

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

CLEANUP AND ABATEMENT ORDER NO. 88-55

**UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP PENDLETON
SAN DIEGO COUNTY**

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board) finds that:

1. The United States Marine Corps owns and operates the Marine Corps Base at Camp Pendleton in San Diego County. The site lies in both the Upper Ysidora Hydrographic Subunit and the Mission Hydrographic Subunit.
2. On November 13, 1986, the Regional Board was notified in writing by the Camp Pendleton United States Marine Corps Base of the presence of high levels of petroleum hydrocarbon contamination in the soil adjacent to underground storage tanks associated with the following building numbers:

<u>Building No.</u>	<u>Soil Concentration of Total Petroleum Hydrocarbons</u>
13175	1200 ppm
13176	2200 ppm
13161	1200 ppm
13163	1000 ppm
1272	1200 ppm
1283	2000 ppm
1282	20 ppm
1281	1000 ppm

3. On December 3, 1987, the Regional Board received from Mele Amantea Architects on behalf of the Camp Pendleton Natural Resources Office, a Subsurface Storage Tank Investigation report by Westec Services dated December 22, 1986. The report includes the results of preliminary investigation of subsurface contamination associated with 16 underground storage tanks and sumps and one underground product transfer pipeline. Most of the tanks and sumps and pipeline had not yet been removed. The storage tanks contained diesel, gasoline, waste oil, and unspecified solvents. The tanks, sumps, and pipeline will hereinafter be referred to as sources and they may be identified using the building number of the nearest building as follows:

<u>Source No.</u>	<u>I.D. No. of nearest building</u>	<u>Contents</u>
1-13171	13171	gasoline
2-13175	13175	waste oil
3-13176	13176	solvents
4-13176	13176	solvents
5-13161	13161	diesel
6-13163	13163	oil
7-13163	13163	oil
8-13162	13162	diesel
9-13161	13161	oil
10-1224	1224	diesel
11-1272	1272	diesel
12-1281	1281	diesel
13-1283	1283	diesel
14-1282	1282	solvents, oil
15-1282	1282	waste oil
16-1275	1275	diesel
17-PIPE	13161 and 13162	diesel product pipeline

4. The December 1986 Westec report contains the following information:

- a) Soil samples collected from borings drilled near source no. 1-13171 were analyzed and found to contain as much as 3900 ppm total petroleum hydrocarbons. Ground water was encountered at a depth of 15 feet below grade.
- b) Westec Services installed a ground water monitoring well near source no. 1-13171 from which a ground water sample was collected. The ground water sample was analyzed and found to contain petroleum hydrocarbon and chlorinated hydrocarbon constituents in the following concentrations:

<u>Constituent</u>	<u>Concentration</u>
Benzene	27 mg/l
Toluene	28 mg/l
Total xylenes	11.8 mg/l
Ethylbenzene	3.3 mg/l
1,2-dichloroethane	3.1 mg/l

- c) Soil samples collected from borings drilled near source no. 2-13175 were analyzed and found to contain as much as 10,300 ppm total petroleum hydrocarbons.
- d) Soil samples collected from borings drilled near source no. 3-13176 were analyzed and found to contain as much as 27 ppm total petroleum hydrocarbons.

- e) Soil samples collected from borings drilled near source no. 4-13176 were analyzed and found to contain as much as 25 ppm total petroleum hydrocarbons.
- f) Soil samples collected from borings drilled near source no. 5-13161 were analyzed and found to contain as much as 220 ppm total petroleum hydrocarbons.
- g) Soil samples collected from borings drilled near source no. 6-13163 were analyzed and found to contain as much as 1300 ppm total petroleum hydrocarbons.
- h) Soil samples collected from borings drilled near source no. 7-13163 were analyzed and found to contain as much as 73 ppm total petroleum hydrocarbons.
- i) Soil samples collected from borings drilled near source no. 8-13162 were analyzed and found to contain as much as 320 ppm total petroleum hydrocarbons.
- j) Soil samples collected from borings drilled near source no. 9-13161 were analyzed and found to contain as much as 36 ppm total petroleum hydrocarbons.
- k) Soil samples collected from borings drilled near source no. 10-1224 were analyzed and found to contain as much as 10,000 ppm total petroleum hydrocarbons.
- l) A ground water sample collected from monitoring well no. CPW-4 located near source no. 10-1224 was analyzed and found to contain 900 $\mu\text{g/l}$ total petroleum hydrocarbons.
- m) Soil samples collected from borings drilled near source no. 11-1272 were analyzed and found to contain as much as 2500 ppm total petroleum hydrocarbons.
- n) Soil samples collected from borings drilled near source no. 12-1281 were analyzed and found to contain as much as 4600 ppm total petroleum hydrocarbons.
- o) Soil samples collected from borings drilled near source no. 13-1283 were analyzed and found to contain as much as 16,000 ppm total petroleum hydrocarbons.
- p) Soil samples collected from borings drilled near source no. 14-1282 were analyzed and found to contain as much as 24 ppm total petroleum hydrocarbons. A ground water sample collected from monitoring well no. CPW-5 was analyzed and found to contain 300 $\mu\text{g/l}$ total petroleum hydrocarbons.
- q) Soil samples collected from borings drilled near source no. 15-1282 were analyzed and found to contain as much as 3300 ppm total petroleum hydrocarbons.
- r) Soil samples collected from borings drilled near source no. 16-1275 were analyzed and found to contain as much as 6400 ppm total petroleum hydrocarbons.
- s) Soil samples collected from borings drilled near a subsurface pipeline connecting source nos. 5-13161 and 8-13162 and referred to as 17-PIPE were analyzed and found to contain as much as 23,700 ppm total petroleum hydrocarbons.

5. **The *Comprehensive Water Quality Control Plan Report, San Diego Basin (9)* (Basin Plan) was adopted by this Regional Board on March 17, 1975; approved by the State Water Resources Control Board on March 20, 1975; and updated by the Regional Board on February 27, 1978; March 23, 1981; January 24 and October 3, 1983; and August 27, 1984. The 1978, 1981, 1983 and 1984 updates were subsequently approved by the State Board.**
6. **The Basin Plan established the following uses as the potential and existing beneficial uses for the ground water in the Ysidora Hydrographic Subunit**
 - a. **Municipal and domestic supply**
 - b. **Agricultural supply**
 - c. **Industrial service supply**
 - d. **Industrial process supply**
 - e. **Ground water recharge**
7. **The Basin Plan established the following uses as the potential and existing beneficial uses for the surface waters in the Ysidora Hydrographic Subunit**
 - a. **Municipal and domestic supply**
 - b. **Agricultural supply**
 - c. **Industrial service supply**
 - d. **Industrial process supply**
 - e. **Water contact recreation**
 - f. **Non-contact water recreation**
 - g. **Warm fresh-water habitat**
 - h. **Cold fresh-water habitat**
 - i. **Wildlife habitat**
 - j. **Preservation of rare and endangered species**
8. **The Basin Plan established the following uses as the potential and existing beneficial uses for the ground water in the Bonsall Hydrographic Subunit**
 - a. **Municipal and domestic supply**
 - b. **Agricultural supply**
 - c. **Industrial service supply**
 - d. **Ground water recharge**
9. **The Basin Plan established the following uses as the potential and existing beneficial uses for the surface waters in the Bonsall Hydrographic Subunit**
 - a. **Agricultural supply**
 - b. **Industrial service supply**
 - c. **Water contact recreation**
 - d. **Non-contact water recreation**
 - e. **Warm fresh-water habitat**
 - f. **Wildlife habitat**
 - g. **Preservation of rare and endangered species**

10. Section 13050 of the California Water Code defines "pollution" as follows:

"Pollution means an alteration of the quality of the waters of the State by waste to a degree which unreasonably affects (1) such waters for beneficial uses, or (2) facilities which serve such beneficial uses."

11. To protect the beneficial uses listed in Finding 6 and 8, it is necessary that the ground water aquifer underlying Camp Pendleton Marine Corps Base not contain constituents in concentrations exceeding the following State Department of Health Services (DOHS) Action levels for volatile hydrocarbons and the United States Environmental Protection Agency (U.S. EPA) recommended maximum contaminant level for lead:

<u>Constituent</u>	<u>Maximum Allowable Concentration</u>
Benzene	0.7 µg/l
Toluene	100 µg/l
Total xylenes	620 µg/l
Ethylbenzene	680 µg/l
Total lead	50 µg/l
1,2 - dichloroethane	1.0 µg/l

12. The presence of petroleum hydrocarbons in the ground water underlying the Camp Pendleton Marine Corps Base constitutes a "pollution" of the State's waters as defined in Finding 10 in accordance with the following rationale: The resulting concentrations of petroleum hydrocarbons in the underlying ground water, listed in Finding 4, exceed the DOHS drinking water action levels listed in Finding 11 and therefore impair the ground water for any possible future municipal beneficial use.
13. The quality of the ground water underlying the Camp Pendleton Marine Corps Base is subject to the provisions of the State Water Resources Control Board's Resolution No. 68-16, *Statement of Policy With Respect to Maintaining High Quality Waters in California*. Under the terms and conditions of Resolution No. 68-16, the existing (pre-discharge) ground water quality of the Upper Ysidora and Mission Hydrographic Subunits must be maintained unless it is demonstrated that a decrease in water quality
- (a) will be consistent with maximum benefit to the people of the state,
 - (b) will not unreasonably affect beneficial uses, and
 - (c) will not result in water quality less than prescribed in the Basin Plan or other adopted policies.
14. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Administrative Code.

IT IS HEREBY ORDERED. That pursuant to Section 13304 of the California Water Code, the United States Marine Corps (hereinafter the discharger) shall comply with the following directives:

1. The discharger shall take effective remedial action to:
 - a. Immobilize the free product plumes, if any, and the dissolved product plumes of petroleum hydrocarbon contaminated ground water.
 - b. Protect the beneficial uses of the ground water of the Upper Ysidora and Mission Hydrographic Subunits.
 - c. Clean up the petroleum hydrocarbon contaminated ground water and soil at each of the sites to the satisfaction of the Regional Board Executive Officer.
2. The discharger shall submit a letter to this office no later than April 30, 1988, ✓ describing how the discharger intends to comply with Directive no.1 above. The letter shall also give the name, title, mailing address and telephone number of someone designated by the Camp Pendleton Marine Corps Base as the official contact person for matters regarding this Cleanup and Abatement Order.
3. The discharger shall submit a report to this office no later than August 26, 1988, - characterizing the vertical and horizontal extent of the petroleum and chlorinated hydrocarbon contamination resulting from the unauthorized releases from the sources listed in Finding No. 3 at the Camp Pendleton Marine Corps Base. The report shall contain the following information:
 - a. Site maps for each source site showing the locations of all borings and monitoring wells, the locations of the excavated tanks and other sources, and any underground utilities that might act as conduits along which the petroleum hydrocarbons could migrate.
 - b. The water levels and product thicknesses, if any, in all of the wells at each source site.
 - c. Site maps showing the hydrologic contours and the boundary of the free product and dissolved product plumes.
 - d. Site maps showing the boundaries of the soil contamination zones at each contamination site.
 - e. Soil and ground water samples should be collected and analyzed for:
 - (1) Benzene
 - (2) Toluene
 - (3) Total xylenes
 - (4) Ethylbenzene
 - (5) Total petroleum hydrocarbons
 - (6) Organic lead

- (7) Chlorinated hydrocarbons for those sites in which these compounds were involved
 - (8) Any other hazardous waste constituents, as defined by the California Health and Safety Code, which may have been released from the sources listed in Finding No. 3.
- f. A remedial action strategy to clean up the effects of the unauthorized releases from the source sites at the Camp Pendleton Marine Corps Base. The strategy should address the removal and/or treatment of the free product plumes (if any), the dissolved product ground water plumes, and the soil contamination zones.
4. The discharger shall submit monitoring reports to this office on a quarterly basis until, in the opinion of the Regional Board Executive Officer, all of the individual sources listed in Finding No. 3 have been cleaned up. The monitoring reports shall describe the progress made in the cleanup operations at each contamination site and shall demonstrate that the petroleum hydrocarbon and chlorinated hydrocarbon wastes released from the sources have been and remain immobilized. The quarterly monitoring reports shall include, but not be limited to, the following information for each of the individual sources listed in Finding No. 3:
- a. Quantity of petroleum hydrocarbon product recovered for the quarter and the total to date.
 - b. Quantity of ground water extracted for the quarter, the total to date, and its ultimate disposal point.
 - c. The water levels and product thicknesses in all of the wells.
 - d. Any information necessary to demonstrate that the petroleum or chlorinated hydrocarbon contamination resulting from the unauthorized releases from the sources are fully contained and immobilized or shrinking.
 - e. A map of each source site with hydrologic contours showing the ground water flow pattern and the locations of all of the wells.
 - f. A map of each source site showing the boundary of the free petroleum hydrocarbon product plume and also of the dissolved product ground water plume.
 - g. Ground water samples should be collected and analyzed for:
 - (1) Benzene
 - (2) Toluene
 - (3) Total xylenes
 - (4) Ethylbenzene
 - (5) Total petroleum hydrocarbons
 - (6) Chlorinated hydrocarbons, if these constituents were contained in the discharge
 - (7) Organic lead, if this constituent was contained in the discharge

(8) Any other hazardous waste constituents, as defined by the California Health and Safety Code, which may have been released from the sources listed in Finding No. 3.

h. A description of the remedial actions employed by the discharger.

The quarterly monitoring reports shall be submitted to this Office in accordance with following schedule:

<u>Reporting Period</u>	<u>Date Due</u>
January, February, March	April 30
April, May, June	July 31
July, August, September	October 31
October, November, December	January 31

5. The discharger shall submit a report to this office no later than June 1, 1989, identifying and developing a range of remedial action alternatives for the final phase of the cleanup program. The report shall examine and determine the cost of a cleanup strategy capable of achieving each of the following potential final cleanup levels in the affected ground water zones:

a. Treatment and/or removal of the polluted ground water to attain the naturally occurring background concentrations for the following constituents in the underlying ground water aquifer:

- (1) Benzene
- (2) Toluene
- (3) Total xylenes
- (4) Ethylbenzene
- (5) Total lead, for those sites where lead was a constituent in the discharge
- (6) Chlorinated hydrocarbons, for those sites where chlorinated hydrocarbons were constituents in the discharge
- (7) Any other hazardous waste constituents, as defined by the California Health and Safety Code, which may have been released from the sources listed in Finding No. 3.

This cleanup alternative represents basically complete cleanup of pollution resulting from the waste discharges. If the discharger wishes to implement this cleanup alternative, the discharger will not be required to develop cleanup strategies corresponding to alternatives 5(b) and 5(c).

b. A remedial action alternative proposing the attainment of contaminant concentrations less stringent than those specified in (a). It will be necessary to establish, that the contaminant concentrations being proposed by the discharger under this alternative would comply with the following criteria in accordance with Resolution No. 68-16:

- (1) The proposed contaminant concentrations to be attained in the affected ground water pollution zone would not unreasonably affect the beneficial uses of the ground water listed in Findings 6 and 8 or of any hydraulically connected surface waters.
 - (2) The proposed contaminant concentrations to be attained in the affected ground water pollution zone will be consistent with the maximum benefit to the people of the State.
 - (3) The proposed contaminant concentrations to be attained in the affected ground water pollution zone will not result in water quality less than prescribed in the Basin Plan or other adopted policies.
- c. Treatment and/or removal of the polluted ground water to attain the following DOHS Action Levels and the U.S. EPA recommended maximum contaminant level in the underlying ground water aquifer:

<u>Constituent</u>	<u>Maximum Concentration</u>
Benzene	0.7 µg/l
Toluene	100 µg/l
Total xylenes	620 µg/l
Ethylbenzene	680 µg/l
Lead	50 µg/l
1,2-dichloroethene	1.0 µg/l

All free petroleum hydrocarbon product must be removed under all three alternatives. The report should include a table summarizing the cleanup level versus cost information. The report shall take into account each individual source site listed in Finding No. 3 which has petroleum and/or chlorinated hydrocarbon constituents in the underlying ground water resulting from unauthorized releases.

6. The cleanup alternatives required under Directive 5 of this Order will be evaluated in detail by Regional Board staff. This evaluation will include technical considerations, estimated costs, and anticipated water quality impacts associated with each alternative. Based on this evaluation a specific set of final cleanup levels for the ground water will be selected by the Regional Board. Upon notification by the Executive Officer, the discharger shall implement a cleanup strategy capable of achieving the final cleanup levels selected by the Regional Board.

7. The discharger shall remove and/or treat all soil containing the following constituents in concentrations exceeding:

<u>Constituent</u>	<u>Concentration Level</u>
Benzene	0.7 mg/kg
Toluene	10 mg/kg
Total xylenes	62 mg/kg
Ethylbenzene	68 mg/kg
Total petroleum hydrocarbons	100 mg/kg as gasoline
	1000 mg/kg as diesel oil
1,2 -dichloroethane	1 mg/kg

unless the discharger can demonstrate:

- (a) to the Regional Board staff's satisfaction that higher soil concentrations will not result, under ambient environmental conditions at the site, in waste constituents being released at concentrations which could degrade the quality of the underlying ground water, and
- (b) to the satisfaction of the County of San Diego Department of Health Services that higher soil concentrations will not present a threat to the public or environmental health.
8. The Regional Board recognizes that some of the individual contamination sites may be cleaned up sooner than others. For those sites which are cleaned up early, the Regional Board Executive Officer may determine that these sites no longer need to be monitored in accordance with Directive No. 4 of this Order. In these cases, the Regional Board Executive Officer may notify the discharger in writing that a specific contamination site no longer needs to be included in the monitoring reports required under Directive No. 4. The discharger is required to include in the monitoring reports all the individual sources listed in Finding No. 3 except for those sites which have been specifically exempted in writing by the Executive Officer.
9. The discharger shall dispose of all ground water and/or soil polluted with petroleum hydrocarbons in accordance with all applicable local, state and federal regulations.
10. No later than June 30, 1990, the discharger must demonstrate to the Regional Board Executive Officer's satisfaction that the final cleanup levels, as determined by the Regional Board under Directives 5, 6 and 7, have been achieved throughout the soil and ground water contamination zones at each individual site listed in Finding No. 3. The discharger shall continue to monitor the ground water at each of the individual sites listed in Finding No. 3 except for those sites which the Executive Officer has

determined have not contaminated nor threaten to contaminate the underlying ground water, and submit quarterly monitoring reports in accordance with Directive 3 of this Order for a period of one year. If at any time during this post-cleanup monitoring the data indicate that the final cleanup levels have not been maintained, the discharger shall immediately resume appropriate remedial cleanup actions. If the data indicate that the soil is not contributing petroleum hydrocarbon constituents to the ground water and the final cleanup levels have not been exceeded for the year of monitoring at an individual site, then no further monitoring shall be required.

Ordered by Ladin H. Delaney
Ladin H. Delaney
Executive Officer

Dated: March 31, 1988

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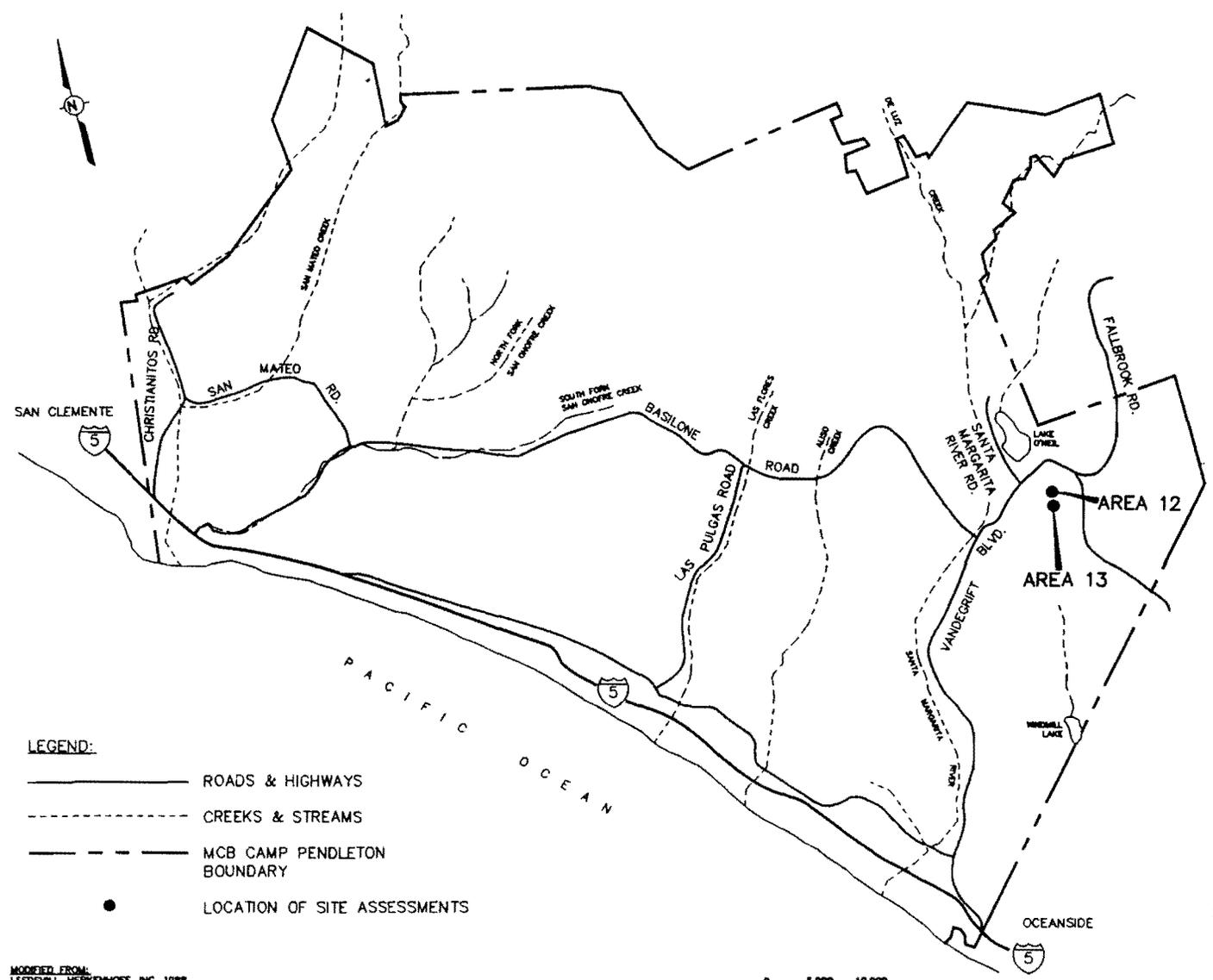
**MARINE CORPS BASE CAMP PENDLETON
 CLEANUP AND ABATEMENT ORDER 88-51 (AND ADDENDUM NO. 1)
 STATUS OF TANK REMOVAL AND SITE ASSESSMENT**

SITE NO. (Note 1)	CAPACITY (Gallons)	CONTENTS	TANK REMOVAL DATE	NUMBER OF SOILS BORINGS (Note 2)	NUMBER OF MONITORING WELLS (Note 2)	FIGURE NO. (Note 3)
1-13171	10,000	Gasoline	July 1991	25	9	4
2-13175	500	Waste Oil	July 1991	11	6	5
3-13176	6,000	Solvents	In-Place	10	4	6
4-13176	6,000	Solvents	In-Place			
5-13161	1,500	Diesel	July 1991	49	21	7
8-13162	200	Diesel	July 1991			
9-13161	650	Oil	July 1991			
17-13161	NA	Diesel	In-Place			
6-13163	350-500	Oil	July 1991	16	4	8
7-13163	350-500	Oil	July 1991			
10-1224	2,000	Diesel	July 1991	10	7	9
11-1272	1,500	Diesel	June 1990	6	4	10
12-1281	1,500	Diesel	July 1991	11	8	11
13-1283	1,500	Diesel	July 1991	17	11	12
14-1282	55	Oil/Solvent	June 1990	9	3	13
15X-1282	Unknown	Waste Oil	June 1990	13	5	14
16-1275	1,500	Diesel	June 1990	12	8	15

Notes:

1. Site Nos. 3 and 4, Site Nos. 5, 8, 9, and 17, and Site Nos. 6 and 7 have been group together due to proximity of release sites.
2. The soil borings and monitoring wells listed were installed by the current CLEAN Contract responsible for the preparation of the final Site Assessment Report required by Directive Nos. 3 & of the Cleanup and Abatement Order.
3. Figure Nos. 4 to 15 are attached and show the location of soil borings and monitoring wells for each site or group of sites.

DRAWN BY: []
 CHECKED BY: []
 APPROVED BY: []
 243276-82C
 DRAWING NUMBER



- LEGEND:**
- ROADS & HIGHWAYS
 - - - CREEKS & STREAMS
 - · - · - MCB CAMP PENDLETON BOUNDARY
 - LOCATION OF SITE ASSESSMENTS

MODIFIED FROM:
 LEEDSHILL-HERRENHOFF, INC. 1988.
 "BASEWIDE WATER REQUIREMENT / AVAILABILITY STUDY".
 SEPTEMBER, REVISED FEBRUARY 1989.

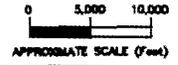


FIGURE 1-1
 AREAS 12 AND 13
 MARINE CORPS BASE
 CAMP PENDLETON, CALIFORNIA
 PREPARED FOR
 NAVAL FACILITIES ENGINEERING COMMAND
 SOUTHWEST DIVISION
 CONTRACT N88711-88-D-0296
 CLE-ICF-01276-86-0002
 INTERNATIONAL TECHNOLOGY CORPORATION

24-3276-B1C

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DATE: 10-15-83

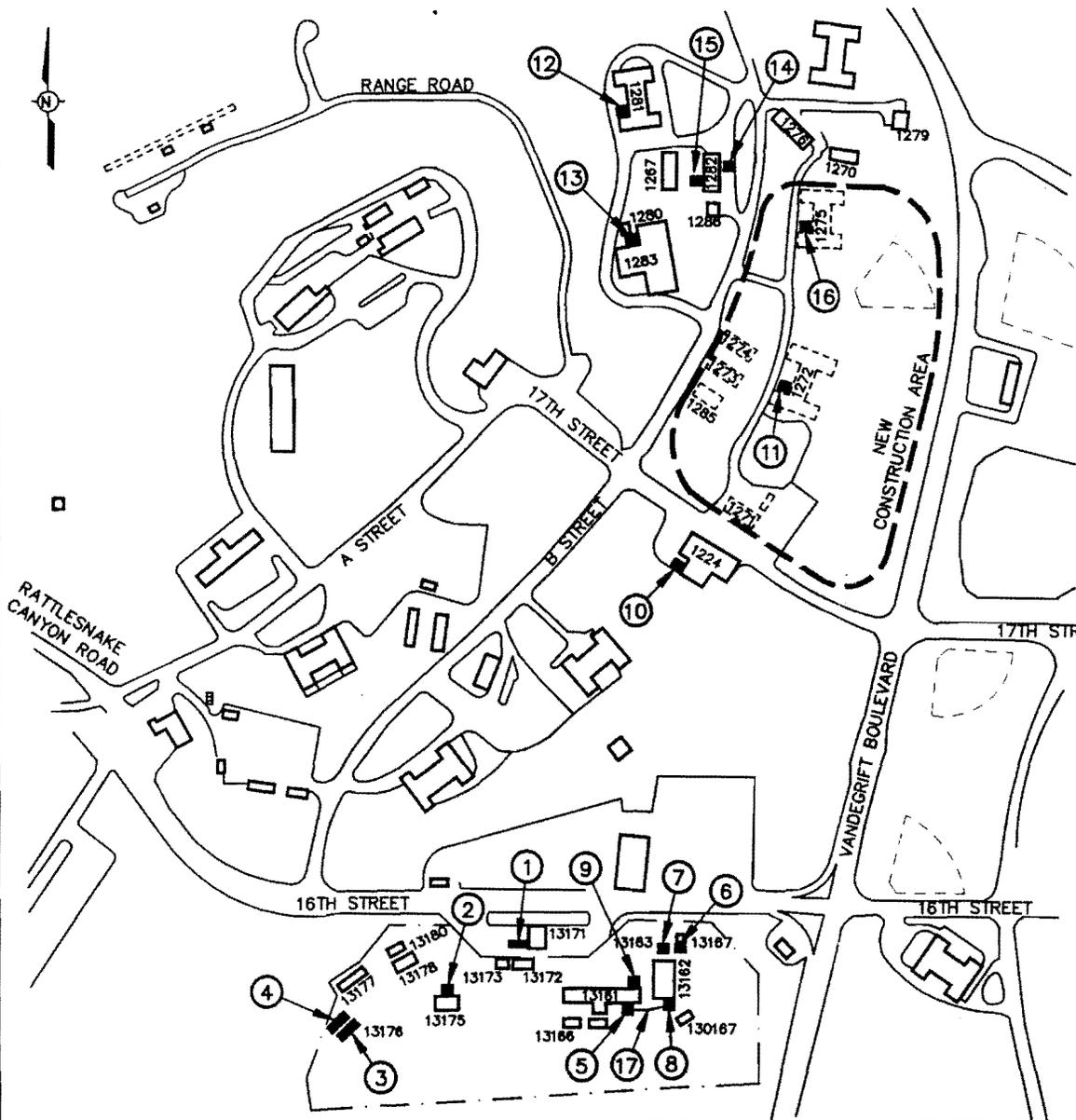
SCALE: 1"=50'

PROJECT: [Signature]

NO. 15

DATE: 10-15-83

SCALE: 1"=50'



TANK I.D. No.	NEAREST BLDG.	VOL.	CONTENTS
1-13171	13171	10000 GAL	GASOLINE
2-13175	13175	500 GAL	WASTE OIL
3-13176	13176	6000 GAL	SOLVENTS
4-13176	13176	6000 GAL	SOLVENTS
5-13161	13161	1500 GAL	DIESEL
6-14163	14163	350-500 GAL	OIL
7-13163	13163	350-500 GAL	OIL
8-13162	13162	200 GAL	DIESEL
9-13161	13161	650 GAL	OIL
10-1224	1224	2000 GAL	DIESEL
11-1272	1272	1500 GAL	DIESEL
12-1281	1281	1500 GAL	DIESEL
13-1283	1283	1500 GAL	DIESEL
14-1282	1282	55 GAL	OIL, SOLVENT
15-1282	1282	UNKNOWN	WASTE OIL
16-1275	1275	1500 GAL	DIESEL
17-1 INCH PIPE	13161	N/A	DIESEL

FIGURE 1-2
 UST SITE LOCATION MAP
 AREAS 12 AND 13
 MARINE CORPS BASE
 CAMP PENDLETON, CALIFORNIA
 PREPARED FOR
 NAVAL FACILITIES ENGINEERING COMMAND
 SOUTHWEST DIVISION
 CONTRACT N68711-86-D-9286
 CLE-10F-01F276-86-0002
 INTERNATIONAL TECHNOLOGY CORPORATION

243776 A14C

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5-18-94

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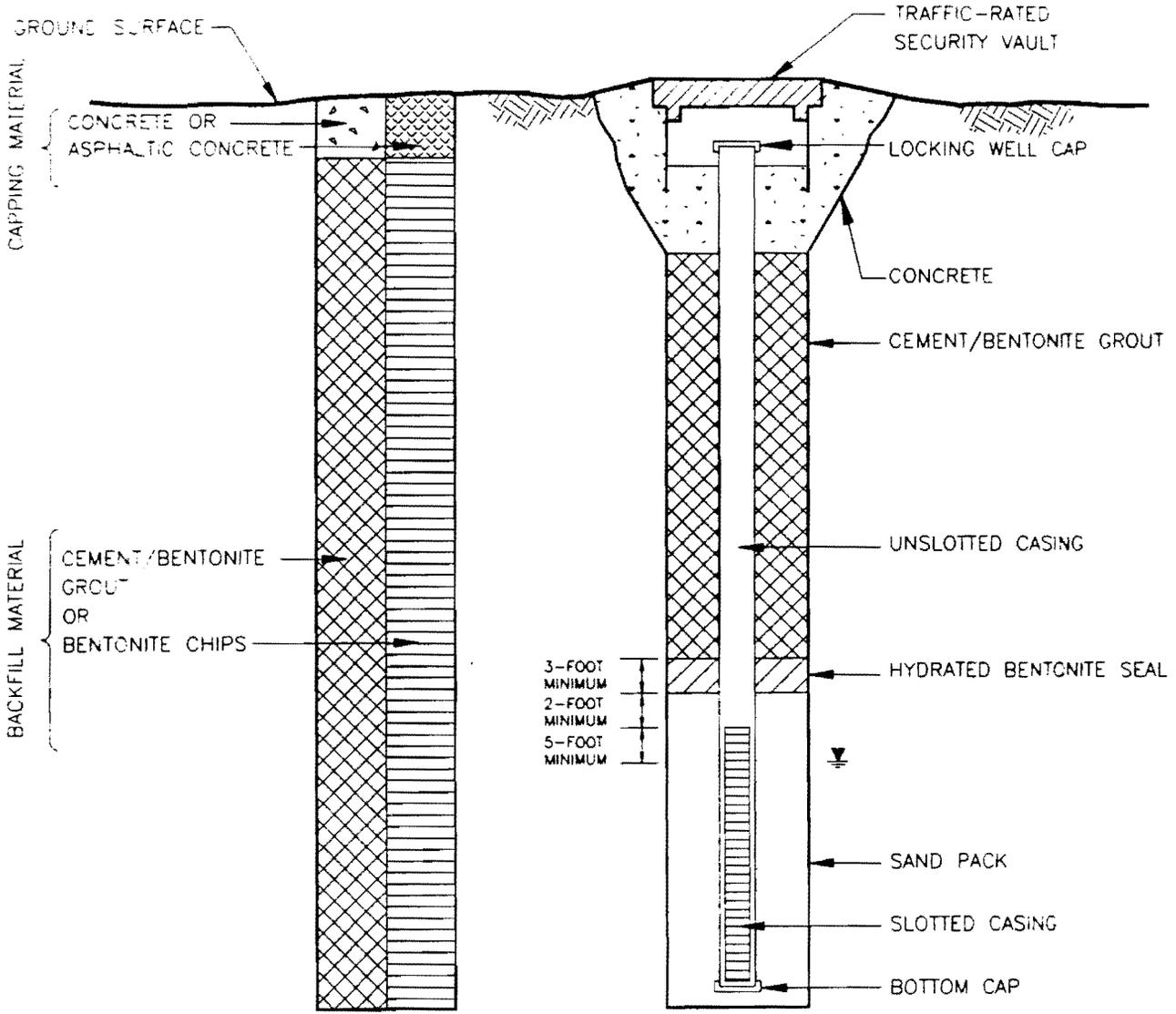
CHECKED BY
APPROVED BY

BJW
12-28-93

DRAWN BY

BOREHOLE ABANDONMENT (TYPICAL)

MONITORING WELL CONSTRUCTION (TYPICAL) (IN ACCORDANCE WITH 1994 SAM GUIDELINES)



NOT TO SCALE

WATER LEVEL SYMBOLS


 STATIC GROUNDWATER LEVEL
 (APPROXIMATELY 60 FEET
 BELOW LAND SURFACE)

FIGURE 3

WELL CONSTRUCTION DIAGRAM
AND BOREHOLE ABANDONMENT

MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA

PREPARED FOR

SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

CONTRACT N68711-89-D-9296
CLE-101-01F276-G4-0003



INTERNATIONAL
TECHNOLOGY
CORPORATION

DRAWN BY	BJW	CHECKED BY	DWU	5-12-94	DRAWING NUMBER	243276-A30C
	1-18-94	APPROVED BY	MBU	6-18-94		

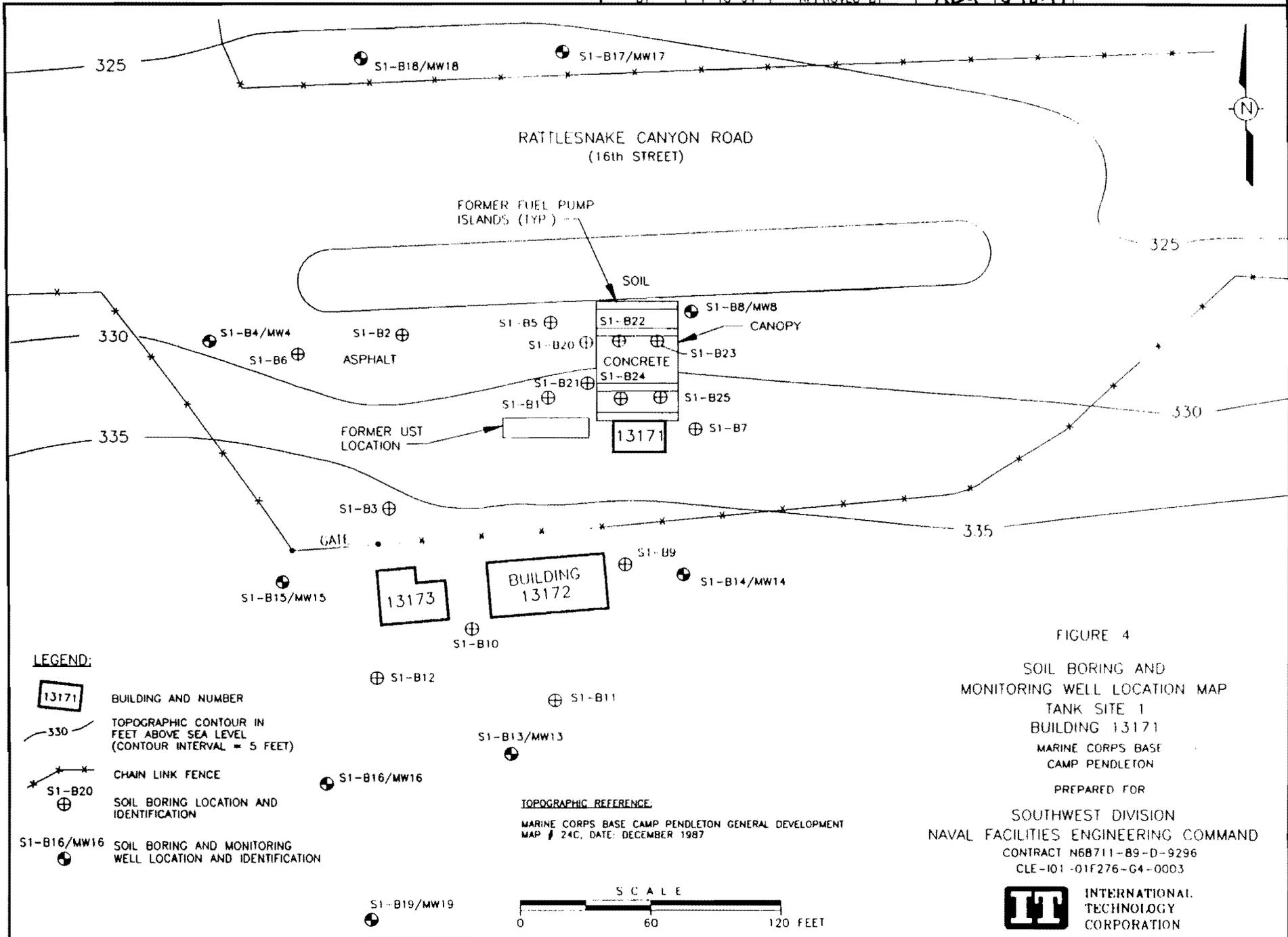
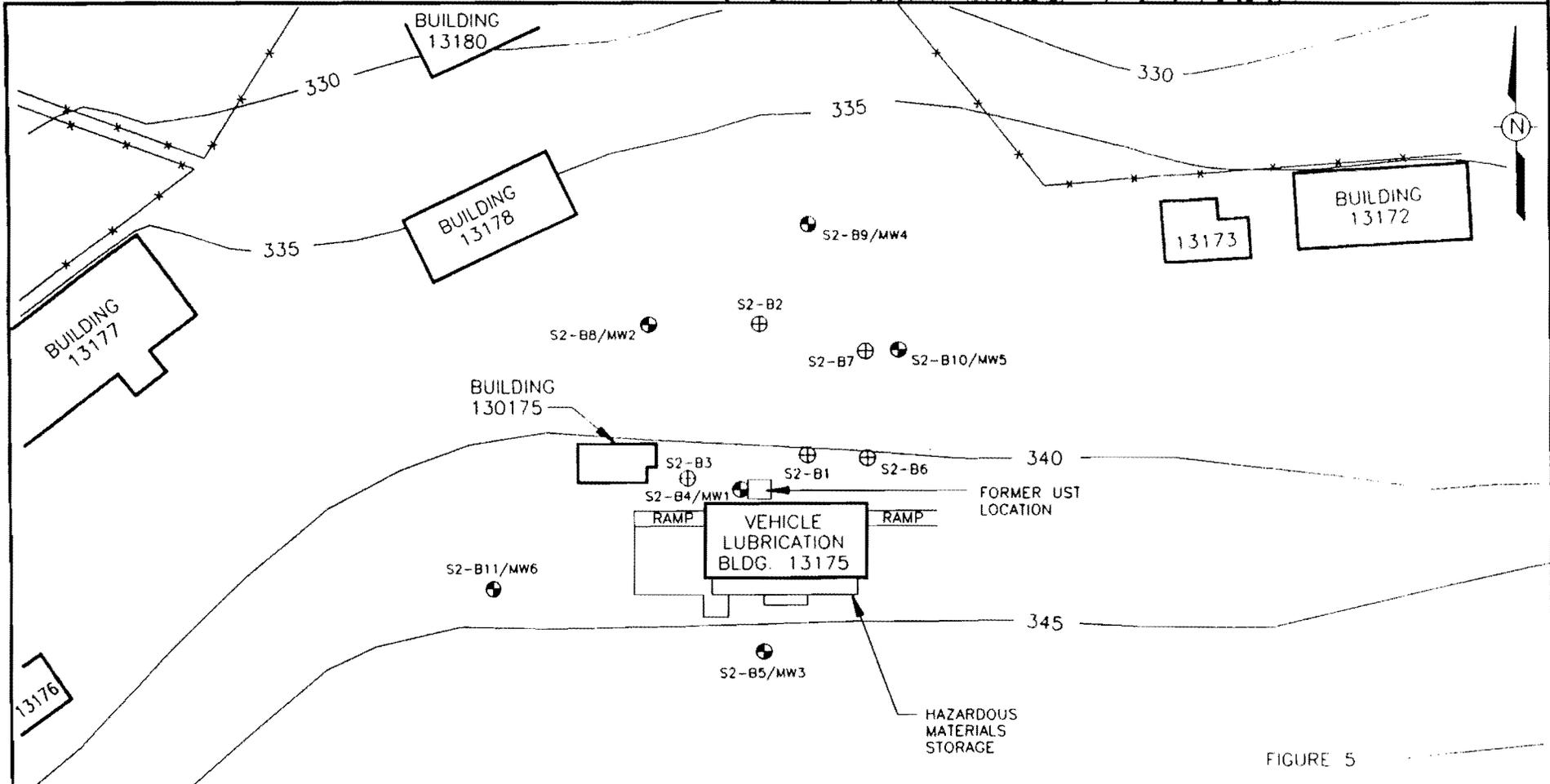


FIGURE 4
SOIL BORING AND
MONITORING WELL LOCATION MAP
TANK SITE 1
BUILDING 13171
MARINE CORPS BASE
CAMP PENDLETON
PREPARED FOR
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT N68711-89-D-9296
CLE-101-01F276-G4-0003



DRAWN BY	BJW	CHECKED BY	DWU	5-12-94	DRAWING NUMBER	243276-A27C
	1-18-94	APPROVED BY	MBU	5-10-94		



LEGEND:

- 13175 BUILDING AND NUMBER
- 330 TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
- CHAIN LINK FENCE
- S2-B1 SOIL BORING LOCATION AND IDENTIFICATION
- S2-B4/MW1 SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

TOPOGRAPHIC REFERENCE:
MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
MAP # 24C, DATE: DECEMBER 1987



FIGURE 5

SOIL BORING AND
MONITORING WELL LOCATION MAP
TANK SITE 2
BUILDING 13175

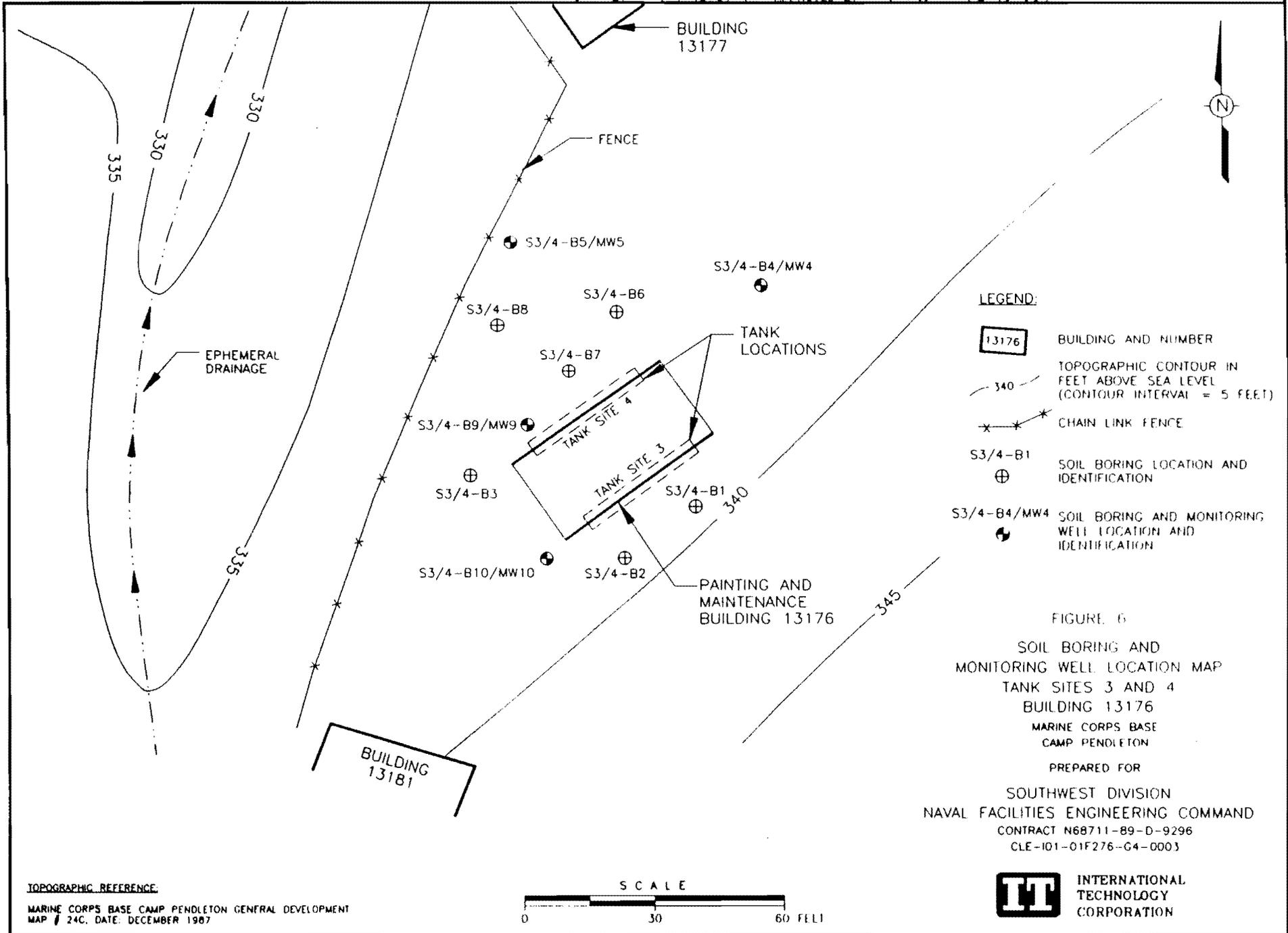
MARINE CORPS BASE
CAMP PENDLETON

PREPARED FOR

SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT N68711-89-D-9296
CLE-101-01F276-G4-0003



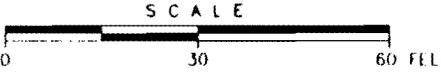
DRAWN BY	BJW	CHECKED BY	SWD	5-12-94	DRAWING NUMBER	243276-A28C
	1-18-94	APPROVED BY	MBU	5-18-94		



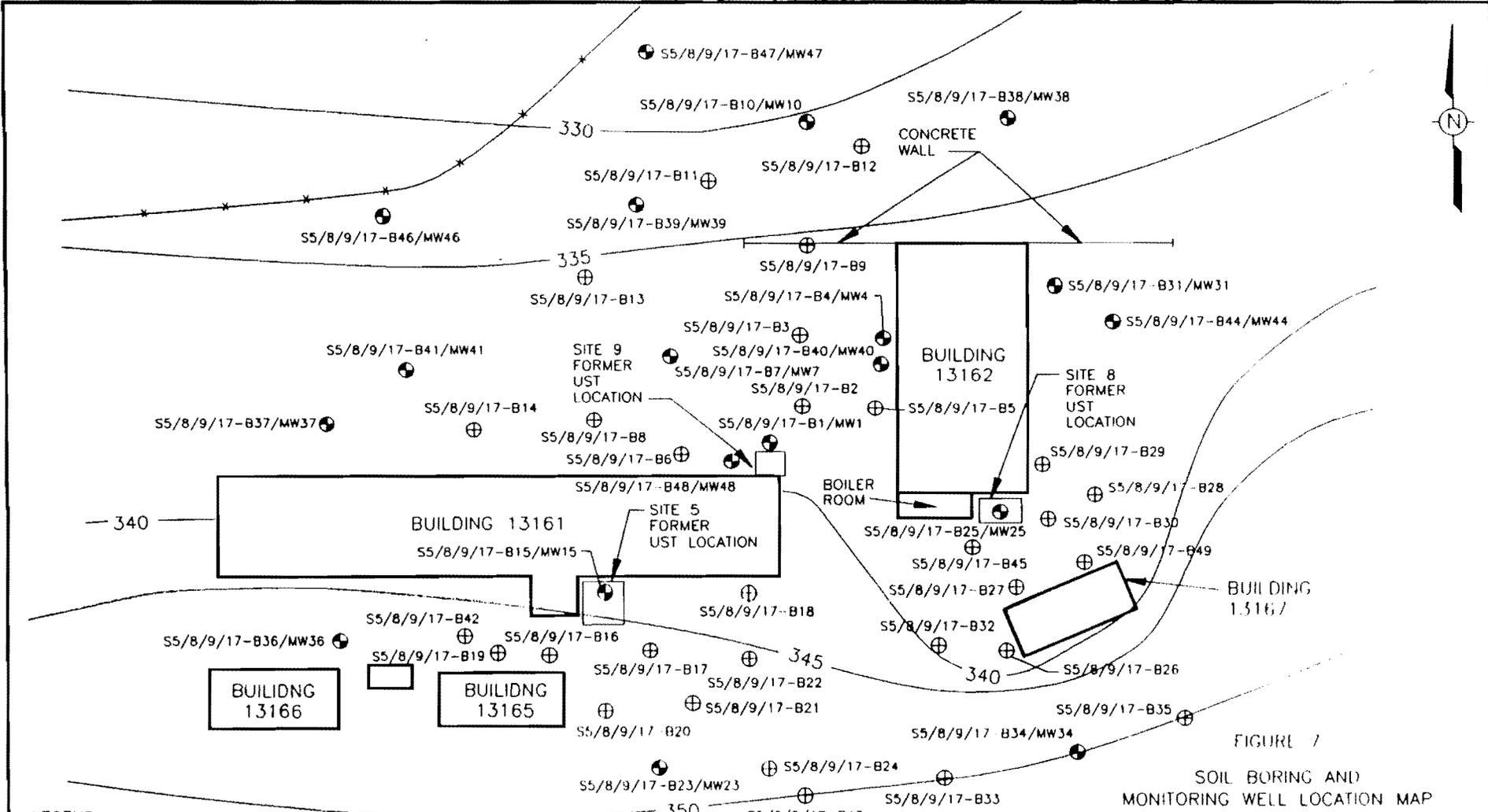
- LEGEND:**
- 13176 BUILDING AND NUMBER
 - 340 --- TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
 - *--- CHAIN LINK FENCE
 - S3/4-B1 ⊕ SOIL BORING LOCATION AND IDENTIFICATION
 - S3/4-B4/MW4 ⊙ SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

FIGURE 6
 SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITES 3 AND 4
 BUILDING 13176
 MARINE CORPS BASE
 CAMP PENDLETON
 PREPARED FOR
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CONTRACT N68711-89-D-9296
 CLE-101-01F276-G4-0003

TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
 MAP 24C, DATE: DECEMBER 1987



DRAWN BY	BJW	CHECKED BY	MEU	5-12-94	DRAWING NUMBER	243276-A26C
	1-18-94	APPROVED BY	MEU	5-18-94		



LEGEND:

- 13161 BUILDING AND NUMBER
- TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
- CHAIN LINK FENCE
- S5/B/9/17-B38 SOIL BORING LOCATION AND IDENTIFICATION
- S5/B/9/17-B42/MW42 SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE
 CAMP PENDLETON
 GENERAL DEVELOPMENT MAP # 24C.
 DATE: DECEMBER 1987



FIGURE 7
 SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITES 5, 8, 9, AND 17
 BUILDINGS 13161 AND 13162
 MARINE CORPS BASE
 CAMP PENDLETON

PREPARED FOR
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
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 CLE-101-01F276-G4-0003



DRAWN BY	BJW	CHECKED BY	PLU	5-17-94	DRAWING NUMBER	243276-A29C
	1-18-94	APPROVED BY	MEW	6-10-94		

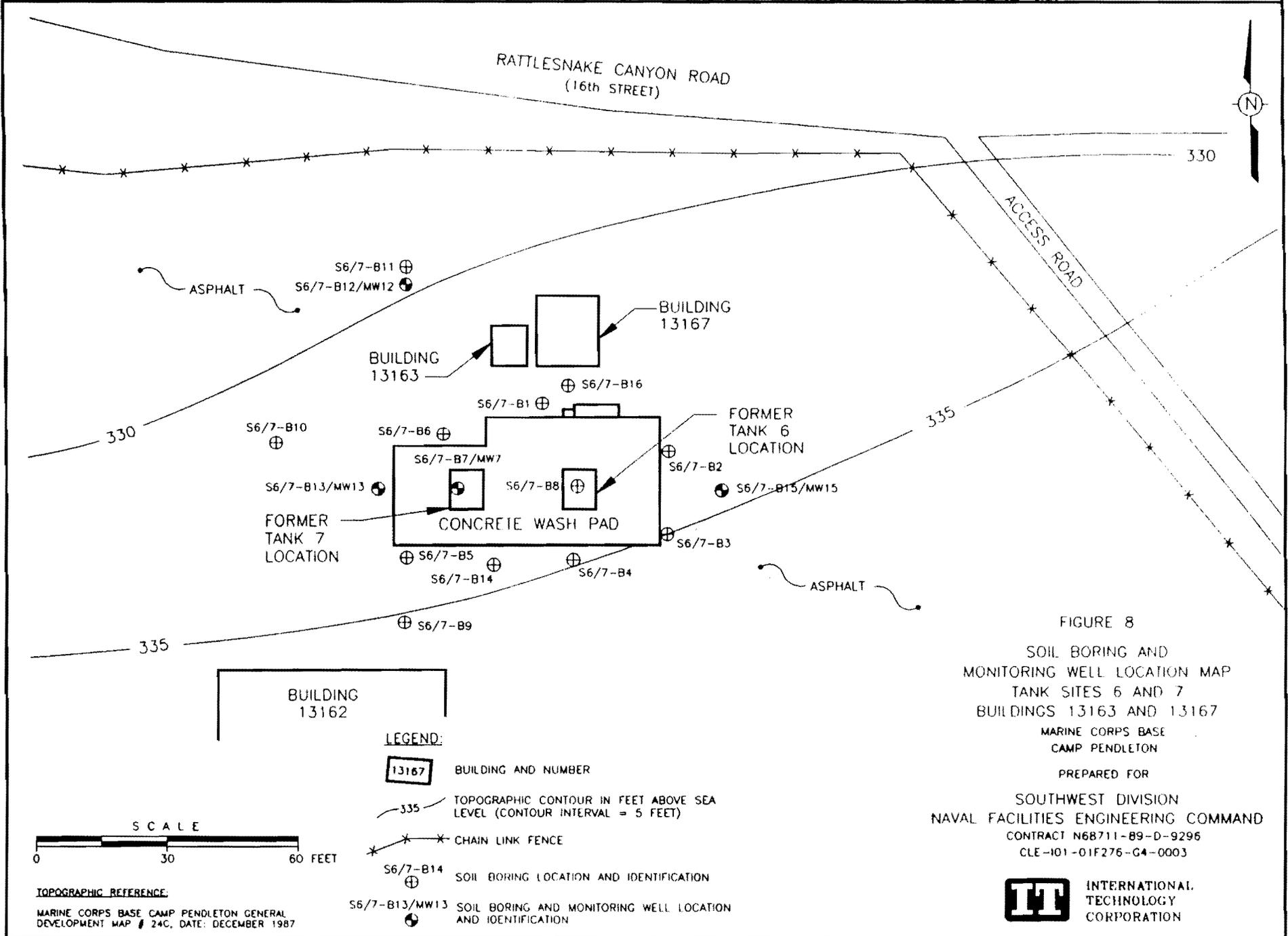


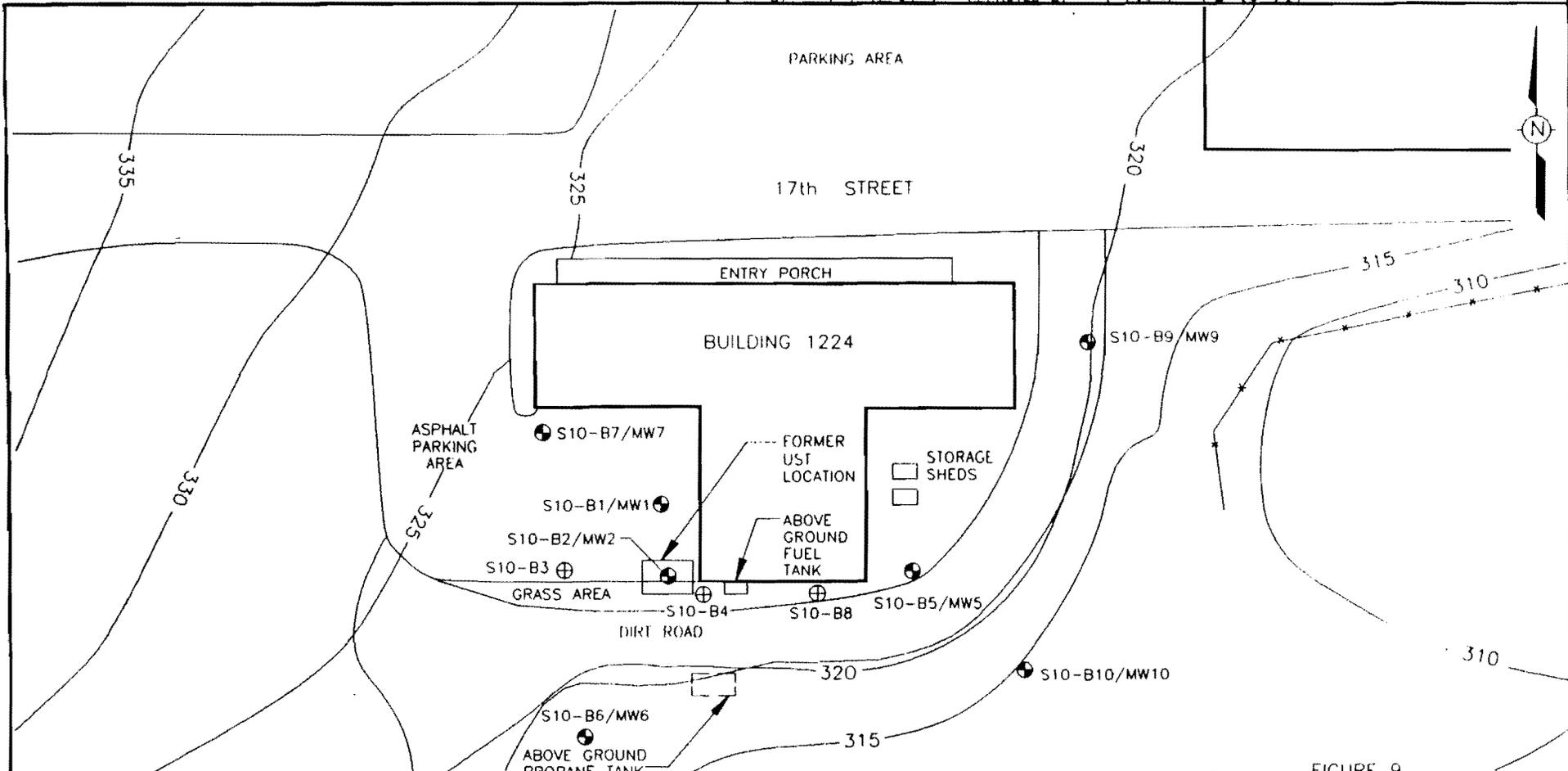
FIGURE 8
 SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITES 6 AND 7
 BUILDINGS 13163 AND 13167
 MARINE CORPS BASE
 CAMP PENDLETON
 PREPARED FOR
 SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CONTRACT N68711-89-D-9296
 CLE-101-01F276-G4-0003



TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE CAMP PENDLETON GENERAL
 DEVELOPMENT MAP # 24C, DATE: DECEMBER 1987

- LEGEND:
- 13167 BUILDING AND NUMBER
 - 335 --- TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
 - x---x--- CHAIN LINK FENCE
 - S6/7-B14 ⊕ SOIL BORING LOCATION AND IDENTIFICATION
 - S6/7-B13/MW13 ⊕ SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

DRAWN BY	BJW	CHECKED BY	DEW	5-12-94	DRAWING NUMBER	243276-A25C
	1-17-94	APPROVED BY	MEU	5-18-94		



LEGEND:



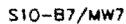
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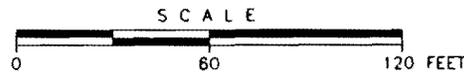
TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)



SOIL BORING LOCATION AND IDENTIFICATION



SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION



TOPOGRAPHIC REFERENCE:

MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
MAP # 24C, DATE DECEMBER 1987

FIGURE 9
SOIL BORING AND
MONITORING WELL LOCATION MAP
TANK SITE 10
BUILDING 1224
MARINE CORPS BASE
CAMP PENDLETON
PREPARED FOR

SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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	1-17-94	APPROVED BY	MEU	6-18-94		

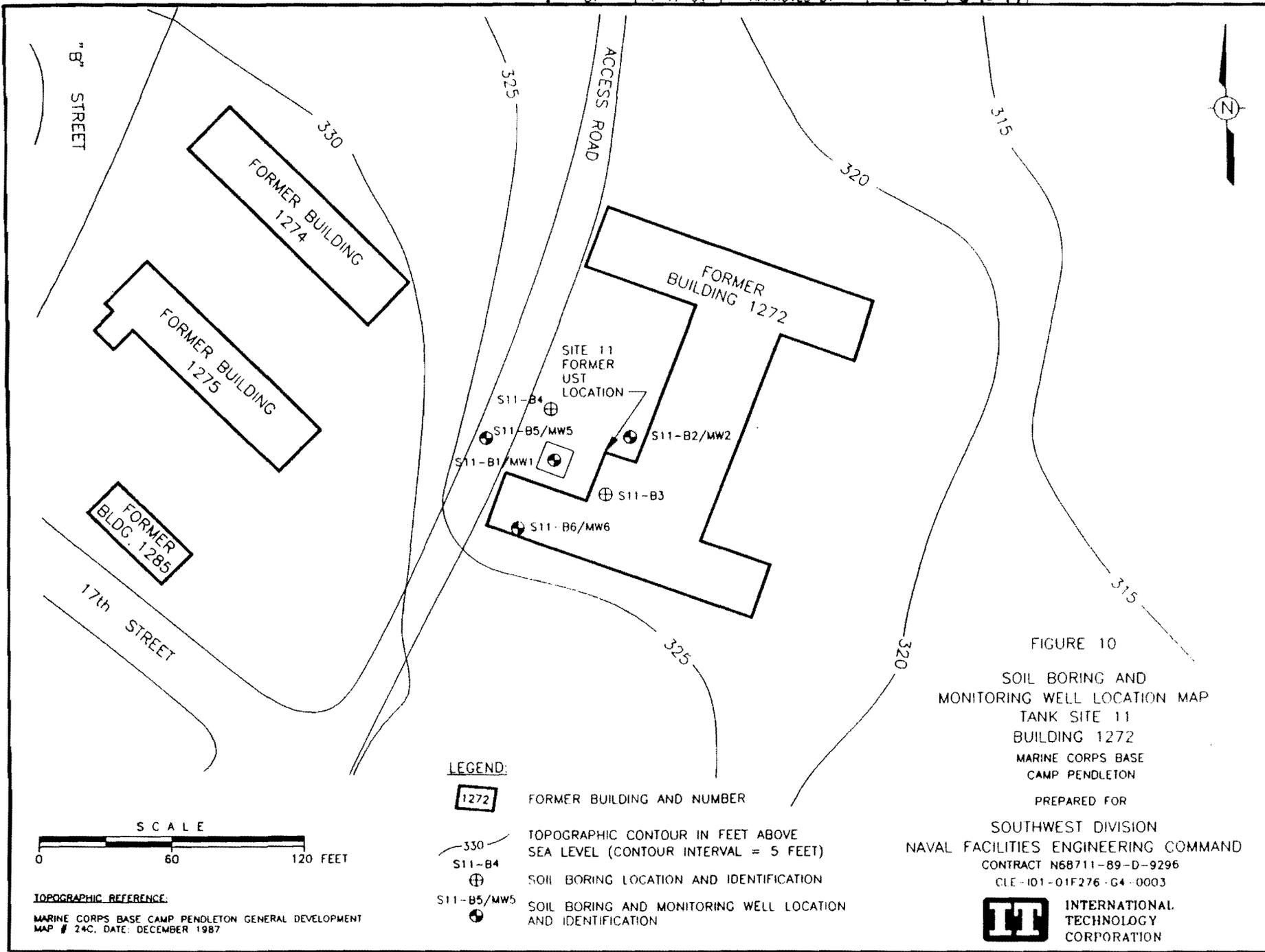
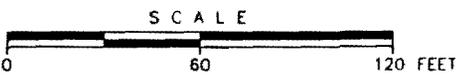


FIGURE 10
 SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITE 11
 BUILDING 1272
 MARINE CORPS BASE
 CAMP PENDLETON

- LEGEND:**
- 1272 FORMER BUILDING AND NUMBER
 - 330 — TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
 - S11-B4 ⊕ SOIL BORING LOCATION AND IDENTIFICATION
 - S11-B5/MW5 ⊕ SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION



TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
 MAP # 24C, DATE: DECEMBER 1987

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 CONTRACT N68711-89-D-9296
 CLE-101-01F276-G4-0003



DRAWN BY	BJW	CHECKED BY	DEW	5-17-94	DRAWING NUMBER	243276-A23C
	1-17-94	APPROVED BY	MEU	5-18-94		

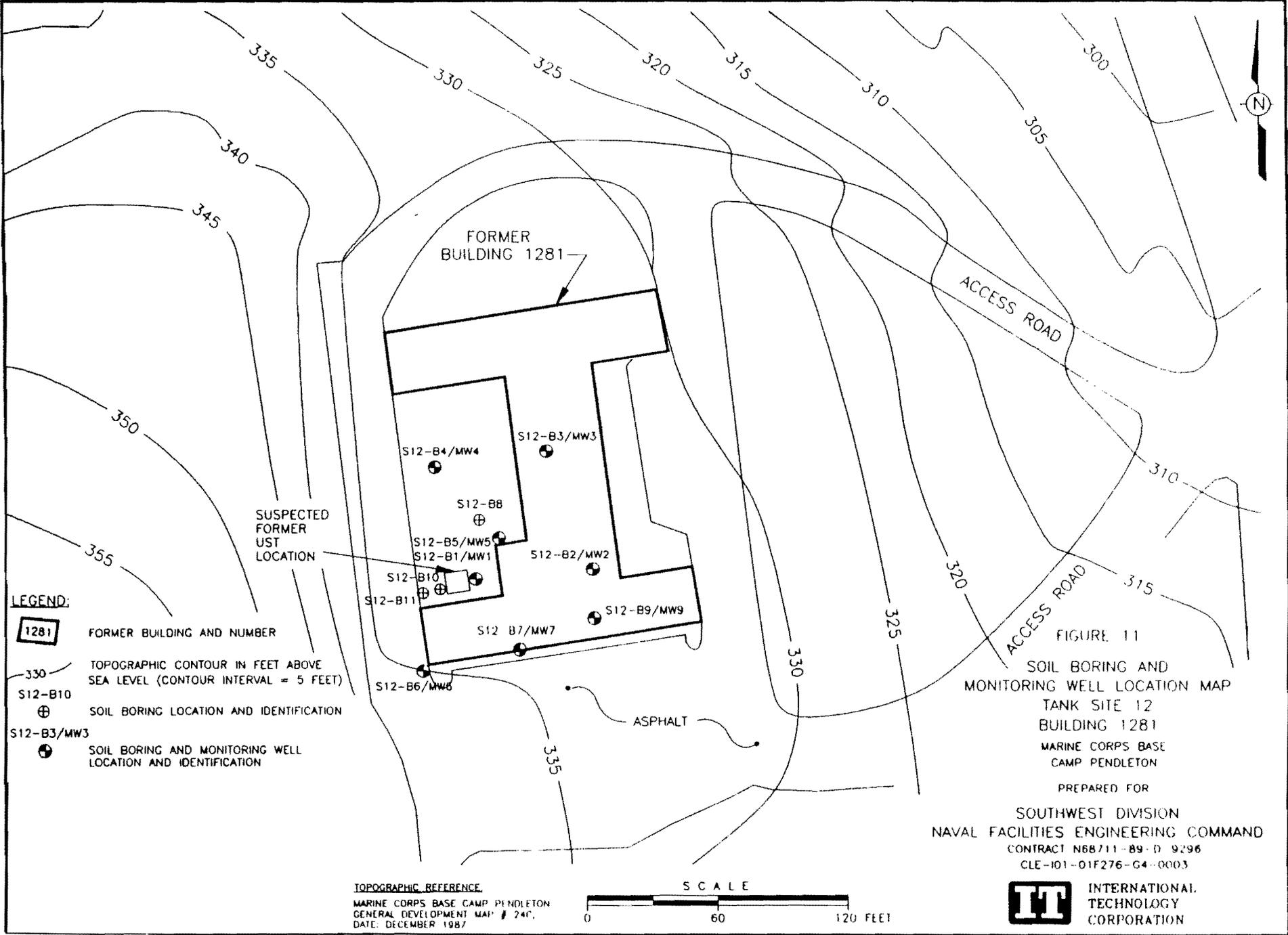
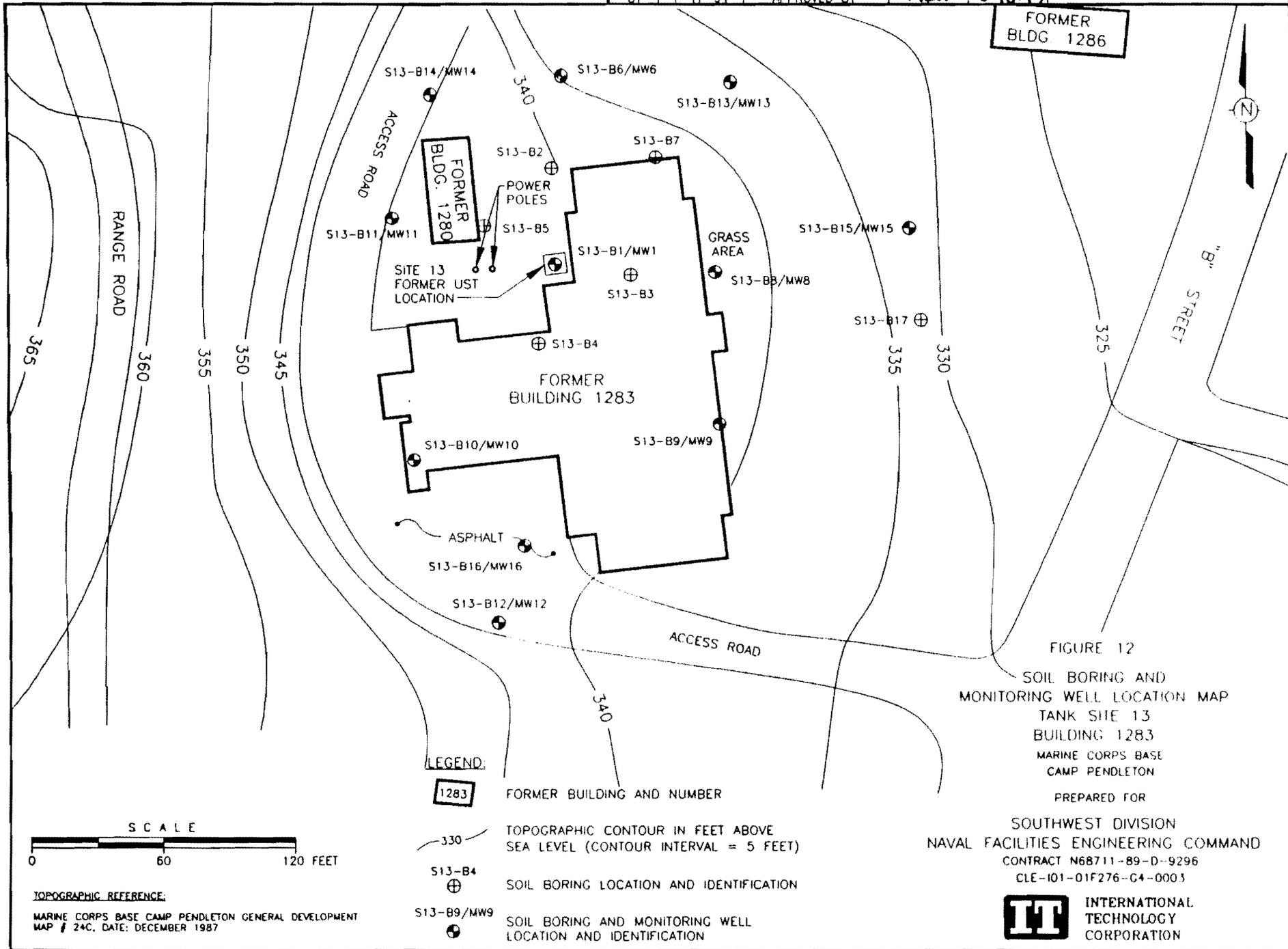


FIGURE 11
SOIL BORING AND
MONITORING WELL LOCATION MAP
TANK SITE 12
BUILDING 1281
MARINE CORPS BASE
CAMP PENDLETON
PREPARED FOR
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NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT N68711-89-D 9296
CLE-101-01F276-G4-0003



DRAWN BY	BJW 1-17-94	CHECKED BY	<i>DWJ</i> MEU	DRAWING NUMBER	5-12-74 5-18-94	243276-A22C
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FORMER BLDG 1286

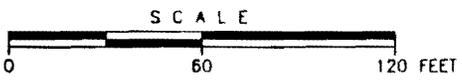
LEGEND:
1283

FORMER BUILDING AND NUMBER

330 TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)

S13-B4 SOIL BORING LOCATION AND IDENTIFICATION

S13-B9/MW9 SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION



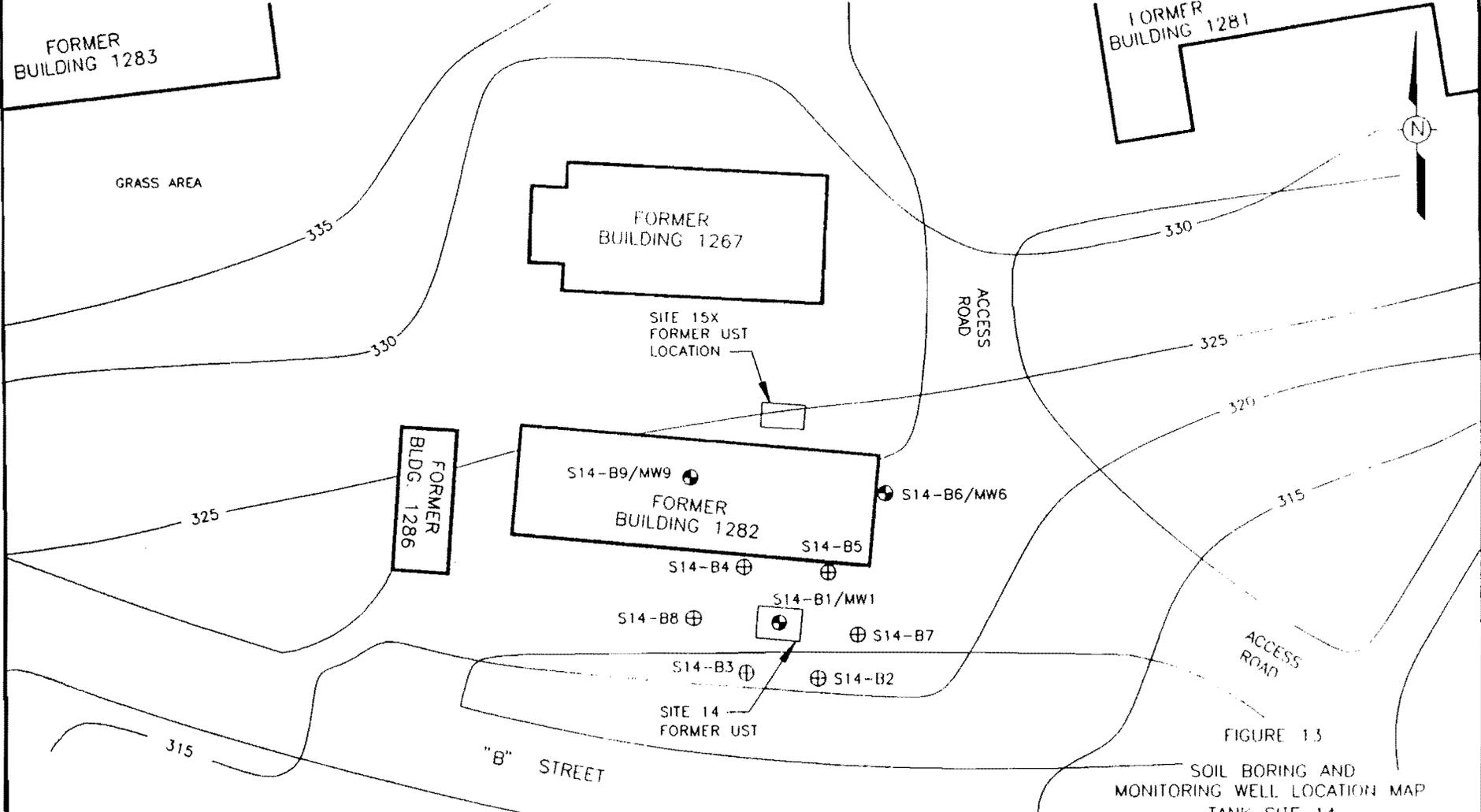
TOPOGRAPHIC REFERENCE:
MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
MAP # 24C, DATE: DECEMBER 1987

FIGURE 12
SOIL BORING AND MONITORING WELL LOCATION MAP
TANK SITE 13
BUILDING 1283
MARINE CORPS BASE CAMP PENDLETON

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DRAWN BY	BJW	CHECKED BY	Devo	5-17-94	DRAWING NUMBER	24 3276 - A100P
	1-17-94	APPROVED BY	MEU	5-18-94		



LEGEND:

- 1281 FORMER BUILDING AND NUMBER
- 315 TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
- S14-B4 + SOIL BORING LOCATION AND IDENTIFICATION
- S14-B9/MW9 ● SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
 MAP # 24C, DATE: DECEMBER 1987

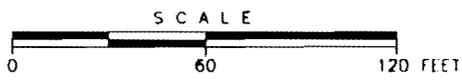


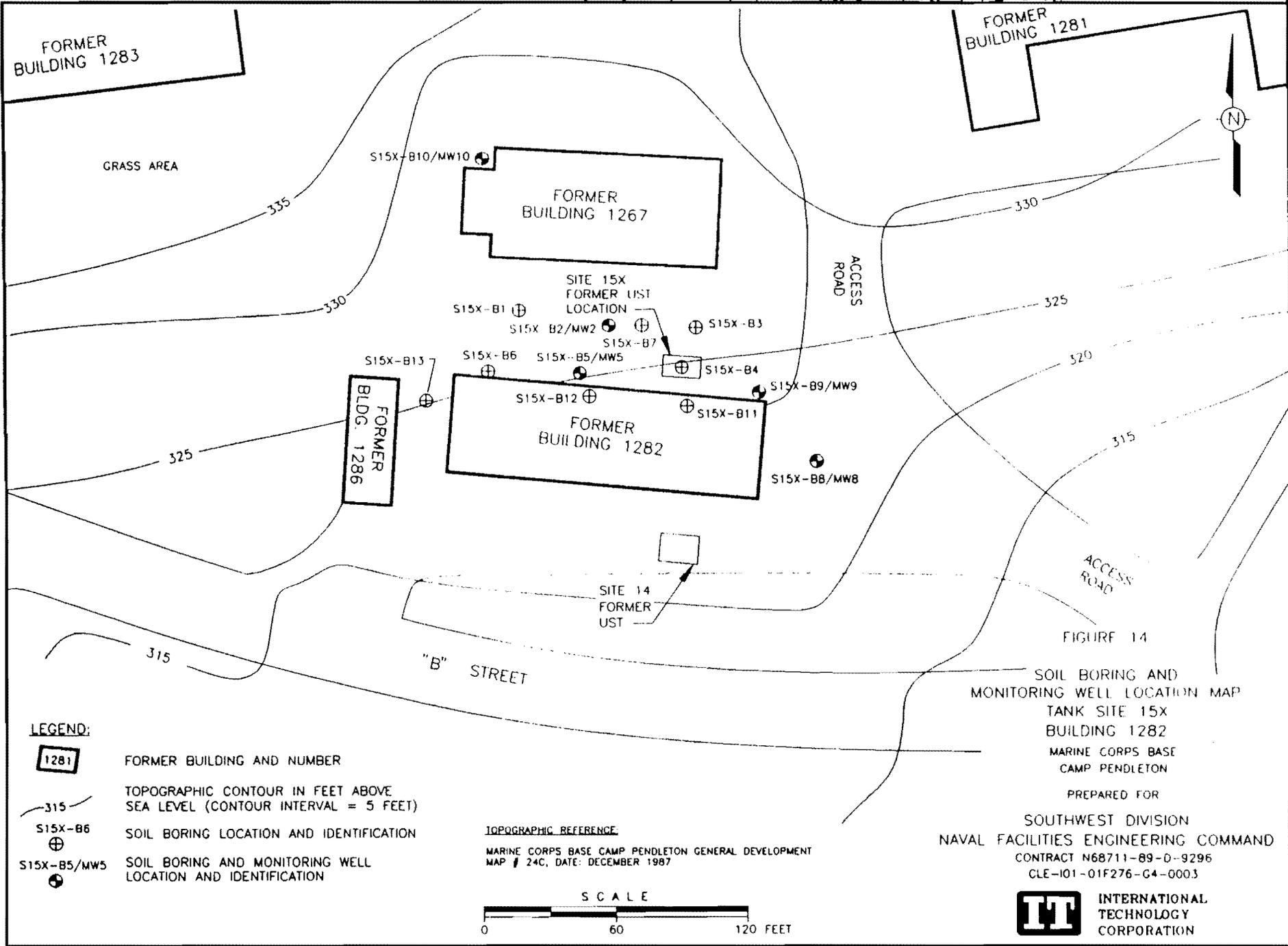
FIGURE 13

SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITE 14
 BUILDING 1282
 MARINE CORPS BASE
 CAMP PENDLETON
 PREPARED FOR

SOUTHWEST DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CONTRACT N68711-89-D-9296
 CLE-I01-01F276-G4-0003



DRAWN BY	BJW	CHECKED BY	MEU	DRAWING NUMBER	243276-A101P
	1-17-94	APPROVED BY	MEU		



LEGEND:

- 1281 FORMER BUILDING AND NUMBER
- 315 — TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
- S15X-B6 + SOIL BORING LOCATION AND IDENTIFICATION
- S15X-B5/MW5 ● SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

TOPOGRAPHIC REFERENCE
 MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
 MAP # 24C, DATE: DECEMBER 1987

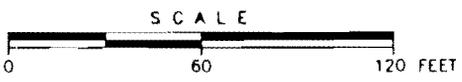
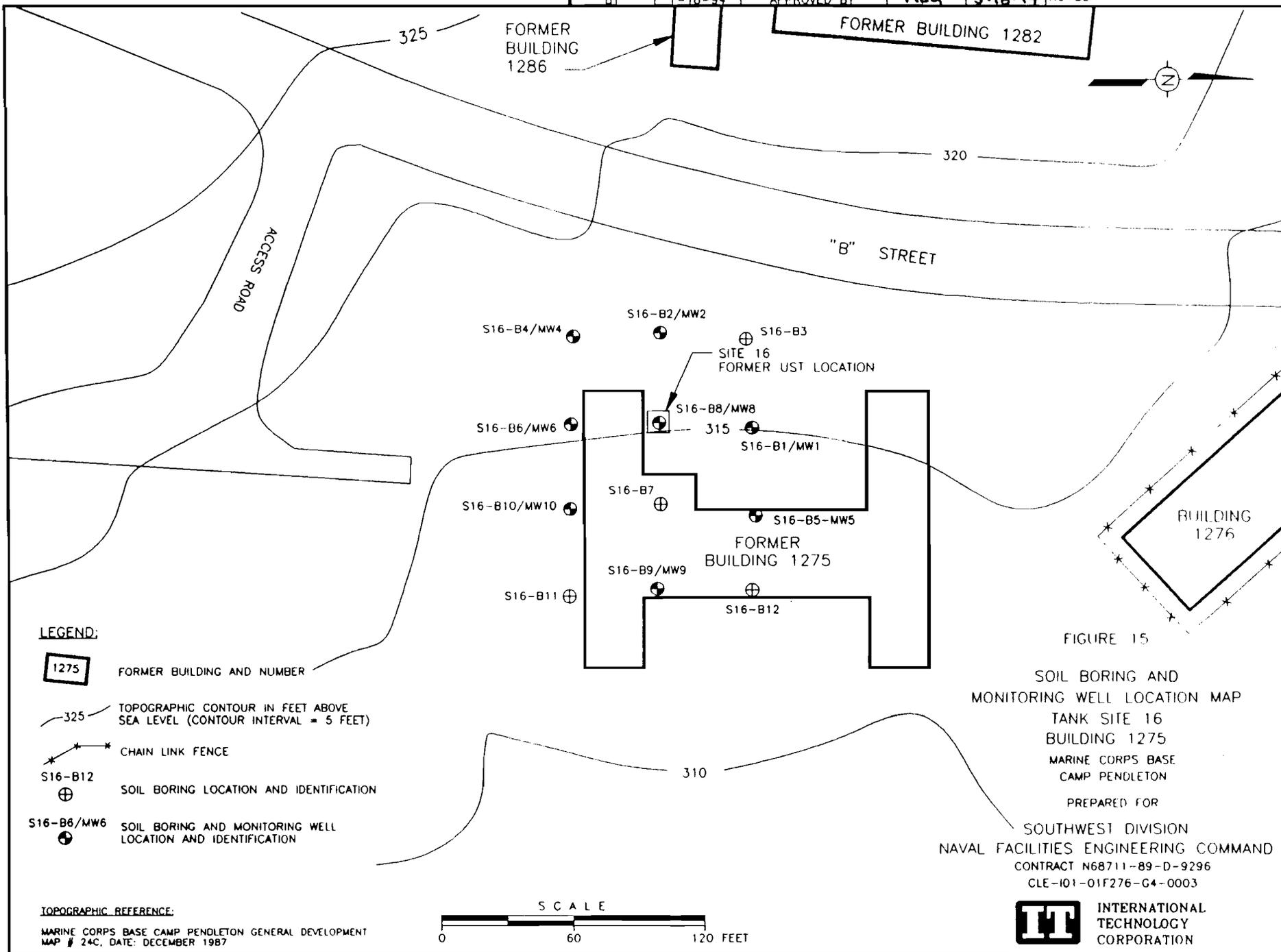


FIGURE 14
 SOIL BORING AND
 MONITORING WELL LOCATION MAP
 TANK SITE 15X
 BUILDING 1282
 MARINE CORPS BASE
 CAMP PENDLETON

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 CONTRACT N68711-89-D-9296
 CLE-101-01F276-G4-0003



DRAWN BY	BJW	CHECKED BY	BJW	5-17-94	DRAWING NUMBER	243276-A20C
	1-18-94	APPROVED BY	MBU	5-18-94		



LEGEND:

- 1275 FORMER BUILDING AND NUMBER
- 325— TOPOGRAPHIC CONTOUR IN FEET ABOVE SEA LEVEL (CONTOUR INTERVAL = 5 FEET)
- x—x—x— CHAIN LINK FENCE
- S16-B12 ⊕ SOIL BORING LOCATION AND IDENTIFICATION
- S16-B6/MW6 ⊕ SOIL BORING AND MONITORING WELL LOCATION AND IDENTIFICATION

FIGURE 15

SOIL BORING AND MONITORING WELL LOCATION MAP
 TANK SITE 16
 BUILDING 1275
 MARINE CORPS BASE
 CAMP PENDLETON
 PREPARED FOR

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 CONTRACT N68711-89-D-9296
 CLE-101-01F276-G4-0003

TOPOGRAPHIC REFERENCE:
 MARINE CORPS BASE CAMP PENDLETON GENERAL DEVELOPMENT
 MAP # 24C, DATE: DECEMBER 1987



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