09.04-01/25/89-00343

January 25, 1989

TECHNICAL REVIEW COMMITTEE MEETING MINUTES . . . . . ~~February 14, 1989~~

Place of meeting: Public Works Building 31, Roosevelt Roads Naval Station

Time of meeting: 8:30 AM

Meeting Principals: (Attachment 1)

Meeting Agenda: (Attachment 2)

8:30 AM Welcome statement by Captain J.C. Kennedy, Commanding Officer

8:40 AM History of Navy's IRP NAVSTA Roosevelt Roads by Mr. Felix Mestey, Director, Environmental Engineering Division

8:45 AM Purpose of TRC in the Remedial Investigation/Feasibility Study (RIFS) process by Sheila Ashton of Naval Facilities Engineering Command, Atlantic Division. Discussion of handout of abbreviations in the Installation Restoration Program (IRP), terminology, and responsibilities (Attachment 3). Approximately $500,000 has been spent to date at the sites at Vieques and Roosevelt Roads. Approximately $125,000 is left in the budget to complete the site investigations and reports.

9:15 AM Presentation of Site Summaries by Thomas F. Palik, Project Manager for the contractor, Hunter/ESE. Individual site summaries are included as Attachment 4.

Site Summary Questions and Answers

1. (General)

   T.F. Palik - Initial disucssion on organization of site summary handout.

2. (General)

   Group discussion - Discussion on importance of community involvement in the TRC (Technical Review Committee).

3. (General)

   Question: Santos Rohena, Jr. EQB - Will we be provided work plans for the sites?

   Answer: Sheila Ashton, LANTDIV - A Draft Interim Report for the sites will be available for your review in the next few months which will contain indepth information on the work completed to date at the sites.

4. (Re: Site 1, Roosevelt Roads)

   Question: Santos Rohena, Jr. EQB - What was the source of the background ground water quality data?

   Answer: T.F. Palik, Hunter/ESE - Background monitor wells were not located at each site. Water quality data from selected monitor wells representative of background groundwater quality at Roosevelt Roads were utilized for comparison purposes.

5. (re: Site 3, Vieques)

   Question: Santos Rohena, Jr. EQB - Why were no soil samples collected (re: fuel spill)?

   Answer: F. Mestey, Roosevelt Roads - No physical evidence (i.e. soil staining, stressed vegetation, or significant field meter levels detected) was found.

6. (re: Roosevelt Roads Site 6)

   Question: Jose C. Font, US EPA - Were the metals in the soils analyzed for using only EPTOX protocols?

   Answer: Thomas F. Palik, Hunter/ESE - Soil samples were also analyzed for total metals.

7. (re: Site 12 Roosevelt Roads)

   Sheila Ashton - This site will be transferred to the Navy's underground storage tank (UST) program.

8. (re: Roosevelt Roads Site 15)

   Question: Santos Rohena, Jr. EQB - Why weren't surface water samples collected in the ditch on the east side of the site?

   Answer: Thomas F. Palik, Hunter/ESE - The ditch, as depicted on the site figure, is really a shallow swale and will be removed from the figure to avoid confusion.

9. (re: Sites 15 and 16, Roosevelt Roads)

Question: Santos Rohena, Jr., EQB - Are Sites 15 and 16 considered a high priority because they are ahead of other sites in terms of remedial action?

Answer: T.F. Palik, Hunter/ESE - Not necessarily. These sites are ahead of others because it is understood that there was enough data to proceed with the development of remedial recommendations.

Answer: John Bell, Hunter/ESE - The risk assessments for Sites 15 and 16 are only preliminary. The final risk assessment will include all possible pathways.

10. (General comment)

Santos Rohena, Jr. EQB-The EQB appreciates the opportunity to participate in the Technical Review Committee and review the studies completed.

11:00 AM Field Trip to Roosevelt Roads Sites

Site 16 Old Power Plant, Building 38
Site 7 Station Landfill
Site 15 Substation 2
Site 13 Tanks 210 and 217
Site 8 Drone Washdown
Site 6 Langley Drive Disposal Area
Site 5 Army Cremator Disposal Area
Site 12 Tow Way Road Fuels Farm
Site 10 Building 25 Storage Area
Site 9 PCB Disposal, Dry Dock Area

12:30 AM Lunch

Station (Page 1 of 2)	Site#	Name	# Samples MW	GW	SW	SD	Soil	Constituents of Concern	Future Plan
NAF Vieques	1	Quebrada Disposal Site	3	6	0	3	6	Metals	No further action
NAF Vieques	2	Mangrove Disposal Site	0	0	5	5	8	None	No further action
NAF Vieques	3	IRFNA/MAF-4 Disposal Site	0	1	0	0	0	None	No further action
NAVSTA Roosevelt Roads	5	Army Cremator Disposal Area	5	10	10	10	0	o Thallium and copper in groundwater (SGW03)	No further action
NAVSTA Roosevelt Roads	6	Langley Drive Disposal	1	1	6	6	32	o Lead in soil (not EPTOX), in surface water, groundwater organics (low) in RGGW01	o Resample SW for lead, RGGW01 for prior, pollution
NAVSTA Roosevelt Roads	7	Station Landfill	8	16	0	0	2	o Low levels of oil and grease in soils, metals in GW	No further action
NAVSTA Roosevelt Roads	8	Drone washdown	0	0	8	6	1	o Oil and grease (coming from Bldg. 200)	No further action
NAVSTA Roosevelt Roads	9	PCB Disposal, Dry Dock	0	0	4	30	0	None (PCBs not detected)	No further action

Station (Continued Page 2 of 2)	Site#	Name	# Samples MW	GW	SW	SD	Soil		Constituents of Concern	Future Plan
NAVSTA Roosevelt Roads	10	Building 25 Storage	8	16	0	0	0	o	Low levels of organics and metals	No further action
NAVSTA Roosevelt Roads	12	Tow Way Road Fuels Farm	6	12	2	2	74	o	Elev. levels of benzene and toluene in MW 126WO2 (fuel cont. in soils-SB)	Install 16 SBs, 2 MWs, sample exist MW for TRPH, BTEX, lead
NAVSTA Roosevelt Roads	13	Tanks 210 and 217	11	22	12	12	0	o	Sign levels of fuel in GW	o 205Bs, 3 MW (TRPH, BTEX, lead)
NAVSTA Roosevelt Roads	14	Ensenada Honda Shoreline and Mangroves	0	0	12	12	0	o	Elev. levels of oil and grease in sediments	o Risk assess
NAVSTA Roosevelt	15	Substation 2	0	0	0	0	36(33*)	o	PCBs-risk assess, for remed. alt.	No further action
NAVSTA Roosevelt	16	Old Power Plant, Bldg. 38	0	0	0	0	23(20*)	o	PCBs-risk assess for remed. alt.	No further action
NAVSTA Roosevelt Roads	18	Pest Control Shop and Surrounding Area	3	3	8	8	15	o	Elev. levels of pesticides in soils, SW, SD, and MW 18GW02	o Risk assess.

* Soil Boring

ATTACHMENT 1

NAME	REPRESENTING	PHONE
Sheila Ashton	LANTDIV Code 1152	804/445-1814
Iliana Pementel	Municipality of Vieques	809/741-5000
Emilio Ortiz	Municipality of Vieques	809/741-2771
Juan Merced	EQB	809/725-8270
Santos Rohena Jr.	Chairman EQB PR	809/722-1175
Flor L. DelValle Lopez	EQB	809/722-0439
Thomas F. Palik	Hunter/ESE	813/287-2755
John U. Bell	Hunter/ESE	904/332-3318
Felix Avila Melendez	Municipality of Ceiba	809/885-2180
Nina Johnson	LANTDIV Code 1152	804/444-8045
John E. Peters	LANTDIV PAO	804/444-9525
Ferdinand Feliciano	EED/PWD	809/865-2507
Robert D. Vigil	NAVSTA Housing Director	809/865-2000 X4024
Lt. R. Litgo	CNAC Vieques Liaison	X4262
Lt. R. Boyle	CNAC PAO	
LTJG J. Irrizary	CRAC/NAVSTA PAC	
Felix Mestey	NAVSTA ROOS. RDS., EED/PWD	809/865-2507
CDR J.B. Venable	NAVSTA PNO	X4152
LCDR W.L. Nelson	NAVSTA APWO	X4152
Lt. R. Boyle	COMNAVACTSCARIB PAO	X5434
Lt. (JG) Javier Iriazarry	Naval Station Public Affairs Officer	X-4422/5248 or 865-6383
Jose C. Font	US EPA	809/729-6951

ATTACHMENT 2

TECHNICAL REVIEW COMMITTEE (TRC) AGENDA
JANUARY 25, 1989

FOR THE INSTALLATION RESTORATION PROGRAM (IRP)
NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

8:30-8:40 AM	Welcome by Captain J.C. Kennedy, Commanding Officer
8:40-9:00	History of Navy's IRP NAVSTA Roos Rds by Mr. Felix Mestey, Director, Environmental Engineering Division
9:00-9:15	Purpose of TRC in the Remedial Investigation/ Feasibility Study (RIFS) process by Naval Facilities Engineering Command, Atlantic Division
9:15-10:00	Review of Confirmation Study findings and recommendations by Naval Facilities Engineering Command, Atlantic Division
10:00-10:30	Questions and Answers, Discussion by all TRC members.
10:30-12:00	Field Trip - IR Site Tour
12:00-1:00 PM	Lunch
1:00-2:00	Questions and Answers Discussion
2:00-2:30	Overview and Discussion of Public Participation Requirements by Lieutenant Irizarry, Public Affairs Officer, Naval Station

ATTACHMENT 3

ABBREVIATIONS IN THE INSTALLATION RESTORATION PROGRAM

.RCLA	- Comprehensive Environmental Response, Compensation, and Liability Act; original 1980 Act setting up "SUPERFUND" for hazardous waste (HW) site cleanups nationwide
DERA	- Defense Environmental Restoration Account; established by Congress, under SARA, to fund DoD HW site cleanups, building demolition, and HW minimization projects
HRS	- Hazard Ranking System; data from PA/SI is scored by EPA using this methodology
IAS	- Initial Assessment Study; Phase I under the old NACIP program, equivalent to the IR program's PA/SI
IAG	- Inter-Agency Agreement; Three party agreement between DoD, EPA, and the affected state for NPL sites only.
IR	- Installation Restoration; DoD's program to assess and clean up old HW sites; funded by DERA
NACIP	- Navy Assessment and Control of Installation Pollutants Program; old terminology equivalent to IR program
NPL	- National Priorities List; sites with HRS scores above 28.5 are considered of national concern and are eligible for SUPERFUND if no "responsible party" can be found; DERA funds apply to cleanup efforts at Navy sites
PA/SI	- Preliminary Assessment/Site Investigation; first phase in the DoD IR and EPA SUPERFUND programs; consists of record searches, interviews, initial data collection for scoring purposes
RD/RA	- Remedial Design/Remedial Action; third phase of DoD IR and EPA SUPERFUND programs; consists of design and cleanup phase; emerging technologies for decontamination required where "practicable"
RI/FS	- Remedial Investigation/Feasibility Study; second phase of DoD IR and EPA SUPERFUND programs; consists of groundwater profiles, site sampling, pollutant characterization and detailed analysis of remedial alternatives
ROD	- Record of Decision; signed at the end of the RI/FS process
SARA	- Superfund Amendments and Reauthorization Act; makes major changes to CERCLA and RCRA; sets requirements for DERA and TRCs
TRC	- Technical Review Committee; made up of representatives of the activity, federal, state and local agencies and the community at large to review and comment on actions taken under the IR program

TERMINOLOGY	
FORMER	*NEW*
INITIAL ASSESSMENT STUDY	PRELIMINARY ASSESSMENT/ SITE INVESTIGATION (PA/SI)
	REMOVAL ACTION
CONFIRMATION STUDY —VERIFICATION —CHARACTERIZATION —FEASIBILITY	REMEDIAL INVESTIGATION/ FEASIBILITY STUDY (RI/FS)
	RECORD OF DECISION
REMEDIAL MEASURES	REMEDIAL ACTION

EFD

RESPONSIBILITIES

- ADMINISTER IR PROGRAM
- MANAGE IR CONTRACTS
- PROVIDE TECHNICAL GUIDANCE
- PROVIDE LEGAL ASSISTANCE THROUGH OGC

ACTIVITY RESPONSIBILITIES

- MANAGE PUBLIC AFFAIRS PROGRAM
- COORDINATE AGENCY REVIEW; CHAIR TRC
- SIGN RODS AND IAGS
- PROVIDE LONG TERM O&M COSTS

ATTACHMENT 4

Site Summaries

SITE SUMMARY

ISSUE

- NAF Vieques, Puerto Rico: Quesbrada Disposal Site (Site 1)

SUMMARY

- Sediment, soil and groundwater samples were taken from this site. Metal concentrations found in the groundwater samples exceed drinking water criteria and ambient water quality criteria in Round 1 and Round 2 investigations. Since these metal levels are representative of background levels in the area, the site does not pose any threat to human health or the environment.

BACKGROUND

- This site was operated as a disposal area from the early 1960s to the 1970s. The site covers an area approximately 500 feet long by about 20 feet deep and is about 4 feet wide. The material apparently tumbled down the side of the quebrada and is partially burned.

- Wastes disposed at this site include: ordnance carriers (2.75-inch rocket launchers), POL, solvent, paint cans, buried and exposed 55-gallon drums, wood, rubber, cars, flourescent light fixtures, metal, etc. It is estimated that there is over 1500 cubic yards of material at the site.

- This information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

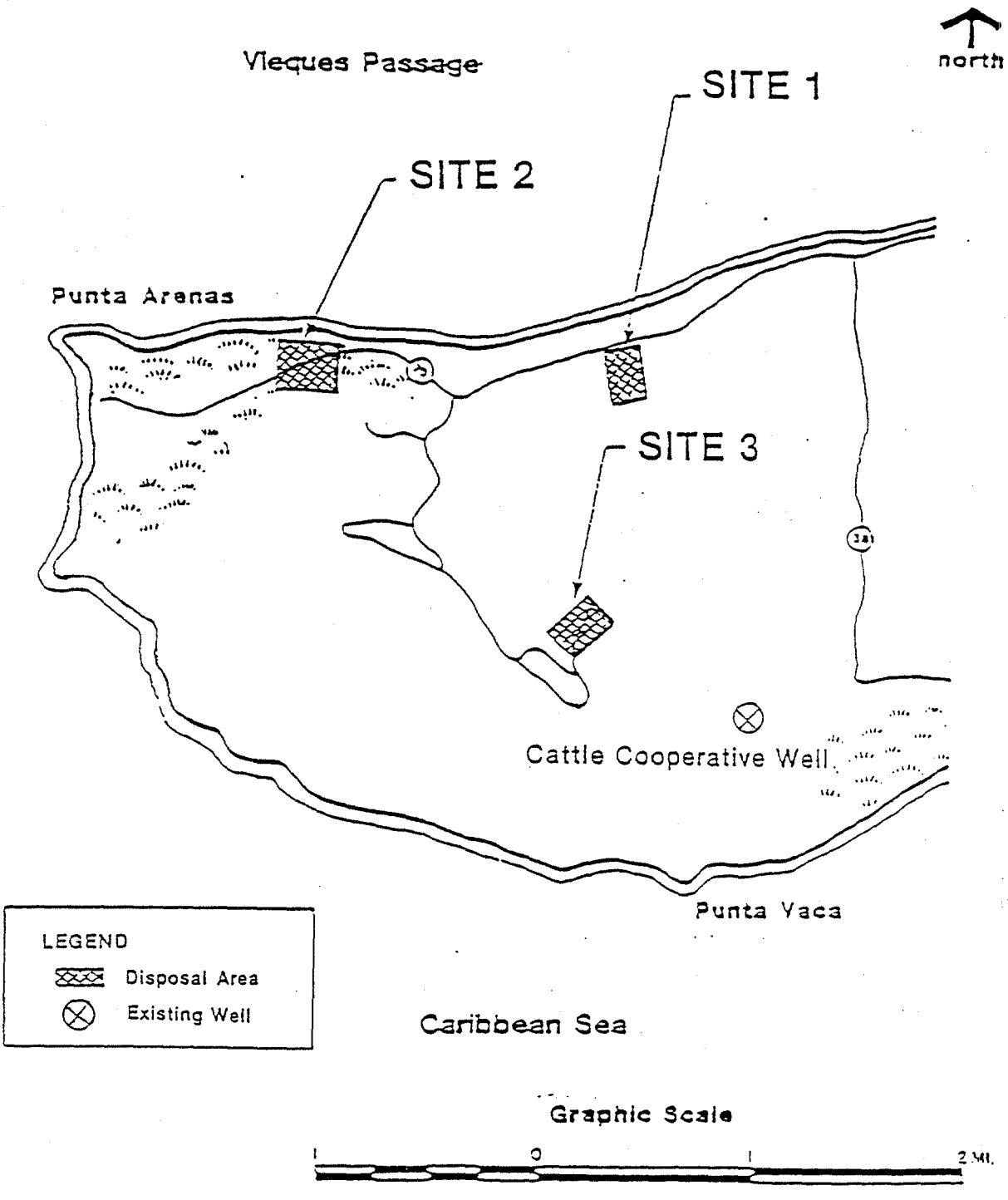
- Round 1 sampling included 3 shallow groundwater samples, 3 sediment samples and 6 soil samples. Sediment and soil sampling data did not show elevated levels of any of the constituents of concern. Samples were analyzed for pH, oil and grease, and chromium.

- During Round 2, only the 3 monitor wells were sampled. Cadmium, chromium (total), chromium (+6), copper, nickel, and zinc were detected above primary drinking water standards and ambient water quality criteria. Highest concentrations found during each round from groundwater sampling data are shown below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Cadmium (ug/L)	NA	13	10 PDWS**
Chromium (Total) (ug/L)	309	512	50 PDWS**
Chromium (+6) (ug/L)	--	73.2	50 PDWS**
Copper (ug/L)	NA	629	1,000 SDWS+
Nickel (ug/L)	NA	215	13.4 AWQC*
Zinc (ug/L)	NA	400	5,000 SDWS+

-- = Not detected
NA = Not analyzed
*AWQC = Ambient water quality criteria
**PDWS = Primary drinking water standards
+ = Secondary drinking water standards

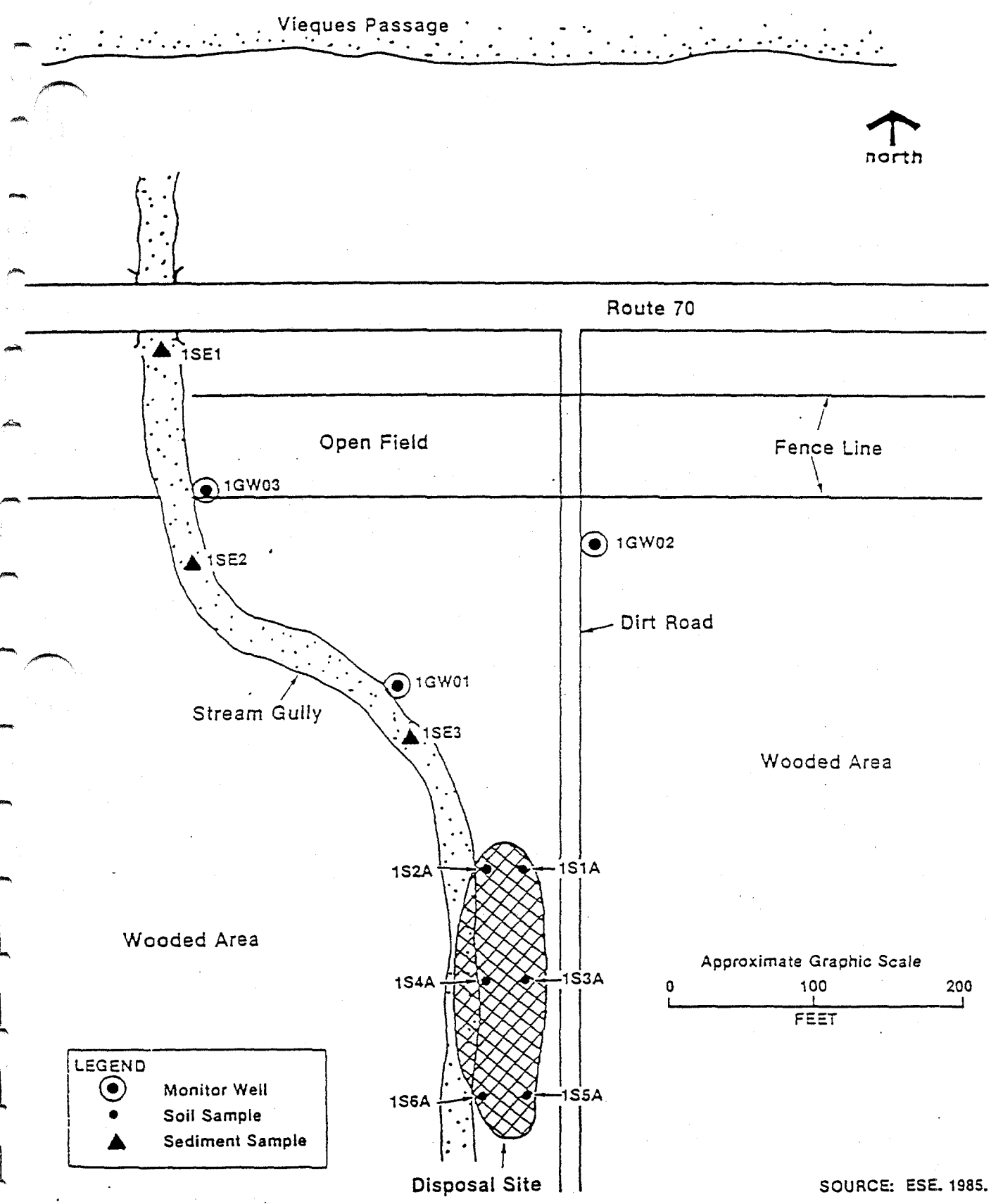
- Future Plan--Since the elevated levels of metals detected in the groundwater are representative of existing background levels, no additional investigation is recommended. A risk assessment will be performed to confirm the field results.



SOURCES: NEESA, 1984b; ESE, 1985.

Figure 1-2
MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL AMMUNITION FACILITY, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



e 3-1
ND 1 SAMPLING LOCATIONS AT SITE 1, QUEBRADA DISPOSAL SITE, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAF Vieques, Puerto Rico: Mangrove Disposal Site (Site 2)

SUMMARY

- Soil, sediment and surface water samples were taken from this site. Elevated levels of chromium and lead were found in the sediment and surface water samples. However, the levels were not significant when compared to background element concentrations found in native soils.

BACKGROUND

- This site was operated as a base disposal area during the 1960s and 1970s. The site is located within an 18-acre oceanside mangrove swamp. It is estimated to be 300 feet long and extends into a seaside mangrove swamp for approximated 100 feet.

- Materials found at the site include all types of trash, solvents, paint, cans of oil and lubricant, and rubble. The material was piled, burned, and deposited into the mangrove swamp.

- This information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- In Round 1, eight soil samples were collected and analyzed for chromium and lead. No elevated levels of any of the constituents of concern were detected in the soil. Additional soil sampling was not performed in Round 2. Shown below are the highest concentrations found during Round 1 sampling.

Parameter	Round 1	Element Concentration Ranges in Soils (ug/g)
Chromium (total (ug/g, dry)	48.2	1 - 2,000
Lead (ug/g, dry)	345	<10 - 700

o A total of 10 sediment samples, (5 each in Round 1 and Round 2) were collected and analyzed. Chromium and lead were detected. However, the levels were not significant when compared to background element concentrations found in soils. Lead levels were higher in Round 2 for all but one sample. Seasonal fluctuations and slightly different sampling locations may account for this variation. The table below presents the highest concentrations found in the sediment samples from Rounds 1 and 2.

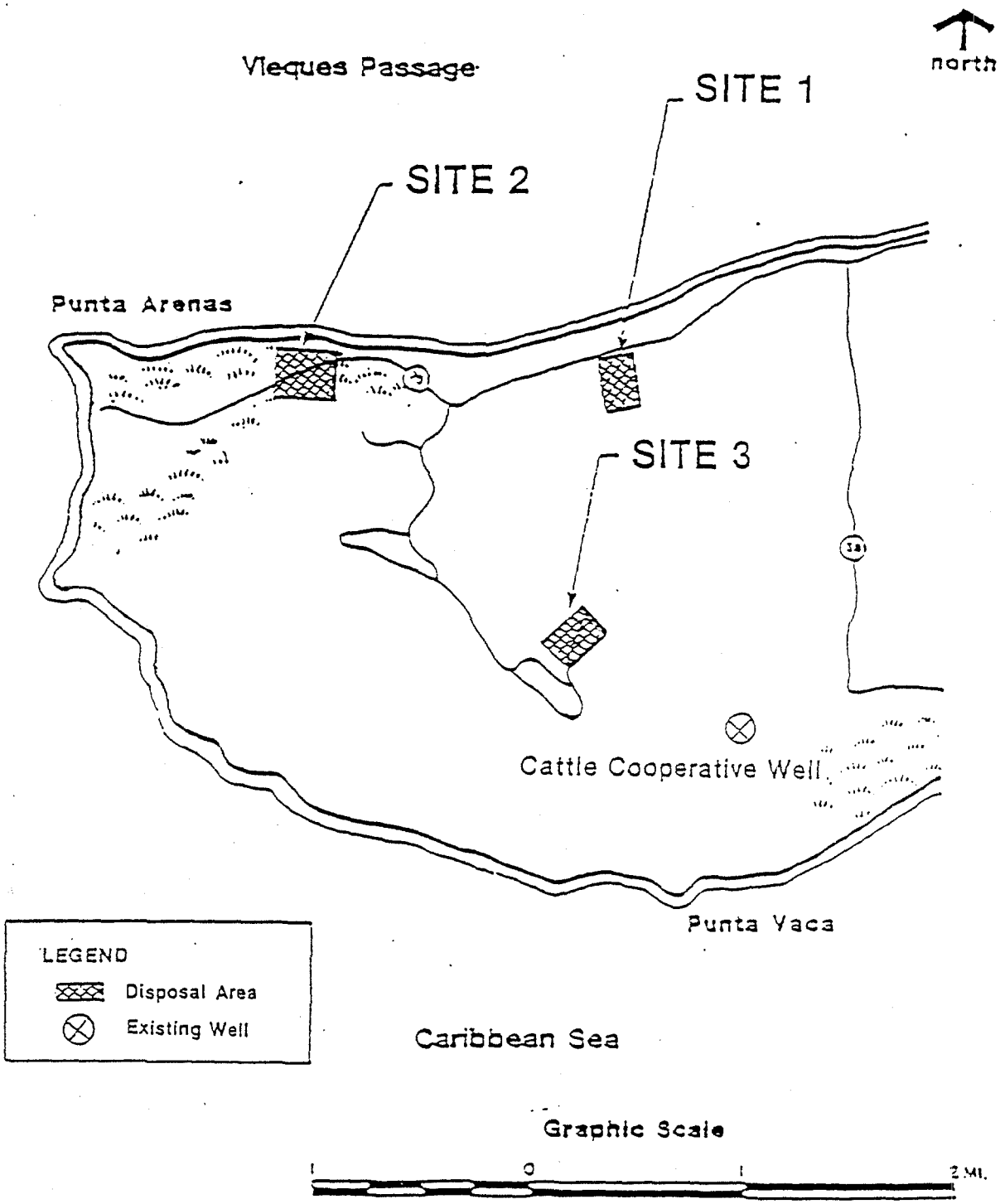
Parameter	Round 1	Round 2	Element Concentration Ranges in Soils (ug/g)
Chromium (total (ug/g, dry)	88.4	36.2	1 - 2,000 ug/g
Lead (ug/g, dry)	63.9	312	<10 - 700 ug/g

o The table below presents the highest concentrations from sampling results of the 10 surface water samples collected during Rounds 1 and 2. Chromium was not detected during Round 2 and lead was detected in only one sample. The chromium and lead concentrations meet ambient water criteria as well as primary drinking water standards.

Parameter	Round 1	Round 2	Comparison Value
Chromium total (ug/L)	4.0	--	50 AWQC*
Lead (ug/L)	--	8.4	50 AWQC*

-- = Not detected
*AWQC = Ambient water quality criteria

- Future Plan--Since the elevated levels of chromium and lead found in the sediment and surface water samples were not significant compared to background element concentrations found in the native soils, no further investigation of the Mangrove Disposal Site (Site 2) is recommended. A risk assessment will be performed to confirm the field results.



SOURCES: NEESA, 1984b; ESE, 1985.

re 1-2
E MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL AMMUNITION FACILITY, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

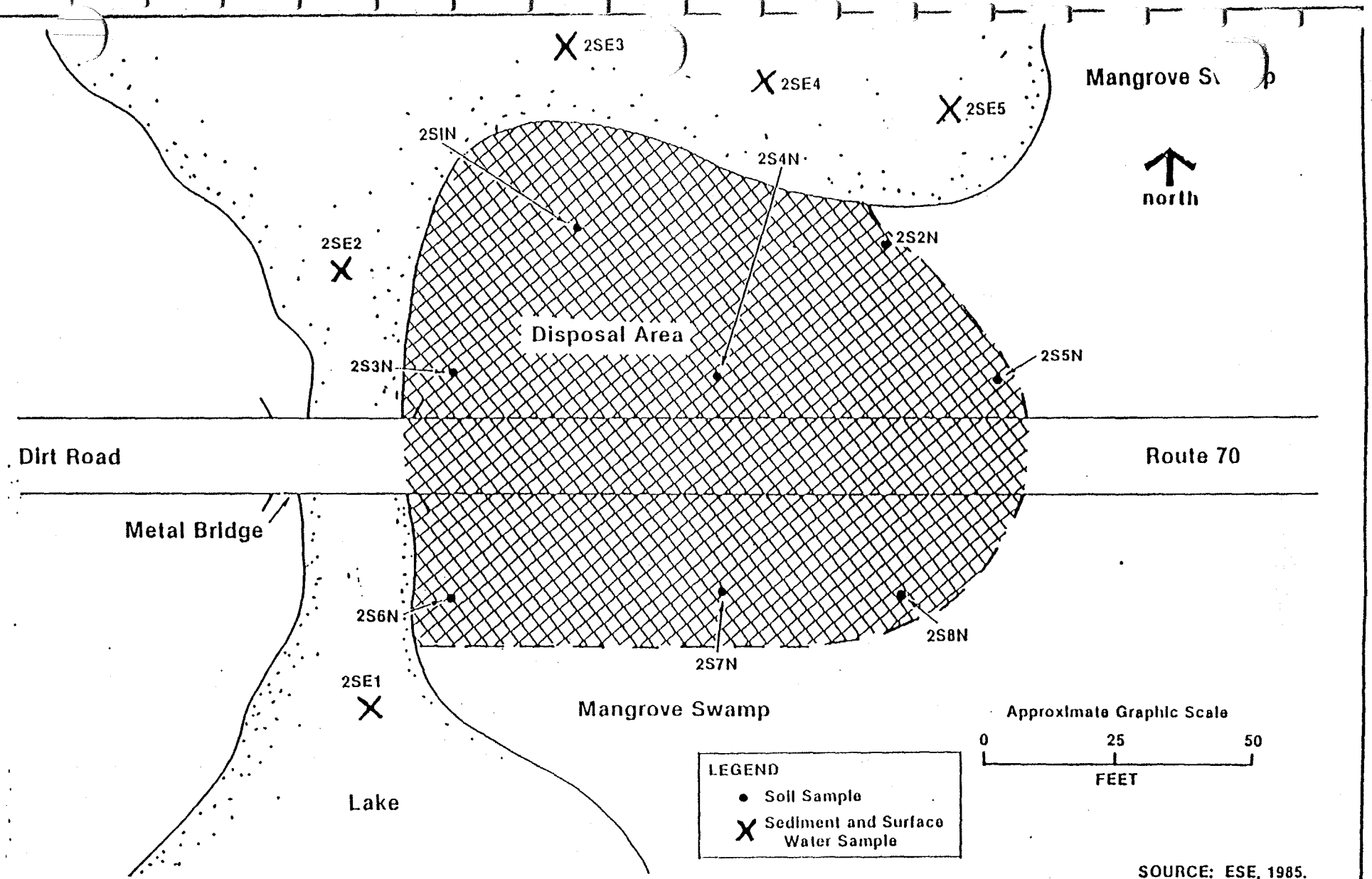


Figure 3-2
ROUND 1 SAMPLING LOCATIONS AT SITE 2,
MANGROVE DISPOSAL SITE, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAF Vieques, Puerto Rico: IRENA/MAF-4 Disposal Site (Site 3)

SUMMARY

- A groundwater sample taken from a nearby existing well was the only sample taken from this site. The sample was taken during Round 2. Zinc was the only constituent detected in the groundwater. The detected level is well below the National Secondary Drinking Water Standard.

BACKGROUND

- In 1975, Weapons Department personnel emptied fuel from 25 AQM-37A target drones into a quebrada near Building 422 at the NAF, Vieques.

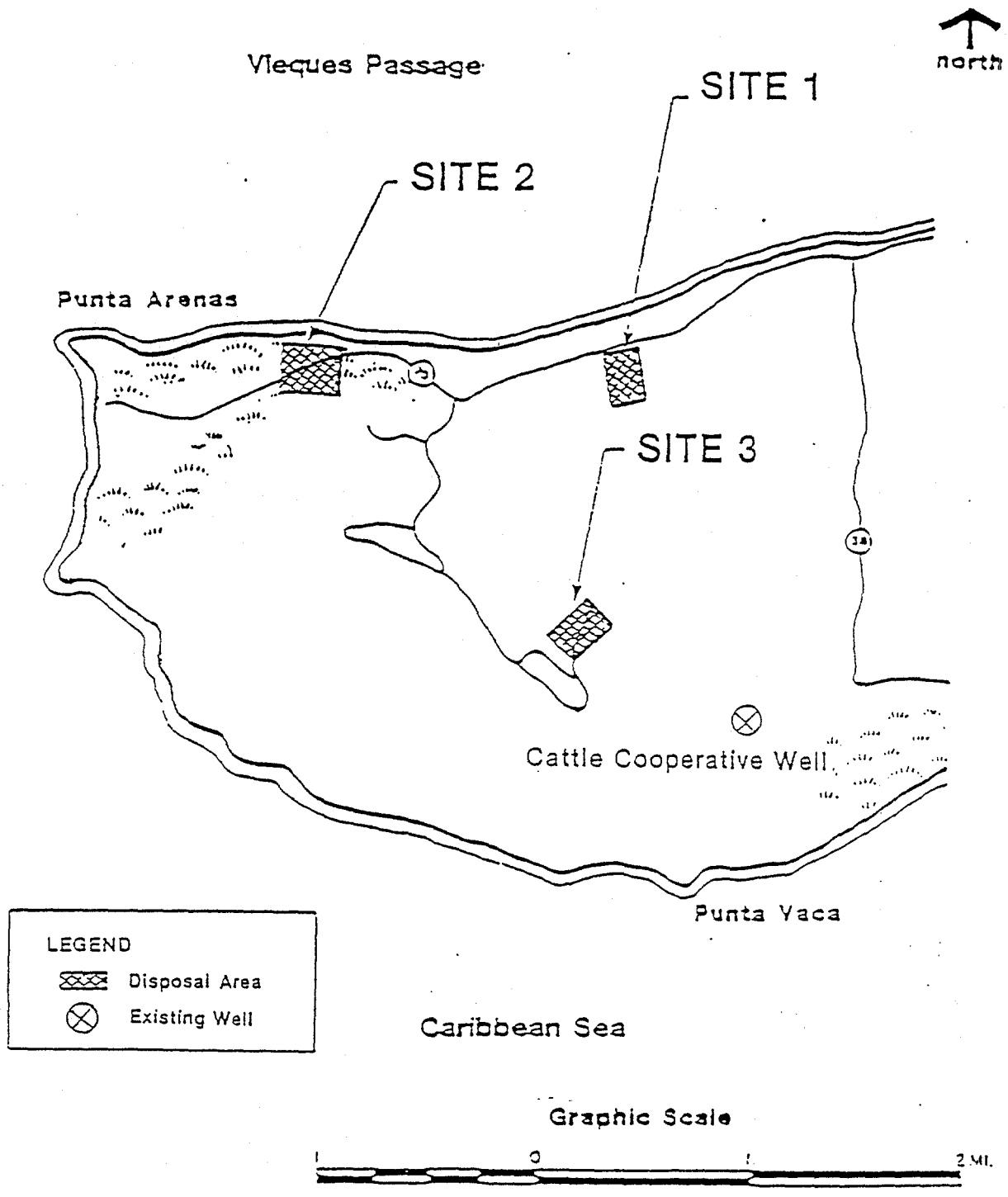
- A maximum of 1,775 pounds of mixed amine fuel (MAF-4) and 5,275 pounds of inhibited red fuming nitric acid (IRFNA) were poured into the low lying area.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- During Round, 2 one groundwater sample was collected and analyzed for priority pollutants. Zinc was the only constituent detected. The level of detected, 469 ug/L, is well below the Secondary Drinking Water Standard of 5000 ug/L.

- Future Plan - Since the level of zinc detected at the site is well below the National Secondary Drinking Water Standard, no further investigation of the IRFNA/MAF-4 Disposal Site (Site 3) is recommended.



SOURCES: NEESA, 1984b; ESE, 1985.

FIGURE 1-2
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL AMMUNITION FACILITY, VIEQUES

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

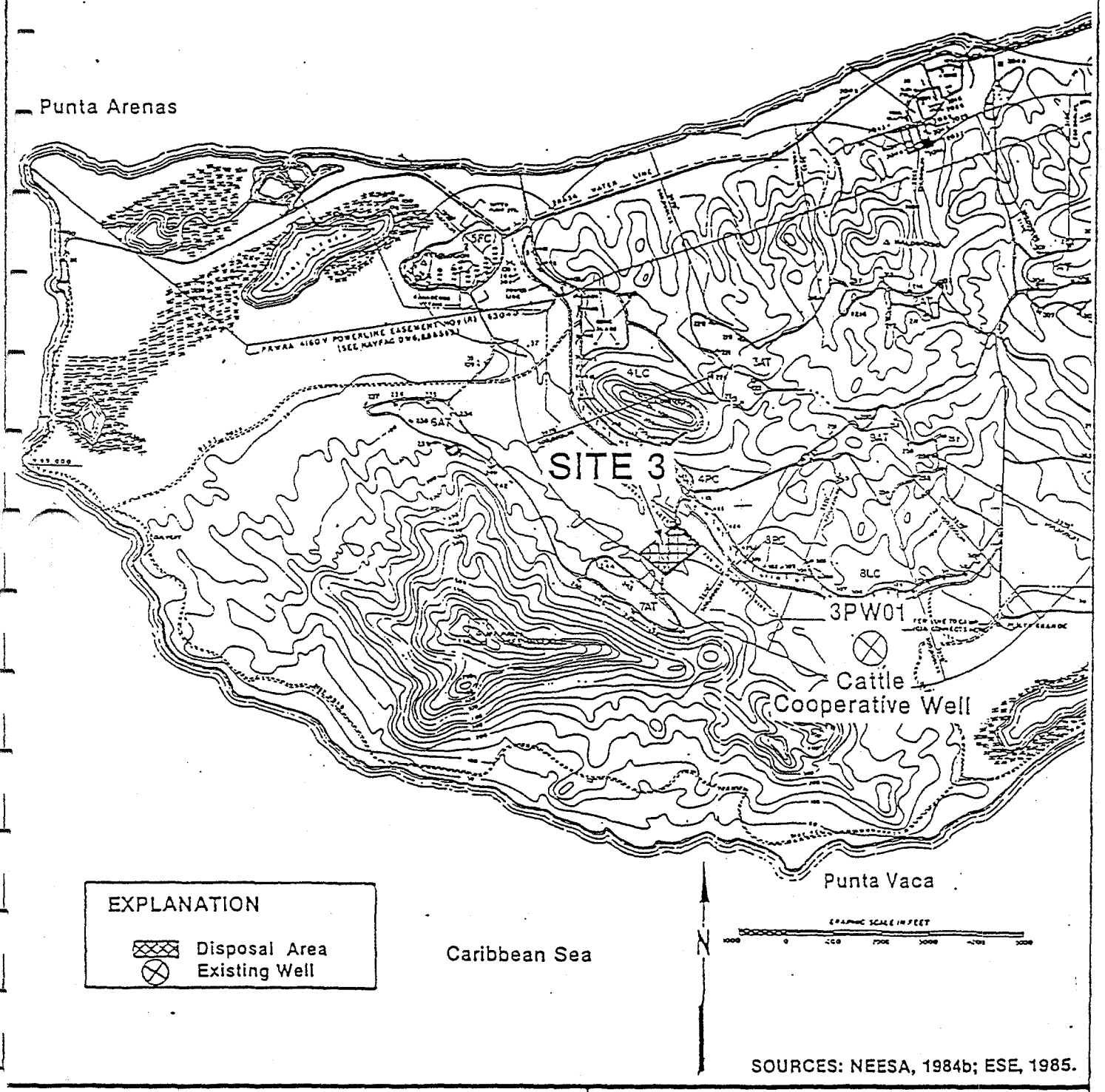


Figure 3-3
ND 2 SAMPLING LOCATION AT SITE 3,
A/MAF-4 DISPOSAL SITE, VIEQUES

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U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Army Cremator Disposal Area (Site 5)

SUMMARY

- Sediment, surface water, and groundwater samples were taken from this site. Some contaminants were detected at levels higher than comparison values. Based on the low concentrations relative to background levels, the site does not pose any threat to human health or the environment.

BACKGROUND

- This site was operated as a landfill from the early 1940s to the early 1960s. Wastes disposed of at this site were burned to reduce their volume.

- The type of wastes disposed of at this site included inert solid wastes, domestic refuse, construction debris, tires, appliances, cars, paints, and dry cleaning solvents.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Ten sediment samples were collected (5 in round 1 and 5 in round 2). These samples were analyzed for pH, priority pollutants, hexavalent chromium, xylene, MEK, MIBK, and EDB. Isolated, low levels of pesticides, in addition to elevated levels of antimony, selenium and methylene chloride were found present. Maximum contaminant levels exceeding comparison levels are as shown below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Methylene Chloride (ug/kg)	---	3,600	None
DDE, PP' (ug/kg)	---	272	None
DDT, PP' (ug/kg)	---	138	None
Antimony (ug/kg)	24.0	---	<1 - 8.8 Common range in soil
Selenium (ug/kg)	85.4	6.5	<0.1 - 4.3 Common range in soil

- o A total of ten surface water samples (5 in round 1 and 5 in round 2) were collected. These samples were analyzed for pH, priority pollutants, hexavalent chromium, xylene, MEK, MIBK, and EDB. Several metals were detected at levels exceeding ambient water quality criteria, but when evaluated relative to shallow background groundwater quality data, are not significant. Maximum levels exceeding comparison levels are as shown below.

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Arsenic ug/L	105	---	0.0022 ug/L AWQC*
Chromium (Total) ug/L	7.49	108	50 ug/L AWQC*
Copper ug/L	2.0	24.8	12 ug/L AWQC*
Nickel ug/L	33.6	---	13.4 ug/L AWQC*
Selenium ug/L	---	221	10 ug/L AWQC*
Thallium ug/L	116	---	13 ug/L AWQC*

* AWQC - Ambient Water Quality Criteria

- Five shallow monitor wells were installed. All wells were sampled twice. All groundwater samples were analyzed for pH, priority pollutants, hexavalent chromium, xylene, MEK, MIBK, and EDB. The only constituents of concern detected at significant levels were thallium, copper, arsenic, chromium (total and hexavalent) and selenium which exceeded primary drinking water standards. In addition, low levels of organic compounds were detected in some of the sample. Elevated phenol levels are attributable to naturally occurring phenolic compounds. Maximum contaminants levels exceeding comparison levels are as shown below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Bis (ethylhexyl) phthalate (ug/L)	2	22	---
Pentachlorophenol (ug/L)	25	---	---
1,1,2,2-Tetrachloro-ethane (ug/L)	1.1	---	---
Phenols (ug/L)	Not analyzed	800	---
Arsenic (ug/L)	93.4	2.5	50 ug/L PDWS*
Chromium (Total) (ug/L)	28.4	205	50 ug/L PDWS*
Chromium (Hexavalent) (ug/L)	34.6	110	50 ug/L PDWS*
Copper (ug/L)	1,850	1,780	1,000 ug/L PDWS*
Selenium (ug/L)	---	359	10 ug/L PDWS*
Thallium (ug/L)	4,310	69.4	13 ug/L AWQC+

* PDWS - Primary Drinking Water Standard
\+ AWQC - Ambient Water Quality Criteria

- The most probable exposure pathway is ingestion of surface water and shallow groundwater. Surface water and shallow groundwater are not used as a drinking water source at or near the site.

- Future Plan--Based on the relative low concentrations of contaminants detected relative to background levels, no additional investigation of the site is recommended. A risk assessment will be performed for this site.

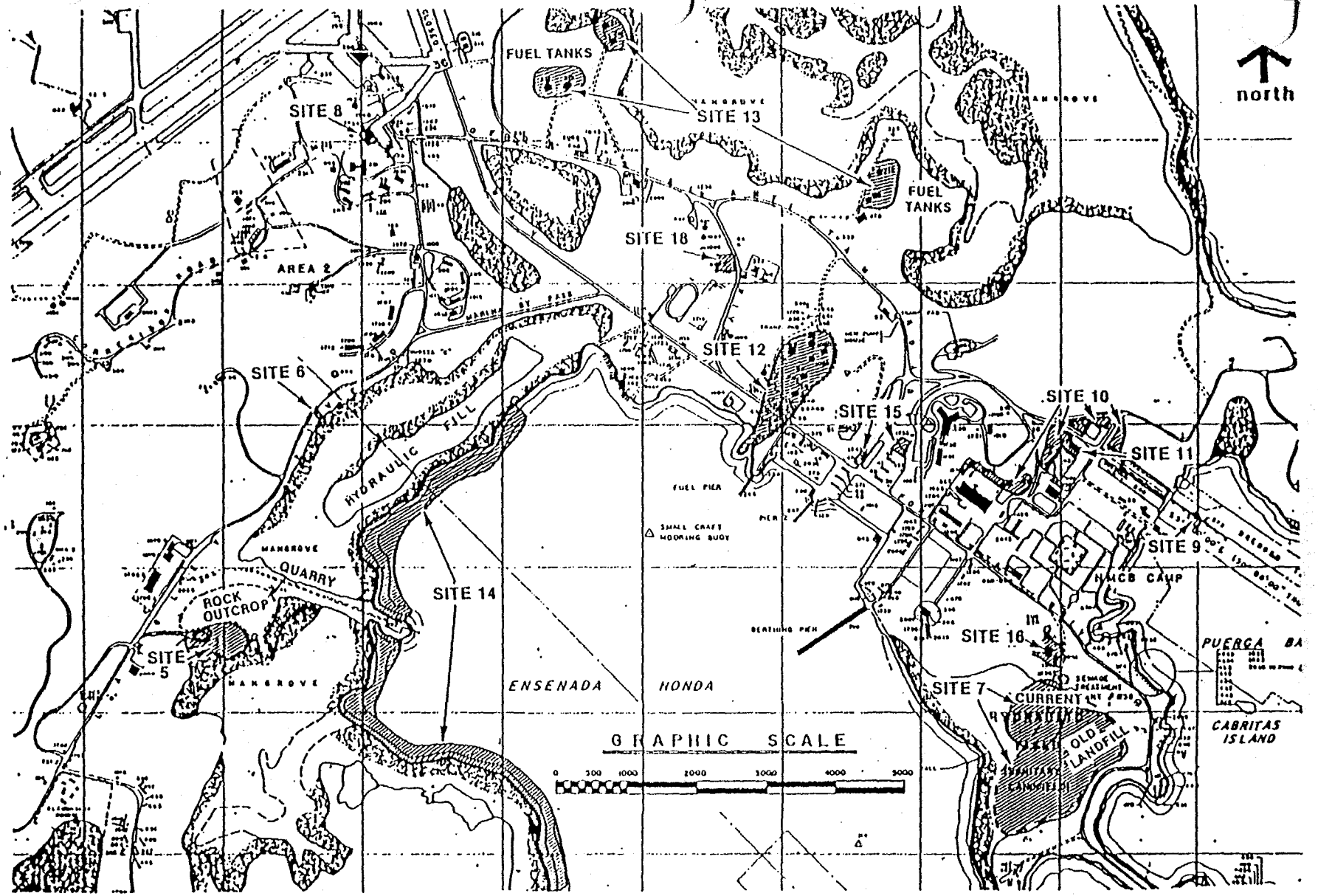
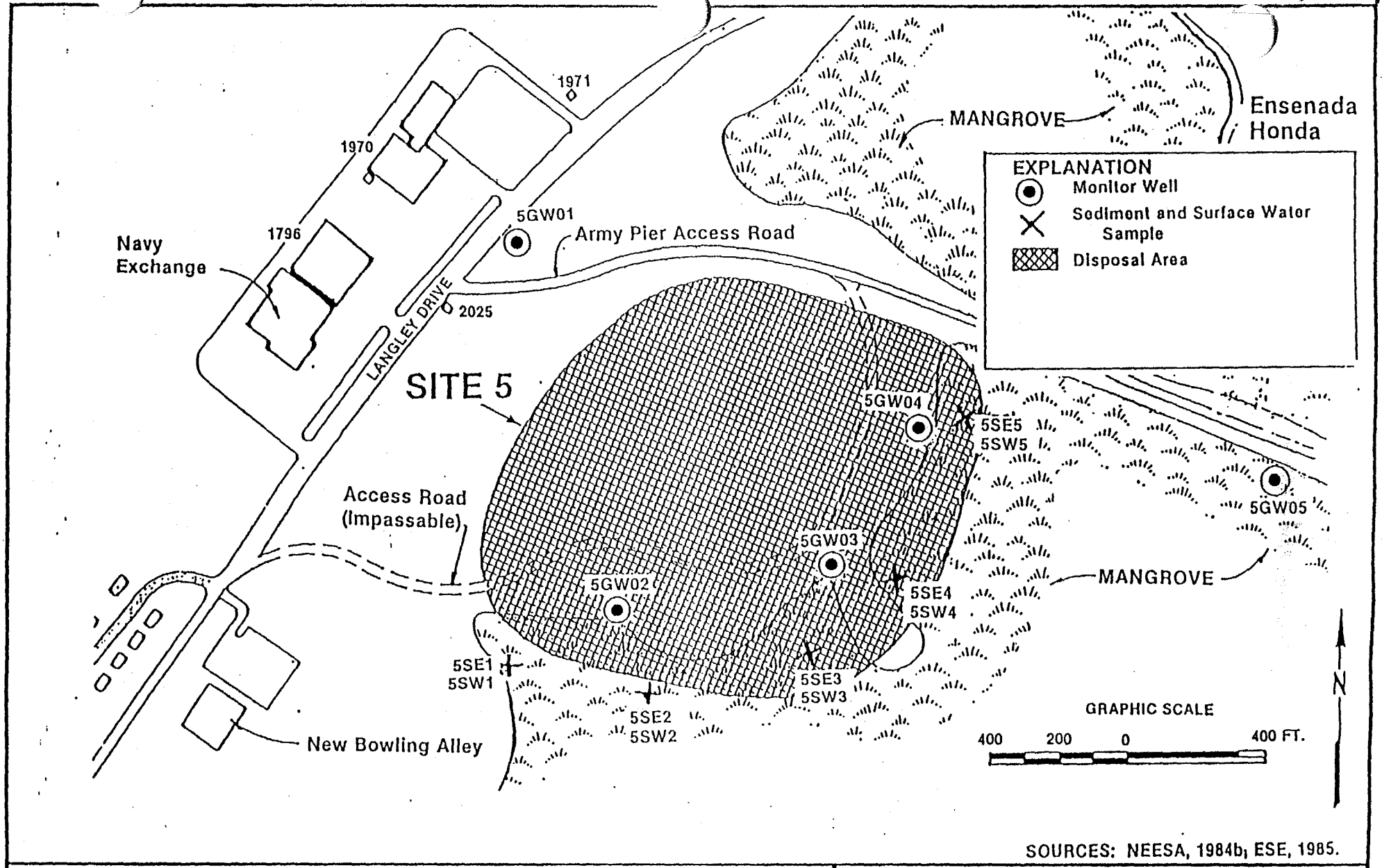


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



SOURCES: NEESA, 1984b; ESE, 1985.

Figure 3-4
ROUNDS 1 AND 2 SAMPLING LOCATIONS AT SITE 5,
ARMY CREMATOR DISPOSAL AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Langley Drive Disposal (Site 6)

SUMMARY

- Soil, sediment, surface water, and groundwater samples were taken from this site. Elevated levels of lead were found in the soil, sediment, surface water, and groundwater at the site. In addition, low levels of organic contamination were found in the monitor well at the site.

BACKGROUND

- This site allegedly had been used as a landfill between 1939 and 1959.

- The type of wastes disposed of at this site included inert solid wastes, construction or demolition debris, old fuel lines, hardened tar, sample containers, and approximately 10 - 15 full 55-gallon drums containing potentially hazardous material.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Thirty-two soil samples were collected at the site in 2 separate sampling rounds. Fifteen soil samples were collected in Round 1 and were analyzed for pH, priority pollutants hexavalent chromium, xylene, MEK, MIBK, and EDB. In Round 2, 15 soil samples were collected and analyzed for lead. Elevated levels of lead were found in the soil samples. Also in Round 2, 2 soil samples were

collected and analyzed for EP Toxicity for lead only. The two soil samples analyzed for EP Toxicity for lead only, indicate that the soil samples are not classified as a hazardous waste. Maximum contaminant levels exceeding comparison levels are detailed below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Lead (ug/g)	3,040	988	<10 - 700 Common range in soils)
Lead, EP Toxicity (ug/L)	---	10.6	5,000 (40CFR 264.94)

- Six sediment samples were collected at the site (3 samples in Round 1 and 3 samples in Round 2). The sediment samples were analyzed for pH, priority pollutants, xylene, MEK, MIBK, and EDB. Phenols were detected in all 3 sediment samples collected during Round 2 but are likely attributable to naturally occuring phenolic compounds in the mangrove environment of Site 6.

- Six surface water samples were collected at the site (3 samples in Round 1 and 3 samples in Round 2). The surface water samples were analyzed for pH, priority pollutants, xylene, MEK, MIBK, and EDB. Elevated levels of total chromium, copper and selenium, in excess of ambient water quality criteria, were detected in both sampling rounds. In addition, phenols were also detected in round 2 surface water samples, but are likely attributable to naturally occurring phenolic coumpounds in the mangrove environment of Site 6. Maximum contaminant levels exceeding comparison levels are shown below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Beryllium (ug/L)	50.6	---	0.0068 AWQC*
Chromium (Total) (ug/L)	611	116	50 AWQC*
Copper (ug/L)	966	67.8	12 AWQC*
Lead (ug/L)	526	---	50 AWQC*
Mercury (ug/L)	0.997	---	0.144 AWQC*
Nickel (ug/L)	252	---	13.4 AWQC*
Selenium (ug/L)	549	241	10 AWQC*
Thallium (ug/L)	29.3	---	13 AWQC*
Zinc (ug/L)	1,310	52.5	110 AWQC*

*AWQC - Ambient Water Quality Criteria

- One shallow monitor well was installed at the site. This monitor well was sampled once during the Round 2 sampling. The groundwater sample was analyzed for pH, priority pollutants, xylene, MEK, MIBK, and EDB. The analytical results indicate the presence of low levels of organic compounds including pentachlorophenol and aldrin. In addition, elevated levels of lead, in excess of the National Primary Drinking Water Standard, were detected. Maximum contaminant levels exceeding comparison levels are as shown below:

Parameter	Round 2 Concentration	Comparison Value
Chloroform (ug/L)	1.7	0.19 AWQC*
Lead (ug/L)	121	50 PDWS+

*ADWC - Ambient Water Quality
+PDWS - Primary Drinking Water Standard

- Future Plan--Resampling of the 3 surface water sampling stations at Site 6 for lead is recommended. Resampling of the monitor well for priority pollutants (excluding asbestos, cyanide, and dioxin) is recommended. In addition, a focused environmental assessment of the area upgradient of the monitor well to determine the presence of any potential sources of contamination is recommended.

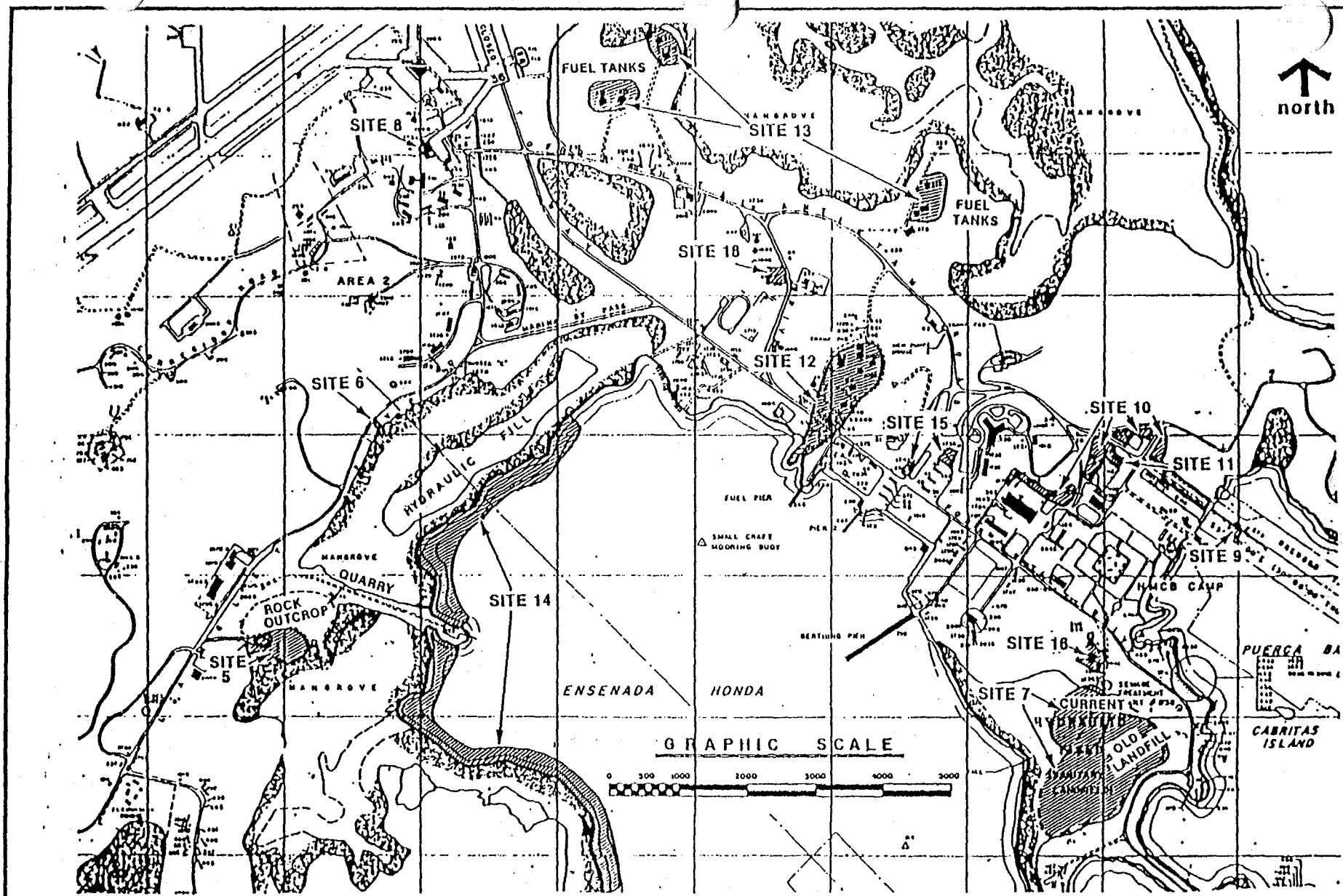


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

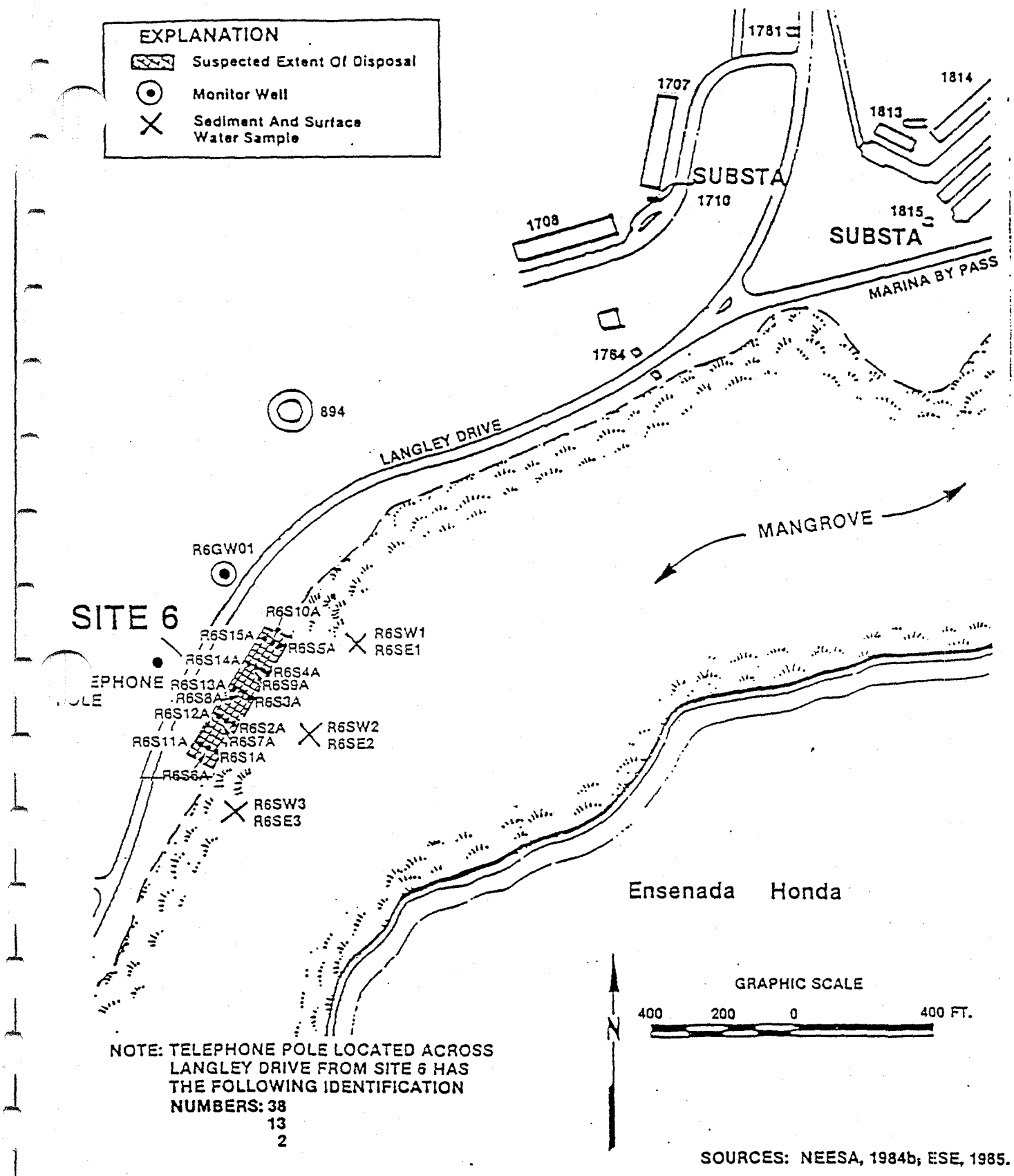
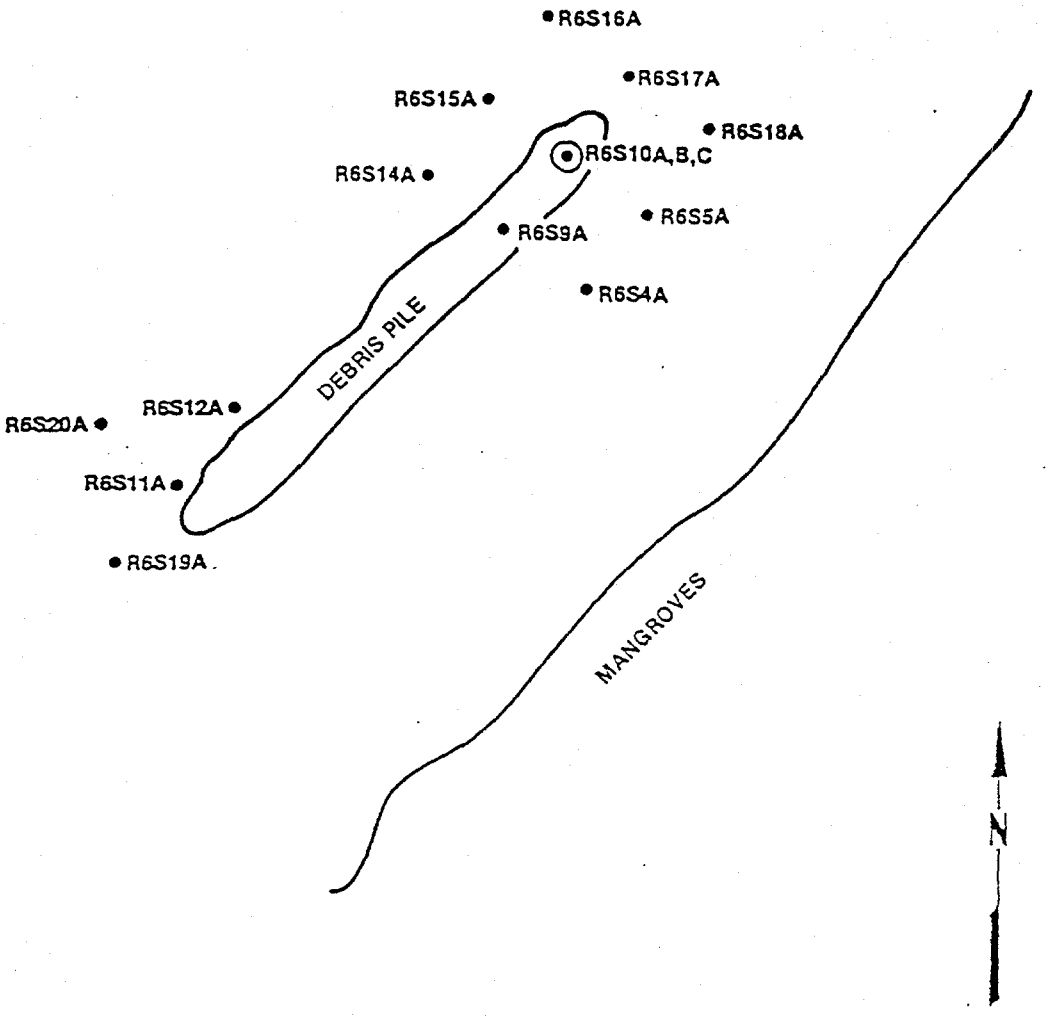


Figure 3-5
ROUND 1 SAMPLING LOCATIONS AT SITE 6, LANGLEY DRIVE DISPOSAL SITE

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



EXPLANATION

- Composite Soil Sample From 0 To 1 Ft. Depth

⊙ Composite Soil Samples From 0- To 1- Ft. Depth, 1- To 2- Ft. Depth, And 2- To 3- Ft. Depth (Total Of 3 Samples)

NOTE: Grid Spacing For Soil Sampling Locations Is 25 Feet

Figure 3-6
R[illegible]ND 2 SOIL SAMPLING LOCATIONS AT
[illegible]S, LANGLEY DRIVE DISPOSAL SITE

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, Puerto Rico: Station Landfill (Site 7)

SUMMARY

- Soil and groundwater samples were taken from this site. The soil samples showed low levels of oil and grease. Some contaminants in the groundwater exceed drinking water criteria.

BACKGROUND

- Since the early 1960s this site has been operated as the base landfill. The landfill site encompasses 85 acres, most of which has been used for waste disposal.

- Materials known to have been disposed of in the landfill include residential waste, scrap metal, cable, paint wastes, solvents, PCBs, OTTO fuel II, Agentine, pesticides, lubricating oil, dead animals, digested sludge, construction debris, and possibly Super Tropical Bleach (STB), a decontaminating agent.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- In each Round 1 and 2 investigations, 8 monitor wells were sampled. The groundwater samples were analyzed for chromium (+6) and priority pollutants. Low levels of organic compounds as well as metal concentrations exceeding drinking water criteria were present in the groundwater samples collected during both rounds. Metal levels were highest in the samples from two wells nearest the scrap

metal area. Shown below are exceedances of maximum contaminant levels of constituents of concern.

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Chlorobenzene (ug/L)	89	18	.0270 AIC**
Bis (2-eth'hex') phthlate (ug/L)	8	5.3	.0200 AIC**
Butyl benz'phthlate (ug/L)	17	--	NR
Di-n-butylphthalate (ug/L)	2	--	NR
Arsenic (ug/L)	120	20.9	50 ug/L AWQC*
Chromium (Total) (ug/L)	57.7	440	50 ug/L SWQC*
Copper (ug/L)	135	1,820	12 ug/L AWQC*
Nickel (ug/L)	18.7	225	13.4 ug/L AWQC*
Selenium (ug/L)	88.9	34.4	10 ug/L AWQC*
Silver (ug/L)	--	369	50 ug/L AWQC*
Thallium (ug/L)	1,780	89	13 ug/L AWQC*
Zinc (ug/L)	225	3,510	110 ug/L AWQC*
Phenols (ug/L)	NA	160	NR

-- = Not detected
NA = Not analyzed
NR = Not reported
**AIC = Chronic acceptable intake
*AWQC = Ambient water quality criteria

- Three composite soil samples were collected from the Drum Ditch, a separate disposal area within the site. Only low levels of oil and grease were detected in the Drum Ditch.

- Future Plan--No additional investigation of the Drum Ditch is recommended. At site 7, elevated levels of some metals were detected but only on a sporadic basis suggesting that a significant source of metals contamination does not exist. No additional groundwater investigation is recommended for Site 7. A risk assessment will be performed at this site.

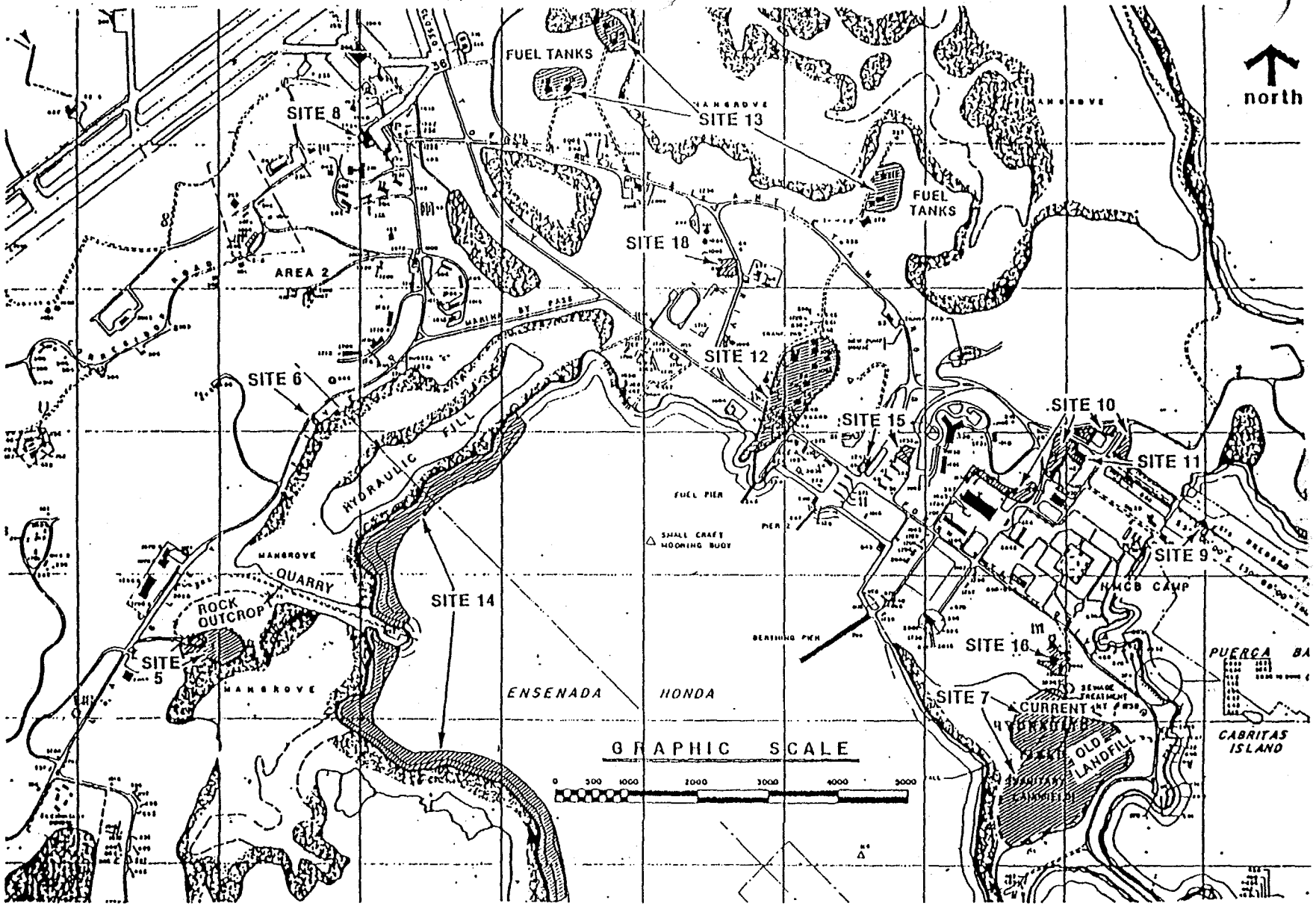
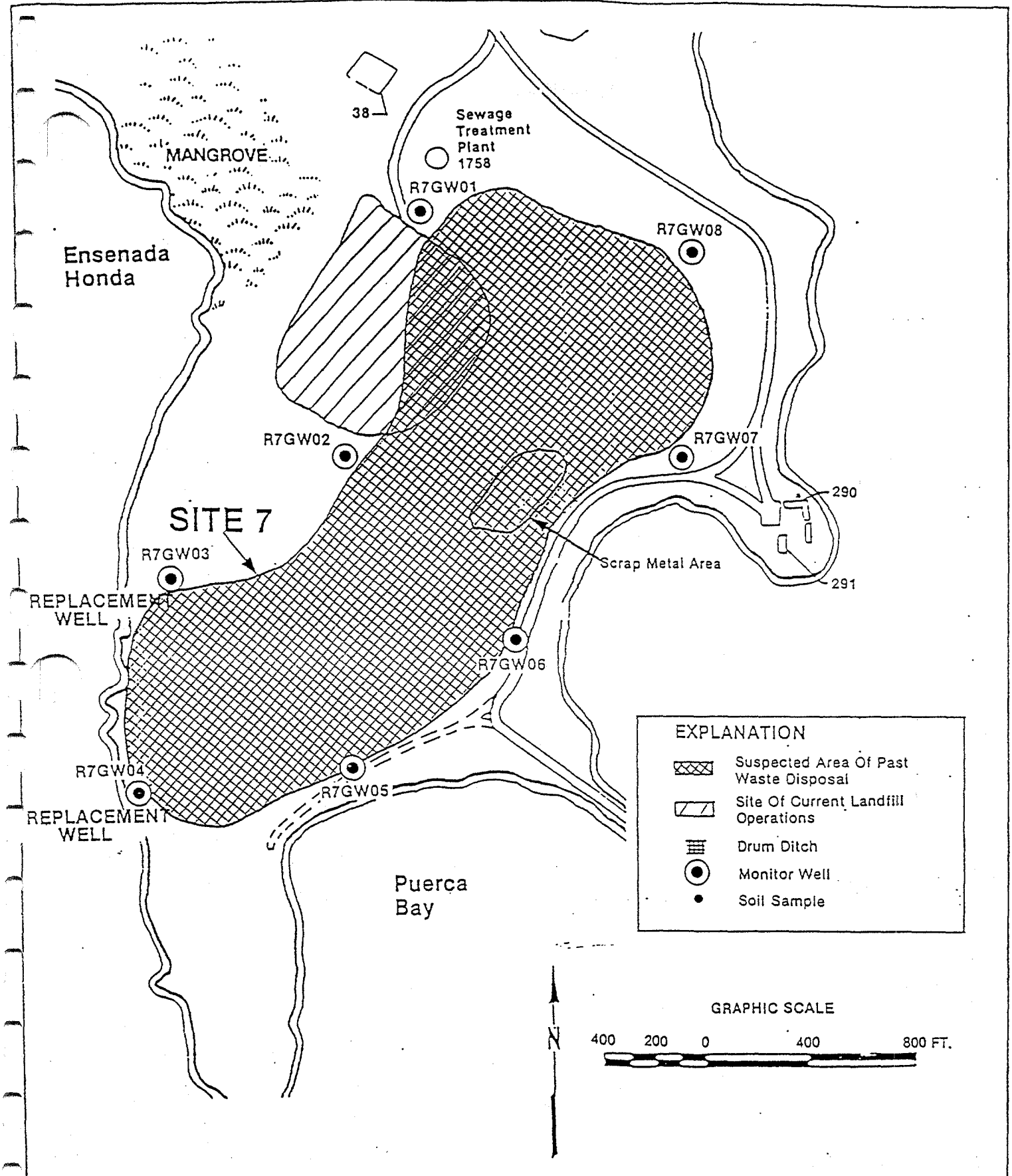


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



SOURCES: NEESA, 1984b; ESE, 1985.

ure 3-8
ROUNDS 1 AND 2 SOIL AND GROUND WATER SAMPLING LOCATIONS AT SITE 7, STATION LANDFILL

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Drone Washdown (Site 8)

SUMMARY

- Soil, sediment, and surface water samples were taken from this site. Elevated levels of oil and grease in the sediment and surface water samples, as well as low levels of volatile organic compounds in the surface water samples were detected. The elements of concern were found in the upstream sampling station and are emanating from beyond the boundaries of Site 8 (hangar area - building 200). Since the elements of concern are originating from beyond the boundaries of Site 8, the site does not pose any threat to human health or the environment.

BACKGROUND

- This site has been utilized as a washdown area for drones since 1961.

- From 1961 until the mid-1970s residual drone fuel and oil, as well as waste water from the washdown area, were disposed of in a drainage ditch which flows into a mangrove swamp and eventually into the harbor. In the mid-1970s, an underground oil separator was installed onsite to handle these waste streams. From the mid-1970s when it was installed, until about 1983, this oil separator would overflow into the adjacent storm sewer system during periods of heavy rainfall. This problem was remedied in about 1983.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- One soil sample was collected as a background sample in Round 1. This sample was analyzed for oil and grease, lead, VOA, xylene, MEK, and EDB. Elevated levels of oil and grease (8.21 mg/kg) were detected in this soil sample.

- A total of six sediment samples were collected for Site 8 (3 samples during each round). Oil and grease levels ranged from 69-4740 mg/kg. These levels are attributable to a source located beyond the boundaries of the site (hangar area - Bldg. 200).

- A total of eight surface waters were collected from Site 8 during both Rounds. Three were collected in Round 1 and during Round 2, two additional surface water samples were collected. Significant levels of oil and grease (ranging from 5 to 102 ug/L) were found in Round 1 samples. Oil and grease was not detected in Round 2 samples. The levels of oil and grease detected are attributable to a source located beyond the boundaries of Site 8 (hangar area - Bldg. 200).

- The most probable exposure pathway is ingestion of surface water and shallow groundwater. Surface water and shallow groundwater are not used as a drinking water source at or near the site.

- Future Plan--Since the oil and grease levels detected at the site are attributable to a source located beyond the boundaries of Site 8 (hangar area - Building 200), no additional monitoring is recommended for the site in question. The levels of oil and grease emanating from the hangar area - Building 200 are being handled separately.

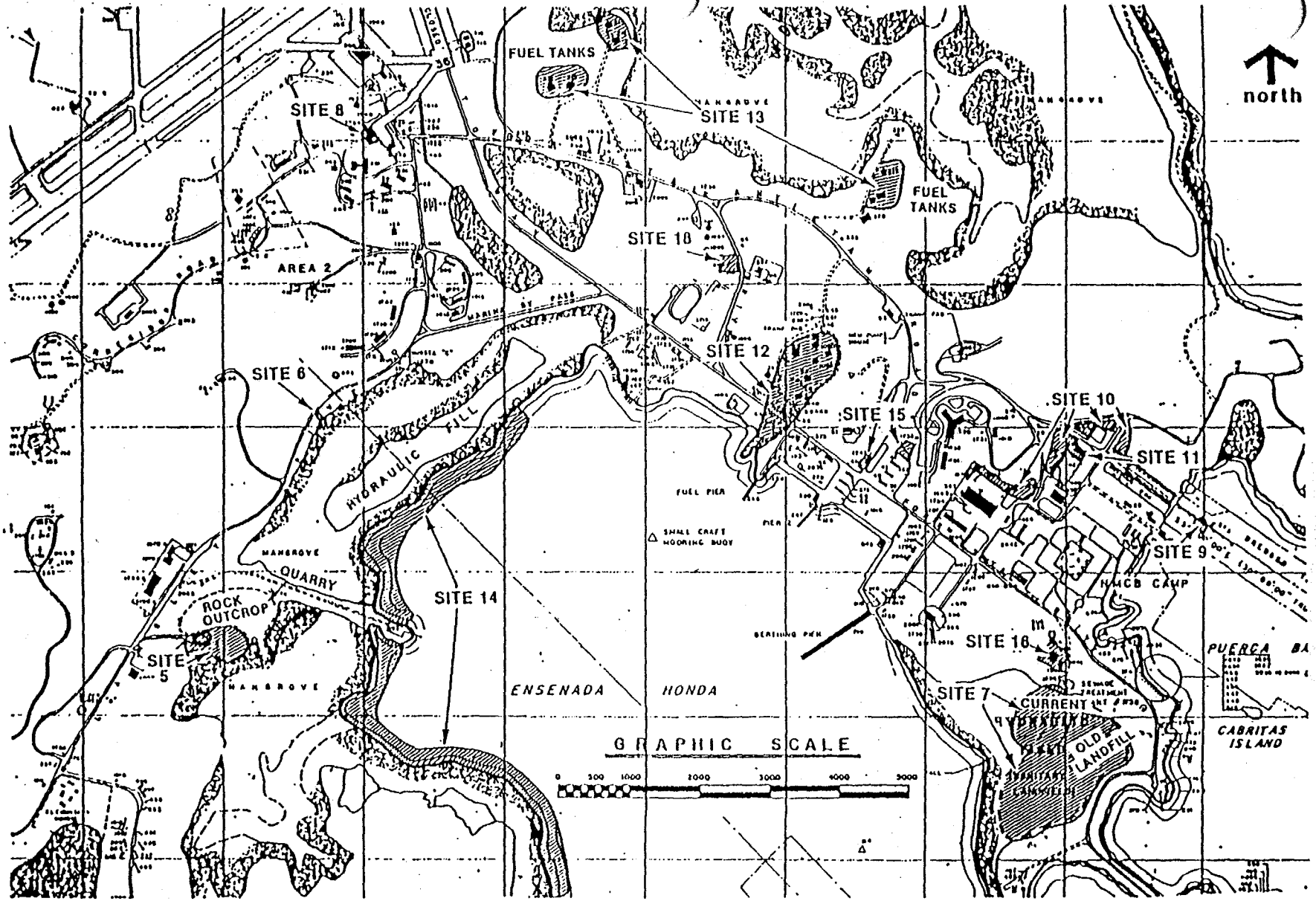


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: PCB Disposal, Dry Rock Area (Site 9)

SUMMARY

- Sediment and surface water samples were taken from this site. No PCBs were detected in the samples collected at the site. The site does not pose any threat to human health or the environment.

BACKGROUND

- In approximately 1968, 25 five-gallon cans of Askarel (a PCB dielectric fluid) were disposed of at this site. Some of the cans, which had been stored in Public Works Building 31, were in a rusted condition at the time of disposal.

- IR information has been provided to the EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Thirty sediment samples were collected at this site in Round 1 and were analyzed for PCBs. No PCBs were detected.

- Four surface water samples were collected at this site in Round 1 and were analyzed for PCBs. No PCBs were detected.

- Future Plan--Since no PCBs were detected in the samples collected at the site, no additional investigation of the site is recommended.

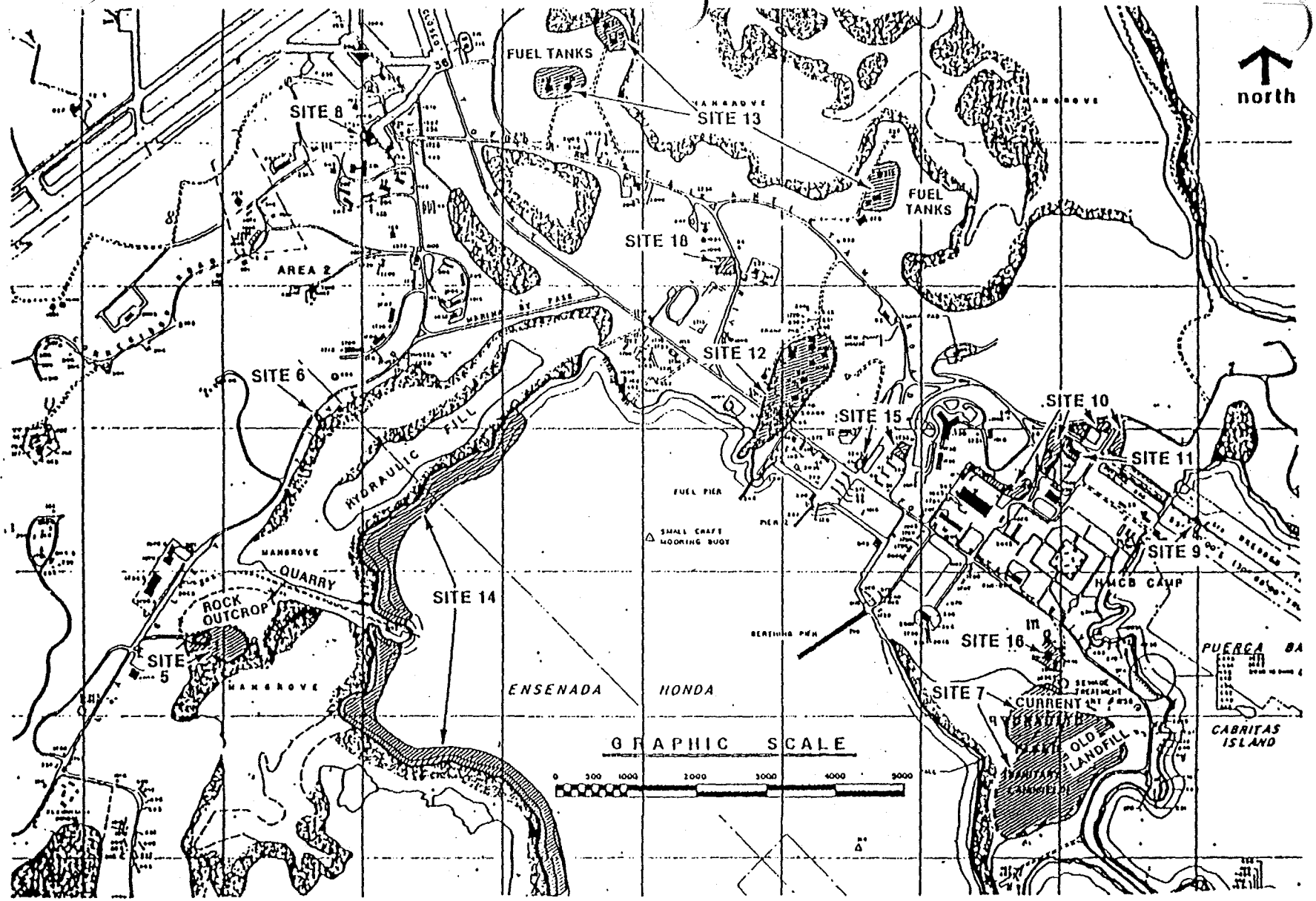
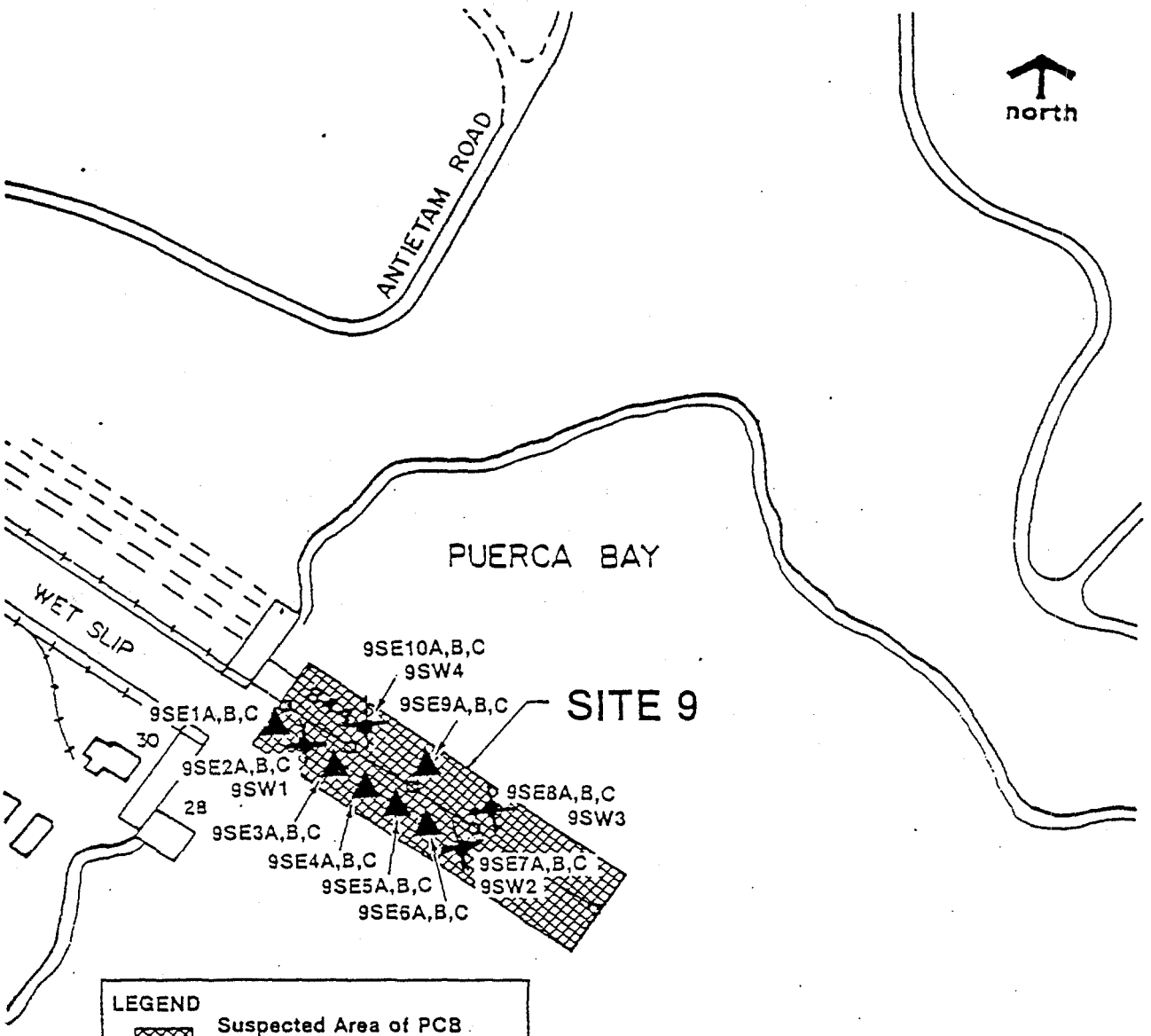


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



LEGEND

- Suspected Area of PCB Disposal and Possible Dispersal
- Sediment Sample
- Sediment and Surface Water Sample

Recommended Sampling Plan:

1. Visual
2. Sediment Core Sampling as Shown
3. Composite Sample from 0- to 1- Foot Depth, 1- to 2- Foot Depth, and 2- to 3- Foot Depth at Each Boring

Graphic Scale

400 200 0 400 FT.

SOURCES: NEESA, 1984b; ESE, 1985.

ure 3-10
)UND 1 SAMPLING LOCATIONS AT SITE 9,
PCB DISPOSAL, DRY DOCK AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Building 25 Storage Area (Site 10)

SUMMARY

- Groundwater samples were collected from this site. Only very low levels of organic compounds were detected, and the metals concentrations detected were sporadily elevated and generally representative of background groundwater quality suggesting that a significant source of metals contamination does not exist at this site. The site does not pose any threat to human health or the environment.

BACKGROUND

- Building 25 was used from the 1940s to about 1979, when it collapsed, for the temporary storage of Public Works - Supply Department material scheduled to be turned over to the Defense Property Disposal Office (DPDO).

- The type of wastes present at this site include up to seventy-five empty or partially filled, corroded 55-gallon drums, of unknown contents, fifteen corroded 5-gallon pails of unknown contents, asbestos sheeting, transformers (one of which has leaked dielectric fluid), mechanical devices, gas cylinders, and construction rubble.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Eight shallow monitor wells were installed at the site. A total of 16 groundwater samples were collected at the site (8 in Round 1 and 8 in Round 2). The groundwater samples were analyzed for pH, priority pollutants, hexavalent chromium, xylene, MEK, MIBK, and EDB. Low levels of organic compounds were detected in the groundwater samples. Additionally, some metals were detected at levels exceeding the primary drinking water standard and ambient water quality criteria. Phenols were detected in Round 2 samples only. Maximum levels of contaminants exceeding comparison levels are shown below:

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
1,2-Dibromomethane (ug/L)	---	0.015	---
Bis (2-ethylhexyl) phthalate (ug/L)	4.0	4.2	---
Buthylbenzyl phthalate (ug/L)	40	---	---
Methyl Ethyl Ketone (ug/L)	9.3	---	---
Antimony (ug/L)	252	---	146 AWQC*
Arsenic (ug/L)	119	4.4	50 PDWS+
Beryllium (ug/L)	27.1	---	0.0068 AWQC*
Chromium (total) (ug/L)	138	202	50 PDWS+
Copper (ug/L)	1,550	624	1,000 PDWS+
Lead (ug/L)	69.1	134	50 PDWS+
Mercury (ug/L)	0.527	---	0.144 AWQC*
Nickel (ug/L)	99.2	88.6	13.4 AWQC*
Selenium (ug/L)	512	154	10 PDWS+
Thallium (ug/L)	112	63.3	13 AWQC*
Zinc (ug/L)	857	557	110 AWQC*
Phenols (ug/L)	---	470	---

AWQC* - Ambient Water Quality Criteria
PDWS+ - Primary Drinking Water Standards

- The most probable exposure pathway is ingestion of shallow groundwater. Groundwater is not used as a drinking water source at or near the site.

- Future Plan--Since only very low levels of organic compounds were detected and the metal concentrations detected were representative of background groundwater quality, no additional investigation of the site is recommended. A risk assessment will be performed at this site.

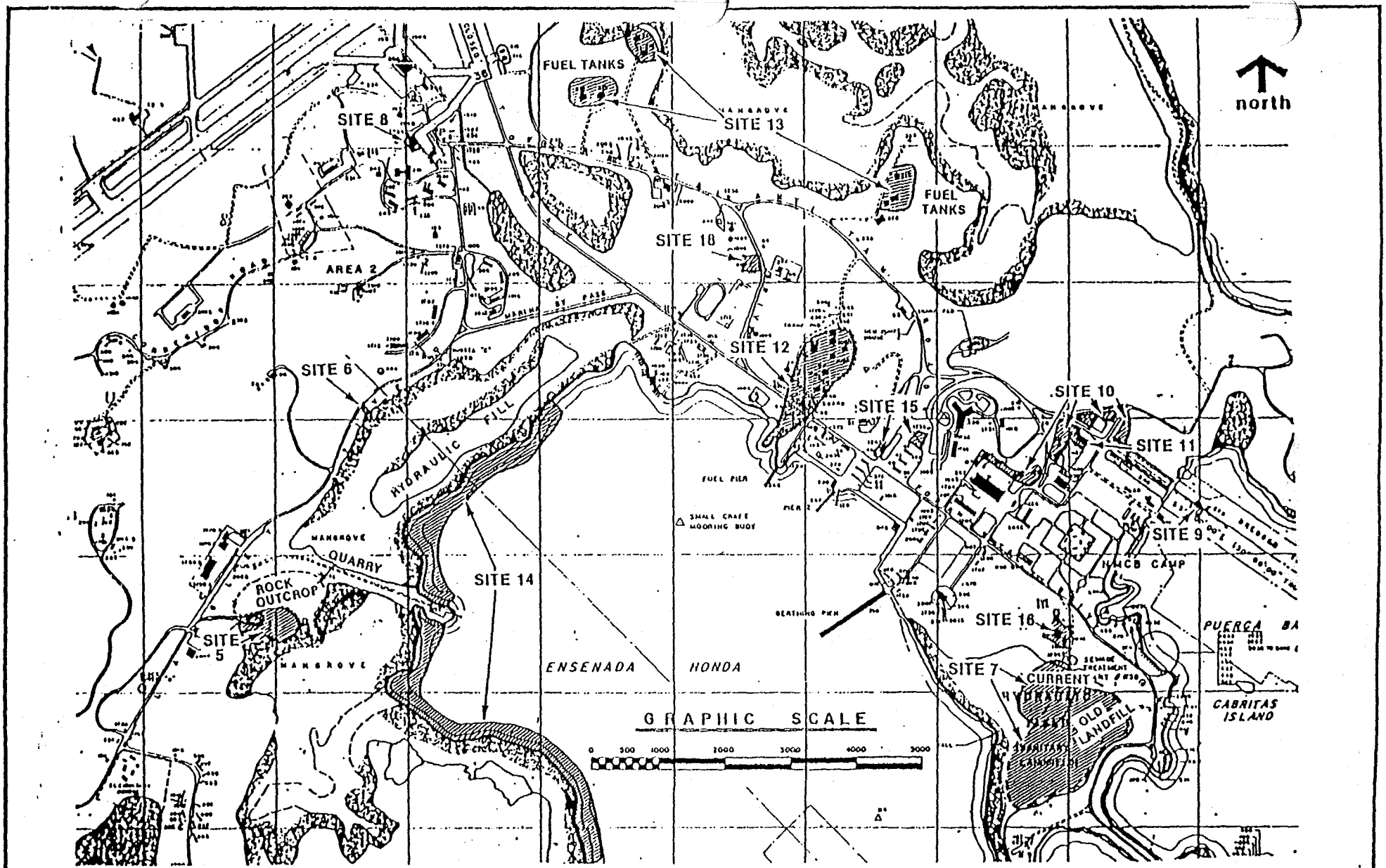
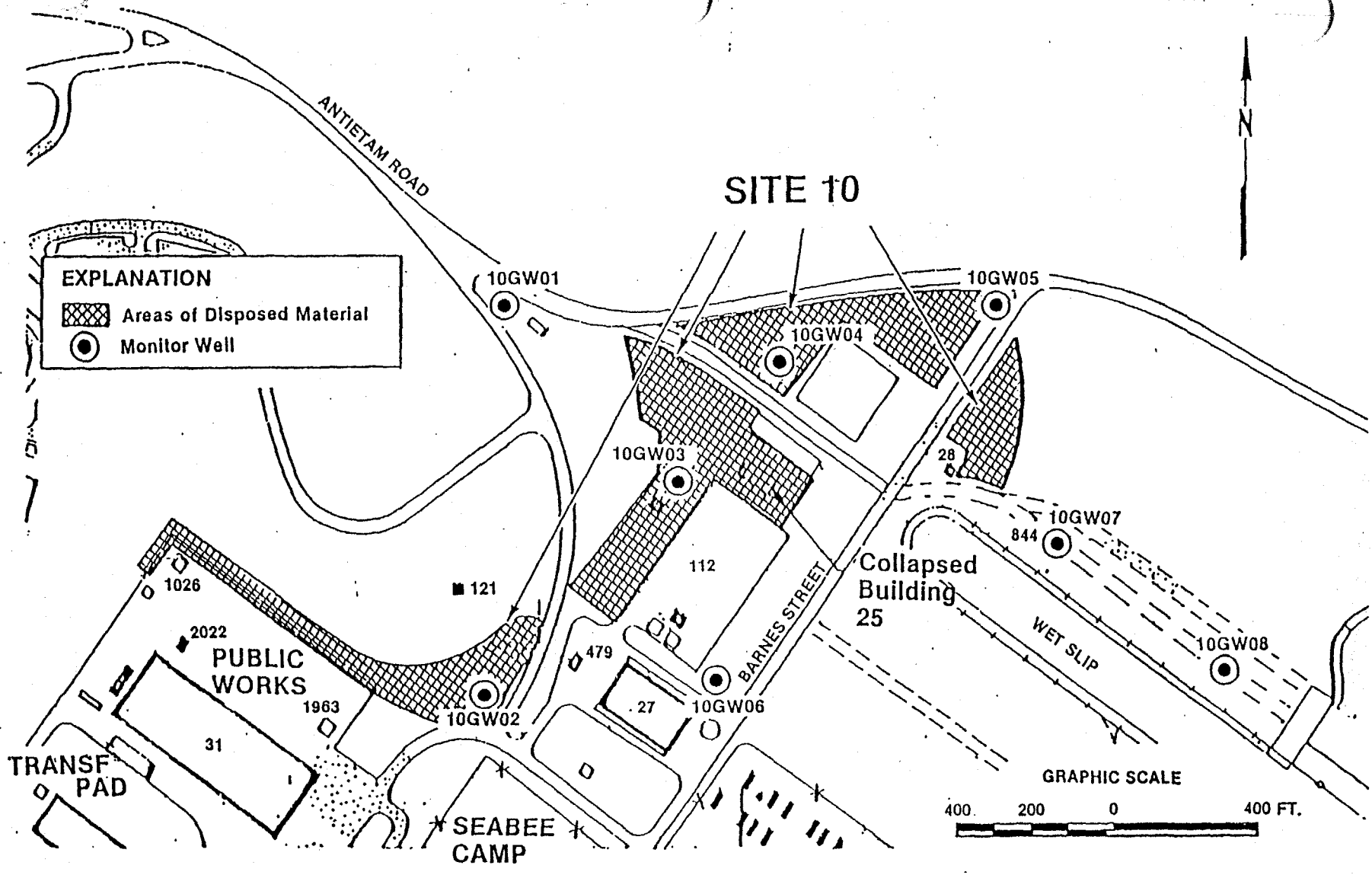


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



SOURCES: NEESA, 1984b; ESE, 1985.

Figure 3-11
ROUNDS 1 AND 2 SAMPLING LOCATIONS AT SITE NO. 10, BUILDING 25 STORAGE AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Two Way Road Fuels Farm (Site 12).

SUMMARY

- In addition to sediment, surface water, and groundwater samples, soil boring investigations were also conducted. Round 2 sampling showed an overall decrease in contaminant levels except for lead. Soil boring investigations generally outlined the contaminant locations and flow directions.

BACKGROUND

- This site is operated as a fuels farm. Spills, leaks, and sludge disposal have occurred since 1957. Some leaks have been slow and over a period of 15-20 years while other spills due to line breaks, burst tanks, etc., have dumped up to 420,000 gallons over a period of several hours.

- The type of contamination found at this site includes diesel, fuel sludge, leaded and unleaded gasolines as well as aviation fuels.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- During each round, one sediment sample was collected and analyzed. Round 1 results indicated a significant amount of oil and grease (3340 ug/g); however, oil and grease were not detected in Round 2.

- A surface water sample was also collected during each round, and the results were similar. Oil and grease were detected in Round 1 and not detected in Round 2. Lead was detected in Round 2, but the concentration was well below ambient water quality criteria.

- A total of 12 groundwater samples were collected, six during each round. In Round 1, benzene, toluene, and oil and grease were detected. Round 2 results indicated the absence of oil and grease, but the presence of lead and an increase concentration of benzene. Listed below are the highest concentrations of groundwater Constituents of Concern from each round.

Parameter	Round 1 Concentration	Round 2 Concentration	Comparative Value
Benzene (ug/L)	2000	4100	.66 *AWQC
Toluene (ug/L)	400	--	14300 *AWQC
Oil & Grease (mg/L)	42	--	NR
1,2 -Dibromoethane (EDB, ug/L)	--	0.016	NR
Lead (ug/L)	--	42.5	50 *AWQC

-- = Not detected
NR = Not reported
*AWQC = Ambient Water Quality Criteria

- In Round 1, twenty soil borings were completed between fuel tanks in the upper section of Site 12. The investigation consisted of split spoon samples with visual and odor observations to determine possible fuel contamination. Fuel contamination was detected in nine of the twenty borings.

- During Round 2, the soil investigation included 29 additional borings in the upper section of Site 12, and 48 borings in the lower section of Site 12, near Ensenada Honda. The Round 2 investigation involved visual and odor observations of soil samples as well as field measurements of organic vapors emitted by the soil samples using a photoionization detector (PID).

  As shown in Figure 3-14 the location of the detected fuel contamination in the upper section of Site 12 coincides with the low areas that form the drainage way for the tank farm. Figure 3-15 shows the area where fuel contamination was detected in the lower section of Site 12. Similarly, the detected fuel contamination in the lower section of Site 12 corresponds to low lying areas that form drainage pathways for run off. In both sections, all borings with visual contamination and/or maximum PID reading over 30 ppm were included in the contamination envelope.

- Future Plan - Further sampling and analysis are recommended at Site 12 to quantify the degree, and determine the extent of the soil contamination. Sixteen soil borings are proposed (five in the upper section, and eleven in the lower section), using the hollow stem auger technique to collect soil samples at 5-ft. intervals to a depth of approximately 15 ft. Each sample will be analyzed for total petroleum hydrocarbons, benzene, toluene, xylene and lead. Figures 4-1 and 4-2 show the proposed soil boring locations in the upper and lower sections of Site 12, respectively. Additionally as shown in Figure 4-2, the installation of two monitor wells (12GW07 and 12GW08) is recommended at two of the proposed soil boring locations. The objective of these two wells is to determine the lateral extent of the contamination detected in monitor well

12GW02. The sampling and analysis of monitor wells 12GW02 through 12GW08 for total petroleum hydrocarbon, benzene, xylene and lead are recommended. This site will be investigated further under the Navy's underground storage tank (UST) program.

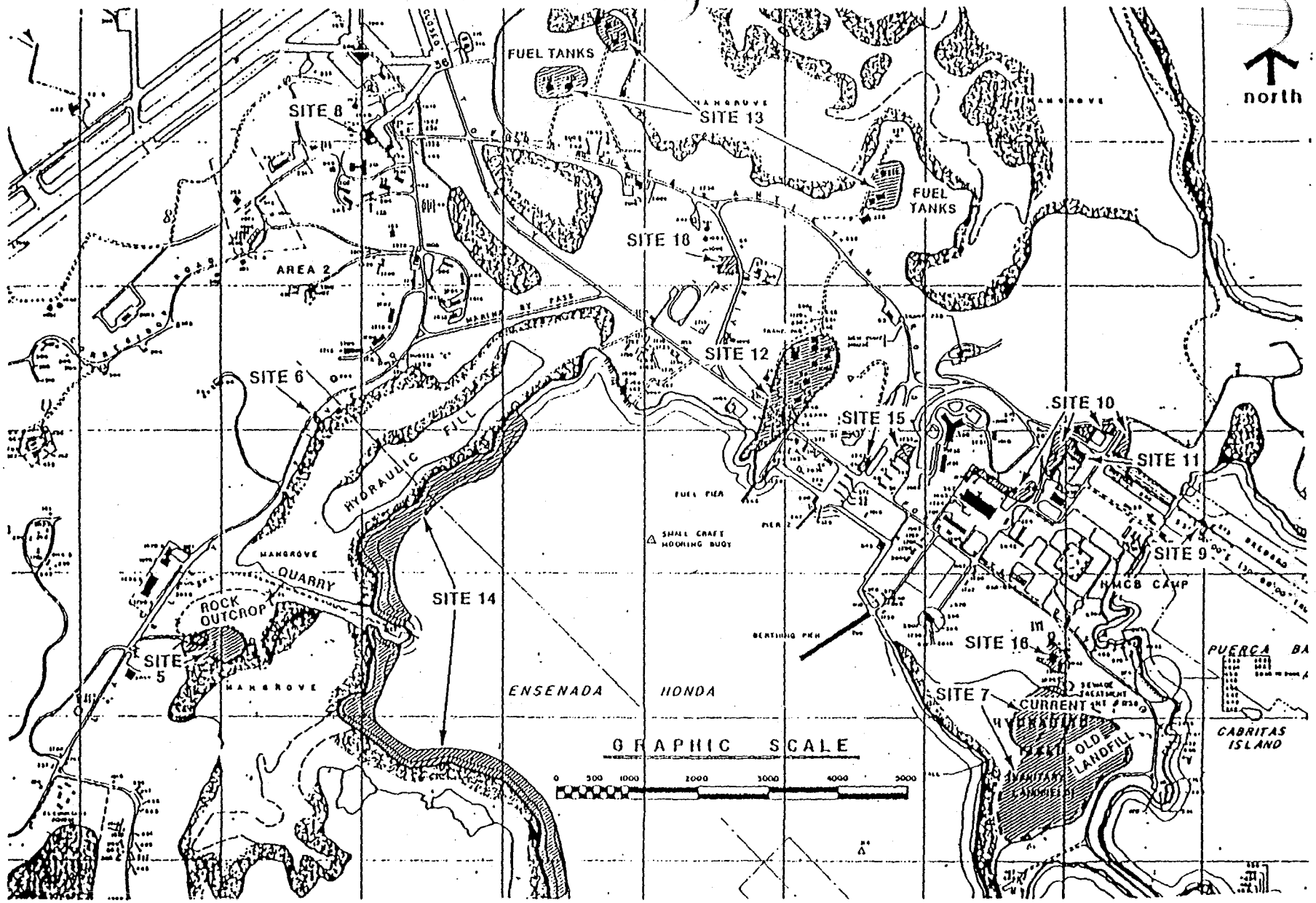
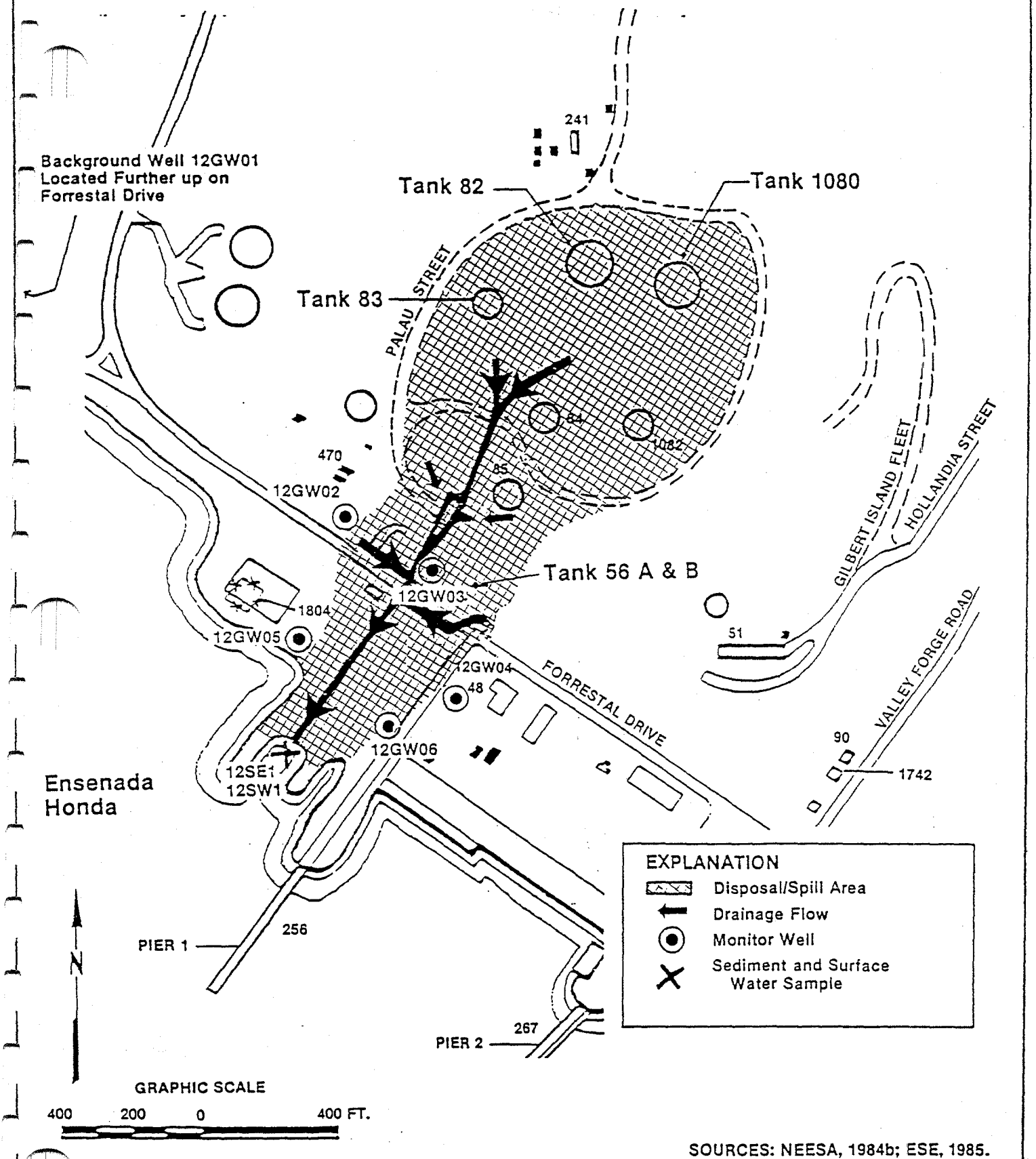


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



SOURCES: NEESA, 1984b; ESE, 1985.

...e 3-12
ROUNDS 1 AND 2 GROUND WATER, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS AT SITE 12, TOW WAY ROAD FUELS FARM

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

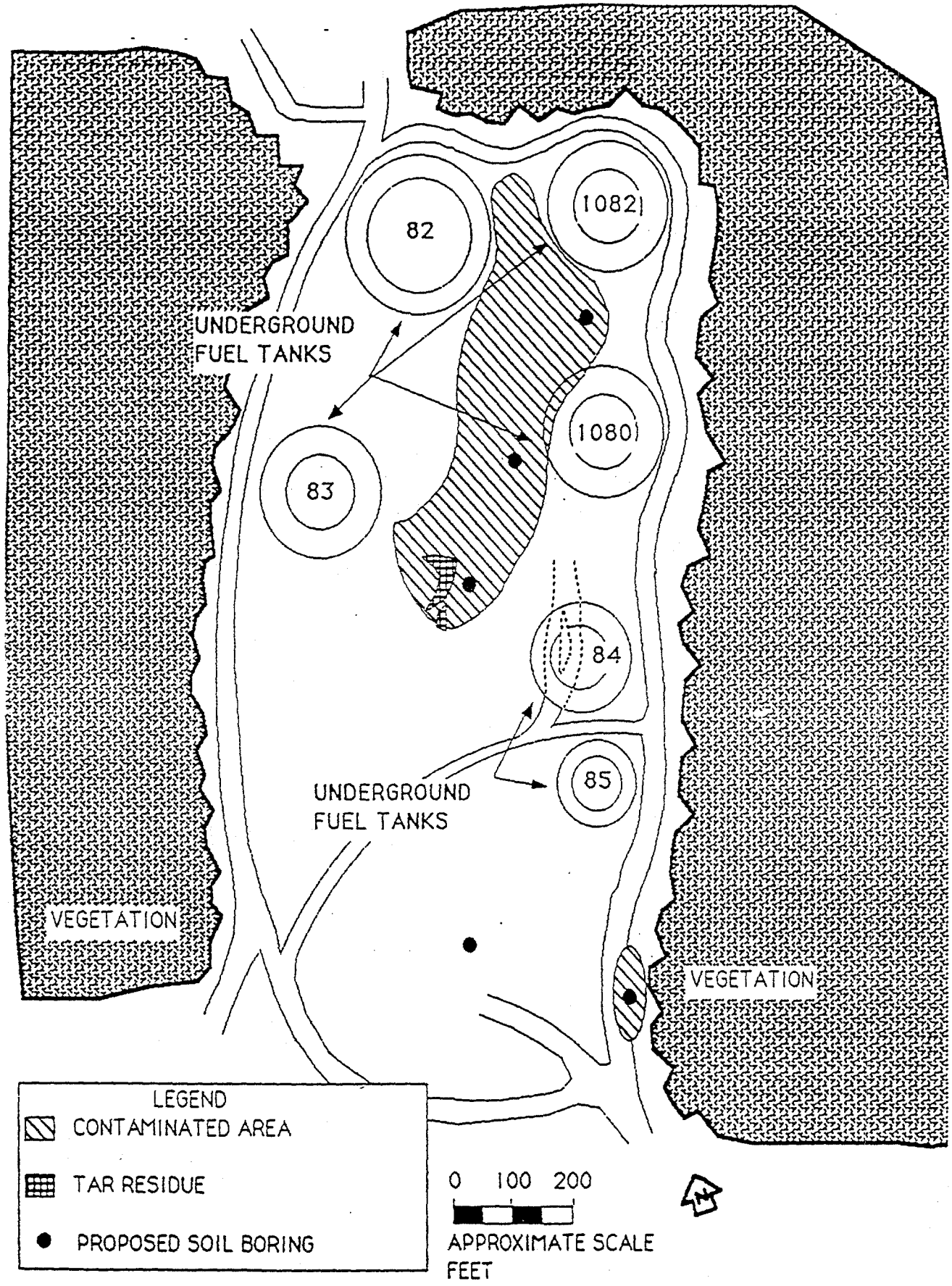


Figure 4-1
PROPOSED ROUND 3 SOIL BORING LOCATIONS AT UPPER SECTION OF SITE 12, TOW WAY ROAD FUELS FARM

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

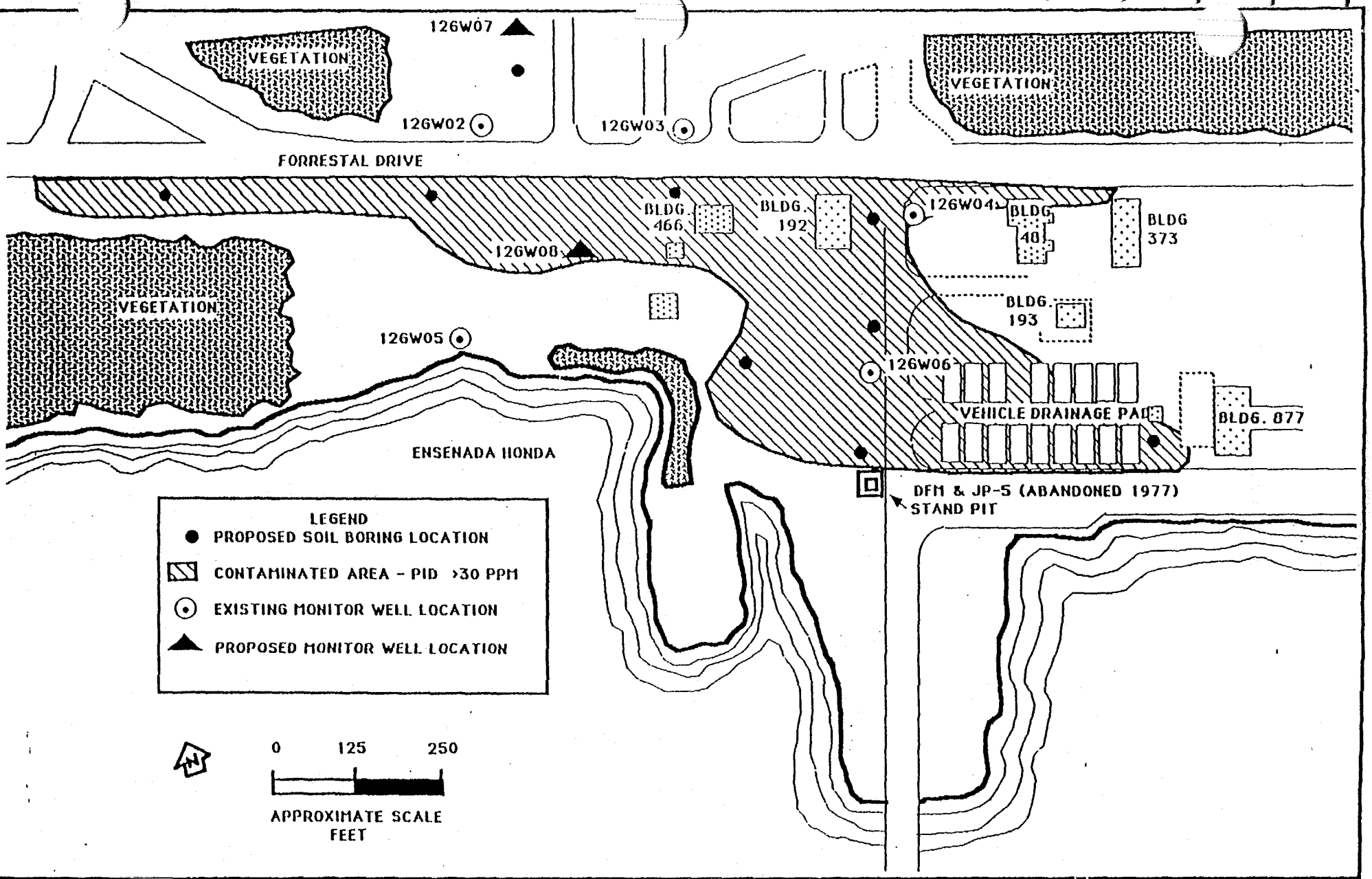


Figure 4-2
PROPOSED ROUND 3 SOIL BORING LOCATIONS AT LOWER SECTION OF SITE 12, TOW WAY ROAD FUELS FARM

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Ensenada Honda Shoreline and Mangroves (Site 14).

SUMMARY

- Sediment and surface water samples were collected from the site. Surface water contaminants were not found in significant amounts and damaged mangroves showed signs of recovery.

BACKGROUND

- Site 14 is the site of a 210,000 gallon fuel spill. A civilian tanker chartered by the U.S. Navy developed a problem with the piping system in August 1981 and leaked approximately 210,000 gallons into Ensenada Honda.

- Diesel fuel is the contaminant of investigation at this site.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- 12 sediment samples were collected from Site 14 during Round 1. Some significant levels of oil and grease were detected in the sediment samples but were not considered unusual due to the shipping activities conducted in Ensenada Honda. Additional monitoring was not performed in Round 2. Listed below are the highest sediment concentrations of constituents of concern.

Parameters	Round 1 Concentrations	Round 2 Concentrations	Comparison Value
Oil & Grease (ug/kg, dry)	52300	51800	NR
Benzene (ug/kg, dry)	--	2500	.700 *DLS
Chlorobenzene (ug/kg, dry)	--	2100	3 *DLS
Methylene Chloride (ug/kg, dry)	--	4400	NR
Toluene (ug/kg, dry)	--	3000	100 *DLS
Trichloroethene (ug/kg, dry)	--	2500	NR
Lead (mg/kg, dry)	400	189	500 *DLS <10-700 **CRS

-- = Not Detected
NR = Not reported
*DLS = Designated Levels in a Solid (ug/g)
**CRS = Element Concentration Ranges in Soils (ug/g)

- o A total of twelve surface water samples were collected and analyzed. Low levels of oil and grease were detected in only 2 of the 6 Round 1 surface water samples and none of the wells in Round 2. Low levels of lead, however, were detected in all six surface water samples collected in Round 1.

- o Eleven wells were sampled during each Round. During Round 1, significant levels of fuel-derived organic constituents were detected in four wells. However, during Round 2, only 2 of those 4 wells continued to show significant fuel-derived organic constituents. Shown below are the exceedances of groundwater constituents of concern.

Parameter	Round 1 Concentrations	Comparison Value
Methyl Ethyl Ketone (ug/g, dry)	0.008	---
Oil & Grease (ug/g, dry)	2080	---

- 12 surface water samples were also collected from Site 14 during Round 1. Oil and grease concentrations did not indicate a substantial degree of contamination. Inspection of the mangroves along the shore of Ensenada Honda indicated that the majority of damage resulted from the past oil spill occurred in the mangroves along the southwestern shore, and signs of recovery were apparent in this area. Therefore, no additional monitoring was performed at Site 14. Listed below are the highest concentrations of surface water constituents of concern.

Parameter	Round 1 Concentrations	Comparison Value
Oil & Grease (ug/g, dry)	2	NR *TLC

*TLC = Threshold Limit Concentrations (ug/g)
NR = Not reported

- Future Plan - Although elevated levels of oil and grease were detected in sediment samples collected from Site 14, the mangroves which sustained damage from past oil spills in Ensenada Honda showed signs of recovery. No additional monitoring is recommended for Site 14. A risk assessment will be performed.

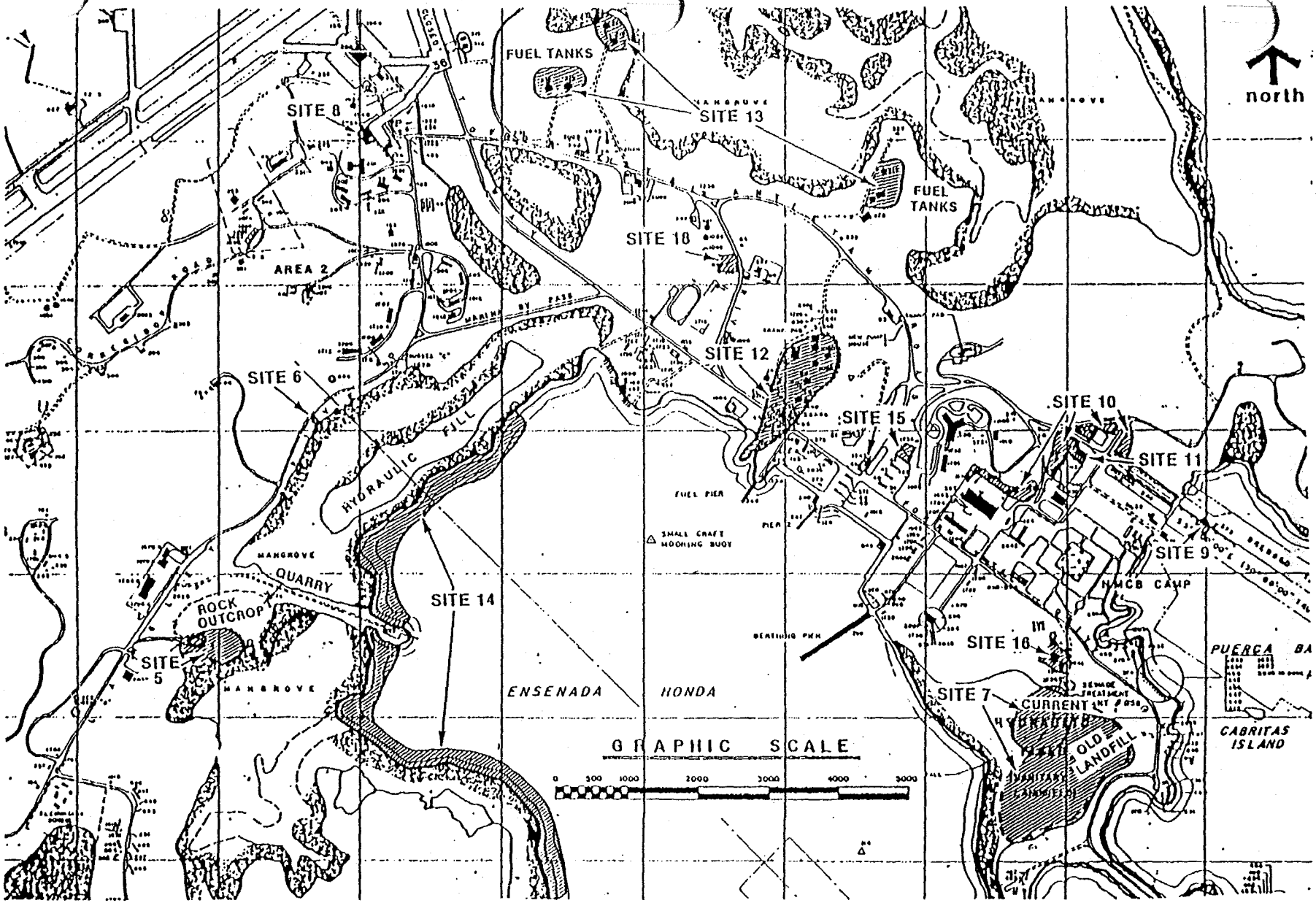
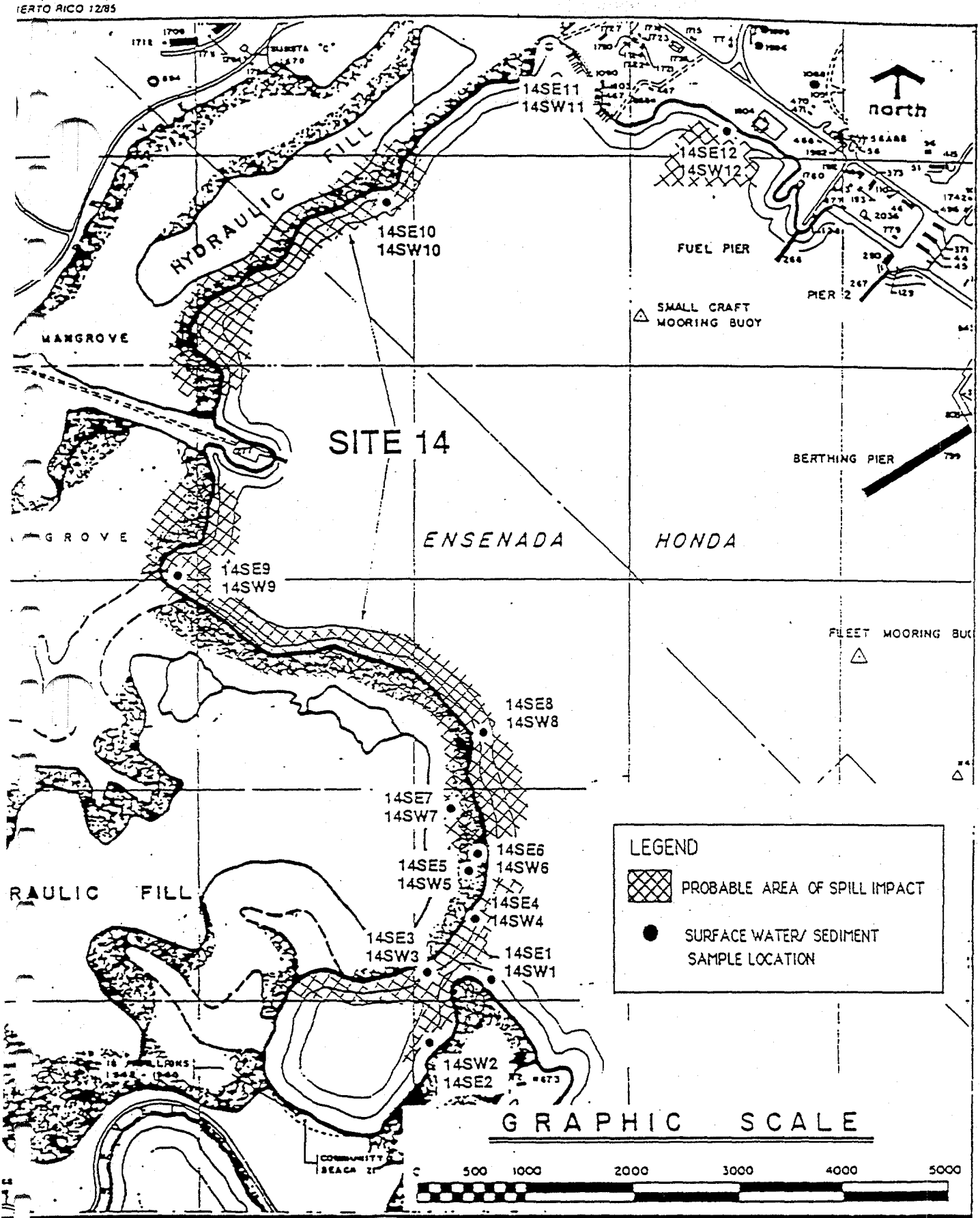


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



igure 17
OU SAMPLING LOCATIONS
T SITE 14, ENSENADA HONDA
SHORELINE AND MANGROVES
OURCES: NEESA. 1984b: ESE. 1985.

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Tanks 210 to 217 (Site 13).

SUMMARY

- Sediment, surface water, and groundwater samples were collected from this site. Constituents of concern in the sediment and surface water samples were not detected at significant levels. Groundwater samples, however, did have contamination detected in significant levels.

BACKGROUND

- This site is located within a 300-ft. diameter around tanks 212 through 217. The tanks were constructed for the storage of AVGAS. Approximately every 5 years the tanks were cleaned and the sludge was disposed of in nearby pits.

- The type of contamination disposed of at this site is leaded-sludge from tank cleaning normally resulted in 20-30 drums of sludge per tank. This sludge was disposed of in a series of pits approximately 300 feet from the tanks.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Six sediment samples were collected during each round. Oil and grease were detected in each round but levels were not unusual considering the activities in the vicinity of Site 13. Lead was also detected in both rounds, but not in significant levels. Round 2 samples revealed low levels of volatile organic compounds which

were not detected in Round 1. Listed below are the highest concentrations of sediment constituents of concern from each Round.

Parameters	Round 1 Concentrations	Round 2 Concentrations	Comparison Value	
Oil & Grease (ug/kg, dry)	52300	51800	NR	
Benzene (ug/kg, dry)	--	2500	.700	*DLS
Chlorobenzene (ug/kg, dry)	--	2100	3	*DLS
Methylene Chloride (ug/kg, dry)	--	4400	NR	
Toluene (ug/kg, dry)	--	3000	100	*DLS
Trichloroethene (ug/kg, dry)	--	2500	NR	
Lead (mg/kg, dry)	400	189	500	*DLS
			<10-700	**CRS

-- = Not Detected
NR = Not reported
*DLS = Designated Levels in a Solid (ug/g)
**CRS = Element Concentration Ranges in Soils (ug/g)

- o A total of twelve surface water samples were collected and analyzed. Low levels of oil and grease were detected in only 2 of the 6 Round 1 surface water samples and none of the wells in Round 2. Low levels of lead, however, were detected in all six State surface water samples.

- o Eleven wells were sampled during each Round. During Round 1 significant levels of fuel-derived organic constituents were detected in four wells. However, during Round 2 only 2 of those 4 wells continued to show significant fuel-derived organic constituents. Shown below are the exceedances of groundwater constituents of concern.

Parameter	Round 1 Concentrations	Round 2 Concentrations	Comparison Value	
Benzene (ug/L)	2000	2100	.66	*AWQC
1,2-dichlorethane	170	150	.94	*AWQC
Toluene (ug/L)	34000	7500	14300	*AWQC
Vinyl Chloride (ug/L)	1.9	--	2.0	*AWQC
Trichlorethene (ug/L)	--	1500	NR	
M-Xylene (ug/L)	290	21	NR	
O- and/or P-Xylene (ug/L)	360	260	NR	
Lead (ug/L)	--	150	50	*AWQC
Oil & Grease (ug/L)	5	57	NR	

-- = Not detected
NR = Not reported
* AWQC = Ambient Water Quality Criteria

o Future Plan - Sixteen soil borings and the installation of three monitor wells is recommended in order to determine the extent of the fuel contamination detected at Site 13. Soil borings should be drilled using the hollow stem auger technique with the collection of soil samples at 5-ft. intervals to a depth of approximately 20 feet or to a depth at which ground water is encountered. The soil samples will be analyzed for total petroleum hydrocarbons, benzene, toluene, xylene, and lead. Groundwater samples will be collected from existing monitor wells and analyzed for the same constituents as for the soil samples. A risk assessment will be performed at this site.

In the area of Tanks 216 and 217, four soil borings are recommended to determine the degree and extent of fuel contamination in the area of monitor well 136W09. Soil samples will be collected at 5 ft. intervals to a depth of approximately 20 ft. or to a depth at which groundwater is encountered. The samples will be analyzed for the same constituents as for the soil samples collected in the area of tanks 216 and 217.

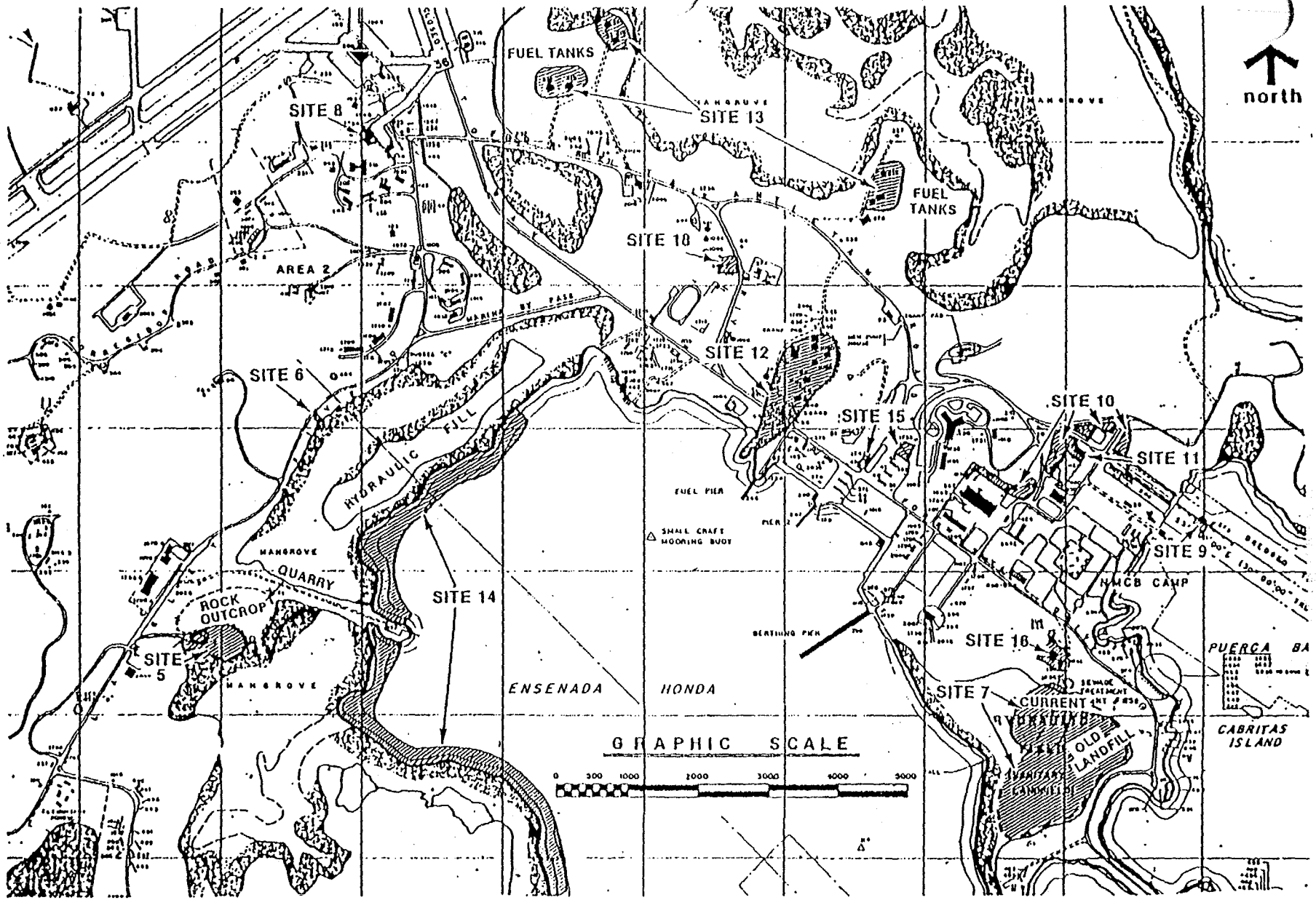
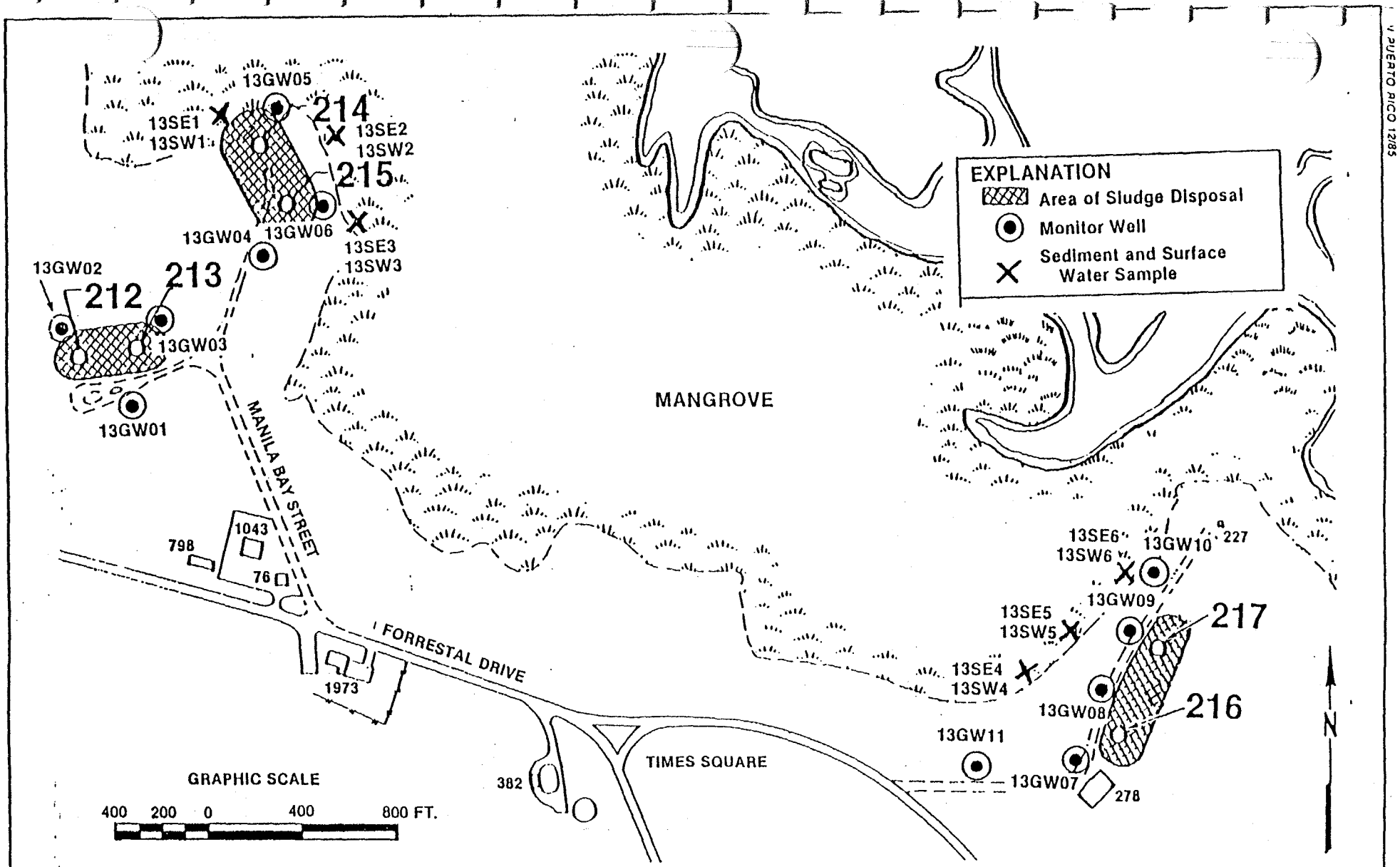


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



SOURCES: NEESA, 1984b; ESE, 1985.

Figure 3-16
ROUNDS 1 AND 2 SAMPLING LOCATIONS AT SITE 13, TANKS 210 TO 217

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Substation 2 (Site 15)

SUMMARY

- Soil samples were taken from this site. The analytical data for these soil samples show that PCB contamination exists in the area surrounding Substation 2. However, no PCB contamination was detected in the soil in the storage yard. This PCB contamination might pose an imminent health or environmental threat on or off the Naval Facility. A site specific risk assessment and remedial action alternatives analysis has been completed.

BACKGROUND

- This site was used by the Public Works Department-Power Distribution Shop for the repair of pole mounted distribution electrical transformers from 1964 to 1979.

- It is suspected that approximately 3,000 gallons of PCB-containing oil were discharged from 1964 to 1979 from oil that was contaminated with PCB-based dielectric fluids from the draining of oil from the transformers onto the ground to repair the inner cores and coils of the transformers.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

Discussion:

- Thirty-six soil samples were collected from 33 hand augered soil borings at the site. Soil samples were collected from the surface to a depth of one foot below land surface (BLS) in all but two of the borings which were extended deeper. The soil samples were analyzed for PCBs. Concentrations of PCBs ranged from ND (not detected) to 1,186 ppm. PCB levels above the 50 ppm PCB clean-up requirements set forth by EPA in the TSCA policy were found at 4 sampling locations.

- TSCA clean-up criteria levels for PCB contaminated sites are presented below:

Location of Spill	PCB Clean-up Criteria
1. Spills at outdoor electrical with restricted access	25-50 ppm
2. Spills at other restricted access locations other than electrical substations	25 ppm
3. Spills at non-restricted access areas	10 ppm

Site Risk Assessment:

- To evaluate the appropriateness of the 10 ppm clean-up standard for Site 15, a site specific risk assessment was performed. Results of this risk assessment are presented below.

- The following routes of exposure have been identified for Site 15 based on pathway screening analysis:
  1. Exposure of workers or the public through dermal absorption of contaminated surface soil.
  2. Exposure of workers or the public through incidental ingestion of contaminated surface soil.

3. Exposure of workers or the public through ingestion of contaminated drinking water.
4. Exposure of workers or the public through inhalation of contaminated dusts and/or vapors.

o Based on exposure pathways analysis, the worst case scenario involves dermal absorption, incidental ingestion, and dust inhalation of residual soil contaminants. The calculated Pathway Preliminary Pollutant Limit Value (PPLV) for PCBs is 20 mg/kg. Therefore, based on the site specific risk assessment, the calculated PCB clean-up level is 20 mg/kg or ppm. However, the more conservative TSCA clean-up standard of 10 ppm was used to provide an added degree of protection to human health in the development of the site remedial alternatives.

Alternatives Analysis:

o Four remedial alternatives were developed for Site 15. These alternatives are detailed below along with their estimated cost:

1. "No action" alternative - In this alternative a 6-foot high, galvanized chain link fence is to be installed around the site to encompass areas where PCB contamination exceeds 10 ppm. The fence will be 542 linear feet long and encompasses an area of 688 square yards. The estimated cost of this alternative is $8,423 with an annual overhead and maintenance cost of $50/yr assumed.

2. Cap Alternative - In this alternative a single-layered asphaltic concrete cap is to be installed over the site covering the area where PCB concentrations exceeded 10 ppm. The cap will consist of a 4 inch base with 1 inch of asphaltic concrete and will

encompass an area of 688 square yards. The estimated cost of this alternative is $2,938 with an annual overhead and maintenance cost of $50/yr assumed.

3. "Partial excavation & capping alternative - In this alternative site areas confirmed to have PCB concentrations above 25 ppm are to be excavated. A total of 96 cubic yards of PCB contaminated soil are to be removed by excavating the area where PCB levels exceed 10 ppm (288 square yards) to a depth of 1 ft BLS. The excavated areas are to be backfilled with clean soil which is defined by EPA as containing less than 1 ppm PCBs. Site areas confirmed to have PCB concentrations between 10 and 25 ppm are to be capped with a 1 inch asphaltic concrete with a 4 inch base (400 square yards). Excavated material is to be disposed of by incineration in an incinerator permitted for PCB incineration. The cost of this alternative is $242,325 with an annual overhead and maintenance cost of $50/yr assumed.

4. Excavation alternative - In this alternative site areas confirmed to have PCB concentrations exceeding 10 ppm are to be excavated. A total of 229 cubic yards of PCB-contaminated soil are to be removed by excavating an area of 688 square yards to a depth of 1 ft BLS. The excavated area is to be backfilled with clean soil contaminating less than 1 ppm PCBs as defined by EPA. The excavated soil is to be disposed of by incineration in an incinerator permitted for PCB incineration. The cost of this alternative is $573,978 with no annual overhead and maintenance cost assumed.

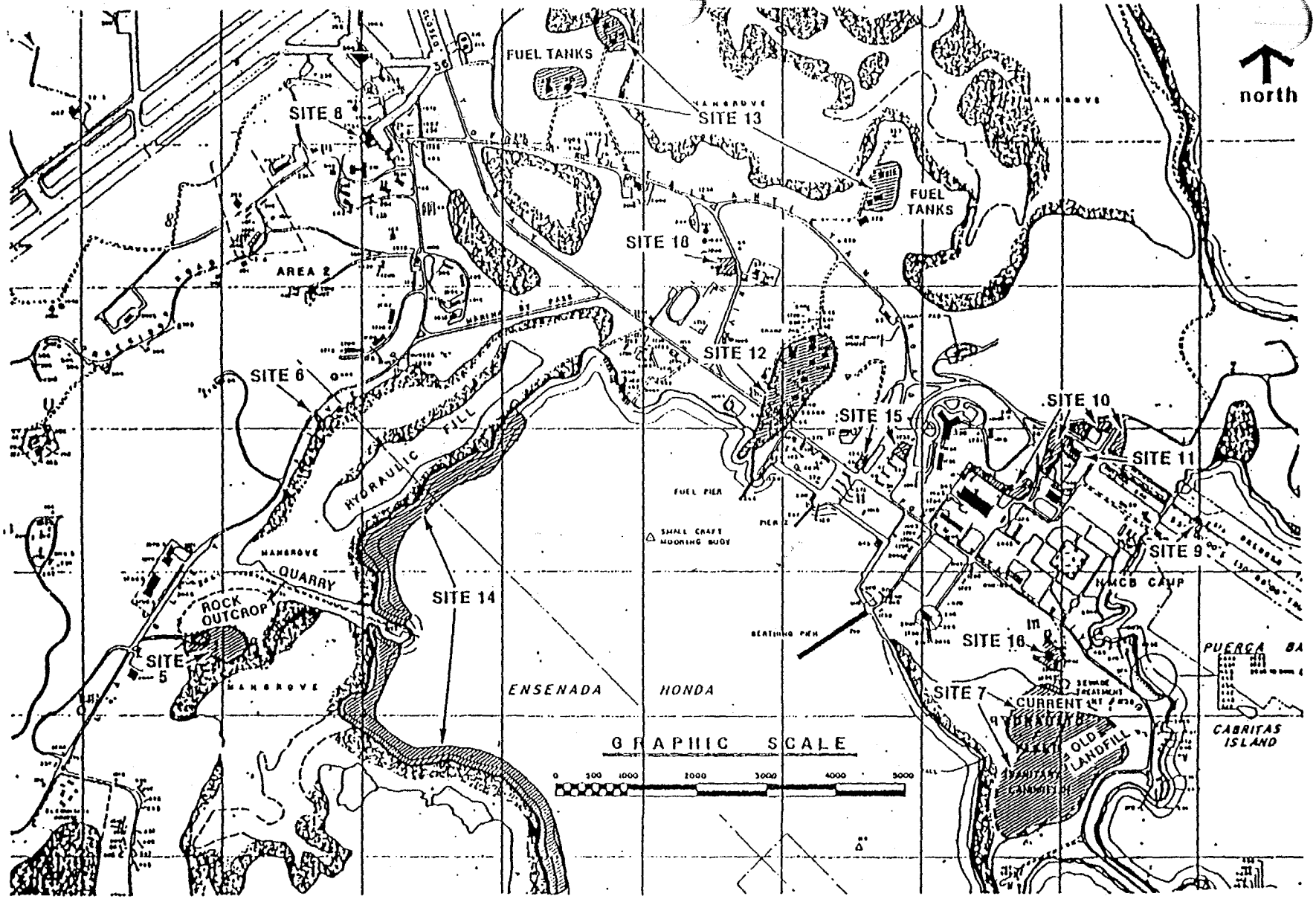


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

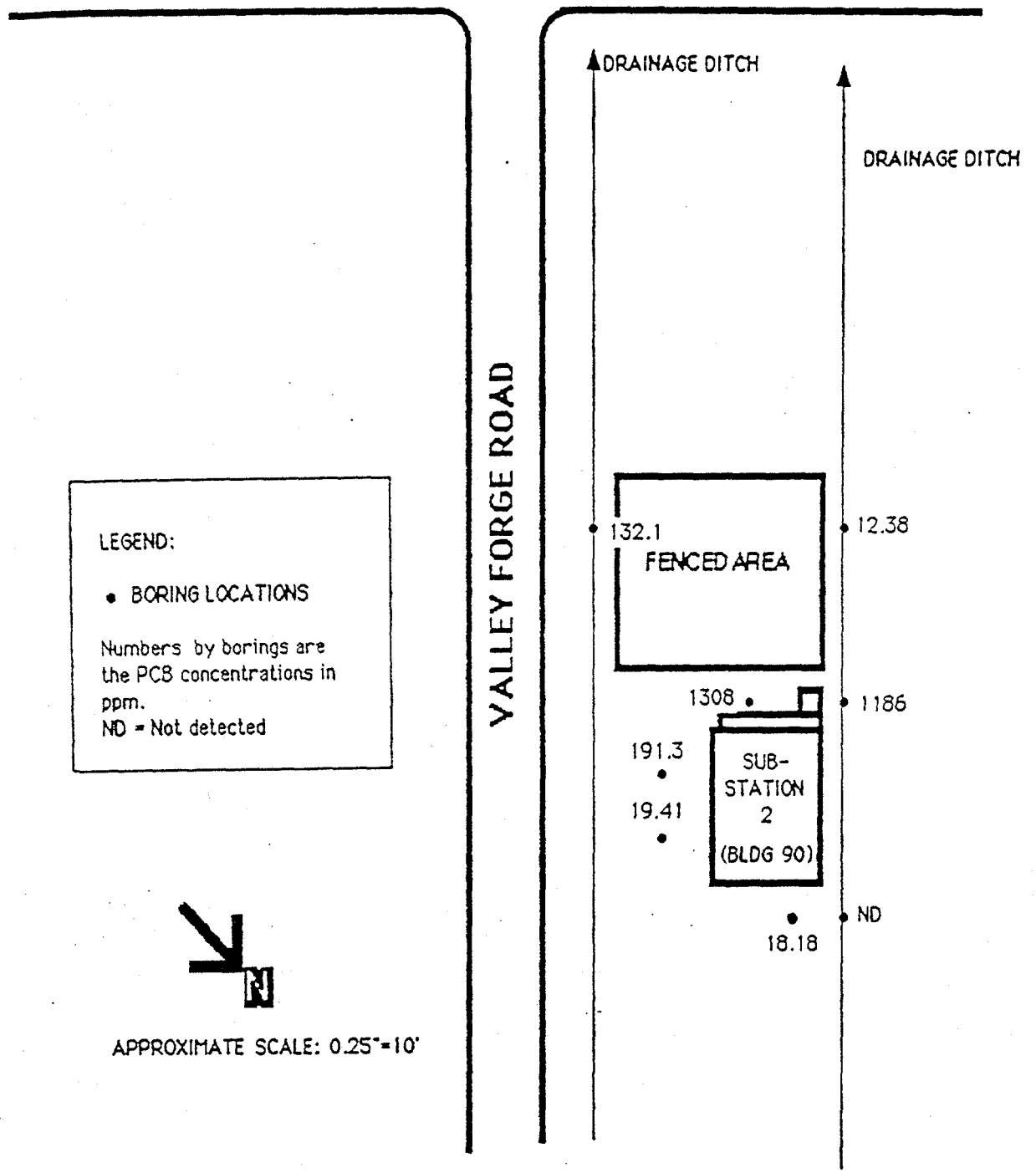


FIGURE 2-1
LOCATION SAMPLING LOCATIONS AND RESULTS AT SITE 15, SUBSTATION 2

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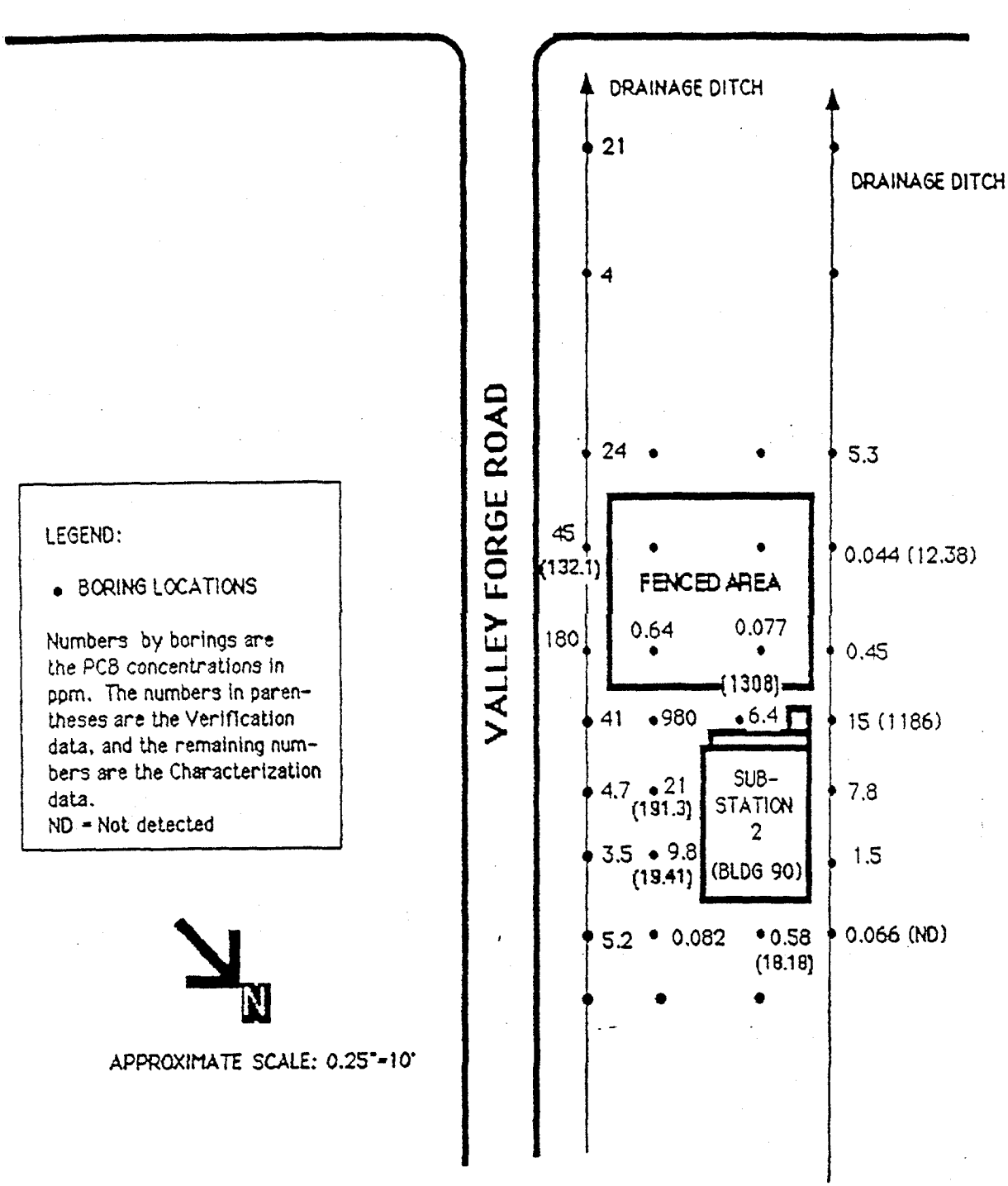
U.S. NAVAL COMPLEX
PUERTO RICO



IRE 3-1
RACTERIZATION STEP SAMPLING
LOCATIONS AND RESULTS AT SITE 15,
SUBSTATION 2

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Old Power Plant, (Site 16).

SUMMARY

- Soil samples were taken from this site. The analytical data for these soil samples show that PCB and lead contamination exists in the area surrounding the old Power Plant, Building 38. This PCB and lead contamination might pose an imminent health or environmental threat on or off the Naval facility. A site specific risk assessment and remedial action alternatives analysis has been completed.

BACKGROUND

- Building 38 was a 60-megawatt steam turbine facility, that generated power from the early 1940's through 1949, which operated on Bunker "C" fuel stored in two 50,000 gallon underground reinforced concrete storage tanks. During the period from 1956 to 1964, this site was used by the Public Works Department - Power Distribution Shop for the repair and storage of electrical transformers.

- During the 1970s, Bunker "C" fuel was reported to have been found in manholes near Building 38 and reportedly discharged to the Enlisted Beach via the cooling water outlet for the powerplant. IAS interviews reported the draining of PCB-containing transformer oil onto the soil in order to repair the inner cores and coils of the transformers. The only known exception to this practice was with transformers containing Askarel (a type of PCB) which was reportedly drained into 55-gallon drums for disposal at the Station landfill.

- IR information has been provided to the U.S. EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

- Thirty-eight soil samples were collected from the site (9 in Round 1 and 29 in Round 2). These samples were analyzed for PCBs, oil and grease, volatile organic compounds (VOC), ethylene dibromide (EDB), xylenes, methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK). In Round 2, an EP toxicity test for lead was completed. The analytical results indicated the presence of PCB and lead contamination at the site. Lead concentrations were less than the EP toxicity standard for lead. Other constituents detected, but not at levels of concern, were MEK as well as oil and grease. Maximum levels for the constituents of concern detected in the soil samples in Rounds 1 and 2 versus comparative values are presented below:

Parameter	Round 1 Concentration	Round 2 Concentration	Comparative Value	
Lead (EP Tox) CFR (ug/L) 264.94	--	45.9	5000	40
Lead (ug/g) common soils	15700	1070	<10-700	range in
PCB 1016 (ug/g)	4.78	--	50	TSCA
PCB 1260 (ug/g)	404	40,000	50	TSCA
Oil and Grease (ug/g)	6350	(not sampled)	--	--
Methyl Ethyl Ketone (ug/g)	1	(not sampled)	--	--

- TSCA cleanup criteria levels for PCB contaminated sites are presented below:

	Location of Spill	PCB Cleanup Criteria
1.	Spills at outdoor electrical substations with restricted access	25-50 ppm
2.	Spills at other restricted access locations other than electrical substations	25 ppm
3.	Spills at nonrestricted access areas	10 ppm

Site Risk Assessment

- To evaluate the appropriateness of the 10 ppm clean-up standard for PCBs for site 16, a site specific risk assessment was performed. The risk assessment also addressed the lead contamination present in the soil at the site.

- The following routes of exposure have been identified for Site 16 based on pathway screening analysis;

  1. Exposure of workers or the public through dermal absorption of contaminated surface soil,

  2. Exposure of workers or the public through incidental ingestion of contaminated surface soil,

  3. Exposure of workers or the public through ingestion of contaminated drinking water.

4. Exposure of workers or the public through inhalation of contaminated dusts and/or vapors.

- Based on exposure pathways analysis, the worst case scenario involved dermal absorption, incidental ingestion, and dust inhalation of residual soil contaminants. The calculated Pathway Preliminary Pollutant Limit Value (PPLV) for PCBS is 16 mg/kg.

  Therefore, based on the site specific risk assessment, the calculated PCB clean-up level is 16 mg/kg or ppm. However, the more conservative TSCA clean-up standard of 10 ppm was used to provide an added degree of protection to human health in the development of the site remedial alternatives.

- To determine if the PCB target level results in a acceptable risk level relative to the lead concentrations detected in the soil at Site 16, a chronic hazard risk index (HI) of 2.4×10^{-4} was calculated for lead to determine the associated health risk. This HI indicates a very low degree of risk posed by the observed concentrations of lead in the soil. There, the proposed action level for PCB ensures an acceptable risk level for lead at this site.

Alternative Analysis:

- Four remedial alternatives were developed for Site 16. These alternatives are detailed below along with their estimated cost:

1. "No action" alternative - In this alternative a 6-foot high galvanized chain link fence is to be installed at the site to encompass all areas of the site confirmed to have PCB concentrations above 10 ppm to restrict site access (approx. 2246 square yards). The total linear length of the fence is 652 feet. The estimated cost of this alternative is $9,670 with an annual overhead and maintenance of $50/yr assumed.

2. Cap alternative - In this alternative, the soils in the concrete ditch are to be scraped to remove the soil in the ditch (approx. 2 cubic yards). These soils are to be spread out in the area where PCB levels exceed 10 ppm where a 1 inch asphaltic concrete is to be installed over a 4 inch base. The total area to be capped is 1780 square yards. The estimated cost of this alternative is $7,758 with an annual overhead and maintenance of $50/yr assumed.

3. Partial excavation and capping alternative - In this alternative, the concrete lined ditch is to be scraped to remove the soil in the ditch and the area having PCB concentrations above 25 ppm is to be excavated to a depth of 1 ft. A total of 469 cubic yards of PCB - contaminated soil will be removed and disposed of by incineration in an incinerator permitted for PCB incineration. The area excavated is to be filled with clean back fill (less than 1 ppm PCB). The site areas containing PCB levels from 10-25 ppm are to be capped with a 1 inch asphaltic concrete with a 4 inch base (379 square yards). The cost of this alternative is $1,177,219 with an annual overhead and maintenance cost of $50/yr assumed.

4. Excavation alternative - In this alternative, all site areas containing PCB concentration greater than 10 ppm are to be excavated to a depth of 1 foot below land surface and disposed of by incineration in an incinerator permitted for PCB incineration (595 cubic yards). Areas that are excavated are to be backfilled with clean soil (less than 1 ppm PCB). The estimated cost of this alternative is $1,491,415 with no annual overhead and maintenance cost assumed.

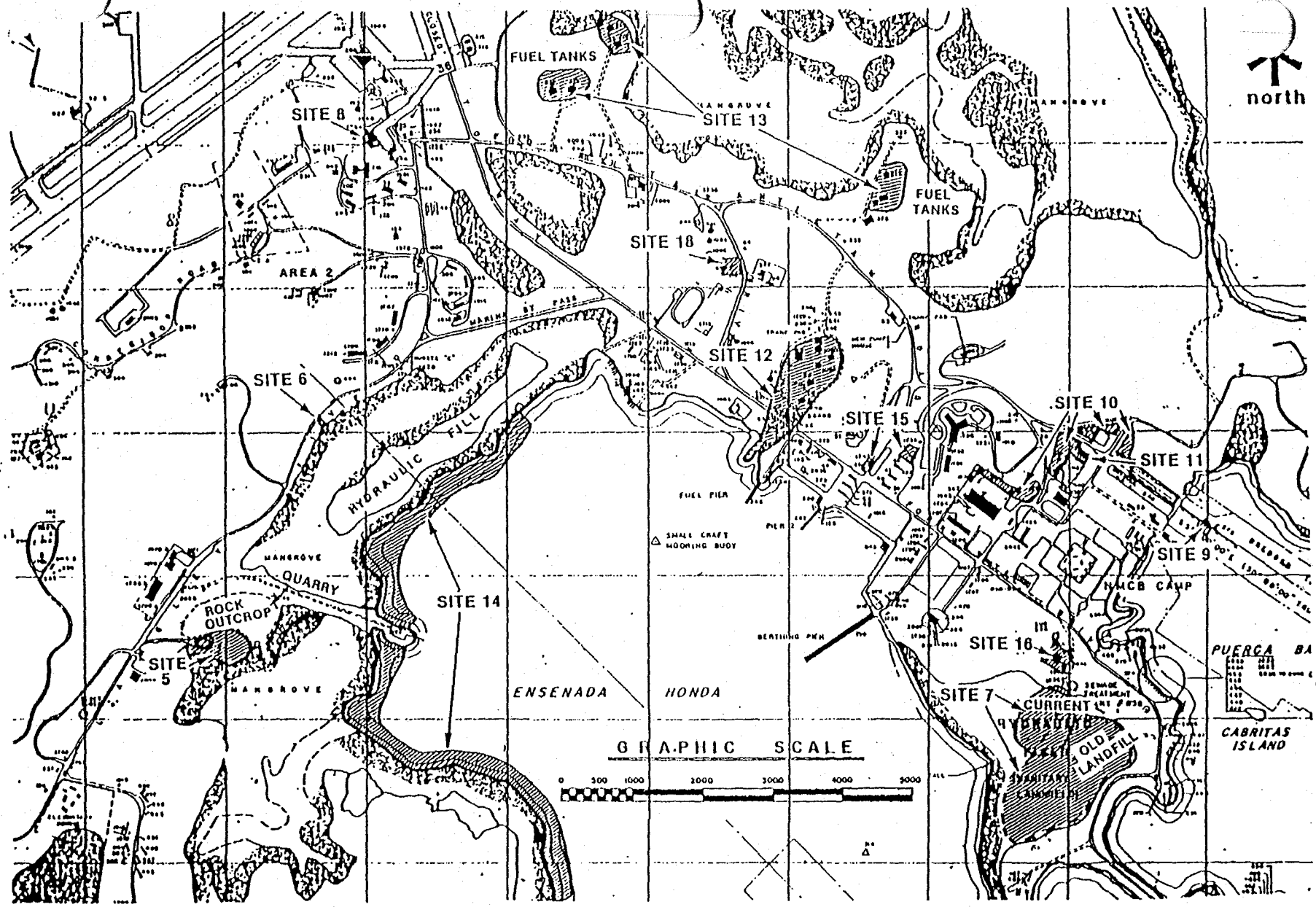


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

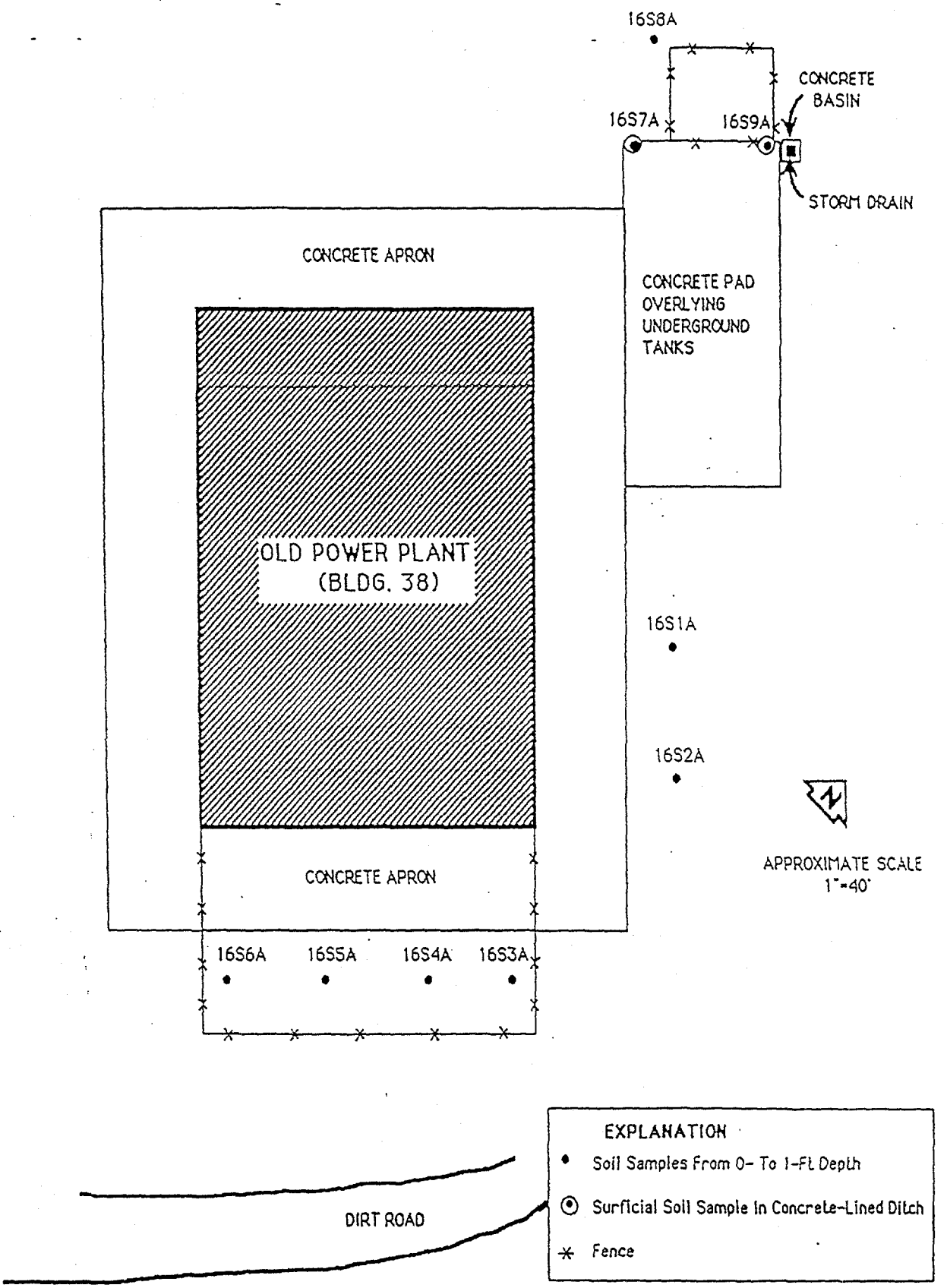


FIGURE 2-1
VERIFICATION STEP SAMPLING LOCATIONS AT SITE 16, THE OLD POWER PLANT, BUILDING 38

ESE
ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

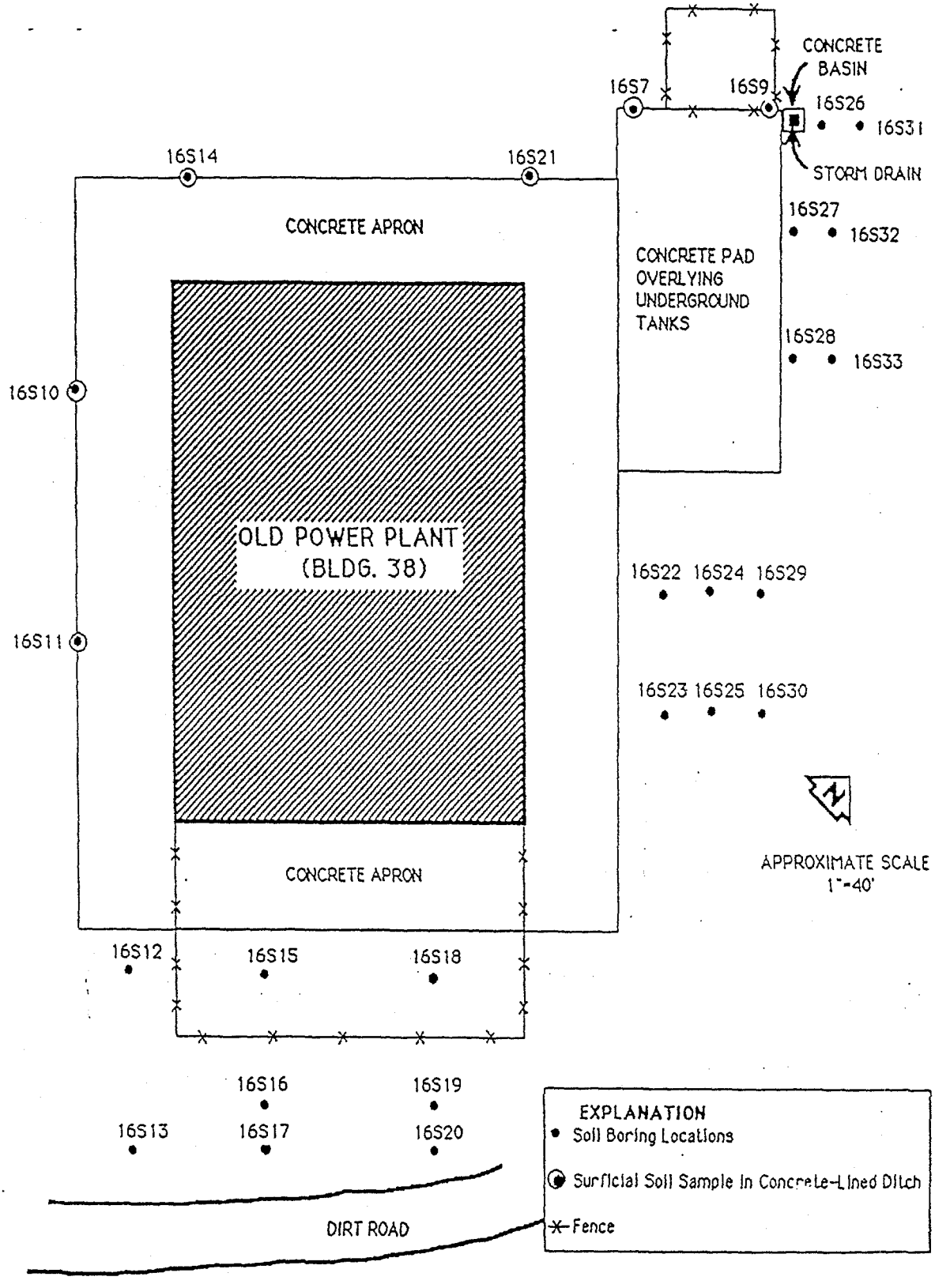


FIGURE 3-1
CHARACTERIZATION STEP SAMPLING LOCATIONS AT SITE 16, THE OLD POWER PLANT, BUILDING 38

ESE
ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

SITE SUMMARY

ISSUE

- NAVSTA Roosevelt Roads, PR: Pest Control Shop and Surrounding Area (Site 18).

SUMMARY

- Soil, sediment, surface water, and groundwater samples were taken at this site. Several pesticides, including chlordane, were detected in the surficial soils in the area adjacent to Building 258, as well as the surface water and sediments from the drainage ditch which conveys storm water runoff from the site. A low concentration of DDD, PP[1] (0.0017 ug/L) was detected in one of the three shallow monitor wells installed at the site. A risk assessment is recommended to assess the threat to human health or the environment at the site.

BACKGROUND

- The Pest Control Shop was located at Building 258 from the late 1950s through 1983 at this site.
- Incidental spillage of pesticides, as well as a spill from a ruptured 55-gallon drum of malathion in 1976 washing into the onsite drainage ditch, has occurred at this site. In addition, the drainage ditch has received rinse water from the cleaning of pesticide equipment.

- IR information has been provided to the U.S EPA and the Commonwealth of Puerto Rico. A Remedial Investigation is underway.

DISCUSSION

o Fifteen soil samples were collected in Round 1 and analyzed for pesticides at this site. Several pesticides, including chlordane, were detected in the surficial soils in the area adjacent to Building 258. Maximum contaminant levels exceeding comparison levels are as shown below:

Parameter	Round 1 Concentration	Comparative Value
Aldrin (ug/g)	0.803	1.4 TLC*
Chlordane (ug/g)	181	2.5 TLC*
DDD, PP[1] (ug/g)	55.3	1.0 TLC*
DDE, PP[1] (ug/g)	36.4	1.0 TLC*
DDT, PP[1] (ug/g)	208	1.0 TLC*
Endosulfan Sulfate (ug/g)	2.54	-- TLC*
Endrin (ug/g)	13.2	-- TCL*
Heptachlor epoxide (ug/g)	0.993	-- TLC*

* TLC = Threshold Limit Concentrations (Haz. waste) in California.

o Eight sediment samples were collected at this site (2 in Round 1 and 6 in Round 2) and analyzed for pesticides. Chlordane and other pesticides were detected in the sediment samples collected from the drainage ditch which conveys storm water runoff from the site. Maximum contaminant levels exceeding comparison levels are as shown below:

Parameter	Round 1 Concentration	Round 2 Concentration	Comparative Value
Clordane (ug/g)	66.7	78.4	2.5 TLC*
DDD, PP[1] (ug/g)	--	75.6	1.0 TLC*
DDE, pp[1] (ug/g)	2.63	82.0	1.0 TLC*
Endosulfur A (ug/g)	3.44	--	--
Endosulfur, B (ug/g)	7.65		

* TLC = Threshold Limit Concentrations (Haz. waste) in California.

- o A total of 8 surface water samples were collected at this site (2 in Round 1 and 6 in Round 2) and analyzed for pesticides. Chlordane and other pesticides were detected in the surface water samples collected from the drainage ditch which conveys storm water runoff. Maximum contaminant levels exceeding comparison levels are as shown below:

Parameter	Round 1 Concentration	Round 2 Concentration	Comparative Value
Chlordane (ug/g)	0.616	0.170	0.00046 AWQC*
DDD, PP[1] (ug/g)	--	75.6	
DDE, PP[1] (ug/g)	2.63	82.0	

*AWQC - Ambient Water Quality Criteria

- o Three shallow monitor wells were installed at the site and groundwater samples collected in Round 2. Groundwater samples were analyzed for pesticides and volatile organic aromatics (VOAs). A low concentration of DDD, PP[1] (0.0017 ug/L) was detected in one of the three monitor wells at the site.

- o Future Plan - A baseline risk assessment of the pesticide contamination is recommended at Site 18 to determine if the levels of pesticide detected in the soils, sediment, surface water, and groundwater pose a threat to human health and the environment.

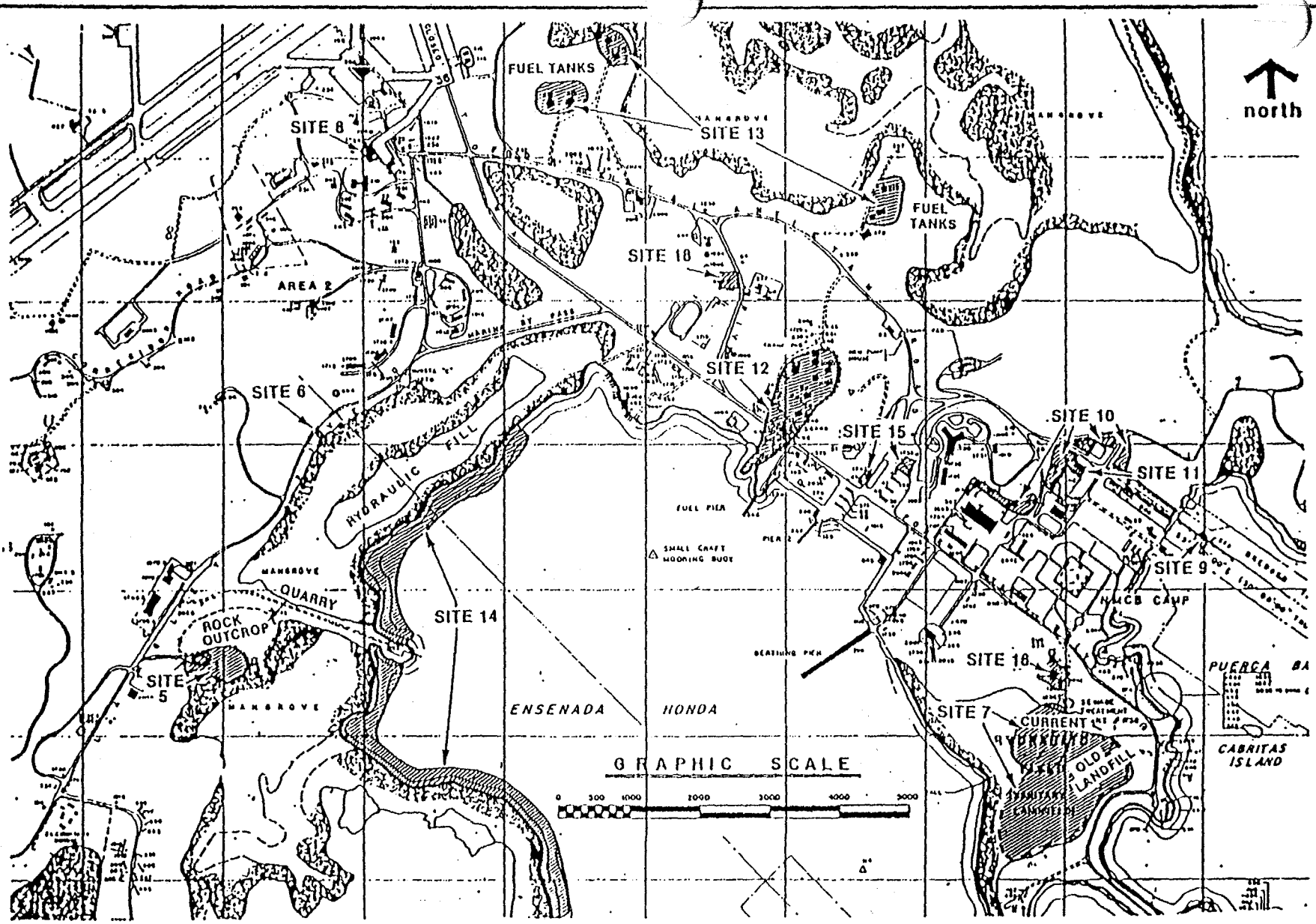
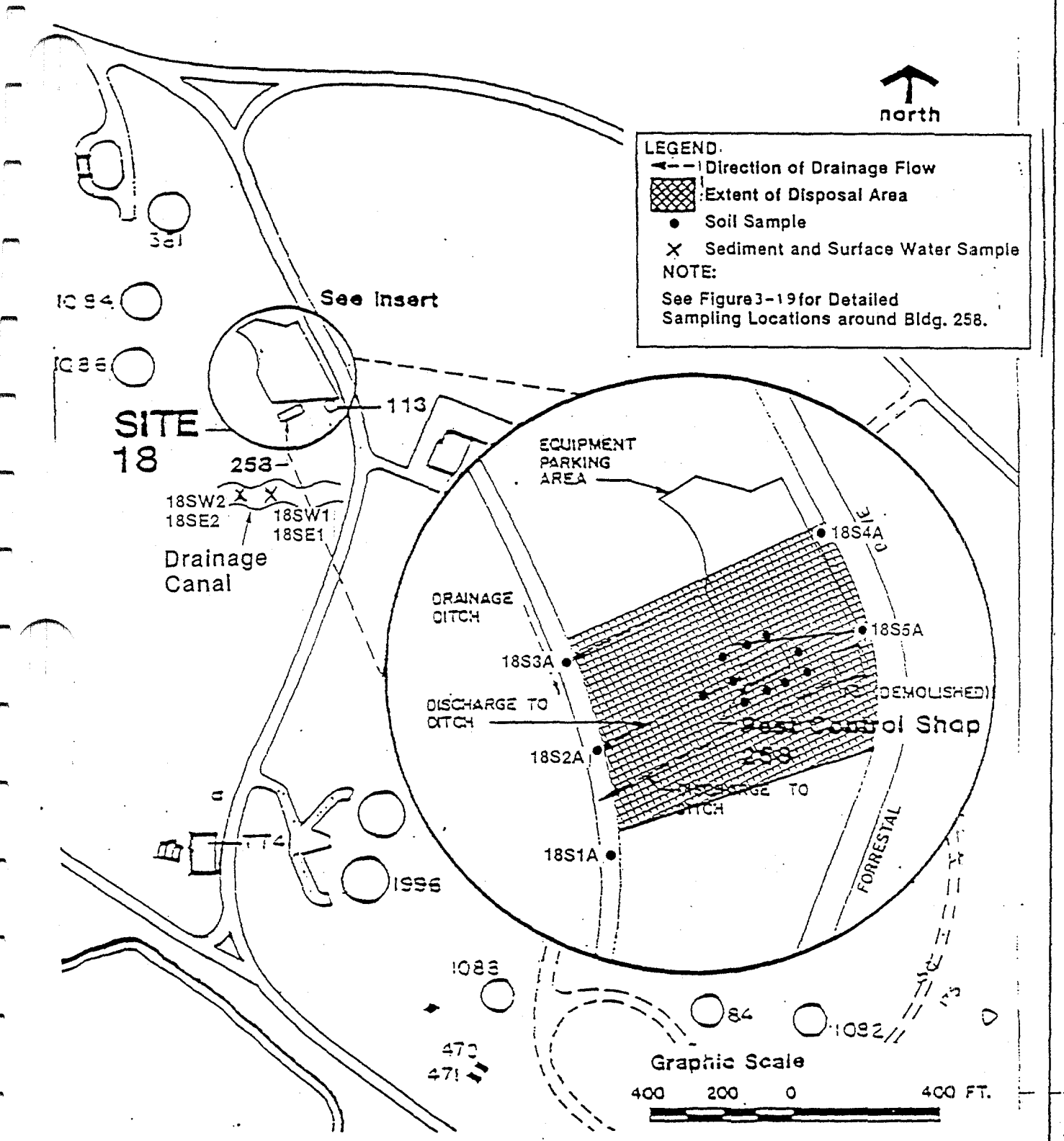


Figure 1-1
SITE MAP SHOWING LOCATIONS OF SITES OF POTENTIAL CONTAMINATION AT NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



e 3-18
ROUND 1 SOIL, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS AT SITE 18, PEST CONTROL SHOP AND SURROUNDING AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

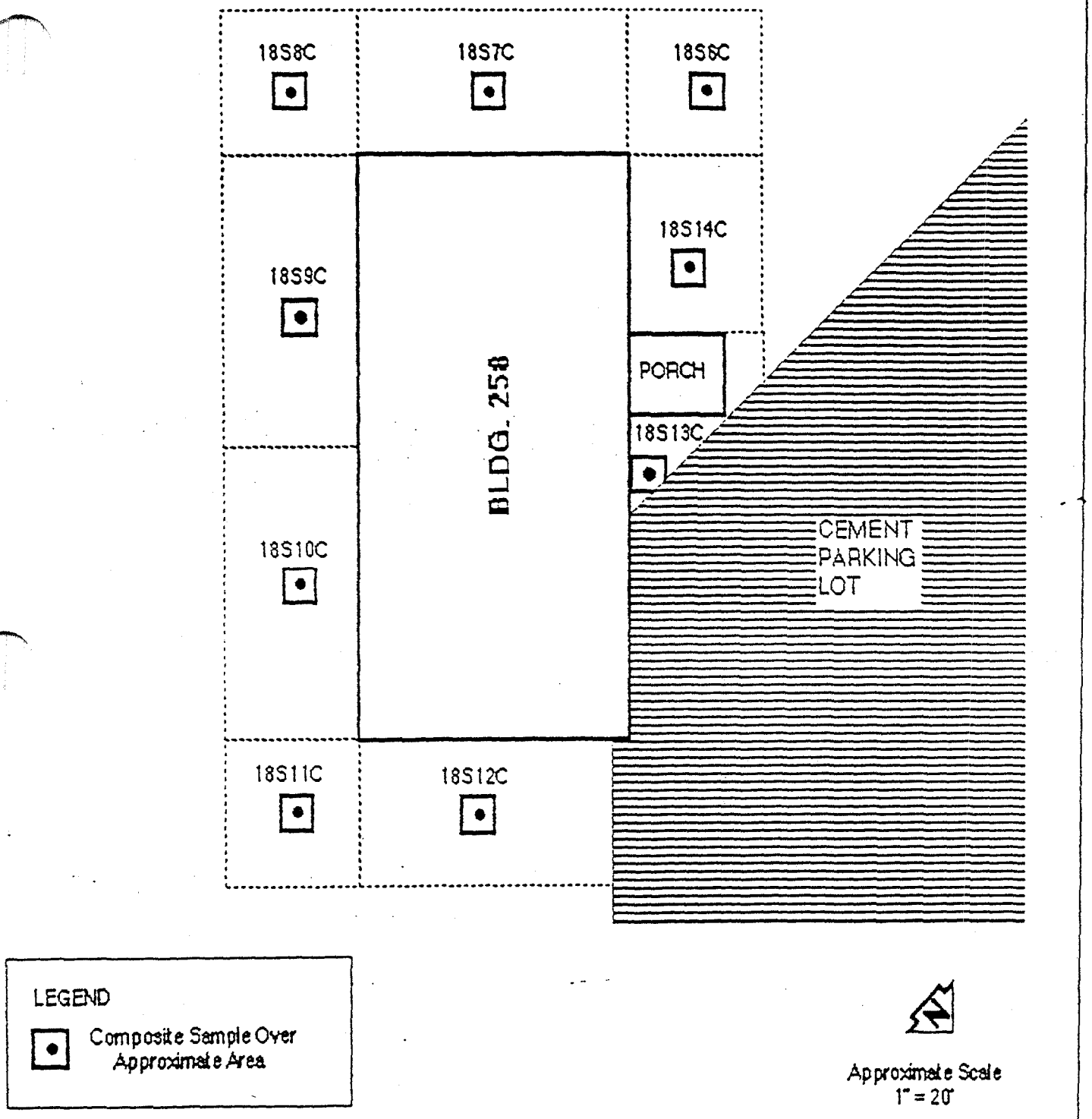


Figure 3-19
ROUND 1 SOIL SAMPLING LOCATIONS
AT SITE 18, PEST CONTROL SHOP
AND SURROUNDING AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO

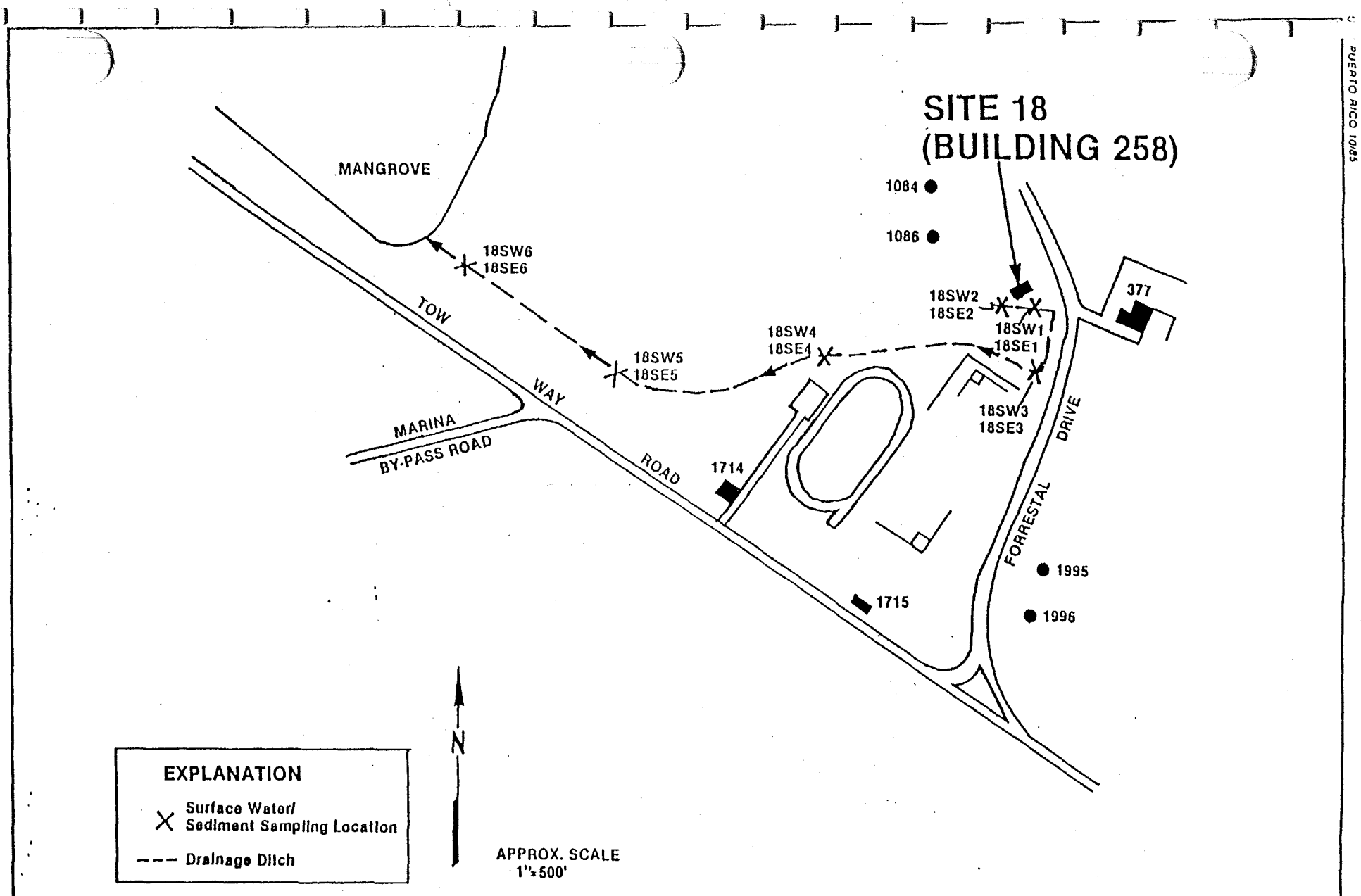
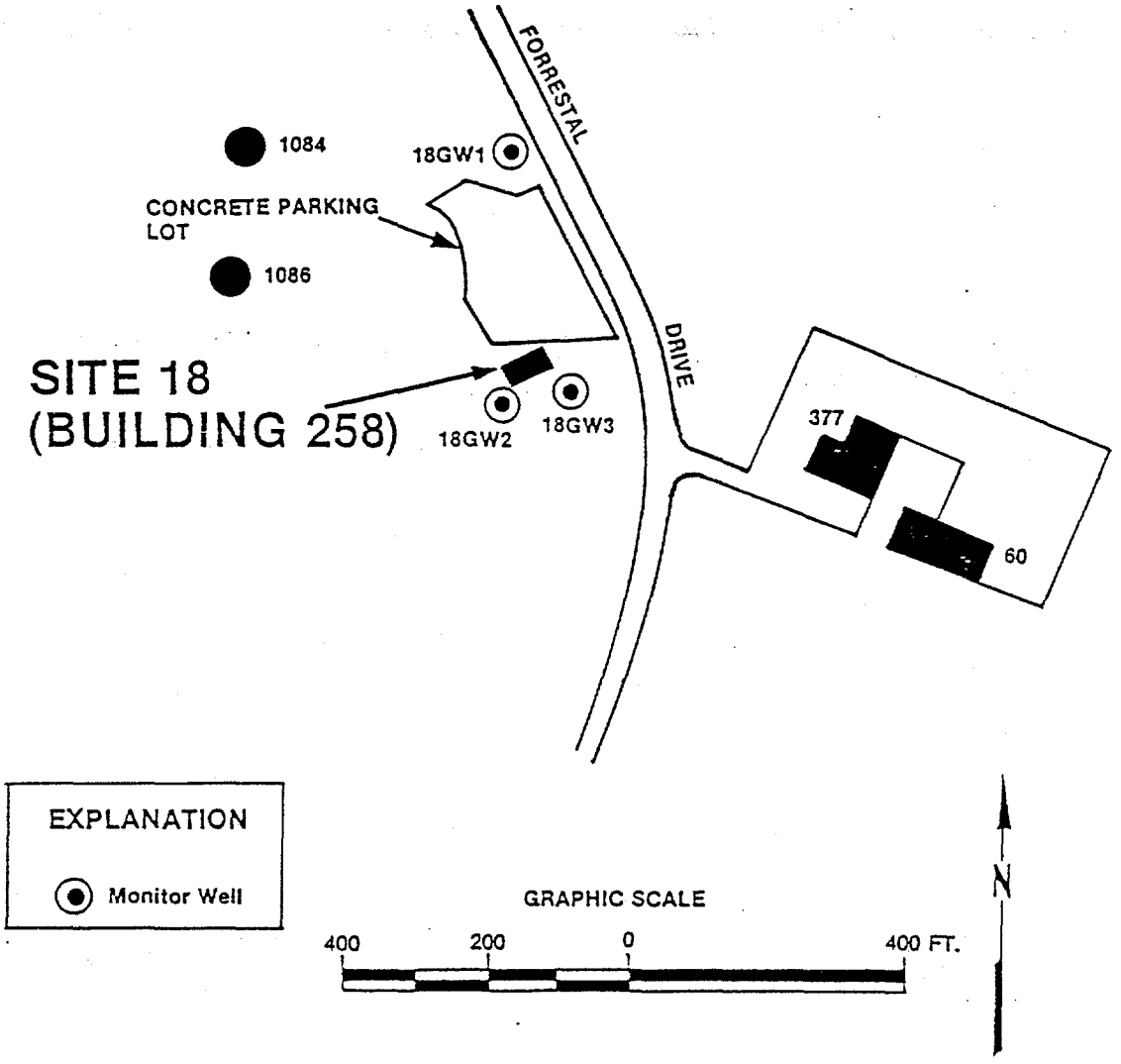


Figure 3-20
ROUND 2 SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS AT SITE 18, PEST CONTROL SHOP AND SURROUNDING AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO



F 3-21
D 2 GROUND WATER SAMPLING
OCATIONS AT SITE 18, PEST CONTROL
SHOP AND SURROUNDING AREA

CONFIRMATION STUDY
U.S. NAVAL COMPLEX
PUERTO RICO