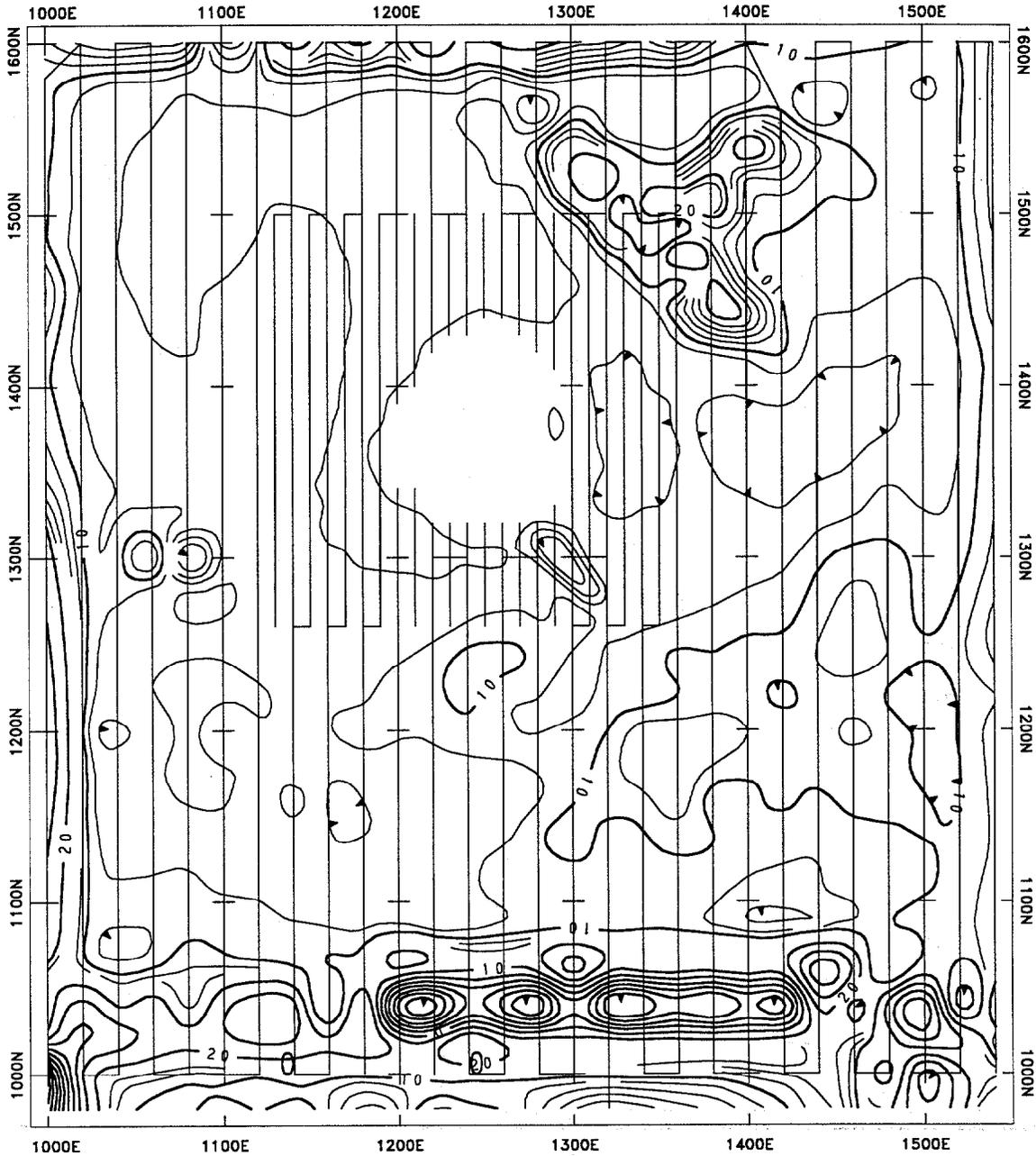
SOUTHERN DIVISION

VERTICAL GRADIENT CONTOURS  
STUDY AREA 22 - EASTERN PORTION  
LAKE STANLEY

ABB ENVIRONMENTAL SERVICES, INC.

Scale 1:1200





CONTOUR INTERVAL: 2/10 MILLIMHOS PER METER

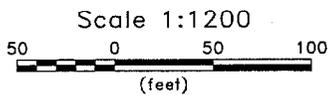
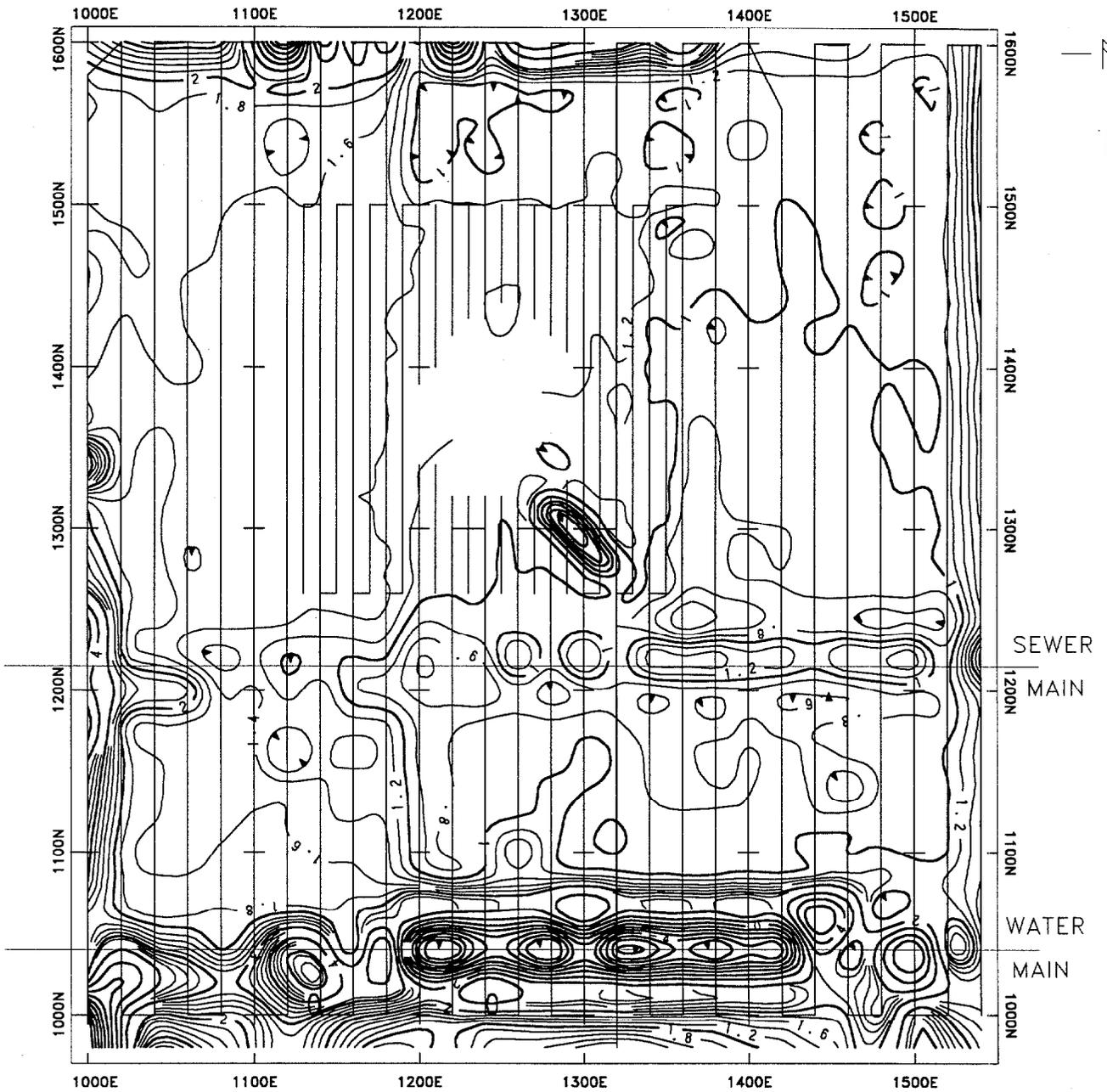


FIGURE 7

<p>SOUTHERN DIVISION</p> <p>TERRAIN CONDUCTIVITY CONTOURS</p> <p>STUDY AREA 22 - EASTERN PORTION</p> <p>LAKE STANLEY</p> <p>ABB ENVIRONMENTAL SERVICES, INC.</p>
--



CONTOUR INTERVAL: 0.2/1.0

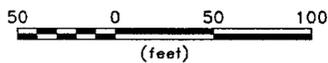
FIGURE 8

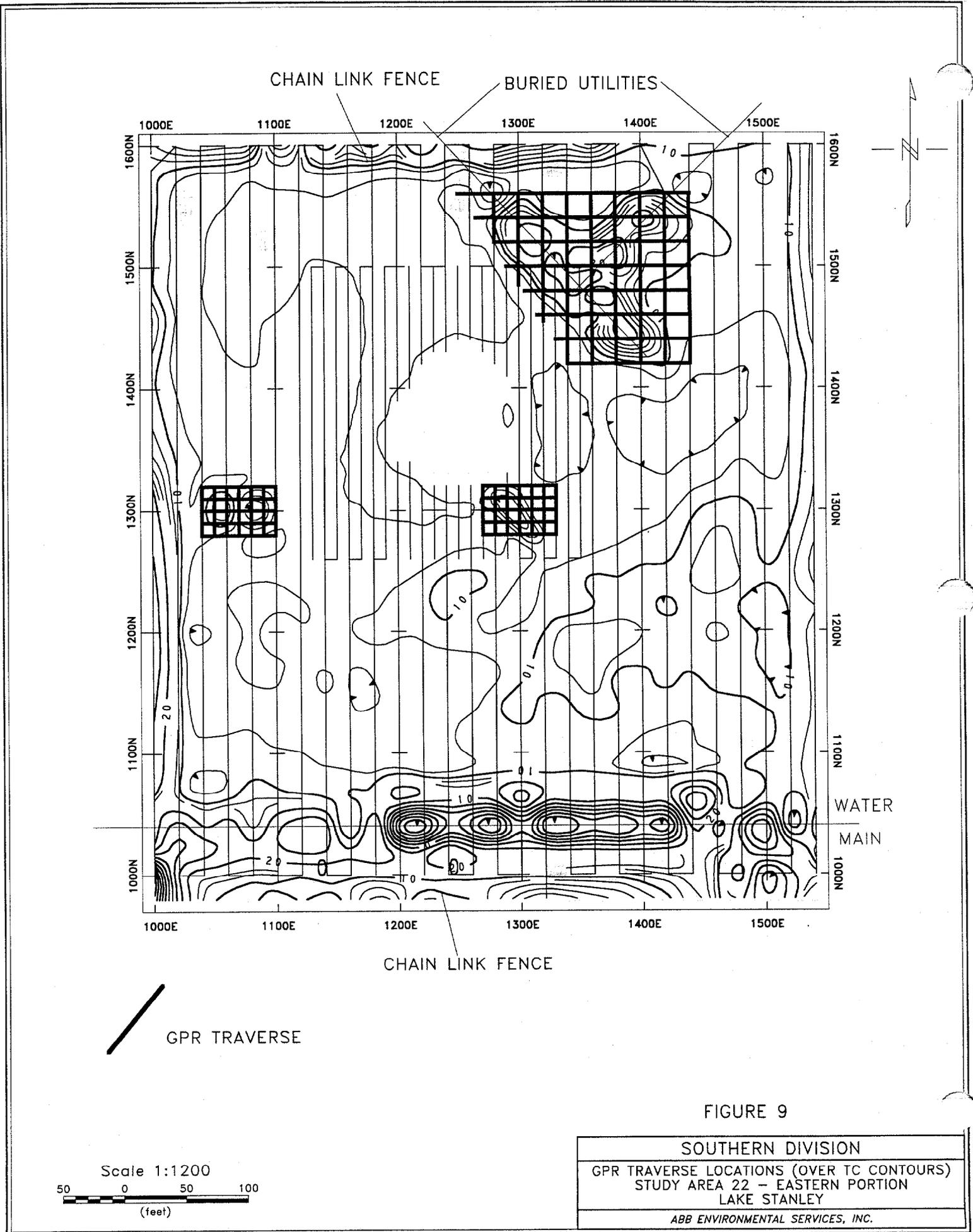
SOUTHERN DIVISION

INPHASE (TERRAIN CONDUCTIVITY) CONTOURS  
STUDY AREA 22 - EASTERN PORTION  
LAKE STANLEY

ABB ENVIRONMENTAL SERVICES, INC.

Scale 1:1200





**APPENDIX B**

**RESULTS OF PASSIVE SOIL-GAS SURVEYS, STUDY AREA 22**

Quadrel Report No. QS1272

EMFLUX® Passive, Non-Invasive  
Soil-Gas Survey:

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Prepared for

ABB Environmental Services, Inc.  
2590 Executive Center Circle East  
Tallahassee, FL 32301

by

Quadrel Services, Inc.  
1896 Urbana Pike  
Suite 20  
Clarksburg, MD 20871

July 7, 1995

**EMFLUX® Survey Number: OS1272**

**STUDY AREA 22, NAVAL TRAINING CENTER  
Orlando, Florida**

**1. Objective(s):**

To survey Study Area 22 within McCoy Annex at the Naval Training Center, Orlando, Florida, for emissions of targeted compounds. Sixteen samples were taken on 50-foot centers in a rectangular pattern surrounding Lake Stanley.

**2. Target Compounds:**

Aliphatic Hydrocarbons	Methylene Chloride
Benzene	Tetrachloroethene
Carbon Tetrachloride	Toluene
Chloroform	1,1,1-Trichloroethane
1,1-Dichloroethane	1,1,2-Trichloroethane
1,1-Dichloroethene	Trichloroethene
1,2-Dichloroethene(total)	Xylenes (total)
Ethylbenzene	

**3. Investigation Plan:**

- No. of Field Sample Points: 16
- No. of QA/QC samples: 2
- Total No. of EMFLUX® Cartridges: 18

**4. Field Work:**

- ABB-ES personnel deployed field samplers between 1209 hours and 1328 hours on June 12, 1995.
- ABB-ES personnel retrieved field samplers between 0646 hours and 0702 hours on June 16, 1995.
- Individual deployment and retrieval times can be found in the Field Deployment Report (Attachment 1) completed by the ABB-ES field team.

**5. Analysis and Reporting Dates of Maryland Spectral Services, Inc. (MSS), QSI's Contract Laboratory:**

- MSS received 18 sample cartridges on June 20, 1995.
- Analysis completed on June 21, 1995.
- Quadrel received MSS data (Attachment 2) on June 22, 1995.

## 6. Quality Assurance/Quality Control Factors:

EMFLUX® cartridges were analyzed by thermal-desorption using gas chromatography/mass spectrometry (GC/MS) equipment for the compounds listed previously. Laboratory procedures included standards, surrogates, and blanks appropriate to the modified EPA Method 8240. Field work and reporting were done under Quadrel's Quality Assurance Program Plan. MSS performed analyses under the laboratory's own Quality Assurance Plan.

## 7. Report Notes:

- **Table 1** provides the Survey results in emission flux rates ( $\text{ng m}^{-2} \text{min}^{-1}$ ). Laboratory values were converted to emission flux rates by the following formula:

$$F = W/ATR$$

where:

- $F$  = Average emission flux rate ( $\text{ng m}^{-2} \text{min}^{-1}$ ),
- $W$  = Contaminant mass (ng),
- $A$  = Subtended shell area ( $6.2 \times 10^{-3} \text{ m}^2$ ),
- $T$  = Time of collection (min), and
- $R$  = Adsorbent recovery factor (decimal fraction)

Actual collection areas and collection durations (found in the Field Deployment Report) are used to compute emission flux rates for each contaminant identified by the laboratory.

- **Sample Integrity:** The ABB-ES field team reported finding the collection shell for sample 7 overturned (**Attachment 1**). Because this sample was exposed to ambient air for an indeterminate amount of time and may have been exposed to any number of contaminants during this time, data from this sample should be treated with caution. The field team reported the sample 5 collection shell had been pushed down into the soil, however, the cartridge remained in good condition. This should not affect the reliability of sample 5 data.
- The **Trip Blank** is a cartridge prepared, transported, and analyzed with other samples but not intentionally exposed. Contamination on this QA/QC sample is normally subtracted from measurements of the same compounds on other samples. Here, the trip blank recorded none of the targeted compounds, indicating that the survey site is the source of detected contamination.
- The **Control Sample** serves to identify compounds present in ambient air during deployment of collection devices. Contaminant detections found on the control sample are normally subtracted from measurements of the same compounds on other samples. Control sample A (see **Attachment 2**) was collected at sample point 7 and recorded 43 ng of Toluene; this measurement was subtracted from all field sample measurements of Toluene before converting the latter to emission flux rates. [Note: Ambient air is pumped through EMFLUX® control samples

at a rate and for a time sufficient to duplicate the volume of air trapped beneath a collector shell during field-sample emplacement -- *i.e.*, one liter.]

- The following Attachments are included:
  - 1- Field Deployment Report
  - 2- MSS Laboratory Report
  - 3- EMFLUX® Field Procedures
  - 4- MSS Laboratory Procedures
  - 5- Chain-of-Custody Form

## 8. Discussion:

- References to contamination levels (*i.e.*, low, moderate, or high) are relative to the present Survey alone and should not routinely be compared to the results of other EMFLUX® investigations. To establish correlations between reported emission flux rates and actual subsurface contaminant concentrations, it is necessary to do follow-on intrusive sampling at selected locations with high and low emission flux rates. Results from such sampling can be used to determine flux-rate values that represent significant subsurface contamination. Based on Quadrel's experience, however, the emission-rate levels reported in this Survey are typically found to represent insignificant contaminant concentrations, unless the contamination is beneath highly impermeable soils or at considerable depth.
- Of the 15 compounds or compound groups targeted in this Survey, four were identified: Total Aliphatic Hydrocarbons; Ethylbenzene; Toluene; and Xylenes. Each of these compounds is commonly associated with petroleum products.
- Total Aliphatic Hydrocarbons (a compound group which includes Naphtha) were detected at sample point 5 at an emission rate of  $9.6 \text{ ng m}^{-2} \text{ min}^{-1}$ , a value just over the emission-flux-rate quantitation level (see Table 1).
- Ethylbenzene was recorded at sample point 7 ( $2.2 \text{ ng m}^{-2} \text{ min}^{-1}$ ); Toluene was found at points 7 and 11 at emission rates of  $7.1$  and  $1.9 \text{ ng m}^{-2} \text{ min}^{-1}$ , respectively. Points 7, 8, and 12 exhibited emissions of Xylenes ranging from  $1.2$  to  $10.7 \text{ ng m}^{-2} \text{ min}^{-1}$ . Although sample 7 showed the highest levels of these compounds, it is important to remember that sample 7 was exposed to ambient air for an indeterminate amount of time and that such exposure could account for increased detections on the cartridge.

Table 1

Emission Flux Rates (ng m<sup>-2</sup> min<sup>-1</sup>)  
 ABB Environmental Services, Inc.  
 Study Area 22  
 Naval Training Center  
 Orlando, FL

SAMPLE LOCATION	Q.L.	1	2	3	4	5	6	7	8	9	10
CONTAMINANTS											
Total Aliphatic Hydrocarbons	7.5	--	--	--	--	9.6	--	--	--	--	--
Ethylbenzene	0.7	--	--	--	--	--	--	2.2	--	--	--
Toluene	0.7	--	--	--	--	--	--	7.1	--	--	--
Xylenes (total)	0.7	--	--	--	--	--	--	10.7	3.5	--	--

SAMPLE LOCATION	Q.L.	11	12	13	14	15	16
CONTAMINANTS							
Total Aliphatic Hydrocarbons	7.5	--	--	--	--	--	--
Ethylbenzene	0.7	--	--	--	--	--	--
Toluene	0.7	1.9	--	--	--	--	--
Xylenes (total)	0.7	--	1.2	--	--	--	--

NOTES:

- 1) Values listed under "Q.L." are reported emission-flux-rate quantitation levels.
- 2) "--" denotes no detection found at this location.

**Attachment 1**  
**Field Deployment Report**

QUADREL SERVICES, INC.  
FIELD DEPLOYMENT REPORT

CLIENT: ABB ENVIRONMENTAL

SITE: Naval Training Center

INDIVIDUAL SAMPLE INFORMATION

EMPLACEMENT DATE: Monday June 12, 1995

RETRIEVAL DATE: Friday June 16, 1995

SAMPLE NO.	TIME		CONDITION OF CARTRIDGE/VIAL	FIELD NOTES
	EMPLACED	RETRIEVED		
1	1209	0646	good	
2	1216	0647	good	
3	1220	0647	good	
4	1228	0648	good	
5	1232	0649	good	Had been pushed in to far (Half in the soil) <small>metal cover 47 collector was</small>
6	1237	0652	good	
7	1242	0653	good	Camo & metal cover had been removed
8	1250	0655	good	
9	1255	0656	good	
10	1259	0657	good	
11	1303	0658	good	
12	1308	0658	good	
13	1311	0659	good	
14	1319	0700	good	
15	1321	0701	good	



**Attachment 2**

**MSS Laboratory Report**

MARYLAND SPECTRAL SERVICES, INC.  
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD MODIFIED 8240

CLIENT SAMPLE ID:	01	02	03	04	05	06
	QS1272	QS1272	QS1272	QS1272	QS1272	QS1272
LAB SAMPLE ID:	95062001	95062002	95062003	95062004	95062005	95062006
RECEIVED DATE:	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95
ANALYSIS DATE:	06/20/95	06/20/95	06/20/95	06/20/95	06/21/95	06/21/95
FILE NAME:	062001	062002	062003	062004	062005	062006
INSTRUMENT ID:	MSD	MSD	MSD	MSD	MSD	MSD
UNITS:	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP

VOLATILE COMPOUNDS

Compound	01	02	03	04	05	06
Benzene	25 U	25 U	25 U	25 U	25 U	25 U
Carbon Tetrachloride	25 U	25 U	25 U	25 U	25 U	25 U
Chloroform	25 U	25 U	25 U	25 U	25 U	25 U
1,1-Dichloroethane	25 U	25 U	25 U	25 U	25 U	25 U
1,1-Dichloroethene	25 U	25 U	25 U	25 U	25 U	25 U
1,2-Dichloroethene (total)	25 U	25 U	25 U	25 U	25 U	25 U
Ethylbenzene	25 U	25 U	25 U	25 U	25 U	25 U
Methylene Chloride	25 U	25 U	25 U	25 U	25 U	25 U
Tetrachloroethene	25 U	25 U	25 U	25 U	25 U	25 U
Toluene	25 U	25 U	25 U	25 U	25 U	25 U
1,1,1-Trichloroethane	25 U	25 U	25 U	25 U	25 U	25 U
1,1,2-Trichloroethane	25 U	25 U	25 U	25 U	25 U	25 U
Trichloroethene	25 U	25 U	25 U	25 U	25 U	25 U
Xylenes (total)	25 U	25 U	25 U	25 U	25 U	25 U
Aliphatic HCs	250 U	250 U	250 U	250 U	322	250 U

B - Detected in Lab Blank. U - Below Reported Quantitation Level. J - Estimated Value.

MARYLAND SPECTRAL SERVICES, INC.  
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD MODIFIED 8240

CLIENT SAMPLE ID:	07	08	09	10	11	
	0S1272	0S1272	0S1272	0S1272	0S1272	0S1272
LAB SAMPLE ID:	95062007	95062008	95062009	95062010	95062011	95062012
RECEIVED DATE:	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95
ANALYSIS DATE:	06/21/95	06/21/95	06/21/95	06/21/95	06/21/95	06/21/95
FILE NAME:	062007	062008	062009	062010	062011	062012
INSTRUMENT ID:	MSD	MSD	MSD	MSD	MSD	MSD
UNITS:	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP

VOLATILE COMPOUNDS

Compound	07	08	09	10	11	
Benzene	25 U					
Carbon Tetrachloride	25 U					
Chloroform	25 U					
1,1-Dichloroethane	25 U					
1,1-Dichloroethene	25 U					
1,2-Dichloroethene (total)	25 U					
Ethylbenzene	75	25 U				
Methylene Chloride	25 U					
Tetrachloroethene	25 U					
Toluene	282	54	25 U	25 U	105	54
1,1,1-Trichloroethane	25 U					
1,1,2-Trichloroethane	25 U					
Trichloroethene	25 U					
Xylenes (total)	359	117	25 U	25 U	25 U	39
Aliphatic HCs	250 U					

B - Detected in Lab Blank. U - Below Reported Quantitation Level. J - Estimated Value.

MARYLAND SPECTRAL SERVICES, INC.  
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD MODIFIED 8240

CLIENT SAMPLE ID:	13	14	15	16	17	A
LAB SAMPLE ID:	QS1272	QS1272	QS1272	QS1272	QS1272	QS1272
RECEIVED DATE:	95062013	95062014	95062015	95062016	95062017	95062018
ANALYSIS DATE:	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95	06/20/95
FILE NAME:	06/21/95	06/21/95	06/21/95	06/21/95	06/21/95	06/21/95
INSTRUMENT ID:	062013	062014	062015	062016	062017	062018
UNITS:	MSD	MSD	MSD	MSD	MSD	MSD
	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP	NG/TRAP

VOLATILE COMPOUNDS						
Benzene	25 U					
Carbon Tetrachloride	25 U					
Chloroform	25 U					
1,1-Dichloroethane	25 U					
1,1-Dichloroethene	25 U					
1,2-Dichloroethene (total)	25 U					
Ethylbenzene	25 U					
Methylene Chloride	25 U					
Tetrachloroethene	25 U					
Toluene	25 U	43				
1,1,1-Trichloroethane	25 U					
1,1,2-Trichloroethane	25 U					
Trichloroethene	25 U					
Xylenes (total)	25 U					
Aliphatic HCs	250 U					

B - Detected in Lab Blank. U - Below Reported Quantitation Level. J - Estimated Value.

MARYLAND SPECTRAL SERVICES, INC.  
1500 Caton Center Drive Baltimore, MD 21227

VOLATILE ORGANICS BY EPA GC/MS METHOD MODIFIED 8240

CLIENT SAMPLE ID: VBLK062001 VBLK062101

LAB SAMPLE ID: METHOD\_BLANK METHOD\_BLANK

RECEIVED DATE:

ANALYSIS DATE: 06/20/95 06/21/95

FILE NAME: 0620VBLKD1 0621VBLKD1

INSTRUMENT ID: MSD MSD

UNITS: NG/TRAP NG/TRAP

VOLATILE COMPOUNDS

Benzene	25 U	25 U
Carbon Tetrachloride	25 U	25 U
Chloroform	25 U	25 U
1,1-Dichloroethane	25 U	25 U
1,1-Dichloroethene	25 U	25 U
1,2-Dichloroethene (total)	25 U	25 U
Ethylbenzene	25 U	25 U
Methylene Chloride	25 U	25 U
Tetrachloroethene	25 U	25 U
Toluene	25 U	25 U
1,1,1-Trichloroethane	25 U	25 U
1,1,2-Trichloroethane	25 U	25 U
Trichloroethene	25 U	25 U
Xylenes (total)	25 U	25 U
Aliphatic HCs	250 U	250 U

B - Detected in Lab Blank. U - Below Reported Quantitation Level. J - Estimated Value.

### Attachment 3

## QUADREL FIELD PROCEDURES FOR EMFLUX® SOIL-GAS SURVEYS

Quadrel routinely follows the field procedures outlined below in performing EMFLUX® soil-gas surveys, although modifications can be and are incorporated from time to time in response to requirements of individual projects. In all instances, Quadrel or other designated personnel follow EPA-approved Quality Assurance and Quality Control practices.

- A. One or more two-person teams, the specific number dependent upon scope and schedule of the project, transport EMFLUX® system components and support equipment to the site and deploy samplers according to a prearranged survey pattern. One member of each team is designated "clean" and given exclusive responsibility for procedures involving components that must be protected from contamination.
- B. At each survey point, the team clears vegetation as necessary, removes a laboratory-prepared sampler cartridge containing a standardized adsorbent from an airtight vial, affixes it to a support stake, and secures this sampler assembly to the ground at the specified point. The sampler shell is immediately placed on the ground, open end down, over the sampler assembly and surrounded with a collar of sand or local soil (to minimize effects of ambient airflow). The shell is then covered with camouflage cloth which is secured with a small additional amount of sand or soil. Finally, the team records the survey point location code, cartridge number, date and time of emplacement, and other relevant information.
- C. At intervals during the emplacement phase, as a quality control check, the team draws ambient air through control samples and records the date, time, and location of collection. (One or more trip blanks are also carried to and from the site in airtight vials as part of the quality control program.)
- D. Once the predetermined number of EMFLUX® sampling devices are in the field, the team sets the time for sampler recovery (generally not less than 72 hours after emplacement) and leaves the area, taking with it all equipment except the detection devices.
- E. The team returns to retrieve the sampling devices when the exposure period has elapsed. The "clean" person of the team recovers the cartridge at each point and returns it to its airtight vial, while the other person collects the remaining equipment. Again, location codes, cartridge numbers, dates, times, etc. are recorded.
- F. The field team carries or ships resealed vials containing exposed cartridges to analytical laboratories under contract to Quadrel for processing. The remaining equipment is returned to Quadrel's preparation facility for cleaning and reuse.

## Attachment 4

### MSS LABORATORY PROCEDURES FOR EMFLUX® ADSORBENT CARTRIDGES

After exposure, EMFLUX® cartridges are analyzed using U.S. EPA Method 8240 as described in the Solid Waste Manual (SW-846), a purge-and-trap capillary gas chromatographic/mass spectrometric method, modified to accommodate thermal desorption of the adsorbent cartridges. This procedure is summarized as follows:

- A. The adsorbent cartridges are thermally desorbed at 300°C for 11 minutes in a 40 mL/min helium flow, through 5mL of reagent water held in the purge-and-trap vessel, and adsorbed onto a standard three-component trap (Tenax, silica gel, coconut charcoal). The blank water is spiked with 250 ng of the internal standards and surrogate compounds specified in Method 8240.
- B. Following cryofocusing, the three-component trap is thermally desorbed at 220°C onto a Restek 502.2 capillary column, per the U.S. EPA CLP Statement of Work (SOW) for the method.
- C. Following the SOW, the GC/MS is scanned between 35 and 260 Atomic Mass Units (AMU) at one second per scan.
- D. The internal standard method is used to determine amounts of analytes found.
- E. Analytical instrument calibration and internal quality control procedures follow the requirements of Method 8240 as modified to accommodate thermal desorption of the adsorbent cartridges.
- F. The instrumentation used for these analyses includes:
  - Finnigan Model OWA 1050 Gas Chromatograph/Mass Spectrometer;
  - Tekmar Model 6016 Aero Trap Autosampler;
  - Tekmar Model LSC 2000 Liquid Sample Concentrator; and
  - Tekmar Model ALS 2016 Autosampler.

**Attachment 5**

**Chain-of-Custody Form**

QUADREL SERVICES, INC.  
CHAIN-OF-CUSTODY FORM

PROJECT NO.	Q5 1272	PROJECT NAME	Naval Training Center
LOCATION	Orlando, FL	CLIENT	ABB ENVIRONMENTAL

TARGET COMPOUNDS: 1,1-dichloroethane, trichloroethane, 1,1,1-trichloroethane, chloroform, carbon tetrachloride, toluene, total xylenes, naphtha, 1,1-dichloroethane, total 1,2-DCE, tetrachloroethane, 1,1,2-TCA, methylene chloride, benzene, ethylbenzene

SAMPLE NO.	CONDITION OF SAMPLE	DATE	TIME	INIT
1	good	6/16/95	0646	MA
2	good	6/16/95	0647	MA
3	good	6/16/95	0647	MA
4	good	6/16/95	0648	MA
5	metal shell clogged with soil, sample was in good condition	6/16/95	0649	MA
6	good	6/16/95	0652	MA
7	can's shell had been removed, sample was in good condition	6/16/95	0653	MA
8	good	6/16/95	0655	MA
9	good	6/16/95	0656	MA
10	good	6/16/95	0657	MA
11	good	6/16/95	0658	MA
12	good	6/16/95	0658	MA
13	good	6/16/95	0659	MA
14	good	6/16/95	0700	MA
15	good	6/16/95	0701	MA
16	good	6/16/95	0702	MA
17	good	6/16/95	---	MA
A	good	6/12/95	1245	MA

RELINQUISHED BY		DATE	TIME	RECEIVED BY	
Signature	Printed Name			Signature	Printed Name
<i>Ben Breeze</i>	BEN BREEZE	6/7/95	16:00	<i>[Signature]</i>	FED EX
<i>[Signature]</i>	FED EX	6/9/95	14:00	<i>[Signature]</i>	ROBERT J. BURNS JR
<i>[Signature]</i>	ROBERT J. BURNS JR	6-16-95	09:10		FED EX

## **APPENDIX C**

### **SUMMARY OF POSITIVE DETECTIONS ANALYTICAL RESULTS**

C-1: Summary of Positive Detections in Sediment Analytical Results

C-2: Summary of Positive Detections in Groundwater Analytical Results

C-3: Summary of Positive Detections in Surface Water Analytical Results

**APPENDIX C-1**

**SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT ANALYTICAL RESULTS**

Appendix C-1. Summary of Positive Detections in Sediment Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
 Naval Training Center  
 Orlando, FL

Identifier	Sediment Screening Value <sup>1</sup>	22D00101	22D00101D	22D00201
Sampling Date		6/18/96	6/18/96	6/18/96
<b>Volatile Organics, ug/kg</b>				
2-Butanone	ND	5 J	6 J	11 J
2-Hexanone	ND			5 J
Methylene chloride	ND	9 J	7 J	6 J
Toluene	ND		1 J	2 J
Xylene (total)	ND	6 J		
<b>Semivolatile Organics, ug/kg</b>				
N-Nitrosodiphenylamine	ND		54 J	
<b>Inorganics, mg/kg</b>				
Aluminum	ND	1210 J	1310 J	1890 J
Antimony	12 (3)			6 B
Arsenic	6 (1)		0.38 B	0.97 B
Barium	ND	1.5 B	1.2 B	2.2 B
Calcium	ND	105 BJ	104 BJ	254 BJ
Chromium	26 (1)	1.9 B	1.9 B	2.6 B
Iron	20,000 (1)	79.5	77.9	134
Lead	30.2 (2)			2.4
Magnesium	ND	36.6 B	25.7 B	50.1 B
Manganese	460 (1)	1.1 B	0.98 B	1.3 B
Mercury	0.13 (2)	0.06 B	0.05 B	0.05 B
Nickel	15.9 (2)		1.5 B	1.8 B
Sodium	ND	35.1 B	30.7 B	37.3 B
Vanadium	ND	0.54 B	0.72 B	1.5 B
Zinc	120 (1)	7.1	9.9	5 B
<b>General chemistry, mg/kg</b>				
Total Organic Carbon	ND	1410	1730	6170

Appendix C-1. Summary of Positive Detections in Sediment Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
Naval Training Center  
Orlando, FL

**NOTES:**

<sup>1</sup> Sediment Screening Value is the lowest of

- (1) Ontario Sediment Quality Guidelines (SQGs) (Persaud et al., 1992),
- (2) Florida Department of Environmental Protection Sediment Quality Assessment Guidelines (MacDonald, 1994), and
- (3) Region IV SQG (U.S. Environmental Protection Agency, 1995).

BRAC = Base Realignment and Closure

ND = Not Determined

mg/kg = milligrams per kilogram

ug/kg = micrograms per liter.

J = Reported concentration is an estimated quantity.

B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).

Bold/shaded values indicate exceedance of sediment screening value.

Blank space indicates analyte/compound was not detected at the reporting limit.

**APPENDIX C-2**

**SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER  
ANALYTICAL RESULTS**

Appendix C-2. Summary of Positive Detections in Groundwater Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
 Naval Training Center, Orlando  
 Orlando, FL

Well ID	OLD-22-01							
Identifier	Background Screening <sup>1</sup>	FDEPG	FEDMCL	RBC <sup>2</sup> for Tap Water	22G00101	22G00101D	22H00101	22H00101D
Sampling Date					18-Jun-96	18-Jun-96	18-Jun-96	18-Jun-96
<b>Semivolatile Organics, ug/L</b>								
bis(2-Ethylhexyl)phthalate		6 <sup>6</sup>	ND	4.8 c		1 J	NA	NA
<b>Inorganics, ug/L</b>								
Aluminum	4,067	200 <sup>3</sup>	ND	37,000 n	9450 J	9380 J	7040 J	7900 J
Antimony	4.1	6 <sup>5</sup>	6	15 n			3.8 BJ	3.6 B
Arsenic	5	50 <sup>5</sup>	50	0.045 c/11 n			1.3 B	
Barium	31.4	2,000 <sup>5</sup>	2,000	2,600 n	10.2 B	9.2 B	8.5 B	9.7 B
Beryllium	--	4 <sup>5</sup>	4	0.016 c	0.17 B			
Calcium	36,830	ND	ND	1,000,000	6670	6260	6450	6380
Iron	1,227	300 <sup>3</sup>	ND	11,000 n	750 J	728 J	586 J	637 J
Lead	4	15 <sup>5</sup>	15	15	3	5.6	2.3 B	1.5 B
Magnesium	4,560	ND	ND	118,807	1180 B	1110 B	1110 B	1120 B
Manganese	17	50 <sup>3</sup>	ND	840 n	10 B	8.6 B	8.1 B	8.5 B
Nickel	--	100 <sup>4</sup>	100	730 n			10.7 B	
Potassium	5,400	ND	ND	297,016	2510 B	2120 B	2400 B	2590 B
Sodium	18,222	160,000 <sup>5</sup>	ND	396,022	4590 BJ	4230 J	4480 BJ	4540 BJ
Thallium	3.8	2 <sup>4</sup>	2	2.9 n				0.87 J
Vanadium	20.6	49 <sup>4</sup>	ND	260 n	7.5 B	6.9 B	5.6 B	6.8 B
Zinc	4	5,000 <sup>3</sup>	ND	11,000 n		57.8	42	59.1
<b>Radiological, pCi/L</b>								
Gross Alpha	13	ND	15	ND	6.46	4.86	NA	NA
Gross Beta	9.5	ND	ND	ND	7.68	9.74	NA	NA
<b>General chemistry, mg/L</b>								
Total Suspended Solids	ND	ND	ND	ND	23	58	NA	NA

## Appendix C-2. Summary of Positive Detections in Groundwater Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
Naval Training Center, Orlando  
Orlando, FL

### NOTES:

<sup>1</sup> Groundwater background screening value is twice the average of detected concentrations for inorganic analytes.

<sup>2</sup> RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith. RBC for lead is not available, value is treatment technology action limit for lead in drinking water distribution system identified in Drinking Water Regulations and Health Advisories (USEPA, 1996).

For essential nutrients (calcium, magnesium, potassium, and sodium) screening values were derived based on recommended daily allowances (RDAs).

<sup>3</sup> Secondary Standard.

<sup>4</sup> Systemic Toxicant

<sup>5</sup> Primary Standard

<sup>6</sup> Organoleptic

n = noncarcinogenic pathway

c = carcinogenic pathway

ND = Not determined.

NA = Not analyzed.

ID = identifier

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, February 1996.

B = Reported concentration is between the instrument detection limit (IDL) and the contract required detection limit (CRDL).

J = Reported concentration is an estimated quantity.

ug/l = micrograms per liter.

mg/l = milligrams per liter.

pCi/l = picocuries per liter.

Bold/shaded numbers indicate exceedance of groundwater guidance and background.

Blank space indicates analyte/compound was not detected at the reporting limit.

**APPENDIX C-3**

**SUMMARY OF POSITIVE DETECTIONS IN SURFACE WATER  
ANALYTICAL RESULTS**

Appendix C-3. Summary of Positive Detections in Surface Water Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
 Naval Training Center, Orlando  
 Orlando, FL

Identifier	Surface Water Screening Value	22W00200	22W00200D	22W00300
Sampling Date		5/16/95	5/16/95	5/16/95
<b>Volatile Organics, ug/L</b>				
Acetone	ND	10	10	9 J
<b>Semivolatile Organics, ug/L</b>				
Phenol	256 (2)			1 J
<b>Inorganics, ug/L</b>				
Aluminum	87 (1,4)	232	243	122 B
Arsenic	50 (3)	2.3 B		
Barium	ND	4.9 B	5.1 B	12.6 B
Calcium	ND	8,590	8,620	8,540
Iron	1,000 (1,3)	228	226	173
Lead	0.5 (3,5)	2 B		
Magnesium	ND	1,690 B	1,700 B	1,740 B
Manganese	ND	28.5	25.3	79
Potassium	ND	1,540 B	1,760 B	2,120 B
Sodium	ND	4,570 B	4,560 B	3,890 B
<b>Radiological, pCi/L</b>				
Gross Alpha	15 (3)	3.6	3.3	3.7
Gross Beta	ND	5.5	4.6	4.3
<b>General chemistry, mg/L</b>				
Alkalinity as CaCO3	ND	20	18	20

Appendix C-3. Summary of Positive Detections in Surface Water Analytical Results, Study Area 22

BRAC Environmental Site Screening Report  
Naval Training Center, Orlando  
Orlando, FL

**NOTES:**

<sup>1</sup> Federal Ambient Water Quality Criteria, chronic values (USEPA, 1991; 1988)

<sup>2</sup> USEPA Region IV Waste Management Division Chronic Freshwater Quality Screening Values based on the Water Quality Standards Units Screening List (USEPA, 1992).

<sup>3</sup> Chapter 62-302. Florida Administrative Code Surface Water Quality Standards; 1995

<sup>4</sup> Criterion is based on pH of 6.5 - 9 (USEPA, 1988).

<sup>5</sup> Hardness dependent criterion. Average water hardnesses of 30, 63.5, and 19.3 mg/L CaCO<sub>3</sub> were used to calculate criteria for Study Area 22.

The average water hardness of 19.3 mg/L for Study Area 22 is below the range of water hardnesses to be used in calculating AWQC (i.e., 25 to 400 mg/L). Therefore, a hardness of 25 mg/L (the lowest usable hardness value) was used to calculate criteria for Study Area 22.

ND = Not determined.

mg/L = milligrams per liter.

J = Reported concentration is an estimated quantity.

ug/L = micrograms per liter.

B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).

Blank space indicates analyte/compound was not detected at the reporting limit.

## **APPENDIX D**

### **SUMMARY OF ANALYTICAL RESULTS**

- D-1: Summary of Analytical Results in Sediment Analytical Results
- D-2: Summary of Analytical Results in Groundwater Analytical Results
- D-3: Summary of Analytical Results in Surface Water Analytical Results

**APPENDIX D-1**

**SUMMARY OF ANALYTICAL RESULTS IN SEDIMENT ANALYTICAL RESULTS**

Appendix D-1. Summary of Sediment Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22D00101	22D00101D	22D00201
Lab ID	MB173002	MB173003	MB173004
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96
<b>Volatile organics, ug/kg</b>			
1,1,1-Trichloroethane	13 U	13 U	14 U
1,1,2,2-Tetrachloroethane	13 U	13 U	14 U
1,1,2-Trichloroethane	13 U	13 U	14 U
1,1-Dichloroethane	13 U	13 U	14 U
1,1-Dichloroethene	13 U	13 U	14 U
1,2-Dichloroethane	13 U	13 U	14 U
1,2-Dichloroethene (total)	13 U	13 U	14 U
1,2-Dichloropropane	13 U	13 U	14 U
2-Butanone	5 J	6 J	11 J
2-Hexanone	13 U	13 U	5 J
4-Methyl-2-pentanone	13 U	13 U	14 U
Acetone	23 U	23 U	44 U
Benzene	13 U	13 U	14 U
Bromodichloromethane	13 U	13 U	14 U
Bromoform	13 U	13 U	14 U
Bromomethane	13 U	13 U	14 U
Carbon disulfide	13 U	13 U	14 U
Carbon tetrachloride	13 U	13 U	14 U
Chlorobenzene	13 U	13 U	14 U
Chloroethane	13 U	13 U	14 U
Chloroform	13 U	13 U	14 U
Chloromethane	13 U	13 U	14 U
cis-1,3-Dichloropropene	13 U	13 U	14 U
Dibromochloromethane	13 U	13 U	14 U
Ethylbenzene	13 U	13 U	14 U
Methylene chloride	9 J	7 J	6 J
Styrene	13 U	13 U	14 U
Tetrachloroethene	13 U	13 U	14 U
Toluene	13 U	1 J	2 J
trans-1,3-Dichloropropene	13 U	13 U	14 U
Trichloroethene	13 U	13 U	14 U
Vinyl chloride	13 U	13 U	14 U
Xylene (total)	6 J	13 U	14 U
<b>Semivolatile organics, ug/kg</b>			
1,2,4-Trichlorobenzene	430 U	430 U	440 U
1,2-Dichlorobenzene	430 U	430 U	440 U
1,3-Dichlorobenzene	430 U	430 U	440 U
1,4-Dichlorobenzene	430 U	430 U	440 U
2,2'-oxybis(1-Chloropropane)	430 U	430 U	440 U
2,4,5-Trichlorophenol	1100 U	1100 U	1100 U
2,4,6-Trichlorophenol	430 U	430 U	440 U
2,4-Dichlorophenol	430 U	430 U	440 U
2,4-Dimethylphenol	430 U	430 U	440 U
2,4-Dinitrophenol	1100 U	1100 U	1100 U
2-Chloronaphthalene	430 U	430 U	440 U
2-Chlorophenol	430 U	430 U	440 U
2-Methylnaphthalene	430 U	430 U	440 U
2-Methylphenol	430 U	430 U	440 U
2-Nitroaniline	1100 U	1100 U	1100 U

**Appendix D-1. Summary of Sediment Analytical Results  
Study Area 22**

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22D00101	22D00101D	22D00201
Lab ID	MB173002	MB173003	MB173004
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96
2-Nitrophenol	430 U	430 U	440 U
3,3'-Dichlorobenzidine	430 U	430 U	440 U
3-Nitroaniline	1100 U	1100 U	1100 U
4,6-Dinitro-2-methylphenol	1100 U	1100 U	1100 U
4-Bromophenyl-phenylether	430 U	430 U	440 U
4-Chloro-3-methylphenol	430 U	430 U	440 U
4-Chloroaniline	430 U	430 U	440 U
4-Chlorophenyl-phenylether	430 U	430 U	440 U
4-Methylphenol	430 U	430 U	440 U
4-Nitroaniline	1100 U	1100 U	1100 U
4-Nitrophenol	1100 U	1100 U	1100 U
Acenaphthene	430 U	430 U	440 U
Acenaphthylene	430 U	430 U	440 U
Anthracene	430 U	430 U	440 U
Benzo(a)anthracene	430 U	430 U	440 U
Benzo(a)pyrene	430 U	430 U	440 U
Benzo(b)fluoranthene	430 U	430 U	440 U
Benzo(g,h,i)perylene	430 U	430 U	440 U
Benzo(k)fluoranthene	430 U	430 U	440 U
bis(2-Chloroethoxy)methane	430 U	430 U	440 U
bis(2-Chloroethyl)ether	430 U	430 U	440 U
bis(2-Ethylhexyl)phthalate	500 U	1100 U	440 U
Butylbenzylphthalate	430 U	430 U	440 U
Carbazole	430 U	430 U	440 U
Chrysene	430 U	430 U	440 U
Di-n-butylphthalate	430 U	430 U	440 U
Di-n-octylphthalate	430 U	430 U	440 U
Dibenz(a,h)anthracene	430 U	430 U	440 U
Dibenzofuran	430 U	430 U	440 U
Diethylphthalate	430 U	430 U	440 U
Dimethylphthalate	430 U	430 U	440 U
Fluoranthene	430 U	430 U	440 U
Fluorene	430 U	430 U	440 U
Hexachlorobenzene	430 U	430 U	440 U
Hexachlorobutadiene	430 U	430 U	440 U
Hexachlorocyclopentadiene	430 U	430 U	440 U
Hexachloroethane	430 U	430 U	440 U
Indeno(1,2,3-cd)pyrene	430 U	430 U	440 U
Isophorone	430 U	430 U	440 U
N-Nitroso-di-n-propylamine	430 U	430 U	440 U
N-Nitrosodiphenylamine (1)	430 U	54 J	440 U
Naphthalene	430 U	430 U	440 U
Pentachlorophenol	1100 U	1100 U	1100 U
Phenanthrene	430 U	430 U	440 U
Phenol	430 U	430 U	440 U
Pyrene	430 U	430 U	440 U

Appendix D-1. Summary of Sediment Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22D00101	22D00101D	22D00201
Lab ID	MB173002	MB173003	MB173004
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96
<b>Pesticides/PCBs, ug/kg</b>			
4,4'-DDD	4.3 U	4.3 U	4.3 U
4,4'-DDE	4.3 U	4.3 U	4.3 U
4,4'-DDT	4.3 U	4.3 U	4.3 U
Aldrin	2.2 U	2.2 U	2.2 U
alpha-BHC	2.2 UJ	2.2 UJ	2.2 UJ
alpha-Chlordane	2.2 U	2.2 U	2.2 U
Aroclor-1016	43 U	43 U	43 U
Aroclor-1221	87 U	87 U	88 U
Aroclor-1232	43 U	43 U	43 U
Aroclor-1242	43 U	43 U	43 U
Aroclor-1248	43 U	43 U	43 U
Aroclor-1254	43 U	43 U	43 U
Aroclor-1260	43 U	43 U	43 U
beta-BHC	2.2 U	2.2 U	2.2 U
delta-BHC	2.2 UJ	2.2 UJ	2.2 UJ
Dieldrin	4.3 U	4.3 U	4.3 U
Endosulfan I	2.2 U	2.2 U	2.2 U
Endosulfan II	4.3 U	4.3 U	4.3 U
Endosulfan sulfate	4.3 U	4.3 U	4.3 U
Endrin	4.3 U	4.3 U	4.3 U
Endrin aldehyde	4.3 U	4.3 U	4.3 U
Endrin ketone	4.3 U	4.3 U	4.3 U
gamma-BHC (Lindane)	2.2 U	2.2 U	2.2 U
gamma-Chlordane	2.2 U	2.2 U	2.2 U
Heptachlor	2.2 U	2.2 U	2.2 U
Heptachlor epoxide	2.2 U	2.2 U	2.2 U
Methoxychlor	22 U	22 U	22 U
Toxaphene	220 U	220 U	220 U
<b>Herbicides, ug/kg</b>			
2,4,5-T	13 U	13 U	26 U
2,4,5-TP (Silvex)	13 U	13 U	26 U
2,4-D	65 U	65 U	130 U
2,4-DB	65 U	65 U	130 U
2,4-DP (Dichloroprop)	65 U	65 U	130 U
Dalapon	130 U	130 U	260 U
Dicamba	13 U	13 U	26 U
Dinoseb	13 U	13 U	26 U
MCPA	6500 U	6500 U	13000 U
MCPP	6500 U	6500 U	13000 U
<b>Explosives, ug/g</b>			
1,3,5-Trinitrobenzene	0.08 U	0.08 U	0.08 U
1,3-Dinitrobenzene	0.08 U	0.08 U	0.08 U
2,4,6-Trinitrotoluene	0.09 U	0.09 U	0.09 U
2-Amino-4,6-Dinitrotoluene	0.08 U	0.08 U	0.08 U
2-Nitrotoluene	0.15 U	0.15 U	0.15 U
3-Nitrotoluene	0.18 U	0.18 U	0.18 U
4-Amino-2,6-Dinitrotoluene	0.08 U	0.08 U	0.08 U
4-Nitrotoluene	0.18 U	0.18 U	0.18 U
HMX	0.18 U	0.18 U	0.18 U

Appendix D-1. Summary of Sediment Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22D00101	22D00101D	22D00201
Lab ID	MB173002	MB173003	MB173004
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96
RDX	0.16 U	0.16 U	0.16 U
Tetryl (total)	0.1 U	0.1 U	0.1 U
2,4-Dinitrotoluene	0.06 U	0.06 U	0.06 U
2,6-Dinitrotoluene	0.08 U	0.08 U	0.08 U
Nitrobenzene	0.09 U	0.09 U	0.09 U
<b>Inorganics, mg/kg</b>			
Aluminum	1210 J	1310 J	1890 J
Antimony	3.9 U	3.9 U	6 B
Arsenic	0.34 U	0.38 B	0.97 B
Barium	1.5 B	1.2 B	2.2 B
Beryllium	0.03 U	0.03 U	0.03 U
Cadmium	0.85 U	0.85 U	0.87 U
Calcium	105 BJ	104 BJ	254 BJ
Chromium	1.9 B	1.9 B	2.6 B
Cobalt	0.65 U	0.65 U	0.66 U
Copper	0.31 U	0.31 U	0.31 U
Iron	79.5	77.9	134
Lead	1.2 U	1.1 U	2.4
Magnesium	36.6 B	25.7 B	50.1 B
Manganese	1.1 B	0.98 B	1.3 B
Mercury	0.06 B	0.05 B	0.05 B
Nickel	1.4 U	1.5 B	1.8 B
Potassium	192 U	193 U	196 U
Selenium	0.34 U	0.34 U	0.34 U
Silver	0.57 UJ	0.57 UJ	0.58 UJ
Sodium	35.1 B	30.7 B	37.3 B
Thallium	0.22 U	0.22 U	0.23 U
Vanadium	0.54 B	0.72 B	1.5 B
Zinc	7.1	9.9	5 B
<b>General Chemistry, mg/kg</b>			
Total Organic Carbon	1410	1730	6170

**APPENDIX D-2**

**SUMMARY OF ANALYTICAL RESULTS IN GROUNDWATER  
ANALYTICAL RESULTS**

Appendix D-2. Summary of Groundwater Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22G00101	22H00101	22G00101D	22H00101D
Lab ID	MB172002	MB172004	MB172003	MB172005
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96	18-Jun-96
<b>Volatile organics, ug/L</b>				
1,1,1-Trichloroethane	1 U	NA	1 U	NA
1,1,2,2-Tetrachloroethane	1 U	NA	1 U	NA
1,1,2-Trichloroethane	1 U	NA	1 U	NA
1,1-Dichloroethane	1 U	NA	1 U	NA
1,1-Dichloroethene	1 U	NA	1 U	NA
1,2-Dibromo-3-chloropropane	1 U	NA	1 U	NA
1,2-Dibromoethane	1 U	NA	1 U	NA
1,2-Dichloroethane	1 U	NA	1 U	NA
1,2-Dichloropropane	1 U	NA	1 U	NA
2-Butanone	5 UR	NA	5 UR	NA
2-Hexanone	5 U	NA	5 U	NA
4-Methyl-2-pentanone	5 U	NA	5 U	NA
Acetone	5 UR	NA	5 UR	NA
Benzene	1 U	NA	1 U	NA
Bromochloromethane	1 U	NA	1 U	NA
Bromodichloromethane	1 U	NA	1 U	NA
Bromoform	1 U	NA	1 U	NA
Bromomethane	1 U	NA	1 U	NA
Carbon disulfide	1 U	NA	1 U	NA
Carbon tetrachloride	1 U	NA	1 U	NA
Chlorobenzene	1 U	NA	1 U	NA
Chloroethane	1 U	NA	1 U	NA
Chloroform	1 U	NA	1 U	NA
Chloromethane	1 U	NA	1 U	NA
cis-1,2-Dichloroethene	1 U	NA	1 U	NA
cis-1,3-Dichloropropene	1 U	NA	1 U	NA
Dibromochloromethane	1 U	NA	1 U	NA
Ethylbenzene	1 U	NA	1 U	NA
Methylene chloride	0.3 U	NA	2 U	NA
Styrene	1 U	NA	1 U	NA
Tetrachloroethene	1 U	NA	1 U	NA
Toluene	1 U	NA	1 U	NA
trans-1,2-Dichloroethene	1 U	NA	1 U	NA
trans-1,3-Dichloropropene	1 U	NA	1 U	NA
Trichloroethene	1 U	NA	1 U	NA
Vinyl chloride	1 U	NA	1 U	NA
Xylene (total)	1 U	NA	1 U	NA
<b>Semivolatile organics, ug/L</b>				
1,2,4-Trichlorobenzene	10 U	NA	10 U	NA
1,2-Dichlorobenzene	1 U	NA	1 U	NA
1,3-Dichlorobenzene	1 U	NA	1 U	NA
1,4-Dichlorobenzene	1 U	NA	1 U	NA
2,2'-oxybis(1-Chloropropane)	10 U	NA	10 U	NA
2,4,5-Trichlorophenol	25 U	NA	25 U	NA
2,4,6-Trichlorophenol	10 U	NA	10 U	NA
2,4-Dichlorophenol	10 U	NA	10 U	NA
2,4-Dimethylphenol	10 U	NA	10 U	NA
2,4-Dinitrophenol	25 U	NA	25 U	NA
2,4-Dinitrotoluene	0.03 U	NA	0.03 U	NA

**Appendix D-2. Summary of Groundwater Analytical Results  
Study Area 22**

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22G00101	22H00101	22G00101D	22H00101D
Lab ID	MB172002	MB172004	MB172003	MB172005
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96	18-Jun-96
2,6-Dinitrotoluene	0.04 U	NA	0.04 U	NA
2-Chloronaphthalene	10 U	NA	10 U	NA
2-Chlorophenol	10 U	NA	10 U	NA
2-Methylnaphthalene	10 U	NA	10 U	NA
2-Methylphenol	10 U	NA	10 U	NA
2-Nitroaniline	25 U	NA	25 U	NA
2-Nitrophenol	10 U	NA	10 U	NA
3,3'-Dichlorobenzidine	10 U	NA	10 U	NA
3-Nitroaniline	25 U	NA	25 U	NA
4,6-Dinitro-2-methylphenol	25 U	NA	25 U	NA
4-Bromophenyl-phenylether	10 U	NA	10 U	NA
4-Chloro-3-methylphenol	10 U	NA	10 U	NA
4-Chloroaniline	10 U	NA	10 U	NA
4-Chlorophenyl-phenylether	10 U	NA	10 U	NA
4-Methylphenol	10 U	NA	10 U	NA
4-Nitroaniline	25 U	NA	25 U	NA
4-Nitrophenol	25 U	NA	25 U	NA
Acenaphthene	10 U	NA	10 U	NA
Acenaphthylene	10 U	NA	10 U	NA
Anthracene	10 U	NA	10 U	NA
Benzo(a)anthracene	10 U	NA	10 U	NA
Benzo(a)pyrene	10 U	NA	10 U	NA
Benzo(b)fluoranthene	10 U	NA	10 U	NA
Benzo(g,h,i)perylene	10 U	NA	10 U	NA
Benzo(k)fluoranthene	10 U	NA	10 U	NA
bis(2-Chloroethoxy)methane	10 U	NA	10 U	NA
bis(2-Chloroethyl)ether	10 U	NA	10 U	NA
bis(2-Ethylhexyl)phthalate	10 U	NA	1 J	NA
Butylbenzylphthalate	10 U	NA	10 U	NA
Carbazole	10 U	NA	10 U	NA
Chrysene	10 U	NA	10 U	NA
Di-n-butylphthalate	10 U	NA	10 U	NA
Di-n-octylphthalate	10 U	NA	10 U	NA
Dibenz(a,h)anthracene	10 U	NA	10 U	NA
Dibenzofuran	10 U	NA	10 U	NA
Diethylphthalate	10 U	NA	10 U	NA
Dimethylphthalate	10 U	NA	10 U	NA
Fluoranthene	10 U	NA	10 U	NA
Fluorene	10 U	NA	10 U	NA
Hexachlorobenzene	10 U	NA	10 U	NA
Hexachlorobutadiene	10 U	NA	10 U	NA
Hexachlorocyclopentadiene	10 U	NA	10 U	NA

Appendix D-2. Summary of Groundwater Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22G00101	22H00101	22G00101D	22H00101D
Lab ID	MB172002	MB172004	MB172003	MB172005
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96	18-Jun-96
Hexachloroethane	10 U	NA	10 U	NA
Indeno(1,2,3-cd)pyrene	10 U	NA	10 U	NA
Isophorone	10 U	NA	10 U	NA
N-Nitroso-di-n-propylamine	10 U	NA	10 U	NA
N-Nitrosodiphenylamine (1)	10 U	NA	10 U	NA
Naphthalene	10 U	NA	10 U	NA
Nitrobenzene	0.04 U	NA	0.04 U	NA
Pentachlorophenol	25 U	NA	25 U	NA
Phenanthrene	10 U	NA	10 U	NA
Phenol	10 U	NA	10 U	NA
Pyrene	10 U	NA	10 U	NA
<b>Pesticides/PCBs, ug/L</b>				
4,4'-DDD	0.1 UJ	NA	0.1 UJ	NA
4,4'-DDE	0.1 UJ	NA	0.1 UJ	NA
4,4'-DDT	0.1 UJ	NA	0.1 UJ	NA
Aldrin	0.05 UJ	NA	0.05 UJ	NA
alpha-BHC	0.05 UJ	NA	0.05 UJ	NA
alpha-Chlordane	0.05 UJ	NA	0.05 UJ	NA
Aroclor-1016	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1221	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1232	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1242	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1248	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1254	0.5 UJ	NA	0.5 UJ	NA
Aroclor-1260	0.5 UJ	NA	0.5 UJ	NA
beta-BHC	0.05 UJ	NA	0.05 UJ	NA
delta-BHC	0.05 UJ	NA	0.05 UJ	NA
Dieldrin	0.1 UJ	NA	0.1 UJ	NA
Endosulfan I	0.05 UJ	NA	0.05 UJ	NA
Endosulfan II	0.1 UJ	NA	0.1 UJ	NA
Endosulfan sulfate	0.1 UJ	NA	0.1 UJ	NA
Endrin	0.1 UJ	NA	0.1 UJ	NA
Endrin aldehyde	0.1 UJ	NA	0.1 UJ	NA
Endrin ketone	0.1 UJ	NA	0.1 UJ	NA
gamma-BHC (Lindane)	0.05 UJ	NA	0.05 UJ	NA
gamma-Chlordane	0.05 UJ	NA	0.05 UJ	NA
Heptachlor	0.05 UJ	NA	0.05 UJ	NA
Heptachlor epoxide	0.05 UJ	NA	0.05 UJ	NA
Methoxychlor	0.5 UJ	NA	0.5 UJ	NA
Toxaphene	5 UJ	NA	5 UJ	NA
<b>Herbicides, ug/L</b>				
2,4,5-T	0.5 U	NA	0.5 U	NA
2,4,5-TP (Silvex)	0.5 U	NA	0.5 U	NA
2,4-D	2.5 U	NA	2.5 U	NA
2,4-DB	2.5 U	NA	2.5 U	NA
2,4-DP (Dichloroprop)	2.5 U	NA	2.5 U	NA
Dalapon	5 U	NA	5 U	NA
Dicamba	0.5 U	NA	0.5 U	NA
Dinoseb	0.5 U	NA	0.5 U	NA
MCPA	250 U	NA	250 U	NA

**Appendix D-2. Summary of Groundwater Analytical Results  
Study Area 22**

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22G00101	22H00101	22G00101D	22H00101D
Lab ID	MB172002	MB172004	MB172003	MB172005
Sampling Date	18-Jun-96	18-Jun-96	18-Jun-96	18-Jun-96
MCPP	250 U	NA	250 U	NA
<b>Explosives, ug/L</b>				
1,3,5-Trinitrobenzene	0.04 U	NA	0.04 U	NA
1,3-Dinitrobenzene	0.04 U	NA	0.04 U	NA
2,4,6-Trinitrotoluene	0.04 U	NA	0.04 U	NA
2-Amino-4,6-Dinitrotoluene	0.04 U	NA	0.04 U	NA
2-Nitrotoluene	0.08 U	NA	0.08 U	NA
3-Nitrotoluene	0.09 U	NA	0.09 U	NA
4-Amino-2,6-Dinitrotoluene	0.04 U	NA	0.04 U	NA
4-Nitrotoluene	0.09 U	NA	0.09 U	NA
HMX	0.09 U	NA	0.09 U	NA
RDX	0.08 U	NA	0.08 U	NA
Tetryl (total)	0.05 U	NA	0.05 U	NA
<b>Inorganics, ug/L</b>				
Aluminum	9450 J	NA	9380 J	NA
Antimony	2.6 U	NA	2.6 U	NA
Arsenic	1.3 U	NA	1.3 U	NA
Barium	10.2 B	NA	9.2 B	NA
Beryllium	0.17 B	NA	0.13 U	NA
Cadmium	3.3 U	NA	3.3 U	NA
Calcium	6670	NA	6260	NA
Chromium	11.9 U	NA	11.2 U	NA
Cobalt	2.5 U	NA	2.5 U	NA
Copper	8.4 U	NA	4.2 U	NA
Iron	750 J	NA	728 J	NA
Lead	3	NA	5.6	NA
Magnesium	1180 B	NA	1110 B	NA
Manganese	10 B	NA	8.6 B	NA
Mercury	0.12 U	NA	0.14 U	NA
Nickel	5.5 U	NA	5.5 U	NA
Potassium	2510 B	NA	2120 B	NA
Selenium	1.3 U	NA	1.3 U	NA
Silver	2.2 U	NA	2.2 U	NA
Sodium	4590 BJ	NA	4230 J	NA
Thallium	0.86 UJ	NA	0.86 UJ	NA
Vanadium	7.5 B	NA	6.9 B	NA
Zinc	10.5 U	NA	57.8	NA
<b>Radiological, pCi/L</b>				
Gross Alpha	6.46	NA	4.86	NA
Gross Beta	7.68	NA	9.74	NA
<b>General Chemistry, mg/L</b>				
Total Suspended Solids	23	NA	58	NA

**APPENDIX D-3**

**SUMMARY OF ANALYTICAL RESULTS IN SURFACE WATER  
ANALYTICAL RESULTS**

Appendix D-3. Summary of Surface Water Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22W00200	22W00200D	22W00300
Lab ID	G7582001	G7582002	G7582003
Sampling Date	16-May-95	16-May-95	16-May-95
<b>Volatile organics, ug/L</b>			
1,1,1-Trichloroethane	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U
Acetone	10	10	9 J
Benzene	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U
Carbon disulfide	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U
Chloromethane	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U
Methylene chloride	10 U	10 U	10 U
Styrene	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U
Toluene	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U
<b>Semivolatile organics, ug/L</b>			
1,2,4-Trichlorobenzene	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U

**Appendix D-3. Summary of Surface Water Analytical Results  
Study Area 22**

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22W00200	22W00200D	22W00300
Lab ID	G7582001	G7582002	G7582003
Sampling Date	16-May-95	16-May-95	16-May-95
2-Nitrophenol	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U
Dimethylphthalate	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U
Phenol	10 U	10 U	1 J
Pyrene	10 U	10 U	10 U

**Appendix D-3. Summary of Surface Water Analytical Results  
Study Area 22**

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22W00200	22W00200D	22W00300
Lab ID	G7582001	G7582002	G7582003
Sampling Date	16-May-95	16-May-95	16-May-95
<b>Pesticides/PCBs, ug/L</b>			
4,4'-DDD	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDE	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDT	0.1 UJ	0.1 UJ	0.1 UJ
Aldrin	0.05 UJ	0.05 UJ	0.05 UJ
alpha-BHC	0.05 UJ	0.05 UJ	0.05 UJ
alpha-Chlordane	0.05 UJ	0.05 UJ	0.05 UJ
Aroclor-1016	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1221	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1232	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1242	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1248	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1254	0.5 UJ	0.5 UJ	0.5 UJ
Aroclor-1260	0.5 UJ	0.5 UJ	0.5 UJ
beta-BHC	0.05 UJ	0.05 UJ	0.05 UJ
delta-BHC	0.05 UJ	0.05 UJ	0.05 UJ
Dieldrin	0.1 UJ	0.1 UJ	0.1 UJ
Endosulfan I	0.05 UJ	0.05 UJ	0.05 UJ
Endosulfan II	0.1 UJ	0.1 UJ	0.1 UJ
Endosulfan sulfate	0.1 UJ	0.1 UJ	0.1 UJ
Endrin	0.1 UJ	0.1 UJ	0.1 UJ
Endrin aldehyde	0.1 UJ	0.1 UJ	0.1 UJ
Endrin ketone	0.1 UJ	0.1 UJ	0.1 UJ
gamma-BHC (Lindane)	0.05 UJ	0.05 UJ	0.05 UJ
gamma-Chlordane	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor	0.05 UJ	0.05 UJ	0.05 UJ
Heptachlor epoxide	0.05 UJ	0.05 UJ	0.05 UJ
Methoxychlor	0.5 UJ	0.5 UJ	0.5 UJ
Toxaphene	5 UJ	5 UJ	5 UJ
<b>Herbicides, ug/L</b>			
2,4,5-T	2 U	2 U	2 U
2,4,5-TP (Silvex)	1.7 U	1.7 U	1.7 U
2,4-D	12 U	12 U	12 U
2,4-DB	9.1 U	9.1 U	9.1 U
2,4-DP (Dichloroprop)	6.5 U	6.5 U	6.5 U
Dalapon	58 U	58 U	58 U
Dicamba	2.7 U	2.7 U	2.7 U
Dinoseb	0.7 U	0.7 U	0.7 U
MCPA	2500 U	2500 U	2500 U
MCPP	2000 U	2000 U	2000 U
<b>Explosives, ug/L</b>			
1,3,5-Trinitrobenzene	0.05 U	0.05 U	0.05 U
1,3-Dinitrobenzene	0.03 U	0.03 U	0.03 U
2,4,6-Trinitrotoluene	0.04 U	0.04 U	0.04 U
2-Amino-4,6-Dinitrotoluene	0.04 U	0.04 U	0.04 U
2-Nitrotoluene	0.08 U	0.08 U	0.08 U
3-Nitrotoluene	0.08 U	0.08 U	0.08 U
4-Amino-2,6-Dinitrotoluene	0.04 U	0.04 U	0.04 U
4-Nitrotoluene	0.09 U	0.09 U	0.09 U
HMX	0.08 U	0.08 U	0.08 U

Appendix D-3. Summary of Surface Water Analytical Results  
Study Area 22

Screening Report  
Naval Training Center, Orlando  
Orlando, FL

Sample ID	22W00200	22W00200D	22W00300
Lab ID	G7582001	G7582002	G7582003
Sampling Date	16-May-95	16-May-95	16-May-95
RDX	0.08 U	0.08 U	0.08 U
Tetryl (total)	0.05 U	0.05 U	0.05 U
2,4-Dinitrotoluene	0.03 U	0.03 U	0.03 U
2,6-Dinitrotoluene	0.04 U	0.04 U	0.04 U
Nitrobenzene	0.05 U	0.05 U	0.05 U
<b>Inorganics, ug/L</b>			
Aluminum	232	243	122 B
Antimony	29.6 U	29.6 U	29.6 U
Arsenic	2.3 B	1.9 U	1.9 U
Barium	4.9 B	5.1 B	12.6 B
Beryllium	0.1 U	0.1 U	0.1 U
Cadmium	3.1 U	3.1 U	3.1 U
Calcium	8590	8620	8540
Chromium	3.1 U	3.1 U	3.1 U
Cobalt	2.9 U	2.9 U	2.9 U
Copper	2.6 U	2.5 U	4 U
Iron	228	226	173
Lead	2 B	1.5 U	1.5 U
Magnesium	1690 B	1700 B	1740 B
Manganese	28.5	25.3	79
Mercury	0.12 U	0.12 U	0.12 U
Nickel	14.2 U	14.2 U	14.2 U
Potassium	1540 B	1760 B	2120 B
Selenium	2.3 U	2.3 U	2.3 U
Silver	2.6 U	2.6 U	2.6 U
Sodium	4570 B	4560 B	3890 B
Thallium	1.8 U	1.8 U	1.8 U
Vanadium	2.5 U	3.3 U	2.5 U
Zinc	12 U	11.2 U	11.3 U
<b>Radiological, pCi/L</b>			
Gross Alpha	3.6	3.3	3.7
Gross Beta	5.5	4.6	4.3
<b>General Chemistry, mg/L</b>			
Alkalinity as CaCO3	20	18	20

## NOTES TO SUMMARY OF ANALYTICAL RESULTS TABLES

BRAC Environmental Site Screening Report  
Naval Training Center  
Orlando, FL

NA = Identified parameter not analyzed.

Sample ID = Sample Identifier

Lab ID = Laboratory identifier

Units:

mg/kg milligram per kilogram  
ug/kg microgram per kilogram  
mg/L milligram per liter  
ug/L microgram per liter  
pCi/L picocuries per liter

The following standard validation qualifiers are used in this Appendix.

- U The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit
- J The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.
- N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
- JN The analysis indicates the presence of a compound that has been tentatively identified, and the associated numerical value represents an estimated concentration.
- UJ The analyte/compound was not detected above the reported sample quantitation limit.  
The reported quantitation limit, however, is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte/compound in the sample.
- R The sample results are rejected because of serious deficiencies in meeting quality control criteria.

The following laboratory qualifiers are typically dropped upon validation but are retained here to provide additional information on their associated numerical values.

- B The analyte was positively identified and the associated numerical value is an estimated concentration because the detection was below the contract required detection limit (CRDL) and above the instrument detection limit.
- E The reported value for the compound exceeds the linear calibration range for that compound. Therefore, the sample have been reanalyzed at an appropriate dilution (sample identifiers ending in DL).
- D The reported value for the compound has been quantified at a secondary dilution factor. This value typically is used in favor of E qualified values. When this applies, the E qualifier are flagged ER; D qualified values that are rejected in favor of the original results are flagged DR.

**APPENDIX E**

**RESULTS OF EXPLOSIVE ORDNANCE DISPOSAL ANOMALY SURVEY**



DEPARTMENT OF THE NAVY  
EXPLOSIVE ORDNANCE DISPOSAL MOBILE UNIT SIX  
DETACHMENT MAYPORT  
MAYPORT, FLORIDA 32228-0023

8027  
Ser 008  
15 Feb 1996

From: Officer in Charge, Explosive Ordnance Disposal Mobile Unit SIX  
Detachment Mayport

To: Commander, Naval Training Center Orlando

Subj: RESULTS OF EOD ANOMALY SURVEY ISO NTC ORLANDO BRAC  
5-16 FEB 1996

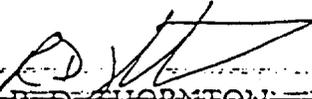
Encl: (1) Gas Well Test Site (adjacent to NTC Main Gate)  
(2) McCoy Annex Fence Line Site  
(3) McCoy Annex Pond Site

1. This detachment conducted magnetic anomaly surveys and intrusive operations at designated sites in support of NTC Orlando BRAC. Enclosures 1-3 contain specific results of excavation operations. Magnetic anomalies were initially identified by civilian contractor. Anomalies were surface marked prior to USN EOD arrival. Surface marks were found to be within plus/minus 20 feet of original survey. The marks at McCoy Annex Fence Line Site 1A (enclosure 2) were deemed unreliable by EOD and a magnetic anomaly survey was conducted of the entire area. No ordnance or ordnance like objects were detected at any of the sites (enclosures 1-3).

2. Metallic contacts were reacquired or detected using the Mk 26 Ferrous Metal Detector and MK 29 All-Metals Detector. All anomalies detected to an approximate depth of 3-4 feet were investigated. Previous testing by civilian contractor using ground penetrating radar (GPR) had identified some anomalies to depths down to 8 feet.

3. As stated, I found NO indications of buried unexploded ordnance (UXO). "Indications" would include fragmented metal, UXO components such as fuzes, fins, containers, spent shell casings, aircraft suspension components, etc. As a result of these findings I do not recommend further investigation of the anomalies that were deeper than 3-4 feet. There is NO physical evidence that any ordnance was buried or discarded at any of the sites surveyed.

4. Point of contact is myself, CWO4 Thornton, Comm: (904)270-5412, DSN: 960-5412, FAX (904) 270-6880.

  
R. D. THORNTON

Copy to:  
Base Transition Officer

## RESULTS FOR ANOMALY INVESTIGATION GAS WELL TEST SITE

1. This area, adjacent to the main gate and softball field, consisted of 430 gas test well sites and 30 magnetic anomalies. The test wells were designated by surface survey flags placed by ABB (civilian contractor). The anomalies were previously located by contractor, surface marked by contractor, and EOD was tasked with identification of anomaly.
2. All designated site were checked and anomalies unearthed, as required. NO ordnance related items were located. The majority of site was apparently an old dump area that had been covered over with dirt. Furthermore, no gases or odors were humanly detected at the excavation sites.
3. Several anomalies were not excavated due to the being detected under the adjacent parking lot. As a result of NO evidence of ordnance at throughout the survey of this area I do NOT recommend tearing up the parking lot and pursuing the excavation of the remaining anomalies.

RESULTS FOR ANOMALY INVESTIGATION  
McCOY ANNEX FENCE LINE

<u>GRID NO.</u>	<u>ITEMS FOUND</u>
4A-001	TWO TIN CANS, SMALL PIPE, SURVEYOR FLAG WIRE
4A-002	SIX INCH WHEEL AND BRACKET
4A-003	SURVEYOR FLAG WIRE
4A-004	LARGE COTTER PIN
4A-005	NOTHING FOUND
4A-006	SURVEYOR FLAG WIRE AND ALUMINUM CAN
4A-007	ONE INCH BED SPRING
4A-008	NOTHING FOUND
4A-009	ONE INCH BED SPRING
4A-010	NOTHING FOUND
4A-011	ALUMINUM CAN
4A-012	NOTHING FOUND
4A-013	ONE INCH STEEL NUT
4A-014	NOTHING FOUND
4A-015	SURVEYOR FLAG WIRE
4A-016	ALUMINUM CAN
3A-017 thru 019	SURVEYOR FLAG WIRE
3A-020	SURVEYOR FLAG WIRE AND 3 INCH PIN BY ½ INCH DIAMETER
3A-021	NOTHING FOUND
3A-022	SIX INCH BY ½ INCH METAL ROD
3A-023	NOTHING FOUND
3A-024	SURVEYOR FLAG WIRE
3A-025 thru 026	NOTHING FOUND
3A-027	TWO ALUMINUM CANS
3A-028	NOTHING FOUND
3A-029	TWO SURVEYOR FLAG WIRES AND CHUNK OF METAL
3A-030	NOTHING FOUND
3A-031	TEN INCH METAL HANDLE AND ALUMINUM CAN
3A-032 thru 035	NOTHING FOUND
3A-036	ALUMINUM CAN
3A-037	THREE BINDER FRAME AND SIX INCH PIECE OF WIRE
2A-038	SURVEYOR FLAG WIRE AND ONE INCH WIRE
2A-039	THREE ALUMINUM CANS
2A-040	STEEL CAN
2A-041	NOTHING FOUND
2A-042	SIX INCH BY ½ INCH STEEL BAR
2A-043	NOTHING FOUND
2A-044	THREE INCH STEEL (RUSTED) SCRAP

**APPENDIX F**

**TEST PIT ACTIVITIES, SEPTEMBER 6, 1996**



Tech Memo

To: Rick Allen  
cc: John Kaiser *Kaiser*  
From: Marc Hawes  
Date: September 11, 1996  
Subject: Test Pit Activities on September 6, 1996

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The following pages summarize the test pit excavation events that took place on September 6, 1996 and the anomalies encountered at those sites. A photographic log was taken and inserted into the back of this memo. Site maps are also present as Figures 1,2 & 3.

## Introduction

Following review of the results of geophysical surveys conducted during the screening investigations at study areas (SA) 17, 22 & 44, ABB-ES recommended and the NTC Orlando Partnering Team (OPT) concurred that the source for several anomalies needed to be identified.

On September 6, 1996, ABB-ES employed the services of Groundwater Protection, Inc. to excavate small test pits in the areas of the anomalies to assist in identifying them. The Groundwater Protection, Inc. crew consisted of a certified backhoe operator, Kevin Pelkey and a helper, Robert Detweiler. The backhoe that Mr. Pelkey operated was a John Deere 310D backhoe.

A decontamination pad was built for decontaminating the back hoe and Investigative Derived Waste (IDW) was contained in 55-gallon drums (Photographs 1 & 2). All personnel on site were 40-hour OSHA 29 CFR 1910.120 certified and were given a health and safety briefing. At each location, the back hoe operator was instructed to remove a trench of 6 inches of soil at a time (Photograph 3). Each bucket of soil was analyzed for volatile organic vapors with a flame-ionization detector and the results recorded in a logbook (Photograph 4).

## Study Area 44

Two anomalies were investigated at SA-44 between Building 2720 and Building 2723 at the Naval Training Center, Orlando, Orange County, Florida. Site map, Figure 1 shows the locations of the two anomalies. The area was cordoned off with caution tape to form the exclusion zone.

The first anomaly, 44TP1 was located approximately 4 feet from the southwest corner of the existing basketball court and 6 feet south of monitoring well, OLD-44-07 (Figure 1). A concrete pad was located 1 foot below level surface (bls). The pad was approximately 18 inches wide by 8 inches thick. The length of the concrete pad was not determined. The size of the excavation was approximately 8 feet wide by 10 feet long by 1 foot deep (Photographs 5). No volatile organic vapors were detected and the anomaly was identified as non-hazardous. The test pit was backfilled with the original soil (Photograph 6).

The second anomaly, 44TP2 was located approximately 10 feet southeast of monitoring well OLD-44-07 and 22 feet south of the basketball court (Figure 1). Within the first 6 inches of trenching, a three foot metal pipe, 2-inches in diameter was located (Photograph 7). The excavation continued and a concrete pad was found at 1 foot bls, resembling the concrete pad found at 44TP1. The length of the pad was not determined. The size of the excavation was approximately 5 feet by 5 feet by 1 foot deep (Photograph 8). No volatile organic vapors were detected and the anomalies were identified as non-hazardous. The test pit was backfilled with the original soil. The metal pipe was removed from the test pit, set aside and reported to the NTC Orlando Environmental Coordinator at the Public Works office.

## Study Area 17

One large anomaly needed to be identified at SA-17 southwest of building 7191 at McCoy Annex, Naval Training Center, Orlando, Orange County, Florida. The area of excavation, shown in Figure 2, was established from the geophysical investigation grid coordinates between 930E - 970E, 870N - 910N.

The first excavation, 17TP1, began at 1000E, 850N where metal debris was found on the surface (Figure 2). The excavation was clean to a depth of 3 feet. A second excavation, 17TP1a, began at 980E, 870N, just outside the anomaly boundaries (Figure 2). The excavation was also clean to a depth of 4 feet, where the water table was encountered.

The third excavation, 17TP1b, was performed inside the anomaly boundaries at 945E, 880N (Figure 2). Methane was encountered between 1 foot of excavation and 5 feet of excavation at concentrations up to 800 parts per million (ppm). Between the depths of 3 feet and 5 feet, pieces of scrap metal and wood were

encountered (Photograph 9 & 10). The trench was approximately 6 feet long, 2 feet wide and 5 feet deep. The water table was not encountered.

Another trench within the anomaly grid system was begun to confirm that the anomaly was only scrap metal and wood. The next trench, 17TP1c, was performed at 960E, 900N (Figure 2). At a depth of 3.5 feet, large pieces of wood and metal were encountered, as well as, pieces of barbed wire. The water table poured into the trench when the bucket was pulled up from a depth of 3 - 3.5 feet. The trench was approximately 6 feet long, 2 feet wide and 3.5 feet deep (Photograph 11).

Two more trenches, 17TP1d and 17TP1e, were excavated parallel to 17TP1c, four feet on center from one another (Figure 2). At location 17TP1d and 17TP1e and at a depth of 3 feet, yellow, elliptical, 1/2 inch to 3/4 inch diameter objects were encountered in mason jars (Photograph 12 & 13). The jars appeared to be 3/4 filled and unopened. Only methane was encountered with the flame-ionization detector. Five jars were found. One jar was broken and the objects were smeared together with a clayey texture. All objects were noted and not removed from the excavation. The water table was encountered at 3 feet. All trenches were backfilled (Photograph 14) and the back hoe was decontaminated.

#### Study Area 22

Two anomalies were investigated at SA-22 at McCoy Annex, Naval Training Center, Orlando, Orange County, Florida. The site map (Figure 3) shows the locations of the two anomalies.

The first anomaly, 22TP1, was excavated at 1070E - 1075E and 1300N from a previous geophysical investigation grid (Figure 3). The trench was 4 feet wide by 5 feet long and 4.5 feet deep (Photograph 15). The water table was encountered at approximately four feet. Remnants of an old tree were found. No volatile organic vapors were encountered and the anomaly was identified as not hazardous. Due to time restraints and dark clouds, the old tree was assumed to be the anomaly in question and the excavation was backfilled.

The second anomaly, 22TP2, was excavated at 1300E and 1300N (Figure 3). The anomaly was identified as an 8-inch diameter metal pipe (Photograph 16). The start of the pipe was at 1310E, 1280N and ran northwest into the lake edge at 1270E, 1310N. No volatile organic vapors were encountered and the anomaly was identified as not hazardous. The excavation was backfilled.





Photograph # 3: Backhoe taking 6-inch buckets of soil at a time.



Photograph # 4: Monitoring each bucket for volatile organic vapors with a flame-ionization detector and recording any readings.



Photograph # 5: Excavation 44TP1 facing North.



Photograph # 6: Excavation 44TP1 backfilled with original soil.



Photograph # 7: Metal pipe found at 44TP2.



Photograph # 8: Concrete pad found at 44TP2.



Photograph # 9: Wood & metal debris found at SA-17.



Photograph # 10: Wood and metal debris found at SA-17.



Photograph # 11: Trench 17TP1c.



Photograph # 12: Yellow, elliptical, 1/2 inch to 3/4 inch diameter objects encountered in mason jars.



Photograph # 13: Yellow, elliptical, 1/2 inch to 3/4 inch diameter objects encountered in mason jars.



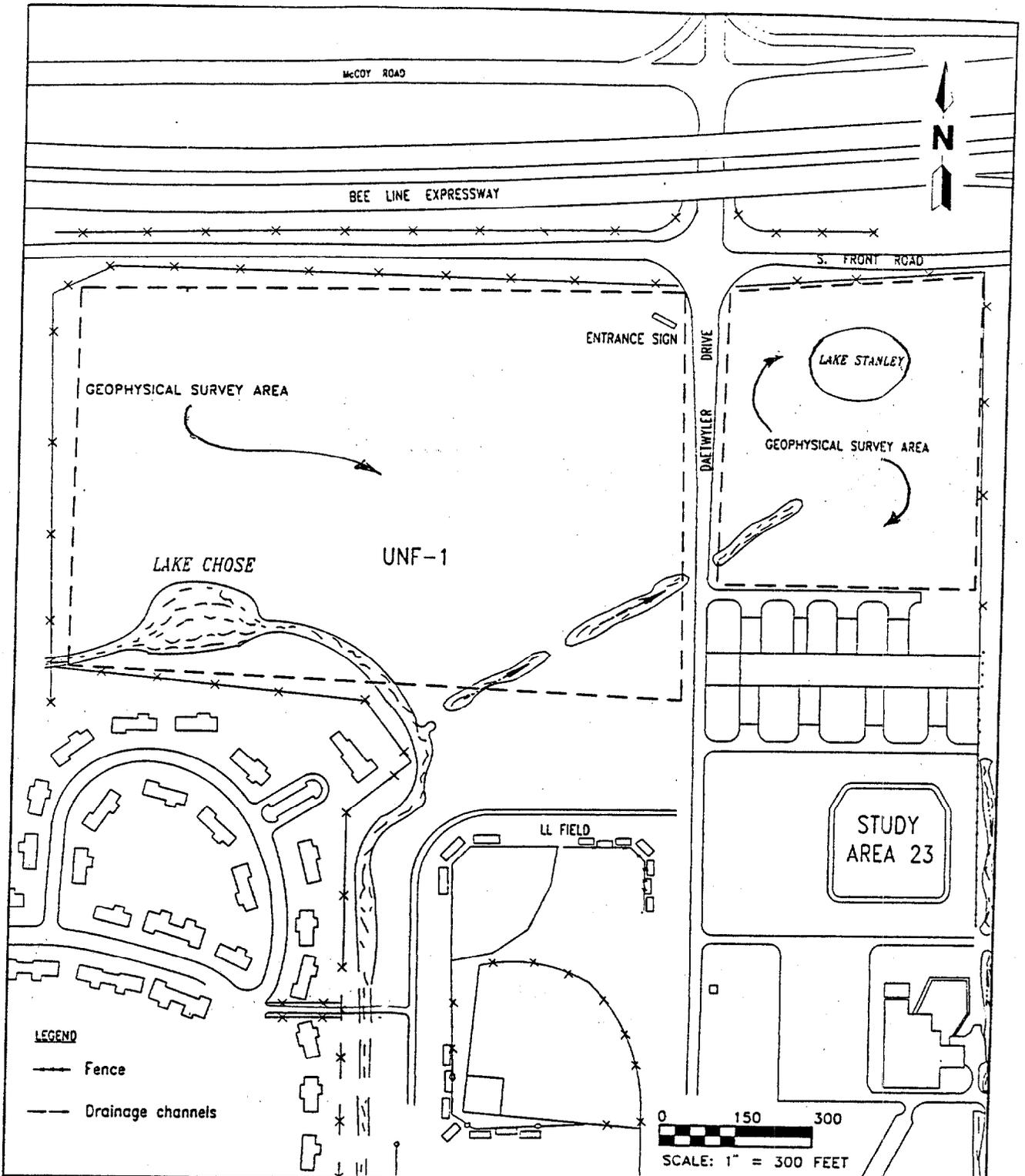
Photograph # 14: Backfilling trenches at SA-17.



Photograph # 15: Excavation at 22TP1.



Photograph # 16: Anomaly at 22TP2.



**FIGURE 1**  
**GEOPHYSICAL SURVEY AREAS**  
**MCCOY ANNEX UNF-1**  
**FORMER GOLF COURSE, STUDY AREA 22**



**SITE SCREENING**

**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDA**

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