EVALUATION OF REEF SHELL EMBANKMENT

Final Report

by

James L. Melancon
Senior Soils Research Geologist

and

Steve G. Bokun
Soils Research Geologist

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METRIC CONVERSION FACTORS

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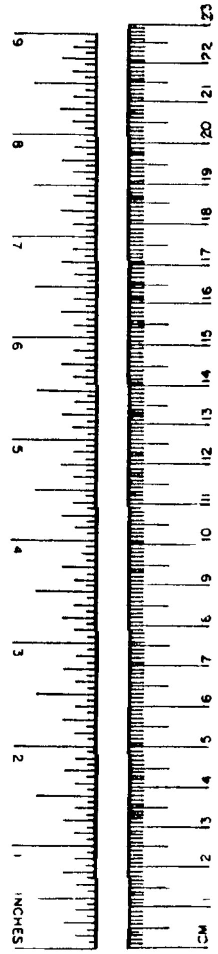
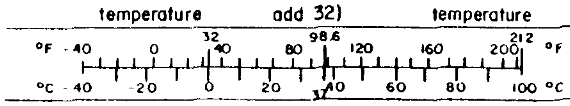
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.6	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



APPROXIMATE CONVERSIONS FROM METRIC MEASURES

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	36	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



ABSTRACT

This report discusses a method of constructing an embankment over marshland soils by end-dumping reef shell directly onto the marshland with no other major subgrade preparation. The dumped reef shell is then spread out to form a "floating" embankment over the soft marshland. This report compares the subsidence characteristics of a reef shell embankment with those of a clam shell embankment and determines if such a reef shell embankment would provide adequate structural support for traffic. The report indicates it is physically and economically feasible to construct a reef shell embankment on soft organic marshland soils. A properly constructed reef shell embankment develops into a homogeneous floating slab of substantial stability and strength capable of supporting allowable traffic loads.

IMPLEMENTATION

The concept of reef shell embankment construction has been recognized as feasible, and several projects in south Louisiana have been approved using shell for embankment material. The reef shell embankment is recommended as an alternate method in areas of the state where this type of construction will cross soft organic marshlands.

INTRODUCTION

For many years building roads in south Louisiana has been an expensive and difficult task. Roads had to follow the expensive high ground of natural levees along the many rivers, streams, and bayous of the southern part of the state. The areas between these natural levee systems became low lying wet swamplands and marshlands. The organic deposits of these mucklands are very soft rotting vegetative mats over lying soft clay layers with a few sand layers intertwined. Bridging of the swampland or marshland has been an effective but also a very expensive construction method. Excavation-backfill operations have been effective to some degree, but this method has also become expensive. Newer, cheaper methods of constructing roads across the low coastal mucklands must be found and put into use.

This report will discuss a method which shows promise, constructing an embankment over marshland soils by end-dumping reef shell directly onto the marshland with no other major subgrade preparation except for tree removal. The dumped reef shell is then spread out to form a "floating" embankment over the marshland.

OBJECTIVES

1. To investigate the feasibility of constructing a reef shell embankment directly upon in-situ marshland soil.

2. To ascertain the subsidence characteristics of such a reef shell embankment.

3. To compare the subsidence characteristics of a reef shell embankment with those of a clam shell embankment, both structures overlying organic deposits.

4. To determine if such an embankment would provide adequate structural support for traffic.

METHODOLOGY

The experimental reef shell embankment was part of State Project No. 424-08-08 Gibson-Raceland Highway relocating U.S. Highway 90. The 400 foot reef shell section was located between stations 346+50 and 350+50. On each end there was a 150 foot transition zone from the clam shell embankment which adjoins the reef embankment on both ends.

The reef shell embankment was constructed by end dumping the reef shell (Figure 1) directly on the marshland soils (Figure 2) with the only subgrade preparation being the clearing of trees. The trees were cut approximately six inches above the existing ground and disposed of beyond the limits of the right of way. The grass, stumps, and other vegetative material were left in place. After the trucks dumped the reef shell near the front working edge of the embankment construction zone, the shell was spread forward and outward by bulldozers being careful to maintain full embankment height and width in the construction zone. It is particularly important to maintain the full plan thickness in the construction zone, as a thinner lift may not tend to bridge the soft organic mat and soft organic clays underneath. A thinner lift would tend to fail when the heavy loads from construction and in-service traffic are applied. The leading point of the construction zone was approximately on a 45° angle with respect to the center line of the embankment. This angled attack tended to "roll" the resulting loose muck wave to the sides of the embankment and avoided trapping the loose muck underneath the embankment. An isometric view of this embankment construction zone appears in Figure 3. The cross section view in Figure 4 shows how the leading edge of the embankment was constructed. The bulldozer operator dozed the shell upward right at the leading face of the embankment and then let the shell tumble down the slope as the embankment proceeded forward onto the virgin marshland (Figure 5).

FIGURE 1

Close up view of typical reef shell

FIGURE 2

End dumped reef shell on marshland soil and grass

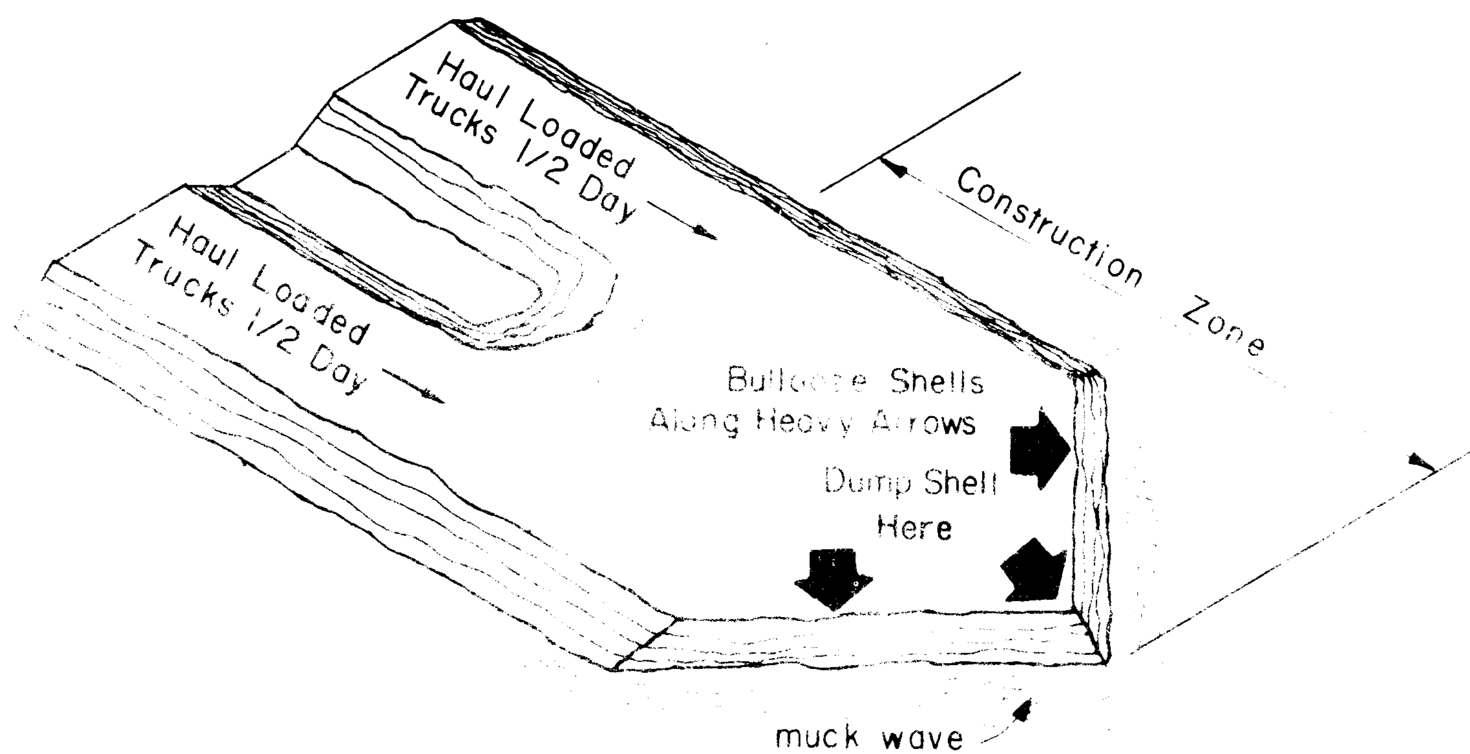


FIGURE 3

Isometric view of embankment construction zone

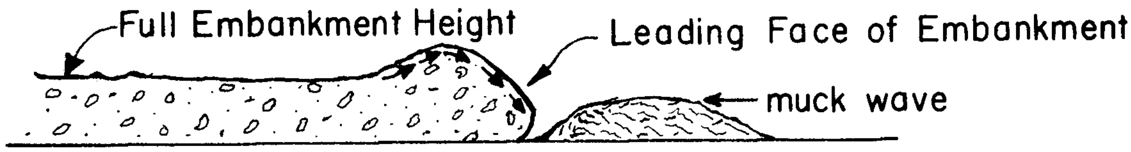


FIGURE 4

Cross section view of leading edge of embankment

FIGURE 5

Bulldozer operator pushing reef shell forward onto the virgin marshland

Research personnel installed a forty-foot pipe down into the marsh which established a permanent bench mark. This bench mark is located approximately 150 feet left of the centerline of the west bound lane at station 348+50. This bench mark was used for taking elevations of the settlement plates which were installed under the embankment. Elevations were taken before, during, and after embankment construction. These elevation figures vs time appear in the Appendix, on pages 31-49 for the reef shell and on pages 51-67 for the clam shell. Elevations were read for slightly less than 29 months after construction.

Figure 6 shows the plan layout of the settlement plates at the reef shell test embankment. There were originally fifteen settlement plates installed, although several were damaged by the haul trucks (Figure 7). Plates numbered 1, 3, 9, 13, and 14 can no longer be read. The settlement plate consists of a 30-inch round aluminum plate to which is attached a ten-foot length of 2-inch pipe. A ten-foot section of 4-inch aluminum pipe acts as a collar around the smaller 2-inch pipe, and the larger pipe is not attached to the smaller pipe or the settlement plate itself. This arrangement allows the inner pipe and plate to move independently of the outer 4-inch pipe, which acts as a protective collar from the locking effect of the reef shell. By accurately measuring, before installation, the length of the inner pipe, a distance is found which when subtracted from the elevation of the top of the inner pipe will give the elevation of the in-place settlement plate. Figure 8 shows this arrangement. By taking elevation readings on the plates, settlement versus time curves were developed. These elevations were taken before, during, and for many months after construction of the shell embankment. Figure 9 shows research personnel taking elevations on the settlement plates during the actual embankment construction. Figure 10 is a view of the completed embankment with the reef shell test section settlement plate riser pipes in view.

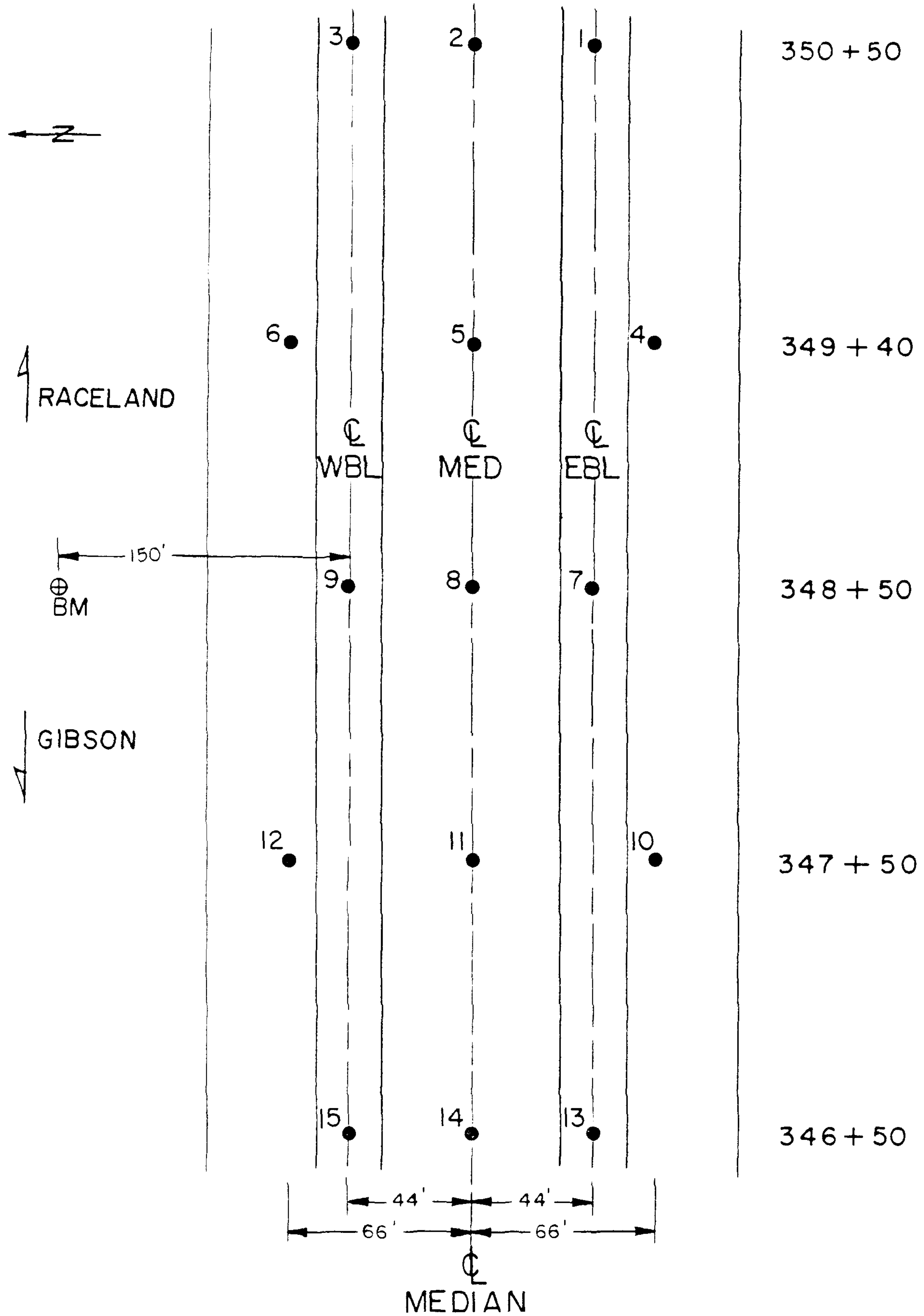


FIGURE 6

Plan view of settlement plates installed in reef shell test embankment

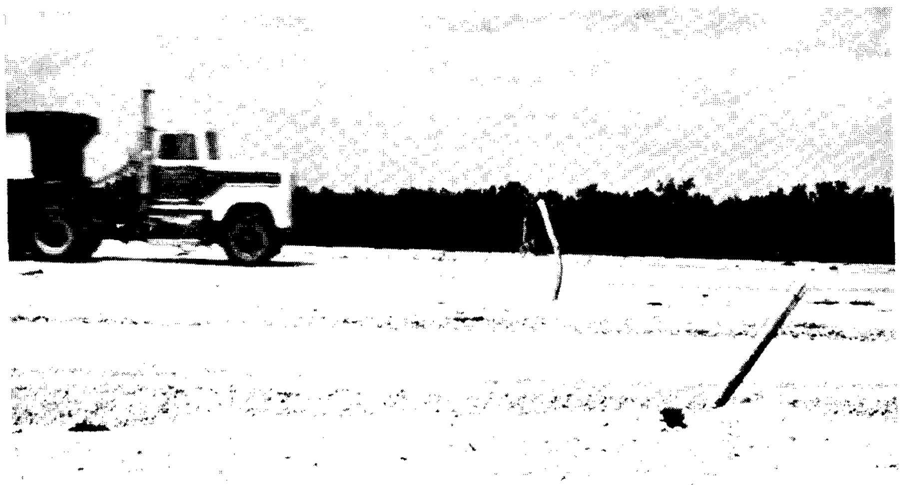


FIGURE 7

Some of the damage done to the settlement plates due to haul traffic

FIGURE 8

Settlement plates being assembled before installation beneath the reef shell test embankment

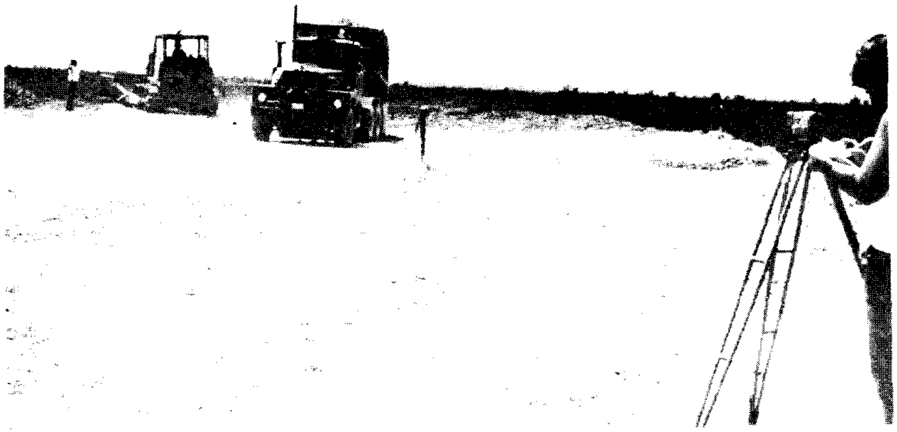


FIGURE 9

Research personnel taking elevations on the settlement plates in place

FIGURE 10

View of the completed reef embankment with the settlement plate riser pipes in view

DISCUSSION OF RESULTS

Feasibility of Construction

The results of this research project indicated that an embankment of reef shell could be constructed over soft in-situ marshland soils without subgrade preparation other than cutting of the few trees which grow in the marsh areas. The reef shell test section was constructed, as was the adjoining clam shell embankment in one five-foot-thick lift. Reef shell was dumped near the centerline of the embankment and worked forward and outward, maintaining plan elevation and crown width in the construction zone. It was important that loaded construction haul traffic use one roadway for 1/2 day then the other roadway for the remaining 1/2 day. This technique results in more uniform settlement of the shell embankment as it locks together to bridge the soft underlying materials. The reef shell's interlocking nature and strength from internal friction make reef shell embankment construction feasible as a strong monolithic floating slab results. The ability of the embankment to distribute deformations over a much larger surface also helped to reduce differential settlement.

Compaction Achieved

Although the dumping and bulldozer spreading of the reef shell in the construction zone had a slight compactive effort, the major effort resulted from the construction haul truck traffic. Nuclear moisture-density tests were taken about 14 months after the reef shell was put down. Haul trucks for the adjoining clam shell embankment as well as an adjacent sand embankment project traveled across the reef shell test embankment imparting heavy construction traffic loads on the reef embankment.

Density tests were taken with a Troxler Model 3411 nuclear device at one-foot intervals for the top four feet of embankment. Tests were taken at the median centerline and at both 32 foot and 56 foot left and right of the median centerline. The locations 32 foot left and right of the median centerline places the tests approximately in the inside wheel path of the inside lane. The locations 56 foot left and right of median centerline places the tests approximately in the outside wheel path of the outside lane. The shell was removed in one foot depth intervals with the help of a backhoe and much manual labor. Figure 11 shows the Troxler nuclear device taking a test at the 3 foot level.

A wide range of nuclear dry unit weights, from 84.3 to 114.0 pounds per cubic foot was obtained on the top foot of reef shell. The average for the top foot was 103.9 pounds per cubic foot. The low value of 84.3 pounds per cubic foot was obtained in the centerline of the median where there was much less haul traffic. The high value of 114.0 pounds per cubic foot was obtained, as one might suspect, in the inside travel lane where the haul traffic was concentrated. The top foot or so of the reef embankment formed a tough crust of crushed, well-compacted shell similar to that shown in Figure 12. Although Figure 12 is a picture taken in the adjoining clam embankment, the reef shell embankment also showed a "crust" in the top foot of shell. Beneath the top foot the densities tapered off as the depth increased. The nuclear dry weight densities with depth in the reef shell can be seen in Table 1. The average density results were 103.9 pounds per cubic foot for the first foot, 81.4 pounds per cubic foot for the second foot, 70.9 pounds per cubic foot for the third foot, and 67.9 pounds per cubic foot for the fourth foot from the surface.

Table 2 shows similar values obtained in the adjoining clam shell embankment. The field determined dry unit weight by truck volume measure for the reef shell was 69.2 pounds per cubic foot. The nuclear density tests were influenced by the standing water in the shell embankment (Figure 13) in the third and fourth foot tests which resulted in low densities due

FIGURE 11

Troxler moisture density device taking a test at the three-foot level

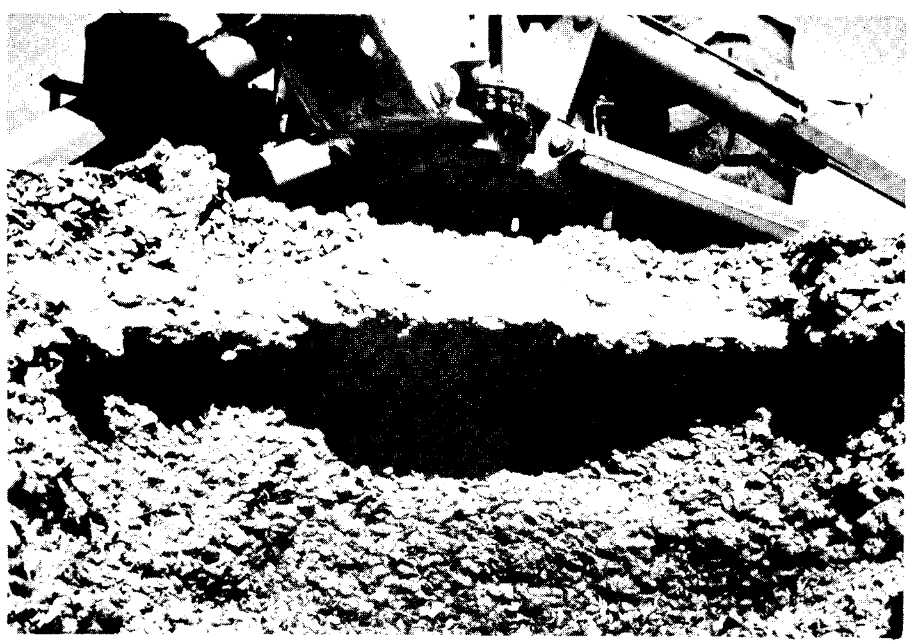


FIGURE 12

Crust of crushed well-compacted shell in the top one foot of the embankment

TABLE 1

NUCLEAR DRY WEIGHT DENSITIES WITH DEPTH IN REEF SHELL EMBANKMENT, POUNDS PER CUBIC FOOT

Station	Location	Depth from Surface of Embankment 0-1 foot	1-2 feet	2-3 feet	3-4 feet
349+57	32' Lt. Med. ℄	111.7	91.9	73.6	66.3
349+00	56' Lt. Med. ℄	102.1	95.2	76.2	67.1
347+65	32' Rt. Med. ℄	114.0	80.0	70.6	73.7
348+43	Med. ℄	84.3	68.6	66.4	70.0
348+00	56' Rt. Med. ℄	107.5	71.4	67.5	62.5

TABLE 2

NUCLEAR DRY WEIGHT DENSITIES WITH DEPTH IN CLAM SHELL EMBANKMENT, POUNDS PER CUBIC FOOT

Station	Location	Depth from Surface of Embankment 0-1 foot	1-2 feet	2-3 feet	3-4 feet
343+55	56' Rt. Med. ℄	102.5	82.1	73.4	70.5
343+55	32' Rt. Med. ℄	118.5	78.3	78.2	78.7
343+55	Med. ℄	88.4	81.1	78.3	72.6

FIGURE 13

Standing water which affected the third and fourth foot nuclear tests on the embankment to subtracting out the water from the wet weight densities. It was apparent that the reef shell was tightly knit together in the top four feet that was tested for densities.

Actual volume of reef dumped was 33,376 cubic yards for the reef test section. The calculated volume, from cross section measurements of the test section, was 24,478 cubic yards. Thus a factor of 1.36 should be used to estimate the actual amount of reef shell to be placed in order to obtain the required cross section volumes and embankment heights above the existing ground level.

If the surfacing of the shell embankment is to be accomplished under a separate contract at a later date, the shaping and dressing of the embankment should include scarification and uniform compaction of the top 6 inches to a minimum of 90% of the maximum laboratory density. This effort is recommended in order to eliminate any non-uniform compacted conditions resulting from haul traffic, as well as, facilitate the final cross section measurements. However, whether the embankment and pavement structure are constructed under one or separate contracts, it is recommended that final preparation of the top 6 inches prior to placement of the pavement structure include scarification and compaction to a minimum of 95% of maximum laboratory density.

Structural Support for Traffic

The reef shell test embankment proved to be a sound test section capable of supporting traffic loads. The reef shell test embankment was located close to one end of a 4.45 mile clam shell embankment and almost all the clam haul trucks traveled across the reef shell test embankment. Haul trucks also traveled across the reef shell embankment to get to an adjacent sand embankment project. Approximately 1,000,000 cubic yards of clam shell weighing about 1.8 billion pounds was hauled across the reef embankment. Approximately 350,000 cubic yards of sand weighing 9.5 million pounds was also hauled across the reef test embankment. When the weights of the haul trucks are added to the sand and shell weights, the combined total is 2,233,200 gross tons! These figures further translate into 577,037 equivalent 18,000 pound single axle loads or around 2 1/2 years of our interstate traffic loads.

The embankment has performed very satisfactorily, but the reader is again reminded that these load figures are claculated from construction traffic loads only. The embankment should continue to provide adequate structural support for in service traffic loads in the future.

Subsidence Characteristics

During construction, the loaded haul traffic was required to use one side of the embankment for half day and then the other roadway for the remaining half day. This was done to equalize traffic loads across the embankment.

The reef embankment measurements showed more settlement in the travel lanes than in the median or near the shoulders, as would be expected, since the lanes carried the construction traffic loads. As shell was displaced downward into the marsh, more shell was added from the median to keep the top of the embankment fairly level. The bottom profile of the reef embankment took on the shape of a wide W with the two low points of the W being under the travel lanes of the embankment. The adjacent clam shell embankment in the same general physical area took on the shape of a bowl with the lowest point of the profile being under the median or middle of the embankment.

The final thickness of the reef shell embankment was 5.68 feet thick for the 10 settlement plates out of 15 which could be read and thicknesses calculated. The thickness range went from 4.87 feet to 7.01 feet.

The thickness of the adjacent clam shell embankment was slightly more, 6.41 feet thick for the 5 settlement plates out of 8 which could be calculated. The clam shell range went from 4.42 feet to 7.62 feet.

The thickness measurements were calculated for the thickness of the reef and clam shell embankments after being in place for slightly more than 113 weeks on the reef embankment and 110 weeks on the clam embankment.

At 1.0, 2.2, 14.2, 39.3, 60.3, and 113.1 weeks after erecting the reef embankment, Departmental personnel established cross-sectional as well as settlement plate elevations which enabled the Departmental personnel to depict the configuration of the embankment.

Figure 14 is a depiction of the cross section shape of the embankment with these various time intervals. The cross section elevations depicted were taken at station 347+50 except for the centerline of the travel lane figures which were at station 348+50 for the east bound lane and station 346+50 for the west bound lane. It was necessary to combine three stations into a single composite station at 347+50, since there were no settlement plates installed in the travel lanes at station 347+50. This arrangement gives a good idea of how the reef embankment as a whole changed shape with time. Note that the thickness of the reef embankment (Table 3) increased slightly in the travel lanes and decreased in the centerline of the embankment median because the reef shell was rebladed in order to maintain grade. If the embankment plans call for a median ditch, it should be constructed by excavation of shell at the tail end of the construction zone (Figure 3).

Overall the reef embankment held together, due to the interlocking effect of the shell, and the embankment as a whole formed a homogeneous, monolithic slab which subsided into the marsh approximately three feet from the original ground elevation.

Subsidence of Reef versus Clam

With the reef shell embankment showing a slightly thinner section (.73 foot thinner) capable of bridging the same soft areas of marshland as a comparable clam shell embankment, money may be saved by using a slightly thinner reef shell embankment rather than a clam shell embankment. At current per yard prices reef shell is a little less expensive than clam shell. Reef shell is also a slightly lighter unit weight material; therefore, more yield or area coverage would result from the

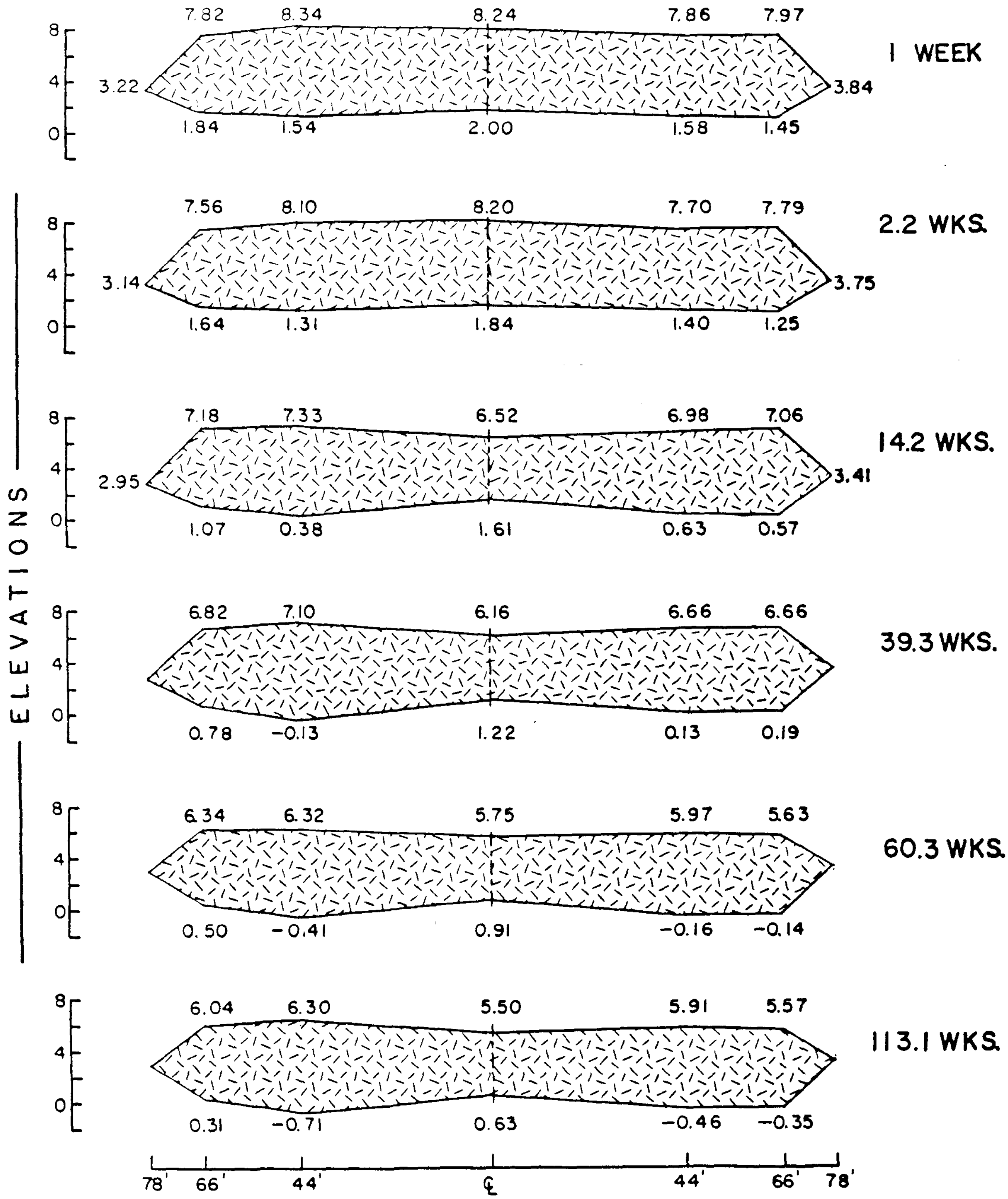


FIGURE 14

Composite Cross Section of Reef

Test Embankment at selected time intervals

TABLE 3

REEF SHELL EMBANKMENT THICKNESS WITH TIME IN FEET
AT STATION 347+50 (COMPOSITE)

Time after Construction Weeks	66 Feet Left of ℄	44 Feet Left of ℄	℄	44 Feet Right of ℄	66 Feet Right of ℄
1.0	5.98	6.80	6.24	6.28	6.52
2.2	5.92	6.79	6.36	6.30	6.54
14.2	6.11	6.95	4.91	6.35	6.49
39.3	6.04	7.23	4.94	6.53	6.47
60.3	5.84	6.73	4.84	6.13	5.77
113.1	5.73	7.01	4.87	6.37	5.92

use of reef shell rather than clam shell for embankment construction in marshlands. The subsidence into the marsh for the reef shell test embankment was calculated to be 3.08 feet, while the subsidence for the clam embankment was calculated to be 3.57 feet. The major subsidence for a reef embankment appears to occur during the first six to nine months after construction of the embankment.

Of course the availability of the different materials (reef vs. clam), the site accessibility and the economics of the two materials must be examined in order to obtain the most substantial savings to the Department.

SUMMARY AND CONCLUSIONS

The use of reef shell for construction of embankments on soft organic marshland soils has given the highway engineer another construction tool to add to his arsenal. The use of reef shell as a lightweight embankment fill material has overcome some of the problems connected with embankment construction on soft marsh soils using normal muck excavation and hydralic placement or truck-dumped sand embankments. The following conclusions can be formed at this time:

I. It appears to be physically feasible to construct a reef shell embankment directly upon in-situ soft marshland soils with the only subgrade preparation being the cutting and clearing of trees. The following technique is recommended in constructing a reef shell embankment:

   A. The reef shell should be end dumped to maintain a lift thickness in the construction zone at least five feet above the existing ground elevation. Anything less may allow a break through into the soft organic material when heavy loads are applied.

   B. The reef shell should be dumped near the centerline of the embankment and worked with the bulldozer forward and outward. The leading point of the embankment construction zone should be approximately on a 45° angle with respect to the centerline. This angled attack is geared toward pushing the mudwave to the sides of the embankment and not trapping any loose muck beneath the embankment.

   C. As construction proceeds care should be taken to maintain full embankment plan height and width.

D. The loaded haul trucks should use one roadway of the embankment for one half day, then use the other roadway for the remaining one half day. This process assures uniform embankment settlement under construction traffic.

E. If the shell embankment and pavement surfacing are to be done on two seperate construction contracts, the top 6 inches of the shell embankment should be scarified to eliminate the highly compacted areas from the wheel paths of the haul traffic and uniformly recompacted to a minimum of 90% of the maximum laboratory density. If the shell embankment and pavement surfacing are to be done under the same construction contract, the top 6 inches of the shell embankment should be scarified and uniformly recompacted to a minimum of 95% of the maximum laboratory density prior to placement of the base.

F. If the embankment plans call for a median ditch, it should be constructed by excavation of shell at the tail end of the construction zone being careful not to cut away too much shell which would affect the embankment's stability and strength.

G. The method of payment for the reef shell should be by truck measurement.

II. Compared to a sand embankment, it is economically feasible to construct a reef shell embankment over soft organic marshland soils. Since the cost of a shell embankment (reef or clam) is much less than the cost of mucking out and placement of a normal sand fill, many millions of dollars can be saved through the use of the shell embankment concept.

III. A properly constructed reef shell embankment develops into a homogeneous floating slab of substantial stability and strength. Differential settlement is reduced greatly by the reef embankments ability to flex within itself in distributing deformations. This structure should be capable of supporting allowable traffic loads.

IV. A factor of 1.36 is needed to calculate the volume of shell needed to give the embankment the required cross sections and heights above the existing ground level. This factor takes into account the compaction of the reef shell within itself and the subsidence or intrusion of the shell into the marshland.

V. The major subsidence for a reef embankment of this type should occur during the first six to nine months after general construction of the embankment to reasonable grade.

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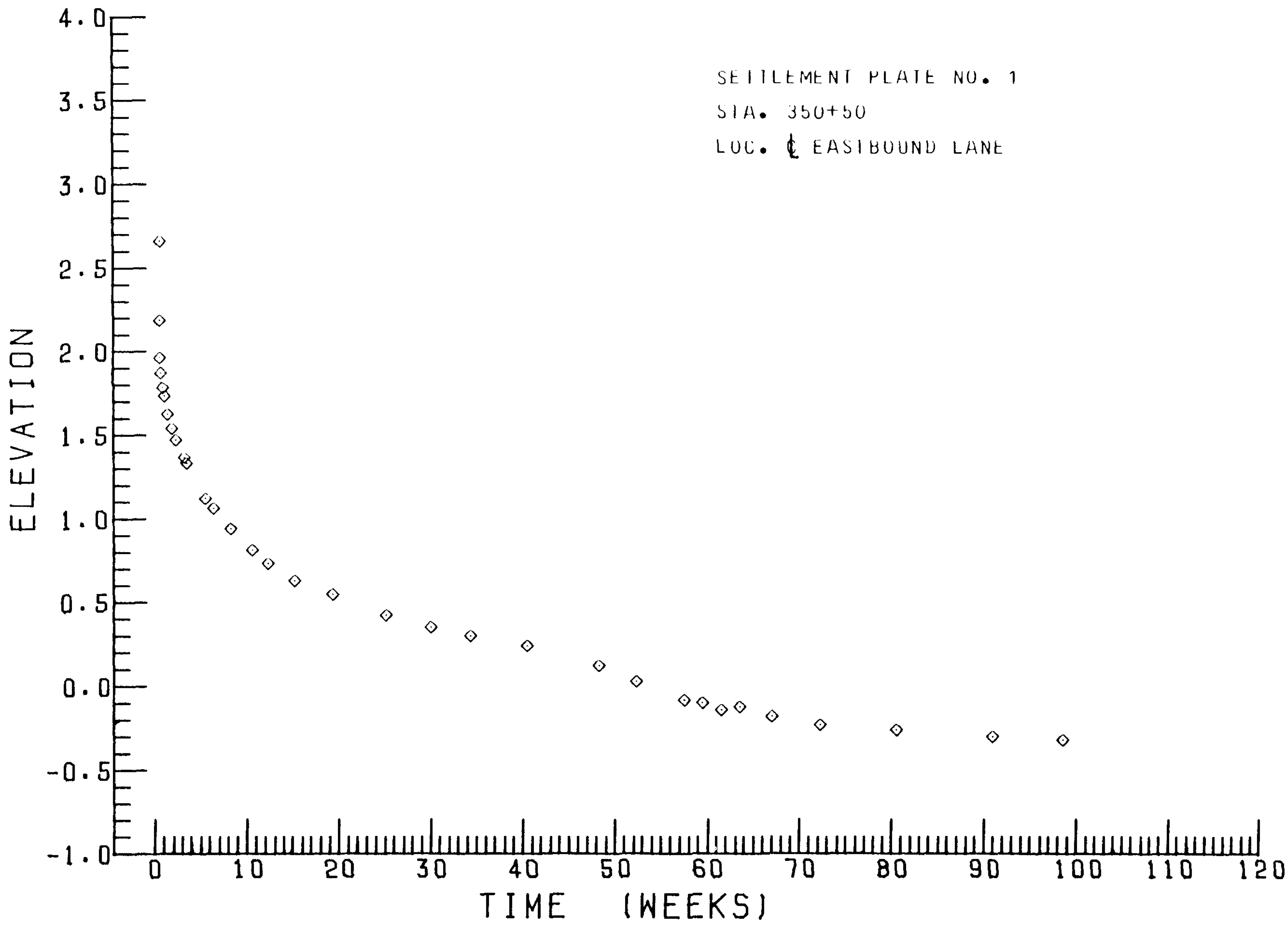
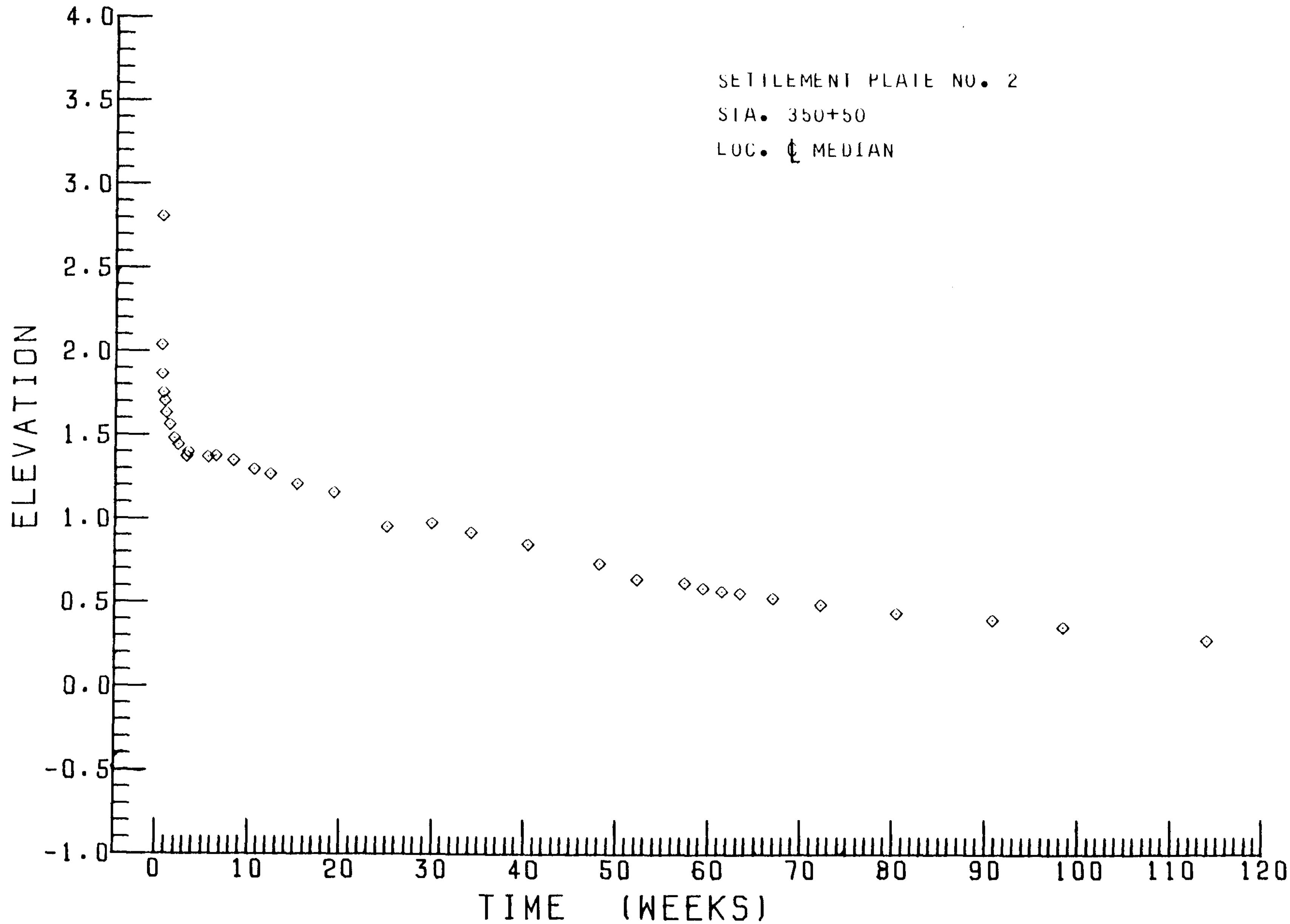
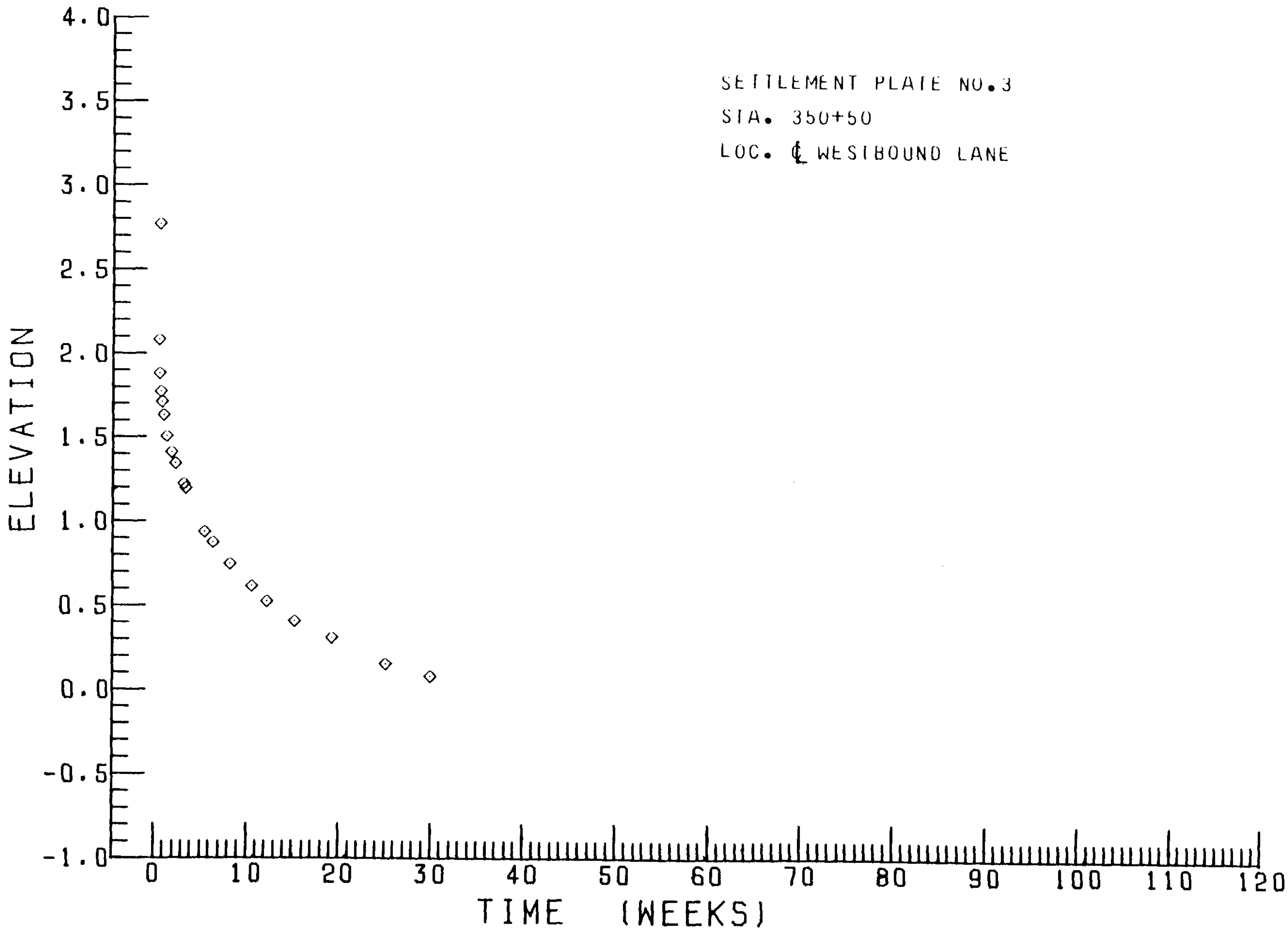
APPENDIX

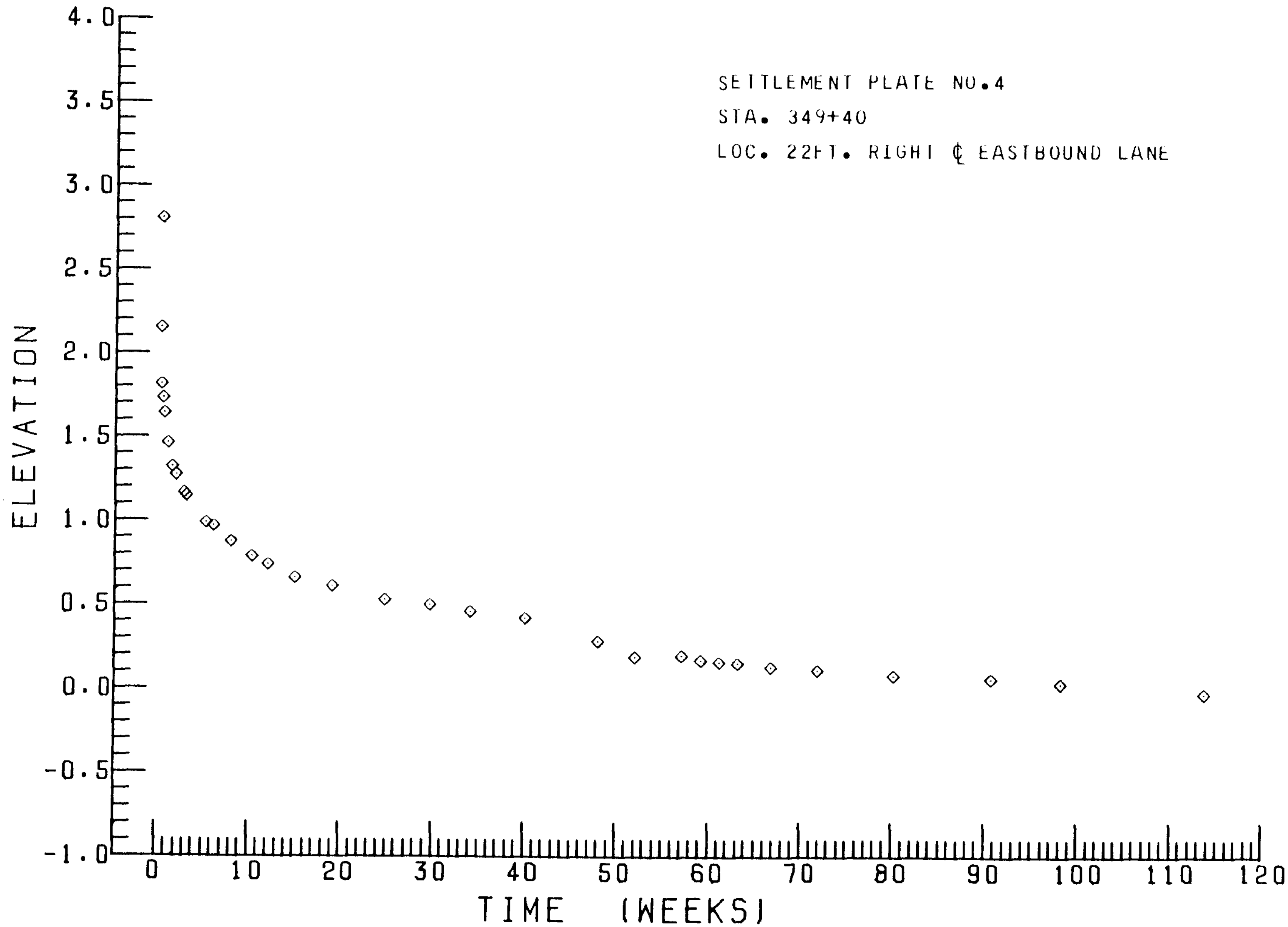
SETTLEMENT PLATE DATA

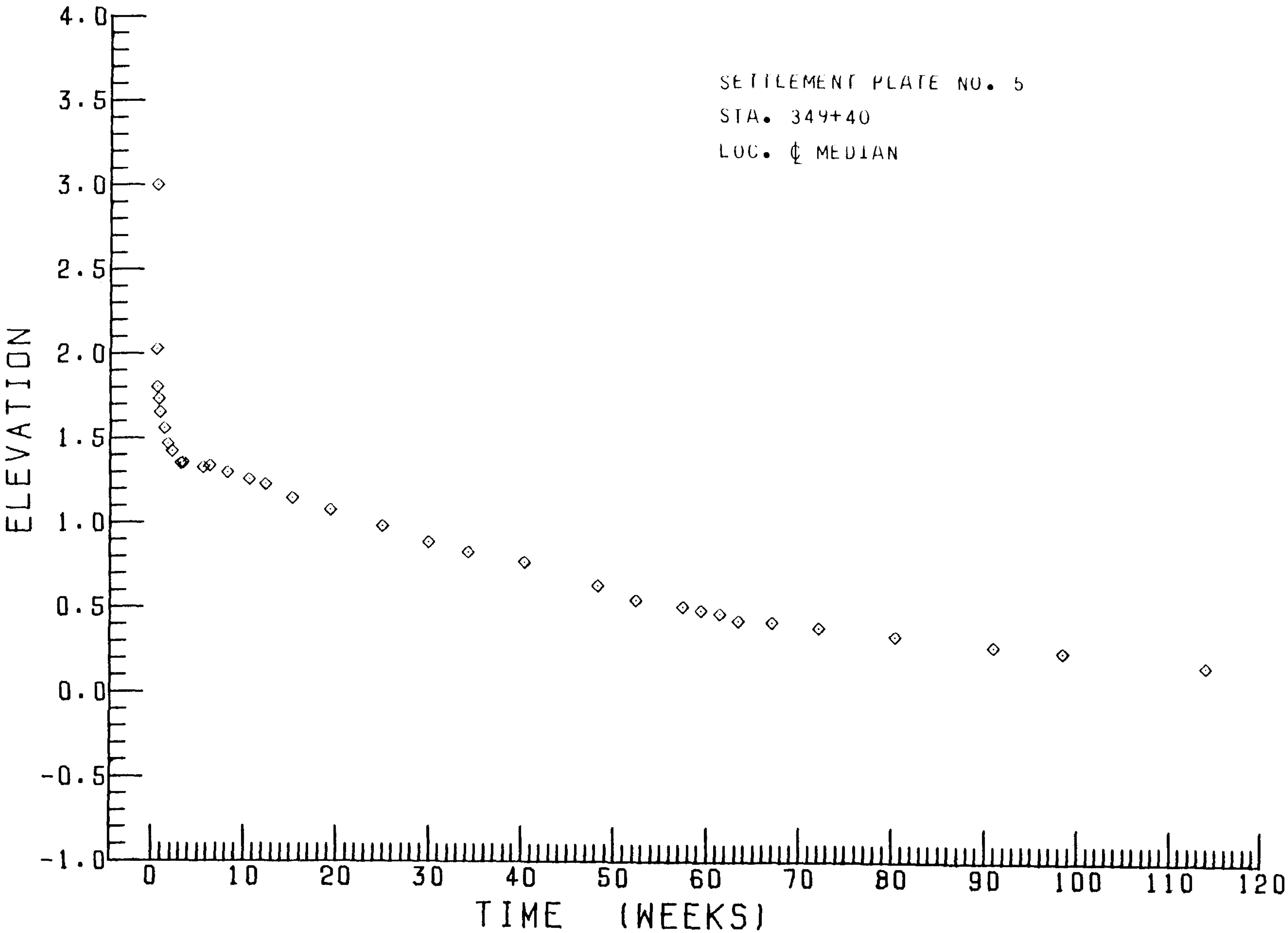
REEF SHELL EMBANKMENT

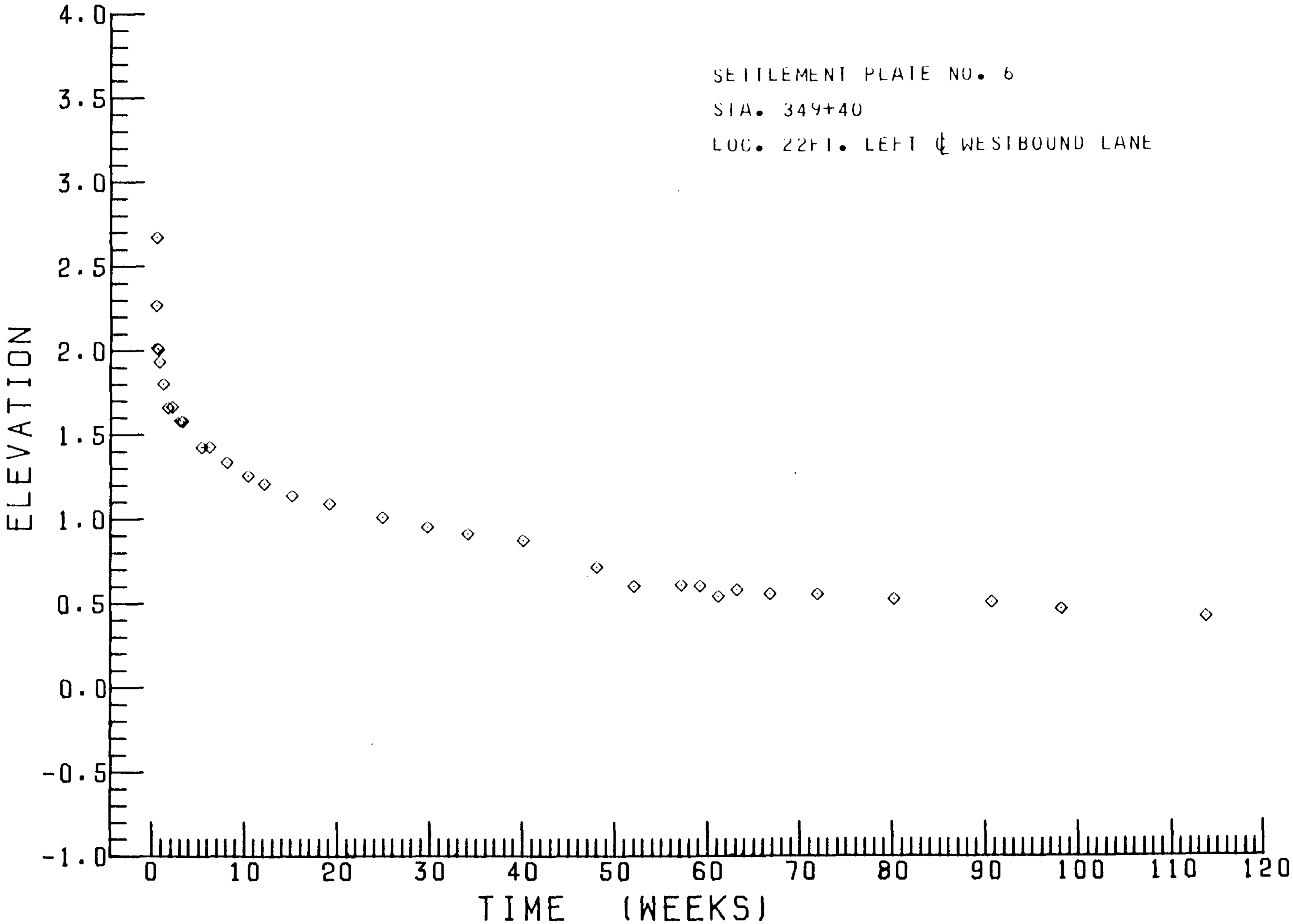

SETTLEMENT PLATE NO. 1
STA. 350+50
LOC. ℄ EASTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

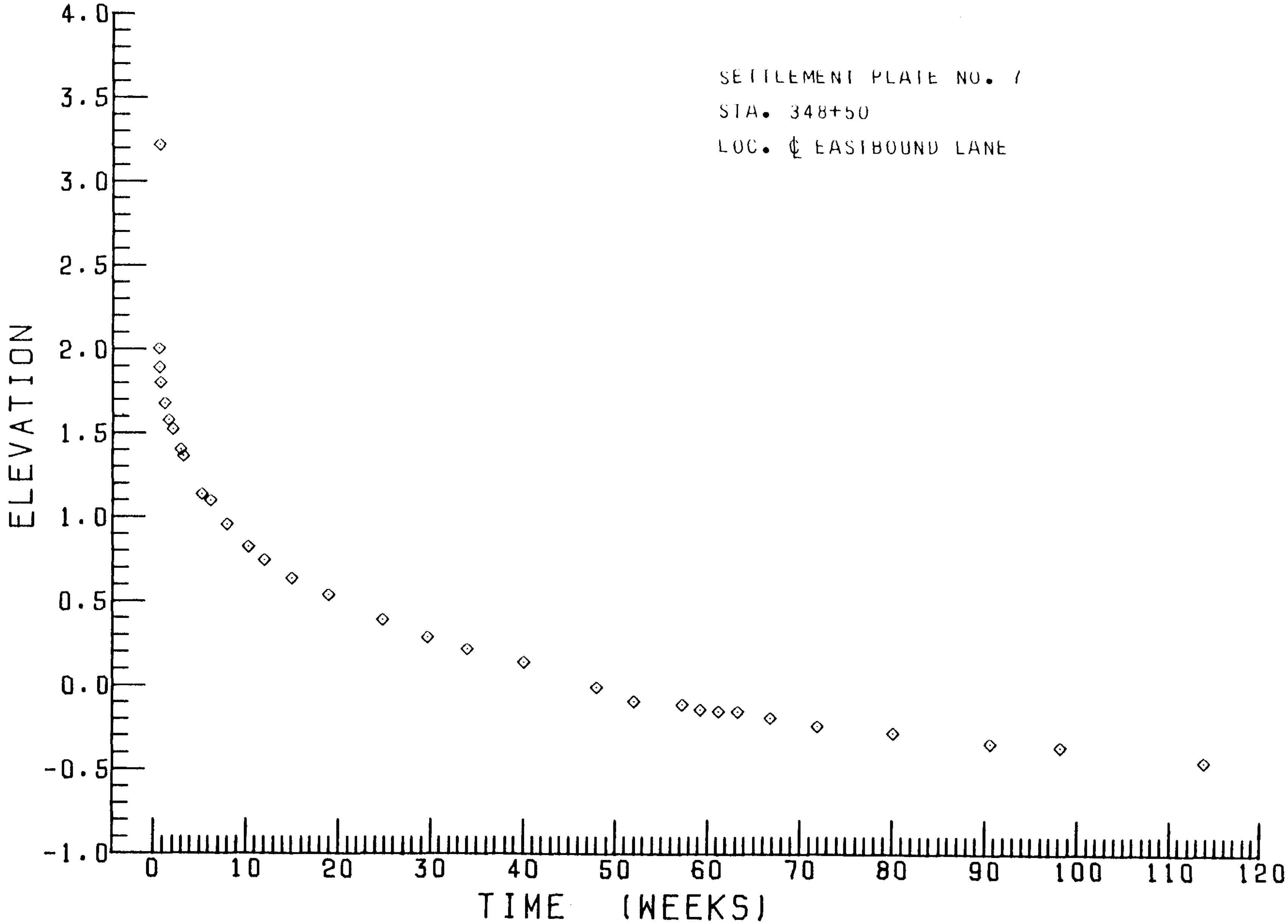

SETTLEMENT PLATE NO. 2
STA. 350+50
LOC. ℄ MEDIAN
ELEVATION
TIME (WEEKS)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120

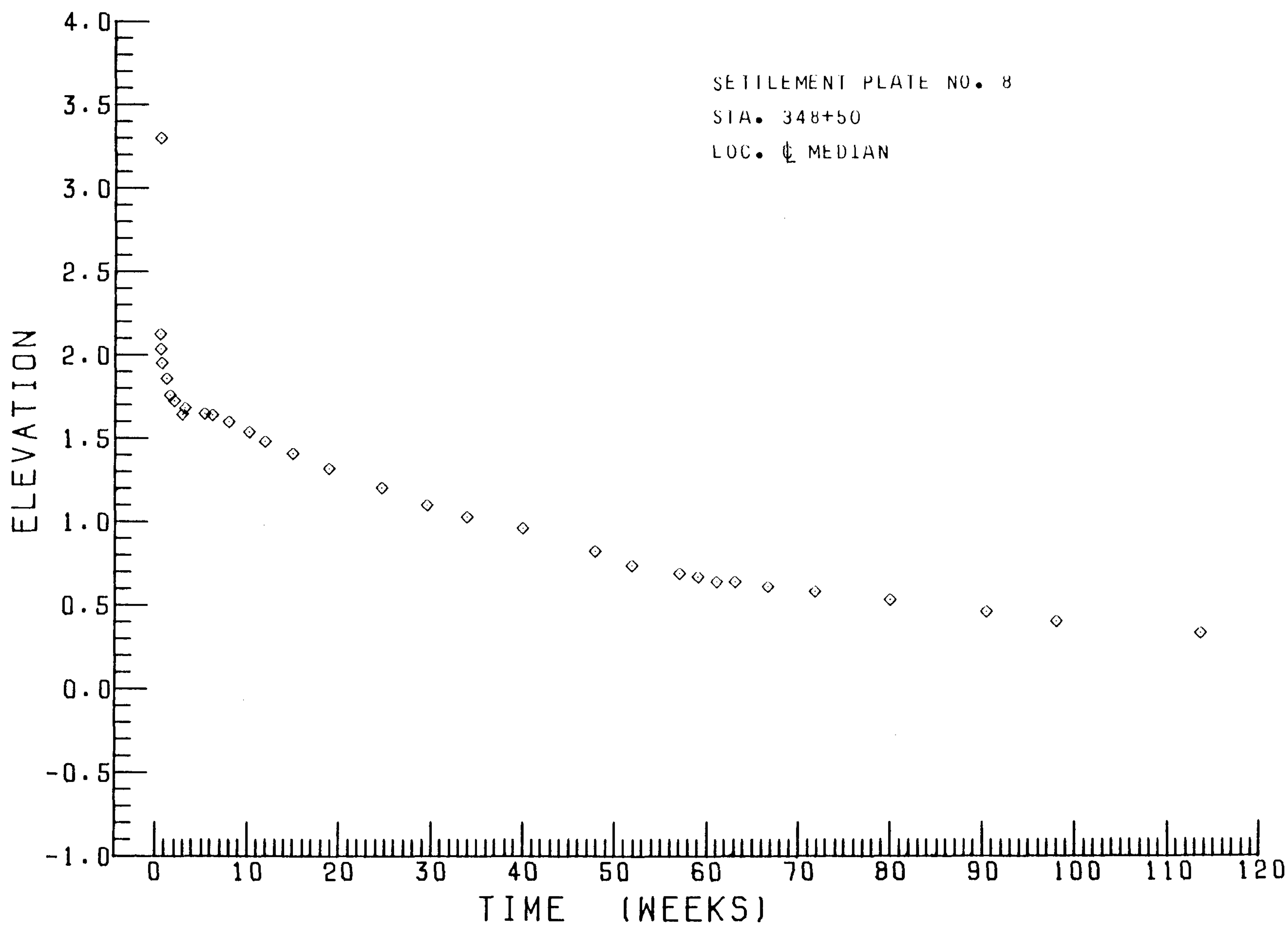

SETTLEMENT PLATE NO.3
STA. 350+50
LOC. ℄ WESTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
TIME (WEEKS)
0
10
20
30
40
50
60
70
80
90
100
110
120

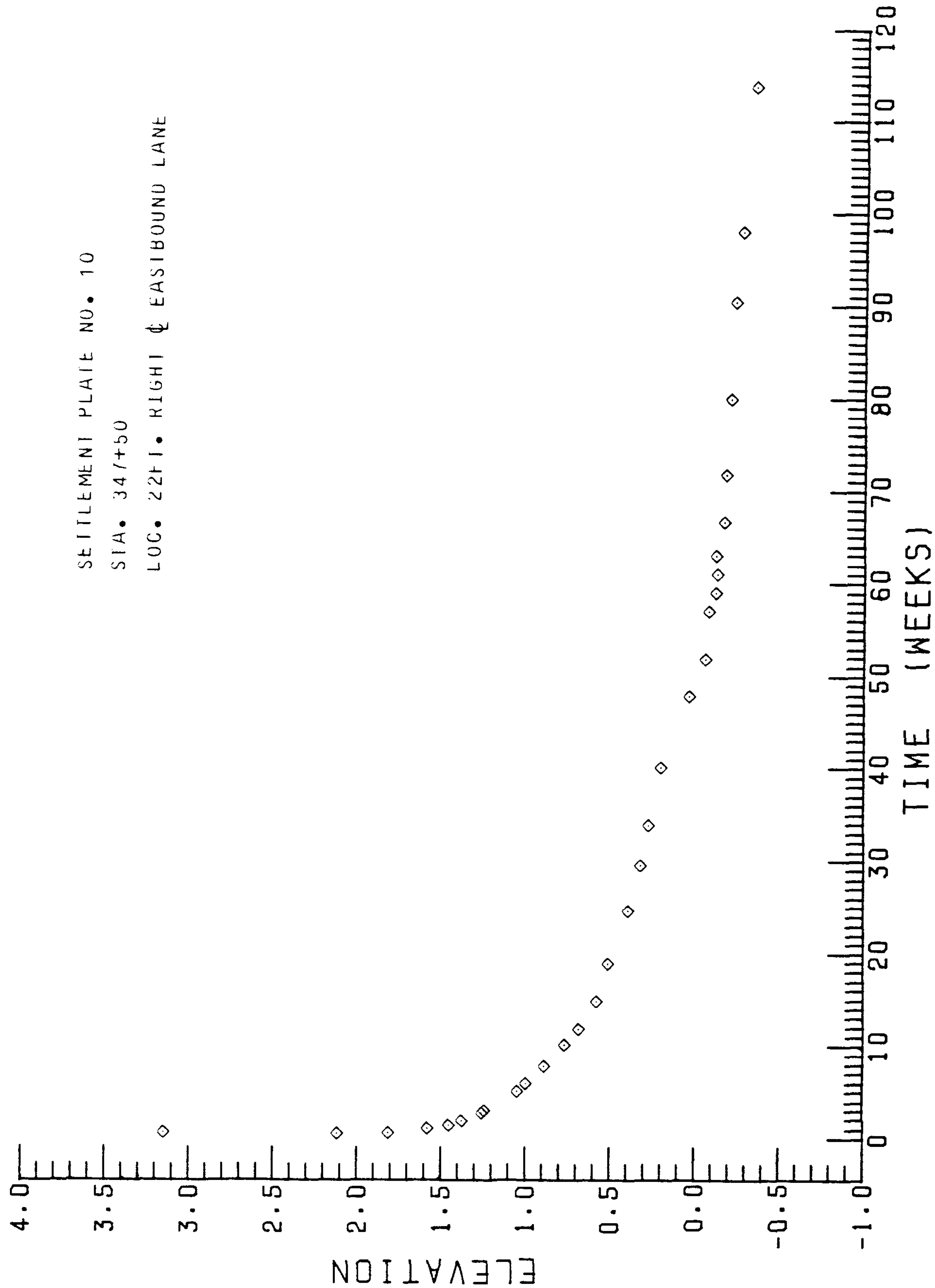

SETTLEMENT PLATE NO.4
STA. 349+40
LOC. 22FT. RIGHT ℄ EASTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)


SETTLEMENT PLATE NO. 5
STA. 349+40
LOC. ℄ MEDIAN
ELEVATION
TIME (WEEKS)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120

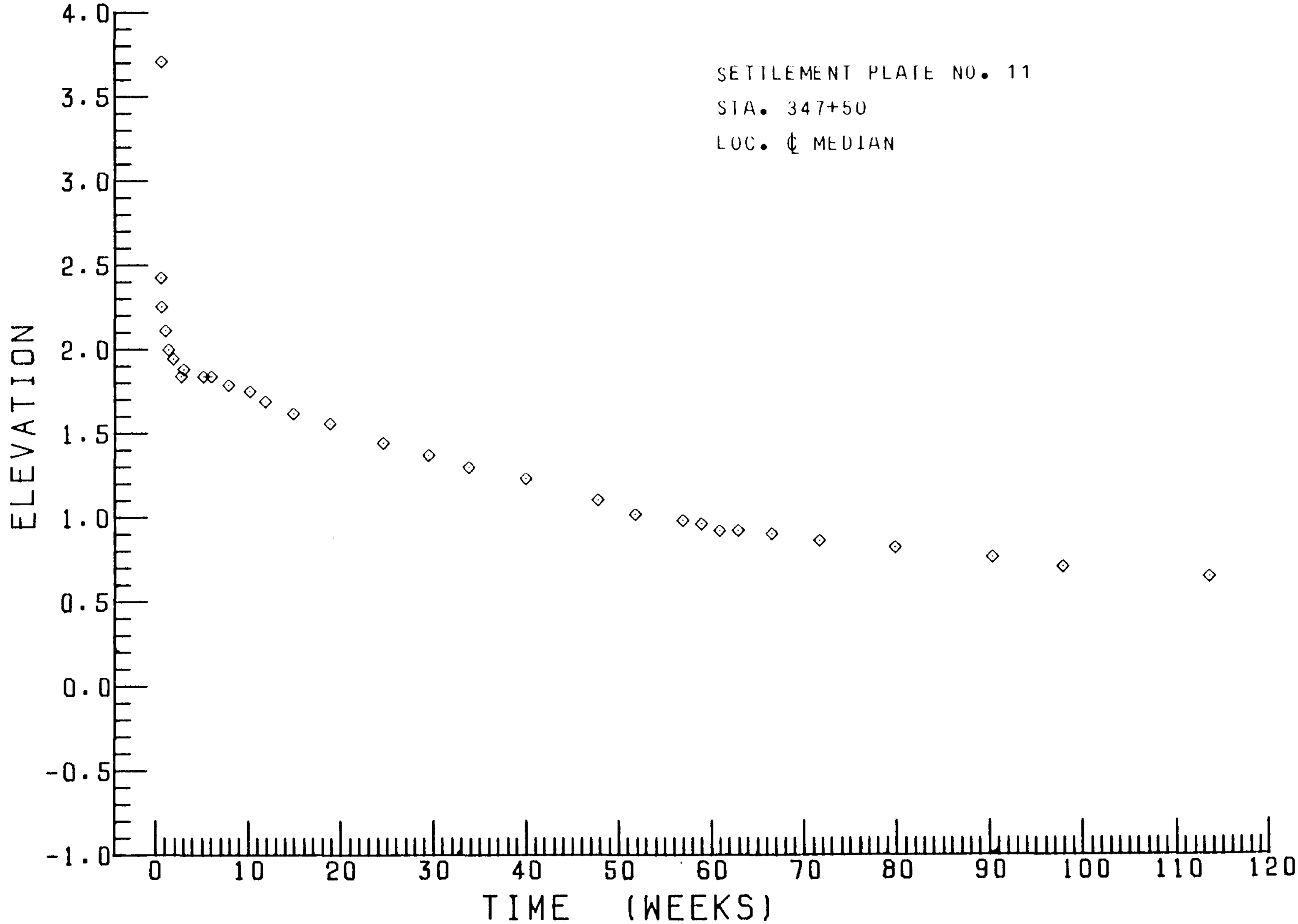

SETTLEMENT PLATE NO. 6
STA. 349+40
LOC. 22FT. LEFT ℄ WESTBOUND LANE
ELEVATION
TIME (WEEKS)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120

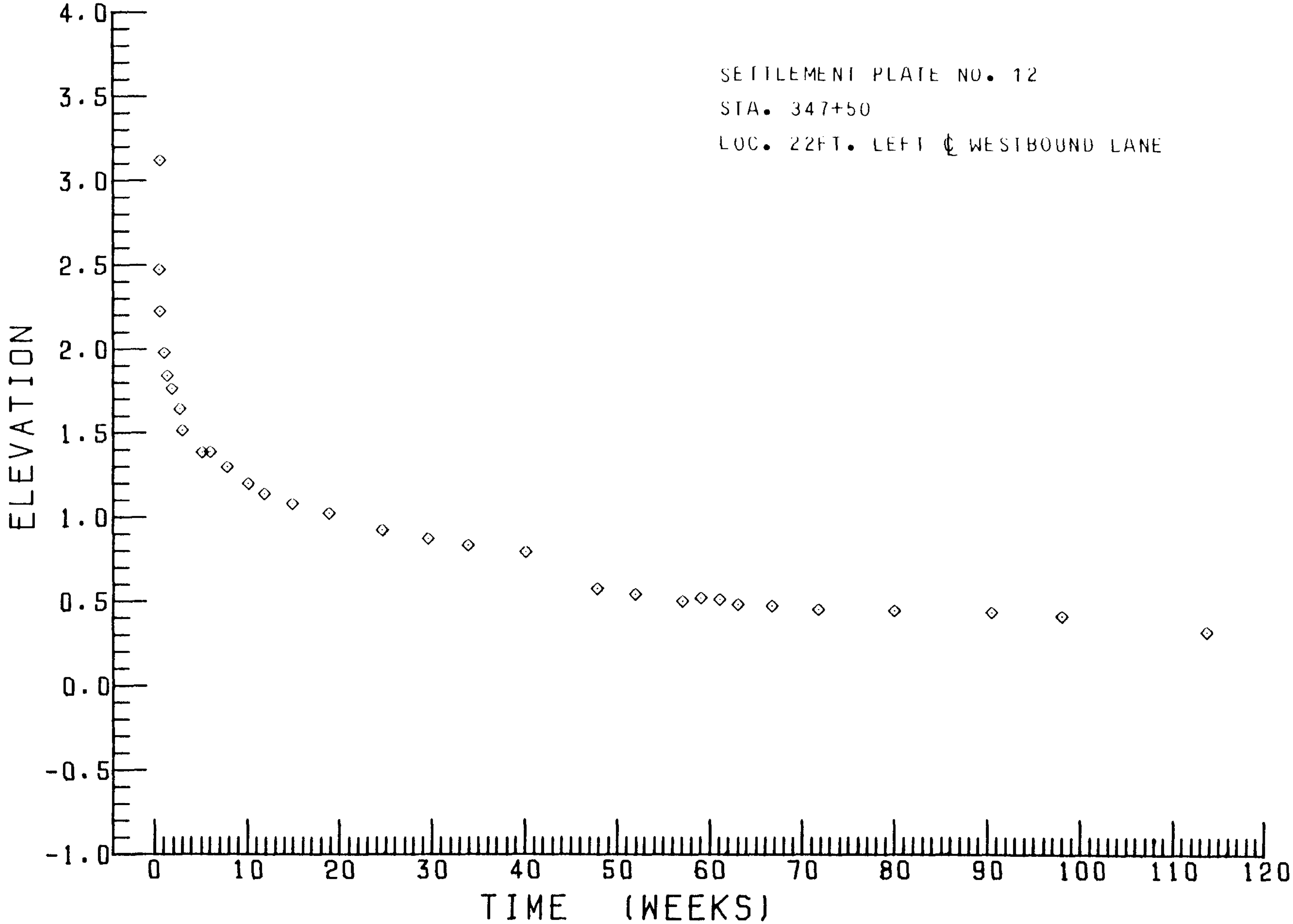

SETTLEMENT PLATE NO. 7
STA. 348+50
LOC. ℄ EASTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

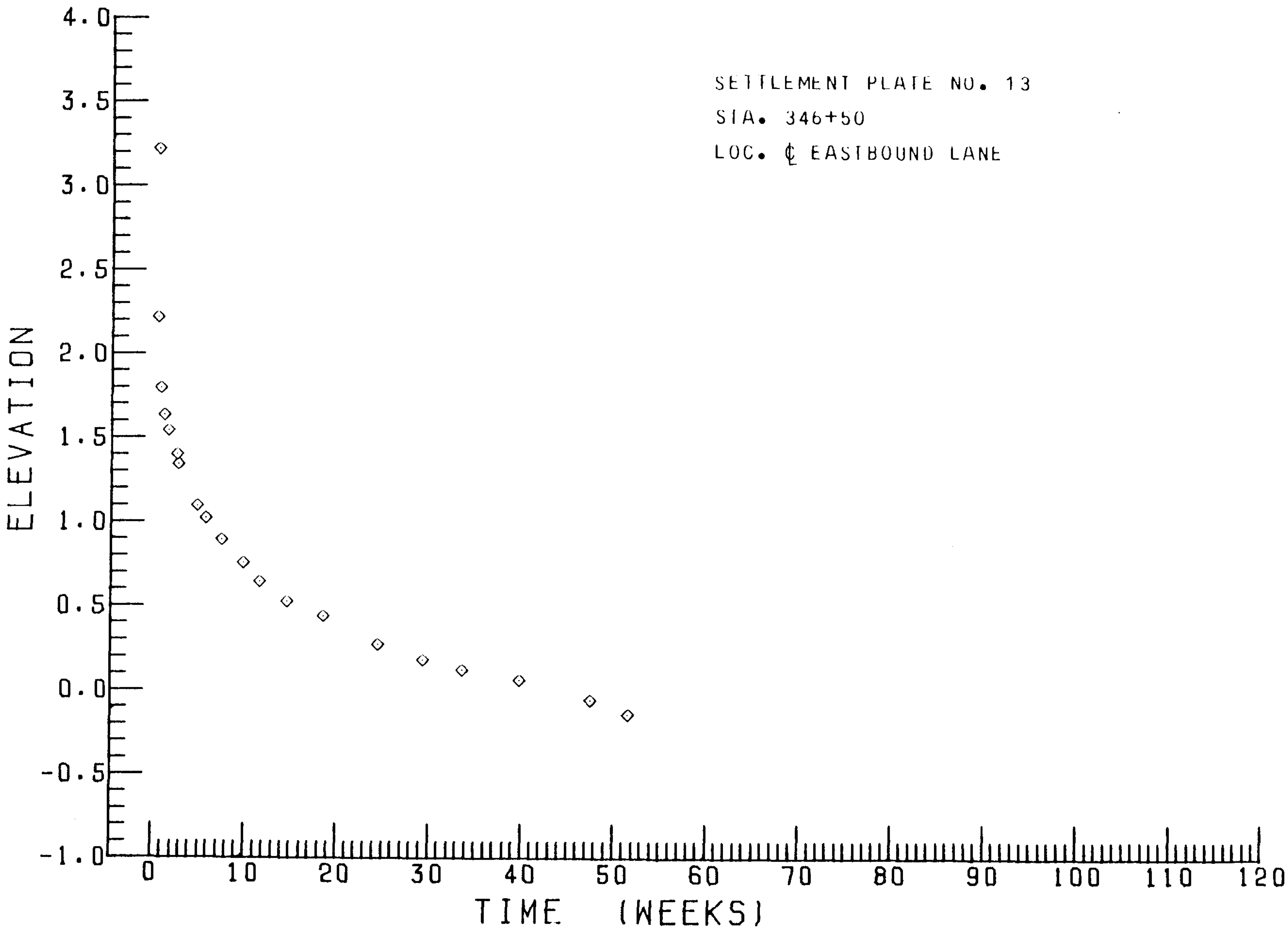

SETTLEMENT PLATE NO. 8
STA. 348+50
LOC. ℄ MEDIAN
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)



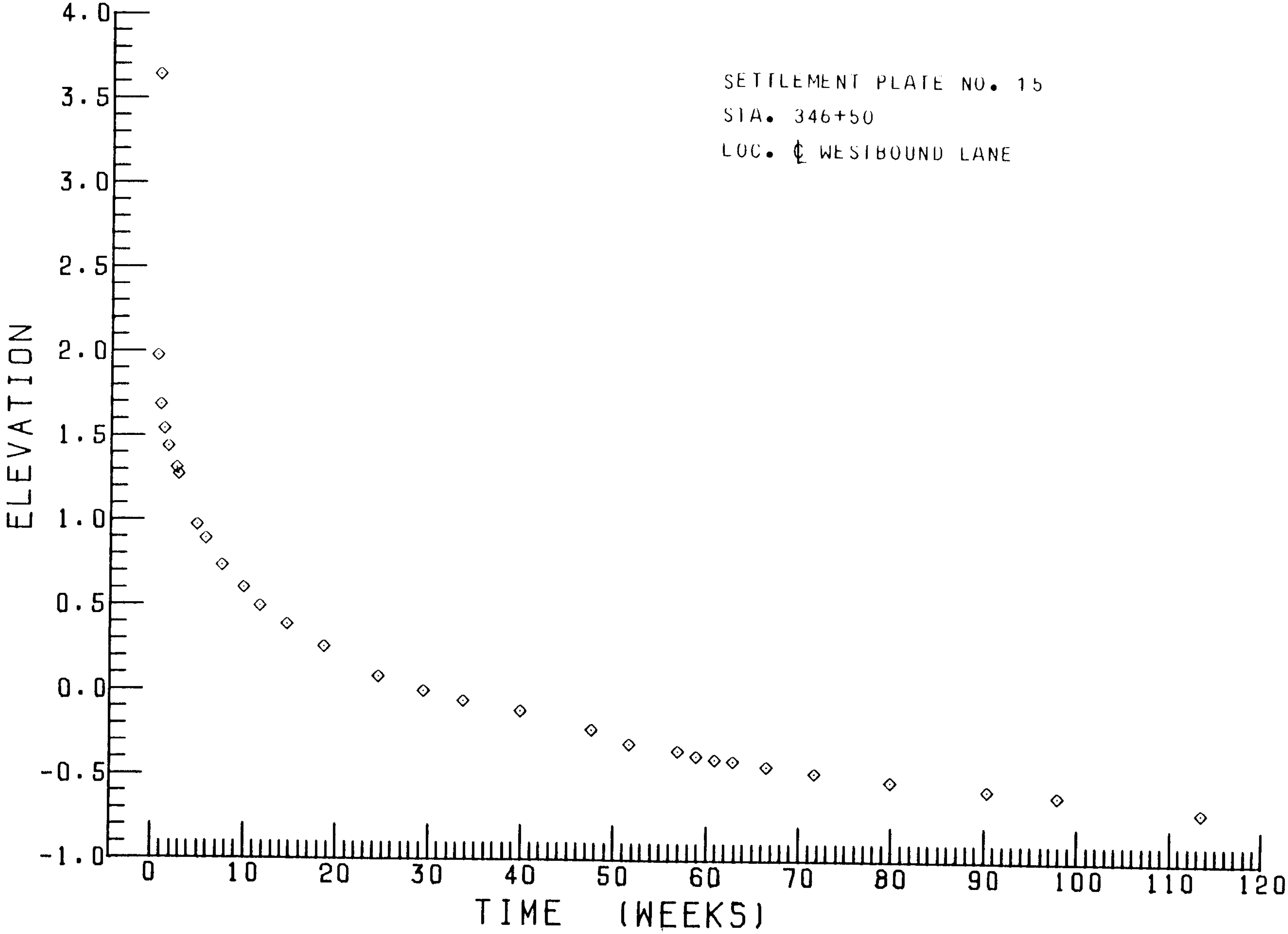
SETTLEMENT PLATE NO. 10
STA. 347+50
LOC. 22FT. RIGHT ℄ EASTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
TIME (WEEKS)
0
10
20
30
40
50
60
70
80
90
100
110
120


SETTLEMENT PLATE NO. 11
STA. 347+50
LOC. ℄ MEDIAN
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)


SETTLEMENT PLATE NO. 12
STA. 347+50
LOC. 22FT. LEFT ℄ WESTBOUND LANE
ELEVATION
TIME (WEEKS)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120



SETTLEMENT PLATE NO. 13
STA. 346+50
LOC. ℄ EASTBOUND LANE
ELEVATION
TIME (WEEKS)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120


SETTLEMENT PLATE NO. 15
STA. 346+50
LOC. ℄ WESTBOUND LANE
ELEVATION
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

SETTLEMENT PLATE ELEVATIONS
REEF SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
RESEARCH PROJECT NO. 77-1S(B)
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 350+50
Loc. ℄ Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/6/76	--	2.66
8/6/76	12.22	2.18
8/7/76	12.00	1.96
8/8/76	11.91	1.87
8/9/76	11.82	1.78
8/10/76	11.77	1.73
8/13/76	11.67	1.63
8/16/76	11.58	1.54
8/19/76	11.51	1.47
8/25/76	11.41	1.37
8/27/76	11.37	1.33
9/10/76	11.16	1.12
9/16/76	11.10	1.06
9/29/76	10.98	0.94
10/15/76	10.85	0.81
10/27/76	10.77	0.73
11/17/76	10.66	0.62
12/15/76	10.58	0.54
1/25/77	10.45	0.41
2/28/77	10.38	0.34
3/30/77	10.33	0.29
5/12/77	10.27	0.23
7/6/77	10.15	+0.11
8/3/77	10.06	+0.02
9/8/77	9.95	-0.09
9/22/77	9.93	-0.11
10/6/77	9.89	-0.15
10/20/77	9.91	-0.13
11/14/77	9.85	-0.19
12/20/77	9.80	-0.24
2/16/78	9.77	-0.27
5/1/78	9.73	-0.31
6/22/78	9.71	-0.33
10/10/78	run over	

Settlement Plate
Sta. 350+50
Loc. ℄ Median

Date	Elev. Top Pipe	Elev. Plate
8/6/76	--	2.81
8/6/76	12.07	2.02
8/7/76	11.91	1.86
8/8/76	11.80	1.75
8/9/76	11.75	1.70
8/10/76	11.68	1.63
8/13/76	11.61	1.56
8/16/76	11.53	1.48
8/19/76	11.49	1.44
8/25/76	11.42	1.37
8/27/76	11.43	1.39
9/10/76	11.41	1.36
9/16/76	11.42	1.37
9/29/76	11.39	1.34
10/15/76	11.34	1.29
10/27/76	11.31	1.26
11/17/76	11.25	1.20
12/15/76	11.20	1.15
1/25/77	10.99	0.94
2/28/77	11.02	0.97
3/30/77	10.96	0.91
5/12/77	10.89	0.84
7/6/77	10.77	0.72
8/3/77	10.68	0.63
9/8/77	10.66	0.61
9/22/77	10.63	0.58
10/6/77	10.61	0.56
10/20/77	10.60	0.55
11/14/77	10.57	0.52
12/20/77	10.53	0.48
2/16/78	10.48	0.43
5/1/78	10.44	0.39
6/22/78	10.40	0.35
10/10/78	10.32	0.27

Settlement Plate
Sta. 350+50
Loc. ℄ Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/6/76	--	2.77
8/6/76	12.12	2.07
8/7/76	11.93	1.88
8/8/76	11.82	1.77
8/9/76	11.76	1.71
8/10/76	11.68	1.63
8/13/76	11.55	1.50
8/16/76	11.46	1.41
8/19/76	11.39	1.34
8/25/76	11.27	1.22
8/27/76	11.24	1.19
9/10/76	10.99	0.93
9/16/76	10.92	0.87
9/29/76	10.79	0.74
10/15/76	10.66	0.61
10/27/76	10.57	0.52
11/17/76	10.45	0.40
12/15/76	10.35	0.30
1/25/77	10.19	0.14
2/28/77	10.12	0.07
3/30/77	Run Over by Truck	

SETTLEMENT PLATE ELEVATIONS
REEF SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
RESEARCH PROJECT NO. 77-1S(B)
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate Sta. 349+40 Loc. 22' Right ℄ Eastbound Lane			Settlement Plate Sta. 349+40 Loc. ℄ Median			Settlement Plate Sta. 349+40 Loc. 22' Left ℄ Westbound Lane		
Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate
8/6/76	--	2.81	8/6/76	--	3.00	8/6/76	--	2.67
8/7/76	12.18	2.14	8/7/76	12.05	2.01	8/7/76	12.31	2.26
8/8/76	11.85	1.81	8/8/76	11.84	1.80	8/8/76	12.06	2.01
8/9/76	11.77	1.73	8/9/76	11.77	1.73	8/9/76	12.05	2.00
8/10/76	11.68	1.64	8/10/76	11.69	1.65	8/10/76	11.98	1.93
8/13/76	11.50	1.46	8/13/76	11.60	1.56	8/13/76	11.85	1.80
8/16/76	11.36	1.32	8/16/76	11.51	1.47	8/16/76	11.71	1.66
8/19/76	11.31	1.27	8/19/76	11.46	1.42	8/19/76	11.71	1.66
8/25/76	11.20	1.16	8/25/76	11.39	1.35	8/25/76	11.63	1.58
8/27/76	11.18	1.14	8/27/76	11.39	1.35	8/27/76	11.62	1.57
9/10/76	11.02	0.98	9/10/76	11.36	1.32	9/10/76	11.47	1.42
9/16/76	11.00	0.96	9/16/76	11.37	1.33	9/16/76	11.47	1.42
9/29/76	10.91	0.87	9/29/76	11.33	1.29	9/29/76	11.38	1.33
10/15/76	10.82	0.78	10/15/76	11.29	1.25	10/15/76	11.30	1.25
10/27/76	10.77	0.73	10/27/76	11.26	1.22	10/27/76	11.25	1.20
11/17/76	10.69	0.65	11/17/76	11.18	1.14	11/17/76	11.18	1.13
12/15/76	10.64	0.60	12/15/76	11.11	1.07	12/15/76	11.13	1.08
1/25/77	10.56	0.52	1/25/77	11.01	0.97	1/25/77	11.05	1.00
2/28/77	10.53	0.49	2/28/77	10.92	0.88	2/28/77	10.99	0.94
3/30/77	10.49	0.45	3/30/77	10.86	0.82	3/30/77	10.95	0.90
5/12/77	10.45	0.41	5/12/77	10.80	0.76	5/12/77	10.91	0.86
7/6/77	10.31	0.27	7/6/77	10.66	0.62	7/6/77	10.75	0.70
8/3/77	10.22	0.18	8/3/77	10.58	0.54	8/3/77	10.64	0.59
9/8/77	10.22	0.19	9/8/77	10.54	0.50	9/8/77	10.65	0.60
9/22/77	10.20	0.16	9/22/77	10.52	0.48	9/22/77	10.64	0.59
10/6/77	10.19	0.15	10/6/77	10.50	0.46	10/6/77	10.58	0.53
10/20/77	10.18	0.14	10/20/77	10.46	0.42	10/20/77	10.62	0.57
11/14/77	10.16	0.12	11/14/77	10.45	0.41	11/14/77	10.59	0.54
12/20/77	10.14	0.10	12/20/77	10.42	0.38	12/20/77	10.59	0.54
2/16/78	10.11	0.07	2/16/78	10.37	0.33	2/16/78	10.56	0.51
5/1/78	10.09	0.05	5/1/78	10.31	0.27	5/1/78	10.54	0.49
6/22/78	10.06	0.02	6/22/78	10.28	0.24	6/22/78	10.50	0.45
10/10/78	10.11	-0.04	10/10/78	10.20	0.16	10/10/78	10.45	0.40

SETTLEMENT PLATE ELEVATIONS
REEF SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
RESEARCH PROJECT NO. 77-1S(B)
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate Sta. 348+50 Loc. ℄ Eastbound Lane			Settlement Plate Sta. 348+50 Loc. ℄ Median			Settlement Plate Sta. 348+50 Loc. ℄ Westbound Lane		
Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate
8/7/76	--	3.22	8/7/76	--	3.30	8/7/76	--	3.22
8/8/76	12.02	1.99	8/8/76	12.15	2.11	8/8/76	Run Over by Truck	
8/9/76	11.92	1.89	8/9/76	12.07	2.03			
8/10/76	11.83	1.80	8/10/76	11.99	1.95			
8/13/76	11.71	1.68	8/13/76	11.90	1.86			
8/16/76	11.61	1.58	8/16/76	11.80	1.76			
8/19/76	11.55	1.52	8/19/76	11.76	1.72			
8/25/76	11.43	1.40	8/25/76	11.68	1.64			
8/27/76	11.39	1.36	8/27/76	11.71	1.67			
9/10/76	11.16	1.13	9/10/76	11.68	1.64			
9/16/76	11.12	1.09	9/16/76	11.67	1.63			
9/29/76	10.98	0.95	9/29/76	11.63	1.59			
10/15/76	10.85	0.82	10/15/76	11.57	1.53			
10/27/76	10.77	0.74	10/27/76	11.51	1.47			
11/17/76	10.66	0.63	11/17/76	11.44	1.40			
12/15/76	10.56	0.53	12/15/76	11.35	1.31			
1/25/77	10.41	0.38	1/25/77	11.23	1.19			
2/28/77	10.31	0.28	2/28/77	11.13	1.09			
3/30/77	10.24	0.21	3/30/77	11.06	1.02			
5/12/77	10.16	+0.13	5/12/77	10.99	0.95			
7/6/77	10.01	-0.02	7/6/77	10.85	0.81			
8/3/77	9.93	-0.10	8/3/77	10.77	0.73			
9/8/77	9.91	-0.12	9/8/77	10.72	0.68			
9/22/77	9.88	-0.15	9/22/77	10.70	0.66			
10/6/77	9.87	-0.16	10/6/77	10.67	0.63			
10/20/77	9.87	-0.16	10/20/77	10.67	0.63			
11/14/77	9.83	-0.20	11/14/77	10.64	0.60			
12/20/77	9.78	-0.25	12/20/77	10.61	0.57			
2/16/78	9.74	-0.29	2/16/78	10.56	0.52			
5/1/78	9.68	-0.35	5/1/78	10.49	0.45			
6/22/78	9.66	-0.37	6/22/78	10.43	0.39			
10/10/78	9.57	-0.46	10/10/78	10.36	0.32			

SETTLEMENT PLATE ELEVATIONS
REEF SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
RESEARCH PROJECT NO. 77-1S(B)
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate Sta. 347+50 Loc. 22' Right ¢ Eastbound Lane			Settlement Plate Sta. 347+50 Loc. ¢ Median			Settlement Plate Sta. 347+50 Loc. 22' Left ¢ Westbound Lane		
Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate	Date	Elev. Top Pipe	Elev. Plate
8/8/76	--	3.15	8/8/76	--	3.71	8/8/76	--	3.12
8/9/76	12.17	2.10	8/9/76	12.45	2.41	8/9/76	12.50	2.46
8/10/76	11.88	1.81	8/10/76	12.29	2.25	8/10/76	12.26	2.22
8/13/76	11.65	1.58	8/13/76	12.15	2.11	8/13/76	12.02	1.98
8/16/76	11.52	1.45	8/16/76	12.04	2.00	8/16/76	11.88	1.84
8/19/76	11.44	1.37	8/19/76	11.98	1.94	8/19/76	11.80	1.76
8/25/76	11.32	1.25	8/25/76	11.88	1.84	8/25/76	11.68	1.64
8/27/76	11.30	1.23	8/27/76	11.91	1.87	8/27/76	11.55	1.51
9/10/76	11.11	1.04	9/10/76	11.87	1.83	9/10/76	11.42	1.38
9/16/76	11.06	0.99	9/16/76	11.87	1.83	9/16/76	11.42	1.38
9/29/76	10.95	0.88	9/29/76	11.82	1.78	9/29/76	11.33	1.29
10/15/76	10.83	0.76	10/15/76	11.78	1.74	10/15/76	11.23	1.19
10/27/76	10.75	0.68	10/27/76	11.72	1.68	10/27/76	11.17	1.13
11/17/76	10.64	0.57	11/17/76	11.65	1.61	11/17/76	11.11	1.07
12/15/76	10.57	0.50	12/15/76	11.59	1.55	12/15/76	11.05	1.01
1/25/77	10.45	0.38	1/25/77	11.47	1.43	1/25/77	10.95	0.91
2/28/77	10.38	0.31	2/28/77	11.40	1.36	2/28/77	10.90	0.86
3/30/77	10.33	0.26	3/30/77	11.33	1.29	3/30/77	10.86	0.82
5/12/77	10.26	0.19	5/12/77	11.26	1.22	5/12/77	10.82	0.78
7/6/77	10.09	+0.02	7/6/77	11.13	1.09	7/6/77	10.60	0.56
8/3/77	10.00	-0.07	8/3/77	11.05	1.01	8/3/77	10.57	0.53
9/8/77	9.98	-0.09	9/8/77	11.01	.97	9/8/77	10.53	0.49
9/22/77	9.94	-0.13	9/22/77	10.99	.95	9/22/77	10.55	0.51
10/6/77	9.93	-0.14	10/6/77	10.95	.91	10/6/77	10.54	0.50
10/20/77	9.94	-0.13	10/20/77	10.95	0.91	10/20/77	10.51	0.47
11/14/77	9.89	-0.18	11/14/77	10.93	0.89	11/14/77	10.50	0.46
12/20/77	9.88	-0.19	12/20/77	10.89	0.85	12/20/77	10.48	0.44
2/16/78	9.85	-0.22	2/16/78	10.85	0.81	2/16/78	10.47	0.43
5/1/78	9.83	-0.24	5/1/78	10.79	0.75	5/1/78	10.46	0.42
6/22/78	9.79	-0.28	6/22/78	10.73	0.69	6/22/78	10.44	0.40
10/10/78	9.72	-0.35	10/10/78	10.67	0.63	10/10/78	10.35	0.31

SETTLEMENT PLATE ELEVATIONS
REEF SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
RESEARCH PROJECT NO. 77-1S(B)
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 346+50
Loc. ℄ Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/9/76	--	3.22
8/10/76	12.26	2.20
8/13/76	11.85	1.79
8/16/76	11.69	1.63
8/19/76	11.60	1.54
8/25/76	11.46	1.40
8/27/76	11.40	1.34
9/10/76	11.15	1.09
9/16/76	11.08	1.02
9/29/76	10.95	0.89
10/15/76	10.81	0.75
10/27/76	10.70	0.64
11/17/76	10.58	0.52
12/15/76	10.49	0.43
1/25/77	10.32	0.26
2/28/77	10.23	0.17
3/30/77	10.17	0.11
5/12/77	10.11	+0.05
7/6/77	9.99	-0.07
8/3/77	9.91	-0.15
9/8/77	Run Over by Truck	

Settlement Plate
Sta. 346+50
Loc. ℄ Median

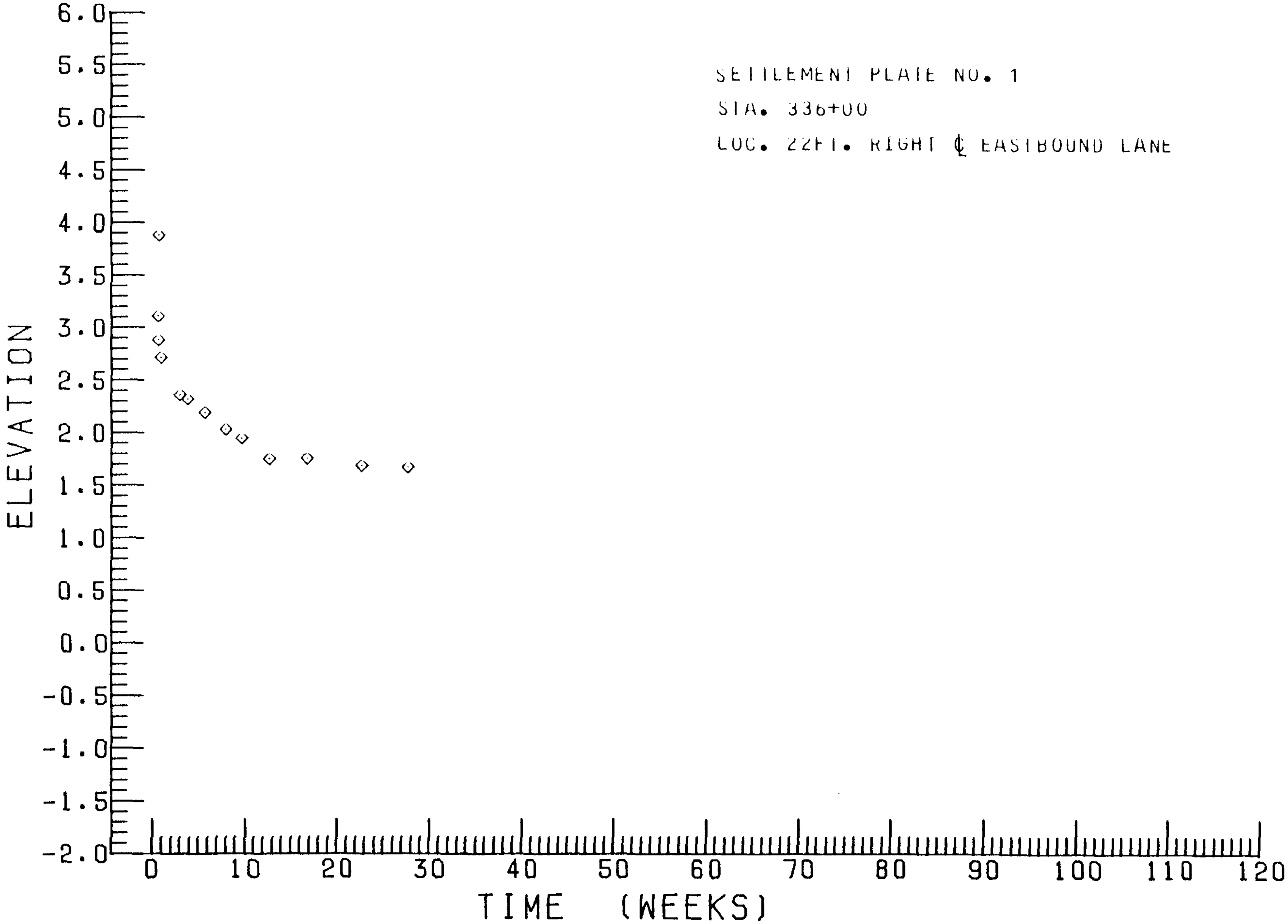
Date	Elev. Top Pipe	Elev. Plate
8/9/76	--	3.28
8/10/76	12.42	2.37
	Run Over by Truck	

Settlement Plate
Sta. 346+50
Loc. ℄ Westbound Lane

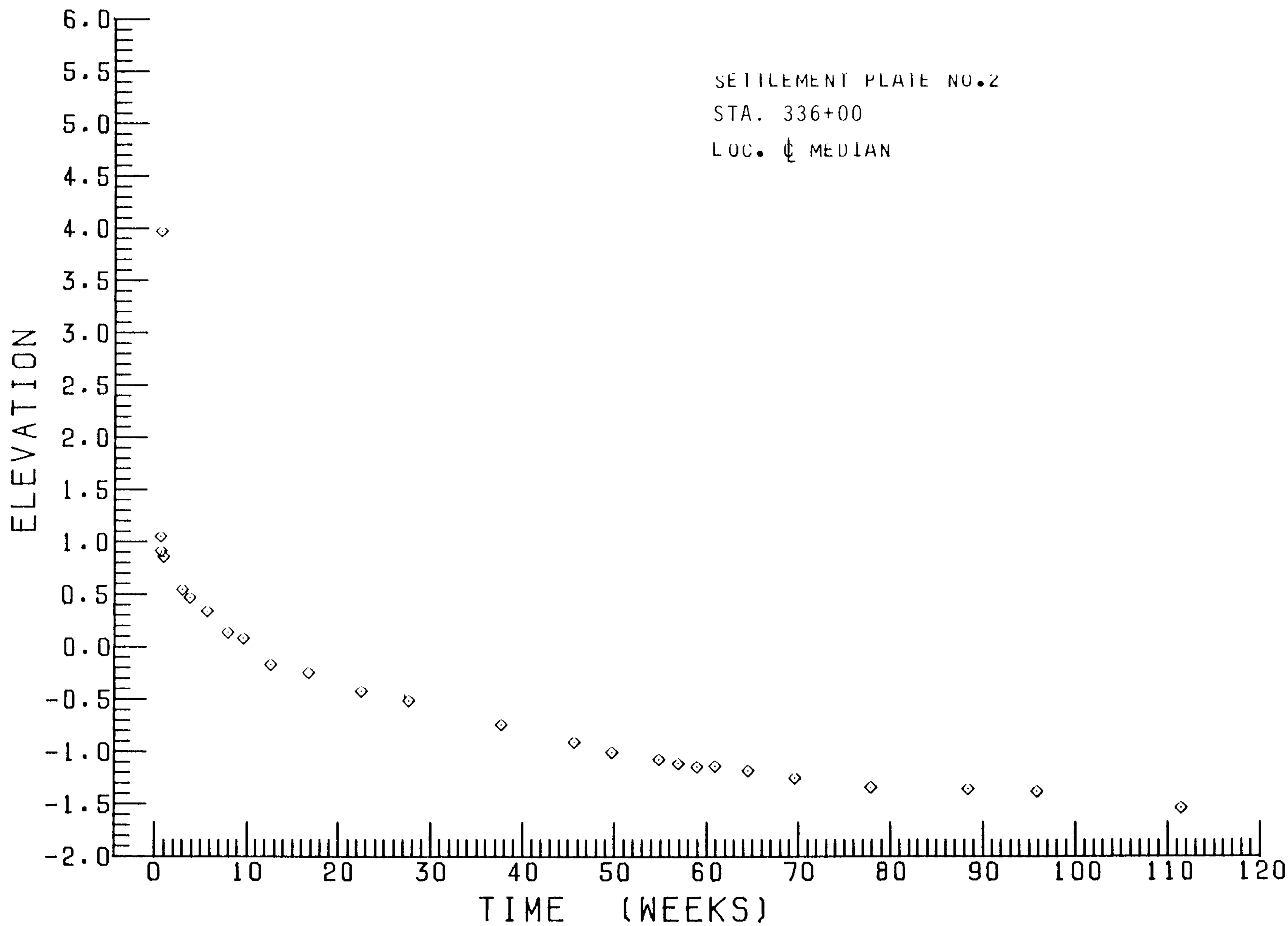
Date	Elev. Top Pipe	Elev. Plate
8/9/76	--	3.64
8/10/76	11.99	1.96
8/13/76	11.71	1.68
8/16/76	11.57	1.54
8/19/76	11.47	1.44
8/25/76	11.34	1.31
8/27/76	11.30	1.27
9/10/76	11.00	0.97
9/16/76	10.92	0.89
9/29/76	10.76	0.73
10/15/76	10.63	0.60
10/27/76	10.52	0.49
11/17/76	10.41	0.38
12/15/76	10.28	0.25
1/25/77	10.10	0.07
2/28/77	10.02	-0.01
3/30/77	9.96	-0.07
5/12/77	9.90	-0.13
7/6/77	9.79	-0.24
8/3/77	9.71	-0.32
9/8/77	9.67	-0.36
9/22/77	9.64	-0.39
10/6/77	9.62	-0.41
10/20/77	9.61	-0.42
11/14/77	9.58	-0.45
12/20/77	9.54	-0.49
2/16/78	9.49	-0.54
5/1/78	9.44	-0.59
6/22/78	9.41	-0.62
10/10/78	9.32	-0.71

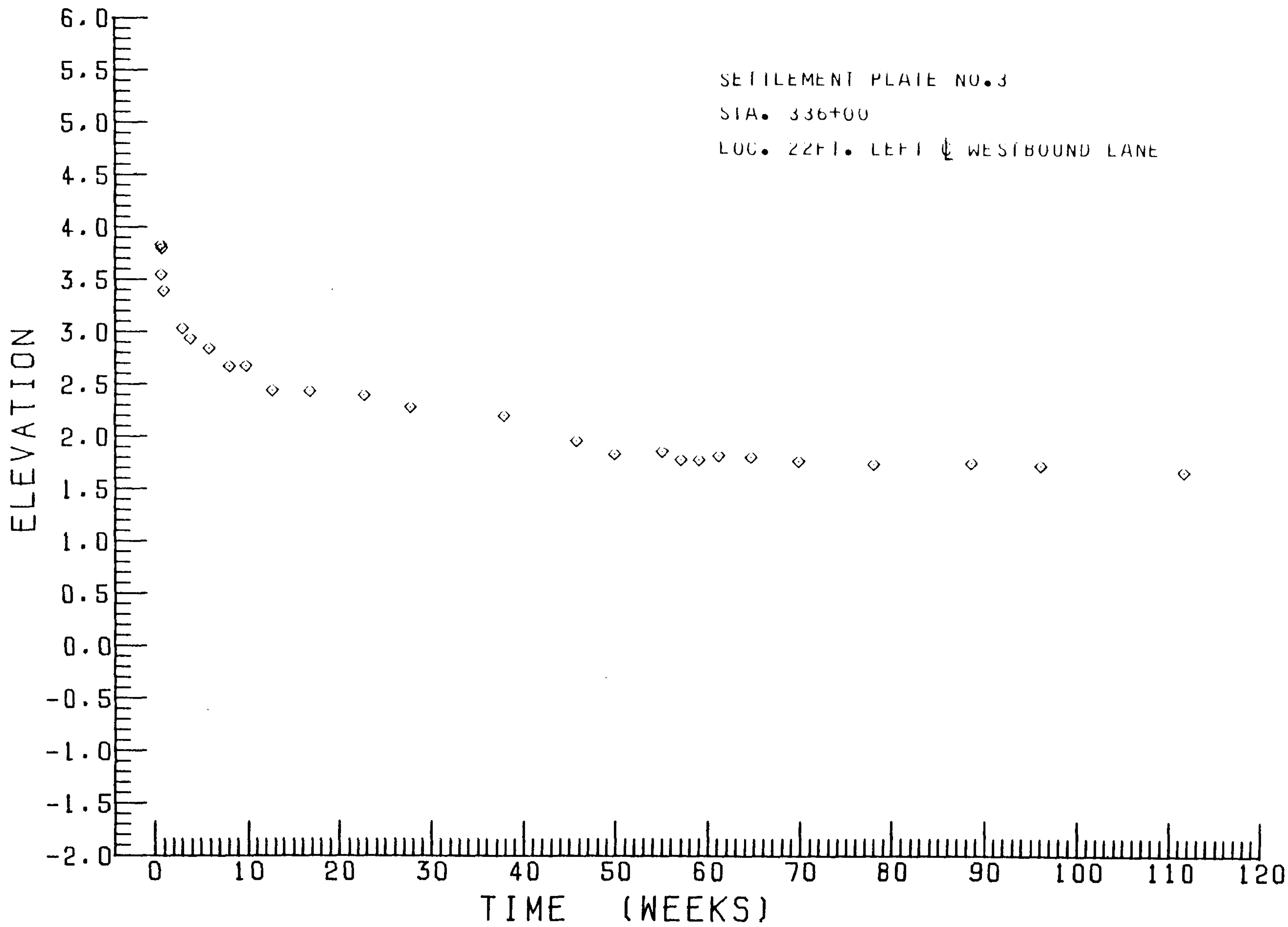
SETTLEMENT PLATE DATA

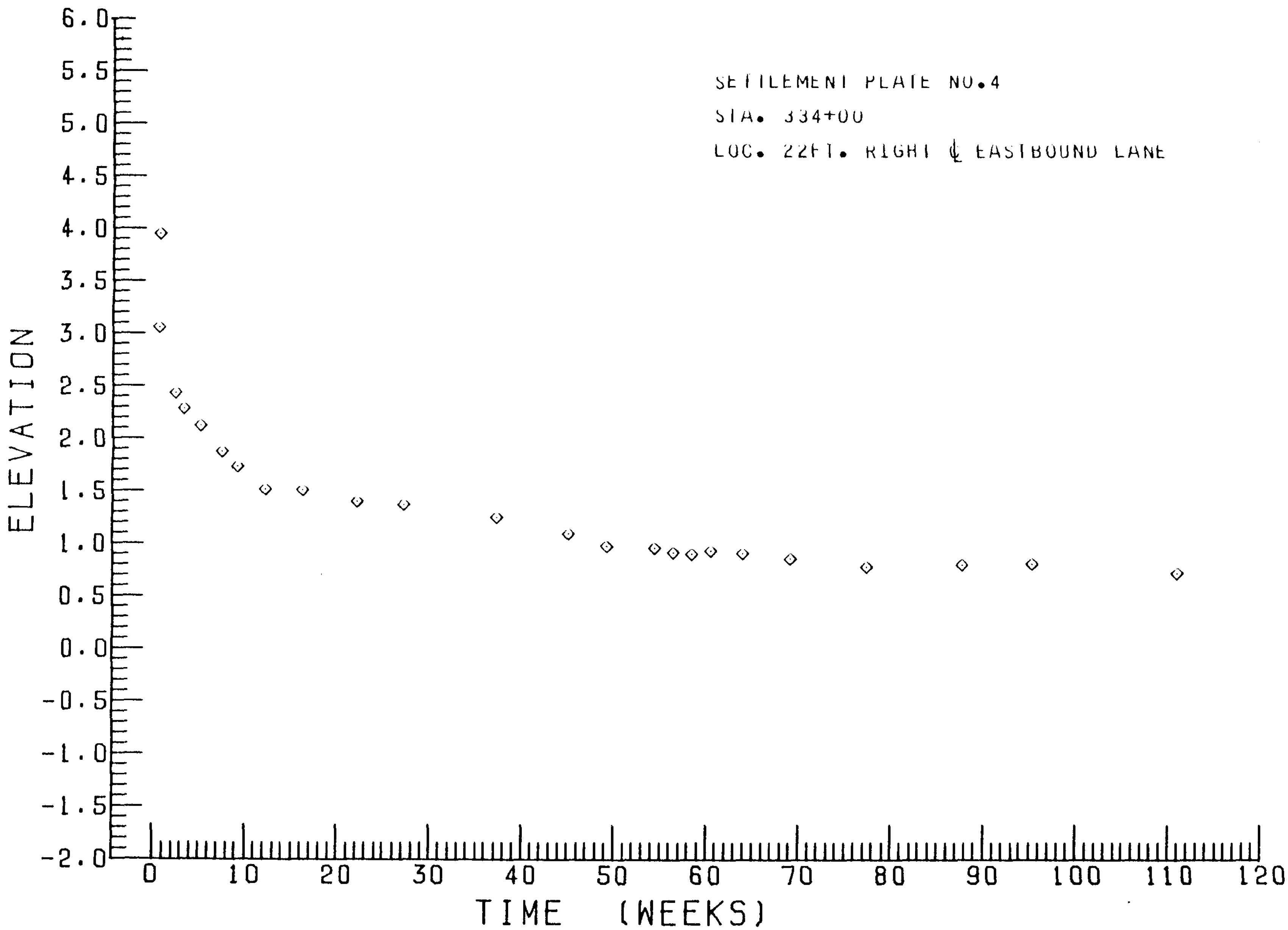
CLAM SHELL EMBANKMENT

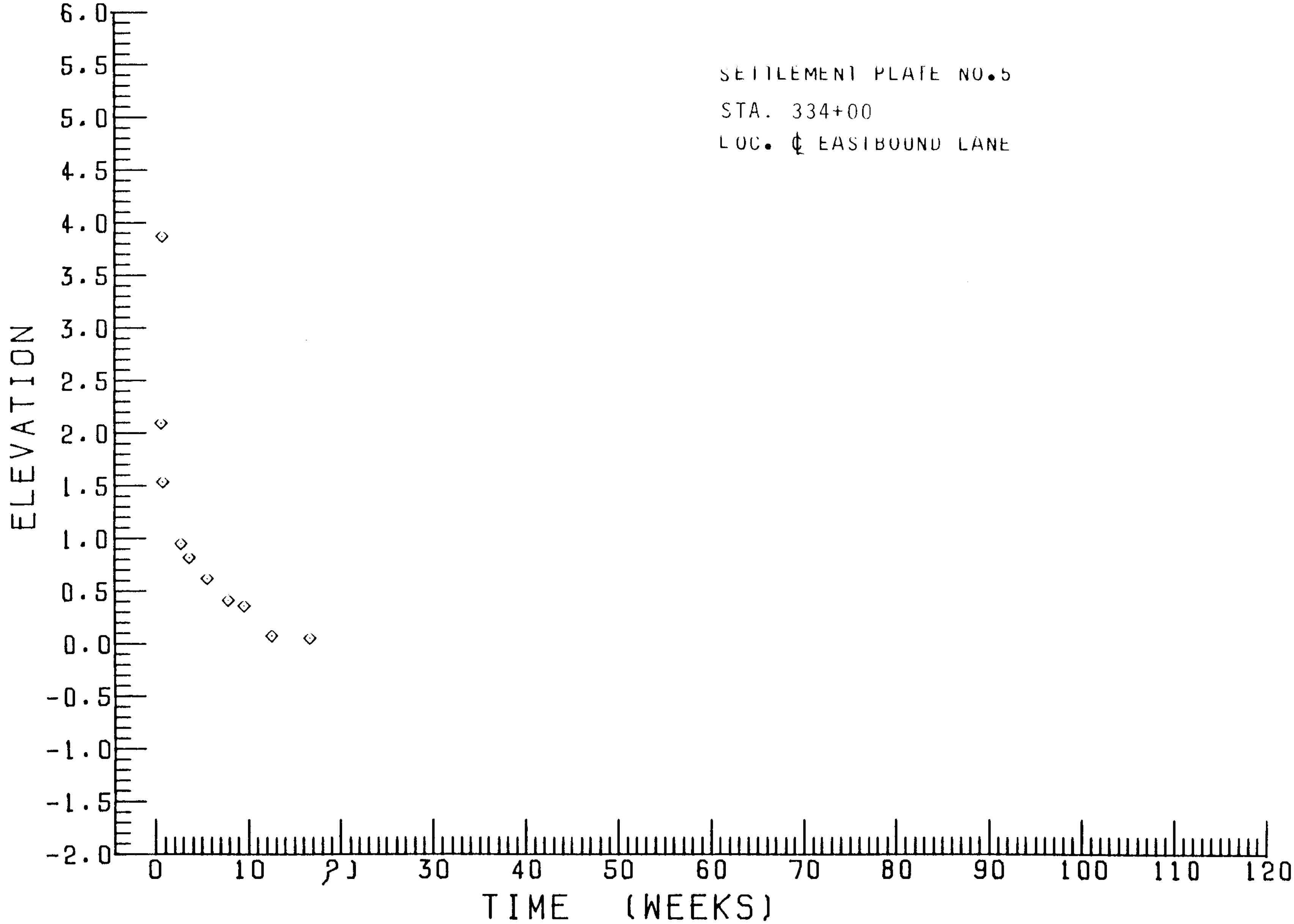


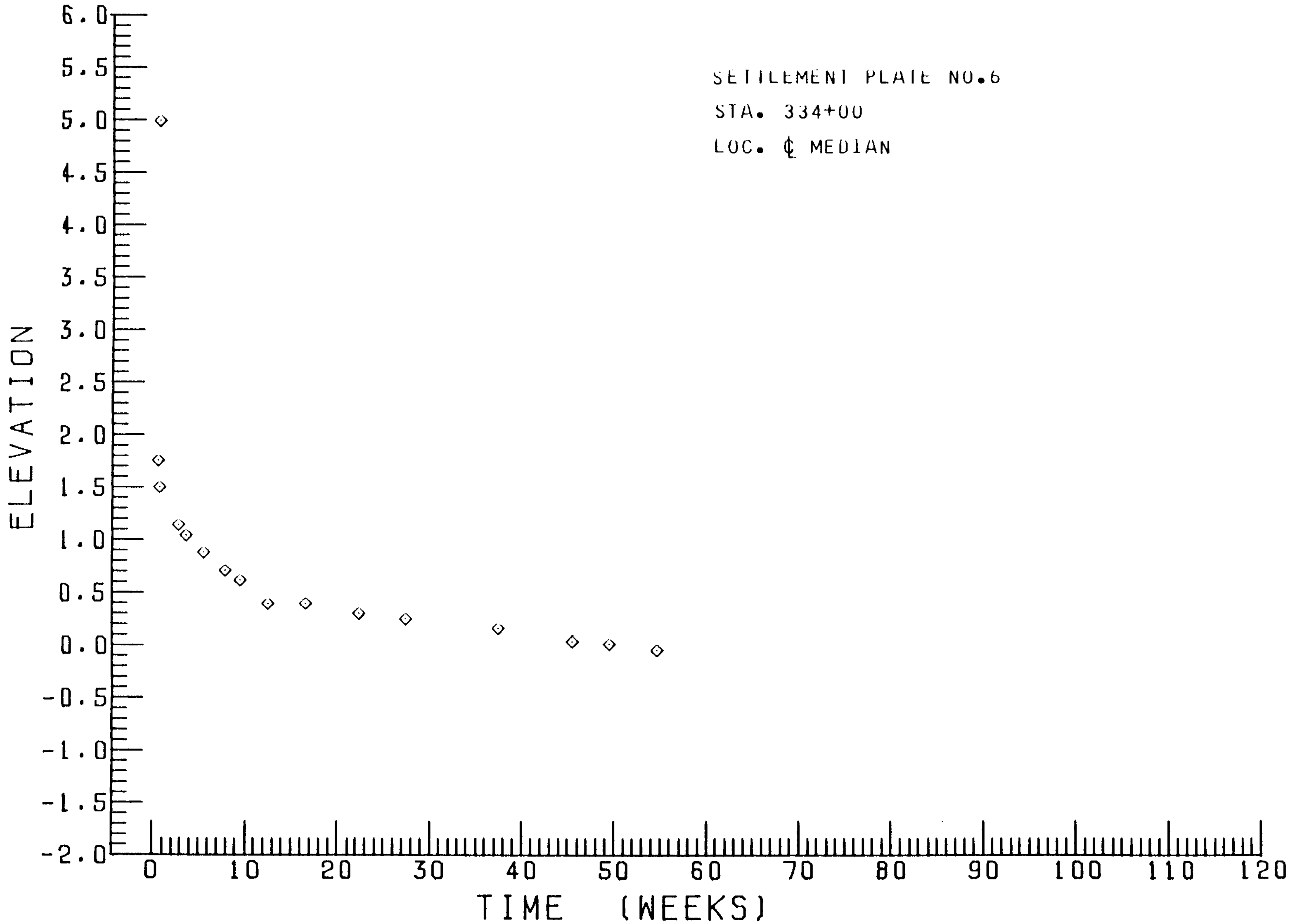
SETTLEMENT PLATE NO. 1
STA. 336+00
LOC. 22FT. RIGHT ℄ EASTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

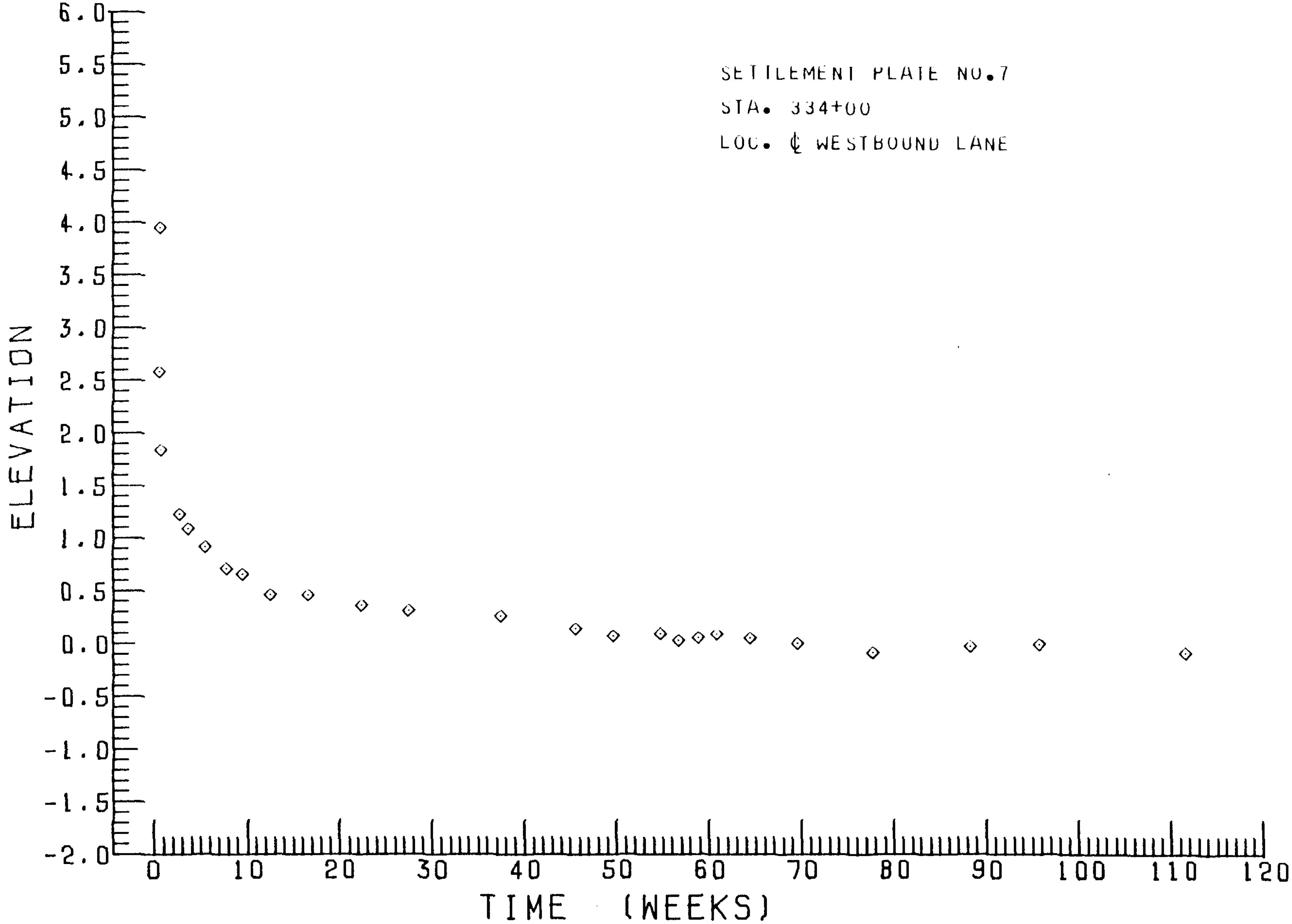

SETTLEMENT PLATE NO.2
STA. 336+00
LOC. ℄ MEDIAN
ELEVATION
TIME (WEEKS)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120

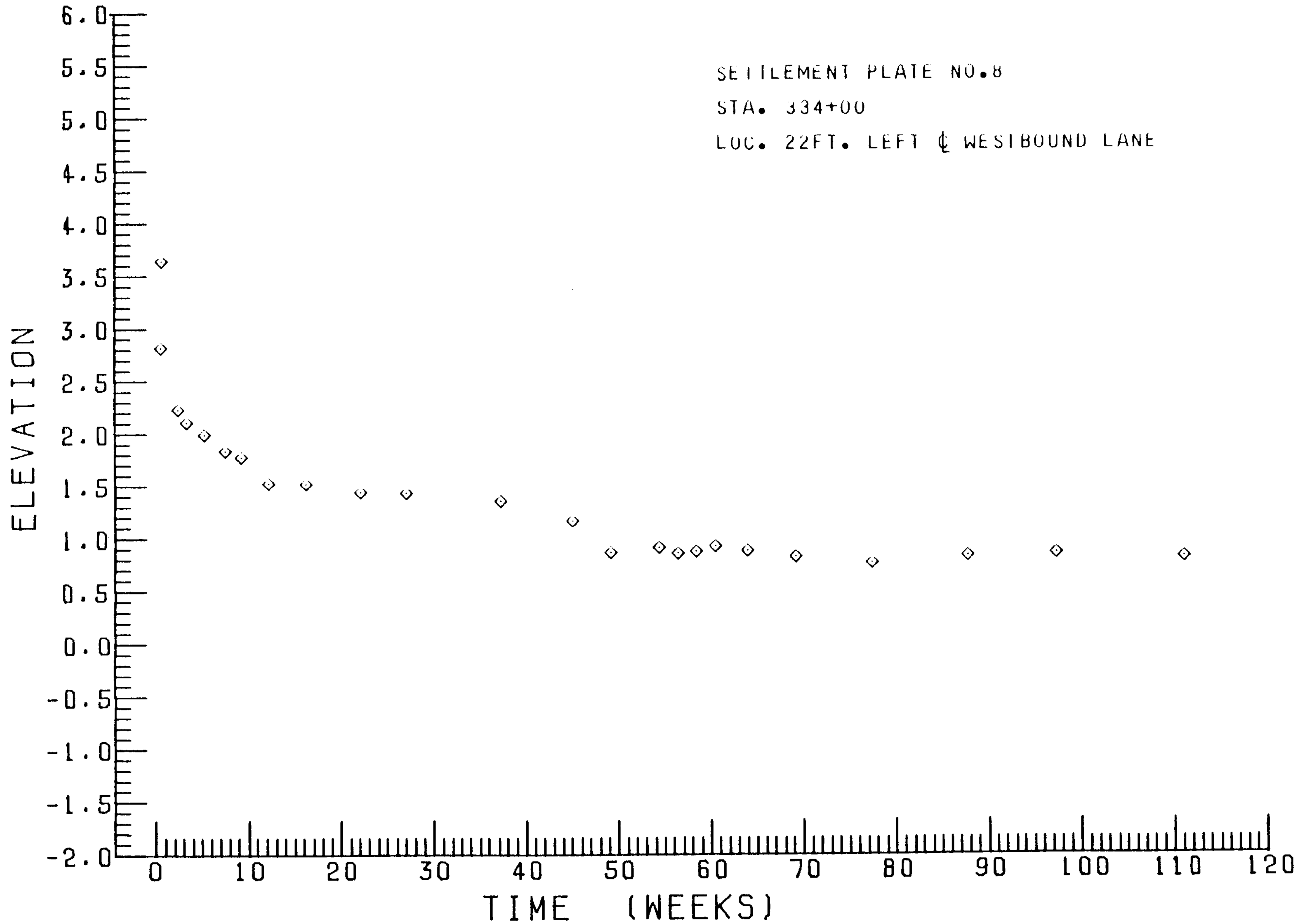

SETTLEMENT PLATE NO.3
STA. 336+00
LOC. 22FT. LEFT ℄ WESTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

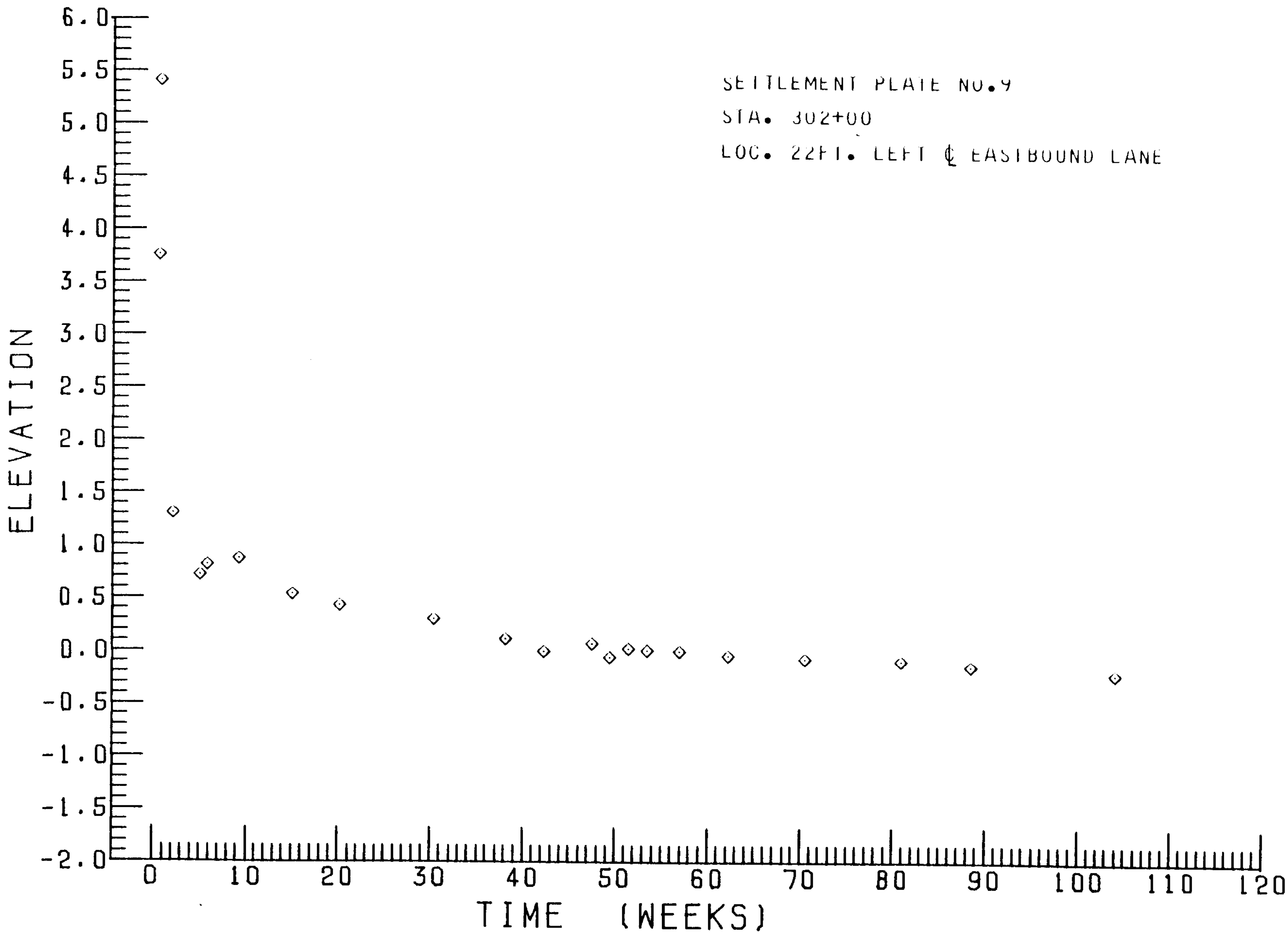

SETTLEMENT PLATE NO.4
STA. 334+00
LOC. 22FT. RIGHT ℄ EASTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)


SETTLEMENT PLATE NO.5
STA. 334+00
LOC. ¢ EASTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

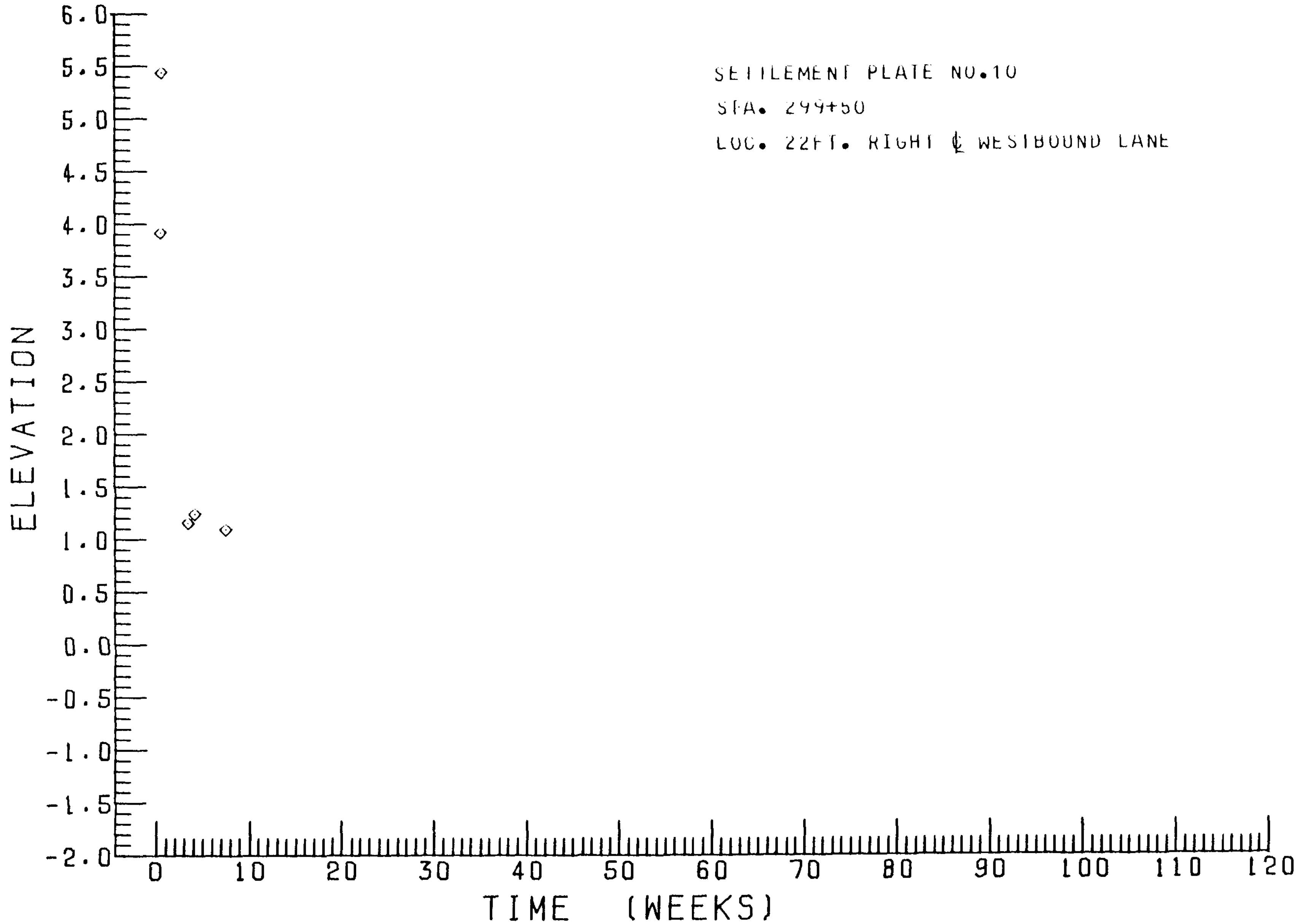

SETTLEMENT PLATE NO.6
STA. 334+00
LOC. ℄ MEDIAN
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

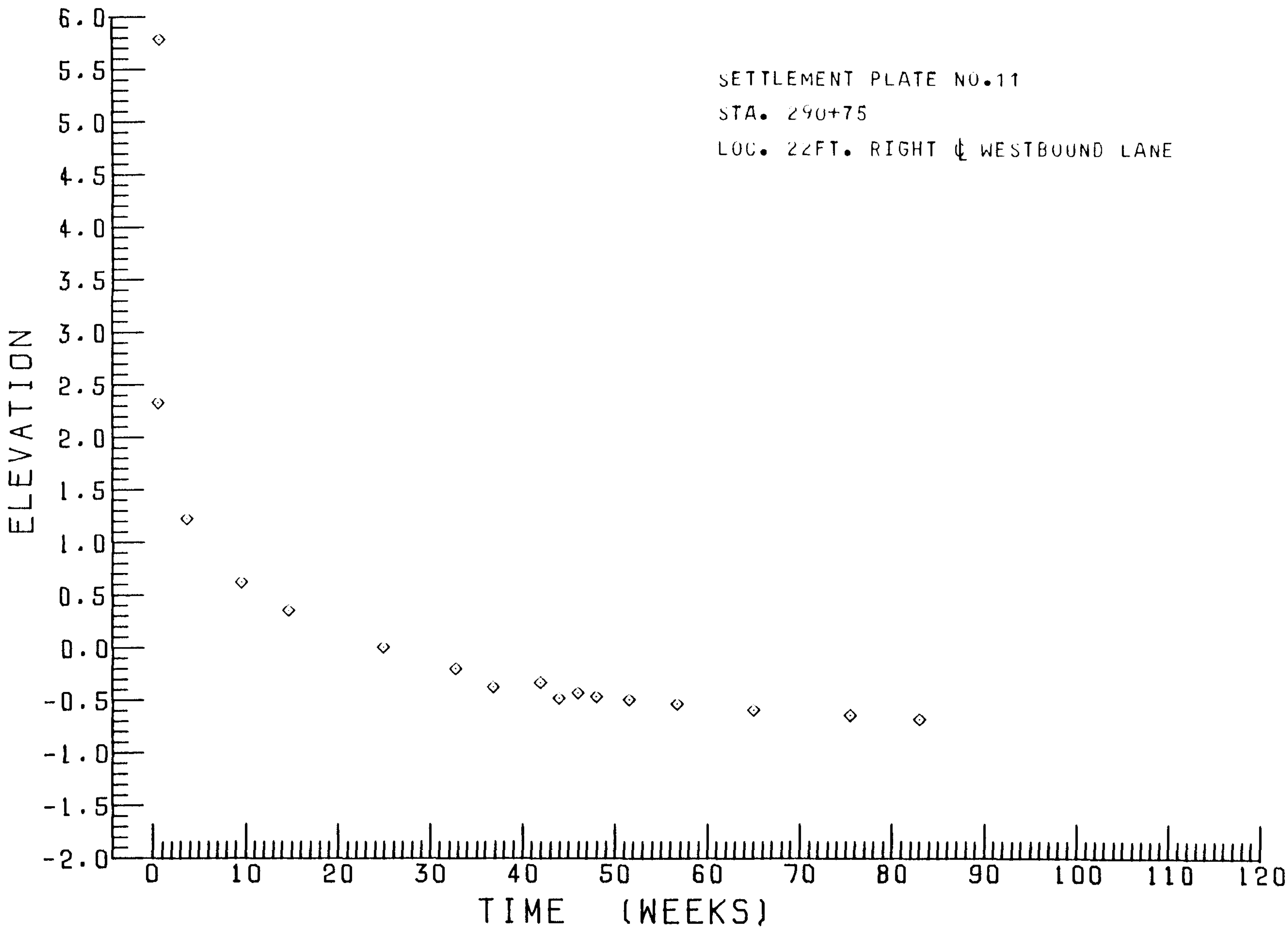

SETTLEMENT PLATE NO.7
STA. 334+00
LOC. ℄ WESTBOUND LANE
ELEVATION
TIME (WEEKS)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120


SETTLEMENT PLATE NO.8
STA. 334+00
LOC. 22FT. LEFT ℄ WESTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)


SETTLEMENT PLATE NO.9
STA. 302+00
LOC. 22FT. LEFT ℄ EASTBOUND LANE
ELEVATION
TIME (WEEKS)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120

60


SETTLEMENT PLATE NO.10
STA. 299+50
LOC. 22FT. RIGHT ℄ WESTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)


SETTLEMENT PLATE NO.11
STA. 290+75
LOC. 22FT. RIGHT ℄ WESTBOUND LANE
ELEVATION
TIME (WEEKS)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120

SETTLEMENT PLATE ELEVATIONS
CLAM SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 336+00
Loc. 22' Right ℄ Eastbound Lane

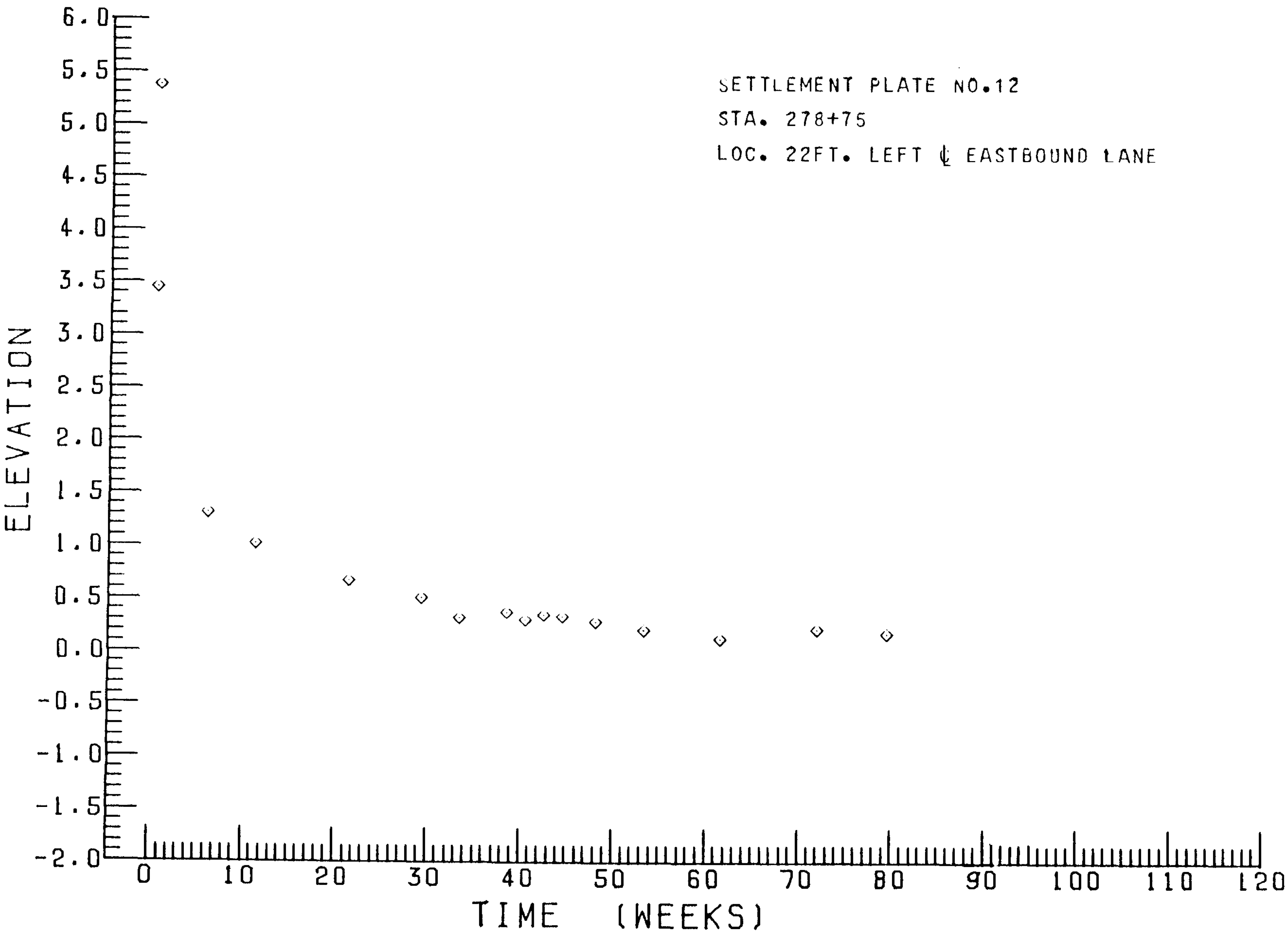
Date	Elev. Top Pipe	Elev. Plate
8/23/76	--	3.88
8/24/76	13.11	3.10
8/25/76	12.89	2.88
8/27/76	12.73	2.72
9/10/76	12.37	2.36
9/16/76	12.32	2.31
9/29/76	12.19	2.18
10/15/76	12.03	2.02
10/27/76	11.94	1.93
11/17/76	11.75	1.74
12/15/76	11.75	1.74
1/25/77	11.68	1.67
3/1/77	11.66	1.65
3/2/77	Run Over by Truck	

Settlement Plate
Sta. 336+00
Loc. ℄ Median

Date	Elev. Top Pipe	Elev. Plate
8/23/76	--	3.97
8/24/76	11.06	1.03
8/25/76	10.94	0.91
8/27/76	10.88	0.85
9/10/76	10.57	0.54
9/16/76	10.49	0.46
9/29/76	10.36	0.33
10/15/76	10.16	+0.13
10/27/76	10.10	+0.07
11/17/76	9.85	-0.18
12/15/76	9.77	-0.26
1/25/77	9.59	-0.44
3/1/77	9.50	-0.53
5/12/77	9.27	-0.76
7/6/77	9.10	-0.93
8/3/77	9.01	-1.02
9/8/77	8.94	-1.09
9/22/77	8.90	-1.13
10/6/77	8.87	-1.16
10/20/77	8.88	-1.15
11/14/77	8.83	-1.20
12/20/77	8.76	-1.27
2/16/78	8.67	-1.36
5/1/78	8.65	-1.38
6/22/78	8.63	-1.40
10/10/78	8.47	-1.56

Settlement Plate
Sta. 336+00
Loc. 22' Left ℄ Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/23/76	--	3.80
8/24/76	13.82	3.82
8/25/76	13.54	3.54
8/27/76	13.39	3.39
9/10/76	13.03	3.03
9/16/76	12.93	2.93
9/29/76	12.83	2.83
10/15/76	12.66	2.66
10/27/76	12.66	2.66
11/17/76	12.43	2.43
12/15/76	12.41	2.41
1/25/77	12.37	2.37
3/1/77	12.26	2.26
5/12/77	12.17	2.17
7/6/77	11.93	1.93
8/3/77	11.81	1.81
9/8/77	11.84	1.84
9/22/77	11.76	1.76
10/6/77	11.75	1.75
10/20/77	11.80	1.80
11/14/77	11.78	1.78
12/20/77	11.74	1.74
2/16/78	11.71	1.71
5/1/78	11.73	1.73
6/22/78	11.70	1.70
10/10/78	11.64	1.64


SETTLEMENT PLATE NO.12
STA. 278+75
LOC. 22FT. LEFT ℄ EASTBOUND LANE
ELEVATION
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME (WEEKS)

SETTLEMENT PLATE ELEVATIONS
CLAM SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 334+00
Loc. 22' Right ℄ Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/24/76	--	3.95
8/27/76	13.10	3.04
9/10/76	12.48	2.42
9/16/76	12.34	2.28
9/29/76	12.17	2.11
10/15/76	11.93	1.87
10/27/76	11.78	1.72
11/17/76	11.56	1.50
12/15/76	11.55	1.49
1/25/77	11.44	1.38
3/1/77	11.41	1.35
5/12/77	11.29	1.23
7/6/77	11.13	1.07
8/3/77	11.02	0.96
9/8/77	11.00	0.94
9/22/77	10.96	0.90
10/6/77	10.94	0.88
10/20/77	10.98	0.92
11/14/77	10.95	0.89
12/20/77	10.90	0.84
2/16/78	10.82	0.76
5/1/78	10.85	0.79
6/22/78	10.86	0.80
10/10/78	10.76	0.70

Settlement Plate
Sta. 334+00
Loc. ℄ Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/24/76	--	3.87
8/25/76	12.09	2.07
8/27/76	11.55	1.53
9/10/76	10.96	0.94
9/16/76	10.83	0.81
9/29/76	10.63	0.61
10/15/76	10.42	0.40
10/27/76	10.36	0.34
11/17/76	10.08	+0.06
12/15/76	10.05	+0.03
1/25/77	Run Over by Truck	

Settlement Plate
Sta. 334+00
Loc. ℄ Median

Date	Elev. Top Pipe	Elev. Plate
8/24/76	--	4.99
8/25/76	11.80	1.73
8/27/76	11.57	1.50
9/10/76	11.21	1.14
9/16/76	11.10	1.03
9/29/76	10.94	0.87
10/15/76	10.77	0.70
10/27/76	10.67	0.60
11/17/76	10.45	+0.38
12/15/76	10.45	+0.38
1/25/77	10.35	+0.28
3/1/77	10.30	+0.23
5/12/77	10.21	+0.14
7/6/77	10.08	+0.01
8/3/77	10.00	-0.01
9/8/77	10.01	-0.07
9/22/77	Run Over by Truck	

SETTLEMENT PLATE ELEVATIONS
CLAM SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 334+00
Loc. ℄ Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/24/76	--	3.95
8/25/76	12.59	2.55
8/27/76	11.86	1.82
9/10/76	11.25	1.21
9/16/76	11.12	1.08
9/29/76	10.94	0.90
10/15/76	10.74	0.70
10/27/76	10.68	0.64
11/17/76	10.49	+0.45
12/15/76	10.48	0.44
1/25/77	10.38	0.34
3/1/77	10.33	+0.29
5/12/77	10.28	+0.24
7/6/77	10.16	+0.12
8/3/77	10.09	+0.05
9/8/77	10.12	+0.08
9/22/77	10.05	+0.01
10/6/77	10.08	+0.04
10/20/77	10.12	+0.08
11/14/77	10.07	+0.03
12/20/77	10.02	-0.02
2/16/78	9.93	-0.11
5/1/78	10.00	-0.04
6/22/78	10.02	-0.02
10/10/78	9.93	-0.11

Settlement Plate
Sta. 334+00
Loc. 22' Left ℄ Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
8/24/76	--	3.64
8/27/76	12.90	2.80
9/10/76	12.32	2.22
9/16/76	12.20	2.10
9/29/76	12.08	1.98
10/15/76	11.92	1.82
10/27/76	11.86	1.76
11/17/76	11.61	1.51
12/15/76	11.60	1.50
1/25/77	11.52	1.42
3/1/77	11.51	1.41
5/12/77	11.43	1.33
7/6/77	11.24	1.14
8/3/77	10.95	0.85
9/8/77	11.00	0.90
9/22/77	10.94	0.84
10/6/77	10.96	0.86
10/20/77	11.01	0.91
11/14/77	10.96	0.86
12/20/77	10.90	0.80
2/16/78	10.84	0.74
5/1/78	10.92	0.82
6/22/78	10.94	0.84
10/10/78	10.89	0.79

Settlement Plate
Sta. 302+00
Loc. 22' Left ℄ Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
10/15/76	--	5.41
10/15/76	13.80	3.73
10/27/76	11.35	+1.28
11/17/76	10.77	+0.70
11/22/76	10.86	+0.79
12/15/76	10.93	+0.86
1/25/77	10.58	0.51
3/1/77	10.48	+0.41
5/12/77	10.35	+0.28
7/6/77	10.16	+0.09
8/3/77	10.05	-0.02
9/8/77	10.13	+0.06
9/22/77	10.00	-0.07
10/6/77	10.08	+0.01
10/20/77	10.06	-0.01
11/14/77	10.05	-0.02
12/20/77	10.01	-0.06
2/16/78	9.98	-0.09
5/1/78	9.96	-0.11
6/22/78	9.91	-0.16
10/10/78	9.84	-0.23

SETTLEMENT PLATE ELEVATIONS
CLAM SHELL EMBANKMENT
STATE PROJECT NO. 424-08-08
GIBSON-RACELAND HIGHWAY
SECTION 2, LAFOURCHE PARISH

Settlement Plate
Sta. 299+50
Loc. 22' Right ¢
Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
10/27/76	--	5.44
10/27/76	13.95	3.89
11/17/76	11.19	1.13
11/22/76	11.28	1.22
12/15/76	11.14	1.08
1/25/77	Run Over by Truck	

Settlement Plate
Sta. 290+75
Loc. 22' Right ¢
Westbound Lane

Date	Elev. Top Pipe	Elev. Plate
11/22/76	--	5.79
11/22/76	12.38	2.31
12/15/76	11.27	1.20
1/25/77	10.67	0.60
3/1/77	10.41	0.34
5/12/77	10.05	-0.02
7/6/77	9.85	-0.22
8/3/77	9.68	-0.39
9/8/77	9.73	-0.34
9/22/77	9.58	-0.49
10/6/77	9.63	-0.44
10/20/77	9.59	-0.48
11/14/77	9.56	-0.51
12/20/77	9.52	-0.55
2/16/78	9.46	-0.61
5/1/78	9.41	-0.66
6/22/78	9.37	-0.70
10/10/78	9.28	-0.79

Settlement Plate
Sta. 278+75
Loc. 22' Left ¢
Eastbound Lane

Date	Elev. Top Pipe	Elev. Plate
12/15/76	--	5.38
12/15/76	13.51	3.43
1/25/77	11.36	1.28
3/1/77	11.09	1.01
5/12/77	10.73	0.65
7/6/77	10.57	0.49
8/3/77	10.39	0.31
9/8/77	10.45	0.37
9/22/77	10.37	0.29
10/6/77	10.42	0.34
10/20/77	10.40	0.32
11/14/77	10.35	0.27
12/20/77	10.27	0.19
2/16/78	10.19	0.11
5/1/78	10.29	0.21
6/22/78	10.24	0.16
10/10/78	10.19	0.11