01-09-5/1/84-00337

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WORK AND SAFETY PLAN

CONFIRMATION STUDY TO DETERMINE EXISTENCE AND POSSIBLE MIGRATION OF SPECIFIC CHEMICALS IN SITU

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA
CONTRACT NO. N62470-83-C-6106

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
GAINESVILLE, FLORIDA

MAY 1984

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Gainesville, Florida

May 1984

TABLE OF CONTENTS

Section		Page
1.0	INTRODUCTION	1-1
2.0	WORK PLAN	2-1
	2.1 PLAN OF ACTION	2-1
	2.1.1 PRESITE ACTIVITIES	2-3
	2.1.2 ONSITE INVESTIGATION	2-4
	2.1.3 EVALUATION AND REPORTS	2-26
	2.2 PROJECT SCHEDULE	2-26
	2.3 PROJECT ORGANIZATION	2-28
	2.3.1 ESE	2-28
	2.3.2 STS CONSULTANTS, LTD. (STS)	2-28
	2.3.3 MCB CAMP LEJEUNE PERSONNEL	2-29
3.0	SAFETY PLAN	3-1
	3.1 PROJECT DESCRIPTION	3-1
	3.2 RESPONSIBILITY AND ORGANIZATION	3-1
	3.3 GENERAL SAFETY RULES	3-3
	3.3.1 ONSITE SAFETY	3-3
	3.3.2 LABORATORY SAFETY	3-4
	3.4 SITE CHARACTERISTICS AND SPECIFIC SAFETY PLAN	3-5

APPENDIX A--ADDITIONAL MCB CAMP LEJEUNE CONTACTS
APPENDIX B--SITE CHARACTERISTICS AND SITE SAFETY WORK PLAN

VISITORS NOT Allowed WITHIN designated WORK Site. Unauthorized persons REFUSING to leave work site will result in a request for Base Security to have them removed.

LIST OF TABLES

Table		Page
2-1	Confirmation Study Verification Step Sampling and Analysis Program--MCB Camp Lejeune	2-5

LIST OF FIGURES

Figure		Page
2-1	Site Map Showing Locations of Sites of Potential Contamination at Marine Corps Base, Camp Lejeune	2-2
2-2	Proposed Sampling Locations at Site No. 1, French Creek Liquids Disposal Area	2-8
2-3	Proposed Sampling Locations at Site No. 2, Former Nursery/Day Care Center	2-9
2-4	Proposed Sampling Locations at Site Nos. 6 and 9, Storage Lots 201 and 203 and Fire Fighting Training Pit	2-10
2-5	Proposed Sampling Locations at Site Nos. 21 and 22, Transformer Storage Lot 140 and Industrial Area Tank Farm	2-11
2-6	Proposed Sampling Locations at Site No. 24, Industrial Area Fly Ash Dump	2-12
2-7	Proposed Sampling Locations at Site No. 28, Hadnot Point Burn Dump	2-13
2-8	Proposed Sampling Locations at Site No. 30, Combat Town Training Area	2-14
2-9	Proposed Sampling Locations at Site No. 35, Camp Geiger Area Fuel Farm	2-15
2-10	Proposed Sampling Locations at Site No. 36, Camp Geiger Area Dump (Near STP)	2-16
2-11	Proposed Sampling Locations at Site No. 41, Camp Geiger Dump (Near Former Trailer Park)	2-17
2-12	Proposed Sampling Locations at Site No. 45, Campbell Street Underground Fuel Storage Area	2-18
2-13	Proposed Sampling Locations at Site No. 48, MCAS New River Mercury Dump Site	2-19
2-14	Proposed Sampling Locations at Site No. 54, Crash Crew Fire Training Burn Pit	2-20
2-15	Proposed Sampling Locations at Site No. 68, Rifle Range Dump	2-21

LIST OF FIGURES
(Continued, Page 2 of 2)

Figure		Page
2-16	Proposed Sampling Locations at Site No. 69, Rifle Range Chemical Dump	2-22
2-17	Proposed Sampling Locations at Site No. 73, Courthouse Bay Liquid Disposal Area	2-23
2-18	Proposed Sampling Locations at Site No. 74, Grease Pit and Pest Control Area	2-24
2-19	Proposed Sampling Locations at Site Nos. 75 and 76, MCAS Basketball Court and Curtis Road Sites	2-28
2-20	MCB Camp Lejeune Confirmation Study Schedule	2-27

1.0 INTRODUCTION

This report presents the Work and Safety/Contingency Plans for the Confirmation Study at the Marine Corps Base (MCB), Camp Lejeune, North Carolina. The Work Plan addresses only the Verification Step (Step IA) of the Confirmation Study, whereas the Safety/Contingency Plan applies to all phases of the study. to be modified as required

The objective of the Verification Step is to determine whether specific toxic and hazardous materials identified in the Initial Assessment Study, and possibly other contaminants, are present in concentrations considered to be hazardous. Efforts will include the installation of ground water monitoring wells and sampling of ground water, surface water, soil, sediment, and tissue. The result of the Verification Step will be a general evaluation of contamination found, including geohydrological, health, safety, and regulatory aspects, and a recommendation as to whether or not to proceed with the Characterization Step of the Confirmation Study.

2.0 WORK PLAN

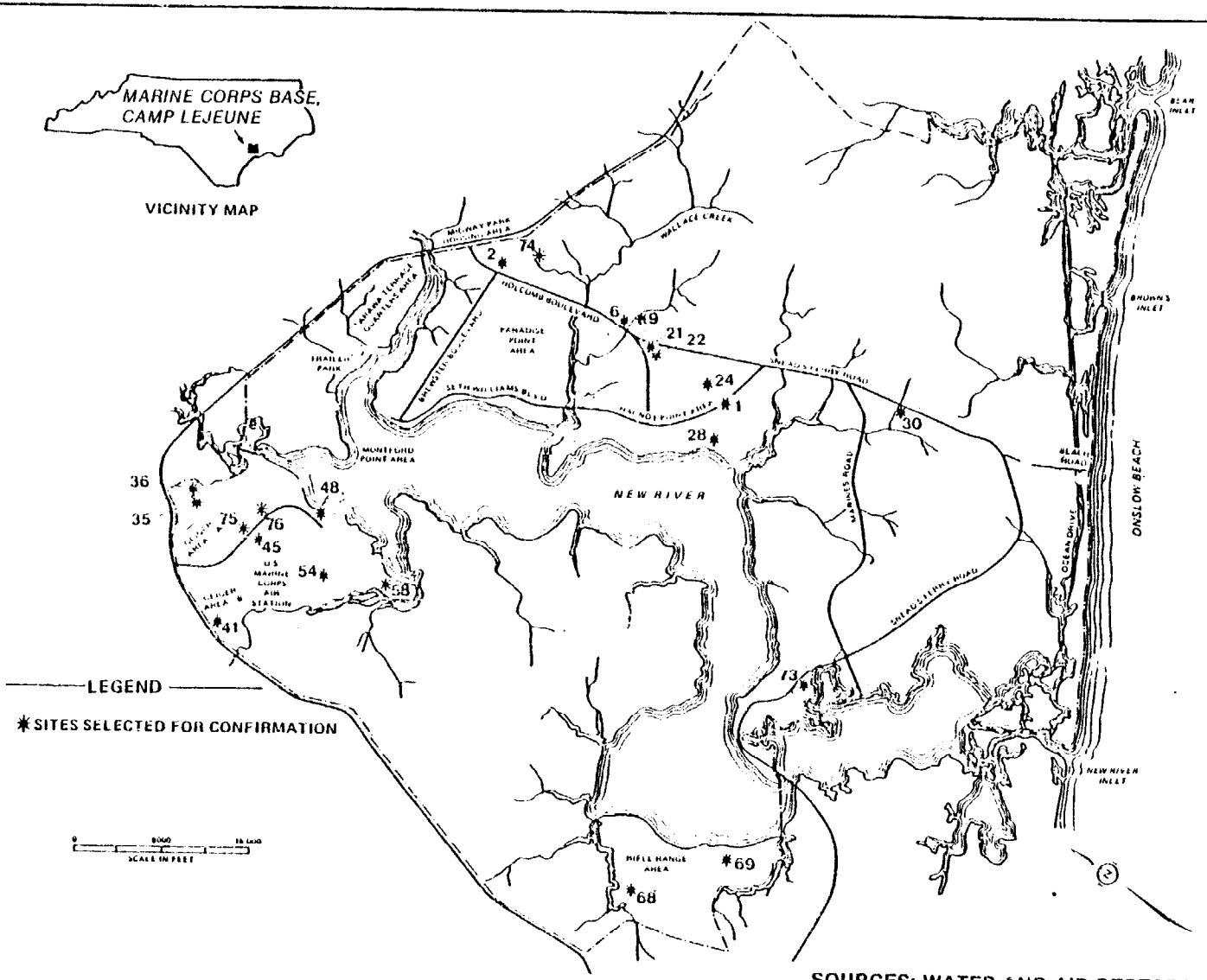
The Work Plan consists of a task-by-task description of the plan of action for completing the Verification Step of the Confirmation Study, including a project schedule and a brief discussion of the project organization that was developed to assure successful project completion. Each of these components of the Work Plan is presented below.

2.1 PLAN OF ACTION

The plan of action was developed based on a thorough review of the scope of work detailed in the contract (Contract No. N62470-83-C-6106) and the Initial Assessment Study Report for MCB Camp Lejeune (Naval Energy and Environmental Support Activity Report No. NEESA 13-011, April 1983). In addition, information obtained during the onsite inspection of the sites of potential contamination and the initial plan of action and milestones (POA&M) development meeting conducted at MCB Camp Lejeune on April 16 through 18, 1984, was utilized in finalizing the plan of action.

The plan of action covers the investigation of 21 sites of potential contamination which are listed below and shown in Figure 2-1.

Site Number	Name
1	French Creek Liquids Disposal Area
2	Former Nursery/Day Care Center (Bldg. 712)
6	Storage Lots 201 and 203
9	Fire Fighting Training Pit
21	Transformer Storage Lot 140
22	Industrial Area Tank Farm
24	Industrial Area Fly Ash Dump
28	Hadnot Point Burn Dump
30	Sneads Ferry Road Fuel Tank Sludge Area
35	Camp Geiger Area Fuel Farm



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT MARINE CORPS BASE, CAMP LEJEUNE

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

36	Camp Geiger Area Dump near Sewage Treatment Plant (STP)
41	Camp Geiger Dump
45	Campbell Street Fuel Farm
48	Marine Corps Air Station (MCAS) Mercury Dump Site
54	Crash Crew Fire Training Burn Pit
68	Rifle Range Dump
69	Rifle Range Chemical Dump
73	Courthouse Bay Liquids Disposal Area
74	Mess Hall Grease Disposal Area
75	MCAS Basketball Court Site
76	MCAS Curtis Road Site

A task-by-task description of the plan of action for performing the Verification Step of the Confirmation Study at these 21 sites follows.

2.1.1 PRESITE ACTIVITIES

1. Development of Work Plan: Review existing records, conduct site reconnaissance, and meet with Engineer-In-Charge (EIC) and MCB Camp Lejeune personnel to discuss POA&M. Prepare work plan and forward to EIC.
2. Development of Safety/Contingency Plan: Assess potential risks associated with field investigations and laboratory analyses and coordinate with MCB Camp LeJeune Safety personnel to establish a Safety/Contingency Plan. Plan must address safety precautions to be taken by contractor, subcontractor, and MCB Camp Lejeune personnel, to include protective clothing and training, and emergency response procedures.
3. Well Drilling Specifications: Prepare specifications and subcontract for well drilling subcontractor.
4. Training: In accordance with the Safety Plan, an indoctrination of MCB Camp Lejeune personnel on all aspects of the contractor's safety requirements, including equipment, will

be conducted. In addition, in-house training for contractor personnel will be performed.

2.1.2 ONSITE INVESTIGATION

1. Setup of Equipment Storage: Upon arrival of the field team at MCB Camp Lejeune, secure locations for storage of equipment and supplies will be identified and utilized.
2. Drilling and Boring: Drilling and boring will be required for monitor well installation and possibly for soil sampling. Table 2-1 identifies the number of wells to be installed and the number of soil cores to be drilled at each site, and Figures 2-2 through 2-19 show the proposed locations for the wells and soil cores. Drilling will begin at the sites located in the northeastern portion of the installation (Sites 1, 2, 6, 9, 21, 22, 24, 28, 30, and 74) and proceed to Site 73, located in the southeastern portion of the base. From Site 73, drilling will then proceed to Sites 68 and 69 and finally to those sites located in MCAS (Sites 35, 36, 41, 45, 48, 54, 75, and 76).
3. Geophysical Investigation: Prior to any drilling or boring at Sites 75 and 76, a geophysical investigation will be conducted at each of these sites to locate drums that are possibly buried and to avoid puncturing any buried drums during subsequent drilling operations. Additionally, geophysical techniques will be utilized at Site 69 to verify that landfill materials do not underlie the staked well locations.
4. Well Development: Following the installation of ground water monitoring wells, each well will be developed by vigorous pumping to assure the collection of representative ground water samples during subsequent sampling activities.
5. Surveying: Surveying will be performed to provide ~~approximate~~ vertical and horizontal locations of all monitoring wells and borings and to determine ground water elevations in each well. Elevations of each well stated at 0 ft above MSL for top of well casing cap off
6. Soil Augering/Sampling: Soil augering/sampling will be conducted at Sites 2, 6, 21, 35, 45, 48, 54, and 74. Table 2-1

NO

Locations of borings/wells may be modified at the discretion of FSO person on site based on site specific requirements.

The exceptions will be for Site 68 & 69 - There will

Table 2-1. Confirmation Study Verification Step Sampling and Analysis Program—MCB Camp Lejeune

Site No.	Wells to be to Installed	Total Wells	Surface Water	Sediments (S) or Tissues (T)	Cores	Frequency*	Analytical Constituents
1	6	7	0	0	0	3	Cd, Cr, Pb, Sb, O&G, VOA, T. Phenols
2	1	5	0	0	-	3	OCP, OCH
					11	1	OCP, OCH
6	0	0	0	0	20	1	DDT-R
9	2	3	0	0	0	3	Cd, Cr, Pb, O&G, VOA, T. Phenols
21	1	1	0	0	-	3	OCP, OCH, PCB
					6	1	OCP, OCH, PCB
					6	1	OCP, OCH
22	2	3	0	0	0	3	Pb, O&G, VOA
24	5	5	2	-	0	3	Metals A, VOA
				2S		1	Metals A
28	3	3	2	-	0	3	Metals B, OCP, PCB, O&G, VOA
				2S		1	Metals B, OCP, PCB, O&G
				2T		1	OCP, PCB
30	1	1	0	0	0	3	Pb, O&G, VOA
35	0	3**	0	0	-	1	Pb, O&G, VOA
					3	1	Visual Only, Pb, O&G
36	4	4	0	0	0	3	Cd, Cr, Pb, O&G, VOA, T. Phenols
41	4	4	0	0	0	3	Cd, Cr, Pb, VOA, T. Phenols, OCP, O&G, Mirex, Ordnance Compounds
45	3	5	0	0	-	3	Pb, O&G, VOA
					30	1	Visual Only
48	0	0	0	4S	4	1	Hg

Table 2-1. Confirmation Study Verification Step Sampling and Analysis Program—MCB Camp Lejeune (Continued, Page 2 of 3)

Site No.	Wells to be to Installed	Total Wells	Surface Water	Sediments (S) or Tissues (T)	Cores	Frequency*	Analytical Constituents
54	1	1	0	0	-	3	Cd, Cr, Pb, O&G, VOA, T. Phenols
					15	1	Visual Only
68	3	5	0	0	0	3	VOA
69	8	8	3	0	0	3	OCP, PCB, PCP, VOA, Hg, Residual Chlorine
73	4	5	0	0	0	3	Cd, Cr, Pb, Sb, O&G, VOA, T. Phenols
74	2	3	0	0	-	3	OCP, OCH, PCB
					6	1	OCP, OCH, PCB
75	3	6	0	0	0	3	VOA, Chloropicrin
76	2	2	0	0	0	3	VOA, Chloropicrin

— = Not applicable.

* Frequency refers to the number of sampling events during the Verification Phase in accordance with EIC's determination.

** [illegible]

† Key to Constituent Abbreviations:

Cd = Cadmium.
Cr = Chromium.
Pb = Lead.
Sb = Antimony.
O&G = Oil and grease.
VOA = Volatile organic analysis.
T. Phenols = Total phenols.
OCP = Organochlorine pesticides.
OCH = Organochlorine herbicides.
DDT-R = o,p- and p,p'-isomers of DDD, DDE, and DDT.
PCB = Polychlorinated biphenyls.
Metals A = Arsenic, cadmium, chromium, copper, lead, nickel, selenium, and zinc.
Metals B = Arsenic, cadmium, chromium, lead, mercury, nickel, and zinc.
Visual Only = Samples taken and inspected in the field for petroleum, oil, and/or lubricant (POL) contamination.
Ordnance Compounds = TNT, DNT, RDX, and white phosphorus (WP).
PCP = Pentachlorophenol.
Hg = Mercury.

Note: [illegible]

Table 2-1. Confirmation Study Verification Step Sampling and Analysis Program—MCB Camp Lejeune (Continued, Page 3 of 3)

** Hand-augered holes without casings.

Move to preceding page.

NOTE: All surface and ground water samples will be analyzed for specific conductance and pH in the field.

Organochlorine Pesticides (OCP)

Aldrin
a-BHC
b-BHC
d-BHC
g-BHC
Chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide
Toxaphene

Organochlorine Herbicides (OCH)

2,4-D
2,4,5-T
Silvex

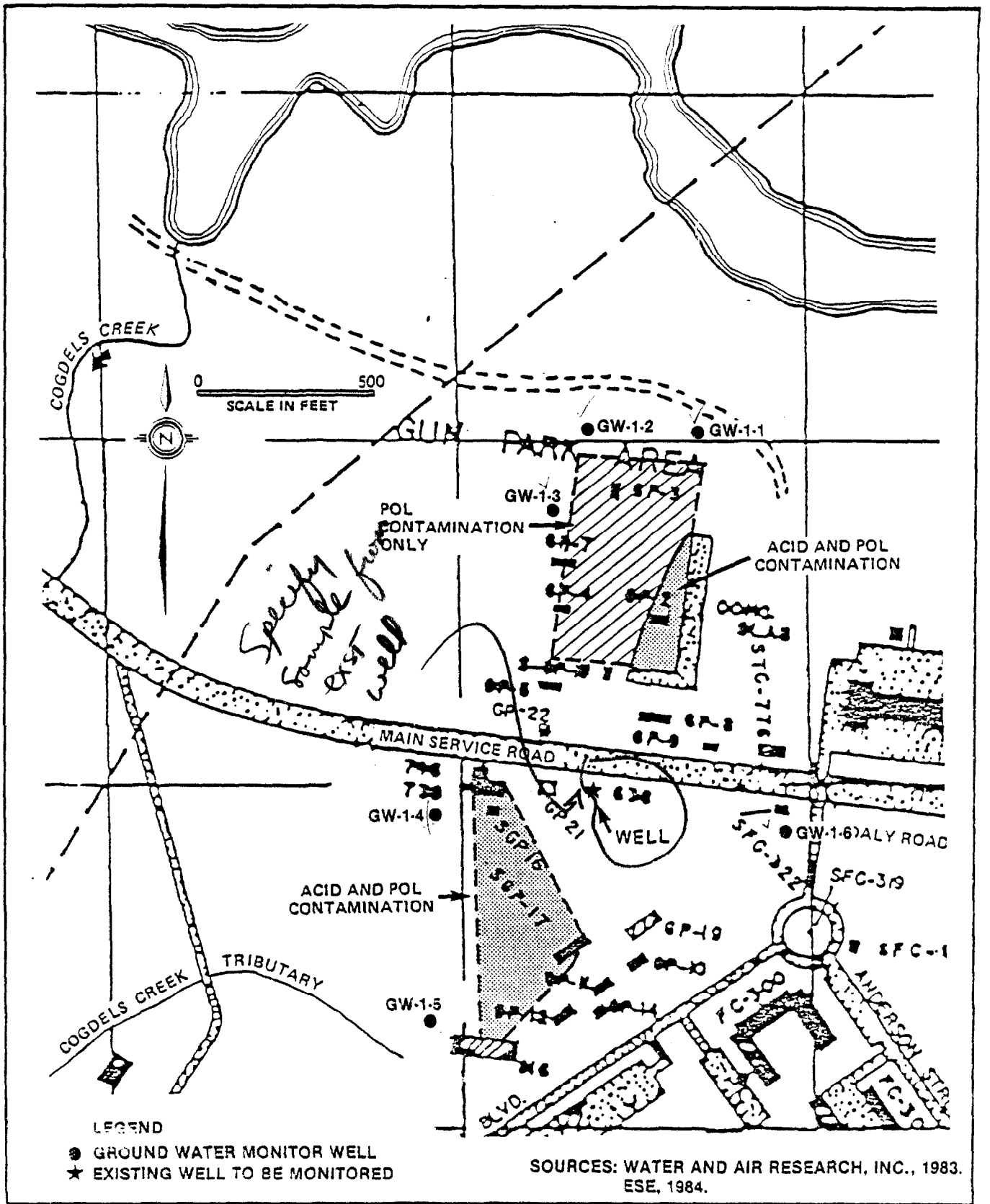
DDT-R

o,p-DDD
o,p-DDE
o,p-DDT
p,p'-DDD
p,p'-DDE
p,p'-DDT

Volatile Organic Analysis (VOA)

Acrolein
Acrylonitrile
Benzene
Bromomethane
Bromodichloromethane
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Dibromochloromethane
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
T-1,2-Dichloroethene
1,2-Dichloropropane
Cis-1,3-dichloropropene
T-1,3-dichloropropene
Ethylbenzene
Methylene Chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichlorofluoromethane
Toluene
Vinyl Chloride
2-Chloroethylvinylether

Source: ESE, 1984.



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-2
PROPOSED SAMPLING LOCATIONS AT SITE NO. 1, FRENCH CREEK LIQUIDS DISPOSAL AREA

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

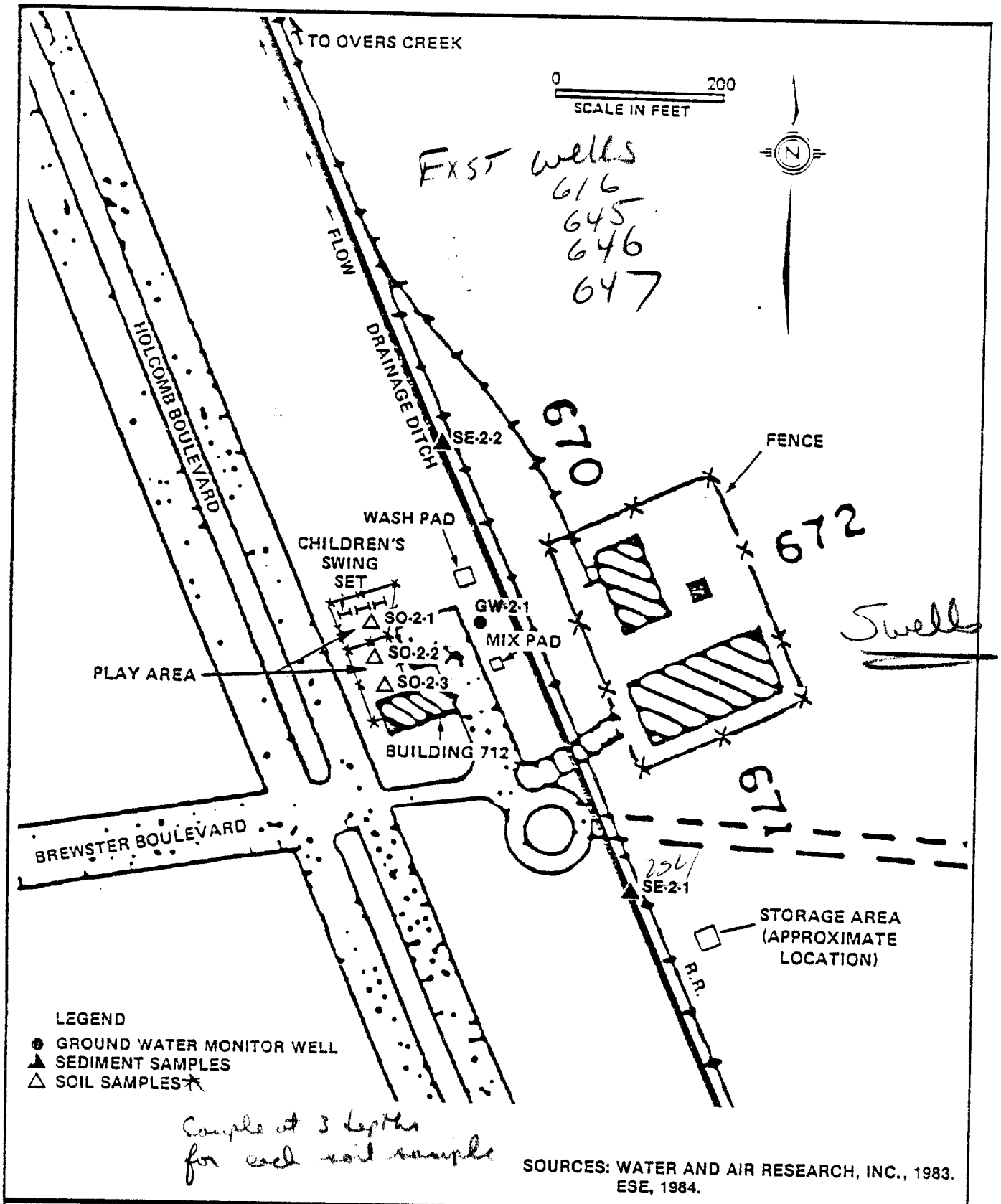


Figure 2-3
PROPOSED SAMPLING LOCATIONS AT SITE NO. 2, FORMER NURSERY/DAY CARE CENTER

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

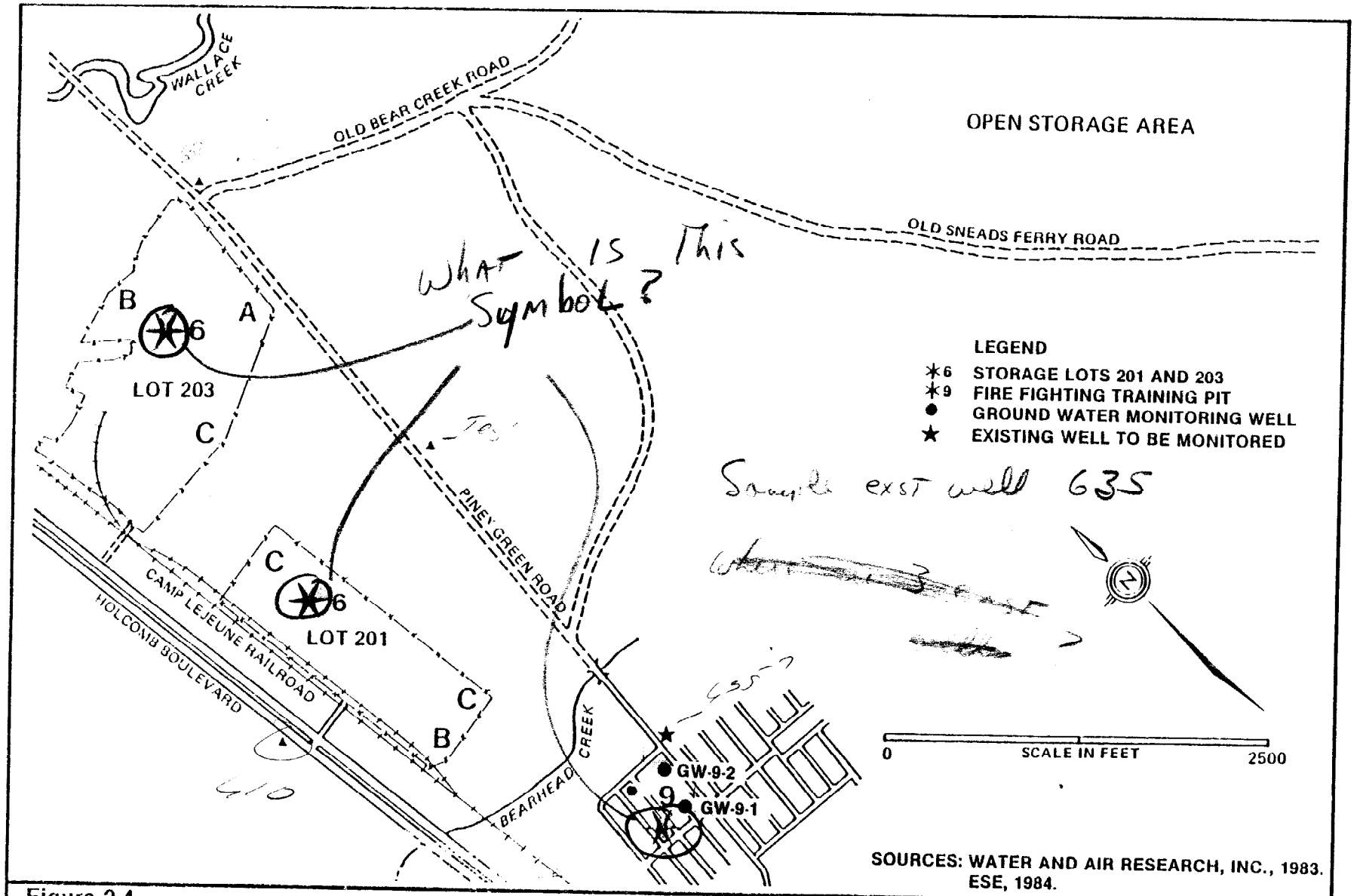


Figure 2-4
PROPOSED SAMPLING LOCATIONS AT SITE NOS. 6 AND 9, STORAGE LOTS 201 AND 203 AND FIRE FIGHTING TRAINING PIT

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

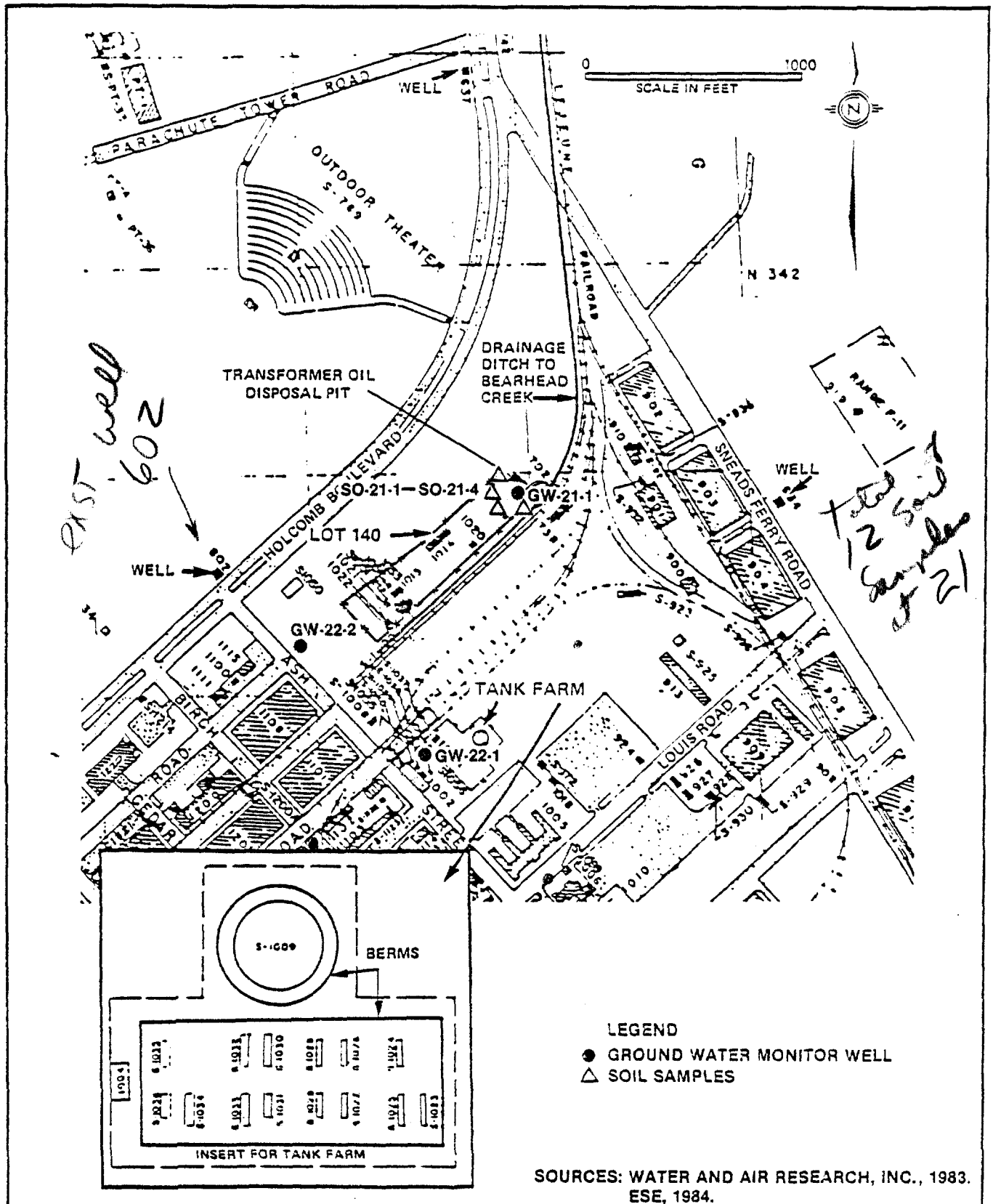
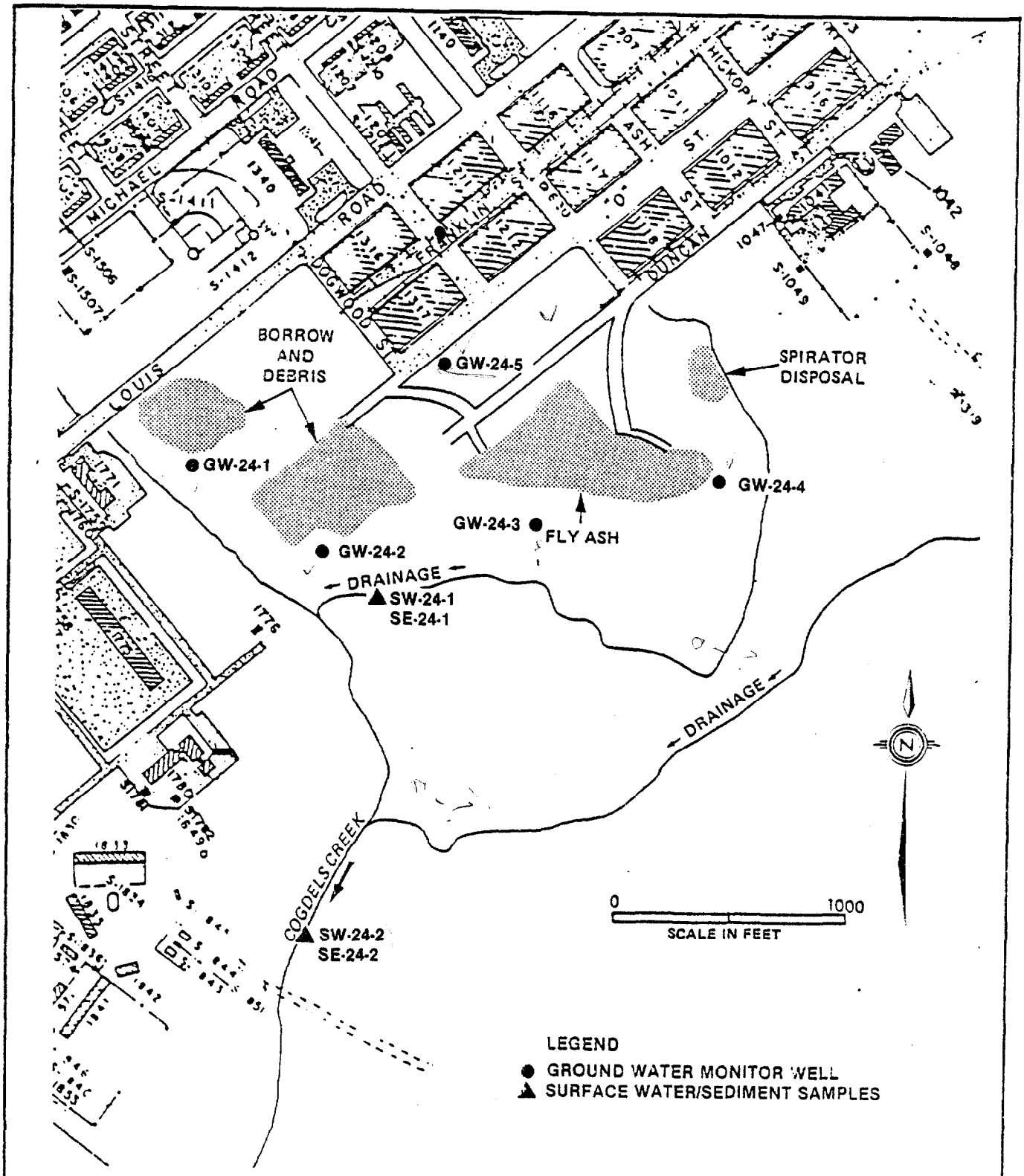


Figure 2-5
PROPOSED SAMPLING LOCATIONS AT SITE NOS. 21 AND 22, TRANSFORMER STORAGE LOT 140 AND INDUSTRIAL AREA TANK FARM

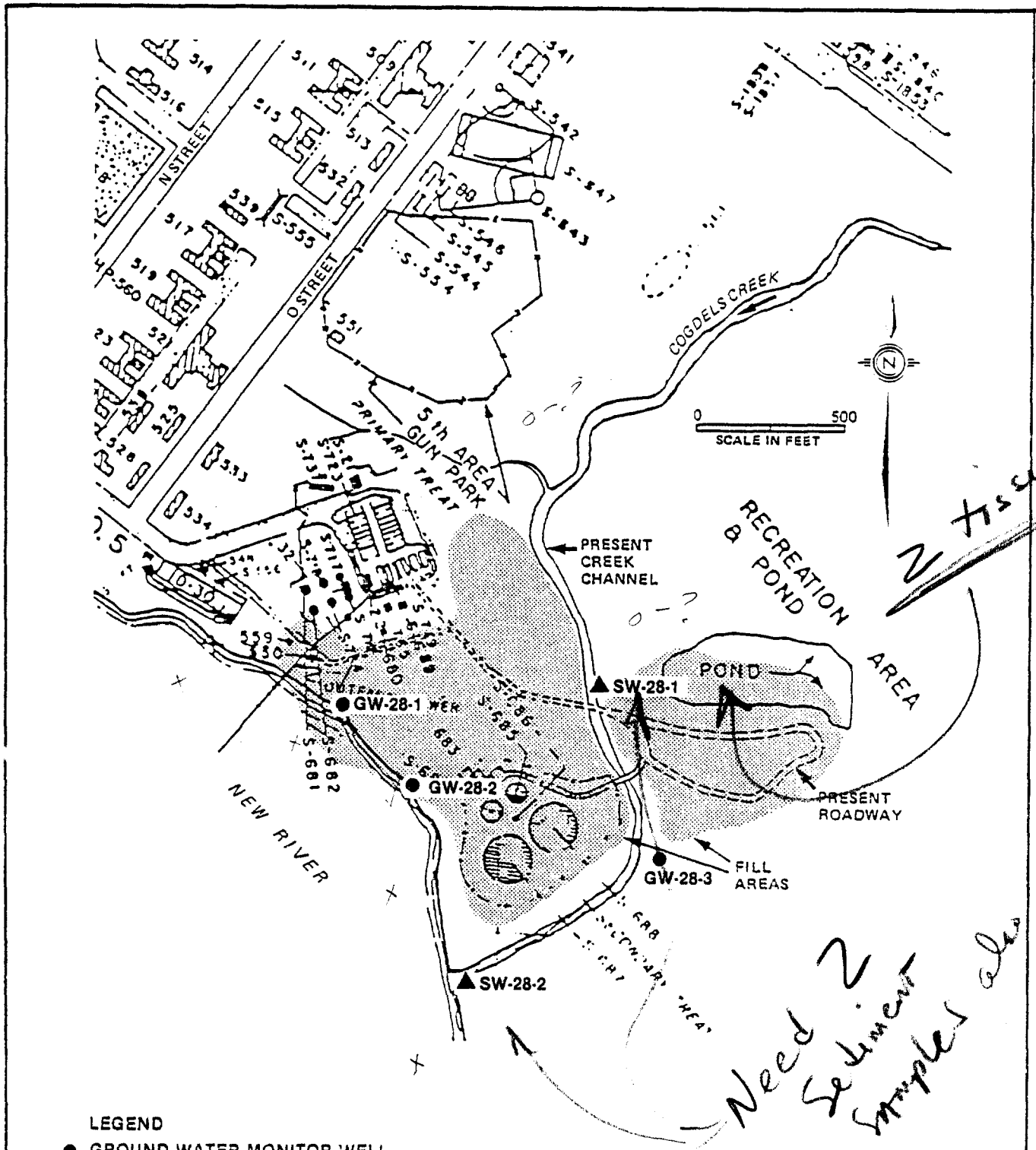
CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-6
PROPOSED LOCATIONS AT SITE NO. 24,
INDUSTRIAL AREA FLY ASH DUMP

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-7
PROPOSED SAMPLING LOCATIONS AT
SITE NO. 28, HADNOT POINT BURN DUMP

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

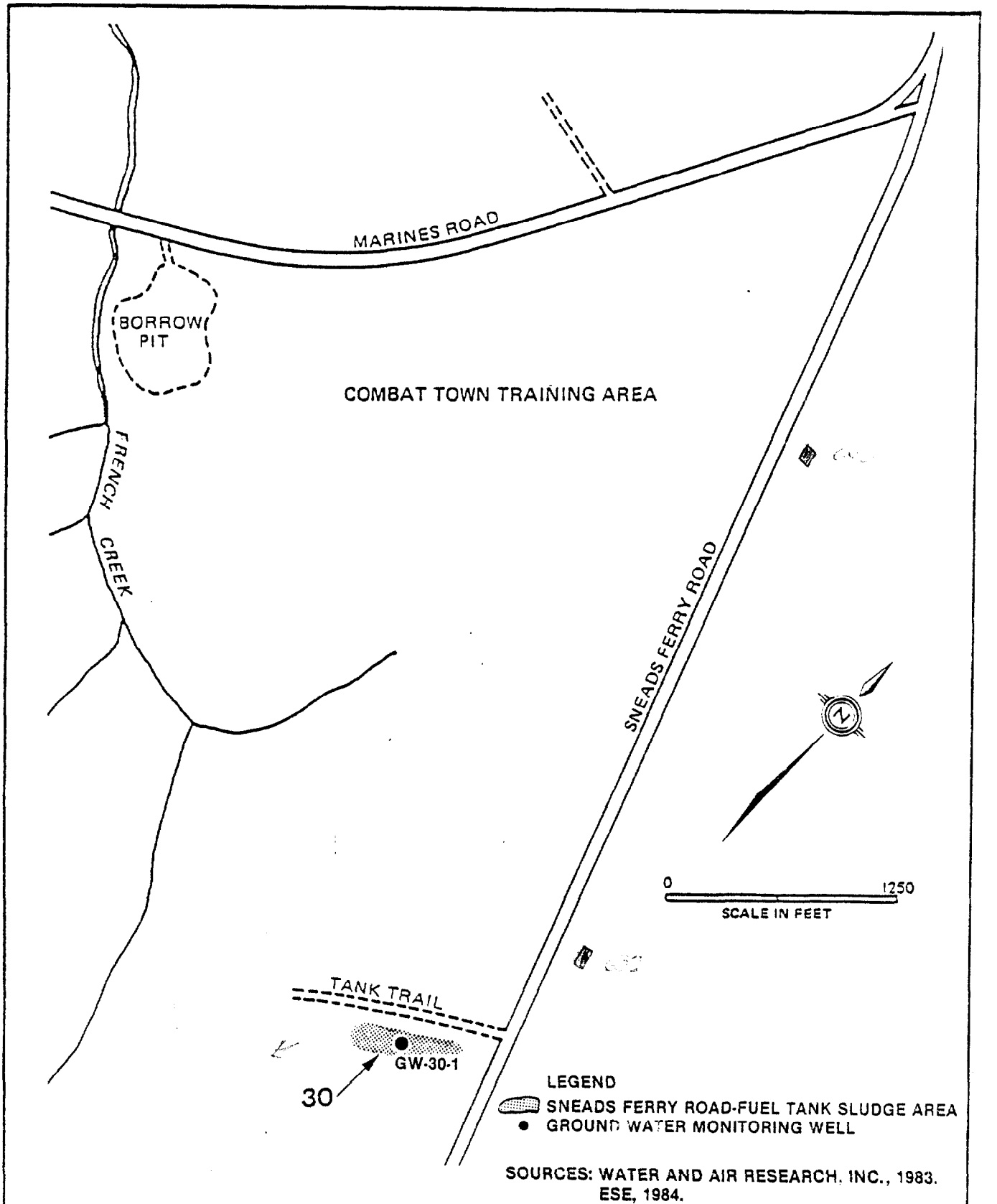


Figure 2-8
PROPOSED SAMPLING LOCATIONS AT SITE NO. 30, COMBAT TOWN TRAINING AREA

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

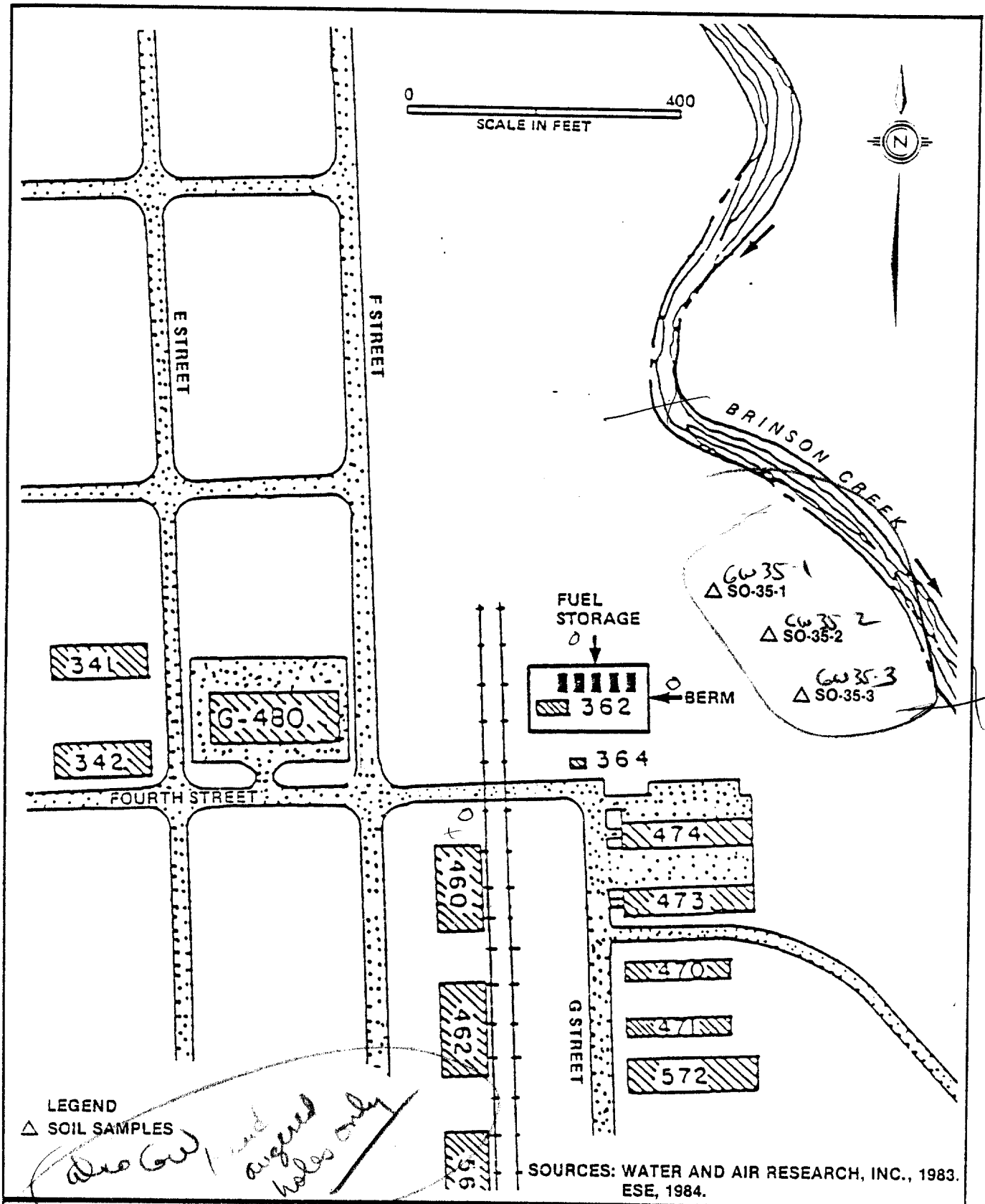
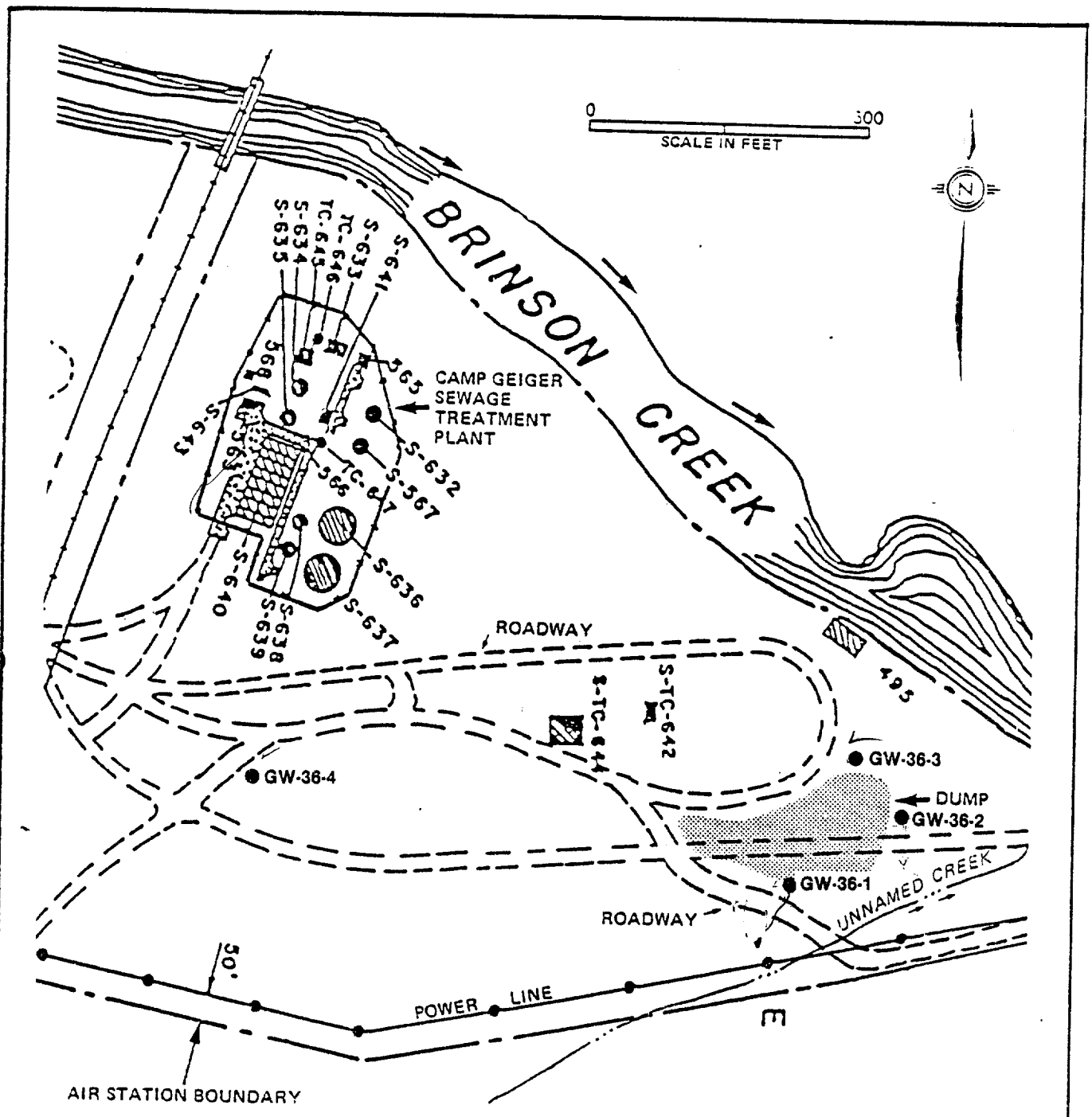


Figure 2-9
PROPOSED SAMPLING LOCATIONS AT SITE NO. 35, CAMP GEIGER AREA FUEL FARM

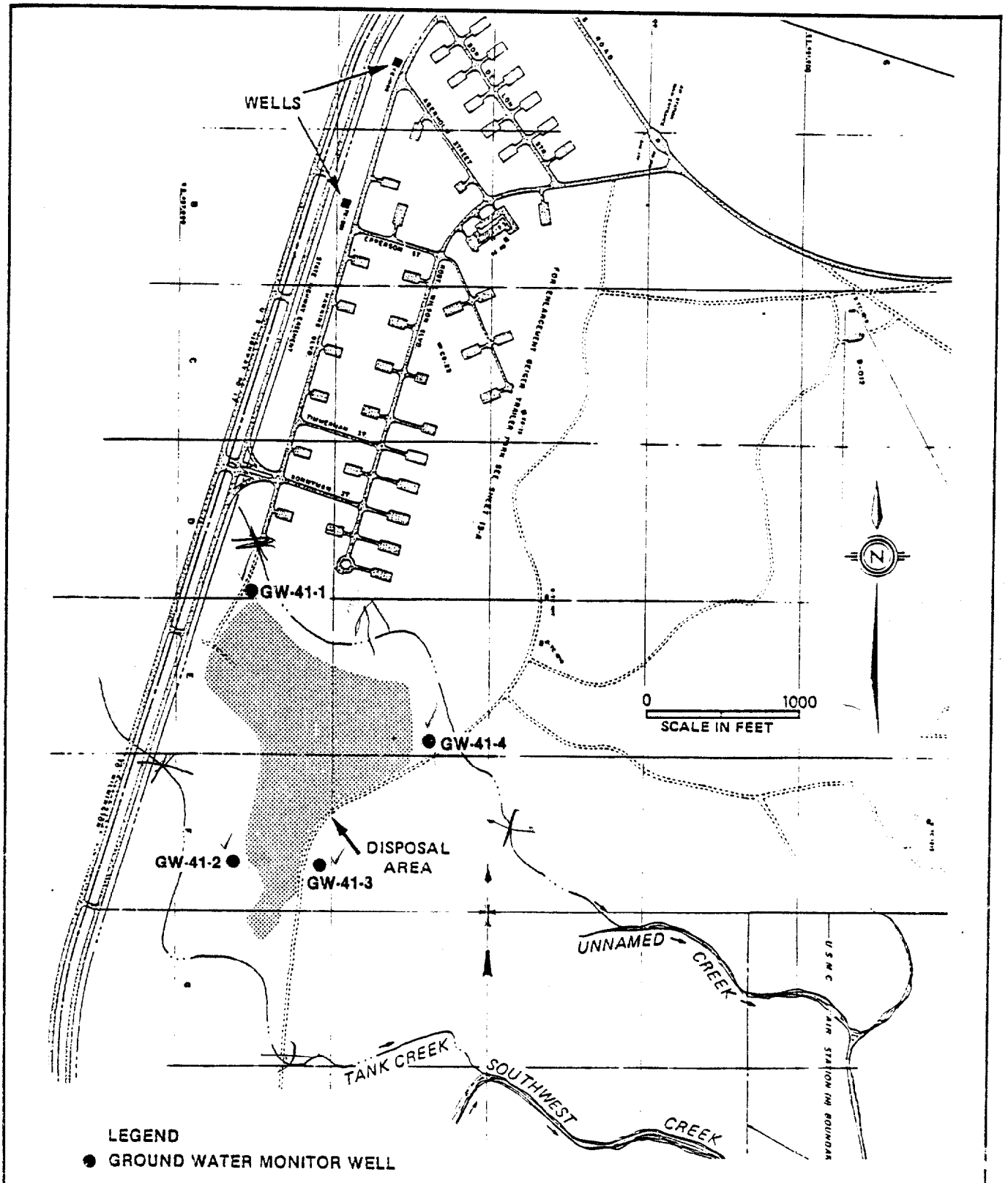
CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-10
PROPOSED SAMPLING LOCATIONS AT
SITE NO. 36, CAMP GEIGER AREA
DUMP (NEAR STP)

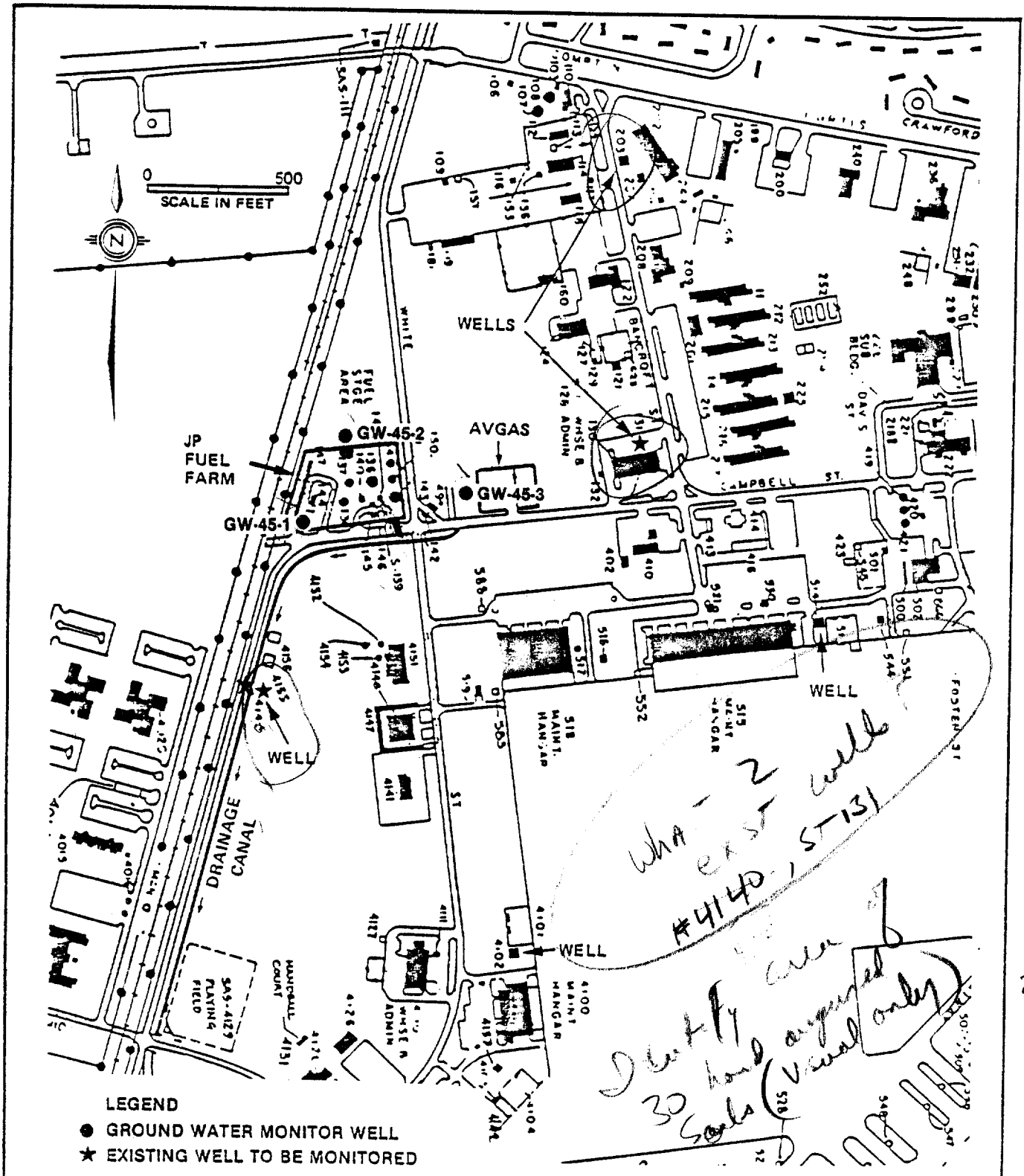
CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-11
PROPOSED SAMPLING LOCATIONS AT SITE NO. 41, CAMP GEIGER DUMP (NEAR FORMER TRAILER PARK)

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-12
PROPOSED SAMPLING LOCATIONS AT
SITE NO. 45, CAMPBELL STREET
UNDERGROUND FUEL STORAGE AREA

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

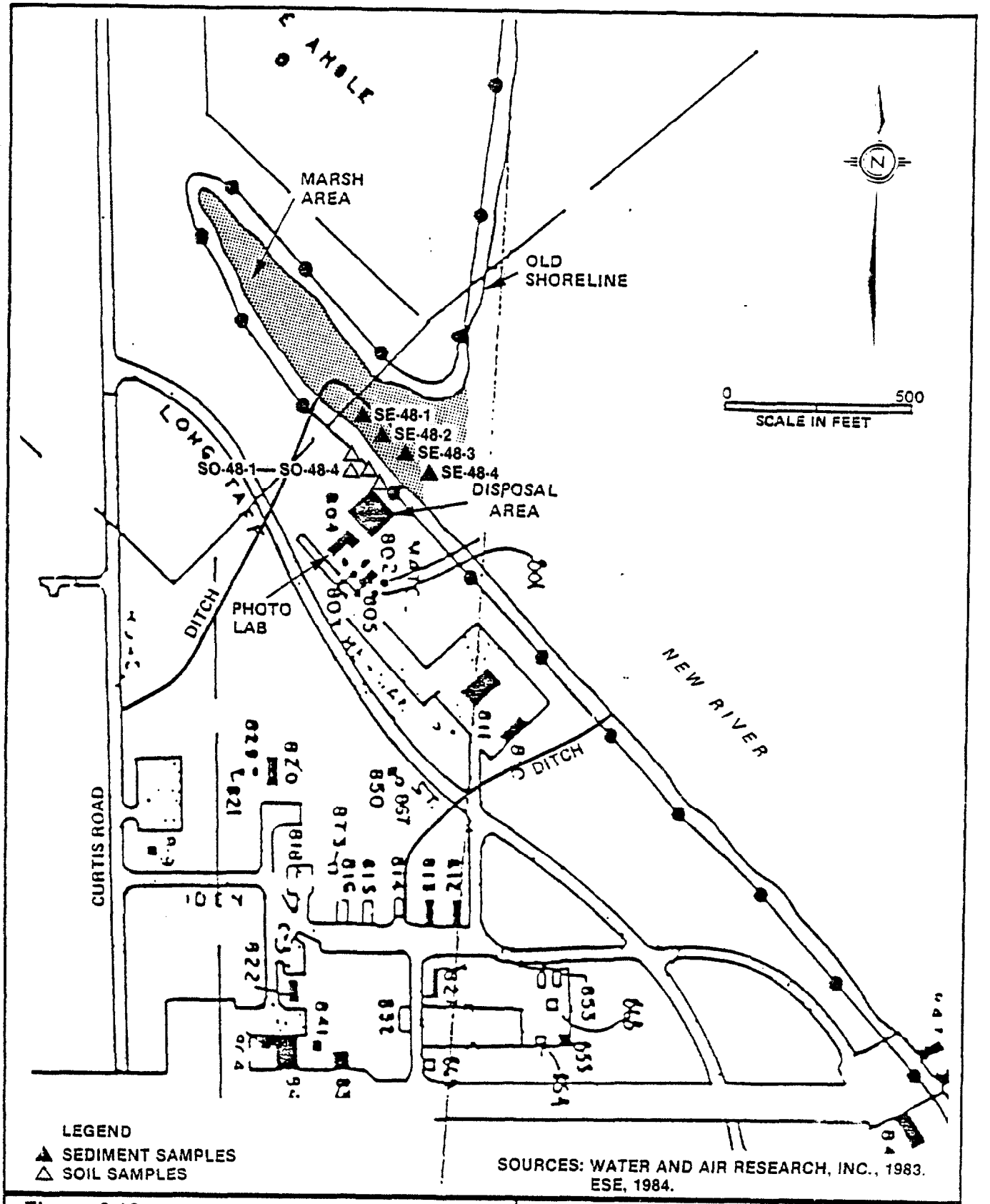


Figure 2-13
PROPOSED SAMPLING LOCATIONS AT SITE NO. 48, MCAS NEW RIVER MERCURY DUMP SITE

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

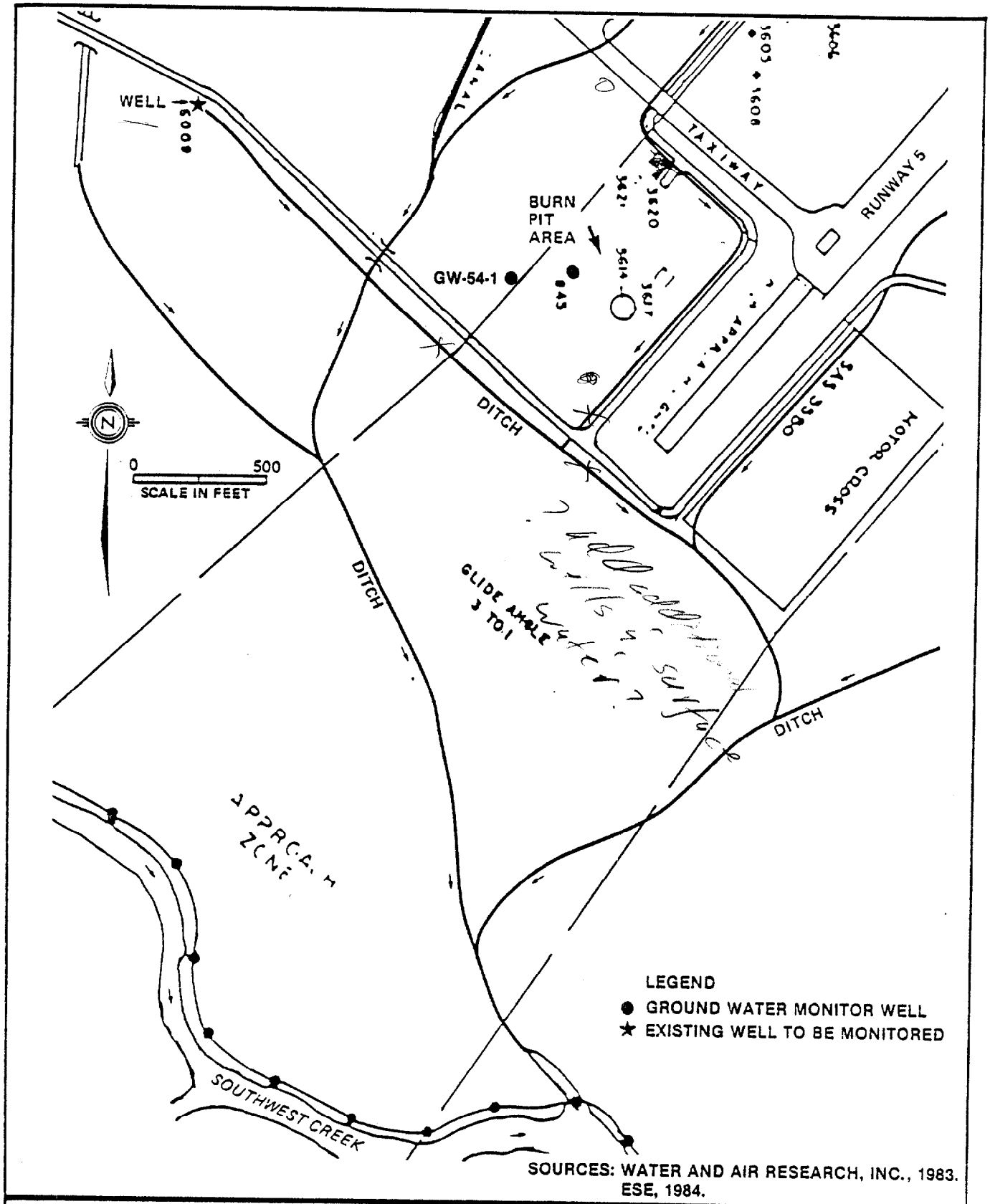
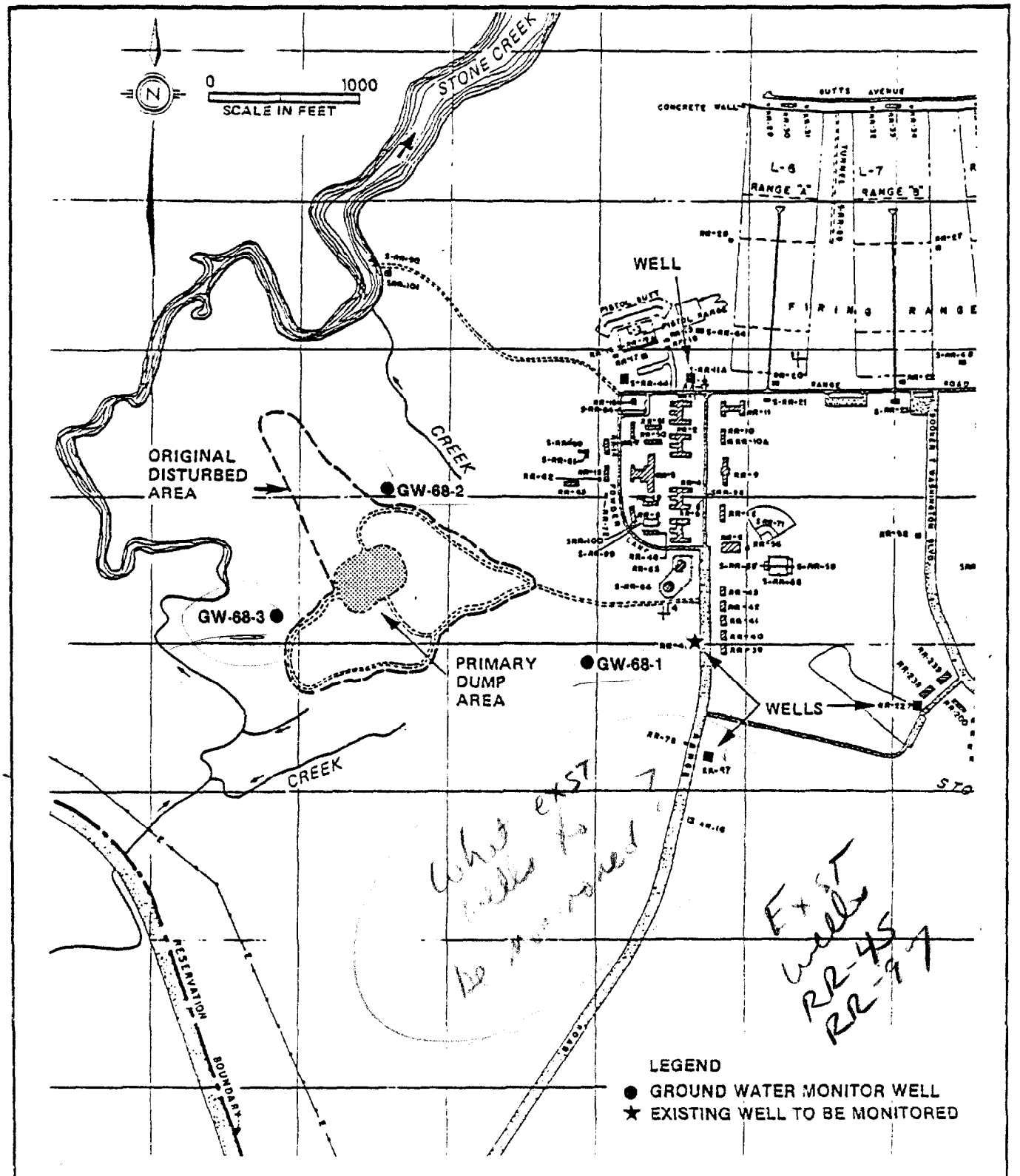


Figure 2-14
PROPOSED SAMPLING LOCATIONS AT SITE NO. 54, CRASH CREW FIRE TRAINING BURN PIT

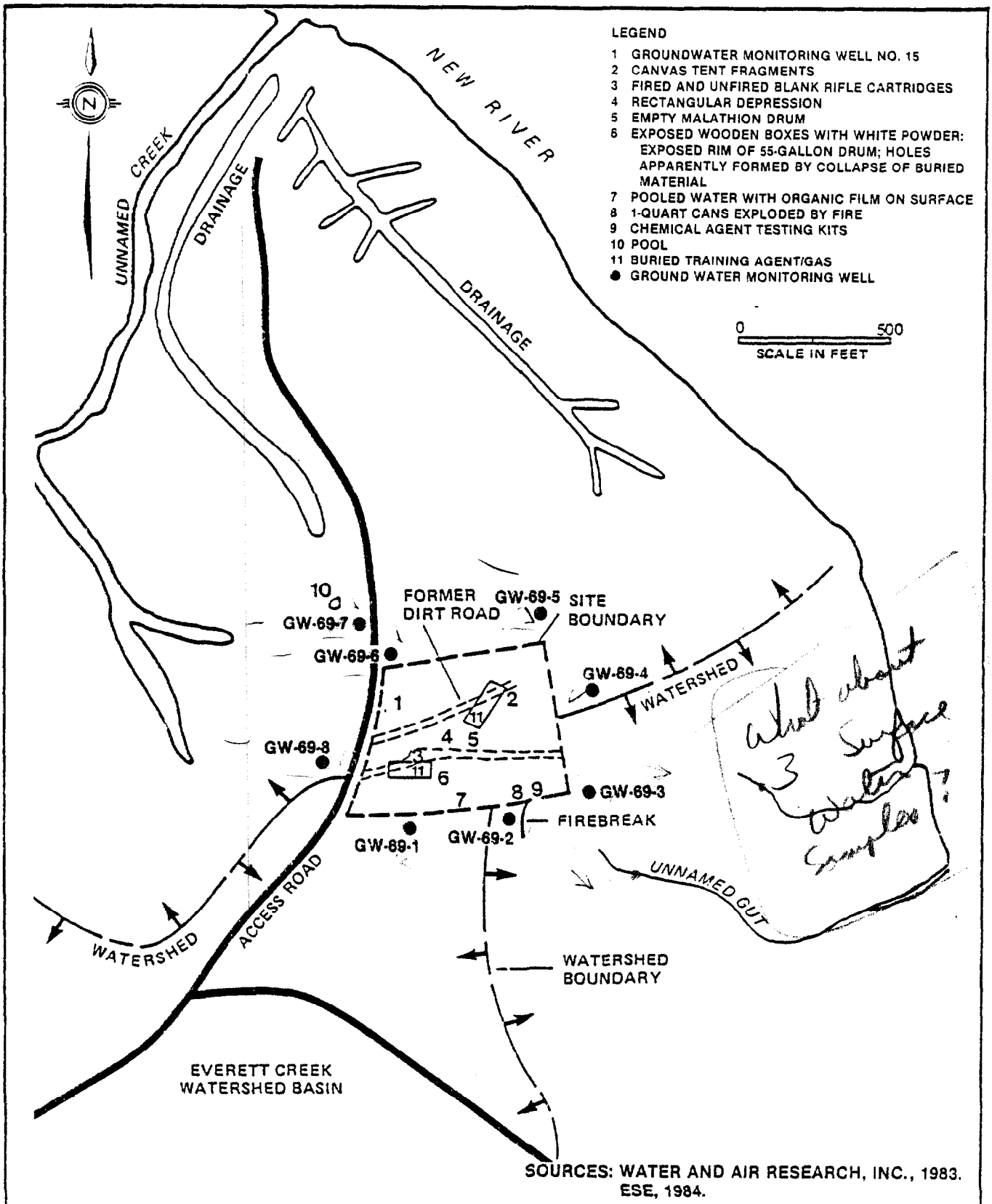
CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-15
PROPOSED SAMPLING LOCATIONS AT
SITE NO. 68, RIFLE RANGE DUMP

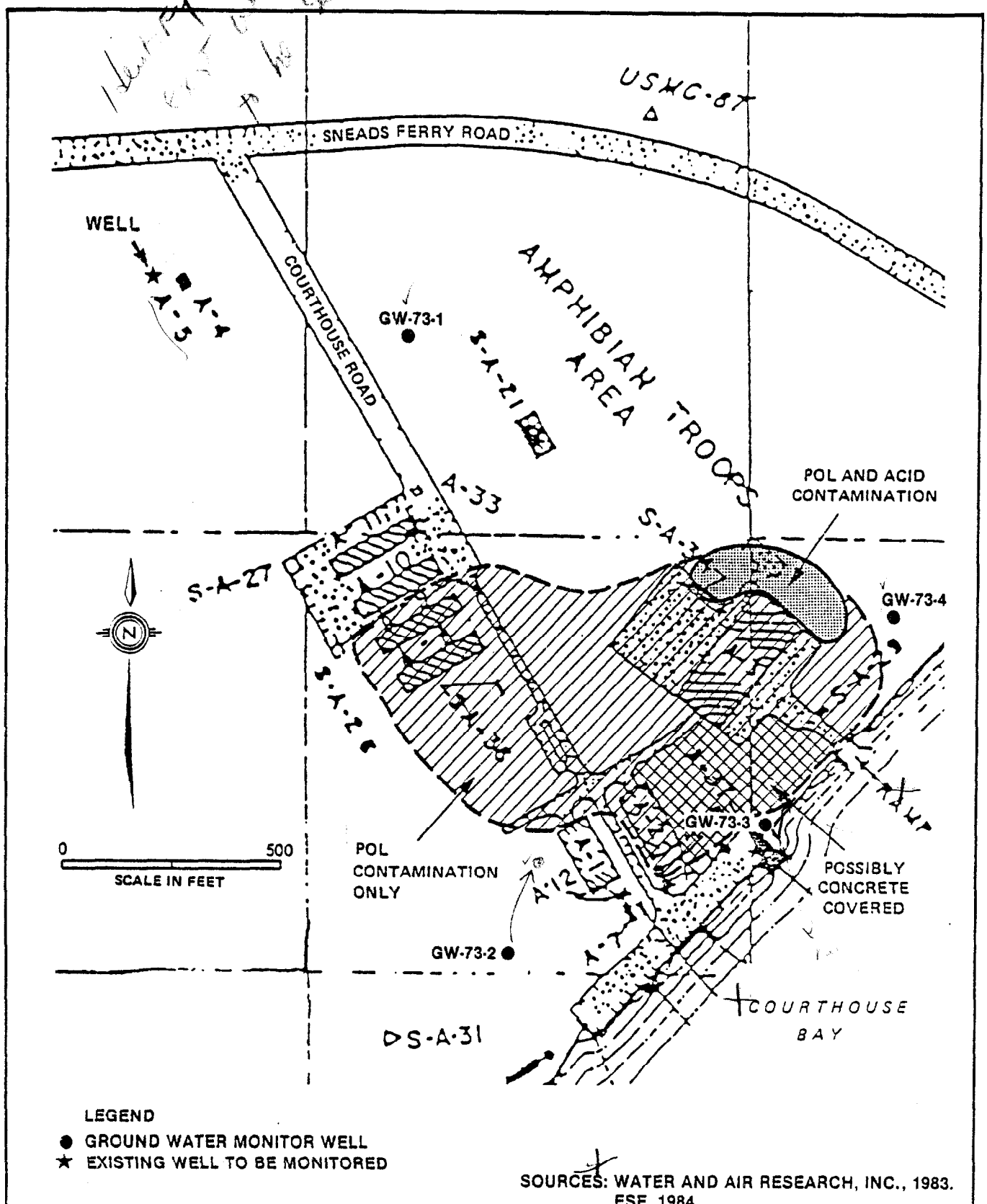
CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-16
PROPOSED SAMPLING LOCATIONS AT SITE NO. 69, RIFLE RANGE CHEMICAL DUMP

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-17
PROPOSED SAMPLING LOCATIONS AT SITE NO. 73, COURTHOUSE BAY LIQUID DISPOSAL AREA

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

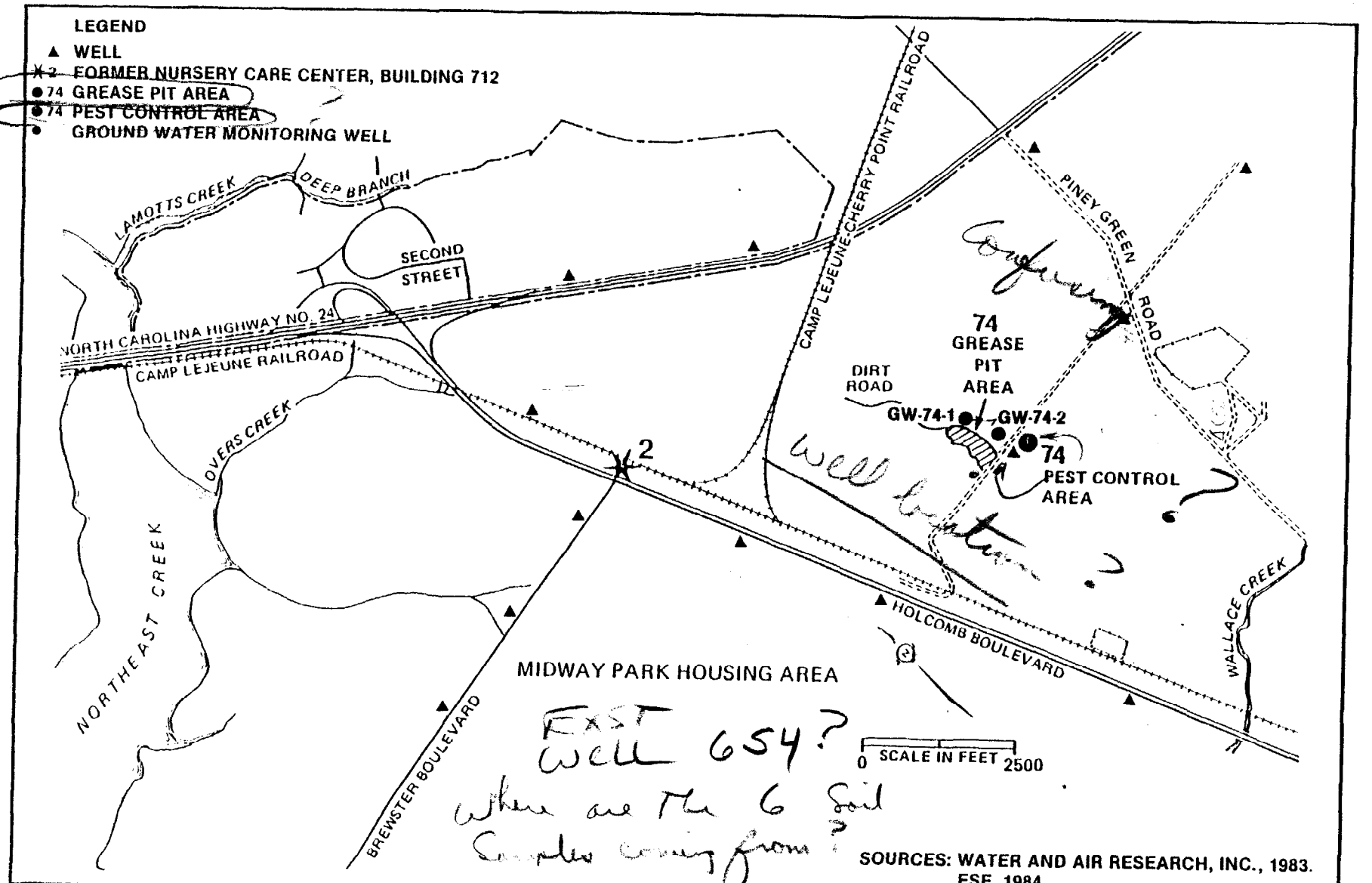
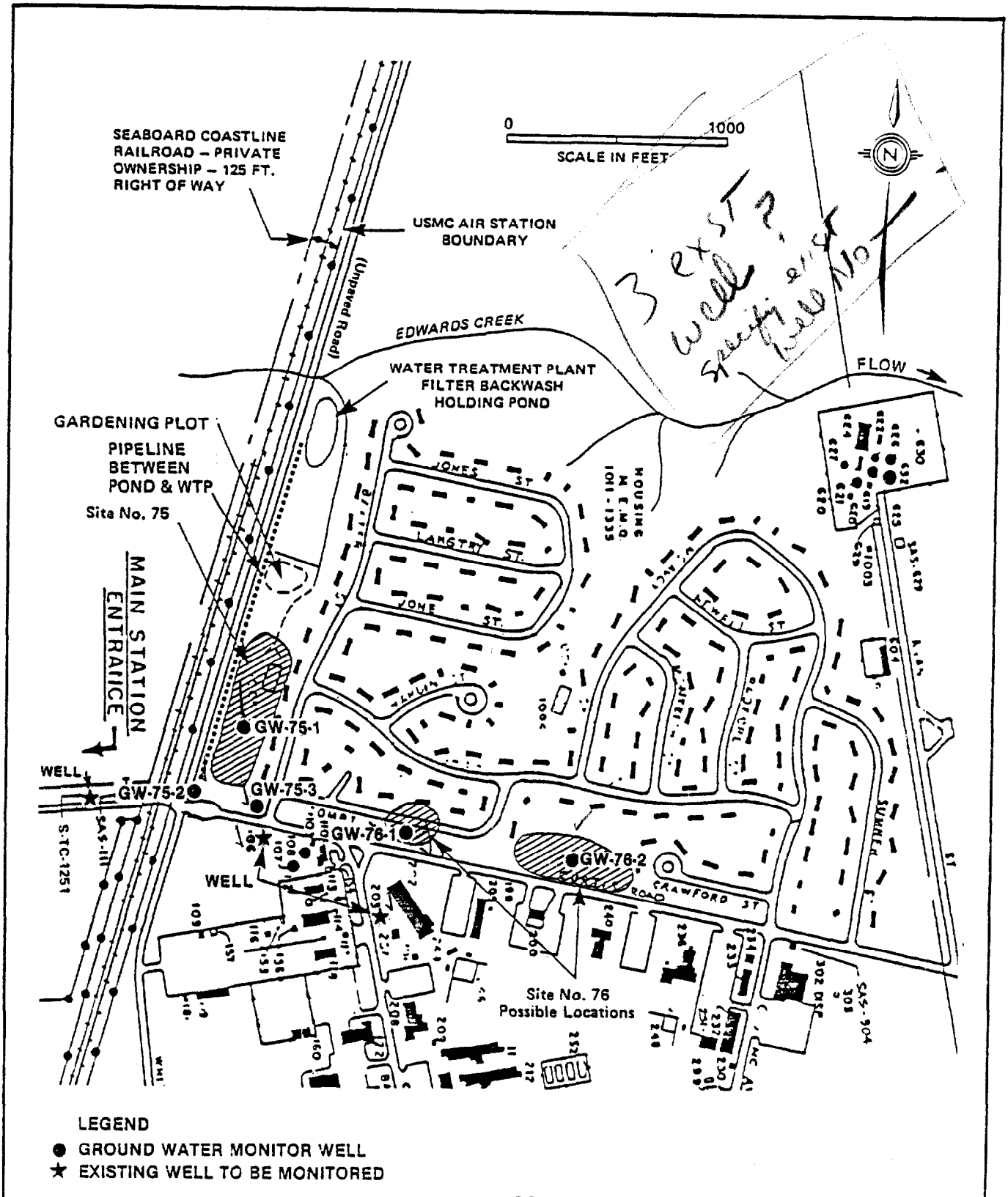


Figure 2-18
PROPOSED SAMPLING LOCATIONS AT SITE NO. 74, GREASE PIT AND PEST CONTROL AREA

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



SOURCES: WATER AND AIR RESEARCH, INC., 1983.
ESE, 1984.

Figure 2-19
PROPOSED SAMPLING LOCATIONS AT SITE NOS. 75 AND 76, MCAS BASKETBALL COURT AND MCAS CURTIS ROAD SITES

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

shows the number of soil cores to be augered at each of these sites, and Figures 2-3, 5, 9, and 13 show the proposed soil core locations.

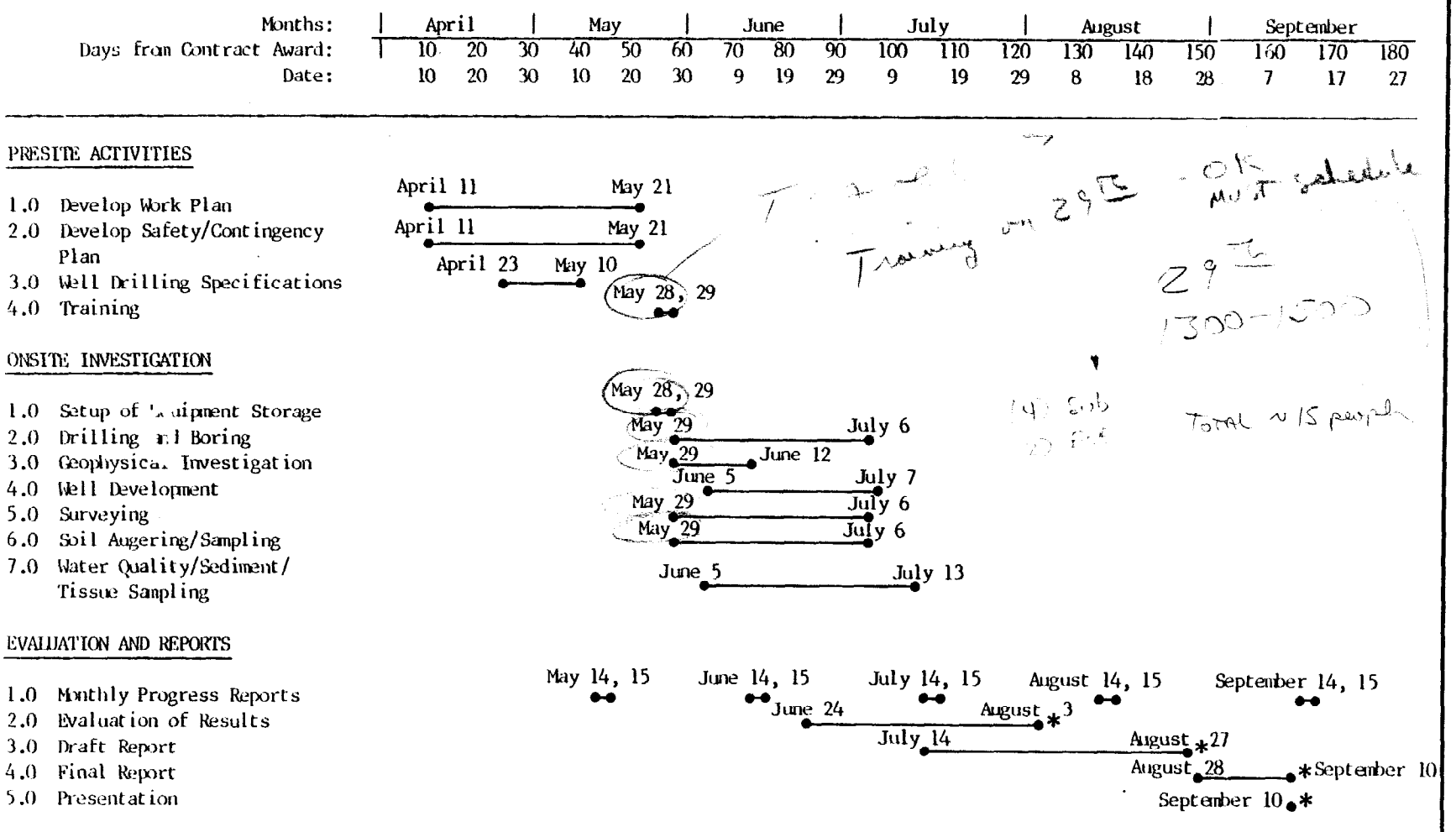
7. Water Quality/Sediment/Tissue Sampling: Samples of ground water, surface water, and tissue will be collected and analyzed. Table 2-1 shows the number and type of samples to be collected from each site, as well as the analytical parameters for each sample. Figures 2-2 through 2-19 show all the proposed sampling locations, except for the pond at Site 28, where tissue samples will be collected.

2.1.3 EVALUATION AND REPORTS

1. Monthly Progress Reports: A brief progress report will be submitted to the EIC by the 15th day of each calendar month for the duration of the contract.
2. Evaluation of Results: All laboratory analytical results and field investigation data will be evaluated.
3. Draft Report: A draft report summarizing the results of the Verification Step will be submitted to the EIC and MCB Camp Lejeune within 45 days of completion of the onsite investigation.
4. Final Report: If the Characterization Step of the Confirmation Study is not required, the Verification Step Draft Report will be finalized.
5. Presentation: If required, a presentation of findings and conclusions will be conducted.

2.2 PROJECT SCHEDULE

Figure 2-20 presents the project schedule for each task described above. The schedule was developed to meet the milestones presented in the Contract. Throughout the course of the project, Environmental Science and Engineering, Inc. (ESE) will routinely contact the EIC to report the project status and any adjustments to the schedule.



* Based on assumption of only one sampling event.

SOURCE: ESE, 1984.

Figure 2-20
MCB CAMP LEJEUNE CONFIRMATION STUDY SCHEDULE

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

2.3 PROJECT ORGANIZATION

2.3.1 ESE

ESE will be responsible for providing all personnel, material, and equipment necessary to complete the study. Persons in responsible positions on the project staff have extensive experience and expertise in their area(s) of involvement, which include geohydrologic investigations, contamination assessments, remedial engineering, and site safety for hazardous waste disposal sites. ESE's responsibilities include the development of and adherence to an appropriate safety/contingency plan to protect contractor and Government personnel. Key ESE project personnel are listed below.

Name	Title	Telephone No. (MCB Camp Lejeune No.)
Bruce N. McMaster	Project Director	904/332-3318 (919/451-3034)
Russell V. Bowen	Project Manager	904/332-3318 (919/451-3034)
Robert G. Gregory	Onsite Investigation Task Manager	904/332-3318 (919/451-3034)
Michael J. Geden	Geologist, Field Team Leader	904/332-3318 (919/451-3034)
Robert K. Momberger	Geologist	904/332-3318 (919/451-3034)

2.3.2 STS CONSULTANTS, LTD. (STS)

As a subcontractor to ESE, STS will be responsible for performing all drilling operations associated with the installation of ground water monitoring wells. STS personnel will be required to adhere to the Safety/Contingency Plan, as directed by the ESE Onsite Investigation Task Manager. STS personnel assigned to this project are listed below.

Name	Title	Telephone No. (MCB Camp Lejeune No.)
Larry Thompson	Technician	919/787-5124 (919/451-3034)
Scott Tillerson	Head Driller	919/787-5124 (919/451-3034)
Deric Davis	Driller	919/787-5124 (919/451-3034)
Leland Adams	Technician	919/787-5124 (919/451-3034)

2.3.3 MCB CAMP LEJEUNE PERSONNEL

Primary contacts at Naval Facilities Engineering Command, Atlantic Division (LANTDIV) and MCB Camp Lejeune involved in this project are listed below.

Name	Title	Involvement	Telephone No.
J.G. Wallmeyer	Environmental Engineer	EIC	804/444-9566
R.E. Alexander	Environmental Engineer	Base Environmental Engineer	919/451-3034 -3035
Lt. Sean Mahar	Industrial Hygienist	Safety/Medical Support	919/451-2707

Additional contacts are listed in Appendix A.

3.0 SAFETY PLAN

3.1 PROJECT DESCRIPTION

ESE will provide sampling and analytical services to determine the extent of soil and water contamination that may have resulted from past disposal operations, spills, or leaks at MCB Camp Lejeune, near Jacksonville, North Carolina.

Ground water monitor wells will be installed, and sampling will include soil, sediments, ground water, surface water, and tissue to confirm or refute the presence of contamination. If ground water contamination is detected, additional wells will be installed to further define the extent of ground water contamination. Once evaluations based on the site investigation are completed, recommendations on future remedial action at Camp Lejeune will be made.

3.2 RESPONSIBILITY AND ORGANIZATION

The purpose of the Safety Plan is to protect all personnel and the surrounding environment during investigative activities at MCB Camp Lejeune. The plan includes procedures and preventive measures that will protect human health and the environment from the hazards of metal, acid, and volatile organic compound exposure and from fire, explosion, and mechanical hazards which may exist during field and laboratory activities.

The corporate safety policy of ESE requires that a safety plan be implemented at Camp Lejeune to protect all individuals and the environment. It is the responsibility of each member of the investigative team, including all subcontractor personnel, to conform to and comply with all aspects of this safety program. All personnel must regard and conduct themselves as members of the "safety team" and adhere to the prescribed site safety plan.

Senior Rep of ESE responsible on site for assuring Compliance w/

The "buddy system" is a key element of this plan and requires that all activities at the site be conducted using a minimum of two-person teams.

Overall responsibility for safety during the site investigation and laboratory activities rests with the Project Manager, R.V. Bowen, P.E. His responsibilities include:

1. Preparing an effective site safety plan for the project,
2. Categorizing and identifying the project staff as to the levels of potential exposure to dangerous levels of hazardous materials,
3. Assuring that adequate and appropriate safety training and equipment are available for project personnel,
4. Arranging for medical examinations for specified project personnel, and
5. Designating a Site Safety Officer.

We are paying for physicals for people

The responsibilities of the Site Safety Officer, R.G. Gregory, include:

1. Implementing all safety procedures and operations onsite;
2. Updating equipment or procedures based upon new information gathered during site inspections and monitoring;
3. Upgrading or downgrading (with approval of the Project Manager) the levels of personnel protection based upon site observations;
4. Determining and posting locations and routes to medical facilities, including poison control centers, and arranging emergency transportation to medical facilities (as required);
5. Notifying (as required) local public emergency officers (i.e., police and fire departments) of the nature of the team's operations, and making emergency telephone numbers available to all team members;
6. Observing work party members for symptoms of exposure or stress; and

7. Arranging for the availability of emergency medical care and first aid onsite, as necessary.

The Site Safety Officer has the ultimate responsibility to stop any operation that threatens the health and safety of the team or surrounding populace or causes significant adverse impact to the environment.

In the absence of R.G. Gregory during the onsite investigation, the Field Team Leader, M.J. Geden, will serve as the Site Safety Officer.

It is the responsibility of all other onsite personnel:

1. To comply with all aspects of the Project Safety Plan, including strict adherence to the "buddy system";
2. To obey the orders of the Site Safety Officer; and
3. To notify the Site Safety Officer of hazardous or potentially hazardous incidents or working situations.

3.3 GENERAL SAFETY RULES

3.3.1 ONSITE SAFETY

In addition to the specific requirements of the Project Safety Plan, common sense should prevail at all times. The following general safety rules will be in effect at the site.

1. Each sample must be treated as though it were toxic and hazardous;
2. To reduce contact between the hands and mouth, all smoking, eating, and drinking will be strictly prohibited in the work area;
3. Persons with beards or other facial hair that interferes with respirator fit are not permitted within the site boundaries when conditions require respiratory protection;
4. All personnel should avoid unnecessary contact with contaminated soil and water;
5. All personnel should avoid any contact between their hands and mouths until they are thoroughly decontaminated;
6. Horseplay is prohibited;

7. Use of alcohol, narcotics, or controlled substances while working is prohibited;
8. Firearms, ammunition, fireworks, and explosives are prohibited; and
9. Approved and appropriate safety equipment, as specified in the Project Safety Plan, such as eye protection, hardhats, foot protection, and respirators, must be worn in areas where required by the Safety Plan. In addition, eye protection must be worn when handling acidic, caustic, or other hazardous liquids, such as analytical preservatives.

3.3.2 LABORATORY SAFETY

Samples collected from MCB Camp Lejeune and shipped to the ESE laboratory for analysis may present a potential for exposure of laboratory personnel to dangerous levels of metals, pesticides, or PCBs. Potentially hazardous samples will be identified as such by the Field Team Leader and appropriately labeled prior to shipment to the laboratory. It is important that the laboratory implement an effective safety plan for handling these materials.

Handling procedures must protect personnel from skin contact with the hazardous materials and offer respiratory protection from airborne concentrations of hazardous samples. At a minimum, all laboratory personnel having direct contact with the hazardous samples must be equipped with:

1. Safety glasses or a face shield to protect from splashes,
2. Impervious gloves, and
3. Rubberized aprons and other chemical protective garments.

Respiratory protection in the form of air-purifying cartridge respirators for acids and dust may be required by the Laboratory Coordinator, P.C. Geiszler, if airborne exposure to hazardous samples is likely. All operations conducted with raw hazardous materials must be performed where there is adequate ventilation.

Due to possibly high concentrations of toxic materials in the contaminated water and soil samples, all laboratory personnel handling these samples:

1. Must not smoke, eat, chew gum, or drink, to avoid contact between their hands and mouths while carrying out laboratory activities;
2. Must thoroughly wash their hands and other potentially exposed skin upon completion of laboratory work; and
3. Must keep the work area and equipment as clean as possible to avoid contamination.

All appropriate safety precautions described in the ESE Laboratory Safety Manual must be followed during laboratory work.

3.4 SITE CHARACTERIZATION AND SPECIFIC SAFETY PLAN

Descriptive detail on MCB Camp Lejeune is given in the standard format "Site Safety Plan" in Appendix B. The various procedures and precautions that will be followed in assuring preservation of health and safety during all site activities are presented in the plan. These procedures and precautions are based on a thorough evaluation of the literature and an assessment of the potential hazards at the site.

APPENDIX A

ADDITIONAL MCB CAMP LEJEUNE CONTACTS

APPENDIX A

Name	Activity	Telephone No.
R.J. Andrews	Assistant Chief of Staff, Manpower (Base Safety)	919/451-5725
Danny Sharpe	Natural Resources and Environmental Affairs Division	919/451-5003
Vann Mashburn	Resident Officer in Charge of Construction	919/451-5006
F.E. Acosta	MCAS (H) S-4, Construction Coordinator	919/451-6506
B.W. Elston	Deputy Assistant Chief of Staff, Facilities	919/451-5925
Willard Price	Base Maintenance Division (Supervisory Utilities Foreman)	919/451-5988

APPENDIX B

SITE CHARACTERISTICS AND SITE SAFETY WORK PLAN

describe each Level of PPE and what triggers its use

A. GENERAL INFORMATION

SITE: MCB Camp Lejeune DATE: 05/04/84

LOCATION: North Carolina PREPARED BY: Charles Haury

INVESTIGATIVE OBJECTIVE(S): Remedial investigation of numerous waste disposal sites. PROPOSED DATE OF INVESTIGATION 5/29-6/29/84

BACKGROUND REVIEW: Complete: X Preliminary:

DOCUMENTATION/SUMMARY: OVERALL HAZARD: Serious: Moderate: X

Low: X Unknown:

B. SITE/WASTE CHARACTERISTICS

WASTE TYPE(S): Liquid: X Solid: X Sludge: X Gas: X

CHARACTERISTICS: Corrosive: X Ignitable: X Radioactive:

Volatile: X Toxic: X Reactive: X Unknown: Other:

FACILITY DESCRIPTION: Size: 170 square miles

Buildings: Many structures on this large active installation.

Topography: Low-lying coastal plain.

Principal Disposal Method (type and location): Surface deposits, pits, shallow burial; 21 separate sites.

Unusual Features (dike integrity, power lines, terrain, etc.): Extremely varied.

Status (open, closed, unknown): Some open; most closed.

History (worker or non-worker injury; complaints from public; previous agency action): Waste disposal or chemical spillage has occurred from the 1940s to the present. Some of the sites have been reported on the U.S. Environmental Protection Agency (EPA) waste site inventory. Monitoring wells have been drilled in some areas and show evidence of contamination by organics.

C. HAZARD EVALUATION

Many different compounds have been identified at the various disposal sites, either by analysis or by examination of records. Possible PCB contamination has been identified at several sites, which could pose a skin absorption problem or an inhalation problem when present in dust particles. Possible pesticide and herbicide contamination has also been identified at several sites. These compounds affect the nervous system, and many are absorbed through intact skin. Both solutions and dusts containing these compounds are potentially hazardous. Solvents such as trichloroethylene, chloroform, and methylene chloride have been reported as possible water contaminants and may be present in drums in a relatively pure state. Skin contact should be avoided, but inhalation is the greatest hazard. Explosives are an obvious hazard to drilling and sampling activities and may be present at some of the sites.

D. WORK PLAN INSTRUCTIONS

PERIMETER ESTABLISHMENT: Map/Sketch Attached: X Site Control: Public Restricted

Perimeter Identified: ____ Zones(s) of Contamination Identified: ____

Notes: See Attachment 1.

PERSONAL CLOTHING: Level of Protection: A: ____ B: ____ C: X D: X

Modifications: See Attachment 2.

Surveillance Equipment and Materials: Each drilling crew will be equipped with an HNU photoionization detector for the monitoring of organic vapors. The HNU will have a 10.2-electron volt (eV) lamp.

What are the Action Levels?

COMBAT TRAINING CHART

UNITED STATES—EAST COAST

NORTH CAROLINA

APPROACHES TO NEW RIVER

SOUNDINGS IN METERS

(Under Twenty in Meters and Decimeters)

reduced to the approximate level of Mean Low Water

HEIGHTS IN FEET ABOVE MEAN SEA LEVEL

Contour interval 10 and 20 feet

(supplementary contours shown in dashed lines at 5 feet intervals)

TRANSVERSE MERCATOR PROJECTION

NORTH AMERICAN DATUM 1927

PURPLE LINES INDICATE THE 1000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 18S, CLARKE 1866 SPHEROID

SCALE 1:50 000

WARNING

The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

TIDAL INFORMATION

Place	Position		Height above datum of soundings			
			Mean High Water		Mean Low Water	
	N. Lat.	W. Long.	Springs	Neaps	Springs	Neaps
			meters	meters	meters	meters
New River Inlet	34°32'	77°20'	1.0	0.8	−0.1	0.1

WORLD GEODETIC SYSTEM 1972 DATUM

To place this chart on the WGS 1972, shift all parallels 0.39 seconds south and all meridians 0.51 seconds west.

GRID ZONE DESIGNATION 18S

100,000 M. SQUARE IDENTIFICATION: TP | UP

TO GIVE A STANDARD REFERENCE ON THIS CHART TO NEAREST 100 METERS

SAMPLE POINT A33

SAMPLE REFERENCE TP 956 369

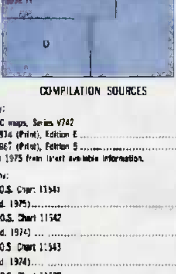
18S TP 956 369

CAUTION

GRID LINES ARE NOT TRUE NORTH AND SOUTH

At West edge of chart Grid N. is 1°11'W of True N.

At East edge of chart Grid N. is 1°25'W of True N.



COMPILATION SOURCES

Topography:

DMATC maps, Series V742

(1) 1974 (Print), Edition 6 .... 1:50,000

(2) 1967 (Print), Edition 5 .... 1:50,000

Updated in 1975 from latest available information.

Hydrography:

A—N.O.S. Chart 11541 (Ed. 1975) 1:40,000

B—N.O.S. Chart 11542 (Ed. 1974) 1:40,000

C—N.O.S. Chart 11543 (Ed. 1974) 1:80,000

C—N.O.S. Chart 11539 (Ed. 1973) 1:80,000

FOREST FIRE SEVERITY RATING:

All units engaged in training requiring the use of fire tracer ammunition, explosives, white phosphorous, flares, pyrotechnics, flame weapons or other materials which create a fire hazard will organize and assemble at the training site one detail as set forth in paragraph 6a of enclosure (6) to Base Order 11320.1_. This firefighting detail may be composed of personnel engaged in the training. Firefighting tools will be drawn on temporary memorandum receipt from Fire Station #3 (Hadnot Point, Building No. 18) for use by this detail. The detail will be doubled when Forest Fire Danger Class II occurs.

Fire Danger Classes, and their effect on the use of training areas/ranges and facilities, are as follows:

(1) Class I: Fire danger is low. No restriction on authorized ranges and training areas. Normal safety precautions will be followed. A firefighting detail, composed of personnel of the training unit, will be organized for the purpose of combating any grass or brush fires that may occur.

(2) Class II: Fire danger is moderate. The use of ranges and training areas will be at the discretion of the commanding officer of the training unit. Extreme caution shall be exercised in the use of all pyrotechnics. A firefighting detail will be kept on standby alert during the entire period of training.

(3) Class III: Fire danger is high. Two firefighting details will be organized and one unit kept on standby during training. Heat tabs and warming fires will be used only in designated places under supervision of an NCO. Pyrotechnics are restricted to authorized ranges. The multishot portable flame weapons (M202) are restricted to use on ranges G-9, K-301, K-305 and K-325.

(4) Class IV: Fire danger is very high. Pyrotechnics are restricted to the G-10, N-1 and K-2 impact areas. Smoking is permitted only in locations specifically designated by the training unit commander. These areas will be fireproofed and supervised by an NCO. The use of generators will be restricted to areas that have been fireproofed to mineral soil for 60' around each generator. Heat tabs will be used only in fireproofed areas designated by the training unit commander and under the supervision of an NCO. Warming fires are not authorized. Two firefighting details will be kept on standby alert during training.

(5) Class V: Fire danger is extreme. All types of military training in forested areas, and other activities likely to start forest fires, will be suspended.

DUDS AND UNSERVICEABLE AMMUNITION:

A. Duds will be reported immediately to the Range Control Duty Officer.

B. The Range Control Duty Officer will request destruction by the Explosive Ordnance Disposal Officer.

C. Duds will not be marked, handled, moved, or destroyed except by EOD officers/technicians or personnel under EOD supervision.

D. Unused or unserviceable ordnance will not be reported as duds but will be marked "Unused" or "Unserviceable" and returned to the appropriate Ammunition Supply Point. Misfires and hangfires will be cleared by the using unit; all safety pins, bands, clips, etc., replaced and the item declared unserviceable. If all safety devices cannot be replaced place the item of ordnance in a safe area, notify the Range Control Duty Officer, and request EOD assistance.

E. Any person residing on this base having knowledge of the whereabouts of souvenir ammunition or "duds" will report such facts to the Base Training Facilities Officer or the Base Provost Marshal.

BASE ORDER P11102.1_ promulgates the regulations for the assignment, control, and safe use and maintenance of training facilities including live field firing ranges, maneuver areas, and field training facilities under the control of the Commanding General, Marine Corps Base, Camp Lejeune, North Carolina and provides information and instructions regarding training services available to units training at Camp Lejeune.

All officers involved in the utilization of live firing ranges, helicopter/landing/drop zones and air operations will be thoroughly familiar with BO P11102.1_ and each Range Safety Officer in Charge of Firing or Tactical Air Controller will possess a copy of this order at all times when such training exercises are in progress.

Strict compliance with BO P11102.1_ is an absolute must for the safe use of all training facilities on this base.

BLAST FOCUS

The Station Aerology Section (MCAS New River) provides the Range Control Office, technically recommended limitations on the weight of high explosives when they be detonated on those ranges on which such ordnance may be employed. No deviations from the limitations imposed will be permitted except by express authority of the Assistant Chief of Staff, Training. Additional readings of ordnance limitations may be obtained by contacting the Range Control Office.

OTHER INFORMATION

A. Range Control Duty Officer: ext. 3064.

B. Range Control Scheduling NCO: ext. 3064.

C. Fire Department (emergency): ext. 3333.

D. Emergency Medevac-Range Control Duty Officer, phone ext. 3064; radio 38.60 FM.

E. Range Control Frequency: 38.60 FM. Range Control Call Sign: "BLACKBURN".

F. Ambulance: ext. 3211 (Hadnot Point); ext. 0136 (Camp Geiger).

G. UHF frequency for A/C w/o FM capability 325.0.

FIRING POSITIONS:

FIRING POSITION	GRID COORDINATES	TRAINING AREA
1	912417	FC
2	876414	FA
3	923416	FB
4	928407	FB
5	881383	FD
6	905378	FD
7	914379	FD
8	947381	GA
9	939371	GB
10	952368	GB
11	897344	GE
12	952350	GD
13	962359	GB
14	970348	GI
15	947331	GF
16	902332	GF
17	912323	GF
18	931322	GF
19	942322	GG
20	952324	GH
21	887308	HB
22	908308	HF
23	916308	GG
24	847283	IF
25	868294	IE
26	898302	HF
27	904282	IB
28	912294	GG
29	872260	ID
30	895272	IB
31	892266	IB
32	925301	GG
33	909298	IB

TACTICAL LZ'S:

DESIGNATION	TACAN NCA POSITION	GRID COORDINATES	TRAINING AREA
ALBA	192	[illegible]	[illegible]
BLUEBIRD	161	874257	[illegible]
CANARY	154/9½	852284	IF
DODO	147/9½	887300	HB-HF
DOVE	145/8½	864306	HB
EAGLE	189/1½	783411	MC
FALCON	137/11	912288	GG
GOOSE	142/10½	919308	GG
HAWK	135/9½	896321	HE
JAYBIRD	131/8	879342	HD
LARK	108/10½	947382	QA
ROBIN	095/10	952425	QA
SPARROW	114/5½	854397	DH
CARDINAL	164/04	784367	K
OWL	180/7.9	764285	LC
PENGUIN	110/8	898377	FD
CROW	130/9½	909326	GF
GANDER	134/10½	913301	GG

ADMINISTRATIVE LZ'S

A/Z NUMBER	LOCATION	GRID COORDINATES
1A	MONTFORD POINT	794461
1	MONTFORD POINT	792146
2	NAVAL HOSPITAL	828393
3	AREA 1	836302
4	WPT HILL FIELD	861392
5	2d MAR DIV CP	841377
6	10th MAR AREA	848369
7	OP 2	914376
8	COURTHOUSE BAY	835294
9	RIFLE RANGE	753306
10	TENNIS COURT/MOQ AREA	823424
11	FORCE TROOPS CP	851388
12	GOLF COURSE	808436
13	GOLF COURSE	824437
14	RIFLE RANGE QUARTERS	753300
15	CP GEIGER	744454
15A	CP GEIGER	748454
16	6th MAR AREA	847374
17	RADIO ISLAND, MOREHEAD CITY	
18	2d MAR AREA	861382
19	ITC	751281
20	VERONA LOOP	[illegible]
21	FRENCH CREEK AREA	[illegible]
22	ADJACENT TO RISELEY PIER	903265

OBSERVATION POSTS

DESIGNATION	LOCATION	IMPACT AREA
OP 1	903376	G-10
OP-2	914373	G-10
OP 3	927368	G-10
OP-5	895344	G-10
OP-303	797359	K-2
BROWNS TOWER	958321	N-1

LEGEND

MAP INFORMATION AS OF 1974

IN DEVELOPED AREAS, ONLY THROUGH ROADS ARE CLASSIFIED

MIL RES

HOSPITAL

WORK SITE

ROUTE TO HOSPITAL

MAJOR TRAINING AREAS

TRAINING AREA SUBDIVISIONS

MILITARY RESERVATION PERIMETER

ADMINISTRATIVE LANDING ZONES

FIRING POSITIONS

OBSERVATION POSTS

TOWERS

ADMINISTRATIVE AREAS

ENGINEER DEMO RANGES

IMPACT AREAS

BUFFER ZONES

EXPLOSIVE ORDNANCE RANGE

CONTAMINATED AREAS

TACTICAL LANDING ZONES

CAMP LEJEUNE SPECIAL MAP

SOUNDINGS IN METERS

CAUTION

CAUTION

CAUTION

NOTE

COMBAT TRAINING CHART
UNITED STATES—EAST COAST
NORTH CAROLINA
APPROACHES TO NEW RIVER

SOUNDINGS IN METERS

HEIGHTS IN FEET ABOVE MEAN SEA LEVEL

TRANSVERSE MERCATOR PROJECTION

WARNING

CAUTION

OVERLAY SOURCE

HOSPITAL

HEIGHTS IN FEET

CAMP LEJEUNE SPECIAL MAP

SOUNDINGS IN METERS

ATTACHMENT 2

SITE SAFETY WORK PLAN

MCB CAMP LEJEUNE, NORTH CAROLINA

PERSONAL PROTECTION

1. GEOPHYSICS

Geophysics will be used to screen potential drilling locations to prevent drilling into buried objects such as ordnance, gas cylinders, and drums. Techniques to be utilized include: resistivity, magnetometer, and metal detector surveys. Personnel involved in these activities will wear Level D equipment:

- o Tyvek® coveralls,
- o Steel-toed neoprene boots,
- o Disposable boot covers, and
- o Two pairs of disposable gloves.

2. DRILLING PROGRAMS

All drilling personnel will wear the protective clothing specified above. Saranex®-coated Tyvek® will be substituted for all drilling programs at sites known or suspected to contain explosives, solvents, PCBs, or pesticides. The geologist assigned to each drill crew will be responsible for air monitoring during all phases of the drilling operation. The instrument to be used shall be an HNU, with a 10.2-eV lamp or the Foxboro OVA. Full-face, air-purifying respirators with organic vapor/pesticide cartridges will be available and will be used if air monitoring instruments show readings above background levels. Respirators will also be used if visible dusting occurs in the vicinity of the drilling operation at pesticide or PCB sites. In summary, protective equipment will include:

ATTACHMENT 2
(Continued, Page 2 of 2)

- o Saranex® or uncoated Tyvek® coveralls (based on site history),
- o Steel-toed neoprene boots,
- o Disposable boot covers,
- o Disposable gloves (geologist),
- o Impervious inner gloves and outer drilling gloves (drillers),
- o Hardhats,
- o Faceshields (drillers), and
- o Respirators (full-face, with organic vapor/pesticide cartridges).

3. SURFACE WATER COLLECTION AND WELL SAMPLING

These activities will utilize equipment outlined for drilling activities, with the exception of hardhats and faceshields.

SCBA Available for emergency response?

Bail out Air Packs

Dispose of wastewater on site unless HW suspected

DECONTAMINATION PROCEDURES: Boots, gloves, other gear, and sampling equipment will be soap-and-water washed and rinsed at the site decontamination area.

Special Equipment, Facilities, or Procedures: Due to the number of sites to be investigated in a short period of time, decontamination stations must be easily mobile and simple (wash-and-rinse basins, heavy duty trash bags for disposable clothing).

SITE ENTRY PROCEDURES: Always enter sites from an upwind direction, if possible. Avoid obvious contamination to lessen the risk of exposure and ease decontamination.

Team Member	Responsibilities
Robert Gregory	Site Safety Officer, Geologist
Michael Geden	Alternate Site Safety Officer, Geologist
Robert Momberger	Geologist

WORK LIMITATIONS (Time of day, etc.): Daylight hours only. Corporate industrial hygienist must be notified to modify the level of protection or other safety plan aspects.

INVESTIGATION-DERIVED MATERIAL DISPOSAL: Contaminated disposable clothing must be labeled and stored onsite in heavy plastic bags or drums. (MCB Camp Lejeune personnel may modify this procedure, as necessary.)

E. EMERGENCY INFORMATION

LOCAL RESOURCES

Ambulance 451-4551 (4551 on base) 5 4

Hospital Emergency Room 451-4300 (4300 on base)

Poison Control Center

Police 451-2555 (2555 on base)

Fire Department 451-3333 (3333 on base)

Airport

Explosives Unit 451-0118 (0118 on base)

EPA Contact See emergency contacts.

SITE RESOURCES

Water Supply Base supply in vicinity of all sites.

Telephone Various locations near sites (to be identified prior to activities at each site).

Radio

Other

EMERGENCY CONTACTS

1. R.J. Andrews, Camp Lejeune (Safety Manager), 919/451-5725
2. Lt. Sean Mahar, Camp Lejeune (Safety/Medical Support), 919/451-2707
3. Charles Haury, ESE (Industrial Hygiene Manager), 904/332-3318

F. EMERGENCY ROUTES

(See Attachment 1)

HOSPITAL: ~~Brewster Boulevard across from the Camp Lejeune School.~~ The hospital is located approximately 1/2 mile west of the intersection of Brewster Boulevard and Holcomb Boulevard.

→ to Brewster Blvd

OTHER:

G. GENERAL ASSUMPTIONS

1. This Site Safety Plan is based on research and investigatory data which may be dated or incomplete. Site conditions may have changed. Consequently, the Site Safety Officer is advised to bring any unusual or changed site conditions which are inconsistent with the Safety Plan or which raise health and safety issues that require additional input or support to the attention of ESE, Attn.: Charles Haury, (904) 332-3318.

2. The safety recommendations made in this plan assume (a) that all personnel onsite have been determined by their employers, and/or an authorized physician, to be in good mental and physical health and able to perform anticipated tasks and react to emergency situations in a safe and appropriate manner; (b) that the company employing personnel subject to this safety plan has had its medical health and safety program approved by ESE and said program is designed to protect all employees who regularly work on hazardous material/waste projects; (c) that all personnel engaged in field activities subject to this safety plan have undergone training to an "intermediate level" or better, in an EPA-approved training program, in accordance with "EPA Guidelines for Hazardous Waste Investigations," Section 1440.2, and have appropriate experience in performing services in hazardous waste sites having both known and unknown waste characteristics; and (d) that any persons engaged in field activities subject to this safety plan are adequately trained in the testing and operation of recommended safety equipment.

3. Should the work objective or scope of work for a particular field assignment specified in this safety plan be changed at any time prior to the completion of the specified field assignment, the terms of this plan must be reviewed and reevaluated because of the possibility that the plan may be inappropriate for the changed circumstances. In the event such changes in scope or work

objectives occur, it is understood that the Site Safety Officer and the Project Manager have the responsibility to reevaluate the appropriateness of the safety plan in light of the changes and request a new site safety plan. It is further understood that the initial site safety plan is not designed for activities that are inconsistent with the scope of work or work objectives of this plan and that any activities undertaken by a subcontractor to ESE under such circumstances without modifying the health and safety plan are performed at the sole risk of the subcontractor.

any violation of the site safety plan

H. PERSONNEL CATEGORIZATION

Person	Project Activities/ Duties	Training Provided? Yes	Training Provided? No	Medical Yes	Monitoring No
Robert Gregory	Site Safety Officer, Geologist	X		X	
Michael Geden	Alternate Site Safety Officer, Geologist	X		X	
Robert Momberger	Geologist	X		X	

W/o maintain medical records
what
How long?

First aid Kit
Fire extinguishers in Vehicles

What about the physicals for our contractor personnel? We paid for 10.