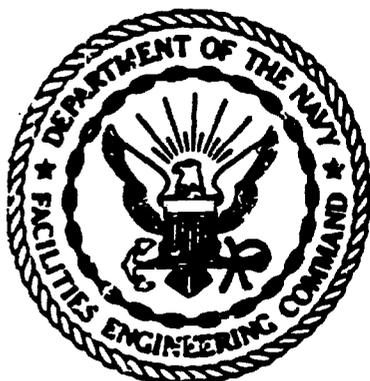


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INITIAL ASSESSMENT STUDY NTC ORLANDO FL
9/1/1985
NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY



SEPTEMBER 1985

**INITIAL ASSESSMENT STUDY OF
NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

NEESA 13-085



**NAVAL ENERGY AND ENVIRONMENTAL
SUPPORT ACTIVITY**

Port Hueneme, California 93043

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INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER, ORLANDO, FLORIDA

UIC: N65928

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September, 1985

EXECUTIVE SUMMARY

This report presents the results of an Initial Assessment Study (IAS) conducted at the Naval Training Center (NTC) Orlando, Florida. The purpose of the IAS is to identify and assess sites posing a potential threat to human health or to the environment due to contamination from past hazardous materials operations.

NTC Orlando is comprised of four areas: the Main Training Center (throughout the report is referred to as NTC); the Naval Training Equipment Center (NTEC) Annex; Area "C"; and McCoy Annex. The facilities at NTC Orlando were previously owned and operated by the Army Air Corps and by the U.S. Air Force. From 1940 to around 1947, the Army Air Corps conducted operations at NTC and Area "C" as the Orlando Air Base. Around 1947, the U.S. Air Force took command of the facilities as the Orlando Air Force Base (OAFB) headquarters of the Military Airlift Command. The most active facility at Orlando AFB was the Air Photographic and Charter Service which was responsible for photographic development of U.S. Air Force movies and still photographs. In 1968, the U.S. Air Force ceased operations at Orlando and the property was commissioned as the Naval Training Center Orlando. From around 1950 to 1974, McCoy Annex was owned and operated by the U.S. Air Force Strategic Command. From 1950 to the late 1950s, the base operated as the Pinecastle AFB. From the late 1950s to 1974, the base operated as the McCoy AFB. In 1974, NTC Orlando acquired title to McCoy AFB and renamed it McCoy Annex.

Potential migration pathways at NTC Orlando include infiltration to ground water and runoff to surface waters such as the numerous lakes in the area. Excessively drained to moderately well drained soils at NTC, NTEC Annex, and Area "C" contribute to the potential for ground water contaminant transport in these areas. Soils at McCoy Annex, however, are poorly drained resulting in greater potential of pollutant migration through the surface water route. There are two existing monitoring wells located at the McCoy Annex landfill. These wells penetrate to a minimum depth of 15 feet below ground surface. Also, recharge to the Floridan aquifer is augmented through 12 drainage wells at the main training center and Area "C". The presence of these wells may provide a route of migration of pollutants from the surface into the upper zone of the Floridan aquifer.

Based on information from historical records, aerial photographs, field inspections, and personnel interviews, a total of nine potentially contaminated sites were identified at NTC Orlando. Each site was evaluated with regard to contamination characteristics, migration pathways, and pollutant receptors.

The study concludes that while none of the sites pose an immediate threat to human health or the environment, five warrant further investigation under the Navy Assessment and Control of Installation Pollutants (NACIP) program to assess potential long-term impacts. A Confirmation Study, involving sampling and monitoring of the five sites, is recommended to confirm or deny the presence of the suspected contamination and to quantify the extent of any contamination which may exist. The five sites recommended for Confirmation Study are listed below in order of priority:

- (1) Site 9, Lake Baldwin
- (2) Site 8, Old Pesticide Building
- (3) Site 3, McCoy Annex Landfill
- (4) Site 6, DPDO McCoy Annex
- (5) Site 1, North Field Grinder Landfill

The results of the Confirmation Study will be used to evaluate the necessity of conducting remedial measures for cleanup operations.



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FOREWORD

The Department of the Navy developed the Navy Assessment and Control of Installation Pollutants (NACIP) program to identify and control environmental contamination from past use and disposal of hazardous substances at Navy and Marine Corps Installations. The NACIP program is part of the Department of Defense Installation Restoration Program, and is similar to the Environmental Protection Agency's "Superfund" program authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

In the first phase of the NACIP program, a team of engineers and scientists conducts an Initial Assessment Study (IAS). The IAS team collects and evaluates evidence of contamination that may pose a potential threat to human health or to the environment. The IAS includes a review of archival and activity records, interviews with activity personnel, and an on-site survey of the activity. This report documents the findings of an IAS at Naval Training Center (NTC) Orlando, Florida.

A total of nine sites were identified at NTC Orlando. Confirmation Studies under the NACIP program were recommended for five of the sites at NTC Orlando. Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), will assist NTC Orlando in implementing the recommendations.

Questions regarding this report should be referred to the Naval Energy and Environmental Support Activity, 112N at AUTOVON 360-3351, FTS 799-3351, or commercial (805) 982-3351. Questions regarding confirmation work or other follow-on efforts should be referred to SOUTHNAVFACENGCOM, 11422, at AUTOVON 794-5510, FTS 679-5510, or commercial (803) 743-5510.

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ACKNOWLEDGEMENTS

The Initial Assessment Study team commends the support, assistance, and cooperation provided by personnel at Naval Training Center (NTC) Orlando, Florida; Naval Energy and Environmental Support Activity (NEESA); and Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular the team gratefully acknowledges the outstanding effort provided by the following people, who participated in the successful completion of the study.

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TABLE OF CONTENTS

		<u>Page</u>
Chapter 1.	Introduction.....	1-1
1.1	Program Background.....	1-1
1.1.1	DOD Program.....	1-1
1.1.2	Navy Program.....	1-1
1.2	Authority.....	1-1
1.3	Scope.....	1-1
1.3.1	Past Operations.....	1-1
1.3.2	Results.....	1-2
1.4	Initial Assessment Study.....	1-2
1.4.1	Records Search.....	1-2
1.4.2	On-Site Survey.....	1-2
1.4.3	Confirmation Study Ranking System.....	1-2
1.4.4	Site Scoring.....	1-3
1.4.5	Confirmation Study Criteria.....	1-3
1.5	Confirmation Study.....	1-3
1.6	IAS Report Contents.....	1-3
Chapter 2.	Significant Findings and Conclusions.....	2-1
2.1.	Introduction.....	2-1
2.1.1	Hydrogeology and Migration Potential.....	2-1
2.1.2	Potential Contamination Receptors.....	2-6
2.2	Sites Recommended for Confirmation Study.....	2-7
2.2.1	Site 1, North Field Grinder Landfill.....	2-7
2.2.2	Site 3, McCoy Annex Landfill.....	2-7
2.2.3	Site 6, DPDO McCoy Annex.....	2-12
2.2.4	Site 8, Old NTC Pesticide Building.....	2-12
2.2.5	Site 9, Lake Baldwin.....	2-15
2.3	Sites Not Recommended for Confirmation Study...	2-15
2.3.1	Site 5, Old Laundry Boiler Building.....	2-15
2.3.2	Site 2, Filled WTP Lagoons.....	2-19
2.3.3	Site 4, Disposal Area Near the NTC Magazine No. 123.....	2-19
2.3.4	Site 7, Barracks Burial Area.....	2-19
Chapter 3.	Recommendations.....	3-1
3.1	Introduction.....	3-1
3.2	Confirmation Study Recommendations.....	3-1
3.2.1	Site 1, North Field Grinder Landfill.....	3-1
3.2.2	Site 3, McCoy Annex Landfill.....	3-4
3.2.3	Site 6, DPDO McCoy Annex.....	3-6
3.2.4	Site 8, Old NTC Pesticide Building.....	3-6
3.2.5	Site 9, Lake Baldwin.....	3-9
3.3	General Recommendations.....	3-9

TABLE OF CONTENTS

		<u>Page</u>
Chapter 4.	Background.....	4-1
✓ 4.1	Introductuion.....	4-1
✓ 4.1.1	Tenant/Host Relationships.....	4-1
✓ 4.1.2	Adjacent Land Use.....	4-3
✓ 4.2	History.....	4-5
✓ 4.2.1	Site History.....	4-5
✓ 4.2.2	Historical Sites.....	4-6
✓ 4.3	Legal Actions.....	4-6
4.4	Biological Features.....	4-6
4.4.1	Ecosystems.....	4-6
4.4.2	Endangered, Threatened and Rare Species.....	4-9
4.5	Physical Features.....	4-10
4.5.1	Climatology.....	4-10
4.5.2	Topography.....	4-11
✓ 4.5.3	Geology.....	4-11
4.5.4	Soils.....	4-15
✓ 4.5.5	Hydrology.....	4-15
4.6	Migration Potential.....	4-20
4.7	Water Quality.....	4-20
4.7.1	Surface Water Quality.....	4-20
4.7.2	Groundwater Quality.....	4-21
4.8	Water Supply.....	4-22
Chapter 5.	Waste Generation.....	5-1
5.1.	General.....	5-1
5.2	Industrial Operations.....	5-1
5.2.1	Industrial Shops at NTC.....	5-1
5.2.2	Industrial Shops at McCoy Annex.....	5-8
5.2.3	Industrial Shops at Area "C".....	5-10
5.3	Tenant Activities.....	5-11
5.3.1	Recruit Training Command.....	5-11
5.3.2	Service School Command.....	5-12
5.3.3	Naval Hospital.....	5-14
5.3.4	McCoy Annex Clinic.....	5-17
5.3.5	Dental Center.....	5-17
5.3.6	Naval Training Equipment Center.....	5-17
5.3.7	Navy Publishing and Printing Service Branch....	5-19
5.3.8	Naval Construction Battalion, Unit 419.....	5-19

TABLE OF CONTENTS

		<u>Page</u>
Chapter 6.	Material Handling: Storage and Transportation.....	6-1
6.1	Industrial.....	6-1
6.1.1	Naval Training Center.....	6-1
6.1.2	Naval Training Equipment Center Annex.....	6-3
6.1.3	Naval Training Center Annex.....	6-4
6.1.4	Area "C".....	6-5
6.2	Ordnance.....	6-9
Chapter 7.	Waste Processing.....	7-1
7.1	General.....	7-1
7.2	Wastewater Conveyance and Treatment.....	7-1
7.3	Solid Waste Disposal.....	7-2
7.4	Used Oil and Solvent Recycling.....	7-2
7.5	Ordnance Waste Disposal.....	7-2
Chapter 8.	Disposal Sites and Potentially Contaminated Areas.....	8-1
8.1	General.....	8-1
8.2	Site 1, North Field Grinder Landfill.....	8-1
8.3	Site 2, Filled WWTP Lagoons.....	8-8
8.4	Site 3, McCoy Annex Landfill.....	8-8
8.5	Site 4, Disposal Area near the NTC Magazine 123.....	8-11
8.6	Site 5, Old Laundry Boiler Building.....	8-13
8.7	Site 6, DPDO McCoy Annex.....	8-13
8.8	Site 7, Barracks Burial Area.....	8-13
8.9	Site 8, Old NTC Pesticide Building.....	8-17
8.10	Site 9, Lake Baldwin.....	8-17
REFERENCES.....		REF-1
APPENDIX A	Agencies Contacted During the IAS.....	A-1
APPENDIX B	Water Samples Collected and Analyzed by the Orange County Pollution Control Department from a Ditch at McCoy Annex Landfil.....	B-1
APPENDIX C	Underground Storage Tanks, NTC Orlando.....	C-1
APPENDIX D	Water Samples Collected and Analyzed by the Orange County Pollution Control Department from the Gulf Course Leachate and Pond	D-1

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
1-1	Vicinity Map - Naval Training Center Orlando, Florida.....	1-4
2-1	Location of Disposal Sites and Potential Contamination Areas, Naval Training Center Orlando, Florida.....	2-2
2-2	Location of Disposal Sites and Potential Contamination Areas, Naval Training Center Orlando, Florida.....	2-3
2-3	Site 1 - North Field Grinder Landfill.....	2-8
2-4	Site 3 - McCoy Annex Landfill.....	2-10
2-5	Site 6 - DPDO McCoy Annex.....	2-13
2-6	Site 4 - Disposal Area Near the NTC Magazine No. 123 Site 8 - Old NTC Pesticide Building.....	2-14
2-7	Site 9 - Lake Baldwin.....	2-16
2-8	Site 5 - Old Laundry Boiler Building.....	2-18
2-9	Site 2 - Filled WWTP Lagoons.....	2-20
2-10	Site 7 - Barracks Burial Area.....	2-21
3-1	Site 1 - North Field Grinder Landfill.....	3-5
3-2	Site 3 - McCoy Annex Landfill.....	3-7
3-3	Site 6 - DPDO McCoy Annex.....	3-8
3-4	Site 8 - Old NTC Pesticide Building.....	3-10
3-5	Site 9 - Lake Baldwin	3-11
4-1	Vicinity Map, Naval Training Center Orlando, Florida.....	4-2
4-2	Surrounding Land Use Map.....	4-3

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
4-3	Generalized Geologic Cross-Section at the Naval Training Center.....	4-13
4-4	Generalized Soil Map, Orange County, Florida.....	4-16
4-5	Potentiometric Surface of the Floridan Aquifer.....	4-19
6-1	DPDO Buildings and Storage Areas in Area "C"	6-6
8-1	Location of Disposal Sites and Potential Contamination Areas, Naval Training Center Orlando, Florida.....	8-2
8-2	Location of Disposal Sites and Potential Contamination Areas, Naval Training Center Orlando, Florida.....	8-3
8-3	Site 1 - North Field Grinder Landfill.....	8-4
8-4	Site 2 - Filled WWTW Lagoons.....	8-9
8-5	Site 3 - McCoy Annex Landfill.....	8-10
8-6	Site 4 - Disposal Area Near the NTC Magazine No. 123 Site 8 - Old NTC Pesticide Building.....	8-12
8-7	Site 5 - Old Laundry Boiler Building.....	8-14
8-8	Site 2 - DPDO McCoy Annex.....	8-15
8-9	Site 7 - Barracks Burial Disposal.....	8-16
8-10	Site 9 - Lake Baldwin	8-18

LIST OF TABLES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
2-1	Disposal Sites and Potentially Contaminated Areas - Naval Training Center Orlando, Florida..	2-4
2-2	Waste Disposal at Site 1, North Field Grinder Landfill, NTC Orlando, Florida.....	2-9
2-3	Waste Disposed at Site 9, Lake Baldwin.....	2-19
3-1	Summary of Confirmation Study Recommendations, Naval Training Center Orlando, Florida...	3-2
4-1	Summary of the Properties of the Geologic Formation Penetrated by Water Wells in Orange County, Florida.....	4-12
5-1	Estimated Photo Shop Waste Generation and Disposal.....	5-3
5-2	Materials Used at the Carpentry/Masonry/Painting Shop NTC Orlando.....	5-6
5-3	Pesticide Used at NTC Orlando, Florida.....	5-9
5-4	Estimated RTC Waste Generation and Disposal.....	5-13
5-5	Estimated SSC Waste Generation and Disposal.....	5-15
5-6	Estimated Naval Hospital Waste Generation and Disposal.....	5-16
5-7	Estimated Dental Clinic Waste Generation and Disposal.....	5-18
5-8	Estimated Publishing/Printing Service Branch Waste Generation and Disposal.....	5-20
6-1	Pesticide Usage for 1970.....	6-2
8-1	Disposal Sites and Potentially Contaminated Areas - Naval Training Center Orlando.....	8-5
8-2	Waste Disposed at Site 1, North Field Grinder Landfill.....	8-7
8-3	Wastes Disposed at Site 9, Lake Baldwin.....	8-19

CHAPTER 1. INTRODUCTION

1.1 PROGRAM BACKGROUND. Past hazardous waste disposal methods, although acceptable at the time, have often caused unexpected long-term problems through release of hazardous pollutants into the soil and ground water. In response to increasing national concern regarding these problems, Congress directed the Environmental Protection Agency (EPA) to develop a comprehensive national program to manage past disposal sites. The program is outlined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of December 1980.

1.1.1 DOD Program. Department of Defense (DOD) efforts in this area preceded the nationwide CERCLA program. In 1975, the U.S. Army developed for DOD a pilot program to investigate past disposal sites at military installations. DOD defined the program as the Installation Restoration Program in 1980, and instructed the services to comply with program guidelines.

1.1.2 Navy Program. The Navy manages its part of the program, the Navy Assessment and Control of Installation Pollutants (NACIP), in three phases. Phase one, the Initial Assessment Study (IAS), identifies disposal sites and contaminated areas caused by past hazardous substance storage, handling, or disposal practiced at naval activities. These sites are then individually evaluated with respect to their potential threat to human health or to the environment. Phase two, the Confirmation Study, verifies or characterizes the extent of contamination present and provides additional information regarding migration pathways. Phase three, Remedial Measures, provides the required corrective measures to mitigate or eliminate confirmed problems.

1.2 AUTHORITY. The Chief of Naval Operations (CNO) initiated the NACIP program in OPNAVNOTE 6240 of 11 September 1980, superseded by OPNAVINST 5090.1 of 26 May 1983. Commander, Naval Facilities Engineering Command (COMNAVFACENGCOM), manages the program within the existing structure of the Naval Environmental Protection Support Service (NEPSS) which is administered by the Naval Energy and Environmental Support Activity (NEESA). NEESA conducts the program's first phase, the IAS, in coordination with COMNAVFACENGCOM Engineering Field Divisions (EFDs). Activities are selected for an IAS by CNO, based on recommendations by COMNAVFACENGCOM, the EFDs, and NEESA. Approval of the Naval Training Center (NTC) Orlando, Florida for an IAS is contained in CNO letter ser. 451/4U383534 of 26 March 1984.

1.3 SCOPE

1.3.1 Past Operations. The NACIP program focuses attention on past hazardous substance storage, use, and disposal practices on Navy property. Current practices are regularly surveyed for conformity to state and federal regulations and, therefore, are not included in the scope of the NACIP program. The IAS report addresses operational nonhazardous disposal and

storage areas only if they were hazardous waste disposal or storage areas in the past. Current operations are investigated solely to determine what types and quantities of chemicals or other materials were used and what disposal methods were practiced in the past.

1.3.2 Results. If necessary, an IAS recommends remedial measures to be performed by the activity or EFD, or recommends Confirmation Studies to be administered by the EFD under the NACIP Program. Based on these recommendations, COMNAVFACENGCOM schedules Confirmation Studies for those sites which have been determined by scientific and engineering judgement to be potential hazards to human health or to the environment.

1.4 INITIAL ASSESSMENT STUDY

1.4.1 Records Search. The IAS begins with an investigation of activity records followed by a records search at various government agencies including EFDs, national and regional archives and records centers, and U.S. Geological Survey offices. In this integral step, study team members review records to assimilate information about the activity's past mission, industrial processes, waste disposal records, and known environmental contamination. Examples of records include activity master plans and histories, environmental impact statements, cadastral records, and aerial photographs. Appendix A lists the agencies contacted during this study.

1.4.2 On-Site Survey. After the records search, the study team conducts an on-site survey to complete documentation of past operations and disposal practices and to identify potentially-contaminated areas. With the assistance of an activity point-of-contact, the team inspects the activity during ground and aerial tours, and interviews long-term employees and retirees. The on-site survey for NTC Orlando was conducted from 25 February to 1 March 1985; information in this report is current as of those dates.

Information obtained from interviews is verified by data from other sources or from corroborating interviews before inclusion in the report. If information for certain sites is conflicting or inadequate, the team may collect samples for clarification. No samples were collected at the Naval Training Center during the IAS.

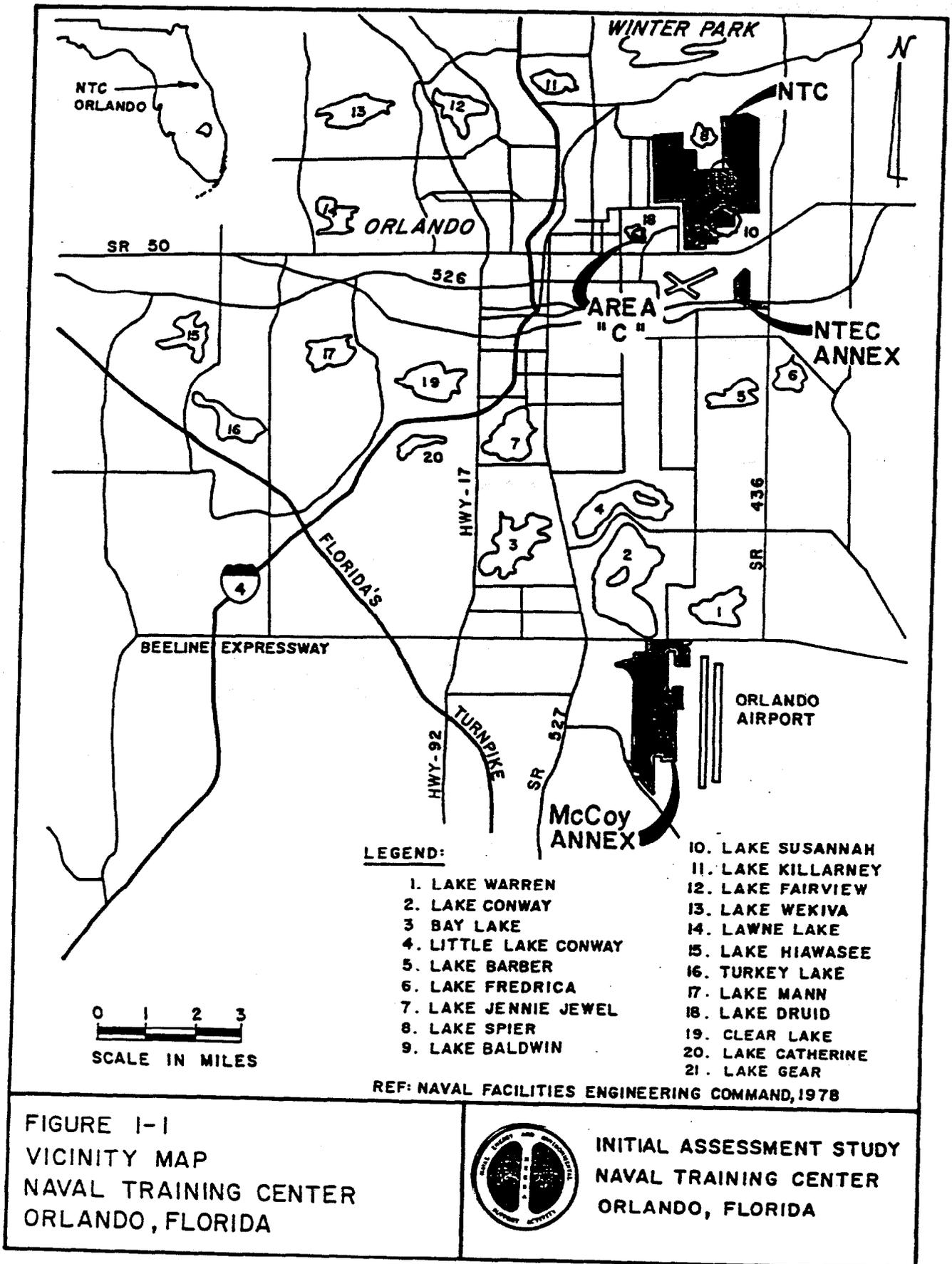
1.4.3 Confirmation Study Ranking System. With information collected during the study, team members evaluate each site for its potential hazard to human health or to the environment. A two-step Confirmation Study Ranking System (CSRS) developed at NEESA is used to systematically evaluate the relative severity of potential problems. The two steps of the CSRS are a flowchart and numerical ranking model. The first step is a flowchart based on type of waste, containment, and hydrogeology. This step eliminates innocuous sites from further consideration. If the flowchart indicates a site poses a potential threat to human health or to the environment, the second step, the model, is applied. This model assigns a numerical score from 0 to 100 to each site. The score reflects the characteristics of the wastes, the potential migration pathways from the site, and possible contaminant receptors on and off the activity.

1.4.4 Site Scoring. After scoring a site, engineering judgment is applied to determine the need for a Confirmation Study or for immediate remedial measures. At sites recommended for further work, CSRS scores are used to rank the sites in a prioritized list for scheduling project. For a more detailed description, refer to NEESA 20.2-042, Confirmation Study Ranking System.

1.4.5 Confirmation Study Criteria. A Confirmation Study is recommended for sites at which (1) sufficient evidence exists to indicate the presence of contamination and (2) the contamination poses a potential threat to human health or to the environment.

1.5 CONFIRMATION STUDY. Generally, the EFD conducts the Confirmation Study in two phases—verification and characterization. In the verification step, short-term analytical testing and monitoring determines whether specific toxic and hazardous materials, identified in the IAS, are present in concentrations considered to be hazardous. Normally, the IAS recommends verification phase sampling and monitoring. The design of the characterization phase usually depends on results from the verification phase. If required, a characterization phase, using longer-term testing and monitoring, provides more detailed information concerning the horizontal and vertical distribution of contamination migrating from sites, as well as site hydrogeology. If sites require remedial measures or additional monitoring programs, the confirmation study recommendations include the necessary planning information for the work, such as design parameters.

1.6 IAS REPORT CONTENTS. In this report, the significant findings and conclusions from the IAS are presented in Chapter 2. Recommendations are presented in Chapter 3. Chapter 4 describes general activity information, history, biology, and physical features. Chapters 5 through 8 trace the use of chemicals and hazardous materials from storage and transfer, through manufacturing and operations, to waste processing and disposal. The latter chapters provide detailed documentation to support the findings and conclusions in Chapter 2. Figure 1-1 shows the location of the Naval Training Center Orlando, Florida.



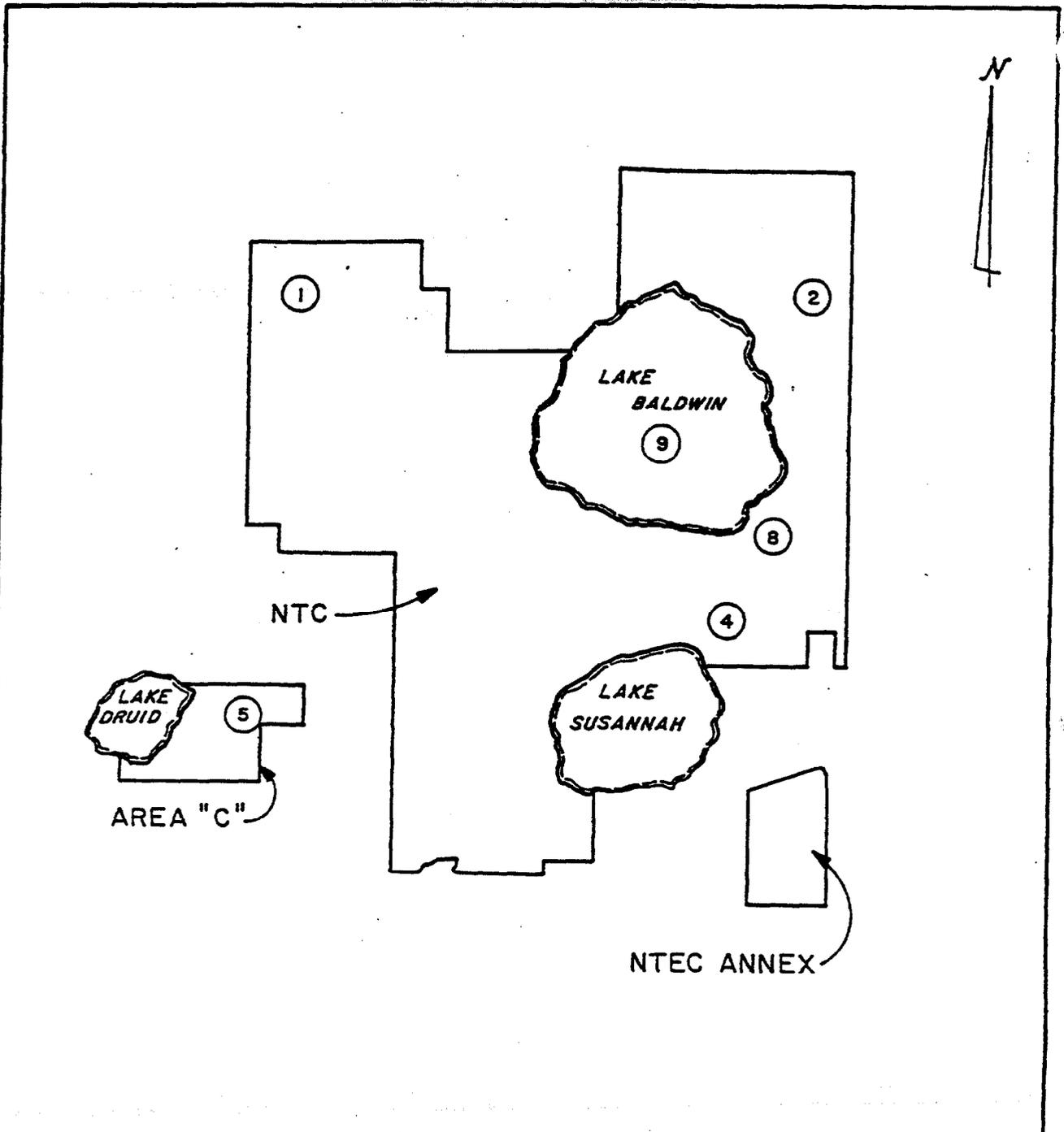
CHAPTER 2. SIGNIFICANT FINDINGS AND CONCLUSION

2.1 INTRODUCTION. This chapter summarizes the significant findings and conclusions of the Initial Assessment Study (IAS) team regarding the potential contamination pathways, the potential contaminant receptors, and other characteristics of the waste disposal and spill sites identified at NTC Orlando Complex. Nine disposal and spill sites at NTC Orlando were identified during the IAS. Of these nine sites, five (Site 1, 3, 6, 8, and 9) require a Confirmation Study because they pose a potential threat to human health or to the environment. Figures 2-1 and 2-2 identify the locations of the nine sites at NTC Orlando and a summary of their characteristics is found in Table 2-1.

2.1.1 Hydrogeology and Migration Potential. NTC Orlando is divided into four major areas: NTC, NTEC Annex, Area "C", and McCoy Annex. These areas are shown on Figures 2-1 and 2-2. NTC slopes from an elevation of 130 feet above mean sea level (m.s.l.) at the Recruit Training Command to 91 feet above m.s.l. at Lake Baldwin. Surface water from NTC primarily discharges into Lakes Susannah and Baldwin. These lakes discharge six miles southeast of NTC into the Little Econolockhatchee River which is a tributary of St. John's River. Area "C" slopes east to west from elevation 114 feet above m.s.l. to approximately 100 feet above m.s.l. The area gently slopes to Lake Druid in the northwest corner. The terrain at McCoy Annex is essentially flat, sloping gently from north to south, with little change in grade. The elevation is approximately 90 feet above m.s.l. Surface water flows south into the Boggy Creek Drainage basin which drains about four miles south of the Annex into the Kissimee River.

NTC, NTEC Annex and Area "C" are dominated by the presence of excessively drained to moderately well drained soils. McCoy Annex is dominated by the presence of poorly drained soils. Average annual rainfall at NTC Orlando Complex is 51 inches.

Ground water at NTC Orlando Complex occurs under three different conditions, in three aquifers: the water table, secondary artesian, and principal artesian or Floridan aquifer. The water table aquifer extends approximately 40 feet below land surface and is mainly composed of quartz sand with varying amounts of clay and shell. The secondary artesian aquifer underlies the water table aquifer within the clayey confining beds of the Hawthorn Formation. The secondary aquifer consists of discontinuous shell beds, thin limestone lenses or permeable sand with some gravel. This aquifer generally is found at depths ranging from 60 to 150 feet below land surface. The low-permeability sediments of the Hawthorn formation also comprise the confining deposits which retard vertical movement of water and hydraulically separate the surficial aquifer from the underlying Floridan aquifer. The Floridan aquifer underlies the secondary artesian aquifer consisting of two primary water-producing zones; the upper zone, from 150 to 600 feet below land surface, and the lower zone from 1000 to 1500 feet below land surface.



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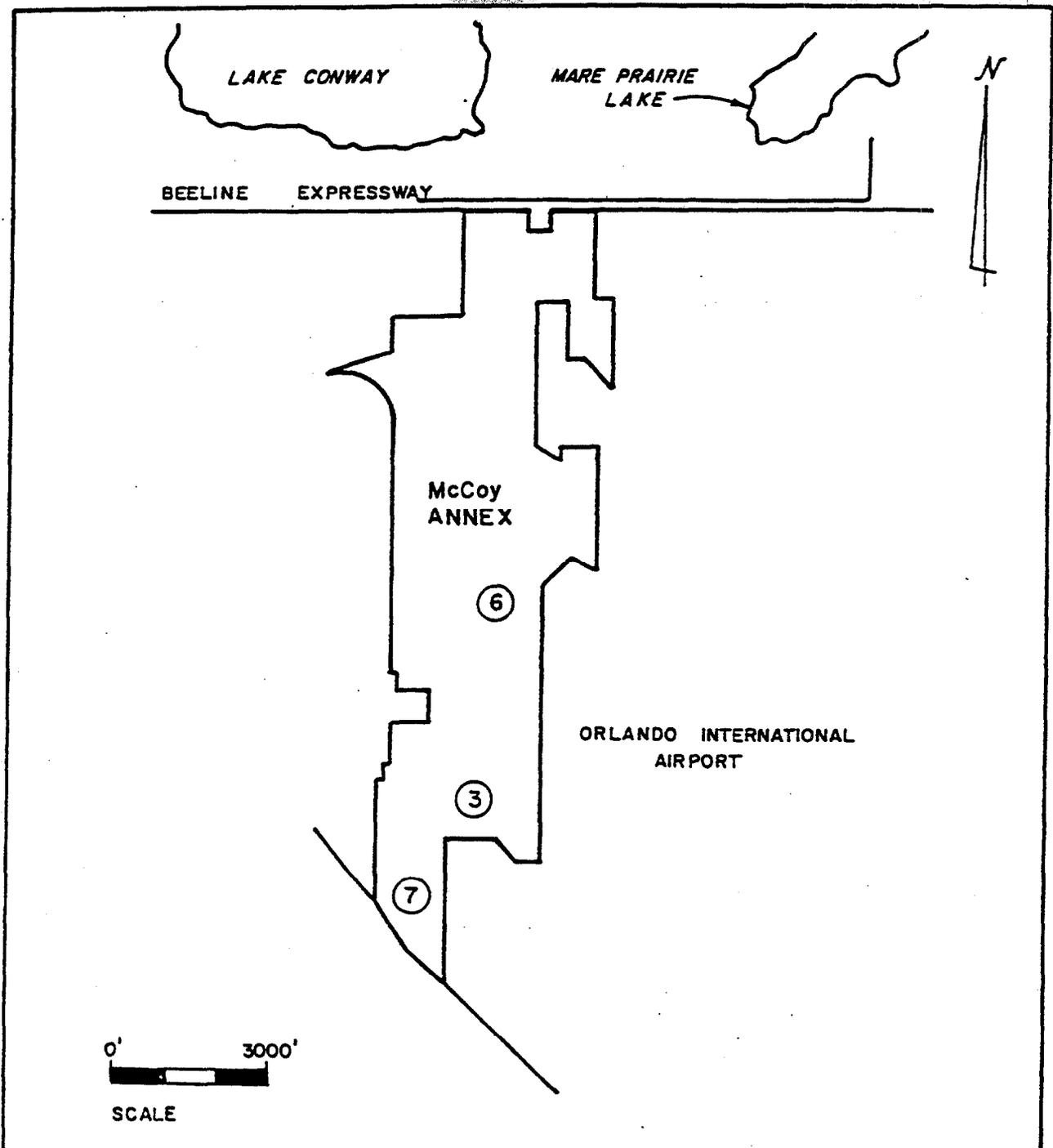
LEGEND

REF: NAVAL FACILITIES ENGINEERING COMMAND, 1978 (4) DENOTES DISPOSAL SITES

FIGURE 2-1
 LOCATION OF DISPOSAL SITES
 AND POTENTIAL CONTAMINATION
 AREAS, NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



LEGEND

REF: NAVAL FACILITIES ENGINEERING COMMAND, 1978 (7) DENOTES DISPOSAL SITES

FIGURE 2-2
 LOCATION OF DISPOSAL SITES
 AND POTENTIAL CONTAMINATION
 AREAS, NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

TABLE 2-1

DISPOSAL SITES AND POTENTIALLY CONTAMINATED AREAS -
NAVAL TRAINING CENTER ORLANDO, FLORIDA

AREA OF CONCERN	PERIOD OF OPERATION	TYPES OF WASTES DISPOSED OR SPILLED	GENERAL DEVELOPMENT MAP COORDINATES	COMMENTS
Site 1 North Field Grinder Landfill	1958-1967	Photochemicals, film, paint thinner, garbage, biological wastes and syringes from hospital, paper, plastic, tree limbs, construction materials, perchloroethylene	C-3,4	Trench and fill operation by Air Force covering 15 acres
Site 2 Filled WWTP Lagoons	1977-1978	WWTP sludge, tree limbs, yard wastes, dirt, sand, asphalt, demolished building debris, stainless steel mixing tank	J-3,4	Lagoons were part of a 35,000 to 50,000 gpd WWTP
Site 3 McCoy Annex Landfill	1960-1978	Photochemical wastes, paint, paint thinners, plastics, trees, construction wastes, surgical wastes, cable, airplane parts, oil, transformers	J, K, L-4, 5, 6	This landfill was operated by the Air Force and Navy and is under the golf course at McCoy Annex
Site 4 Disposal Area Near the NTC Magazine No. 123	1968-1969	Yard wastes (tree limbs, grass clippings)	I-7	Site was a pit 30 feet in diameter and 8 to 9 feet deep

TABLE 2-1 (Continued)

DISPOSAL SITES AND POTENTIALLY CONTAMINATED AREAS -
 NAVAL TRAINING CENTER ORLANDO, FLORIDA

AREA OF CONCERN	PERIOD OF OPERATION	TYPES OF WASTES DISPOSED OR SPILLED	GENERAL DEVELOPMENT MAP COORDINATES	COMMENTS
Site 5 Old Laundry Boiler Building	Closed in 1972, demolished in 1979	Asbestos containing materials	B-6	Building housed boilers for the laboratory
Site 6 DPDO McCoy Annex	At least 1984	Oil, anti-freeze, transmission and hydraulic fluid	G-4	Contaminants leaked from drums stored in the DPDO yard
Site 7 Barracks Burial Area	1968	Building debris	L-6	Demolished barracks were bulldozed into a quarry at southwestern end of McCoy Annex
Site 8 Old NTC Pesticide Building	Early 1950s to 1972	Pesticides	J-6	Insecticide storage, mixing and container and equipment cleaning took place here
Site 9 Lake Baldwin	Early 1950s to 1978	Film processing chemicals	G-6	Film processing chemicals were discharged from the photo shop directly to Lake Baldwin

2-5

X

The lower zone is the major productive high yielding zone for the Floridan aquifer at NTC Orlando. Although the potential for downward movement of ground water exists at NTC Orlando, ground water movement is primarily lateral through the surficial aquifer as vertical movement is impeded by underlying clayey sediments.

At McCoy Annex, bailing tests have been performed to determine the permeability of the surficial aquifer. The results indicate the permeability ranges from 0.1-4.5 feet per day and averages 2.8 feet per day. Vertical permeability has been found to average 5.1 feet per day (Geraghty and Miller, 1984). The transmissivity for the secondary artesian aquifer is reported to be 31,000 gallons per day per foot. The upper zone of the Floridan aquifer has a transmissivity which ranges between 270,000 and 596,000 gallons per day per foot and the lower zone has a transmissivity of between 4,300,000 and 5,000,000 gallons per day per foot (Boyle Engineering Corporation, 1982a). In general, the secondary artesian aquifers yields less water than the underlying Floridan aquifer, but more than the overlying water table aquifer.

The potential migration pathways at NTC Orlando are ground water movement and surface water runoff to ponds, lakes and streams. At NTC Orlando, the water table aquifer is 70 feet thick consisting mostly of quartz sands. The composition of the aquifer along with the abundant rainfall at NTC Orlando provide recharge to the water table aquifer. The presence of pollutants on the surface could potentially migrate vertically downwards along with the recharging water thereby posing a threat to contaminate the water table aquifer. There are two existing monitoring wells located at the McCoy Annex landfill (see Figure 2-4). The wells are constructed of 2-inch PVC casing with five feet of PVC screen and penetrate to a minimum depth of 15 feet below the ground surface. Also, recharge to the Floridan aquifer is augmented through 12 drainage wells at the main training center and Area "C." The exact locations of the wells are not known. The presence of these wells may provide a route of pollutant migration from the surface into the upper zone of the Floridan aquifer. Additionally, surface water drainage at NTC and McCoy Annex is directed to small lakes that are used for fishing and recreation on the activity. The most likely pathways of surface water discharge to activity lakes is through small intermittent streams and the storm drainage system.

2.1.2 Potential Contaminant Receptors. Potable water used at NTC Orlando Complex is supplied from both the Orlando Utilities Commission (OUC) and Winter Park Utilities. Water supplied for these systems is received from wells penetrating the lower and upper zones of the Floridan aquifer. The OUC owns and operates a supply well at the southeast corner of NTC; this well is 1,400 feet deep (SOUTHNAVFACENCOM, 1978). Two large lakes, Baldwin and Susannah are maintained at the activity for fishing and recreation purposes. These lakes are also a source of fish and wildlife habitat, none of which are known as endangered or threatened species. All surface waters in the

vicinity of the activity, including Lakes Baldwin and Susannah, are classified as Class III waters suitable for fish and wildlife propagation and water contact sports by the State of Florida. If any contaminants are present, the possibility exists for migration from disposal sites into Lakes Baldwin and Susannah and into ground water. Therefore, potential receptors include humans through direct contact during recreational activities and through potential infiltration into the water table aquifer or the Floridan aquifer. Fish and wildlife using these surface waters are also potential receptors. However, there are no known endangered or threatened species using the lakes on Navy property at the Orlando Complex.

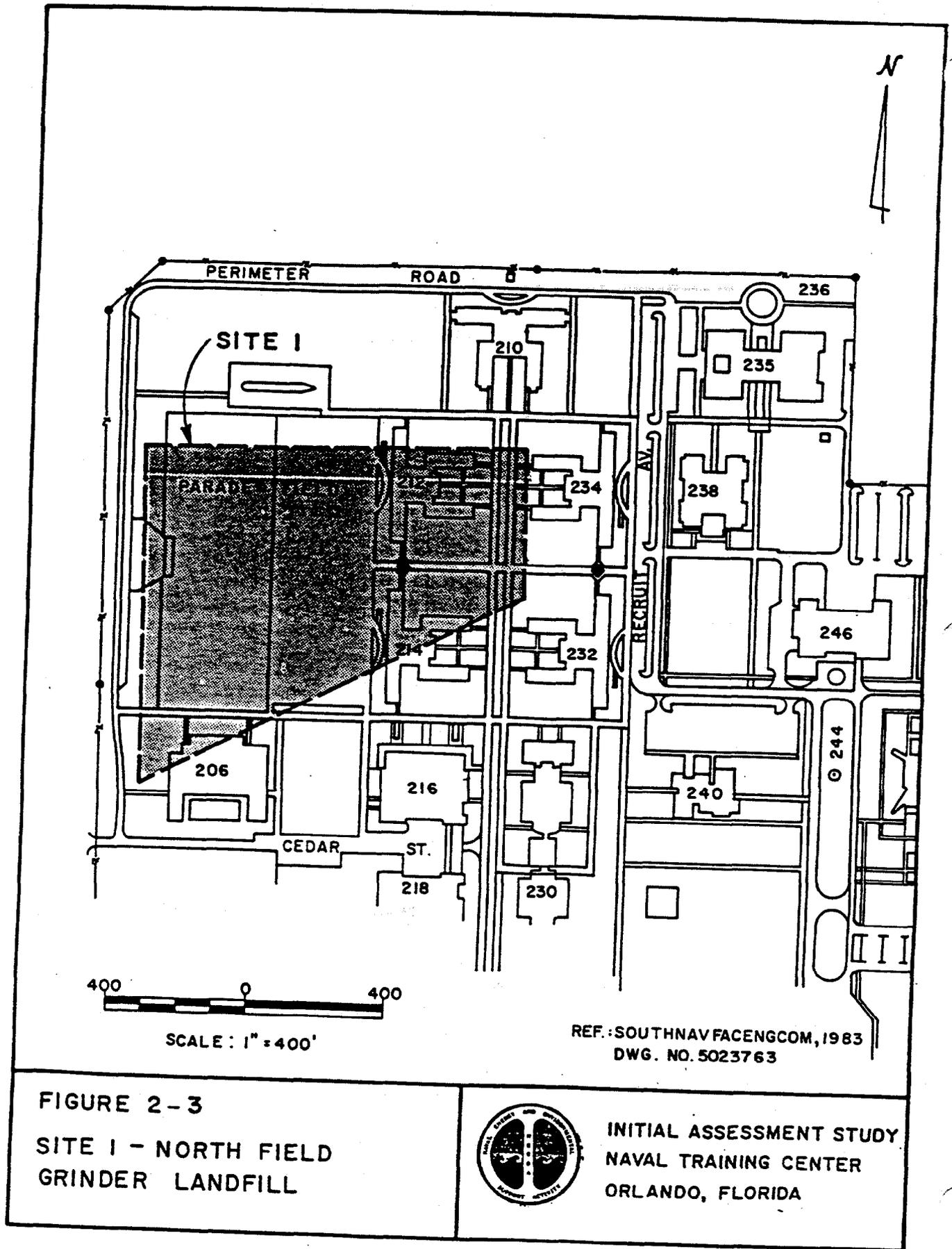
2.2 CONFIRMATION STUDY RECOMMENDATIONS. The following are brief descriptions of the five sites recommended for Confirmation Study.

2.2.1 Site 1, North Field Grinder Landfill. This site, located at NTC, is mainly under an asphalt paved area known as the "grinder" parade area (see Figure 2-3). The site was originally wooded when landfilling operations were started by the Air Force in 1958. The landfill reportedly covered 15 acres and extended eastward just beyond the area now occupied by Buildings 212 and 214. When construction began on the buildings in 1967, the landfill was closed. Wastes reportedly disposed in the landfill include film, photographic chemicals, paint thinner, garbage from mess halls, cardboard boxes, biological wastes and syringes from the hospital, paper, plastic, tree limbs and construction materials. Reportedly, no 55-gallon drums were disposed of in the landfill. The quantity of waste disposed of is estimated at 194,000 cubic yards (see Table 2-2), approximately one-third of which was removed during the construction of Buildings 212 and 214.

Because the soils are sandy and well drained, the potential for ground water contamination to the water table aquifer exists. The water table aquifer at NTC ranges from 3 to 9 feet below land surface. Based on the topography, the inferred direction of ground water flow in the water table aquifer at NTC from Site 1 is north-northeast toward Lakes Virginia, Berry, and Spier. Also, surface water runoff from the site drains to Lake Spier, approximately 1300 feet to the east.

Based on the hazardous nature of the waste buried in the landfill including photographic chemicals, paint thinner, perchloroethylene, and biological wastes, and possible contamination pathways to surface and ground waters, a Confirmation Study is recommended for Site 1.

2.2.2 Site 3, McCoy Annex Landfill. This site is an inactive landfill of approximately 99 acres located in the southern portion of McCoy Annex (see Figure 2-4). A golf course now occupies much of the site; the remaining area supports fields of grass, forest and low brush. The western portion of the landfill was reportedly used by the Air Force from about 1960 to 1972, while the eastern portion was used by the Air Force and the Navy from 1972 until about 1978. Landfill operations consisted of excavating ditches (100 to 200 feet long by 20 to 25 feet wide by 10 to 15 feet deep) into which wastes were disposed from trucks. Trenches were filled with waste to within three or



REF: SOUTHNAVFACENCOM, 1983
 DWG. NO. 5023763

FIGURE 2-3
 SITE I - NORTH FIELD
 GRINDER LANDFILL



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

TABLE 2-2

WASTE DISPOSED AT SITE 1, NORTH FIELD GRINDER LANDFILL
NTC ORLANDO, FLORIDA

<u>WASTE</u>	<u>SOURCE OF WASTE</u>	<u>TIME PERIOD</u>	<u>ESTIMATED TOTAL QUANTITY (Gallons)</u>
Photochemicals:	Air Force Photo Shop	1958-1967	
Developer			200 ¹
Fixer			1500 ¹
Developer Replenisher			300 ¹
Activator			900 ¹
Acetic Acid			100 ¹
Bleach Fix			100 ¹
E-4 Process Chemical			300 ³
Stabilizer			Less than 100 ¹
Film	Air Force Photo Shop	1958-1967	Unknown
Paint Thinner	Carpentry/Masonry/Painting Shop	1958-1967	Less than 100 ²
Garbage, paper, plastic, tree limbs, construction materials	General Activity Operations	1958-1967	194,000 cubic yards
Biological wastes, syringes	Hospital	1958-1967	Unknown
Perchloroethylene Still Bottoms	Laundry	1958-1967	2700

¹Quantities of photochemicals are based on 5 percent of estimated Photo Shop Waste Generation and Disposal (Table 5-1) which is the assumed residual in waste containers disposed at Site 1 (Rounded to nearest 100 gallons). These numbers should be considered very rough estimates.

²Quantity of paint thinner based on 5 percent of quantity assumed to be used during time landfill was in operation (which was extrapolated from annual quantities used since 1968).

³Quantity based on dimensions at site.

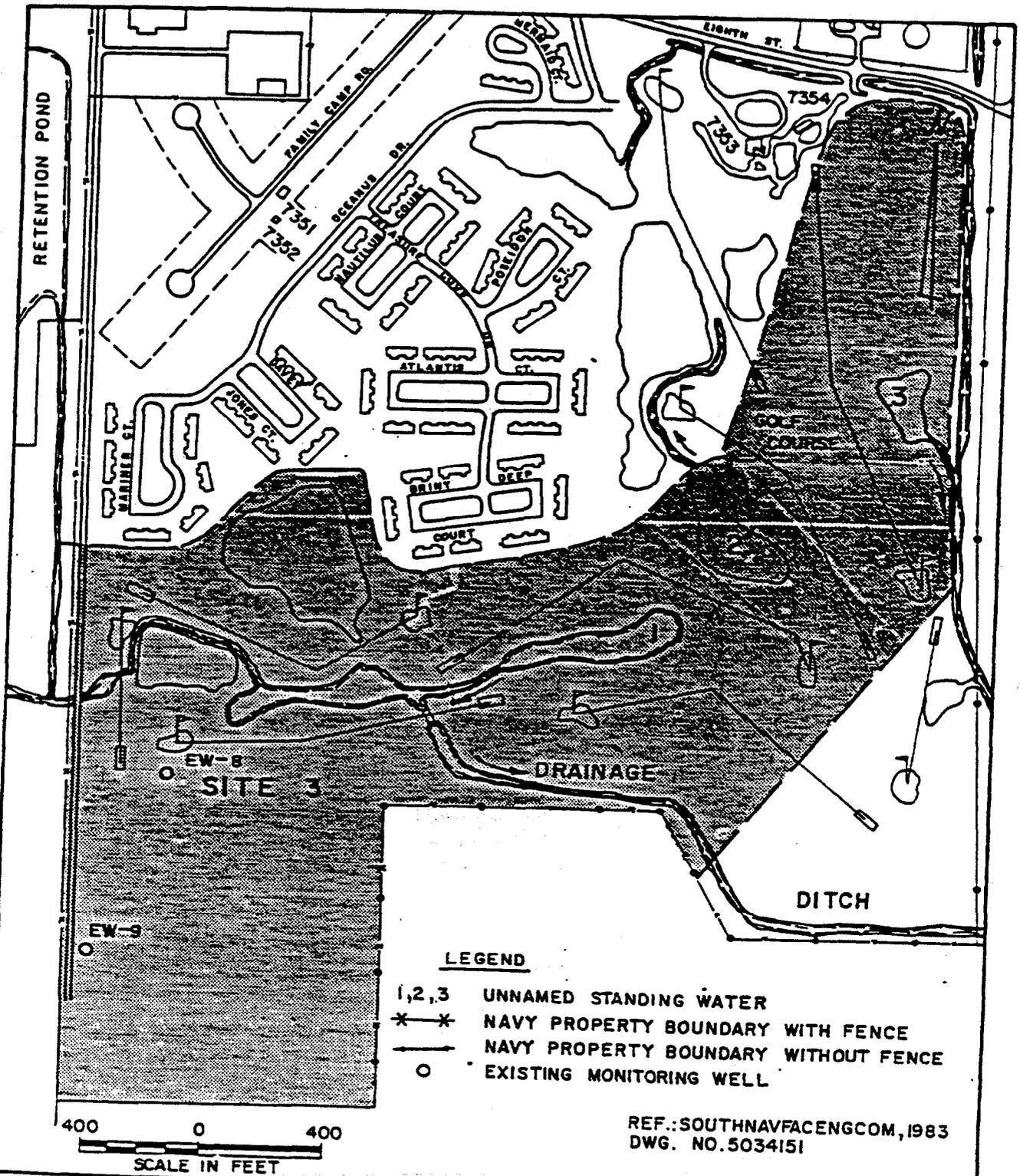


FIGURE 2-4
SITE 3 - McCOY ANNEX
LANDFILL



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

four feet of the ground surface and then backfilled with topsoil and seeded. Reportedly, wastes disposed in the landfill included unknown quantities of paint and paint thinner, asbestos, transformers (possibly with transformer oil containing polychlorinated biphenyls), hospital wastes (including syringes, dressings, blood and urine samples), low-level radiological waste (from Air Force operations) automobile batteries, steel cable, airplane parts, bricks, fire hoses, parachutes, trees, leaves, paper, plastic, scrap wood, scrap metal and sections of pipe, and possibly waste oil. It is unknown if the transformers and batteries were drained or full.

Reportedly, occasional waste burning took place in the trenches at the landfill. It is estimated that over 1,000,000 cubic yards of waste could have been deposited in the landfill. In late 1981, the presence of buried waste was discovered while relocating a drainage canal during construction of the McCoy Annex golf course. Upon inspection of the relocated drainage canal, the Florida Department of Environmental Regulation (DER) observed refuse protruding from the banks of the canal and leachate entering the water in the ditch. Surface water samples were collected by the Orange County Pollution Control Department (currently known as the Orange County Environmental Protection Department) in late 1981 from a relocated canal which ran through the proposed golf course site. The results of sample analyses indicate concentrations of greater than 17 parts per million of iron and 54 parts per billion of mercury (see Appendix B). No State standards exist for these metals in the general criteria for surface water (DER, 1983). Results of the sampling also showed conductivity and total solids concentrations ranging from 135 to 600 micromhos and from 63 to 317 mg/l respectively, further indicating surface water contamination.

There are two existing monitoring wells located at the McCoy Annex landfill (See Figure 2-4). The wells are constructed of 2-inch PVC casing with 5 feet of PVC screen and penetrate to a minimum depth of 15 feet below the ground surface. The depth and construction details of these wells make them unsuitable for monitorings (Geraghty and Miller, 1984).

Surface water from the landfill flows through the drainage canal and retention ponds and discharges to Boggy Creek and Boggy Creek Swamp which are located south of the landfill. Chemical analysis and visual observations of the waters in the retention ponds and canal indicate that wastes in the landfill are probably polluting Boggy Creek and Boggy Creek Swamp. Because the soils in the area are sandy and well-drained, the potential for contamination of the water table exists.

Based on the disposal of hazardous wastes, including asbestos, transformers (possibly with transformer oil containing PCB), and hospital wastes, and because migration pathways to Boggy Creek, Boggy Creek Swamp and ground water exist, Site 3 is recommended for Confirmation Study.

2.2.3 Site 6, DPDO McCoy Annex. This site is an unpaved area measuring 30 feet by 6 feet in the southeastern section of the DPDO yard at McCoy Annex (see Figure 2-5). Since at least 1984, this area was used for storing 73, 55-gallon drums containing chemical waste. The drums were in various stages of deterioration; at least one was completely corroded. During the IAS on-site survey, no labels or markings were observed on any of the deteriorating drums. Reportedly, the drums contained used motor oil, antifreeze and hydraulic fluid (possibly containing polychlorinated biphenyls). However, one drum was marked "Soilax Liquid 'S' Plus, Multipurpose Cleaner". This cleaning compound composed of sodium hydroxide and 2-Butoxy ethanol. Another drum was marked "Paint Thinning Liquid." During the IAS on-site survey, 66 of the 73, 55-gallon drums (reportedly empty) had been relocated on the paved area approximately 50 feet away from where the spill occurred and were covered with a tarpaulin. Of these 66 drums, at least one contained liquid, and two others showed stains from leakage on the outsides. The contents were not identified on these drums. The remaining seven had been moved to Building 7193. Quantities of material spilled are estimated to range from 1000 to 4000 gallons.

The soil at the site was stained to a depth of two to three inches. There was also much less vegetation growing on the site than on its surroundings. Due to the permeable nature of the soils, contamination of the water table aquifer is possible. Because of the hazardous types of wastes spilled and due to permeable sandy soils, Site 6 is recommended for a Confirmation Study.

2.2.4 Site 8, Old NTC Pesticide Building. This site is the location of the demolished pesticide building that was located adjacent to the golf course along Trident Lane (Figure 2-6). The building, which measured 15 feet wide by 30 feet long, was the storage, mixing and cleaning area for all pest control operations on the activity from the early 1950s to 1972. The Orlando Air Force Base operated the pest control building from the early 1950s through 1969. NTC used the pesticide building from 1969 to 1972. Pesticides were mixed in containers on the ground near the building and reportedly spills may have occurred. Reportedly, remaining pesticides were in the building when it was demolished and covered with sandy soil in about 1981. Rinse water used to clean empty pesticide containers was discharged to a drain in the building which was connected to a gravel sump. Reported pesticides used include chlordane, and phenyl mercuric compounds. Baygon, diazinon, anticoagulant, malathion, pyrethrum, diron, 2-4,D and monuron were also used and stored at the building (NAVFACENCOM, 1970). The estimated quantity of pesticides buried at the site is 300 gallons. It is assumed that useable chemicals not buried at the site were moved to the new building.

The soil at the site is sandy. Based on topography, the surface drainage appears to be in the direction of the nearby drainage canal that drains to Lake Baldwin. The lake is maintained for recreational purposes and as a fish and wildlife habitat.

Because of the type and estimated quantity of pesticides disposed of and due to the migration pathways to surface and ground water, Site 8 is recommended for a Confirmation study.

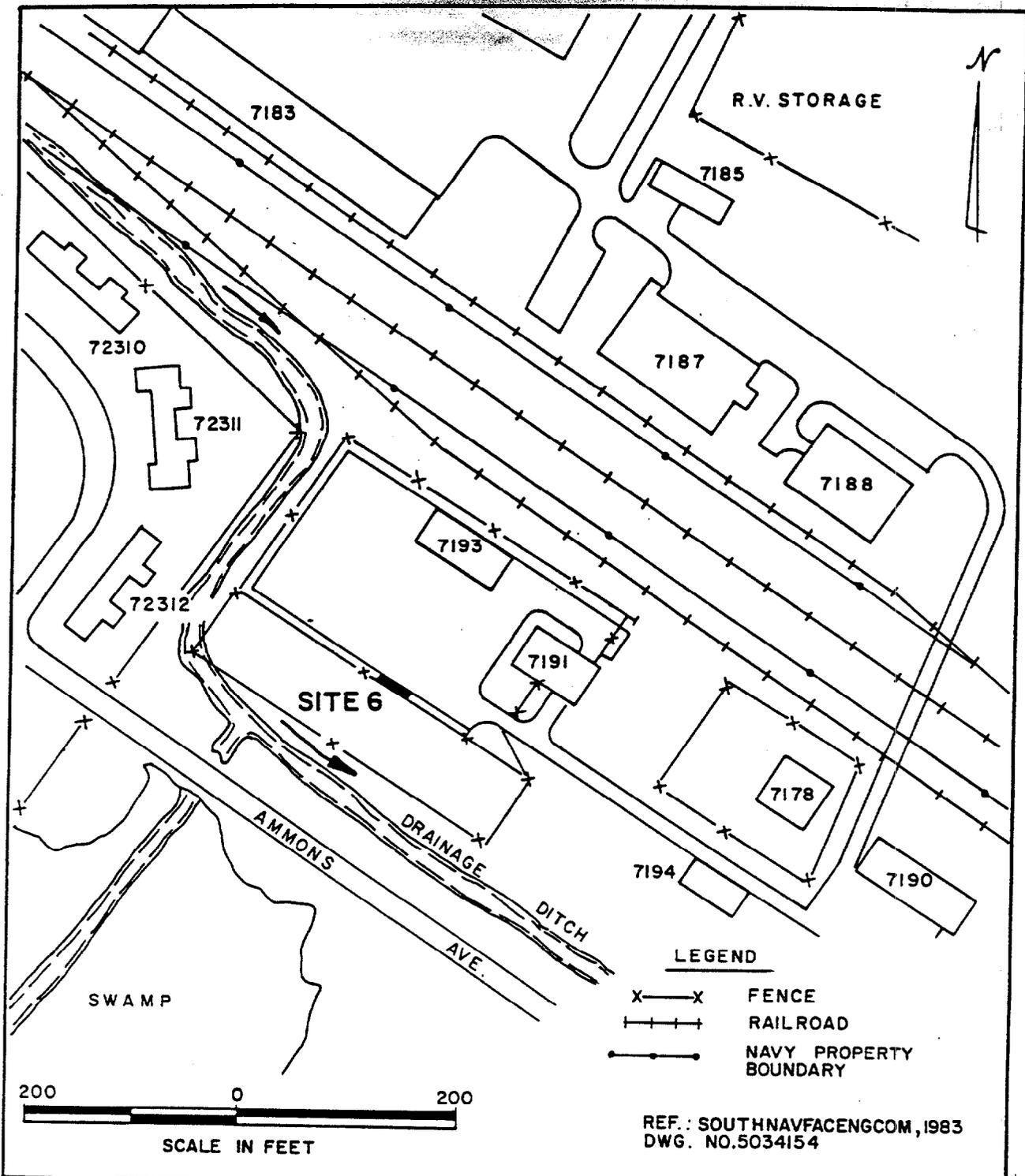


FIGURE 2-5
 SITE 6 - DPDO MCCOY ANNEX



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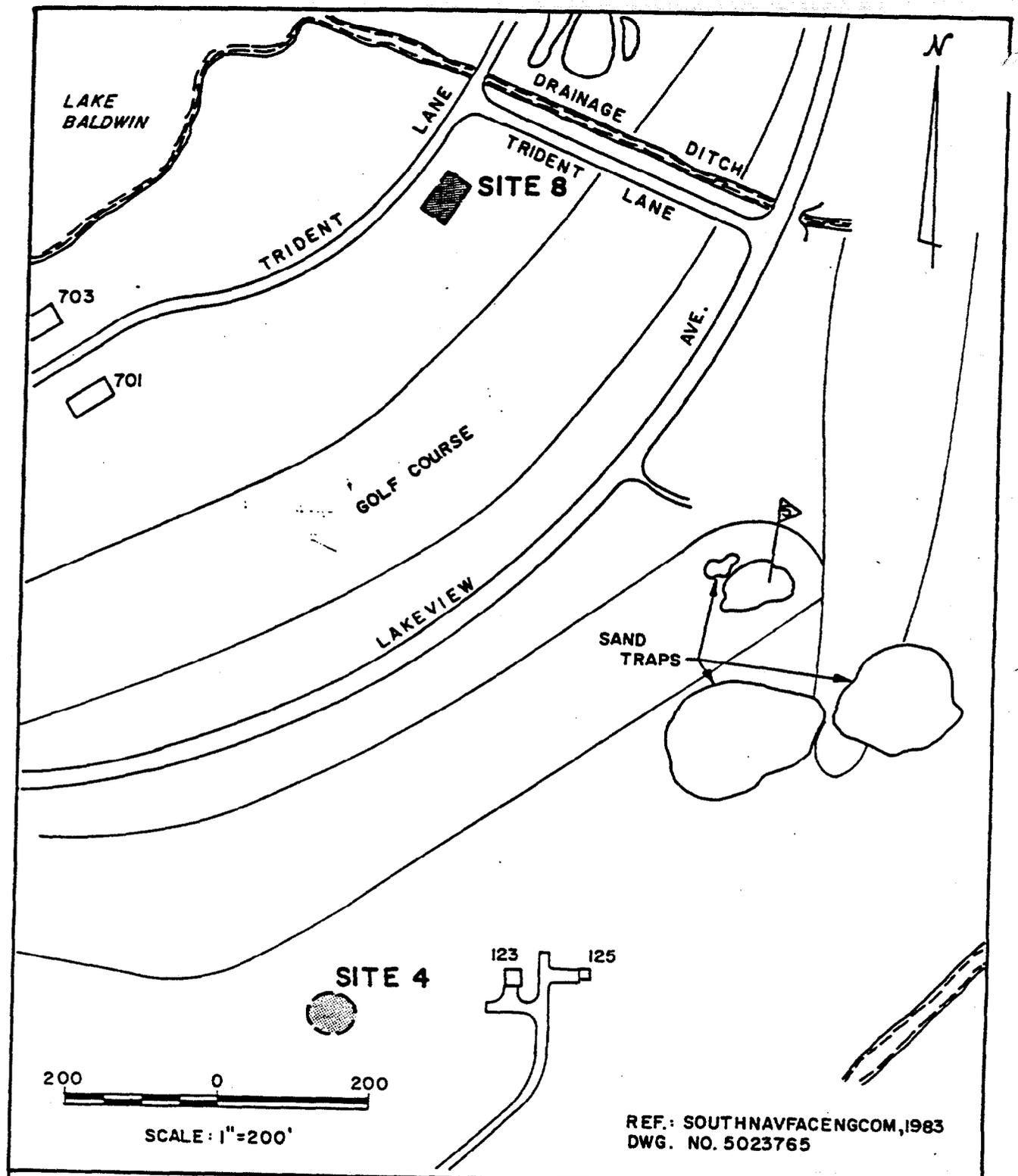


FIGURE 2-6
SITE 4 - DISPOSAL AREA NEAR THE NTC MAGAZINE NO. 123
SITE 8 - OLD NTC PESTICIDE BLDG.



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NAVAL TRAINING CENTER
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2.2.5 Site 9, Lake Baldwin. From the early 1950s through 1978, the film and photograph developing chemicals were drained from Building 2089, through a storm sewer to a point on the southwest shore of Lake Baldwin (Figure 2-7). Types and quantities of the chemicals reaching the lake are shown in Table 2-3. These include developers, fixers and activators.

Lake Baldwin is used for fishing, boating, swimming and water skiing by military personnel as well as the public. The lake is also used for military training.

Silver and cyanide are potential elements of concern that are found in the waste chemicals used in photographic processing. The persistence of cyanide in water is highly variable. This variability is dependent upon the chemical form of cyanide in the water, the concentration of cyanide, and the nature of other constituents. Cyanide ingested by humans at quantities of 10 mg or less per day is not toxic. Toxic effects from the ingestion of water containing cyanide occur when cyanide concentrations are above 200 ug/l (as free cyanide). Also, free cyanide concentrations in the range from 50 to 100 ug/l as cyanide have proven eventually fatal to many fish with a low tolerance to cyanide solutions and levels much above 200 ug/l probably are rapidly fatal to most fish species. Cyanide has not been reported to have any direct effect on recreational uses of water other than its effects on aquatic life (USEPA, 1976). Silver has been recognized as causing skin discoloration in humans, and as being systematically toxic to aquatic life. However, there is a wide variation in the toxicity of silver compounds to aquatic life.

Based on the potential hazardous nature of the waste discharged in the lake including photochemicals and acetic acid, a Confirmation Study is recommended for Site 9.

2.3 SITES NOT RECOMMENDED FOR CONFIRMATION. Four of the nine potentially contaminated sites are not recommended for Confirmation Study. The sites are summarized in Table 2-1 with brief descriptions following.

2.3.1 Site 5, Old Laundry Boiler Building. Site 5 (Building 1101) is adjacent to the laundry facility in Area "C" (see Figure 2-8). The building was constructed in the early 1940s and housed the boilers used by the laundry. It was closed in January 1972, at which time the boilers were removed. Partial demolition began in 1979. During the IAS on-site visit, the building was exposed to the environment and filled with fire brick, asbestos rope, and cement mortar containing friable asbestos fiber (formerly used around the fire doors of the boilers). Additional items containing friable asbestos noticed in the building include lagging from pipes and mortar jointing. The quantity of asbestos has been estimated at 700 cubic yards. Because NTC has initiated action for cleaning up this site, no further work is recommended under the NACIP program.

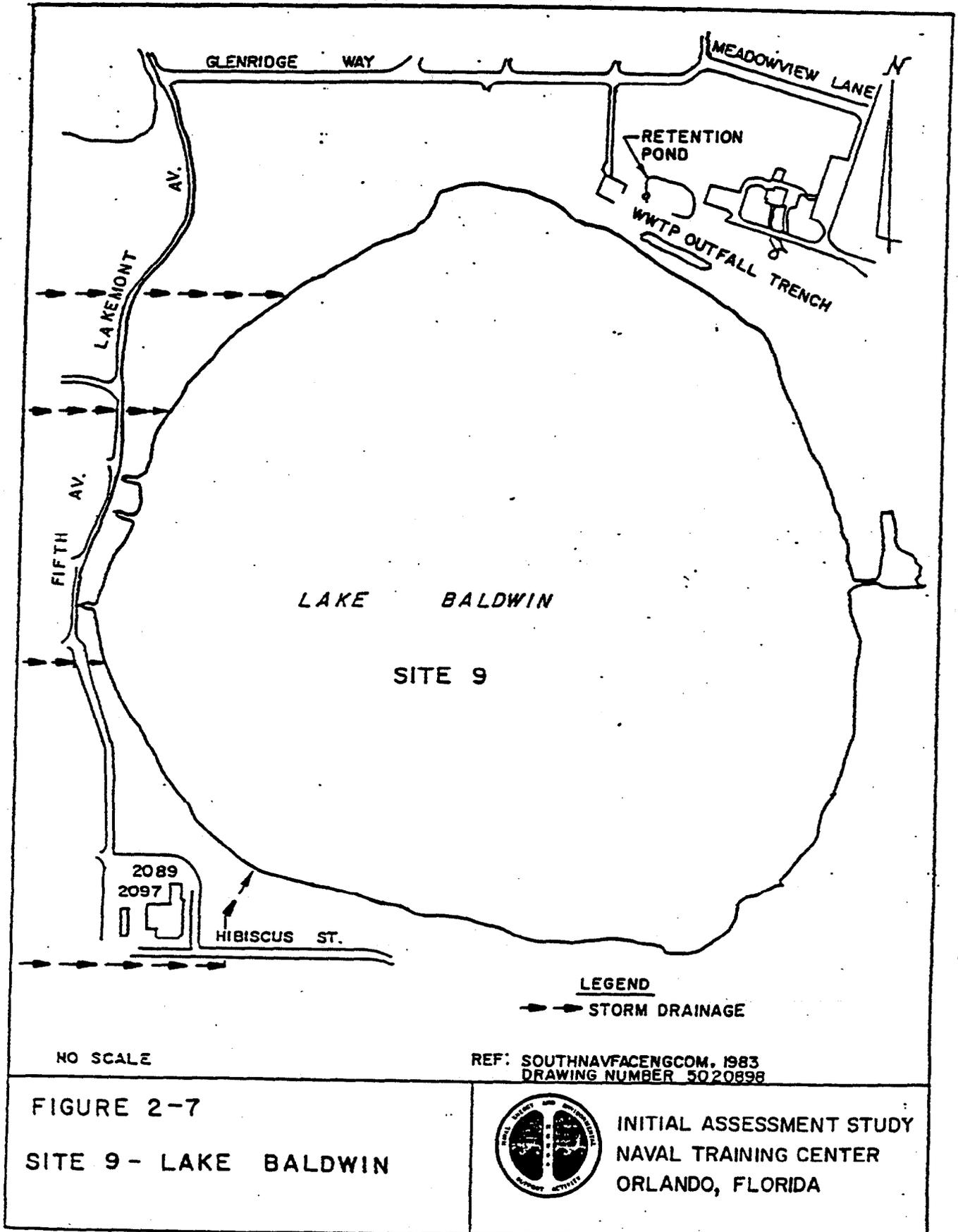


FIGURE 2-7
 SITE 9 - LAKE BALDWIN

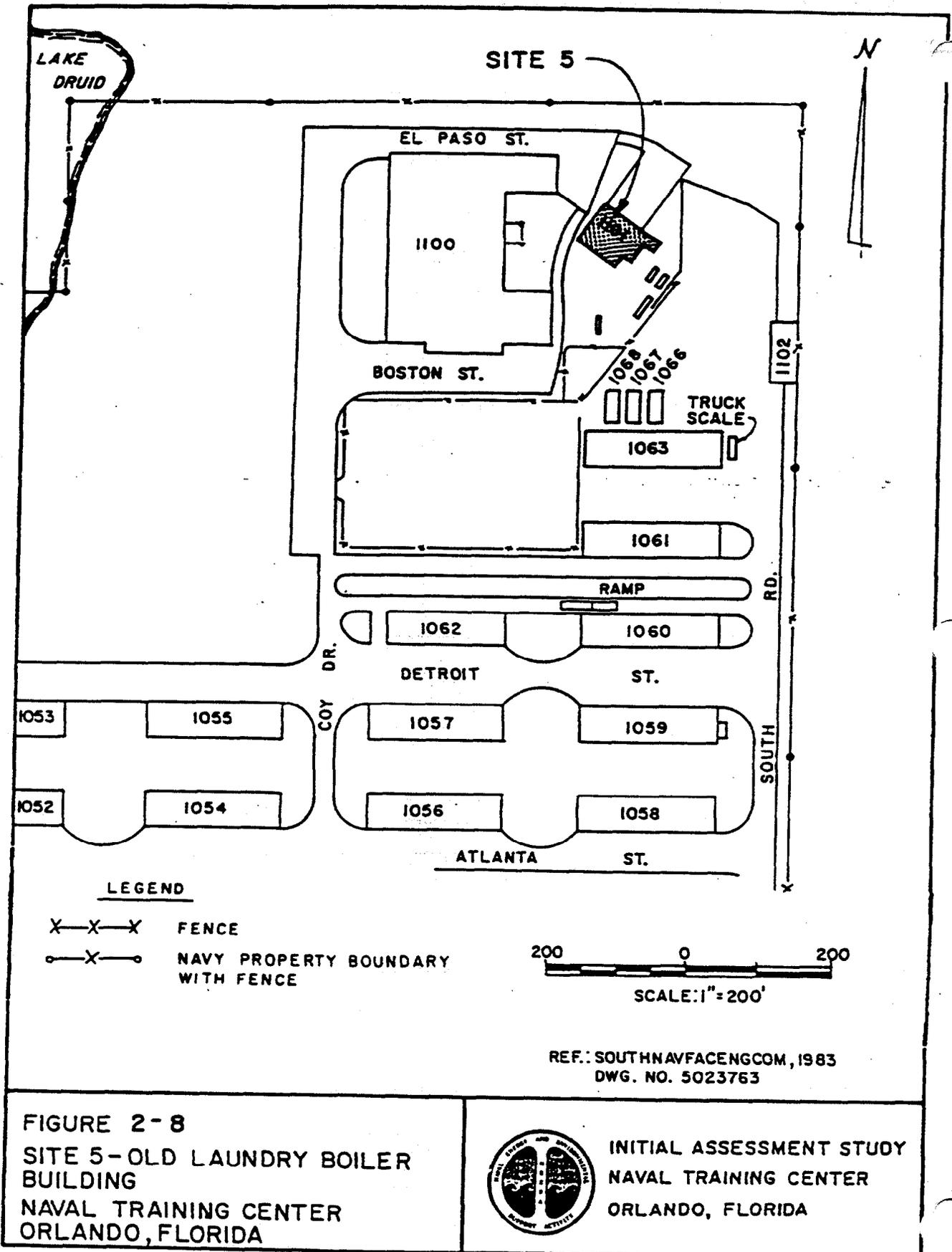
INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

TABLE 2-3

WASTES DISPOSED AT SITE 9, LAKE BALDWIN
NTC ORLANDO, FLORIDA

<u>WASTE</u>	<u>SOURCE OF WASTE</u>	<u>TIME PERIOD</u>	<u>ESTIMATED TOTAL QUANTITY¹ (Gallons)</u>
Photochemicals:	Photo Shop	Early 1950s to 1968	
Developer			4,300
Fixer			29,400
Developer Replenisher			6,100
Activator			16,500
Acetic Acid			2,500
Bleach Fix			1,500
E-4 Process Chemical			5,400
Stabilizer			800

¹Quantities of photo chemicals based on 95 percent of Estimated Photo Shop Waste Generation and Disposal (Table 5-1).



2.3.2 Site 2, Filled WWTP Lagoons. This disposal area, located west of the NTC golf course (see Figure 2-9), is the site of two filled wastewater treatment plant (WWTP) lagoons. These lagoons were part of a 35,000 to 50,000 gallons per day (gpd) plant for treatment of wastewater from NTC including the on-base hospital. The treatment plant was closed in 1976 and the lagoons were reportedly filled between 1977 and 1978 with tree limbs and other types of yard waste, soil, sand, building debris, WWTP sludge and a steel mixing tank. An estimate of the fill quantity is 18,000 cubic yards.

Because there were no reports or evidence of hazardous waste disposal, this site does not pose a potential threat to human health or to the environment. Therefore, no further action is recommended under the NACIP program.

2.3.3 Site 4, Disposal Area Near the NTC Magazine No. 123. This site, located about 200 feet southwest of Magazine No. 123 (see Figure 2-6), is a pit 30 feet in diameter by 8 or 9 feet deep, into which yard wastes (tree limbs, and grass clippings) were placed. Reportedly, no hazardous materials were disposed of at Site 4. The site was used from 1968 to 1969, and then covered with topsoil. The quantity of waste disposed is approximately 6400 cubic feet.

Because there were no reports or evidence of hazardous wastes disposal, this site does not pose a potential threat to human health or to the environment. Therefore, no further action is recommended under the NACIP program.

2.3.4 Site 7, Barracks Burial Area. During 1978, demolished wooden barracks from McCoy Annex were bulldozed into a quarry (now filled with water) at the southwestern edge of the Annex (see Figure 2-10). Quantities of building debris in the quarry are estimated at 100,000 cubic yards. Reportedly, no hazardous materials were disposed of along with the building rubble.

Because there were no reports or evidence of hazardous wastes disposal, this site does not pose a potential threat to human health or to the environment. Therefore, no further action is recommended under the NACIP program.

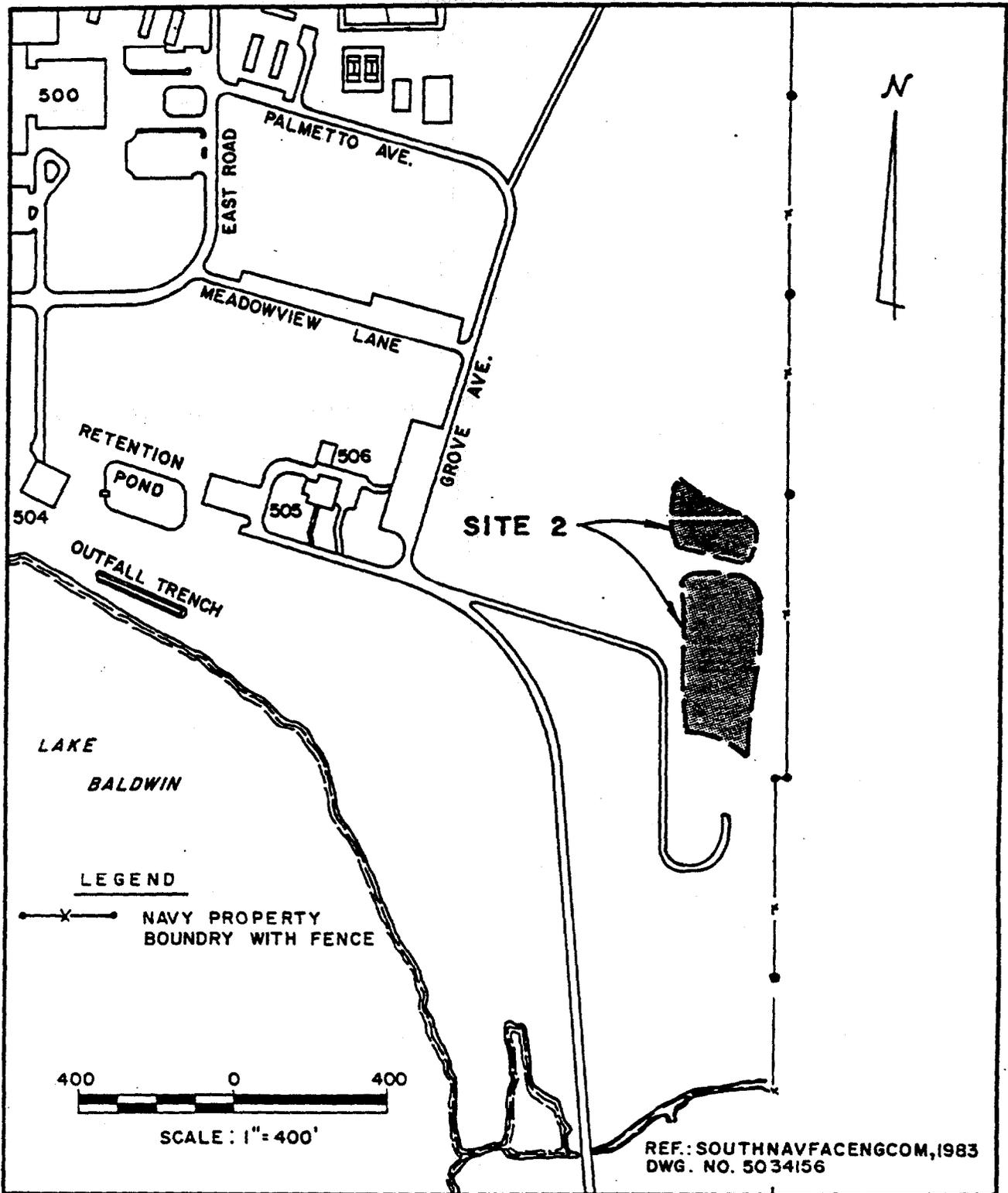


FIGURE 2-9
SITE 2 - FILLED WWTP
LAGOONS



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ORLANDO, FLORIDA

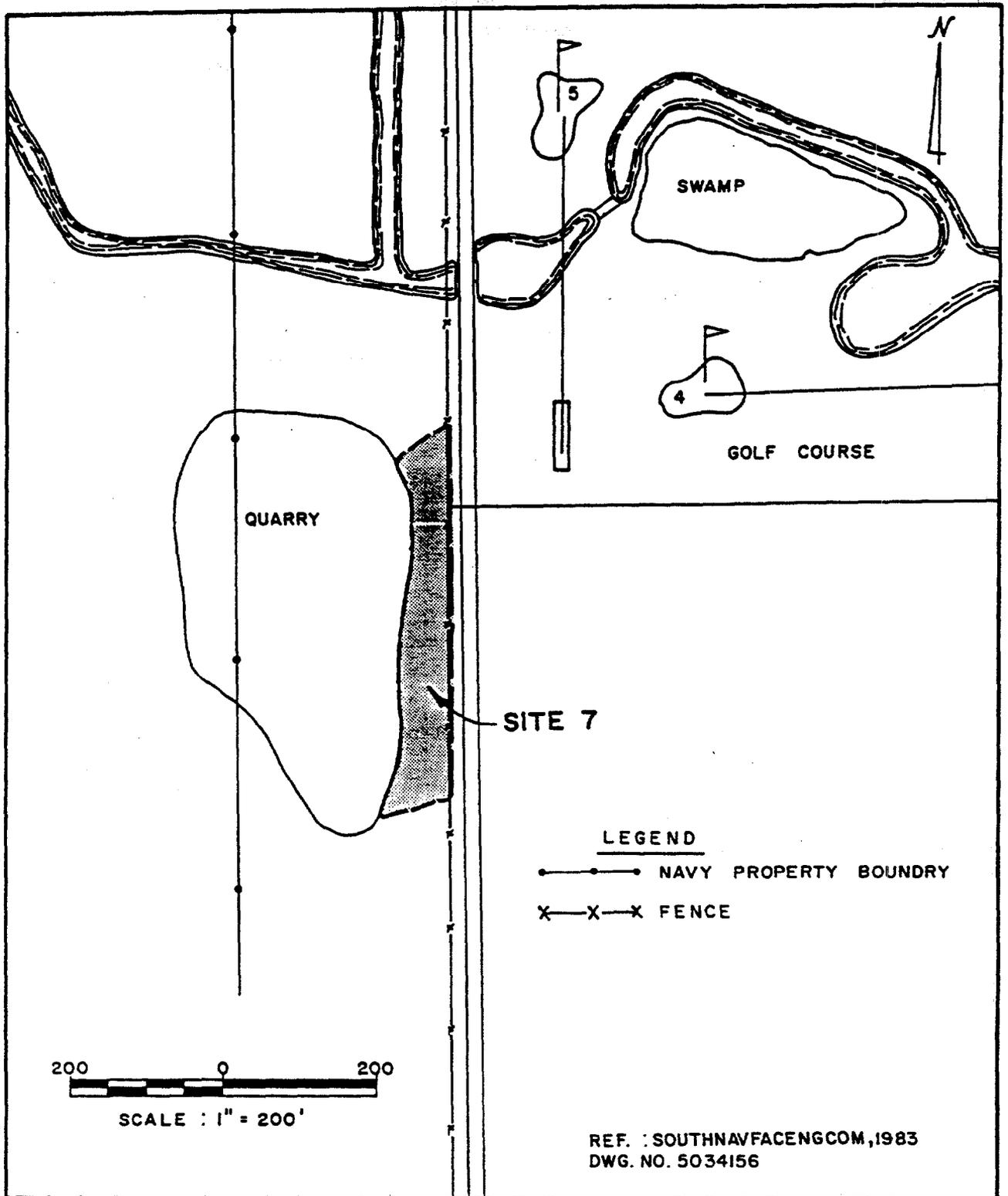


FIGURE 2-10
 SITE 7-BARRACKS BURIAL AREA
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 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

CHAPTER 3. RECOMMENDATIONS

3.1 INTRODUCTION. Recommended courses of action are provided for the potentially contaminated sites identified at the Naval Training Center (NTC), Orlando Complex. Five sites pose a potential threat to human health or to the environment. Confirmation Studies, phase II of the NACIP program, are recommended for Site 1, North Field Grinder Landfill; Site 3, McCoy Annex Landfill; Site 6, DPDO McCoy Annex; Site 8, Old NTC Pesticide Building; and Site 9, Lake Baldwin. The Confirmation Study Ranking System (CSRS) is used to systematically evaluate the severity of the potential problems at the sites recommended for confirmation. The remaining four sites are not recommended for Confirmation Study.

The results of the CSRS and a summary of the recommended actions for these sites are listed in Table 3-1. The sampling recommendations are designed to first verify the presence of contamination. If contamination is verified at any of the five sites prior to the conclusion of the one year of sampling, then additional sampling points may be required to characterize the areal and vertical extent of contamination. Depending on the results of the recommended actions for verification, a characterization of the extent of the contamination at the sites may be required. The design of the characterization phase will depend on results from the verification phase.

3.2 CONFIRMATION STUDY RECOMMENDATIONS

3.2.1 Site 1, North Field Grinder Landfill

Types of Samples:	Ground water, soil
Number of ground water Monitoring Wells:	Five
Frequency of Sampling:	Ground water - Quarterly for one year Soil - Once
Number of Samples:	Ground water - 20 Soil - 20
Testing Parameters:	Ground water - Water level, specific conductance, pH, oil and grease, silver, cyanide, volatile organics. Soil - Oil and grease, silver, cyanide, volatile organics.

TABLE 3-1

**SUMMARY OF CONFIRMATION STUDY - STUDY RECOMMENDATIONS
NAVAL TRAINING CENTER ORLANDO, FLORIDA**

Site No.	Site Name	CSRS Score	Number of Wells	Number and Type of Samples	Frequency of Sampling	Analyzed Parameters
85-1	North Field Grinder Landfill	12	5	20 - Ground water	Quarterly for one year	Ground water: Water level, specific conductance, pH, oil and grease, volatile organics, silver, cyanide.
				20 - Soil	Once	Oil and grease, volatile organics, silver, cyanide.
85-3	McCoy Annex Landfill	19	7	28 - Ground water	Quarterly for one year	Ground water: Water level, specific conductance, pH, oil and grease, lead, chromium, zinc, mercury, volatile organics, base-neutral extractables.
				32 - Surface water	Quarterly for one year	Oil and grease, lead, chromium, zinc, volatile organics, base-neutral extractables, PCB.
				8 - Sediment	Once	Same as surface water.
				28 - Soil	Once	Same as surface water.

TABLE 3-1 (Continued)

SUMMARY OF CONFIRMATION STUDY - STUDY RECOMMENDATIONS
 NAVAL TRAINING CENTER ORLANDO, FLORIDA

Site No.	Site Name	CSRS Score	Number of Wells	Number and Type of Samples	Frequency of Sampling	Analyzed Parameters
85-6	DPDO McCoy Annex	13	None	2 - Soils	Once	Soil: Oil and grease, lead, volatile organics, base-neutral extractable PCB.
85-8	Old NTC Pesti- cide Building	20	3	12 - Ground water	Quarterly for one year	Ground water: Water level, specific con- ductance, pH, mercury, pesticides, phenols, arsenic.
				9 - Soil	Once	Mercury, pesticides, phe- nols, arsenic.
85-9	Lake Baldwin	24	None	3 - Surface water	Once	Specific conductance, silver, cyanide
				3 - Sediment	Once	Silver, cyanide

CSRS - Confirmation Study Ranking System

PCB - Polychlorinated biphenyls

Remarks:

A total of five wells, four downgradient and one upgradient should be installed with Shelby tubes every five feet when drilling the wells. The wells should be screened for 15 feet into the aquifer from the water table level. Borehole core samples should be taken at five-foot intervals during well drilling. Recommended well locations are shown on Figure 3-1.

3.2.2 Site 3, McCoy Annex Landfill

Types of Samples:

Ground water, surface water, sediment, soil

Number of ground water Monitoring Wells:

Seven

Frequency of Sampling:

Ground water - Quarterly for one year

Surface water - Quarterly for one year

Sediment - Once

Soil - Once

Number of Samples:

Ground water - 28

Surface water - 32

Sediment - 8

Soil - 28

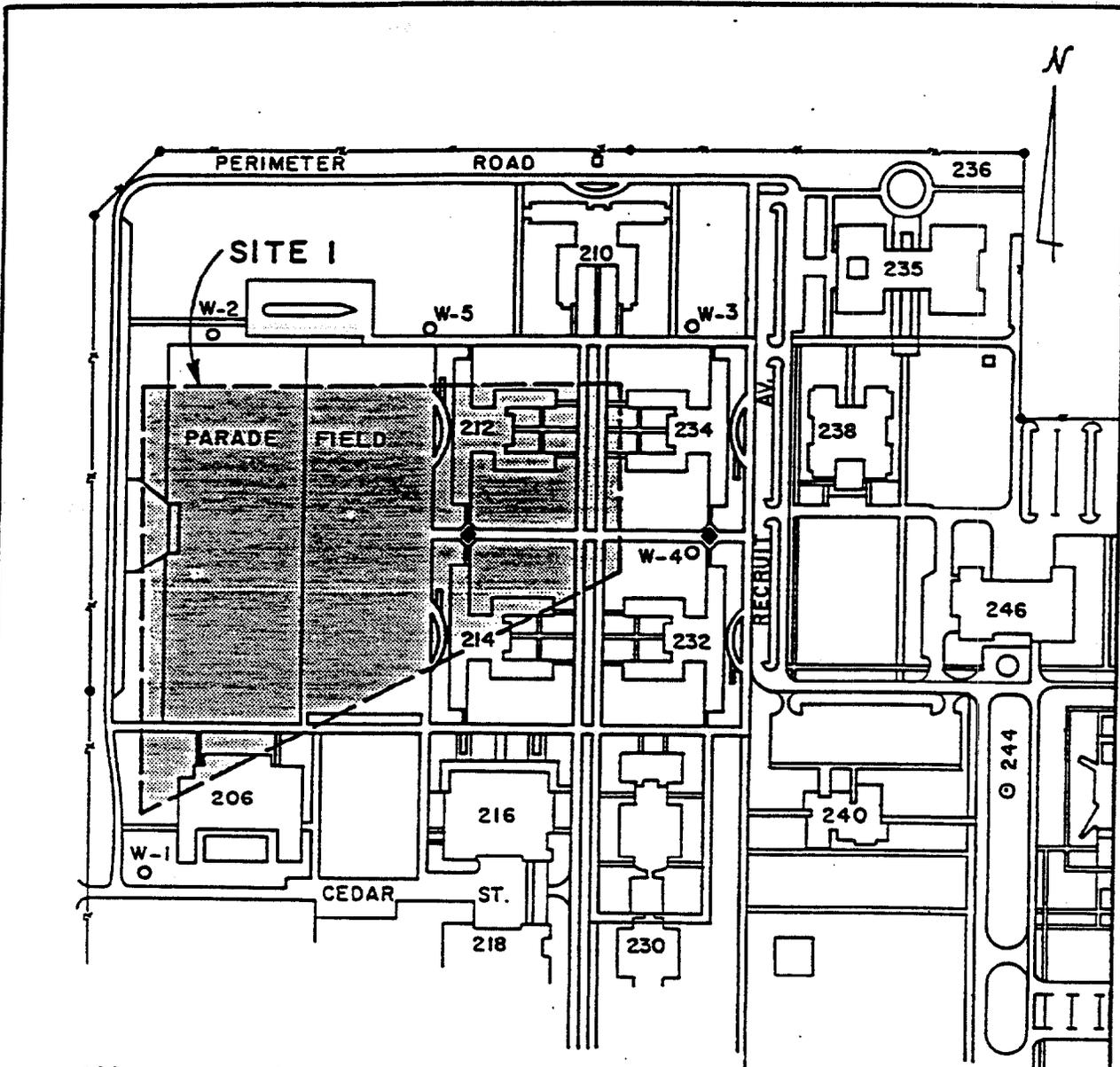
Testing Parameters:

Ground water - Water level, specific conductance, pH, oil and grease, lead, chromium, zinc, mercury, volatile organics, base-neutral extractables.

Surface water - Oil and grease, lead, chromium, zinc, mercury, volatile organics, base-neutral extractables, polychlorinated biphenyls (PCB).

Sediment - Same as surface water.

Soil - Same as surface water.



SCALE: 1" = 400'

LEGEND

○ W-1 MONITORING WELL

REF.: SOUTHNAV FACENGCOM, 1983
 DWG. NO. 5023763

FIGURE 3-1
 SITE I - NORTH FIELD
 GRINDER LANDFILL



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

Remarks:

A total of seven wells should be installed with Shelby tubes every five feet when drilling. One well is upgradient and the remaining six are downgradient of the site. The wells should be screened for 15 feet into the aquifer from the water table level. Borehole core samples should be taken at five-foot intervals during well drilling. Eight surface water/sediment sampling points, including two upstream and two downstream, should be utilized as shown in Figure 3-2.

3.2.3 Site 6, DPDO McCoy Annex

Type of Samples: Soil

Number of ground water Monitoring Wells: None

Frequency of Sampling: Once

Number of Samples: Two

Testing Parameters: Oil and grease, lead, volatile organics, base-neutral extractables, polychlorinated biphenyls (PCB).

Remarks: Sampling during the verification phase should be limited to two soil samples taken from the top 24 inches of soil. Recommended soil sampling locations are shown on Figure 3-3.

3.2.4 Site 8, Old NTC Pesticide Building

Type of Samples: Ground water, soil

Number of ground water Monitoring Wells: Three

Frequency of Sampling: Ground water - Quarterly for one year
Soil - Once

Number of Samples: Ground water - 12
Soil - 9

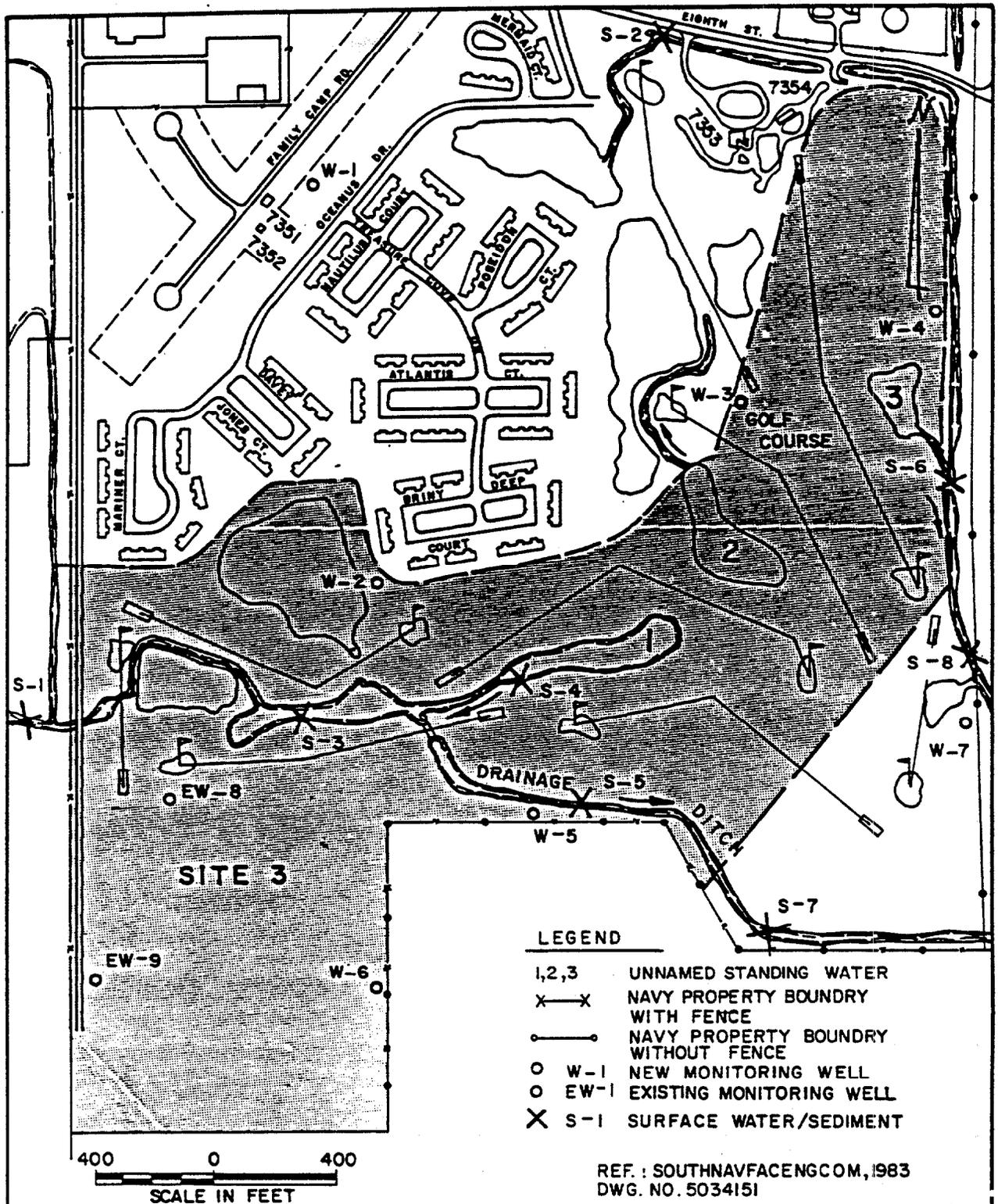
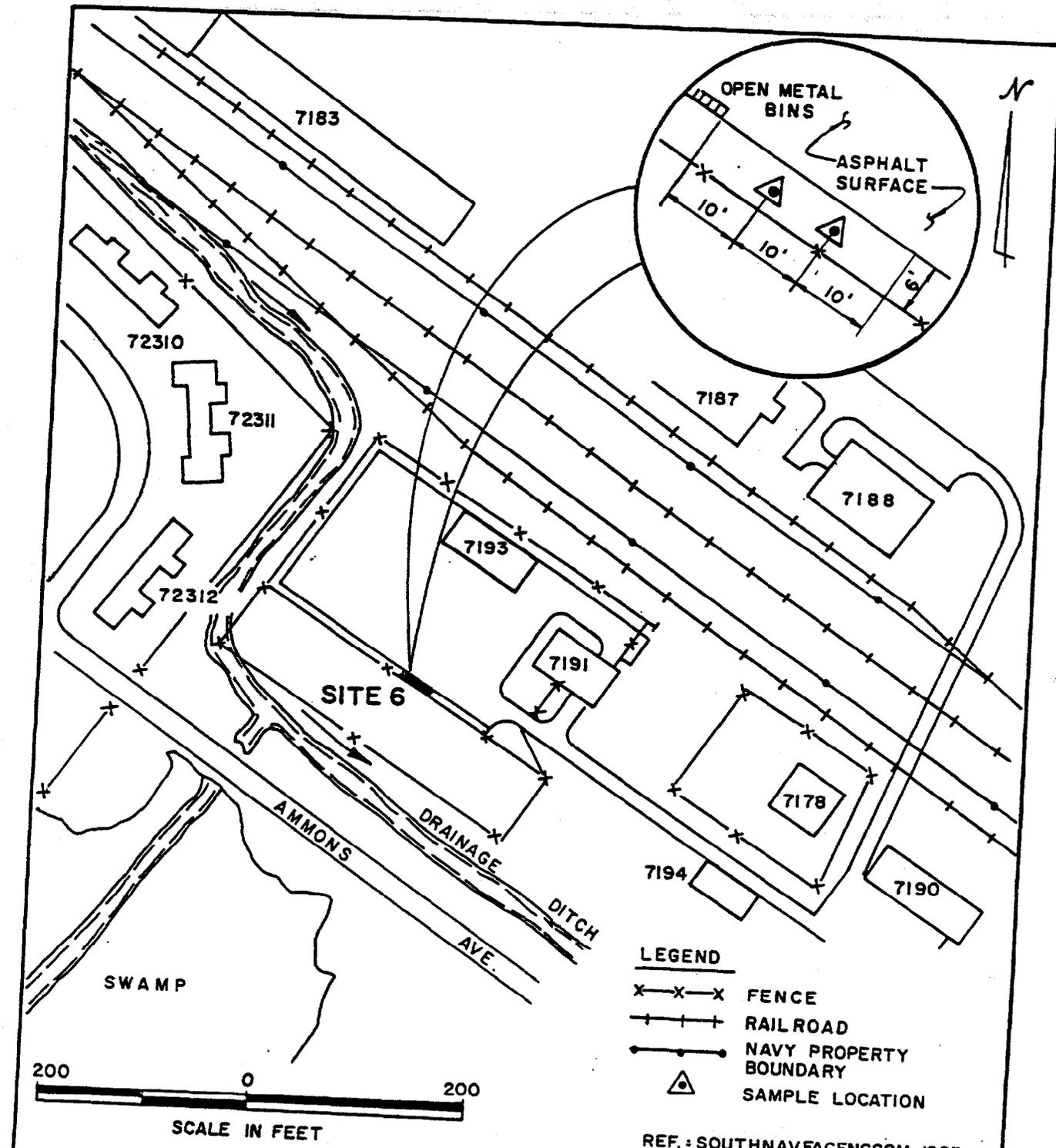


FIGURE 3-2
SITE 3 - McCOY ANNEX
LANDFILL



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA



LEGEND
 X-X-X FENCE
 + + + RAILROAD
 —●— NAVY PROPERTY BOUNDARY
 ▲ SAMPLE LOCATION

REF.: SOUTHNAVFACENCOM, 1983
 DWG. NO. 5034154

FIGURE 3-3
SITE 6 - DPDO McCOY ANNEX



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Testing Parameters:

Ground water - Water level, specific conductance, pH, mercury, pesticides, phenols, arsenic.

Soil - Mercury, pesticides, phenols, arsenic.

Remarks:

A total of three monitoring wells, one upgradient and two downgradient should be located as shown on Figure 3-4. Soil cores should be collected with Shelby tubes every five feet when drilling the wells. The wells should be screened for 15 feet into the aquifer from the water table level. Borehole core samples should be taken at five-foot intervals during well drilling. Use EPA method 608 for pesticide testing.

3.2.5 Site 9, Lake Baldwin

Type of Samples:

Surface water and sediment

Number of ground water Monitoring Wells:

None

Frequency of Sampling:

Once

Number of Samples:

Six

Testing Parameters:

Surface water - Specific conductance, silver, cyanide.

Sediment - Silver, cyanide.

Remarks:

Samples should be taken once at the outfall, 20 feet straight out from the outfall in the lake, and at the edge of Lake Baldwin that is opposite the outfall. Recommended locations of surface water and sediment sampling are shown on Figure 3-5.

3.3 GENERAL RECOMMENDATIONS. It is recommended that the locations of all nine sites at NTC Orlando Complex identified in the IAS be marked on activity General Development Maps.

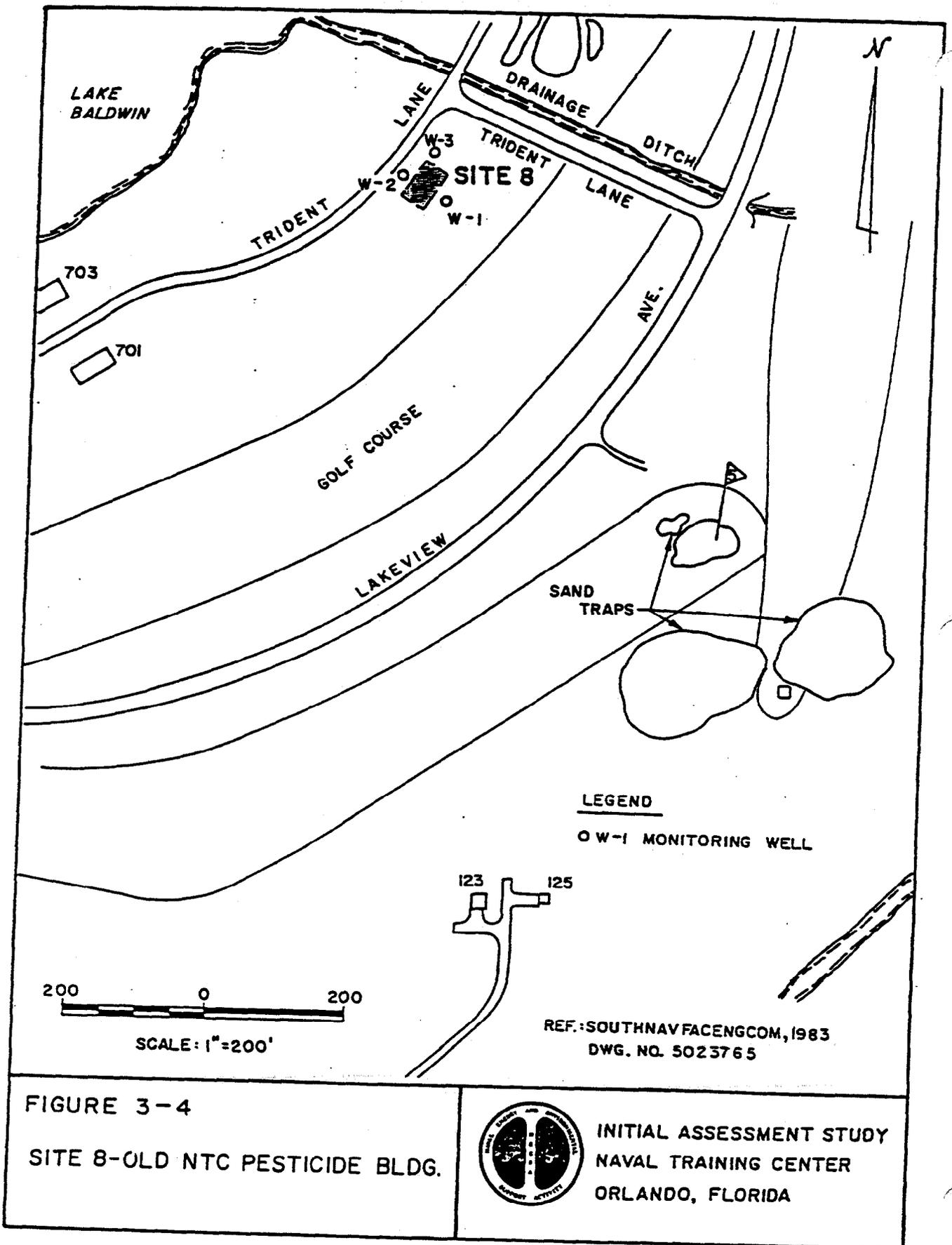


FIGURE 3-4
 SITE 8-OLD NTC PESTICIDE BLDG.



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

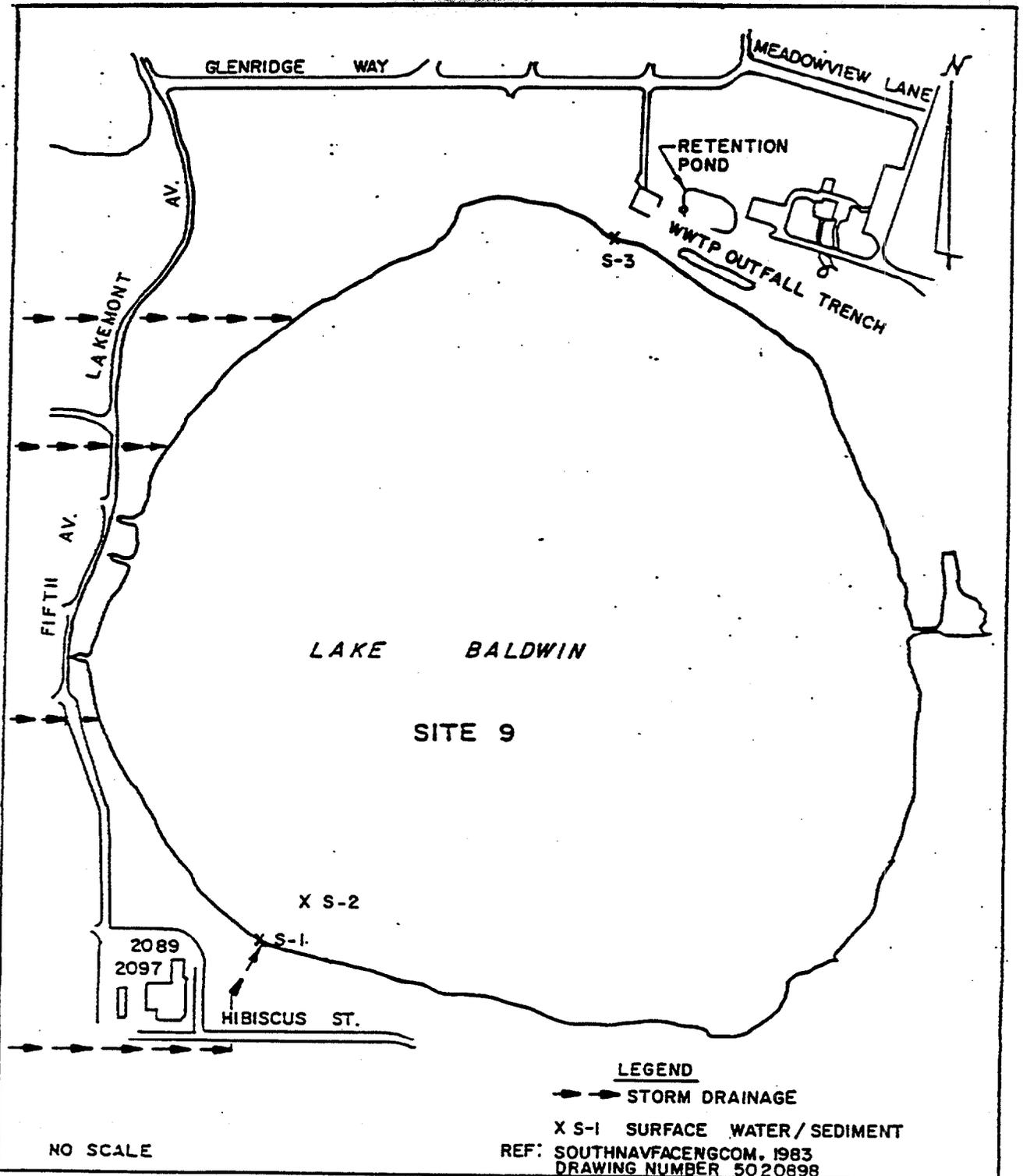


FIGURE 3-5
SITE 9 - LAKE BALDWIN



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

CHAPTER 4. BACKGROUND

4.1 INTRODUCTION. The NTC complex at Orlando, Florida covers 2072 acres in Orange County, Florida. The Complex is comprised of the Naval Training Center (NTC) and three remote areas: Area "C", the Naval Training Equipment Center (NTEC) Annex, and the McCoy Annex.

The NTC occupies 1095 acres located approximately three miles east of Interstate 4 and just north of State Road 50 (see Figure 4-1). NTC is located entirely within the Orlando city limits and is comprised mainly of operational and training facilities.

Area "C" covers 46 acres and is located approximately one mile west of NTC off Maguire Boulevard (see Figure 4-1). Area "C" mainly services as a supply center for the complex. NTEC Annex is located on a 54 acre piece of land approximately five miles south of NTC (see Figure 4-1) and adjacent to the Herndon Public Airport. NTEC provides research, design, development, testing, evaluation, procurement, fabrication, maintenance, and logistic support for Naval training devices and equipment. Contained within this Annex is a computer center, flight-training building, uniform-supply warehouse, and several office buildings. The most distant of the remote areas is McCoy Annex. The Annex occupies 877 acres and is located twelve miles south of NTC, and west of the Orlando International Airport (see Figure 4-1). McCoy Annex serves mainly as a housing and community support activity for NTC Complex. Since about 1974, approximately 12,000 military personnel, including students, and 2,600 civilians have been assigned to the activity.

4.1.1 Tenant/Host Relationships. The Naval Training Center (NTC) is the host activity at the complex and is assisted in its mission by several tenant activities. A description of the missions of each of these individual tenant activities is given below.

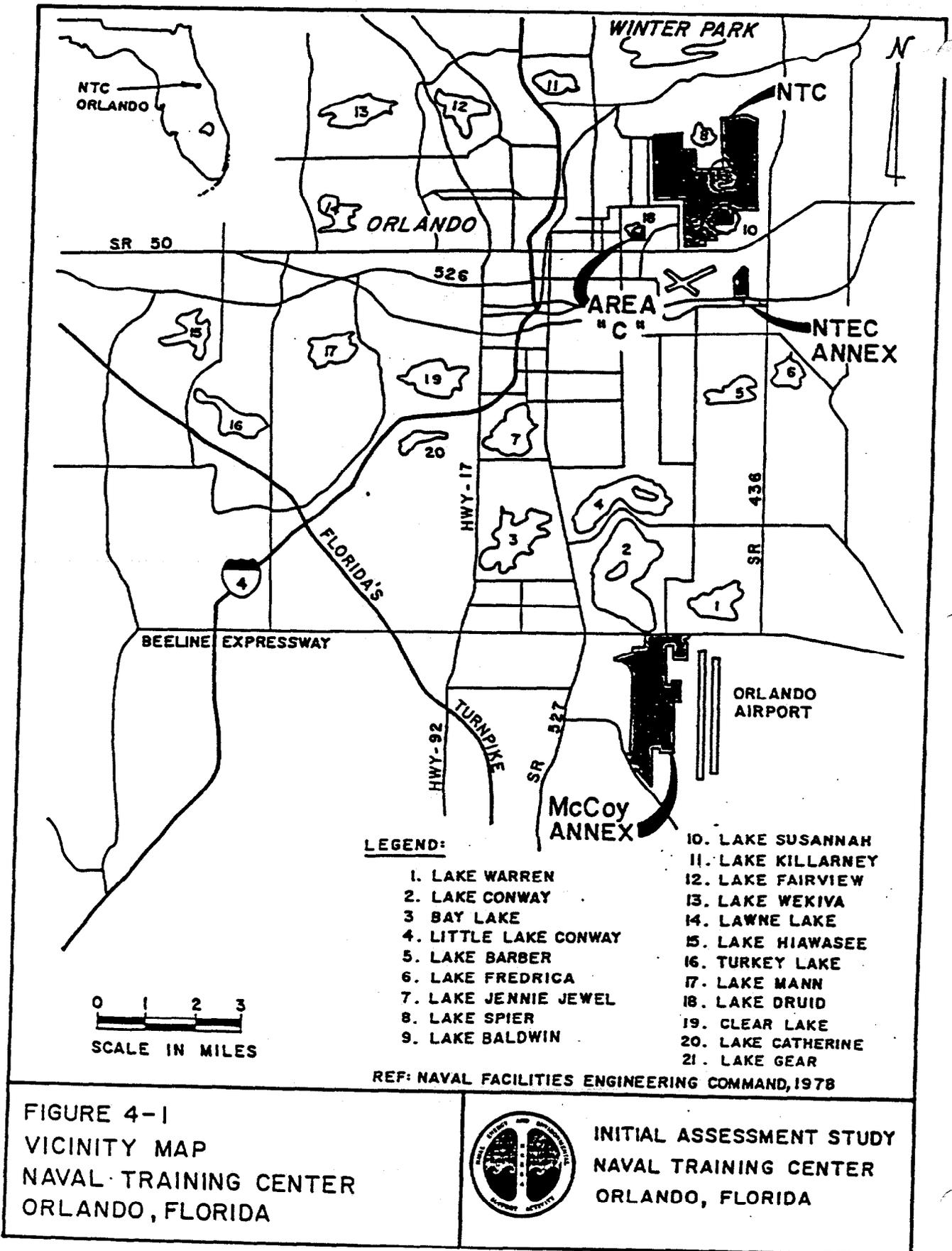
4.1.1.1 Recruit Training Command. The Recruit Training Command provides basic recruit indoctrination for enlisted personnel.

4.1.1.2 Service School Command. The Service School Command provides basic and specialized electronic and torpedo operations training, as well as courses preparing recruits to function as quartermasters and signalmen.

4.1.1.3 Naval Administrative Command. The Naval Administrative Command provides logistic, community and administrative support to all commands under NTC and to other commands as directed.

4.1.1.4 Naval Training Equipment Center. The Naval Training Equipment Center provides research, design, development, testing, evaluation, procurement, fabrication, maintenance and logistic support of Naval training devices and equipment.

4.1.1.5 Nuclear Power School. The Nuclear Power School provides basic instruction to officers and enlisted personnel in the field of nuclear propulsion.



4.1.1.6 Naval Hospital. The Naval Hospital provides general and specialized clinical and hospitalization services for active duty Navy and marine Corps personnel; active duty personnel of the other armed services; dependents of active duty personnel, retirees; and other personnel as authorized by current directives.

4.1.1.7 Dental Clinic. The Dental Clinic provides complete dental service to Navy and Marine Corps Shore Activities; units of the operating force; and other authorized personnel within the assigned geographical area.

4.1.1.8 Navy Recruiting Orientation Unit. The Navy Recruiting Orientation Unit plans, directs, controls and coordinates initial recruiting orientation and subsequent field management services for officer and enlisted recruiters, and selected support personnel assigned to recruiting duty in the Navy Recruiting Command.

4.1.1.9 Navy Commissary Store. The Navy Commissary Store, Orlando Branch provides commissary support for authorized personnel in the Orlando area.

4.1.1.10 Naval Construction Battalion, Unit 419. The Naval Construction Battalion, Unit 419, provides construction services to the fleet operation.

4.1.1.11 Navy Publishing and Printing Service Branch. The Navy Publishing and Printing Service Branch provides printing and duplicating services for NTC Orlando, government activities in the central Florida area, and the recruiting office from the southeast section of the Navy.

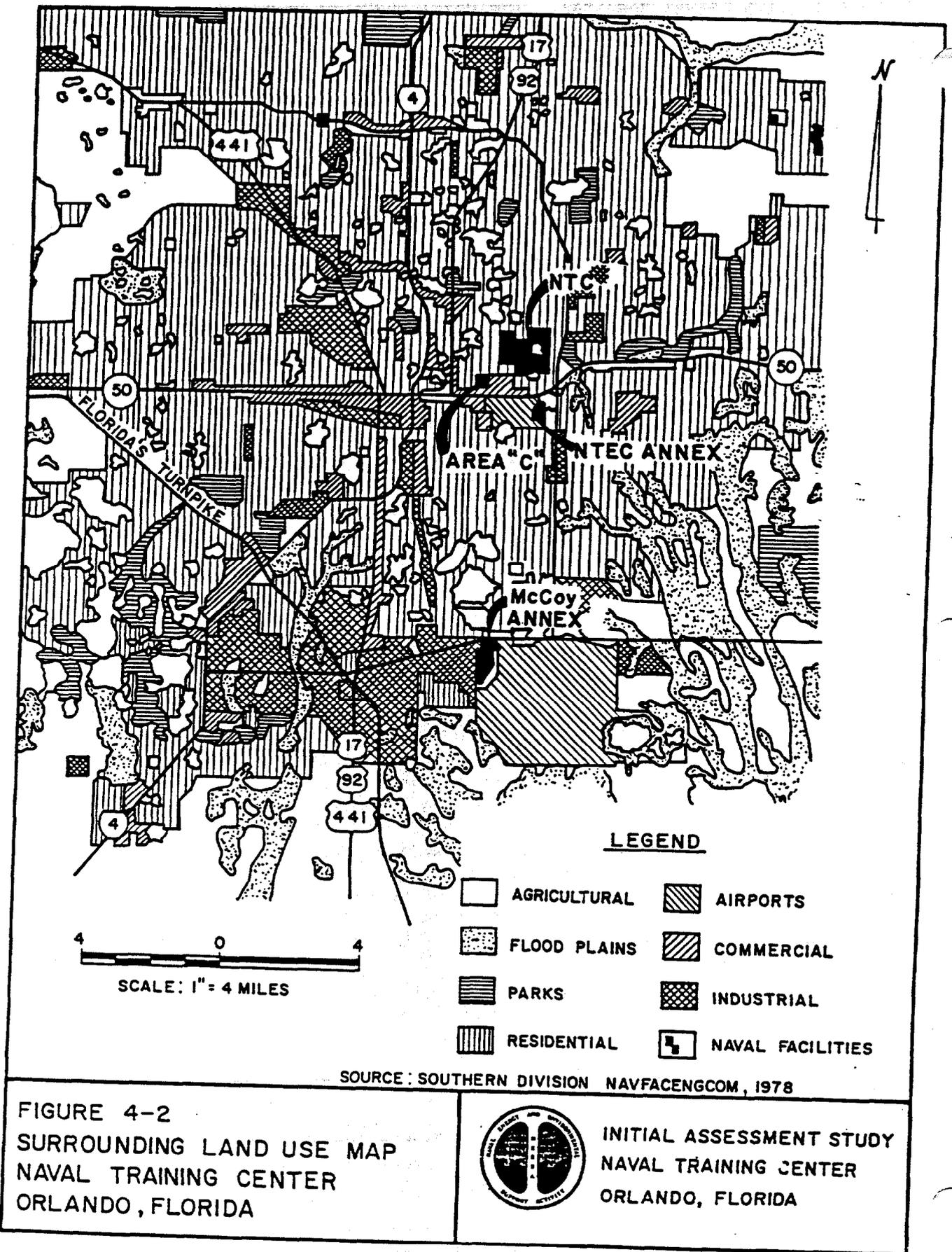
4.1.1.12 The Army Reserve. The Army Reserve uses the Transportation facilities at McCoy Annex as a motor pool maintenance area.

4.1.2 Adjacent Land Use. NTC Complex is comprised of NTC, Area "C," NTEC Annex, and McCoy Annex. NTC, Area "C," and NTEC Annex are located three miles east of the Orlando Metropolitan area. McCoy Annex is located west of Orlando International Airport. Figure 4-2 illustrates the adjacent land use of the activity. Brief descriptions of adjacent land use near the areas of the activity follow.

4.1.2.1 Naval Training Center. NTC is surrounded by built-up urban development of various types including single and multi-family housing, schools and commercial buildings. Land uses immediately west and northeast of the area are primarily residential. Small areas of commercial development occur to the southwest. Herndon Airport is located immediately south of NTC. No industrial facilities exist adjacent to NTC.

4.1.2.2 Area "C." Area "C" is surrounded by urban development with multi-family residential development to the north; an office park to the east; single family residences to the west and south; and single family residential development to the north across Lake Druid. No industrial facilities exist adjacent to Area "C."

4.1.2.3 Naval Training Equipment Center Annex. NTEC Annex is within Herndon Airport on the fringe of a major residential area.



4.1.2.4 McCoy Annex. The eastern boundary of McCoy Annex is adjacent to the Orlando International Airport. The Greater Orlando Aviation Authority has developed a master plan for the west side of the airport designating sites for industrial and commercial activities related to aviation.

The western boundary of the Annex is flanked by industrially zoned property. The zoning allows heavy industry and aviation related development. However, no industrial facilities currently exist adjacent to the area. Approximately 0.5 miles north of the Annex is the Beeline Expressway, a major arterial running east and west through Orange County. The property north of the Beeline and within 0.75 miles of the McCoy Annex is used primarily by businesses directly related to the airport: rental agencies, hotels, and restaurants.

Adjacent to the southern boundary are undeveloped woodlands. The boundaries of McCoy Annex create enclaves of city owned property.

4.2 HISTORY

4.2.1 History. The property of the Naval Training Center (NTC) Orlando (the Main Training Center, Area "C," McCoy Annex and NTEC Annex) was previously owned and operated by the Army Air Corps and by the U.S. Air Force. From 1940 to around 1947, the Army Air Corps conducted operations at the Main Training Center and Area "C" as the Orlando Air Base. Around 1947, the U.S. Air Force began command of the facilities as the Orlando Air Force Base (AFB). The base operated as the headquarters of the Military Airlift Command (MAC). A tenant of Orlando AFB was the Air Photographic and Charter Service (reportedly the most active facility on base) which was responsible for developing U.S. Air Force movies and still photographs. Geodetic (the measurement of the shape and area of large tracts of country) and photographic squadrons were also stationed at Orlando AFB. In 1968, the U.S. Air Force ceased operations at Orlando AFB and Area "C" and the property was commissioned as the Naval Training Center, Orlando. Since 1968, the commands of NTC have been directly responsible for training or specialized instruction including the following: Recruit Training Command (RTC) which provides basic recruit indoctrination for enlisted personnel; Service School Command (SSC) which provides primary, advanced and specialized training as directed by Chief of Naval Technical Training; Naval Administrative Command (NAC) which provides logistic, community and administrative support to all commands under NTC and to other commands as directed. In 1968, the Navy took over operation of the on-base hospital from the U.S. Air Force. Since 1980, the hospital has been located in Building 500. From 1968 to 1976, the Navy operated a wastewater treatment plant at NTC located northeast of Lake Baldwin on Truman Road. The buildings associated with the WWTP have since been razed.

Area "C" has consisted of a laundry facility, supply storage and the Defense Property Disposal Office (DPDO) facility. Area "C" was constructed in 1942 to provide support services for the Army Air Corps Orlando Air Base. Since 1942, the laundry facility has been used for cleaning military uniforms. From 1942 to 1957, military supplies and salvageable material were transported by train to the Area "C" supply storage warehouses and salvage yard. Reportedly, a railroad system existed and was used for material transport within Area "C" until 1957. Since 1957, military supplies and

salvageable materials have been shipped by truck to the supply warehouses and salvage yard in Area "C." In 1959, DPDO took over operation of the salvage yard. Since 1968, the laundry facility, supply storage warehouses and DPDO have operated under the command of NTC Orlando.

From around 1950 to 1974, McCoy Annex was owned and operated by the U.S. Air Force Strategic Air Command (SAC). From 1950 to the late 1950s, the SAC base operated as the Pine Castle AFB. From the late 1950s to 1974, the base operated as the McCoy AFB. In 1974, NTC Orlando acquired title to the property and the name was changed to McCoy Annex. McCoy Annex was acquired to serve as a community support annex for NTC Orlando. However, the majority of property previously used by the U.S. Air Force has never been acquired by the Navy; it is owned and used by the Orlando International Airport.

From about 1960 to 1972, a cut and fill landfill was used and operated by McCoy AFB (see Section 8.4, Site 3, McCoy Annex Landfill). NTC Orlando began using the landfill around 1972 and ceased disposal operations there in 1978. In late 1981, NTC Orlando and the Greater Orlando Aviation Authority (GOAA) agreed to an exchange of two parcels of land at McCoy Annex. As part of the land exchange agreement, replacement golf course facilities were to be provided to NTC Orlando on the parcel of land received from the GOAA. In 1982, construction of the golf course was completed.

From 1950 to 1960, a salvage yard was operated by and at McCoy AFB. In 1960, DPDO took over responsibility of the salvage yard and continues this role under the command of NTC Orlando. Since 1974, McCoy Annex has served primarily as a housing and community support facility for NTC Orlando.

4.2.2 Historical Sites. There are no historical sites at or near any of the four areas comprising the NTC Orlando Complex.

4.3 LEGAL ACTIONS. There are no records or evidence of past environmental legal actions against the NTC Orlando Complex.

4.4 BIOLOGICAL FEATURES. The Naval Training Center, Orlando covers an area of approximately 2072 acres. This total area is divided into 4 areas: NTC (1095 acres), Area "C" (46 acres), NTEC Annex (54 acres) and McCoy Annex (877 acres). Plant and animal life at the four areas are very similar and are described in the following sections.

4.4.1 Ecosystems. NTC complex lies within the Florida section of the Atlantic Coastal Plain and has a subtropical climate. Natural vegetation consists of pine and scrub hardwoods in unimproved areas. These unimproved areas, although not extensive (100 acres, 5 percent of the total area of NTC Orlando Complex), provide habitat for wildlife including the bald eagles (Haliaeetus leucorephalus), the peregrine falcon (Falco peregrinus), and the snowy egret (Egretta thula). Maintained areas are covered with Pensacola Bahia grass, pine, oak, palm trees and locally adapted shrubs. Land at NTC Orlando Complex can be classified as follows:

<u>CATEGORIES</u>	<u>ACREAGE</u>	<u>COMMENTS</u>
Improved	1156	grounds on which maintenance are performed primarily to obtain a pleasing appearance.
Semi-improved	54	grounds on which maintenance is performed primarily to provide an erosion resistant stand of grass, to control weeds and brush, and to reduce fire hazard.
Unimproved	100	all other unpaved areas not included in improved and semi-improved categories and on which no maintenance is performed.
Others	762	pavement, lakes, roads, buildings, and land not available for productive use.

4.4.1.1 Terrestrial Flora and Fauna.

4.4.1.1.1 Predominant at NTC are three species of native trees: live oak (Quercus virginiana), pine (Pinus elliottii) and cabbage palm (Sabal palmetto). Natural stands of these three species of native trees have been preserved on the station (Naval Facilities Engineering Command, 1983a). Other ornamental trees and shrubs have been planted to supplement the preserved trees. Listed below are some of the ornamentals growing on the station (Naval Facilities Engineering Command, 1983a).

<u>Common Name</u>	<u>Botanical Name</u>
Bottle-Brush	Callistemon spp.
Senegal Date Palm	Phoenix reclinata
Oleander	Nerium oleander
Pittosporum	Pittosporum tobira
Viburnum	Viburnum spp.
Azalea	Rhododendron spp.
Juniper	Juniperus spp.

Areas maintained by groundskeepers are principally vegetated by Pensacola Bahia grass, pines, oaks, palms and locally adapted shrubs. Hybrid bermuda grass has been established on two of the drill fields in the recruit training area of NTC. Wooded areas (11 acres, 1 percent of the total area of NTC) support wildlife species such as the bald eagle (Haliaeetus leucorephalus), the peregrine falcon (Falco peregrinus), and the snowy egret (Egretta thula).

4.4.1.1.2 Predominant in Area "C" are four tree species: slash pine (Pinus elliotti), live oak (Quercus virginiana), australian pine (Casuarina equisetifolia) and cabbage palm (Sabal palmetto). Almost all vegetation occurs within the undeveloped area around Lake Druid, which is located less than 400 feet from Area "C" (Naval Facilities Engineering Command, 1983a).

4.4.1.1.3 NTEC Annex is paved with concrete and therefore only birds which are residents of NTC and NTEC Annex occasionally inhabit the area.

4.4.1.1.4 Predominant at McCoy Annex are three species of native trees: slash pine (Pinus ellioti), bald cypress (Taxodium distichum) and live oak (Quercus virginiana). Stands of slash pines and bald cypress occur at the Annex. Additionally, slash pines, live oaks and other ornamental trees and shrubs have been planted in developed land. Listed below are some of the ornamentals planted at the Annex (Naval Facilities Engineering Command, 1983a):

<u>Common Name</u>	<u>Botanical Name</u>
Queen palm	Arecastrum romanzoffianum
Ear Tree	Enterolobium cyclocarpum
Camphor Tree	Cinnamomum camphora
Cajeput Tree	Melaleuca quinquenervia
Crape Myrtle	Lagerstroemia indica
Glossy Privet	Ligustrum japonicum
Viburnum	Viburnum spp.

The Peregrine falcon (Falco peregrinus) and Bald eagle (Haliaeetus leucorephalus) are likely migrant or occasional visitors to the area. The Eastern indigo snake (Drymarchon corais couperi) is a possible breeding resident of McCoy Annex.

4.4.1.2 Aquatic Flora and Fauna

4.4.1.2.1 Two lakes, Baldwin and Susannah, are partially within the boundaries of NTC. These lakes are infested with Florida elodea (Hydrilla verticillata), a submerged aquatic plant, and other weeds. The Corps of Engineers and the University of Florida with cooperation from the Navy have been using grass carp to help control the Hydrilla. Fish species include bass, bluegill, redear sunfish, golden shiner, yellow bullheads and seminole killfish.

Lake Baldwin is 196 acres in size and used for recreation and training by military personnel in addition to public recreation. The lake receives run-off water from administrative areas and the golf course. Lake Susannah is used for recreation by military personnel and the public for fishing, sailing, boating, skiing, and swimming. The present use of Lake Susannah is limited due to growth of Florida Elodea and other weeds (SOUTHNAVFACENCOM, 1984).

4.4.1.2.2 Area "C" gently slopes to Lake Druid located less than 400 feet to the northwest. Lake Druid is not used by Navy personnel and very little by the public due to limited access and heavy vegetative growth in the water. The characteristics of Lake Druid are similar to that of Lake Baldwin and Lake Susannah (see Section 4.4.1.2.1).

4.4.1.2.3 A number of swamps and ditches are located on NTEC Annex. These water bodies flows south into the Boggy Creek drainage basin.

4.4.1.2.4 Lakes Conway and Warren are located on the northern boundary of McCoy Annex. Further information on these lakes is unavailable. Additionally, the area contains numerous golf course retention lakes and ditch which drains into Boggy Creek less than three miles southeast of McCoy Annex.

4.4.2 Endangered, Threatened and Rare Species. The Endangered Species Act of 1973 (Public Law 93-0205), as amended, provides that all federal agencies shall carry out programs for the conservation of listed endangered and threatened species. Federal agencies must ensure that actions authorized, funded, or carried out by them will not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitats as determined by the Secretary of the Interior (OPNAVINST 5090.1, 1983).

A species is endangered when its prospects of survival and reproduction are in immediate jeopardy. A species is threatened or rare when, although not immediately facing extinction, it is in such small numbers throughout its range that it may become endangered if its present environmental conditions deteriorate.

Cooperating biologists from the State of Florida and U.S. Department of Interior have surveyed the NTC Orlando Complex and have reported that a number of both state and federally listed species are either resident or transients, and must be protected (SOUTHNAVFACENCOM, 1984b). These species include the following:

Bald Eagle (Halioeetus leucorephalus)

Federal Status:	Endangered
State of Florida Status:	Threatened
Residence Status:	Unlikely breeding resident; likely migrant or occasional visitor.
Description and Habitat:	The bald eagle is the national bird and has a predominant white head and white tail. The immature bird has a dusky head and tail. It usually shows some whitish in the wing linings and breast.
Distribution:	Resident chiefly near ocean, rivers and lakes from Gulf of Mexico, north to Arctic; winters north as far as ice-free water permits.

Pergrine Falcon (Falco peregrinus)

Federal Status:	Endangered
State of Florida Status:	Endangered
Residence Status:	Likely migrant or occasional visitor.

Description and Habitat: Recognized as a falcon by its long, pointed wings and long narrow tail, and its quick 'rowing' wing-beats that are not unlike the flight of a pigeon. Its size, near that of a crow, identifies it as this species.

Distribution: Breeds mainly on cliffs from Arctic south, locally to north Georgia and north Louisiana, winters from north United States, south to Gulf of Mexico.

American Alligator (Alligator mississippiensis)

Federal Status: Threatened

State of Florida Status: Special concern

Residence Status: Confirmed breeding resident

Description and Habitat: This large reptile of the crocodile group is shorter and blunter than the crocodile.

Distribution: Resides near edges of lakes, ponds and rivers, and the interiors of swamps and marshes.

4.5 PHYSICAL FEATURES. NTC Orlando complex is generally predominated by lakes, intermittent ponds, swamps and marshes. They are connected by sluggish streams or by wide shallow sloughs. The lithology varies from medium to fine sand and clayey sand erosional remnants. The area in and around the Naval complex is quite diverse lithologically and geomorphologically (see Figure 4.5.3). The land surface has been shaped predominantly by marine forces and later modified by solution removal of portions of the underlying carbonate material.

4.5.1 Climatology. NTC Orlando complex is located in central Florida about 50 miles west of the Atlantic Ocean, and 90 miles east of the Gulf of Mexico. The presence of numerous ponds and lakes in and around Florida have a significant effect on the climate of the region. Humid winds prevail most of the year from the Atlantic Ocean on the east coast of Florida. On Florida's west coast, the Gulf of Mexico provides a warming effect to counterbalance cold fronts moving in from the north. Generally, the humidity is very high during evenings and it decreases and tapers off as the day progresses along with rising temperatures. The winds originate from south and east during the period from February-August, whereas the cooler breeze originates from north-northwest direction during Septemebr-January. The recorded data suggests the average yearly wind speed of 6 to 10 miles per hour, with March

and April being the windiest months. Throughout the year, the skies are cloudy to partly-cloudy. Thunderstorms occur quite frequently in central Florida, with more than 100 days of lightning occurring annually (SOUTHNAVFACENCOM, 1978).

The average annual temperature is 72°F, and average annual rainfall is 51 inches. Out of the annual 51 inches of precipitation, 70 percent returns to the atmosphere by evaporation and transpiration (Anderson and Joyner, 1966). During June to September, the monthly average temperature varies from 80 to 83°F, with rainfall averaging 7 to 8 inches per month. The coolest and driest month is January with an average temperature of 60°F and rainfall of two inches. In spite of the wide variation in temperature and the high humidity, the climate in central Florida is still considered to be comfortable.

4.5.2 Topography. The NTC Orlando Complex is comprised of four different sites located in Orange County, Florida. They are the Naval Training Center (NTC), McCoy Annex, Area "C," and the Naval Training Equipment Center (NTEC) Annex. The topography varies from gently sloping to flat, with the presence of numerous ponds and lakes in and around the NTC Complex. The general elevation of all four areas averages about 108 feet above mean sea level.

NTC is located at the highest elevations of the NTC Complex. It varies from 130 feet above mean sea level near the Recruit Training Command to 91 feet above mean sea level near Lake Baldwin. Erosion problems are common along the western portion of the lakes due to the steeply sloping topography. Surface water from NTC is discharged into Lakes Susannah and Baldwin primarily through runoff. These lakes in turn discharge into the Little Econolockhatchee River located about six miles southeast of NTC. The Little Econolockhatchee River drains into the Econolockhatchee River joining the St. John's River in a northerly direction.

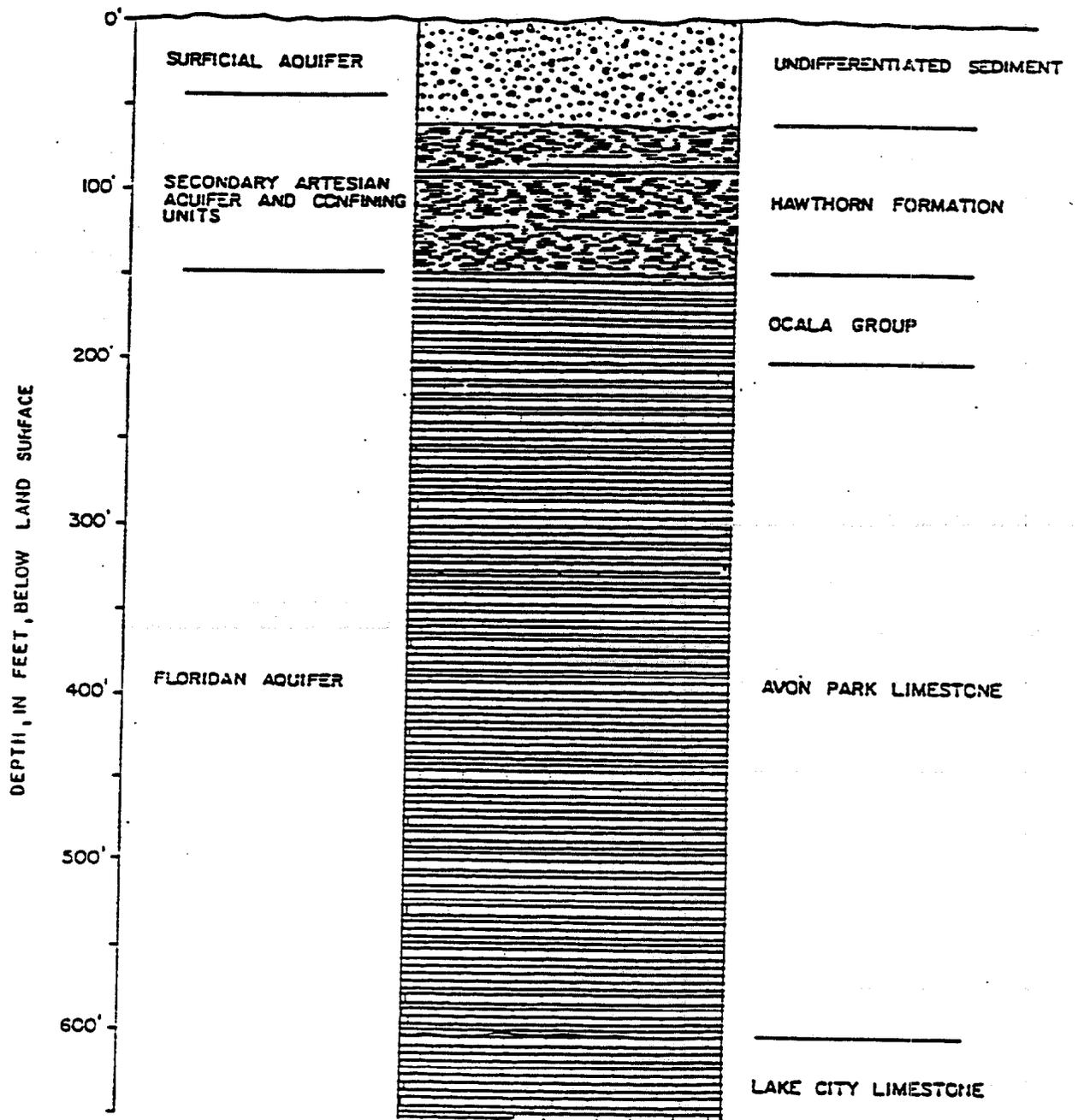
The terrain at McCoy Annex is essentially flat to gently sloping from north to south. The elevation ranges from 80 to 95 feet above mean sea level. An extensive drainage network keeps the station relatively well-drained and free from flooding. Surface water runoff flows south into the Boggy Creek drainage basin.

Area "C" is located southwest of NTC, sloping east to west with elevations varying from 110 to 114 feet above mean sea level. Area "C" slopes gently to Lake Druid in the northwest corner. Small insignificant flood prone areas surround Lake Druid.

4.5.3 Geology. The Naval Complex at Orlando, Florida consists of undifferentiated sediments mostly consisting of sands, clay and shell. These sediments are underlain by marine carbonate rocks of well indurated limestones and dolomites in composition. The Naval Complex is characterized by five different geological units, varying in thickness and age. The deposits range in age from the Eocene Epoch (58 to 35 million) to the Recent. The oldest deposit present in the area is of Upper Eocene in age. The general characteristics of the geological formations are summarized in Table 4-1 and a generalized geologic cross-section is presented in Figure 4-3.

TABLE 4-1
 SUMMARY OF THE PROPERTY OF THE GEOLOGIC FORMATION PENETRATED
 BY WATER WELLS IN ORANGE COUNTY, FLORIDA

Series	Formation Name	Thickness, in feet	Description of Material	Water-bearing properties	Aquifer
Holocene and Pleistocene Pliocene	Undifferentiated, may include Caloosahatchee Marl	0-200	Mostly quartz sand with varying amounts of clay and shell.	Varies widely in quantity and quality of water produced.	Nonartesian
Miocene	Hawthorn Formation	0-200	Gray-green, clayey quartz sand and silt; phosphatic sand; and buff, impure, phosphatic limestone, mostly in lower part.	Generally impermeable except for limestone, shell, or gravel beds.	Shallow artesian, lower limestone beds may be part of Floridan aquifer.
Eocene	Ocala Limestone	0-125	Cream to tan, fine, soft to medium hard, granular, porous, sometimes dolomitic limestone.	Moderately high transmissivity, most wells also penetrate underlying formations	Floridan
	Avon Park Limestone	400-600	Upper section mostly cream to tan, granular porous limestone. Lower section mostly dense, hard, brown, crystalline dolomite.	Overall transmissivity very high, contains many interconnected solution cavities. Many large capacity wells draw water from this formation.	Floridan
	Lake City Limestone	More than 700. Total Unknown.	Dark brown crystalline layers of dolomite alternating with chalky fossiliferous layers of limestone.	Similar to Avon Park Limestone. Municipal supply of cities of Orlando and Winter Park obtained from this formation.	Floridan



SOURCE: GERAGHTY & MILLER, 1984

FIGURE 4-3
 GENERALIZED GEOLOGIC CROSS-SECTION AT THE NAVAL TRAINING CENTER
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

The thickness of the undifferentiated deposits average 150 feet. These deposits primarily consist of quartz sands with varying amounts of clayey sands, clays, and shell materials. At the Naval Complex, these deposits extend to a depth of 65 feet below surface (Geraghty and Miller, 1984). The age of these formation varies from Pliocene to Recent.

The Hawthorn Formation of Miocene age underlies the undifferentiated deposits and varies in thickness from 0-250 feet. At the Naval Complex, the thickness is approximately 85 feet, and extends to a depth of 150 feet (Geraghty and Miller, 1984). The highly variable, diverse lithologic character of the Hawthorn includes interbedded and interfingering sands, clayey sands, sandy clays, phosphatic sediments, dolomites, and limestones. The carbonate rocks that generally occur in the lower Hawthorn contain highly variable amounts of sand, clay and or phosphorite. The Hawthorn sediments underlie most of the Naval Complex except in the limestone area, and in scattered areas where it was removed by erosion prior to deposition of younger sediments. The dolomites of the Hawthorn formation are buff-colored, crystalline, soft to hard, and impure, containing varying amounts of sand, clay and phosphorite. The lower permeability sediments of the Hawthorn formation comprise the confining layers that hydraulically separate the water table aquifer from the underlying Floridan aquifer.

The Floridan aquifer underlying the Hawthorn formation is primarily composed of limestone and dolomitic limestones. This aquifer consists of three different formations of limestone: the Ocala limestone, Avon Park Limestone, and Lake City Limestone. The formations are primarily Upper Eocene in age (Lichtler and others, 1968).

The Ocala group limestone that underlies the Hawthorn formation is the youngest group of the Floridan aquifer. It is made up of three formations: Crystal River, Williston and the Inglis of the late Eocene age. The Ocala group limestones are cream to tan, fine, soft to medium hard, granular, porous with sporadic occurrence of dolomitic limestones. At the Naval Complex, the Ocala Group is approximately 50 feet thick, and extends to a depth of 200 feet.

The Avon Park limestone underlies the Ocala group, which is generally 400 feet thick. This group extends in depth from 200 to 600 feet below land surface and is distinguished from neighboring formations by the occurrence of many sand sized, cone-shaped foraminifera. In many areas, the Avon Park is composed primarily of the shells of tiny single celled animals. The upper section of the formation is mostly cream to tan, granular, porous limestone, while the lower section consists of dense, hard, brown, crystalline dolomite.

Lake City limestone, the oldest formation in Orange County, Florida, underlies the Avon Park limestone. The formation is generally more than 700 feet thick. The Lake City group consists of alternating layers of hard, porous to dense, crystalline dolomitic and soft to hard, cream to tan, chalky, fossiliferous limestones and dolomitic limestones. The Lake City limestone is distinguished from the overlying Avon Park limestone by the presence of the fossil Dityoconous americanus. No water wells penetrate the total thickness of the Lake City group, but the formation is probably more than 700 feet thick (Lichtler and others, 1968).

4.5.4 Soils. NTC Complex is covered by two soil associations (see Figure 4-4):

- the Lakeland-Eustis-Blanton-Orlando association found throughout NTC, Area "C", and NTEC Annex, and in a small northernmost section of McCoy Annex;
- the Leon-Immokalee-Pomello-St. Johns association found in the remainder of McCoy Annex.

The Lakeland-Eustis-Blanton-Orlando association is composed of somewhat excessively drained to moderately well drained soils formed from thick deposits of sand. The soils are generally near level to strongly sloping, but, a few short, steep slopes can be found near lakes, ponds, streams and sink-holes. Most of the soils consists of fine sands to depths of more than 42 inches. The surface layer is usually grayish brown to dark gray and 4 to 8 inches thick except in the Orlando soils where it is dark gray to black and 9 to 18 inches thick. The lower horizons vary from yellow or yellowish brown to light gray, white or yellowish red in color (USDA/SCS, 1960).

The Leon-Immokalee-Pomello-St. Johns soils association is characterized by somewhat poorly drained soils formed from moderately thick deposits of sand. The surface layer varies in color from light gray to very dark gray and black and may be 8 to 60 inches thick. It is underlain by an organic pan at depths varying from 14 to 60 inches in the main soils of the association (USDA/SCS, 1960). An extensive system of drainage canals were created over the years to improve the characteristics of the soil at NTC Annex. Some muck pockets can be found in the area (SOUTHNAVENCOM, 1983a).

4.5.5 Hydrology

4.5.5.1 Surface Hydrology. The area adjacent to the NTC Orlando Complex is bounded by a number of large and small lakes. The areas of NTC, NTEC Annex and Area "C" drain into Lake Spier, Lake Baldwin, Lake Susannah, Lake Gear, and by a County-owned drainage canal into the Little Econolockhatchee River located about six miles southeast of NTC. Lakes Susannah, Baldwin and Gear are located partially within the boundary of the NTC. Lake Spier is located less than 400 feet off the northern boundary of NTC. Drainage at McCoy Annex is conveyed through numerous golf course retention lakes and ditches, to Lake Conway and Lake Warren in the north, and to the south by way of Boggy Creek for about four miles south to the Kissimee River (see Figure 4-1). Lake Conway and Lake Warren are both located about 0.25 miles north of McCoy Annex. The surface water bodies mentioned above are classified as Class III waters (suitable for recreation, harvesting, propagation and maintenance of a healthy well-balanced population of fish and wildlife).

The hydrologic cycle for Orange County reveals that out of an annual precipitation of 51 inches, 70 percent of the precipitation returns to the atmosphere by evaporation and transpiration, about 20 percent flows as stream flow and 10 percent infiltrates into the ground (Anderson and Joyner, 1966).

4.5.5.2 Flood Hazard. The 50 and 100 year flood elevations for NTC are 94.5 feet above mean sea level and 94.8 feet above mean sea level, respectively. The large number of lakes and drainage canals, the highly permable soils,

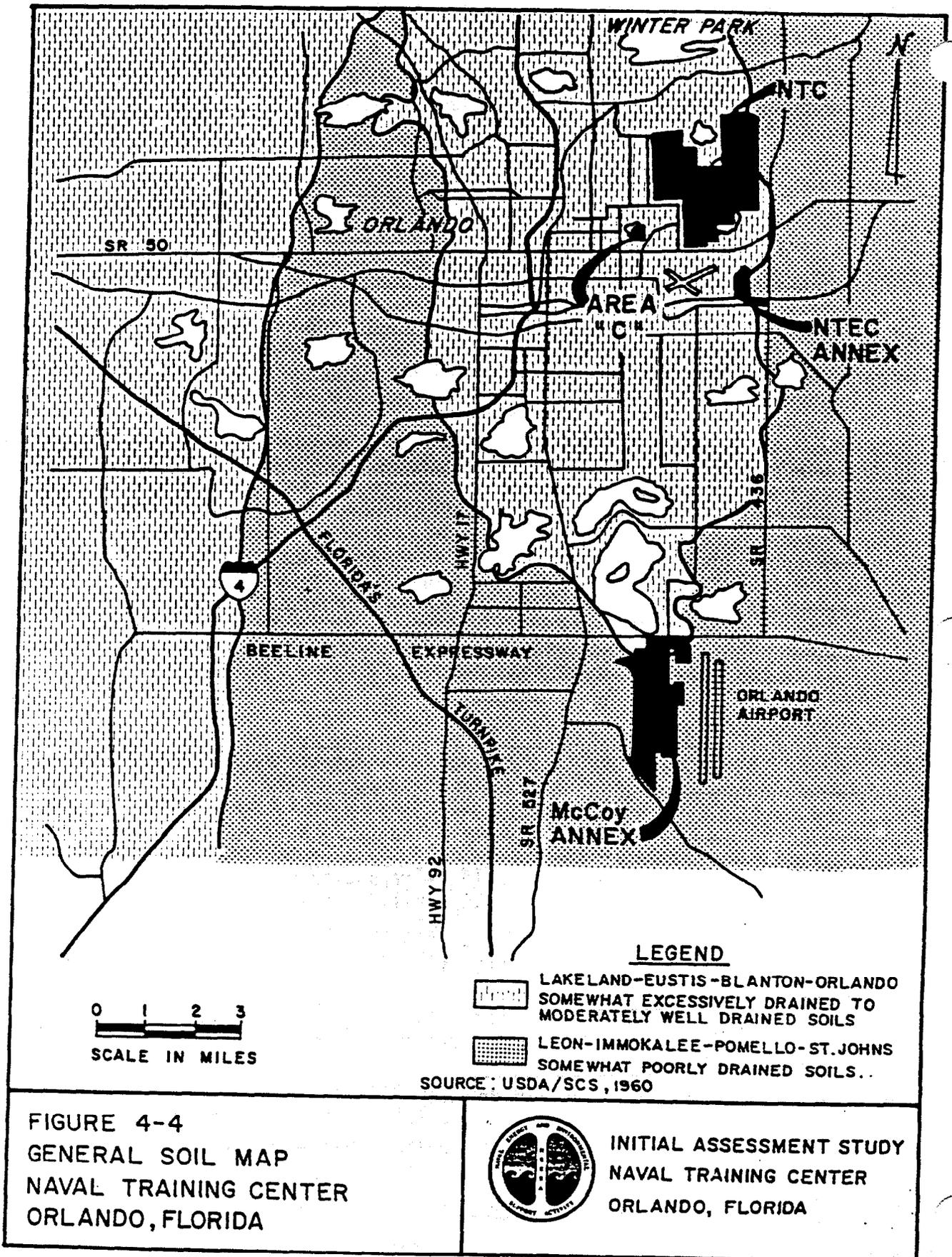


FIGURE 4-4
 GENERAL SOIL MAP
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

the high rate of evapotranspiration, and the fact that most of the NTC Orlando Complex is topographically higher than these elevations almost eliminates flooding as a threat in the area. The only flood prone areas are narrow bands of land surrounding the lakes on and adjacent to the activity. Typically, the 50 and 100 year flood levels extend to less than 200 feet from the lakes.

4.5.5.3 Groundwater Hydrology. Ground water at NTC Orlando Complex occurs in three aquifers: the water table, the secondary artesian, and the principal artesian or Floridan aquifer. The direction of ground water flow in the water table aquifer generally follows the topography and in the Floridan aquifer is easterly. Information on the direction of flow in the secondary artesian aquifer is not available.

The water table aquifer extends throughout the activity and is mainly composed of quartz sand with varying amounts of clay and shell overlying the confining layer of the Hawthorn formation. The thickness of the aquifer is highly variable throughout Orange County, but is approximately 70 feet below ground surface at the activity surface (Scott, 1978).

At McCoy Annex, bailing tests have been performed to determine the permeability of the surficial aquifer. The results indicate that the permeability ranges from 0.1 to 4.5 feet per day (ft/day) and averages 2.8 ft/day. Lab constant head permeability tests on remolded Shelby tubes samples resulted in vertical permeabilities averaging to 5.1 ft/day (Geraghty and Miller, 1984). The water level in Orange County ranges from 0-20 feet below the land surface (Lichtler and others, 1968). Water levels at the activity reportedly range from 3 to 9 feet below the ground surface (Geraghty and Miller, 1984). In general, wells in the water table aquifer are 20-40 feet deep, and yield sufficient water for domestic use (5 to 10 gpm). However, there are no supply wells tapping this aquifer existing in the area of the NTC Orlando Complex. Two shallow monitoring wells were installed at the McCoy Annex Landfill. The 4-inch wells are believed to be approximately 15 feet deep. It is unknown why these wells were installed.

Recharge of the water table aquifer by precipitation occurs throughout the unpaved areas of the activity. The generally excessively well drained soils of the activity facilitate ground water recharge. Flow through the water table aquifer is expected to be mainly lateral from areas of high topography to areas of natural discharge (lakes and drainage channels). The water table aquifer is separated from the secondary artesian aquifer by a clayey cap ranging in thickness from zero to 20 feet.

The secondary artesian aquifer lies within the clayey confining beds of the Hawthorn formation and is composed of discontinuous shell beds, thin limestone lenses, or permeable sand and gravel zones. The aquifer generally occurs at depths ranging from 60 to more than 150 feet below ground surface. The secondary artesian aquifer generally yields sufficient water for domestic use (Lichtler and others, 1968). However, no wells tap this aquifer in the area of NTC Orlando. The transmissivity and storage coefficient for the secondary artesian aquifer have been estimated to be 31,800 gallons per day per foot (gpd/ft) and 0.003, respectively (Boyle Engineering Corp, 1982). The secondary artesian aquifer does not respond to rainfall indicating that water enters and leaves the aquifer at a slow rate. The hydraulic

connections to the water table aquifer and Floridan aquifer are rather poor (Lichtler and others, 1968). In general, the secondary artesian aquifer yields less water than the underlying Floridan aquifer, but more than the overlying water table aquifer.

The Floridan aquifer, underlying the confining layer of the Hawthorn formation, consists of three types of limestones: Lake City Limestone, Avon Park Limestone, and Ocala Limestone. These limestones vary in age from middle Eocene to Upper Eocene. Generally, the aquifer consists of alternating layers of the limestones mentioned above and dolomite. The thickness of the aquifer in and around Orlando is estimated to be about 2000 feet (Lichtler and others, 1968). The Floridan aquifer is the most productive aquifer in the southeast region of the U.S.A. and is used widely for domestic and industrial purposes. The Orlando Utilities Commission (OUC) operates a water supply well at the southeast corner of NTC. This well is 1400 feet deep and taps the lower zone of the Floridan aquifer. The lithologic and hydrologic character of the Floridan aquifer is not uniform, either horizontally or vertically (Lichtler, 1972).

The Floridan aquifer has two primary water producing zones. The upper zone, consists of the Ocala and Avon Park Limestones and ranges from 150 to 600 feet below ground surface. The lower zone consists of the Lake City Limestone and ranges from 1000 to 1500 feet below ground surface. Transmissivity values for the upper zone are estimated to vary between 270,000 and 596,000 gallons per day per foot (gpd/ft), and for the lower zone between 4,300,000 and 5,000,000 gpd/ft (Boyle Engineering Corporation, 1982). Separating the two major producing zones is a 300-400 foot series of relatively impermeable layers composed of soft limestone, and dolomitic limestone. These impermeable layers contain some water bearing cavities, but generally yield less water than the upper and lower zones.

Figure 4-5 illustrates the potentiometric surface of the Floridan aquifer at the NTC Orlando Complex for September 1983. As can be seen, the regional ground water flow within the Floridan aquifer is easterly (Geraghty and Miller, 1984). There are numerous solution caverns and channels (cavities where the stone has dissolved) within the producing zones of Floridan aquifer, with some caverns as large as 90 feet in diameter (Lichtler, 1972). Most of the water movement within the aquifer is through these interconnected caverns and cavities.

The major source of ground water recharge to the Floridan aquifer comes from rainfall percolating through the water table aquifer in the northwestern part of Orange County. This area of recharge is about 20-25 miles from the NTC Orlando Complex. However, additional recharge is received by underground flow from adjacent counties. The percentage of recharge by underground flow from outside the county to the Floridan aquifer is unknown.

Drainage wells to the Floridan aquifer are found throughout Orange County, Florida. These wells are mainly used to drain the surface water into the upper zones of the aquifer (Lichtler and others, 1968). Twelve drainage wells have been in use in 1943 at the Orlando Air Force Base (Kimrey, 1978). These wells are reportedly no longer in use. Exact locations of the wells are not known. The drainage wells are considered an additional source of recharge to the Floridan aquifer.

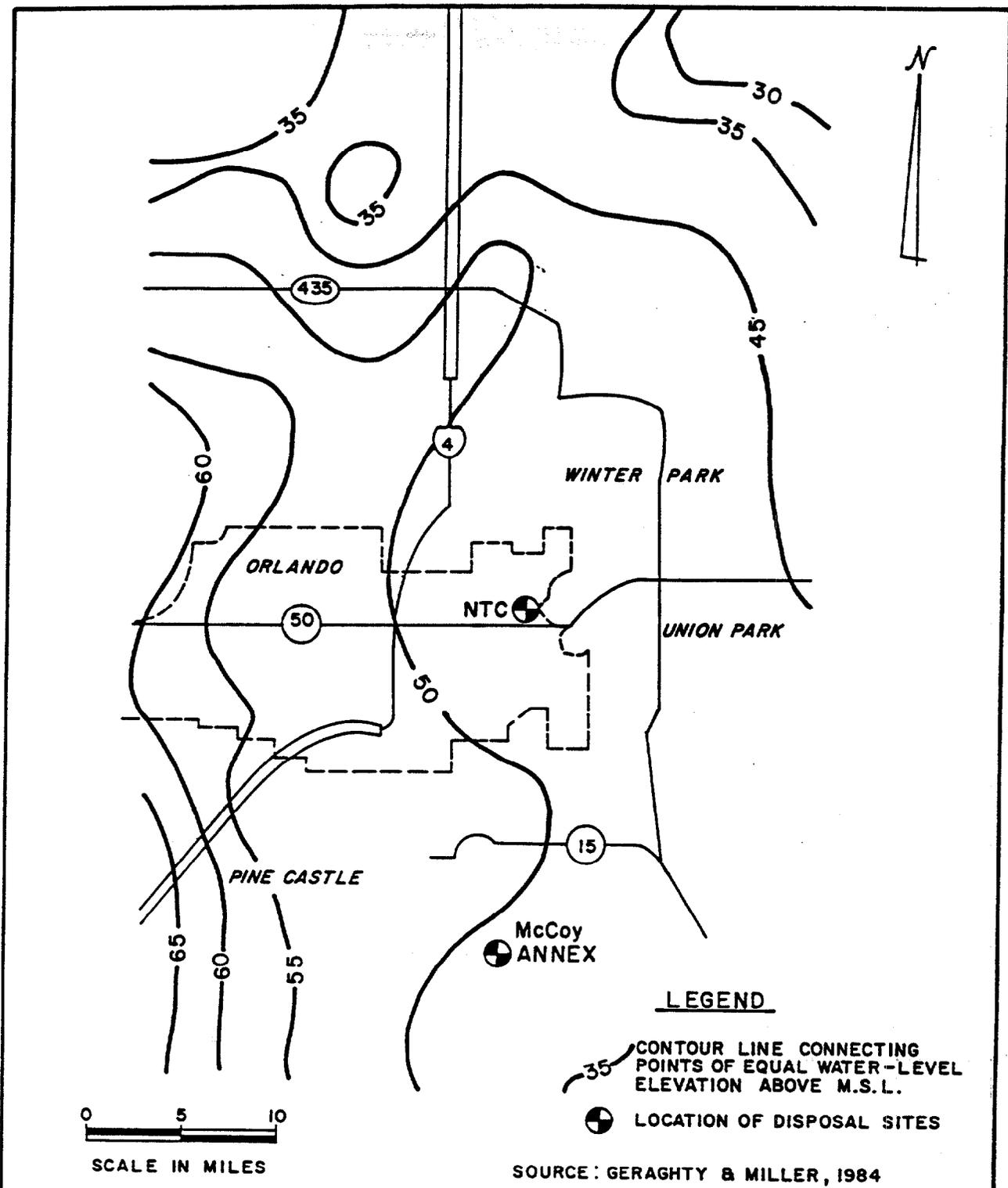


FIGURE 4-5
 POTENTIOMETRIC SURFACE OF THE
 FLORIDAN AQUIFER, SEPT., 1983
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

4.6 **MIGRATION POTENTIAL.** Contaminant migration at NTC Orlando Complex can occur by both surface water and ground water. Surface water contaminant migration can occur in ditches, generally during storm events when contaminants could be flushed into these ditches. Surface water drainage at NTC and McCoy Annex is directed to small lakes that are used for fishing and recreation on the activity. The most likely pathways of surface water to activity lakes is through small intermittent streams and the storm drainage system. The lakes and rivers adjacent to the activity will ultimately receive most contaminants that migrate from disposal and spill areas on the activity. These lakes and rivers are designated Class III waters suitable for fish and wildlife propagation and for water contact sports.

Since the threat of flooding in the area of the NTC Orlando Complex is relatively non-existent, flooding is not a significant concern when analyzing the contaminant migration routes for the sites at the activity.

Ground water in alluvium and in shallow soil zones discharges to streams. Any soluble contaminants that enter the shallow ground water will migrate downgradient to streams.

The water table aquifer extends approximately 40 feet below land surface and is mainly composed of quartz sand with varying amounts of clay and shell. The composition of the aquifer along with the abundant rainfall at NTC Orlando provide recharge to the water table aquifer. The presence of any pollutants on the surface would migrate vertically downwards along with the recharging water thereby posing a threat to contaminate the water table aquifer. The presence of 12 drainage wells at NTC and Area "C" may also provide a route of contamination of pollutants from the surface into the upper zone of the Floridan aquifer.

Other factors affecting the migration potential and environmental impact of contaminants include soil attenuation, microbial degradation, diffusion, and chemical reaction. All of these factors can decrease the migration and effects of the wastes.

4.7 **WATER QUALITY.** The State of Florida has established water standards under Florida Statutes (FS) 403.061, Chapter 17-3 (DER, 1983). The following sections summarize the criteria established for surface and ground waters in the vicinity of the activity.

4.7.1 Surface Water Quality. All surface waters of the state have been classified according to designed uses as follows:

CLASS I	Potable Water Supplies
CLASS II	Shellfish Propagation
CLASS III	Recreation, Harvesting Propagation and Maintenance of a Health Well-Balanced Population of Fish and Wildlife

CLASS IV**Agricultural Water Supplies****CLASS V****Navigation, Utility and Industrial Use.**

As a minimum, all surface waters of the state are classified as Class III except for certain waters which are classified in the other classes. There are no exceptions in Orange County, and hence all surface waters in the county including those in the vicinity of the activity are classified as Class III. This applies to Lakes Spier, Baldwin, Susannah, Conway, and the Econolockhatchee River and Boggy Creek.

Class III waters must meet a number of general criteria established for all surface waters pertaining to arsenic, BOD, chlorides, chromium, dissolved oxygen, lead, nutrients, oils and grease, pH, chlorinated phenols and several other parameters. In addition, Class III waters must meet criteria for a number of specific parameters including alkalinity, aluminum, bacteriological quality, cadmium, mercury, nickel, aldrin, chlordane, polychlorinated biphenyls and several other inorganics and organics.

4.7.2 Ground Water Quality. All ground water of the state of Florida are classified according to the designated uses as follows:

- | | |
|-------------|---|
| CLASS G-I | Potable water use, ground water in single source aquifers which has a total dissolved solids content of less than 3,000 milligrams per liter. |
| CLASS G-II | Potable water use, ground water in aquifers which has a total dissolved solids content of less than 10,000 milligrams per liter, unless otherwise classified by the Commission. |
| CLASS G-III | Non-potable water use, ground water in unconfined aquifers which has a total dissolved solids content of 10,000 milligrams per liter or greater, or which has total dissolved solids of 3,000 to 10,000 milligrams per liter and either has been reclassified by the Commission as having no reasonable potential as a future source of drinking water, or has been designated by the Department as an exempted aquifer pursuant to Section 17-28.13(3), F.A.C. |
| CLASS G-IV | Non-potable water use, ground water in confined aquifers which has a total dissolved solids contents of 10,000 milligrams per liter or greater. |

Generally, water in the water table aquifer is soft (hardness less than 25 milligrams per liter), low in mineral content (25 to 50 milligrams per liter) and acidic in composition (Lichtler and others, 1968), (Lichtler, 1972). The acidic composition makes the water corrosive.

The ground water in the secondary artesian aquifer is generally less mineralized than water in the underlying aquifer and more mineralized than water from the water table aquifer (Lichtler and others, 1968) (Lichtler, 1972). The dissolved solids concentrations range from 100 to 400 parts per million (ppm) with predominating ions being calcium and bicarbonate.

The quality of water in the Floridan aquifer varies greatly throughout the region, but varies little with time at a particular location and depth. Geology is the major factor influencing the natural quality of water in Orange County. The aquifer is composed of limestones, which is soluble, and the presence of carbon dioxide in the water, dissolved from the atmosphere or vegetation, increases the rate of solution. As water moves through the aquifer, it becomes more mineralized until equilibrium is reached (Lichtler and others, 1968) (Lichtler, 1972).

Domestic water is supplied to the NTC Orlando Complex by the Orlando Utilities Commission. This water originates from the lower producing zone Floridan aquifer. The dissolved solids content of water received at NTC, Area "C," and NTEC Annex range from 150 to 200 parts per million (ppm), and at McCoy Annex, from 200 to 300 parts per million. The hardness at NTC, Area "C," and NTEC Annex is less than 150 parts per million and at the McCoy Annex ranges from 150 to 250 parts per million. The chlorine concentration throughout the activity ranges from 10 to 25 parts per million. Ground water in Orange County tends to become more mineralized from west to east of Orlando (Lichtler and others, 1968) (Lichtler, 1972).

4.8 WATER SUPPLY. The domestic water supply for the NTC Complex is obtained from the municipal system of the Orlando Utility Commission (OUC). The activity purchases water from the OUC through six separate metering points. Two points each serve NTC and Area "C" and one each serves McCoy Annex and NTEC Annex. The State government owns the distribution system, chlorination stations, and storage tanks. The NTC Complex water system consists of 382,730 feet of 4-inch to 12-inch distribution lines. NTC area has a ground level storage of 871,000 gallons, as well as elevated storage of 400,000 gallons. McCoy Annex has two elevated storage tanks of 175,000 and 450,000 gallons capacity. Neither of these tanks at McCoy Annex are connected to the system (SOUTHNAVFACENCOM, 1978).

A major portion of the water distribution system at NTC is over 30 years old. The system in the north and south sections of NTC area were installed in 1965. The system serving the center of the base and the Naval Hospital were installed during World War II. The distribution system at NTC Annex has been constructed in stages over the past 25 years.

In order to improve the water distribution system, OUC provided a well and water plant on the southeast corner of the NTC. The well is 1400 feet deep and taps the lower producing zone of the Floridan aquifer. The water supply plant was constructed with a 20-inch minimum diameter main which was tied into the Bennett Road 16-inch main in 1981.

CHAPTER 5. WASTE GENERATION

5.1 GENERAL. A variety of industrial operations have occurred at the Naval Training Center Orlando Complex over the years. Most of the shops have been in support of ground vehicles, photography and base maintenance operations. This chapter discusses the shops on base that have the potential for producing hazardous wastes. Past operations are described as completely as possible, while current operations are discussed to enhance an understanding of past waste generation practices.

5.2 INDUSTRIAL OPERATIONS. Industrial operations which generate hazardous wastes at the Naval Training Center Orlando are discussed in this section. The section is broken into four major subsections: industrial shops at NTC; industrial shops at NTEC Annex; industrial shops at McCoy Annex; and industrial shops at Area "C."

Some of the shops discussed were operated by the Air Force before the Navy took over the base. Information on waste generation and disposal during the Air Force operation is scanty, but what information is available is discussed in each shop description.

All wastes generated on the base since the Navy began operation in 1968 have been disposed of off-base by a private waste disposal contractor.

5.2.1 Industrial Shops at NTC. The auto hobby shop, Navy Exchange (NEX) Service Station and Public Works Shops make up all the industrial operations which generate hazardous waste at NTC.

5.2.1.1 Auto Hobby Shop. The auto hobby shop at NTC provides facilities to enlisted personnel for private vehicle maintenance. The shop has been located in Building 129 since 1975. An underground waste oil tank (approximately 250 gallon capacity) was also installed in 1975 and was used for collecting waste engine oil and small amounts of transmission fluid and diesel fuel until the middle of 1985. Every two weeks, a waste oil disposal contractor has picked up about 100 gallons of waste material from the tank and disposed of the contents off-base. Oil contaminated solvents are now placed in separate 55-gallon drums and hauled off-base by a private waste hauling contractor. Small amounts of solvents (trichloroethylene) have been used for cleaning engine parts since 1975. The solvents are wiped off with rags and the rags placed in dumpsters for off-base disposal. Prior to this date, diesel fuel was used for this purpose. About 5 gallons of diesel fuel per month were used and wiped off with rags which were disposed in dumpsters.

5.2.1.2 Photo Shop. From the early 1950s until 1968, film processing was conducted in Building 2097 by the Air Photographic and Charter Service, a tenant activity at the Orlando Air Force Base. This tenant was responsible for developing U.S. Air Force movies and still photographs. Reportedly, the operation was larger than the photo shop that has since operated at NTC. During this period, film developing chemicals were discharged to the storm

sewer which drains to lake Baldwin (see Section 8.10, Site 9). All empty chemical containers and solid wastes (film and unused powdered chemicals) were disposed of at either Site 1 or Site 3 (see Sections 8.2 and 8.4). Table 5-1 identifies types of waste and estimated waste quantities reportedly generated by film processing operations before 1968.

From 1968 to 1976, the NTC photo shop operated out of Building 2097. Since 1976, the photo shop has been located in Building 2039. Chemicals used in color negative, color print, and black and white negative and print processes, as well as special projects since 1968 are shown in Table 5-1. Until 1978, film was processed in dip tanks. Spent chemicals from the tanks were flushed down the drain to the NTC wastewater treatment plant. Since 1978, continuous process machines have been in use for color and black and white film processing. The film processing chemicals are diluted with large amounts of water before disposal to drains. Ultimate disposal is to the Orlando Utilities Commission (OUC) wastewater treatment plant. Since 1968, waste fixer solution has been collected and sent off-base for silver recovery.

5.2.1.3 Navy Exchange Service Station. Private vehicles operated by persons assigned to NTC may be serviced at the NTC Navy Exchange (NEX) Service Station. Approximately 30 to 50 gallons of waste engine oil and cleaning solvents (trichloroethylene) have been generated each month by the service station since it began operations in 1972. Old undrained batteries and the waste oil and solvents have always been collected by a private contractor for off-base reclamation. The NEX Service Station has three underground 20,000 gallon gasoline storage tanks that were installed when the station was built in 1972. There were no reports or evidence of leaking from the tanks.

5.2.1.4 Public Works Shops at NTC. The Public Works Department operates the following seven shops: Carpentry/Masonry/Painting; Transportation Vehicle Maintenance; Locksmith; Electrical; Metal Trades; Pest Control; and the Heating/Boiler Plant.

5.2.1.4.1 Carpentry/Masonry/Painting Shop. From 1960 to 1968, the Air Force operated a carpentry, masonry and painting shop in Building 2025. No records exist on waste generation, but the shop was probably ran similarly to the Navy operation which began in 1968. Wastes generated during Air Force occupation were probably disposed of in either Site 1 or Site 3.

The Navy operation at this shop is also located in Building 2025. The shop performs maintenance and repair of buildings and other facilities at NTC. Procedures have changed very little since the Navy began operation of the shop in 1968. Types and quantities of materials used at the shop since 1968 are shown in Table 5-2. Most of the materials have been used up in the operations leaving little waste. Empty containers and rags have been disposed of in dumpsters.

5.2.1.4.2 Transportation Vehicle Maintenance Shop. This shop, located in Building 2079, has been responsible for the maintenance of government vehicles at NTC since 1968. An aboveground waste oil tank at the shop approximately 50 gallons in capacity has been emptied about once a month by a waste oil disposal contractor. About 70 gallons of waste oil per month have been generated and disposed of since 1968. Mineral spirits have been used

TABLE 5-1

ESTIMATED PHOTO SHOP WASTE GENERATION AND DISPOSAL
NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL WASTE QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>
Early 1950s to 1968 (Air Force)	<u>Black & White Prints</u>		
	Developer	1,800 gallons	Storm sewer to Lake Baldwin
	Fixer	27,600 gallons	Storm sewer to Lake Baldwin
	Developer replenisher	4,000 gallons	Storm sewer to Lake Baldwin
	Activator	17,400 gallons	Storm sewer to Lake Baldwin
	Acetic Acid	900 gallons	Storm sewer to Lake Baldwin
	<u>Black & White Negatives</u>		
	Developer	1,100 gallons	Storm sewer to Lake Baldwin
	Fixer	3,300 gallons	Storm sewer to Lake Baldwin
	Acetic Acid	minute quantities	Storm sewer to Lake Baldwin
	<u>Color Print</u>		
	Developer	800 gallons	Storm sewer to Lake Baldwin
	Developer replenisher	2,400 gallons	Storm sewer to Lake Baldwin
	Acetic acid	900 gallons	Storm sewer to Lake Baldwin
	Bleach fix	800 gallons	Storm sewer to Lake Baldwin
	<u>Color Slides</u>		
	E-4 process chemical	5,700 gallons	Storm sewer to Lake Baldwin
<u>Color Negatives</u>			
Developer	800 gallons	Storm sewer to Lake Baldwin	
Acetic Acid	800 gallons	Storm sewer to Lake Baldwin	
Bleach fix	800 gallons	Storm sewer to Lake Baldwin	
Stabilzer	800 gallons	Storm sewer to Lake Baldwin	

TABLE 5-1 (Continued)

ESTIMATED PHOTO SHOP WASTE GENERATION AND DISPOSAL
 NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL WASTE QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>
1968 to 1978 (Navy)	<u>Color Print</u>		
	Developer	500 gallons	Drain to WWTP
	Developer replenisher	1,600 gallons	Drain to WWTP
	Acetic Acid	600 gallons	Drain to WWTP
	Bleach fix	500 gallons	Drain to WWTP
	<u>Color Slides</u>		
	E-4 process chemical	3,800 gallons	Drain to WWTP
	<u>Color Negatives</u>		
	Developer	500 gallons	Drain to WWTP
	Acetic Acid	500 gallons	Drain to WWTP
	Bleach fix	500 gallons	Drain to WWTP
	Stabilizer	500 gallons	Drain to WWTP
	<u>Black & White Prints</u>		
	Developer	1,200 gallons	Drain to WWTP
	Fixer	18,400 gallons	Drain to WWTP
	Developer Replenisher	2,700 gallons	Drain to WWTP
Activator	11,600 gallons	Drain to WWTP	
Acetic Acid	600 gallons	Drain to WWTP	
<u>Black & White Negatives</u>			
Developer	700 gallons	Drain to WWTP	
Fixer	200 gallons	Drain to WWTP	
Acetic Acid	minute quantities	Drain to WWTP	

5-4

TABLE 5-1 (Continued)

ESTIMATED PHOTO SHOP WASTE GENERATION AND DISPOSAL
 NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL WASTE QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>
1978 to February 1985 (Navy)			
	<u>Special Projects</u>		
	Kodak Dektal developer	260 gallons	Drain to WWTP
	Kodak Super RT developer	minute quantities	Drain to WWTP
	Kodak fixer	35 gallons	Drain to WWTP
	Kodak D-76	270 gallons	Drain to WWTP
	Hunt Stafix fixer & replenisher	280 gallons	Drain to WWTP
	Orbet bath	840 gallons	Drain to WWTP
	Photo Flo 600	7 gallons	Drain to WWTP
	<u>Color Negative Process</u>		
	Flexicolor developer starter	10 quarts	Drain to WWTP
	Flexicolor developer	270 gallons	Drain to WWTP
	Flexicolor developer replenisher	1,330 gallons	Drain to WWTP
	Flexicolor stabilizer & replenisher	270 gallons	Drain to WWTP
	Flexicolor fixer & replenished bleach	270 gallons	Drain to WWTP
	Unicolor Rapid E-6	170 gallons	Drain to WWTP
	<u>Paper Prints</u>		
	Electaprint - 2 developer	Unknown	Drain to WWTP
	Electaprint - bleach fix	590 gallons	Drain to WWTP
	<u>Black & White Prints</u>		
	Royal Print stop bath	320 gallons	Drain to WWTP
	Royal Print activator	630 gallons	Drain to WWTP
	Royal Print fixer	1,700 gallons	Drain to WWTP

TABLE 5-2

TYPES AND QUANTITIES OF MATERIALS USED AT THE
CARPENTRY/MASONRY/PAINTING SHOP SINCE 1968
NTC ORLANDO, FLORIDA

<u>Materials Used</u>	<u>Estimated Quantity Per Year</u>
Muratic acid	3 to 4 gallons
Contact cement	6 gallons
Lacquer thinner	100 gallons
Latex paint	1,000 gallons
Enamel paint	10 gallons
Paint and varnish stripper	15 gallons
Mineral spirits	50 gallons

for parts cleaning. The used mineral spirits were poured into the shop's waste oil tank up to until the middle of 1985. About 40 to 60 gallons of waste mineral spirits have been generated each year. Also, approximately 12 waste batteries have been generated each month at this shop. The undrained batteries are exchanged for new batteries through the shop's off-base battery supplier.

5.2.1.4.3 Locksmith. The locksmith shop, located in Building 2025, has been responsible for making and repairing locks and keys for use at NTC since 1968. Very little waste is generated from the shop. About 2 cans of WD-40 have been used each week. Empty cans have been placed in a dumpster.

5.2.1.4.4 Electrical Shop. This shop has been located in Building 2025 since 1979. The electrical shop has conducted interior electrical work such as maintenance of wiring and lighting fixtures. Waste generated by the shop has been mainly empty solvent cans. The following types and approximate quantities of materials have been used on a yearly basis: contact cleaner (24-13 oz. spray cans), cleaning solvent (12-13 oz. spray cans), WD-40 (24 to 36-8 oz. spray cans) spray paint (6-13 oz. spray cans) and lube oil (4 to 5 gallons). Empty cans have been placed in dumpsters. The Electrical Shop has also been responsible for the transformer storage area located adjacent to the old coal storage area. Transformers have been stored here until they are removed from the base by a private contractor. This storage facility has been operated since 1980. No work is done to the transformers other than oil sampling to test for PCBs. Transformer storage is discussed in Chapter 6.

5.2.1.4.5 Metal Trades Shop. The metal trades shop has been located in Building 2025 since its inception in 1977. Work done by the shop includes plumbing and pipe fitting, metal fabrication and repair and maintenance of air ducts and gutters. Chemicals used in the shop have included small amounts of cutting oil, WD-40, and silicone in spray cans. Most of these materials are consumed during shop use. Empty containers and rags have been disposed of in the dumpsters. Scrap metal and broken equipment has been submitted to the Defense Property Disposal Office at NTC.

5.2.1.4.6 Pest Control Shop. The pest control shop at NTC has been at its current location in Building 139 since 1972. From the early 1950's to 1972, a pest control building was located adjacent to the golf course near the current location of the senior officers' quarters. This building was demolished and the debris covered with soil in 1972. Pesticides being stored in the building were buried along with the demolition debris. Types of pesticides reportedly stored at the building include chlordane, phenol, mercuric compounds, baygon, diazinon, anticoagulants, malathion, pyrethrum, diuron, 2,4-D, and monuron. Assuming that five percent of the average monthly usage at the time of demolition was buried with the building, an estimated quantity of 300 gallons of pesticides may have been disposed of at this location (see Section 8.9, Site 8).

The pest control shop is responsible for the control of all types of pests and insects. All pesticides have been mixed in an indoor mixing room since 1972 in an effort to contain spills. The quantity of solution mixed is limited to that which will be used at the time. Pesticide containers, sprayers and other equipment are rinsed at an unbermed area in front of the building. Rinse water has been discharged to the sewer system. Pesticide

containers have been punctured after a triple rinse and placed in a dumpster. Table 5-3 identifies types and quantities of pesticides used per year at NTC. The table is based on usage during 1970.

5.2.1.4.7 Heating/Boiler Plant Branch. The Heating/Boiler Plant Branch has been responsible for the maintenance and operation of the various steam and hot water boilers located at the activity. The shop generates very little waste. Small quantities of caustic soda have been used to blow down the boilers. The blowdown water has been discharged to the sewer system. Asbestos gaskets have been replaced on an as needed basis. The old gaskets have been placed in a plastic bag and then sealed in a drum since around 1978. The drums have been picked up once a month by the Defense Property Disposal Office at NTC or as needed. Prior to 1978, the gaskets were landfilled in McCoy Annex (see Section 8.4, Site 3).

5.2.1.5 Fire Fighting. The Fire Department has been reportedly located in Building 2013 since the 1940s. The Navy took over operation of the Fire Department in 1968. Personnel are responsible for fire fighting, fire safety inspections and other associated activities at each of the four areas of the NTC Orlando Complex. Fire fighting training by recruits has been conducted at NTC. The Fire Department has never conducted any burning during fire fighting exercises at NTC. However, on one occasion over the last five years, fuel was reportedly placed on the ground near the old coal pile and burn during training exercises. Also, gas has been placed in one gallon barrels and used for extinguisher practice. The station generates little hazardous waste. Small quantities of paint and oil have been used by the department. Empty containers for touch-up painting and equipment lubrication are placed in dumpsters.

5.2.2 Industrial Shops at McCoy Annex. There are three industrial shops located at McCoy Annex which generate hazardous wastes. They are the auto hobby shop, the motor pool shop and the pest control shop.

5.2.2.1 Auto Hobby Shop. The auto hobby shop at McCoy Annex has been located in Building 7184 since 1969. A 250 gallon aboveground tank has been used for collecting waste engine oil since the shop was located in this building. The tank has been emptied about once every 3 months and the contents disposed of off-base by a waste oil contractor. About 200 gallons have been handled during each disposal. Some time in the mid 1970s, stained soils adjacent to the tank had to be removed to a depth of three feet in an area approximately 3 feet by 10 feet due to past spillage or overflow of waste oil from the tank. It is likely that this waste oil contaminated soil was landfilled in McCoy Annex Landfill (see Section 8.4, Site 3). The tank was then moved to a concrete pad. Reportedly, solvents have not been used at this shop. From 1969 to 1984, small quantities of diesel fuel were used to clean engines and then poured into the waste oil tank. Used rags were disposed of in dumpsters for removal from the base by a waste disposal contractor. Waste oils from the tank have been picked up by Defense Property Disposal Office (DPDO) since the Navy began operations at the Annex in 1974.

The Air Force operated the auto hobby shop at McCoy Annex in Building 7184 from the 1969 to 1974. No records or information describing waste generation or disposal during the Air Force occupation exists. Therefore, it can be

TABLE 5-3

TYPICAL TYPES AND QUANTITIES OF PESTICIDES USED AT NTC
ORLANDO, FLORIDA

<u>Type of Pesticide</u>	<u>Quantity used per year (Diluted with water before application).</u>
Baygon	301 gallons
Diazinon	10,140 galons
Chlordane	7,714 gallons
Dieldrin	5 gallons
Malathion	3,247 gallons
Anticoagulant	902 pounds
2,4-D	21,600 gallons
Pyrethrum	95 gallons
Diuron	3,000 gallons
Paraquat	500 gallons
Kepone	11,200 gallons
Endothall	40,400 pounds
Naled	2,300 gallons
Monuron	1,400 pounds
Mineral Oils	200 gallons
Arsenic	1,600 gallons
Dchlorvos	10 pounds
Hydrothol	3,150 pounds
Dimethoate	50 gallons

assumed that the shop was operated similarly to the initial Navy operation and that the waste generation quantities and types were similar. Waste engine oil from the Air Force auto hobby shop was probably disposed of at the McCoy Annex Landfill (see Section 8.4, Site 3).

5.2.2.2 Motor Pool. McCoy Annex Motor Pool, has been located in Building 7171 since 1974. The Motor Pool has been responsible for the maintenance and repair of vehicles used by the Army Reserve Units. Wastes generated from the Motor Pool consist primarily of oils and antifreeze.

Waste engine oil and antifreeze (ethylene glycol) have been stored in 55 gallon drums on an outdoor asphalt pad. Since 1974, these waste have been picked up once a month by a private contractor for off-base reclamation. From 1974 to 1984, oil was changed every few months on approximately 150 vehicles. Each vehicle generates 26 quarts of waste oil each year. Therefore, in this time span, about 2000 gallons of waste oil were generated each year. Since 1974, vehicle oil samples have been sent to a lab for testing of parameters which affect the useful life of the oil. Oil changes are based on the results of the analysis and servicing is performed on an as needed basis. Since 1984, approximately three to four 55 gallon drums of waste oil every three months have been picked up by the DPDO for sale to an off-base waste oil recycling firm. Approximately 6 waste batteries have been generated each month at the motor pool. Since the Navy began operation in 1974 the undrained batteries have been sent off-base to a battery reclamation contractor.

5.2.2.3 Pest Control Shop. Pesticide operations at McCoy Annex were originally located in the old golf course maintenance building located at the northern end of McCoy Annex. When the Beeline Expressway (a major highway) was constructed in late 1981, this building along with the old golf course were abandoned. Building 7203 was constructed when the golf course was relocated to the southern end of McCoy Annex in 1981. The pesticides used for golf course maintenance were moved from the old golf course maintenance building to Building 7203. Pesticides used at McCoy Annex are similar to pesticides used at NTC, however, smaller quantities are used. Empty containers have been triple rinsed, crushed, and placed in the trash dumpsters.

5.2.3 Industrial Shops at Area "C". The NTC Laundry is located east of the main activity at Area "C". Since 1968, the laundry has cleaned all Navy issue uniforms and clothing. However, the Air Force operated the laundry facility from 1941 to 1968. It is assumed that during this period conventional wash water was discharged to the storm sewer which drained to Lake Druid. Reportedly, the Air Force operated the dry cleaning facility similarly to the NTC operation. Therefore, the major dry cleaning solvents used were perchloroethylene and Stoddard Solvent. From 1958 to 1967, about 25 gallons of perchloroethylene still bottoms were generated each month and disposed of at the North Field Grinder Landfill (see Section 8.2, Site 1). At that time, diatomaceous earth filters were used to remove soil from the solvents. From 1958 to 1967, approximately 70 pounds of perchloroethylene

and Stoddard Solvent contaminated diatomaceous earth filter media were disposed of at the North Field Grinder Landfill (see Section 8.2, Site 1). The disposal locations for the perchloroethylene still bottoms and solvent contaminated diatomaceous earth filters for the period from 1941 to 1958 are unknown.

From 1968 until the mid 1970s, diatomaceous earth filters continued to be used to remove contaminants from the dry cleaning solvents (perchloroethylene and Stoddard Solvent) in the laundry's two dry cleaning machines. Approximately 70 pounds of contaminated diatomaceous earth filters (35 pounds contaminated with perchloroethylene and 35 pounds contaminated with Stoddard Solvents) were disposed of each week. The contaminated diatomaceous earth filters along with approximately one 25 gallon drum of perchloroethylene still bottoms were placed in the dumpsters. During this period, the dumpsters containing the solvent contaminated diatomaceous earth filters and perchloroethylene still bottoms were disposed of off-base by a waste disposal contractor. In the mid 1970s, the diatomaceous earth filters were replaced with cartridge type (folded paper) filters. Approximately 340 cartridges every ten months were disposed in dumpsters until early 1980. From 1980 to early 1985, approximately 440 cartridges were disposed of in the same time period due to the addition of a third dry cleaning machine. Prior to disposal, the cartridges were drained for about one week to recover dry cleaning solvents (perchloroethylene and Stoddard Solvent) for reuse. The drained filters have been placed in dumpsters that were hauled off-base and contents disposed of by a waste disposal contractor.

Since 1984, a cartridge stripper has been used to remove perchloroethylene from the cartridges. The stripper uses steam to distill perchloroethylene for reuse from the cartridges. Until early 1985, the steam stripped cartridges were crushed and placed in dumpsters that were hauled off-base and contents disposed of by a waste disposal contractor. Since early 1985, the crushed, steam stripped filters have been placed in 55 gallon drums and turned into the Defense Property Disposal Office at NTC. Since the Navy began operating the laundry, spent laundry water (from conventional clothes washing) has been discharged to a surge/equalization basin (about 12 feet wide by 25 feet long by 10 feet deep) located outside and adjacent to the laundry building. From this basin, wash water has been pumped to the sewer system at a controlled rate. The wash water contains dye from uniforms and phosphorus from detergent. Reportedly, in 1984 the tank overflowed, due to pump failure, allowing wash water to discharge to nearby Lake Druid (100 feet from the tank).

5.3 TENANT ACTIVITIES

5.3.1 Recruit Training Command (RTC). The RTC, located in Building 200 at NTC, has provided basic recruit training for enlisted personnel since 1968. Along with classroom work, the RTC operates an indoor rifle range in Building 229. Recruits have 1-1/2 hours (7 rounds) of hands-on training with pistols and rifles. Ammunition includes .38, .45 and .22 caliber. Approximately 80 pounds of lead alloy each month have been collected downrange from these training exercises. The lead is accrued in containers and turned into the

Supply Department for salvage. Brass from the different caliber bullets is separated each month when the downrange impact area is cleaned. Since 1968, lead air filters, used to filter lead from the air ventilation system of the firing range, have also been changed and turned over to a waste disposal contractor. Materials used to clean weapons include VVL 800, a light lubricant oil, and Breakfree, a solvent. These materials have been stored in the rear of the armory in concrete lockers. Approximately 30 ounces of VVL 800 are used every three months and 15 gallons of Breakfree every six months. The solvents are wiped off with rags which are turned over to the Supply Department. Empty containers have been placed in dumpsters since 1968. Potassium bicarbonate and soda acid bottles are kept on hand to extinguish oil fires, should they occur. Reportedly, no fires have occurred.

Since 1968, the fire fighter training school at the RTC (Building 200) has used an average of 26,000 gallons of No. 2 diesel oil, 1,000 gallons of MOGAS, and 179,000 therms of natural gas each year for its practice fires (Naval Facilities Engineering Command, 1973). The school operates two fire fighter training units. Each unit contains two concrete live fire training rooms. These rooms are equipped with natural gas after-burners to reduce smoke to acceptable levels. The fuel is used until it is emulsified to the point where it no longer burns. Sludge residues, containing a mixture of water, No. 2 fuel oil, unburned hydrocarbons, and particles of metal have been hauled off-base by a waste disposal contractor since 1970. From 1968 to 1984, once every three to four months, approximately three to four dump truck loads (about 1,000 gallon capacity) of sludge were pumped from the two units' oil/water separators located at Building 200. Since 1984, most training fires are put out with water; occasionally carbon dioxide liquid mix is used. Fire fighter training wastewater enters an oil/water separator and is reused. Small amounts of water (5 to 10 gallons) may leave the area by way of the storm drains.

A summary of hazardous wastes generated by the RTC is shown on Table 5-4. Other wastes include wood, metal, electronic speakers and other types of waste such as personnel support equipment. All of these wastes have been turned over to DPDO.

5.3.2 Service School Command (SSC). The SSC in Building 340 has been a tenant of NTC since 1969 and provides training in Basic Electronic and Electricity, and special training for Torpedoman's Mates, Quartermasters, and Signalmen.

The Basic Electronics and Electricity course is designed to teach basic computer electronics so that the recruits have an understanding of torpedo operations. Torpedo test sets, for all types of torpedoes, are electronically calibrated and repaired. Since 1969, wastes generated from the courses have included tricell batteries (containing mercury) from the test sets and vacuum tubes from old test equipment. Undrained batteries have been turned over to Defense Property Disposal Office (DPDO) once every six months. Vacuum tubes are turned over to the DPDO on an infrequent basis.

TABLE 5-4

ESTIMATED RTC WASTE GENERATION AND DISPOSAL
NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>
1968 to 1984	Fuel oil sludge	9,000 gallons/year	Removed off-base by private waste hauler.
1984 to Present	Fuel oil sludge	12,200 gallons/year	Removed off-base by private waste hauler.
1968 to Present	Lead Alloy	880 pounds/year	Off-base, handled by DPDO salvage
1968 to Present	Lead Filters (Ventilation System)	200	Removed off-base by private waste hauler.

The Torpedoman's Mate course is divided into an A School and a C School. The A School teaches basic torpedo theory, and the C School teaches more detailed information about specific torpedoes. Students have hands-on experience in tearing down and rebuilding the torpedoes which contain substitute materials; no ordnance or otto fuels have ever been used.

Solvents, such as mineral spirits and trichlorodifluoromethane, and denatured alcohol have been used to clean torpedo parts and electrical contacts since 1969. The mineral spirits are in a 50-gallon dip tank that is drained into 55-gallon drums. Since 1969, about 50 gallons every six months have been turned over to DPDO for disposal. Empty trichlorodifluoromethane (Freon) aerosol cans and cleaning rags containing mineral spirits, freon and alcohol have been disposed of in dumpsters. Reportedly, this has been the practice since 1969. These solvents are kept in a storage room inside of Building 304.

The other two courses, Quartermaster and Signalman training, require no handling of hazardous or toxic materials. A summary of waste generation and disposal practices for the SSC is shown on Table 5-5.

5.3.3 Naval Hospital. The Naval Hospital as a tenant of NTC provides clinical and hospitalization services for active duty members of the Navy, Marine Corps and other armed services. The hospital has always occupied the same land area and has been in Building 500 since 1980. The Air Force operated the hospital from a tent in the 1940s until a structure was built in the 1950s. The Navy took over operation of the hospital in 1967 and apparently demolished this structure when Building 500 was constructed.

Pathological wastes from the hospital and McCoy Annex Clinic were and presently are first autoclaved, and then incinerated. Autoclaving has been practiced since hospital operations began in 1942. However, wastes have been incinerated only since 1980. These autoclaved materials, as well as pharmaceuticals (unusable drugs and empty drug containers), were probably placed in dumpsters and disposed of in North Field Grinder Landfill (see Section 8.2, Site 1) until 1967 when the landfill was closed. Since 1967, these wastes have been disposed of off-base by a waste disposal contractor. Chemicals used by the hospital, since it began operations in the 1940s, include methanol and formaldehyde. Waste methanol and formaldehyde have been disposed of to the sewer system and then conveyed to the treatment plant. Xylene and alcohol were also used to make tissue slides from the 1950's to 1982. Waste xylene and alcohol were placed in cans and allowed to evaporate outside. A total of about 5 gallons of chemicals were disposed in this way every two weeks. The use of these chemicals was discontinued in 1982.

Chemicals containing silver from x-ray processing have been sent off-base to be recovered since approximately 1965 to at least 1980. Sometime after 1980, silver recovery units were installed in the hospital. From the 1940s to 1965, they were presumably disposed of in North Field Grinder Landfill (see Section 8.2, Site 1). The hospital operates six processing machines, and also collects the solutions from x-ray processing at the recruit dispensary and the McCoy Annex clinic. Table 5-6 lists the estimated waste generation and disposal practices employed by the Naval Hospital.

TABLE 5-5

ESTIMATED SSC WASTE GENERATION AND DISPOSAL
NTC ORLANDO

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>	<u>COMMENTS</u>
1969 - February 1985	Tricell Batteries (Hg)	8 batteries per year	Off base	Disposed of through DPDO and private contractor
	Vacuum tubes from old test equipment	1 tube per year	Off base	Disposed of through DPDO and private contractor
	Mineral Spirits	570 gallons per year	Off base	Disposed of through DPDO and private contractor
	Denatured Alcohol	23 gallons per year	Off base	Disposed of through DPDO and private contractor

TABLE 5-6

ESTIMATED NAVAL HOSPITAL WASTE GENERATION AND DISPOSAL
 NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>	<u>COMMENTS</u>
1940's to Present	Pathological wastes and pharmaceuticals (tissues, blood, penicillin)	Unknown	Site 1 prior to 1967, off-base disposal from 1967 to present, began incineration in 1980	Autoclaved prior to disposal
1940's to Present	Methanol formaldehyde	Unknown	Drain	
1940's to Present	Xylene alcohol	1,820 gallons combined	Evaporated outside building	
1940's to Present	X-ray film processing solution containing silver	3,000 gallons each month (includes from hospital, recruit dispensary, and McCoy Annex clinic)	Site 1 prior to 1965, off-base 1965 to present	Silver recovered by contractor since 1965

5.3.4 McCoy Annex Clinic. The McCoy Annex Clinic, a family practice satellite of the Naval Hospital, has been located in Building 7201 since the Navy took over the operation in 1974. Prior to 1974, the Air Force operated a dispensary from this building. With a present staff of around 20 people, including only one physician, the Clinic operates their own pharmacy and x-ray laboratory.

Wastes from the Clinic have always been handled by the Naval Hospital at NTC. Wastes have been packaged and transported daily to the Naval Hospital for processing and disposal with the hospital's wastes. Although not reported, the Air Force dispensary including waste disposal may have been operated similiarly to the Navy Clinic.

5.3.5 Dental Clinic. Since 1968, the Dental Clinic at NTC located in Building 128 has provided complete dental services to Navy and Marine Corps shore activities, and other military personnel within the assigned geographical area. Wastes generated from the dental clinic has included silver from x-ray development, amalgam (containing mercury) in HGX solution from dental fillings, and beryllium dust from the grinding of teeth casts. Silver and mercury containing solutions have always been sent to DPDO for reclaiming. The beryllium dust has been captured on filters which are disposed of in the dumpster. Table 5-7 identifies types and estimated quantities of wastes generated at the Dental Clinic.

5.3.6 Naval Training Equipment Center. NTEC has been a tenant activity to NTC Orlando since 1965. They have occupied 27 buildings and trailers at NTC and six buildings at NTEC Annex since 1968. These buildings house laboratories, warehouses and administrative offices enabling NTEC to provide research, development, evaluation, procurement, and administrative support of Naval training devices and equipment. Most of the laboratories are computer oriented, utilizing simulation and computer generated imagery.

Small quantities of wastes (10-20 gallons each year) such as solvents (acetone, trichloroethane, trichloroethylene), degreasers, paint thinners, and lacquers have been used by the laboratories. Most of these materials are used up in the laboratory, generating small amounts of waste if any. Empty containers are disposed of in a dumpster that is disposed of off-base by a waste disposal contractor.

Building 606, Software Support Facility, at Herndon Annex is a phototype testing shop. Building 606 is assigned to NTEC. The following materials (with expired shelf lives) were turned into DPDO in 1984 and then disposed of by a waste disposal contractor in December 1984.

Methylene chloride	1 quart
Ammonia capsules	1/2 dozen
Lupersol DDM (a strong oxidizing agent)	2 gallons
Ecostrip 57 (chemical make-up unknown)	3 gallons

TABLE 5-7

ESTIMATED DENTAL CLINIC WASTE GENERATION AND DISPOSAL
NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED TOTAL QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>	<u>COMMENTS</u>
1968 to February 1983	X-ray film processing solution containing silver	3 to 4 gallons each week	Off base	Reclaimed
1968 to February 1983	Amalgum (mercury containing in HGX solution	Small amount	Off base	Reclaimed
1968 to February 1983	Beryllium dust collected on filters	Small amount	Off base	Collected on filters

Methyl ethyl Ketone	2 gallons
Polyester resin	2 gallons
R.T.V. 11 (chemical make-up unknown)	2 gallons
1 unknown container	1 gallon

It is believed that the operation which may have used these chemicals was discontinued in the early 1980s. Since that time, the only chemical used at the Software Support Facility has been a small amount of alcohol. The alcohol has been used to clean computer parts and has been wiped up with rags that are placed in the dumpster for off-base disposal.

Small paint and flammable liquids storage facility, located in NTEC in Building 2067, has been used to store alcohol, freon, and DS2 (a decontamination agent) in spray containers since 1965. This building was formerly a hydraulic power room. There are no reports of leakage or spillage of chemicals from this building. All waste chemicals are turned over to the Defense Property Disposal Office for disposal.

5.3.7 Navy Publishing and Printing Service Branch Office. The Navy Publishing and Printing Service Branch Office (NPPSBO) has been located in Building 2049 at NTC since approximately 1968. The Air Force also operated a printing shop in this building from 1965 to 1968. Currently, they provide printing and duplicating services for NTC Orlando, government activities in the central Florida area, and for the Southeastern Navy Recruiting Office. Five offset printing presses are used for black and white and some color printing. Table 5-8 presents the types and estimated quantities of chemical wastes generated by NPPSBO.

5.3.8 Naval Construction Battalion Unit 419. The Naval Construction Battalion, Unit 419 has been located in Building 7181 at McCoy Annex since October 1982. Their mission is to provide construction services to augment the fleet operation of NTC. Laborers of Unit 419 include carpenters, masons, steelworkers, electricians, plumbers and heavy equipment mechanics and operators. Potentially hazardous materials used during construction operations include paints, lacquer, paint thinner, mineral spirits and various cements and adhesives. These materials have been stored inside a paint locker in Building 7182. Small quantities of waste have been generated since most of these materials are completely used up during the jobs. Empty containers have been placed in dumpsters. Other materials, including motor oil, brake, and transmission fluids, mineral spirits, and antifreeze have been used to maintain vehicles. These materials have been stored in a fenced area behind Building 7182 since 1982. There are no evidence of leakage or spillage of the stored chemicals. These waste have always been disposed of by a private waste disposal contractor.

TABLE 5-8

ESTIMATED PUBLISHING PRINTING SERVICE BRANCH WASTE GENERATION AND DISPOSAL
NTC ORLANDO, FLORIDA

<u>YEARS OF GENERATION</u>	<u>WASTE TYPES</u>	<u>ESTIMATED QUANTITY</u>	<u>LOCATION OF DISPOSAL</u>	<u>COMMENTS</u>
1965 to February 1985	Isopropyl alcohol	1 gallon each week	Drain to WWTP ¹	Diluted with water
1965 to February 1985	Potassium ferrocyanide (electrostatic solution)	2-3 gallons each week	Drain to WWTP ¹	Diluted with water
1979 to February 1985	422 developer (N-propyl alcohol)	5 gallons each two weeks	Drain to WWTP ¹	Diluted with water
1965 to February 1985	Perchloroethylene	5 gallons each week	Off base	
	Petroleum naptha	5 gallons each week		
1965 to February 1985	Photographic fixer	5 gallons each two weeks	Turned over to base photo lab for reclaiming since 1968, prior to this probably disposed down drain	

¹WWTP - Wastewater Treatment Plant

CHAPTER 6. MATERIAL HANDLING: STORAGE AND TRANSPORTATION

6.1 INDUSTRIAL. The Naval Training Center (NTC) includes several facilities and operations similar to industrial facilities. Storage and transportation of NTC materials, supplies, chemicals, pesticides, transformers, and coal are described in the following sections. These sections are divided by location at NTC Orlando Complex. Very little information exists concerning Air Force operations. When available, such information is described in the sections about operations at specific locations.

6.1.1 Naval Training Center (NTC).

6.1.1.1 Materials Storage: Defense Property Disposal Office (DPDO). The DPDO has not operated any facilities at NTC. However, the NTC Orlando Complex has been served by DPDO through facilities in Area "C" (see Section 6.1.4.1) and McCoy Annex (see Section 6.1.3.1).

6.1.1.2 Supply Storage. Supply storage at NTC has been provided through facilities located in Area "C" (see Section 6.1.4.2). There are no supply storage facilities at NTC.

6.1.1.3 Chemical and Hazardous Materials Storage. Hazardous materials and chemical storage for the NTC Orlando Complex have been located in Area "C" since 1959 (see Section 6.1.4). However, at NTC individual shops store small quantities of chemicals for daily operations.

6.1.1.4 Petroleum, Oil, Lubricant Storage. These materials have been stored and used at 332 locations at the activity. Quantities range from small containers of lubricants to large fuel oil tanks. Fuel oil deliveries have always been made by way of truck by a contractor. Shipments of smaller quantities of solvents and lubricants have been handled by Supply and distributed to various shops. There are 81 storage tanks with a capacity of over 1000 gallons and 251 storage tanks at 1000 gallons and less. Locations with respect to building numbers for tanks with capacities greater than and equal to 1000 gallons are shown in Appendix C. There were no reports or evidence of spillage at any of the tanks.

6.1.1.5 Pesticide Storage. Control, storage and use of pesticides at NTC have been the responsibility of the Pest Control Shop in Building 139 since approximately 1981. The Old Pesticide Building (Site 8) was located adjacent to the golf course along Trident Lane from the early 1950s to 1972. Pest control for Area "C" and NTEC Annex has also been handled through these shops. Table 6-1 identifies types and quantities of pesticides stored at NTC. The table is based on typical types and quantities used during 1970 (Naval Training Center, 1970).

TABLE 6-1

TYPICAL TYPES AND QUANTITIES OF PESTICIDES USED AT NTC
ORLANDO, FLORIDA

<u>Type of Pesticide</u>	<u>Quantities used in 1970</u>
Baygon	301 gallons
Diazinon	10,140 galons
Chlordane	7,714 gallons
Dieldrin	5 gallons
Malathion	3,247 gallons
Anticoagulant	902 pounds
2,4-D	21,600 gallons
Pyrethrum	95 gallons
Diuron	3,000 gallons
Paraquat	500 gallons
Kepone	11,200 gallons
Endothall	40,400 pounds
Naled	2,300 gallons
Monuron	1,400 pounds
Mineral Oils	200 gallons
Arsenic	1,600 gallons
Dchlorvos	10 pounds
Hydrothol	3,150 pounds
Dimethoate	50 gallons

6.1.1.6 Transformer Storage. From the early 1960s until 1982 about 30 to 40 transformers at a time were stored in a lot adjacent to Building 2025. This storage area was an unpaved lot fenced on the northeast end. The dimensions of the lot are approximately 12 feet by 30 feet. No maintenance was conducted on the transformers in this area and there were no spills or leaks reported. This area has been used for parking privately owned vehicles since 1982. Since 1982, transformer storage at NTC has been located adjacent to the old coal storage area. The transformer storage area occupies a portion of the area located in the southwest corner of NTC. Dimensions are estimated at less than 225 feet long by 125 feet wide. Approximately 100 transformers have reportedly been stored at the concrete pad and adjacent grass. During the IAS on-site visit, about five of the transformers showed evidence of leakage as indicated by stained oily soil around the transformers. The area of stained soil averaged 6 inches in diameter. None of these transformers were labeled as containing PCBs.

6.1.1.7 Coal Storage. Coal has not been used at the activity since late 1962. All boilers have been fueled with oil or natural gas since then. From the early 1940s until late 1962, coal was stored in an aboveground coal storage pile located west of Building 137 in the southwest corner of NTC along Bennett Road and south of Gate 5. Based on the coal residual noticed at the site during the IAS on-site survey, approximate dimensions of the site are 8 feet to 10 feet wide by 12 feet to 15 feet long.

6.1.1.8 Materials and Waste Transportation. Prior to contractor services for waste hauling in 1968, wastes were deposited in the North Field Grinder Landfill (see Section 8.2, Site 1). The North Field Grinder Landfill was started by the Air Force about 1958. Trenches varying in size from 100 to 200 feet long by 10 to 12 feet wide and 8 feet deep were dug with bulldozers. Reportedly, waste disposed in the landfill included film, photographic chemicals, paint thinner, garbage from mess halls, cardboard boxes, biological wastes from the hospital, paper, plastic, tree limbs and construction materials. Wastes were brought to the site each day (6 to 7 truckloads) covered with soil and compacted with bulldozers.

Since July 1968, the majority of waste generated at NTC has been domestic solid waste which was deposited in dumpsters and removed by a waste disposal contractor. Scrap metal has been collected separately for salvage at DPDO.

From 1958 to January 1985, the DPDO was responsible for collection of hazardous waste at NTC. Since January 1985, DPDO has not accepted hazardous waste. NTC has been considered a small quantity generator of hazardous waste. The major contributors of hazardous waste at the activity were the vehicles maintenance facilities including the NEX service stations, auto hobby shops and the transportation department.

All hazardous waste generated by activity operations since January 1985 has been stored at the place of generation. These wastes have been picked up by a private contractor and then taken off-base for disposal.

6.1.2 Naval Training Equipment Center Annex. Storage and transportation facilities for handling materials at NTEC Annex are located at NTC and Area "C" (see Sections 6.1.1 and 6.1.4).

6.1.3 McCoy Annex.

6.1.3.1 **Material Storage:** Defense Property Disposal Office (DPDO). DPDO at McCoy Annex consists of Buildings 7191 and 7193 and an open paved storage lot. Since 1959, the buildings have provided storage of general supplies and salvageable materials for DPDO. This area was an Army Air Corps and Air Force storage area from 1950 to 1974. The exact contents of the storage during the time of Air Force usage is not known. DPDO has been at the McCoy Annex location since at least 1959. Scrap materials have been stored in the southwest corner of the open storage lot in stainless steel bins approximately 8 feet by 8 feet by 8 feet deep. The majority of the materials are scrap metals. During the IAS on-site visit, approximately 66 drums were being stored near the middle of the DPDO paved lot in an area measuring 300 feet by 150 feet (see Section 8.7, Site 6). The drums have been stored at this location since they were moved from an area adjacent to the fence.

6.1.3.2 **Supply Storage.** Supply storage facilities serving McCoy Annex have been located in Area "C" (see Section 6.1.4.2).

6.1.3.3 **Chemical and Hazardous Materials Storage.** Hazardous materials and chemical storage for McCoy Annex has been conducted in Area "C" since 1950. There were no reports or evidence of previous hazardous material storage facilities at McCoy Annex.

6.1.3.4 **Petroleum, Oil, Lubricant Storage.** These materials have been stored and used at over 300 locations throughout the activity. Section 6.1.1.4 describes these facilities. As shown in Appendix C, there are 21 underground storage tanks with a capacity equal to and greater than 1000 gallons.

6.1.3.5 **Pesticide Storage.** Pest control operations at McCoy Annex have been handled by golf course maintenance personnel in Building 7203 since 1972. Air Force operations began at McCoy Annex in 1950 (known then as Pine Castle AFB). Assuming the golf course was constructed at the same time as the rest of the activity, pest control operations probably began during the early 1950s. When the Expressway was constructed, a new golf course was constructed at the south end of McCoy Annex and Building 7203 was no longer used. Types of pesticides stored were similar to those used at NTC (see Section 6.1.1.5 for types and quantities of pesticides). There were no reports on evidence of pesticide spills or leaks at McCoy Annex.

6.1.3.6 **Transformer Storage.** No transformers have ever been stored at McCoy Annex. Out of service transformers have been stored at either NTC or Area "C" (see Sections 6.1.1.6 and 6.1.4.6).

6.1.3.7 **Coal Storage.** Reportedly, no coal storage has ever occurred at McCoy Annex.

6.1.3.8 Materials and Waste Transportation. Prior to contractor services for waste hauling in July 1968, wastes were deposited in the McCoy Annex Landfill. The western portion of the landfill was reportedly used by the Air Force from about 1960 to 1972. The eastern portion was used by the Air Force and the Navy from 1972 until about 1978. Landfill operations consisted of excavation of ditches (100 to 200 feet long by 20 to 25 feet wide by 10 to 15 feet deep) into which wastes were disposed from trucks. Trenches were filled with waste to within three or four feet of the ground surface and then backfilled with top soil and seeded (see Section 8.4, Site 3).

6.1.4 Area "C"

6.1.4.1 Materials Storage: Defense Property Disposal Office (DPDO). The DPDO has been located in Buildings 1061, 1063, 1066 through 1068 and 1102 in Area "C" at NTC since 1959 (see Figure 6-1). The function of the DPDO has been to accept hazardous and non-hazardous excess or aged government equipment and materials. These materials have usually been sold by DPDO. Since January 1985, DPDO has not transported or accepted hazardous wastes outside of Area "C."

From 1959 to January 1985, hazardous wastes (oils, paints and solvents) were accepted at DPDO in Building 1061. Since 1978, these wastes were stored in a hazardous waste storage area in the southwest corner of the lot located behind Buildings 1061 and 1063. The wastes have been stored uncovered on pallets and in five lockers. The lockers have been used to store paints, insecticides, various types of solvents and asbestos. The types of hazardous wastes accepted have included trichloroethylene (approximately 1 gallon per year), methyl ethyl ketone (approximately 1 gallon per year), ammonium hydroxide (approximately 2 gallons per year), sodium sulfide (approximately 1 pint per year) and mercury (approximately 5 pints per year). Approximately 56 gallons per year of paints have typically been accepted. These wastes have been hauled off-base by a contractor. There have been several cement storage cells along the southern side of the lot in which drained batteries have been stored. Reportedly, no major spills (greater than one gallon) occurred. Occasionally, there have been minor leaks (less than 1/2 gallon). These leaks were cleaned up immediately with absorbant and disposed of off-base by a waste hauling contractor. DPDO has also received about five batteries per month. Reportedly, the batteries were received and sold without being drained.

Materials for sale to the public are handled out of Building 1063. Reportedly, past operations were similar to current operations. Presumably Building 1063 was therefore used for arranging sales of materials. However, the types of materials have varied somewhat over the years. Furniture, desks, chairs, mattresses and stoves have always been handled by DPDO, but due to the nature of Air Force operations, materials such as air craft parts and airfield bedding were also handled between 1959 and 1968.

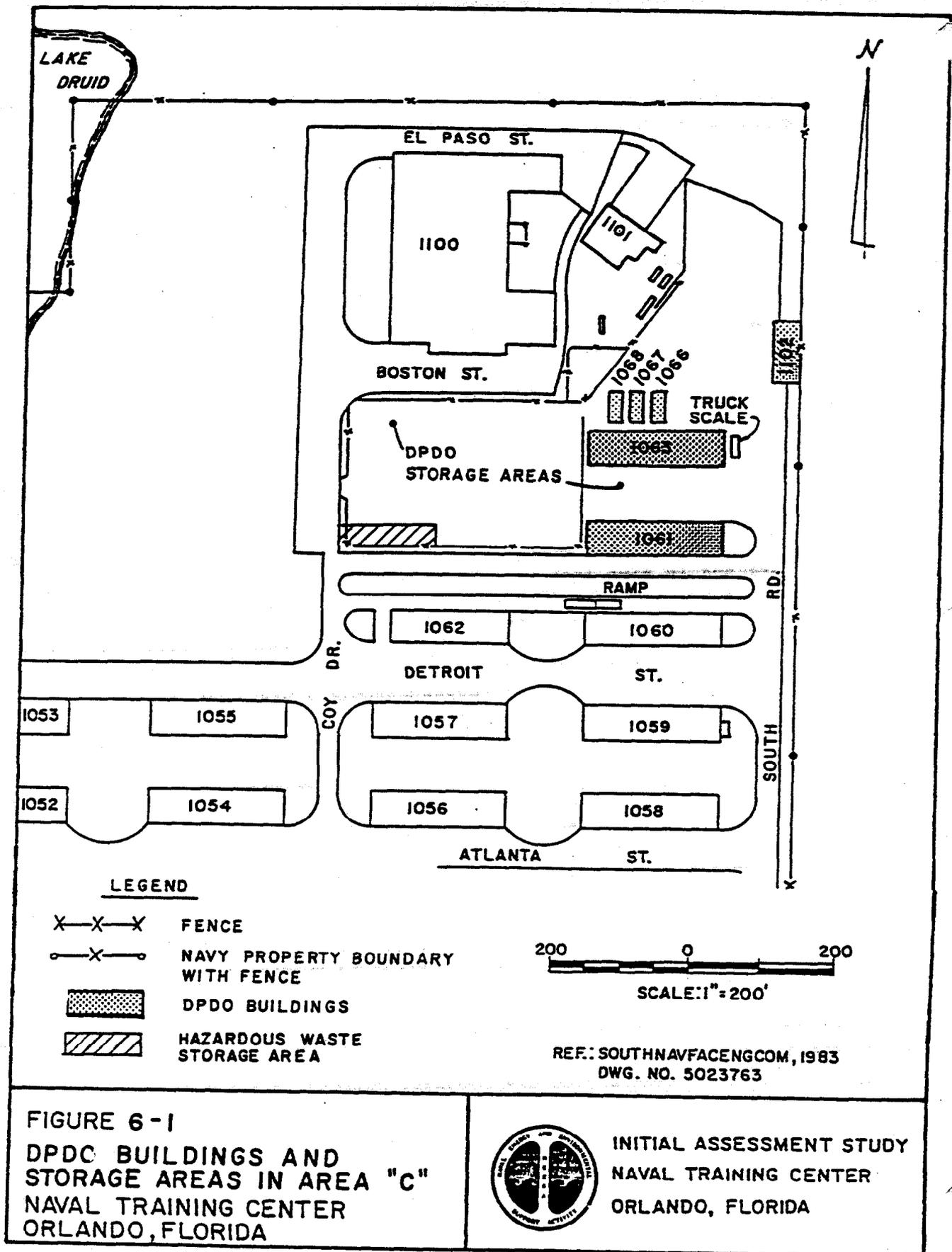


FIGURE 6-1
DPDC BUILDINGS AND
STORAGE AREAS IN AREA "C"
NAVAL TRAINING CENTER
ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Scrap metal and empty 55-gallon drums for resale (on pallets) have been stored in an area northeast of Buildings 166 through 168. These buildings are Quonset huts that have been used to store various materials since 1959. DPDO has never been sure of the types of materials they would receive until they are received. During the IAS on-site visit, office furniture was located in the Quonset huts. Materials stored are usually turned around (sold, disposed, donated, or transferred) within 30 days of receipt. Materials which were stored in the open storage areas near the Quonset huts at the time of the IAS on-site survey included wooden pallets, shopping carts, lockers, and scrap metal.

Between Buildings 1061 and 1063, is an asphalt paved open storage area (approximately 200 feet by 75 feet) for items such as furniture, desks, chairs, mattresses and stoves.

6.1.4.2 Supply Storage. The NTC Orlando Complex Supply storage facilities have been located in Area "C" adjacent to DPDO in Buildings 148, 1052 through 1058 and 1062 since 1942. From 1942 to 1968, the area was used by the Air Force for supply storage, which included aircraft parts, beds, paints, oils, furniture, and photographic supplies. There were no reports or evidence of spillage or leakage from past Air Force supply storage operations. Materials stored in these buildings at the time of the IAS on-site survey were as follows:

Building 148 - Food in cold storage

Building 1052 - Dry foods

Buildings 1053, 1055, 1062 West - Recruit clothing

Building 1054 - Office supplies, tools, maintenance items and food

Building 1057 - Three new transformers, pumps, pipes, training devices, protection equipment

Building 1062 East - Hazardous and flammable materials: paint, cleaning fluids, sodium hydroxide, hydrochloric acid and insecticide

The three new transformers have been in Building 1057 since November 1984. During the IAS on-site visit, there was no evidence of leakage or spillage.

From these warehouses, the materials are distributed to individual facilities at the activity as they are needed.

6.1.4.3 Chemical and Hazardous Materials Storage. Chemical and hazardous materials storage at Area "C" has been conducted in Building 1062 East since 1970. Building 1062 East has an area of 3200 square feet. Hazardous materials are stored on wooden pallets on a concrete floor. The materials are stored such that non-compatible chemicals are segregated.

Between 1942 and 1970, hazardous materials were stored in Building 1062. In 1970, the building was destroyed along with its contents by fire. After the fire, Building 1062 was reconstructed and a fire wall was installed to separate hazardous materials storage in Building 1062 East from hazardous materials storage in Building 1062 West.

6.1.4.4 Petroleum, Oil, Lubricant Storage. These materials have been stored and used at over 300 locations throughout the activity. Section 6.1.1.4 provides a brief description of these facilities. As shown in Appendix C, there are 21 underground storage tanks with a capacity equal to or greater than 1000 gallons. Two storage tanks are located adjacent to the laundry facility (Building 1100). One of these is an above ground 3000 gallon standby propane tank. The second tank is an underground 8000 gallon No. 2 fuel oil tank which is used as a backup for the laundry boilers. No reports or evidence of leakage exists.

6.1.4.5 Pesticide Storage. Reportedly, no pesticide storage has ever occurred at Area "C." Pesticides that have been required have been stored at NTC (see Section 6.1.1.5).

6.1.4.6. Transformer Storage. Approximately 35 out-of-service transformers have been stored adjacent to a small storage shed west of Building 1050 since 1970. The dimensions of the storage area are approximately 25 feet by 50 feet. Five to ten of these transformers are labeled "NON-PCB BY ANALYSIS." It is unknown whether the remaining transformers contain PCBs. During the IAS on-site survey, there was no evidence of leakage at or near the transformer storage area.

6.1.4.7 Coal Storage. Reportedly, coal storage has never been conducted at Area "C."

6.1.4.8 Materials and Waste Transportation. Area "C" consists of three facilities: the laundry facility, DPDO, and supply storage. Materials and waste transportation activities for these three facilities are summarized as follows.

The Air Force operated the NTC laundry facility in Area "C" from 1941 to 1968. Reportedly, conventional wash water was discharged to the storm sewer which drained to Lake Druid. The Air Force operated the dry cleaning facility similarly to the current NTC operation. The major dry cleaning solvents used during the Air Force operation were perchloroethylene and Stoddard Solvent. Once a month, these solvents were placed in dumpsters that were disposed of at the North Field Grinder Landfill (see Section 8.2, Site 2). From 1968 to early 1985, the perchloroethylene and Stoddard Solvents were disposed of off-base by a waste disposal contractor. Since early 1985, chemical related wastes have been turned into DPDO for disposal (see Section 5.2.4).

DPDO has been located in Buildings 1061, 1063 and 1066 through 1068 and 1102 in Area "C" at NTC since 1959. The function of the DPDO has been to accept hazardous and non-hazardous excess or aged government materials and equipment. These materials have usually been sold by DPDO. Since January 1985, DPDO has not transported or accepted hazardous waste outside of Area "C" (see Section 6.1.4.1).

The NTC Orlando Complex Supply storage facilities have been located in Area "C" in Buildings 148, 1052 through 1058 and 1062 since 1942. From 1942 to 1968, the area was used by the Air Force for supply storage. Since July 1968, solid waste generated from these three facilities has been deposited in dumpsters and disposed of off-base by a waste disposal contractor.

6.2 ORDNANCE. The following is a list of ordnance materials stored in the NTC magazines 123 and 125 during 1978. These may be considered typical of the types of ordnance materials stored at NTC.

<u>Type</u>	<u>Quantity</u>
Salute Charges (40MM) Class 1 Division 3	200 Rounds (105 lbs)
7.62 MM Blanks Class 1 Division 4	147,840 Rounds (413.9 lbs)
.45 Caliber Ball Class 1 Division 4	42,600 Rounds (336 lbs)
12 Gage 00 Buck Class 1 Division 4	990 Rounds (4.95 lbs)
22 Caliber Ball Class 1 Division 4	62,000 Rounds (14.88 lbs)
7.62 MM Ball Class 1 Division 4	10,300 Rounds (70.21 lbs)
.38 Caliber Ball Class 1 Division 4	6,400 Rounds (5.12 lbs)
.38 Caliber Wadcutter	4,800 Rounds (3.84 lbs)

Dispersal of these materials has been primarily to the Recruit Training Command for small arms training in their indoor rifle range in Building 229. Ammunition for about four days firing has been stored here in a Class B safe. A small amount of arms ammunition is dispersed to the activity's security personnel in Building 2046.

Reportedly, no ordnance storage has ever existed in the past in Area "C," NTEC Annex, or McCoy Annex.

CHAPTER 7. WASTE PROCESSING

7.1 GENERAL. This chapter discusses the various methods of waste processing used at NTC Orlando Complex. These waste processing operations include: sewage treatment, solid waste disposal, hazardous waste disposal, and waste fuel and solvent recycling.

7.2 WASTEWATER CONVEYANCE AND TREATMENT. Since 1976, sewage from NTC North (NTC, Area "C" and NTEC Annex) has been treated at the City of Orlando's Iron Bridge Road wastewater treatment plant (WWTP). Since 1975, sewage from McCoy Annex has been treated at a Navy-owned trickling filter treatment plant located at the Annex.

From 1968 to 1976, wastewater generated at NTC North was treated at the activity's WWTP located northeast of Lake Baldwin on Truman Road. Prior to 1968, the Army Air Corps and the Air Force used an on-base WWTP. When the activity was transferred to the Navy in 1968, the WWTP was still in operation. The WWTP handled a waste stream of about 35,000 to 50,000 gallons per day (gpd) from NTC including the on-base hospital. The effluent from the WWTP was disposed into two lagoons located north and south of the treatment plant (Geraghty and Miller, Inc., 1984). Information on past sludge disposal practices is unknown. In June 1975, wastewater from the NTC hospital was connected to the City of Orlando collection system. At this time, operation of the sewage treatment plant was discontinued. Since 1976, however, sewage from NTC North has been collected by a sewerage system consisting of 6 to 24-inch diameter sewers and five pumping stations. Wastewater is pumped to the Bennett Road pumping facility which in turn pumps to the Iron Bridge facility via 14-inch and 16-inch force mains. The hospital area sewage is collected at a lift station and transferred to NTC area by a force main where it is included in NTC area flow. During fiscal year 1983, NTC discharged an average of 50,946 million gallons per month (mgm) (SOUTHNAVFACENGCOM, 1983B).

Sewage from McCoy Annex has been collected by a sewerage system consisting of 6 to 15-inch diameter sewers and six lift stations since 1975. The sewage receives secondary treatment with enhanced nitrogen and phosphorus removal at a Navy-owned trickling filter treatment plant with a design capacity of approximately 1.35 mgd. The treatment facility is operated by the City of Orlando personnel under contract agreement. Effluent from the wastewater treatment plant is discharged into three lagoons for nitrogen removal by water hyacinths. Effluent from these lagoons is then discharged to a drainage canal flowing southeast for 3.5 miles to Boggy Creek, and ultimately flows south five miles to East Lake Tohopekaliga. The expected treatment levels following chlorination are as follows: 5-day biochemical oxygen demand (5-day BOD) 11 part per million (ppm), suspended solids (SS) 15.6 ppm; total nitrogen (TKN) 5 ppm; and total phosphorus (P) 1 ppm. Discharges from the treatment plant are regulated by the National Pollutant Discharge

Elimination System (NPDES) Permit Number FLO026069 which expires October 19, 1988. The parameters expected to be monitored on this permit include 5-day BOD, SS, fecal coliform, total phosphorus (as P), total nitrogen (as N) and chlorine. Sludge from the treatment plant has been stored at the treatment plant and utilized for soil conditioner and low-grade organic fertilizer.

7.3 SOLID WASTE DISPOSAL. From 1960 to 1967, the U.S. Air Force operated a 15-acre landfill at NTC (see Section 8.2, North Field Grinder Landfill). The landfill is presently covered by a drill field and Barracks 1 and 3, and is bordered by Recruit Barracks 2 and 4, Perimeter Road, and a mock training battleship. Between 1956 and 1973, the U.S. Air Force operated the western portion of a 99-acre landfill at McCoy Annex (see Section 8.4, McCoy Annex Landfill). The eastern portion of the landfill was operated by the Navy from 1972 until about 1978 for disposal of activity generated wastes. Since 1978, the activity has generated approximately 11,130 tons of solid wastes per year of which 11,000 tons per year comes from NTC North (SOUTHNAVFACENGCOM, 1976).

All solid wastes have been deposited in dumpster-type containers, and then picked up on a regularly scheduled basis by a local waste disposal contractor.

7.4 USED OIL AND SOLVENT RECYCLING. Up to at least 1978, all of the used oil and solvents generated at NTC resulted from automotive maintenance. Most of the waste oil generated at the NTC Orlando Complex has been picked up by a waste oil disposal contractor for off-base disposal. However, waste oil from the Auto Hobby Shop at McCoy Annex has been picked up by the DPDO for sale to an off-base waste oil recycling firm (see Section 5.2.3.1).

7.5 ORDNANCE. Reportedly, ordnance wastes have never been processed at NTC Orlando Complex.

CHAPTER 8. DISPOSAL SITES AND POTENTIALLY CONTAMINATED AREAS

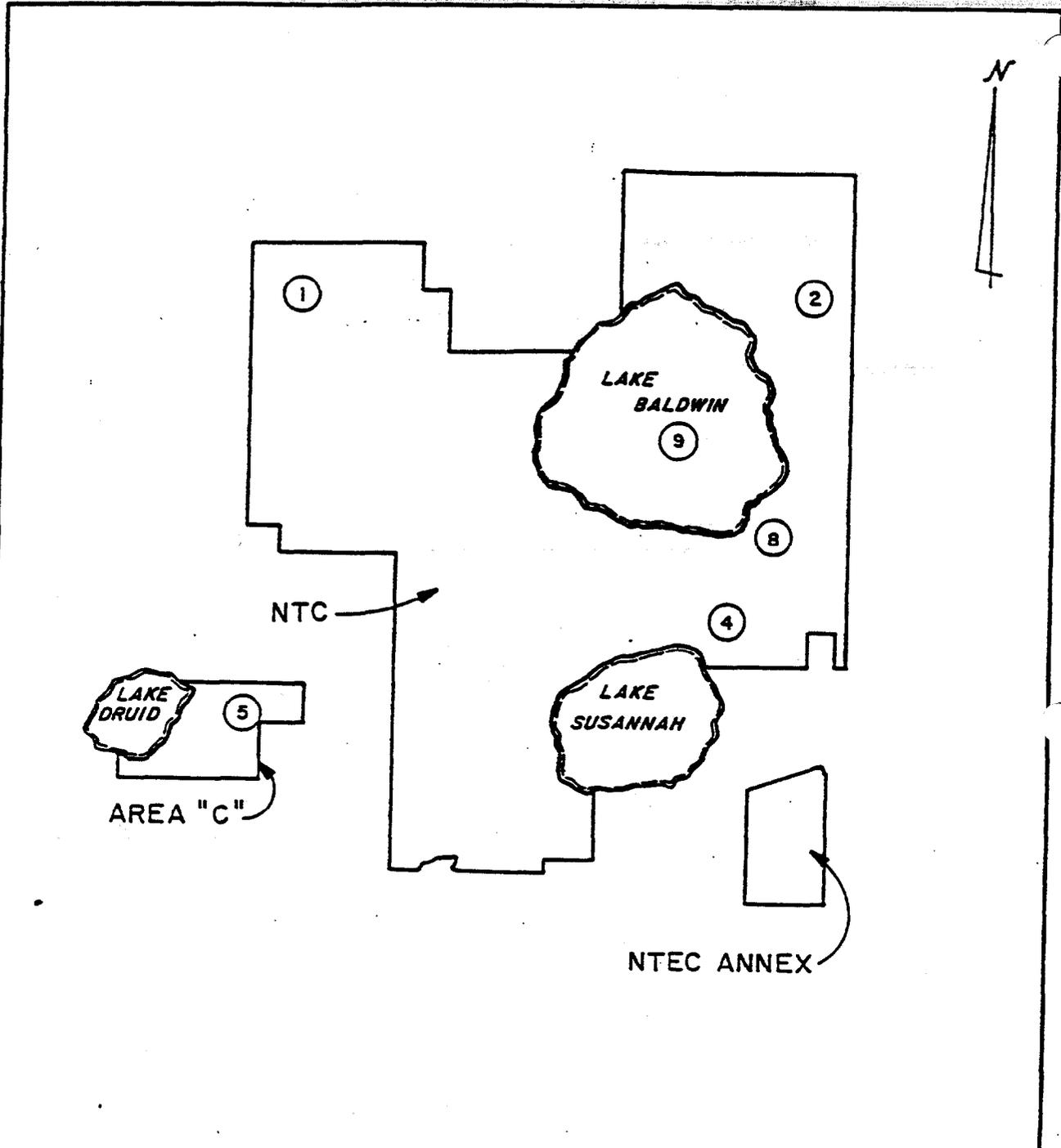
8.1 GENERAL. This chapter describes each of the nine disposal sites or potentially contaminated areas identified at the Naval Training Center, Orlando during the IAS. Locations of these sites are shown on Figures 8-1 and 8-2. More detailed maps are found within the chapter. Table 8-1 summarizes the information collected on these through on-site examinations, interviews, and record review.

8.2 SITE 1, NORTH FIELD GRINDER LANDFILL. This site, located at NTC is mainly under asphalt paved area known as the "grinder" parade area (Figure 8-1). The site was originally wooded when landfilling operations began in 1958. Subsidence of the landfill materials has been occurring in several sections of the site since the landfill was closed in 1967. Areas of subsidence have been paved over with additional asphalt. The landfill reportedly covered 15 acres and extended eastward just beyond the area now occupied by Buildings 212 and 214.

The Air Force began the trench and fill operation about 1958. Trenches varying in size from 100 to 200 feet long by 10 to 12 feet wide and 8 feet deep were dug with bulldozers. Wastes were brought to the site each day (6 to 7 truckloads), covered with soil and compacted with bulldozers. Some reports indicated that burning took place prior to covering the waste with soil. Gasoline was not used to ignite the waste material. Closure of the site began in 1967 when construction was started on Buildings 212 and 214. At this time, the eastern section of the site was excavated below the water table to a depth of 12 to 14 feet. Excavated material was removed by a contractor and the area was refilled with sand and compacted. In 1967, while installing a sprinkler system in the grassed western section of the closed landfill, numerous film cannisters and large quantities of film were found. These materials were left in place and the area was covered with 8 to 10 inches of topsoil.

In addition to film and film cannisters, other materials reportedly disposed of in the landfill included photochemicals, paint thinner (from the paint shop), garbage from mess halls, cardboard boxes, biological wastes and syringes from the hospital, paper, plastic, tree limbs and construction materials (see Table 8-2). Reportedly, no 55-gallon drums were put in the landfill since they were turned into the Salvage Department and recycled by the company selling the drum's contents. Based on the dimensions of the landfill, disposal quantities were approximately 194,000 cubic yards. However, approximately one-third of this material was removed during the construction of Buildings 212 and 214.

Because the soils are sandy and well drained, the potential for ground water contamination of the water table aquifer exists. Surface water runoff from the site drains mainly to Lake Spier, approximately 1300 feet to the east.



NO SCALE

LEGEND

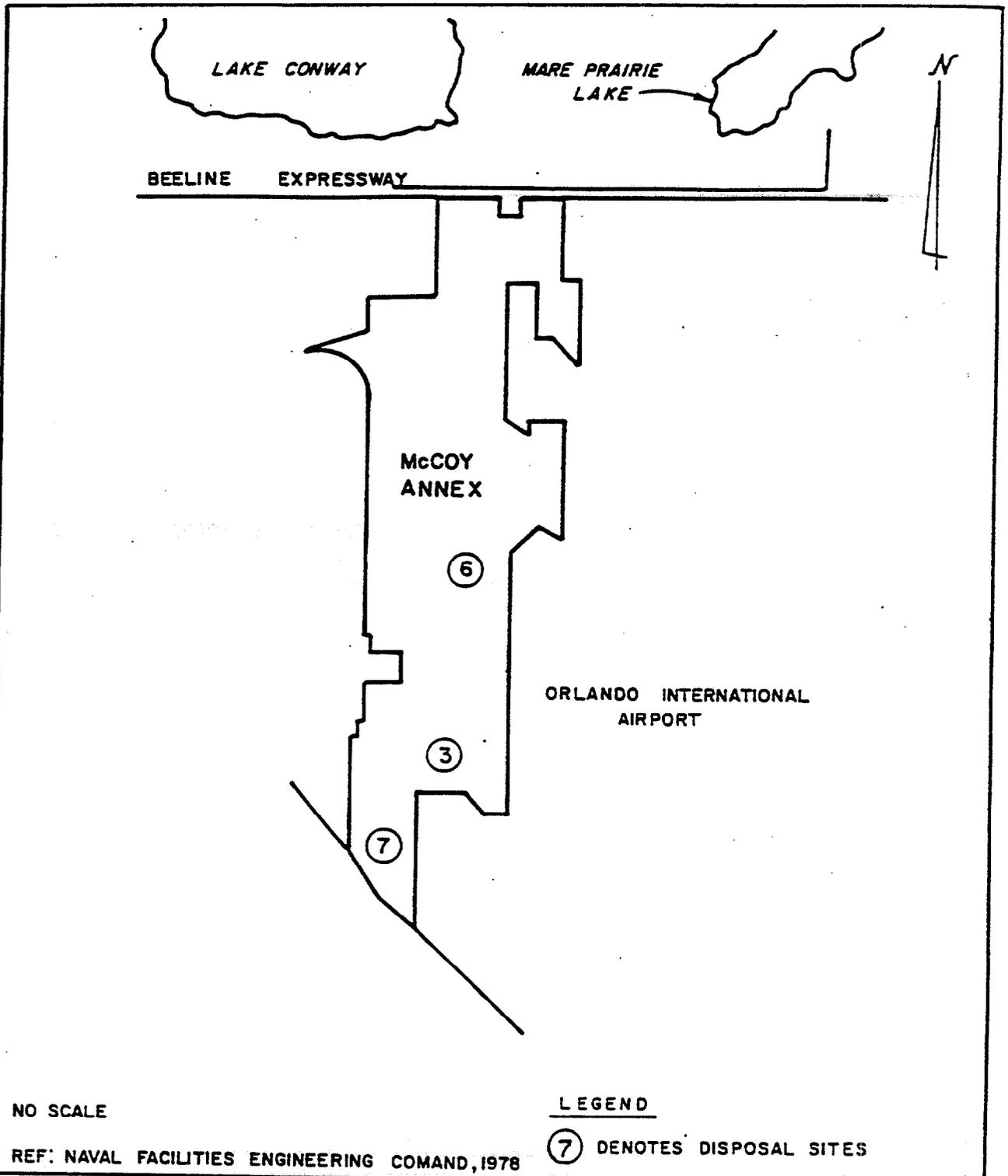
REF: NAVAL FACILITIES ENGINEERING COMMAND, 1978

④ DENOTES DISPOSAL SITES

FIGURE 8-1
LOCATION OF DISPOSAL SITES
AND POTENTIAL CONTAMINATION
AREAS, NAVAL TRAINING CENTER
ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA



NO SCALE

REF: NAVAL FACILITIES ENGINEERING COMAND, 1978

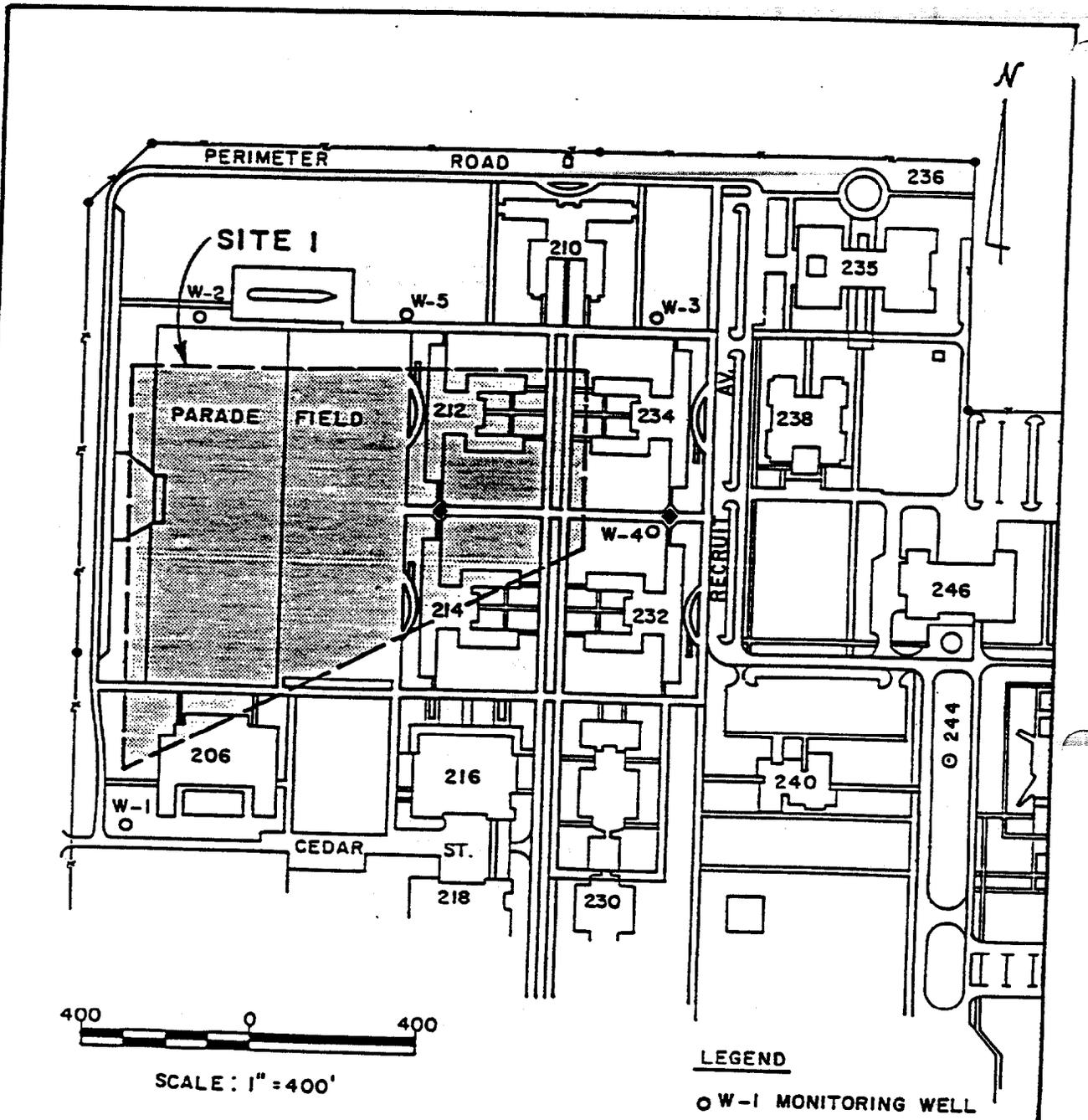
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⑦ DENOTES DISPOSAL SITES

FIGURE 8-2
 LOCATION OF DISPOSAL SITES
 AND POTENTIAL CONTAMINATION
 AREAS, NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



REF.: SOUTHNAV FACENCOM, 1983
 DWG. NO. 5023763

FIGURE 8-3
 SITE I - NORTH FIELD
 GRINDER LANDFILL



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

TABLE 8-1

DISPOSAL SITES AND POTENTIALLY CONTAMINATED AREAS -
NAVAL TRAINING CENTER ORLANDO, FLORIDA

AREA OF CONCERN	PERIOD OF OPERATION	TYPES OF WASTES DISPOSED OR SPILLED	GENERAL DEVELOPMENT MAP COORDINATES	COMMENTS
Site 1 North Field Grinder Landfill	1958-1967	Photochemicals, film, paint thinner, garbage, biological wastes and syringes from hospital, paper, plastic, tree limbs, construction materials, perchloroethylene	C-3,4	Trench and fill operation by Air Force covering 15 acres
Site 2 Filled WWTP Lagoons	1977-1978	WWTP sludge, tree limbs, yard wastes, dirt, sand, asphalt, demolished building debris, stainless steel mixing tank	J-3,4	Lagoons were part of a 35,000 to 50,000 gpd WWTP
Site 3 McCoy Annex Landfill	1960-1978	Photochemical wastes, paint, paint thinners, plastics, trees, construction wastes, surgical wastes, cable, airplane parts, oil, transformers	J, K, L-4, 5, 6	This landfill was operated by the Air Force and Navy and is under the golf course at McCoy Annex
Site 4 Disposal Area Near the NTC Magazine No. 123	1968-1969	Yard wastes (tree limbs, grass clippings)	I-7	Site was a pit 30 feet in diameter and 8 to 9 feet deep

TABLE 8-1 (Continued)

DISPOSAL SITES AND POTENTIALLY CONTAMINATED AREAS -
NAVAL TRAINING CENTER ORLANDO, FLORIDA

AREA OF CONCERN	PERIOD OF OPERATION	TYPES OF WASTES DISPOSED OR SPILLED	GENERAL DEVELOPMENT MAP COORDINATES	COMMENTS
Site 5 Old Laundry Boiler Building	Closed in 1972, demolished in 1979	Asbestos containing materials	B-6	Building housed boilers for the laboratory
Site 6 DPDO McCoy Annex	At least 1984	Oil, anti-freeze, transmission and hydraulic fluid	G-4	Contaminants leaked from drums stored in the DPDO yard
Site 7 Barracks Burial Area	1968	Building debris	L-6	Demolished barracks were bulldozed into a quarry at southwestern end of McCoy Annex
Site 8 Old NTC Pesticide Building	Early 1950s to 1972	Pesticides	J-6	Insecticide storage, mixing and container and equipment cleaning took place here
Site 9 Lake Baldwin	Early 1950s to 1978	Film processing chemicals	G-6	Film processing chemicals were discharged from the photo shop directly to Lake Baldwin

TABLE 8-2

WASTE DISPOSED AT SITE 1, NORTH FIELD GRINDER LANDFILL
NTC ORLANDO, FLORIDA

<u>WASTE</u>	<u>SOURCE OF WASTE</u>	<u>TIME PERIOD</u>	<u>ESTIMATED TOTAL QUANTITY (Gallons)</u>
Photochemicals:	Air Force Photo Shop	1958-1967	
Developer			200 ¹
Fixer			1500 ¹
Developer Replenisher			300 ¹
Activator			900 ¹
Acetic Acid			100 ¹
Bleach Fix			100 ¹
E-4 Process Chemical			300 ³
Stabilizer			Less than 100 ¹
Film	Air Force Photo Shop	1958-1967	Unknown
Paint Thinner	Carpentry/Masonry/Painting Shop	1958-1967	Less than 100 ²
Garbage, paper, plastic, tree limbs, construction materials	General Activity Operations	1958-1967	194,000 cubic yards
Biological wastes, syringes	Hospital	1958-1967	Unknown
Perchloroethylene Still Bottoms	Laundry	1958-1967	2700

¹Quantities of photochemicals are based on 5 percent of estimated Photo Shop Waste Generation and Disposal (Table 5-1) which is the assumed residual in waste containers disposed at Site 1 (Rounded to nearest 100 gallons). These numbers should be considered very rough estimates.

²Quantity of paint thinner based on 5 percent of quantity assumed to be used during time landfill was in operation (which was extrapolated from annual quantities used since 1968).

³Quantity based on dimensions at site.

8.3 SITE 2, FILLED WWTP LAGOONS. This disposal area, located west of the NTC golf course, is the site of two filled-in wastewater treatment plant (WWTP) lagoons (see Figure 8-4). These lagoons were part of a 35,000 to 50,000 gallon per day plant for treatment of wastewater from NTC including the on-base hospital. The treatment plant probably began operating during the 1940s and was closed in 1976. The lagoons were reportedly filled between 1977 and 1978.

In addition to the remaining wastewater treatment plant sludge, the site was filled with limbs and other types of yard waste, soil, sand, asphalt, several empty one gallon unmarked containers, demolished building debris, and a large stainless steel mixing tank, reportedly from the Air Force photo squadron located in Building 2089. Following the fill operations, the area was covered with soil.

The lagoons were approximately 3000 square feet in area and reportedly 4 to 8 feet deep. An estimate of the quantity of fill is thus approximately 18,000 cubic feet.

Soils at the site are fine sand. Surface drainage is towards Lake Baldwin which is approximately 1000 feet west.

8.4 SITE 3, McCOY ANNEX LANDFILL. This site is large inactive landfill of approximately 99 acres located in the southern portion of McCoy Annex (see Figure 8-5). A golf course now occupies much of the site; the remaining area supports fields of grass, forest and low brush. The western portion of the landfill was reportedly used by the Air Force from about 1960 to 1972, while the eastern portion was used by the Air Force and the Navy from 1972 until about 1978. Reportedly, wastes disposed at the landfill included trees, leaves, paper, plastic, scrap wood, scrap metal, sections of pipe, paint and paint thinner, asbestos, bricks, airplane parts, cables, fire hoses, parachutes, automobile batteries, transformers, syringes, surgical waste, and low-level radiological waste, and possibly some waste oil. Landfill operations consisted of excavation of ditches (100 to 200 feet long by 20 to 25 feet by 10 to 15 feet deep) into which wastes were disposed of from trucks. Each night, the waste was covered with a thin layer of soil. Trenches were filled with waste to within three or four feet of the ground surface and then backfilled with top soil and seeded.

There are two existing monitoring wells located at the McCoy Annex landfill (see Figure 8-5). These wells are identified in a report by Geraghty and Miller (1984) in which installation of additional monitoring wells is recommended. The wells are 4-inch nominal diameter and penetrate to a minimum depth of 15 feet below the ground surface.

Reportedly, occasional waste burning took place in the trenches at the landfills. Based on filling the entire 99-acre landfill using the previously described method, it is estimated that over 1,000,000 cubic yards of waste were deposited in the landfill.

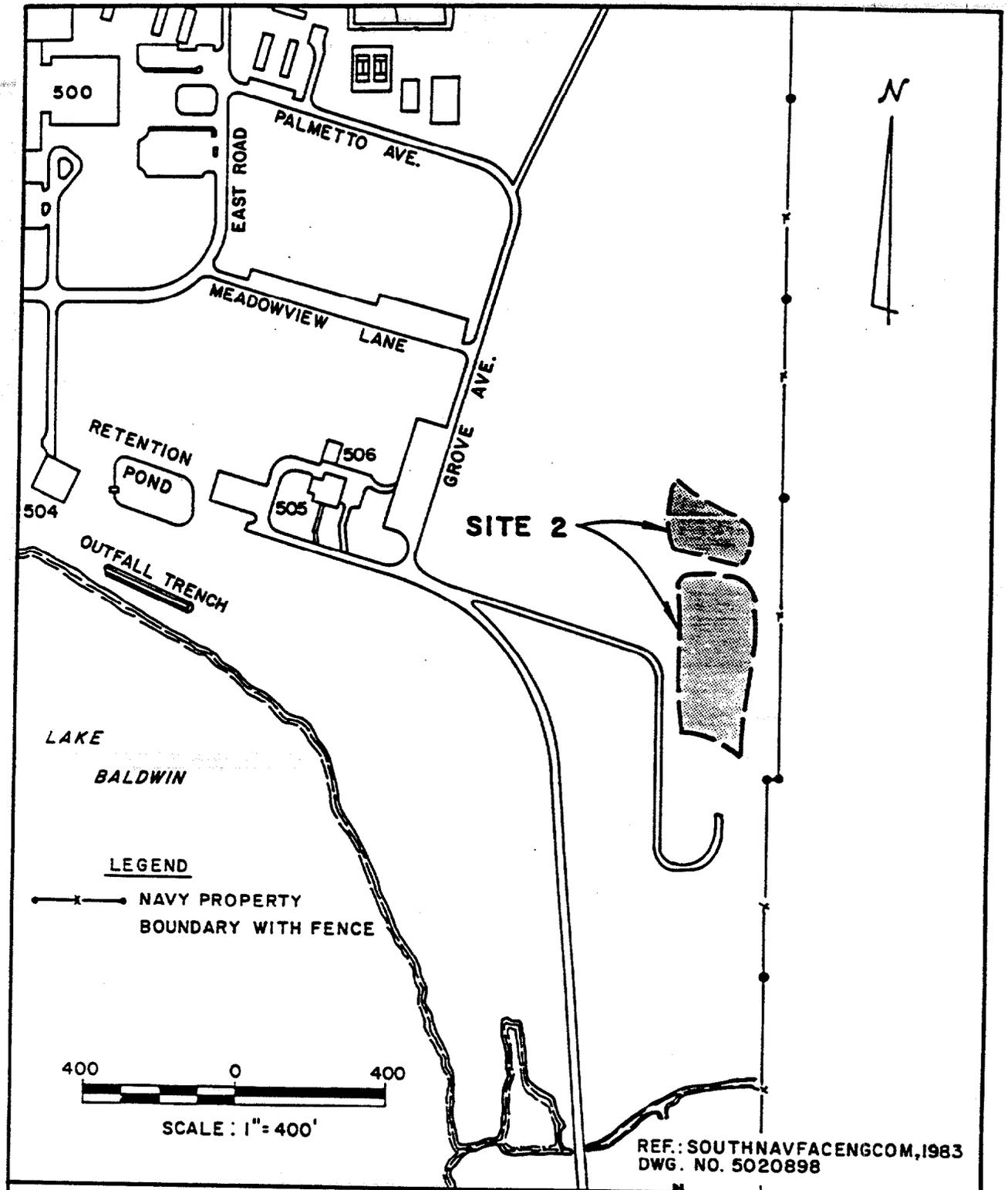


FIGURE 8-4
SITE 2 - FILLED WWTP LAGOONS



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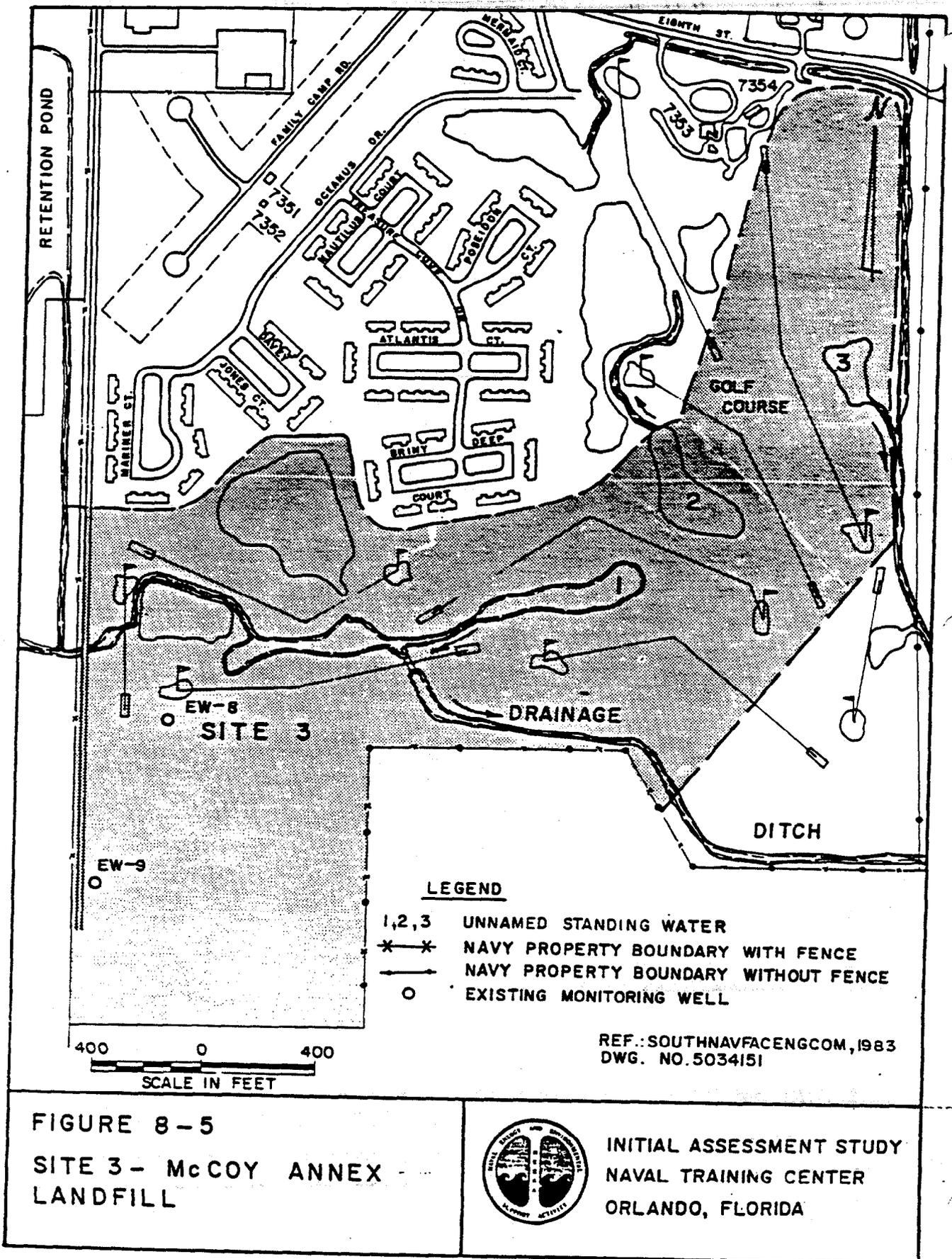


FIGURE 8-5
SITE 3 - McCOY ANNEX
LANDFILL



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

In late 1981, NTC Orlando and the the Greater Orlando Aviation Authority (GOAA) agreed to an exchange of two parcels of land at McCoy Annex. As part of the land exchange agreement, replacement golf course facilities were to be provided to the Navy on the parcel of land received from the GOAA. In late 1981, during construction of the golf course, plans required relocation of an existing drainage canal to the south through the proposed golf course facility. The presence of buried wastes was discovered during excavation for construction of the replacement drainage canal. Upon inspection of the relocated drainage canal, the Florida Department of Environmental Regulation (DER) observed refuse protruding from the banks of the canal and leachate entering the water in the ditch. Water samples were collected from the relocated canal and concentrations of greater than 17 parts per million of iron and 54 parts per billion of mercury were detected by the Orange County Pollution Control Department (See Appendix B). No State standards exist for these metals in the general criteria for surface water (DER, 1983). Some samples also had elevated levels of conductivity and total solids, further indicating surface water contamination.

As a corrective action, the canal was relocated a second time to an alignment north of its original location. Two additional samples were collected from a retention pond hydraulically linked to the relocated canal. Analysis of the samples performed through the Atlantic Division of the Naval Facilities Engineering Command indicated a concentration of zinc greater than 10 parts per million as well as higher conductivity, solids and chemical oxygen demand (See Appendix D). The state standards for zinc for surface waters (general criteria) is 1.0 part per million (DER, 1983). During the IAS visit, leachate was visible in one of the golf course retention ponds. In addition, scrap metal unearthed during golf course construction was found in several small wooded patches on the course.

Surface water from the landfill flows through the drainage canal generally from east to southwest and discharges to the Boggy Creek and Boggy Creek Swamp which are located south of the landfill. Chemical analysis and visual observation of the waters in the retention ponds and canal indicate that wastes in the landfill are polluting local surface waters (including Boggy Creek and Boggy Creek Swamp). Because the soils in the area are sandy and well-drained, the potential for ground water contamination of the water table aquifer exists.

8.5 SITE 4, DISPOSAL AREA NEAR THE NTC MAGAZINE NO. 123. This site, located about 200 feet southwest of Magazine No. 123, is a pit 30 feet in diameter by 8 or 9 feet deep, into which yard wastes (tree limbs and grass clippings) were placed (see Figure 8-6). Reportedly, no hazardous materials were disposed of at Site 4. The site was used from 1968 to 1969, and then covered with topsoil. Based on the reported dimensions of the pit, the quantity of wastes disposed of was approximately 64,000 cubic feet. During the IAS on-site visit, the surface of the site had grass growing and no evidence of past disturbance was noticeable.

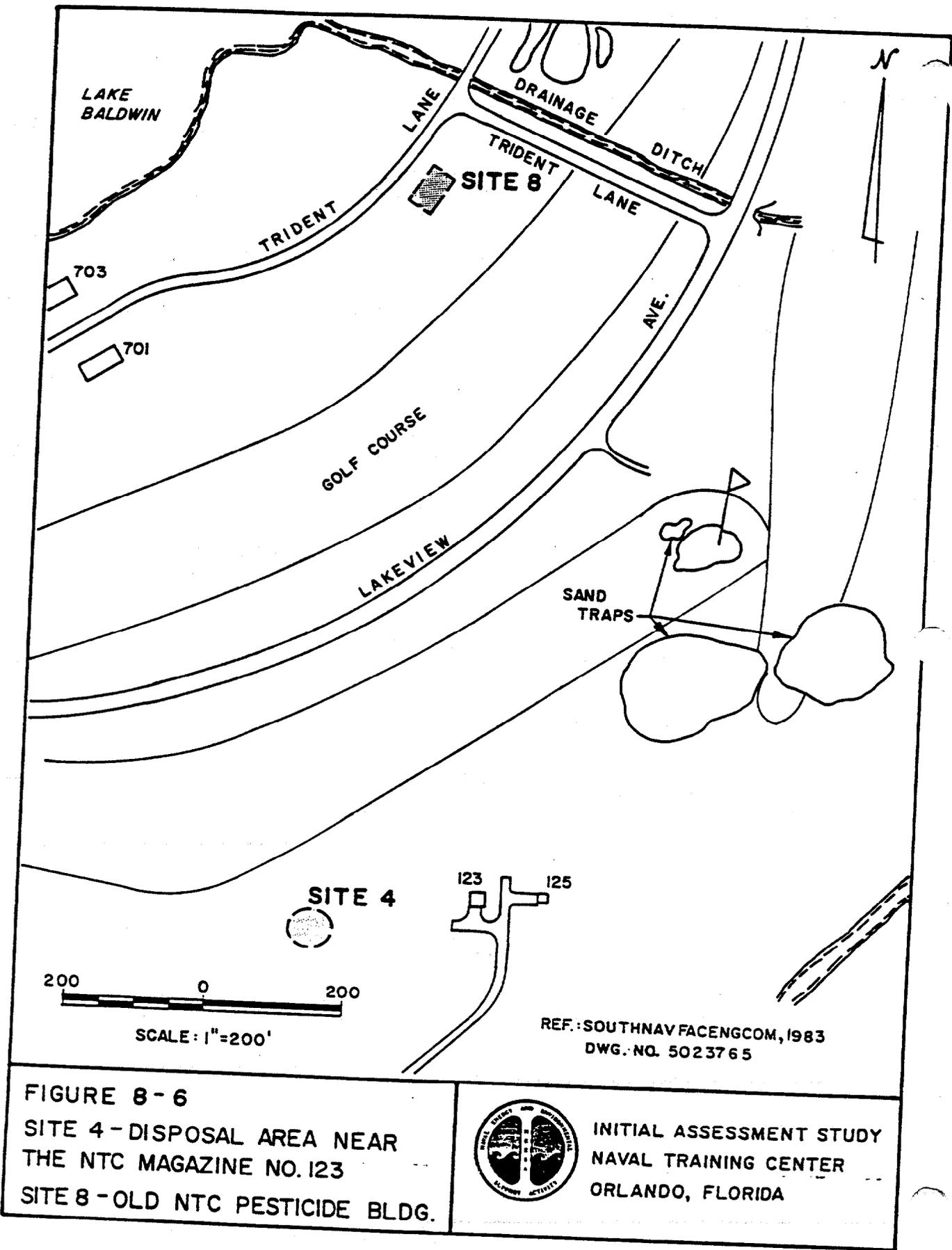


FIGURE 8-6
SITE 4 - DISPOSAL AREA NEAR
THE NTC MAGAZINE NO. 123
SITE 8 - OLD NTC PESTICIDE BLDG.



INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

8.6 SITE 5, OLD LAUNDRY BOILER BUILDING. Site 5 is a delapidated building (Building 1011) adjacent to the laundry facility in Area "C" (see Figure 8-7). The building was constructed in the early 1940's and housed the boilers for the laundry. It was closed in January 1972, at which time the boilers were removed. Partial demolition began in 1979. During the IAS on-site visit, the building was filled with various materials including fire brick, cement mortar containing friable asbestos, and asbestos rope.

Additional items containing friable asbestos noticed in the building include lagging from pipes and mortar jointing in flues stacked in a 7 feet by 5 feet by 4 feet rack. Quantities of waste asbestos materials are estimated at 700 cubic yards. Asbestos is the only hazardous material reportedly present at the site. Asbestos typically occurs as solids particles which migrate mainly in the air but may also migrate by surface runoff from the building during a heavy storm. The nearest water body is Lake Druid, approximately 700 feet west.

8.7 SITE 6, DPDO McCOY ANNEX. This site is an unpaved area in the southeastern section of the DPDO yard at McCoy Annex. The site is between the paved area and the fence (see Figure 8-8). The area of the site is 30 feet by 6 feet of contaminated soil. Reportedly, no one knew this site existed until its "discovery" in November 1984. During and prior to 1984, this area was used for storing 73 55-gallon drums of chemical wastes. The drums were in various states of deterioration, at least one was completely corroded. Reportedly, the drums contained used motor oil, anti-freeze and hydraulic fluid (possibly containing polychlorinated biphenyls). One drum was marked "Soilax Liquid 'S' Plus, Multipurpose Cleaner". Soilax liquid 'S' is a cleaning compound composed of sodium hydroxide and 2-Butoxy ethanol. Another was marked "Paint Thinning Liquid". The contents of the 73 drums were reportedly spilled during and prior to 1984 onto the paved area and the adjacent unpaved area of the site, with resulting soil staining and contamination. Spill quantities are estimated to range from 1000 to 4000 gallons. At the time of the IAS on-site survey, 66 of these drums (reportedly empty) had been relocated on the paved area further away from soil contaminated area and covered with a tarpaulin. The remaining seven drums had been moved into Building 7193 where there were stored under a plastic cover with other drums marked hazardous waste. At least one of the 66 drums, relocated under the tarpaulin, contained liquids, while at least two others showed leak stains on the outside. The soil at the site was stained to a depth of two to three inches. There was also much less vegetation growing on the site than on its surroundings. Because of the permeable nature of the soils at the site, it is also possible that contaminants may have leached to the water table aquifer.

8.8 SITE 7, BARRACKS BURIAL AREA. During 1978, demolished wooden barracks from McCoy Annex were bulldozed into a quarry (now filled with water) at the southwestern edge of McCoy Annex (see Figure 8-9). Quantities of building debris in the quarry are estimated at 100,000 cubic yards. Reportedly, no hazardous materials were disposed of along with the building rubble.

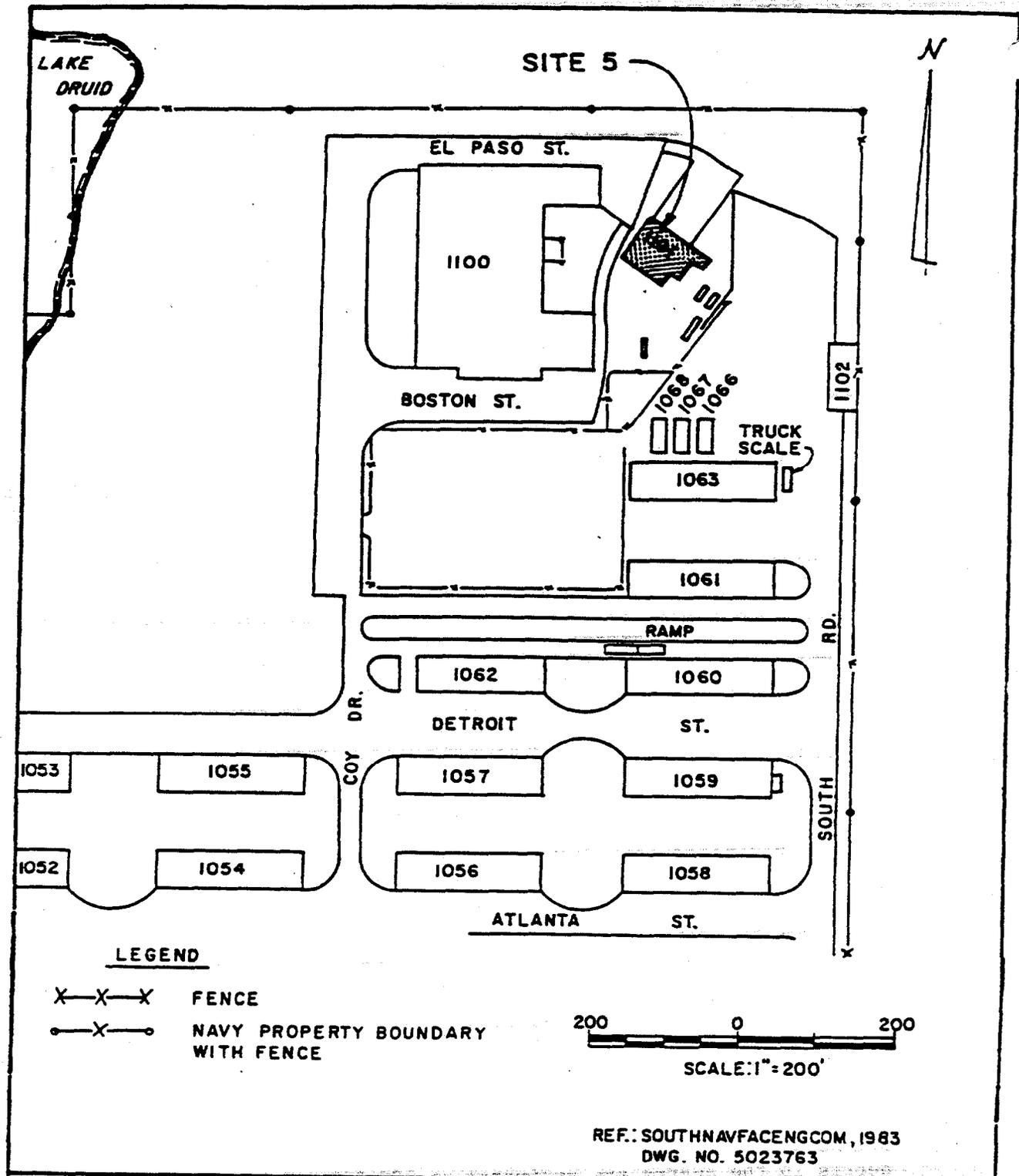


FIGURE 8-7
SITE 5-OLD LAUNDRY BOILER BUILDING
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

INITIAL ASSESSMENT STUDY
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

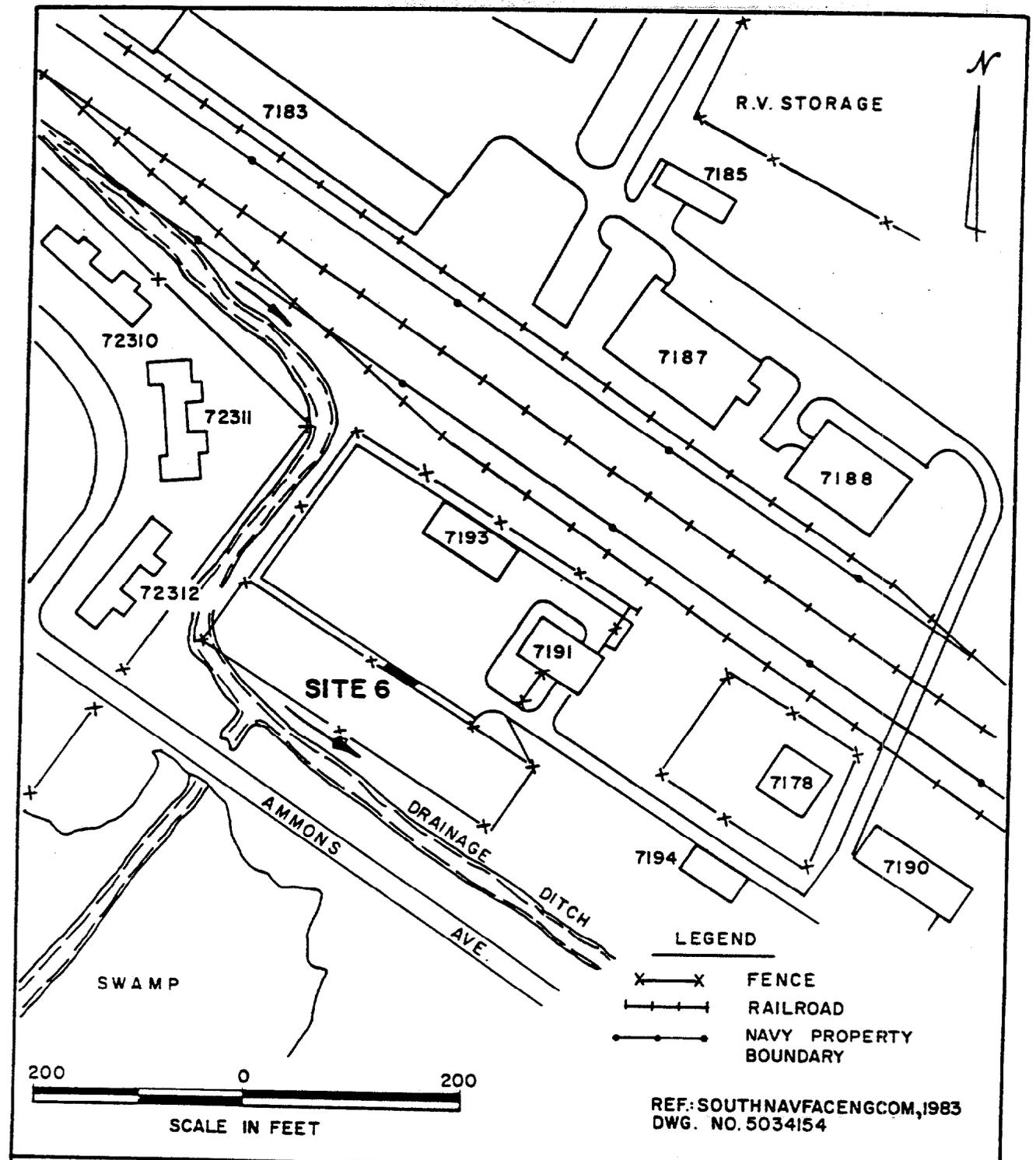


FIGURE 8-8
SITE 6 - DPDO MCCOY ANNEX



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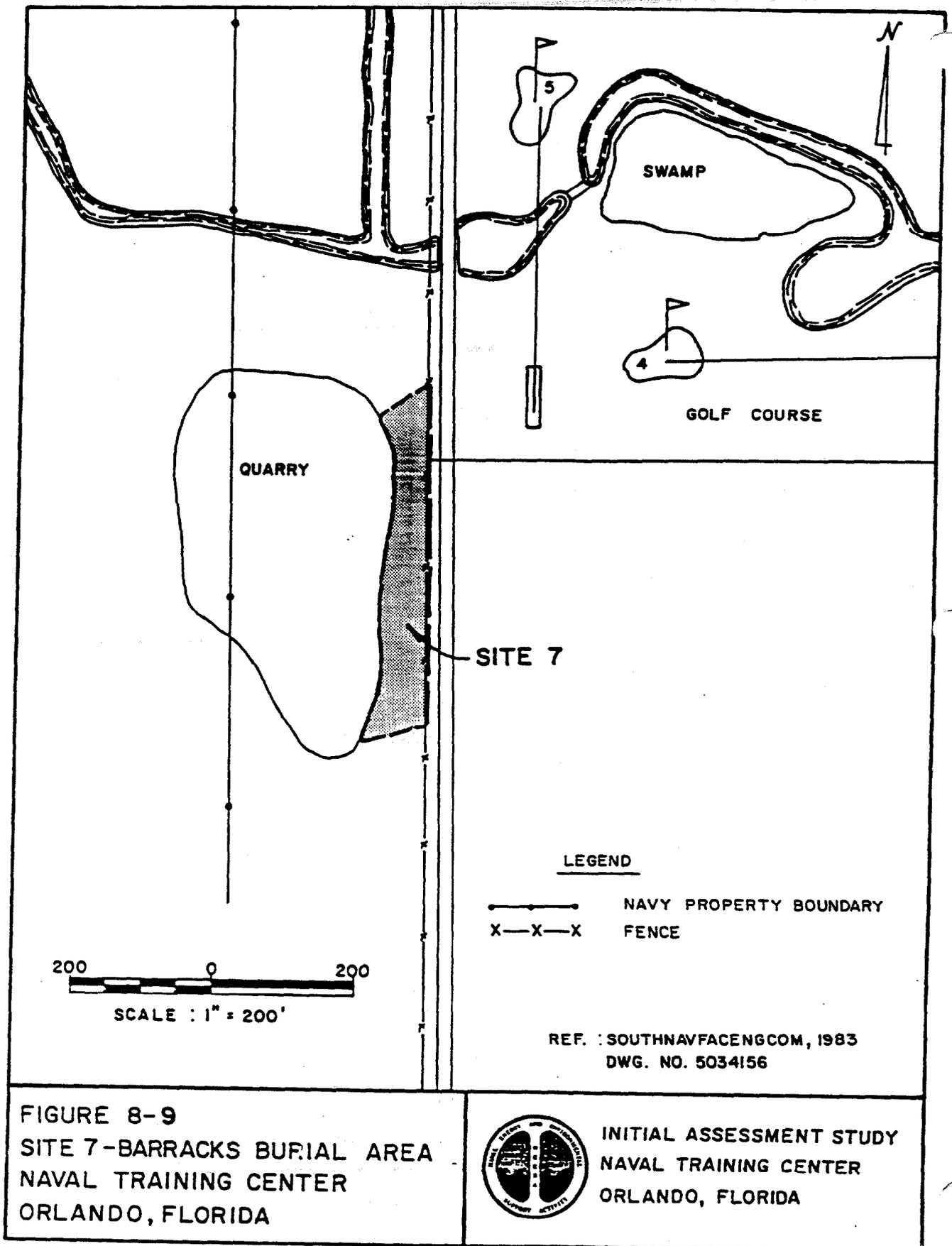


FIGURE 8-9
 SITE 7-BARRACKS BURIAL AREA
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

8.9 SITE 8, OLD NTC PESTICIDE BUILDING. From the early 1950's through 1972, the Orlando Air Force Base (until 1969) and NTC (from 1969 to 1972) operated a pest control building at this site (see Figure 8-6). The building was demolished and then covered with sandy soil sometime after the current pest control building was built (approximately 1981). The building was used for insecticide storage, mixing, and container and equipment cleaning. Personnel at the shop were responsible for all pest control functions at the activity. The building was located adjacent to the golf course approximately 100 feet southwest of a drainage canal crossing holes Number 4 and 6 and along Trident Lane. The building measured approximately 15 feet wide by 30 feet long and was constructed of block and wood. Reportedly, a buried oil tank is located near the site. The distance of the buried tank to the site is not known.

Reportedly, pesticides (including insecticides and herbicides) were mixed on the ground near the building and spills may have occurred. Pesticides were in the building when it was demolished. Rinse water, used to clean empty pesticide containers, was discharged to a drain in the building which was connected to a gravel sump. Reported types of pesticides included chlordane, phenyl mercuric compounds, baygon, diazinon, anticoagulant, malathion, pyrethrum, diuron, 2-4,D and monuron (SOUTHNAVFACENCOM, 1970). When the building was demolished, many of the pesticide containers reportedly were still inside the building. These pesticides and containers were buried at the site along with building debris. Quantities of pesticides buried are estimated at 300 gallons. This estimate is based on the quantities used during one month, and assuming that five percent of the chemicals were buried. Quantities used during June 1970 were used because this was near the time that the building was demolished and the quantities were representative of other months.

The soil at the site is sandy. Grass on the site is growing in patches. Surface drainage appears to be in the direction of the nearby drainage canal. The canal drains to Lake Baldwin.

8.10 SITE 9, LAKE BALDWIN. This site is the result of the disposal of film and photograph developing chemicals from the Photo Shop (Building 2089) (see Figure 8-10). From the early 1950's through 1978, the chemicals drained from Building 2089 through a storm sewer to a point on the southeast shore of Lake Baldwin. The location of the storm sewer on Figure 8-10 between Building 2097 and Lake Baldwin is approximate. Types and estimated quantities of chemicals discharged to the lake are shown in Table 8-3. Silver from film developing has been recovered at the shop since 1965. Before 1965 it would have drained to the lake along with other chemicals.

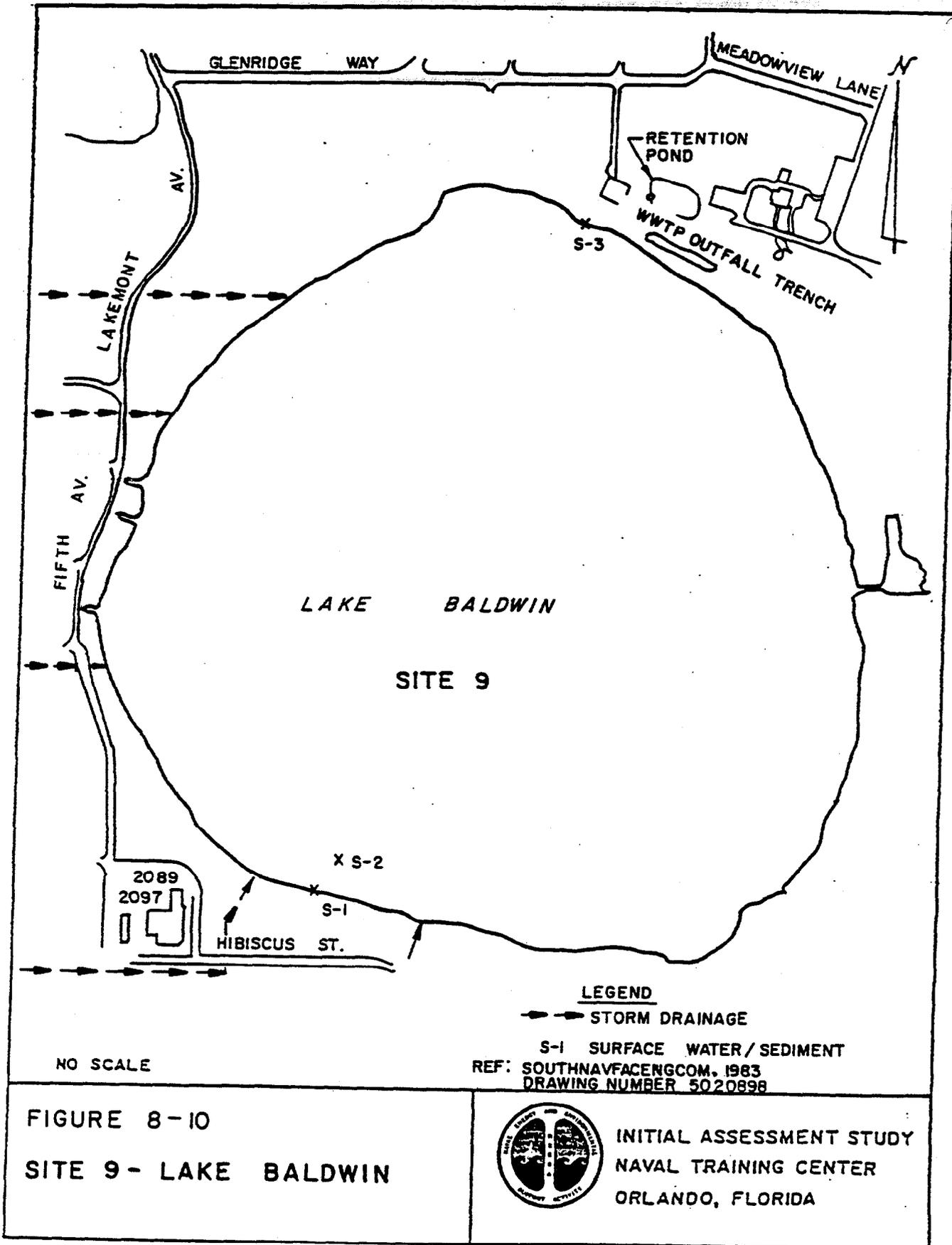


FIGURE 8-10
 SITE 9 - LAKE BALDWIN



INITIAL ASSESSMENT STUDY
 NAVAL TRAINING CENTER
 ORLANDO, FLORIDA

TABLE 8-3

WASTES DISPOSED AT SITE 9, LAKE BALDWIN
NTC ORLANDO, FLORIDA

<u>WASTE</u>	<u>SOURCE OF WASTE</u>	<u>TIME PERIOD</u>	<u>ESTIMATED TOTAL QUANTITY¹ (Gallons)</u>
Photochemicals:	Photo Shop	Early 1950s to 1968	
Developer			4,300
Fixer			29,400
Developer Replenisher			6,100
Activator			16,500
Acetic Acid			2,500
Bleach Fix			1,500
E-4 Process Chemical			5,400
Stabilizer			800

¹Quantities of photo chemicals based on 95 percent of Estimated Photo Shop Waste Generation and Disposal (Table 5-1).

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APPENDIX A

AGENCIES CONTACTED DURING THE IAS

1. U.S. Air Force Records Office, Washington, D.C.
2. Headquarters, USAF Historical Research Center, Maxwell Air Force Base, Alabama
3. Office of Air Force History - Bolling Air Force Base, Washington, D.C.
4. U.S. Army Records Office, Alexandria, Virginia
5. Beale Air Force Base, Marysville, California
6. NEESA Information Management Department
7. Naval Facilities Engineering Command Historian, Naval Construction Battalion Center, Port Hueneme, California
8. Southern Division, Naval Facilities Engineering Command, Charleston, South Carolina including:
 - (a) Control of Hazardous and Industrial Pollutants Section
 - (b) Water Resources Management Section
 - (c) Applied Biology Section
 - (d) Natural Resources Section
9. Naval Facilities Engineering Command, Headquarters, Alexandria, Virginia
10. Naval Historical Center, Washington Navy Yard, Washington, D.C.
11. Naval Sea Systems Command, Alexandria, Virginia
12. Commandant of the Marine Corps, Navy Department, Washington, D.C.
13. Marine Corps History Office, Washington Navy Yard, Washington, D.C.
14. Ordnance Environmental Support Office, Indian Head, Maryland
15. DoD Explosives Safety Board, Alexandria, Virginia
16. National Archives, Washington, D.C. and Suitland, Maryland
 - (a) Cartographic Branch
 - (b) Navy and Old Army Branch
17. Washington National Records Center, Suitland, Maryland
18. Federal Archives and Record Center, East Point, Georgia
19. U.S. Geological Survey, Public Inquiries Office, Reston, Virginia

ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/8/87

LOCATION: Navy Golf Course

IDENTIFICATION NUMBER: 7575

STATION NUMBER: G.C.C. 1

REMARKS: _____

UPSTREAM

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered
Total Unfiltered
Ortho Filtered

0.053
0.083
-

RESIDUE

Total Solids
Total Suspended
Suspended Fixed
Suspended Volatile

75
-
-
-

NITROGEN

Total Nitrogen
Nitrate-Nitrite Nitrogen
Ammonia Nitrogen
Organic Nitrogen
TKN

0.94
0.15
0.35
0.5
0.94

Sulfate
Chloride
Alkalinity (as CaCO₃)
Acidity (as CaCO₃)

-
-
18
-

OXYGEN

Dissolved Oxygen
Biochemical Oxygen Demand
Chemical Oxygen Demand

7.2
2.7
-

pH
Temperature-°C
Conductivity-µmho
Turbidity - FTU
Other

6.7
14.5
135
7.0
-

METALS

Na _____ Ca _____ Mg _____ K _____ Fe 0.6 Cu <0.02
Pb <0.1 Zn <0.005 Cd <0.005 Al 0.2 Ni <0.04 Mn 0.01
Hg <0.2 <0.05

SIGNED: _____



ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/8/89 LOCATION: Wavy Golf Course
 IDENTIFICATION NUMBER: 7576 STATION NUMBER: G.C.C. 2
 REMARKS: DITCH ABOVE OUTFALL

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered 0.064
 Total Unfiltered 0.107
 Ortho Filtered ---

RESIDUE

Total Solids 63
 Total Suspended ---
 Suspended Fixed ---
 Suspended Volatile ---

NITROGEN

Total Nitrogen 0.77
 Nitrate-Nitrite Nitrogen 0.78
 Ammonia Nitrogen 0.22
 Organic Nitrogen 0.47
 TKN 0.29

Sulfate ---
 Chloride ---
 Alkalinity (as CaCO₃) 17
 Acidity (as CaCO₃) ---
 pH 6.4
 Temperature-°C 13.5
 Conductivity-µmho 140
 Turbidity - FTU 6.0
 Other ---

OXYGEN

Dissolved Oxygen 7.2
 Biochemical Oxygen Demand 2.6
 Chemical Oxygen Demand ---

METALS

Na _____ Ca _____ Mg _____ K _____ Fe 0.45 Cu <0.02
 Pb <0.1 Zn 0.01 Cd <0.005 Al <0.1 Ni <0.04 Mn 0.01
 Hg <0.24 <0.05

SIGNED: _____

ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/8/84 LOCATION: Navy Golf Course
 IDENTIFICATION NUMBER: 7577 STATION NUMBER: R.C.C. 3
 REMARKS: OUTFALL

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered 0.027
 Total Unfiltered 1.256
 Ortho Filtered -

RESIDUE

Total Solids 317
 Total Suspended -
 Suspended Fixed -
 Suspended Volatile -

NITROGEN

Total Nitrogen 21
 Nitrate-Nitrite Nitrogen 3.05
 Ammonia Nitrogen 1.7
 Organic Nitrogen 17.25
 TKN 1.7

Sulfate -
 Chloride -
 Alkalinity (as CaCO₃) 197
 Acidity (as CaCO₃) -
 pH 6.4

OXYGEN

Dissolved Oxygen -
 Biochemical Oxygen Demand 4.7
 Chemical Oxygen Demand -

Temperature-°C -
 Conductivity-µmho 600
 Turbidity - FTU 36
 Other -

METALS

Na - Ca - Mg - K - Fe 17.5 Cu <0.02
 Pb <0.1 Zn 0.01 Cd <0.005 Al <0.1 Ni <0.04 Mn 0.44
 Hg <0.2 Ag <0.05

SIGNED: [Signature]

ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/8/91

LOCATION: Navy Golf Course

IDENTIFICATION NUMBER: 2579

STATION NUMBER: G.L.C. 5

REMARKS:

DOWNSTREAM BETWEEN N. & OLD DITCH

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered 0.026
 Total Unfiltered 0.026
 Ortho Filtered --

RESIDUE

Total Solids 93
 Total Suspended -
 Suspended Fixed -
 Suspended Volatile -

NITROGEN

Total Nitrogen 0.91
 Nitrate-Nitrite Nitrogen 0.07
 Ammonia Nitrogen 0.31
 Organic Nitrogen 0.63
 TKN 0.87

Sulfate -
 Chloride -
 Alkalinity (as CaCO₃) 18
 Acidity (as CaCO₃) -
 pH 6.5
 Temperature-°C 13.5
 Conductivity-umho 150
 Turbidity - FTU 7.0
 Other -

OXYGEN

Dissolved Oxygen 8.1
 Biochemical Oxygen Demand 2.6
 Chemical Oxygen Demand -

METALS

Na Ca Mg K Fe 0.45 Cu <0.02
 Pb <0.1 Zn <0.005 Cd <0.005 Al <0.1 Ni <0.04 Mn 0.02
 Hg <0.2 U <0.05

SIGNED: [Signature]

ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/9/81 LOCATION: Navy Golf Course
 IDENTIFICATION NUMBER: 7580 STATION NUMBER: G.C.C. 6
 REMARKS: DOWNSTREAM OF STP

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered 0.365
 Total Unfiltered 0.840
 Ortho Filtered -

RESIDUE

Total Solids 279
 Total Suspended -
 Suspended Fixed -
 Suspended Volatile -

NITROGEN

Total Nitrogen 33.7
 Nitrate-Nitrite Nitrogen 8.7
 Ammonia Nitrogen 2.5
 Organic Nitrogen 21.5
 TKN 24.0

Sulfate -
 Chloride -
 Alkalinity (as CaCO₃) 35
 Acidity (as CaCO₃) -
 pH 6.8

OXYGEN

Dissolved Oxygen -
 Biochemical Oxygen Demand 4.3
 Chemical Oxygen Demand -

Temperature-°C -
 Conductivity-µmho 550
 Turbidity - FTU 11
 Other -

METALS

Na _____ Ca _____ Mg _____ K _____ Fe < 0.05 Cu < 0.02
 Pb < 0.1 Zn 0.01 Cd < 0.05 Al < 0.1 Ni < 0.04 Mn 0.04

Fluoride 3.1 mg/l < 0.05

SIGNED: [Signature]

ORANGE COUNTY POLLUTION CONTROL

Chemistry Department

Certificate of Analysis

DATE: 12/8/81 LOCATION: Naval Golf Course
 IDENTIFICATION NUMBER: 7581 STATION NUMBER: C.C.7
 REMARKS: STP & DITCH

ANALYSIS

All concentrations ppm unless otherwise specified

PHOSPHORUS

Total Filtered 0.203
 Total Unfiltered 0.750
 Ortho Filtered —

RESIDUE

Total Solids 240
 Total Suspended —
 Suspended Fixed —
 Suspended Volatile —

NITROGEN

Total Nitrogen 70.
 Nitrate-Nitrite Nitrogen 7.5
 Ammonia Nitrogen 2.8
 Organic Nitrogen 9.2
 TKN 12.

Sulfate —
 Chloride —

Alkalinity (as CaCO₃) 31
 Acidity (as CaCO₃) —
 pH 6.7

OXYGEN

Dissolved Oxygen 10.
 Biochemical Oxygen Demand 4.05
 Chemical Oxygen Demand —

Temperature-°C 15.0
 Conductivity-umho 430
 Turbidity - FTU 11.
 Other —

METALS

Na — Ca — Mg — K — Fe 0.05 Cu < 0.02
 Pb < 0.1 Zn 0.02 Cd < 0.005 Al < 0.1 Ni < 0.04 Mn 0.03

544 ug Cr < 0.05

SIGNED: _____

[Signature]

APPENDIX C

UNDERGROUND STORAGE TANKS, NTC, ORLANDO

(Total Storage Capacity Greater Than 1,000 Gallons)

NAVAL TRAINING CENTER ORLANDO

<u>BLDG. NO.</u>	<u>TANK CAPACITY</u>	<u>FUEL TYPE</u>
109 (3 tanks)	20,000	Gasoline
(Exchange Service Station)	20,000	Gasoline
	20,000	Gasoline
502 (2 tanks)	30,000	Fuel oil #2
(NRMCC Boiler/ Generator Facility)	30,000	Fuel oil #2
106	2,000	Fuel oil #2
113	2,500	Fuel oil #2
128	4,000	Fuel oil #2
138	5,000	Fuel oil #2
200	10,000	Fuel oil #2
206	5,000	Fuel oil #2
208	1,000	Fuel oil #2
210	10,000	Fuel oil #2
212	10,000	Fuel oil #2
214	10,000	Fuel oil #2
216	15,000	Fuel oil #2
218	15,000	Fuel oil #2
220	10,000	Fuel oil #2
222	10,000	Fuel oil #2
224	10,000	Fuel oil #2

<u>BLDG NO.</u>	<u>TANK CAPACITY</u>	<u>FUEL TYPE</u>
226	10,000	Fuel oil #2
228	10,000	Fuel oil #2
230	3,000	Fuel oil #2
232	10,000	Fuel oil #2
234	10,000	Fuel oil #2
235	2,000	Fuel oil #2
238	2,000	Fuel oil #2
240	3,000	Fuel oil #2
246	2,500	Fuel oil #2
250	2,500	Fuel oil #2
252	2,500	Fuel oil #2
304	10,000	Fuel oil #2
351	2,000	Fuel oil #2
352	15,000	Fuel oil #2
356	3,000	Fuel oil #2
358	3,000	Fuel oil #2
361	3,000	Fuel oil #2
363	3,000	Fuel oil #2
364	3,000	Fuel oil #2
366	3,000	Fuel oil #2
369	3,000	Fuel oil #2
371	3,000	Fuel oil #2
375	5,000	Fuel oil #2

<u>BLDG. NO.</u>	<u>TANK CAPACITY</u>	<u>FUEL TYPE</u>
	<u>NTEC ANNEX</u>	
607	10,000	Fuel oil #2
	<u>AREA "C"</u>	
2273 (4 tanks)	11,750	Fuel oil #2
(Supply POL Area)	11,750	Fuel oil #2
	11,750	Fuel oil #2
	11,750	Fuel oil #2
1100	20,000	Fuel oil #2
2008	1,000	Fuel oil #2
2010	5,000	Fuel oil #2
2015	1,000	Fuel oil #2
2022	1,000	Fuel oil #2
2041	1,400	Fuel oil #2
2065	2,500	Fuel oil #2
2080 (4 tanks)	1,000	Gasoline
	7,000	Diesel
	10,000	Gasoline
	10,000	Gasoline
2089	5,000	Fuel oil #2
2090	1,000	Fuel oil #2
2091	1,000	Fuel oil #2
2434	3,500	Fuel oil #2
2510	4,000	Fuel oil #2
3025	20,000	Fuel oil #2

<u>BLDG. NO.</u>	<u>TANK CAPACITY</u>	<u>FUEL TYPE</u>
	<u>McCOY ANNEX</u>	
	(All Tanks Underground)	
7171 (Not Used)	5,000	Fuel oil #2
7174 (6 tanks)	5,000	Gasoline
	3,000	Gasoline
7243	1,000	Fuel oil #2
7244	1,250	Fuel oil #2
7247	2,000	Fuel oil #2
7253 (Supply Storage Tank)	10,000	Fuel oil #2
7175 (2 tanks)	7,800	Gasoline
	7,800	Gasoline
7180	1,000	Fuel oil #2
7182	1,000	Fuel oil #2
7184	5,000	Fuel oil #2
7185 (Not Used)	1,000	Fuel oil #2
7239	2,000	Fuel oil #2
7240	1,000	Fuel oil #2
7241	1,500	Fuel oil #2
7242	2,000	Fuel oil #2

APPENDIX D

Naval Facilities Engineering Command

01 June 1983

Page 2

CAS No. 29222 - Description Naval Administration Command
PondCAS No. 29223 - Description Naval Administration Command, Orlando
Leachate

PARAMETER	CAS No 29222	CAS No. 29223
Alkalinity (mg/l) (MO)	53	464
BOD ₅ (mg/l)	20	65
COD (mg/l)	62	938
Cyanide (mg/l)	0.03	< 0.02
pH	6.88	6.78
TDS (mg/l)	140	660
TSS (mg/l)	65	533
P (mg/l)	0.15	2.8
TOX	70	121
Nitrogen (mg/l)	1.6	50
Specific Conductance	160	700
As (mg/l)	0.005	0.227
Cd (mg/l)	<0.01	0.02
Cr (mg/l) (Hexavalent)	<0.05	<0.05
Cu (mg/l)	0.06	0.15
Hg (mg/l)	<0.0005	0.0009
Pb (mg/l)	0.008	0.320
Se (mg/l)	0.005	0.005
Zn (mg/l)	0.02	11.4
B (mg/l) (ICP)	0.4	3.4