

Appendix A

Details of Channel Geometry

LOS ANGELES RIVER

Description of Invert and Cross Section Data

The Los Angeles River is approximately 52 miles long, with headwaters near Bell Canyon and discharging into the Pacific Ocean. The Los Angeles River drains approximately 832 square miles with contributions from many land uses. The upland area of the watershed is mountainous with steep relief. The lowland area of the watershed is highly urbanized with moderate land slopes. Bridges, piers, and the Sepulveda Dam were not modeled in this study.

Invert Data

For reference, in this study, the I-710 crossing of the Los Angeles River was river station (RS) 0. From the downstream end of the Los Angeles River to the confluence of the Rio Hondo, RS 68,032, invert information was determined from a FEMA flood study HEC2 deck. There were two segments of the Los Angeles River where invert information could not be located. These segments are from RS 68,032 to RS 107,930 and RS 128,648 to RS 190,735. The invert values for these segments were estimated by using linear interpolation between available invert values. From RS 107,930 to RS 128,648 invert information was determined from a FEMA flood study HEC2 deck. From RS 190,735 to the upstream end of the Los Angeles River the invert information was determined from construction plan drawings. It is noted that this information was from documents created in the 1930s. Typical slopes for the Los Angeles River were approximately 0.001 to 0.004 feet/feet. The approximate upstream invert elevation is 780 feet, NGVD and the approximate downstream invert elevation is -10 feet, NGVD.

Cross Section Data

The Los Angeles River cross section in the downstream portions is trapezoidal. The bottom width is 200-400 feet, top width is 400-600 feet and the depth is 20-35 feet. This typical cross section decreases in area in the upstream direction of the river. In the upstream portions of the Los Angeles River the sections are rectangular. Typical widths range from 60-120 feet and the typical depths are 12-20 feet. Cross sectional geometry for the Los Angeles River was determined from OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION MANUAL, LACDA, December 1999, USACE (O&M Manual). Typical sections were published in this report that included descriptions of the low flow channel. The construction plans, as-built drawings, and FEMA flood study HEC2 decks that were reviewed prior to receiving the O&M Manual did not define the low flow channel in the Los Angeles River. The low flow channel geometry was critical to this study. The sections used in the study are shown in figures A.11 to A.20.

COMPTON CREEK

Description of Invert and Cross Section Data

The stationing assigned to Compton Creek began at the downstream end and increased in the upstream direction. The downstream station was RS 8,000. This location is the confluence of Compton Creek with the Los Angeles River. The confluence is approximately 5.8 miles upstream of the mouth of the Los Angeles River. The studied portion of Compton Creek is approximately 8.5 miles. Compton Creek drains a highly urbanized area. The subwatershed is approximately 40 square miles.

Invert Data

Construction plans were used to define the invert of Compton Creek. The plans were dated from the 1940s and 1950s. Typical slopes for this reach ranged from approximately 0.001 to 0.004 feet/foot. The approximate upstream invert elevation is 115 feet, NGVD and the approximate downstream invert elevation is 30 feet, NGVD.

Cross Section Data

Compton Creek does not have a low flow channel. The upper three-fourths of the reach are mostly rectangular in shape. The section bottom was constructed with cross slopes that create a wide angle "V" bottom. Typical widths are 20-50 feet and depth ranges from 8-15 feet. The downstream most fourth of the reach is a wide trapezoidal section with a natural bottom. The bed in this portion is marsh-like. The typical bottom width of this section is approximately 80 feet and the top width is approximately 150 feet. Typical depth is approximately 12 feet. The sections used in the study are shown in figures A.27 to A.31.

RIO HONDO

Description of Invert and Cross Section Data

The stationing assigned to the Rio Hondo began at the downstream end and increased in the upstream direction. The downstream station was RS 0. This location is the confluence of the Rio Hondo with the Los Angeles River. The confluence is approximately 12.4 miles upstream of the mouth of the Los Angeles River. The studied portion of the Rio Hondo is approximately 8.3 miles. The Rio Hondo drains a highly urbanized area in the lower reaches and moderately developed areas in the upper reaches. During high flow events, water is passed from the neighboring San Gabriel to the Rio Hondo. The subwatershed is approximately 150 square miles. The Whittier Narrows Dam and Rio Hondo Spreading grounds are not modeled in this study.

Invert Data

Invert information for the Rio Hondo was derived from a FEMA flood study HEC2 deck. The studied segment is from the confluence of the Rio Hondo with the Los Angeles River to the Whittier Narrows Dam. Typical slopes for this reach ranged from approximately 0.001 to 0.003 feet/feet. The approximate upstream invert elevation is 236 feet, NGVD and the approximate downstream invert elevation is 82 feet, NGVD.

Cross Section Data

Cross sectional information for the Rio Hondo was determined from typical section sketches in the O&M Manual. The existing sections are characterized as wide trapezoidal sections. The typical bottom width of this section is approximately 100 feet and the top width is approximately 200 feet. The approximate channel depth is 20 feet. A low flow channel was modeled for the entire length of the water course because of the dry weather, low flow values. However, the reviewed material available did not indicate that there was a low flow channel in any part of the modeled segment. The geometry of the low flow channel was assumed based on review of other low flow channels in this study. The section used in the study is shown in figure A.34

ARROYO SECO

Description of Invert and Cross Section Data

The stationing assigned to Arroyo Seco began at the downstream end and increased in the upstream direction. The downstream station was RS 1,000. This location is the confluence of Arroyo Seco with the Los Angeles River. The confluence is approximately 24.5 miles upstream of the mouth of the Los Angeles River. The studied portion of the Arroyo Seco is approximately 9.6 miles. The Arroyo Seco drains a highly urbanized area in the lower reaches and less developed areas in the upper reaches. The subwatershed is approximately 50 square miles. The Devils Gate Dam and Colorado Street impoundment are not modeled in this study.

Invert Data

The Arroyo Seco invert information was determined from construction plans, as-built drawings, and engineering judgement. The bed slope is less steep in the lower reaches which range from approximately 0.003 to 0.010 feet/foot. The bed slope becomes increasingly steeper in the upper reaches. In these reaches the slope ranges from approximately 0.010 to 0.020 feet/foot. The approximate upstream invert elevation is 940 feet, NGVD and the approximate downstream invert elevation is 296 feet, NGVD.

Cross Section Data

The Arroyo Seco cross sectional information was determined from construction plans, as-built drawings, and engineering judgement. There are many transitions from rectangular to trapezoidal sections, and back, along the Arroyo Seco. Typical cross sections are 20-80 feet in width and 8-12 feet in depth. The section bottoms vary between a rectangular or trapezoidal low flow channel to a wide angle "V" bottom. The sections used in the study are shown in figures A.37 to A.42.

VERDUGO WASH

Description of Invert and Cross Section Data

The stationing assigned to Verdugo Wash began at the downstream end and increased in the upstream direction. The downstream station was RS 100. This location is the confluence of Verdugo Wash with the Los Angeles River. The confluence is approximately 31.1 miles upstream of the mouth of the Los Angeles River. The studied portion of the Verdugo Wash is approximately 9.3 miles. Verdugo Wash drains an urbanized area in the lower reaches and less developed, mountainous areas in the upper reaches. The subwatershed is approximately 25 square miles. The upstream end of Verdugo Wash is at the confluence of Blanchard Canyon Channel and Las Barras Canyon.

Invert Data

The Verdugo Wash invert information was determined from construction plans, as-built drawings, and engineering judgement. The bed slope is steep for the entire water course which ranges from approximately 0.010 to 0.050 feet/feet. The bed slope becomes increasingly steeper in the upper reaches. The approximate upstream invert elevation is 1,700 feet, NGVD and the approximate downstream invert elevation is 427 feet, NGVD. However, due to low flows and steep slopes, the bed slope of Verdugo Wash was assumed to be constant. This slope was determined by using the average slope of the Arroyo Seco. For model input, the upstream invert elevation is entered as approximately 1,080 feet, NGVD.

Cross Section Data

Cross sectional information was determined from construction plans and as-built drawings from 1935 and 1968, and typical section sheets in the O&M Manual. The majority of the Verdugo Wash length is a rectangular section. Typical cross sections are 25-90 feet in width and 7-10 feet in depth. The construction plan and as-built data reviewed did not show any low flow channel in Verdugo Wash. However, there were recent photographs that showed a low flow channel. Using the best information available and engineering judgement, an assumed low flow channel was added to the entire reach. This aided in model calculations during low flow dry weather events. The sections used in the study are shown in figures A.45 to A.52. The head of Verdugo Wash is the confluence of Blanchard Canyon Channel and Las Barras Canyon. The most upstream cross section of Verdugo Wash was repeated upstream to represent the Las Barras Canyon.

BURBANK CHANNEL – WESTERN SYSTEM

Description of Invert and Cross Section Data

The stationing assigned to Burbank Channel – Western System began at the downstream end and increased in the upstream direction. The downstream station was RS 0. This location is the confluence of Burbank Channel – Western System with the Los Angeles River. The confluence is approximately 32.4 miles upstream of the mouth of the Los Angeles River. The studied portion of the Burbank Western Channel is approximately 6.2 miles. The Burbank Western Channel drains an urbanized area in the lower reaches and less developed, mountainous areas in the upper reaches. The subwatershed is approximately 29 square miles. The upstream end of the Burbank Western Channel is at the confluence of La Tuna Canyon Lateral and Hansen Heights Channel.

Invert Data

The Burbank Western Channel invert information was determined from construction plans, as-built drawings, and engineering judgement. The bed slope is steep for the entire water course, which ranges from approximately 0.007 to 0.020 feet/feet. The approximate upstream invert elevation is 876 feet, NGVD and the approximate downstream invert elevation is 455 feet, NGVD.

Cross Section Data

Burbank Channel – Western System consists of both closed and open conduit sections. More than half of the reach in this study is closed. These sections were entered as open channel sections. The discharge values that were evaluated in this study never caused the closed conduits to flow full. The entire reach is made up of rectangular sections. The typical width ranges from 30-60 feet and the depth ranges from 12-16 feet. A low flow channel was modeled for the entire length of the water course because of the dry weather, low flow values. However, the reviewed material available did not indicate that there was a low flow channel in any part of the modeled segment. The geometry of the low flow channel was assumed based on review of other low flow channels in this study. The sections used in the study are shown in figures A.54 and A.55.

TUJUNGA WASH

Description of Invert and Cross Section Data

The stationing assigned to Tujunga Wash began at the downstream end and increased in the upstream direction. The downstream station was RS 0. This location is the confluence of Tujunga Wash with the Los Angeles River. The confluence is approximately 38.0 miles upstream of the mouth of the Los Angeles River. The studied portion of Tujunga Wash is approximately 9.7 miles. Tujunga Wash drains an urbanized area in the lower reaches and protected mountainous areas in the upper reaches. The subwatershed is approximately 230 square miles. This is approximately 25 percent of the total Los Angeles River watershed. Pacoima Wash connects to Tujunga Wash through at least two conduits. The Pacoima Diversion Channel connects the Pacoima Spreading Grounds to the Tujunga Wash Spreading Grounds. The Pacoima Wash appears to take two paths at the intersection with the Southern Pacific Railroad, downstream of the Pacoima Wash Spreading Grounds, according to a USGS quad map. A channel is shown to connect to Tujunga Wash from Pacoima Wash that runs parallel and on the north side of the Southern Pacific Railroad. A second flow path is shown to flow underneath the Southern Pacific Railroad but does not result in a termination with another water course. The upstream end of Tujunga Wash in this study is at the Hansen Dam. The Hansen Dam and spreading grounds along the studied segment were not modeled in this study.

Invert Data

There were no invert data available for the Tujunga Wash. Bed slopes were determined from USGS 7.5-minute quad maps. A downstream invert from the Los Angeles River was used with these slopes to calculate invert information in the Tujunga Wash. The bed slope for this water course ranged from approximately 0.003 to 0.010 feet/feet. The approximate upstream invert elevation is 990 feet, NGVD and the approximate downstream invert elevation is 566 feet, NGVD.

Cross Section Data

Cross sectional information was determined from typical section sheets in the O&M Manual. The reach of Tujunga Wash in this study is a rectangular section. Typical cross sections are 60-70 feet in width and 11-13 feet in depth. The construction plans, as-built drawings, and typical section sheets in the O&M Manual reviewed did not show any low flow channel in Tujunga Wash. However, there were recent photographs that showed a low flow channel. Using the best information available and engineering judgement, an assumed low flow channel was added to the entire reach. This was beneficial to model calculations during dry weather events. The sections used in the study are shown in figures A.58 to A.60.

BELL CREEK

Description of Invert and Cross Section Data

The stationing assigned to Bell Creek began at the downstream end and increased in the upstream direction. The downstream station was RS 0. This location is the confluence of Bell Creek with the Los Angeles River. The confluence of Bell Creek with Arroyo Calabasas forms the headwaters of the Los Angeles River. This is approximately 52.0 miles upstream of the mouth of the Los Angeles River. The studied portion of Bell Creek is approximately 3.9 miles. Bell Creek drains an urbanized area in the lower reaches and mountainous areas in the upper reaches. The subwatershed is approximately 18 square miles.

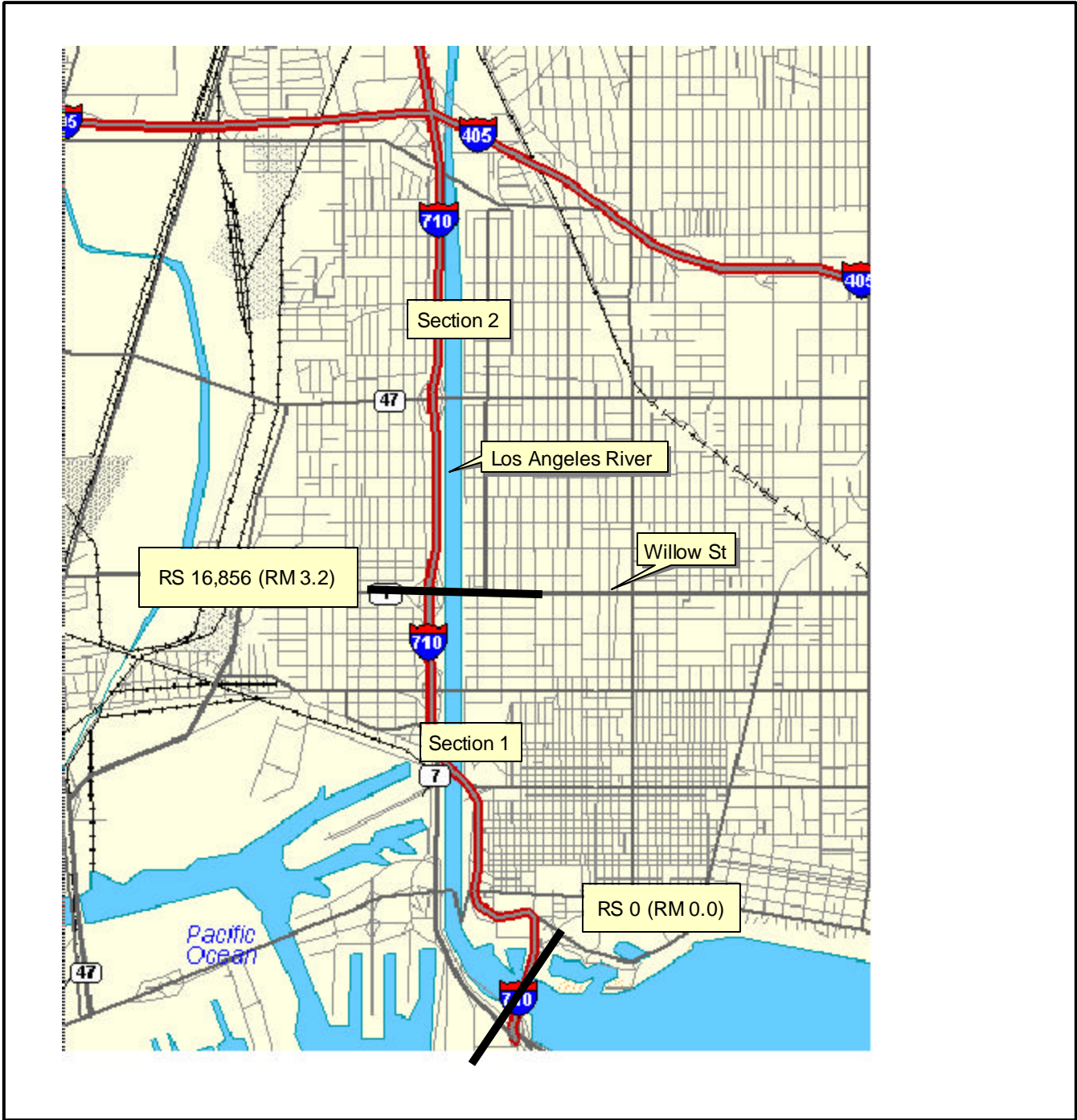
Invert Data

There were no invert data available for Bell Creek. Bed slopes were determined from USGS 7.5-minute quad maps. A downstream invert from the Los Angeles River was used with these slopes to calculate invert information in Bell Creek. The slope for this water course ranged from approximately 0.002 to 0.020 feet/foot. The upstream portion of Bell Creek extended into mountainous terrain. The approximate upstream invert elevation is 1,040 feet, NGVD and the approximate downstream invert elevation is 781 feet, NGVD.

Cross Section Data

There were no cross sectional data available for Bell Creek. There were a limited number of photographs for Bell Creek. A representative cross section for Bell Creek was developed from the upstream section of the Los Angeles River, photographs of the Bell Creek confluence, and engineering judgement. The section was rectangular with a width of 60 feet and a depth of 11 feet. An assumed section bottom was input with cross slopes that create a wide angle "V" bottom. The section used in the study is shown in figure A.62.

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 1 and 2



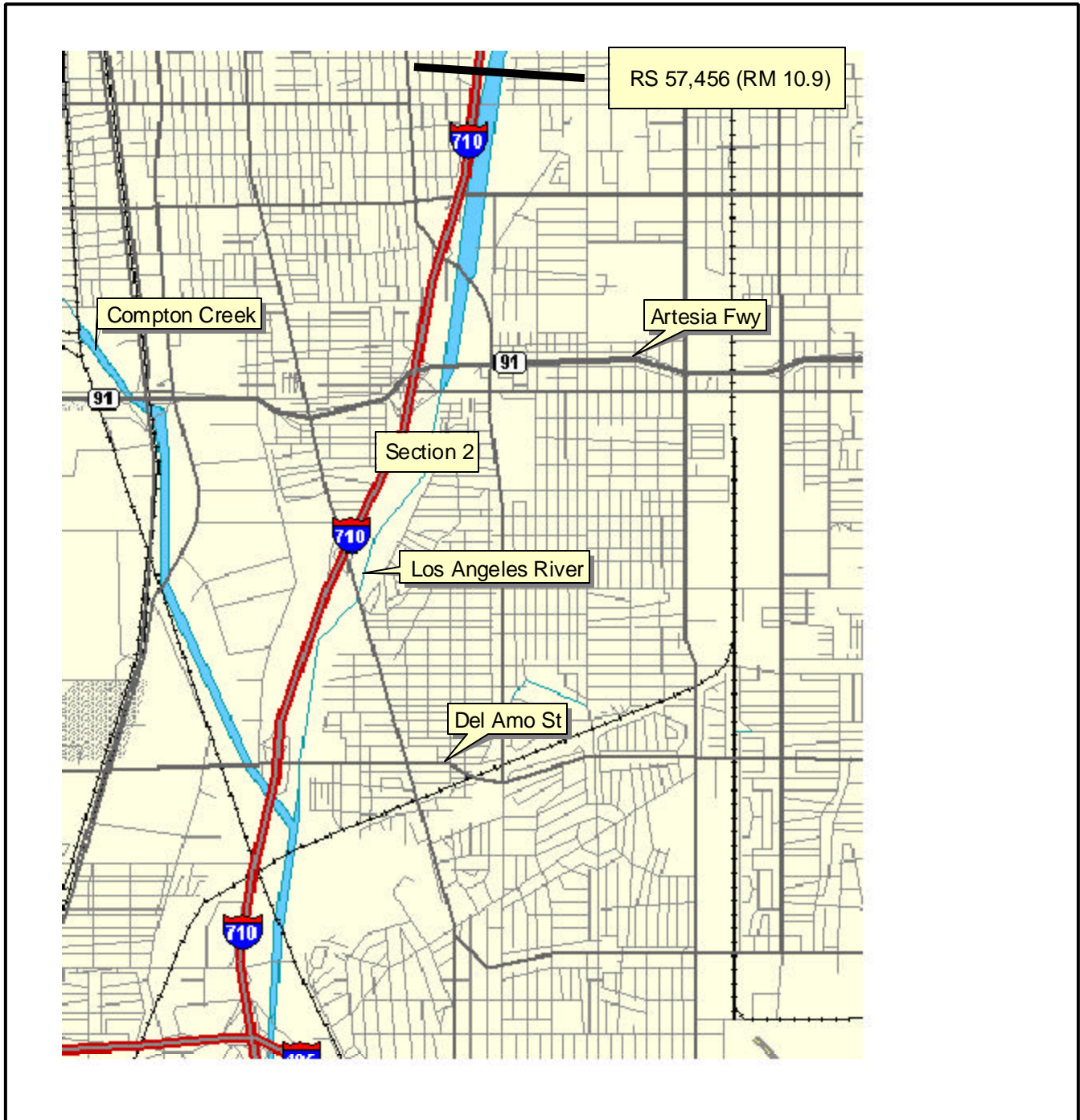
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.1

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Section 2



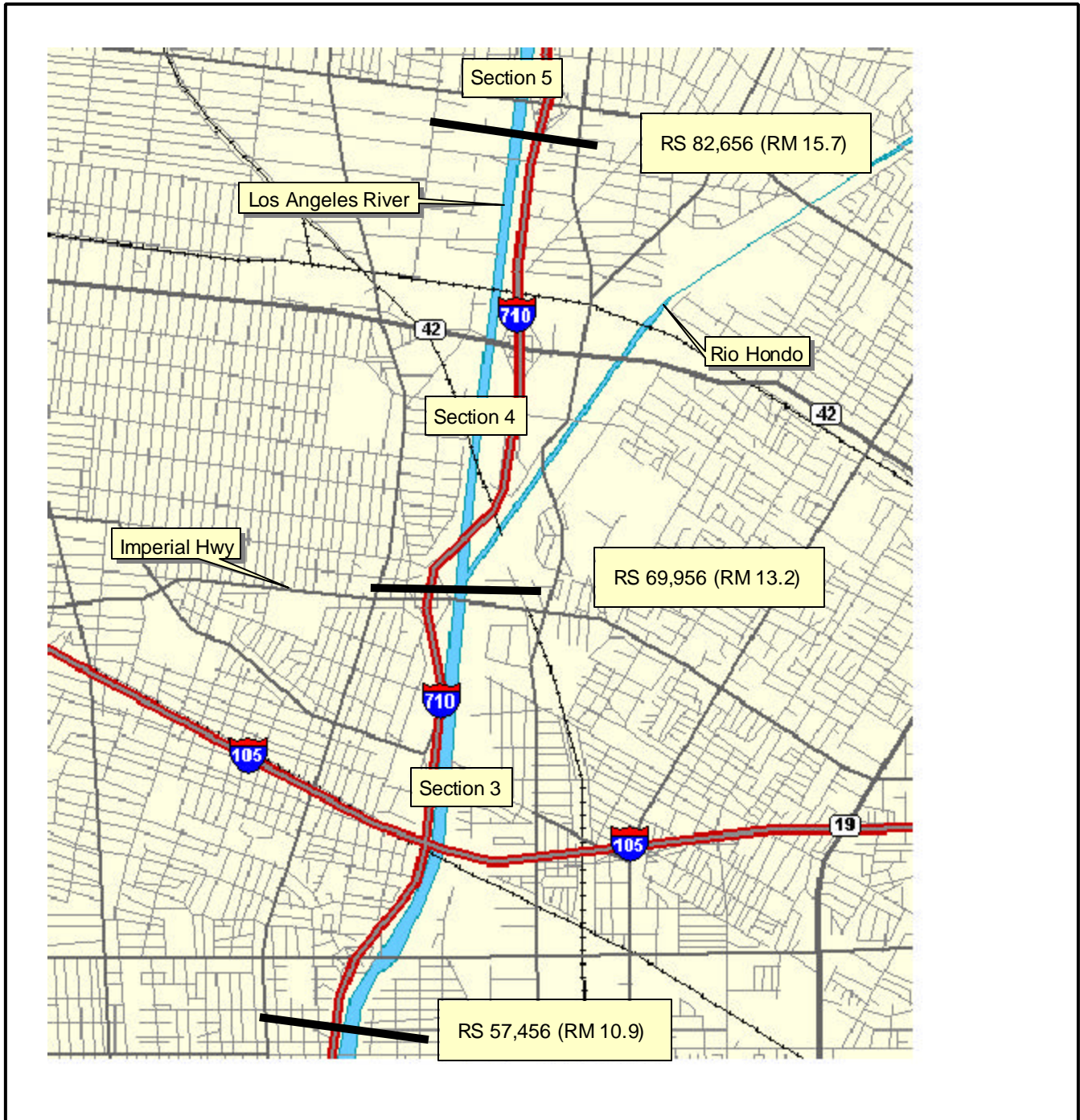
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.2

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 3, 4, and 5



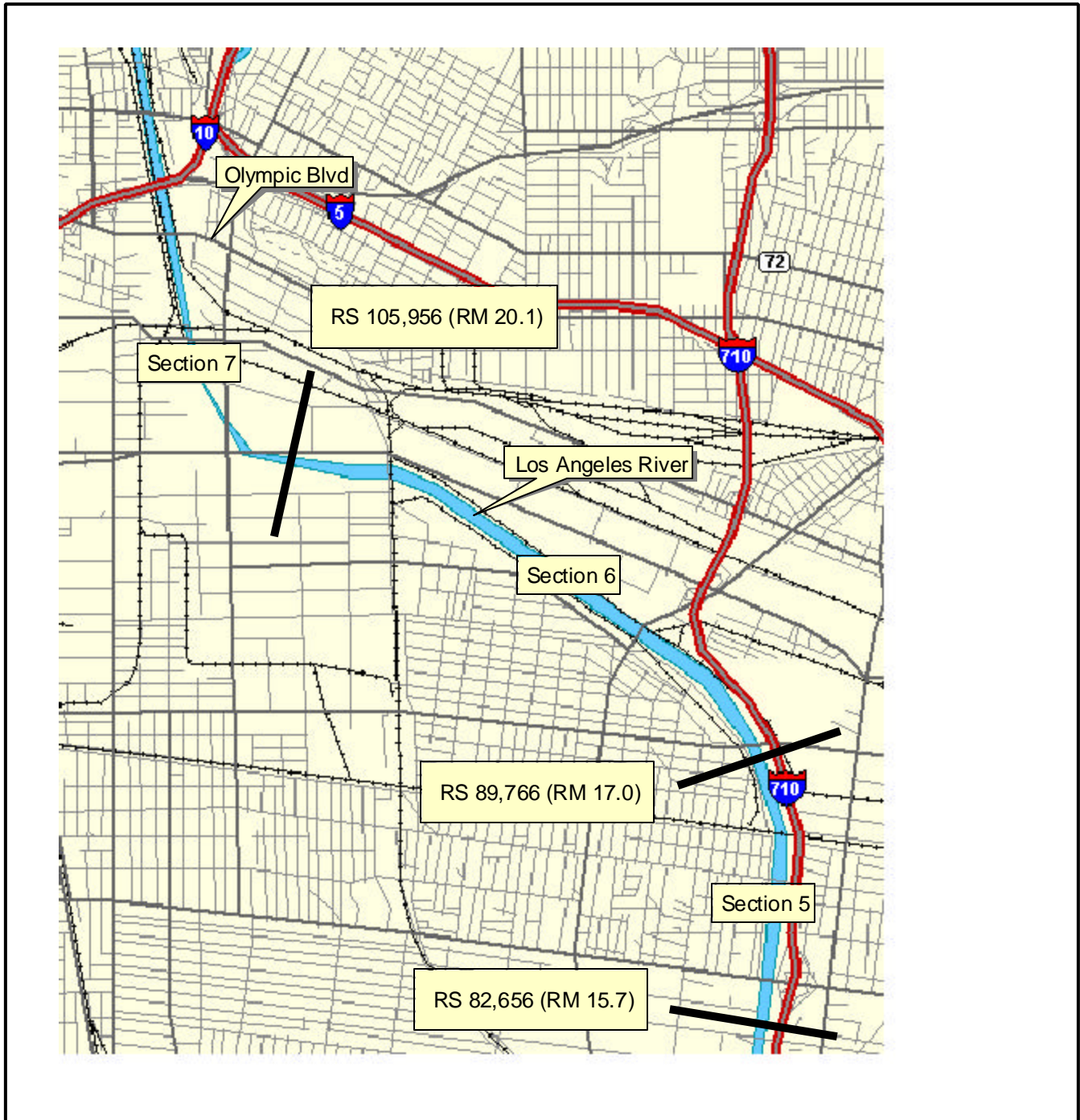
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.3

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 5, 6, and 7



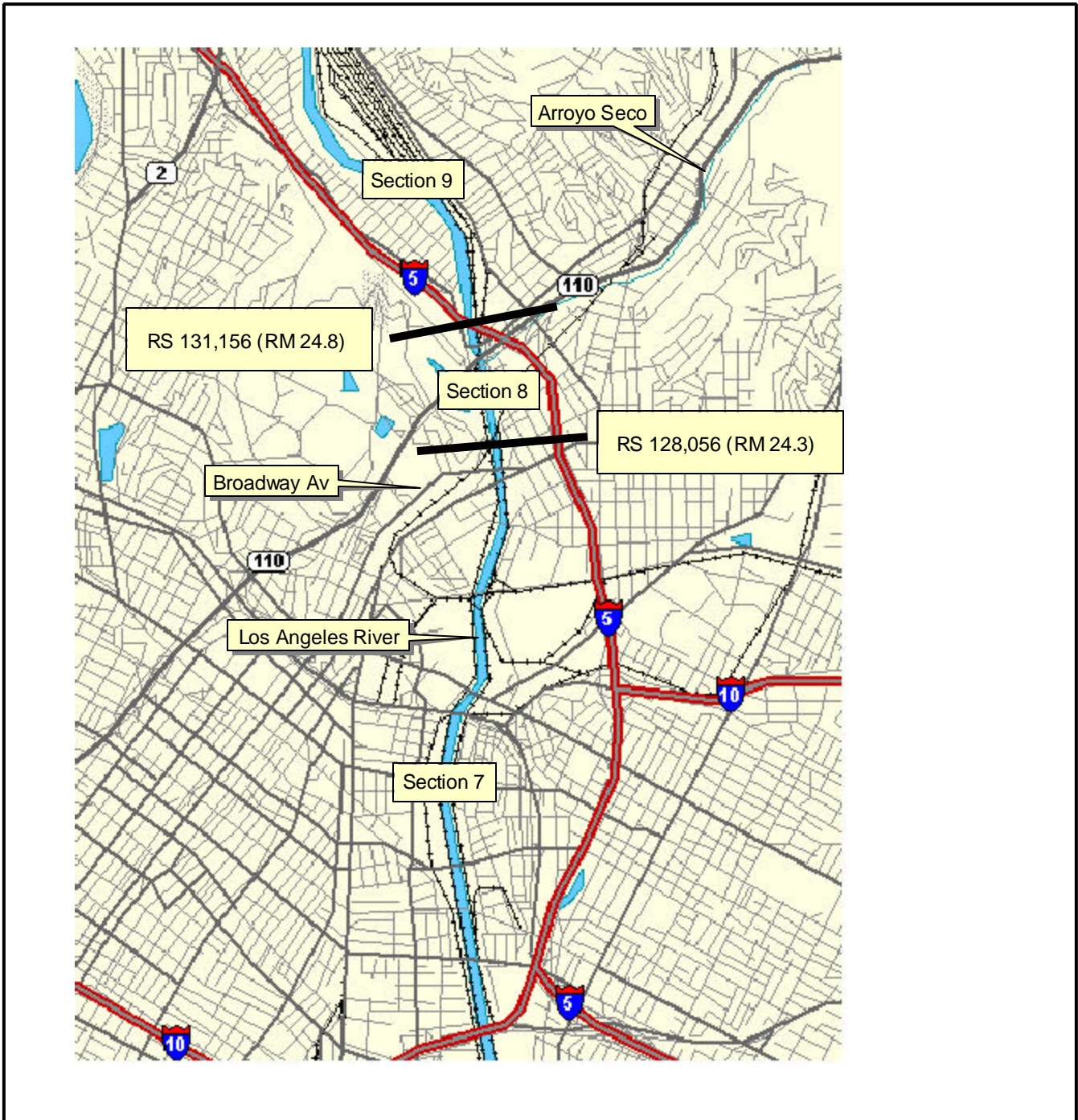
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.4

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 7, 8, and 9



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.5

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 9 and 10



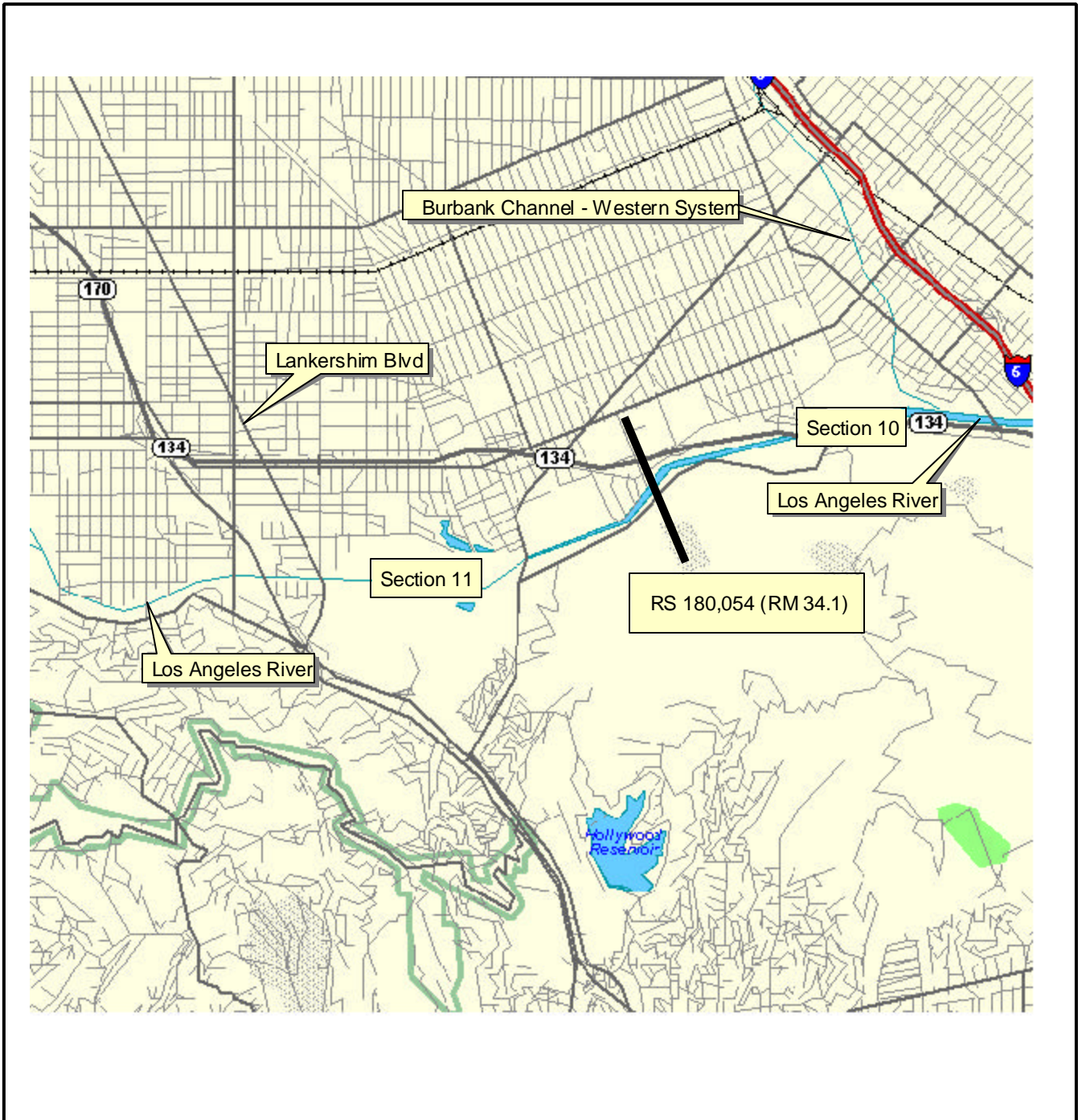
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.6

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 10 and 11



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.7

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 11, 12, and 13



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.8

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Sections 13 and 14



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.9

EFDC MODEL CROSS SECTION LOCATION Los Angeles River - Section 14



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.10

EFDC MODEL CROSS SECTION
Los Angeles River - Section 1
RS 0 to RS 16,856 (RM 0.0 to RM 3.2)

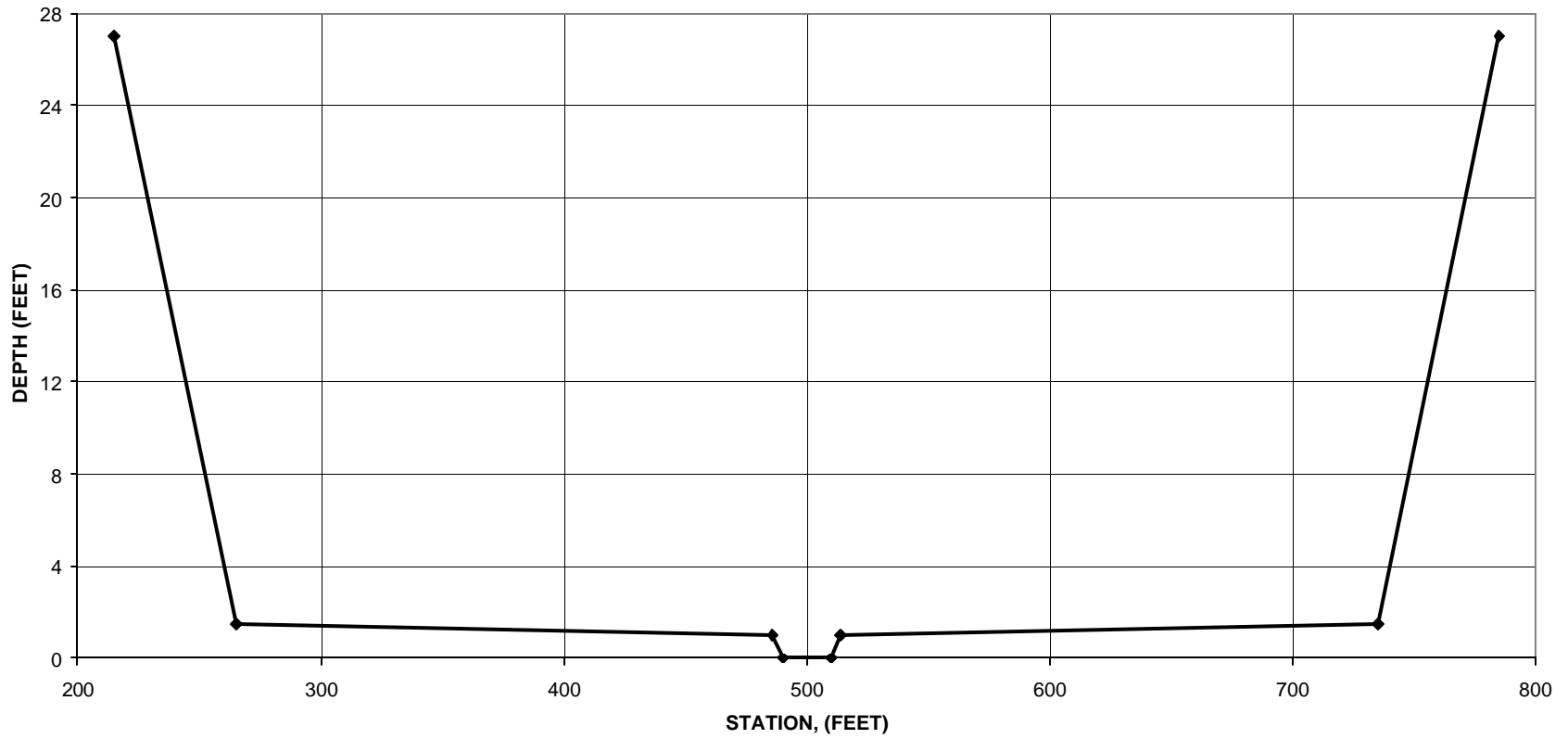


FIGURE A.11

**EFDC MODEL CROSS SECTION
Los Angeles River - Section 2
RS 16,856 to RS 57,456 (RM 3.2 to RM 10.9)**

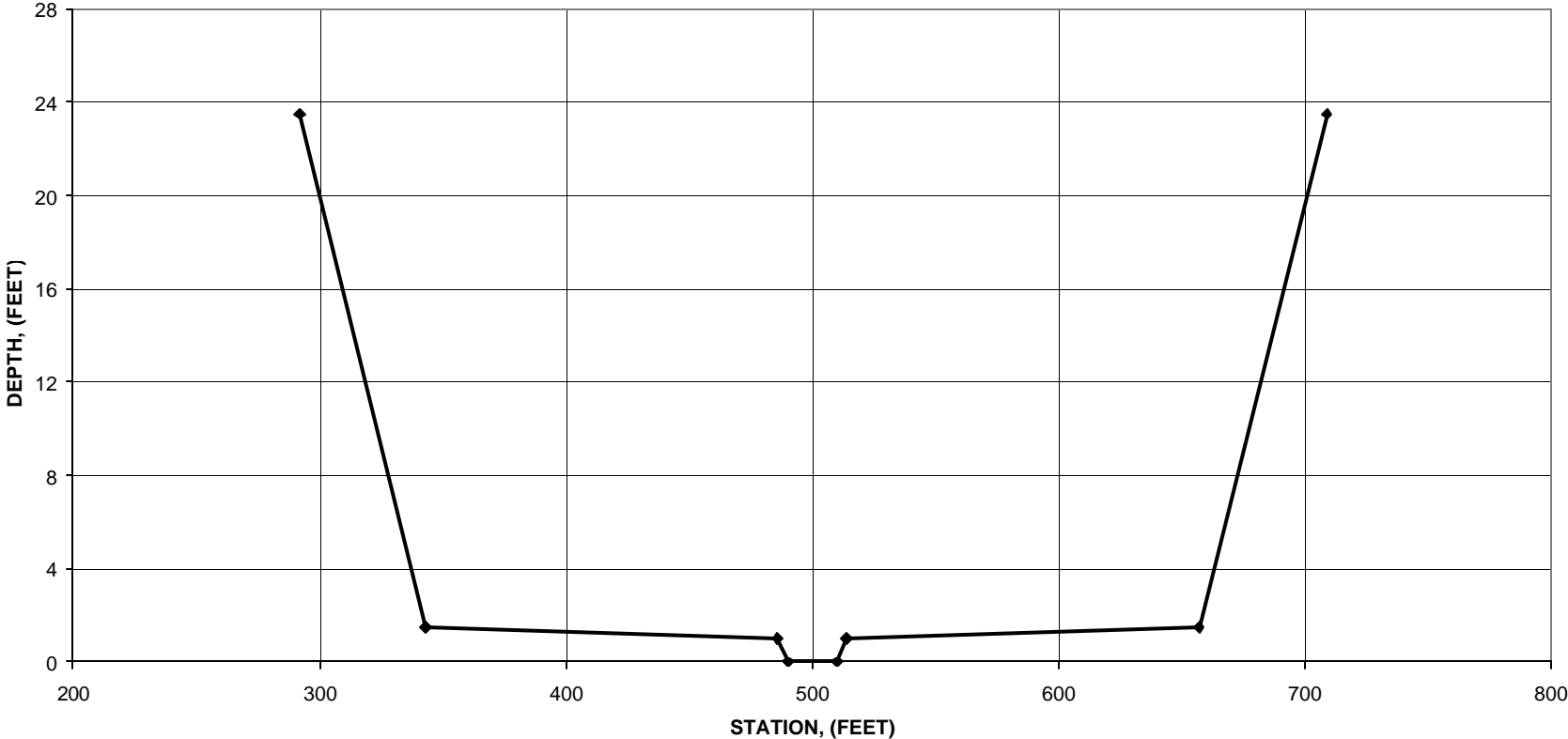


FIGURE A.12

EFDC MODEL CROSS SECTION
Los Angeles River - Section 3
RS 57,456 to RS 69,956 (RM 10.9 to RM 13.2)

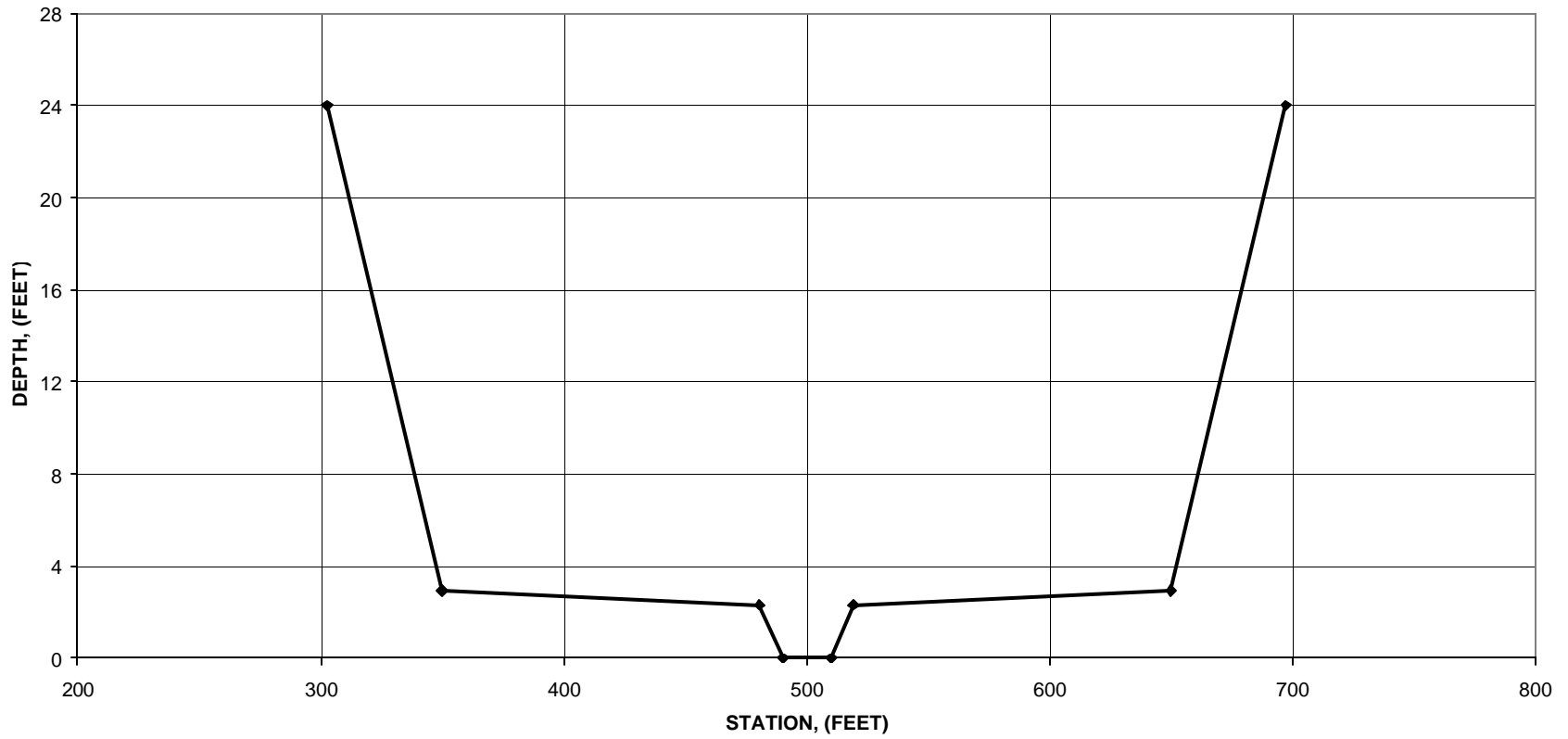


FIGURE A.13

EFDC MODEL CROSS SECTION
Los Angeles River - Section 4
RS 69,956 to RS 82,656 (RM 13.2 to RM 15.7)

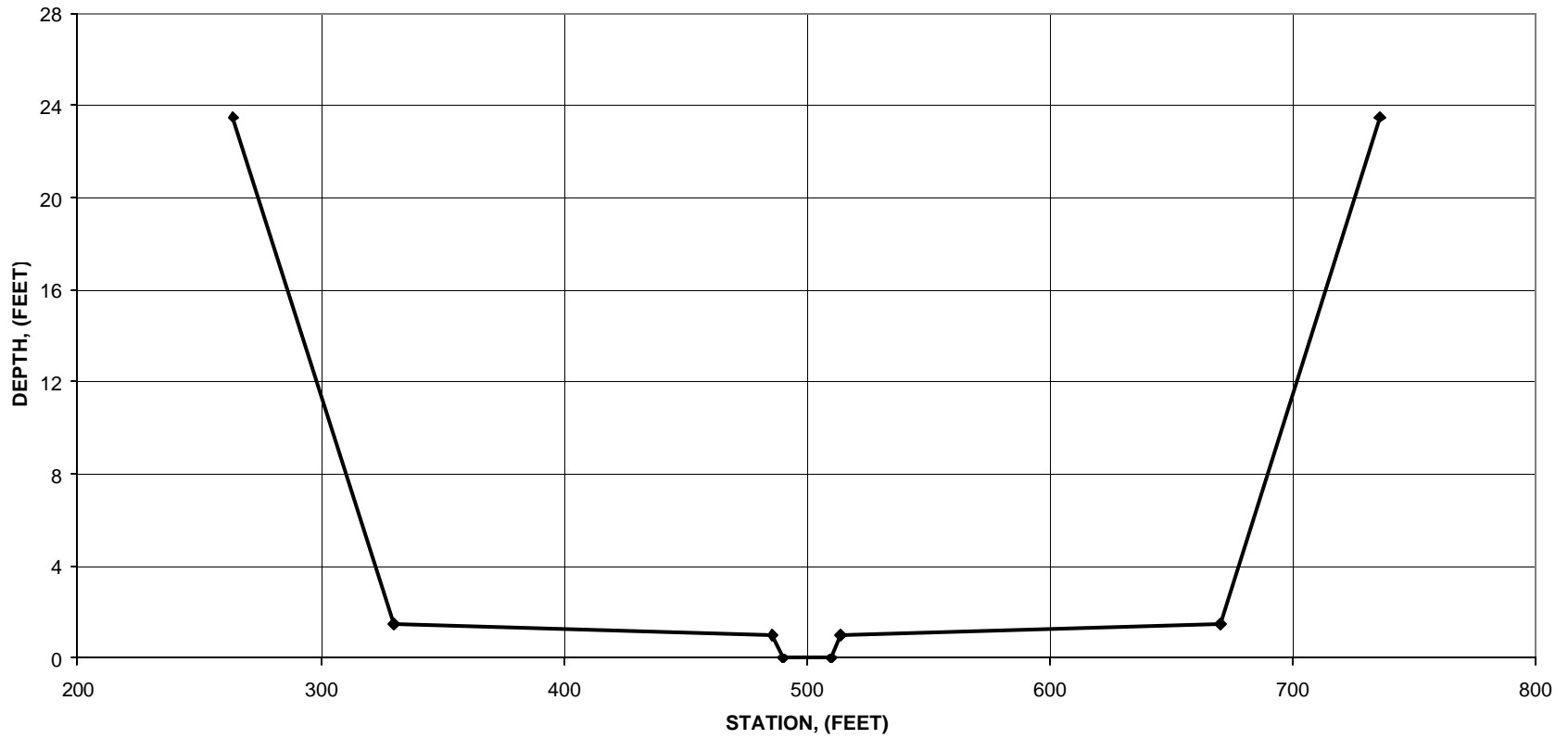


FIGURE A.14

EFDC MODEL CROSS SECTION
Los Angeles River - Section 5
RS 82,656 to RS 89,766 (RM 15.6 to RM 17.0)

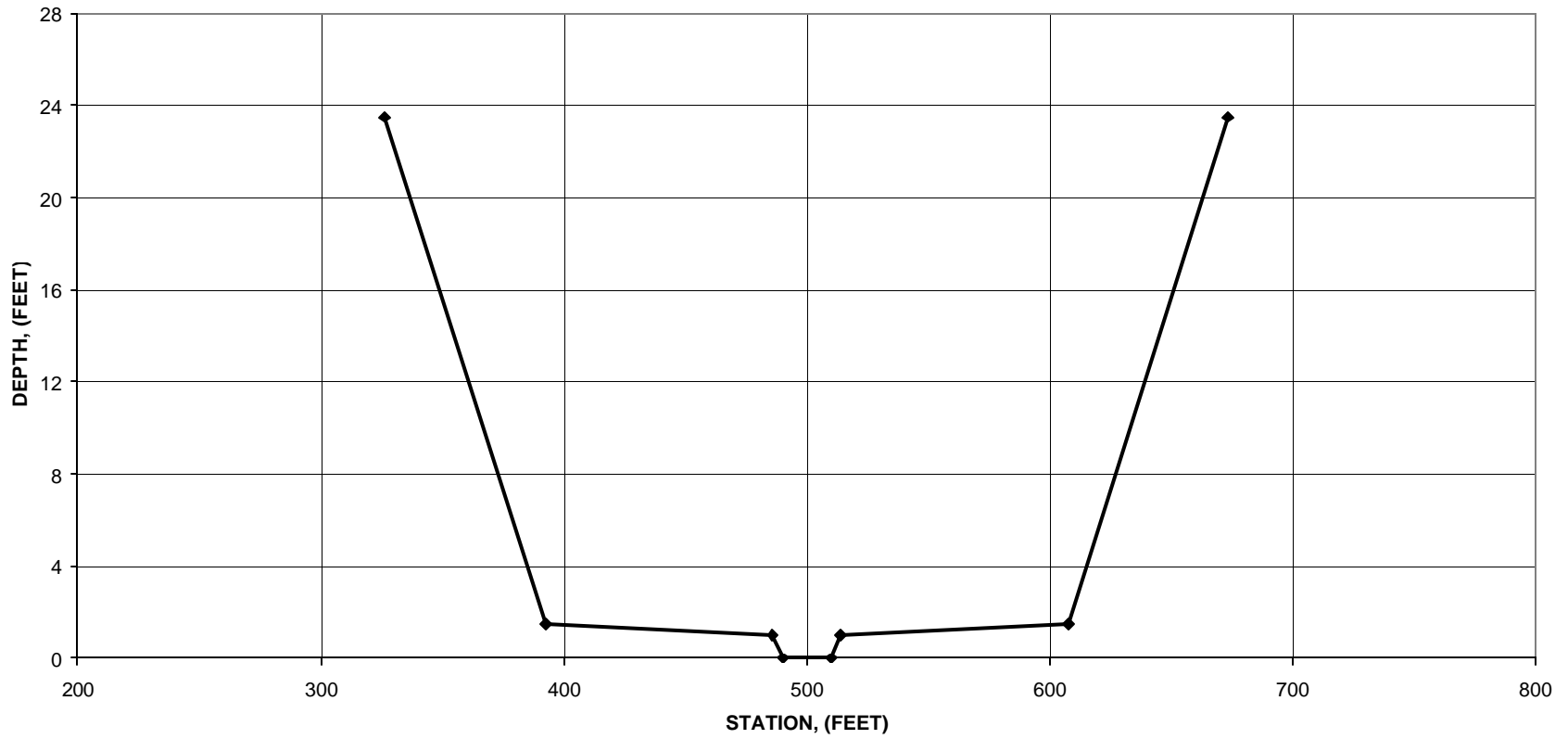


FIGURE A.15

EFDC MODEL CROSS SECTION
Los Angeles River - Section 6
RS 89,766 to RS 105,956 (RM 17.0 to RM 20.1)

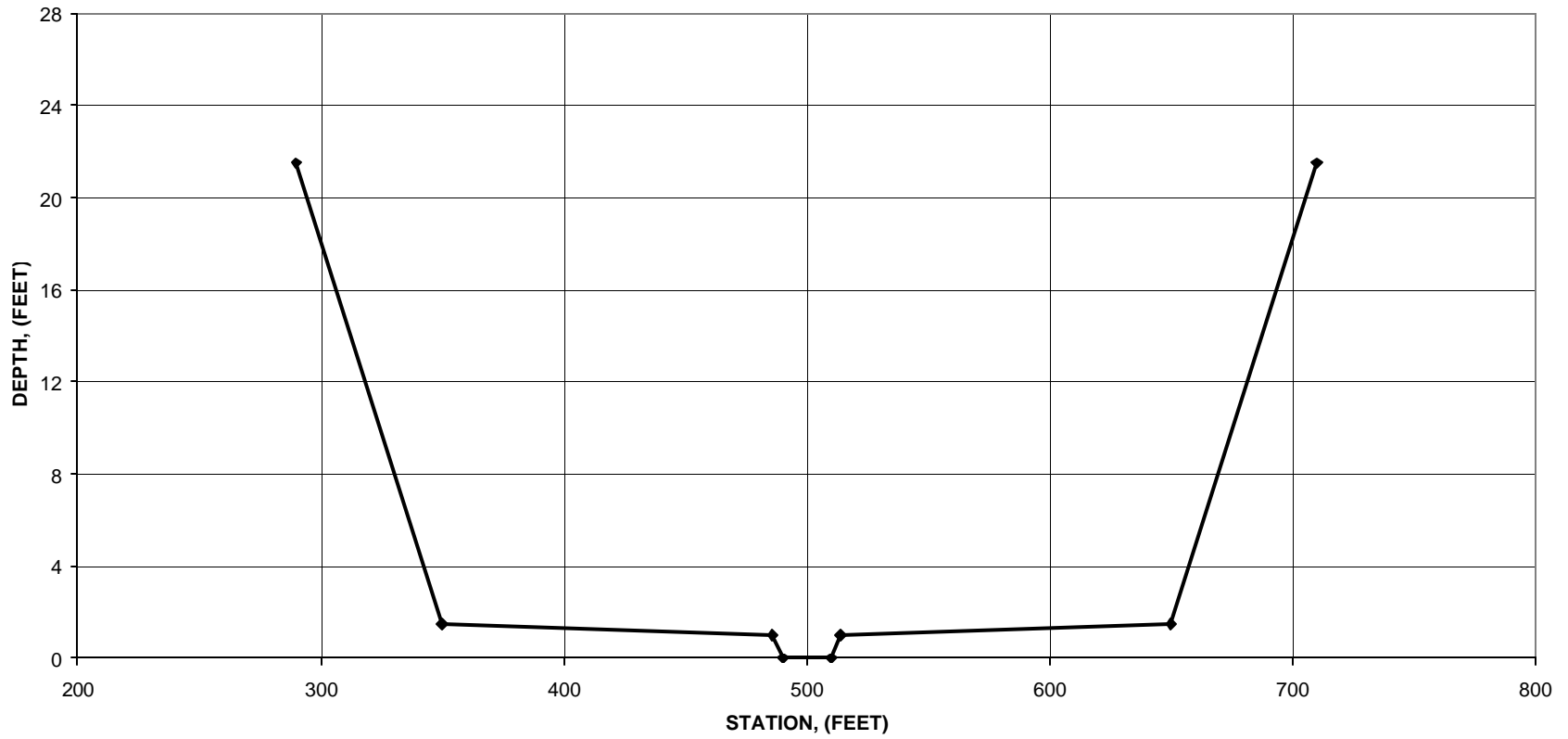


FIGURE A.16

**EFDC MODEL CROSS SECTION
Los Angeles River - Section 7
RS 105,956 to RS 128,056 (RM 20.1 to RM 24.3)**

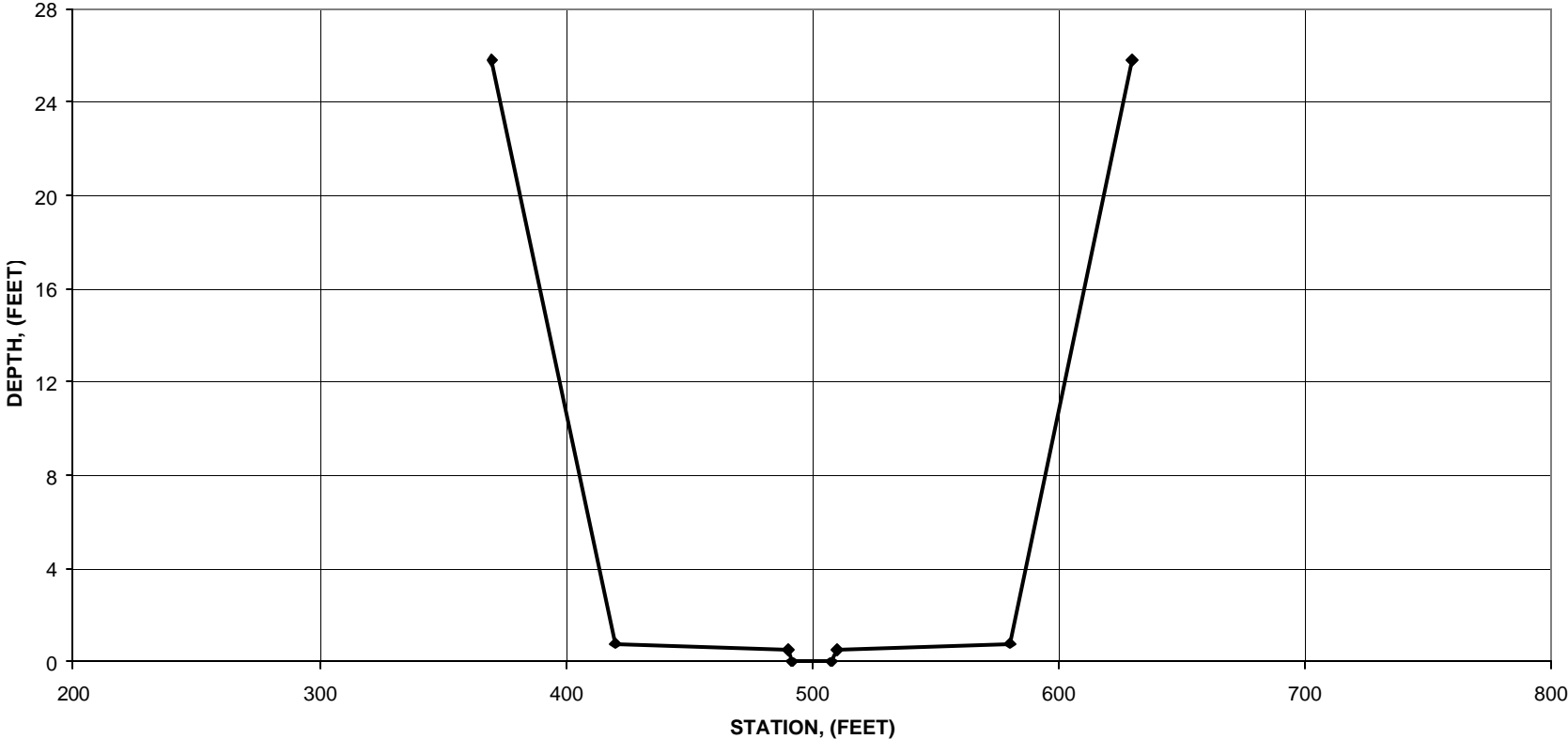


FIGURE A.17

EFDC MODEL CROSS SECTION
Los Angeles River - Section 8
RS 128,056 to RS 131,156 (RM 24.3 to RM 24.8)

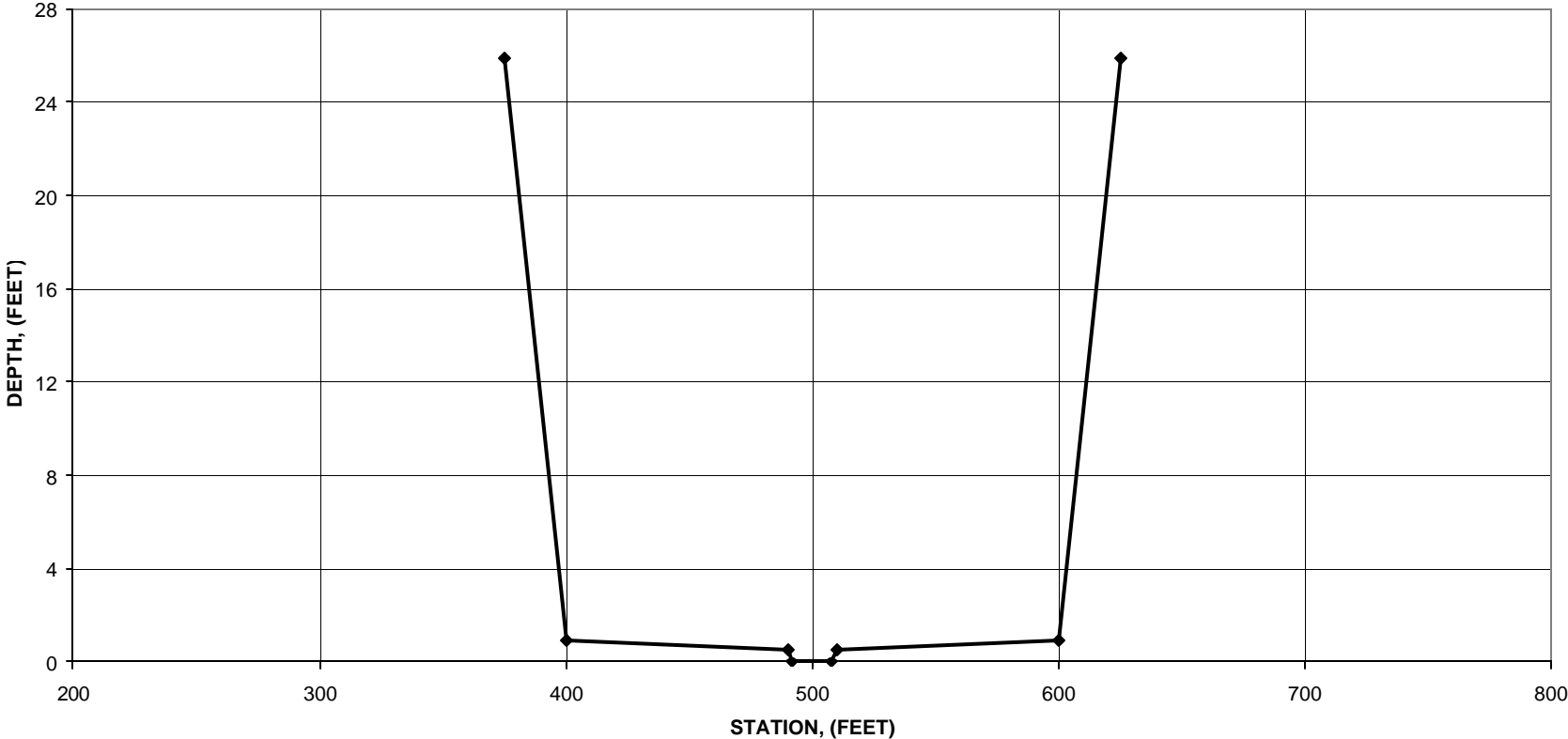


FIGURE A.18

EFDC MODEL CROSS SECTION
Los Angeles River - Section 9
RS 131,156 to RS 162,951 (RM 24.8 to RM 30.9)

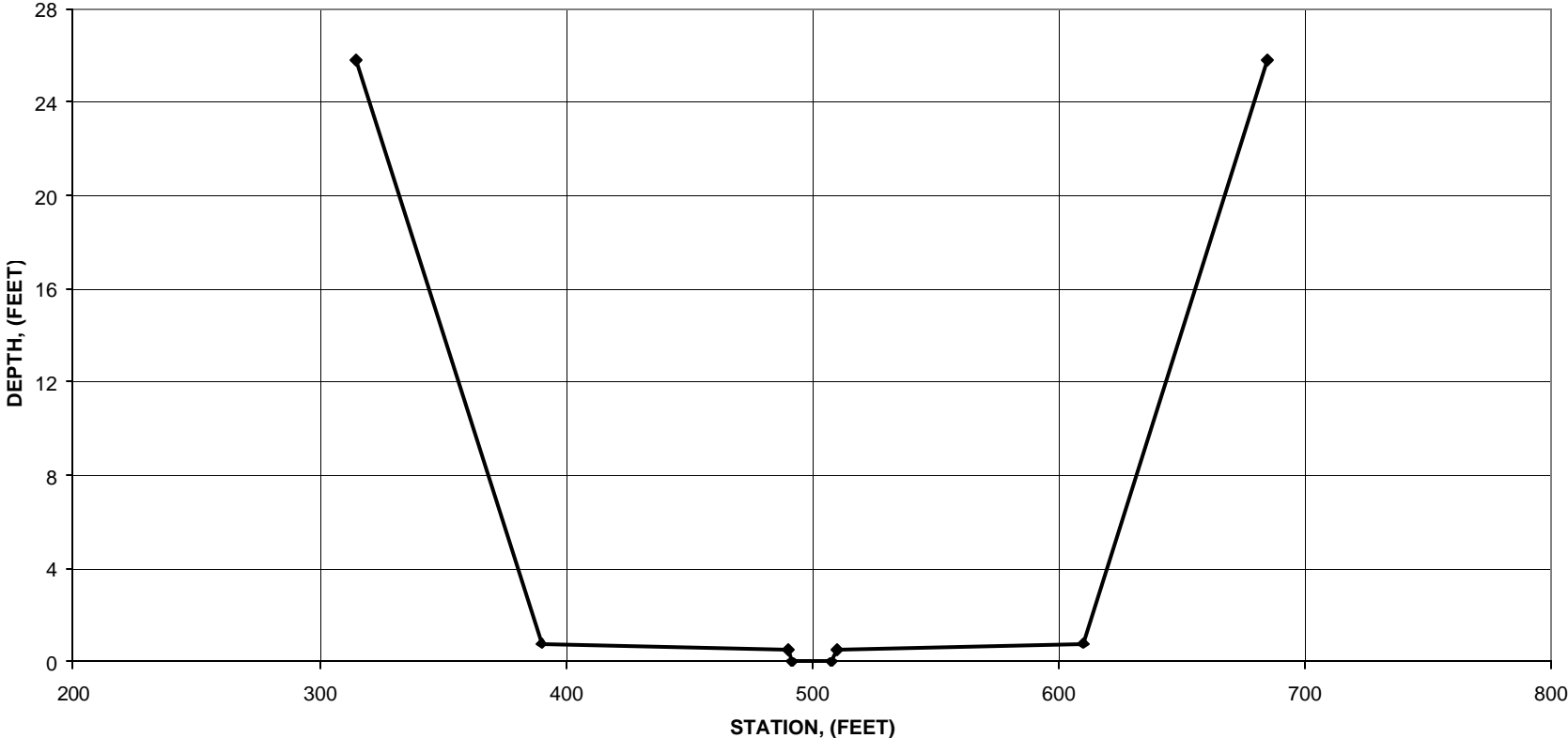


FIGURE A.19

EFDC MODEL CROSS SECTION
Los Angeles River - Section 10
RS 162,951 to RS 180,054 (RM 30.9 to RM 34.1)

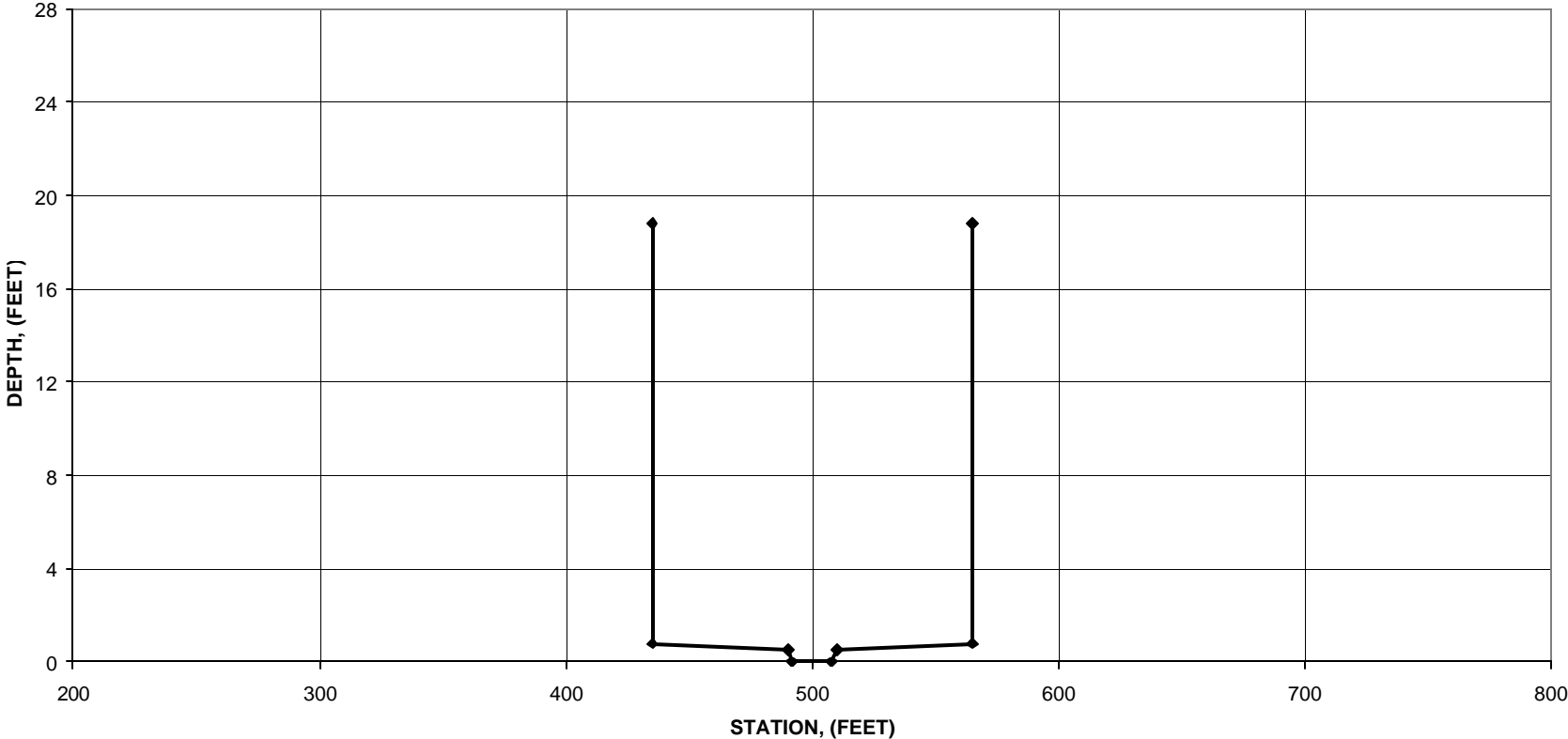


FIGURE A.20

EFDC MODEL CROSS SECTION
Los Angeles River - Section 11
RS 180,054 to RS 201,474 (RM 34.1 to RM 38.2)

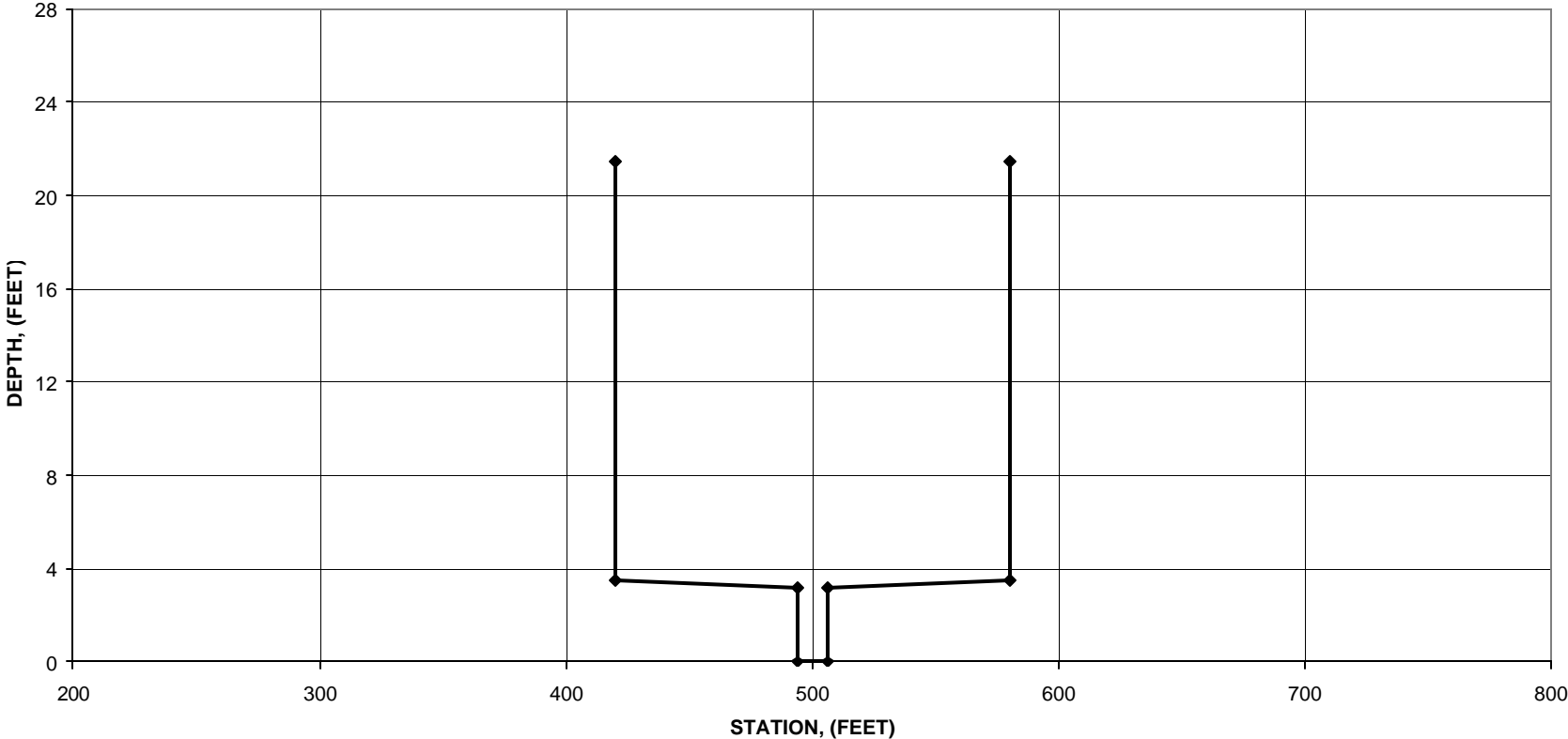


FIGURE A.21

EFDC MODEL CROSS SECTION
Los Angeles River - Section 12
RS 201,474 to RS 226,843 (RM 38.2 to RM 43.0)

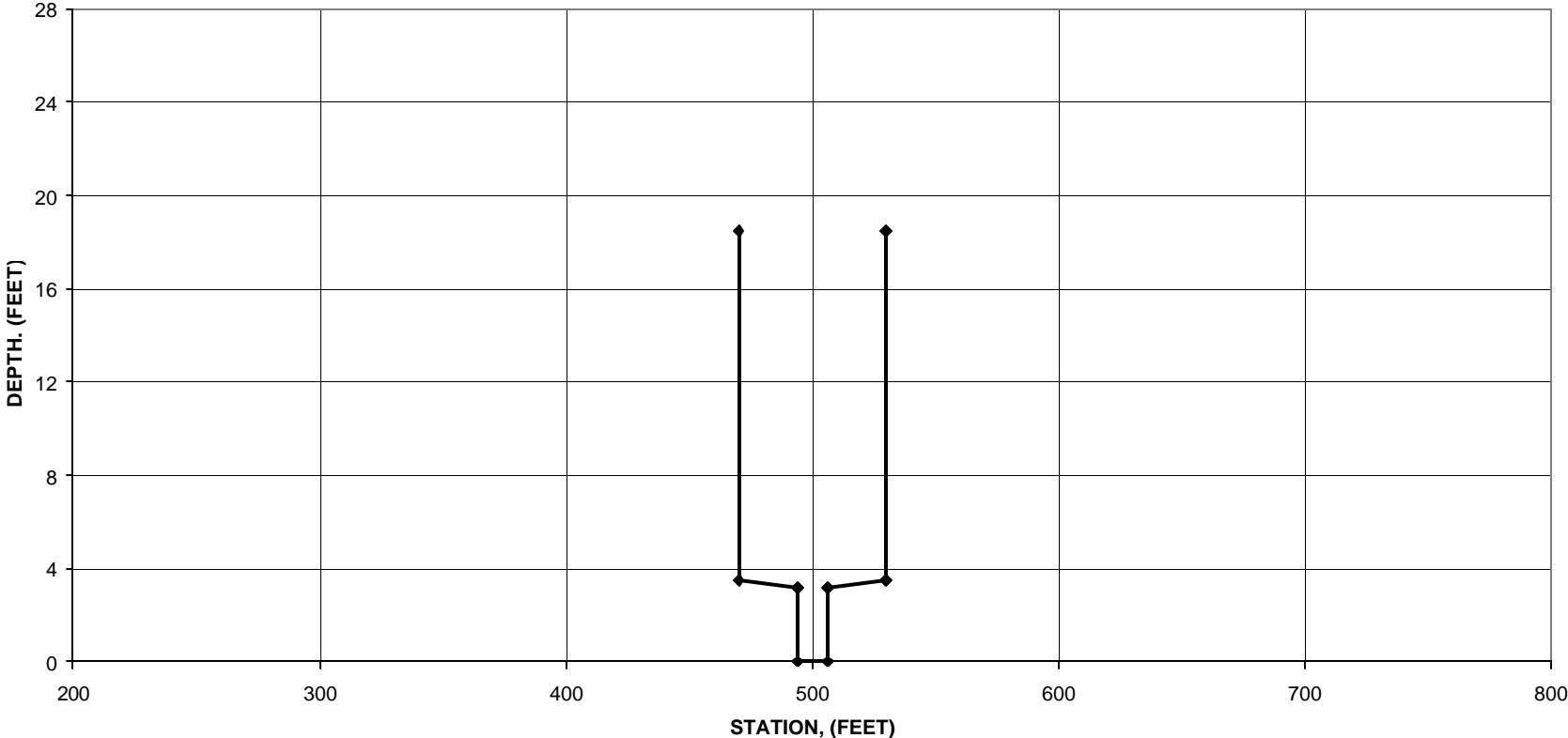


FIGURE A.22

EFDC MODEL CROSS SECTION
Los Angeles River - Section 13
RS 226,843 to RS 251,846 (RM 43.0 to RM 47.7)

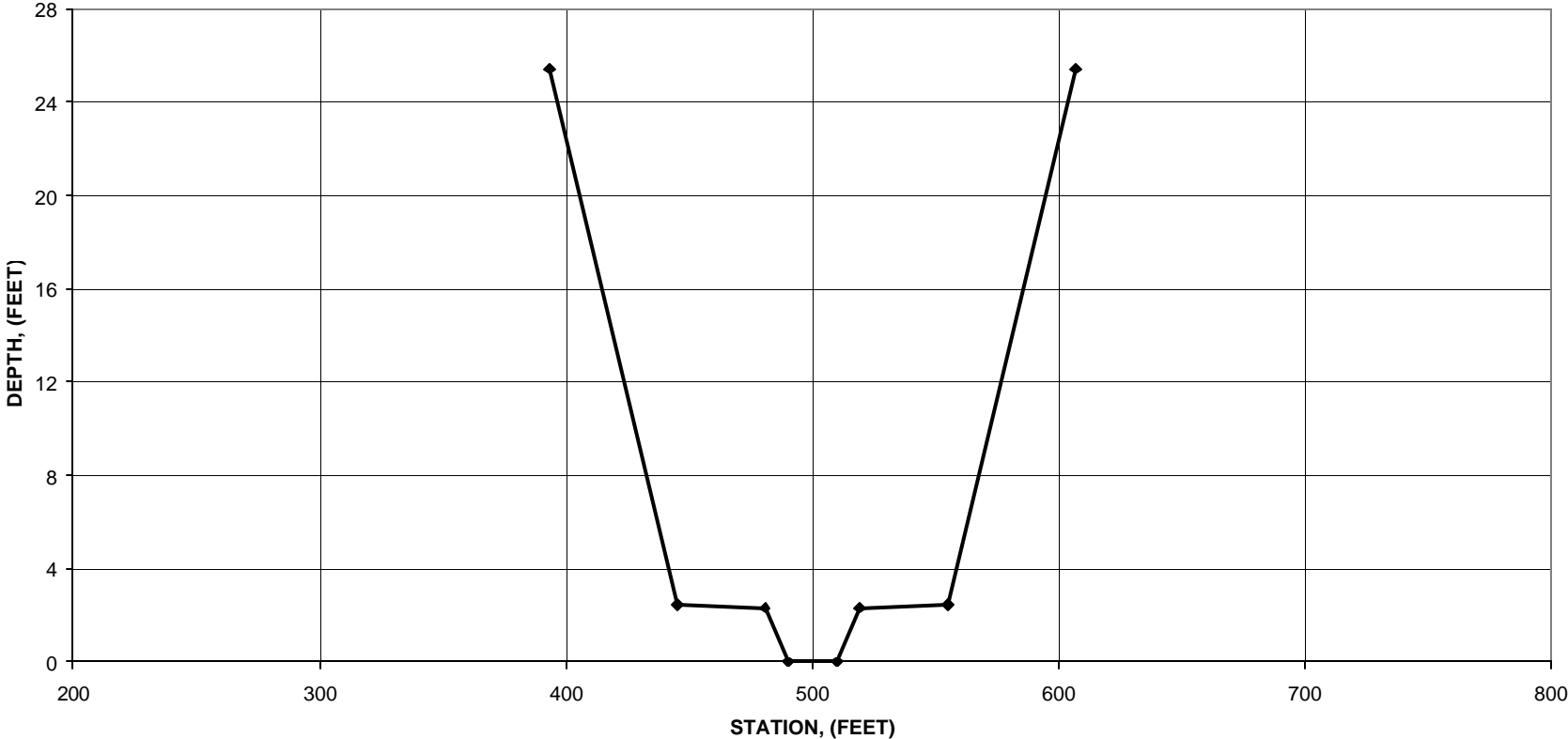


FIGURE A.23

EFDC MODEL CROSS SECTION
Los Angeles River - Section 14
RS 251,846 to RS 271,997 (RM 47.7 to RM 51.5)

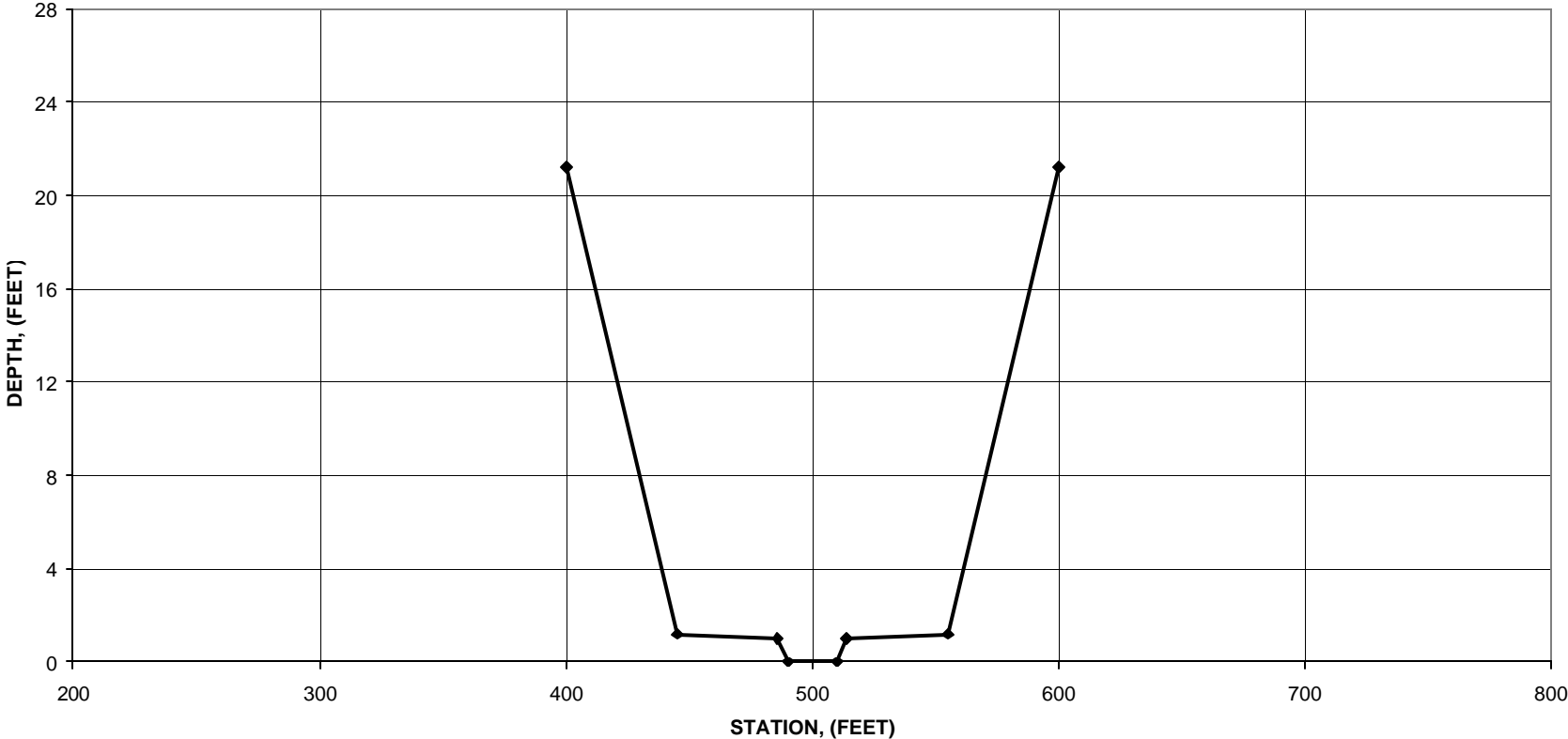


FIGURE A.24

EFDC MODEL CROSS SECTION LOCATION Compton Creek - Sections 1 and 2



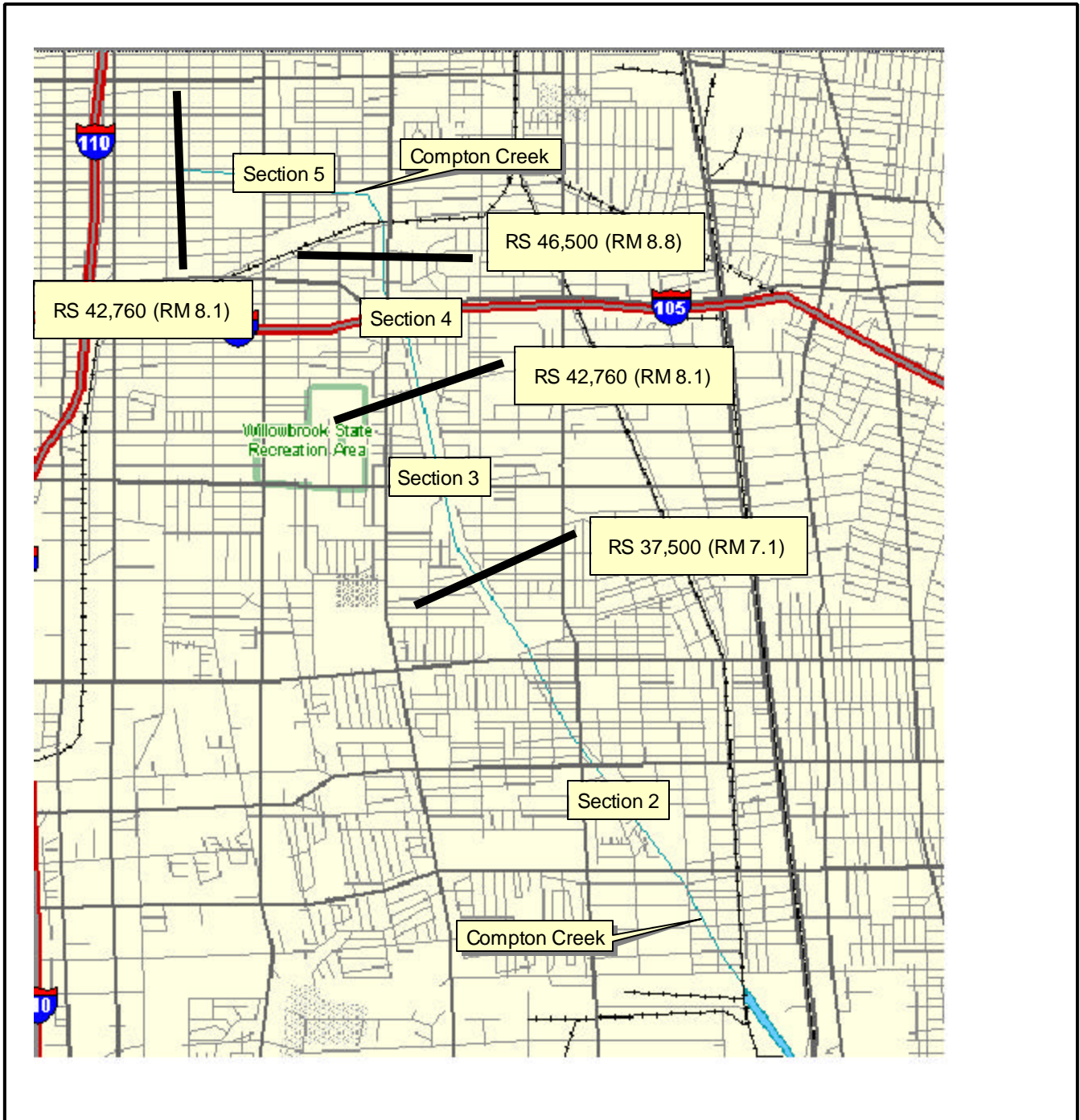
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.25

EFDC MODEL CROSS SECTION LOCATION Compton Creek - Sections 2 and 3



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.26

EFDC MODEL CROSS SECTION
Compton Creek - Section 1
RS 8,000 to RS 22,616 (RM 1.5 to RM 4.3)

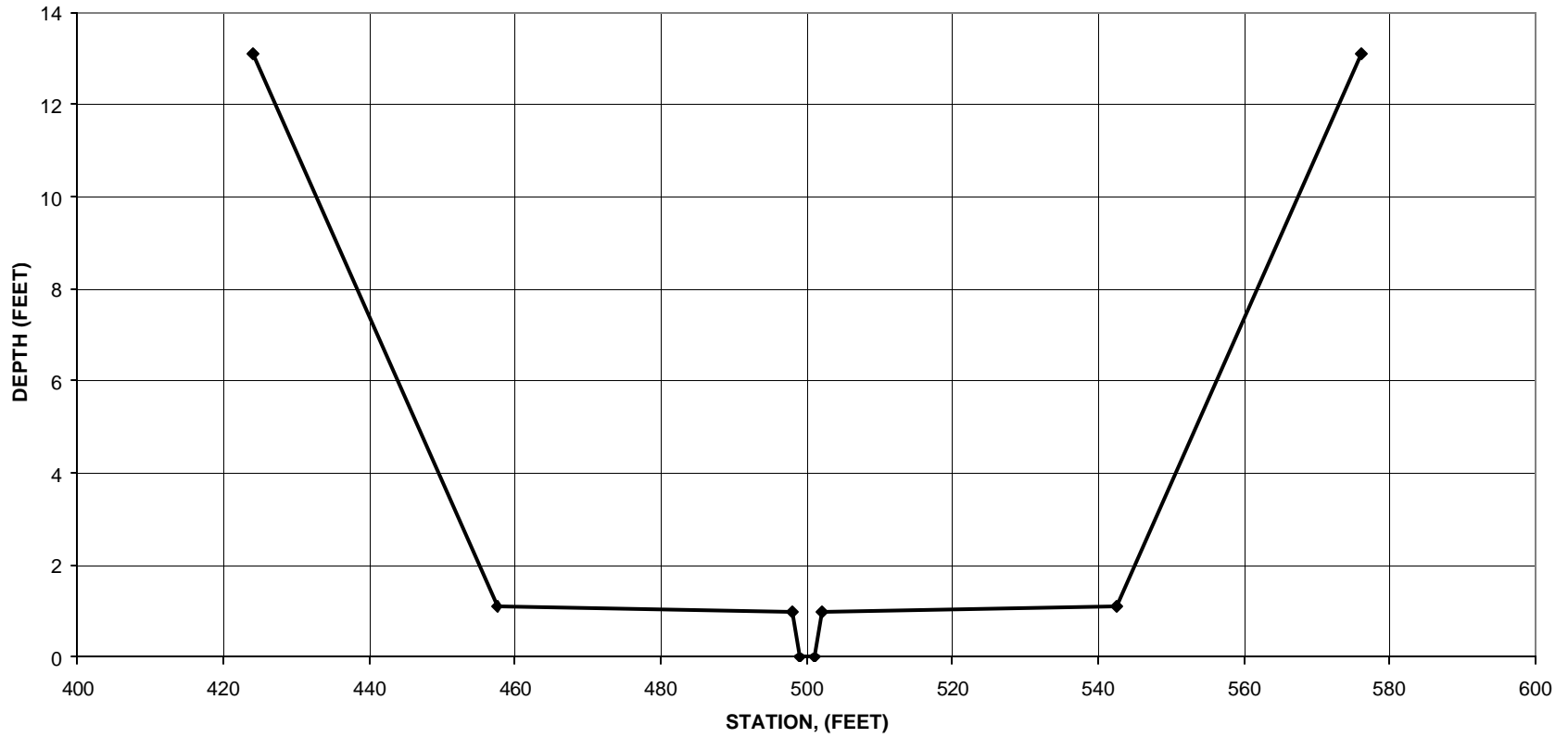


FIGURE A.27

EFDC MODEL CROSS SECTION
Compton Creek - Section 2
RS 22,616 to RS 37,500 (RM 4.3 to RM 7.1)

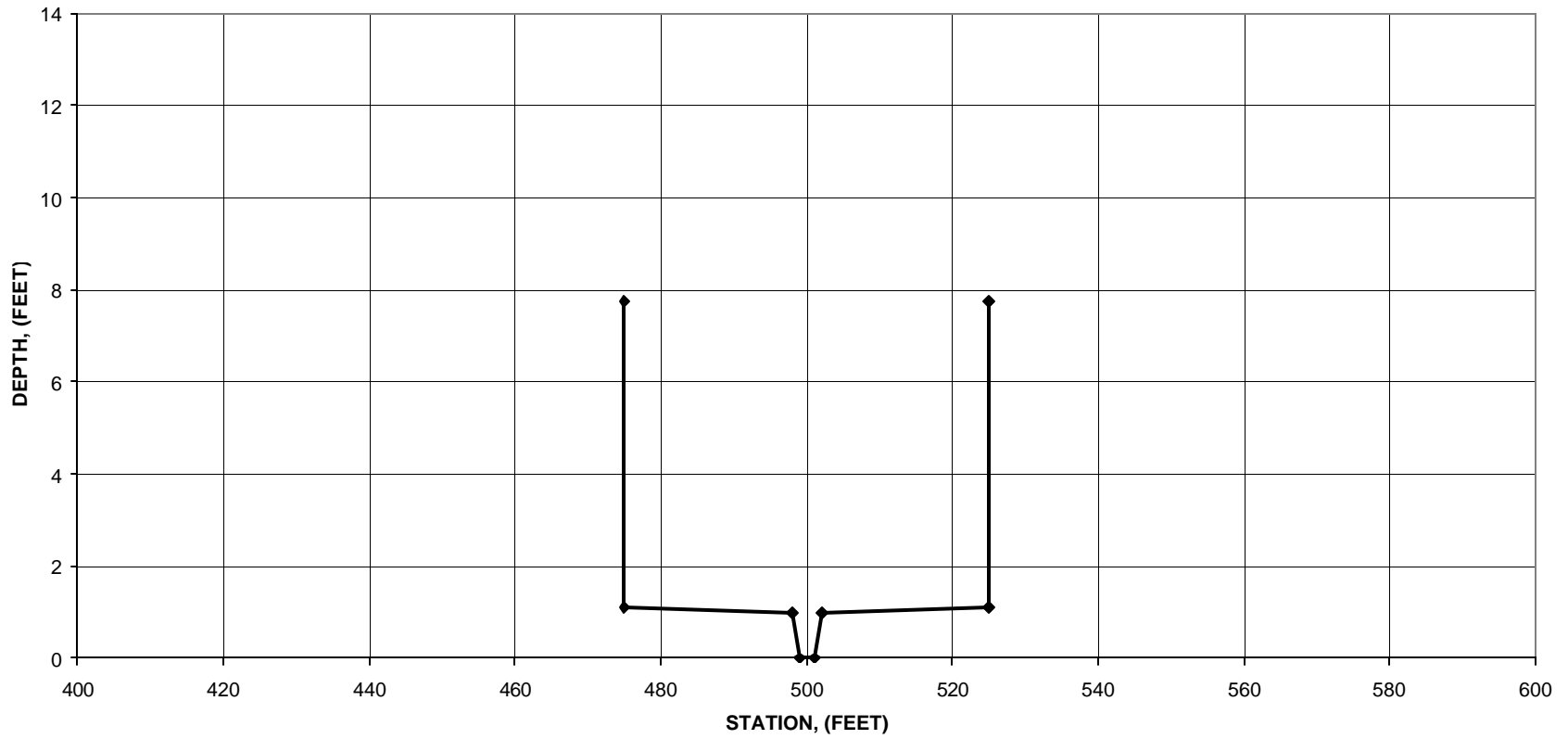


FIGURE A.28

EFDC MODEL CROSS SECTION
Compton Creek - Section 3
RS 37,500 to RS 42,760 (RM 7.1 to RM 8.1)

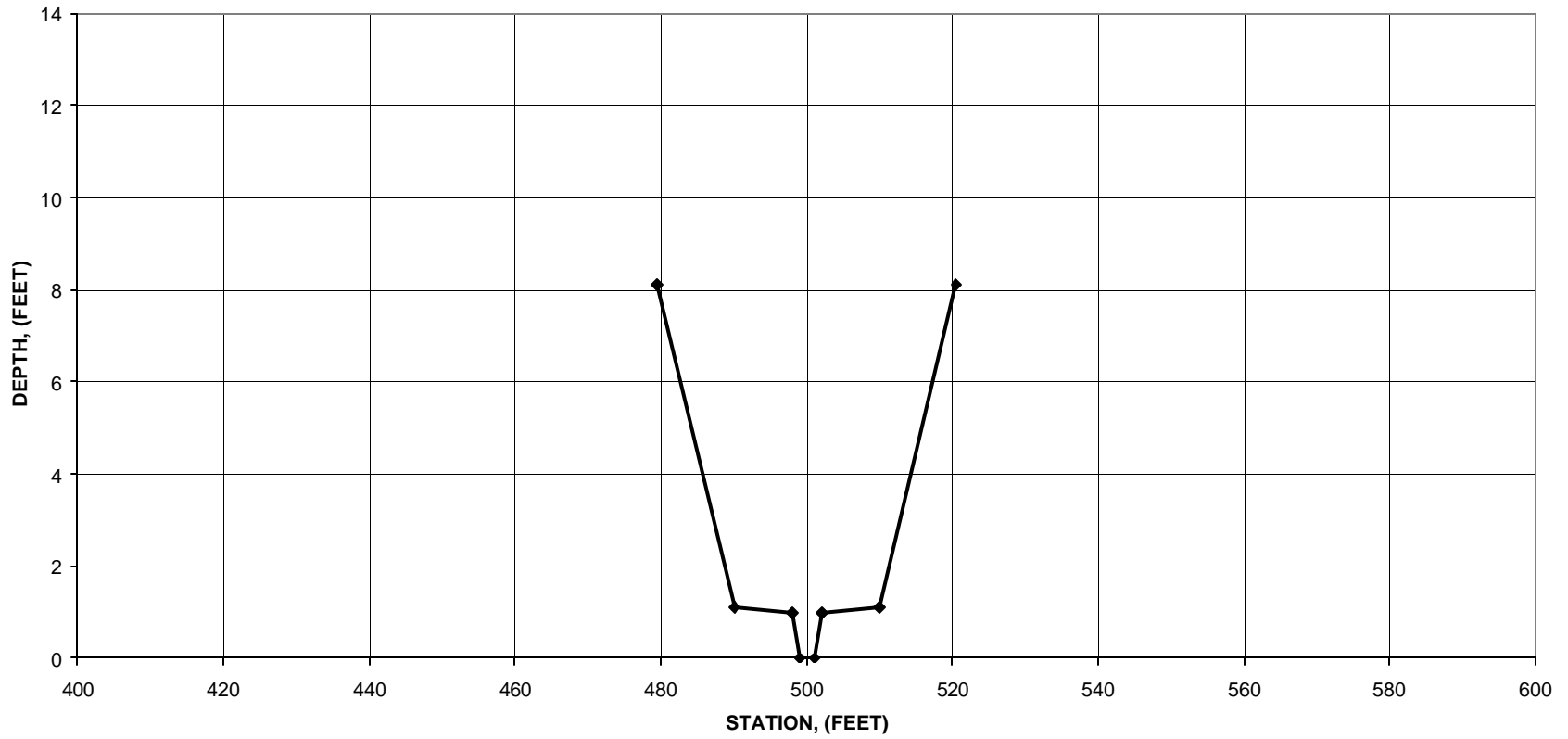


FIGURE A.29

EFDC MODEL CROSS SECTION
Compton Creek - Section 4
RS 42,760 to RS 46,500 (RM 8.1 to RM 8.8)

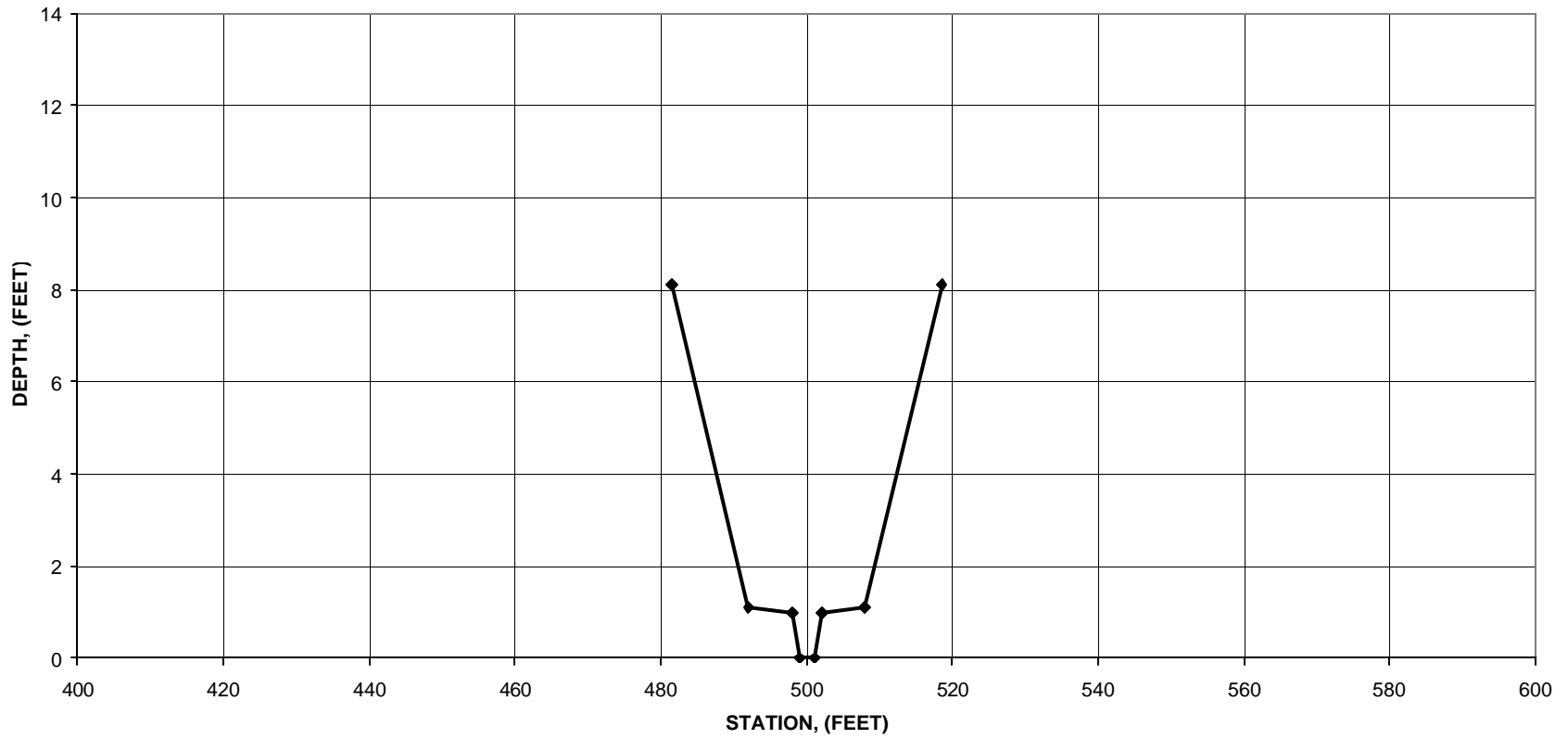


FIGURE A.30

EFDC MODEL CROSS SECTION
Compton Creek - Section 5
RS 46,500 to RS 52,498 (RM 8.8 to RM 9.9)

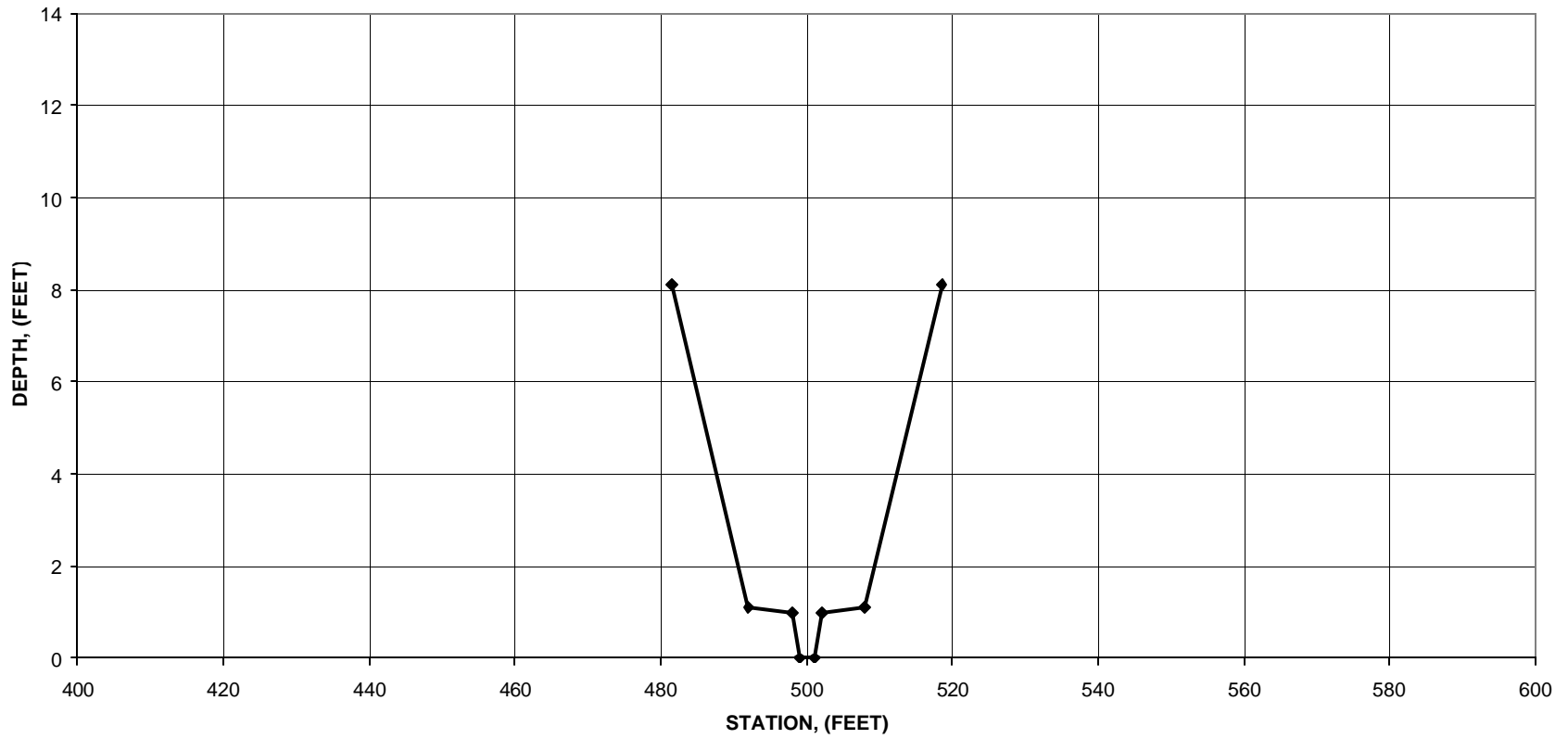
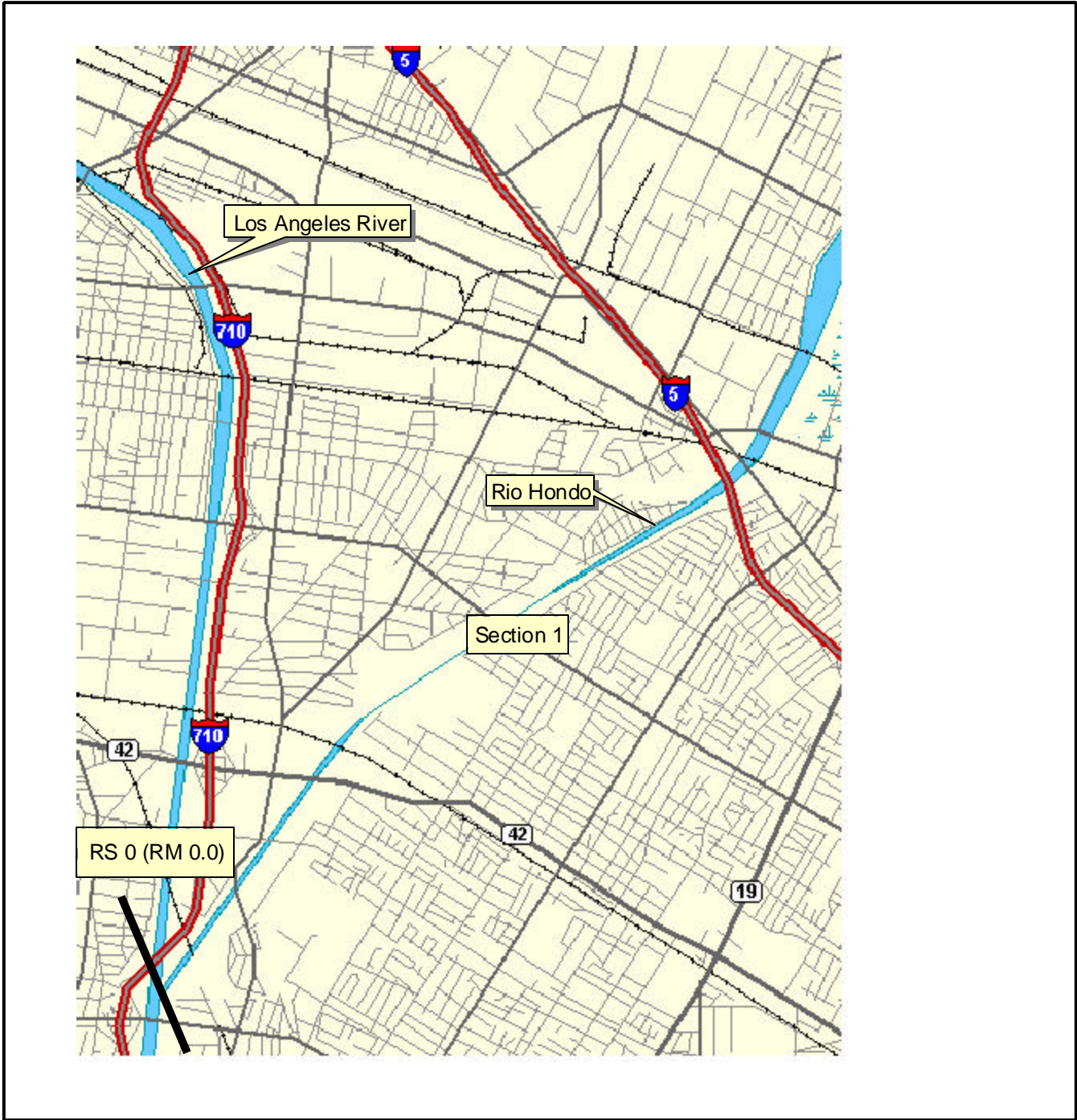


FIGURE A.31

EFDC MODEL CROSS SECTION LOCATION
Rio Hondo - Section 1



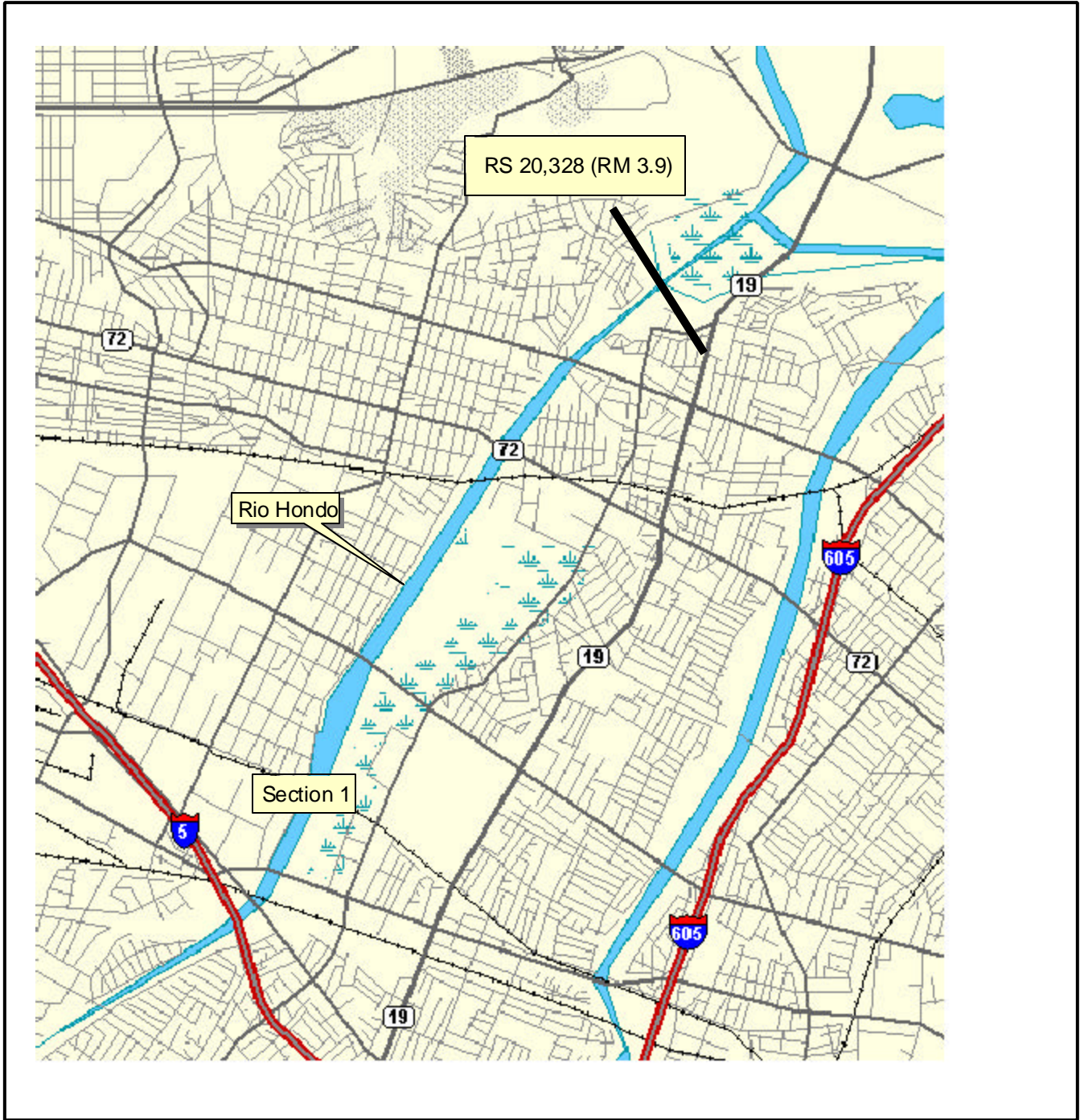
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.32

EFDC MODEL CROSS SECTION LOCATION Rio Hondo - Section 1



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.33

EFDC MODEL CROSS SECTION
Rio Hondo - Section 1
RS 0 to RS 20,328 (RM 0.0 to RM 3.9)

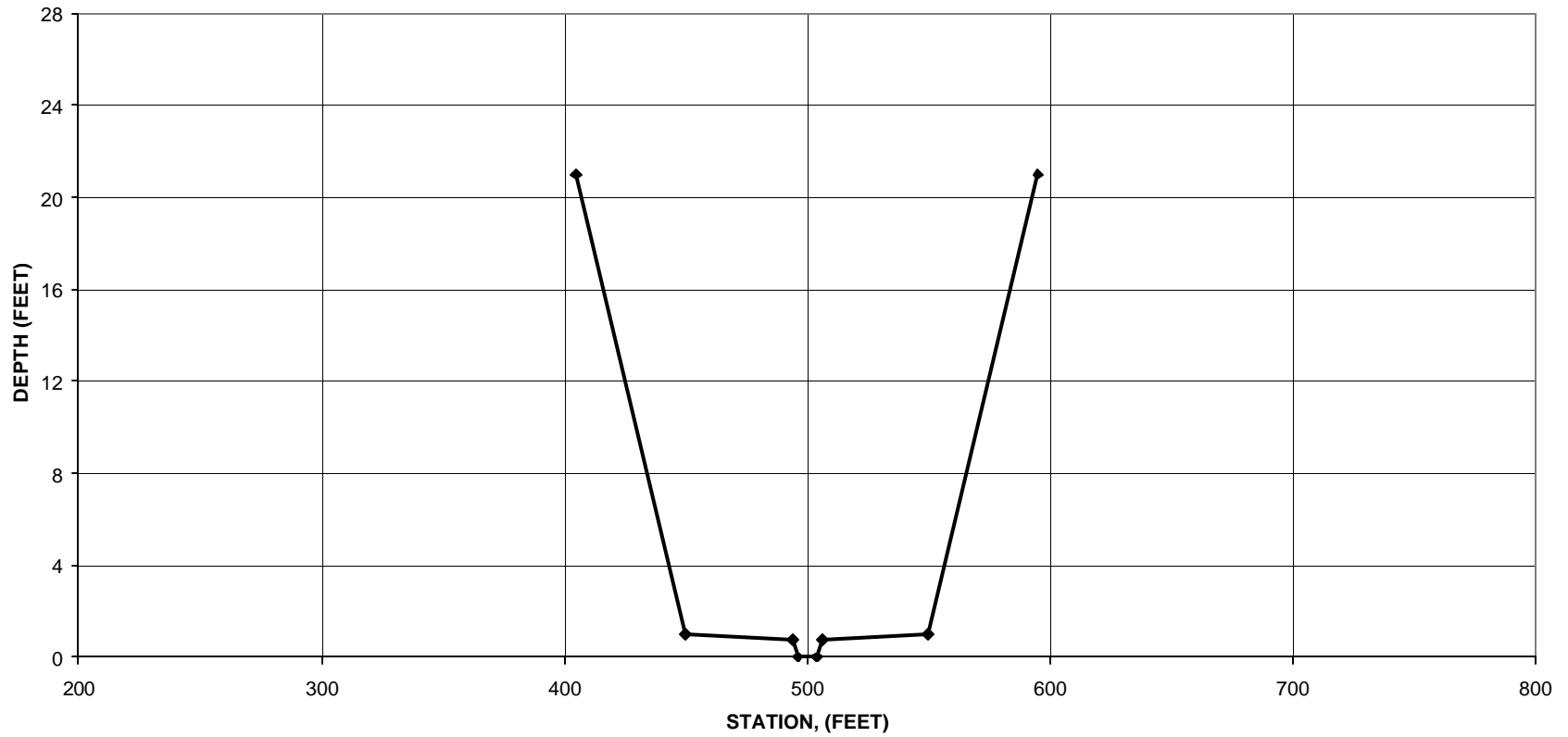
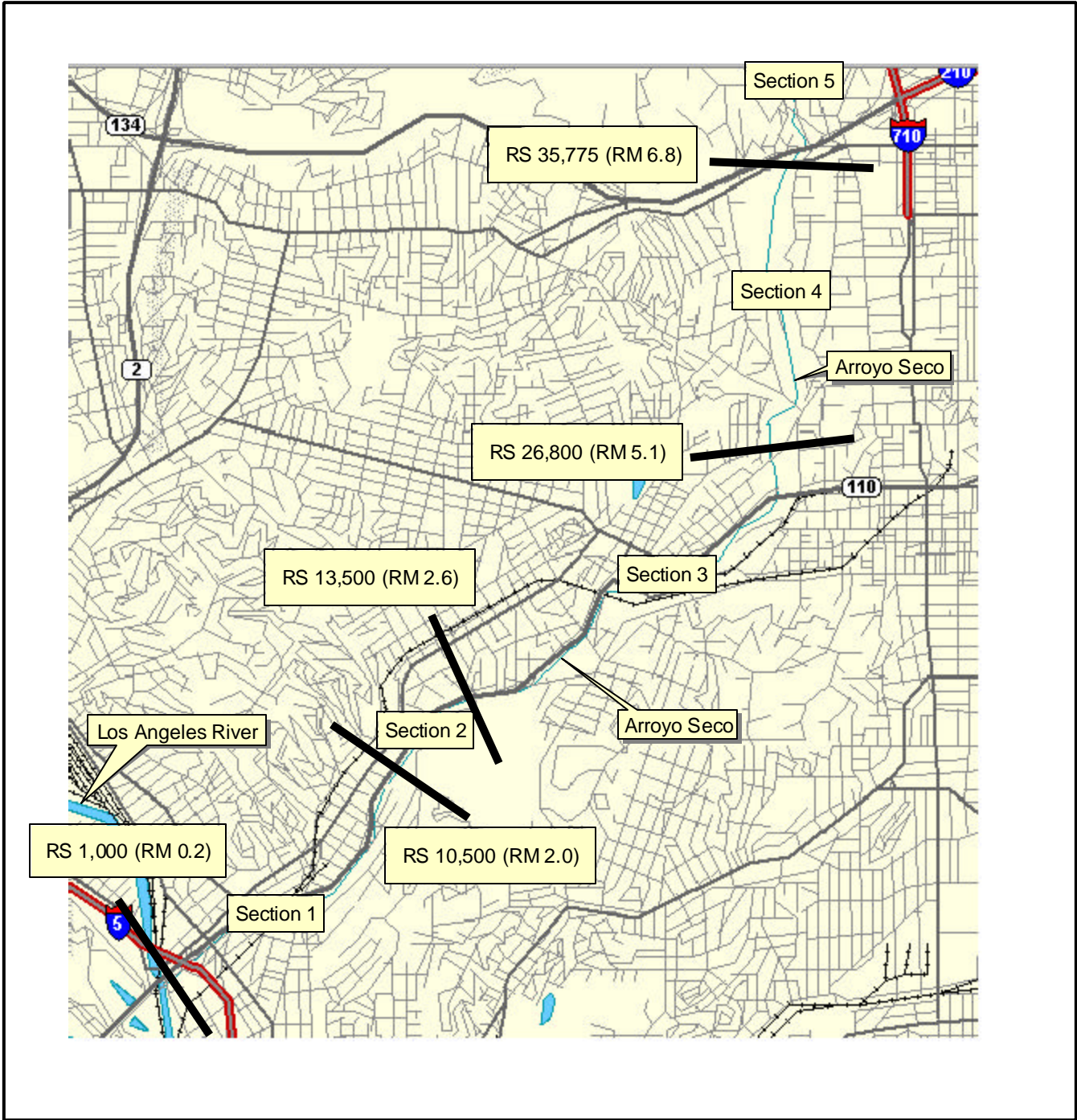


FIGURE A.34

EFDC MODEL CROSS SECTION LOCATION Arroyo Seco - Sections 1, 2, 3, 4, and 5



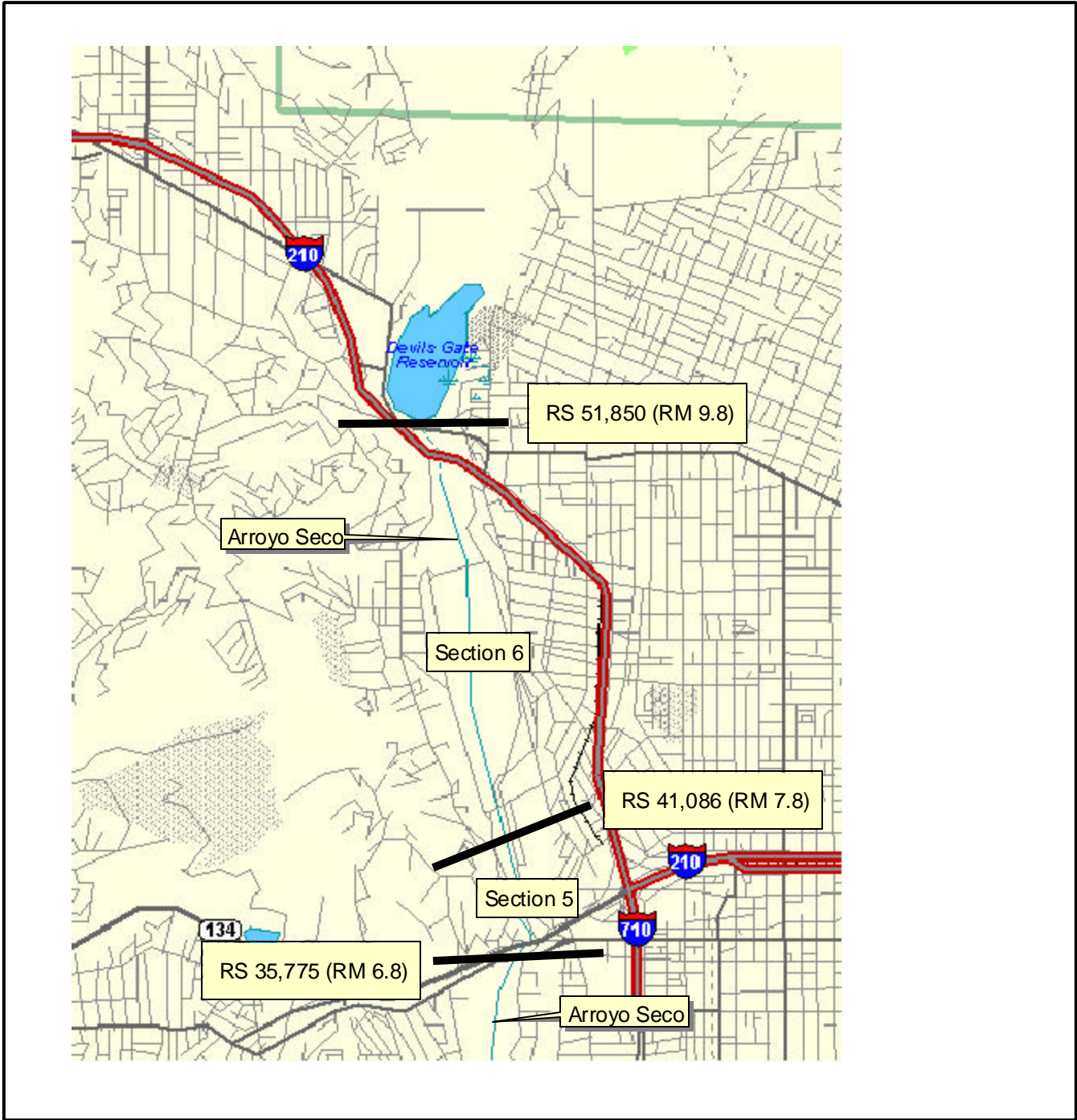
Section number located between hash marks.
 Indicates the reach that the section represents.
 Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.35

EFDC MODEL CROSS SECTION LOCATION Arroyo Seco - Sections 5 and 6



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.36

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 1
RS 1,000 to RS 10,500 (RM 0.2 to RM 2.0)

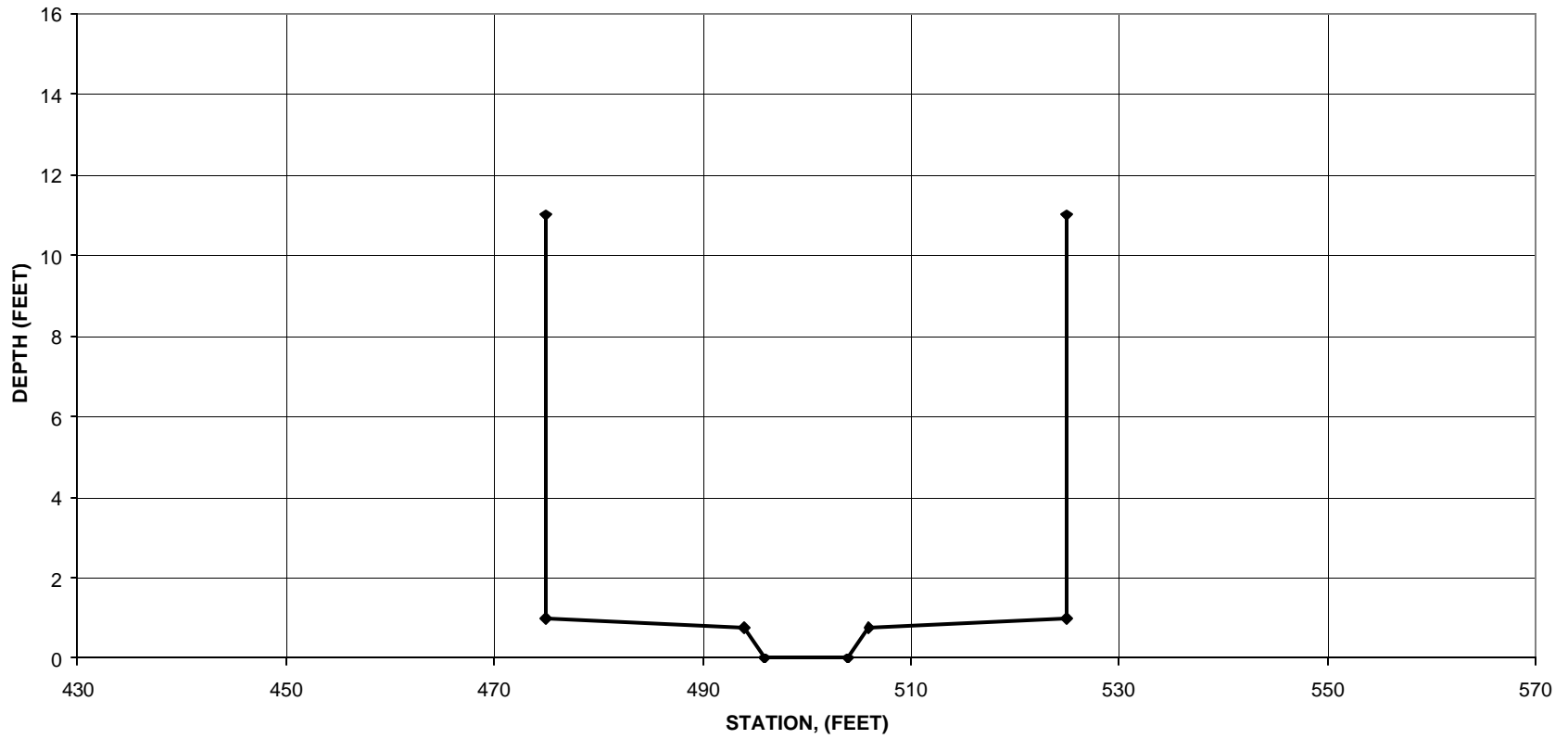


FIGURE A.37

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 2
RS 10,500 to RS 13,500 (RM 2.0 to RM 2.6)

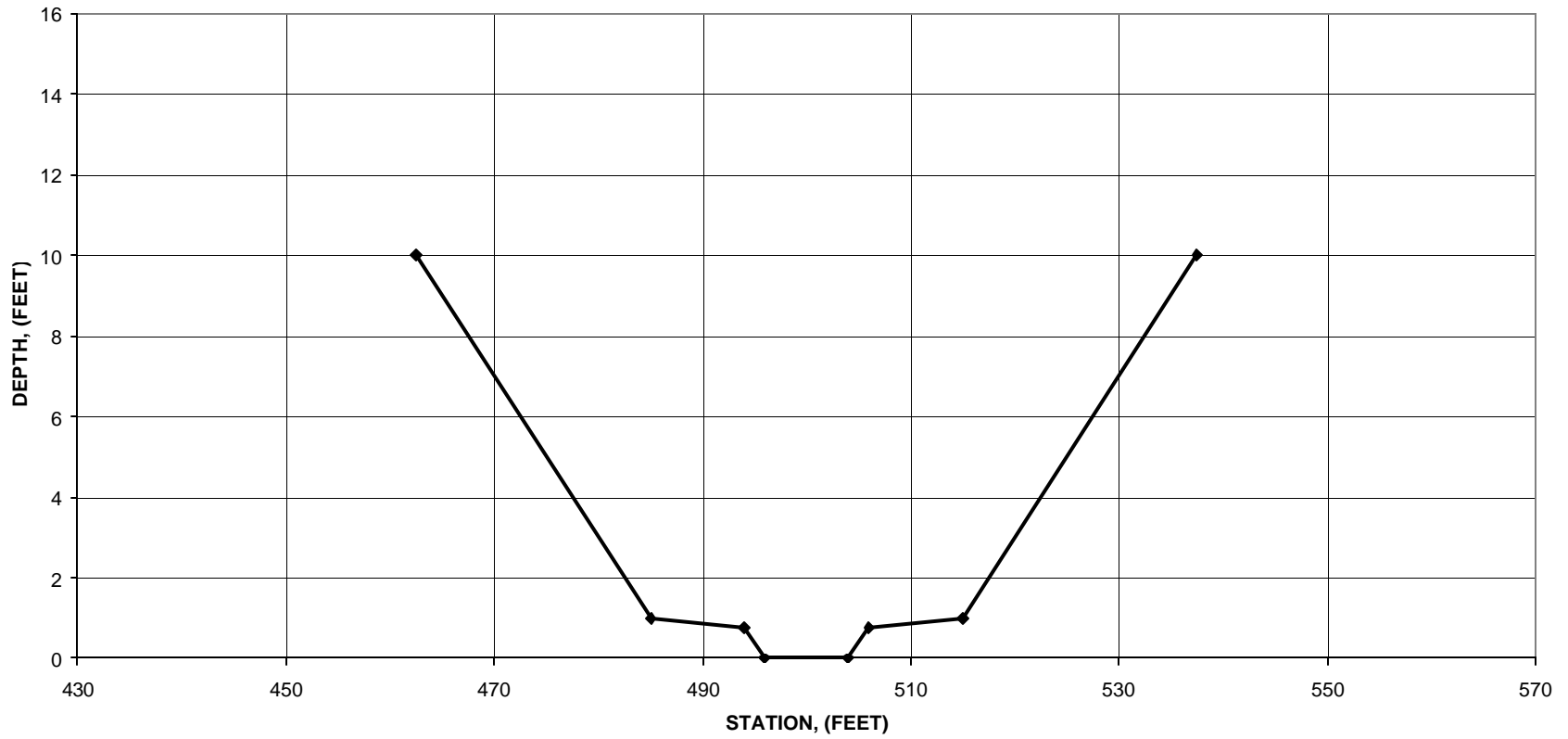


FIGURE A.38

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 3
RS 13,500 to RS 26,800 (RM 2.6 to RM 5.1)

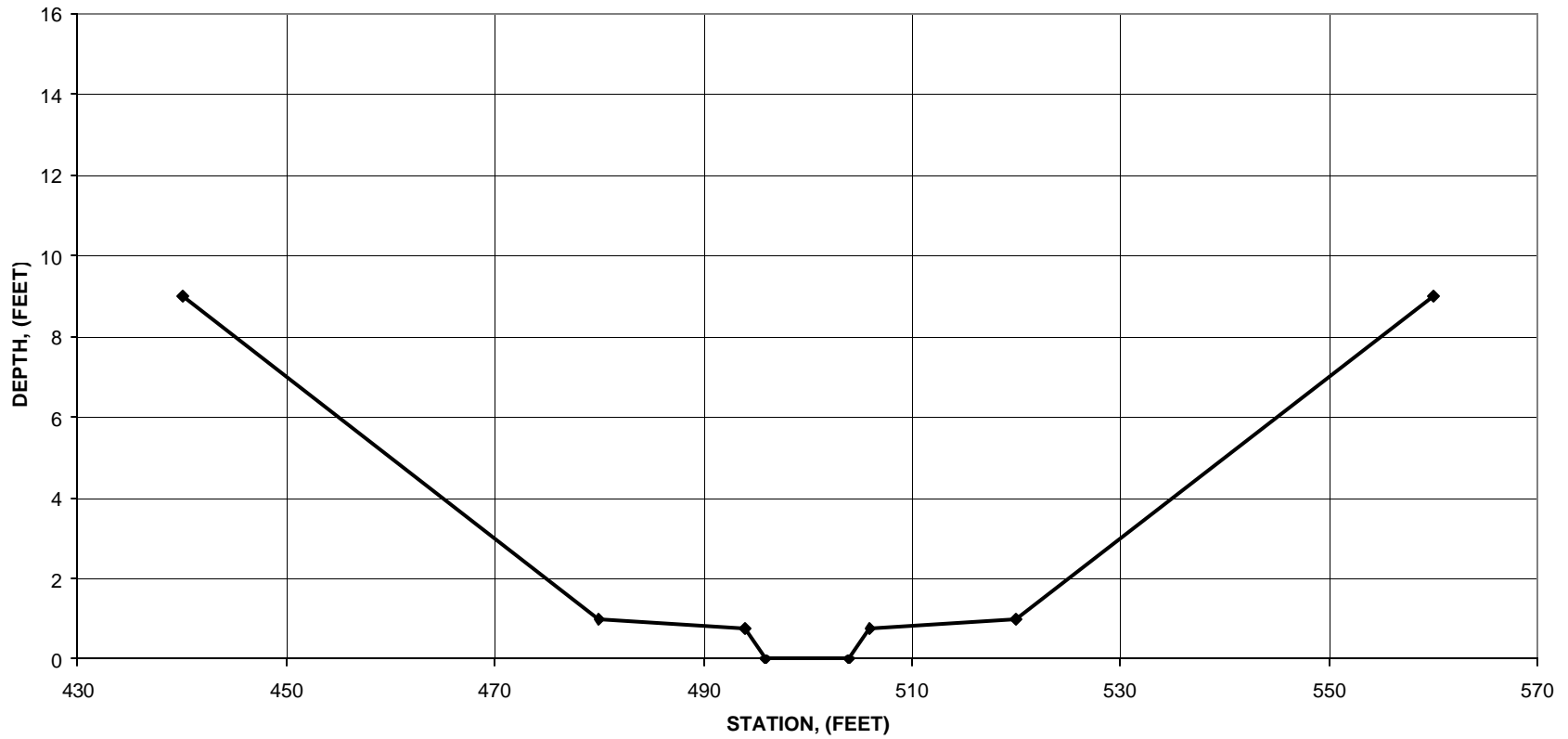


FIGURE A.39

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 4
RS 26,800 to RS 35,775 (RM 5.1 to RM 6.8)

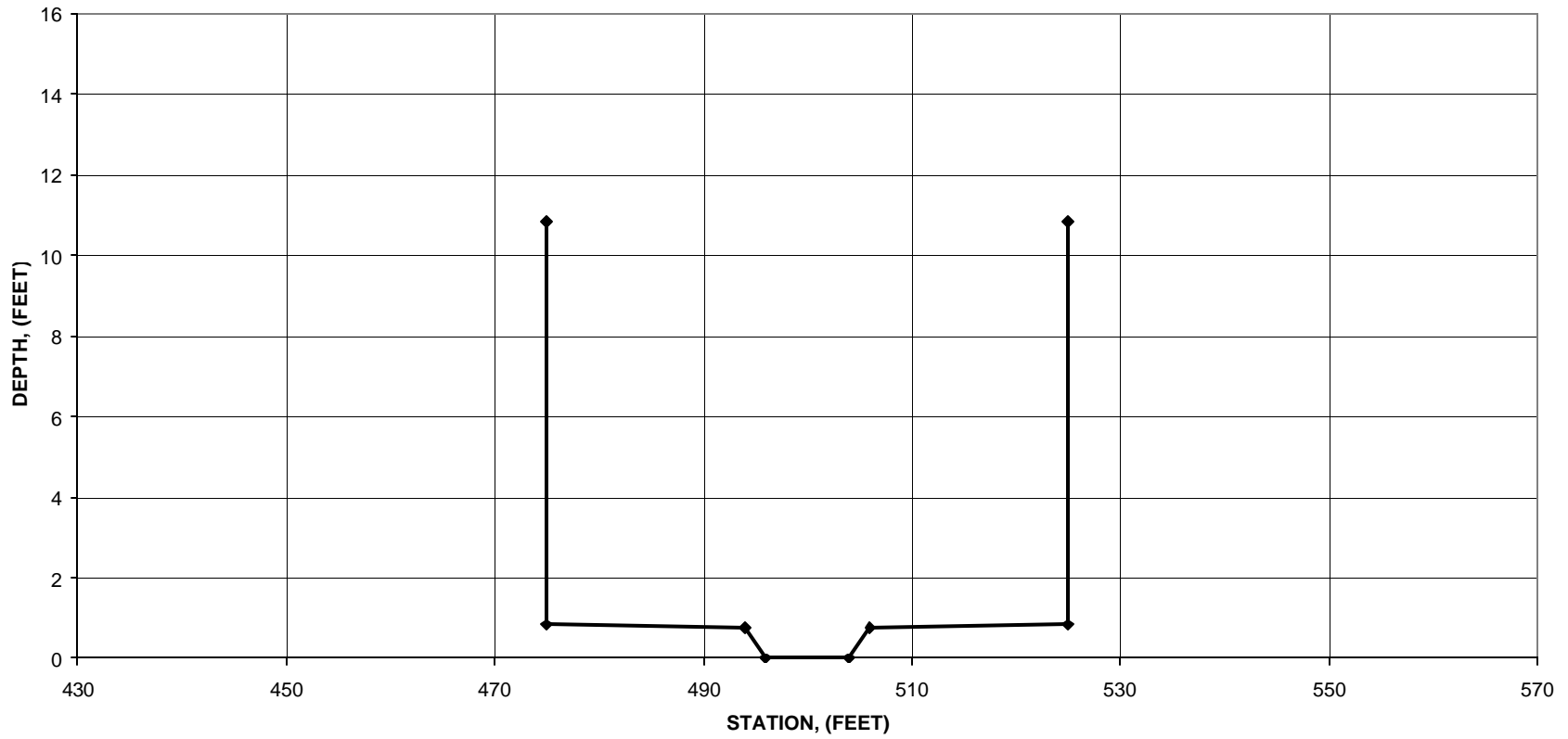


FIGURE A.40

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 5
RS 37,721 to RS 41,086 (RM 7.1 to RM 7.8)

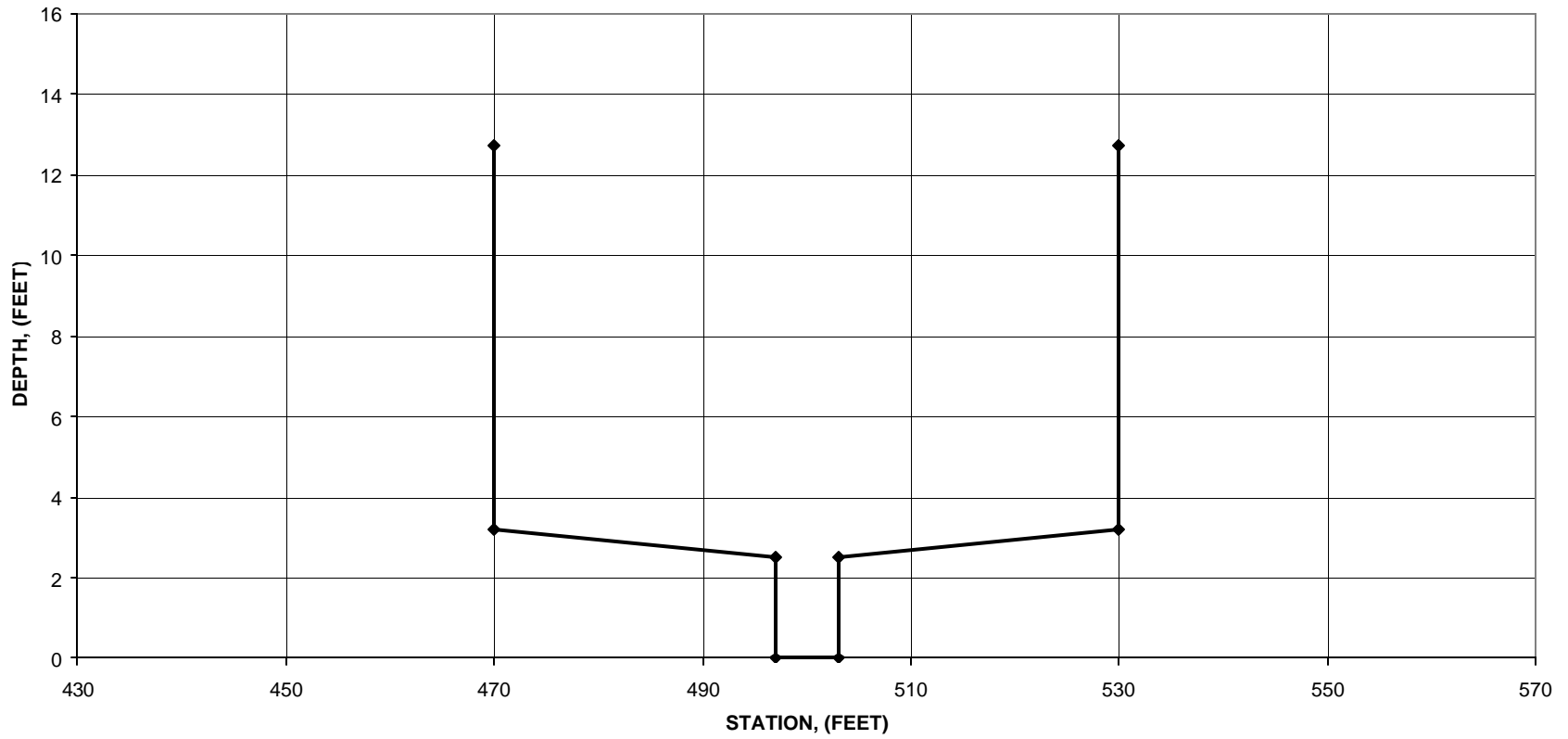


FIGURE A.41

EFDC MODEL CROSS SECTION
Arroyo Seco - Section 6
RS 41,086 to RS 51,850 (RM 7.8 to RM 9.8)

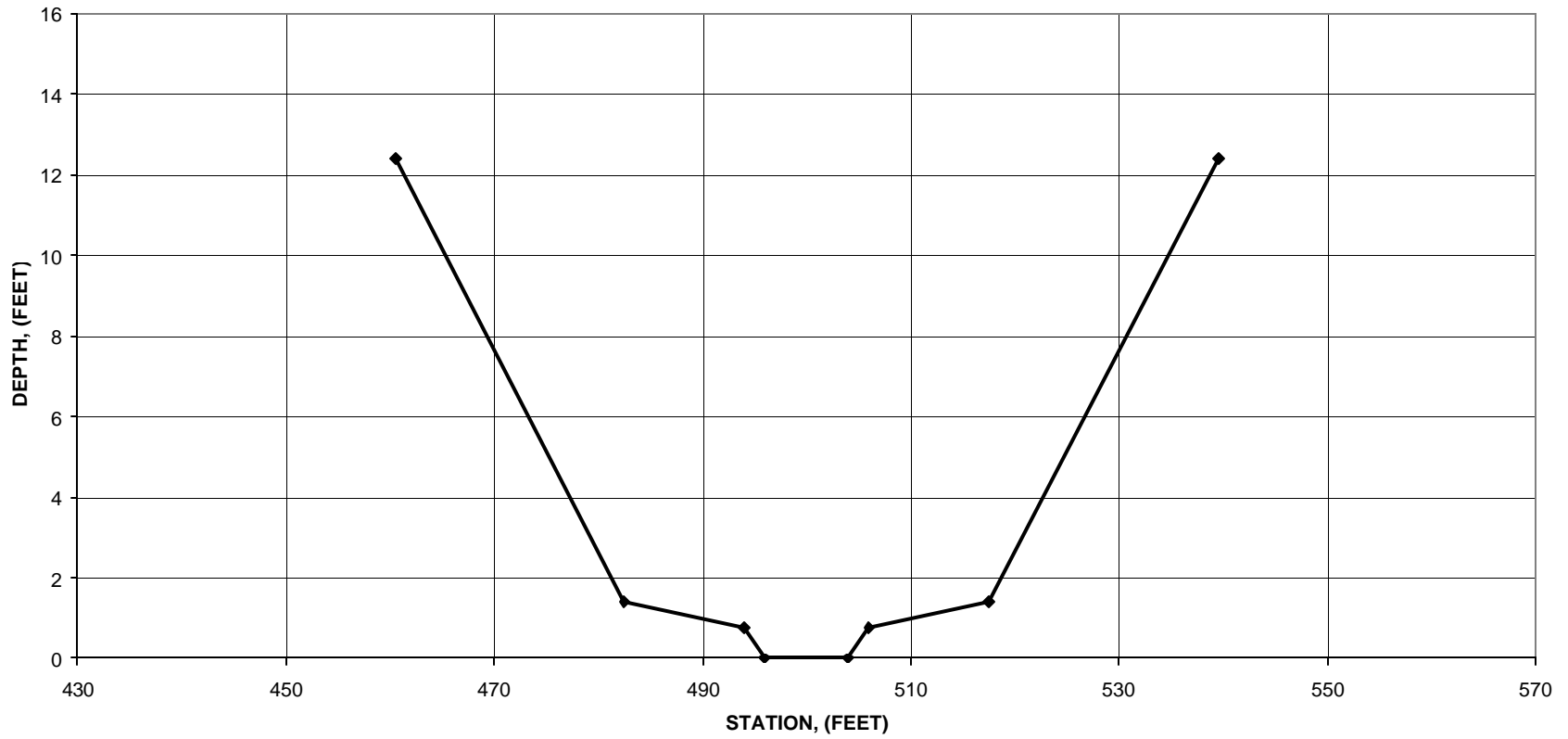
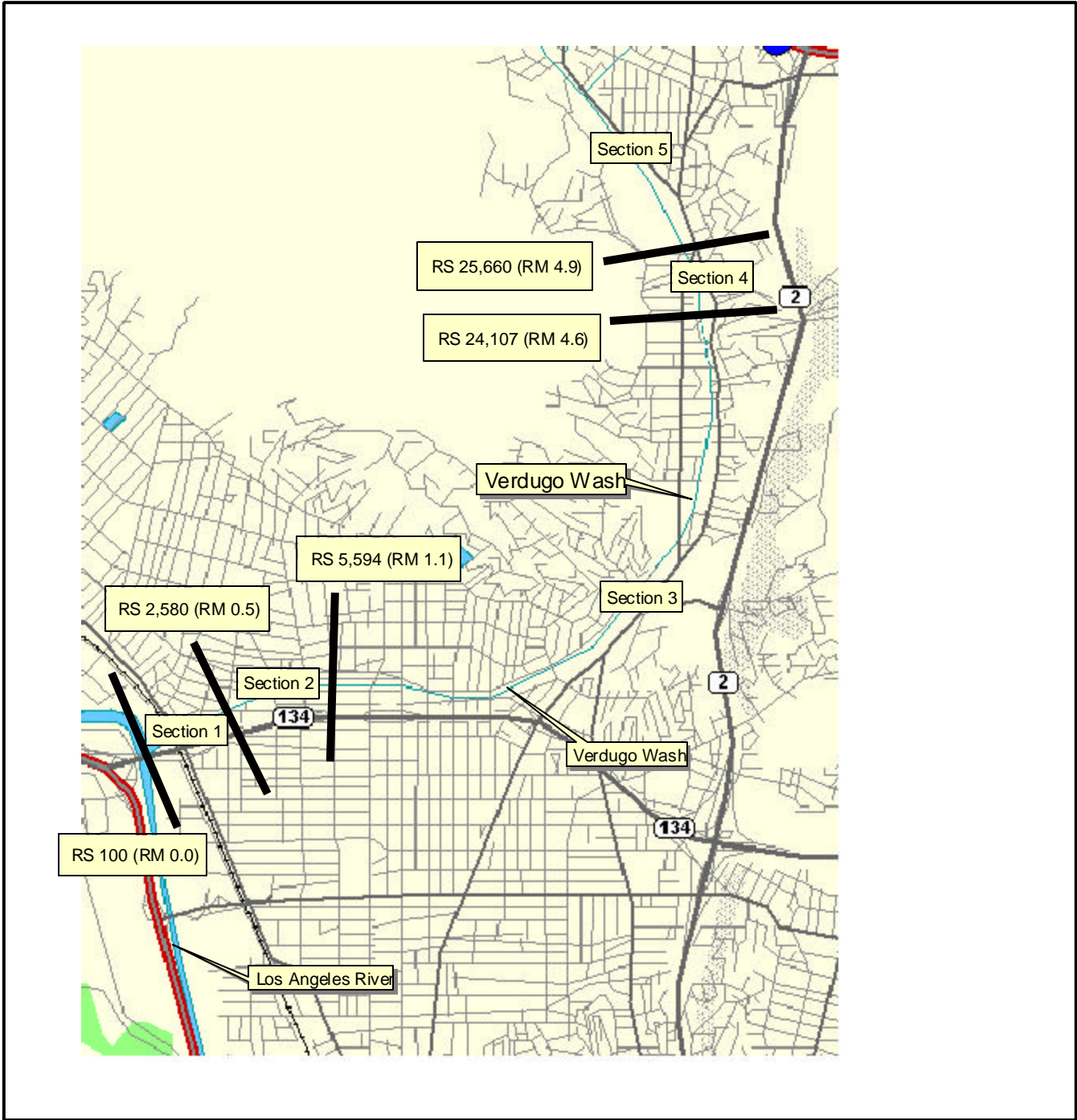


FIGURE A.42

EFDC MODEL CROSS SECTION LOCATION Verdugo Wash - Sections 1, 2, 3, 4, and 5



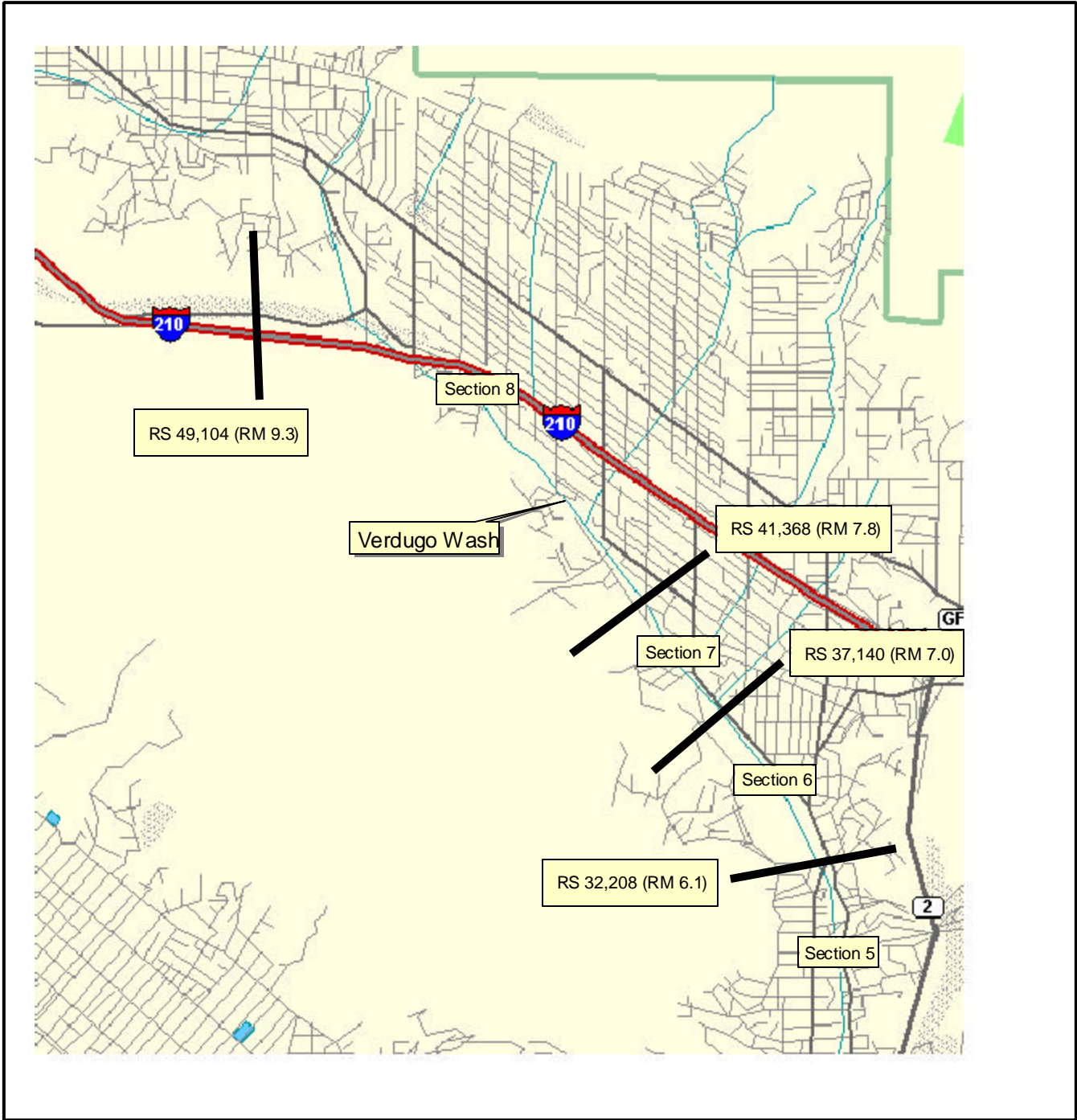
Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.43

EFDC MODEL CROSS SECTION LOCATION Verdugo Wash - Sections 5, 6, 7, and 8



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.44

EFDC MODEL CROSS SECTION
Verdugo Wash - Section 1
RS 100 to RS 2,580 (RM 0.0 to RM 0.5)

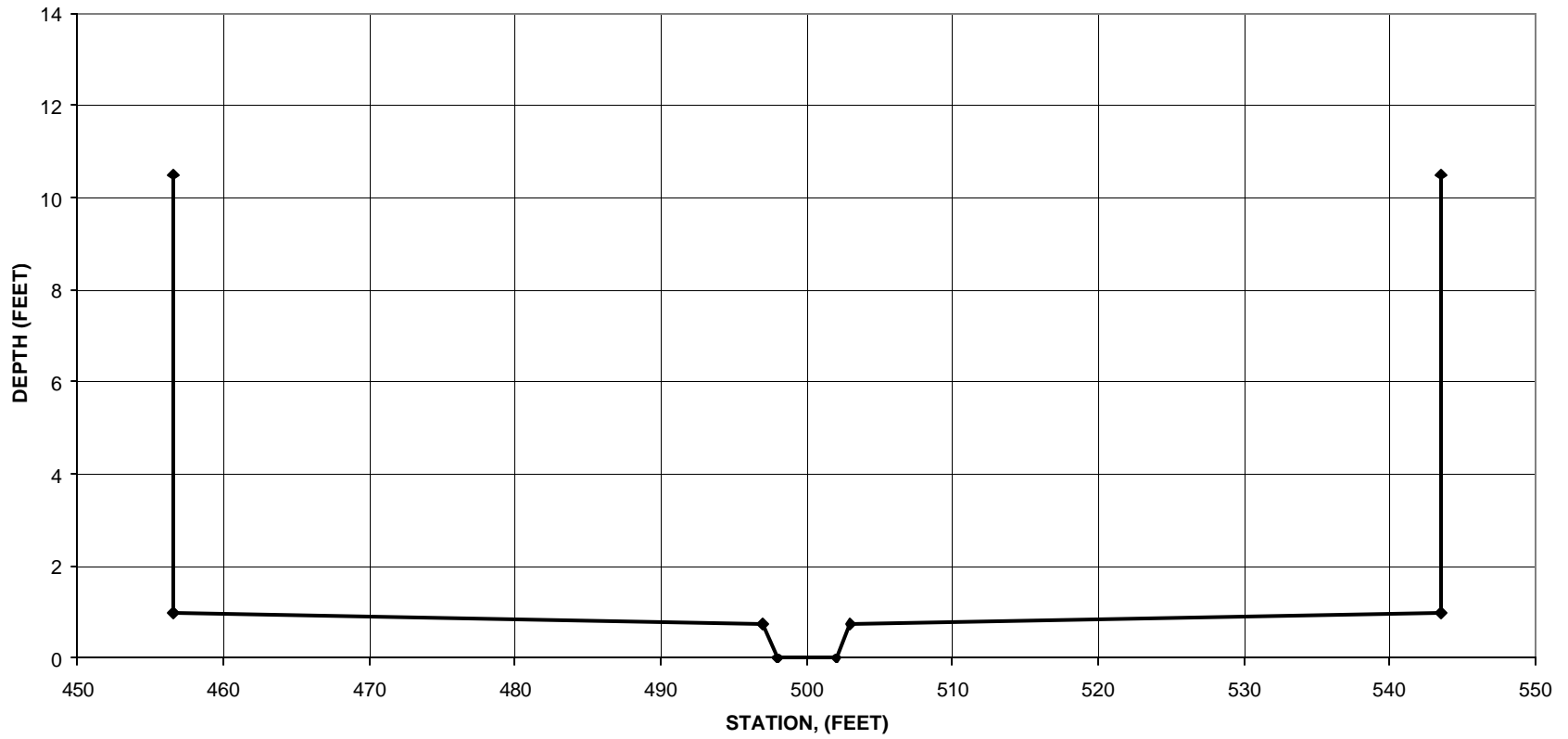


FIGURE A.45

EFDC MODEL CROSS SECTION
Verdugo Wash - Section 2
RS 2,580 to RS 5,594 (RM 0.5 to RM 1.1)

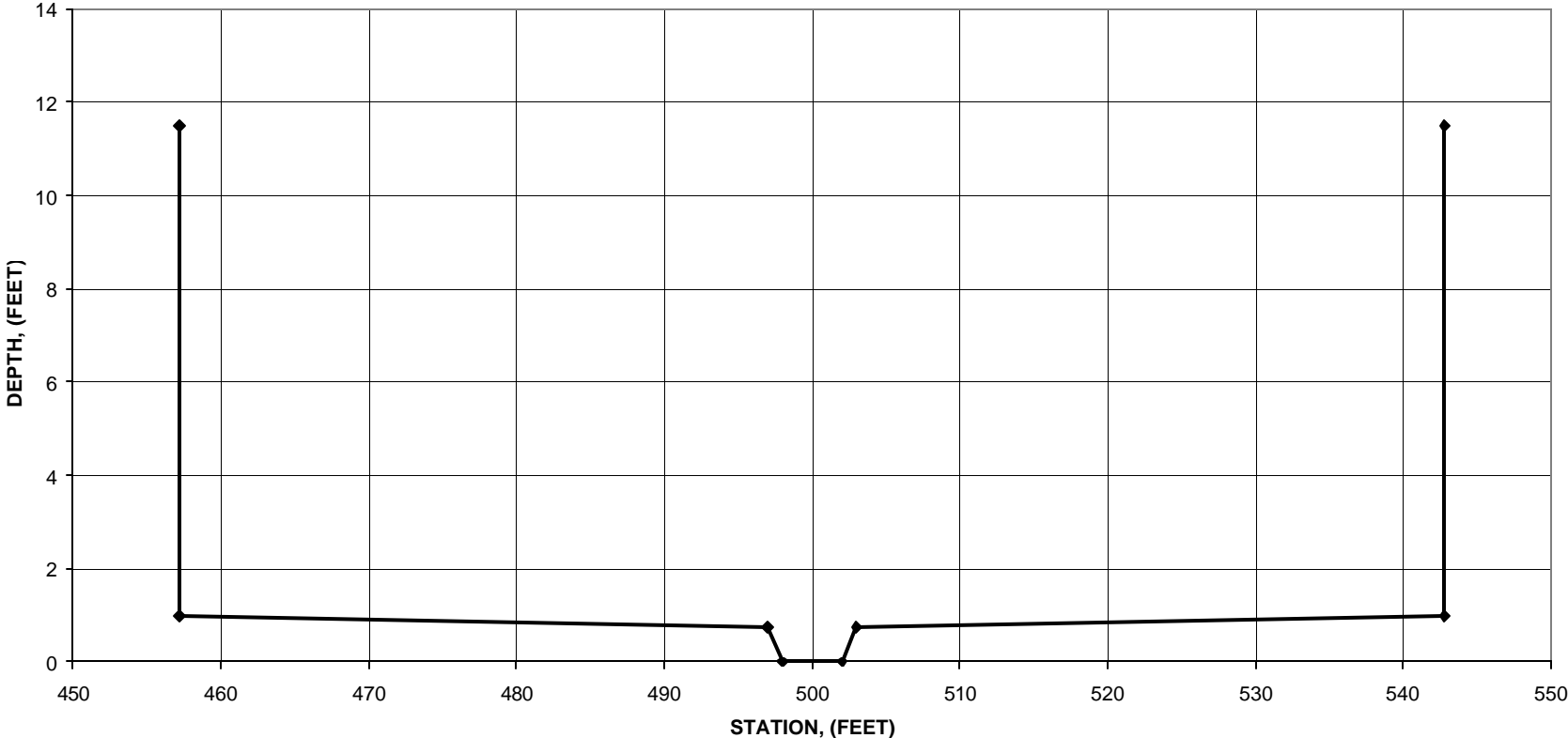


FIGURE A.46

**EFDC MODEL CROSS SECTION
Verdugo Wash - Section 3
RS 5,594 to RS 24,107 (RM 1.1 to RM 4.6)**

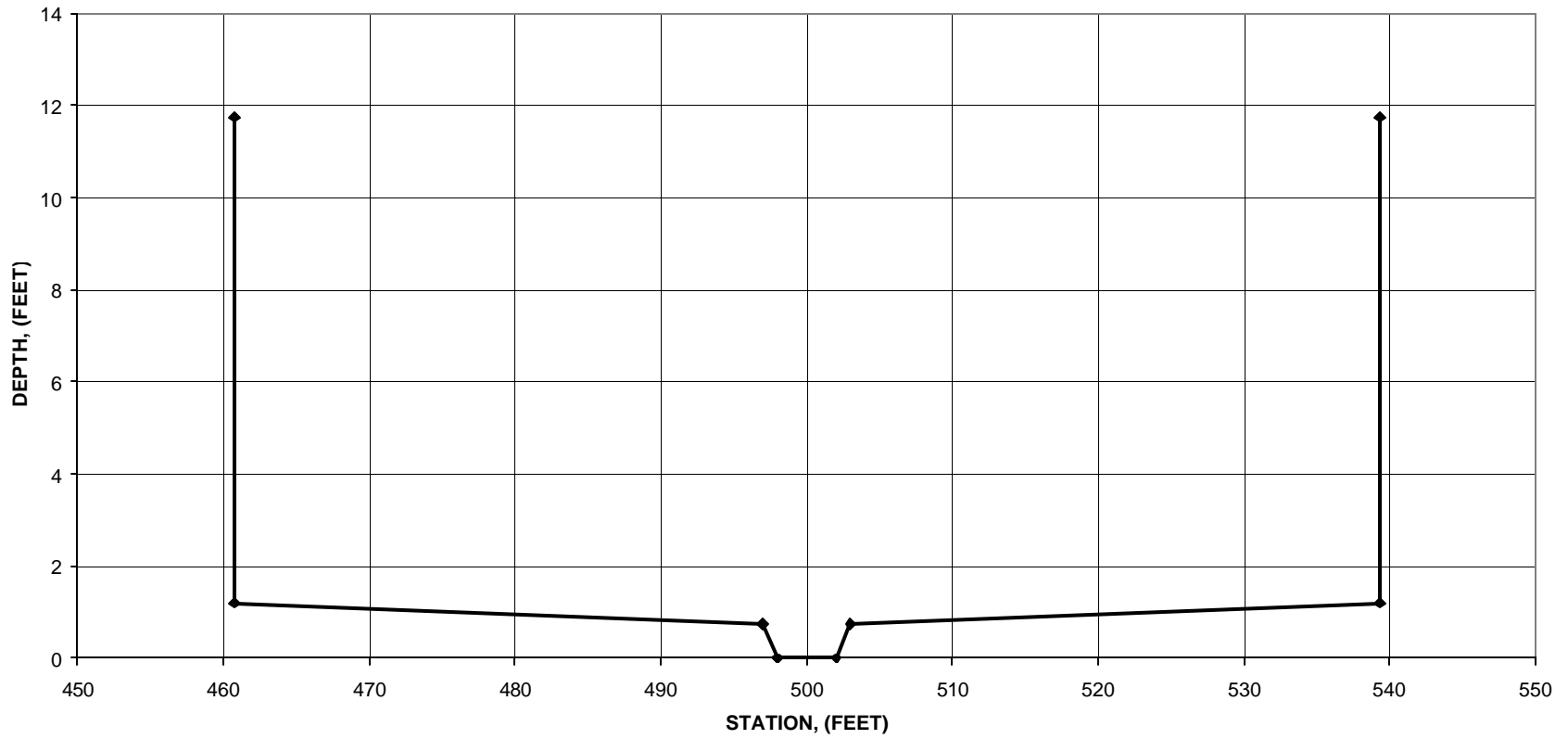


FIGURE A.47

**EFDC MODEL CROSS SECTION
Verdugo Wash - Section 4
RS 24,107 to RS 25,660 (RM 4.6 to RM 4.9)**

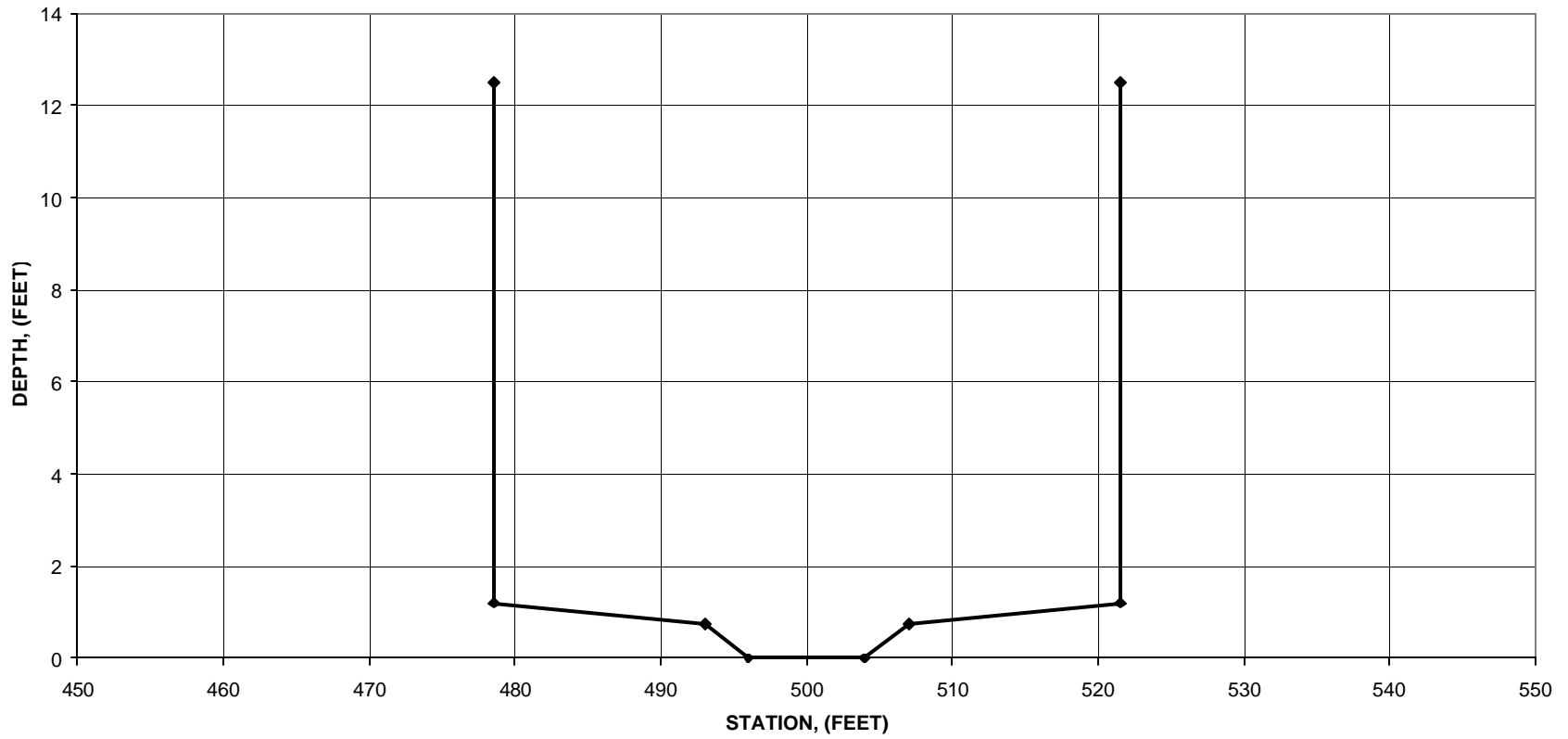


FIGURE A.48

**EFDC MODEL CROSS SECTION
Verdugo Wash - Section 5
RS 25,660 to RS 32,208 (RM 4.9 to RM 6.1)**

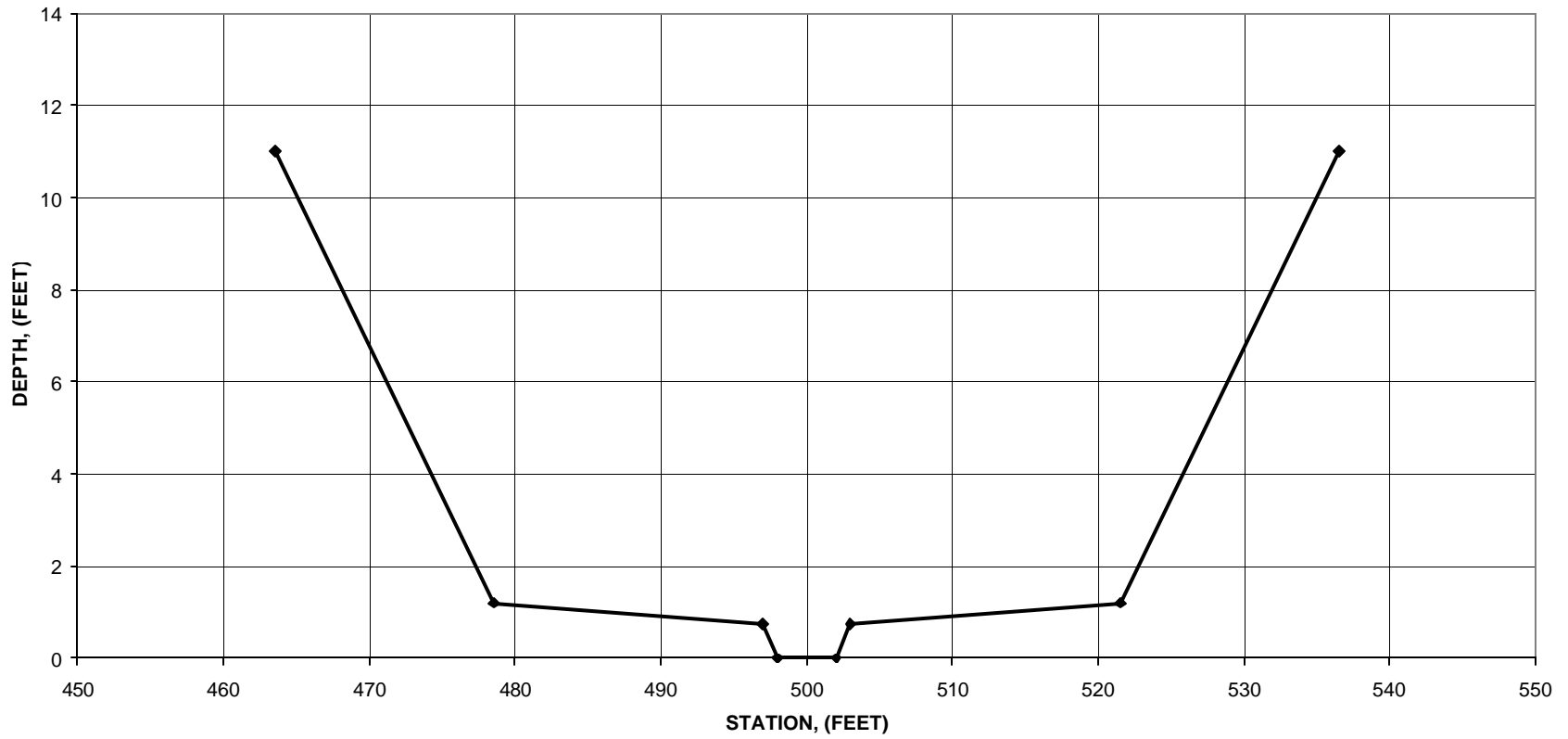


FIGURE A.49

EFDC MODEL CROSS SECTION
Verdugo Wash - Section 6
RS 32,208 to RS 37,140 (RM 6.1 to RM 7.0)

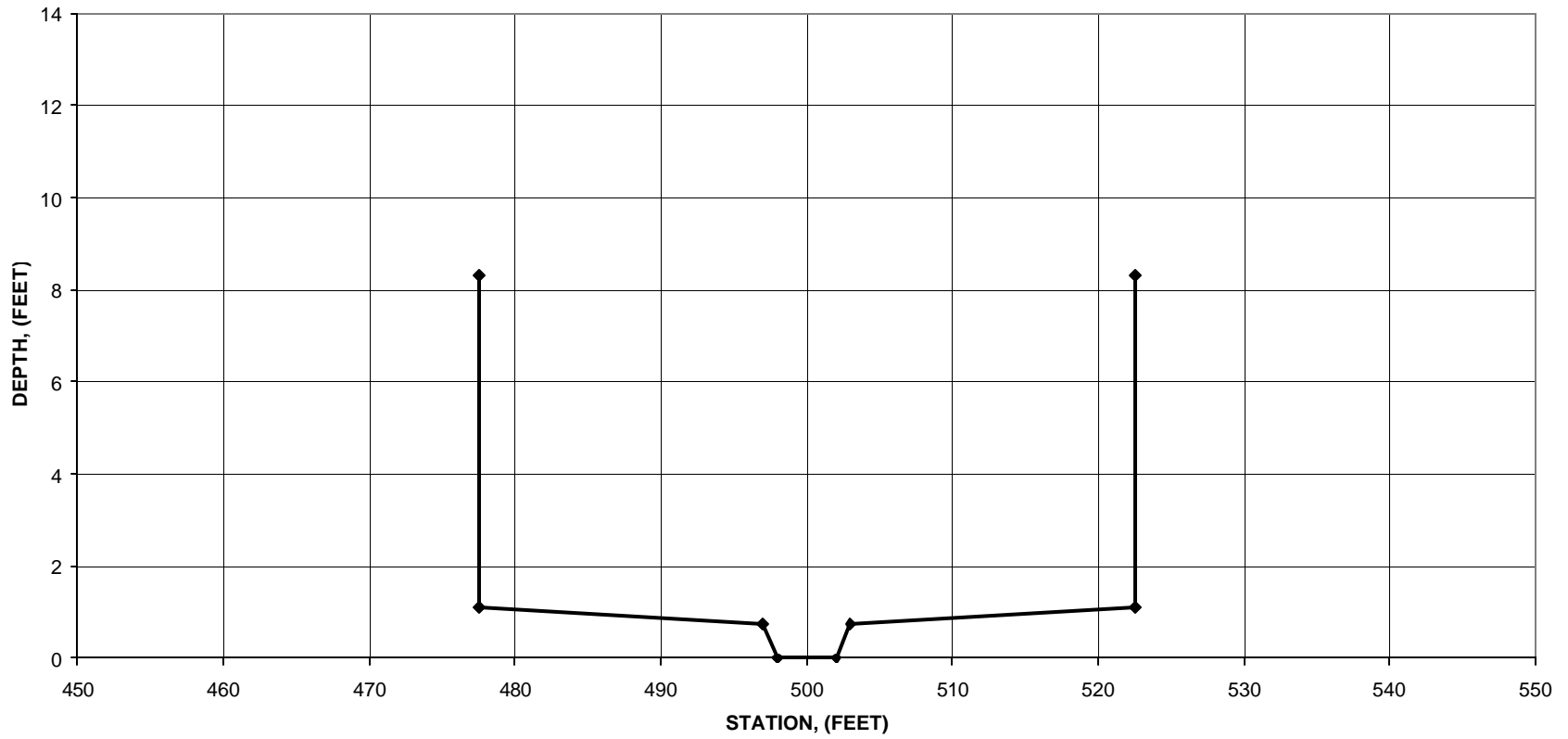


FIGURE A.50

EFDC MODEL CROSS SECTION
Verdugo Wash - Section 7
RS 37,140 to RS 41,368 (RM 7.0 to RM 7.8)

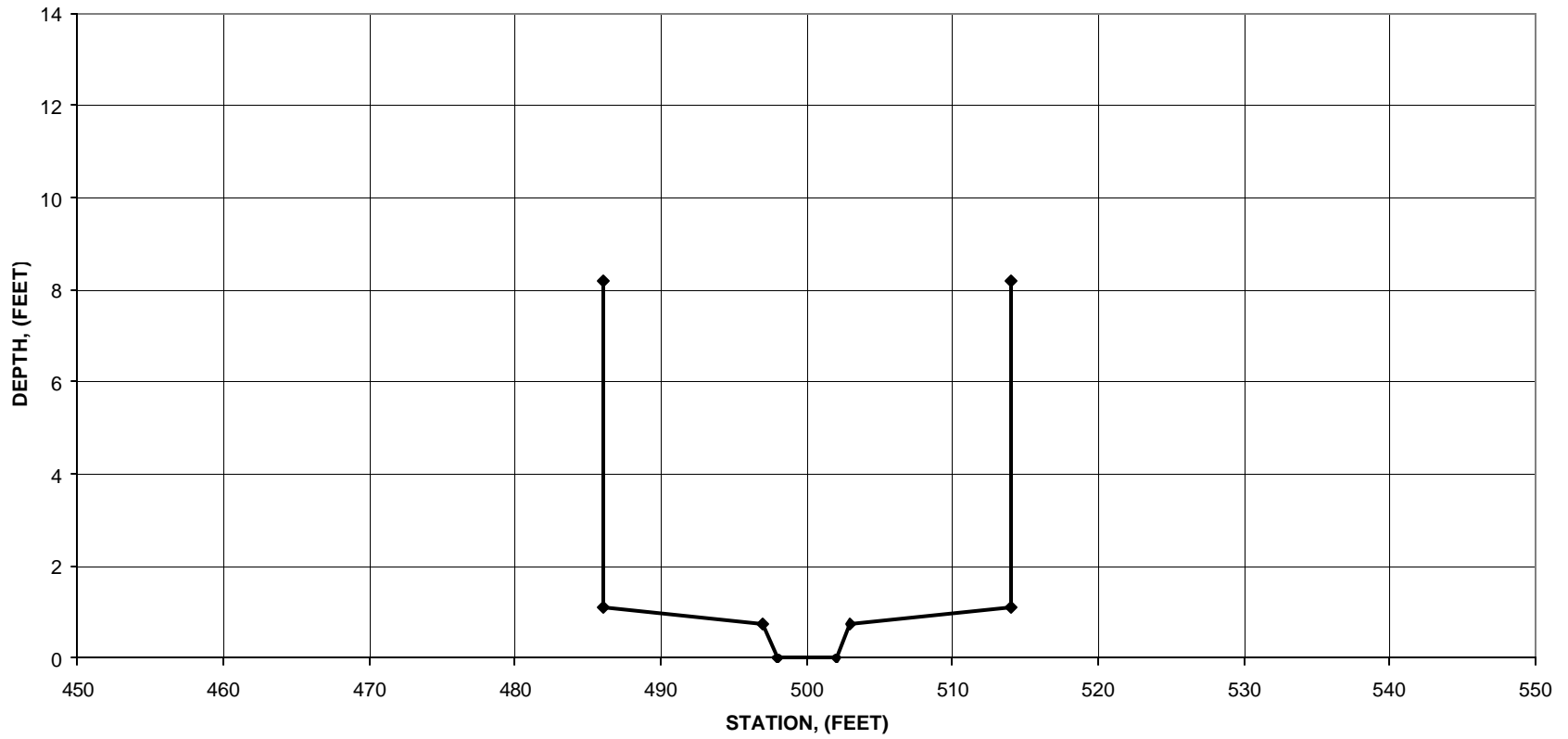


FIGURE A.51

EFDC MODEL CROSS SECTION
Verdugo Wash - Section 8
RS 41,368 to RS 49,104 (RM 7.8 to RM 9.3)

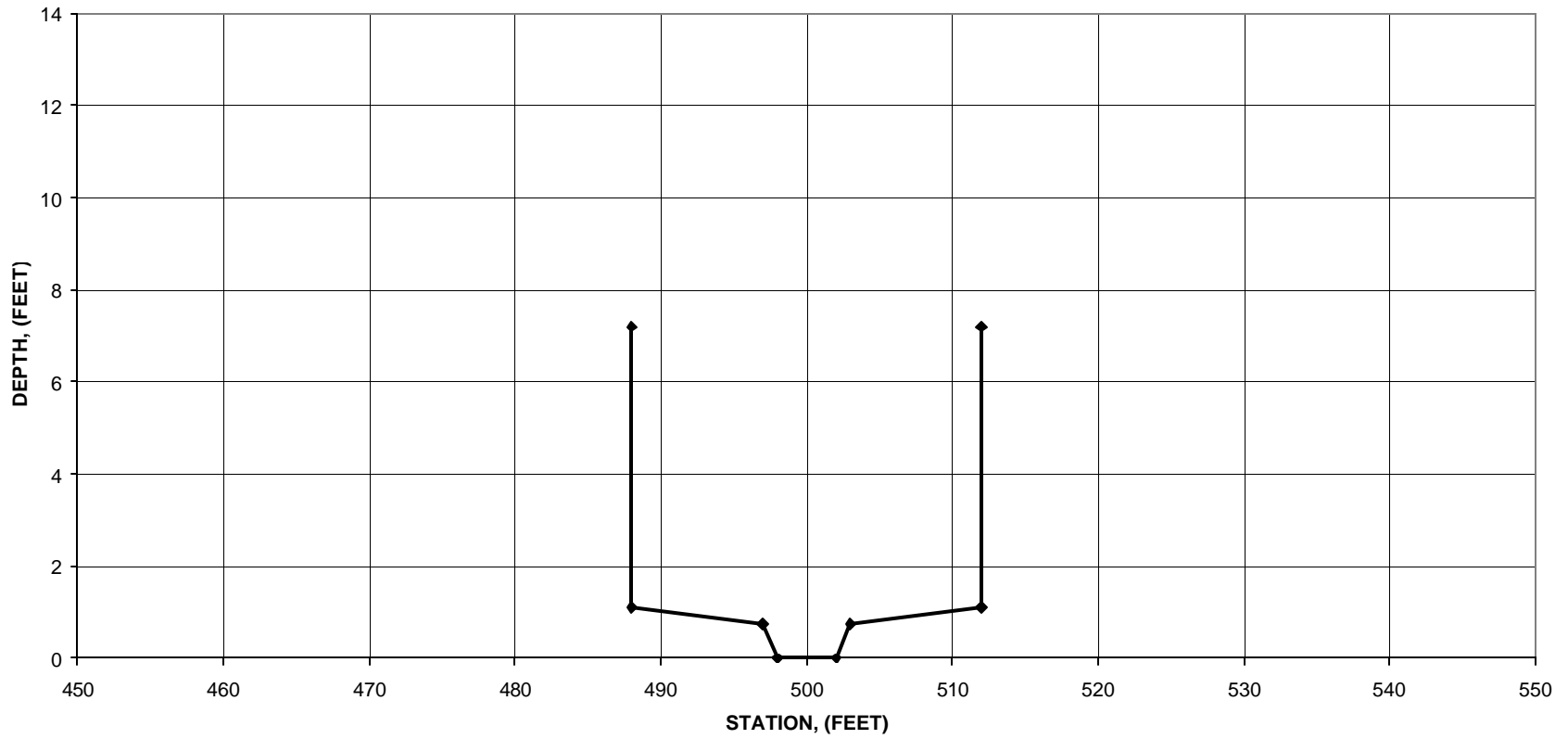


FIGURE A.52

EFDC MODEL CROSS SECTION LOCATION Burbank Channel - Western System - Sections 1 and 2



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.53

EFDC MODEL CROSS SECTION
Burbank Channel - Western System - Section 1
RS 0 to RS 11,698 (RM 0.0 to RM 2.2)

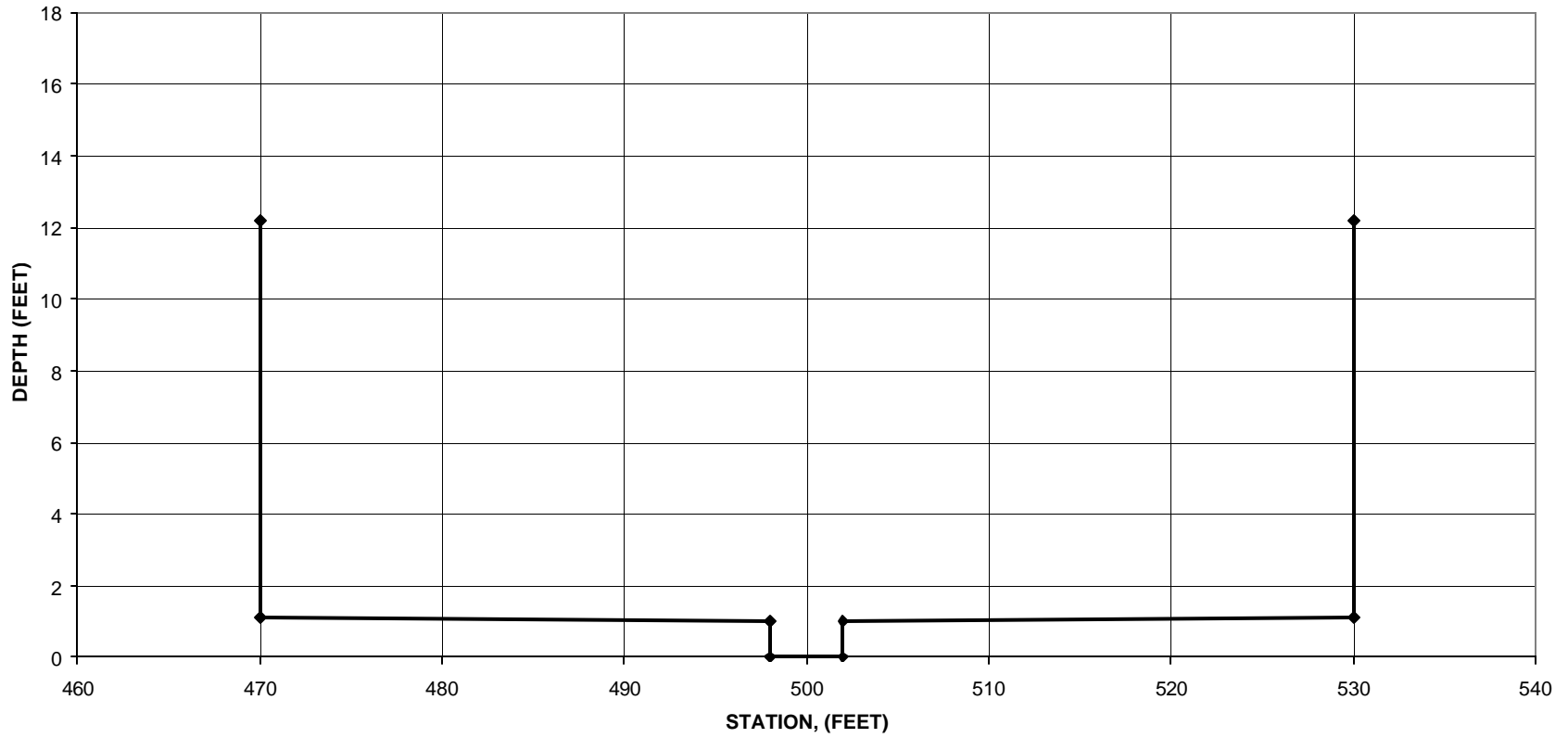


FIGURE A.54

EFDC MODEL CROSS SECTION
Burbank Channel - Western System - Section 2
RS 11,698 to RS 33,264 (RM 2.2 to RM 6.3)

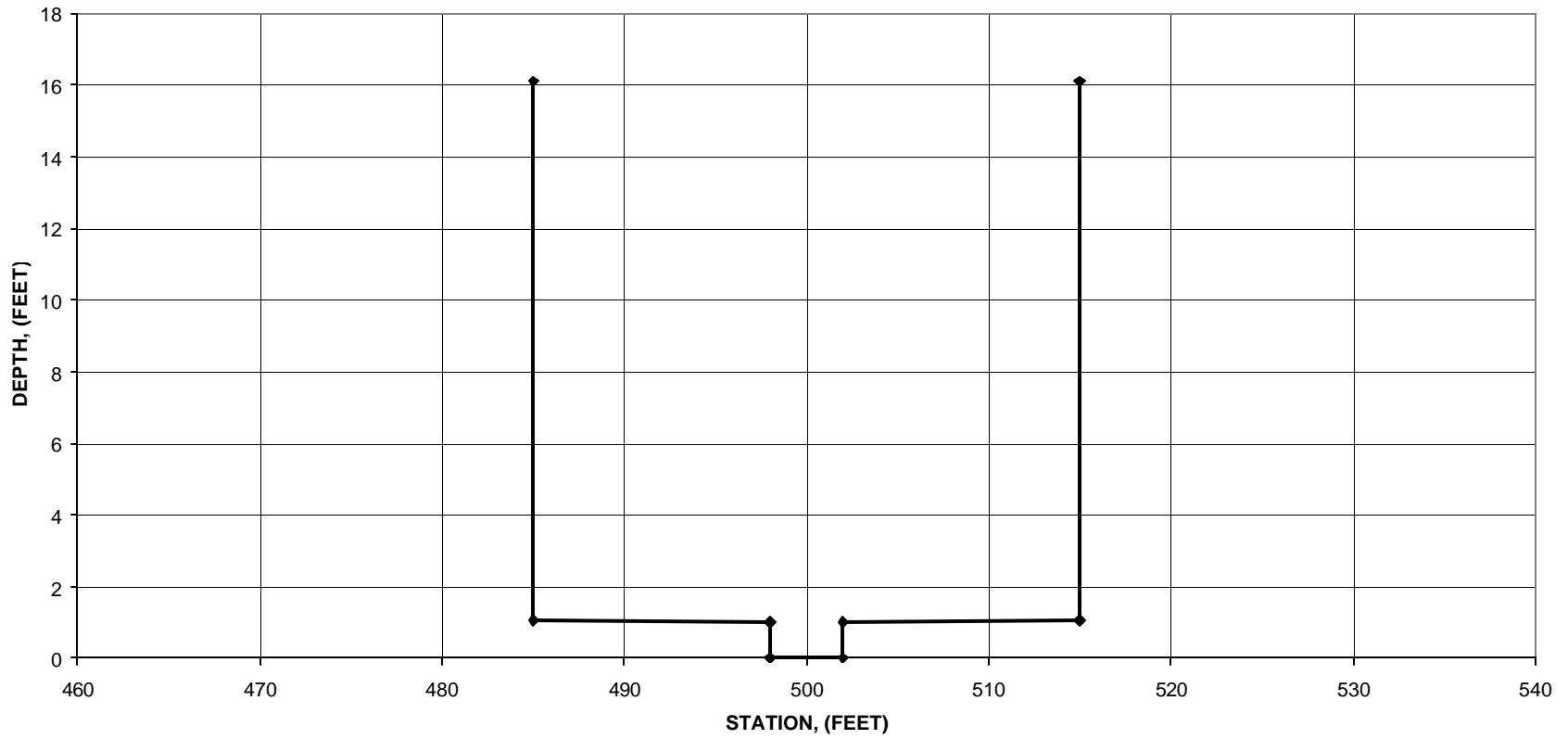
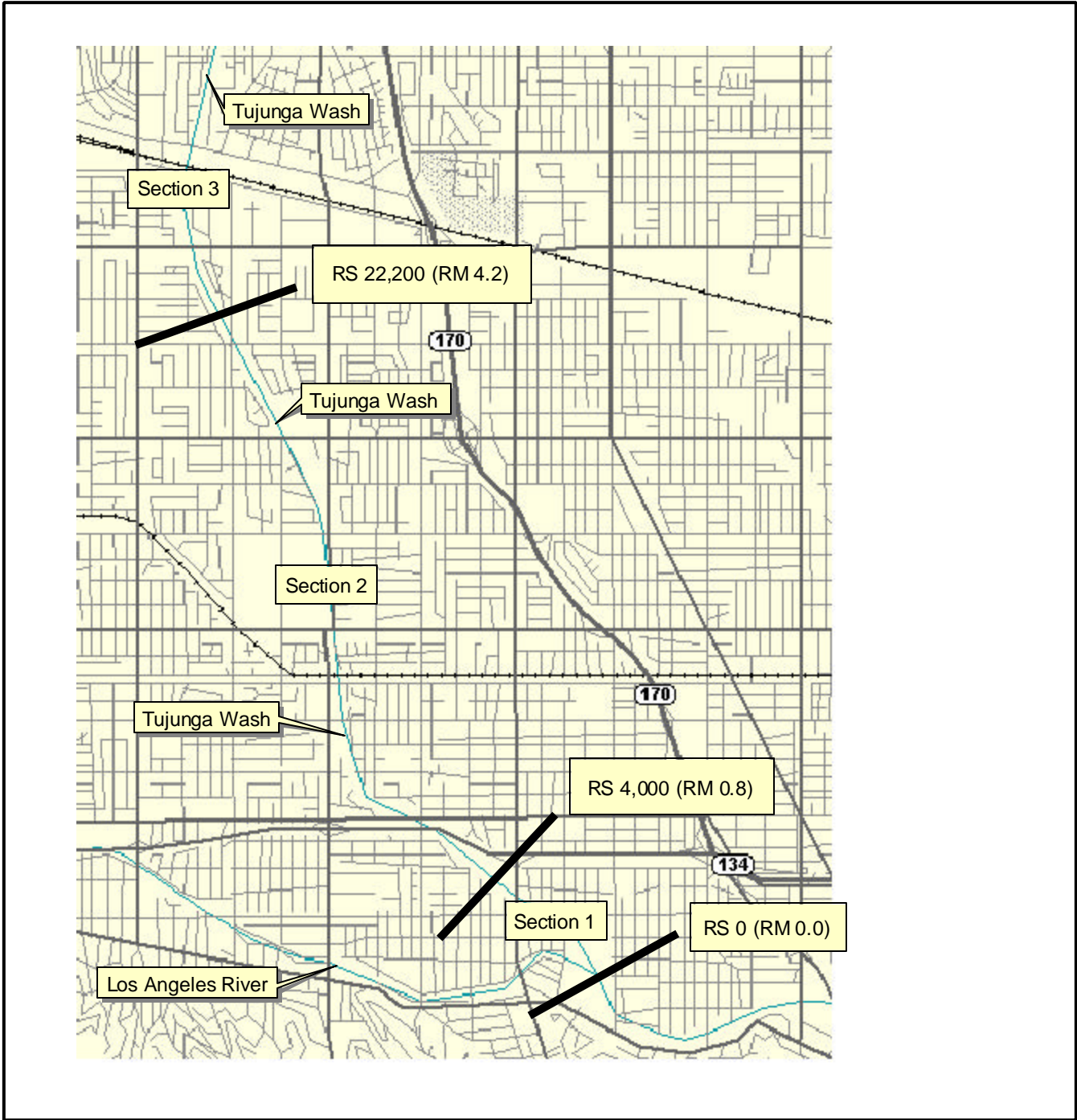


FIGURE A.55

EFDC MODEL CROSS SECTION LOCATION Tujunga Wash - Sections 1, 2, and 3



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.56

EFDC MODEL CROSS SECTION LOCATION Tujunga Wash - Section 3



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.57

EFDC MODEL CROSS SECTION
Tujunga Wash - Section 1
RS 0 to RS 4,000 (RM 0.0 to RM 0.8)

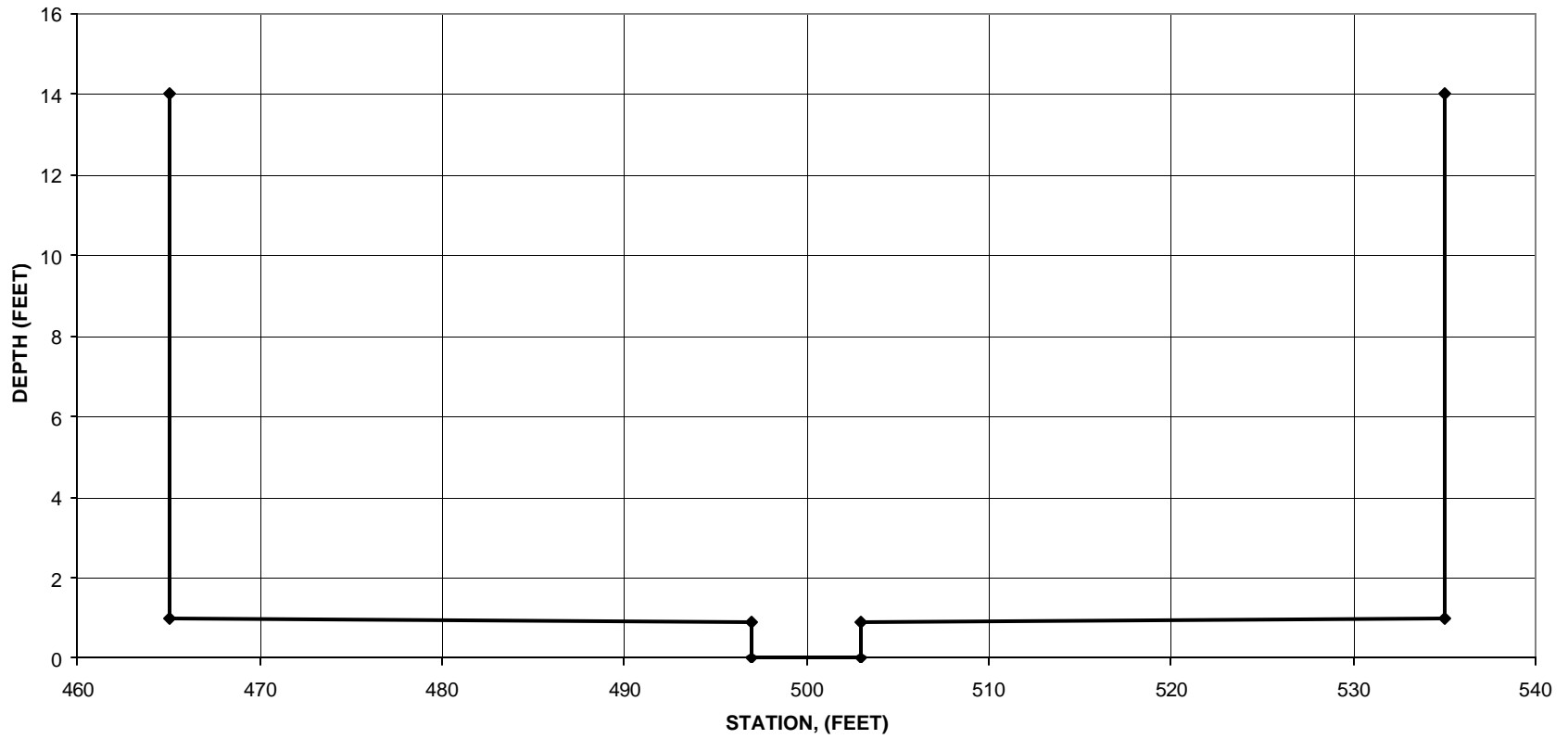


FIGURE A.58

EFDC MODEL CROSS SECTION
Tujunga Wash - Section 2
RS 4,000 to RS 22,200 (RM 0.8 to RM 4.2)

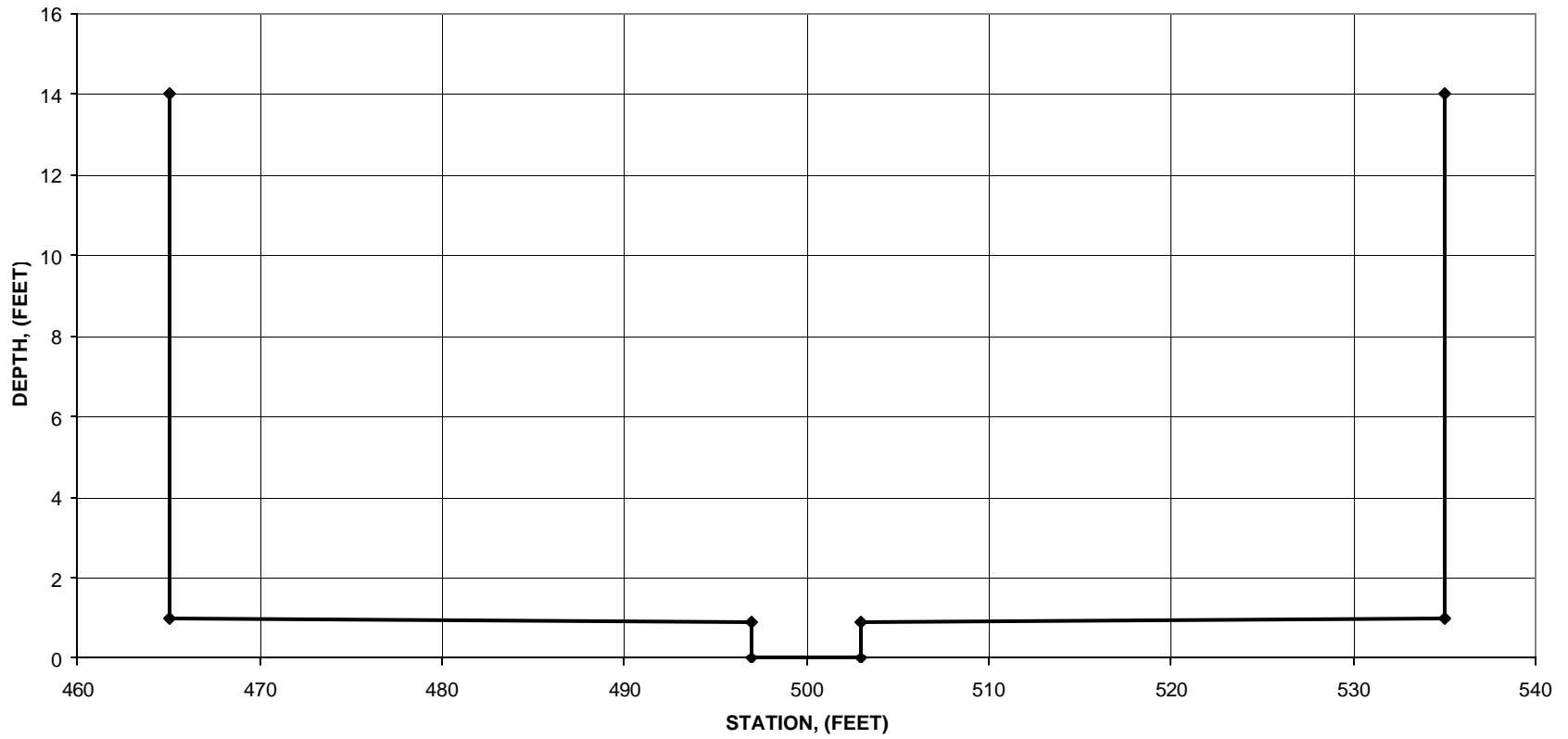


FIGURE A.59

**EFDC MODEL CROSS SECTION
Tujunga Wash - Section 3
RS 22,200 to RS 49,988 (RM 4.2 to RM 9.5)**

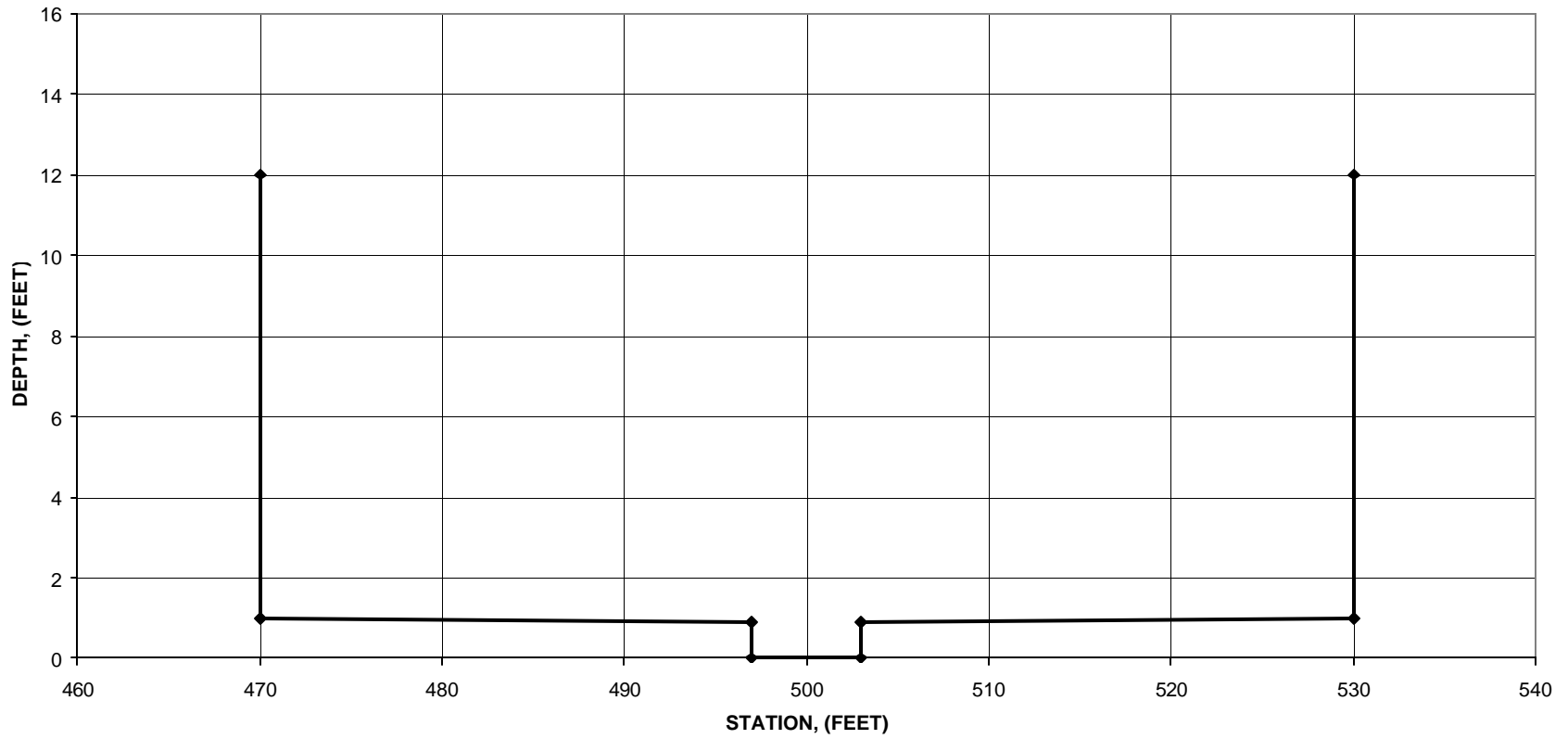


FIGURE A.60

EFDC MODEL CROSS SECTION LOCATION Bell Creek - Section 1



Section number located between hash marks.
Indicates the reach that the section represents.
Source of map: DeLorme 3-D TopoQuads, California South.



Not To Scale

FIGURE A.61

EFDC MODEL CROSS SECTION
Bell Creek - Section 1
RS 0 to RS 20,328 (RM 0.0 to RM 3.9)

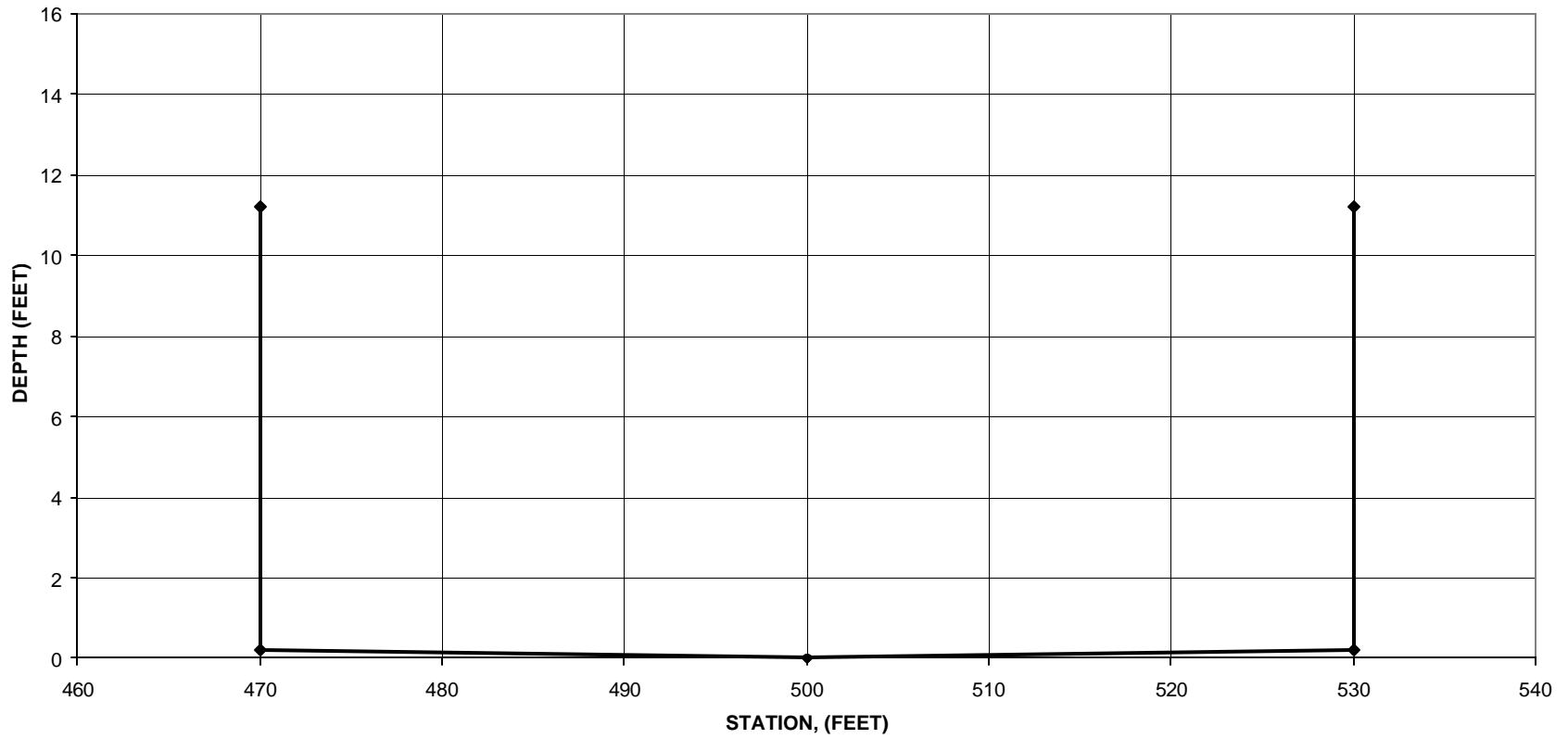


FIGURE A.62