LUKE WASH FLOOD INSURANCE STUDY

Between the Gila River Floodplain and the Southern Pacific Railroad

FLOOD CONTROL
DISTRICT
OF
MARICOPA
COUNTY

HYDRAULIC ANALYSIS

Technical Data Notebook Section 4

CVL

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LUKE WASH
FLOOD INSURANCE STUDY

Between the Gila River Floodplain and the Southern Pacific Railroad

FCDMC CONTRACT #90-68

TECHNICAL DATA NOTEBOOK
SECTION 4
HYDRAULIC ANALYSIS

March 18, 1993

Prepared for:

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Date Signed 3/19/93
ARIZONA, U.S.A.

CVL

LUKE WASH
HYDRAULIC ANALYSIS

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LUKE WASH
HYDRAULIC ANALYSIS

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4.0 Introduction

4.0.1 Scope of Study

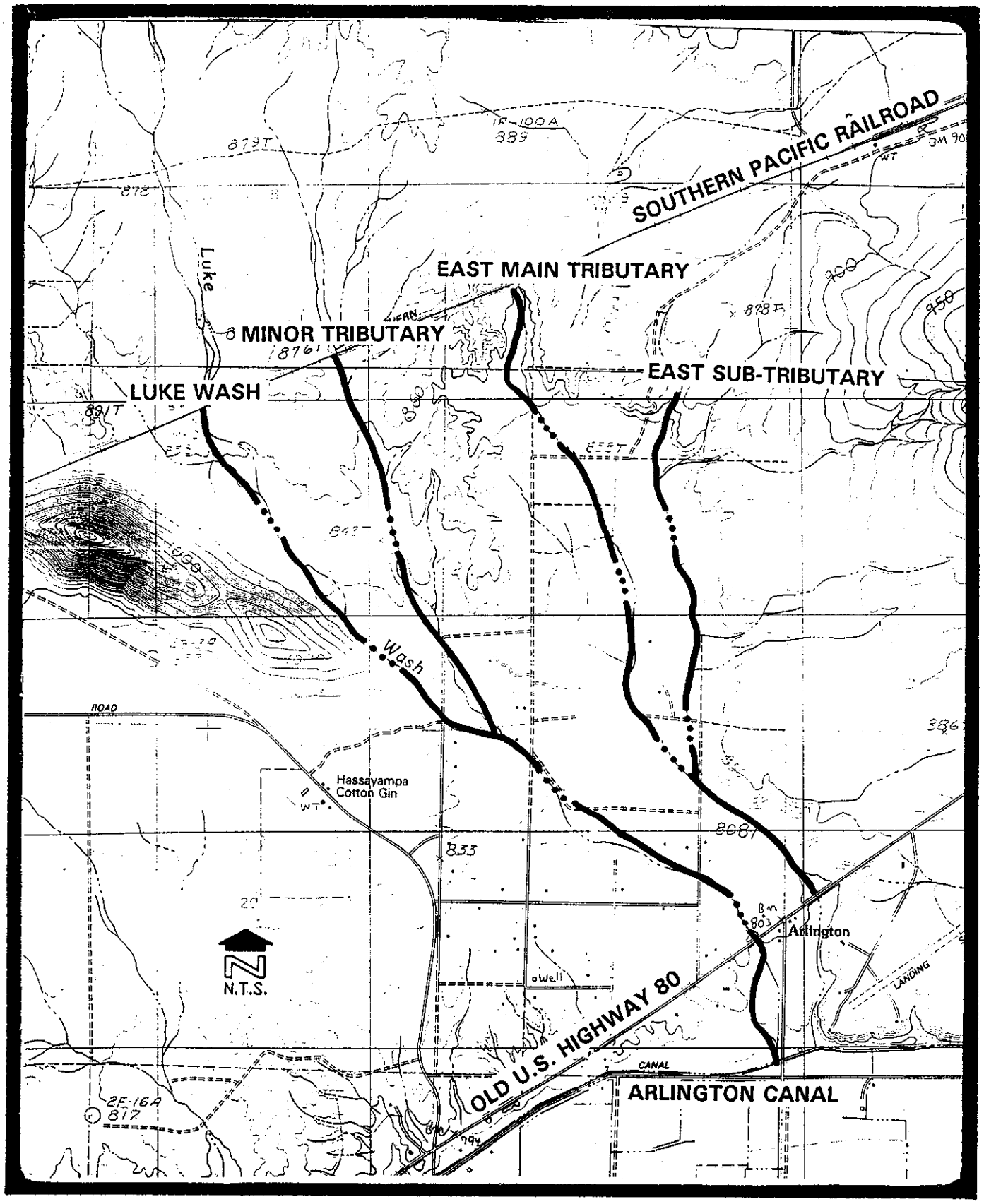
Coe & Van Loo Consultants, Inc., (CVL) has contracted with the Flood Control District of Maricopa County (FCDMC) to perform a Flood Insurance Study (FIS) for a portion of Luke Wash located in Maricopa County, Arizona.

The project consists of topographic mapping and floodplain delineation of approximately 9 miles of Luke Wash and its tributaries from the Gila River Floodplain to the Southern Pacific Railroad. In addition, topographic mapping has been produced and ponding limits established on the upstream side of the Arlington Canal. CVL developed the hydrology for the entire watershed contributing to the Gila River between the Hassayampa River and Centennial Wash watershed boundaries using the U.S. Army CORPS of Engineer's (CORPS) HEC-1 computer model. Backwater analysis has been conducted using the CORPS HEC-2 computer model to determine floodplain delineations for the 100-year peak flood.

The specific scope of this Floodplain Delineation Study is to evaluate the existence and severity of flood hazards for the following washes which are in unincorporated areas of Maricopa County:

- Luke Wash from the Gila River Floodplain to the Southern Pacific Railroad.
- Minor Tributary to Luke Wash from its confluence with Luke Wash to the Southern Pacific Railroad.
- East Main Tributary to Luke Wash from its confluence with Luke Wash to the Southern Pacific Railroad.
- East Sub-Tributary to East Main Tributary from its confluence with East Main Tributary to one-half mile south of the Southern Pacific Railroad.

Refer to the study area location map (page 2) for the wash locations.



LUKE WASH
Between Gila River Floodplain &
Southern Pacific Railroad
FLOOD INSURANCE STUDY

STUDY AREA
LOCATION MAP

4.0.2 Description of Study Area

The terrain within the study area generally slopes to the south at 0.5 percent. The majority of this study area is in its natural desert condition, with a few man-made disturbances. Included in these disturbances are: roads, irrigation canals, agricultural areas, and housing. The community of Arlington is within the study area. This community is made up of mostly low-density rural housing.

The 100-year flow typically will not be contained within the channel banks. In addition, the Arlington canal and Old U.S. Highway 80 cause large backwater areas. Most of the roads cross the washes as dip crossings with the exception of the Luke Wash Crossing at Old U.S. Highway 80. At this crossing, 2 sets of 6-barrel 10' x 6' concrete box culverts allow most of the flow to pass under the highway with some flow overtopping the road. Further south, the Arlington Canal is siphoned to allow Luke Wash to cross. This crossing is not large enough and much of the flow will overtop the canal. South of the canal is mostly farm fields and then the Gila River. The Gila River floodplain is very wide and covers much of the farmland.

The vegetation in the study area is very diverse, the southern portion is mostly farmland with alfalfa and cotton as the primary crops. Where Luke Wash crosses old U.S. Highway 80, the vegetation includes many trees intergrown with weeds and brush. The vegetation in the remaining portions of the study is primarily desert weeds and brush with some smaller trees.

4.0.3 Mapping

Topographic mapping was prepared by Aerial Mapping Company, Inc. (AMCI) from photographs taken in September, 1991. Horizontal datum for this project is NAD 83, Arizona State Plane Coordinate System, Central Zone. Vertical elevations are based

on the mean Sea Level Datum of 1929 as monumented by the United States National Geodetic Survey and the United States Geological Survey. Horizontal and vertical control tabulation are provided in the Survey Data Report under separate cover. The cross-sections were located by CVL and digitized by AMCI.

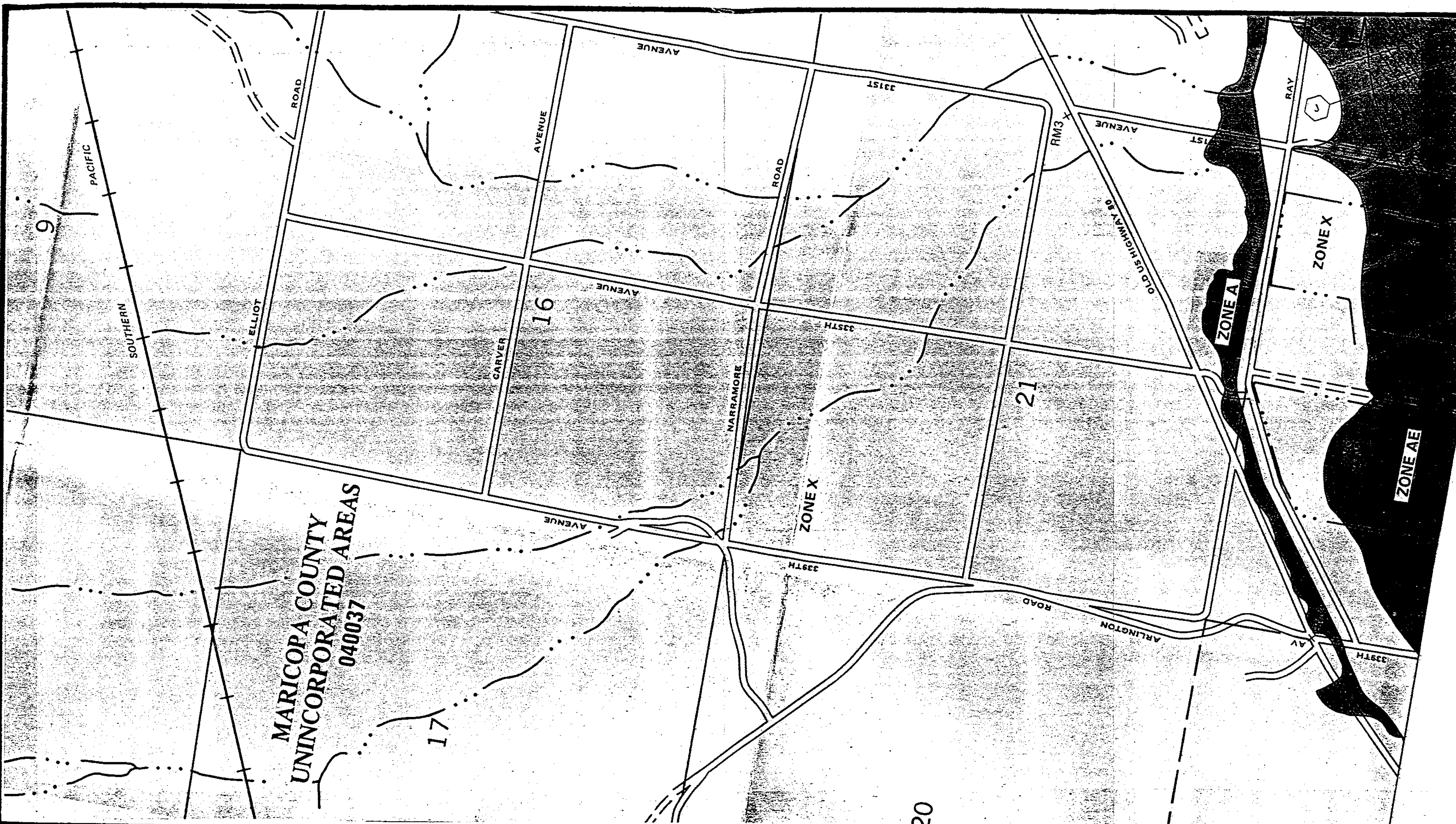
4.0.4 Other Studies

Luke Wash has not previously been analyzed for a Flood Insurance Study, and is not delineated as a special flood hazard area. The current Flood Insurance Rate Maps for Maricopa County and Incorporated Areas include the entire study area to be in Zone X (shaded) except for the Gila River floodplain (Zone AE) and some ponding behind the Arlington Canal (Zone A). The Gila River floodplain was analyzed for a Flood Insurance Study by Dames and Moore, see reference 12. Hydraulic calculations are not available for any of the wash crossings structures in the study area. These include the Southern Pacific Railroad timber bridges, culverts under Old U.S. Highway 80, and the Arlington Canal siphon. Refer to the Flood Insurance Rate Map (page 5) for the current regulatory flood zones.

4.0.5 Coordination and Acknowledgements

CVL and the FCDMC have been in close coordination throughout the project. This coordination was typically meetings or telephone conversations to discuss the aspects of the FIS. The methodology used in preparing this FIS have been agreed upon by the FCDMC and CVL.

The Flood Control District of Maricopa County was represented at the "N" value field investigation and they provided guidance in the determination of "N" values for the entire study area. See the N Value Determination Report (Ref. 11).



1"=1000'

LUKE WASH
Between Gila River Floodplain & Southern Pacific Railroad
FLOOD INSURANCE STUDY

BASE MAP FROM MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS
MAP NUMBER: 04013C2460E
MAP REVISED: SEPTEMBER 4, 1991

CURRENT REGULATORY FLOOD INSURANCE RATE MAP

CVL
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LANDSCAPE ARCHITECTURE

4.0.6 Location of Data

Survey, hydrologic, "N" value, and other pertinent data used in this study may be obtained from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, AZ 85009.

4.1 Engineering Methods

4.1.1 Hydrologic Analysis

A computerized rainfall/runoff model was developed for the Luke Wash watershed using the U.S. Army Corps of Engineers (CORPS) Flood Hydrograph Package (HEC-1). The September 1990 HEC-1 computer program was used to model the Luke Wash Watershed. The HEC-1 version 4.0, as implemented by Dodson and Associates, Inc. in their April 1991 version of ProHEC-1 was used for this study.

The assumptions and parameters used in the preparation of the HEC-1 model have been documented in the Technical Data Notebook Section 3 (Ref. 2, under separate cover) for this study. The 100-year, 6-hour and 24-hour storms were modeled. The floodplain delineation was based on the storm event that produced the higher peak flow. Refer to Table 1 for a list of the peak discharges that were used for the floodplain delineation.

Table 1 Peak Discharges Used for Floodplain Delineation				
Wash Name	**Location Section-Section**	**HEC-1 ID**	**Controlling Storm**	**Peak Flow 100-yr**
Luke Wash	1.160-1.404	RES 513	24-HR.	7633
	1.449-1.819	C 495	24-HR.	7814
	1.839-2.197	C 486	24-HR.	7948
	2.294-2.682	C 375	24-HR.	6551
	2.764-3.344	C 360	24-HR.	6674
	3.440-4.223	C 320	24-HR.	6757
Minor Tributary	0.389-0.723	C 355	6-HR.	590
	0.834-1.242	C 340	6-HR.	657
East Main Tributary	1.051-2.653	C 425	24-HR.	2749
East Sub-Tributary	0.130-1.049	S 445	6-HR.	871

4.1.2 Hydraulic Analysis

The study reach is 9 miles of Luke Wash and its tributaries from the Gila River Floodplain to the Southern Pacific Railroad. For most of the study reach Luke Wash and its tributaries are in their natural condition. There are, however, some road and structure crossings, including Old U.S. Highway 80 and the Arlington Canal.

The existing condition 100-year frequency flood was analyzed for the hydraulics of the entire study reach. The resultant 100-year flood limits were delineated for FEMA regulatory purposes. Refer to the floodplain delineation maps in the Appendix Section VIII for the location of the floodplain boundary. In addition, ponded flood boundaries behind the Arlington Canal west of Luke Wash were based on flow over the canal using weir flow rating curves. At Old U.S. Highway 80, the ponded flood boundaries behind the culverts west of Luke Wash were based on the HDS 5 (reference 9) culvert flow and combined with the weir flow rating curves. See sections 4.5.3 and 4.5.4 for more details, and the appendix sections VI and VII for calculations regarding the ponding areas.

The Arlington Canal is siphoned to allow Luke Wash to cross. This crossing is not large enough to convey the 100-year flow, and therefore, some of the flow will pond behind the canal and weir over the canal bank. The Luke Wash crossing of the Arlington Canal was modeled using the CORPS HEC-2 Water Surface Profiles computer program. The ponding elevation was based on this backwater. See section 4.5.2 for more detail regarding this ponding.

The National Flood Insurance Program was established to encourage state and local governments to adopt sound floodplain management programs to reduce future flood losses. Flood insurance has been made available to communities meeting the standards of this program as defined in reference 1. This study, therefore, has been performed to meet these standards and includes a flood boundary map designed to assist the FCDMC and the local communities in developing sound floodplain management measures.

The 100-year flood has been adopted by the Federal Emergency Management Agency (FEMA) as the base flood for purposes of floodplain management measures. The boundary of the 100-year flood (shown in Appendix VIII) has been delineated from flood elevations computed at each cross section. The boundaries were then interpolated between each cross section using topographic maps at a scale of 1" = 200' with a contour interval of 2 feet.

The CORPS HEC-2 Water Surface Profiles computer program was used to model the study reaches. The May 1991 HEC-2 version 4.6.2 (as supplied by NTIS) was used in the study. The study reaches were modeled as sub-critical profiles. The computer runs were started based on the slope area method. The water surface from the Gila River was not used due to the difference in the time of peak flow. In some areas, encroachment cards (ET) were used to model dead or noneffective flow areas.

Consequently "SSTA" in "ENDST" do not represent the actual flooding limits, and the delineation was established based on the cross-section point elevations and the topography. In some cases "TOPWID" does not represent the full width of the floodplain due to ineffective flow areas or low islands within the floodplain. These considerations were accounted for in the modeling and the delineation process. At locations near the confluence of washes where the floodplains overlap, the higher water surface and floodplain will be shown on the maps (see section 4.5.5 for more detail on how this water surface was derived).

4.2 Parameter Estimation

4.2.1 Manning's "N" Value

The roughness factors ("N" values) for Luke Wash and its tributaries were established based on field investigations, topographic mapping, and photographs of the area. These values were coordinated with the FCDMC. For complete description of assumptions made regarding "N" value determination, refer to the "N" Value Determination Report for the Luke Wash F.I.S. dated November, 1992 (reference 11).

Table 2 'N' Values Used for the Luke Wash FIS	
LUKE WASH BELOW OLD U.S. HIGHWAY 80	
"N" value for the channel =	0.045 to 0.065
"N" value for the overbanks =	0.120
"N" value for concrete box culverts at Old U.S. Highway 80 =	0.017
LUKE WASH ABOVE OLD U.S. HIGHWAY 80	
"N" value for the channel =	0.045 to 0.065
"N" value for the overbanks =	0.055 to 0.120
MINOR TRIBUTARY	
"N" value for the channel =	0.045
"N" value for the overbanks =	0.045
EAST MAIN TRIBUTARY	
"N" value for the channel =	0.050
"N" value for the overbanks =	0.050 to 0.120
EAST SUB-TRIBUTARY	
"N" value for the channel =	0.045
"N" value for the overbanks =	0.045

4.2.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients were used to model the energy losses within a reach due to the changes in shape of river cross-sections (or effective flow areas). The contraction and expansion coefficients used for Luke Wash and its tributaries are 0.1 and 0.3 respectively (for gradual transitions). In the vicinity of the box culvert, a contraction coefficient of 0.3 and an expansion coefficient of 0.5 was used.

4.2.3 Hydraulic Jump/Drop Analysis

There are no significant hydraulic jumps or drops that occur in Luke Wash or its tributaries within the study area. Therefore, a hydraulic jump or drop analysis was not performed.

4.3 Cross Section Description

4.3.1 Channel and Overbank

All cross-sections are stationed from left to right looking downstream with the control line set at station 10,000. Cross-section numbers for Luke Wash are stationed in river miles upstream from the confluence with the Gila River. Cross-section numbers for the Minor Tributary and the East Main Tributary are stationed in river miles upstream from the confluence with Luke Wash. Cross-section numbers for the East Sub-Tributary are stationed in river miles upstream from the confluence with the East Main Tributary.

Cross-sections are located at intervals along the washes to define the flow carrying capability of the wash and its adjacent floodplain. The cross sections are generally situated perpendicular to the direction of flow and typically extend over the banks across the entire floodplain. Cross sections are spaced approximately 500 feet apart or they are located where changes in discharge occur, or where there are changes in slope, shape, or roughness.

Bank stations at each cross section were offset from the channel thalweg based on aerial photographs, 1" = 200' topographic maps and field investigation. The location of these bank stations on the cross sections affect the HEC 2 model computations due to differing 'N' values and the location of encroachments with respect to these bank stations.

4.3.2 Bridge and Constriction

Cross sections are located near the concrete culverts at Old U.S. Highway 80 in the manner described in the Corps of Engineers' HEC-2 manual (Ref. 6). To represent the contraction of flow entering the box culverts, one cross section is located upstream

a distance approximately equal to the width of the flow contraction. Cross sections are also located adjacent to the upstream and downstream ends of the culverts. Another cross section is located downstream of the culverts approximately four times the width of the expansion to model the flow as it leaves the culverts. The culverts located at Old U.S. Highway 80 were modeled using the special culvert method. The bridge modeling techniques were coordinated with the FCDMC.

4.3.3 Grade Control

There are currently no engineered grade control structures within the Luke Wash study area. However, at Old U.S. Highway 80, the 2 sets of 6-barrel 10' x 6 concrete box culverts will act as grade control for that portion of the wash.

4.4 Calibration

For the Luke Wash F.I.S., calibration was performed for the hydraulics of the concrete box culverts at Old U.S. Highway 80. The HDS 5 (reference 9) that was used for this calibration verified the performance of the special culvert routine of the HEC 2.

4.5 Special Problems

4.5.1 Luke Wash Crossing of Old U.S. Highway 80

Luke Wash crosses under Old U.S. Highway 80 through a 6 barrel 10' x 6' concrete box culvert. Approximately 1100 feet east of the Luke Wash crossing, the East Main tributary crosses the highway through a similar culvert. Neither culvert has adequate capacity to convey the 100-year flow, and therefore the backwater from the two washes combine, and the two sets of culverts act as a single bridge outlet. These two sets of culverts were modeled in the HEC-2 as a twelve barrel 10' x 6' concrete box

culvert. The special culvert routine within the HEC-2 program was used to model the culvert crossing.

The Luke Wash backwater behind Old U.S. Highway 80 is delineated on the flood boundary maps in the appendix. At this location Luke Wash will also overtop the road in the 100-year storm. This backwater depth was determined by the water surface elevations computed from the HEC 2 run.

4.5.2 Luke Wash Crossing of the Arlington Canal

The Arlington Canal is siphoned to allow a channel crossing of Luke Wash. The Luke Wash crossing is not large enough to convey the 100-year flow, therefore, some flow will overtop the canal bank. This will also create a large ponding area behind the elevated canal, and allow some of the flow to break out to the west and east before it overtops the canal. The water surface elevation for the backwater upstream of the canal adjacent to Luke Wash was obtained from the HEC-2 model.

4.5.3 Local Ponding Behind Old U.S. Highway 80

For the areas within the study west of Luke Wash, the 100-year storm will cause ponding behind the culverts at Old U.S. Highway 80. In some locations this flow will overtop the road. The ponding depths and elevations were determined using combined outflow curves (included in the appendix) with culvert flow based on inlet control (HDS 5, reference 9) and flow over the road based on the weir flow equation. The flood boundaries were then plotted on the 1" = 200' topographic maps based on the water surface elevation.

4.5.4 Local Ponding Behind the Arlington Canal

West of Luke Wash, the elevated Arlington Canal causes stormwater ponding. The 100-year storm event will back up behind the canal, until the flow overtops the

bank. The ponding limits behind the canal and depths of flow over the canal were calculated by weir flow over the canal. An average depth of flow over the span of the canal inundated by flow was used for the calculations (included in the appendix). The resultant water surface elevation was then delineated on the 1" = 200' topographic maps.

4.5.5 Floodplain Determination at the Wash Confluences

At the confluence of the East Main Tributary with Luke Wash, the higher water surface elevation is from Luke Wash, therefore the floodplain of Luke Wash extends across the floodplain of the East Main Tributary. At the East Sub-Tributary's confluence with the East Main Tributary, the water surface is also influenced by backwater from Luke Wash. The Luke Wash profile was used for mapping flood boundaries and base flood elevations in this portion of the study. Luke Wash also has the higher water surface elevation at the confluence with the minor tributary. Therefore, the Luke Wash floodplain was used for this reach of the study area. At all of these locations, the controlling water surface elevation from Luke Wash was delineated on the maps as backwater up the tributary.

4.6 Flood Hazard Zones

The National Flood Insurance Program provides for the delineation of different flood hazard zones. These zones can be used as a tool to assist local communities in providing good floodplain management.

Based upon extensive discussion between the FCDMC and CVL, it was agreed that flood hazard zones would not be determined for this study. However, flood hazard zones are being recommended for the 100-year floodplains, and FEMA can make the final determination on the flood hazard zones.

100-year floodplains have been determined for Luke Wash and its tributaries as described previously in this report. These washes typically have a very small channel with limited capacity. Much of the 100-year flow is conveyed in shallow overbank flow with very low velocities. Based on this, the FCDMC and CVL concluded that a floodway would be very wide and encompass a large area of shallow flooding with very low velocities. Therefore, a floodway was not delineated for Luke Wash and its tributaries. The FCDMC and CVL recommend that Luke Wash and its tributaries be designated as a Zone "AE" without a floodway.

Culverts under old U.S. Highway 80 west of Luke Wash cause local ponding upstream of the highway. This is described in Section 4.5.3 and in Section VI of the appendix. The FCDMC and CVL recommend that these areas be designated as a Zone "AE" with a poinding water surface elevation denoted.

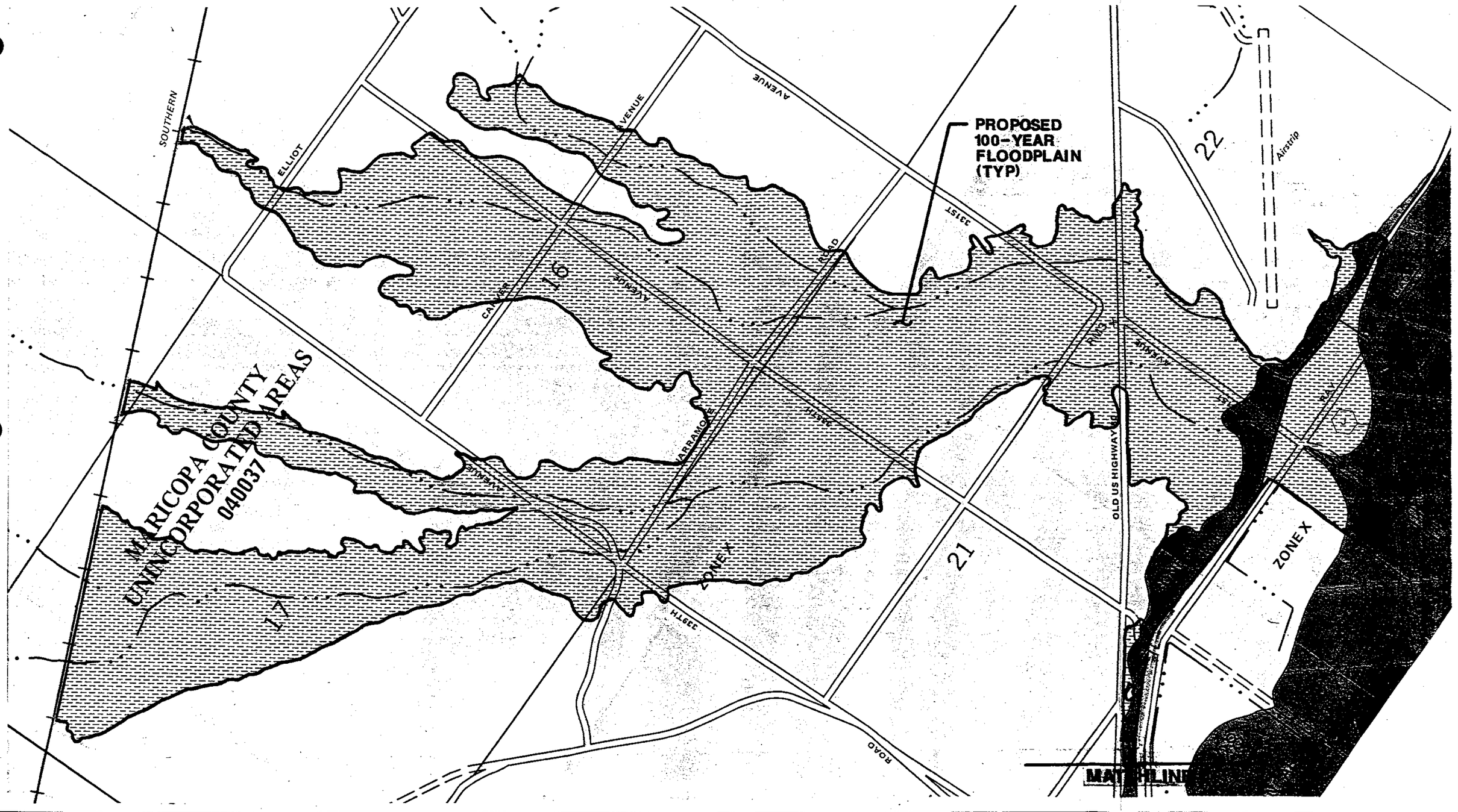
Stormwater ponding upstream of the Arlington Canal west of Luke Wash has been delineated for the 100-year storm. This is described in Section 4.5.4 and Section VII of the appendix. The FCDMC and CVL recommend that this area be designated as a Zone "A" on the Flood Insurance Rate Maps.

A copy of the current regulatory Flood Insurance Rate Map is included on Page 5 of this report. The proposed 100-year floodplain boundaries have been superimposed on the FIRM and are shown on Pages 16 and 17 of this report.

4.7 Final Results

4.7.1 Computer Runs

The HEC-2 computer model was used to compute the 100-year floodplain and floodway boundaries for Luke Wash and its tributaries. The results of this computer run were used to complete the Floodplain Maps as previously described. Water surface



1"=1000'

LUKE WASH
Between Gila River Floodplain &
Southern Pacific Railroad
FLOOD INSURANCE STUDY

BASE MAP FROM MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS
MAP NUMBER: 04013C2460E
MAP REVISED: SEPTEMBER 4, 1991

PROPOSED
100-YR FLOODPLAIN

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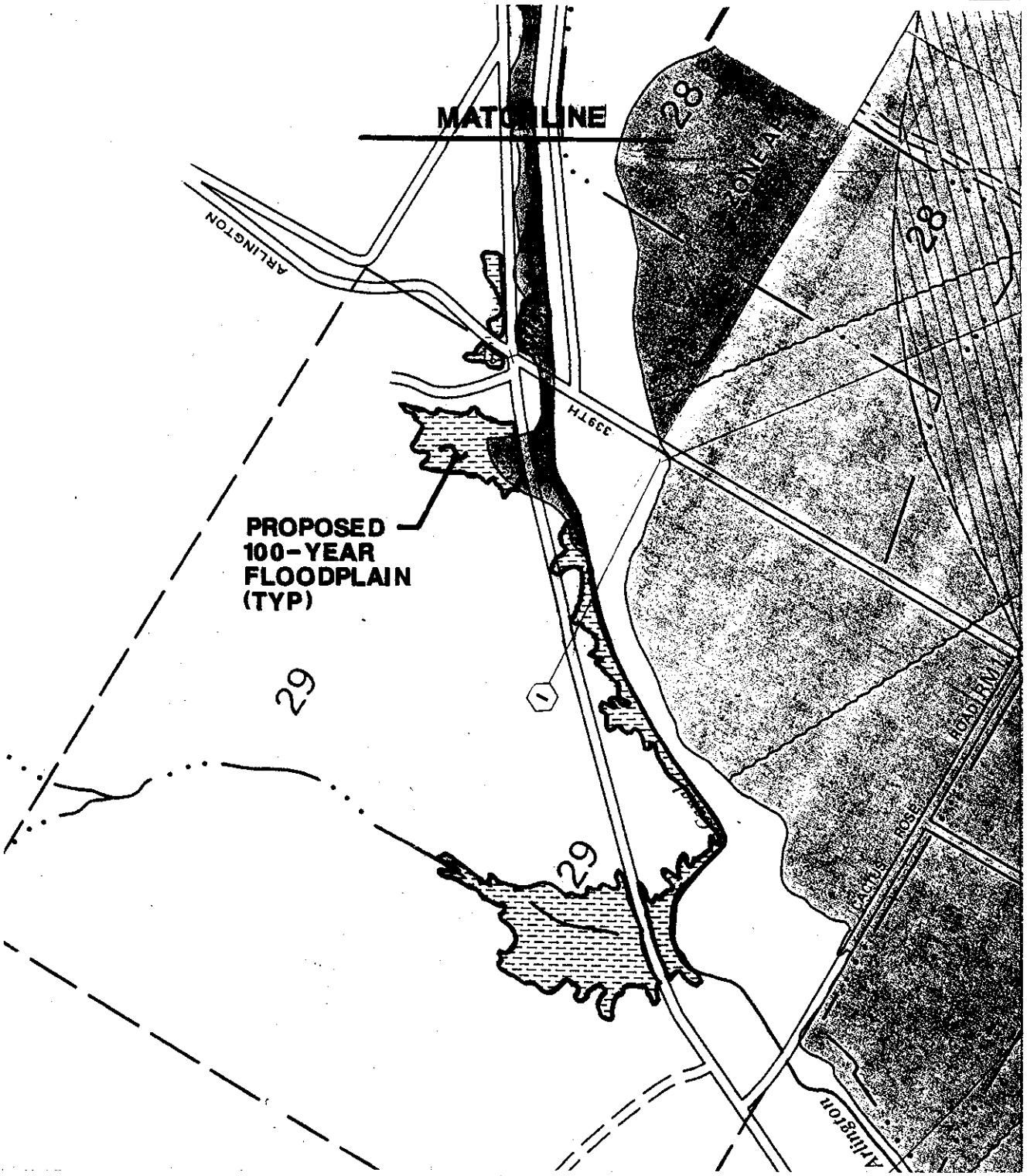

BASE MAP FROM MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS
MAP NUMBER: 04013C2460E & 04013C2470E
MAP REVISED: SEPTEMBER 4, 1991

1"=1000'

LUKE WASH
Between Gila River Floodplain &
Southern Pacific Railroad
FLOOD INSURANCE STUDY

PROPOSED
100-YR FLOODPLAIN

COE & VAN LOO
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LANDSCAPE ARCHITECTURE

elevations, top widths, etc. have been taken directly from the output of the runs, which are included in the appendix of this report.

4.7.2 Insurance Applications

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A: Zone A is the flood insurance rate zone that corresponds to 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. The depth should be averaged along the cross-section and then along the direction of flow to determine

the extent of the zone. Average depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99 Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, and areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone.

Zone D Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

4.8 Diskettes of Runs

The enclosed floppy diskettes contain each of the floodway runs and are named as follows:

Wash Name	Input File Name	Output File Name
Luke Wash	- LUKE.AH	LUKE.AHO
Minor Tributary	- MINTRIB.AH	MINTRIB.AHO
East Main Tributary	- ETRIB.AH	ETRIB.AHO
East Sub-Tributary	- ESUBTRIB.AH	ESUBTRIB.AHO

4.9 References

1. U.S. Federal Emergency Management Agency, *Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas*. Revised September 29, 1989.

2. Coe & Van Loo Consultants, Inc., *Luke Wash Flood Insurance Study Between the Gila River Floodplain and the Southern Pacific Railroad, Technical Data Notebook Section 3, Hydrologic Analysis*, November 30, 1992.

3. Federal Emergency Management Agency, *Flood Insurance Study Guidelines and Specifications for Study Contractors*. September, 1985

4. Flood Control District of Maricopa County, Special Projects Branch, Hydrology Division. *Hydrologic Design Manual for Maricopa County, Arizona*. September 1, 1990.

5. U.S. Army Corps of Engineers, Los Angeles District, *Gila River Basin; Phoenix, Arizona and Vicinity (including New River) Hydrology Part 2, Design Memorandum No. 2*. 1982

6. U.S. Army Corps of Engineers, The Hydrologic Engineering Center, *HEC-2 Water Surface Profiles Users Manual*. September 1982.

7. Dodson & Associates, Inc. *Hands-On HEC-2*. Draft January 29, 1990.

8. Hoggan, Daniel H., *Computer-Assisted Floodplain Hydrology & Hydraulics*. New York, N.Y.: McGraw-Hill, 1989.

9. U.S. Department of Transportation, Federal Highway Association *Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5*. September 1985.

10. Flood Control District of Maricopa County, *Data Structures*, November 1985, Updated February 1990.

11. Coe & Van Loo Consultants, Inc., *Luke Wash Flood Insurance Study Between the Gila River Floodplain and the Southern Pacific Railroad, N Value Determination Report*, November 23, 1992.

12. Dames & Moore, *Floodplain Delineation, Gila River, Gillespie Dam to Bullard Avenue*, May, 1988.

SECTION I

LUKE WASH HEC-2 OUTPUT
AND
CROSS SECTION PLOTS

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*******************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    21FEB93    TIME   10:56:55 *
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*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 21FEB93 10:56:55

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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T1      LUKE WASH FLOOD INSURANCE STUDY, FOR FCDMC (#90-68), BY CVL (#1090-07)
T2      LUKE WASH, THE GILA RIVER FLOODPLAIN TO THE SOUTHERN PACIFIC RAILROAD
T3      100-YR EVENT    EXISTING CONDITION          FILE NAME - LUKE.AH

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0    .00434         0         0         0     780.7         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1         0        -1         0         0         0        -1         0         0        15


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         8         3         2        26         5        39        53
      4        54        37

QT        2      7633      7633
NC     0.12      0.12     0.045       0.1       0.3
ET    1.160       7.1       9.1                                          9000   10485.9      9300     10200
         LUKE WASH, FROM GILA RIVER FLOODPLAIN TO THE SOUTHERN PACIFIC RAILROAD
         PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
         PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
         PREPARED BY COE & VAN LOO CONSULTANTS, INC.  (CVL #1090-07)
         TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
         FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
         THE CONTROL LINE OF LUKE WASH IS STATION 10,000.
         ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
         CROSS SECTION NUMBERS FOR LUKE WASH ARE STATIONED IN RIVER MILES FROM
         THE CONFLUENCE WITH GILA RIVER.
         THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
         FROM THE GILA RIVER WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
         ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
         MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
         IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
         LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
         IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
         FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
         AT SOME SECTIONS AN OUTPUT MESSAGE INDICATES THAT THE CHANNEL SECTION
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IS EXTENDED VERTICALLY. AT THESE LOCATIONS, ENCROACHMENTS HAVE BEEN
SET TO CONTAIN THE FLOW WITHIN A NATURAL RIDGE OR WITHIN THE EFFECTIVE
FLOW AREAS. WHERE THE FLOW IS CONTAINED BY A NATURAL RIDGE, THE MESSAG
HAS NO MEANING. WHERE THE FLOW IS ENCROACHED TO ELIMINATE NON-EFFECTIV
FLOW AREAS, THEN THERE IS A POTENTIAL FOR THE BACKWATER TO BREAKOUT.
HYDROLOGY IS BASED ON THE 100-YEAR, 24-HOUR HEC-1 MODEL PREPARED FOR
THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
100-YEAR FLOW = 7633 CFS FROM CONCENTRATION POINT RES513.
SECTIONS 1.160 TO 1.404 IN THE EXISTING CONDITION, THE LEFT OVERBANK
HAS BEEN ENCROACHED AT A 4:1 DOWNSTREAM FROM THE ARLINGTON CANAL.
THE RIGHT OVERBANK HAS BEEN ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.

X1	1.160	93	9947.1	10031.1	0	0	0			
GR	786.1	6896	786.9	6897	783.6	6909.4	782.5	6931.2	782.3	7060.1
GR	782.6	7328.9	783	7377.6	783.7	7380.8	783.2	7385.8	783.3	7410.3
GR	781.3	7423.7	780	7429.9	781.1	7442.9	781	7477	781.6	7479.7
GR	780.3	7494.5	780.8	7522.6	781.2	7630	781.8	7691.6	781.6	7753.8
GR	780.5	7812.4	781.4	7890.2	780.2	7972.6	780.1	8028.8	781.2	8159.6
GR	779.9	8213.6	780.1	8230.1	781.4	8240.7	781.4	8243.6	779.4	8248.3
GR	779.4	8252.5	781.3	8253.4	779.5	8262.6	779	8291.5	778.5	8552.9
GR	778.4	8790.4	777.2	9040.1	777.9	9051.5	778.8	9056	779.1	9074
GR	777.5	9075.7	777.5	9077.5	778.7	9080.7	778	9088.9	778	9416.3
GR	778.2	9494	777.9	9560.4	778.2	9629.9	778	9701.9	778.5	9884.7
GR	778.2	9926.7	780.7	9935	782.2	9941.6	782.6	9947.1	782.2	9952.4
GR	777.9	9971.7	774.9	9988.5	775	10000	777.1	10013.4	782.5	10031.1
GR	782.8	10045.7	780.1	10057.3	779	10068.3	779.4	10141.3	779.1	10295.2
GR	779.3	10393.2	780	10450.4	780.6	10461.1	779	10464.6	778.9	10466.1
GR	780.5	10471.2	781.6	10478.7	781.8	10485.9	781	10493.9	780.6	10541.5
GR	781.5	10917.4	781.7	11082	782.1	11123	781.9	11188.5	782.9	11251.2
GR	781.5	11279.8	780.8	11336.4	781.1	11378.1	781	11576.3	781.5	11919.7
GR	782	12196.3	781.7	12276.4	782.5	12438.3	782.4	12510	782.7	12545.8
GR	784	12560.8	783.8	12575.2	783.3	12577				
ET	1.257	7.1	9.1	10.4			9100	10485	9370	10150
X1	1.257	93	9954.9	10028.8	505	515	512			
GR	786.1	7621.8	784.1	7633.6	783	7731.7	783.6	8007.4	784.3	8073.7
GR	782.1	8088.7	783.3	8103.6	783.4	8112.7	782.9	8140.3	783.4	8141.9
GR	782	8149.6	781.8	8172	780.9	8209.1	780.9	8327.3	781.8	8349.4
GR	781.7	8369	782.4	8375.1	780.4	8381.2	780.4	8383.3	782.5	8389.6
GR	783.2	8463	782.6	8488.2	782.8	8535.8	783.8	8572.2	782.9	8625.1
GR	783.5	8855.3	783.9	8866.5	783.8	8883.5	781.1	8892.3	779.1	8894.8
GR	779.1	8897.9	780.7	8900.3	780.4	8902.4	779.2	8906.5	778.9	9023.4
GR	779.1	9037	781.1	9053.1	781.3	9071.3	781.7	9076.3	780.1	9079.2
GR	780.1	9080	781.8	9081	781.2	9137.4	781.2	9196	781.9	9263.2
GR	781.4	9411.8	782	9611.9	781.8	9727.4	782	9821.8	781.5	9917.2
GR	782.6	9926.2	784.6	9938	785.2	9946.7	785	9954.9	776.7	9983.6
GR	776.1	9996.7	776.6	10000	779.6	10006.1	782.2	10021.7	784.1	10028.8
GR	784.2	10047	781.8	10054.7	782.4	10092.8	782.1	10400.2	782.6	10442.5
GR	783.4	10462.9	786.7	10475.4	787.3	10484.8	787	10497.1	785.9	10511.6
GR	786.4	10607.9	786.3	10666.2	786.7	10728.7	786.4	10856	787.1	11055.5
GR	786.8	11099.3	787.4	11285	786.9	11319.6	787.3	11368.6	786.7	11458.2
GR	787.2	11478.2	788.7	11501.3	787	11502.8	787.1	11503.9	788.6	11506.6
GR	787.9	11516.6	787.1	11543.9	786.7	11879.7	785.9	12236.6	785.3	12465
GR	784.7	12522.6	785.4	12543.6	786.4	12560.5				

ET	1.351	7.1	9.1				9200	10481	9450	10120
X1	1.351	93	9962.2	10036.2	500	510	496			
GR	794.4	8491.2	790.9	8532.6	789.7	8563.7	789.3	8623.7	789.4	8661.3
GR	788	8710.4	788.9	8743.7	790.5	8767.7	790.5	8851.5	790.2	8896.9
GR	788.6	8956.4	787.4	8965.7	787.8	8977.2	787.8	8994.3	786.7	9019.8
GR	785.2	9040.3	784.6	9042.2	784.6	9044.7	786.7	9047	785.4	9052.2
GR	784.9	9075.2	785.5	9190.6	784.9	9273.8	785.2	9412.5	784.9	9574.1
GR	785.1	9666.3	784.7	9746.3	784.9	9899.6	784.6	9933.3	786.4	9948.2
GR	786.7	9962.2	781.7	9970.4	778.3	9985.5	777.5	9992.7	777.4	10000
GR	778.7	10007.1	783.1	10014.1	786.7	10027.1	787.7	10036.2	787.3	10048.4
GR	785.8	10057.8	785.3	10079.3	785.4	10184.5	785.1	10255.6	785.3	10272
GR	785.2	10405.9	785.4	10452.2	786.5	10464.9	789.1	10481.3	789	10498.5
GR	788.3	10523.3	788.5	10727.4	788.3	10903.2	788.9	11105.2	789.1	11328.2
GR	789.4	11385.5	789.9	11419.5	790.3	11481.7	791	11492.2	790.4	11508.2
GR	788.5	11509.9	788.5	11511.3	790.6	11512.5	789.3	11516.9	788.4	11570.4
GR	788.7	11631.9	788.2	11691.8	787.8	11815.4	786.7	12049	786.4	12157.3
GR	785.7	12252.7	785.1	12414.2	785.3	12520.9	785.6	12537	786.3	12551
GR	786.3	12566.5	785.5	12568.9	783.7	12570.9	783.7	12572.1	786.2	12574.3
GR	786	12579.9	785.2	12590.3	784.9	12632.6	785	12664.8	785.4	12671.5
GR	786	12676.7	785.9	12677.9	784	12679.8	784.1	12681.8	786.1	12684.5
GR	786.4	12693.6	786	12723.2	786	12752.6				
ET	1.404	7.1	9.1				9182	10494	9480	10090
X1	1.404	96	9911.7	10070.7	230	155	280			
GR	794.8	8733.7	794.7	8754.6	793.9	8776.4	793.9	8792	792.5	8811.7
GR	791	8838.4	791.1	8866.6	790.6	8910.1	789.5	8937.7	790.7	8973.6
GR	791.7	9047.5	791.8	9182.1	791.3	9212.6	789.4	9239.3	787.4	9249.4
GR	785.7	9250.7	785.7	9252.2	788.1	9257.5	788.5	9283.4	787.4	9303.9
GR	787.7	9388.8	787.3	9484.1	787.6	9587.2	787.4	9662.9	787.9	9701.4
GR	789.2	9714.2	788.4	9720.9	787.4	9733.4	787.4	9781.6	787.9	9832.1
GR	789.3	9844.6	787.9	9861.8	787.4	9877.7	786.6	9885.6	786.8	9911.7
GR	786.1	9930.9	785.4	9939.2	785	9959.1	784.4	9972.4	784.6	10000
GR	785.7	10038.5	786.9	10070.7	787.8	10107.6	788	10129.4	787.9	10140.2
GR	786	10149.7	786	10157.6	787.2	10165.2	786.4	10189.7	785.8	10316.1
GR	785.8	10362.2	786	10401.4	786	10446.5	786.4	10461.2	789.8	10493.9
GR	788.7	10531.6	788.7	10653.7	789	10709.2	789	10856.3	789	10929.6
GR	789.3	11014.2	789.4	11160.9	790	11239.9	789.8	11296	790	11346.1
GR	790.5	11395.3	790.5	11487.9	790.5	11506.1	791	11510.5	789.3	11512.7
GR	789.3	11514	790.9	11515.3	790.6	11517.5	788.3	11523.6	789.4	11529.7
GR	789.3	11558.5	788.5	11623.3	788.2	11701.6	787.9	11795.4	786.8	11957.4
GR	786.8	12044	786.4	12145.4	786.4	12244.1	786.3	12368.7	786.3	12485.5
GR	786.9	12514.3	787	12543.4	783.9	12544.6	783.9	12547.2	786.4	12554.7
GR	786.5	12581.5	786.8	12607.1	787.6	12618.1	787.6	12641.6	788	12667.9
GR	789.1	12683.9								
QT	2	7814	7814							
ET	1.449	7.1	9.1				9200	10100	9500	10070

SOUTH BANK (DOWNSTREAM BANK) OF THE ARLINGTON CANAL.

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        100-YEAR FLOW = 7814 FROM CONCENTRATION POINT C495.
X1    1.449      60    9878.4    10067      245      210      238
GR    794.4  7012.9     793.2   7101.7    792.7   7226.3    794.1   7390.7    793.2   7482.1
GR    793.5  7514.7       793   7584.9    793.2     7820    793.9   7929.5    793.2   8044.6
GR      794  8170.3     793.4   8375.7    793.8   8490.6    795.1   8553.8    795.8   8680.7
GR    795.5    8789     795.9   8820.1    795.2   8834.8    795.4   8897.2    794.1   9035.2
GR    793.7  9279.1     792.7   9513.2    792.8   9732.5    792.2   9878.4    789.6   9950.1
GR    789.5  9964.9     787.5   9975.7    784.1     9987    783.4    10000    783.4  10013.7
GR    791.7 10040.6     793.8    10067    794.7  10107.4    794.3    10208    791.7  10343.2
GR    791.1 10409.2     792.3  10494.7    791.7  10660.5    792.6  10761.5    792.1  10990.2
GR    792.4 11165.8     793.4  11254.1    792.5  11306.6    791.7  11407.6    792.1    11482
GR    793.1 11540.5     792.2  11654.1      792  11748.5    791.4  11834.5      792  12047.8
GR    792.3 12203.6     791.6    12375    792.4  12420.3    792.5  12509.8      791  12589.2
GR    790.9 12633.4     789.7  12757.3    790.4    12777    790.6  12918.7    792.4  12991.9

ET    1.461     7.1       9.1                              9085    10100     9500    10060
        UPSTREAM SIDE OF THE ARLINGTON CANAL.
        SECTION 1.461 ENCROACHED AT A 1:1 FROM THE ARLINGTON CANAL.
X1    1.461      84    9957.2   10056.8       55       65       63
GR    806.2  9084.5     803.4   9117.2      799     9151    795.1   9185.2    793.3   9211.2
GR    793.5  9241.6       793   9267.5      791   9279.4    790.8   9366.2    791.6   9392.5
GR      792  9426.8     791.7     9471    791.7   9515.6    791.5     9555    791.7   9601.1
GR    792.1  9630.8     791.5   9645.7      791   9665.6    790.6   9699.3    791.4   9726.1
GR    791.3  9803.8     790.3   9894.4    791.1   9918.4    790.9     9930    790.3   9942.8
GR    790.6  9957.2     785.4   9970.7    784.6   9992.2    784.6    10000    786.8  10017.2
GR    790.3 10035.9     792.3  10056.8    793.2  10088.8    793.4  10137.7    794.1  10206.1
GR    792.6   10347     792.7  10395.1    792.6  10442.3    792.1  10476.8    792.6  10498.1
GR    793.1 10575.3     793.5  10608.1    792.7  10646.7    792.6  10704.7    791.7  10756.1
GR    791.2 10809.3     792.3  10940.1    792.5  11059.9    791.2  11119.1    791.7  11145.6
GR    791.6 11161.1       792  11180.1    791.6  11210.4    791.9    11240    791.3  11276.4
GR    790.5 11303.6     791.3  11331.7    790.6  11370.9    790.8  11409.9    790.2  11438.5
GR    791.2 11483.2     790.3  11514.7    790.6  11542.2    790.4    11589    789.5  11617.6
GR    789.7 11658.9     789.9  11661.2    788.8  11708.1      789  11761.5    788.8  11819.2
GR    788.9 11884.4     788.7  11947.2      788  12079.6    788.4  12275.3    788.6    12310
GR    788.3   12344       789  12375.6      789  12427.6    789.5  12461.5      790  12539.2
GR    789.7 12579.6     790.3  12595.8    792.7  12609.5      792  12704.6

NC     0.12    0.12     0.065      0.1      0.3
ET    1.534     7.1       9.1                              9334    10500     9500    10090
        SECTIONS 1.534 TO 1.813 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE
        OLD U.S. HIGHWAY 80 CULVERTS
X1    1.534      95    9962.8   10034.4      305      465      385
GR    811.9  9333.4     801.5   9353.1    792.1   9365.5    792.3   9384.6      793   9392.8
GR    790.7  9403.4     791.1   9433.3      791   9486.1    791.4   9579.2    791.3   9666.8
GR    791.3  9764.8     791.6   9857.9    792.1   9886.2    793.1   9906.1    793.3   9922.7
GR    793.5  9934.8     793.2   9956.7    792.5   9962.8    789.4   9973.9    785.6   9984.7
GR    784.9  9994.4     784.6    10000    786.3  10013.2    792.3  10034.4    791.6  10047.3
GR    791.4 10091.8     791.2  10168.1    791.3  10280.4    791.3  10353.5    791.9  10437.2
GR    792.9 10459.2     793.5  10481.5    795.8  10492.8    796.5  10514.9    797.6  10572.8
GR    798.8 10586.8     796.5  10602.4    794.9  10616.2    793.9  10690.5    793.5  10758.3
GR      793 10832.7     791.6  10914.6    791.8  10964.4    791.8  11006.2      791  11037.8
GR    790.8 11056.1     791.8  11092.4    792.2  11136.2    792.6  11175.5    793.2  11215.8
GR    793.7 11248.1     794.2  11272.1    793.1  11281.4    795.7  11293.9    795.4  11311.4
GR    793.3 11321.1     794.7  11336.6    795.9    11350    796.4  11368.5    797.3  11384.7
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GR	795.7	11400.2	795.5	11417.2	797.3	11437.8	798.4	11460.2	797.6	11480.4
GR	794.7	11504.3	793.9	11531.5	793.2	11561.1	792.7	11590.5	793.4	11616.7
GR	793.4	11652.9	793.6	11688.8	793.6	11723	793.3	11752.7	793.2	11773.7
GR	792.9	11815.5	792.7	11865.3	792.1	11890.6	792.2	11921.8	792.4	11952.8
GR	792	12003.3	791.4	12055.9	792.9	12081.1	792.8	12095.7	792.4	12112.9
GR	792.7	12150	792.9	12184.7	793.5	12215.8	794.3	12244.2	793.6	12267.5
GR	794.3	12293.1	797.1	12316.7	801.2	12347.9	802	12368.3	804.6	12398.8
ET	1.632	7.1	9.1				9300	10400	9335	10130
X1	1.632	73	9964.7	10058.9	520	475	517			
GR	810.8	9299.6	798.3	9330.2	792.7	9347.2	791.5	9354.8	792.8	9366.6
GR	792.9	9381.6	792.8	9403.9	792.7	9439.5	793.9	9456.1	794.1	9467.9
GR	794.4	9510.1	794.7	9552.0	794.5	9594.0	795.3	9641.6	796.0	9677.3
GR	794.3	9711.0	793.9	9761.0	793.8	9815.4	794.2	9861.5	795.2	9888.7
GR	796.7	9907.4	797.6	9922.9	797.6	9935.2	797.0	9946.7	796.7	9957.7
GR	795.7	9964.7	789.1	9976.0	787.7	9986.3	787.2	10000.0	787.7	10011.9
GR	790.5	10029.6	792.1	10042.3	795.0	10058.9	794.2	10074.9	793.7	10126.8
GR	793.8	10195.9	794.3	10263.5	794.3	10330.2	794.9	10440.6	794.9	10568.3
GR	795.2	10601.6	796.2	10616.8	796.4	10644.4	796.5	10657.2	796.3	10702.3
GR	796.2	10744.6	795.5	10789.8	794.5	10882.8	794.8	10943.6	794.9	10996.7
GR	795.0	11039.3	794.9	11067.5	793.7	11081.3	793.3	11089.3	795.6	11116.6
GR	797.7	11137.8	799.5	11165.2	798.1	11198.4	798.1	11216.4	799.0	11243.8
GR	797.8	11266.3	797.1	11300.1	798.7	11327.1	799.6	11354.3	801.7	11378.5
GR	802.0	11400.5	800.7	11424.3	803.1	11448.8	805.1	11466.5	804.3	11483.0
GR	804.0	11504.3	806.0	11523.9	805.5	11530.6				
NC	0.100	0.070	0.065	0.1	0.3					
ET	1.723	7.1	9.1				9188	10250	9226	10120
X1	1.723	73	9966.3	10033.6	575	340	480			
GR	811.6	9187.8	801.9	9210.9	796.5	9236.8	794.5	9255.9	791.9	9269.8
GR	793.7	9279.4	795.5	9300.0	795.2	9337.5	795.9	9376.7	796.6	9426.5
GR	797.2	9479.9	797.5	9499.0	797.6	9557.0	797.4	9617.6	797.3	9660.0
GR	796.7	9701.9	796.7	9748.7	797.2	9781.8	797.8	9797.9	798.1	9809.5
GR	798.2	9822.5	797.1	9834.7	796.2	9842.4	797.1	9861.9	797.7	9898.4
GR	796.8	9917.9	794.4	9929.2	795.5	9939.2	796.6	9945.6	793.9	9953.5
GR	793.9	9960.5	794.6	9966.3	790.4	9979.5	788.7	9988.3	788.4	9997.5
GR	788.2	10000.0	789.4	10010.2	794.0	10023.1	799.3	10033.6	799.1	10042.0
GR	797.6	10053.7	797.9	10115.5	797.0	10205.8	797.1	10294.1	796.7	10387.5
GR	796.4	10483.8	796.4	10564.6	799.4	10631.0	801.5	10686.7	801.6	10742.7
GR	801.5	10784.6	800.2	10826.5	799.6	10900.8	799.0	10957.0	797.6	11005.7
GR	796.9	11041.3	798.1	11090.6	797.3	11148.7	796.7	11193.8	797.2	11226.6
GR	797.3	11253.1	796.4	11265.6	798.9	11290.2	799.4	11324.4	800.8	11351.4
GR	802.7	11386.7	801.3	11426.6	801.6	11459.7	804.0	11489.3	808.8	11524.3
GR	810.6	11552.1	811.0	11570.9	810.9	11634.9				
ET	1.767	7.1	9.1				8677	10170	8800	10100
X1	1.767	94	9981.2	10038.8	300	185	232			
GR	814.2	8676.6	805.7	8688.8	801.7	8698.2	801.8	8710.3	799.4	8722.5
GR	797.4	8741.3	796.4	8754.9	794.7	8764.9	797.5	8778.4	797.8	8796.4
GR	798.3	8814.1	797.1	8832.3	796.9	8838.9	796.4	8847.2	795.7	8854.5
GR	796.8	8868.7	795.9	8884.4	796.1	8904.1	796.1	8930.3	795.8	8959.6
GR	796.5	9005	796.7	9029.5	797.3	9059.8	797.6	9090.7	797.6	9121.4
GR	797.7	9150.9	798.1	9179	798.4	9209.1	799.1	9241.1	799.5	9282.9
GR	800.2	9323.6	800.1	9341.4	800.6	9488.9	800.7	9531.9	799.8	9564.3

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GR    799.6    9588.3    799.8    9620.1    799.7    9646.9    799.5    9662.3    799.1    9679.1
GR    799.3    9694.1    798.6      9717    798.5    9752.3    798.2    9795.4      799    9831.9
GR    798.1    9867.2    797.1    9901.3    797.4    9924.3      798    9953.5    796.8    9968.6
GR    797.5    9981.2    794.6    9991.2    789.9     10000    789.8   10014.2      793   10025.8
GR    797.6   10038.8    798.6   10057.4    798.6   10144.6    798.4     10196    798.5   10254.1
GR    798.2   10324.5    798.1   10390.8    798.1     10465    797.8   10529.6    797.9   10581.2
GR    798.9   10618.2    801.3   10646.2    802.1   10659.3    802.4   10752.9    802.2   10774.9
GR    801.2   10815.7    800.9     10858    801.4   10893.4    801.1   10925.4    800.2   10986.9
GR    798.5   11058.8    797.9     11122    798.1   11235.5    798.6   11269.3    799.2   11350.6
GR    800.8   11394.2      804   11426.2    804.8   11466.3    804.9   11493.4    805.7   11499.1
GR    805.5   11521.8    804.3     11535    804.1   11567.6      805   11580.5    806.8   11584.5
GR    808.2   11618.8    809.2   11633.2    810.5   11650.3    810.5   11655.9

NC    0.100     0.070    0.065       0.3      0.5
ET    1.813       7.1      9.1                                 8550     10200     8860     10100
         DOWNSTREAM FACE OF THE OLD U.S. HIGHWAY 80 BOX CULVERTS.
         TWO SETS OF 6-BARREL 10' X 6' CONCRETE BOX CULVERTS CROSS THE HIGHWAY.
         ONE SET ON THE LUKE WASH THALWEG AND THE OTHER SET ON THE EAST
         MAIN TRIBUTARY THALWEG, APPROXIMATELY 1100 FEET APART.
         THE INVERTS ON THE TWO SETS OF BOX CULVERTS ARE THE SAME, AND THEY HAVE
         A COMMON PONDING AREA BEHIND THEM.
         THEREFORE, THEY WERE MODELED TOGETHER USING THE SPECIAL CULVERT ROUTINE
         AS 12-10' BY 6' CONCRETE BOX CULVERTS.
         WEIR FLOW OCCURS OVER THE HIGHWAY BETWEEN THE CULVERTS.
         BT POINTS REPRESENT THE CENTERLINE OF THE HIGHWAY.
X1    1.813        83   9961.6   10042.6      240      195      243
X3       10
GR    814.7    8195.4    812.5    8223.6    811.2    8256.5    809.8    8294.4    808.2    8338.0
GR    806.3    8377.6    805.5    8410.1    804.9    8449.1    804.3    8478.0    804.2    8512.0
GR    803.7    8554.7    803.3    8592.3    802.6    8618.0    803.1    8646.5    803.0    8687.9
GR    802.9    8734.5    803.0    8778.3    803.1    8821.7    803.1    8848.6    802.2    8868.9
GR    799.0    8881.6    796.7    8889.3    795.9    8903.6    796.2    8917.5    797.8    8929.9
GR    802.2    8936.9    803.7    8944.8    803.6    8963.4    803.0    8979.3    802.6    9020.1
GR    802.9    9054.5    802.9    9111.7    802.9    9167.0    802.1    9190.2    802.3    9238.8
GR    802.3    9285.6    802.3    9333.1    802.3    9371.8    801.9    9423.2    802.7    9491.6
GR    802.4    9529.7    802.6    9567.8    802.4    9616.6    802.2    9670.7    802.1    9739.2
GR    801.7    9800.0    801.6    9857.0    802.0    9902.1    801.9    9941.0    801.1    9961.6
GR    795.4    9970.9    795.1    9987.0    793.4   10000.0    794.7   10020.1    798.1   10033.2
GR    802.5   10042.6    802.1   10078.7    802.2   10124.7    802.6   10184.8    803.3   10239.0
GR    802.9   10307.5    803.0   10381.4    803.5   10449.0    803.3   10511.2    803.7   10573.7
GR    804.2   10647.8    803.8   10722.1    803.9   10788.1    803.4   10851.1    803.3   10912.6
GR    803.0   10980.7    803.1   11055.2    803.1   11119.2    803.1   11190.0    802.9   11272.3
GR    803.3   11326.3    803.7   11409.6    804.2   11467.9    805.4   11520.4    805.6   11595.5
GR    806.1   11669.5    806.2   11737.3    806.7   11778.3

ET    1.819                9.1                                                      8860     10100
SC   12.012       .40     2.68         0        6        10       34       8.1    795.9     795.9
         UPSTREAM FACE OF THE OLD U.S. HIGHWAY 80 BOX CULVERTS.
X1    1.819        33   9966.9   10033.1       34       34       34
X2                          2     801.9    802.1
X3       10
BT      -27    8190.1    814.5             8293.9    810.1             8359.1    808.3
BT             8422.6    805.8             8549.9      804             8814.3    803.4
BT             8858.7    803.5             8858.8    803.5             8891.8    803.6
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BT          8949.7    803.7          9076.1    803.5          9149.6    804
BT          9365.4    802.6          9519.8    803.4          9717.8    802.1
BT          9950.0    802.6         10000.0    803.1         10078.9    802.9
BT         10388.7    803.4         10477.6    804.1         10826.6    804.3
BT         10964.9    803.9         11040.3    803.2         11324.4    804.7
BT         11428.1    804.9         11588.0    806.8         11777.3    807.3
GR   814.5  8190.1    810.1  8293.9  808.3  8359.1  805.8  8422.6  804.0  8549.9
GR   803.4  8814.3    803.5  8858.7  795.9  8858.8  795.9  8891.8  795.9  8924.8
GR   803.6  8924.9    803.7  8949.7  803.5  9076.1  804.0  9149.6  802.6  9365.4
GR   803.4  9519.8    802.1  9717.8  802.6  9950.0  802.7  9966.9  795.9  9967.0
GR   795.9 10000.0    795.9 10033.0  802.8 10033.1  802.9 10078.9  803.4 10388.7
GR   804.1 10477.6    804.3 10826.6  803.9 10964.9  803.2 11040.3  804.7 11324.4
GR   804.9 11428.1    806.8 11588.0  807.3 11777.3

NC   0.100   0.100    0.065     0.1    0.3
QT       2    7948     7948
ET   1.839     7.1      9.1                          8700    10270    8820    10060
        SECTIONS 1.839 ENCROACHED AT 1:1 UPSTREAM OF OLD U.S. HIGHWAY 80.
        100-YEAR FLOW = 7948 CFS FROM CONCENTRATION POINT C486.
X1   1.839      69   9962.6 10036.3   100    100    100
GR   817.2  8252.2      811   8282  808.1  8310.7  807.6  8351.3  807.8  8387.5
GR   806.6  8408.1    801.6  8433.8  800.4  8463.3  800.1  8536.5  799.1  8572.7
GR     799  8597.3    797.9  8615.8  798.6  8654.6  798.7    8689  799.2  8728.2
GR   799.2    8757    798.5  8787.9  797.3   8855   796.7  8856.2    798  8887.8
GR   798.5    8918    799.7  8942.6    800  8969.1  799.8  9006.3  800.1  9051.4
GR   800.9  9101.1    801.1  9151.9  801.1  9204.7  801.6  9266.7  801.6   9313
GR   801.2  9360.9    802.1  9433.4  802.7   9467   802.8  9506.2  802.3  9552.4
GR   801.3  9599.6    801.3  9721.6  801.3   9772   799.3   9803   800.4  9841.8
GR   800.4  9883.1      799  9918.3  799.4   9945   799.4  9962.6  798.8  9979.3
GR   796.8   10000    796.1 10009.8  798.3 10021.3  799.8 10036.3  799.9 10066.5
GR   799.6 10104.3      799 10134.1  801.3  10170    803 10200.8  803.8  10298
GR   803.8 10351.9    800.5 10442.6  799.9 10477.7  801.4 10513.2    802 10543.6
GR   800.8 10572.6    801.2 10613.5  802.8 10649.4    803 10678.7  802.8 10705.3
GR   804.4 10745.4    806.3 10780.2  806.4 10810.2    806 10853.1

ET   1.940     7.1      9.1                          8600    10220    8900    10120
        SECTION 1.940 RIGHT OVERBANK ENCROACHED AT A 4:1 DOWNSTREAM FROM
        FLOODPLAIN EXPANSION.
X1   1.940      75   9985.7 10036.9   510    430    533
GR   820.2  8464.7    813.9   8504  811.2  8529.5  809.2  8556.6    808   8580
GR   809.4  8602.8    808.6  8622.7    808   8643  806.6  8653.4  802.3  8673.6
GR   800.3  8757.4    800.1  8780.7  800.5  8845.7  801.4  8877.3  801.6  8894.9
GR   799.5  8915.2    798.3  8925.3  798.9  8945.1  799.4  8970.3  799.4  8995.6
GR   799.7  9026.8    799.1  9053.3  799.9   9085   800.1  9116.2  800.7  9148.2
GR     802  9185.6    802.4  9220.4  803.1  9262.1  803.3  9347.1  803.1  9446.7
GR   803.4  9477.1    803.7  9578.1  803.2  9609.9    802  9646.3  802.4  9670.9
GR   802.1  9692.3    801.4  9708.4  801.9  9726.4  801.7    9748    802  9766.9
GR   801.5  9781.7    801.7  9808.6  801.6  9834.2  802.3  9856.3  801.8  9871.6
GR   802.1  9893.6    801.9  9929.3  802.2  9952.1  802.1  9985.7  799.7  9991.3
GR   798.9  9995.5    798.7   10000  799.4   10009  800.9 10021.3  801.9 10036.9
GR   802.2 10066.7    801.9 10103.9  802.1 10134.4    802 10146.8  803.7 10168.8
GR     804 10192.7    804.7 10216.6  803.8 10272.7    804 10337.8  803.8  10405
GR   803.7 10544.3    803.7 10596.4  803.5 10641.8  804.2 10679.3  805.1 10710.4
GR   805.3 10736.8    805.3 10764.5    806 10816.6    807 10840.9  806.6  10909
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ET    2.020       7.1       9.1                                   8400      10100      8800     10026
        SECTION 2.020 RIGHT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.
X1    2.020        75    9965.6   10025.5       530       290       422
GR      815    8397.3       811      8464     809.9    8477.2     807.5    8492.5     805.6    8514.1
GR    805.1    8557.2       804    8607.9     802.8    8700.2     802.9    8732.8     802.5    8771.7
GR    802.5    8804.6     802.1    8832.2     802.1    8858.1     802.3    8879.4     801.9    8892.8
GR    802.4    8901.5     802.7    8979.5     801.8    9006.4     801.6    9034.5     802.8    9081.3
GR    802.2    9084.5     802.4    9170.5     803.8    9200.8     804.4    9238.7     804.6      9279
GR    804.2    9355.4     805.1    9391.4     806.3    9399.1     805.1    9408.1     806.1    9419.5
GR    806.5      9469     806.5      9497     805.8    9508.6     806.4    9516.2     805.3      9530
GR    804.9    9563.6       805    9614.1     805.3    9664.2     804.8    9704.7     805.4    9732.9
GR    804.8    9755.6     805.2    9785.5     804.7    9834.7     803.8    9852.3     803.3      9892
GR      805    9930.9     804.8    9959.3     805.8    9965.6     803.4    9983.1     800.6    9992.2
GR    799.9    9997.7     799.9     10000     800.8   10005.7       804   10014.1       805   10025.5
GR    804.5   10042.9     803.3   10061.4     804.9   10078.2     807.5   10093.3     807.2   10185.2
GR    806.1     10226       806   10277.2     806.1     10319     805.9   10344.7     805.9   10375.3
GR    805.2   10400.8       806   10457.3     806.1   10542.8     806.2   10592.2     807.4   10650.3
GR    807.4   10695.8       807   10737.5     806.9   10771.8     808.1   10847.4     808.2   10878.8

ET    2.104                 9.1                                                      8750     10020
X1    2.104        70    9946.8   10019.7       490       380       444
GR    820.8    8596.1     812.9    8620.5     809.6    8646.9     807.8      8668     806.1      8695
GR    805.3    8725.2     805.7    8756.6     804.8    8790.5     805.9    8820.2     805.2    8849.7
GR    806.1    8882.5     805.2    8895.9       805    8915.3     804.4      8930       804    8960.3
GR    804.4    8969.5     803.5    9012.8       804    9039.2     807.6    9053.9     806.2    9072.5
GR    806.8    9136.7     806.9      9280     806.8    9328.8     807.1    9386.5     806.6    9416.8
GR    807.4    9434.7     808.7    9450.7       808    9475.2     808.8    9543.3     810.8    9558.4
GR    810.8    9562.8     808.3    9586.8     808.4    9609.9     807.7    9638.3     806.6    9671.2
GR    806.4    9703.5     806.8    9741.3     806.8    9781.6       806      9814     806.4    9847.5
GR    806.4    9868.5     805.5    9878.6     805.2    9885.1     806.4    9905.4     805.7    9922.2
GR    806.3    9946.8     806.1    9981.7     803.4    9989.6     802.6     10000     803.3   10008.7
GR    806.5   10019.7     806.7   10060.4     810.2   10077.8     810.5   10080.4       811   10128.8
GR    810.7   10192.5     810.8   10265.5     810.6   10338.3     810.9   10428.8     811.8   10435.4
GR    810.4   10446.9     809.5   10461.4     809.5   10504.8       810   10613.3       810   10657.8
GR    811.2   10681.7     810.9   10716.3     811.2   10747.6     811.2   10835.5     810.8     10877

NC    0.060     0.060     0.045       0.1       0.3
ET    2.197                 9.1                                                      8580     10045
        CONFLUENCE WITH EAST MAIN TRIBUTARY.
X1    2.197        60    9953.4   10044.9       520       435       491
GR    817.9    8514.3     813.2      8540     810.8      8564     807.8    8587.9     806.7    8599.9
GR    807.8    8610.7       806    8623.9     807.7    8635.4     806.7    8650.4     807.4    8663.1
GR      808    8731.7     807.2    8752.1     808.2    8774.1     808.5      8788       806    8799.1
GR    807.8    8840.8     808.2    8858.1     809.2    8870.9     808.1    8886.2     808.5    8919.6
GR    808.5    8993.2     808.3    9014.9     809.8    9029.4     809.8    9058.1     810.2    9101.3
GR      811    9138.4       811    9170.6     810.4    9274.2     810.7    9313.4     810.7    9400.7
GR      810    9427.3     809.8    9512.8     809.9    9550.1     809.5      9634     809.1    9657.6
GR    809.7    9690.6     809.4      9717     807.4    9764.2     808.6      9775       808    9797.2
GR    808.4    9856.2       808    9881.5     808.6    9899.2       808    9912.3       809    9929.7
GR    808.9    9953.4     805.7    9988.2     804.9     10000     806.1   10008.2       809   10016.9
GR    810.7   10033.6     812.9   10044.9     812.9   10069.9     813.5   10120.9     813.4   10253.9
GR    813.7   10406.2     813.5   10514.5       814   10542.6       815   10550.9     814.7   10570.9
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QT       2      6551      6551
ET   2.294       7.1       9.1                                        8800     10755      9200     10020
        SECTIONS 2.294 TO 2.769 LEFT OVERBANK ENCROACHED AT A 4:1 DOWNSTREAM
        FROM FLOODPLAIN EXPANSION.
        100-YEAR FLOW = 6551 CFS FROM CONCENTRATION POINT C375.
X1   2.294        75    9967.7   10016.5       500       500       512
GR   822.6    8275.2     817.1    8298.9     812.5    8317.3     811.4    8329.6     808.2    8341.2
GR   807.7    8360.9     807.6    8376.4     808.9    8394.8     808.8    8406.5     808.6    8440.8
GR   808.8    8480.6     808.9    8507.7     810.4    8526.5     809.3    8539.8     808.4    8557.6
GR   810.1    8573.1     808.9    8578.3     809.5    8612.7     809.5    8656.7     809.8    8711.3
GR   810.2    8766.0     810.7    8796.0     810.7    8861.6     811.2    8932.8     811.2    9024.5
GR   811.7    9097.7     812.0    9163.4     812.9    9217.6     812.5    9251.3     812.0    9283.5
GR   812.9    9325.5     813.6    9329.9     812.5    9338.9     812.2    9401.0     812.8    9432.0
GR   812.6    9512.6     812.2    9584.5     812.6    9615.3     813.3    9634.5     812.9    9653.0
GR   812.2    9683.2     811.5    9720.6     811.8    9769.8     811.0    9811.5     811.2    9844.4
GR   811.0    9869.2     811.2    9893.4     810.9    9912.6     811.3    9939.3     812.8    9955.6
GR   813.0    9967.7     811.2    9982.7     806.3    9993.4     806.7   10000.0     807.6   10008.6
GR   811.4   10016.5     810.2   10040.6     809.2   10049.7     808.2   10057.6     810.8   10067.7
GR   810.8   10078.6     812.8   10098.9     815.3   10114.4     815.6   10140.4     815.2   10178.4
GR   815.4   10235.5     815.5   10302.7     816.0   10379.8     816.3   10422.6     818.1   10449.5
GR   817.9   10498.6     817.8   10560.2     817.7   10611.4     817.5   10672.2     817.1   10755.6

NC    0.12     0.055     0.045       0.1       0.3
ET   2.388       7.1       9.1                                        8850     11011      9200     10100
X1   2.388        75    9967.3   10022.7       420       500       496
GR     828    7244.4     826.1    7266.9     823    7294.9     818.6    7326.2     815.6    7352.1
GR   813.6    7410.7     813.4    7444.7     812.9    7464.3     811.5    7482.1     812.2    7501.9
GR   813.9    7518.9     815.6    7539.7     815.2    7560.5     812.5    7585.9     812.2    7615.1
GR   812.1    7685.7     812.5    7731.5     811.7    7780.8     812.3    7857.5     811.8    7899.9
GR   811.9    8068.5     811.7    8113.1     811.1    8153.9       811    8245.2     811.3    8272.1
GR   812.9    8301.1       813    8547.8     813.5    8652.2     813.8    8798.8     814.1    8837.1
GR   814.8    8855.5       814    8866.3     814.6      8882     815.2    8890.2     814.3    8900.4
GR   814.5    9119.7     814.1    9258.7     814.5    9306.1     815.9    9334.2     815.9    9364.5
GR   814.8    9427.7     814.6    9513.2     815.5    9546.6     814.9    9624.1     815.3    9769.7
GR   814.3    9942.9     815.1      9948       815    9967.3       810    9990.4     808.6     10000
GR   810.1   10007.4     812.4   10022.7     812.4     10037     813.8   10061.6     812.6   10087.9
GR   818.8   10117.2     819.8   10136.4       819   10151.1     818.4   10171.9     817.5     10191
GR     818   10239.6     819.7   10303.8     820.3   10349.5     819.9   10425.8     818.5   10517.7
GR   818.6     10560     817.3     10716     817.4   10817.9     816.7   10825.6     817.4   10838.9
GR   816.9   10861.3     817.9   10922.1     817.9   10953.2       817   10961.9     818.9   11011.6

ET   2.500       7.1       9.1                                        9000     11653      9300     10150
X1   2.500        50    9974.6   10018.9       400       575       591
GR     816    8710.2     818.7    8726.3     817.3    9081.5     816.9    9384.2     817.1    9527.3
GR   817.6    9550.4     817.6    9564.4     816.4    9587.9       816    9621.5     815.1    9625.4
GR   815.5    9633.8     815.7      9768     814.8    9903.1     814.8      9940     816.1    9954.4
GR   816.7    9966.4     816.7    9974.6     813.5    9980.8     812.4    9991.2     812.1    9997.4
GR   816.1   10018.9     816.2     10031     815.3   10041.2     815.7   10052.8     814.3   10059.7
GR   815.5   10074.8     815.9     10099     815.3   10127.7     815.7   10223.9     815.2   10245.1
GR   815.9     10265     816.9     10378     818.5   10391.1       817   10399.9     817.1   10422.5
GR   817.6   10438.7     817.8   10524.2     818.8   10567.5     819.6   10645.6     820.5   10680.8
GR   822.7     10705     824.7   10722.1     825.2   10770.1     824.3   10791.6     823.8   10824.7
GR   823.7     10858     822.8   10894.8     822.7   10923.1       822   10940.3     824.5   11019.7
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ET    2.597      7.1      9.1                                  9250     11344      9700     10400
X1    2.597       70     9958   10027.4      430       430      512
GR    816.8   8369.6    817.5    8407.1    817.5    8442.7    816.8    8469.8    818.2    8492.8
GR    819.6   8503.4    819.3    8540.3    819.5    8595.1    819.2      8754    818.8    8845.1
GR    818.7   9002.3    818.2    9185.1    818.2    9257.1      819    9294.6      821      9311
GR    820.1   9336.1    820.1    9473.6      820    9558.2      820    9664.6      820    9743.7
GR    819.8     9872    819.3    9900.6    819.2    9936.2    819.7    9946.1    820.6     9958
GR    820.2   9972.5    815.5    9980.3    815.3     10000    816.5   10009.6    817.6   10022.9
GR    818.4  10027.4    817.7   10067.3    817.6   10090.5      818   10110.9      818   10131.9
GR    817.5  10166.6    818.5   10199.4    819.6   10216.4    819.3   10249.5    818.4   10277.9
GR      819  10315.7    819.2   10352.7    818.9   10403.4    817.8   10493.7    818.2   10550.8
GR    817.6    10566    818.5   10580.3    818.6   10634.9    817.8   10650.7    817.5   10661.8
GR    818.4  10707.8    818.6   10731.2    818.5   10757.4      819   10779.9      819     10811
GR    819.6  10841.5    823.1   10901.9    824.7   10924.1    825.1   10953.7    824.6   10981.6
GR    823.4  11019.5    823.3   11051.2    824.2   11113.9    826.3   11153.1    826.4   11185.6
GR    825.9  11218.2      826   11248.3      827   11280.5    827.2   11312.6    827.9   11344.3

ET    2.682      7.1      9.1                                  9400     11485      9800     10500
X1    2.682       68   9970.2   10027.5      425       405      449
GR    820.3   8712.4    820.3    8877.4    819.5    8894.3    819.5    8911.7    821.4     8921
GR      822   8928.9    822.1    9058.2    822.2     9120    822.1    9182.4    821.2   9260.4
GR    821.4   9437.1    820.8    9679.2    819.6     9900    819.6    9941.3    821.3   9949.1
GR    821.9   9961.5      822    9970.2    818.3    9981.1    816.9     9989    816.5    10000
GR    817.1  10005.7    818.9   10015.3    820.3   10027.5    820.5   10046.4      820   10098.2
GR    820.3  10211.7      820   10219.8    820.5   10256.6    821.3    10278    821.3   10302.8
GR    820.9    10325    820.4   10386.6    820.4   10417.9      820   10440.2    819.9    10481
GR    818.8  10497.8      820   10515.1    820.2   10563.6    820.7   10581.8    820.4   10592.6
GR      821  10609.1      821   10616.9    819.8     10630    820.3   10646.3    820.1   10702.2
GR    820.4  10771.8    820.9   10791.2    820.4   10816.9    820.3   10846.3    821.4   10872.1
GR      821  10897.5    820.8   10929.1    821.5   10990.5    822.4   11013.7    822.1   11035.4
GR    822.8  11062.2    823.2   11099.4    824.4   11131.5    824.5   11155.9    825.1   11190.1
GR      825  11221.7    825.4   11254.1    825.9     11277    827.1   11306.5    828.1   11398.7
GR    828.1  11422.3    829.3   11454.9    829.5   11485.3

QT        2     6674     6674
ET    2.764      7.1      9.1                                  9580     11808      9900     10600
        100-YEAR FLOW = 6674 CFS FROM CONCENTRATION POINT C360.
X1    2.764       69   9983.9   10022.6      375       440      433
GR      825   9236.6    824.6    9308.9    822.2    9343.4      822    9364.3    822.8    9393.2
GR    821.9     9408    821.9    9485.1    820.4    9805.5    820.6    9831.5    822.6    9846.3
GR    822.5   9875.3    820.8      9886    820.7    9909.9    822.1    9936.9    821.1    9948.8
GR    822.1   9965.2      822    9983.9    820.5    9990.8    817.1    9995.4    816.8     10000
GR    817.6  10010.3    821.8   10022.6    822.1     10035      821   10097.1    821.5   10136.8
GR    822.3  10151.7    822.5   10170.5    821.9   10198.1    823.4   10213.9    823.5   10241.5
GR    821.5  10295.6    822.3   10308.7    822.1   10328.5    821.1   10337.4    822.4   10353.5
GR    822.1  10379.2    823.2   10471.6    822.5   10482.7    822.2   10497.6    821.3   10507.7
GR      822    10531    821.3   10579.5    820.5   10587.7    821.7   10603.3    822.5   10681.9
GR    822.6  10795.1    821.9   10969.3    821.2   10977.7    821.9   10990.9    822.5   11045.7
GR    822.3  11080.5    823.5   11150.7    824.3   11178.1    824.4   11206.4    823.8   11252.8
GR    824.3  11280.5    824.2   11290.5    823.8   11296.4    823.8   11309.1    824.4   11330.5
GR    824.5  11358.7    825.3   11392.8    825.6   11498.1    826.2   11531.7    826.2   11568.4
GR    827.7  11671.2    827.2   11698.8    828.8   11766.9    828.5   11808.7
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NC	0.055	0.055	0.045	0.1	0.3					
ET	2.850		9.1						9900	10450
X1	2.850	63	9979.7	10026.3	500	445	454			
GR	829.2	9063.2	828.3	9100.9	828.5	9210.6	828.2	9243.7	827.3	9280.2
GR	826.9	9470	824.5	9616.6	824.5	9650.7	824.1	9668.7	825.3	9711.4
GR	824.4	9725.1	824.7	9790.7	823.1	9808.4	823.8	9822.8	824.4	9886.4
GR	823.9	9979.7	821.2	9989	819.2	10000	820.2	10011.4	824	10026.3
GR	823.4	10052.3	824.2	10121.6	824.8	10126.5	822.7	10135.1	824.9	10169
GR	825.3	10195.7	824	10246.3	823.8	10300.4	825	10310.3	825	10319.7
GR	824	10334.2	824.8	10342.5	824.9	10367.6	824.5	10371.9	825.4	10378.7
GR	825.1	10394.7	823.7	10423.2	823.5	10441.3	824.7	10454	824.9	10531.4
GR	824.1	10539.3	825.1	10550.8	824.9	10637	823	10647.9	824.5	10654.6
GR	825.5	10845.5	825	10871.6	825.7	10895.9	828.5	10949.7	828.7	10985.5
GR	827.5	11063.6	828.4	11135.3	829.4	11154.2	829.7	11173.6	831.5	11229.3
GR	830.8	11248.6	831.4	11302	832.7	11319.3	832.1	11365.7	832.3	11385.5
GR	833	11390.6	832.6	11409.2	834.6	11501.7				
ET	2.963		9.1						9550	10050
X1	2.963	68	9985.2	10014	450	440	597			
GR	830.9	8780.6	830.1	8827.9	830.2	8855.7	829.1	8887	828.8	8917.9
GR	829	8952.2	828.8	8991.9	828	9032.6	827.3	9146.6	827.1	9220.6
GR	827.8	9253.6	827.1	9318.6	826.6	9428.3	827.6	9457.2	827	9482.6
GR	825.8	9497.1	824.3	9501.5	824.4	9503.5	825.9	9513.3	826	9528
GR	825.5	9536.3	826	9548.3	827.3	9561	827.1	9601.2	827.2	9618.4
GR	824.7	9629.3	825.2	9632.2	826.2	9644.8	826.5	9654.5	826.5	9666.5
GR	825	9677.1	826.7	9685.4	825.7	9694.9	826.3	9751.7	823.9	9771.4
GR	823.6	9784.7	825.6	9792.6	826.3	9807.3	826.3	9826.7	827.1	9879.1
GR	826.6	9899.5	826.7	9985.2	822.9	10000	822.9	10006.8	827.3	10014
GR	826.7	10120.6	827.4	10187.6	827.5	10238.6	827	10255.9	827.4	10334.9
GR	827.3	10412.1	827.6	10458	828.7	10477.2	829.8	10490.5	830.5	10519.1
GR	831.1	10530	831.7	10568.6	831.4	10601.7	831.9	10623.2	831.4	10646.5
GR	831.2	10668.6	831.8	10698.4	831.1	10733.1	831.5	10798.8	831.9	10823.5
GR	833.5	10854.3	836.1	10893.3	836.2	10903.6				
ET	3.091		9.1						9500	10050
X1	3.091	76	9980.5	10022.3	545	705	676			
GR	833.2	8738.5	832.5	8757	832.1	8776.3	832.2	8801.5	831.9	8834.1
GR	831.2	8869.7	830.9	8916.6	830.2	8969.5	830.3	9013.4	829.9	9096.7
GR	829.1	9175.3	828.7	9404.5	828.7	9437.9	829.3	9453.6	828.7	9481.1
GR	827.3	9489	829.3	9501.6	829.9	9511.3	829.5	9516.6	828.6	9520.9
GR	829.9	9527.4	829.3	9537.4	829.4	9552.1	828.1	9557.2	826.4	9560.2
GR	828.9	9570.2	828.4	9590.9	828.7	9605.5	828.5	9609.9	827.7	9617.6
GR	829.2	9622	828.9	9686.1	828.2	9696.5	829	9700.9	828.9	9713.1
GR	828.5	9723.1	829.4	9734.7	829	9744.8	828.3	9752.1	829	9761.1
GR	828.7	9773.6	828.9	9814.8	828.1	9826.8	829.3	9835.9	829.8	9852.6
GR	829.8	9875.3	829.3	9890.9	830.5	9899.3	830.4	9904.2	828.5	9909.5
GR	829.4	9920.1	829.2	9947.8	829.8	9980.5	829.6	9991.6	826.2	10000
GR	826.3	10018	830.3	10022.3	830.2	10036.4	829.5	10052.9	829.9	10073.1
GR	828.9	10085	829.6	10090.7	830.8	10131.8	830.1	10137.2	830.9	10150.3
GR	830.9	10309.4	830.4	10323.4	831	10338.5	830.8	10373.3	830.4	10392.9
GR	830.8	10410.2	831.5	10422.9	832.3	10454.2	832.2	10494.9	835.7	10547.7
GR	836.2	10582.3								

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ET    3.182                 9.1                                                    9380      10030
        CONFLUENCE WITH MINOR TRIBUTARY.
X1    3.182        77     9981.2    10014.6      495       450       480
GR    838.8    8849.7      838.8     8863.2    835.4    8878.1     834.6    8900.1       834      8929
GR    834.5    8957.1      835.2     8973.4    833.5    9007.8     832.7      9042     832.9    9097.6
GR    833.6      9123        834     9163.8    832.1    9251.2     832.2    9371.7     829.7    9390.6
GR      829    9391.4      830.1       9409    831.1    9419.7     831.1    9431.6     831.6    9454.1
GR    831.7      9479      831.1     9503.2    831.9    9512.8     831.9    9537.4     831.5    9564.1
GR    829.8    9574.1      830.1     9579.4    831.3    9584.6     830.9    9591.3       832      9599
GR    829.5    9607.6      829.7     9610.6    831.1    9614.6     830.6      9636     831.4    9672.2
GR    831.5    9705.4      832.2     9719.6    830.9    9732.1     831.7    9750.2     831.9    9770.6
GR    831.8    9808.2      831.4     9825.2    832.1    9832.6     832.3    9842.9     832.1    9854.5
GR    830.7    9867.9      830.5     9877.4    832.4    9894.1     832.5      9901     832.1      9906
GR    830.4    9912.4      830.8     9915.5    832.3      9923     832.5    9932.9     831.8    9941.6
GR    831.2    9964.6      832.2     9975.6    832.2    9981.2     828.5    9992.1     828.5   10007.8
GR    832.3   10014.6      832.1    10046.2    832.3   10077.6       832   10107.1     832.5   10212.2
GR    832.3     10241        833    10298.5    832.2     10304       833   10374.3       833   10395.8
GR      834   10438.9        835      10467    836.9   10496.9       837   10519.1     838.6   10540.4
GR    839.5   10564.6        840    10586.3

ET    3.248                 9.1                                                    9600      10050
X1    3.248        56     9966.6    10047.8      355       335       348
GR    837.4    9387.4      835.5     9396.0    835.5    9413.9     834.9    9438.2     834.5    9460.8
GR    834.2    9491.8      834.0     9515.2    834.0    9522.1     833.1    9531.9     832.1    9539.0
GR    832.2    9578.2      833.4     9585.2    833.6    9617.1     833.9    9676.6     833.8    9681.5
GR    833.1    9694.8      833.8     9717.0    834.4    9732.9     833.5    9747.2     833.5    9759.0
GR    832.7    9767.2      833.9     9776.3    833.8    9782.0     832.1    9792.9     833.6    9805.5
GR    833.5    9814.1      831.9     9824.5    832.1    9828.7     833.5    9839.1     833.8    9855.5
GR    833.5    9867.4      833.7     9899.7    834.0    9916.0     833.8    9928.9     834.0    9954.3
GR    833.6    9966.6      833.9     9980.7    830.7    9994.9     830.7   10000.0     830.7   10022.4
GR    833.8   10033.4      834.5    10047.8    834.2   10070.9     833.9   10087.8     833.3   10099.2
GR    834.0   10105.7      833.1    10113.0    834.7   10120.1     834.6   10129.2     834.0   10139.1
GR    833.5   10145.9      834.2    10155.3    833.3   10160.3     836.3   10180.8     841.5   10209.4
GR    848.4   10241.0

ET    3.344                 9.1                                                    9700      10040
X1    3.344        30     9972.1    10029.6      470       485       507
GR    839.6    9319.3      838.9       9345    839.2    9354.1     840.2    9363.8     839.9    9369.5
GR    836.1    9384.5      835.8     9437.5    835.9    9491.7     836.2    9548.7       836    9565.7
GR    838.6    9580.7      838.7     9590.6    835.9    9599.6     835.9    9695.8     835.4      9746
GR    835.6    9789.3      836.7     9795.1      837      9813     835.9      9825     835.8    9887.1
GR    835.2    9906.3      835.4     9926.6    834.4    9938.4     834.7    9972.1     833.7    9988.2
GR    832.6    9992.6      832.9    10018.5    835.8   10029.6     839.5   10041.4     849.2   10060.4

QT        2      6757       6757
ET    3.440                 9.1                                                    9700      10030
        100-YEAR FLOW = 6757 FROM CONCENTRATION POINT C320.
X1    3.440        46     9969.4    10023.6      485       500       507
GR    841.8    9291.1      841.0     9321.9    840.4    9353.3     840.4    9389.5     840.5    9414.0
GR    840.2    9434.1      839.0     9455.1    838.6    9484.9     839.1    9502.8     839.8    9527.1
GR    840.3    9551.6      839.7     9573.0    840.2    9596.8     840.3    9612.0     840.0    9635.7
GR    839.1    9651.7      837.6     9664.0    836.5    9672.0     837.9    9678.5     837.9    9696.3
GR    837.6    9723.1      837.6     9764.9    837.9    9801.0     837.5    9814.9     836.4    9821.9
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GR    837.5    9828.7    837.0    9856.3    837.8    9867.8    837.6    9894.2    836.9    9911.8
GR    838.0    9926.6    838.0    9956.4    837.8    9969.4    834.0    9979.5    834.3    9994.2
GR    834.2   10000.0    838.6   10014.7    839.0   10023.6    838.6   10035.9    838.0   10048.4
GR    838.4   10068.8    839.9   10086.8    840.3   10100.3    840.1   10110.7    843.6   10121.4
GR    850.4   10133.9

ET    3.535              9.1                                                      9650     10030
X1    3.535       49    9975.7   10021.0     500      490      502
GR    844.3    9330.7    843.9    9367.5    843.7    9404.3    842.7    9446.9    841.7    9489.5
GR    840.8    9524.9    840.5    9569.7    840.1    9603.6    839.9    9632.5    839.7    9658.1
GR    840.6    9673.0    840.8    9688.0    841.2    9708.4    841.0    9715.8    838.0    9722.2
GR    838.3    9731.1    839.9    9739.5    840.3    9749.5    840.8    9755.3    839.2    9761.1
GR    840.4    9780.0    840.7    9798.1    839.3    9816.5    839.9    9838.8    839.6    9861.4
GR    839.6    9881.3    840.1    9901.8    839.8    9930.6    839.8    9961.3    839.9    9971.2
GR    841.4    9975.7    840.2    9982.3    839.7    9991.3    836.4    9998.6    836.4   10000.0
GR    837.3   10005.6    839.7   10013.5    840.4   10021.0    839.6   10031.3    841.4   10058.3
GR    841.6   10073.3    841.3   10090.8    841.3   10113.9    842.0   10140.9    842.9   10149.4
GR    843.5   10159.8    843.6   10175.1    843.6   10182.5    850.9   10201.5

NC    0.055    0.065     0.045       0.1      0.3
ET    3.630              9.1                                                      9700     10053
        LEVEE IN RIGHT OVERBANK IS NOT ENGINEERED, AND THEREFORE IS ASSUMED TO
        NOT BE STABLE.  FLOODPLAIN HAS BEEN DELINEATED OVER LEVEE.
X1    3.630       47    9958.3   10052.5     485      435      502
GR      848    9241.2    847.8    9269.9    846.5     9331    844.9    9354.3    844.7     9376
GR    845.4    9415.3    844.5    9438.3    842.8    9452.6    843.1     9498    844.5    9528.8
GR    844.6    9566.1    844.1    9584.4    842.2    9597.7    841.7    9609.9    842.7    9623.8
GR    842.9    9642.2    841.4    9674.3    841.8    9696.6    841.4    9733.5    843.3     9752
GR    843.5    9769.7    842.7    9784.2    841.2    9793.8    841.3    9809.1    842.1    9820.6
GR    841.3    9828.9    842.2    9838.8    841.8    9873.1    839.9     9878    842.4    9908.4
GR      843    9958.3    842.5    9964.3    840.8    9978.3    840.3    9989.2    839.4     9995
GR    839.8   10023.2    840.2   10033.5    845.9   10052.5    845.5   10060.8    845.3    10093
GR    845.9   10117.8    845.4   10201.1    845.5   10315.1    845.3   10343.1    845.7   10382.2
GR    845.4   10389.3    854.6   10405.6

ET    3.742              9.1                                                      9650     10350
X1    3.742       58    9988.3   10025.9     535      665      591
GR    852.6    8747.4     852      8815    850.7    8818.6    850.8    8824.5    851.7    8830.3
GR      850    8861.3    849.6    8877.6    851.1    8908.4    851.6    8926.8    850.5    9026.3
GR    848.5    9065.9    848.8    9084.7    847.5    9094.2    849.4    9155.2    848.9     9197
GR      849    9235.8    849.9    9292.6      851    9319.6    849.5    9376.9    848.2     9398
GR    846.6    9454.1    844.8    9558.4    843.8    9675.2    843.8    9712.7    844.2    9732.8
GR      844    9751.9    841.9    9758.6      842     9763      843    9770.7    843.8    9784.4
GR    844.2     9846      844    9890.6    844.4    9930.8    844.2    9949.3    844.7    9969.3
GR    844.4    9988.3    841.7    9996.6    841.7   10010.9    844.1   10017.9    844.7   10025.9
GR    844.9   10046.8    844.2     10128    844.7     10186    844.1   10195.2    844.4   10246.3
GR    844.1   10339.9    844.3   10374.2    843.8   10403.9    843.4   10505.4    841.9    10518
GR    842.2   10533.7    843.3   10548.8    843.3   10586.3    843.7   10615.1    844.6    10625
GR    844.8   10644.6    848.9   10654.7    859.2   10684.9
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ET	3.863		9.1						9850	10700
X1	3.863	85	9984	10019.1	610	620	639			
GR	855.8	8919.2	855.4	8972.6	854.8	9029.3	854.7	9072.2	853.2	9097.7
GR	852.9	9122.9	852.7	9153	852.9	9183.8	853.4	9222	853.3	9252.9
GR	852.5	9283	851.5	9309.1	851.7	9336.3	850.9	9360.9	850.1	9387.4
GR	849.9	9407.7	850.7	9430.4	851	9481.8	850.7	9508.4	849.4	9533.4
GR	849	9563.4	848.6	9597.2	847.6	9666.6	847	9717.5	846.9	9766.8
GR	846.9	9823.7	846.1	9855.1	845.3	9867.6	844.7	9870.8	846.3	9879.8
GR	846.8	9894.9	847.4	9921.5	847	9935.2	846.6	9946.6	846.6	9960
GR	846.9	9975.2	847	9984	843.6	9988.9	843.9	9998.9	844	10000
GR	844.2	10011.2	847.1	10019.1	847.2	10030.1	846.8	10046.1	846	10060.4
GR	847	10070.5	847.1	10088.6	847.1	10108	847.5	10136.4	847.2	10169.8
GR	847.2	10202.4	847.4	10252.3	847.7	10283.4	847.1	10304.4	847.6	10328.5
GR	848.4	10357.2	849	10380.9	850.1	10405.1	849.7	10412.5	848.7	10441.5
GR	847.7	10486.2	847.3	10526.9	847.1	10550.9	846.4	10561.8	847.2	10578.3
GR	846.9	10601.8	846.6	10627.4	846.7	10664.7	846.5	10702	846.5	10733.9
GR	846.3	10769	845.8	10780.8	845.7	10804.8	845.8	10837.1	845.7	10872.6
GR	845.8	10892.6	845.5	10907	844.4	10915.1	844.2	10921.9	845.9	10934.9
GR	845.2	10946.9	845.8	10960.4	847.5	10981.1	855.9	11012.5	858.5	11022.4
ET	3.966		9.1						9720	10700
X1	3.966	90	9982.6	10015.1	480	520	544			
GR	858.1	8612.5	858.3	8644.2	857.8	8688.2	856.5	8719.8	856.1	8746
GR	856.2	8789.5	855.3	8841.4	854.8	8893.6	854.1	8937.8	854.4	8990.8
GR	854.9	9027.7	854.2	9076.1	854.3	9174	854	9198.3	853	9231.3
GR	852.4	9285.4	851.1	9305.6	851	9319.5	851	9355.7	850.6	9387.3
GR	849.6	9441.4	849.9	9453.7	850	9462.8	849.7	9474.6	850.2	9511.7
GR	849.6	9544	849.4	9576.2	849.4	9603.1	848.7	9609.9	849.4	9617.4
GR	849.4	9669.8	847.9	9674.7	849.5	9681.9	849.5	9693.6	849.7	9717.2
GR	849.3	9740.5	849.5	9777.7	849.4	9785.1	849.9	9793.3	849.7	9809.4
GR	849.4	9824.5	849.5	9833.2	849	9846.3	849.6	9879.4	849.6	9948.3
GR	849.9	9973.5	849.8	9982.6	847.4	9990.5	847.4	10000	847.2	10007.8
GR	850.2	10015.1	850	10027.4	850.5	10056.3	850.6	10106.8	850.3	10131.2
GR	849.7	10157	850	10192.2	850	10224.7	849.6	10251.8	850.2	10313.2
GR	850.3	10330.9	848.9	10337.9	848.9	10347.3	849.7	10352.1	850	10359
GR	850	10392.6	849.5	10436.4	848.9	10472.6	848.4	10543.7	848.5	10578.9
GR	847.9	10618.9	847.9	10653.1	847.8	10673.2	847.3	10682.8	847.6	10702.8
GR	847.4	10731.5	847	10747.5	846.9	10758.7	846.8	10762.4	847.2	10776.1
GR	847.4	10801.7	847.3	10820	847.5	10837	847.6	10854.7	848.1	10878.7
GR	849.3	10905.5	850.8	10933	851.3	10944.5	856.2	10961.6	860.5	10976.2
ET	4.088	7.1	9.1				9600	10800	9750	10700
	SECTIONS 4.088 TO 4.260 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE									
	SOUTHERN PACIFIC RAILROAD BRIDGES.									
X1	4.088	90	9988.6	10030	455	555	644			
GR	859.2	8582.6	859.6	8611.2	859.7	8636.7	858.6	8682.7	857.7	8735.1
GR	857.2	8791.6	856.5	8824.6	857.1	8862.1	856.4	8900	855.3	8938.5
GR	855.2	9011.4	854.3	9033.1	853.1	9042.3	853.8	9055.5	853.7	9078.6
GR	853.3	9106.7	853.3	9172.4	852.9	9193.6	852	9197.6	853	9229.2
GR	852.1	9282	851.5	9359	852	9413	852	9436.7	851.7	9451.3
GR	852	9468.4	849.9	9472.7	851.9	9484.2	851.4	9499.1	851.2	9542.9
GR	851.8	9590.5	853	9613.5	852.6	9660.5	852	9669	853.1	9679.9
GR	852.5	9690.5	853	9701.7	853	9725.3	850.2	9729.3	852.8	9735.5

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GR    852.7    9750.7      853    9771.7    851.9      9786    852.7    9798.4    851.7    9805.2
GR      853    9814.1      852    9827.3      853    9883.1    853.3    9913.6    853.1    9942.4
GR      851    9945.7    853.3    9954.5    853.1    9974.9    853.2    9988.6    849.8    9997.5
GR    849.8   10011.5    852.1     10030    852.8   10050.1    852.8   10119.4    852.6     10148
GR    852.1   10172.8      851   10178.8    851.8   10190.6    851.9   10283.3    851.6   10286.3
GR    850.8   10458.9    850.2     10505      850   10548.7    849.6   10595.4      850   10607.8
GR    849.8     10617    850.2   10629.8    849.7   10644.4    849.9   10657.4    849.9     10677
GR    849.5   10691.7      850   10708.6    849.8   10735.6      850   10761.4    849.8   10789.3
GR    849.2   10809.2    849.8   10828.9    849.8   10898.2    850.3   10964.5    850.3   11002.3
GR    850.6   11043.5    851.4   11094.8    852.3   11114.3    862.8   11155.9    869.7   11178.8

ET    4.158       7.1      9.1                                 9750     10850      9850     10850
X1    4.158        94   9960.6   10043.2      385      330      370
GR    859.7    8725.5    859.9    8749.4    857.7    8823.7    858.2    8848.1    858.5    8880.3
GR    858.5    8910.3    857.7    8940.5      857    8957.9    857.3    8977.4    858.3     9007
GR    858.2    9027.7    857.4    9053.7    856.2     9080    854.5    9098.3    854.6    9122.8
GR    853.5    9138.5    854.8    9159.3    853.9    9178.2    854.2    9201.5    853.4    9218.9
GR    853.8    9249.8    852.6    9257.7    854.4    9274.5    854.9    9306.1    854.5     9382
GR    853.8    9397.6    853.2    9405.1    853.9    9443.2    854.1    9487.2    853.1     9498
GR    853.1    9502.3      854    9512.7    853.8    9529.6    854.5    9547.4    854.7     9572
GR    854.7    9599.3    853.8    9650.1      853    9662.7    852.5    9697.3    854.6    9713.9
GR    854.7    9782.3    853.2    9787.5    854.3    9799.6    854.3    9822.9    854.6     9858
GR    854.7    9914.1    854.9    9914.4    854.4    9929.1    854.6    9944.5    855.2    9960.6
GR    852.4    9965.5    852.7     10000    852.2   10014.3    853.8   10027.8      855   10043.2
GR    854.6   10065.3    855.6   10095.4    856.2   10123.1    856.2     10153    852.9   10203.5
GR    852.6   10287.9    851.7   10355.7      852   10383.4    851.9   10417.1    852.2   10452.5
GR    851.7   10559.2    851.3   10588.9    851.3   10625.2    851.1     10647    850.8   10659.1
GR    851.5   10670.9    850.6   10684.8    850.8   10694.3      851   10750.9    850.7   10757.8
GR    851.1   10773.1    850.5   10787.8    850.9   10802.3    850.3   10811.3    850.9   10824.4
GR    850.8   10851.8    851.1   10889.9    851.7   11119.2    851.9   11172.4    852.9   11302.2
GR    852.9   11347.9    853.4   11386.7    853.4   11403.2    852.9   11410.8    853.7   11433.5
GR    853.8   11470.2    855.3   11518.5    856.8     11538    862.1   11568.6

ET    4.223       7.1      9.1                                 9920     10920      9920     10920
        SOUTH RIGHT-OF-WAY OF SOUTHERN PACIFIC RAILROAD.
        UPSTREAM LIMIT OF STUDY.
        LUKE WASH FLOWS THROUGH BOTH BRIDGES UNDER SOUTHERN PACIFIC RAILROAD.
X1    4.223        94   9963.6   10026.4      275      390      343
GR    862.3    8712.7    862.2    8742.5    861.8    8766.4    861.7    8806.3    860.9    8922.7
GR    860.4    8972.5    859.9    9002.4    856.2    9070.6    856.1    9102.9    855.1    9179.9
GR    855.4    9210.6    854.6    9230.9    854.8    9241.5    855.7    9260.2    855.2     9281
GR    854.9    9303.5    855.3    9327.2    855.4    9431.7    855.9    9535.2    855.8    9565.3
GR      856    9587.9    855.6    9617.6    856.1     9689      855     9717    856.1    9739.6
GR    856.5    9823.5    856.2    9914.9      856     9939    855.2    9952.9    855.4    9963.6
GR    854.6    9985.4    853.1    9994.2    853.6    10000    854.4   10012.6    856.4   10026.4
GR    855.9   10074.7    856.1   10140.5    855.9    10184    855.2   10251.3    854.5     10291
GR    854.1   10331.4    855.1   10375.7    854.6   10453.8    854.2   10470.9    854.2   10502.9
GR    853.7   10605.7    853.6   10673.5    853.3   10719.7    852.9   10756.3    852.5   10776.2
GR    851.9   10786.1    853.4   10803.4      853    10833    852.8   10862.5    851.6   10874.1
GR      850   10885.6    851.6   10906.9    851.9   10932.8    852.2   11006.8    852.6   11044.4
GR    852.8   11109.8      852   11148.9    852.4   11185.4    852.2   11264.5    852.8   11344.6
GR    854.8   11490.4      856   11540.7    858.4   11571.9    858.8   11594.1    859.7   11615.4
GR    859.3   11639.7      858   11679.7    858.2   11714.1    857.6   11741.3    858.1   11827.8
GR    858.2   11965.8    858.7   12015.2    858.8   12065.8    859.4   12126.3    859.7   12181.6
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GR	861.3	12217	861.1	12237.5	859.4	12242.7	860.7	12264.1	861.6	12306.2
GR	863.2	12340.6	864	12377.2	864.5	12414.7	863.6	12419.3	864.4	12432
GR	864.4	12443.8	864.2	12451	865.5	12459.6	865.4	12501.2		

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=     .100 CEHV=     .300
*SECNO 1.160

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9000.0   10485.9  TYPE=      1  TARGET=     1485.900
        LUKE WASH, FROM GILA RIVER FLOODPLAIN TO THE SOUTHERN PACIFIC RAILROAD
        PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
        PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
        PREPARED BY COE & VAN LOO CONSULTANTS, INC.  (CVL #1090-07)
        TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
        FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
        THE CONTROL LINE OF LUKE WASH IS STATION 10,000.
        ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
        CROSS SECTION NUMBERS FOR LUKE WASH ARE STATIONED IN RIVER MILES FROM
        THE CONFLUENCE WITH GILA RIVER.
        THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
        FROM THE GILA RIVER WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
        ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
        MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
        IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
        LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
        IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
        FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
        AT SOME SECTIONS AN OUTPUT MESSAGE INDICATES THAT THE CHANNEL SECTION
        IS EXTENDED VERTICALLY.  AT THESE LOCATIONS, ENCROACHMENTS HAVE BEEN
        SET TO CONTAIN THE FLOW WITHIN A NATURAL RIDGE OR WITHIN THE EFFECTIVE
        FLOW AREAS.  WHERE THE FLOW IS CONTAINED BY A NATURAL RIDGE, THE MESSAG
        HAS NO MEANING.  WHERE THE FLOW IS ENCROACHED TO ELIMINATE NON-EFFECTIV
        FLOW AREAS, THEN THERE IS A POTENTIAL FOR THE BACKWATER TO BREAKOUT.
        HYDROLOGY IS BASED ON THE 100-YEAR, 24-HOUR HEC-1 MODEL PREPARED FOR
        THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
        100-YEAR FLOW = 7633 CFS FROM CONCENTRATION POINT RES513.
        SECTIONS 1.160 TO 1.404 IN THE EXISTING CONDITION, THE LEFT OVERBANK
        HAS BEEN ENCROACHED AT A 4:1 DOWNSTREAM FROM THE ARLINGTON CANAL.
        THE RIGHT OVERBANK HAS BEEN ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.
   1.160      6.32    781.22    779.90       .00    781.35       .12       .00       .00    782.60
  7633.0    5157.5    1479.2     996.3    2932.7     275.2     788.9        .0        .0    782.50
     .00      1.76      5.38      1.26      .120      .045      .120      .000    774.90   9000.00
 .004396        0.        0.        0.         0        12         4       .00   1431.11  10476.14
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1.16 CWSEL= 781.22

STA=	9000.	9040.	9089.	9416.	9494.	9560.	9630.	9702.	9885.	9937.	10031.	10295.	10393.
PER Q=	4.0	3.1	24.8	5.6	4.9	5.1	5.2	12.1	2.9	19.4	8.0	3.4	
AREA=	157.5	141.0	1055.5	242.7	210.8	220.6	224.9	543.6	136.0	275.2	472.7	198.4	
VEL=	1.9	1.7	1.8	1.8	1.8	1.8	1.8	1.7	1.6	5.4	1.3	1.3	
DEPTH=	3.9	2.9	3.2	3.1	3.2	3.2	3.1	3.0	2.6	3.9	1.8	2.0	

STA=	10393.	10476.
PER Q=	1.7	
AREA=	117.9	
VEL=	1.1	
DEPTH=	1.4	

*SECNO 1.257

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9100.0 10485.0 TYPE= 1 TARGET= 1385.000

1.257	7.96	784.06	783.60	.00	784.42	.36	3.00	.07	785.00
7633.0	3940.4	2475.5	1217.1	1963.1	311.5	733.5	40.8	16.1	784.10
.04	2.01	7.95	1.66	.120	.045	.120	.000	776.10	9100.00
.008331	505.	512.	515.	2	12	0	.00	1323.24	10465.39

FLOW DISTRIBUTION FOR SECNO= 1.26 CWSEL= 784.06

STA=	9100.	9196.	9263.	9412.	9612.	9727.	9822.	9917.	9935.	10029.	10400.	10465.
PER Q=	7.7	4.6	9.5	12.4	6.2	5.0	5.7	.5	32.4	14.1	1.9	
AREA=	267.0	168.6	357.9	472.0	249.3	203.8	220.2	24.4	311.5	638.8	94.7	
VEL=	2.2	2.1	2.0	2.0	1.9	1.9	2.0	1.6	7.9	1.7	1.5	
DEPTH=	2.8	2.5	2.4	2.4	2.2	2.2	2.3	1.4	4.4	1.7	1.5	

*SECNO 1.351

3265 DIVIDED FLOW

3280 CROSS SECTION 1.35 EXTENDED 1.39 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 9200.0 10481.0 TYPE= 1 TARGET= 1281.000

1.351	9.99	787.39	786.94	.00	787.83	.44	3.39	.03	786.70
7633.0	3007.4	3343.9	1281.7	1810.3	424.7	853.2	76.0	31.0	787.70
.07	1.66	7.87	1.50	.120	.045	.120	.000	777.40	9200.00
.005620	500.	496.	510.	2	12	0	.00	1258.12	10470.50

FLOW DISTRIBUTION FOR SECNO= 1.35 CWSEL= 787.39

STA=	9200.	9274.	9413.	9574.	9666.	9746.	9900.	9962.	10036.	10185.	10256.	10406.	10470.
PER Q=	3.3	6.9	8.1	4.8	4.4	9.1	2.7	43.8	5.0	3.1	6.5	2.2	
AREA=	163.9	324.2	377.7	220.1	199.0	396.6	128.7	424.7	261.8	152.0	322.1	117.4	
VEL=	1.6	1.6	1.6	1.7	1.7	1.7	1.6	7.9	1.5	1.5	1.5	1.4	
DEPTH=	2.2	2.3	2.3	2.4	2.5	2.6	2.1	6.0	1.8	2.1	2.1	1.8	

*SECNO 1.404

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9182.0 10494.0 TYPE= 1 TARGET= 1312.000

1.404	5.10	789.00	788.40	.00	789.42	.42	1.59	.00	786.80
7633.0	1365.5	3967.3	2300.3	933.5	568.1	1056.2	89.8	37.0	786.90
.08	1.46	6.98	2.18	.120	.045	.120	.000	783.90	9241.32
.008192	230.	280.	155.	2	18	0	.00	1234.89	10486.21

FLOW DISTRIBUTION FOR SECNO= 1.40 CWSEL= 789.00

STA=	9241.	9389.	9587.	9701.	9832.	9912.	10071.	10165.	10316.	10362.	10401.	10447.	10486.
PER Q=	3.4	5.9	3.1	3.1	2.4	52.0	3.5	12.3	4.7	3.8	4.1	1.8	
AREA=	188.5	302.8	165.5	166.5	110.1	568.1	157.6	420.5	147.5	121.5	135.3	73.7	
VEL=	1.4	1.5	1.4	1.4	1.7	7.0	1.7	2.2	2.4	2.4	2.3	1.8	
DEPTH=	1.3	1.5	1.4	1.3	1.4	3.6	1.7	2.8	3.2	3.1	3.0	1.9	

*SECNO 1.449
3280 CROSS SECTION 1.45 EXTENDED .78 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9200.0 10100.0 TYPE= 1 TARGET= 900.000
SOUTH BANK (DOWNSTREAM BANK) OF THE ARLINGTON CANAL.
100-YEAR FLOW = 7814 FROM CONCENTRATION POINT C495.

1.449	9.78	793.18	793.18	.00	794.65	1.46	2.39	.31	792.20
7814.0	201.4	7612.6	.0	222.5	773.7	.0	99.3	42.1	793.80
.09	.91	9.84	.00	.120	.045	.000	.000	783.40	9399.87
.012979	245.	238.	210.	0	17	0	.00	659.39	10059.26

FLOW DISTRIBUTION FOR SECNO= 1.45 CWSEL= 793.18

STA=	9400.	9513.	9733.	9878.	10067.
PER Q=	.2	1.0	1.4	97.4	
AREA=	27.4	95.2	99.8	773.7	
VEL=	.5	.8	1.1	9.8	
DEPTH=	.2	.4	.7	4.3	

*SECNO 1.461
3280 CROSS SECTION 1.46 EXTENDED 2.73 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.32

3470 ENCROACHMENT STATIONS= 9085.0 10100.0 TYPE= 1 TARGET= 1015.000
UPSTREAM SIDE OF THE ARLINGTON CANAL.
SECTION 1.461 ENCROACHED AT A 1:1 FROM THE ARLINGTON CANAL.

1.461	10.13	794.73	793.00	.00	795.05	.32	.29	.11	790.60
7814.0	3415.0	4326.1	72.9	2482.6	721.4	80.1	102.1	43.1	792.30
.09	1.38	6.00	.91	.120	.045	.120	.000	784.60	9190.58
.002402	55.	63.	65.	3	9	0	.00	909.42	10100.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1.46 CWSEL= 794.73

STA=	9191.	9366.	9427.	9516.	9601.	9666.	9726.	9804.	9894.	9943.	9957.	10057.	10100.
PER Q=	7.7	3.3	4.2	4.4	3.2	4.4	4.6	6.9	3.8	1.3	55.4	.9	
AREA=	458.1	193.2	262.2	267.4	196.8	232.3	262.4	355.8	192.7	61.6	721.4	80.1	
VEL=	1.3	1.3	1.2	1.3	1.3	1.5	1.4	1.5	1.5	1.6	6.0	.9	
DEPTH=	2.6	3.2	3.0	3.1	3.1	3.8	3.4	3.9	4.0	4.3	7.2	1.9	

CCHV= .100 CEHV= .300
*SECNO 1.534

3470 ENCROACHMENT STATIONS= 9334.0 10500.0 TYPE= 1 TARGET= 1166.000
SECTIONS 1.534 TO 1.813 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE
OLD U.S. HIGHWAY 80 CULVERTS

1.534	11.12	795.72	793.09	.00	795.79	.08	.72	.02	792.50
7814.0	3242.7	2105.5	2465.8	2476.9	576.2	1884.1	135.7	51.3	792.30
.15	1.31	3.65	1.31	.120	.065	.120	.000	784.60	9360.73
.001644	305.	385.	465.	3	10	0	.00	1131.67	10492.40

FLOW DISTRIBUTION FOR SECNO= 1.53 CWSEL= 795.72

STA=	9361.	9433.	9486.	9579.	9667.	9765.	9858.	9923.	9963.	10034.	10092.	10168.	10280.
PER Q=	4.7	4.4	7.4	6.6	7.5	6.7	3.1	1.1	26.9	3.9	5.8	8.7	
AREA=	286.1	246.5	420.6	382.6	433.0	397.4	213.3	97.4	576.2	236.3	337.1	501.8	
VEL=	1.3	1.4	1.4	1.3	1.4	1.3	1.1	.9	3.7	1.3	1.4	1.4	
DEPTH=	3.9	4.7	4.5	4.4	4.4	4.3	3.3	2.4	8.0	4.1	4.4	4.5	

STA=	10280.	10354.	10437.	10492.
PER Q=	5.6	5.7	1.8	
AREA=	323.0	344.7	141.2	
VEL=	1.4	1.3	1.0	
DEPTH=	4.4	4.1	2.6	

*SECNO 1.632

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .60

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     9300.0   10400.0  TYPE=      1  TARGET=     1100.000
     1.632      9.71    796.91    795.53       .00    797.15       .24      1.31       .05    795.70
    7814.0    2668.3    3568.6    1577.1    1547.7     646.2     945.8     182.4      63.8    795.00
       .19      1.72      5.52      1.67      .120      .065      .120      .000    787.20   9334.42
   .004634      520.      517.      475.         2        17         0       .00   1026.68  10400.00


FLOW DISTRIBUTION FOR SECNO=      1.63          CWSEL=    796.91

STA=    9334.    9367.    9404.    9440.    9510.    9594.    9711.    9761.    9815.    9889.    9965.   10059.   10127.
  PER Q=      3.3      4.2      4.1      4.6      3.7      3.1      3.0      3.8      4.1       .2     45.7      4.1
   AREA=    119.7    151.5    148.1    206.6    196.0    200.1    140.6    166.5    194.4     24.2    646.2    190.7
    VEL=      2.1      2.1      2.2      1.7      1.5      1.2      1.7      1.8      1.6       .8      5.5      1.7
  DEPTH=      3.7      4.1      4.2      2.9      2.3      1.7      2.8      3.1      2.7       .3      6.9      2.8

STA=   10127.   10196.   10264.   10330.   10400.
  PER Q=      5.1      4.2      3.6      3.2
   AREA=    218.5    193.4    174.2    169.0
    VEL=      1.8      1.7      1.6      1.5
  DEPTH=      3.2      2.9      2.6      2.4

CCHV=     .100 CEHV=     .300
*SECNO 1.723

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9188.0   10250.0  TYPE=      1  TARGET=     1062.000
     1.723     10.99    799.19    798.06       .00    799.45       .26      2.29       .00    794.60
    7814.0    3972.0    3121.0     721.0    1921.1     527.5     351.7     216.8      75.7    799.30
       .23      2.07      5.92      2.05      .100      .065      .070      .000    788.20   9223.90
   .004534      575.      480.      340.         2         5         0       .00   1021.24  10250.00


FLOW DISTRIBUTION FOR SECNO=      1.72          CWSEL=    799.19
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


STA=    9224.    9270.    9300.    9338.    9377.    9427.    9499.    9618.    9702.    9782.    9898.    9939.    9966.
  PER Q=      5.9      6.0      4.5      4.3      3.8      3.4      3.6      3.5      4.4      4.1      3.4      4.0
   AREA=    171.1    155.9    144.0    142.7    146.4    157.4    197.5    169.7    190.6    208.3    120.8    116.9
    VEL=      2.7      3.0      2.5      2.4      2.1      1.7      1.4      1.6      1.8      1.5      2.2      2.7
  DEPTH=      3.7      5.2      3.8      3.6      2.9      2.2      1.7      2.0      2.4      1.8      3.0      4.3

STA=    9966.   10034.   10206.   10250.
  PER Q=     39.9      6.4      2.8
   AREA=    527.5    256.0     95.7
    VEL=      5.9      2.0      2.3
  DEPTH=      7.9      1.5      2.2

*SECNO 1.767

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     8677.0   10170.0  TYPE=      1  TARGET=     1493.000
     1.767     10.61    800.41    799.05       .00    800.59       .18      1.13       .01    797.50
    7814.0    4957.3    2350.6     506.1    2569.9     436.4     248.3     236.1      83.3    797.60
       .25      1.93      5.39      2.04      .100      .065      .070      .000    789.80   8717.36
   .003974      300.      232.      185.         2        10         0       .00   1343.86  10170.00


FLOW DISTRIBUTION FOR SECNO=      1.77         CWSEL=    800.41

STA=    8717.    8765.    8814.    8855.    8884.    8930.    8960.    9005.    9060.    9121.    9179.    9341.    9795.
  PER Q=      3.7      3.9      3.7      3.8      6.4      4.2      6.1      5.5      4.3      3.5      3.0      4.7
   AREA=    136.8    149.7    135.0    122.9    199.9    130.7    193.5    196.8    177.9    152.1    192.3    316.1
    VEL=      2.1      2.0      2.1      2.4      2.5      2.5      2.5      2.2      1.9      1.8      1.2      1.2
  DEPTH=      2.9      3.0      3.3      4.1      4.4      4.5      4.3      3.6      2.9      2.6      1.2       .7

STA=    9795.    9901.    9954.    9981.   10039.   10145.   10170.
  PER Q=      4.7      3.7      2.2     30.1      5.3      1.2
   AREA=    227.8    151.9     86.6    436.4    201.0     47.3
    VEL=      1.6      1.9      2.0      5.4      2.1      1.9
  DEPTH=      2.2      2.9      3.1      7.6      1.9      1.9

CCHV=     .300 CEHV=     .500
*SECNO 1.813
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 8550.0 10200.0 TYPE= 1 TARGET= 1650.000
DOWNSTREAM FACE OF THE OLD U.S. HIGHWAY 80 BOX CULVERTS.
TWO SETS OF 6-BARREL 10' X 6' CONCRETE BOX CULVERTS CROSS THE HIGHWAY.
ONE SET ON THE LUKE WASH THALWEG AND THE OTHER SET ON THE EAST
MAIN TRIBUTARY THALWEG, APPROXIMATELY 1100 FEET APART.
THE INVERTS ON THE TWO SETS OF BOX CULVERTS ARE THE SAME, AND THEY HAVE
A COMMON PONDING AREA BEHIND THEM.
THEREFORE, THEY WERE MODELED TOGETHER USING THE SPECIAL CULVERT ROUTINE
AS 12-10' BY 6' CONCRETE BOX CULVERTS.
WEIR FLOW OCCURS OVER THE HIGHWAY BETWEEN THE CULVERTS.
BT POINTS REPRESENT THE CENTERLINE OF THE HIGHWAY.

1.813	9.33	802.73	802.73	.00	803.72	.99	1.62	.41	801.10
7814.0	2471.3	5250.4	92.3	794.0	552.4	62.3	248.8	90.0	802.50
.26	3.11	9.51	1.48	.100	.065	.070	.000	793.40	8613.31
.014069	240.	243.	195.	0	9	0	.00	1145.00	10194.69

FLOW DISTRIBUTION FOR SECNO= 1.81 CWSEL= 802.73

STA=	8613.	8889.	8904.	8918.	8930.	9617.	9857.	9962.	10043.	10195.
PER Q=	3.4	7.2	7.4	5.1	3.1	3.4	2.1	67.2	1.2	
AREA=	68.5	91.9	92.8	71.0	197.9	174.5	97.4	552.4	62.3	
VEL=	3.9	6.1	6.2	5.6	1.2	1.5	1.7	9.5	1.5	
DEPTH=	.2	6.4	6.7	5.7	.3	.7	.9	6.8	.4	

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	12	.012	.40	2.68	.00	6.00	10.00	34.00	8	1	795.90	795.90

CHART 8 - BOX CULVERT WITH FLARED WINGWALLS; NO INLET TOP EDGE BEVEL
SCALE 1 - WINGWALLS FLARED 30 TO 75 DEGREES

*SECNO 1.819

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG = 803.77

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
805.29	805.40	.05	2939.	4878.	9.594	720.0	802.10	1884.

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY
UPSTREAM FACE OF THE OLD U.S. HIGHWAY 80 BOX CULVERTS.

1.819	7.14	803.04	802.79	.00	804.00	.96	.52	-.46	802.70
7814.0	3272.4	4530.4	11.1	742.0	472.2	15.3	249.9	90.7	802.80
.26	4.41	9.59	.73	.100	.065	.070	.000	795.90	8858.71
.016423	34.	34.	34.	20	15	0	.00	814.28	10168.04

FLOW DISTRIBUTION FOR SECNO= 1.82 CWSEL= 803.04

STA=	8859.	8892.	8925.	9365.	9451.	9718.	9950.	9967.	10033.	10079.	10168.
PER Q=	18.7	18.7	.1	.2	1.0	3.1	.1	58.0	.1	.0	
AREA=	236.1	235.7	15.5	19.0	67.8	161.1	6.7	472.2	8.9	6.4	
VEL=	6.2	6.2	.7	.7	1.2	1.5	1.0	9.6	.9	.5	
DEPTH=	7.1	7.1	.0	.2	.3	.7	.4	7.1	.2	.1	

CCHV= .100 CEHV= .300
*SECNO 1.839

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.05

3470 ENCROACHMENT STATIONS= 8700.0 10270.0 TYPE= 1 TARGET= 1570.000
SECTIONS 1.839 ENCROACHED AT 1:1 UPSTREAM OF OLD U.S. HIGHWAY 80.
100-YEAR FLOW = 7948 CFS FROM CONCENTRATION POINT C486.

1.839	8.22	804.32	800.83	.00	804.35	.03	.26	.09	799.40
7948.0	5917.9	1144.3	885.8	4778.8	460.0	744.8	258.2	93.5	799.80
.28	1.24	2.49	1.19	.100	.065	.100	.000	796.10	8700.00
.001038	100.	100.	100.	2	19	0	.00	1570.00	10270.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1.84 CWSEL= 804.32

STA=	8700.	8757.	8788.	8855.	8888.	8918.	8969.	9051.	9152.	9267.	9361.	9506.	9722.
PER Q=	5.1	3.2	9.0	5.0	3.7	4.3	5.8	5.0	4.5	3.2	3.3	6.7	
AREA=	296.7	168.9	430.6	228.9	183.2	246.7	361.3	358.2	353.8	265.5	319.2	568.5	
VEL=	1.4	1.5	1.7	1.7	1.6	1.4	1.3	1.1	1.0	1.0	.8	.9	
DEPTH=	5.2	5.5	6.4	7.0	6.1	4.8	4.4	3.6	3.1	2.8	2.2	2.6	

STA=	9722.	9803.	9883.	9945.	9963.	10036.	10104.	10170.	10270.
PER Q=	3.8	5.3	5.2	1.5	14.4	5.1	5.0	1.1	
AREA=	276.6	335.1	299.1	86.5	460.0	307.5	299.1	138.2	
VEL=	1.1	1.2	1.4	1.4	2.5	1.3	1.3	.6	
DEPTH=	3.4	4.2	4.8	4.9	6.2	4.5	4.6	1.4	

*SECNO 1.940

3470 ENCROACHMENT STATIONS= 8600.0 10220.0 TYPE= 1 TARGET= 1620.000
SECTION 1.940 RIGHT OVERBANK ENCROACHED AT A 4:1 DOWNSTREAM FROM
FLOODPLAIN EXPANSION.

1.940	6.70	805.00	802.24	.00	805.04	.04	.69	.00	802.10
7948.0	6757.3	678.7	512.0	4352.1	244.7	419.1	321.7	111.4	801.90
.37	1.55	2.77	1.22	.100	.065	.100	.000	798.30	8660.87
.001862	510.	533.	430.	3	14	0	.00	1559.13	10220.00

FLOW DISTRIBUTION FOR SECNO= 1.94 CWSEL= 805.00

STA=	8661.	8757.	8846.	8895.	8925.	8945.	8970.	8996.	9027.	9053.	9085.	9116.	9148.
PER Q=	6.2	9.5	3.8	3.6	3.5	3.9	3.6	4.3	3.8	4.4	3.7	3.3	
AREA=	328.2	418.3	190.1	152.3	126.9	147.7	141.9	170.4	148.7	174.7	156.3	147.5	
VEL=	1.5	1.8	1.6	1.9	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.8	
DEPTH=	3.4	4.7	3.9	5.0	6.4	5.9	5.6	5.5	5.6	5.5	5.0	4.6	

STA=	9148.	9220.	9347.	9578.	9692.	9748.	9809.	9872.	9952.	9986.	10037.	10104.	10193.
PER Q=	4.2	3.2	4.3	3.9	3.2	3.6	3.5	4.1	1.6	8.5	3.3	3.0	
AREA=	234.7	248.1	381.3	265.6	182.3	199.7	199.0	242.3	96.1	244.7	198.3	203.8	
VEL=	1.4	1.0	.9	1.2	1.4	1.4	1.4	1.3	1.3	2.8	1.3	1.2	
DEPTH=	3.3	2.0	1.7	2.3	3.3	3.3	3.2	3.0	2.9	4.8	3.0	2.3	

STA=	10193.	10220.
PER Q=	.1	
AREA=	16.9	
VEL=	.5	
DEPTH=	.6	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2.020

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

3470 ENCROACHMENT STATIONS= 8400.0 10100.0 TYPE= 1 TARGET= 1700.000
SECTION 2.020 RIGHT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.

2.020	6.46	806.36	804.44	.00	806.43	.07	1.38	.01	805.80
7948.0	7064.8	698.2	184.9	3475.0	207.2	117.2	373.3	129.4	805.00
.43	2.03	3.37	1.58	.100	.065	.100	.000	799.90	8505.54
.004276	530.	422.	290.	2	18	0	.00	1531.20	10086.64

FLOW DISTRIBUTION FOR SECNO= 2.02 CWSEL= 806.36

STA=	8506.	8700.	8733.	8772.	8805.	8832.	8858.	8893.	8980.	9006.	9035.	9081.	9171.
PER Q=	9.1	3.2	4.1	3.8	3.5	3.5	4.6	10.0	3.5	4.5	6.1	11.2	
AREA=	410.3	114.2	142.1	126.7	111.9	110.1	145.4	333.2	110.4	130.7	194.3	360.8	
VEL=	1.8	2.2	2.3	2.4	2.5	2.6	2.5	2.4	2.5	2.7	2.5	2.5	
DEPTH=	2.1	3.5	3.7	3.9	4.1	4.3	4.2	3.8	4.1	4.7	4.2	4.0	

STA=	9171.	9239.	9355.	9614.	9786.	9892.	9966.	10026.	10087.
PER Q=	4.4	4.2	3.0	3.1	4.5	2.5	8.8	2.3	
AREA=	183.9	223.8	209.0	217.2	217.3	133.6	207.2	117.2	
VEL=	1.9	1.5	1.2	1.1	1.6	1.5	3.4	1.6	
DEPTH=	2.7	1.9	.8	1.3	2.0	1.8	3.5	1.9	

*SECNO 2.104

3265 DIVIDED FLOW

2.104	6.14	808.74	807.21	.00	808.85	.11	2.40	.01	806.30
7948.0	6631.9	1139.8	176.3	2913.6	272.3	97.3	412.6	145.5	806.50
.49	2.28	4.19	1.81	.100	.065	.100	.000	802.60	8657.01
.005888	490.	444.	380.	3	14	0	.00	1368.86	10070.53

FLOW DISTRIBUTION FOR SECNO= 2.10 CWSEL= 808.74

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	8657.	8725.	8757.	8791.	8820.	8883.	8915.	8960.	9013.	9039.	9137.	9280.	9387.
PER Q=	3.8	3.2	3.9	3.3	6.0	3.7	7.6	10.1	5.5	5.5	5.9	4.2	
AREA=	145.1	101.6	118.2	100.6	195.3	111.9	196.8	249.0	131.7	221.0	270.4	195.2	
VEL=	2.1	2.5	2.6	2.6	2.4	2.6	3.1	3.2	3.3	2.0	1.7	1.7	
DEPTH=	2.1	3.2	3.5	3.4	3.1	3.4	4.4	4.7	5.0	2.3	1.9	1.8	

STA=	9387.	9671.	9741.	9814.	9869.	9905.	9947.	10020.	10071.
PER Q=	3.6	3.7	3.7	3.5	3.3	3.1	14.3	2.2	
AREA=	213.5	153.0	153.8	134.1	109.8	112.5	272.3	97.3	
VEL=	1.3	1.9	1.9	2.1	2.4	2.2	4.2	1.8	
DEPTH=	.7	2.2	2.1	2.5	3.0	2.7	3.7	1.9	

CCHV= .100 CEHV= .300
*SECNO 2.197

3265 DIVIDED FLOW

CONFLUENCE WITH EAST MAIN TRIBUTARY.

2.197	6.04	810.94	809.63	.00	811.08	.14	2.22	.01	808.90
7948.0	6704.3	1243.7	.0	2542.1	286.0	.0	448.8	162.1	812.90
.53	2.64	4.35	.00	.060	.045	.000	.000	804.90	8562.56
.003293	520.	491.	435.	2	16	0	.00	1427.89	10034.85

FLOW DISTRIBUTION FOR SECNO= 2.20 CWSEL= 810.94

STA=	8563.	8611.	8635.	8663.	8732.	8774.	8841.	8886.	8920.	8993.	9058.	9513.	9658.
PER Q=	4.6	4.5	4.6	8.7	5.5	10.6	3.8	3.0	5.8	3.2	3.2	3.9	
AREA=	123.6	100.5	105.6	222.6	139.6	245.7	114.8	88.3	179.9	115.5	221.1	184.0	
VEL=	2.9	3.6	3.5	3.1	3.1	3.4	2.7	2.7	2.6	2.2	1.1	1.7	
DEPTH=	2.6	4.1	3.8	3.2	3.3	3.7	2.5	2.6	2.4	1.8	.5	1.3	

STA=	9658.	9764.	9797.	9856.	9899.	9953.	10045.
PER Q=	6.0	3.2	5.7	4.0	3.9	15.6	
AREA=	207.9	90.5	161.9	116.2	124.4	286.0	
VEL=	2.3	2.8	2.8	2.8	2.5	4.3	
DEPTH=	1.9	2.7	2.7	2.7	2.3	3.5	

*SECNO 2.294

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .55

3470 ENCROACHMENT STATIONS= 8800.0 10755.0 TYPE= 1 TARGET= 1955.000
SECTIONS 2.294 TO 2.769 LEFT OVERBANK ENCROACHED AT A 4:1 DOWNSTREAM
FROM FLOODPLAIN EXPANSION.
100-YEAR FLOW = 6551 CFS FROM CONCENTRATION POINT C375.

2.294	6.85	813.15	812.75	.00	813.41	.27	2.30	.04	813.00
6551.0	4360.0	1271.3	919.7	1491.0	187.0	213.1	475.9	177.7	811.40
.57	2.92	6.80	4.32	.060	.045	.060	.000	806.30	8800.00
.007483	500.	512.	500.	2	9	0	.00	1283.12	10101.04

FLOW DISTRIBUTION FOR SECNO= 2.29 CWSEL= 813.15

STA=	8800.	8862.	8933.	9025.	9098.	9163.	9401.	9615.	9770.	9812.	9844.	9893.	9939.
PER Q=	8.7	8.6	9.1	5.8	3.3	4.3	3.2	5.5	3.5	3.5	5.3	5.0	
AREA=	150.7	156.3	178.4	124.1	85.1	162.1	132.6	145.5	72.8	67.3	100.2	94.9	
VEL=	3.8	3.6	3.3	3.0	2.5	1.7	1.6	2.5	3.1	3.5	3.5	3.5	
DEPTH=	2.4	2.2	1.9	1.7	1.3	.7	.6	.9	1.7	2.0	2.0	2.1	

STA=	9939.	9968.	10017.	10041.	10058.	10079.	10101.
PER Q=	.7	19.4	3.3	5.4	4.3	1.1	
AREA=	20.8	187.0	56.5	66.5	62.4	27.7	
VEL=	2.1	6.8	3.8	5.3	4.5	2.6	
DEPTH=	.7	3.8	2.3	3.9	3.0	1.2	

CCHV= .100 CEHV= .300
*SECNO 2.388

3470 ENCROACHMENT STATIONS= 8850.0 11011.0 TYPE= 1 TARGET= 2161.000

2.388	7.79	816.39	816.10	.00	816.91	.52	3.42	.08	815.00
6551.0	2786.0	2460.8	1304.3	1815.8	288.9	256.1	497.3	190.2	812.40
.60	1.53	8.52	5.09	.120	.045	.055	.000	808.60	8850.00
.007530	420.	496.	500.	2	8	0	.00	1255.83	10105.83

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 2.39 CWSEL= 816.39

STA=	8850.	9120.	9259.	9334.	9513.	9770.	9943.	9967.	10023.	10037.	10062.	10088.	10106.
PER Q=	13.6	7.8	3.3	4.6	6.3	6.2	.7	37.6	5.1	6.4	6.5	1.8	
AREA=	530.0	291.0	132.8	225.7	325.7	276.0	34.6	288.9	57.1	81.0	84.0	34.0	
VEL=	1.7	1.8	1.6	1.3	1.3	1.5	1.4	8.5	5.9	5.2	5.1	3.5	
DEPTH=	2.0	2.1	1.8	1.3	1.3	1.6	1.4	5.2	4.0	3.3	3.2	1.9	

*SECNO 2.500

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.83

3470 ENCROACHMENT STATIONS= 9000.0 11653.0 TYPE= 1 TARGET= 2653.000

2.500	6.66	818.76	817.39	.00	818.86	.10	1.91	.04	816.70
6551.0	2422.9	1011.1	3117.0	2218.5	223.8	1260.1	529.3	204.6	816.10
.66	1.09	4.52	2.47	.120	.045	.055	.000	812.10	9000.00
.002237	400.	591.	575.	3	18	0	.00	1565.91	10565.91

FLOW DISTRIBUTION FOR SECNO= 2.50 CWSEL= 818.76

STA=	9000.	9384.	9527.	9634.	9768.	9903.	9940.	9975.	10019.	10053.	10075.	10099.	10128.
PER Q=	7.4	3.3	3.3	8.2	9.8	3.3	1.6	15.4	4.0	4.0	3.1	3.8	
AREA=	609.7	252.3	218.1	424.5	474.6	146.2	93.0	223.8	100.2	84.3	74.1	90.8	
VEL=	.8	.9	1.0	1.3	1.4	1.5	1.2	4.5	2.6	3.1	2.7	2.8	
DEPTH=	1.6	1.8	2.0	3.2	3.5	4.0	2.7	5.1	3.0	3.8	3.1	3.2	

STA=	10128.	10224.	10245.	10378.	10524.	10566.
PER Q=	13.5	3.0	12.0	3.9	.2	
AREA=	313.9	70.2	331.0	175.4	20.1	
VEL=	2.8	2.8	2.4	1.5	.8	
DEPTH=	3.3	3.3	2.5	1.2	.5	

*SECNO 2.597

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


3470 ENCROACHMENT STATIONS=     9250.0   11344.0  TYPE=      1  TARGET=     2094.000
     2.597      4.94    820.24    819.69       .00    820.50       .26      1.60       .05    820.60
    6551.0     222.5    1320.6    5007.9     274.5     208.5    1468.6     557.6     220.1    818.40
       .69       .81      6.33      3.41      .120      .045      .055      .000    815.30   9250.00
   .006687      430.      512.      430.         2        21         0       .00   1557.87  10852.64


FLOW DISTRIBUTION FOR SECNO=      2.60          CWSEL=    820.24

STA=    9250.    9936.    9953.   10027.   10067.   10091.   10111.   10167.   10199.   10278.   10353.   10494.   10551.
  PER Q=      3.3       .1     20.2      5.0      3.8      3.1      8.1      4.3      3.2      4.2     11.1      7.4
   AREA=    264.6      9.8    208.5     87.6     60.2     49.9    133.7     73.7     86.3    100.8    231.8    128.2
    VEL=       .8       .8      6.3      3.7      4.2      4.0      4.0      3.8      2.4      2.7      3.1      3.8
  DEPTH=       .4       .6      3.7      2.2      2.6      2.4      2.4      2.2      1.1      1.3      1.6      2.2

STA=   10551.   10580.   10635.   10662.   10708.   10757.   10842.   10853.
  PER Q=      3.9      4.4      3.6      6.2      4.1      3.9       .1
   AREA=     67.0     92.6     61.1    105.6     85.3    101.2      3.6
    VEL=      3.8      3.1      3.8      3.8      3.2      2.5      1.0
  DEPTH=      2.3      1.7      2.3      2.3      1.7      1.2       .3

*SECNO 2.682

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.41


3470 ENCROACHMENT STATIONS=     9400.0   11485.0  TYPE=      1  TARGET=     2085.000
     2.682      5.81    822.31    821.53       .00    822.43       .13      1.92       .01    822.00
    6551.0     999.3    1091.5    4460.2     936.0     228.7    1821.3     581.0     235.3    820.30
       .73      1.07      4.77      2.45      .120      .045      .055      .000    816.50   9400.00
   .003376      425.      449.      405.         2         5         0       .00   1635.63  11043.73


FLOW DISTRIBUTION FOR SECNO=      2.68          CWSEL=    822.31
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

STA=    9400.    9679.    9900.    9970.   10028.   10098.   10212.   10257.   10387.   10440.   10481.   10515.   10564.
  PER Q=     4.1      8.5      2.7     16.7      5.5      9.9      3.7      5.7      4.1      4.1      4.9      4.4
   AREA=   329.6    467.5    138.9    228.7    143.3    246.0     93.6    185.3    107.2     96.6    100.3    107.5
    VEL=      .8      1.2      1.3      4.8      2.5      2.6      2.6      2.0      2.5      2.8      3.2      2.7
  DEPTH=     1.2      2.1      2.0      4.0      2.0      2.2      2.1      1.4      2.0      2.4      2.9      2.2

STA=   10564.   10617.   10702.   10772.   10846.   10929.   11044.
  PER Q=     3.1      7.1      5.6      4.7      3.3      2.0
   AREA=    90.0    180.4    143.9    133.0    111.0     82.9
    VEL=     2.2      2.6      2.5      2.3      1.9      1.6
  DEPTH=     1.7      2.1      2.1      1.8      1.3       .7

*SECNO 2.764

3470 ENCROACHMENT STATIONS=     9580.0   11808.0  TYPE=      1  TARGET=     2228.000
         100-YEAR FLOW = 6674 CFS FROM CONCENTRATION POINT C360.
     2.764      6.99    823.79    823.03       .00    823.93       .13      1.49       .00    822.00
    6674.0    1516.8    1055.4    4101.8    1055.0     190.2    1775.7     609.8     250.8    821.80
       .78      1.44      5.55      2.31      .120      .045      .055      .000    816.80   9580.00
   .003614      375.      433.      440.         3         9         0       .00   1580.72  11160.72


FLOW DISTRIBUTION FOR SECNO=      2.76          CWSEL=    823.79

STA=    9580.    9806.    9875.    9937.    9984.   10023.   10097.   10137.   10198.   10309.   10354.   10472.   10531.
  PER Q=    14.4      3.2      3.4      1.7     15.8      6.6      4.6      3.3      3.5      3.1      4.1      3.7
   AREA=   646.0    154.1    160.2     94.6    190.2    162.1    100.9     98.3    122.2     83.9    145.2    102.5
    VEL=     1.5      1.4      1.4      1.2      5.5      2.7      3.0      2.2      1.9      2.5      1.9      2.4
  DEPTH=     2.9      2.2      2.6      2.0      4.9      2.2      2.5      1.6      1.1      1.9      1.2      1.7

STA=   10531.   10580.   10603.   10682.   10795.   10969.   11046.   11161.
  PER Q=     4.2      3.1      4.6      4.0      8.7      4.9      2.9
   AREA=   103.9     65.7    133.0    140.7    268.7    135.7    112.6
    VEL=     2.7      3.2      2.3      1.9      2.2      2.4      1.7
  DEPTH=     2.1      2.8      1.7      1.2      1.5      1.8      1.0

CCHV=     .100 CEHV=     .300
*SECNO 2.850
     2.850      6.68    825.88    825.63       .00    826.19       .31      2.21       .05    823.90
    6674.0    1850.8    1651.8    3171.4     630.6     220.3    1114.3     636.4     266.4    824.00
       .81      2.93      7.50      2.85      .055      .045      .055      .000    819.20   9532.23
   .006701      500.      454.      445.         2        13         0       .00   1367.16  10899.38
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 2.85 CWSEL= 825.88

STA=	9532.	9651.	9711.	9791.	9823.	9886.	9980.	10026.	10052.	10122.	10169.	10300.	10368.
PER Q=	3.4	3.1	4.0	3.9	5.5	7.7	24.7	3.2	7.8	5.1	8.6	3.1	
AREA=	105.4	78.9	101.5	70.1	113.3	161.5	220.3	56.7	144.2	95.7	190.4	81.2	
VEL=	2.2	2.7	2.6	3.7	3.3	3.2	7.5	3.7	3.6	3.5	3.0	2.6	
DEPTH=	.9	1.3	1.3	2.2	1.8	1.7	4.7	2.2	2.1	2.0	1.4	1.2	

STA=	10368.	10441.	10531.	10637.	10846.	10899.
PER Q=	4.8	4.0	3.3	7.0	.7	
AREA=	105.0	106.3	101.6	203.6	29.7	
VEL=	3.1	2.5	2.2	2.3	1.5	
DEPTH=	1.4	1.2	1.0	1.0	.6	

*SECNO 2.963

2.963	5.62	828.52	827.85	.00	828.66	.14	2.45	.02	826.70
6674.0	4822.3	617.8	1234.0	1718.2	118.0	590.2	659.5	281.1	827.30
.86	2.81	5.23	2.09	.055	.045	.055	.000	822.90	9005.92
.004139	450.	597.	440.	2	13	0	.00	1468.22	10474.14

FLOW DISTRIBUTION FOR SECNO= 2.96 CWSEL= 828.52

STA=	9006.	9221.	9428.	9497.	9513.	9536.	9601.	9645.	9677.	9752.	9771.	9785.	9807.
PER Q=	5.5	9.6	3.6	3.4	3.0	4.3	4.6	3.4	9.0	4.0	4.7	3.8	
AREA=	204.7	289.0	103.1	56.7	60.9	110.3	97.7	74.8	187.7	67.5	63.5	68.8	
VEL=	1.8	2.2	2.3	4.0	3.3	2.6	3.1	3.1	3.2	3.9	4.9	3.7	
DEPTH=	1.0	1.4	1.5	3.5	2.6	1.7	2.2	2.3	2.5	3.4	4.8	3.0	

STA=	9807.	9879.	9985.	10014.	10121.	10188.	10335.	10458.	10474.
PER Q=	5.6	7.6	9.3	5.6	3.3	5.5	4.0	.1	
AREA=	138.8	194.8	118.0	162.5	98.8	181.5	140.0	7.5	
VEL=	2.7	2.6	5.2	2.3	2.3	2.0	1.9	1.0	
DEPTH=	1.9	1.8	4.1	1.5	1.5	1.2	1.1	.5	

*SECNO 3.091

3.091	4.85	831.05	830.20	.00	831.20	.15	2.54	.00	829.80
6674.0	5677.8	681.6	314.7	1940.2	139.7	190.9	690.7	301.4	830.30
.91	2.93	4.88	1.65	.055	.045	.055	.000	826.20	8893.11
.004684	545.	676.	705.	3	13	0	.00	1521.63	10414.74

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 3.09 CWSEL= 831.05

STA=	8893.	9097.	9175.	9405.	9438.	9481.	9502.	9552.	9570.	9606.	9686.	9713.	9745.
PER Q=	3.4	4.5	22.7	3.8	4.0	3.3	3.1	3.3	4.3	8.1	3.0	3.0	
AREA=	142.5	121.9	492.8	78.5	88.6	58.8	81.0	57.1	86.2	173.2	62.4	66.6	
VEL=	1.6	2.5	3.1	3.3	3.0	3.7	2.5	3.9	3.4	3.1	3.2	3.0	
DEPTH=	.7	1.6	2.2	2.4	2.1	2.9	1.6	3.2	2.4	2.1	2.3	2.1	

STA=	9745.	9774.	9815.	9853.	9920.	9981.	10022.	10132.	10415.
PER Q=	3.2	4.4	3.5	3.4	3.8	10.2	3.9	.9	
AREA=	66.6	92.7	77.0	95.1	99.2	139.7	123.2	67.7	
VEL=	3.2	3.2	3.1	2.4	2.6	4.9	2.1	.8	
DEPTH=	2.3	2.3	2.0	1.4	1.6	3.3	1.1	.2	

*SECNO 3.182

3265 DIVIDED FLOW

CONFLUENCE WITH MINOR TRIBUTARY.

3.182	5.00	833.50	832.89	.00	833.70	.20	2.49	.01	832.20
6674.0	4963.6	805.8	904.5	1552.4	134.0	418.6	715.2	317.3	832.30
.95	3.20	6.02	2.16	.055	.045	.055	.000	828.50	9007.77
.005542	495.	480.	450.	3	9	0	.00	1342.33	10417.41

FLOW DISTRIBUTION FOR SECNO= 3.18 CWSEL= 833.50

STA=	9008.	9372.	9409.	9432.	9479.	9513.	9564.	9579.	9608.	9636.	9672.	9705.	9750.
PER Q=	8.3	8.1	3.4	4.5	3.4	3.8	3.0	3.9	4.9	5.0	3.3	4.2	
AREA=	267.3	121.1	59.6	94.5	70.1	87.5	47.3	70.1	80.9	90.6	68.1	87.7	
VEL=	2.1	4.5	3.9	3.2	3.3	2.9	4.3	3.7	4.1	3.7	3.2	3.2	
DEPTH=	.7	3.2	2.6	2.0	2.1	1.7	3.1	2.5	2.8	2.5	2.1	2.0	

STA=	9750.	9808.	9855.	9877.	9916.	9965.	9981.	10015.	10107.	10212.	10374.	10417.
PER Q=	4.1	3.1	3.1	3.4	3.7	1.1	12.1	4.4	4.6	4.3	.3	
AREA=	96.8	73.8	55.7	70.9	83.3	27.1	134.0	121.9	131.5	149.0	16.2	
VEL=	2.8	2.8	3.7	3.2	2.9	2.8	6.0	2.4	2.3	1.9	1.1	
DEPTH=	1.7	1.6	2.4	1.9	1.7	1.6	4.0	1.3	1.3	.9	.4	

*SECNO 3.248

3.248	4.94	835.64	834.98	.00	835.96	.32	2.22	.04	833.60
6674.0	4357.3	1675.5	641.2	1115.9	269.2	201.3	730.1	325.8	834.50
.97	3.90	6.23	3.18	.055	.045	.055	.000	830.70	9395.34
.007285	355.	348.	335.	2	9	0	.00	780.99	10176.33

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	H	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 3.25 CWSEL= 835.64

STA=	9395.	9515.	9539.	9578.	9617.	9677.	9717.	9759.	9782.	9806.	9825.	9839.	9867.
PER Q=	4.3	3.3	10.9	5.3	6.0	5.0	3.8	3.2	4.4	3.2	3.3	3.1	
AREA=	111.2	53.5	137.0	88.4	112.8	86.8	74.2	52.5	64.6	48.7	44.9	56.5	
VEL=	2.6	4.1	5.3	4.0	3.5	3.8	3.4	4.0	4.5	4.4	4.9	3.7	
DEPTH=	.9	2.2	3.5	2.3	1.9	2.1	1.8	2.3	2.7	2.6	3.1	2.0	

STA=	9867.	9900.	9954.	9967.	10048.	10099.	10139.	10176.
PER Q=	3.7	4.8	1.2	25.1	3.8	3.1	2.8	
AREA=	66.1	96.1	22.7	269.2	80.2	63.1	58.1	
VEL=	3.7	3.4	3.5	6.2	3.2	3.2	3.2	
DEPTH=	2.0	1.8	1.8	3.3	1.6	1.6	1.6	

*SECNO 3.344

3265 DIVIDED FLOW

3.344	5.74	838.34	837.45	.00	838.63	.29	2.66	.00	834.70
6674.0	4922.5	1730.5	20.9	1460.5	278.7	10.3	748.3	333.6	835.80
1.00	3.37	6.21	2.03	.055	.045	.055	.000	832.60	9375.65
.004366	470.	507.	485.	3	6	0	.00	649.51	10037.71

FLOW DISTRIBUTION FOR SECNO= 3.34 CWSEL= 838.34

STA=	9376.	9438.	9492.	9549.	9696.	9746.	9789.	9887.	9927.	9972.	10030.	10038.
PER Q=	6.3	6.6	6.1	13.9	7.0	6.6	10.0	6.4	10.8	25.9	.3	
AREA=	136.7	135.1	130.6	298.4	135.1	123.0	216.9	116.3	168.4	278.7	10.3	
VEL=	3.1	3.3	3.1	3.1	3.5	3.6	3.1	3.7	4.3	6.2	2.0	
DEPTH=	2.2	2.5	2.3	2.0	2.7	2.8	2.2	2.9	3.7	4.8	1.3	

*SECNO 3.440

100-YEAR FLOW = 6757 FROM CONCENTRATION POINT C320.

3.440	6.67	840.67	839.76	.00	841.01	.34	2.37	.02	837.80
6757.0	4553.3	1762.1	441.6	1213.2	260.5	143.2	767.2	341.6	839.00
1.03	3.75	6.76	3.08	.055	.045	.055	.000	834.00	9339.32
.005344	485.	507.	500.	2	5	0	.00	773.12	10112.43

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 3.44 CWSEL= 840.67

STA=	9339.	9485.	9573.	9672.	9696.	9723.	9765.	9801.	9822.	9856.	9894.	9912.	9927.
PER Q=	3.4	3.0	4.7	4.3	4.7	7.9	6.3	4.3	8.0	7.1	4.0	3.0	
AREA=	101.3	91.5	111.0	71.8	78.2	128.2	105.3	67.3	119.6	115.9	60.1	47.6	
VEL=	2.3	2.2	2.9	4.1	4.0	4.2	4.0	4.3	4.5	4.2	4.5	4.3	
DEPTH=	.7	1.0	1.1	3.0	2.9	3.1	2.9	3.2	3.5	3.1	3.4	3.2	

STA=	9927.	9956.	9969.	10024.	10069.	10112.
PER Q=	4.5	2.1	26.1	5.2	1.3	
AREA=	79.5	36.0	260.5	102.9	40.3	
VEL=	3.8	3.9	6.8	3.4	2.2	
DEPTH=	2.7	2.8	4.8	2.3	.9	

*SECNO 3.535

3.535	6.69	843.09	841.84	.00	843.30	.21	2.28	.01	841.40
6757.0	5150.9	949.9	656.1	1473.7	183.6	240.6	787.4	350.1	840.40
1.07	3.50	5.17	2.73	.055	.045	.055	.000	836.40	9430.19
.003941	500.	502.	490.	1	14	0	.00	722.54	10152.73

FLOW DISTRIBUTION FOR SECNO= 3.54 CWSEL= 843.09

STA=	9430.	9525.	9570.	9604.	9633.	9658.	9688.	9722.	9731.	9750.	9780.	9817.	9839.
PER Q=	3.4	5.0	4.7	4.8	4.7	3.9	3.6	3.2	3.7	5.1	5.2	4.5	
AREA=	106.5	109.4	94.7	89.4	84.3	79.7	80.4	44.0	63.5	94.9	102.9	77.9	
VEL=	2.1	3.1	3.4	3.6	3.8	3.3	3.0	4.9	3.9	3.6	3.4	3.9	
DEPTH=	1.1	2.4	2.8	3.1	3.3	2.7	2.4	4.9	3.4	3.1	2.8	3.5	

STA=	9839.	9861.	9881.	9902.	9931.	9961.	9976.	10021.	10058.	10114.	10153.
PER Q=	4.2	4.0	3.7	4.9	5.6	2.2	14.1	5.0	3.4	1.4	
AREA=	75.5	69.5	66.5	90.5	101.1	43.1	183.6	101.8	94.0	44.7	
VEL=	3.8	3.9	3.7	3.6	3.8	3.5	5.2	3.3	2.4	2.0	
DEPTH=	3.3	3.5	3.2	3.1	3.3	3.0	4.1	2.7	1.7	1.2	

CCHV= .100 CEHV= .300
*SECNO 3.630

3265 DIVIDED FLOW

LEVEE IN RIGHT OVERBANK IS NOT ENGINEERED, AND THEREFORE IS ASSUMED TO

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        NOT BE STABLE.  FLOODPLAIN HAS BEEN DELINEATED OVER LEVEE.
    3.630      5.65    845.05    843.94       .00    845.35       .29      2.02       .02    843.00
   6757.0    4571.9    2185.1        .0    1296.8     385.8        .0     807.3     357.8    845.90
     1.10      3.53      5.66       .00      .055      .045      .000      .000    839.40   9352.07
  .004369      485.      502.      435.         2        18         0       .00    669.26  10049.68


FLOW DISTRIBUTION FOR SECNO=      3.63          CWSEL=    845.05

STA=    9352.    9498.    9610.    9642.    9674.    9697.    9734.    9770.    9809.    9829.    9873.    9908.    9958.
  PER Q=      4.9      4.9      4.0      5.0      4.6      7.7      3.6      6.6      3.9      7.7      9.1      5.5
   AREA=    128.6    133.4     81.1     93.2     77.0    127.4     79.3    116.3     66.4    137.4    139.3    117.4
    VEL=      2.6      2.5      3.3      3.6      4.1      4.1      3.1      3.8      4.0      3.8      4.4      3.2
  DEPTH=       .9      1.2      2.5      2.9      3.5      3.5      2.2      3.0      3.4      3.1      3.9      2.4

STA=    9958.   10053.
  PER Q=     32.3
   AREA=    385.8
    VEL=      5.7
  DEPTH=      4.2

*SECNO 3.742

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.57

    3.742      5.12    846.82    845.13       .00    846.90       .07      1.53       .02    844.40
   6757.0    2807.2     524.0    3425.8    1300.1     151.4    1748.0     840.2     370.3    844.70
     1.18      2.16      3.46      1.96      .055      .045      .065      .000    841.70   9446.31
  .001767      535.      591.      665.         3        14         0       .00   1203.28  10649.58


FLOW DISTRIBUTION FOR SECNO=      3.74          CWSEL=    846.82

STA=    9446.    9675.    9713.    9752.    9771.    9846.    9891.    9931.    9988.   10026.   10128.   10186.   10246.
  PER Q=     11.3      4.0      3.6      3.6      7.6      4.0      3.4      4.1      7.8      5.5      3.5      4.1
   AREA=    412.5    113.3    108.7     80.7    220.7    121.4    105.4    137.3    151.4    226.8    137.6    153.7
    VEL=      1.9      2.4      2.2      3.0      2.3      2.2      2.2      2.0      3.5      1.6      1.7      1.8
  DEPTH=      1.8      3.0      2.8      4.3      2.9      2.7      2.6      2.4      4.0      2.2      2.4      2.5

STA=   10246.   10340.   10404.   10505.   10534.   10586.   10615.   10650.
  PER Q=      6.4      4.7     10.1      4.9      6.6      3.0      1.8
   AREA=    240.8    172.3    327.1    127.5    193.6     95.7     73.1
    VEL=      1.8      1.9      2.1      2.6      2.3      2.1      1.6
  DEPTH=      2.6      2.7      3.2      4.5      3.7      3.3      2.1

*SECNO 3.863
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

3.863	4.94	848.54	847.88	.00	848.72	.18	1.79	.03	847.00
6757.0	1681.8	858.4	4216.8	577.7	141.4	1533.1	878.8	388.1	847.10
1.23	2.91	6.07	2.75	.055	.045	.065	.000	843.60	9601.32
.005592	610.	639.	620.	2	10	0	.00	1297.80	10984.99

FLOW DISTRIBUTION FOR SECNO= 3.86 CWSEL= 848.54

STA=	9601.	9767.	9824.	9855.	9880.	9935.	9975.	9984.	10019.	10071.	10170.	10252.	10527.
PER Q=	5.9	3.9	3.1	4.6	3.6	3.3	.6	12.7	3.4	4.0	3.2	3.8	
AREA=	172.3	93.4	64.1	74.2	86.7	73.1	14.0	141.4	91.2	129.9	105.6	157.5	
VEL=	2.3	2.8	3.2	4.2	2.8	3.0	2.8	6.1	2.5	2.1	2.0	1.6	
DEPTH=	1.0	1.6	2.0	3.0	1.6	1.8	1.6	4.0	1.8	1.3	1.3	.6	

STA=	10527.	10602.	10665.	10734.	10769.	10805.	10837.	10873.	10907.	10922.	10947.	10981.	10985.
PER Q=	3.9	4.4	5.5	3.2	4.7	4.5	5.0	4.9	3.6	4.5	3.7	.0	
AREA=	115.4	116.4	137.5	75.1	96.4	90.1	99.1	97.4	57.9	81.3	80.2	2.0	
VEL=	2.3	2.6	2.7	2.8	3.3	3.4	3.4	3.4	4.2	3.7	3.1	1.1	
DEPTH=	1.5	1.8	2.0	2.1	2.7	2.8	2.8	2.8	3.9	3.3	2.3	.5	

*SECNO 3.966

3.966	4.15	850.95	849.96	.00	851.06	.10	2.33	.01	849.80
6757.0	1669.1	401.2	4686.6	808.3	97.2	1801.5	907.9	404.8	850.20
1.29	2.06	4.13	2.60	.055	.045	.065	.000	846.80	9359.58
.003767	480.	544.	520.	4	14	0	.00	1576.89	10936.47

FLOW DISTRIBUTION FOR SECNO= 3.97 CWSEL= 850.95

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9360.	9544.	9610.	9670.	9741.	9809.	9879.	9974.	9983.	10015.	10252.	10393.	10473.
PER Q=	3.8	3.3	3.2	3.7	3.1	3.7	3.6	.3	5.9	3.6	3.5	3.1	
AREA=	158.8	101.4	95.5	110.1	98.0	111.1	123.3	10.0	97.2	188.6	153.1	116.0	
VEL=	1.6	2.2	2.3	2.3	2.1	2.3	2.0	1.8	4.1	1.3	1.5	1.8	
DEPTH=	.9	1.5	1.6	1.6	1.4	1.6	1.3	1.1	3.0	.8	1.1	1.4	

STA=	10473.	10544.	10579.	10619.	10653.	10683.	10703.	10732.	10748.	10762.	10802.	10820.	10855.
PER Q=	5.9	3.4	4.5	4.6	4.3	3.4	4.7	3.0	3.2	7.4	3.2	5.7	
AREA=	163.6	88.0	110.0	104.3	95.0	70.0	99.0	60.0	60.0	147.6	65.9	120.6	
VEL=	2.4	2.6	2.8	3.0	3.0	3.2	3.2	3.4	3.6	3.4	3.3	3.2	
DEPTH=	2.3	2.5	2.8	3.1	3.2	3.5	3.5	3.8	4.0	3.8	3.6	3.5	

STA=	10855.	10879.	10936.
PER Q=	3.3	2.6	
AREA=	74.4	85.4	
VEL=	3.0	2.1	
DEPTH=	3.1	1.5	

*SECNO 4.088

3470 ENCROACHMENT STATIONS= 9600.0 10800.0 TYPE= 1 TARGET= 1200.000
SECTIONS 4.088 TO 4.260 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE
SOUTHERN PACIFIC RAILROAD BRIDGES.

4.088	4.13	853.33	852.08	.00	853.50	.17	2.43	.02	853.20
6757.0	401.5	503.5	5852.0	239.2	110.0	1792.3	937.8	421.4	852.10
1.33	1.68	4.58	3.27	.055	.045	.065	.000	849.20	9600.00
.005345	455.	644.	555.	2	19	0	.00	1200.00	10800.00

FLOW DISTRIBUTION FOR SECNO= 4.09 CWSEL= 853.33

STA=	9600.	9798.	9989.	10030.	10191.	10283.	10459.	10505.	10549.	10595.	10617.	10644.	10677.
PER Q=	3.3	2.6	7.5	3.2	4.4	15.3	6.5	7.7	9.5	4.3	5.1	6.4	
AREA=	135.2	104.0	110.0	131.3	137.9	373.6	130.8	141.5	165.2	75.5	92.2	113.3	
VEL=	1.7	1.7	4.6	1.7	2.2	2.8	3.3	3.7	3.9	3.8	3.8	3.8	
DEPTH=	.7	.5	2.7	.8	1.5	2.1	2.8	3.2	3.5	3.5	3.4	3.5	

STA=	10677.	10692.	10709.	10736.	10761.	10789.	10800.
PER Q=	3.1	3.5	5.2	5.0	5.4	1.9	
AREA=	53.5	60.6	92.8	88.7	95.9	39.6	
VEL=	4.0	3.9	3.8	3.8	3.8	3.3	
DEPTH=	3.6	3.6	3.4	3.4	3.4	3.7	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.158

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9750.0 10850.0 TYPE= 1 TARGET= 1100.000

4.158	4.53	854.83	853.13	.00	854.96	.14	1.46	.00	855.20
6757.0	65.8	446.1	6245.1	66.1	149.0	2083.3	954.9	430.0	855.00
1.36	.99	2.99	3.00	.055	.045	.065	.000	850.30	9750.00
.003613	385.	370.	330.	2	19	0	.00	973.24	10850.00

FLOW DISTRIBUTION FOR SECNO= 4.16 CWSEL= 854.83

STA=	9750.	9951.	10043.	10288.	10356.	10383.	10417.	10453.	10559.	10589.	10625.	10647.	10671.
PER Q=	1.0	6.6	6.4	7.1	3.5	4.0	3.9	12.6	4.5	6.0	3.8	4.5	
AREA=	66.1	149.0	205.8	181.4	82.4	96.9	98.3	306.9	98.8	128.0	79.0	90.3	
VEL=	1.0	3.0	2.1	2.6	2.8	2.8	2.7	2.8	3.1	3.2	3.2	3.3	
DEPTH=	.3	1.9	.8	2.7	3.0	2.9	2.8	2.9	3.3	3.5	3.6	3.8	

STA=	10671.	10694.	10751.	10773.	10788.	10802.	10824.	10850.
PER Q=	4.6	11.2	4.4	3.0	3.1	5.0	4.7	
AREA=	91.7	222.2	87.5	59.2	59.8	93.4	101.7	
VEL=	3.4	3.4	3.4	3.5	3.5	3.6	3.1	
DEPTH=	3.9	3.9	3.9	4.0	4.1	4.2	4.0	

*SECNO 4.223

3470 ENCROACHMENT STATIONS= 9920.0 10920.0 TYPE= 1 TARGET= 1000.000

SOUTH RIGHT-OF-WAY OF SOUTHERN PACIFIC RAILROAD.
UPSTREAM LIMIT OF STUDY.
LUKE WASH FLOWS THROUGH BOTH BRIDGES UNDER SOUTHERN PACIFIC RAILROAD.

4.223	6.43	856.43	855.11	.00	856.59	.16	1.62	.01	855.40
6757.0	50.3	406.4	6300.2	30.3	116.5	1958.7	974.4	438.5	856.40
1.40	1.66	3.49	3.22	.055	.045	.065	.000	850.00	9920.00
.004927	275.	343.	390.	2	8	0	.00	1000.00	10920.00

FLOW DISTRIBUTION FOR SECNO= 4.22 CWSEL= 856.43

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9920.	9964.	10026.	10291.	10331.	10454.	10503.	10606.	10674.	10720.	10756.	10776.	10803.
PER Q=	.7	6.0	4.1	3.4	6.9	4.2	11.1	8.8	6.8	6.5	4.2	6.4	
AREA=	30.3	116.5	182.3	86.0	204.4	106.0	254.9	188.4	137.6	121.9	74.2	107.3	
VEL=	1.7	3.5	1.5	2.7	2.3	2.7	2.9	3.2	3.3	3.6	3.9	4.0	
DEPTH=	.7	1.9	.7	2.1	1.7	2.2	2.5	2.8	3.0	3.3	3.7	3.9	

STA=	10803.	10833.	10863.	10874.	10886.	10907.	10920.
PER Q=	5.0	5.7	3.0	4.8	9.0	3.4	
AREA=	95.6	104.1	49.1	64.7	119.9	62.3	
VEL=	3.5	3.7	4.2	5.0	5.1	3.7	
DEPTH=	3.2	3.5	4.2	5.6	5.6	4.8	

THIS RUN EXECUTED 21FEB93 10:57:18

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YR EVENT EXISTING

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
	1.160	7633.00	781.22	6.32	781.35	779.90	5.38	43.96	.00	9000.00	1431.11	10476.14	.00
	1.257	7633.00	784.06	7.96	784.42	783.60	7.95	83.31	512.00	9100.00	1323.24	10465.39	16.07
	1.351	7633.00	787.39	9.99	787.83	786.94	7.87	56.20	496.00	9200.00	1258.12	10470.50	30.98
	1.404	7633.00	789.00	5.10	789.42	788.40	6.98	81.92	280.00	9241.32	1234.89	10486.21	36.97
*	1.449	7814.00	793.18	9.78	794.65	793.18	9.84	129.79	238.00	9399.87	659.39	10059.26	42.10
*	1.461	7814.00	794.73	10.13	795.05	793.00	6.00	24.02	63.00	9190.58	909.42	10100.00	43.12
	1.534	7814.00	795.72	11.12	795.79	793.09	3.65	16.44	385.00	9360.73	1131.67	10492.40	51.35
*	1.632	7814.00	796.91	9.71	797.15	795.53	5.52	46.34	517.00	9334.42	1026.68	10400.00	63.81
	1.723	7814.00	799.19	10.99	799.45	798.06	5.92	45.34	480.00	9223.90	1021.24	10250.00	75.66
	1.767	7814.00	800.41	10.61	800.59	799.05	5.39	39.74	232.00	8717.36	1343.86	10170.00	83.25
*	1.813	7814.00	802.73	9.33	803.72	802.73	9.51	140.69	243.00	8613.31	1145.00	10194.69	89.97
*	1.819	7814.00	803.04	7.14	804.00	802.79	9.59	164.23	34.00	8858.71	814.28	10168.04	90.73
*	1.839	7948.00	804.32	8.22	804.35	800.83	2.49	10.38	100.00	8700.00	1570.00	10270.00	93.47
	1.940	7948.00	805.00	6.70	805.04	802.24	2.77	18.62	533.00	8660.87	1559.13	10220.00	111.44
*	2.020	7948.00	806.36	6.46	806.43	804.44	3.37	42.76	422.00	8505.54	1531.20	10086.64	129.43
	2.104	7948.00	808.74	6.14	808.85	807.21	4.19	58.88	444.00	8657.01	1368.86	10070.53	145.53
	2.197	7948.00	810.94	6.04	811.08	809.63	4.35	32.93	491.00	8562.56	1427.89	10034.85	162.12

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
*	2.294	6551.00	813.15	6.85	813.41	812.75	6.80	74.83	512.00	8800.00	1283.12	10101.04	177.70
	2.388	6551.00	816.39	7.79	816.91	816.10	8.52	75.30	496.00	8850.00	1255.83	10105.83	190.18
*	2.500	6551.00	818.76	6.66	818.86	817.39	4.52	22.37	591.00	9000.00	1565.91	10565.91	204.62
*	2.597	6551.00	820.24	4.94	820.50	819.69	6.33	66.87	512.00	9250.00	1557.87	10852.64	220.14
*	2.682	6551.00	822.31	5.81	822.43	821.53	4.77	33.76	449.00	9400.00	1635.63	11043.73	235.32
	2.764	6674.00	823.79	6.99	823.93	823.03	5.55	36.14	433.00	9580.00	1580.72	11160.72	250.83
	2.850	6674.00	825.88	6.68	826.19	825.63	7.50	67.01	454.00	9532.23	1367.16	10899.38	266.44
	2.963	6674.00	828.52	5.62	828.66	827.85	5.23	41.39	597.00	9005.92	1468.22	10474.14	281.06
	3.091	6674.00	831.05	4.85	831.20	830.20	4.88	46.84	676.00	8893.11	1521.63	10414.74	301.43
	3.182	6674.00	833.50	5.00	833.70	832.89	6.02	55.42	480.00	9007.77	1342.33	10417.41	317.28
	3.248	6674.00	835.64	4.94	835.96	834.98	6.23	72.85	348.00	9395.34	780.99	10176.33	325.80
	3.344	6674.00	838.34	5.74	838.63	837.45	6.21	43.66	507.00	9375.65	649.51	10037.71	333.60
	3.440	6757.00	840.67	6.67	841.01	839.76	6.76	53.44	507.00	9339.32	773.12	10112.43	341.57
	3.535	6757.00	843.09	6.69	843.30	841.84	5.17	39.41	502.00	9430.19	722.54	10152.73	350.13
	3.630	6757.00	845.05	5.65	845.35	843.94	5.66	43.69	502.00	9352.07	669.26	10049.68	357.83
*	3.742	6757.00	846.82	5.12	846.90	845.13	3.46	17.67	591.00	9446.31	1203.28	10649.58	370.34
*	3.863	6757.00	848.54	4.94	848.72	847.88	6.07	55.92	639.00	9601.32	1297.80	10984.99	388.05
	3.966	6757.00	850.95	4.15	851.06	849.96	4.13	37.67	544.00	9359.58	1576.89	10936.47	404.77
	4.088	6757.00	853.33	4.13	853.50	852.08	4.58	53.45	644.00	9600.00	1200.00	10800.00	421.37
	4.158	6757.00	854.83	4.53	854.96	853.13	2.99	36.13	370.00	9750.00	973.24	10850.00	430.03
	4.223	6757.00	856.43	6.43	856.59	855.11	3.49	49.27	343.00	9920.00	1000.00	10920.00	438.47

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=      1.449  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.449  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      1.461  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      1.632  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      1.813  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.813  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      1.819  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.819  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=      1.819  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=      1.839  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      2.020  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      2.294  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      2.500  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      2.597  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      2.682  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      3.742  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      3.863  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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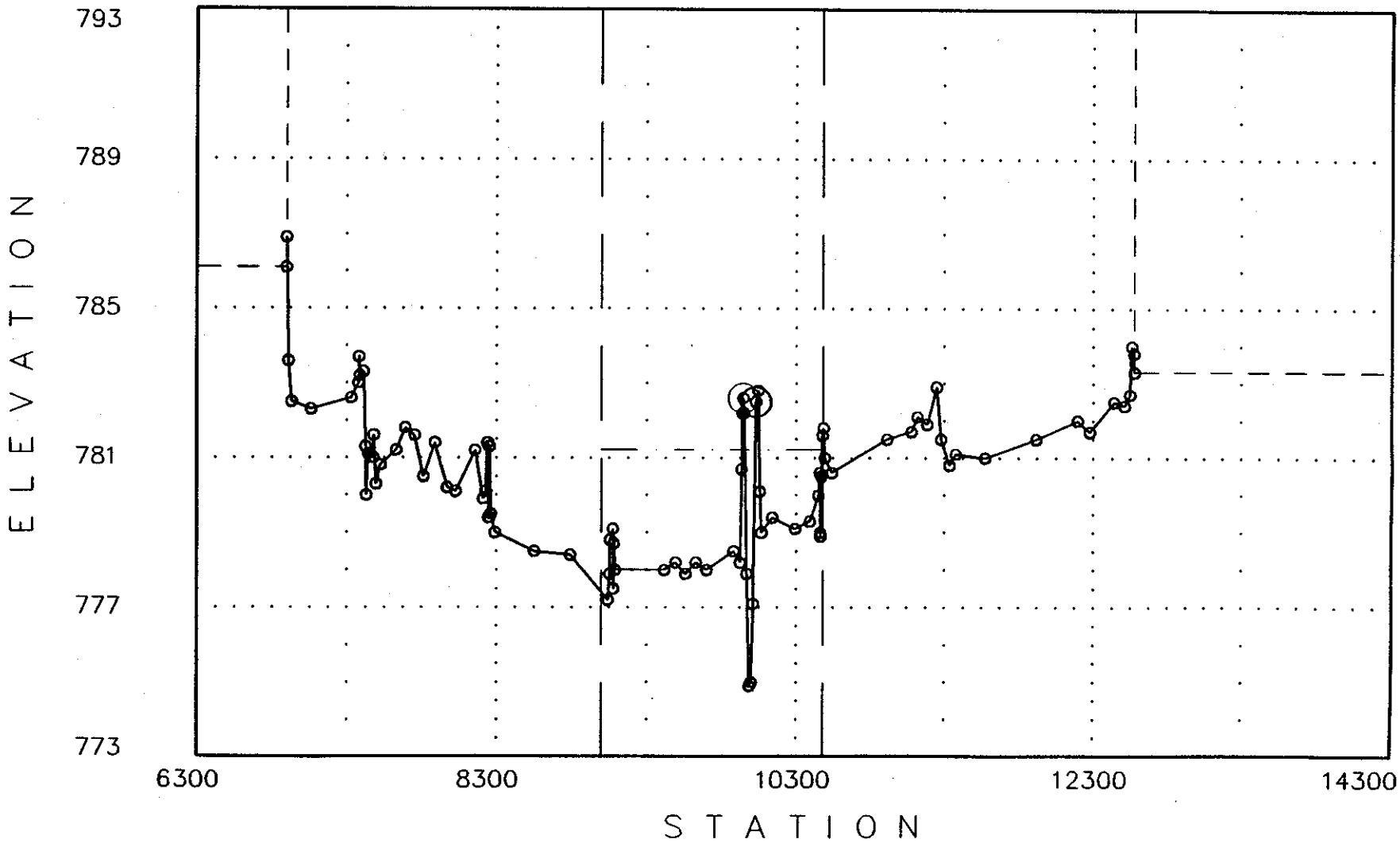
<<<<<< Cross Section: 1.16: (FN = LUKE.AHO) >>>>>>

Q1= 7633 WS1= 781.22

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

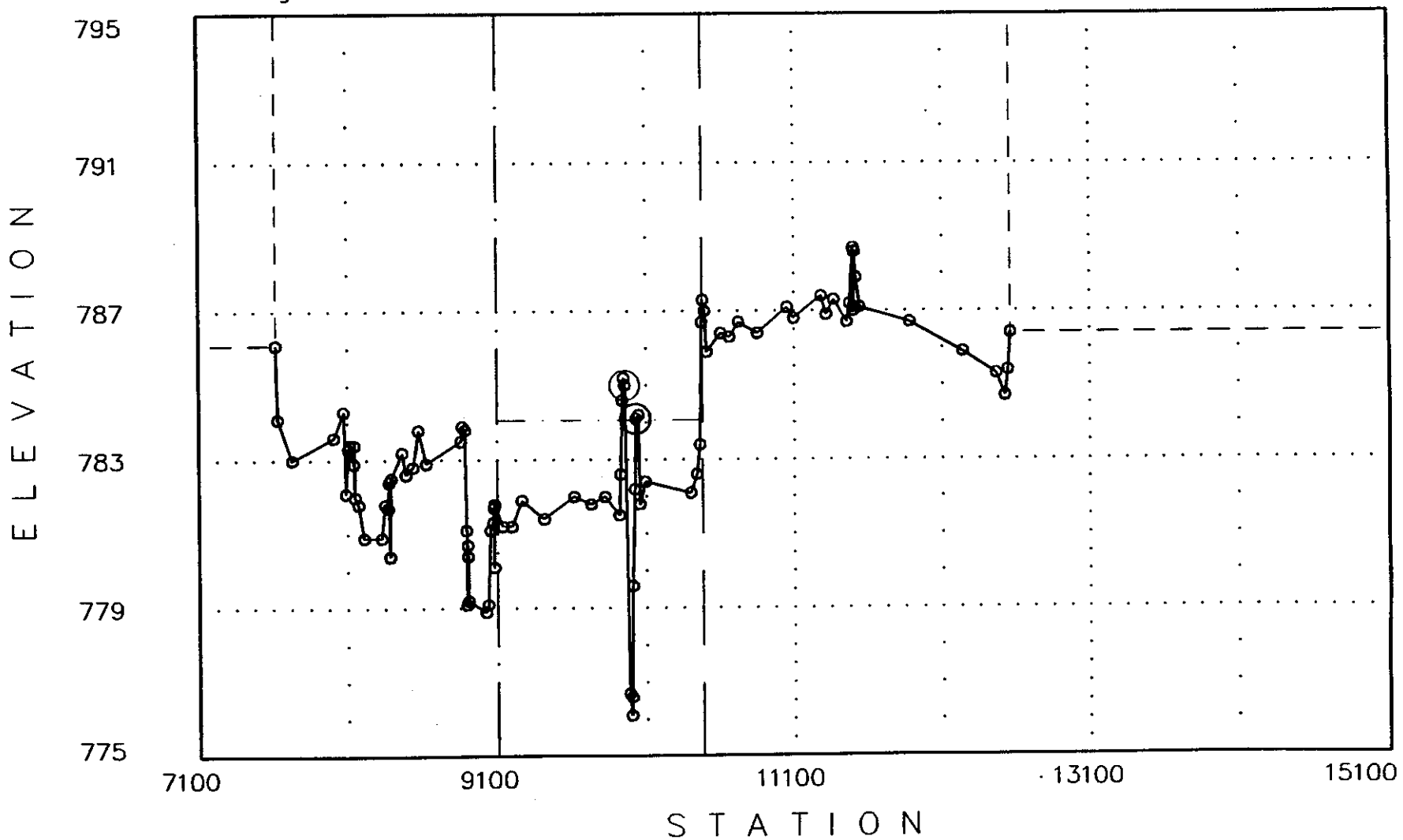


02-21-1993

<<<<<< Cross Section: 1.257: (FN = LUKE.AHO) >>>>>>

Q1= 7633 WS1= 784.06

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

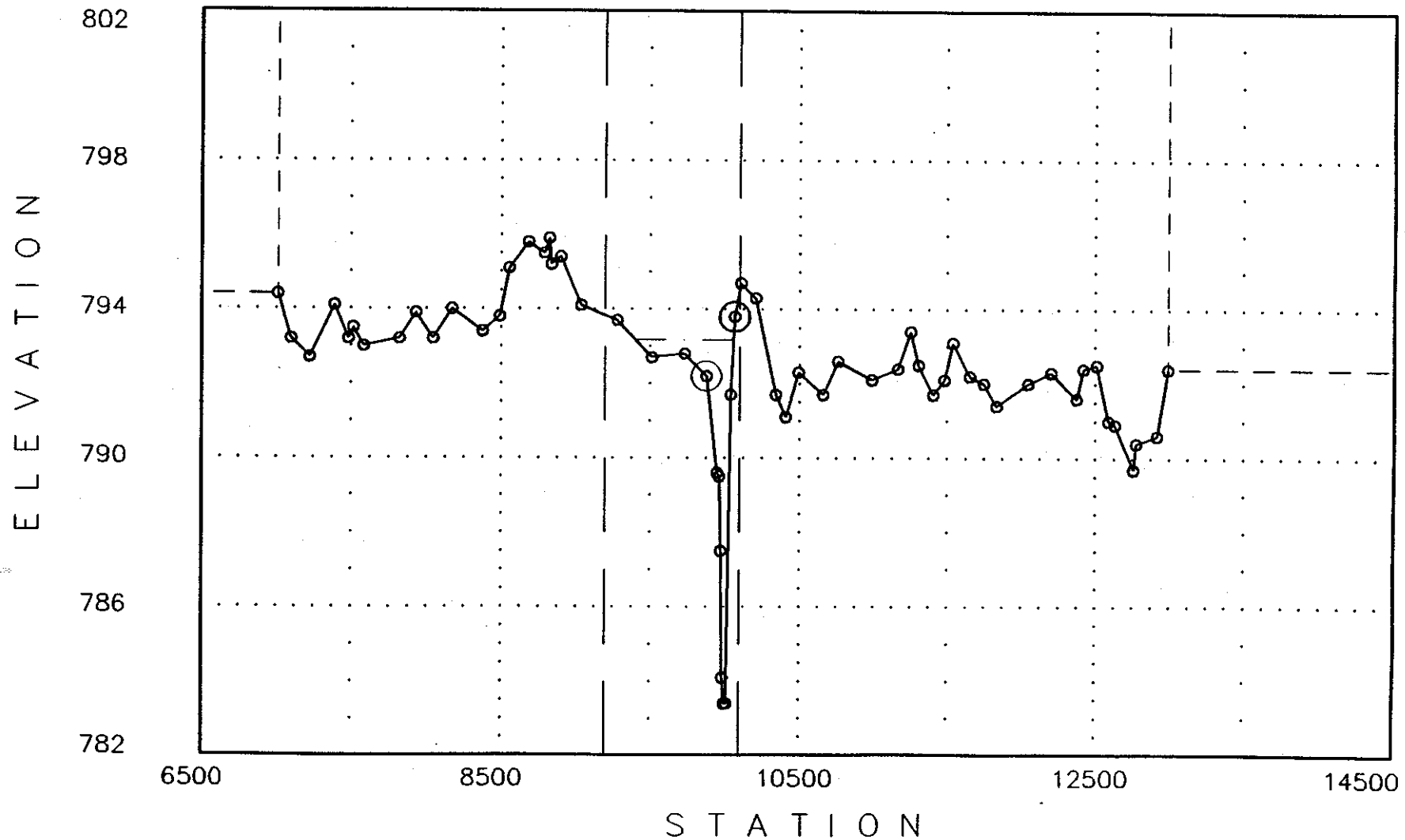


02-21-

<<<<<< Cross Section: 1.449: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 793.18

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

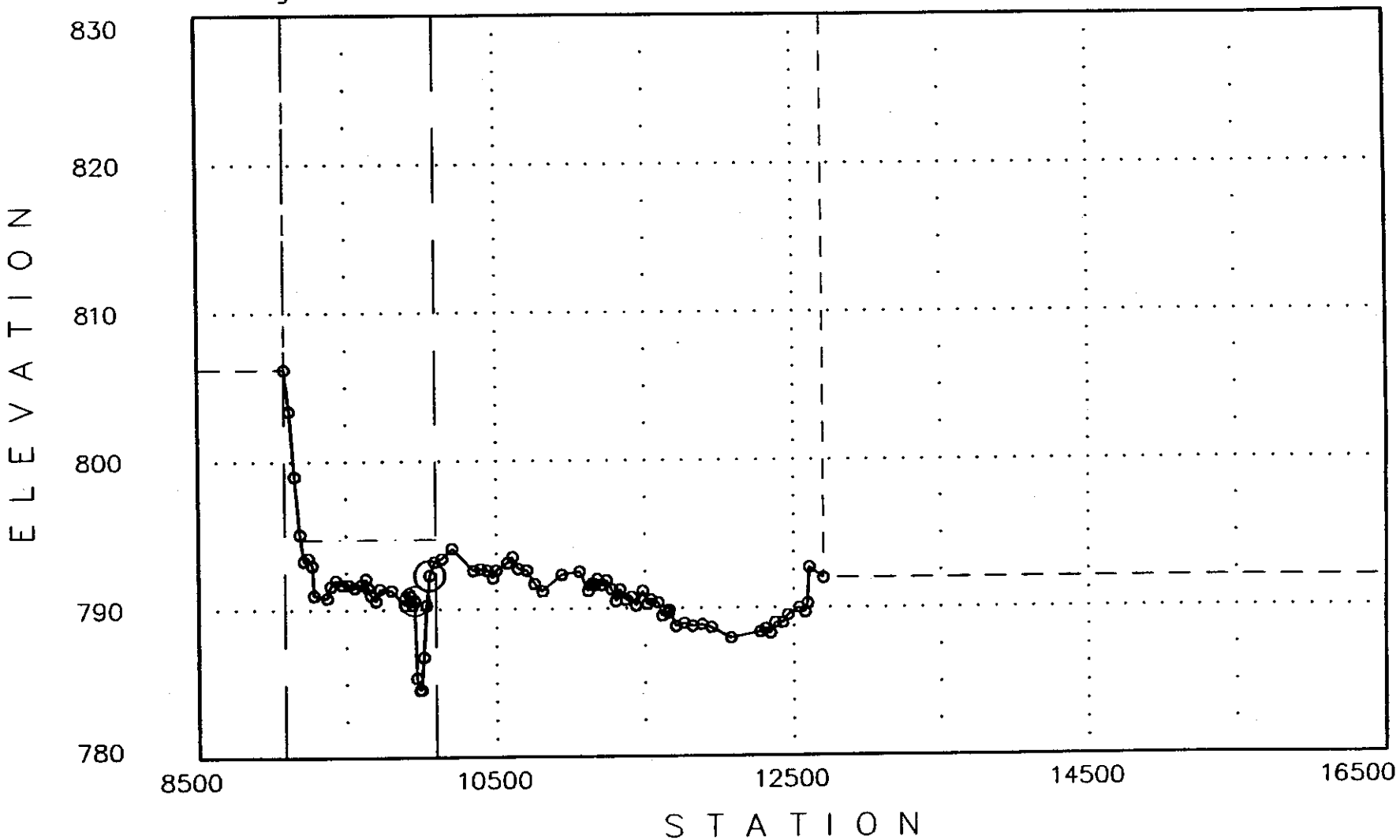


02-21-1993

<<<<<< Cross Section: 1.461: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 794.73

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

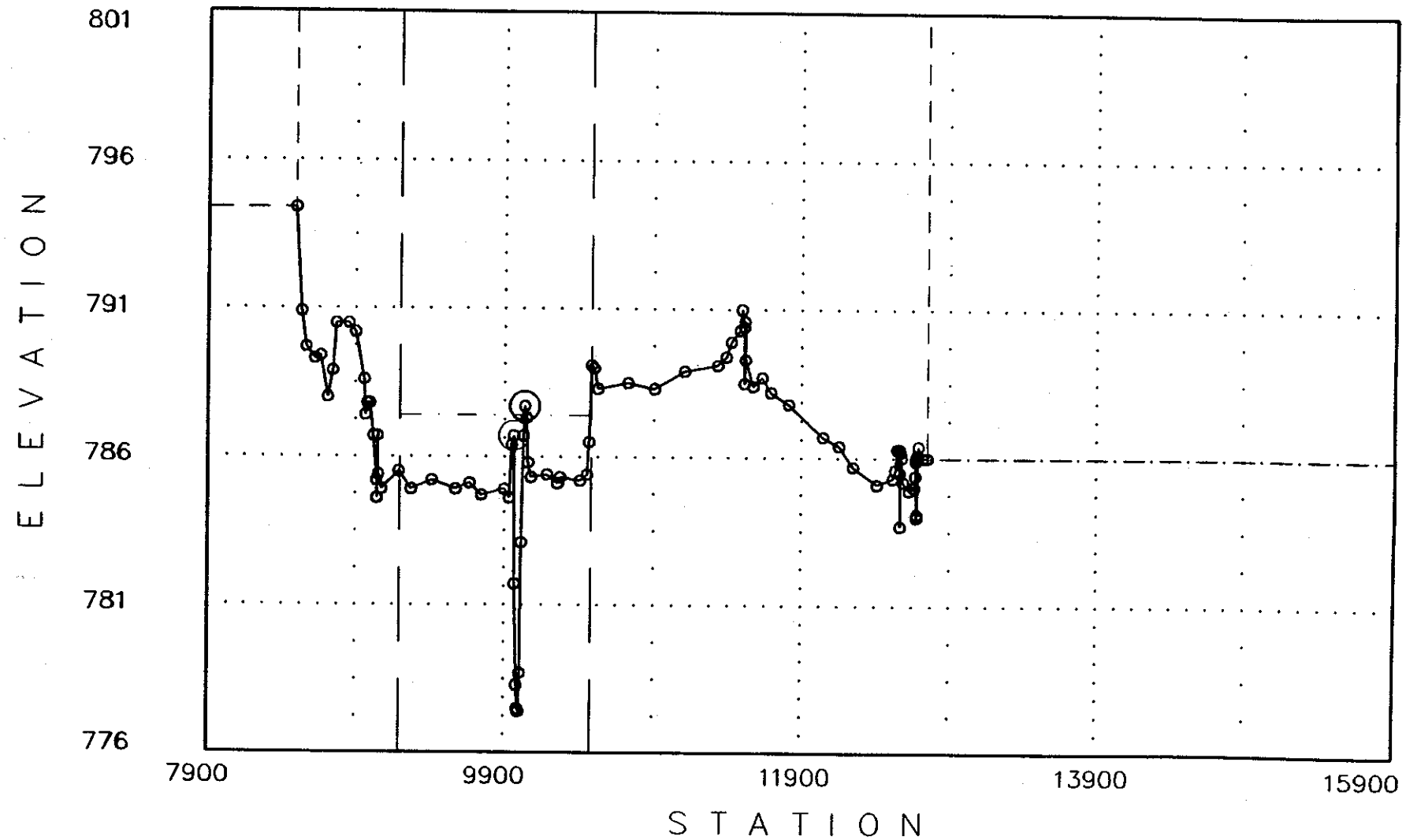


02-21

<<<<<< Cross Section: 1.351: (FN = LUKE.AHO) >>>>>>

Q1= 7633 WS1= 787.39

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

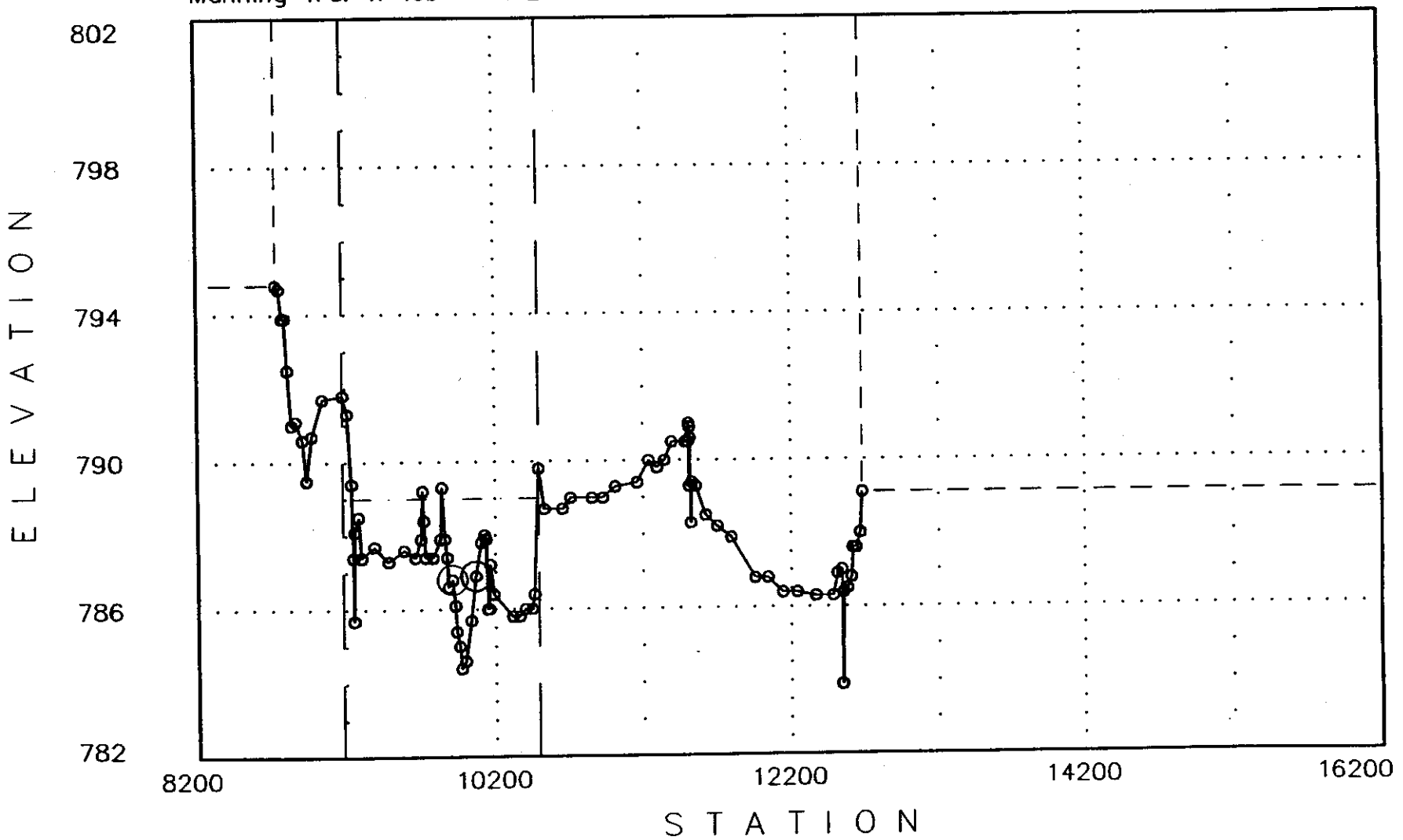


02-21-1993

<<<<<< Cross Section: 1.404: (FN = LUKE.AHO) >>>>>>

Q1= 7633 WS1= 789

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .12

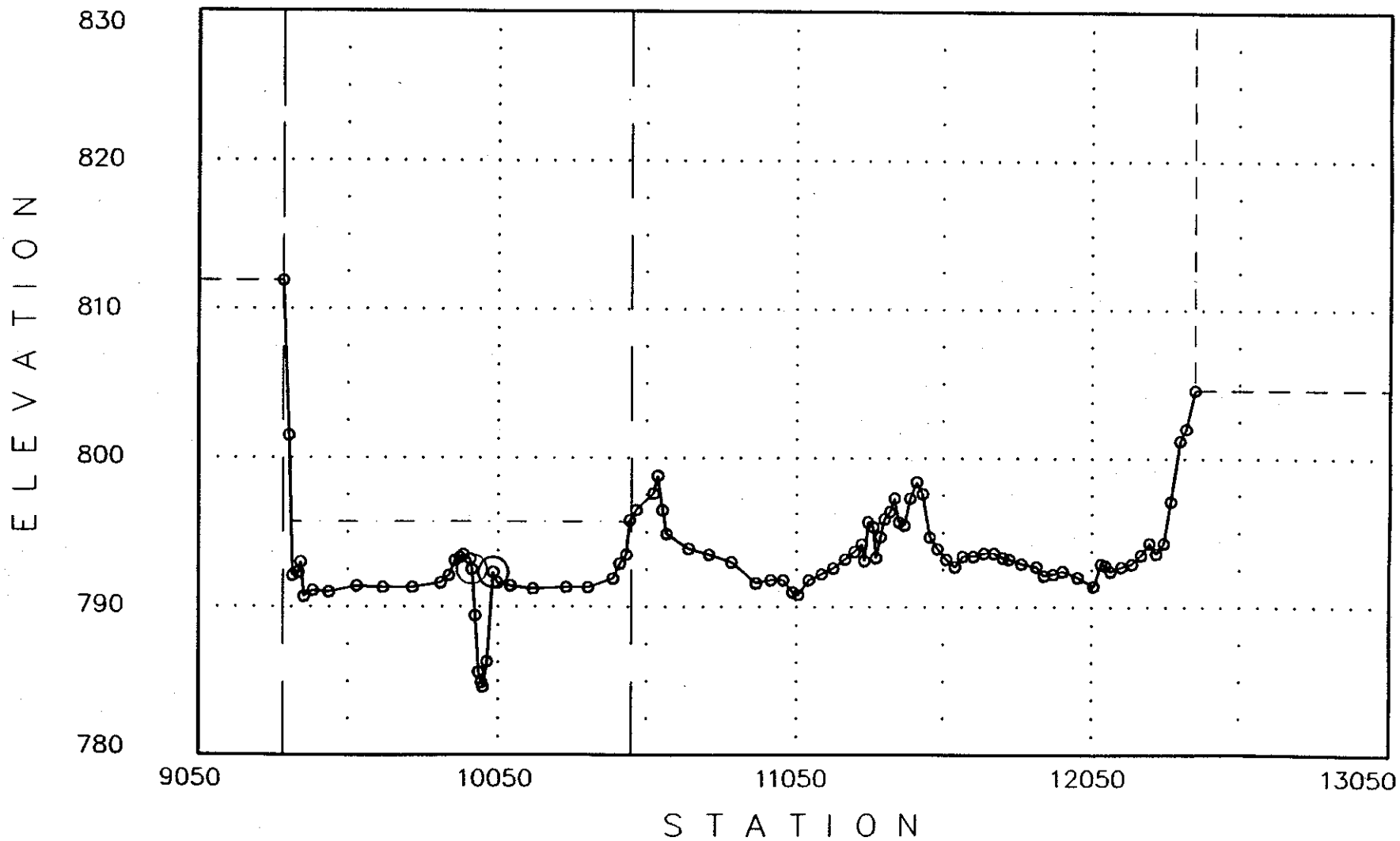


02-21-1

<<<<<< Cross Section: 1.534: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 795.72

Manning-n's: n-lob = .12 n-ch = .065 n-rob = .12

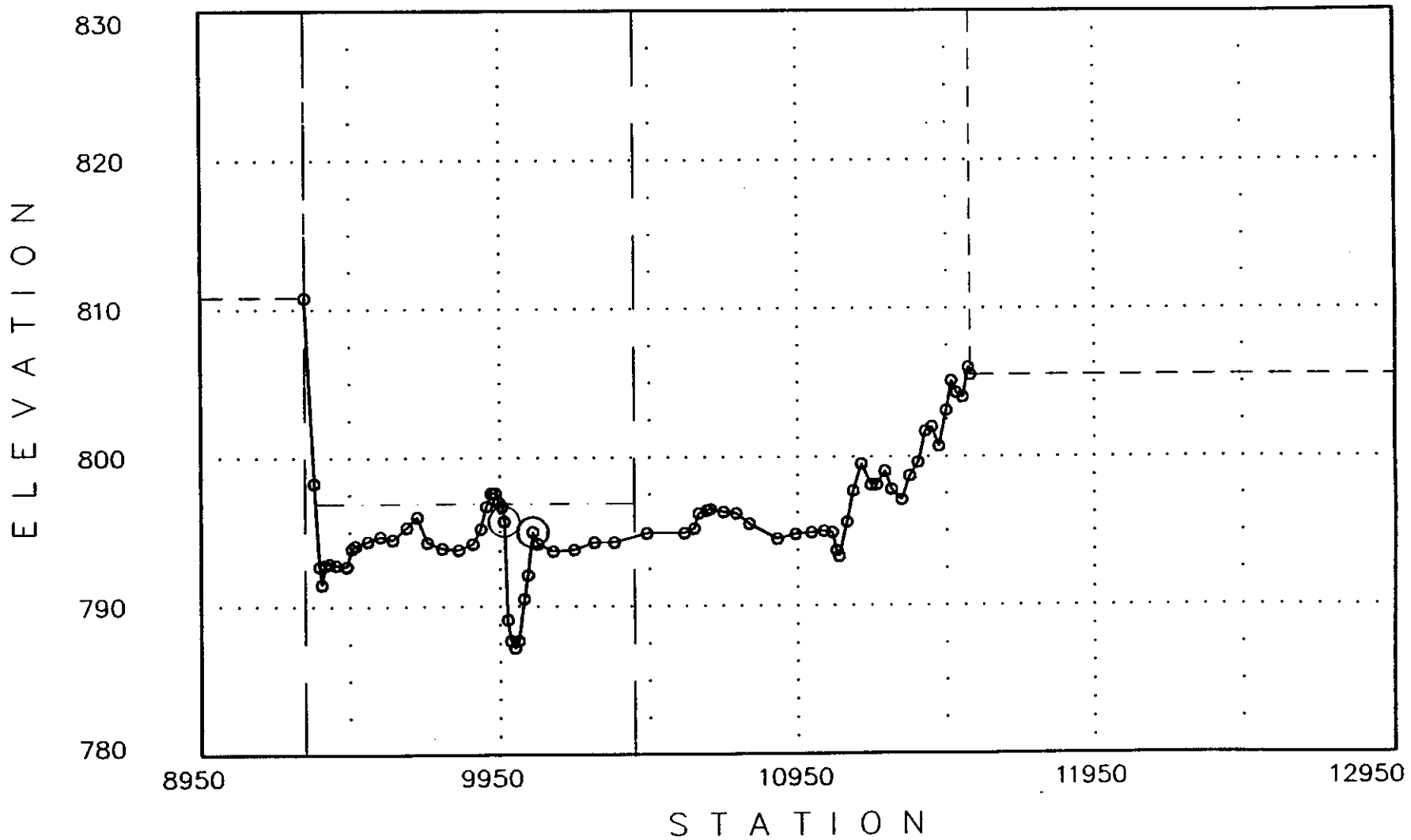


02-21-1993

<<<<<< Cross Section: 1.632: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 796.91

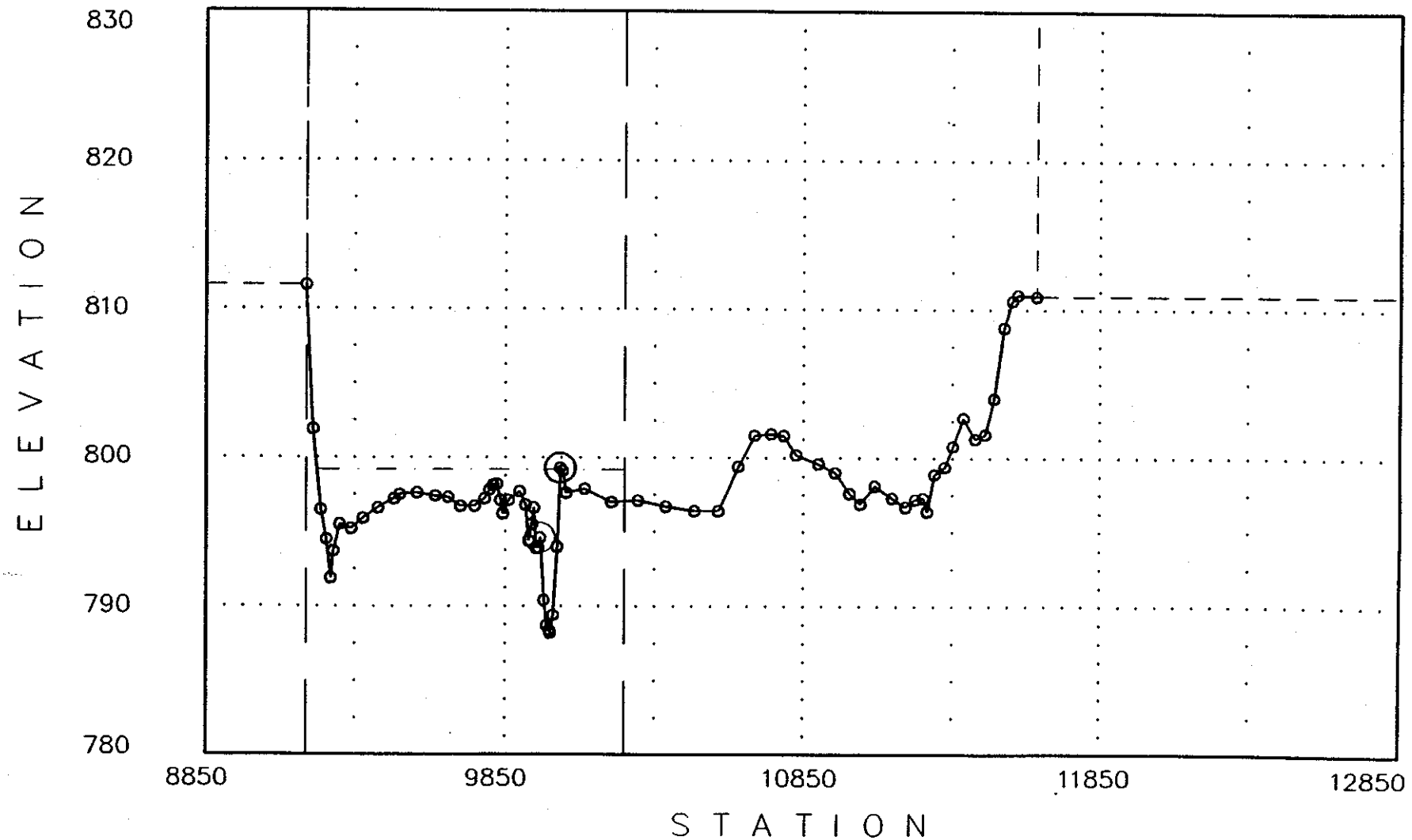
Manning-n's: n-lob = .12 n-ch = .065 n-rob = .12



<<<<<< Cross Section: 1.723: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 799.19

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .07

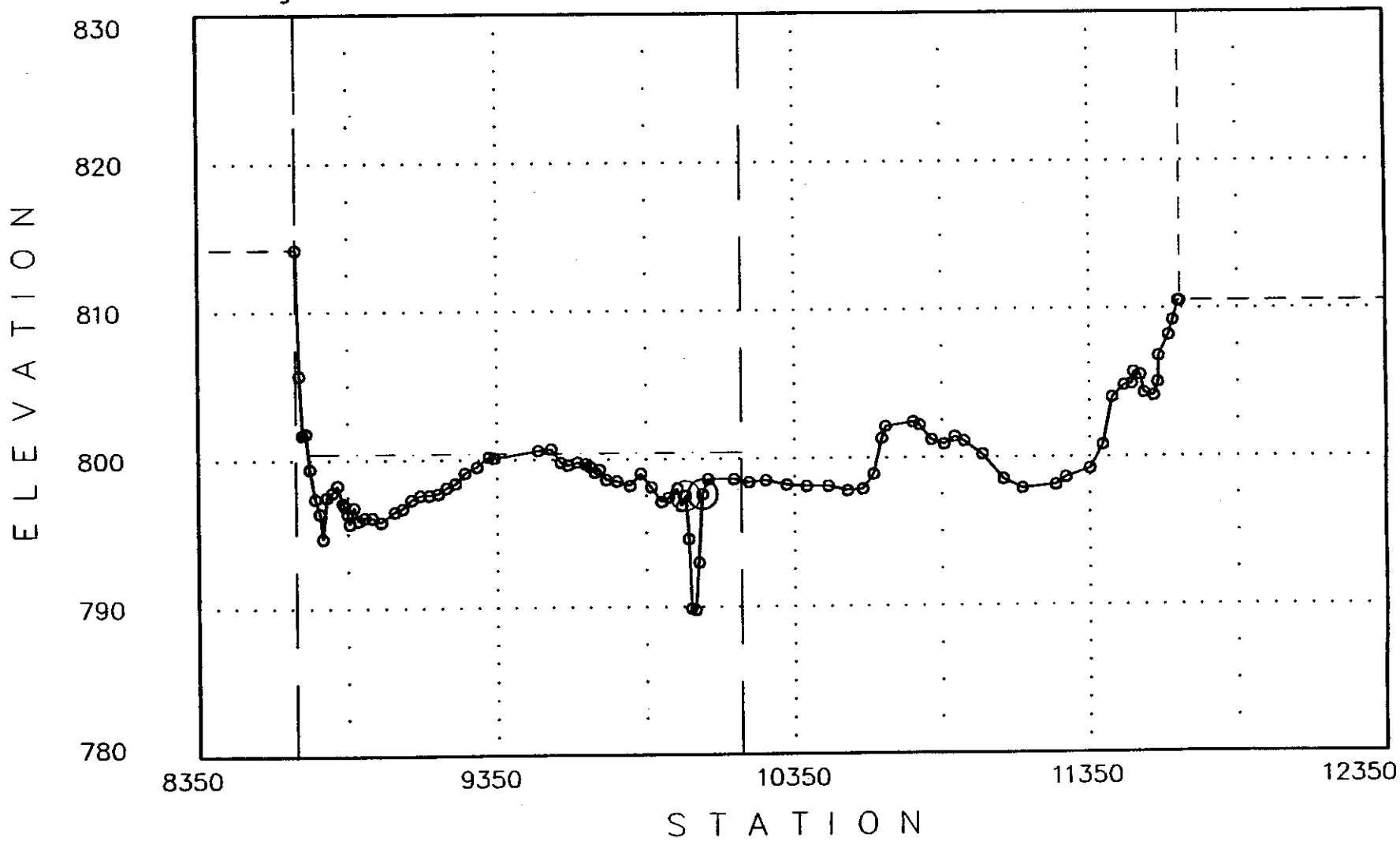


02-21-1993

<<<<<< Cross Section: 1.767: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 800.41

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .07

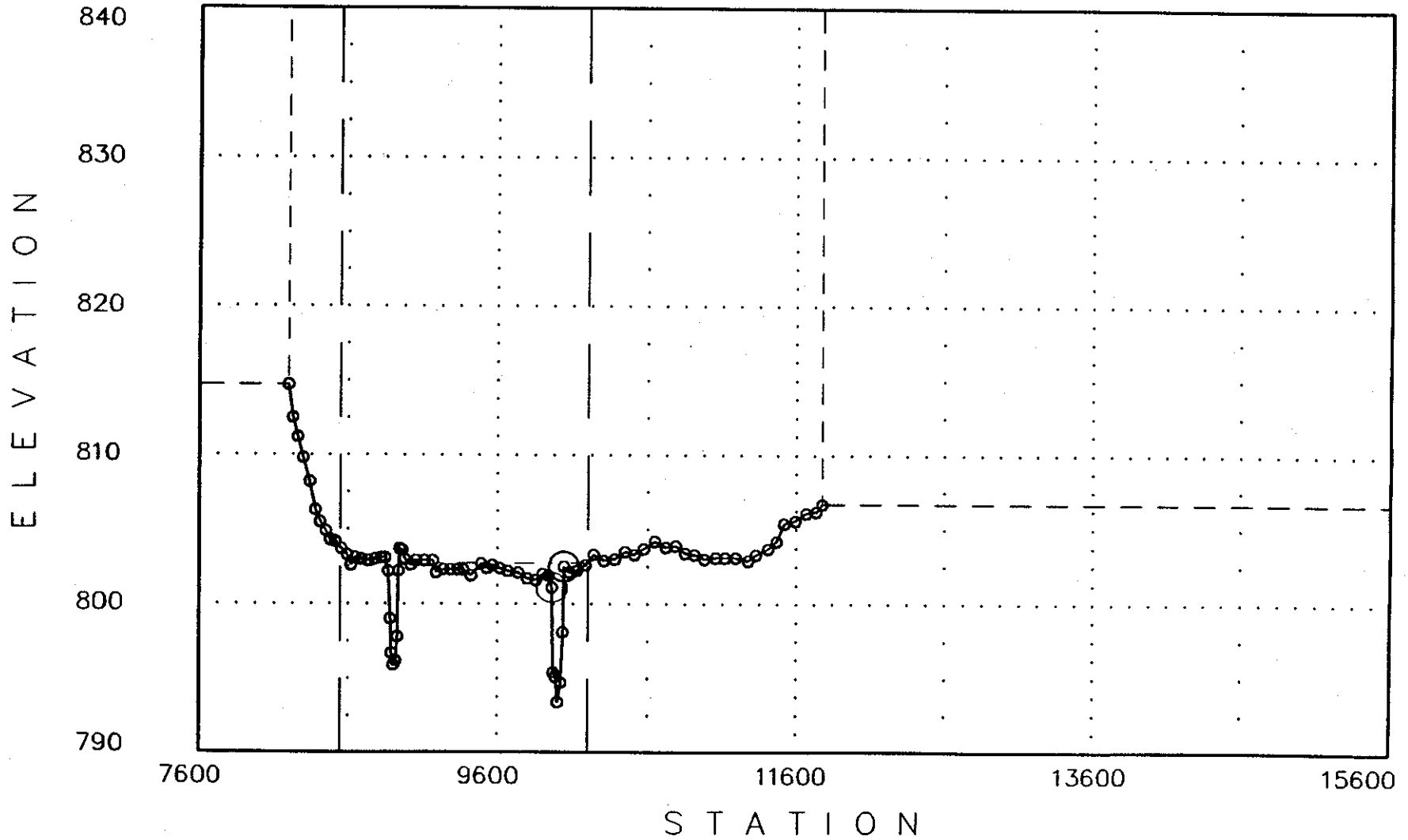


02-21-

<<<<<< Cross Section: 1.813: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 802.73

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .07



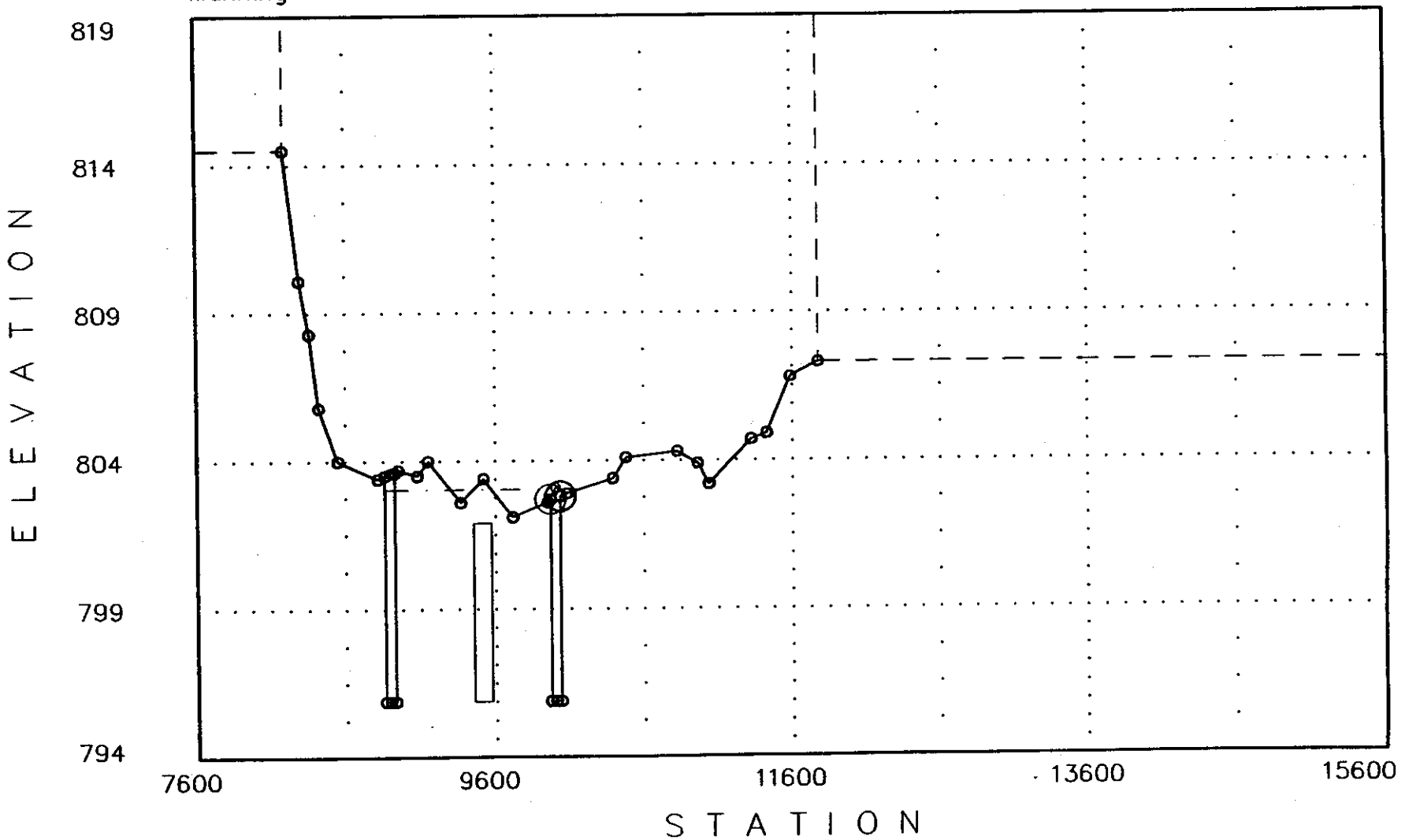
02-21-1993

<<<<<< Cross Section: 1.819: (FN = LUKE.AHO) >>>>>>

Q1= 7814 WS1= 803.04

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .07

SPECIAL CULVERT

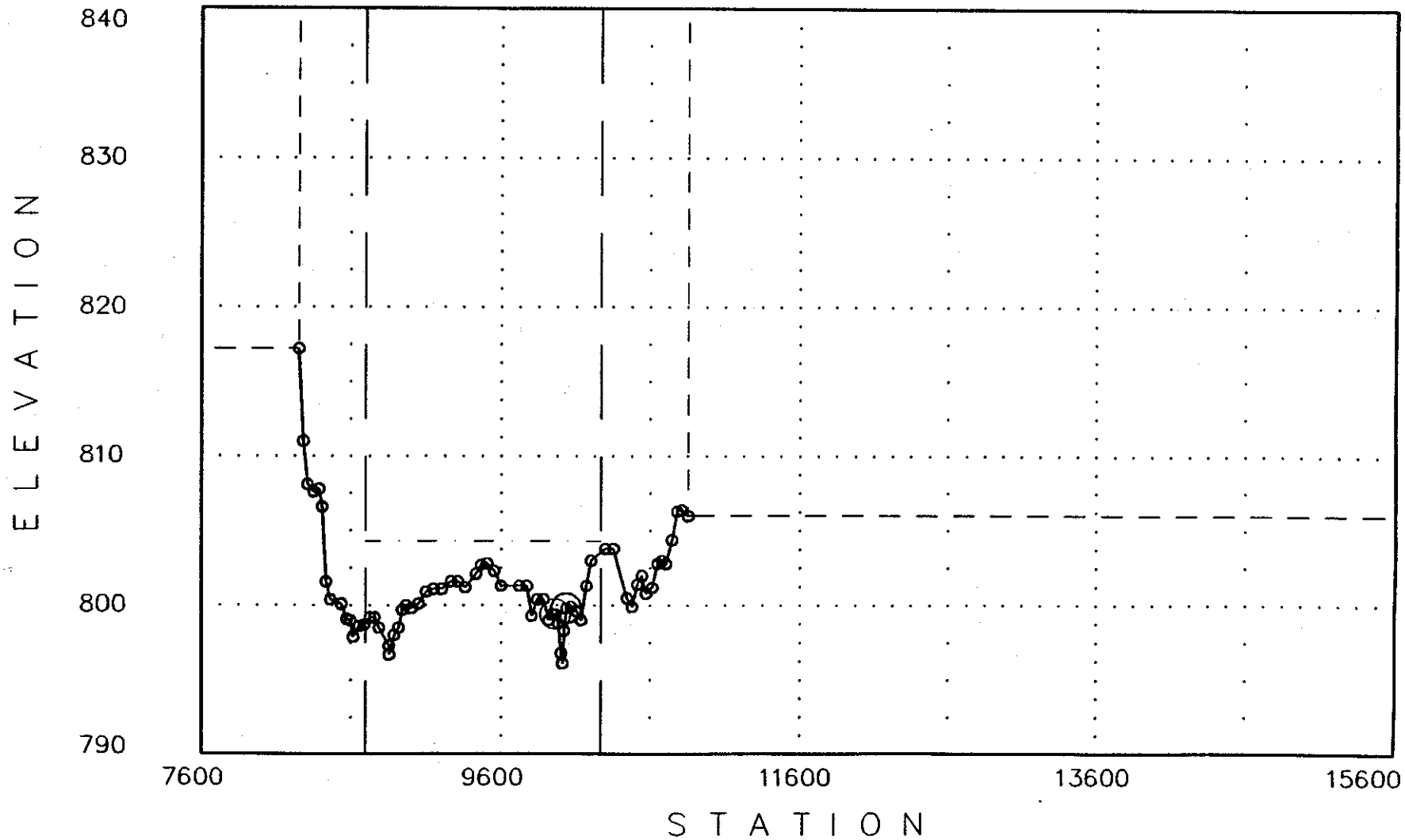


02-21

<<<<<< Cross Section: 1.839: (FN = LUKE.AHO) >>>>>>

Q1= 7948 WS1= 804.32

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .1

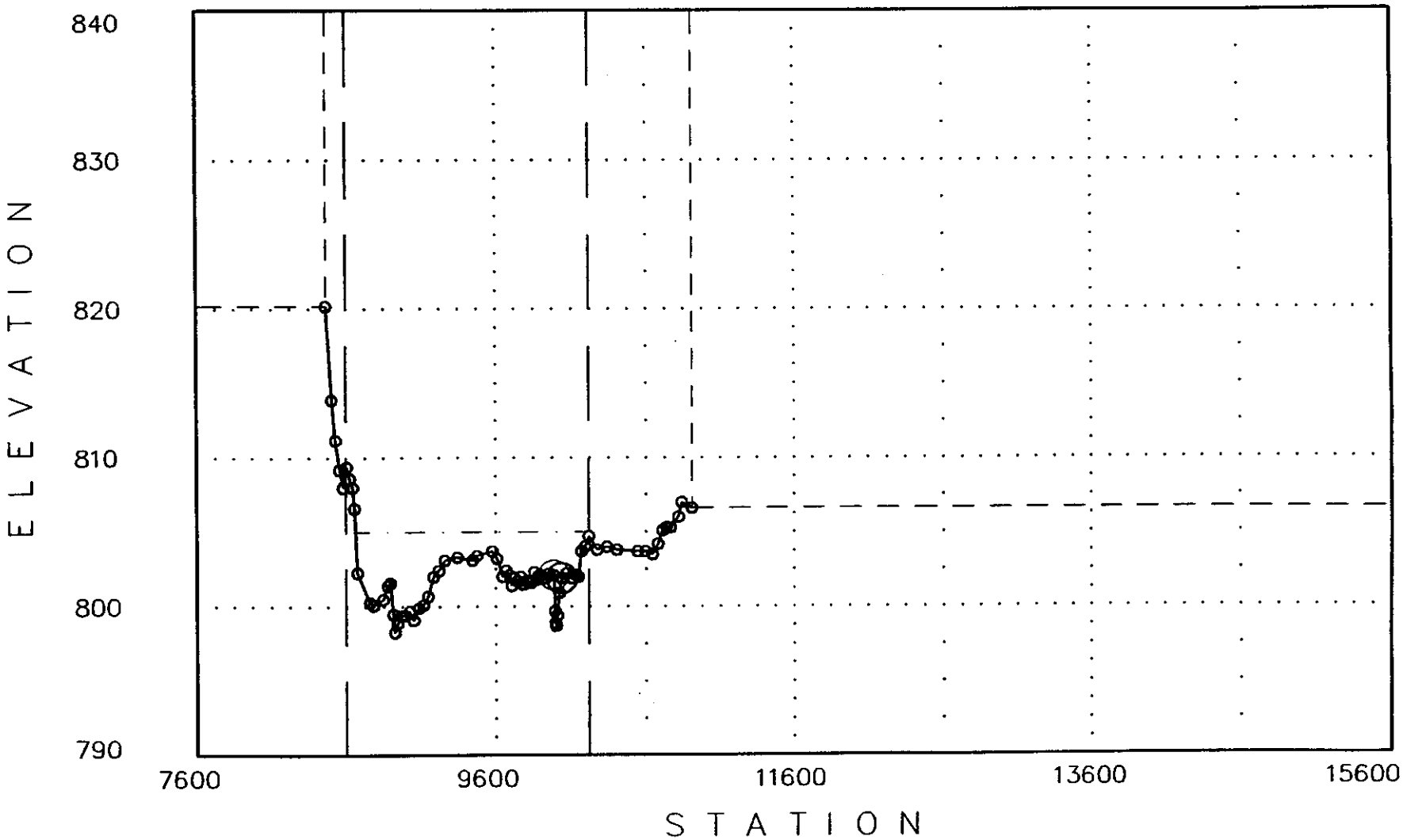


02-21-1993

<<<<<< Cross Section: 1.94: (FN = LUKE.AHO) >>>>>>

Q1= 7948 WS1= 805

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .1

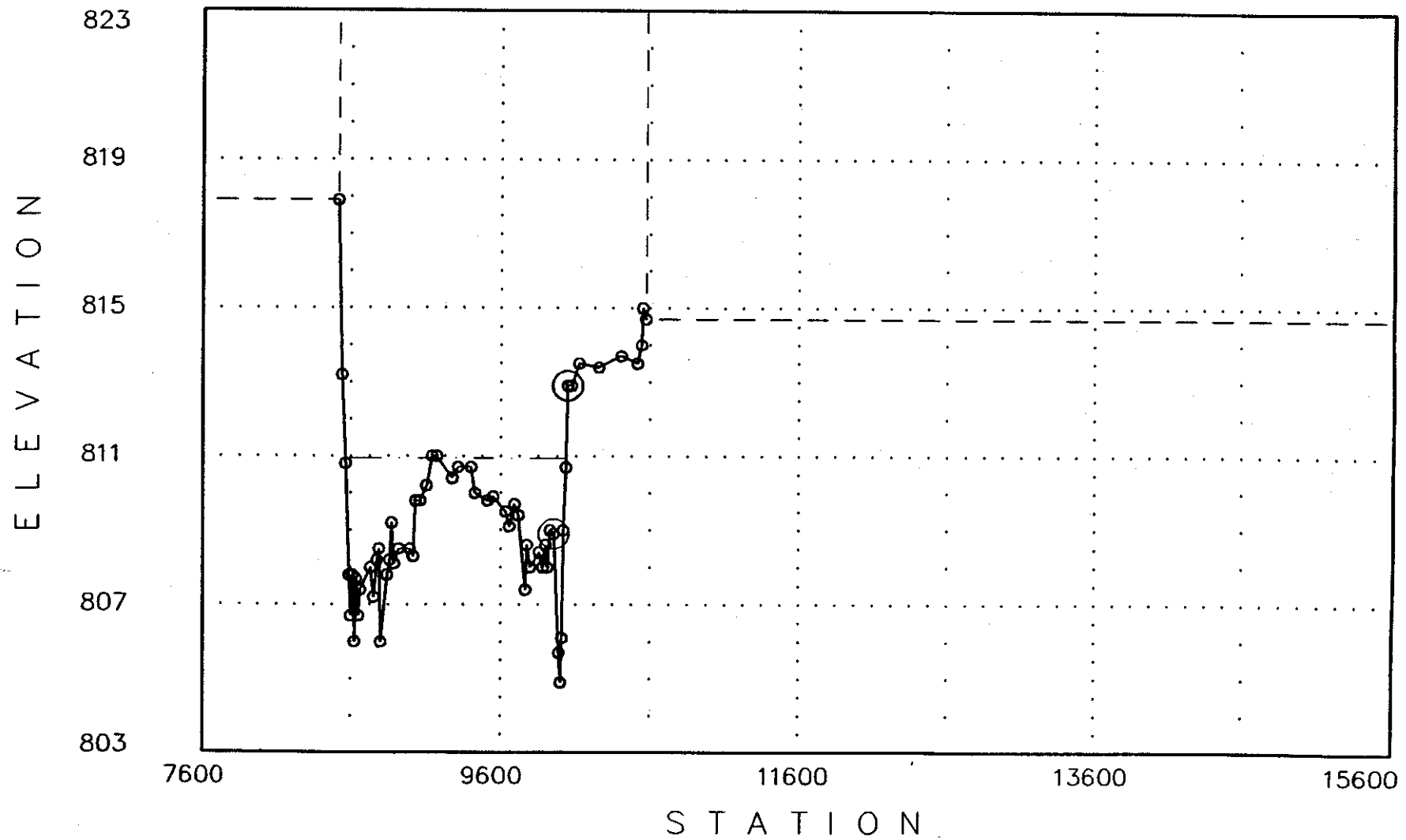


02-27-

<<<<<< Cross Section: 2.197: (FN = LUKE.AHO) >>>>>>

Q1= 7948 WS1= 810.94

Manning-n's: n-lob = .06 n-ch = .045 n-rob = .06

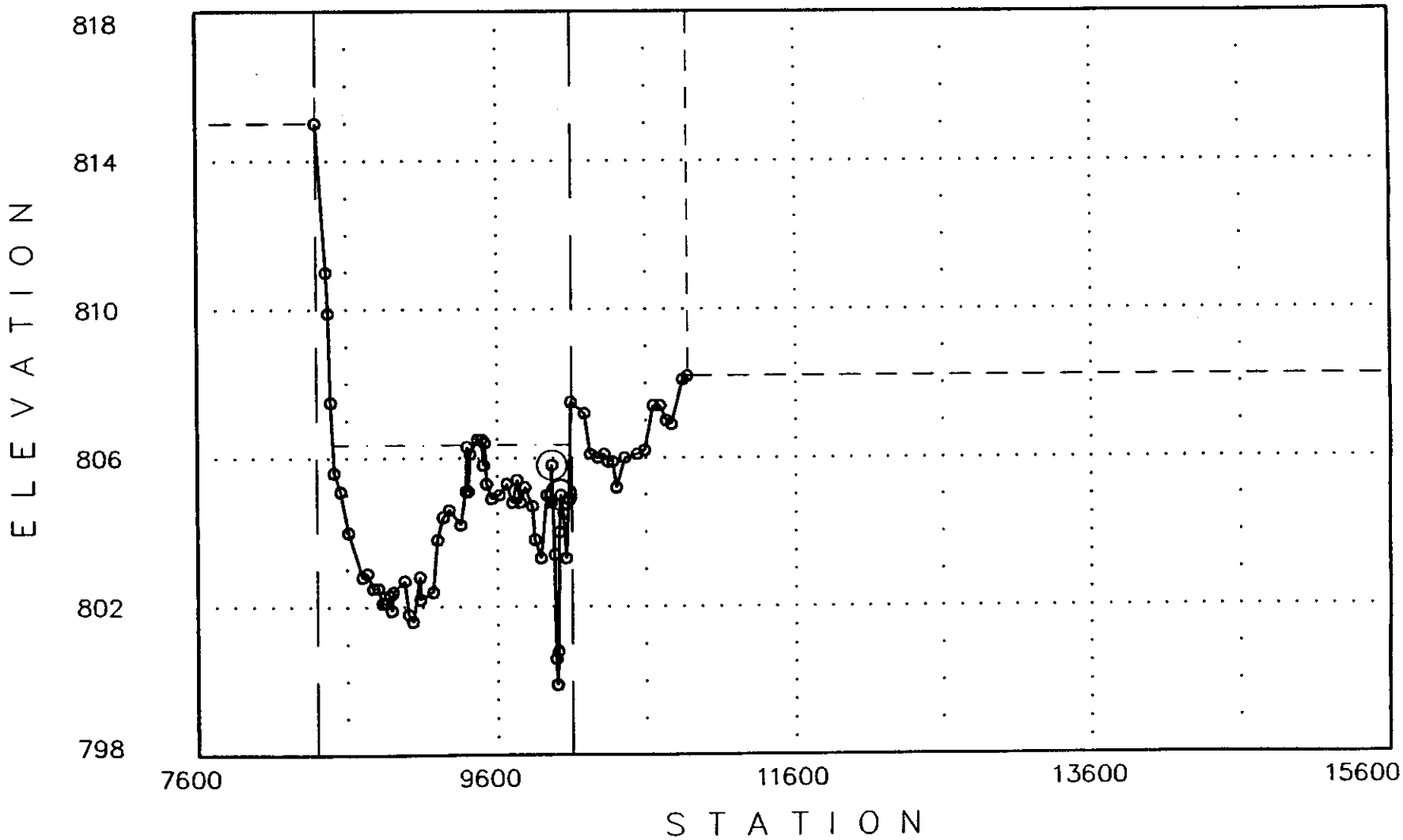


02-21-1993

<<<<<< Cross Section: 2.02: (FN = LUKE.AHO) >>>>>>

Q1= 7948 WS1= 806.36

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .1

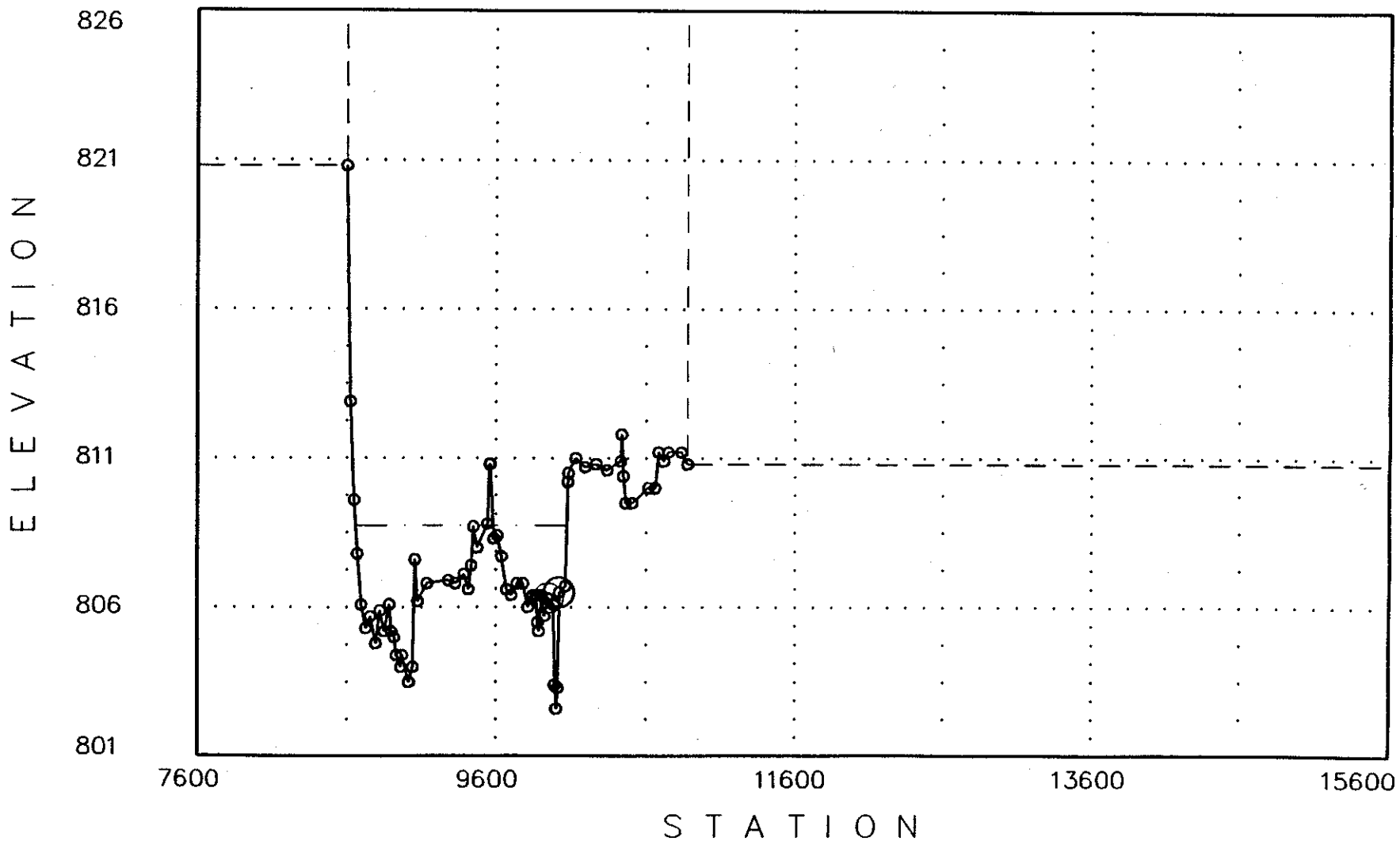


02-21-

<<<<<< Cross Section: 2.104: (FN = LUKE.AHO) >>>>>>

Q1= 7948 WS1= 808.74

Manning-n's: n-lob = .1 n-ch = .065 n-rob = .1

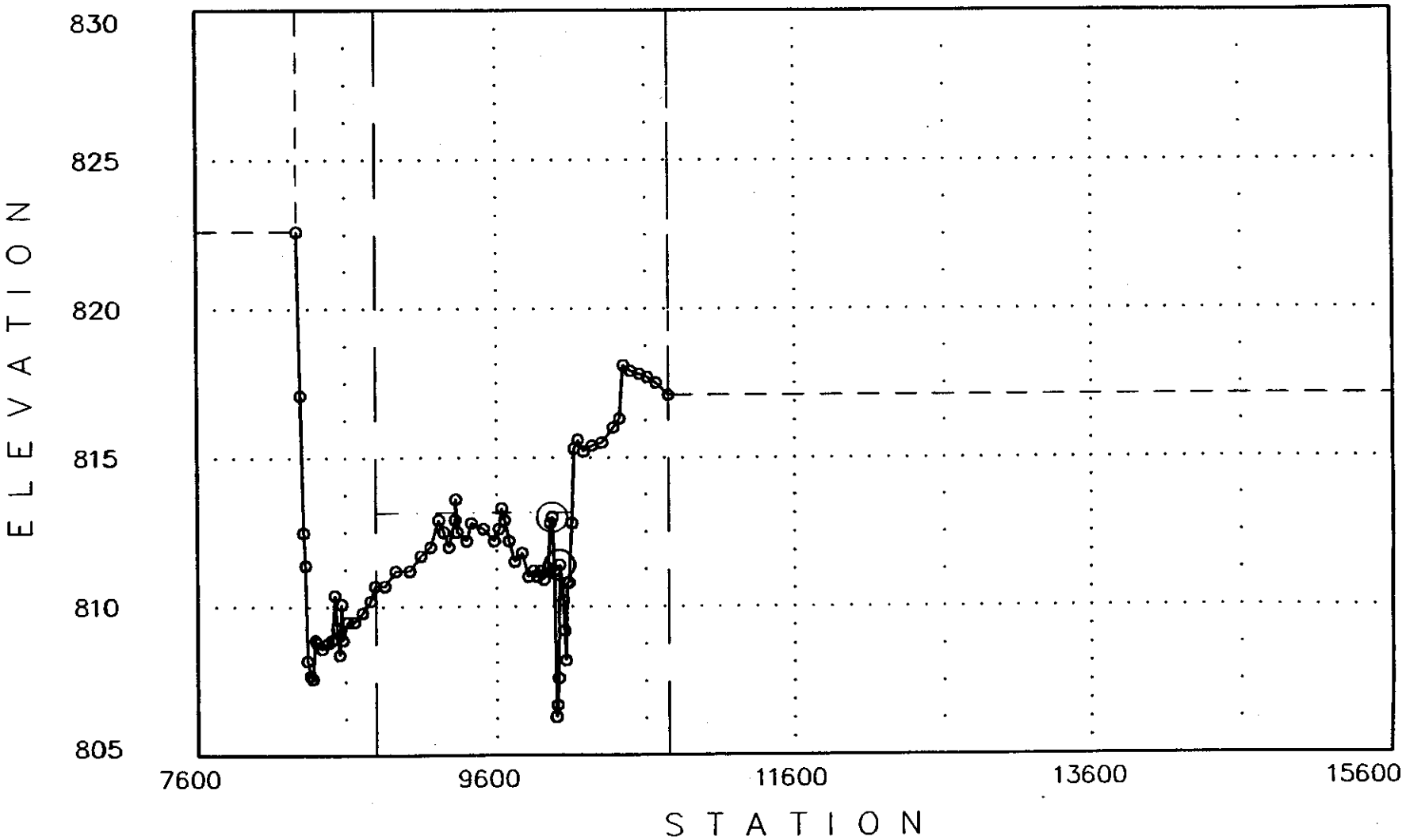


02-21-1993

<<<<<< Cross Section: 2.294: (FN = LUKE.AHO) >>>>>>

Q1= 6551 WS1= 813.15

Manning-n's: n-lob = .06 n-ch = .045 n-rob = .06

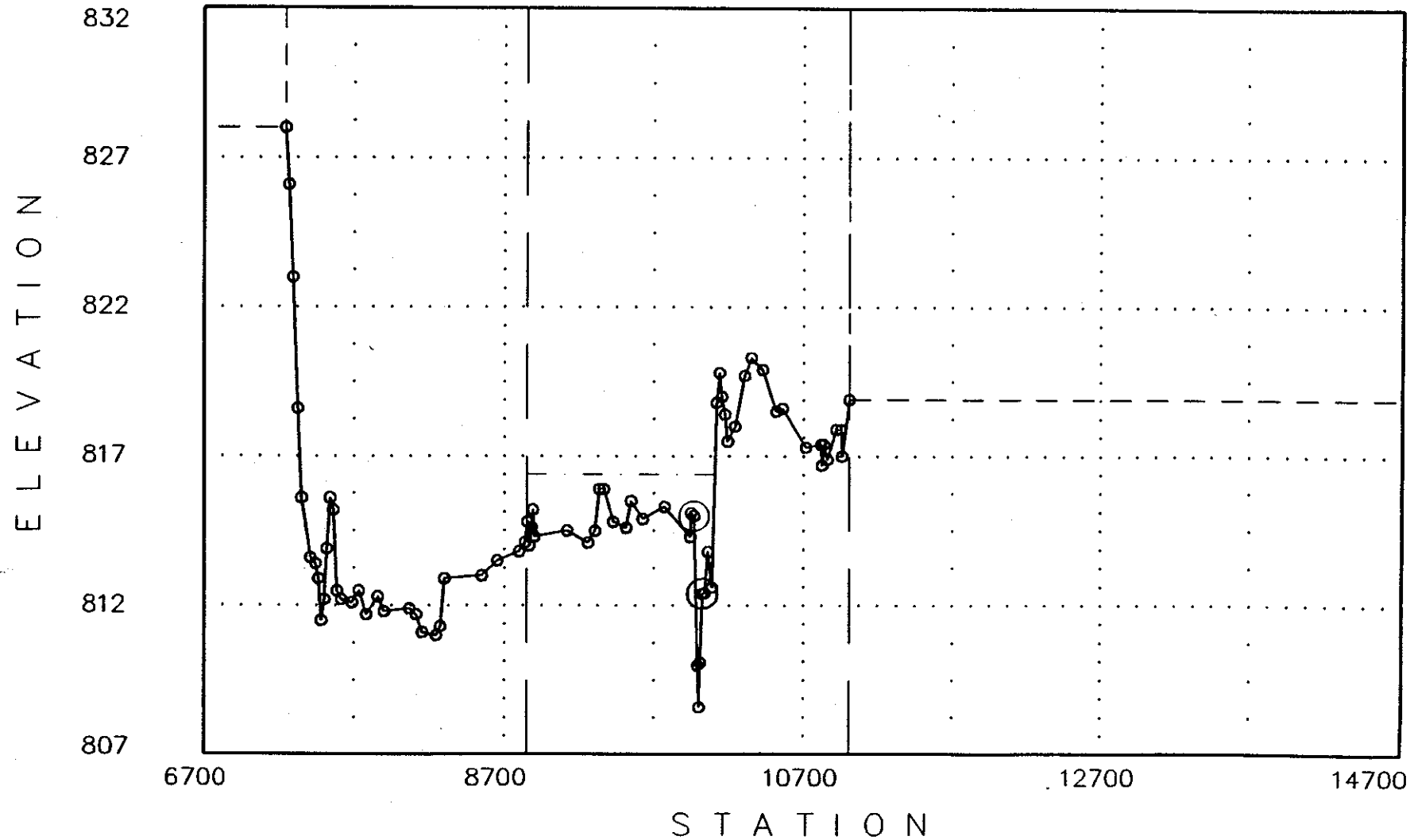


02-21-19

<<<<<< Cross Section: 2.388: (FN = LUKE.AHO) >>>>>>

Q1= 6551 WS1= 816.39

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .055

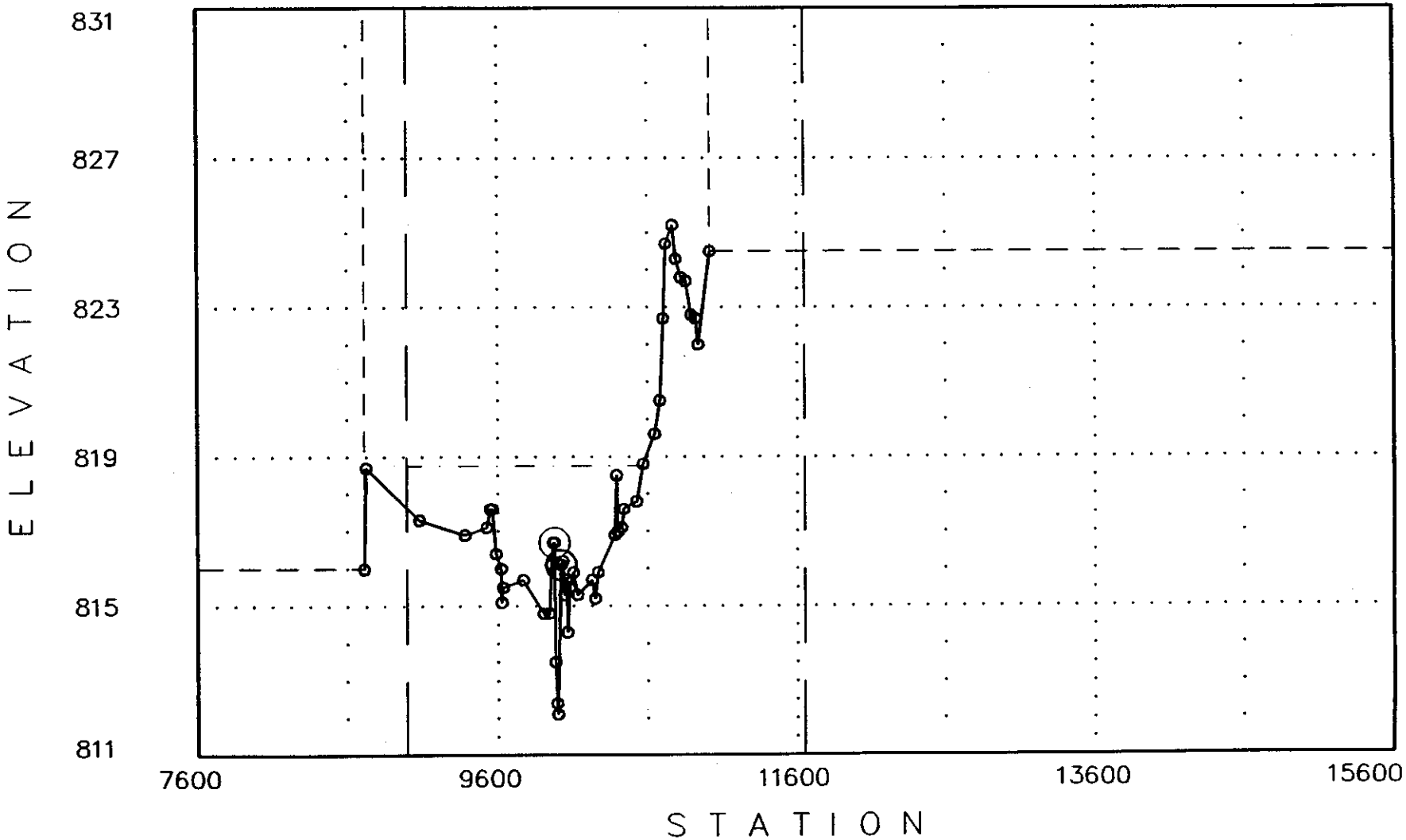


02-21-1993

<<<<<< Cross Section: 2.5: (FN = LUKE.AHO) >>>>>>

Q1= 6551 WS1= 818.76

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .055

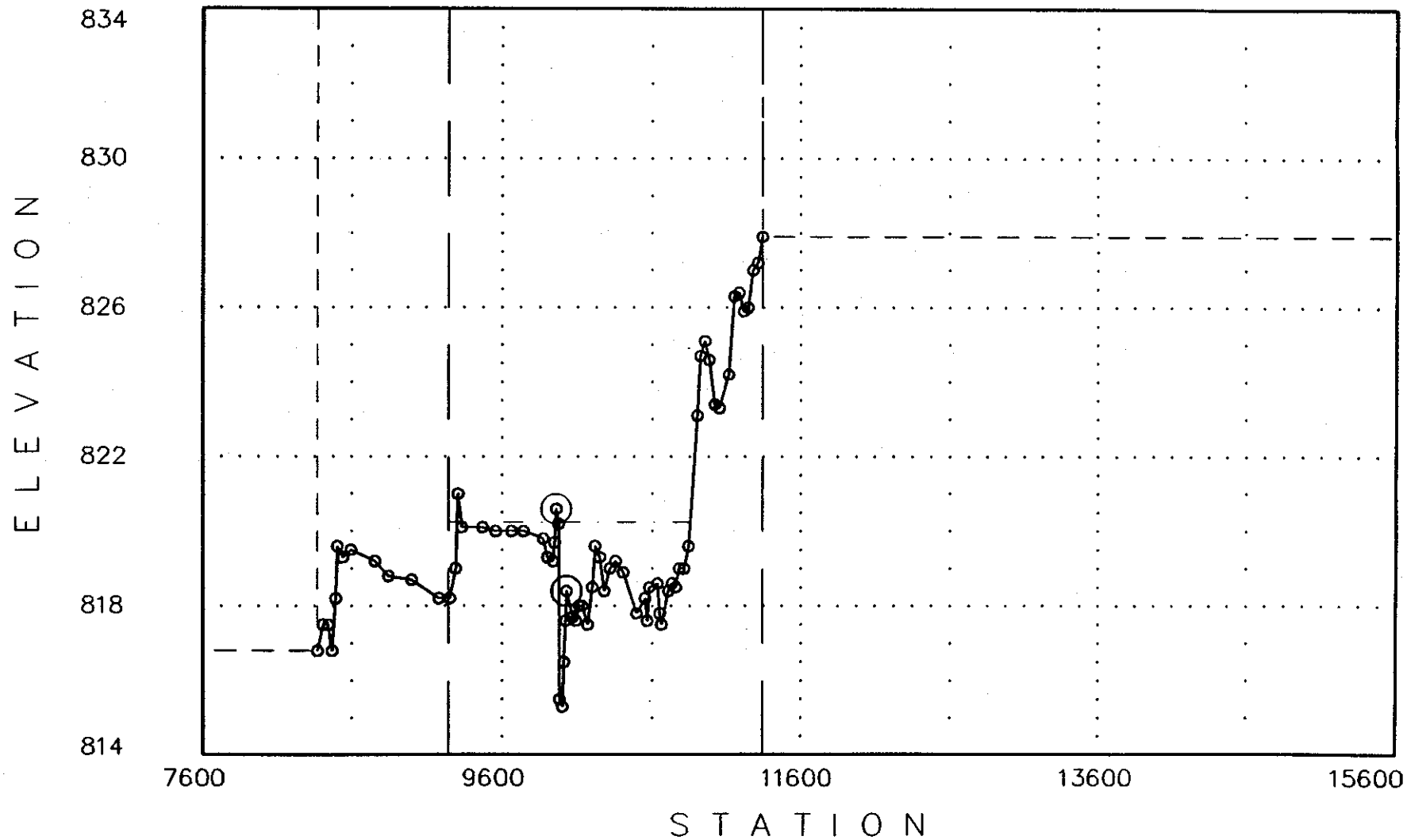


02-21-

<<<<<< Cross Section: 2.597: (FN = LUKE.AHO) >>>>>>

Q1= 6551 WS1= 820.24

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .055

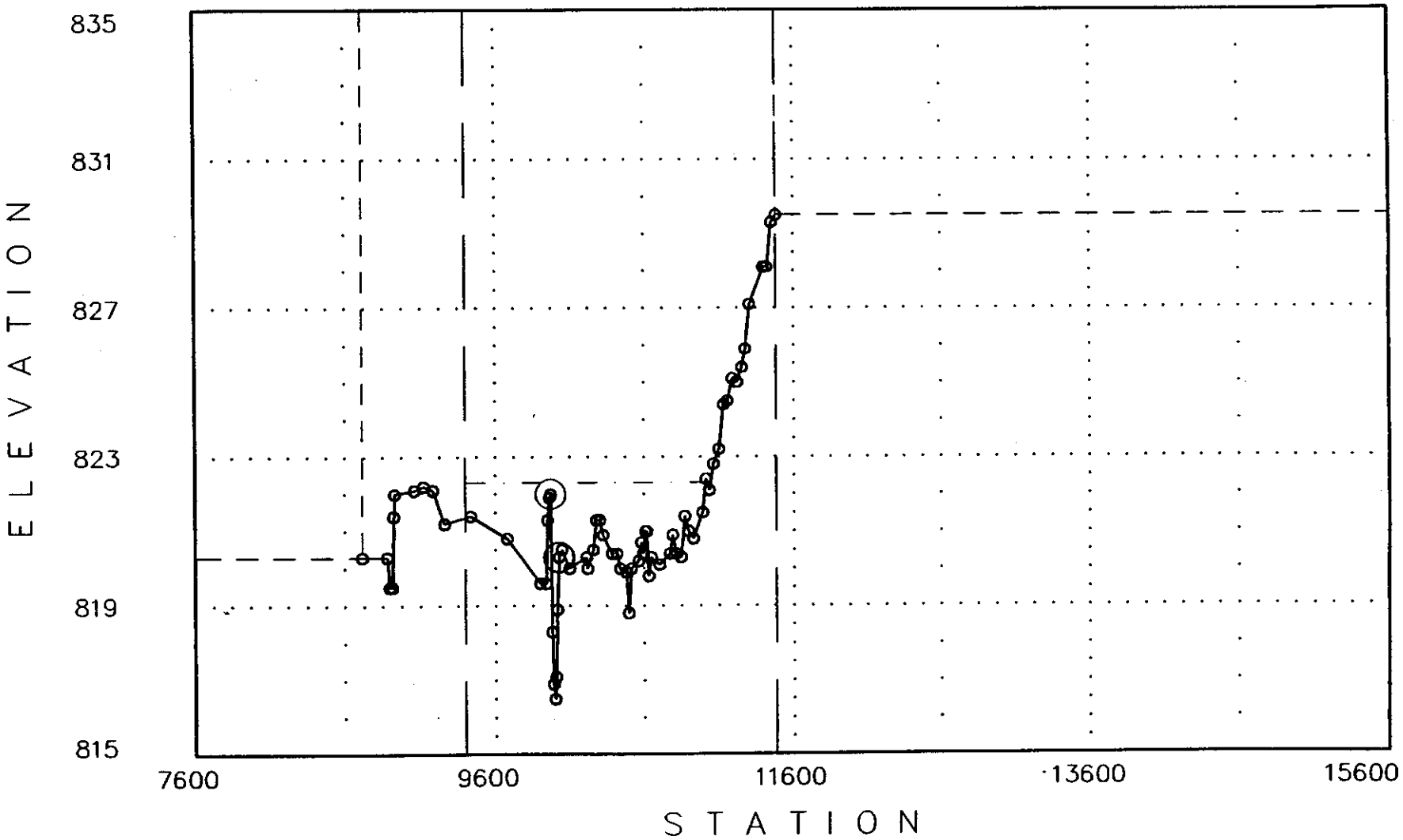


02-21-1993

<<<<<< Cross Section: 2.682: (FN = LUKE.AHO) >>>>>>

Q1= 6551 WS1= 822.31

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .055

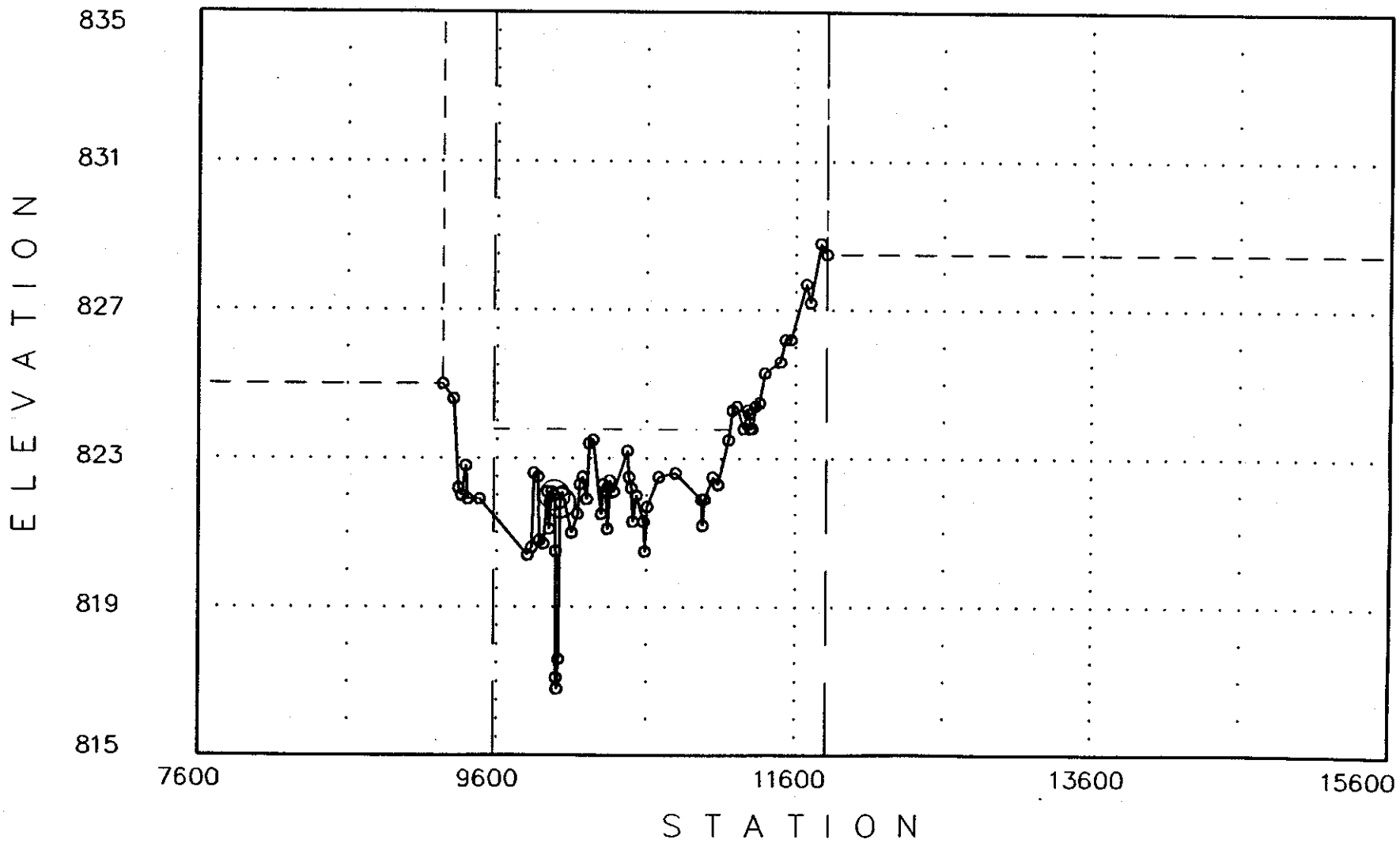


02-21-

<<<<<< Cross Section: 2.764: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 823.79

Manning-n's: n-lob = .12 n-ch = .045 n-rob = .055

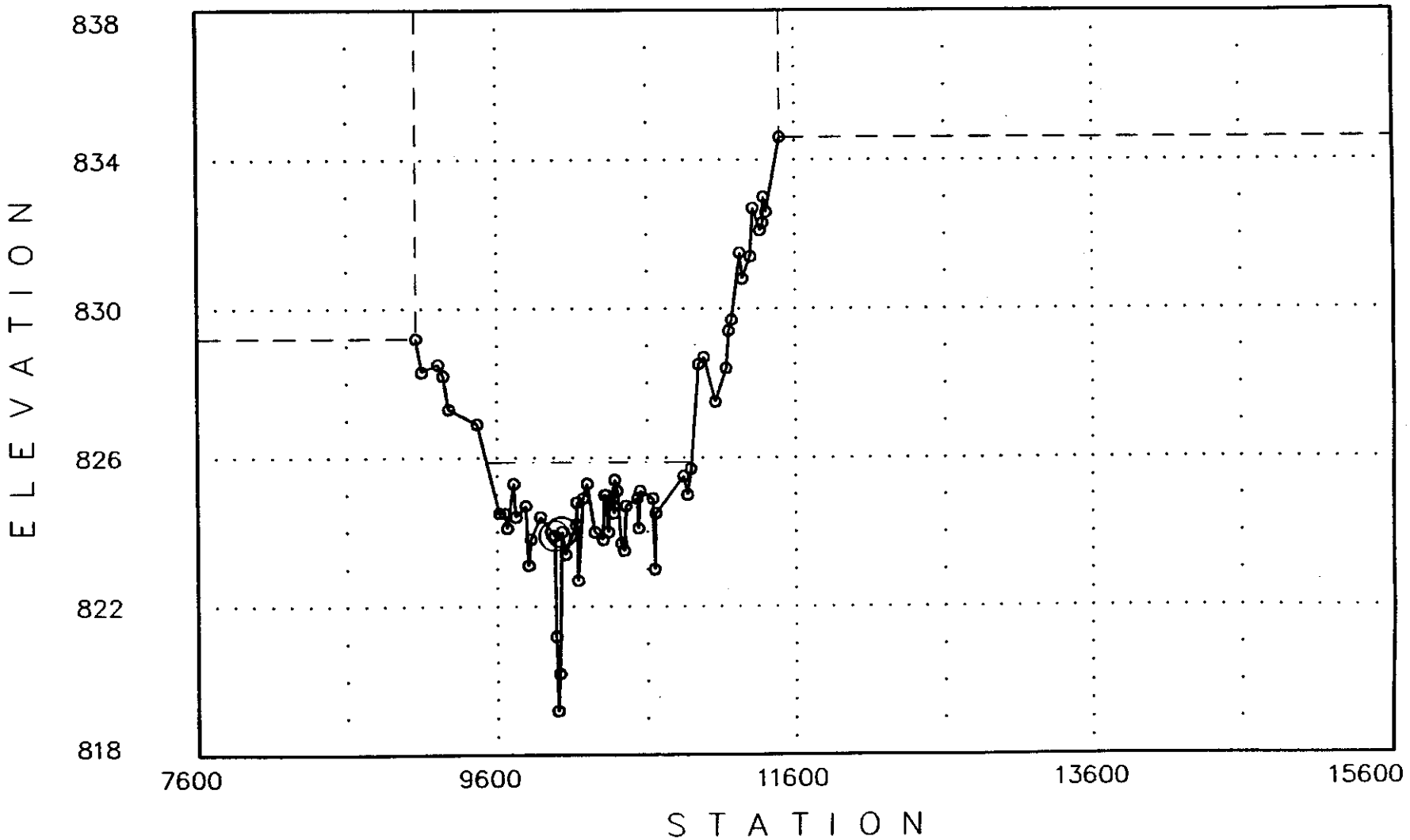


02-21-1993

<<<<<< Cross Section: 2.85: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 825.88

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

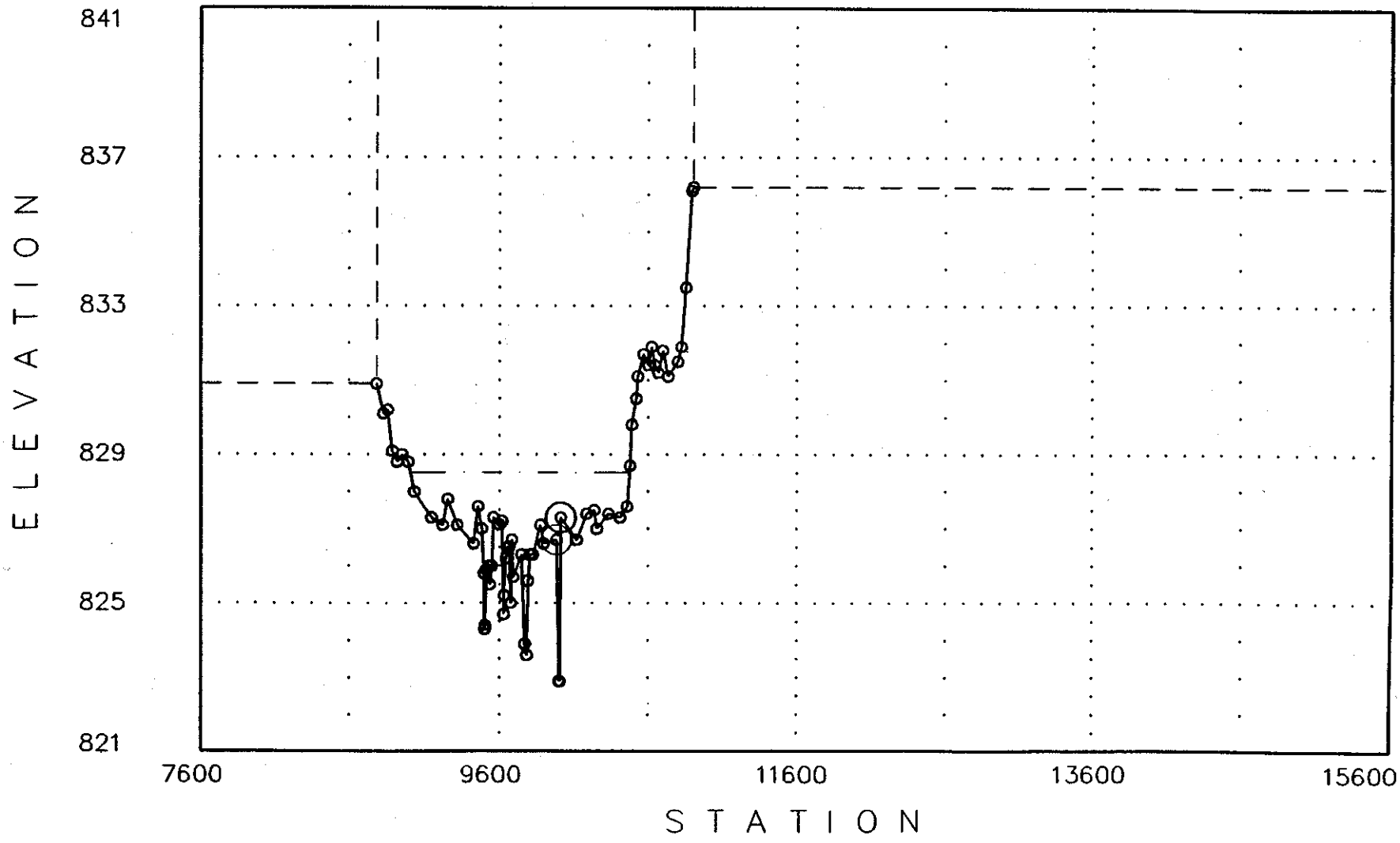


02-21-19

<<<<<< Cross Section: 2.963: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 828.52

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

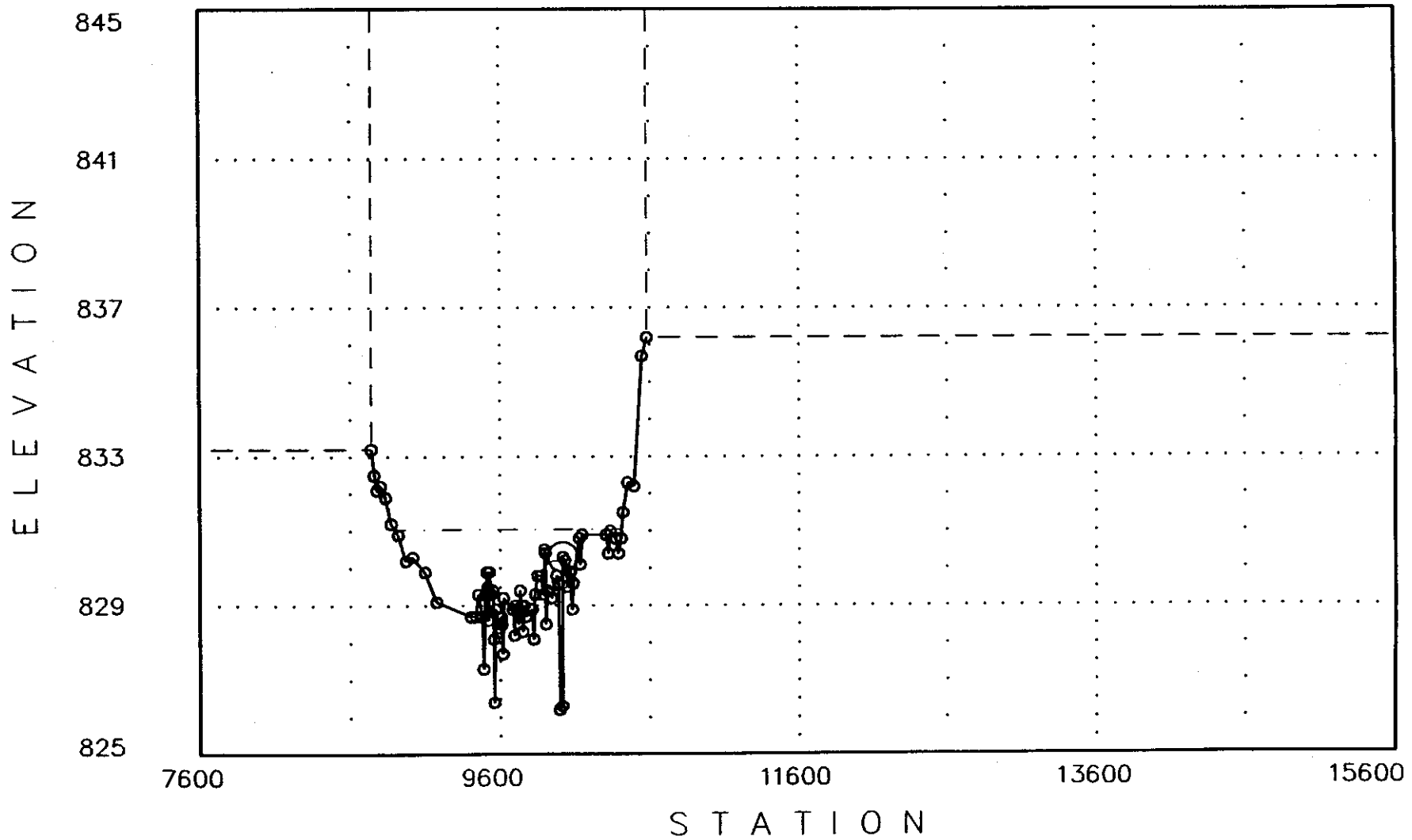


02-21-1993

<<<<<< Cross Section: 3.091: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 831.05

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

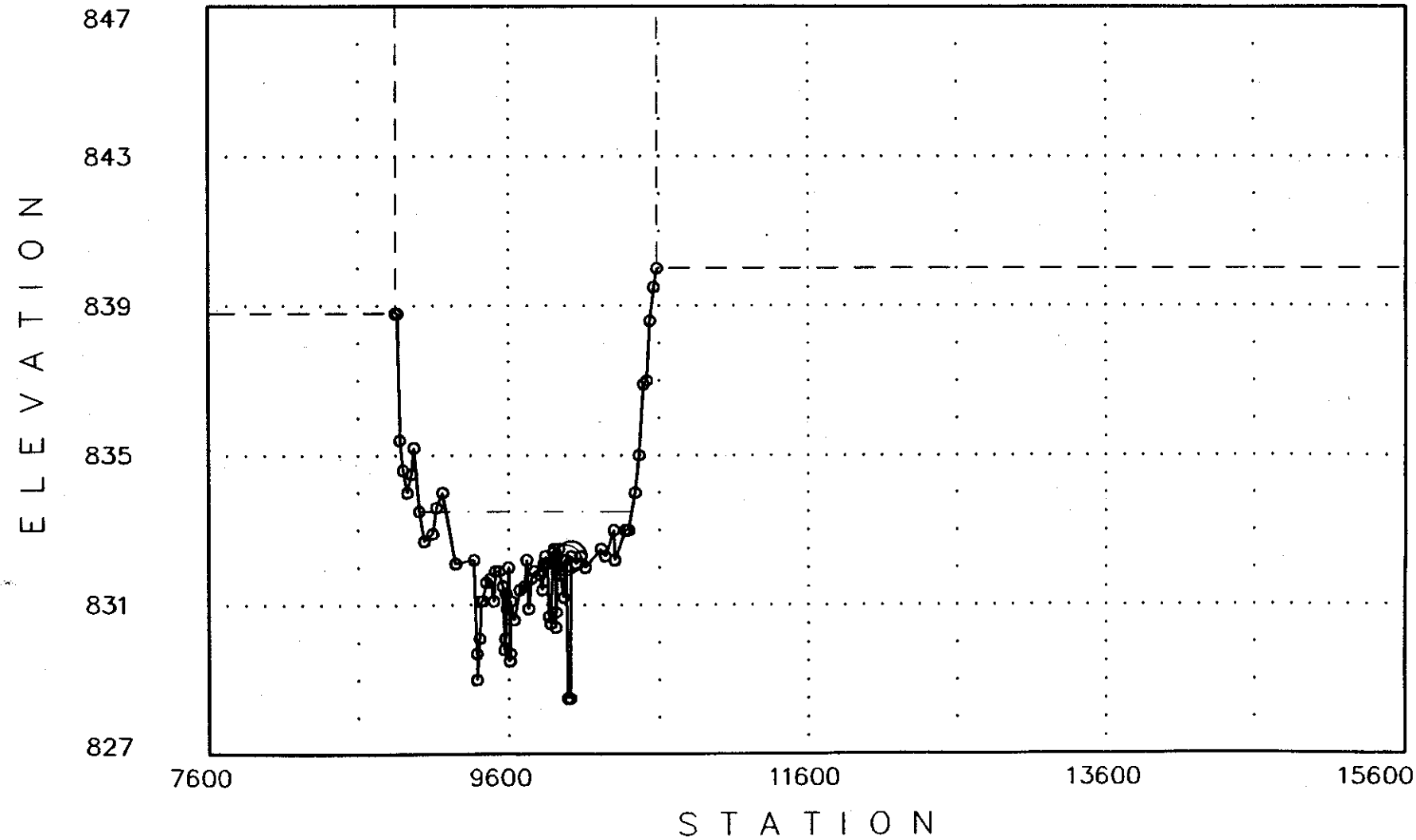


02-21-19

<<<<<< Cross Section: 3.182: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 833.5

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

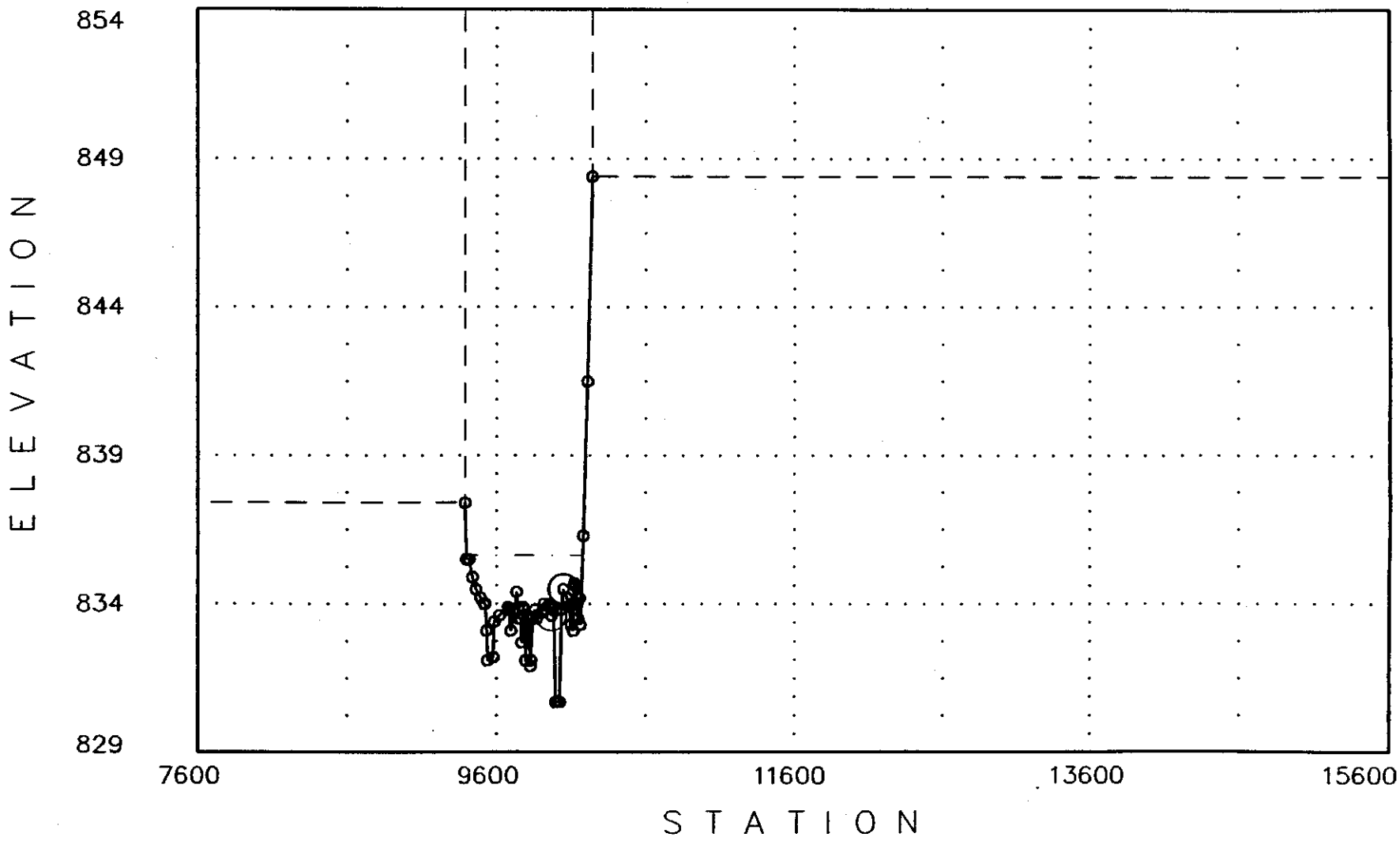


02-21-1993

<<<<<< Cross Section: 3.248: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 835.64

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

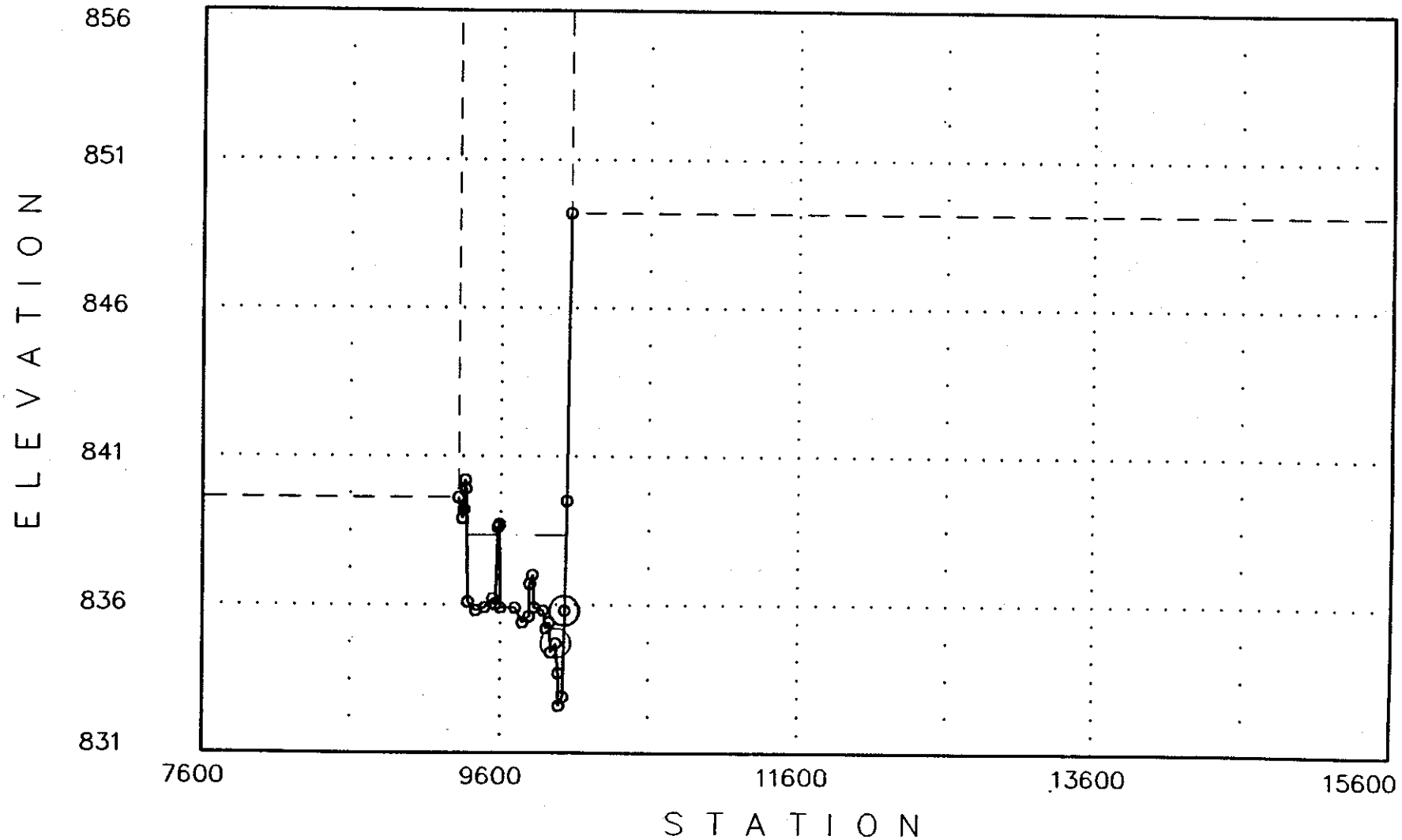


02-21-1

<<<<<< Cross Section: 3.344: (FN = LUKE.AHO) >>>>>>

Q1= 6674 WS1= 838.34

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

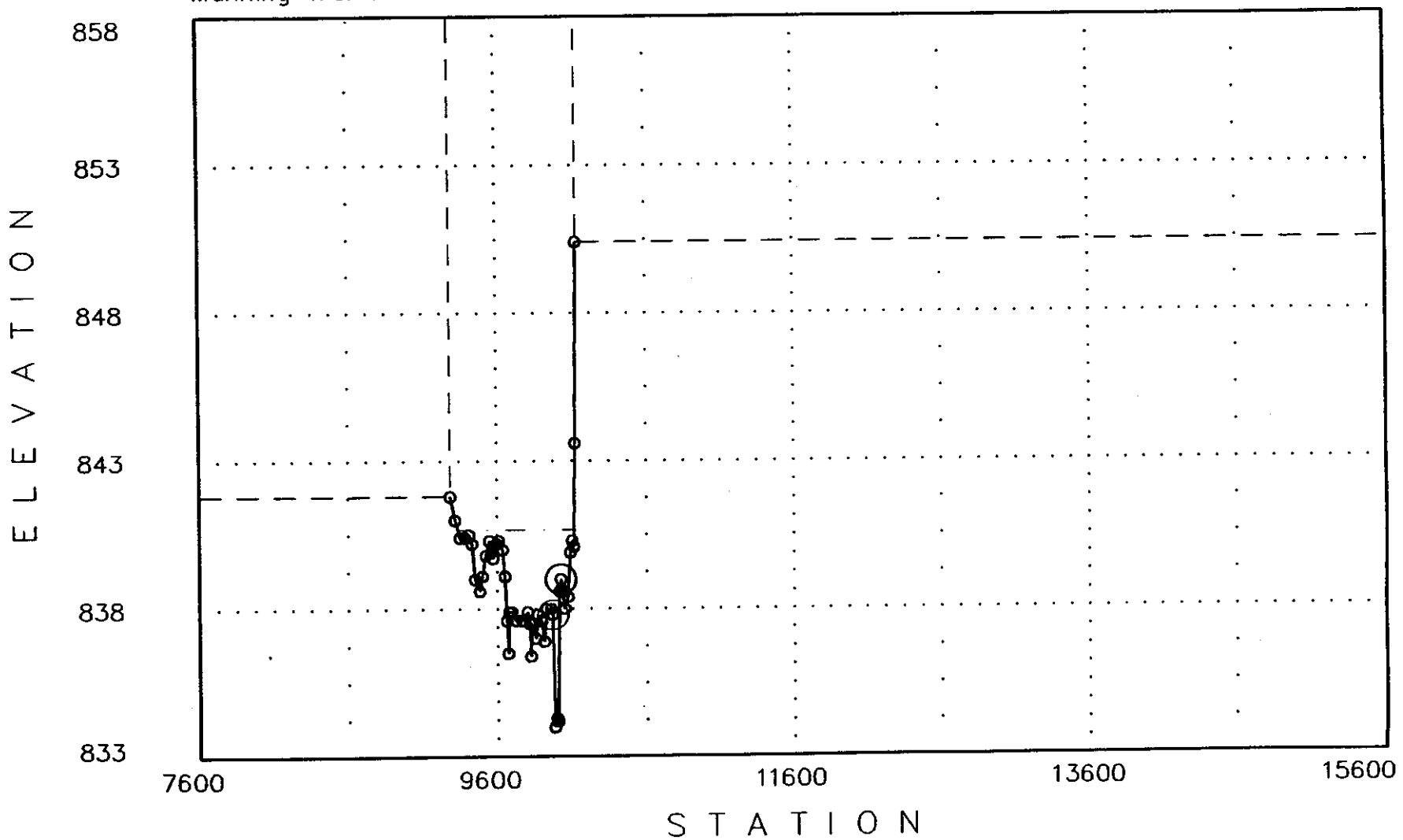


02-21-1993

<<<<<< Cross Section: 3.44: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 840.67

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

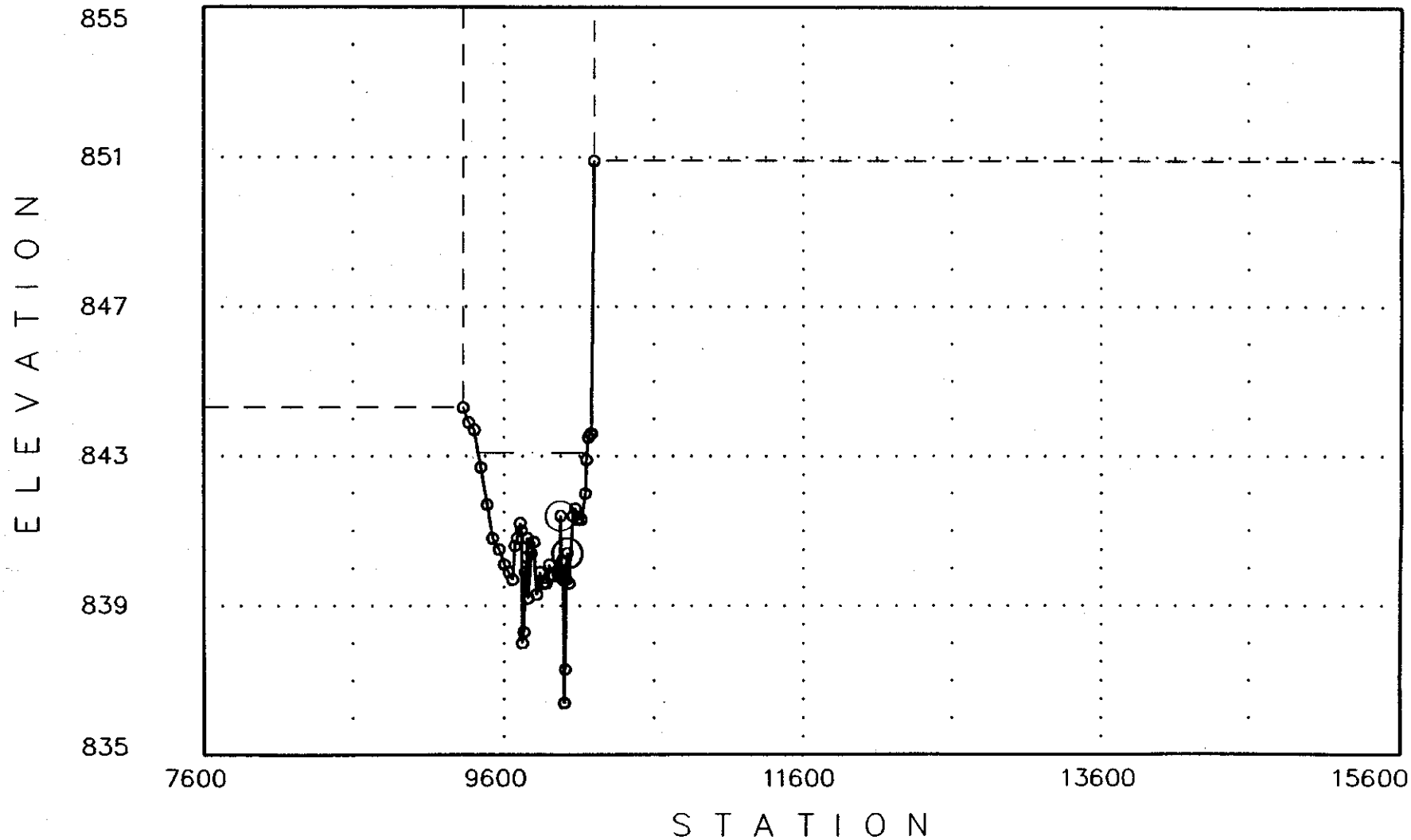


02-21-

<<<<<< Cross Section: 3.535: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 843.09

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .055

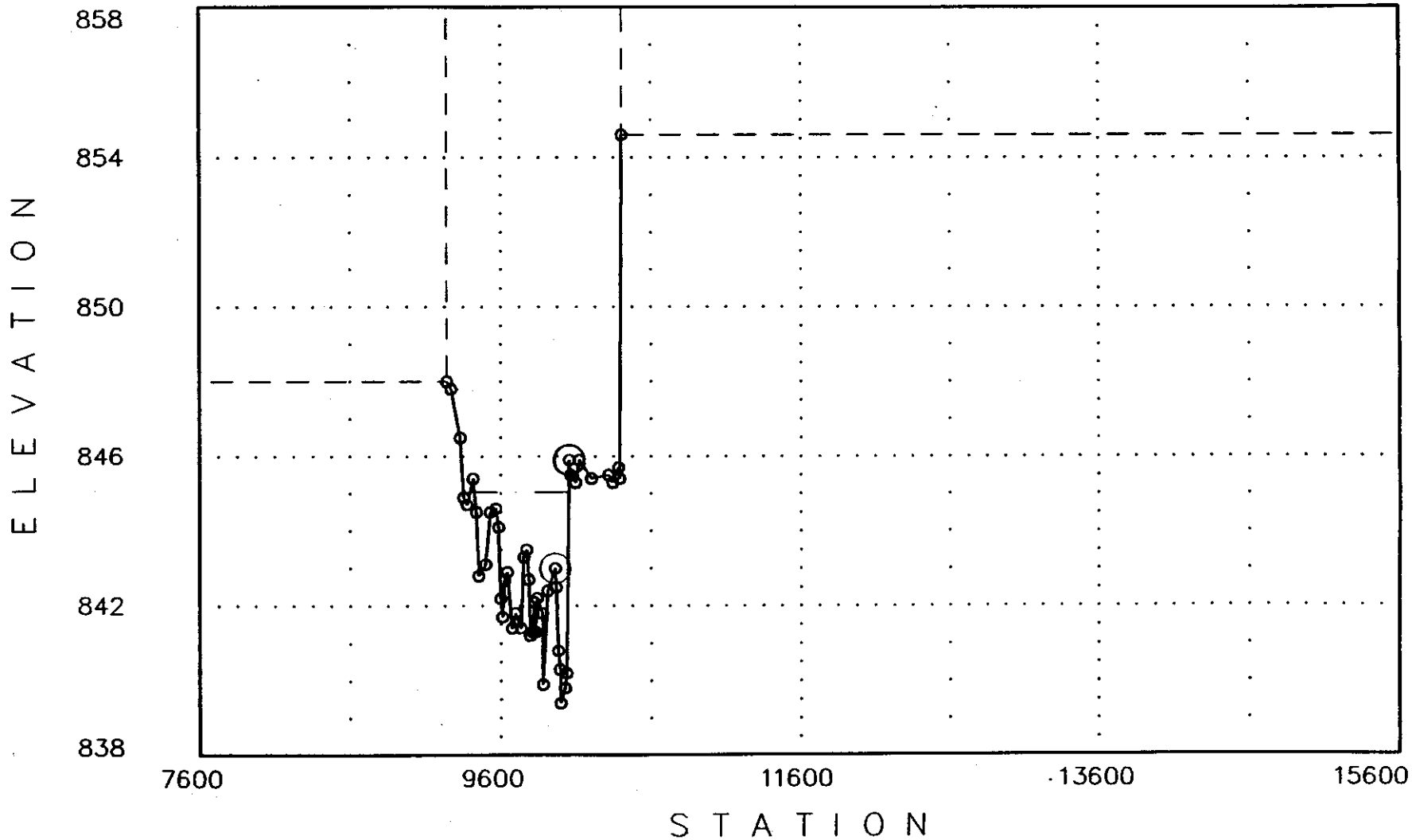


02-21-1993

<<<<<< Cross Section: 3.63: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 845.05

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065

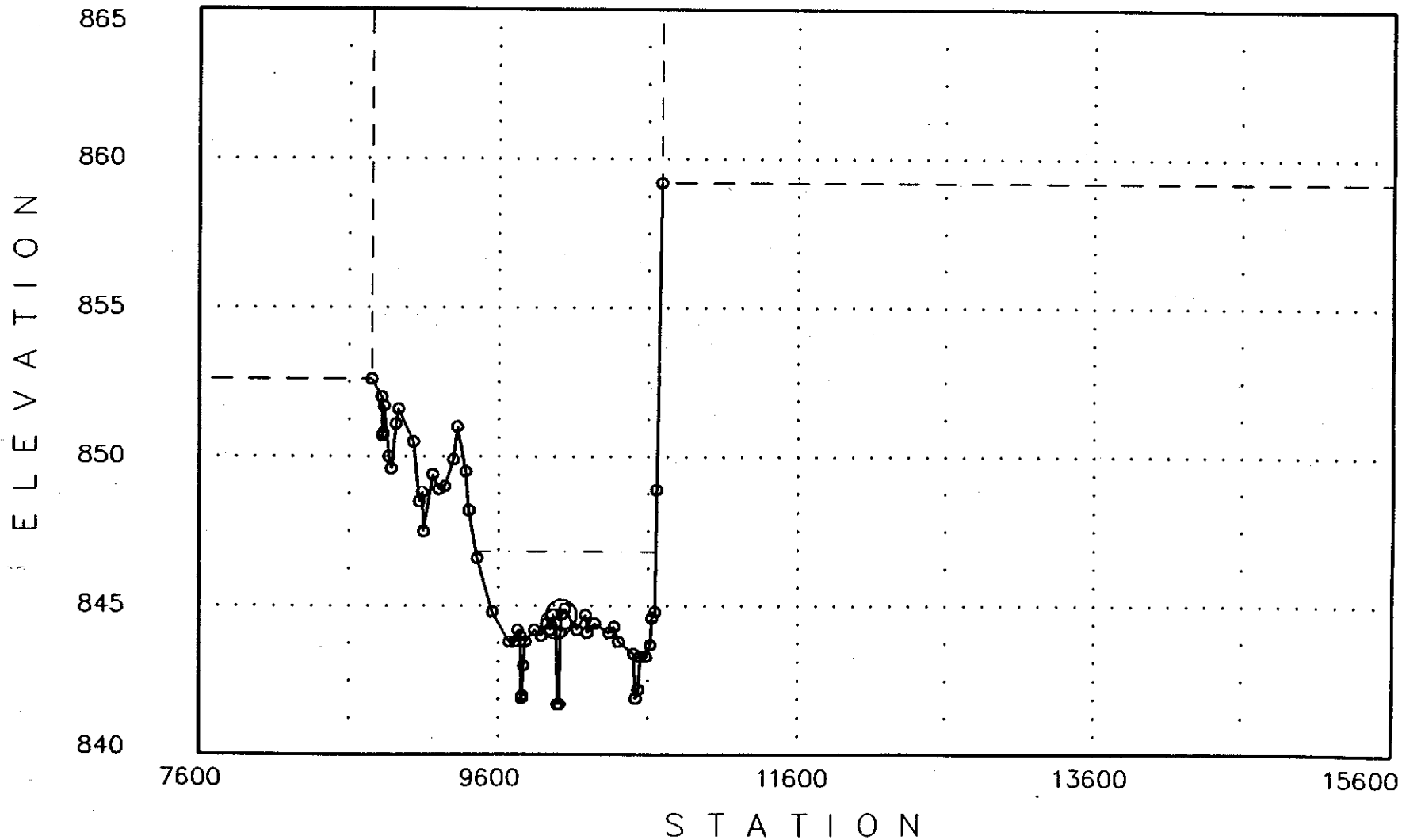


02-21-

<<<<<< Cross Section: 3.742: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 846.82

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065

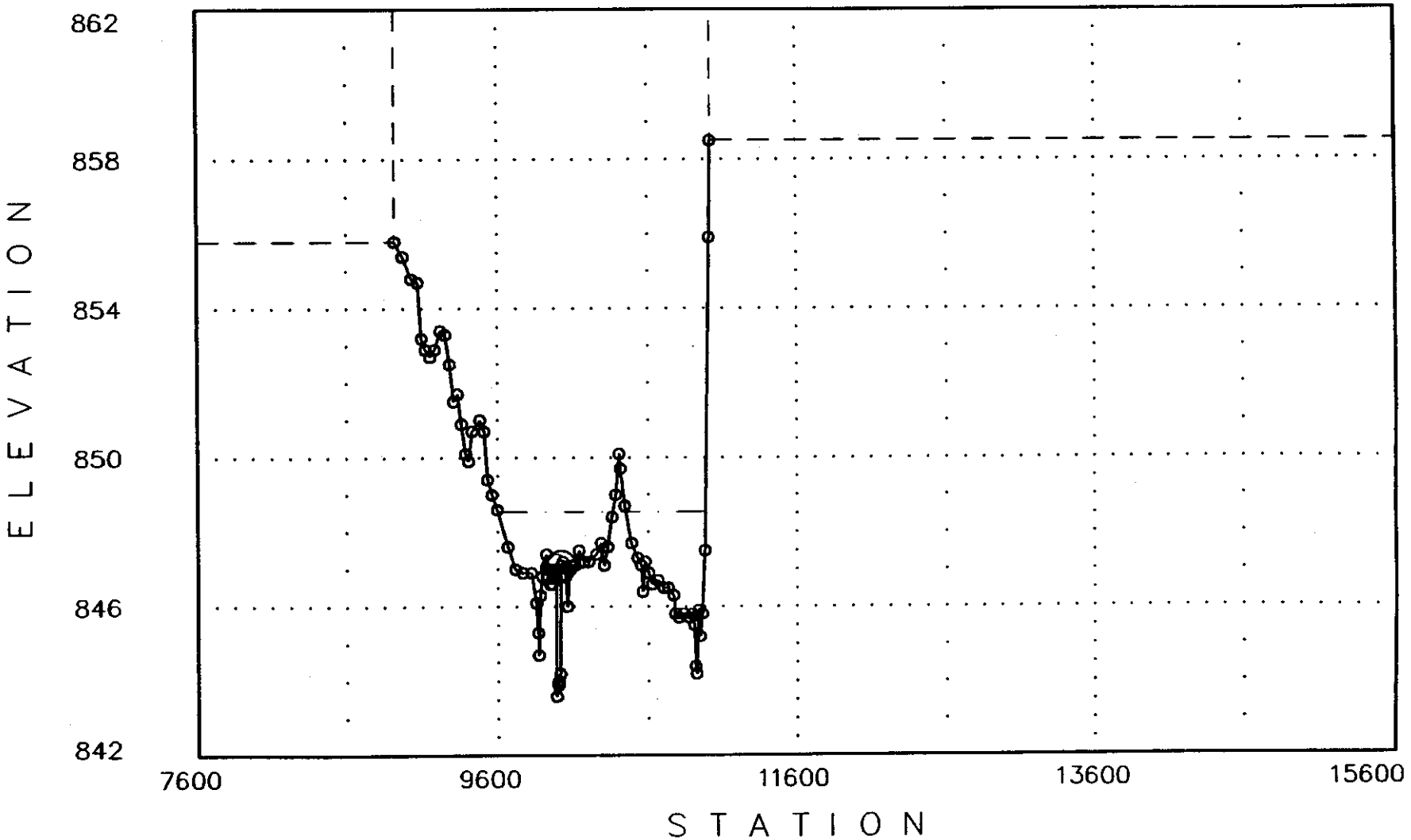


02-21-1993

<<<<<< Cross Section: 3.863: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 848.54

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065

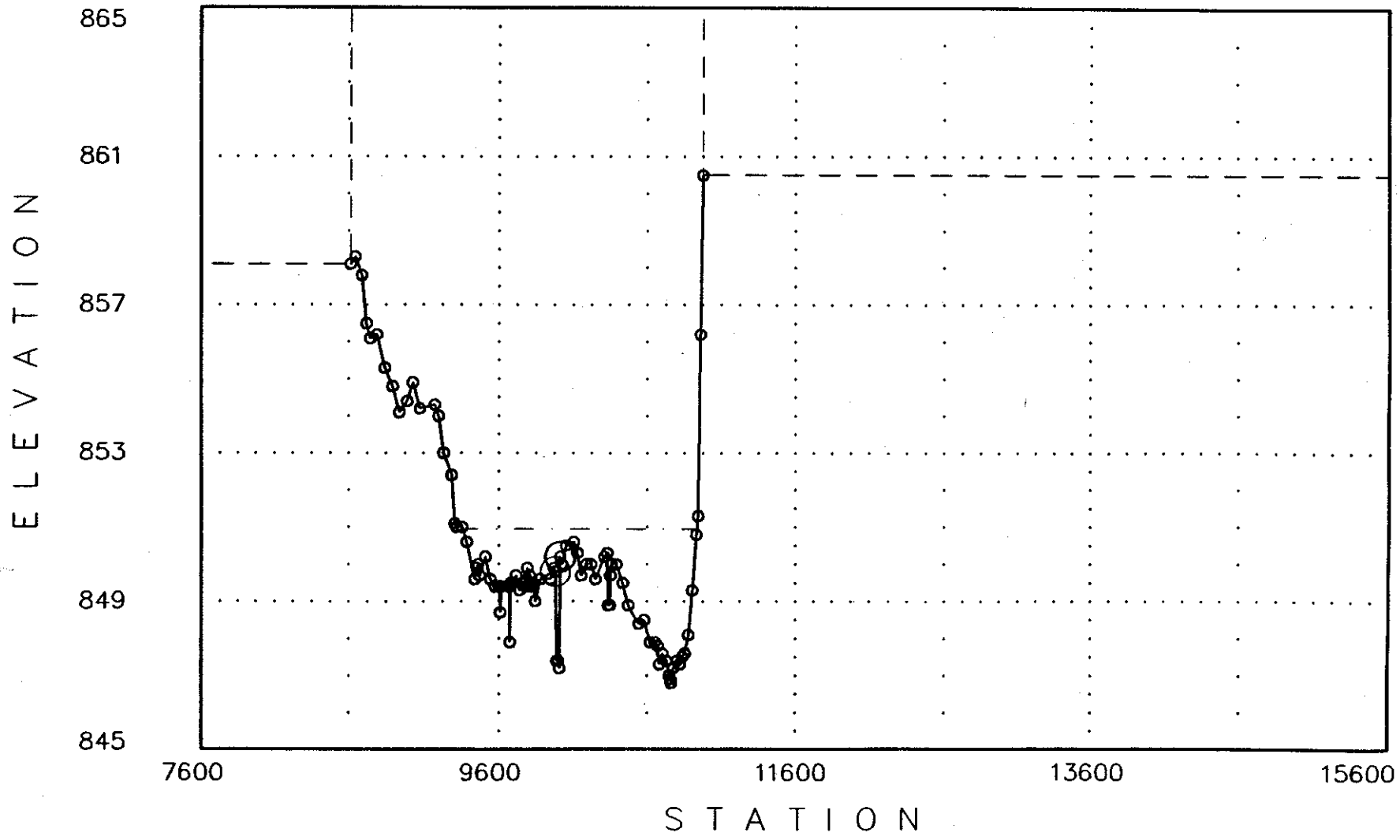


02-21-19

<<<<<< Cross Section: 3.966: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 850.95

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065

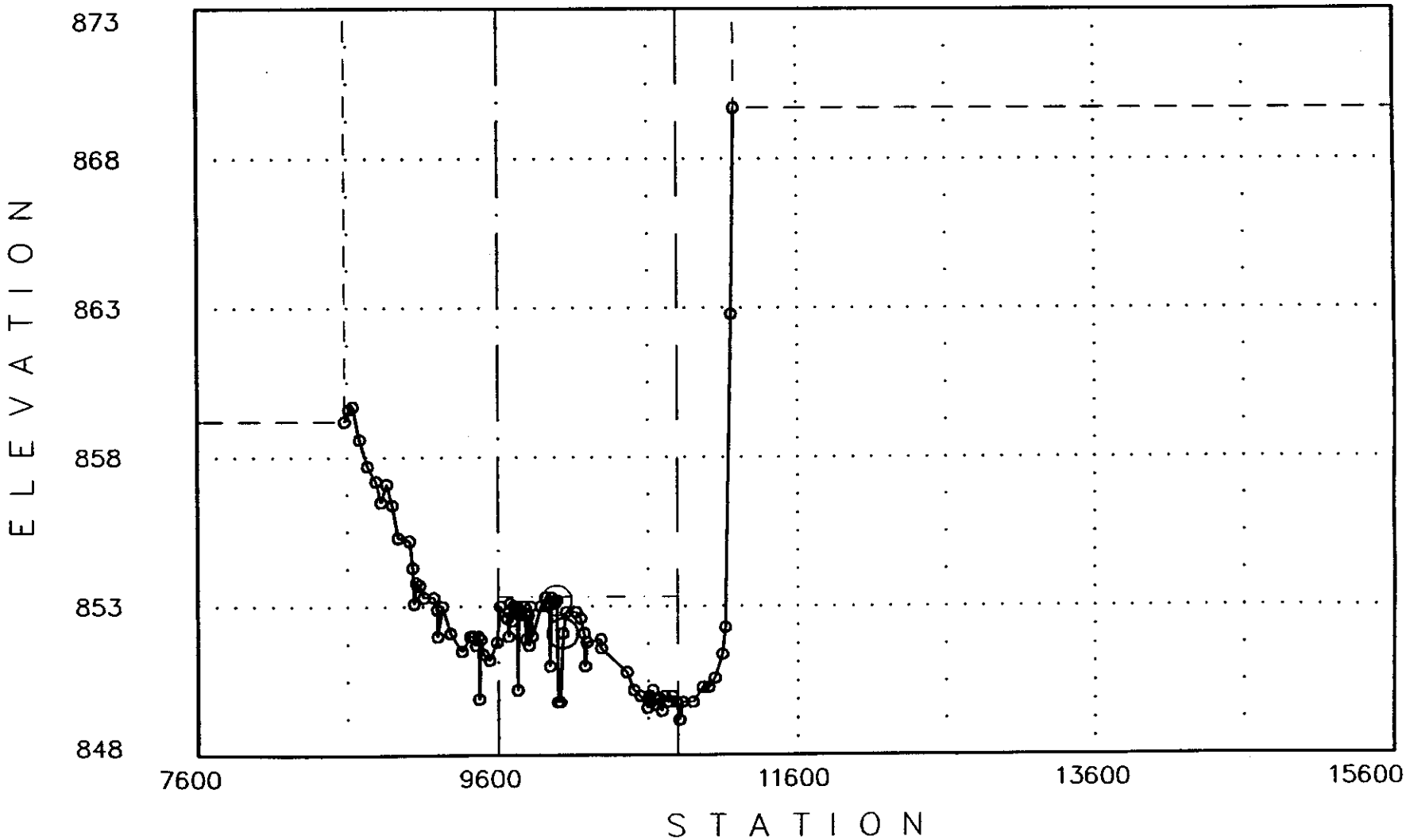


02-21-1993

<<<<<< Cross Section: 4.088: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 853.33

Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065

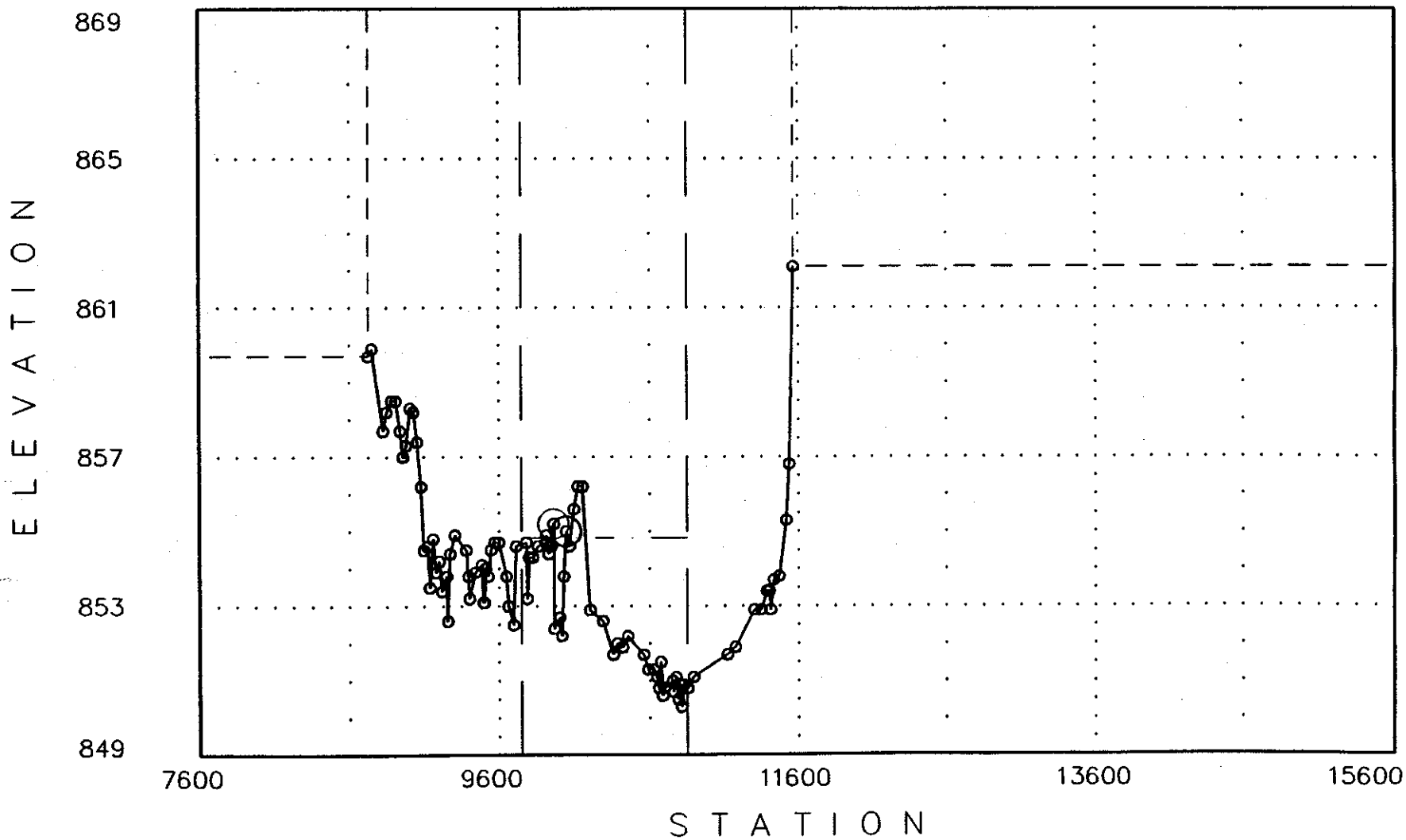


02-21-1

<<<<<< Cross Section: 4.158: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 854.83

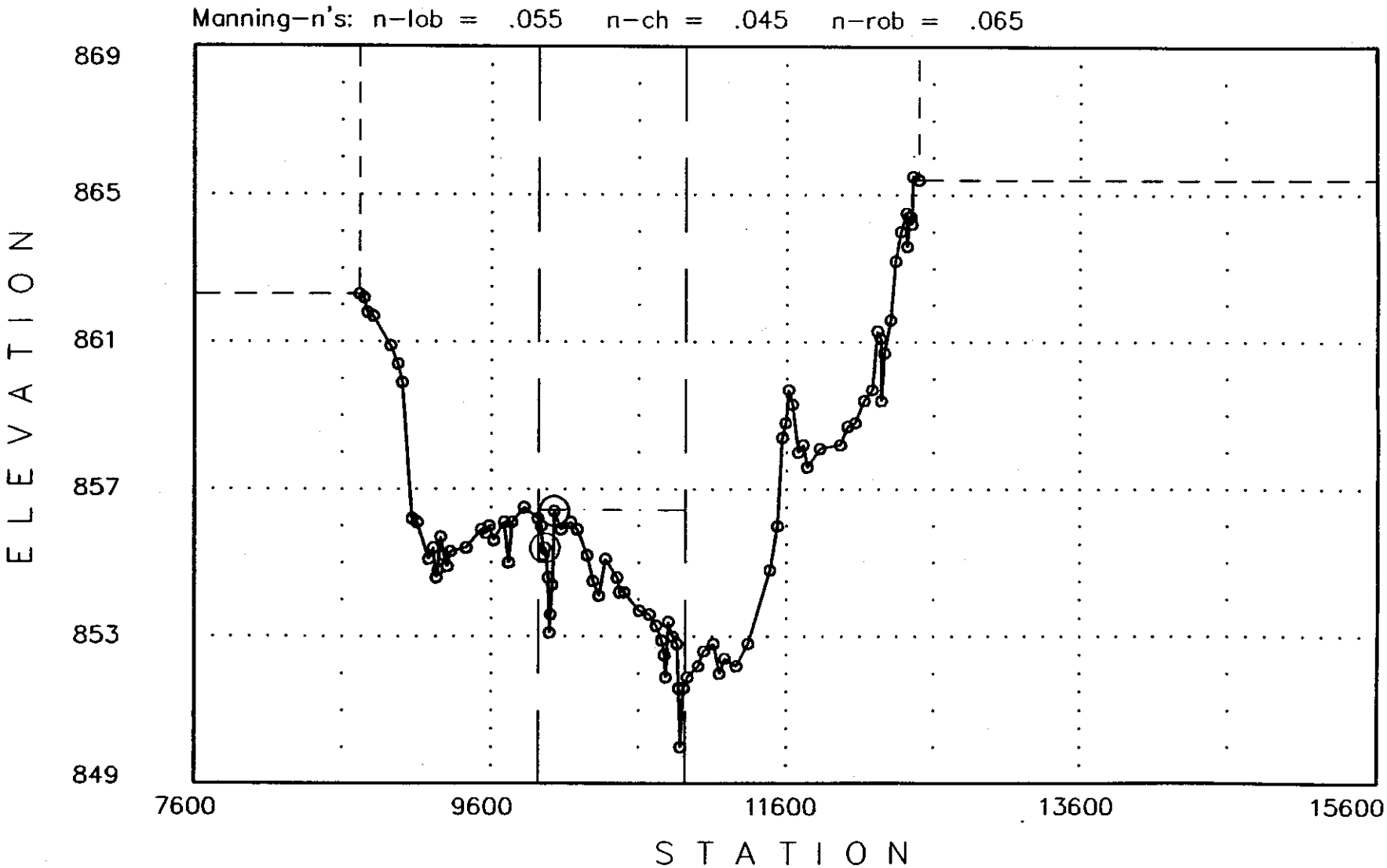
Manning-n's: n-lob = .055 n-ch = .045 n-rob = .065



02-21-1993

<<<<<< Cross Section: 4.223: (FN = LUKE.AHO) >>>>>>

Q1= 6757 WS1= 856.43



02-21-19

SECTION II

MINOR TRIBUTARY HEC-2 OUTPUT AND CROSS SECTION PLOTS

```
*******************************************
* HEC-2 WATER SURFACE PROFILES            *
*                                         *
* Version   4.6.2;  May 1991              *
*                                         *
* RUN DATE    21FEB93    TIME   11:09:39  *
*******************************************
```

```
****************************************
* U.S. ARMY CORPS OF ENGINEERS         *
* HYDROLOGIC ENGINEERING CENTER        *
* 609 SECOND STREET, SUITE D           *
* DAVIS, CALIFORNIA 95616-4687         *
*          (916) 756-1104              *
****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

THIS RUN EXECUTED 21FEB93 11:09:39

```
************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************


T1      LUKE WASH FLOOD INSURANCE STUDY, FOR FCDMC (#90-68), BY CVL (#1090-07)
T2      MINOR TRIBUTARY FROM LUKE WASH TO THE SOUTHERN PACIFIC RAILROAD
T3      100-YR EVENT    EXISTING CONDITION          FILE NAME - MINTRIB.AH

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0    0.0049         0         0         0    835.86         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1         0        -1         0         0         0        -1         0         0         15


    VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         8         3         2        26         5        39        53
      4        54        37

QT        2       590       590
NC    0.045     0.045     0.045       0.1       0.3
ET     .389       7.1       9.1                                          9850     10047      9980     10047
        MINOR TRIBUTARY TO LUKE WASH, FROM THE LUKE WASH FLOODPLAIN TO
        THE SOUTHERN PACIFIC RAILROAD.
        PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
        PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
        PREPARED BY COE & VAN LOO CONSULTANTS, INC.  (CVL #1090-07)
        TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
        FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
        THE CONTROL LINE OF MINOR TRIBUTARY TO LUKE WASH IS STATION 10,000.
        ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
        CROSS SECTION NUMBERS FOR MINOR TRIBUTARY TO LUKE WASH ARE STATIONED
        IN RIVER MILES FROM THE CONFLUENCE WITH LUKE WASH.
        THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
        FROM LUKE WASH WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
        ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
        MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
        IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
        LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
        IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
        FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
```

```
        HYDROLOGY IS BASED ON THE 100-YEAR, 6-HOUR HEC-1 MODEL PREPARED FOR
        THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
        100-YEAR FLOW = 590 CFS FROM CONCENTRATION POINT C355.
X1    .389       34    9980.5   10015.8        0        0        0
GR   849.6     9572     848.8    9586.3    845.5   9606.6    841.7   9643.6    838.9   9675.8
GR   836.2   9696.8     836.3    9718.7    836.2   9748.5      836   9760.4    836.5   9774.2
GR   837.9   9798.3     840.2    9820.3    841.4   9833.5    841.5   9849.9    840.6   9870.3
GR   838.6     9895     837.3    9926.6    836.4   9943.3    835.1   9966.8    835.2   9980.5
GR   834.1   9997.3     831.6     10000      833  10015.8    833.1  10028.7    835.6  10040.2
GR     836    10047     835.7   10051.7    833.9  10056.4    833.3  10058.6    833.2    10131
GR   833.2  10180.7     833.4   10268.2    833.3  10306.1    837.4  10315.3

ET    .487               9.1                                                    9970    10060
X1    .487       38    9978.6   10007.5      545      465      630
GR   838.4   9761.4     838.1    9770.3    838.4   9786.1    837.9   9806.9      838   9846.1
GR   837.9   9879.9     837.1    9918.1    837.3   9950.9    837.3   9978.6    837.1   9994.1
GR   834.9    10000     834.9   10002.5    837.2  10007.5    837.2  10035.8    835.6  10040.5
GR   836.6  10047.2     837.2   10056.7    837.5  10067.8    837.4  10096.3    837.5  10108.8
GR   836.4  10117.4     836.5   10124.1      837  10131.6    837.4    10154    837.4  10165.6
GR   834.8  10174.8     836.8   10181.6    837.5  10193.8    837.4    10209    837.1  10226.6
GR   836.3  10234.7     836.9   10245.2    836.9  10271.6    837.4  10290.5    837.8  10308.7
GR     838  10324.7     840.3   10340.2    840.3    10355

ET    .570               9.1                                                    9950    10060
X1    .570       31    9975.5   10011.1      410      445      438
GR   850.8   9611.8     850.9    9621.5      850   9638.4    849.1   9658.7    848.8   9685.4
GR     849     9703     847.3    9722.3    846.1   9745.1    843.6   9767.5    841.1   9793.1
GR   840.2   9814.9     839.1    9835.2    839.4   9871.1    839.3   9901.6    839.1   9926.1
GR   839.1   9947.6     838.3    9957.6      839   9975.5    839.2   9993.7      837    10000
GR   839.2  10011.1     839.5   10029.6    838.8  10059.3    838.9    10101    839.2  10136.9
GR   839.2  10176.8     839.6   10206.8    840.3  10229.7    840.9    10255    841.3  10283.4
GR   841.7  10313.5

ET    .634               9.1                                                    9930    10020
X1    .634       31    9980.1   10003.9      280      370      338
GR   845.6   9653.6     843.9     9680    843.2    9713      842   9738.3      841   9770.9
GR   840.1   9795.5       841    9810.8    841.2   9823.5    840.2   9829.9      840   9832.5
GR   840.8   9841.3     840.8    9856.6    840.7   9884.2    840.2   9910.4    840.7     9933
GR     841   9960.1     840.8    9980.1    840.3   9995.8    837.8    10000    840.2  10003.9
GR   840.4  10034.1     840.8   10083.6    840.7    10123    841.1  10148.6      841  10171.4
GR   841.3  10197.7     841.8   10228.6    842.9  10267.6    843.3  10302.5    843.5  10326.7
GR   843.8  10375.5

ET    .723       .7.1       9.1                                   9654    10250     9963    10070
        SECTION .723, RIGHT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.
X1    .723       46    9983.8   10030.2      390      480      470
GR   854.3   9653.1     854.2    9669.3    853.5   9686.2    852.4   9706.1    848.9   9726.9
GR   846.9   9743.6     846.8    9762.4    846.9   9779.3      849   9801.8    849.3   9830.5
GR   849.6     9860     849.5    9878.2    847.9   9899.3    846.4   9920.6    843.9   9939.5
GR   843.1     9952     842.8     9965     842.6     9968    843.1   9971.5    843.6   9983.8
GR   842.6    10000       843   10030.2    842.7  10047.4    842.9  10064.3    842.9    10074
GR     842  10081.8     843.2   10087.4    842.7  10128.8    842.7  10154.3    843.1  10176.9
GR   843.6  10204.9     843.9   10224.7    844.2  10251.9    843.6    10281    843.2  10310.1
GR   843.2  10331.3     843.5     10355    842.9  10385.6    843.4  10403.6      844  10429.8
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GR    844.4     10484     844.5    10530.7     845.2    10583.5     846.2    10635.4       847    10662.1
GR    847.9   10684.1

QT        2       657       657
ET     .834                 9.1                                                          9991      10060
          100-YEAR FLOW = 657 CFS FROM CONCENTRATION POINT S340.
X1     .834        45    9991.3    10017.9       610        550       586
GR      860    9593.4     859.4     9612.7     858.2       9642     855.6     9672.1     853.6     9691.6
GR    850.9    9709.7     850.1     9725.4     848.8     9748.1     847.8     9769.2     847.7     9790.1
GR    847.5    9799.2     846.8     9801.3     847.9     9806.9       848       9819     848.9     9845.7
GR    849.2    9874.2     848.9     9900.9     847.4     9922.8     845.6     9940.5     844.9     9948.8
GR    844.6    9950.7     845.8       9954       846     9976.2     845.8     9991.3     844.7     10000
GR    844.8   10008.7       845    10017.9     845.3      10024     845.3    10045.7     845.4    10063.8
GR    845.9   10088.3     845.8    10117.2     845.7    10144.9     845.6    10171.6     845.3     10187
GR    844.1   10192.3       845    10198.1     845.1    10209.7     846.6    10224.5     846.3    10238.6
GR    845.4   10249.7     846.2    10269.7     847.8    10287.5       849    10309.9     850.5    10338.1

ET     .970                 9.1                                                          9974      10075
X1     .970        49    9993.9    10009.6       720        670       718
GR    860.3    9663.9     859.1       9680     857.2     9693.6     857.8     9705.1     858.7     9722.7
GR    858.6    9737.2     857.3     9759.1     855.8     9783.3       854     9808.5     853.3      9829
GR    851.1    9862.1     850.2     9880.6     850.4     9914.7     849.4     9934.6     849.1     9954.9
GR    848.9    9970.2     849.1     9984.3     849.1     9993.9     846.3      10000     848.5    10009.6
GR    849.8   10031.2       850      10055     850.1    10076.7     849.6    10091.6     847.4    10098.3
GR    847.9   10101.2       850    10108.9       851    10119.3     850.7    10138.5     849.6    10160.8
GR    849.8   10193.1     849.5    10218.5     849.6      10238     850.8    10262.1     850.4    10281.5
GR    850.4   10303.2     851.6    10319.5     851.8    10347.8     852.1    10371.8     852.1    10389.6
GR    852.9   10412.3     851.2    10415.1     851.2    10422.2     853.2    10424.7     852.9    10434.2
GR    851.5   10456.4     851.4    10486.8     852.1    10518.4     853.4    10544.5

ET    1.054       7.1       9.1                                       9875      10405      9990      10055
          SECTION 1.054, LEFT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.
X1    1.054        43      9995    10004.4       425        435       444
GR    868.3    9494.4       867     9516.2     864.3     9548.8     861.4     9574.3     859.9     9584.8
GR    857.7    9608.2     857.1     9622.8     857.3     9648.5     857.2     9666.1     855.1     9697.3
GR    853.7      9726     853.1     9761.9     852.9     9785.3     852.4     9798.8     851.1     9803.6
GR    851.1    9805.2       853      9807.3     852.9     9818.3     852.8     9847.1     853.5      9873
GR    853.1    9906.7       852      9926.2     851.6     9961.1     851.6     9976.2     851.4      9995
GR    848.8     10000     848.9    10004.4     851.9    10011.4     851.6    10036.1     851.3    10079.6
GR    851.8   10113.2     851.7    10149.1       852    10188.3       852    10205.3       855    10236.8
GR    855.3   10252.1     854.6    10267.9     853.7    10284.6     853.5    10299.5     854.1    10324.5
GR    854.6   10347.1     855.8    10372.3     857.6    10405.6

ET    1.127                 9.1                                                          9970      10090
X1    1.127        58    9992.4    10012.5       380        380       385
GR    863.5    9527.8     863.2     9540.2     862.4       9547       861     9555.1     863.7     9566.9
GR    864.6    9577.5     863.7     9595.6     862.1     9617.1     860.8      9632     859.8     9639.3
GR    861.3    9653.7     862.7     9670.9     862.7     9694.7     861.6     9726.8     860.5     9758.7
GR    859.9    9781.7     858.6     9810.2     857.7      9838     855.5     9872.3     854.8     9896.3
GR    853.5    9909.9     853.6     9929.9     854.2     9951.8     854.2      9985     853.6     9992.4
GR    853.4     10000     853.9    10012.5     852.2    10018.2     853.8    10024.4     853.9    10037.3
GR    854.1   10048.1     853.1    10052.5     853.2    10055.5     854.5    10059.6     854.1    10079.1
GR      854   10109.7       854    10132.1     854.1    10163.1       854    10170.4     852.7    10176.2
GR    852.9   10180.4     853.9    10186.7     853.7    10194.6     853.2    10200.7       854    10207.8
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GR    855.2    10222.5      856    10240.6      856.1    10268.1      855.9    10312.1      856.2    10347.6
GR    856.2    10397.8    856.7      10446        858    10493.8      858.6    10522.5      858.3    10549.7
GR    859.7    10578.2    860.8    10599.8      860.7    10607.9

ET    1.221        7.1      9.1                                       9900      10070       9960      10020
         SECTIONS 1.221 AND 1.242 ENCROACHEDAT A 4:1 DOWNSTREAM FROM THE
         SOUTHERN PACIFIC RAILROAD BRIDGE.
X1    1.221         47   9995.3    10008.7      495      485       496
GR    866.1     9410.3    865.9       9428      865    9446.8      862.9     9469.9      861.9       9491
GR      860     9514.5    860.4     9523.6    860.4    9550.6      859.4     9589.2      859.3       9606
GR    857.9     9610.1    858.5     9618.6    859.2    9629.5      859.4       9649      859.4     9656.4
GR    857.7     9665.8    858.4     9679.4    858.6    9727.9      857.8     9811.8      857.6       9836
GR    855.5     9841.7    857.4     9851.9    857.1    9878.8        856     9889.9      855.9     9904.4
GR    855.6     9923.9    856.6     9939.3      856    9955.9      856.1     9976.4      856.2     9995.3
GR    853.9      10000    854.1    10003.4    855.6   10008.7      856.8    10030.6      856.3    10058.2
GR    855.6    10075.4    856.3    10089.2    857.9   10105.9      858.6    10131.4      859.2    10157.5
GR      858    10170.7      859    10196.2    858.6   10236.2        859      10277        860    10318.2
GR    860.3    10344.2    860.9    10381.6

ET    1.242        7.1      9.1                                       9940      10040       9980      10020
X1    1.242         53   9997.5      10010      110      115        111
GR    870.2     9036.2    870.2       9063    869.5    9086.5      868.4       9102      869.3     9121.5
GR    870.8     9142.1    870.4     9164.4      870    9188.8        869     9206.5      867.6       9220
GR    866.9     9234.7      868     9256.5    869.4    9282.7      870.3     9315.5      869.8     9347.7
GR    868.9     9377.5    868.1     9394.5    864.5    9420.4      862.6     9451.6      860.8     9478.2
GR    860.2     9513.6    860.1     9549.6    858.7    9563.7      859.7     9583.8      859.3     9605.2
GR    859.6     9634.1    859.3     9670.8    859.3    9710.6      858.8     9734.5      858.4     9771.5
GR    858.3     9829.9    857.4       9884    857.4    9917.3      857.4     9954.3      856.3     9980.2
GR    856.6     9997.5    854.2      10000      857     10010      856.7    10045.4      856.8    10072.4
GR    857.3    10079.7    857.7    10123.4    856.9     10153      857.2      10177      857.3    10203.3
GR    858.8    10237.8    859.6    10270.2    860.2   10303.6      858.8      10347      858.8    10386.1
GR    859.9    10449.6      862    10503.3    862.2   10552.4
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=     .100 CEHV=     .300
*SECNO  .389

3470 ENCROACHMENT STATIONS=     9850.0   10047.0  TYPE=      1  TARGET=      197.000
        MINOR TRIBUTARY TO LUKE WASH, FROM THE LUKE WASH FLOODPLAIN TO
        THE SOUTHERN PACIFIC RAILROAD.
        PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
        PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
        PREPARED BY COE & VAN LOO CONSULTANTS, INC.  (CVL #1090-07)
        TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
        FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
        THE CONTROL LINE OF MINOR TRIBUTARY TO LUKE WASH IS STATION 10,000.
        ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
        CROSS SECTION NUMBERS FOR MINOR TRIBUTARY TO LUKE WASH ARE STATIONED
        IN RIVER MILES FROM THE CONFLUENCE WITH LUKE WASH.
        THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
        FROM LUKE WASH WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
        ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
        MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
        IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
        LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
        IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
        FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
        HYDROLOGY IS BASED ON THE 100-YEAR, 6-HOUR HEC-1 MODEL PREPARED FOR
        THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
        100-YEAR FLOW = 590 CFS FROM CONCENTRATION POINT C355.
     .389      4.26    835.86    834.86       .00    836.11       .25       .00       .00    835.20
    590.0      24.3     345.5     220.2      14.9      84.7      54.2        .0        .0    833.00
      .00      1.63      4.08      4.06      .045      .045      .045      .000    831.60   9953.06
   .004943       0.        0.        0.         0        14         0       .00     91.56  10044.62


FLOW DISTRIBUTION FOR SECNO=       .39          CWSEL=    835.86

STA=    9953.    9967.    9981.   10016.   10029.   10040.   10045.
  PER Q=      1.1      3.0     58.6     28.4      8.9       .1
   AREA=      5.2      9.7     84.7     36.3     17.4       .6
    VEL=      1.2      1.8      4.1      4.6      3.0       .6
  DEPTH=       .4       .7      2.4      2.8      1.5       .1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .487

3265 DIVIDED FLOW

.487	3.13	837.93	837.46	.00	837.98	.04	1.85	.02	837.30
590.0	70.4	80.9	438.7	58.5	39.8	259.3	3.0	3.2	837.20
.09	1.20	2.03	1.69	.045	.045	.045	.000	834.80	9805.53
.002582	545.	630.	465.	5	17	0	.00	464.93	10319.34

FLOW DISTRIBUTION FOR SECNO= .49 CWSEL= 837.93

STA=	9806.	9951.	9979.	10008.	10036.	10047.	10068.	10109.	10124.	10154.	10175.	10182.	10209.
PER Q=	8.3	3.7	13.7	4.8	7.8	4.1	3.5	6.0	6.6	8.2	6.6	3.6	
AREA=	41.0	17.5	39.8	20.7	19.5	16.3	19.8	18.4	25.3	23.0	14.5	16.9	
VEL=	1.2	1.2	2.0	1.4	2.4	1.5	1.0	1.9	1.5	2.1	2.7	1.3	
DEPTH=	.3	.6	1.4	.7	1.7	.8	.5	1.2	.8	1.1	2.1	.6	

STA=	10209.	10235.	10245.	10272.	10291.	10319.
PER Q=	5.9	4.8	7.9	3.6	.9	
AREA=	22.0	14.0	27.3	14.8	6.8	
VEL=	1.6	2.0	1.7	1.4	.8	
DEPTH=	.9	1.3	1.0	.8	.2	

*SECNO .570

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .56

.570	2.74	839.74	839.51	.00	839.83	.10	1.84	.02	839.00
590.0	202.7	126.9	260.4	89.0	39.9	117.2	6.1	7.5	839.20
.14	2.28	3.18	2.22	.045	.045	.045	.000	837.00	9823.53
.008133	410.	438.	445.	3	13	0	.00	387.61	10211.14

FLOW DISTRIBUTION FOR SECNO= .57 CWSEL= 839.74

STA=	9824.	9871.	9902.	9926.	9948.	9958.	9976.	10011.	10059.	10101.	10137.	10177.	10211.
PER Q=	6.2	3.1	4.3	5.1	5.3	10.3	21.5	8.0	17.1	9.6	7.0	2.4	
AREA=	21.0	11.7	13.0	13.6	10.3	19.4	39.9	24.4	36.8	24.5	21.2	10.3	
VEL=	1.8	1.6	2.0	2.2	3.0	3.1	3.2	1.9	2.7	2.3	2.0	1.4	
DEPTH=	.4	.4	.5	.6	1.0	1.1	1.1	.5	.9	.7	.5	.3	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .634

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.53

.634	3.65	841.45	841.02	.00	841.50	.05	1.66	.00	840.80
590.0	283.6	80.1	226.2	167.0	33.8	136.6	8.2	10.6	840.20
.19	1.70	2.37	1.66	.045	.045	.045	.000	837.80	9756.16
.003474	280.	338.	370.	3	11	0	.00	450.96	10207.11

FLOW DISTRIBUTION FOR SECNO= .63 CWSEL= 841.45

STA=	9756.	9796.	9811.	9833.	9841.	9884.	9910.	9933.	9960.	9980.	10004.	10034.	10084.
PER Q=	7.2	4.2	3.5	3.2	7.5	8.7	7.5	3.8	2.5	13.6	12.6	12.5	
AREA=	25.5	13.8	12.8	9.3	29.4	26.3	22.7	16.3	11.0	33.8	34.8	42.2	
VEL=	1.7	1.8	1.6	2.0	1.5	1.9	1.9	1.4	1.3	2.4	2.1	1.7	
DEPTH=	.6	.9	.6	1.1	.7	1.0	1.0	.6	.6	1.4	1.2	.9	

STA=	10084.	10123.	10149.	10207.
PER Q=	7.2	3.1	2.9	
AREA=	27.7	14.1	17.8	
VEL=	1.5	1.3	.9	
DEPTH=	.7	.6	.3	

*SECNO .723

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .63

3470 ENCROACHMENT STATIONS= 9654.0 10250.0 TYPE= 1 TARGET= 596.000
SECTION .723, RIGHT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.

.723	1.76	843.76	843.48	.00	843.88	.12	2.35	.02	843.60
590.0	60.1	108.6	421.3	25.1	39.4	148.3	11.1	14.3	843.00
.23	2.39	2.75	2.84	.045	.045	.045	.000	842.00	9941.77
.008642	390.	470.	480.	4	17	0	.00	273.35	10215.12

FLOW DISTRIBUTION FOR SECNO= .72 CWSEL= 843.76

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9942.	9965.	9972.	9984.	10030.	10047.	10064.	10074.	10082.	10087.	10129.	10154.	10177.
PER Q=	5.5	3.2	1.4	18.4	7.6	8.1	3.9	6.3	3.6	15.0	14.5	9.1	
AREA=	13.8	6.3	5.0	39.4	15.6	16.1	8.3	10.2	6.5	33.3	26.9	19.3	
VEL=	2.4	3.0	1.7	2.8	2.9	3.0	2.8	3.6	3.3	2.7	3.2	2.8	
DEPTH=	.6	1.0	.4	.9	.9	1.0	.9	1.3	1.2	.8	1.1	.9	

STA=	10177.	10205.	10215.
PER Q=	3.2	.1	
AREA=	11.3	.8	
VEL=	1.7	.6	
DEPTH=	.4	.1	

*SECNO .834

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.82

100-YEAR FLOW = 657 CFS FROM CONCENTRATION POINT S340.

.834	2.45	846.55	846.03	.00	846.62	.06	2.74	.01	845.80
657.0	83.4	108.1	465.6	47.6	42.3	238.1	14.6	18.3	845.00
.31	1.75	2.56	1.96	.045	.045	.045	.000	844.10	9931.11
.003242	610.	586.	550.	6	8	0	.00	339.96	10273.65

FLOW DISTRIBUTION FOR SECNO= .83 CWSEL= 846.55

STA=	9931.	9949.	9976.	9991.	10018.	10024.	10046.	10064.	10088.	10117.	10145.	10172.	10187.
PER Q=	4.5	6.1	2.1	16.4	3.1	9.1	7.1	5.9	4.6	5.5	6.5	5.2	
AREA=	15.3	22.4	9.9	42.3	8.6	27.2	21.8	22.2	20.4	22.3	24.2	17.0	
VEL=	1.9	1.8	1.4	2.6	2.4	2.2	2.1	1.8	1.5	1.6	1.8	2.0	
DEPTH=	.9	.8	.7	1.6	1.4	1.3	1.2	.9	.7	.8	.9	1.1	

STA=	10187.	10192.	10198.	10210.	10250.	10270.	10274.
PER Q=	4.2	5.2	6.6	4.3	3.6	.1	
AREA=	9.8	11.6	17.5	19.8	15.1	.7	
VEL=	2.8	3.0	2.5	1.4	1.6	.6	
DEPTH=	1.9	2.0	1.5	.5	.8	.2	

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .970

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57

      .970      3.74    850.04    849.93       .00    850.32       .28      3.64       .06    849.10
     657.0     184.4     233.8     238.9      60.0      39.7      86.3      18.6      23.1    848.50
       .36      3.07      5.89      2.77      .045      .045      .045      .000    846.30   9921.79
   .009932      720.      718.      670.         3        14         0       .00    268.76  10246.91


FLOW DISTRIBUTION FOR SECNO=       .97          CWSEL=    850.04

STA=    9922.    9955.    9970.    9984.    9994.   10010.   10031.   10098.   10101.   10109.   10193.   10238.   10247.
  PER Q=      7.9      8.2      7.6      4.4     35.6      9.0      7.7      6.2      4.4      3.1      5.7       .4
    AREA=    20.2     16.0     14.7      9.1     39.7     19.3     16.9      6.9      8.4     13.1     19.6      2.0
     VEL=      2.6      3.4      3.4      3.2      5.9      3.0      3.0      5.8      3.4      1.6      1.9      1.2
   DEPTH=       .6      1.0      1.0       .9      2.5       .9       .3      2.4      1.1       .2       .4       .2

*SECNO 1.054

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.68


3470 ENCROACHMENT STATIONS=     9875.0   10405.0  TYPE=      1  TARGET=      530.000
        SECTION 1.054, LEFT OVERBANK ENCROACHED TO ELIMINATE INEFFECTIVE FLOW.
     1.054      3.84    852.64    852.28       .00    852.74       .09      2.40       .02    851.40
     657.0     132.0     117.7     407.3      70.2      29.4     202.3      21.0      25.9    848.90
       .41      1.88      4.00      2.01      .045      .045      .045      .000    848.80   9914.83
   .003507      425.      444.      435.         4        13         0       .00    297.21  10212.04


FLOW DISTRIBUTION FOR SECNO=      1.05          CWSEL=    852.64

STA=    9915.    9961.    9976.    9995.   10004.   10011.   10036.   10080.   10113.   10149.   10188.   10212.
  PER Q=      8.3      4.8      7.0     17.9      7.6      6.1     17.3     11.6      8.8      7.9      2.7
    AREA=    33.0     15.7     21.5     29.4     15.7     22.0     51.8     36.7     32.0     31.0     13.1
     VEL=      1.7      2.0      2.1      4.0      3.2      1.8      2.2      2.1      1.8      1.7      1.4
   DEPTH=       .7      1.0      1.1      3.1      2.2       .9      1.2      1.1       .9       .8       .6
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.127

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

1.127	2.42	854.62	854.35	.00	854.74	.12	1.99	.01	853.60
657.0	158.0	64.4	434.6	62.9	20.6	152.7	23.4	28.6	853.90
.45	2.51	3.12	2.85	.045	.045	.045	.000	852.20	9898.20
.008652	380.	385.	380.	4	14	0	.00	317.18	10215.38

FLOW DISTRIBUTION FOR SECNO= 1.13 CWSEL= 854.62

STA=	9898.	9930.	9952.	9985.	9992.	10013.	10018.	10024.	10037.	10053.	10060.	10110.	10132.
PER Q=	12.5	5.9	3.6	2.0	9.8	5.5	6.3	3.9	4.4	3.9	6.9	4.7	
AREA=	27.9	15.7	13.9	5.3	20.6	8.9	10.0	9.9	11.2	7.6	23.6	13.9	
VEL=	2.9	2.5	1.7	2.5	3.1	4.0	4.1	2.6	2.6	3.4	1.9	2.2	
DEPTH=	.9	.7	.4	.7	1.0	1.6	1.6	.8	.7	1.1	.5	.6	

STA=	10132.	10163.	10176.	10180.	10187.	10201.	10208.	10215.
PER Q=	5.7	5.3	5.3	4.1	6.3	3.4	.5	
AREA=	17.6	11.5	7.6	7.7	13.6	7.2	2.3	
VEL=	2.1	3.0	4.6	3.5	3.1	3.1	1.4	
DEPTH=	.6	.9	1.8	1.2	1.0	1.0	.3	

*SECNO 1.221

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

3470 ENCROACHMENT STATIONS= 9900.0 10070.0 TYPE= 1 TARGET= 170.000
SECTIONS 1.221 AND 1.242 ENCROACHEDAT A 4:1 DOWNSTREAM FROM THE
SOUTHERN PACIFIC RAILROAD BRIDGE.

1.221	3.54	857.44	856.94	.00	857.58	.13	2.83	.00	856.20
657.0	352.8	147.7	156.5	133.2	36.8	68.7	26.1	31.3	855.60
.50	2.65	4.01	2.28	.045	.045	.045	.000	853.90	9900.00
.004126	495.	496.	485.	3	11	0	.00	170.00	10070.00

FLOW DISTRIBUTION FOR SECNO= 1.22 CWSEL= 857.44

STA=	9900.	9904.	9924.	9939.	9956.	9976.	9995.	10009.	10031.	10058.	10070.
PER Q=	2.4	15.3	8.2	6.8	11.6	9.5	22.5	10.3	7.5	6.1	
AREA=	6.8	33.2	20.8	19.1	28.7	24.6	36.8	27.4	24.9	16.4	
VEL=	2.3	3.0	2.6	2.3	2.7	2.5	4.0	2.5	2.0	2.4	
DEPTH=	1.5	1.7	1.4	1.2	1.4	1.3	2.7	1.3	.9	1.4	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.242

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .53

3470 ENCROACHMENT STATIONS= 9940.0 10040.0 TYPE= 1 TARGET= 100.000

1.242	3.81	858.01	857.84	.00	858.45	.44	.78	.09	856.60
657.0	303.6	208.0	145.4	66.1	30.7	34.3	26.5	31.7	857.00
.50	4.59	6.77	4.24	.045	.045	.045	.000	854.20	9940.00
.014552	110.	111.	115.	2	8	0	.00	100.00	10040.00

FLOW DISTRIBUTION FOR SECNO= 1.24 CWSEL= 858.01

STA=	9940.	9954.	9980.	9998.	10010.	10040.
PER Q=	3.8	20.3	22.2	31.7	22.1	
AREA=	8.8	30.2	27.1	30.7	34.3	
VEL=	2.8	4.4	5.4	6.8	4.2	
DEPTH=	.6	1.2	1.6	2.5	1.1	

THIS RUN EXECUTED 21FEB93 11:09:43

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YR EVENT EXISTING

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
	.389	590.00	835.86	4.26	836.11	834.86	4.08	49.43	.00	9953.06	91.56	10044.62	.00
	.487	590.00	837.93	3.13	837.98	837.46	2.03	25.82	630.00	9805.53	464.93	10319.34	3.23
*	.570	590.00	839.74	2.74	839.83	839.51	3.18	81.33	438.00	9823.53	387.61	10211.14	7.47
*	.634	590.00	841.45	3.65	841.50	841.02	2.37	34.74	338.00	9756.16	450.96	10207.11	10.62
*	.723	590.00	843.76	1.76	843.88	843.48	2.75	86.42	470.00	9941.77	273.35	10215.12	14.33
*	.834	657.00	846.55	2.45	846.62	846.03	2.56	32.42	586.00	9931.11	339.96	10273.65	18.30
*	.970	657.00	850.04	3.74	850.32	849.93	5.89	99.32	718.00	9921.79	268.76	10246.91	23.08
*	1.054	657.00	852.64	3.84	852.74	852.28	4.00	35.07	444.00	9914.83	297.21	10212.04	25.89
*	1.127	657.00	854.62	2.42	854.74	854.35	3.12	86.52	385.00	9898.20	317.18	10215.38	28.57
*	1.221	657.00	857.44	3.54	857.58	856.94	4.01	41.26	496.00	9900.00	170.00	10070.00	31.31
*	1.242	657.00	858.01	3.81	858.45	857.84	6.77	145.52	111.00	9940.00	100.00	10040.00	31.66

SUMMARY OF ERRORS AND SPECIAL NOTES

```
WARNING SECNO=      .570  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .634  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .723  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .834  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .970  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     1.054  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     1.127  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

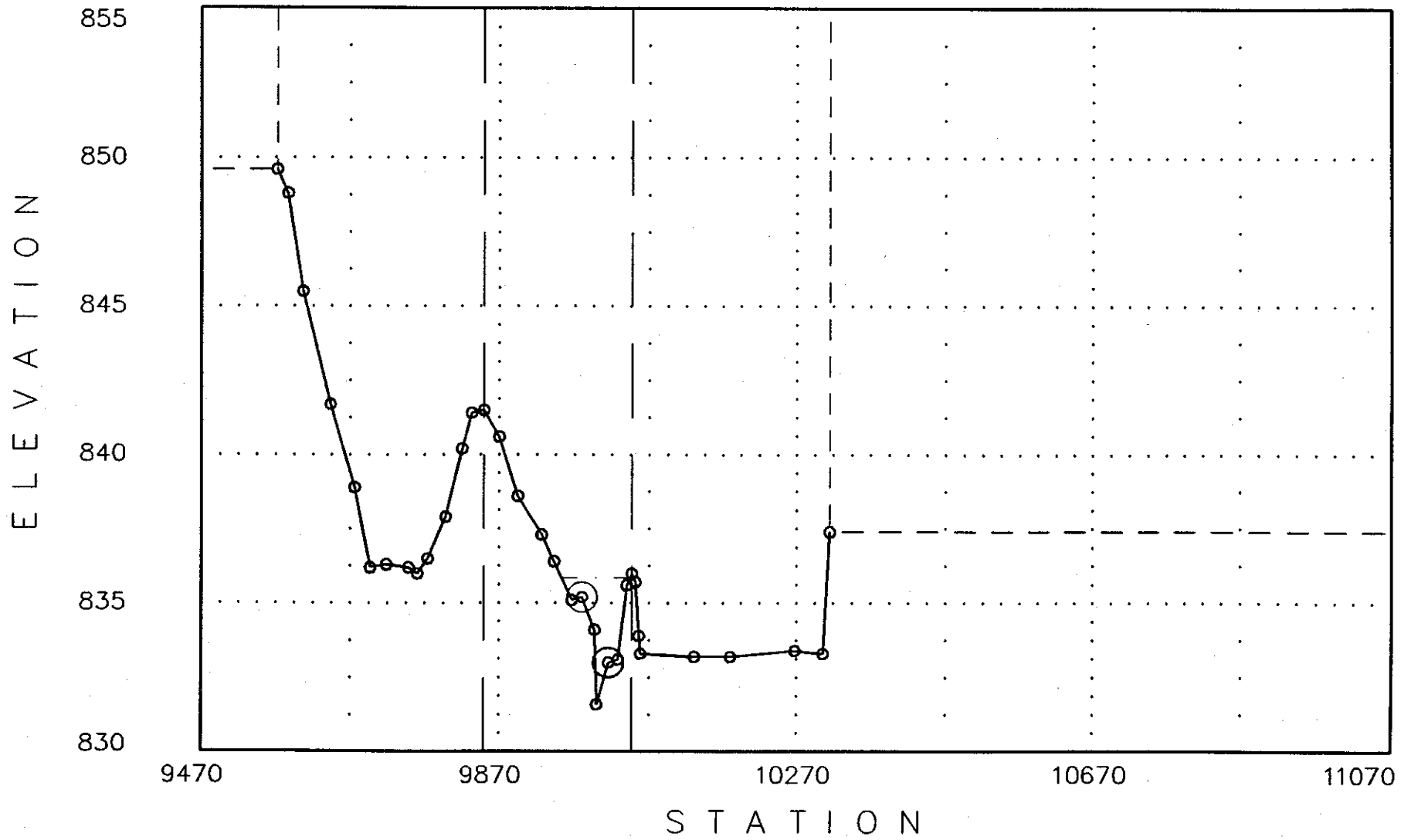
WARNING SECNO=     1.221  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     1.242  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

<<<<<< Cross Section: .389: (FN = MINTRIB.AHO) >>>>>>

Q1= 590 WS1= 835.86

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

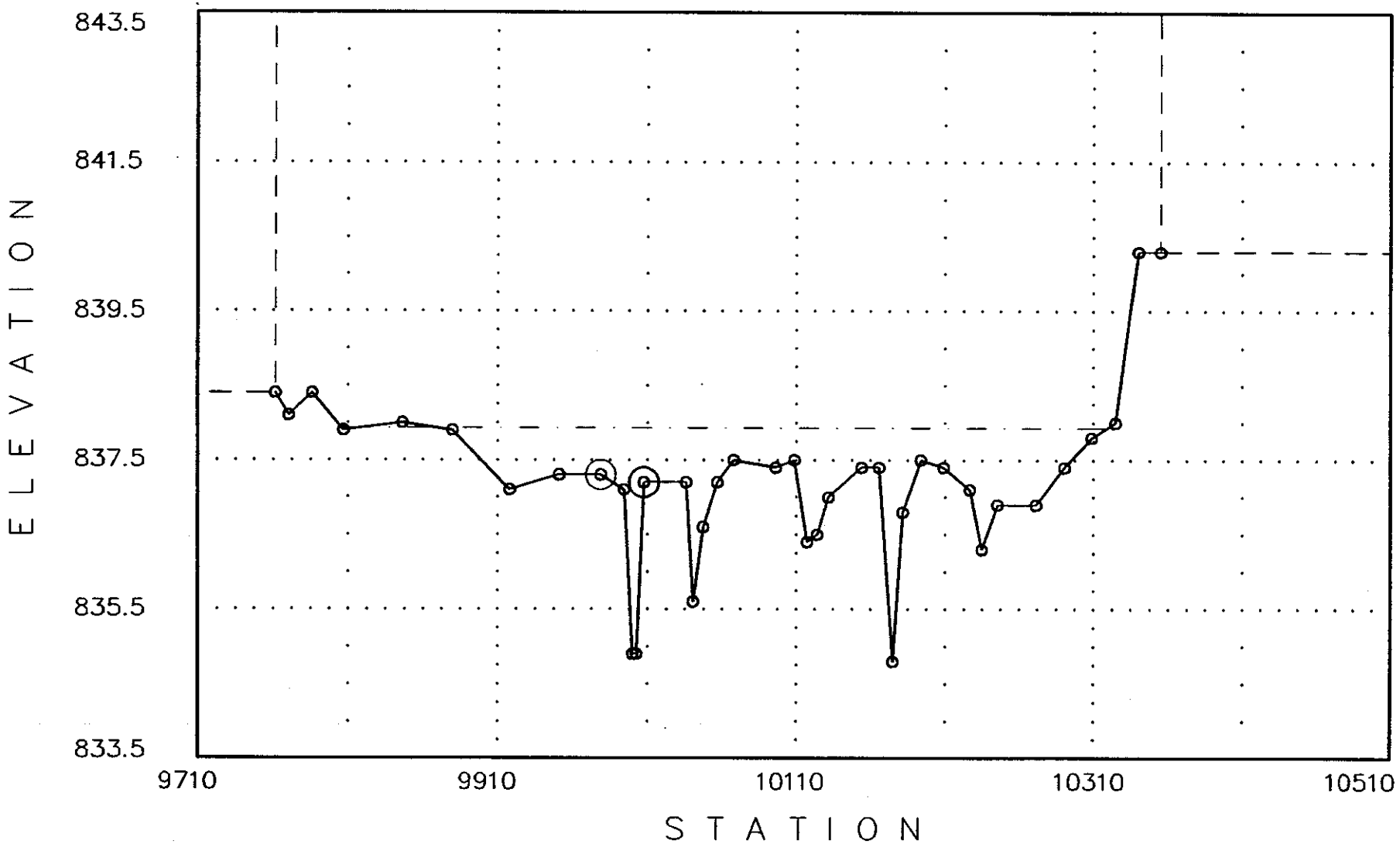


02-21-1993

<<<<<< Cross Section: .487: (FN = MINTRIB.AHO) >>>>>>

Q1= 590 WS1= 837.93

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

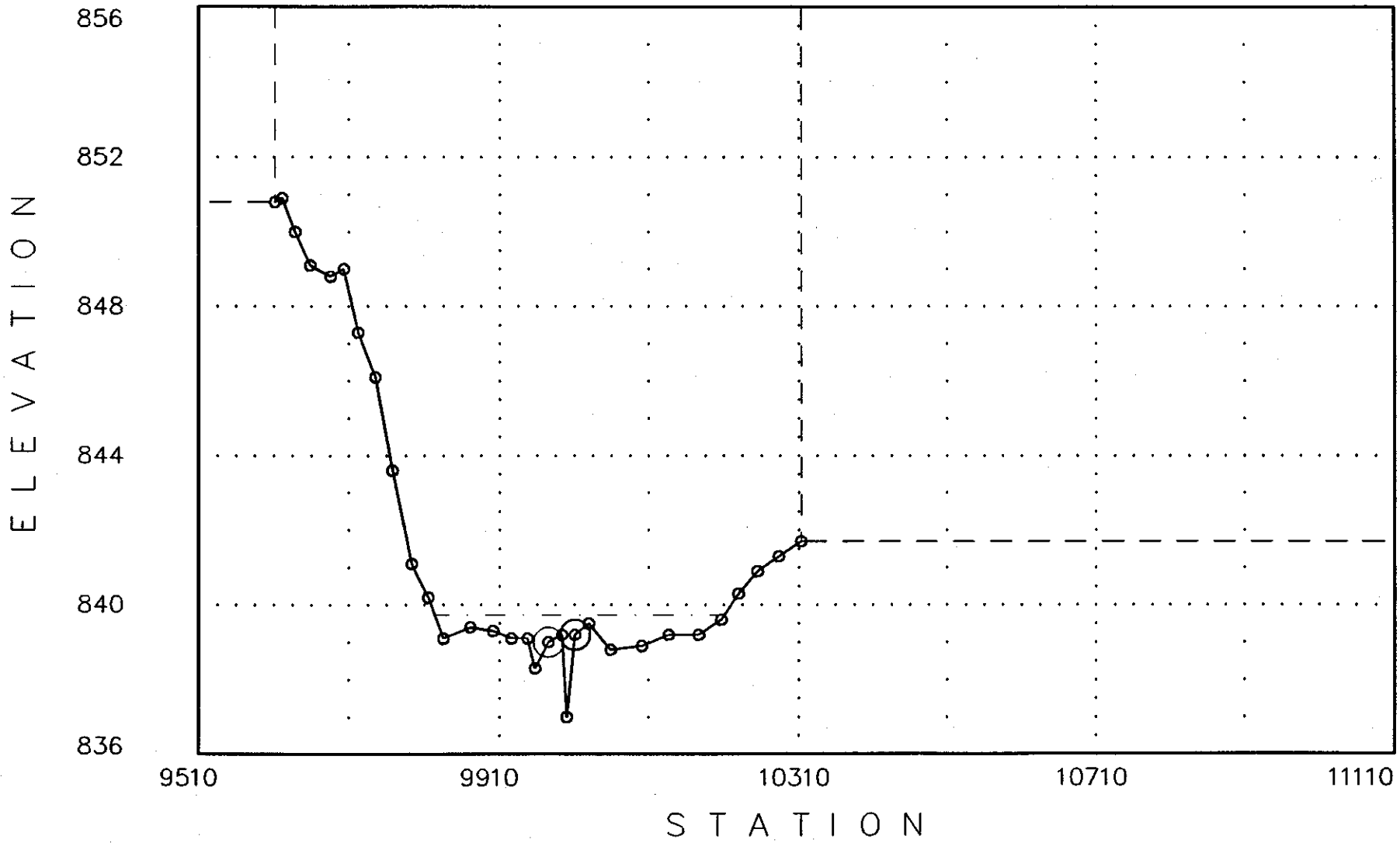


02-21-1993

<<<<<< Cross Section: .57: (FN = MINTRIB.AHO) >>>>>>

Q1= 590 WS1= 839.74

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

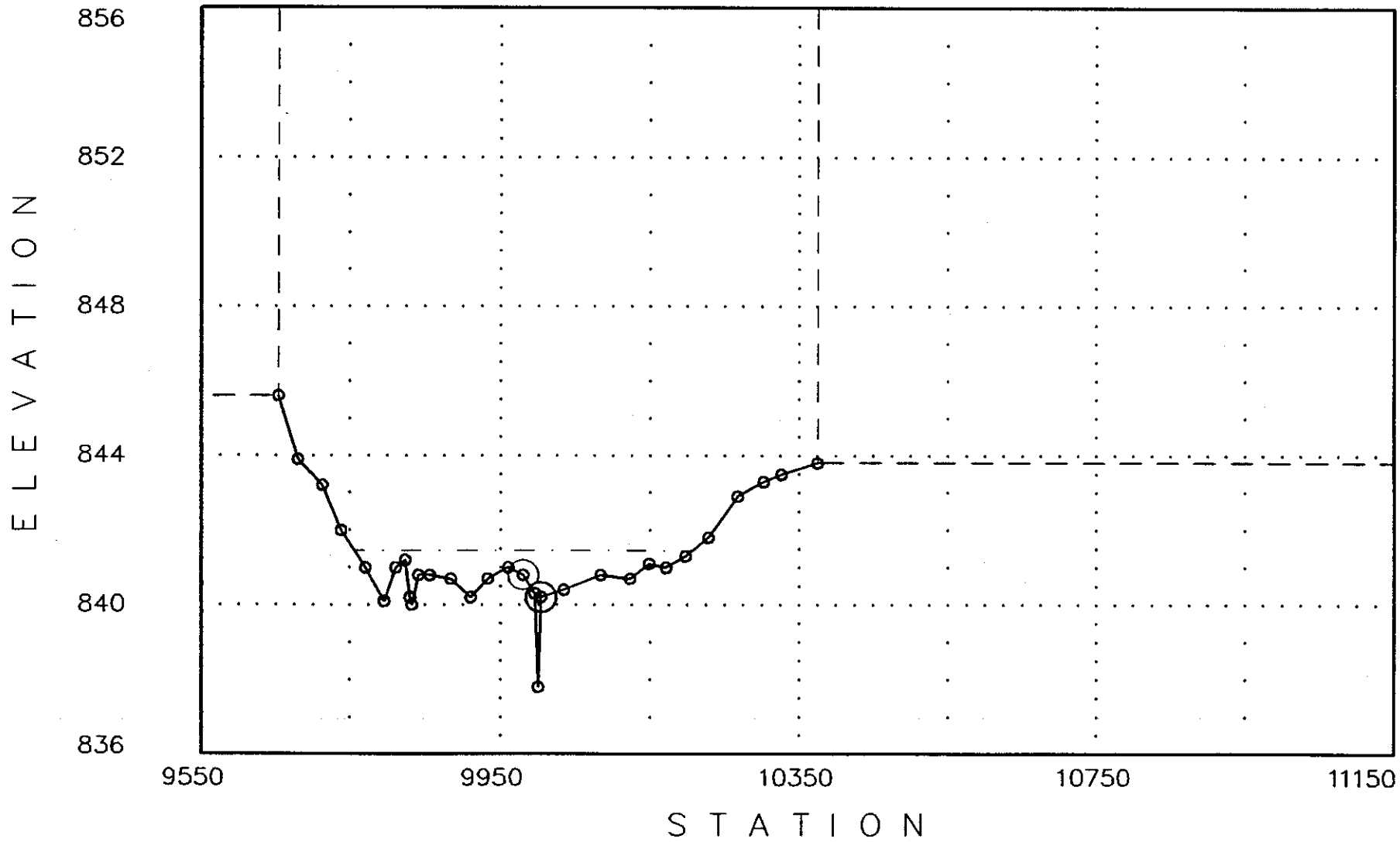


02-21-1993

<<<<<< Cross Section: .634: (FN = MINTRIB.AHO) >>>>>>

Q1= 590 WS1= 841.45

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

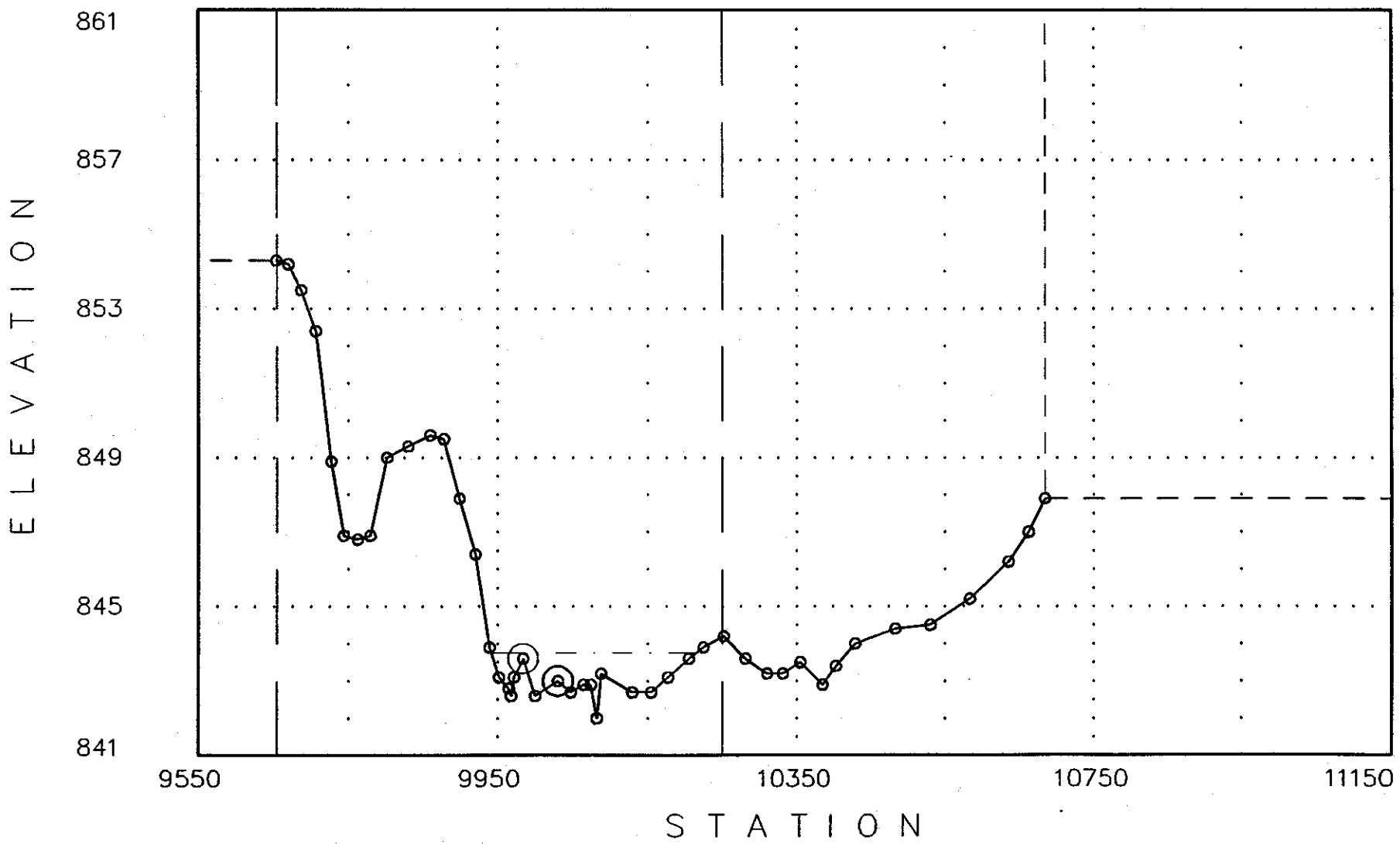


02-21-1993

<<<<<< Cross Section: .723: (FN = MINTRIB.AHO) >>>>>>

Q1= 590 WS1= 843.76

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

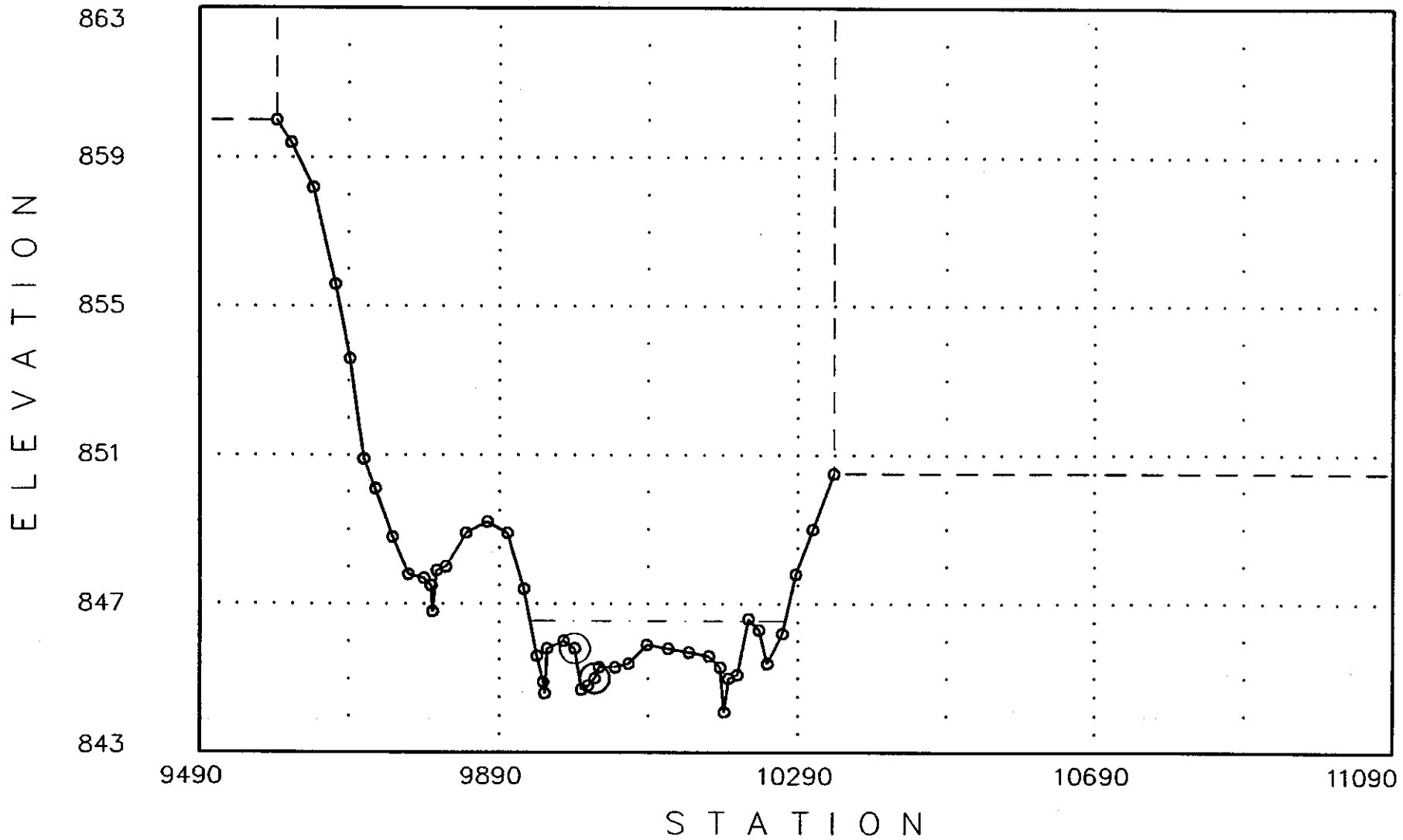


02-21-1993

<<<<<< Cross Section: .834: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 846.55

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

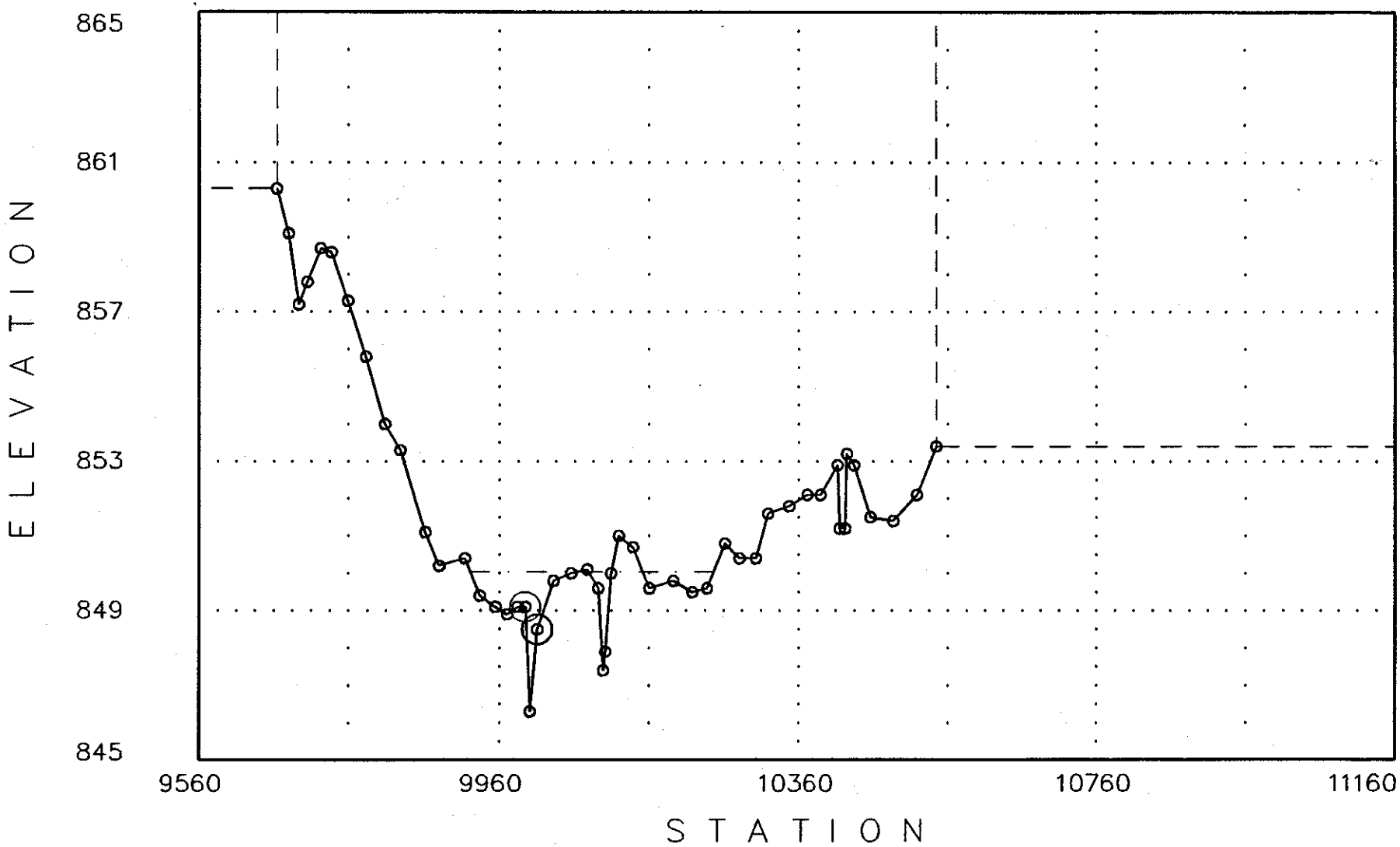


02-21-1993

<<<<<< Cross Section: .97: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 850.04

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

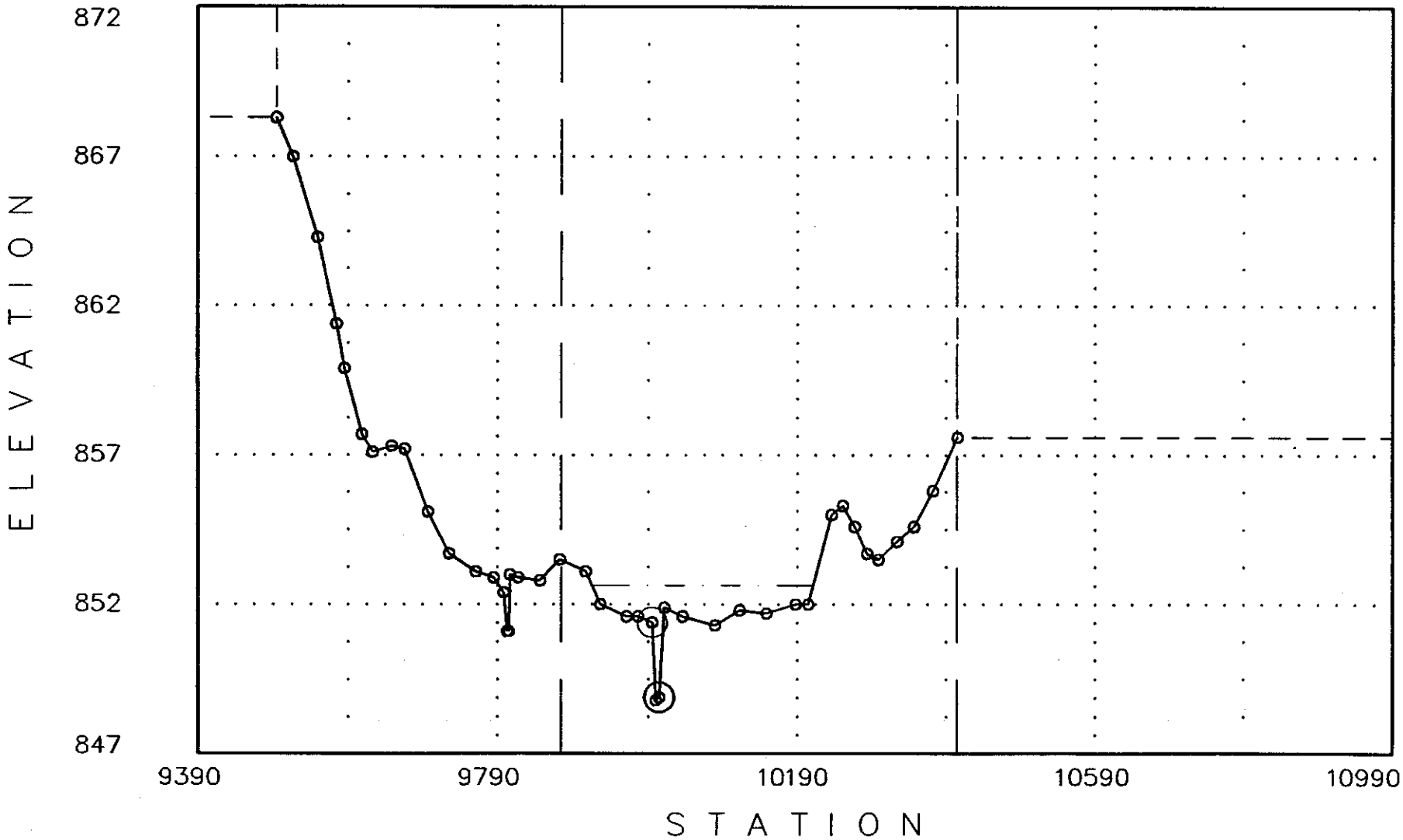


02-21-1993

<<<<<< Cross Section: 1.054: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 852.64

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

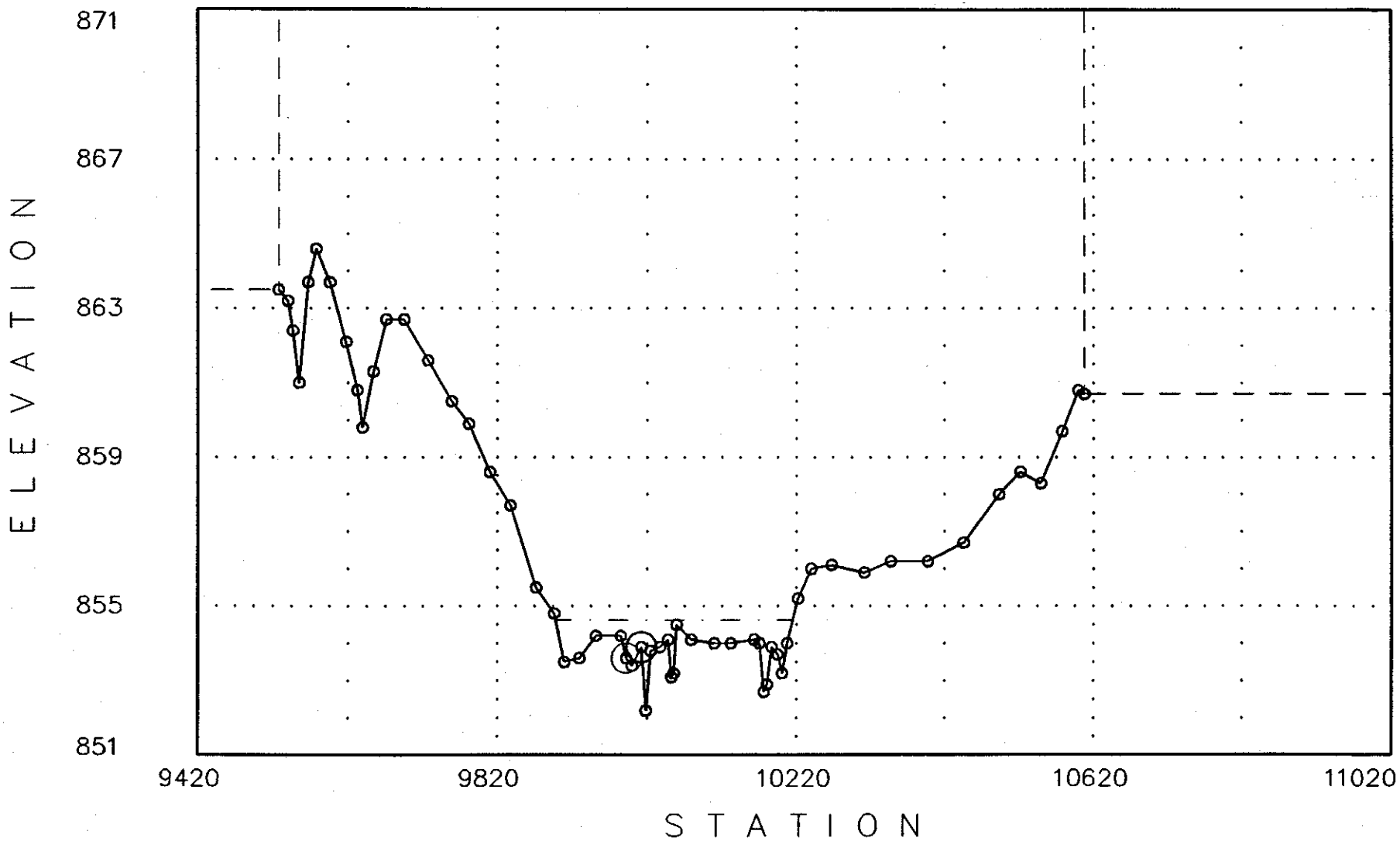


02-21-1993

<<<<<< Cross Section: 1.127: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 854.62

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

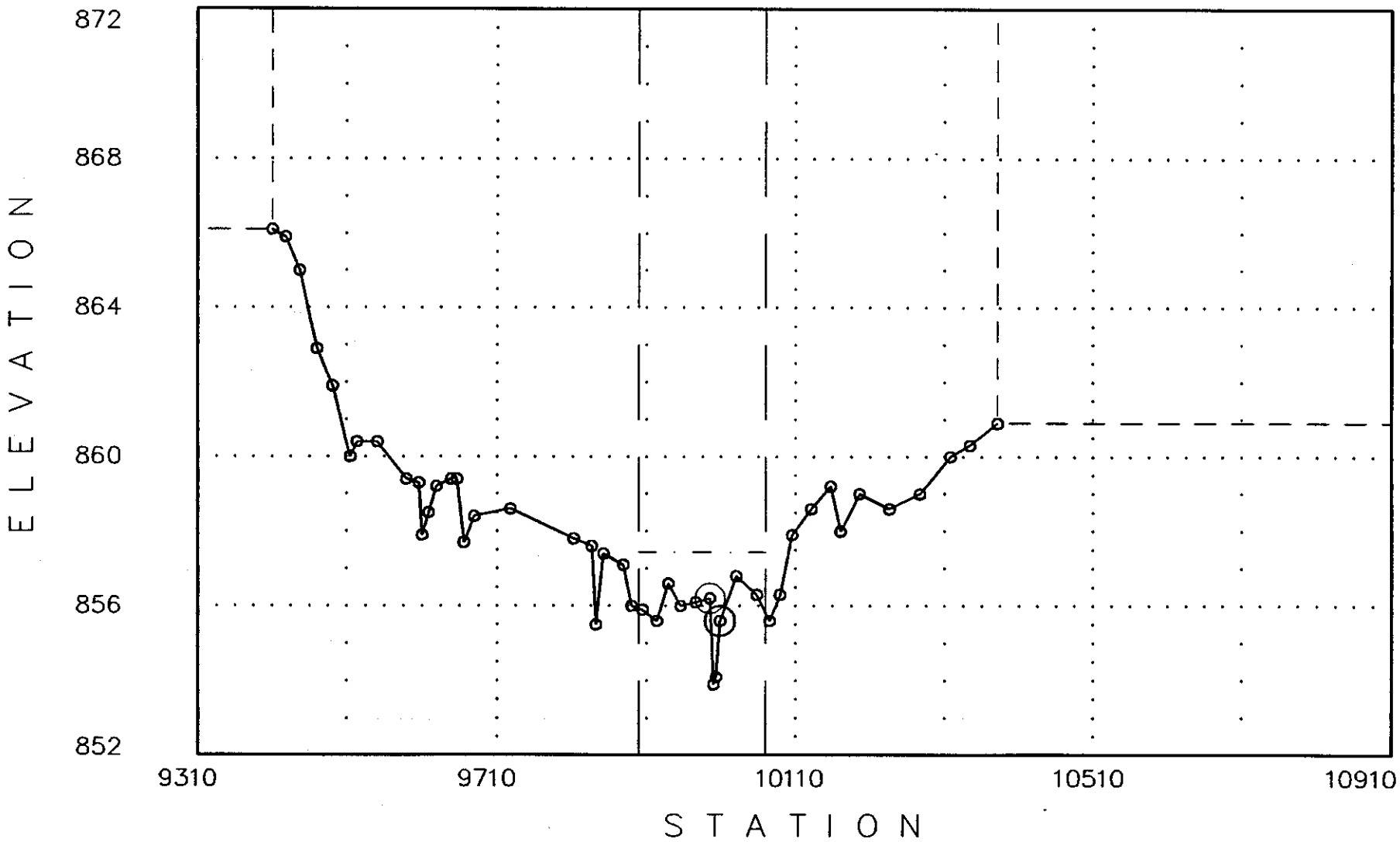


02-21-1993

<<<<<< Cross Section: 1.221: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 857.44

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

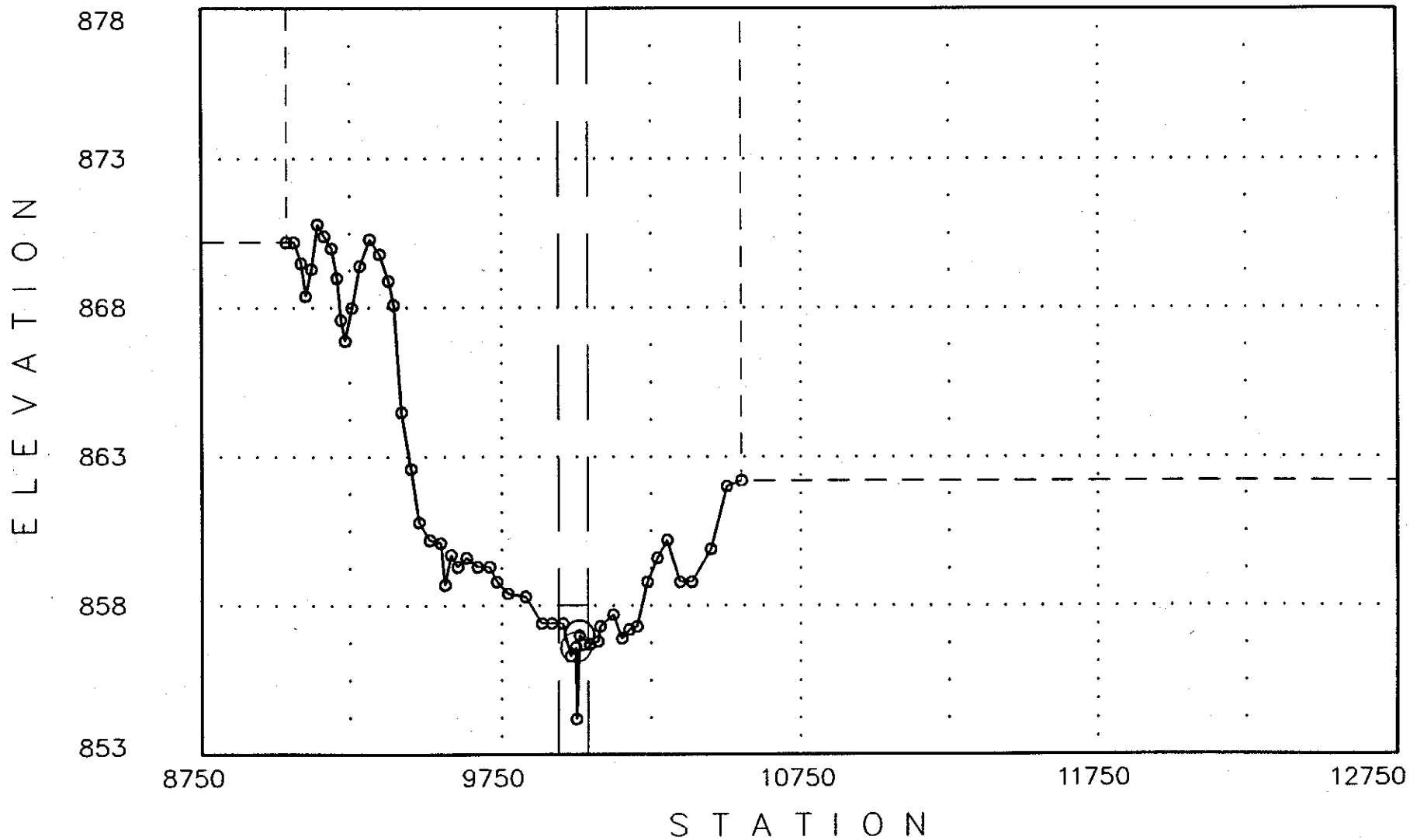


02-21-1993

<<<<<< Cross Section: 1.242: (FN = MINTRIB.AHO) >>>>>>

Q1= 657 WS1= 858.01

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045



02-21-1993

SECTION III

EAST MAIN TRIBUTARY HEC-2 OUTPUT AND CROSS SECTION PLOTS

```
*******************************************
* HEC-2 WATER SURFACE PROFILES            *
*                                         *
* Version   4.6.2;  May 1991              *
*                                         *
* RUN DATE    21FEB93    TIME   11:17:54  *
*******************************************
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****************************************
* U.S. ARMY CORPS OF ENGINEERS         *
* HYDROLOGIC ENGINEERING CENTER        *
* 609 SECOND STREET, SUITE D           *
* DAVIS, CALIFORNIA 95616-4687         *
*          (916) 756-1104              *
****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X .   X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 21FEB93 11:17:54

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************


T1      LUKE WASH FLOOD INSURANCE STUDY, FOR FCDMC (#90-68), BY CVL (#1090-07)
T2      EAST MAIN TRIBUTARY, LUKE WASH FLOODPLAIN TO THE SOUTHERN PACIFIC RAILRO
T3      100-YR EVENT    EXISTING CONDITION          FILE NAME - ETRIB.AH

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0    0.0043         0         0         0    811.87         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1         0        -1         0         0         0        -1         0         0        15


 VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         8         3         2        26         5        39        53
      4        54        37

QT       2      2749      2749
NC   0.050     0.120     0.050       0.1       0.3
ET   1.051                 9.1                                                          9971     10250
        EAST MAIN TRIBUTARY TO LUKE WASH, FROM THE LUKE WASH FLOODPLAIN TO THE
        SOUTHERN PACIFIC RAILROAD.
        PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
        PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
        PREPARED BY COE & VAN LOO CONSULTANTS, INC.  (CVL #1090-07)
        TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
        FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
        THE CONTROL LINE OF THE EAST MAIN TRIBUTARY IS STATION 10,000.
        ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
        CROSS SECTION NUMBERS FOR THE EAST MAIN TRIBUTARY ARE STATIONED IN RIVE
        MILES FROM THE CONFLUENCE WITH LUKE WASH.
        THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
        FROM LUKE WASH WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
        ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
        MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
        IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
        LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
        IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
        FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
```

```
        HYDROLOGY IS BASED ON THE 100-YEAR, 24-HOUR HEC-1 MODEL PREPARED FOR
        THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
        100-YEAR FLOW = 2749 CFS FROM CONCENTRATION POINT C425.
X1    1.051       34    9971.2   10024.8      360      305      338
GR    817.1   9928.9     812.5    9947.3    811.4   9959.6    808.2   9971.2    807.7   9990.9
GR    807.6  10006.4     808.9   10024.8    808.8  10036.5    808.6  10070.8    808.8  10110.6
GR    808.9  10137.7     810.4   10156.5    809.3  10169.8    808.4  10187.6    810.1  10203.1
GR    808.9  10208.3     809.5   10242.7    809.5  10286.7    809.8  10341.3    810.2    10396
GR    810.7    10426     810.7   10491.6    811.2  10562.8    811.2  10654.5    811.7  10727.7
GR      812  10793.4     812.9   10847.6    812.5  10881.3    812.3  10913.5    812.9  10955.5
GR    813.6  10959.9     812.5   10968.9    812.2    11031    812.8    11062

ET    1.175       7.1       9.1                                 9450    11244     9830    10220
        SECTION 1.175 TO 1.567 HAS BEEN ENCROACHED AT 4:1 DOWNSTREAM FROM
        FLOODPLAIN EXPANSION.
X1    1.175       32    9978.5   10023.1      580      680      655
GR    828.0   9154.0     815.6    9262.1    813.6   9320.7    813.4   9354.7    812.9   9374.3
GR    811.5   9392.1     812.2    9411.9    813.9   9428.9    815.6   9449.7    815.2   9470.5
GR    812.5   9495.9     812.2    9525.1    812.1   9595.7    812.5   9641.5    811.7   9690.8
GR    812.3   9767.5     811.8    9809.9    811.9   9978.5    811.8  10000.0    811.7  10023.1
GR    811.1  10063.9       811   10155.2    811.3  10182.1    812.9  10211.1      813  10457.8
GR    813.5  10562.2     813.8   10708.8    814.1  10747.1    814.8  10765.5      814  10776.3
GR    814.6    10792     815.2   10800.2

ET    1.294       7.1       9.1                                 9500    10746     9800    10150
X1    1.294       44    9940.5   10081.1      665      585      628
GR    831.2   8755.0     827.1    8778.8    820.5   8818.9    816.0   8846.8    815.0   8882.1
GR    814.4   8917.9     814.6    8946.5    814.7   8976.4    814.8   8991.9    814.5   9006.7
GR    814.5   9036.6     814.5    9054.6    814.5   9079.5    814.3   9119.8    814.5   9171.4
GR    814.4   9224.7     814.3    9271.9    814.8   9313.1    815.3   9335.6    816.2   9360.1
GR    816.3   9379.3     815.7    9432.9    815.7   9484.1    815.8   9535.8    815.8   9585.5
GR    816.4   9643.2     815.5    9713.6    815.7   9766.1    815.5   9833.9    815.6   9877.7
GR    815.1   9940.5     814.8   10000.0    814.9  10081.1    814.8  10141.3    816.8  10176.9
GR    816.5  10237.6     816.2   10310.7    816.1  10384.9    816.6  10442.5    819.9  10457.8
GR    819.5  10521.7     819.1   10600.2    819.1  10668.4    818.7  10746.6

NC    0.040   0.060     0.040       0.1        0.3
ET    1.372               9.1                                                     9830    10180
X1    1.372       35    9961.9   10076.5      400      400      412
GR    819.4   9535.0     818.9    9576.1    818.9   9588.1    818.9   9639.4    818.1   9694.7
GR    817.3   9752.2     817.1    9797.2    816.6   9819.7    816.2   9870.7    816.6   9922.9
GR    816.5   9961.9     816.1   10000.0    816.1  10076.5    816.1  10128.7    816.4  10175.4
GR    816.3  10234.5     816.4   10277.7    816.3  10302.8    816.4  10341.0    816.5  10386.5
GR    816.5  10436.5     817.6   10494.7    817.8  10561.0    818.1  10628.6    818.9  10683.7
GR    819.6  10734.7     819.2   10764.4    819.3  10796.7    819.5  10825.9    819.2  10841.1
GR    820.0  10862.2     820.2   10879.7    822.4  10893.5    822.6  10936.5    822.6  10985.7

ET    1.460       7.1       9.1                                 9500    10882     9820    10200
        INNEFECTIVE FLOW AREA IN RIGHT OVERBANK DUE TO SUMP AREA. BOTTOM
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POINTS HAVE BEEN REMOVED TO MAKE THE AREA INSIDE THE HOLE INEFFECTIVE.

X1	1.460	38	9989.4	10096.2	430	500	465			
GR	822.8	9008.9	822.3	9025.7	820.1	9057.9	819.1	9079.1	819.6	9105.4
GR	821.1	9131.8	820.4	9158.2	818.5	9189.6	818.8	9225.2	818.9	9264.7
GR	818.7	9301.0	817.9	9338.1	817.2	9382.8	818.1	9413.0	818.7	9430.6
GR	818.7	9447.1	818.9	9479.4	818.9	9528.9	818.9	9590.5	818.7	9612.8
GR	818.5	9622.9	817.9	9704.7	818.0	9879.3	818.2	9989.4	817.9	10000.0
GR	817.6	10096.2	817.3	10125.3	817.3	10211.3	817.2	10362.9	821.1	10370.8
GR	820.3	10443.8	817.6	10450.4	817.8	10670.5	818.6	10742.0	819.8	10790.3
GR	820.8	10820.4	821.4	10851.2	822.6	10882.1				
ET	1.567		9.1						9940	10420
X1	1.567	22	9985.8	10042.3	530	530	565			
GR	823.1	9703.5	821.6	9752.0	820.9	9789.7	820.8	9823.7	819.7	9868.0
GR	819.6	9911.9	819.7	9946.6	819.6	9985.8	819.6	10000.0	819.8	10042.3
GR	819.5	10125.0	819.0	10251.5	819.3	10391.0	819.6	10504.0	819.3	10559.8
GR	819.2	10752.9	819.7	10857.1	820.0	10995.3	821.3	11149.6	822.1	11302.1
GR	824.5	11484.4	825.1	11515.0						
ET	1.660		9.1						9950	10300
X1	1.660	47	9966.1	10019.2	480	470	491			
GR	822.9	9833.5	822.0	9875.3	820.9	9923.4	820.9	9966.1	820.4	10000.0
[illegible]	821.4	10019.2	820.7	10045.8	820.5	10068.2	821.2	10093.7	821.3	10134.4
[illegible]	821.3	10178.8	821.5	10207.7	821.6	10230.8	821.2	10276.0	821.8	10357.8
GR	822.1	10380.8	821.9	10399.3	820.1	10415.2	819.7	10428.8	820.0	10440.0
GR	820.4	10451.5	822.0	10461.8	822.4	10494.2	821.8	10496.2	821.6	10536.2
GR	822.0	10564.4	822.1	10604.6	822.5	10649.7	822.5	10691.5	822.7	10739.6
GR	822.7	10798.5	822.8	10843.1	822.7	10874.9	822.6	10914.5	822.3	10960.2
GR	822.3	11017.7	822.6	11084.6	822.8	11111.2	822.7	11143.4	822.9	11169.9
GR	823.2	11184.3	823.0	11188.7	823.2	11198.1	823.3	11240.6	823.4	11288.1
GR	824.3	11311.3	825.5	11333.9						
NC	0.060	0.060	0.050	0.1	0.3					
ET	1.759		9.1						9920	10220
X1	1.759	52	9987.7	10018.2	530	515	523			
GR	830.1	9701.2	828.2	9732.6	827.4	9768.7	826.3	9798.3	826.2	9818.4
GR	826.0	9844.1	825.9	9869.1	826.3	9892.8	825.8	9909.2	824.5	9926.3
GR	823.9	9950.6	823.5	9977.0	823.6	9987.7	823.1	9998.5	823.5	10000.0
GR	823.8	10018.2	824.1	10046.5	824.0	10082.6	824.0	10121.0	824.2	10144.7
GR	824.5	10154.9	823.6	10166.1	823.9	10186.2	824.0	10227.4	824.1	10259.7
GR	824.4	10285.4	824.8	10294.9	824.6	10329.8	825.1	10474.2	824.6	10581.5
GR	824.6	10680.1	825.2	10776.9	825.2	10826.2	825.1	10869.5	825.3	10913.3
GR	825.5	10963.0	825.7	11011.3	826.2	11081.6	826.5	11120.0	826.4	11129.7
GR	825.9	11149.1	826.0	11196.3	826.2	11262.9	826.9	11329.1	827.1	11369.7
GR	826.9	11392.2	827.5	11403.8	830.0	11420.9	831.0	11434.1	831.2	11446.9
GR	831.0	11463.8	830.8	11487.0						
ET	1.851		9.1						9850	10200
[illegible]	1.851	57	9962	10020.6	470	470	486			
[illegible]	833.7	9448.7	832.3	9477	830.9	9508.3	829.9	9537.8	829.4	9572.7
GR	828.6	9587.1	828.6	9597.3	828.4	9619.4	828.5	9655.2	828.4	9691.7
GR	827.6	9726.3	826.7	9756.7	826.7	9818.7	826.4	9849.8	826.3	9877.4
GR	827	9900.9	826.9	9935.1	826.9	9962	826.4	9981.1	826.7	10000
GR	827.3	10020.6	827	10047.8	827.3	10074.1	827.3	10105.7	827.4	10139.7

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GR    826.9    10166.9    827.2    10197.1    827.5    10223    827.4    10230.2    827.7    10245.6
GR    828.2    10340.5    827.1    10366.6    827.7    10399.1    827.1    10434.2    828.1    10460.9
GR    827.9    10479.1    826.9    10489.2    827.6    10507.7    827.7    10530    828.2    10560.1
GR    828.1    10595.2    828    10651.1    827.9    10685.7    828.2    10715.1    828.3    10749.6
GR    826.2    10756.5    826.1    10761    827.6    10766    828.4    10796.7    828.6    10870.5
GR    828.8    10950.1    828.8    10988.3    828.2    11008.2    829.4    11073.7    829.5    11107.7
GR    831.5    11154.1    833    11199.8

ET    1.953    9.1    9770    10280
      SECTIONS 1.953 AND 2.040 RIGHT OVERBANK ENCROACHED AT 4:1 DOWNSTREAM
      FROM FLOODPLAIN EXPANSION.
X1    1.953    45    9970.5    10028    505    500    539
GR    834.3    9295.8    833.2    9329.7    831.5    9366.7    831.3    9385    831.1    9419.6
GR    830.2    9454.3    829.9    9497.6    830.1    9604.7    829.9    9638.4    829.4    9666.3
GR    829.7    9695.2    829.7    9721.5    829.3    9742.8    829.7    9766    829.7    9808.7
GR    829.3    9825.7    829.7    9845.8    829.9    9970.5    829.7    10000    830    10028
GR    830    10078.3    830.4    10126    830.4    10190.1    830.6    10279.3    831    10317.1
GR    830.8    10351.8    830.8    10504.7    830.9    10541.6    830.7    10584.9    831    10633.7
GR    831.1    10721.9    831.4    10821.3    831.4    10870.6    830.9    10970.8    830.9    11020.8
GR    830.7    11048.8    830.7    11078.9    829.8    11080.6    830    11122.8    830.8    11131.4
GR    831.4    11182.8    831.9    11242.9    832.6    11311.1    833.6    11379.6    836.7    11420.9

NC    0.050    0.050    0.050    0.1    0.3
ET    2.040    9.1    9620    10250
X1    2.040    49    9988.3    10095.3    480    420    459
GR    838.4    9193.7    837    9209.1    834.4    9233    833.1    9269.1    832.6    9309.5
GR    831.5    9360.6    830.6    9365.6    831.8    9375.9    832    9412.8    831.9    9450.5
GR    832.1    9536.7    832.2    9676    832.1    9706.7    831.7    9728.5    832.4    9745.3
GR    831.8    9760.6    832.3    9780.4    832.4    9814.8    832.8    9849.2    831.7    9858.3
GR    832.5    9877.1    832.4    9903.8    832.1    9920.3    832.5    9937.8    832.2    9965.4
GR    832.5    9988.3    832.4    10000    832.8    10095.3    832.5    10133.8    832.7    10205.2
GR    832.5    10240.6    832.5    10309.8    833.1    10438.1    833    10548.9    832.6    10601.4
GR    832.5    10647.6    832.2    10718.3    831.8    10775.6    831.7    10869.8    831.8    10917.7
GR    831.8    11026    832.2    11068.6    832.1    11104.8    832.4    11153    833.7    11238.1
GR    835.1    11272.6    834.7    11280.5    834.7    11292.5    838.6    11302.7

ET    2.140    9.1    9650    10220
X1    2.140    57    9973.5    10021.6    545    520    528
GR    838    9365.6    837.2    9390.5    836    9412.9    834.8    9434.6    834.9    9465.7
GR    835    9499.9    835.2    9535.4    834.9    9570.5    834.8    9610.5    835.3    9643.7
GR    835.3    9689.2    835.4    9721.7    835.4    9755.4    835.8    9790.7    835.7    9824.5
GR    835.1    9847.1    835.3    9870.7    834.7    9888.5    834.7    9904.1    834    9916.1
GR    834.7    9933.7    834.7    9948.8    834.8    9961    835.3    9973.5    834.1    9983.5
GR    834.7    10000    834.7    10021.6    835.1    10042.3    834.9    10069.2    835.1    10094
GR    835.2    10121.4    835.1    10152    835.6    10175.4    835.5    10194.8    834.9    10203.4
GR    834.5    10207.1    835.6    10215.5    835.6    10237.7    834.7    10261.7    835.3    10283.1
GR    835.5    10306.6    835.5    10329.8    834.9    10348.5    835.1    10369.4    835.3    10386.8
GR    835    10407.3    835.1    10431.5    835.3    10458.2    835.5    10484.3    835.8    10511.4
GR    835.8    10531.7    835.8    10540.5    836.3    10551.1    836.6    10560.7    838.4    10570.2
GR    842.6    10587.8    843.8    10597.6
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ET	2.217		9.1						9800	10280
X1	2.217	68	9979.8	10014.7	405	405	407			
GR	844.9	9467.4	841.6	9485.1	839.0	9507.1	837.8	9521.1	837.9	9549.6
GR	837.7	9592.2	837.3	9646.8	836.9	9689.9	836.6	9708.1	837.3	9728.1
GR	837.1	9764.9	836.9	9798.1	837.1	9831.9	836.7	9861.0	837.0	9870.0
GR	837.0	9895.5	836.2	9905.4	837.2	9922.8	837.2	9945.3	836.2	9957.7
GR	836.7	9965.6	836.4	9970.2	837.5	9979.8	836.9	9995.4	836.2	10000.0
GR	836.4	10005.0	837.0	10014.7	837.1	10046.9	837.3	10068.6	836.9	10076.2
GR	836.6	10082.4	837.3	10102.6	837.1	10136.0	836.7	10151.7	837.4	10166.0
GR	837.4	10186.8	837.0	10193.7	837.3	10201.4	836.1	10207.5	836.9	10221.4
GR	837.2	10248.8	837.1	10271.9	836.3	10283.2	837.0	10300.4	836.6	10330.3
GR	835.9	10342.8	836.3	10351.7	837.0	10356.6	836.4	10373.7	836.9	10388.5
GR	835.8	10395.3	835.7	10400.5	836.9	10410.2	836.9	10431.3	837.2	10451.2
GR	837.0	10465.4	836.3	10473.9	836.7	10485.4	836.9	10506.7	837.3	10542.4
GR	837.7	10587.6	837.1	10622.8	837.7	10651.4	837.4	10663.1	837.5	10678.9
GR	838.2	10706.7	839.9	10726.0	843.7	10752.1				
ET	2.301		9.1						9850	10210
X1	2.301	71	9984.9	10015.3	450	405	444			
GR	857.4	9659.5	857.3	9682.0	855.5	9706.3	849.0	9726.8	843.9	9749.8
GR	839.6	9773.4	839.7	9798.2	839.2	9830.6	839.5	9859.0	839.1	9884.8
GR	838.8	9904.2	837.5	9911.3	836.9	9915.5	837.5	9921.2	838.2	9931.0
GR	838.2	9955.6	838.7	9974.3	837.9	9984.9	837.0	9992.5	837.4	9998.0
GR	838.4	10000.0	839.1	10015.3	838.7	10039.4	838.8	10068.2	839.3	10089.5
GR	838.5	10102.8	838.8	10117.0	838.3	10129.8	839.2	10141.1	839.3	10163.2
GR	838.9	10184.2	837.8	10194.4	838.9	10206.5	838.8	10227.7	838.1	10235.1
GR	838.9	10247.5	837.5	10256.7	838.6	10270.7	839.0	10293.3	839.0	10313.3
GR	837.2	10321.4	838.2	10325.3	838.5	10331.1	838.0	10342.0	838.8	10354.8
GR	838.4	10373.3	837.9	10390.2	838.8	10402.0	838.3	10415.4	838.7	10428.5
GR	839.0	10462.6	838.3	10487.9	839.6	10515.5	839.4	10549.2	839.8	10580.2
GR	839.7	10614.8	839.2	10629.7	839.1	10643.6	838.5	10647.4	839.7	10660.4
GR	841.1	10683.8	841.1	10707.7	840.3	10732.2	840.7	10755.9	841.3	10786.4
GR	842.8	10820.0	845.2	10859.7	851.1	10892.4	853.8	10917.2	855.2	10948.9
GR	855.9	10954.5								
ET	2.405		9.1						9950	10120
X1	2.405	43	9990.1	10013.2	490	625	549			
GR	857.5	9758.0	856.7	9791.1	854.6	9814.4	852.3	9827.2	850.3	9839.1
GR	848.1	9853.8	843.1	9865.3	842.2	9872.5	841.6	9884.3	840.9	9890.8
GR	841.5	9902.8	841.1	9921.8	841.8	9939.8	841.4	9954.2	841.0	9959.0
GR	840.6	9965.3	842.0	9973.8	842.1	9990.1	839.2	9993.2	839.4	9996.3
GR	841.4	10000.0	841.4	10013.2	840.0	10023.1	841.3	10038.8	840.9	10048.2
GR	842.0	10060.8	841.1	10073.4	842.5	10086.9	840.9	10099.0	841.7	10106.0
GR	840.7	10116.1	841.6	10125.1	840.3	10135.4	841.6	10148.5	841.8	10160.8
GR	840.9	10169.3	842.2	10185.0	841.8	10199.9	843.2	10214.0	849.9	10235.8
GR	852.7	10249.6	852.8	10261.0	851.1	10271.2				
ET	2.479		9.1						9940	10100
X1	2.479	33	9982.2	10011.5	380	400	391			
GR	859.8	9676.4	859.9	9727.2	859.5	9777.1	858.0	9816.3	855.4	9833.2
GR	853.1	9846.8	854.1	9864.2	854.4	9885.4	853.6	9904.2	850.3	9922.1
GR	843.2	9939.6	842.7	9951.2	842.2	9957.8	843.8	9969.1	844.6	9982.2
GR	843.4	9992.2	842.3	9998.6	842.3	10000.0	844.5	10011.5	843.2	10022.8

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GR    842.6    10031.0    844.3    10051.0    844.2    10086.1    844.0    10113.3    843.8    10133.4
GR    843.6    10150.7    842.9    10156.9    844.5    10170.5    845.1    10184.9    843.7    10196.5
GR    844.6    10208.8    852.1    10231.6    860.2    10253.3

ET    2.568              9.1                                                           9950     10050
X1    2.568        49    9976.1   10017.6      470       435      470
GR    864.8     9574.1   863.0     9595.7    862.8     9605.8   863.0     9632.7   861.5     9683.7
GR    860.2     9728.6   859.0     9783.6    857.6     9828.7   857.1     9857.8   854.6     9872.8
GR    852.6     9887.2   851.7     9899.0    849.2     9907.6   847.7     9914.5   847.8     9920.2
GR    848.0     9931.7   847.8     9945.3    846.8     9961.7   847.8     9976.1   847.3     9995.8
GR    846.6    10000.0   847.2    10017.6    849.1    10024.9   848.4    10033.1   849.3    10043.3
GR    849.2    10061.2   848.8    10070.9    850.2    10081.7   849.7    10092.3   848.8    10099.7
GR    848.2    10102.0   849.4    10106.5    850.0    10128.9   850.5    10162.8   851.0    10207.1
GR    851.8    10241.3   853.7    10267.5    855.3    10286.6   856.1    10301.3   855.6    10316.8
GR    855.4    10344.6   856.1    10372.4    857.9    10394.5   861.6    10415.4   862.0    10435.8
GR    860.9    10459.3   862.9    10476.4    863.8    10497.0   864.8    10504.9

ET              7.1       9.1                                    9975     10140     9975     10075
        SECTION 2.653 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE SOUTHERN PACIFIC
        RAILROAD. THE SOUTH RIGHT OF WAY OF THE SOUTHERN PACIFIC RAILROAD IS
        THE UPSTREAM LIMIT OF STUDY.
X1    2.653        39    9976.1   10012.8      445       390      449
GR    867.6     9732.9   865.1     9747.5    862.5     9760.0   860.2     9773.1   858.5     9801.9
GR    856.9     9827.5   856.6     9858.0    853.3     9878.3   853.8     9903.4   852.3     9953.2
GR    851.8     9976.1   849.1     9985.5    848.4     9996.0   849.1    10000.0   849.6    10012.8
GR    850.6    10039.1   850.9    10074.8    851.1    10096.6   851.1    10120.2   854.1    10131.6
GR    853.4    10147.0   853.8    10164.2    855.2    10192.5   855.7    10218.2   856.2    10244.0
GR    855.4    10279.7   855.5    10308.6    855.6    10347.0   855.7    10382.2   856.3    10413.4
GR    856.7    10443.3   858.3    10471.5    858.8    10501.7   859.8    10528.7   861.5    10551.7
GR    863.2    10574.9   864.9    10597.4    868.0    10621.1   868.9    10624.2
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300

*SECNO 1.051

EAST MAIN TRIBUTARY TO LUKE WASH, FROM THE LUKE WASH FLOODPLAIN TO THE
SOUTHERN PACIFIC RAILROAD.
PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD #90-68)
PREPARED BY COE & VAN LOO CONSULTANTS, INC. (CVL #1090-07)
TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991. HORIZONTAL DATUM IS NAD 83.
THE CONTROL LINE OF THE EAST MAIN TRIBUTARY IS STATION 10,000.
ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
CROSS SECTION NUMBERS FOR THE EAST MAIN TRIBUTARY ARE STATIONED IN RIVE
MILES FROM THE CONFLUENCE WITH LUKE WASH.
THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD. THE WATER SURFACE
FROM LUKE WASH WAS NOT USED DUE TO THE DIFFERENCE IN TIME TO PEAK.
ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
HYDROLOGY IS BASED ON THE 100-YEAR, 24-HOUR HEC-1 MODEL PREPARED FOR
THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
100-YEAR FLOW = 2749 CFS FROM CONCENTRATION POINT C425.

1.051	4.27	811.87	810.72	811.87	812.02	.15	.00	.00	808.20
2749.0	74.7	1005.3	1669.0	25.2	209.2	1227.2	.0	.0	808.90
.00	2.96	4.80	1.36	.050	.050	.120	.000	807.60	9954.34
.004257	360.	338.	305.	0	18	0	.00	810.58	10764.93

FLOW DISTRIBUTION FOR SECNO= 1.05 CWSEL= 811.87

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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

STA=    9954.    9971.   10025.   10071.   10111.   10138.   10170.   10188.   10243.   10287.   10341.   10396.   10492.
  PER Q=      2.7     36.6      9.1      8.0      5.0      3.3      3.3      8.1      5.4      6.1      4.6      4.1
   AREA=     25.2    209.2    144.1    126.2     81.8     68.6     53.8    144.8    104.3    121.2    102.3    119.3
    VEL=      3.0      4.8      1.7      1.7      1.7      1.3      1.7      1.5      1.4      1.4      1.2       .9
  DEPTH=      1.5      3.9      3.1      3.2      3.0      2.1      3.0      2.6      2.4      2.2      1.9      1.2

STA=   10492.   10655.   10765.
  PER Q=      3.2       .5
   AREA=    126.9     33.9
    VEL=       .7       .4
  DEPTH=       .8       .3

*SECNO 1.175

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.40


3470 ENCROACHMENT STATIONS=     9450.0   11244.0  TYPE=      1  TARGET=     1794.000
         SECTION 1.175 TO 1.567 HAS BEEN ENCROACHED AT 4:1 DOWNSTREAM FROM
         FLOODPLAIN EXPANSION.
     1.175      2.87    813.87    812.61       .00    813.92       .05      1.89       .01    811.90
    2749.0    1855.8     207.7     685.4     894.9      92.4     807.0      24.3      15.3    811.70
       .10      2.07      2.25       .85      .050      .050      .120      .000    811.00   9483.01
   .002167      580.      655.      680.         3        17         0       .00   1234.72  10717.73


FLOW DISTRIBUTION FOR SECNO=      1.17          CWSEL=    813.87

STA=    9483.    9525.    9596.    9642.    9691.    9768.    9810.    9979.   10023.   10064.   10155.   10211.   10458.
  PER Q=      3.3      8.8      4.9      6.4     11.0      5.8     27.4      7.6      3.9     10.8      4.6      4.5
   AREA=     53.2    121.4     71.9     87.3    143.4     77.2    340.6     92.4    100.8    257.5    124.5    226.9
    VEL=      1.7      2.0      1.9      2.0      2.1      2.1      2.2      2.2      1.1      1.2      1.0       .5
  DEPTH=      1.3      1.7      1.6      1.8      1.9      1.8      2.0      2.1      2.5      2.8      2.2       .9

STA=   10458.   10718.
  PER Q=      1.2
   AREA=     97.3
    VEL=       .3
  DEPTH=       .4
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1.294

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .39

3470 ENCROACHMENT STATIONS= 9500.0 10746.0 TYPE= 1 TARGET= 1246.000

1.294	2.29	816.59	816.37	.00	816.83	.25	2.86	.06	815.10
2749.0	1264.1	1182.7	302.2	381.8	237.8	196.1	43.1	30.6	814.90
.15	3.31	4.97	1.54	.050	.050	.120	.000	814.30	9500.00
.013900	665.	628.	585.	2	16	0	.00	892.94	10440.60

FLOW DISTRIBUTION FOR SECNO= 1.29 CWSEL= 816.59

A=	9500.	9536.	9586.	9714.	9766.	9834.	9878.	9941.	10081.	10141.	10441.
PER Q=	3.2	4.2	6.4	6.5	8.4	5.9	11.4	43.0	8.0	3.0
AREA=	29.3	38.9	72.5	51.6	66.7	45.3	77.5	237.8	104.4	91.7
VEL=	3.0	3.0	2.4	3.5	3.5	3.6	4.0	5.0	2.1	.9
DEPTH=	.8	.8	.6	1.0	1.0	1.0	1.2	1.7	1.7	.3

CCHV= .100 CEHV= .300

*SECNO 1.372

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.84

1.372	2.22	818.32	817.23	.00	818.38	.06	1.53	.02	816.50
2749.0	817.8	634.7	1296.6	387.6	246.6	855.7	53.8	39.1	816.10
.20	2.11	2.57	1.52	.040	.040	.060	.000	816.10	9679.59
.001727	400.	412.	400.	4	8	0	.00	964.06	10643.65

FLOW DISTRIBUTION FOR SECNO= 1.37 CWSEL= 818.32

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9680.	9797.	9871.	9923.	9962.	10077.	10129.	10175.	10235.	10278.	10341.	10387.	10437.
PER Q=	4.5	10.9	8.7	5.7	23.1	7.4	5.9	6.8	5.0	7.3	4.8	5.1	
AREA=	87.6	130.9	100.1	69.0	246.6	115.8	96.6	116.3	85.0	124.6	85.0	90.9	
VEL=	1.4	2.3	2.4	2.3	2.6	1.8	1.7	1.6	1.6	1.6	1.6	1.5	
DEPTH=	.7	1.8	1.9	1.8	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.8	

STA=	10437.	10495.	10644.
PER Q=	3.2	1.6	
AREA=	73.8	67.6	
VEL=	1.2	.7	
DEPTH=	1.3	.5	

*SECNO 1.460

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9500.0 10882.0 TYPE= 1 TARGET= 1382.000
INNEFECTIVE FLOW AREA IN RIGHT OVERBANK DUE TO SUMP AREA. BOTTOM
POINTS HAVE BEEN REMOVED TO MAKE THE AREA INSIDE THE HOLE INEFFECTIVE.

1.460	2.03	819.23	818.35	.00	819.28	.05	.90	.00	818.20
2749.0	875.0	340.9	1533.1	479.4	155.2	945.5	70.5	50.8	817.60
.28	1.83	2.20	1.62	.040	.040	.060	.000	817.20	9500.00
.002124	430.	465.	500.	5	11	0	.00	1188.08	10767.48

FLOW DISTRIBUTION FOR SECNO= 1.46 CWSEL= 819.23

STA=	9500.	9705.	9879.	9989.	10096.	10125.	10211.	10363.	10671.	10742.	10767.
PER Q=	6.9	16.5	8.4	12.4	3.2	10.7	19.7	18.9	3.1	.2	
AREA=	130.7	224.0	124.7	155.2	51.9	166.2	300.6	344.8	73.9	8.1	
VEL=	1.5	2.0	1.9	2.2	1.7	1.8	1.8	1.5	1.2	.5	
DEPTH=	.6	1.3	1.1	1.5	1.8	1.9	2.0	1.1	1.0	.3	

*SECNO 1.567

1.567	1.71	820.71	820.02	.00	820.77	.06	1.48	.00	819.60
2749.0	324.5	136.0	2288.5	144.6	58.2	1259.7	89.1	65.7	819.80
.36	2.24	2.34	1.82	.040	.040	.060	.000	819.00	9827.52
.003800	530.	565.	530.	3	8	0	.00	1251.48	11079.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1.57 CWSEL= 820.71

STA=	9828.	9912.	9947.	9986.	10042.	10125.	10252.	10391.	10504.	10560.	10753.	10857.	10995.
PER Q=	5.1	3.2	3.6	4.9	5.0	13.1	16.2	9.2	4.5	20.0	8.5	5.9	
AREA=	66.7	36.6	41.4	58.2	87.3	184.1	217.0	141.8	70.0	281.0	130.8	118.2	
VEL=	2.1	2.4	2.4	2.3	1.6	2.0	2.0	1.8	1.8	2.0	1.8	1.4	
DEPTH=	.8	1.1	1.1	1.0	1.1	1.5	1.6	1.3	1.3	1.5	1.3	.9	

STA=	10995.	11079.
PER Q=	.8	
AREA=	29.5	
VEL=	.8	
DEPTH=	.4	

*SECNO 1.660

3265 DIVIDED FLOW

1.660	3.01	822.71	822.09	.00	822.83	.12	2.05	.02	820.90
2749.0	501.7	430.4	1816.9	149.9	104.7	858.6	103.1	79.0	821.40
.41	3.35	4.11	2.12	.040	.040	.060	.000	819.70	9842.20
.004950	480.	491.	470.	4	14	0	.00	1196.55	11145.09

FLOW DISTRIBUTION FOR SECNO= 1.66 CWSEL= 822.71

STA=	9842.	9923.	9966.	10019.	10046.	10068.	10094.	10134.	10179.	10231.	10276.	10358.	10415.
PER Q=	7.3	10.9	15.7	3.9	4.9	4.6	4.9	5.0	4.8	4.5	7.2	4.1	
AREA=	72.5	77.4	104.7	44.2	47.3	47.5	59.5	62.7	64.8	59.3	99.2	58.0	
VEL=	2.8	3.9	4.1	2.4	2.9	2.6	2.2	2.2	2.0	2.1	2.0	1.9	
DEPTH=	.9	1.8	2.0	1.7	2.1	1.9	1.5	1.4	1.2	1.3	1.2	1.0	

STA=	10415.	10429.	10440.	10452.	10536.	10650.	11145.
PER Q=	4.8	4.1	3.4	4.6	3.5	1.9	
AREA=	38.3	32.1	28.9	73.9	71.0	71.8	
VEL=	3.5	3.5	3.2	1.7	1.3	.7	
DEPTH=	2.8	2.9	2.5	.9	.6	.1	

CCHV= .100 CEHV= .300

*SECNO 1.759

1.759	2.57	825.67	825.23	.00	825.77	.10	2.94	.00	823.60
2749.0	346.4	262.5	2140.2	119.9	65.6	958.8	116.5	92.6	823.80
.46	2.89	4.00	2.23	.060	.050	.060	.000	823.10	9910.82
.006553	530.	523.	515.	4	14	0	.00	1094.89	11005.71

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 1.76 CWSEL= 825.67

STA=	9911.	9951.	9977.	9988.	10018.	10047.	10083.	10121.	10145.	10166.	10186.	10227.	10260.
PER Q=	3.9	6.0	2.7	9.5	5.1	5.9	6.6	3.7	3.0	4.4	7.5	5.3	
AREA=	45.0	52.2	22.8	65.6	48.9	58.7	64.4	37.4	31.8	38.7	71.1	52.5	
VEL=	2.4	3.2	3.3	4.0	2.9	2.8	2.8	2.7	2.6	3.1	2.9	2.8	
DEPTH=	1.1	2.0	2.1	2.2	1.7	1.6	1.7	1.6	1.5	1.9	1.7	1.6	

STA=	10260.	10285.	10330.	10474.	10582.	10680.	10777.	10913.	11006.
PER Q=	3.4	3.2	7.7	5.7	8.1	4.6	3.1	.5	
AREA=	36.7	44.3	119.4	88.7	106.2	75.2	67.2	17.5	
VEL=	2.5	2.0	1.8	1.8	2.1	1.7	1.3	.8	
DEPTH=	1.4	1.0	.8	.8	1.1	.8	.5	.2	

*SECNO 1.851

3265 DIVIDED FLOW

1.851	2.42	828.52	827.90	.00	828.61	.09	2.84	.00	826.90
2749.0	1159.8	339.1	1250.1	440.7	104.3	677.1	129.3	105.3	827.30
.52	2.63	3.25	1.85	.060	.050	.060	.000	826.10	9606.14
.005558	470.	486.	470.	3	19	0	.00	1262.90	11025.66

FLOW DISTRIBUTION FOR SECNO= 1.85 CWSEL= 828.52

STA=	9606.	9757.	9819.	9850.	9877.	9901.	9935.	9962.	10021.	10048.	10106.	10167.	10197.
PER Q=	4.3	11.3	6.5	6.7	4.5	4.9	4.0	12.3	3.1	5.9	6.1	3.9	
AREA=	65.5	112.8	61.3	59.9	43.9	53.7	43.6	104.3	37.3	74.6	77.0	44.4	
VEL=	1.8	2.8	2.9	3.1	2.8	2.5	2.5	3.3	2.3	2.2	2.2	2.4	
DEPTH=	.4	1.8	2.0	2.2	1.9	1.6	1.6	1.8	1.4	1.3	1.3	1.5	

STA=	10197.	10246.	10367.	10434.	10508.	10651.	10761.	11026.
PER Q=	3.8	3.9	5.5	4.6	3.5	3.7	1.6	
AREA=	52.9	76.8	75.7	68.8	75.8	62.3	31.5	
VEL=	2.0	1.4	2.0	1.9	1.3	1.6	1.4	
DEPTH=	1.1	.6	1.1	.9	.5	.6	.1	

*SECNO 1.953

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

SECTIONS 1.953 AND 2.040 RIGHT OVERBANK ENCROACHED AT 4:1 DOWNSTREAM
FROM FLOODPLAIN EXPANSION.

1.953	1.95	831.25	830.63	.00	831.32	.07	2.71	.00	829.90
2749.0	1758.6	221.0	769.4	774.8	81.9	540.6	144.5	122.1	830.00
.59	2.27	2.70	1.42	.060	.050	.060	.000	829.30	9393.72
.005136	505.	539.	500.	4	11	0	.00	1646.90	11169.91

FLOW DISTRIBUTION FOR SECNO= 1.95 CWSEL= 831.25

STA=	9394.	9498.	9605.	9638.	9666.	9695.	9722.	9743.	9766.	9809.	9846.	9971.	10028.
PER Q=	4.8	10.0	3.2	3.9	4.5	3.5	3.5	3.8	5.7	6.1	14.9	8.0	
AREA=	74.7	133.8	42.1	44.6	49.1	40.8	37.3	40.6	66.2	64.9	180.8	81.9	
VEL=	1.8	2.1	2.1	2.4	2.5	2.4	2.6	2.6	2.4	2.6	2.3	2.7	
DEPTH=	.7	1.2	1.2	1.6	1.7	1.5	1.7	1.7	1.5	1.7	1.4	1.4	

STA=	10028.	10078.	10126.	10190.	10279.	10505.	11021.	11123.	11170.
PER Q=	4.7	3.3	3.2	3.6	3.6	3.2	5.8	.6	
AREA=	62.9	50.1	54.5	66.9	97.9	104.7	87.8	16.0	
VEL=	2.1	1.8	1.6	1.5	1.0	.8	1.8	1.1	
DEPTH=	1.2	1.0	.8	.7	.4	.2	.9	.3	

CCHV= .100 CEHV= .300

*SECNO 2.040

2.040	2.56	833.16	832.60	.00	833.20	.05	1.88	.00	832.50
2749.0	1254.8	71.1	1423.1	703.7	60.2	835.7	160.0	140.3	832.80
.66	1.78	1.18	1.70	.050	.050	.050	.000	830.60	9267.81
.003391	480.	459.	420.	4	8	0	.00	1934.06	11201.86

FLOW DISTRIBUTION FOR SECNO= 2.04 CWSEL= 833.16

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9268.	9361.	9376.	9413.	9451.	9537.	9676.	9729.	9780.	9877.	9965.	9988.	10095.
PER Q=	4.1	3.0	3.4	3.2	6.8	8.7	3.9	3.7	4.0	3.8	1.0	2.6	
AREA=	68.0	30.5	46.0	45.1	98.8	138.8	57.8	56.1	74.0	70.2	18.2	60.2	
VEL=	1.7	2.7	2.0	2.0	1.9	1.7	1.9	1.8	1.5	1.5	1.5	1.2	
DEPTH=	.7	2.0	1.2	1.2	1.1	1.0	1.1	1.1	.8	.8	.8	.6	

STA=	10095.	10241.	10438.	10718.	10776.	10870.	10918.	11026.	11069.	11153.	11202.
PER Q=	3.2	3.5	5.0	4.5	10.3	5.3	11.2	3.4	4.8	.6	
AREA=	77.5	89.2	112.8	65.7	131.5	66.9	145.8	48.8	79.3	18.2	
VEL=	1.1	1.1	1.2	1.9	2.2	2.2	2.1	1.9	1.7	.9	
DEPTH=	.5	.5	.4	1.1	1.4	1.4	1.3	1.1	.9	.4	

*SECNO 2.140

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

2.140	2.00	836.00	835.73	.00	836.14	.13	2.91	.03	835.30
2749.0	1466.8	255.5	1026.7	492.3	67.7	389.4	175.6	159.0	834.70
.71	2.98	3.77	2.64	.050	.050	.050	.000	834.00	9412.80
.010234	545.	528.	520.	4	20	0	.00	1132.05	10544.85

FLOW DISTRIBUTION FOR SECNO= 2.14 CWSEL= 836.00

STA=	9413.	9466.	9500.	9535.	9571.	9611.	9644.	9722.	9847.	9889.	9916.	9934.	9961.
PER Q=	5.4	4.1	3.3	3.6	5.6	3.4	4.5	3.9	3.8	5.7	4.5	4.5	
AREA=	49.1	36.1	32.1	33.5	46.2	31.7	53.4	57.0	36.9	40.2	29.1	35.0	
VEL=	3.0	3.1	2.8	2.9	3.3	2.9	2.3	1.9	2.8	3.9	4.2	3.6	
DEPTH=	.9	1.1	.9	1.0	1.2	1.0	.7	.5	.9	1.5	1.7	1.3	

STA=	9961.	9974.	10022.	10069.	10121.	10175.	10238.	10283.	10349.	10387.	10432.	10484.	10545.
PER Q=	1.3	9.3	5.6	5.0	3.8	3.2	4.4	3.4	3.6	4.2	3.3	.8	
AREA=	11.9	67.7	49.9	48.4	41.5	37.6	42.0	41.0	35.0	40.6	37.3	16.0	
VEL=	2.9	3.8	3.1	2.9	2.5	2.4	2.9	2.2	2.9	2.8	2.4	1.3	
DEPTH=	1.0	1.4	1.0	.9	.8	.6	.9	.6	.9	.9	.7	.3	

*SECNO 2.217

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.77

2.217	2.55	838.25	837.60	.00	838.31	.06	2.16	.01	837.50
2749.0	957.8	103.7	1687.5	500.9	48.9	832.2	186.4	169.8	837.00
.77	1.91	2.12	2.03	.050	.050	.050	.000	835.70	9515.89
.003266	405.	407.	405.	5	10	0	.00	1191.34	10707.23

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 2.22 CWSEL= 838.25

STA=	9516.	9647.	9690.	9728.	9798.	9832.	9870.	9905.	9945.	9970.	9980.	10015.	10069.
PER Q=		3.2	3.3	4.1	5.4	3.0	3.9	3.7	3.7	3.6	.9	3.8	4.1
AREA=		72.3	49.4	53.2	79.9	42.1	51.8	48.1	50.5	41.2	12.4	48.9	61.2
VEL=		1.2	1.9	2.1	1.9	2.0	2.1	2.1	2.0	2.4	2.0	2.1	1.9
DEPTH=		.6	1.1	1.4	1.1	1.2	1.4	1.4	1.3	1.7	1.3	1.4	1.1

STA=	10069.	10103.	10152.	10201.	10249.	10283.	10330.	10352.	10389.	10410.	10451.	10485.	10542.
PER Q=		3.3	3.8	3.2	5.2	3.1	5.7	4.4	4.8	4.5	3.8	4.0	5.2
AREA=		44.2	56.1	50.4	66.5	42.8	70.7	44.1	57.9	44.8	52.2	49.9	71.8
VEL=		2.0	1.9	1.7	2.2	2.0	2.2	2.7	2.3	2.8	2.0	2.2	2.0
DEPTH=		1.3	1.1	1.0	1.4	1.2	1.5	2.1	1.6	2.1	1.3	1.5	1.3

STA=	10542.	10623.	10707.
PER Q=		3.4	2.8
AREA=		63.6	56.0
VEL=		1.5	1.4
DEPTH=		.8	.7

*SECNO 2.301

2.301	3.08	839.98	839.45	.00	840.09	.12	1.77	.02	837.90
2749.0	665.2	195.0	1888.8	233.3	57.6	722.1	198.0	179.9	839.10
.81	2.85	3.39	2.62	.050	.050	.050	.000	836.90	9771.30
.005620	450.	444.	405.	2	5	0	.00	893.82	10665.12

FLOW DISTRIBUTION FOR SECNO= 2.30 CWSEL= 839.98

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9771.	9885.	9911.	9921.	9956.	9974.	9985.	10015.	10068.	10117.	10141.	10194.	10228.
PER Q=	3.4	3.2	4.4	8.0	3.1	2.0	7.1	5.5	4.6	3.2	4.3	4.3	
AREA=	61.5	33.0	27.5	64.7	28.7	17.8	57.6	61.6	53.2	32.3	51.4	43.8	
VEL=	1.5	2.7	4.4	3.4	3.0	3.1	3.4	2.5	2.4	2.7	2.3	2.7	
DEPTH=	.5	1.2	2.8	1.9	1.5	1.7	1.9	1.2	1.1	1.3	1.0	1.3	

STA=	10228.	10248.	10271.	10313.	10325.	10342.	10373.	10390.	10415.	10463.	10488.	10549.	10660.
PER Q=	3.2	5.3	4.0	3.1	3.3	4.8	3.8	4.1	5.4	3.3	3.2	3.3	
AREA=	29.7	43.5	46.4	24.2	28.4	45.8	31.0	38.5	58.0	33.7	44.8	55.4	
VEL=	2.9	3.4	2.4	3.5	3.2	2.9	3.3	3.0	2.6	2.7	1.9	1.6	
DEPTH=	1.5	1.9	1.1	2.0	1.7	1.5	1.8	1.5	1.2	1.3	.7	.5	

STA=	10660.	10665.
PER Q=	.0	
AREA=	.7	
VEL=	.6	
DEPTH=	.1	

*SECNO 2.405

2.405	4.23	843.43	842.66	.00	843.67	.24	3.54	.04	842.10
2749.0	891.3	258.0	1599.7	235.2	59.5	403.4	209.4	188.2	841.40
.85	3.79	4.34	3.97	.050	.050	.050	.000	839.20	9864.54
.006626	490.	549.	625.	4	8	0	.00	350.21	10214.75

FLOW DISTRIBUTION FOR SECNO= 2.40 CWSEL= 843.43

STA=	9865.	9891.	9903.	9922.	9940.	9954.	9965.	9990.	10013.	10023.	10039.	10048.	10061.
PER Q=	4.6	4.0	5.9	4.9	3.5	4.4	5.1	9.4	4.6	7.6	3.4	3.5	
AREA=	38.0	26.8	40.5	35.7	26.4	27.3	40.6	59.5	27.0	43.7	21.9	25.0	
VEL=	3.3	4.1	4.0	3.8	3.6	4.4	3.4	4.3	4.7	4.8	4.3	3.8	
DEPTH=	1.4	2.2	2.1	2.0	1.8	2.5	1.6	2.6	2.7	2.8	2.3	2.0	

STA=	10061.	10073.	10099.	10116.	10125.	10135.	10149.	10169.	10185.	10214.
PER Q=	3.2	5.3	5.5	3.1	4.1	5.2	5.2	4.0	3.5	
AREA=	23.7	43.0	37.5	20.5	25.6	32.5	39.0	29.5	34.5	
VEL=	3.7	3.4	4.1	4.2	4.4	4.4	3.7	3.7	2.8	
DEPTH=	1.9	1.7	2.2	2.3	2.5	2.5	1.9	1.9	1.2	

*SECNO 2.479

2.479	3.87	846.07	845.27	.00	846.37	.30	2.69	.02	844.60
2749.0	636.5	364.2	1748.3	129.3	77.2	419.3	215.4	191.1	844.50
.88	4.92	4.72	4.17	.050	.050	.050	.000	842.20	9932.53
.007039	380.	391.	400.	3	19	0	.00	280.73	10213.26

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 2.48 CWSEL= 846.07

STA=	9933.	9951.	9958.	9969.	9982.	10012.	10023.	10031.	10051.	10086.	10113.	10133.	10151.
PER Q=	8.1	5.1	6.6	3.4	13.2	3.8	5.1	9.0	8.6	7.6	6.6	6.6	
AREA=	46.3	23.9	34.7	24.5	77.2	25.1	26.0	52.3	63.8	53.5	43.6	41.0	
VEL=	4.8	5.9	5.2	3.8	4.7	4.2	5.4	4.7	3.7	3.9	4.2	4.4	
DEPTH=	2.5	3.6	3.1	1.9	2.6	2.2	3.2	2.6	1.8	2.0	2.2	2.4	

STA=	10151.	10157.	10171.	10197.	10209.	10213.
PER Q=	3.1	5.2	4.4	3.3	.2	
AREA=	17.5	32.2	37.6	23.6	3.3	
VEL=	5.0	4.4	3.2	3.8	2.0	
DEPTH=	2.8	2.4	1.4	1.9	.7	

*SECNO 2.568

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .68

2.568	3.69	850.29	850.12	.00	851.02	.72	4.52	.13	847.80
2749.0	1262.2	985.8	501.0	181.8	128.0	121.7	220.9	193.8	847.20
.90	6.94	7.70	4.12	.050	.050	.050	.000	846.60	9903.83
.015006	470.	470.	435.	2	11	0	.00	245.21	10149.04

FLOW DISTRIBUTION FOR SECNO= 2.57 CWSEL= 850.29

STA=	9904.	9920.	9932.	9945.	9962.	9976.	10018.	10025.	10043.	10071.	10102.	10149.
PER Q=	6.3	6.5	7.7	13.5	11.9	35.9	3.4	4.7	4.5	3.1	2.5	
AREA=	29.3	27.6	32.6	49.2	43.2	128.0	15.7	27.4	31.3	24.2	23.1	
VEL=	5.9	6.5	6.5	7.6	7.6	7.7	5.9	4.7	4.0	3.5	3.0	
DEPTH=	1.8	2.4	2.4	3.0	3.0	3.1	2.1	1.5	1.1	.8	.5	

*SECNO 2.653

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.73

3470 ENCROACHMENT STATIONS= 9975.0 10140.0 TYPE= 1 TARGET= 165.000

SECTION 2.653 ENCROACHED AT A 4:1 DOWNSTREAM FROM THE SOUTHERN PACIFIC RAILROAD. THE SOUTH RIGHT OF WAY OF THE SOUTHERN PACIFIC RAILROAD IS THE UPSTREAM LIMIT OF STUDY.

2.653	5.66	854.06	852.69	.00	854.46	.40	3.41	.03	851.80
2749.0	4.3	998.1	1746.6	2.5	171.3	377.1	225.6	195.7	849.60
.92	1.72	5.83	4.63	.050	.050	.050	.000	848.40	9975.00
.005014	445.	449.	390.	3	11	0	.00	164.02	10140.00

FLOW DISTRIBUTION FOR SECNO= 2.65 CWSEL= 854.06

STA=	9975.	9976.	10013.	10039.	10075.	10097.	10120.	10131.	10140.
PER Q=	.2	36.3	20.0	20.1	10.8	11.0	1.6	.0	
AREA=	2.5	171.3	104.2	118.2	66.7	69.9	16.7	1.3	
VEL=	1.7	5.8	5.3	4.7	4.4	4.3	2.7	.6	
DEPTH=	2.2	4.7	4.0	3.3	3.1	3.0	1.5	.2	

THIS RUN EXECUTED 21FEB93 11:18:03

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 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YR EVENT EXISTING

MMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
	1.051	2749.00	811.87	4.27	812.02	810.72	4.80	42.57	.00	9954.34	810.58	10764.93	.00
*	1.175	2749.00	813.87	2.87	813.92	812.61	2.25	21.67	655.00	9483.01	1234.72	10717.73	15.35
*	1.294	2749.00	816.59	2.29	816.83	816.37	4.97	139.00	628.00	9500.00	892.94	10440.60	30.59
*	1.372	2749.00	818.32	2.22	818.38	817.23	2.57	17.27	412.00	9679.59	964.06	10643.65	39.15
	1.460	2749.00	819.23	2.03	819.28	818.35	2.20	21.24	465.00	9500.00	1188.08	10767.48	50.79
	1.567	2749.00	820.71	1.71	820.77	820.02	2.34	38.00	565.00	9827.52	1251.48	11079.00	65.70
	1.660	2749.00	822.71	3.01	822.83	822.09	4.11	49.50	491.00	9842.20	1196.55	11145.09	78.96
	1.759	2749.00	825.67	2.57	825.77	825.23	4.00	65.53	523.00	9910.82	1094.89	11005.71	92.55
	1.851	2749.00	828.52	2.42	828.61	827.90	3.25	55.58	486.00	9606.14	1262.90	11025.66	105.29
	1.953	2749.00	831.25	1.95	831.32	830.63	2.70	51.36	539.00	9393.72	1646.90	11169.91	122.09
	2.040	2749.00	833.16	2.56	833.20	832.60	1.18	33.91	459.00	9267.81	1934.06	11201.86	140.32
*	2.140	2749.00	836.00	2.00	836.14	835.73	3.77	102.34	528.00	9412.80	1132.05	10544.85	159.01
*	2.217	2749.00	838.25	2.55	838.31	837.60	2.12	32.66	407.00	9515.89	1191.34	10707.23	169.81
	2.301	2749.00	839.98	3.08	840.09	839.45	3.39	56.20	444.00	9771.30	893.82	10665.12	179.88
	2.405	2749.00	843.43	4.23	843.67	842.66	4.34	66.26	549.00	9864.54	350.21	10214.75	188.23
	2.479	2749.00	846.07	3.87	846.37	845.27	4.72	70.39	391.00	9932.53	280.73	10213.26	191.08
*	2.568	2749.00	850.29	3.69	851.02	850.12	7.70	150.06	470.00	9903.83	245.21	10149.04	193.79

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
*	2.653	2749.00	854.06	5.66	854.46	852.69	5.83	50.14	449.00	9975.00	164.02	10140.00	195.72

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 1.175 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.294 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.372 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 2.140 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 2.217 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

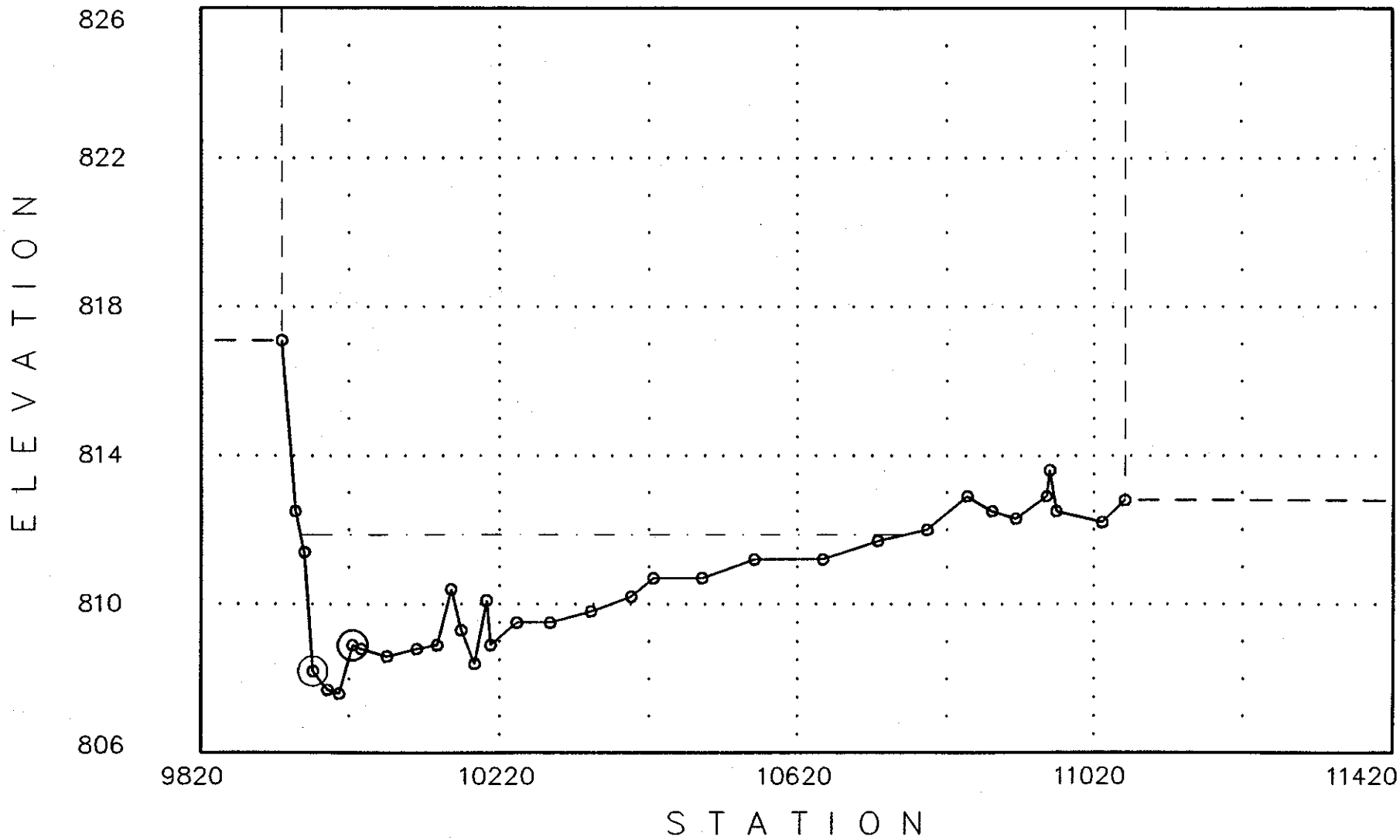
WARNING SECNO= 2.568 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 2.653 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

<<<<<< Cross Section: 1.051: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 811.87

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .12

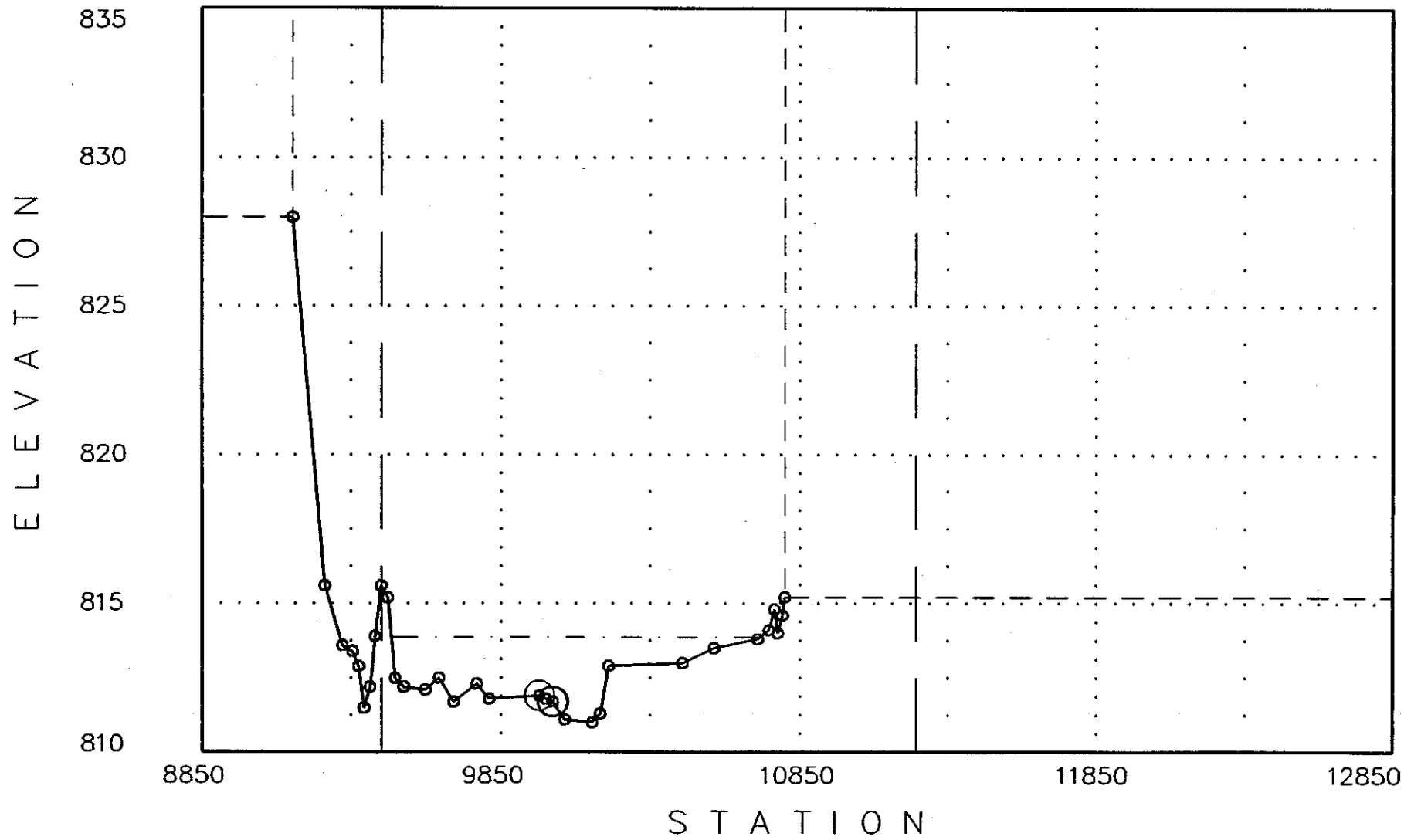


02-21-1993

<<<<<< Cross Section: 1.175: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 813.87

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .12

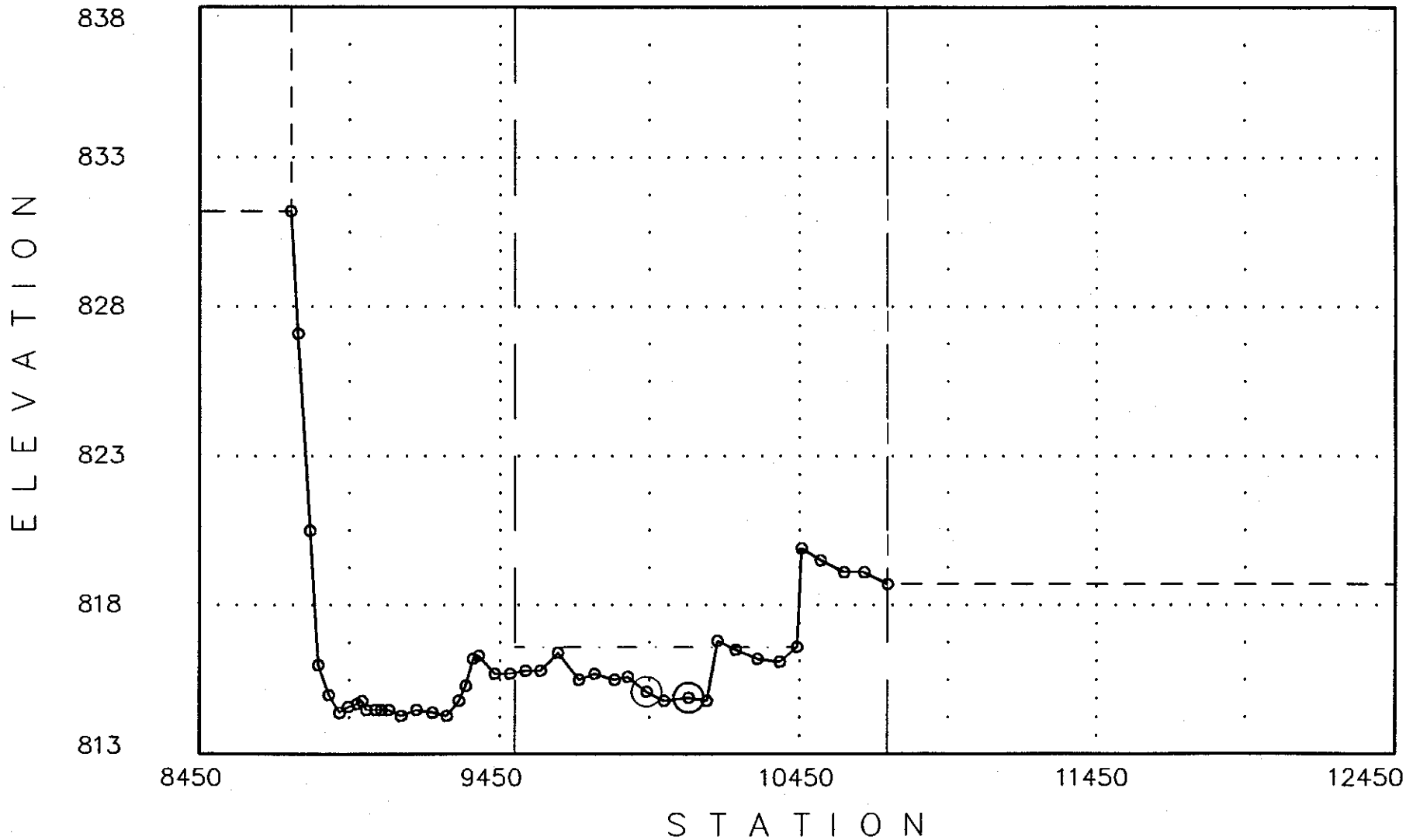


02-21-1993

<<<<<< Cross Section: 1.294: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 816.59

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .12

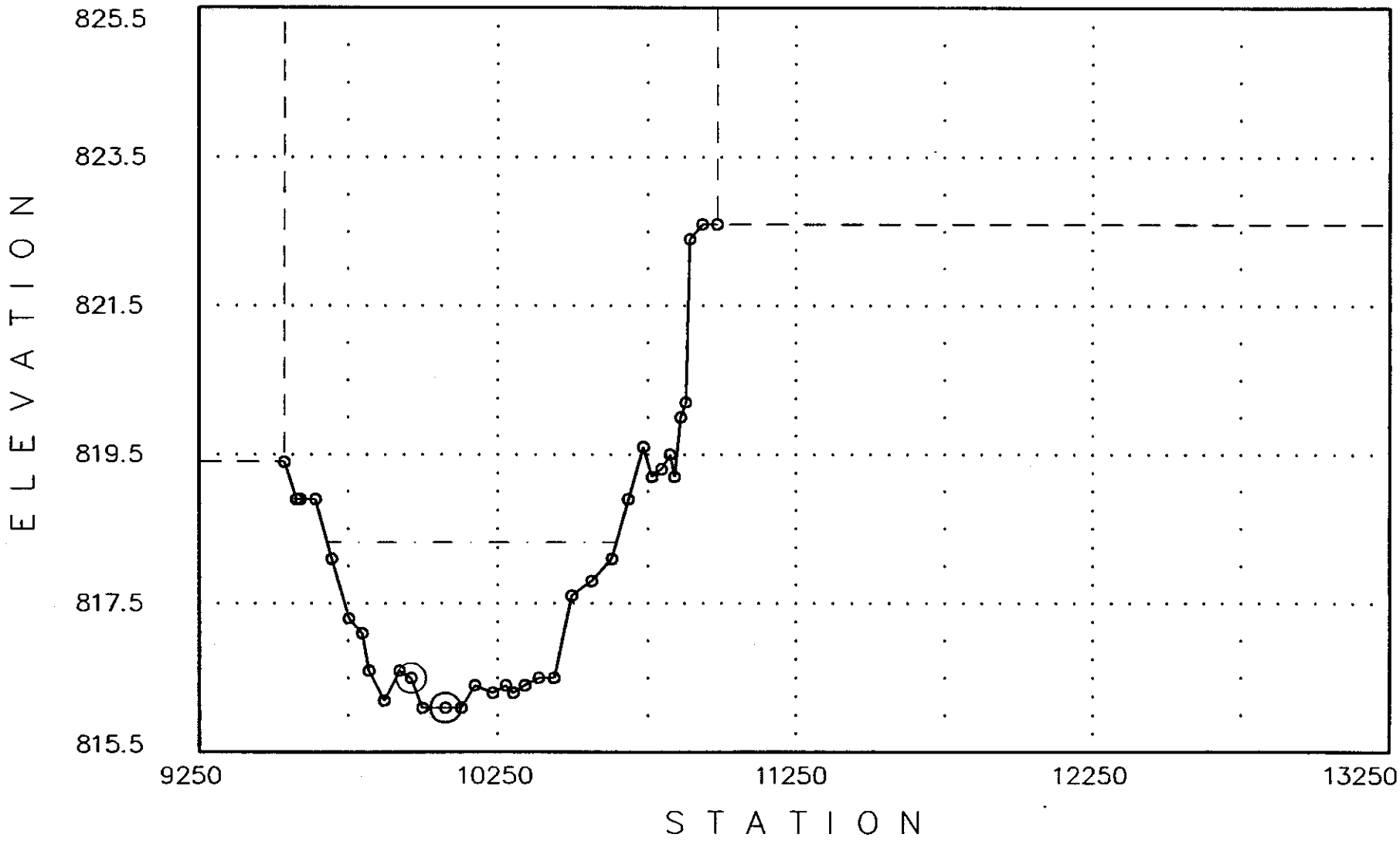


02-21-1993

<<<<<< Cross Section: 1.372: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 818.32

Manning-n's: n-lob = .04 n-ch = .04 n-rob = .06

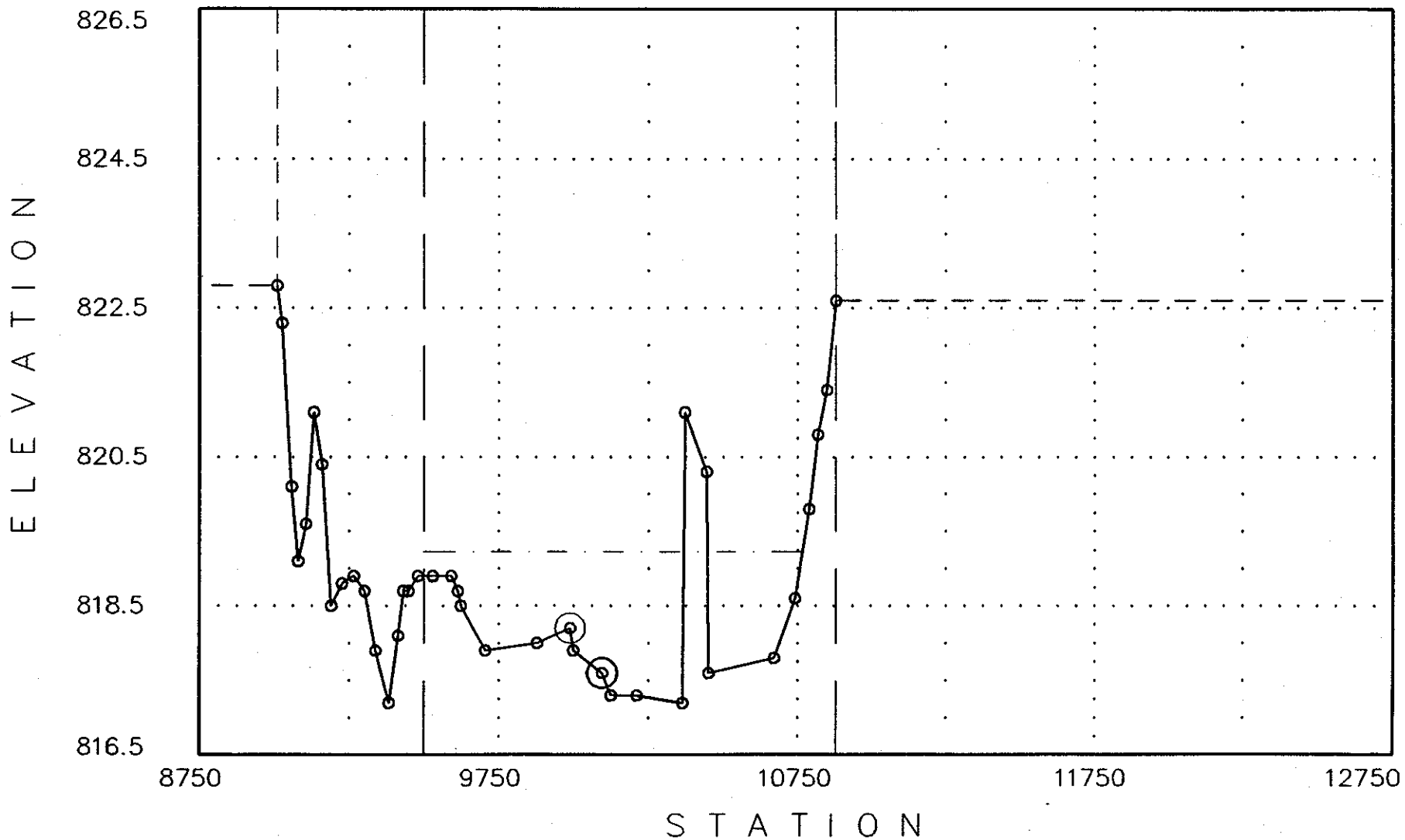


02-21-1993

<<<<<< Cross Section: 1.46: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 819.23

Manning-n's: n-lob = .04 n-ch = .04 n-rob = .06

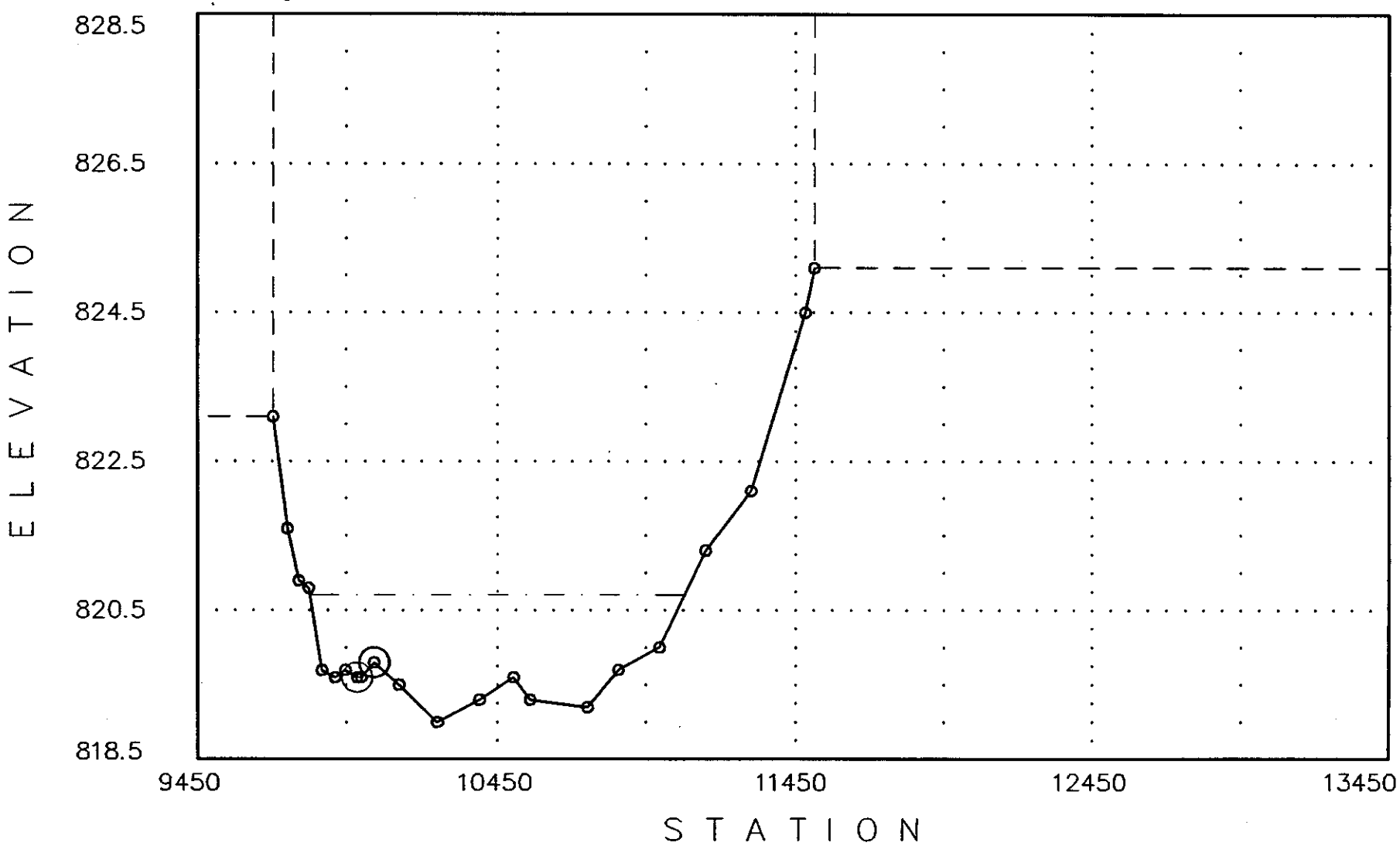


02-21-1993

<<<<<< Cross Section: 1.567: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 820.71

Manning-n's: n-lob = .04 n-ch = .04 n-rob = .06

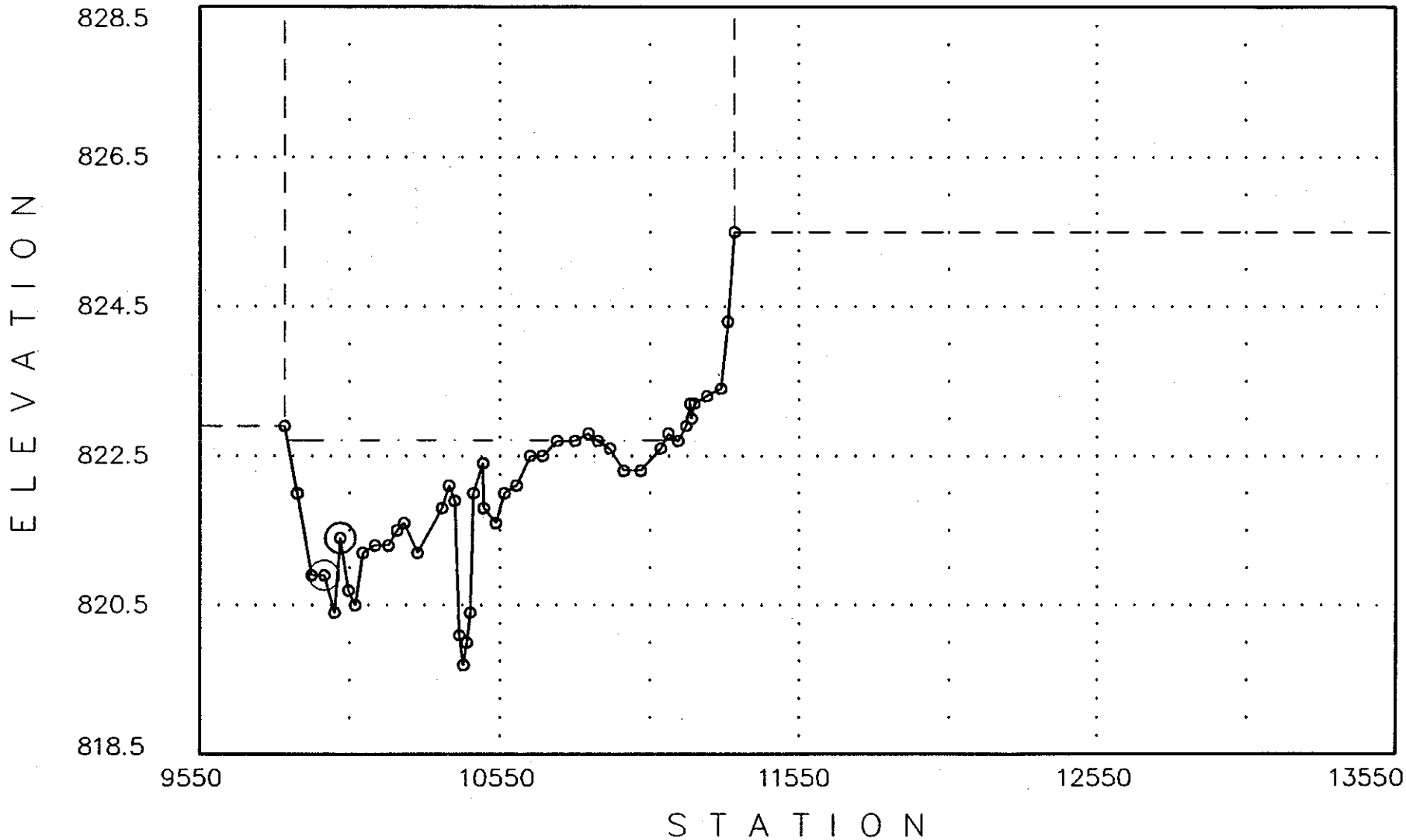


02-21-1993

<<<<<< Cross Section: 1.66: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 822.71

Manning-n's: n-lob = .04 n-ch = .04 n-rob = .06

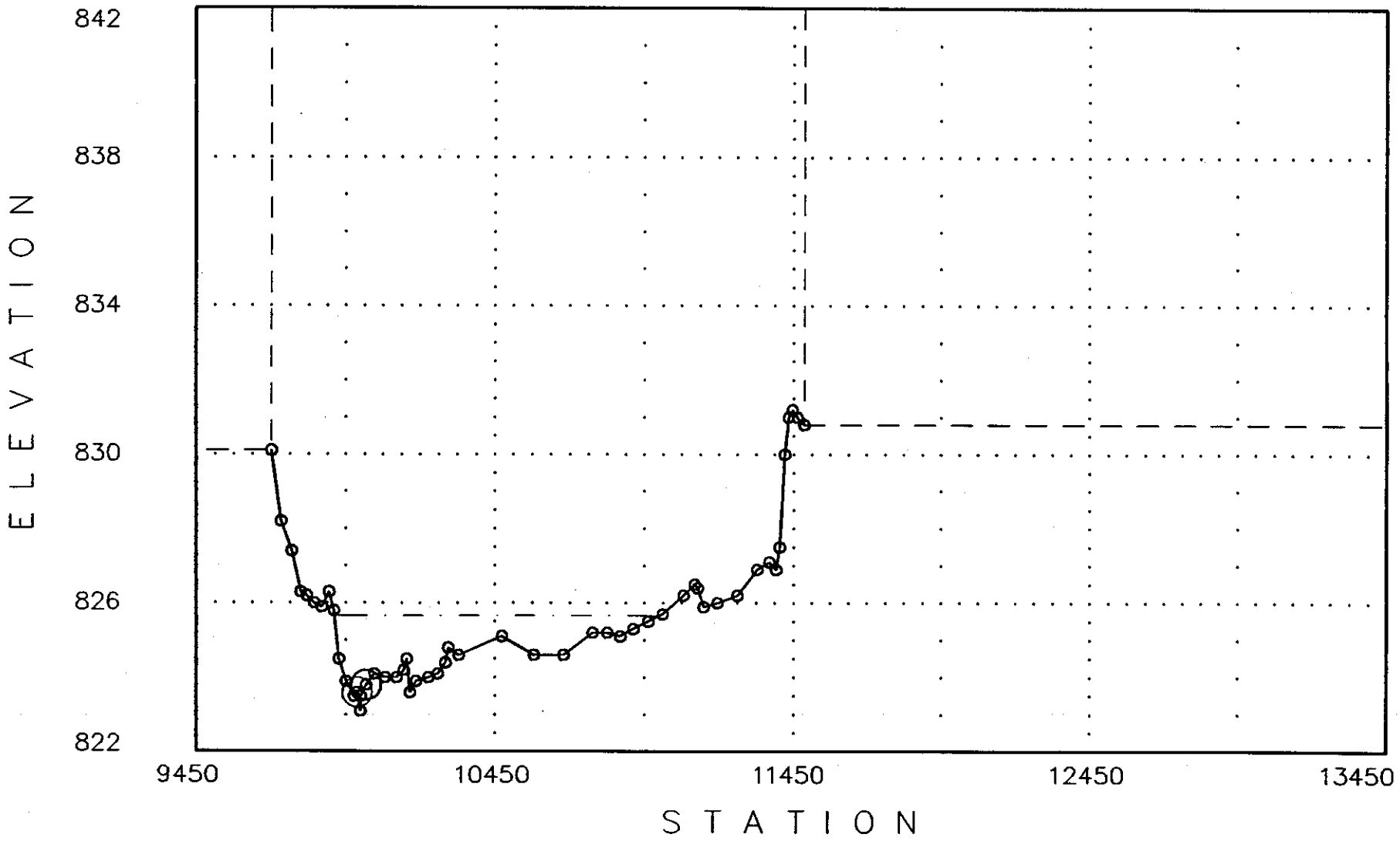


02-21-1993

<<<<<< Cross Section: 1.759: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 825.67

Manning-n's: n-lob = .06 n-ch = .05 n-rob = .06

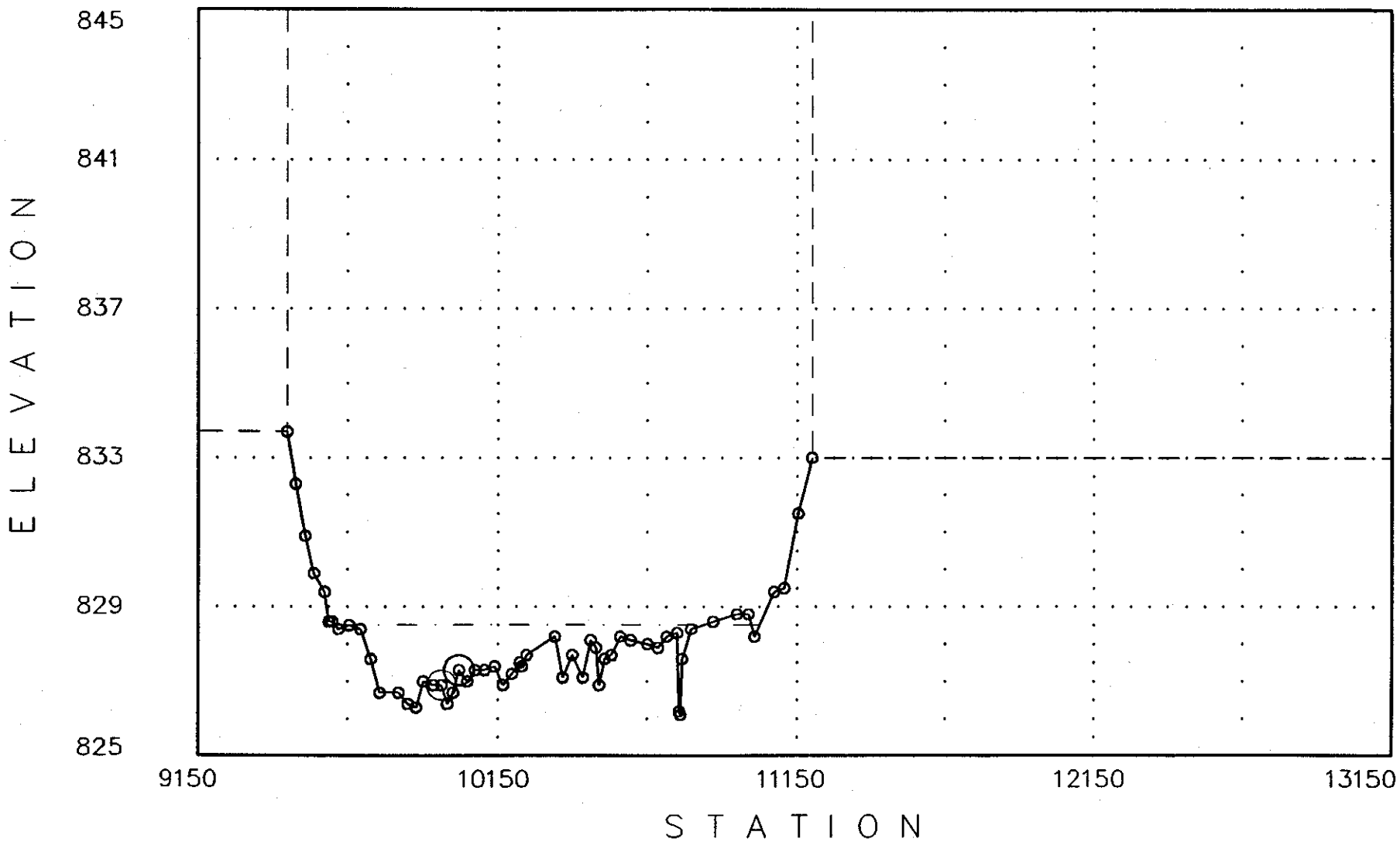


02-21-1993

<<<<<< Cross Section: 1.851: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 828.52

Manning-n's: n-lob = .06 n-ch = .05 n-rob = .06

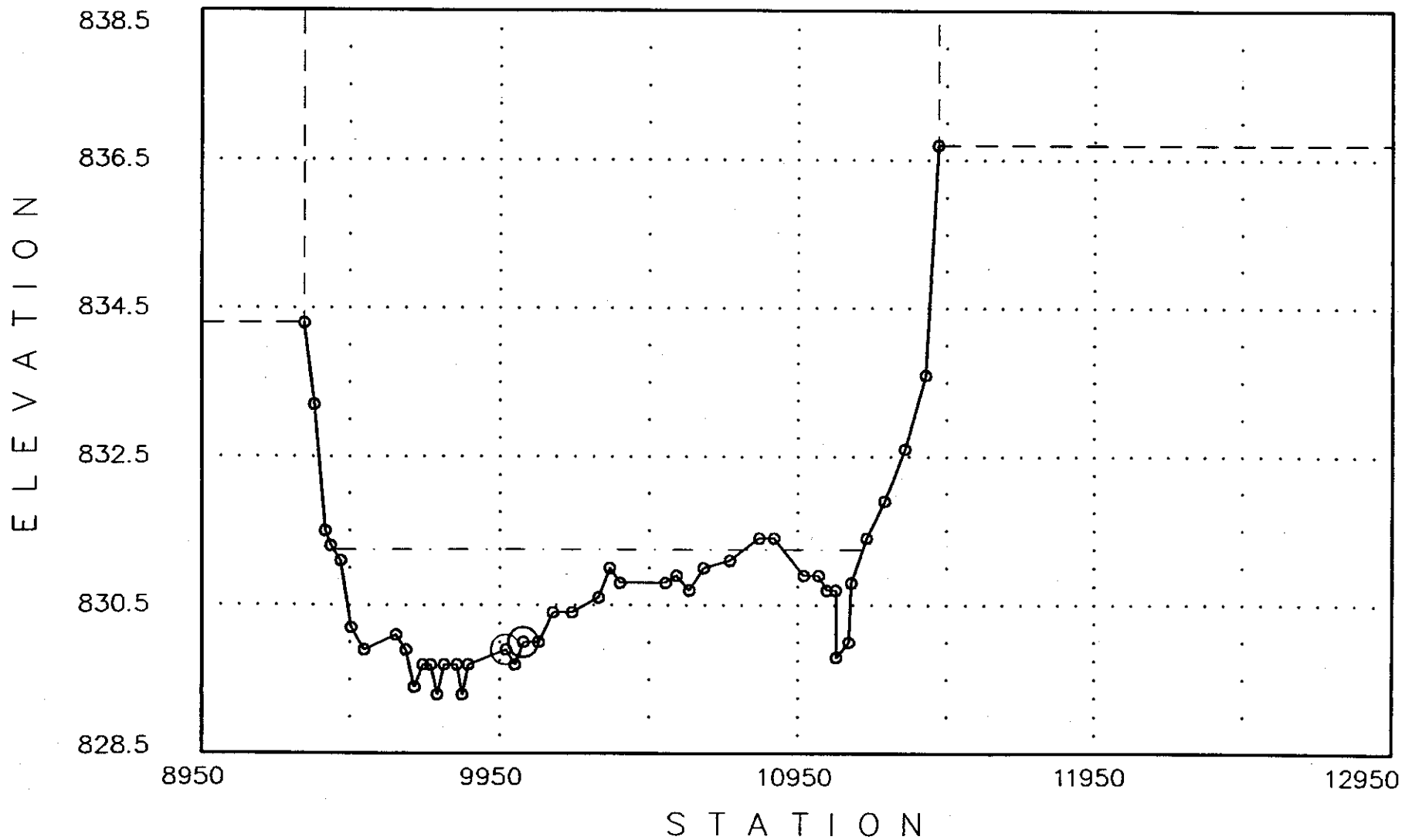


02-21-1993

<<<<<< Cross Section: 1.953: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 831.25

Manning-n's: n-lob = .06 n-ch = .05 n-rob = .06

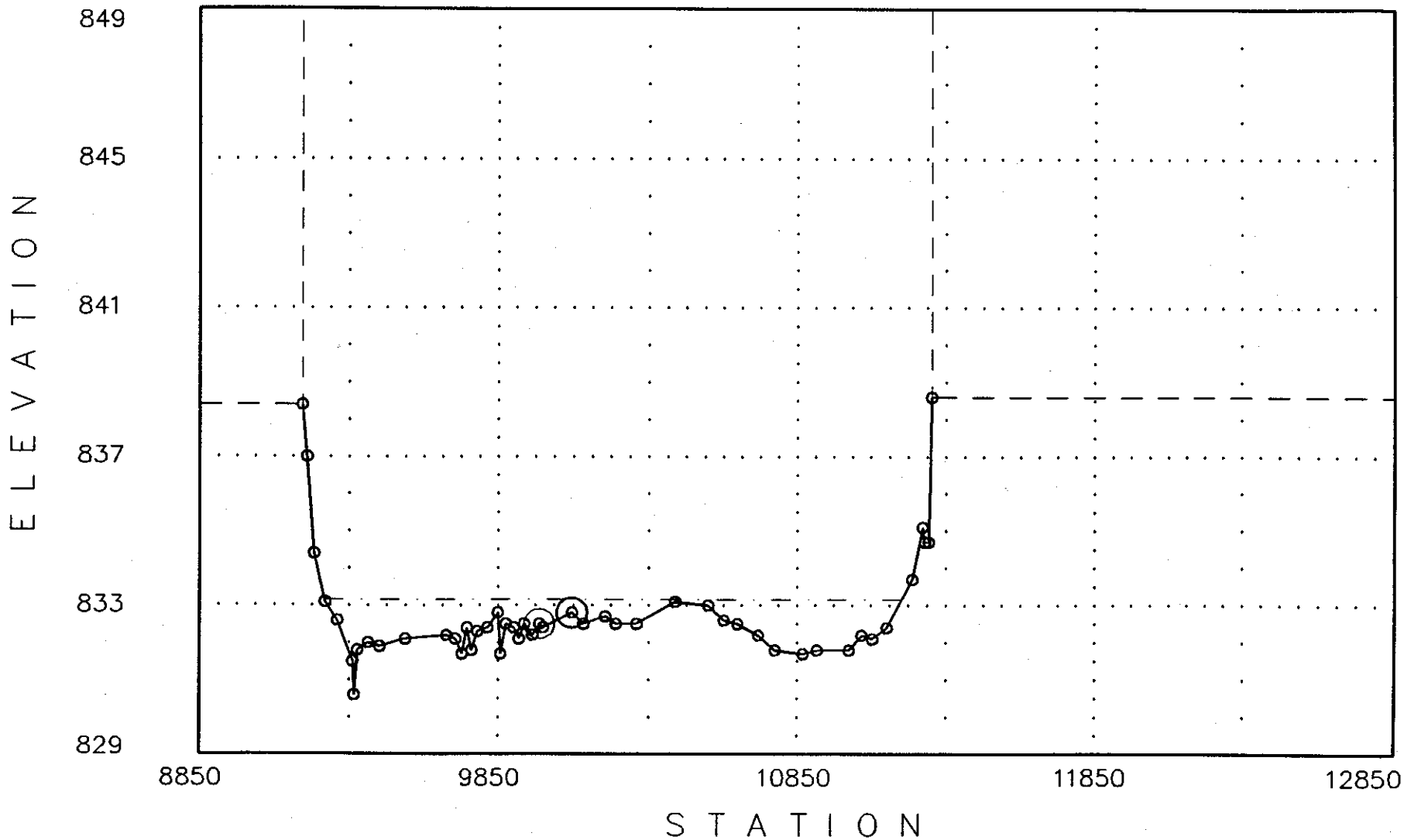


02-21-1993

<<<<<< Cross Section: 2.04: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 833.16

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

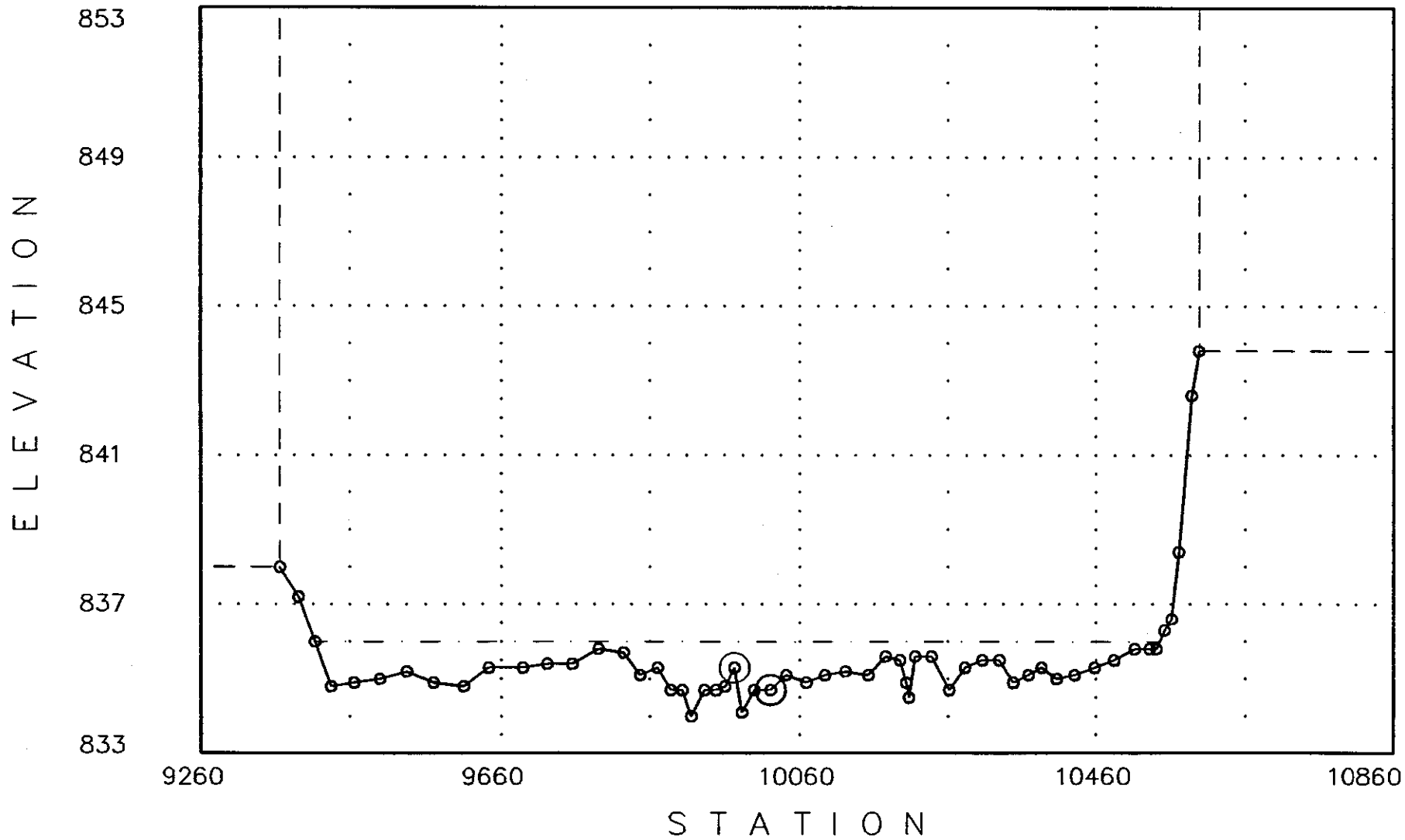


02-21-1993

<<<<<< Cross Section: 2.14: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 836

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

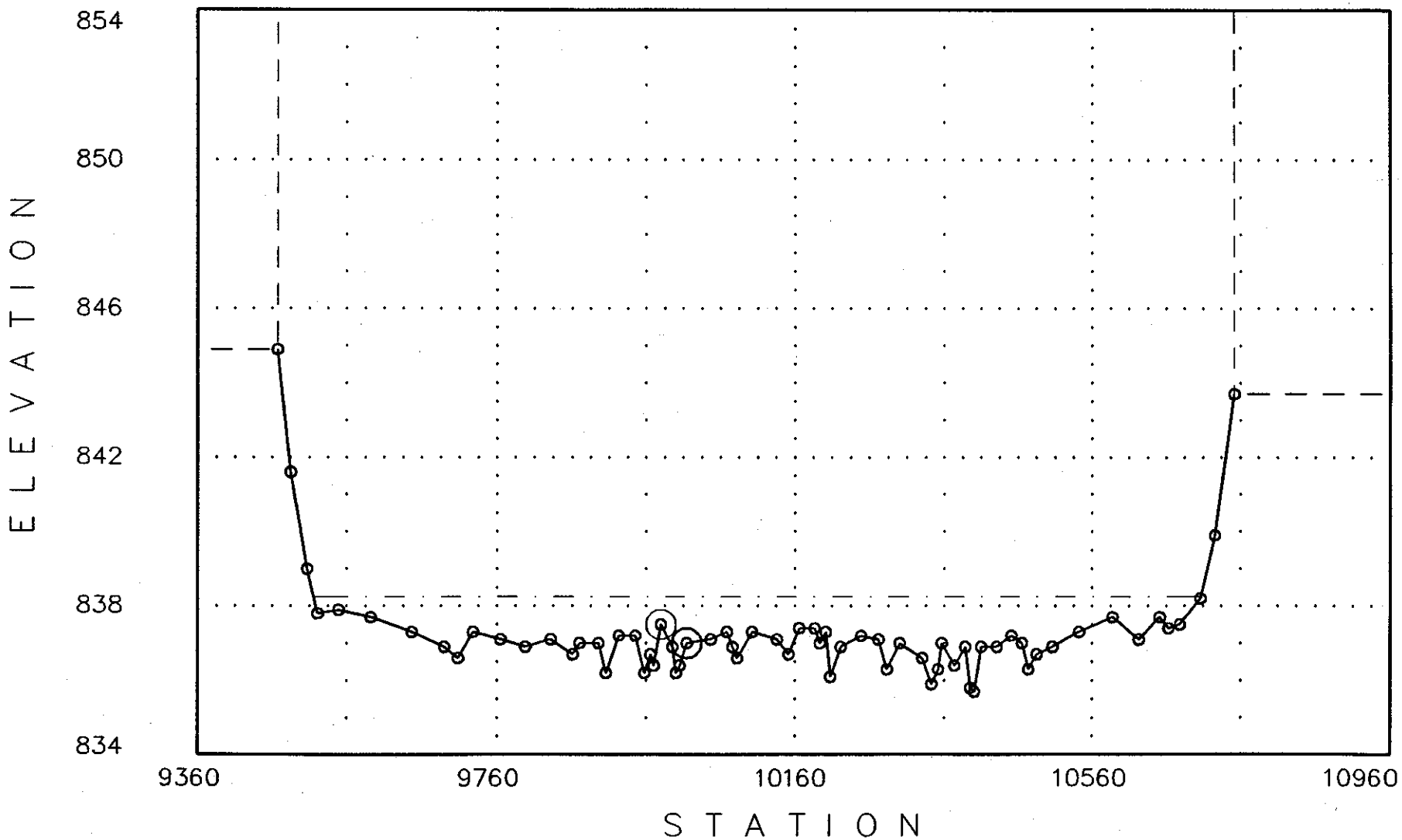


02-21-1993

<<<<<< Cross Section: 2.217: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 838.25

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

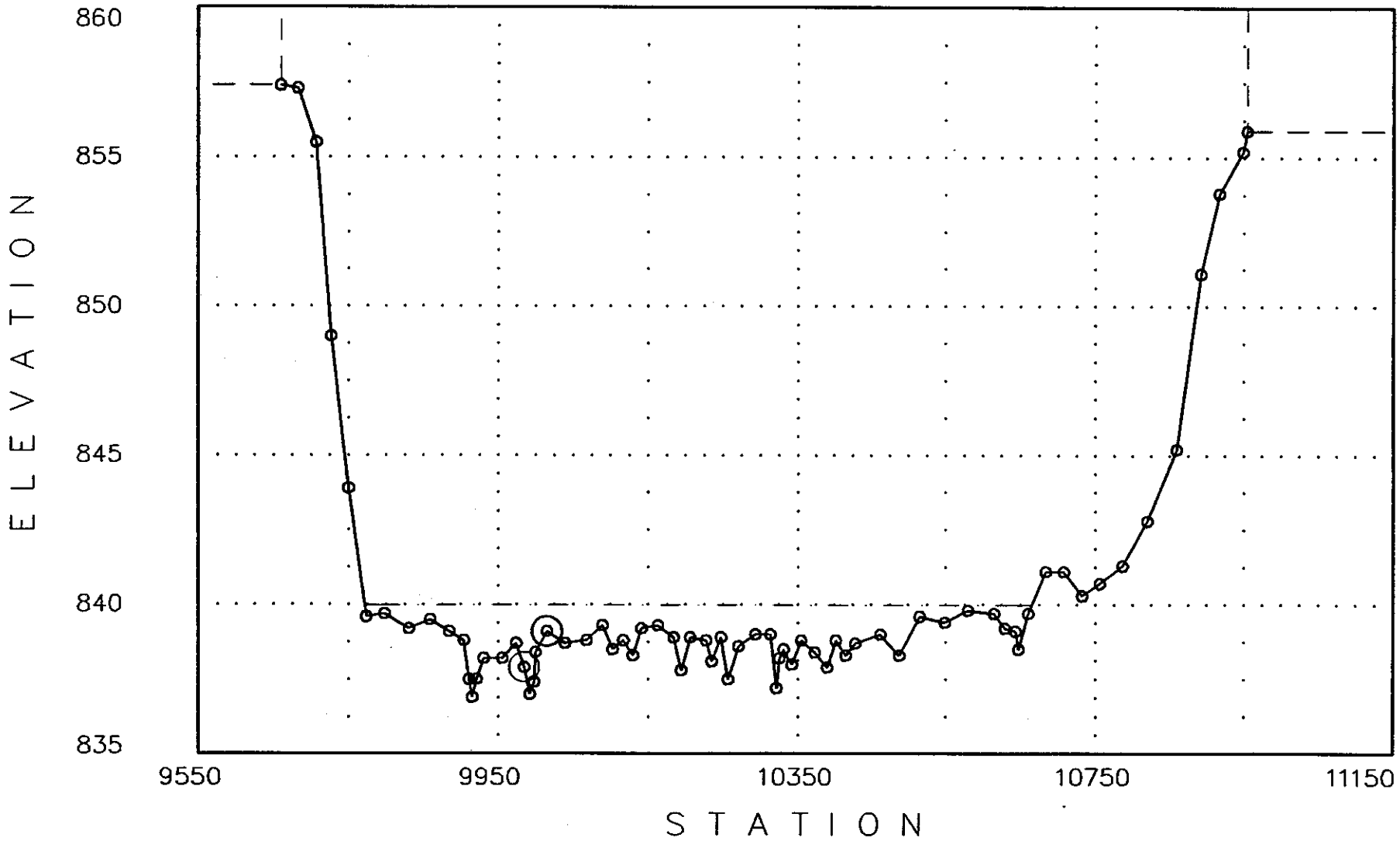


02-21-1993

<<<<<< Cross Section: 2.301: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 839.98

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

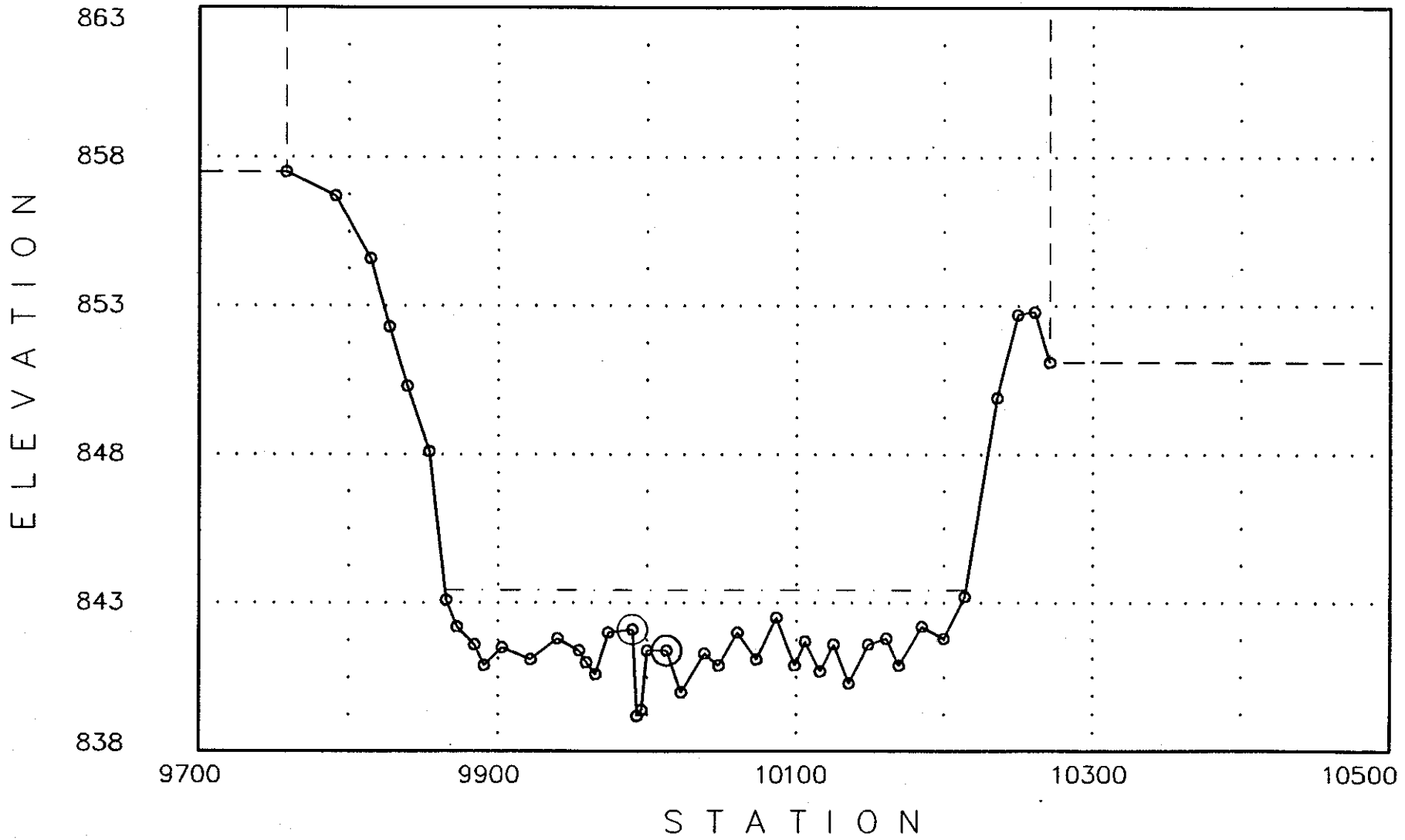


02-21-1993

<<<<<< Cross Section: 2.405: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 843.43

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

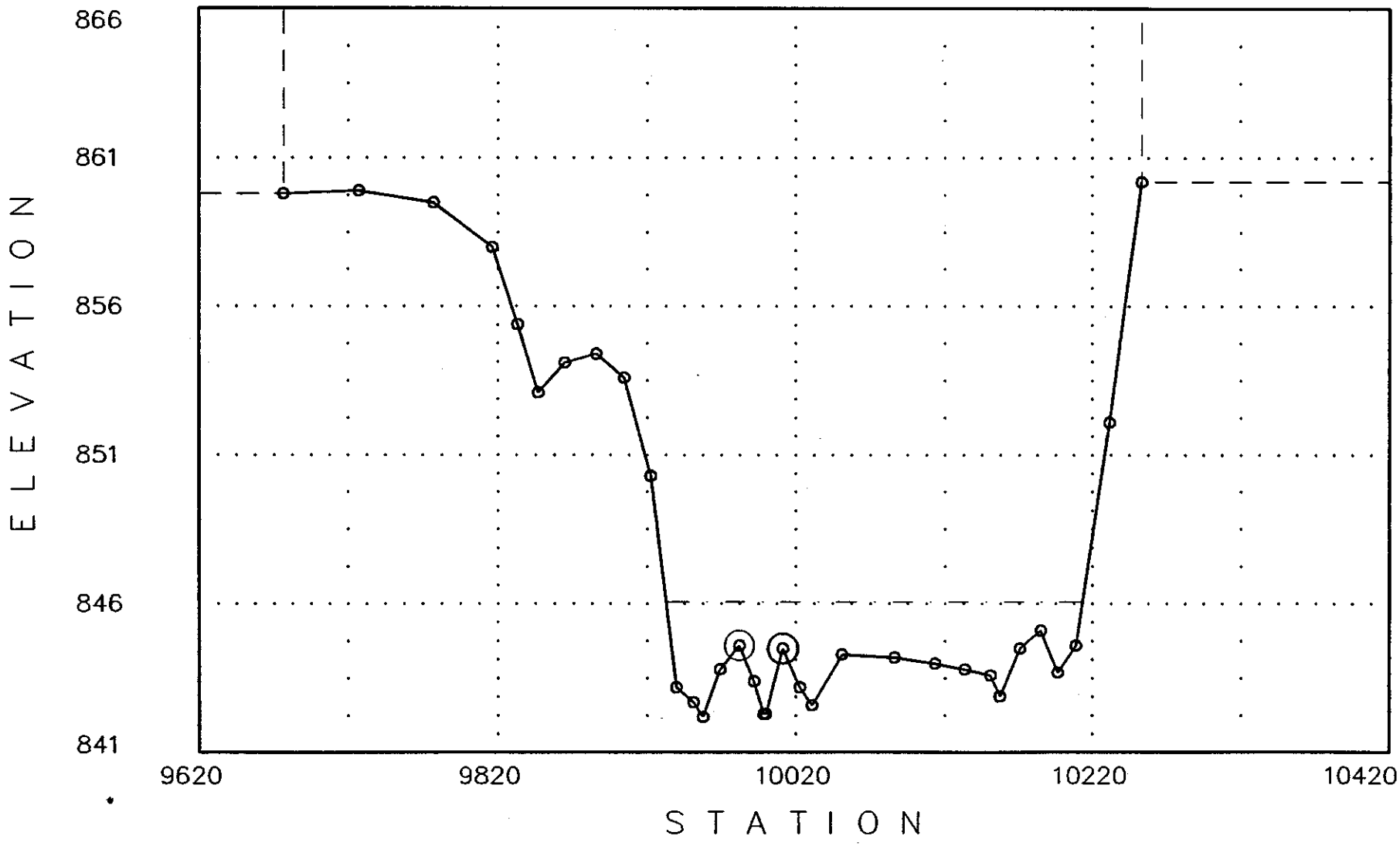


02-21-1993

<<<<<< Cross Section: 2.479: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 846.07

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

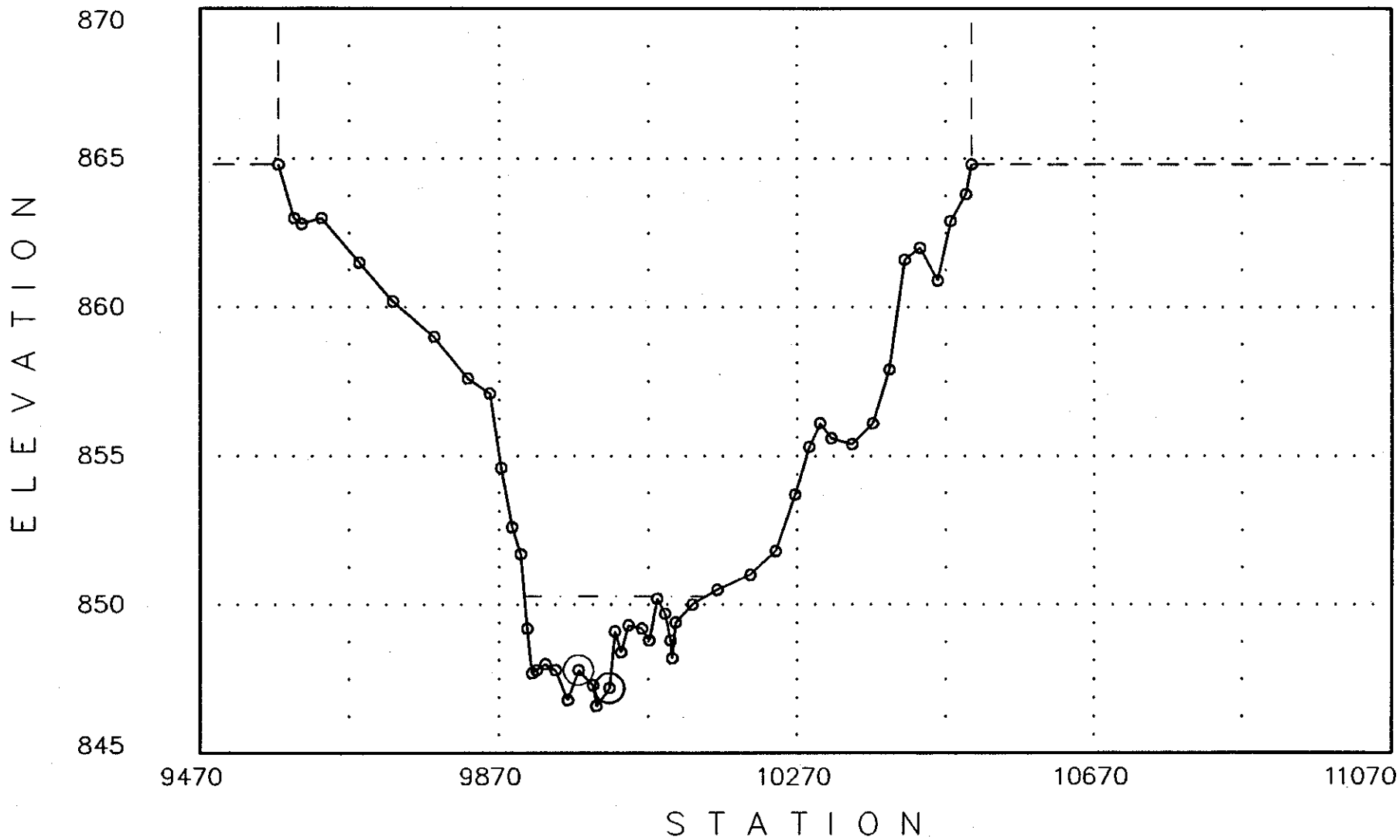


02-21-1993

<<<<<< Cross Section: 2.568: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 850.29

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05

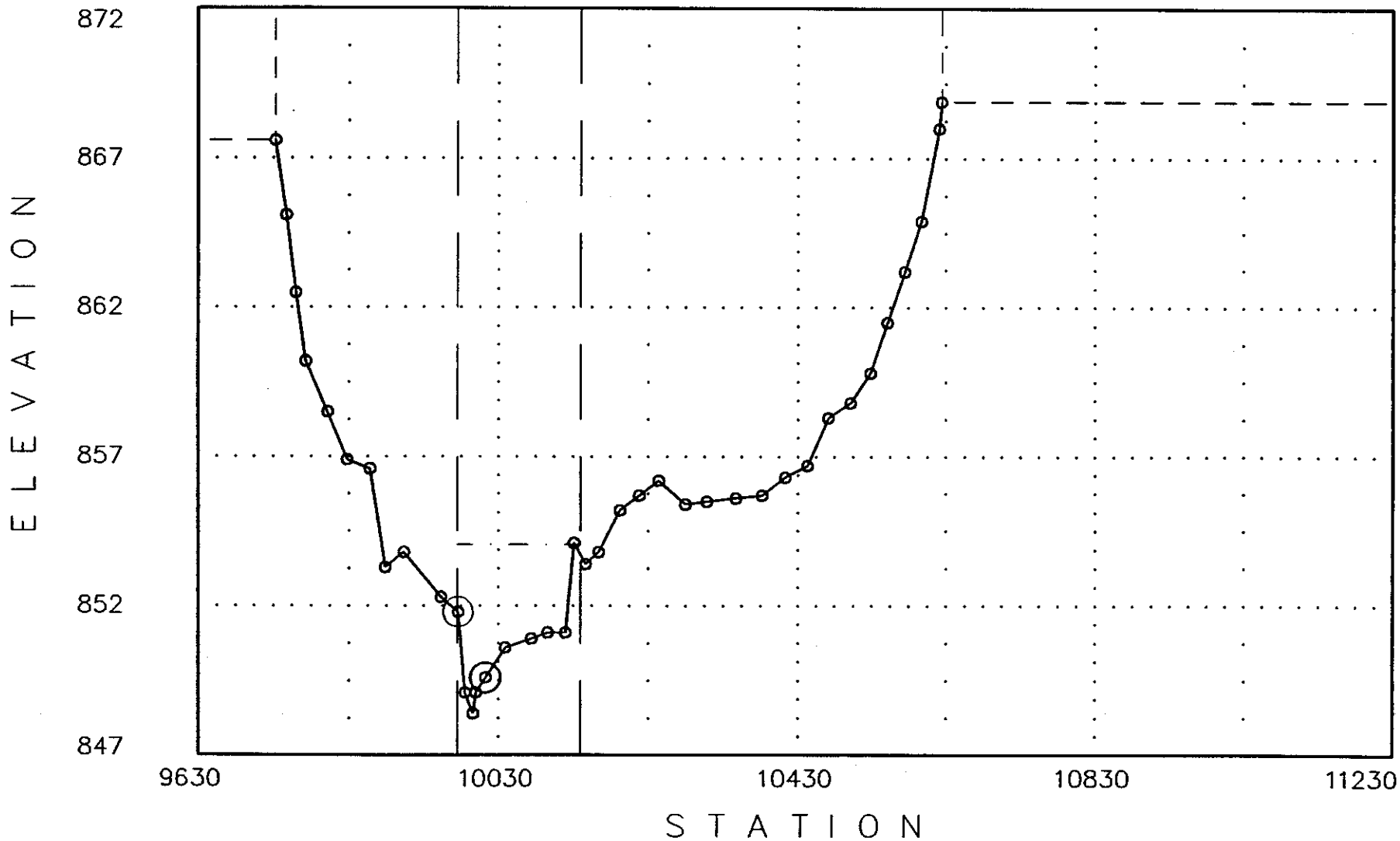


02-21-1993

<<<<<< Cross Section: 2.653: (FN = ETRIB.AHO) >>>>>>

Q1= 2749 WS1= 854.06

Manning-n's: n-lob = .05 n-ch = .05 n-rob = .05



02-21-1993

SECTION IV

EAST SUB-TRIBUTARY HEC-2 OUTPUT AND CROSS SECTION PLOTS

```
*****************************************
*  HEC-2 WATER SURFACE PROFILES          *
*                                        *
*  Version   4.6.2;  May 1991            *
*                                        *
*  RUN DATE    21FEB93    TIME   11:25:32 *
*****************************************
```

```
***************************************
*  U.S. ARMY CORPS OF ENGINEERS       *
*  HYDROLOGIC ENGINEERING CENTER      *
*  609 SECOND STREET, SUITE D         *
*  DAVIS, CALIFORNIA 95616-4687       *
*          (916) 756-1104             *
***************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

THIS RUN EXECUTED 21FEB93 11:25:32

```
************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************


T2      EAST SUB-TRIBUTARY TO EAST MAIN TRIBUTARY TO LUKE WASH
T3      100-YR EVENT    EXISTING CONDITION          FILE NAME - ESUBTRIB.AH

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0   .004356         0         0         0    809.94         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1         0        -1         0         0         0        -1         0         0        15


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         8         3         2        26         5        39        53
      4        54        37

QT        1       871       871
NC     .045      .045      .045       0.1       0.3
ET    0.130                 9.1                                                                9987      10340
        EAST SUB-TRIBUTARY TO EAST MAIN TRIBUTARY OF LUKE WASH. FROM THE
        EAST MAIN TRIBUTARY FLOODPLAIN, UPSTREAM APRROXIMATELY 1 MILE.
        PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
        PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD
        #90-68). PREPARED BY COE & VAN LOO CONSULTANTS, INC. (CVL #1090-07)
        TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
        FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991.  HORIZONTAL DATUM IS NAD 83.
        THE CONTROL LINE OF THE EAST SUB-TRIBUTARY IS STATION 10,000.
        ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
        CROSS SECTION NUMBERS FOR THE EAST SUB-TRIBUTARY ARE STATIONED IN RIVER
        MILES FROM THE CONFLUENCE WITH THE EAST MAIN TRIBUTARY.
        THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD.  THE WATER SURFACE
        FROM THE EAST MAIN TRIBUTARY WAS NOT USED DUE TO THE DIFFERENCE IN TIME
        TO PEAK.
        ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
        MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
        IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
        LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
        IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
        FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
```

```
        HYDROLOGY IS BASED ON THE 100-YEAR, 6-HOUR HEC-1 MODEL PREPARED FOR
        THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
        100-YEAR FLOW = 871 CFS FROM CONCENTRATION POINT S445.
X1    0.130       33    9982.2   10019.8       725       760       735
GR    818.6   9844.1     815.6      9870     813.6    9928.6     813.4    9962.6     812.9    9982.2
GR    811.5    10000     812.2   10019.8     813.9   10036.8     815.6   10057.6     815.2   10078.4
GR    812.5  10103.8     812.2     10133     812.1   10203.6     812.5   10249.4     811.7   10298.7
GR    812.3  10375.4     811.8   10417.8     811.9   10586.4     811.8   10607.9     811.7     10631
GR    811.1  10671.8       811   10763.1     811.3     10790     812.9     10819       813   11065.7
GR    813.5  11170.1     813.8   11316.7     814.1     11355     814.8   11373.4       814   11384.2
GR    814.6  11399.9     815.2   11408.1     814.3   11418.3

ET    0.225      7.1       9.1                                   9933     10403      9960     10100
        SECTION 0.225 TO 0.300  RIGHT OVERBANK ENCROACHED AT 4:1 DOWNSTREAM
        FROM FLOODPLAIN EXPANSION.
        GR POINTS HAVE BEEN ADJUSTED IN THE RIGHT OVERBANK TO BLOCK OUT
        INEFFECTIVE FLOW AREA STATION 10100 TO 10300.
X1    0.225       19    9982.9   10011.5       500       510       502
GR    820.5   9883.9       816    9911.8       815    9947.1     814.4    9982.9     814.6   10011.5
GR    814.7  10041.4     814.8   10056.9     814.5   10071.7     814.5     10100     817.2     10101
GR    817.2  10144.5     817.2   10184.8     817.2     10299     814.4     10300     814.3   10336.9
GR    814.8  10378.1     815.3   10400.6     816.2   10425.1     816.3   10444.3

ET    0.300      7.1       9.1                                   9835     10275      9940     10120
X1    0.300       28      9981   10015.1       420       360       396
GR    820.6   9618.9     818.3    9652.2     817.9      9695       818    9746.7     817.6    9796.4
GR    817.2   9849.3     816.9    9893.2     816.9    9935.3     816.3      9981     816.1    9989.2
GR      816    10000     816.4   10015.1     816.5   10036.9     816.2     10076     815.9   10128.4
GR    815.5  10185.3     815.3   10250.4     815.4   10300.3     815.7   10354.3     816.4   10373.7
GR    816.1  10422.5     816.6   10448.7     817.8   10454.4       816   10469.6     816.8   10518.6
GR      817  10568.8     817.7   10603.4     819.4   10638.3

ET    0.402                 9.1                                                       9930     10070
X1    0.402       18    9982.4   10023.9       555       505       539
GR    823.3   9724.5     818.8    9739.8     818.3    9746.9     818.3    9777.5     817.8    9818.7
GR    817.1   9861.8     816.9    9907.2     816.3    9942.4     816.7    9964.4     816.7    9982.4
GR    816.4    10000     816.7   10023.9     816.6   10048.7     816.5   10062.3     818.3   10081.7
GR      821  10112.5     822.5   10139.3     822.8   10162.7

ET    0.473                 9.1                                                       9930     10070
X1    0.473       29    9976.2   10006.5       360       365       375
GR      826   9559.4       824    9579.4     821.4    9596.5     820.5    9616.2     820.5     9636
GR    818.5   9655.4     818.7    9690.3     818.4      9734     818.7    9771.7     818.7    9808.3
GR    818.8     9833     818.2      9837     819.3    9849.3     818.7      9882     818.9     9912
GR    818.1     9926     818.5    9945.1     818.5    9976.2     818.2     10000     818.4   10006.5
GR    819.1  10046.7     818.8   10084.3       819     10129     819.4   10185.3       820   10245.7
GR    820.7    10305       821     10345     823.6   10386.2     825.3   10419.2

ET    0.545                 9.1                                                       9850     10040
X1    0.545       22    9980.5     10048       305       420       380
GR    822.9   9527.8     822.4    9561.8     822.2    9592.1     820.2    9621.6     819.4    9642.3
GR    819.5     9687     819.8    9733.6     819.7    9778.9     819.8    9816.4     819.8    9854.4
GR    819.4   9887.6     819.7    9909.1     819.6    9943.2     819.8    9980.5     819.8     10000
GR    819.9    10048     820.1   10101.4     820.5   10147.7     821.8   10203.1     821.8   10254.3
```

GR	822.6	10307.8	822.8	10362.1						
ET	0.648		9.1						9900	10060
X1	0.648	30	9970.9	10024.6	545	545	544			
GR	830.5	9458.2	826.5	9486.6	823.9	9509.7	823.1	9541.4	822.7	9576.9
GR	822.8	9612.3	822.8	9648.9	823	9678.8	822.8	9696.2	822.7	9705
GR	822.9	9724.9	822.7	9753	822.6	9787.2	822.4	9818.7	822.5	9848.7
GR	822.5	9881.8	822.5	9912.4	822.5	9943.1	822.5	9970.9	822.7	10000
GR	822.5	10002	822.8	10024.6	822.7	10055.1	822.8	10093.8	822.9	10134.8
GR	823	10173.2	823.1	10196.5	824.1	10253.6	825.8	10303.6	828.3	10336.2
ET	0.753		9.1						9910	10060
X1	0.753	30	9981.9	10010.6	560	515	554			
GR	836.1	9560	832	9581.9	828.8	9597.7	826.5	9609.6	826.2	9649.8
GR	825.8	9679.9	825.1	9704.7	825.1	9730.7	825.6	9763.1	825.7	9786.5
GR	825.1	9802.4	825.4	9811.3	825.4	9822.8	824.8	9835	825.6	9856.1
GR	825.3	9887.8	825.4	9920.9	824.8	9954.2	825.1	9981.9	825.1	9994.4
GR	824.7	10000	825.7	10010.6	825.5	10031.5	825.4	10061.7	825.4	10089
GR	825.6	10116	826.2	10149.3	827.3	10193.6	828.4	10231.1	830.2	10265.8
ET	0.857		9.1						9920	10050
X1	0.857	30	9983	10008.3	500	515	549			
GR	836.3	9547.7	830.1	9566.8	828.6	9582.7	828.4	9597.8	828.9	9619.6
GR	828.8	9653.8	828.5	9689	828.3	9733.7	827.5	9739.9	828.8	9752.5
GR	828.9	9776.8	828.1	9788.4	827.3	9793.6	828.6	9802.3	828.5	9824.5
GR	827.5	9832.5	827.1	9840.2	828.4	9854	828.2	9923	828.5	9983
GR	828.7	9996	827	10000	828.5	10008.3	828.7	10029.8	828.8	10092.6
GR	827.7	10100	830.3	10135.6	830.4	10155.5	830.3	10180.2	831.6	10204.4
ET	0.953		9.1						9920	10080
X1	0.953	34	9990.9	10011.2	495	515	507			
GR	842	9602.3	839.9	9623.8	836.1	9647.3	832.3	9666.8	831.5	9679.6
GR	831.4	9703.2	832.5	9726.1	833	9752.3	832.6	9779.3	831.3	9806.3
GR	831.1	9876.8	831.3	9918.4	831.8	9948.3	832.1	9977.6	832	9990.9
GR	829.9	10000	831.5	10011.2	830.1	10019.3	832.1	10027.8	830.7	10045
GR	831.9	10056.4	831.9	10075.4	831.7	10106.2	831.2	10114.6	831.8	10127.6
GR	831.4	10147.4	831.5	10168.2	831.2	10180.2	832.1	10200.5	832.5	10233.8
GR	836.2	10290.7	837.6	10309.3	837.4	10323	837.4	10343.8		
ET	1.049		9.1						9980	10020
	UPSTREAM LIMIT OF STUDY									
X1	1.049	18	9992.9	10008.7	390	585	507			
GR	845.3	9840.5	841.6	9859.8	840.3	9885.2	839.1	9910.6	837.1	9932.8
GR	836.4	9955.8	835.3	9965.9	834.8	9972.3	836.1	9983.1	836	9992.9
GR	835.1	10000	835.9	10008.7	836	10016.2	837.1	10028.9	840.3	10042.3
GR	842.6	10055.3	845	10070.6	848.2	10089.6				

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO .130

3265 DIVIDED FLOW

EAST SUB-TRIBUTARY TO EAST MAIN TRIBUTARY OF LUKE WASH. FROM THE
EAST MAIN TRIBUTARY FLOODPLAIN, UPSTREAM APRROXIMATELY 1 MILE.
PREPARED AS A PART OF THE LUKE WASH FLOOD INSURANCE STUDY.
PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCD
#90-68). PREPARED BY COE & VAN LOO CONSULTANTS, INC. (CVL #1090-07)
TOPOGRAPHIC MAPPING PREPARED BY AERIAL MAPPING COMPANY, INC.
FROM PHOTOGRAPHS TAKEN SEPTEMBER 1991. HORIZONTAL DATUM IS NAD 83.
THE CONTROL LINE OF THE EAST SUB-TRIBUTARY IS STATION 10,000.
ALL SECTIONS ARE STATIONED LOOKING DOWNSTREAM.
CROSS SECTION NUMBERS FOR THE EAST SUB-TRIBUTARY ARE STATIONED IN RIVER
MILES FROM THE CONFLUENCE WITH THE EAST MAIN TRIBUTARY.
THIS RUN WAS STARTED BASED ON THE SLOPE AREA METHOD. THE WATER SURFACE
FROM THE EAST MAIN TRIBUTARY WAS NOT USED DUE TO THE DIFFERENCE IN TIME
TO PEAK.
ENCROACHMENT CARDS (ET) WERE USED IN SOME LOCATIONS OF THE EXISTING
MODEL, TO BETTER MODEL DEAD OR NONEFFECTIVE FLOW AREAS.
IN SOME CASES "SSTA" AND "ENDST" DO NOT REPRESENT THE ACTUAL FLOODING
LIMITS, AND THE DELINEATION WAS BASED ON CROSS-SECTIONS AND TOPOGRAPHY.
IN SOME CASES, "TOPWID" DOES NOT REPRESENT THE FULL WIDTH OF THE
FLOODPLAIN, DUE TO INEFFECTIVE FLOW AREAS OR ISLANDS IN THE FLOODPLAIN.
HYDROLOGY IS BASED ON THE 100-YEAR, 6-HOUR HEC-1 MODEL PREPARED FOR
THIS FIS, AS DOCUMENTED IN THE TECHNICAL DATA NOTEBOOK SECTION 3.
100-YEAR FLOW = 871 CFS FROM CONCENTRATION POINT S445.

.130	1.43	812.43	812.07	809.94	812.49	.06	.00	.00	812.90
871.0	.0	24.8	846.2	.0	17.1	436.1	.0	.0	812.20
.00	.00	1.45	1.94	.000	.045	.045	.000	811.00	9988.14
.004431	725.	735.	760.	0	20	6	.00	722.25	10810.53

FLOW DISTRIBUTION FOR SECNO= .13 CWSEL= 812.43

STA=	9988.	10020.	10299.	10375.	10586.	10631.	10672.	10763.	10790.	10811.
PER Q=	2.8	5.0	4.8	19.4	5.3	10.9	39.5	10.3	2.0	
AREA=	17.1	45.7	33.2	114.4	28.3	42.1	126.2	34.5	11.6	
VEL=	1.5	.9	1.3	1.5	1.6	2.2	2.7	2.6	1.5	
DEPTH=	.5	.2	.4	.5	.6	1.0	1.4	1.3	.6	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .225

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .66

3470 ENCROACHMENT STATIONS= 9933.0 10403.0 TYPE= 1 TARGET= 470.000
SECTION 0.225 TO 0.300 RIGHT OVERBANK ENCROACHED AT 4:1 DOWNSTREAM
FROM FLOODPLAIN EXPANSION.
GR POINTS HAVE BEEN ADJUSTED IN THE RIGHT OVERBANK TO BLOCK OUT
INEFFECTIVE FLOW AREA STATION 10100 TO 10300.

.225	1.31	815.61	815.32	.00	815.78	.17	3.26	.03	814.40
871.0	111.3	112.4	647.3	38.3	31.7	191.2	4.2	5.8	814.60
.04	2.91	3.55	3.39	.045	.045	.045	.000	814.30	9933.00
.010054	500.	502.	510.	4	19	0	.00	270.84	10403.00

FLOW DISTRIBUTION FOR SECNO= .22 CWSEL= 815.61

STA=	9933.	9983.	10012.	10041.	10057.	10072.	10100.	10337.	10378.	10401.	10403.
PER Q=	12.8	12.9	10.6	4.6	5.2	12.8	20.6	17.2	3.2	.1	
AREA=	38.3	31.7	28.6	13.3	14.2	31.4	46.9	43.6	12.6	.6	
VEL=	2.9	3.5	3.2	3.0	3.2	3.5	3.8	3.4	2.2	1.3	
DEPTH=	.8	1.1	1.0	.9	1.0	1.1	.2	1.1	.6	.3	

*SECNO .300

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.13

3470 ENCROACHMENT STATIONS= 9835.0 10275.0 TYPE= 1 TARGET= 440.000

.300	1.95	817.25	816.51	.00	817.31	.06	1.52	.01	816.30
871.0	50.6	61.8	758.6	53.3	37.4	371.3	7.3	8.9	816.40
.09	.95	1.65	2.04	.045	.045	.045	.000	815.30	9842.78
.002218	420.	396.	360.	3	11	0	.00	432.21	10275.00

FLOW DISTRIBUTION FOR SECNO= .30 CWSEL= 817.25

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9843.	9893.	9935.	9981.	10015.	10037.	10076.	10128.	10185.	10250.	10275.
PER Q=	.5	1.3	4.0	7.1	2.7	5.8	12.7	21.1	32.4	12.4	
AREA=	8.9	14.7	29.7	37.4	17.4	35.2	62.8	88.2	120.4	47.3	
VEL=	.5	.8	1.2	1.7	1.3	1.4	1.8	2.1	2.3	2.3	
DEPTH=	.2	.3	.6	1.1	.8	.9	1.2	1.5	1.8	1.9	

*SECNO .402

.402	2.10	818.40	817.51	.00	818.46	.07	1.15	.00	816.70
871.0	507.0	178.4	185.6	258.6	76.9	88.2	12.6	13.6	816.70
.17	1.96	2.32	2.10	.045	.045	.045	.000	816.30	9745.43
.002168	555.	539.	505.	4	14	0	.00	337.45	10082.88

FLOW DISTRIBUTION FOR SECNO= .40 CWSEL= 818.40

STA=	9745.	9862.	9907.	9942.	9964.	9982.	10024.	10049.	10062.	10082.	10083.
PER Q=	8.4	14.1	16.6	11.4	7.7	20.5	11.2	6.7	3.4	.0	
AREA=	58.9	63.7	63.5	41.9	30.7	76.9	43.5	25.2	19.5	.1	
VEL=	1.2	1.9	2.3	2.4	2.2	2.3	2.2	2.3	1.5	.0	
DEPTH=	.5	1.4	1.8	1.9	1.7	1.9	1.8	1.9	1.0	.1	

*SECNO .473

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .67

.473	1.43	819.53	819.17	.00	819.60	.07	1.13	.00	818.50
871.0	617.4	92.3	161.2	287.8	35.9	99.5	16.1	17.3	818.40
.21	2.15	2.57	1.62	.045	.045	.045	.000	818.10	9645.47
.004847	360.	375.	365.	3	8	0	.00	552.26	10197.74

FLOW DISTRIBUTION FOR SECNO= .47 CWSEL= 819.53

STA=	9645.	9690.	9734.	9772.	9808.	9833.	9849.	9912.	9926.	9945.	9976.	10007.	10047.
PER Q=	8.9	11.0	9.5	7.0	4.2	3.2	7.6	3.8	7.1	8.5	10.6	6.9	
AREA=	37.3	42.5	36.7	30.1	19.1	13.6	38.8	14.3	23.4	31.8	35.9	31.1	
VEL=	2.1	2.3	2.3	2.0	1.9	2.0	1.7	2.3	2.6	2.3	2.6	1.9	
DEPTH=	.8	1.0	1.0	.8	.8	.8	.6	1.0	1.2	1.0	1.2	.8	

STA=	10047.	10084.	10129.	10198.
PER Q=	3.9	5.4	2.3	
AREA=	21.6	27.9	19.0	
VEL=	1.6	1.7	1.1	
DEPTH=	.6	.6	.3	

```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO  .545
     .545      1.33    820.73    820.21       .00    820.77       .05      1.18       .00    819.80
    871.0     697.5      97.8      75.7     385.2      60.7      60.5      19.7      21.6    819.90
      .27      1.81      1.61      1.25      .045      .045      .045      .000    819.40   9613.71
  .002745      305.      380.      420.         2        11         0       .00    543.98  10157.70


FLOW DISTRIBUTION FOR SECNO=       .55          CWSEL=    820.73

STA=    9614.    9642.    9687.    9734.    9779.    9816.    9854.    9888.    9909.    9943.    9981.   10048.   10101.
  PER Q=     3.8     13.5     10.6      8.8      7.3      6.7      8.1      5.7      7.8      7.8     11.2      6.3
   AREA=    21.5     57.4     50.5     44.6     36.9     35.5     37.7     25.5     37.0     38.6     60.7     39.2
    VEL=     1.6      2.0      1.8      1.7      1.7      1.7      1.9      1.9      1.8      1.8      1.6      1.4
  DEPTH=      .8      1.3      1.1      1.0      1.0       .9      1.1      1.2      1.1      1.0       .9       .7

STA=   10101.   10158.
  PER Q=     2.3
   AREA=    21.3
    VEL=     1.0
  DEPTH=      .4

*SECNO  .648

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .52

     .648       .88    823.28    823.10       .00    823.37       .09      2.58       .01    822.50
    871.0     644.6      88.0     138.4     261.2      35.2      72.7      25.2      29.2    822.80
      .33      2.47      2.50      1.90      .045      .045      .045      .000    822.40   9534.38
  .010040      545.      544.      545.         4        11         0       .00    672.23  10206.61


FLOW DISTRIBUTION FOR SECNO=       .65          CWSEL=    823.28

STA=    9534.    9612.    9649.    9696.    9725.    9753.    9787.    9819.    9849.    9882.    9912.    9943.    9971.
  PER Q=     7.3      4.1      3.5      3.4      3.1      6.0      7.9      8.3      8.3      7.6      7.7      6.9
   AREA=    32.7     17.5     17.8     14.1     13.4     21.4     24.5     24.8     25.7     23.8     23.9     21.6
    VEL=     2.0      2.0      1.7      2.1      2.0      2.4      2.8      2.9      2.8      2.8      2.8      2.8
  DEPTH=      .4       .5       .4       .5       .5       .6       .8       .8       .8       .8       .8       .8

STA=    9971.   10025.   10055.   10094.   10135.   10197.   10207.
  PER Q=    10.1      4.0      5.1      3.8      3.0       .1
   AREA=    35.2     16.1     20.4     17.5     17.9       .9
    VEL=     2.5      2.2      2.2      1.9      1.5       .7
  DEPTH=      .7       .5       .5       .4       .3       .1
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO .753

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.72

.753	1.61	826.31	825.83	.00	826.37	.06	3.00	.00	825.10
871.0	628.8	76.5	165.7	320.5	34.9	102.0	30.4	36.7	825.70
.41	1.96	2.19	1.62	.045	.045	.045	.000	824.70	9634.50
.003407	560.	554.	515.	5	11	0	.00	519.39	10153.90

FLOW DISTRIBUTION FOR SECNO= .75 CWSEL= 826.31

STA=	9635.	9705.	9731.	9763.	9802.	9823.	9835.	9856.	9888.	9921.	9954.	9982.	10011.
PER Q=	5.3	8.0	6.7	5.6	4.4	3.7	5.6	5.5	6.9	10.2	10.3	8.8	
AREA=	31.8	31.6	31.2	30.1	20.0	14.8	23.5	27.4	31.9	40.4	37.8	34.9	
VEL=	1.5	2.2	1.9	1.6	1.9	2.2	2.1	1.7	1.9	2.2	2.4	2.2	
DEPTH=	.5	1.2	1.0	.8	1.0	1.2	1.1	.9	1.0	1.2	1.4	1.2	

STA=	10011.	10062.	10089.	10116.	10154.
PER Q=	7.9	5.2	4.2	1.7	
AREA=	41.0	25.0	22.0	14.1	
VEL=	1.7	1.8	1.7	1.1	
DEPTH=	.8	.9	.8	.4	

*SECNO .857

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .58

.857	2.04	829.04	828.85	.00	829.16	.12	2.77	.02	828.50
871.0	714.9	62.4	93.7	256.1	21.3	46.1	34.9	42.8	828.50
.46	2.79	2.94	2.03	.045	.045	.045	.000	827.00	9578.01
.010219	500.	549.	515.	4	11	0	.00	540.38	10118.38

FLOW DISTRIBUTION FOR SECNO= .86 CWSEL= 829.04

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

STA=	9578.	9620.	9689.	9734.	9753.	9794.	9802.	9833.	9840.	9854.	9923.	9983.	10008.
PER Q=	4.0	3.7	8.2	6.9	5.4	3.8	5.9	7.4	8.1	16.1	12.5	7.2	
AREA=	17.8	20.4	28.7	18.3	18.0	9.5	19.3	13.4	17.8	51.2	41.6	21.3	
VEL=	2.0	1.6	2.5	3.3	2.6	3.5	2.7	4.8	3.9	2.7	2.6	2.9	
DEPTH=	.4	.3	.6	1.0	.4	1.1	.6	1.7	1.3	.7	.7	.8	

STA=	10008.	10093.	10118.
PER Q=	5.2	5.5	
AREA=	27.9	18.2	
VEL=	1.6	2.6	
DEPTH=	.3	.7	

*SECNO .953

3265 DIVIDED FLOW

02 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.50

.953	2.45	832.35	831.93	.00	832.43	.07	3.27	.00	832.00
871.0	459.7	91.4	319.9	216.8	31.2	158.3	39.1	48.8	831.50
.53	2.12	2.93	2.02	.045	.045	.045	.000	829.90	9666.54
.004518	495.	507.	515.	4	5	0	.00	493.43	10221.43

FLOW DISTRIBUTION FOR SECNO= .95 CWSEL= 832.35

STA=	9667.	9703.	9806.	9877.	9918.	9948.	9991.	10011.	10019.	10028.	10045.	10056.	10106.
PER Q=	5.9	3.4	22.7	13.4	5.3	2.1	10.5	4.2	3.1	4.0	3.1	4.2	
AREA=	27.1	20.9	81.2	47.9	24.0	15.8	31.2	12.6	10.6	16.4	12.0	25.6	
VEL=	1.9	1.4	2.4	2.4	1.9	1.2	2.9	2.9	2.5	2.1	2.3	1.4	
DEPTH=	.7	.2	1.2	1.2	.8	.4	1.5	1.6	1.3	1.0	1.1	.5	

STA=	10106.	10128.	10147.	10168.	10180.	10221.
PER Q=	4.3	3.1	4.5	3.1	3.0	
AREA=	18.6	14.9	18.7	12.0	16.9	
VEL=	2.0	1.8	2.1	2.2	1.6	
DEPTH=	.9	.8	.9	1.0	.4	

*SECNO 1.049

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
UPSTREAM LIMIT OF STUDY

1.049	2.62	837.42	837.42	.00	838.10	.68	3.91	.18	836.00
871.0	532.0	221.4	117.6	81.5	29.9	22.2	42.0	52.0	835.90
.54	6.53	7.40	5.29	.045	.045	.045	.000	834.80	9929.28
.021563	390.	507.	585.	0	8	0	.00	100.95	10030.23

FLOW DISTRIBUTION FOR SECNO= 1.05 CWSEL= 837.42

STA=	9929.	9933.	9956.	9966.	9972.	9983.	9993.	10009.	10016.	10029.	10030.
PER Q=	.1	6.5	11.8	14.9	18.5	9.2	25.4	7.9	5.6	.0	
AREA=	.6	15.3	15.8	15.1	21.2	13.4	29.9	11.0	11.0	.2	
VEL=	1.4	3.7	6.5	8.6	7.6	6.0	7.4	6.3	4.4	1.4	
DEPTH=	.2	.7	1.6	2.4	2.0	1.4	1.9	1.5	.9	.2	

THIS RUN EXECUTED 21FEB93 11:25:36

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YR EVENT EXISTING

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	EG	CRIWS	VCH	10*KS	XLCH	SSTA	TOPWID	ENDST	TWA
	.130	871.00	812.43	1.43	812.49	812.07	1.45	44.31	.00	9988.14	722.25	10810.53	.00
*	.225	871.00	815.61	1.31	815.78	815.32	3.55	100.54	502.00	9933.00	270.84	10403.00	5.80
*	.300	871.00	817.25	1.95	817.31	816.51	1.65	22.18	396.00	9842.78	432.21	10275.00	8.86
	.402	871.00	818.40	2.10	818.46	817.51	2.32	21.68	539.00	9745.43	337.45	10082.88	13.57
*	.473	871.00	819.53	1.43	819.60	819.17	2.57	48.47	375.00	9645.47	552.26	10197.74	17.27
	.545	871.00	820.73	1.33	820.77	820.21	1.61	27.45	380.00	9613.71	543.98	10157.70	21.59
*	.648	871.00	823.28	.88	823.37	823.10	2.50	100.40	544.00	9534.38	672.23	10206.61	29.20
*	.753	871.00	826.31	1.61	826.37	825.83	2.19	34.07	554.00	9634.50	519.39	10153.90	36.68
*	.857	871.00	829.04	2.04	829.16	828.85	2.94	102.19	549.00	9578.01	540.38	10118.38	42.84
*	.953	871.00	832.35	2.45	832.43	831.93	2.93	45.18	507.00	9666.54	493.43	10221.43	48.79
*	1.049	871.00	837.42	2.62	838.10	837.42	7.40	215.63	507.00	9929.28	100.95	10030.23	52.02

SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=      .225  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .300  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .473  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .648  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .753  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .857  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=      .953  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     1.049  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     1.049  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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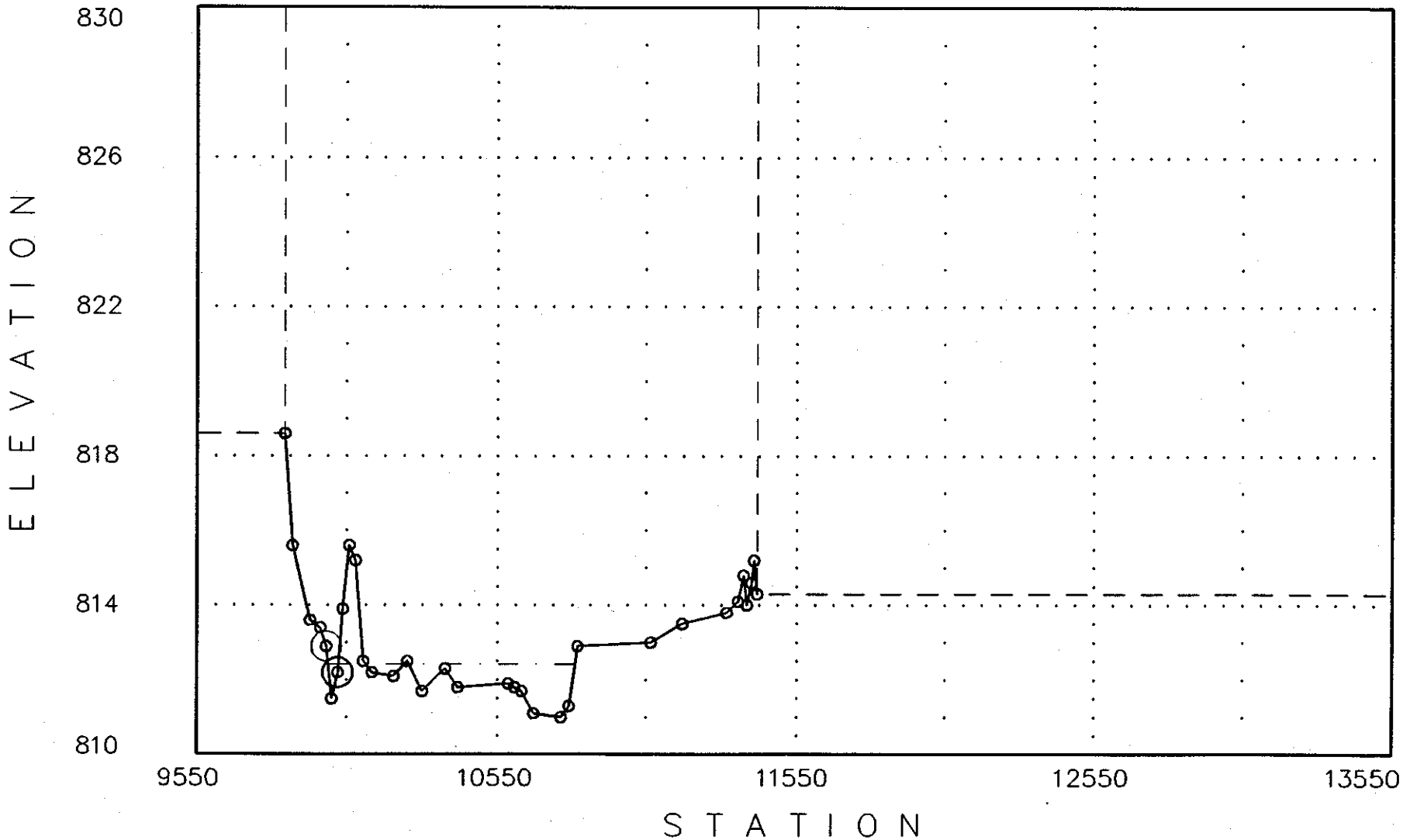
<<<<<< Cross Section: .13: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 812.43

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

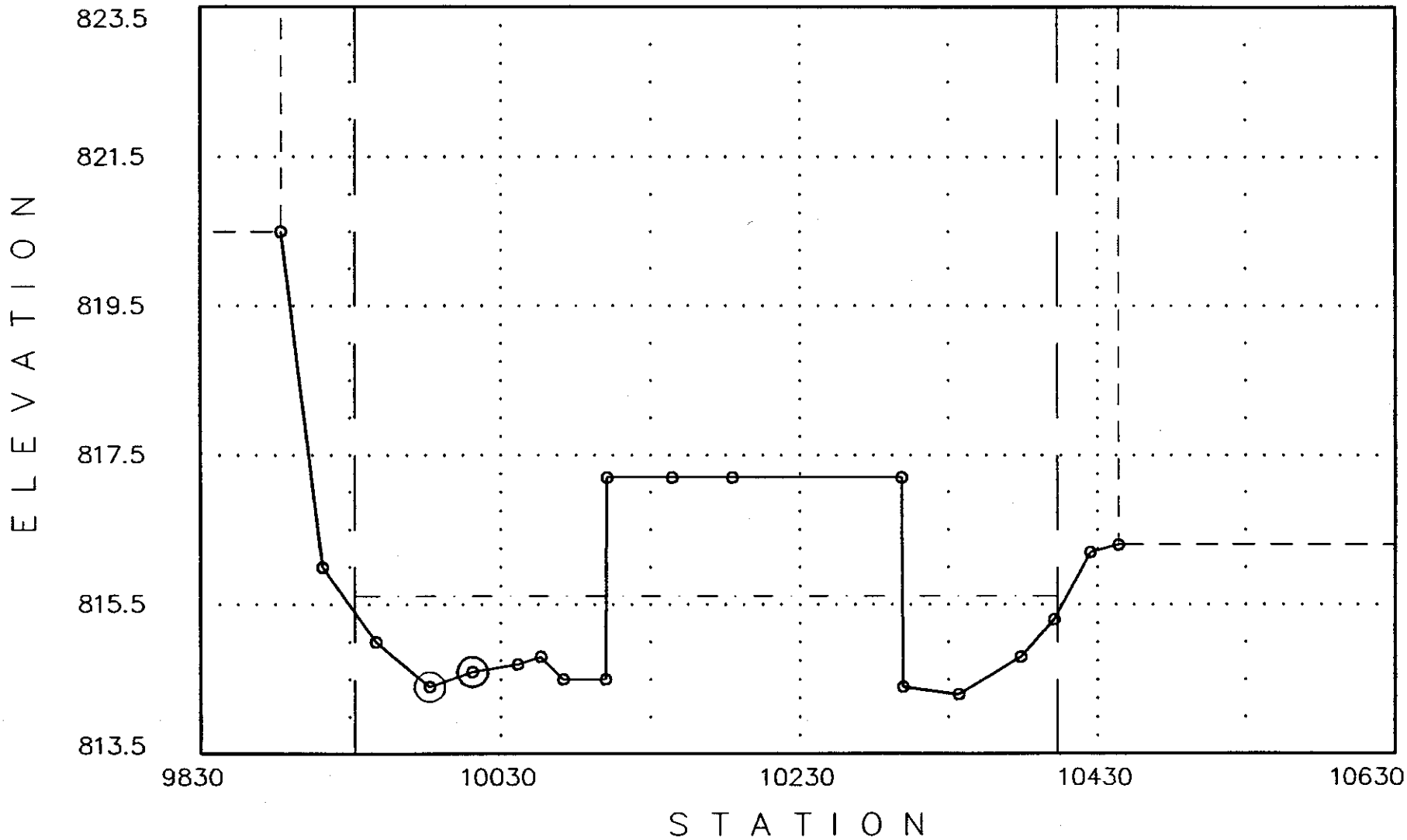


02-21-1993

<<<<<< Cross Section: .225: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 815.61

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

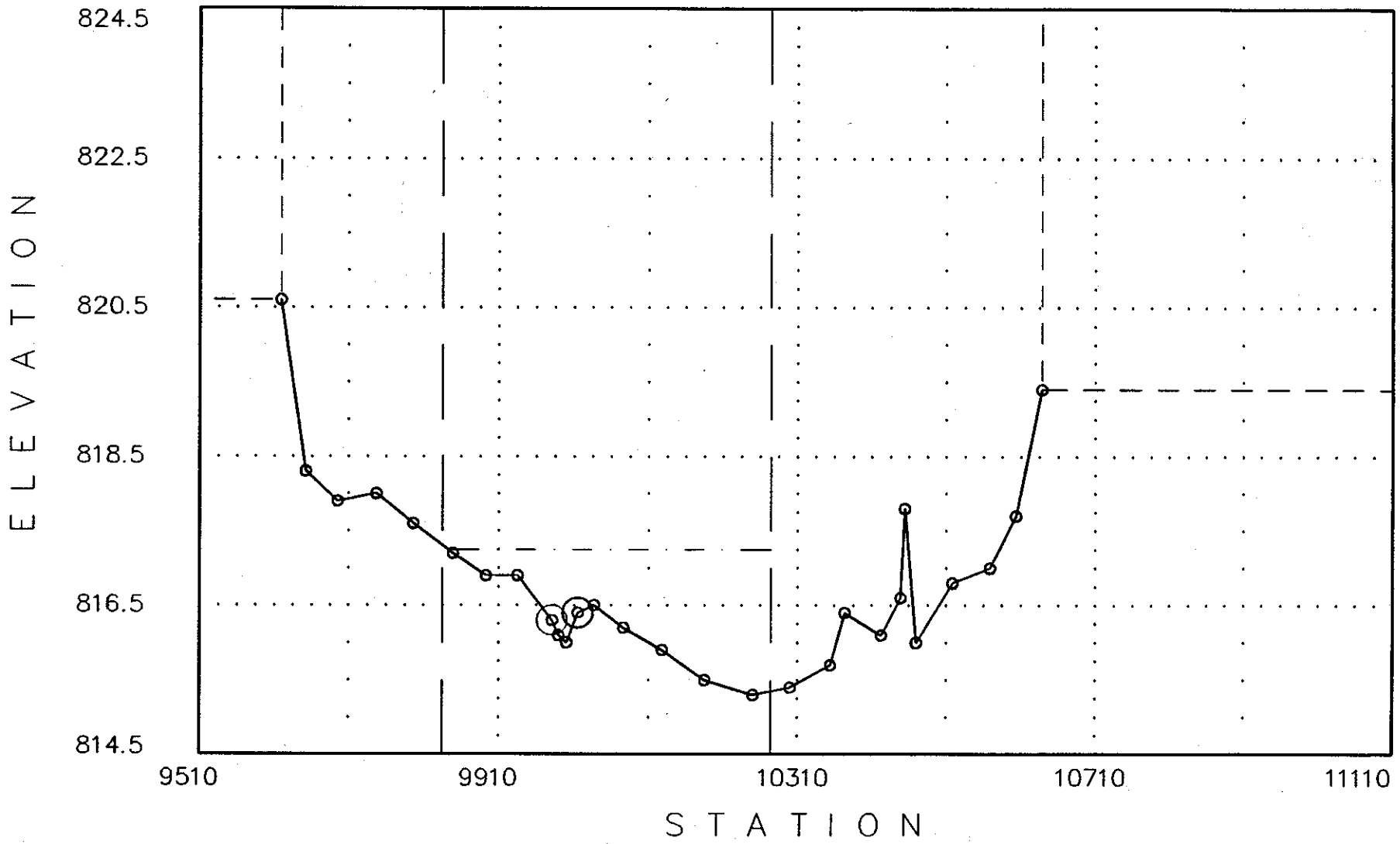


02-21-1993

<<<<<< Cross Section: .3: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 817.25

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

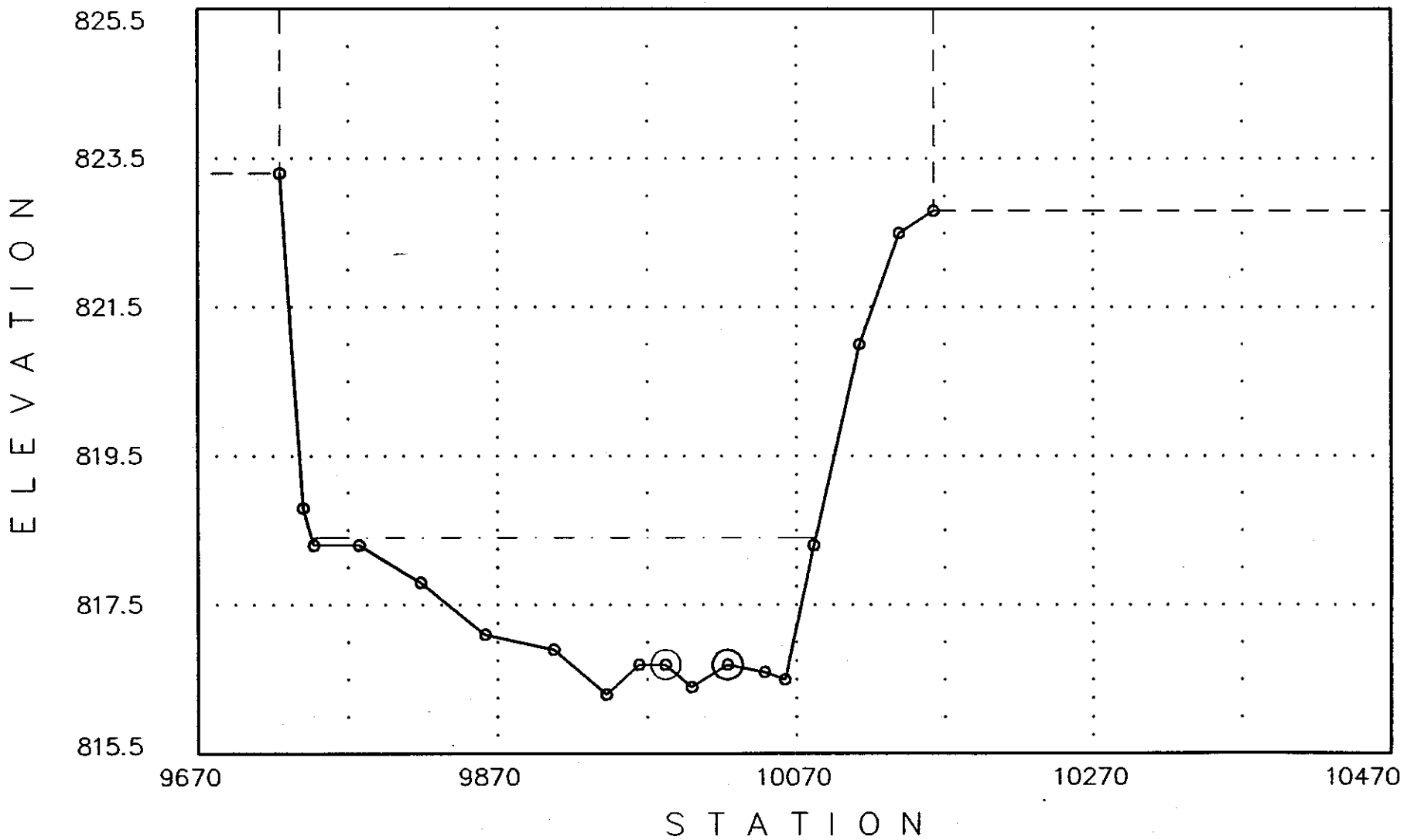


02-21-1993

<<<<<< Cross Section: .402: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 818.4

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

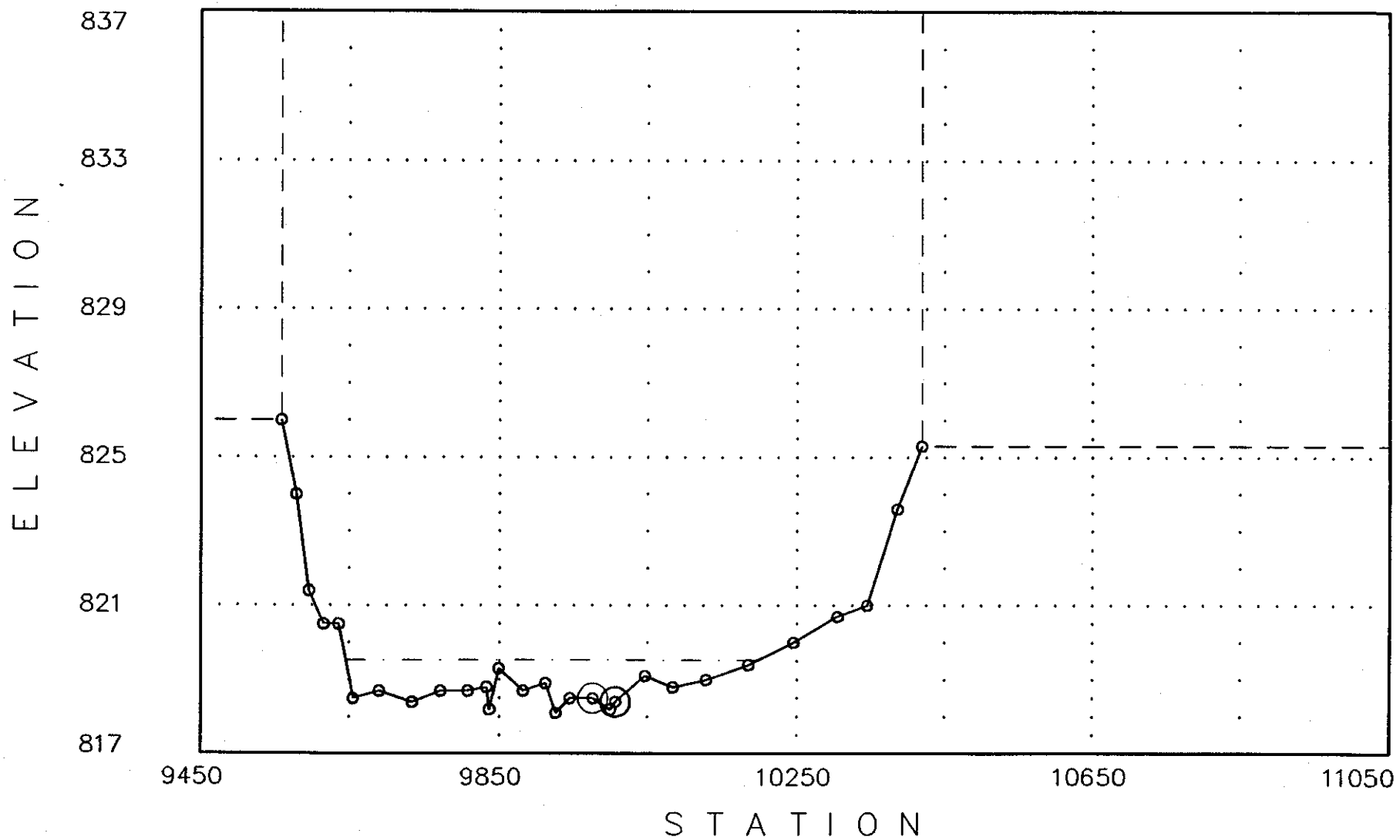


02-21-1993

<<<<<< Cross Section: .473: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 819.53

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

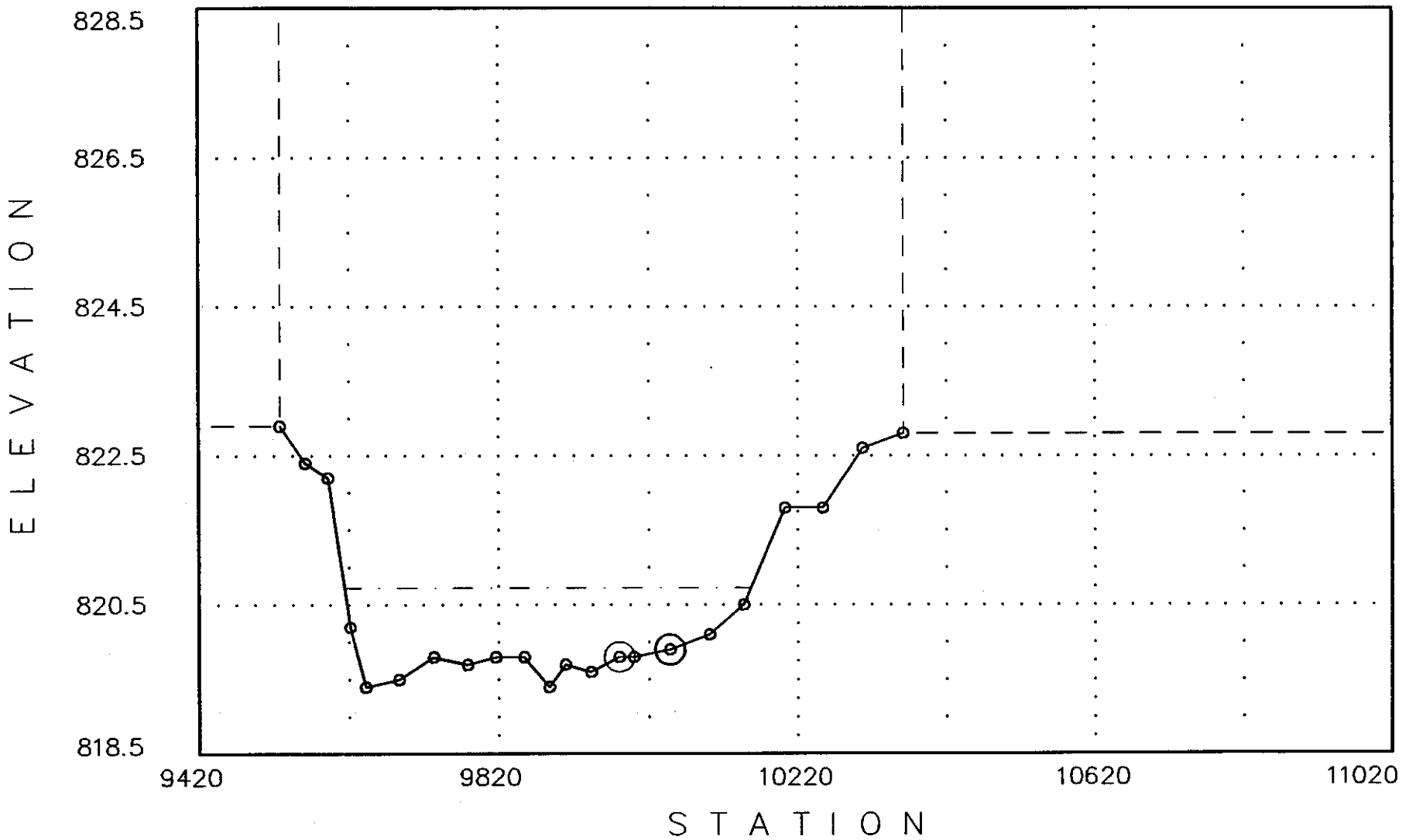


02-21-1993

<<<<<< Cross Section: .545: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 820.73

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

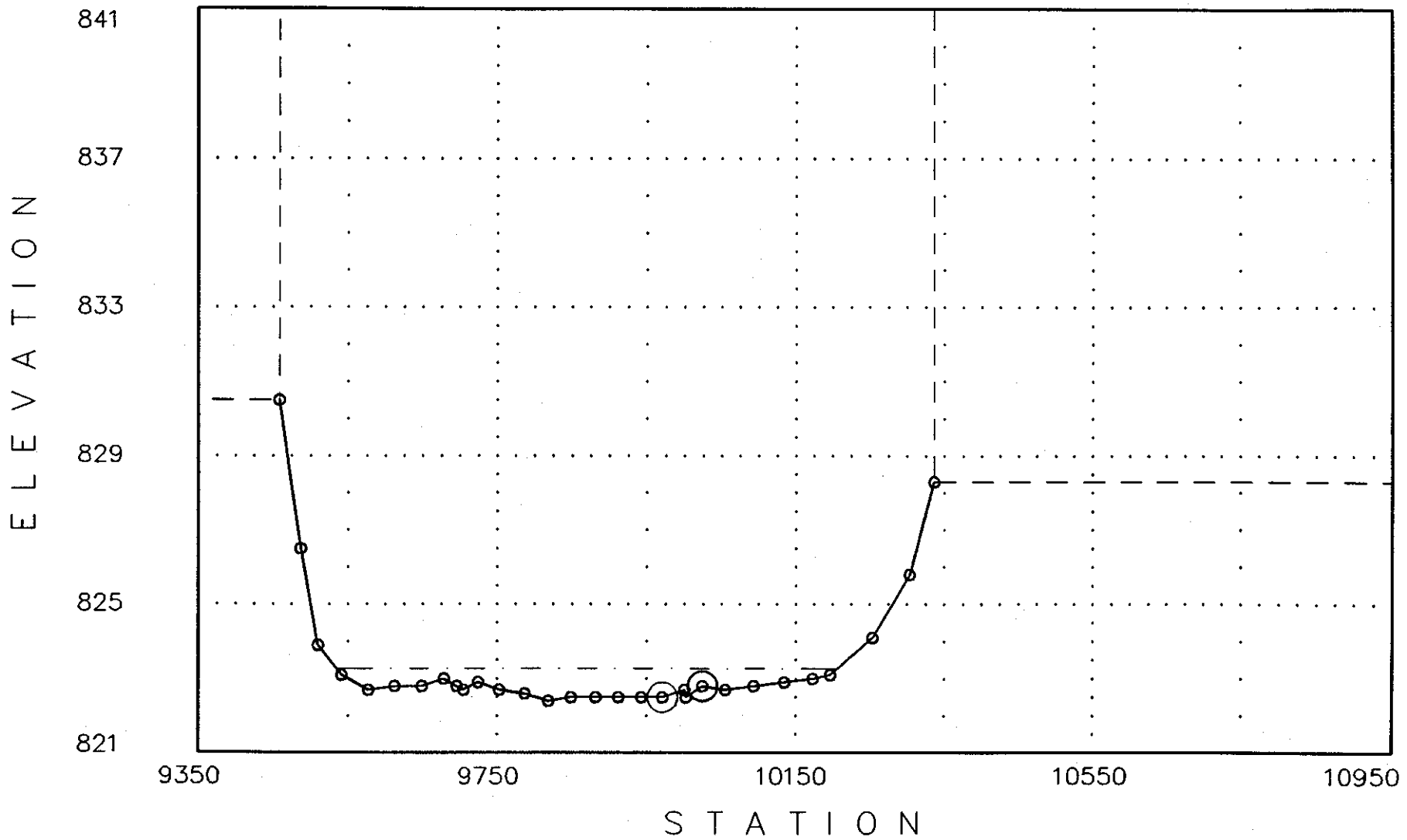


02-21-1993

<<<<<< Cross Section: .648: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 823.28

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

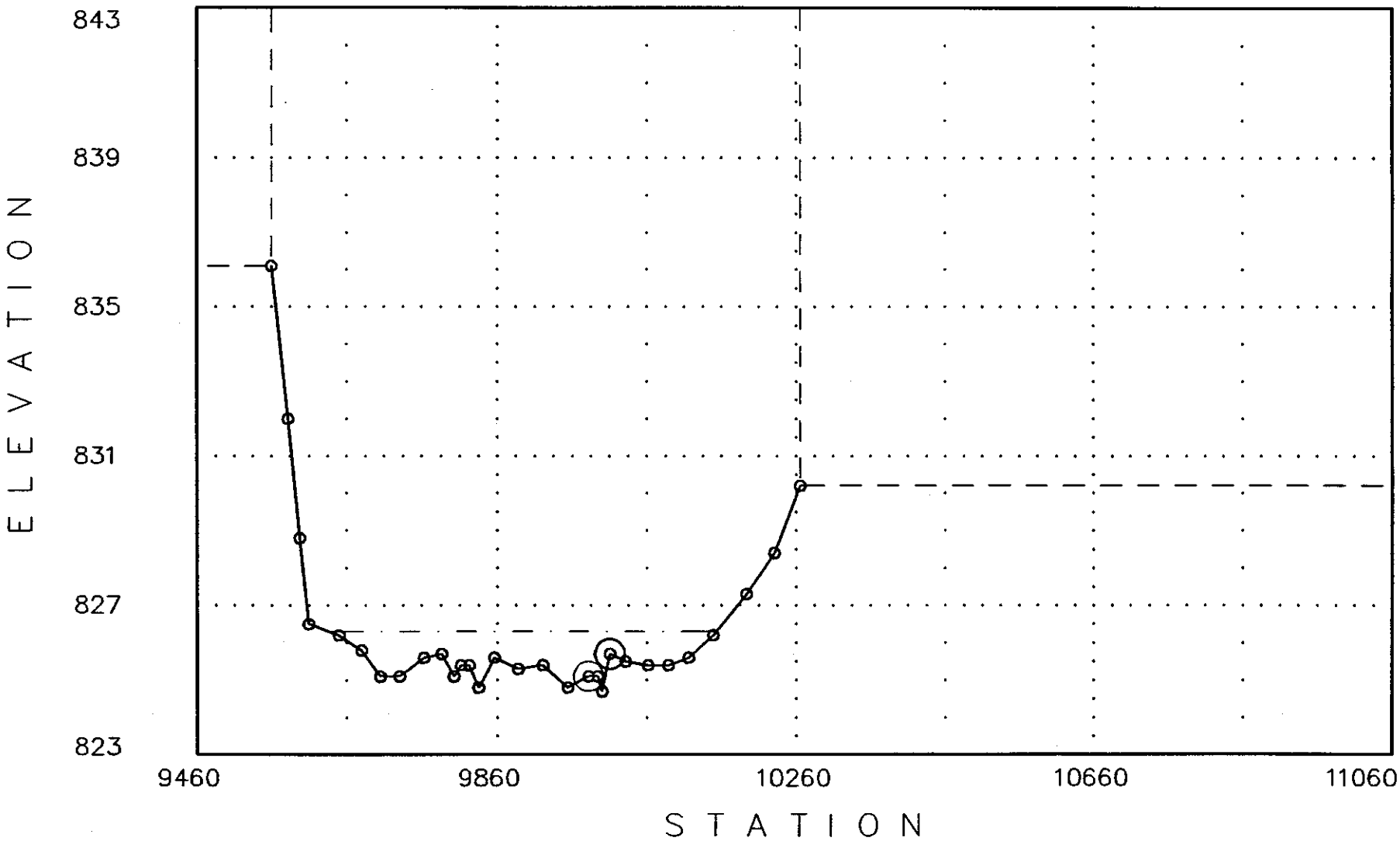


02-21-1993

<<<<<< Cross Section: .753: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 826.31

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

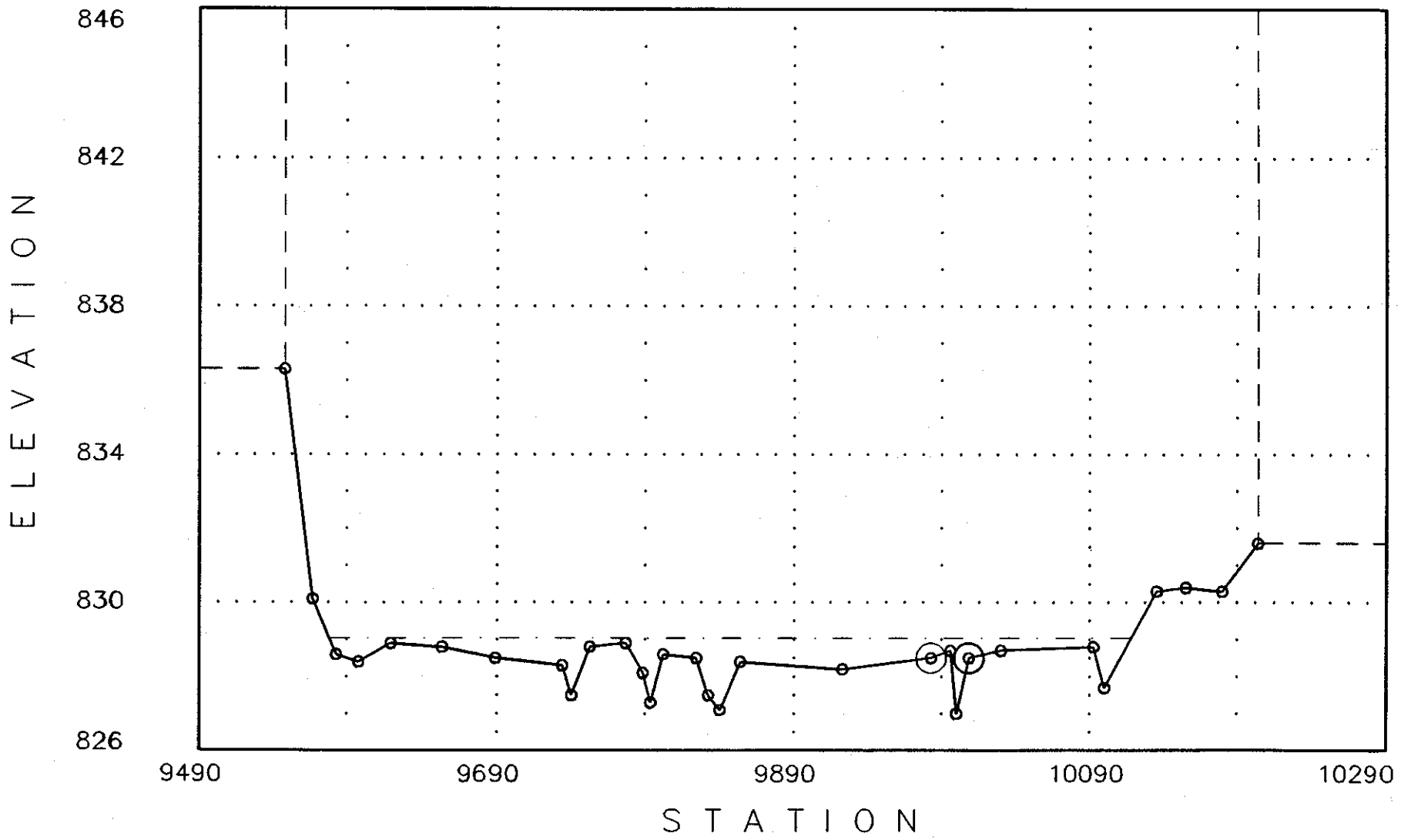


02-21-1993

<<<<<< Cross Section: .857: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 829.04

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

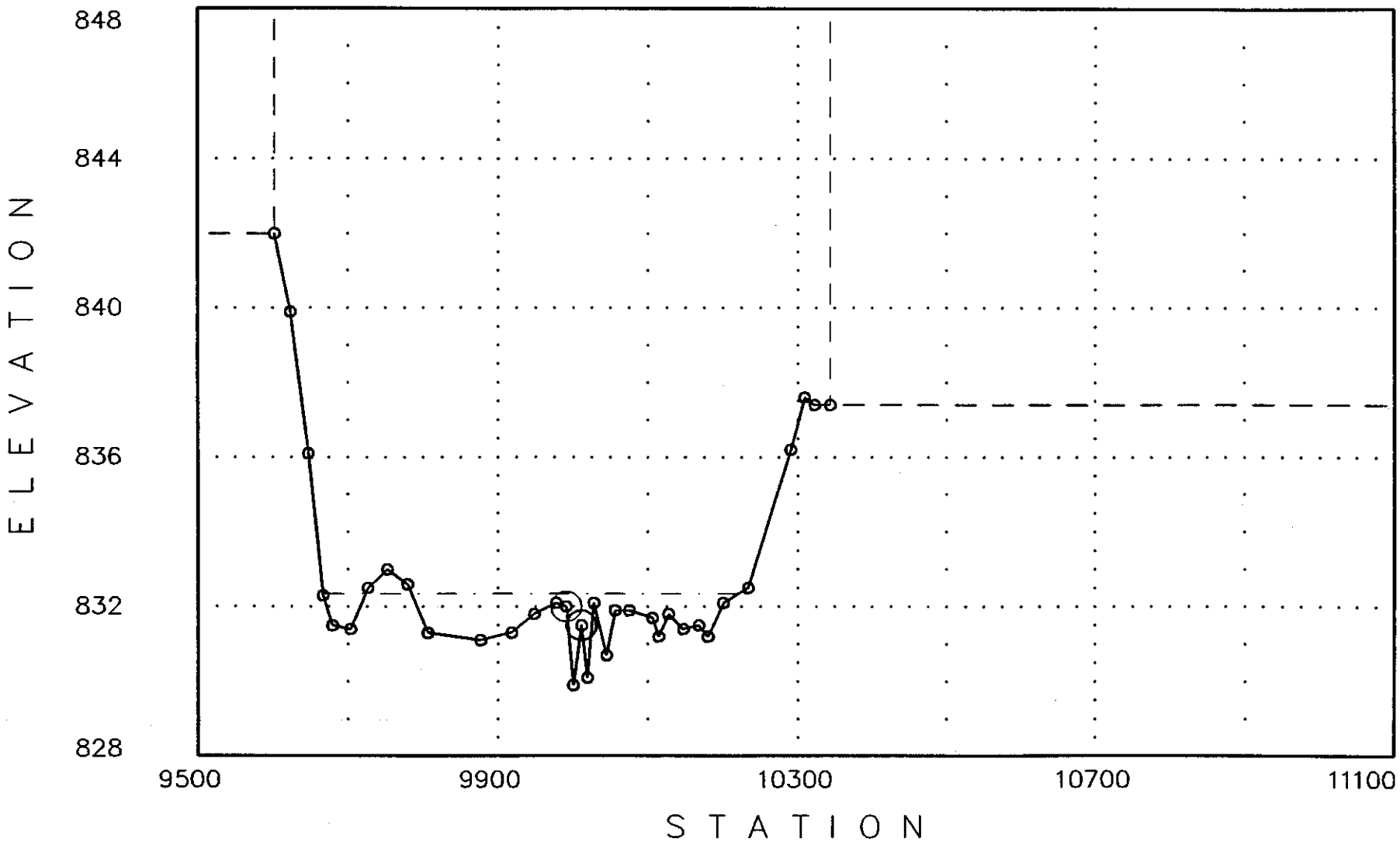


02-21-1993

<<<<<< Cross Section: .953: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 832.35

Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045

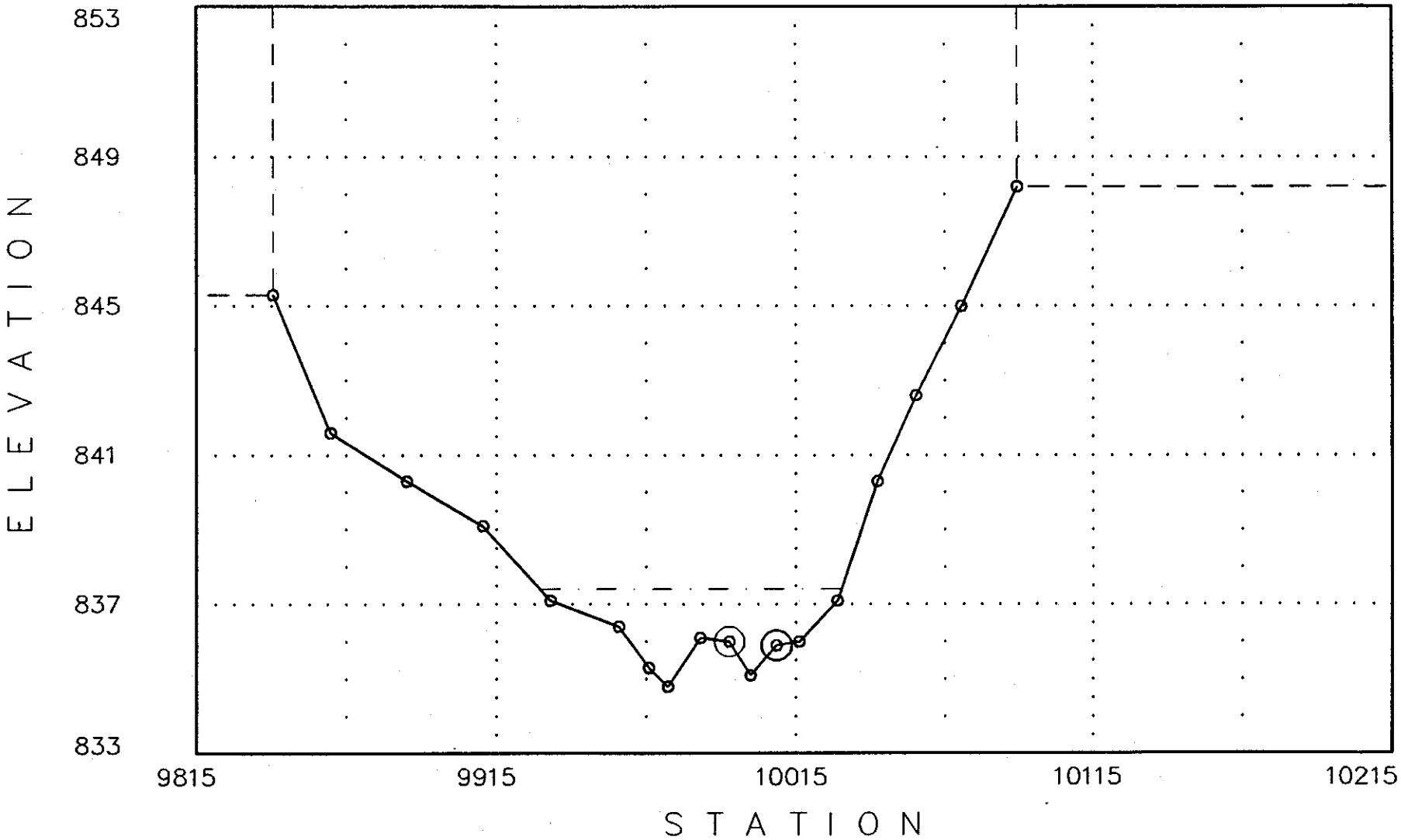


02-21-1993

<<<<<< Cross Section: 1.049: (FN = ESUBTRIB.AHO) >>>>>>

Q1= 871 WS1= 837.42

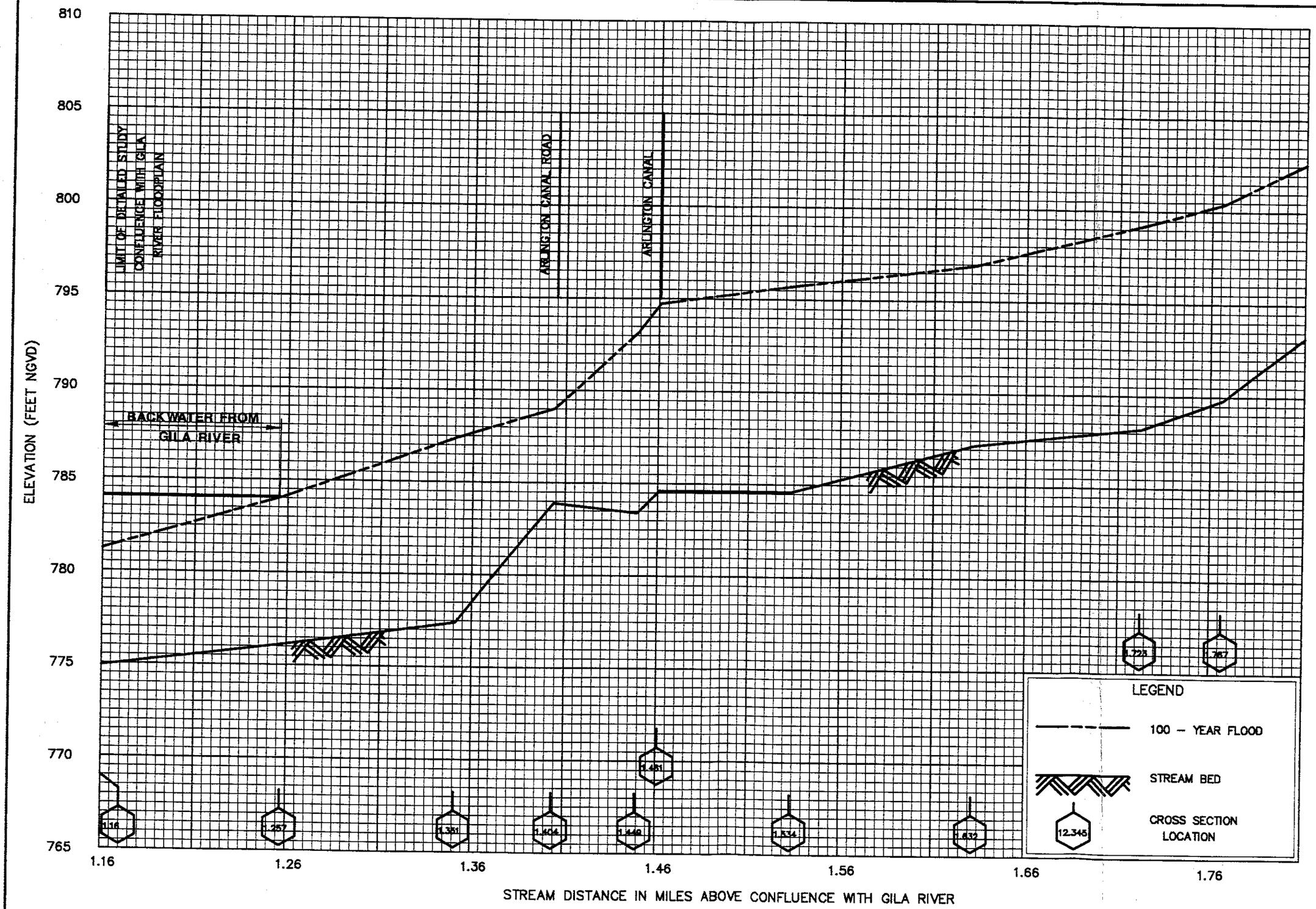
Manning-n's: n-lob = .045 n-ch = .045 n-rob = .045



02-21-1993

SECTION V

FLOOD PROFILES



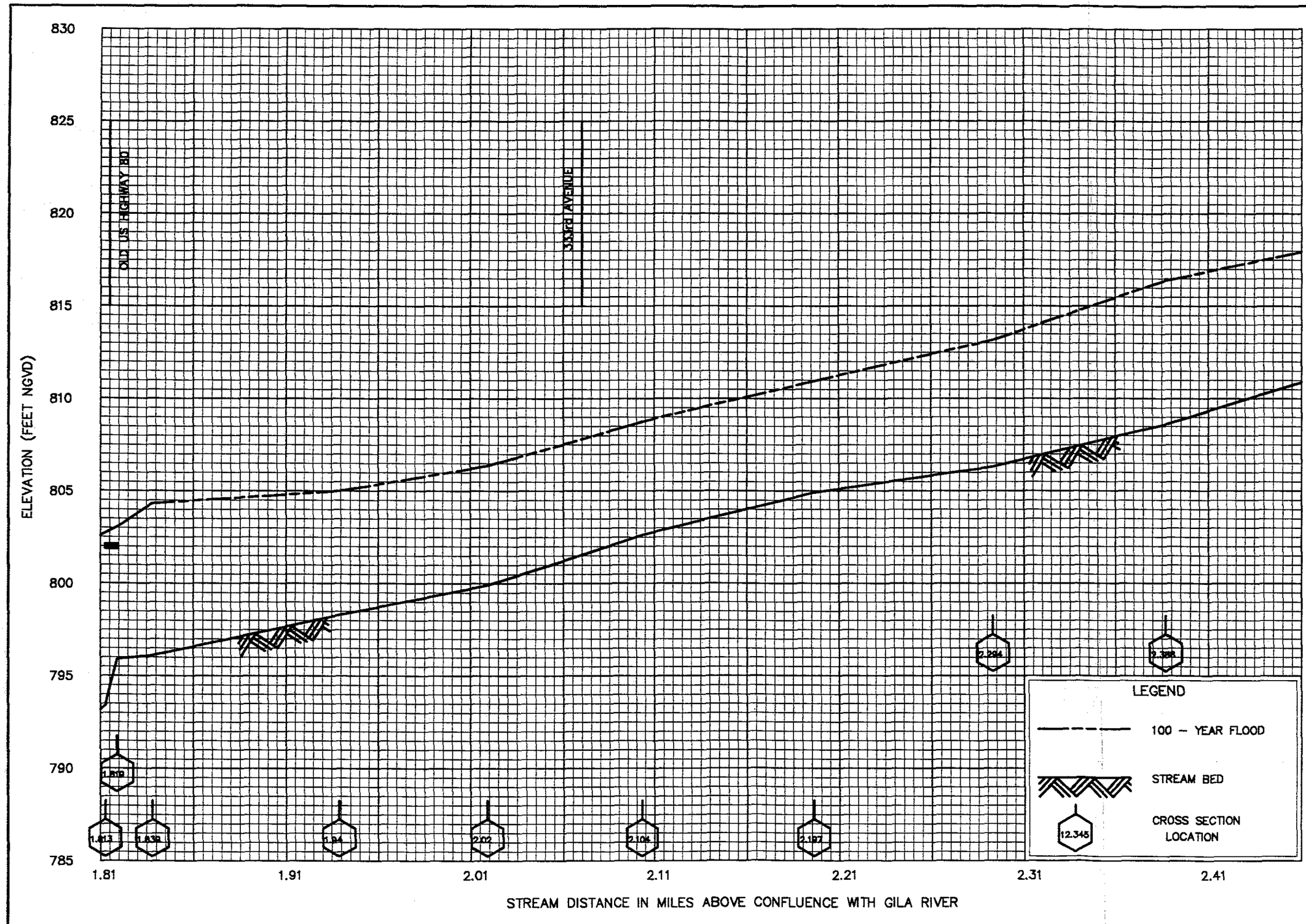
FLOOD PROFILES

LUKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

LW1



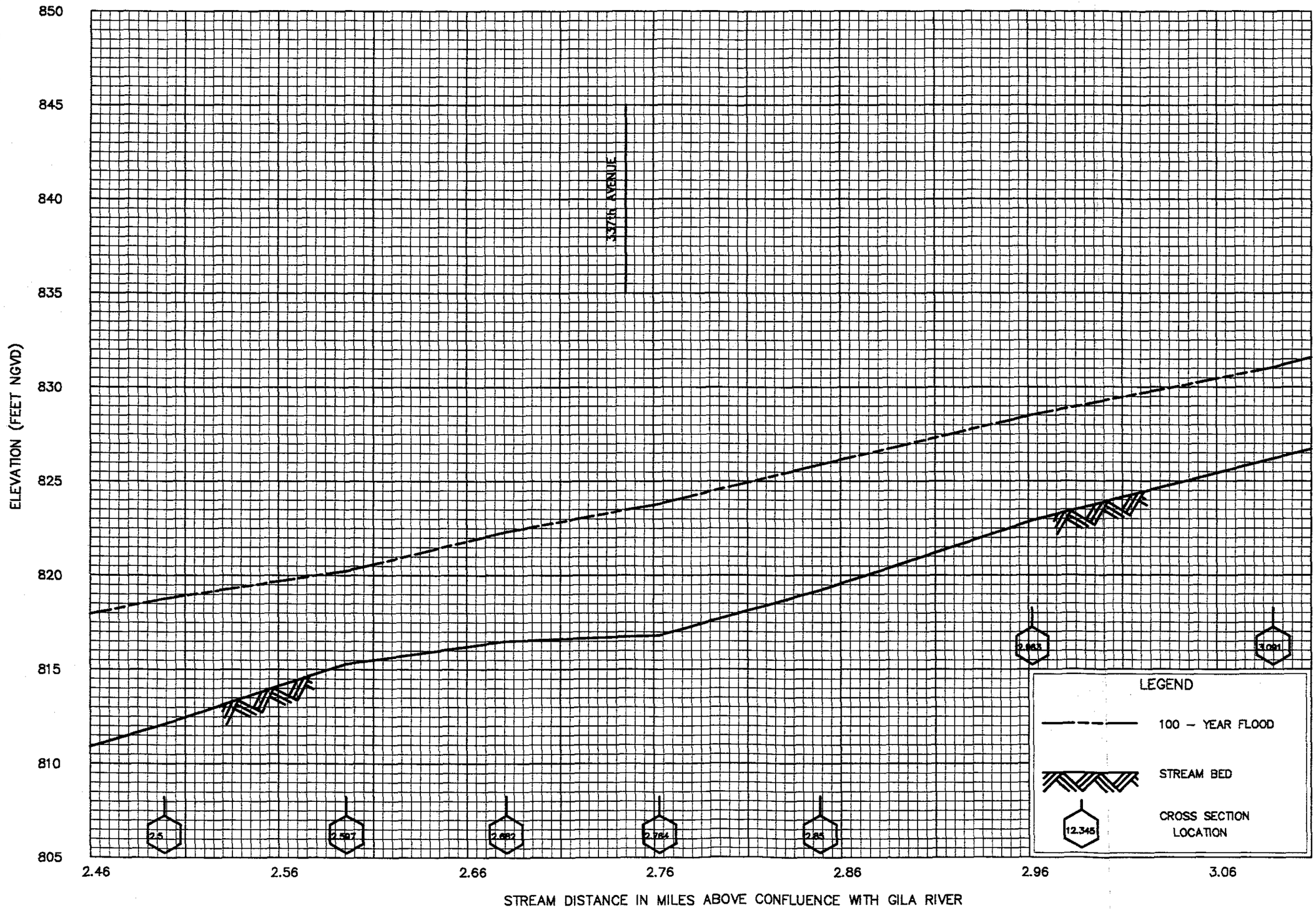
FLOOD PROFILES

LUKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

LW2



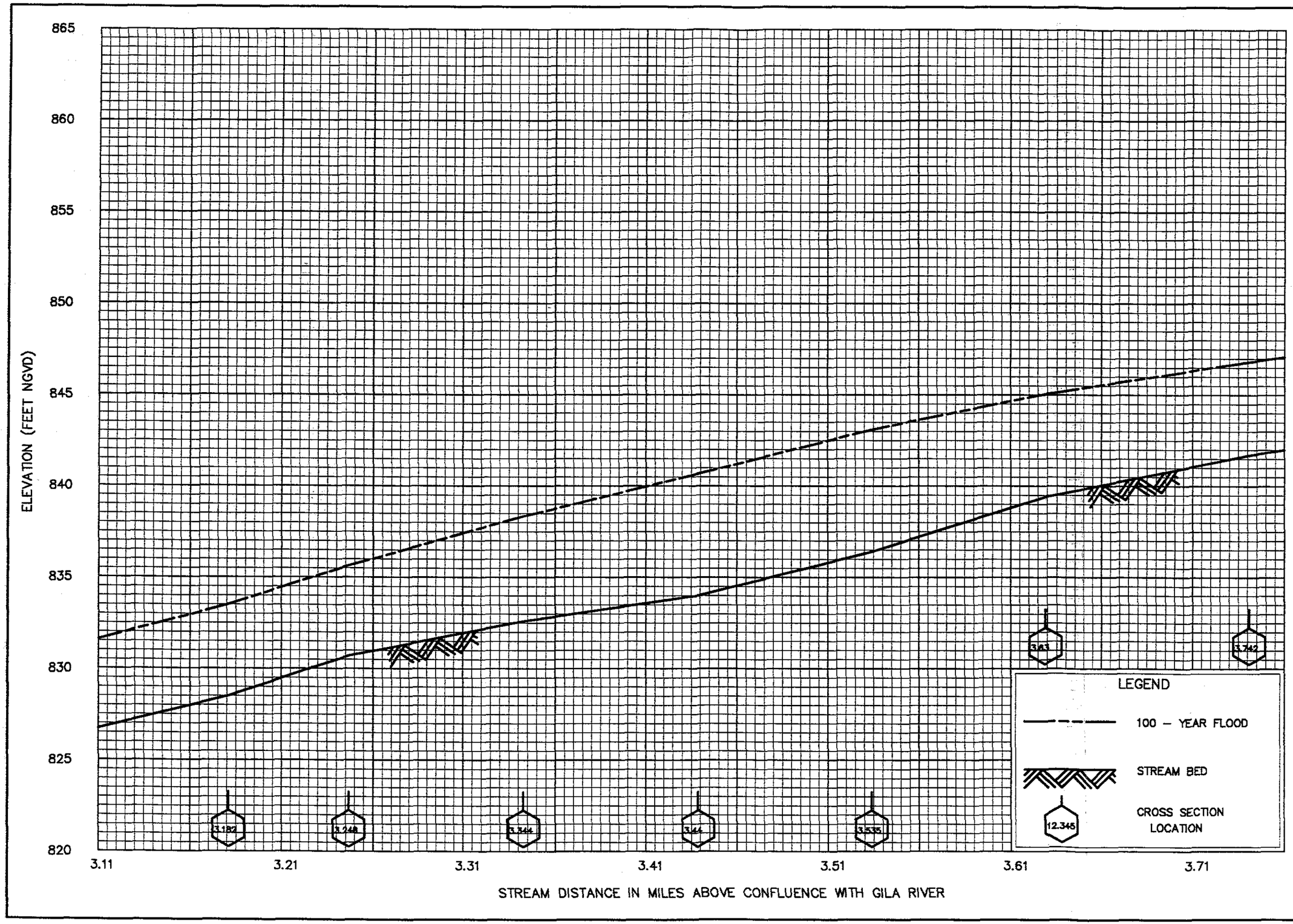
FLOOD PROFILES

LUKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

LW3



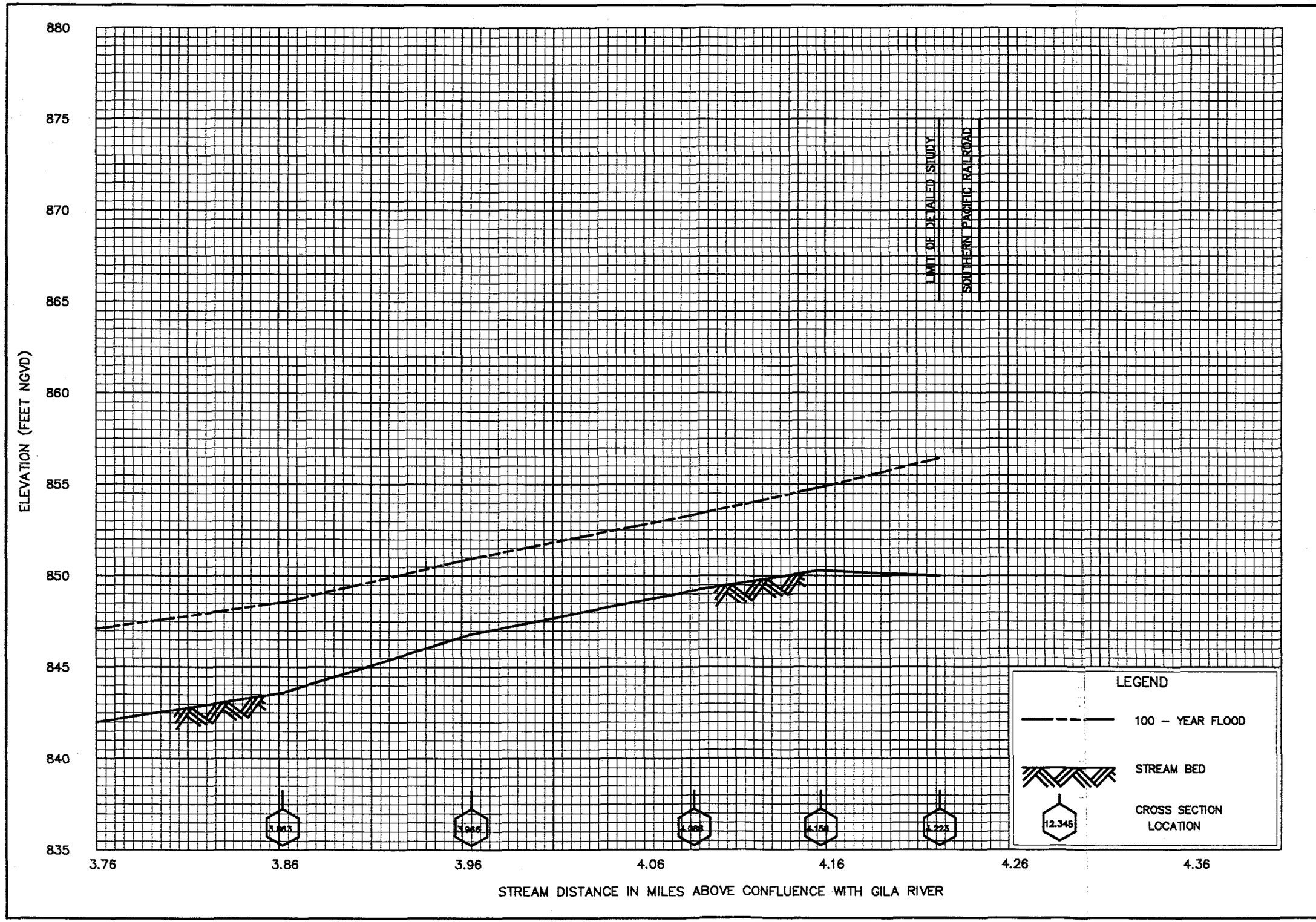
FLOOD PROFILES

LUKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

LW4



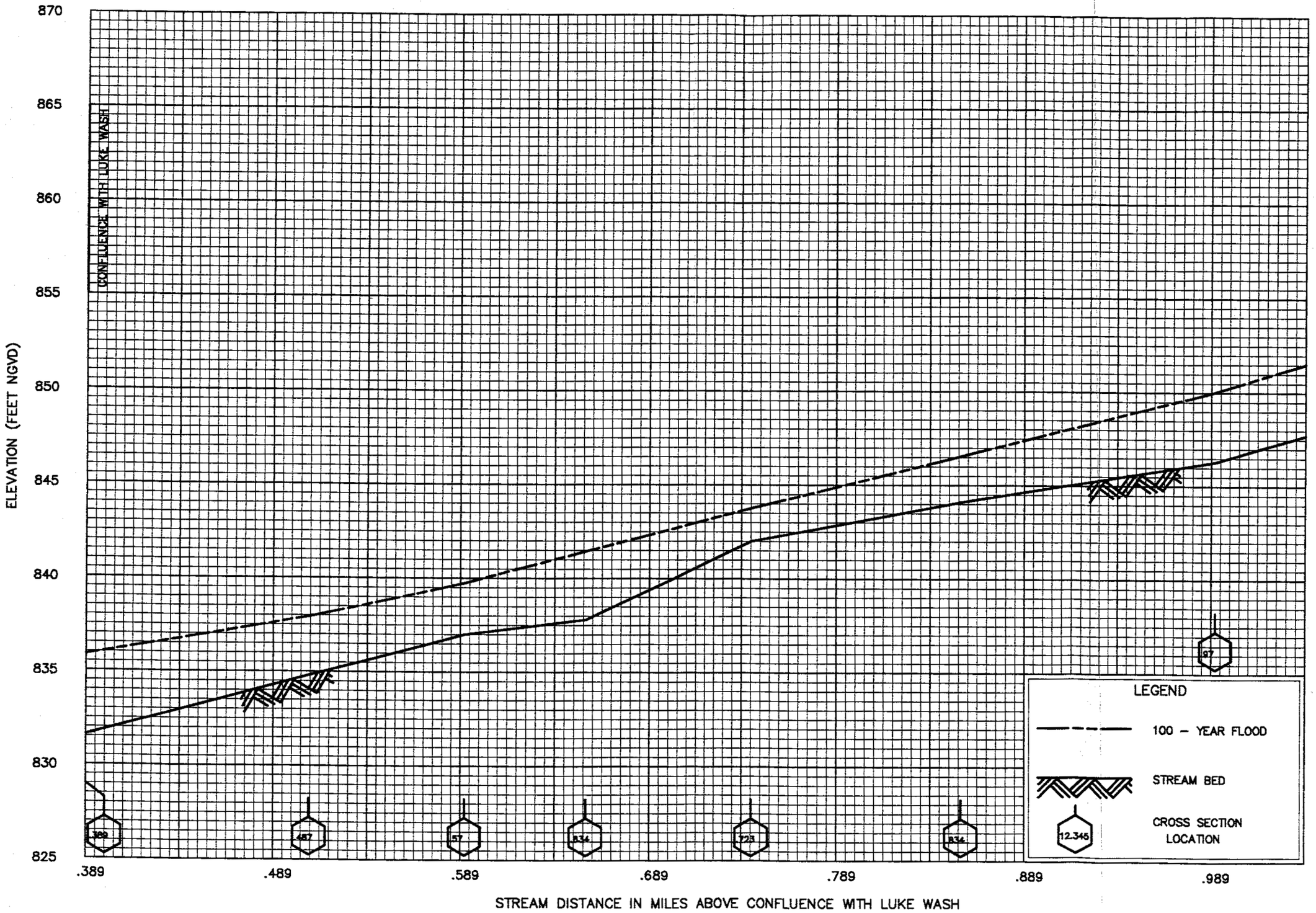
FLOOD PROFILES

LUKE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

LW5



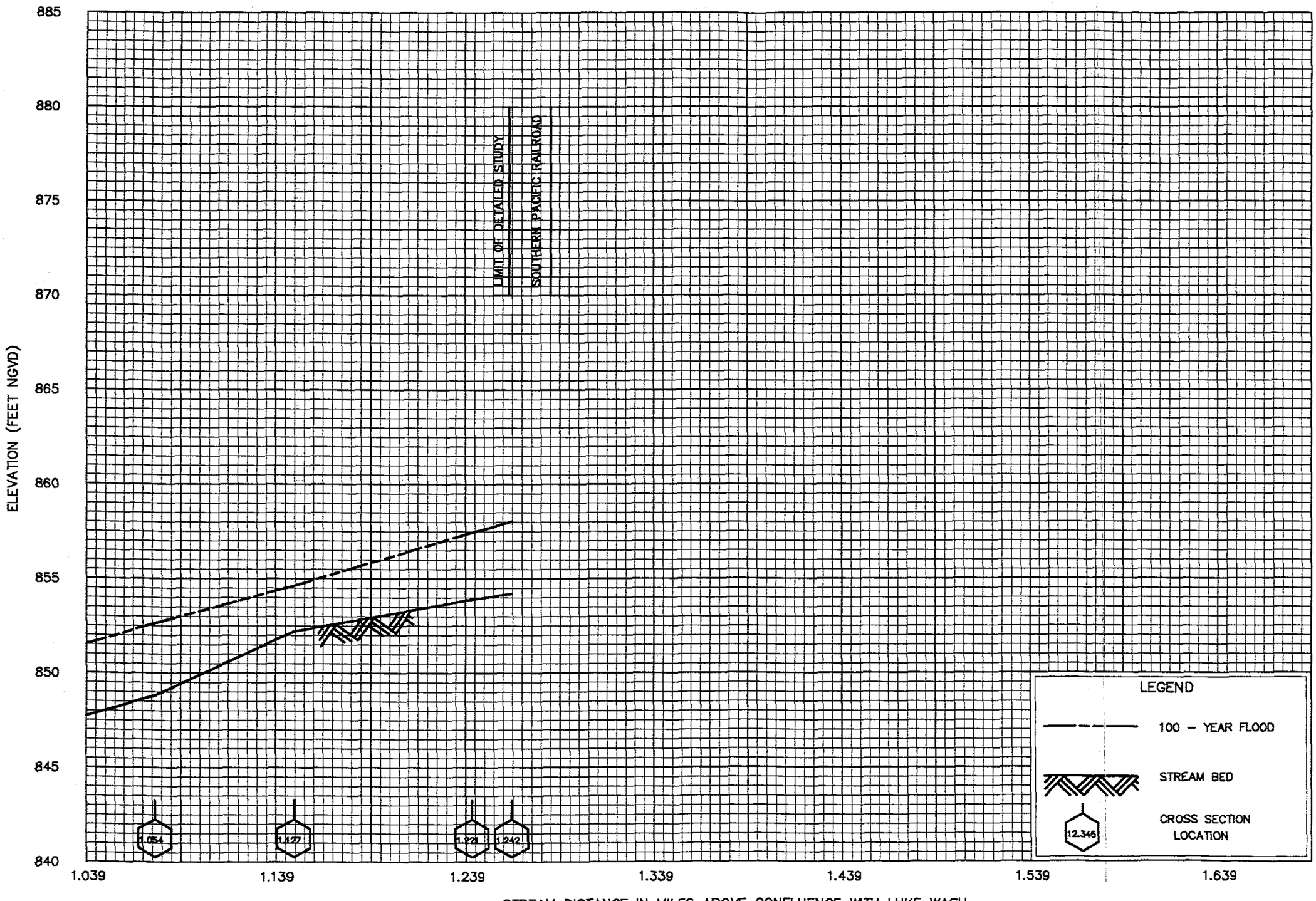
FLOOD PROFILES

MINOR TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

MT1



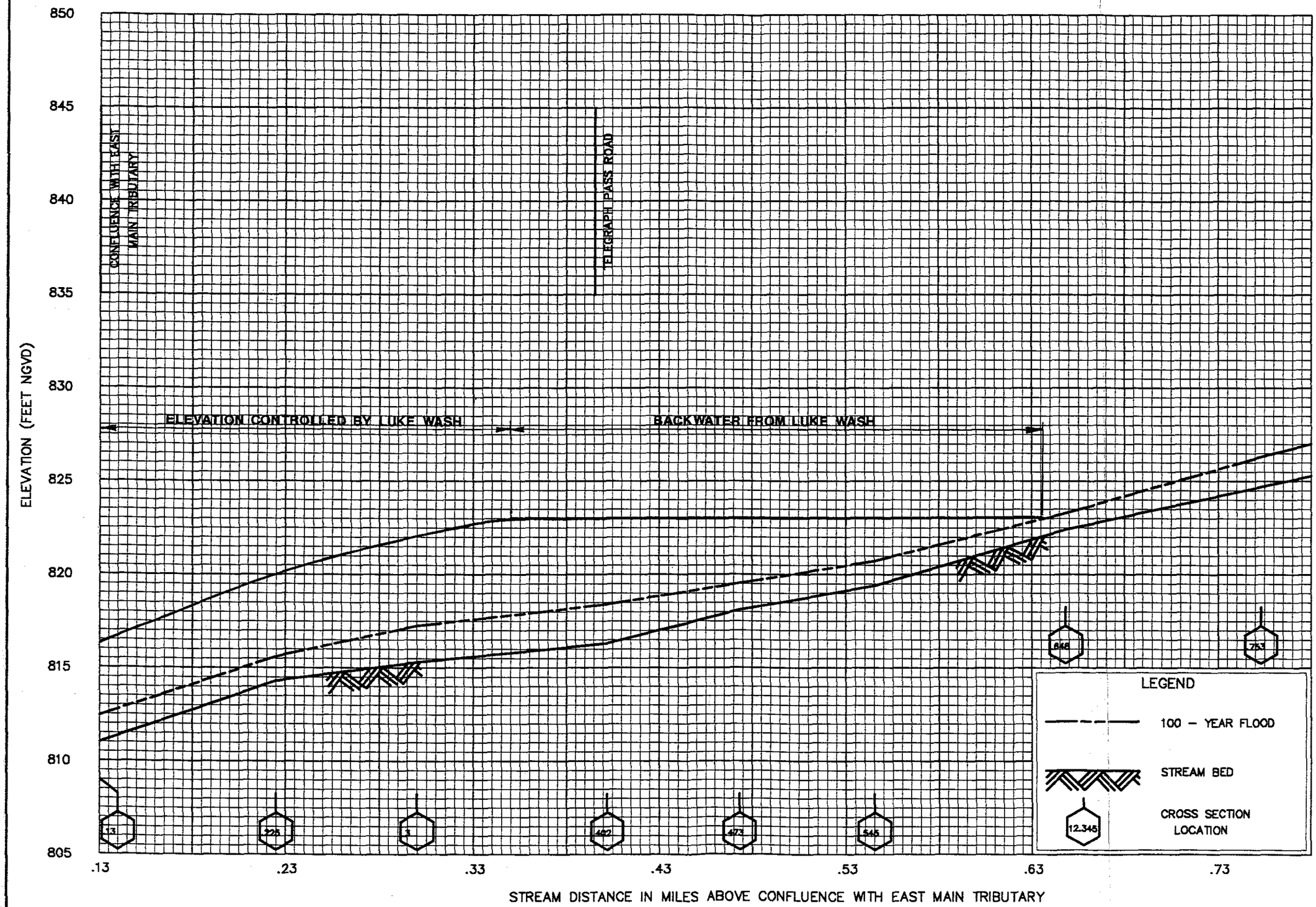
FLOOD PROFILES

MINOR TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

MT2



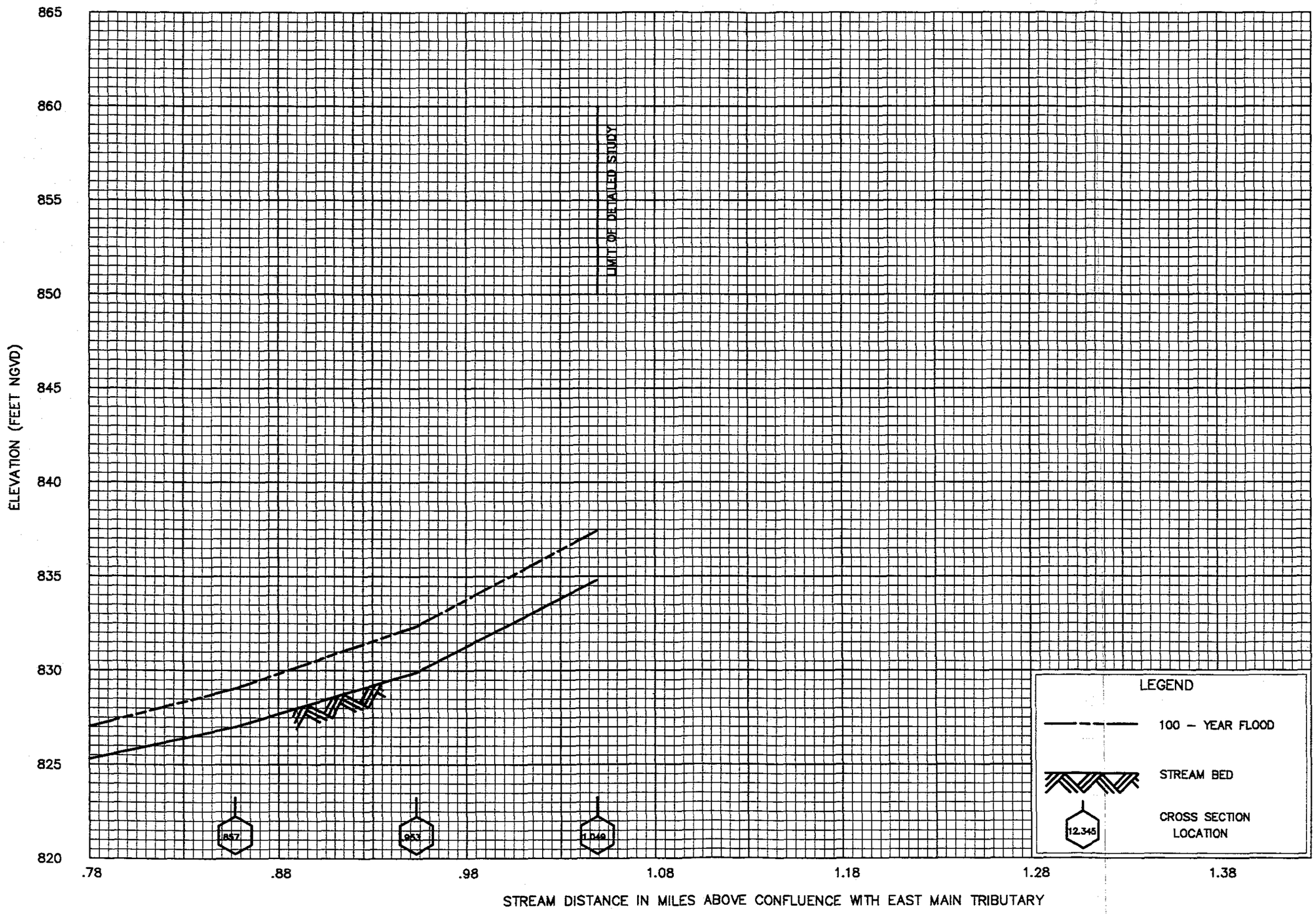
FLOOD PROFILES

EAST SUB-TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

EST1



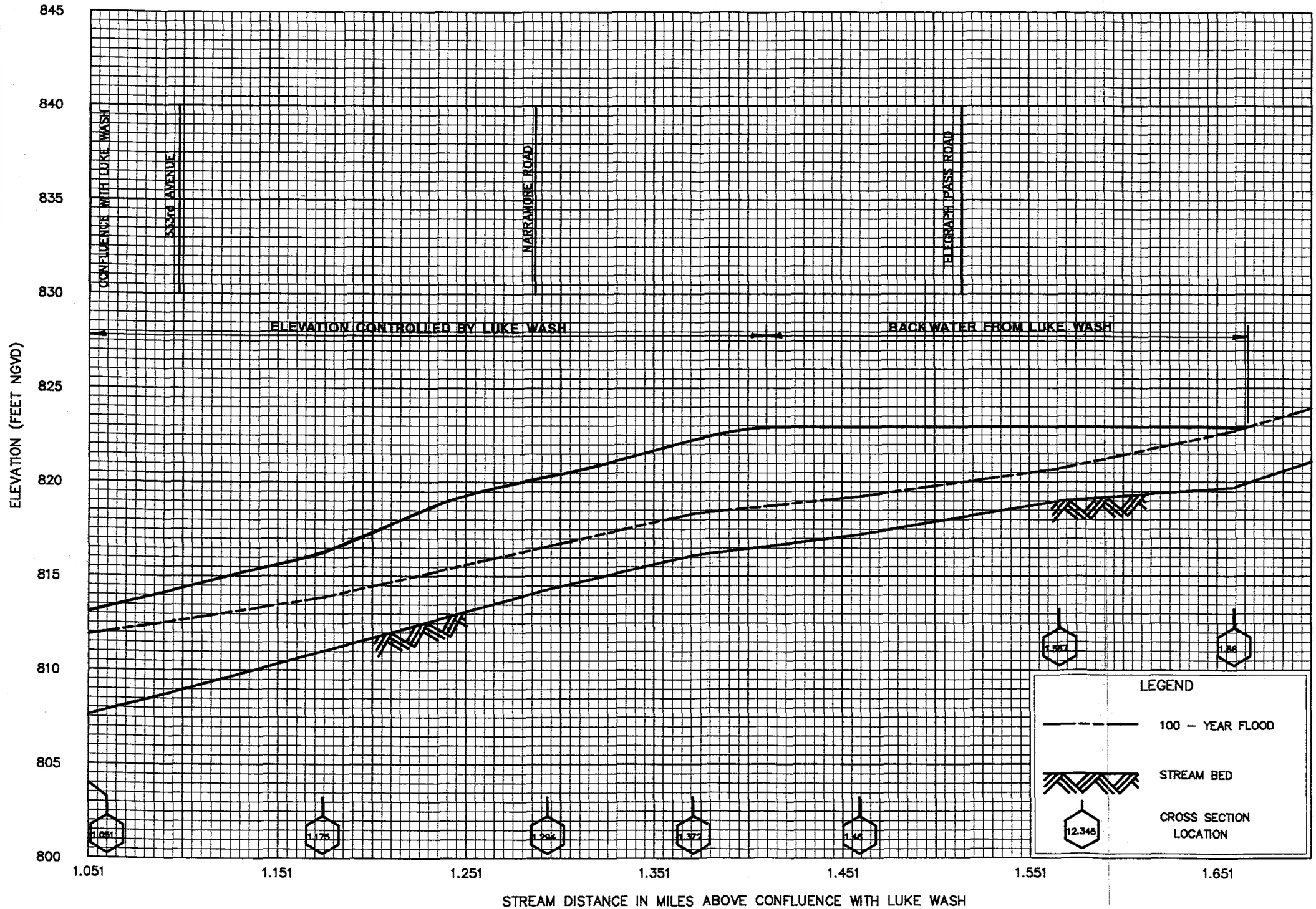
FLOOD PROFILES

EAST SUB-TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

EST2



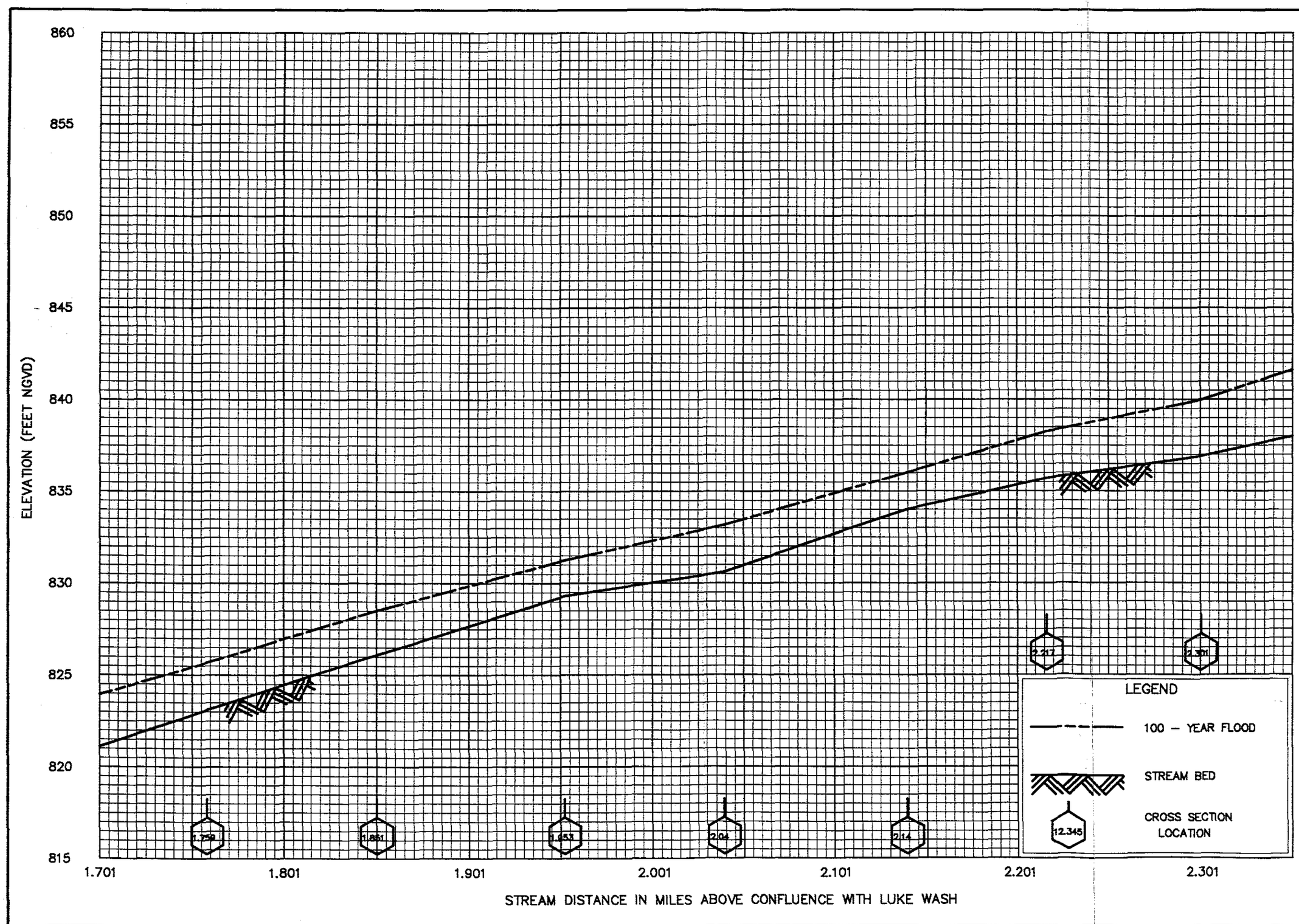
FLOOD PROFILES

EAST MAIN TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

EMT1



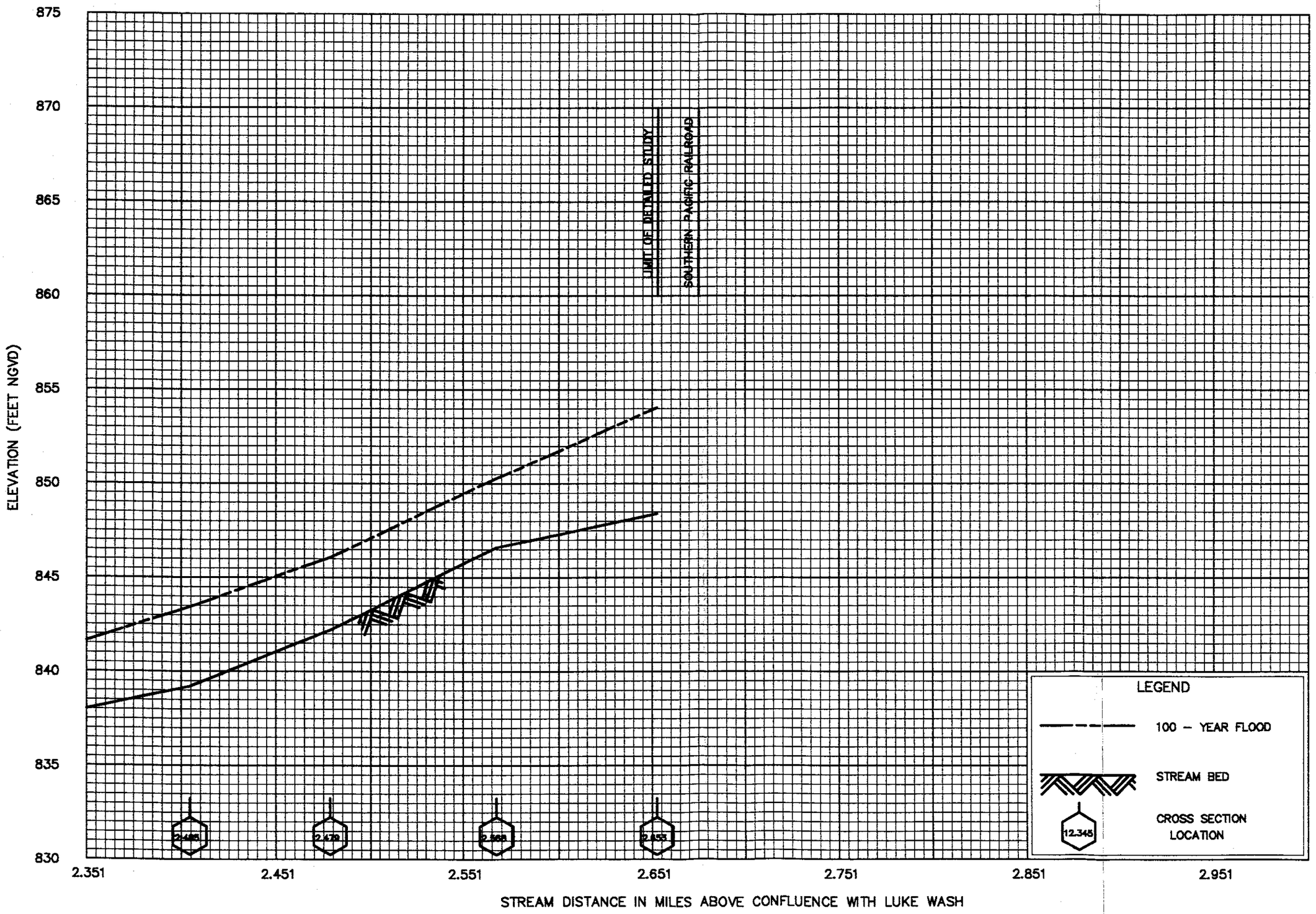
FLOOD PROFILES

EAST MAIN TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

EMT2



FLOOD PROFILES

EAST MAIN TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

EMT3

SECTION VI

LOCAL PONDING BEHIND OLD U.S. HIGHWAY 80

1. CULVERT P-20 (SUB BASIN S525)
2. CULVERT P-21 (SUB BASIN S525)
3. CULVERT P-22 (SUB BASIN S530)
4. CULVERT B-12 (SUB BASIN S575)

Local Ponding Behind Old U.S. Highway 80

For the areas within the study west of Luke Wash, the 100-year storm will cause ponding areas behind the culverts at Old U.S. Highway 80. In some locations this flow will overtop the road. The ponding depths and elevations were determined using combined outflow curves with culvert flow based on inlet control (HDS 5 reference 9) and flow over the road based on the weir flow equation.

The culvert flow was calculated first to determine the capacity of the culvert without the flow overtopping the road. In the event this calculated flow was equal to or greater than the 100-year flow from the HEC-1 output (flow does not overtop the road), then weir flow calculations were not necessary. The depth of ponding was then determined directly from the HDS 5 computation sheets (included in the following pages).

In the event the calculated capacity of the culvert was less than the 100-year flow from the HEC-1 output (flow overtops the road) then weir flow calculations were required. The weir flow calculations were used between each grade break to determine a portion of the weir flow at various elevations above the road. At each span (between grade breaks) an average depth was used for the 'H' in the weir equation. At each increasing depth the flow was calculated and added cumulatively. These cumulative flows were calculated and added with the flow determined in the culvert capacity calculations as described above. See the weir flow calculations in the following pages. The rating curves for both the weir flow and the culvert flow were plotted onto a graph with elevation versus flow being the two axes. The two curves were then added together to develop a combined weir flow/culvert flow curve. At the point on this curve that intercepts the 100-year flow from the HEC-1 output there is a corresponding ponding elevation. The flood boundaries were based on these elevations and were then plotted on the 1" = 200' topographic maps.

HYDROLOGY SUMMARY

LOCAL PONDING AT OLD U.S. HIGHWAY 80

Structure I.D. No. & Type	HEC-1 I.D.	Controlling Storm 6 or 24-hour	Q_{100} (cfs) for HEC-1 I.D.	Percent of Total Subbasin (%)	Q_{100} (cfs) Pro-Rated
P20 1-3.5'x2.5' CMP	S525	6 HR	537	29	154
P21 1-5'x4'x78' CBC	S525	6 HR	537	31	168
P22 1-10'x4'x34' CBC	S530	6 HR	448	86	387
B12 3-10'x7'x33' CBC	C575	24 HR	1745	100	1745

This data is based on Technical Data Notebook Section 3 Hydrologic Analysis for the Luke Wash F.I.S. (Reference 2).

1. CULVERT P-20 (SUB BASIN S525)

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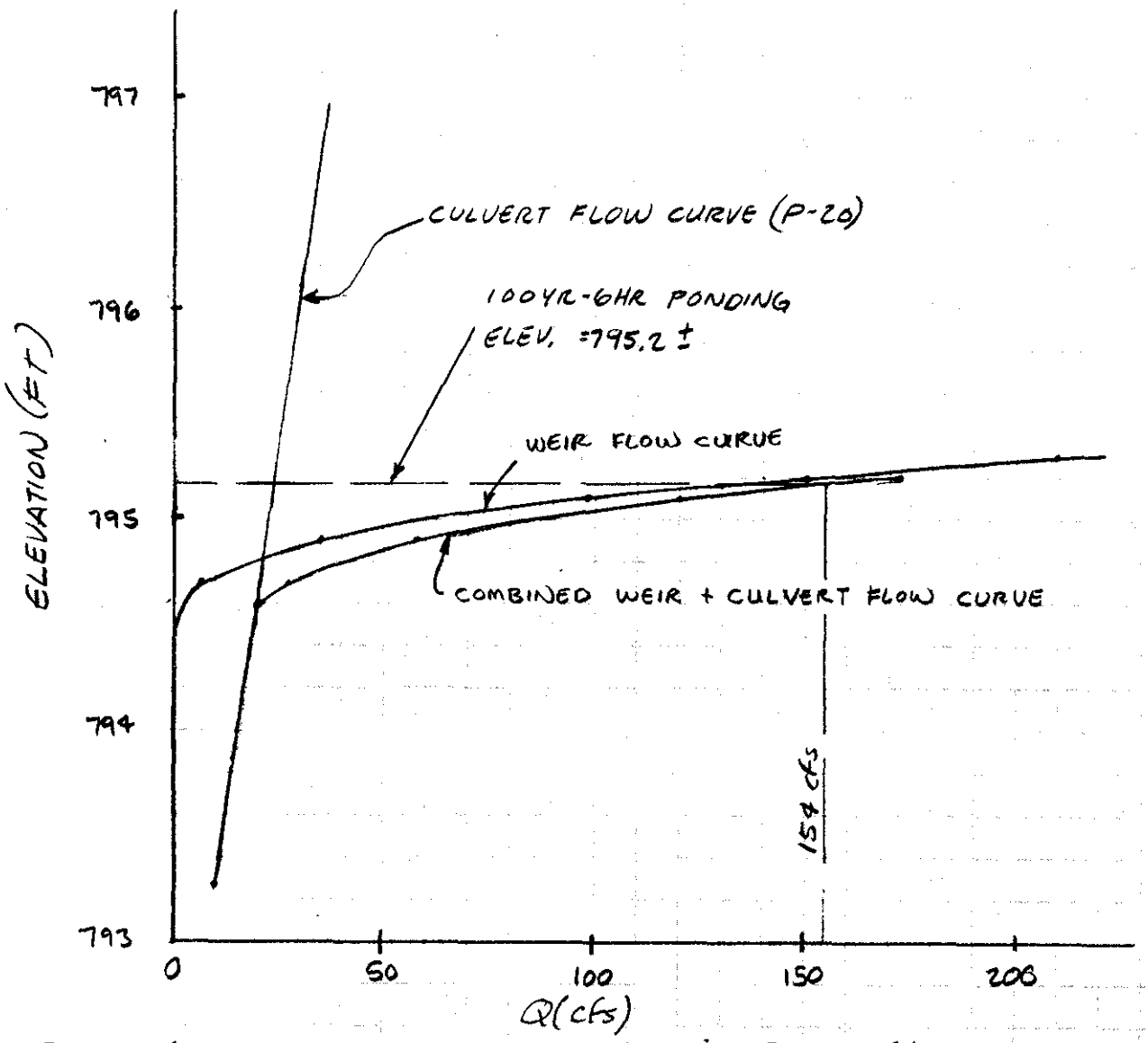
Project LUKE WASH
Project No. 1090-070
Sheet No. 1 of 6
Calculated by DB Date 9-2-92
Checked by _____ Date _____

PONDING AT OLD US. 80 (AT P-20, SUBBASIN S525)

WEIR FLOW AND CULVERT FLOW GRAPH



154 cfs is a pro-rated Q from subbasin S525 (based on percent area). The culvert flow curve is plotted from the culvert hydraulics calculations (pg. 2 of 6). The weir flow curve is plotted from the weir flow calculations (pg. 3 of 6). The combined curve is plotted by adding the Q's at respective elev's. The 100yr-6hr ponding elev. of 795.2 intersects the curve at Q=154

PROJECT: LUKE WASH F.I.S.

DESIGNER: DB

DATE: 8-27-92

HYDROLOGIC AND CHANNEL INFORMATION

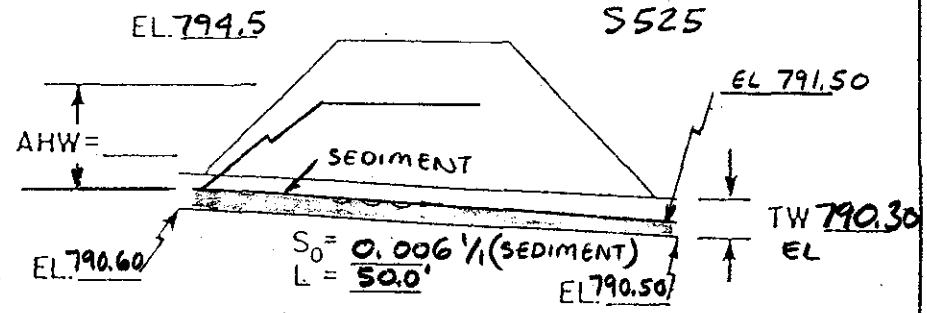
Q_1 = 154 cfs (100YR-6HR) TW_1 = —

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: P20 S525



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q CFS	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL $HW = H + h_o - LS_o$: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
3.5'x2.5' CMP ARCH-INLET HDWL	10	1.2'	0.77	.92	0.5	.38	0.8	1.40	—	1.40	.30	1.48	1.48			791.8 + 1.48' = 793.28
"	20	1.2'	1.32	1.58	0.5	1.5	1.20	1.60	—	1.60	.30	2.80	2.80			791.8 + 2.80 = 794.60 ≃ .1' OVER ROAD
"	30	1.2'	2.10	2.52	0.5	3.4	1.20	1.60	—	1.60	.30	4.30	4.30			791.8 + 4.30 = 796.10 ≃ 1.6 OVER ROAD
"	40	1.2'	3.25	3.90	0.5	6.0	1.20	1.60	—	1.60	.30	7.30	7.30			791.8 + 7.30 = 799.10
"	50	1.2'	4.50	5.40	0.5	9.2	1.20	1.60	—	1.60	.30	10.50	10.50			791.8 + 10.50 = 802.3
"	60	1.2'	6.00	7.20	0.5	13.0	1.20	1.60	—	1.60	.30	14.30	14.30			791.8 + 14.30 = 806.10

SUMMARY & RECOMMENDATIONS: 154 cfs is a pro-rated Q from subbasin S525 (based on percent area). There is no ponding from the Arlington Canal above the elevation of the inverts of the culvert, therefore, the tailwater depth is assumed to be negligible.

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Project LUKE WASH
Project No. 1090-070
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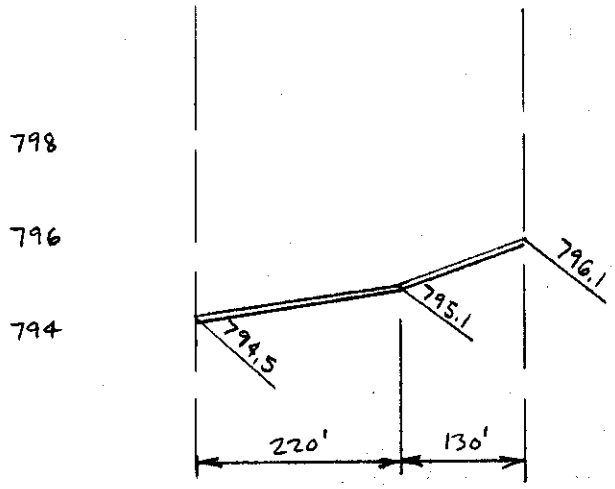
Calculated by DB Date 9-2-92
Checked by _____ Date _____

WEIR FLOW AT OLD U.S. 80 (AT P-20, SUBBASIN S525)



WEIR FLOW : $(Q = C \cdot L \cdot H^{\frac{3}{2}})$

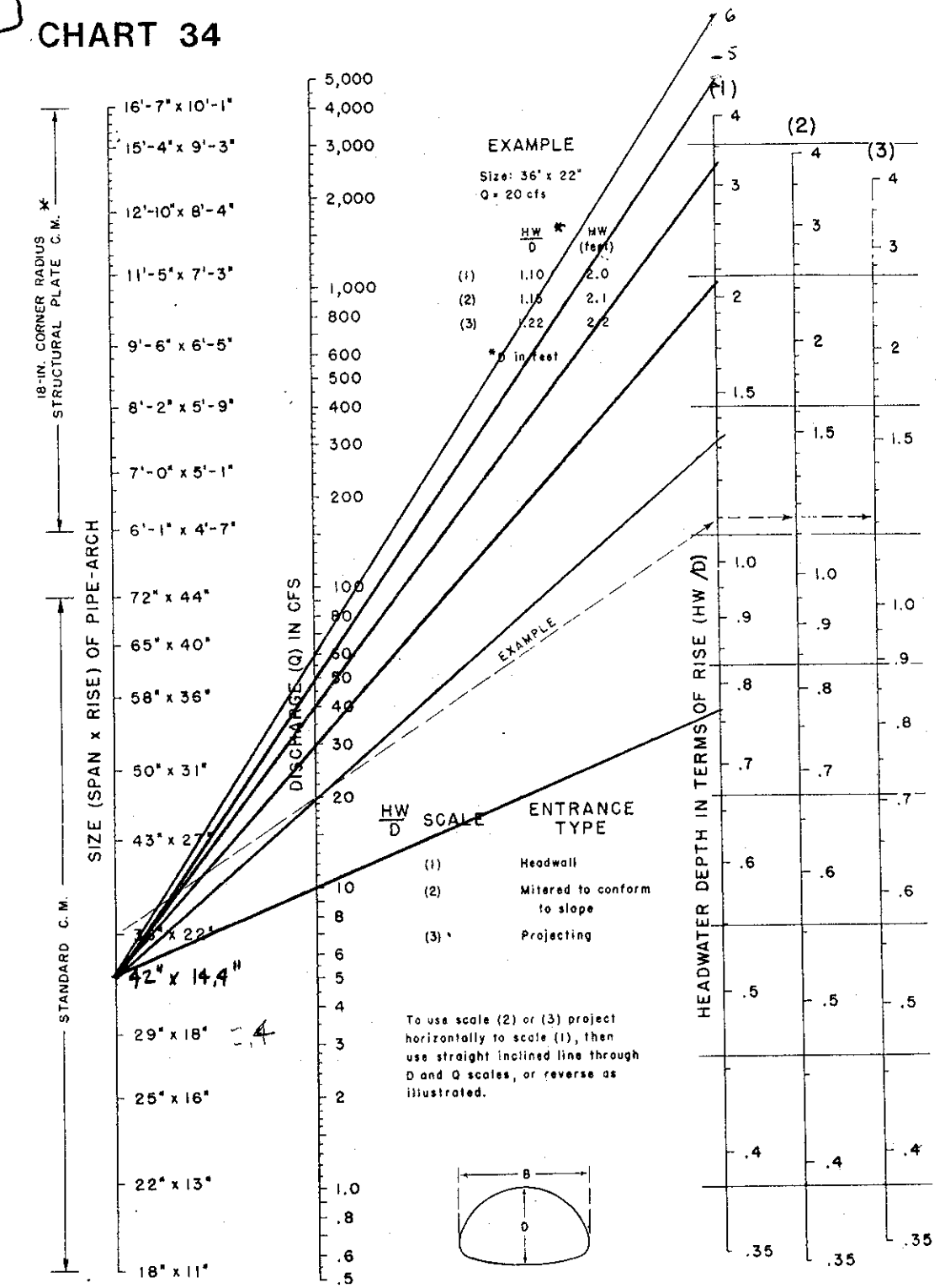
Q = FLOW IN CFS OVER THE ROAD
C = WEIR COEF. = 2.68 *
L = LENGTH OF WEIR BETWEEN GRADE BREAK
H = AVE. DEPTH OF WATER OVER WEIR

* Handbook of Hydraulics, Brater & King, 1976

WEIR FLOW CALCULATIONS

ELEV.		
794.7	$Q = 2.68 \cdot 73' \left(\frac{0.2+0}{2}\right)^{\frac{3}{2}}$ =	6 cfs
794.9	$Q = 2.68 \cdot 147' \left(\frac{0.4+0}{2}\right)^{\frac{3}{2}}$ =	35 cfs
795.1	$Q = 2.68 \cdot 220' \left(\frac{0.6+0}{2}\right)^{\frac{3}{2}}$ =	98 cfs
795.2 LT. SIDE	$Q = 2.68 \cdot 220' \left(\frac{0.7+0.1}{2}\right)^{\frac{3}{2}}$ =	149 cfs
795.2 RT. SIDE	$Q = 2.68 \cdot 13' \left(\frac{0.1+0}{2}\right)^{\frac{3}{2}}$ =	1 cfs 149 cfs + 1 cfs = 150 cfs
795.3 LT SIDE	$Q = 2.68 \cdot 220' \left(\frac{0.8+0.2}{2}\right)^{\frac{3}{2}}$ =	208 cfs
795.3 RT SIDE	$Q = 2.68 \cdot 26' \left(\frac{0.2+0}{2}\right)^{\frac{3}{2}}$ =	2 cfs 208 cfs + 2 cfs = 210 cfs

CHART 34

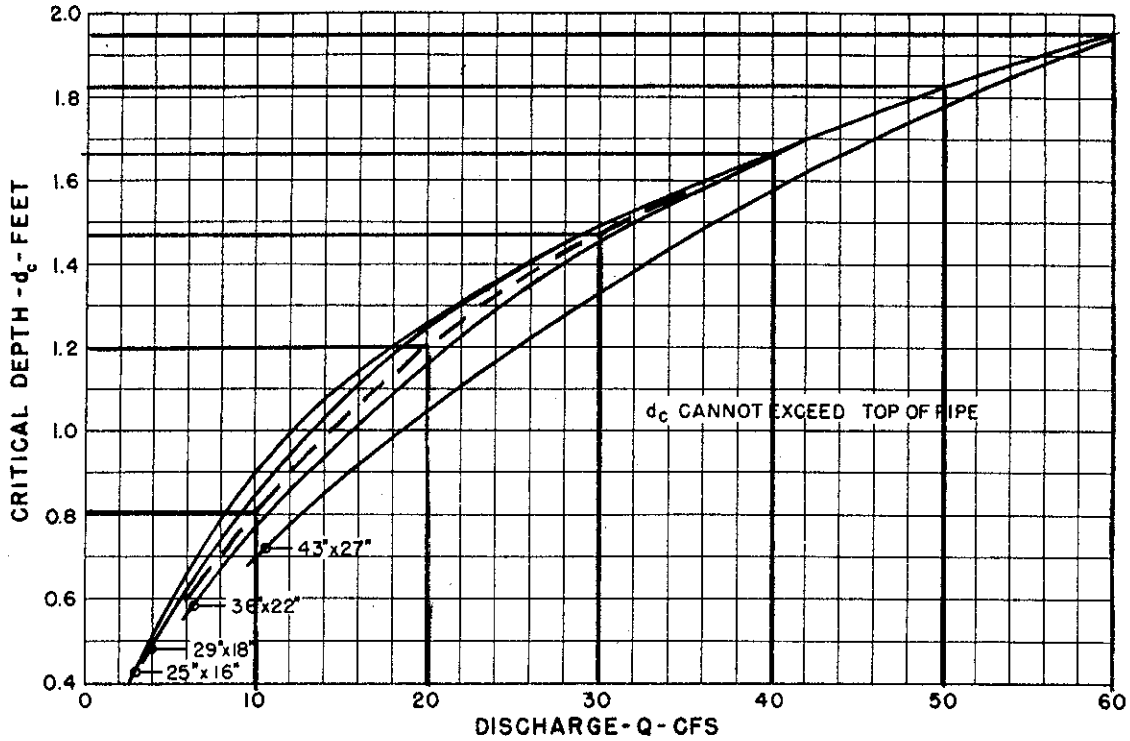


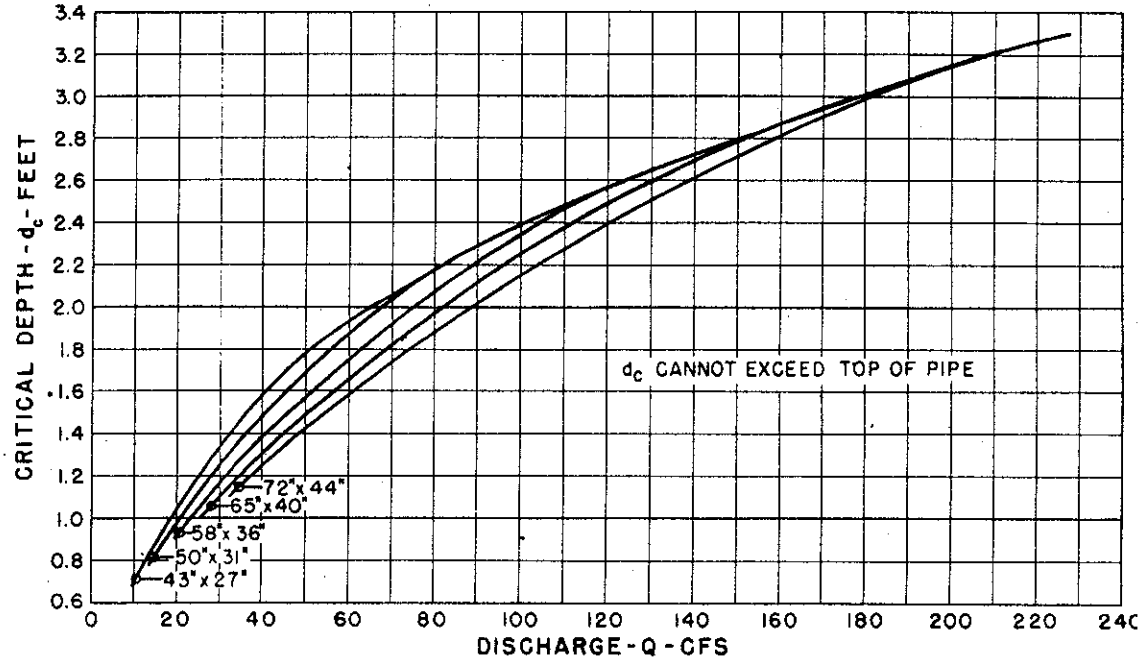
*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL

CHART 37



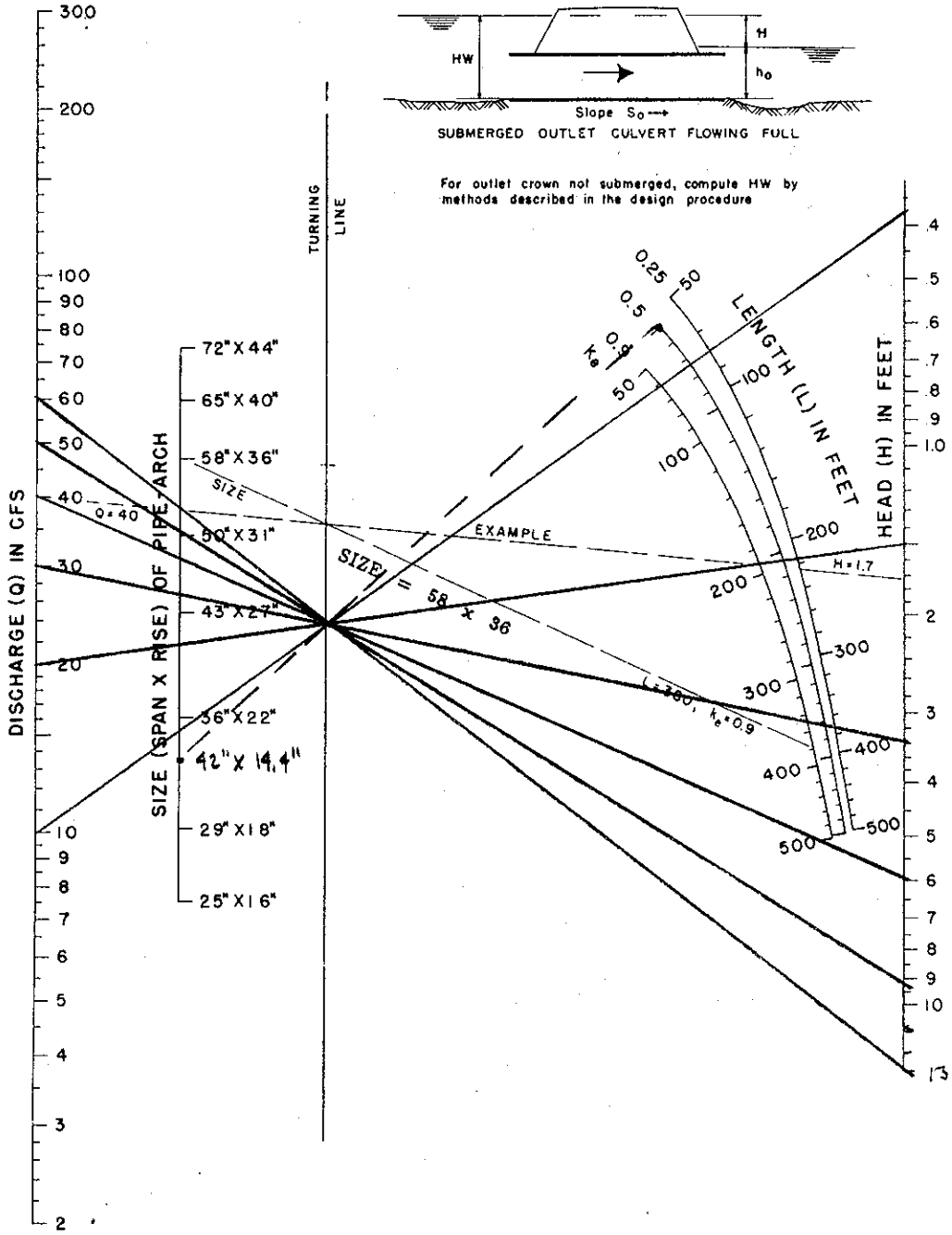


BUREAU OF PUBLIC ROADS

JAN. 1964

CRITICAL DEPTH
STANDARD C.M. PIPE-ARCH

CHART 39



HEAD FOR
STANDARD C. M. PIPE-ARCH CULVERTS
FLOWING FULL
n=0.024

BUREAU OF PUBLIC ROADS JAN. 1963

2. CULVERT P-21 (SUB BASIN S525)

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Project LUKE WASH F.I.S.
Project No. 1090-070
Sheet No. 1 of 6
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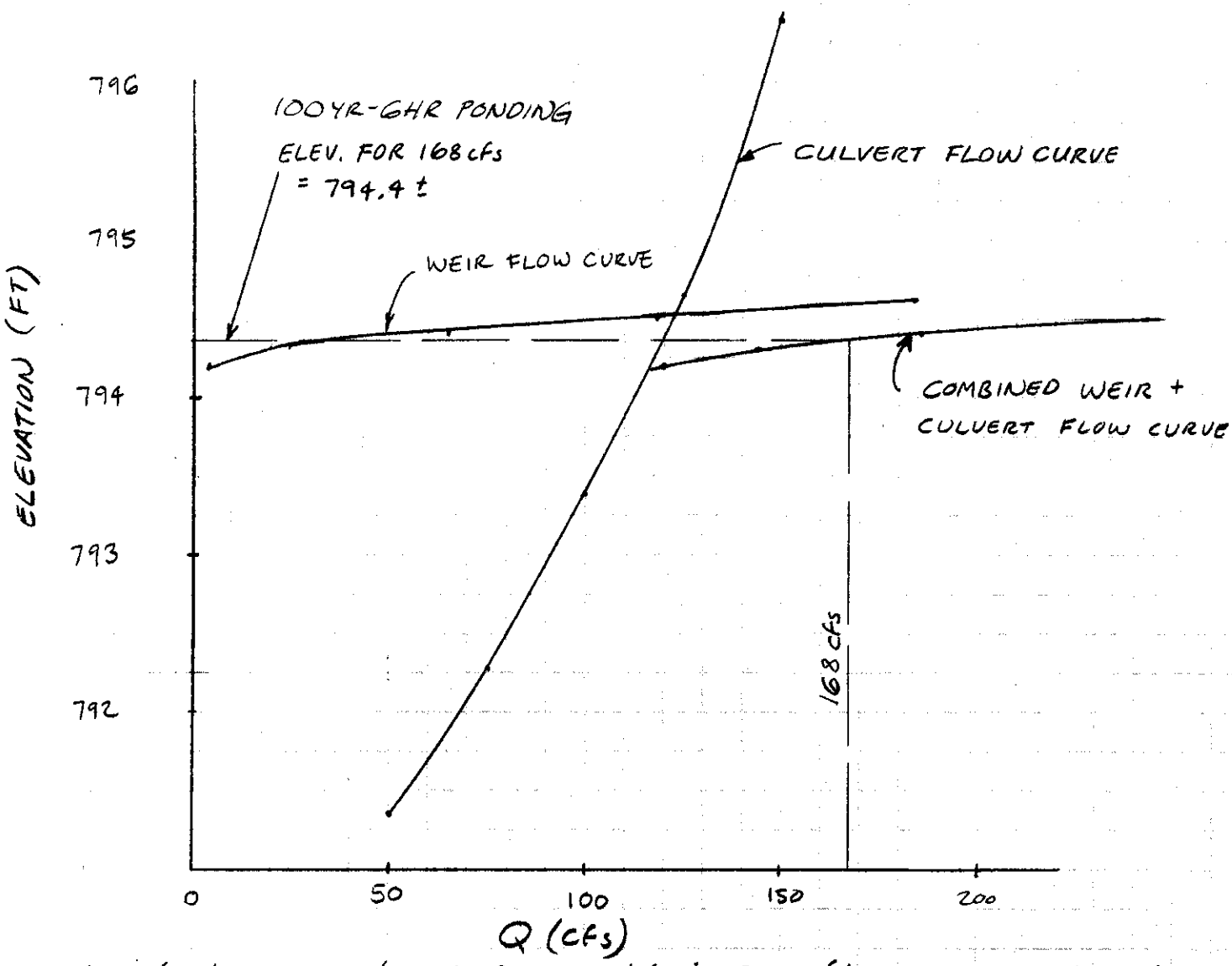
Checked by _____ Date _____

PONDING AT OLD U.S. 80 (AT P-21, SUB BASIN S525)

WEIR FLOW AND CULVERT FLOW GRAPH



168 cfs is a pro-rated Q from subbasin S525 (based on percent area). The culvert flow curve is plotted from the culvert hydraulics calculations (pg. 2 of 6). The weir flow curve is plotted from the weir flow calculations (pg. 3 of 6). The combined curve is plotted by adding both culvert and weir flow Q's at their respective elevations. The 100yr-6hr ponding elevation of 794.4 intersects the combined curve at Q = 168 cfs.

PROJECT: LUKE WASH F.I.S.

DESIGNER: DB

DATE: 9-2-92

HYDROLOGIC AND CHANNEL INFORMATION

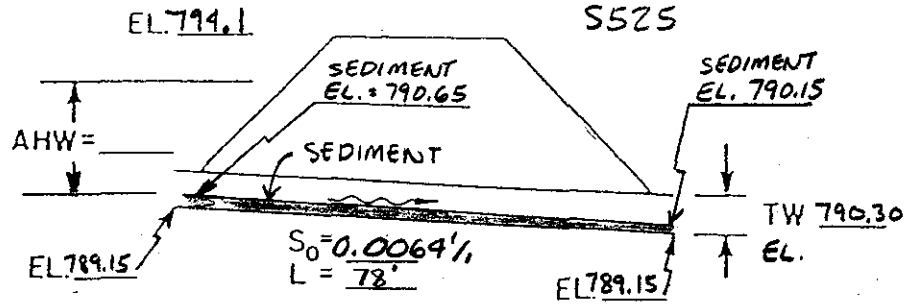
Q_1 = 168 cfs (100 YR - 6 HR) TW_1 = .15

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: P-21 / S525



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q cfs	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H + h_o − LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
5'x4' CONC. BOX-INLET HDWL	50	2.5	0.91	2.28	0.4	.48	1.5	2.0	.15	2.0	.5	1.98	2.28			789.15 + 2.28' = 791.43
"	75	2.5	1.25	3.13	0.4	1.08	1.9	2.2	.15	2.2	.5	2.78	3.13			789.15 + 3.13' = 792.28
"	100	2.5	1.70	4.25	0.4	1.92	2.2	2.35	.15	2.35	.5	3.77	4.25			789.15 + 4.25' = 793.40
"	125	2.5	2.20	5.50	0.4	3.0	2.5	2.5	.15	2.5	.5	5.00	5.50			789.15 + 5.50' = 794.65 ≃ 0.6' OVER ROAD
"	150	2.5	2.90	7.25	0.4	4.4	2.5	2.5	.15	2.5	.5	6.40	7.25			789.15 + 7.25' = 796.40 ≃ 2.3' OVER ROAD

SUMMARY & RECOMMENDATIONS:

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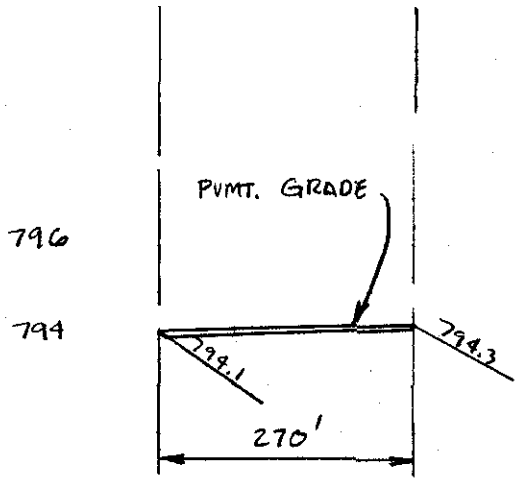
Project LUKE WASH F.I.S.
Project No. 1090-070
Sheet No. 3 of 6
Calculated by DB Date 9-3-92
Checked by _____ Date _____

WEIR FLOW AT OLD U.S. 80 (AT P-21, SUB BASIN S525)



WEIR FLOW: $Q = C \cdot L \cdot H^{\frac{3}{2}}$

Q = FLOW IN CFS OVER THE ROAD
C = WEIR FLOW COEF. = 2.68 *
L = LENGTH OF WEIR
H = AVE. DEPTH OF WATER OVER WEIR

* HANDBOOK OF HYDRAULICS, BRATER & KING, 1976

WEIR FLOW CALCULATIONS

ELEV.

794.2 $Q = 2.68 \cdot 135 \left(\frac{0.1+0}{2}\right)^{\frac{3}{2}} = 4$ cfs

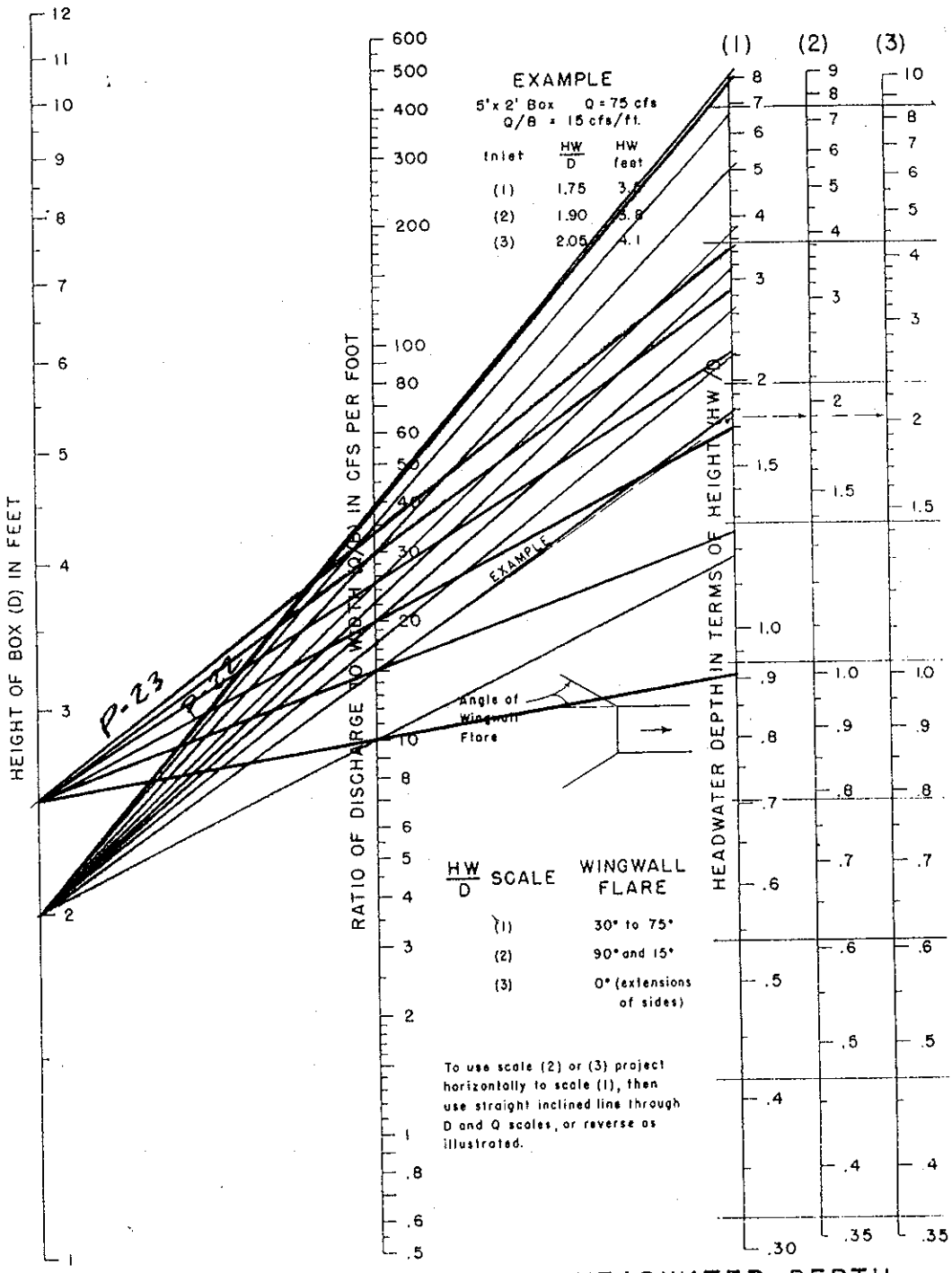
794.3 $Q = 2.68 \cdot 270 \left(\frac{0.2+0}{2}\right)^{\frac{3}{2}} = 23$ cfs

794.4 $Q = 2.68 \cdot 270 \left(\frac{0.3+0.1}{2}\right)^{\frac{3}{2}} = 65$ cfs

794.5 $Q = 2.68 \cdot 270 \left(\frac{0.4+0.2}{2}\right)^{\frac{3}{2}} = 119$ cfs

794.6 $Q = 2.68 \cdot 270 \left(\frac{0.5+0.3}{2}\right)^{\frac{3}{2}} = 183$ cfs

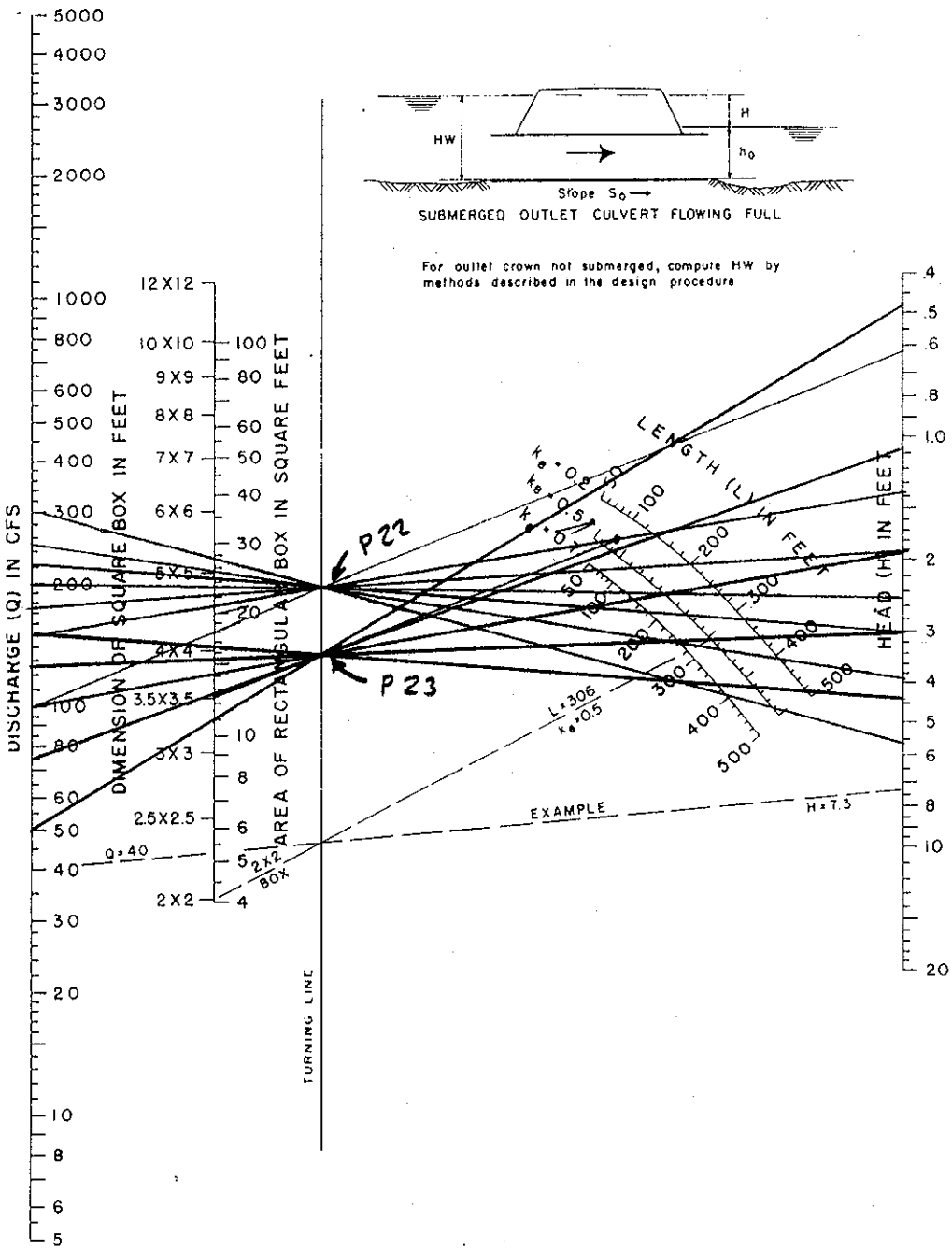
CHART 8



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

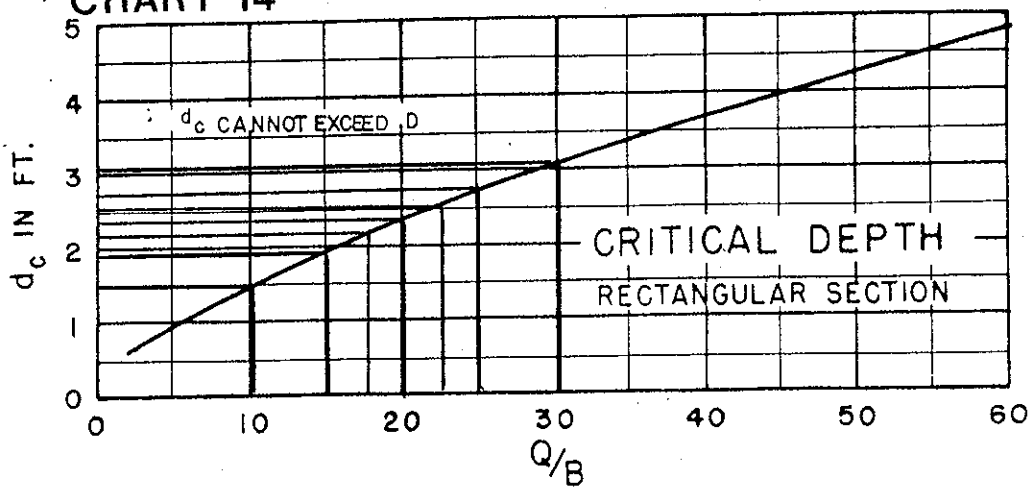
CHART 15

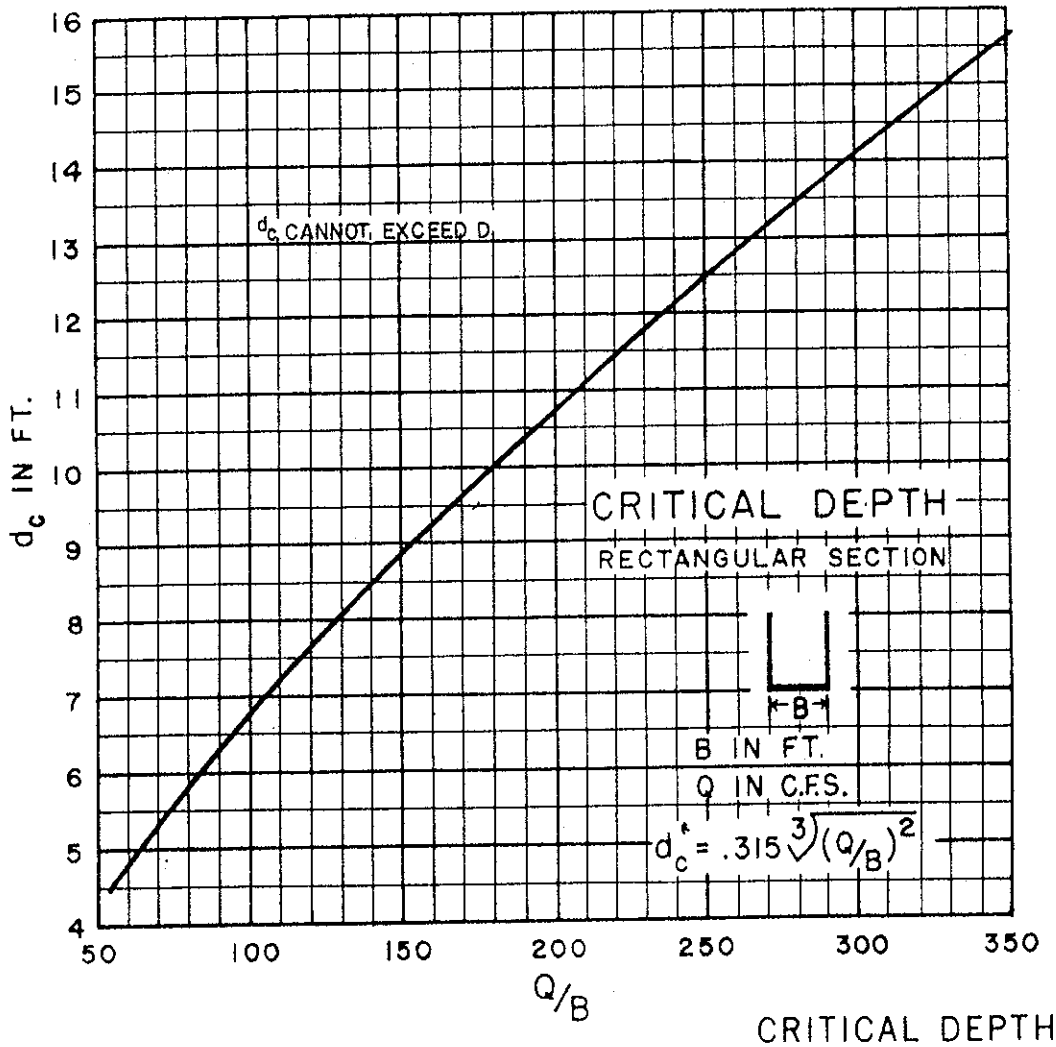


HEAD FOR
CONCRETE BOX CULVERTS
FLOWING FULL
n = 0.012

AU OF PUBLIC ROADS JAN. 1963

CHART 14





CRITICAL DEPTH
RECTANGULAR SECTION

BUREAU OF PUBLIC ROADS JAN. 1963

3. CULVERT P-22 (SUB BASIN S530)

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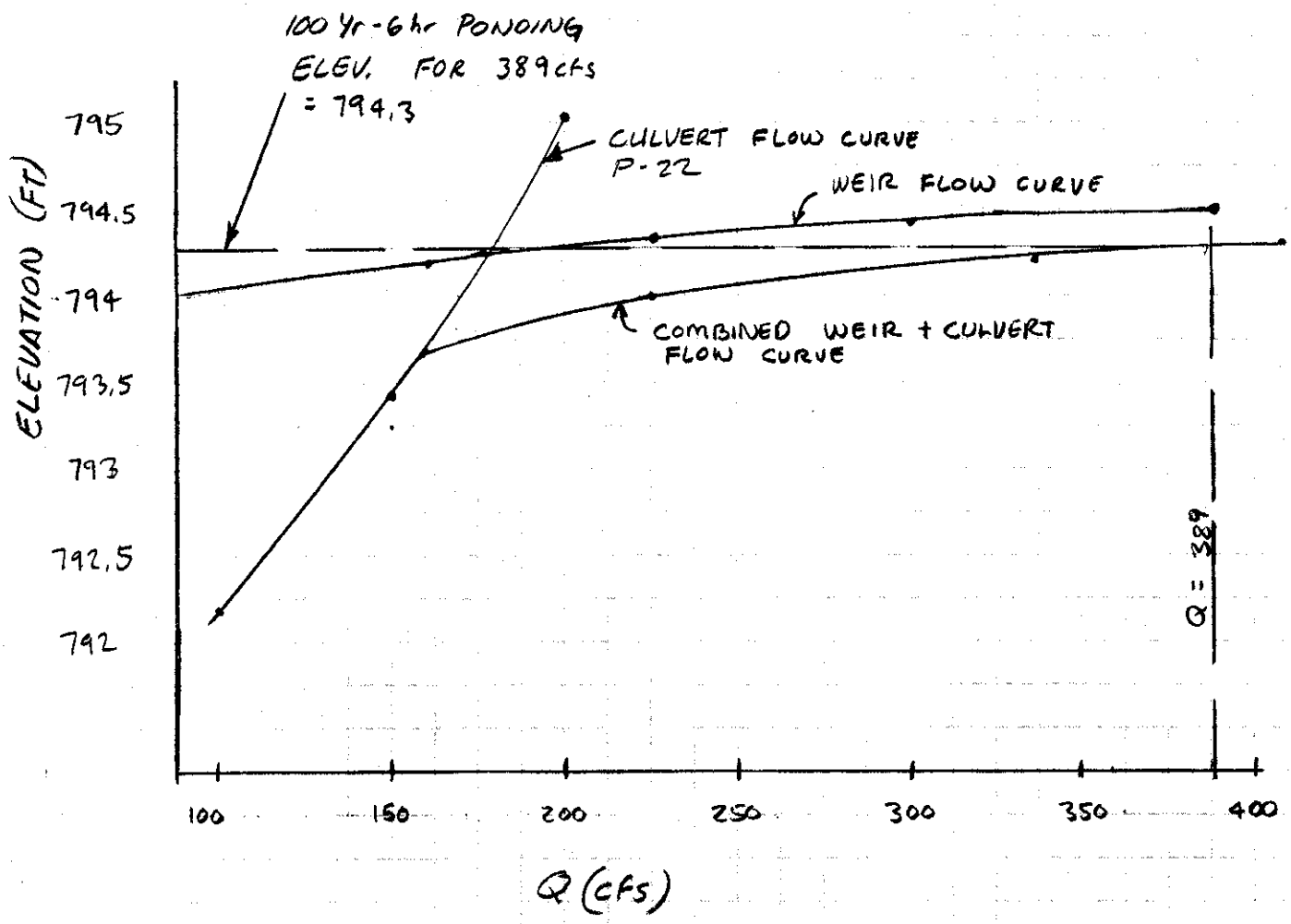
PONDING AT OLD U.S. 80 (AT P-22, SUB BASIN S530)

WEIR FLOW AND CULVERT FLOW GRAPH



389 cfs is a pro-rated Q from subbasin S530 (based on percent area). The culvert flow curve is plotted from the culvert hydraulics calculations (pg. 2 of 7). The weir flow curve is plotted from the weir flow calculations (pg. 3 of 7). The combined curve is plotted by adding both culvert and weir flow Q's at their respective elevations. The 100yr-6hr ponding elevation of 794.3 intersects the combined curve at Q = 389cfs.

PROJECT: LUKE WASH F.I.S.

Pg. 2

DESIGNER: DB

DATE: 9-2-92

HYDROLOGIC AND CHANNEL INFORMATION

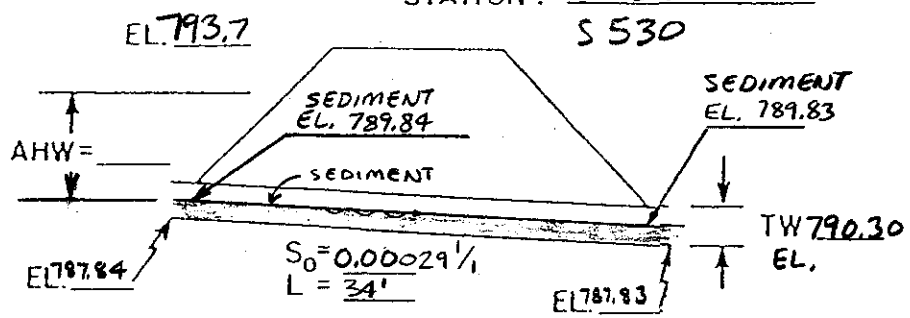
Q_1 = 387 cfs (100YR-6HR) TW_1 = 0.47'

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: P-22 S530



MEAN STREAM VELOCITY = _____

MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q cfs	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H + h_o − LS_o: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS_o	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
10' x 4' CONC. BOX - INLET HDWL	100	2	1.18	2.36	0.4	0.62	1.5	1.75	.47	1.75	.01	2.36	2.36			789.84 + 2.36' = 792.20
"	150	2	1.80	3.60	0.4	1.38	1.9	1.95	.47	1.95	.01	3.32	3.60			789.84 + 3.60' = 793.44
"	175	2	2.20	4.40	0.4	1.90	2.0	2.0	.47	2.0	.01	3.89	4.40			789.84 + 4.40' = 794.24 ≃ .5' OVER ROAD
"	200	2	2.60	5.20	0.4	2.50	2.0	2.0	.47	2.0	.01	4.49	5.20			789.84 + 5.20' = 795.04, ≃ 1.3' OVER ROAD
"	225	2	3.20	6.40	0.4	3.00	2.0	2.0	.47	2.0	.01	4.99	6.40			789.84 + 6.40' = 796.24; ≃ 2.5' OVER ROAD

SUMMARY & RECOMMENDATIONS: 387cfs is a pro-rated Q from subbasin S530 (based on percent area).

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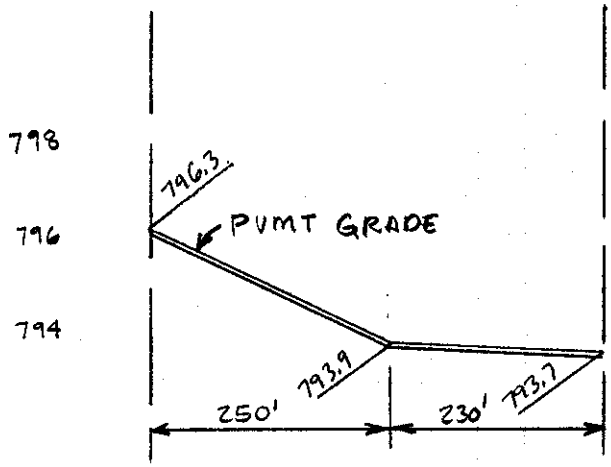
WEIR FLOW AT OLD US. 80 (AT P-22, SUB BASIN S530)



WEIR FLOW: $(Q = C \cdot L \cdot H^{\frac{3}{2}})$

Q = FLOW IN CFS OVER THE ROAD
C = WEIR COEF. = 2.68 *

L = LENGTH OF WEIR BETWEEN GRADE BREAK
H = AVE. DEPTH OF WATER OVER WEIR

* Handbook of Hydraulics, Brater & King, 1976

WEIR FLOW CALCULATIONS

ELEV.			
793.8	$Q = 2.68 \cdot 115' \left(\frac{0 + 0.1}{2}\right)^{\frac{3}{2}}$	= 3 cfs	
794.0 RT SIDE	$Q = 2.68 \cdot 230' \left(\frac{0.1 + 0.3}{2}\right)^{\frac{3}{2}}$	= 55 cfs	
794.0 LT SIDE	$Q = 2.68 \cdot 10' \left(\frac{0 + 0.1}{2}\right)^{\frac{3}{2}}$	= 0 cfs	55 cfs + 0 cfs = 55 c
794.2 RT SIDE	$Q = 2.68 \cdot 230' \left(\frac{0.3 + 0.5}{2}\right)^{\frac{3}{2}}$	= 156 cfs	
794.2 LT SIDE	$Q = 2.68 \cdot 31' \left(\frac{0 + 0.3}{2}\right)^{\frac{3}{2}}$	= 5 cfs	156 cfs + 5 cfs = 161 cfs
794.3 RT SIDE	$Q = 2.68 \cdot 230' \left(\frac{0.4 + 0.6}{2}\right)^{\frac{3}{2}}$	= 218 cfs	
794.3 LT SIDE	$Q = 2.68 \cdot 42' \left(\frac{0 + 0.4}{2}\right)^{\frac{3}{2}}$	= 10 cfs	218 cfs + 10 cfs = 228 cfs

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WEIR FLOW CALCULATIONS CONT.

ELEV.

794.4 RT SIDE $Q = 2.68 \cdot 230' \left(\frac{0.5+0.7}{2}\right)^{3/2} = 286$ cfs

794.4 LT SIDE $Q = 2.68 \cdot 52' \left(\frac{0+0.5}{2}\right)^{3/2} = 17$ cfs

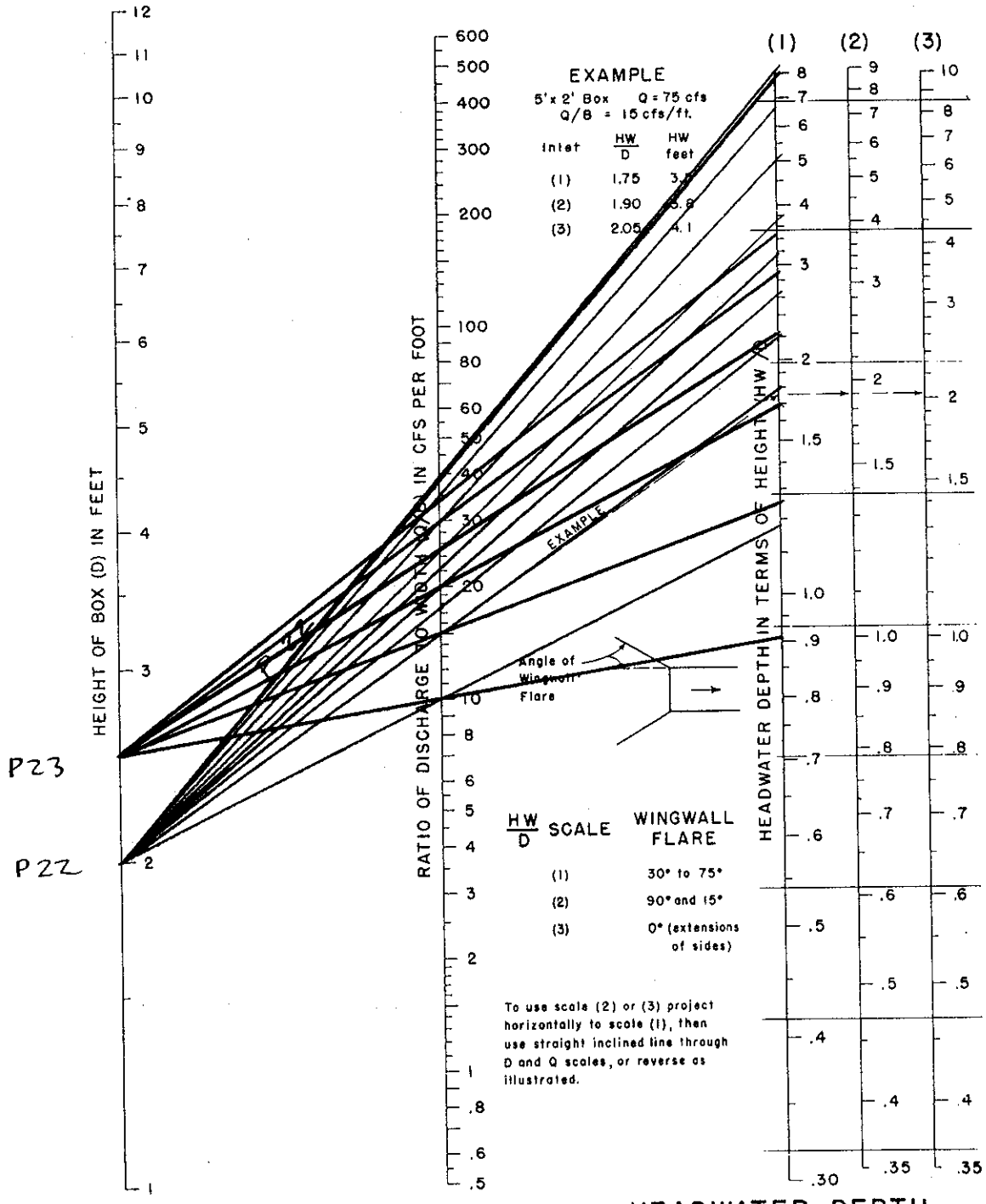
286 cfs + 17 cfs = 303 cfs

794.5 RT SIDE $Q = 2.68 \cdot 230' \left(\frac{0.6+0.8}{2}\right)^{3/2} = 361$ cfs

794.5 LT SIDE $Q = 2.68 \cdot 63' \left(\frac{0+0.6}{2}\right)^{3/2} = 28$ cfs

361 cfs + 28 cfs = 389 cfs

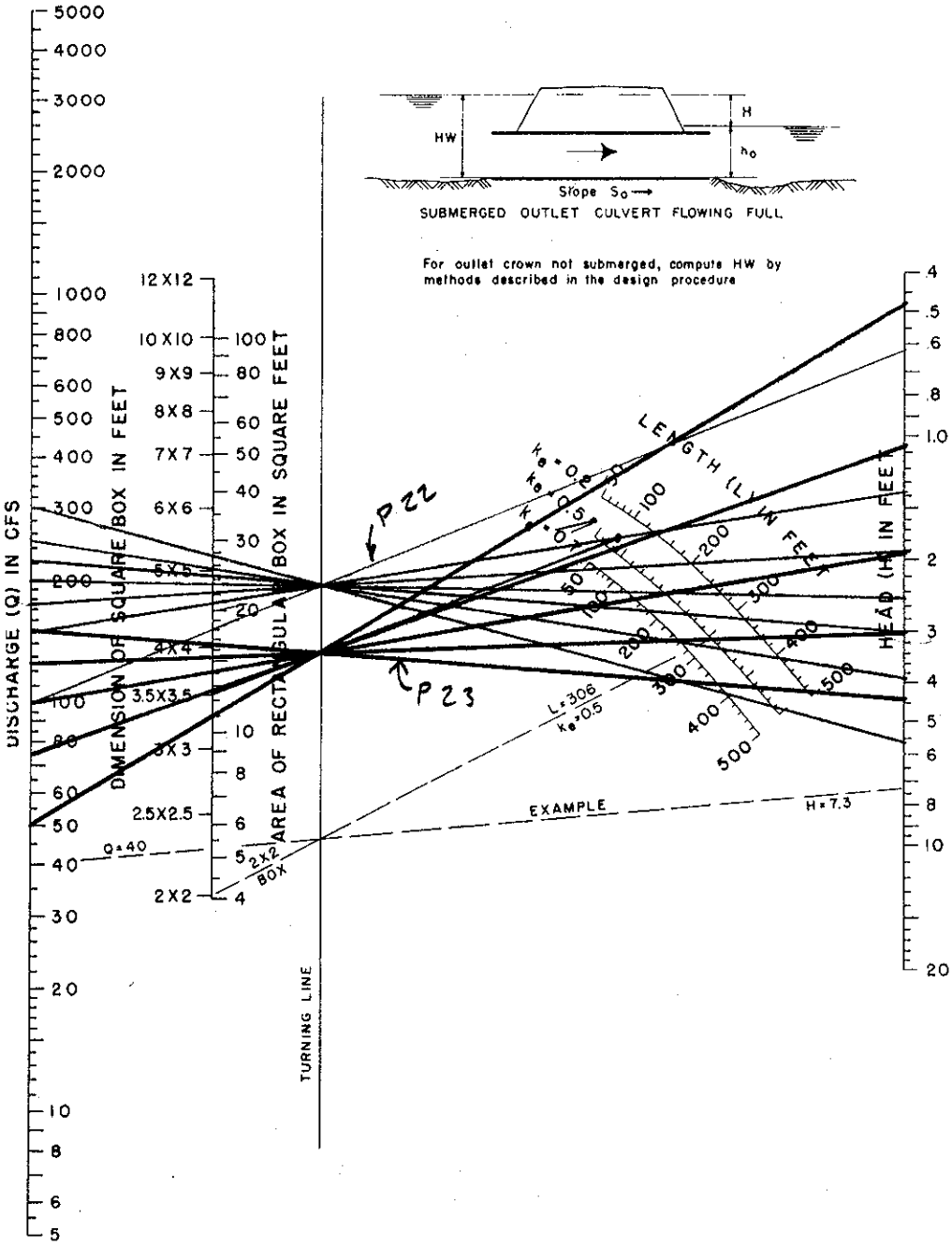
CHART 8



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

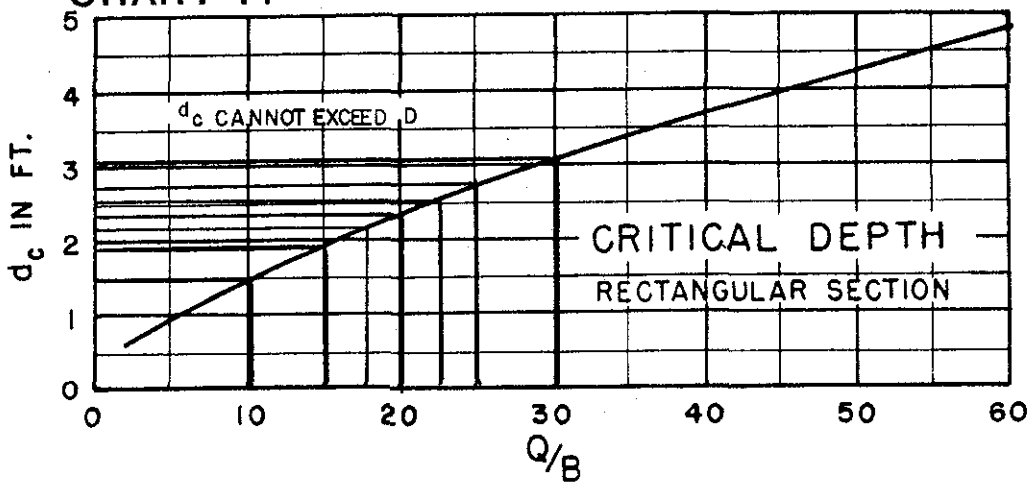
CHART 15

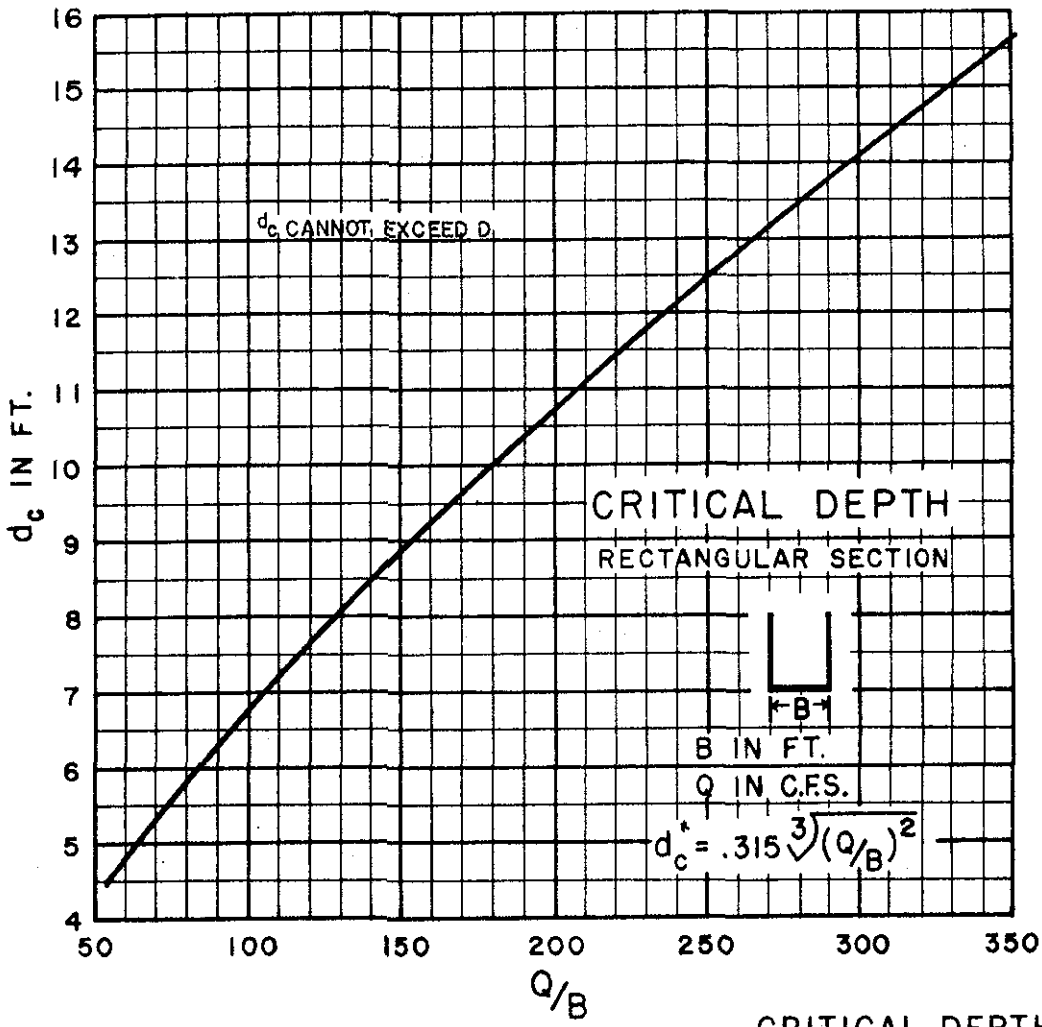


HEAD FOR
CONCRETE BOX CULVERTS
FLOWING FULL
n = 0.012

AU OF PUBLIC ROADS JAN. 1963

CHART 14





BUREAU OF PUBLIC ROADS JAN. 1963

CRITICAL DEPTH
RECTANGULAR SECTION

4. CULVERT B-12 (SUB BASIN S575)

PROJECT: LUKE WASH F.I.S.

DESIGNER: DB

DATE: 8-25-92

HYDROLOGIC AND CHANNEL INFORMATION

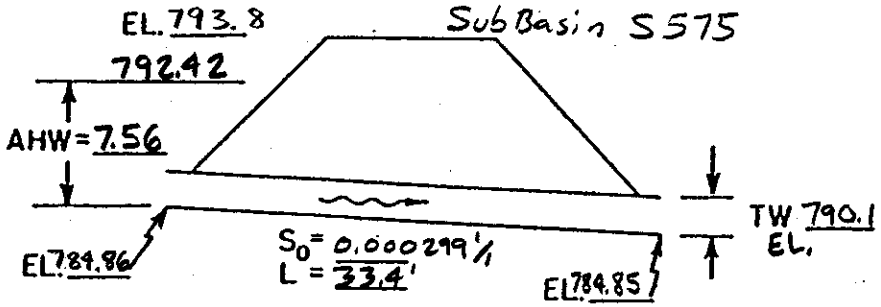
Q_{100} = 1745 cfs (100 YR, 24HR) TW_1 = 5.25

Q_2 = _____ TW_2 = _____

(Q_1 = DESIGN DISCHARGE, SAY Q_{25}
Q_2 = CHECK DISCHARGE, SAY Q_{50} OR Q_{100})

SKETCH

STATION: B#12
Sub Basin S575



MEAN STREAM VELOCITY = _____
MAX. STREAM VELOCITY = _____

CULVERT DESCRIPTION (ENTRANCE TYPE)	Q	SIZE	HEADWATER COMPUTATION: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL HW=H + h_0 − LS_0: K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_0	LS_0	HW	CONTROLLING HW	OUTLET VELOCITY	COST	COMMENTS
3-10'x7' CONC. BOX - INLET HDWL	1745/3 582	3-10'x7'	1.08	7.56	.4	1.6	4.5	5.75	5.25	5.75	.01	7.34	7.56			784.86 + 7.56 = 792.42
																NO WEIR FLOW OVER
																ROAD

SUMMARY & RECOMMENDATIONS: 1745 cfs is the full Q for CP C575. The tailwater depth of 5.25 feet (elev. 790.1) is the ponding depth upstream of the Arlington canal (from the 100 YR - 6HR HEC-1 model).

SECTION VII

LOCAL PONDING BEHIND THE ARLINGTON CANAL

1. SUB BASIN S530 (RES 534)
2. SUB BASIN S521 (RES 523)
3. SUB BASIN S525 (RES 529)
4. SUB BASIN S570 (RES 578)

Local Ponding Behind the Arlington Canal

West of Luke Wash, the elevated Arlington Canal causes stormwater ponding. The 100-year storm event will back up behind the canal, until the flow overtops the bank. The ponding limits behind the canal and depths of flow over the canal were calculated by weir flow over the canal.

The weir flow calculations were used between each grade break along the canal to determine a portion of the weir flow. At each span (between grade breaks) an average depth was used for the 'H' in the weir equation. These calculations were done at increasing depths of flow and added cumulatively. The cumulative flows were compared with the Q determined in the HEC-1 output. This was accomplished using a rating curve with elevation versus flow. At the point where the cumulative weir flow can be interpolated in the rating curve the corresponding elevation was determined. The flood boundaries were based on these elevations and were then plotted on the 1" = 200' topographic maps.

HYDROLOGY SUMMARY

LOCAL PONDING AT ARLINGTON CANAL

HEC-1 ID	CONTROLLING STORM 6 OR 24 HOUR	Q_{100} (cfs) FOR HEC-1 I.D.
RES 578	6 HR	1565
RES 534	6 HR	374
RES 529	6 HR	280
S521	6 HR	285

This data is based on Technical Data Notebook Section 3 Hydrology Analysis for the Luke Wash F.I.S. (Reference 2).

1. SUB BASIN S530 (RES 534)

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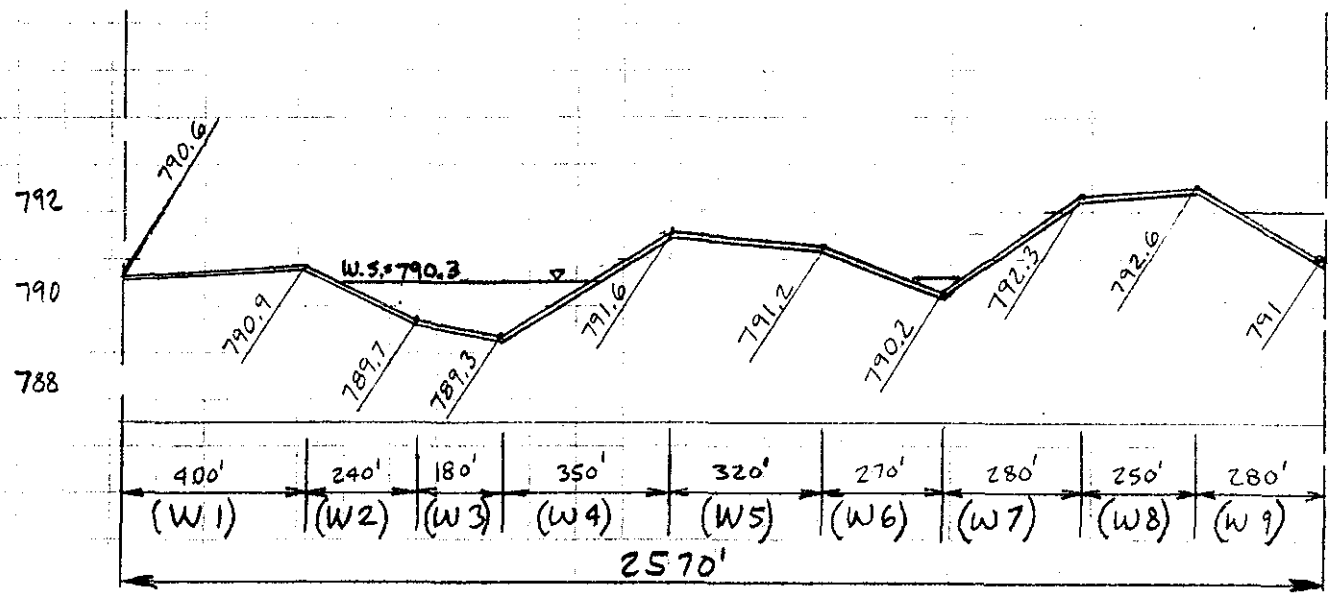
PONDING AT ARLINGTON CANAL (SUB BASIN S530)

(Q at RES534)



CROSS SECTION AT
TOP OF CANAL
LOOKING UPSTREAM

SCALE: 1"=4' VERT
1"=400' HOR

WEIR FLOW RATING CURVE

RS	1	ELEV	787.5					
SA	0	1.75	3.24	4.68	5.64	6.59	7.53	8.46
SE	787.5	788	789.3	790	790.5	791	791.5	792
SQ	0	0	0	169	837	2159	4769	8827

FOR THE 100-YR, 6HR HEC-1 FLOW OF 374 CFS AT RES534 – THE PONDING ELEVATION = 790.3 (BY INTERPOLATION).

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ARLINGTON CANAL PONDING

SAMPLE CALCULATIONS

RESERVOIR ROUTING (RES 534) - PONDING AT ARLINGTON CANAL (SUB BASIN S530) FOR HEC-1 MODEL.

CALCULATIONS ARE BASED ON WEIR FLOW OVER THE CANAL

WEIR FLOW CALCULATIONS $(Q = C \cdot L \cdot H^{3/2})$

WHERE: Q = FLOW IN CFS OVER THE CANAL
C = WEIR COEFFICIENT = 2.68 (BASED ON THE HANDBOOK OF HYDRAULICS BY BRATER & KING, REF. 5).
L = LENGTH OF WEIR BETWEEN EACH GRADE BREAK OR INTERPOLATED FROM WATER SURFACE.
H = AVERAGE DEPTH OF WATER OVER WEIR.

WEIR FLOW AT ELEVATION 790.0

(W2)* $Q = 2.68 \cdot 60 \left(\frac{0 + 0.30}{2}\right)^{3/2} = 9.3$

(W3) $Q = 2.68 \cdot 180 \left(\frac{0.30 + 0.70}{2}\right)^{3/2} = 100.9$

(W4) $Q = 2.68 \cdot 106.5 \left(\frac{0.70 + 0}{2}\right)^{3/2} = 59.1$

TOTAL Q AT ELEVATION 790.0 = 169.3 cfs

* (W2) SEGMENT OF WEIR (BETWEEN GRADE BREAKS) BEING EVALUATED. REFERENCED ON CROSS SECTION, SHEET 1 OF 6.

ARLINGTON CANAL PONDING

SAMPLE CALCULATIONS

WEIR FLOW CALCULATIONS (CONTINUED)

WIER FLOW AT ELEVATION 790.5

(W2) $Q = 2.68 \cdot 160 \left(\frac{0 + 0.8}{2}\right)^{3/2} = 108.5$

(W3) $Q = 2.68 \cdot 180 \left(\frac{0.8 + 1.2}{2}\right)^{3/2} = 482.4$

(W4) $Q = 2.68 \cdot 182.6 \left(\frac{1.2 + 0}{2}\right)^{3/2} = 227.4$

(W6) $Q = 2.68 \cdot 81 \left(\frac{0 + 0.3}{2}\right)^{3/2} = 12.6$

(W7) $Q = 2.68 \cdot 40 \left(\frac{0.3 + 0}{2}\right)^{3/2} = 6.2$

TOTAL Q AT ELEVATION 790.5 = 837.1 cfs

WEIR FLOW AT ELEVATION 791.0

(W1) $Q = 2.68 \cdot 400 \left(\frac{0.4 + 0.1}{2}\right)^{3/2} = 134$

(W2) $Q = 2.68 \cdot 240 \left(\frac{0.1 + 1.3}{2}\right)^{3/2} = 376.7$

ARLINGTON CANAL PONDING

SAMPLE CALCULATIONS

WEIR FLOW CALCULATIONS (CONTINUED)

WIER FLOW AT ELEVATION 791.0 (CONTINUED)

(W3) $Q = 2.68 \cdot 180 \left(\frac{1.3 + 1.7}{2}\right)^{3/2} = 886.2$

(W4) $Q = 2.68 \cdot 258.7 \left(\frac{1.7 + 0}{2}\right)^{3/2} = 543.3$

(W6) $Q = 2.68 \cdot 216 \left(\frac{0 + 0.8}{2}\right)^{3/2} = 146.4$

(W7) $Q = 2.68 \cdot 106.7 \left(\frac{0.8 + 0}{2}\right)^{3/2} = 72.3$

TOTAL Q AT ELEVATION 791.0 = 2158.9 cfs

WEIR FLOW AT ELEVATION 791.5

(W1) $Q = 2.68 \cdot 400 \left(\frac{0.9 + 0.6}{2}\right)^{3/2} = 696.3$

(W2) $Q = 2.68 \cdot 240 \left(\frac{0.6 + 1.8}{2}\right)^{3/2} = 845.5$

(W3) $Q = 2.68 \cdot 180 \left(\frac{1.8 + 2.2}{2}\right)^{3/2} = 1364.4$

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ARLINGTON CANAL PONDING

SAMPLE CALCULATIONS

WEIR FLOW CALCULATIONS (CONTINUED)

WEIR FLOW AT ELEVATION 791.5 (CONTINUED)

(W4) $Q = 2.68 \cdot 334.8 \left(\frac{2.2 + 0}{2}\right)^{3/2} = 1035.2$

(W5) $Q = 2.68 \cdot 240 \left(\frac{0 + 0.3}{2}\right)^{3/2} = 37.4$

(W6) $Q = 2.68 \cdot 270 \left(\frac{0.3 + 1.3}{2}\right)^{3/2} = 517.8$

(W7) $Q = 2.68 \cdot 173.3 \left(\frac{1.3 + 0}{2}\right)^{3/2} = 243$

(W9) $Q = 2.68 \cdot 87.5 \left(\frac{0.5 + 0}{2}\right)^{3/2} = 29.3$

TOTAL Q AT ELEVATION 791.5 = 4768.9 CFS

WEIR FLOW AT ELEVATION 792.0

(W1) $Q = 2.68 \cdot 400 \left(\frac{1.4 + 1.1}{2}\right)^{3/2} = 1498.2$

(W2) $Q = 2.68 \cdot 240 \left(\frac{1.1 + 2.3}{2}\right)^{3/2} = 1425.7$

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ARLINGTON CANAL PONDING

SAMPLE CALCULATIONS

WEIR FLOW CALCULATIONS (CONTINUED)

WEIR FLOW AT ELEVATION 792.0 (CONTINUED)

(W3) $Q = 2.68 \cdot 180 \left(\frac{2.3 + 2.7}{2}\right)^{3/2} = 1906.9$

(W4) $Q = 2.68 \cdot 350 \left(\frac{2.7 + 0.4}{2}\right)^{3/2} = 1810.1$

(W5) $Q = 2.68 \cdot 320 \left(\frac{0.4 + 0.8}{2}\right)^{3/2} = 398.6$

(W6) $Q = 2.68 \cdot 270 \left(\frac{0.8 + 1.8}{2}\right)^{3/2} = 1072.5$

(W7) $Q = 2.68 \cdot 240 \left(\frac{1.8 + 0}{2}\right)^{3/2} = 549.2$

(W8) $Q = 2.68 \cdot 175 \left(\frac{0 + 1.0}{2}\right)^{3/2} = 165.8$

TOTAL Q AT ELEVATION 792.0 = 8,827 CFS

2. SUB BASIN S521 (RES 523)

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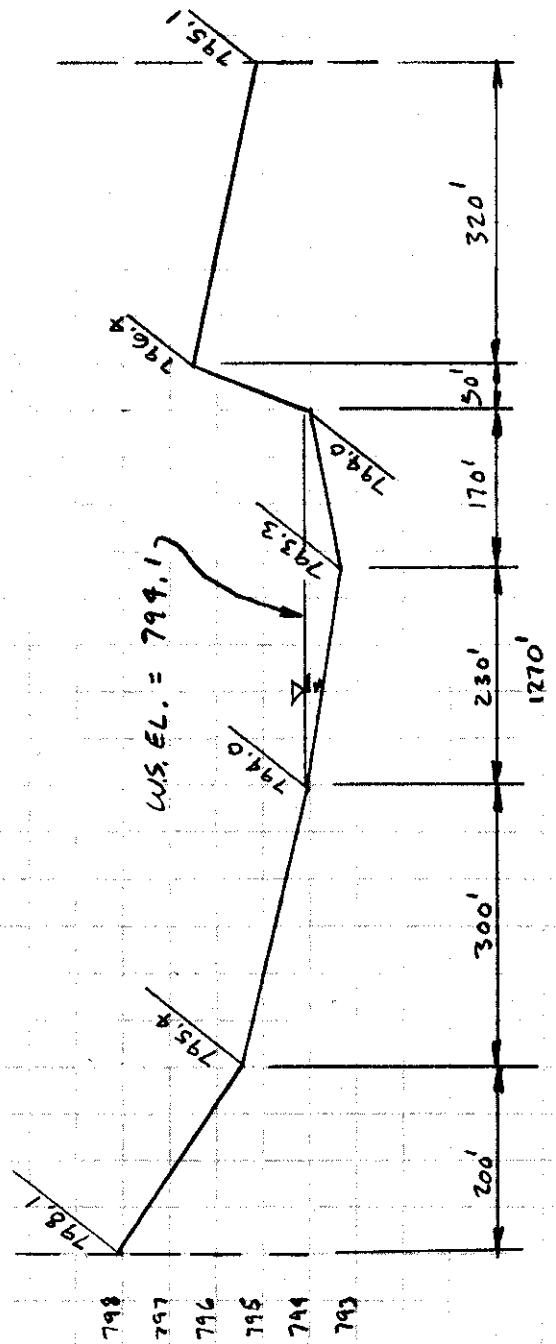
PONDING AT ARLINGTON CANAL
(SUB BASIN 5521)

Q at RES 523



WEIR FLOW RATING CURVE

ELEV	793.3	793.5	793.8	794	794.2
FLOW (Q)	0	10	96	222	329

FOR THE 100 YR, 6HR HEC 1 FLOW OF 285 CFS @ 5521
THE PONDING ELEVATION = 794.1 (BY INTERPOLATION)

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SUB BASIN S 521

RESERVOIR ROUTING

PONDING AT ARLINGTON CANAL (RES 523)

WEIR FLOW CALCULATIONS S 521

ELEV.

793.5 $Q = 2.68 \cdot 66' \left(\frac{0+0.2}{2}\right)^{3/2} = 6$ cfs

793.5 $Q = 2.68 \cdot 49' \left(\frac{0.2+0}{2}\right)^{3/2} = 4$ cfs

793.8 $Q = 2.68 \cdot 164' \left(\frac{0+0.5}{2}\right)^{3/2} = 55$ cfs

793.8 $Q = 2.68 \cdot 121' \left(\frac{0.5+0}{2}\right)^{3/2} = 41$ cfs 55+41 = 96 cfs

794.0 $Q = 2.68 \cdot 230' \left(\frac{0.7+0}{2}\right)^{3/2} = 128$ cfs

794.0 $Q = 2.68 \cdot 170' \left(\frac{0+0.7}{2}\right)^{3/2} = 94$ cfs 128+94 = 222 cfs

794.2 $Q = 2.68 \cdot 230' \left(\frac{0+0.9}{2}\right)^{3/2} = 186$ cfs

794.2 $Q = 2.68 \cdot 170' \left(\frac{0.9+0}{2}\right)^{3/2} = 138$ cfs

794.2 $Q = 2.68 \cdot 43' \left(\frac{0+0.2}{2}\right)^{3/2} = 4$ cfs

794.2 $Q = 2.68 \cdot 4' \left(\frac{0.2+0}{2}\right)^{3/2} = 1$ cfs

TOTAL Q @ 794.2 = 186+138+4+1
= 329 cfs

3. SUB BASIN S525 (RES 529)

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project LUKE WASH F.I.S.

Project No. 1090-070

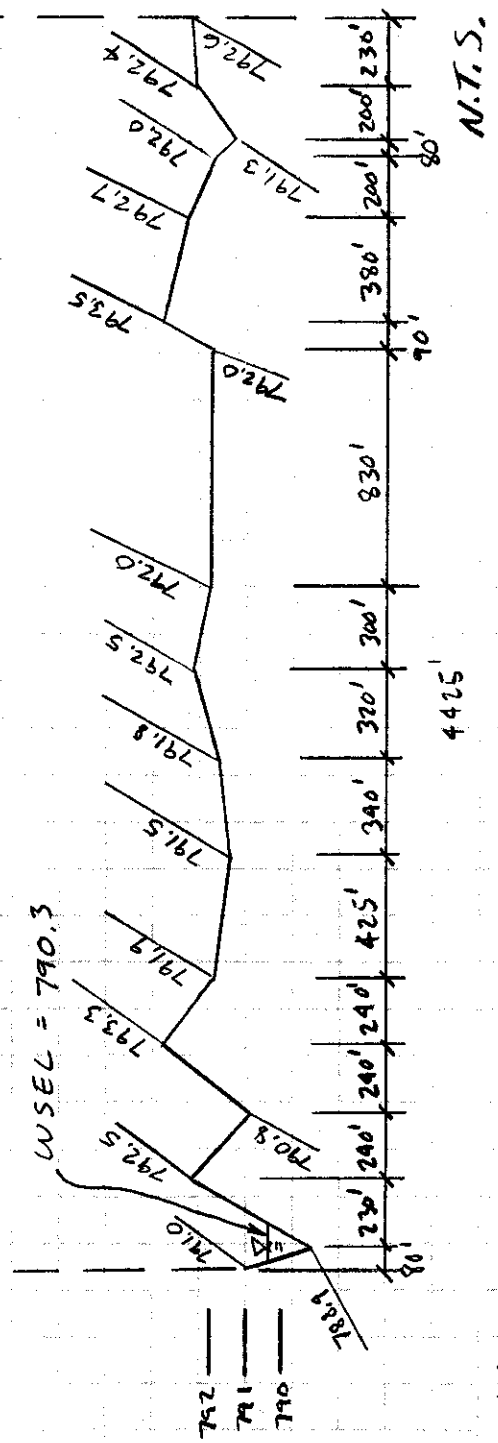
Sheet No. 1 of 3

Calculated by DB Date 8-26-92

Checked by _____ Date _____

PONDING AT ARLINGTON CANAL
(SUB BASIN SS25)

(Q at RESS29)



WEIR FLOW RATING CURVE

	1				
	ELEV	788			
RS	1.2	6.7	12.7	16.4	18.3	20.2	21.8
SA	788	788.9	790	791	791.5	792	792.5
SE	0	0	123	622	1170	2511	6360
SQ							

FOR THE 100 YR, 6 HR HEC 1 FLOW OF 280 cfs cfs AT RESS29 - THE PONDING ELEVATION = 790.3 (BY INTERPOLATION).

4550 NORTH 12TH STREET • PHOENIX, ARIZONA 85014 • PHONE (602) 264-6831

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Project LUKE WASH
Project No. 1090-07
Sheet No. 2 of 3
Calculated by DB Date
Checked by Date

RESERVOIR ROUTING (RES529)

PONDING AT ARLINGTON CANAL (SUB BASIN 525)

WEIR FLOW CALCULATIONS $Q = C \cdot L \cdot H^{3/2}$
(SEE THE DESCRIPTION OF THE COMPONENTS OF THE EQUATION IN THE CALCULATIONS FOR SUBBASIN S 530)

790 $Q_{790} = 2.68(41.9)\left(\frac{0+1.1}{2}\right)^{3/2} = 46$ cfs

790 $Q_{790} = 2.68(70.3)\left(\frac{1.1+0}{2}\right)^{3/2} = 77$ cfs

46 + 77 = 123 cfs

791 $Q_{791} = 2.68(80)\left(\frac{0+2.1}{2}\right)^{3/2} = 231$ cfs

791 $Q_{791} = 2.68(134.2)\left(\frac{2.1+0}{2}\right)^{3/2} = 387$ cfs

791 $Q_{791} = 2.68(28.2)\left(\frac{0+.2}{2}\right)^{3/2} = 2$ cfs

791 $Q_{791} = 2.68(19.2)\left(\frac{.2+0}{2}\right)^{3/2} = 2$ cfs

231 + 387 + 2 + 2 = 622

791.5 $Q_{791.5} = 2.68(80)\left(\frac{0.5+2.6}{2}\right)^{3/2} = 414$ cfs

791.5 $Q_{791.5} = 2.68(166)\left(\frac{2.6+0}{2}\right)^{3/2} = 659$ cfs

COE & VAN LOO
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LANDSCAPE ARCHITECTURE

Project LUKE WASH
Project No. 1090-07
Sheet No. 3 of 3
Calculated by DB Date
Checked by Date

RESERVOIR ROUTING (RES529)

PONDING AT ARLINGTON CANAL (SUB BASIN 525)
WEIR FLOW CALCULATIONS (CONT)

791.5 $Q_{791.5} = 2.68(22.9)\left(\frac{0+0.2}{2}\right)^{3/2} = 2$ cfs

791.5 $Q_{791.5} = 2.68(36.4)\left(\frac{0.2+0}{2}\right)^{3/2} = 3$ cfs

791.5 $Q_{791.5} = 2.68(98.8)\left(\frac{0+0.7}{2}\right)^{3/2} = 55$ cfs

791.5 $Q_{791.5} = 2.68(67.2)\left(\frac{0.7+0}{2}\right)^{3/2} = 37$ cfs

414 + 659 + 2 + 3 + 55 + 37 = 1170 cfs

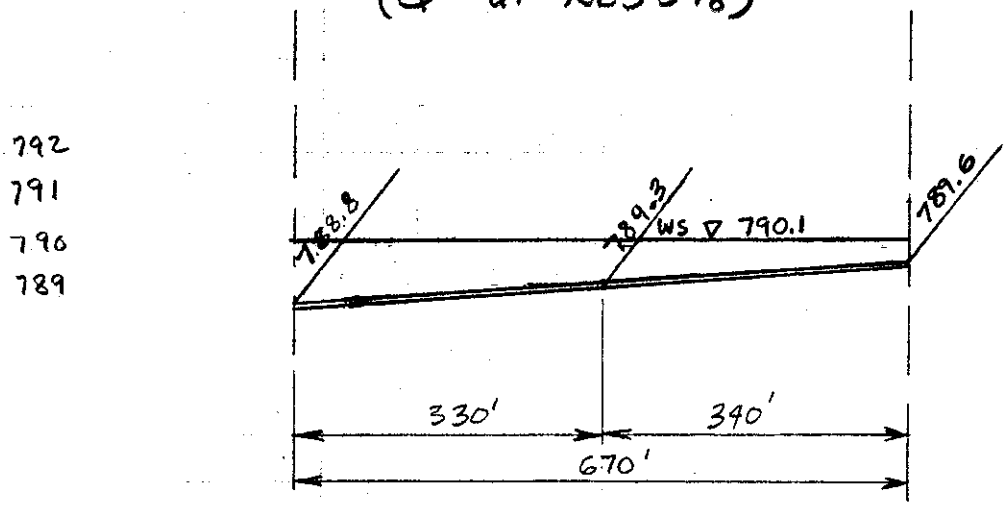
4. SUB BASIN S570 (RES 578)

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

Project LUKE WASH
Project No. 1090-070
Sheet No. 1 of 2
Calculated by DB Date 8-92
Checked by _____ Date _____

PONDING AT ARLINGTON CANAL (SUB BASIN 570)

(Q at RES 578)



WEIR FLOW
RATING CURVE

RS	1	ELEV	785.6				
SA	0	0.5	1.8	2.0	2.1	2.2	2.4
SE	785.6	787	788.8	789.2	789.6	790	791
SQ	0	0	0	03	414	1191	4166

FOR THE 100 YR, 6 HR HEC 1 FLOW OF 1565 cfs @ RES 578 – THE PONDING ELEVATION = 790.1 (BY INTERPOLATION)

COE & VAN LOO
PLANNING • ENGINEERING
LANDSCAPE ARCHITECTURE

SUBBASIN S570

Project LUKE WASH
Project No. 1090-070
Sheet No. 2 of 2
Calculated by DB Date 2-4-92
Checked by _____ Date _____

RESERVOIR ROUTING
PONDING AT ARLINGTON CANAL (RES 578)

WEIR FLOW CALCULATIONS

$Q = C \cdot L \cdot H^{3/2}$ (SEE DESCRIPTION OF THE COMPONENTS OF THE EQUATION IN THE CALCULATIONS FOR SUB BASIN S530)

789.2 $Q_{789.2} = 2.68(264)\left(\frac{0.4+0}{2}\right)^{3/2} = 63$ cfs

789.6 $Q_{789.6} = 2.68(330)\left(\frac{0.8+0.3}{2}\right)^{3/2} = 361$ cfs

789.6 $Q_{789.6} = 2.68(340)\left(\frac{0.3+0}{2}\right)^{3/2} = 53$ cfs

TOTAL @ EL. 789.6 = 361 + 53 = 414 cfs

790 $Q_{790} = 2.68(330)\left(\frac{1.2+0.7}{2}\right)^{3/2} = 819$ cfs

790 $Q_{790} = 2.68(340)\left(\frac{0.7+0.4}{2}\right)^{3/2} = 372$ cfs

TOTAL @ EL 790.0 = 819 + 372 = 1191 cfs

791 $Q_{791} = 2.68(330)\left(\frac{2.2+1.7}{2}\right)^{3/2} = 2408$ cfs

791 $Q_{791} = 2.68(340)\left(\frac{1.7+1.4}{2}\right)^{3/2} = 1758$ cfs

TOTAL @ EL 791 = 2408 + 1758 = 4166 cfs

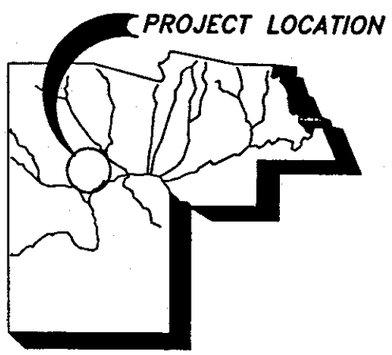
SECTION VIII

FLOODPLAIN DELINEATION MAPS

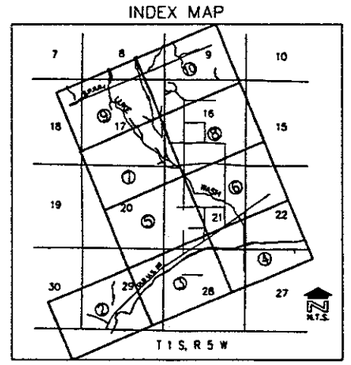
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

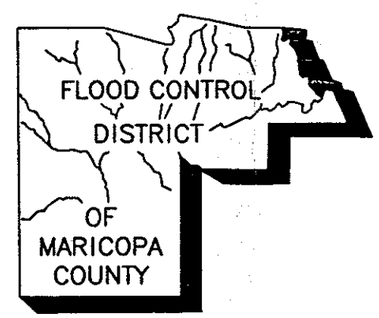
FLOODPLAIN DELINEATION MAPS
FOR
LUKE WASH FLOOD INSURANCE STUDY
GILA RIVER TO THE SOUTHERN PACIFIC RAILROAD

CONTRACT FCD 90-68



INDEX MAP

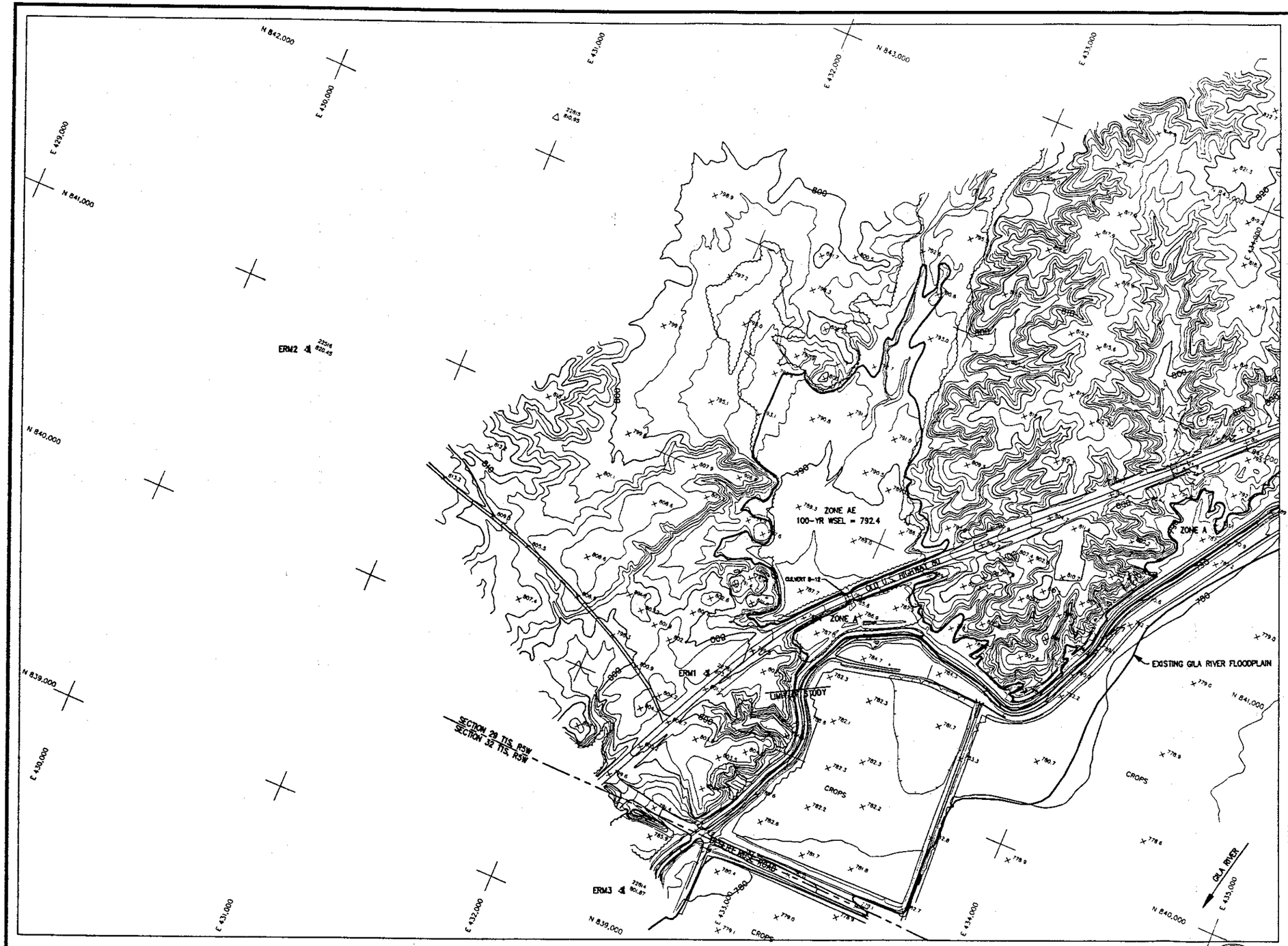




REDUCED COPY
DO NOT SCALE

COE & VAN LOO, INC.			
DESIGN	BY DB	DATE 3/93	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JM	3/93	RECOMMENDED BY: FCDMC DATE 5/93
PLANS	PP	3/93	APPROVED BY: FEMA DATE 7/93
PLANS CHK.	JM	3/93	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY: Jack K. Moody, P.E. DATE: 3/93			SHEET 1 OF 10

COE & VAN LOO JOB # 1090-07



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

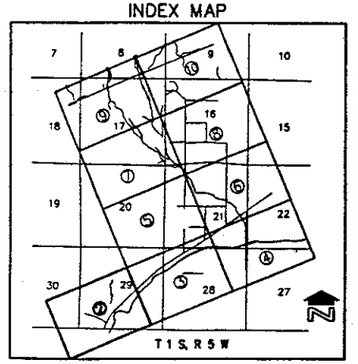
I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 1	803.726	Std. brass disk set in a 6" iron pipe. 40' W of CL of Old U.S. 80, 600' +/- N of Desert Rose Rd. F.E. of R/W Fence.
ERM 2	820.606	Geo. cap on 2" iron pipe set by C.O.E., 0.4 mi. W of Old U.S. 80 on dirt rd. 50' N of dirt rd. on very small sand hill.
ERM 3	802.027	1/2" rebar, 400' +/- E of Old U.S. 80, 400' +/- S of Desert Rose Rd. In NW1/4 Sec. 32 T1S, R5W.

NOTES

UNITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

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COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
PLANS CHK.	JM	3/93
SUBMITTED BY: Jack K. Moody, P.E.		DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 2 OF 10

ADMUNG REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

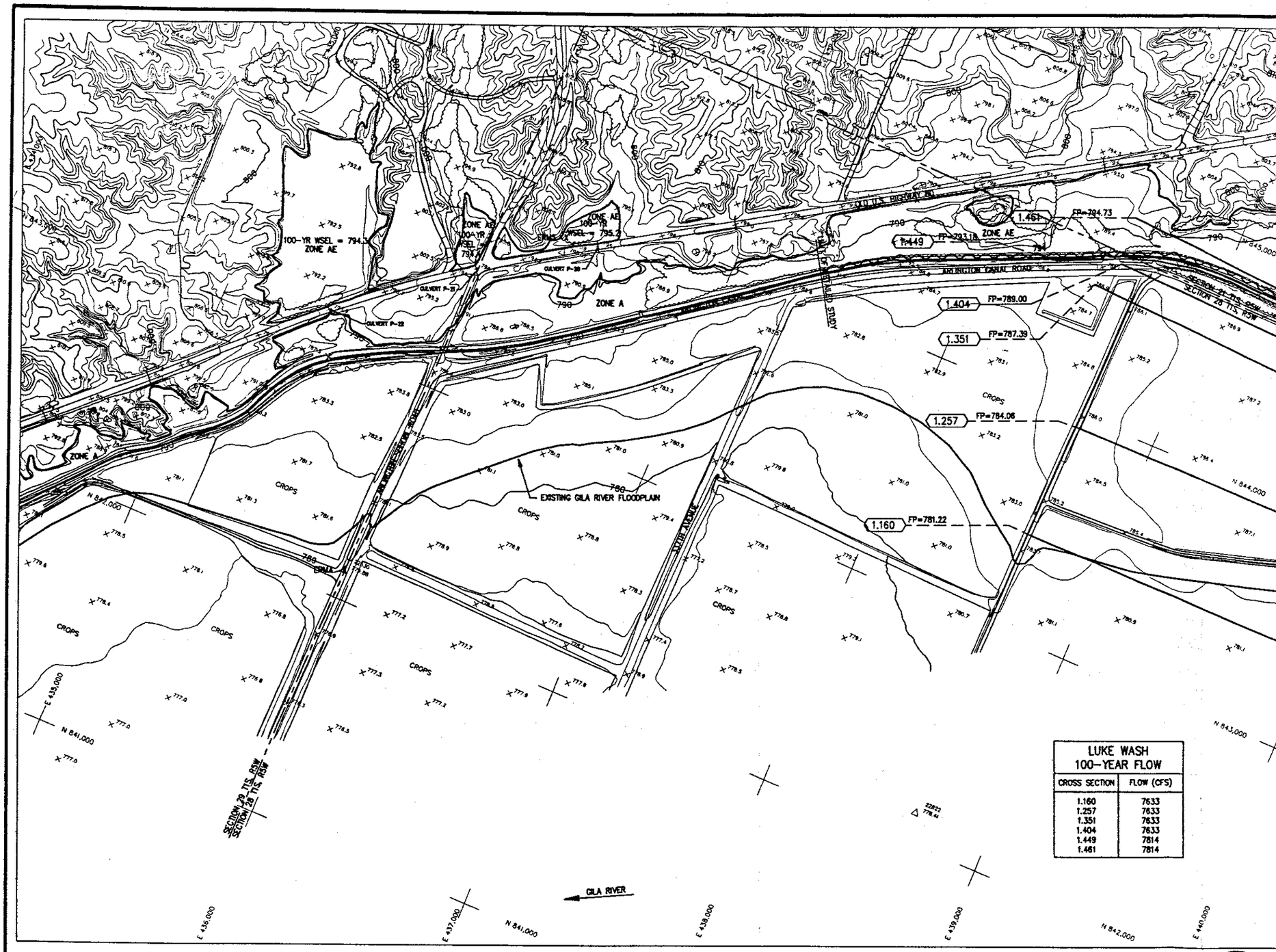
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
1.160	7633
1.257	7633
1.351	7633
1.404	7633
1.449	7814
1.461	7814

REDUCED COPY
DO NOT SCALE

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

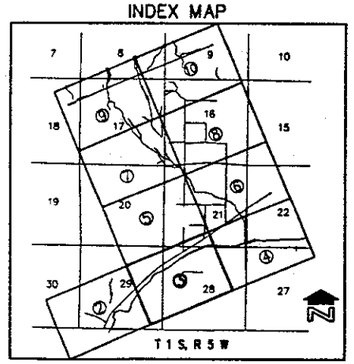
I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 4	779.288	Maricopa City brass cap in pot hole 0.25ft below surface in Arlington School Rd., 1400' +/- S. of Old U.S. 80. E. 1/4 Cor. Sec. 29 T1S, R5W.
ERM 5	783.638	Std. brass disk set in concrete pedt. 40' N. of the Ct. of Old U.S. 80, 1' S. of R/W fence, 410' +/- E. of Arlington School Rd.

NOTES

LIMITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
PLANS CHK.	JM	3/93

SUBMITTED BY: Jack K. Woody, P.E. DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

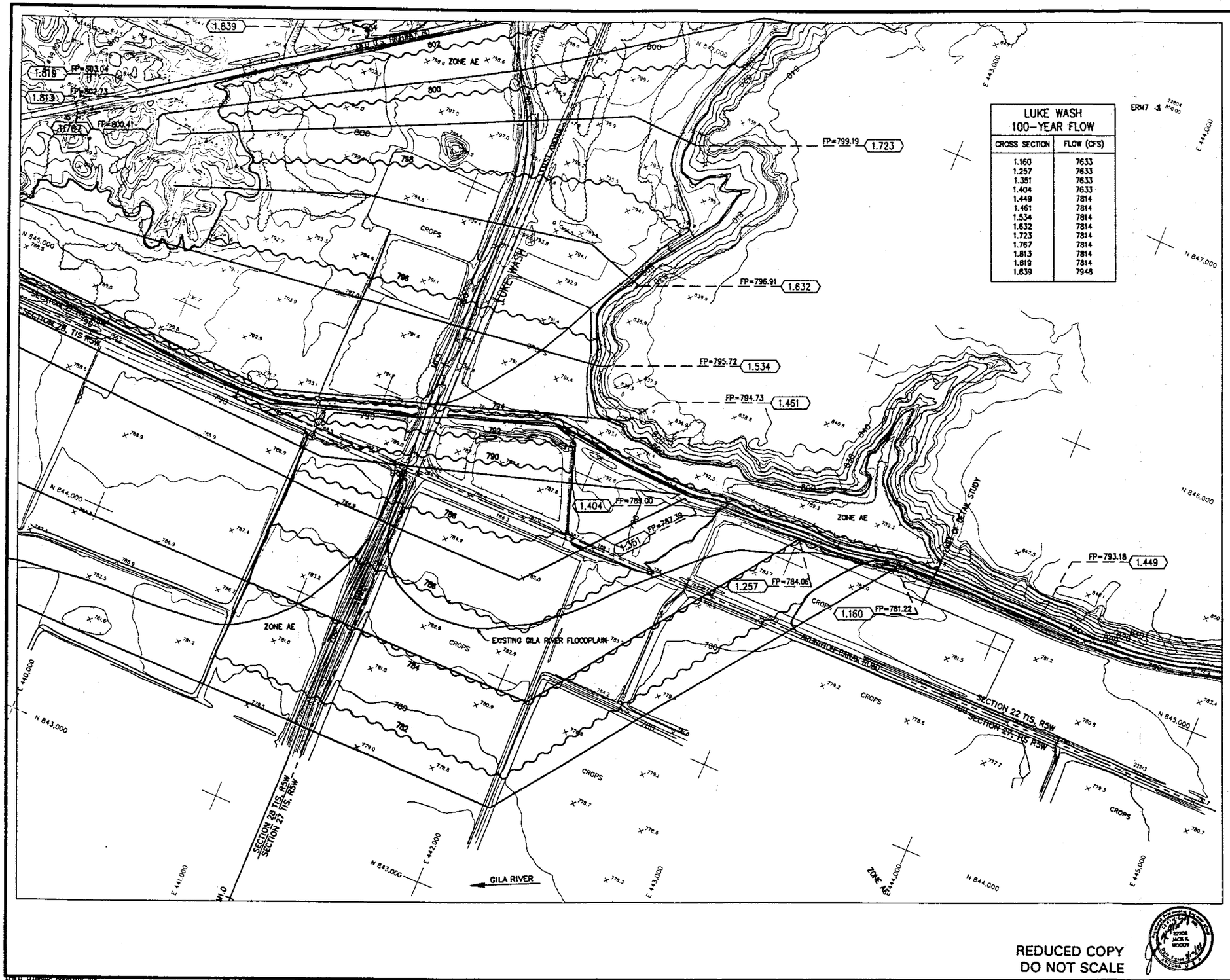
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 3 OF 10

ADMLMB REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
1.160	7633
1.257	7633
1.351	7633
1.404	7633
1.449	7814
1.461	7814
1.534	7814
1.632	7814
1.723	7814
1.767	7814
1.813	7814
1.819	7814
1.839	7948

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

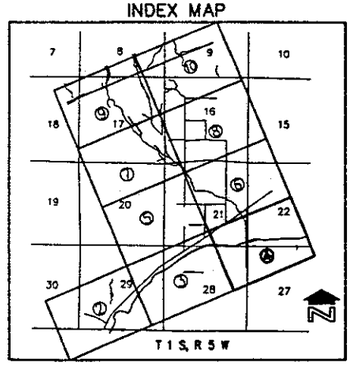
I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 8	795.703	Copperfield rod in hand hole at the intersection of 33rd Ave. & Arlington Canal Rd.
ERM 7	850.001	1/2" rebar 800' +/- S. of Old U.S. 80, 500' E of 327th Ave, on S. side of small wash in NW1/4 Sec. 22, T1S, R5W.

NOTES

LIMITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

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COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	FP	3/93
PLANS CHK.	JM	3/93

SUBMITTED BY: Jack K. Moody, P.E. DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

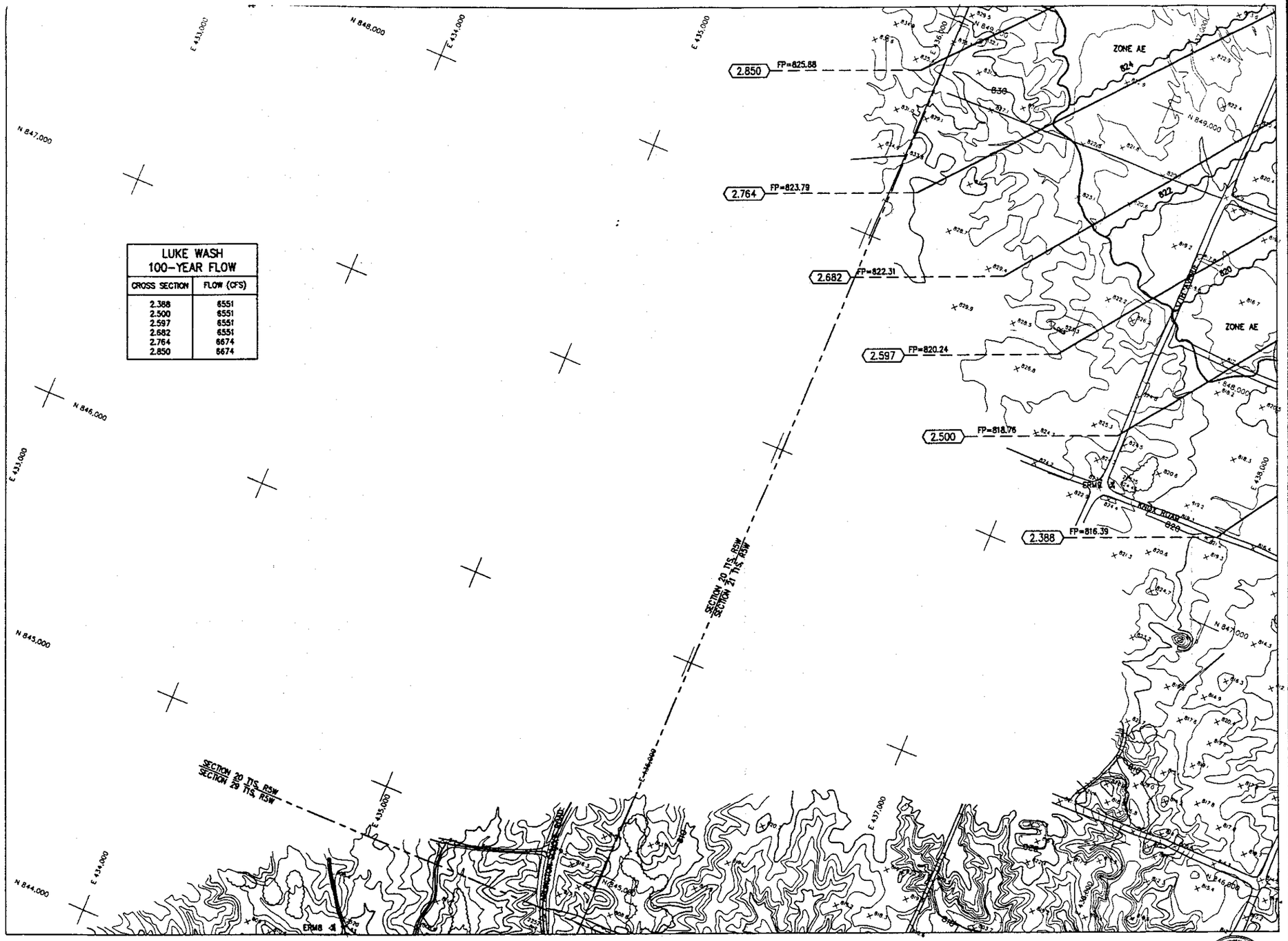
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 10

ADALWRB REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
2.388	6551
2.500	6551
2.597	6551
2.682	6551
2.764	6674
2.850	6674

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

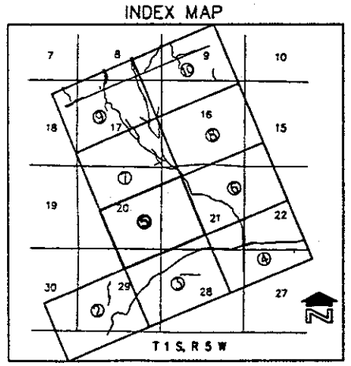
I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 8	801.527	"+" on cement pad, 1300' +/- on dirt rd. NW of Old U.S. 80 & Arlington School Rd. 150' NE of trailer house in bottom of drwy.
ERM 9	824.462	1/2" rebar, NE corner of intersection Knox Rd. & 337th Ave. approx. 30' N. & 30' E. of edge of rd.

NOTES

LIMITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

INDEX MAP



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CONTOUR INTERVAL = 2' FEET

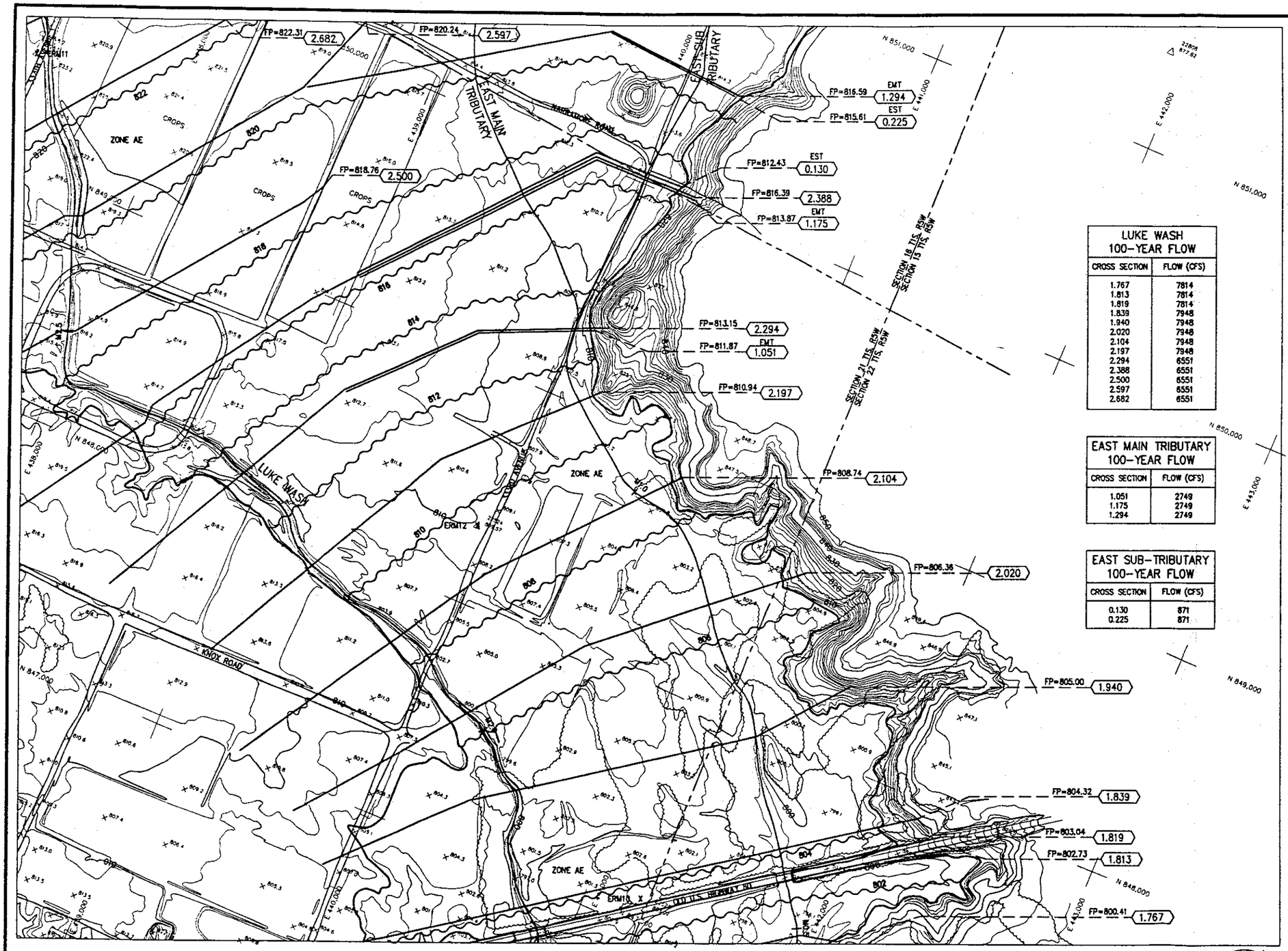
COE & VAN LOO, INC.

	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN	DB	3/93	
DESIGN CHK.	JM	3/93	RECOMMENDED BY: FCDMC DATE 5/93
PLANS	PP	3/93	APPROVED BY: FEMA DATE 7/93
PLANS CHK.	JM	3/93	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY: Jack K. Moody, P.E. DATE: 3/93			SHEET 5 OF 10

ADMLAN66 REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



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LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
1.767	7814
1.813	7814
1.819	7814
1.839	7948
1.940	7948
2.020	7948
2.104	7948
2.197	7948
2.294	6551
2.388	6551
2.500	6551
2.597	6551
2.682	6551

EAST MAIN TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
1.051	2749
1.175	2749
1.294	2749

EAST SUB-TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
0.130	871
0.225	871

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 10	803.072	Std. brass disk set in concrete post 46' NW of the CL of Old U.S. 80 approx. 40' W. of the CL of 331st Ave.
ERM 11	821.7211	1/2" rebar, 35' +/- W. of 337th Ave., 90' S. of CL of Luke Wash.
ERM 12	809.570	1/2" rebar, 1002' +/- N. of Knox Rd. & 80' +/- W. of 333rd Ave.

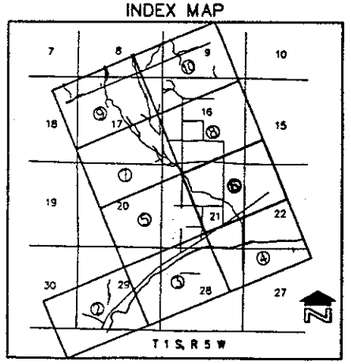
NOTES

LIMITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

EMT = EAST MAIN TRIBUTARY
EST = EAST SUB-TRIBUTARY

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

COE & VAN LOO, INC.

	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN	DB	3/93	
DESIGN CHK.	JM	3/93	RECOMMENDED BY: FCDMC DATE 5/93
PLANS	PP	3/93	APPROVED BY: FEMA DATE 7/93
PLANS CHK.	JM	3/93	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY: Jack K. Woody, P.E. DATE 3/93			SHEET 6 OF 10

ADM.MRD REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

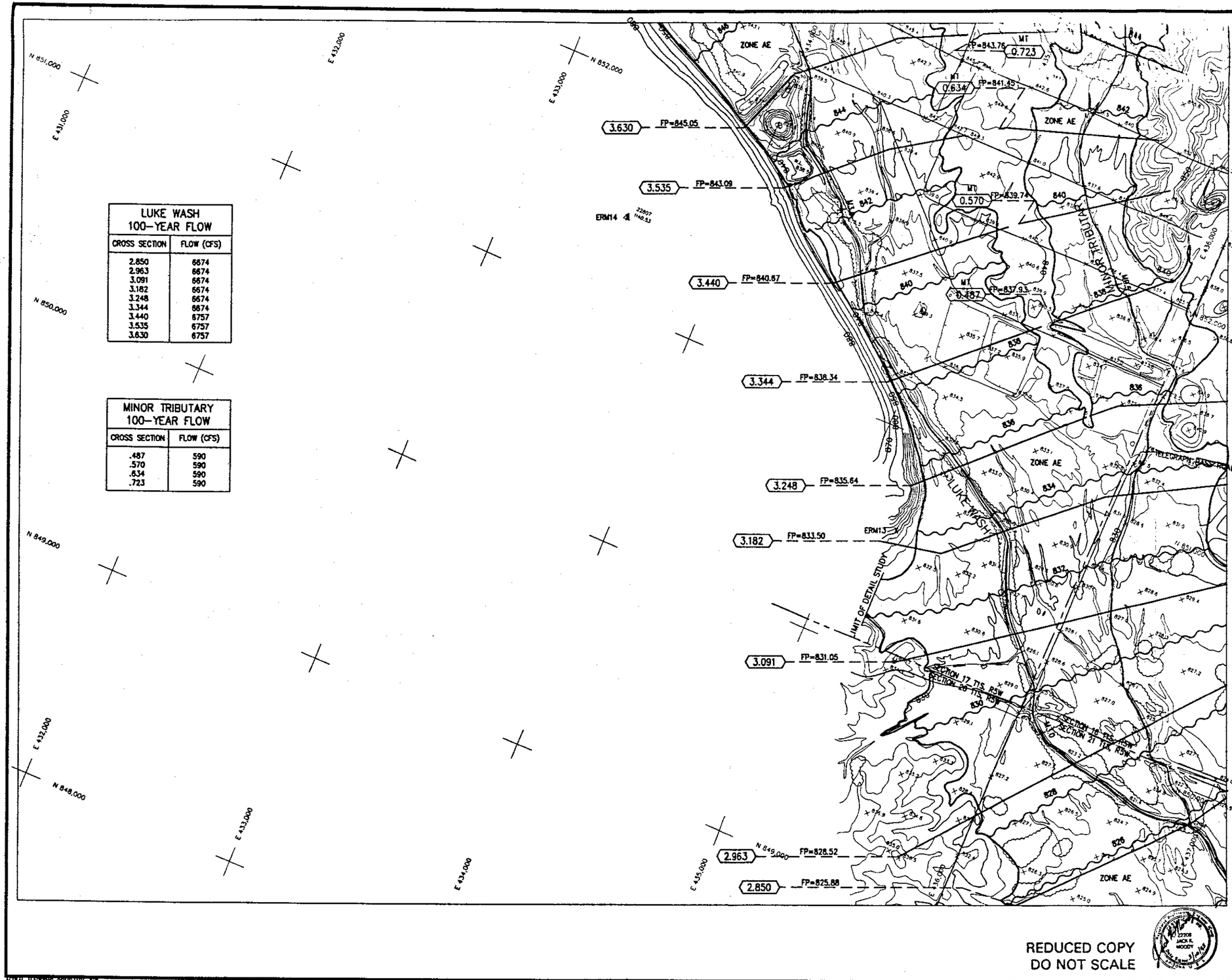
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD REDUCTION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
2.850	6674
2.963	6674
3.091	6674
3.182	6674
3.248	6674
3.344	6674
3.440	6757
3.535	6757
3.630	6757

MINOR TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
.487	590
.570	590
.634	590
.723	590

REDUCED COPY
DO NOT SCALE

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 13	842.431	B.C. set in metapel boulder approx. 3' x 4', 2' out to ground, at end of track road. Point is in SE 1/4 Sec. 17 T1S, R5W
ERM 14	1140.5	Drill hole in metapel boulder on top of Hill located near mid section line of sec. 17 T1S, R5W, 140' +/- N of S 1/4 Sec. 17 on high point of Hill.

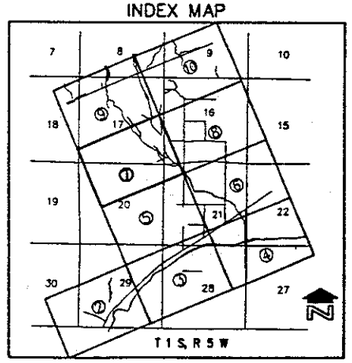
NOTES

LIMITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

MT = MINOR TRIBUTARY

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
PLANS CHK.	JM	3/93

SUBMITTED BY: Jack K. Moody, P.E. DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

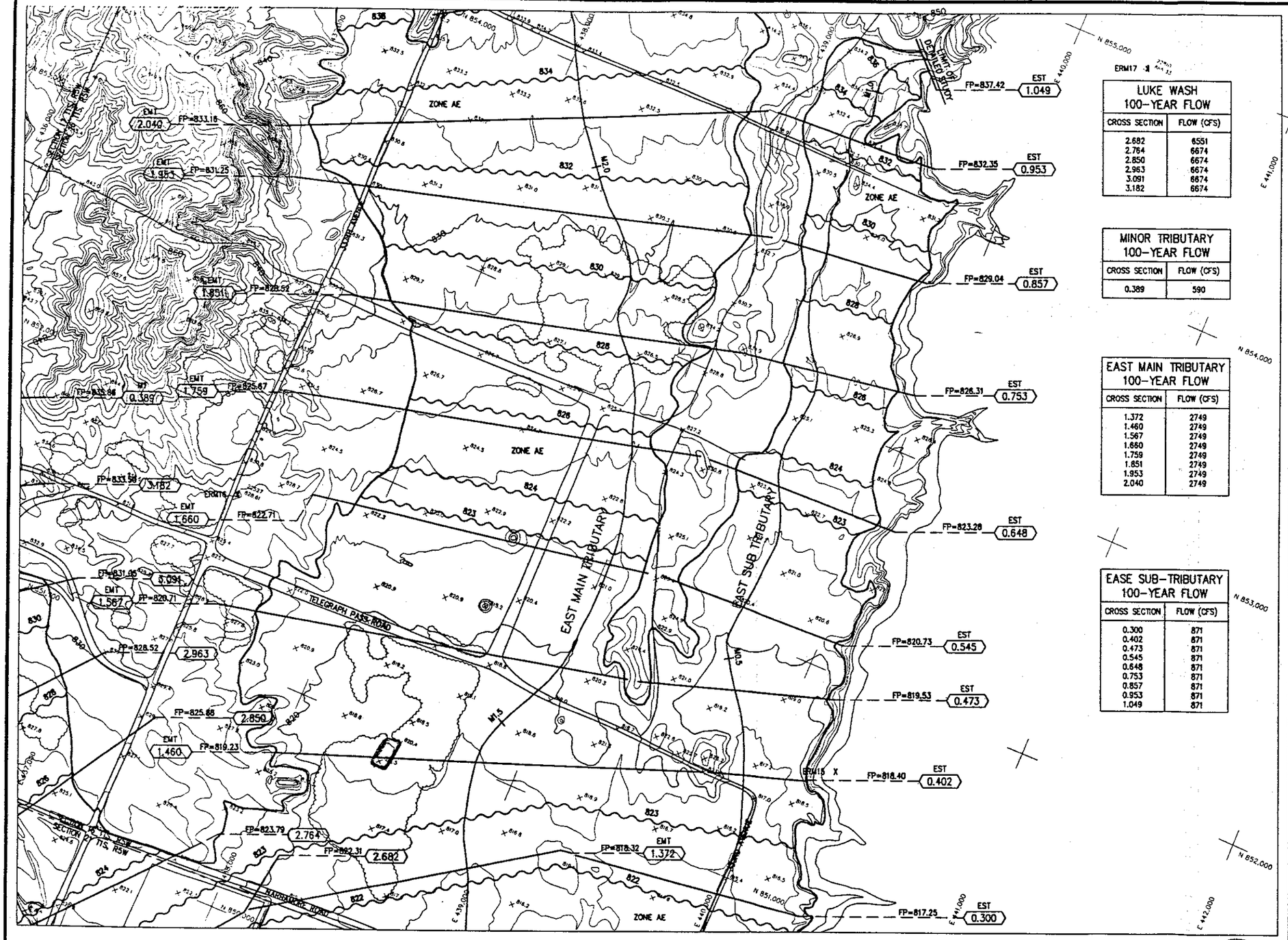
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 7 OF 10

REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1990

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
2.682	6551
2.764	6674
2.850	6674
2.963	6674
3.091	6674
3.182	6674

MINOR TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
0.389	590

EAST MAIN TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
1.372	2749
1.460	2749
1.567	2749
1.660	2749
1.759	2749
1.851	2749
1.953	2749
2.040	2749

EASE SUB-TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
0.300	871
0.402	871
0.473	871
0.545	871
0.648	871
0.753	871
0.857	871
0.953	871
1.049	871

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	(A) FP=100 Yr WSE FW=Floodway WSE (A)
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 15	854.508	B.C. set in metamal boulder 300' +/- E of 333rd Ave. 1500' +/- N. of Narrowns Rd. Pt. is in SE1/4 Sec. 16 T1S, R5W.
ERM 16	828.611	1/2" rebar 1500' +/- N. Narrowns Rd & 337th Ave. on E. side of dirt rd.
ERM 17	865.328	1/2" rebar 900' +/- W & 300' S. of the NEC of Sec. 16, T1S, R5W.

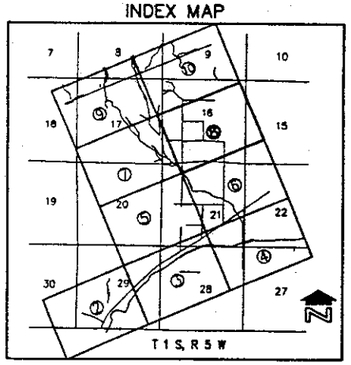
NOTES

UNITS OF THIS FLOOD INSURANCE STUDY ARE WITHIN THE UNINCORPORATED AREAS OF MARICOPA COUNTY.

SECTION LINES SHOWN ARE APPROXIMATE LOCATION ONLY. SURVEY DID NOT INCLUDE LOCATING SECTION CORNERS.

MT = MINOR TRIBUTARY
EMT = EAST MAIN TRIBUTARY
EST = EAST SUB-TRIBUTARY

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

REDUCED COPY
DO NOT SCALE

COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
PLANS CHK.	JM	3/93

SUBMITTED BY: Jack K. Moody, P.E. DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

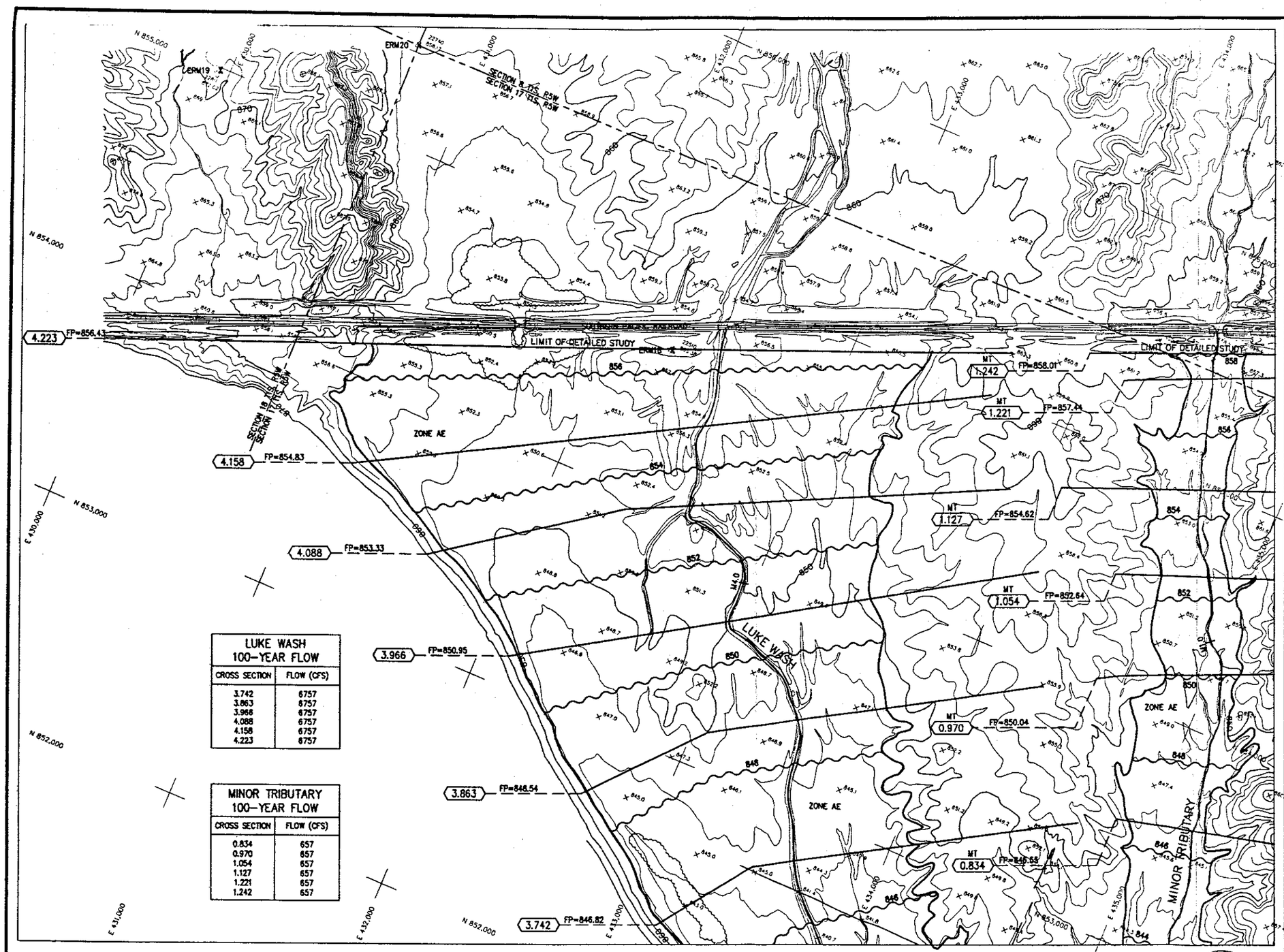
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 10

ADALWRB REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



LUKE WASH 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
3.742	6757
3.863	6757
3.966	6757
4.088	6757
4.158	6757
4.223	6757

MINOR TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
0.834	657
0.970	657
1.054	657
1.127	657
1.221	657
1.242	657

REDUCED COPY
DO NOT SCALE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE / FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 18	857.600	Std. disk on cement post 2.1 ft. out of ground, approx. 300' W of Bridge No. 863.37 (R/R mile post) & 100' +/- S. of R/R track.
ERM 19	872.020	1/2" rebar 900' +/- N. R/R signal light on the E. side of small wash in the NE1/4 Sec. 18, T1S, R5W.
ERM 20	858.280	3/4" iron pipe 1000' +/- NW of R/R Bridge No. 862.90 E. of track dirt trail.

NOTES

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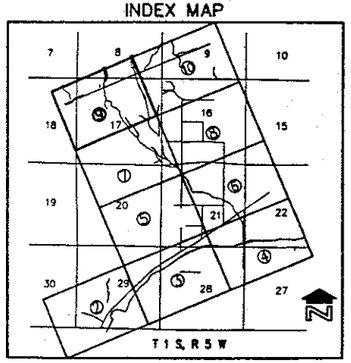
MT = MINOR TRIBUTARY

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
PLANS CHK.	JM	3/93

SUBMITTED BY: Jack K. Moody, P.E. DATE 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

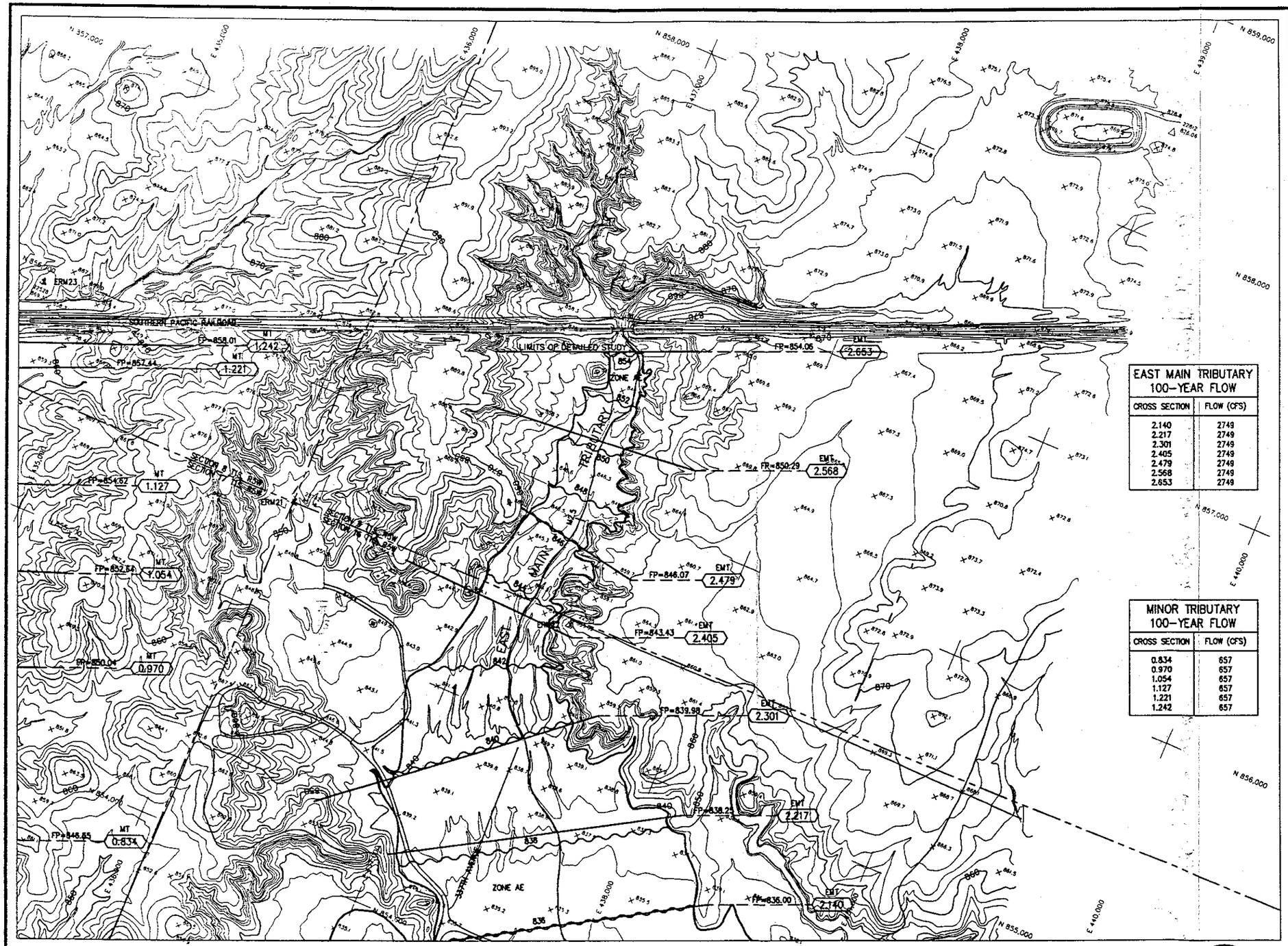
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 9 OF 10

ACALAMB REV. DEC. 10, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1"=200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
DATA PROVIDED BY AERIAL MAPPING COMPANY, INC.



EAST MAIN TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
2.140	2749
2.217	2749
2.301	2749
2.405	2749
2.479	2749
2.568	2749
2.653	2749

MINOR TRIBUTARY 100-YEAR FLOW	
CROSS SECTION	FLOW (CFS)
0.834	657
0.970	657
1.054	657
1.127	657
1.221	657
1.242	657

REDUCED COPY
DO NOT SCALE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF

LUKE WASH F.I.S.

F.C.D. CONTRACT NO. 90-68

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	A FP=100 Yr WSE FW=Floodway WSE A
ELEVATION REFERENCE MARK	ERM3 X
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
ERM 21	852.524	Galv. pipe with cap stamped 5/8 17/16 DV letter PE 148, NWC Sec. 16, T1S, R5W.
ERM 22	860.287	5/8" rebar w/return. cap at the end of 337th Ave. projected on E. bank of wash, 12' S of E. & E. fence. Pt. appears to be 1/16 corner 1/4 mi. E. of the NWC of Sec. 16, T1S, R5W.
ERM 23	869.3032	1/2" rebar 407' E. of R/R Bridge 863.78 125' N. of C.L. R/R tracks on bank.

NOTES

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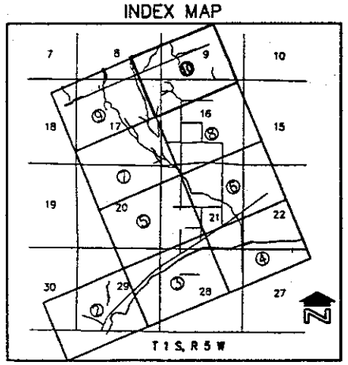
MT = MINOR TRIBUTARY
EMT = EAST MAIN TRIBUTARY

INDEX MAP



200 0' 200 400

CONTOUR INTERVAL = 2' FEET

COE & VAN LOO, INC.

	BY	DATE
DESIGN	DB	3/93
DESIGN CHK.	JM	3/93
PLANS	PP	3/93
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SUBMITTED BY: Jack K. Moody, P.E. DATE: 3/93

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: FCDMC DATE 5/93

APPROVED BY: FEMA DATE 7/93

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 10 OF 10

ADALAMB REV. DEC. 16, 1991

AERIAL MAPPING COMPANY, INC.
SURVEYING AND PHOTOGRAMMETRY
FLIGHT DATE: 9-11-1991

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS
1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY
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