UFL/COEL-89/006

# BEACH MONITORING PROJECT
# SAND KEY PHASE II BEACH NOURISHMENT PROGRAM
# (North Redington Beach and Redington Shores)
# Post-Nourishment Report
# PART II - Offshore Profiles and Wave Data
# (Survey of November 18-23, 1988)

by

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and
Robert G. Dean

Prepared for:

Pinellas County
and
Division of Beaches and Shores
Florida Department of Natural Resources

March, 1989

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This study presents the post-nourishment survey results for the Sand Key Phase II beach nourishment project carried out in June, 1988. The monitoring program to this beach nourishment project is a joint effort between the University of South Florida and University of Florida. The field surveys include a total of 26 profiles, encompassing approximately 3 miles of shoreline extending from DNR R-96 to R-111. The total calculated volume loss of sand in the nourished segment (from R-99G to R-107) between the July and November surveys is 49,215 cubic yards, which is a loss about 9.3 percent of 529,150 cubic yards actually placed in the nourishment project. The total loss of sand computed in the entire survey area is 18,305 cubic yards, which is only 3.5 percent of the sand placed in the nourishment project. It is stressed that a part of these net volume reductions is due to the background erosion and not due to spreading losses induced by the nourishment project.

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Department of Coastal and Oceanographic Engineering
University of Florida

and

Department of Geology
University of South Florida

PART I – Beach profiles (USF - Separate Report)
PART II – Offshore profiles and wave data (UF)
PART III – Sediment analysis (USF - Separate Report)
PART IV – Shoreline maps (USF - Separate Report)

March, 1989

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BEACH MONITORING PROJECT
SAND KEY PHASE II BEACH NOURISHMENT PROGRAM
Post-Nourishment Report
PART II – Offshore Profiles and Wave Data (Survey of Nov 18–23, 1988)

## INTRODUCTION

This is the third of a series of reports presenting offshore survey results for the Sand Key Phase II beach nourishment project carried out in June, 1988. This project comprised the placement of 369,714 cubic yards of sand (paid yardage) obtained from Johns Pass ebb tidal shoals, delivered by pipeline dredge and placed along 1.6 miles of Sand Key shoreline. As shown in Figure 1, the monitoring project encompasses approximately 3 miles of shoreline extending from Florida Department of Natural Resources (FDNR) Monument No. R-96 to FDNR Monument No. R-111.

This field program to document the performance of this beach nourishment program is a joint effort between the University of South Florida (USF) and the University of Florida (UF). The USF has presented their results in a series of three reports.

This report is organized as follows. The main body of this report describes the survey methods, problems encountered and any necessary adjustments to the survey data. The following section presents an analysis of volume changes of sand for the entire survey region at North Redington Beach and Redington Shores. The volumes as determined by the November survey are compared with the post-nourishment (July 88) surveyed volumes, providing a measure of project performance over this four month period. The final section of the main body describes the wave data from the Clearwater gage which is maintained by the Univeristy of Florida. Appendix I presents the combined USF and UF profiles for the second post-nourishment (Nov 18–23, 1988) survey. Appendix II presents, for each profile line, the profiles obtained from the first (July 88) and second (Nov 88) post-nourishment surveys. Appendix III presents the wave data obtained in August, September, October, and November, 1988, from the UF maintained gage off Clearwater. The digitized data for this and the two earlier surveys in the form of floppy disks have been forwarded to Pinellas County and the Division of Beaches and Shores of the Florida Department of Natural Resources.

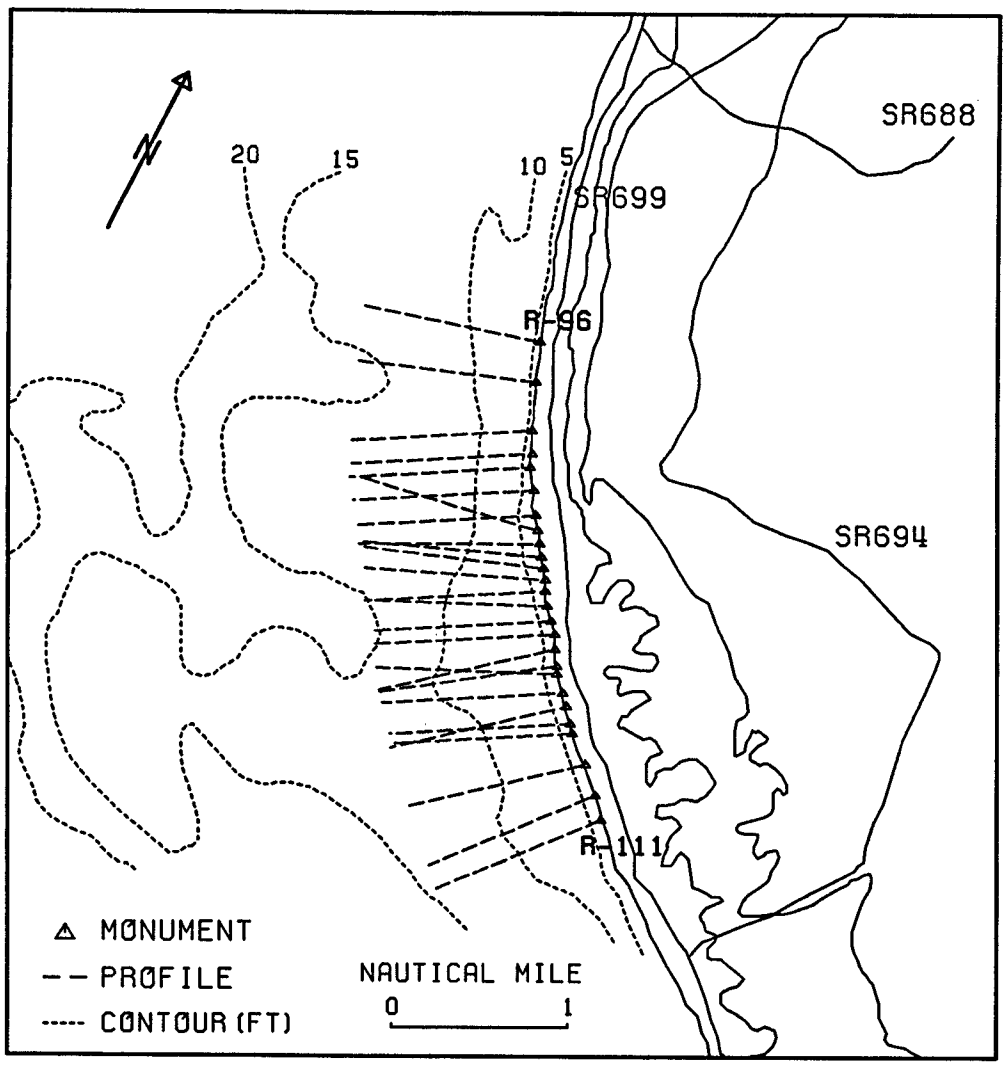



Fig. 1: A plan view of beach monitoring profiles in the Sand Key project.

## ADVANCED SUMMARY

The change in sand volume of the nourished beach was computed based on the first (July 88) and second (Nov 88) post-nourishment surveys. The change is a loss of 18,305 cubic yards between profiles R-96 and R-111G, which is a loss of about 3.5 percent of 529,150 cubic yards, the total amount of sand actually placed in the nourishment project. The loss within the nourished area (R-99G to R-107) is 49,215 cubic yards, amounting to approximately 9.3 percent.

## PURPOSE

The main objective of the project is to develop and interpret survey data. Based upon the surveyed profile data, changes in sediment volumes along the shoreline can be computed. At the end of the two year project the littoral sediment budget in the North Redington Beach and Redington Shores can be evaluated. Therefore, the long-term shoreline changes and sand losses for the project area can be estimated. Also, by using this information and the wave information collected from the Clearwater wave gage, a wave refraction study of the monitored project area will be performed. The wave refraction study will allow comparison between predicted and measured performances of the beach nourishment project. It can be used also to interpret the sediment motion between any two surveyed profiles.

## SURVEY AND REPORT SCHEDULE

The monitoring study is for a duration of two years plus pre- and post-nourishment surveys. The offshore profiles were taken immediately prior to the nourishment project and immediately upon completion of the nourishment. Offshore profiles are to be taken at three month intervals for the first twelve months. During the second year after the initial nourishment, profiles will be taken at six month intervals. Individual reports have been completed for the pre-nourishment and first post-nourishment surveys. A report will be prepared for each additional post-nourishment survey.

## FIELD METHODOLOGY

The field survey program includes a total of 26 profiles. The corresponding profile azimuths were established by USF for the pre-nourished beaches representing an approximate shore normal direction at that time (also see Figure 1). The profiles are located at the U.S. Army Corps of Engineers profile points which are D.N.R. reference monuments listed in Table 1. These profile lines include R-96, R-97, R-98A, R-99A, T100, T100A, R101, R101A, R102, R103, R103A, T104,

TABLE 1: MONUMENTS INCLUDED IN SURVEY PROGRAM
State Plane Coordinates (from D.N.R.)

| Station* | Easting (x) (feet) | Northing (y) (feet) | Mon. Ht.**(z) (feet) | Azimuth (o) |
|---|---|---|---|---|
| R-96 | 227958.485 | 1276710.289 | 5.93 | 255 |
| R-97 | 228343.814 | 1275866.521 | 6.46 | 250 |
| R-98G | 228772.087 | 1275053.219 | 6.79 | 240 |
| T-98A | 229028.789 | 1274566.127 | 6.14 | 240 |
| R-99G | 229275.691 | 1274163.874 | 6.29 | 240 |
| R-99A | 229597.306 | 1273596.413 | 7.63 | 240 |
| T-100 | 229891.061 | 1273110.390 | 9.06 | 240 |
| T-100A | 230148.906 | 1272691.171 | 8.31 | 260 |
| R-101 | 230423.542 | 1272252.968 | 8.36 | 243 |
| R-101A | 230688.978 | 1271769.475 | 6.92 | 248 |
| R-102 | 231008.001 | 1271352.894 | 5.48 | — |
| R-102G | 230898.594 | 1271308.691 | 6.74 | 250 |
| R-102A | 231116.317 | 1270935.255 | 5.68 | 247 |
| R-103 | 231360.509 | 1270528.098 | 6.19 | 240 |
| R-103A | 231583.068 | 1269891.226 | 6.82 | 245 |
| T-104 | 231879.478 | 1269383.631 | 6.42 | 240 |
| T-104A | 232146.410 | 1268917.614 | 7.65 | 240 |
| R-105 | 232484.160 | 1268492.980 | 6.24 | — |
| R-105G | 232455.921 | 1268467.560 | 6.52 | 230 |
| R-105A | 232744.670 | 1268091.876 | 6.45 | 235 |
| T-106 | 233058.630 | 1267702.733 | 6.48 | 245 |
| T-106A | 233416.537 | 1267304.950 | 6.01 | 240 |
| R-107 | 233776.623 | 1266915.338 | 6.04 | 235 |
| R-107A | 234162.479 | 1266496.174 | 4.25 | 240 |
| R-108 | 234582.270 | 1266287.600 | 6.58 | — |
| R-108G | 234521.211 | 1266249.446 | 7.69 | 240 |
| R-109 | 235223.399 | 1265406.463 | 7.46 | 230 |
| R-110G | 236031.320 | 1264755.180 | 5.87 | 220 |
| R-111G | 236870.595 | 1264146.555 | 6.27 | 220 |

* 'G' monuments established by USF Geology Dept., May, 1988
** Monument height (z) referenced to N.G.V.D. 1929

T104, R105, R105A, T106, T106A, R107, R107A, R108, R109, R110, and R111. For all these profiles, the D.N.R. monuments serve as the baseline points for the survey except for profiles R-102, R-105, and R-108 where the 'G' monuments established on the gulf front seawall by the University of South Florida are used as the baseline points.

The field surveys are divided into a landward portion (conducted by USF) and a gulfward portion (conducted by UF).

Landward Portion of Profile

The technique of documenting the landward portion of the profiles has been described in earlier USF reports, but will be presented briefly here.

The survey procedures for the landward portion of the profile are standard for land surveying. Basically a leveling rod is held vertical at points of interest by a 'rod-person' and in this case the elevation is read using a transit. The distance from the transit to the rod is established optically by reading stadia hairs on the telescope of the transit. This procedure is continued out to wading depth where the boat surveys continue the profile line into the gulf. In order to obtain the maximum possible overlap between the landward and gulfward portions of the lines, it is desirable to conduct the landward surveys at low tide and the gulfward surveys during high tide.

Gulfward Portion of Profile

The offshore profile survey is performed using a computer controlled survey system installed on a 26 feet aluminum power boat. The survey system includes a fathometer unit (Model 412 Auto Track) and a range finder (Mini-Ranger Falcon 484). The fathometer is able to measure water depths ranging from 2.0 to 999.9 feet and provides an accuracy within $\pm$ 0.1 foot. The range finder can measure distance between the receiver transmitter located on the boat and a microwave transponder located on shore up to distances of 10 nautical miles with a probable error range of $\pm$ 6 feet. When sampling a profile, the boat moves relatively slowly along the profile in order to obtain dense data points. In the shallower water depths, a boat speed of 4 knots is maintained and in deeper water where the bottom slopes are less, a speed of 6 knots is maintained. The measured profile data obtained from the fathometer and the range finder are recorded in a PDP-11/23 Micro-computer at a sampling rate of one data point per second. Therefore, the horizontal distance between any two contiguous sample points is about 7 feet in the nearshore area, and 10 feet in the offshore area.

The Mini-Ranger which is used for horizontal positioning consists of a 'master' unit mounted on the boat and a 'slave' unit located on the shore reference point from which the profile is being measured. Upon command from the master unit (at one second intervals), the slave unit responds and the delay between command and receipt of response is interpreted as distance. Since only one transponder is utilized, thus providing distance from the reference point, the alignment along the profile is provided by positioning two large orange-color target boards on the beach. They are separated by some distance and aligned with the profile azimuth by using a transit. The boat then moves in a course adjusted visually on line with the two target boards. Two survey runs are usually carried out for each profile line. An extra run may be added to profile surveys if any irregularities of the survey system are encountered during the profiling processes. For the post-nourishment survey conducted in November, 1988, the profile surveys were extended gulfward to a water depth of 18 feet.

### Difficulties Encountered in the Surveys

For the pre-nourishment (May 88) and the first post-nourishment (July 88) surveys, overlap of the landward and gulfward portions of some of the profiles was not obtained, thus leaving an unsurveyed gap. Inspection of this problem showed that greater emphasis needed to be given to carrying out the landward portion of the surveys at low tide and the gulfward portion of the surveys at high tide. The technique was refined for the gulfward portion of the profile lines so that the effort during high tides is directed toward the critical inshore portion of these lines with survey of the deeper offshore portion possible during any stage of the tide. This offshore profile survey technique was first utilized in the November, 1988 survey and proved effective and thus will be used in the sequent surveys.

## ANALYSIS AND PRESENTATION OF DATA

The offshore profile data obtained in the field are analyzed in the Coastal Laboratory of the Department of Coastal and Oceanographic Engineering at the University of Florida. After the data are retrieved from the field, they are transferred from the PDP-11 Micro-computer to a standard VAX-750 computer for later analysis. The first step in the analysis of surveyed profile data is to eliminate any erratic points in the depth measurements with frequencies smaller than 0.1 Hz by utilizing a nine-point rectangular filter. The second step is to adjust the water depth data, based upon the measurements of daily tides from a tide gage, to N.G.V.D datum. The third step is to reformat the data based on a linear interpolation to generate profile data points at spacings of 10 feet in horizontal distance from the baseline. The fourth step is to blend the two or three runs of

a profile into one single profile. The reduced data indicate the final form for the surveyed profiles and are available in 5.25" floppy diskettes at the Department of Coastal and Oceanographic Engineering, University of Florida.

Appendix I presents plots combining the offshore profiles and beach profiles, surveyed by the Department of Geology, University of South Florida, for the post-nourishment survey. Appendix II presents the offshore and beach profiles for both the first (July 88) and second (Nov 88) post-nourishment surveys. Some of the composite profiles are seen to have a segment which is dashed in the nearshore area. The dashed line indicates the 'constructed' profile which is not available from either the beach/nearshore profile survey or the offshore profile survey. It is constructed in a sense that if no bar formation is present in the adjacent profiles a simple interpolation is then inserted for the gap. Otherwise, a smoothed bar segment similar to the neighbouring profiles is established in the gap. The offshore profile for R-96 was not measured for this post-nourishment survey and was taken as the same as the one surveyed in January, 1989. The comparson of profiles T-104 between July and November surveys reveals large deviation of the two for offshore distances greater than 2,600 feet. It is noted here that offshore portion of T-104 was not measured in July, and it was linearly interpolated between the two adjacent profiles: R-103A and T-104A. Thus, the interpolated T-104 profile of July is less accurate than the measured one of November.

## CALCULATION OF VOLUME CHANGES AFTER NOURISHMENT

The volume changes of sand for the nourished beach are computed by adding the volume changes of sand in every two adjacent profiles between the July and November surveys. In computing the volume change between any two adjacent profiles, the volume change per beach length at each profile is first calculated. This is equivalent to computing the area change of sand in a profile between the July and November surveys. The individual profile area is obtained by using a trapezoidal rule to numerically integrate the area from the monument to a reference offshore distance, which is normally chosen at the place where the water depth is equal to 12 feet. The volume change in any two adjacent profile lines is computed, based on the spacings between the two profiles, and using the trapezoidal rule. A positive change of volume corresponds to the increase of volume and indicates a convergence zone of sand, while a negative change of volume corresponds to the decrease of sand and a divergence zone. Table 2 presents the results for the computation of volume changes from profiles R-96 to R-111G between the July and November surveys. The integration of sand area in a profile is referred to N.G.V.D, 1929, and is carried out from the monument location to a 12 feet depth offshore distance.

TABLE 2: CALCULATION OF VOLUME CHANGES AFTER NOURISHMENT.

| Station* | Spacing (feet) | length** (feet) | vol.*** per unit beach length($ft^2$) July(88) | Nov(88) | vol. change per unit length($ft^2$) | vol. change (cubic yard) |
|---|---|---|---|---|---|---|
| R-96 | | 2800 | -35200 | -35093 | 107 | |
| | 928 | | | | | 356 |
| R-97 | | 1300 | -12234 | -12321 | -87 | |
| | 919 | | | | | 12101 |
| R-98G | | 1400 | -14131 | -13333 | 798 | |
| | 550 | | | | | 11647 |
| R-98A | | 1450 | -12377 | -12032 | 345 | |
| | 472 | | | | | 582 |
| R-99G | | 1400 | -12692 | -12970 | -278 | |
| | 652 | | | | | -19063 |
| R-99A | | 1450 | -12562 | -13862 | -1300 | |
| | 568 | | | | | -19674 |
| T-100 | | 2300 | -24302 | -24873 | -571 | |
| | 492 | | | | | -9134 |
| T-100A | | 2000 | -17920 | -18351 | -431 | |
| | 517 | | | | | -1233 |
| R-101 | | 3200 | -36449 | -36146 | 303 | |
| | 552 | | | | | 8702 |
| R-101A | | 3500 | -41075 | -40526 | 549 | |
| | 506 | | | | | 6106 |
| R-102G | | 3300 | -37414 | -37312 | 102 | |
| | 432 | | | | | 7884 |
| R-102A | | 3550 | -40252 | -39369 | 883 | |
| | 475 | | | | | 8383 |
| R-103 | | 3250 | -34098 | -34027 | 71 | |
| | 675 | | | | | 2655 |
| R-103A | | 2950 | -32622 | -32480 | 142 | |
| | 588 | | | | | 229 |
| T-104 | | 2200 | -20343 | -20465 | -122 | |
| | 537 | | | | | 515 |
| T-104A | | 2200 | -20251 | -20078 | 173 | |
| | 546 | | | | | -4286 |
| R-105G | | 1200 | -8906 | -9503 | -597 | |
| | 474 | | | | | -8730 |
| R-105A | | 1700 | -14376 | -14775 | -399 | |
| | 500 | | | | | -6643 |
| T-106 | | 1800 | -15003 | -15322 | -319 | |
| | 535 | | | | | -8969 |
| T-106A | | 2050 | -17598 | -18184 | -586 | |
| | 530 | | | | | -5958 |
| R-107 | | 2050 | -18521 | -18541 | -20 | |
| | 570 | | | | | 2482 |
| R-107A | | 1900 | -18050 | -17794 | -256 | |
| | 435 | | | | | 1618 |
| R-108G | | 1750 | -14419 | -14473 | -54 | |
| | 1097 | | | | | 1691 |
| R-109 | | 1900 | -17365 | -17226 | 139 | |
| | 1038 | | | | | 1711 |
| R-110G | | 1000 | -6272 | -6331 | 49 | |
| | 1037 | | | | | -1279 |
| R-111G | | 2100 | -20871 | -20888 | -17 | |

Volume changes from R-99G to R-107 in cubic yards = -49,215
Volume changes from R-96 to R-111G in cubic yards = -18,305

* nourished area from R-99G to R-107

** horizontal distance over which volume is integrated (from baseline to an approximate depth of 12 ft)

***volume relative to N.G.V.D. 1929

Figure 2 shows the computed volume changes and cumulative changes between profiles R-96 and R-111G. It is seen in Figure 2 that the greatest volume losses occur in two areas: one is between R-99G and T-100A, and another is between T-104A and R-107. It appears that the volumetric changes shown in the lower part of Figure 2 are primarily due to a combination of three effects: (1) the expected "spreading" losses associated with the nourishment project, (2) trapping of northerly transport by the Redington Shores breakwater, and (3) the background erosion.

The total calculated volume loss of sand in the nourished segment (from R-99G to R-107) between the July and November surveys is 49,215 cubic yards, which is a loss of about 9.3 percent of 529,150 cubic yards actually placed in the nourishment project. However, most of the lost volume of sand is found to stay in the neighbourhood inside the entire survey region. The total loss of sand computed between R-96 and R-111G is 18,305 cubic yards, which is only 3.5 percent of the sand placed in the nourishment project. It is stressed that a part of these net volume reductions is due to the background erosion and not due to spreading losses induced by the nourishment project.

## WAVE DATA

The wave data were collected by a UF maintained underwater wave gage located about 3 miles offshore Clearwater Beach, Florida. The data contain unidirectional wave information, including modal wave period and significant wave height. The directional wave gage is scheduled to replace the unidirectional gage in and after the third quarter monitoring period. Until the directional wave gage is available in collecting wave data, wave directions are assumed to be the same as the local wind directions. Appendix III presents the wave data collected in August, September, October, November, 1988. The gage was not operable between Sep 24 and Oct 11, and between Oct 29 and Nov 20. The wave refraction analysis is in process and will be presented as an addendum to this report.

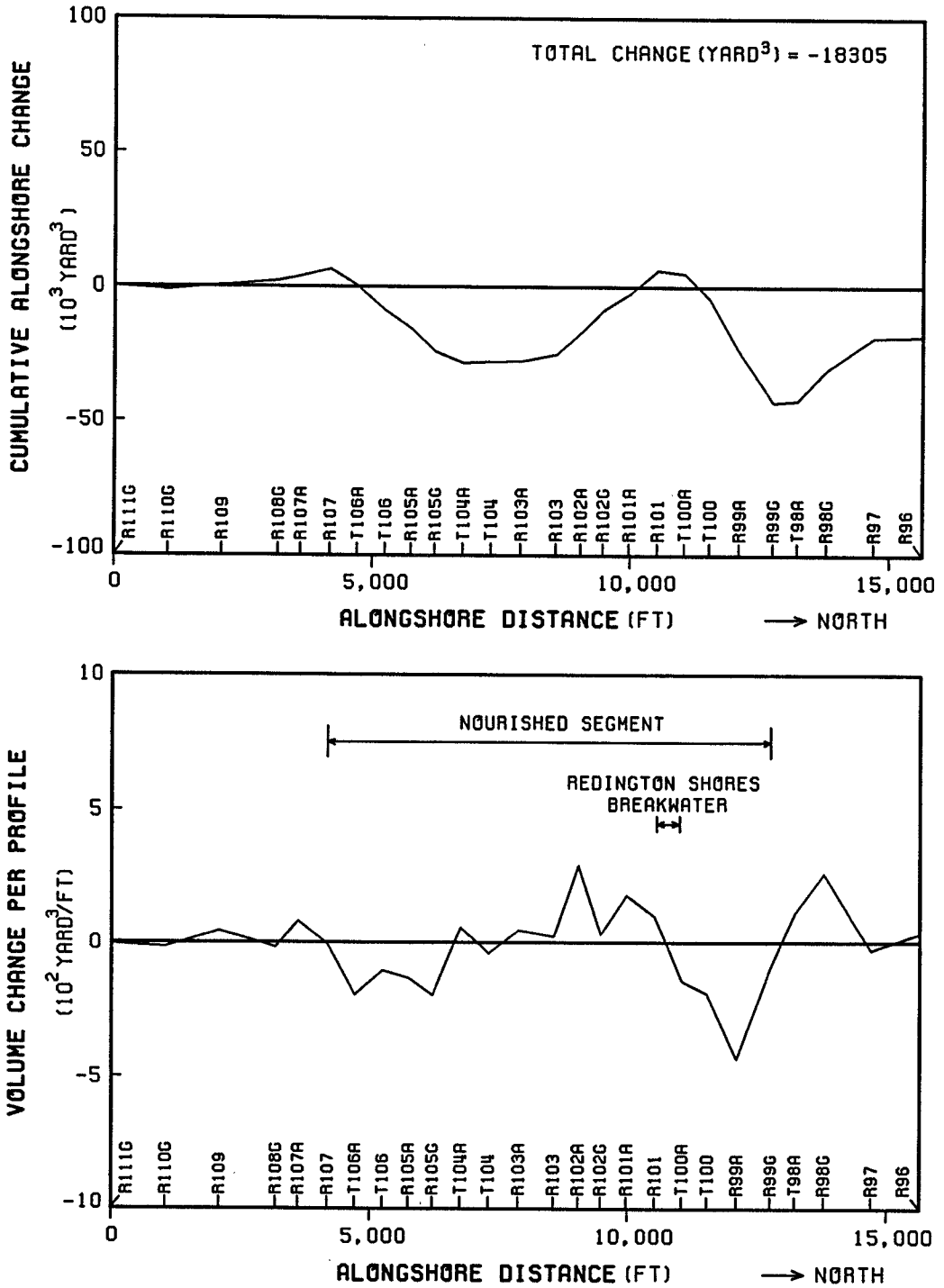



Fig. 2: Local and cumulative volume changes of sand after beach nourishment

# APPENDIX I:

# COMBINED OFFSHORE AND BEACH PROFILES

# APPENDIX I:
# COMBINED OFFSHORE AND BEACH PROFILES

## OFFSHORE AND BEACH PROFILE NOTES:

a. All elevations are in feet and tenths and are referred to N.G.V.D. 1929.

b. Coordinates are based on the standard plane rectangular coordinate system for the state of Florida.

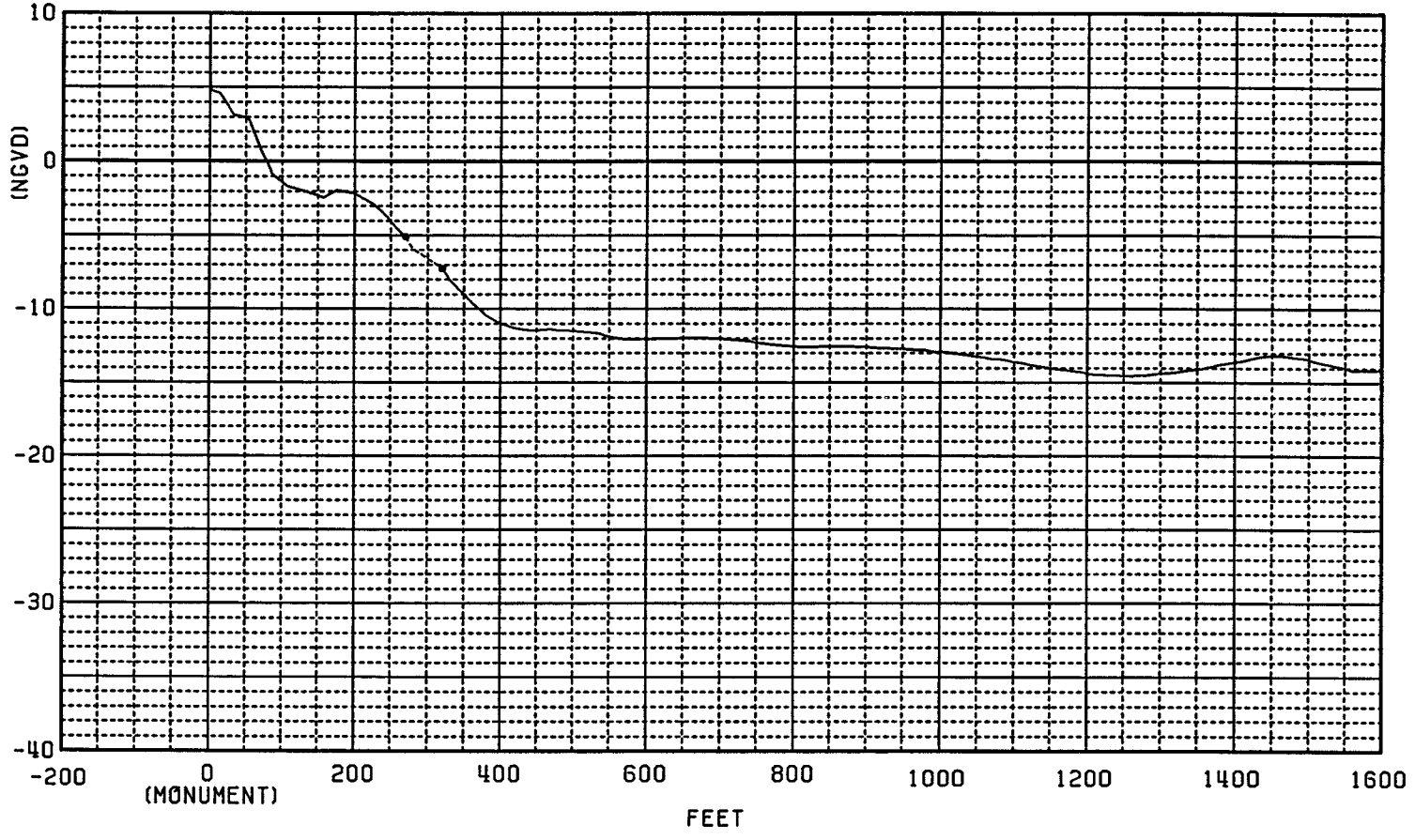
c. Azimuths (0 = north) are clockwise relative to magnetic north.

d. Profile azimuths were established for the pre-nourished beaches representing a shore normal strike at that time.

e. D.N.R. monuments are standard bronze disks set in concrete.

f. USF Coastal Research Lab 'G' monuments represent surveyed gulfward markers of the Corps of Engineers monuments.

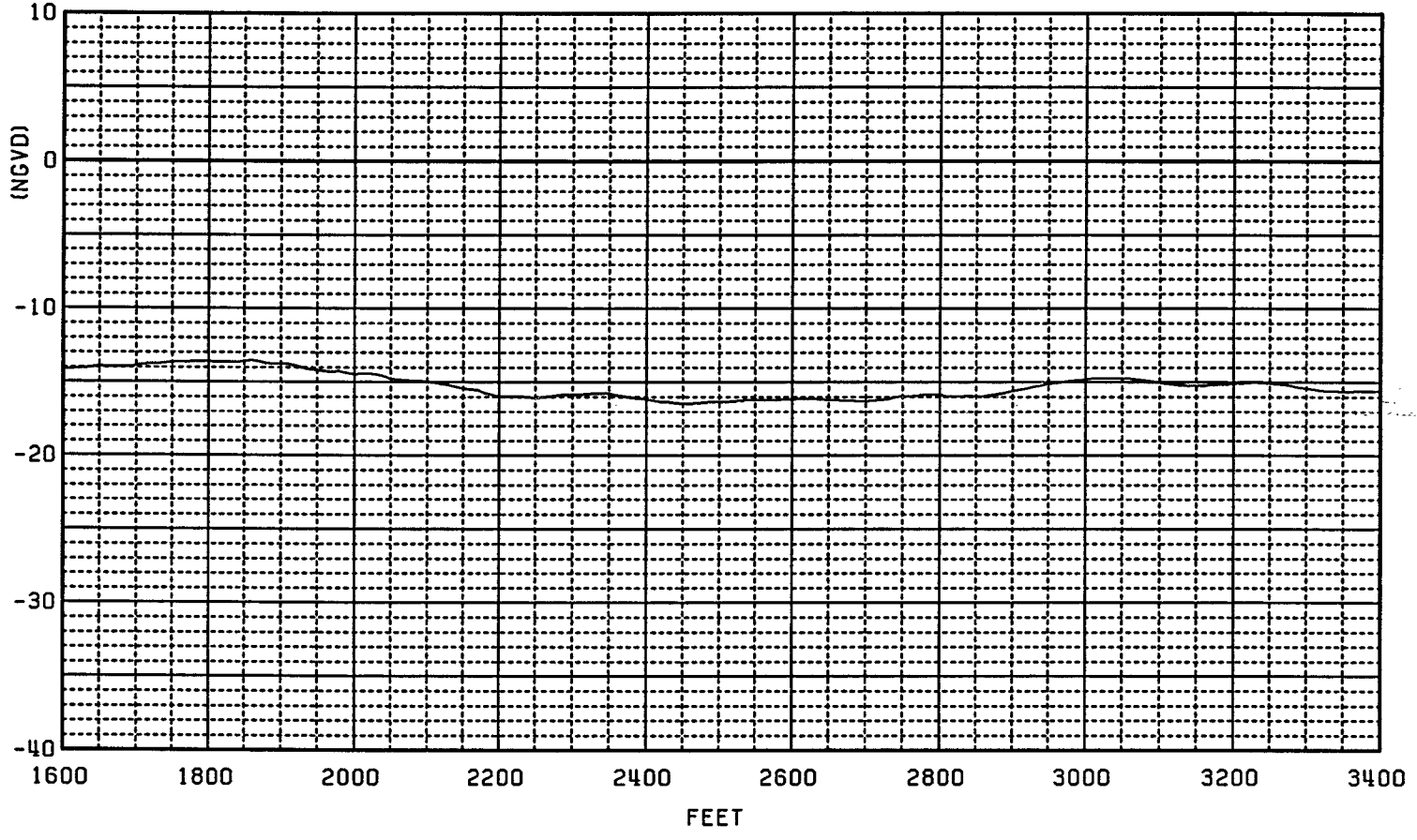
g. Plotted offshore profiles begin at the DNR/USF-'G' monuments located on the seawall and extend southward.




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

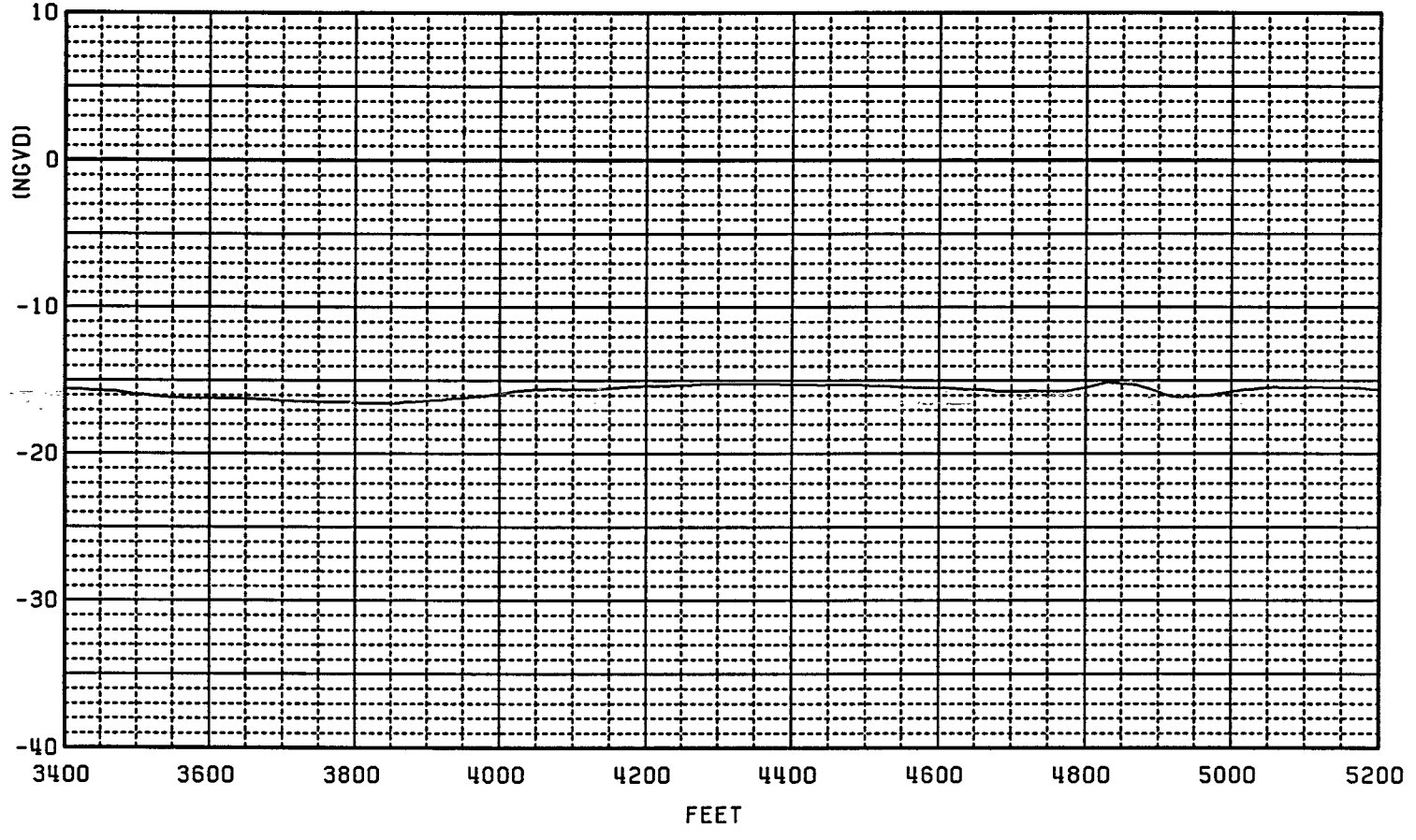
RANGE: R-96 1/4
SURVEY BEAR (MAG. N): 255
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-96 2/4
SURVEY BEAR (MAG. N): 255
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88

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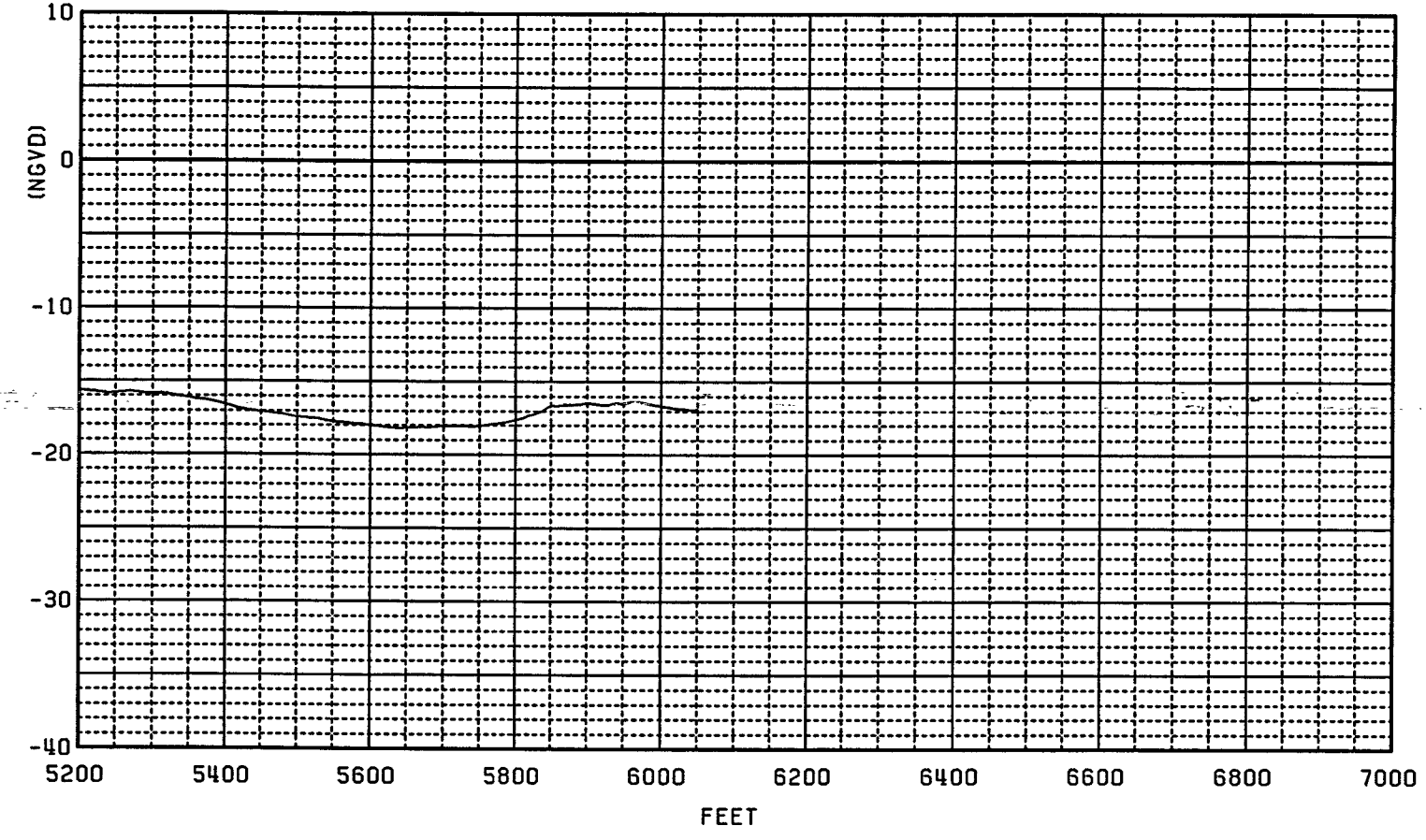
COMBINED PROFILE
—— MEASURED PROFILE
•---•CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

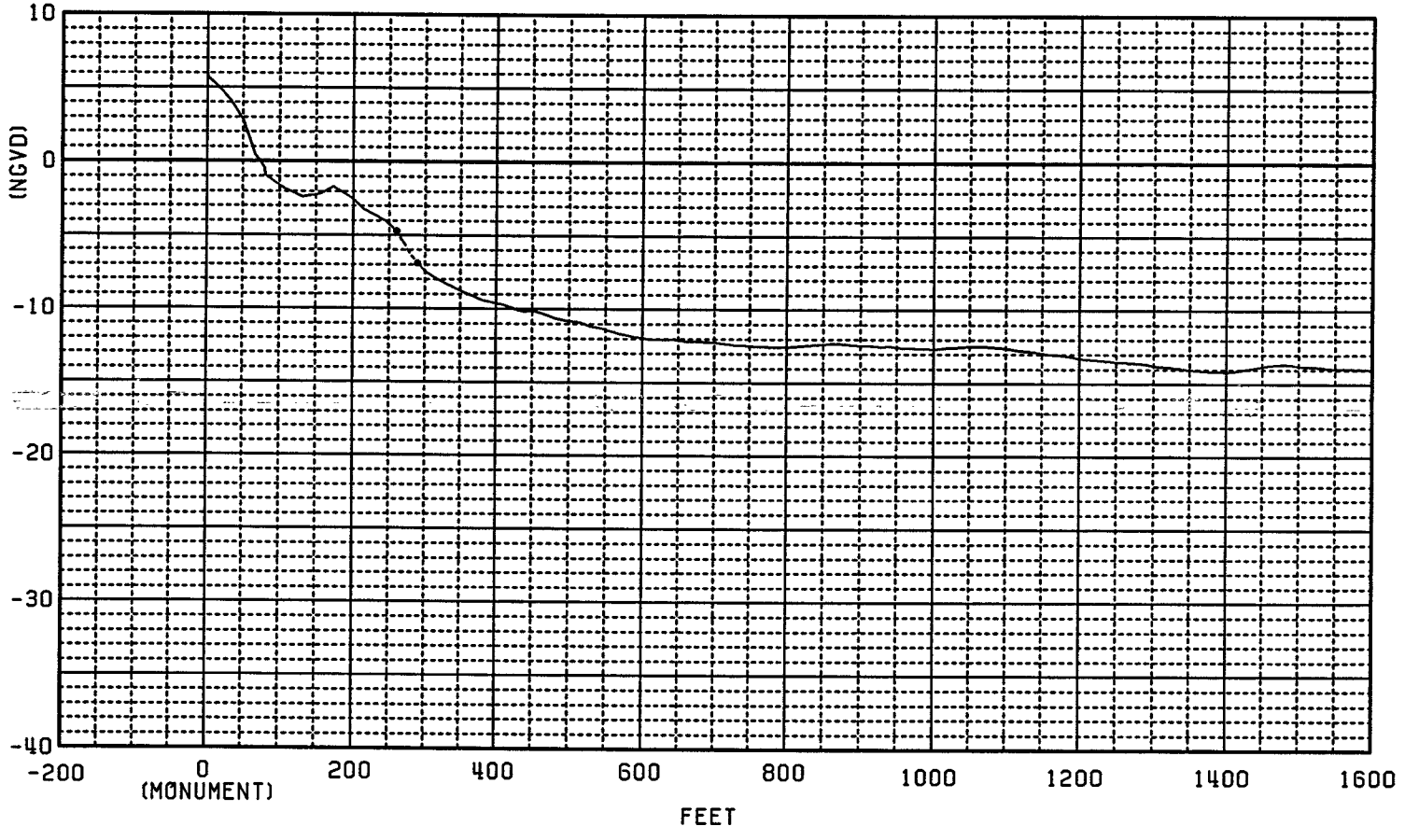
RANGE: R-96 3/4
SURVEY BEAR (MAG. N): 255
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

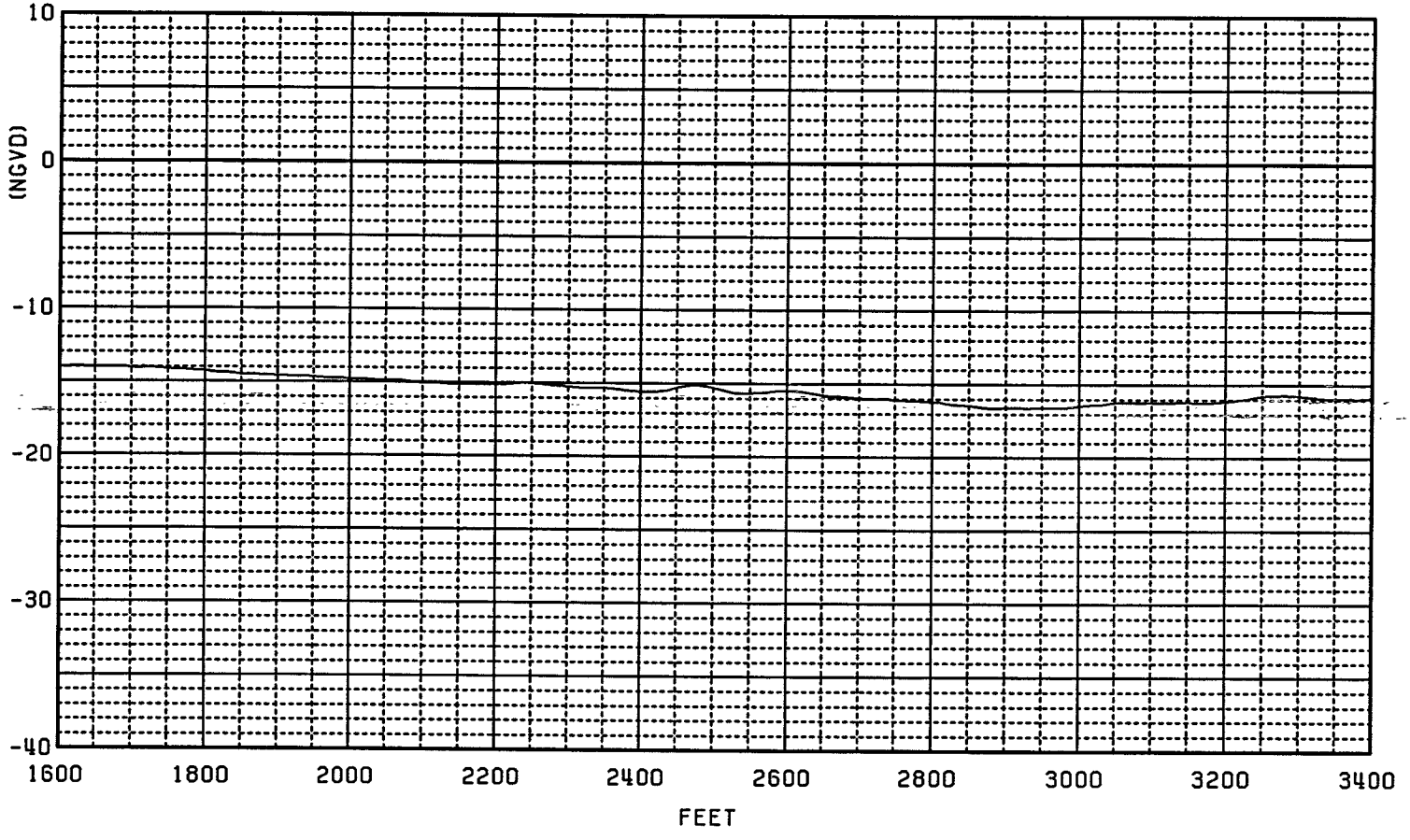
RANGE: R-96 4/4
SURVEY BEAR (MAG. N): 255
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

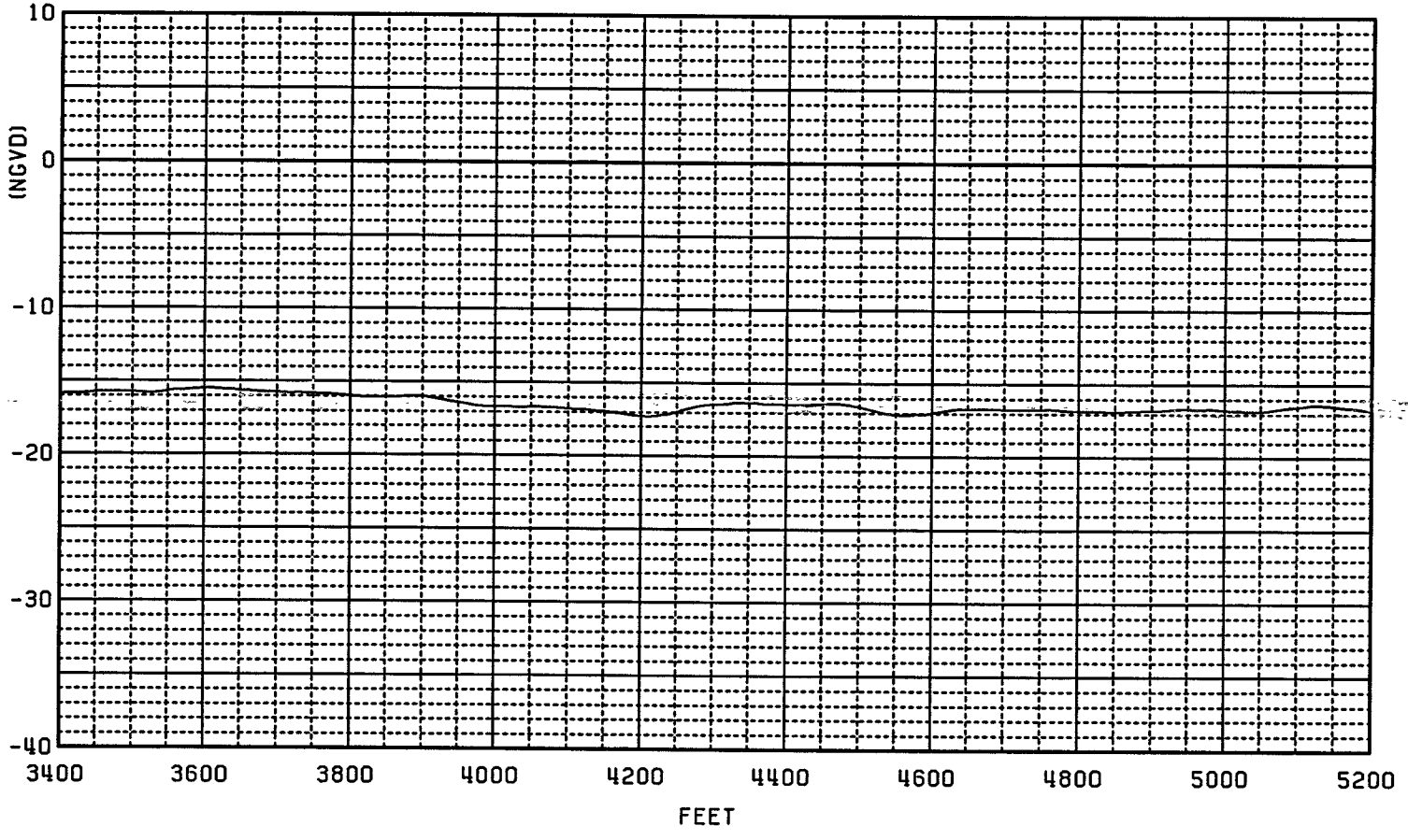
RANGE: R-97 1/4
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

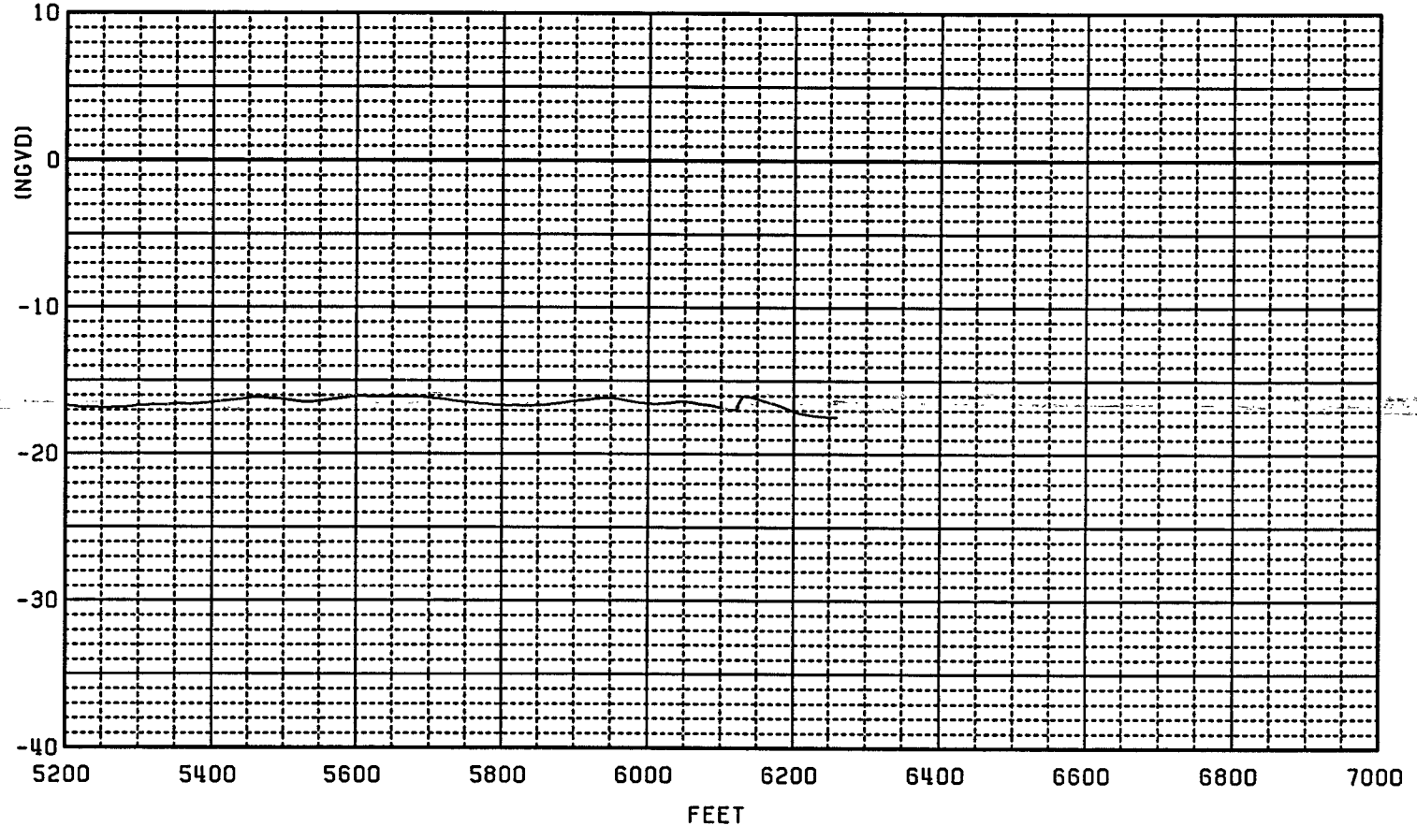
RANGE: R-97 2/4
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

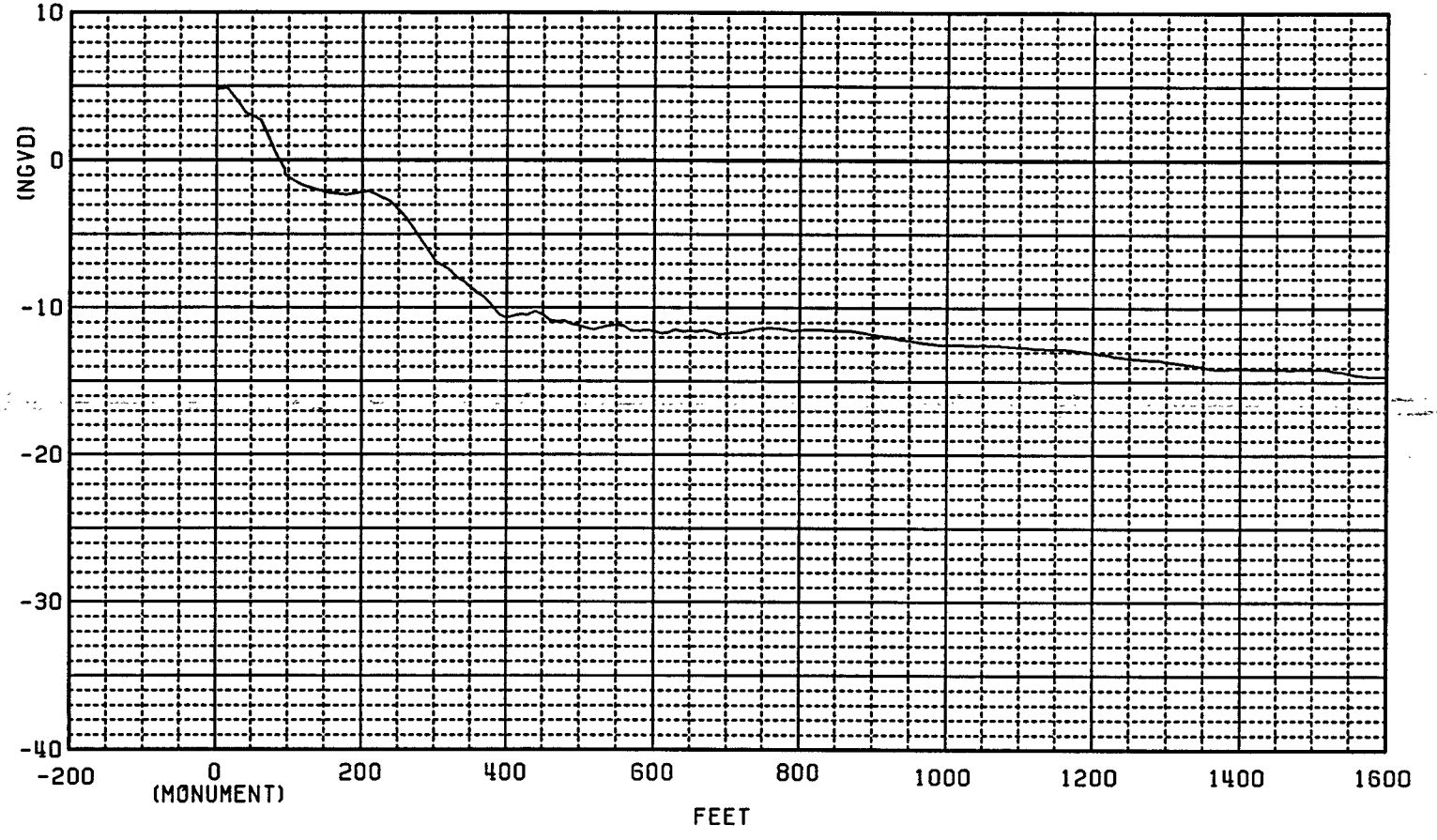
RANGE: R-97 3/4
SURVEY BEAR (MAG. N) : 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

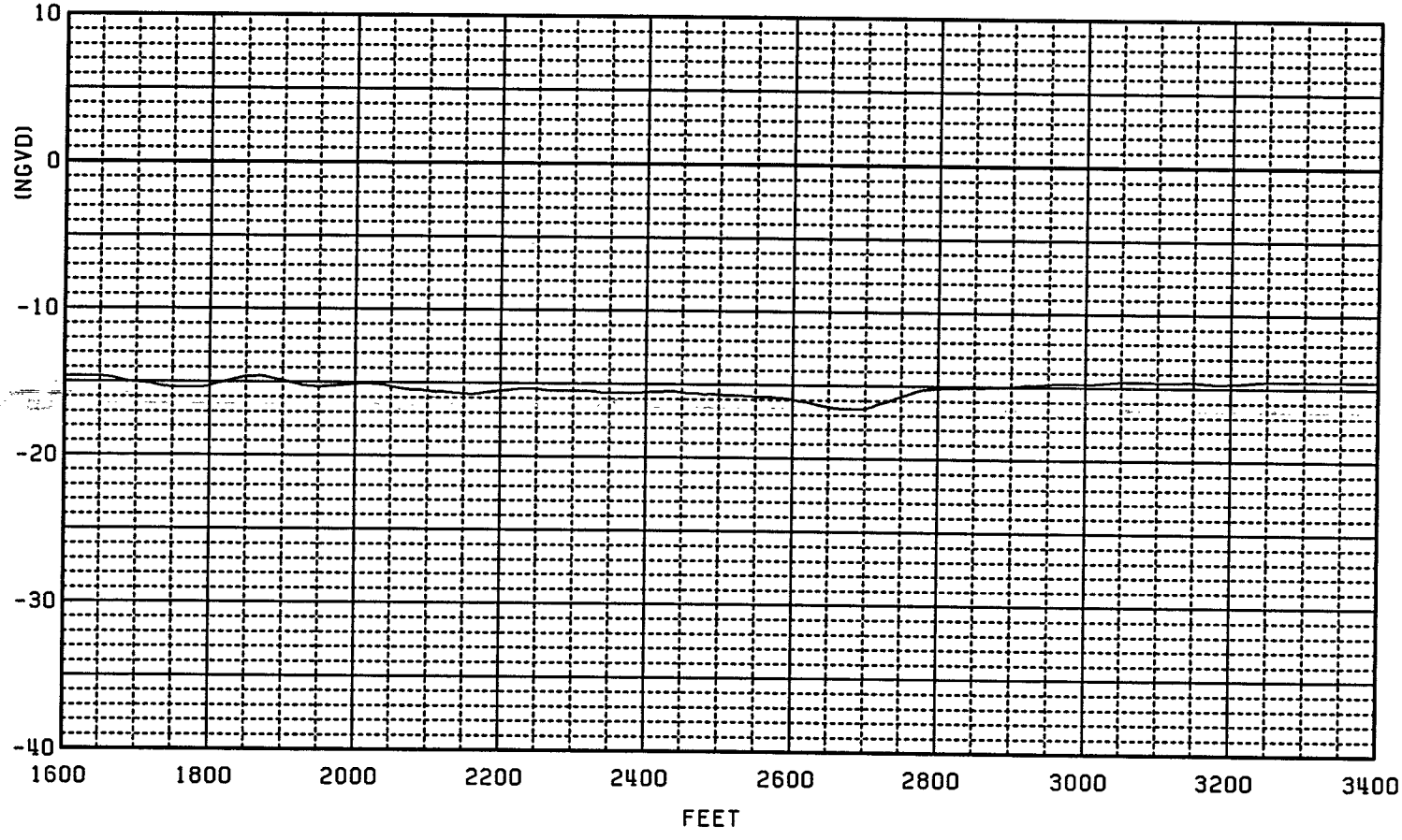
RANGE: R-97 4/4
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

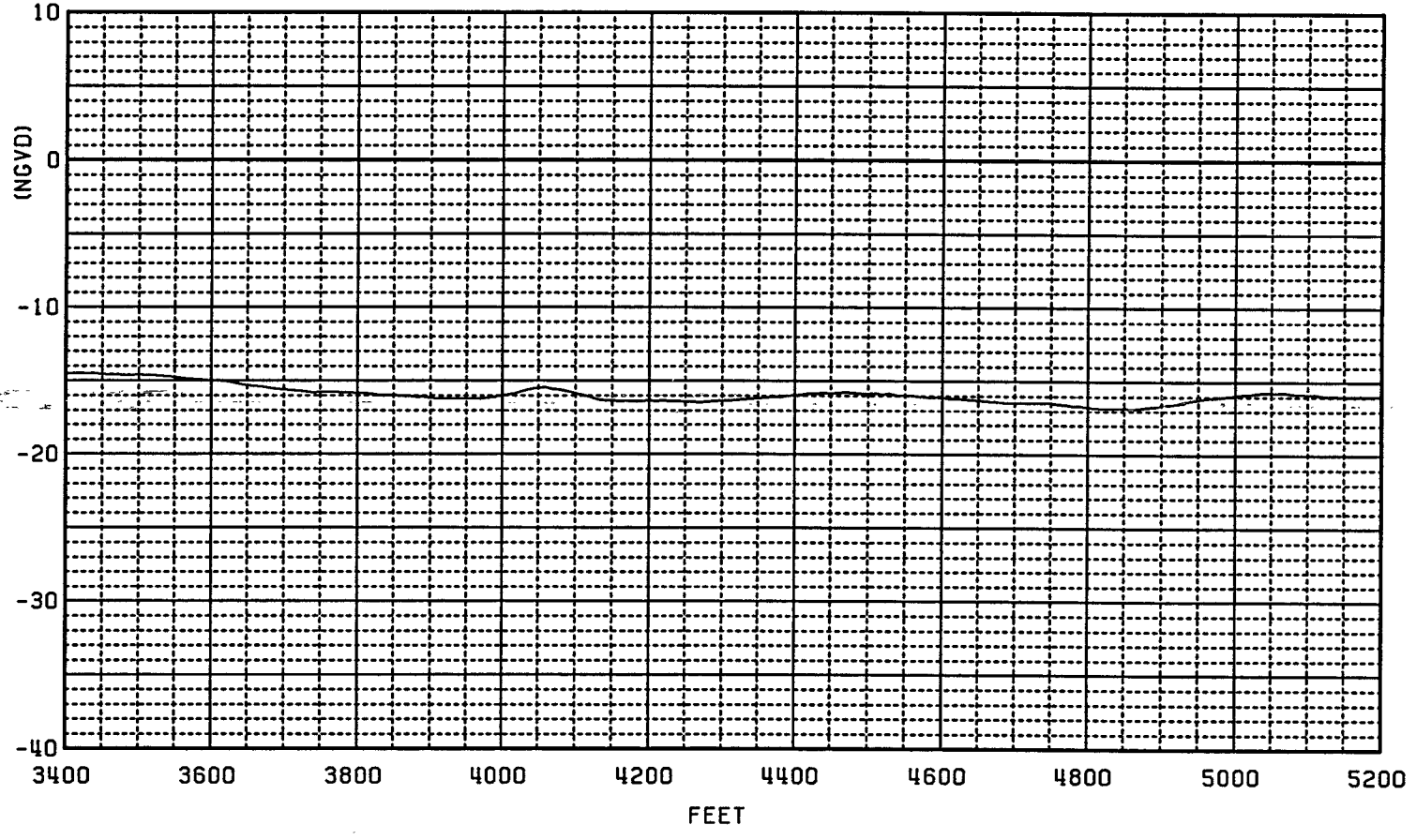
RANGE: R-98G 1/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

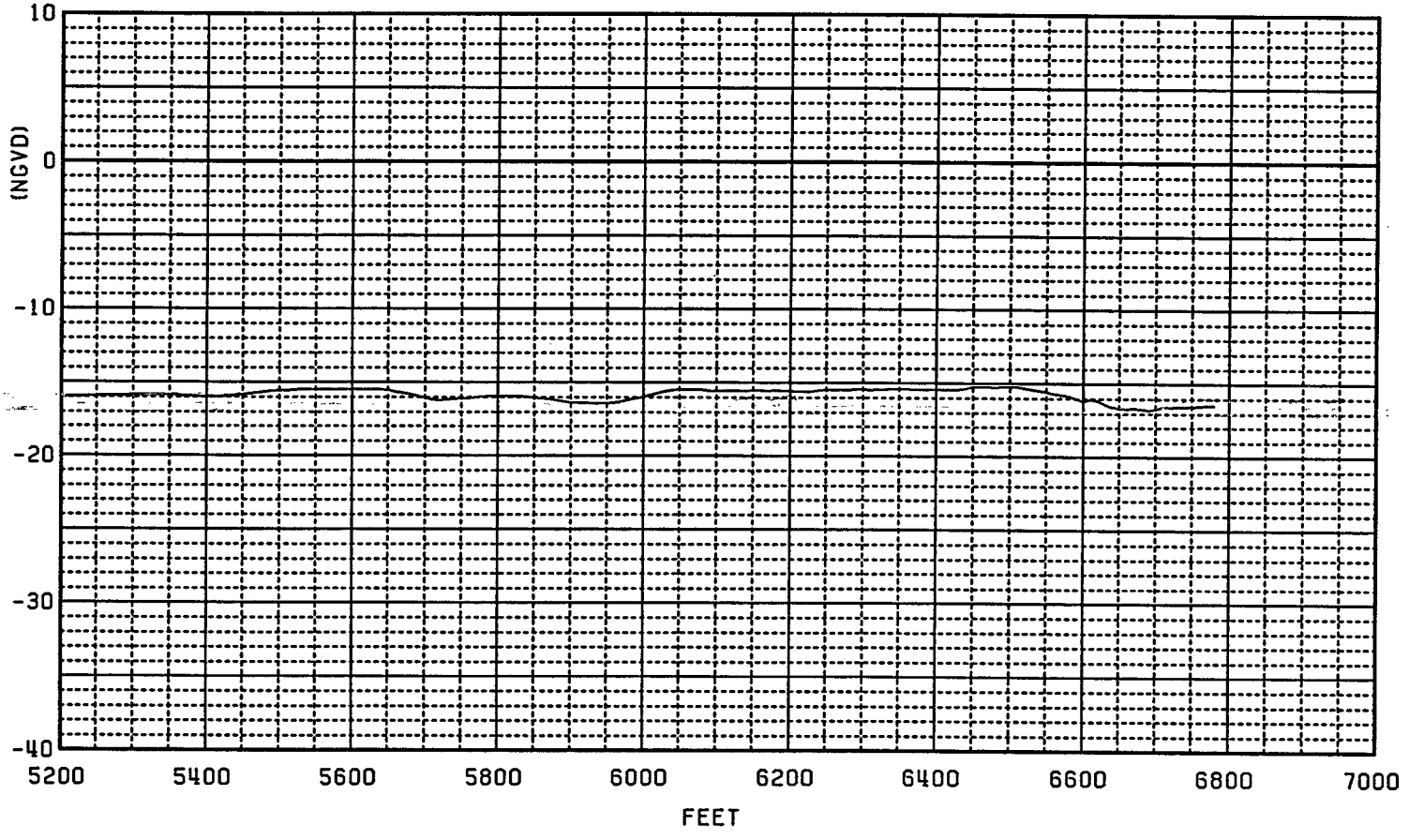
RANGE: R-98G 2/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

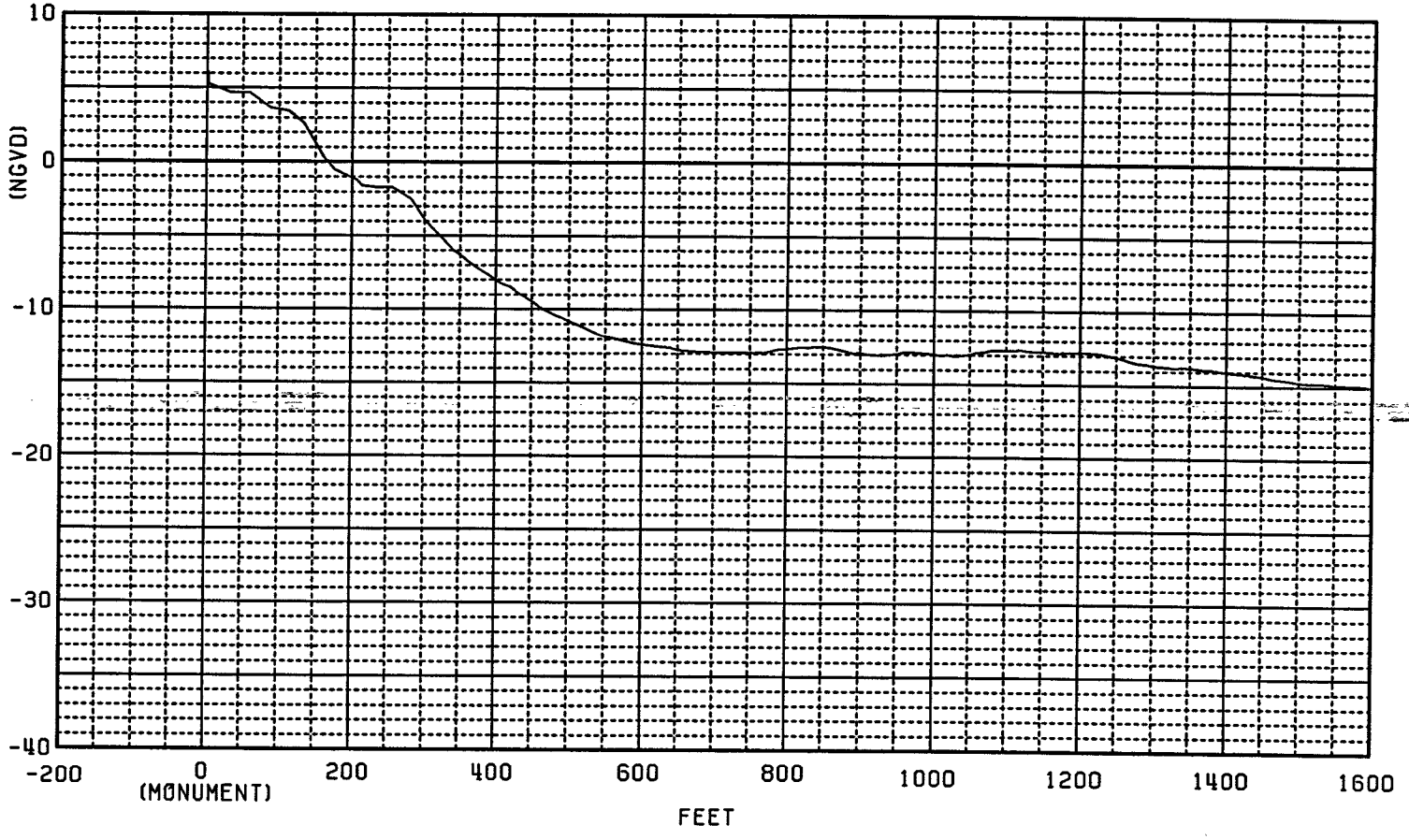
RANGE: R-98G 3/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

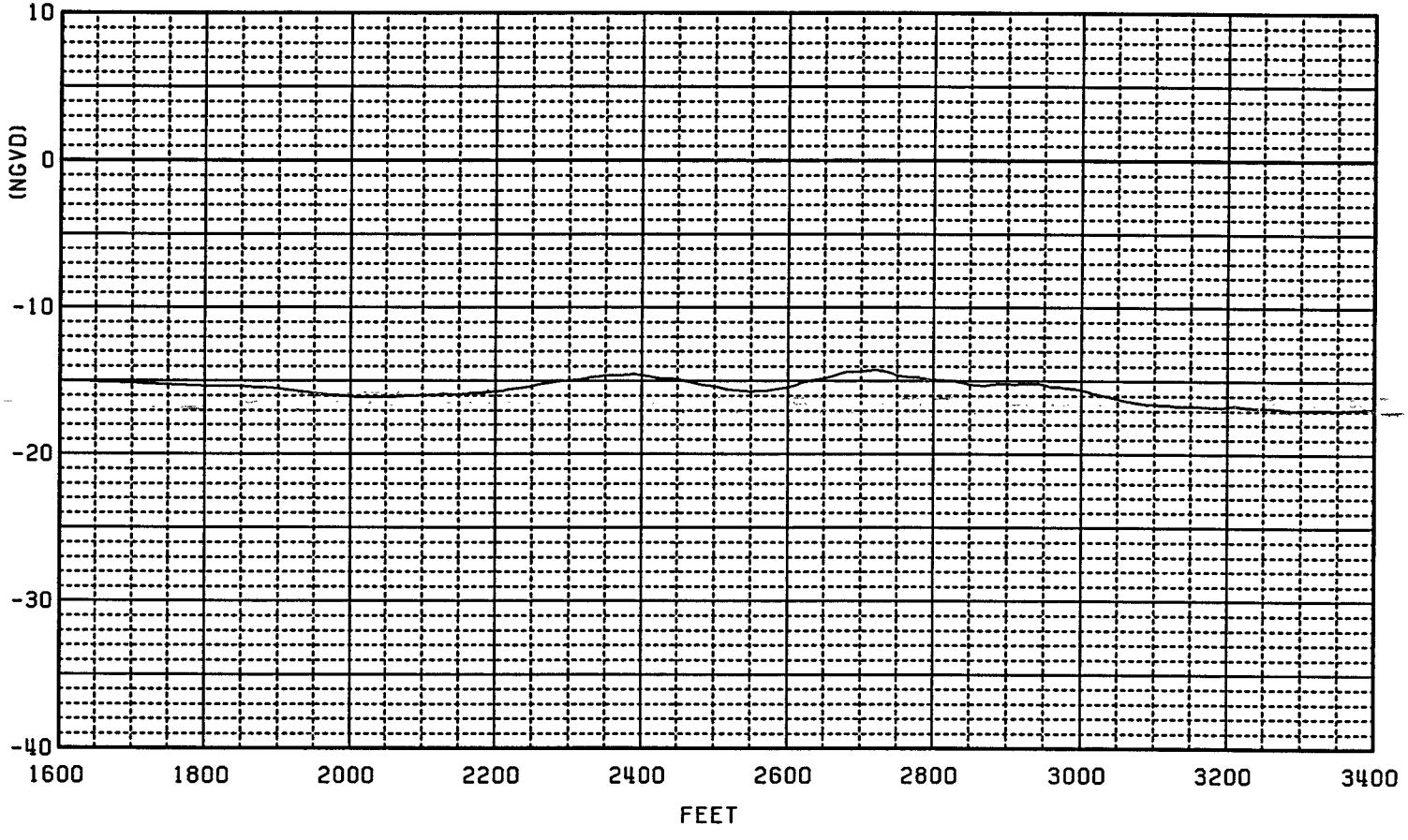
RANGE: R-98G 4/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

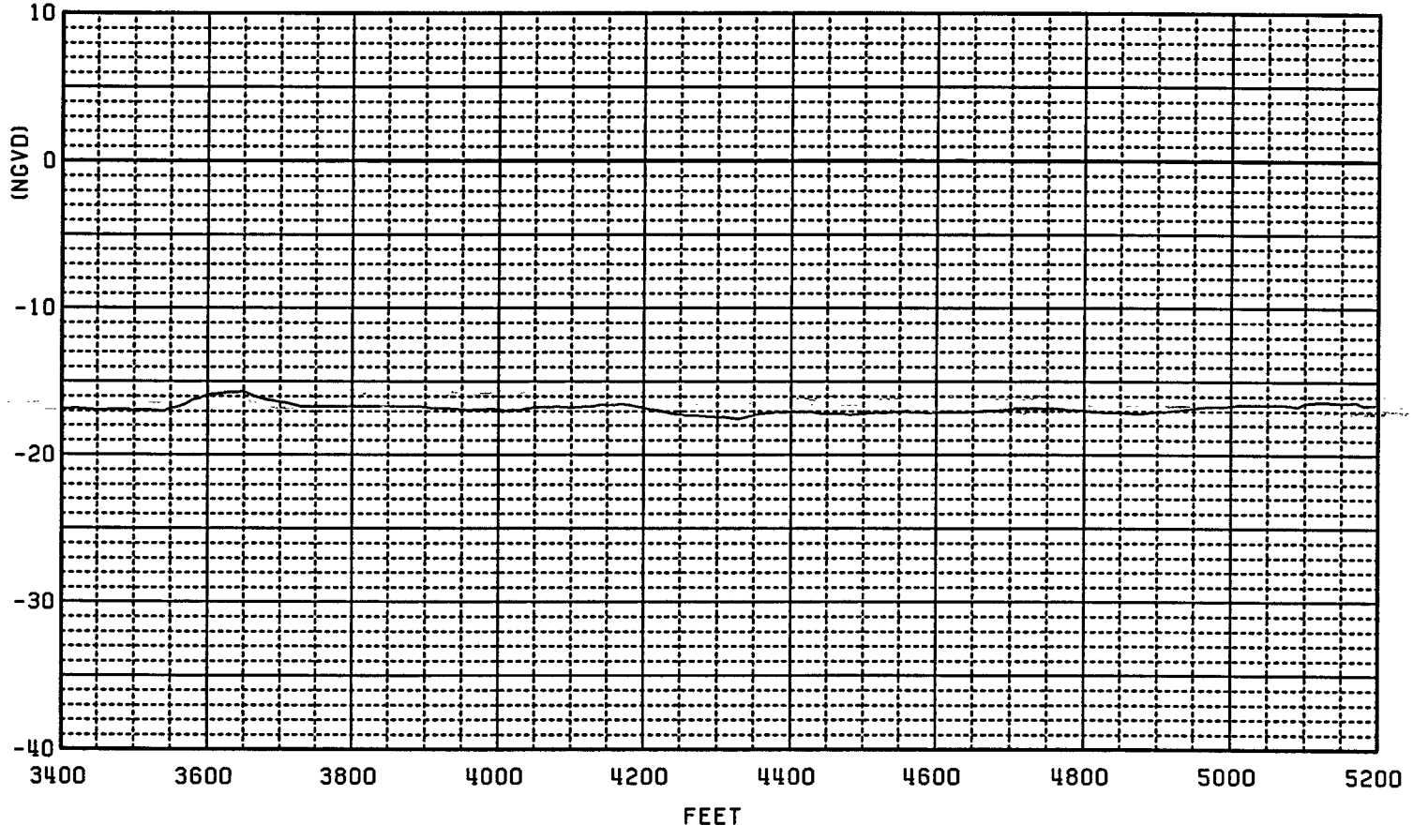
RANGE: T-98A 1/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

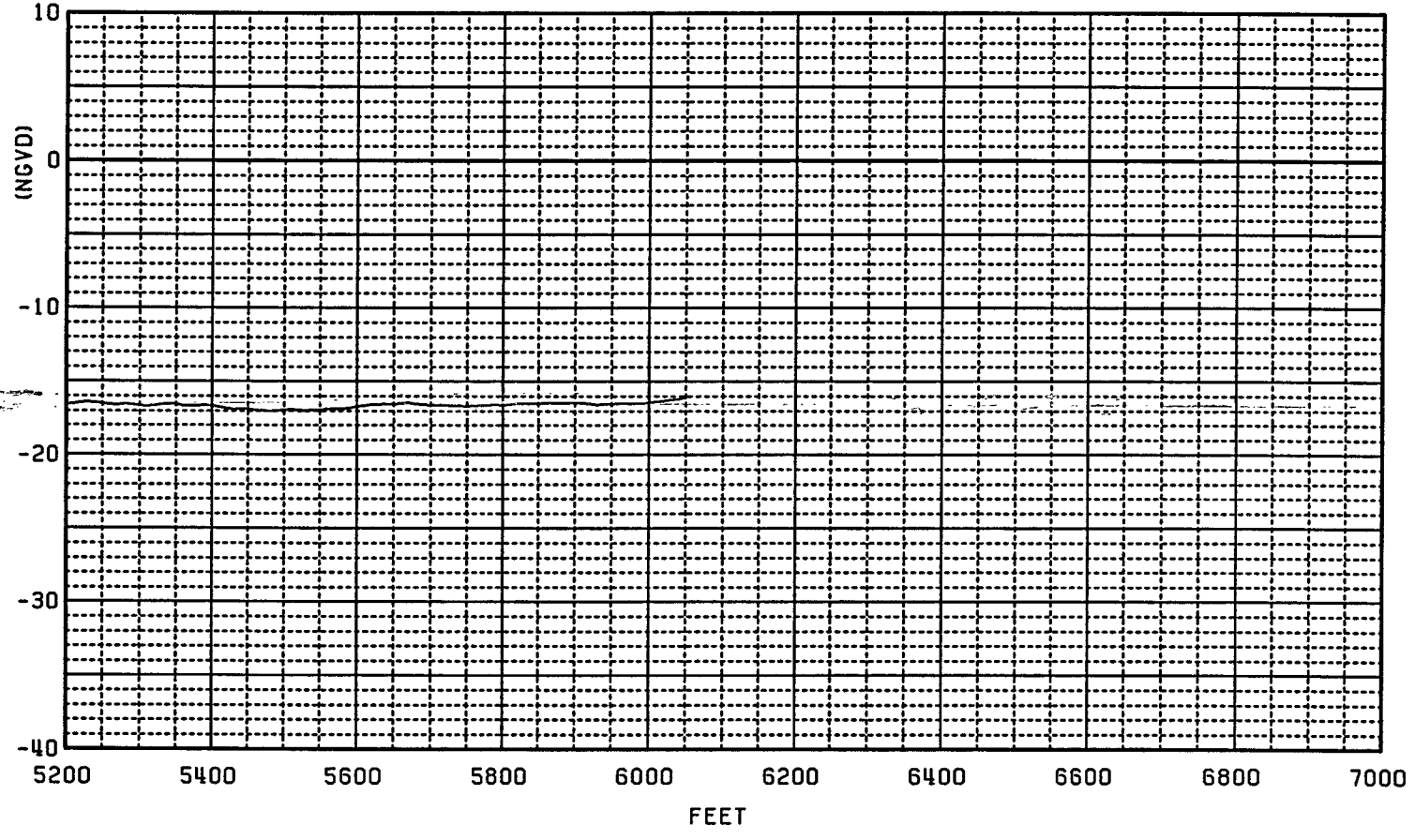
RANGE: T-98A 2/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

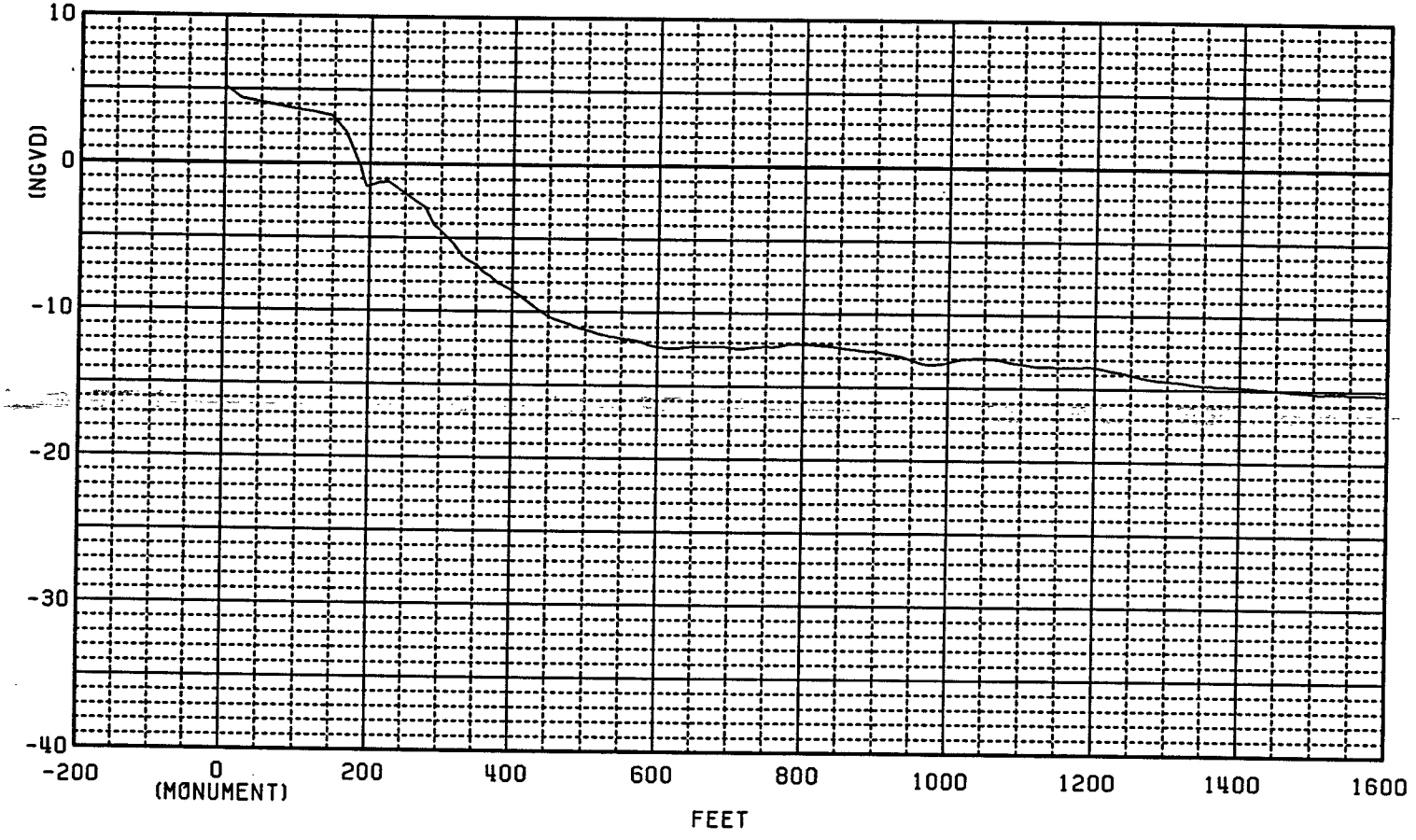
RANGE: T-98A 3/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

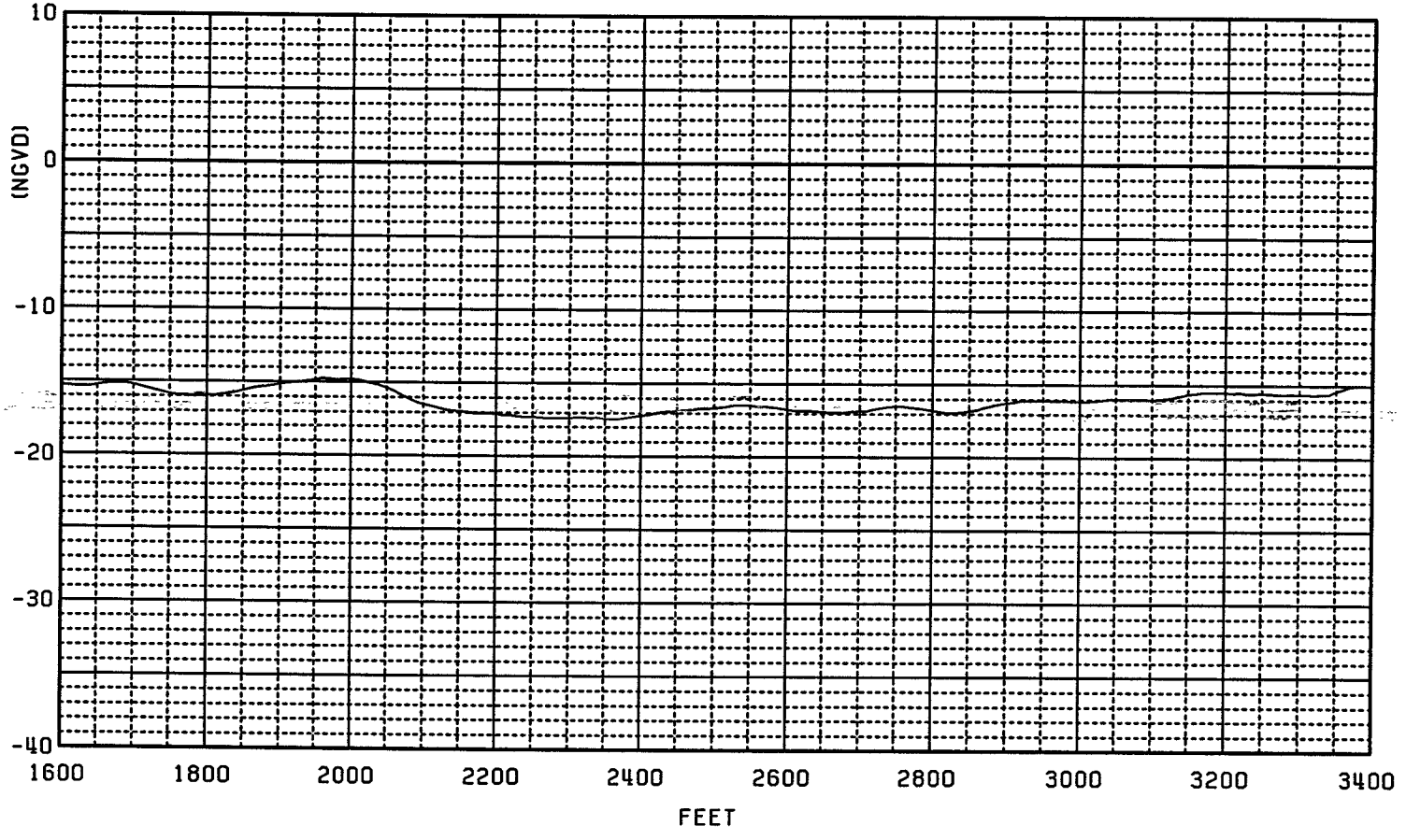
RANGE: T-98A 4/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

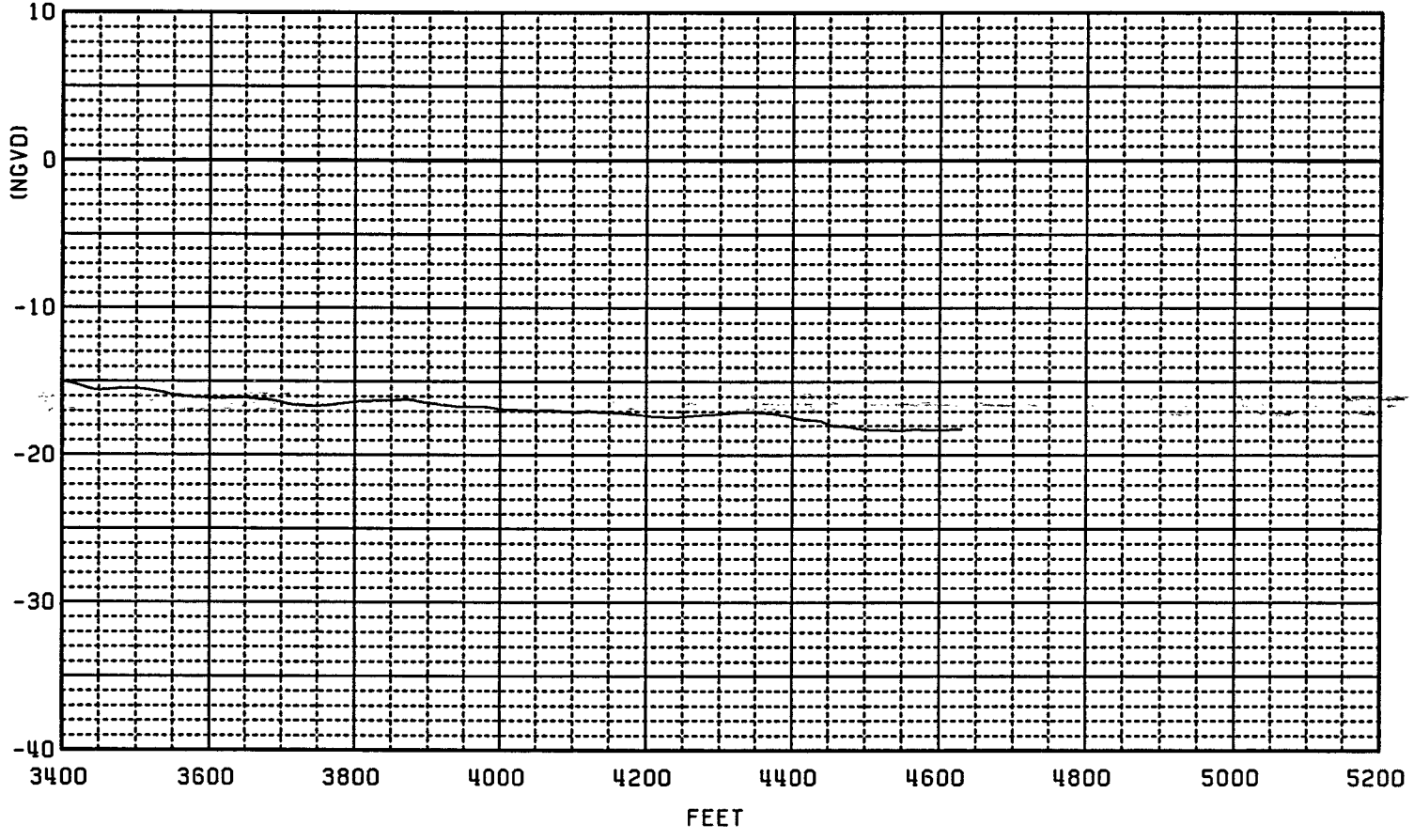
RANGE: R-99G 1/3
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

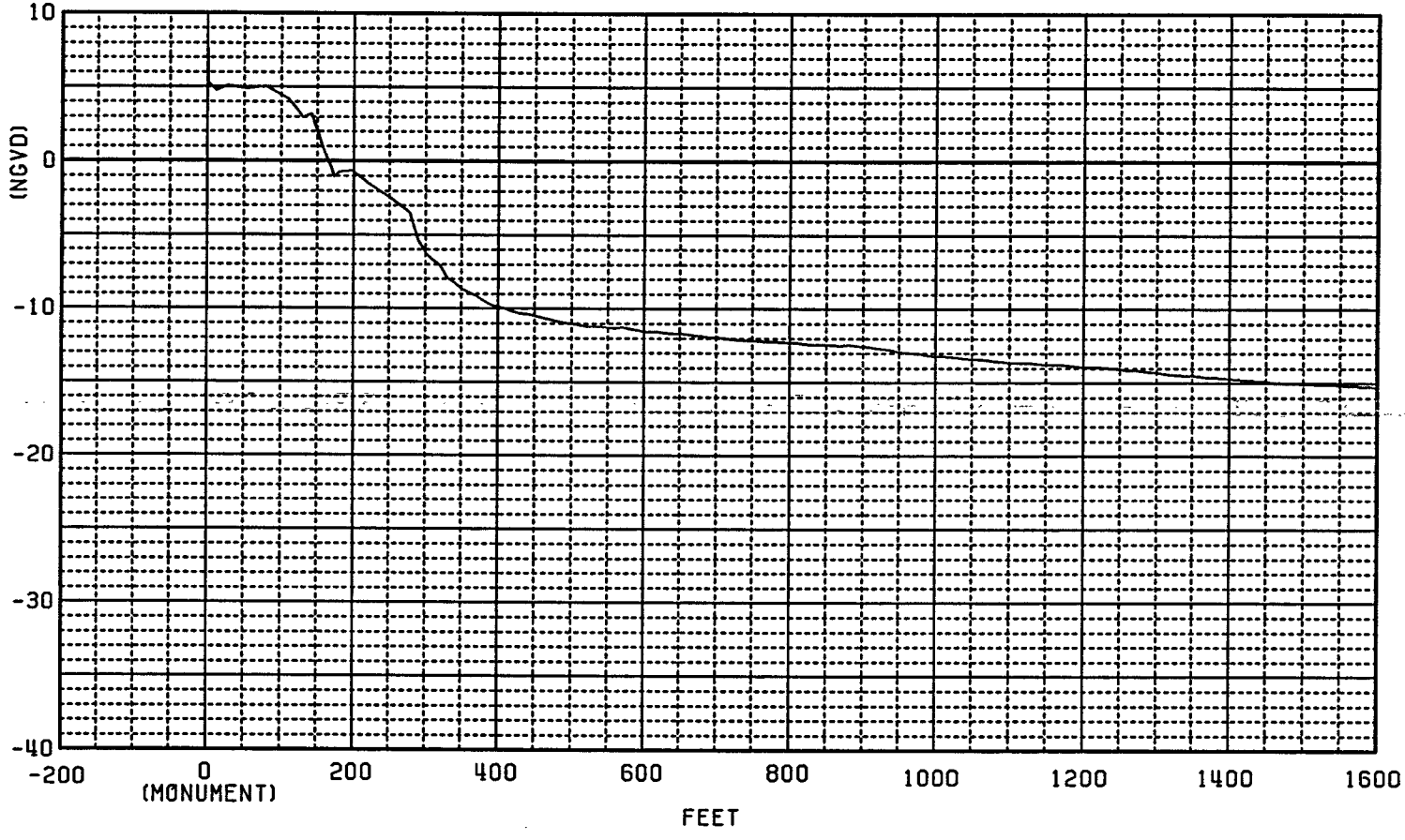
RANGE: R-99G 2/3
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

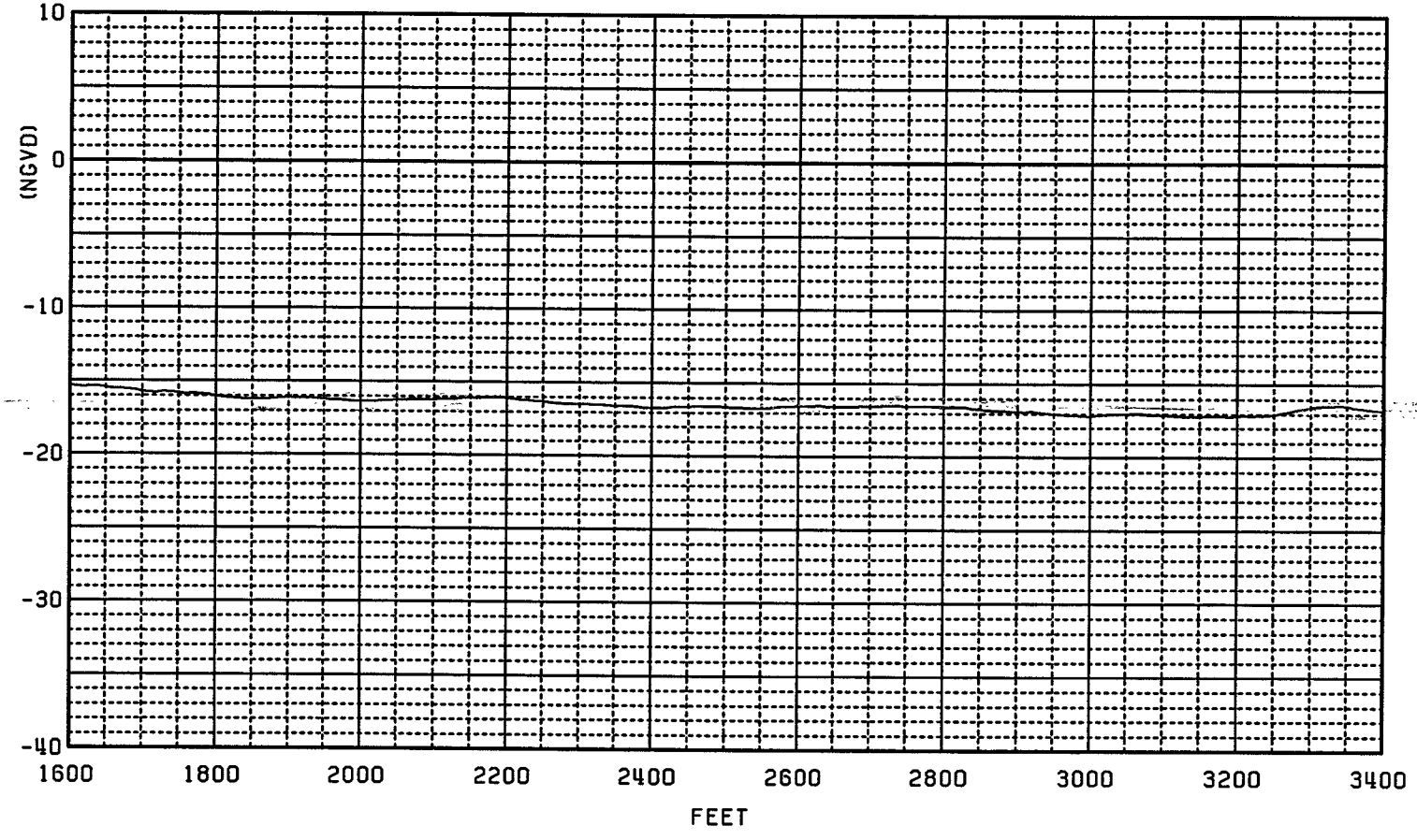
RANGE: R-99G 3/3
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

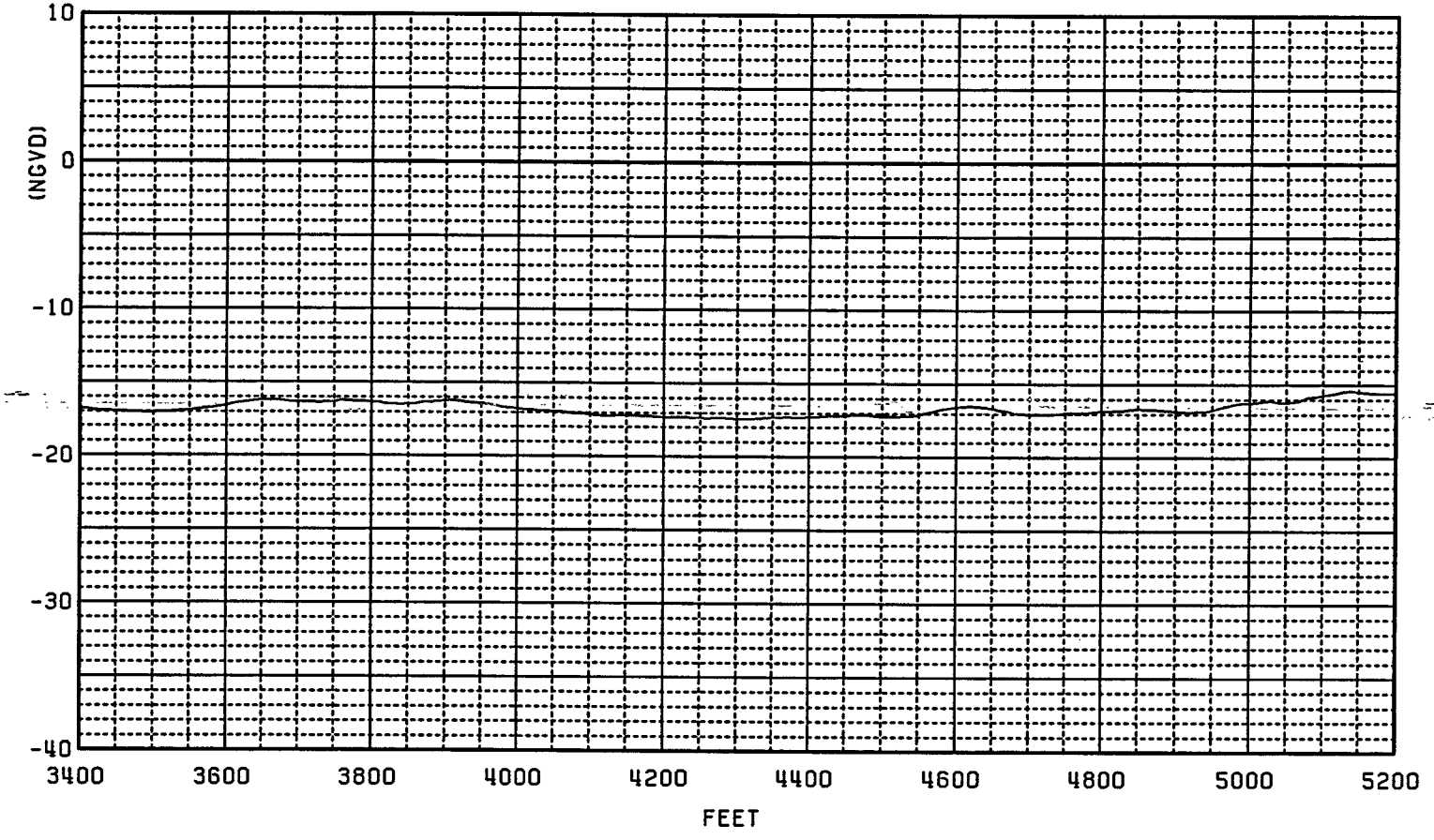
RANGE: R-99A 1/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

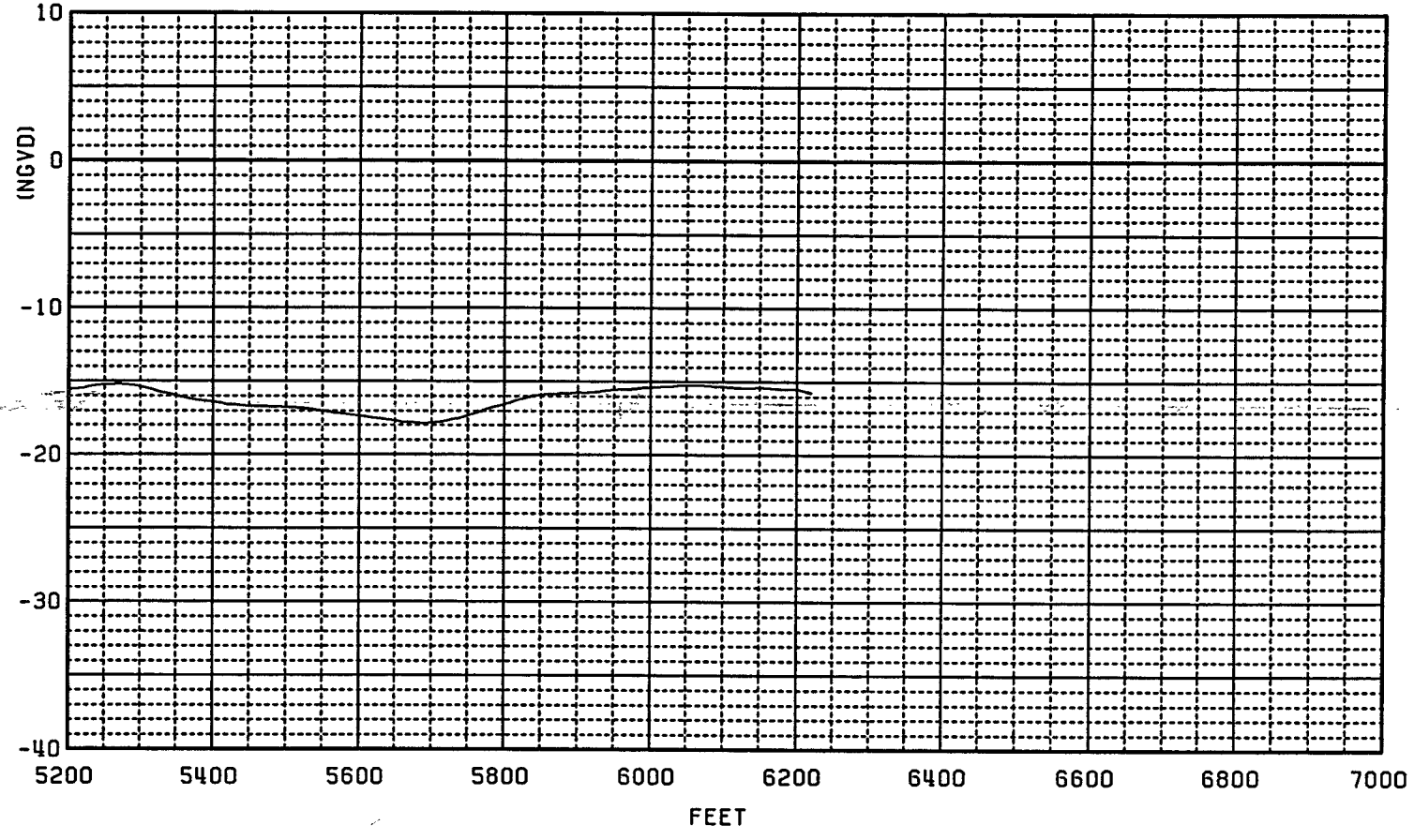
RANGE: R-99A 2/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-99A 3/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88

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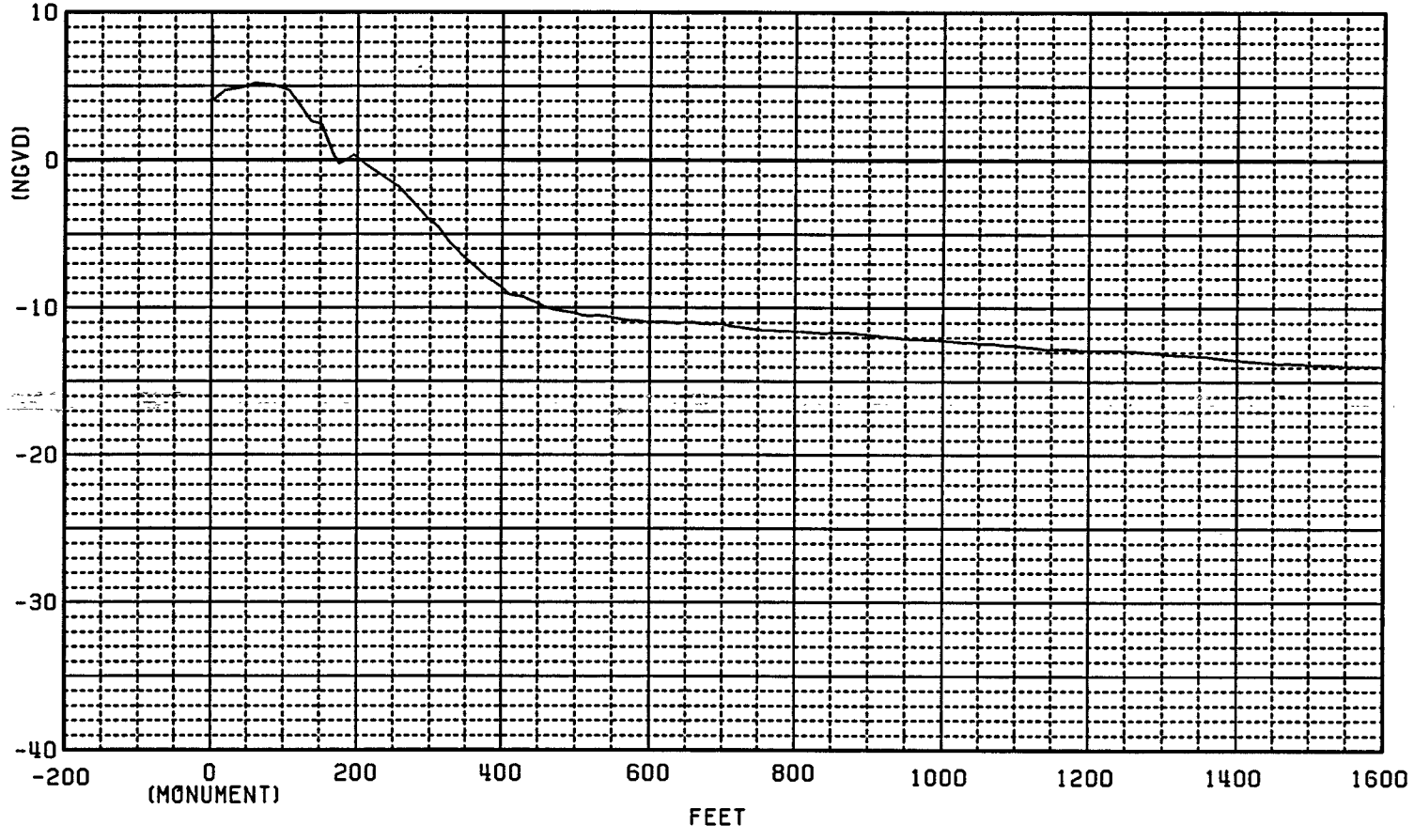
COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

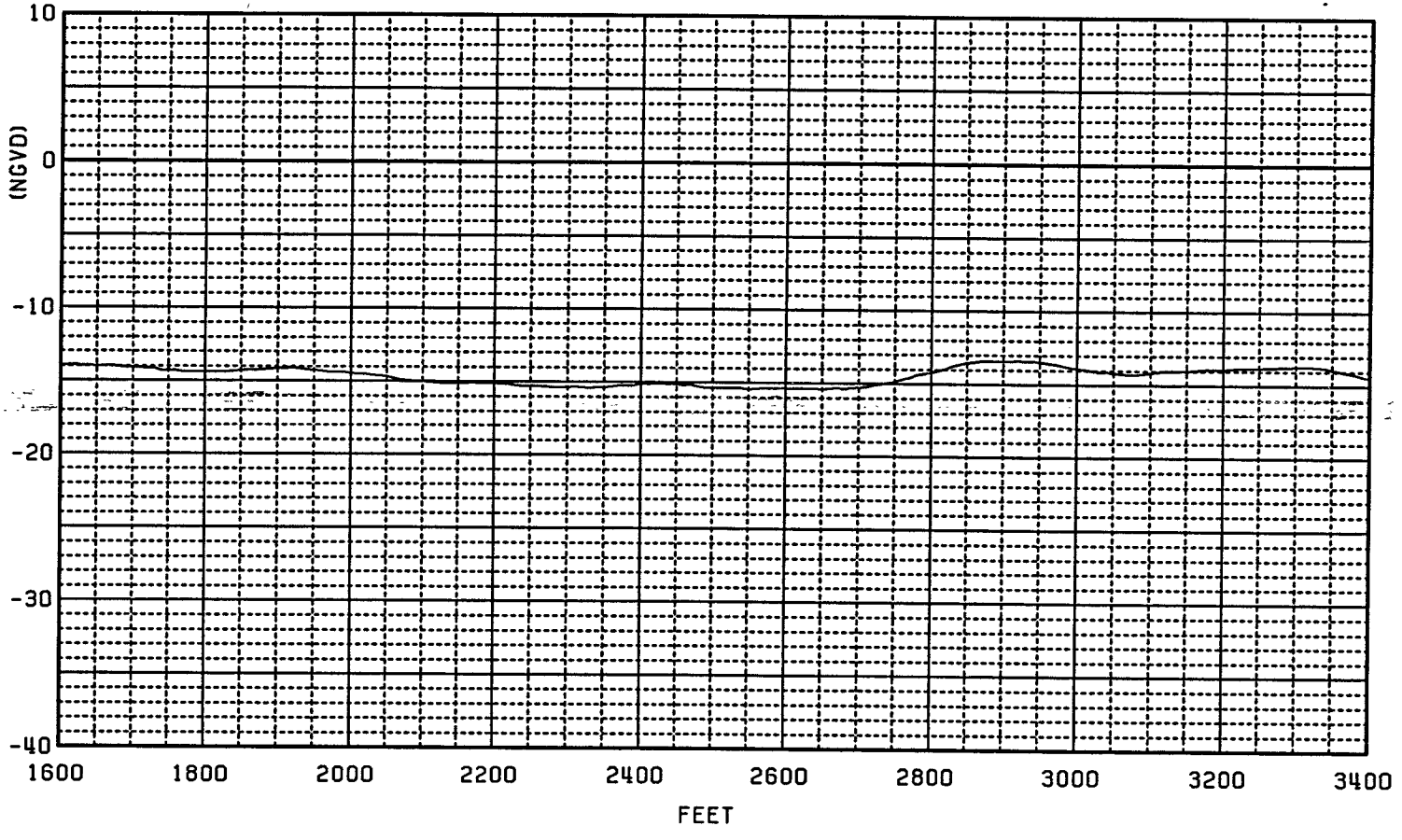
RANGE: R-99A 4/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

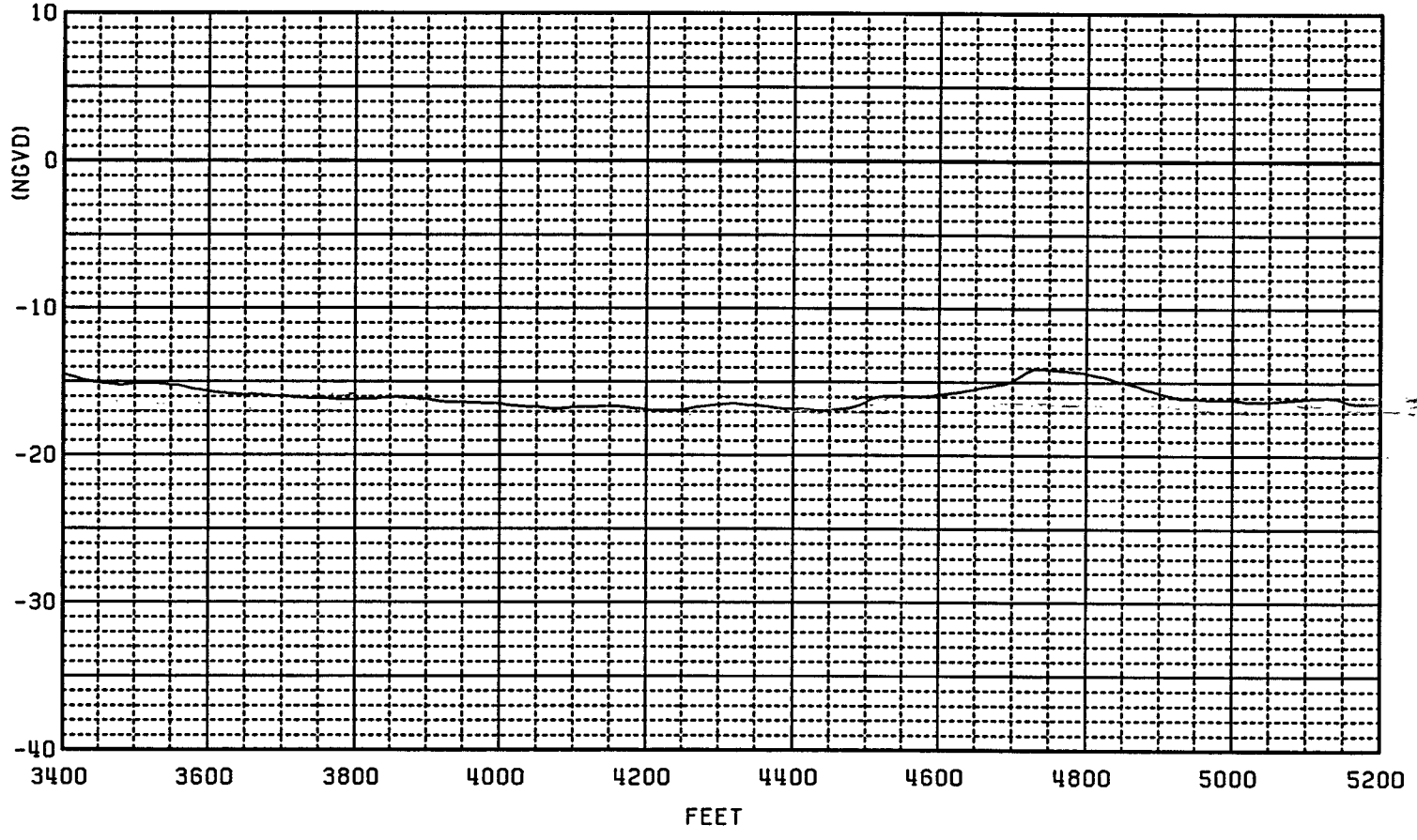
RANGE: T-100 1/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

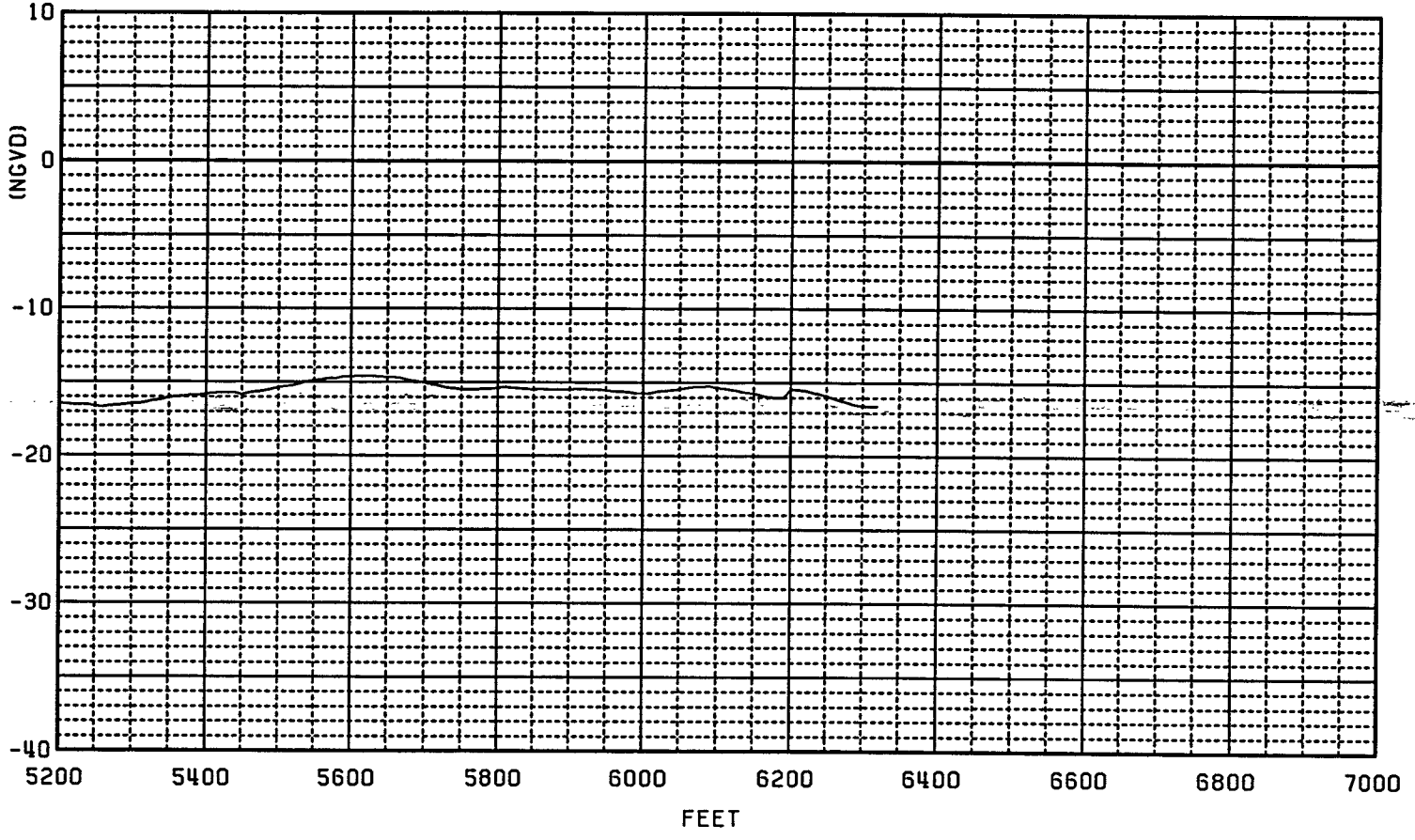
RANGE: T-100 2/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

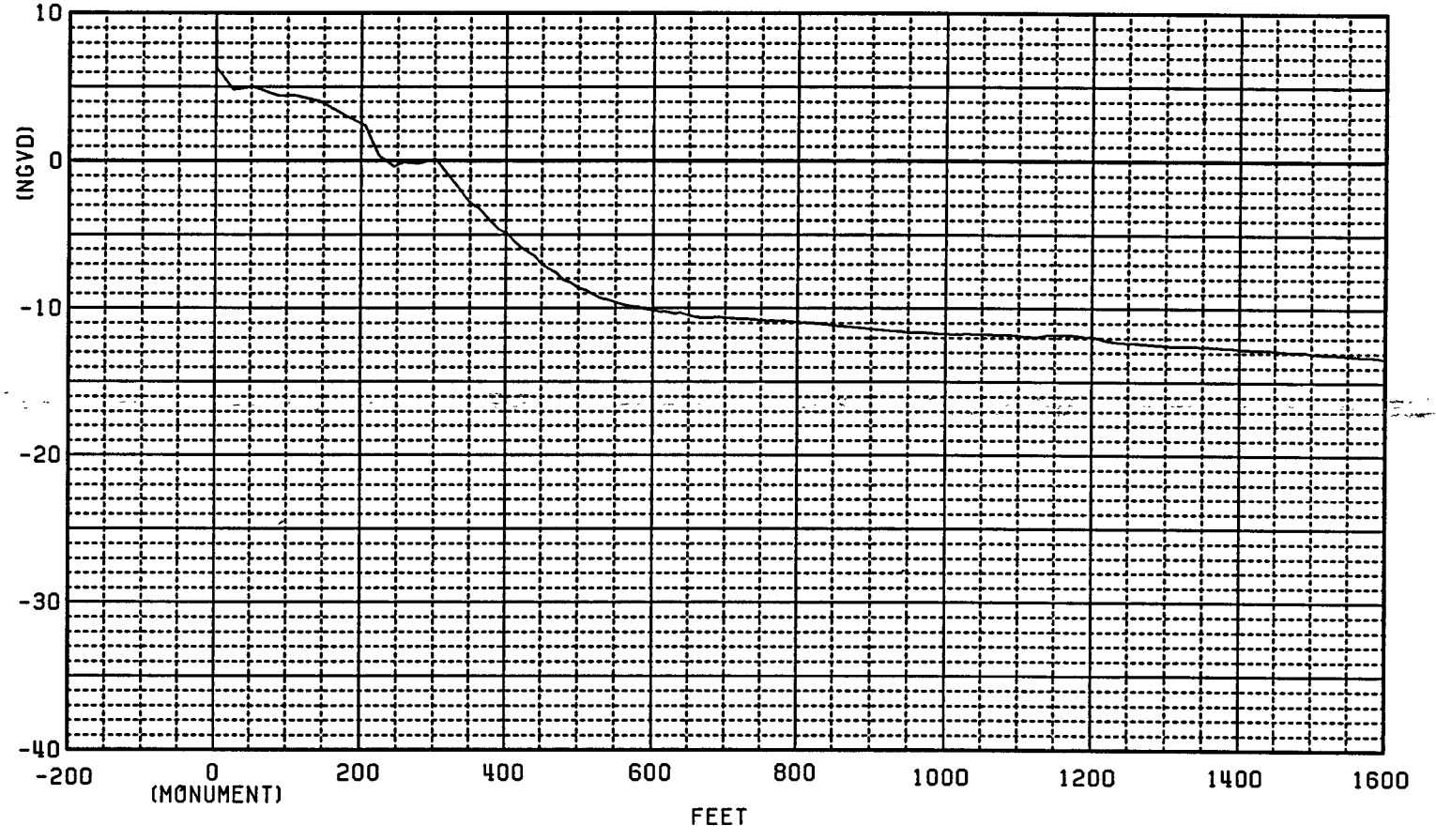
RANGE: T-100 3/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

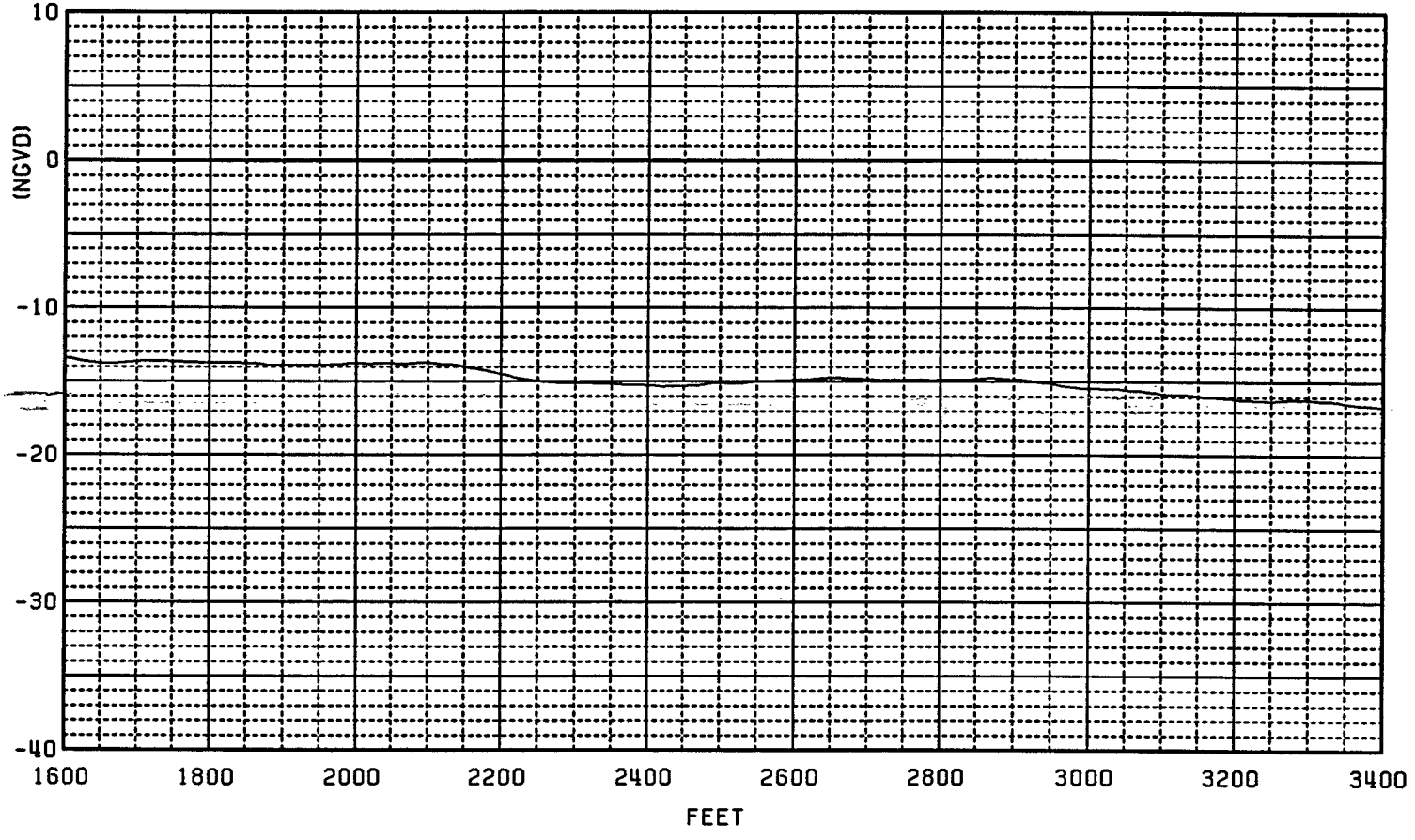
RANGE: T-100 4/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

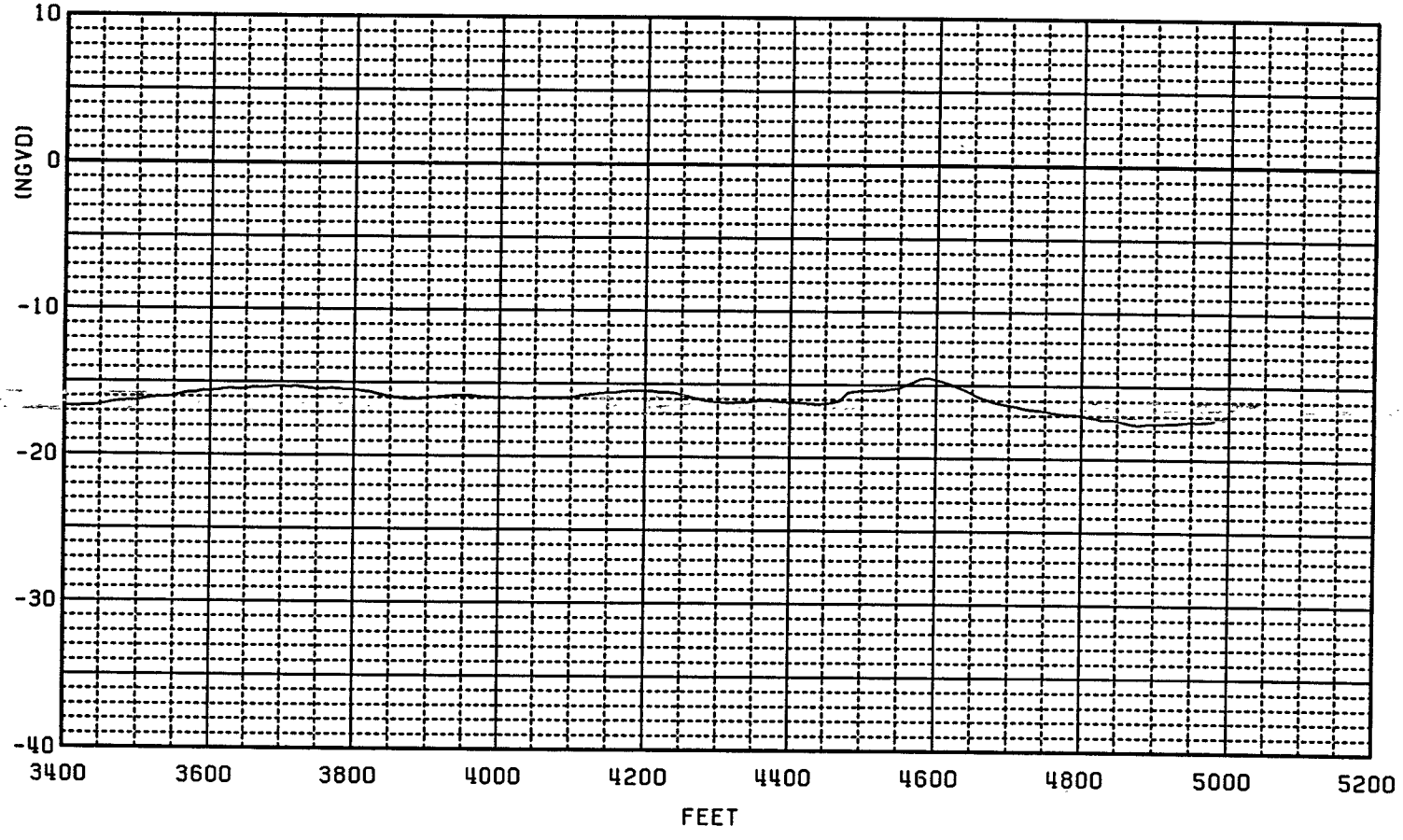
RANGE: T-100A 1/3
SURVEY BEAR (MAG. N): 260
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

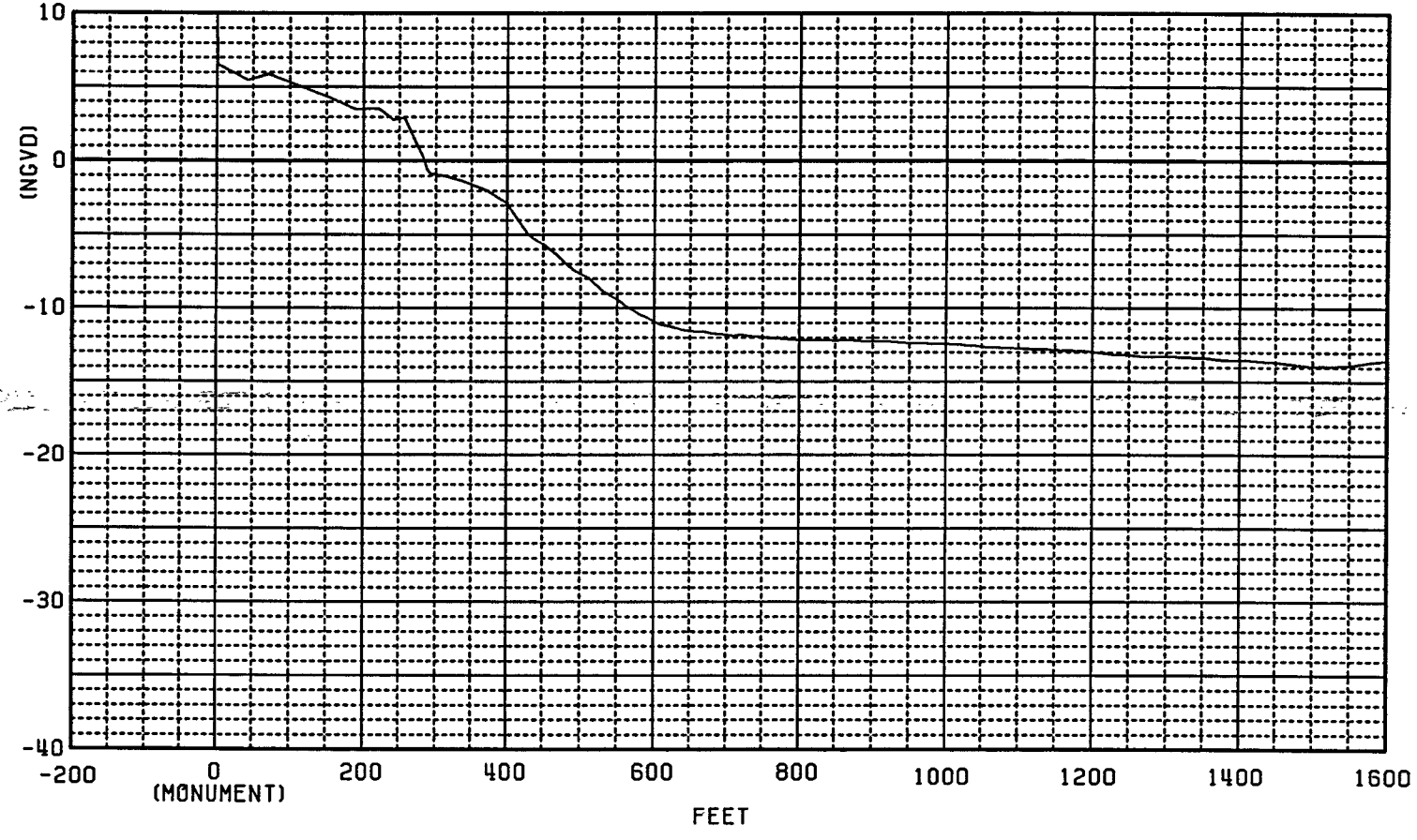
RANGE: T-100A 2/3
SURVEY BEAR (MAG. N): 260
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

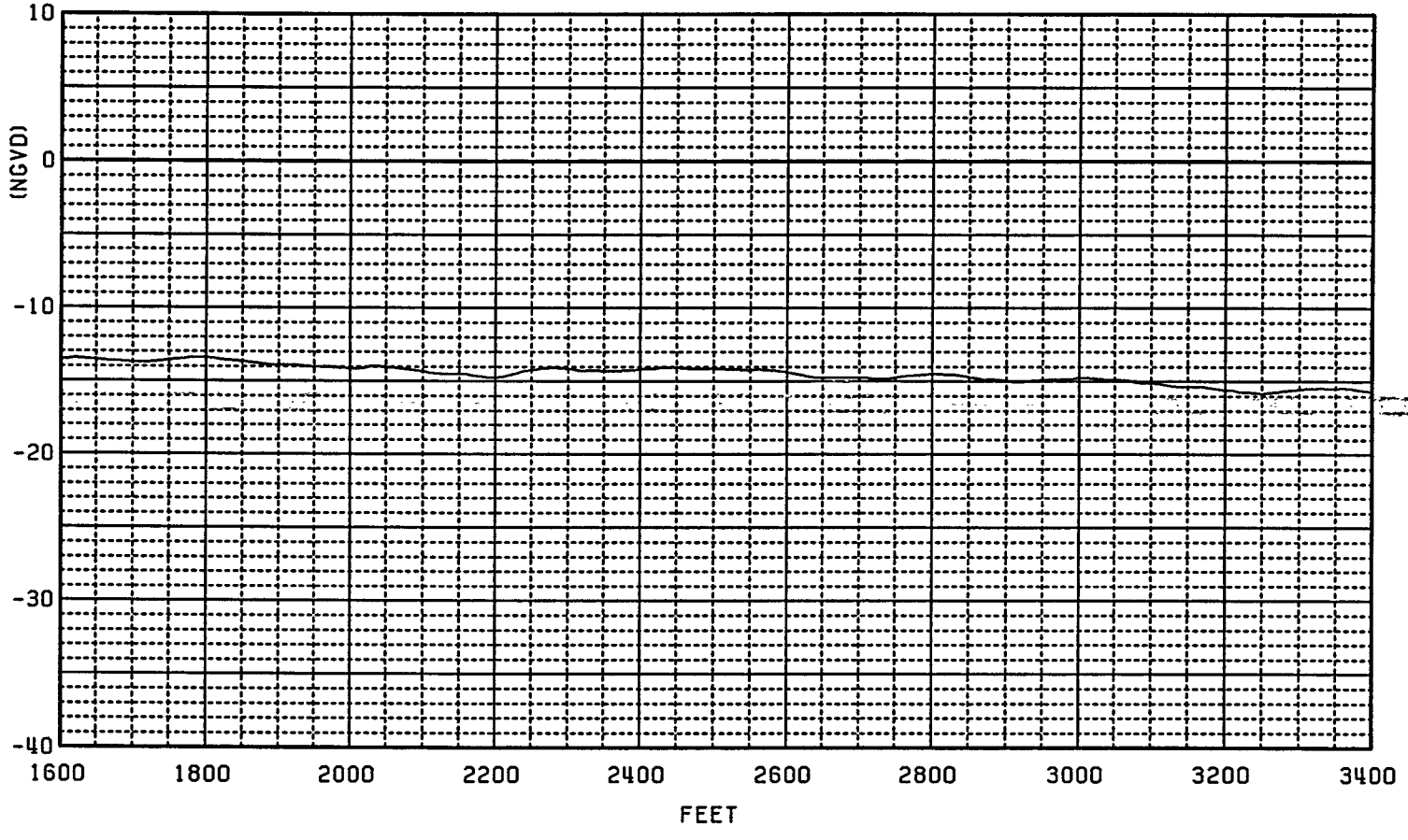
RANGE: T-100A 3/3
SURVEY BEAR (MAG. N) : 260
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---→CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

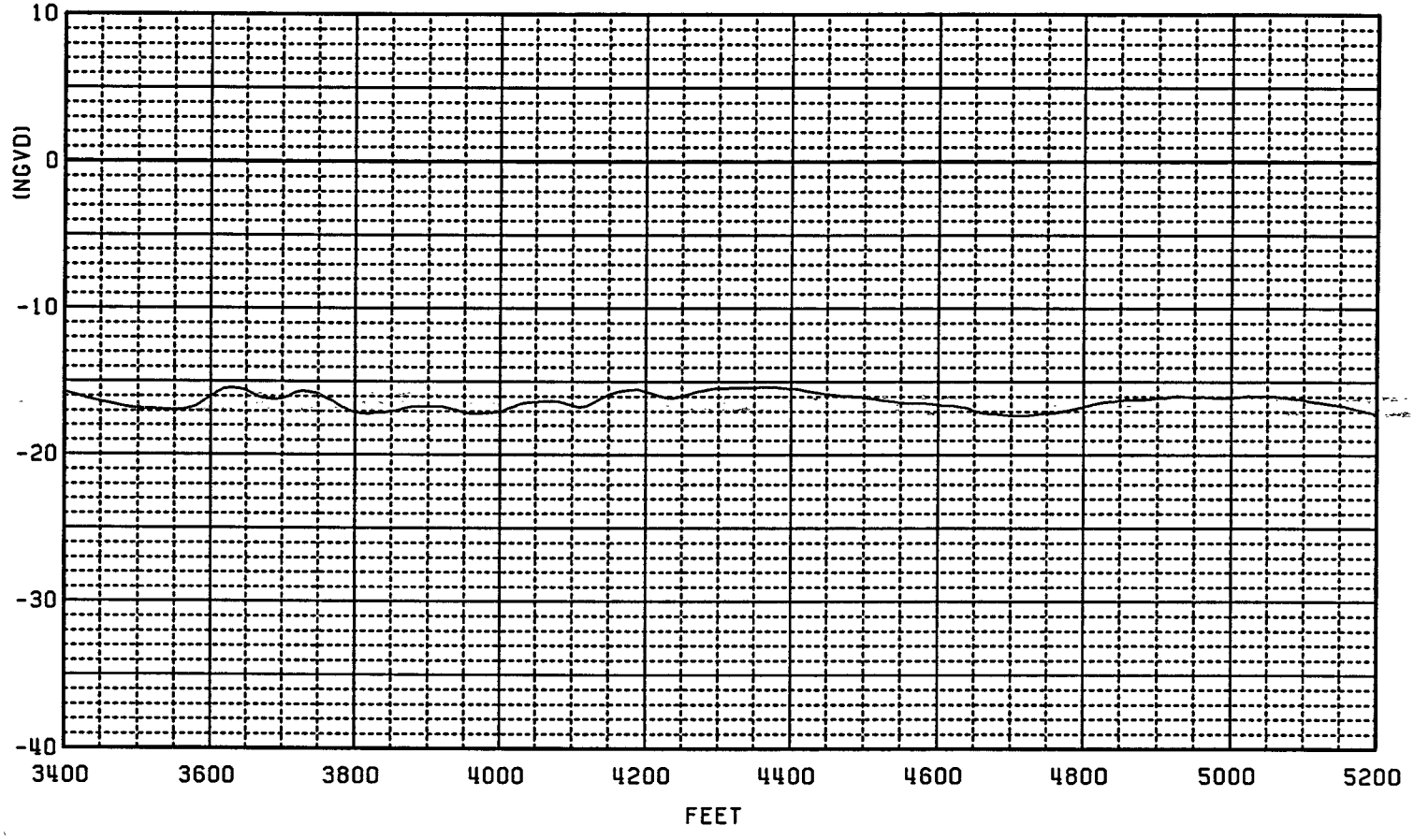
RANGE: R-101 1/4
SURVEY BEAR (MAG. N) : 243
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

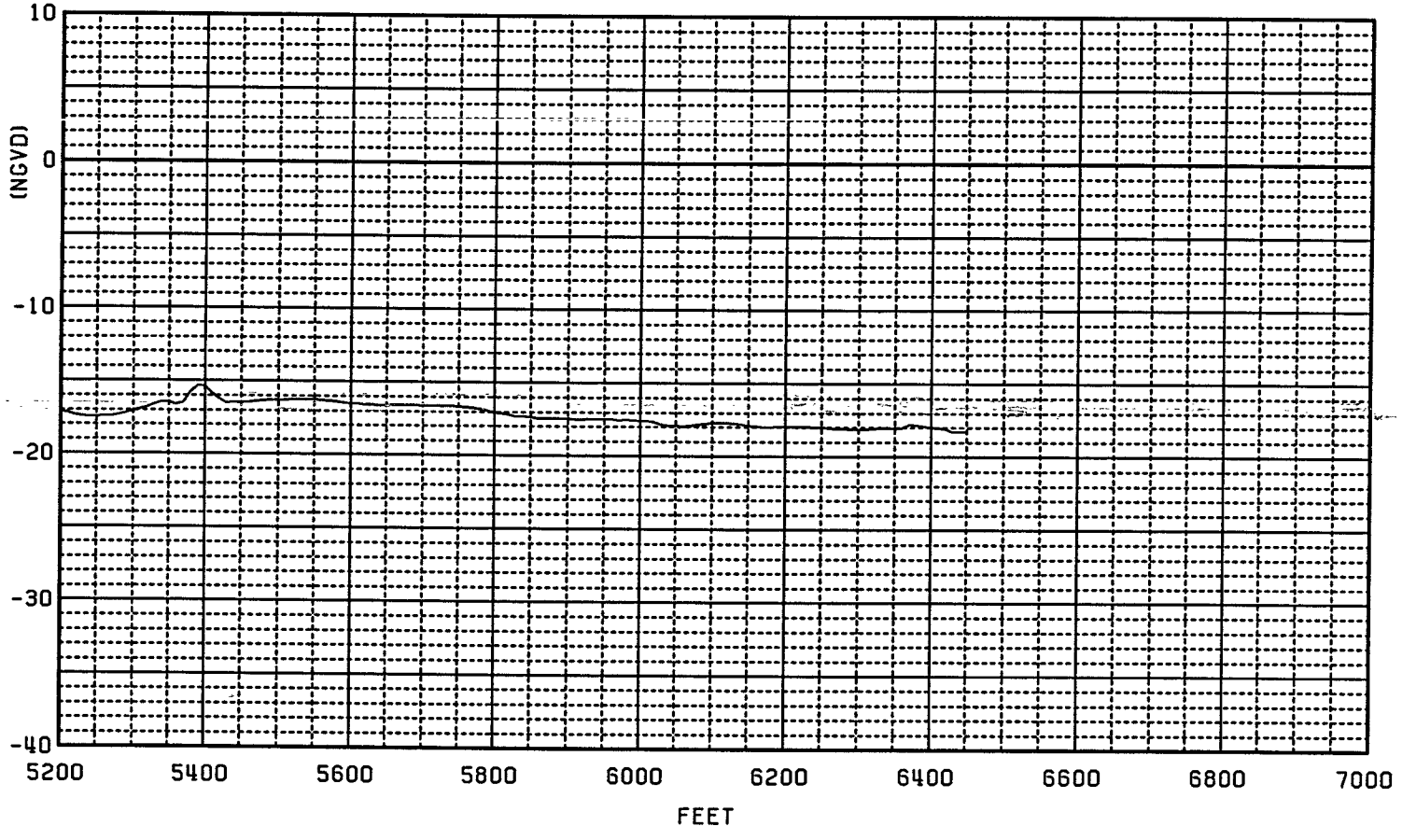
RANGE: R-101 2/4
SURVEY BEAR (MAG. N) : 243
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

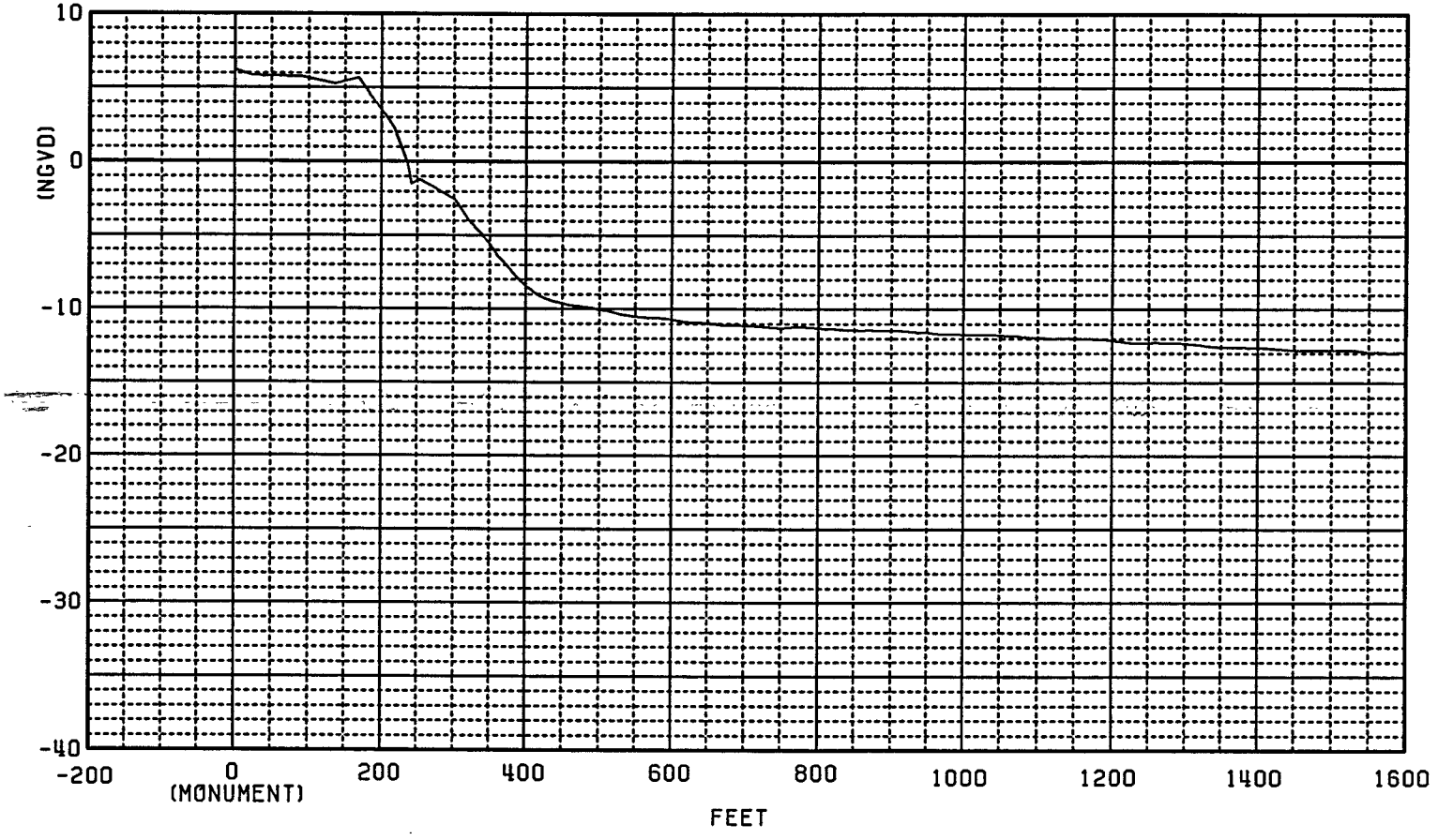
RANGE: R-101 3/4
SURVEY BEAR (MAG. N): 243
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

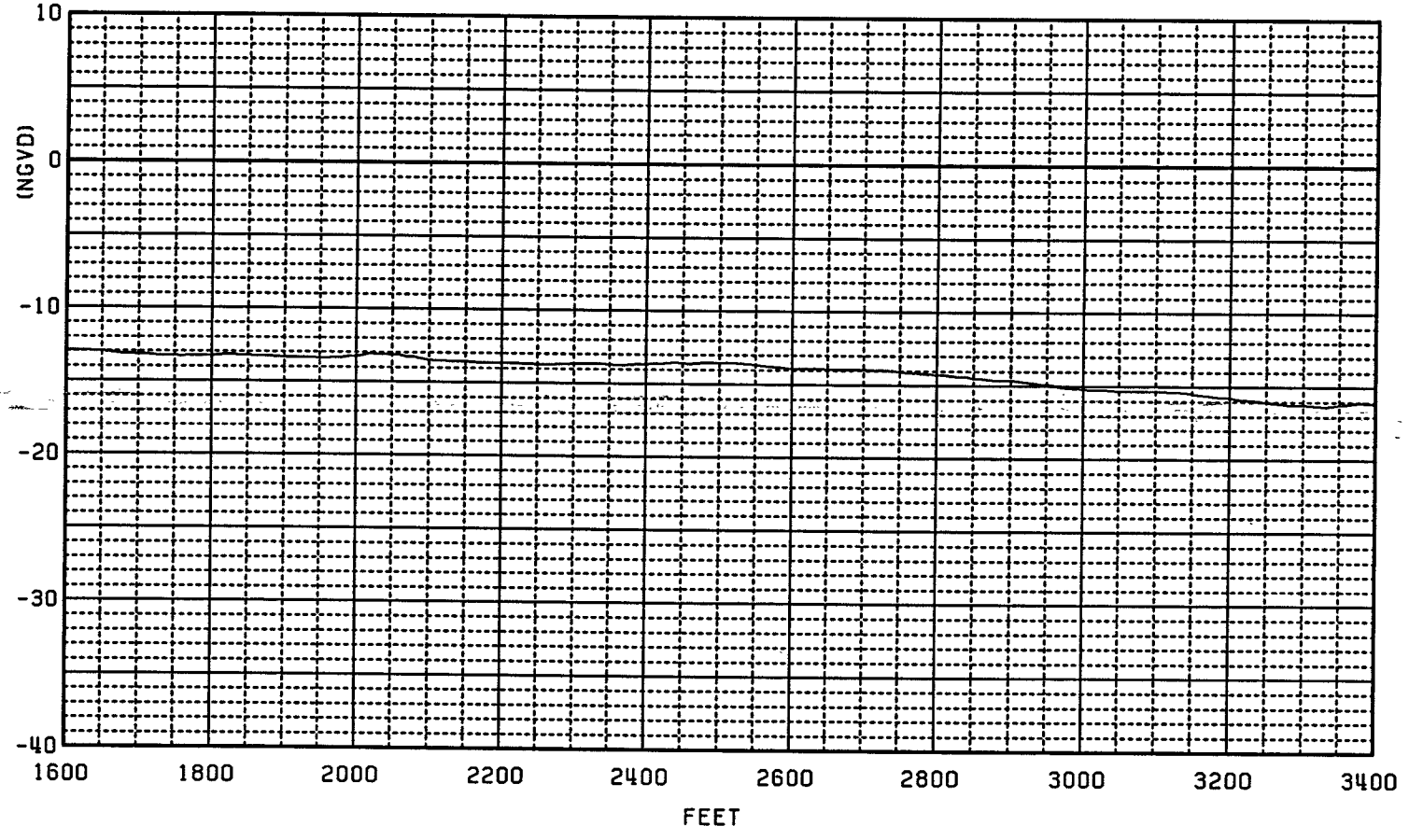
RANGE: R-101 4/4
SURVEY BEAR (MAG. N) : 243
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

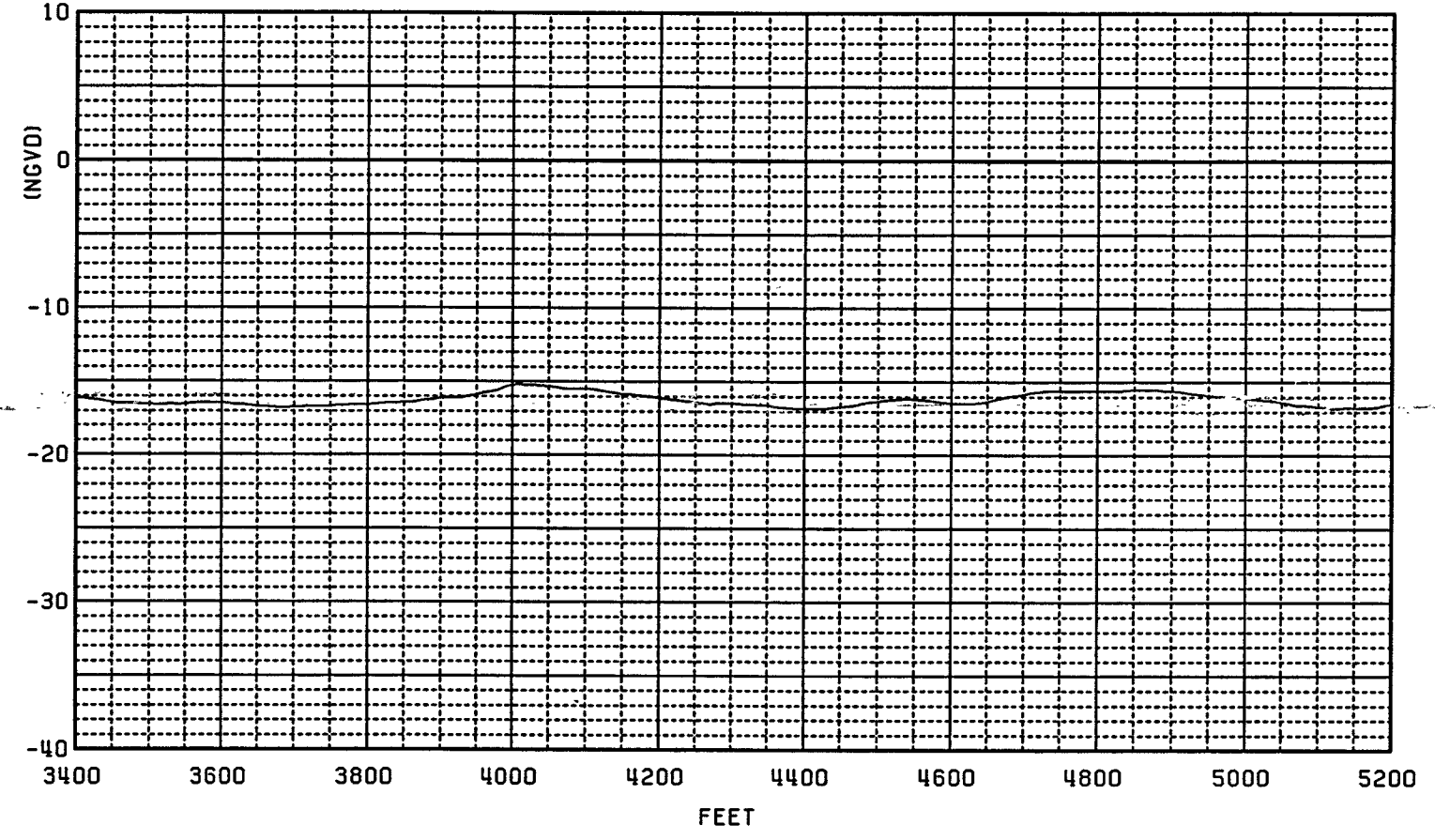
RANGE: R-101A 1/4
SURVEY BEAR (MAG. N): 248
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

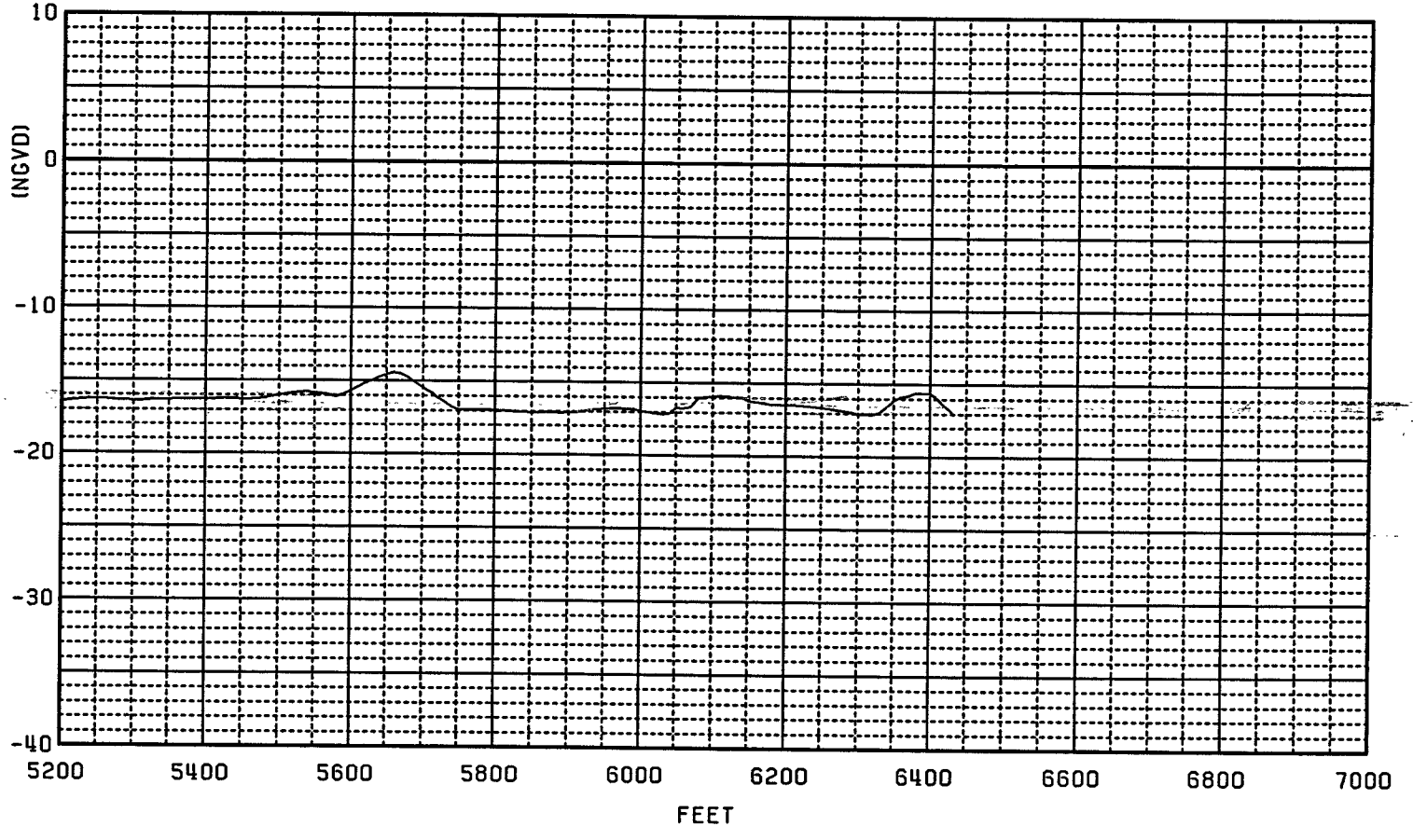
RANGE: R-101A 2/4
SURVEY BEAR (MAG. N): 248
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

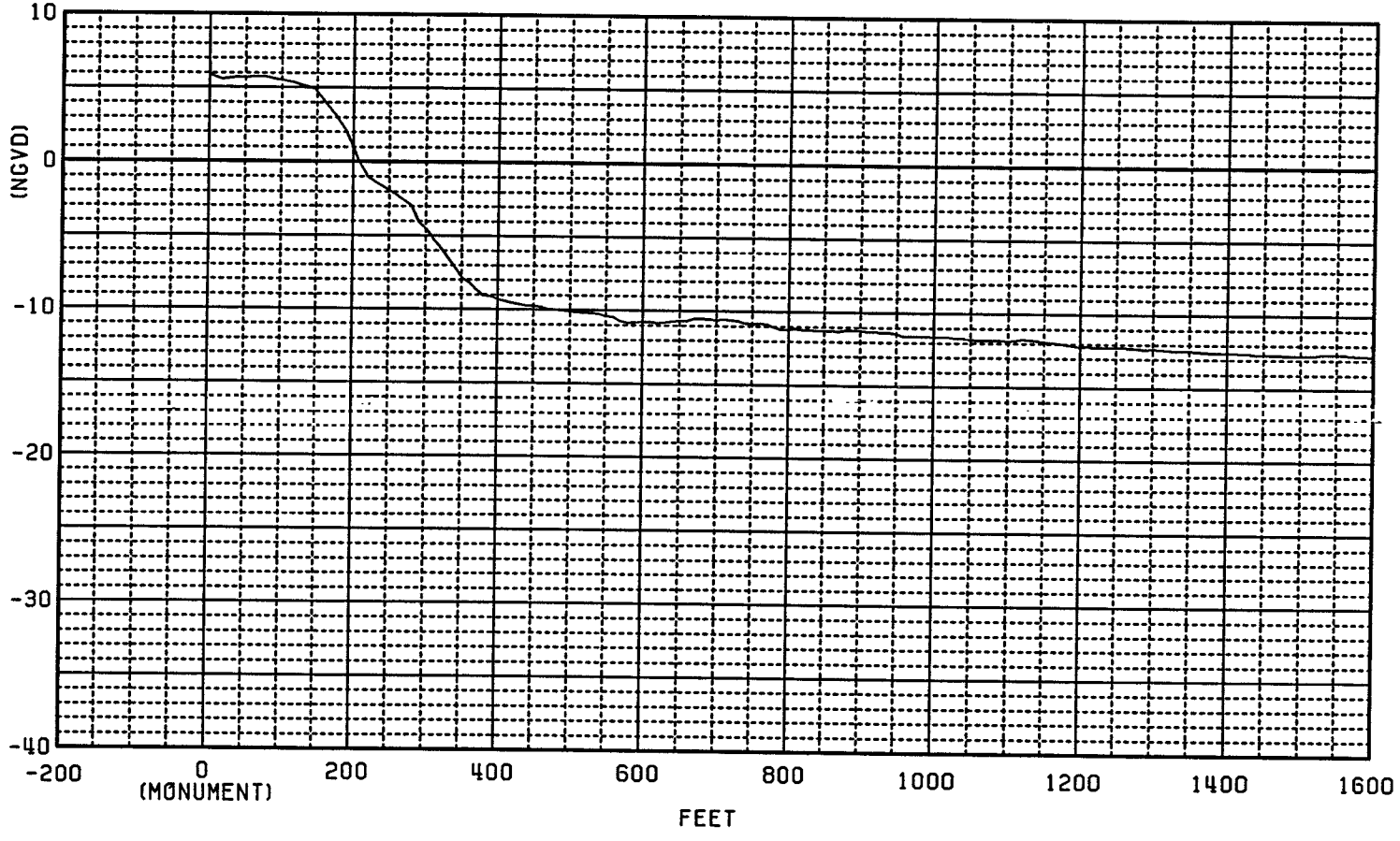
RANGE: R-101A 3/4
SURVEY BEAR (MAG. N): 248
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

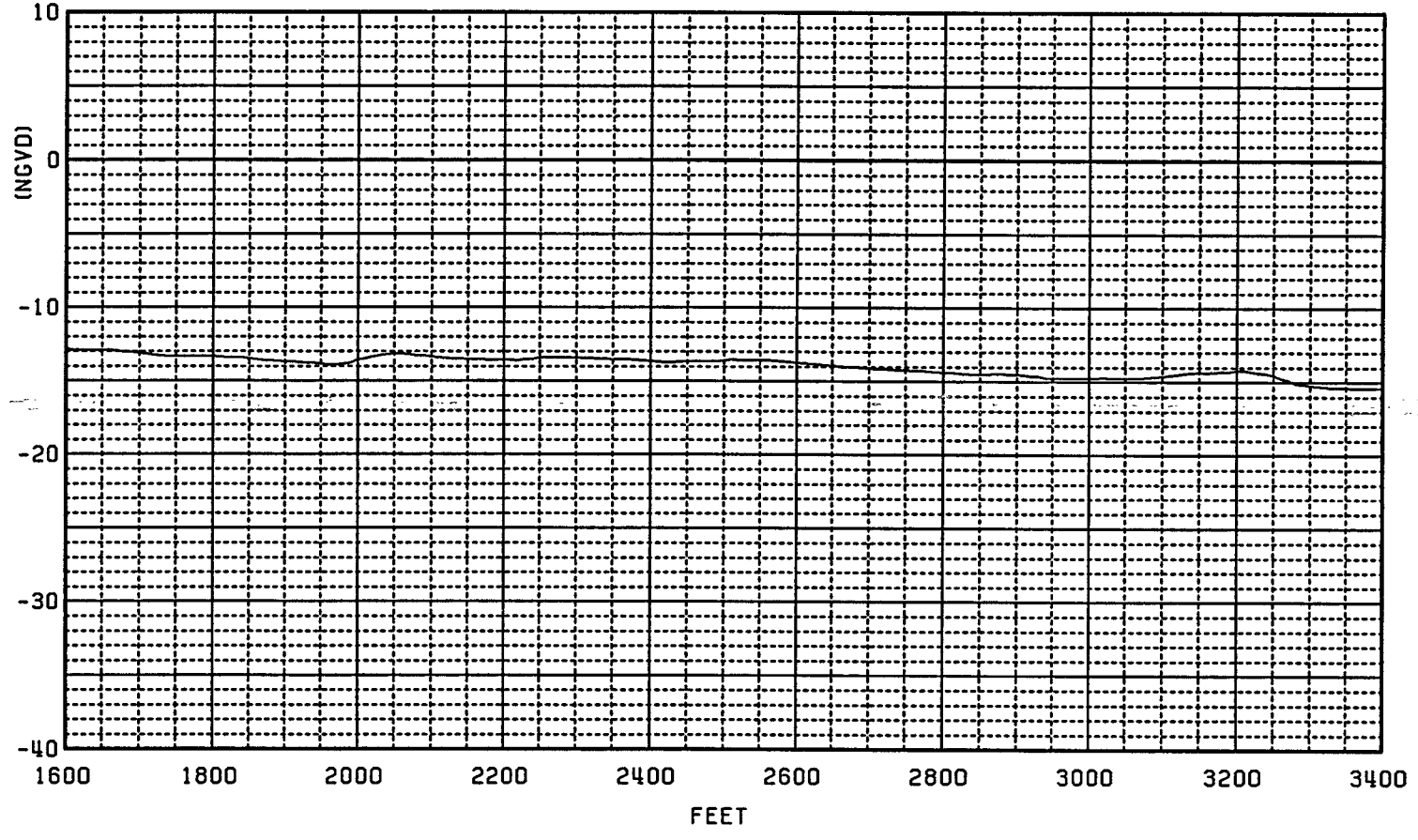
RANGE: R-101A 4/4
SURVEY BEAR (MAG. N) : 248
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

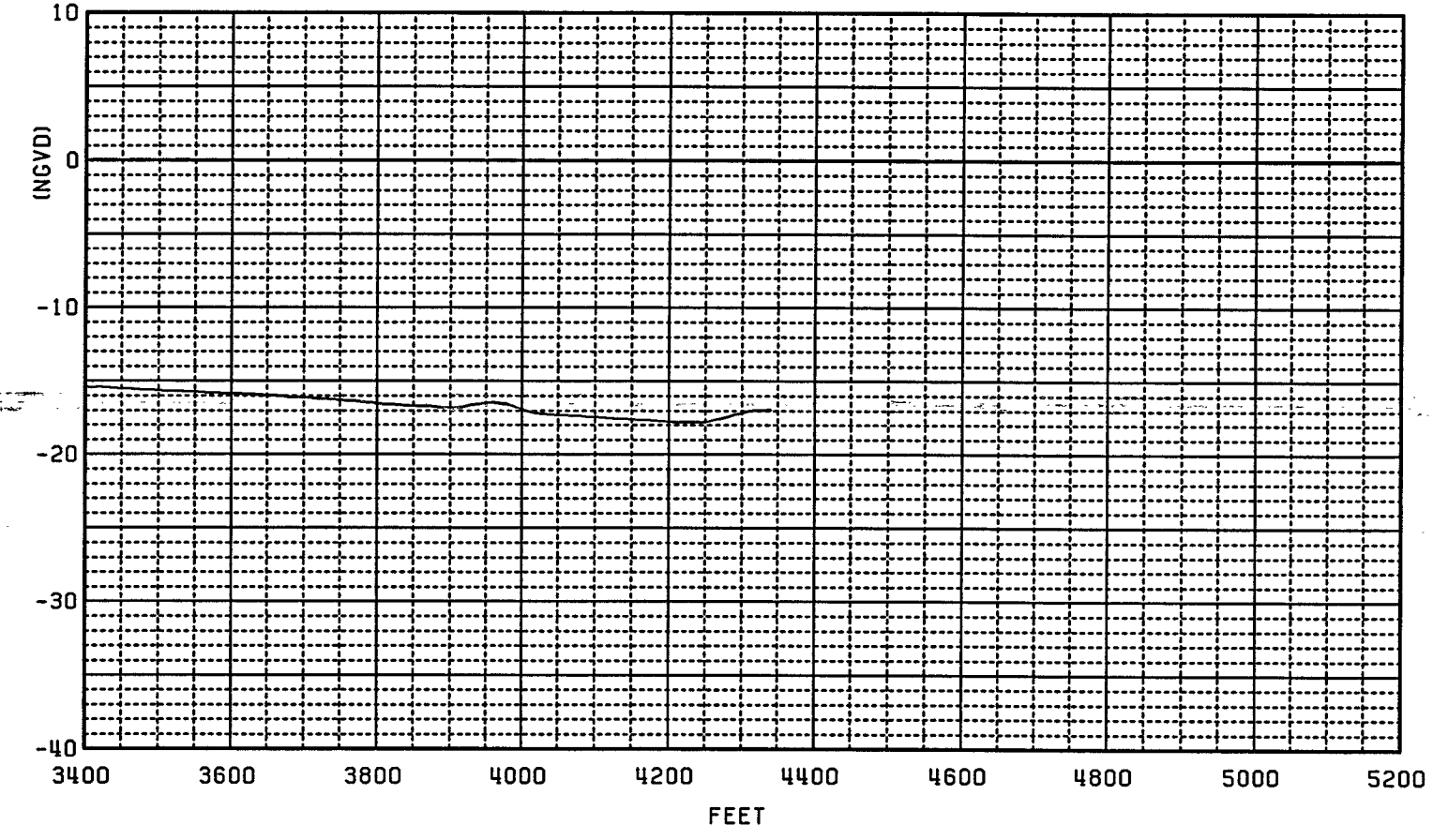
RANGE: R-102G 1/3
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

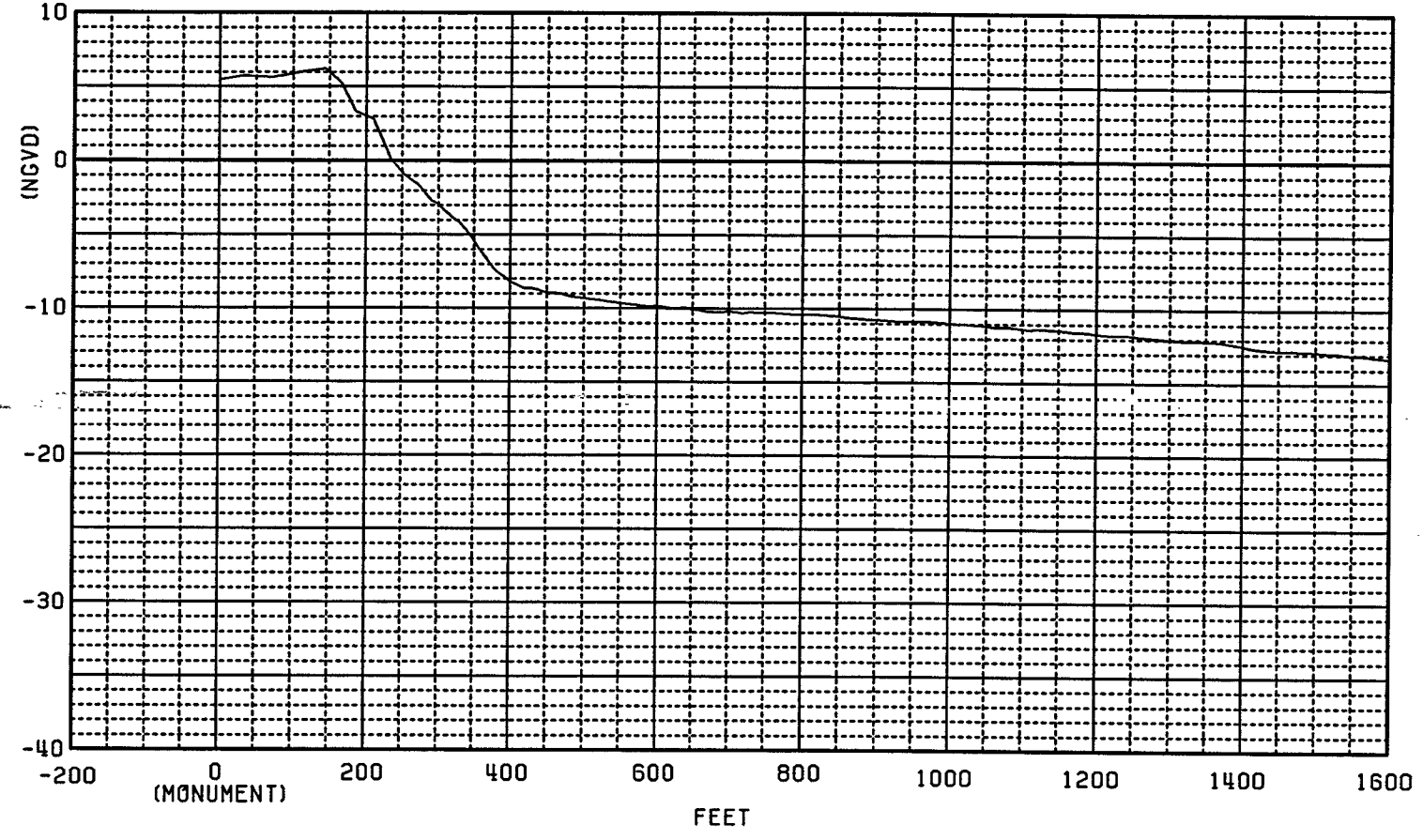
RANGE: R-102G 2/3
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

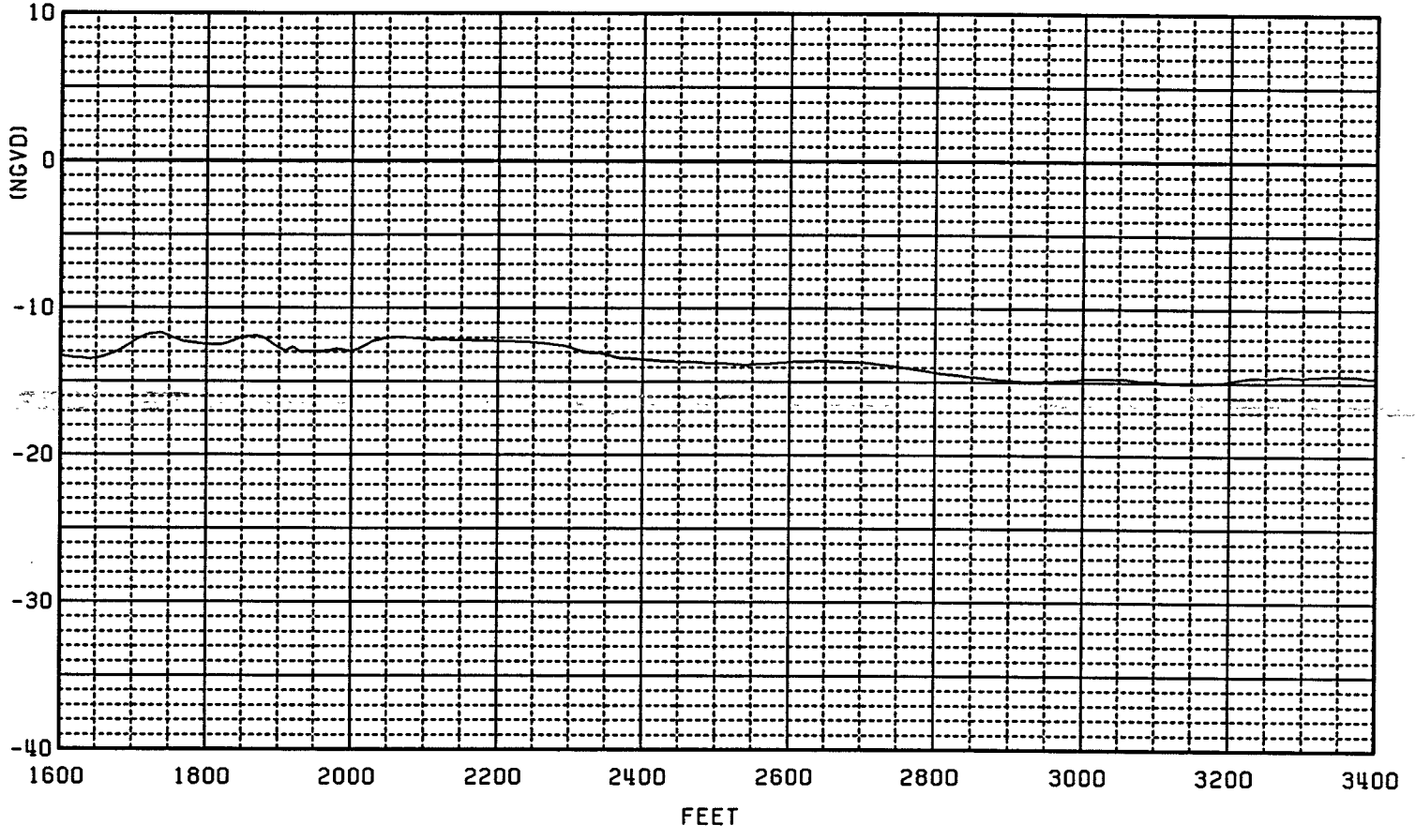
RANGE: R-102G 3/3
SURVEY BEAR (MAG. N): 250
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

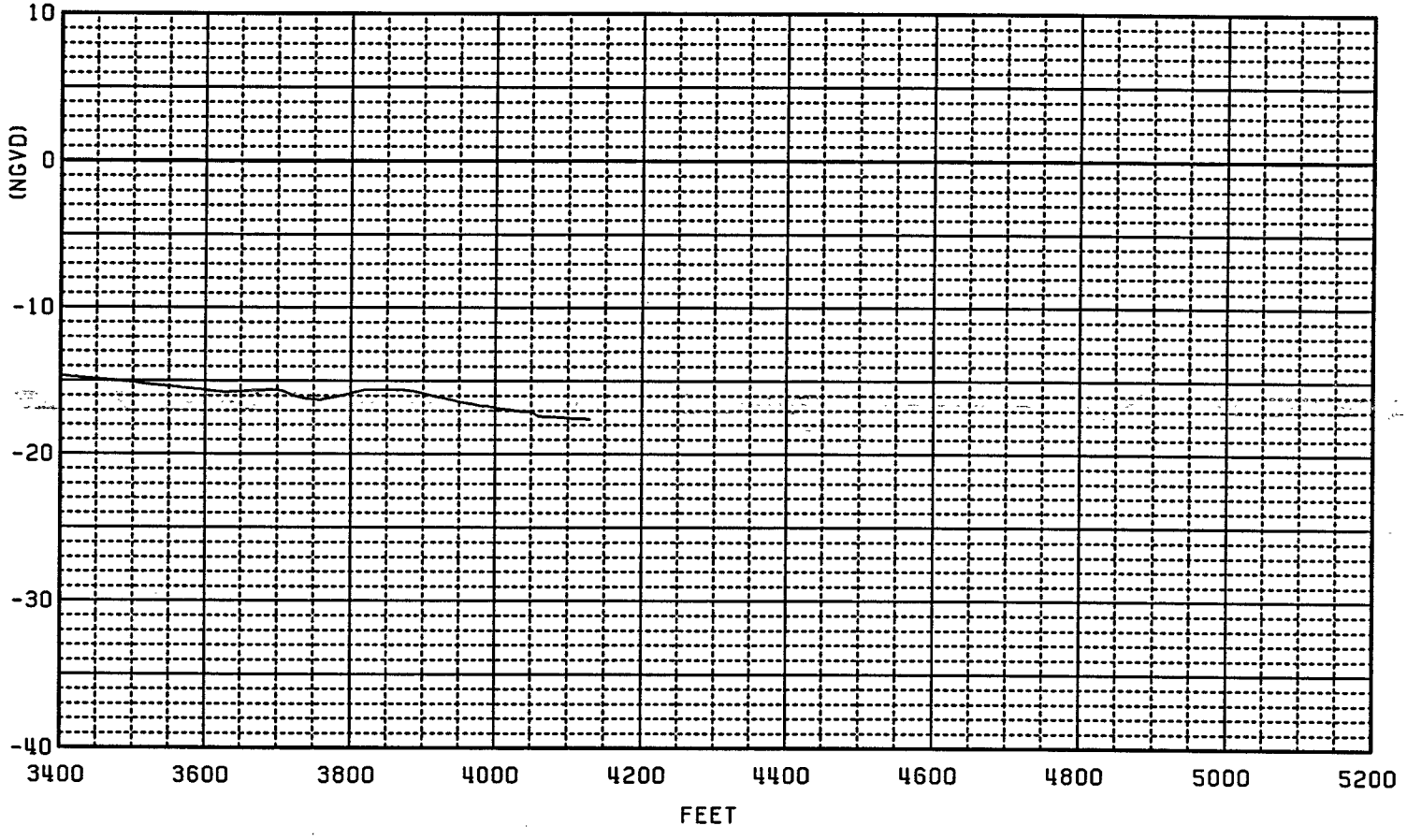
RANGE: R-102A 1/3
SURVEY BEAR (MAG. N): 247
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-102A 2/3
SURVEY BEAR (MAG. N): 247
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88

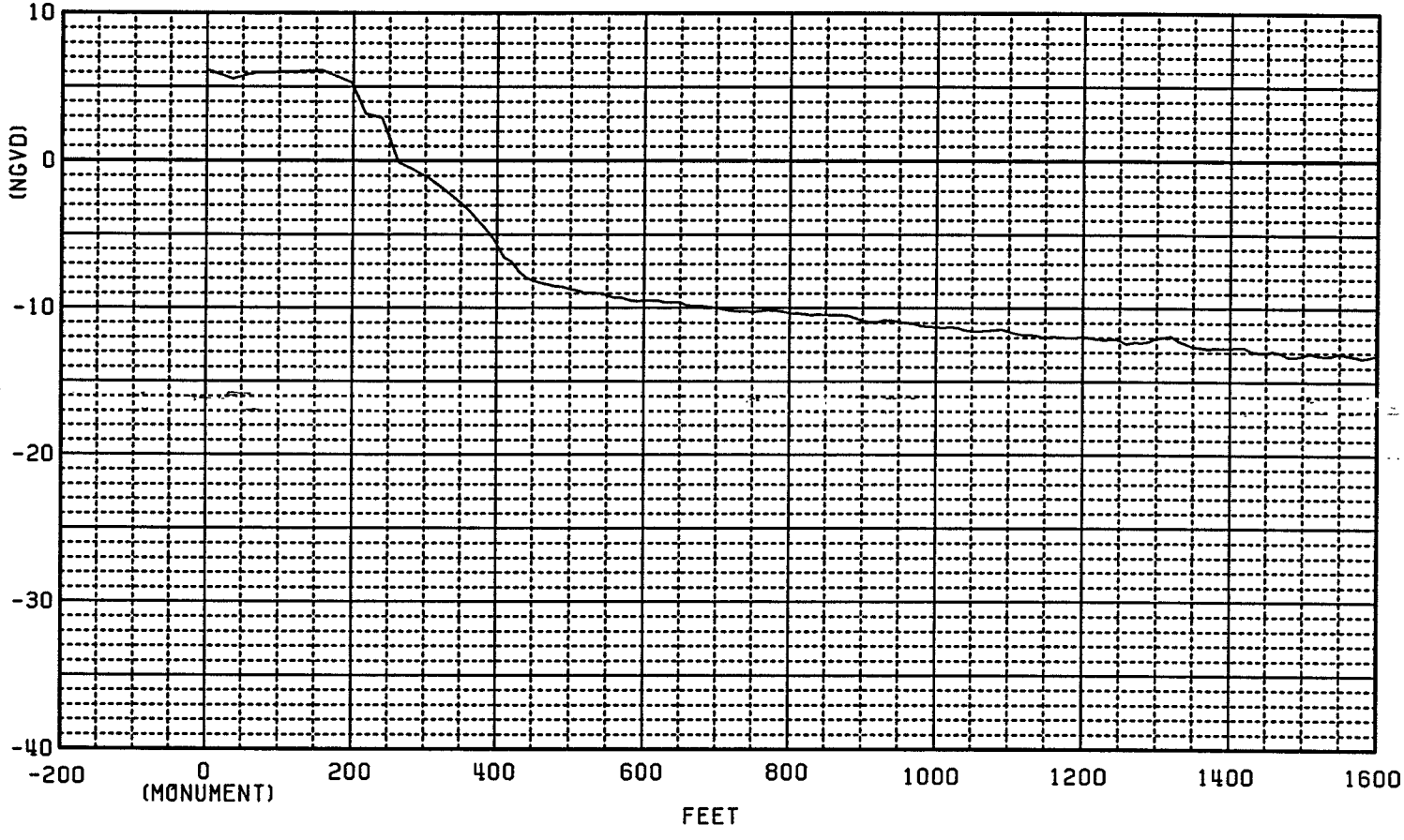



COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-102A 3/3
SURVEY BEAR (MAG. N): 247
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 09NOV88

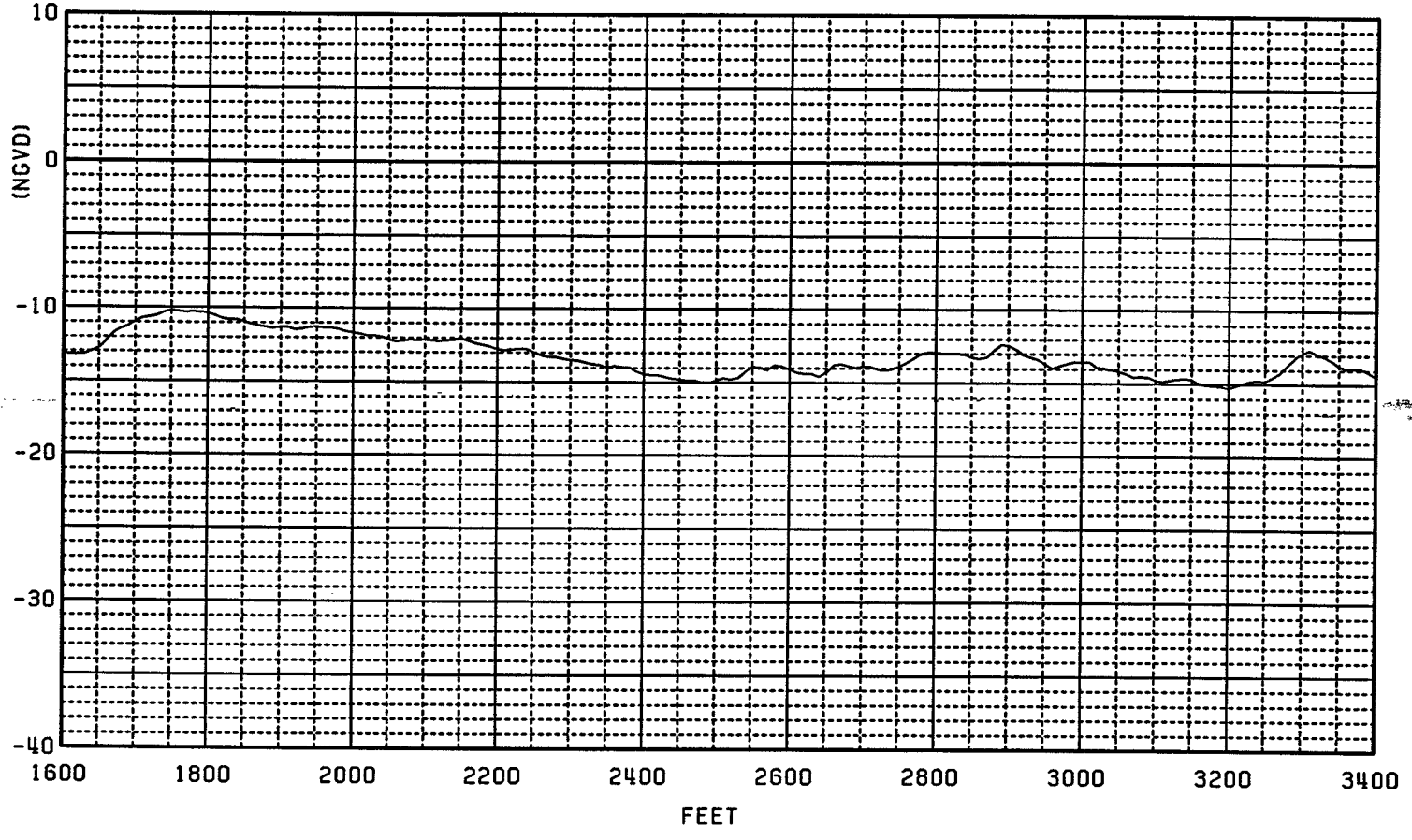
I-45




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

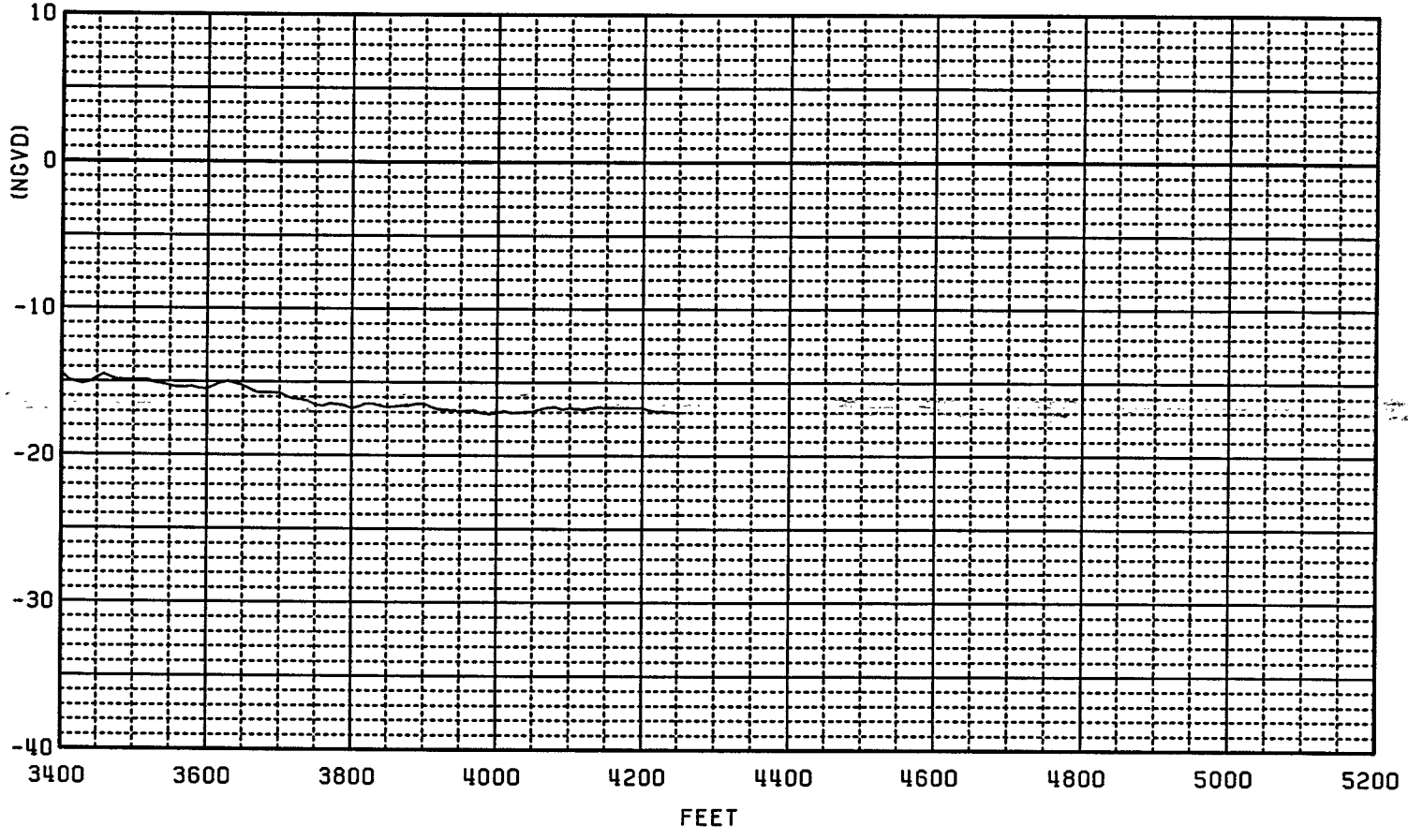
RANGE: R-103 1/3
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

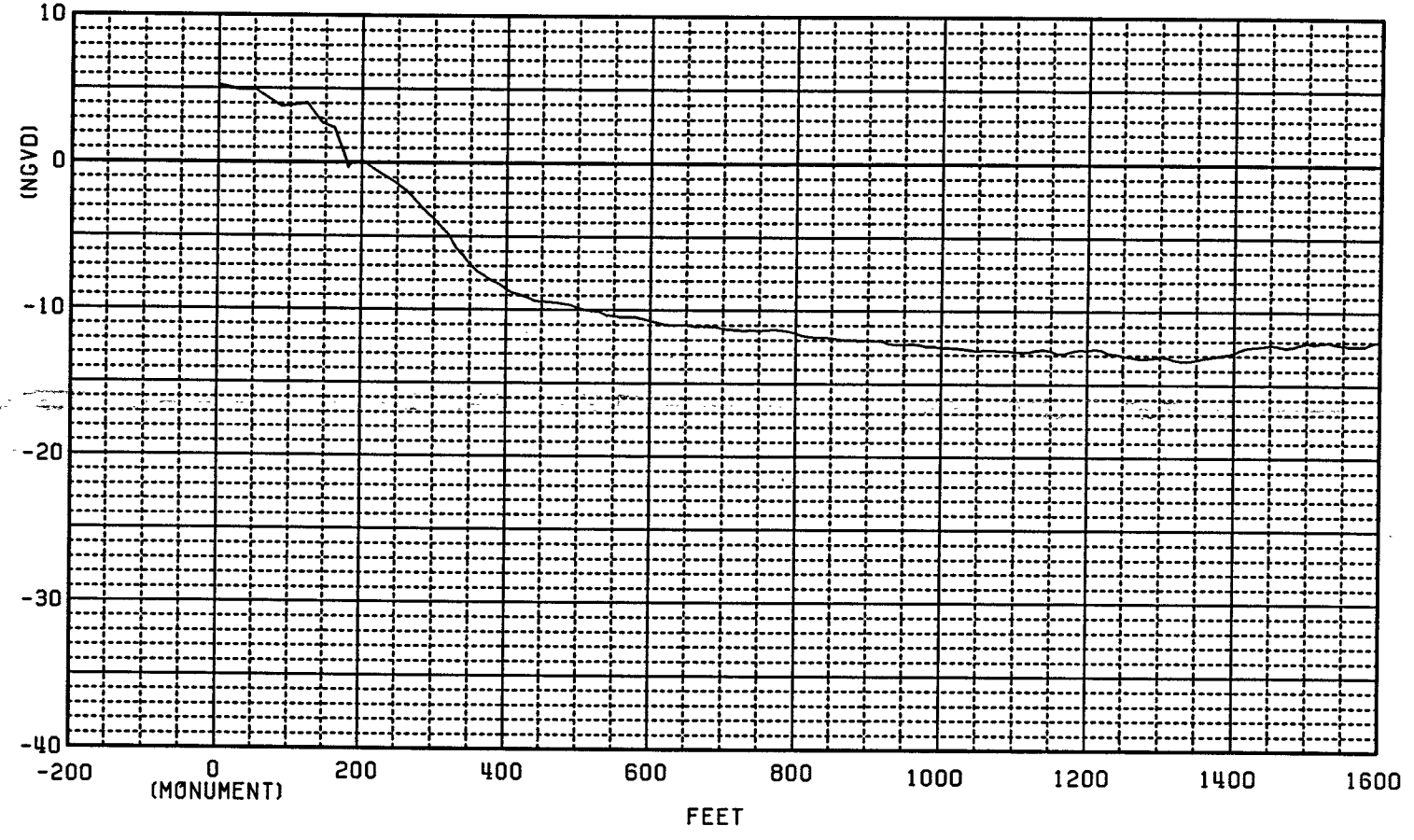
RANGE: R-103 2/3
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

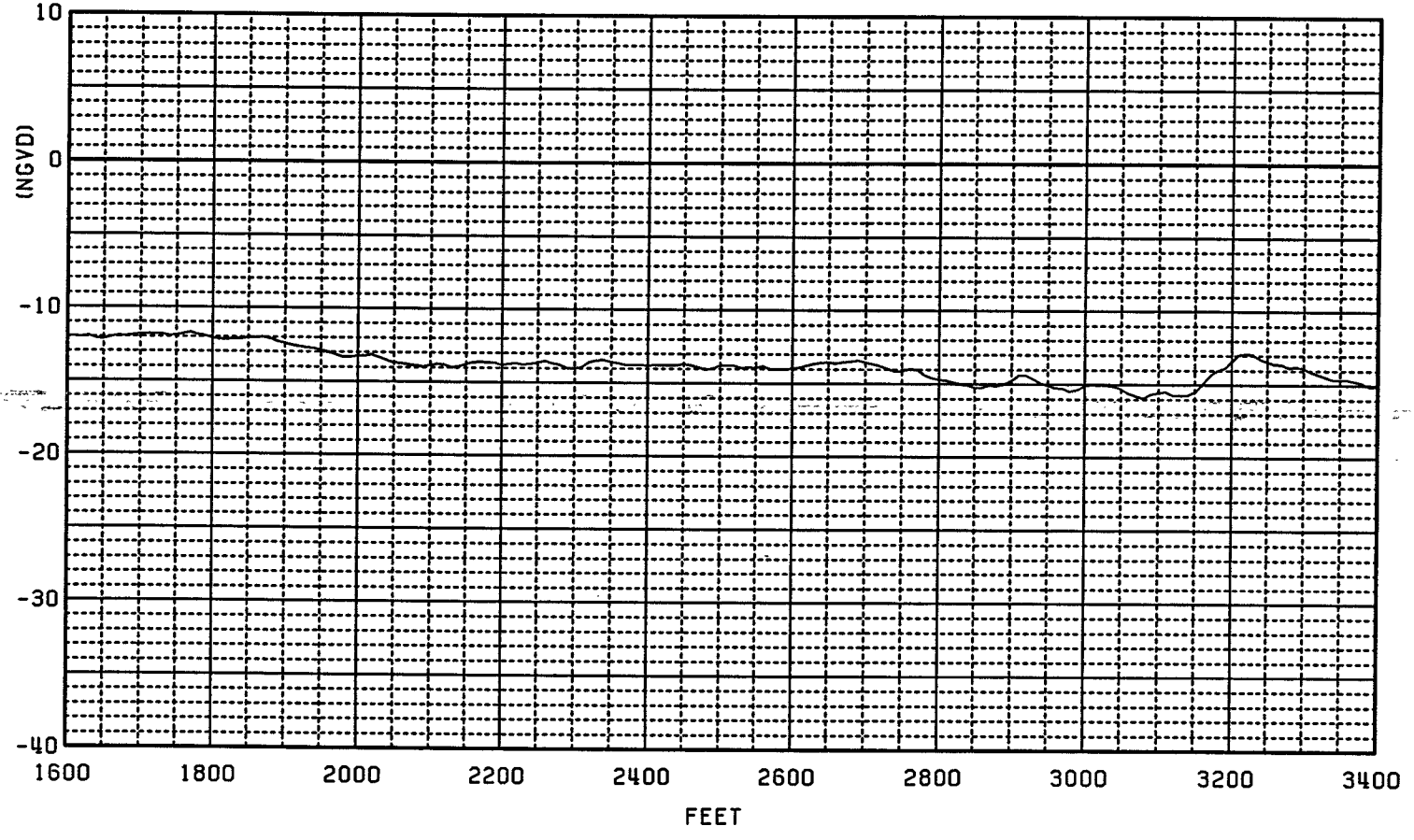
RANGE: R-103 3/3
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

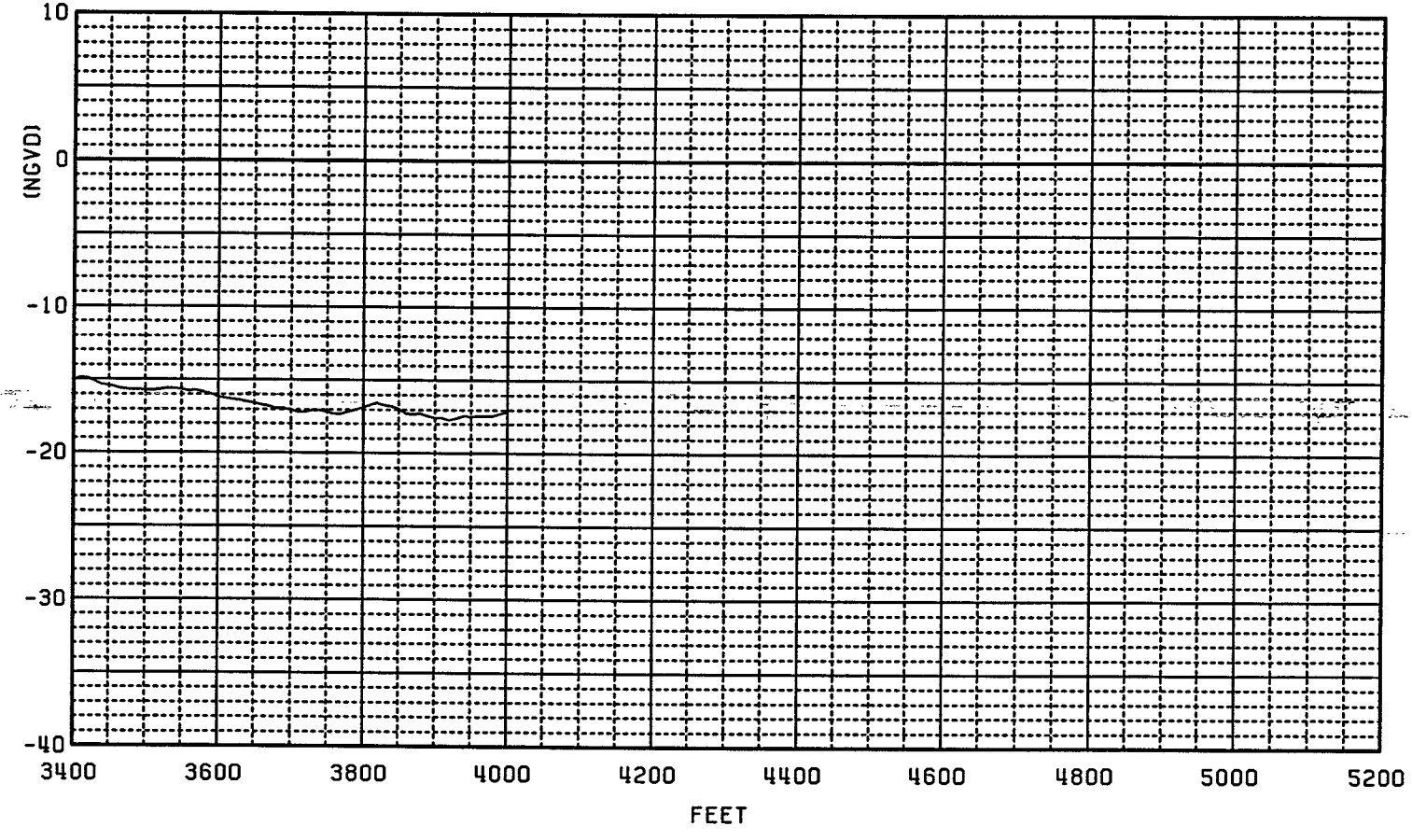
RANGE: R-103A 1/3
SURVEY BEAR (MAG. N) : 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

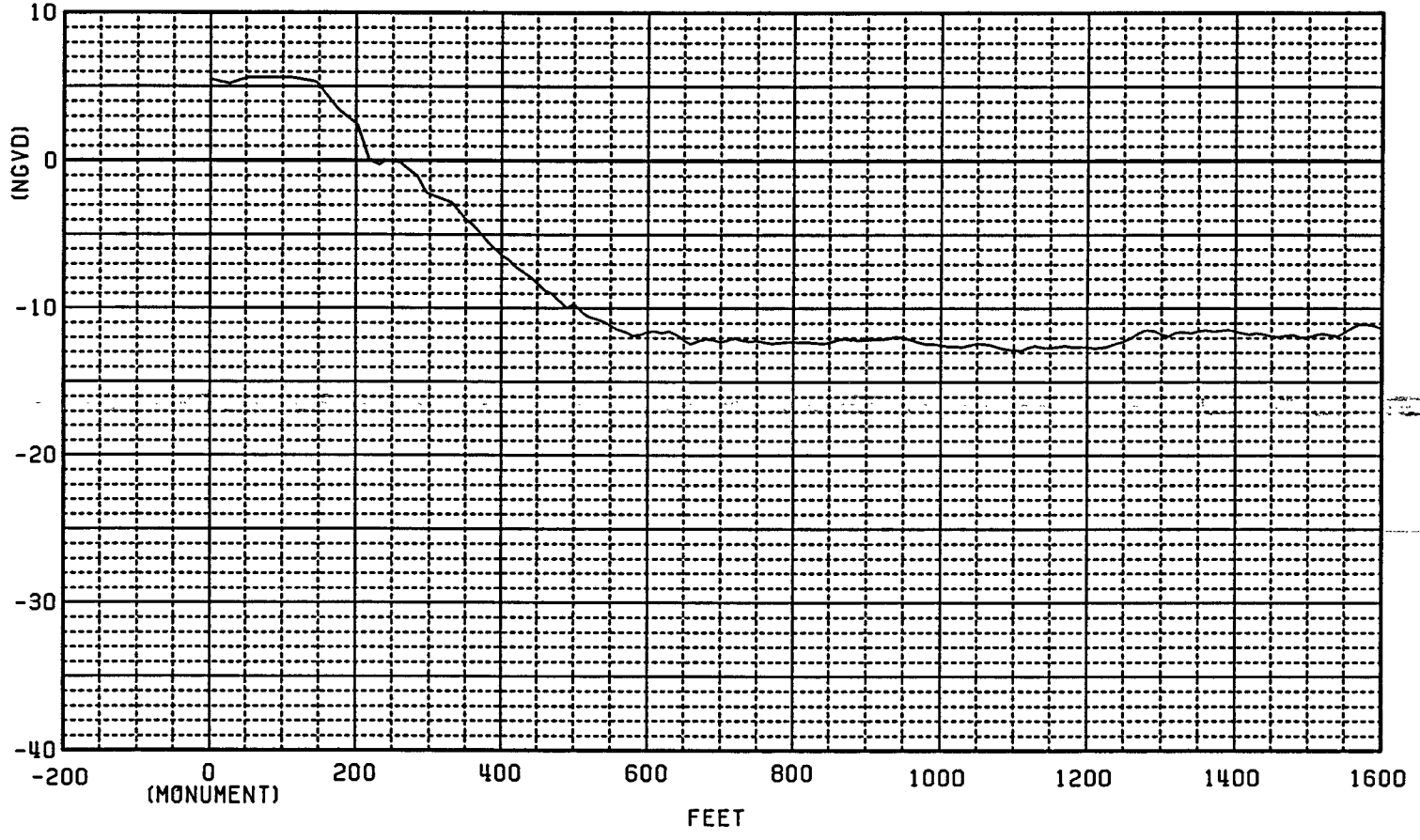
RANGE: R-103A 2/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

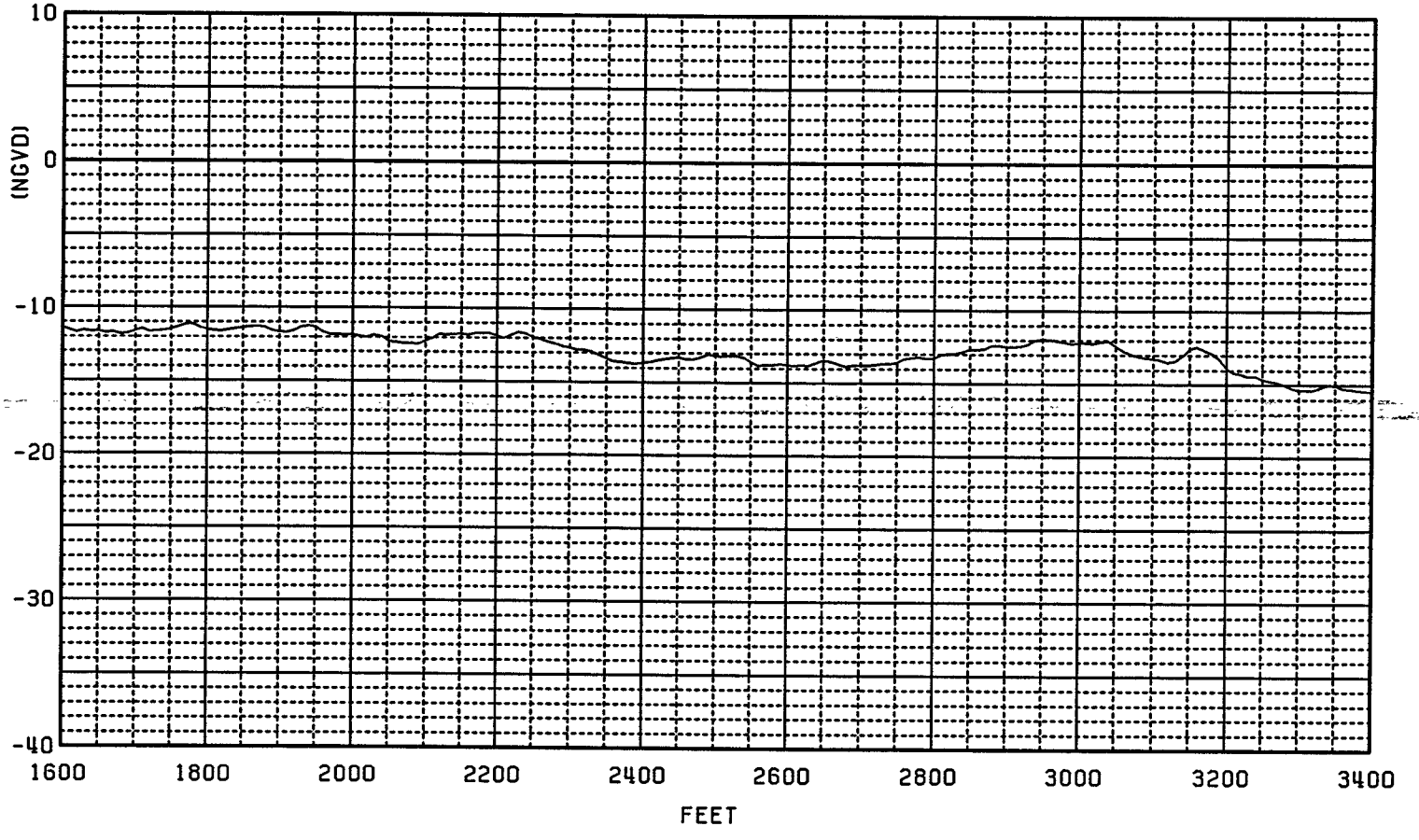
RANGE: R-103A 3/3
SURVEY BEAR (MAG. N) : 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

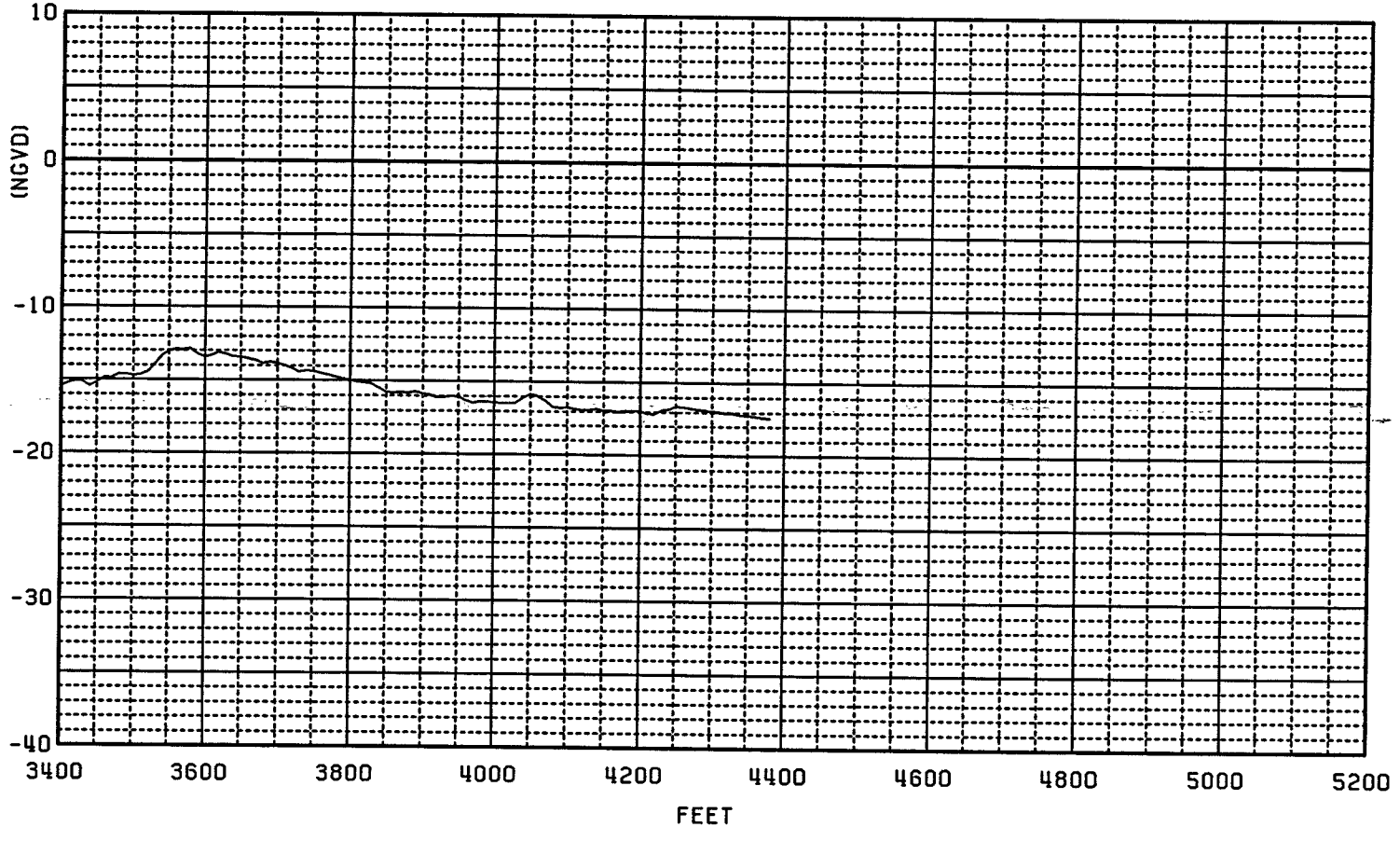
RANGE: T-104 1/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

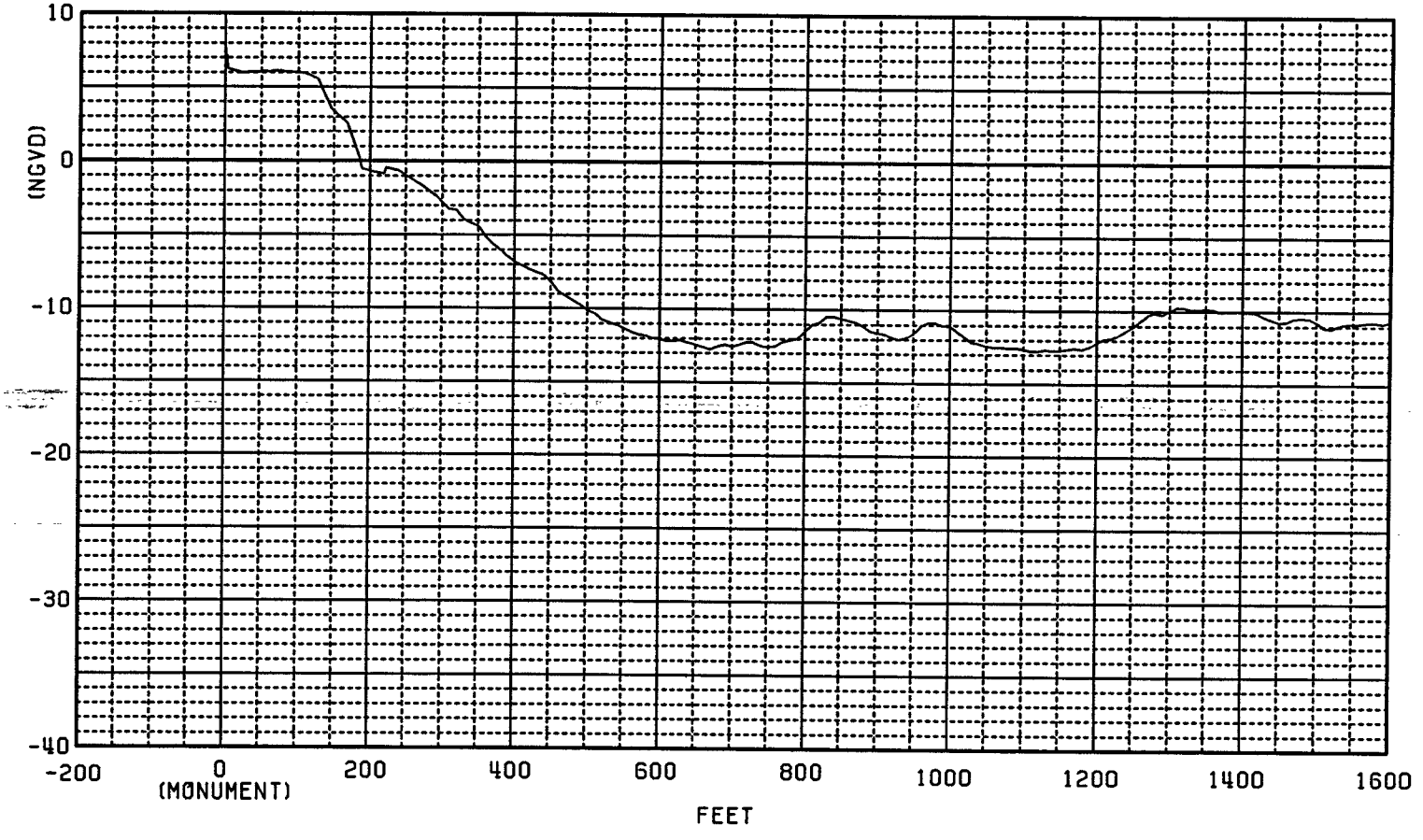
RANGE: T-104 2/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

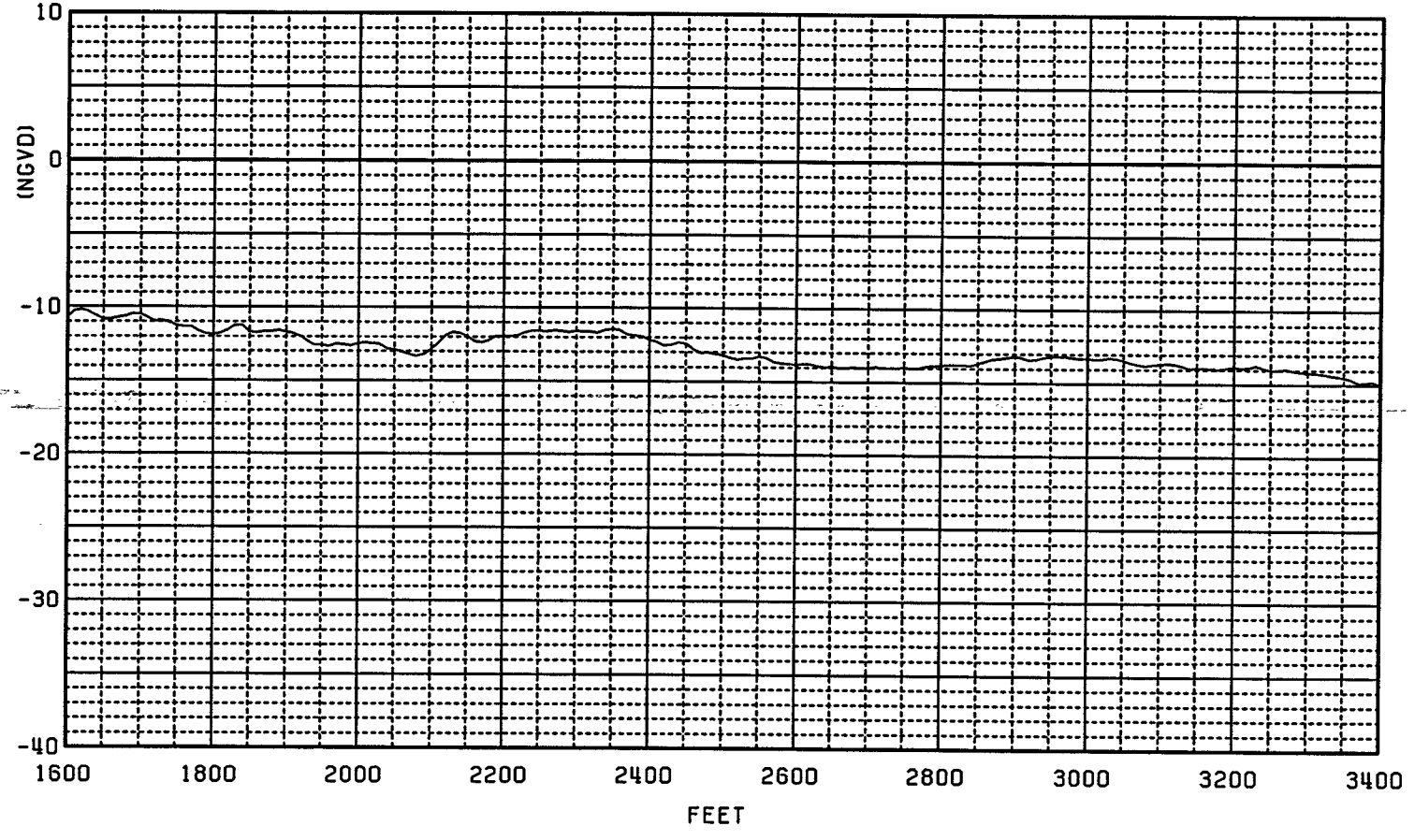
RANGE: T-104 3/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

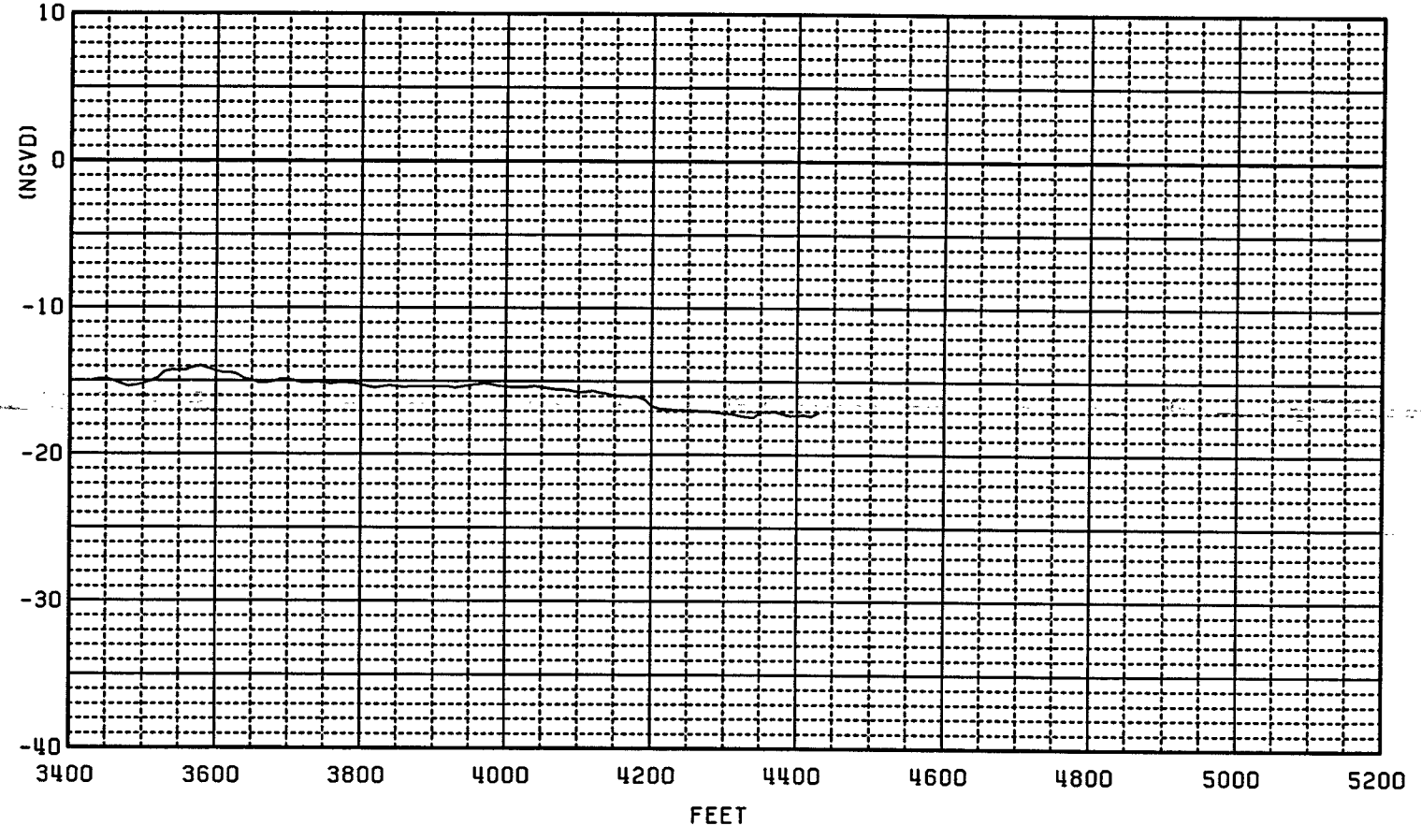
RANGE: T-104A 1/3
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

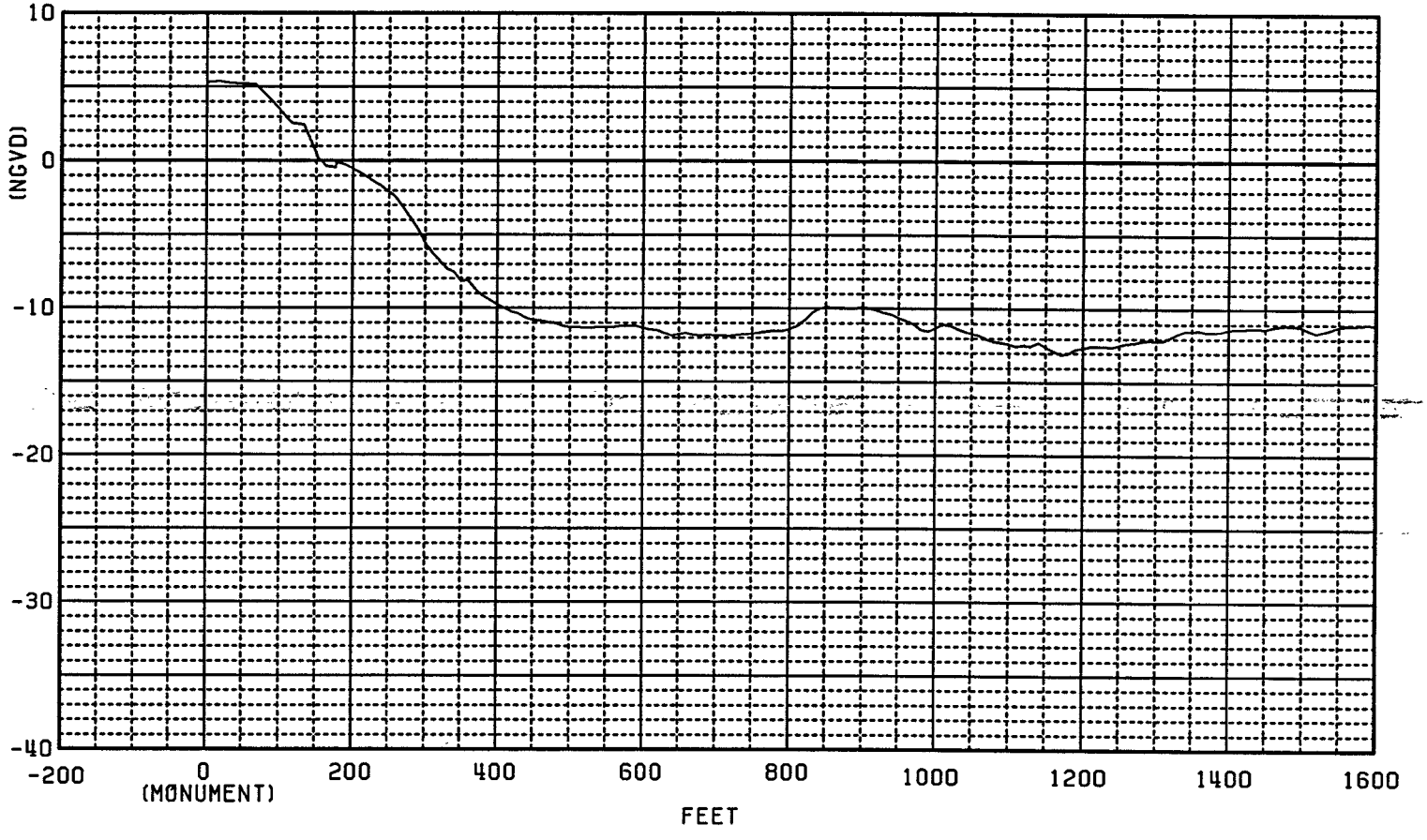
RANGE: T-104A 2/3
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

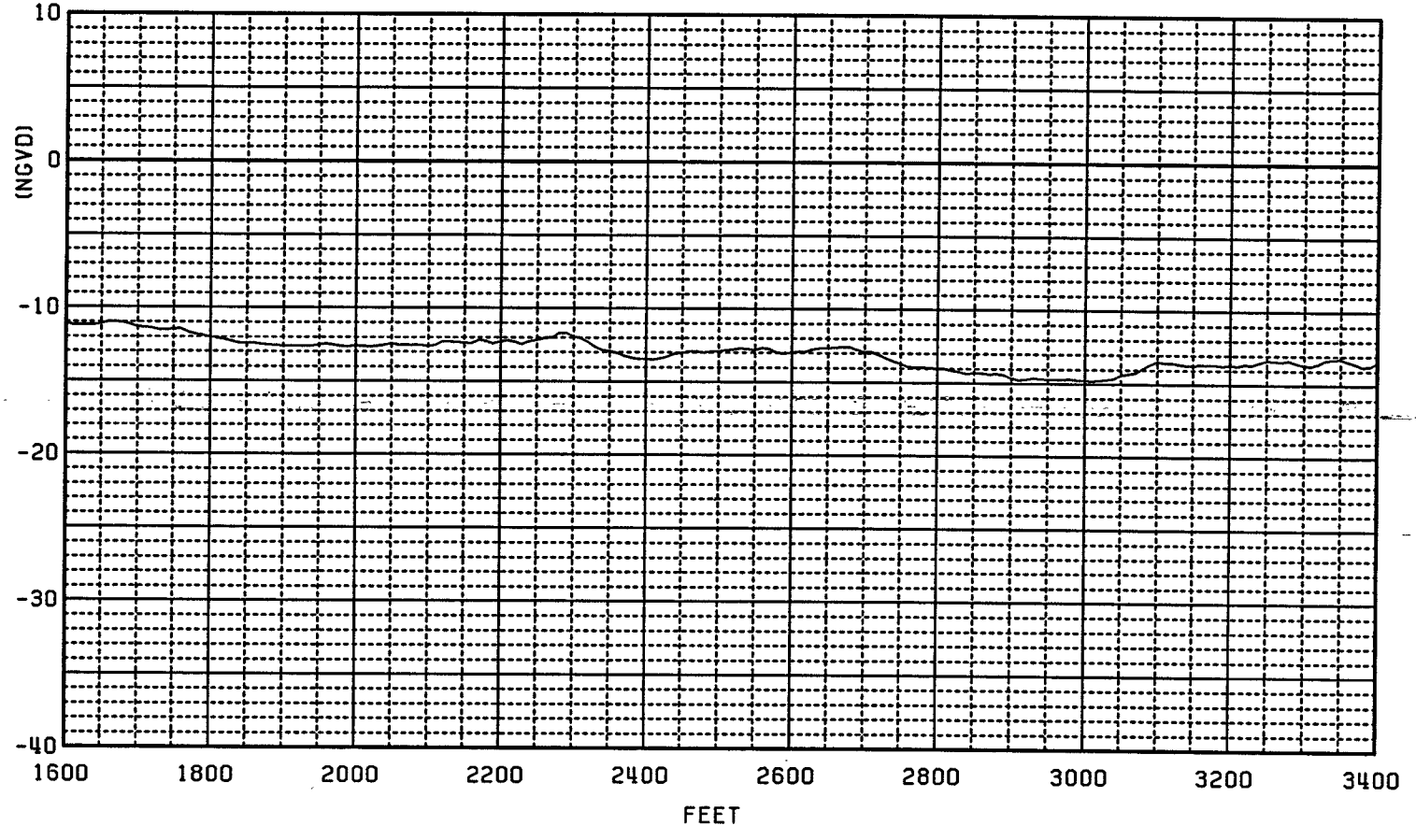
RANGE: T-104A 3/3
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 22NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---•CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

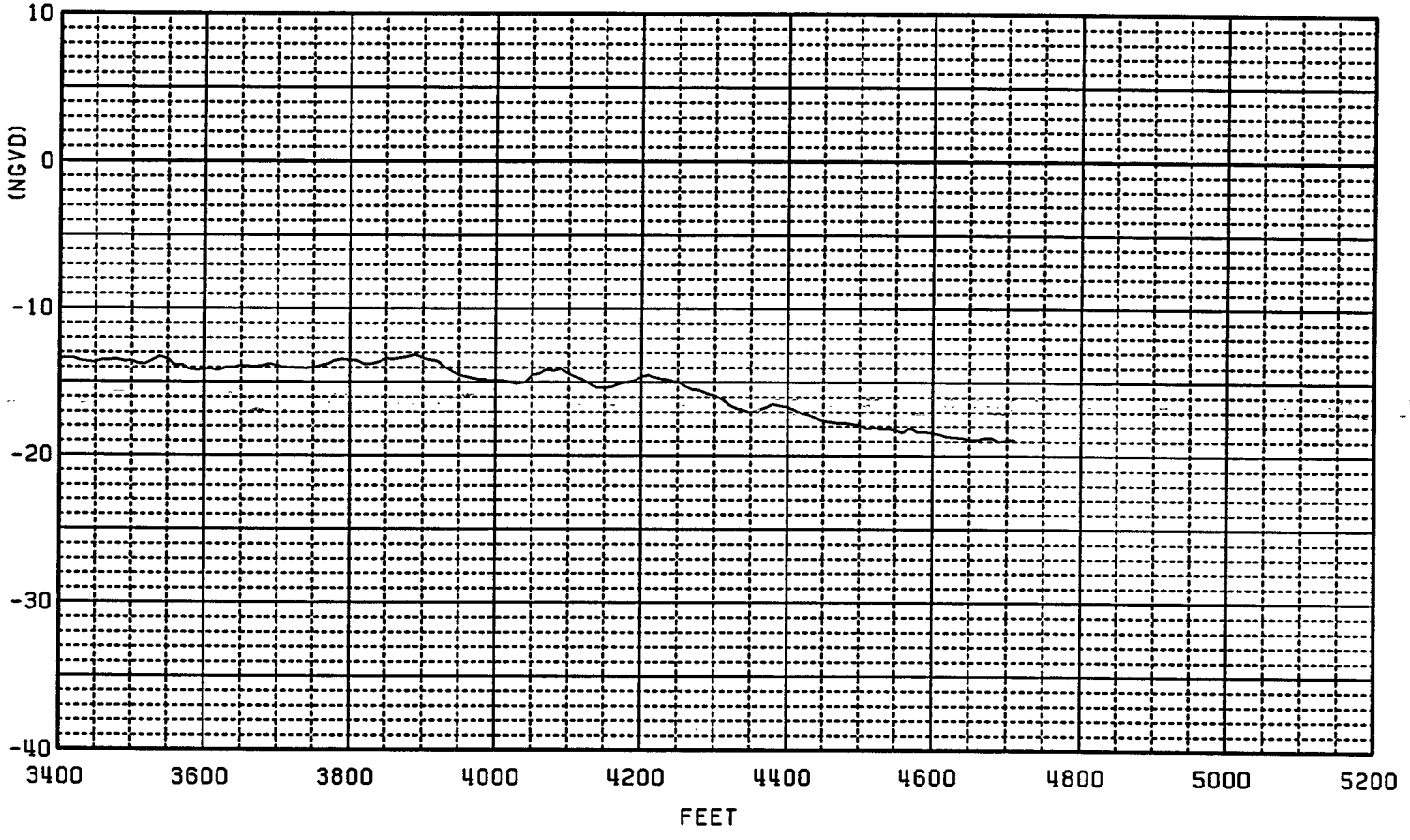
RANGE: R-105G 1/3
SURVEY BEAR (MAG. N) : 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

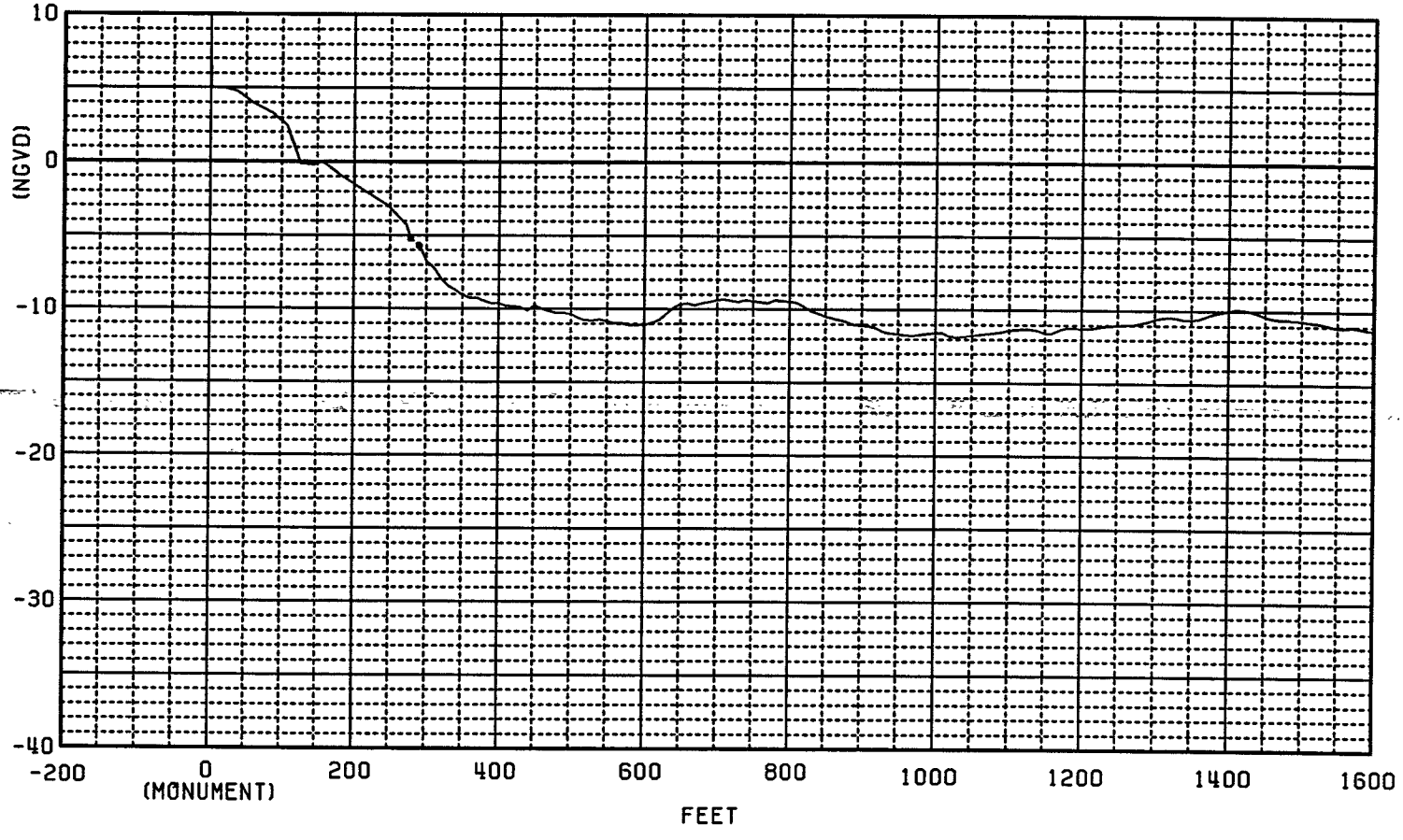
RANGE: R-105G 2/3
SURVEY BEAR (MAG. N): 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

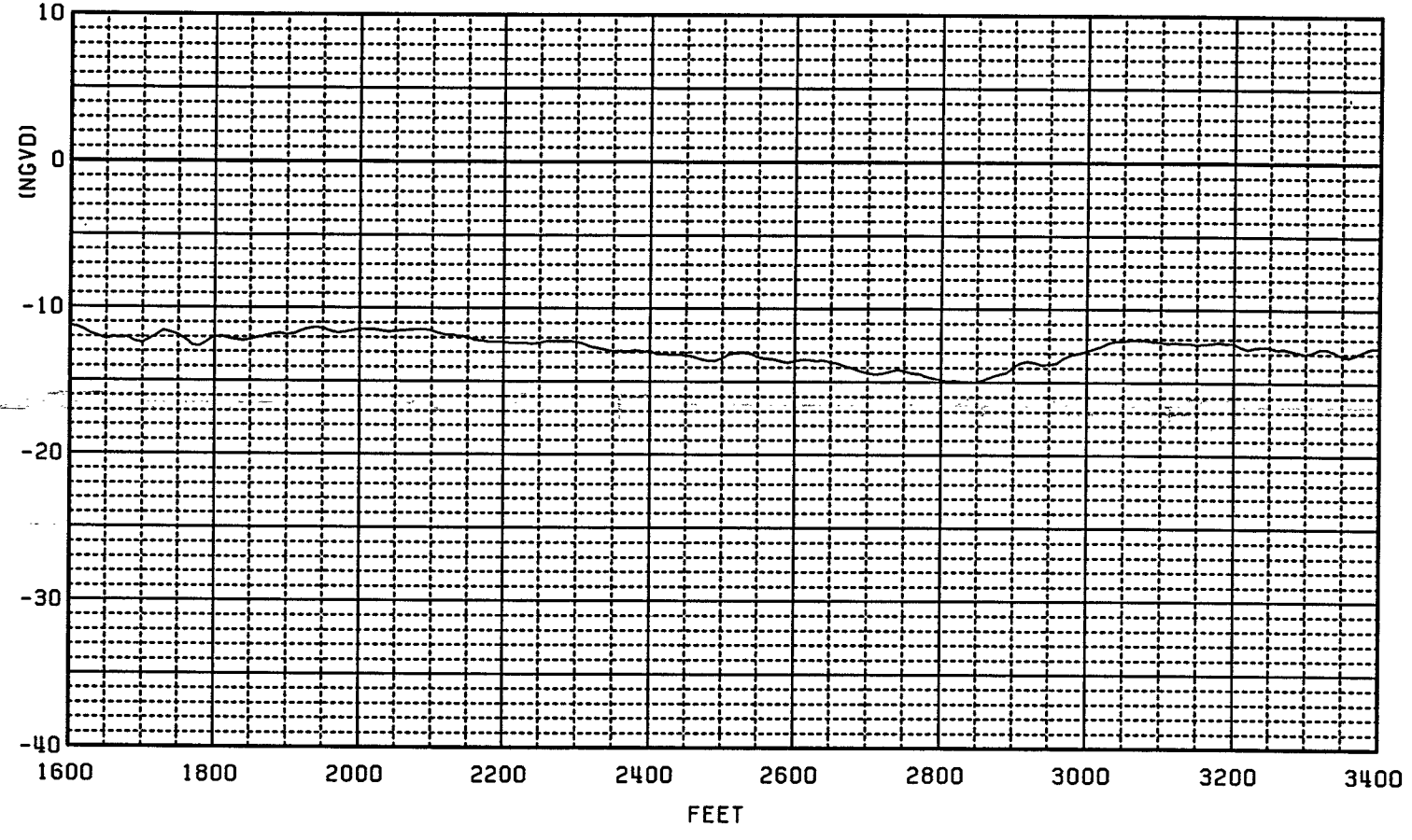
RANGE: R-105G 3/3
SURVEY BEAR (MAG. N): 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

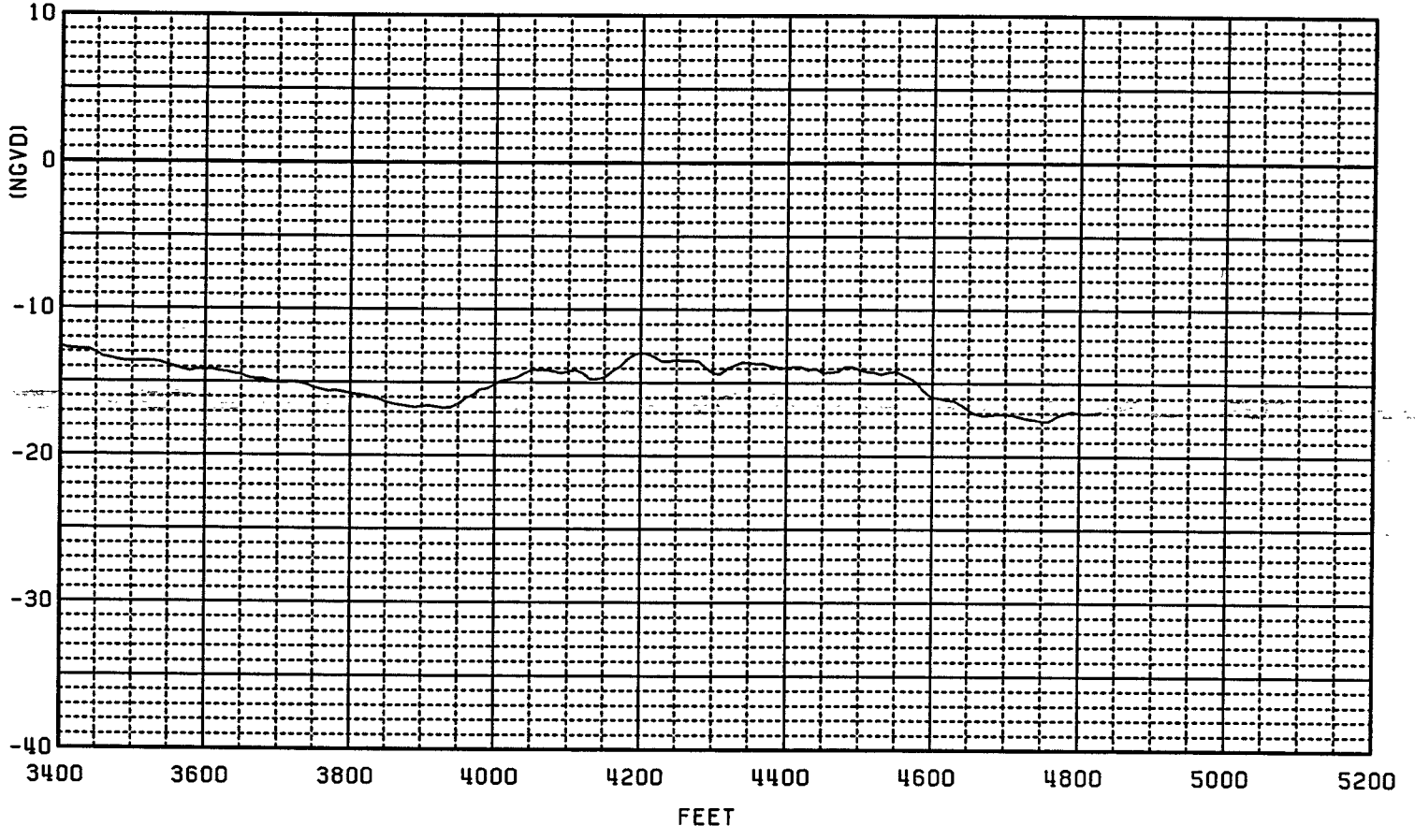
RANGE: R-105A 1/3
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

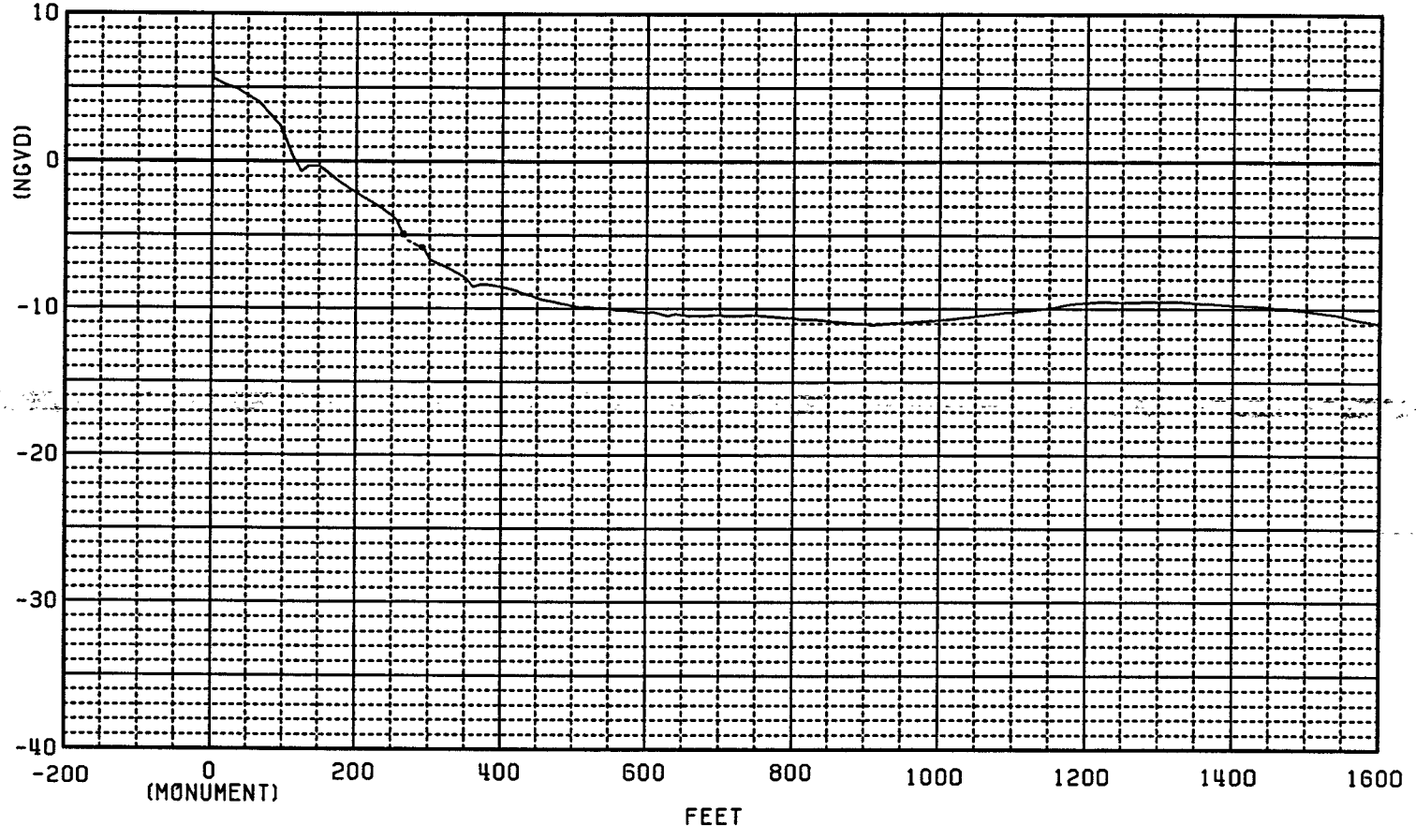
RANGE: R-105A 2/3
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

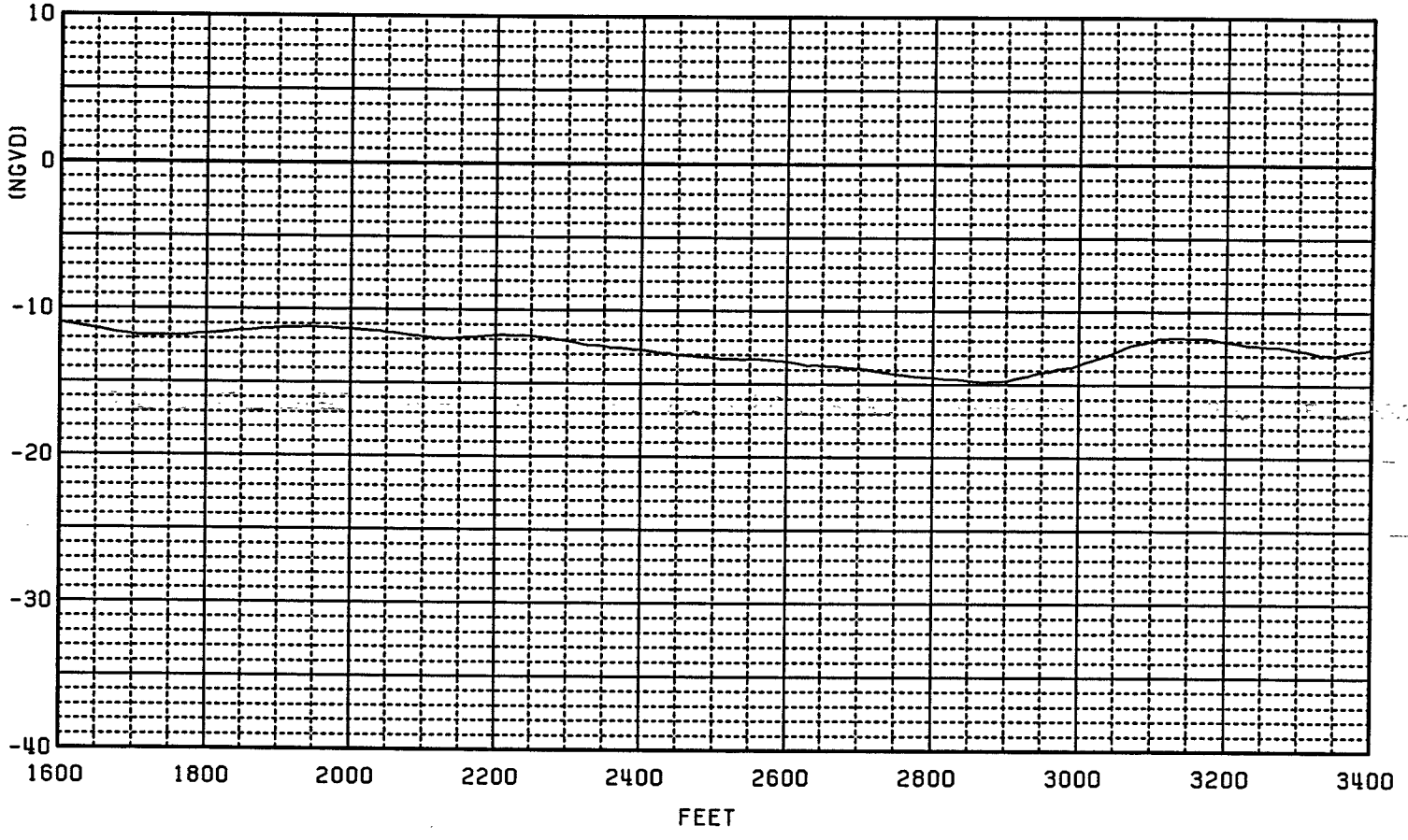
RANGE: R-105A 3/3
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

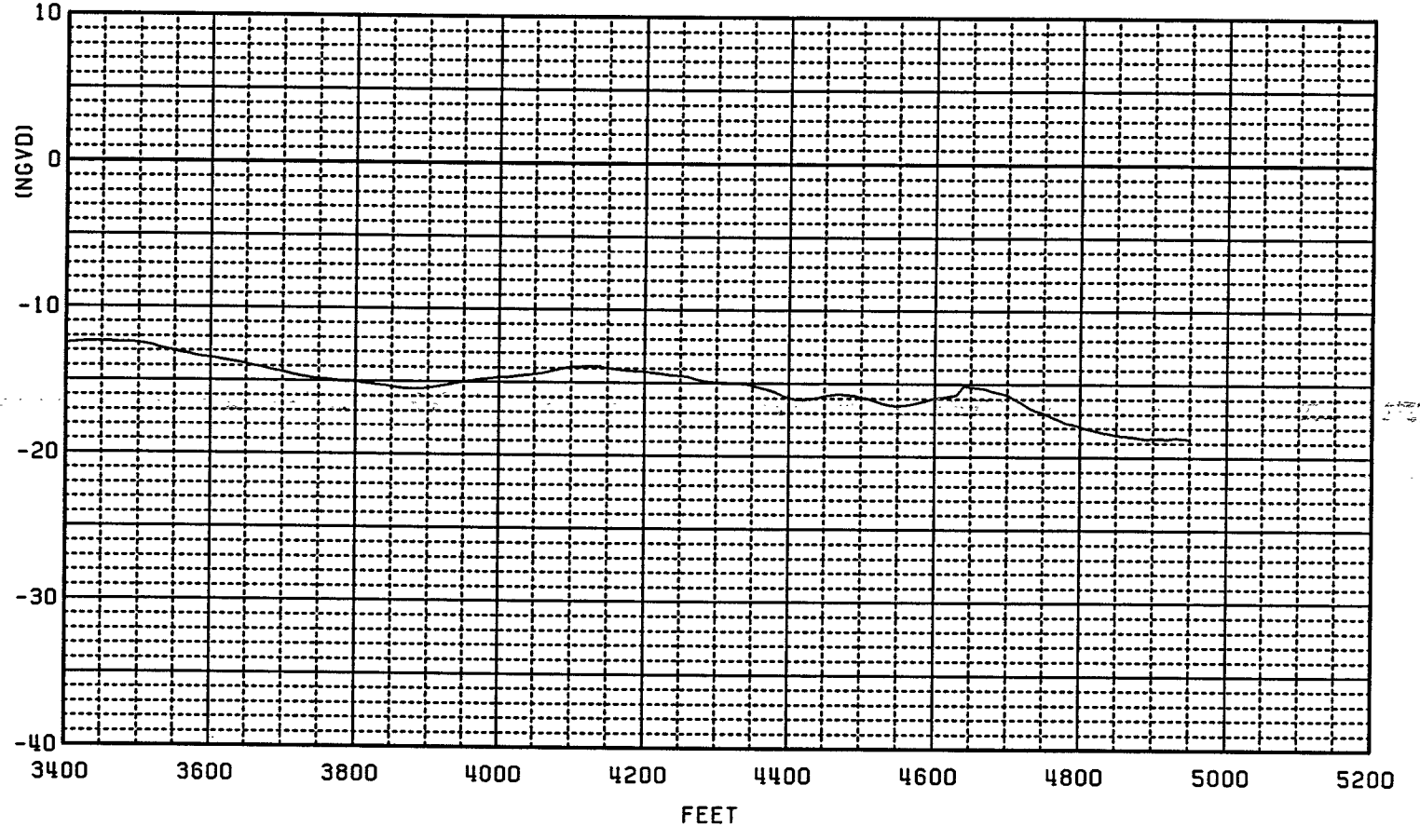
RANGE: T-106 1/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

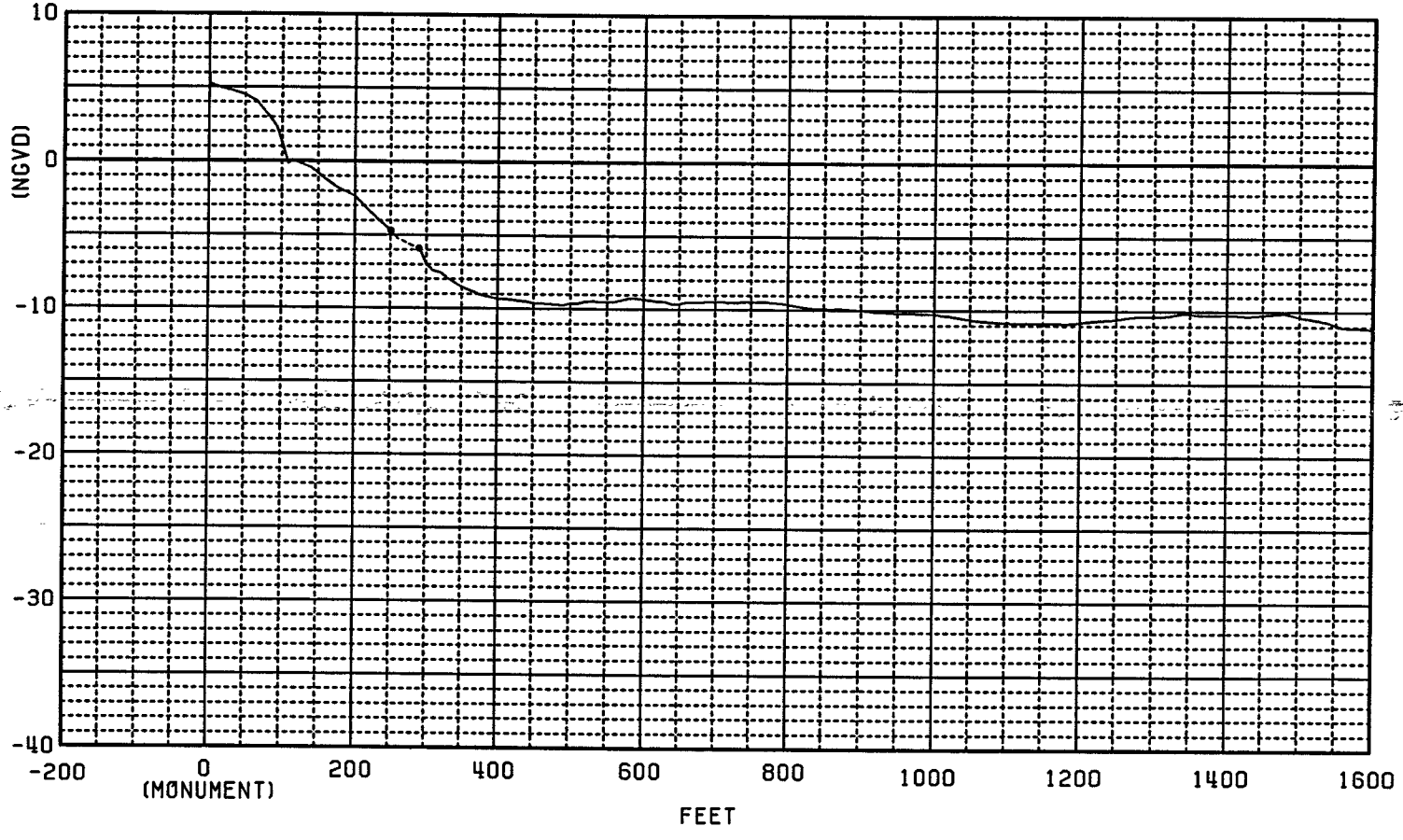
RANGE: T-106 2/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

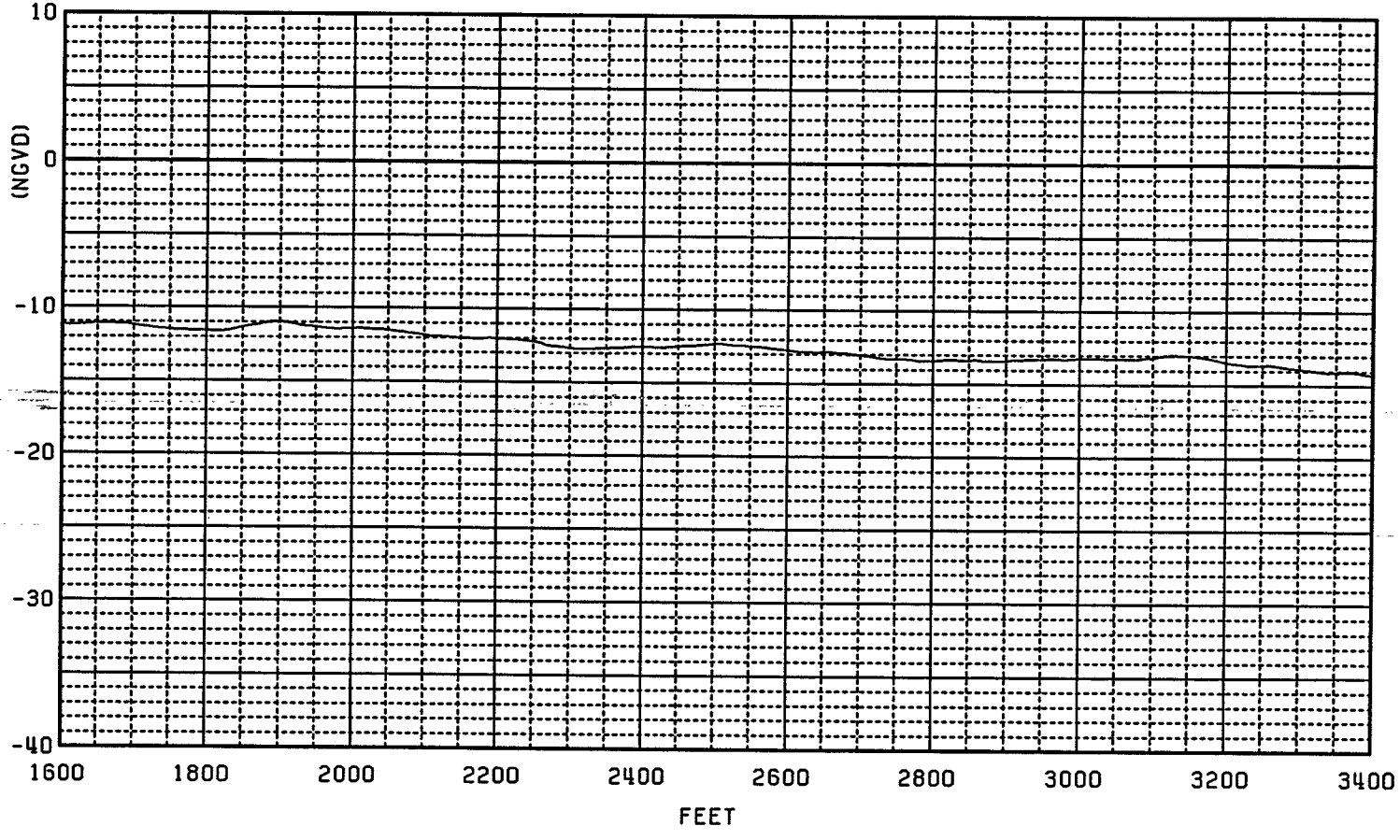
RANGE: T-106 3/3
SURVEY BEAR (MAG. N): 245
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

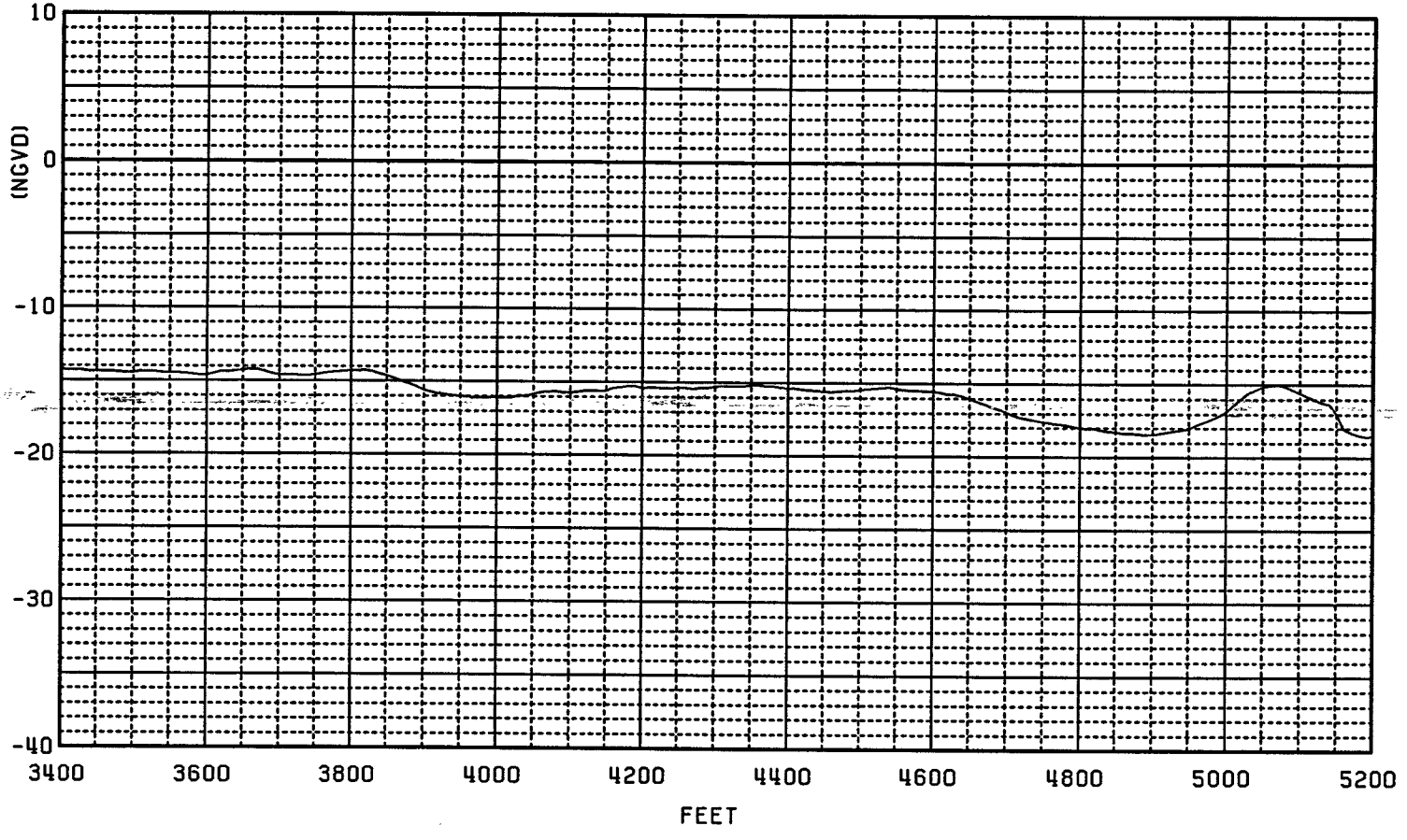
RANGE: T-106A 1/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

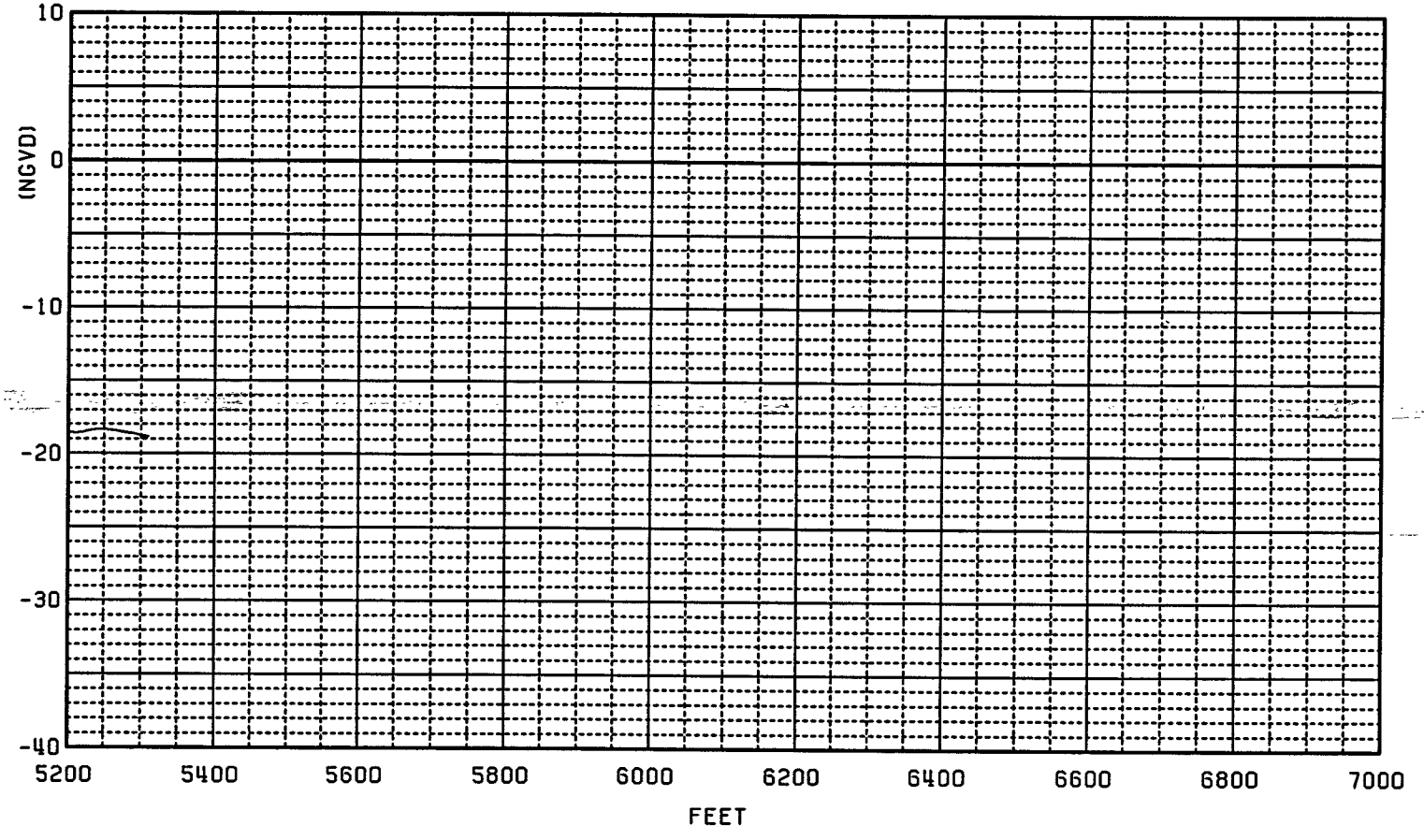
RANGE: T-106A 2/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

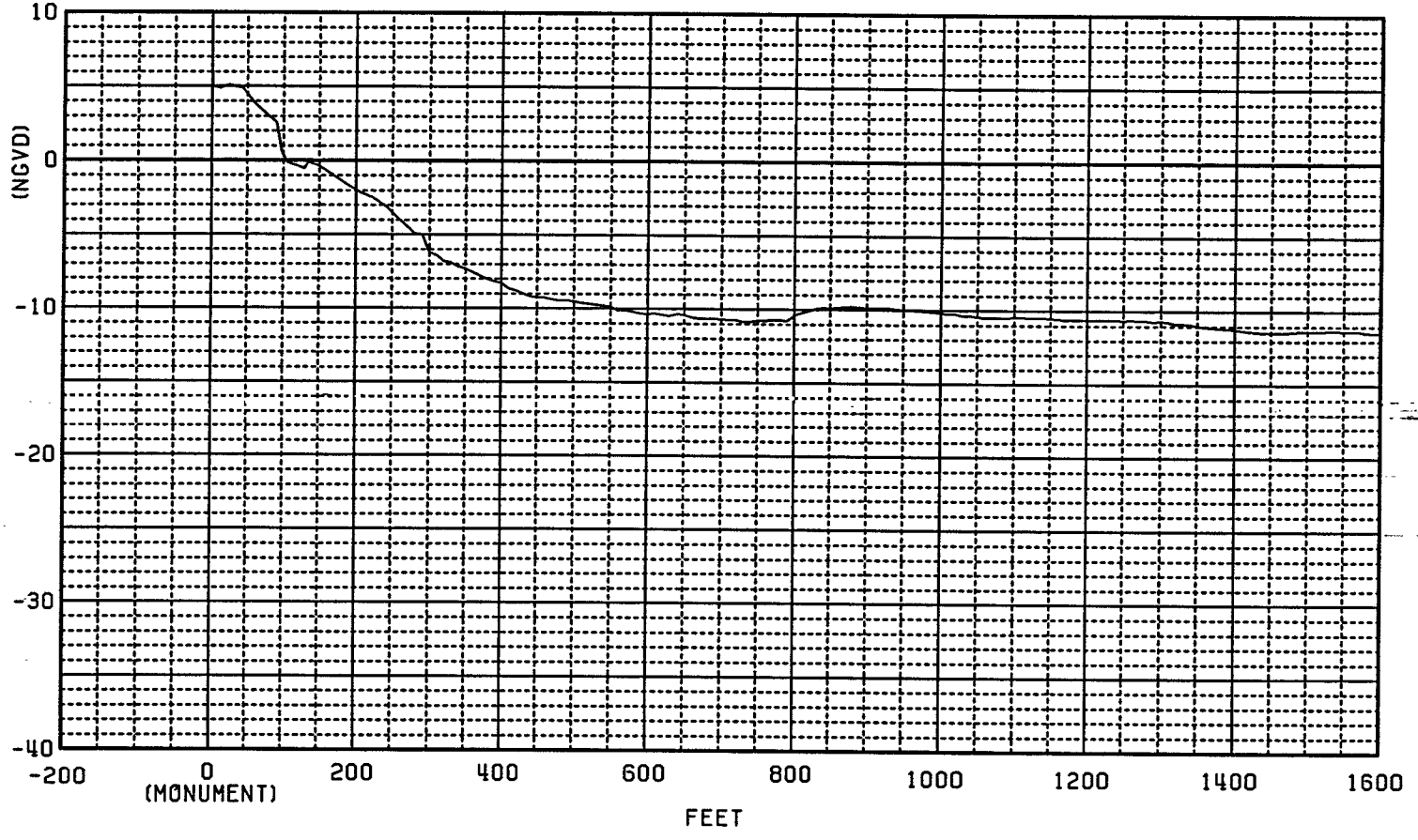
RANGE: T-106A 3/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

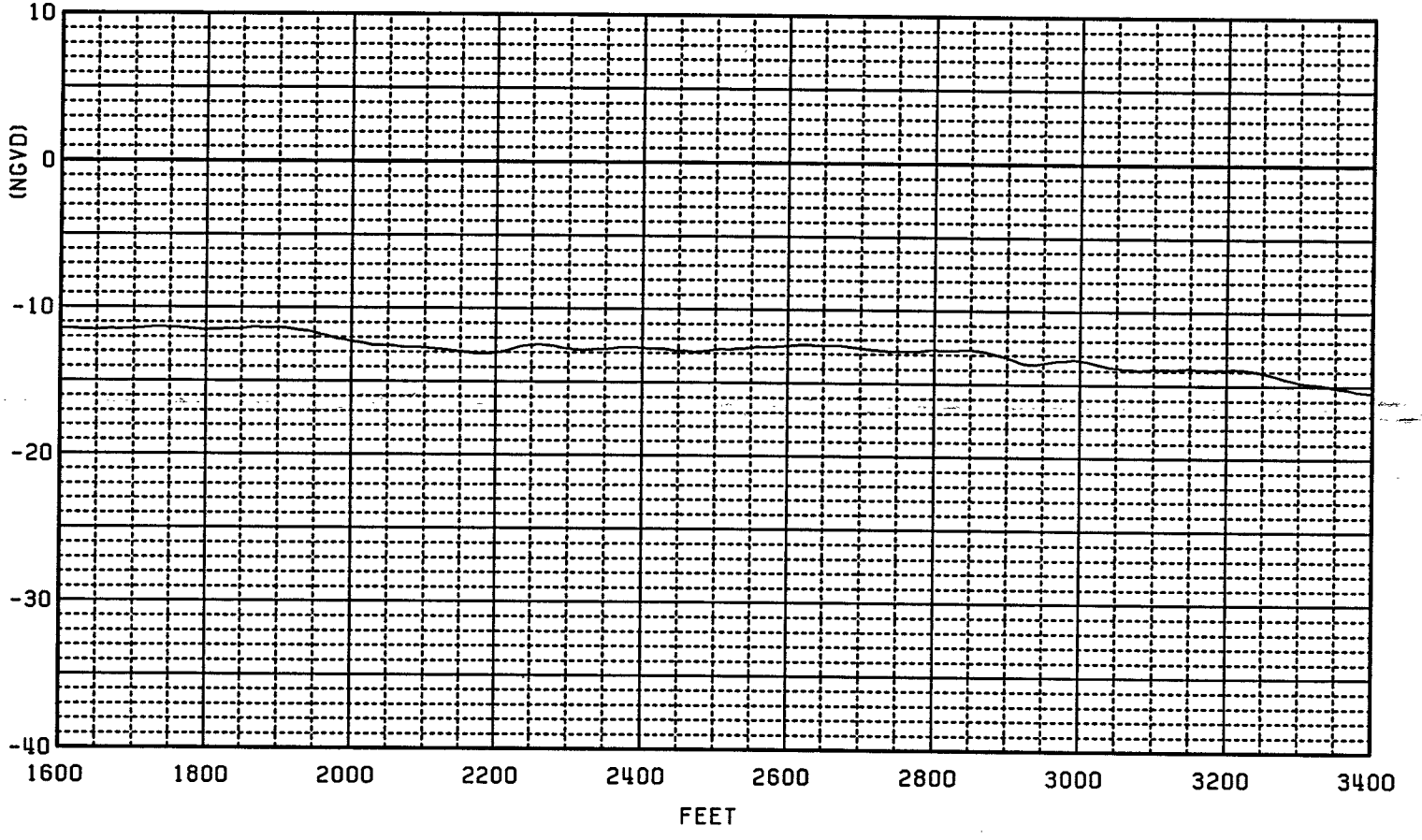
RANGE: T-106A 4/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•– – –• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

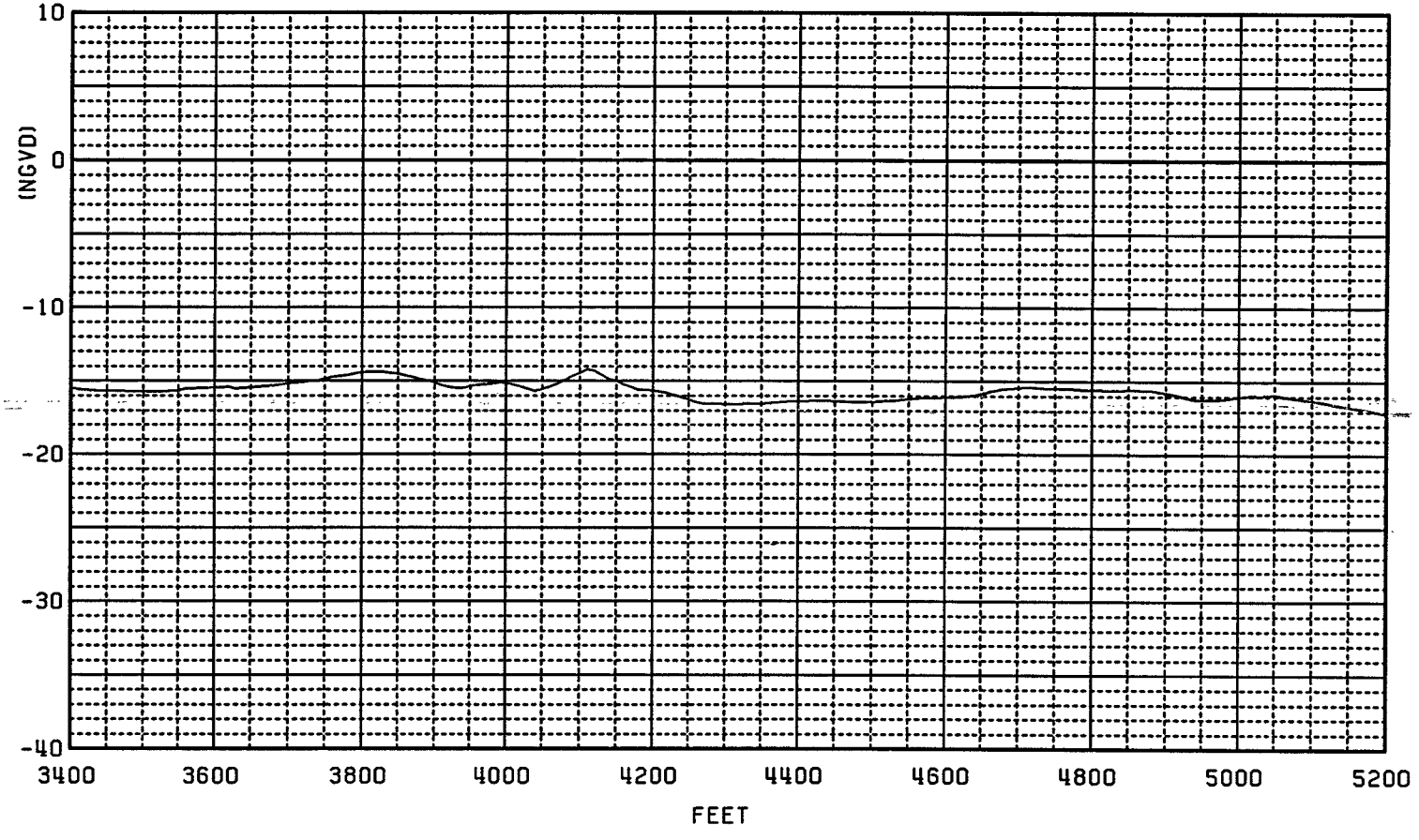
RANGE: R-107 1/4
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

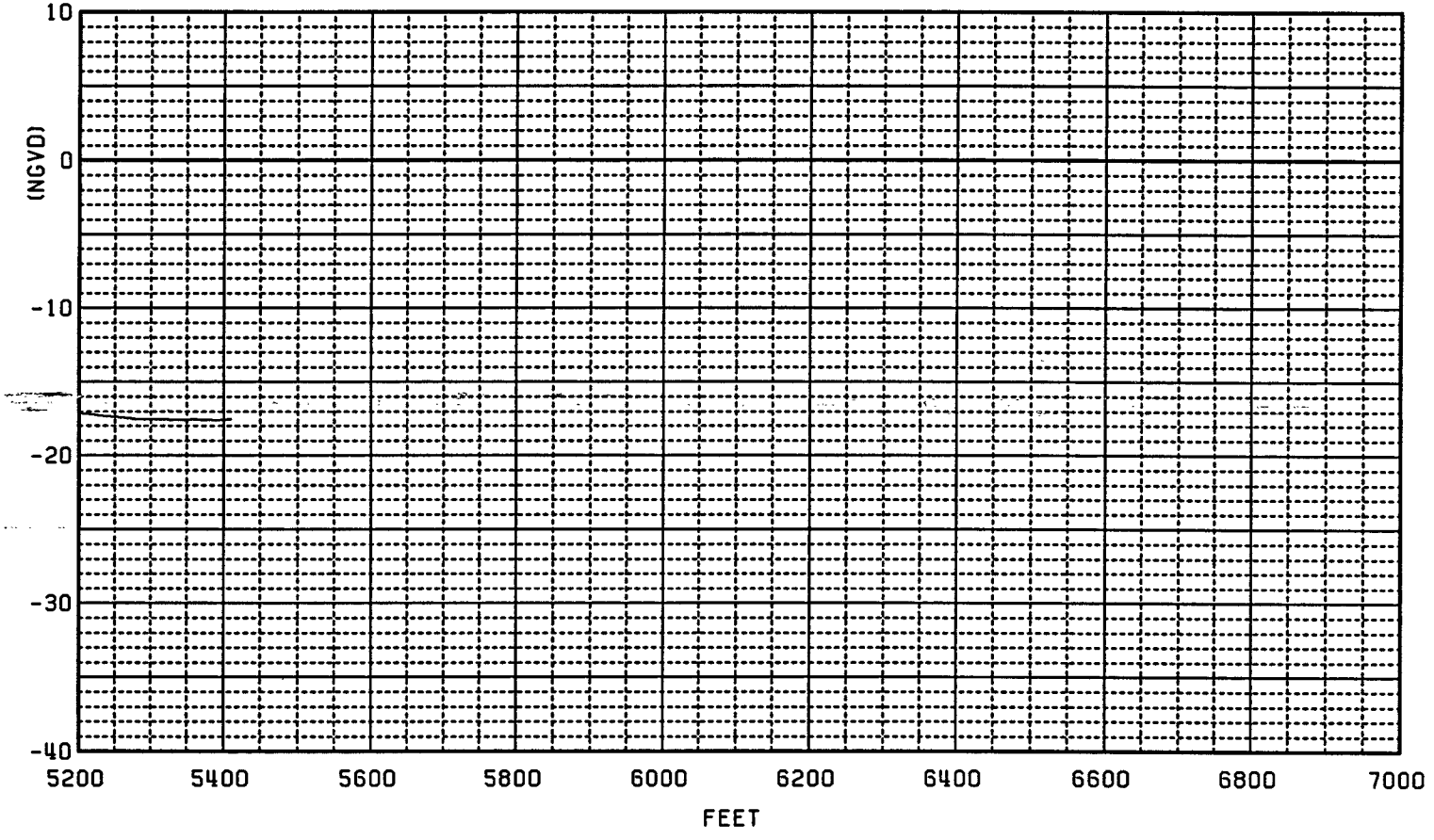
RANGE: R-107 2/4
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

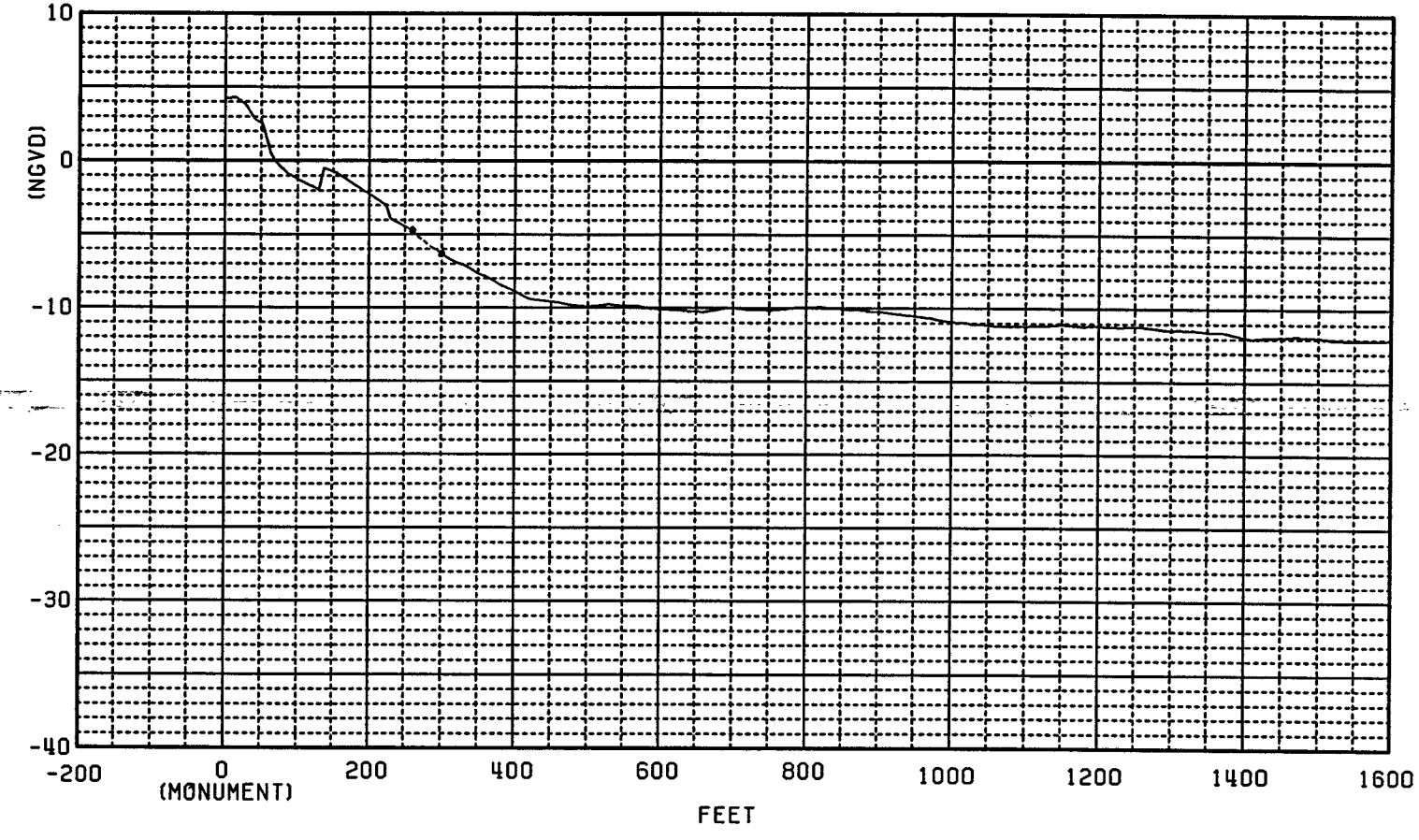
RANGE: R-107 3/4
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

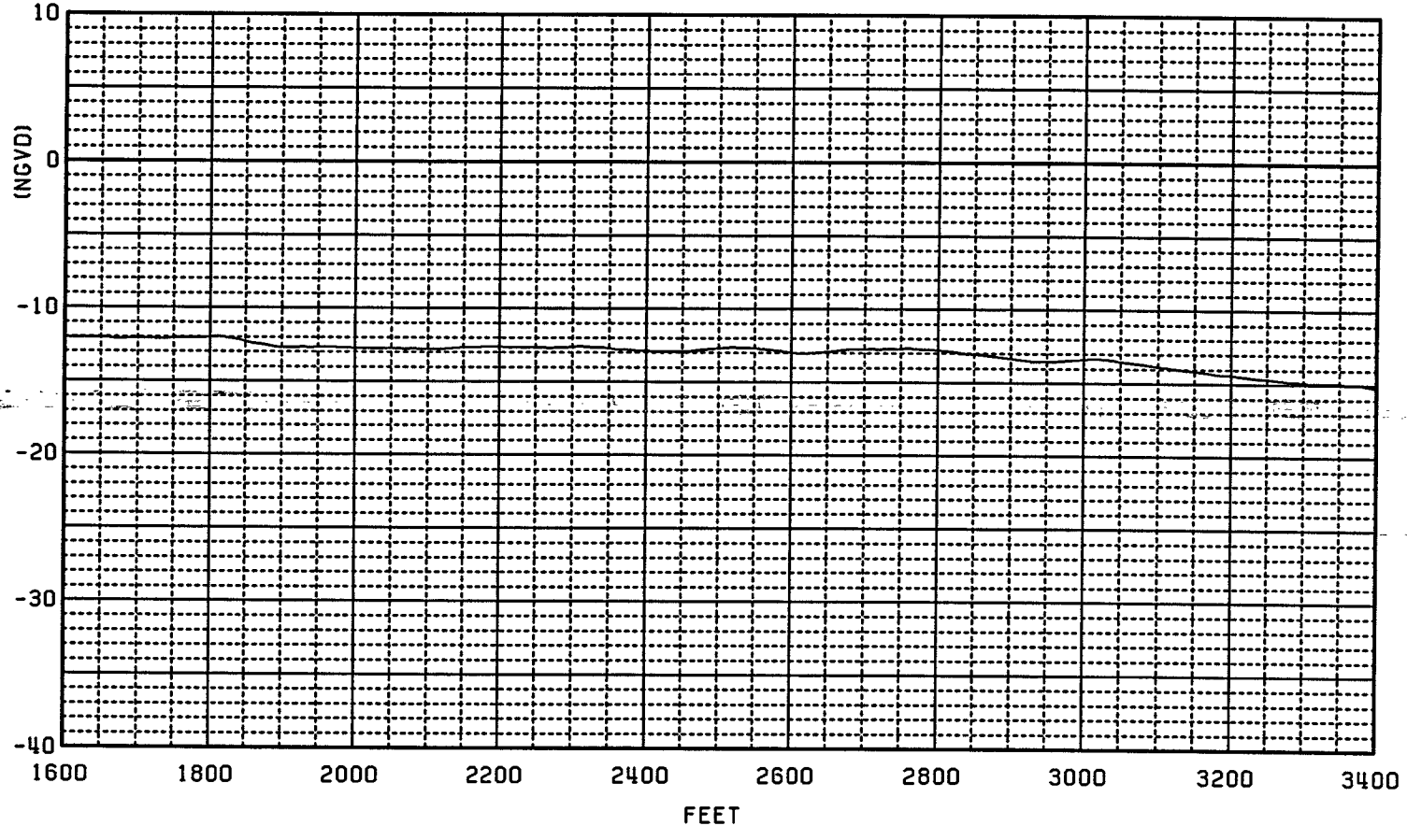
RANGE: R-107 4/4
SURVEY BEAR (MAG. N): 235
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

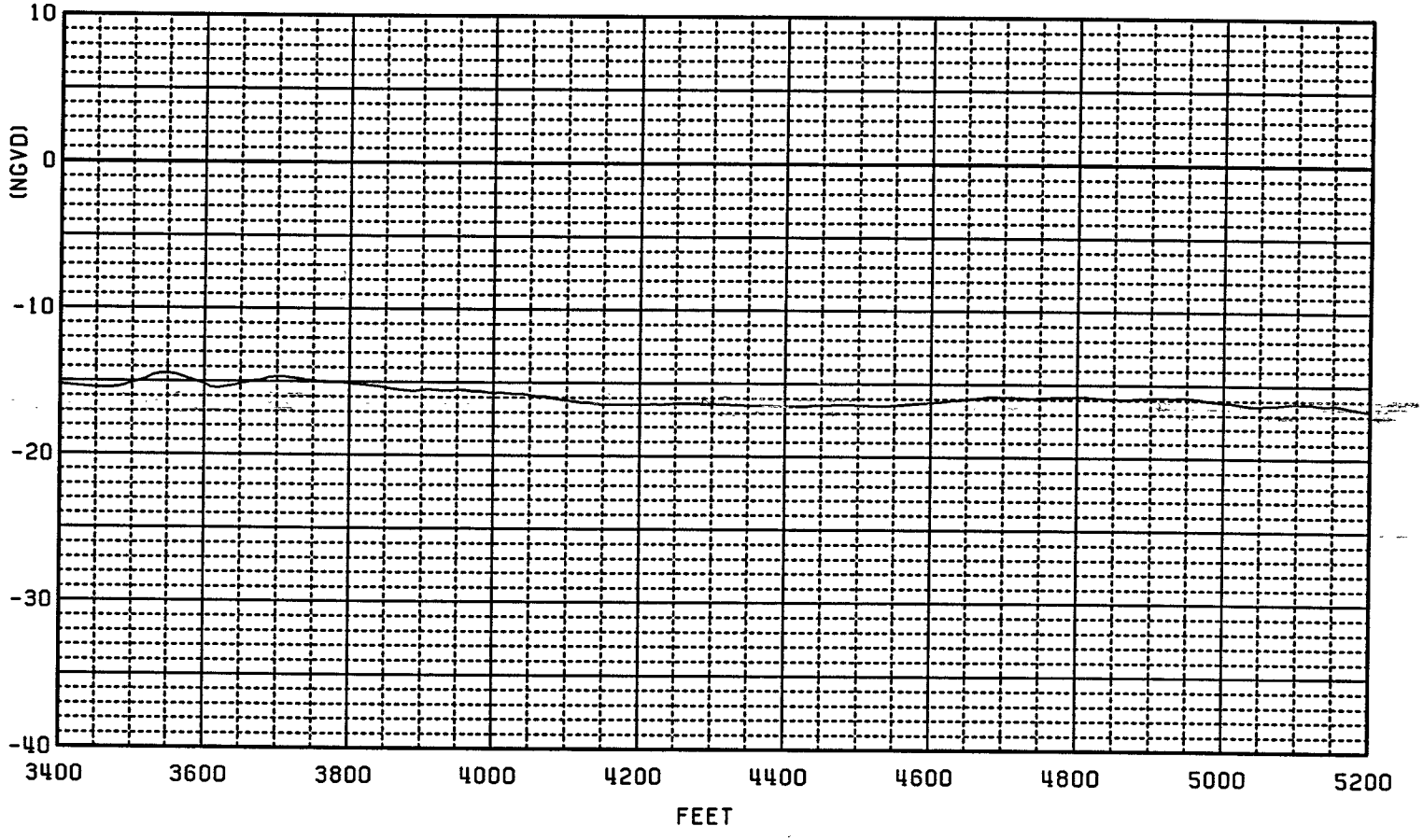
RANGE: R-107A 1/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

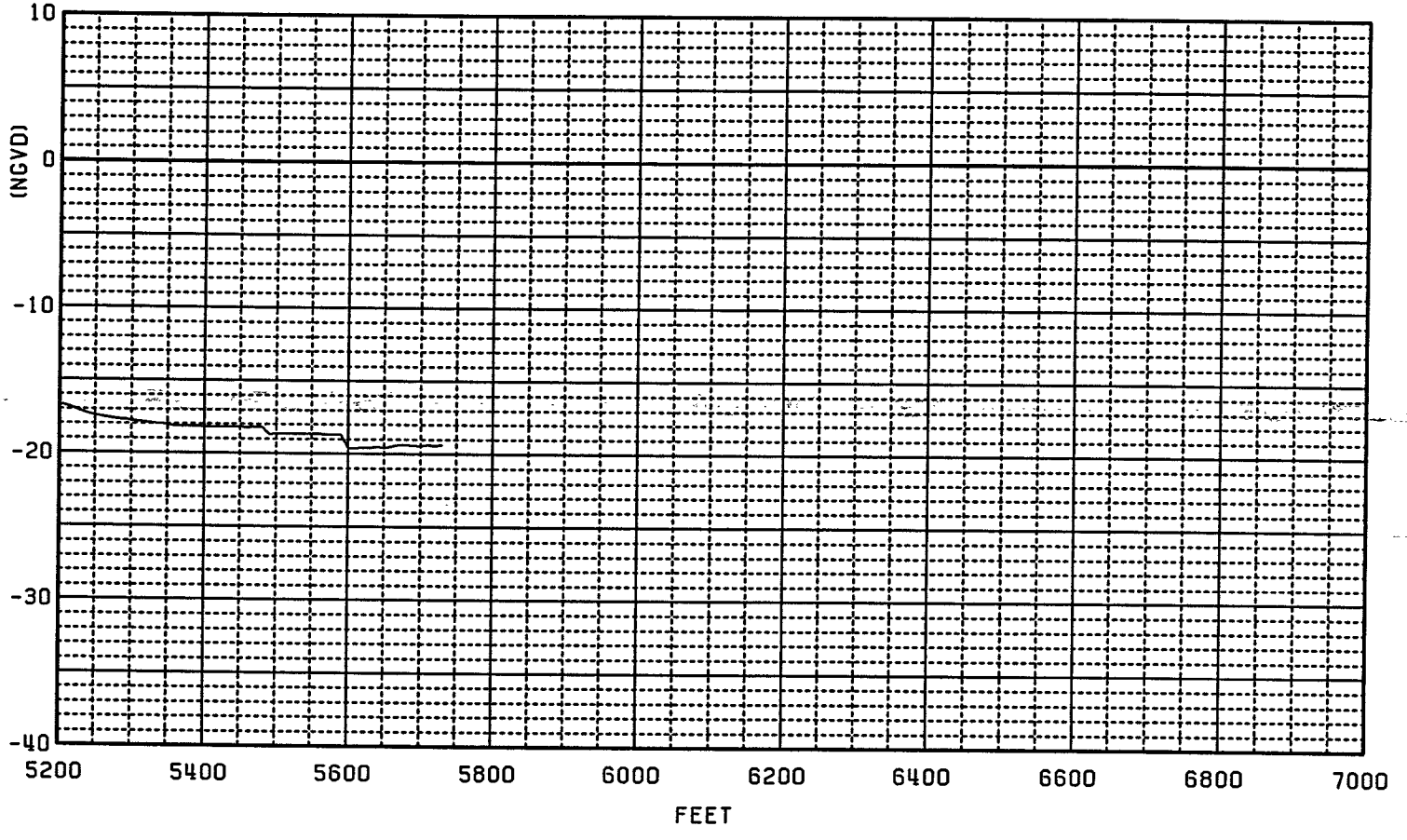
RANGE: R-107A 2/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

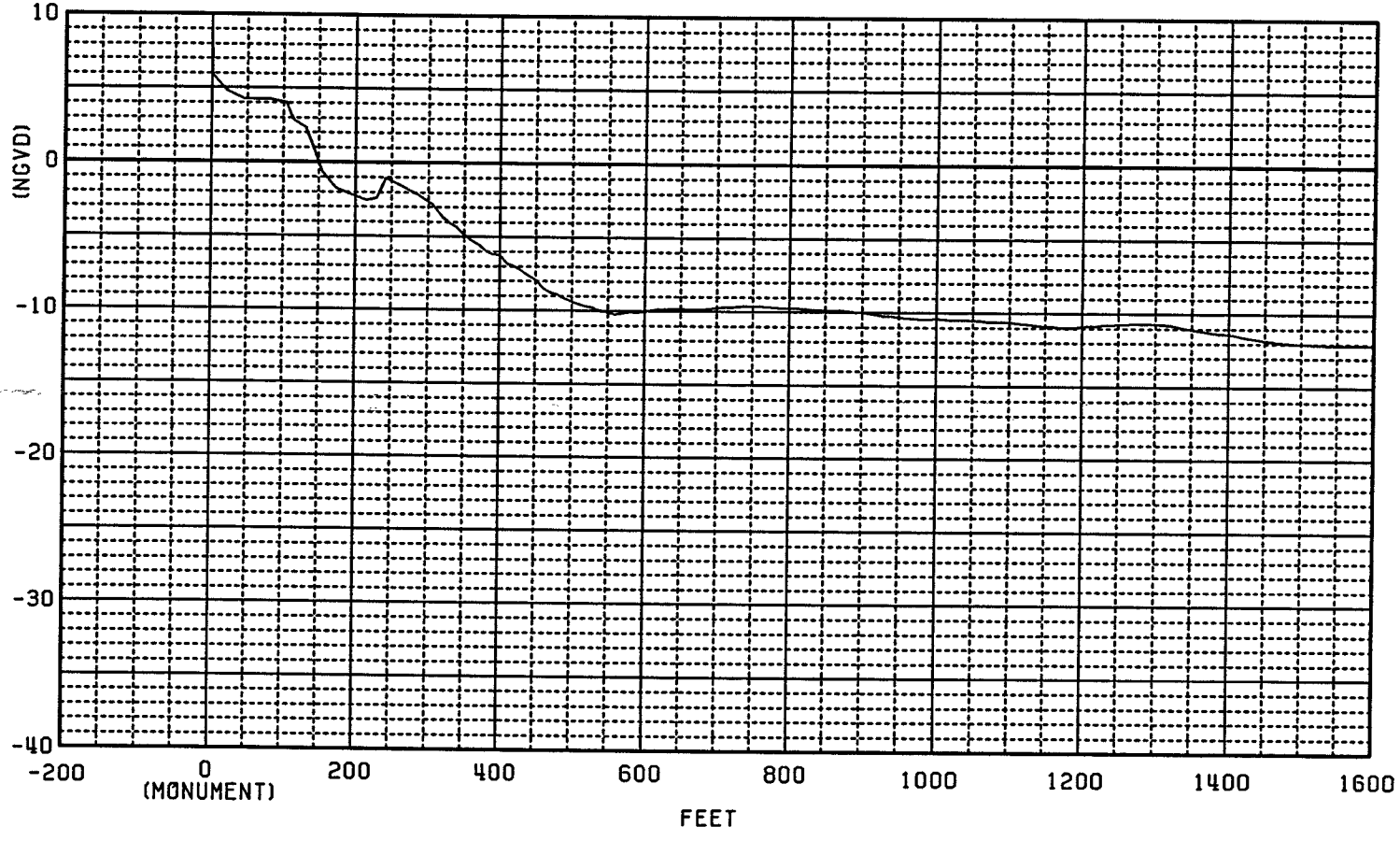
RANGE: R-107A 3/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

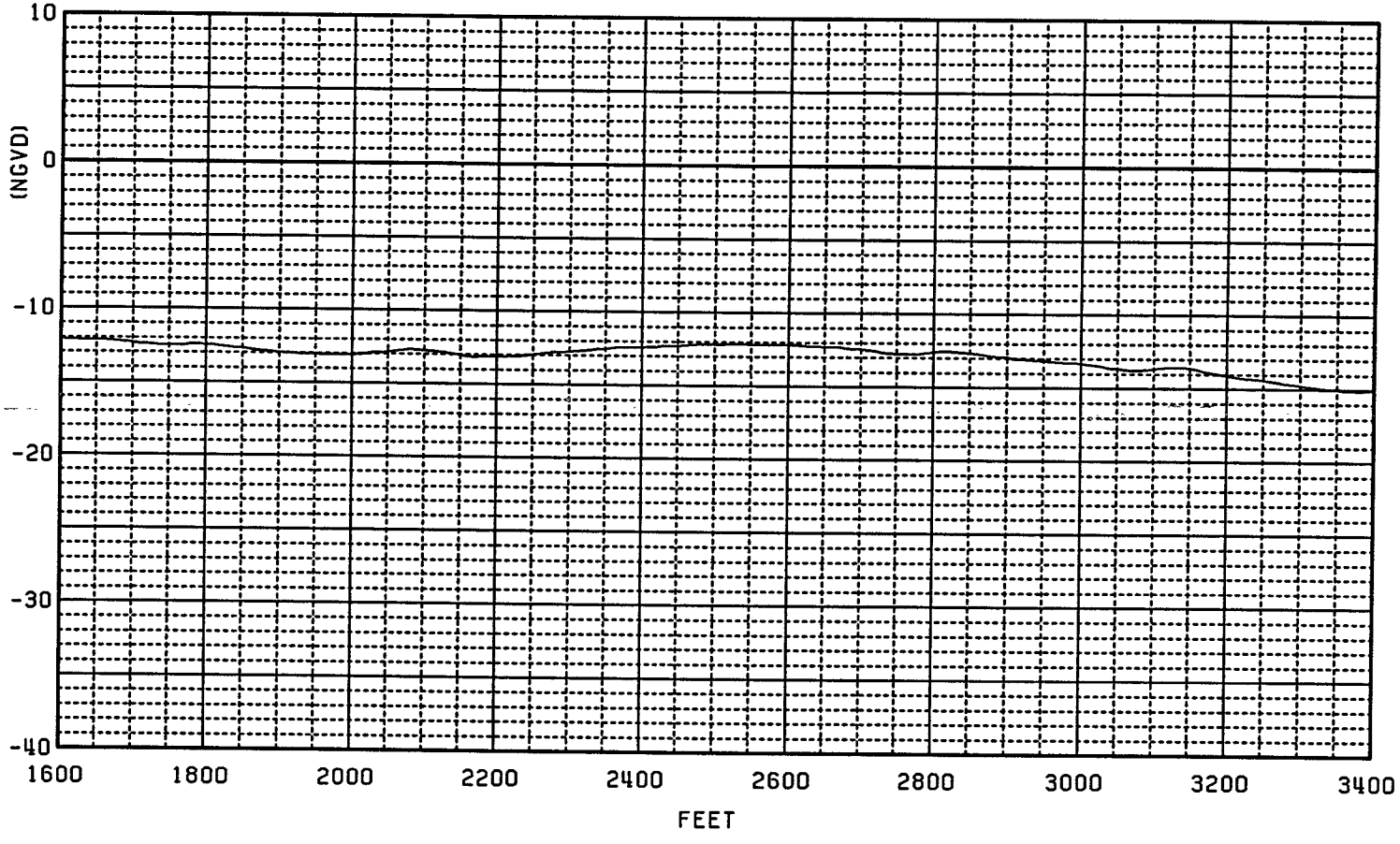
RANGE: R-107A 4/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

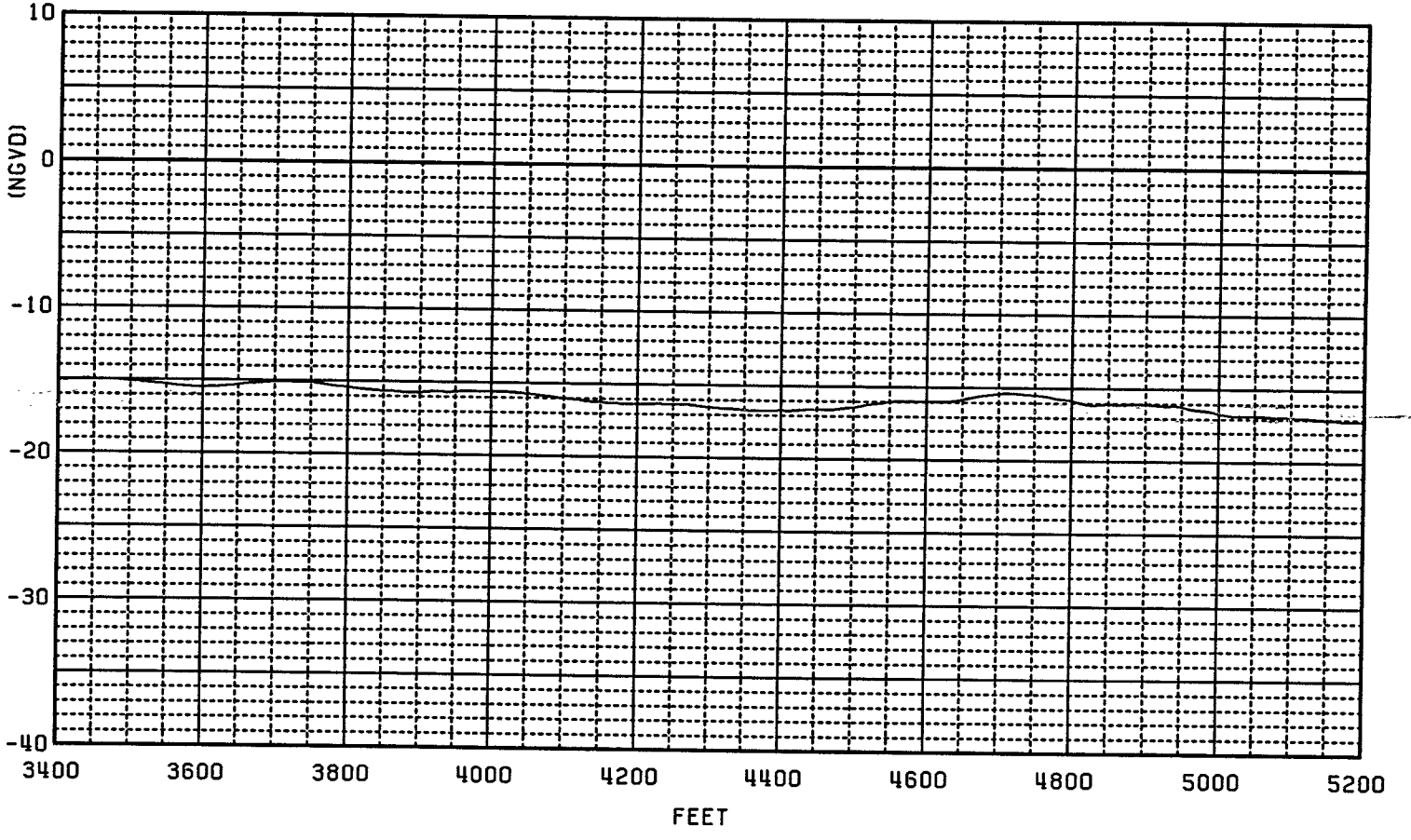
RANGE: R-108G 1/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

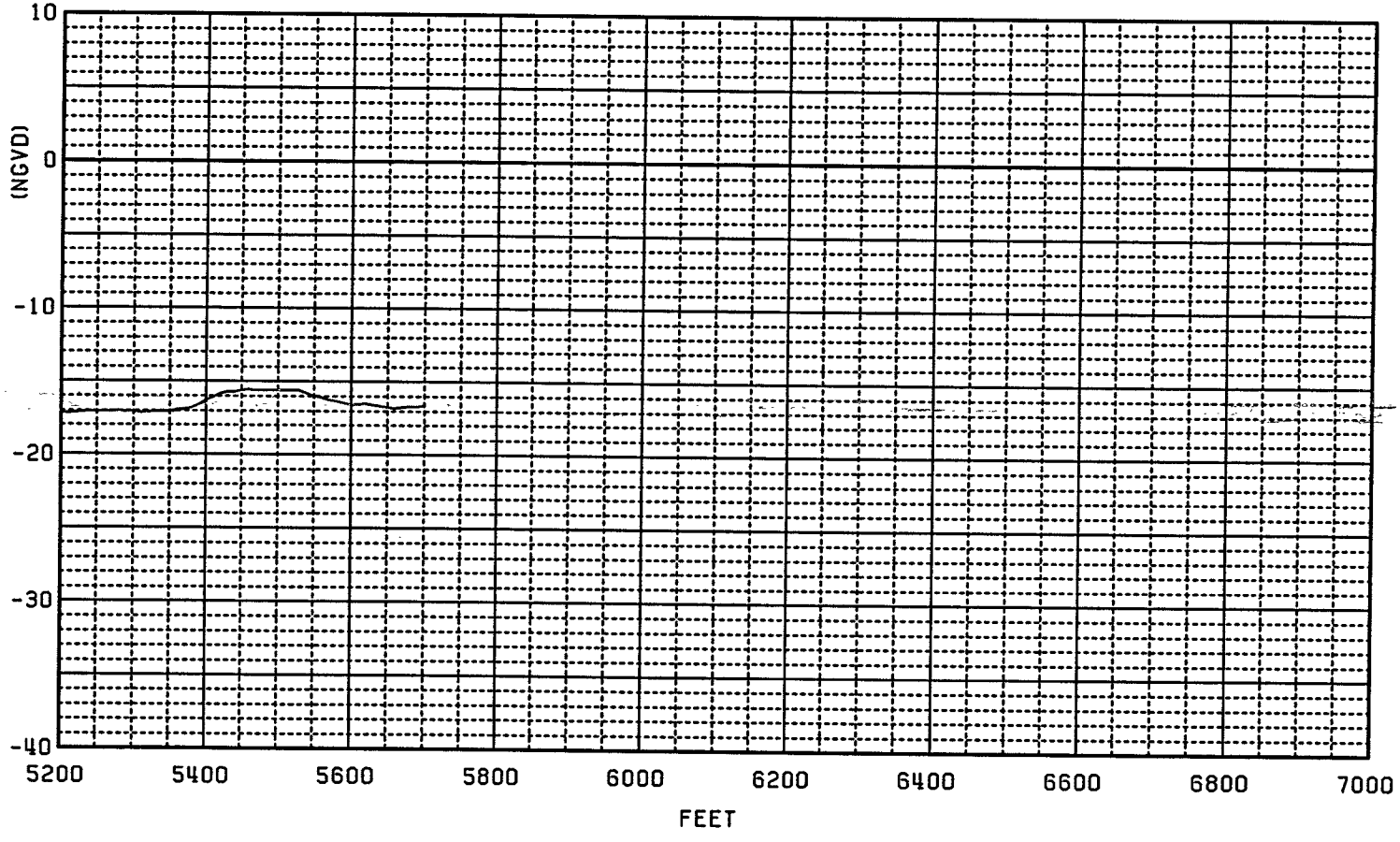
RANGE: R-108G 2/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

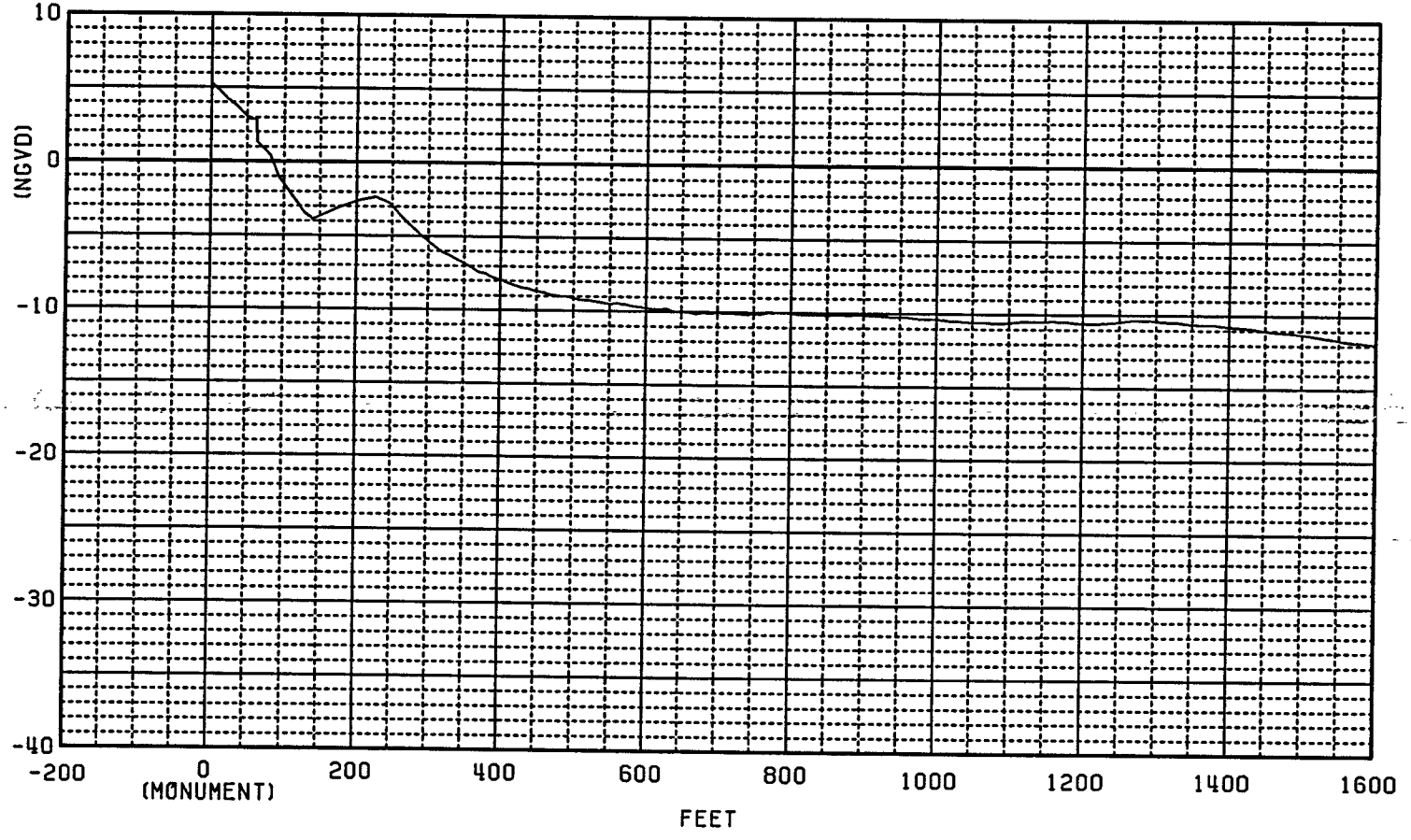
RANGE: R-108G 3/4
SURVEY BEAR (MAG. N): 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

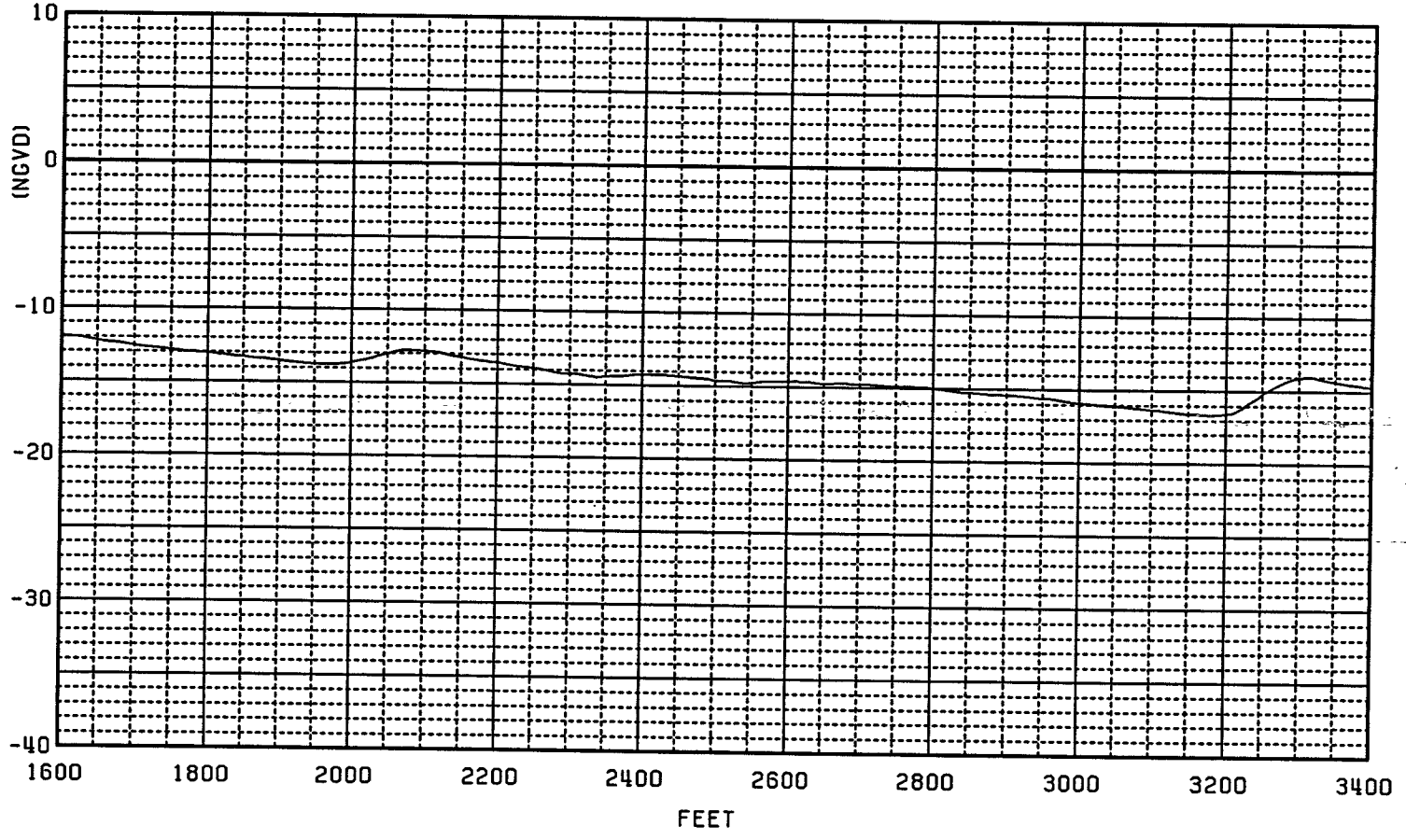
RANGE: R-108G 4/4
SURVEY BEAR (MAG. N) : 240
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

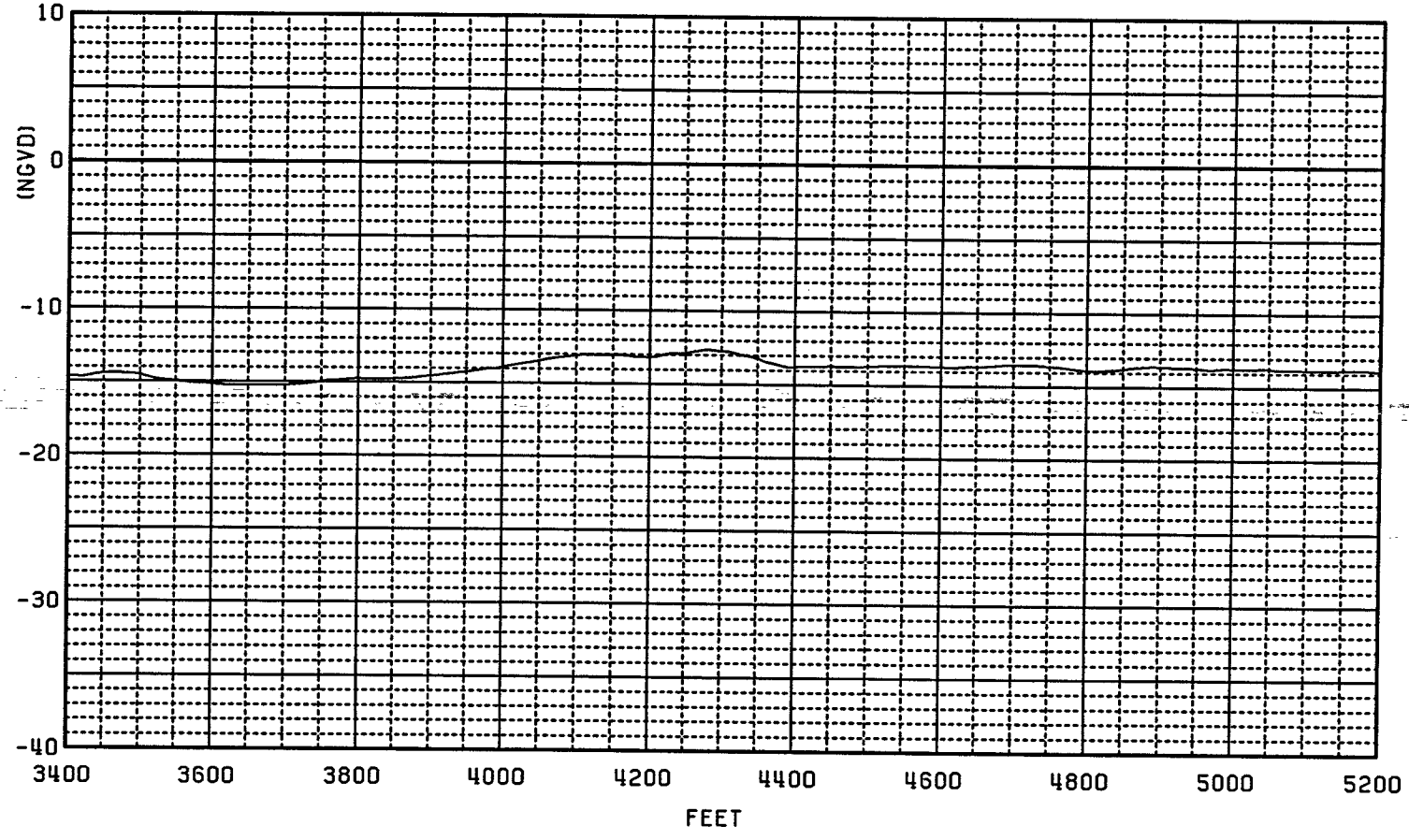
RANGE: R-109 1/4
SURVEY BEAR (MAG. N) : 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

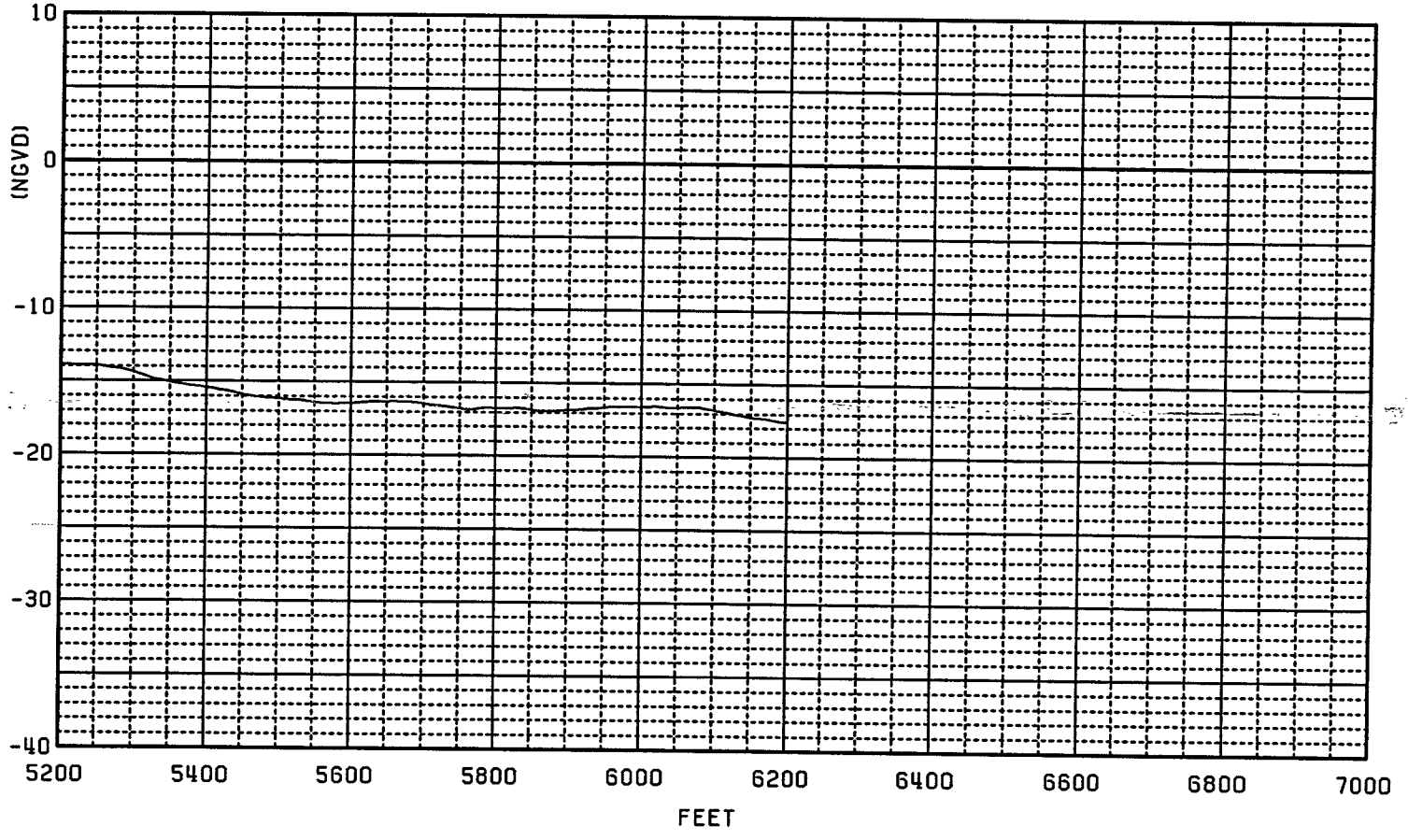
RANGE: R-109 2/4
SURVEY BEAR (MAG. N) : 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

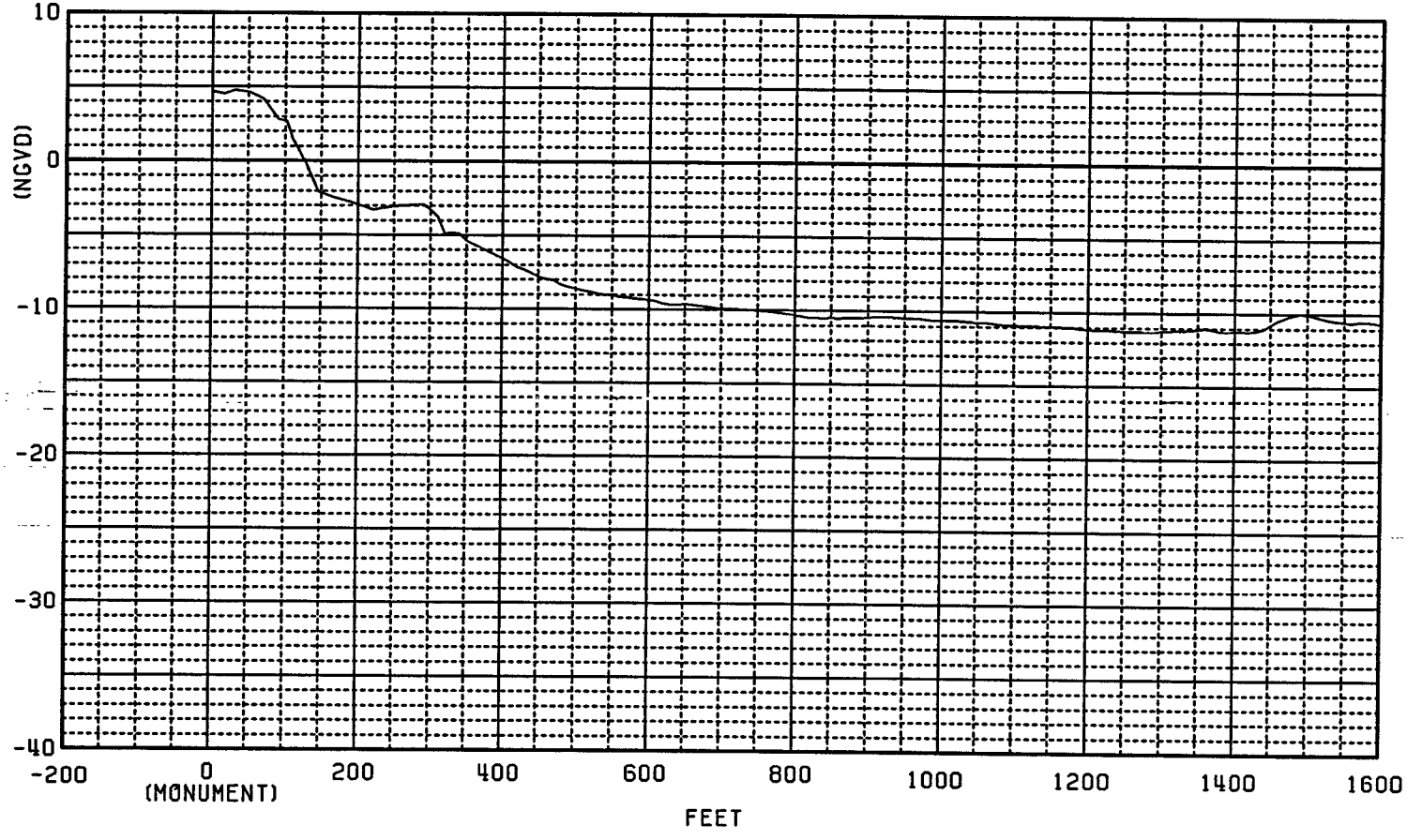
RANGE: R-109 3/4
SURVEY BEAR (MAG. N) : 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

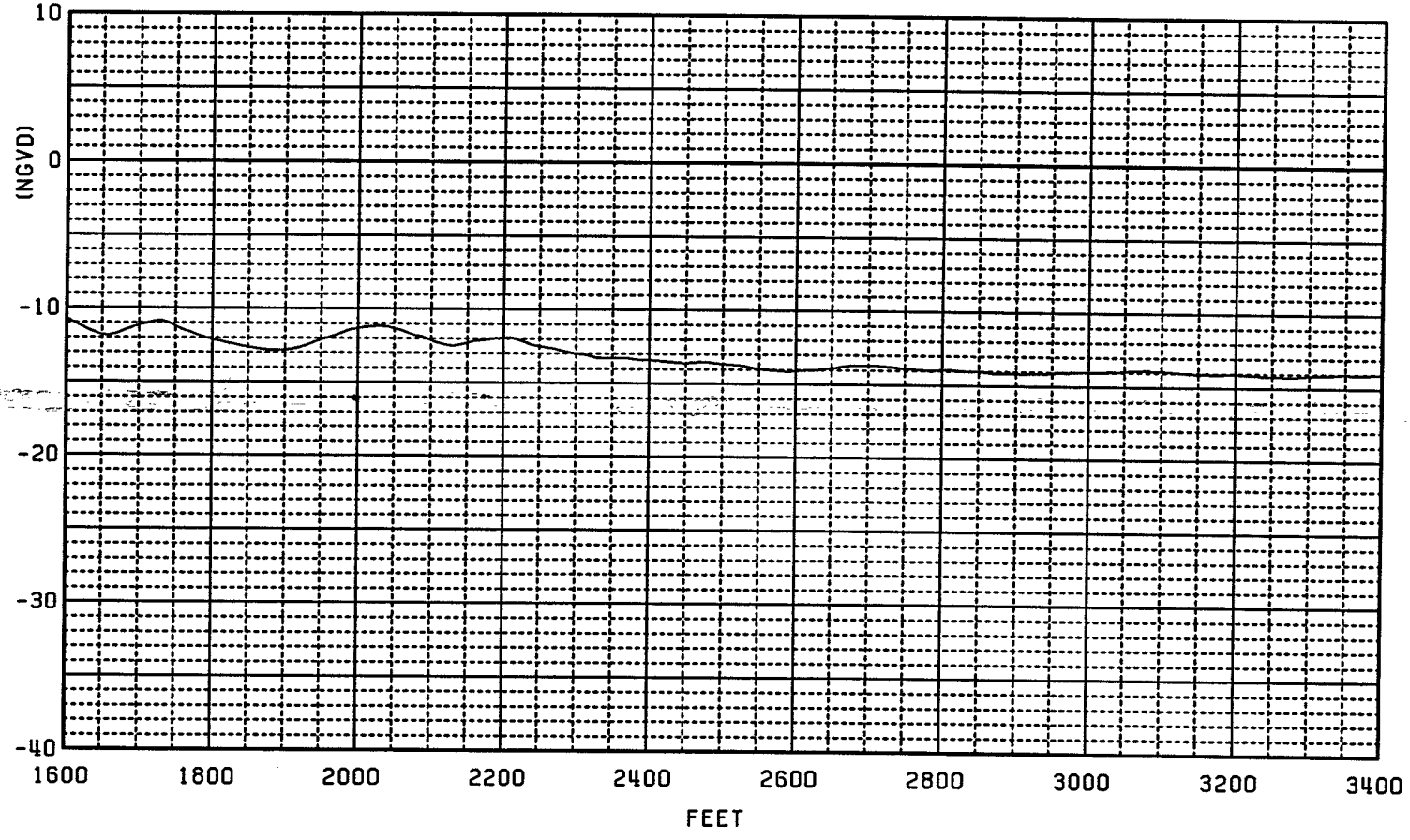
RANGE: R-109 4/4
SURVEY BEAR (MAG. N) : 230
BEACH SURVEY: 23NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

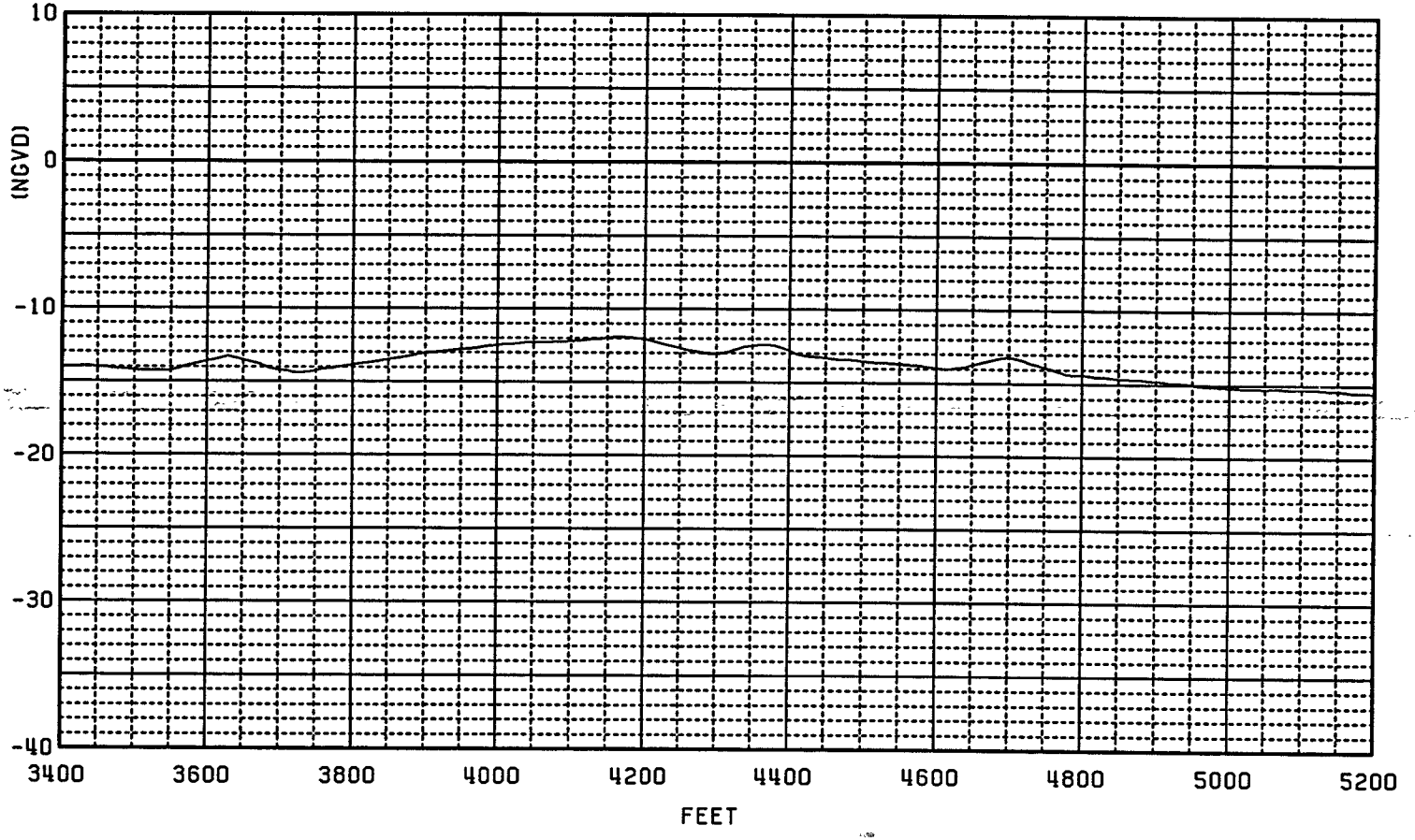
RANGE: R-110G 1/4
SURVEY BEAR (MAG. N) : 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

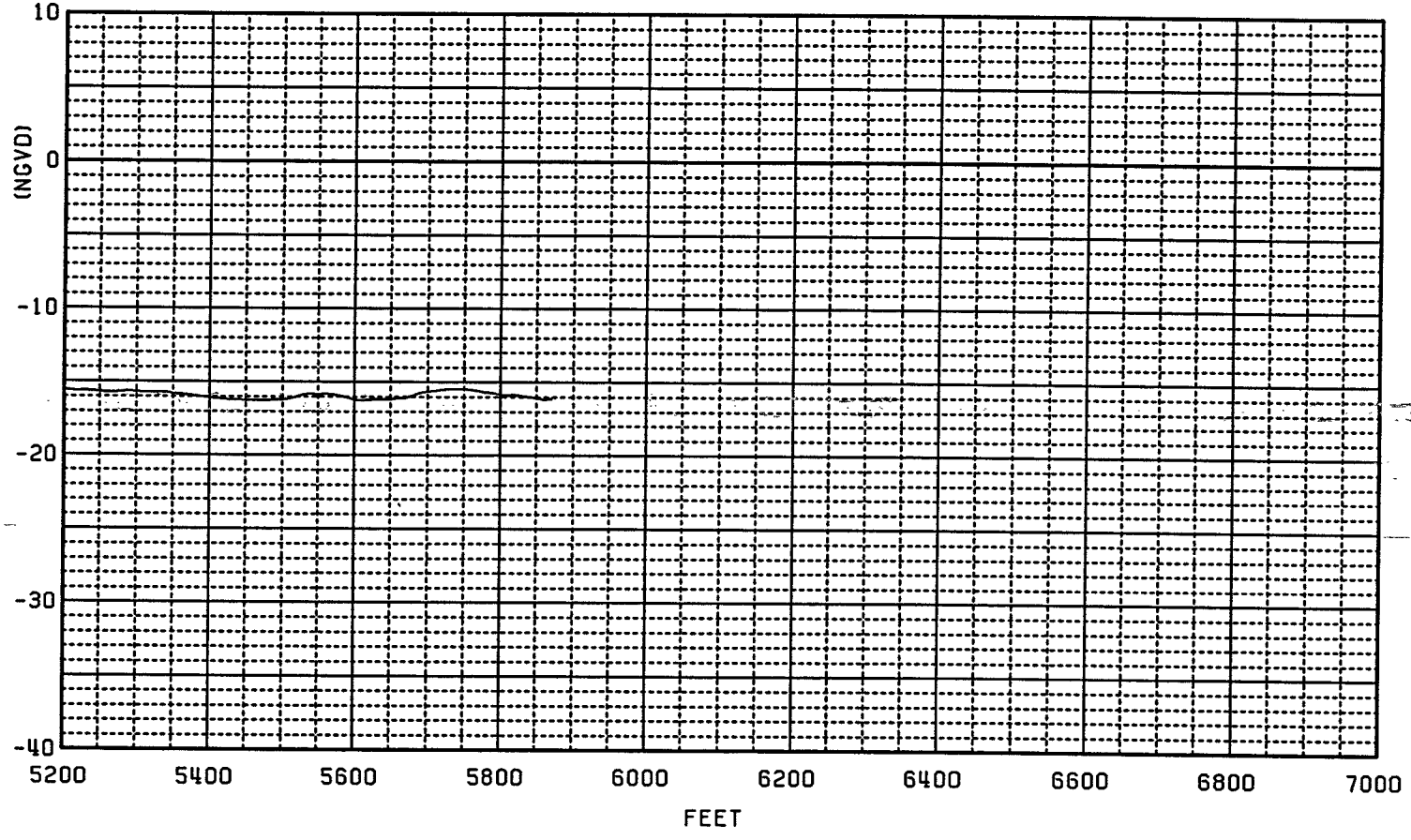
RANGE: R-110G 2/4
SURVEY BEAR (MAG. N): 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

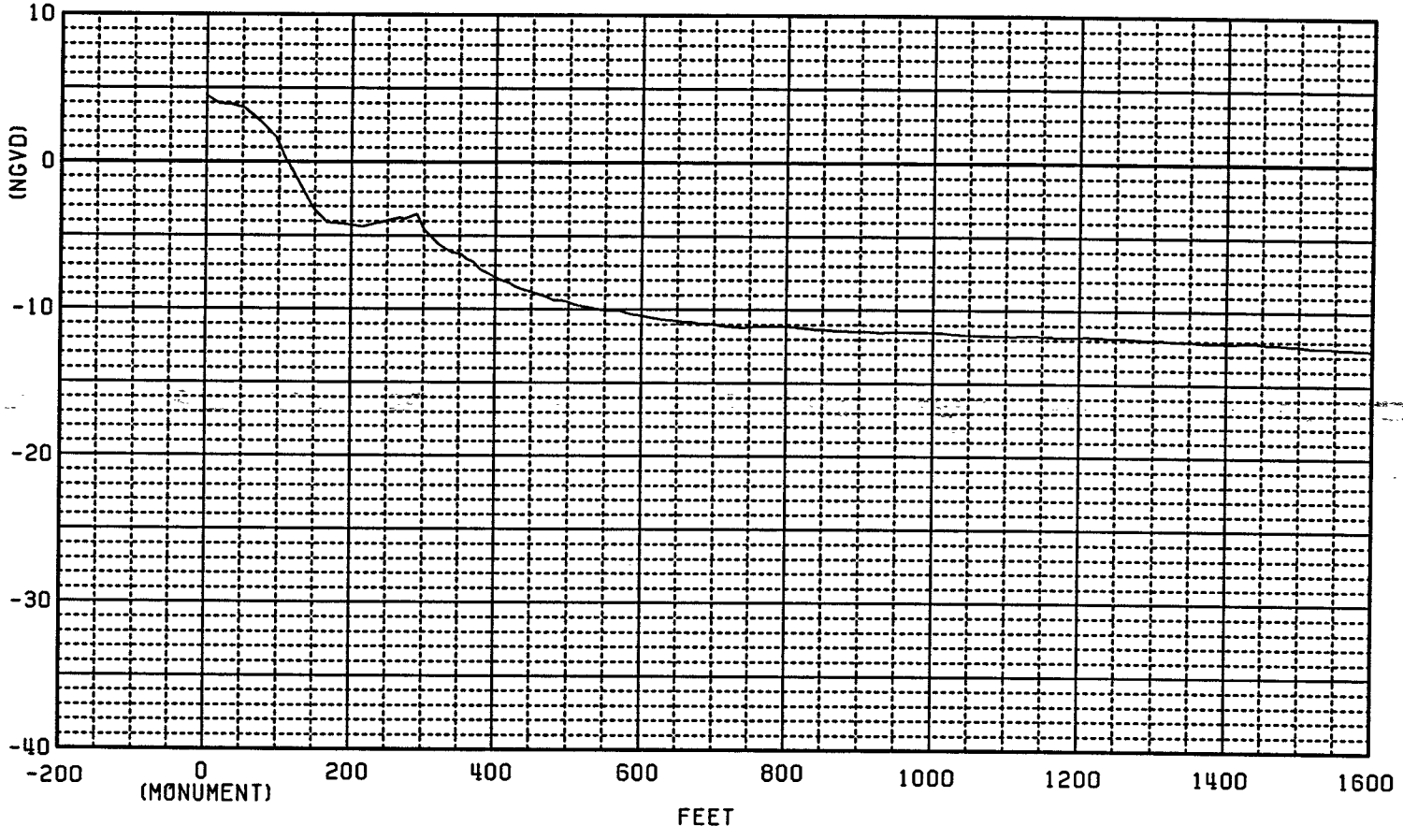
RANGE: R-110C 3/4
SURVEY BEAR (MAG. N) : 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

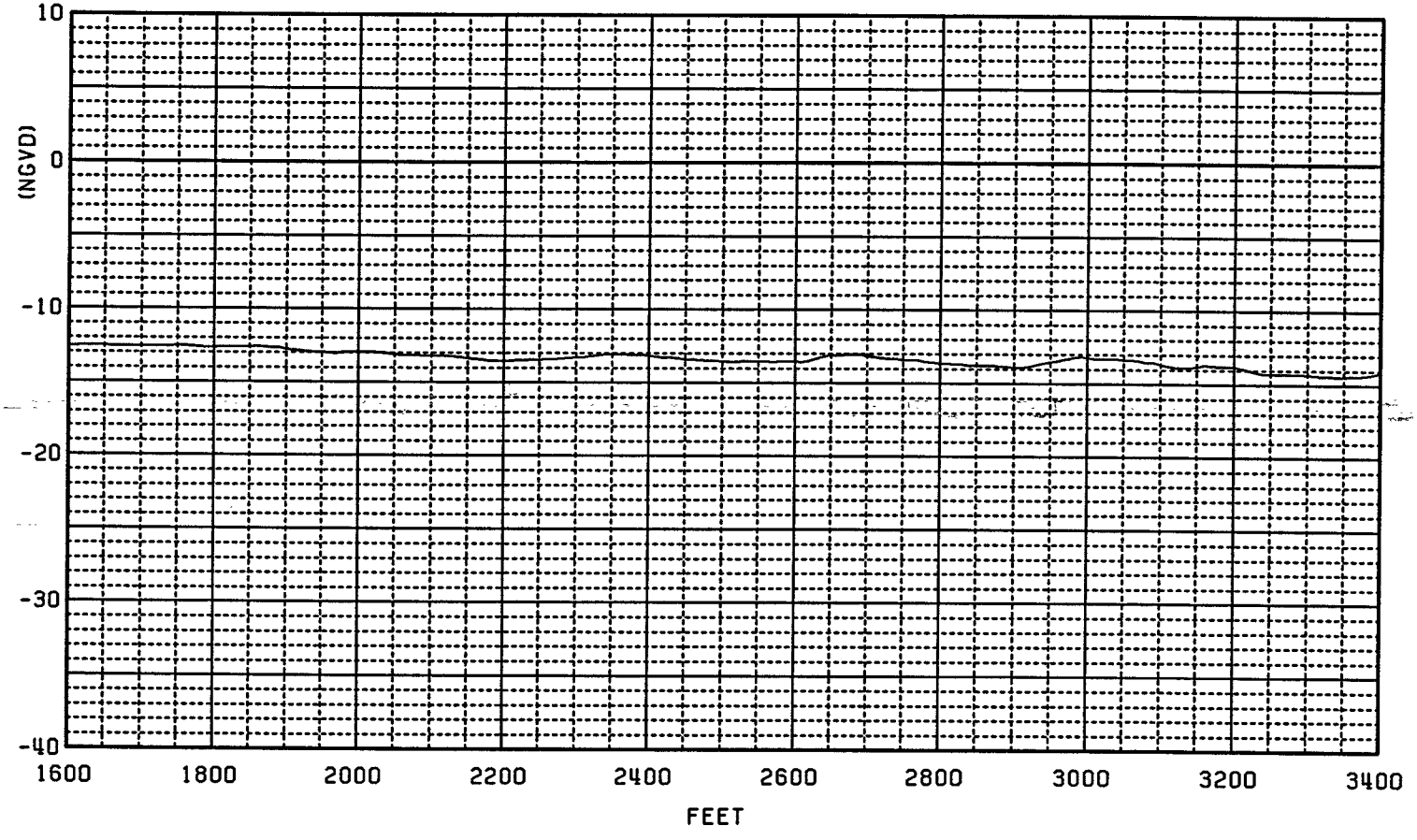
RANGE: R-110G 4/4
SURVEY BEAR (MAG. N) : 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

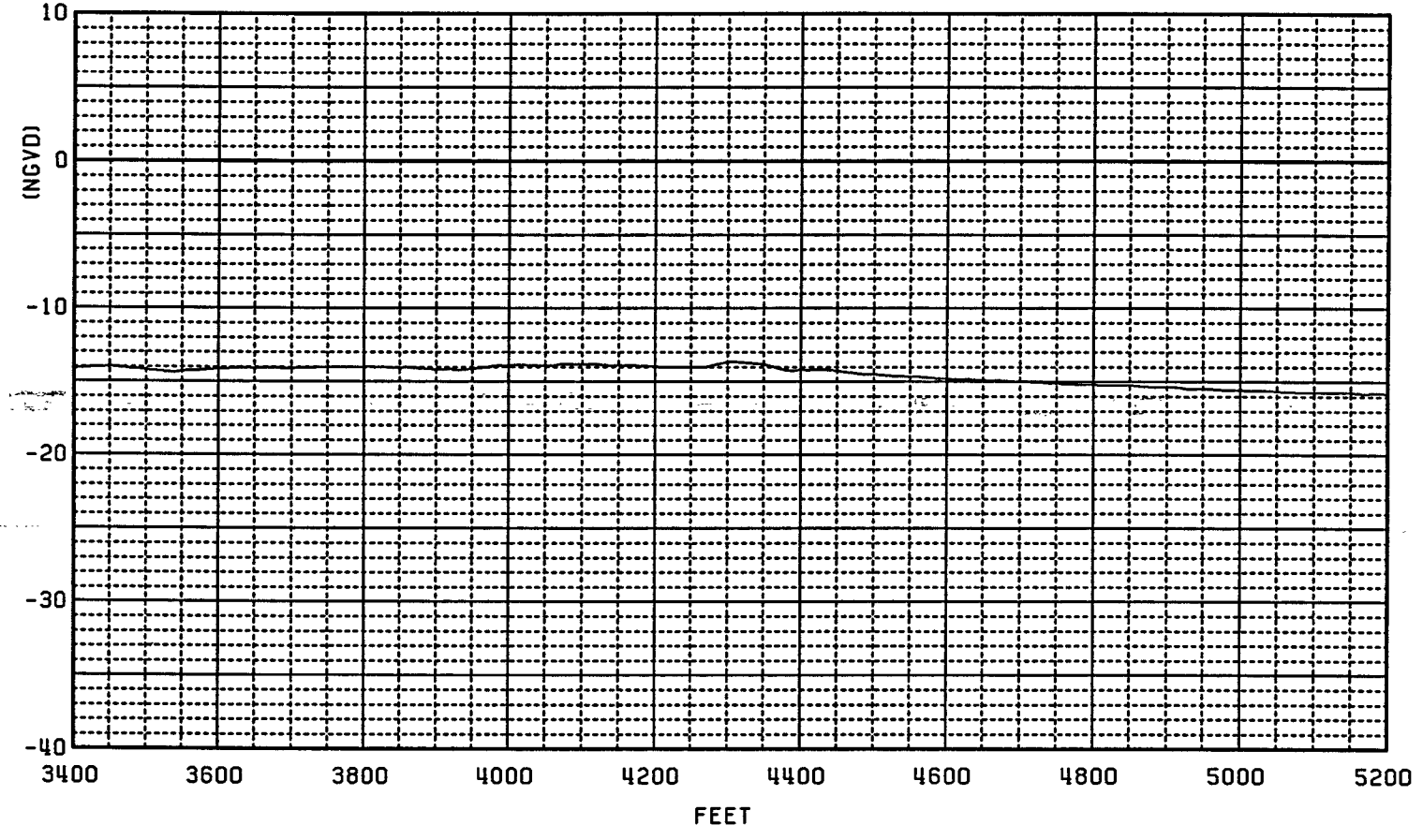
RANGE: R-111G 1/4
SURVEY BEAR (MAG. N) : 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

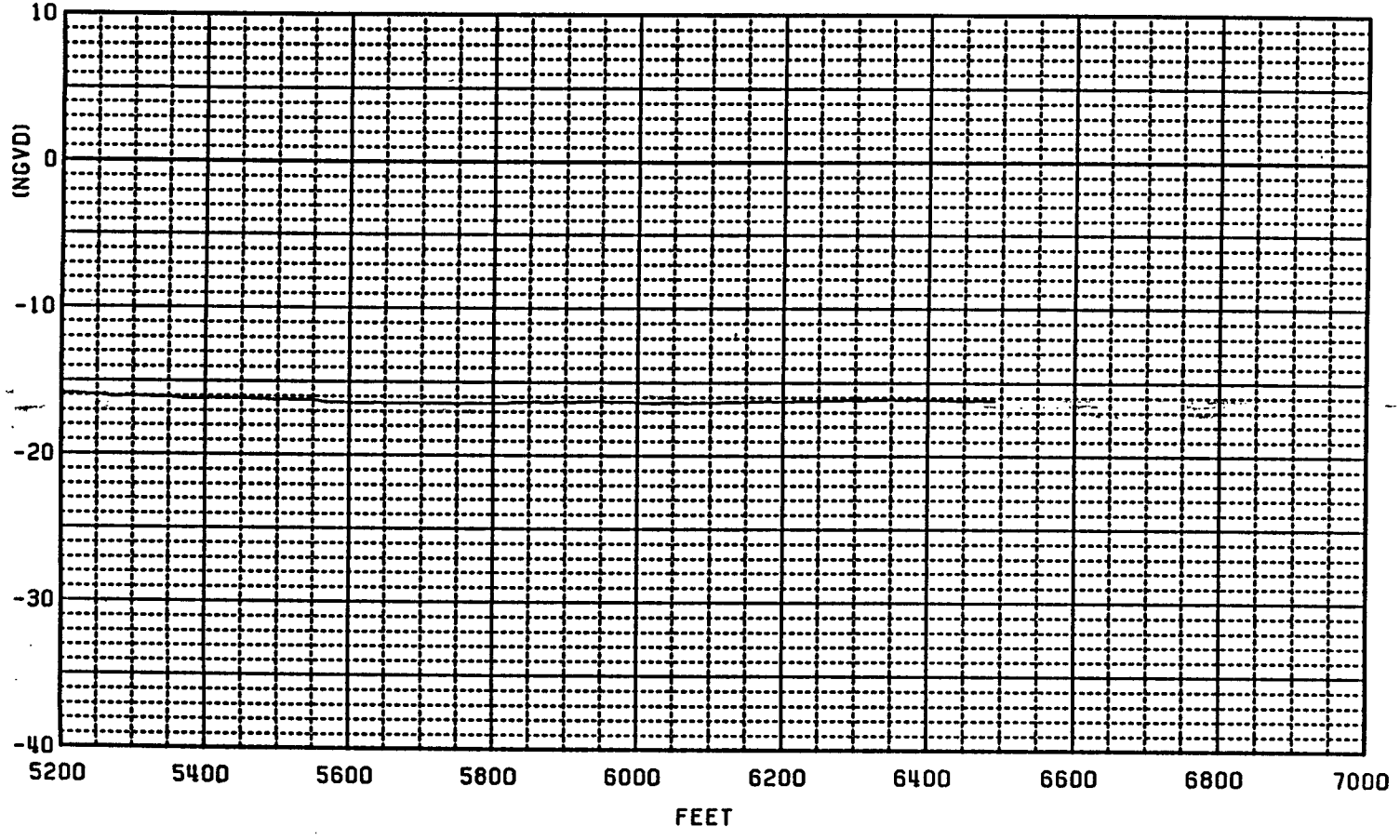
RANGE: R-111G 2/4
SURVEY BEAR (MAG. N): 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-111G 3/4
SURVEY BEAR (MAG. N): 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88




COMBINED PROFILE
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COUNTY: PINELLAS
COASTAL & OCEAN ENG DEPT
UNIVERSITY OF FLORIDA

RANGE: R-111G 4/4
SURVEY BEAR (MAG. N): 220
BEACH SURVEY: 18NOV88
OFFSHORE SURVEY: 08NOV88

# APPENDIX II:

## THE FIRST (JULY 88) AND SECOND (NOV 88) POST-NOURISHMENT PROFILES

# APPENDIX II:
# THE FIRST (JULY 88) AND THIRD (JAN 89) POST-NOURISHMENT PROFILES

## OFFSHORE AND BEACH PROFILE NOTES:

a. All elevations are in feet and tenths and are referred to N.G.V.D. 1929.

b. Coordinates are based on the standard plane rectangular coordinate system for the state of Florida.

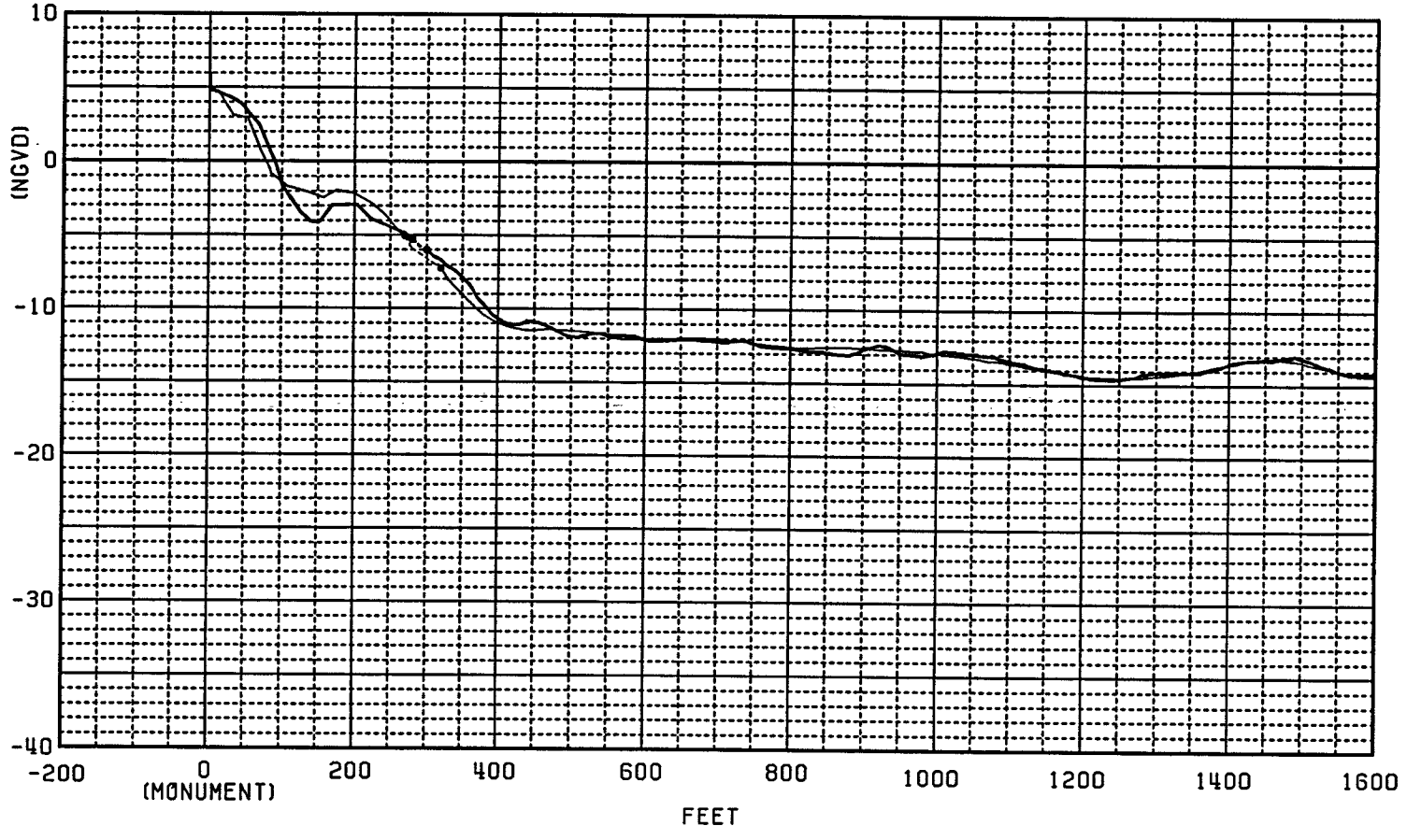
c. Azimuths (0 = north) are clockwise relative to magnetic north.

d. Profile azimuths were established for the pre-nourished beaches representing a shore normal strike at that time.

e. D.N.R. monuments are standard bronze disks set in concrete.

f. USF Coastal Research Lab 'G' monuments represent surveyed gulfward markers of the Corps of Engineers monuments.

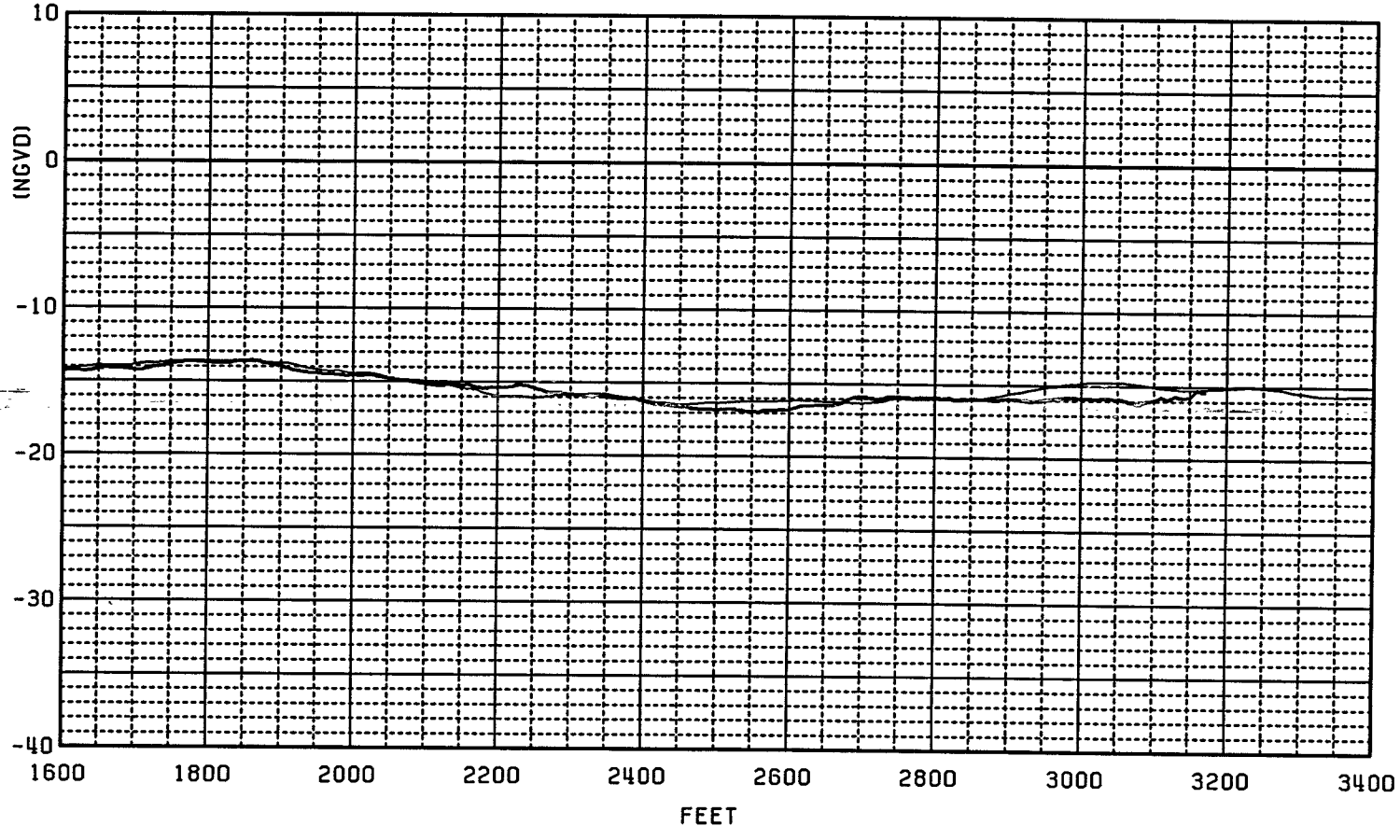
g. Plotted offshore profiles begin at the DNR/USF-'G' monuments located on the seawall and extend southward.




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

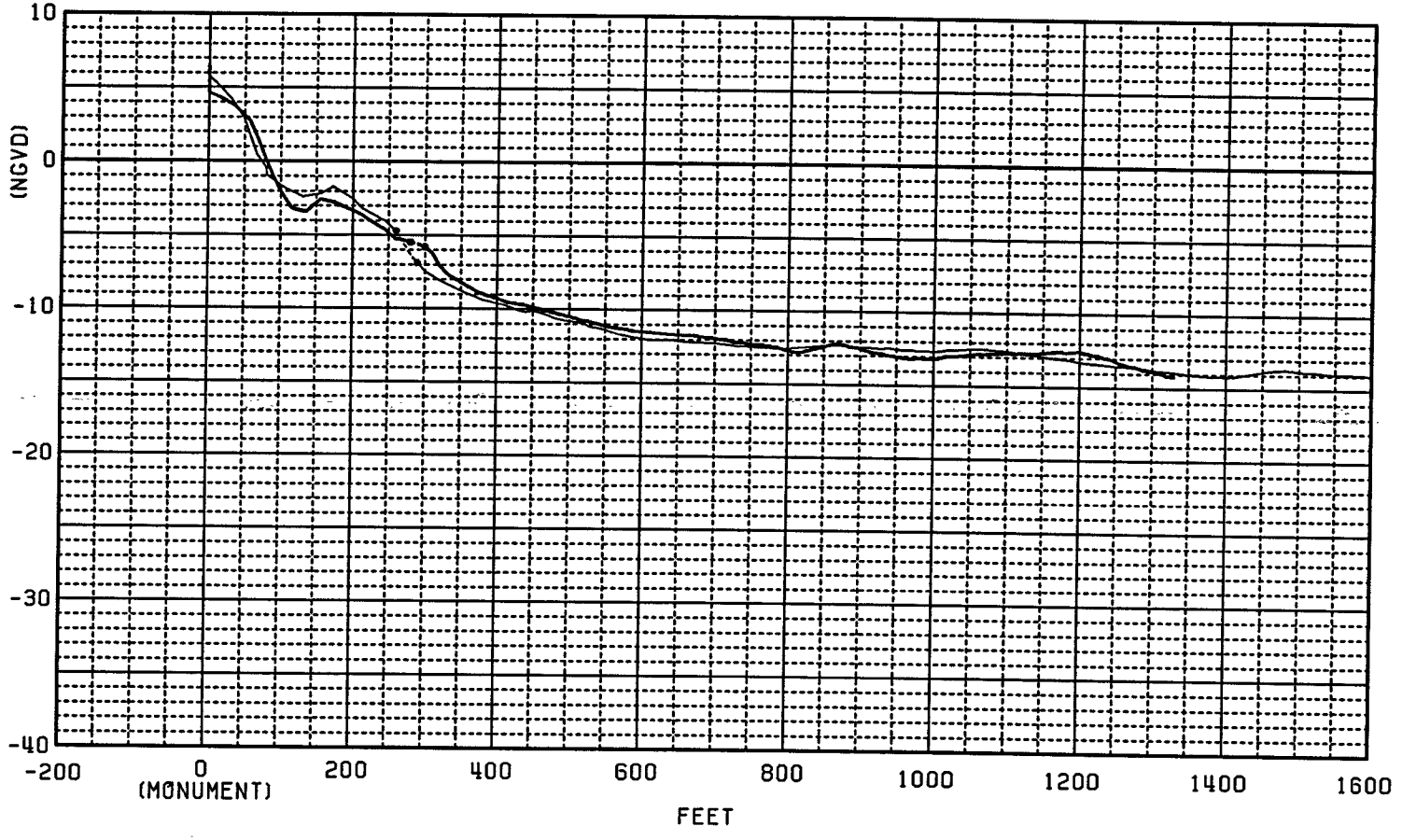
RANGE: R-96 1/2
SURVEY BEAR (MAG. N): 255
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

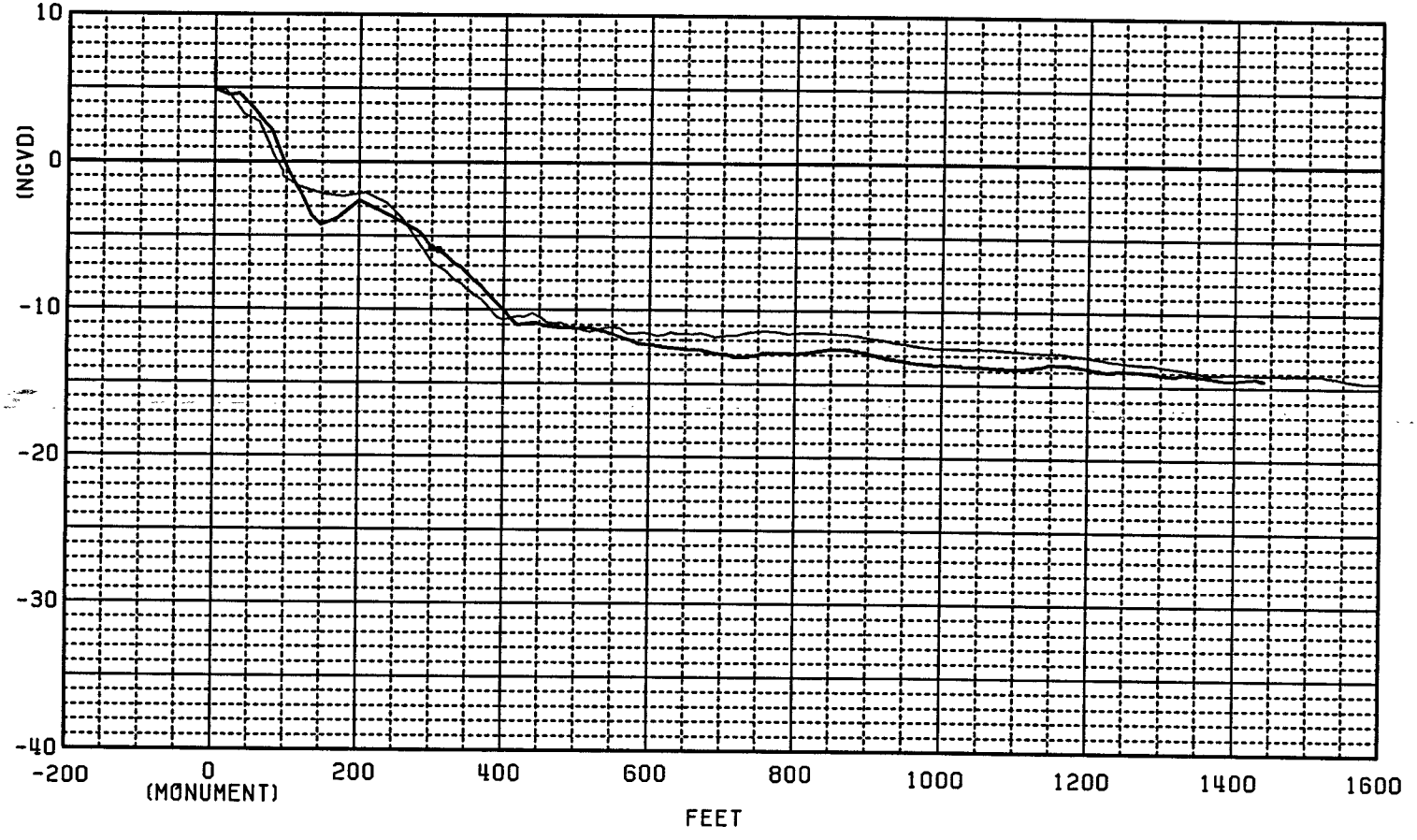
RANGE: R-96 2/2
SURVEY BEAR (MAG. N): 255
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

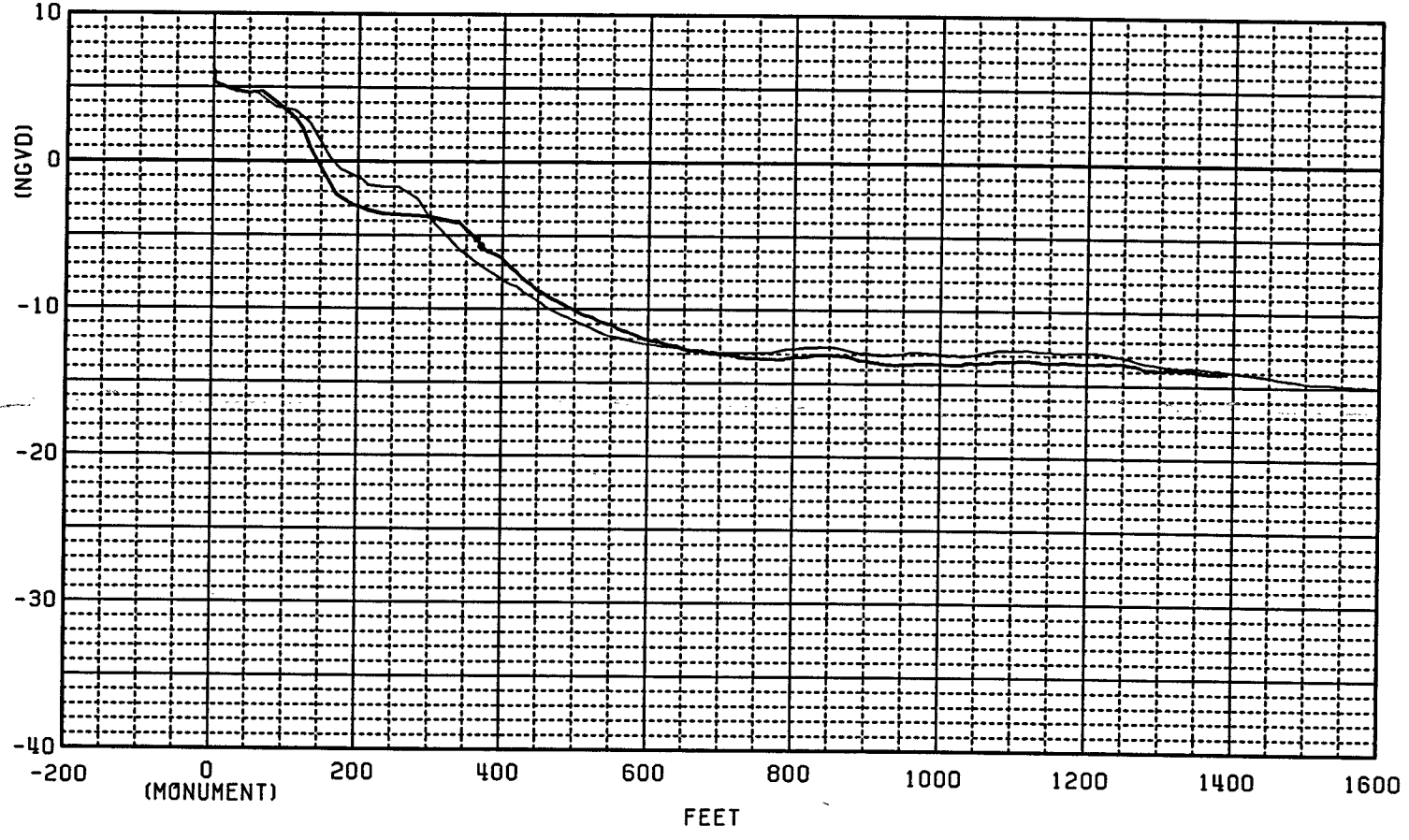
RANGE: R-97 1/1
SURVEY BEAR (MAG. N) : 250
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

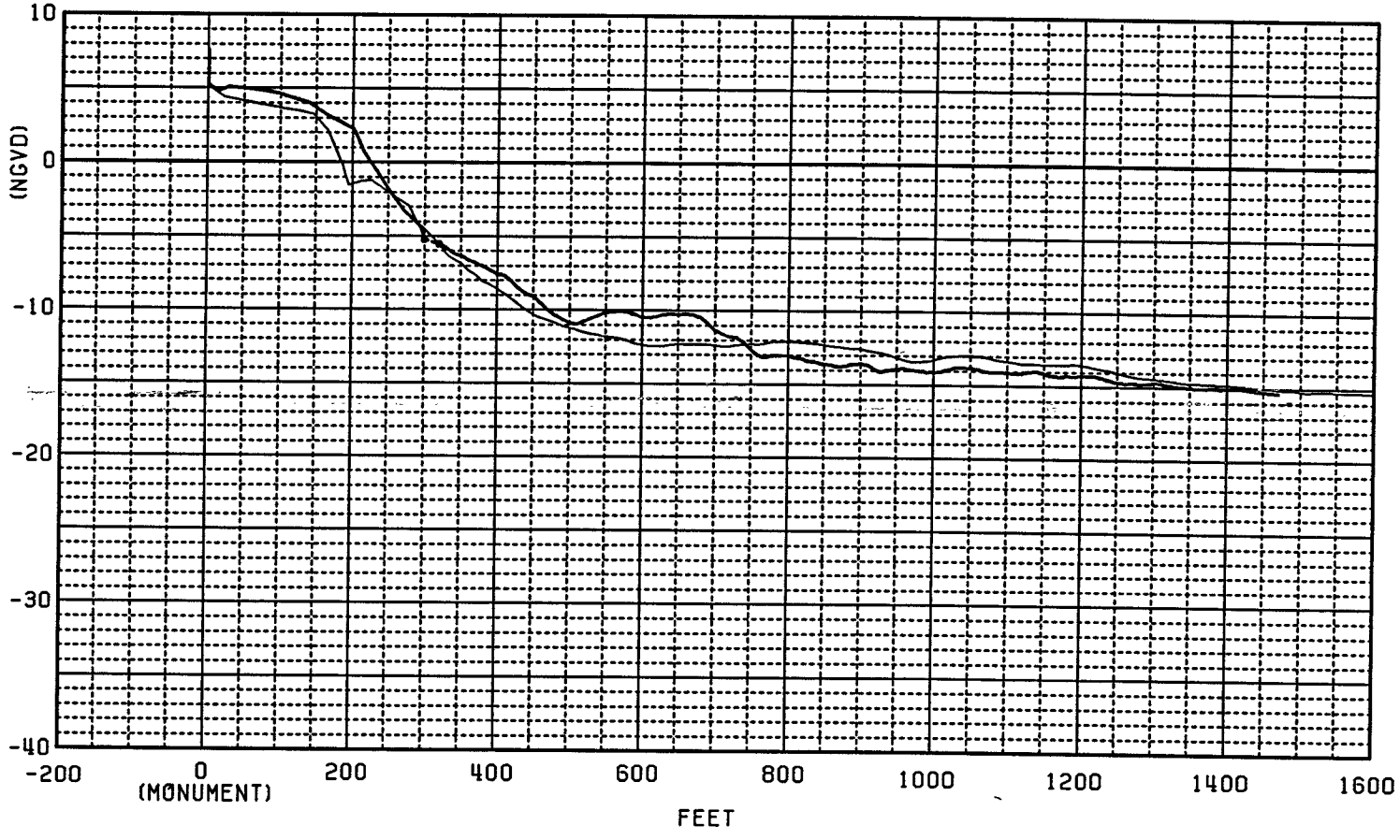
RANGE: R-98G 1/1
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

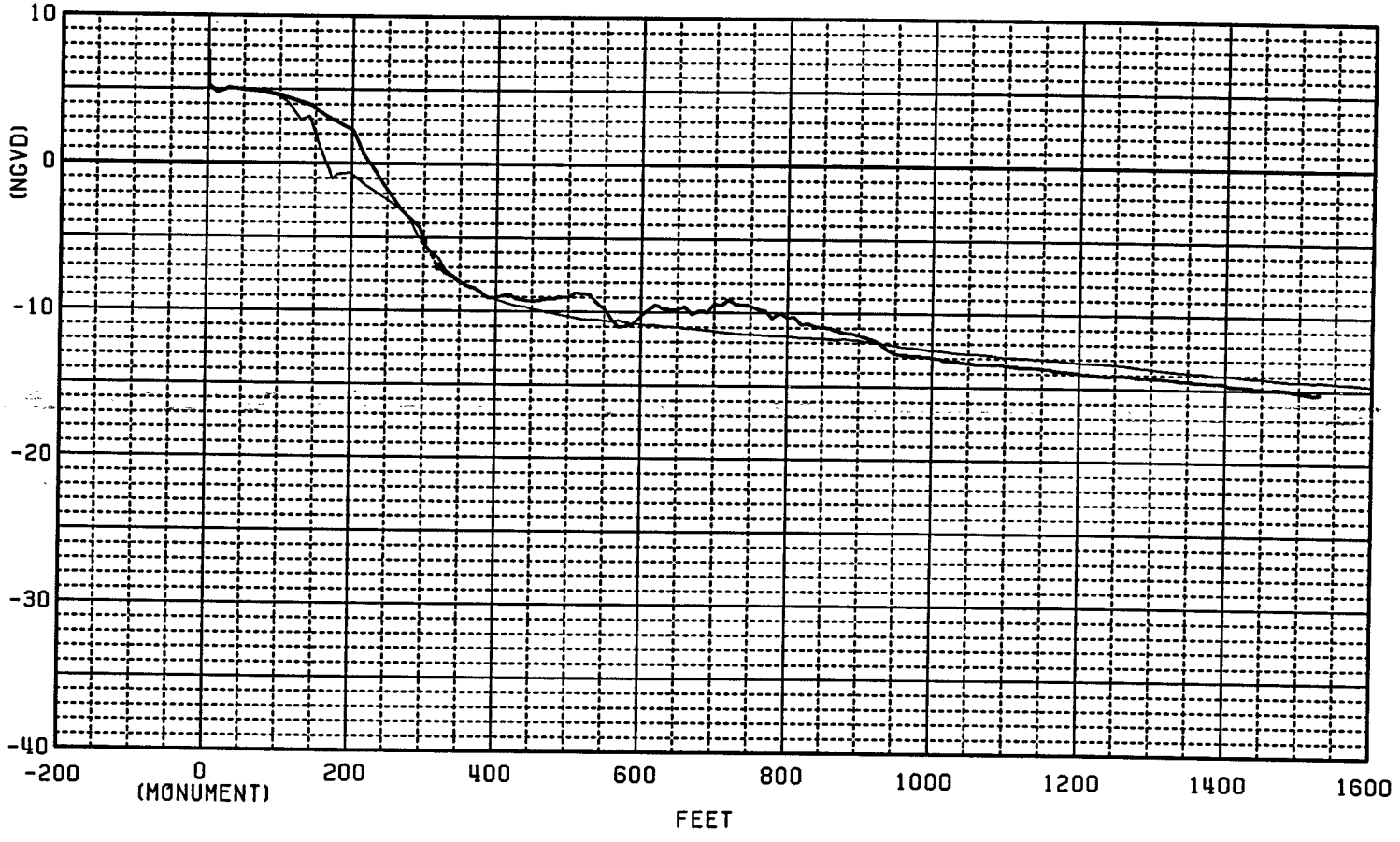
RANGE: T-98A 1/1
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

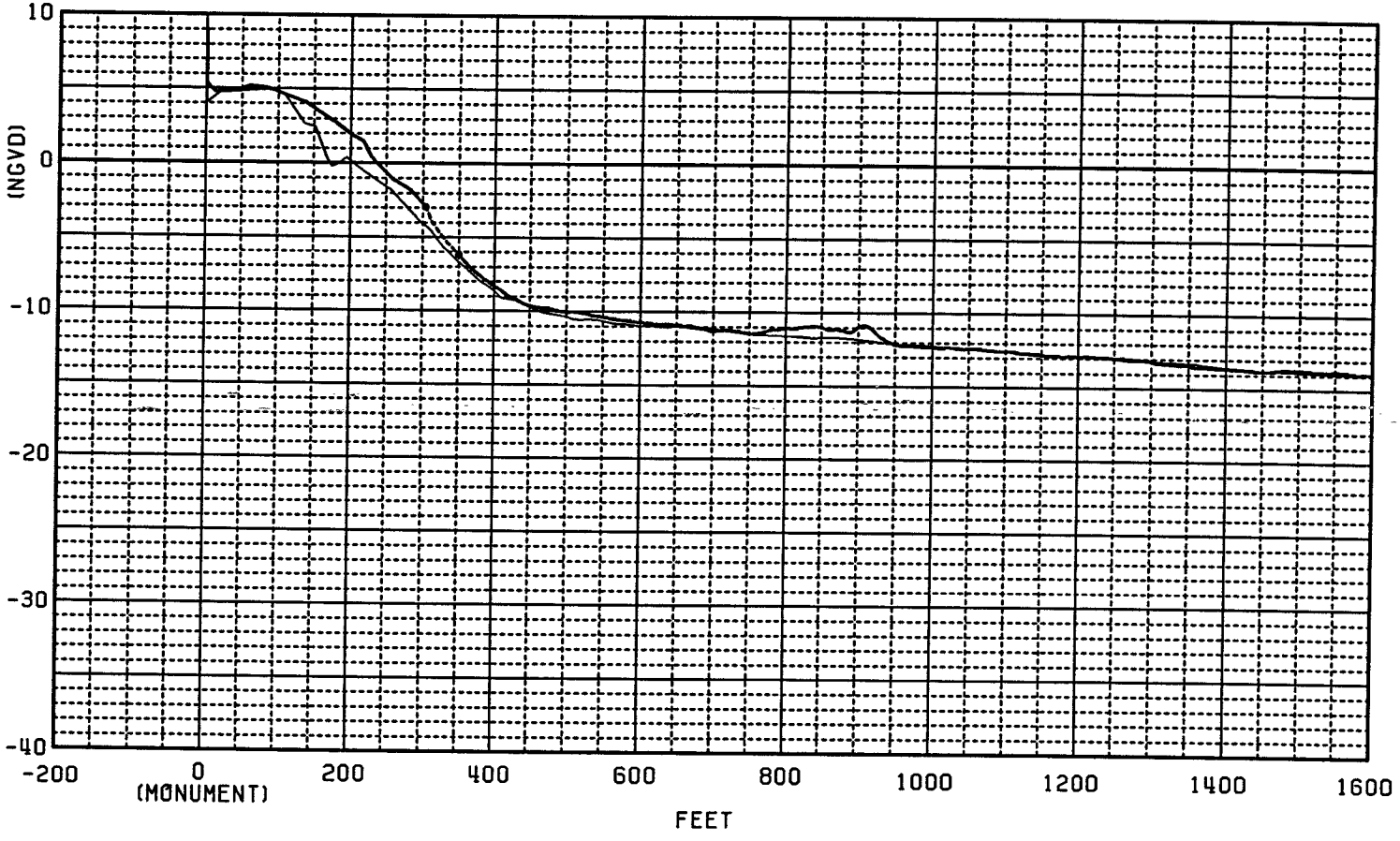
RANGE: R-99G 1/1
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS

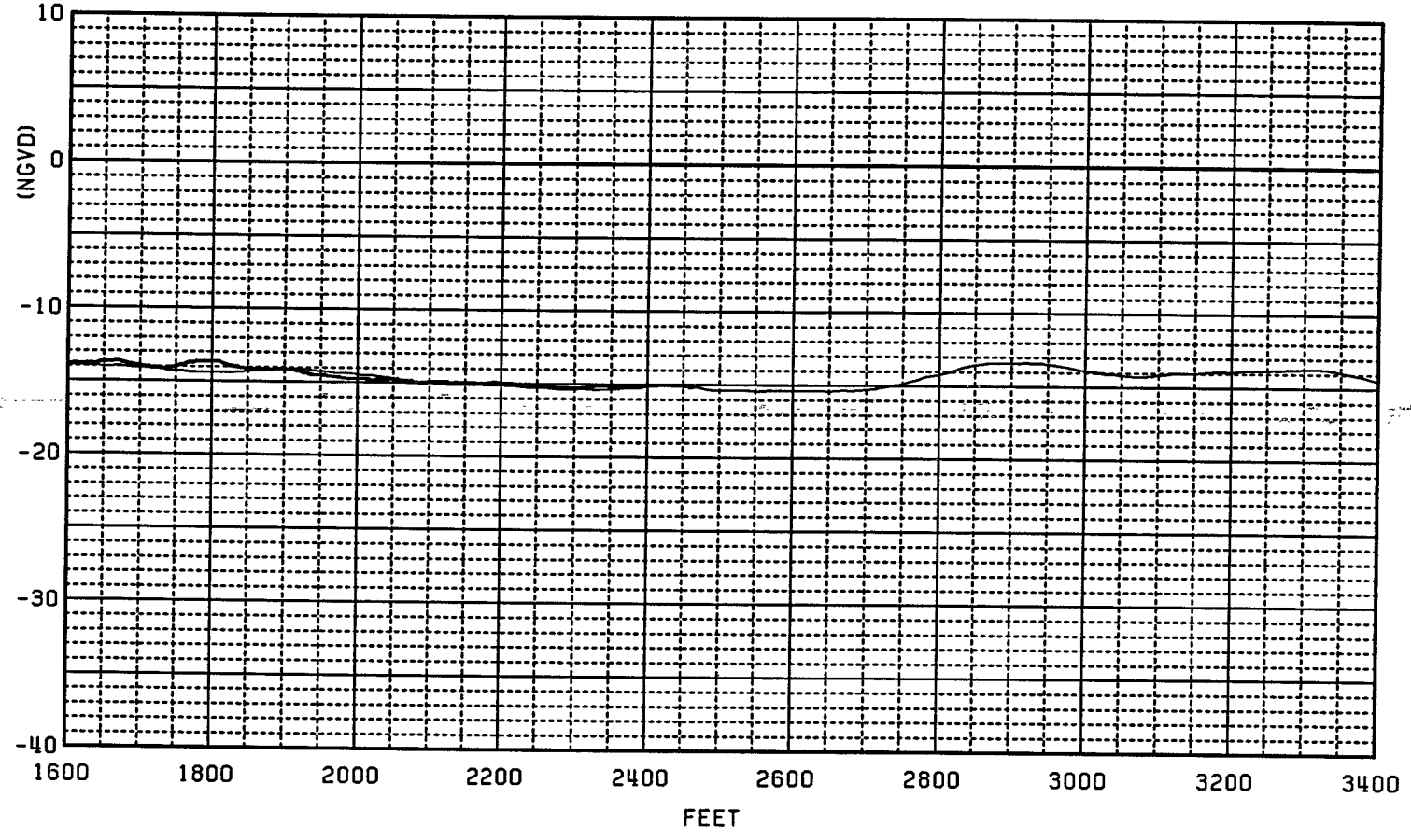



COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-99A 1/1
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS

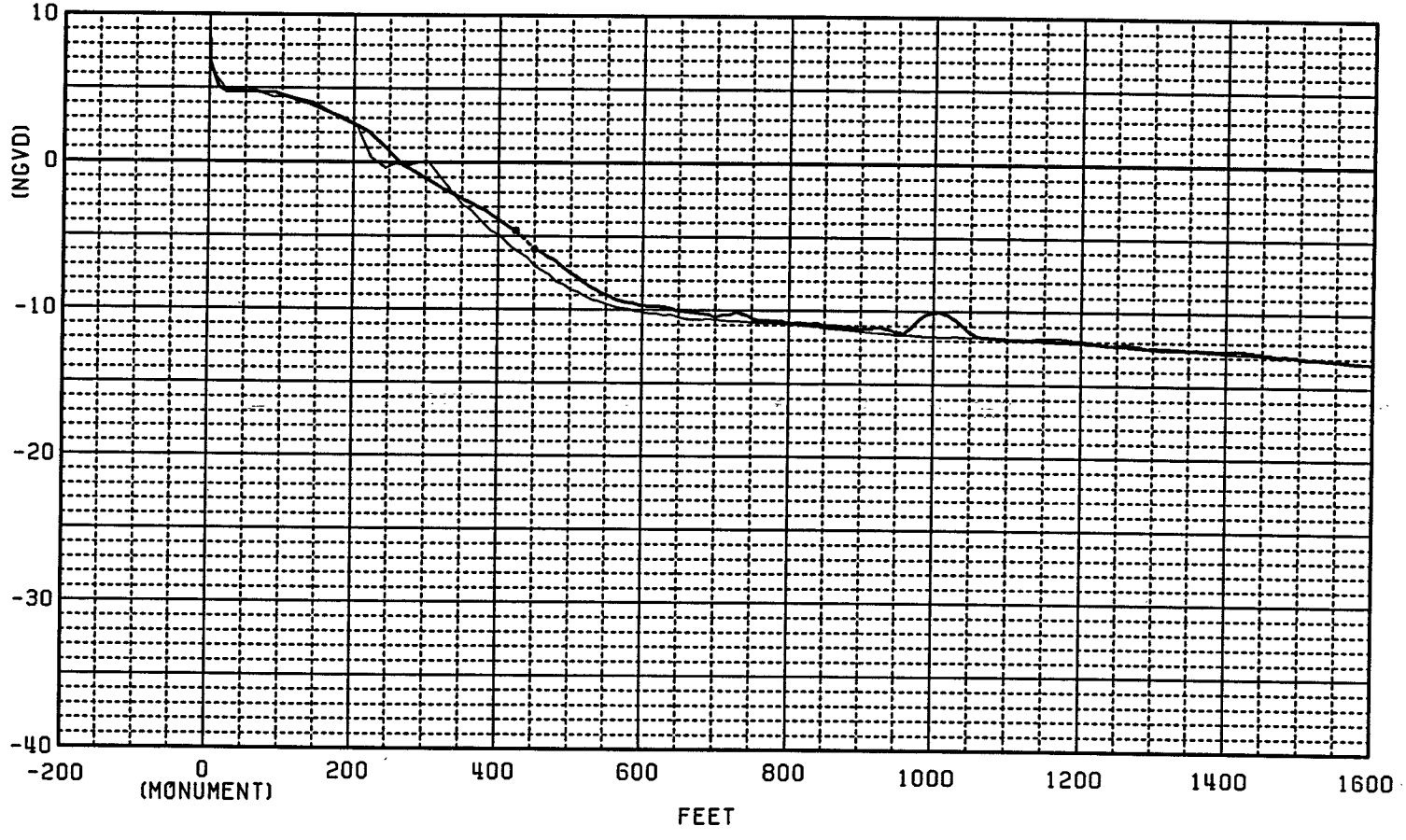

10
0
-10
-20
-30
-40
(NGVD)
-200
0
(MONUMENT)
200
400
600
800
1000
1200
1400
1600
FEET
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-100 1/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE ( NOV88 )
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE ( JUL88 )
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: T-100 2/2
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS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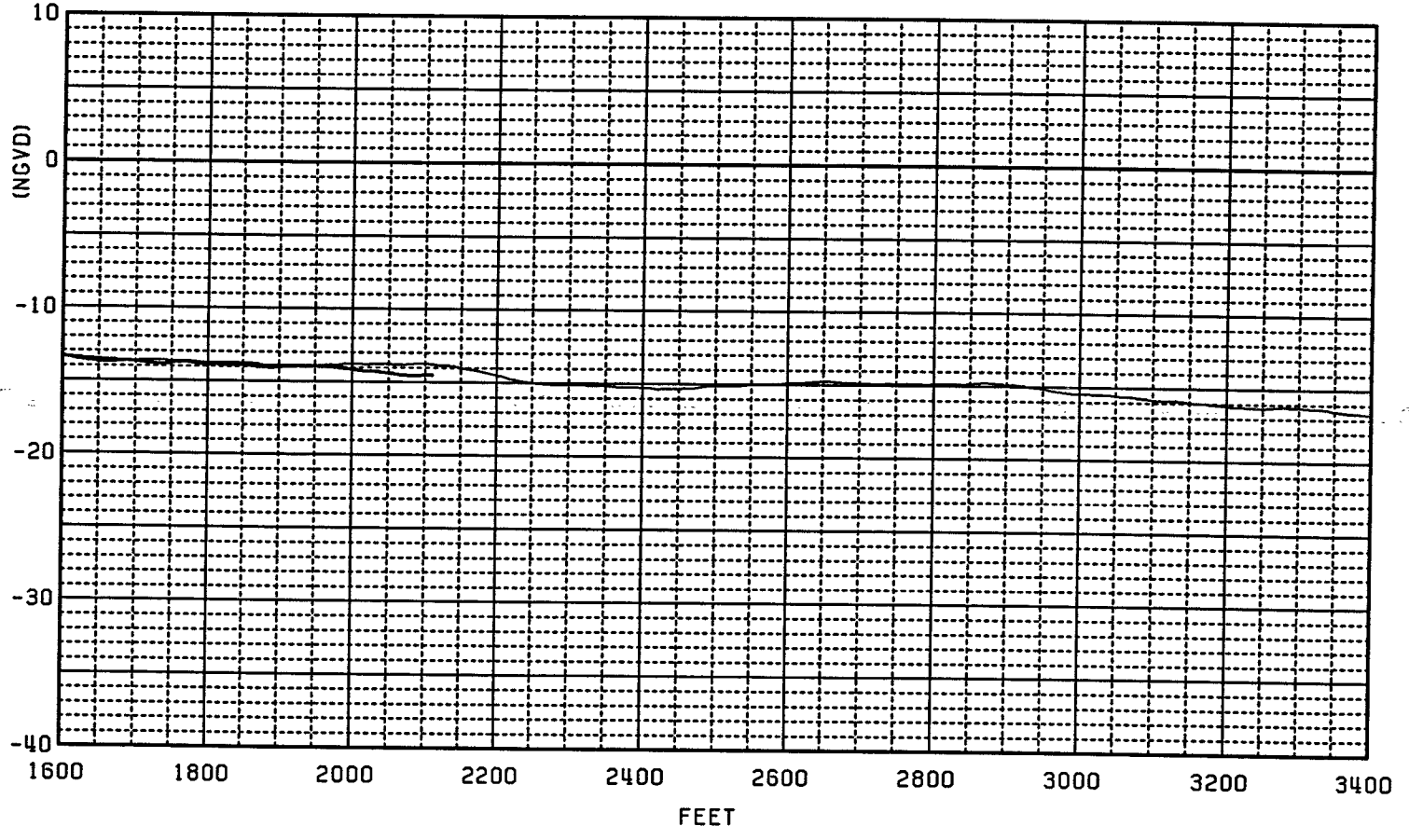
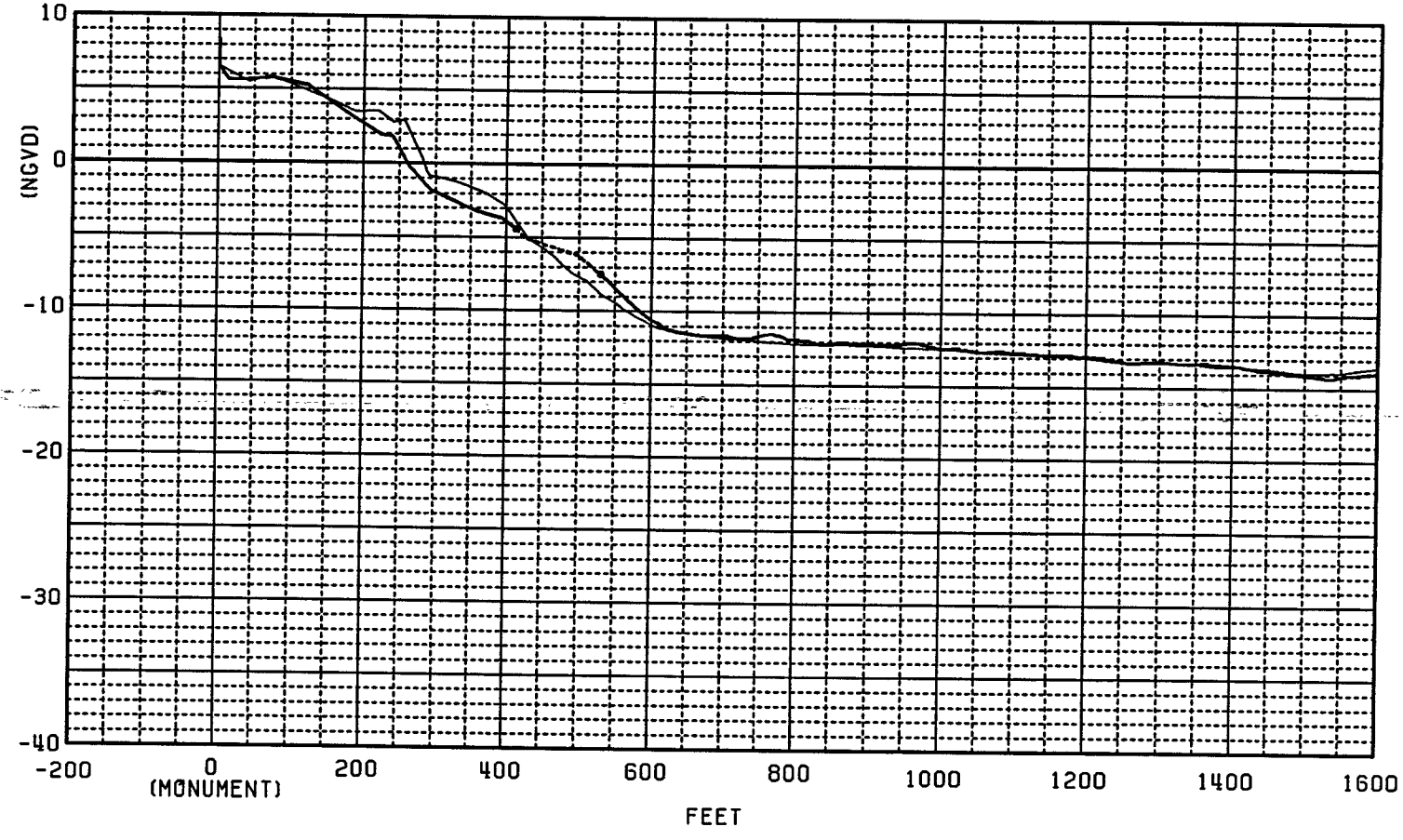
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-100A 1/2
SURVEY BEAR (MAG. N) : 260
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

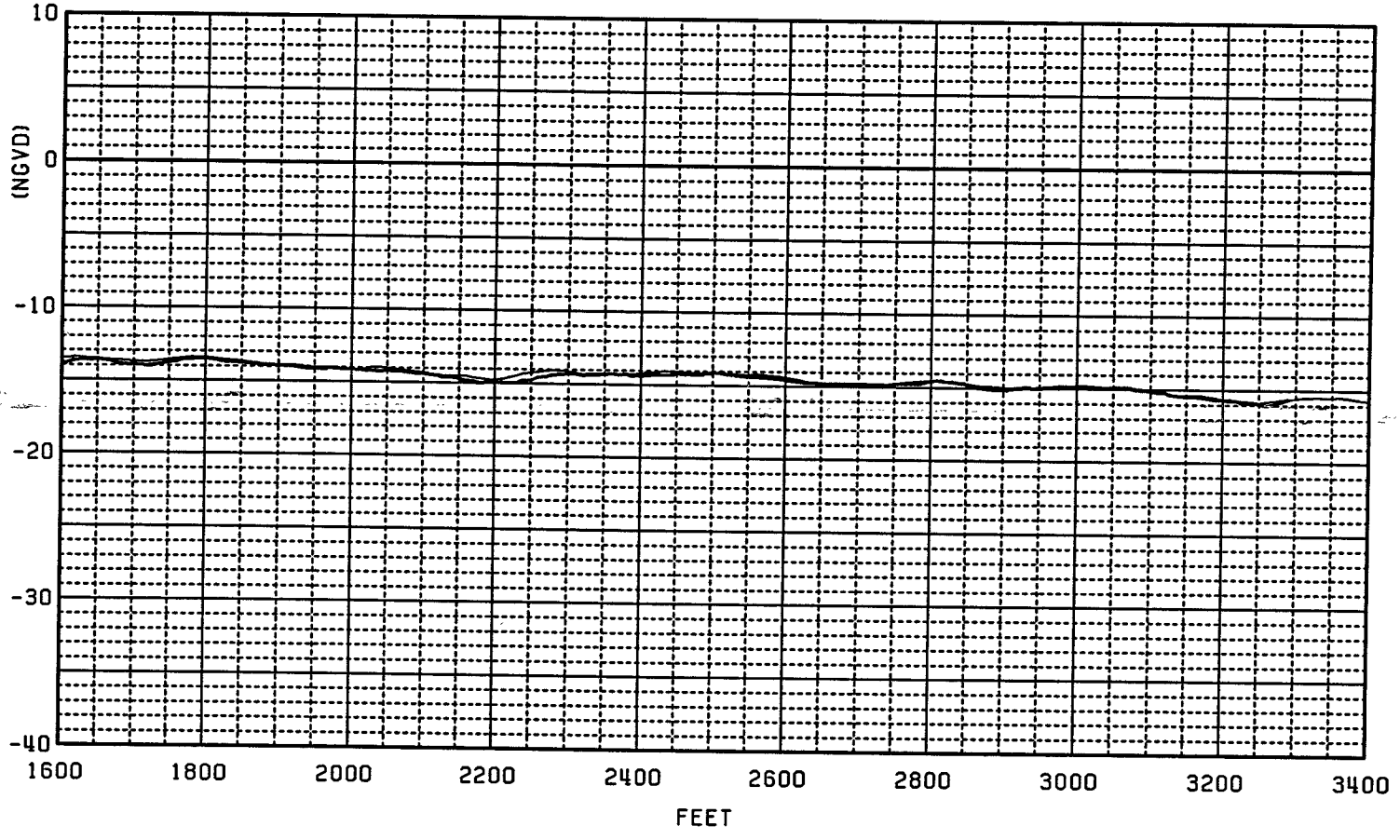
RANGE: T-100A 2/2
SURVEY BEAR (MAG. N): 260
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

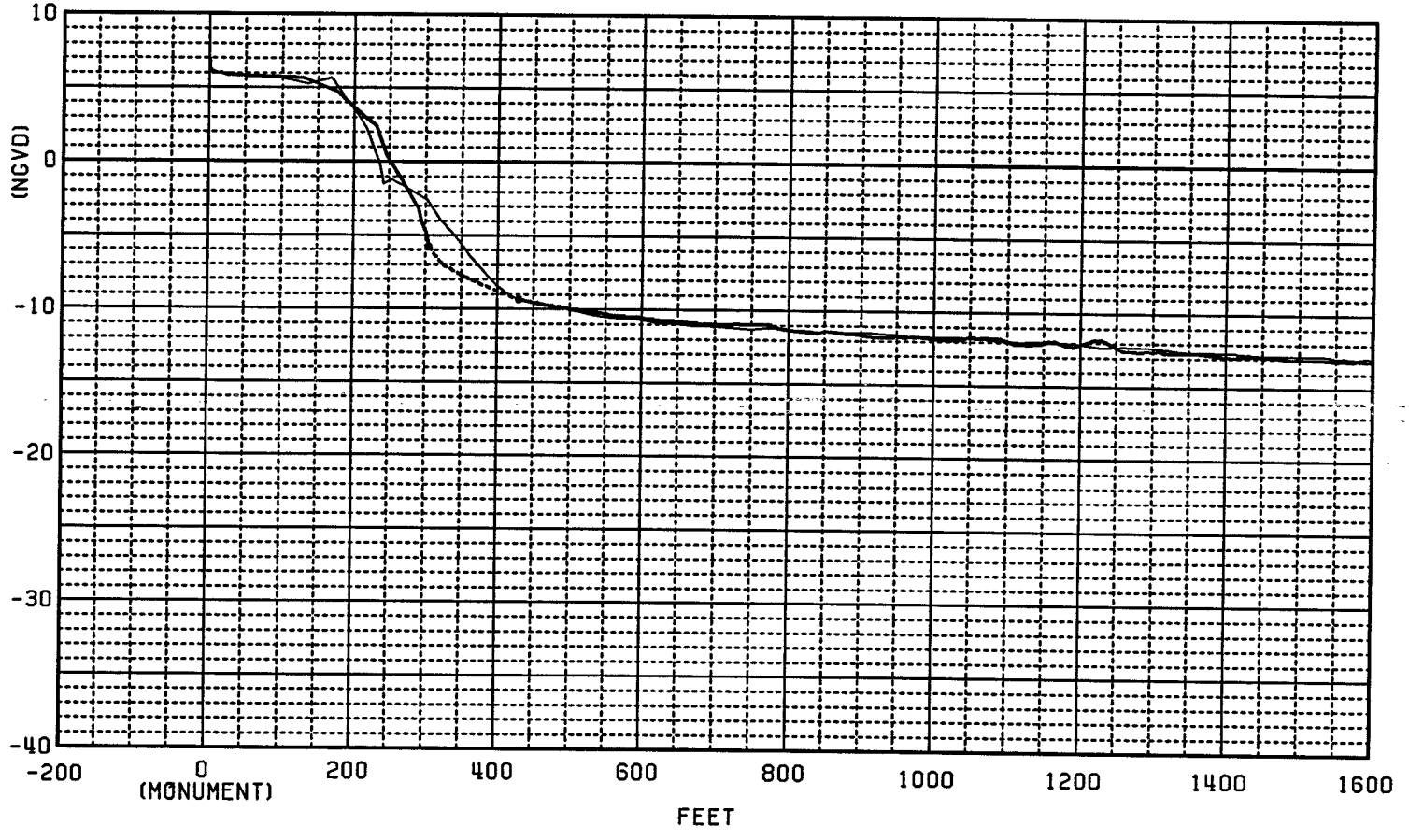
RANGE: R-101 1/2
SURVEY BEAR (MAG. N): 243
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

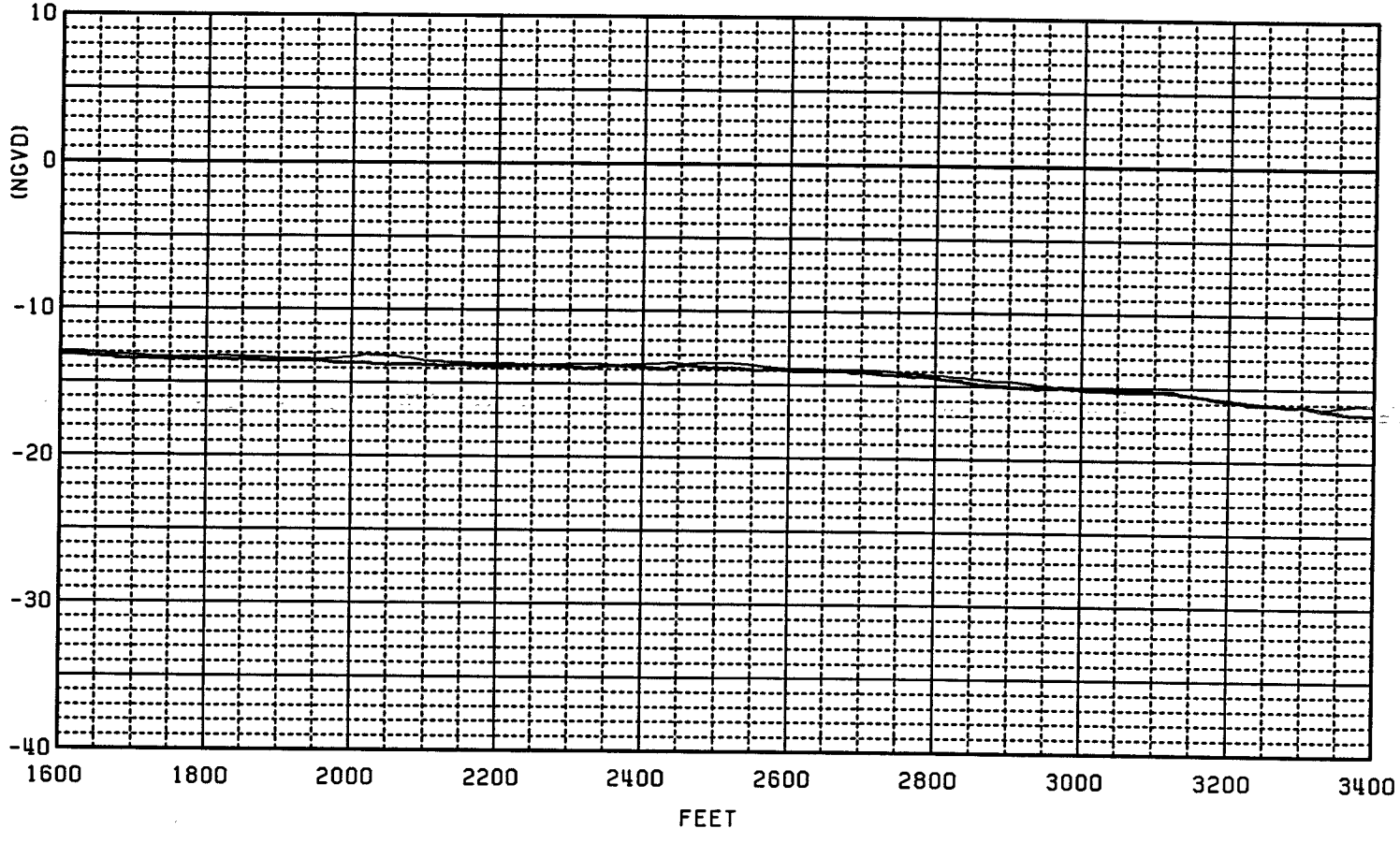
RANGE: R-101 2/2
SURVEY BEAR (MAG. N): 243
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-101A 1/3
SURVEY BEAR (MAG. N): 248
COUNTY: PINELLAS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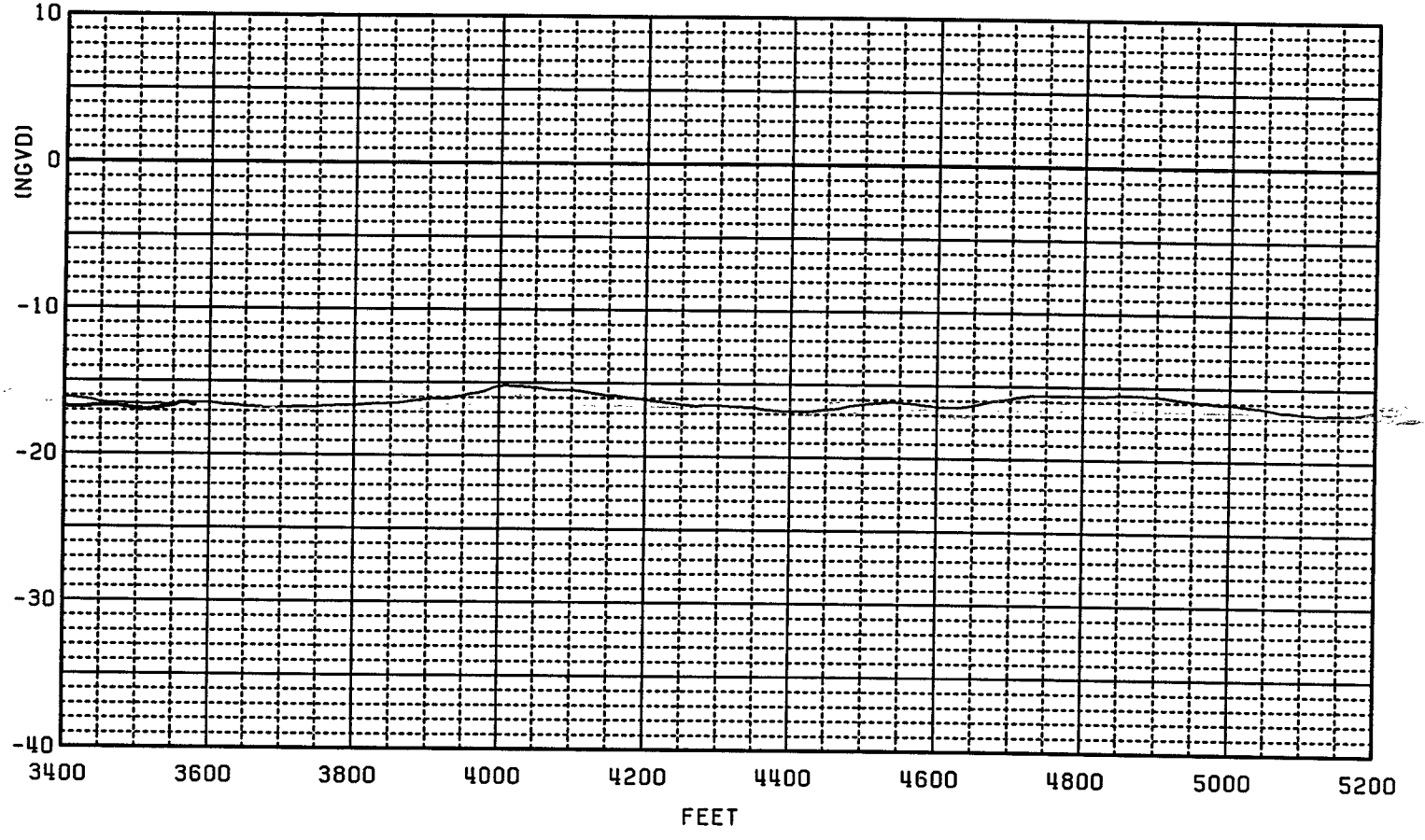
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-101A 2/3
SURVEY BEAR (MAG. N) : 248
COUNTY: PINELLAS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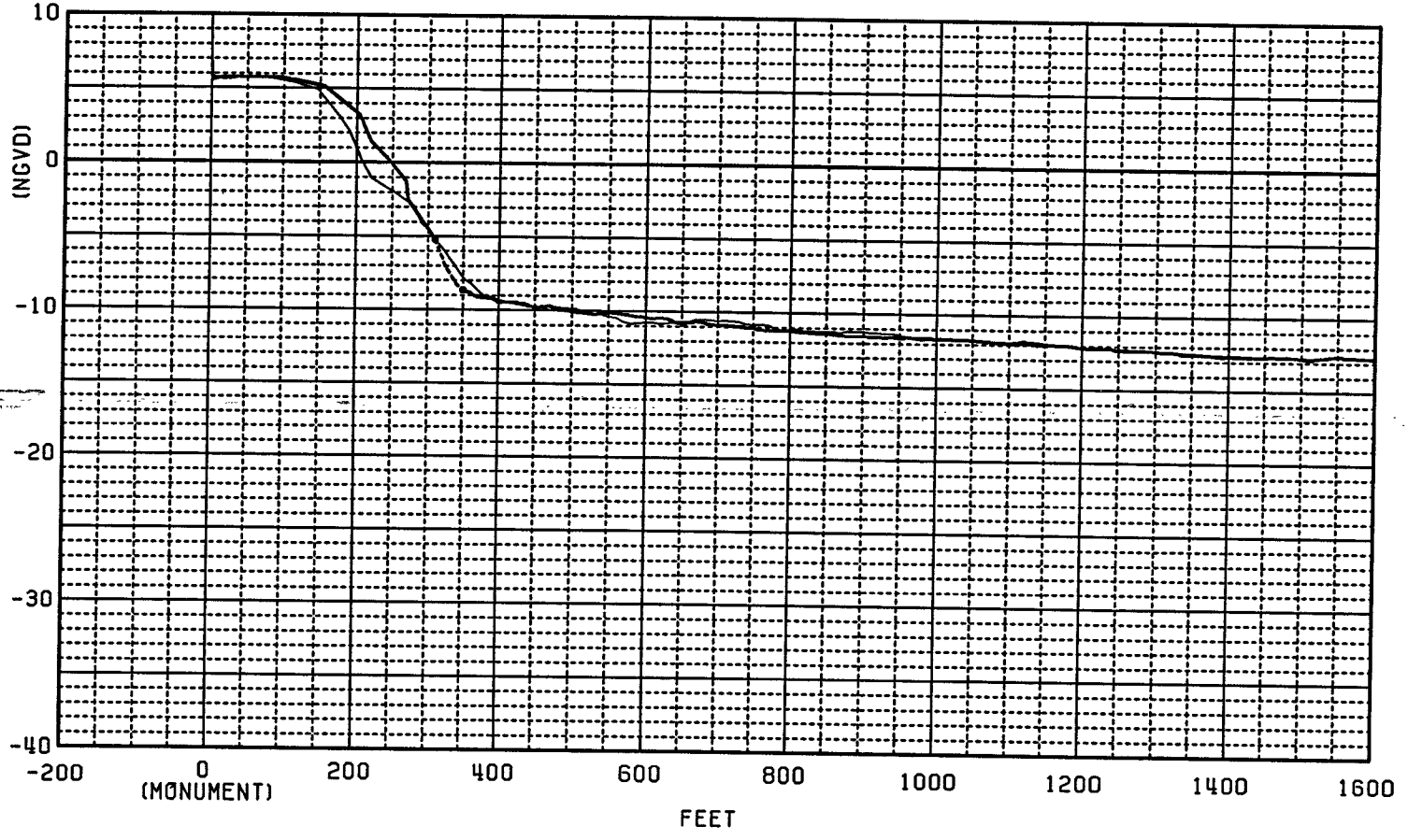
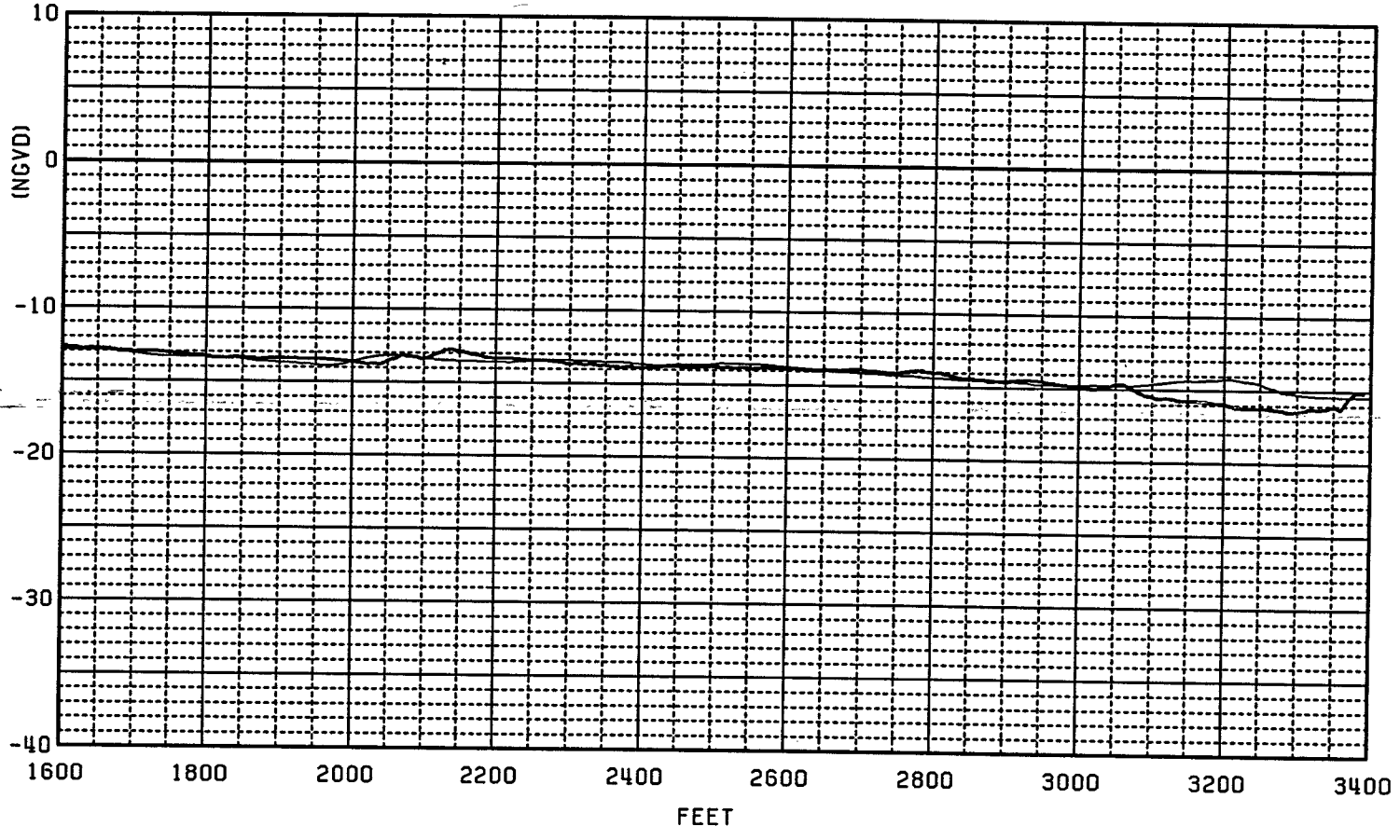
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-101A 3/3
SURVEY BEAR (MAG. N) : 248
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

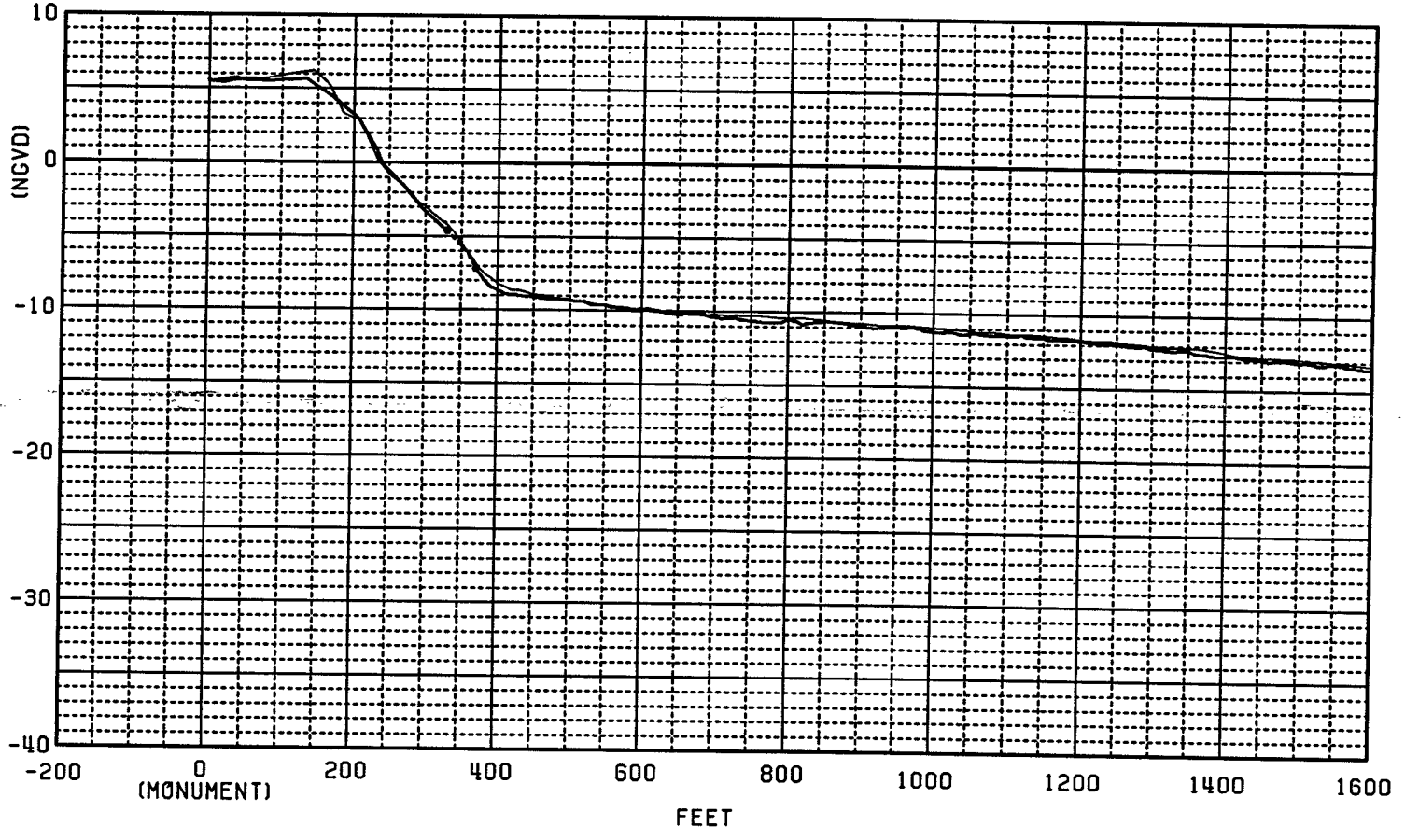
RANGE: R-102G 1/2
SURVEY BEAR (MAG. N): 250
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
●---● CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
●---● CONSTRUCTED PROFILE

RANGE: R-102G 2/2
SURVEY BEAR (MAG. N): 250
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
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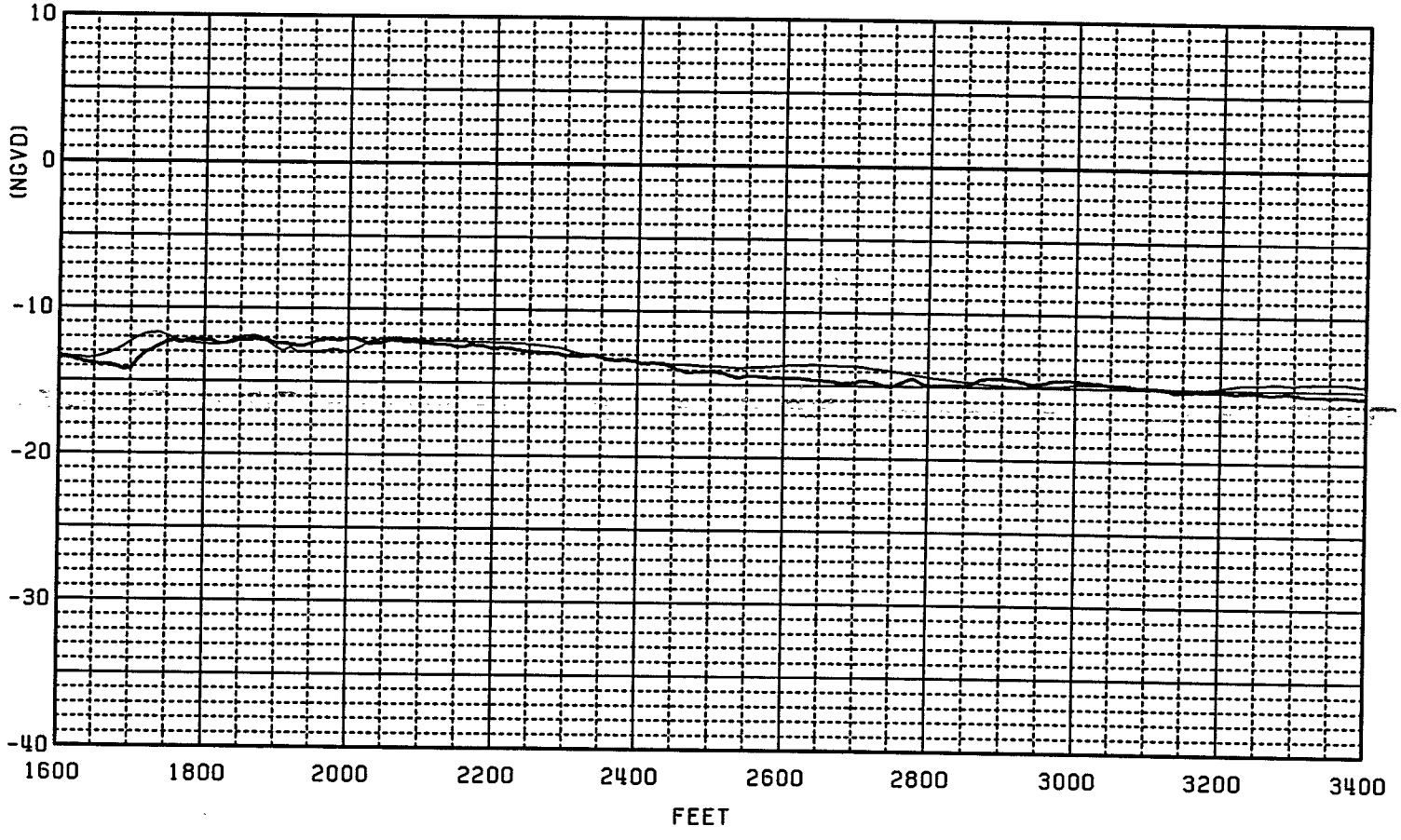
COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

RANGE: R-102A 1/3
SURVEY BEAR (MAG. N): 247
COUNTY: PINELLAS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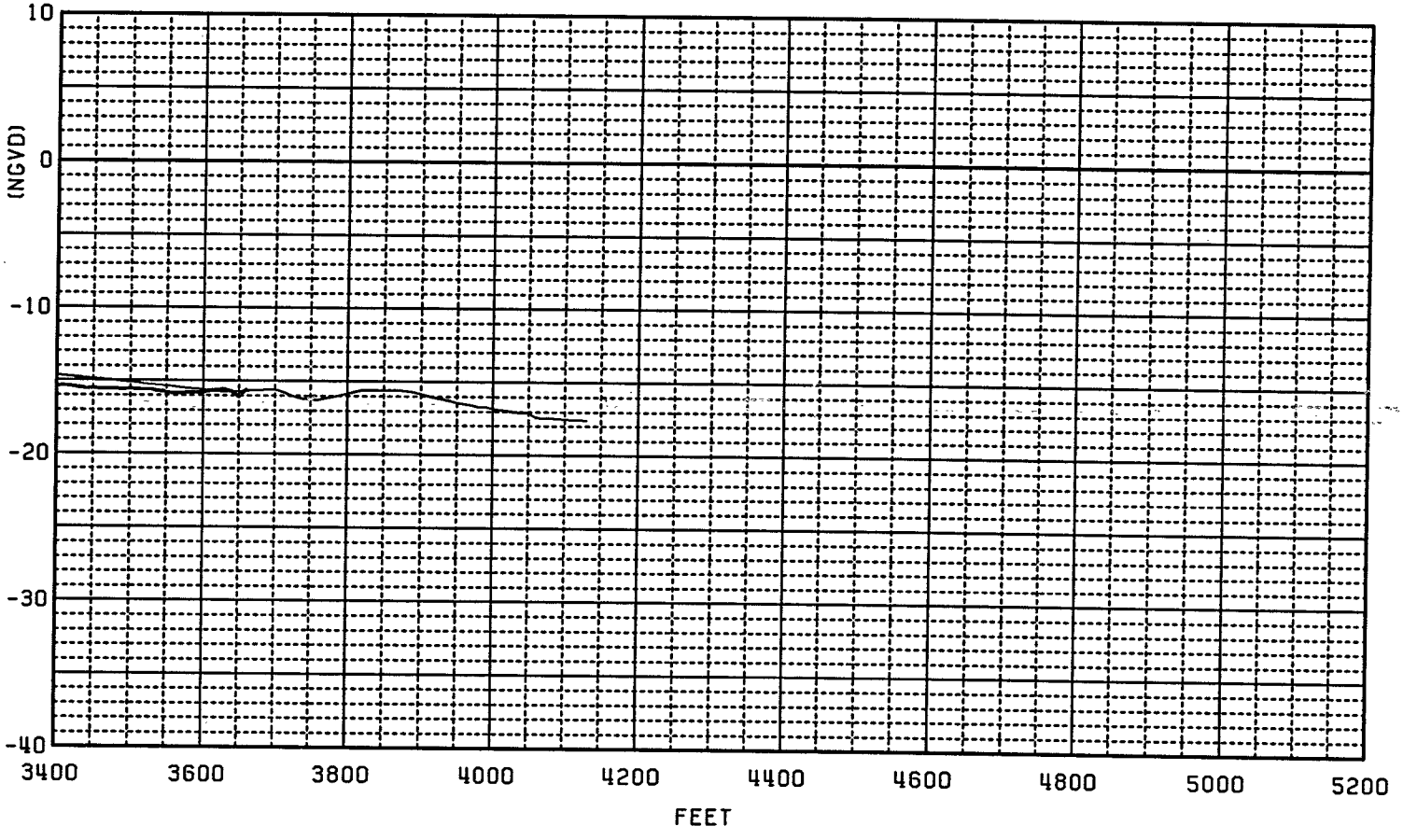
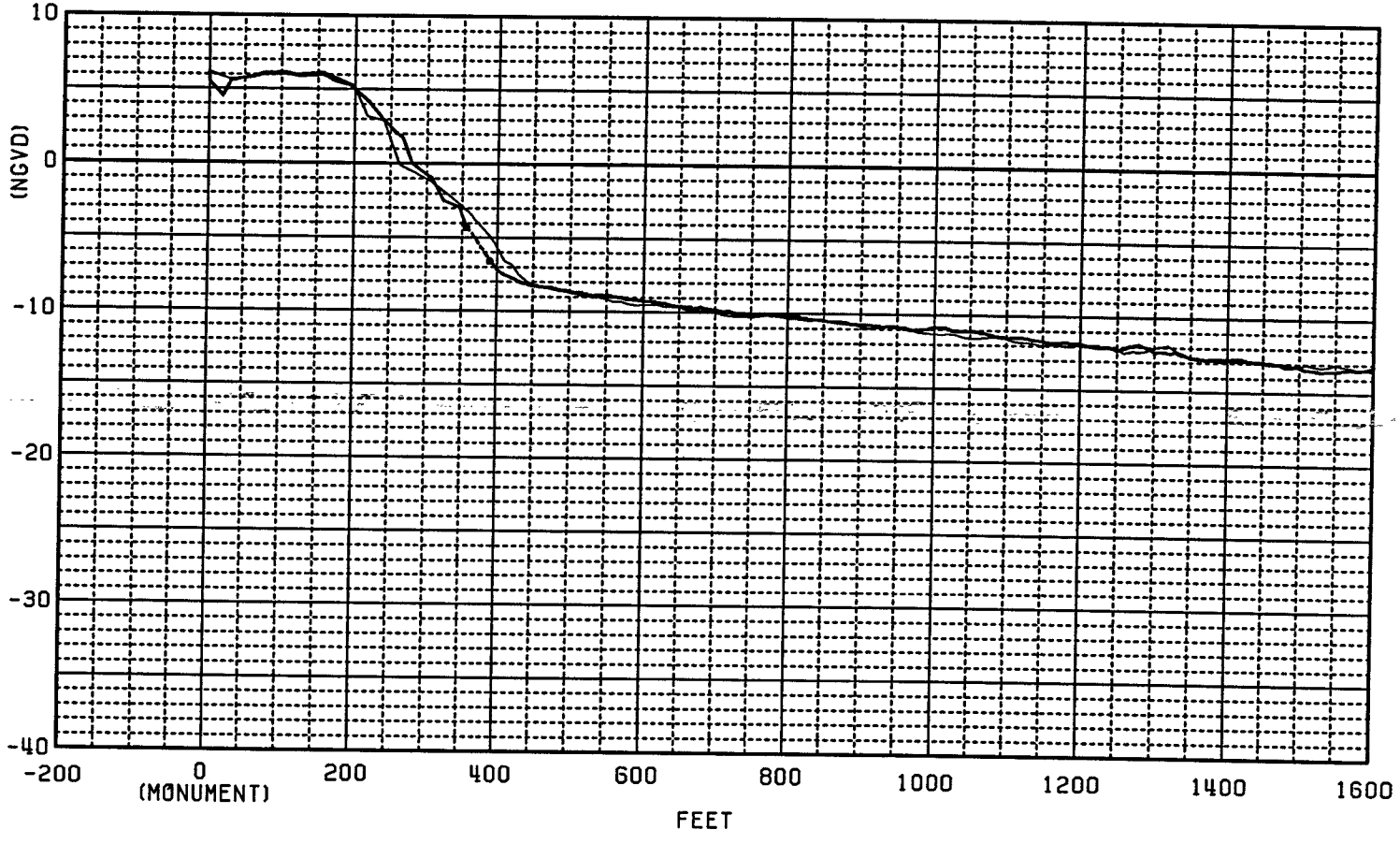
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-102A 2/3
SURVEY BEAR (MAG. N) : 247
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

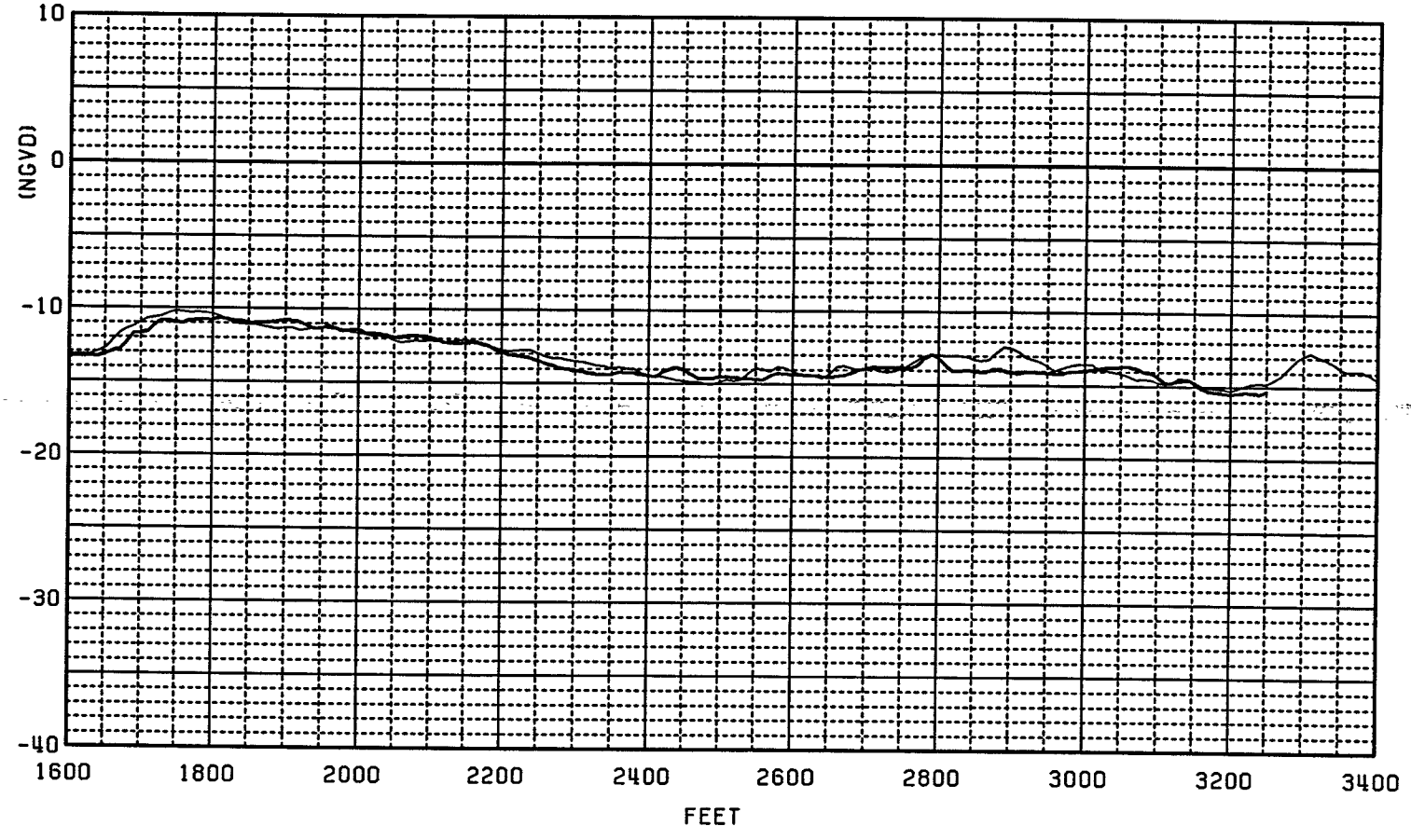
RANGE: R-102A 3/3
SURVEY BEAR (MAG. N): 247
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

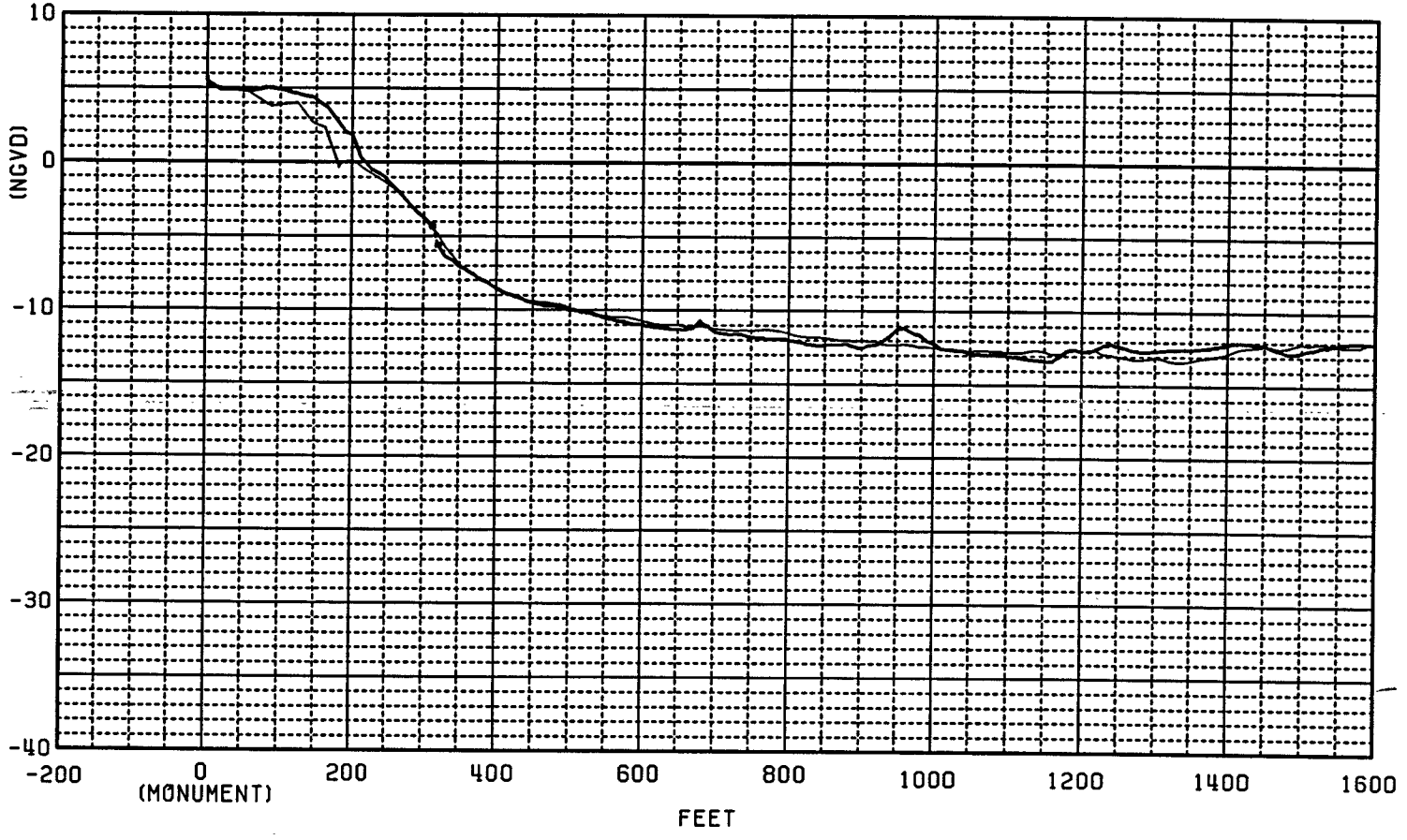
RANGE: R-103 1/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-103 2/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS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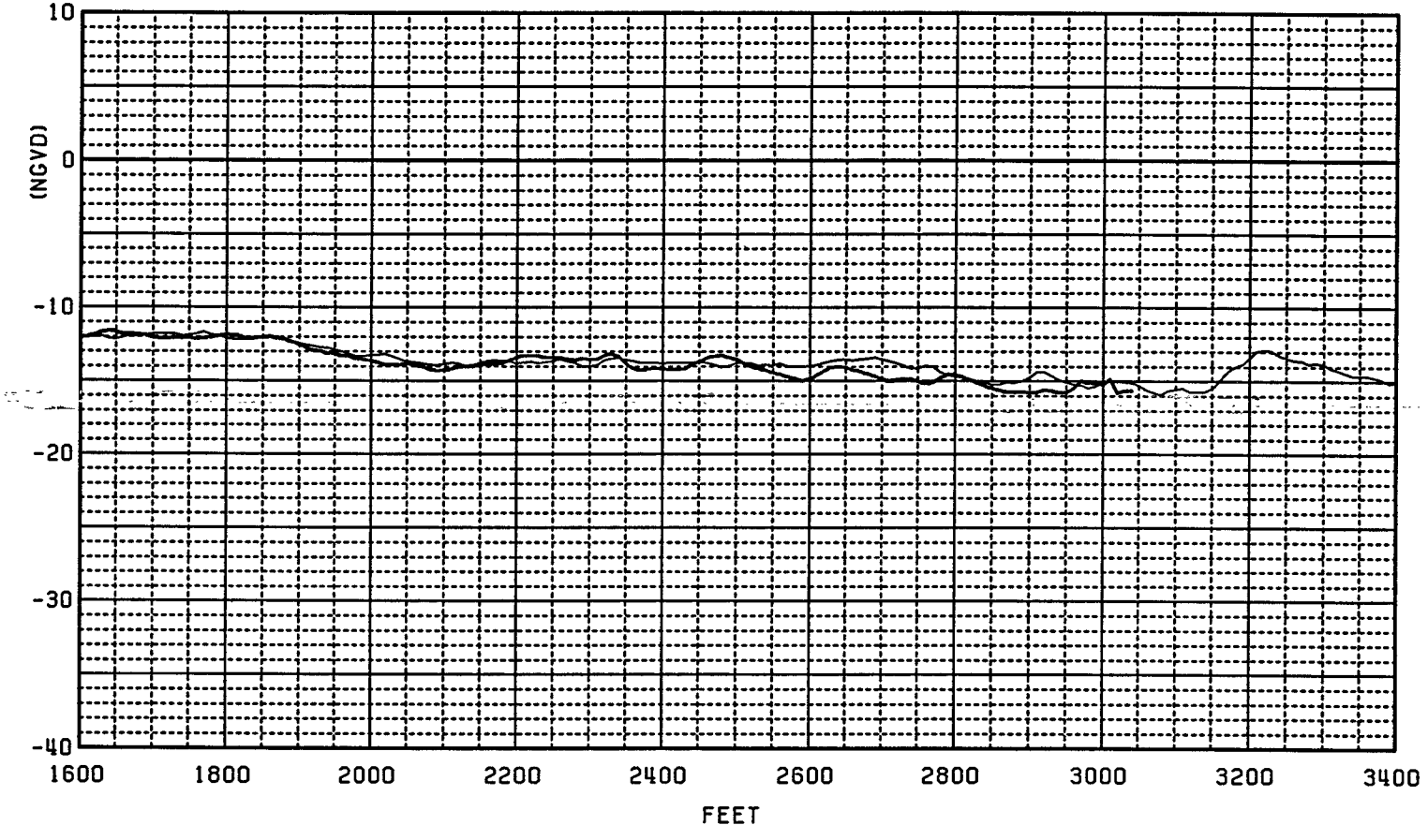
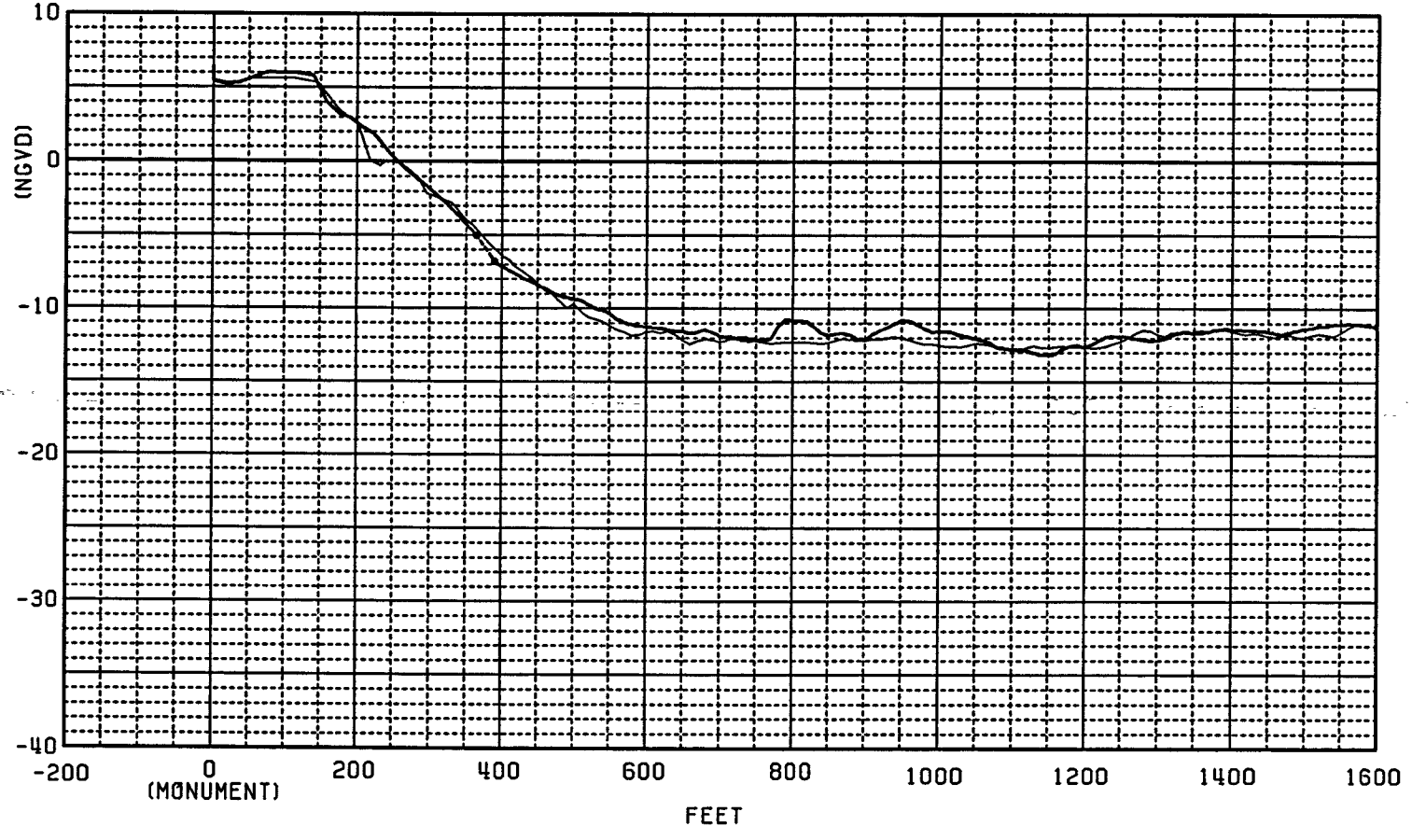
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-103A 1/2
SURVEY BEAR (MAG. N) : 245
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

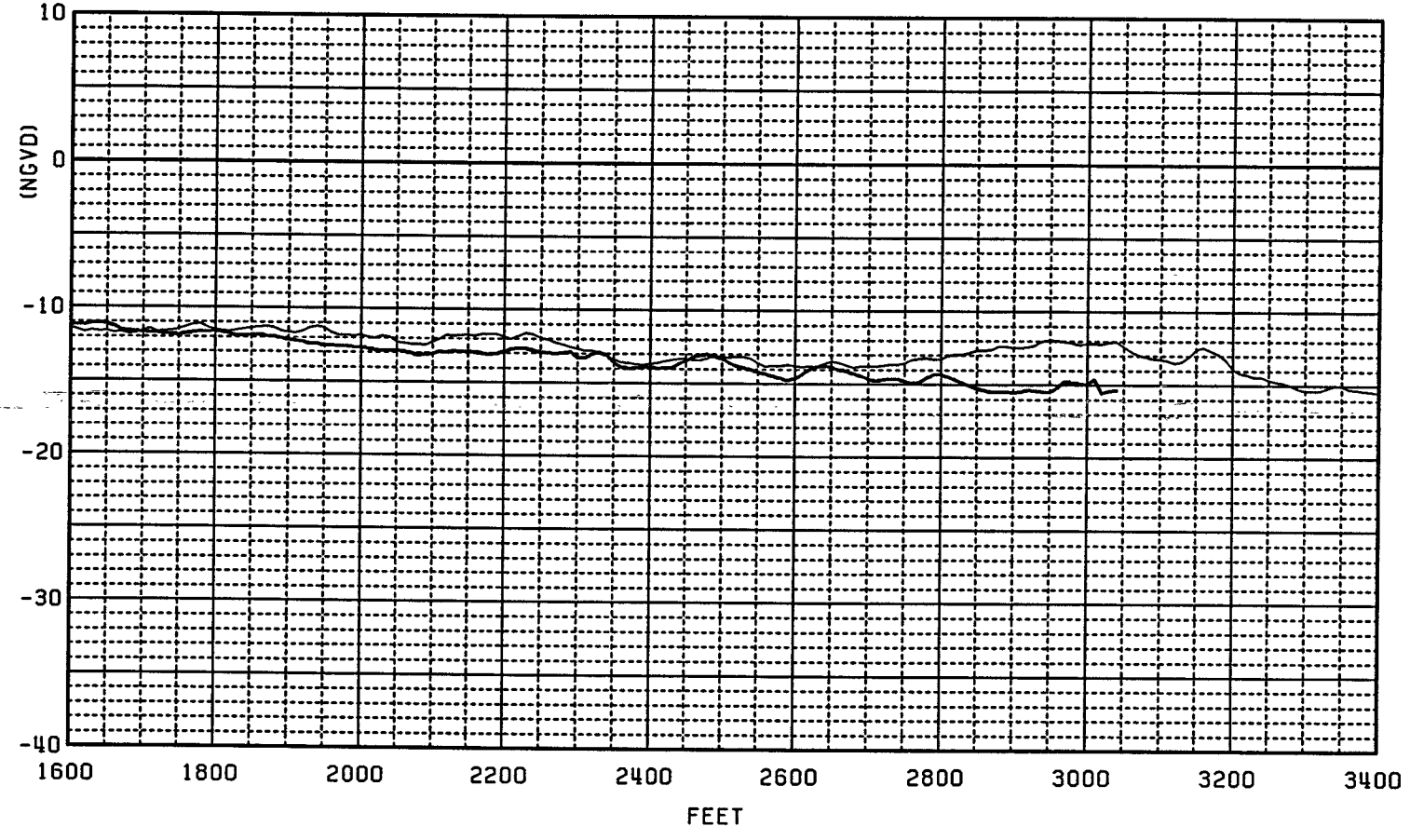
RANGE: R-103A 2/2
SURVEY BEAR (MAG. N): 245
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

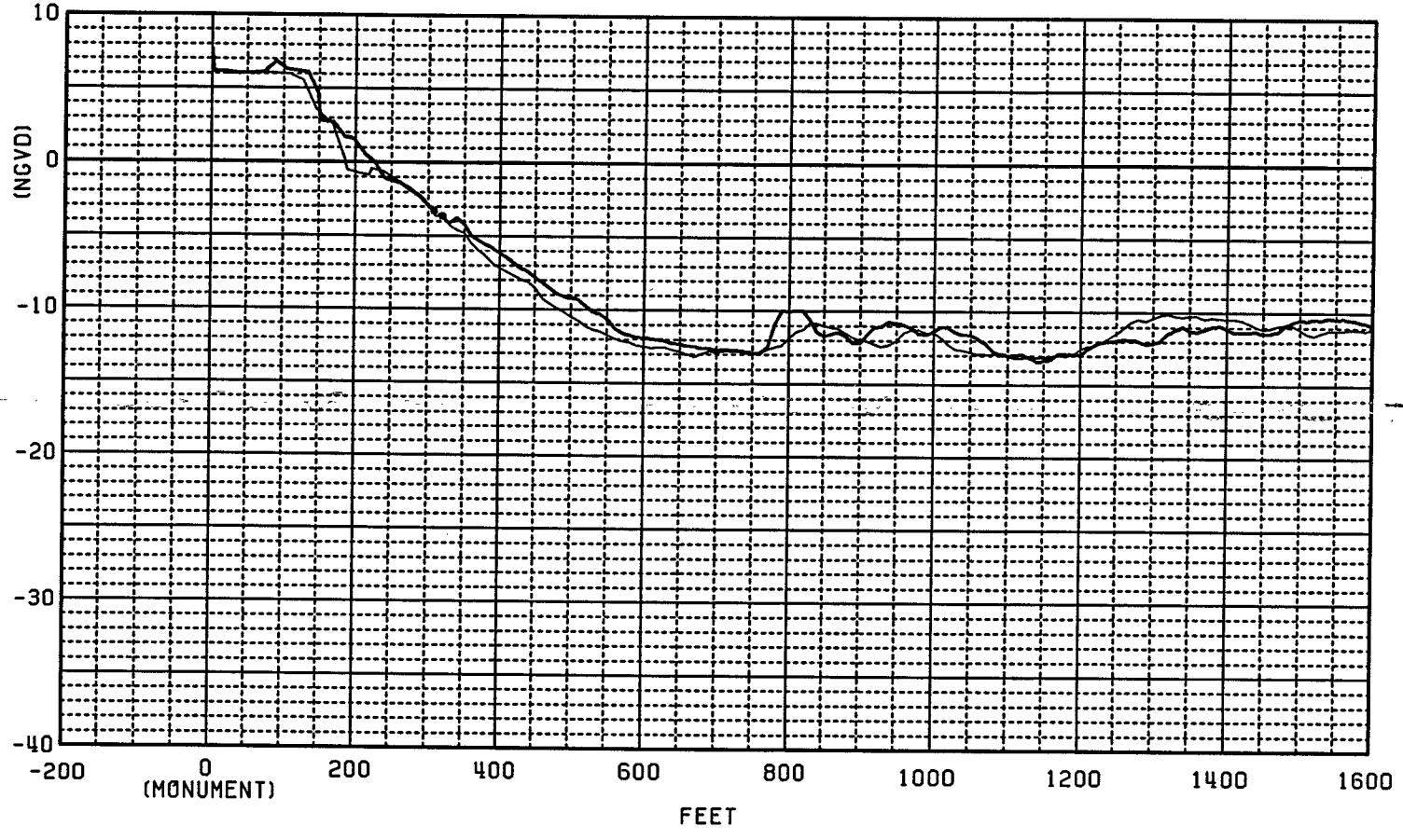
RANGE: T-104 1/2
SURVEY BEAR (MAG. N) : 245
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: T-104 2/2
SURVEY BEAR (MAG. N): 245
COUNTY: PINELLAS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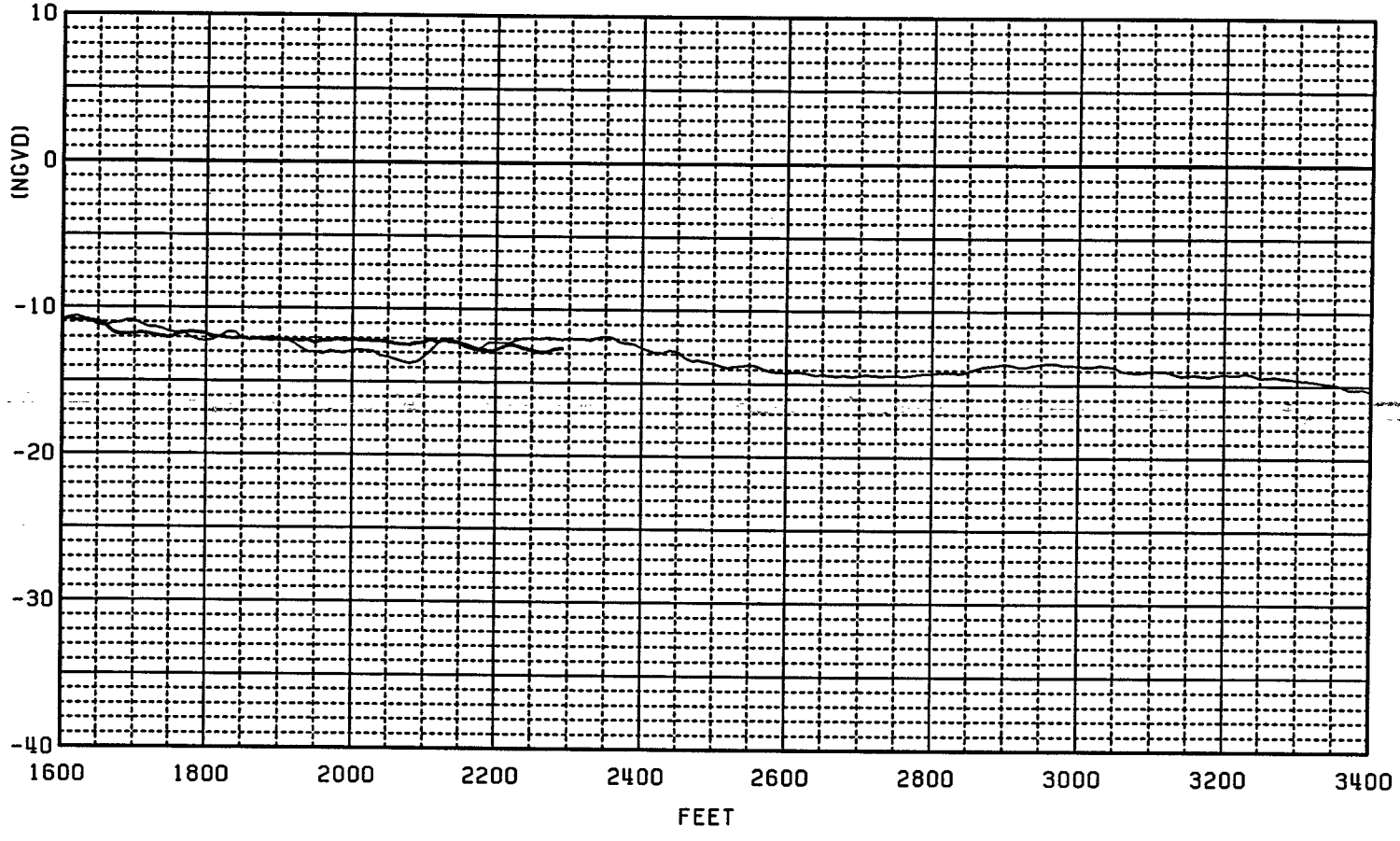
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-104A 1/2
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS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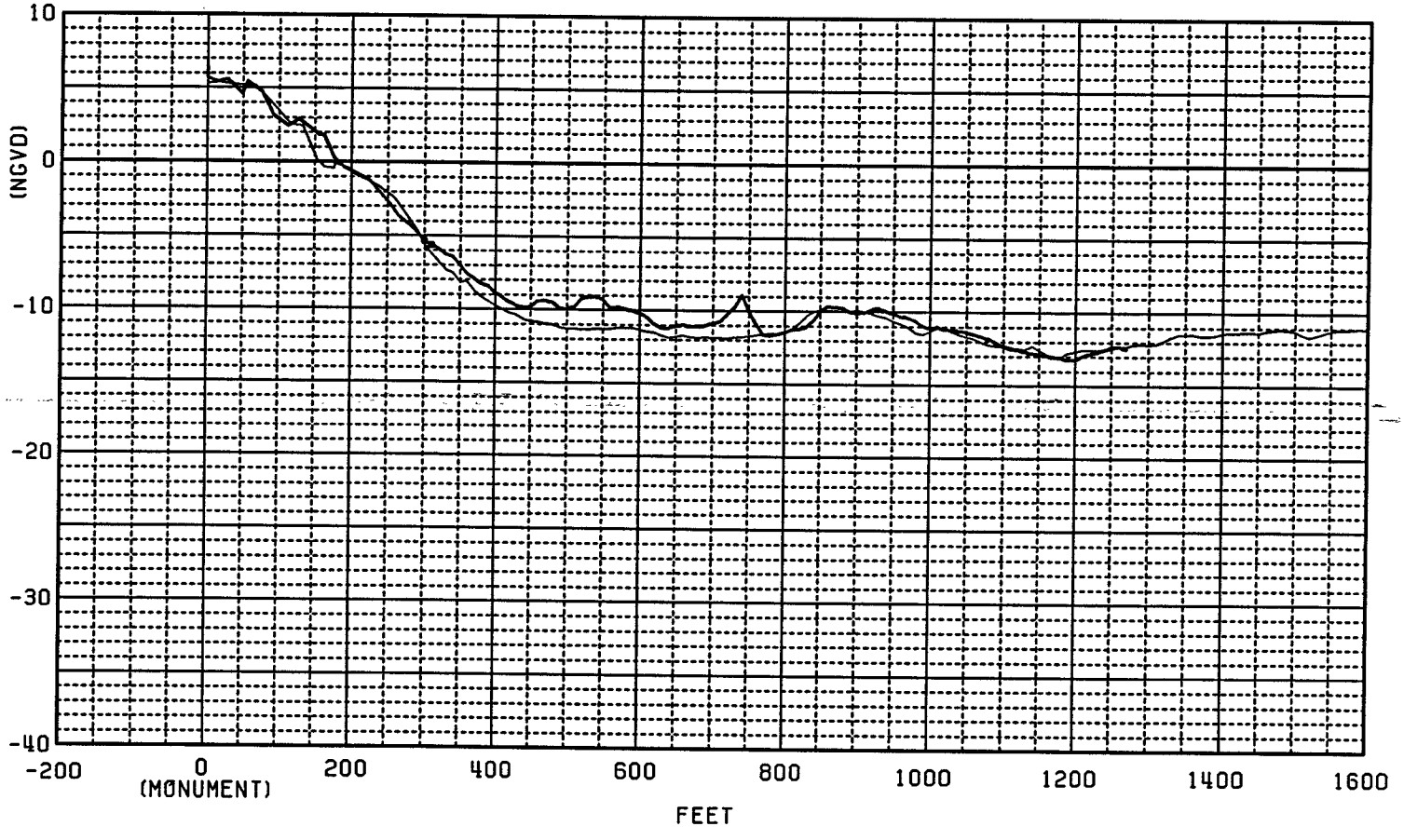
COMBINED PROFILE ( NOV88 )
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE ( JUL88 )
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-104A 2/2
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS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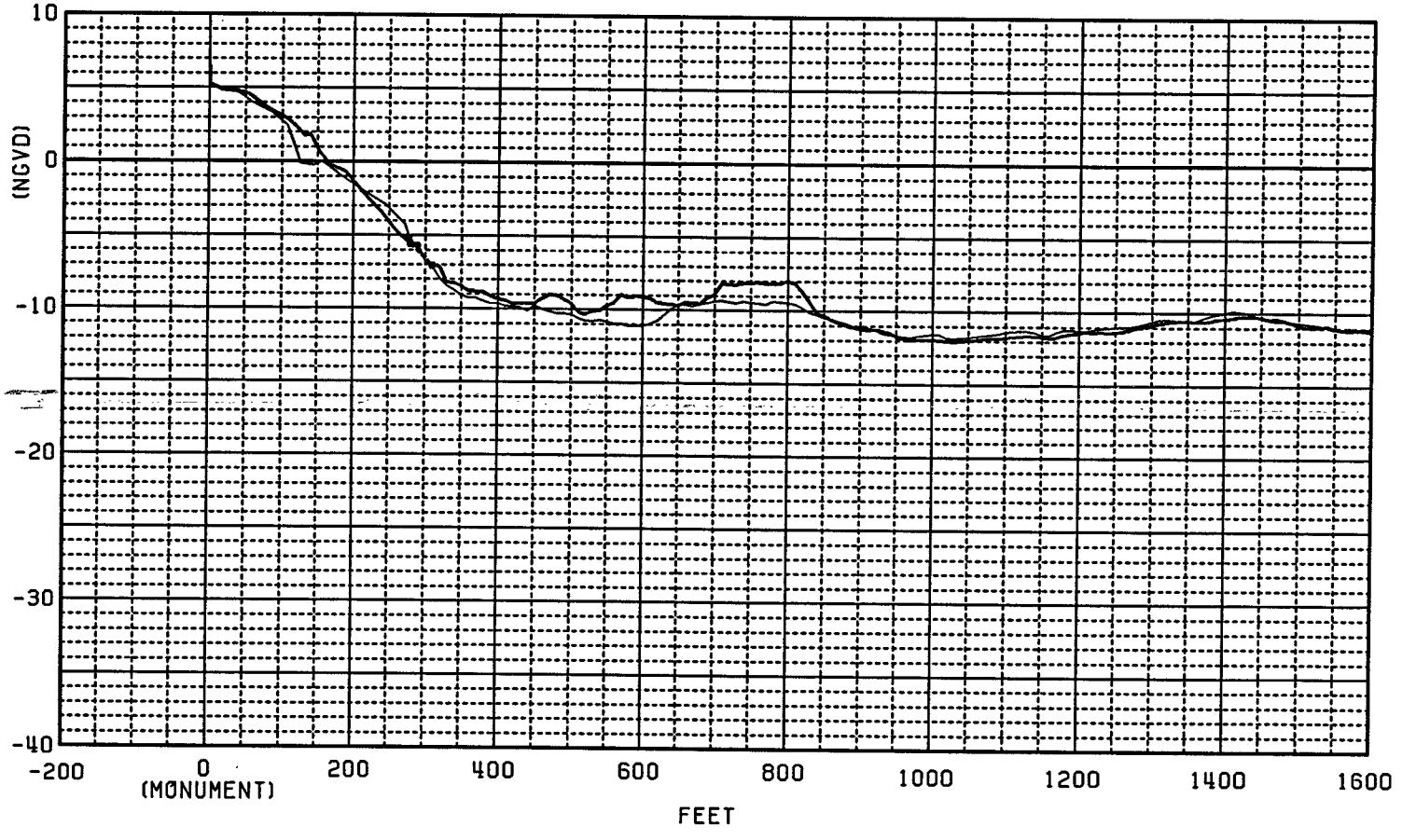
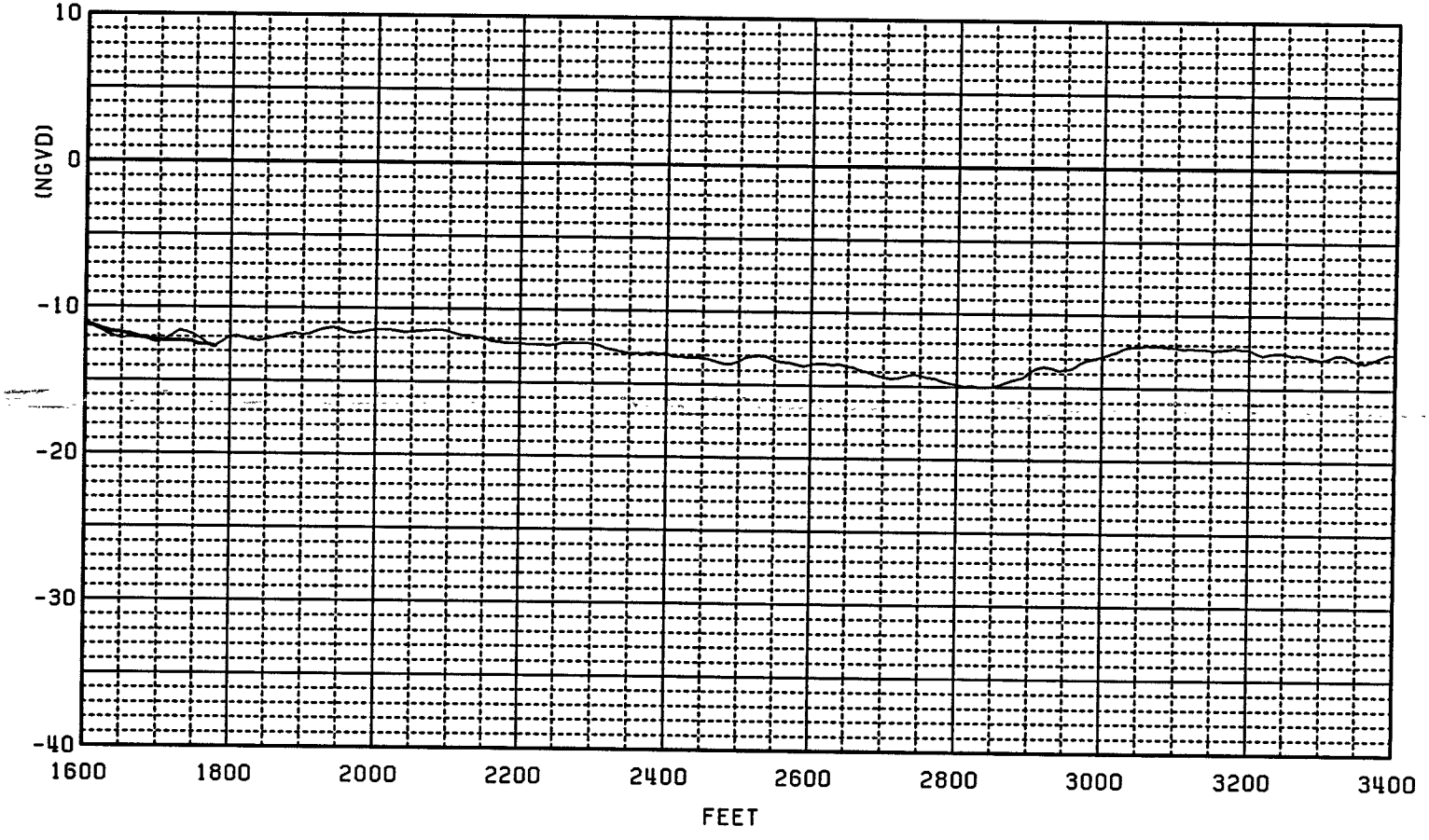
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-105G 1/1
SURVEY BEAR (MAG. N): 230
COUNTY: PINELLAS




COMBINED PROFILE ( NOV88 )
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE ( JUL88 )
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-105A 1/2
SURVEY BEAR (MAG. N) : 235
COUNTY: PINELLAS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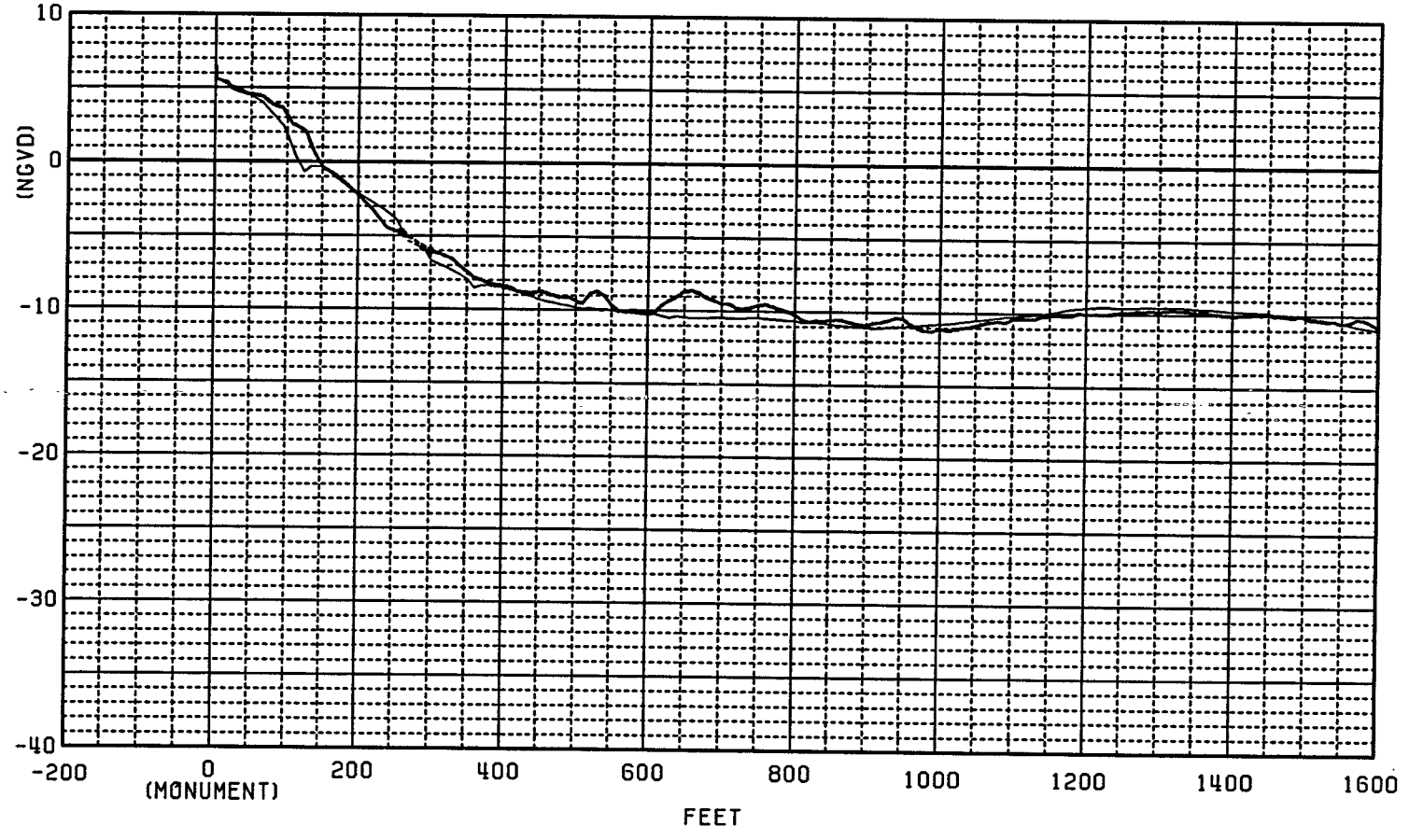
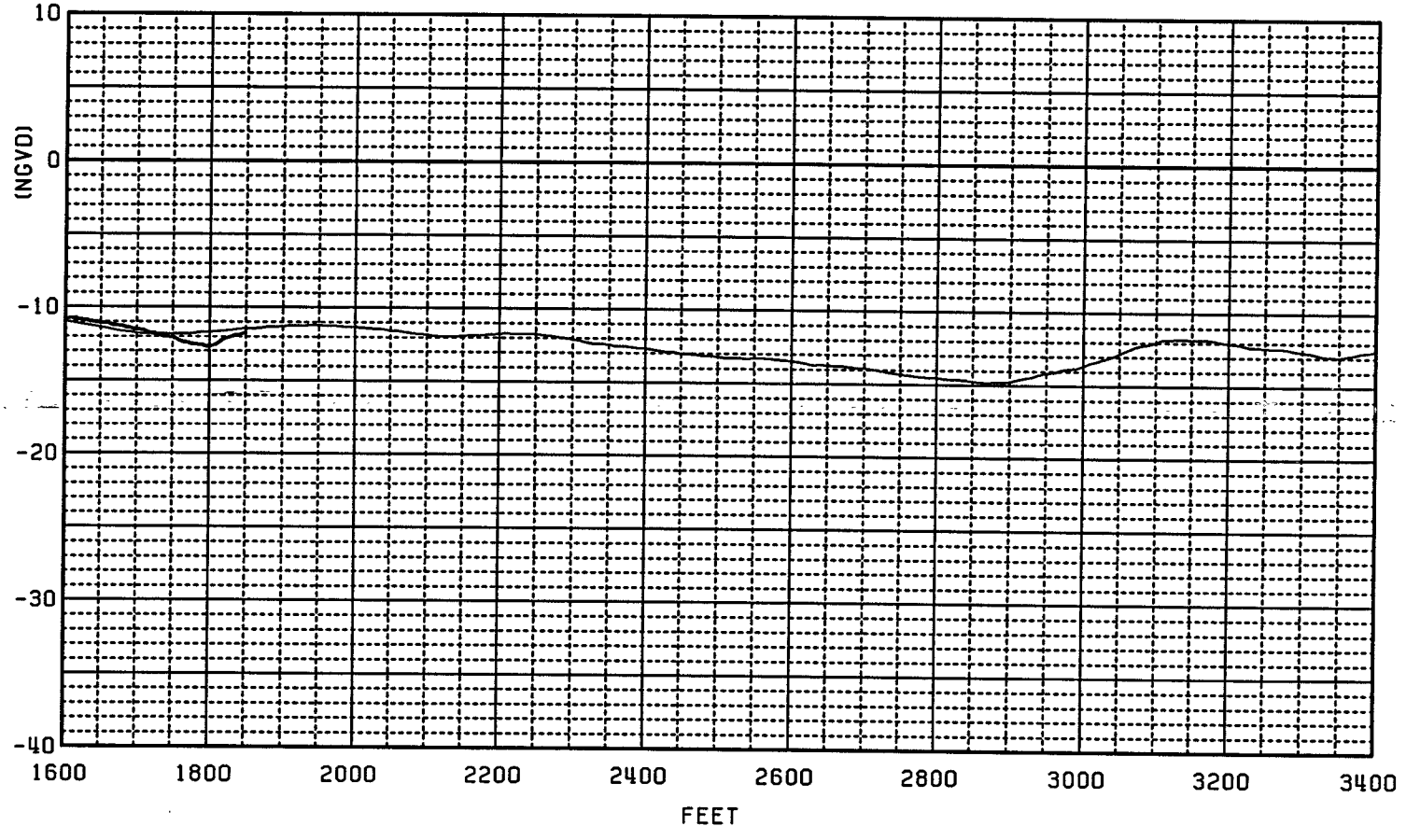
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: R-105A 2/2
SURVEY BEAR (MAG. N): 235
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: T-106 1/2
SURVEY BEAR (MAG. N) : 245
COUNTY: PINELLAS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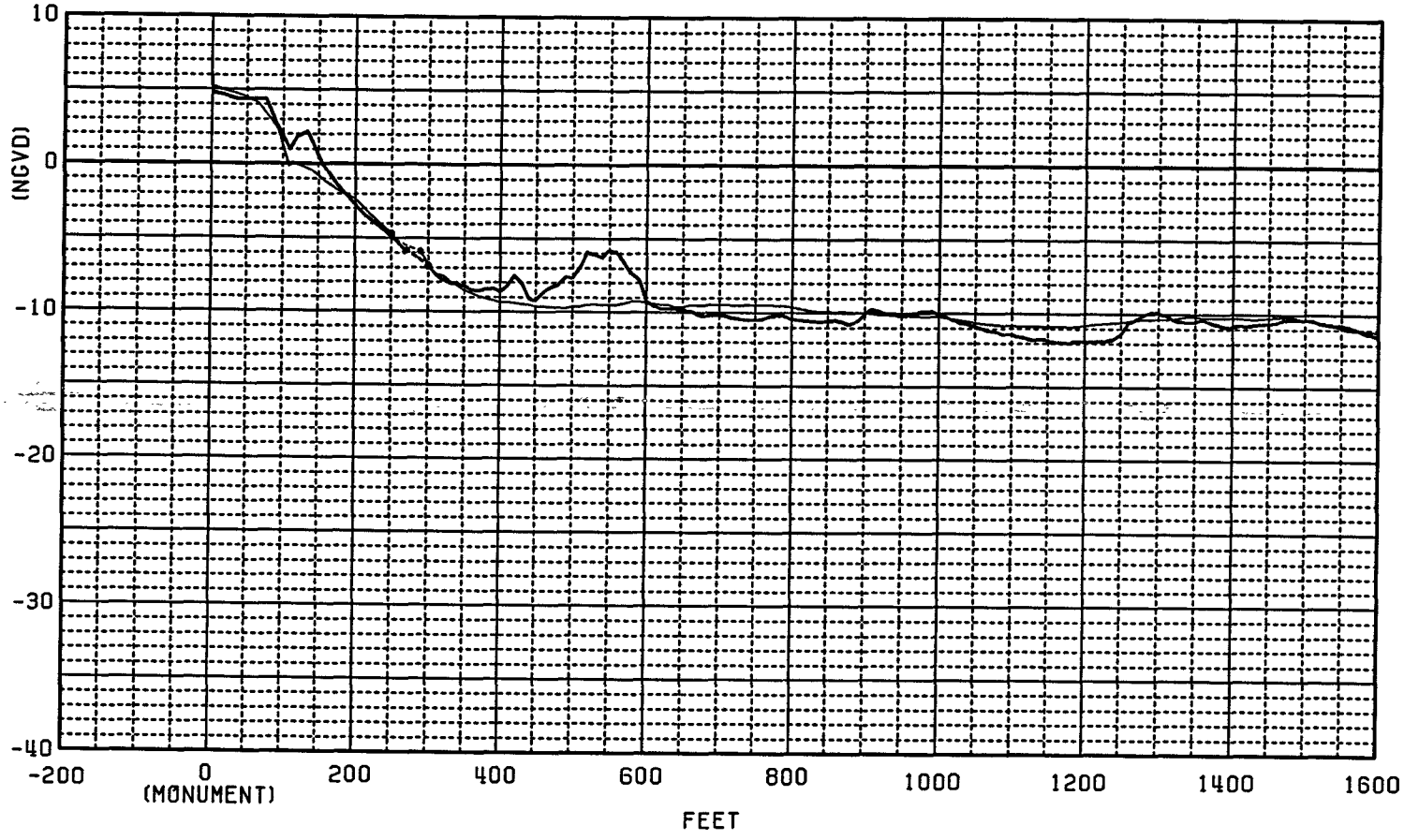
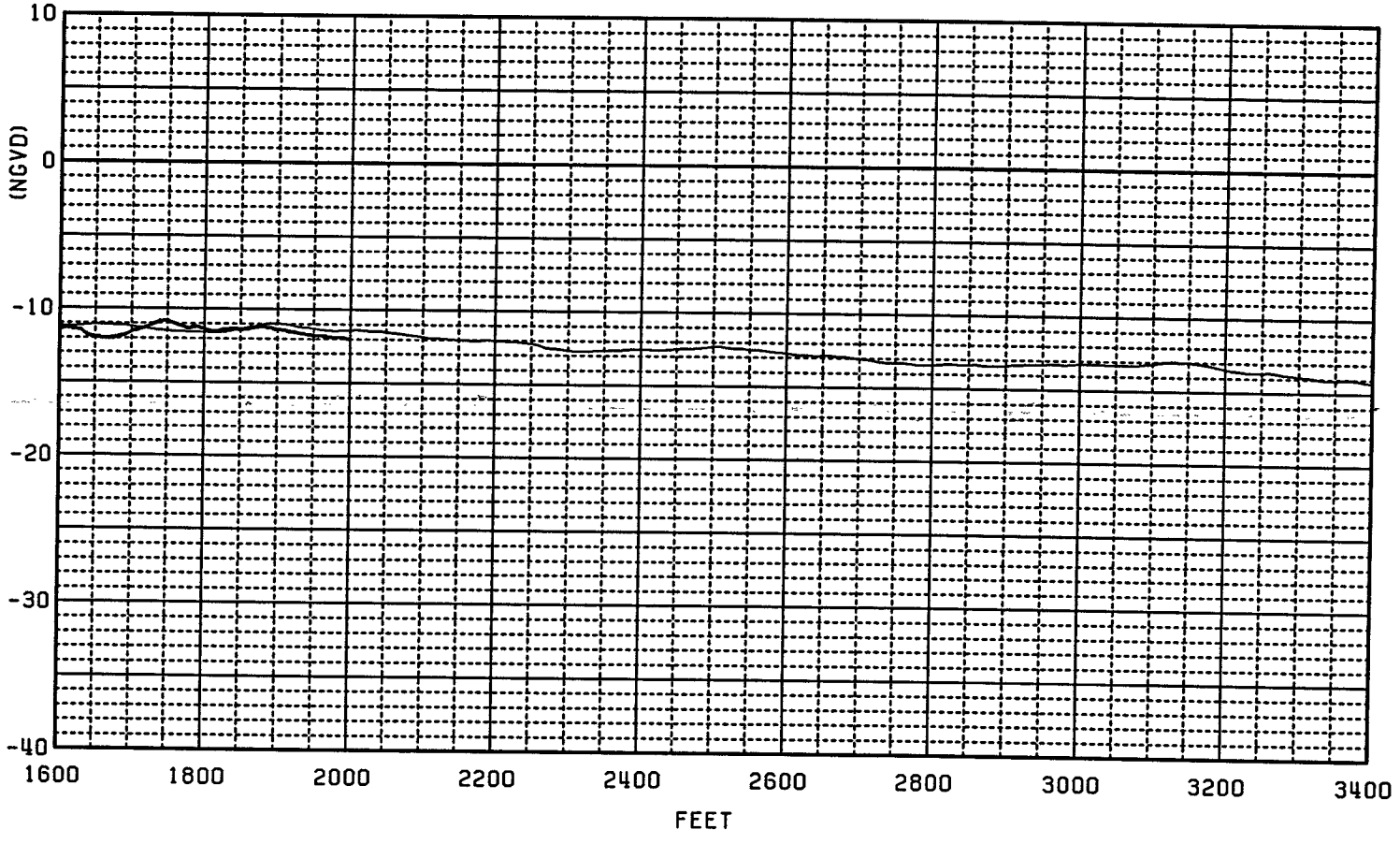
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-106 2/2
SURVEY BEAR (MAG. N) : 245
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: T-106A 1/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS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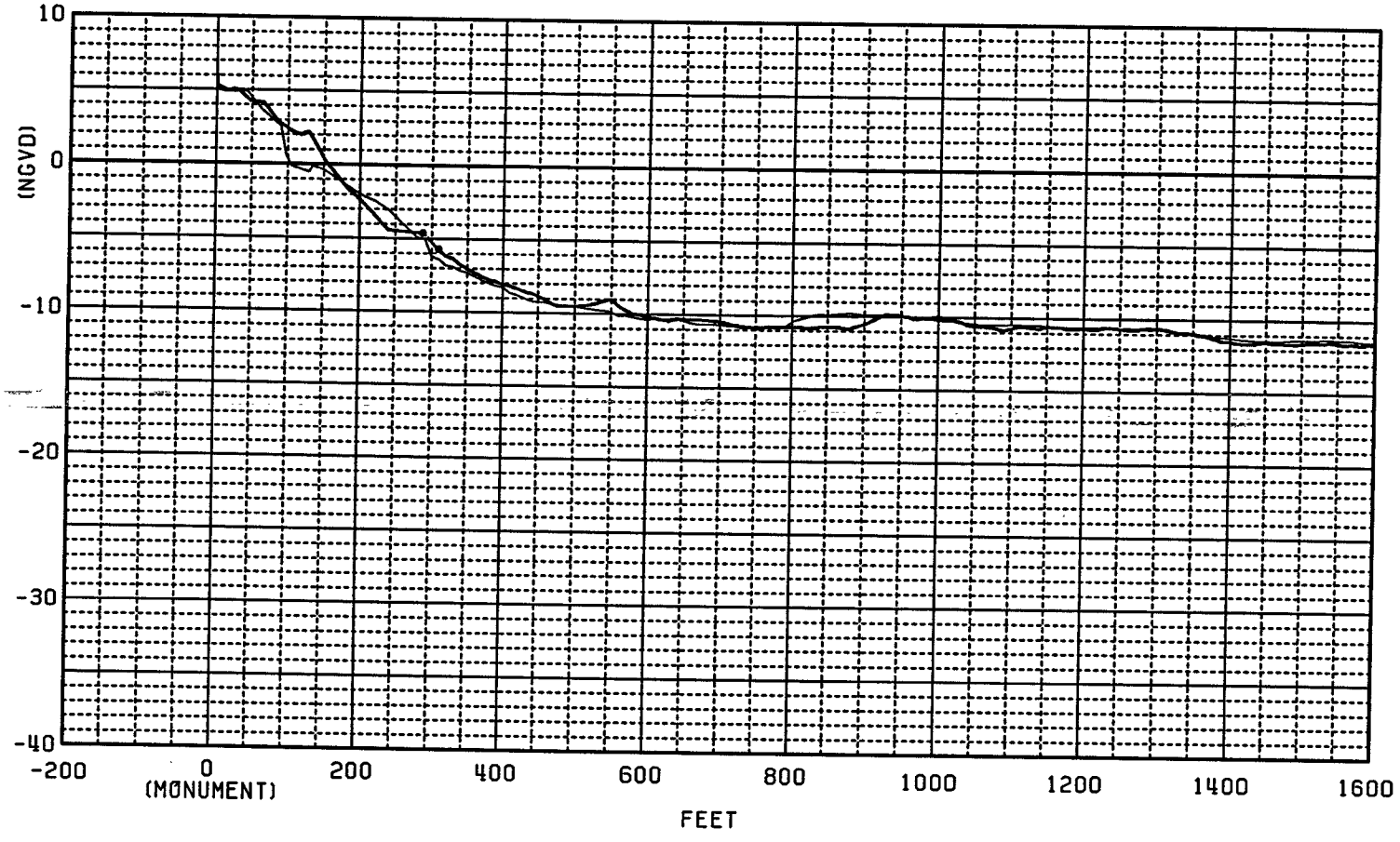
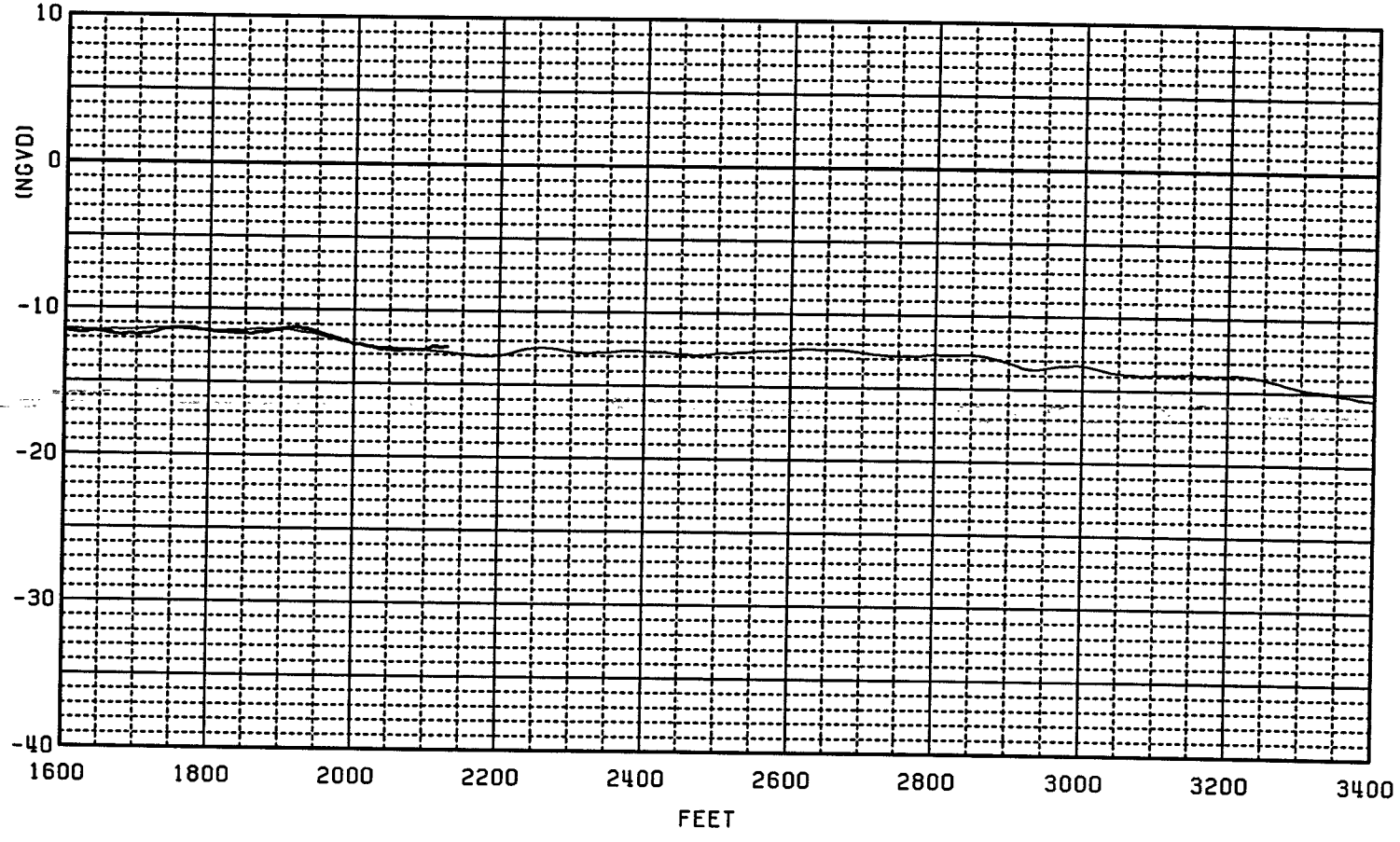
COMBINED PROFILE (NOV88)
MEASURED PROFILE
CONSTRUCTED PROFILE
COMBINED PROFILE (JUL88)
MEASURED PROFILE
CONSTRUCTED PROFILE
RANGE: T-106A 2/2
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

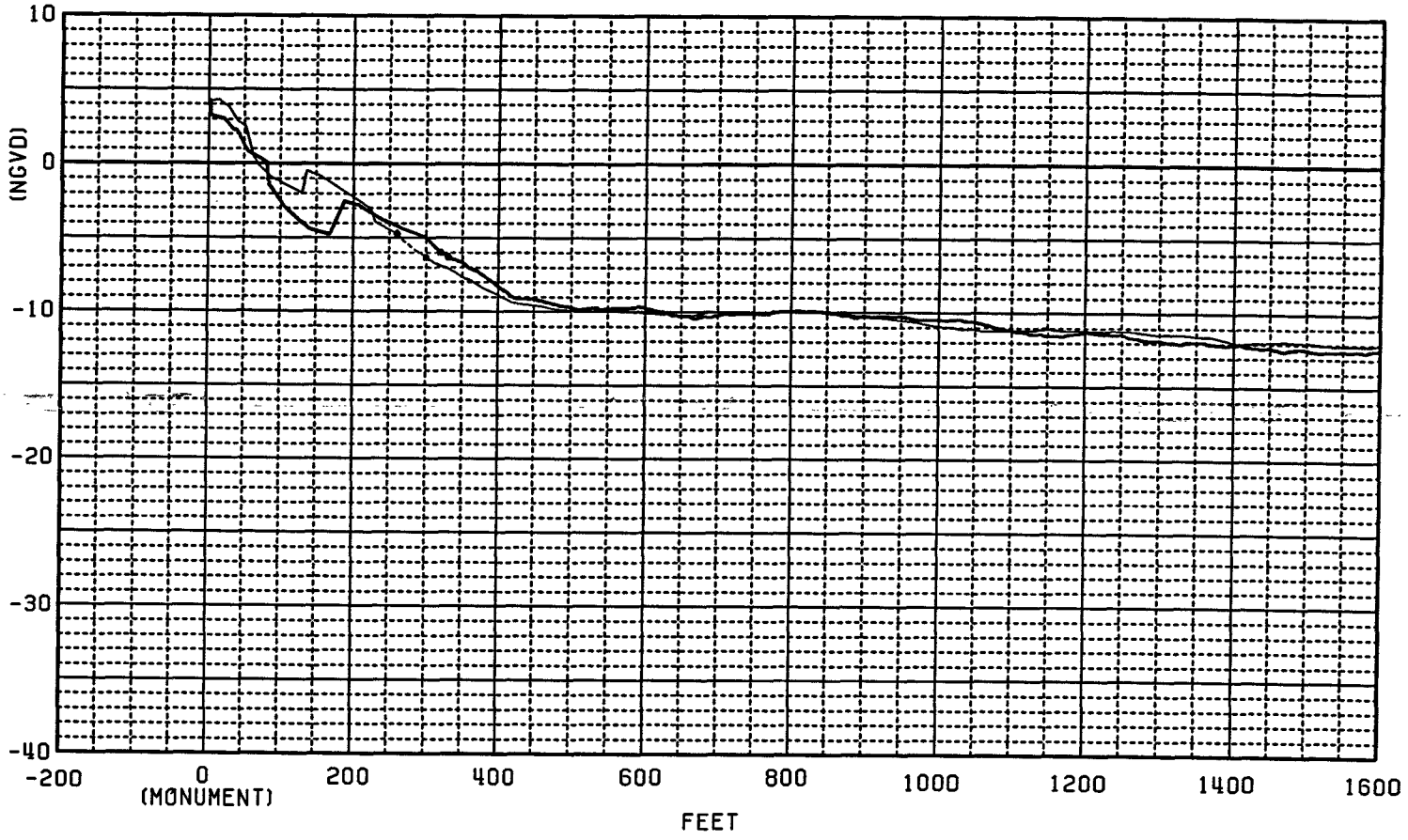
RANGE: R-107 1/2
SURVEY BEAR (MAG. N): 235
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

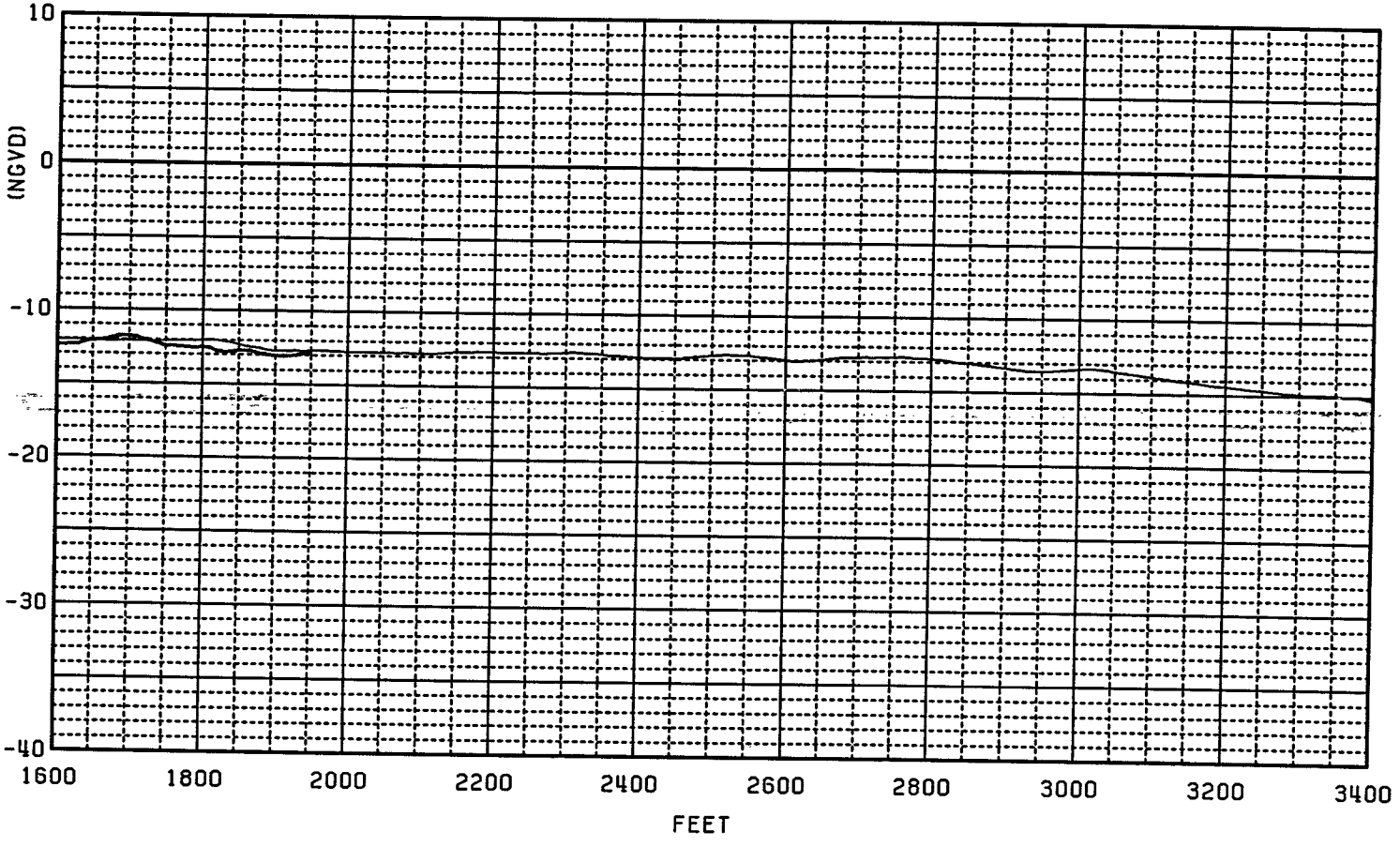
RANGE: R-107 2/2
SURVEY BEAR (MAG. N): 235
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

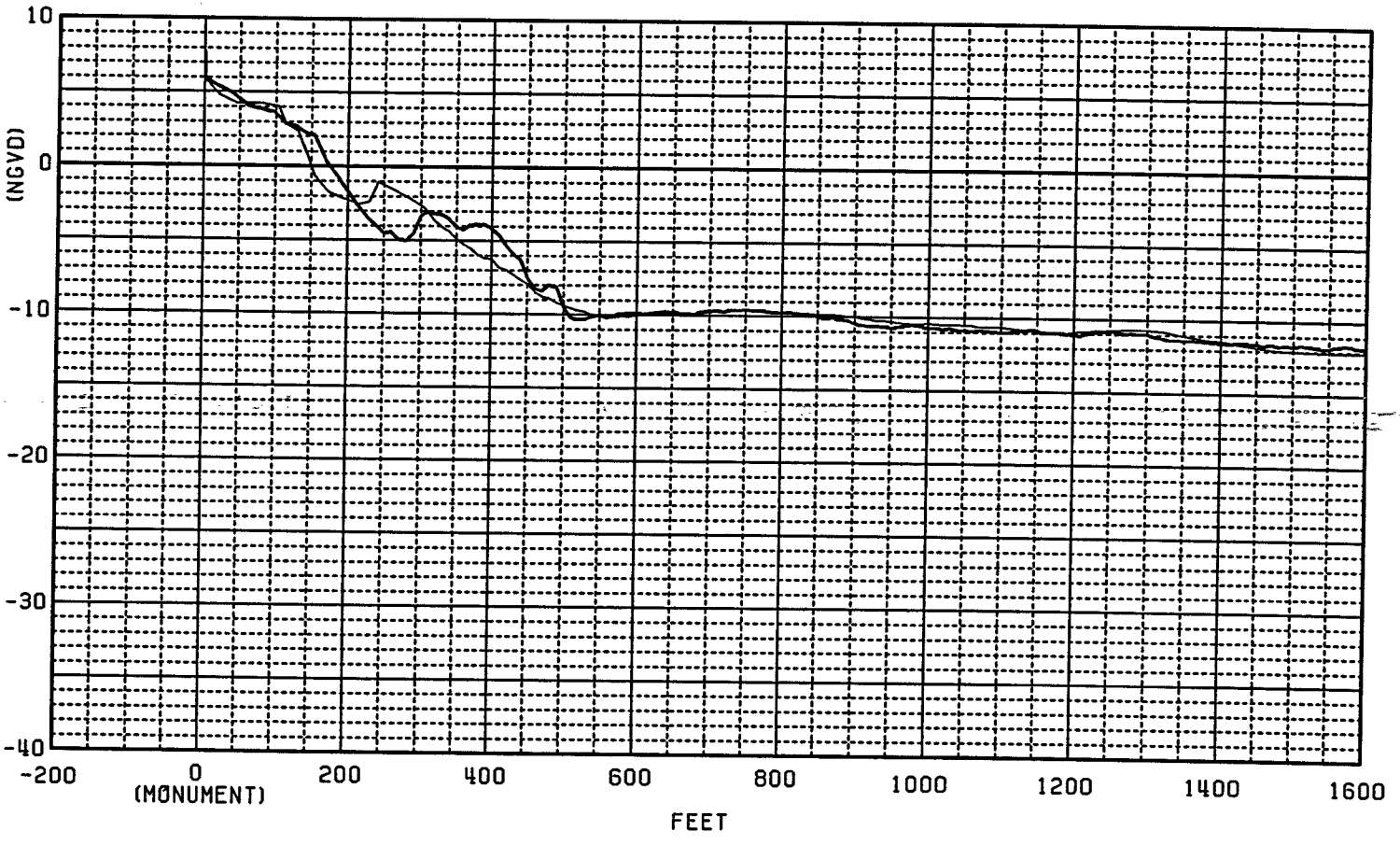
RANGE: R-107A 1/2
SURVEY BEAR (MAG. N) : 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

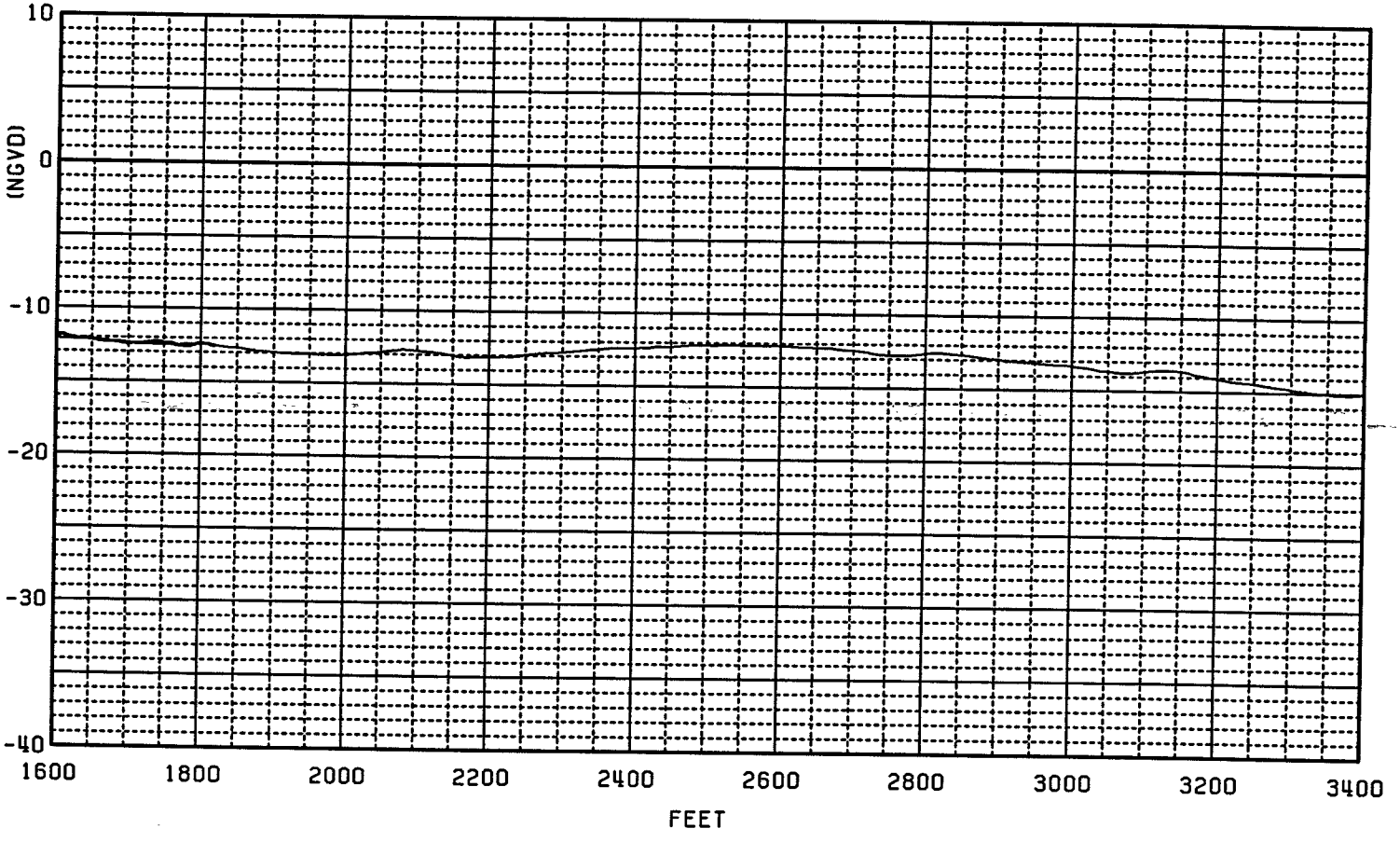
RANGE: R-107A 2/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

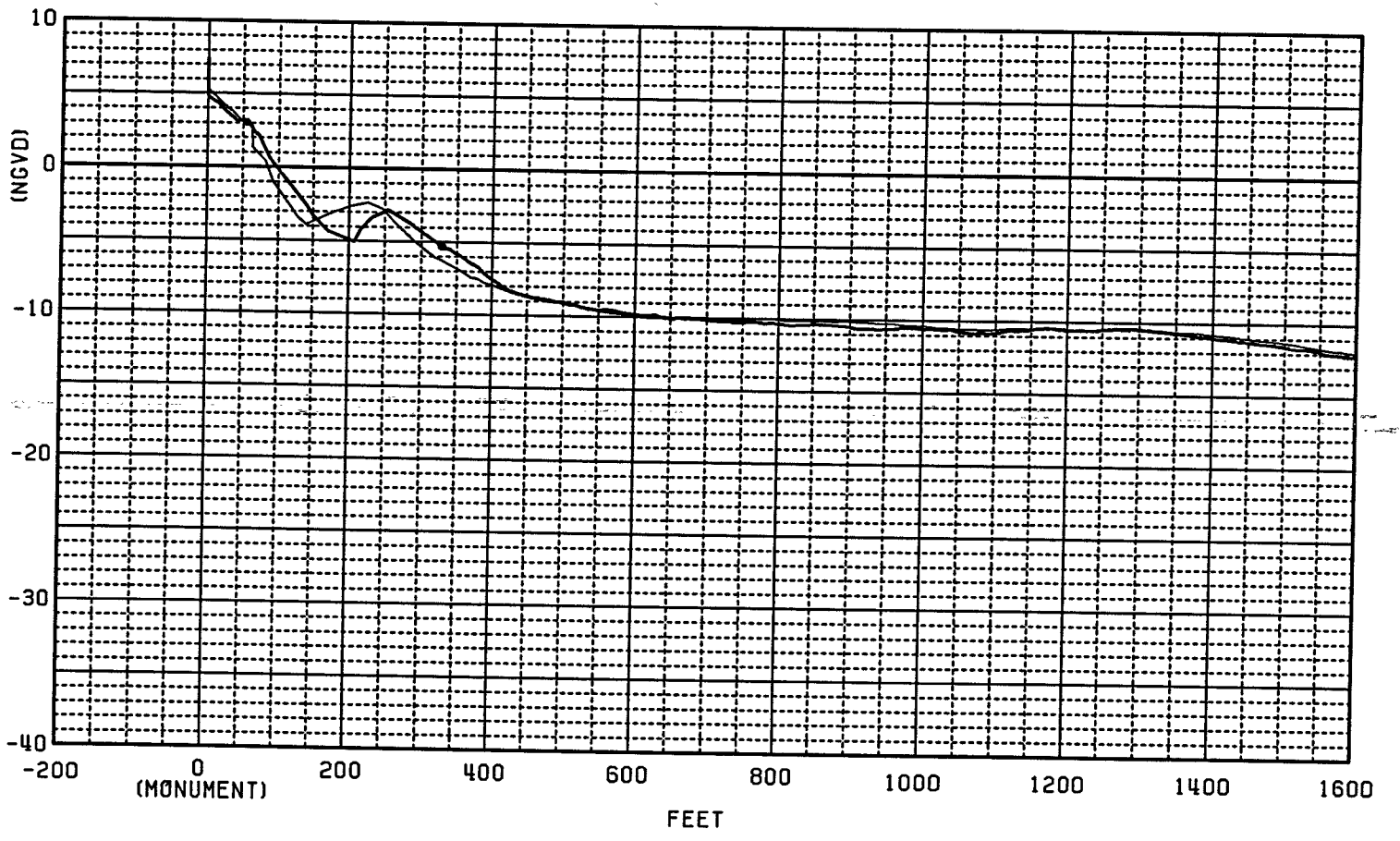
RANGE: R-108G 1/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

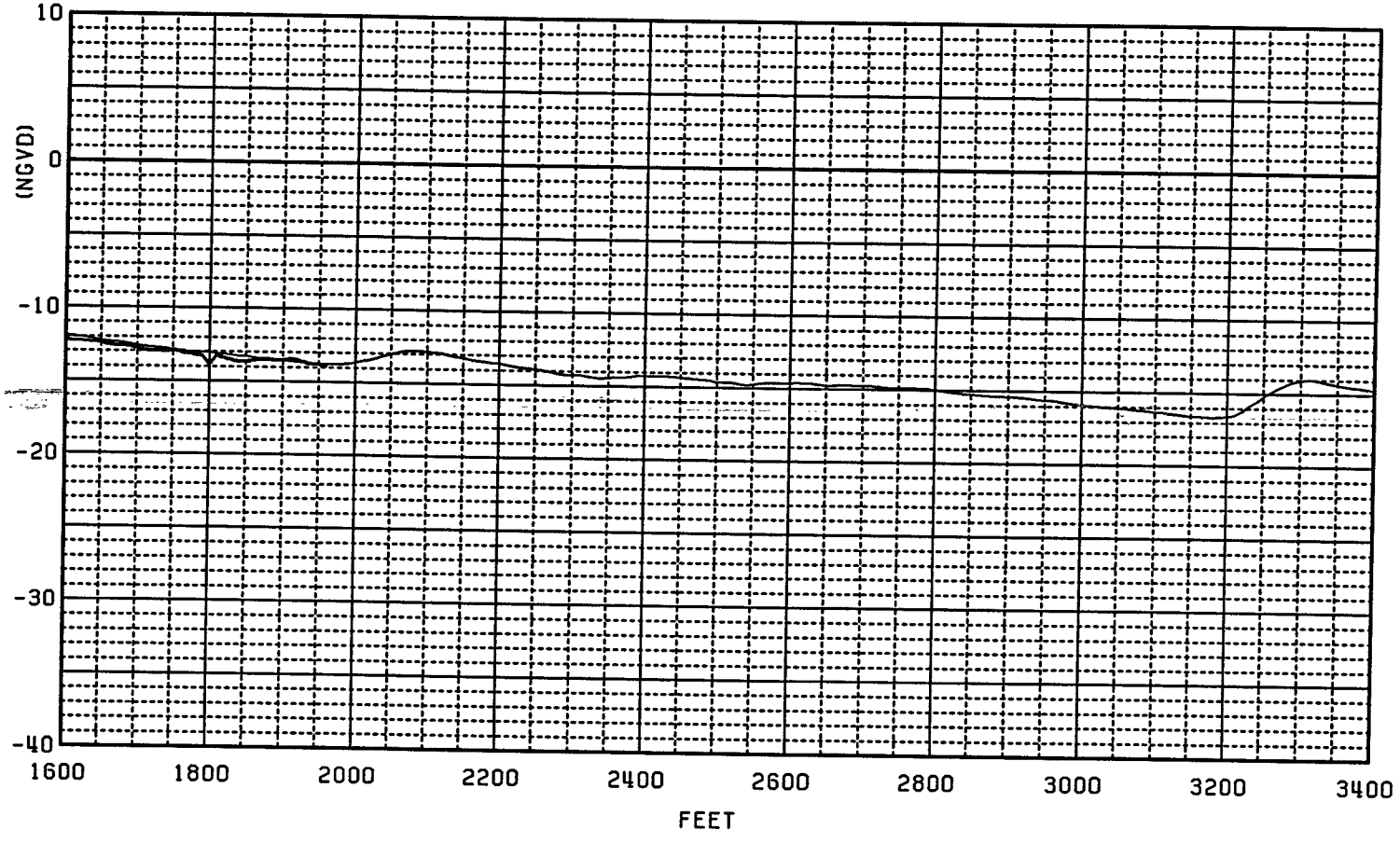
RANGE: R-108G 2/2
SURVEY BEAR (MAG. N): 240
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-109 1/2
SURVEY BEAR (MAG. N): 230
COUNTY: PINELLAS

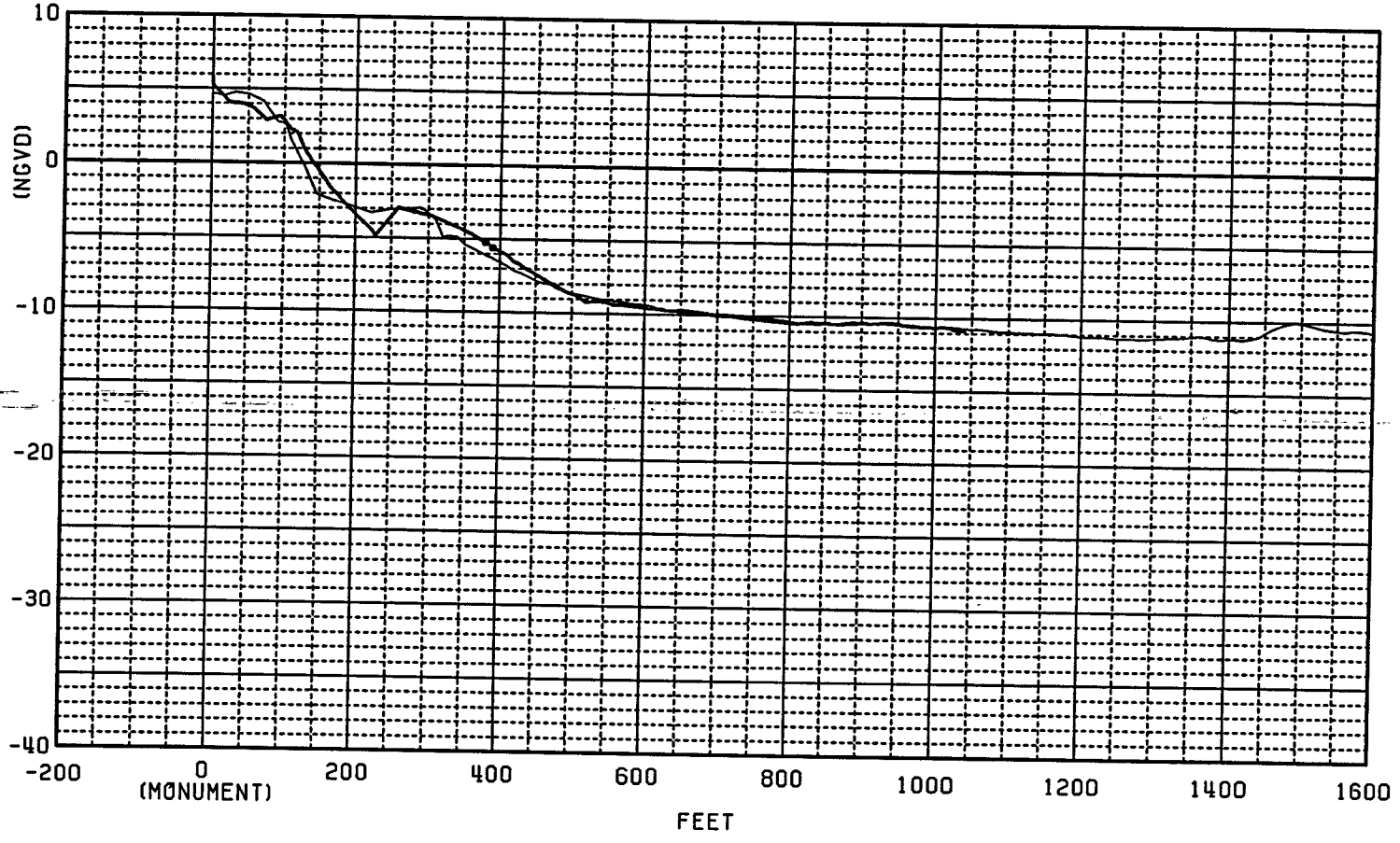



COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-109 2/2
SURVEY BEAR (MAG. N): 230
COUNTY: PINELLAS

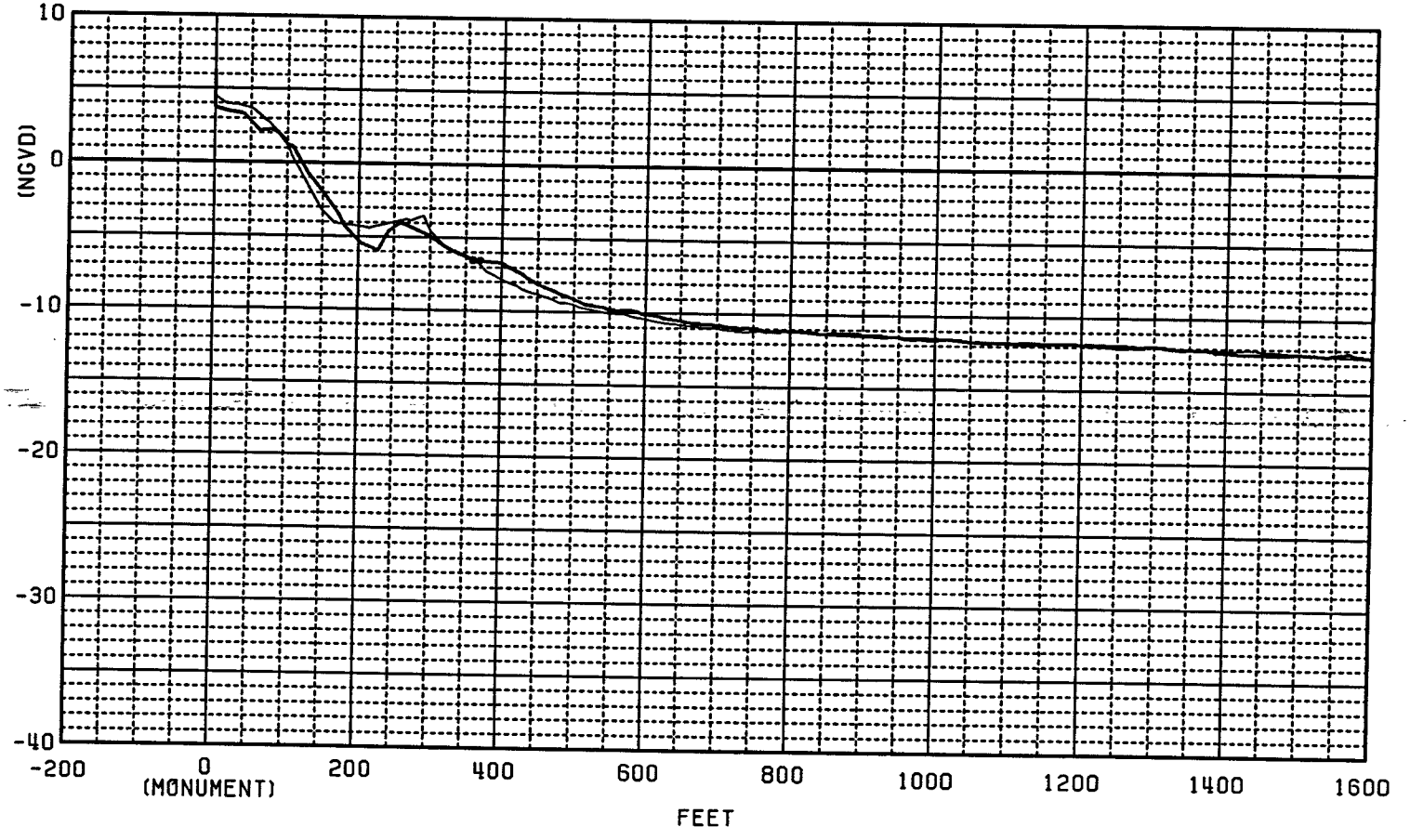
Sh-II-45




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

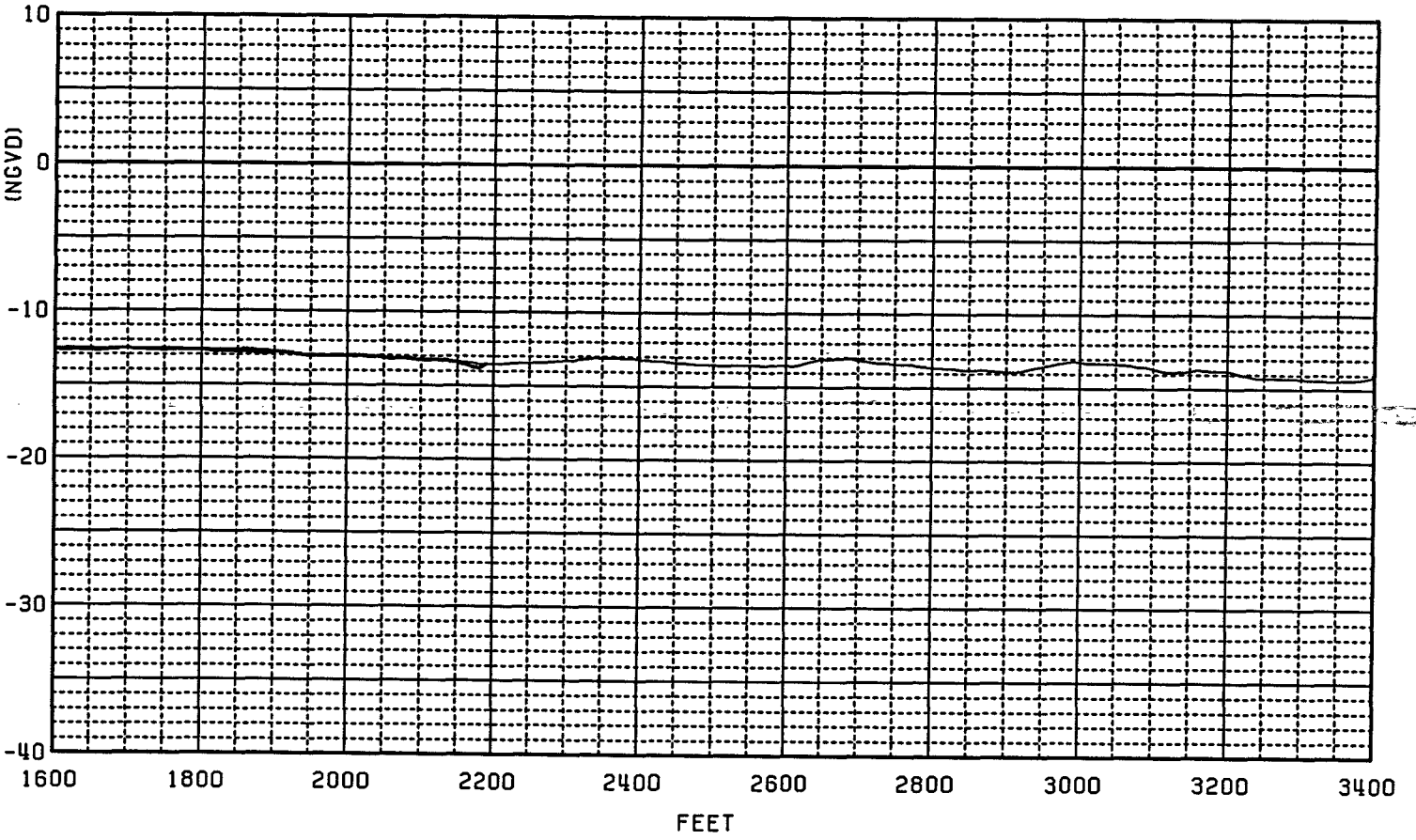
RANGE: R-11OG 1/1
SURVEY BEAR (MAG. N): 220
COUNTY: PINELLAS




COMBINED PROFILE ( NOV88 )
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

COMBINED PROFILE ( JUL88 )
—— MEASURED PROFILE
•- - -• CONSTRUCTED PROFILE

RANGE: R-111G 1/2
SURVEY BEAR (MAG. N) : 220
COUNTY: PINELLAS




COMBINED PROFILE (NOV88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

COMBINED PROFILE (JUL88)
—— MEASURED PROFILE
•---• CONSTRUCTED PROFILE

RANGE: R-111G 2/2
SURVEY BEAR (MAG. N): 220
COUNTY: PINELLAS

# APPENDIX III:

# SUMMARY OF WAVE DATA

# APPENDIX III:
# SUMMARY OF WAVE DATA

WAVE DATA NOTES:

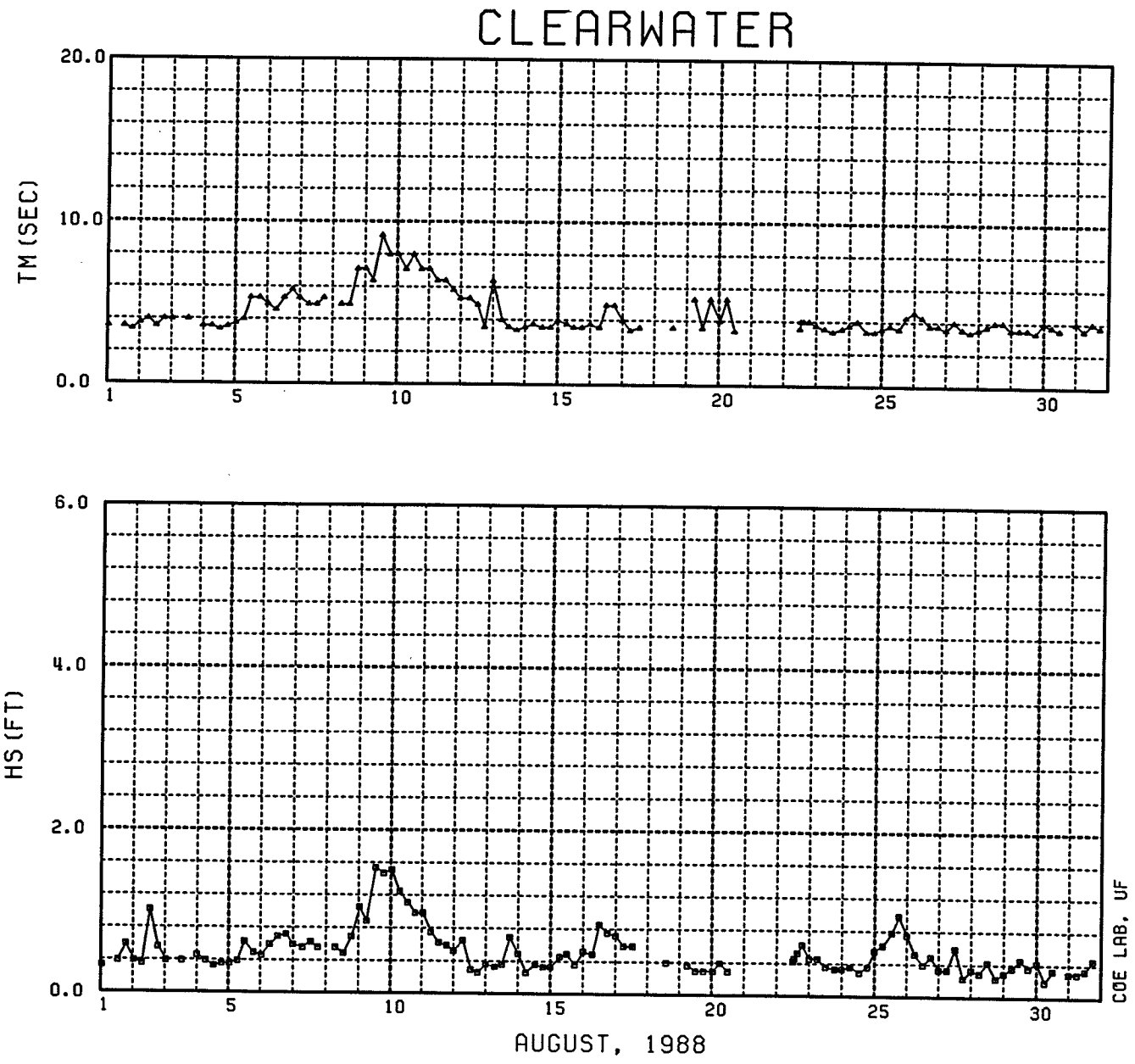
a. Clearwater wave gage station location is at Latitude 27° 58' 44" N, and Longitude 82° 51' 00" W.

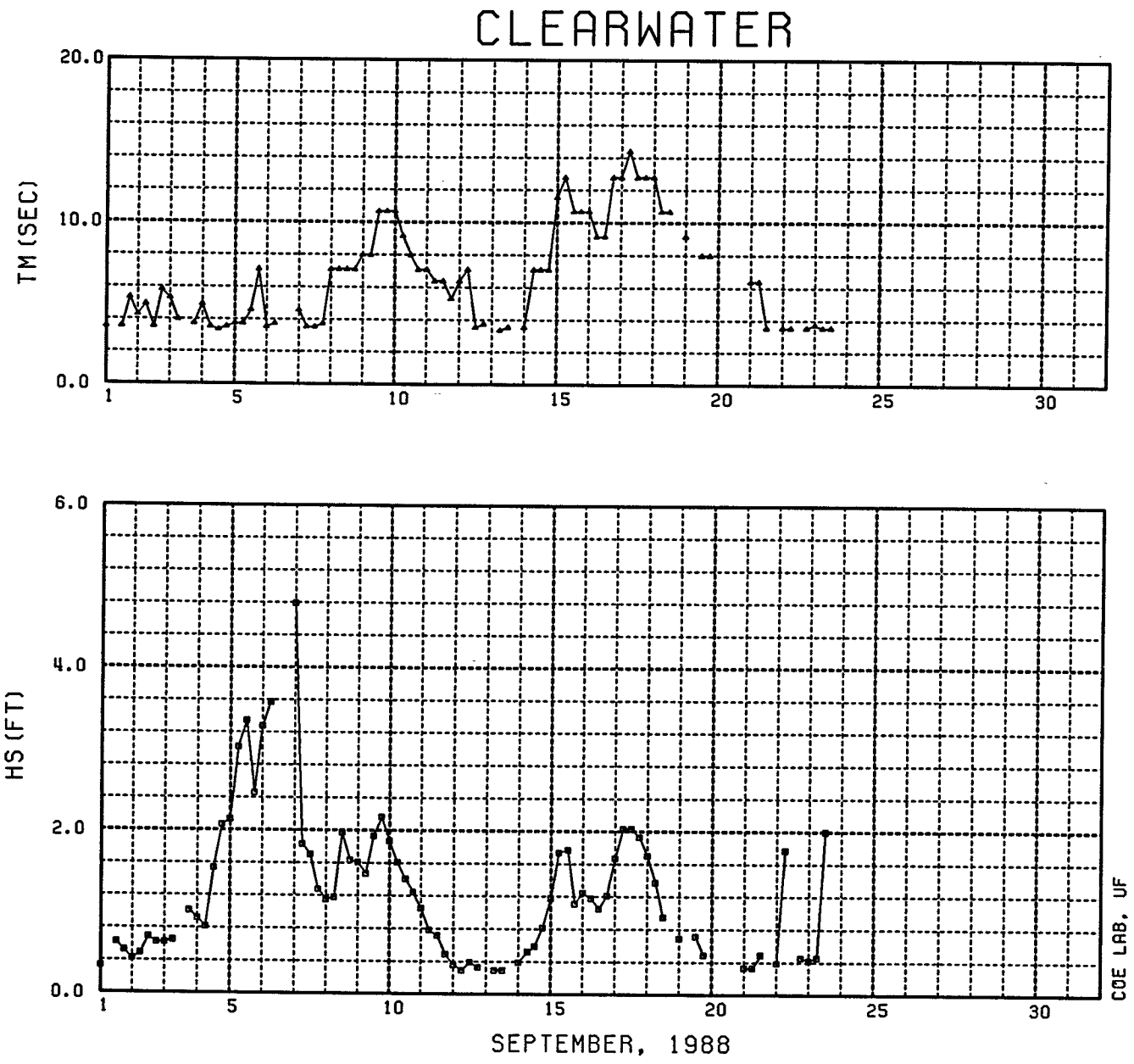
b. Reported wave data include the significant wave height and modal period.

c. Significant wave height is defined as the average height of the one-third highest waves.

d. Modal period is defined as the period where the highest wave energy concentration is observed.

e. Wave direction is not measured by the present wave gage. A directional gage is schedule to be installed in June 1989.


CLEARWATER
TM (SEC)
20.0
10.0
0.0
1
5
10
15
20
25
30
HS (FT)
6.0
4.0
2.0
0.0
AUGUST, 1988
COE LAB, UF


CLEARWATER
TM (SEC)
20.0
10.0
0.0
HS (FT)
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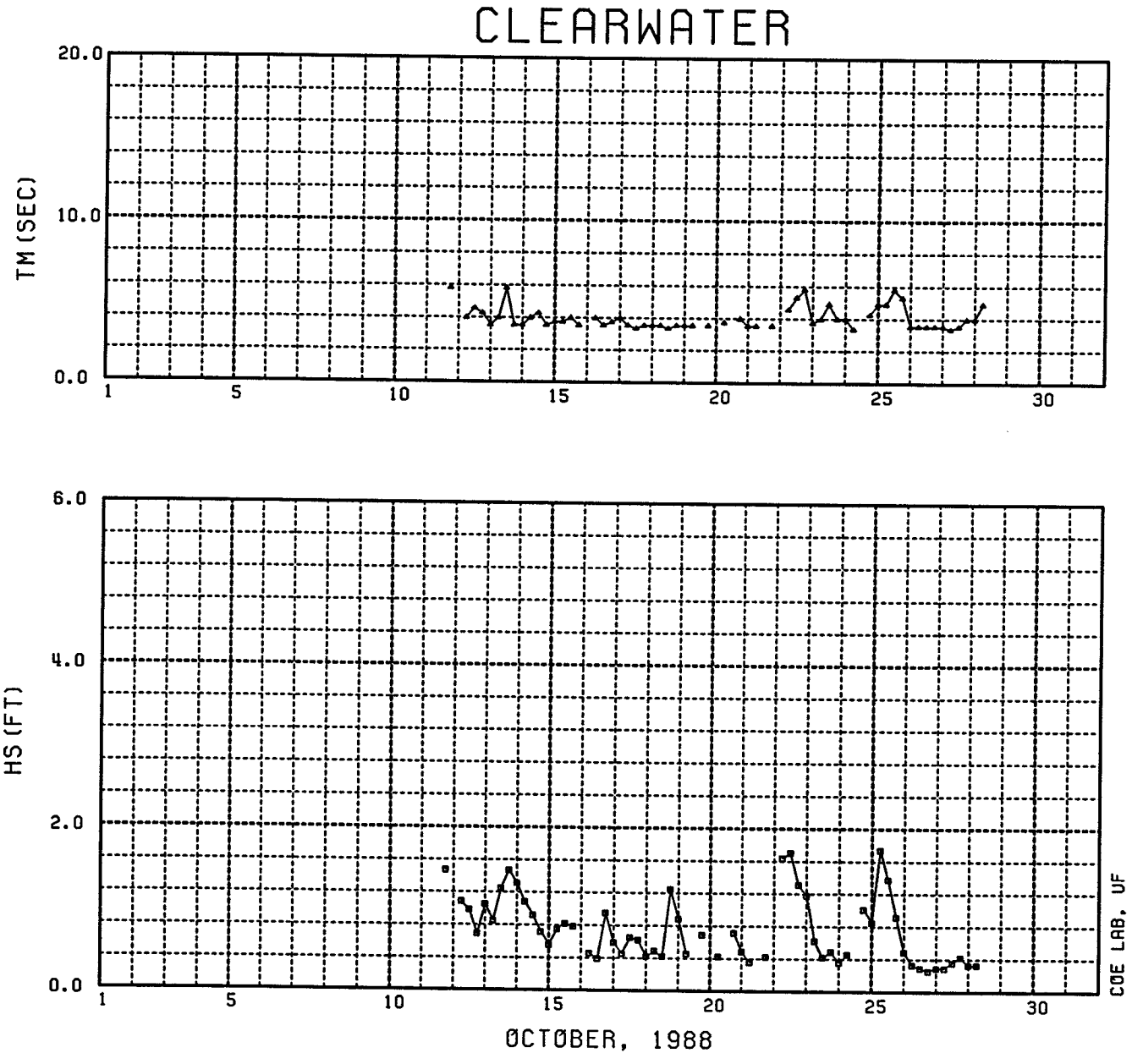
4.0
2.0
0.0
1
5
10
15
20
25
30
SEPTEMBER, 1988
COE LAB, UF


CLEARWATER
TM (SEC)
20.0
10.0
0.0
HS (FT)
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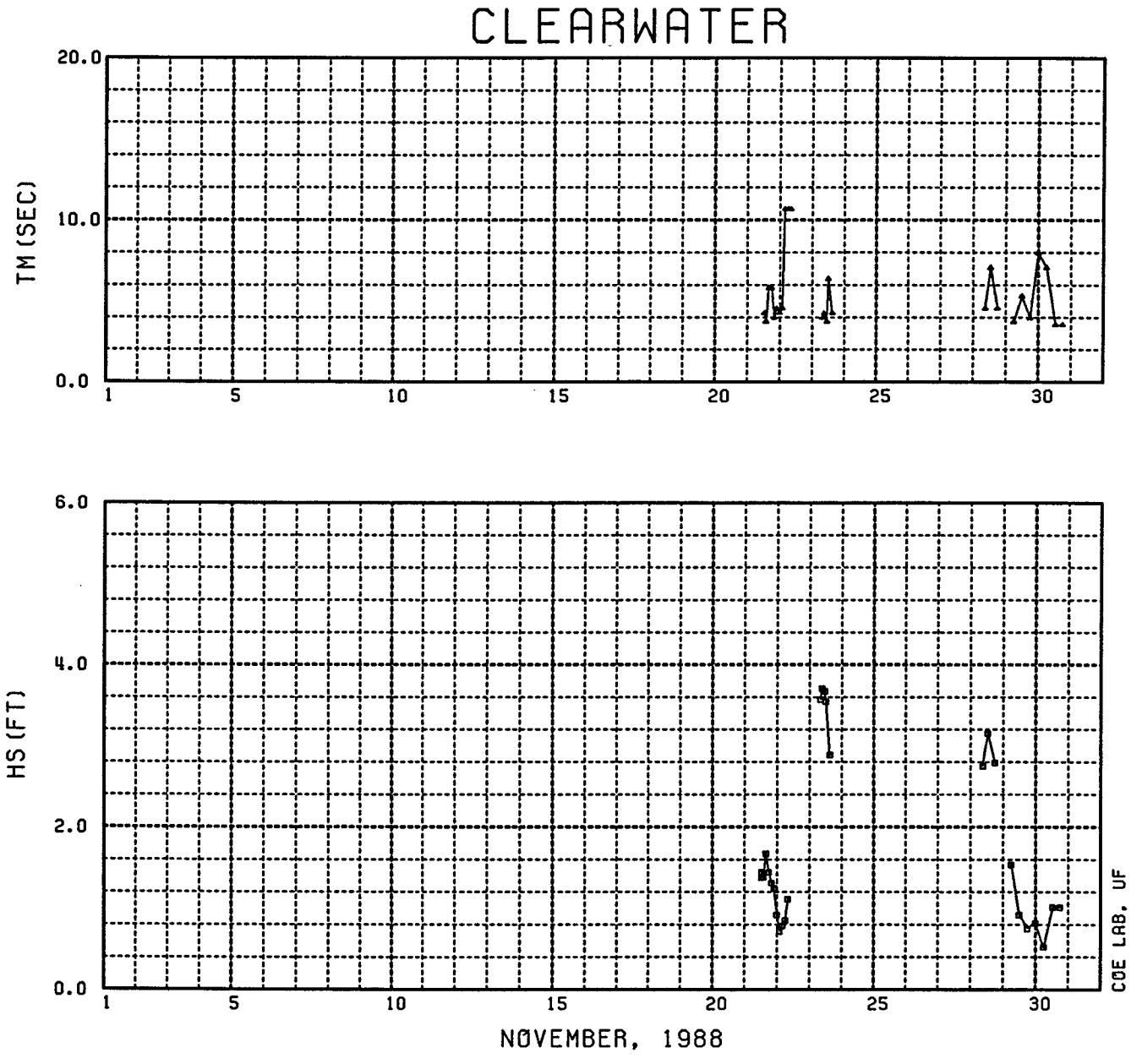
4.0
2.0
0.0
1
5
10
15
20
25
30
OCTOBER, 1988
COE LAB, UF


CLEARWATER
TM (SEC)
20.0
10.0
0.0
1
5
10
15
20
25
30
HS (FT)
6.0
4.0
2.0
0.0
NOVEMBER, 1988
COE LAB, UF