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INFORMAL REPORT

AUTEC SEDIMENT DEPOSITION/EROSION STUDY INTERIM REPORT

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INFORMAL REPORT

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ABSTRACT

This report presents the results of the first three surveys in a planned series of seven replicate surveys. The study is designed to monitor sediment accretion and/or erosion on the beaches and in the channels at the AUTEC main base and downrange sites. The data collection methods are described in detail. Channel data are presented in tabular form for all three surveys and graphically for the third survey. Beach profiles show the change in the slope of the beaches over a six month period. The data are discussed and a few preliminary interpretations are made.

H.D. HUDDELL

Underwater Range Projects

Deep Ocean Surveys Division

Marine Sciences Department

APPROVED FOR RELEASE: Edward F. Kelley
Director
Deep Ocean Surveys Division

DATE: September 1967

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SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967.

INTRODUCTION

The initial survey in a study of sediment deposition and erosion was conducted at the AUTEC Sites in the Bahamas (Figure 1) in February 1966. Two replicate surveys were completed in August 1966 and February 1967. The halfway point in the planned series of surveys has been reached. Sufficient data have been collected to determine the validity of the method and to make some tentative interpretations of the results.

The objectives of the study are to monitor possible beach modifications as a result of construction of the AUTEC main base and downrange sites, and to determine the extent and rate of sedimentation in the sites' channels and turning basins.

The study is being conducted in three phases: (1) Beach profiles using standard leveling procedures are made north and south of each site wherever a sand beach exists. (2) Sediment thickness over bedrock is measured in the channels and turning basin at each site. (3) Color aerial photographs are used to monitor gross modifications to the distribution of sediment in the shallow water near the sites. As originally planned the study will extend over a three year period and replicate surveys will be performed every six months.

CHANNEL PHASE

Field Methods - The sediment thickness measurements consist of pushing a calibrated rod into the bottom sediment to bedrock (or hard subsurface) and recording thickness in feet. In order to enable comparison, replicate measurements must be made at the same location. Thus the problem is to adequately mark the location of the measurement lines so the same spot may be relocated six months later. This problem was not satisfactorily solved until the third survey (February 1967). Immediately prior to this survey the installation of fixed channel markers (numbered piles and dolphins) provided ready-made reference points for survey lines. In addition, concrete blocks were fabricated for use where an existing permanent marker was not available.

The blocks, weighing approximately 120 pounds each and equipped with steel lifting eyes, were manufactured at Site 1 prior to the survey. The top half of each block was painted red to facilitate finding it after installation.

Positions of the blocks were always measured with reference to a numbered piling or dolphin. Measuring was accomplished by

reeling out marked, 3/32" steel wire from a small boat. The boat traveled along the edge of the channel, and when the required distance had been covered, a block was pushed over the side. For uniformity, measurements were always made on the south sides of the channels. After retrieving the measuring wire another block was dropped on the opposite edge of the channel. One or both blocks were temporarily marked with small floats.

The following considerations determined the ultimate placement of the measurement lines (Figure 2C): (1) the availability of existing permanent markers, i.e., numbered Navaids (piles and/or dolphins); (2) obvious trouble spots such as the sand ridges at Site 6; and (3) the location of previous measurements.

Prior to making the sediment thickness measurements an appropriately marked wire was laid between the blocks or numbered Navaids which marked the beginning and end of the line.

In order to assure repeatability it was necessary to follow a set procedure in laying out the wire and in recording the measurements. The end of the marked wire was fastened with nylon cord to the pile or block on the south side of the channel by a swimmer. If a 3- or 4-legged structure was used, the wire was run from the leg nearest to the line, or from the seaward leg if two were equidistant. A small boat then reeled out the wire towards the seaward side of the pile opposite; when the pile was passed, the boat turned to landward in order to bring the wire up against the pile. Then the wire was pulled tight and the reel was thrown over the side (if blocks were being used the reel was dropped over the block). A SCUBA-equipped diver then began taking measurements at prescribed intervals along the wire while a second diver recorded the sediment thicknesses on a plexiglas slate.

Results - Locations of the measurement lines for the initial and first replicate surveys are presented in Figures 2A and 2B. The results of those surveys are shown in Tables 1 and 2. Because an adequate scheme for relocating the measuring points was not devised until the third survey, these two original sets of measurements can not be compared to determine a quantitative rate of filling in the channels. Neither can the third set of measurements (Table 3) be quantitatively compared to the two preceeding ones. However certain preliminary conclusions are possible based on the present distribution of sediment in the channels and turning basins.

The channel and turning basin at Site 1 (Figure 3) shows

a pattern of filling typical of most of the sites. The majority of filling is taking place in the turning basin and the adjacent parts of the channel. The high energy environment near the reef is keeping the outer part of the channel swept relatively clear.

There is strong evidence from the beach surveys and aerial photos for a movement of beach sand behind the detached breakwater and into the south corner of the turning basin. An additional measurement line, diagonally crossing this corner, will be marked, and initial measurements of sediment thickness will be made on the August 1967 survey.

At Site 2 (Figure 4) sand ridges in the vicinity of lines 5 and 6 are encroaching upon the channel. Otherwise the pattern is greater sedimentation adjacent to, and within, the turning basin with a relatively clean outer channel. Line 7 was not sampled as no dredging had been necessary there.

Strong tidal currents sweeping Middle Bight have virtually obliterated all traces of the outer part of the channel at Site 3 (Figure 5). Fortunately, a natural channel exists running eastward from the site. This natural channel connects with the dredged channel in the vicinity of line 4. The remainder of the dredged channel has been abandoned. Active filling is presently taking place along the edges of the turning basin. This is shown in the sediment accumulations at the beginning of line 1 and the end of line 2. The source of this sediment is the beach north and west of the site. Tidal currents bring sand from both directions and deposit it in the turning basin. Subsequent surveys will determine the rate of this deposition.

The channel at Site 4 (Figure 6) is practically free of any sediment. A moderate accumulation of silt exists in the turning basin. Rapid filling is not expected to be a problem at Site 4 mainly because of the lack of a nearby source of sediment.

The presence of fine to medium sand forming offshore bars indicates a low energy environment at Site 6 (Figure 7). These offshore bars can be expected to eventually encroach upon the channel between lines 3 and 6; however, such encrochment is not now evident from the measurements. It may be that a year or two will pass before the sand bars seriously endanger the channel. The channels at Site 6 and 7 were not included in the initial survey as dredging was still in progress at that time.

Site 7 (Figure 8) shows relatively little filling. The most likely trouble spot is the west edge of the turning basin.

Here sand has begun to accumulate against the wall. Although the turning basin is not expected to undergo rapid filling, dredging or blasting might be considered necessary to remove several high points in the center of the turning basin left by the original excavator.

The channel and turning basin at Site 16 (Figure 9) will require additional dredging if frequent use is contemplated. Several high points remain as a result of inadequate original dredging. In addition, filling is taking place along the edge of the channel in the vicinity of lines 3 and 4. This sediment is being eroded from the spoil pile which bounds the channel on the south.

BEACH PHASE

Field Methods - On the initial survey iron stakes were driven into the sand shoreward of the berm to mark the beginning of each profile. Each stake was located with reference to prominent features by turning angles with a theodolite and measuring distances with a steel tape. Level lines were run normal to the berm from the stake seaward to the low tide level. Level rod measurements were made at ten foot intervals using an N-2 level and extendable rod calibrated in centimeters.

The second survey in August 1966 used the previously installed stakes as control points. The majority of the stakes were relocated intact. Those which were lost were replaced and new level lines run.

The planned third beach survey was cancelled; however visual observations of the beaches were made during the channel survey in February 1967.

It is expected that the most significant modification to the beaches will occur within a few hundred feet of the breakwaters constructed to protect the turning basins. Therefore the profiles are more closely spaced in these areas as shown in Figure 10.

Results - Beach profiles for the two surveys are plotted in Figures 11 - 17 and Figure 19. The zero line shown on each profile is mean sea level as determined by level lines run from geodetic monuments at each site. Each profile has been identified in the figures by (1) a number representing the site number, (2) the letter "N" or "S" indicating north or south beach, and (3) a number locating it on the beach as shown in Figure 10.

The profiles show the change in the shape of the beach after a period of six months from the initial survey. The changes shown can be attributed to three possible causes:

(1) Seasonal changes in the nearshore wave and current regime create a summer profile consistently different from that in winter.

(2) The modifications represent short period changes brought about by daily or weekly weather conditions.

(3) The changes shown have been caused by construction of the channels, turning basins, and breakwaters at the AUTEC sites.

In order to determine the role of the last factor the effects of the first two must be considered. The forthcoming survey (August 1967) will enable a comparison between profiles during the same month of different years. Further surveys will provide additional data on seasonal changes, as well as monitoring changes due to construction of the sites.

Site 1 (Figures 11 and 12) has the longest beach and the one most likely to suffer major modification as a result of site construction. Two structures, the north jetty and a spoil pile north of the site, interrupt the normal movement of sand along the beach. The section of beach between these structures, approximately 3000 feet long, has been virtually isolated from the rest of the beach. The profiles 1 N 1 through 1 N 9 are taken from this stretch of beach. No significant change is evident from the two sets of profiles. However, erosion is expected in the center of this area with a simultaneous build-up against one or both boundary structures.

Profiles 1 S 1 through 1 S 6 show a marked increase in sediment. This would indicate that sand is being moved northward along the beach and building up behind the detached breakwater.

The beach at Site 2 (Figures 13 and 14) shows evidence of buildup both north and south of the site construction. This is evident in the accretion shown on north beach profiles 2 N 2 through 2 N 5 and to a lesser extent at the south beach on profile 2 S 1. The beach south of profile 2 S 1 is almost entirely weathered limestone with an occasional thin covering of sand. The close agreement between the two sets of profiles from this part of the beach illustrates the accuracy of the field methods. Profiles 2 S 2 through 2 S 9 will be deleted from future surveys unless visual observations indicate that the beach may be undergoing modification.

Only the northern side of Site 3 has a sand beach. Here a very narrow strip of sand separates a rocky offshore zone from the backshore. It is doubtful that any significant changes will result from site construction as no major breakwaters have been built at this site. This is substantiated by the absence of any change in the two sets of profiles shown in Figure 15. Profiles 3 N 11 and 3 N 12 have been deleted from the figure as the elevation of the control points are doubtful. No future beach surveys are planned for Site 3 except for visual observations and aerial photography.

A wide sandy beach north and south of Site 6 is protected by offshore bars. Rock outcrops are infrequent south of the site and nonexistent to the north. This beach, composed of fine to medium sand, should be the first to show the effects of site construction. With few exceptions, all the Site 6 profiles (Figures 16 and 17) show beach buildup over the six-month period. This may be the result of seasonal modifications not associated with the construction of the site. Data obtained on the forthcoming survey (August 1967) will help to determine what modifications can be expected as a result of seasonal effects. The north breakwater, which extends almost 2000 feet from shore, undoubtedly exerts a strong influence upon the movement of sediment both on the beach and offshore. However, comparison of the aerial photos taken at this site in February 1966 and in February 1967 show remarkably little change in the size or shape of offshore bars and sand ridges. Sediment movement is evidently taking place very slowly along this beach.

Site 16 (Figure 18) has two small crescent-shaped beaches. The remainder of the shoreline is rough limestone. There is little possibility that these beaches will be significantly altered by site construction. However, the north beach profiles (Figure 19) show an interesting phenomenon. A buildup has occured to the north (16 N 4 through 16 N 6) while the southern profiles (16 N 1 and 16 N 2) show a degradation. This is probably the effect of short period or seasonal movements of sand from one end of the beach to the other. No further study of these beaches is deemed necessary; however profiles may continue to be run simultaneously with the Site 16 channel survey.

SUMMARY

The present distribution of sediment indicates the most rapid rate of filling is in the turning basins and the adjacent parts of the channels.

Site 3 and Site 1 contain the greatest average amounts of sediment. Occasional dredging will be necessary to maintain the required depths at both these sites.

The spoil pile south of the channel at Site 16 may need to be reinforced or moved to prevent its eroding into the channel.

The channels and turning basins at Sites 2, 4, 6, and 7 have accumulated relatively little sediment; however the offshore sand bars at Sites 2 and 6 will require surviellance.

Additional beach surveys at Sites 1, 2, and 6 are required to determine the effects of seasonal modifications. The Site 1 beach is expected to undergo the greatest changes due to site construction.

The beach at Site 3 will be deleted from future surveys. Site 16 beach surveys will be continued on an opportunity basis.

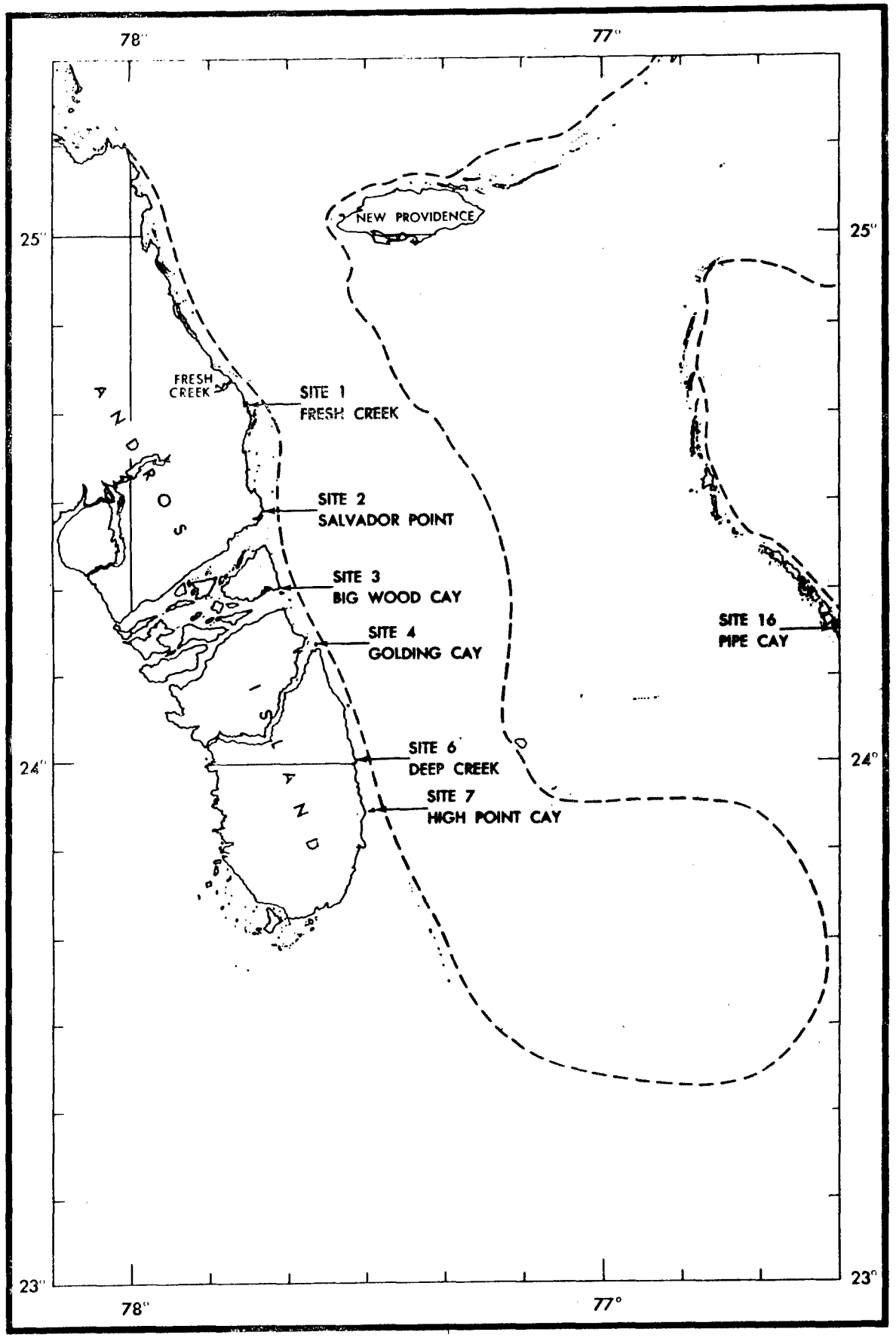

FIGURE 1 LOCATION CHART, AUTEC SITES

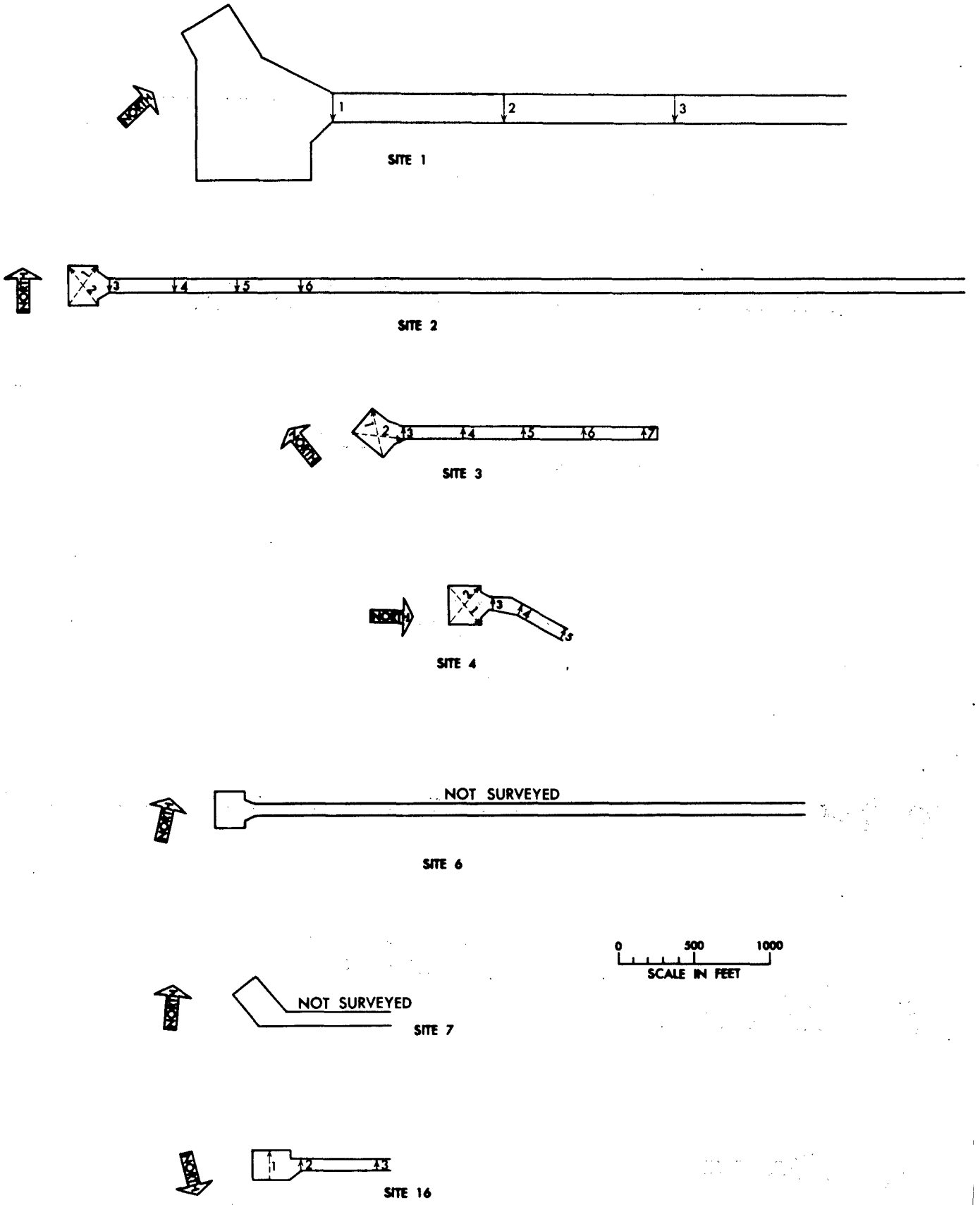

FIGURE 2A LOCATIONS OF MEASUREMENT LINES IN AUTEC CHANNELS AND TURNING BASINS, FEB 1966

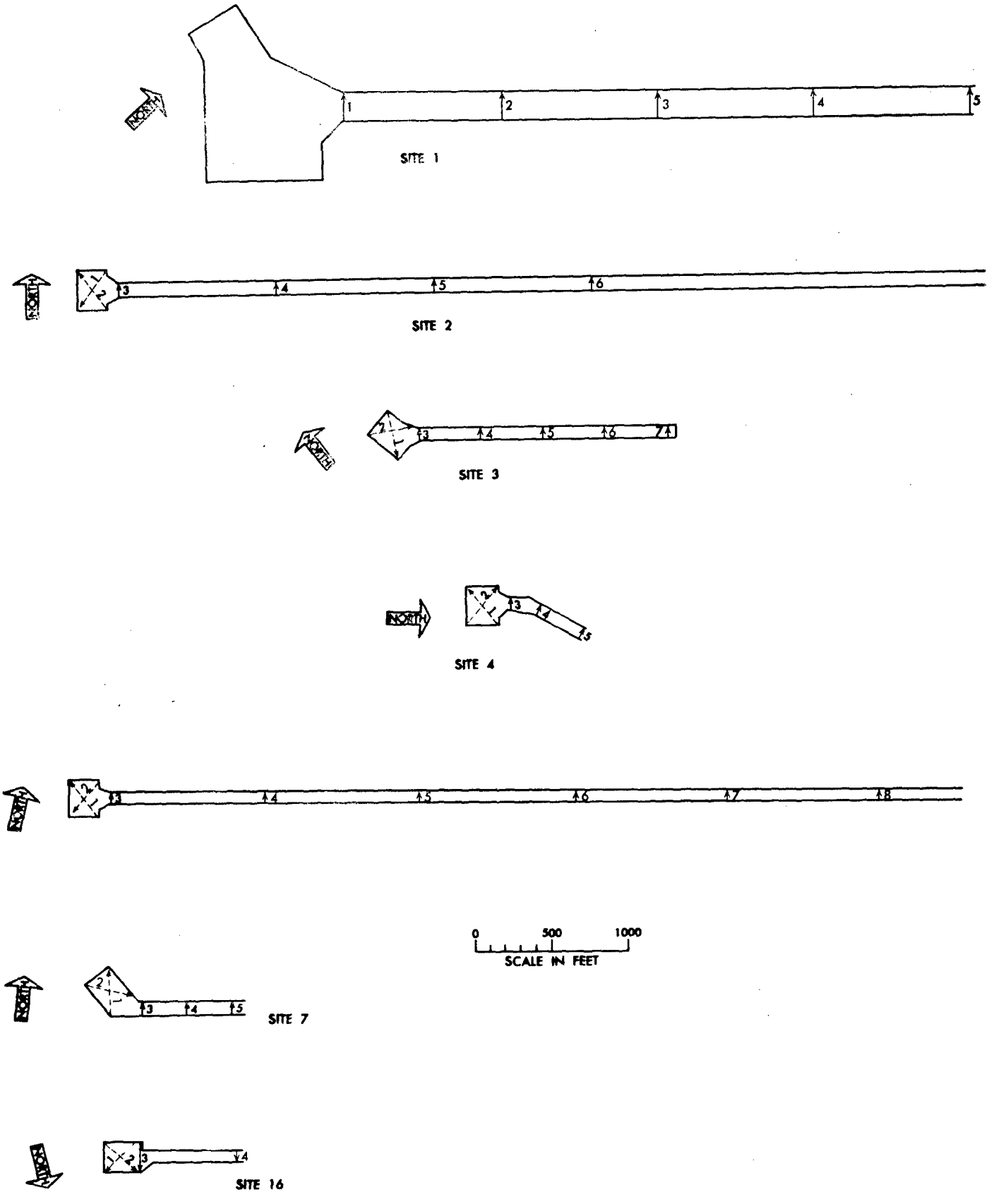

FIGURE 2B LOCATIONS OF MEASUREMENT LINES IN AUTEC CHANNELS AND TURNING BASINS, AUG 1966

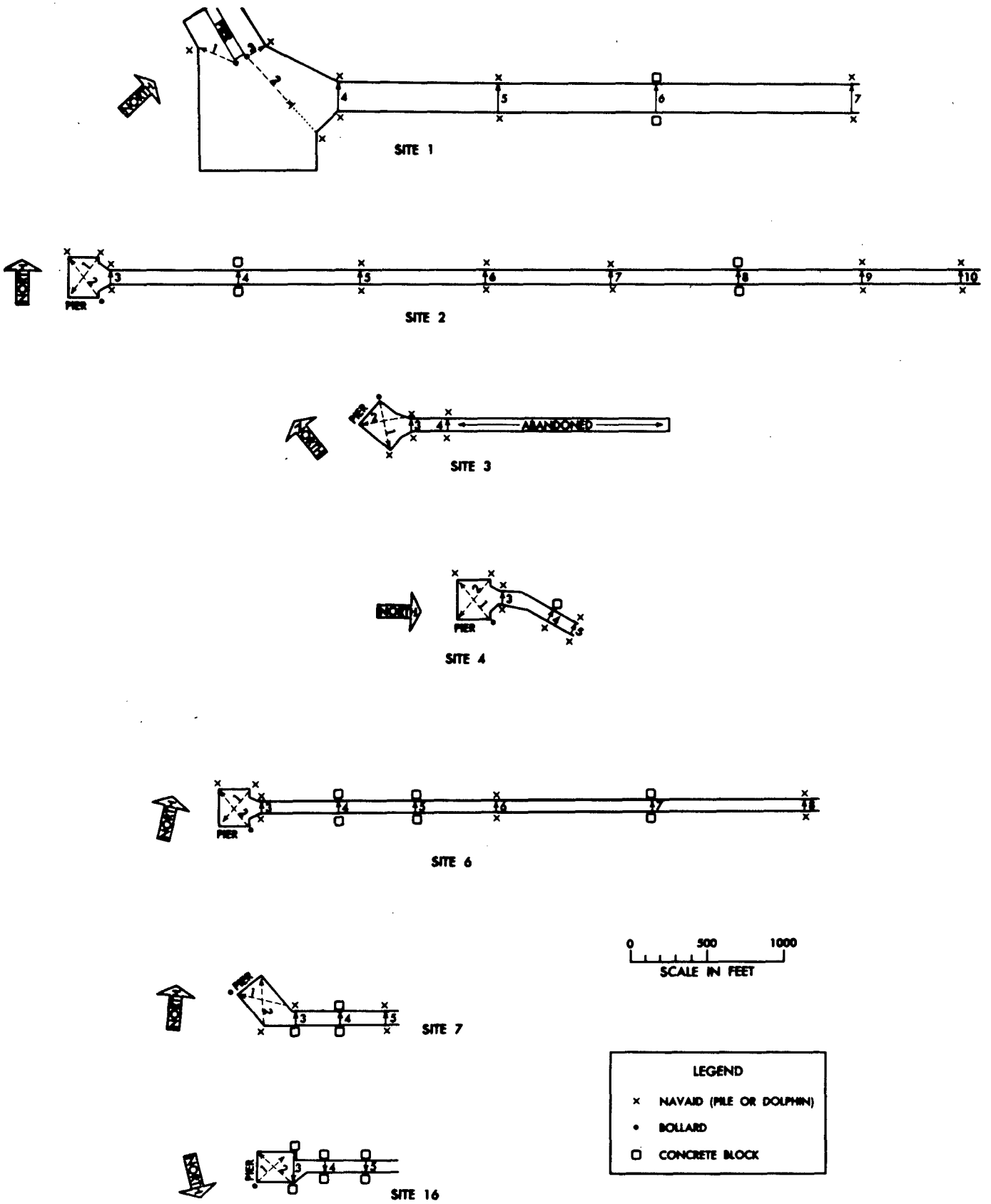

FIGURE 2C LOCATIONS OF MEASUREMENT LINES IN AUTEC CHANNELS AND TURNING BASINS, FEB 1967

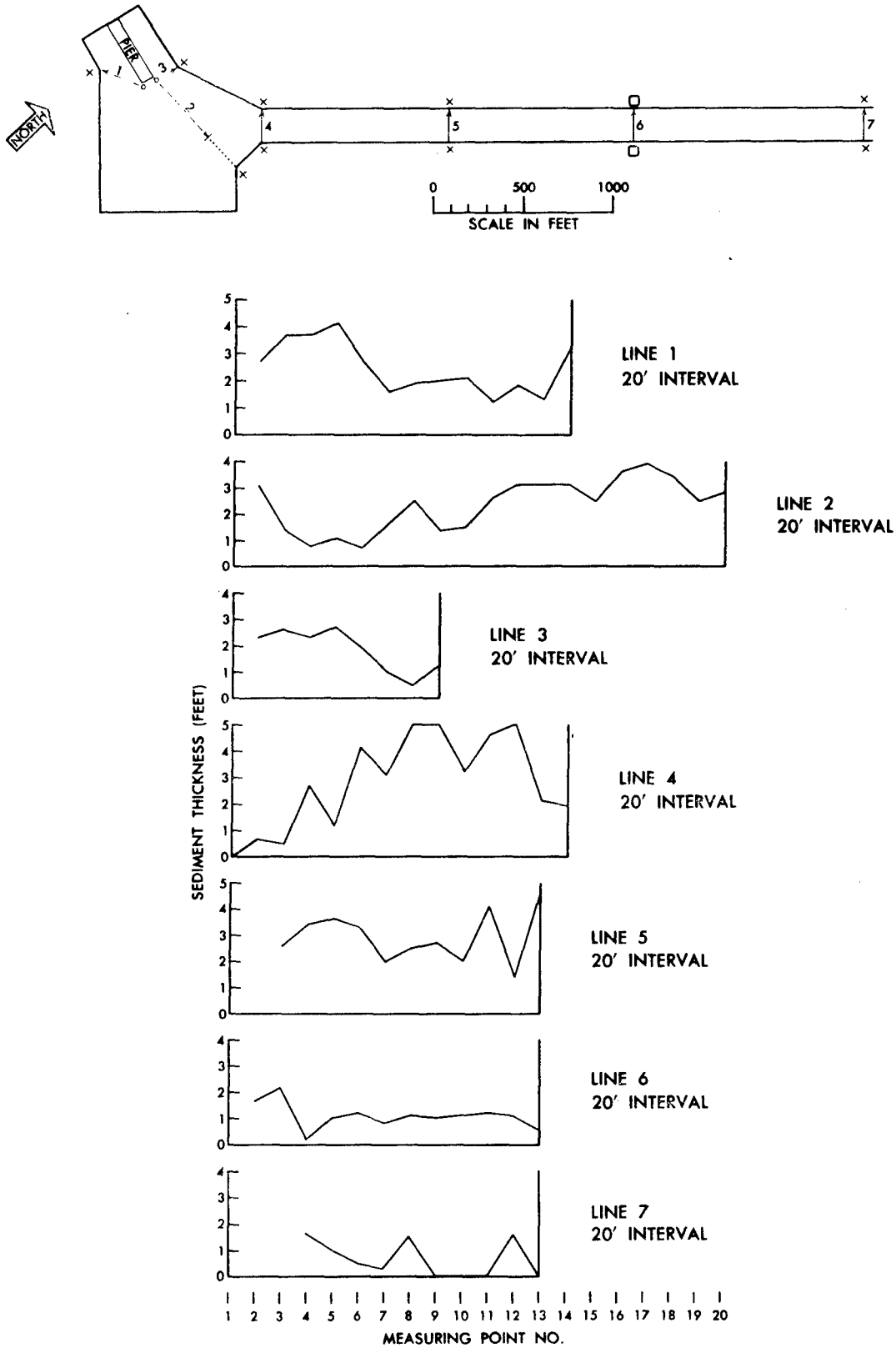

FIGURE 3 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 1 (FRESH CREEK)

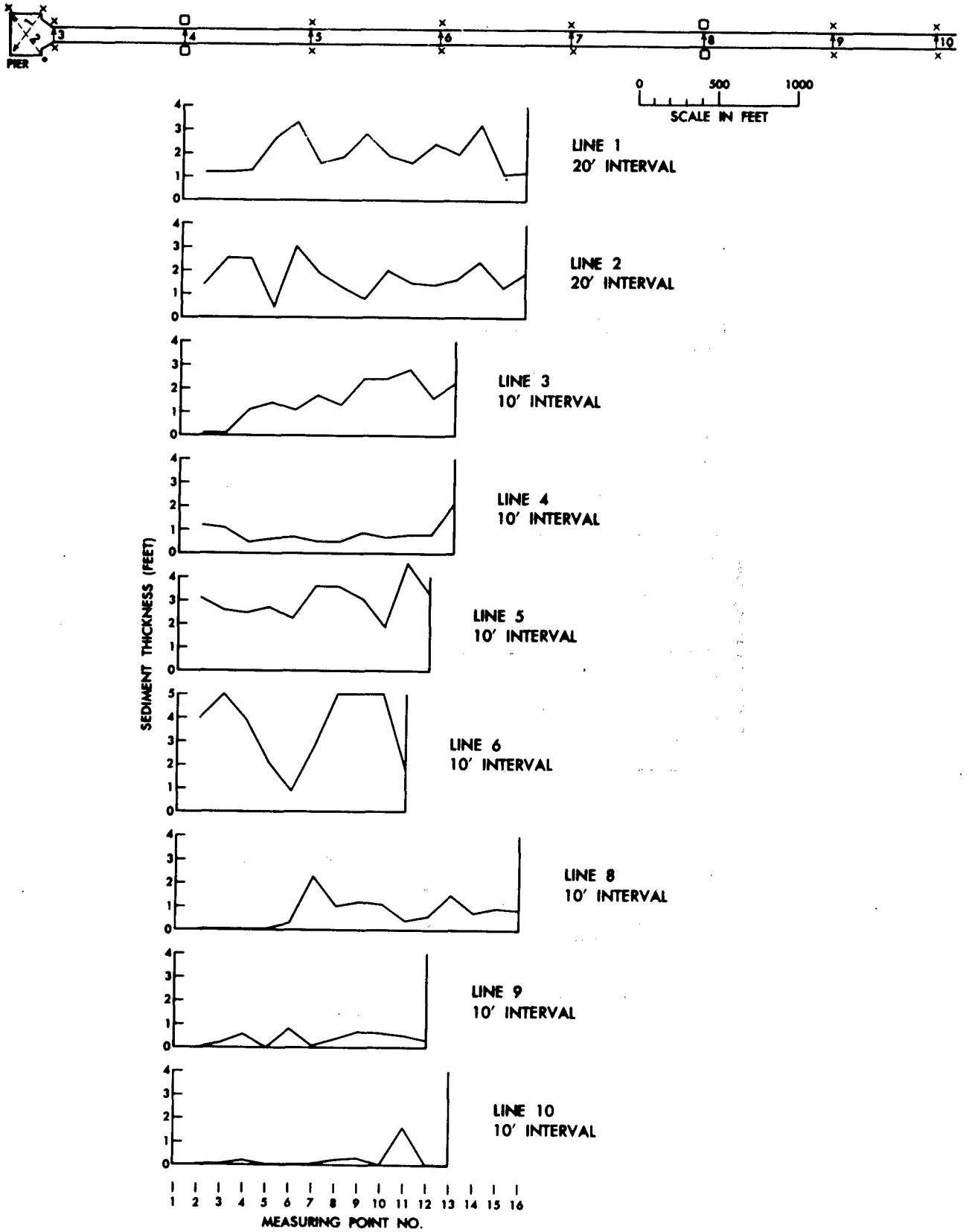

FIGURE 4 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 2 (SALVADOR POINT)

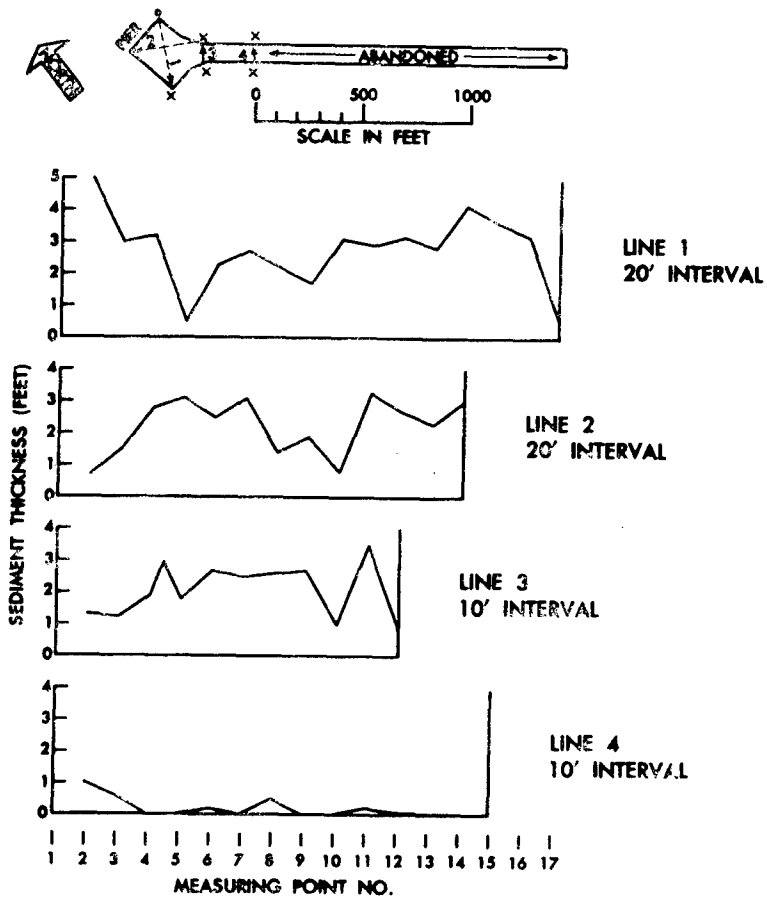

FIGURE 5 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 3 (BIG WOOD CAY)

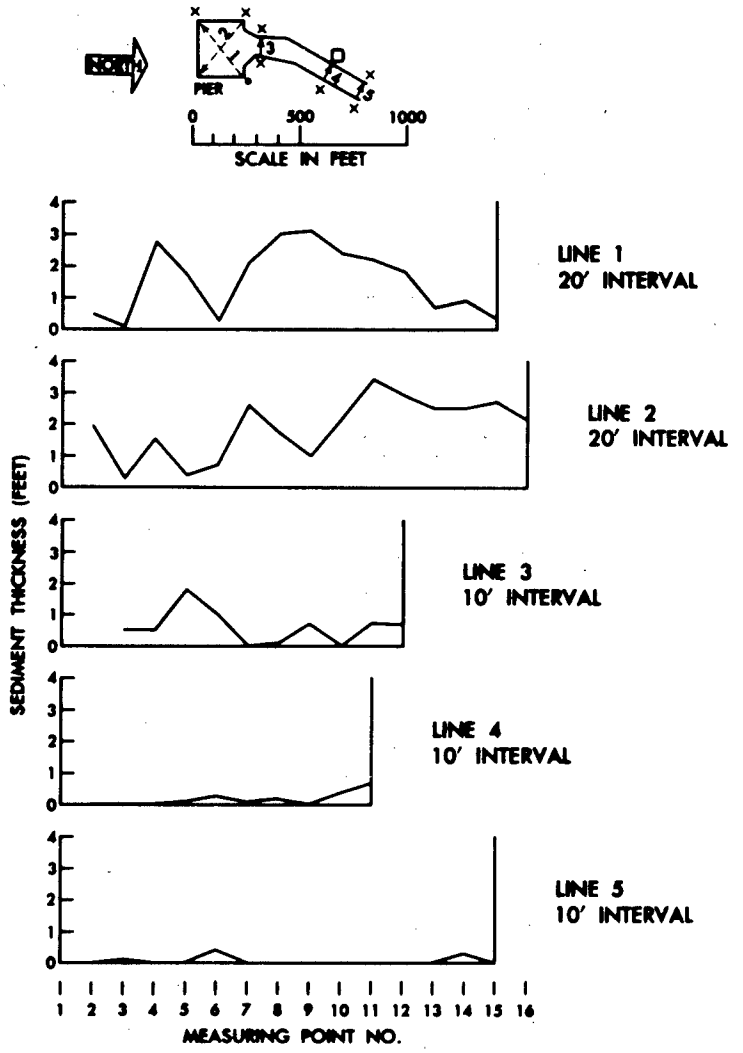

FIGURE 6 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 4 (GOLDING CAY)

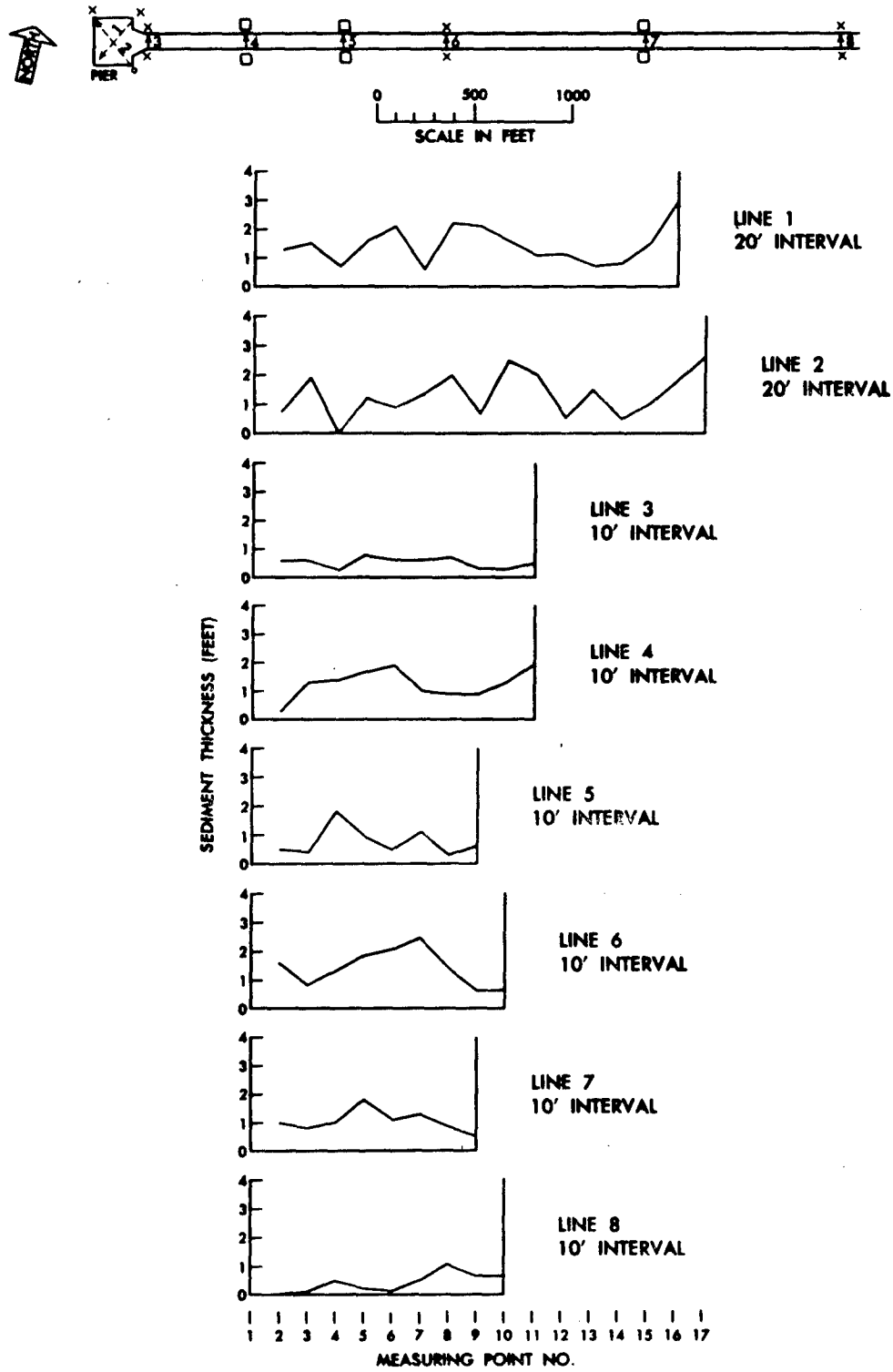

FIGURE 7 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 6 (DEEP CREEK)

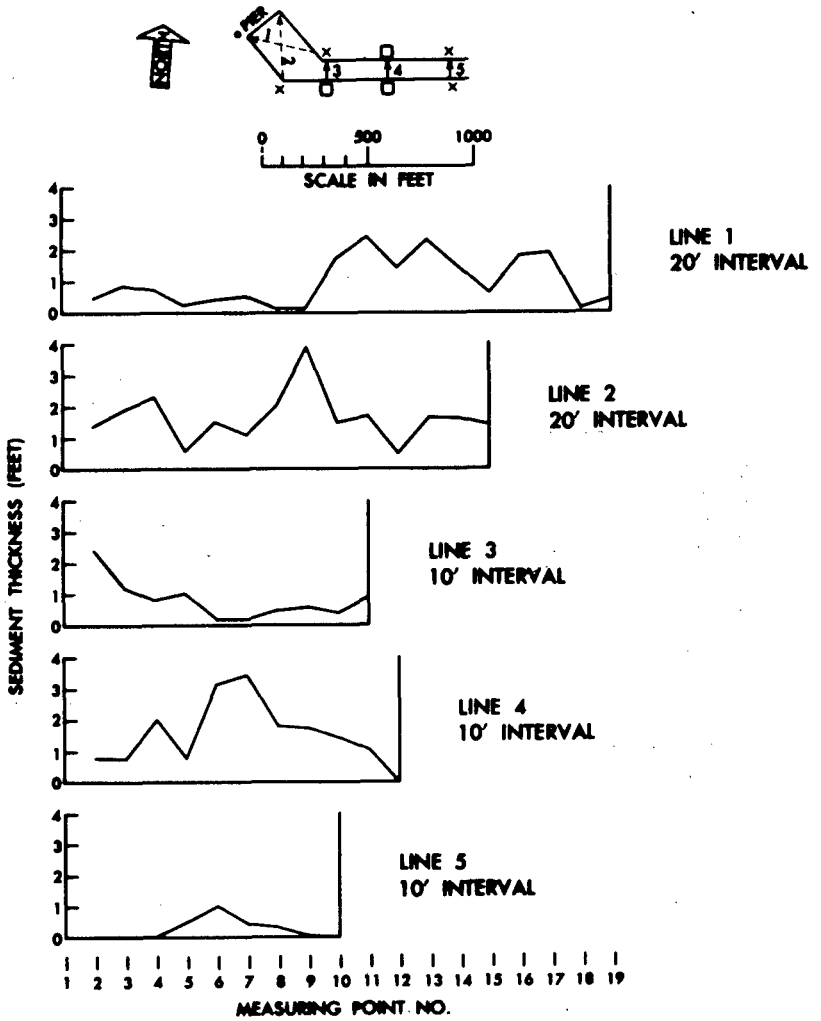

FIGURE 8 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 7 (HIGH POINT CAY)

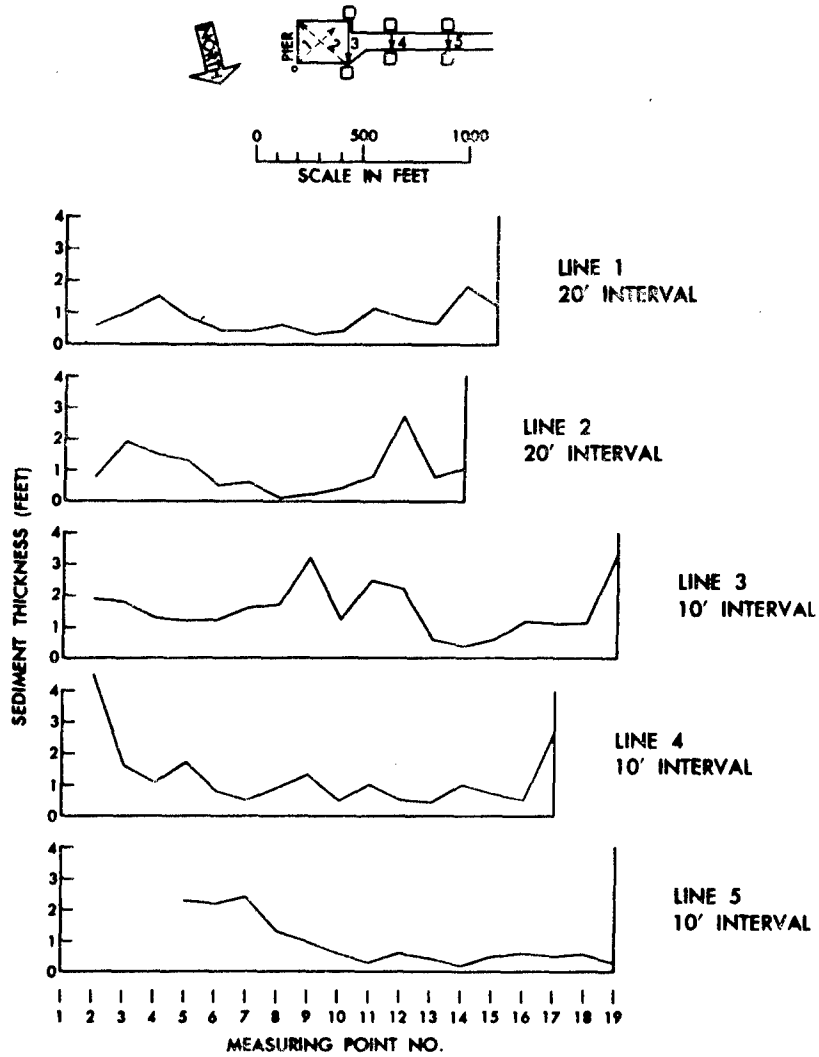

FIGURE 9 SEDIMENT THICKNESS OVER BEDROCK, FEB 1967, SITE 16 (PIPE CAY)

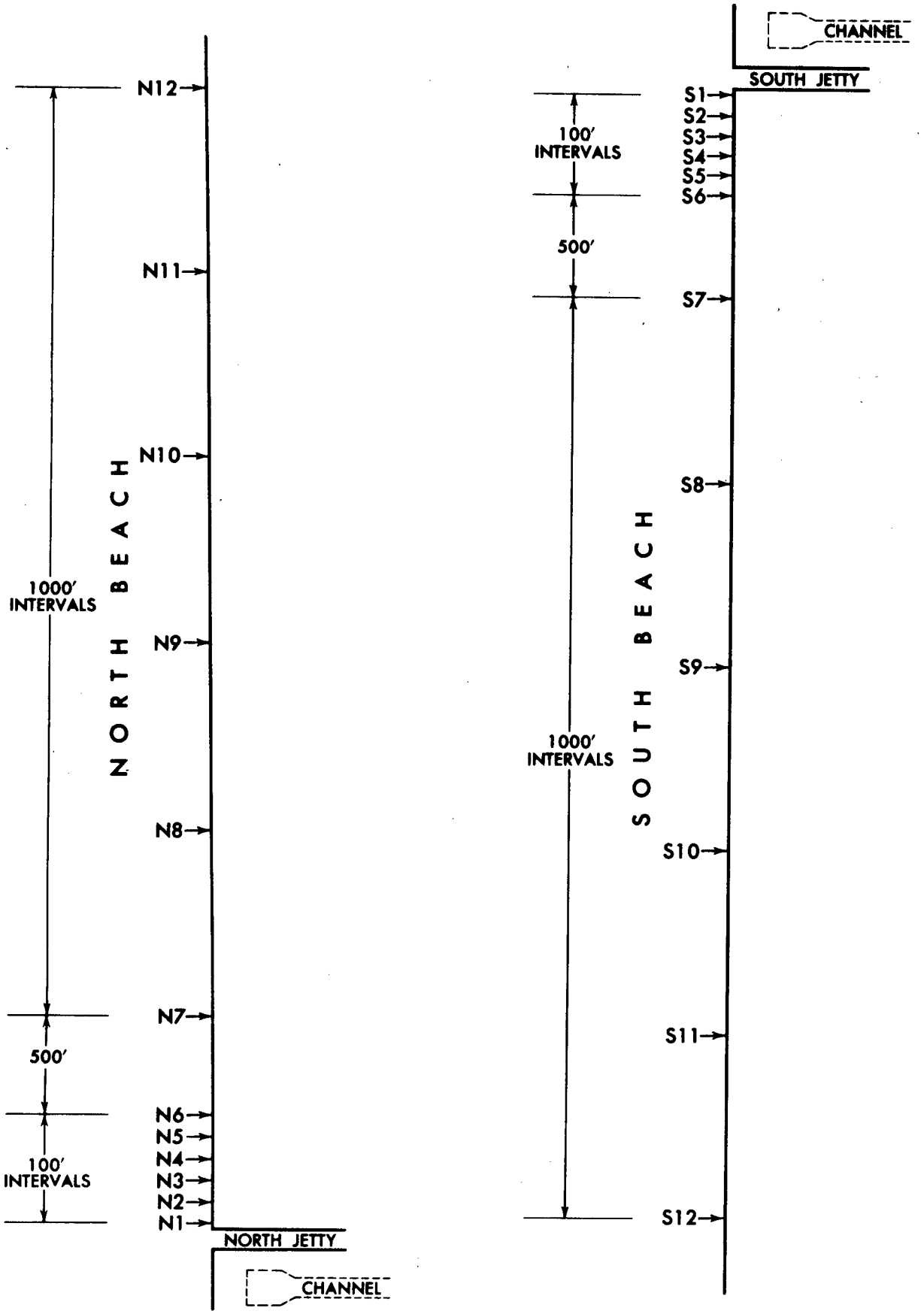

FIGURE 10 LOCATOR DIAGRAM FOR BEACH PROFILES AT SITES 1, 2, 3, AND 6.

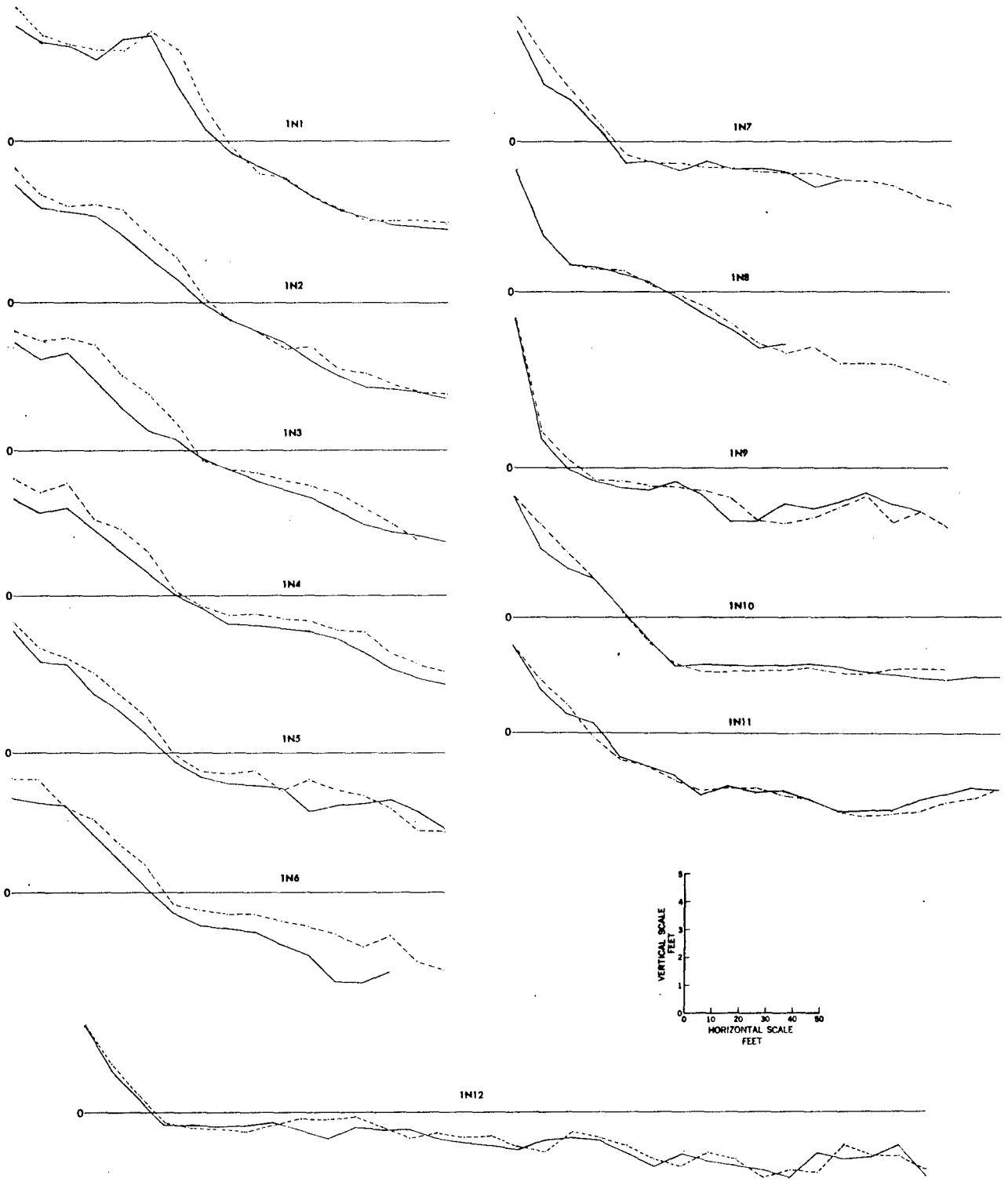

FIGURE 11 BEACH PROFILES AT SITE 1, NORTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

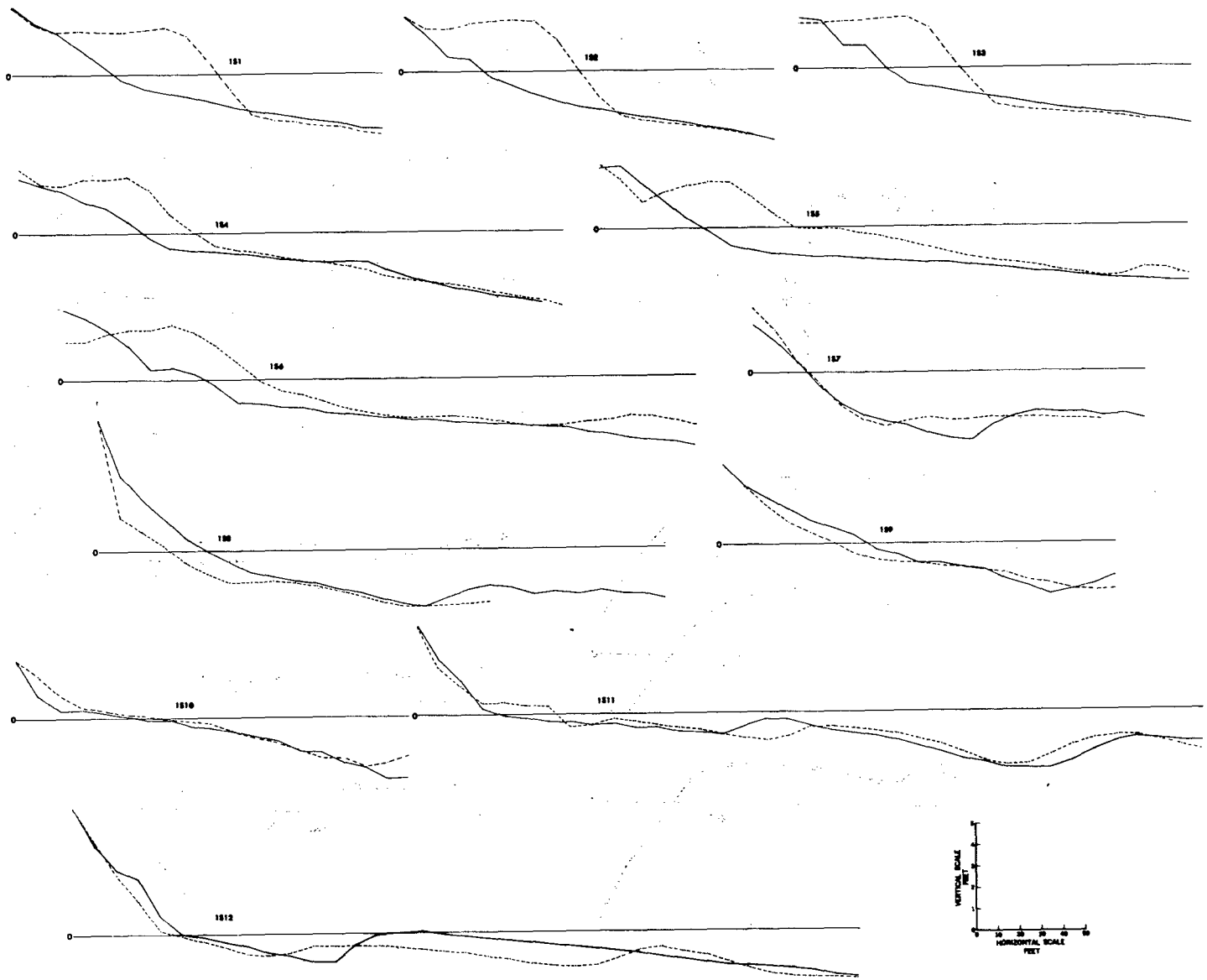

FIGURE 12 BEACH PROFILES AT SITE 1, SOUTH BEACH.
SOLID LINE IS PROFILE IN FEB 1984.
DASHED LINE IS PROFILE IN AUG 1984.

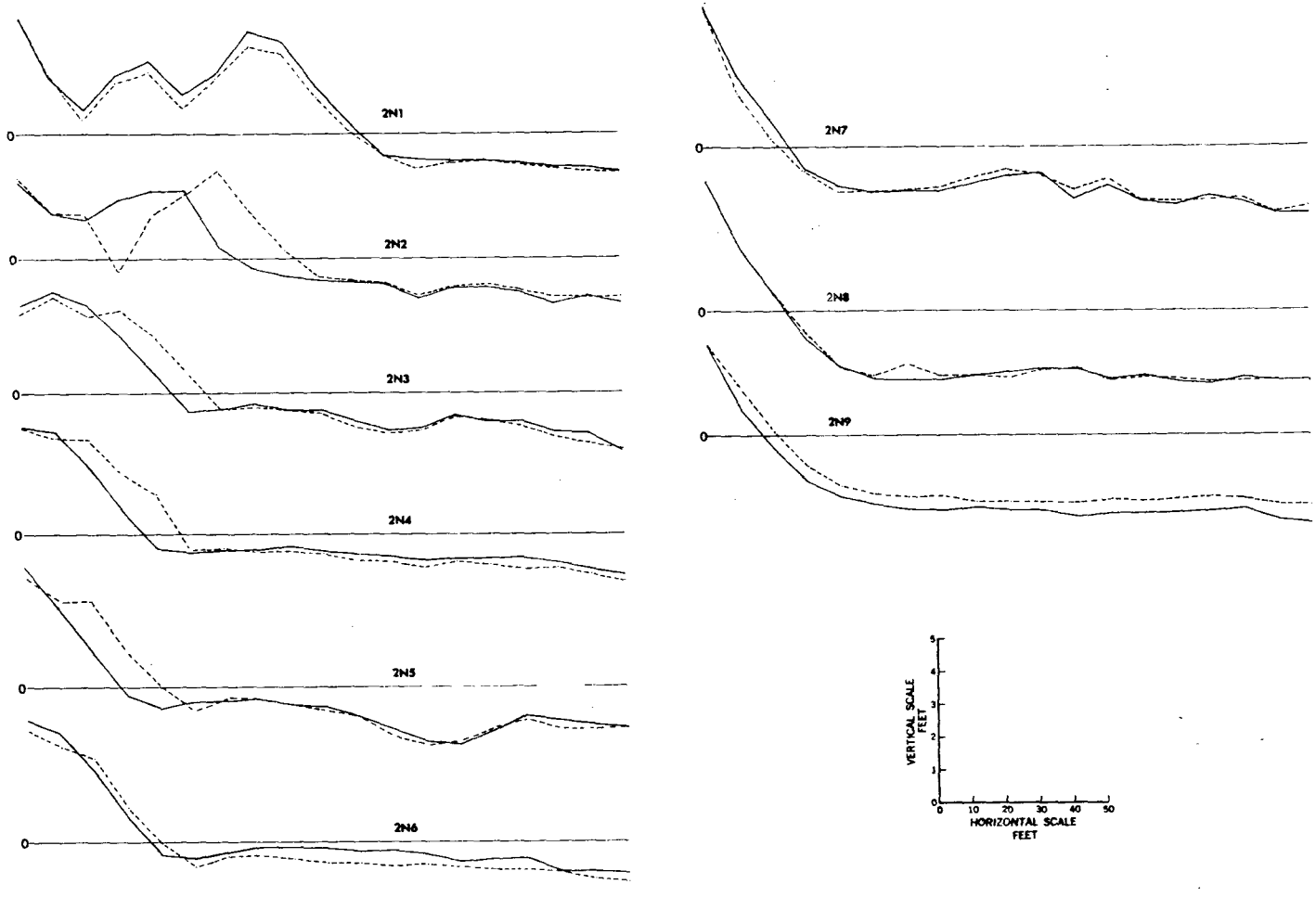

FIGURE 13 BEACH PROFILES AT SITE 2, NORTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

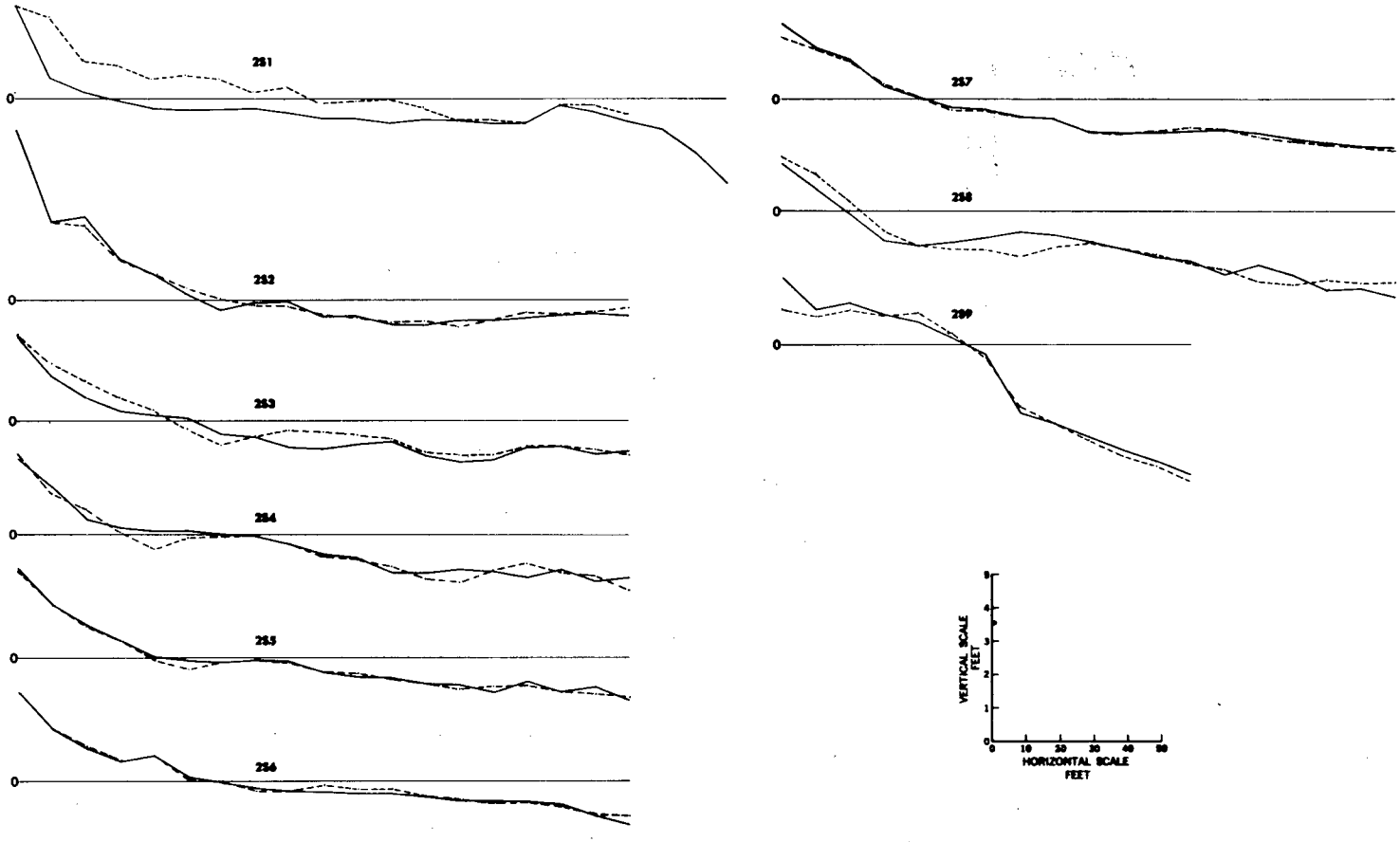

FIGURE 14 BEACH PROFILES AT SITE 2, SOUTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

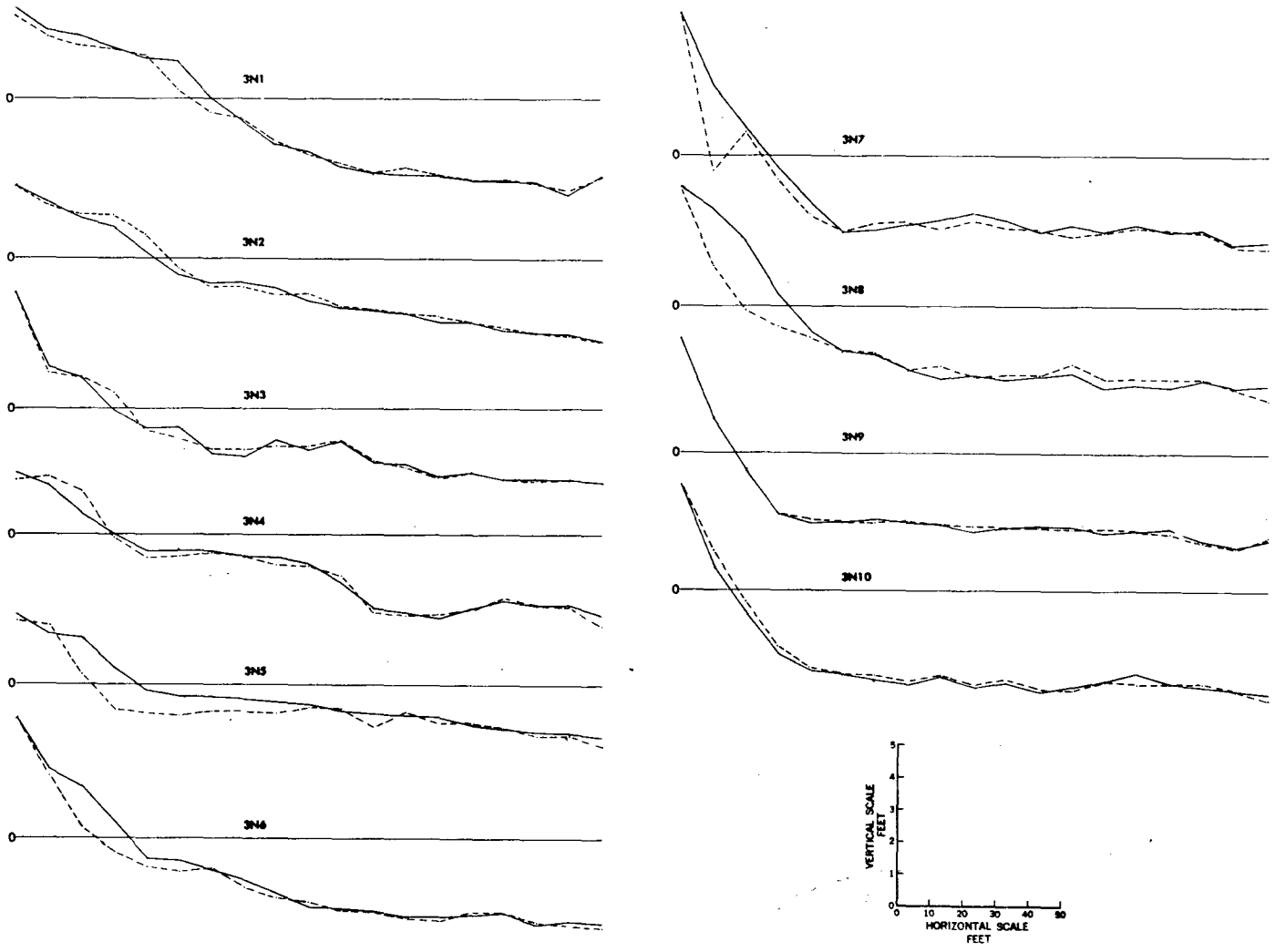

FIGURE 15 BEACH PROFILES AT SITE 3, NORTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

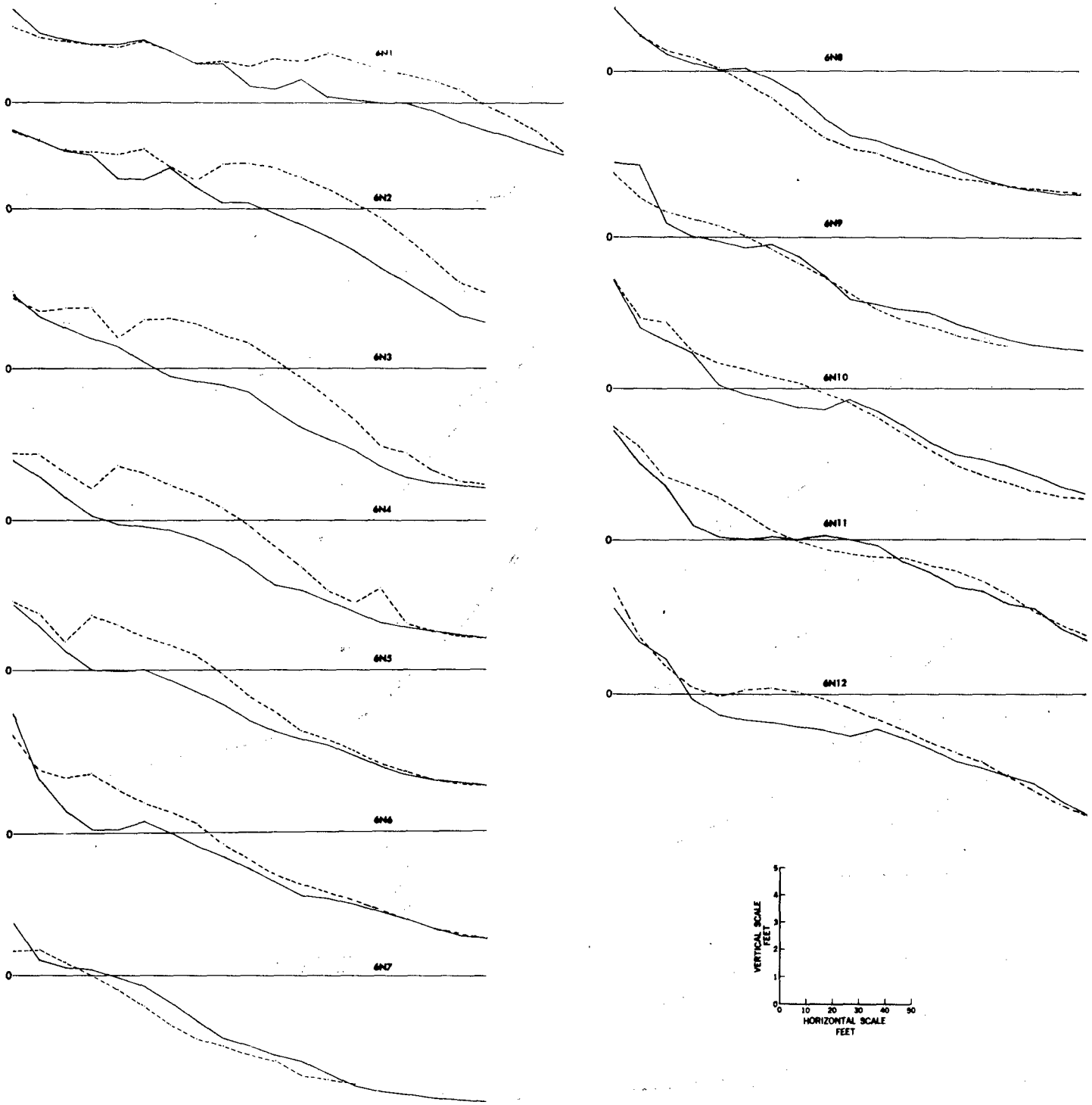

FIGURE 16 BEACH PROFILES AT SITE 6, NORTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

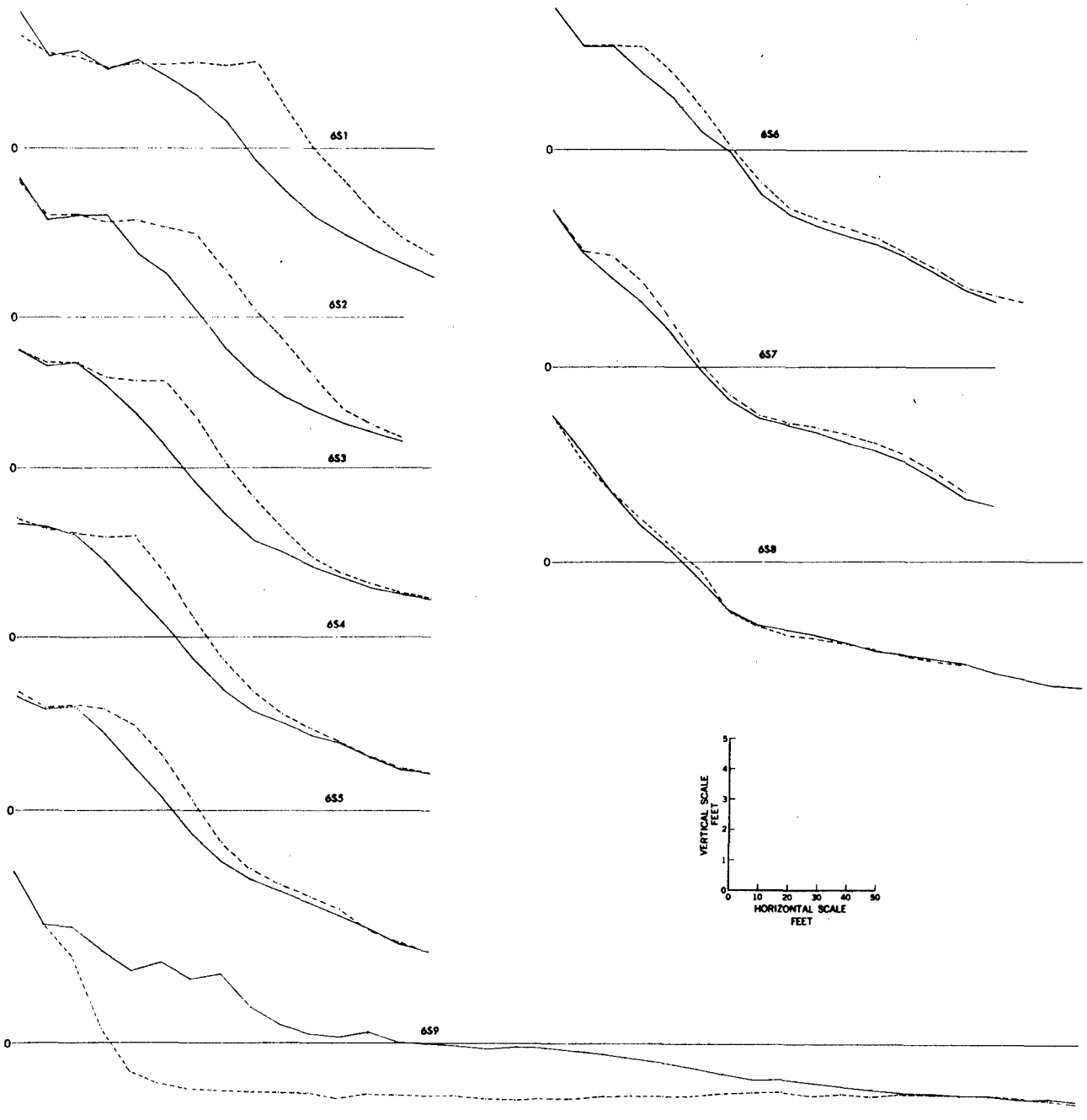

FIGURE 17 BEACH PROFILES AT SITE 6, SOUTH BEACH.
SOLID LINE IS PROFILE IN FEB 1966.
DASHED LINE IS PROFILE IN AUG 1966.

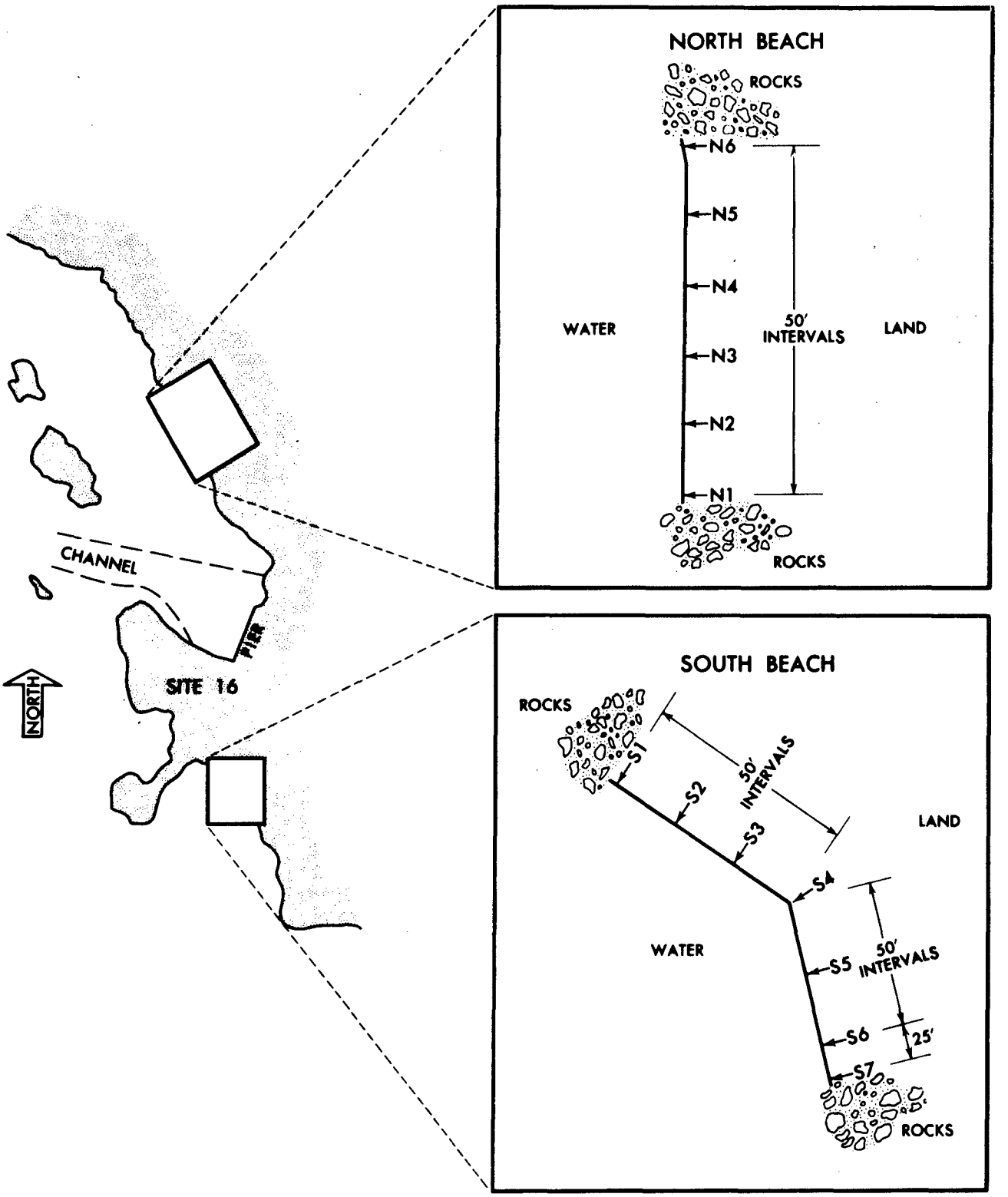

FIGURE 18 LOCATOR DIAGRAM FOR BEACH PROFILES AT SITE 16

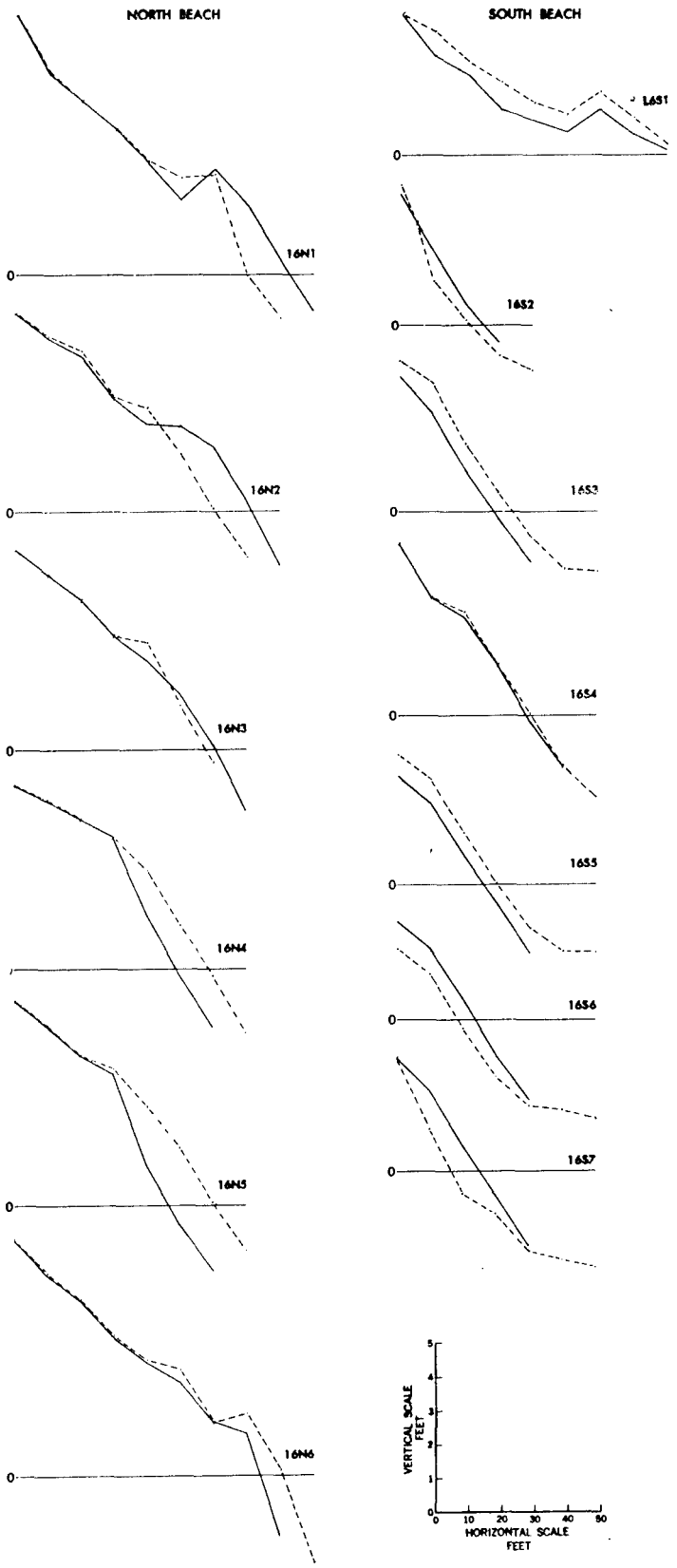

FIGURE 19 BEACH PROFILES AT SITE 16, NORTH AND SOUTH BEACHES. SOLID LINE IS PROFILE IN FEB 1966. DASHED LINE IS PROFILE IN AUG 1966.

TABLE 1 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1966 (Con't)
(values in feet)

SITE 4

Point No.	Line Number 1**	2**	3*	4*	5*
1	0.0	1.5	0.3	0.0	0.0
2	1.6	2.1	0.1	0.0	0.0
3	0.9	2.8	0.5	0.0	0.0
4	0.6	3.0	1.1	0.0	0.0
5	0.7	2.0	1.5	0.0	0.0
6	1.2	3.4	0.9	0.0	0.0
7	2.0	1.0	0.8	0.0	0.0
8	2.1	1.0	2.0	0.0	0.0
9	1.7	0.9	1.1	0.0	0.0
10	3.0	1.0	1.0	0.0	0.0
11	1.5	0.7	0.7	0.0	0.0
12	2.0	0.5	0.5	0.0	0.0
13	0.1	0.5	0.5	0.0	0.0
14	2.3	1.1	1.1	0.0	0.0
15	2.2	0.0	0.0		
16	2.1				
17	0.2				

* 10' Sampling interval

** 20' Sampling interval

Site 4 average thickness 0.8 feet

SITE 16

Point No.	Line Number 1**	2**	3**
1	4.0	1.7	0.0
2	1.7	0.8	0.0
3	3.1	0.4	0.0
4	1.2	0.5	0.0
5	0.7	1.2	0.2
6	0.2	0.6	0.0
7	0.1	0.0	0.2
8	0.2	0.8	0.3
9	0.7	2.1	0.6
10	0.2	0.0	1.2
11	0.9	0.0	0.3
12	0.1	0.0	0.4
13	0.2		0.0
14	0.2		0.0
15	0.2		
16	0.2		
17	0.2		

* 10' Sampling interval

** 20' Sampling interval

Site 16 average thickness 0.6 feet

TABLE 2 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, AUG 1966
(values in feet)

SITE 1

Point No.	Line Number 1**	2**	3*	4*	5*
1	1.2	1.3	1.7	1.2	2.0
2	1.1	1.2	0.8	0.1	1.0
3	2.5	2.0	1.0	0.1	0.4
4	4.5	2.1	0.6	0.2	0.4
5	4.0	1.2	0.7	0.2	0.6
6	>5	4.0	0.3	0.9	0.5
7	4.8	1.4	1.0	0.2	0.3
8	2.5	2.0	1.0	0.0	0.3
9	>5	2.5	2.7	0.8	0.8
10	4.2	2.0	2.0	0.5	1.4
11	4.8	1.8	2.7	1.9	1.7
12	2.7	0.7			2.4
13					2.5

* 10' Sampling interval

** 20' Sampling interval

Site 1 average thickness 1.7 feet

SITE 2

Point No.	Line Number 1**	2**	3*	4	5*	6*
1	1.2	3.2	0.5	Not Sampled	1.0	0.3
2	2.2	1.5	0.2		2.3	0.0
3	0.6	2.3	0.3		2.3	0.0
4	2.0	1.2	1.2		0.3	0.0
5	2.1	1.3	1.3		0.0	0.0
6	1.7	1.0	1.0		0.0	0.2
7	1.5	2.2	2.2		1.0	0.0
8	1.0	1.7	1.7		0.0	0.9
9	1.5	0.2	0.2		1.3	1.2
10	2.0	0.7	0.7		0.2	0.3
11	2.9	0.5	0.5		0.4	0.0
12	0.7					1.9
13	2.3					1.4
14	0.7					

* 10' Sampling interval

** 20' Sampling interval

Site 2 average thickness 1.1 feet

TABLE 2 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, AUG 1966 (Con't)
(values in feet)

SITE 3

Point No.	Line Number 1**	2**	3*	4*	5*	6*	7*
1	2.0	2.5	0.2	0.0	1.9	1.0	0.7
2	2.2	2.1	1.7	0.2	1.7	1.6	2.6
3	1.2	2.5	1.2	0.1	1.4	1.6	3.5
4	1.8	2.7	2.0	0.2	0.9	1.3	2.1
5	3.3	3.4	1.7	0.1	1.5	1.1	1.9
6	2.3	2.4	1.6	0.2	0.7	1.2	1.8
7	2.4	1.6	1.8	0.2	1.2	1.2	1.1
8	1.8	2.2	1.3	0.2	0.9	0.8	0.7
9	2.8	1.4	1.3	0.2	1.1	1.3	0.7
10	2.6	1.0	1.6	0.0	1.1	1.9	0.9
11	3.2	1.3	1.7	0.1	0.8	2.3	0.5
12	1.1	4.0		0.1		2.5	0.6
13		3.3		0.2		1.6	0.8
14		4.5		0.2			0.8
15							0.2
16							0.7
17							1.2
18							1.2
19							1.4
20							1.6

* 10' Sampling interval

** 20' Sampling interval

Site 3 average thickness 1.4 feet

SITE 4

Point No.	Line Number 1**	2**	3*	4	5
1	1.0	0.9	0.4	Not Sampled	Not Sampled
2	0.4	3.3	1.2		
3	0.5	2.7	0.1		
4	2.0	2.1	0.2		
5	1.6	3.2	0.7		
6	1.2	3.0	0.4		
7	1.2	2.7	0.2		
8	2.1	2.7	0.2		
9	3.7	0.8	0.9		
10	2.0	0.7	1.0		
11	2.2	0.5	2.9		
12	2.6	0.7	3.2		
13	1.4	0.6			
14	1.6	3.8			
15	1.2				
16	0.7				
17	2.4				

* 10' Sampling interval

** 20' Sampling interval

Site 4 average thickness 1.6 feet

TABLE 2 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, AUG 1966 (Con't)
(values in feet)

SITE 6

Point No.	Line Number 1**	2**	3*	4*	5*	6*	7*
1	1.1	0.3	0.3	0.4	1.2	1.2	0.1
2	0.8	0.7	0.1	0.5	0.9	0.1	0.1
3	1.4	0.9	0.3	0.1	0.8	0.6	0.2
4	0.6	0.6	0.4	0.6	0.8	0.6	0.1
5	1.1	1.0	1.1	0.4	0.1	0.3	0.1
6	0.8	1.3	0.7	0.4	0.1	0.2	0.1
7	0.7	1.5	0.8	0.4	0.7	0.0	0.0
8	1.6	1.2	0.7	0.2	0.6		
9	1.4	1.8	0.8		0.6		
10	2.2	0.8	1.1		0.7		
11	0.6	0.5	0.3				
12	0.5	0.7					
13	1.4	0.7					
14	0.5	1.2					
15	1.6	0.6					
16	0.3	2.9					

* 10' Sampling interval

** 20' Sampling interval

Site 6 average thickness 0.7 feet

SITE 7

Point No.	Line Number 1**	2**	3*	4*	5*
1	0.2	0.6	3.8	0.2	0.4
2	2.2	0.3	1.4	0.5	0.4
3	3.1	0.7	0.0	0.3	0.4
4	0.2	0.3	0.5	0.3	0.4
5	1.2	0.2	0.8	0.4	1.1
6	0.1	0.1	0.2	0.7	0.2
7	0.7	0.2	0.3	0.1	0.8
8	0.2	0.2	0.4	0.4	0.0
9	0.9	1.7	0.4	0.6	
10	0.7	1.6	0.2	2.2	
11	0.7	0.9	0.3	1.0	
12	0.5	0.8	2.2		
13	0.2	2.1			
14	0.6	3.0			
15		1.5			
16		0.3			

* 10' Sampling interval

** 20' Sampling interval

Site 7 average thickness 0.8 feet

TABLE 2 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, AUG 1966 (Con't)
(values in feet)

SITE 16

Point No.	Line Number 1**	2**	3*	4*
1	1.2	0.7	1.5	0.0
2	1.5	0.7	1.2	0.0
3	1.2	0.4	2.4	0.1
4	1.5	1.5	1.0	1.2
5	1.0	0.7	3.0	1.0
6	0.2	0.3	0.5	1.2
7	0.8	0.0	0.8	2.1
8	1.0	0.0	2.0	1.3
9	2.0	0.5	1.0	1.1
10	0.0	0.2	0.0	1.1
11	0.5	0.7	0.4	1.2
12	0.2	1.7	0.0	0.0
13	0.2	2.4	0.4	0.6
14	1.2	0.7	1.5	0.0
15	1.0	1.1	0.5	0.0
16	1.0	1.5	0.7	0.7
17	0.7	1.7	0.2	0.0
18		2.4	1.2	0.0
19		>5	0.7	0.4
20			1.0	0.2

* 10' Sampling interval
** 20' Sampling interval

Site 16 average thickness 0.9 feet

TABLE 3 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967
(values in feet)

SITE 1

Point No.	Line Number 1**	2**	3**	4**	5**	6**	7**
1	-	-	-	-	-	-	-
2	2.7	3.1	2.3	0.7	-	1.7	-
3	3.7	1.4	2.6	0.5	2.6	2.2	5.0
4	3.7	0.8	2.3	2.7	3.4	0.2	1.6
5	4.1	1.1	2.7	1.2	3.6	1.0	1.0
6	2.7	0.7	1.9	4.1	3.3	1.2	0.5
7	1.6	1.6	1.0	3.1	2.0	0.8	0.3
8	1.9	2.5	0.5	>5	2.5	1.1	1.5
9	2.0	1.4	1.2	>5	2.7	1.0	0.0
10	2.1	1.5	-	3.2	2.0	1.1	0.0
11	1.2	2.6		4.6	4.1	1.2	0.0
12	1.8	3.1		>5	1.4	1.1	1.6
13	1.3	3.1		2.1	4.6	0.5	0.0
14	3.2	3.1		1.9	-	-	-
15	-	2.5		-			
16		3.6					
17		3.9					
18		3.4					
19		2.5					
20		2.8					

** All Lines 20' sampling interval

Site 1 average thickness 1.9 feet

TABLE 3 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967 (Con't)
(values in feet)

SITE 2

Point No.	Line Number 1**	2**	3*	4*	5*	6*	7*	8*	9*	10*
1	-	-	-	-	-	-	Not Sampled	-	-	-
2	1.2	1.4	0.1	1.2	3.1	4.0		0.0	0.0	0.0
3	1.2	2.5	0.1	1.1	2.6	>5		0.0	0.2	0.0
4	1.3	2.5	1.1	0.5	2.5	3.9		0.0	0.6	0.2
5	2.6	0.5	1.4	0.6	2.7	2.1		0.0	0.0	0.0
6	3.3	3.0	1.1	0.7	2.2	0.9		0.3	0.8	0.0
7	1.6	1.9	1.7	0.5	3.6	2.8		2.3	0.1	0.0
8	1.8	1.3	1.3	0.5	3.6	>5		1.0	0.4	0.2
9	2.8	0.8	2.4	0.9	3.1	>5		1.2	0.7	0.3
10	1.9	2.0	2.4	0.7	1.9	>5		1.1	0.6	0.0
11	1.6	1.5	2.8	0.8	4.6	1.8		0.4	0.5	1.6
12	2.4	1.4	1.6	0.8	3.2			0.6	0.3	0.0
13	2.0	1.6	2.2	2.1	-			1.5		0.0
14	3.2	2.4	-					0.7		
15	1.1	1.3						0.9		
16	1.2	1.9						0.8		

* 10' Sampling interval

** 20' Sampling interval

Site 2 average thickness 1.0 feet

TABLE 3 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967 (Con't)
(values in feet)

SITE 3

Point No.	Line Number 1**	2**	3*	4*
1	-	-	-	-
2	5.0	0.7	1.3	1.0
3	3.0	1.5	1.2	0.6
4	3.2	2.8	1.9	0.0
5	0.5	3.1	1.8	0.0
6	2.3	2.5	2.7	0.2
7	2.7	3.1	2.5	0.0
8	2.2	1.4	2.6	0.5
9	1.7	1.9	2.7	0.0
10	3.1	0.8	1.0	0.0
11	2.9	3.3	3.5	0.2
12	3.2	2.7	0.8	0.1
13	2.8	2.3	-	0.0
14	4.2	3.0		0.0
15	3.6	-		0.0
16	3.2			-
17	0.5			

* 10' Sampling interval

** 20' Sampling interval

Site 3 average thickness 1.8 feet

SITE 4

Point No.	Line Number 1**	2**	3*	4*	5*
1	-	-	-	-	-
2	0.5	1.9	-	-	0.0
3	0.1	0.3	0.5	0.0	0.1
4	2.8	1.5	0.5	0.0	0.0
5	1.7	0.4	1.8	0.1	0.0
6	0.3	0.7	1.0	0.3	0.4
7	2.1	2.6	0.0	0.1	0.0
8	3.0	1.7	0.1	0.2	0.0
9	3.1	1.0	0.7	0.0	0.0
10	2.4	2.1	0.0	0.4	0.0
11	2.2	3.4	0.7	0.7	0.0
12	1.8	2.9	0.7		0.0
13	0.7	2.5	-		0.0
14	0.9	2.5			0.3
15	0.3	2.7			0.0
16	-	2.1			
17		-			

* 10' Sampling interval

** 20' Sampling interval

Site 4 average thickness 0.9 feet

TABLE 3 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967 (Con't)
(values in feet)

SITE 6

Point No.	Line Number 1**	2**	3*	4*	5*	6*	7*	8*
1	-	-	-	-	-	-	-	-
2	1.3	0.8	0.6	0.3	0.5	1.6	1.0	0.0
3	1.5	1.9	0.6	1.3	0.4	0.8	0.8	0.1
4	0.7	0.0	0.3	1.4	1.9	1.3	1.0	0.5
5	1.6	1.2	0.8	1.7	1.0	1.8	1.8	0.2
6	2.1	0.9	0.6	1.9	0.5	2.0	1.1	0.1
7	0.6	1.3	0.6	1.0	1.1	2.4	1.3	0.5
8	2.2	2.0	0.7	0.9	0.3	1.4	0.9	1.1
9	2.1	0.7	0.3	0.9	0.6	0.6	0.5	0.6
10	1.6	2.5	0.3	1.3		0.6	-	0.6
11	1.1	2.0	0.5	1.9		-		-
12	1.1	0.6	-	-				
13	0.7	1.5						
14	0.8	0.5						
15	1.5	1.0						
16	3.0	1.8						
17	-	2.6						

* 10' Sampling interval

** 20' Sampling interval

Site 6 average thickness 1.0 feet

SITE 7

Point No.	Line Number 1**	2**	3*	4*	5*
1	-	-	-	-	-
2	0.5	1.4	2.4	0.8	0.0
3	0.9	1.9	1.2	0.8	0.0
4	0.7	2.3	0.8	2.0	0.0
5	0.2	0.6	1.0	0.8	0.5
6	0.4	1.5	0.2	3.1	1.0
7	0.5	1.1	0.2	3.4	0.4
8	0.1	2.0	0.5	1.8	0.3
9	0.1	3.9	0.6	1.7	0.0
10	1.7	1.5	0.4	1.4	0.0
11	2.4	1.7	0.9	1.0	-
12	1.4	0.5	-	0.0	
13	2.3	1.6		-	
14	1.4	1.6			
15	0.6	1.4			
16	1.8	-			
17	1.9				
18	0.1				
19	0.4				
20	-				

* 10' Sampling interval

** 20' Sampling interval

Site 7 average thickness 1.0 feet

TABLE 3 - SEDIMENT THICKNESS OVER BEDROCK, AUTEC CHANNELS AND TURNING BASINS, FEB 1967 (Con't)
(values in feet)

SITE 16

Point No.	Line Number 1**	2**	3*	4*	5*
1	-	-	-	-	-
2	0.6	0.8	1.9	4.5	-
3	1.0	1.9	1.8	1.6	-
4	1.5	1.5	1.3	1.1	-
5	0.8	1.3	1.2	1.7	2.3
6	0.4	0.5	1.2	0.8	2.2
7	0.4	0.6	1.6	0.5	2.4
8	0.6	0.1	1.7	0.9	1.3
9	0.3	0.2	3.2	1.3	1.0
10	0.4	0.4	1.3	0.5	0.6
11	1.1	0.8	2.5	1.0	0.3
12	0.8	2.7	2.2	0.5	0.6
13	0.6	0.8	0.6	0.4	0.4
14	1.8	1.0	0.4	1.0	0.2
15	1.2	-	0.6	0.7	0.5
16	-		1.2	0.5	0.6
17			1.1	2.6	0.5
18			1.1	-	0.6
19			3.3		0.3

* 10' Sampling interval

** 20' Sampling interval

Site 16 average thickness 1.1 feet

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13. ABSTRACT

This report presents the results of the first three surveys in a planned series of seven replicate surveys. The study is designed to monitor sediment accretion and/or erosion on the beaches and in the channels at the AUTEC main base and downrange sites. The data collection methods are described in detail. Channel data are presented in tabular form for all three surveys and graphically for the third survey. Beach profiles show the change in the slope of the beaches over a six month period. The data are discussed and a few preliminary interpretations are made.

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