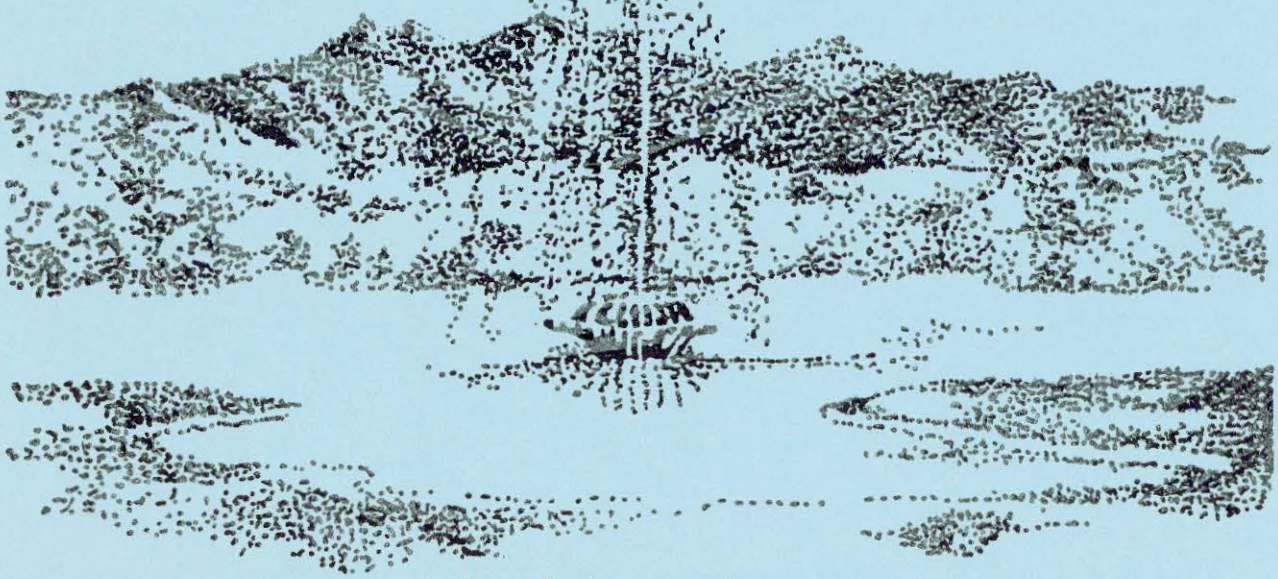
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

FOUNTAIN HILLS NORTH FLOODPLAIN DELINEATION STUDY FCD 92-04

TECHNICAL DATA NOTEBOOK HYDRAULICS

Existing Condition



George V. Sabol Consulting Engineers, Inc.
In Association with McLaughlin Kmetty Engineers, Ltd.
Scottsdale, Arizona

APRIL 1995

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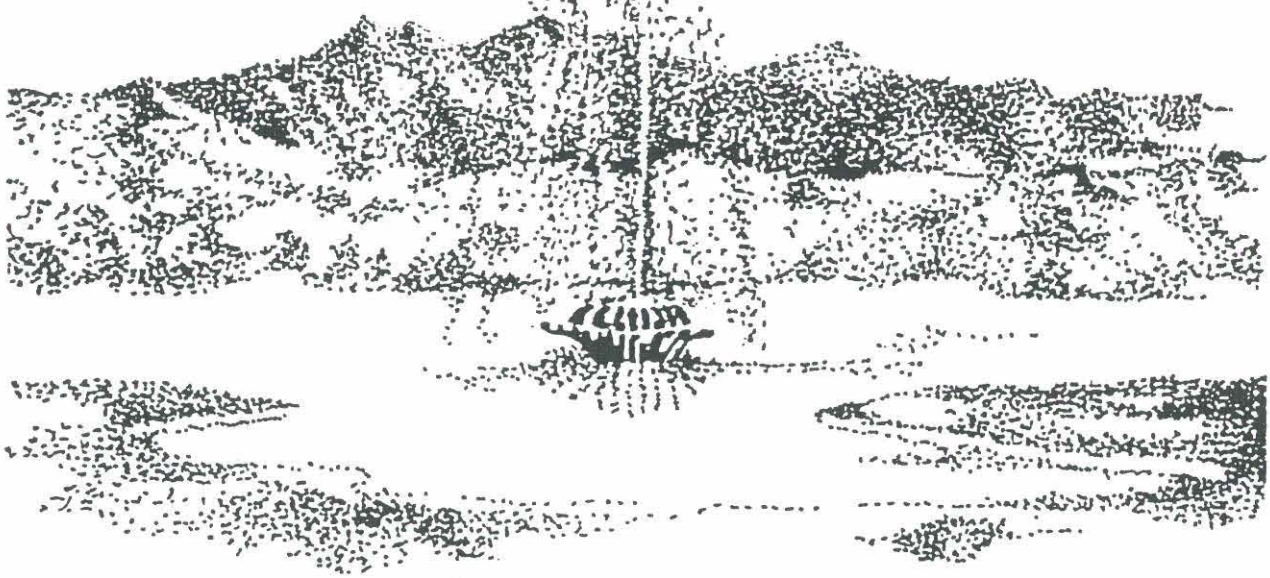

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Scottsdale, Arizona

APRIL 1995

ADDENDUM NUMBER 1

to the

FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY
FCD 92-04

TECHNICAL DATA NOTEBOOK
HYDRAULICS

EXISTING CONDITION

This sheet should be placed immediately following the cover sheet for the Hydraulics Technical Data Notebook (TDN).

This addendum is in response to review comments by the Federal Emergency Management Agency (FEMA) concerning backup calculations for the Zone A floodplain delineations shown on the Floodplain and Floodway Maps, and discussed in TDN Section 4.5 Special Problems.

1. Pages 4-10 through 4-12 are revised and reprinted. No other text changes are made.

2. The calculations to support the special problem analysis (Zone A floodplain delineations) are inserted immediately after the TDN Appendix E tab. No other hydraulic calculations appearing in the TDN are affected by these special problem calculations.

3. Floodplain and Floodway Maps 1 of 10 and 9 of 10 are revised to show some Zone A floodplain revisions and are reprinted. No other map changes are made.

4. The reduced size Floodplain and Floodway Maps 1 of 10 and 9 of 10 appearing in Appendix F are reprinted.

Addendum Number 1 is issued in July 1997.

PREFACE

The Fountain Hills North Floodplain Delineation Study (Contract No. FCD 92-04) was performed for:

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A Elevation Reference Marks
B Survey Field Notes
- Hydraulics Book No. 1
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- Hydraulics Book No. 3
- Hydraulics Book No. 4
- Hydrology Book No. 1

C Manning's n value Determination Calculations
D HY-8 Output for Special Culvert Routine Verification
E HEC-2 Output, Cross Section Plots and Flood Profiles
F Floodplain and Floodway Maps (reduced size)
G Draft Flood Insurance Study Report

LIST OF EXHIBITS

1	Manning's n Value Map	following Page	4-3
2	Culvert Index Map	following Page	4-6

SECTION 1: GENERAL DOCUMENTATION and CORRESPONDENCE

The entire contents of Study Documentation Section 1 are found in "Fountain Hills North Floodplain Delineation Study, Technical Data Notebook, Hydrology".

SECTION 2: MAPPING and SURVEY INFORMATION

2.1 General

The base mapping for the 200 scale floodplain and floodway mapping was provided by the Flood Control District of Maricopa County (District). The mapping covers Sections 2-5, 9-11, 14-16 and a portion of Sections 1, 8 and 17, all in Township 3 North, Range 6 East. The mapping was prepared by Kenney Aerial Mapping in 1991 under a subcontract with Anderson-Nelson, Inc., who was under contract with the Town of Fountain Hills. Horizontal and vertical control was done by Anderson-Nelson, Inc. The aerial photography date is 29 August 1991, and the Kenney Aerial Mapping project number is 910804-1. The mapping was prepared using a Digital Terrain Model (DTM). Reproducible mylars and digital drawings in AutoCAD format are provided by the District. The DTM is based on grid spot elevations using a 75-foot interval, and break lines defining wash flowlines and ridges.

The base topographic mapping used for the Floodplain and Floodway Maps differs in some areas from that used for the hydrology exhibit drawings. The field surveyed check cross sections revealed deficiencies in the mapping accuracy along the washes. The DTM was revised by adding additional photogrammetric spot elevations along flowlines and ridges. The resultant revised mapping was used for the Floodplain and Floodway Maps. The mapping discrepancies were not significant from a hydrologic standpoint; therefore, the base mapping for the hydrology exhibits was not updated.

Surveying for this project, exclusive of that provided by the District, consisted of mapping verification, establishment of elevation reference marks (ERM's), as-built hydraulic structures and supplemental topography. That work was done by Alcocer Land Surveyors.

2.2 Index of Maps

The index of Floodplain and Floodway Maps is contained in Appendix F (reduced scale). Full size copies are bound separately from this report.

2.3 Survey Field Notes

Copies of the survey field notes for elevation reference marks, supplemental topography and mapping verification cross sections are contained in Appendix B.

2.4 Watershed Maps

Refer to Section 3.

2.5 Hydraulic Analysis Maps

The Floodplain and Floodway Maps are contained in Appendix F (reduced scale). Full size copies are bound separately from this report.

2.6 Draft FIRM Maps

Full size copies of the draft Flood Insurance Rate Maps (FIRM) are bound separately from this report.

2.7 Community Maps

The community street layout is shown on the Floodplain and Floodway Maps.

SECTION 3: HYDROLOGIC ANALYSIS

Refer to "Fountain Hills North Floodplain Delineation Study, Technical Data Notebook, Hydrology".

SECTION 4: HYDRAULIC ANALYSIS

4.1 Method Description

There are nine (9) separately named washes within the study area that are designated for detailed study. Those are:

Arrow Wash
Ashbrook Wash
Balboa Wash
Caliente Wash
Escalante Wash
Hesperus Wash
Legend Wash
Oxford Wash
Tulip Wash

The total length of detailed study is approximately 13.1 miles. The summary of discharges is presented in Table 3-1, Appendix G.

The floodplains are analyzed using the US Army Corps of Engineers (COE) HEC-2 Water Surface Profiles Program, version 4.6.2, as implemented by Dodson and Associates, June 1992. The Dodson and Associates program is an enhanced version entitled ProHec-2 and includes plotting capabilities for cross sections and profiles using Auto CAD.

Three (3) washes leave the study area; Ashbrook Wash, Caliente Wash and Escalante Wash. The starting water surface elevations for those washes are obtained using the HEC-2 slope-area method option. The remaining washes are tributaries to other washes. The starting water surface elevations for the remaining washes are based on the previously calculated mainstream water surface elevation.

There is one storm drain system within a study wash. That system is on Arrow Wash between Fountain Hills Boulevard and Palisades Boulevard. The hydraulics of that storm drain are determined by separate hydraulic analysis done as a part of the hydrologic analysis in Section 3. The detailed study of Arrow Wash stops at Palisades Boulevard at the outlet of the storm drain, and recommences upstream from Fountain Hills Boulevard at the inlet to the storm drain, which is a significant ponding area. The starting water surface elevation at this location is based on a level pool water surface elevation calculated by

storage routing using the HEC-1 computer program. Refer to Section 3 for the calculations.

4.2 Parameter Estimation

4.2.1 Manning's n Value

4.2.1.1 General

There are 9 separately named washes contained within the study area, as stated previously. Two of the washes, Balboa/Hesperus and Legend/Tulip, change name without changing flow characteristics, thus there are only 7 separate HEC-2 computer models. The study washes have been separated into reaches that have similar hydraulic characteristics for defining Manning's n value roughness coefficients. Each reach has been identified with a three-character identifier. The identifier starts with the first two letters of the wash name and the third character is the reach number; for example, AS2 is Ashbrook Wash, Reach 2. A list of reach labels is shown on Exhibit 1.

The Exhibit 1 map entitled "Manning's n Value Map" shows reach limits, the location of photographs for each reach and n value estimates. The density of vegetation has significant impact on the roughness coefficient. Vegetation within the floodplain has been identified to include the following:

Brittle Bush
Cactus - Barrel, Cholla, Prickly Pear, Saguaro
Canyon Ragweed
Catclaw
Cottonwood Tree
Creosote Bush
Desert Broom
Desert Hackberry
Desert Willows
Graythorn
Horsebrush
Ironwood
Mesquite
Native Grasses
Ocotillo
Palm tree
Palo Verde Tree
Seep Willow
Triangle Leaf Bursage

Seep Willow
Triangle Leaf Bursage

Unless otherwise noted, the photographs for each reach are arranged in the following sequence:

1 Bed Material	2 Looking upstream or downstream at main channel
3 Left Overbank looking upstream or downstream	4 Right Overbank looking upstream or downstream

Photograph location and direction are shown on Exhibit 1. The photographs for each reach are contained in Appendix C.

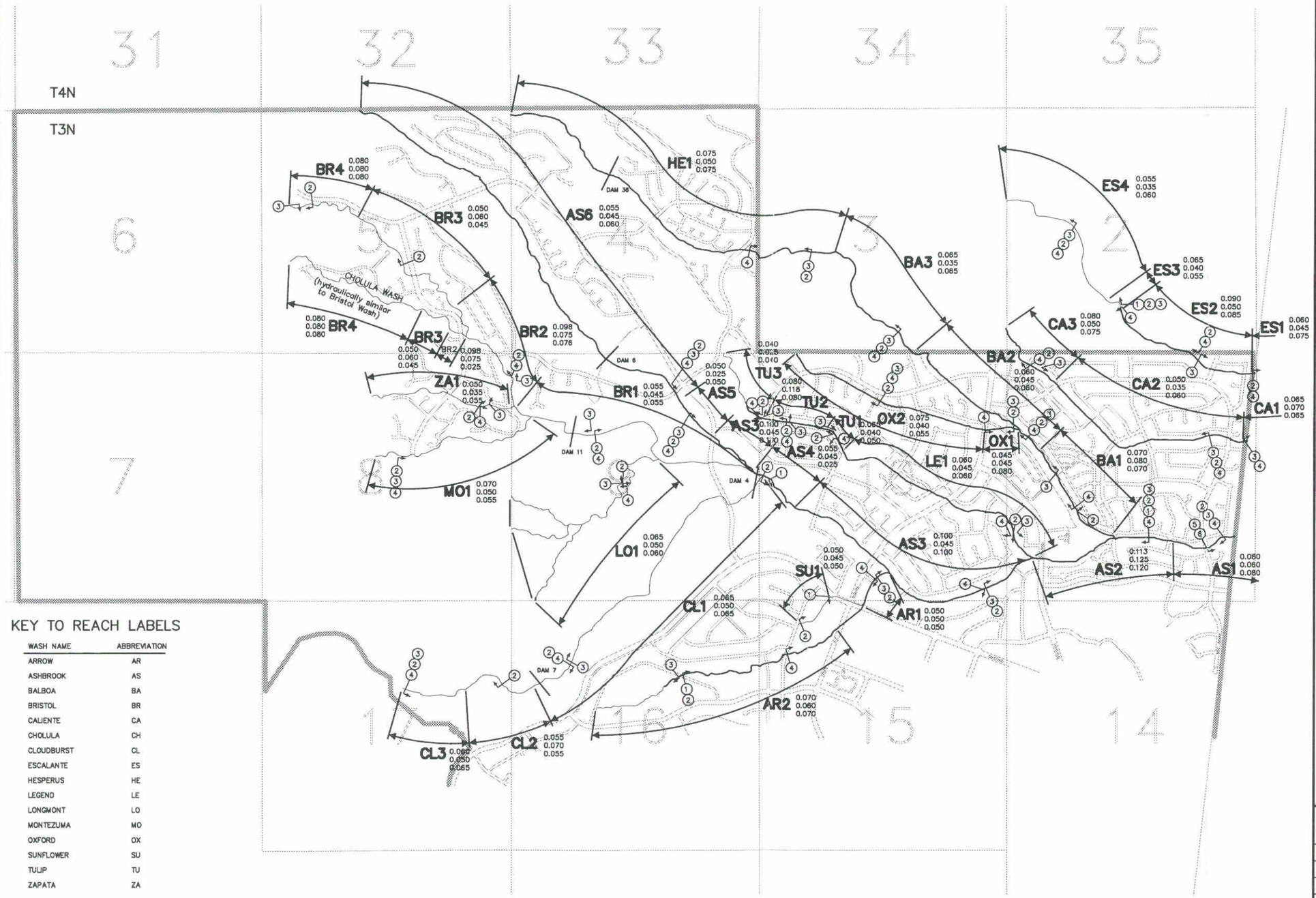
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. 92-04

LEGEND

REACH LABEL	ES2
PHOTO LOCATION AND DIRECTION	③→
HYDRAULIC BASE LINE	
LEFT OVERBANK n VALUE MAIN CHANNEL n VALUE RIGHT OVERBANK n VALUE	0.065 0.040 0.055
HEC-2 HYDRAULIC BASELINE	
NON-HEC2 HYDRAULIC BASELINE	



KEY TO REACH LABELS

WASH NAME	ABBREVIATION
ARROW	AR
ASHBROOK	AS
BALBOA	BA
BRISTOL	BR
CALIENTE	CA
CHOLULA	CH
CLOUDBURST	CL
ESCALANTE	ES
HESPERUS	HE
LEGEND	LE
LONGMONT	LO
MONTEZUMA	MO
OXFORD	OX
SUNFLOWER	SU
TULIP	TU
ZAPATA	ZA

EXHIBIT 1

MANNINGS n VALUE MAP

1000 0' 1000 2000

SCALE: 1"= 2200'±

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

	BY	DATE
DESIGN	F.E.B.	3/94
DESIGN CHK.	D.T.P.	5/93
PLANS	P.J.K.	5/93
PLANS CHK.	F.E.B.	10/94
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 1 OF 1

Dwg. Name \F\FTHILLS\CAD\EX-1.dwg
Date: REV. OCT. 21, 1994 04:00pm

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF **FOUNTAIN HILLS NORTH**

F.C.D. CONTRACT NO. **FCD 92-04**

LEGEND

CULVERT

HEC-1 AND HEC-2 CULVERT — C536

HEC-1 CULVERT ONLY — C509

HEC-2 HYDRAULIC BASELINE

NON-HEC2 HYDRAULIC BASELINE

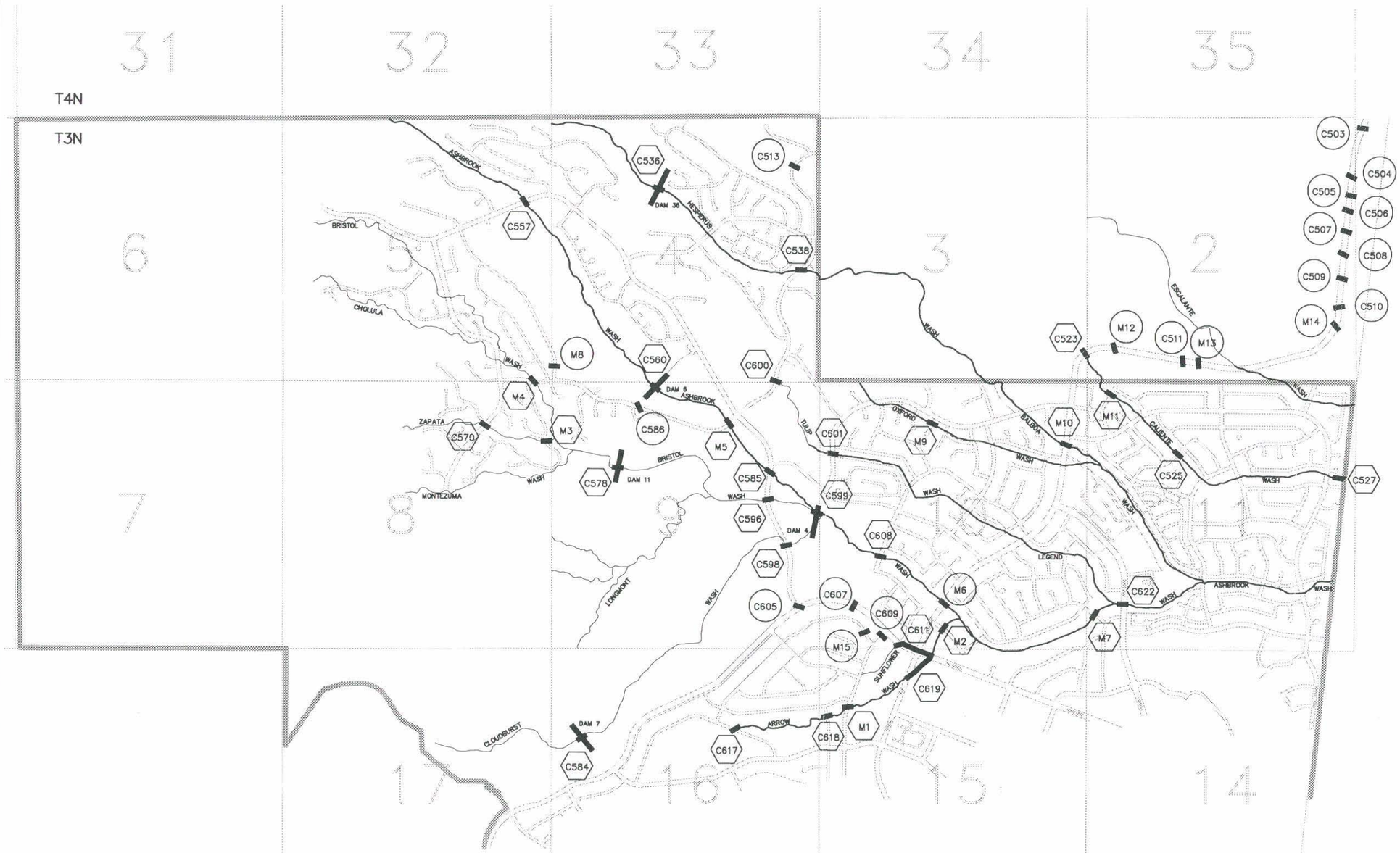


EXHIBIT 2
CULVERT INDEX MAP

1,000' 0' 1,000' 2,000'

SCALE: 1" = 2,200'±

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	BY	DATE
DESIGN	F.E.B.	3/94
DESIGN CHK.	D.T.P.	5/93
PLANS	P.J.K.	3/94
PLANS CHK.	F.E.B.	10/94

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 1 OF 1

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4.2.1.2 Methodology

Each reach was initially identified from the 1 inch = 100 feet aerial photographs. The discerning characteristics were channel size, apparent similarities in bed material, and vegetation. Each reach was photographed during the field reconnaissance phase at representative and accessible locations. The 1 inch = 200 feet topographic base maps were taken to the field to record photograph locations and floodplain characteristics. A representative from the Flood Control District of Maricopa County (District) assisted during some of the field reconnaissance visits.

Manning's roughness coefficients were estimated using the methodology contained in Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona [6.5:13]. Chow's book, Open Channel Hydraulics [6.5:3] was also consulted for background on the USGS methodology and photographs of typical channels showing different n values. The basic methodology is to select a base value of Manning's n for the bed material, and then add adjustments for irregularity, obstructions, vegetation and variations in channel cross section. If sufficient channel meander is present, a multiplier is applied to the n value enumeration. The n value calculations for each reach are contained in Appendix C. Those values are summarized for each wash in Table 3-2, Appendix G.

A plastic grid is shown in many of the photographs. The outside measures 1.5 feet square. The inside grid measures 1.0 feet square, with 1 inch grids. The grid is shown to gain perspective on the size of bed materials and vegetation.

4.2.1.3 n Value Determination

Base Roughness Value

The base n value for bed material roughness was selected utilizing a photograph of the grid on the bed material. The dimensions of the grid allowed determination of the size of the bed material. Throughout the study area, typical values were for 2.5 inch to 10 inch rock, which has an n value range of 0.030 to 0.050. Some reaches had firm soil, coarse gravel or rock larger than 10 inches. Two reaches are lined with riprap for erosion protection. Throughout the study area, n values for the main channel ranged from 0.025 to 0.125.

Adjustments to Base Value

Based upon field reconnaissance data and the photographs, adjustments were added to the base roughness value. Where washes had a low-flow channel, the side slopes were generally slightly eroded.

Obstructions varied from stumps to flood debris to boulders. Vegetation was found mainly outside of the low flow channel. In some instances, the low-flow channel had some scattered bushes growing in it. In general, the channel cross section size and slope varied gradually. There were no washes that had enough meander to warrant an adjustment. Overbank n values ranged from 0.025 to 0.120.

4.2.2 Expansion and Contraction Coefficients

The expansion and contraction coefficients used in the HEC-2 model are determined from the HEC-2 User's Manual [6.5:10]. For gradual transitions, which includes most applications, the contraction and expansion coefficients are set at 0.1 and 0.3, respectively. At culvert locations, these values are set at 0.3 for contraction and 0.5 for expansion.

4.3 Cross Section Description

4.3.1 Channel and Overbank

Prior to obtaining GR records for exact location, the channel bank stations have been approximated from field reconnaissance data. The proposed location of channel bank stations are shown on a sketch contained on the roughness coefficient calculation sheets in Appendix C. The letters "L" and "R" denote the location of the left and right channel bank stations, respectively. In general, the majority of washes have a low-flow channel, with vegetation outside of the low-flow channel. The lower reaches of Ashbrook Wash have a significant amount of trees that are either in the low-flow channel, or line the low-flow channel. There is no appreciable difference in vegetation out to the floodplain edge. Therefore, the majority of reaches for Ashbrook Wash have bank stations set at the edge of the low-flow channel.

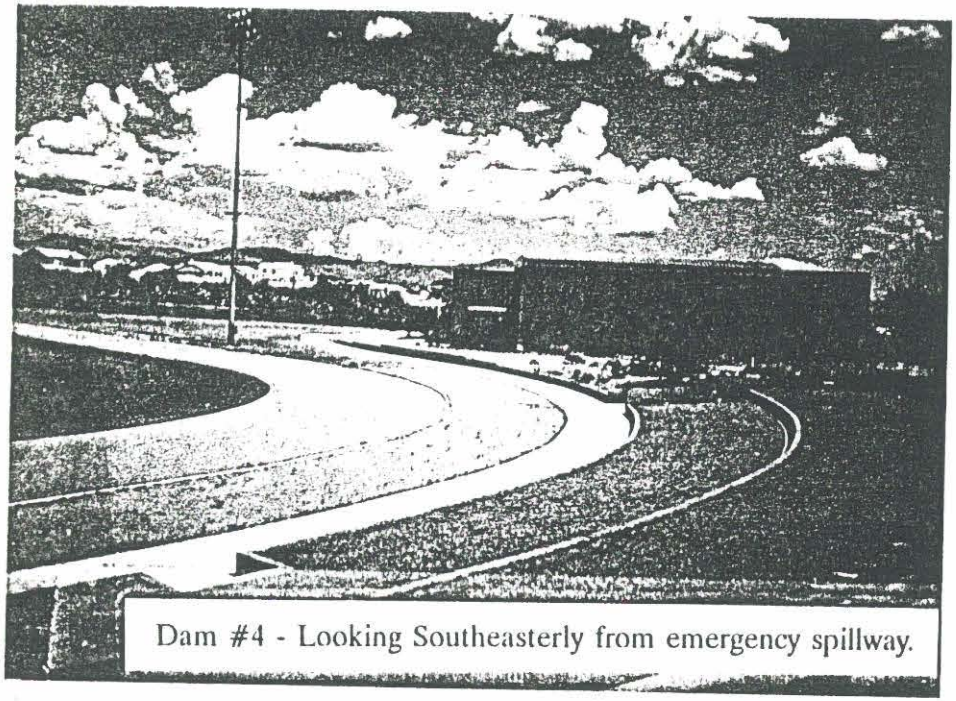
4.3.2 Bridges or Constrictions

4.3.2.1 Minor Hydraulic Structures

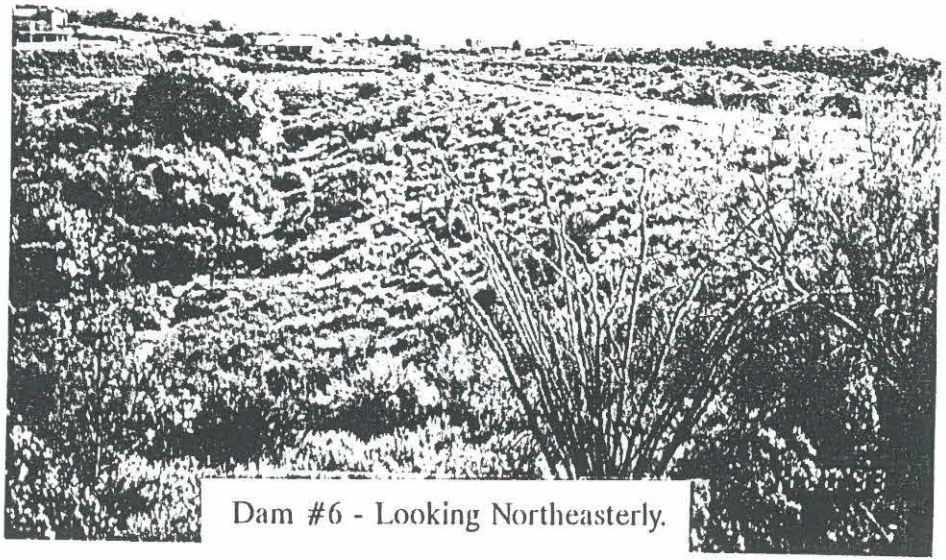
There are no bridges within the study area. Culverts at roadway crossings comprise the constrictions in the floodplain. There are 20 culverts located within study reaches. Culverts range from 18" CMP to multiple barrel concrete box culverts. Many of those culverts would be overtopped during a 100-year storm. Approximately 25% of the culverts appear to have been designed for overtopping. The remaining culverts have the appearance of being stable from scour and from washing out during an overtopping event. Very few culverts are clogged with sediment and debris. On Arrow Wash at Cavern Drive, there is one significantly clogged culvert (Culvert C617) that is ignored for floodplain delineation purposes, and an HEC-2 section along the roadway is used to determine the floodplain. Some culverts have significant upstream storage and are modeled as detention basins using HEC-1 (See Section 3). The culverts within the study area are shown on Exhibit 2.

4.3.2.2 Major Hydraulic Structures

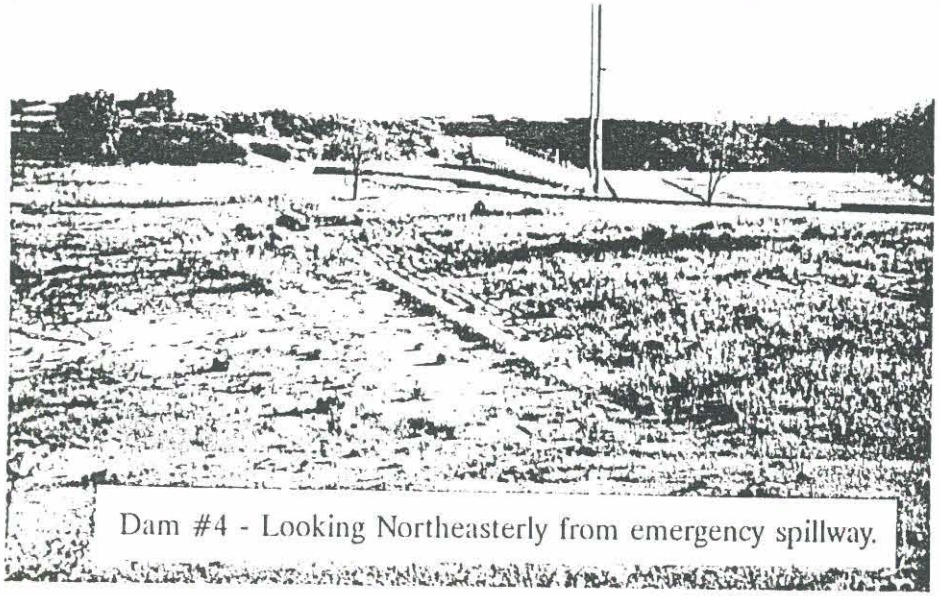
There are three (3) major hydraulic structures, namely Dams #4, 6 and 36, within the study washes. A photograph of each dam is presented following Exhibit 2. The dams were constructed as flood retarding structures to reduce peak flows through the Town of Fountain Hills. The dams were constructed in the 1970's and are regulated by the Arizona Department of Water Resources (ADWR). Each structure was designed to pass the 100-year flow through the principal spillway (culvert) only. The emergency spillway was designed to pass the ½ PMF or full PMF. The hydraulic analyses and a more detailed history of these structures is described in Section 3. The emergency spillway of Dam 4 will operate during the 100-year event (refer to Section 3).



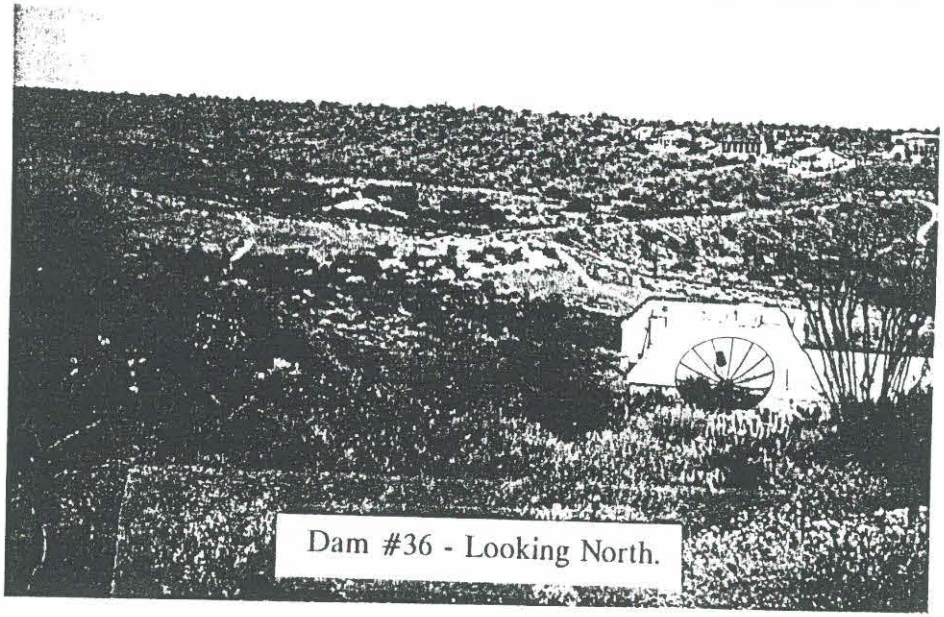
Dam #4 - Looking Southeasterly from emergency spillway.



Dam #6 - Looking Northeasterly.



Dam #4 - Looking Northeasterly from emergency spillway.



Dam #36 - Looking North.

4.4 Calibration

4.4.1 Special Culvert Routine in HEC-2

The HEC-2 Special Culvert Routine results are compared to the results of computer program HY-8 version 4.0 dated 30 April 1992 [6.5:12]. The HY-8 program utilizes standard culvert nomographs, as presented in HDS-5 [6.5:11] by the Federal Highway Administration (FHWA). The HEC-2 computed water surface elevation is compared to the HY-8 computed headwater elevation, and presented in Table 4-1. The computed water surface elevation is variable CWSEL in HEC-2 and is reported as "FP=" on the floodplain maps. The comparison is made for culvert flow only (HEC-2 variable QCULV). When there is roadway overtopping, the HY-8 weir overtopping option is not used, with three exceptions. At three culverts (C622, C557 and C601, see Exhibit 2), the HY-8 weir flow option is activated to more closely resemble the actual flow conditions. The reason this is necessary is that the HEC-2 program does not directly compute culvert exit losses since the expansion coefficient accounts for culvert exit losses. In comparison, the HY-8 program directly computes losses at the culvert exit, which led to significant differences at these three culverts. In summary, there is acceptable comparison between the HEC-2 and HY-8 results, as presented in Table 4-1. The HEC-2 special culvert routine is coded according to direction from the HEC-2 manual and the ProHEC2 manual, utilizing surveyed culvert and weir geometry. The actual tailwater elevation from HEC-2 is used as the tailwater in the HY-8 analysis. There is no reason to doubt the validity of the special culvert routine based upon this comparison with HY-8.

4.4.2 HEC-2 Model Calibration

There is no stream gage data available for the study washes; therefore, calibration of the HEC-2 models is not possible. The mapped floodplain limits are inspected for reasonableness and found to be appropriate.

TABLE 4-1

Summary of HEC-2 Special Culvert Routine Verification

Culvert ID (1)	HEC-2 Cross Section River Mile (2)	HEC-2 Culvert Flowrate cfs (3)	Computed WSEL HEC-2 (4)	Computed WSEL HY8 (5)	Difference in feet (HEC-2 - HY8) (6)	Comment (7)
C622*	AS 2.428	714 *	1586.54	1586.70	-0.16	OK
M7	AS 2.545	654	1594.26	1594.92	-0.66	OK
M6	AS 3.208	18" CMP not modeled in HEC-2.				
C608	AS 3.531	970	1678.39	1678.09	+0.30	OK
C585	AS 4.110	300	1725.23	1725.84	-0.61	OK
M5	AS 4.349	300	1771.68	1771.64	+0.04	OK
C557*	AS 5.563	279 *	1923.04	1923.24	-0.20	OK
M2	AR 0.071	371	1648.33	1648.43	-0.10	OK
C619	AR 0.338	Not modeled in HEC-2, See THYSYS Analysis in Section 3.				
M1	AR 0.583	55	1727.00	1727.404	-0.04	OK
C618	AR 0.672	Plugged, thus not modeled (approx. 9" dia. open).				
C617	AR 1.032	Completely plugged, thus not modeled.				
M10	BA 0.782	328	1633.64	1633.91	-0.27	OK
C538	HE 2.229	261	1790.45	1791.31	-0.86	OK
C527	CA 1.098	80	1532.40	1532.96	-0.56	OK
C525	CA 1.789	360	1601.71	1601.18	+0.53	OK
M11	CA 2.120	280	1636.77	1636.79	-0.02	OK
C523	CA 2.306	257	1659.68	1660.03	-0.35	OK
C601*	TU 1.365	382 *	1716.86	1717.27	-0.41	OK
M9	OX 0.669	289	1685.53	1685.62	-0.09	OK

* Note: HY8 was used to model culverts with the weir flow option activated. There may be discrepancies between culvert flowrates as reported by HY8 and HEC-2 due to different calculation methods for exit losses.

4.4.3 Flow Splits

Balboa Wash at Fountain Hills Boulevard is the location of a flow split. The culvert under the road is inadequate to pass the 100-year flow, and overtopping flows enter Fountain Hills Boulevard and travel south to Oxford Wash. The overtopping flow (400 cfs) is subtracted from the peak discharge in Balboa Wash downstream of Fountain Hills Boulevard and added to Oxford Wash at River Mile 0.129. Based upon field reconnaissance, it is possible that some of the overtopping flow travels down Kings Way, thus Kings way is depicted as Zone A on the flood maps. Due to the presence of dwelling units at the northeast corner of Oxford Wash and Fountain Hills Boulevard, adding all of the overtopping flow to Oxford Wash is the hydraulically most conservative approach. Those dwelling units are outside the Zone A or AE floodplain, and are within a Zone X floodplain.

Other flow splits within the study area consist of runoff at street crossings diverging from the wash and flowing down a parallel street a short distance back to the wash. This type of situation is discussed in Section 4.5.

4.5 Special Problems

There are eight buildings within the Zone AE or Zone A floodplain. Split flows occurring at some street crossings result in a Zone A floodplain. There are sixteen buildings within a Zone X floodplain due to the surrounding flood waters. Access during flooding would be limited for building occupants in Zone X areas. Calculations outside of the HEC-2 analyses determine the limits of the Zone A floodplain, and are found at the start of Appendix E. The following items describe buildings in the floodplain, buildings in a Zone X floodplain and/or the Zone A floodplain areas.

1. Hesperus Wash at Boulder Drive: An existing sewage lift station building is within a Zone AE floodway due to roadway overtopping. Refer to Floodplain and Floodway Map 3 of 10.

2. Upstream of Oxford Wash and Fairlynn Drive: Two residential buildings along Oxford Wash upstream of Fairlynn Drive are in the fringe of the 100-year floodplain (Zone AE, depicted on Floodplain and Floodway Map 6 of 10).

3. Ashbrook Wash at Golden Eagle Boulevard: This area is depicted on Floodplain and Floodway Map 1 of 10. The existing culvert is inadequate to convey the 100-year flow, and Golden Eagle Boulevard would be overtopped by 1600 cfs. A combination of weir flow calculations and the Manning's formula are utilized to

determine the hydraulic characteristics. The majority of the overtopping flow (1360 cfs) would return to Ashbrook Wash in the vicinity of the street low point, and a Zone A floodplain is shown in this area. A portion of the Zone A overtopping flow (240 cfs) would travel down Marathon Circle, and return to Ashbrook Wash via a drainage channel. This leaves four residential buildings surrounded by Zone A and Zone AE floodplains, and this area is designated as Zone X accordingly. Marathon Circle was constructed subsequent to the floodplain map aerial photography, and is depicted from recorded plat information.

4. Ashbrook Wash at Bayfield Drive: Bayfield Drive would be overtopped by 740 cfs. The majority of overtopping runoff (590 cfs) would return to the wash, after flowing through the Zone A floodplain east of the wash and north of Bayfield Drive. It should be noted that flood waters must reach the curb elevation above the culverts before any water could flow easterly down the street. About 150 cfs would continue easterly, and then northerly on Hamilton Drive, creating a Zone A floodplain. There are five (four constructed since the date of mapping photography) residential structures surrounded by these two Zone A areas. These buildings are within a Zone X floodplain. This area is depicted on Floodplain and Floodway Map 9 of 10.

5. Ashbrook Wash at Dam #4 (Emergency Spillway): The local high school has athletic event bleachers constructed against the downstream embankment of Dam 4. The emergency spillway would operate during the 100-year storm, flowing over the bleacher area and through the athletic fields before flowing back to Ashbrook Wash. The resultant Zone A floodplain is depicted on Floodplain and Floodway Map 5 of 10.

6. Balboa Wash (River Mile 1.645): As shown on Floodplain and Floodway Map 4 of 10, a Zone A floodplain has been determined for Balboa Wash in this area. The channel bends here, and the Zone A is located on the inside of the bend. The HEC-2 analysis shows that this area is above the 100-year flood level. Calculations presented in Appendix E show there is about 1.2 feet of freeboard. Based upon field reconnaissance, and engineering judgement, a Zone A is appropriate here because the soils are erodible, and there is the possibility for erosion such that the channel could shift and flood this area. The fill within the Zone A is loose, unconsolidated fill, and appears to be flood-deposited. The upstream and downstream floodplain occupies the channel in bank-to-bank fashion, and there is no reason to doubt that the area presently depicted as Zone A could become part of the main floodplain in a future flood event.

7. Oxford Wash at Fairlynn Drive: Oxford Wash crosses Fairlynn Drive using a street dip section. Most of the flood waters would continue across the road and back to the wash. However, the elevation of Oxford Drive is low enough to accept some floodwater from the wash. Calculations in Appendix E determine that approximately 130 cfs could flow down Oxford Drive, creating the Zone A floodplain shown on Floodplain and Floodway Map 6 of 10. Between this Zone A and Oxford Wash are three buildings in a Zone X floodplain.

8. Balboa Wash at Fountain Hills Boulevard (Flooding of Kings Way): As described in Section 4.4.3 Flow Splits, the 400 cfs that overtops Fountain Hills Boulevard would flow south to the Oxford Drive dip section. Some of the overtopping flows could enter Kings Way. To be conservative, Zone A calculations are performed with all of the overtopping flow going down Kings Way. This street has the capacity for 318 cfs flowing one foot deep, and then the ridge between the street and Balboa Wash would begin to be overtopped. Therefor the Zone A depicted in Floodplain and Floodway Map 6 of 10 includes both Kings Way and the adjacent channel bank. The four buildings between Kings Way and Oxford Wash are in a Zone X floodplain.

9. Arrow Wash from Fountain Hills Boulevard to Palisades Drive: The inadequate culvert at this location would allow about 170 cfs to enter Fountain Hills Boulevard. Flow would go northerly, then easterly on Palisades Drive, and enter Arrow Wash at the street low point. If some of the runoff fails to turn the corner onto Palisades, it would flow less than 0.5 feet deep. Please refer to Floodplain and Floodway Map 9 of 10.

10. Arrow Wash at Arrow Drive: Some of the overtopping flow at this inadequate culvert crossing would enter Arrow Drive. It is assumed that all of the overtopping flow (115 cfs) would flow easterly along Arrow Drive, in order to be conservative. The resultant Zone A floodplain is shown on Floodplain and Floodway Map 6 of 10.

4.6 Floodway Modeling

The washes within the study area generally have steep banks, with the 100-year floodplain contained within the channel banks, as depicted on the individual cross section plots in Appendix E. Each wash is within a platted drainage easement. For those reasons, and for floodplain management purposes, the floodplain will be regulated as a floodway. Therefore, the majority of washes are shown on the Floodplain and Floodway Maps as having a floodway coincident with the floodplain, with two exceptions. One exception is Ashbrook Wash above Hampstead Drive, near River Mile 3.544, where a floodway is shown for the left bank (see Floodplain and Floodway Map 9 of 10). The other exception is on Oxford Wash between Fairlynn Drive and Greenhurst Avenue, as shown on Floodplain and Floodway Map 6 of 10. The floodway data for all study washes are shown in the respective Standard Floodway Table of the HEC-2 computer output discussed in Section 4.7.

4.7 Final Results/Computer Output

The final HEC-2 results are contained in Appendix E. The two-letter tabs represent the first two letters of the wash name. A key to the abbreviations is included with Exhibit 1. Ashbrook Wash is presented first in Appendix E because of its importance as a mainstem river in Fountain Hills North. The following washes are in alphabetical order. After the HEC-2 output, the individual cross section plots are presented for each wash, followed by the stream profiles.

4.8 Computer Model Diskette

The computer diskette contains all the input files necessary to generate the enclosed HEC-2 floodplain analyses. The file README.DOC contains explanatory information for each computer file. The diskette is located in a plastic pocket at the back of this report.

SECTION 5: EROSION/SEDIMENT TRANSPORT ANALYSIS

Not part of this report.

SECTION 6: REFERENCE MATERIALS

6.1 Other Published Flood Studies

There are no other significant published flood studies of record. Refer to Study Documentation Section 6.6.

6.2 Previous FEMA Studies

There are no previous FEMA studies for the study watershed.

6.3 Other Applicable Studies

Refer to Study Documentation Sections 6.5 and 6.6.

6.4 Published and Unpublished Historical Flood Information

There is no significant historical flood information of record for this watershed.

6.5 Bibliography

1. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1991. Instructions for Organizing and Submitting Technical Documentation for Flood Study.

2. Arizona Department of Water Resources, Engineering Division, Flood Management Section, December 1991. Requirement For Floodplain Delineation In Riverine Environments.

3. Chow, V.T., Open Channel Hydraulics, McGraw-Hill, 1959.

4. Dodson & Associates, Inc. 1991. ProHEC2 User's Manual and Program Reference.

5. Federal Emergency Management Agency, September 4, 1991. Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas, Volumes 1 through 7.

6. Federal Emergency Management Agency, March, 1991. FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Contractors.

6.5 (continued)

7. Flood Control District of Maricopa County, September, 1992. Drainage Design Manual for Maricopa County, Volume II, Hydraulics.

8. Hoggan, Daniel H. 1989. Computer-Assisted Floodplain Hydrology & Hydraulics.

9. Ohio Department of Natural Resources, October 1987. Uneven Weir Program, Fortran version.

10. U.S. Army, Corps of Engineers, September, 1990. HEC-2 Water Surface Profiles Users Manual.

11. U.S. Department of Transportation, September, 1985. Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5, FHWA Report No. 1P-85-15.

12. U.S. Department of Transportation, May 1987. HY8 Culvert Analysis Microcomputer Program Applications Guide.

13. U.S. Geological Survey, 1991. Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona.

6.6 Applicable Improvement Plans, Maps and Related Documents

Reference Source Abbreviations:

Abbreviation:	Reference Source:
A-N	Anderson-Nelson, Inc.
ADWR	Arizona Department of Water Resources
AMC	Aerial Mapping Company, Inc.
F. Hills	Town of Fountain Hills
FCDMC	Flood Control District of Maricopa County
GCA	GIS Consultants of Arizona, Ltd.
KAM	Kenney Aerial Mapping Company
MCDOT	Maricopa County Department of Transportation
SCS	U.S. Soil Conservation Service
USGS	U.S. Geological Survey

Source	Type	Description	File I.D.
F. Hills	Map	Anderson-Nelson Inc., 1991. *Low level horizontal control map of Fountain Hills used in preparation of Improvement District plans.* Sections 4-11, 14-17, 20-23, and 26-29, T3N, R6E, G&SRB&M, Maricopa County, Arizona. Scale 1" = 400´.	1

6.6 (continued)

Source	Type	Description	File I.D.
F. Hills	Plans	Anderson-Nelson Inc., 1990. *Palisades Plaza Plans. Fountain Hills.* Scale: Horizontal 1" = 20´,Vertical 1" = 2´.	2
F. Hills	Plans	Anderson-Nelson Inc., 1992. *Fountain Hills Street Paving Plans: Cerro Alto Drive.* Scale: Horizontal 1" = 40´, Vertical 1" = 10´	3
F. Hills	Plans	Anderson-Nelson Inc., 1992. *Final Plat 509 Paving Plans.* Scale: Horizontal 1" = 40´, Vertical 1" = 4´	4
F. Hills	Plans	Anderson-Nelson Inc., 1989. *Fountain Hills Sanitary District Sewer Improvements.* As-Built 1989. Structure #4.	5
FCDMC	Maps	Anderson-Nelson Inc. and Kenney Aerial Mapping, 1991. *Topographic Mapping. Sections 2-5, 8-11, and 14-17, T3N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: 1" = 200´. Job #910804.	6
F. Hills	Plans	Castro Fleet Engineering Inc., 1992. *Fountain Hills Storm Sewer, Grading & Drainage Plans for Bainbridge, Hampstead & Glenview Drive.* Scale: Horizontal 1" = 40´, Vertical 1" = 8´.	7
FCDMC	Plans	Howard, Needles, Tammen & Bergendorf Engineers, 1991. *Fountain Hills Unified School District Site, Junior High and High School Drainage & Site Plans.* Scale: 1" = 50´.	8
F. Hills	Map	Town of Fountain Hills Engineering Department, 1992. *Bench Mark Map. Sections 4-11, 14-17, 20-23, and 26-29, T3N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: 1" = 800´.	9
A-N	Plans	Anderson-Nelson Inc., June 1989. *Fountain Hills Improvement Project #8. Golden Eagle Blvd Paving Improvements. As-Built 18 August 1989.* Scale: Horizontal 1" = 20´, Vertical 1" = 4´.	10
F. Hills	Map	Town of Fountain Hills, 1992. *Zoning Map. Sections 4-11,14-17, 20-23, and 26-29, T3N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1" = 800´.	11

6.6 (continued)

Source	Type	Description	File I.D.
F. Hills	Map	Trico International Inc. and McCulloch Properties, 1979.*Master Drainage Control Study for Fountain Hills, AZ.*, with Channel Cross Sections, and 100-year Storm Data. Scale: 1" = 650´ (Approx.)	12
ADWR	Plans	Trico International Inc., 6 June 1971. *Fountain Hills Storm Water Retardation Basin #4.* As-Built 1 July 1974.	13(4)
ADWR	Plans	Trico International Inc., 10 October 1972. *Fountain Hills Storm Water Retardation Basin #6.* As-Built 1 July 1974.	13(6)
ADWR	Plans	Trico International Inc., 27 July 1972. *Fountain Hills Storm Water Retardation Basin #7.* As-Built.	13(7)
ADWR	Plans	Trico International Inc., 1 December 1972. *Fountain Hills Storm Water Retardation Basin #11.*	13(11)
ADWR	Plans	Trico International Inc., 25 August 1972. *Fountain Hills Storm Water Retardation Basin #36.* As-Built 1 July 1974.	13(36)
A-N	Plans	Anderson-Nelson Inc., 1989. *Fountain Hills Improvement Project #8: Palisades Boulevard Paving Plans.* Scale: Horizontal 1" = 20´, Vertical 1" = 4´.	14
A-N	Plans	Anderson-Nelson Inc., 1989. *Fountain Hills Plat #601-C Off-Site Storm Drain Improvements.* See File I.D. 34. Scale: Horizontal 1" = 20´, Vertical 1" = 4´.	15
A-N	Plans	Anderson-Nelson Inc., 1988. *Drainage Plan and Catch Basin Detail for Wendover Drive and Stancrest Drive Drainage, Fountain Hills, AZ.* Scale: Horizontal 1" = 20´.	16
F. Hills	Map	Town of Fountain Hills, Undated. *Fountain Hills Index Map.* No Scale Given.	17
F. Hills	Plans	P & D Technologies, 4 April 1992. *Town of Fountain Hills Street Paving Project East of Fountain Hills Blvd.* Scale: Horizontal 1" = 40´, Vertical 1" = 4´	18
F. Hills	Plans	Stanley Consultants, Inc., 1 April 1992. *Town of Fountain Hills Street Paving Project West of Fountain Hills Blvd.* Scale: Horizontal 1" = 40´, Vertical 1" = 4´.	19

6.6 (continued)

Source	Type	Description	File I.D.
GCA	Map	GIS Consultants of Arizona, December 1992. *Topographic map of project study area prepared by Rastor Scan and Vector conversion of USGS Quadrangle maps to AutoCAD format. Scale: Horizontal 1" = 1000'.*	20
KAM	Map	Kenney Aerial Mapping, Preliminary. *Topographic map of Section 10, T3N, R6E, and digital test cross sections. Also, plots of field check cross sections.*	21
MCDOT	Plans	Sverdrup & Parcel and Associates, Inc., May 1981. *McDowell Mountain Road Grading and Drainage Plans, Project No. 68030.* As-Built 27 October 1982. Scale: Horizontal 1" = 100', Vertical 1" = 10'.	22
MCDOT	Plans	Maricopa County Highway Department, 23 March 1984. *McDowell Mountain Road Construction Plans, Project No. 68254.* As-Built 6 May 1985. Scale: Horizontal 1"=100', Vertical 1"=10'.	23
F. Hills	Plans	P&D Technologies, June 1992. *Town of Fountain Hills Street Paving Project East of Fountain Hills Blvd. Revised sheets 8 and 11.* See File I.D. 18. Scale: Horizontal 1"=40', Vertical 1"=4'.	24
F. Hills	Plans	Stanley Consultants, Inc., 1 April 1992. *Town of Fountain Hills Street Paving Project West of Fountain Hills Blvd. Revised Sheets 8 and 20.* See File I.D. 19. Scale: Horizontal 1"=40', Vertical 1"=4'.	25
F. Hills	Map	Town of Fountain Hills, 3 November 1992. *Plat Map. Sections 4-11, 14-17, 20-23, and 26-29, T3N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1"=800'.	26
F. Hills	Map	Maricopa County Parks and Recreation, 1962. *Topographic Map of McDowell Mountain Park, Sections 1-36, T4N, R6E, G&SRB&M, Maricopa Co., Arizona.* Scale: Horizontal 1"=1000'. Contour interval=10'.	27
F. Hills	Map	Maricopa County Parks and Recreation, 1962. *Topographic Map of McDowell Mountain Park, Sections 19-36, T4N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1"=400'. Contour interval=10'.	28

6.6 (continued)

Source	Type	Description	File I.D.
F. Hills	Map	Maricopa County Parks and Recreation, 14 August 1962. *Aerial Photographs of McDowell Mountain Park, Sections 1-36, T4N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1" = 800'.	29
A-N	Map	Kenney Aerial Mapping, 19 July 1972. *Topographic Maps of Sections 5-8, 17, and 31, T3N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1" = 100', Contour interval = 4' with 2' supplementals. Kenney Aerial Mapping project number 691003.	30
A-N	Map	Kenney Aerial Mapping, undated. *Topographic Maps of Portions of Sections 9 and 10, T4N, R6E, G&SRB&M, Maricopa County, Arizona.* Scale: Horizontal 1" = 40', Contour interval = 1'. Kenney Aerial Mapping project number 891028-1.	31
FCDMC	Plans	Coe & Van Loo, 8 February 1993. *Golden Eagle Park, Master Plan - Phase 1 Improvements.* Scale: 1" = 50'.	32
FCDMC	Plans	Coe & Van Loo, 5 May 1993. *Golden Eagle Park, Phase 1 Improvements.* Scale: 1" = 30'.	33
A-N	Plans	Anderson-Nelson, Inc., 13 June 1988. *F. H. Plat 601-C Paving Improvements, Sheets 7 and 8 of 10.* See File I.D. 15. Scale: Varies.	34
F. Hills	Doc.	Anderson-Nelson, Inc., 24 June 1991. *Hydrology Report for Mirage Resort Casitas.* A 1.2 acre condominium development at Fountain Hills Blvd. and Oxford Wash.	A
F. Hills	Doc.	Vernon Swaback Associates, 23 July 1992. *Town of Fountain Hills Land Use Elements General Plan.*	B
F. Hills	Doc.	Town of Fountain Hills, Undated. *Preliminary Zoning Ordinance.*	C
ADWR	Doc.	Arizona Department of Water Resources, June 1980. *Dam #6 (ADWR 7-39) Phase I Inspection Report #0075, National Dam Safety Program.*	D
ADWR	Doc.	Trico International, Inc., Undated. *Dam #6 (ADWR 7-39) Engineering Calculations, Computer Hydrology, and Cost Estimates.*	E

6.6 (continued)

Source	Type	Description	File I.D.
ADWR	Doc.	Arizona Department of Water Resources, July 1980. *Dam #11 (ADWR 7-40) Phase I Inspection Report #00167, National Dam Safety Program.*	F
ADWR	Doc.	Trico International, Inc., December 1972. *Dam #11 (ADWR 7-40) Engineering Calculations, Computer Hydrology, and Cost Estimates.*	G
ADWR	Doc.	Arizona Department of Water Resources, June 1980. *Dam #36 (ADWR 7-38) Phase I Inspection Report #00074, National Dam Safety Program.*	H
ADWR	Doc.	Trico International, Inc., October 1972. *Dam #36 (ADWR 7-38) Engineering Calculations, Computer Hydrology, and Cost Estimates.*	I
ADWR	Doc.	Cox, G.D., November 1972. *Dam #36 (ADWR 7-38) Review of Geologic Conditions for Fountain Hills Dam #36.*	J
ADWR	Doc.	Trico International, Inc., May 1972. *Dam #7 ((ADWR 7-32) Hydraulic Calculations and Computer Hydrology.*	K
ADWR	Doc.	U.S. Army Corps of Engineers, Los Angeles District, August 1972. *Dam #4 (ADWR 7-33) Phase 1 Inspection Report #03AZ0011, National Dam Safety Program.*	L
ADWR	Doc.	Trico International Inc., August 1972. *Dam #4 (ADWR 7-33) Hydraulic Calculations and Computer Hydrology.*	M
ADWR	Doc.	Howard, Needles, Tammen, and Bergendorf, April 1991. *Dam #4 (ADWR 7-33) Miscellaneous hydraulic calculations for the modification of the emergency spillway* (not in report format).	N
ADWR	Doc.	Arizona Department of Water Resources. 16 January 1990. *Dams No. 4, 6, 7, 11, and 36 Dam Safety Inspection Report. This report is typical of previous years.*	O
ADWR	Doc.	Arizona Department of Water Resources. *Dam #4 (ADWR 7-33) Miscellaneous correspondence and calculations regarding principal and emergency spillway modifications.*	P
ADWR	Doc.	Trico International, Inc., 25 August 1975. *Design Calculations for Trash Rack Modifications Retardation Structure Nos. 4, 6, 7, 19 and 36, Fountain Hills, AZ.*	Q

6.6 (continued)

Source	Type	Description	File I.D.
ADWR	Doc.	Anderson-Nelson, Inc., 6 July 1989. *Dam #4 (ADWR 7-33) Fountain Hills Structure #4 - Sewer Line Proposal.*	R
F. Hills	Doc.	Standage & Associates Consulting Engineers, 2 July 1992. *Mirage Resort Casitas Condominium Development.* Letter with attachments regarding channel modifications.	S
F. Hills	Doc.	Anderson-Nelson, Inc., 31 August 1991. *Mirage Resort Casitas Drainage Study.* Response to Town review comments, with attachments.	T
A-N	Doc.	Anderson-Nelson, Inc., undated. *Monument Descriptions, Fountain Hills Mapping, High Altitude Aerial Panels.* (refer to Map 1).	U
F. Hills	Doc.	Town of Fountain Hills, 20 November 1991. *Bench mark and coordinate data list for local coordinate system.*	V
FCDMC	Doc.	Tudor Engineering, March 1992. *Preliminary McDowell Mountain Road Initial Drainage Report.* Project No. 68812/1991-14.	W
AMC	Map	Aerial Mapping Company, Inc., 10 December 1992. *Aerial Photographs of Fountain Hills Area.* Scale: Horizontal 1" = 1760'.	X
F. Hills	Doc.	Anderson-Nelson, Inc., 1991. *Fountain Hills Aerial Control, Street Paving Project, Vertical Control.*	Y
F. Hills	Doc.	Anderson-Nelson, Inc., 1991. *Fountain Hills Aerial Control, Street Paving Project, Horizontal Control.*	Z
SCS	Doc.	U.S. Soil Conservation Service, April 1986. *Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona.*	AA

6.6 (continued)

Source	Type	Description	File I.D.
USGS	Map	U.S. Geological Survey. USGS 7.5 minute quadrangle maps, and orthophotos, as follows:	Flatfile
		Granite Reef Dam: 1964, 1962 photo date, 1974 photo revised, 20' contour interval (CI), 10' supplementary CI (SCI). Orthophoto dated 1971.	
		McDowell Peak: 1965, 1962 photo date, 1982 photorevised, 20' CI. Orthophoto dated 1971.	
		Sawik Mountain: 1964, 1962 photo date, 1982 photorevised, 20' CI, 10' SCI. Orthophoto dated 1971.	
		Fort McDowell: 1964, 1962 photo date, 1974 photorevised, 1978 photo inspected, 20' CI, 10' SCI. Orthophoto dated 1971.	

SECTION 7: CROSS-REFERENCE AND LABELING INFORMATION

Not part of this report.

SECTION 8: DRAFT FLOOD INSURANCE STUDY REPORT

See Appendix G.

APPENDIX A

Elevation Reference Marks

ID Num.	ELEV (ft)	DESCRIPTION
1-A	1544.63	Top of Brass Cap set by G.L.O., Southeast of the intersection of Grande Boulevard and El Pueblo Boulevard, at the intersection of the South line of Section 11, Township 3 North, Range 6 East, and the West boundary of the Fort McDowell Indian Reservation.
1-B	1556.30	Top of Brass Cap, at a point of curvature of center line of La Casa Drive, approximately 80 feet West of Del Cambre Avenue, being in the Southwest 1/4 of Section 11, Township 3 North, Range 6 East.
1-C	1603.59	Top of Brass Cap on centerline of Deerskin Drive, approximately 190 feet Northeast from the intersection of Deerskin Drive and Escondido Drive, being in the Northwest 1/4 of Section 11, Township 3 North, Range 6 East.
1-D	1655.56	Top of Brass Cap, at point of curvature of centerline of McDowell Mountain Road, approximately 80 feet North of the South line of Section 3, Township 3 North, Range 6 East.
1-E	1551.77	Top of Brass Cap, at Station 41 + 33 on McDowell Mountain Road, approximately 185 feet West of Escalante Wash, being in the Southeast 1/4 of Section 2, Township 3 North, Range 6 East.
1-F	1521.64	Top of Brass Cap set by G.L.O., stamped 1/16 Section 1 and 12, located approximately 36 feet East of the Southwest corner of Section 1, Township 3 North, Range 6 East.
1-G	1537.66	Brass Cap in concrete at center of Northeast curb return at Southeast corner of intersection of San Marcus and El Pueblo Boulevard, being in the Northeast 1/4 of Section 11, Township 3 North, Range 6 East.
1-H	1529.73	Top of Brass Cap at intersection of Vallecito Drive and Rosita Drive, being in the Southeast 1/4 of Section 11, Township 3 North, Range 6 East.
2-A	1630.62	Top of Brass Cap in concrete at the middle of Northeast curb return at intersection of Fountain Hills Boulevard and Kings Way, being in the Northeast 1/4 of Section 10, Township 3 North, Range 6 East.

ID Num.	ELEV (ft)	DESCRIPTION
2-B	1619.45	Top of Brass Cap at the intersection of Saguaro Boulevard and Sterling Way, being in the Southwest 1/4 of Section 11, Township 3 North, Range 6 East.
2-C	1581.56	Top of Brass Cap at the center of the cul-de-sac at the West end of De Anza Drive, being in the Southwest 1/4 of Section 11, Township 3 north, Range 6 east.
3-A	1644.18	Top of Brass Cap at center of cul-de-sac at the South end of Arrow Drive, near the Southwest corner of Southeast 1/4 of Section 10, Township 3 North, Range 6 East.
3-B	1636.82	Top of Brass Cap in concrete at middle of Southeast curb return at the intersection of Fountain Hills Boulevard and Edgeworth Drive, being in the Southeast 1/4 of Section 10, Township 3 North, Range 6 East.
4-A	1700.67	Top of Brass Cap at the intersection of Hampstead Drive and Bainbridge Avenue, being in the Northwest 1/4 of Section 10, Township 3 North, Range 6 East.
5-A	1684.27	Top of Brass Cap at the intersection of Glenbrook Boulevard and Tanglewood Court, being in the Northwest 1/4 of Section 10, Township 3 North, Range 6 East.
6-A	1707.36	Top of Brass Cap at the intersection of Mountainside Drive and Lost Hills Drive, being in the Northwest 1/4 of Section 15, Township 3 North, Range 6 East.
6-B	1813.51	Top of Brass Cap at a point of tangency on Cavern Drive approximately 430 feet Northeast of the intersection of El Lago Boulevard and Cavern Drive, being in the Northeast 1/4 of Section 16, Township 3 North, Range 6 East.
6-C	1869.71	Top of Brass Cap at a point of tangency on Sunflower Drive, approximately 80 feet Southeast of the intersection of Palisades Boulevard and Sunflower Drive, being in the Northeast 1/4 of Section 16, Township 3 North, Range 6 East.

ID Num.	ELEV (ft)	DESCRIPTION
6-D	1730.12	Top of Brass Cap at the intersection of Palisades Boulevard and Golden Eagle Boulevard, being in the Southeast 1/4 of Section 9, Township 3 North, Range 6 East.
7-A	1830.08	Top of Brass Cap at the intersection of Blackbird Drive and Audubon Place, being in the Southeast 1/4 of Section 4, Township 3 North, Range 6 East.
7-B	1750.17	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Bainbridge Avenue, being in the Northeast 1/4 of Section 9, Township 3 North, Range 6 East.
8-A	1876.03	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Aspen Drive, being in the Southeast 1/4 of Section 4, Township 3 North, Range 6 East.
8-B	1925.49	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Nyack Drive, being in the Southwest 1/4 of Section 4, Township 3 North, Range 6 East.
8-C	1809.90	Top of Brass Cap at the intersection of Kipling Drive and Runyon Place, being in the Southeast 1/4 of Section 4, Township 3 North, Range 6 East.
9-A	1924.94	Top of Brass Cap at the intersection of Marathon Drive and Greene Valley Drive, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.
9-B	1980.84	Top of Brass Cap at the North end of Marathon Drive cul-de-sac, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.
9-C	1893.64	Top of Brass Cap at a point of curvature on the centerline of Aspen Drive, approximately 700 feet Southeast of the intersection of Aspen Drive and Sourdough Place, (opposite 16644 N. Aspen Drive), being in the Northwest 1/4 of Section 4, Township 3 North, Range 6 East.
9-D	1856.71	Top of Brass Cap at the West end of Grassland Drive cul-de-sac, being in the Northwest 1/4 of Section 4, Township 3 North, Range 6 East.

ID Num.	ELEV (ft)	DESCRIPTION
10-A	1982.50	Top of Brass Cap at the intersection of El Lago Boulevard and Palisades Boulevard, being in the Northwest 1/4 of Section 16, Township 3 North, Range 6 East.
11-A	1772.83	Top of Brass Cap set in concrete on the East side of Longmont Wash approximately 30 feet South of Fountain Hills bench mark #295, being near the Southwest corner of Northeast 1/4 of Section 9, Township 3 North, Range 6 East.
12-A	2025.18	Top of Brass Cap set by G.L.O., stamped elev = 2026.82 (Fountain Hills bench mark #240) and located approximately 300 feet West of the intersection of Thistle Drive and Palisades Boulevard and approximately 40 feet North of Palisades Boulevard, being the West 1/4 corner of Section 16, Township 3 North, Range 6 East.
12-B	2015.48	Top of Brass Cap set in concrete located S 89°52'21" W 1618.00 feet of bench mark 12-A, being in the Northeast 1/4 of Section 17, Township 3 North, Range 6 East.
12-C	1894.76	Top of Brass Cap set by G.L.O., (Fountain Hills bench mark #252), being the Common corner of Sections 8, 9, 16 and 17, Township 3 North, Range 6 East.
12-D	1929.94	Top of Brass Cap set by G.L.O. (Fountain Hills bench mark #299) being the West 1/4 corner of Section 9, Township 3 North, Range 6 East.
12-E	1869.37	Top of Brass Cap set by G.L.O. (Fountain Hills bench mark #302) at the intersection of Sierra Madre Drive and Zapata Drive, being in the Southeast 1/4 of Section 5, Township 3 North, Range 6 East.
12-F	1822.68	Top of Brass Cap at the intersection of Sierra Madre Drive and Lorma Lane, being in the Northwest 1/4 of Section 9, Township 3 North, Range 6 East.
13-A	1873.28	Top of Brass Cap in concrete at North end of East headwall of box culvert in Zapata Wash at Montezuma Boulevard, being in the Northeast 1/4 of Section 8, Township 3 North, Range 6 East.

ID Num.	ELEV (ft)	DESCRIPTION
13-B	1954.42	Top of Brass Cap in concrete in rock outcrop on West side of Montezuma Boulevard and North side of Montezuma Wash, being in the Northeast 1/4 of Section 8, Township 3 North, Range 6 East.
14-A	2091.39	Top of Brass Cap (Fountain Hills panel point #203 elev = 2092.98) at the intersection of Golden Eagle Boulevard and Cerro Alto Drive, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.
14-B	2119.31	Top of Brass Cap located on the South side of Golden Eagle Boulevard, approximately 2300 feet Easterly from the intersection of Montezuma Boulevard and Golden Eagle Boulevard, being in the Northwest 1/4 of Section 5, Township 3 North, Range 6 East.
14-C	1996.54	Top of Brass Cap in concrete on parcel 36, approximately 350 feet Northwesterly of intersection of Montezuma Boulevard and Cholula Drive, being in the Southwest 1/4 of Section 5, Township 3 North, Range 6 East.
15-A	2051.40	Top of Brass Cap in concrete located on the Southwest side of Ramon Drive, approximately 210 feet Southeast of the intersection of Cholula Drive and Ramon Drive, being in the Southwest 1/4 of Section 5, Township 3 North, Range 6 East.
16-A	1772.83	Top of Brass Cap in concrete, N37°15'03"W 1013.30 feet from center of cul-de-sac at station 15+09.47 of Blue Jay Place, being in the Southwest 1/4 Section 3, Township 3 North, Range 6 East.

APPENDIX B

Survey Field Notes

HYDRAULICS - BOOK No. 1

FOUNTAIN HILLS NORTH FCD MARICOPA COUNTY, ARIZONA BOOK

FOUNTAIN HILLS NORTH

FLOOD CONTROL DISTRICT

OF

MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

BOOK NO. 1

TELEDYNE

407

FIELD BOOK

ALCOCER LAND SURVEYORS
3501 N. 16th STREET
PHOENIX, ARIZONA 85016

Property of _____

_____

Address _____

_____

Telephone _____

This Book is manufactured of a High Grade 50% Rag Paper having a Water Resisting Surface, and is sewed with Nylon Waterproof Thread.

BOOK 1

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I CERTIFY THAT THESE NOTES CORRECTLY REPRESENT A SURVEY MADE UNDER MY SUPERVISION

FOUNTAIN HILLS (NORTH) FLOOD DELINEATION STUDY

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY, ARIZONA

F.C.D 92-04

Basis of Elevation

Elevations were adjusted -0.18' in order to match existing elevation datum to Fountain Hills (South) Flood Delineation Study. - Page 58-59

BENCH LOOP #1

R. ALLOCCA
L. CAPONO

1.25.93

CLEAR & COOL
TEMP: 60°

	BS.	HI	FS.	ELEV.	
B.M.				ELEV.	1544.94
T.B.M.				1545.12	
	7.66	1552.60			
B.M. 1-A			1.77	1550.83	
	5.56	1557.49			
T.P.			2.60	1554.89	
	5.61	1560.50			
T.P.			2.90	1557.60	
	3.89	1560.65			
T.P.			2.01	1544.64	
	16.29	1560.93			
T.P.			3.33	1558.60	
	4.86	1563.46			
T.P.			7.27	1556.19	
	5.42	1561.71			
B.M. 1-B			5.41	1556.30	
	3.32	1559.62			
T.P.			0.56	1559.06	
	16.13	1573.20			
T.P.			0.61	1572.63	
	15.94	1588.57			
T.P.			2.19	1586.38	
	11.68	1598.01			
T.P.			20.68	1577.33	
	21.01	1598.34			
T.P.			11.93	1586.41	

DESCRIPTION

FOUNTAIN HILLS AERIAL PANEL #123

ELEVATION ADJUSTED - 0.18'

TOP OF G.L.O. BRASS CAP AT SE. COR. SEC. 12 - FORT MCDOWELL INDIAN RES.

TOP OF BRASS CAP AT P.C. & LA CASA DRIVE - 80' WEST OF DEL ZAMORA AVENUE

B.M.	B.S.	HI	F.S.	ELEV.	DESCRIPTION
T.P.				1536.41	
	8.00	1594.41			
T.P.			7.00	1587.41	
	7.74	1595.48			
T.P.			0.51	1594.74	
	15.49	1610.25			
B.M. 1-C			6.66	1603.59	TOP BRASS CAP ON DEERSKIN DRIVE
	10.56	1613.35			1 190' NE OF ESCONDIDO DRIVE
T.P.			0.99	1612.36	
	11.19	1624.15			
T.P.			0.70	1623.45	
	11.07	1634.52			
T.P.			3.60	1630.92	
	10.58	1641.50			
T.P			3.70	1637.80	
	4.03	1641.83			
T.P			4.57	1637.26	
	15.56	1652.82			
T.P.			0.07	1652.75	
	7.27	1660.02			
BM 1-D			4.46	1655.56	TOP BRASS CAP ON FOUNTAIN HILLS BLVD.
	4.57	1660.13			± 80' N OF POWER LINES
T.P.			4.30	1655.83	
	13.53	1669.36			
T.P.			13.88	1655.48	

B.M.	B.S.	H.I.	F.S.	Elev
T.P.				1655.48
	7.44	1662.92		
T.P.			26.25	1638.67
	3.61	1642.28		
T.P.			24.69	1617.59
	0.35	1617.94		
T.P.			19.71	1598.23
	0.88	1599.11		
T.P.			21.05	1578.06
	4.52	1582.58		
T.P.			20.58	1561.97
	5.70	1565.67		
BM 1-E			13.90	1551.77
	8.06	1559.83		
T.P.			17.05	1542.78
	5.49	1548.24		
T.P.			16.29	1531.95
	3.53	1535.48		
T.P.			8.12	1527.36
	5.15	1532.51		
BM 1-F			10.87	1521.64
	10.68	1532.32		
T.P.			4.73	1527.59
	10.53	1538.12		
T.P.			1.54	1532.58

1-26-93
CLEAR. COOL

T.R. McCORMICK
J. L. CAMPOLO

DESCRIPTION

TOP BRASS CAP @ STA 61+33.00 ON McDOWELL MOUNTAIN ROAD ~~FOUNTAIN HILLS BLVD.~~ ± 185' W/E. OF ~~CALIENTE~~ ESCALANTE WASH

TOP OF GLO BRASS CAP STAMPED 1/16 SEC 1 & SEC 12 @ RESERVATION BOUNDARY

BM	B.S.	HI	FS	ELEV	Adj'd
T.P.				1536.58	
	6.55	1543.13			
BM 1-G			5.46	~~1537.67~~	1537.67
	16.22	1553.89			
T.P.			1.37	1552.52	
	1.75	1554.27			
T.P.			14.35	1539.92	
	0.67	1540.59			
T.P.			15.86	1524.73	
	8.70	1533.43			
BM 1-H			3.68	~~1529.75~~	1529.73
	5.22	1534.97			
T.P.			10.24	1524.73	
	3.42	1528.15			
T.P.			1.95	1526.20	
	15.19	1541.39			
TP			2.44	1538.95	
	15.28	1554.23			
BM 1-A			9.57	1544.66	

DESCRIPTION

BRASS CAP IN CONCRETE AT CENTER OF RETURN AT SE CORNER OF EL PUEBLO BLVD & SAN MARCOS

TOP OF BRASS CAP AT INTERSECTION OF VALLECITO DR & ROSITA DR.

CHECK IN +0.13

BEACH Loop #2

T. R. McCrea
J. C. Capone

1-27-13

PARTLY CLOUDY
BREEZY & COOL
Temp. 60°

B.M.	BS	H.I.	FS	ELEV	ADJUSTED
BM 1-D				1655.56	
	1.81	1657.37			
T.P.			6.05	1651.32	
	2.67	1653.99			
T.P.			13.52	1640.47	
	3.83	1644.30			
BM 2-A			10.27	1630.62	
	7.11	1637.73			
T.P.			0.48	1637.25	
	9.97	1647.22			
T.P.			8.45	1638.77	
	6.81	1645.58			
T.P.			15.64	1629.94	
	0.57	1630.51			
BM 2-B			11.05	~~1619.46~~	1619.45
	0.27	1619.73			
T.P.			18.93	1600.80	
	0.26	1601.06			
T.P.			16.93	1584.13	
	6.26	1590.39			
BM 2-C			8.82	~~1581.57~~	1581.56
	5.32	1586.89			
T.P.			9.59	1580.30	
	1.33	1581.63			
T.P.			11.83	1569.80	

DESCRIPTION

Top Brass Cap on Fountain Hills Blvd ± 80' N. of Power Lines

Top of Brass Cap in concrete at middle of N.E. curb return at intersection Fountain Hills Blvd & Kings Way.

*

Top of Brass Cap at intersection of Saguaro Blvd & Sterling Way

*

Top of Brass Cap at center of Cul-De-Sac at West De Anza Drive

BM	BS	HI	FS	ELEV
T.P.				1569.50
	0.85	1570.65		
T.P.			10.86	1559.79
	5.20	1564.99		
BM 1-B			8.67	1556.32

DESCRIPTION

CHECK IN +0.02' (SEE PAGE 6)

BENCH CORP #3

Π - R. ALCOCER
/ - L. CAPONIO

1.22.93
CLEAR & COOL

B.M.	B.S.	H.I.	F.S.	ELEV	Adjusted
BM 2-C				1581.58	
	10.54	1592.10			
			1.09	1591.01	
	7.71	1598.72			
			0.05	1598.67	
	10.11	1608.78			
			2.25	1606.47	
	12.22	1618.69			
			0.15	1618.54	
	11.41	1629.95			
			0.68	1629.27	
	19.13	1648.40			
BM 3-A			4.22	1644.18	
	16.67	1660.85			
			6.43	1654.42	
	0.09	1654.51			
			4.82	1649.69	
	16.97	1666.66			
			0.52	1666.14	
	5.43	1671.57			
			2.10	1669.47	
	1.00	1670.47			
			23.63	1646.84	
	0.52	1647.66			
BM 3-B			10.84	1636.82	

12

DESCRIPTION

SEE PAGE 11

*

TOP OF BRASS CAP @ ARROW DRIVE CUL-DE-SAC

*

TOP BRASS CAP IN CONCRETE AT MIDDLE OF SE CURB RETURN AT FOUNTAIN HILLS BLVD. & EDGEWORTH DRIVE.

BM	BS.	HI	FS.	ELEV	
				1636.82	
	3.47	1640.29			
T.P.			1.53	1638.76	-0.01

DESCRIPTION

TOP OF BOLT AT INTERSECTION OF FOUNTAIN HILLS BLVD & SAGUARO BLVD.

(SEE PAGE 11)

BENCH Loop #4

T - R. Alcocer
I - L. Capono

2-1-93

Clean & cool
Temp - 65°

B.M.	B.S.	H.I.	F.S.	Elev.	
T.P.				1652.92	
	13.88	1667.80			
T.P.			0.42	1667.38	
	15.72	1683.10			
T.P.			7.74	1675.36	
	10.97	1686.33			
T.P.			2.84	1683.49	
	17.97	1701.46			
T.P.			1.03	1700.43	
	13.56	1713.99			
T.P.			13.83	1700.16	
	2.19	1702.35			
T.P.			13.26	1689.09	
	2.15	1691.24			
T.P.			6.57	1684.67	
	2.52	1687.19			
T.P.			1.37	1685.82	
	22.46	1708.28			
T.P.			0.35	1707.93	
	11.75	1719.68			
BM 4-A			19.01	1700.67	
	8.72	1709.39			
SM			9.72	1699.67	+0.01

Description

Top of Curb at Middle of SE Return
Fountain Hills & Arrow Drive
(See Page 14)

*

*

*

*

Top of Brass Cap at Intersection of
Hampstead Drive & Bainbridge Avenue
Check Aerial Panel # 50120
Elev. 1699.66

BEECH Coop #5

T - R. ALLOCCA
1 - L. CAPONO

2-1-93
CLEAR & COOL
TEMP 75°

B.M.	B.S.	H.I.	F.S.	ELEV.
BM 4-A				1700.67
	5.97	1706.64		
T.P.			0.55	1706.09
	11.61	717.70		
T.P.			2.30	1715.40
	7.20	722.60		
T.P.			4.60	1718.00
	14.63	1732.63		
T.P.			3.62	1729.01
	5.41	1734.42		
T.P.			4.01	1730.41
	15.46	1745.87		
T.P.			1.96	1743.91
	12.95	1756.86		
T.P.			20.50	1736.36
	1.27	1737.63		
T.P.			24.73	1712.90
	1.32	1714.22		
T.P.			14.35	1699.87
	0.21	1700.08		
BM 5-A			15.81	1684.27
	2.33	1686.60		
T.P.			13.01	1673.59
	17.54	1691.13		
T.P.			24.64	1666.49

DESCRIPTION

TOP BRASS CAP @ HAMPSTEAD DR. & BAINBRIDGE AVE. (SEE PAGE 17)

*

TOP OF BRASS CAP AT INTERSECTION OF GLENBROOK BLVD & TANGLEWOOD COURT.

BM	B.S.	H.I.	F.S.	ELEV	DESCRIPTION
T.P.				1666.49	
	2.14	1668.63			
TP			17.81	1650.82	
	14.70	1665.52			
TP			14.19	1651.33	
	6.05	1657.38			
BM 1-D			1.81	1655.57	+0.01

(SEE PAGE 7)

BENCH Loop #6

T-R ALCOCER
J-L CAPONIO

2-3-93
COOL & CLEAR
TEMP 70°

B.M.	B.S.	H.I.	F.S.	ELEV.
T.P.				1700.43
	6.01	1706.44		
T.P.			0.72	1705.72
	19.17	1724.89		
T.P.			2.73	1722.16
	6.27	1728.43		
B.M. 6-A			21.27	1707.16
	23.55	1730.91		
T.P.			1.09	729.82
	12.12	1741.94		
T.P.			1.64	1740.30
	20.01	1760.31		
T.P.			0.18	1760.13
	15.99	1776.12		
T.P.			1.62	1774.50
	19.44	1793.94		
T.P.			3.39	1790.55
	23.76	1814.31		
T.P.			1.78	1812.53
	19.28	1831.81		
T.P.			0.39	1831.42
	17.40	1848.82		
T.P.			0.58	1848.24
	4.05	1852.29		
T.P.			21.18	1831.11

TOP OF CURB ON EAST BULLNOSE AT INTERSECTION OF PALISADES BLVD & MORNINGSIDE DRIVE. (SEE PAGE 17)

TOP OF BRASS CAP AT INTERSECTION OF MORNINGSIDE DRIVE & LOST HILLS DRIVE

B.M.	B.S.	H.I.	F.S.	ELEV	ADJUSTED	DESCRIPTION
T.P.				1831.11		
	1.41	1832.52				
T.P.			22.88	1809.64		
	4.58	1814.22				
BM 6-B			0.72	~~1813.50~~	1813.51	TOP OF BRASS CAP AT NORTH P.C. OF CURVE ON CAVERN DRIVE - NORTH OF EL LAGO BLVD.
	0.87	1814.37				
T.P.			3.16	1811.21		
	24.42	1835.63				
T.P.			4.53	1831.10		
	20.87	1851.97				
T.P.			1.70	1850.27		
	14.44	1864.71				
T.P.			1.13	1863.58		
	18.68	1882.26				
T.P.			0.30	1881.96		
	16.06	1898.02				
BM 6-C			1.33	~~1896.69~~	1869.71	TOP BRASS CAP AT NORTH P.T. OF CURVE ON SUNFLOWER DRIVE - SOUTH OF PALISADES BLVD
	0.63	1897.32				
T.P.			19.07	1878.25		
	0.17	1878.42				
T.P.			20.48	1857.94		
	2.37	1860.31				
T.P.			20.59	1839.42		
	0.41	1839.83				
T.P.			20.46	1819.37		

BM	BS.	HI	FS.	ELEV.	ADJUSTED	DESCRIPTION
T.P.				1819.37		
	0.11	1819.48				
T.P.			21.18	1795.30		
	0.39	1795.69				
T.P.			20.23	1778.46		
	0.11	1775.57				
T.P.			17.33	1761.24		
	0.42	1761.66				
T.P.			20.23	1741.43		
	2.50	1743.93				
B.M. G-D			13.84	~~1730.09~~	1730.12	TOP OF BRASS CAP AT INTERSECTION OF PALISADES BLVD & GOLDEN EAGLE BLVD.
	0.33	1730.42				
T.P.			21.37	1709.05		
	0.10	1709.15				
T.P.			8.54	1700.61		
	4.40	1705.01				
T.P.			4.88	1700.13	-0.03	BRASS CAP AT INTERSECTION OF PALISADES BLVD & HAMPSTEAD DR. ELEV. 1700.16 (SEE PAGE 17)

BEACH LOOP #7

T - R. MCCOEN
I - L. CAPONO

2-5-93
COOL & CLEAR
TEMP 75°

BM.	BS.	HI	FS.	ELEV	ADJUSTED
T.P.				1743.91	
	12.96	1756.87			
T.P.			0.87	1756.00	
	21.26	1777.26			
T.P.			0.76	1776.50	
	20.92	1797.42			
T.P.			0.61	1796.81	
	20.75	1817.56			
T.P.			0.19	1817.37	
	9.84	1827.21			
T.P.			0.86	1826.35	
	7.94	1834.29			
BM 7-A			4.19	~~1830.10~~	1830.03
	1.57	1831.67			
T.P.			24.58	1807.09	
	2.55	1809.64			
T.P.			23.03	1786.61	
	0.42	1787.03			
T.P.			12.86	1774.17	
	11.02	1785.19			
T.P.			4.81	1780.38	
	7.80	1788.18			
BM 50244			13.14	~~1775.04~~	1775.01
	0.15	1775.19			
T.P.			13.56	1761.63	

20

DESCRIPTION

TOP BRASS CAP AT INTERSECTION OF BLACKBIRD DR. & GLENBROOK BLVD. (SEE PAGE 19)

TOP OF BRASS CAP AT INTERSECTION OF BLACKBIRD DR. & AUDUBON PLACE (# 242 ELEV = 1850.29)

TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & BOULDER DR. (ELEV 1775.17)

BM	B.S.	HI	F.S.	ELEV	ADJUSTED	DESCRIPTION
T.P.				1761.63		
	0.53	1762.16				
BM 7-B			11.94	~~1750.22~~	1750.17	TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & FAIRBRIDGE AVE.
	1.85	1752.07				
T.P.			13.01	1739.06		
	0.39	1739.45				
T.P.			7.50	1731.95		
	0.22	1732.17				
T.P.			6.88	1723.29		
	2.37	1725.66				
T.P.			3.72	1721.94		
	7.60	1729.54				
T.P.			4.95	~~1724.59~~	1724.52	*
	12.09	1736.68				
T.P.			5.54	1731.14		
	4.66	1735.80				
BM 6-1			5.60	~~1730.20~~	1730.12	BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & PALISADES BLVD ELEV = 1730.12 (SEE PAGE 24)

BENCH LOOP #8

T - R ALCOCER
I - L. CAPONO

2-4-93
CLEAR & COOL
TEMP 70°

BM	BS	H.I.	FS.	ELEV.	ADJUSTED	DESCRIPTION
SM50244				1775.01		BRASS CAP AT GOLDEN EAGLE BLVD. & BOULDER DR. (SEE PAGE 26)
	16.50	1791.51				
T.P.			0.65	1790.86		
	20.60	1811.46				
T.P.			0.10	1811.36		
	18.81	1830.17				
T.P.			2.31	1827.86		
	20.49	1848.35				
T.P.			0.17	1848.18		*
	15.99	1863.67				
T.P.			0.85	1862.82		
	13.32	1876.14				
BM B-A			0.11	1876.03		TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & ASPEN DR.
	21.10	1897.13				
T.P.			0.59	1896.54		
	19.76	1916.30				
T.P.			0.11	1916.19		
	20.92	1937.11				
T.P.			9.17	1927.94		
	2.93	1931.87				
BM B-B			6.37	1925.50	1925.49	TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & NYACK DR.
	4.33	1929.83				
T.P.			24.74	1905.09		
	1.23	1906.32				
T.P.			24.40	1881.92		

BM	BS	HI	FS	ELEV	ADJUSTED
T.P.				1881.92	
	0.19	1882.11			
T.P.			23.74	1858.37	
	0.25	1858.62			
T.P.			18.70	1839.92	
	3.12	1843.04			
T.P			10.08	1832.96	
	6.22	1839.18			
T.P.			10.53	1828.65	
	0.42	1829.07			
T.P.			7.35	1821.72	
	0.32	1822.04			
BM B-C			12.12	~~1809.72~~	1809.90
	1.55	1811.47			
T.P.			10.76	1800.71	
	5.19	1805.90			
T.P			1.55	1804.35	
	15.61	1819.96			
T.P.			0.48	1819.48	
	20.62	1340.10			
T.P.			0.76	1839.34	
	1.77	1841.11			
BM 7-A			11.01	1830.10	+0.02

DESCRIPTIONS

*

Top of Brass cap at intersection of Kipling Place & Runyon Place

(See Page 34)

BENCH Loop #7

T - R. Moore
I - L. Capone

2-15-93
Cloudy & Breezy
Rain
Temp 55°

Pegged level
checked ok

BM	BS.	HI	FS	ELEV
BM 5-B				1925.50
	1.21	1926.71		
T.P.			20.14	1906.57
	0.19	1906.76		
T.P.			19.82	1886.94
	0.15	1887.09		
T.P.			17.04	1870.05
	1.18	1871.16		
T.P.			11.97	1859.19
	3.51	1862.70		
T.P.			1.20	1861.50
	12.24	1873.74		
T.P.			1.18	1872.56
	11.18	1883.74		
T.P.			2.59	1881.15
	12.39	1893.54		
T.P.			5.07	1888.47
	14.24	1902.71		
T.P.			0.55	1902.16
	10.04	1912.20		
T.P.			0.60	1911.60
	12.47	1924.07		
TP			2.61	1921.46
	6.68	1928.14		
BM 9-A			3.20	1924.94

TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & N YUCK DR.
(SEE PAGE 29)

*

TOP OF BRASS CAP AT INTERSECTION OF MARATHON DR. AND GREEN VALLEY DR.

B.M.	B.S.	H.I.	F.S.	ELEV	DESCRIPTION
T.P.				1924.74	
	16.29	1941.03			
T.P.			1.59	1939.44	
	12.27	1951.71			
T.P.			0.55	1951.33	
	10.46	1961.79			
T.P.			2.77	1959.02	
	9.32	1965.34			
T.P.			0.10	1968.24	
	14.19	1982.43			
BM 9.6			1.59	1980.84	Top of Brass Cap at Center Marathon
	1.26	1982.10			Drive Cul-de-sac
T.P.			13.68	1968.42	
	0.52	1968.94			
T.P.			9.92	1959.02	Panel Pt # 50209 Elev: 1959.32
	9.26	1968.28			
T.P.			0.32	1967.96	
	14.56	1982.52			
T.P.			1.32	1981.20	
	18.93	2000.13			
T.P.			2.82	1997.31	
	0.63	1997.94			
T.P.			21.02	1976.92	
	0.29	1977.21			
T.P.			20.19	1957.02	

S.M.	B.S.	H.I.	F.S.	ELEV.	DESCRIPTION
T.P.				1957.02	
	0.38	1957.40			
T.P.			18.76	1938.64	
	1.77	1940.41			
T.P.			10.79	1929.62	PANEL P.L. #50214 ELEV. 1929.84
	0.69	1930.31			
T.P.			11.86	1918.45	
	0.23	1918.68			
T.P.			15.01	1903.67	
	1.58	1905.25			
TP			8.64	1896.61	
	0.80	1897.41			
B.M. 9-C			3.77	1893.64	TOP OF BRASS CAP AT P.C. @ 16644 N. ASPEN DRIVE.
	3.92	1897.56			
T.P.			10.69	1886.87	
	8.40	1895.27			
T.P.			19.84	1875.43	
	1.98	1877.41			
B.M. 9-D			20.70	1856.71	TOP OF BRASS CAP AT CENTER OF GRASSLAND DRIVE CUL-DE-SAC.
	3.65	1860.36			
TP			12.23	1848.13	
	6.11	1854.24			
T.P.			4.68	1849.56	PANEL P.L. #50230 ELEV= 1849.69
	0.29	1849.85			
T.P.			17.16	1832.69	

B.M.	B.S.	H I	F.S	ELEV	
T.P.				1832.69	
	9.25	1841.94			
T.P.			5.99	1832.95	-0.01

DESCRIPTION

BRASS CAP AT INTERSECTION OF DIXIE MINE TR. & RICHWOOD AVE. (SEE PAGE 30)

BENCH Corp. SK 10

T- R. ALLOCCA
I- L. CAPONIO

2-16-93
CLEAR - Cool
Temp 60°

BM	+S.	H.I.	F.S.	ELEV.
BM 6-B				1813.51
	2.70	1816.21		
T.P.			1.55	1814.66
	17.36	1832.02		
T.P.			0.02	1832.00
	20.62	1852.62		
T.P.			1.59	1851.03
	20.16	1873.19		
T.P.			0.60	1872.59
	20.68	1893.27		
T.P.			0.99	1892.28
	20.52	1912.80		
T.P.			0.04	1912.76
	21.33	1934.09		
T.P			0.03	1934.06
	21.21	1955.27		
T.P.			2.51	1952.76
	14.66	1967.42		
T.P.			4.76	1962.66
	20.48	1983.14		
BM 10-A			0.64	1982.50
	0.46	1982.96		
T.P.			18.74	1964.22
	0.54	1964.76		
T.P.			20.45	1944.31

DESCRIPTION

TOP BRASS CAP AT P.C. ON CAVERN DR. NORTH OF EL LAGO BLVD (SEE PAGE 23)

TOP BRASS CAP AT INTERSECTION OF EL LAGO BLVD & PALISADES BLVD.

B.M.	B.S.	H.I.	F.S.	ELEV.	
T.P.				1944.31	
	0.75	1945.06			
T.P.			20.75	1924.31	
	1.42	1925.73			
T.P.			19.31	1906.42	
	0.66	1907.08			
BM 6-C			10.35	1896.73	+0.0-

DESCRIPTION

(SEE PAGE 23)

BENCH Loom #11

T- R. ALCOCER
J- L CAPONO

2-17-93
CLEAR & COOL
TEMP. 65°

BM	B.S.	HI	F.S.	ELEV	DESCRIPTION
T.P.				1724.52	TOP OF BRASS CAP AT CENTERLINE P.C. ON GOLDEN EAGLE BLVD BETWEEN ASHBROOK & BRISTOL WASHES. (SEE PAGE 27)
	7.46	1731.98			
T.P.			0.59	1731.39	
	17.40	1748.79			
T.P.			0.73	1748.06	
	20.40	1768.46			
T.P.			3.42	1765.04	
	10.13	1775.17			
T.P.			4.19	1770.98	
	3.69	1774.67			
BM 11-A			1.82	1772.85	TOP BRASS CAP IN CONCRETE ON THE EAST SIDE OF BRISTOL WASH. I 30' SOUTH OF B.M. #295 N = 952689.612 E = 752582.933
	1.24	1774.07			
T.P.			15.18	1758.89	
	0.26	1759.15			
T.P.			18.92	1740.23	
	1.62	1741.85			
T.P.			13.62	1728.23	
	4.22	1732.47			
T.P.			7.95	1724.52	0.00 CHECK IN.

Beech Loop #12

T - R. Alcocer
I - L. Capono

2-17-93
Clear & Cool
Temp 65°

B.M.	B.S.	H.I.	F.S.	Elev	Description
BM 10-A				1982.50	Brass cap at intersection of Palisades Blvd. & El Lago Blvd. (See page 37)
	16.09	1998.59			
T.P.			1.89	1996.70	
	18.72	2015.42			
T.P.			0.26	2015.16	
	5.84	2031.00			
BM 12-A			5.82	2025.18	Top of GLO. Brass cap @ 1/4 cor. to Sec 17 & 16. ± 300' West of Thistle Dr. & ± 40' N. of Palisades Blvd. - Also BM. #240 Fountain Hills - Stamped Elev = 2026.82
	5.65	2030.83			
T.P.			16.64	2014.19	
	9.89	2024.08			
T.P.			7.76	2016.32	
	4.90	2021.22			
BM 12-B			5.74	2015.48	Top Brass cap in concrete - 1618.00' S 89°52'21" W. of GLO B.C. @ 1/4 Corner to Section 17 & 16 N = 947373.1329 E = 748278.6287
	5.91	2021.39			
T.P.			23.28	1998.11	
	0.34	1998.45			
T.P.			24.36	1974.09	
	0.07	1974.16			
T.P.			18.91	1955.25	
	4.64	1959.89			
T.P.			20.51	1939.38	
	0.71	1940.09			
T.P.			20.53	1919.56	
	0.40	1919.96			
T.P.			15.63	1904.33	

BM.	BS.	HI	FS.	ELEV
T.P.				1904.33
	10.93	1915.26		
BM. 12-C			20.50	1894.76
	3.38	1898.14		
T.P.			16.25	1881.89
	0.46	1882.35		
T.P.			12.01	1870.34
	19.72	1890.06		
T.P.			4.75	1885.31
	20.22	1905.53		
T.P.			7.12	1898.41
	3.65	1902.06		
T.P.			6.09	1895.97
	20.18	1916.15		
T.P.			0.92	1915.23
	21.02	1936.25		
BM 12-D			6.31	1929.94
	20.87	1950.81		
T.P.			2.96	1947.85
	10.84	1958.69		
T.P.			20.21	1938.48
	0.84	1939.32		
T.P.			21.03	1918.29
	1.61	1919.90		
T.P.			20.03	1899.87

2-19-93
CLOUDY : RAIN
TEMP · 50°

DESCRIPTION

TOP G.L.O BRASS CAP @ CORNER TO SECTIONS 8 & 9 & 16 & 17. ALSO BM # 252 (FOUNTAIN HILLS)

TOP G.L.O. BRASS CAP @ ¼ CORNER TO SECTIONS 8 & 9. ALSO BM # 299 (FOUNTAIN HILLS)

BM	BS.	H.I	F.S.	ELEV
T.P.				1899.87
	0.10	1899.97		
T.P.			19.73	1880.24
	0.61	1880.85		
T.P.			20.36	1860.49
	0.47	1860.96		
T.P.			20.42	1840.54
	1.25	1841.79		
T.P.			14.64	1827.15
	3.59	1830.74		
T.P.			2.99	1827.75
	20.05	1847.80		
T.P.			0.27	1847.53
	16.58	1864.11		
T.P.			1.28	1862.83
	16.39	1879.22		
BM 12-E			9.85	1869.37
	3.26	1872.63		
T.P.			1.04	1871.59
	7.30	1878.89		
T.P			4.05	1874.31
	5.95	1880.76		
T.P.			7.56	1873.20
	2.43	1875.63		
T.P.			14.26	1861.37

DESCRIPTION

*

*

TOP BRASS CAP AT INTERSECTION OF SIERRA MADRE & ZAPATA DRIVE.

TOP G.L.O. BRASS CAP AT CORNER OF SECTIONS 4, 5, 8 & 9. ALSO BM #302 (FOUNTAIN HILLS)

BM	B.S.	H.I	F.S.	ELEV.	
T.P.				1861.37	
	0.56	1861.93			
T.P.			19.34	1842.59	
	0.35	1842.94			
BM 12-F			20.26	1822.68	
	20.51	1843.19			
T.P.			1.40	1841.79	
	21.16	1862.95			
T.P			19.49	1843.46	
	5.52	1848.98			
T.P.			0.81	1848.17	-0.01

DESCRIPTION

TOP OF SURVEY CAP AT INTERSECTION OF SIERRA MADRE & LORMA LANE

TOP OF CURB ON GOLDEN EAGLE BLVD & EAST OF ASPEN DR. ELEV = 1848.18

(SEE PAGE 29)

Bench Comp #13

T - A. Alcocer
I - L. Capoxio

2-21-93
Partly Cloudy
Cool.
Temp 65°

Pegged Level
Checked OK

BM	BS	HI	FS	ELEV.	ADJUSTED	DESCRIPTION
BM 12-E				1869.37		TOP BRASS CAP AT INTERSECTION OF SIERRA MADRE & ZAPATA DR. (SEE PAGE 44)
	16.35	1885.72				
T.P.			0.38	1885.34		
	18.97	1904.31				
T.P.			5.20	1899.13		*
	0.67	1899.80				
T.P.			16.52	1883.28		
	0.35	1883.63				
BM 13-A			10.34	~~1873.29~~	1873.23	TOP OF BRASS CAP IN CONCRETE AT NORTH END OF E. HEADWALL OF CULVERT ON MONTEZUMA BLVD & ZAPATA WASH
	15.38	1888.67				
T.P.			0.88	1887.79		
	15.55	1903.34				
T.P.			0.74	1902.60		
	19.83	1922.43				
T.P.			0.37	1922.06		
	21.10	1943.16				
T.P.			1.66	1941.50		
	17.08	1958.58				
BM 13-B			4.14	~~1954.44~~	1954.42	TOP OF BRASS CAP IN CONCRETE IN ROCKCROP ON WESTSIDE OF MONTEZUMA BLVD & NORTH SIDE OF MONTEZUMA WASH
	3.86	1958.30				N: 953242.515 E: 747611.692
T.P.			20.28	1938.02		
	0.32	1938.34				
T.P.			20.02	1918.32		
	1.58	1919.90				
T.P.			18.92	1900.98		

B.M	B.S.	H.I.	F.S.	ELEV.	Adjust.	DESCRIPTION
T.P.				1900.98		
	0.22	1901.20				
T.P.			20.42	1880.78		
	0.47	1881.25				
T.P.			21.00	1860.25		
	2.94	1863.19				
T.P.			12.12	1851.07		
	0.98	1852.05				
T.P.			24.27	1827.78	+0.03	BRASS CAP AT END OF ZAPATA DRIVE - P.C. POINT SOUTH OF PANCHO VILLA DR. (SEE PAGE 42)

BENCH LOOP # 14

T- R. ALCOCER
I- L. CAPONO

2-23-93
CLEAR & COOL
TEMP 65°

PEGGED LEVEL
CHECKED OK

BM	B.S.	HI	F.S.	ELEV.
T.P.				1921.46
	3.63	1925.09		
T.P.			3.51	1921.58
	17.28	1940.86		
T.P.			0.13	1940.65
	19.65	1960.31		
T.P.			0.71	1959.60
	19.96	1979.56		
T.P.			0.75	1978.81
	19.64	1998.45		
T.P.			0.30	1998.15
	20.84	2018.99		
T.P.			0.31	2018.68
	19.49	2038.17		
T.P.			0.37	2037.80
	21.07	2058.87		
T.P.			0.28	2058.59
	20.78	2079.37		
T.P.			0.72	2078.65
	16.59	2095.24		
BM 14-A			3.85	2091.39
	0.96	2092.35		
T.P.			19.84	2072.51
	0.09	2072.60		
T.P.			21.09	2051.51

1 DESCRIPTION 50

TOP OF BOLT AT CENTERLINE PC ON MARATHON DRIVE NORTH OF GOLDEN EAGLE BLVD (SEE PAGE 72)

TOP OF BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & CIERRO ALTO DR. - ALSO PANEL PT #203 ELEV. 2092.98 (FOUNTAIN HILLS)

B.M.	B.S.	H.I.	F.S.	ELEV	DESCRIPTION
T.P.				2051.51	
	0.20	2051.71			
T.P.			9.63	2042.08	
	14.82	2056.90			
T.P.			1.47	2055.43	
	20.32	2075.75			
T.P.			1.04	2074.71	
	21.43	2096.14			
T.P.			0.71	2095.43	
	17.90	2113.33			
T.P.			0.53	2112.80	
	9.19	2121.99			
BM 14-B			2.68	2119.31	Top of Brass cap at North West end of Golden Eagle Blvd.
	17.64	2136.95			
T.P.			0.77	2136.18	
	17.61	2153.79			
T.P.			3.61	2150.18	
	9.58	2159.76			
T.P.			1.16	2158.60	
	0.49	2159.09			
T.P.			20.60	2138.49	
	1.96	2140.45			
T.P.			21.13	2119.32	
	1.39	2120.71			
T.P.			20.57	2100.14	Top 1/2" Iron Pin in Concrete BM # 398 Elev = 2165.18 (Fountain Hills)

BM	BS.	HI	F.S.	ELEV	DESCRIPTION
T.P.				2100.14	
	3.30	2103.44			
T.P			2076	2082.68	
	0.11	2082.79			
T.P			2048	2062.31	
	1.58	2065.89			
T.P			19.85	2044.04	
	2.57	2046.61			
T.P			18.74	2027.87	
	1.84	2029.71			
T.P.			19.88	2009.83	
	0.58	2010.41			
T.P.			21.01	1989.40	
	045	1989.85			
TP.			21.14	1968.71	
	15.34	1984.05			
T.P			5.75	1980.30	
	18.47	1998.77			
BM 14-C			2.23	1996.54	TOP OF BRASS CAP IN CONCRETE ON PARCEL 36
	2.64	1999.18			& WEST SIDE OF BRISTOL WASH
T.P.			18.88	1980.30	COORD: N: 956863.790 E: 74012.598
	0.11	1980.41			
T.P.			19.64	1960.77	
	1.25	1962.02			
T.P.			21.08	1940.94	

BM	B.S.	HI	F.S.	ELEV.	DESCRIPTION
T.P.				1941.90	
	0.14	1941.08			
T.P.			17.80	1923.28	
	0.44	1923.72			
T.P.			16.81	1906.91	
	0.63	1907.54			
T.P.			10.41	1899.13	0.00 TOP OF BRASS CAP AT INTERSECTION OF MONTEZUMA BLVD & SIERRA MADRE (SEE PAGE 47)

Beach Log #15

T - K. Alcorn
I - L. Capozzo

3:00 p.m.
Clear, calm
Temp 70°

BM	BS	HI	FS	ELEV	DESCRIPTION
BM 14.C				1996.54	TOP OF BRASS CAP IN CONCRETE ON PARCEL #36 & WEST SIDE OF SCISTOL WASH (SEE PAGE 52)
	8.02	2004.56			
T.P.			0.92	2003.64	
	18.40	2022.04			
T.P.			0.41	2021.63	
	18.38	2040.01			
T.P.			0.47	2039.54	
	19.42	2058.96			
BM 15-A			7.56	2051.40	TOP OF BRASS CAP IN CONCRETE - NORTH SIDE OF CHOLLA WASH - EAST OF RANDOM DR.
	15.60	2067.00			COORD. = 957198.389 E = 745737.177
T.B.M.			5.05	2061.55	PANEL PT #80104 ELEV = 2061.37
					PT # 104 ELEV = 2061.76
					(FOUNTAIN HILLS)

Beach Camp #116

T. K. Mercer
D. W. Perez

4-14-93
Clear & Warm
Temp 90°

SM	BS.	HI	FS	ELEV	
BM 5-A				1684.27	
	16.72	1700.99			
T.P.			0.14	1700.85	
	14.83	1715.68			
T.P			0.16	1715.52	
	15.78	1731.30			
T.P			0.64	1730.66	
	6.95	1737.61			
T.P.			11.90	1725.71	
	24.82	1750.53			
T.P.			2.45	1748.08	
	21.37	1769.45			
T.P.			3.93	1765.52	
	10.92	1776.44			
BM 16-A			3.62	~~1772.82~~	1772.83
	1.15	1773.97			
T.P.			18.89	1755.08	
	0.32	1755.40			
T.P.			24.65	1730.75	
	0.51	1731.26			
T.P			19.50	1711.76	
	0.41	1712.17			
TP			24.72	1687.45	
	14.54	1701.79			
BM 5-A			17.54	1684.25 - 0.02	

TOP OF BRASS CAP AT INTERSECTION OF GLENBROOK BLVD & TANGLEWOOD COURT
(SEE PAGE 19)

TOP BRASS CAP IN CONCRETE ON THE SOUTH SIDE OF HESPERUS WASH. 1013.30' N 37°15'03" W OF PT 249.

ERM 16-A N.1956133.690
E 756633.634

ELEVATION CHECK INTO TEMA FOR FOUNTAIN HILLS (SOUTH) FLOOD DELINEATION STUDY - SET BY VALCO SURVEYING CORPORATION

6-29-93

T. W. PEREL
J. L. CAPONIO

CLEAR - WARM

STA	BS	HI	FS	ELEV	
T.P.				1675.54	
	2.42	1677.96			
T.P.			4.73	1673.23	
	5.29	1678.52			
T.P.			4.58	1673.94	
	10.32	1684.26			
T.P.			7.86	1676.40	
	0.20	1670.60			
TBM.			11.96	1664.65	-0.18

BRASS CAP IN HANDHOLE AT INTER-SECTION FOUNTAIN HILLS BLVD & PALISADES BLVD.

BRASS CAP AT INTERSECTION PALISADES BLVD & WESTBY DR.
ELEV = 1664.83

HYDRAULICS - BOOK No. 2

FOUNTAIN HILLS NORTH

FLOOD CONTROL DISTRICT

OF

MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

BOOK No. 2

TELEDYNE

407

FIELD BOOK

Property of ALCOCER LAND SURVEYORS
3501 N. 16th STREET
PHOENIX, ARIZONA 85016

Address _____

_____

Telephone _____

This Book is manufactured of a High Grade 50% Rag Paper having a Water Resisting Surface, and is sewed with Nylon Waterproof Thread.

BOOK 2
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"	"	#M103	38-40
"	"	#M104	41-43
"	"	#M105	44-46
"	"	#M107	47-49
"	"	#M110	50-52
DAM	#536		53-57
"	#560		58-62
"	#578		63-66
"	#584		67-71
℄ F.H. BLVD PAVEMT			72-74

I CERTIFY THAT THESE NOTES CORRECTLY REPRESENT A SURVEY MADE UNDER MY SUPERVISION.

FOUNTAIN HILLS (NORTH) FLOOD DELINEATION STUDY

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

CULVERT CROSSING #527

SAN MARCOS & CALIENTE WASH

3-15-93

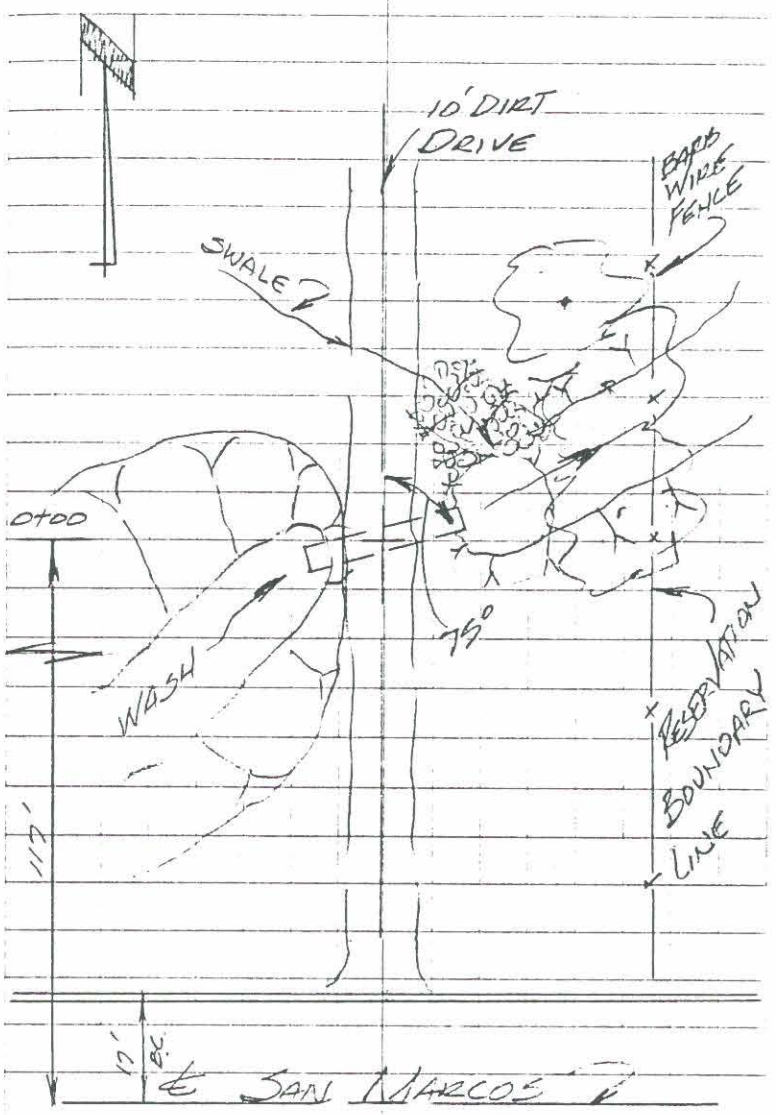
STA.		ELEV.	
BM. 1-GT		1537.66	BRASS CAP IN CONCRETE - PUEBLO BLVD & SAN MARCOS - SEE PAGE 9
PROFILE ALONG 10' DIRT DRIVE			
1+00	NORTH	1531.8	NAT'L GROUND
+85	"	1531.6	" "
+50	"	1531.2	" "
+32	"	1530.4	" "
+29	"	1530.0	" "
+22	"	1529.9	℄ DRAINAGE SWALE
+17	"	1530.3	
0+00		1531.0	℄ 42"x25' CMP & 10' DIRT DRIVE
0-50	SOUTH	1532.1	℄ 10' DIRT DRIVE & TOE OF SLOPE
0-90	"	1537.5	" " " " TOP " "
-100.	"	1536.87	TOP OF 1.25' EXTRUDED CURB
-101.5	"	1535.42	PAVEMT
-117.0	"	1536.66	℄ SAN MARCOS

Cross Section
42" x 25' Lined C.M.P.

1527.5	2708	31.0	31.0	30.8	1526.10
17	12.5	7	0	8	12.5
℄ Wash	℄ CMP	Top Bank	℄ RD	Top Bank	℄ CMP

1524.9	1522.4
22.5	17.5
℄ Wash	℄ Wash

1526.0
43.0
℄ Wash



CULVERT CROSSING # 538

BOULDER DR & HESPERUS WASH

3-15-93

BM	BS	HI	FS	ELEV.
T.P				1804.35
	1.35	1805.70		
T.P			1585	1789.85
	5.01	1794.86		

PROFILE

Top of Curbs @ West Side Boulder

STA	West	East		ELEV.
2+50	-10.55	North		1784.31
2+00	-10.48	"		1784.38
+50	-10.30	"		1784.56
+15		-11.80	North	1783.06
1+00	-9.72	North		1785.14
+50	-8.47	"		1786.39
0+00	-6.97			1787.89
0-50	-5.57	South		1789.29
-100	-4.00	"		1790.86

Top Bolt @ Intersection Boulder Dr & Rocky Mountain (Page 30)

Top of Curb @ West Side

" " " "

" " " "

& 25' opening @ Spillway (East Side)

Top of Curb @ West Side

" " "

" " "

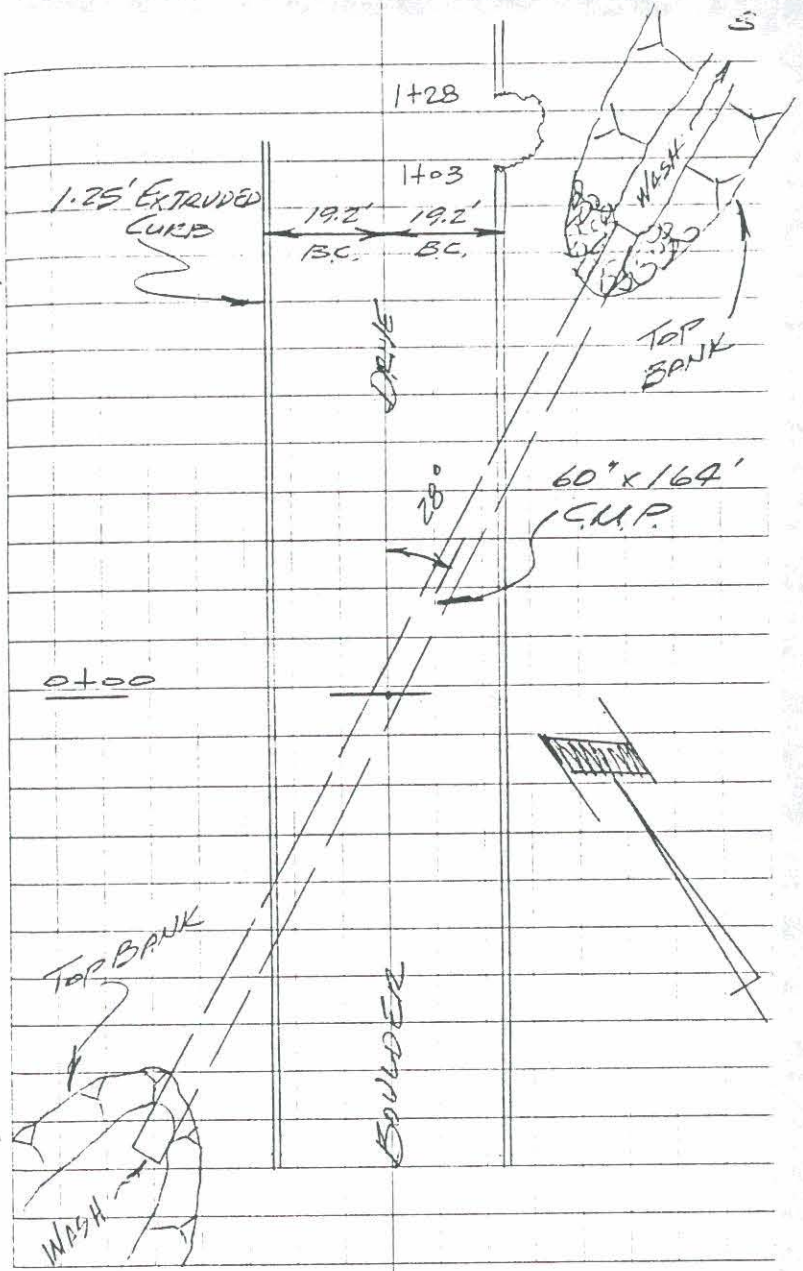
" " "

" " "

CROSS SECTION
60" x 164' C.M.P.

HI = 1794.96

1788.85	1788.53	1787.26	1785.69	1786.01
-6.01	-6.33	-7.60	-9.17	-8.85
39.5	38.0	0	38	39
T.C.	PAVE	PAVE.	PAVE	T.C.
1789.8	1778.02		1775.76	1785.8
-5.1	-16.84		-19.10	-9.1
68.0	82.3		82	70
T. SLOPE	INV. CMP		OUTLET CMP.	T. SLOPE
	1778.4		1774.2	
	-16.5		-20.7	
	84		86	
	℄ WASH		℄ WASH	



CULVERT CROSSING #557

GOLDEN EAGLE BLVD & ASHBROOK

3.15.93

BM	BS	HI	FS	Elev.
T.P.				1921.46
	3.28	1924.74		

PROFILE

TOP CURB @ WESTSIDE GOLDEN EAGLE

4+00			-3.64	1921.10
+50			-3.82	1920.92
3+00			-4.06	1920.68
+50			-4.36	1920.38
2+00			-4.64	1918.10
+50			-4.82	1919.92
1+00			-5.05	1919.69
+50			-5.19	1919.55
+42			-7.52	1917.22
0+00			-4.63	1920.11
0-50			-2.28	1922.46
T.P.			-2.27	1922.47
	6.64	1929.11		
-100			-1.59	1927.52

TOP BOLT @ P.C. & MARATHON & N.W. OF GOLDE EAGLE BLVD.

TOP CURB @ WEST SIDE

" " "
" " "
" " "
" " "
" " "
" " "
" " "

℄ 15' CONC. SPILLWAY @ 29.2' RT.

TOP CURB @ WEST SIDE

" " "
" " "

" " "

CROSS SECTION
60" x 110' CMP

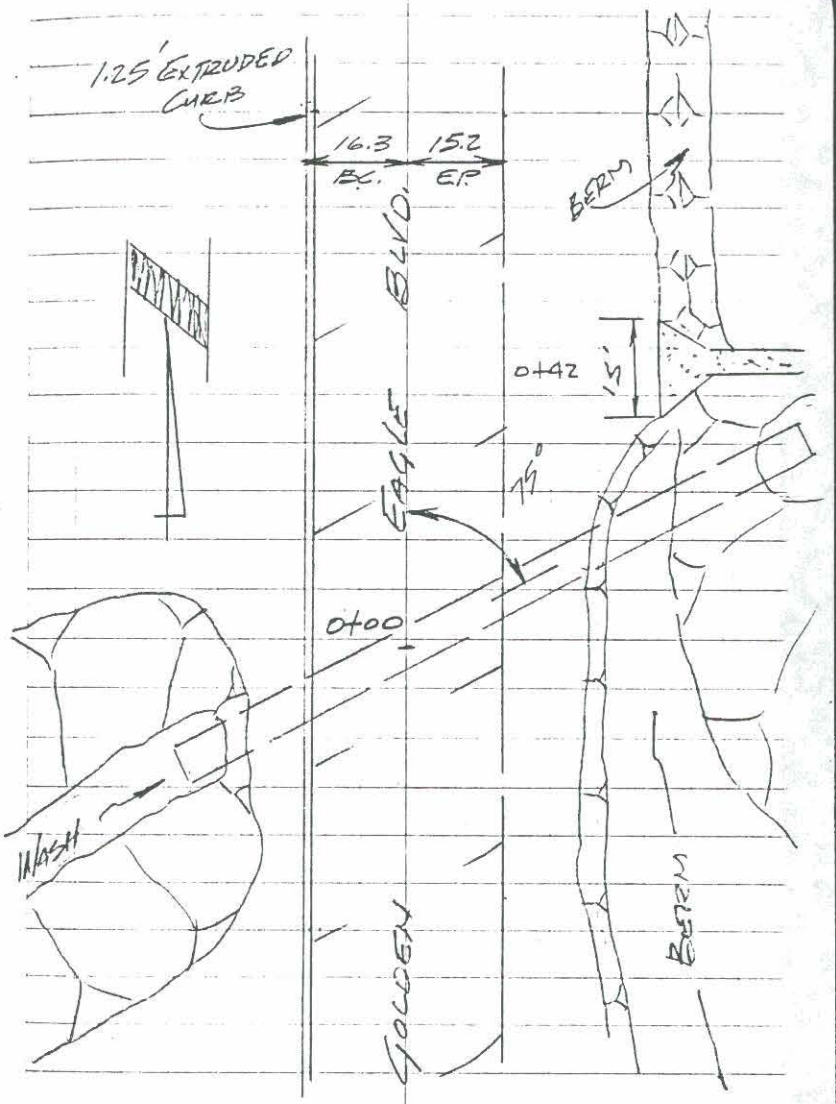
HI = 1929.11

1920.09	1919.67	1919.31	1919.11	1918.71
-9.02	-9.44	-9.80	-10.00	-10.4
17	16.0	0	16.0	31.0
T.C.	PAVE	PAVE	E.P.	T. BERM

1919.4	1911.6	1920.0	1920.1
-9.7	-17.5	-9.1	-9.0
28.0	31.0	55.0	34.0
T. Slope	Toe Slope	Top Slope	Top Berm

1909.3	1909.38	1910.3	1905.77
19.8	19.73	-18.8	-23.34
42	40	60	70
WASH	INV. CMP.	TOP SLOPE	E CMP

1905.6
-23.5
75
WASH



CULVERT CROSSING #570

MONTEZUMA BLVD & ZAPATA WASH

3-16-93

STA.	B.S.	H.I.	F.S.	ELEV.
B.M. 13-P				1873.28
	6.83	1880.11		

PROFILE

TOP CURB @ EAST SIDE N/O TEZUMA

3+50	NORTH		1.87	1878.24
3+00	"		3.47	1876.64
+50	"		5.13	1874.98
2+00	"		6.03	1874.08
+85	"		6.36	1873.25
+85	"		6.83	1873.28
+50	"		6.24	1873.87
1+00	"		5.79	1874.32
+50	"		5.17	1874.94
0+00			4.55	1875.56
+50	SOUTH		3.92	1876.19
+74	"		4.14	1875.97
1+00	"		3.54	1876.57
+50	"		3.00	1877.11
2+00	"		3.54	1876.57
+50	"		3.06	1877.05
3+00	"		2.49	1877.62
3+50	"		1.65	1878.46

BRASS CAP IN CONCRETE AT NORTH END OF E. HEADWALL OF CULVERT ON MONTEZUMA BLVD ; ZAPATA WASH

TOP OF CURB @ EAST SIDE

" " " "

" " " "

" " " "

GUTTER @ 18' SPILLWAY @ WEST CURB

" " " " EAST "

TOP OF CURB @ EAST SIDE

" " " " " "

" " " " " "

" " " " " "

" " " " " "

GUTTER @ 19' SPILLWAY @ WEST CURB

TOP OF CURB @ EAST SIDE

" " " " " "

" " " " " "

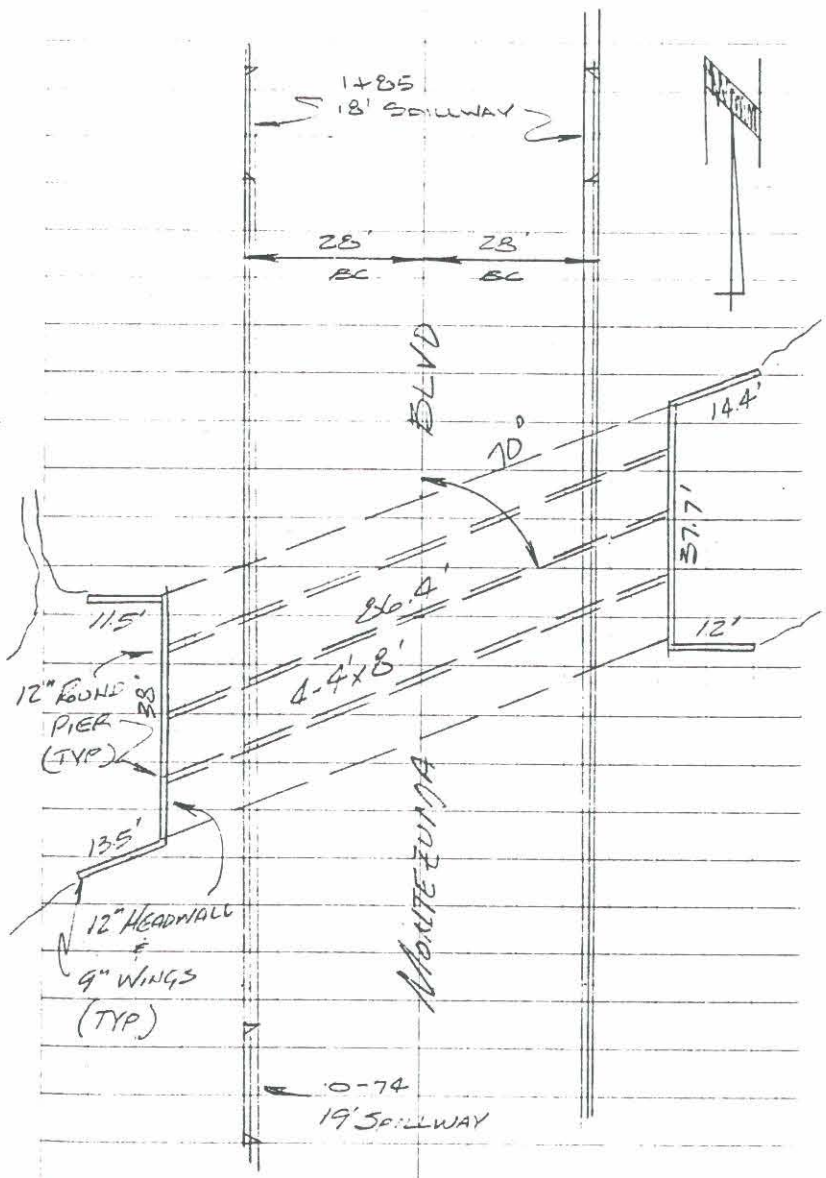
" " " " " "

" " " " " "

" " " " " "

MONTEZUMA BLVD & ZAPATA WASH
CROSS SECTION
4-4'x8' BOX CULVERT

75.6	75.70	75.22	75.61	74.99	75.46	75.1
32.5	27.7	27.0	0	26.9	27.6	32.
N/G	T.C.	G	P	G.	T.C.	N/G
74.65	69.41	69.7		68.0	68.24	73.62
47.	69.39	52		40	68.26	38.5
HOWL	69.40	WASH		WASH	68.26	HOWL
	69.60				68.33	
	47.				38.5	
	℄ CULV.				℄ CULV.	



CULVERT CROSSING #601

GLENROSE BLVD & TULIP WASH

2-16-93

STA.		ELEV.
T.P.		1729.01
T.P.		[illegible]

PROFILE.

TOP OF CURB @ WESTSIDE GLEN EAGLE DR.

2+00	NORTH	1719.55
+50	"	1718.79
1+00	"	1717.[illegible]
+50	"	1716.32
0+00		1716.0[illegible]
+50	SOUTH	1717.03
1+00	"	1717.[illegible]
+50	"	1722.30

BRASS CAP ± 60' N OF INTERSECTION GLENBROOK & GLEN EAGLE DR.
B.C. & P.T. @ GLENBROOK BLVD AS NOTED ON PAGE 19 OF LEVEL BOOK

TOP OF CURB " " "
" " "
" " "
" " "
" " "
" " "
" " "

T.P. 1729.01

T.P. 1719.02

GLENBROOK BLVD. T.P. → T.P.

16.4 / 35 / N.G.

16.03 / 320 / T.C.

16.16 / ℄ / P

16.19 / 320 / T.C.

16.6 / 40 / N.G.

16.10 / 45.9 / T. HOWL

09.62 / 46 / I.E. SOUTH 60" C.M.P.

09.07 / 46 / I.E. NORTH 60" C.M.P.

08.44 / 41.7 / I.E.S.

08.10 / 41.7 / I.E.N

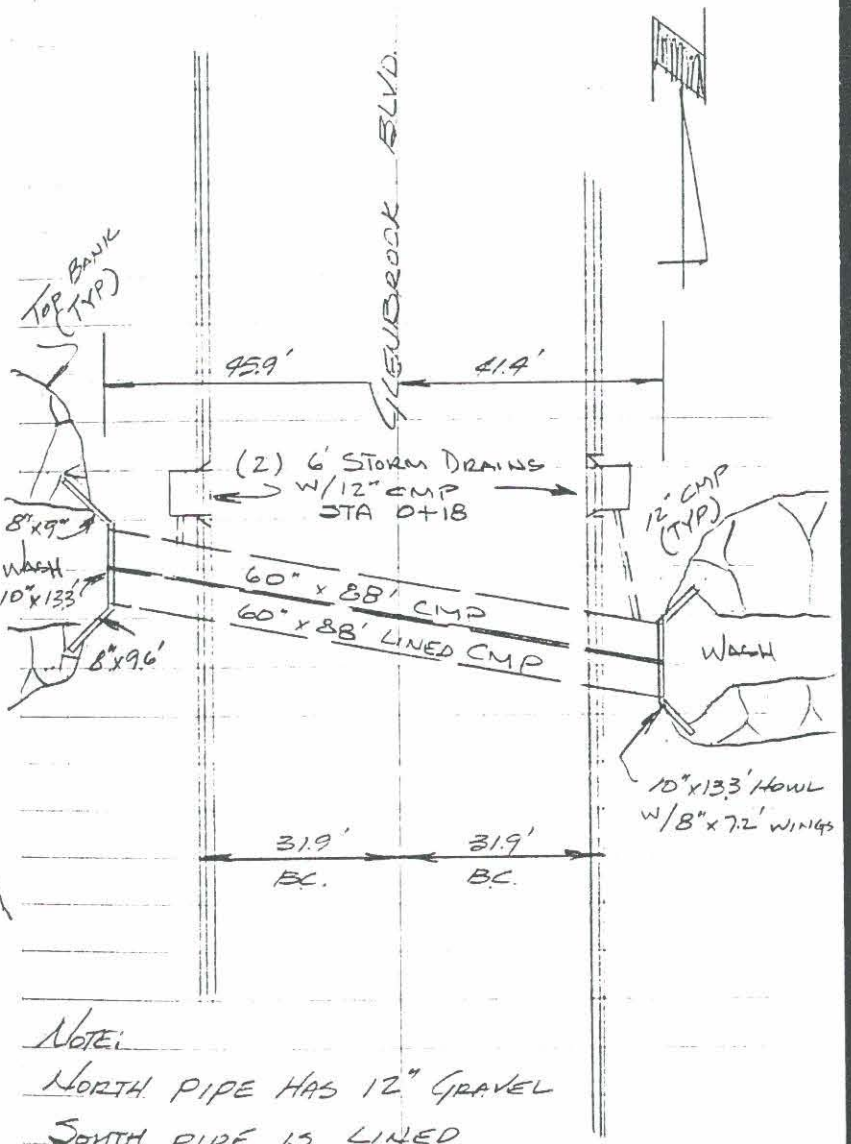
15.00 / 21.2 / T. HOWL

09.3 / 50 / WASH

27.9 / 55

CATCH BASIN GRATES

0+13	31.2	EAST	1715.9
0+18	31.2	WEST	1715.56



NOTE:

NORTH PIPE HAS 12" GRAVEL

SOUTH PIPE IS LINED

Culvert Crossing #608

Hampstead Dr. Hanover, NH

3-17-93

Sta		
T.P.		1682.67

Brass Cap at Intersection Hempstead Dr & Stancrest Dr as noted in Page 17 of Level Book

Profile

Top of Curb @ West side Hempstead

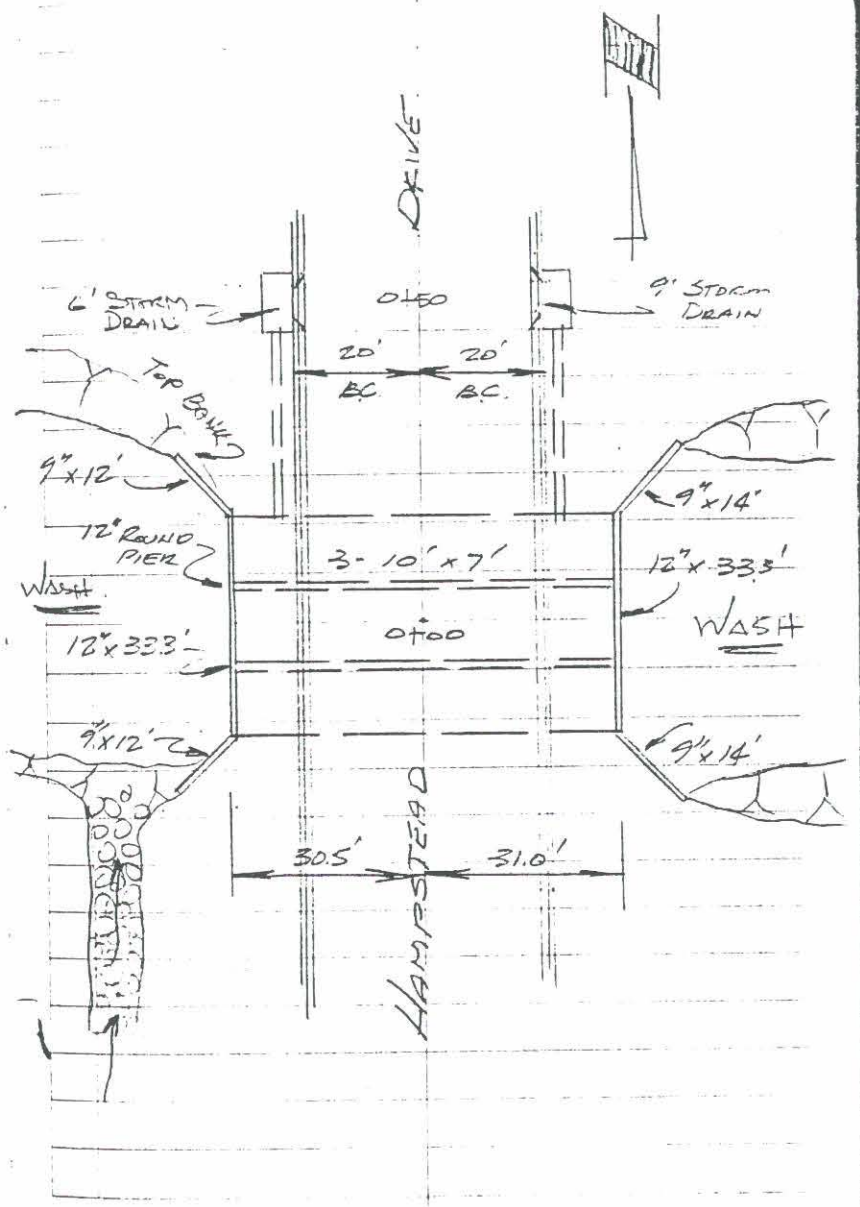
2+00	North	1684.76
+50	"	1682.76
1+00	"	1681.89
+50	"	1681.57
+50	"	1680.84
+50	"	1680.76
0+00		1681.87
+50	South	1682.36
1+00	"	1682.86
+50	"	1683.35
2+00	"	1683.82
3+00	"	1685.45

Top of Curb
" " "
" " "
" " "
Grate @ Catch Basin West side
" " " " East side
Top of Curb
" " "
" " "
" " "

HOMESTEAD DR:

81.5	81.89	81.78	81.73	81.0
23.5	20	0	20	25
N/G	TC	P	TG	N/G

80.57	73.19	72.71	80.01
30.5	N.	N.	31
T. HOWL	73.19	72.69	T. HOWL
	E	E	
	73.15	72.70	
	30.5	31.0	
	E CULV.	E CULV.	
	S.	S.	



CULVERT CROSSING #618

MIMOSA DR & ARROW WASH

3-17-93

STA	B.S.	H.I.	F.S.	ELEV.
T.P.				177450
	0.30	177480		
T.P.			13.81	176099
	0.65	176164		
T.P.			13.45	174819
	5.60	175379		
T.P.			9.38	174391
	5.43	174934		

BRASS CAP AT INTERSECTION SUNFLOWER & MIMOSA AS NOTED IN PAGE 22 OF LEVEL BOOK

PROFILE

TOP OF CURB @ WEST SIDE MIMOSA

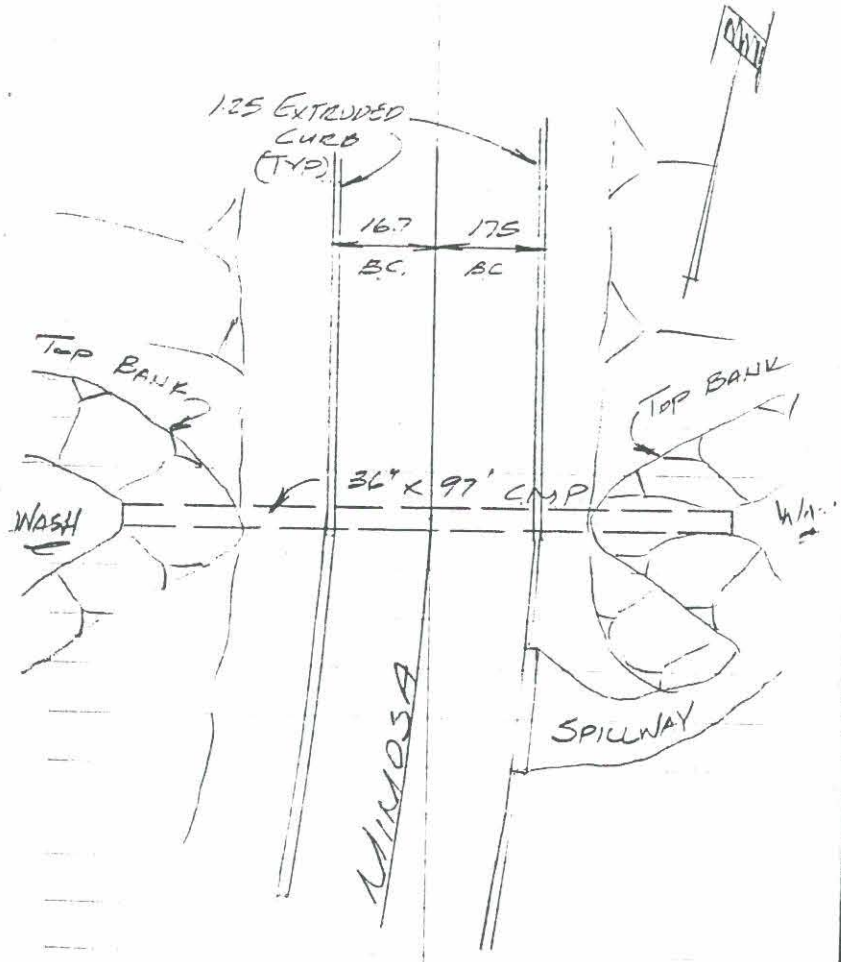
0+70	NORTH	0.10	1749.24
+50	"	1.69	1747.65
0+00		4.37	1744.97
+13	SOUTH	6.20	1743.14 (EAST CURB)
+38	"	5.52	1747.82 (EAST CURB)
+50	"	4.99	1744.35
1+00	"	3.91	1745.43
1+50	"	0.35	1749.09

TOP OF CURB (WEST SIDE)
" " " " "
" " " " "
DEPRESSED CURB FOR SPILLWAY
"
TOP OF CURB (WEST SIDE)
" " " " "
" " " " "

MIMOSA DRIVE : ARROW WASH
36" x 97' CMP

HI = 1709.54

(44.97)	(44.44)	(43.96)	(43.48)	(43.98)	
4.37	4.90	5.38	5.85	5.36	
16.7	15.4	0	16.2	17.5	
T.C.	P	P	P	T.C.	
(45.34)	(30.9)	(30.44)	(26.83)	(32.8)	(44.3)
4.0	18.4	18.90	22.51	16.5	5.0
30	48.5	48.5	48.5	48.5	25
T. BANK	TOE	℄ CMP	℄ CMP.	TOE	T. BANK



CULVERT #611

BEEHIVE INLET SOUTH OF PALISADES BLVD

3-17-93

STA	BS.	HI	FS	ELEV
T.P.				1683.49
	B.M.	1691.62		

TOP BRASS CAP AT INTERSECTION ELISABETH BLVD & WENDOVER DR.

PROFILE

TOP OF CURB @ SOUTHSIDE KALISH CT.

1+50		8.52	1683.11
1+00		7.74	1683.89
+50		6.70	1684.93
0+00		5.29	1686.34
+50		4.08	1687.55
1+00		2.83	1688.80
1+50		1.33	1690.30

TOP OF CURB

" " "

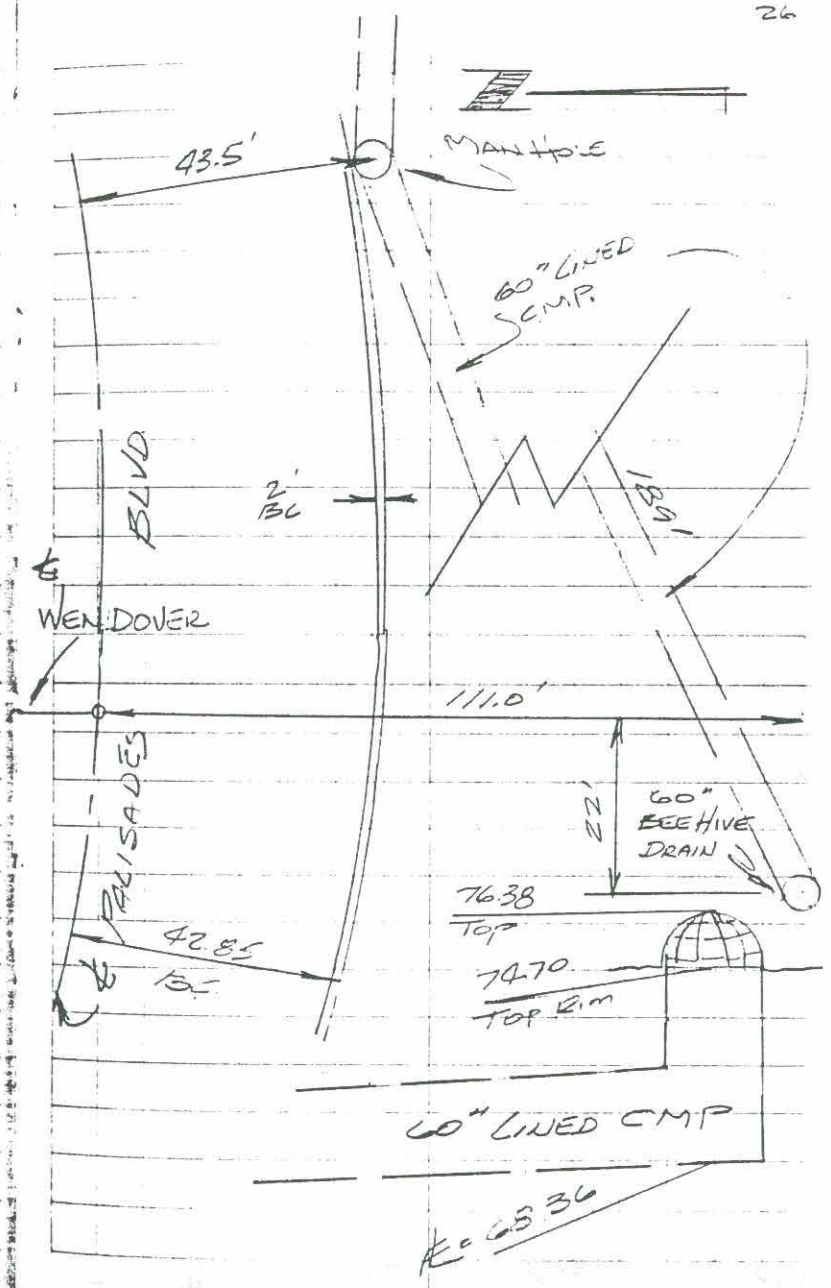
" " "

" " "

" " "

" " "

60" BEEHIVE METAL DRAIN
ON WENDOVER ± SOUTH OF
PALISADES BLVD.



CROSS SECTION SOUTH

83.98	82.85	80.30
-7.65	-5.78	-5.20
0	42	47.85
℄	℄	℄

85.0	83.3	31.5
6.0	8.3	-5.6
77	67	47
Top	TOE	

75.6	167.4
-10.0	16.75
95	111
TOE	RIM OF BEEHIVE DRAIN

CULVERT CROSSING #617

CAVERN DR. & ARROW WASH

3-17-93

STA	ES	HI	FS	ELEV
BM 6-A				1813.51
	0.44	1813.95		
			9.21	1804.74
	4.33	1809.57		

PROFILE

Top of Curb @ South side Cavern Dr.

1+50	"		3.25	1806.32
1+00	"		4.04	1805.53
+64	"		4.95	1804.62
+50	East		4.44	1805.13
0+00			3.66	1805.91
+50	West		2.60	1806.97
0+95	"		1.53	1808.04

Top of Curb @ North side Cavern Dr.

1+50			3.80	1805.77
1+00			4.52	1805.05
+51			5.31	1804.26
0+00			4.11	1805.46
+50			2.56	1806.98
0+95			1.53	1808.04

Top of Brass Cap at North P.C. of Curve on Cavern Drive - North of El Lago Blvd.

℄ 10' opening

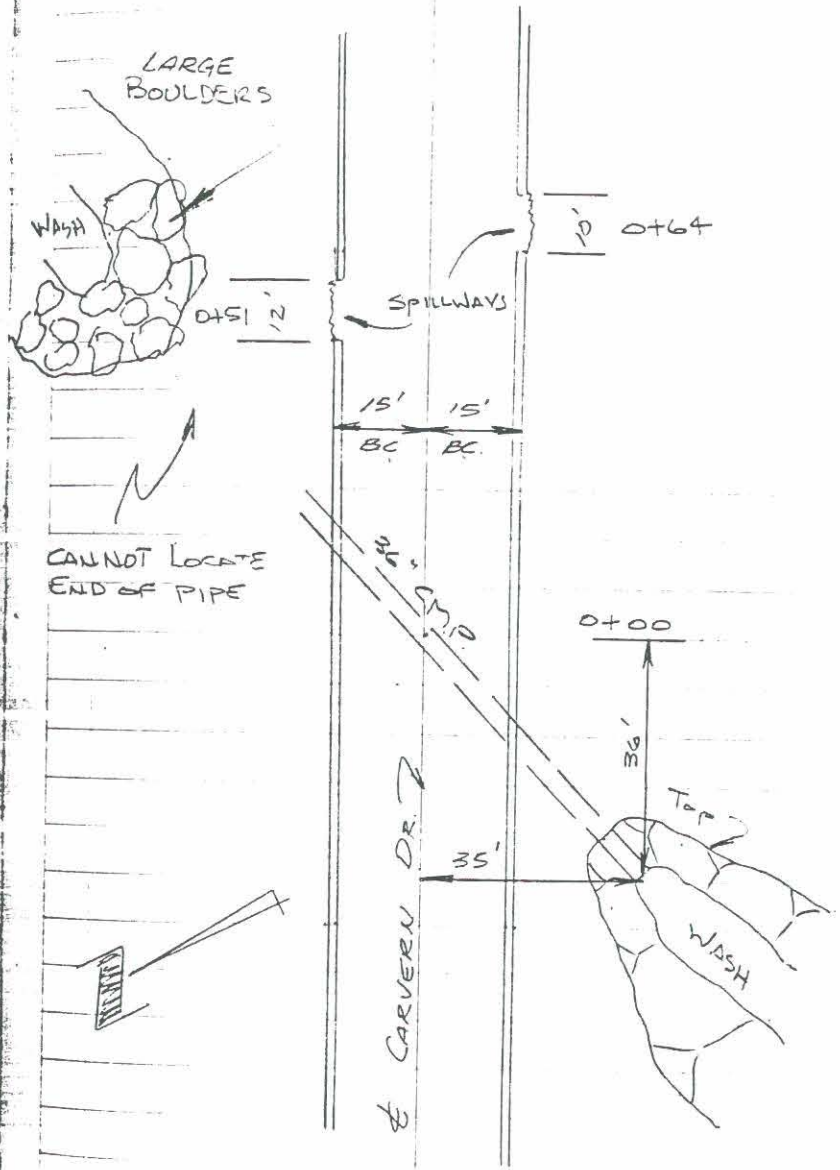
℄ 12' opening

CAVERN DRIVE & ARROW WASH
36" x - C.M.P.

HI = 1809.57

03.4	04.94	04.52	05.39	05.80	06.22	06.3
(6.1)	(4.63)	(5.05)	(4.18)	(3.77)	(3.35)	(3.3)
63	24	24	0	24	26	41
Top	T/C.	P	P	P	T/C.	Top

96.3	00.21	00.7
(13.3)	(9.36)	(8.9)
75	50	50
TOE	INV 36" CMP	TOE
Bottom Wash		



CULVERT CROSSING #619

FOUNTAIN HILL BLVD
PALISADES PLAZA
PALISADES BLVD

3-13-91

STA	BS	HI	FS	ELEV
T.P.				1675.36
	12.31	1687.67		
T.P.			4.37	1683.30
	12.24	1695.54		

PROFILE

Top of Curb @ East Side

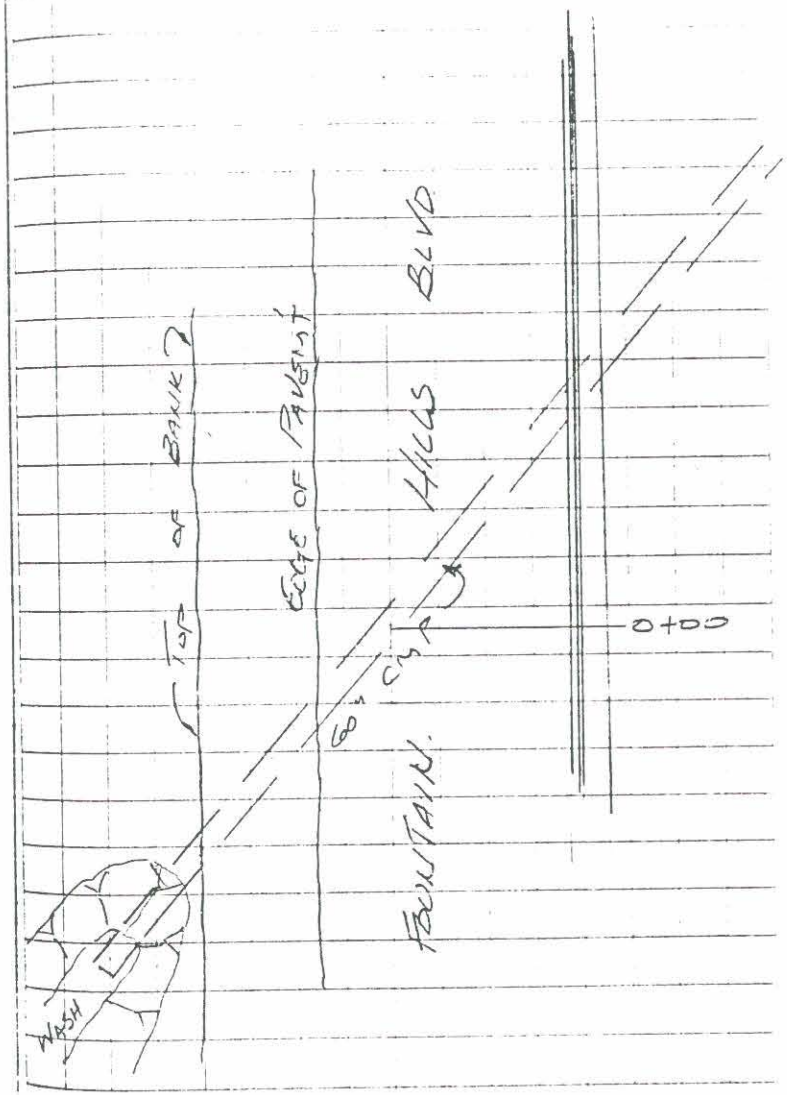
1+50		8.88	
1+00		7.40	
+50	North	5.98	
0+00		4.55	
+50	South	2.92	
1+00		1.28	
1+50		0.18	
		20.19	1675.53

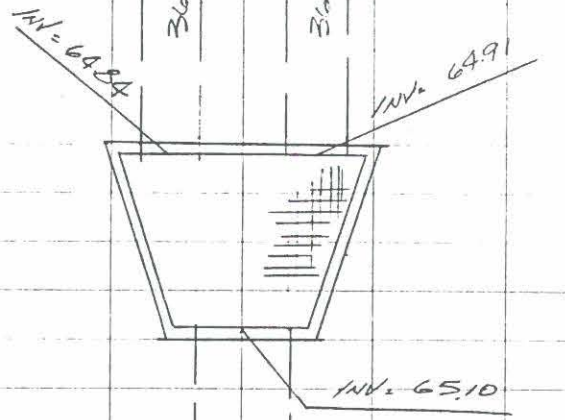
BRASS CAP IN HH @ INTERSECTION FOUNTAIN HILLS BLVD & PALISADES BLVD AS NOTED IN PAGE 17 OF LEVEL BOOK

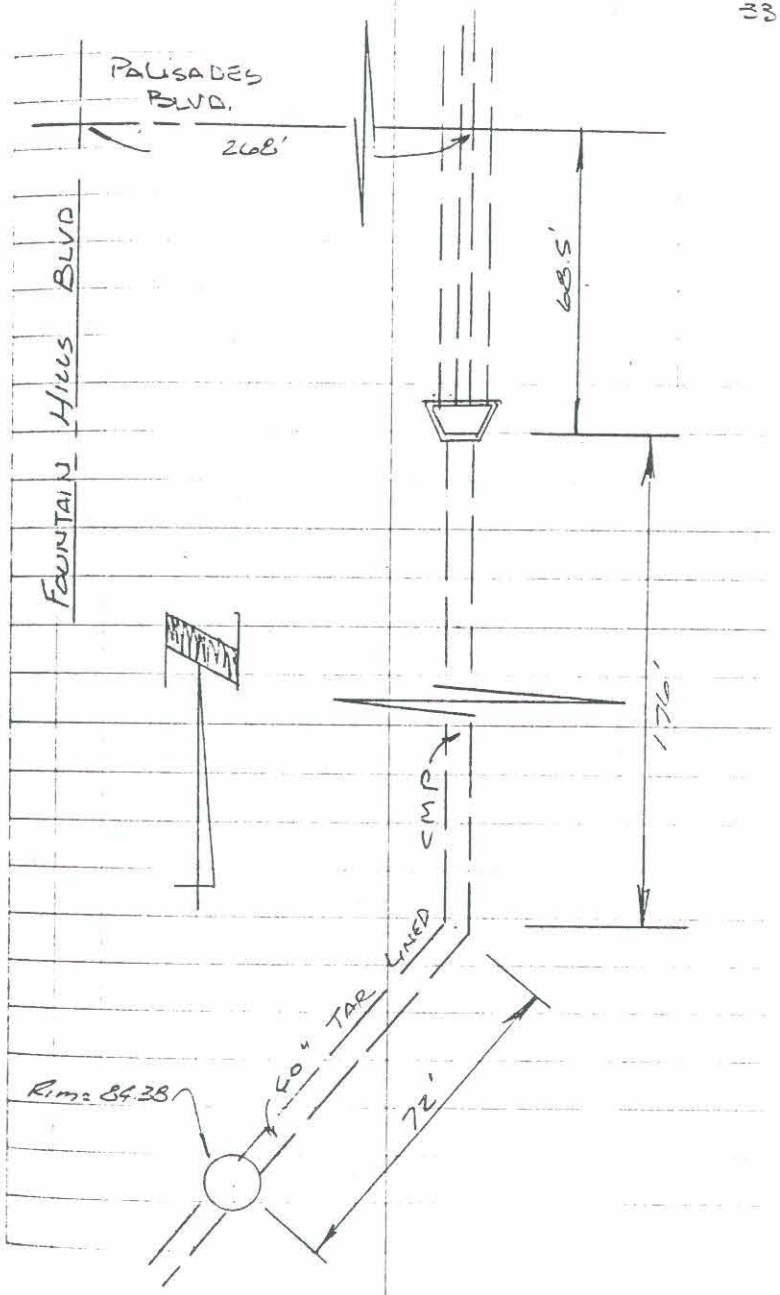
FOUNTAIN HILLS BLVD - ARROW WASH

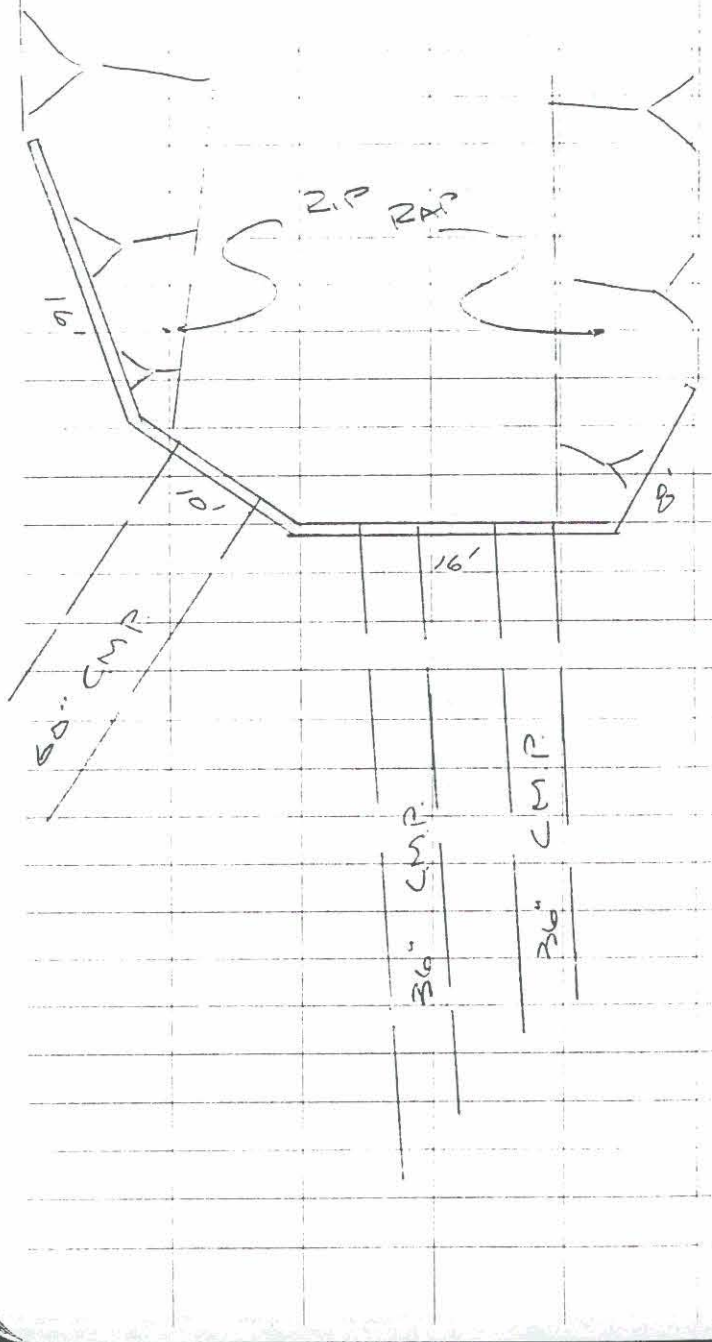
HI = 1695.54

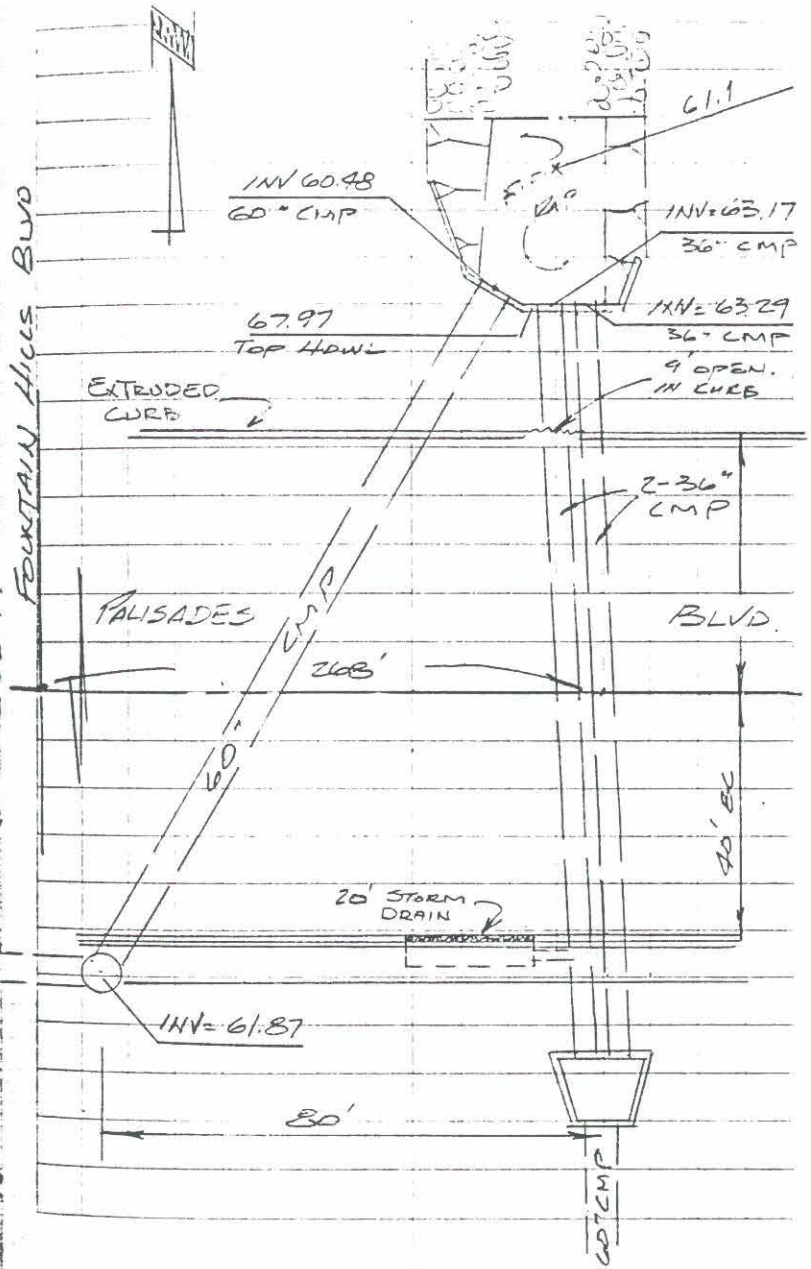
90.9	91.06	95.36
(4.6)	(4.43)	(0.18)
38	17	0
GB	EP	P
92.1	75.4	75.39
(3.4)	(20.1)	(20.15)
63	37	95
TOP	TOE SLOPE	18" RN CO" CMP




36" CMP
36" CMP
INV. 64.84
INV. 64.91
INV. 65.10
60" CMP


PALISADES BLVD.
268'
FOUNTAIN HILLS BLVD
68.5'
175'
CMP
60" TAR LINED
72'
Rim: 84.38


2.1% RAP
6'
10'
8'
16'
60" CMP
36"
36"


FOUNTAIN HILLS BLVD
61.1
INV 60.48
60" CMP
INV=63.17
36" CMP
67.97
TOP HOWL
INV=63.29
36" CMP
9' OPEN.
IN CURB
EXTRUDED
CURB
2-36"
CMP
PALISADES
BLVD.
268'
60'
80' BC
20' STORM
DRAIN
INV=61.87
80'
60" CMP

CULVERT CROSSING #622

SAGUARO BLVD; ASHBROOK WASH

3.15.93

STA	BS	HI	FS	ELEV
TP				1584.5

PROFILE

Top of Curb @ West side of Saguaro

3+50	North	1588.76
3+00		1586.[illegible]
+50		1585.[illegible]
2+00		1584.3
+50		1582.59
1+00		1582.71
+50		1584.75
0+00		1584.06
+50	South	1586.38
1+00		1584.65
+50		1581.62
2+00		1584.31
+50		1584.53
3+00		1585.16
+50		1585.74
4+00		1586.86
4+50		1593.37

Top of Curb @ East Side of Saguaro Blvd. ± 200' North Ashbrook Wash as noted in Page 11 of Level Book

Top of Curb

Pavemt Elev

Top of Curb

Pavemt Elev.

Top of Curb

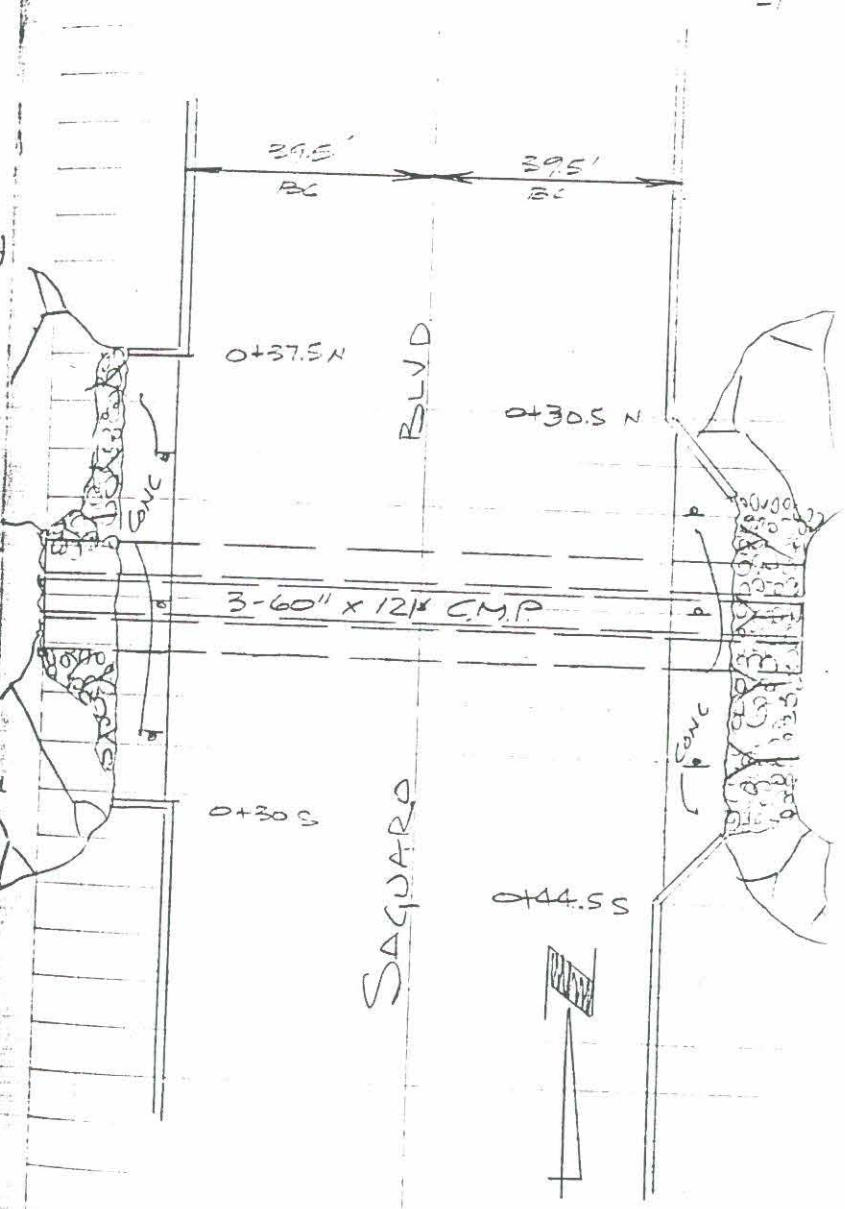
Pavemt Elev.

" "

Top of Curb

SAGUARO BLVD : ASHBROOK WASH

75.93 / 60 / INV						73.37 / 61 / INV
75.83 / 60 / INV.	74.6 / 65 / WASH	84.06 / 39.5 / CONC	83.33 / 0 / P	82.21 / 39.5 / CONC	82.00 / 50 / CONC	74.00 / 61 / INV.
75.83 / 60 / INV						83.97 / 61 / INV.



CULVERT CROSSING #M03

ZAPATA DRIVE / ZAPATA WASH

2-5-93

STA		ELEV	CORRECTED ELEV.
T.P.		1862.83	
T.P.		~~1830.47~~	1831.68

PROFILE

TOP OF CURB @ WEST SIDE OF ZAPATA DR.

1+50	NORTH	~~1846.72~~	1850.93
1+00		~~1845.71~~	1829.92
+50		~~1842.71~~	1827.42
+23		~~1841.47~~	1825.93
0+00		~~1841.05~~	1825.74
+31	SOUTH	~~1840.96~~	1825.67
+50		~~1841.77~~	1826.48
1+00		~~1842.57~~	1826.93
+50		~~1843.85~~	1828.56
2+00		~~1845.69~~	1830.40

NOTE: ERROR DUE TO USING WRONG TURNING POINT (-1.52)

TOP OF CURB ON WEST SIDE OF ZAPATA DRIVE ± 200 NORTH OF RANCHO VILLA AS NOTED ON PAGE 44 OF LEVEL BOOK

GUTTER

TOP OF CURB

" "

GUTTER @ EAST SIDE = DEPRESSED SPILLWAY

" " " "

" " " "

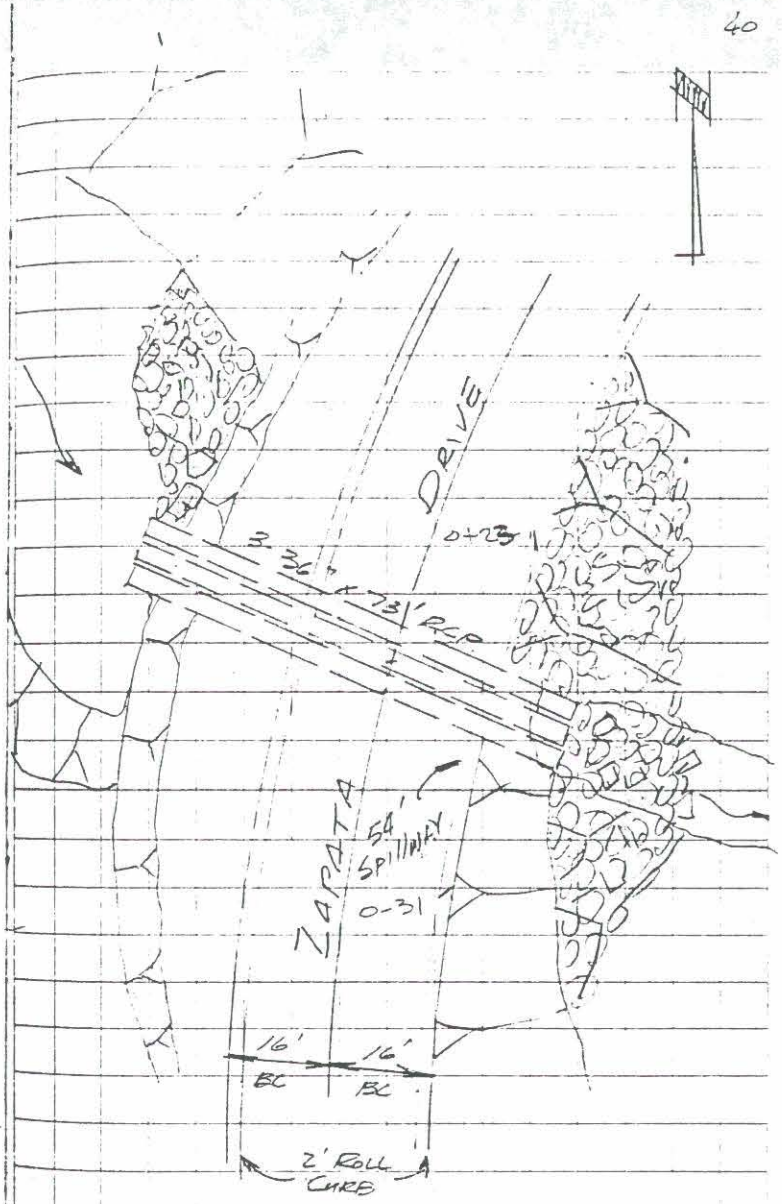
TOP OF CURB

ZAPATA DRIVE & ZAPATA WAY
3.36" x 73' R.C.P.

26.82	26.50	26.05	25.71	25.6
~~42.11~~	~~41.79~~	~~41.34~~	41.00	~~40.9~~
20.8	18.5	0	15.5	23
T/C	G	P	DEP. GR.	

27.1		23.2	20.3	
~~42.4~~	23.20	~~38.5~~	~~35.6~~	20.79
38.5	44	48	32	29.0
	INV.	WASH	WASH	INV.
~~33.0~~	~~38.7~~			~~31.2~~ 29.80
	43.5			24.5
	INV.			INV.
	23.00			~~20.53~~
	43			30.
	INV.			INV.

NOTE: ERROR DUE TO USING WRONG TURNING POINT. (-15.29)



CULVERT CROSSING # M04

SIERRA MADRE ~~CHOLLA~~ BRISTOL WASH

9-5-95

STA	BS	HI	FS	ELEV
BM 12-E				1869.37
	3.08	1872.45		

PROFILE

Top of Curb @ South Side

1+50	EAST	3.05	1869.40
1+00		2.61	1868.82
+50		4.26	1869.19
+06		5.15	1867.30
0+00		5.19	1867.26
+06	WEST	5.17	1867.28
+50		6.42	1868.03
1+00		5.95	1868.57
1+50		5.39	1869.06

BRASS CAP AT INTERSECTION OF SIERRA MADRE & ZAPATA DR. AS NOTED ON PAGE 44 OF LEVEL BOOK

Top Curb

{

Storm Drain @ South Gutter

Top of Curb

Storm Drain @ North Gutter

Top of Curb

{

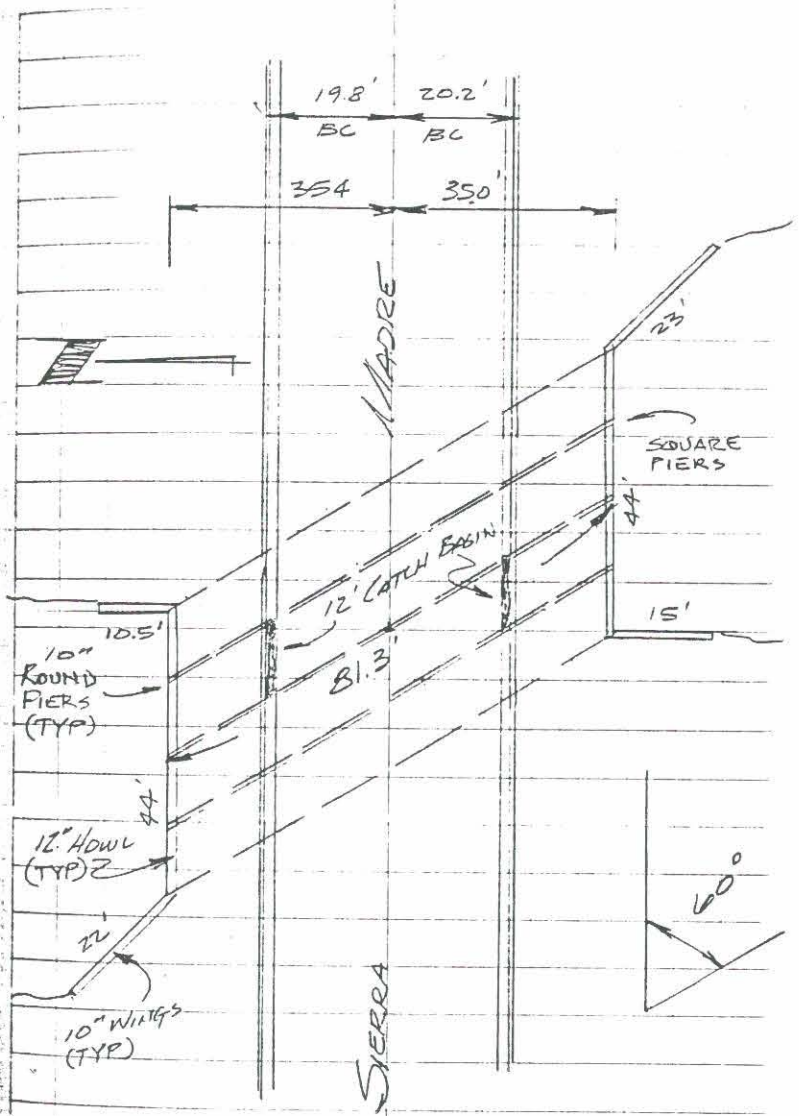
SIERRA MADRE & CHOLULA PINE
4- 9'x6' BOX CULVERT

HI = 1872.45

67.3	67.97	67.85	67.87	67.2
(5.1)	(2.48)	(4.60)	(4.58)	(5.2)
33.5	22.5	0	22.5	37
N/G	T/C	P	T/C	

66.60	59.26	56.06	63.41
(5.85)	(13.19)	(16.39)	(9.04)
40	40.7	40.5	40
Top Howl	INV. Box	INV. Box	Top Howl

NOTE: ALL BOX INV. @ NORTH & SOUTH ARE ± 0.05' AS SHOWN.



Cultural Property #1105

Sierra Madre / Ashbrook Wash

E.G. 93

STA	BS	HI	FS	ELEV.	
T.P.				1775.01	T.P. BRASS CAP AT INTERSECTION OF GOLDEN EAGLE BLVD & BOULDER DR. AS NOTED IN PAGE 26 OF LEVEL BOOK
	5.98	1780.99			
		PROFILE SOUTHERN MEDIAN CURB			
TOP OF CURB @ ~~SOUTHEAST SIDE~~					
1+50	NORTH		4.70	1776.29	TOP OF CURB
1+00			3.95	1777.04	
+50			3.90	1777.09	
+21			5.02	1775.97	STORM DRAIN @ EAST GUTTER
+21			5.06	1775.93	" " WEST "
0+00			3.99	1777.00	TOP OF CURB
+50	SOUTH		3.41	1777.58	
1+00			2.10	1778.89	
1+50					
			5.99	1775.00	-0.01 CHECK IN

SIERRA WAY & ASHBROOK WASH
5 - 10' x 3' BOX CULVERT

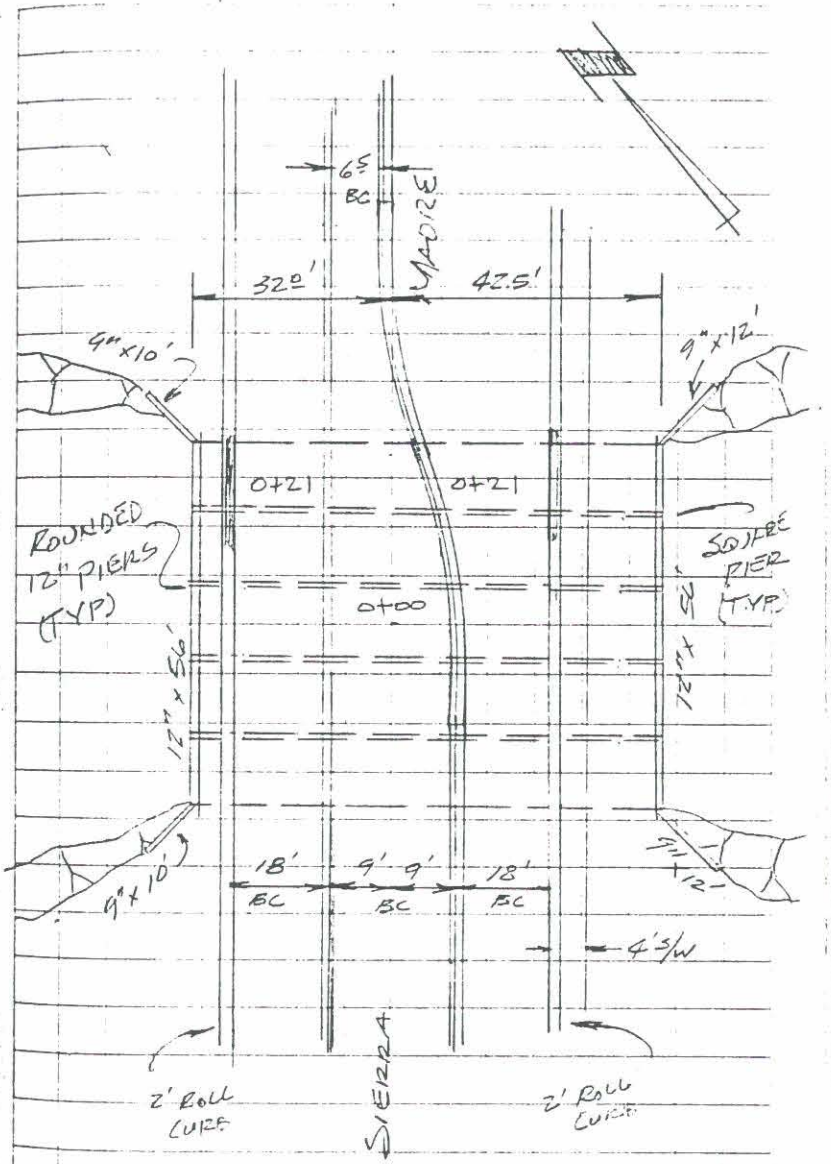
HI = 1780.99

76.17 (4.82) 26.5 G
76.43 (4.56) 9.5 G
76.94 (C.05) 9 T/C
76.8 (4.2) 0
77.00 (3.99) 6.17 T/C
76.48 (4.51) 7.2 G
76.16 (4.83) 26.5 G

76.52 (4.47) 27 T/C
74.52 (6.47) 32 HDWL
70.08 (10.91) 32 INV
76.7 (4.3) 32.5 W/G
76.21 (4.75) 31 B/W
76.51 (4.48) 27 T/C

70.1 (10.9) 37 WASH
75.19 (5.8) 36 W/G
73.42 (7.57) 42.5 HDWL
68.99 (12.00) 42.5 INV

68.5 (12.5) 47 WASH



CULVERT CROSSING #1107

BAYFIELD DR & ASHBROOK WASH

4-6-93

STA	ELEV.
T.P.	1591.01

PROFILE UPSTREAM SIDE @

TOP OF CURB @ ~~NORTH SIDE~~ BAYFIELD

1+93	1597.65
1+50	1595.94
1+00	1594.26
+50	1593.22
+285	1592.38
+24	1591.90
0+00	1592.38
+50	1592.17
1+00	1591.92
+50	1591.69
2+00	1591.72

TOP BOLT AT INTERSECTION OF HAMILTON DR & BAYFIELD DR AS NOTED IN PAGE 14 OF LEVEL BOOK

TOP OF CURBS

(

)

@ 12' CURB OPEN. @ UPSTREAM ~~NORTH SIDE~~

" " " DOWNSTREAM ~~SOUTH SIDE~~

TOP OF CURBS UPSTREAM SIDE

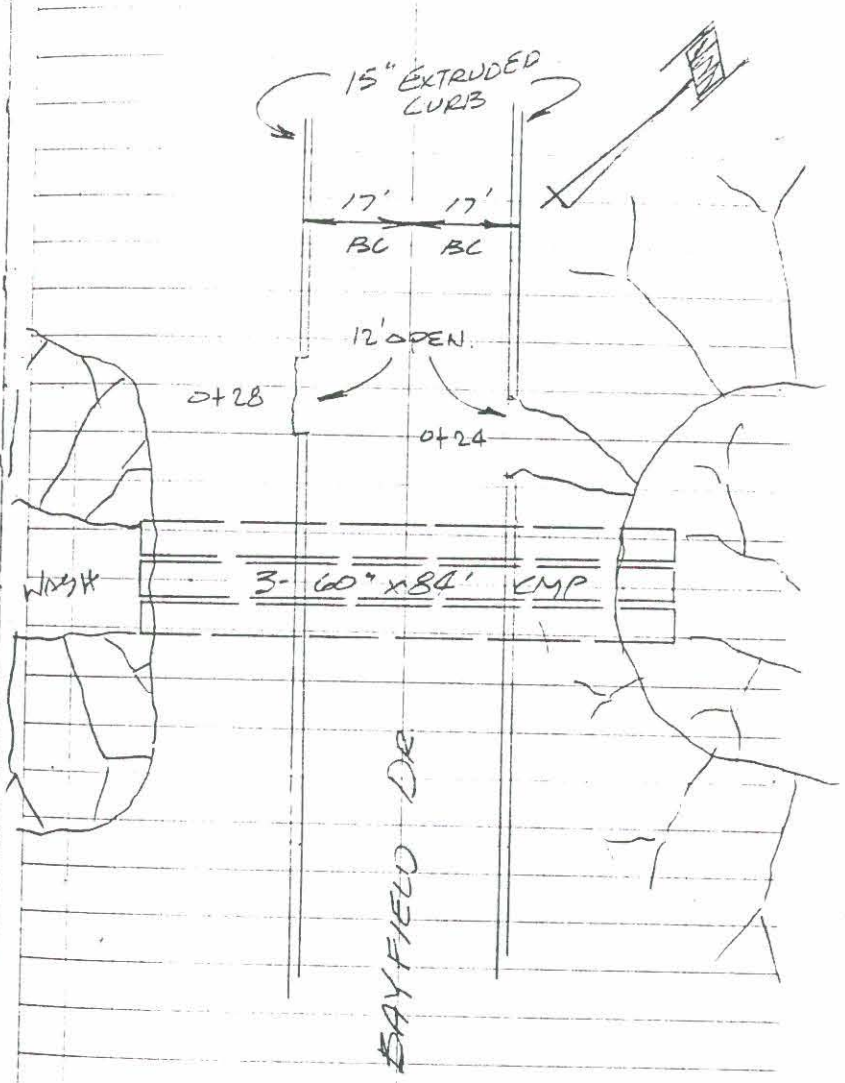
(

)

BAYFIELD DR & ASHBROOK WASH

3- 60" x 84' CMP

85.07 / 42 INV.						84.72 / 42 INV
84.98 / 42 INV	92.0 / 24	92.39 / 17 T/C	92.11 / 0 P	92.06 / 17 T/C	91.2 / 34	84.71 / 42 INV.
85.17 / 42 INV.						84.77 / 42 INV.
85.1 / 45 WASH						83.8 / 45 WASH



CULVERT CROSSING #MID

FOUNTAIN HILLS BLVD; BALSOA WASH

STA	ELEV.
BM 2-A	1650.62

TOP OF BRASS CAP IN CONCRETE AT MIDDLE OF NE CURB RETURN AT INTERSECTION OF FOUNTAIN HILLS BLVD & KINGS WAY AS NOTED IN PAGE 11 OF LEVEL BOOK

PROFILE

TOP OF CURB @ WESTSIDE F.H. BLVD.

2+50	(NORTH)	1636.37
2+00	"	1635.41
+50	"	1634.44
1+00	"	1633.86
+50	"	1633.33
0+00		1632.87
+50	(SOUTH)	1632.38
1+00	"	1631.97
+50	"	1631.52
2+00	"	1630.87
+50	"	1630.83
3+00	"	1630.69
3+50	"	1630.25

TOP OF CURB

CENTER OF PIPE LOCATION

PAVEMT

TOP OF CURB

NOTE: DISREGUARD THESE ELEVATIONS - USE ℄ PAVEMT @ FOUNTAIN HILLS BLVD. - SEE PAGE 72

FOUNTAIN HILLS BLVD & BALBO WASH

2- 54" x 122' C.M.P.

1633.01 1632.64 1632.21 1631.37 1631.58

41.5 T/C | 41 P | 0 P | 41 P | 41.5 T.C.

1632.7 | 1625.37

53.8 GB | 57.5 N.INV.

1625.9 | 1625.31

62 WASH | 57.5 S.INV.

1623.77 | 1631.9

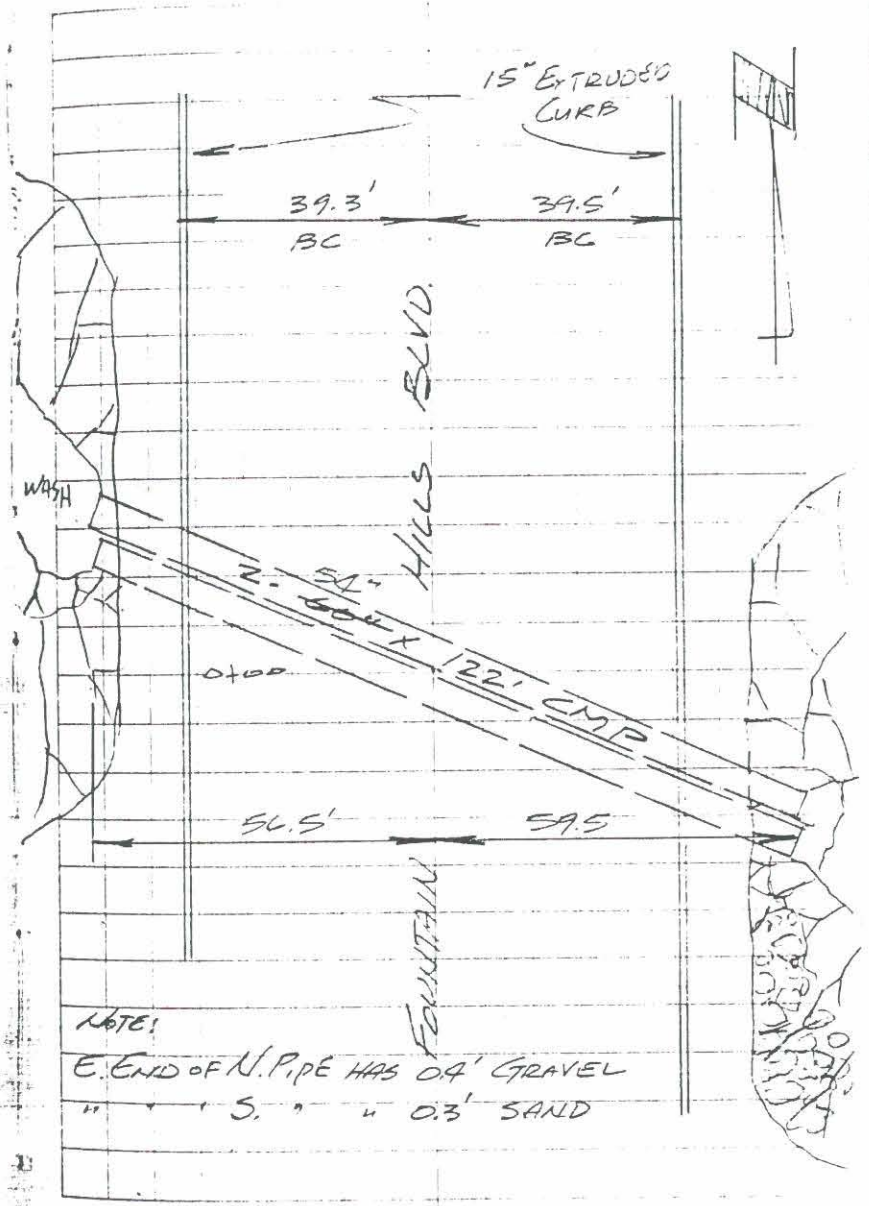
64.5 N.INV. | 55.7 G.B.

1623.77 | 1624.3

64.5 S.INV. | 65 GB WASH

1614.0 | 1619.0

72.5 WASH | 71 GB WASH



NOTE:

E. END OF N. PIPE HAS 0.4' GRAVEL

" " S. " " 0.3' SAND

Dam # 536

3-8-93

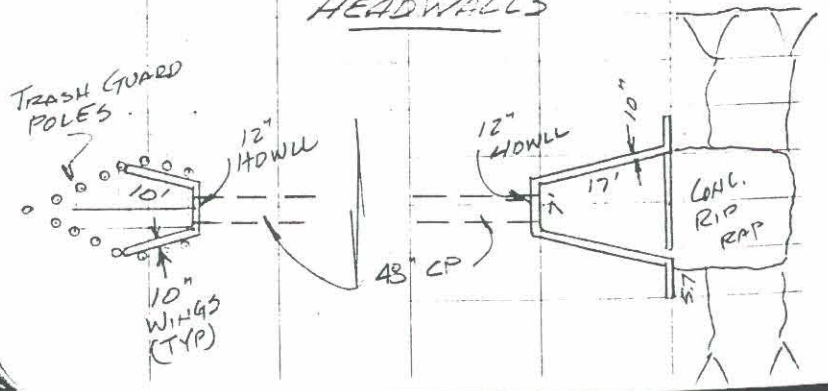
3-9-93

		ELEV
BM 9-D		1856.71
	TARGET HEIGHT	+ 6.11
		1862.82
	D.E.	+ -36.82
		1899.64
	H.I	- 5.07
T.P.		1894.57

T @ P.O.L. @ STA 7+02.64 1894.57
H.I. +5.07 = 1899.64
B.S. NORTH - 0-00-00

∠ ANGLE	DIST	TARGET	D.E	ELEV.
106-43-14	94.57	12.69	-35.15	1851.80
101-17-26	111.50	6.11	-43.50	1850.03
283-52-14	63.90	"	-26.00	1867.52
342-03-26	92.03	12.69	-35.09	1851.86

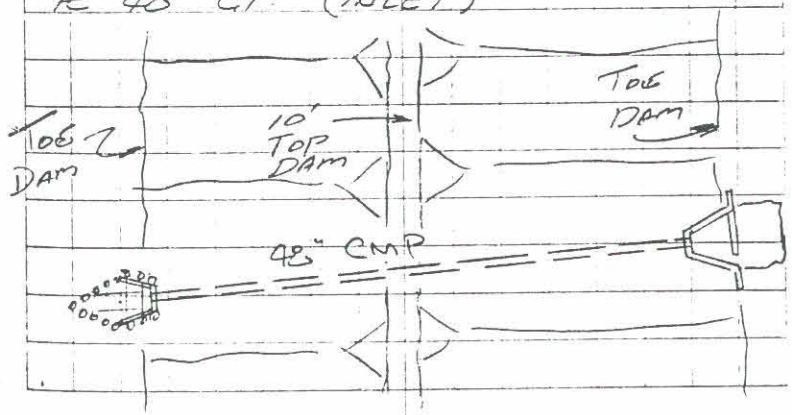
HEADWALLS



TOP OF BRASS CAP AT CENTER OF GRASSLAND DRIVE CUL-DE-SAC AS NOTED IN PAGE 34 OF LEVEL BOOK

TOP OF DAM @ STA 7+02.64

℄ 48" CP (OUTLET)
℄ @ OUTLET AT SE COR. HEADWALLS
HIGHWATER MARK
℄ 48" CP (INLET)



FT @ P.O.C @ STA 702.64 1894.57
HI : 5.13 : 1899.70
BS. NORTH : 0-00-00

∠ ANGLE	DIST.	TARGET	DE	ELEV.
105-59-22	94.43	12.34	-35.49	1851.37
105-51-50	94.36		-29.48	1857.88
96-18-48	167.34		-40.36	1847.0
101-31-53	171.1		-38.11	1849.2
107-53-31	181.7		-27.82	1859.5
89-29-10	164.7		-33.41	1849.5
84-31-40	163.6		-32.93	1854.4
180-00-00	742.85		+13.55	1900.9
"	702.64		+3.20	1890.5
"	595.29		+1.60	1888.9
"	450.71		+2.08	1889.4
"	423.65		+7.29	1894.6
172-52-09	576.2		+1.20	1888.6
169-25-14	570.85		-3.28	1884.1
160-34-57	601.29		-12.94	1874.4
145-46-22	645.91		-24.20	1863.16
170-18-47	460.50		+0.96	1888.52
169-55-07	433.30		+6.73	1894.1
169-55-30	423.36		+6.83	1894.2
167-29-24	365.97		-8.02	1879.3
198-35-22	490.12		+0.86	1888.2

CHECK ℄ 48" CP (+0.07)
TOP OF HEADWALL
℄ WASH
TOE @ S. SLOPE
TOP @ S. SLOPE
TOE @ N. SLOPE
TOP @ N. SLOPE
} WASH X-SECTION
TOP OF SLOPE @ SPILLWAY
TOE " " "
℄ OF SPILLWAY
TOE OF DAM
TOP " "
℄ OF SPILLWAY - TOP OF BOULDERS
℄ " " - TOE " "
℄ " "
TOE OF RIP RAP CUNNING
TOP " " " "
TOP OF DAM
TOE " "
℄ OF SPILLWAY
" " "

Z ANGLE	DIST	TARGET	DE	ELEV
218-31-02	400.26	12.34	-0.56	1886.3
220-22-50	364.43		-1.23	1836.1
232-45-40	386.75		-6.76	1830.6
180-00-00	373.27		+7.38	1894.7
" " "	270.72		+7.26	1894.6
" " "	171.12		+7.17	1894.5
" " "	72.34	5.77	+0.56	1894.5
0-00-00	31.35		+0.73	1894.6
" " "	128.0		+0.56	1894.5
" " "	225.0		+0.72	1894.6
" " "	324.9		+0.78	1894.7
" " "	424.0		+0.68	1894.6
" " "	525.2		+0.60	1894.5
" " "	626.6		+0.93	1894.9
" " "	658.7		+1.99	1895.9
" " "	685.1		+15.09	1909.0

T @ P.O.L. @ STA 8+30 1894.5 +0.85
HI: 4.93 : 1899.43

Z ANGLE	DIST	TARGET	DE	ELEV
289-14-02	76.93	5.77	-27.86	1865.8
316-15-12	103.0	5.77	-26.96	1866.7

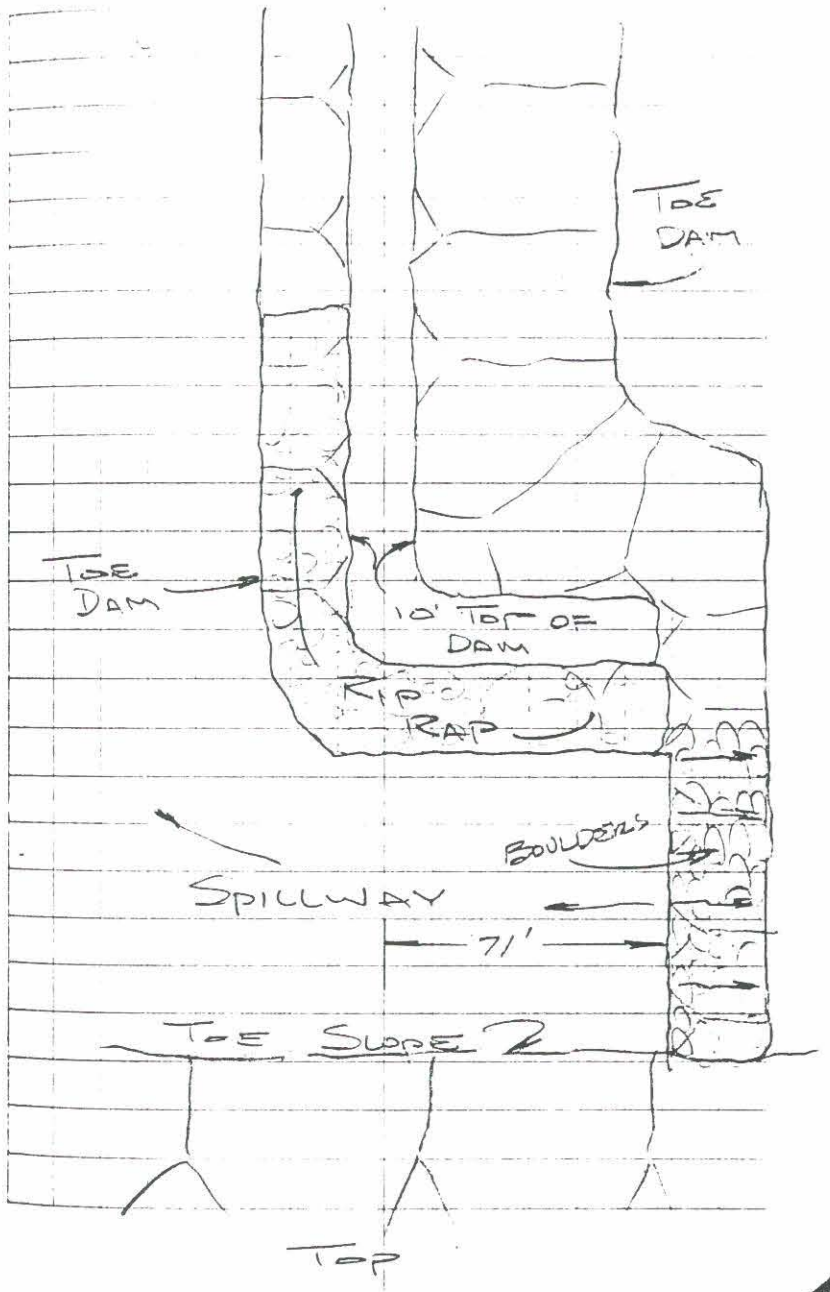
℄ OF SPILLWAY
G.B. @ "
" " "
℄ TOP OF DAM
" " " "
" " " "
" " " "
" " " "
" " " "
" " " "
" " " "
" " " "
TOP OF SLOPE

8+30

HIGH WATER MARK
" " "

ELEVATIONS @ SPILLWAY

2+52	89.5 / 0	89.4 / 73 Top	82.8 / 107 TOE	74.3 / 157 N/G
1+26	89.0 / 0	88.6 / 71.5 Top	84.1 / 104 TOE	
0+00	90.6 / 0	88.6 / 71' Top	85.3 / 114 TOE	81.0 / 164 N/G



DRM #5600

3-8-93

		Elev
T.P.		1843.26
Target Height	+	5.75
		1849.01
DE	−	0.75
		1848.26
H.I.	−	5.01
T.P.		1843.25

T @ POL 2 STA 1+36.1 1843.25

H.I = 5.01 - 1848.26

B.S. South - 180-00-00

∠ Angle	Dist	Target	DE	Elev.
180-00-00	136.1	5.75	+1.0	1843.51
180-00-00	206.1	5.75	+17.87	1860.4
102-14-15	85.62	15.62	-27.08	1805.56
113-57-52	109.6	5.75	-36.72	1805.79
340-25-41	104.3	12.33	-27.29	1803.64
240-25-13	106.2	12.33	-21.35	1811.58

Top of Nail @ Top of Dam #6 as Noted in Page 45 of Level Book

Top of Dam @ Sta 1+36.1

S. End of Dam #6

Top of Hill

℄ of 48" CP (outlet)

Top of 24" Breaker Wall

℄ of 48" CP (inlet)

Top of 6' Headwall

IT @ P.O.L. & STA 4+36.1 1845.13

H.I. = 5.01 = 1845.26

B.S. 360-00-00 = 180-00-00

Z ANGLE	DIST	TARGET	± E	ELEV	
180-00-00	60.0	5.75	+0.7	1845.2	
0-00-00	60.0	"	+0.1	1844.5	TOP OF DAM
" " "	161.5	"	+0.37	1844.6	
" " "	257.9	"	+0.35	1844.1	
" " "	251.0	"	+0.95	1848.5	T.P.
" " "	355.5	"	+0.16	1843.5	
" " "	457.5	"	+1.08	1842.6	
" " "	557.3	"	+0.93	1843.5	
" " "	655.4	"	+1.19	1843.7	
" " "	697.9	"	+1.44	1843.95	END OF ROAD - TOP OF CONC.
" " "	717.3	12.33	-0.54	1836.6	TOE OF CONC - SPILLWAY
" " "	830.8	"	-0.31	1835.62	CENTER OF SPILLWAY
" " "	971.5	"	+0.35	1836.3	TOE OF HILL - SPILLWAY
" " "	431.3	"	+5.04	1841.0	POINT OF [illegible]
3-06-51	827.0	"	-1.37	1834.6	CENTER OF SPILLWAY
6-32-29	820.4	"	-6.17	1838.8	
9-51-15	817.0	"	-11.25	1834.7	
250-50-24	802.3	9.06	-3.76	1835.5	
343-46-02	729.9	"	-5.37	1835.3	
349-13-17	725.1	5.75	+3.28	1845.99	

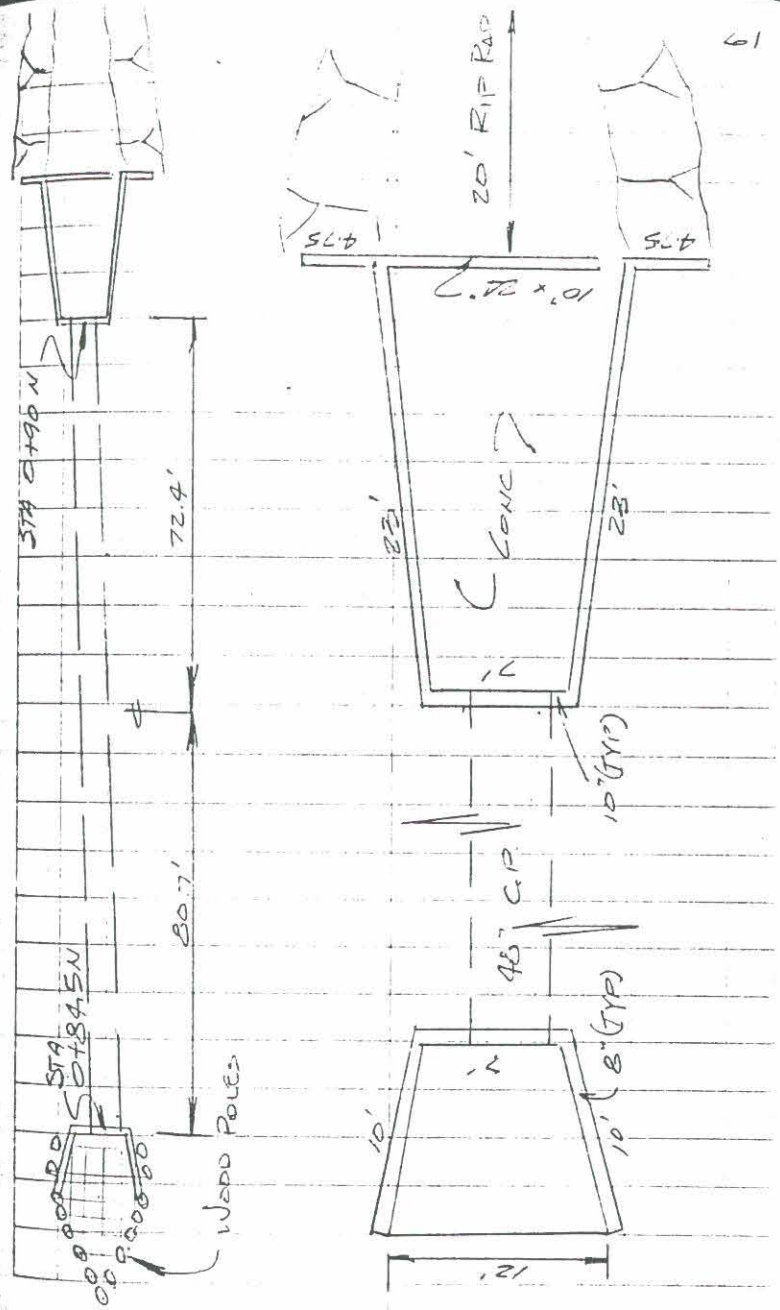
CHECK BC @ ASPEN LEVEL BOOK

PAGE 29 ELEV = 1834.98

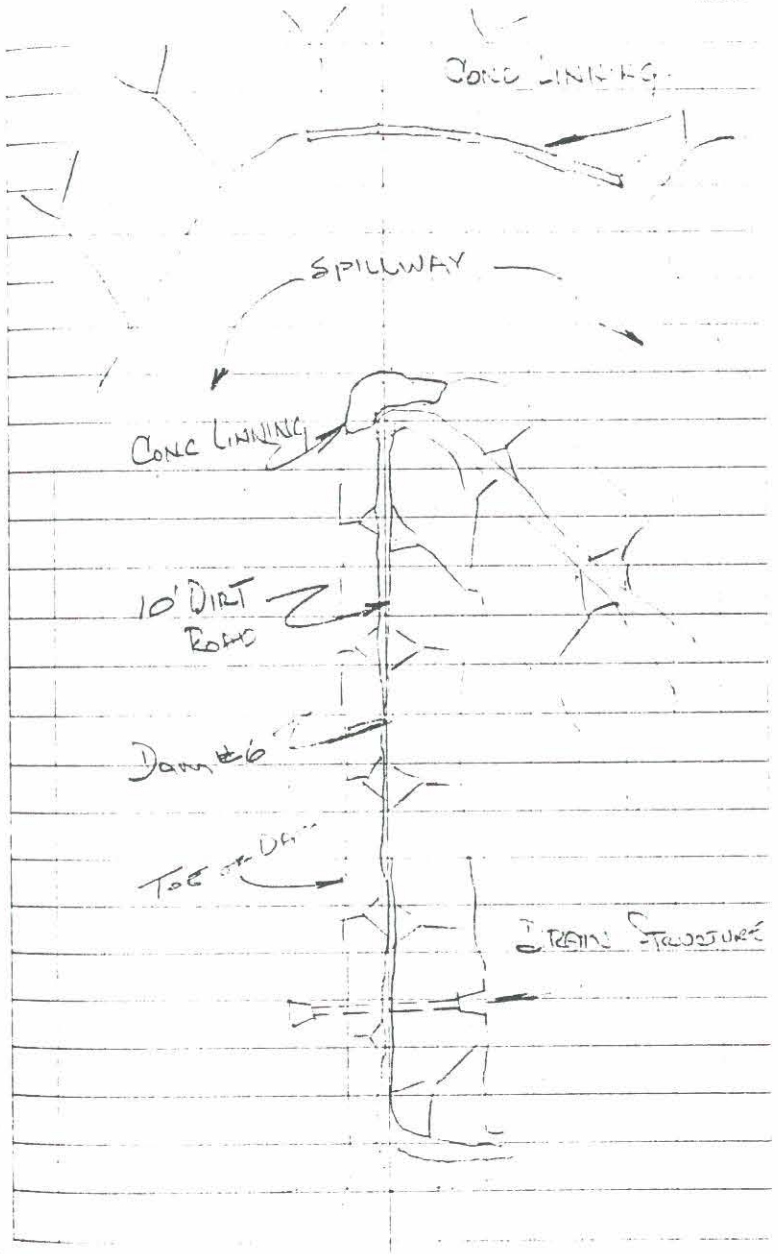
			ELEV	
HIGH WATER MARKS @			WEST	E
			1808.6	
	16.90	1805.04		
		10.0	1815.0	
		10.6	1814.6	
		10.9	1814.1	
		10.3	1814.7	

X-SECTION OF WASH @ 90' E. OF 48" PIPE

			1805.56	
	12.50	1813.06		
+30		10.0	1803.1	TOE
+16		16.6	1801.7	TOE
0+00		—		
-16		17.0	1801.1	TOE
-30		+8.0	1826.1	TOE



	CONCRETE @ N. END		LINNING SPILLWAY
11+18	0.2		Top Conc
11+09		To C	Top Conc
11+08	81.5		Top Conc (P.C.)
11+07	0.3		Bottom Conc
11+00	80.0		Bottom Conc
10+98		78.7	Bottom Conc.
10+83		177.0	Top Conc
10+73		174.7	Bottom Conc
10+66		244.6	Top Conc
10+57		242.3	Bottom Conc
8+53	3.5		Bottom Conc
8+41		59.6	Bottom Conc. & PT.
8+38	26.8		Bottom Conc (PC)
8+23		52.5	Top & End of Conc
8+15	9.5		Top
7+93.6	40.6		Bottom of Conc. Linning
+54	8+93	West & East	End 25' CE
0+00		BEGIN DAM - TOE OF HILL	



DAM # 578

3.9.93

BM 12-F 1822.63

TARGET HEIGHT		5.77
		1828.45
I.E.	+	26.02
		1854.47
H.I.		[illegible]
		[illegible]
H.I.	+	[illegible]
		1854.47
D.E.	−	29.73
		1824.74
TARGET	−	5.77
STA 2+31.2		1818.97

H.I. = 5.08 = 1824.05

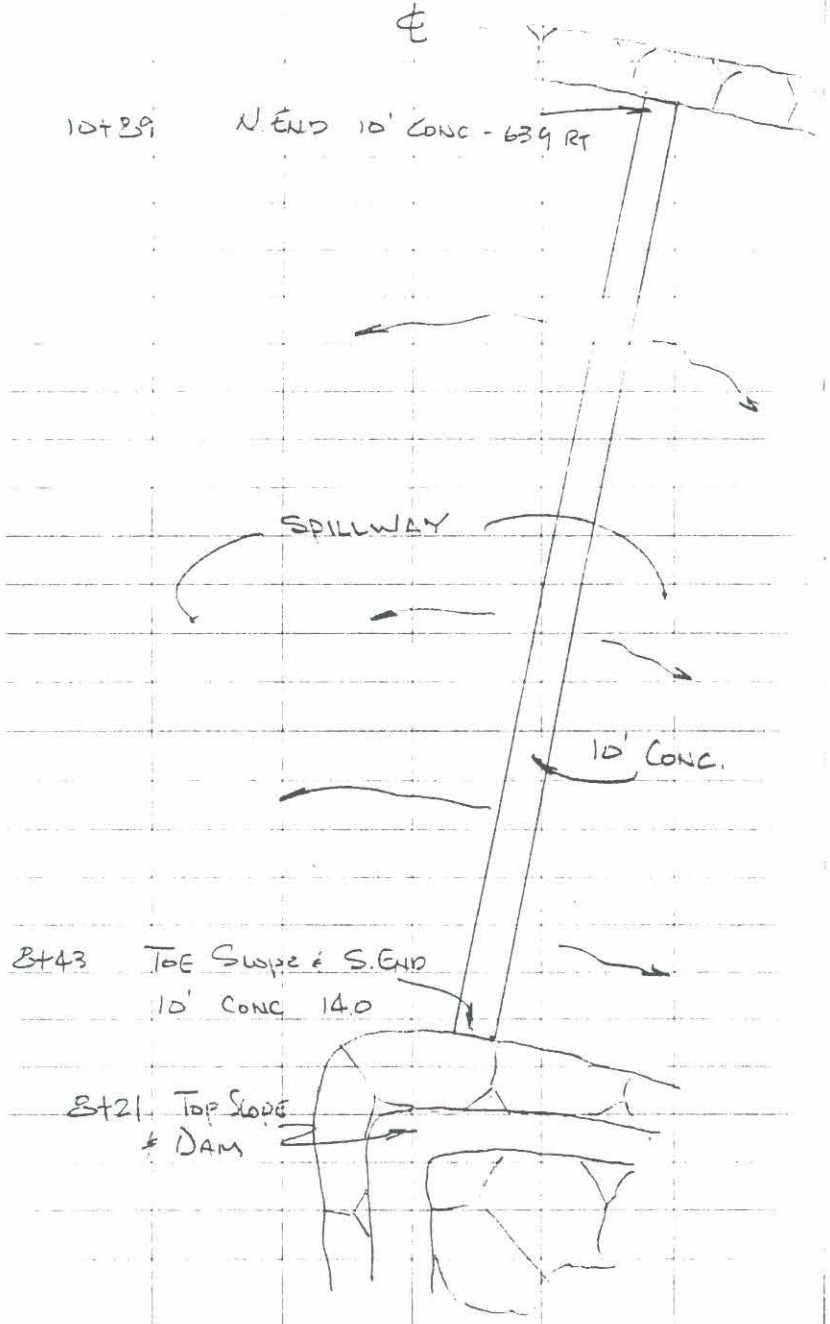
Bg. South = 180-00-00

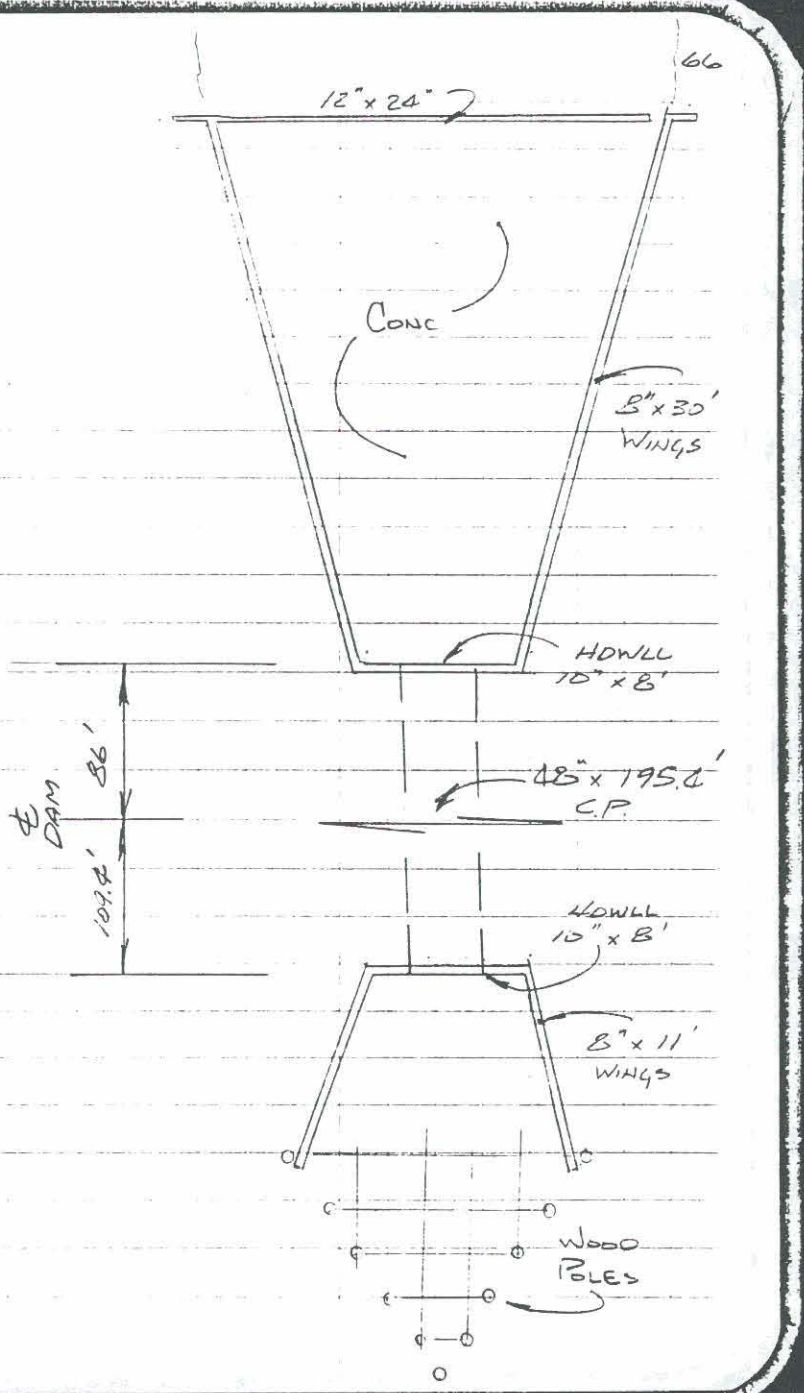
∠ ANGLE	DIST	TARGET	D.E.	ELEV.	
180-00-00	295.4	5.77	+29.28	1847.26	TOP OF HILL
" " "	282.0	"	+0.76	1824.74	TOE OF SLOPE & TOP OF DAM
" " "	185.0	"	+0.5	1825.73	TOP OF DAM
" " "	89.0	"	+0.6	1824.33	" " "
00-00-00	8.0	"	+0.7	1818.93	" " "
" " "	102.0	"	+0.9	1824.13	" " "
" " "	199.0	"	+0.9	1824.18	" " "
" " "	293.0	"	+0.9	1824.18	" " "

TOP OF BRASS CAP AT INTERSECTION OF SIERRA MADRE & LORNA LANE AS NOTED IN THE LEVEL BOOK PAGE 45

∠ ANGLE	DIST	TARGET	DE	ELEV	
00-00-00	392.0	5.77	+0.6	1813.33	TOP OF CLIFF
" " "	389.0	"	+0.4	1813.63	" " "
" " "	400	"	+0.1	1818.38	" " "
" " "	566.0	12.34	-0.9	1810.61	TOE OF SLOPE @ BEGIN SPILLWAY
" " "	610		-0.5	1811.21	SPILLWAY
348-30-00	622.0		-1.5	1810.21	"
358-63-55	561.0		-4.35	1807.35	"
324-59-22	570.0		-5.85	1805.85	"
4-08-55	556.0		-1.39	1810.32	"
13-51-38	658.0		-11.42	1800.29	"
25-07-29	625.0		-19.83	1791.88	"
00-00-00	812.0		-0.08	1811.63	END OF SPILLWAY @ TOE OF SLOPE
" " "	534.0		+18.91	1830.62	POINT ON SLOPE
1-25-55	563.0		-1.05	1810.66	CENTER 10' CONC. (S. END)
4-51-09	811.0		-1.09	1810.62	" " " (N END)
95-46-48	207.6		-20.91	1790.80	HIGH WATER MARK
272-50-06	109.51		-32.71	1779.00	@ 48" C.P. (INLET)
280-03-17	92.02		-20.22	1791.49	HIGH WATER MARK
10-51-16	86.06		-35.58	1776.13	@ 48" C.P. (OUTLET)
21-43-27	106.7		-37.24	1774.47	@ 24' BREAKER WALL
83-16-18	174.9		-35.24	1776.47	POINT ON SLOPE
87-43-08	175.2		-40.61	1771.10	TOE (WASH)
93-41-23	170.7		-40.81	1770.90	TOE (WASH)
102-34-09	175.1		-22.31	1789.40	POINT ON SLOPE

WASH X-SECTION


℄
10+89 N END 10' CONC - 63' RT
SPILLWAY
10' CONC.
8+43 TOE SLOPE & S.END
10' CONC 14.0
8+21 TOP SLOPE
& DAM


12" x 24"
CONC
8" x 30'
WINGS
HDWLL
10" x 8'
℄ DAM
86'
104.2'
48" x 195.2'
C.P.
HDWLL
10" x 8'
8" x 11'
WINGS
WOOD
POLES

DAM # 584

3-9-93

BM 12-A

~~1825.18~~ 2025.18

H.I. + 321

~~1828.39~~ 2018.39

D.E. − 91.26

~~1737.13~~ 1937.13

TARGET HEIGHT − 4.72

~~1732.41~~ 1932.41

T.P.

HI: 5.02 = ~~1737.43~~ 1937.43

TOP OF GLO BRASS CAP @ 1/4 CORNER TO SEC 17 & 16 AS NOTED IN LEVEL BOOK PAGE 42

TOP NAIL @ STA 3+74.64 @ TRAV PT AT TOP OF DAM.

1/4 @ 1/4 COR SEC 17/16

F.S. NE COR SEC 17

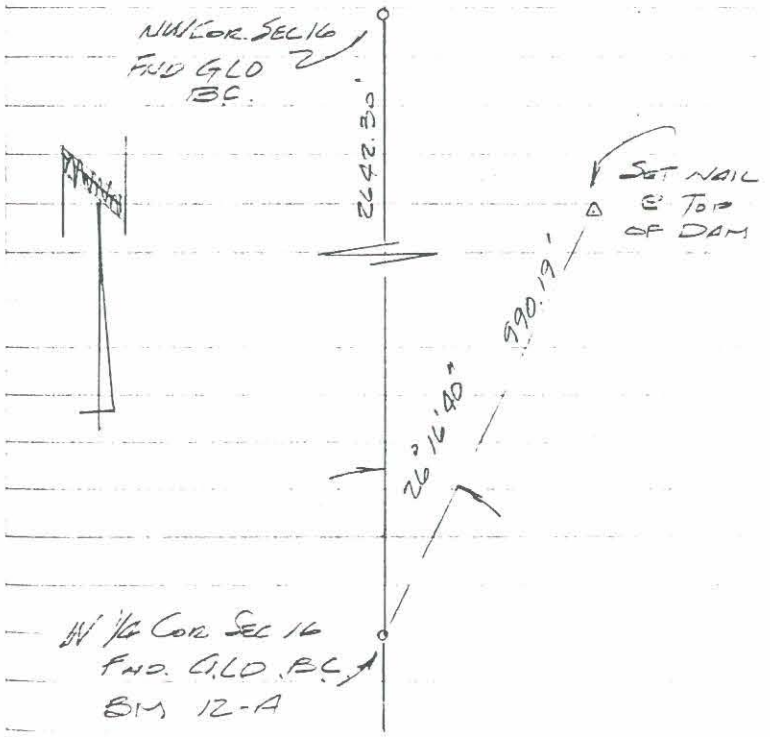
00° 00' 00" DIST: 2642.30'

F.S. TRAV POINT @ DAM

ANG. RIGHT: 26°16'40"

DIST: 990.19'

DE: -91.26



T 2 TRAV. POINT AT TOP DAM
E.S W.1/2 COR. SEC. 16
SET: 00°00'00
HI: 5.00 + 1932.41 = 1937.43

Angle	Dist	Target	DE	Elev
331°30'23"	374.2	6.74	+0.36	193305

B.S. SOUTH END DAM

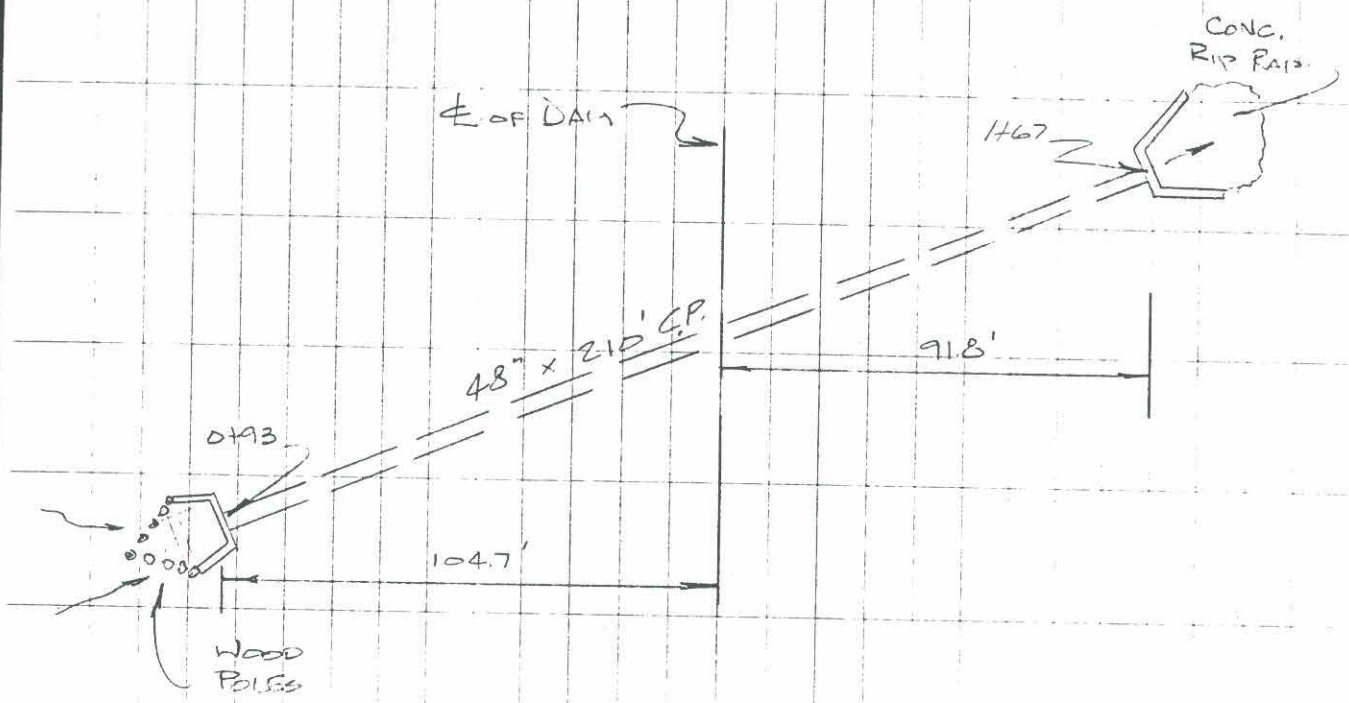
180°00'00"	374.6	6.74	+0.36	1933.05
" " "	470.4'	"	+28.3	1961.0
" " "	274.9'	"	-0.08	1932.6
" " "	174.5'	"	0.0	1932.7
" " "	72.4	"	0.0	1932.7
00°00'00"	24.6	"	-0.07	1932.6
" " "	75.7	"	+0.7	1933.4
" " "	129.4	"	+0.7	1933.4
" " "	152.1	15.62	+3.89	1936.63
" " "	338.1	"	+4.53	1937.2
" " "	431.6	5.75	+3.72	1935.15
139°18'55"	125.42	9.06	-45.37	1887.50
209°55'33"	180.26	15.62	-37.12	1895.61

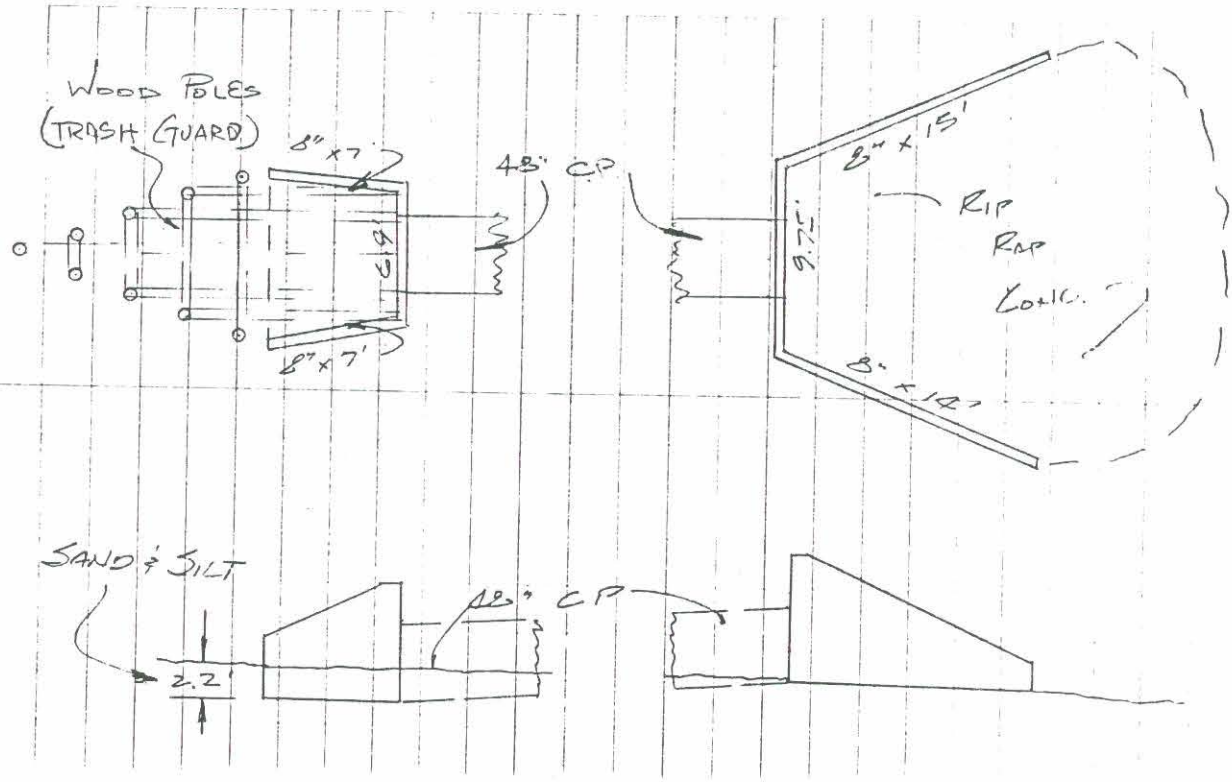
TOE OF HILL & TOP OF DAM (SOUTH END)

STA 0+00
TOP OF HILL
TOP OF DAM
" " "
" " "
" " "
" " "
" " " E.S.
TOE OF SLOPE - SPILLWAY
" "
TOP OF SLOPE
OUTLET FL. 43" C.P.
INLET FL. 43" C.P.

WASH CROSS SECTION
69' DOWNSTREAM FROM OUTLET P-

STA	B.S.	H.I.	F.S.	ELEV	
				1882.50	F.L 48" OUTLET PIPE
	12.10	1895.60			
			33	1856.8	22' LEFT - T.E. @ HILL
			17.2	1873.4	7' LEFT - TOE OF HILL & FL WASH
			17.2	1878.4	0' ℄ WASH
			17.0	1878.6	5' RIGHT - TOE OF HILL & FL WASH
			15.0	1880.6	13' RIGHT - GB @ HILL
			2.4	1893.2	45' RIGHT - TOP OF HILL
	WEST SIDE				
				1885.0	GROUND ELEV
	22.1	1906.10			
			16.8	1889.3	HIGH WATER MARK @ WEST SIDE


CONC.
RIP RAP
℄ OF DAM
1467
48" x 210' C.P.
91.8'
0193
104.7'
WOOD
POLES


WOOD POLES
(TRASH GUARD)
8" x 7'
48" C.P.
8" x 15'
RIP
RAP
8" x 14'
SAND & SILT
2.2'
48" C.P.

1C

℄ FOUNTAIN HILLS BLVD.
@ BALBOA WASH AND
OXFORD WASH

6-4-93

NOTE: SEE PAGE 51

STA	B.S.	H.I.	F.S.	ELEV.	
BM 2-A				1630.68	
	9.23	1639.85			
97+00			1.01	1638.84	
+50			2.00	1637.85	
98+00			3.14	1636.71	
+50			4.35	1632.36	
99+00			5.44	1634.41	
+50			6.35	1633.50	
100+00			6.95	1632.90	
+50			7.52	1632.33	
101+00			8.04	1631.81	
+50			8.65	1631.20	
102+00			9.03	1630.82	
+50			9.41	1630.44	TP
	3.37	1633.31			
98+50			3.55	1630.26	
99+00			3.83	1629.98	
+50			4.35	1629.46	
100+00			4.79	1629.02	
+50			4.08	1629.73	
101+00			3.17	1630.64	
+50			2.19	1631.62	

TOP OF BRASS CAP IN CONCRETE AT MIDDLE OF N.E CURB RETURN AT INTERSECTION OF FOUNTAIN HILLS BLVD. & KINGS WAY. LEVEL BOOK, PAGE 11

℄ F.H. BLVD - 550' No. OXFORD DR. INTER

- BALBOA WASH

TOP BOLT @ OXFORD DR. INTERSECTION ℄ F.H. BLVD

- OXFORD WASH

STA	B.S.	H.I.	F.S.	ELEV	
		1633.81			
102+0			1.12	1632.69	
T.P.			0.48	1633.33	
	2.74	1638.07			
+50			4.20	1633.87	
103+0			2.90	1635.17	
+50			1.55	1636.52	
T.P.			7.87	1630.20	
	4.86	1635.06			
BM 2-A			4.42	1630.64	+0.02

HYDRAULICS - BOOK No. 3

FOUNTAIN HILLS NORTH

FLOOD CONTROL DISTRICT

OF

MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

BOOK No. 3

NATIONAL

407

FIELD BOOK

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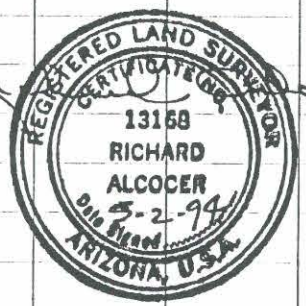
BOOK 3
INDEX

	PAGE
SURVEYORS CERTIFICATION	1
JOB TITLE	1
DAM #599	3-16
OXFORD WASH	17-32

I CERTIFY THAT THESE NOTES CORRECTLY REPRESENT A SURVEY MADE UNDER MY SUPERVISION.

R[illegible]



FOUNTAIN HILLS (NORTH) FLOOD DELINEATION STUDY

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

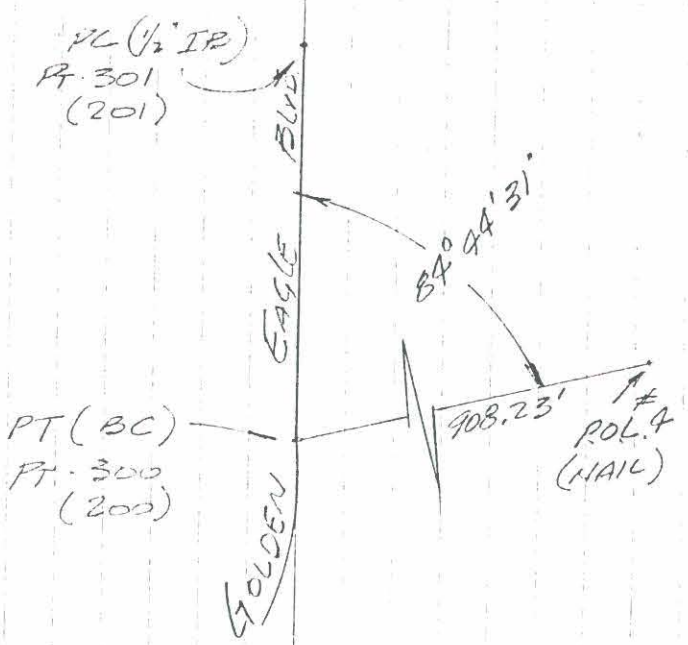
DAM # 599

2-12-93

IT @ P.T. on ℄ GOLDEN EAGLE
B.S. @ PC (NORTH) " " "
SET 00°-00'-00"
F.S. P.O.L. #4
ANG. RT. 84° 44' 31"
H DIST. 908.23
D.E. -1.67

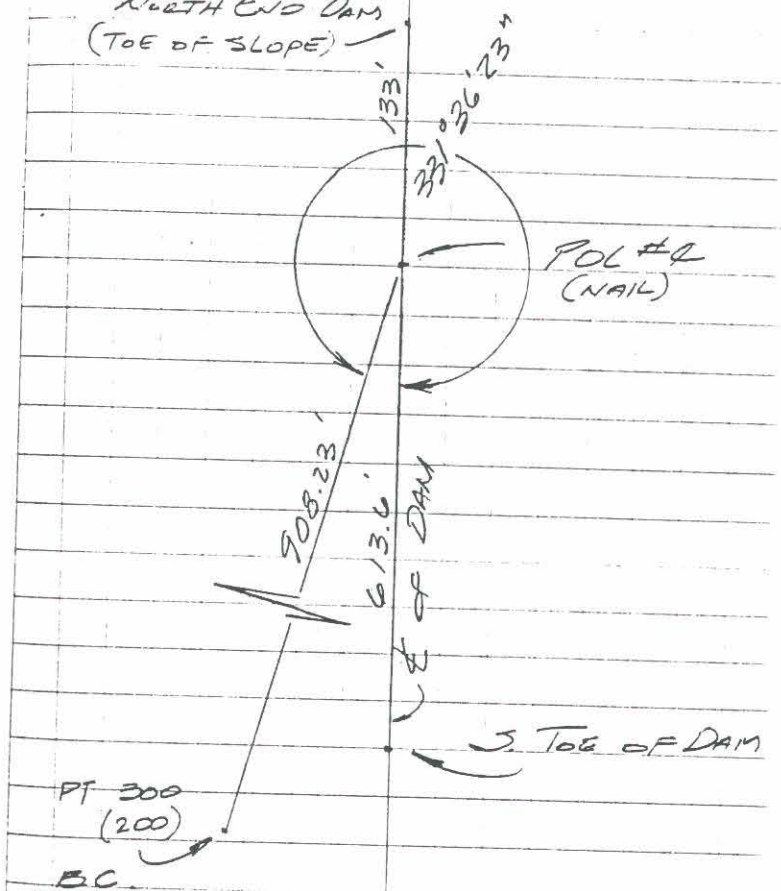
IT @ P.T. - ELEV: 1724.52 LEV. BK, Pg 27
+ 4.53
H I. 1729.05
F.S. POL #4 — 1.67
1727.38
TARGET — 5.60
ELEV @ P.O.L.4 = 1721.78

FND BRASS CAP
" 1/2" IRON ROD
SET NAIL @ DOT #4



T @ POL #4
B.S. @ PT @ ℄ GOLDEN EAGLE END
SET 00° 00' 000
F.S. PT @ ℄ TOE OF DAM
ANG R. = 331° 36' 23"
H. DIST = 613.6'

T @ POL #4	1721.78
+	4.92
H.I.	1726.70



T.C. P.O.L #4 AT Top of DAM
B.S. SOUTH TOE @ ℄ DAM
SET 180°00'00"
HI = 4.92 + 1721.78 = 1726.70

∠ ANGLE	DIST.	TARGET	ΔE	ELEV
180-00-00	924	12.19	+8.02	1722.72
" " "	898.1	15.47	+0.1	1711.33
" " "	868.7	"	-1.0	1710.73
" " "	841.0	"	+3.8	1715.05
" " "	768.8	"	+3.5	1714.73
176-27-59	694.0	"	+2.8	1714.03
180-00-00	613.6	"	+3.54	1714.77
" " "	592.0	5.60	+0.65	1721.75
179-19-04	587.0	"	-1.57	1719.53
181-04-20	588.0	8.90	+1.29	1719.09
180-00-00	488.0	5.60	+0.4	1721.50
" " "	389.0	"	+03	1721.90
" " "	290.0	"	+0.6	1721.70
" " "	170.5	"	+0.6	1721.70
" " "	91.0	"	+03	1721.60
00-00-00	108.0	"	+0.6	1721.70
" " "	133.0	"	+1.7	1722.80
" " "	192.0	"	+16.8	1737.90
300-44.02	59.6	12.19	-20.09	1694.42

DAM & DRAIN STRUCTURE TOPO
TOP OF SLOPE
TOE OF RETENTION AREA
RETENTION AREA - TOE of SPILLWAY
CENTER of SPILLWAY
℄ SPILLWAY
W. EDGE 10' CONC WALL
SPILLWAY : TOE CONC. @ DAM
TOP CONC LINING @ DAM
℄ TOP of DAM
" " " "
" " " "
" " " "
" " " "
" " " "
" " " "
" " " "
N. END of DAM - TOE of SLOPE
TOP of DAM
W. END 60" CP . F.L.

Z Angle	Dist	Target	D.E.	Elev	
294-43-48	56.0	12.19	-18.04	1696.47	W. End 60" CP. F.L. Elev - +24"
284-16-06	93.6	"	-13.61	1700.90	Sewer M.H.
299-42-06	90.8	"	-11.68	1702.83	High Water Mark
186-10-53	365.0	"	-8.05	1706.46	" " "
61-05-15	62.3	"	-21.36	1693.15	E. End 60" CP F.L.
66-59-03	59.4	"	-19.50	1695.01	" " " " " +24"
79-22-41	115.6	"	-16.22	1698.29	Sewer M.H.
76-39-11	101.5	"	-19.83	1694.65	Center Sewer Encasement
75-26-23	101.6	"	-21.08	1693.43	12" Breaker Wall
					School & Downstream Wash
111-31-31	92.6	12.19	-15.71	1698.80	Top of Conc. Lining (Wash)
101-33-56	98.6	"	-17.14	1697.37	Bottom " " " "
119-12-53	207.7	5.60	-21.61	1699.49	℄ PT " " " (Top)
111-30-04	203.7	"	-27.87	1693.23	" " " " " (Bottom)
132-52-23	201.13	"	-19.97	1701.13	Cor. 6" Curb (Track)
140-10-41	178.97	"	-19.39	1701.71	" " " "
114-58-38	280.22	"	-20.35	1700.75	Top of Conc Lining (Wash)
118-22-17	287.92	"	-19.53	1701.57	" " 6" Curb (Track)
123-46-42	304.50	"	-20.22	1700.88	" " " " "
113-19-04	323.1	"	-19.76	1701.34	℄ PT of Top Conc. Lining (Wash)
108-53-35	318.4	"	-30.04	1691.06	" " " Bottom " "
113-02-25	691.6	"	-24.22	1696.88	" " " Top " " "
112-16-25	717.13	"	-25.43	1695.67	" " " " " " "
110-53-55	694.6	"	-35.80	1685.30	" " " Bottom " " "

Z ANGLE	DIST.	TARGET	DE.	ELE.
110-13-21	728.5	5.60	-36.80	1684..
110-46-29	778.3	"	-35.82	1685.2
112-22-21	767.7	"	-26.68	1694.6
113-40-32	814.0	"	-26.73	1694.57
113-09-12	817.7	"	-29.87	1691.23
111-25-28	825.34	"	-30.74	1690.36
109-59-52	817.7	"	-37.39	1683.71
107-15-15	928.7	"	-37.62	1683.48
108-24-56	934.9	"	-30.65	1690.45
110-07-44	919.3	"	-29.23	1691.87
110-04-02	917.5	"	-29.64	1691.46
109-27-02	897.7	"	-30.55	1690.51
112-17-51	900.9	"	-28.62	1692.48
113-21-11	885.4	"	-26.50	1694.60
112-49-54	880.0	"	-29.71	1691.39
114-09-35	849.9	"	-26.67	1694.43
113-34-25	845.9	"	-30.20	1690.90
PT#				
114		5.60	-24.01	1697.09
113		"	-25.89	1671.20
112		"	-24.23	1696.87
111		"	-22.52	1698.58
110		"	-22.30	1698.80
109		"	-22.50	1698.60

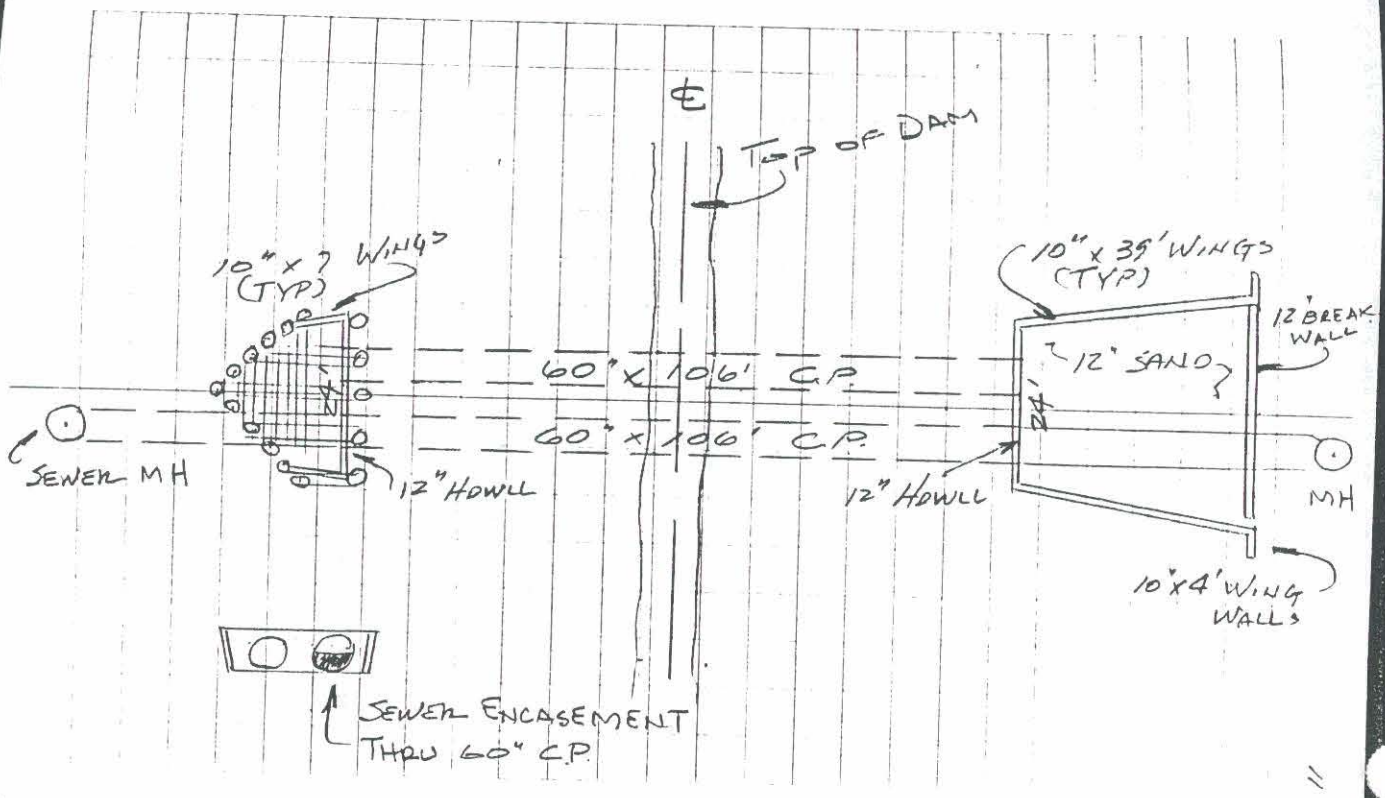
PT of Bottom Conc Lining (wash)
" " " " " " "
" " " Top " " "
" " " " " " "
Cor of Retention Basin
" " " "
Toe of conc. Lining (wash)
" " " " " End
Top " " " " "
" " " " "
Cor. of Retention Basin
" " " "
Top of conc. Lining
" " " "
" " " "
" " " "
" " " "

Football Field Grid Topo
Natl Ground
" "
" "
" "
" "
" "

Pt #	Z Angle	Dist.	Target	D.E.	Elev.	
108			5.60	-22.77	1698.33	
107			"	-22.81	1698.29	
106			"	-21.25	1699.85	
105			"	-21.34	1699.76	
104			"	-21.36	1699.74	
103			"	-21.20	1699.90	
102			"	-19.81	1701.29	
101			"	-18.36	1702.74	
			"	-17.98	1703.12	
115			"	-19.36	1701.74	
116			"	-19.26	1701.84	
62	146-42-47	713.81	"	-19.02	1702.08	
117			"	-19.35	1701.75	
118			"	-19.51	1701.59	
119			"	-19.15	1701.95	
120			"	-19.12	1701.98	
121			"	-19.11	1701.99	
122			"	-19.57	1701.53	
123			"	-19.57	1701.53	
63	148-53-26	685.97	"	-19.69	1701.41	
124			"	-19.65	1701.45	
64	125-04-37	478.46	"	-19.33	1701.77	
65	127-27-33	452.30	"	-19.99	1701.11	
125			"	-19.68	1701.42	
126			"	-20.56	1700.54	

NATL GROUND
" "
" "
" "
" "
" "
" "
" "
FF @ GYM
NATL GROUND
" "
TOP 6" CONC CURB - TRACK (PC)
NATL GROUND
" "
" "
" "
" "
" "
" "
TOP 6" CONC. CURB - TRACK (PC)
NATL GROUND
TOP 6" CONC. CURB - TRACK (PC)
" " " " " "
NATL GROUND
" "

PT #	ZANGLE	DIST.	TARGET	D.E.	ELEV.	
127			5.60	-19.84	1701.26	NAT'L GROUND
128			"	-19.47	1701.63	
129			"	-19.05	1702.05	
130			"	-17.50	1703.60	
131			"	-17.79	1703.31	
132			"	-19.08	1702.02	
133			"	-19.60	1701.50	
66	151-28-38	309.01	"	-20.06	1701.04	TOP 6" CONC. CURB - TRACK (PC)
67	156-55-56	293.19	"	-19.27	1701.83	" " " " " "
68	166-03-38	615.13	"	-19.65	1701.45	" " " " "
69	169-01-16	608.0	"	-12.28	1708.82	" " " " "
70	160-10-48	747.16	"	-19.49	1701.61	" " " " "
71	160-55-03	778.18	"	-18.86	1702.24	" " " " "
134			"	-18.7	1702.40	NAT'L GROUND
135			"	-17.5	1703.60	" "
136			"	-17.5	1703.60	" "
137			"	-19.5	1703.60	" "
138			"	-19.4	1703.70	" "
139			"	-18.8	1702.30	" "
140			"	-19.0	1702.10	" "
141			"	-19.3	1701.80	" "
142			"	-19.2	1701.90	" "


℄
TOP OF DAM
10" x ? WINGS (TYP)
10" x 35' WINGS (TYP)
12' BREAK WALL
12" SAND
24'
60" x 106' C.P.
60" x 106' C.P.
SEWER MH
12" HOWELL
12" HOWELL
MH
10" x 4' WING WALLS
SEWER ENCASEMENT THRU 60" C.P.

STA	B.S.	H.I.	F.S.	ELEV.	
T.P.				1721.78	
	2.24	1724.02			
			21.3	1702.7	
T.P			25.7	1698.3	
	5.82	1704.11			
			9.3	1694.81	
6+19			7.3	1696.81	
6+02			7.3	1696.81	
5+98			10.4	1693.71	
5+91			12.8	1691.31	
5+80			13.8	1690.31	
5+69			13.4	1690.71	
5+64			12.5	1691.61	
5+53			15.0	1689.11	
5+32			15.8	1688.31	
5+29			15.1	1689.01	
5+02			11.9	1692.21	
5+02			11.48	1692.63	
4+75			4.20	1699.91	
			4.63	1699.48	+0.01

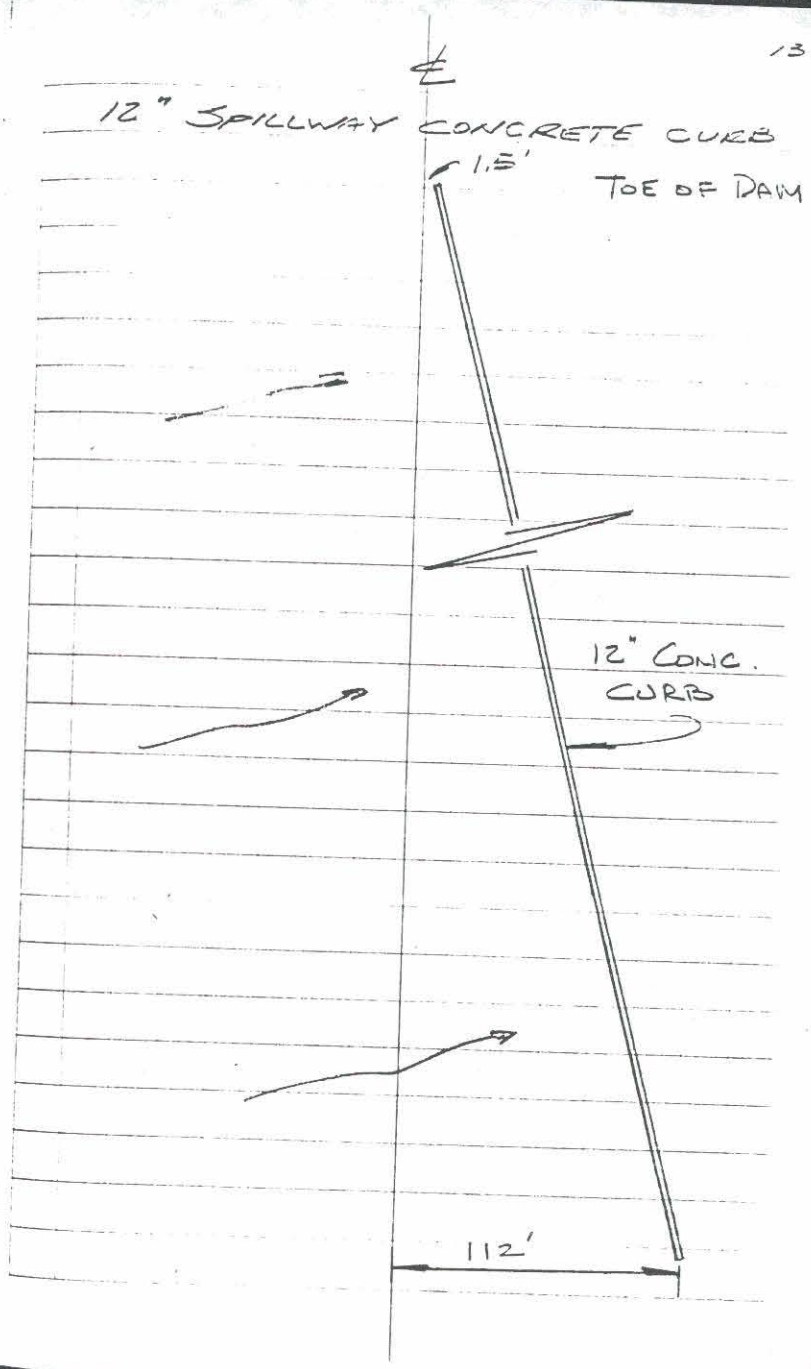
TOP NAIL @ POLE #4

HIGH WATER MARK @ STA 6+58 ± 77' RT
" " " " " 6+35 ± 113' RT

" " " " " 6+46 ± 163' RT

CROSS SECTION 200' DOWNSTREAM
OF PRINCIPAL SPILLWAY OUTLET
FT. ON SLOPE
G.B.
G.B.
G.B.
TOE of SLOPE (WASH)
BOTTOM OF WASH
" " "
" " "
" " "
WASH
"
TOE OF CONC. LINING
TOP " " "
CHECK POINT @ CONC

STA	BS	HI	FS	ELEV
T.P.				1718.58
	1.70	1720.28		
0+00			5.51	1714.77
-1+33			5.51	1714.77
-2+80			5.51	1714.77



ELEVATIONS ON MASONRY WALL AND 10' CONCRETE WALK WEST OF AMPHITHEATER.

9-9-95

T @ STA 0+22.75
B.S. P.O.L. #4
SET 00° 00' 00"
HI = 1721.69 + 4.93 = 1726.62

∠ ANGLE	DIST	TARGET	O.E.	ELEV.	
117-54.00	60.17	4.87	-8.41	1713.54	BEG. MASONRY WALL
126-49-29	66.85	"	-8.42	1713.33	TOP OF WALL
126-52-06	66.96	"	-7.76	1713.99	" " "
147-42-03	130.05	"	-7.73	1714.02	" " "
153-06-13	128.18	"	-7.63	1714.12	E. EDGE OF 10' CONC. WALK
157-34-51	127.12	"	-7.48	1714.27	W " " " " "
162-14-09	129.94	"	-6.92	1714.83	TOP OF 12" CONC. BREAKER CURB
148-17-12	187.88	5.87	-6.08	1714.67	TOP OF WALL
148-17-18	187.94	"	-5.42	1715.33	" " "
148-22-45	188.53	"	-6.15	1714.60	NAT'L GROUND
152-01-51	189.39	"	-5.70	1715.05	E. EDGE OF 10' CONC WALK
154-50.33	192.37	"	-5.66	1715.09	W. " " " " "
161-04-21	200.73	4.87	-7.01	1714.74	TOP OF 12" CONC. BREAKER CURB
145-16-45	235.83	5.87	-5.43	1715.32	TOP OF WALL
145-16-45	235.92	"	-4.83	1715.92	" " "
145-20-54	235.99	"	-5.60	1715.15	NAT'L GROUND
148-05-36	239.98	"	-5.18	1715.57	E. EDGE OF 10' CONC. WALK
150-08-51	244.77	"	-5.06	1715.69	W. " " " " "
160-36-54	261.10	4.87	-6.97	1714.78	TOP OF 12" CONC. BREAKER CURB

H ANGLE	DIST	TARGET	D.E.	ELEV.	
142-24-06	263.83	5.87	-4.75	1716.05	Top of Masonry Wall
142-24-06	263.90	"	-4.12	1716.68	" " " "
142-29-03	264.55	"	-5.17	1715.68	Nat'l Ground
144-44-27	269.81	"	-4.95	1715.80	E. Edge 10' Conc. Walk
146-32-51	274.47	"	-4.77	1715.96	W. " " " "
136-04-39	314.06	"	-4.11	1716.64	Top of Masonry Wall
136-09-15	314.27	"	-4.83	1715.81	Nat'l Ground
137-48-30	321.89	"	-4.45	1716.30	E. Edge 10' Conc. Walk
139-13-06	327.73	4.87	-5.31	1716.44	W. " " " "
141-06-39	335.0	"	-5.26	1716.49	N.E. Corner Safe. Bldg
150-13-48	290.60	"	-6.51	1716.24	Nat'l Ground
160-22-18	316.09	"	-6.95	1714.80	Top of 12" Conc. Breaker Wall

OXFORD WASH

WESTSIDE

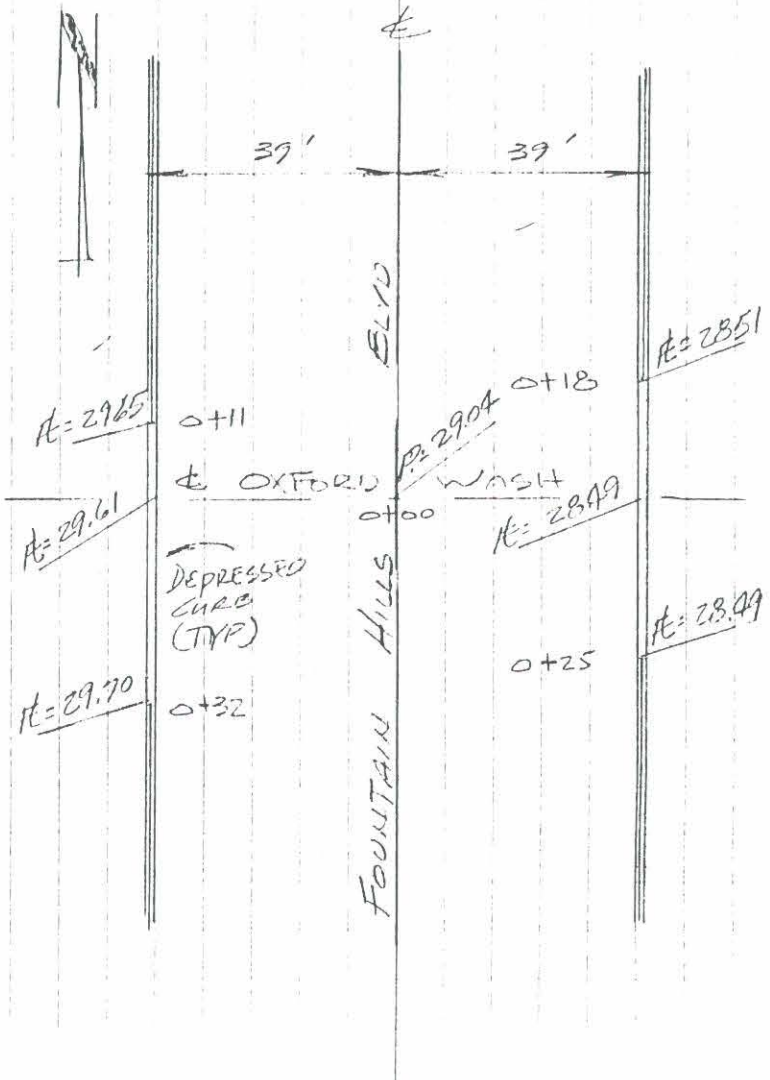
CURB PROFILES

ALONG FOUNTAIN BLVD.

6-493

Sta	BS	H.I.	FS	Elev.	
BM 2-A				1630.62	
	3.10	1633.72			
T.P.			5.16	1628.56	
	5.27	1633.83			
2+00 N			2.87	1630.96	T.C.
+50 N			2.82	1631.01	T.C.
1+00 N			3.00	1630.83	T.C.
+50 N			3.34	1630.49	T.C.
+11 N			3.85	1629.98	T.C.
0+00			4.22	1629.61	℄ wash
+32 S			3.70	1630.13	T.C.
+50 S			3.25	1630.58	T.C.
1+00 S			2.49	1631.34	T.C.
+50			1.63	1632.20	T.C.
2+00 S			0.68	1633.15	T.C.

TOP OF BRASS CAP IN CONCRETE AT MIDDLE OF NE CURB RETURN AT FOUNTAIN HILLS BLVD & KINGS WAY. - LEVEL BK - Pg 11



GROUND ELEV.
15' BEHIND EAST CURB
ALONG FOUNTAIN HILLS BLVD.

6-9-93

STA	B.S.	H.I.	F.S.	ELEV.	
BM 2-A				1630.62	See Level Book, Page 11
	4.42	1635.04			
0+00			4.7	1630.3	Nat. Ground
+50			5.5	1629.5	" "
+58			6.0	1629.0	Top of Wash
+68			8.0	1627.0	℄ Wash
+76			6.3	1628.7	Top of Wash
+97.5			5.80	1629.24	Top N. Curb @ D/W
+98			6.32	1628.72	Pavmt
1+00			6.27	1628.77	"
+22			5.85	1629.19	"
+22.5			5.32	1629.72	Top S. Curb @ D/W
+50			5.0	1630.0	Ground Elev.
2+00			4.5	1629.5	" "
+50			3.9	1628.9	" "
3+00			1.4	1633.6	" "
T.P.			2.06	1633.98	" "
	7.29	1640.27			
+22			5.76	1634.51	Top N. Curb @ D/W
+22.5			6.15	1634.12	Pavmt
+33.5			6.02	1634.25	"
+39			5.65	1634.62	Top S. Curb @ D/W
+50			5.6	1634.7	Ground Elev.
+91.5			4.02	1636.25	Top N. Curb @ D/W
+92			4.43	1635.84	Pavmt

STA	B.S.	H.I.	F.S.	ELEV.	
		1640.27			
4+00			4.43	1635.84	PAVEMT
+09			4.39	1635.80	"
+09.5			4.01	1636.26	TOP OF CURB @ D/W
4+50			3.3	1637.0	GROUND ELEV
T.P.			8.03	1632.24	
	1.54	1633.78			
BM.2-A			3.12	1630.64	+0.02

OXFORD WASH
TOPO

R. Alcocer
W Perez
C. Capone

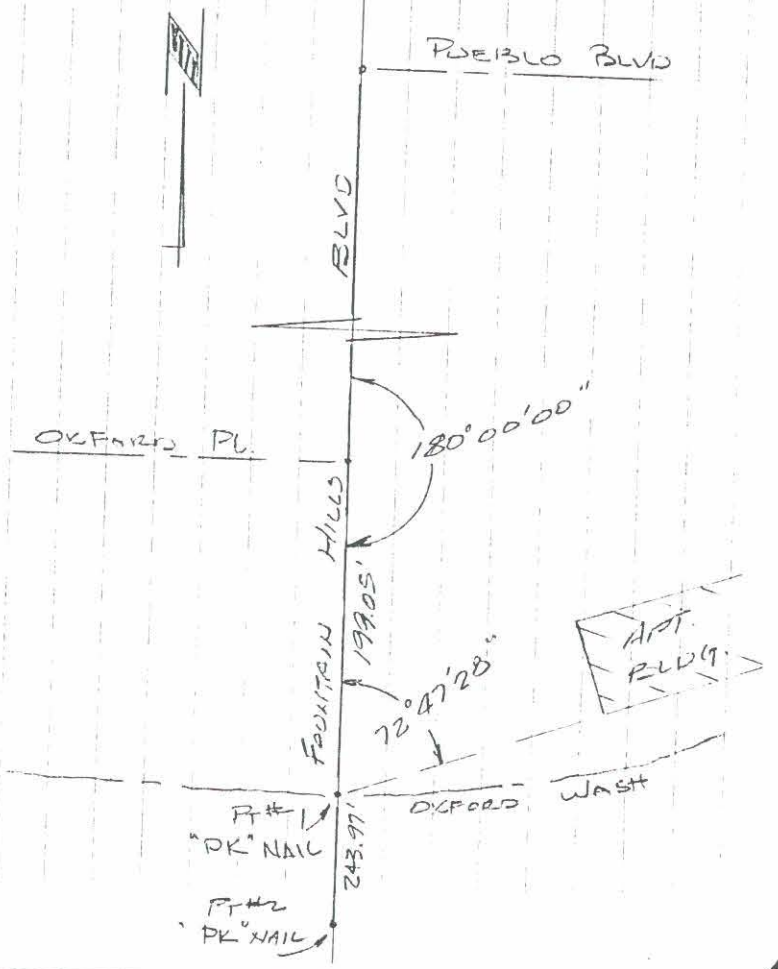
3.25.15

IT @ OXFORD PLACE
B.S. @ PUEBLO BLVD.
00-00-00
F.S. POINT #1
180-00-00 DIST. 199.05'

IT @ POINT #1
B.S. @ BOLT @ PUEBLO BLVD.
00-00-00
F.S. SOUTH FACE OF BLDG.
∠ RT: 72° 47' 28"

BOLT @ OXFORD PL. & FOUNTAIN HILLS BLVD
BOLT IN PAVEMT

SET "PK" NAIL
INTERSECTION PT @ S. FACE BLDG.



HI = 1627.77 ~~1653.77~~

Angle	Dist.	D.E.	Elev.	
280-35-06	40.3			
295-03-00	42.94			
237-04-00	46.30			
66-06-37	43.23			
851-40-18	38.27			
120-22-00	45.45			
123-37-36	47.20			
142-45-24	65.24			
110-03-24	78.47			
125-33-30	90.71			
126-30-15	99.95			
129-43-42	104.41			
132-02-54	109.52	-3.92	1629.23 ~~1657.69~~	
140-52-48	99.02	-4.43	1628.72 ~~1657.15~~	
141-28-21	195.80	-6.91	1629.44 ~~1657.91~~	11:34:36
159-50-21	208.15	-6.92	1629.44 ~~1657.91~~	11:39:36
112-33-00	196.48	-6.94	1628.71 ~~1657.15~~	
112-04-51	196.83	-6.54	1627.61 ~~1657.15~~	
106-18-36	190.69			
103-05-48	194.08			
101-35-09	204.35			
94-32-24	199.81			
94-28-48	188.24			
92-39-21	182.19	-5.93	1627.22 ~~1657.69~~	
102-47-21	210.61	-6.42	1626.73 ~~1657.17~~	

℄ 3' OXFORD WALK @ WEST SIDE
N.END DEPRESSED CURB @ " "
S " " " " "
N " " " EAST SIDE
℄ OXFORD WALK "
S.END DEPRESSED CURB "
B/C N. SIDE DRIVEWAY
B/C S. " "
P.I. RT TO B/C W/2' RADIUS
B/C END CURB - CORNER 6' BLOCK WALL
N.E. CORNER TRASH ENCLOSURES
S.E. " " "
S.W CORNER PARKING AREA - B/C
N.W " TENNIS COURT
S.W " " "
N.W " " "
N.E " " "
S.E " PARKING AREA - B/C
P.C. RT PARKING AREA - B/C
MID. POINT @ B/C
CORNER PARKING AREA - B/C W/4' CONC. WALK
" " " "
MID POINT @ B/C
P.C - B/C PARKING AREA
N.W. CORNER TENNIS COURT

	H.I. : ~~1633.15~~ ~~1629.13~~		
Angle Lt	Dist.	D.E.	Elev.
100 - 50 - 00	247.39	-6.43	~~1620.72~~ ~~1620.76~~
87 - 04 - 21	243.78	-3.80	~~1626.50~~ ~~1626.54~~ HI: 30.38
87 - 29 - 45	283.16	-3.7.	~~1626.96~~ ~~1626.94~~ HI: 30.38
99 - 23 - 09	286.43	-6.42	~~1624.75~~ ~~1624.79~~
98 - 09 - 21	328.55	-6.52	~~1624.63~~ ~~1624.67~~
84 - 35 - 13	330.18	"	
84 - 38 - 51	284.57	-6.52	~~1624.83~~ ~~1624.87~~
86 - 27 - 57	179.67		
86 - 20 - 09	196.19		
86 - 44 - 27	158.89		
86 - 44 - 12	146.62	-7.59	~~1627.20~~ ~~1627.24~~ HI = 34.79
76 - 25 - 30	143.00	-4.96	~~1629.83~~ ~~1629.83~~ HI = 34.79
89 - 34 - 00	130.51		
94 - 08 - 57	62.56		
96 - 51 - 00	74.15	-6.23	~~1628.56~~ ~~1628.56~~ HI: 34.79
86 - 35 - 06	75.57		
79 - 53 - 57	93.21		
60 - 45 - 27	68.92		
65 - 50 - 03	82.25		
33 - 22 - 00	136.39		
31 - 54 - 15	145.73		
26 - 17 - 39	173.56		
20 - 38 - 18	173.09		
72 - 32 - 36	112.62		
74 - 07 - 03	160.61		

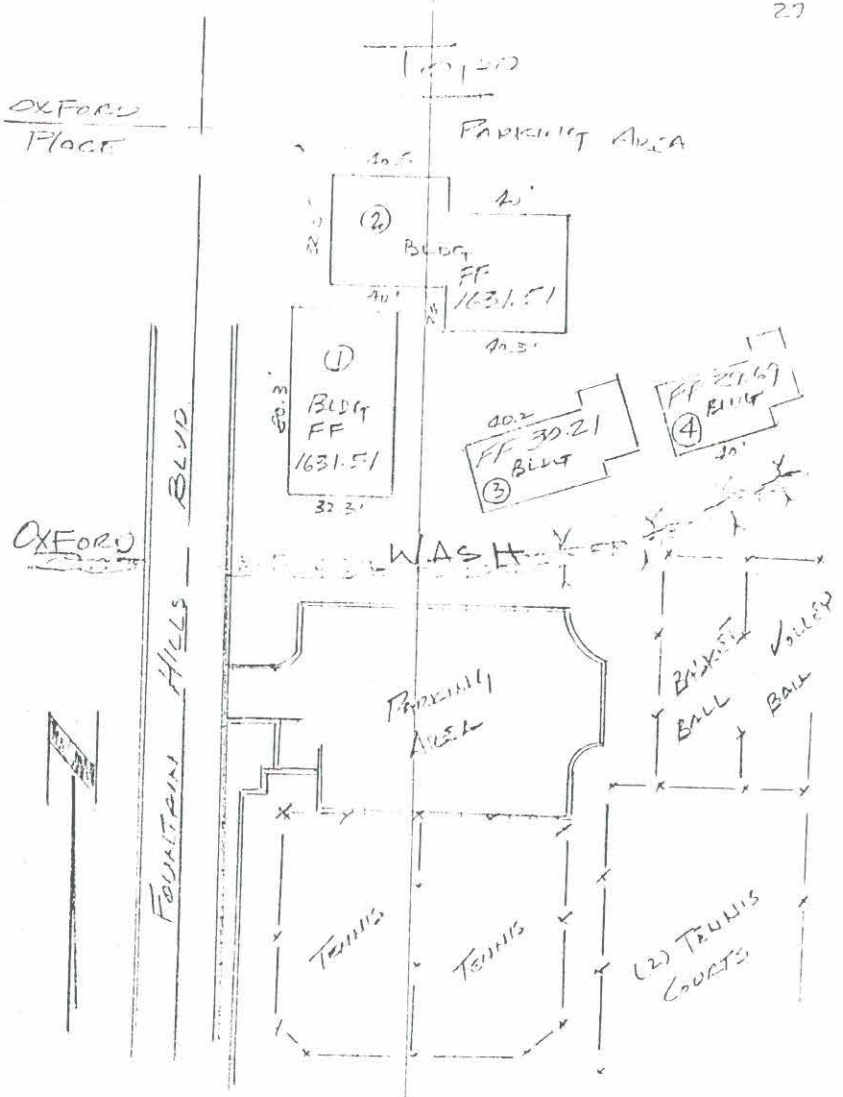
S.W. Corner Basketball Court
N.W. " " "
N.E. " " "
S.E. " " "
N.E. " Tennis "
N.E. " Volleyball "
N.W. " " "
N.W. " Chain Link Fence Enclosure
8' Palo Verde Tree
8" Mesquite "
± 4' Conc. Walk
± " " "
10" Palo Verde Tree
14" " " "
N.W. Corner Parking Area B/C
± Oxford Wash
10" Palo Verde
S End 3' Masonry Wall
S.W. Corner Bldg #1
N.W. " " #1
S.W. " " #2
N.W. " " #2
Corner 3' Masonry Wall
S.E. Corner Bldg #1
S.W. " " #3

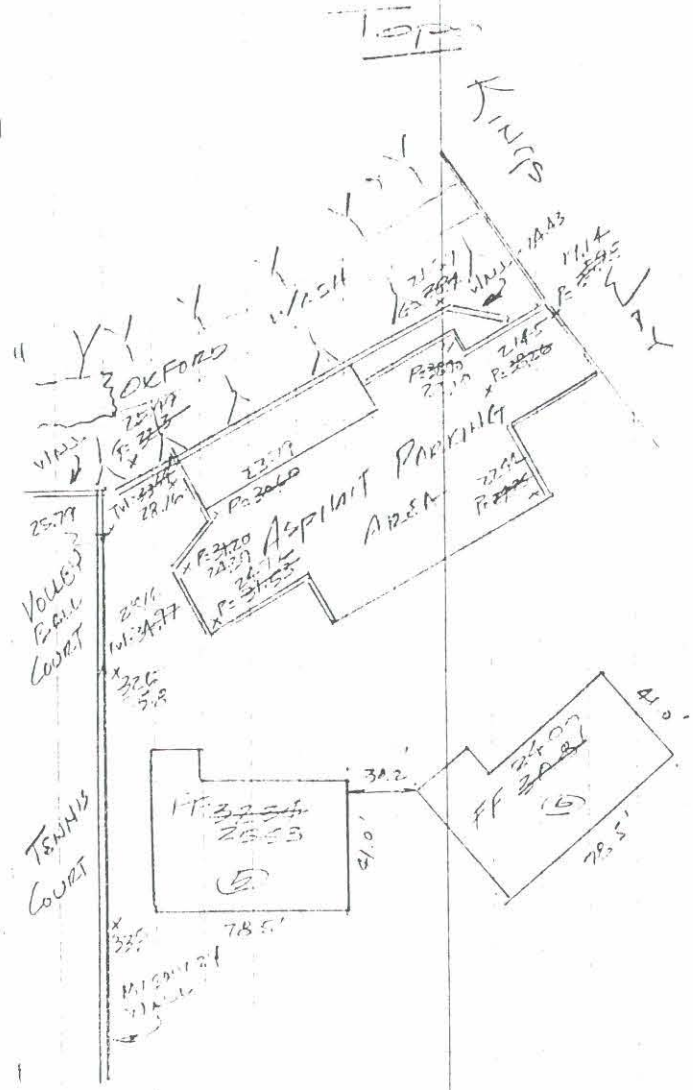
Angle Rt	Dist.		Elev.		
72-07-03	200.89				Angle Pt. @ Bldg #3
"	250.61				S.W. Corner Bldg #4
"	290.61				Angle Pt. @ Bldg #4
79-06-30	329.35				℄ Oxford Wash - End Rip Rap
76-03-19	349.72				N.W. Corner Bldg #5
92-17-39	424.5				N.E. " " #5
90-26-48	528.75				N.E. " " #6
81-47-12	454.46				N.E. Corner 3' Masonry Wall
77-11-57	435.15	-11.93	1622.21	HI= 34.17	℄ Oxford Wash @ West Side Kings Way

⊼ @ Point #2 "PK" Nail
B.S. Point #1 " "
00-00-00 Dist= 343.97'

71-34-21	170.34	N.W. Corner Bldg (Mirage Bar & Grill)
112-56-54	196.61	S.W. " " (" " ")

(FF 1642.04)


OXFORD PLACE
PARKING AREA
(2) BLDG FF 1631.51
(1) BLDG FF 1631.51
(3) BLDG FF 30.21
(4) BLDG
OXFORD
FOUNTAIN HILLS BLVD
WASH
PARKING AREA
BASKET BALL
VOLLEY BALL
TENNIS
TENNIS
(2) TENNIS COURTS


TENNIS
OXFORD
ASPHALT PARKING AREA
VOLLEY BALL COURT
TENNIS COURT
78.5'
41.0'
38.2'

OLYMPIA WASH
CROSS ELECTIONS

3.16.95

STA	B.S.	H.I.	F.S.	ELEV.
T.P				1628.56
	6.23	1634.79		
0+00				
0+43				
0+75				
1+50				

LT ℄ RT

℄ FOUNTAIN HILLS BLVD

28.74 / 5.85 / 6 T.C.

28.48 / 6.31 / 6 ft

28.4 / 6.2 / 0 Top

28.0 / 6.8 / 9 ft

27.8 / 7.0 / 15 ft

28.7 / 5.1 / 2.2 Top

WASH

30.8 / 4.6 / 76

30.3 / 4.5 / 6

29.5 / 5.0 / 0

29.2 / 5.6 / 6 Top

26.5 / 8.3 / 15.5 ft

26.7 / 8.1 / 2.3 ft

WASH

29.38 / 6.46 / 34.5 T/C

27.6 / 7.2 / 30 Top

27.9 / 4.7 / 7

28.7 / 5.1 / 0

29.5 / 5.3 / 8 Top

25.1 / 7.7 / 19 ft

25.1 / 9.7 / 27 ft

WASH

27.63 / 7.16 / 59 T/C

26.3 / 8.5 / 27 Top

STA	B.S.	HI	F.S.	ELEV
		1634.79		
2+25				
3+0				
+40				
+49				

LT — ℄ — RT.

2+25

LT	℄	RT		
	29.5 / 5.0 / 0	23.6 / 5.2 / 8 Top	24.1 / 10.7 / 19 ft	24.3 / 10.3 / 24.5 ft Wash
		Wash 23.4 / 8.4 / 55	26.2 / 8.6 / 47	

3+0

LT		℄	RT		
29.3 / 6.5 / 4	29.0 / 5.8 / 0	28.3 / 6.0 / 3.5 Top	27.5 / 7.3 / 16	21.6 / 13.2 / 27 ft Wash	
		25.8 / 9.0 / 55		25.1 / 9.7 / 46 Top	

+40

LT		℄	RT		
29.3 / 6.5 / 10	28.0 / 4.8 / 0	26.7 / 8.1 / 5	23.6 / 11.2 / 11 /	18.3 / 16.5 / 27 ft	
	24.2 / 10.6 / 62	23.1 / 10.9 / 51	20.4 / 12.4 / 43 Top	18.2 / 16.0 / 41 ft Wash	

+49

LT		℄	RT		
29.0 / 5.8 / 12	26.0 / 8.8 / 0	23.8 / 11.0 / 9 Top			

STA	B.S.	HI	F.S.	Elev
		1634.79		
3+80				
+90				

LT. ℄ RT

3+80

	9.4	16.6	17.2	
	10.1	15.4	18.2	17.6
	21	21	23	35
			ft	ft
			WALL	
22.8	22.6	19.8		
12.0	12.2	15.0		
63	47	37		
WALL	Top	~~Top~~		

+90

16.5	24.5	23.8	19.1	16.8	16.1
18.3	10.3	11.0	15.7	18.0	18.7
20	3	0	21	23	35
	Top			ft	ft
				WASH	
		22.3	21.6	17.9	
		12.5	13.2	16.9	
		65	47	37	
		WALL	Top		

HYDRAULICS - BOOK No. 4

FOUNTAIN HILLS NORTH

FLOOD CONTROL DISTRICT

OF

MARICOPA COUNTY, ARIZONA

F.C.D. 92-04

BOOK No. 4

TELEDYNE

407

FIELD BOOK

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PHOENIX, ARIZONA 85016

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BOOK 4

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I CERTIFY THAT THESE NOTES CORRECTLY REPRESENT A SURVEY MADE UNDER MY SUPERVISION.

FOUNTAIN HILLS (NORTH) FLOOD DELINEATION STUDY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, ARIZONA

FCD 92-04

CHECK SECTION 1

ROHRBROOK WASH

RIVERMILE - 1.636

5-17-93

IT AT POINT #274
BS POINT #273
Az = 192°59'52" - DIST = 261.29
FS TP#1
Az = 93°59'51" - DIST = 624.71'

IT AT TP#1
BS PT #274
Az = 272°59'51"
FS PT 1-A
Az = 30°08'52" DIST = 1235.23'

IT AT PT 1-A
BS PT #1
Az = 210°08'52"
FS PT 1-B
Az = 165°24'00" DIST = 360.0'

USED LEUKEN ROD

T.P.	1526.73
PT 1-A	1513.74

BOLT AT INTERSECTION PUEBLO BLVD & CALICO DRIVE
PAVEMENT

T @ Pt 1-A 1518.74
HI +4.65 1523.59

STA	∠ ANGLE	TARGET	DE	ELEV
0+00	—	—	-4.65	1518.74
+06	—	—	-4.62	1518.97
+22	82-44-18	-5.94	+2.75	1520.40
+96	89-16-48	"	+1.2	1518.85
1+22	89-15-12	-14.04	+1.6	1511.15
+52	89-35-24	(	+1.1	1510.65
+57	88-46-48	(	+3.3	1512.55
2+89	89-05-27	(	+4.6	1514.15
3+00	89-46-24	-5.94	+1.2	1518.85
+11	87-48-45	-14.04	+11.9	1521.45
+40	—	"	+14.1	1523.65
+60	87-31-06	"	+14.8	1524.35
+78	87-22-48	-17.97	+17.02	1522.64

ROADWAY PAVEMT - PT 1-A
TOP CURB
TOP

WASH
WASH

TOP CURB - PT 1-B

(6)

CHECK SECTION 2

ASHBROOK WASH

RIVERMILE - 1686

5-17-93

T AT Pt # 274
BS. Pt. #273
Az = 192° 59' 52" Dist = 261.29
FS TP #1
Az = 92° 59' 51" Dist = 621.71

T AT TP #1
BS. Pt # 274
Az = 272° 59' 51"
FS. Pt 2-A
Az = 349° 10' 38" Dist = 451.18'

Pt 2-B
Az = 139° 47' 13" Dist = 64.71

Used Lenker Road

T.P.		1524.73
Pt B-A		1523.95

Bolt at Intersection Pueblo Blvd. & Calico Drive
Top Curb

PT AT PT 2-A 1523.45
HI = 4.81 = 1528.26

STA	Z ANGLE	TARGET	DE	ELEV.
0+00		—	-4.81	1523.45
+09		-5-90	+1.18	1523.56
+32		"	+0.5	1523.16
+99		-14.05	+4.4	1518.61
2+12			+2.0	1516.21
+19			+0.8	1515.01
+25			-2.1	1521.11
+30			-2.1	1521.11
+36			-0-	1515.21
+59			+3.9	1518.11
+86			+3.5	1517.71
3+09			+6.9	1521.11
+35			+9.7	1523.91
+62			+9.2	1523.41
4+57			+12.6	1526.81
+84			+13.0	1527.21
5+03			+11.4	1525.61
+03			+11.8	1526.19

Top of Curb

Top Curb - PT 2-A

Top Slope

WASH

WASH

Top Slope

Top Curb

PAVEMT - PT 2-B

CHECK SECTION 3

ASHBROOK WASH

RIVERMILE 1.855

5-17-93

T AT Pt #276
BS. Pt #273
Az = 192° 59' 52" Dist. 261.24'
FS. Pt 3-A
Az: 327° 13' 07 Dist. 557.66'
FS. Pt 3-B
Az: 281° 25' 18" Dist: 312.79'

T AT Pt 3-B
BS Pt #274
Az: 101° 25' 18"
FS Pt 3-A
Az: 14° 03' 08" Dist: 373.0'

USED LENKER RD

BM HH 1529.73

Pt 3-B 1536.9

POINT ON ROCK LAWN

Pt 3-B			1536.92	
LI	4.84	154.76		
STA	∠ ANGLE	TARGET	D.E	ELEV.
0+00		—	+11.07	1538.77
+08	88°12'51"	-14.04	+11.2	1536.92
+22	87°57'30"		+12.3	1540.0
+35	87°48'15"		+10.5	1538.5
1+20	87°06'45"	-21.78	+12.4	1532.6
+28	87°39'12"		+9.8	1529.8
+31	88°25'39"		+6.5	1526.5
+48	90°25'39"	-14.04	-1.6	1526.1
+49	89°39'12"		+1.3	1529.0
+59	89°07'24"		+3.1	1530.8
2+44	88°34'45"		+3.1	1530.8
+49	88°41'33"		+2.7	1530.4
+57	87°58'03"		+4.0	1531.7
+86	86°51'24"		+4.5	1532.2
3+08	79°03'00"		+9.2	1536.9
+19	78°49'15"		+9.4	1537.1
+27	77°54'12"		+8.6	1536.3
+31	75°26'45"		-9.1	1536.82
+39	62°20'27"		+9.25	1536.97
+67			-4.82	1536.92
3+73			-4.34	1536.9

Pt 3-A PAVMT IN ROADWAY
Top Curb @ South Side

Top Slope

Toe Slope
Wash
Wash
G/B in Wash

Top Slope

Top Curb
& Road
Top Curb
Pt 3-B (Rock Lawn)

(27)

CHECK - SECTION 4

CALIENTE WASH

RIVERMILE - 1.763

5-18-93

T @ Pt # 265
BS @ Pt # 263
Az: 229° 33' 17" Dist - 507.13'
F.S. 4-A Az: 21° 56' 40" 321.90'
4-B " 209° 46' 13" 291.51'
4-C " 181° 53' 16" 154.90'
4-D " 141° 00' 23" 63.17'

USED PAUL. Rod

STA	BS	HI	FS.	ELEV.
BM 1-C				1603.59
	4.51	1608.10		
0+00			3.33	1604.77
+04			2.95	1605.15
+18			2.4	1605.7
+30			2.4	1605.7
+74			4.0	1604.1
1+17			5.8	1602.3
+75			6.9	1601.2
+89			8.0	1600.1
2+15			14.3	1593.3
+51			13.4	1594.7
+73			6.0	1602.1
3+24			4.5	1603.6
BM 1-C			4.51	1603.59

Pt 4-A Pavemt in Roadway
Top curb

Pt 4-B

Top
Wash
Wash
Pt 4-C
Pt 4-D
check

CHECK SECTION 5

BALBOA WASH

RIVERMILE - 0.608

5-18-93

IT AT PT # 261
B.S. PT # 257
Az 346° 44' 31" Dist. 595.25'
F.S. PT 5-A
Az 307° 45' 19" Dist. 201.9'

IT AT PT 5-A
B.S. PT # 261
Az = 127° 45' 19"
F.S. PT 5-B
Az = 220° 21' 50" Dist. 390.0'

B.M.	B.S.	H.I.	F.S.	ELEV.
2-A				1630.62
	2.34	1632.96		
T.P.			12.22	1620.74
	7.18	1627.92		
T.P.			5.55	1622.37

B.C. @ CENTER OF NE CURB RETURN AT FOUNTAIN HILLS BLVD & KINGS WAY

TOP OF CURB AT STA 01+06

T AT STA 0+06 T/C 1622.37
HT = 5.05 = 1627.42

STA	∠ ANGLE	TARGET	DE	ELEV.	
0+00	–	–	–	1622.07	PT 5-A PAVEMT IN ROADWAY
+06	–	–	-.505	1622.37	
+19	85°25'30"	-5.90	+1.07	1622.5	
+34	86°07'13"		+2.1	1623.6	
+35	89°22'21"		+1.2	1622.9	
+52	90°40'06"		-1.7	1619.8	
+73	90°38'30"		-1.9	1619.6	TOP SLOPE
2+06	90°25'30"	-17.93	-1.5	1607.9	
+19	90°25'30"		-1.6	1607.8	
+22	91°00'06"		-3.8	1605.6	WASH
+43	90°59'12"		-4.1	1605.3	WASH
+52	90°33'12"		-2.4	1607.0	
+75	90°33'12"		-2.6	1606.8	
+79	90°15'42"		-1.2	1608.2	
3+00	90°39'42"	-16.04	-.54	1610.0	
+18	90°43'06"	-5.90	-.39	1617.6	TOP SLOPE
+40	90°34'30"		-3.4	1618.1	
+47	90°21'54"		-2.2	1619.3	TOP CURB @ PARKING AREA
+90			-1.78	1619.70	PT 5-B (PAVEMT)
+96	90°13'54"		-1.57	1619.91	TOP CURB @ PARKING AREA
4+07	90°10'30"		-1.22	1620.26	PAVEMT
+24	90°10'48"		-1.30	1620.18	PAVEMT @ PARKING AREA

HI 1627.42

STA	∠ ANGLE	TARGET	D.E.	ELEV
4+34	90° 03' 45"	-5.94	-0.46	1621.0
4+49	90° 01' 30"	℄	-0.2	1621.3

TOP CURB PARKING AREA
PT S.C RAMP AREA

(13)

CHECK SECTION 6

ASHBLOCK WASH

RIVERMILE - 2.807

5-18-93

T AT PT #239
BS PT #285
Az = 257°08'44" DIST = 832.05' (E)
531.63 (M)
FS PT 6-A
Az = 93°06'03" DIST = 533.77'
N = 950,200.026 E = 759,382.088

T AT PT 6-A
BS. PT #239
Az = 273°06'03"
FS PT 6-B
Az = 167°08'03" DIST 240.5'

	BS.	HI	FS.	ELEV.
T.P.				1598.64
	7.31	1605.95		
T.P.			0.68	1605.27
	9.80	1615.07		
T.P.			2.10	1612.97
	8.12	1621.09		
T.P.			6.70	1614.39

TOP CURB AT SOUTH PL AT S.E. CURB RETURN AT BAYFIELD & ASHBROOK DR.

PT 6-A

Pt 6A 1614.39

HI = 5.02 = 1619.41

STA	∠ ANGLE	TARGET	DE	ELEV.
0+00	–	–	-5.0	1614.4
+20	80°03'12"	-10.03	+3.6	1613.0
+56	90°05'06"		-6.9	1602.5
+87	92°59'24"		-4.5	1604.9
+93	93°20'42"		-5.5	1603.9
+94	93°54'00"		-6.4	1603.0
1+06	93°46'54"		-7.0	1602.4
+11	93°27'24"		-6.7	1602.7
+15	92°47'09"		-5.6	1603.8
+20	93°01'00"		-6.3	1603.1
+49	89°53'06"	-14.04	+0.3	1609.7
+90	89°01'18"	-5.94	+3.2	1612.6
2+40	81°15'18"	"	+37.0	1646.4

POINT 6A
TOP OF SLOPE
TOE " "

WASH
WASH

TOE OF SLOPE

POINT 6-B TOP OF CLIFF

(21)

CLICK SECTION 7

ARROW WASH

RIVERMILE 0.081

5-19-93

T AT PT # 286
BS PT # 286
Az = 203° 31' 14" DIST = 623.23'
FS PT 7-A
Az = 131° 59' 28" DIST = 92.91'

T PT 7-A
BS PT # 284
Az 01° 59' 28"
FS PT 7-B
Az = 123° 39' 38" DIST = 273.0'
FS PT 7-C
Az = 140° 57' 33" DIST = 358.1'

T.P.				1654.42
	7.41	1661.83		
T.P.			5.71	1656.12

TOP CURB AT MIDDLE SE RETURN AT FOUNTAIN HILLS BLVD & ARROW DR PT 7-A

Pt 7A 1656.12
HI = 4.95 = 1661.07

STA.	TARGET	D.E.	ELEV.
0+00		—	1656.1
+12	-5.94	+2.3	1657.5
1+00	"	+1.3	1656.4
+97	"	+1.2	1656.3
2+18	-17.91	+3.3	1646.4
+25	"	+2.1	1645.2
+52	-5.94	+2.3	1657.4
2+74	"	+2.1	1657.2
3+07	"	+2.3	1657.4

Pt 7.A
Top Slope

WASH (CHANNEL WITH ROCKS)
WASH " " "

Pt 7.B
Pt 7.C

CHECK STATION 1

ARROW DRIVE

5-19-93

BM	B.S.	HI	F.S.	ELEV.
BM E-A				1642.18
	14.14	1658.32		

DISTANCE FROM BACK CURB

STA	15' LT.	RIGHT T/C	32' RT
8+00	(41.0) -17.3	(42.27) -16.05	(52.1) -6.2
+50	(40.7) -17.6	(41.33) -16.99	(52.2) -6.1
+44	(40.8) -17.5		
+41	(38.9) -19.4		
+36	(37.3) -21.0		
+30			(52.4) -5.9
+18			(45.9) -12.4
7+00	(41.2) -17.1	(41.39) -16.73	(45.7) -12.6
+84			(53.2) -5.1
+50	(41.4) -16.9	(42.34) -15.98	(53.4) -4.9

BRASS CAP AT ARROW DR CUL DE SAC

STA 0+00 @ FOUNTAIN HILLS & ARROW DR.

GROUND ELEV. ( )

TOP SLOPE

TOE SLOPE

TOP SLOPE

STA	BS	HI	FS		ELEV	
		1658.32				
	LT		T/C	RT		
6+00	(42.0) -16.3		(43.16) -15.16	(53.8) -4.5		
+50	(42.9) -15.4		(44.13) -14.19	(54.4) -3.9		
5+00	(43.5) -14.8		(45.21) -13.11	(55.2) -3.1		
+75				(55.2) -3.1		Top Slope
+55				(48.9) -9.4		Toe Slope
+50	(44.2) -14.1		(46.15) -12.17			
+38				(49.2) -9.1		Toe Slope
+12				(55.5) -2.8		Top Slope
4+00	(45.2) -13.1		(47.11) -11.21	(56.0) -2.3		
+50	(46.1) -12.2		(48.09) -10.23			
T.P.			10.26		1648.06	

STA	B.S.	HI	F.S.		ELEV
	13.27	1661.33			
	15' LT		T/C	32' RT	
5+05	(46.9) -14.4		(48.54) -12.79	(55.8) -5.5	
+95	(41.8) -19.5				
+91	(41.6) -19.70				
+85	(41.6) -19.70				
+80				(42.3) -19.00	
+79	(41.7) -19.60				
+73				(42.4) -18.90	
+68	(46.5) -14.8				
+66				(42.9) -18.90	
+50	(47.8) -13.5		(49.08) -12.25		
+44				(56.2) -5.1	

LT: TOP WASH

TOE WASH

12' N B/C - N. INV. 52" LINED CMP.

12' S B/C - S. INV. 52" LINED CMP. & TOE OF WASH

12' N B/C - N. INV. 52" LINED CMP & TOE OF WASH

12' S B/C - S. INV. 52" LINED CMP.

TOP WASH

12' S B/C - S. INV. 52" LINED CMP & TOE OF WASH

TOP WASH

STA		HI		ELEV
		1661.33		
	LT		T/C	RT
2+00	(48.5) -12.8		(50.29) -11.04	(55.4) -5.4
+50	(51.0) -10.3		(51.74) -9.59	(56.2) -5.1
1+00	(52.5) -8.8		(52.48) -8.85	(56.8) -4.5
0+60	(53.1) -8.2			(57.0) -4.3
T.P.			-6.88	1654.45

CHECK T.P. +0.03

CHECK SECTION 6

ASHBROOK WASH

RIVERMILE - 3.544

5-19-93

T AT Pt # 278

B.S. Pt #279

Az = 112°00'00 D.I. 658.06'

F.S. Pt B-A 212°46'16" 385.84'

Pt B-B 204°56'12" 853.44'

Pt B-C 212°25'21" 959.0'

STA	B.S.	HI	F.S.	ELEV
T.P.				1684.67
	10.27	1694.94		
Pt B			6.6	1688.3
Pt C			4.1	1690.8
Pt A			2.6	1692.3
			10.27	1684.67

BC AT HAMPSTEAD DR & STANCREST DR.

					ELEV	
TT AT PT 8-A					1692.3	
HI: 4.92 = 1697.22						
STA	∠ ANGLE		TARGET	D.E.	ELEV	
0+00			—	4.9	1692.3	PT 8-A.
+18	88°11'51"		10.0	+0.6	1687.8	
+36	92°19'45"			-3.4	1683.5	
1+38	92°46'21"			-6.7	1680.5	
2+36	91°55'18"			-9.5	1677.7	
+99	92°38'39"			-13.8	1673.4	
3+28	92°10'27"			-12.5	1674.7	
+35	92°10'36"			-12.7	1674.5	
+83	91°41'48"			-11.3	1675.9	
+98	91°28'33"			-10.2	1677.0	
4+02	91°33'48"			-11.0	1676.2	
+05	91°16'51"			-9.0	1678.2	
+12	91°07'03"			-8.0	1679.2	
+14	90°37'30"			-4.5	1683.7	
+57	90°30'13"			-4.0	1683.2	
5+04	89°53'21"			+1.0	1688.2	PT 8-B
+50	CENTER ROD				1690.4	
+70		"			1690.6	
6+45		"			1690.5	PT 8-C

CHECK SECTION 7

DEFORD WASH

RIVER MILE- 0.678

5-20-93

L at Pt # 250
BS. Pt # 251
Az = 299°15'00" Dist 236.88'
(M) 239.77'
FS. Pt 9-A 33°38'03" 99.68'
Pt 9-B 225°59'09" 301.0'

STA	BS.	HI	F.S.	ELEV.	
BM 5-A.				1684.27	Top Brass Cap at Intersection Glenbrook Blvd & Tanglewood Court Pt 9-A
	5.49	1689.76			
0+00			1.0	1688.8	Top Curb
+15			1.6	1688.2	℄ Roadway
+27			4.1	1685.7	Top Curb
+31			4.45	1685.31	Front Yard
+625			3.95	1685.81	
+94			4.18	1685.58	
1+18			2.1	1687.7	
T.P.			2.24	1637.52	
	4.21	1691.73			
1+36			3.8	1687.9	Rear Yard
1+39			3.7	1688.0	Top Bank
+53			9.3	1682.4	Toe Slope
+76			11.0	1680.7	Wash
+82			9.0	1682.7	Wash
+95			2.4	1689.3	Top Bank

Sta	B.S.	H.I.	F.S.	Elev
		1691.73		
3+50			2.6	1689.1
+53			2.5	1689.2
3+60			2.5	1689.2
BM 5A			7.46	1684.27

Pt 9-B
Toe of Slope
check BM.

CHECK SECTION 10

ARROW WASH

RIVERMILE 0.984

5-20-93

IT AT PT # 425
BS. PT # 310
Az = 84° 50' 00" DIST. 79.91'
FS. TRAV. PT.
Az = 139° 19' 21"

IT AT TRAV. PT.
BS. PT # 425
Az 319° 19' 21"

FS.	PT 10-A	314° 55' 35"	353.6'
	PT 10-B	312° 22' 52"	334.7'
	PT 10-C	300° 26' 37"	307.4'

STA	∠ ANGLE	TARGET	DE.	ELEV
BM 6-B				1813.51
HI. 4.90 : 1818.41				
PT 10A		5.24	-14.33	1797.59
PT 10-B		17.97	-14.66	1785.78
PT 10-C		14.03	-5.73	1798.60

TOD BRASS CAP @ N P.T. OF CURVE ON CAVERN DR - N. OF EL LAGO BLVD.

HI = 1818.41				
STA	Z ANGLE	TARGET	D.E.	ELEV.
0+00		5.94	-12.9	1797.6
+16	92°26'48	1797	-14.6	1785.8
0+24	92°30'00	1797	-14.6	1785.8
+32	92°28'06		-14.1	1786.3
+39	92°19'12"		-13.2	1787.2
+54	91°30'36"		-8.5	1791.9
+61			-8.1	1792.3
0+96		-14.03	-5.78	1798.6

PT 10-A
WASH & TOE OF SLOPE
PT 10-B & ℄ WASH
WASH & TOE OF SLOPE

PT 10-C

CHECK SECTION 11

LONGMONT WASH

RIVERMILE · 0.225

5·20·93

T AT ERM 11-A
BS. PC @ GOLDEN EAGLE BLVD
Az = 86° 31' 09" DIST = 1637.97'
FS PT 11-A
Az = 250° 35' 08" 253.73'
PT 11-B
Az = 245° 26' 19" 168.81'
PT 11-C
Az = 211° 42' 59" 104.04'

BM	BS	HI	FS	ELEV	
BM 11-A				1772.83	TOP BRASS CAP IN CONC
	6.86	1779.69			
PT 11-C			4.50	1775.19	

TI ON Pt 11-C				1775.19
HI = 5.07 = 1780.26				
STA	Z ANGLE	TARGET	DE	ELEV
0+00	91°49'06"	-5.92	-5.3	1769.0
+30	91°59'06"	S	-4.9	1769.4
+42	92°42'48"	S	-6.2	1768.1
+61	94°05'42"	-1792	-8.2	1754.1
+73	94°31'18"	S	-8.5	1753.8
+77	95°36'36"	S	-10.4	1751.9
+84	102°41'36"	-5.92	-21.4	1752.9
+90	102°55'40"		-20.9	1753.4
1+24	108°02'45"		-18.5	1755.8
+27	107°56'03"		-17.2	1757.1
+31	108°58'51"		-17.2	1757.1
+34	113°27'21"		-15.9	1758.4
+60	108°01'03"		-7.0	1767.3
1+81	—	—	-5.1	1775.2

Pt 11-A

Top of Bank
Wash
Pt 11-B & Wash
Wash

Top of Bank
Pt 11-C

CHECK SECTION 1E

ASHBROOK WASH

RIVER MILE- 4.412

5-24-93

T AT Pt # 244
BS. Pt # 223
Az = 328° 53' 50" D.F = 1843.95
FS. Pt 12-A 335° 15' 33" 394.08'
Pt 12-B 285° 00' 04" 429.32'
Pt 12-C 252° 40' 55" 565.02'

T AT BM #5044 1775.01
HI = 5.10 1780.11

STA	Z Angle	Target	DE	Elev.
Pt 12-A		5.95	+16.21	1790.4
Pt 12-B			+2.39	1776.5
Pt 12-C			+18.41	1792.6

BRASS CAP AT INTERSECTION GOLDEN HILLS BLVD & BOULDER DR.

Pt 12-A 1790.4
HI: 5.00 = 1795.4

STA	TARGET	D.E.	ELEV.
0+00	—	-5.0	1790.4
+17	5.95	-2.0	1787.5
+22		-4.59	1784.86
+58		-5.63	1783.82
+91		-6.03	1783.42
+97		-5.2	1784.2
1+33		-6.1	1783.3
+62		-7.1	1782.3
2+25		-7.8	1781.6
+45		-10.8	1778.6
+85		-11.7	1777.7
3+16		-11.8	1777.6
+49		-12.6	1776.8
+51		-12.9	1776.5

TT AT Pt 12-C 1792.6
HI: 4.80 = 1797.40

3+57	-17.97	-2.1	1777.3
+62	"	+0.5	1779.9
+84	-14.04	-1.4	1782.0
4+08	"	-2.7	1780.7

Pt 12-A

Top Curb
& Roadway
Top Curb

Wash

Pt 12-B Wash

Wash

HI = 1797.40

STA	TARGET	D.E.	ELEV.
4+20	12.02	-1.8	1781.6
+37		-4.0	1779.4
+71		-1.7	1781.7
+97		-3.1	1780.3
5+23		-0.3	1783.1
+90		-1.3	1782.1
6+15		-0.4	1783.0
+29		-1.1	1782.3
6+56	—	-4.8	1792.6

PT 12-C

CHECK SECTION 13

ASHBROOK WASH

RIVERMILE - 5.182

5-26-93

IT AT PT #218
BS PT # 217
Az: 333° 24' 23" DIST: 804.24
FS PT 13-E
Az = 265° 32' 08" DIST = 203.8

IT AT PT 13-B
BS. PT #218
Az: 85° 36' 08"
FS PT 13-A 346° 15' 50" 236.8'
PT 13-D 246° 40' 29" 181.7
PT 13-E 252° 10' 95" 307.1

STA	BS	HI	FS	ELEV
T.P				1881.15
	0.28	1881.43		
T.P			2.69	1878.74
	3.92	1882.66		
PT 13-B			7.54	1875.12
	7.65	1882.77		
			4.02	1878.75
	3.22	1881.97		
T.P.			0.82	1881.15

TOP BRASS CAP AT INTERSECTION OF ASPEN DR. & SHOOT OUT PL AS NOTED IN PAGE 32 @ LEVEL BOOK

CHECK 0-00

T AT PT 13-B 1875.12
HI = 4.9 = 1880.02

STA	∠ ANGLE	TARGET	OE	ELEV.
0+00	87° 21' 05"	-9.99	+5.9	1878.5
+37	87° 22' 36"		+4.1	1879.1
+10	86° 07' 21"		+5.5	1878.5
+91	86° 31' 42"	-5.94	+3.7	1876.8
2+37		—	-4.9	1880.0
+48	84° 59' 06"	-5.94	+0.9	1875.0
+77	95° 35' 51"	-9.99	-4.0	1866.0
+85	94° 39' 42"		-3.9	1866.1
+89	93° 07' 42"		-2.8	1867.2
3+03	92° 58' 39"		-3.4	1866.6
+14	91° 56' 30"		-2.5	1867.5
+21	92° 06' 43"		-3.1	1866.9
+33	93° 01' 30"		-5.1	1864.9
+46	92° 21' 39"		-4.5	1865.5
+52	91° 32' 06"		-3.1	1866.9
+60	91° 07' 54"		-2.4	1867.6
+83	88° 25' 18"		+4.0	1874.2
4+19	88° 15' 18		+5.7	1875.7
+41	88° 17' 12"		+6.1	1876.1
+53	88° 55' 50"		+4.1	1874.1
+70	88° 39' 00"		+5.5	1875.5

PT 13-A

PT 13-B

TOE SLOPE

℄ WASH

TOP BANK
PT 13-D

HI = 1880.02

STA	∠ ANGLE	TARGET	D.E.	ELEV
4+89	89° 00' 12"	9.99	+4.4	1874.5
+89	89° 06' 42"		+3.9	1873.9
+92	89° 02' 48"		+4.3	1874.3
+97	88° 54' 51"		+4.9	1874.9
5+46	88° 24' 36	5.96	+5.5	1882.6

WASH

TOE OF SLOPE
PT 13-E

(49)

CHECK SECTION 14

CLOUDBURST WASH

RIVERMILE - 1.525

5.26-

IT AT PC & PALISADES BLVD.
BS INTERSECTION PALISADES & SAGE
Az = 250° 21' 59" Dist: 767.88'
FS 1/4 Cor SEC 16 & 17
Az: 32° 36' 39" Dist: 185.36'

IT AT 1/4 Cor SEC 16 & 17
BS. PC & PALISADES BLVD.
Az = 212° 36' 39"

FS	14-D	309° 06' 53"	599.29'
	14-C	357° 11' 34"	712.47'
	16-B	359° 45' 28"	912.79'
	14-A	356° 48' 02"	1016.12'

B.M. 12A 2035.3
HI = 3.2 = 2038.3

STA	Target	I.E	Elev
PT 14-D	5.92	-191.37	1850.98
PT 14-C	5.50	-106.12	1896.76
PT 14-B	5.92	-104.03	1918.93
PT 14-A	5.92	-90.37	1927.53

G.L.O. BRASS CAP

G.L.O BRASS CAP @ 1/4 COR. SEC. 16 & 17 AS NOTED IN PAGE 41 OF LEVEL BOOK

T AT PT 14-B				1918.43
HI = 4.82 =	1923.25			
STA		TARGET	D.E.	ELEV
0+00		-5.92	+10.5	1927.3
+51		"	+1.3	1919.1
1+15		—	-4.8	1913.0
+49		-5.92	+0.1	1917.4
2+53		"	+2.3	1919.6
+69	HI: 1923.0		(-16.8)	1906.2
+83	"		(-21.4)	1901.6
3+03	"		(-23.3)	1899.7
+05		-25.50	-1.0	1896.7
3+18		(	-1.0	1896.7
+23		)	-1.0	1896.7
+54		5.92	+3.3	1920.6
+70			+9.5	1926.8
4+64			+13.6	1930.9

PT 14-A

PT 14-B

(PHIL. ROD USED
"
"
WASH

PT 14-C & WASH

WASH

CHECK SECTION 15

TAPATA WASH

RIVERMILE - 0.248

5-25-93

T AT MONTEZUMA & TEQUESTA
E.S. Pt #3 PC @ TEQUESTA CT.
Az: 115° 21' 39" Dist: 160.62
F.S. Pt 15-A 175° 56' 53" 393.53'
Pt 15-B 178° 50' 57" 471.57'

BM 13-A				1873.28
	4.35	1877.63		
T.P.			17.67	1859.96
	4.35	1864.31		

STA	H.I.	FS	ELEV
0+00		4.4	1859.9
+06		4.8	1859.5
+20		4.5	1859.8
+27		6.5	1857.8
+33		12.3	1852.0
+42		16.7	1847.6
+43		17.0	1847.3
+51		16.3	1847.5
+57		10.5	1853.3
+71		13.2	1851.1
+91		8.1	1856.2

BRASS CAP IN CONC N. END OF EAST HEADWALL @ MONTEZUMA BLVD & ZAPATA WASH AS NOTED IN PAGE 46 @ LEVEL BOOK

Pt 15-A

TOP SLOPE

WASH
& WASH
WASH

Pt 15-B

STA	F.S.	HI	F.S.	ELEV
		1864.31		
+82			7.3	1857.0
+85			5.2	1859.1
+91			0.0	1864.3
T.P.			6.00	1858.31
	15.72	1874.03		
			0.74	1873.29

CHECK +0.01

(55)

CHECK SECTION 1

ASHBROOK WASH

RIVERMILE - 5.651

5-25-93

IT AT PT #207
B.S. PT #206
Az: 49° 05' 00" DIST: 304.96'
F.S. PT POL 16
Az: 51° 36' 25" DIST: 797.4'

IT AT PT POL 16
B.S. PT #207
F.S. PT 16-B
Az: 205° 37' 54 405.0'

BM 9-A				1926.94
	15.23	1940.17		
POL 16			195	1938.22

HI: 4.9 : 1945.12

STA	∠ ANGLE	TARGET	DS	ELEV
0+00	94° 49' 15"	[illegible]	-3.4	1923.30
+11	90° 11' 06"		-0.1	1937.1
+42	81° 18' 09"		-1.4	1938.6
+88	92° 10' 39"		-1.8	1935.4
1+12	94° 16' 51"		-5.3	1931.9
+78	92° 55' 27"		-7.0	1930.2

TOP BRASS CAP AT MARATHON DR & GREEN VALLEY DR. AS NOTED IN PAGE 32 OF LEVEL BOOK

TOP CURB

HI 1903.12

STA.	Z ANGLE	TARGET	OE.	ELEV.	
1+39	93° 09' 22"	5.92	-8.2	1929.4	TOE OF SLOPE
2+10	92° 40' 12"	16.01	-7.9	1921.2	WASH
+12	92° 44' 06"		-5.2	1920.9	WASH
+15	92° 23' 27"		-7.3	1921.0	WASH
+54	91° 46' 57"		-6.6	1922.5	WASH
+60	92° 00' 54"		-7.7	1921.4	WASH
+92	91° 35' 24"		-7.0	1922.1	WASH & TOE OF SLOPE
3+27	88° 58' 54"		+5.1	1934.2	
+72	89° 06' 33"		+5.2	1934.3	
+77	89° 12' 03"		+4.7	1933.8	
+90	89° 11' 12"		+5.0	1934.1	NAT. GROUND
+92	88° 49' 06"		+7.2	1936.3	TOP OF 6" CONC. WALL
+92	89° 10' 30		+5.1	1934.2	NAT. GROUND
4+23	89° 04' 42"		+6.1	1935.2	
4+46	88° 30' 21"		+10.5	1939.6	
SM 94	91° 35' 22"	5.92	-12.26	1924.94	CHECK 0.00

CHECK SECTION 17

CHOLULA WASH

RIVERMILE. 0.766

5.23.95

IT AT 139.82' N.W. PT #204
BS. PT #201
Az = 291° 43' 14" DIST = 2054.82'
FS. PANEL PT #102
Az 254° 22' 24" DIST = 2351.30'

IT AT PT #102
BS. TRAV. PT. #204
Az = 74° 22' 24"
FS. PT 17-A 57° 15' 54" 269.30'
PT 17-B 64° 49' 46" 320.21'
PT 17-C 85° 44' 10" 199.78'

BM 15-A			2051.40
	280	2054.24	
PT 17-A		7.42	2046.80

BRASS CAP IN CONCRETE - AS NOTED IN PAGE 54 of LEVEL BOOK

PT 17A 2076.80

HI 5.18 = 2051.98

STA	∠ ANGLE	TARGET	O.E.	ELEV.
2+00		—	-5.18	2046.8
+07	96° 42' 54"	5.92	-0.8	2045.2
+19	97° 53' 36		-1.5	2043.6
+33	107° 12' 21"		-10.1	2035.5
+40	104° 35' 30"		-10.6	2035.7
+43	104° 55' 00"		-11.3	2034.8
+45	103° 02' 54"		-10.4	2035.7
+53	103° 05' 36"		-12.2	2032.9
+56	103° 12' 21"		-13.2	2032.9
+59	102° 03' 39"		-12.5	2033.6
+66	98° 23' 39"	10.00	-9.7	2032.3
+78	97° 02' 42"		-9.5	2032.5
+80	96° 14' 54"		-8.6	2033.4
+90	95° 05' 06"		-7.9	2034.1
1+05	90° 45' 30"	5.92	-1.5	2034.6
1+38	87° 15' 21"	"	+5.9	2042.0
EM 15A		"	-5.36	2051.42

PT 17-A

TOP BANK

WASH

PT 17-B WASH

WASH

PT 17-C TOP

CHECK +0.02

(61)

CHECK SECTION 18

HESPERUS WASH

RIVERMILE - 2.792

S-28.

T AT PT # 227
ES. PT # 228
Δ= 102° 15' 15" DST= 501.64
F.S. PT 18-A 164° 36' 50" 230.98'
PT 18-B 133° 34' 05" 343.66'

STA	BS.	HI	F.S.	ELEV.
BM 9-D				1856.71
	5.01	1861.72		
T.P.			9.27	1852.45
	5.06	1857.51		
0-07			3.0	1854.5
0+00			5.1	1852.4
+15			13.3	1844.2
+48			16.9	1840.6
+55			20.7	1836.8
+57			21.0	1836.5
+60			-.1	1860.4
+66			16.4	1845.1
+74			14.3	1842.7
+96			3.9	1853.6
1+47			1.7	1855.8
TP			1.73	1855.78
	5.98	1861.76		
BM 9-D			5.04	1856.72

BRASS CAP AT CENTER CUL DE SAC AT WEST END GRASSLAND DR AS NOTED IN PAGE 34 OF LEVEL BOOK

TOP BANK
PT 18-A

WASH
WASH

PT 18-B

CHECK +0.01

HYDROLOGY - BOOK No. 1

NOTE:

The following survey was performed by George V. Sabol Consulting Engineers, Inc., for:

Culvert C523 (McDowell Mtn. Road @ Caliente Wash).

4/21/93 Sunny, Clear, Warm 100°F

Culvert at C557

Golden Eagle Blvd. @ Ashbrook Wash
Road overflow control section
Left to Right looking downstream

Sta.	+	HI	−	Elev.	Desc.
TBM	6.91	1921.29		1914.38	
	—				
TP #1			2.21	1919.08	
TP #2	6.45	1925.53			
10+00			4.2	1921.3	
10+25			4.6	20.9	
10+75			5.1	20.4	
11+00			5.5	20.0	
11+25			5.4	20.1	
11+32			6.1	19.4	
11+50			5.8	19.7	
11+52			6.0	19.5	
11+62			5.2	20.3	
11+80			5.7	19.8	
12+05			5.8	19.7	

Wild LNA-2 Laser Level
Philly Rod
TRL

Description
Top of 60" CMP Culvert, inlet end per ALS Book No. 2, Page 11. Invert = 1909.38 + 5' = 1914.38
A/C
East side of street @ angle point ending Pavement taper transitioning full Street Section to no curb on East side
Left end of weir control section
On control section
" " "
" " "
" " "
N. edge AC D/W Fire Station
S. edge AC D/W Fire Station
℄ channel on South Side Fire Sta. D/W
NW corner transformer, ground
Top of concrete spillway lining, North end

RECEIVED OCT 13 1994

Culvert 557 Continued...

Sta.	+	HI	−	Elev.	Description
		1925.53			
12+30			5.9	19.6	Top of concrete spillway lining
12+55			6.2	19.3	" " " " "
12+65			6.0	19.5	" " " " "
12+68			7.2	18.3	" " " " "
12+72			8.6	16.9	℄ " " " "
12+75			8.7	16.8	" " " " "
12+78			6.5	19.0	Top " " " " , South end
12+82			6.5	19.0	On control section
12+86			4.7	20.8	" " "
12+94			4.5	21.0	" " "
13+05			5.3	20.2	" " "
13+10			5.1	20.4	" " "
13+25			4.0	21.5	" " "
13+50			3.3	22.2	Right end of control section

℄ of culvert is approximately at Sta. 13+00

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16569
THOMAS R.
LOOMIS
Date Signed 10/10/94
ARIZONA, U.S.A.

I certify that these notes correctly represent a survey made under my supervision at Culvert C557.

6/28/93 Cloudy, Warm 95°F

Culvert at C523

McDowell Mtn. Road just north of end of Fountain Hills Blvd.

60" CMP x 100' long
ASPHALT LINING - Poor Condition

T. Loomis, G. Kinetty
TopCon AT-G3 level
Lenker Rod

Sta.	Elev.	Description
BM	1955.56	ALS ERM 1-D
0+00	1963.5	Left end of control section
0+40	62.4	On control section
0+50	62.1	" " "
0+70	—	
1+00	61.0	" " "
1+50	60.0	" " "
2+00	59.4	" " "

Weir Control Section, left to right looking downstream, along west edge of Pavement

ALS Field Book No. 1, Page 7
Top of Brass Cap on Fountain Hills Blvd. E 80' N. of power lines (overhead)
Left end of weir. West edge of pavement

Approx. location of culvert ℄

Culvert 523 continued...

Sta.	Elev.	Description
2+50	59.2	On control section
3+00	59.2	" " "
3+50	59.3	" " "
3+87	59.4	Location adjacent to bar ditch crest. Assume vertical wall here for Weir Calcs
4+00	59.4	—
4+50	59.1	—
5+00	58.0	—
5+20	57.4	Point opposite PC @ ℄ (B.C.)
TP #1	59.94	On A/C Pavement
TP #2	54.88	Grnd.
Inlet	50.28	℄ 66" CMP
Outlet	54.67	Top of CMP
Outlet	49.17	℄ of CMP

Assume weir breadth = 5'

Rattlesnake in outlet under plywood

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16569
THOMAS R.
LOOMIS
10/10/14
ARIZONA, U.S.A.

I certify that these notes correctly represent a survey made under my supervision at Culvert C523.

APPENDIX C

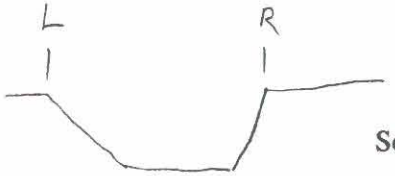
Manning's n value Determination Calculations

Unless otherwise noted, the photographs for each reach are arranged in the following sequence:

1 Bed Material	2 Looking upstream or downstream at main channel
3 Left Overbank looking upstream or downstream	4 Right Overbank looking upstream or downstream

Photograph location and direction are shown on Exhibit 1. The photographs for each reach are contained in Appendix C.

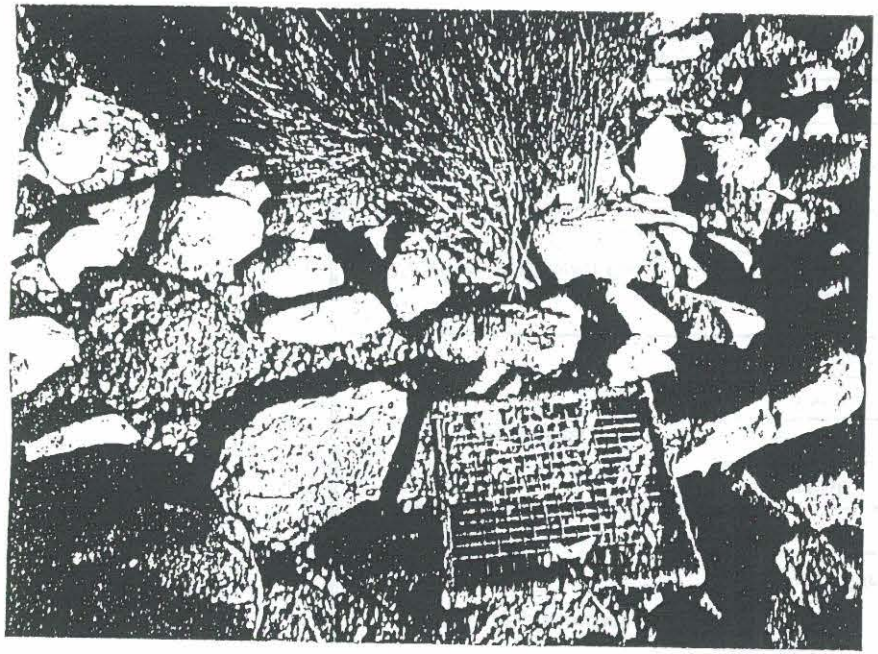
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

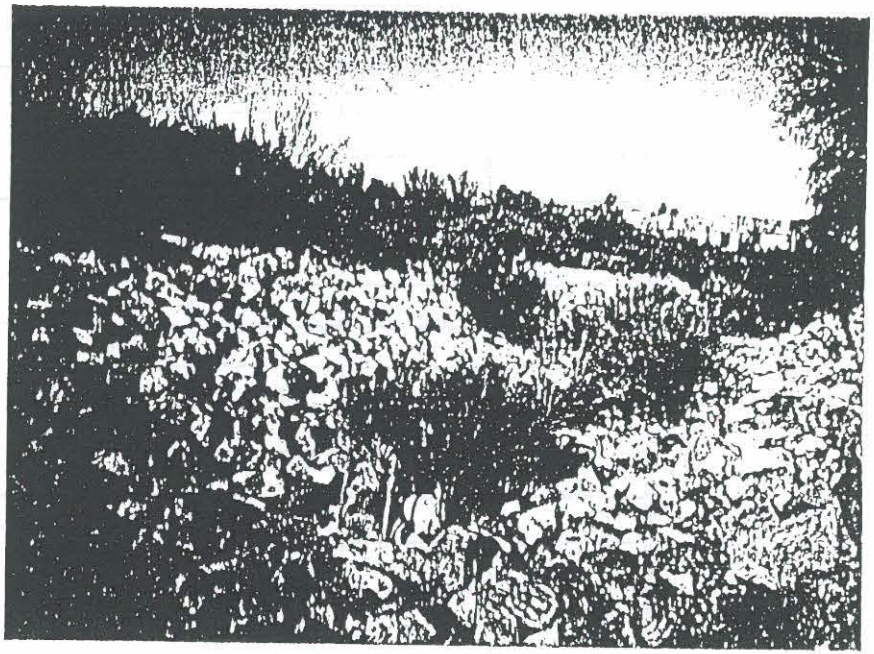


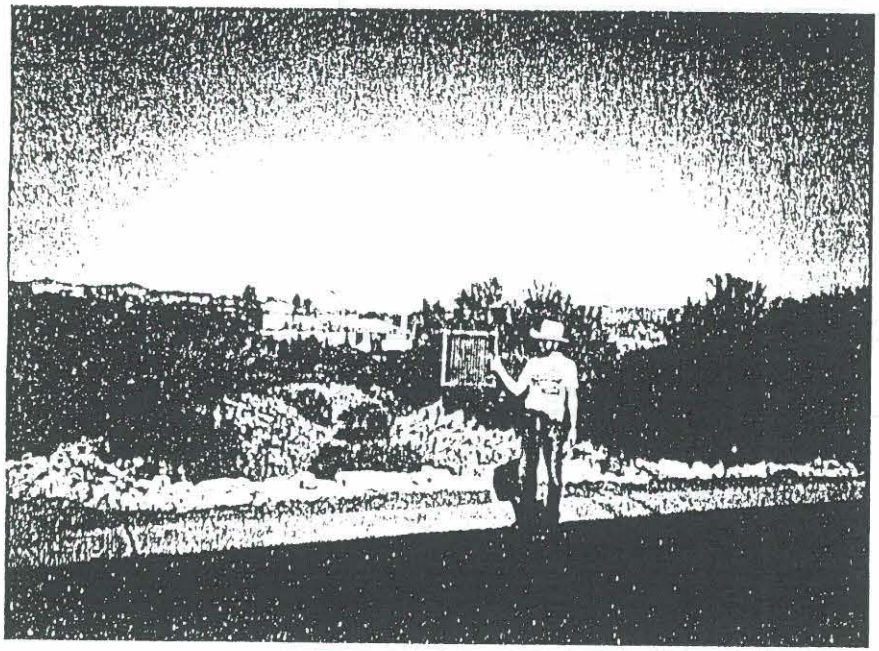
Project: Fountain Hills North Flood Delineation Study
Stream: Arrow Wash
Location: Reach AR1
Photo No.: AR1 - 1, 2, 3 and 4
Section Description: Riprap-lined channel, in-filled with 1"-2" gravel, D50 = 10"±. Some brush in the channel. Use Large vegetation adjustment in overbanks.

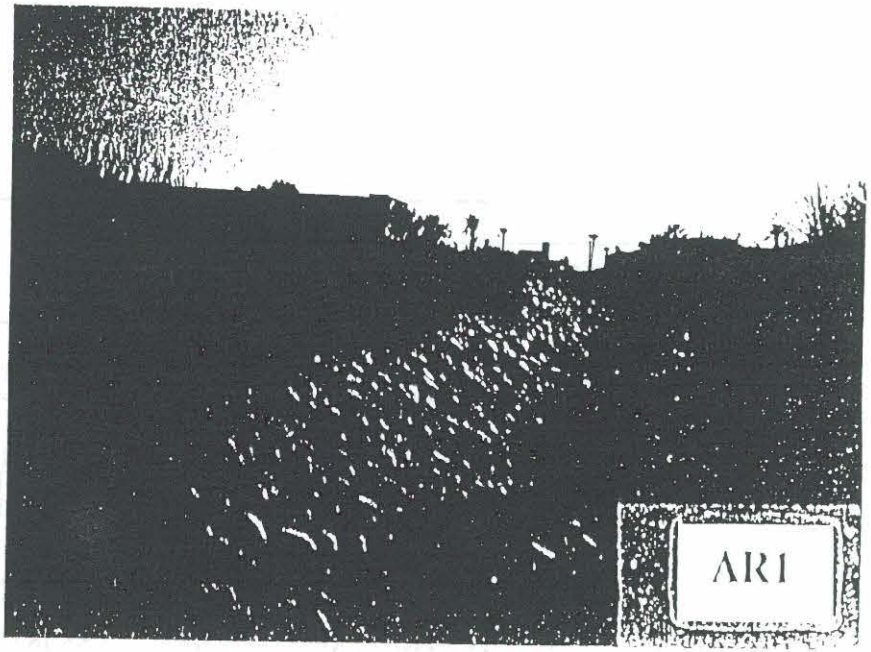
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050			
	Boulder		.040 - .070		0.045	
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.002	
	Medium		.010 - .025			
	Large		.025 - .050	0.025		0.025
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.050	0.047	0.050

Use 0.050







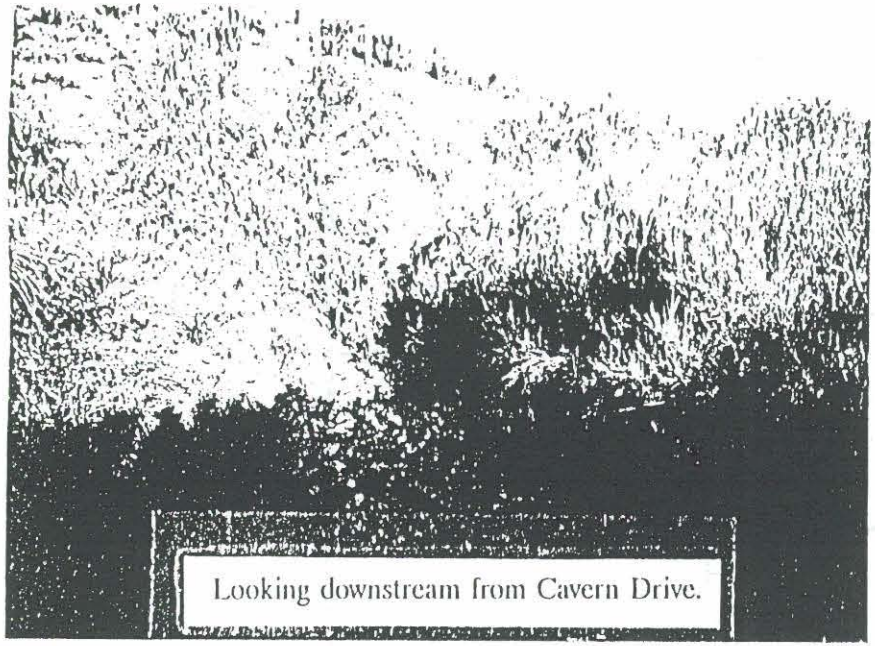

AR1

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

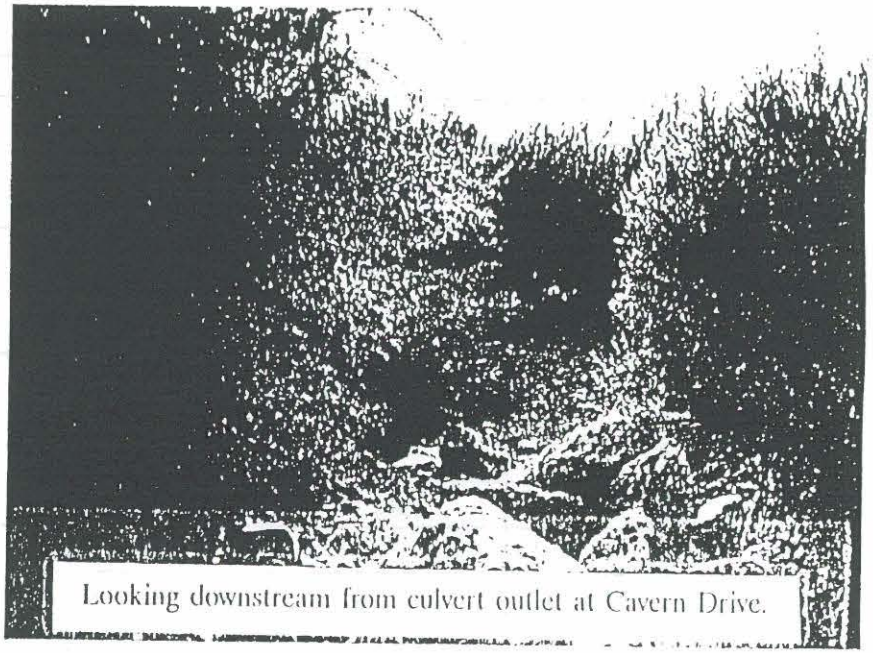
Project: Fountain Hills North Flood Delineation Study
Stream: Arrow Wash
Location: Reach AR2
Photo No.: AR2 - 1, 2, 3 and 4
Section Description: Bed material is gravel and cobbles. Overbanks have a medium dense cover of trees and brush. Use Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.030	0.045	0.030
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025		0.010	
	Large		.025 - .050	0.040		0.040
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.057	0.070

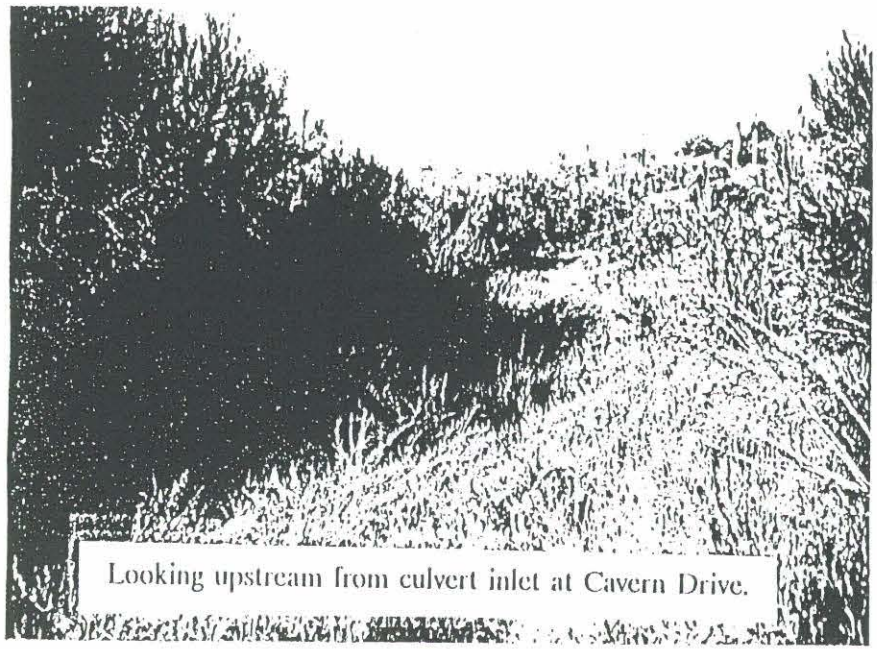
Use 0.060



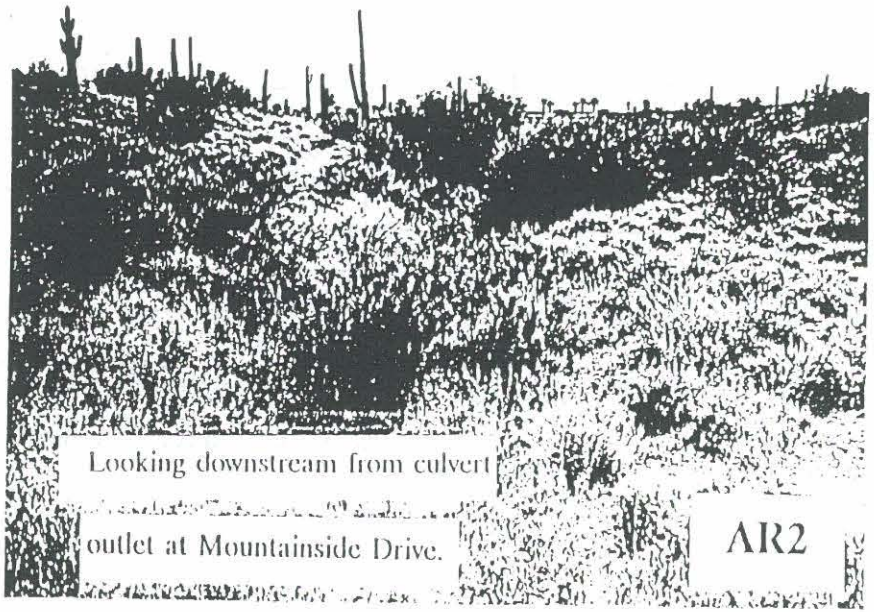
Looking downstream from Cavern Drive.



Looking downstream from culvert outlet at Cavern Drive.



Looking upstream from culvert inlet at Cavern Drive.



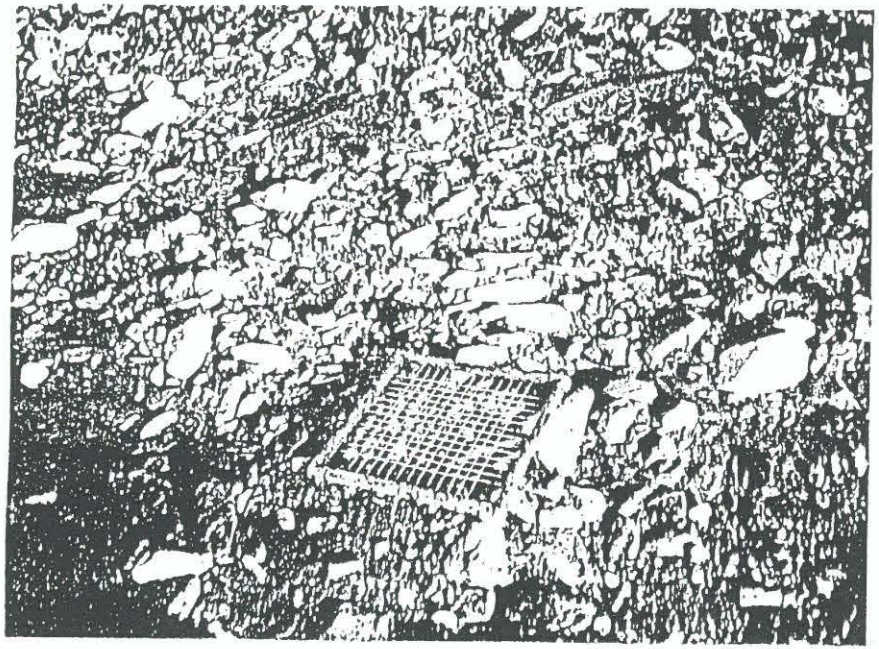
Looking downstream from culvert outlet at Mountainside Drive.

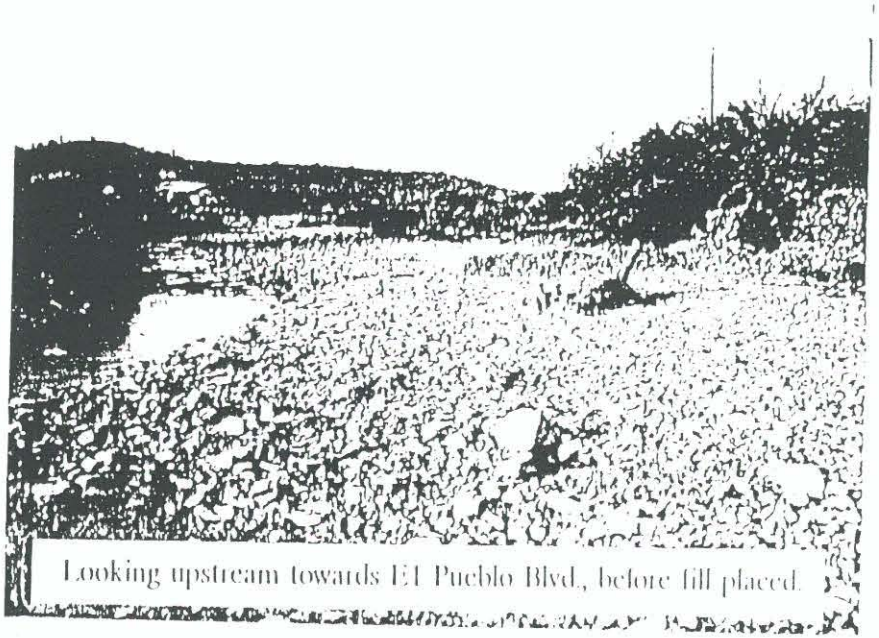
AR2

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

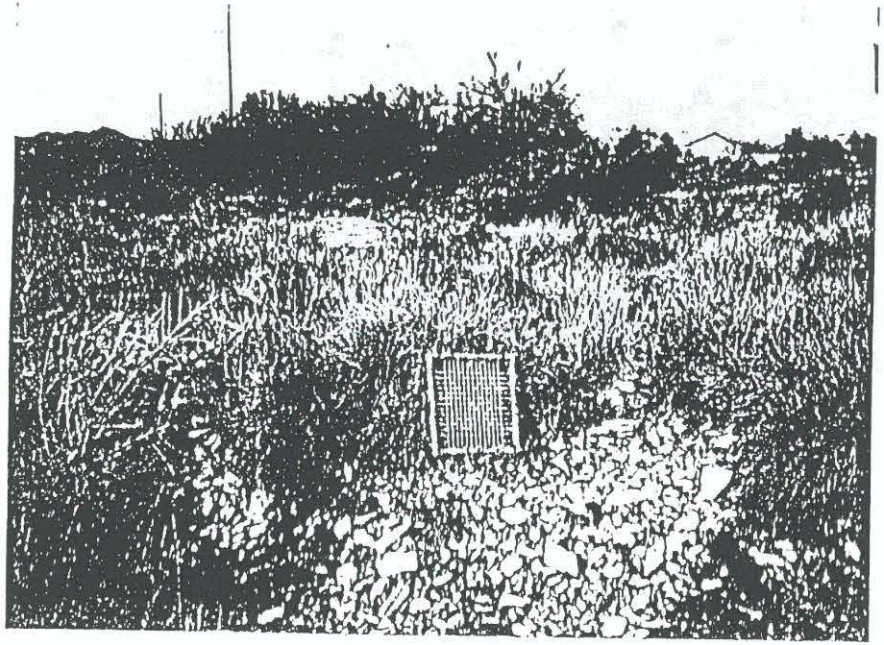
Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS1
Photo No.: AS1 - 1, 2, 3, 4, 5 and 6
Section Description: Bed material is sand, gravel and cobbles. Overbanks have brush and trees, use Large Vegetation adjustment in overbanks.

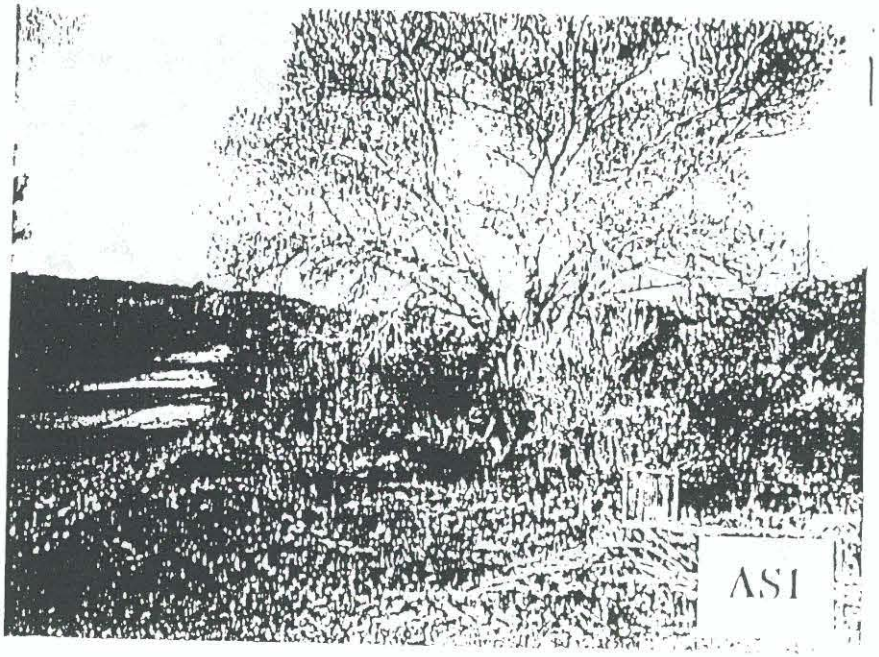
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.028		0.028
	Cobble		.030 - .050		0.040	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015	0.005	0.010	0.005
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025			
	Large		.025 - .050	0.045		0.045
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.078	0.057	0.078
				Use 0.080	Use 0.060	Use 0.080



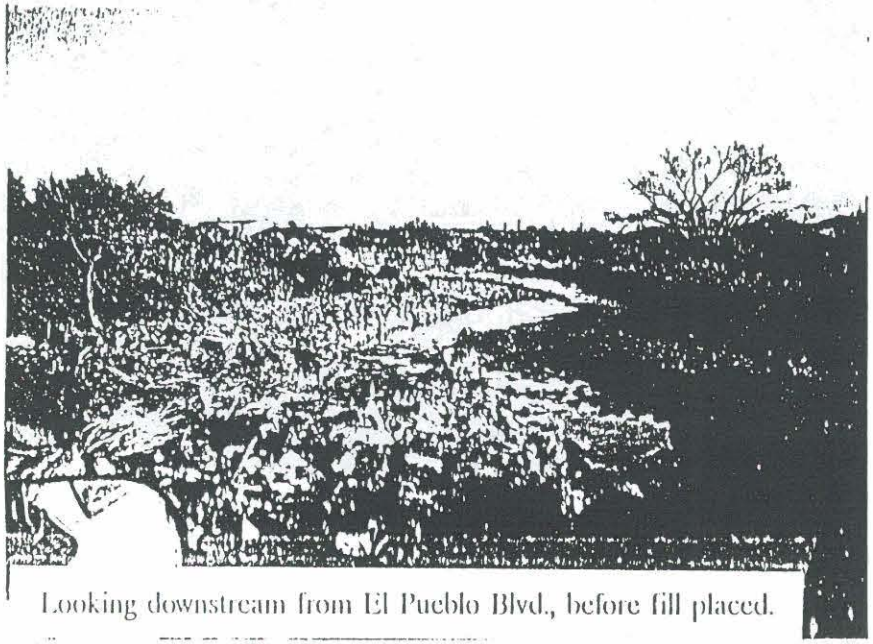


Looking upstream towards El Pueblo Blvd., before fill placed.

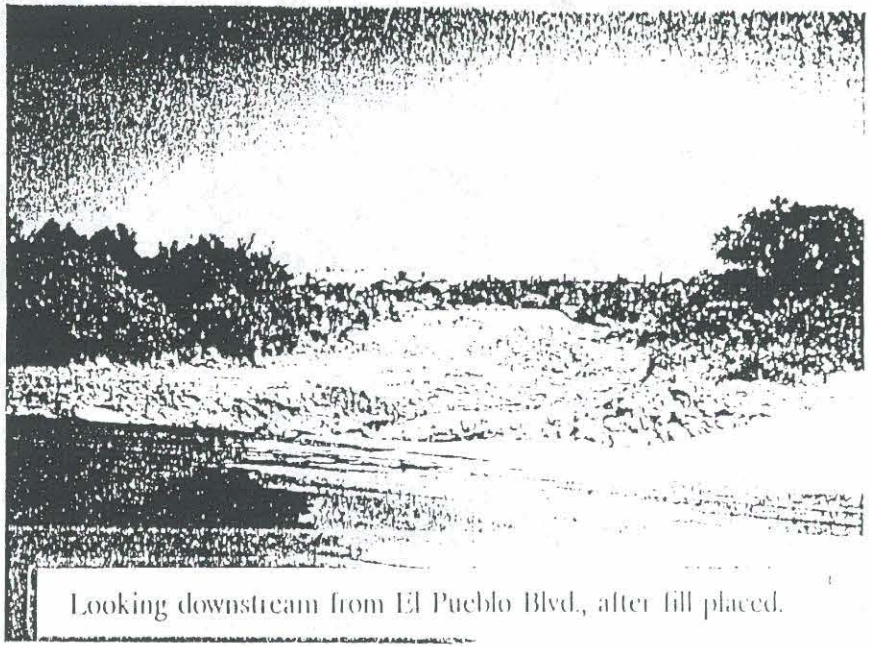




ASI



Looking downstream from El Pueblo Blvd., before fill placed.



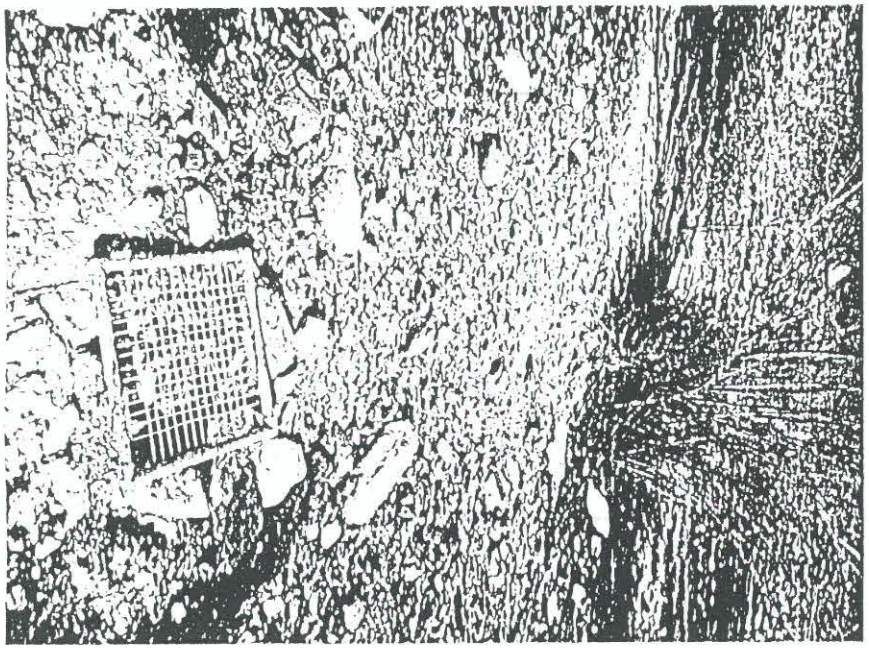
Looking downstream from El Pueblo Blvd., after fill placed.

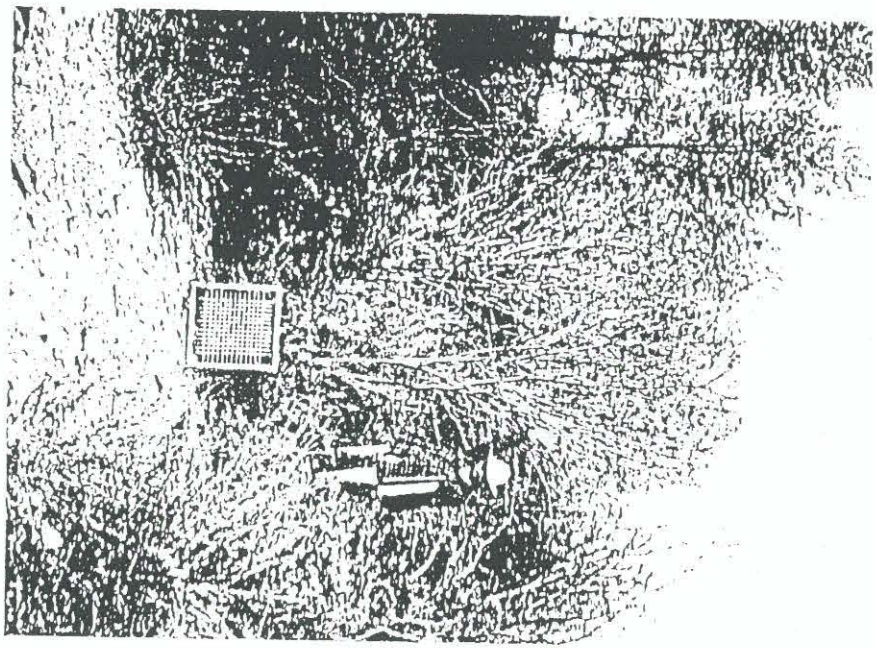
AS1 Cont'd.

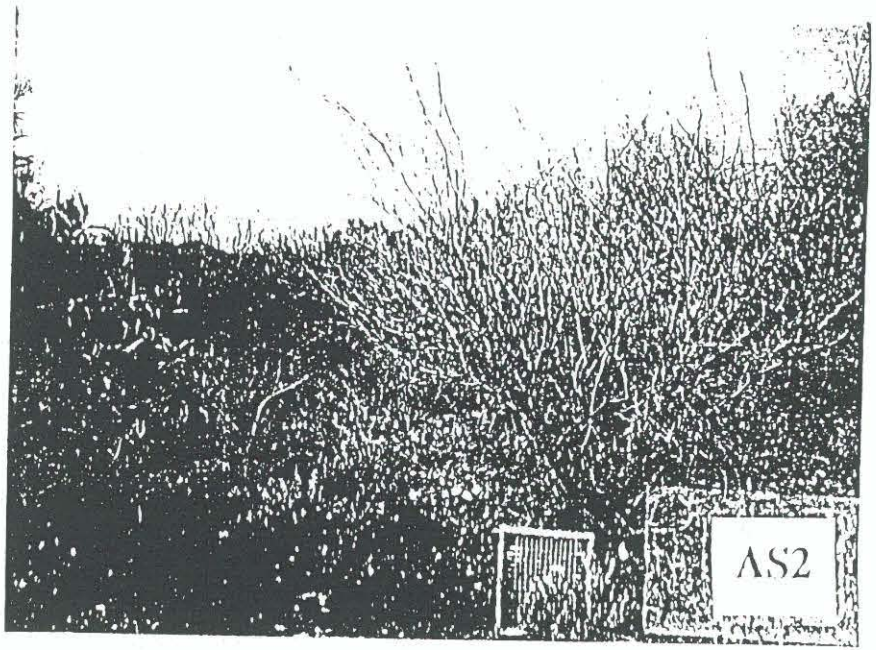
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS2
Photo No.: AS2 - 1, 2, 3, and 4
Section Description: Bed material is coarse gravel with dense trees in main channel. Overbank has dense trees and brush. Use Very Large Vegetative adjustment in channel and overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.028	0.025	
	Cobble		.030 - .050			0.035
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100	0.085	0.100	0.085
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00		1.0	
	Appreciable		1.15			
	Severe		1.30			
$n = (nb + n1 + n2 + n3 + n4)m$				0.113	0.125	0.120





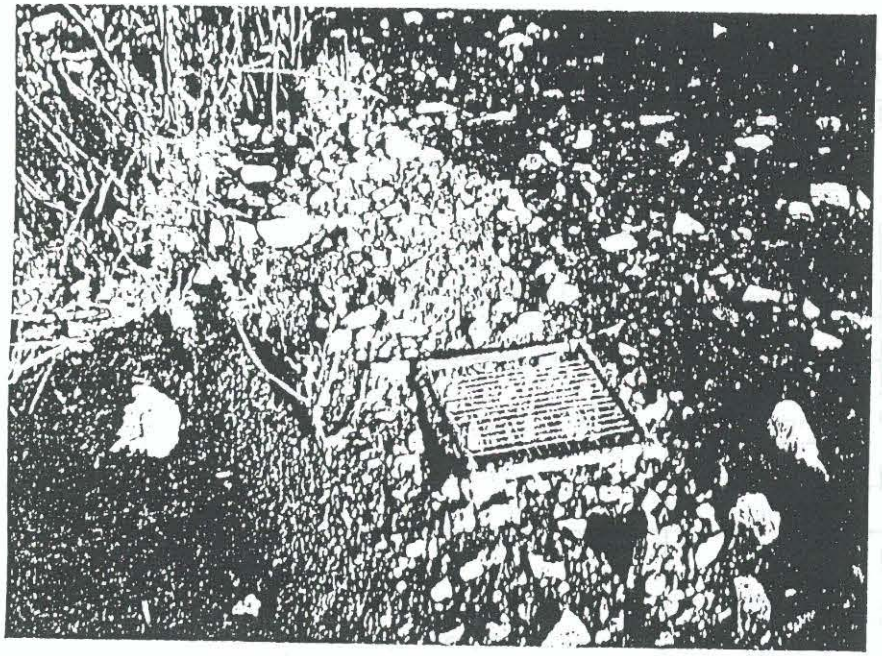

AS2

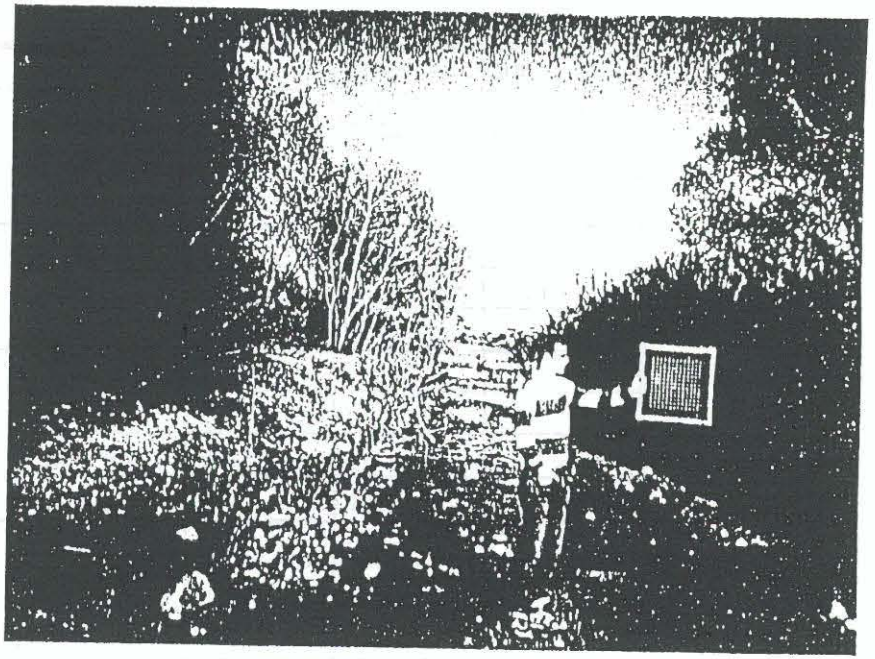
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

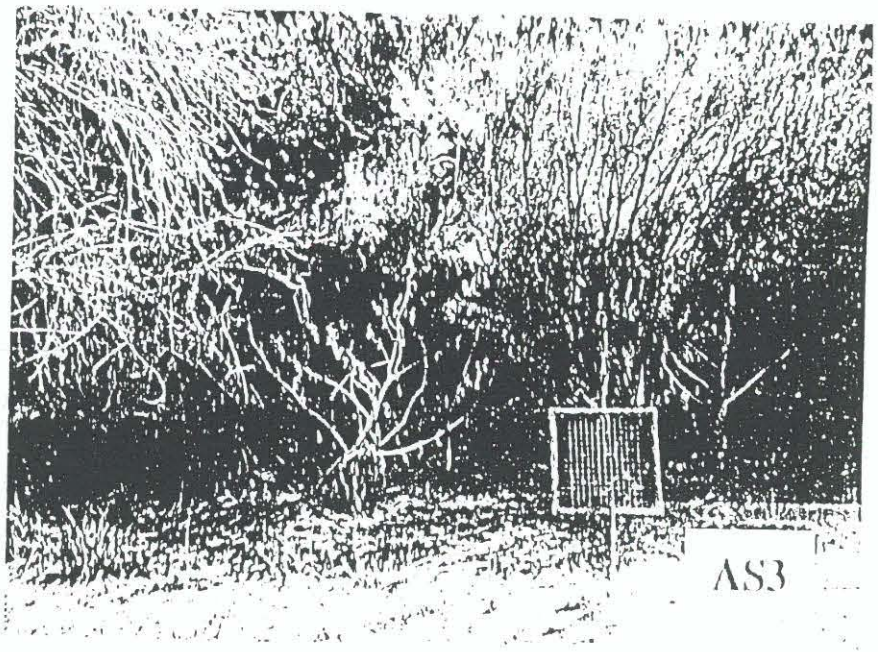
Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS3
Photo No.: AS3 - 1, 2, 3 and 4
Section Description: Bed material is gravel and cobbles, main channel relatively clear of trees. Overbank has a dense cover of trees and brush. Use Very Large Vegetation adjustment in overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.020		0.020
	Cobble		.030 - .050		0.030	0.0350
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.010	
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100	0.080		0.080
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00		1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.100	0.042	0.100

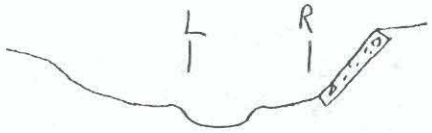
use 0.045






AS3

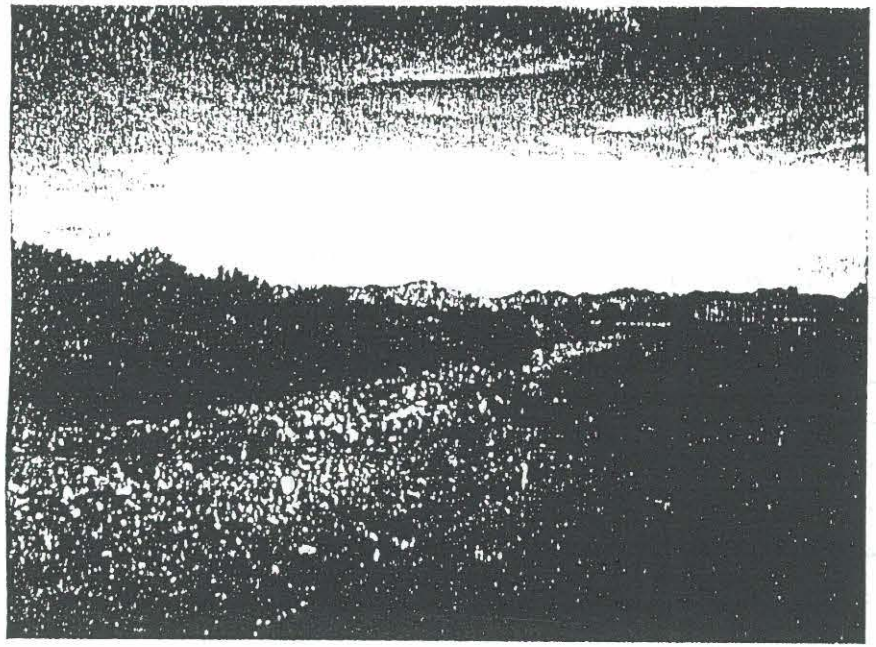
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

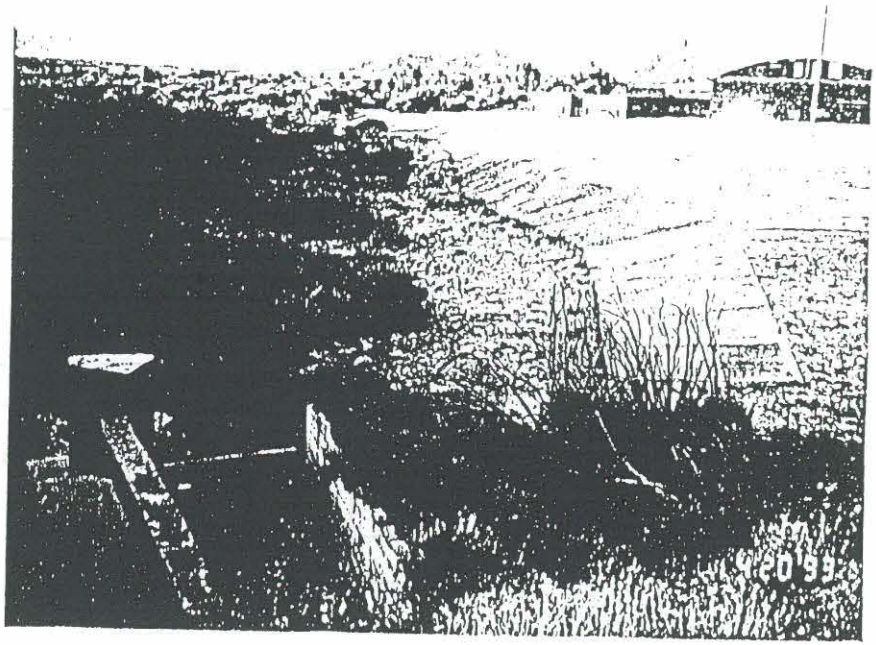


Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS4
Photo No.: AS4 - 1 and 2
Section Description: Bed material is gravel and cobbles. This reach has concrete side slopes on right overbank. Use Medium Vegetation adjustment in left overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				0.018
	Cobble		.030 - .050	0.030	0.035	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			0.001
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.007	
	Medium		.010 - .025	0.025		
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			0.004
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.055	0.045	0.023

Use 0.025





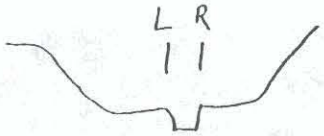
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS5
Photo No.: AS5 - 1, 2, 3, and 4
Section Description: Bed material is relatively smooth clay. Overbanks have moderately dense brush. Use Medium Vegetation adjustment in overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025	0.025	0.025
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.050	0.025	0.050

AS5

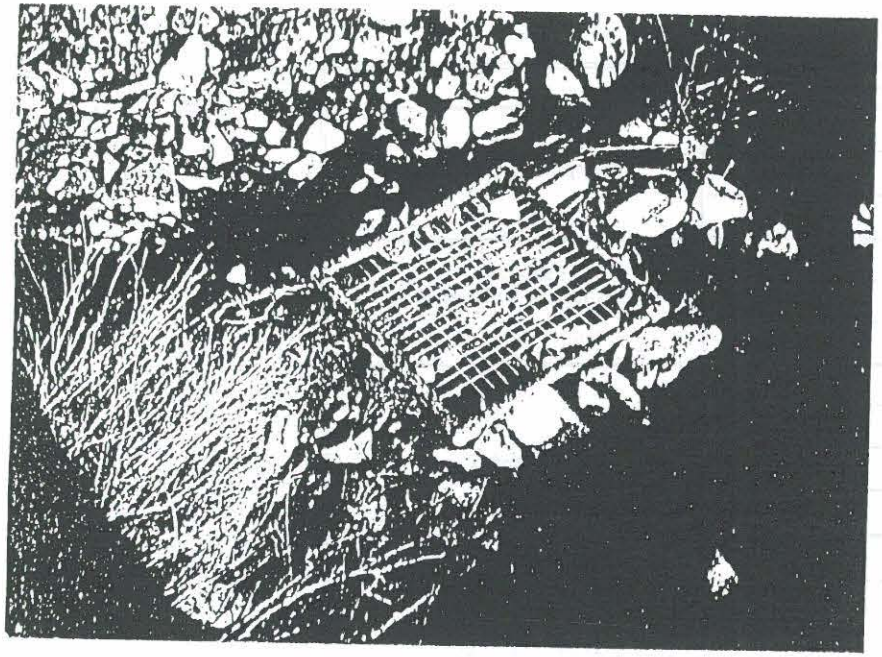
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

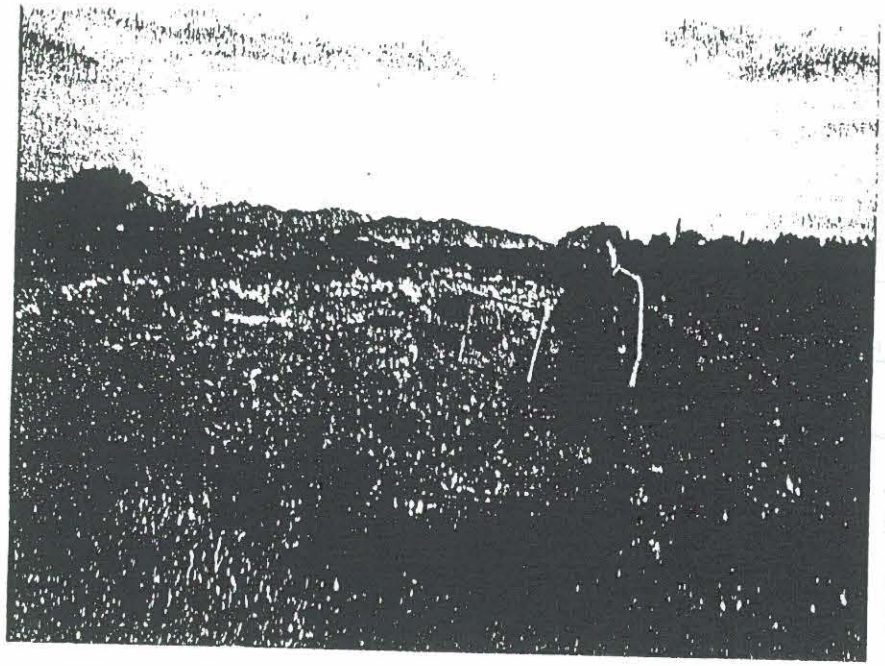


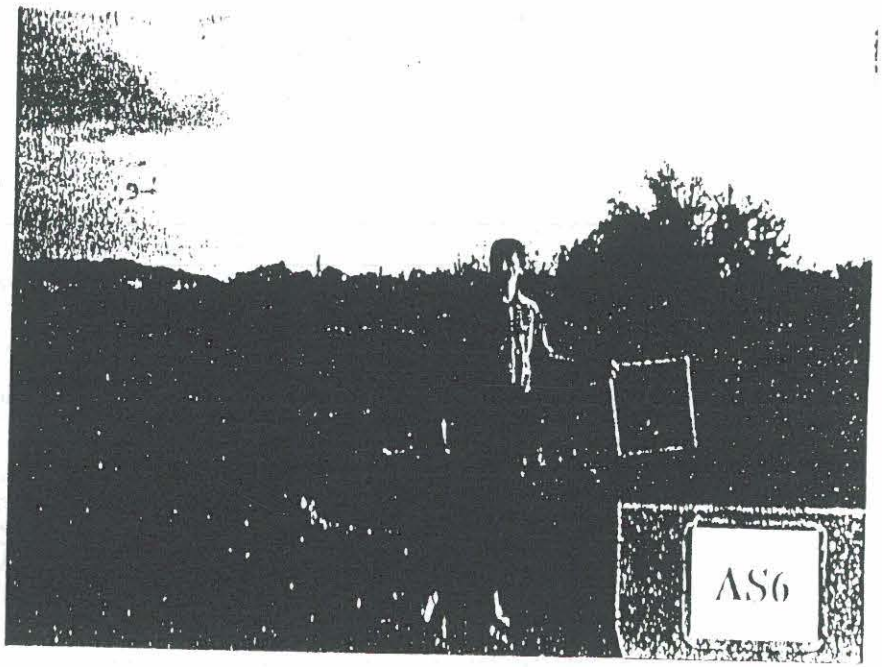
Project: Fountain Hills North Flood Delineation Study
Stream: Ashbrook Wash
Location: Reach AS6
Photo No.: AS6 - 1, 2, 3 and 4
Section Description: Bed material is cobbles. Overbanks have medium density brush. Use Medium Vegetation adjustment in overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.030	0.035	0.030
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.025	0.005	0.030
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00	1.0	1.0	1.0
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.055	0.043	0.060

Use 0.045





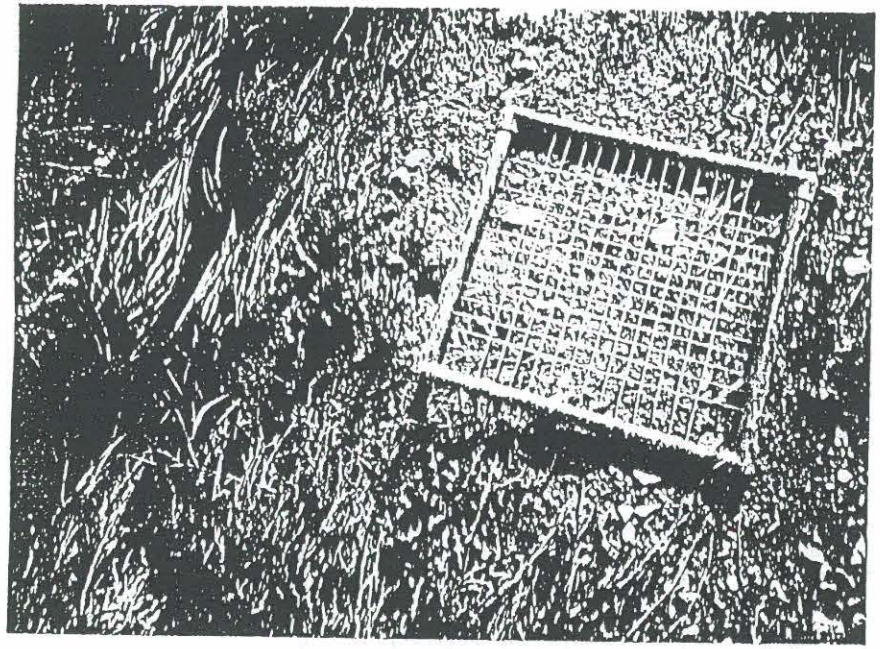

AS6

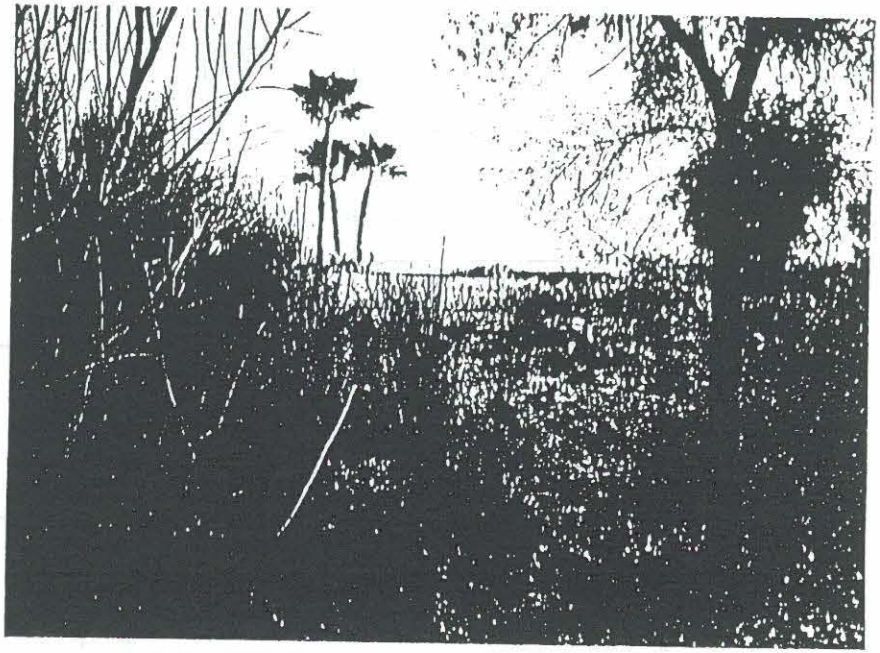
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

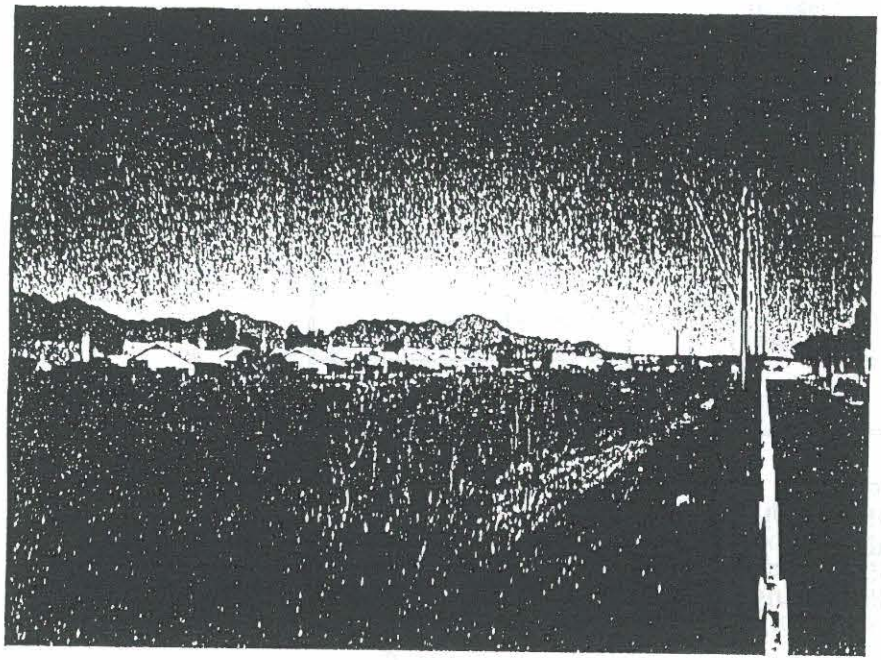
Project: Fountain Hills North Flood Delineation Study
Stream: Balboa Wash
Location: Reach BA1
Photo No.: BA1 - 1, 2, 3 and 4
Section Description: Bed material is gravel and soil. Use Large vegetation adjustment in channel and overbank.

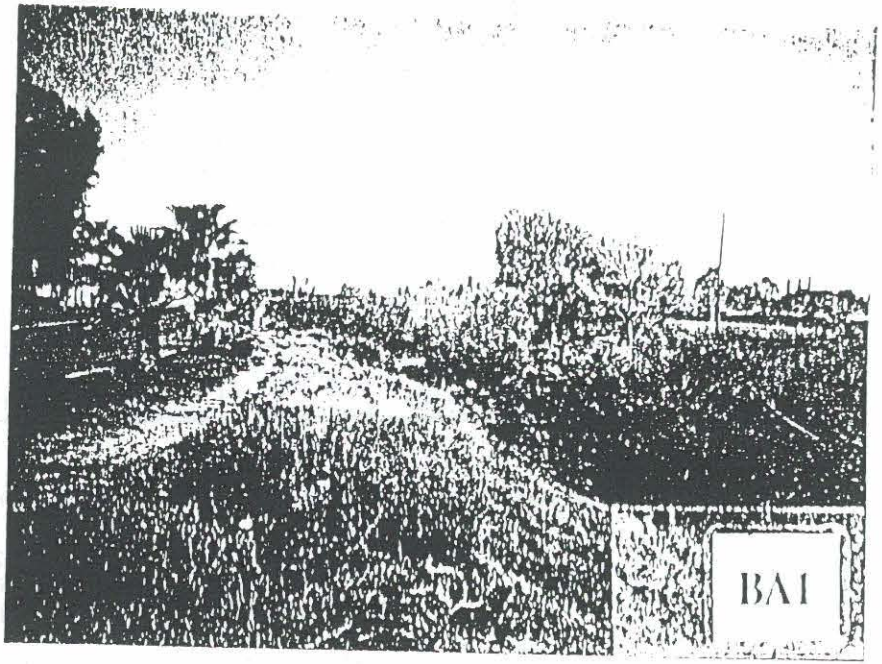
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025	0.028	0.025
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025			
	Large		.025 - .050	0.045	0.05	0.045
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.070	0.078	0.070

Use 0.080





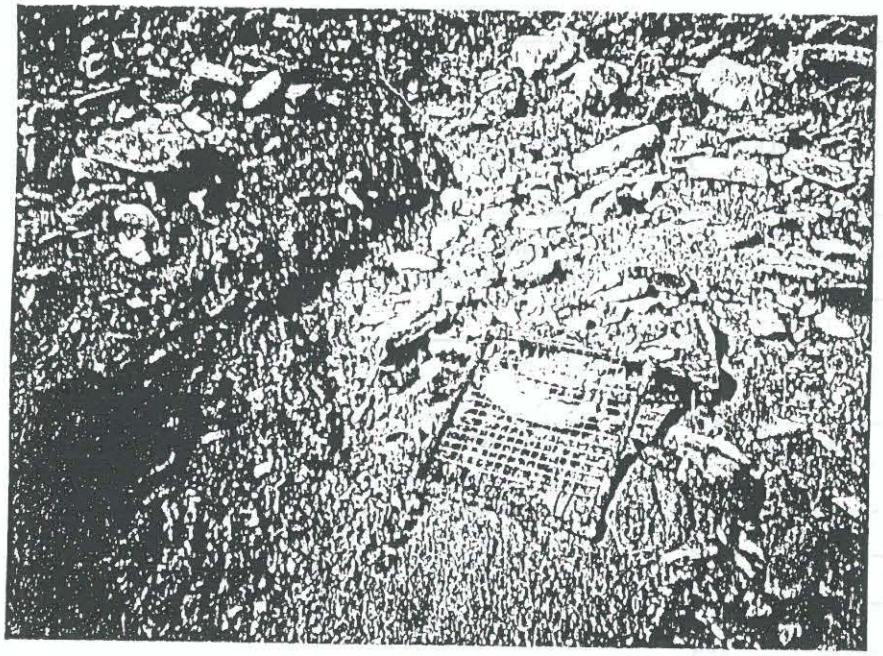


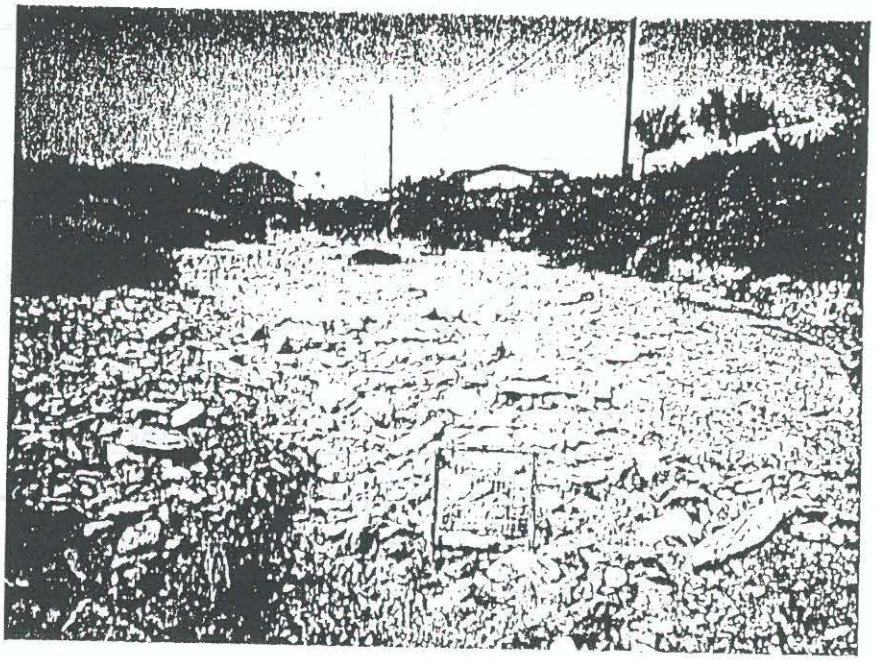

BAI

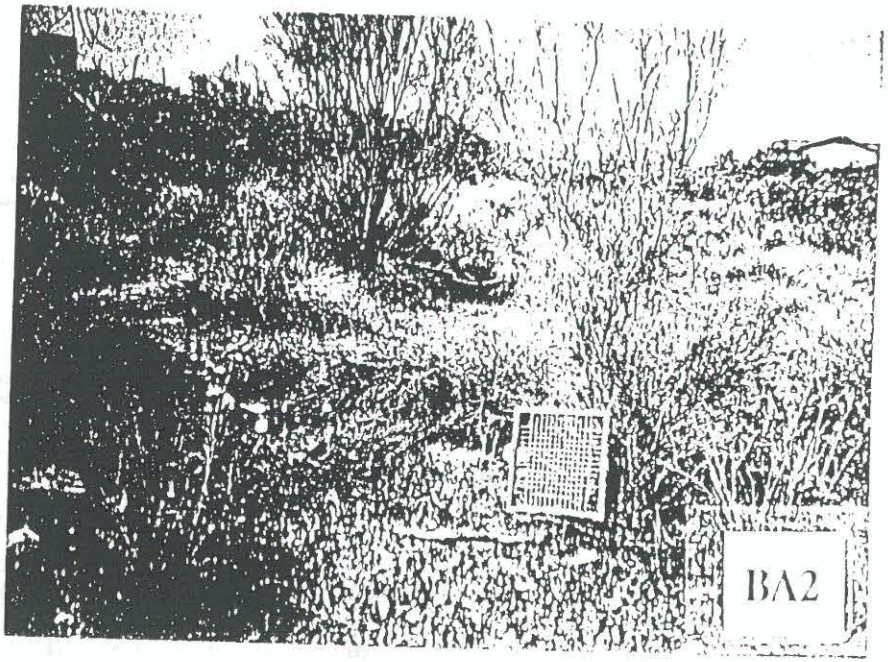
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Balboa Wash
Location: Reach BA2
Photo No.: BA2 - 1, 2, 3 and 4
Section Description: Bed material is cobbles and gravel. Use Large vegetation adjustment in overbank.

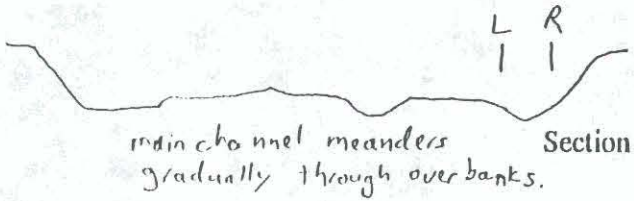
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.030	0.035	0.030
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.007	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.002	
	Medium		.010 - .025			
	Large		.025 - .050	0.030		0.030
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00		1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.044	0.060





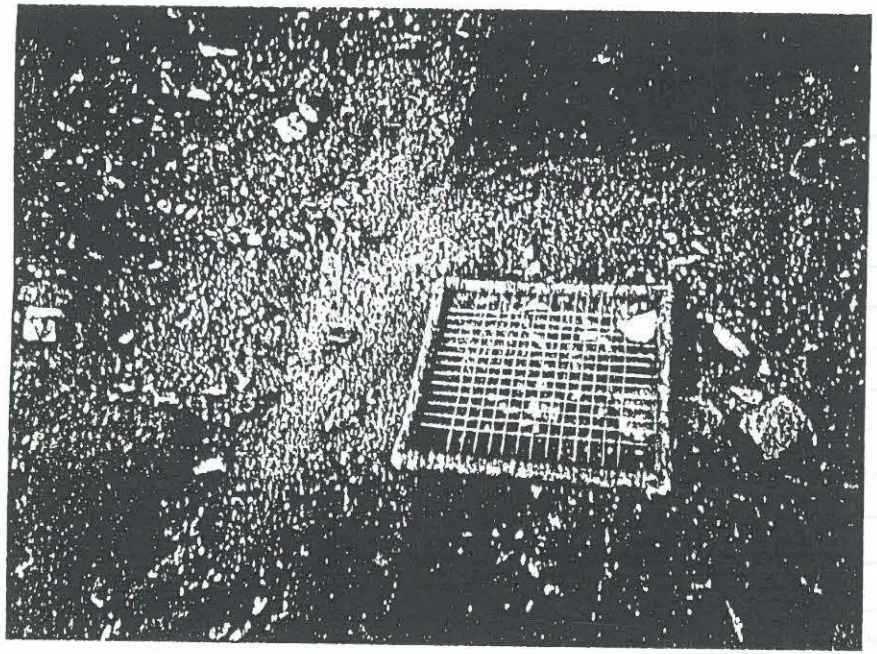

BA2

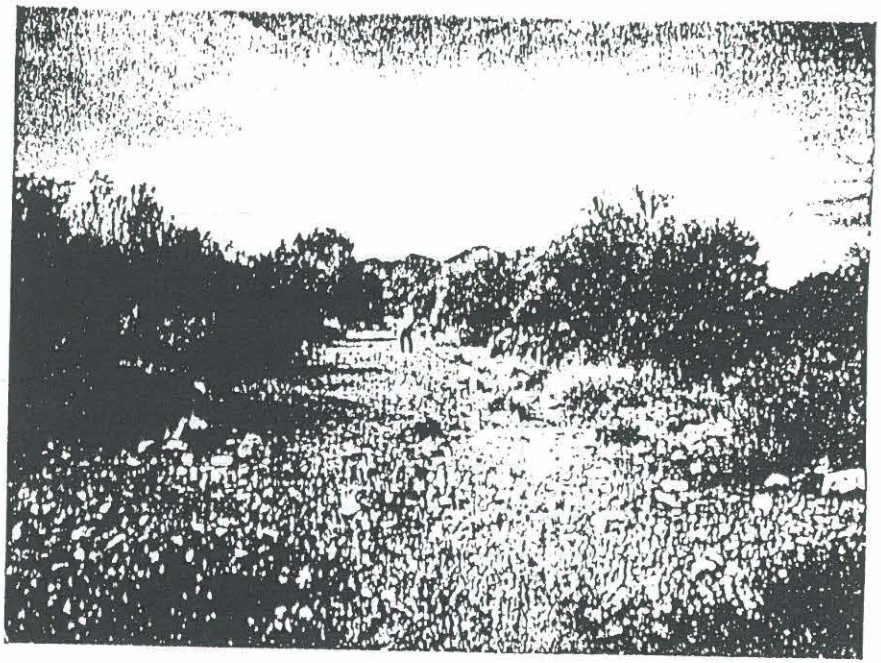
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD



Project: Fountain Hills North Flood Delineation Study
Stream: Balboa Wash
Location: Reach BA3
Photo No.: BA3 - 1, 2, 3 and 4
Section Description: Bed material is gravel and cobbles. Overbanks have dense trees and brush. Use Large vegetation adjustment in overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050		0.030	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.002	
	Medium		.010 - .025			
	Large		.025 - .050	0.040		0.040
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000	0.000		0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00		1.0	
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.034	0.065



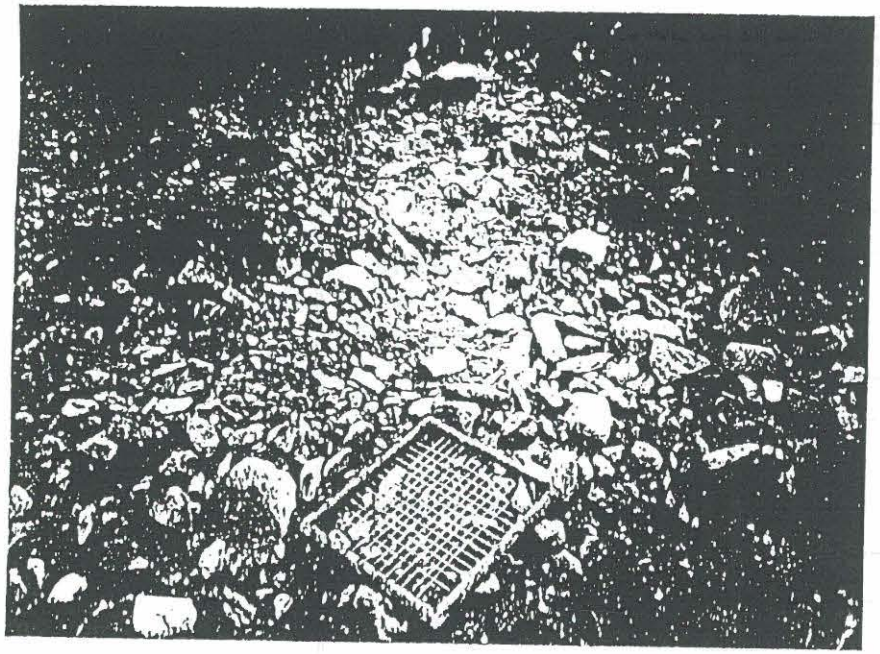


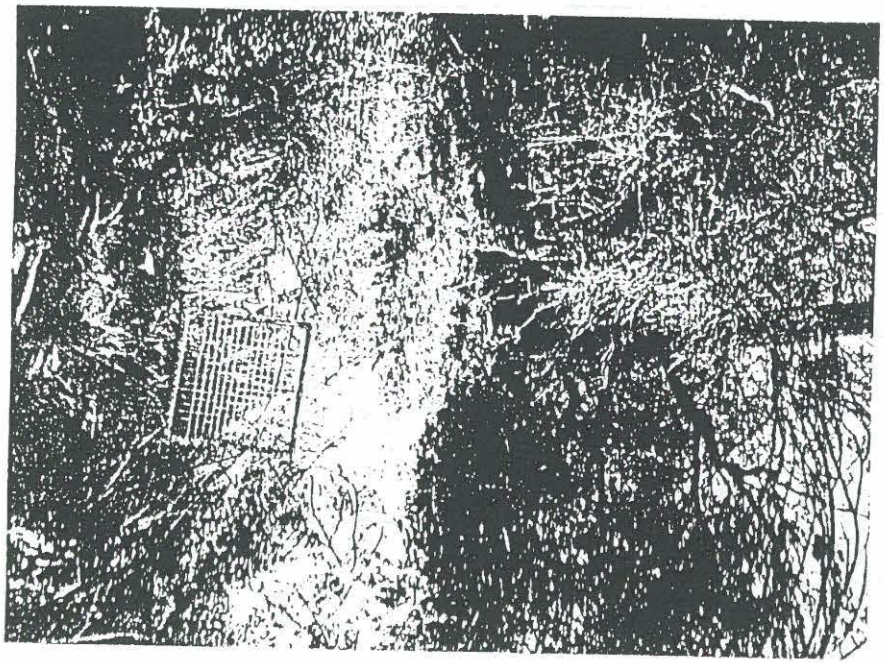
BA3

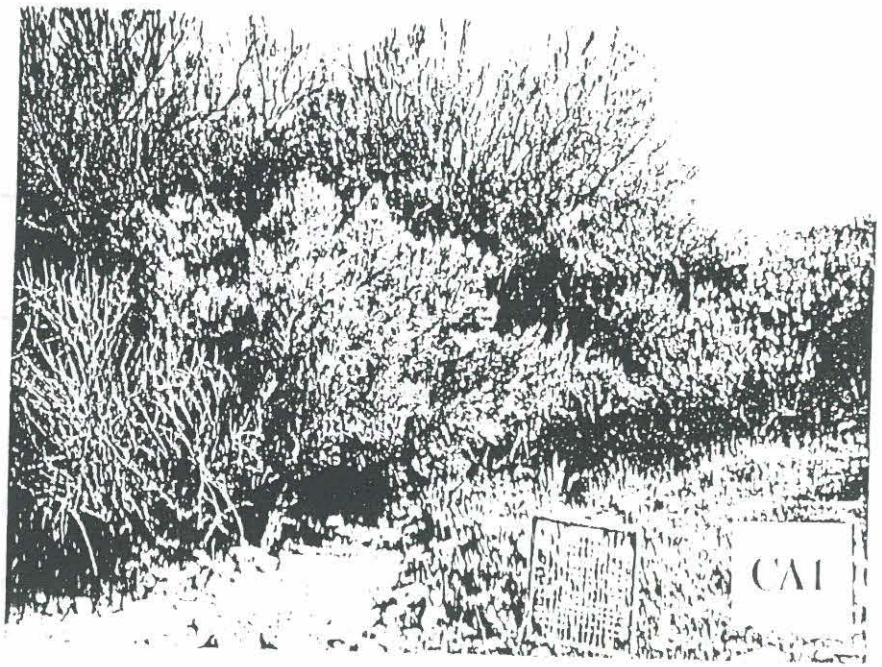
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Caliente Wash
Location: Reach CA1
Photo No.: CA1 - 1, 3 and 4
Section Description: Natural desert on Indian Reservation. Bed material is gravel and cobbles. Dense vegetation adjustment in overbanks. Use Large vegetation on overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050		0.045	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025			
	Large		.025 - .050	0.040	0.025	0.040
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.070	0.065





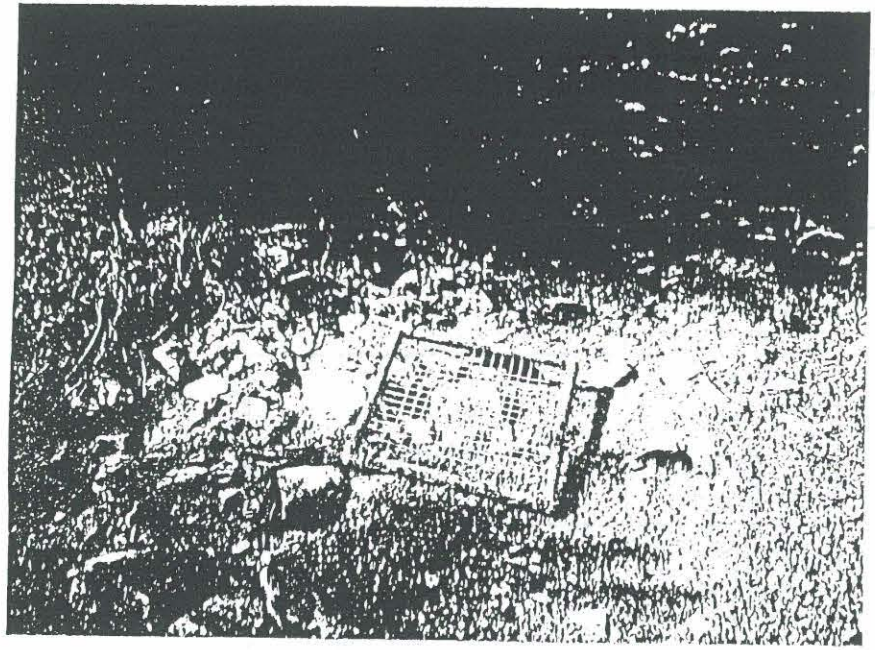

CAI

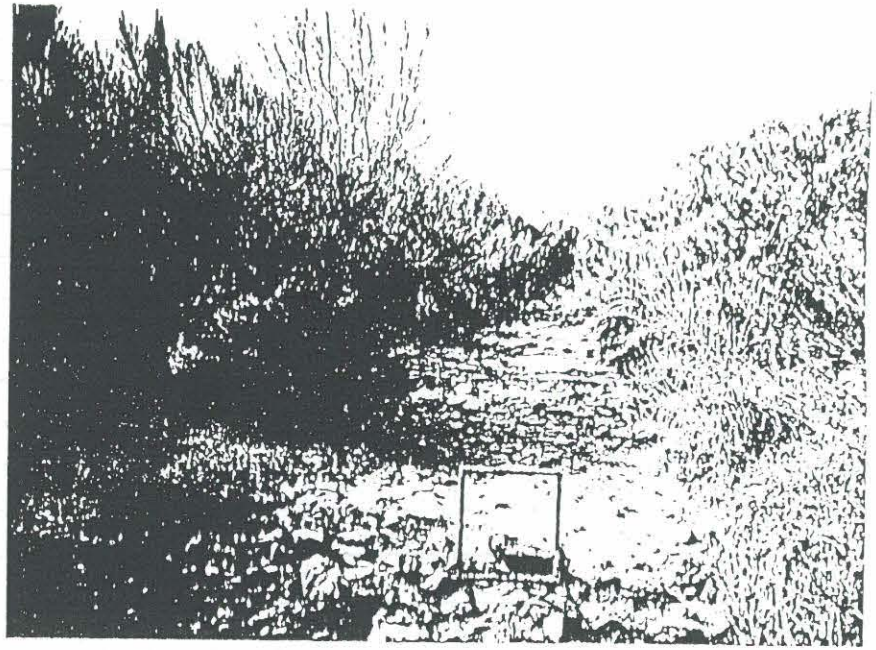
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

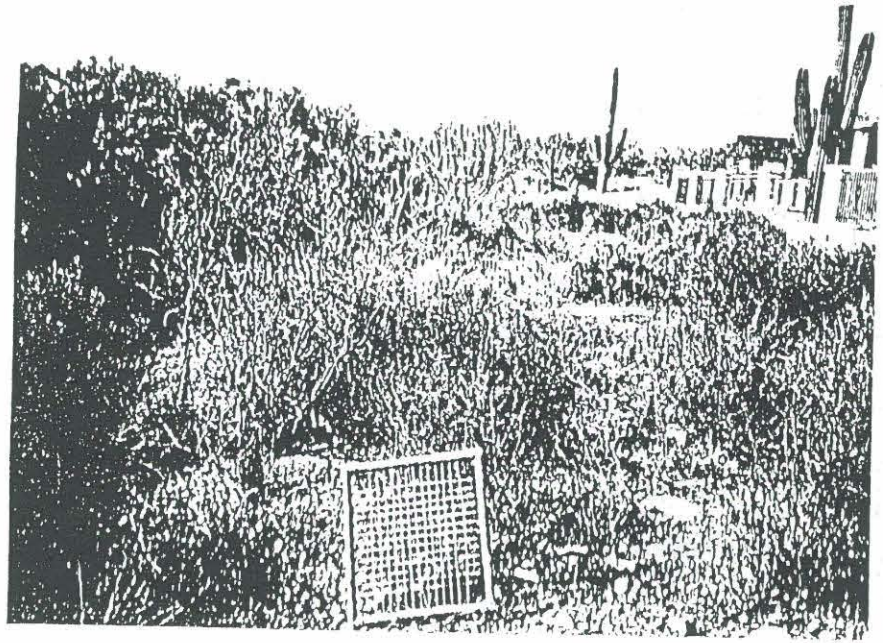
LR
11

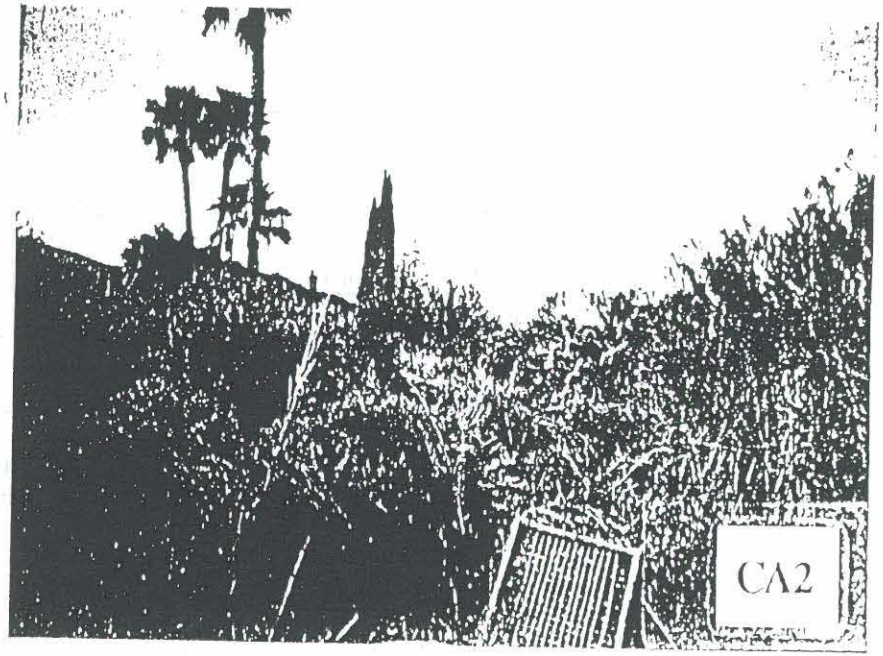
Project: Fountain Hills North Flood Delineation Study
Stream: Caliente Wash
Location: Reach CA2
Photo No.: CA2 - 1, 2, 3 and 4
Section Description: Bed material is cobbles and gravel. Overbank is medium density brush. Use Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050		0.030	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.002	
	Medium		.010 - .025			
	Large		.025 - .050	0.025		0.035
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.050	0.035	0.060





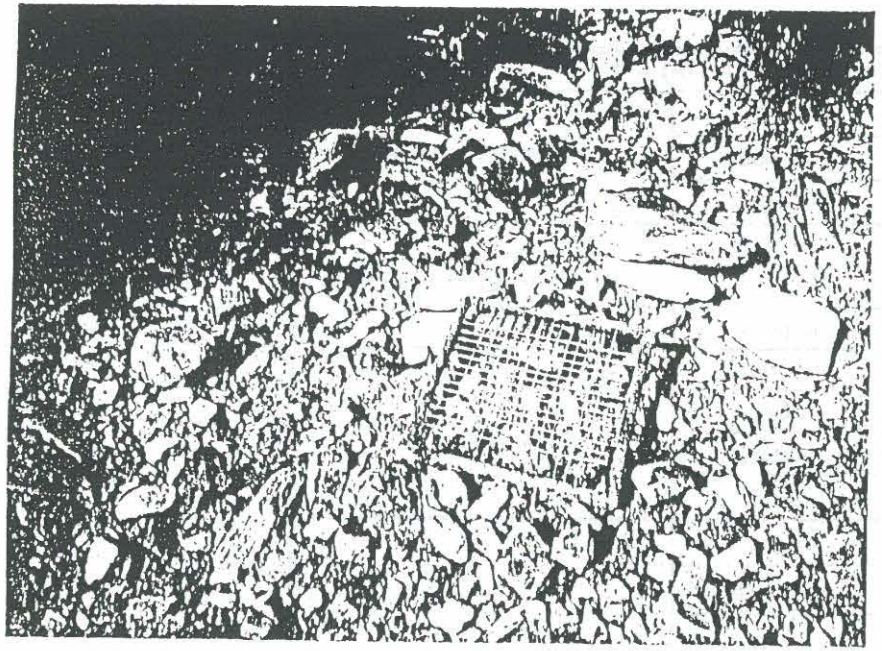


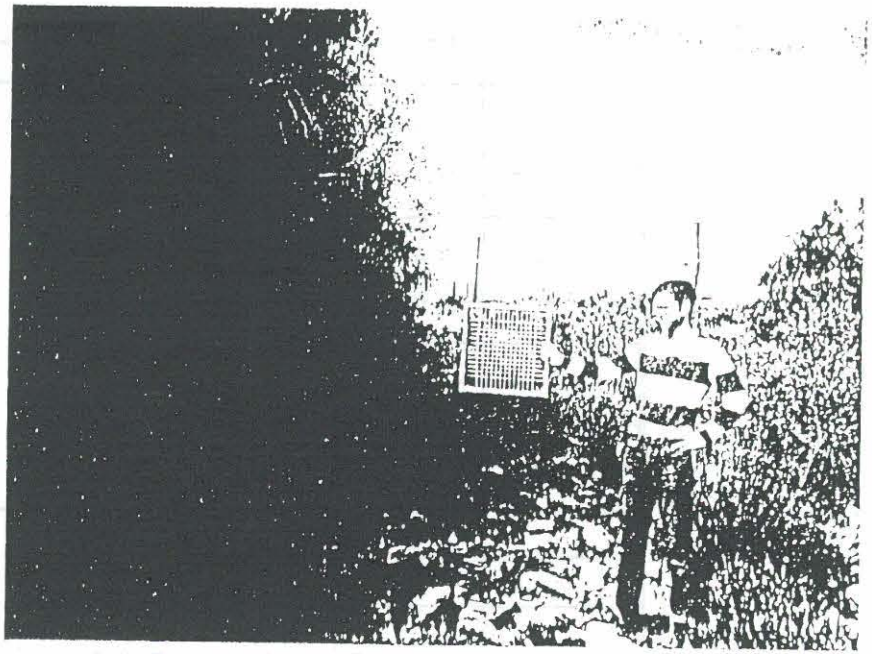

CA2

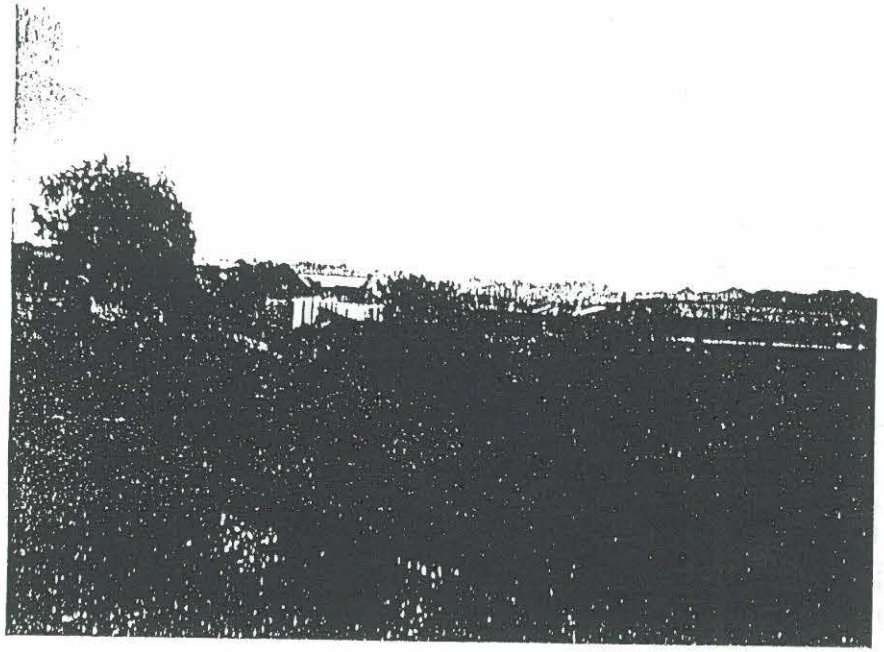
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

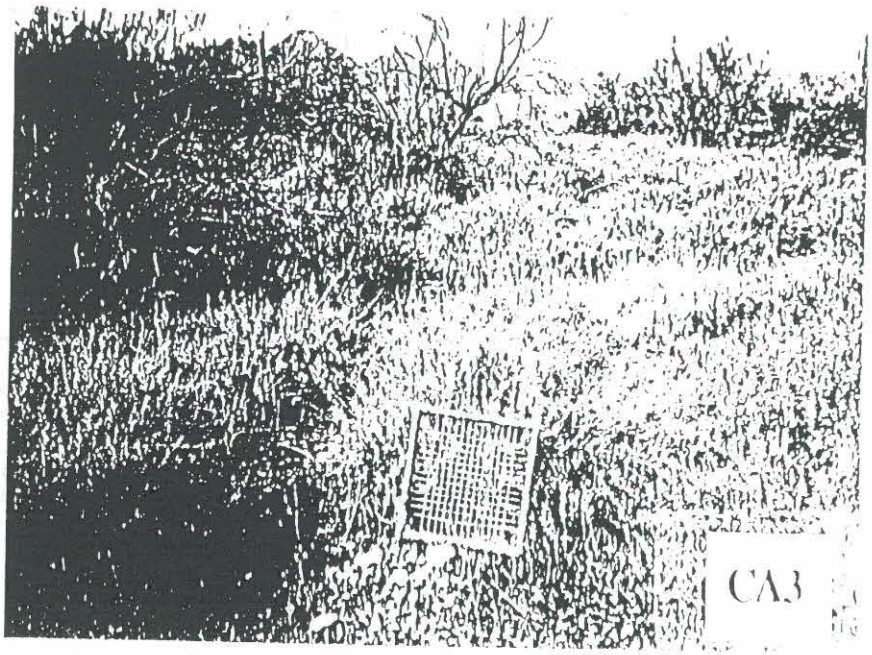
Project: Fountain Hills North Flood Delineation Study
Stream: Caliente Wash
Location: Reach CA3
Photo No.: CA3 - 1, 2, 3 and 4
Section Description: Bed material is gravel and cobbles with isolated boulders. Overbanks have medium density trees and brush. Use Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.030		0.030
	Cobble		.030 - .050		0.040	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.002	
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025			
	Large		.025 - .050	0.050		0.045
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.080	0.047	0.075







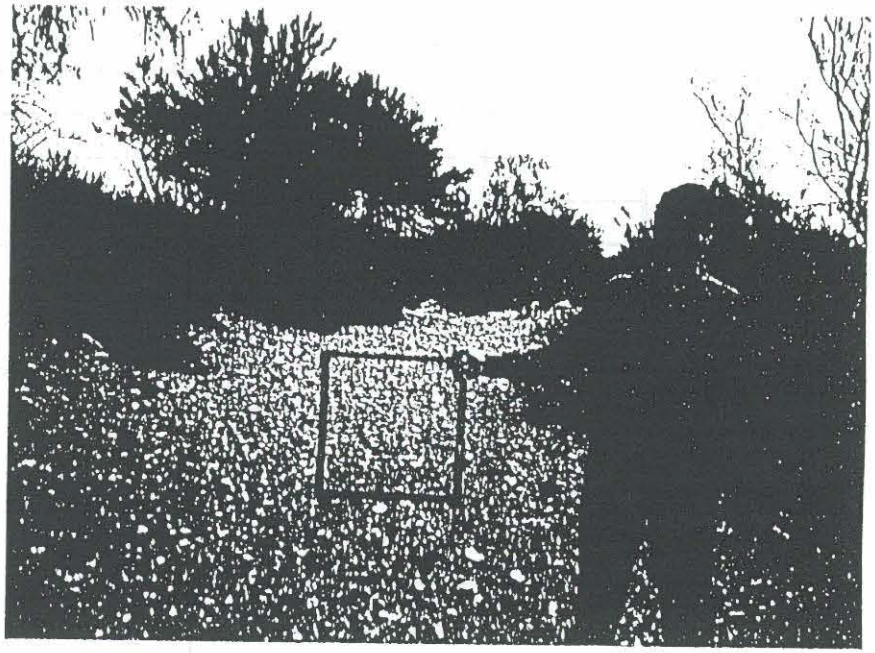


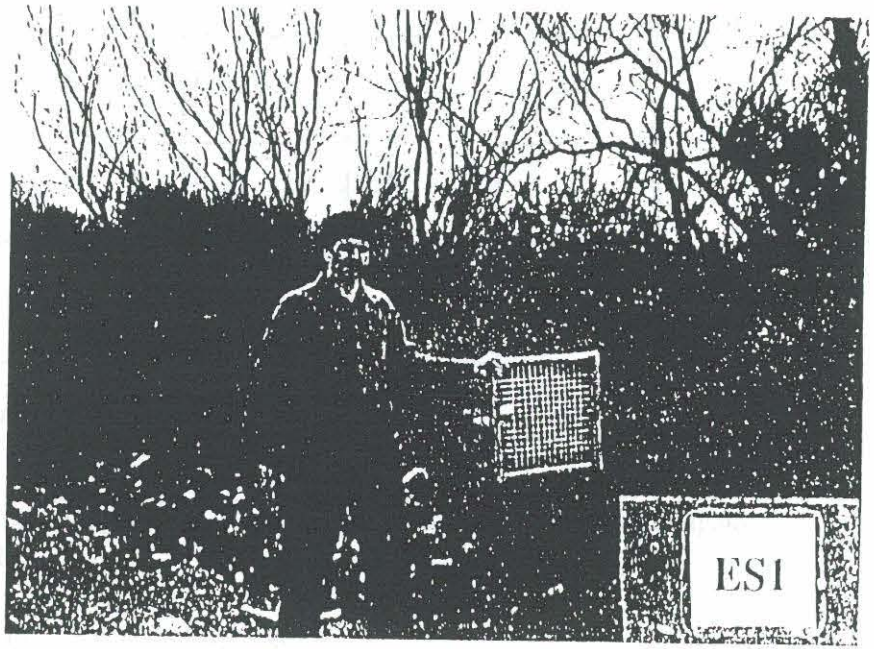
CA3

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

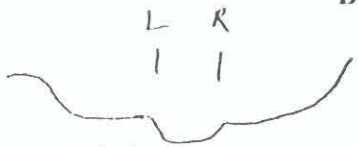
Project: Fountain Hills North Flood Delineation Study
Stream: Escalante Wash
Location: Reach ES1
Photo No.: ES1 - 1, 2, 3 and 4
Section Description: Bed material is gravel and cobbles; overbanks have medium density trees and brush. Use Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.035	0.040	0.035
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025			
	Large		.025 - .050	0.025		0.040
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.045	0.075




ES1

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

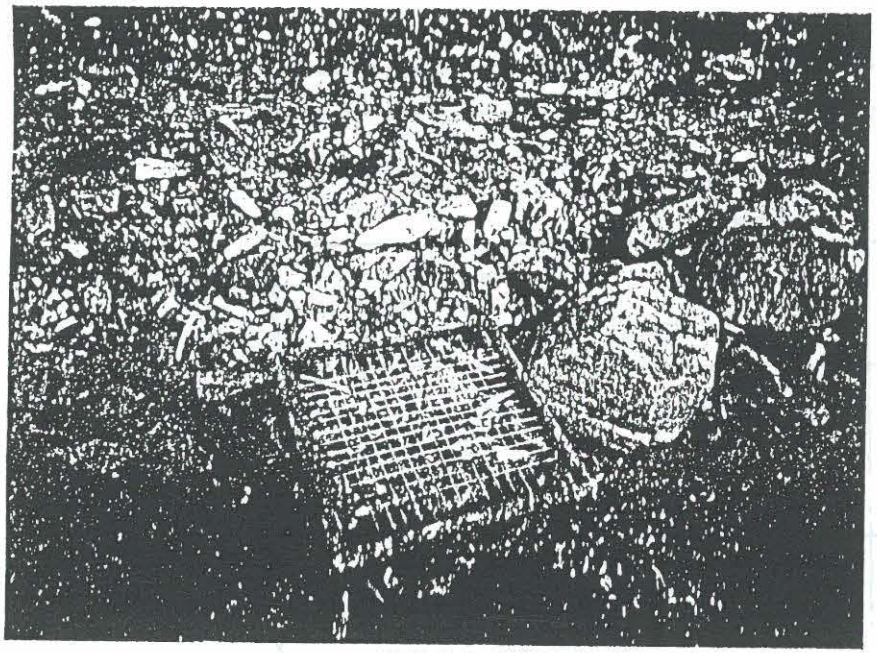


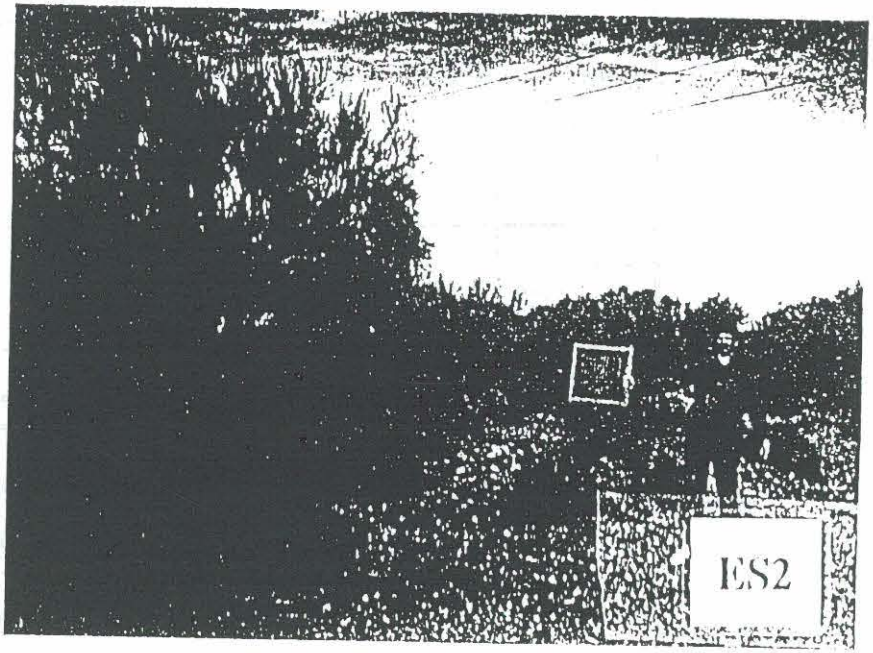
move bank stations to toe of slope downstream of Bahia Drive

Project: Fountain Hills North Flood Delineation Study
Stream: Escalante Wash
Location: Reach ES2
Photo No.: ES1 - 1, 2, 3 and 4
Section Description: Bed material is gravel, cobbles and isolated boulders; overbanks have medium dense trees and brush. Use Very Large vegetation adjustment in overbanks.

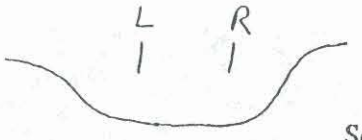
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.030		0.030
	Cobble		.030 - .050		0.035	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.008	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004		0.002	
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.002	
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100	0.060		0.055
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.090	0.047	0.085

Use 0.050



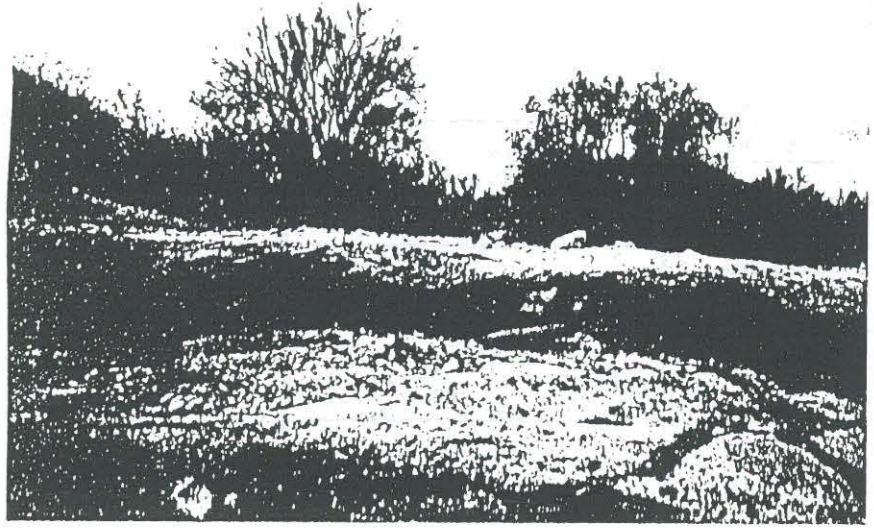

ES2

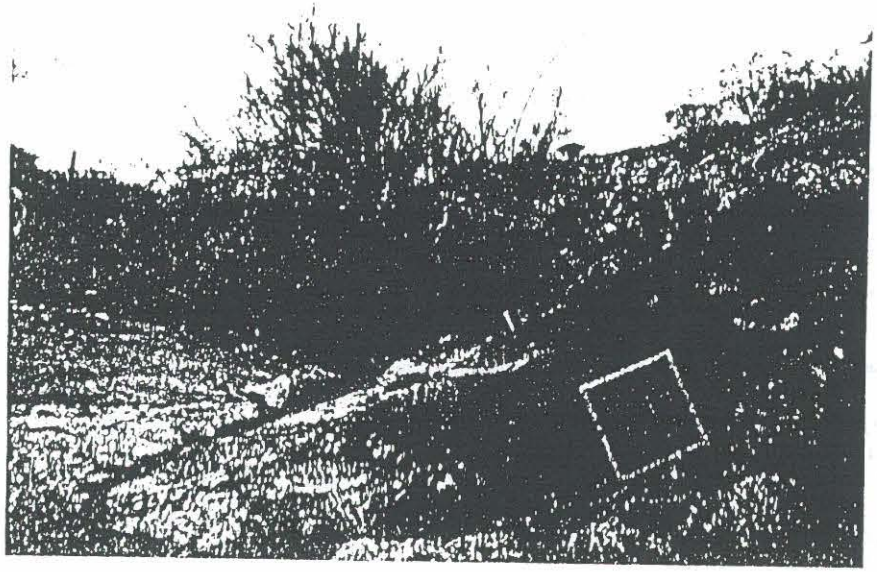
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

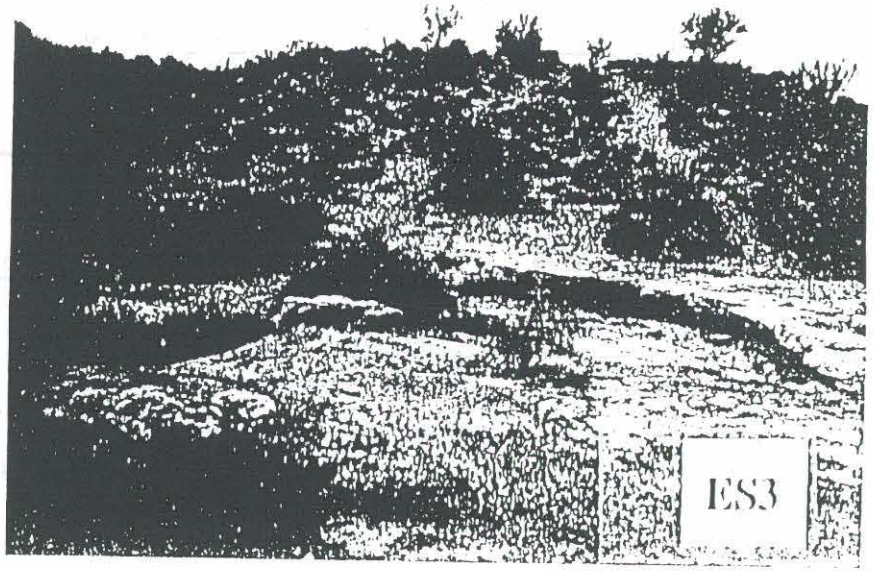


Project: Fountain Hills North Flood Delineation Study
Stream: Escalante Wash
Location: Reach ES3
Photo No.: ES3 - 1, 2, 3 and 4
Section Description: Bed material is coarse gravel and gravel; bedrock at drop structure. Overbanks have some trees and brush. Use Medium vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb			0.025	
	Cobble		.030 - .050	0.030		0.030
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010	0.010		
	Severe		.011 - .020		0.015	
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.040	0.055



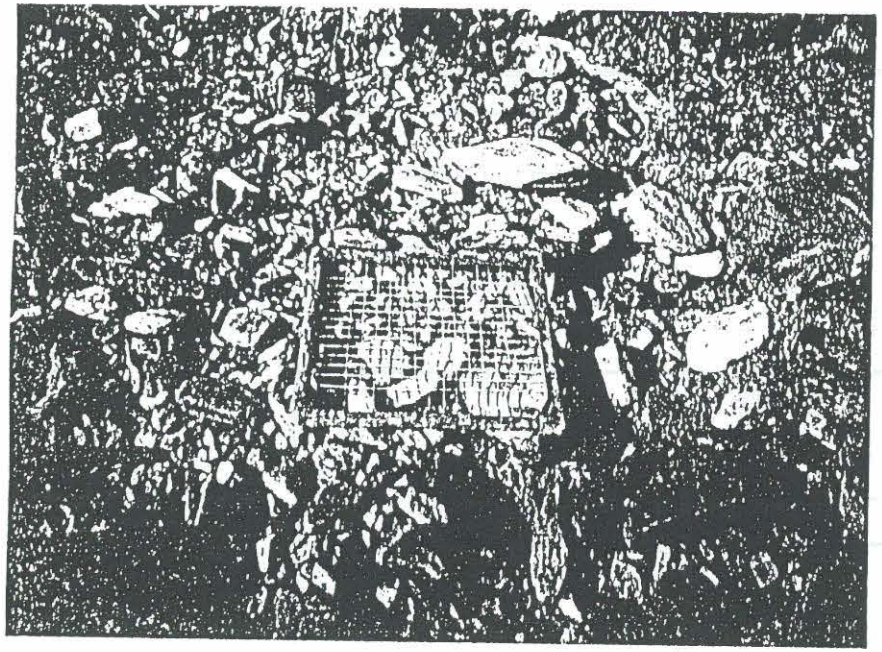


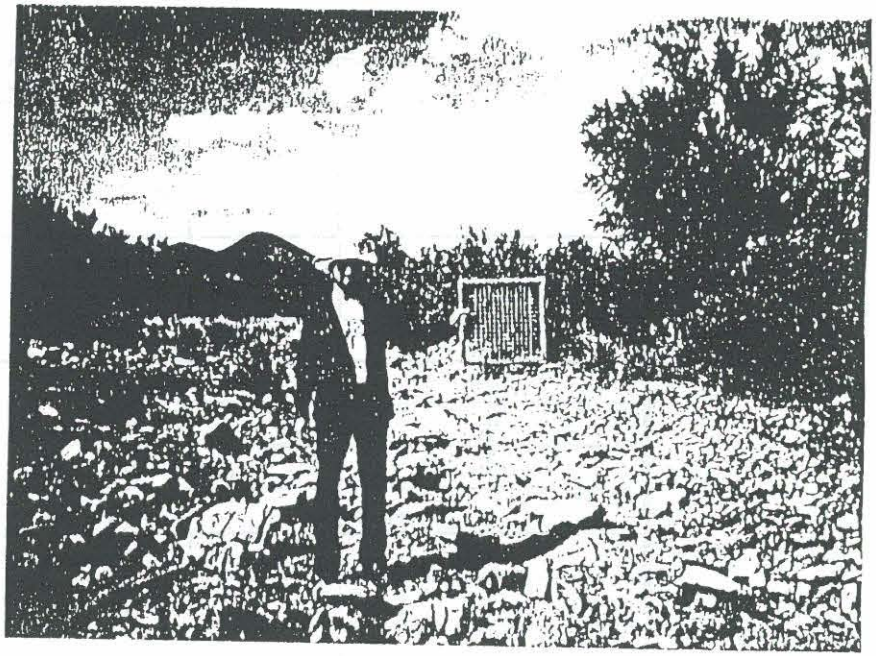

ES3

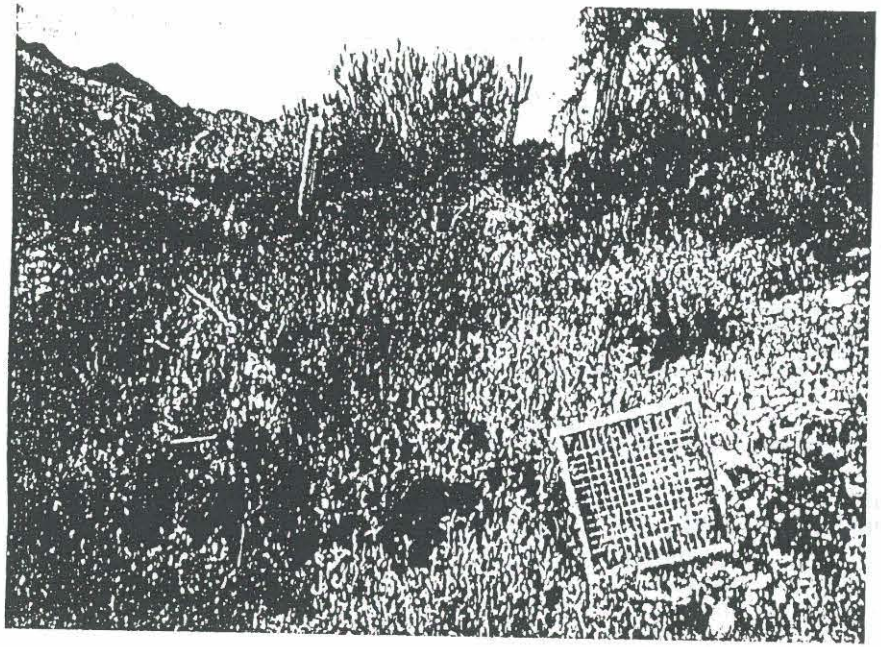
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Hesperus Wash
Location: Reach HE1
Photo No.: HE1 - 1, 2, 3 and 4
Section Description: Bed material is cobbles; overbanks have dense trees and brush. Use Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050		0.045	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.003	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.003	
	Medium		.010 - .025			
	Large		.025 - .050	0.050		0.050
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.075	0.051	0.075





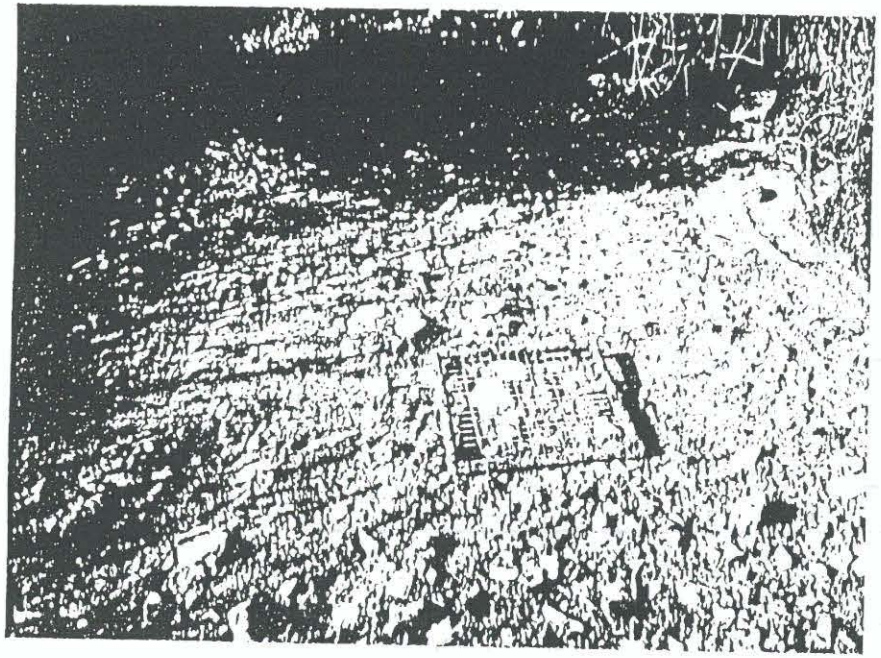


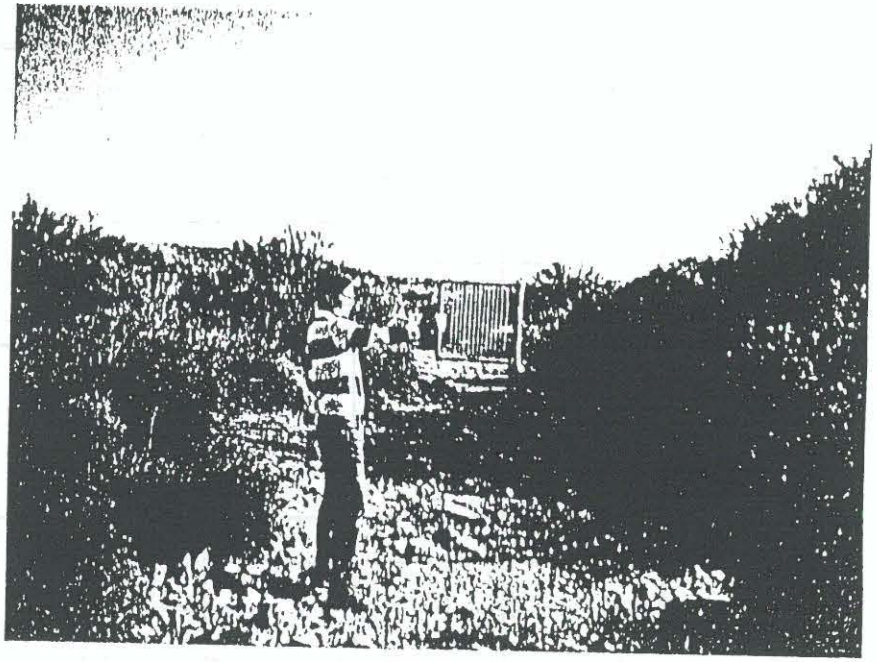
IIE1

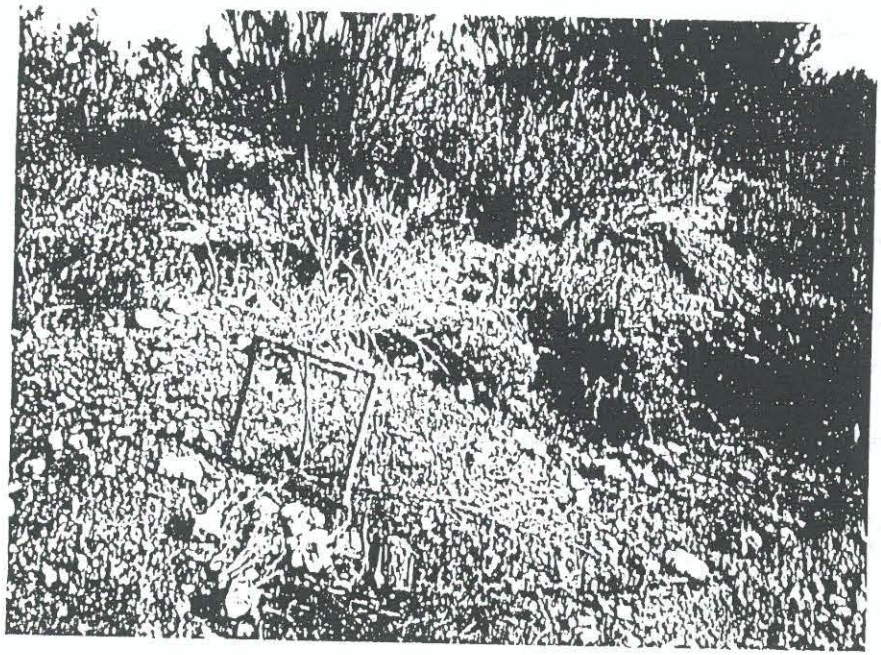
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

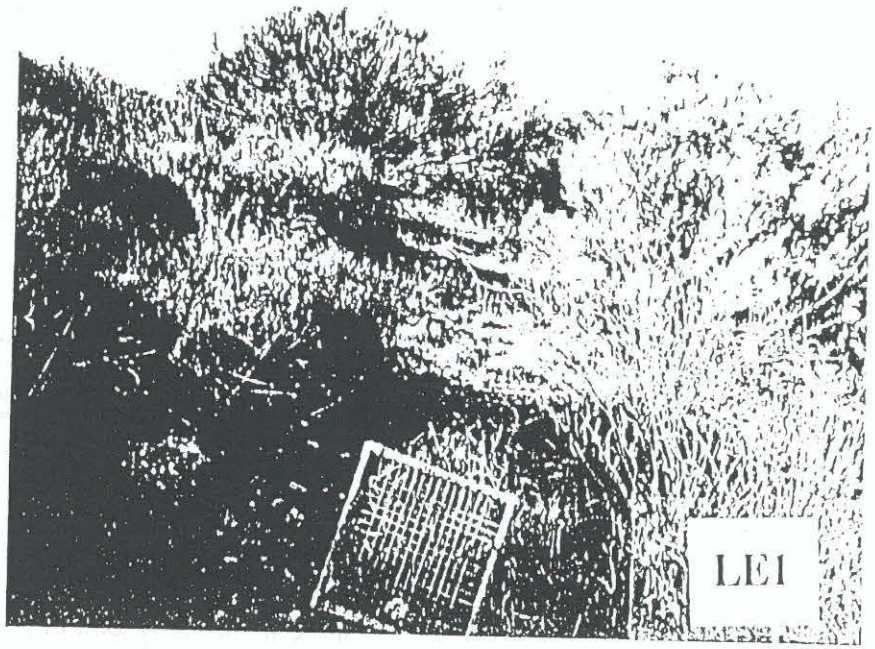
Project: Fountain Hills North Flood Delineation Study
Stream: Legend Wash
Location: Reach LE1
Photo No.: LE1 - 1, 2, 3 and 4
Section Description: Bed material is gravel; overbanks have medium dense trees and brush. Use Medium to Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.035	0.040	0.035
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025	0.025		0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.060	0.045	0.060

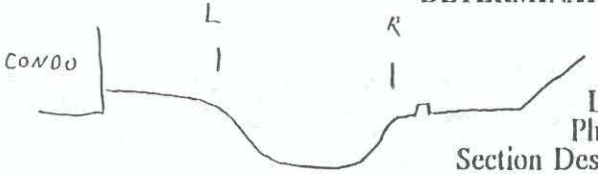







LE1

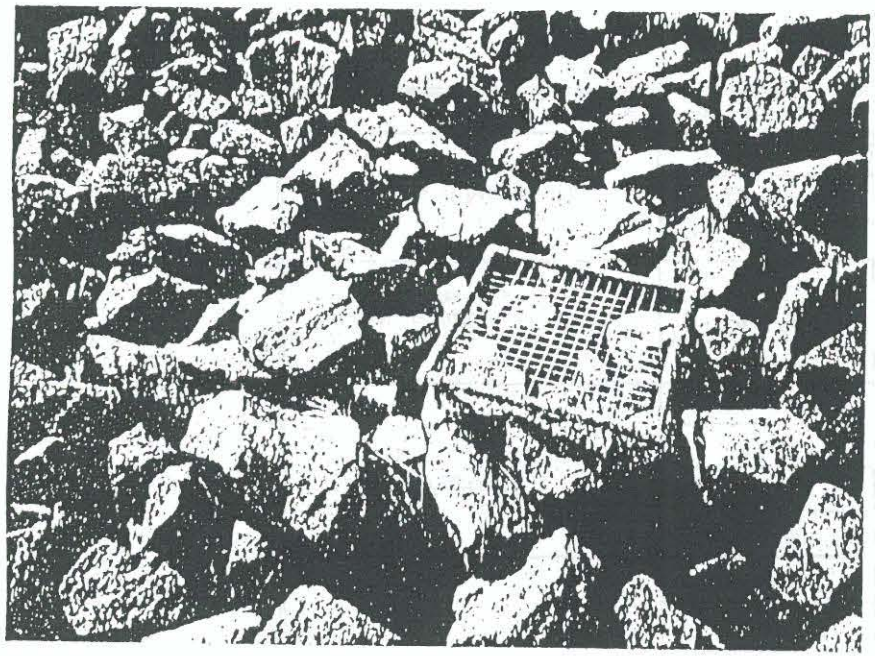
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

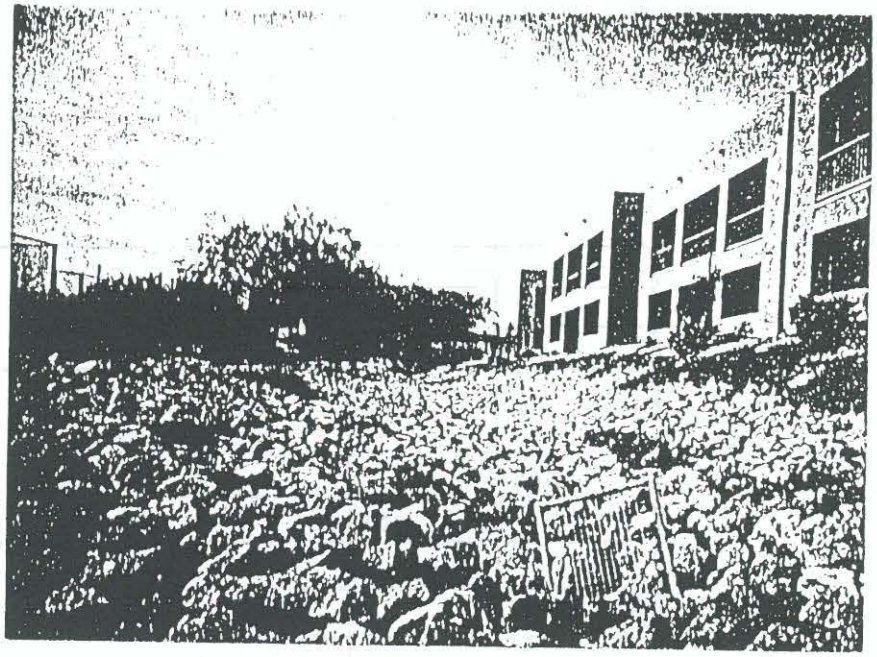


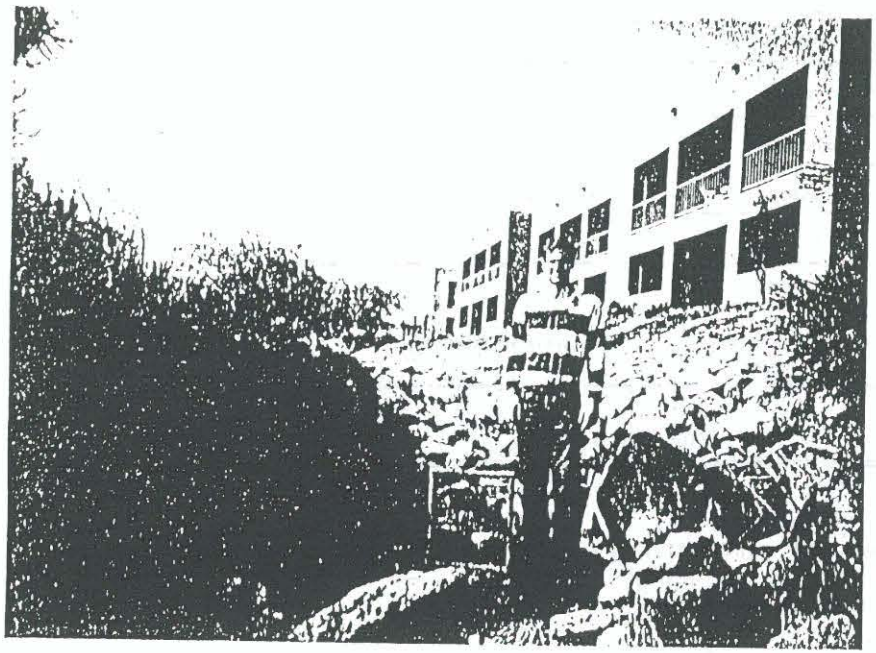
Project: Fountain Hills North Flood Delineation Study
Stream: Oxford Wash
Location: Reach OX1
Photo No.: OX1 - 1, 2, 3 and 4
Section Description: Bed material is D50=9" riprap in main channel. Left overbank is landscaped area of condos; right overbank is parking lot and tennis court with fences subject to debris blockage.

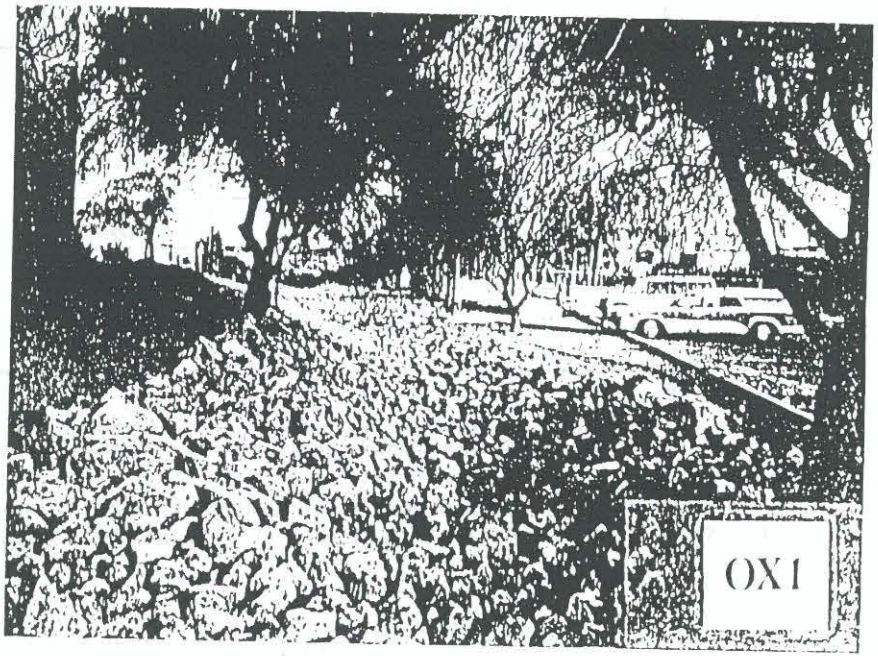
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material		nb		0.028		0.018
	Cobble		.030 - .050		0.045	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			0.060
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025	0.015		
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.043	0.045	0.078

use 0.045 use 0.080





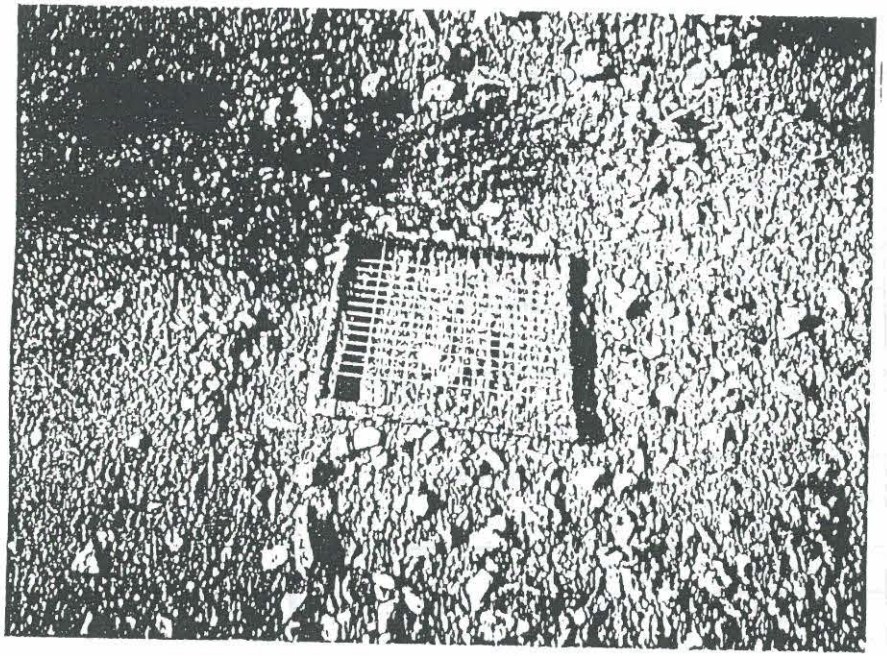


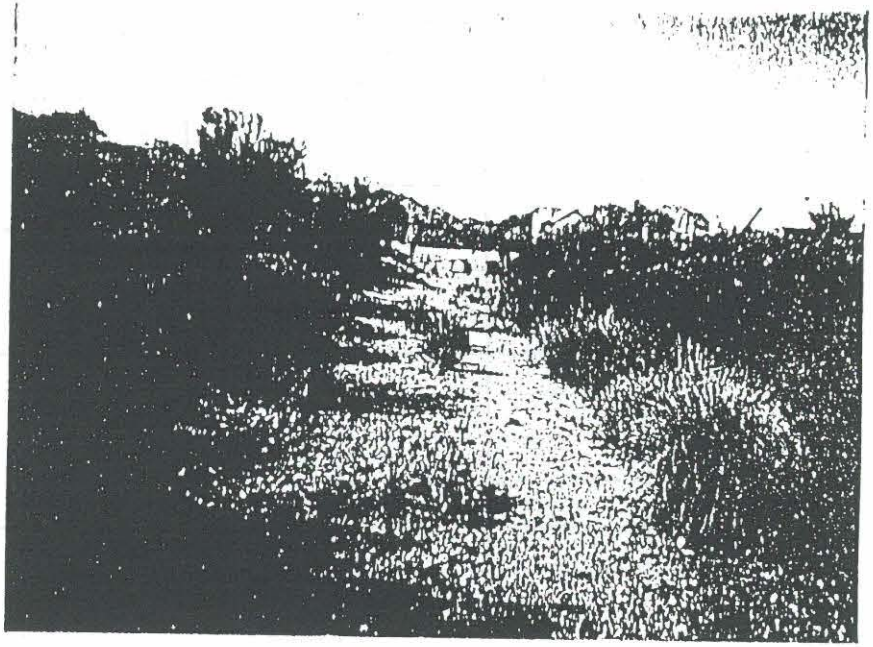

OXI

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Oxford Wash
Location: Reach OX2
Photo No.: OX2 - 1, 2, 3 and 4
Section Description: Bed material is gravel and small rock; overbanks have medium to dense trees and brush. Use Medium to Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.025		0.025
	Cobble		.030 - .050		0.030	
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.010	
	Medium		.010 - .025			0.025
	Large		.025 - .050	0.050		
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.075	0.040	0.050





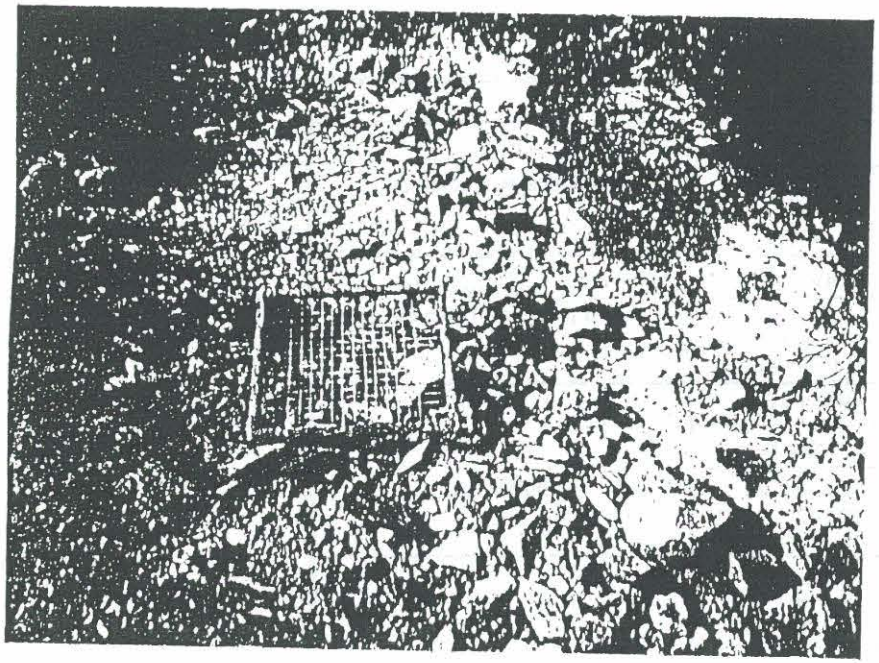
OX2

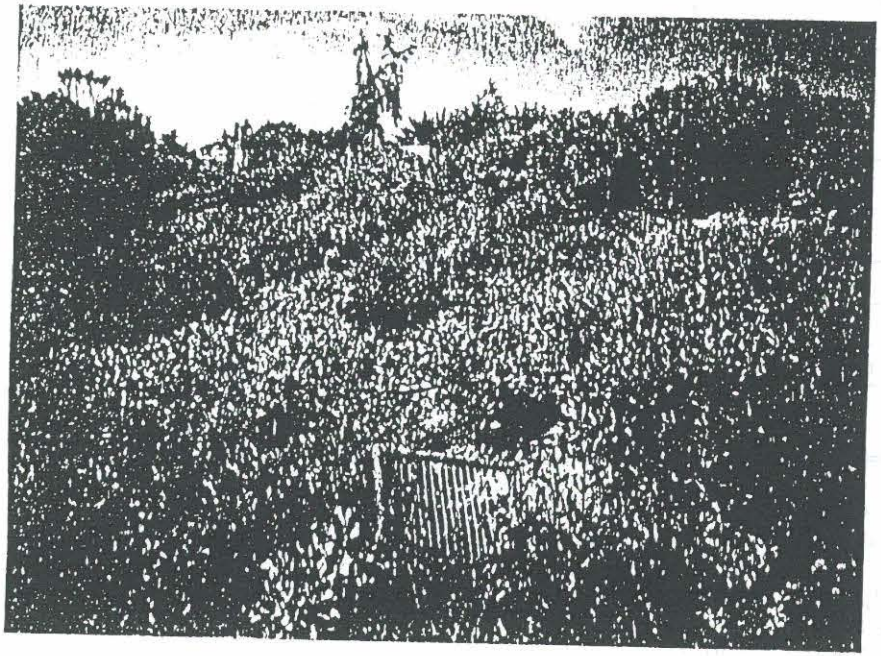
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

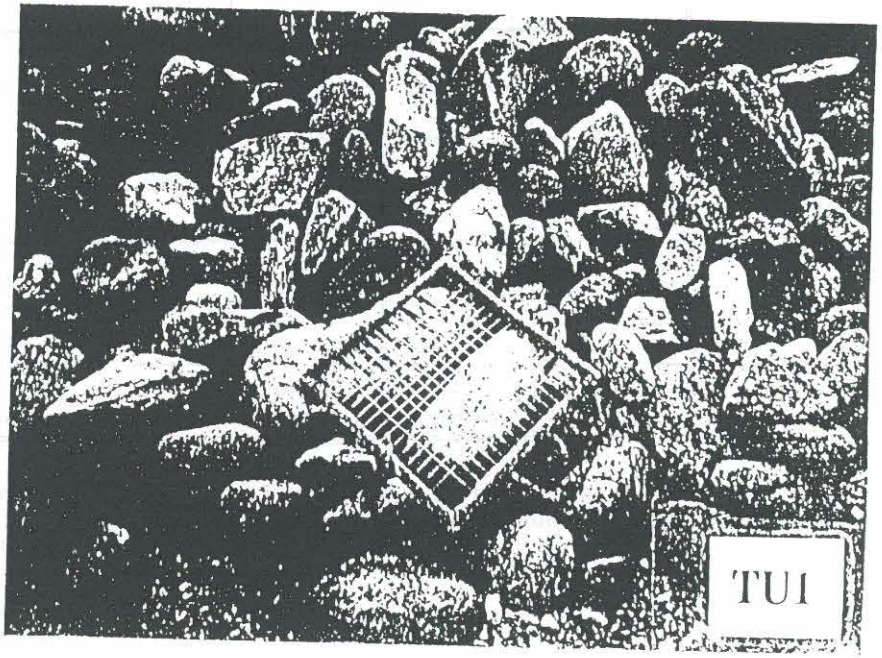
Project: Fountain Hills North Flood Delineation Study
Stream: Tulip Wash
Location: Reach TU1
Photo No.: TU1 - 1, 2, 3 and 4
Section Description: Bed material is gravel and small rock. Left overbank is medium dense brush; right overbank is riprap D50 = 12". Use Medium vegetation adjustment on left overbank.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb				
	Cobble		.030 - .050	0.025	0.030	0.045
	Boulder		.040 - .070			0.050
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005		0.002	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.007	0.005
	Medium		.010 - .025	0.040		
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.065	0.039	0.055

use 0.040



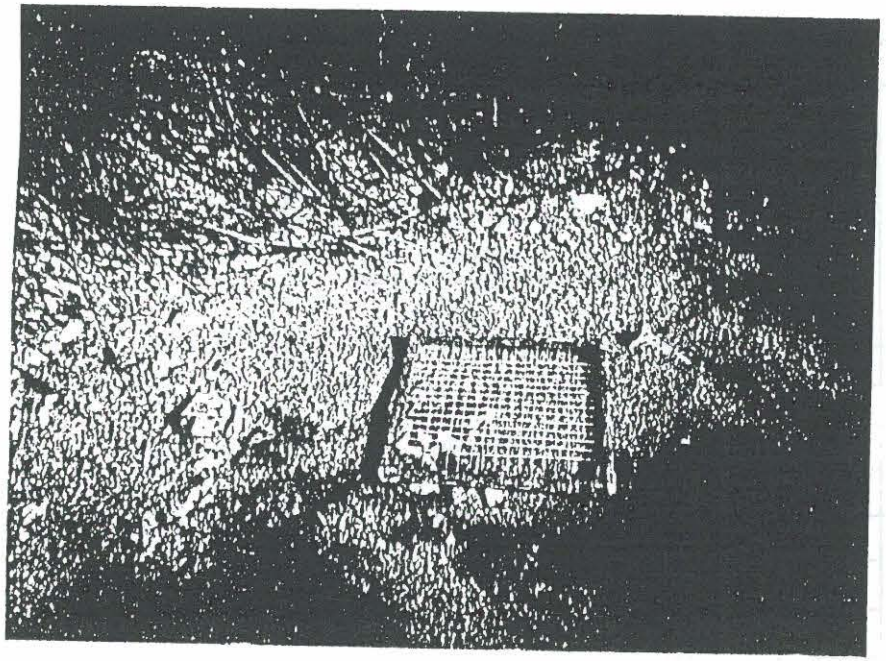


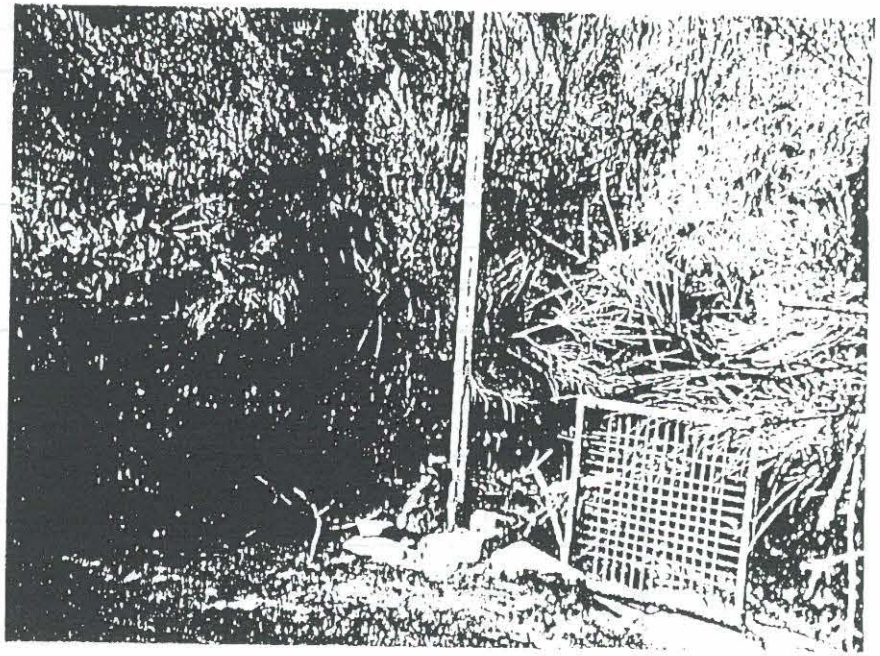

TUI

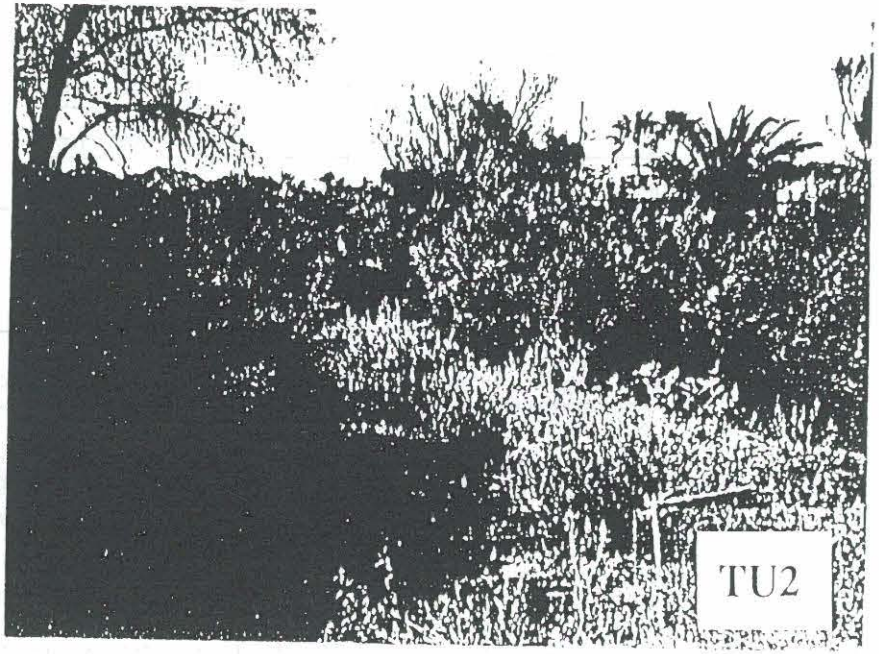
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Fountain Hills North Flood Delineation Study
Stream: Tulip Wash
Location: Reach TU2
Photo No.: TU2 - 1, 2, 3 and 4
Section Description: Bed material is gravel with very large vegetation in main channel; dense vegetation in channel and overbanks. Use Very Large vegetation adjustment on overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Coarse Gravel	nb		0.020	0.028	0.020
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010			
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100	0.060	0.090	0.060
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.080	0.118	0.080



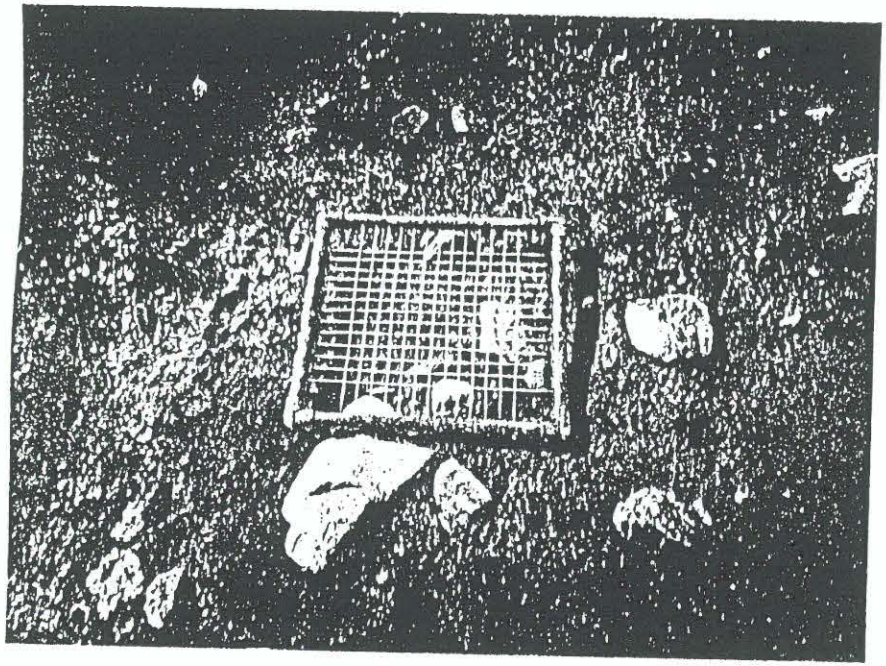


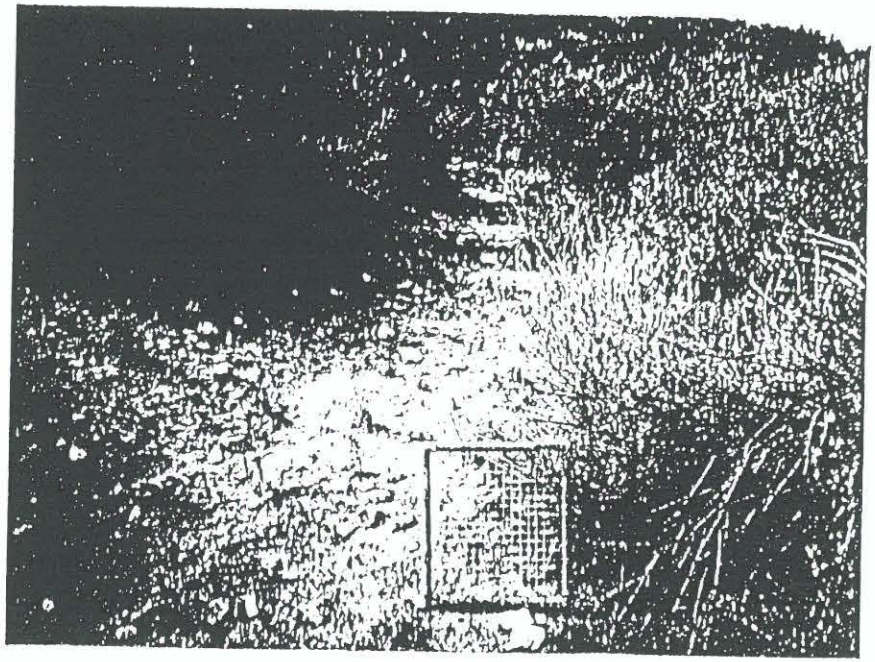

TU2

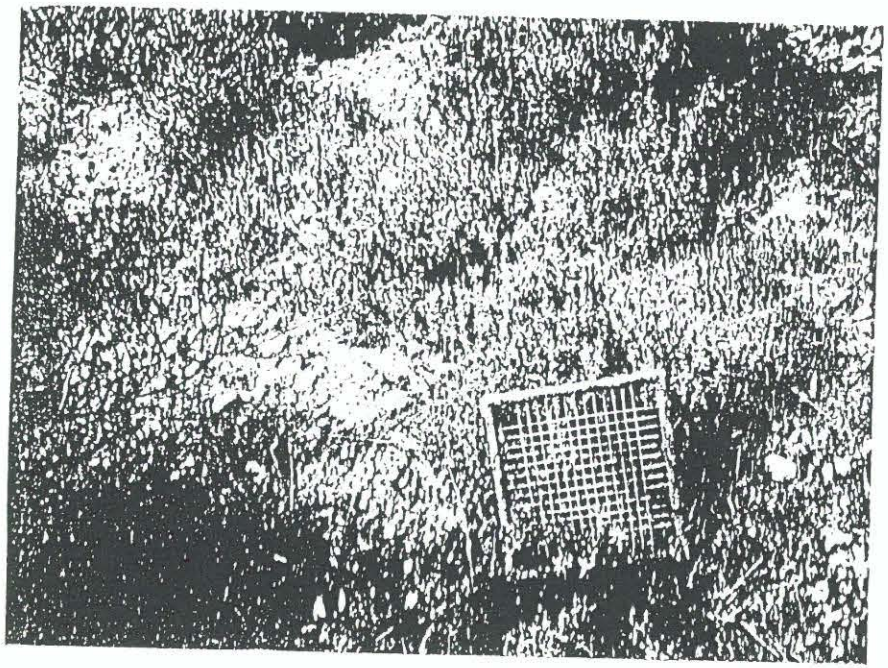
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

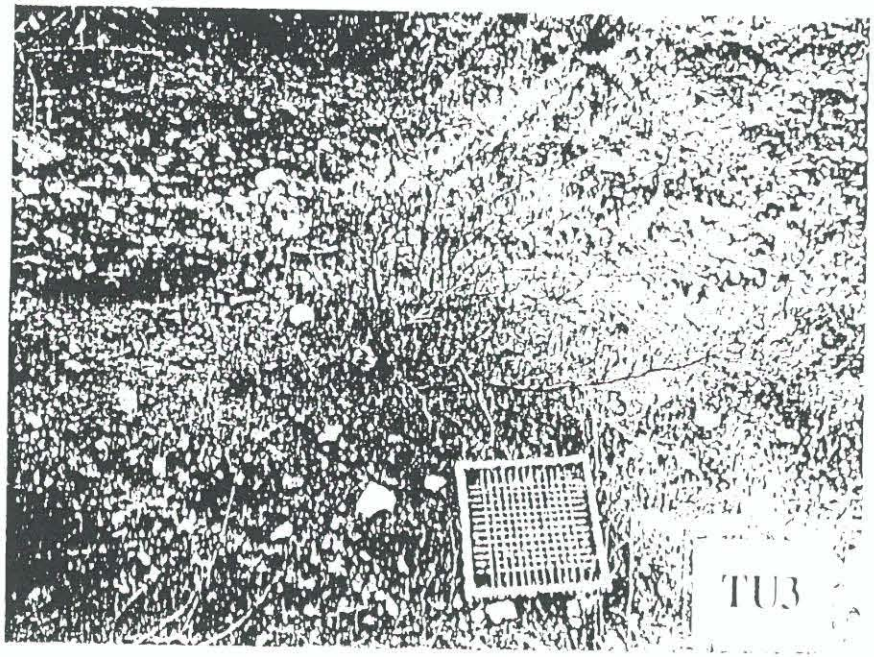
Project: Fountain Hills North Flood Delineation Study
Stream: Tulip Wash
Location: Reach TU3
Photo No.: TU3 - 1, 2, 3 and 4
Section Description: Bed material is clay material with some rock and some vegetation; overbank is light trees and brush. Use Medium to Large vegetation adjustment in overbanks.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material		nb		0.020	0.020	0.020
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n1	.000			
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n2	.000 - .004			
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n3	.002 - .010		0.005	
	Medium		.010 - .025	0.020		0.020
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Sections	Gradual	n4	.000			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Degree of Meandering	Minor	m	1.00			
	Appreciable		1.15			
	Severe		1.30			
n = (nb+n1+n2+n3+n4)m				0.040	0.025	0.040








TUB

APPENDIX D

HY-8 Output for Special Culvert Routine Verification

Ashbrook Wash Cross Section 2.428

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 09:56:50 FILE NAME: C622-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1575.82	1574.01	121.01	3 CSP	5.00	5.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C622-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1581.00	0	0	0	0	0	0	0	0	1
1582.37	300	300	0	0	0	0	0	0	1
1584.80	600	499	0	0	0	0	0	97	6
1585.40	900	538	0	0	0	0	0	358	3
1585.83	1200	563	0	0	0	0	0	629	3
1586.19	1500	584	0	0	0	0	0	907	3
1586.48	1800	600	0	0	0	0	0	1189	3
1586.70	2050	612	0	0	0	0	0	1428	3
1586.97	2400	626	0	0	0	0	0	1765	3
1587.18	2700	637	0	0	0	0	0	2057	3
1587.37	3000	647	0	0	0	0	0	2347	3
1584.06	448	448	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C622-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1581.00	0.00	0	0	0.00
1582.37	0.00	300	0	0.00
1584.80	-0.01	600	3	0.55
1585.40	-0.01	900	5	0.55
1585.83	-0.01	1200	7	0.62
1586.19	-0.01	1500	9	0.59
1586.48	-0.01	1800	11	0.60
1586.70	-0.01	2050	11	0.52
1586.97	-0.01	2400	9	0.36
1587.18	-0.00	2700	6	0.24
1587.37	-0.00	3000	6	0.20

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 09:56:50 FILE NAME: C622-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (5 BY 5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1581.00	0.00	5.18	0-NF	0.00	0.00	0.00	0.00	0.00	6.99
300	1582.37	4.58	6.55	4-FFt	2.73	2.84	5.09	5.00	0.00	6.99
499	1584.80	7.07	8.98	4-FFt	3.95	3.68	8.48	5.00	0.00	6.99
538	1585.40	7.65	9.58	4-FFt	4.33	3.82	9.13	5.00	0.00	6.99
563	1585.83	8.08	10.01	4-FFt	5.00	3.91	9.56	5.00	0.00	6.99
584	1586.19	8.43	10.37	4-FFt	5.00	3.98	9.91	5.00	0.00	6.99
600	1586.48	8.72	10.66	4-FFt	5.00	4.03	10.19	5.00	0.00	6.99
612	*1586.70*	*8.93*	*10.88*	4-FFt	*5.00*	*4.06*	*10.38*	5.00	0.00	6.99
626	1586.97	9.21	11.15	4-FFt	5.00	4.09	10.63	5.00	0.00	6.99
637	1587.17	9.41	11.35	4-FFt	5.00	4.12	10.81	5.00	0.00	6.99
647	1587.36	9.61	11.54	4-FFt	5.00	4.15	10.98	5.00	0.00	6.99

****

El. inlet face invert 1575.82 ft El. outlet invert 1574.01 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1575.82
OUTLET STATION (FT)	121.00
OUTLET ELEVATION (FT)	1574.01
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0150
CULVERT LENGTH ALONG SLOPE (FT)	121.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	*0.024*
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 09:56:50 FILE NAME: C622-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1581.00

****
********** ROADWAY OVERTOPPING DATA **********
****

WEIR COEFFICIENT 2.63
EMBANKMENT TOP WIDTH (FT) 1.00
***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9769.20	1588.20
2	9815.40	1587.50
3	9842.70	1586.70
4	9885.40	1586.10
5	9927.00	1584.90
6	9929.00	1584.75
7	9950.00	1584.73
8	10000.00	1584.06
9	10050.00	1584.38
10	10055.00	1584.30
11	10061.00	1585.60
12	10103.10	1586.90
13	10121.00	1586.70
14	10138.10	1588.10
15	10179.40	1588.20

****

Ashbrook Wash Cross Section 2.545

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:46:20 FILE NAME: M07-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1584.98	1584.71	84.00	3 CSP	5.00	5.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M07-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1588.82	0	0	0	0	0	0	0	0	1
1588.92	70	70	0	0	0	0	0	0	1
1589.15	140	140	0	0	0	0	0	0	1
1589.53	210	210	0	0	0	0	0	0	1
1589.85	280	280	0	0	0	0	0	0	1
1590.43	350	350	0	0	0	0	0	0	1
1591.22	420	420	0	0	0	0	0	0	1
1592.20	490	490	0	0	0	0	0	0	1
1593.29	560	560	0	0	0	0	0	0	1
1594.49	630	630	0	0	0	0	0	0	1
1594.92	654	654	0	0	0	0	0	0	1
1595.00	658	658	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M07-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1588.82	0.00	0	0	0.00
1588.92	0.00	70	0	0.00
1589.15	0.00	140	0	0.00
1589.53	0.00	210	0	0.00
1589.85	0.00	280	0	0.00
1590.43	0.00	350	0	0.00
1591.22	0.00	420	0	0.00
1592.20	0.00	490	0	0.00
1593.29	0.00	560	0	0.00
1594.49	0.00	630	0	0.00
1594.92	0.00	654	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:46:20 FILE NAME: M07-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (5 BY 5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1588.82	0.00	3.84	0-NF	0.00	0.00	0.00	0.00	0.00	4.11
70	1588.92	1.99	3.94	3-M1t	1.84	1.32	1.35	4.11	0.00	4.11
140	1589.15	2.87	4.17	3-M1t	2.74	1.90	2.71	4.11	0.00	4.11
210	1589.53	3.65	4.55	3-M1t	3.63	2.35	4.06	4.11	0.00	4.11
280	1589.85	4.40	4.87	6-FFn	5.00	2.73	4.75	5.00	0.00	4.11
350	1590.43	5.17	5.45	6-FFn	5.00	3.08	5.94	5.00	0.00	4.11
420	1591.22	6.01	6.24	6-FFn	5.00	3.38	7.13	5.00	0.00	4.11
490	1592.20	6.96	7.22	6-FFn	5.00	3.65	8.32	5.00	0.00	4.11
560	1593.29	8.05	8.31	6-FFn	5.00	3.90	9.51	5.00	0.00	4.11
630	1594.49	9.31	9.51	6-FFn	5.00	4.10	10.70	5.00	0.00	4.11
654	1594.92	9.78	9.94	6-FFn	5.00	4.16	11.10	5.00	0.00	4.11

****

El. inlet face invert 1584.98 ft El. outlet invert 1584.71 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1584.98
OUTLET STATION (FT)	84.00
OUTLET ELEVATION (FT)	1584.71
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0032
CULVERT LENGTH ALONG SLOPE (FT)	84.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:46:20 FILE NAME: M07-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1588.82

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1595.00

****

Ashbrook Wash Cross Section 3.531

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:47:12 FILE NAME: C608-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

C U L V #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1673.19	1672.71	61.50	3 RCB	10.00	7.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C608-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1674.04	0	0	0	0	0	0	0	0	1
1674.26	100	100	0	0	0	0	0	0	1
1674.89	200	200	0	0	0	0	0	0	1
1675.42	300	300	0	0	0	0	0	0	1
1675.89	400	400	0	0	0	0	0	0	1
1676.32	500	500	0	0	0	0	0	0	1
1676.73	600	600	0	0	0	0	0	0	1
1677.12	700	700	0	0	0	0	0	0	1
1677.50	800	800	0	0	0	0	0	0	1
1677.85	900	900	0	0	0	0	0	0	1
1678.09	970	970	0	0	0	0	0	0	1
1684.00	2650	2650	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C608-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1674.04	0.00	0	0	0.00
1674.26	0.00	100	0	0.00
1674.89	0.00	200	0	0.00
1675.42	0.00	300	0	0.00
1675.89	0.00	400	0	0.00
1676.32	0.00	500	0	0.00
1676.73	0.00	600	0	0.00
1677.12	0.00	700	0	0.00
1677.50	0.00	800	0	0.00
1677.85	0.00	900	0	0.00
1678.09	0.00	970	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:47:12 FILE NAME: C608-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (10 BY 7) RCB

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1674.04	0.00	0.85	0-NF	0.00	0.00	0.00	0.00	0.00	1.33
100	1674.26	1.07	1.07	1-S2n	0.42	0.70	6.65	0.50	0.00	1.33
200	1674.89	1.70	1.70	1-S2n	0.77	1.12	8.00	0.83	0.00	1.33
300	1675.42	2.23	2.23	1-S2n	0.99	1.46	9.01	1.11	0.00	1.33
400	1675.89	2.70	2.70	1-S2n	1.21	1.77	9.79	1.36	0.00	1.33
500	1676.32	3.13	3.13	1-S2n	1.42	2.06	10.40	1.60	0.00	1.33
600	1676.73	3.54	3.54	1-S2n	1.59	2.32	10.94	1.83	0.00	1.33
700	1677.12	3.93	3.93	1-S2n	1.76	2.57	11.41	2.04	0.00	1.33
800	1677.50	4.31	4.31	1-S2n	1.93	2.81	11.83	2.25	0.00	1.33
900	1677.85	4.66	4.66	1-S2n	2.11	3.04	12.22	2.46	0.00	1.33
970	1678.09	4.90	4.90	1-S2n	2.21	3.20	12.48	2.59	0.00	1.33

****

El. inlet face invert 1673.19 ft El. outlet invert 1672.71 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1673.19
OUTLET STATION (FT)	61.50
OUTLET ELEVATION (FT)	1672.71
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0078
CULVERT LENGTH ALONG SLOPE (FT)	61.50

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.00 FT
BARREL RISE	7.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:47:12 FILE NAME: C608-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1674.04

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1684.00

****

Ashbrook Wash Cross Section 4.110

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:48:00 FILE NAME: C585-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

C U L V #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1722.47	1714.73	242.24	2 RCB	8.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C585-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1722.47	0	0	0	0	0	0	0	0	1
1723.33	40	40	0	0	0	0	0	0	1
1723.84	80	80	0	0	0	0	0	0	1
1724.27	120	120	0	0	0	0	0	0	1
1724.66	160	160	0	0	0	0	0	0	1
1725.02	200	200	0	0	0	0	0	0	1
1725.36	240	240	0	0	0	0	0	0	1
1725.68	280	280	0	0	0	0	0	0	1
1725.84	300	300	0	0	0	0	0	0	1
1726.31	360	360	0	0	0	0	0	0	1
1726.63	400	400	0	0	0	0	0	0	1
1740.00	1252	1252	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C585-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1722.47	0.00	0	0	0.00
1723.33	0.00	40	0	0.00
1723.84	0.00	80	0	0.00
1724.27	0.00	120	0	0.00
1724.66	0.00	160	0	0.00
1725.02	0.00	200	0	0.00
1725.36	0.00	240	0	0.00
1725.68	0.00	280	0	0.00
1725.84	0.00	300	0	0.00
1726.31	0.00	360	0	0.00
1726.63	0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:48:00 FILE NAME: C585-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (8 BY 4) RCB

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1722.47	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	2.49
40	1723.33	0.86	0.86	1-S2n	0.22	0.58	11.30	0.22	0.00	2.49
80	1723.84	1.37	1.37	1-S2n	0.42	0.92	11.87	0.42	0.00	2.49
120	1724.27	1.80	1.80	1-S2n	0.53	1.21	11.87	0.42	0.00	2.49
160	1724.66	2.19	2.19	1-S2n	0.64	1.46	15.56	0.64	0.00	2.49
200	1725.02	2.55	2.55	1-S2n	0.75	1.70	16.58	0.75	0.00	2.49
240	1725.36	2.89	2.89	1-S2n	0.85	1.92	17.18	0.87	0.00	2.49
280	1725.68	3.21	3.21	1-S2n	0.94	2.12	17.97	0.97	0.00	2.49
300	1725.84	3.37	3.37	1-S2n	0.98	2.22	19.17	0.98	0.00	2.49
360	1726.31	3.84	3.84	1-S2n	1.11	2.51	19.28	1.17	0.00	2.49
400	1726.63	4.16	4.16	5-S2n	1.19	2.69	19.81	1.26	0.00	2.49

****

El. inlet face invert 1722.47 ft El. outlet invert 1714.73 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1722.47
OUTLET STATION (FT)	242.12
OUTLET ELEVATION (FT)	1714.73
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0320
CULVERT LENGTH ALONG SLOPE (FT)	242.24

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	8.00 FT
BARREL RISE	4.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:48:00 FILE NAME: C585-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1717.22

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1740.00

****

Ashbrook Wash Cross Section 4.349

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:50:35 FILE NAME: M05-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

C	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
U								
L	INLET	OUTLET	CULVERT	BARRELS				
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET
#	(FT)	(FT)	(FT)	MATERIAL	(FT)	(FT)	n	TYPE
1	1770.06	1768.95	74.51	5 RCB	10.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M05-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1770.06	0	0	0	0	0	0	0	0	1
1770.47	40	40	0	0	0	0	0	0	1
1770.71	80	80	0	0	0	0	0	0	1
1770.91	120	120	0	0	0	0	0	0	1
1771.09	160	160	0	0	0	0	0	0	1
1771.26	200	200	0	0	0	0	0	0	1
1771.42	240	240	0	0	0	0	0	0	1
1771.56	280	280	0	0	0	0	0	0	1
1771.64	300	300	0	0	0	0	0	0	1
1771.85	360	360	0	0	0	0	0	0	1
1771.98	400	400	0	0	0	0	0	0	1
1778.00	1876	1876	0	0	0	0	0	0	OVERTOPPING

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M05-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1770.06	0.00	0	0	0.00
1770.47	0.00	40	0	0.00
1770.71	0.00	80	0	0.00
1770.91	0.00	120	0	0.00
1771.09	0.00	160	0	0.00
1771.26	0.00	200	0	0.00
1771.42	0.00	240	0	0.00
1771.56	0.00	280	0	0.00
1771.64	0.00	300	0	0.00
1771.85	0.00	360	0	0.00
1771.98	0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:50:35 FILE NAME: M05-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 5 (10 BY 3) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1770.06	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.21
40	1770.47	0.41	0.41	1-S2n	0.12	0.27	6.53	0.12	0.00	0.21
80	1770.71	0.65	0.65	1-S2n	0.25	0.43	6.02	0.27	0.00	0.21
120	1770.91	0.85	0.85	1-S2n	0.33	0.56	7.21	0.33	0.00	0.21
160	1771.09	1.03	1.03	1-S2n	0.39	0.68	7.71	0.42	0.00	0.21
200	1771.26	1.20	1.20	1-S2n	0.45	0.79	8.85	0.45	0.00	0.21
240	1771.42	1.36	1.36	1-S2n	0.51	0.90	8.79	0.55	0.00	0.21
280	1771.56	1.50	1.50	1-S2n	0.57	0.99	9.19	0.61	0.00	0.21
300	1771.64	1.58	1.58	1-S2n	0.60	1.04	9.99	0.60	0.00	0.21
360	1771.85	1.79	1.79	1-S2n	0.67	1.17	9.89	0.73	0.00	0.21
400	1771.98	1.92	1.92	1-S2n	0.71	1.26	10.17	0.79	0.00	0.21

El. inlet face invert 1770.06 ft El. outlet invert 1768.95 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1770.06
OUTLET STATION (FT)	74.50
OUTLET ELEVATION (FT)	1768.95
NUMBER OF BARRELS	5
SLOPE (V-FT/H-FT)	0.0149
CULVERT LENGTH ALONG SLOPE (FT)	74.51

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.00 FT
BARREL RISE	3.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:50:35 FILE NAME: M05-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1769.16

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1778.00

****

Ashbrook Wash Cross Section 5.563

CURRENT DATE: 03-23-1995
CURRENT TIME: 12:09:26

FILE DATE: 09-13-1994
FILE NAME: C557-H2

**** FHWA CULVERT ANALYSIS ****
**** HY-8, VERSION 4.0 ****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1909.38	1905.77	110.06	1 CSP	5.00	5.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (CFS) FILE: C557-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1915.73	0	0	0	0	0	0	0	0	1
1920.26	250	185	0	0	0	0	0	63	8
1921.08	500	202	0	0	0	0	0	297	3
1921.64	750	212	0	0	0	0	0	536	3
1922.09	1000	220	0	0	0	0	0	777	3
1922.47	1250	226	0	0	0	0	0	1019	3
1922.80	1500	232	0	0	0	0	0	1265	3
1923.09	1750	237	0	0	0	0	0	1510	3
1923.24	1880	239	0	0	0	0	0	1638	3
1923.61	2250	245	0	0	0	0	0	2000	3
1923.84	2500	248	0	0	0	0	0	2246	3
1919.55	170	170	0	0	0	0	0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C557-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1915.73	0.00	0	0	0.00
1920.26	-0.01	250	2	0.62
1921.08	-0.00	500	1	0.16
1921.64	-0.00	750	2	0.31
1922.09	-0.01	1000	3	0.35
1922.47	-0.01	1250	5	0.37
1922.80	-0.00	1500	3	0.18
1923.09	-0.00	1750	3	0.18
1923.24	-0.00	1880	3	0.16
1923.61	-0.00	2250	5	0.24
1923.84	-0.00	2500	6	0.23

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 03-23-1995 FILE DATE: 09-13-1994
CURRENT TIME: 12:09:26 FILE NAME: C557-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (5 BY 5) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1915.73	0.00	6.35	0-NF	0.00	0.00	0.00	0.00	0.00	9.96
185	1920.25	7.92	10.87	4-FFt	3.16	3.89	9.44	5.00	0.00	9.96
202	1921.08	8.77	11.70	4-FFt	3.35	4.04	10.28	5.00	0.00	9.96
212	1921.64	9.35	12.26	4-FFt	3.47	4.12	10.80	5.00	0.00	9.96
220	1922.08	9.82	12.70	4-FFt	3.57	4.18	11.19	5.00	0.00	9.96
226	1922.47	10.23	13.09	4-FFt	3.67	4.23	11.53	5.00	0.00	9.96
232	1922.80	10.57	13.42	4-FFt	3.74	4.27	11.81	5.00	0.00	9.96
237	1923.09	10.89	13.71	4-FFt	3.81	4.30	12.05	5.00	0.00	9.96
239	1923.24	11.05	13.86	4-FFt	3.84	4.32	12.17	5.00	0.00	9.96
245	1923.61	11.45	14.23	4-FFt	3.92	4.36	12.47	5.00	0.00	9.96
248	1923.84	11.70	14.46	4-FFt	3.97	4.39	12.65	5.00	0.00	9.96

El. inlet face invert 1909.38 ft El. outlet invert 1905.77 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1909.38
OUTLET STATION (FT)	110.00
OUTLET ELEVATION (FT)	1905.77
NUMBER OF BARRELS	1
SLOPE (V-FT/H-FT)	0.0328
CULVERT LENGTH ALONG SLOPE (FT)	110.06

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 03-23-1995 FILE DATE: 09-13-1994
CURRENT TIME: 12:09:26 FILE NAME: C557-H2

****
********** TAILWATER **********
****

CONSTANT WATER SURFACE ELEVATION
1915.73

****
********** ROADWAY OVERTOPPING DATA **********
****

WEIR COEFFICIENT 2.63
EMBANKMENT TOP WIDTH (FT) 50.00
***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9813.00	1924.40
2	9845.00	1924.00
3	9876.00	1923.70
4	9911.00	1923.10
5	9919.00	1922.40
6	9932.00	1919.80
7	9936.00	1919.60
8	9950.00	1919.55
9	10000.00	1920.11
10	10050.00	1922.46
11	10057.00	1922.70
12	10062.00	1923.80

****

Arrow Wash Cross Section 0.071

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:49:40 FILE NAME: M02-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1642.65	1641.71	72.31	3 CSP	4.50	4.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M02-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1644.38	0	0	0	0	0	0	0	0	1
1644.64	40	40	0	0	0	0	0	0	1
1644.74	80	80	0	0	0	0	0	0	1
1645.29	120	120	0	0	0	0	0	0	1
1645.76	160	160	0	0	0	0	0	0	1
1646.65	200	200	0	0	0	0	0	0	1
1647.07	240	240	0	0	0	0	0	0	1
1647.50	280	280	0	0	0	0	0	0	1
1647.89	320	320	0	0	0	0	0	0	1
1648.29	360	360	0	0	0	0	0	0	1
1648.43	371	371	0	0	0	0	0	0	1
1650.00	455	455	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M02-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1644.38	0.00	0	0	0.00
1644.64	0.00	40	0	0.00
1644.74	0.00	80	0	0.00
1645.29	0.00	120	0	0.00
1645.76	0.00	160	0	0.00
1646.65	0.00	200	0	0.00
1647.07	0.00	240	0	0.00
1647.50	0.00	280	0	0.00
1647.89	0.00	320	0	0.00
1648.29	0.00	360	0	0.00
1648.43	0.00	371	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:49:40 FILE NAME: M02-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (4.5 BY 4.5) CSP

DISCHARGE FLOW (cfs)	HEADWATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1644.38	0.00	1.73	0-NF	0.00	0.00	0.00	0.00	0.00	2.67
40	1644.64	1.40	1.99	3-M1t	0.99	1.02	1.36	2.67	0.00	2.67
80	1644.74	2.09	2.09	1-S2n	1.42	1.46	6.16	1.42	0.00	2.67
120	1645.29	2.64	2.64	1-S2n	1.77	1.82	6.86	1.77	0.00	2.67
160	1645.76	3.11	3.11	1-S2n	2.08	2.11	7.42	2.08	0.00	2.67
200	1646.65	3.54	4.00	3-M1t	2.38	2.37	6.78	2.67	0.00	2.67
240	1647.07	3.99	4.42	3-M1t	2.66	2.61	8.14	2.67	0.00	2.67
280	1647.50	4.46	4.85	2-M2c	2.96	2.83	8.88	2.83	0.00	2.67
320	1647.89	5.00	5.24	2-M2c	3.28	3.03	9.38	3.03	0.00	2.67
360	1648.29	5.60	5.64	2-M2c	3.64	3.22	9.87	3.22	0.00	2.67
371	1648.43	5.78	5.77	2-M2c	3.80	3.26	10.03	3.26	0.00	2.67

El. inlet face invert 1642.65 ft El. outlet invert 1641.71 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1642.65
OUTLET STATION (FT)	72.30
OUTLET ELEVATION (FT)	1641.71
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0130
CULVERT LENGTH ALONG SLOPE (FT)	72.31

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	4.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	MITERED TO CONFORM TO SLOPE
INLET DEPRESSION	NONE

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:49:40 FILE NAME: M02-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1644.38

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1650.00

****

Arrow Wash Cross Section 0.583

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:51:35 FILE NAME: M01-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1717.61	1714.47	120.74	1 CSP	3.00	3.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M01-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1722.47	0	0	0	0	0	0	0	0	1
1722.62	10	10	0	0	0	0	0	0	1
1723.07	20	20	0	0	0	0	0	0	1
1723.83	30	30	0	0	0	0	0	0	1
1724.89	40	40	0	0	0	0	0	0	1
1726.24	50	50	0	0	0	0	0	0	1
1727.04	55	55	0	0	0	0	0	0	1
1729.11	70	66	0	0	0	0	0	4	4
1730.05	80	71	0	0	0	0	0	9	2
1730.89	90	75	0	0	0	0	0	15	2
1731.68	100	78	0	0	0	0	0	22	2
1728.00	60	60	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M01-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1722.47	0.00	0	0	0.00
1722.62	0.00	10	0	0.00
1723.07	0.00	20	0	0.00
1723.83	0.00	30	0	0.00
1724.89	0.00	40	0	0.00
1726.24	0.00	50	0	0.00
1727.04	0.00	55	0	0.00
1729.11	-0.01	70	0	0.08
1730.05	-0.00	80	0	0.05
1730.89	-0.01	90	0	0.09
1731.68	-0.01	100	0	0.10

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:51:35 FILE NAME: M01-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (3 BY 3) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1722.47	0.00	4.86	0-NF	0.00	0.00	0.00	0.00	0.00	8.00
10	1722.62	1.46	5.01	4-FFt	0.83	0.99	1.41	3.00	0.00	8.00
20	1723.07	2.19	5.46	4-FFt	1.21	1.43	2.83	3.00	0.00	8.00
30	1723.83	2.88	6.22	4-FFt	1.52	1.77	4.24	3.00	0.00	8.00
40	1724.89	3.65	7.28	4-FFt	1.82	2.06	5.66	3.00	0.00	8.00
50	1726.24	4.58	8.63	4-FFt	2.14	2.29	7.07	3.00	0.00	8.00
55	1727.04	5.13	9.43	4-FFt	2.32	2.41	7.78	3.00	0.00	8.00
66	1729.11	6.59	11.50	4-FFt	3.00	2.59	9.38	3.00	0.00	8.00
71	1730.05	7.28	12.44	4-FFt	3.00	2.66	10.02	3.00	0.00	8.00
75	1730.89	7.90	13.28	4-FFt	3.00	2.72	10.57	3.00	0.00	8.00
78	1731.68	8.48	14.07	4-FFt	3.00	2.78	11.05	3.00	0.00	8.00

****

El. inlet face invert 1717.61 ft El. outlet invert 1714.47 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1717.61
OUTLET STATION (FT)	120.70
OUTLET ELEVATION (FT)	1714.47
NUMBER OF BARRELS	1
SLOPE (V-FT/H-FT)	0.0260
CULVERT LENGTH ALONG SLOPE (FT)	120.74

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	3.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:51:35 FILE NAME: M01-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1722.47

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1728.00

****

Balboa Wash Cross Section 0.782

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:52:34 FILE NAME: M10-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1625.37	1623.77	121.51	2 CSP	4.50	4.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M10-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1625.37	0	0	0	0	0	0	0	0	1
1627.24	40	40	0	0	0	0	0	0	1
1628.10	80	80	0	0	0	0	0	0	1
1628.87	120	120	0	0	0	0	0	0	1
1630.05	160	160	0	0	0	0	0	0	1
1630.62	200	200	0	0	0	0	0	0	1
1631.34	240	240	0	0	0	0	0	0	1
1632.39	280	280	0	0	0	0	0	0	1
1633.63	320	320	0	0	0	0	0	0	1
1633.91	328	328	0	0	0	0	0	0	1
1636.66	400	393	0	0	0	0	0	7	4
1635.00	356	356	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M10-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1625.37	0.00	0	0	0.00
1627.24	0.00	40	0	0.00
1628.10	0.00	80	0	0.00
1628.87	0.00	120	0	0.00
1630.05	0.00	160	0	0.00
1630.62	0.00	200	0	0.00
1631.34	0.00	240	0	0.00
1632.39	0.00	280	0	0.00
1633.63	0.00	320	0	0.00
1633.91	0.00	328	0	0.00
1636.66	0.00	400	-0	-0.01

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:52:34 FILE NAME: M10-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (4.5 BY 4.5) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1625.37	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	1.04
40	1627.24	1.87	1.87	1-S2n	1.21	1.26	5.73	1.21	0.00	1.04
80	1628.10	2.73	2.73	1-S2n	1.77	1.82	6.90	1.77	0.00	1.04
120	1628.87	3.50	3.50	1-S2n	2.22	2.25	7.67	2.22	0.00	1.04
160	1630.05	4.25	4.68	2-M2c	2.65	2.61	8.37	2.61	0.00	1.04
200	1630.62	5.05	5.25	2-M2c	3.09	2.93	9.14	2.93	0.00	1.04
240	1631.34	5.97	5.88	2-M2c	3.61	3.22	9.87	3.22	0.00	1.04
280	1632.39	7.02	6.76	6-FFn	4.50	3.47	8.80	4.50	0.00	1.04
320	1633.63	8.26	8.20	6-FFn	4.50	3.68	10.06	4.50	0.00	1.04
328	1633.91	8.54	8.51	6-FFn	4.50	3.72	10.31	4.50	0.00	1.04
393	1636.66	11.07	11.29	6-FFn	4.50	4.00	12.37	4.50	0.00	1.04

El. inlet face invert 1625.37 ft El. outlet invert 1623.77 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1625.37
OUTLET STATION (FT)	121.50
OUTLET ELEVATION (FT)	1623.77
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0132
CULVERT LENGTH ALONG SLOPE (FT)	121.51

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	4.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:52:34 FILE NAME: M10-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1624.81

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1635.00

****

Hesperus Wash Cross Section 2.229

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:53:28 FILE NAME: C538-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS	SHAPE	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1778.02	1775.76	164.32	1	CSP	5.00	5.00	.024	CONVENTIONAL
2									
3									
4									
5									
6									

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C538-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1780.33	0	0	0	0	0	0	0	0	1
1780.63	40	40	0	0	0	0	0	0	1
1781.97	80	80	0	0	0	0	0	0	1
1783.66	120	120	0	0	0	0	0	0	1
1784.81	160	160	0	0	0	0	0	0	1
1786.74	200	200	0	0	0	0	0	0	1
1789.56	240	240	0	0	0	0	0	0	1
1791.31	261	261	0	0	0	0	0	0	1
1796.03	320	311	0	0	0	0	0	9	6
1798.29	360	332	0	0	0	0	0	27	4
1800.30	400	351	0	0	0	0	0	49	4
1794.00	290	290	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C538-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1780.33	0.00	0	0	0.00
1780.63	0.00	40	0	0.00
1781.97	0.00	80	0	0.00
1783.66	0.00	120	0	0.00
1784.81	0.00	160	0	0.00
1786.74	0.00	200	0	0.00
1789.56	0.00	240	0	0.00
1791.31	0.00	261	0	0.00
1796.03	-0.01	320	0	0.04
1798.29	-0.00	360	0	0.03
1800.30	-0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:53:28 FILE NAME: C538-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (5 BY 5) CSP

DISCHARGE FLOW (cfs)	HEADWATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1780.33	0.00	2.31	0-NF	0.00	0.00	0.00	0.00	0.00	4.57
40	1780.63	2.61	2.61	1-S2n	1.66	1.75	6.99	1.66	0.00	4.57
80	1781.97	3.95	3.95	1-S2n	2.45	2.53	8.38	2.45	0.00	4.57
120	1783.66	5.26	5.64	3-M1t	3.16	3.12	6.40	4.57	0.00	4.57
160	1784.81	6.79	6.65	3-M1t	3.96	3.62	8.53	4.57	0.00	4.57
200	1786.74	8.72	8.65	6-FFn	5.00	4.03	10.19	5.00	0.00	4.57
240	1789.56	11.17	11.54	6-FFn	5.00	4.33	12.22	5.00	0.00	4.57
261	1791.31	12.67	13.29	6-FFn	5.00	4.48	13.29	5.00	0.00	4.57
311	1796.02	16.88	18.00	6-FFn	5.00	4.86	15.84	5.00	0.00	4.57
332	1798.29	18.96	20.27	6-FFn	5.00	5.00	16.93	5.00	0.00	4.57
351	1800.30	20.87	22.28	6-FFn	5.00	5.00	17.88	5.00	0.00	4.57

El. inlet face invert 1778.02 ft El. outlet invert 1775.76 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1778.02
OUTLET STATION (FT)	164.30
OUTLET ELEVATION (FT)	1775.76
NUMBER OF BARRELS	1
SLOPE (V-FT/H-FT)	0.0138
CULVERT LENGTH ALONG SLOPE (FT)	164.32

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:53:28 FILE NAME: C538-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1780.33

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1794.00

****

Caliente Wash Cross Section 1.098

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:54:22 FILE NAME: C527-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1527.08	1526.10	24.52	1 CSP	3.50	3.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C527-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1529.36	0	0	0	0	0	0	0	0	1
1529.69	20	20	0	0	0	0	0	0	1
1530.19	40	40	0	0	0	0	0	0	1
1531.39	60	60	0	0	0	0	0	0	1
1532.96	80	80	0	0	0	0	0	0	1
1534.79	100	98	0	0	0	0	0	2	4
1536.24	120	110	0	0	0	0	0	10	3
1537.57	140	119	0	0	0	0	0	21	3
1538.82	160	127	0	0	0	0	0	33	3
1540.00	180	134	0	0	0	0	0	45	3
1541.13	200	141	0	0	0	0	0	59	3
1534.00	91	91	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C527-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1529.36	0.00	0	0	0.00
1529.69	0.00	20	0	0.00
1530.19	0.00	40	0	0.00
1531.39	0.00	60	0	0.00
1532.96	0.00	80	0	0.00
1534.79	-0.00	100	0	0.00
1536.24	-0.01	120	0	0.10
1537.57	-0.00	140	0	0.05
1538.82	-0.00	160	0	0.04
1540.00	-0.00	180	0	0.03
1541.13	-0.00	200	0	0.01

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:54:22 FILE NAME: C527-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (3.5 BY 3.5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1529.36	0.00	2.28	0-NF	0.00	0.00	0.00	0.00	0.00	3.26
20	1529.69	2.00	2.61	3-M1t	1.01	1.37	2.16	3.26	0.00	3.26
40	1530.19	3.11	3.11	1-S2n	1.46	1.96	9.92	1.53	0.00	3.26
60	1531.39	4.31	4.31	5-S2n	1.85	2.42	10.92	1.95	0.00	3.26
80	1532.96	5.88	5.88	5-S2n	2.23	2.79	11.74	2.34	0.00	3.26
98	1534.79	7.71	7.71	5-S2n	2.60	3.02	12.39	2.68	0.00	3.26
110	1536.23	9.15	9.15	5-S2n	2.90	3.17	12.65	2.96	0.00	3.26
119	1537.57	10.49	8.10	6-FFn	3.50	3.29	12.38	3.50	0.00	3.26
127	1538.81	11.73	8.96	6-FFn	3.50	3.40	13.22	3.50	0.00	3.26
134	1540.00	12.92	9.76	6-FFn	3.50	3.49	13.98	3.50	0.00	3.26
141	1541.13	14.05	10.49	6-FFn	3.50	3.50	14.66	3.50	0.00	3.26

****

El. inlet face invert 1527.08 ft El. outlet invert 1526.10 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1527.08
OUTLET STATION (FT)	24.50
OUTLET ELEVATION (FT)	1526.10
NUMBER OF BARRELS	1
SLOPE (V-FT/H-FT)	0.0400
CULVERT LENGTH ALONG SLOPE (FT)	24.52

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	3.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:54:22 FILE NAME: C527-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1529.36

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1534.00

****

Caliente Wash Cross Section 1.789

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:04 FILE NAME: C525-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS	SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1596.76	1595.56	55.01	3	CSP	5.50	5.50	.024	CONVENTIONAL
2									
3									
4									
5									
6									

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C525-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1598.36	0	0	0	0	0	0	0	0	1
1598.57	40	40	0	0	0	0	0	0	1
1598.63	80	80	0	0	0	0	0	0	1
1599.07	120	120	0	0	0	0	0	0	1
1599.47	160	160	0	0	0	0	0	0	1
1599.84	200	200	0	0	0	0	0	0	1
1600.20	240	240	0	0	0	0	0	0	1
1600.53	280	280	0	0	0	0	0	0	1
1600.86	320	320	0	0	0	0	0	0	1
1601.18	360	360	0	0	0	0	0	0	1
1601.49	400	400	0	0	0	0	0	0	1
1605.00	775	775	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C525-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1598.36	0.00	0	0	0.00
1598.57	0.00	40	0	0.00
1598.63	0.00	80	0	0.00
1599.07	0.00	120	0	0.00
1599.47	0.00	160	0	0.00
1599.84	0.00	200	0	0.00
1600.20	0.00	240	0	0.00
1600.53	0.00	280	0	0.00
1600.86	0.00	320	0	0.00
1601.18	0.00	360	0	0.00
1601.49	0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:04 FILE NAME: C525-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (5.5 BY 5.5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1598.36	0.00	1.60	0-NF	0.00	0.00	0.00	0.00	0.00	2.80
40	1598.57	1.39	1.81	3-M1t	0.79	0.95	1.10	2.80	0.00	2.80
80	1598.63	1.87	1.87	1-S2n	1.16	1.37	7.29	1.16	0.00	2.80
120	1599.07	2.31	2.31	1-S2n	1.41	1.71	8.25	1.41	0.00	2.80
160	1599.47	2.71	2.71	1-S2n	1.66	1.97	8.83	1.66	0.00	2.80
200	1599.84	3.08	3.08	1-S2n	1.85	2.23	9.28	1.88	0.00	2.80
240	1600.20	3.44	3.44	1-S2n	2.04	2.45	9.76	2.07	0.00	2.80
280	1600.53	3.77	3.77	1-S2n	2.23	2.66	10.32	2.23	0.00	2.80
320	1600.86	4.10	4.10	1-S2n	2.40	2.85	10.70	2.40	0.00	2.80
360	1601.18	4.42	4.42	1-S2n	2.57	3.03	10.84	2.60	0.00	2.80
400	1601.49	4.73	4.73	1-S2n	2.73	3.21	11.14	2.77	0.00	2.80

****

El. inlet face invert 1596.76 ft El. outlet invert 1595.56 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1596.76
OUTLET STATION (FT)	55.00
OUTLET ELEVATION (FT)	1595.56
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0218
CULVERT LENGTH ALONG SLOPE (FT)	55.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:04 FILE NAME: C525-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1598.36

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1605.00

****

Caliente Wash Cross Section 2.120

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:43 FILE NAME: M11-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1634.65	1634.20	54.00	3 RCB	10.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M11-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1635.58	0	0	0	0	0	0	0	0	1
1635.64	40	40	0	0	0	0	0	0	1
1635.79	80	80	0	0	0	0	0	0	1
1635.86	120	120	0	0	0	0	0	0	1
1636.11	160	160	0	0	0	0	0	0	1
1636.36	200	200	0	0	0	0	0	0	1
1636.58	240	240	0	0	0	0	0	0	1
1636.79	280	280	0	0	0	0	0	0	1
1636.99	320	320	0	0	0	0	0	0	1
1637.19	360	360	0	0	0	0	0	0	1
1637.38	400	400	0	0	0	0	0	0	1
1642.00	1067	1067	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M11-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1635.58	0.00	0	0	0.00
1635.64	0.00	40	0	0.00
1635.79	0.00	80	0	0.00
1635.86	0.00	120	0	0.00
1636.11	0.00	160	0	0.00
1636.36	0.00	200	0	0.00
1636.58	0.00	240	0	0.00
1636.79	0.00	280	0	0.00
1636.99	0.00	320	0	0.00
1637.19	0.00	360	0	0.00
1637.38	0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:43 FILE NAME: M11-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (10 BY 3) RCB

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1635.58	0.00	0.93	0-NF	0.00	0.00	0.00	0.00	0.00	1.38
40	1635.64	0.58	0.99	3-M1t	0.27	0.38	0.97	1.38	0.00	1.38
80	1635.79	0.92	1.14	3-M1t	0.42	0.61	1.93	1.38	0.00	1.38
120	1635.86	1.21	1.21	1-S2n	0.55	0.79	7.25	0.55	0.00	1.38
160	1636.11	1.46	1.46	1-S2n	0.66	0.96	7.53	0.71	0.00	1.38
200	1636.36	1.71	1.71	1-S2n	0.76	1.12	8.04	0.83	0.00	1.38
240	1636.58	1.93	1.93	1-S2n	0.86	1.26	8.51	0.94	0.00	1.38
280	1636.79	2.14	2.14	1-S2n	0.95	1.40	8.88	1.05	0.00	1.38
320	1636.99	2.34	2.34	1-S2n	1.04	1.53	9.21	1.16	0.00	1.38
360	1637.19	2.54	2.54	1-S2n	1.12	1.65	9.52	1.26	0.00	1.38
400	1637.38	2.73	2.73	1-S2n	1.20	1.77	9.81	1.36	0.00	1.38

****

El. inlet face invert 1634.65 ft El. outlet invert 1634.20 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1634.65
OUTLET STATION (FT)	54.00
OUTLET ELEVATION (FT)	1634.20
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0083
CULVERT LENGTH ALONG SLOPE (FT)	54.00

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	BOX
BARREL SPAN	10.00 FT
BARREL RISE	3.00 FT
BARREL MATERIAL	CONCRETE
BARREL MANNING'S N	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (30-75 DEG. FLARE)
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:55:43 FILE NAME: M11-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1635.58

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1642.00

****

Caliente Wash Cross Section 2.306

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:56:44 FILE NAME: C523-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

C U L V #	SITE DATA: INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1650.28	1649.17	100.01	1 CSP	5.50	5.50	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C523-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1653.34	0	0	0	0	0	0	0	0	1
1653.58	30	30	0	0	0	0	0	0	1
1653.44	60	60	0	0	0	0	0	0	1
1654.65	90	90	0	0	0	0	0	0	1
1655.46	120	120	0	0	0	0	0	0	1
1656.26	150	150	0	0	0	0	0	0	1
1657.01	180	180	0	0	0	0	0	0	1
1658.02	210	210	0	0	0	0	0	0	1
1659.25	240	240	0	0	0	0	0	0	1
1660.03	257	257	0	0	0	0	0	0	2
1661.86	300	292	0	0	0	0	0	8	3
1660.00	256	256	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C523-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1653.34	0.00	0	0	0.00
1653.58	0.00	30	0	0.00
1653.44	0.00	60	0	0.00
1654.65	0.00	90	0	0.00
1655.46	0.00	120	0	0.00
1656.26	0.00	150	0	0.00
1657.01	0.00	180	0	0.00
1658.02	0.00	210	0	0.00
1659.25	0.00	240	0	0.00
1660.03	-0.00	257	0	0.03
1661.86	-0.00	300	0	0.01

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:56:44 FILE NAME: C523-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (5.5 BY 5.5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1653.34	0.00	3.06	0-NF	0.00	0.00	0.00	0.00	0.00	4.17
30	1653.58	2.18	3.30	3-M1t	1.45	1.46	1.56	4.17	0.00	4.17
60	1653.44	3.16	3.16	1-S2n	2.10	2.11	7.17	2.10	0.00	4.17
90	1654.65	4.03	4.37	3-M1t	2.64	2.61	4.67	4.17	0.00	4.17
120	1655.46	4.86	5.18	3-M1t	3.15	3.03	6.22	4.17	0.00	4.17
150	1656.26	5.72	5.98	3-M1t	3.66	3.41	7.78	4.17	0.00	4.17
180	1657.01	6.66	6.73	3-M2t	4.24	3.75	9.33	4.17	0.00	4.17
210	1658.02	7.74	7.29	6-FFn	5.50	4.04	8.84	5.50	0.00	4.17
240	1659.25	8.97	8.54	6-FFn	5.50	4.32	10.10	5.50	0.00	4.17
257	1660.03	9.75	9.30	6-FFn	5.50	4.45	10.81	5.50	0.00	4.17
292	1661.86	11.58	11.01	6-FFn	5.50	4.68	12.30	5.50	0.00	4.17

****

El. inlet face invert 1650.28 ft El. outlet invert 1649.17 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1650.28
OUTLET STATION (FT)	100.00
OUTLET ELEVATION (FT)	1649.17
NUMBER OF BARRELS	1
SLOPE (V-FT/H-FT)	0.0111
CULVERT LENGTH ALONG SLOPE (FT)	100.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:56:44 FILE NAME: C523-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1653.34

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1660.00

****

Tulip Wash Cross Section 1.365

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:23:31 FILE NAME: C601-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1710.22	1709.04	88.01	2 CSP	5.00	5.00	.024	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: C601-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1713.54	0	0	0	0	0	0	0	0	1
1713.71	50	50	0	0	0	0	0	0	1
1714.06	100	100	0	0	0	0	0	0	1
1714.01	150	150	0	0	0	0	0	0	1
1714.81	200	200	0	0	0	0	0	0	1
1715.83	250	250	0	0	0	0	0	0	1
1716.38	300	287	0	0	0	0	0	12	4
1716.70	350	305	0	0	0	0	0	43	3
1716.98	400	318	0	0	0	0	0	80	3
1717.22	450	330	0	0	0	0	0	119	3
1717.27	460	332	0	0	0	0	0	128	3
1716.04	265	265	0	0	0	0	0	OVERTOPPING	

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: C601-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1713.54	0.00	0	0	0.00
1713.71	0.00	50	0	0.00
1714.06	0.00	100	0	0.00
1714.01	0.00	150	0	0.00
1714.81	0.00	200	0	0.00
1715.83	0.00	250	0	0.00
1716.38	-0.01	300	1	0.35
1716.70	-0.01	350	2	0.57
1716.98	-0.01	400	2	0.42
1717.22	-0.01	450	1	0.33
1717.27	-0.00	460	1	0.13

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:23:31 FILE NAME: C601-H2

PERFORMANCE CURVE FOR CULVERT # 1 - 2 (5 BY 5) CSP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1713.54	0.00	3.32	0-NF	0.00	0.00	0.00	0.00	0.00	4.50
50	1713.71	2.04	3.49	3-M1t	1.30	1.37	1.34	4.50	0.00	4.50
100	1714.06	2.96	3.84	3-M1t	1.89	1.98	2.69	4.50	0.00	4.50
150	1714.01	3.79	3.79	1-S2n	2.37	2.44	8.17	2.37	0.00	4.50
200	1714.81	4.59	4.59	1-S2n	2.82	2.84	8.76	2.82	0.00	4.50
250	1715.83	5.43	5.61	3-M1t	3.28	3.19	6.72	4.50	0.00	4.50
287	1716.38	6.12	6.16	3-M1t	3.64	3.43	7.71	4.50	0.00	4.50
305	1716.69	6.47	6.42	3-M1t	3.84	3.54	8.19	4.50	0.00	4.50
318	1716.98	6.76	6.63	3-M1t	3.98	3.61	8.56	4.50	0.00	4.50
330	1717.22	7.00	6.80	3-M1t	4.17	3.67	8.86	4.50	0.00	4.50
332	1717.27	7.05	6.84	3-M1t	4.21	3.68	8.92	4.50	0.00	4.50

El. inlet face invert 1710.22 ft El. outlet invert 1709.04 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1710.22
OUTLET STATION (FT)	88.00
OUTLET ELEVATION (FT)	1709.04
NUMBER OF BARRELS	2
SLOPE (V-FT/H-FT)	0.0134
CULVERT LENGTH ALONG SLOPE (FT)	88.01

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	5.00 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	THIN EDGE PROJECTING
INLET DEPRESSION	NONE

CURRENT DATE: 10-10-1994 FILE DATE: 09-13-1994
CURRENT TIME: 10:23:31 FILE NAME: C601-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1713.54

****
********** ROADWAY OVERTOPPING DATA **********
****

WEIR COEFFICIENT 2.63
EMBANKMENT TOP WIDTH (FT) 1.00
***** USER DEFINED ROADWAY PROFILE

CROSS-SECTION COORD. NO.	X (FT)	Y (FT)
1	9802.70	1722.80
2	9831.10	1721.80
3	9851.30	1721.00
4	9894.00	1720.90
5	9926.30	1720.60
6	9972.30	1719.60
7	9981.91	1716.16
8	10004.00	1716.04
9	10020.21	1716.36
10	10023.60	1717.10
11	10037.70	1718.30
12	10052.90	1720.60

****

Oxford Wash Cross Section 0.669

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 13:32:41 FILE NAME: M09-H2

****
********** FHWA CULVERT ANALYSIS **********
********** HY-8, VERSION 4.0 **********
****

CULV #	SITE DATA: INLET ELEV. (FT)	SITE DATA: OUTLET ELEV. (FT)	SITE DATA: CULVERT LENGTH (FT)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1677.78	1677.40	71.40	3 CSP	3.50	3.50	.022	CONVENTIONAL
2								
3								
4								
5								
6								

****

SUMMARY OF CULVERT FLOWS (CFS) FILE: M09-H2 DATE: 09-13-1994

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1681.11	0	0	0	0	0	0	0	0	1
1681.19	40	40	0	0	0	0	0	0	1
1681.39	80	80	0	0	0	0	0	0	1
1681.72	120	120	0	0	0	0	0	0	1
1682.49	160	160	0	0	0	0	0	0	1
1683.27	200	200	0	0	0	0	0	0	1
1684.22	240	240	0	0	0	0	0	0	1
1685.34	280	280	0	0	0	0	0	0	1
1685.62	289	289	0	0	0	0	0	0	1
1688.11	360	360	0	0	0	0	0	0	1
1689.75	400	400	0	0	0	0	0	0	1
1690.00	406	406	0	0	0	0	0	0	OVERTOPPING

****

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: M09-H2 DATE: 09-13-1994

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1681.11	0.00	0	0	0.00
1681.19	0.00	40	0	0.00
1681.39	0.00	80	0	0.00
1681.72	0.00	120	0	0.00
1682.49	0.00	160	0	0.00
1683.27	0.00	200	0	0.00
1684.22	0.00	240	0	0.00
1685.34	0.00	280	0	0.00
1685.62	0.00	289	0	0.00
1688.11	0.00	360	0	0.00
1689.75	0.00	400	0	0.00

****

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 13:32:41 FILE NAME: M09-H2

****

PERFORMANCE CURVE FOR CULVERT # 1 - 3 (3.5 BY 3.5) CSP

****

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1681.11	0.00	3.33	0-NF	0.00	0.00	0.00	0.00	0.00	3.71
40	1681.19	1.57	3.41	3-M1f	1.33	1.10	1.39	3.50	0.00	3.71
80	1681.39	2.33	3.61	3-M1f	1.98	1.58	2.77	3.50	0.00	3.71
120	1681.72	2.97	3.94	3-M1f	2.66	1.96	4.16	3.50	0.00	3.71
160	1682.49	3.67	4.71	4-FFt	3.50	2.28	5.54	3.50	0.00	3.71
200	1683.27	4.55	5.49	4-FFt	3.50	2.55	6.93	3.50	0.00	3.71
240	1684.22	5.63	6.44	4-FFt	3.50	2.79	8.32	3.50	0.00	3.71
280	1685.34	6.91	7.56	4-FFt	3.50	2.97	9.70	3.50	0.00	3.71
289	1685.62	7.22	7.84	4-FFt	3.50	3.00	10.01	3.50	0.00	3.71
360	1688.11	9.88	10.33	4-FFt	3.50	3.30	12.47	3.50	0.00	3.71
400	1689.75	11.52	11.97	4-FFt	3.50	3.47	13.86	3.50	0.00	3.71

****

El. inlet face invert 1677.78 ft El. outlet invert 1677.40 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

****

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION (FT)	0.00
INLET ELEVATION (FT)	1677.78
OUTLET STATION (FT)	71.40
OUTLET ELEVATION (FT)	1677.40
NUMBER OF BARRELS	3
SLOPE (V-FT/H-FT)	0.0053
CULVERT LENGTH ALONG SLOPE (FT)	71.40

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	3.50 FT
BARREL MATERIAL	CORRUGATED STEEL
BARREL MANNING'S N	0.022
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	MITERED TO CONFORM TO SLOPE
INLET DEPRESSION	NONE

****

CURRENT DATE: 10-05-1994 FILE DATE: 09-13-1994
CURRENT TIME: 13:32:41 FILE NAME: M09-H2

****
********** TAILWATER **********
****
****

CONSTANT WATER SURFACE ELEVATION
1681.11

****
********** ROADWAY OVERTOPPING DATA **********
****

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH (FT)	1.00
CREST LENGTH (FT)	1.00
OVERTOPPING CREST ELEVATION (FT)	1690.00

****

APPENDIX E

HEC-2 Output, Cross Section Plots and Flood Profiles

Appendix E
Special Problem Analysis

Ashbrook Wash at Golden Eagle Boulevard

Ashbrook Wash at Bayfield Drive

Ashbrook Wash at Dam #4 (Emergency Spillway)

Balboa Wash (River Mile 1.645)

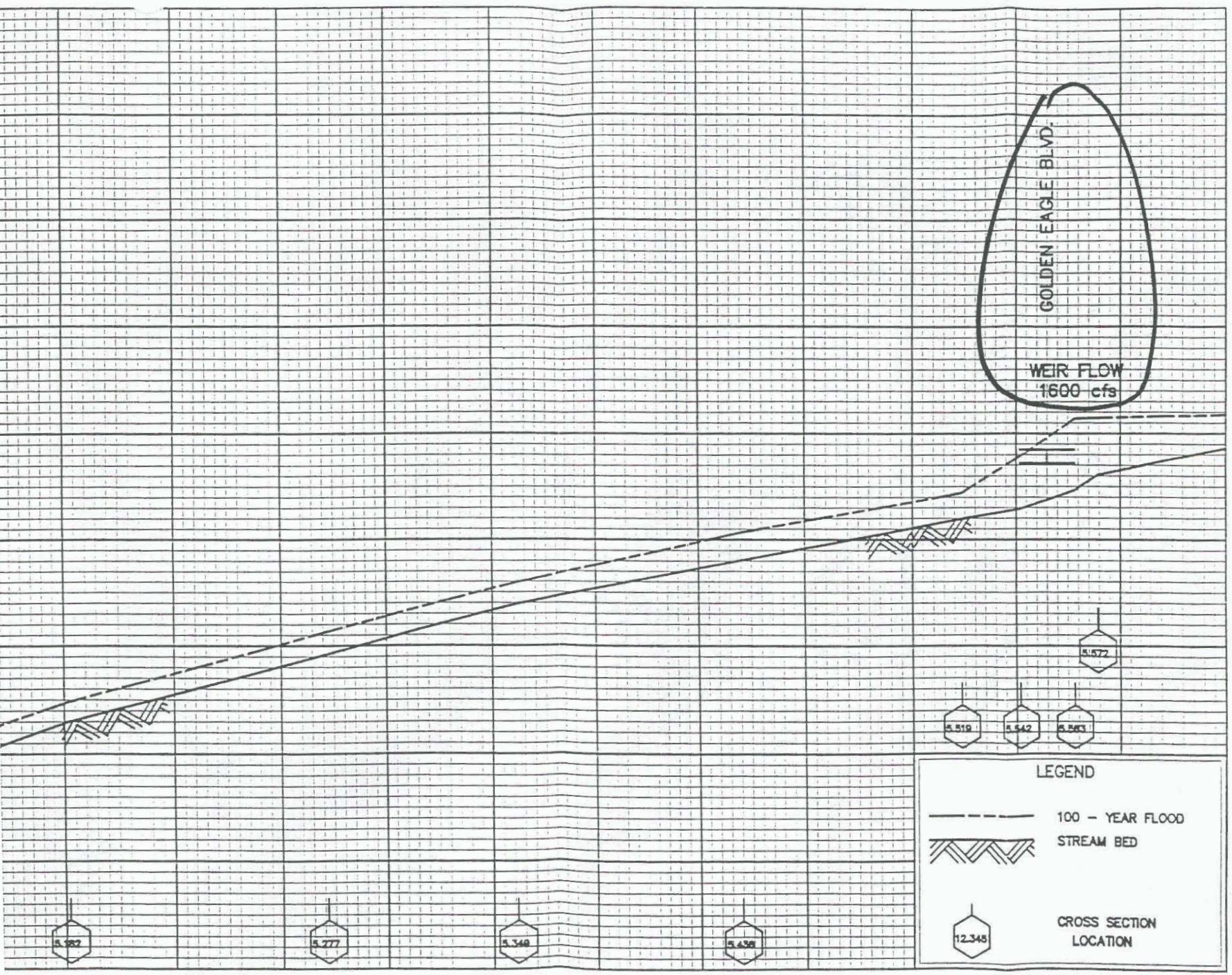
Oxford Wash at Fairlynn Drive

Balboa Wash at Fountain Hills Boulevard (Flooding of Kings Way Road)

Arrow Wash from Fountain Hills Boulevard to Palisades Drive

Arrow Wash at Arrow Drive

Ashbrook Wash at Golden Eagle Boulevard

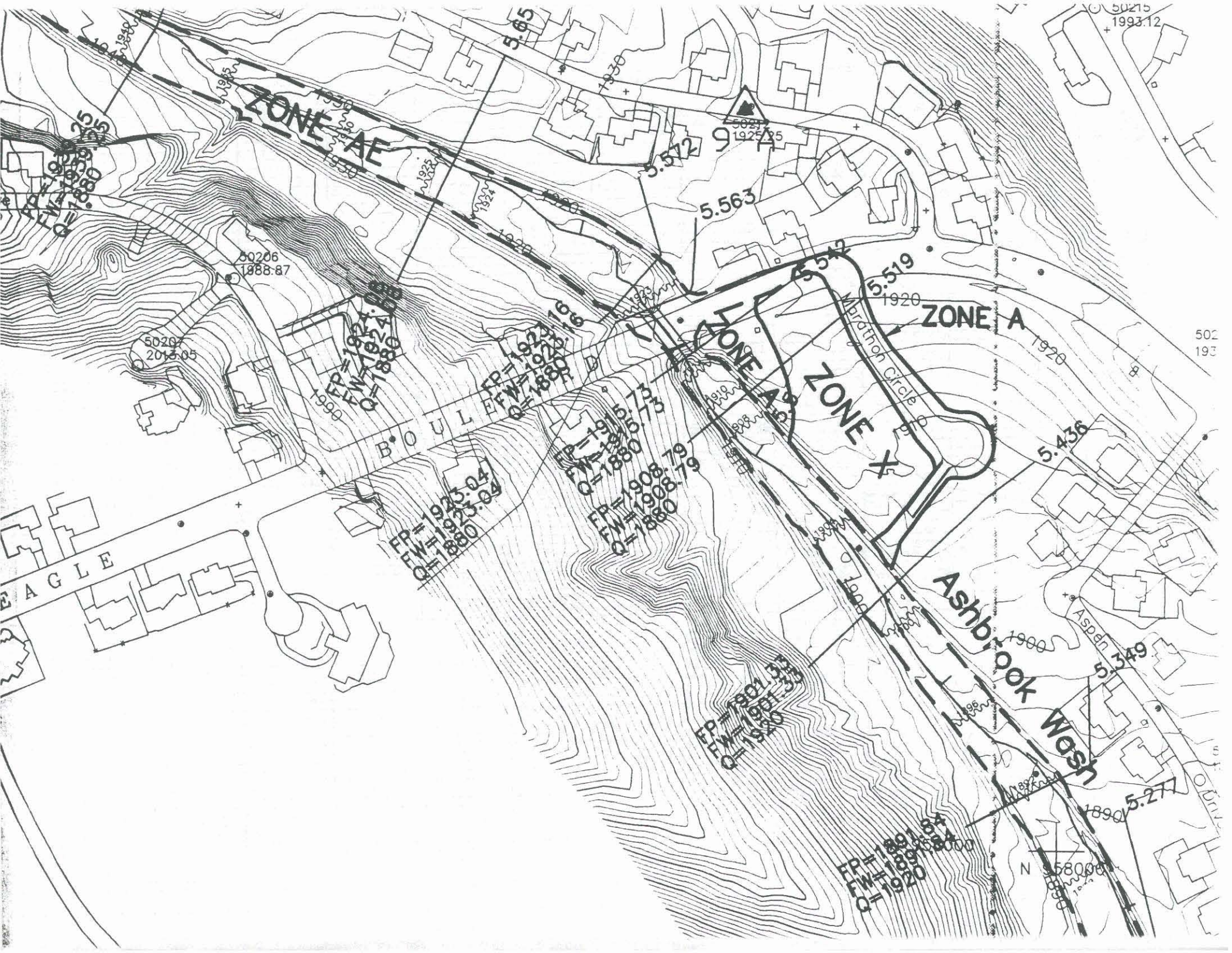


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: V:\FHHS\SUBMAYS\PRO1.dwg (sheet 8 of 9)
Date: FEV 01 FEB 1995 09:45am


ZONE AE
ZONE A
ZONE X
ZONE AE
5.65
5.512
5.563
5.542
5.519
5.436
5.349
5.277
Marathon Circle
Ashbrook Wash
Aspen
B O U L E
E A G L E
50215
1993.12
50206
1988.87
50207
2013.05
FP=1923.04
FW=1923.04
Q=1880
FP=1908.79
FW=1908.79
Q=1880
FP=1901.33
FW=1901.33
Q=1920
FP=1891.84
FW=1891.84
Q=1920
N 4258000

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills FDS Project No. 92.404.001 Date 6-23-97

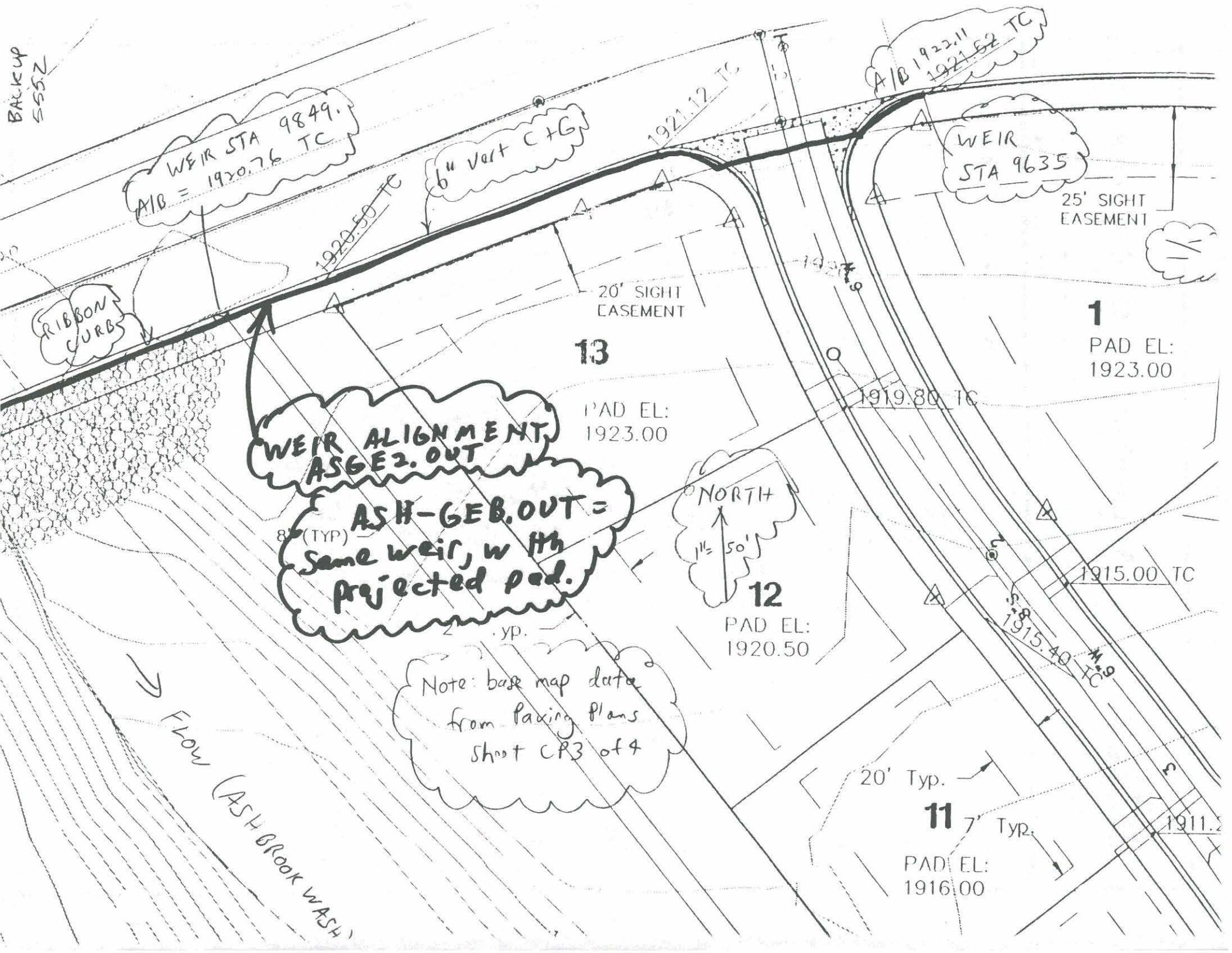
Subject Cross Section Golden Eagle BLVD Designed ZLJ Page 1/1

STA	(measured) Elev	(+6" curb) Elev	
10291	1926	1926.5	see - Weir output file ASGE2.OUT
10271	1924	1924.5	
10246	1922	1922.0	
10000	1920.5	1920.50	} Ribon Curb (flat)
9980	1919.86	1919.86	A/B = As built
9946	1920.0	1920.0	
9930	1920.1	1920 1	G = Gutter
9890	1920.2	1920.8	TC = Top of curb
9849	1920.26 A/B G	1920.76	
9800	1920.7	1921.2	
9732	A/B 1921.55 TC	1921.55	
9707	A/B 1922.20 TC	1922.20	
9706.9	A/B 1921.74 G	1921.74	} Street opening
9662.1	A/B 1921.42 G	1921.42	
9662.0	A/B 1922.30 TC	1922.30	
9635	A/B 1922.11 TC	1922.11	

The Above data represents Cross-sectional data for Golden Eagle Blvd at Ashbrook wash. The stations from 10293 to 10338 represent the entrance To Marathon Circle.

This data is being accumulated to see what effect Zone A Flow has on the new subdivision

Elevations from Sheet CP3 of 4
Fountain Hills Final Plat #516
Greiner INC
Sealed 2-27-96


BACKUP SSSN
WEIR STA 9849.
A/B = 1920.76 TC
6" Vert C+G
1921.12 TC
1920.50 TC
A/B 1922.11
1921.62 TC
WEIR STA 9635
25' SIGHT EASEMENT
RIBBON CURB
20' SIGHT EASEMENT
13
PAD EL: 1923.00
1
PAD EL: 1923.00
1919.80 TC
WEIR ALIGNMENT ASGE2.OUT
ASH-GEB.OUT = Same weir, w/ th projected pad.
8" (TYP)
NORTH
1" = 50'
12
PAD EL: 1920.50
1915.00 TC
1915.40 TC
Note: base map data from Paving Plans Sheet CP3 of 4
FLOW (ASH BROOK WASH)
20' Typ.
11
7' Typ.
PAD EL: 1916.00

%
 ɔuntain Hills North FDS 1
Ashbrook Wash and Golden Eagle Blvd

```
 ********************************************
     UNEVEN WEIR FLOW PROGRAM
     FORTRAN VERSION 1.0
 ********************************************

     PROJECT:

     ENGINEER:

     DATE:   7/ 3/1997
     TIME:  14:38.11

 ---------------------------------------------
     INPUT PARAMETERS
 ---------------------------------------------

     STARTING WSEL:      1919.90
     MAXIMUM WSEL:       1922.60
     STEP SIZE:             0.05
     BREADTH OF WEIR:      15.00
```

▒
1

```
 ********************************************
     INPUT ELEVATION/STATION TABLE.
     PROJECT:

     DATE:   7/ 3/1997
     TIME:  14:38.11
 ********************************************
```

POINT	ELEVATION	STATION
1	1922.11	9635.00
2	1922.30	9662.00
3	1921.42	9662.10
4	1921.74	9706.90
5	1922.20	9707.00
6	1921.20	9800.00
7	1921.55	9732.00
8	1920.76	9849.00
9	1920.80	9889.00
10	1920.30	9890.00
11	1920.10	9930.00
12	1920.00	9946.00
13	1919.86	9980.00
14	1920.50	10000.00
15	1922.00	10046.00
16	1924.00	10070.90
17	1924.50	10071.00
18	1926.50	10091.00

1

****
WEIR COEFFICIENT TABLE
PROJECT:

DATE: 7/ 3/1997
TIME: 14:38.11
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6800
2	0.20	2.6800
3	0.40	2.7000
4	0.60	2.7000
5	0.80	2.6400
6	1.00	2.6300
7	2.00	2.6300
8	5.50	2.6300

1

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:

    DATE:   7/ 3/1997
    TIME:  14:38.11
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
1919.90	0.09	1920.65	127.42
1919.95	0.72	1920.70	144.13
1920.00	2.16	1920.75	161.75
1920.05	4.58	1920.80	180.72
1920.10	8.03	1920.85	201.68
1920.15	12.59	1920.90	224.72
1920.20	18.43	1920.95	249.64
1920.25	25.64	1921.00	276.54
1920.30	34.35	1921.05	305.82
1920.35	44.49	1921.10	337.13
1920.40	55.83	1921.15	370.46
1920.45	68.30	1921.20	405.86
1920.50	81.80	1921.25	443.38
1920.55	96.22	1921.30	482.83
1920.60	111.42	1921.35	524.11

1

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:

    DATE:   7/ 3/1997
    TIME:  14:38.11
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
1921.40	567.09	1922.15	1475.69

→ Elev 1921.40 is EAST EDGE of STREET Opening. ~560 cfs capacity before Flow goes down street. (MARATHON CIRCLE) (compare to 1600 cfs total)

1921.45	611.68	1922.20	1556.00
1921.50	658.21	1922.25	1638.50
1921.55	706.82	1922.30	1723.63
1921.60	757.72	1922.35	1810.47
1921.65	811.19	1922.40	1899.48
1921.70	867.16	1922.45	1990.64
1921.75	925.58	1922.50	2083.76
1921.80	985.73	1922.55	2179.63
1921.85	1048.17		
1921.90	1112.80		
1921.95	1179.59		
1922.00	1249.84		
1922.05	1322.45		
1922.10	1397.85		

1

CONCLUSION

Some of the 1600 CFS overtopping flow will enter Marathon Circle. The PAD elevations appear to be high enough to be out of zone A. See next weir Analysis ASH-GEB.OUT which Projects the PAD Elevation onto the weir Profile.

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills North FDS Project No. 5552 Date 7-2-97

Subject Ashbrook WASH & Golden Eagle BLVD Designed LHV Page 1/1

This cross-sectional profile includes the projection of PAD Elevation for the house located on corner of Marathon Circle and Golden Eagle BLVD

Cross-section taken along Golden Eagle BLVD across ASHBROOK WASH.

See weir output ASH-GEB.OUT

STA	Elev
9909	1926.5
9929	1924.5
9929.1	1924
9954	1922
10000	1920.5
10020	1919.86
10054	1920.0
10070	1920.1
10110	1920.3
10110.1	1920.8
10151	1920.76
10175.9	1920.98
10176	1923.0
10268	1923.0
10268.1	1921.55
10293	1922.20
10293.1	1921.74
10337.9	1921.42
10338	1922.30
10365	1922.11

Fountain Hills North FDS 1
Ashbrook Wash and Golden Eagle Blvd

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  fountain hills north fds

    ENGINEER:  ashbrook wash and golden eagle blvd

    DATE:   7/ 3/1997
    TIME:  15: 7.59

-----------------------------------------
    INPUT PARAMETERS
-----------------------------------------

    STARTING WSEL:       1919.90
    MAXIMUM WSEL:        1922.60
    STEP SIZE:              0.05
    BREADTH OF WEIR:       15.00
```

1

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  fountain hills north fds

    DATE:   7/ 3/1997
    TIME:  15: 7.59
*********************************************
```

POINT	ELEVATION	STATION
POINT	ELEVATION	STATION
1	1922.11	9635.00
2	1922.30	9662.00
3	1921.42	9662.10
4	1921.74	9706.90
5	1922.20	9707.00
6	1921.55	9731.90
7	1923.00	9732.00
8	1923.00	9824.00
9	1920.98	9824.10
10	1920.76	9849.00
11	1920.80	9889.00
12	1920.30	9890.00
13	1920.10	9930.00
14	1920.00	9946.00
15	1919.86	9980.00
16	1920.50	10000.00
17	1922.00	10046.00
18	1924.00	10070.90
19	1924.50	10071.00
20	1926.50	10091.00

1

****
WEIR COEFFICIENT TABLE
PROJECT: fountain hills north fds

DATE: 7/ 3/1997
TIME: 15: 7.59
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6800
2	0.20	2.6800
3	0.40	2.7000
4	0.60	2.7000
5	0.80	2.6400
6	1.00	2.6300
7	2.00	2.6300
8	5.50	2.6300

1

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  fountain hills north fds

    DATE:   7/ 3/1997
    TIME:  15: 7.59
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
1919.90	0.09	1920.65	127.42
1919.95	0.72	1920.70	144.13
1920.00	2.16	1920.75	161.75
1920.05	4.58	1920.80	180.70
1920.10	8.03	1920.85	201.58
1920.15	12.59	1920.90	224.44
1920.20	18.43	1920.95	249.04
1920.25	25.64	1921.00	275.46
1920.30	34.35	1921.05	303.95
1920.35	44.49	1921.10	333.98
1920.40	55.83	1921.15	365.44
1920.45	68.30	1921.20	398.27
1920.50	81.80	1921.25	432.53
1920.55	96.22	1921.30	468.06
1920.60	111.42	1921.35	504.83

1

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  fountain hills north fds

    DATE:   7/ 3/1997
    TIME:  15: 7.59
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
1921.40	542.71	1922.15	1305.31

1921.45	581.61		1922.20	1370.16
1921.50	621.73		1922.25	1436.74
1921.55	663.24 ≈ 660 cfs		1922.30	1505.36
1921.60	706.49		1922.35	1575.83
1921.65	751.68	1922.37 ≈ 1600	1922.40	1648.17
1921.70	798.89		1922.45	1722.40
1921.75	848.02		1922.50	1798.12
1921.80	899.09		1922.55	1875.28
1921.85	952.03			
1921.90	1006.74			
1921.95	1063.17			
1922.00	1121.26			
1922.05	1180.71			
1922.10	1242.19			

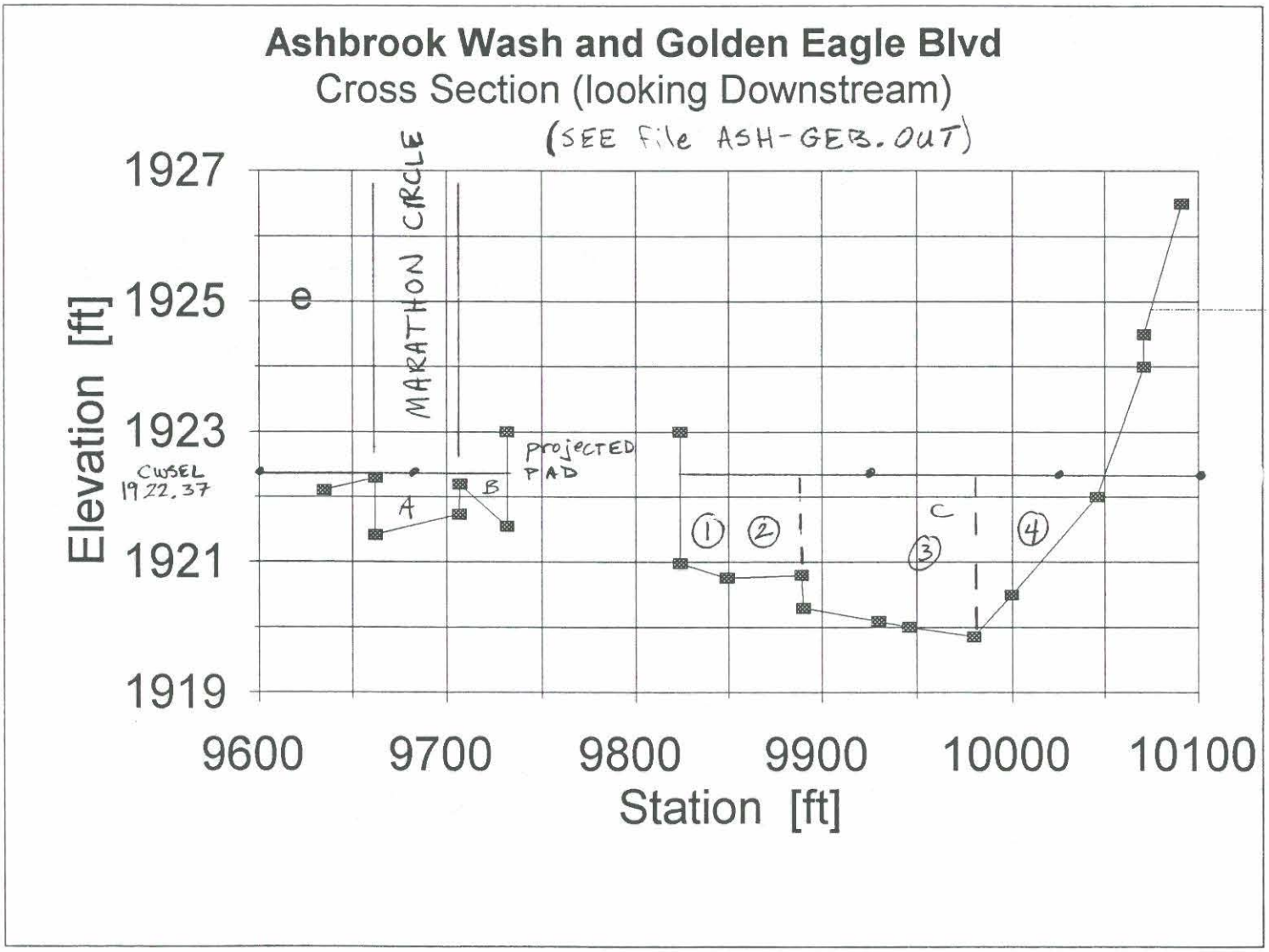
1

CONCLUSION

See sheet 5 of 5. The overtopping water surface elevation of 1922.37 (per sheet 3 of 3) is drawn on the weir profile to determine the actual flow down Marathon Circle.

CONCLUSION

APPROXIMATELY 1,360 cfs would Return to ASHBROOK WASH AFTER OVERTOPPING GOLDEN EAGLE BLVD, AND ABOUT 240 cfs would flow DOWN MARATHON CIRCLE. TOTAL OVERTOPPING = 1360 + 240 = 1600 c



TOTAL Q = 1600 cfs $Q = VA$ $V = \frac{Q}{A}$

$$\text{Velocity} = \frac{Q_{TOT}}{\text{Area}_{TOT}} = \frac{1600 \text{ cfs}}{322.16 \text{ ft}^2} = 4.97 \frac{\text{ft}}{\text{s}}$$

Flow Down MARATHON CIRCLE

$$(V)(A_A + A_B) = (4.97)(35.55 \text{ ft}^2 + 12.03 \text{ ft}^2)$$

$Q_{A+B} = 236.5 \rightarrow$ **240 cfs** ←

AREA A = $45' \times \frac{0.63 + 0.95}{2} = 35.55 \text{ ft}^2$

AREA B = $24.3' \times \frac{0.82 + 0.17}{2} = 12.03 \text{ ft}^2$

AREA C1 = $19.1' \times \frac{1.39 + 1.61}{2} = 28.65 \text{ ft}^2$

C2 = $29.8' \times \frac{1.57 + 1.61}{2} = 47.38 \text{ ft}^2$

C3 = $59.3' \times \frac{2.07 + 2.51}{2} = 135.80 \text{ ft}^2$

C4 = $50.0' \times \frac{1}{2} \times 2.51 = 62.75$

TOTAL AREA ——— 322.16 ft²

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title FOUNTAIN HILLS NORTH FDS Project No. 5552 Date 7-2-97
Subject ZONE A (MARATHON CIRCLE) ASHBROOK WASH Designed LHV Page 1/2

THE FLOW DOWN MARATHON CIRCLE IS CALCULATED TO BE 240 CFS.

THE FOLLOWING TWO CROSS-SECTIONS WERE USED ALONG MARATHON CIRCLE TO DETERMINE DEPTH OF FLOW AND TOP WIDTH TO SET ZONE A BOUNDARIES.

UPPER Marathon Circle

STA	ELEV	
90.0	1930.50	Top wall
89.9	1920.50	wall base
70	1916.35	S/W
61.5	1916.35	T/C
59	1916.02	G
31	1915.93	G
28.5	1916.26	T/C
20	1916.26	S/W
0.1	1923.	wall base
0	1933.	Top wall

(Looking D/S)
5% Slope per Constr. Dwgs

See Mar-CIR 1.OUT

Lower Marathon Circle

STA	ELEV	
0 (pad 6)	1926	> vertical * projection
0.1	1916	
20	1911.40	
28	1911.40	
30.5	1911.07	
60.1	1911.47	
62.5	1911.20	
71.5	1911.80	
91.4	1911.5	> vertical * projection
91.5	1921.5	

(Looking D/S)
2% Slope per Constr. Dwgs
Assume PAD ELEV @ STA 0+00 because pad elev was not on the drawing set we had.

See MAP photocopy page 2/2

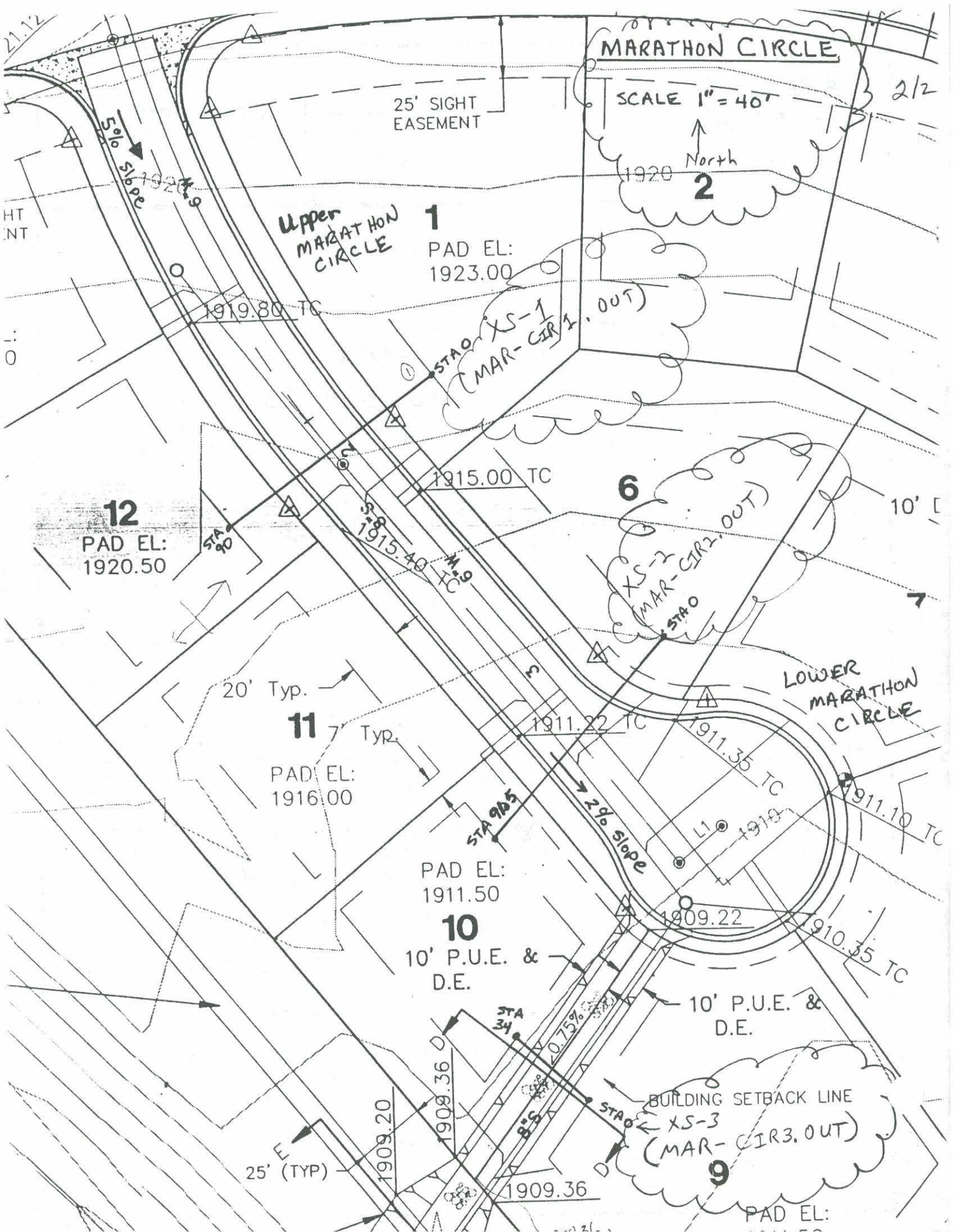
Note: Computed WATER Surface Elevation from MAR-CIR2.OUT is 1911.94 Ft which shows That the Assumed PAD ELEV. on Lower Marathon Circle is Reasonable.

DRAINAGE PATH
MARATHON CIRCLE TO ASHBROOK WASH

STA	ELEV
1921.5	0
1911.5	0.1
1909.77	7
1908.77	10
1908.77	24
1909.77	27
1911.5	33.9
1921.5	34

* Vertical projection represents a flow boundary restraint due to an imposing structure.

LOOKING D/S
RIP RAP LINED D_{50} 'n' = 0.030 per Greiner, Inc.
Slope = 0.75%


MARATHON CIRCLE
SCALE 1" = 40'
North
25' SIGHT EASEMENT
5% Slope
Upper MARATHON CIRCLE
1
PAD EL: 1923.00
1919.80 TC
STA 0
XS-1 (MAR-CIR 1, OUT)
2
1920
1915.00 TC
6
XS-2 (MAR-CIR 2, OUT)
12
PAD EL: 1920.50
STA 90
1915.40 TC
7
10' D
20' Typ.
11
7' Typ.
PAD EL: 1916.00
LOWER MARATHON CIRCLE
1911.22 TC
1911.35 TC
STA 90.5
2% Slope
L1
1911.10 TC
PAD EL: 1911.50
10
10' P.U.E. & D.E.
1909.22
910.35 TC
STA 34
0.75%
10' P.U.E. & D.E.
1909.36
1909.20
BUILDING SETBACK LINE
XS-3 (MAR-CIR 3, OUT)
STA 0
B.S.
25' (TYP)
9
1909.36
PAD EL:

arathon Circe near Ashbrook Wash and Golden Eagle Blvd. 07/02/97

5% slope near outlet to Golden Eagle Blvd.

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	5.0000	%
	Flow Rate:	240.0000	cfs
Calculated	Elev. of Flow:	1916.5500	ft

Calculated Quantities

Area Of Flow:	22.6252	sf
Wetted Perimeter:	51.9411	ft
Hydraulic Radius:	0.4356	ft
Velocity:	10.6076	ft/s
Critical Slope:	0.5041	%
Top Width:	51.8287	ft
Froude Number:	2.8293	
Critical Depth::	1.0627	ft
Depth of Flow:	0.6217	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1933.0000
2	0.1000	1923.0000
3	20.0000	1916.2600
4	28.5000	1916.2600
5	31.0000	1915.9300
6	59.0000	1916.0200
7	61.5000	1916.3500
8	70.0000	1916.3500
9	89.9000	1920.5000
10	90.0000	1930.5000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

Marathon Circe near Ashbrook Wash and Golden Eagle Blvd 07/02/97

2% slope at entrance to the circle.

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	2.0000	%
	Flow Rate:	240.0000	cfs
Calculated	Elev. of Flow:	1911.9400	ft

Calculated Quantities

Area Of Flow:	34.3674	sf
Wetted Perimeter:	74.2912	ft
Hydraulic Radius:	0.4626	ft
Velocity:	6.9834	ft/s
Critical Slope:	0.5438	%
Top Width:	73.7439	ft
Froude Number:	1.8027	
Critical Depth::	1.0966	ft
Depth of Flow:	0.8708	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1926.0000
2	0.1000	1916.0000
3	20.0000	1911.4000
4	28.0000	1911.4000
5	30.5000	1911.0700
6	60.1000	1911.4700
7	62.5000	1911.8000
8	71.5000	1911.8000
9	91.4000	1911.5000
10	91.5000	1921.5000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

arathon Circle near Ashbrook Wash and Golden Eagle Blvd 07/02/97

Drainage Channel from Marathon Circle to Ashbrook Wash.

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0300	
	Channel Slope:	0.7500	%
	Flow Rate:	240.0000	cfs
Calculated	Elev. of Flow:	1910.8500	ft

Calculated Quantities

Area Of Flow:	43.1144	sf
Wetted Perimeter:	29.1666	ft
Hydraulic Radius:	1.4782	ft
Velocity:	5.5666	ft/s
Critical Slope:	1.2152	%
Top Width:	28.5766	ft
Froude Number:	0.7986	
Critical Depth::	1.8256	ft
Depth of Flow:	2.0752	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1921.5000
2	0.1000	1911.5000
3	7.0000	1909.7700
4	10.0000	1908.7700
5	24.0000	1908.7700
6	27.0000	1909.7700
7	33.9000	1911.5000
8	34.0000	1921.5000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

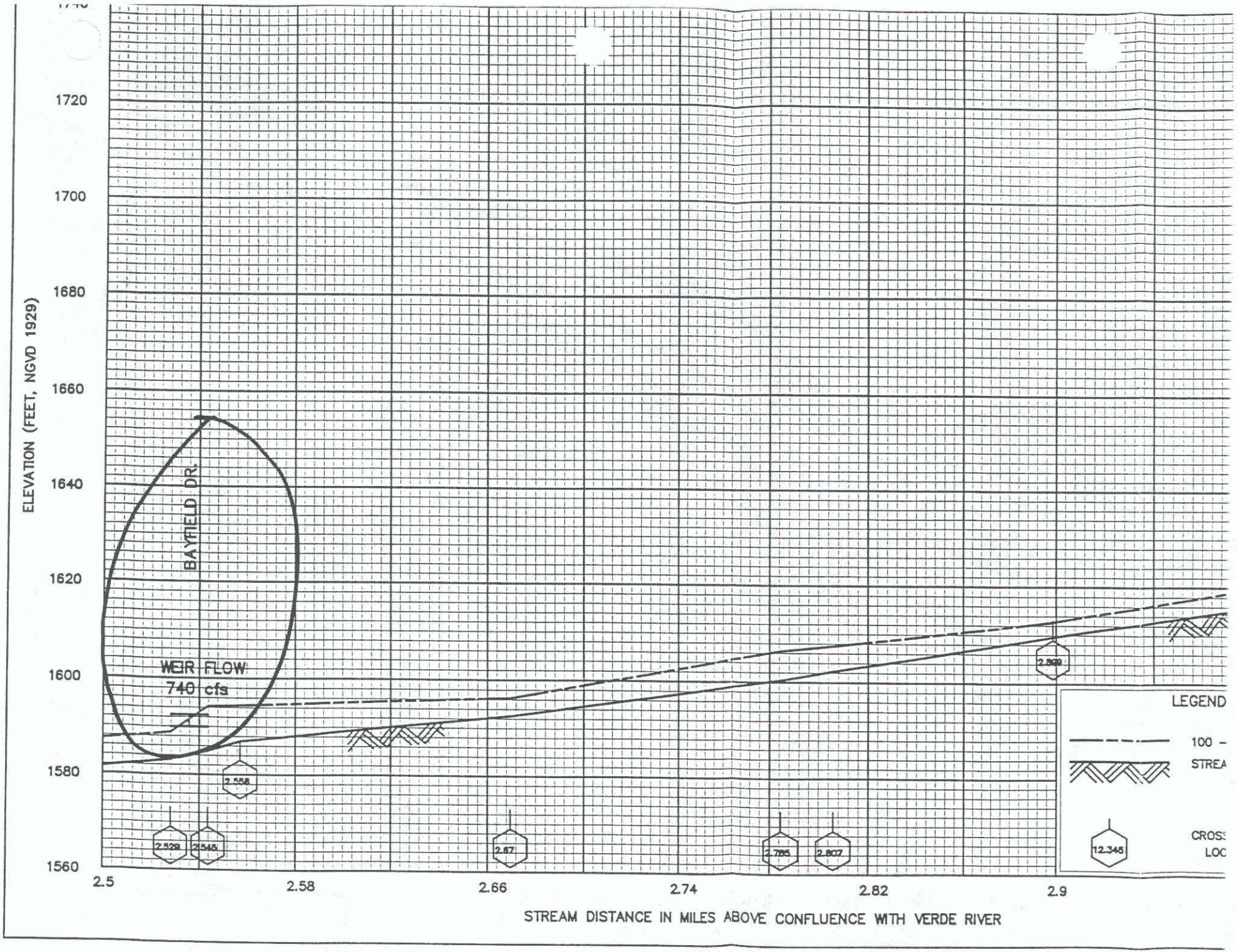
Reference:

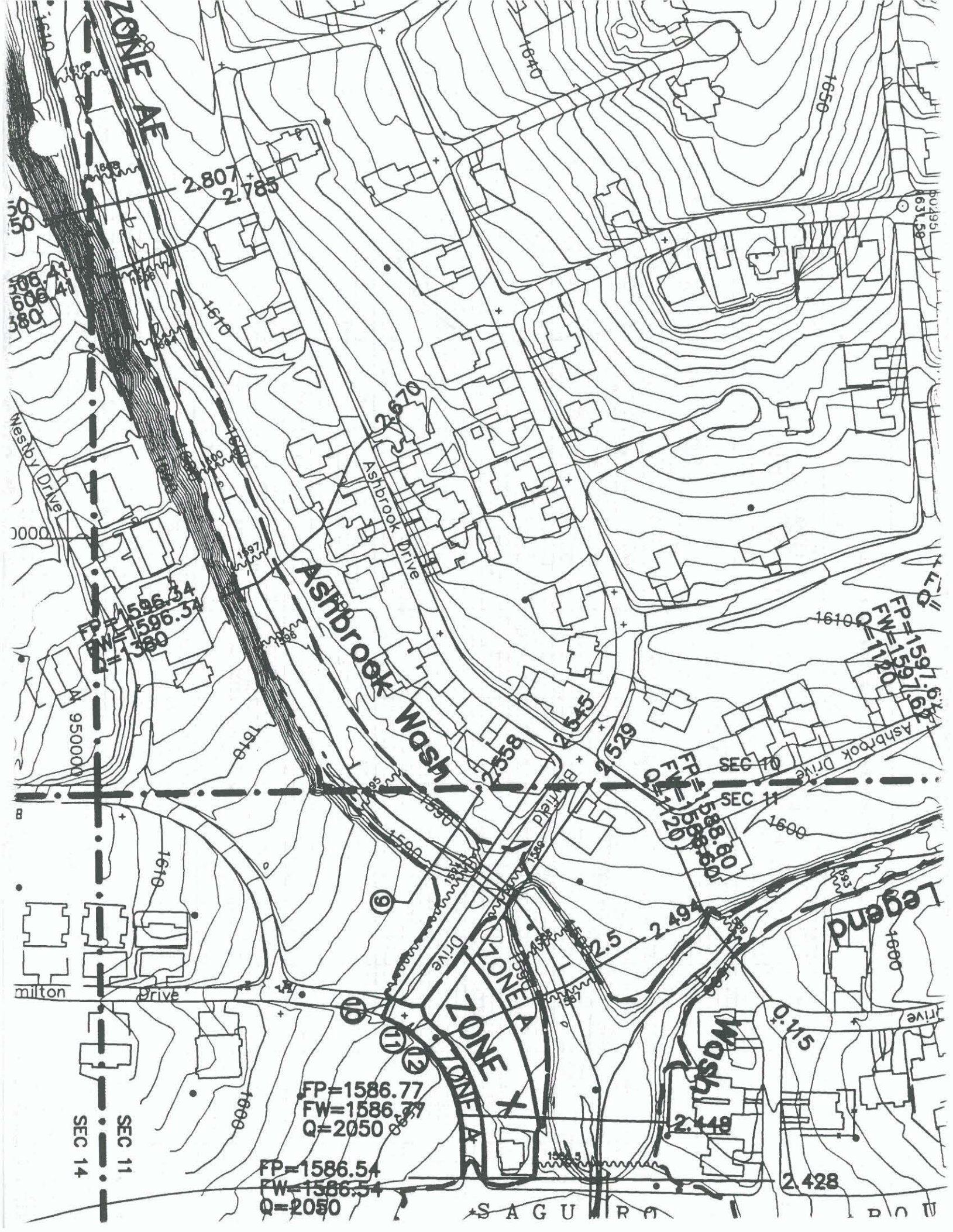
Grenier Inc., Fountain Hills Final Plat #516 : Grading Plans. Drawings sealed 7/21/95.

Grenier Inc., Fountain Hills Final Plat #516 : Paving Plans. Drawings sealed 7/21/95.

Grenier Inc., Fountain Hills - Plat #516 : Drainage Report. Report sealed 4/27/95.

Ashbrook Wash at Bayfield Drive


ELEVATION (FEET, NGVD 1929)
1720
1700
1680
1660
1640
1620
1600
1580
1560
BAYFIELD DR.
WEIR FLOW
740 cfs
2.558
2.529
2.545
2.67
2.785
2.807
2.909
LEGEND
100 -
STREA
12.348
CROSS
LOC
2.5
2.58
2.66
2.74
2.82
2.9
STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER


ZONE AE
2.807
2.785
2.670
Ashbrook Wash
Ashbrook Drive
Westby Drive
FP=1596.34
FW=1596.34
Q=1380
FP=1597.62
FW=1597.62
Q=1120
2.545
2.529
2.558
SEC 10
SEC 11
SEC 14
milton
Drive
ZONE A
ZONE A
ZONE A
FP=1586.77
FW=1586.77
Q=2050
FP=1586.54
FW=1586.54
Q=2050
2.5
2.494
2.449
2.428
0.115
Legend
SAGUARO

STA	ELEV
T.P.	1591.01

PROFILE UPSTREAM SIDE @ TOP OF CURB @ ~~NORTH SIDE~~ BAYFIELD

1+93	9807	1597.65
1+50	9850	1595.94
1+00	9900	1594.26
+50	9950 (1597. 99655)	1593.22
+28.5	9971.5	1592.38
~~+24~~	9976 Downstream side curb opening (9977.5 1592)	1591.90
0+00	10,000	1592.38
+50	10,050	1592.17
1+00	10,100	1591.92
+50	10,150	1591.69
2+00	10,200	1591.72
from 2' topo map (sheet 9)	10,250	1591.90
	10,285	1591.22
	10,310	1592.0
	10,315	1592.9
	10,319	1593.4

REFERENCE : TDN, Appendix B - Book 2
Fantain Hills North FDS

TOP BOLT AT INTERSECTION OF HAMILTON LN & BAYFIELD LN AS NOTED IN PAGE 14 OF LEVEL BOOK

TOP OF CURB

@ 11' CURB OPEN @ ~~NORTH SIDE~~ UPSTREAM
~~SOUTH SIDE~~ DOWNSTREAM

TOP OF CURB UPSTREAM SIDE

SEE ASH-BAY2.OUT

pages 48 & 49 of Hydraulics
April 1995.

7/1

BAYFIELD DR. & ASHBROOK WASH

3 - 60" x 84' CMP

85.07
42
INV.

84.72
42
INV

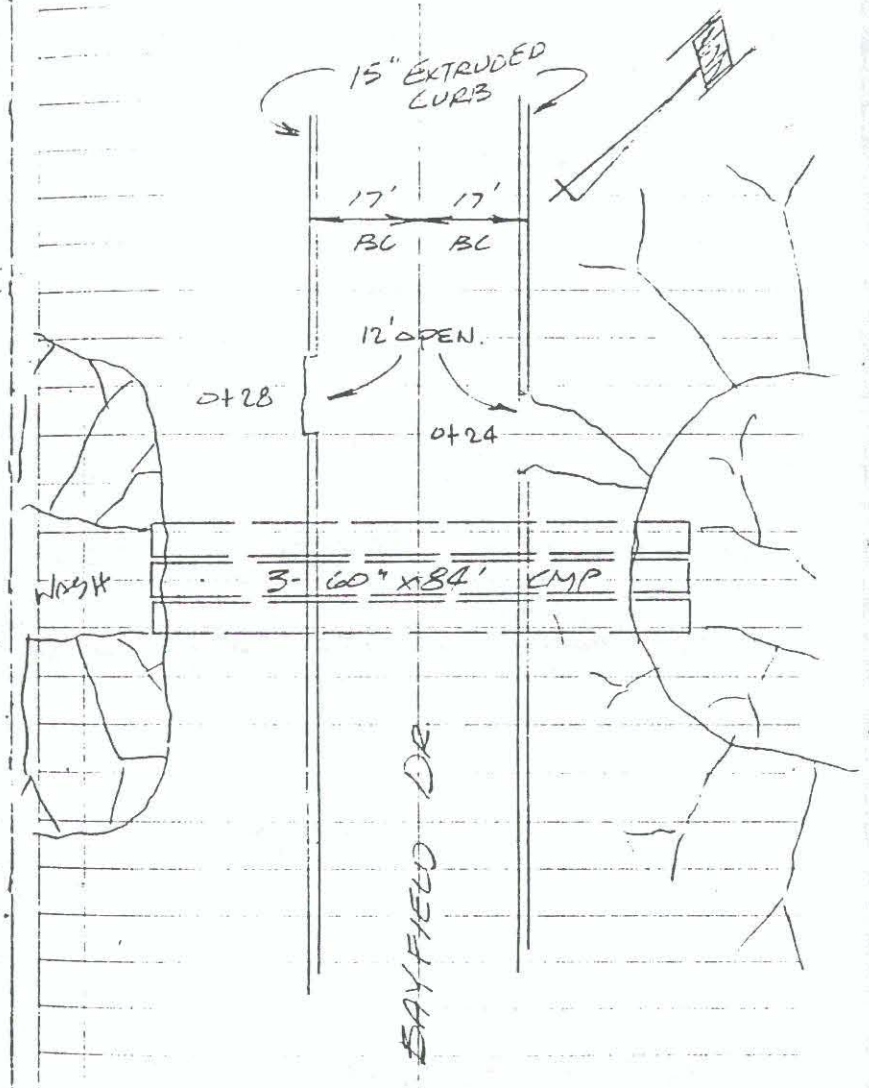
84.98	92.0	92.39	92.11	92.06	91.2	84.71
42	34	17	0	17	34	42
INV		T/C	P	T/C		INV.

85.17
42
INV

84.77
42
INV

85.1
45
WASH

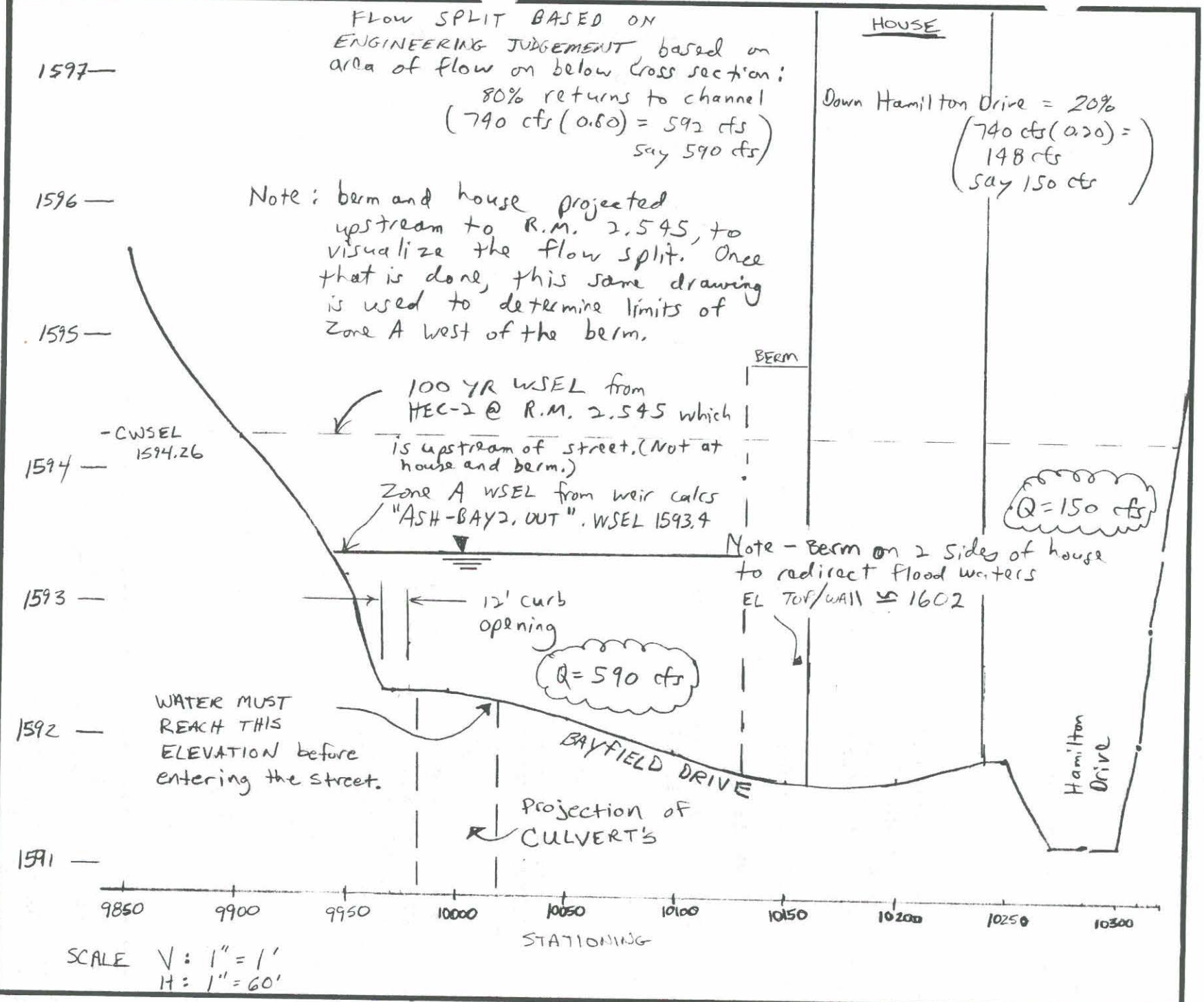
83.3
45
WASH



McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills North FDS Project No. 55552 Date 7-1

Subject Ashbrook & Bayfield Designed _____ Page 1 of 1



1/3

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  fountain hills north fds

    ENGINEER: WEIR PROFILE OF BAYFIELDS DRIVE, with berm superimposed.

    DATE:    7/ 2/1997
    TIME:    8:12.13
```

Note: the berm is substantial, meaning it has a wide top width and wider bottom (base) width.

```
-----------------------------------------------
    INPUT PARAMETERS
-----------------------------------------------

    STARTING WSEL:       1591.80
    MAXIMUM WSEL:        1594.10
    STEP SIZE:             0.10
    BREADTH OF WEIR:      32.00
```

1

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  fountain hills north fds

    DATE:    7/ 2/1997
    TIME:    8:12.13
*********************************************
```

2/3

CROSS-SECTION
Based on proceeding survey notes. with Berm superimposed on cross section

POINT	ELEVATION	STATION
1	1597.65	9807.00
2	1595.94	9850.00
3	1594.26	9900.00
4	1593.22	9950.00
5	1592.71	9965.50
6	1592.38	9965.60
7	1592.38	9971.50
8	1592.38	9977.40
9	1592.71	9977.50
10	1592.38	10000.00
11	1592.17	10050.00
12	1591.92	10100.00
13	1591.80	10130.00
14	1594.80	10130.10
15	1594.80	10160.00

1

****
WEIR COEFFICIENT TABLE
PROJECT: fountain hills north fds

DATE: 7/ 2/1997
TIME: 8:12.13
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6800
2	0.20	2.6800
3	0.40	2.7000
4	0.60	2.7000
5	0.80	2.6400
6	1.00	2.6300
7	2.00	2.6300
8	5.50	2.6300

1

3/3

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  fountain hills north fds

    DATE:    7/ 2/1997
    TIME:    8:12.13
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
1591.80	0.00	1593.30	533.94
1591.90	0.85	1593.40	608.12
1592.00	4.70	1593.50	686.75
1592.10	12.48	1593.60	769.66
1592.20	24.98	1593.70	856.72
1592.30	43.05	1593.80	948.15
1592.40	67.67	1593.90	1044.12
1592.50	99.51	1594.00	1144.53
1592.60	137.13		
1592.70	180.06		
1592.80	227.91		
1592.90	280.66		
1593.00	337.57		
1593.10	398.59		
1593.20	464.25		

< 1593.38 590 cfs >

1

CONCLUSION

The 590 cfs would be at about WSEL 1593.40 next to Bayfield Drive.

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills North Project No. 92.404.001 Date 6-27-97

Subject Zone A Boundaries Ashbrook Wash Designed LAN Page 1/1

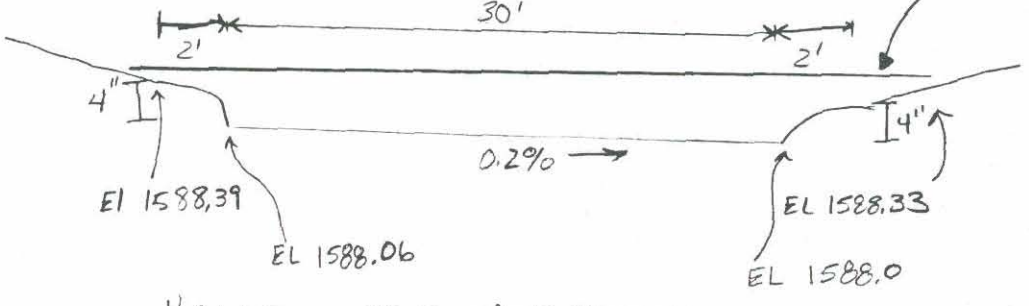
The Zone A exists as an extension of the over flow from Bayfield Dr. and Ashbrook Wash where water overflows onto Hamilton Drive and then flows over to Saguaro Boulevard.

$Q = 152$ cfs

Right edge - Assume 4" rolled curb
Left edge - Assume 4" rolled curb
roadway pavement - 34 ft contouring
Slope = 0.01714 FT/FT

Assume $n = 0.018$ (Asphalt); [CHOW = Asphalt = 0.016]
Contour map shows a slight crown from left to right. assume 0.2%

Computed WSEL From CALC's 1588.62



N.T.S.

HAMILTON DRIVE CROSS SECTION.
See Floodplain Map photocopy for location

Note - IN THE TIME SINCE THE FLOOD DELINEATION STUDY WAS COMPLETED PHOTO RECONNAISSANCE SHOWS THAT HOUSES WERE CONSTRUCTED ON BOTH SIDES OF HAMILTON DRIVE BETWEEN BAYFIELD AND SAGUARO. THIS WILL BE ADJUSTED FOR IN THE FOLLOWING CALCULATIONS

THE UPSTREAM EDGE OF ROAD CREATES A WEIR ALONG BAYFIELD DRIVE WHICH MUST BE OVERTOPPED BEFORE FLOW CAN CONTINUE DOWNSTREAM.

THE WEIR PROFILE IS COMPARED TO THE CALCULATED WATER SURFACE ELEVATION FOR THE OVERTOPPING FLOW OF 740CFS. ENGINEERING JUDGEMENT WAS USED TO DETERMINE THAT 20% OF FLOW WILL FLOW DOWN BAYFIELD DRIVE TO HAMILTON DRIVE THEN CONTINUE ON TO SAGUARO BLVD.

$(740 \text{ cfs})(0.2) = 148 \Rightarrow 150 \text{ cfs}$

THE PAD ELEVATIONS OF THE HOUSES FRONTING HAMILTON DR. ARE UNKNOWN, THEREFORE THESE CALCULATIONS ASSUME AN ELEVATION OF 2' ABOVE NATURAL GROUND

ASH-BAY4.OUT
(Hamilton Drive flow)

Ashbrook Wash and Bayfield Drive 07/02/97

Zone A Flow is down Hamilton Drive.

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0171	ft/ft
	Flow Rate:	150.0000	cfs
Calculated	Elev. of Flow:	1588.6200	ft

Calculated Quantities

Area Of Flow:	21.1176	sf
Wetted Perimeter:	39.5675	ft
Hydraulic Radius:	0.5337	ft
Velocity:	7.1031	ft/s
Critical Slope:	0.5303	%
Top Width:	39.4918	ft
Froude Number:	1.7118	
Critical Depth::	0.8652	ft
Depth of Flow:	0.6211	ft

Ground Shot Information

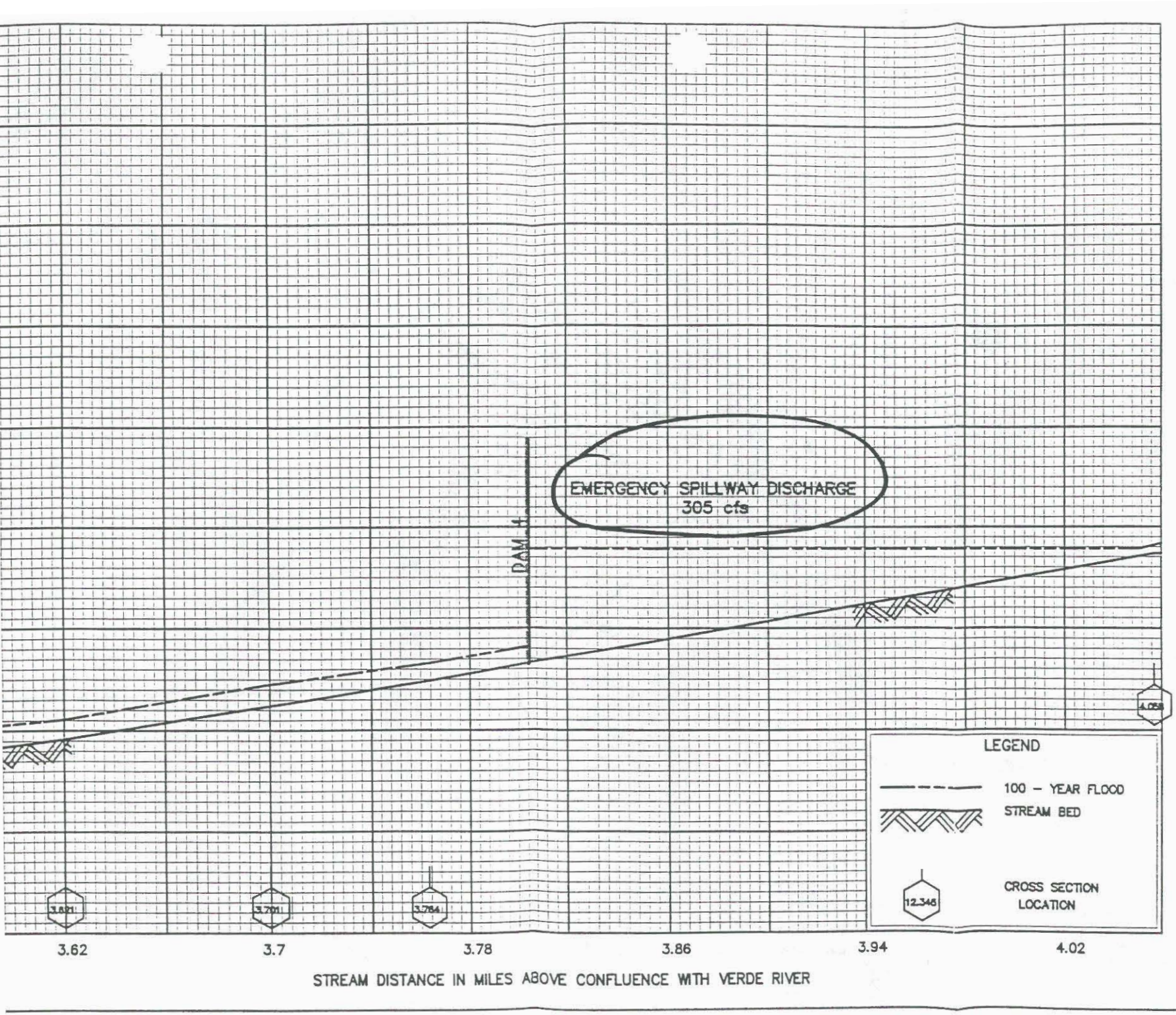
Num	Offset	Elevation
1	0.0000	1601.0000
2	0.1000	1591.0000
3	10.0000	1589.3000
4	20.0000	1588.3900
5	22.5000	1588.0600
6	30.0000	1588.0000
7	52.5000	1588.0000
8	55.0000	1588.3300
9	72.9000	1591.0000
10	73.0000	1601.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION

THE FLOW WIDTH IS APPROXIMATELY 40 ft, as shown on the ZONE A MAPPING WHICH RANGES FROM BETWEEN 40 AND 55 FT.

Ashbrook Wash at Dam #4 (Emergency Spillway)

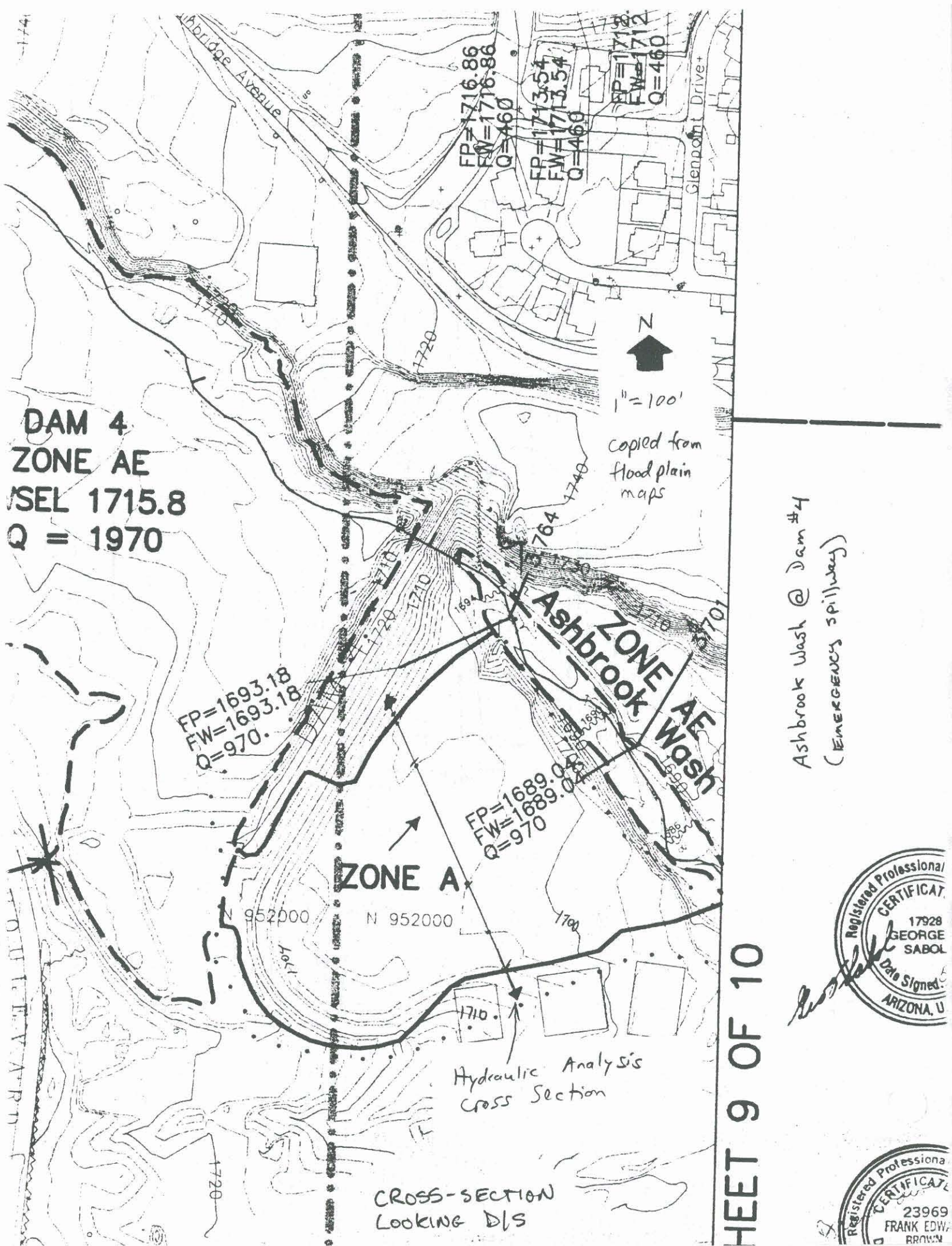


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: V:\FOUNTAIN HILLS\MAYAS PROJ.dwg (sheet 5 of 9)
Date: PLOTTED: 19 SEP 1991 10:47am


Bridge Avenue
Glenpoint Drive
FP=1716.86
FW=1716.86
Q=460
FP=1713.54
FW=1713.54
Q=460
FP=1711
FW=1711
Q=460
N
1"=100'
copied from flood plain maps
DAM 4
ZONE AE
WSEL 1715.8
Q = 1970
ZONE AE
Ashbrook Wash
FP=1693.18
FW=1693.18
Q=970.
FP=1689.04
FW=1689.04
Q=970
ZONE A
N 952000
N 952000
1710
Hydraulic Analysis cross Section
CROSS-SECTION LOOKING D/S
Ashbrook Wash @ Dam #4
(EMERGENCY spillway)
Registered Professional
CERTIFICAT
17928
GEORGE
SABOL
Date Signed
ARIZONA, U
Registered Professiona
CERTIFICAT
23969
FRANK EDW
BROWN

SHEET 9 OF 10

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills North FDS Project No. 92.404.001 Date 6-27-97

Subject Zone A @ DAM 4 EMERGENCY SPILLWAY Designed LAN Page 1/2

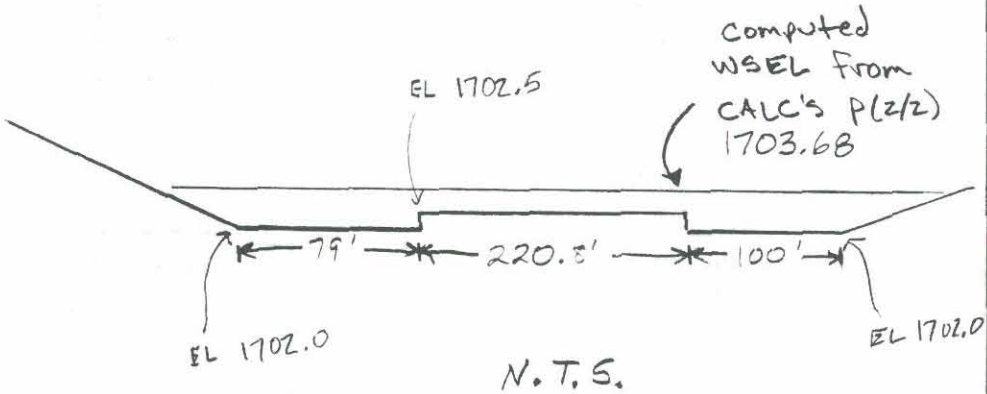
ASHBROOK WASH Approximate River mile 3.7

Flow 305 CFS

Assume 6" curb around Football Field
Channel slope = 0.00678 from topo. map.
Approximate "n" value = grass (mowed) = 0.035, Smooth dirt 0.025 ∴ use 0.030

CROSS-Section

STA	Elev
0	1706
12	1704
30	1702
109	1702
109.1	1702.5
329.9	1702.5
330	1702
430	1702
505	1704
545	1706



N.T.S.

Hydraulic Analysis Cross Section.

see previous sheet for location

2/2

Fountain Hills North FDS 06/27/97

Ashbrook Wash at emergency spillway, Dam #4

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0300	
	Channel Slope:	0.0068	%
	Flow Rate:	305.0000	cfs
Calculated	Elev. of Flow:	1703.6800	ft

Calculated Quantities

Area Of Flow:	625.7160	sf
Wetted Perimeter:	478.9140	ft
Hydraulic Radius:	1.3065	ft
Velocity:	0.4874	ft/s
Critical Slope:	1.7655	%
Top Width:	477.9780	ft
Froude Number:	0.0751	
Critical Depth::	0.4397	ft
Depth of Flow:	1.6770	ft

Ground Shot Information

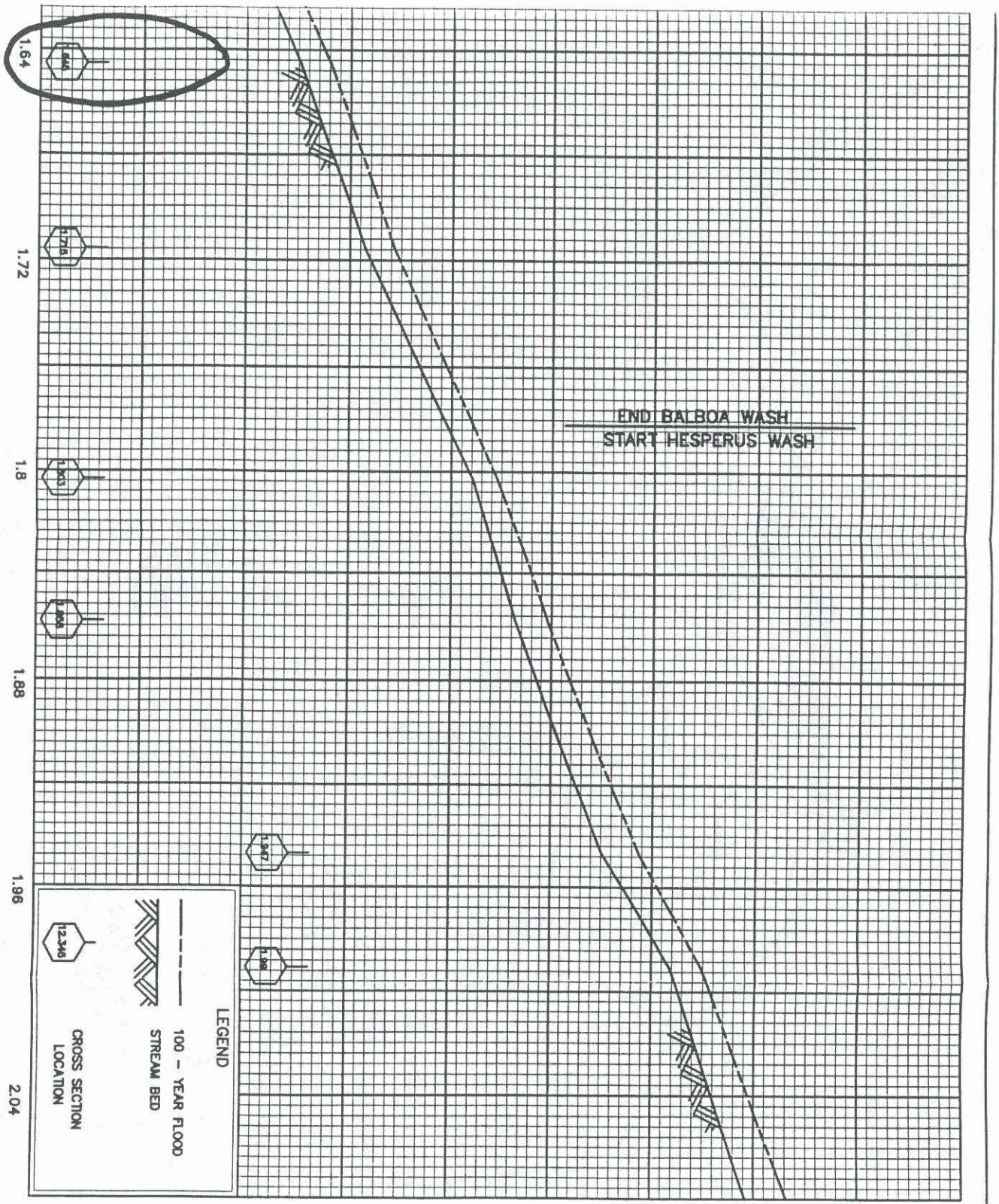
Num	Offset	Elevation
1	0.0000	1706.0000
2	12.0000	1704.0000
3	30.0000	1702.0000
4	109.0000	1702.0000
5	109.1000	1702.5000
6	329.9000	1702.5000
7	330.0000	1702.0000
8	430.0000	1702.0000
9	505.0000	1704.0000
10	545.0000	1706.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION

THE FLOW WILL OVERTOP THE TRACK AND SUBMERGE THE FOOTBALL FIELD TO A DEPTH OF 1.18 ft., total top width 400 to 600 ft, total flow depth 1.67 ft.

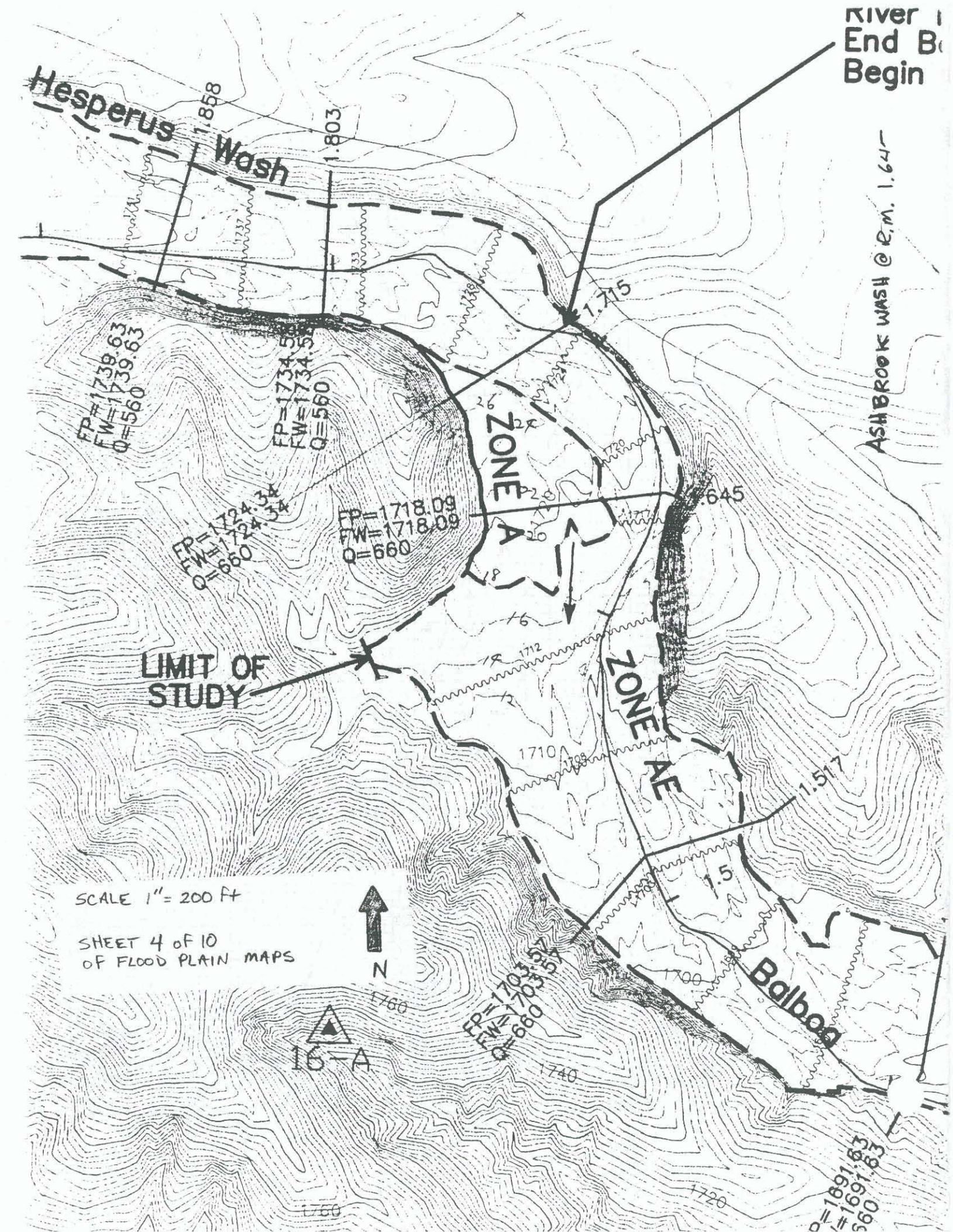
Balboa Wash (River Mile 1.645)



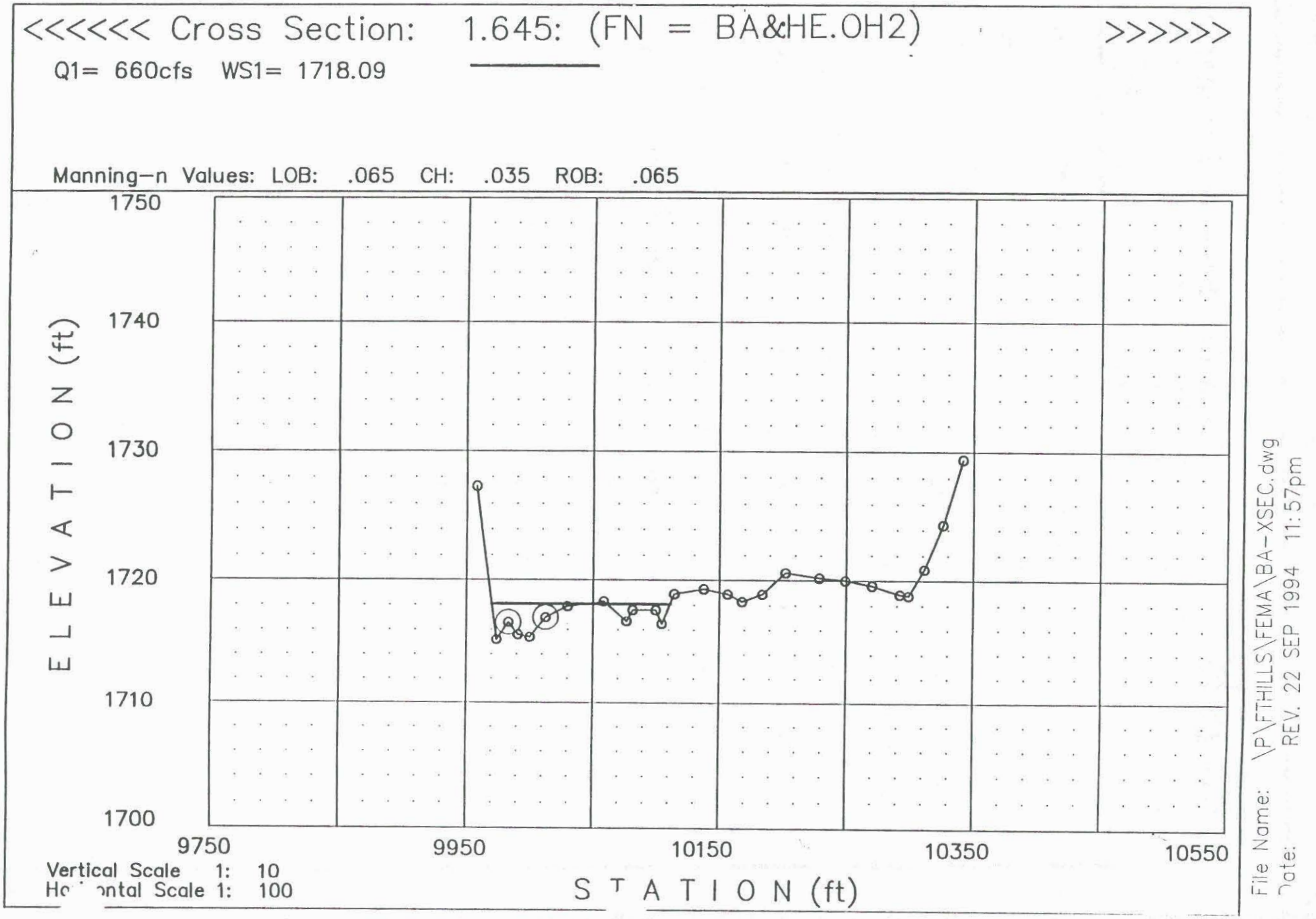
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD PROFILES

BALBOA / HESPERUS WASH


Hesperus Wash
1.858
1.803
1.715
1.645
1.517
1.5
River End B
Begin
ASH BROOK WASH @ P.M. 1.64
FP=1739.63
FW=1739.63
Q=560
FP=1734.5
FW=1734.5
Q=560
FP=1724.34
FW=1724.34
Q=660
FP=1718.09
FW=1718.09
Q=660
ZONE A
ZONE AE
LIMIT OF STUDY
Balboa
1710
1700
1740
1760
1720
SCALE 1" = 200 Ft
SHEET 4 of 10
OF FLOOD PLAIN MAPS
N
16-A

2/2


<<<<<< Cross Section: 1.645: (FN = BA&HE.OH2) >>>>>>
Q1= 660cfs WS1= 1718.09
Manning-n Values: LOB: .065 CH: .035 ROB: .065
1750
1740
1730
1720
1710
1700
ELEVATION (ft)
9750
9950
10150
10350
10550
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

BALBOA WASH (R.M. 1.645) CWSEL: 1718.10

Determination of Freeboard Restraining wash From Flooding ZONE A.

ELEV: 1719.3 STA: 10137.4

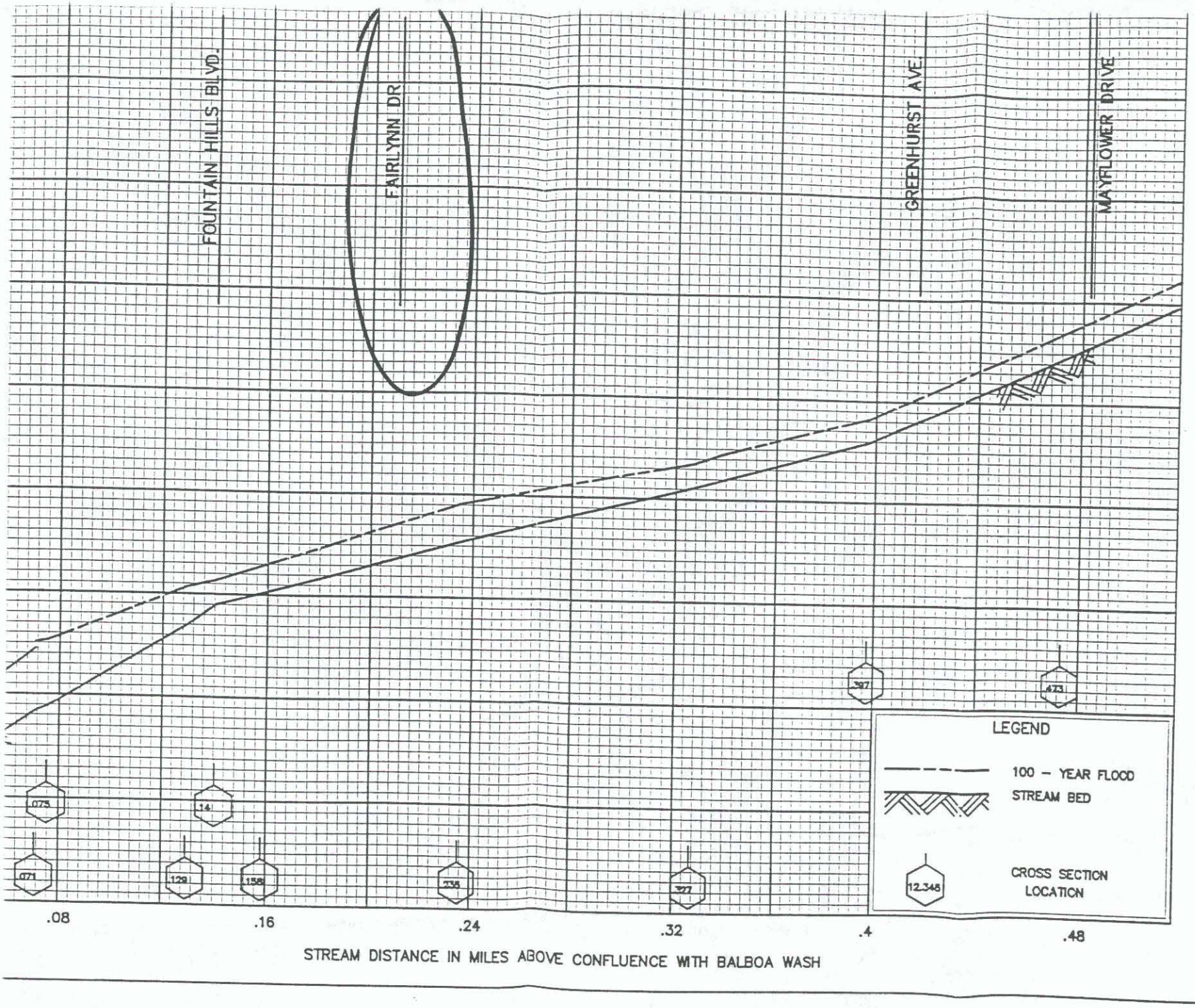
Freeboard = 1.20 ft

The Terrain then dips to a low elevation of 1718.3 @ STA 10167.8

Then there is a rise to an elevation of 1720.9 @ STA 10311.2

CONCLUSION see Section 4.5 Special Problem text for discussion of Zone A determination in this area.

Oxford Wash at Fairlynn Drive

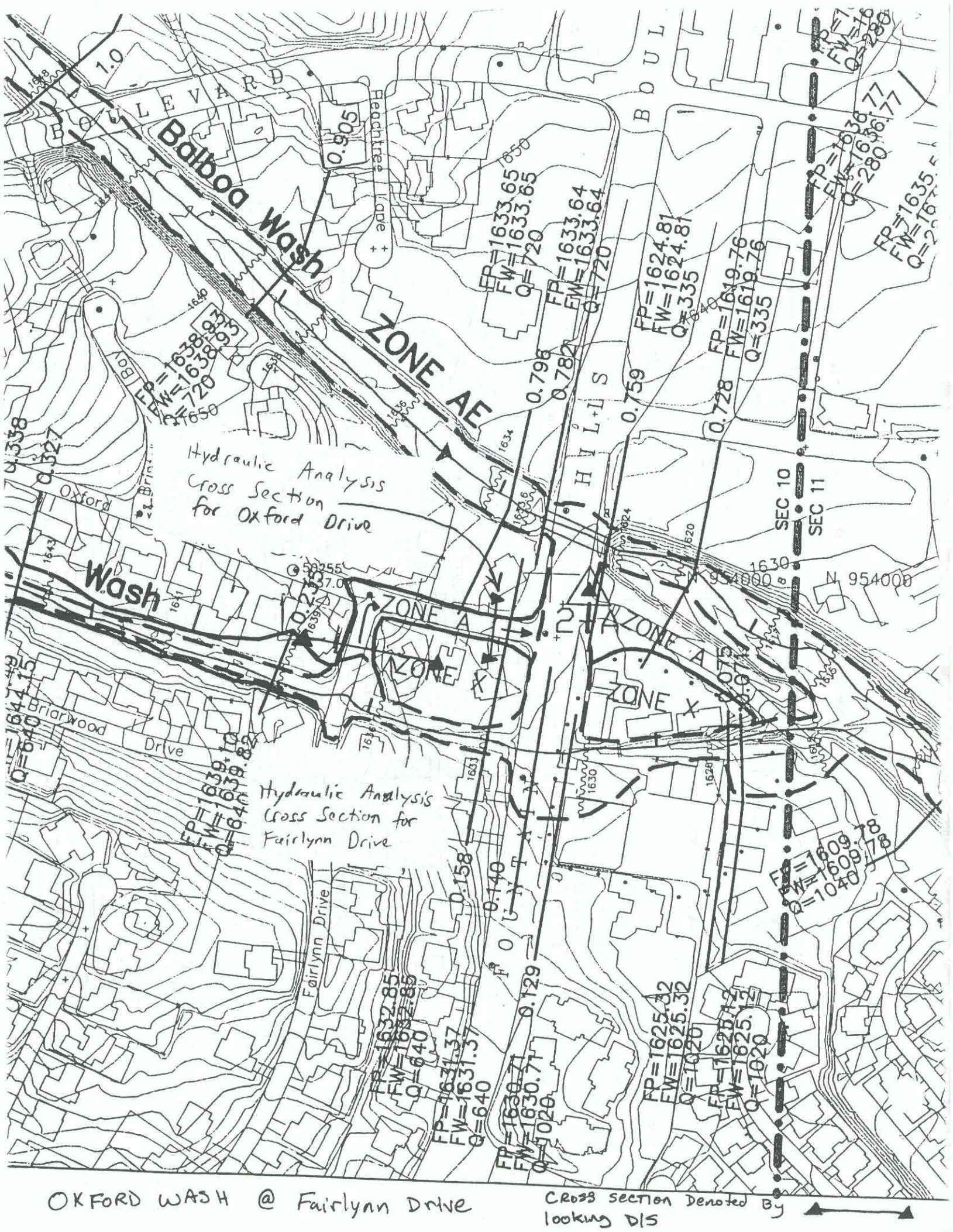


FLOOD PROFILES

OXFORD WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \PVTHILLS\FMA\OX-PROF.dwg (sheet 1 of 2)
Date: REV. 28 OCT 1994 02:23pm


BOULEVARD
Balboa Wash
ZONE AE
Hydraulic Analysis Cross Section for Oxford Drive
Oxford
Wash
ZONE A
ZONE X
Briarwood Drive
Hydraulic Analysis Cross Section for Fairlynn Drive
Fairlynn Drive
HILLS
SEC 10
SEC 11
N 954000
OKFORD WASH @ Fairlynn Drive
Cross section Denoted By
looking D/S

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title Fountain Hills North FDS Project No. 5552 Date 5-30-97
Subject ZONE A Boundaries (OXFORD WASH & Fairlynn Drive) Designed LAV Page 1/7

perform a weir profile Rating Curve on Fairlynn Drive between Oxfordwash and Oxford Drive

Determine Cross section STA & ELEV

STA	ELEV	
0	1648	> vertical projection*
0.1	1639.2	
10	1638	
18.5	1636	
20.5	1635.67	
50.5	1634.73	
52.5	1635.06	
60.4	1635.5	> vertical projection *
60.5	1646	

Right Edge : 4" rolled curb
Left Edge : 4" rolled curb
roadway pavement : 34'
slope :

See location of this cross section, shown on the preceeding map photocopy.

*the vertical projection represents a flow boundary restraint due to an imposing structure

On Fairlynn Drive, between Oxford Wash and Oxford Drive.

1

```
**********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
**********************************************

    PROJECT:

    ENGINEER:

    DATE:    6/28/1997
    TIME:   11:31. 6


-----------------------------------------------
    INPUT PARAMETERS
-----------------------------------------------

    STARTING WSEL:       1634.80
    MAXIMUM WSEL:        1637.00
    STEP SIZE:              0.10
    BREADTH OF WEIR:       15.00
```

1

```
**********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:

    DATE:    6/28/1997
    TIME:   11:31. 6
**********************************************
```

POINT	ELEVATION	STATION
1	1648.00	0.00
2	1639.20	0.10
3	1638.00	10.00
4	1636.00	18.50
5	1635.67	20.50
6	1634.73	50.50
7	1635.06	52.50
8	1635.50	60.40
9	1646.00	60.50

▒
1

****
WEIR COEFFICIENT TABLE
PROJECT:

DATE: 6/28/1997
TIME: 11:31. 6
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6800
2	0.20	2.6800
3	0.40	2.7000
4	0.60	2.7000
5	0.80	2.6400
6	1.00	2.6300
7	2.00	2.6300
8	5.50	2.6300

▒
1

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT:

DATE: 6/28/1997
TIME: 11:31. 6

****

ELEVATION	DISCHARGE (CFS)
1634.80	0.05
1634.90	0.49
1635.00	1.54
1635.10	3.39
1635.20	6.27
1635.30	10.38
1635.40	15.89
1635.50	22.95
1635.60	31.58
1635.70	41.76
1635.80	53.36
1635.90	65.61
1636.00	78.66
1636.10	93.16
1636.20	108.70
1636.30	125.33
1636.40	142.91
1636.50	161.36
1636.60	180.67
1636.70	200.83
1636.80	221.85
1636.90	243.69
1637.00	266.34

← = 100 yr WSEL in Fairlynn from profile (and also from floodplain map)

1

Note: this compares favorably with the other calculations based on area, which determined >66 cfs could flow down Fairlynn Drive. However, the momentum of the flow is along the wash, and not perpendicular to it, as is Fairlynn Drive. Based upon field investigations, inspection of the mapping, and engineering judgement, and recent past experience of street flow splits, it is assumed that 50% of the >66 cfs will actually turn the corner.

CONCLUSIONS: Approximately 133 cfs would actually flow down Oxford Drive.

Cross-section across Fairlynn Drive

CWSEL 1637.0 Ft.

Vertical extention at ℄ of Oxford DR STA 0+17

Low point at Oxford Dr. is 1634.75

Supplemental Calculation For Fairlynn Drive Flow.

Planimeter TOTAL AREA	AREA A
① 538.8 ft²	① 307.0 ft²
② 544.6 ft²	② 319.7
③ 534.9 ft²	③ 316.8
AVE 539.4 ft²	AVE 314.5

∴ Area B = 224.9 ft²

$Q = VA$

$V = \frac{Q}{A}$

$V = \frac{640 \text{ cfs}}{539.4 \text{ ft}^2}$

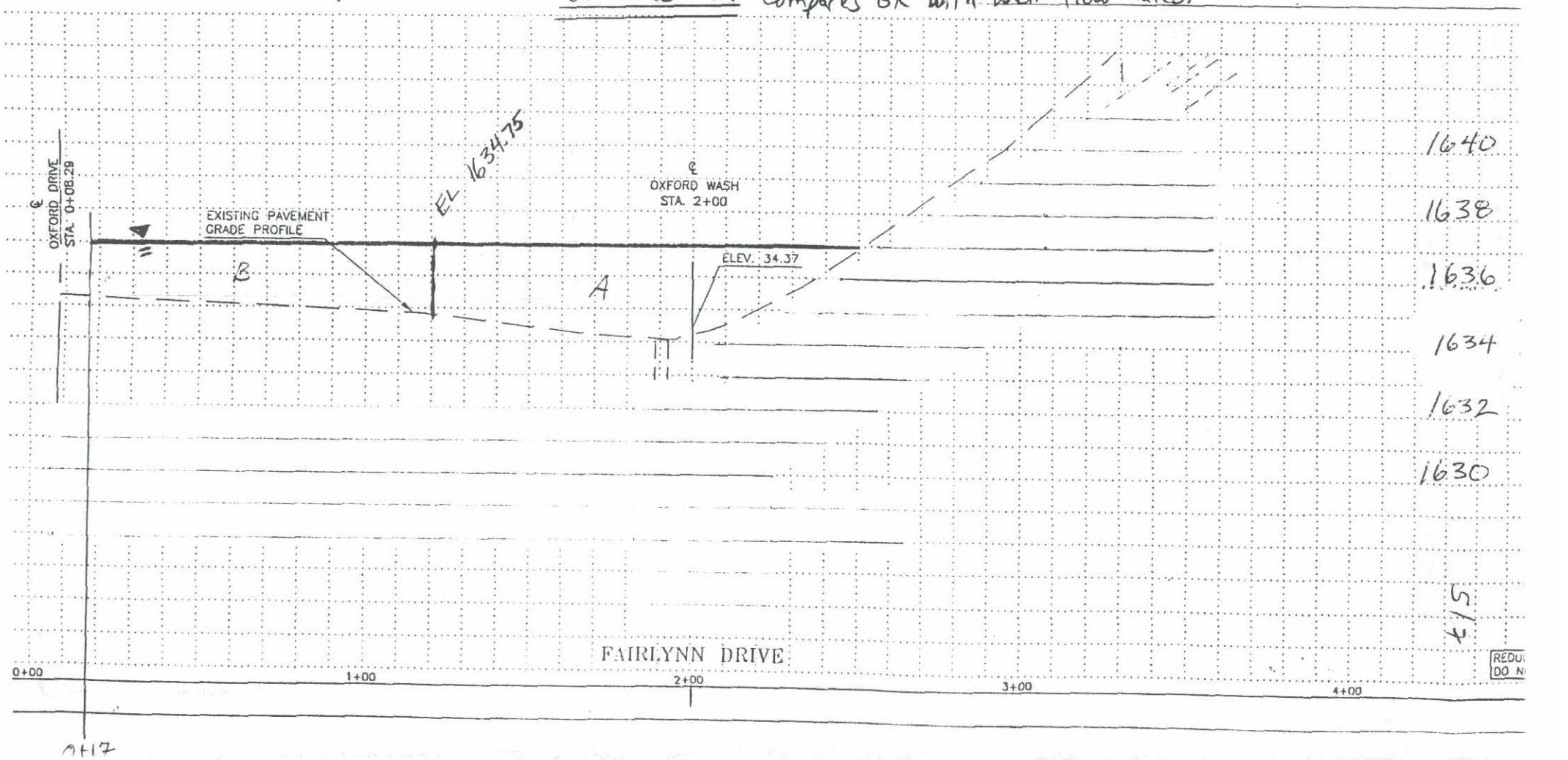
$V = 1.186 \text{ ft/s}$

$Q_A = (1.186 \text{ ft/s})\ 314.5 = 373 \text{ cfs}$

$Q_B = (1.186 \text{ ft/s})\ 224.9 = 266 \text{ cfs}$

TOTAL = 639 cfs ok

CONCLUSION: Compares ok with weir flow calcs.



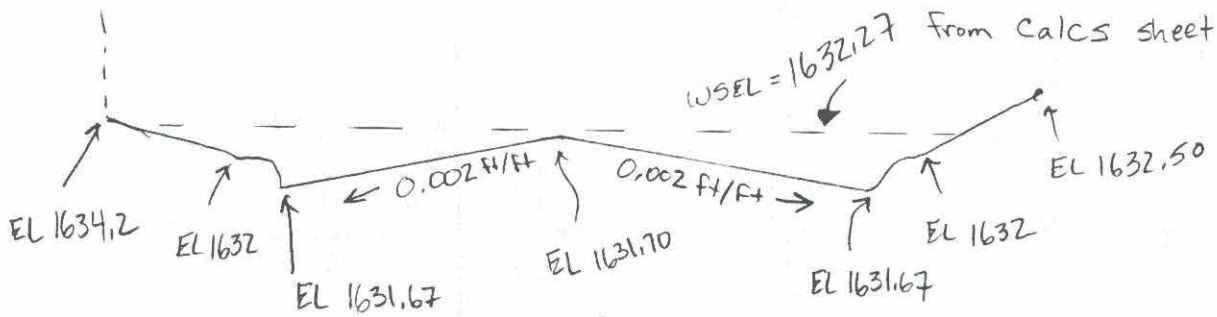
Cross section along Oxford Drive

STA	ELEV
0	1640.0 > vertical projection *
0.1	1634.2
13	1634
27	1632
29	1631.67
44	1631.70
59	1631.67
61	1632
81.9	1632.5 > vertical projection *
82	1640

Assumptions:
Right edge - 4" rolled curb
Left edge - 4" rolled curb
Roadway pavement: 34'
Roadway crown: 0.002 Ft/Ft

Slope: 0.01724 Ft/Ft contours
'n' value = 0.018, Chow (Asphalt) = 0.016

Q = 133 cfs (see p. 4/6)



Oxford Drive
Hydraulic Analysis Cross Section
see previous map for location

N.T.S.

* The vertical projection represents a flow boundary restraint due to an imposing STRUCTURE.

xford Drive Cross-Section (Zone A width) 06/28/97

Split flow from Oxford Wash at Fairlynn Drive

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0172	ft/ft
	Flow Rate:	133.0000	cfs
Calculated	Elev. of Flow:	1632.2700	ft

Calculated Quantities

Area Of Flow:	21.0352	sf
Wetted Perimeter:	47.2177	ft
Hydraulic Radius:	0.4455	ft
Velocity:	6.3228	ft/s
Critical Slope:	0.5768	%
Top Width:	47.1412	ft
Froude Number:	1.6680	
Critical Depth::	0.8006	ft
Depth of Flow:	0.5993	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1640.0000
2	0.1000	1634.2000
3	13.0000	1634.0000
4	27.0000	1632.0000
5	29.0000	1631.6700
6	44.0000	1631.7000
7	59.0000	1631.6700
8	61.0000	1632.0000
9	81.9000	1632.5000
10	82.0000	1640.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

Conclusion

The Flood Delineation study mapping Zone A CALCULATED TOP WIDTH IS APPROXIMATELY 50 ft. The Zone A mapping of TOP WIDTH is between 45 and 60 ft, as shown on Sheet 6 of 10 OF The Flood Plain MAPS.

1/1

Oxford Drive Alternate Zone A boundary 266 CFS 07/03/97

Split Flow from Oxford Wash at Fairlynn Drive

Open Channel Flow for Irregular Channel

Supplemental Calculations, assuming 50% flow split is inaccurate, and 100% turns the corner.

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0172	ft/ft
	Flow Rate:	266.0000	cfs
Calculated	Elev. of Flow:	1632.5300	ft

Calculated Quantities

Area Of Flow:	34.8118	sf
Wetted Perimeter:	58.7167	ft
Hydraulic Radius:	0.5929	ft
Velocity:	7.6411	ft/s
Critical Slope:	0.5046	%
Top Width:	58.5921	ft
Froude Number:	1.7470	
Critical Depth::	1.1299	ft
Depth of Flow:	0.8574	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1640.0000
2	0.1000	1634.2000
3	13.0000	1634.0000
4	27.0000	1632.0000
5	29.0000	1631.6700
6	44.0000	1631.7000
7	59.0000	1631.6700
8	61.0000	1632.0000
9	81.9000	1632.5000
10	82.0000	1640.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION: The Zone A top width would expand from 47 feet to 59 feet, which is still comparable to what is shown on Sheet 6 of 10 (45 to 60 foot Zone A width)

Balboa Wash at Fountain Hills Boulevard (Flooding of Kings Way Road)

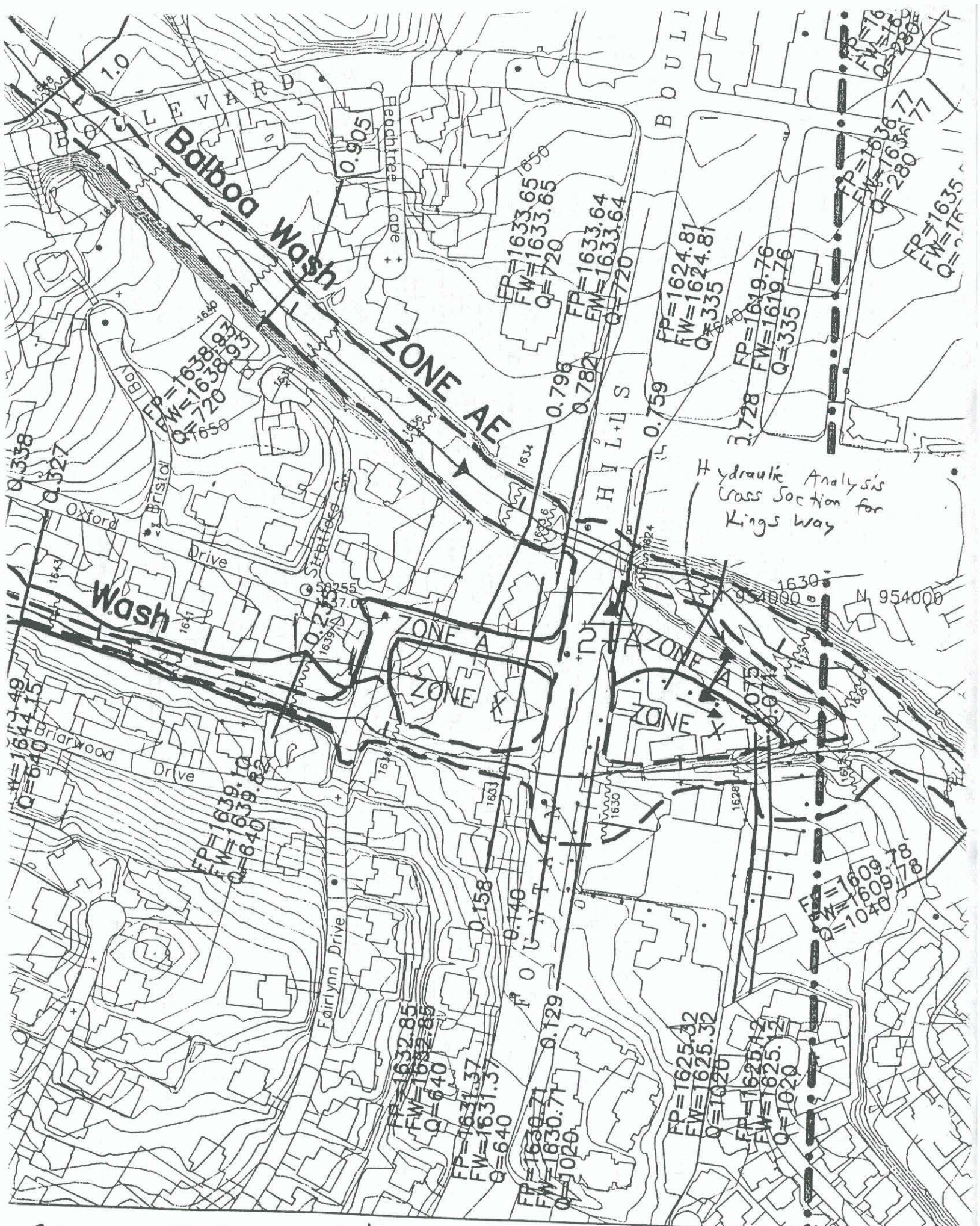
FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

FLOOD PROFILES

BALBOA / HESPERUS WASH

Dwg. Name: V:\FHILLS\FHMAIN\BA_PRO1.dwg (sheet 2 of 7)



Balboa Wash @ Kings Way Road Cross section Denoted By ⟶

Right Edge - 4" rolled Curb } From photographs
Left Edge - 4" rolled Curb }
Roadway pavement 34' from Contour maps
Roadway Crown : Assume 0.02 Ft/Ft

Find Q max without sheetflow back into Balboa wash

Slope : 0.02278 Ft/Ft
'n' value = 0.018, Chow (Asphalt) = 0.016

CROSS - section

STA	Elev
0	1628
4	1628.28
11	1628
17.5	1627.63
19.5	1627.30
32.5	1627.33
45.5	1627.30
47.5	1627.63
54	1628
70.3	1628.30

Depth = 1628.28
- 1627.30
0.98 Ft

Assume total overtopping flow of 400 cfs goes down Kings Way, to be conservative.

Kings Way Road east of Fountain Hills Blvd 06/28/97

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0228	ft/ft
Calculated	Flow Rate:	318.0880	cfs
Calculated	Elev. of Flow:	1628.2800	ft

Calculated Quantities

Area Of Flow:	38.0649	sf
Wetted Perimeter:	69.3065	ft
Hydraulic Radius:	0.5492	ft
Velocity:	8.3565	ft/s
Critical Slope:	2.0628	%
Top Width:	69.2133	ft
Froude Number:	1.9858	
Critical Depth::	1.0000	ft
Depth of Flow:	0.9800	ft

Ground Shot Information

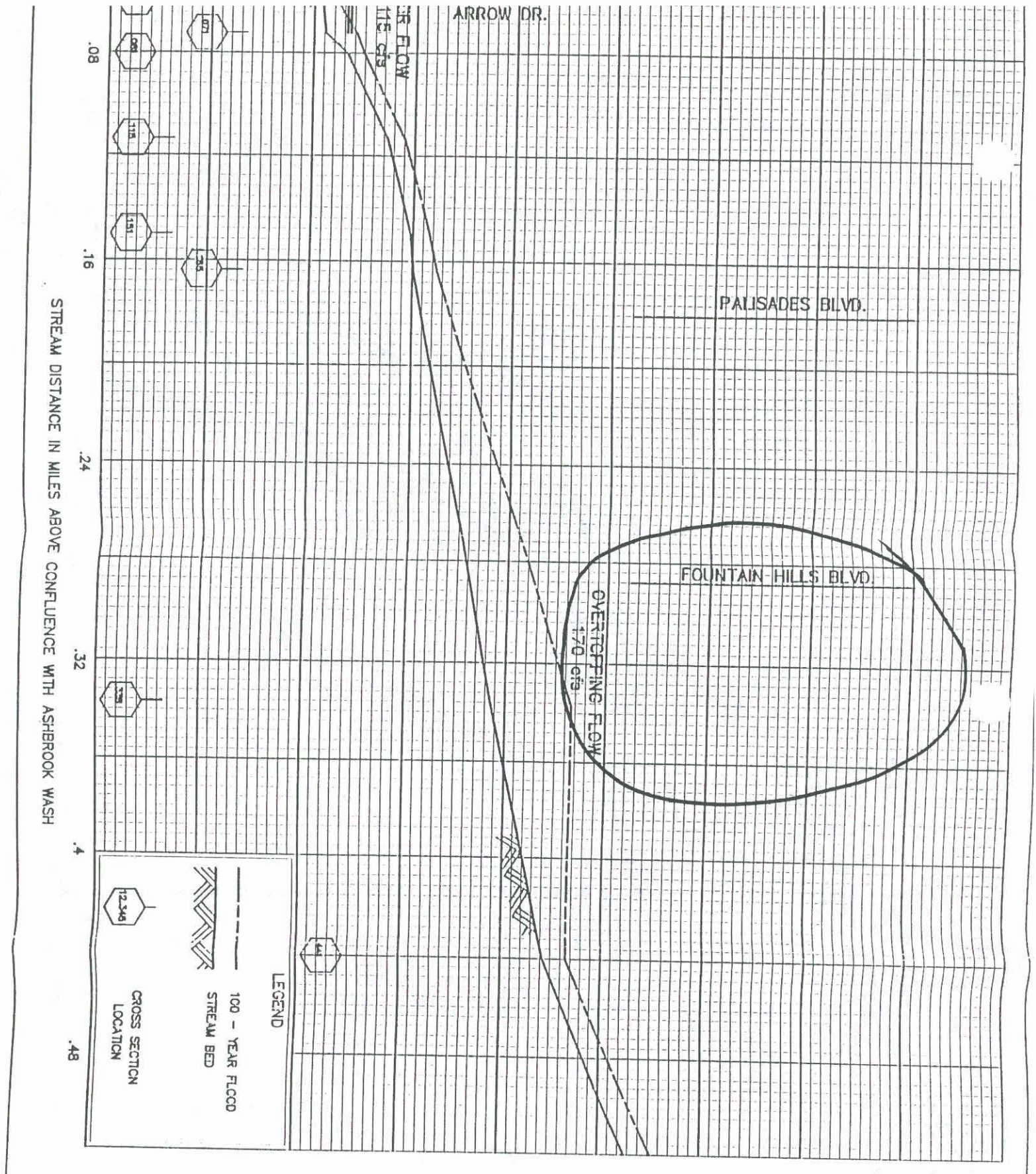
Num	Offset	Elevation
1	0.0000	1628.0000
2	4.0000	1628.2800
3	11.0000	1628.0000
4	17.5000	1627.6300
5	19.5000	1627.3000
6	32.5000	1627.3300
7	45.5000	1627.3000
8	47.5000	1627.6300
9	54.0000	1628.0000
10	70.3000	1628.3000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION

WITH 400 CFS OVERTOPPING THE CULVERT AT FOUNTAIN HILLS BLVD AND BALBOA WASH; THESE CALCULATIONS DETERMINE THE FLOW RATE (318 CFS) WHICH KINGS WAY ROAD CAN ACCOMODATE, AT A DEPTH OF 0.98 ft, BEFORE SHEET FLOW TOPS THE RIDGE LINE AND FLOW RETURNS TO BALBOA WASH.

Arrow Wash from Fountain Hills Boulevard to Palisades Drive



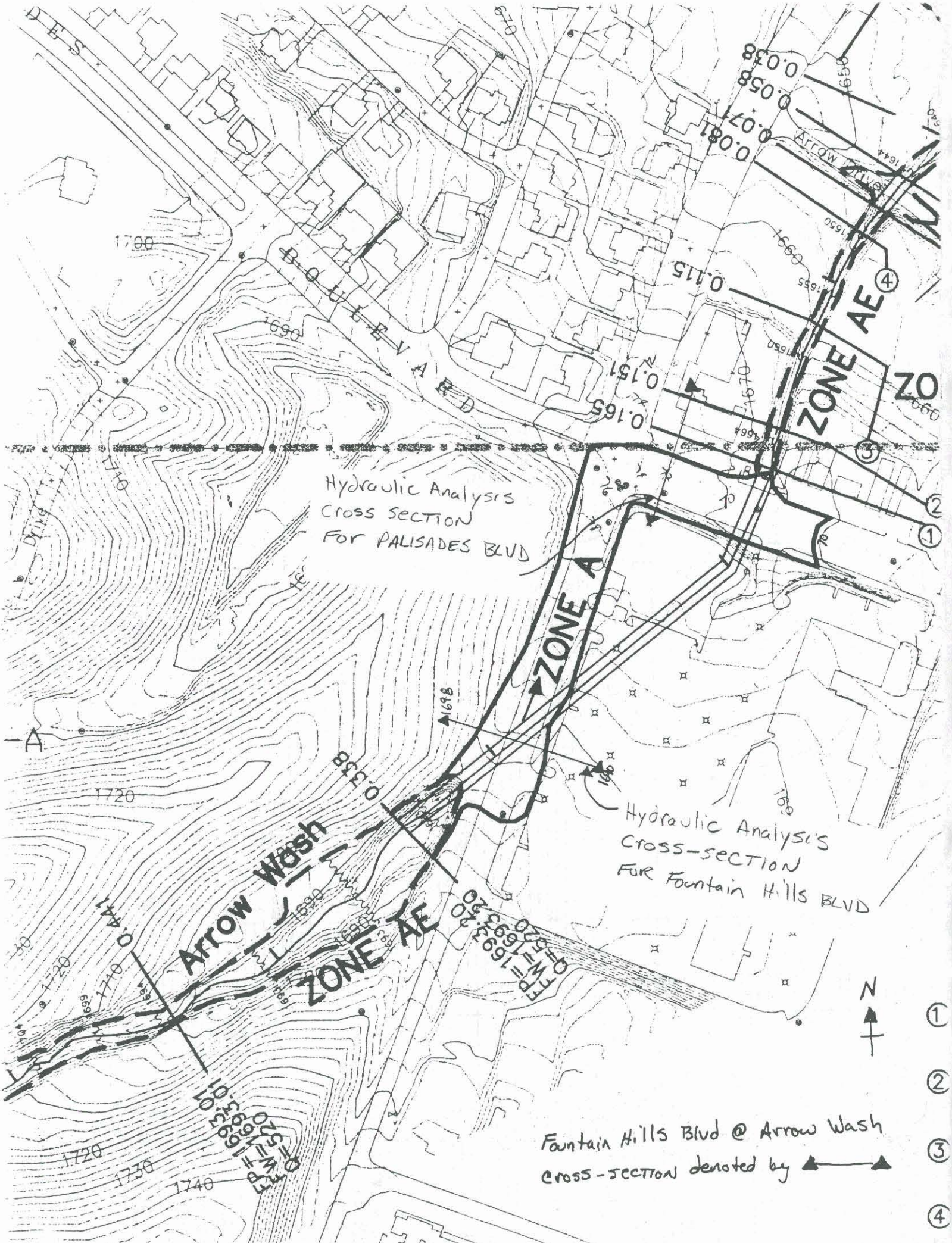
FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

FLOOD PROFILES

ARROW WASH

Dwg. Name: \P\FHILLS\FEMA\AR_PRO1.dwg (sheet 1 of 3)
Date: REV 27 SEP 1994 09:30am


Hydraulic Analysis Cross Section For PALISADES BLVD
Hydraulic Analysis Cross-Section For Fountain Hills BLVD
Arrow Wash
ZONE AE
ZONE A
ZONE AE
0.038
0.058
0.071
0.081
0.115
0.151
0.165
0.538
0.420
WSEL=1693.20
WSEL=1693.20
N
Fountain Hills Blvd @ Arrow Wash
cross-section denoted by

MKE McLaughlin Kmetty Engineers, Ltd.

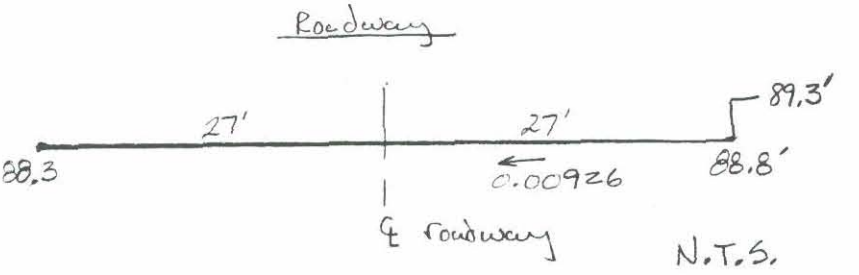
Project Title Fountain Hills FDS Project No. 92.404.001 Date 6-24-97

Subject Zone A boundaries (F.H. BLVD to Palisades & Arrow Wash) Designed LAV Page 1/3

① CROSS-SECTION (Fountain Hills BLVD) Q = 170 cfs

STA	Elev	
0	1698	
19	1696	
33	1694	
47	1692	
60	1690	
110	1688.3	EOP (L)
164	1688.8	EOP (R)
164.1	1689.3	TOC
181	1690	
195.9	1691.9	TOC
196	1691.4	
290	1690	

Right Edge - 6" curb
left Edge - no curb, end of pavement meets existing grou
road pavement - 54' wide per survey data
Slope of Road - 0.02791 Ft/Ft per contouring



N.T.S.

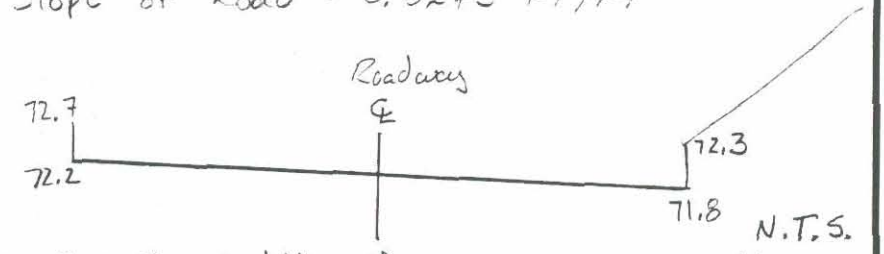
Assume: Contour Map shows little if any crown in the road which suggests the road Drains to the side without the curb.
n = 0.018 (CHOW, Asphalt = 0.016)

(PALISADES BLVD)

② Cross-section

STA	Elev	
0	1672.7	TOC
0.1	1672.2	
30.	1672.0	
79.1	1671.8	
80.0	1672.3	TOC
87	1674	
92	1676	
100	1678	

Right Edge 6" curb
Left Edge 6" curb
roadway pavement - 80' wide per survey data
Slope of Road = 0.0273 FT/FT



N.T.S.

Assume: Contour Map shows little if any crown in the road to suggest the flow line follows the Right Edge of Road.
n = 0.018 (Chow, Asphalt = 0.016)

① Cross-section located on Fountainhills Blvd south of Palisades BLVD.

② Cross-section located on Palisades Blvd East of Fountain Hills BLVD.

WATER TURNS The Corner from Fountain Hills BLVD to PALISADES BLVD Since the Slope Around the Corner is 5.33% compared to the slope across the intersection of 1.43%.

CROSS-SECTION Located on Fountain Hills BLVD South of Palisades BLVD. Approximately 450 ft From Intersection.

06/24/97

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0279	ft/ft
	Flow Rate:	170.0000	cfs
Calculated	Elev. of Flow:	1688.9100	ft

Calculated Quantities

Area Of Flow:	24.9838	sf
Wetted Perimeter:	72.0959	ft
Hydraulic Radius:	0.3465	ft
Velocity:	6.8044	ft/s
Critical Slope:	0.5879	%
Top Width:	71.9922	ft
Froude Number:	2.0355	
Critical Depth::	0.8278	ft
Depth of Flow:	0.6110	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1698.0000
2	19.0000	1696.0000
3	33.0000	1694.0000
4	47.0000	1692.0000
5	60.0000	1690.0000
6	110.0000	1688.3000
7	164.0000	1688.8000
8	164.1000	1689.3000
9	181.0000	1690.0000
10	195.9000	1691.9000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

Conclusion

Water, in the channel, will reach an elevation of 1688.91 and will therefore follow the floodline which runs along the west edge of road. THIS CAUSES A TOP WIDTH OF approximately 72 ft. This is ZONE A which Ranges from 90 ft to 140 ft.

CROSS - SECTION LOCATED on Palisades Blvd East of Fountain Hills Blvd. Approximately 50 ft from the intersection.

06/24/97

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0273	ft/ft
	Flow Rate:	170.0000	cfs
Calculated	Elev. of Flow:	1672.3000	ft

Calculated Quantities

Area Of Flow:	26.2394	sf
Wetted Perimeter:	80.1585	ft
Hydraulic Radius:	0.3273	ft
Velocity:	6.4788	ft/s
Critical Slope:	0.5928	%
Top Width:	79.9413	ft
Froude Number:	1.9929	
Critical Depth::	0.6973	ft
Depth of Flow:	0.5049	ft

Ground Shot Information

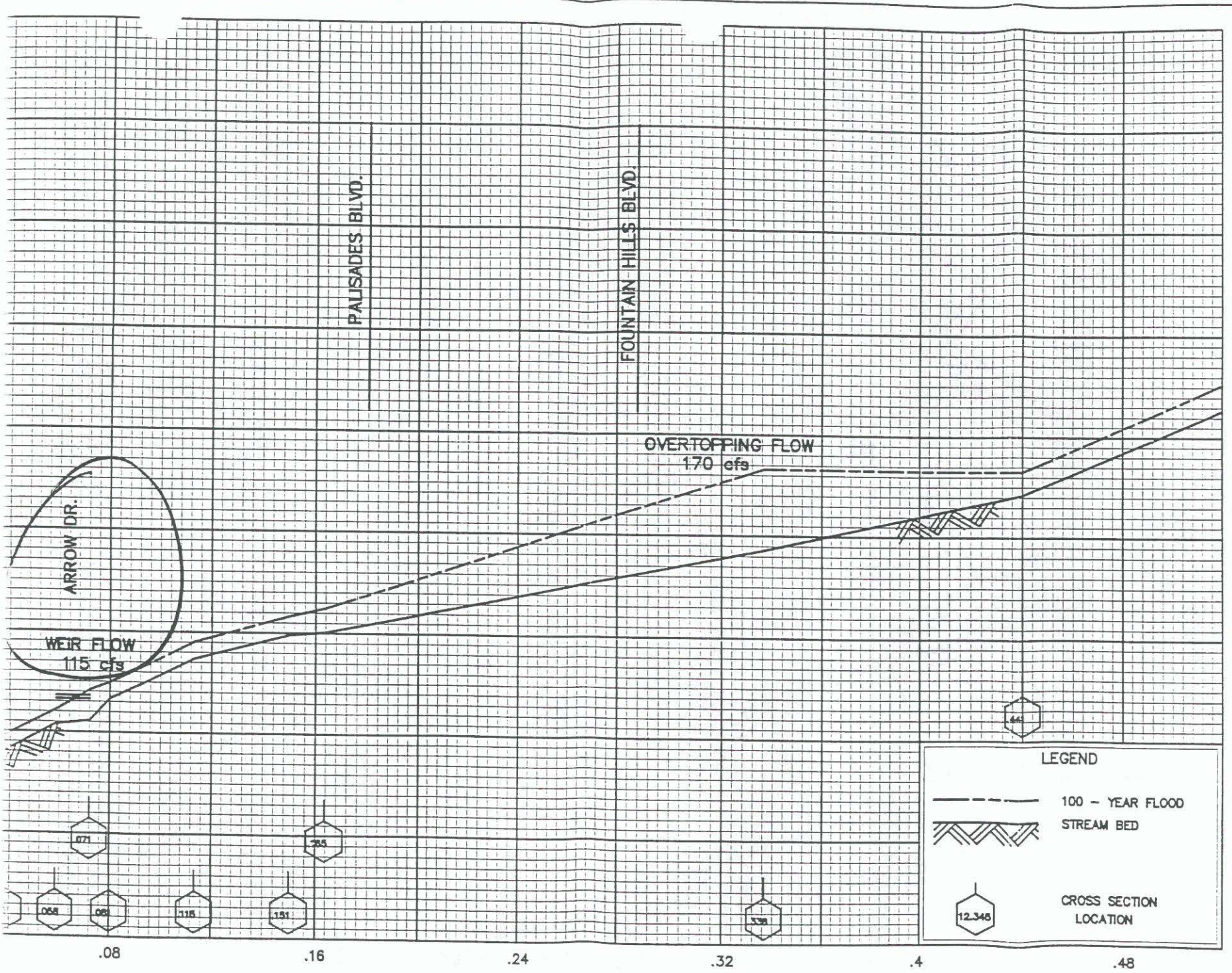
Num	Offset	Elevation
1	0.0000	1672.7000
2	0.1000	1672.2000
3	30.0000	1672.0000
4	79.1000	1671.8000
5	80.0000	1672.3000
6	87.0000	1674.0000
7	92.0000	1676.0000
8	100.0000	1678.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION

WATER will reach an elevation of 1672.3, and will therefore not overtop the curbs. Thus the location of the zone A seems to be correct. Width of the floodplain varies from 90 ft to 110 ft. TOP WIDTH, according to these Calculations, is Approximately 80 ft.

Arrow Wash at Arrow Drive

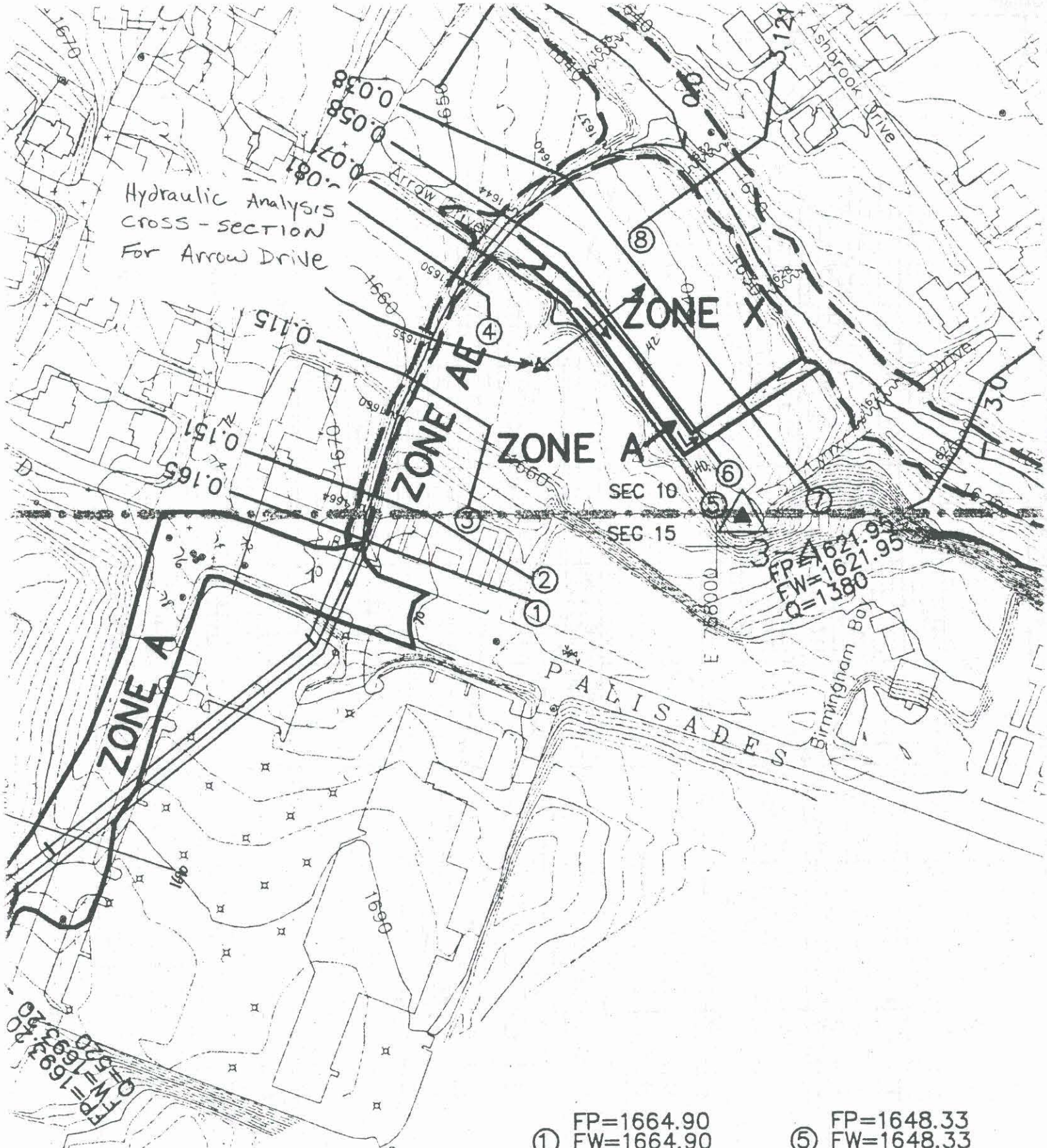


FLOOD PROFILES

ARROW WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY



① FP=1664.90 FW=1664.90 Q=490

② FP=1663.33 FW=1663.33 Q=490

③ FP=1658.12 FW=1658.12 Q=490

④ FP=1649.87 FW=1649.87

⑤ FP=1648.33 FW=1648.33 Q=490

⑥ FP=1644.38 FW=1644.38 Q=490

⑦ FP=1639.28 FW=1639.28 Q=490

⑧ FP=1631.30 FW=1631.30

MKE McLaughlin Kmetty Engineers, Ltd.

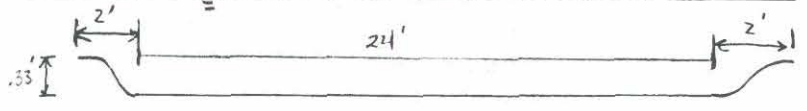
Project Title Fountain Hills North FDS Project No. 92.404.001-5557 Date 6-26-97

Subject Zone A Boundaries (Arrow Dr & Arrow Wash) Designed LAV Page 1/2

Q = 115 cfs

Right edge 4" roll curb
Left edge 4" roll curb
road pavement - 24' wide
Slope of Road - 0.012 ft/ft per Contouring

1644.66 CWSEL From CALC's 2/2



N.T.S.

Cross Section ①

STA	Elev	
0	1650	
16	1648	
32	1646	
52	1644.3	TOC
54	1644	G
78	1644	G
80	1644.3	TOC
135	1644	

Assume: Contour mapping shows little if any crown in the road. Mannings "n" value n = 0.018 [CHOW, Asphalt = 0.016]

File: FHN-AR2

The Zone A flow down Arrow Drive Reaches a local low point approximately 700 ft East of Fountain Hills BLVD. The 4" high roll curb transitions into a flat ribbon curb on the downstream side and the flow is redirected down a wash and into Ashbrook Wash.

Fountain Hills North FDS, Arrow Wash and Arrow Drive 07/03/97

Open Channel Flow for Irregular Channel

Input Quantities

	Manning's n:	0.0180	
	Channel Slope:	0.0120	ft/ft
	Flow Rate:	115.0000	cfs
Calculated	Elev. of Flow:	1644.6600	ft

Calculated Quantities

Area Of Flow:	18.8577	sf
Wetted Perimeter:	34.0551	ft
Hydraulic Radius:	0.5537	ft
Velocity:	6.0983	ft/s
Critical Slope:	0.5422	%
Top Width:	33.9597	ft
Froude Number:	1.4422	
Critical Depth::	0.8282	ft
Depth of Flow:	0.6618	ft

Ground Shot Information

Num	Offset	Elevation
1	0.0000	1650.0000
2	16.0000	1648.0000
3	32.0000	1646.0000
4	52.0000	1644.3300
5	54.0000	1644.0000
6	78.0000	1644.0000
7	80.0000	1644.3300
8	90.0000	1646.0000

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

CONCLUSION

WATER IN THE CHANNEL WOULD FLOW ALONG ARROW DRIVE AT 0.7 feet deep, WHICH CAUSES A ZONE A WIDTH OF APPROXIMATELY 34 ft. THIS IS SHOWN ON THE ZONE A ON THE FLOOD PLAIN MAPS, WHICH VARIES FROM BETWEEN 30 to 50 ft.

ASHBROOK WASH

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    29MAR95    TIME   14:48:42 *
 *****************************************
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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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1
   29MAR95      14:48:42                                                    PAGE    1


                                                        THIS RUN EXECUTED 29MAR95    14:48:42

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

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


T1   *  Fountain Hills North FIS                          File:        AS.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35         DTP & FB   03-17-94
T3   *   Ashbrook Wash 100 Year Floodplain               Revised:   03-29-95
T4   *  GR data taken from stereo model; received 19 Oct 93 from KAM.
T4   *  Extended section GR data received 19 Oct 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.


J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0       0.02         0         0         0    1503.7

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0        -1         0         0         0        -1         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200

         HEC-1 Concentration Point C627   24-hr storm controls
1
   29MAR95      14:48:42                                                    PAGE    2


QT         2       3190       3190

         Start Hydraulically Similar Reach AS1
                See Exhibit 1, Manning's n Value Map.
NC     0.080      0.080      0.060       0.1         0.3

  Section 1.521 is section 1 of 3 for Normal Depth Calculation
ET                            9.1                                          9944.73    10036.23
          HEC-1 Concentration Point C627:  24-Hr storm controls.
                START Similar Hydraulic Reach  AS1
                See Exhibit 1, Manning's n Value Map.
                Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
                Left overbank is non effective flow area:  Hard coded GR's
                           from STA 9804.9 to 9826.6 @ EL 1505
X1    1.521         19     9953.3    10031.7           0         0       0.0                  -0.6
GR   1520.9     9765.7     1520.9     9776.5      1510.2      9790.9      1505      9804.9      1505      9819.3
GR     1505     9826.6     1504.9     9837.0      1505.2      9869.5    1505.3      9886.6    1506.6      9894.6
```

```
GR   1506.9     9916.2     1505.2     9935.3     1505.0     9943.3     1500.4     9953.3     1500.1     9973.9
GR   1499.9    10000.0     1500.0    10001.2     1500.1    10031.7     1510.6    10042.9

  Section 1.523 is section 2 of 3 for Normal Depth Calculation

ET                              9.1                                                            9944.72    10036.23
                  Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
                  Left overbank is non effective flow area:  Hard coded GR's
                              from STA 9804.9 to 9826.6 @ EL 1505
X1   1.523         19         9953.3     10031.7         10         10         10                -0.4
GR   1520.9     9765.7        1520.9      9776.5     1510.2     9790.9       1505     9804.9     1505      9819.3
GR     1505     9826.6        1504.9      9837.0     1505.2     9869.5     1505.3     9886.6    1506.6     9894.6
GR   1506.9     9916.2        1505.2      9935.3     1505.0     9943.3     1500.4     9953.3    1500.1     9973.9
GR   1499.9    10000.0        1500.0     10001.2     1500.1    10031.7     1510.6    10042.9

  Section 1.525 is section 3 of 3 for Normal Depth Calculation

ET                              9.1                                                            9944.71    10036.23
                  Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
                  Left overbank is non effective flow area:  Hard coded GR's
                              from STA 9804.9 to 9826.6 @ EL 1505
X1   1.525         19         9953.3     10031.7         10         10         10                -0.2
GR   1520.9     9765.7        1520.9      9776.5     1510.2     9790.9       1505     9804.9     1505      9819.3
GR     1505     9826.6        1504.9      9837.0     1505.2     9869.5     1505.3     9886.6    1506.6     9894.6
GR   1506.9     9916.2        1505.2      9935.3     1505.0     9943.3     1500.4     9953.3    1500.1     9973.9
GR   1499.9    10000.0        1500.0     10001.2     1500.1    10031.7     1510.6    10042.9

NH       3        .08        9953.3          .06     10031.7          .08     10042.9
ET                              9.1                                                            9944.71    10036.24
                  Left overbank is non effective flow area:  Hard coded GR's
1
   29MAR95      14:48:42                                                                                    PAGE    3

                              from STA 9804.9 to 9826.6 @ EL 1505
                  STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
X1   1.527         19         9953.3     10031.7         10         10         10
GR   1520.9     9765.7        1520.9      9776.5     1510.2     9790.9       1505     9804.9     1505      9819.3
GR     1505     9826.6        1504.9      9837.0     1505.2     9869.5     1505.3     9886.6    1506.6     9894.6
GR   1506.9     9916.2        1505.2      9935.3     1505.0     9943.3     1500.4     9953.3    1500.1     9973.9
GR   1499.9    10000.0        1500.0     10001.2     1500.1    10031.7     1510.6    10042.9

NH       3        .08        9983.5          .06     10020.7          .08     10077.8
ET                              9.1                                                            9918.34    10050.50
X1   1.577         18         9983.5     10020.7          320        250        259.4
GR   1517.9     9859.9        1517.6      9873.1     1510.0     9892.1     1510.5     9914.2    1507.7     9921.4
GR   1506.7     9935.0        1504.4      9943.4     1503.6     9960.5     1504.3     9968.1    1504.3     9983.5
GR   1503.5     9990.1        1503.3     10000.0     1503.2    10015.5     1504.5    10020.7    1506.0    10045.0
GR   1513.2    10058.7        1520.8     10069.3     1515.4    10077.8

NH       3        .08        9951.6          .06     10064.9          .08     10258.6
ET                              9.1                                                            9945.09    10071.55
X1   1.602         18         9951.6     10064.9          135        150        136.1
GR   1517.6     9879.3        1517.3      9905.8     1516.8     9931.5     1507.8     9951.6    1507.5     9972.2
GR   1506.9    10000.0        1507.5     10009.0     1508.0    10040.9     1508.1    10064.9    1511.6    10073.8
GR   1511.7    10094.5        1512.6     10111.3     1513.1    10146.6     1513.4    10172.0    1513.4    10189.2
GR   1518.4    10204.8        1520.3     10233.0     1520.6    10258.6

        AS 1.636 GR Data Surveyed by ALS
        Check Section # 1
        Ashbrook Wash:  Section #4 = 1.636 River Miles

NH       3        .08       10021.4          .06     10056.4          .08     10259.4
ET                              9.1                                                            9995.39    10192.22
                  Channel has been filled.  GR Data Surveyed By ALS.
X1   1.636         12         9995.4     10056.4          170        180        180.1
GR   1518.7     9899.4        1518.97     9905.4     1520.40     9921.4     1518.85    9995.4     1511.1    10021.4
GR   1510.6    10051.4        1512.85    10056.4     1514.15    10188.4     1518.85   10199.4     1521.4    10210.4
GR   1523.6    10239.4        1524.35    10259.4

        AS 1.686 GR Data Surveyed by ALS
        Check Section # 2
        Ashbrook Wash:  Section # 5 = 1.686 River Miles

NH       3        .08          9990          .06       10037          .08       10286
ET                              9.1                                                            9871.80    10079.53
                  Channel has been filled.  GR Data Surveyed By ALS.
X1   1.686         18          9990       10037          250        250        262.6
GR   1523.4     9778         1523.54       9787     1523.16       9860     1518.61      9877    1516.21      9990
GR   1515.0     9997         1512.11      10003     1512.11      10008     1514.21     10014    1518.11     10037
GR   1517.7    10064         1521.11      10087     1523.91      10113     1523.41     10140    1526.81     10235
GR   1527.2    10267         1525.61      10281     1526.19      10286

        HEC-1 Concentration Point C626
1
   29MAR95      14:48:42                                                                                    PAGE    4
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QT        2       3180       3180

NH        3        .08     10036.3        .06     10076.3        .08     10136.4
ET                                9.1                                                 9881.69    10080.63
          HEC-1 Concentration Point C626:  24-Hr storm controls.
X1    1.727         33     10036.3    10076.3         200         220        213.9
GR   1525.4     9773.1     1526.8     9782.8      1528.1      9795.5      1528.2     9811.6     1528.2     9823.0
GR   1527.6     9831.4     1527.6     9847.0      1527.5      9860.8      1526.4     9872.8     1521.1     9888.3
GR   1521.0     9896.3     1520.1     9900.9      1520.6      9909.4      1520.9     9928.2     1519.3     9936.6
GR   1520.9     9944.6     1521.3     9953.6      1520.7      9959.1      1521.3     9980.3     1521.3     9990.2
GR   1521.2    10000.0     1521.7    10010.3      1520.9     10025.6      1519.7    10032.7     1520.6    10036.3
GR   1520.4    10050.7     1519.2    10070.6      1520.6     10076.3      1525.9    10084.6     1525.9    10090.7
GR   1524.0    10103.1     1524.4    10117.7      1524.2     10136.4

NH        3        .08        9987        .06     10035.2        .08     10229.1
ET                                9.1                                                 9967.78    10160.89
X1    1.855         25        9987    10035.2         680         700        677.4
GR   1539.3     9855.7     1539.0     9869.5      1540.0      9876.5      1540.0     9899.3     1539.0     9947.6
GR   1536.1     9957.5     1533.2     9975.6      1532.2      9987.0      1528.1     9997.9     1527.7    10000.0
GR   1527.4    10006.0     1528.5    10011.5      1530.8     10023.4      1531.5    10035.2     1531.7    10060.0
GR   1531.3    10086.0     1531.0    10104.4      1531.7     10114.8      1532.0    10153.2     1535.7    10164.8
GR   1537.3    10172.5     1536.4    10188.1      1536.7     10195.9      1536.8    10218.8     1536.0    10229.1

          START Hydraulically Similar Reach   AS2
                See Exhibit 1, Manning's n Value Map.

NH        3        .113        9980        .125    10068.8         .12     10159.1
ET                                9.1                                                 9927.73    10119.83
                START Hydraulically Similar Reach AS2
                See Exhibit 1, Manning's n Value Map.
X1    1.980         20        9980    10112.6         660         640        659.3
GR   1552.8     9825.0     1552.6     9835.2      1554.2      9846.3      1553.9     9873.7     1553.7     9902.3
GR   1548.2     9918.4     1543.8     9934.7      1543.4      9951.4      1543.0     9980.0     1540.4     9991.3
GR   1540.4    10000.0     1540.9    10009.4      1540.9     10031.2      1541.8    10041.5     1542.2    10068.8
GR   1542.5    10112.6     1547.3    10123.5      1550.0     10135.9      1550.2    10147.1     1548.6    10159.1

NH        3        .113     9988.7        .125    10018.5         .12     10374.7
ET                                9.1                                                 9939.26    10125.75
X1    2.071         25     9948.9    10084.3         490         475        480.4
GR   1558.5     9830.3     1558.2     9841.5      1560.2      9851.9      1561.1     9872.6     1560.7     9903.1
GR   1560.3     9926.3     1555.9     9935.6      1551.6      9948.9      1550.5     9976.2     1549.7     9988.7
GR   1547.4    10000.0     1547.2    10009.4      1548.9     10018.5      1549.7    10051.1     1550.9    10066.1
GR   1551.4    10084.3     1551.3    10115.3      1554.8     10126.0      1556.4    10140.0     1557.0    10181.0
GR   1557.2    10221.1     1556.9    10253.7      1556.8     10302.9      1556.7    10342.5     1556.2    10374.7

          BALBOA  WASH    Tributary

          HEC-1 Concentration Point C549
1
     29MAR95       14:48:42                                                                                  PAGE    5

QT        2       3100       3100

NH        3        .113     9946.9        .125       10000         .12     10156.6
ET                                9.1                                                 9894.22    10100.95
          HEC-1 Concentration Point C549:  24-Hr storm controls.
                BALBOA WASH Tributary
X1    2.095         17     9925.4      10000         120         140        128.7
GR   1563.1     9785.9     1562.5     9828.1      1559.3      9843.4      1558.2     9878.0     1556.2     9905.9
GR   1554.1     9925.4     1553.2     9946.9      1552.7      9967.5      1551.9     9990.9     1553.6    10000.0
GR   1553.6    10020.9     1553.5    10051.4      1552.2     10065.1      1555.0    10078.1     1556.9    10099.0
GR   1558.7    10124.6     1559.1    10156.6

          HEC-1 Concentration Point C549R

QT        2       2110       2110

NH        3        .113     9955.4        .125    10023.9         .12     10088.5
ET                                9.1                                                 9827.06    10054.90
          HEC-1 Concentration Point C549R:  24-Hr storm controls.
X1    2.200         12     9955.4    10023.9         570         490        552.7
GR   1570.0     9815.8     1566.0     9822.2      1561.3      9843.3      1561.5     9862.7     1561.2     9899.8
GR   1560.8     9955.4     1560.1     9974.9      1560.6      9994.7      1560.5    10000.0     1559.9    10023.9
GR   1564.7    10042.4     1565.5    10088.5

NH        3        .113     9924.6        .125    10048.8         .12     10070.5
ET                                9.1                                                 9840.32    10052.48
X1    2.279         12     9924.6    10048.8         380         430        415.5
GR   1576.1     9821.9     1573.1     9829.6      1566.2      9847.2      1566.0     9924.6     1565.7     9950.2
GR   1565.7     9950.2     1565.3    10000.0      1565.1     10035.2      1565.1    10035.2     1567.0    10048.8
GR   1573.7    10061.8     1573.6    10070.5

NH        3        .113     9895.6        .125    10021.3         .12      10071
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ET                              9.1                                                                 9856.22   10063.59
X1    2.304        12       9864.7    10021.3       115       150       134.1
GR   1576.0    9842.8    1574.3     9848.1    1566.3    9864.7    1566.1    9895.6    1565.3     9901.8
GR   1566.3    9909.1    1566.2     9959.0    1566.1   10000.0    1567.3   10021.3    1567.4    10051.7
GR   1569.2   10061.5    1574.6    10071.0

  ********************************************************************************
  *************************    Culvert    622    ******************************
  ********************************************************************************

        HEC-1 Concentration Point C622

QT       2       2050       2050

NH       3       .113     9955.7       .125    10033.7         .12    10081.2
ET                              9.1                                                                 9878.25   10065.35
1
   29MAR95       14:48:42                                                                                        PAGE    6

          HEC-1 Concentration Point C622:  24-Hr storm controls.
          CULVERT  622:  ASHBROOK WASH and SAGUARO BOULEVARD
             Culvert 622      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    2.382        17       9955.7    10033.7       405       405       410.2
GR   1587.5    9836.8    1584.1     9848.5    1583.7    9862.1    1572.2    9884.1    1572.8     9921.5
GR   1573.1    9932.4    1571.9     9945.0    1573.2    9955.7    1571.5    9973.7    1571.3     9982.8
GR   1571.7   10000.0    1571.2    10013.0    1571.6   10021.4    1572.5   10033.7    1572.7    10059.9
GR   1577.2   10069.5    1582.8    10081.2

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC      .113        .12       .125        0.3        0.5
NH       3       0.113     9984.6       0.125   10018.2         0.120   10450.2

ET                              9.1                                                                 9992.30   10011.71
             Culvert 622  Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
               Photogrammetric x-sec. located 28' Downstream. (No Elev. Adjust.)
                Base Channel Elevations were  raised to Culvert Invert EL  1574.0
X1    2.405        23       9992.3    10011.7       115       130       123.1
X3       10                                                                      1581.98   1581.98
GR   1590.3    9743.4    1588.7     9776.2    1586.8    9814.6    1586.1    9855.5    1585.0     9898.6
GR   1584.0    9942.0    1574.9     9961.5    1574.4    9984.6      1574    9992.30      1574    10000.0
GR     1574   10011.7      1574    10018.2      1574   10034.9    1575.4   10050.7    1583.7    10077.0
GR   1584.1   10104.3    1585.5    10116.2    1585.1   10161.0    1585.0   10198.3    1585.0    10267.7
GR   1585.0   10347.6    1585.0    10430.9    1592.2   10450.2

SC    3.024       0.9      2.63          0          5          0        121       2.3   1575.82    1574.01

NH       3       0.113     9951.1       0.125   10036.5         0.120   10339.6

ET                              9.1                                                                 9853.96   10091.50
             Culvert 622  Inlet.   3-60" CMP's          (SECTION 3 OF SC ROUTINE)
               Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1575.82
             Culvert 622 BT information surveyed by ALS. West top of curb.
             Culvert 622 BT information coded per figure 3.16 (HEC-2, Sept 90)
             Right overbank is non effective flow area:  Hard coded GR's
                from STA 10194.7 to STA 10308.4 @ EL 1587.6
X1    2.428        32       9995    10012.2       121       121       121
X2                  2    1580.82    1584.12
X3       10                                                                      1584.06   1584.06
X4        2   1584.75       9929     1584.3     10055

BT      -27     9684.3    1588.8                9704.9    1587.9                9720.8    1589.3
BT          9739.1    1589.1                9769.2    1588.2                9815.4    1587.5
BT          9842.7    1586.7                9885.4    1586.1                9927.0    1584.9
BT            9929   1584.75                  9950   1584.73                 10000   1584.06
BT           10050   1584.38                 10055    1584.3                10061.0   1585.6
BT         10103.1    1586.9               10121.0    1586.7                10138.5   1588.1
BT         10179.4    1588.2               10194.7    1587.6                10209.6   1587.6
BT         10223.3    1587.6               10240.6    1587.6                10254.4   1587.6
BT         10276.8    1587.6               10308.4    1587.6                10339.6   1587.9

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GR   1588.8    9684.3    1587.9     9704.9    1589.3    9720.8    1589.1    9739.1    1588.2     9769.2
GR   1587.5    9815.4    1586.7     9842.7    1586.1    9885.4    1584.9    9927.0    1583.9     9940.1
GR   1580.4    9951.1    1578.2     9974.5    1578.3    9994.3   1575.82      9995   1575.82      10000
GR   1575.8   10004.3   1575.82    10012.2    1576.6   10024.8    1580.2   10036.5    1585.6    10061.0
GR   1586.9   10103.1    1586.7    10121.0    1588.1   10138.5    1588.2   10179.4    1587.6    10194.7
GR   1587.6   10209.6    1587.6    10223.3    1587.6   10240.6    1587.6   10254.4    1587.6    10276.8
GR   1587.6   10308.4    1587.9    10339.6

          Return  Contraction and Expansion coefficients to Normal

NC                                          0.1        0.3

NH       3       .113        9987       .125   10037.3         .12   10256.5
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ET                          9.1                                                                    9887.27    10119.65
          Culvert 622     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
              LEGEND WASH Tributary
X1    2.448        21       9987     10037.3        105        110       104.6
GR   1588.2    9881.6     1584.5      9896.3     1580.2     9905.4      1580.5     9927.7     1580.7     9987.0
GR   1579.7   10000.0     1579.3     10023.3     1581.4    10037.3      1581.5    10070.4     1578.8    10079.3
GR   1580.7   10084.0     1582.0     10090.7     1585.8    10099.6      1586.9    10122.3     1587.8    10158.4
GR   1588.1   10191.4     1587.9     10205.6     1586.9    10215.9      1587.1    10233.5     1586.8    10248.9
GR   1587.3   10256.5

       START Hydraulically Similar Reach   AS3
             See Exhibit 1, Manning's n Value Map.

        LEGEND  WASH   Tributary

       HEC-1 Concentration Point C622R

QT        2       1380       1380

  ********************************************************************************
  *************************    Culvert    M7    ******************************
  ********************************************************************************

  Culvert M7    Downstream fully expanded flow.  Special Culvert Section # 1

NH        3         .1     9973.9       .045     10050.6          .1       10236
ET                          9.1                                                                    9936.33    10058.71
          HEC-1 Concentration Point C622R:  24-hr storm controls.
                START Hydraulically Similar Reach AS3
                See Exhibit 1, Manning's n Value Map.
           CULVERT  M7 :  ASHBROOK WASH and BAYFIELD DRIVE
              Culvert M7      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    2.494        19     9973.9     10050.6        260        220       245.9
GR   1593.7    9831.1     1593.1      9860.6     1592.1     9894.6      1591.5     9922.3     1587.6     9934.7
GR   1583.1    9948.0     1583.0      9973.9     1582.7     9990.8      1582.4    10000.0     1581.7    10022.3
GR   1581.2   10039.0     1584.0     10050.6     1589.6    10065.5      1589.7    10103.0     1590.1    10140.4
GR   1590.5   10179.7     1591.0     10217.4     1589.8    10228.5      1589.0    10236.0

       Use NC Record to set Contraction and Expansion Coefficients for Culvert.
1
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NC                                                 0.3        0.5
NH        3      0.100     9975.4       0.045     10029.2      0.100       10246

       Culvert  M7 OUTLET                Special Culvert Section # 2


ET                          9.1                                                                    9991.00    10009.71
          Culvert M7   Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
            Photogrammetric x-sec. located 12' Downstream. (No Elev. Adjust.)
X1    2.529        23       9991     10009.7        195        170       180.7
X3       10                                                                 1589.94    1589.94
GR   1599.3    9738.5     1599.3      9742.0     1599.7     9753.7      1599.8     9774.5     1598.6     9855.8
GR   1596.9    9878.6     1595.1      9919.4     1593.9     9939.3      1585.5     9960.4     1585.4     9975.4
GR   1583.1    9982.0    1583.25      9991.00    1583.4    10000.0      1583.15   10009.70    1582.9    10019.4
GR   1584.9   10029.2     1591.0     10046.7     1592.2    10061.9      1591.8    10083.1     1591.0    10119.4
GR   1590.8   10162.4     1591.0     10209.0     1591.2    10246.0

      3-60" CMP's

SC    3.024        0.9       2.63           0          5          0          84         2.3    1584.98    1584.71

NH        4      0.100     9987.3       0.045     10015.3      0.100       10047.9     0.002    10248.3

ET                          9.1                                                                    9945.80    10052.29
                  Right bank is non effective flow area:  Hard coded GR's
                              from STA 10072.3 to 10248.3 @ EL 1600
          Culvert M7    Inlet.   3-60"   CMP's        (SECTION 3 OF SC ROUTINE)
            Photogrammetric x-sec. located 12' Upstream. (No Elev. Adjust.)
             Base Channel Elevations were lowered to Culvert Invert EL 1584.98
          Culvert M7  BT information Surveyed by ALS. North top of curb.
          Culvert M7  BT information coded per figure 3.16 (HEC-2, Sept 90)
X1    2.545        24     9993.7     10007.8         84         84          84
X2                            2     1589.98     1592.5                                                                      15
X3       10                                                                 1592.2    1592.2
X4        2    1592.8     9960.5      1592.2      10039

BT      -20    9757.4     1601.3                  9793.4     1601.3                  9824.3     1600.4
BT           9849.3     1599.4                  9882.7     1597.8                  9904.6     1596.8
BT           9916.7     1595.6                  9939.5     1594.8                  9958.1     1593.2
BT          9960.50     1592.8                  9971.5    1592.38                   10000    1592.38
BT            10039     1592.2                 10047.9     1593.0                 10072.3       1600
BT          10099.9       1600                 10138.6       1600                 10173.4       1600
BT          10214.6       1600                 10248.3       1600

GR   1601.3    9757.4     1601.3      9793.4     1600.4     9824.3      1599.4     9849.3     1597.8     9882.7
GR   1596.8    9904.6     1595.6      9916.7     1594.8     9939.5      1593.2     9958.1     1590.5     9974.9
GR   1589.1    9987.3    1584.98      9993.7    1584.98    10000.0      1584.98   10007.8     1588.8    10015.3
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GR   1589.7    10030.8     1592.2    10038.9     1593.0    10047.9       1600    10072.3       1600    10099.9
GR     1600    10138.6       1600    10173.4       1600    10214.6       1600    10248.3

          Return  Contraction and Expansion coefficients to Normal
1
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NC                                          0.1       0.3

NH        3         .1      9989.8       .045    10010.8         .1    10139.4
ET                          9.1                                                          9930.61   10114.81
              Culvert M7       Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    2.558         19      9989.8    10010.8         70        70       71.3
GR   1597.4     9874.5      1596.1     9893.4     1594.9    9929.4     1589.1    9945.1     1589.2    9954.1
GR   1587.8     9960.3      1587.7     9967.7     1588.6    9970.9     1588.5    9989.8     1587.0   10000.0
GR   1587.0    10003.7      1588.4    10010.8     1588.3   10026.5     1589.1   10037.9     1593.7   10053.1
GR   1594.2    10081.5      1594.4    10112.2     1594.7   10126.6     1595.4   10139.4


NH        3         .1     10023.2       .045    10028.9         .1    10066.3
ET                          9.1                                                          9938.75   10044.51
X1    2.670         25      9959.8    10044.5         575       610      593.5
GR   1609.4     9650.9      1606.6     9663.7     1607.0    9681.1     1606.2    9700.5     1606.7    9704.7
GR   1607.0     9721.1      1606.1     9740.1     1605.4    9772.0     1604.4    9828.4     1603.9    9847.0
GR   1602.9     9870.2      1599.8     9888.9     1599.2    9926.0     1594.4    9947.4     1595.0    9959.8
GR   1594.7     9980.3      1594.4     9987.8     1594.3    9995.5     1594.3   10000.0     1594.0   10015.2
GR   1594.5    10023.2      1592.6    10028.9     1599.0   10044.5     1606.1   10059.3     1610.0   10066.3


NH        3         .1      9968.9       .045    9992.6          .1    10066.9
ET                          9.1                                                          9949.46   10045.96
          Left overbank is non effective flow area:  Hard coded GR's
              from STA 9927.3 to 9946.4 @ EL 1607.5
X1    2.785         21      9968.9    9992.6         610       610      607.2
GR   1615.1     9809.0      1614.0     9841.4     1613.1    9875.0     1612.6    9886.4     1611.9    9903.0
GR   1610.5     9913.4      1607.5     9927.3     1607.5    9935.5     1607.5    9941.1     1607.5    9946.4
GR   1604.9     9953.7      1602.6     9968.9     1601.6    9977.4     1600.4    9988.3     1601.7    9992.6
GR   1601.8    10000.0      1602.1    10007.9     1603.9   10021.0     1605.3   10041.1     1607.4   10050.3
GR   1614.9    10066.9


NH        3         .1        10000       .045      10033         .1    10137.3
ET                          9.1                                                          9934.70   10055.59
X1    2.807         23        10000    10047.1         115       120      112.3
GR   1614.4     9896.8       1613.4     9911.0     1609.9    9929.0     1605.4    9939.7     1603.2    9949.3
GR   1604.1     9959.7       1604.2     9975.1     1603.9    9991.9     1604.4   10000.0     1603.9   10009.4
GR   1602.3    10015.1       1603.1    10033.0     1606.0   10047.1     1607.7   10056.7     1610.5   10070.3
GR   1613.5    10081.1       1617.3    10089.4     1622.1   10096.0     1627.3   10102.8     1632.4   10110.3
GR   1639.4    10119.5       1644.5    10126.9     1650.2   10137.3


NH        3         .1        10000       .045    10027.6         .1      10133
ET                          9.1                                                          9980.85   10074.87
X1    2.899         21      9990.2    10036.9         485       490      489.4
GR   1623.7     9891.7      1622.9     9911.2     1621.7    9939.2     1621.3    9947.9     1618.1    9965.3
GR   1613.2     9978.1      1611.0     9990.2     1610.7   10000.0     1609.6   10012.9     1610.3   10027.6
GR   1610.6    10036.9      1609.9    10050.9     1610.1   10060.7     1611.2   10070.2     1613.0   10075.8
GR   1615.1    10083.4      1618.4    10092.6     1620.4   10099.0     1621.2   10110.7     1621.5   10116.6
GR   1638.3    10133.0

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NH        3         .1      9971.8       .045    10023.9         .1    10128.6
ET                          9.1                                                          9959.81   10064.07
X1    3.008         29      9962.7    10023.9         575       600      573.7
GR   1630.8     9799.0      1631.8     9817.3     1631.6    9843.0     1631.1    9864.0     1631.0    9876.2
GR   1631.1     9882.4      1630.6     9891.7     1629.0    9913.4     1628.9    9921.5     1627.7    9938.8
GR   1625.3     9948.5      1621.1     9962.7     1619.7    9971.8     1618.7    9986.5     1617.8   10000.0
GR   1618.7    10005.4      1618.1    10015.6     1620.5   10023.9     1620.1   10039.5     1618.7   10052.9
GR   1619.3    10056.9      1622.3    10065.0     1624.3   10076.9     1625.7   10081.4     1628.5   10096.9
GR   1628.8    10111.2      1629.7    10114.7     1629.8   10118.3     1631.1   10128.6


NH        3         .1      9988.7       .045    10017.8         .1    10148.2
ET                          9.1                                                          9948.20   10032.87
                  ARROW WASH Tributary
X1    3.121         24      9988.7    10017.8         565       600      598.0
GR   1641.5     9787.2      1640.8     9824.7     1640.9    9830.1     1637.9    9837.6     1637.4    9868.2
GR   1636.6     9880.2      1636.6     9890.8     1636.4    9910.9     1634.2    9929.4     1629.3    9961.2
GR   1629.1     9977.0      1628.9     9988.7     1625.8   10000.0     1629.3   10017.8     1630.5   10027.0
GR   1632.7    10043.1      1636.2    10055.6     1637.4   10065.6     1638.3   10080.0     1638.6   10096.9
GR   1639.3    10113.9      1640.1    10128.6     1640.8   10138.9     1641.3   10148.2

          ARROW  WASH    Tributary

        HEC-1 Concentration Point C621
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NH        3        .1       9980        .045     10023.3          .1     10215.8

QT        2      1180       1180

ET                           9.1                                                  9969.40   10050.61
          HEC-1 Concentration Point C621:  6-hr storm controls.
X1    3.208        22       9980     10050.6         260         335        456.4
GR   1649.5    9756.0     1651.8      9776.8      1647.5      9794.4       1646.6   9801.3    1647.8    9814.7
GR   1647.5    9869.3     1646.9      9890.1      1645.9      9904.2       1644.9   9915.9    1644.5    9930.6
GR   1642.7    9943.5     1638.2      9980.0      1635.9     10000.0       1637.0  10023.3    1639.7   10050.6
GR   1646.4   10072.8     1647.3     10112.6      1647.8     10137.9       1648.1  10157.1    1648.6   10177.8
GR   1649.1   10195.3     1649.2     10215.8


NH        3        .1       9998.3      .045     10036.8          .1     10258.8
ET                           9.1                                                  9988.22   10058.81
X1    3.241        34       9998.3     10036.8         175         175        177.3
GR   1655.6    9679.6     1654.7      9699.2      1654.0      9722.2       1652.9   9744.9    1651.8    9769.6
GR   1651.6    9787.1     1651.0      9809.3      1649.9      9822.4       1649.0   9839.1    1648.3    9863.0
GR   1647.4    9889.1     1647.0      9922.3      1646.1      9955.6       1646.0   9974.8    1645.7    9983.9
GR   1641.4    9998.3     1640.9     10000.0      1641.4     10013.6       1641.9  10036.8    1643.9   10055.3
GR   1645.5   10066.3     1647.1     10079.1      1649.4     10094.6       1650.9  10109.4    1652.2   10123.1
GR   1652.6   10145.6     1653.7     10155.4      1654.1     10164.4       1654.1  10190.1    1653.6   10210.6
GR   1654.6   10230.9     1656.8     10239.6      1657.3     10248.5       1657.9  10258.8

         HEC-1 Concentration Point C613
1
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QT        2       970        970

NH        3        .1       9994.8      .045       10014          .1       10196
ET                           9.1                                                  9986.79   10100.35
          HEC-1 Concentration Point C613:  24-hr storm controls.
X1    3.323        30       9986.8     10035.6         420         440        429.5
GR   1661.3    9850.1     1660.8      9863.7      1663.4      9877.7       1663.2   9892.7    1658.3    9909.9
GR   1657.2    9934.0     1656.7      9948.5      1656.4      9961.8       1655.6   9978.7    1654.5    9986.8
GR   1649.8    9994.8     1649.8     10000.0      1651.4     10014.0       1652.0  10035.6    1651.5   10056.8
GR   1651.0   10074.8     1650.4     10089.9      1650.3     10093.9       1653.2  10099.9    1656.3   10104.6
GR   1658.7   10112.2     1660.4     10118.8      1660.6     10128.2       1661.2  10138.4    1662.0   10146.3
GR   1663.1   10154.2     1663.3     10161.8      1663.7     10171.9       1663.6  10187.9    1663.3   10196.0


NH        3        .1       9986        .045     10028.9          .1     10250.3
ET                           9.1                                                  9976.51   10061.39
X1    3.421        29       9977.8     10028.9         510         505        518.2
GR   1667.8    9775.1     1668.8      9788.5      1669.6      9813.4       1670.1   9817.7    1670.2    9880.7
GR   1669.5    9899.9     1668.4      9935.3      1667.7      9953.4       1667.1   9965.8    1662.4    9977.8
GR   1660.1    9986.0     1660.0     10000.0      1660.5     10016.3       1661.0  10028.9    1661.4   10051.0
GR   1661.9   10057.7     1665.2     10069.8      1668.4     10078.2       1670.4  10084.7    1670.6   10110.0
GR   1670.9   10124.0     1673.8     10138.4      1674.2     10151.7       1674.0  10161.5    1674.3   10210.7
GR   1674.3   10222.3     1675.4     10233.3      1675.3     10239.5       1674.2  10250.3

   ********************************************************************************
   **************************    Culvert 608     ****************************
   ********************************************************************************

         HEC-1 Concentration Point C608

QT        2       970        970

NH        3        .1       9973.3      .045     10019.6          .1     10305.1
ET                           9.1                                                  9965.79   10048.85
          HEC-1 Concentration Point C608:  24-Hr storm controls.
         CULVERT  608:  ASHBROOK WASH and HAMPSTEAD DRIVE
            Culvert 608      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    3.487        38       9973.3     10019.6         350         340        351.5
GR   1683.7    9708.3     1682.9      9729.6      1682.8      9752.4       1680.6   9768.8    1680.0    9782.9
GR   1679.7    9846.6     1678.4      9856.0      1677.3      9873.6       1677.2   9905.2    1675.0    9916.4
GR   1675.0    9949.4     1670.5      9960.7      1668.0      9973.3       1667.2   9982.3    1666.6    9990.5
GR   1666.6   10000.0     1666.7     10012.0      1668.6     10019.6       1669.8  10032.0    1669.0   10043.4
GR   1670.4   10059.0     1671.5     10065.9      1676.5     10081.4       1677.2  10093.7    1677.2   10109.9
GR   1676.8   10124.4     1678.8     10132.2      1680.3     10140.9       1681.0  10151.4    1681.0   10168.1
GR   1681.6   10224.8     1682.0     10244.0      1682.9     10255.5       1682.1  10265.9    1682.7   10274.1
GR   1683.4   10288.2     1683.5     10303.3      1683.5     10305.1

         Use NC Record to set Contraction and Expansion Coefficients for Culvert.
1
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NC                                        0.3         0.5
NH        3      0.100       9978.5      0.045    10029.4        0.100     10282.7

ET                           9.1                                                  9988.69   10017.10
            Culvert 608  Outlet.   3-10'x 7' Box       (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 24.4' Downstream. (No Elev. Adjust.
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X1    3.519        30     9988.7    10017.1       170       170      168.3
X3       10                                                        1678.5    1678.5
GR    1688.0     9703.2    1686.8     9716.7    1686.3     9734.4    1685.9   9751.2    1684.6    9768.9
GR    1681.6     9793.0    1682.1     9800.9    1681.3     9839.1    1680.2   9861.1    1679.0    9880.8
GR    1680.4     9889.8    1679.0     9923.2    1674.9     9945.8    1673.2   9957.2    1672.5    9978.5
GR    1670.8     9988.7    1670.8    10000.0    1670.6    10017.1    1671.7  10029.4    1675.6   10052.6
GR    1678.0    10070.8    1679.1    10110.3    1680.8    10149.4    1682.6  10183.3    1683.9   10203.9
GR    1683.9    10221.3    1683.4    10222.7    1683.5    10254.8    1683.9  10257.7    1684.3   10282.7

SC    3.013         0.5       2.63          0         7         10      61.5       8.1   1673.19   1672.71

NH        3       0.100     9980.8       0.045  10013.8       0.100    10300

ET                              9.1                                                    9980.79   10013.80
                Culvert 608  Inlet.    3-10'x7'  Box       (SECTION 3 OF SC ROUTINE)
                  Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
                Culvert 608 BT information Surveyed by ALS. West top of curb.
X1    3.531        21     9980.8    10013.8      61.5      61.5      61.5
X2                            2    1680.19   1681.95
X3       10                                                        1681.57   1681.57

BT      -11     9708.7    1690.0                9800   1684.76               9850   1682.76
BT             9900    1681.89                9950   1681.57              10000   1681.87
BT            10050   1682.36               10100   1682.86              10150   1683.35
BT            10200    1683.8               10300    1685.5

GR    1690.0     9708.7    1686.7     9747.3    1683.8     9786.3    1680.6   9833.4    1678.7    9874.1
GR    1677.5     9920.2    1677.2     9952.6    1677.1     9974.2    1673.1   9980.8    1671.8    9991.0
GR    1673.2    10000.0    1671.7    10013.8    1672.3    10022.9    1677.1  10025.3    1679.3   10033.9
GR    1679.8    10071.4    1680.7    10123.5    1682.0    10161.6    1682.7  10205.9    1682.8   10240.9
GR    1685.5      10300

          Return  Contraction and Expansion coefficients to Normal

NC                                          0.1       0.3

NH        3         .1     9962.2       .045  10028.7         .1    10309.5
ET                              9.1                                                    9950.19   10057.31
                Culvert 608     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    3.544        30     9950.2    10057.3        75        75      71.3
GR    1691.5     9663.5    1686.9     9680.4    1686.0     9706.3    1684.4   9731.7    1682.5    9764.7
GR    1680.6     9792.6    1679.2     9806.3    1678.1     9851.1    1677.0   9894.2    1677.4    9903.1
GR    1677.6     9933.6    1676.9     9950.2    1673.8     9962.2    1674.0   9972.0    1674.2   10000.0
GR    1673.7    10013.1    1674.6    10028.7    1675.2    10047.5    1676.7  10057.3    1676.5   10070.2
GR    1682.7    10078.0    1683.3    10092.7    1683.0    10114.2    1684.9  10143.3    1687.2   10167.5
GR    1689.5    10185.7    1690.3    10216.9    1691.0    10240.9    1690.4  10277.5    1691.3   10309.5
1
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        START Hydraulically Similar Reach   AS4
              See Exhibit 1, Manning's n Value Map.

NH        3        .055     9955.4       .045  10034.2        .025    10161
ET                              9.1                                                    9955.39   10034.21
              START Hydraulically Similar Reach AS4
              See Exhibit 1, Manning's n Value Map.
X1    3.621        28     9955.4    10034.2       390       390      403.4
GR    1691.4     9676.9    1688.2     9688.9    1686.9     9712.0    1686.0   9717.7    1687.0    9723.9
GR    1687.7     9739.3    1687.0     9758.2    1687.3     9796.4    1686.8   9824.6    1686.0    9865.2
GR    1686.2     9883.7    1685.9     9907.3    1685.1     9933.7    1681.9   9955.4    1681.2    9977.5
GR    1679.1     9988.6    1678.4    10000.0    1678.3    10006.7    1681.4  10019.6    1681.9   10034.2
GR    1684.1    10047.5    1689.9    10063.4    1689.5    10072.5    1691.2  10082.2    1691.6   10106.4
GR    1692.2    10121.9    1693.5    10147.6    1693.4    10161.0

NH        3        .055        9990       .045  10062.7        .025    10093.5
ET                              9.1                                                    9980.06   10065.09
X1    3.701        19        9990    10062.7       385       420      421.7
GR    1695.8     9795.3    1692.7     9813.0    1693.7     9821.0    1693.5   9846.3    1694.8    9855.2
GR    1694.3     9877.5    1693.0     9914.9    1692.7     9947.1    1691.9   9964.8    1688.7    9981.9
GR    1687.9     9990.0    1685.2     9994.1    1684.8    10000.0    1686.3  10012.3    1687.8   10035.8
GR    1687.5    10048.9    1688.1    10062.7    1694.0    10077.7    1700.2  10093.5

NH        3        .055     9967.1       .045  10049.3        .025    10220.3
ET                              9.1                                                    9962.68   10051.51
X1    3.764        20     9978.8    10035.2       330       315      332.8
GR    1706.0     9923.7    1699.5     9938.0    1694.2     9951.2    1695.0   9957.9    1691.5    9967.1
GR    1691.8     9978.8    1690.9     9993.0    1690.3    10000.0    1690.6  10008.6    1691.2   10016.2
GR    1689.7    10023.7    1692.7    10035.2    1692.8    10049.3    1696.1  10068.4    1699.2   10081.5
GR    1700.2    10102.1    1701.1    10140.3    1702.4    10180.7    1703.2  10210.1    1703.5   10220.3

   ****************************************************************************
   **************************        Dam 4        ******************************
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        HEC-1 Concentration Point C585
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QT        2        300        300

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   **************************    Culvert   585    ***************************
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        START Hydraulically Similar Reach  AS 3
              See Exhibit 1, Manning's n Value Map.
NH        3         .1      10000       .045       10020         .1       10119
ET                            9.1                                                    9990.00    10032.61
1
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                     SECTION 4.058 USING REVISED MAPPING.
                   START Hydraulically Similar Reach AS3
                   See Exhibit 1, Manning's n Value Map.
              **************************     DAM  4     ****************************
               HEC-1   C599 Storage Route Rating Curve        WSEL =  1715.8 feet
               HEC-1   C585 Inflow Hydrograph (Ashbrook Wash)    Q =      300 cfs
               Reference:      HEC-1  Output  File:  EX100-6.OH1
              HEC-1 Concentration Point C585:  6-hr storm controls.

            CULVERT  585:  ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
               Culvert 585      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1     4.058         11         9990       10028        1500        1490       1552.3
X5         2     1715.8     1715.8
GR      1744       9923       1740        9932        1730        9955        1720       9980        1718        9990
GR    1714.7      10000     1714.73       10020        1716       10028        1718      10052        1720       10063
GR      1730      10119

          Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                        0.3         0.5
NH        3      0.100      9992.5       0.045      10027.6       0.100      10113.2
ET                            9.1                                                    10000.00   10019.10
               Culvert 585  Outlet.   2-8'x 4' Box        (SECTION 2 OF SC ROUTINE)
                 Photogrammetric x-sec. located 5.9' Downstream. (No Elev. Adjust.)
                  Base Channel Elevations were lowered to Culvert Invert EL 1714.73
X1     4.065         12        10000      10019.1          36          33         36.6
X3        10                                                                    1731.4     1731.4
GR    1739.4      9933.0      1729.8       9954.1       1721.6       9974.4       1721.8      9984.5      1719.9      9992.5
GR    1714.7      10000.0     1714.73      10019.1      1718.0       10027.6      1719.9      10049.9     1723.6      10079.2
GR    1726.7      10098.0     1729.2       10113.2


SC     2.013         0.5        2.63           0           4           8          242         8.1       1722.47     1714.73
         START Hydraulically Similar Reach  AS 5
               See Exhibit 1, Manning's n Value Map.
NC     0.050       0.050      0.025         0.3         0.5
NH         3       0.050      9978.9       0.025      10015.4       0.050      10096.5

ET                            9.1                                                    9987.10    10000.00
               Culvert 585  Inlet.    2-8'x 4' Box        (SECTION 3 OF SC ROUTINE)
                 Photogrammetric x-sec. located 30' Upstream. (No Elev. Adjust.)
                  Base Channel Elevations were lowered to Culvert Invert EL 1722.47
               Culvert 585 BT information taken from AS-BUILTS      (Set #10).
               Culvert 585 BT information coded per figure 3.16 (HEC-2, Sept 90)
                   START Hydraulically Similar Reach AS5
                   See Exhibit 1, Manning's n Value Map.
X1     4.110         14       9987.1        10000         242         242         242
X2                              2        1726.47      1740.82
X3        10                                                                    1739.78    1739.78
X4         2     1744.15        9942      1739.78      10047.8

BT       -11      9911.9      1750.4                   9924.4      1749.8                  9936.0     1747.5
BT                  9942     1744.15                     9964     1743.32                   10000     1741.74
BT                10047.8     1739.78                  10048.8      1740.4                10073.6     1741.6
1
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BT                10085.9     1747.7                   10096.5      1751.1

GR    1750.4      9911.9      1749.8       9924.4       1747.5       9936.0       1734.7      9959.1      1723.2      9978.9
GR    1722.4      9987.1     1722.47      10000.0       1724.1      10015.4       1726.9      10020.2     1728.8      10028.2
GR    1740.4      10048.8     1741.6       10073.6      1747.7       10085.9      1751.1      10096.5

          Return  Contraction and Expansion coefficients to Normal

NC     0.050       0.050      0.025         0.1         0.3

         Section 4.119 using revised mapping.

NH         3         .05       9980        .025       10000         .05       10090
ET                            9.1                                                    9972.63    10014.77
               Culvert 585      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                           SECTION 4.119 USING REVISED MAPPING.
X1     4.119         12        9977       10014          45          45         47.5
GR      1750       9926        1740        9945        1730        9966        1724       9977       1722.47      9980
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GR   1722.5      10000       1726       10014        1730       10022        1740       10043       1742       10060
GR     1744      10076       1750       10090

NH         3        .05     9987.9        .025     10006.5         .05     10081.3
ET                            9.1                                                    9983.92    10027.71
X1     4.177         12     9987.9     10027.7         295         300       306.2
GR    1753.6     9951.0     1748.7      9963.1      1746.4      9973.0      1744.9     9987.9     1742.9      9995.3
GR    1743.0    10000.0     1743.6     10006.5      1747.0     10027.7      1747.7    10040.7     1748.3     10063.3
GR    1751.9    10073.3     1754.8     10081.3

NH         3        .05     9971.9        .025      9983.3         .05     10060.4
ET                            9.1                                                    9956.12    10024.47
X1     4.252         13     9971.9      9983.3         390         400       395.2
GR    1767.2     9930.2     1762.5      9938.0      1757.2      9958.3      1756.3     9971.9     1754.2      9977.1
GR    1756.6     9983.3     1756.9     10000.0      1756.7     10013.2      1757.7    10017.9     1757.7     10024.2
GR    1762.1    10041.1     1766.2     10057.2      1766.5     10060.4

**********************************************************************************
**************************    Culvert   M5     *****************************
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      START Hydraulically Similar Reach   AS 6
            See Exhibit 1, Manning's n Value Map.

NH         3       .055     9972.5        .045     10036.3         .06     10191.5
ET                            9.1                                                    9971.12    10043.12
            START Hydraulically Similar Reach AS6
            See Exhibit 1, Manning's n Value Map.
1
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        CULVERT  M5 :  ASHBROOK WASH and SIERRA MADRE
            Culvert M5      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1     4.311         38     9972.5     10036.3         310         310       311.5
GR    1783.8     9591.0     1780.3      9600.2      1776.3      9618.8      1774.2     9635.3     1772.4      9652.4
GR    1771.7     9661.7     1770.0      9674.2      1770.8      9690.1      1770.9     9713.0     1771.5      9715.8
GR    1771.6     9725.5     1771.2      9727.2      1771.2      9739.4      1770.7     9757.7     1771.2      9760.2
GR    1771.7     9776.5     1771.9      9797.3      1771.5      9825.8      1771.8     9851.4     1771.9      9883.1
GR    1771.3     9906.7     1771.6      9930.1      1771.5      9943.0      1771.7     9954.6     1766.1      9972.5
GR    1765.4     9978.6     1765.6     10000.0      1765.6     10000.0      1765.8    10020.3     1765.8     10036.3
GR    1768.5    10061.3     1773.7     10082.6      1773.7     10106.6      1773.1    10114.9     1773.7     10135.7
GR    1776.8    10154.9     1778.7     10179.2      1779.4     10191.5

      Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                        0.3          0.5
NH         3       0.055     9967.5        0.045     10019.5         0.060     10198.1

ET                            9.1                                                    9967.50    10019.51
          Culvert M5   Outlet.  5-10'x 3' Box        (SECTION 2 OF SC ROUTINE)
            Photogrammetric x-sec. located 17.2' Downstream. (No Elev. Adjust.
X1     4.335         41     9967.5     10019.5         130         130       130
X3        10                                                              1772.61    1772.61
GR    1786.4     9592.5     1783.5      9605.6      1781.0      9619.5      1780.8     9621.6     1779.8      9626.3
GR    1777.2     9643.6     1775.4      9661.9      1774.6      9678.7      1773.8     9692.3     1772.6      9703.0
GR    1773.5     9719.5     1773.7      9744.8      1774.1      9746.9      1774.2     9753.9     1773.8      9755.7
GR    1773.6     9767.3     1772.9      9785.7      1774.1      9789.7      1775.1     9814.4     1776.5      9827.6
GR    1777.0     9844.8     1776.0      9859.8      1774.9      9874.3      1774.5     9904.2     1773.8      9937.0
GR    1773.4     9957.9     1768.3      9967.5      1767.3      9982.0      1767.8    10000.0     1768.6     10019.5
GR    1772.0    10028.6     1772.5     10041.8      1774.3     10049.7      1774.2    10073.0     1776.0     10088.4
GR    1776.6    10113.1     1776.9     10133.6      1776.0     10140.7      1775.7    10156.8     1776.6     10176.0
GR    1782.0    10198.1

SC    5.013          0.5        2.63           0           3          10        74.5         8.1    1770.06     1768.95
NH         3       0.055     9972.6        0.045     10025.2         0.060     10266.3

ET                            9.1                                                    9972.59    10025.21
          Culvert M5   Inlet.   5-10'x 3' Box        (SECTION 3 OF SC ROUTINE)
          Culvert M5  BT information Surveyed by ALS. South top of curb.
          Culvert M5  BT information coded per figure 3.16 (HEC-2, Sept 90)
X1     4.349         40     9972.6     10025.2        74.5        74.5        74.5
X2                              2     1773.06     1775.19
X3        10                                                              1775       1775
X4         1     1776.7       9877

BT       -34     9590.0     1785.8                 9605.3      1783.5                 9617.2     1781.3
BT           9623.9     1779.9                 9636.2      1779.0                 9652.5     1777.9
BT           9669.7     1776.6                 9685.5      1776.0                 9702.1     1775.6
BT           9704.4     1775.1                 9712.5      1775.0                 9724.0     1775.7
BT           9740.0     1776.1                 9756.2      1775.9                 9783.8     1775.6
BT           9794.8     1775.4                 9798.2      1776.0                 9831.9     1776.7
BT             9877     1776.7                   9900      1777.04                  9950     1777.09
BT            10000    1777.00                  10050      1777.58                10070.9     1778.1
BT          10088.6     1778.3                10109.6      1778.5                10127.3     1778.0
1
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BT          10159.9    1778.3          10170.7    1779.5          10188.5    1783.0
BT          10204.2    1783.5          10214.0    1785.4          10226.9    1786.5
BT          10239.4    1789.0

GR  1787.5   9579.4   1785.8   9590.0   1783.5   9605.4   1781.3   9617.2   1779.9   9623.9
GR  1779.0   9636.2   1777.9   9652.5   1776.6   9669.7   1776.0   9685.5   1775.6   9702.1
GR  1775.1   9704.4   1775.0   9712.5   1775.7   9724.0   1776.1   9740.0   1775.9   9756.2
GR  1775.6   9783.8   1775.4   9794.8   1776.0   9798.2   1776.7   9831.9   1776.7   9882.1
GR  1776.9   9922.1   1776.3   9956.1   1773.8   9964.9   1770.1   9972.6   1770.0   10000.0
GR  1770.2   10025.2  1774.2   10036.7  1777.4   10054.4  1778.1   10070.9  1778.3   10088.6
GR  1778.5   10109.6  1778.0   10127.3  1778.3   10159.9  1779.5   10170.7  1783.0   10188.5
GR  1783.5   10204.2  1785.4   10214.0  1786.5   10226.9  1789.0   10239.4  1788.7   10266.3

          Return  Contraction and Expansion coefficients to Normal

NC                                    0.1      0.3

NH        3      .055      9975.9     .045     10033.1     .06      10259.3
ET                         9.1                                                 9943.02   10036.18
               Culvert M5      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1   4.362        37        9975.9   10033.1      65        75        65.5
GR  1790.3   9589.1   1787.0   9604.5   1783.0   9624.7   1779.1   9639.6   1777.3   9647.9
GR  1777.2   9669.5   1776.7   9695.1   1776.8   9702.7   1776.9   9716.9   1776.4   9719.1
GR  1777.1   9728.0   1777.1   9743.8   1777.6   9744.8   1777.6   9751.2   1777.1   9753.9
GR  1777.1   9770.0   1776.7   9788.3   1777.1   9793.8   1777.5   9816.6   1777.0   9850.0
GR  1776.6   9874.5   1776.3   9918.7   1775.1   9927.5   1772.4   9944.9   1772.2   9975.9
GR  1771.5   10000.0  1771.9   10033.1  1778.6   10059.2  1778.1   10093.1  1777.7   10122.2
GR  1778.0   10141.9  1779.0   10155.9  1779.7   10191.9  1780.3   10216.1  1780.5   10224.6
GR  1784.8   10241.2  1791.9   10259.3


NH        3      .055      9933.8     .045     10000       .06      10307.8
ET                         9.1                                                 9889.46   10009.71
X1   4.412        42        9933.8   10009.7      290       250       264.6
GR  1789.7   9650.3   1788.9   9657.7   1782.9   9676.4   1783.8   9692.0   1783.7   9712.1
GR  1782.9   9724.5   1782.4   9734.2   1784.3   9746.4   1783.6   9762.7   1782.9   9788.4
GR  1782.0   9808.3   1782.7   9826.4   1782.6   9846.8   1781.5   9874.0   1778.4   9891.0
GR  1778.3   9915.0   1777.9   9933.8   1777.8   9951.0   1777.8   9970.4   1777.8   9984.9
GR  1777.7   9995.6   1777.2   10000.0  1779.5   10009.7  1781.9   10023.2  1782.5   10038.3
GR  1780.8   10065.7  1781.8   10072.9  1779.4   10088.5  1780.4   10099.5  1781.1   10115.4
GR  1782.5   10127.5  1782.3   10137.5  1780.8   10151.1  1783.0   10169.0  1783.0   10186.7
GR  1782.5   10212.0  1782.7   10234.2  1782.7   10254.3  1782.2   10270.1  1782.1   10280.8
GR  1786.3   10290.3  1792.6   10307.8


NH        3      .055      9988.2     .045     10010       .06      10217.9
ET                         9.1                                                 9967.35   10024.74
X1   4.493        26        9988.2   10010        470       420       430.2
GR  1791.4   9875.2   1791.9   9898.0   1791.4   9916.3   1790.5   9931.9   1790.7   9951.0
GR  1788.2   9960.5   1784.8   9970.9   1784.5   9981.3   1785.1   9988.2   1784.2   9997.1
GR  1784.4   10000.0  1784.7   10010.0  1784.6   10020.2  1787.6   10030.2  1789.8   10035.7
GR  1789.3   10052.6  1789.0   10076.5  1788.7   10083.8  1792.1   10091.7  1791.7   10117.9
GR  1791.3   10141.5  1790.8   10157.4  1791.0   10172.7  1791.3   10188.5  1791.3   10202.6
GR  1791.2   10217.9
1
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NH        3      .055      9979.7     .045     10008.6     .06      10114.6
ET                         9.1                                                 9970.19   10018.18
X1   4.559        25        9979.7   10008.6      345       340       344.3
GR  1801.1   9834.3   1800.6   9860.0   1799.3   9875.1   1800.0   9895.6   1800.0   9904.6
GR  1797.3   9918.3   1797.4   9925.1   1798.7   9933.9   1798.5   9942.9   1798.2   9947.0
GR  1797.6   9953.8   1792.1   9968.6   1790.9   9979.7   1790.3   9991.3   1789.8   10000.0
GR  1791.2   10008.6  1792.4   10024.4  1795.3   10031.7  1797.4   10042.7  1797.8   10048.6
GR  1798.8   10061.9  1799.7   10079.0  1803.0   10089.3  1807.7   10100.9  1813.3   10114.6


NH        3      .055       9990      .045     10009.5     .06      10038.4
ET                         9.1                                                 9981.67   10016.83
X1   4.637        16        9990     10009.5      410       415       413.7
GR  1809.8   9918.7   1808.9   9941.1   1808.0   9962.3   1804.4   9973.7   1801.2   9982.0
GR  1800.1   9985.6   1800.4   9990.0   1799.4   9996.2   1799.2   10000.0  1799.6   10009.5
GR  1801.7   10018.4  1801.6   10018.6  1804.1   10022.9  1806.4   10027.6  1816.2   10031.8
GR  1827.3   10038.4

  ********************************************************************************
  **************************        Dam  6          ******************************
  ********************************************************************************

        HEC-1 Concentration Point C560I

QT        2       1990       1990

NH        3      .055       9997      .045     10045.1     .06      10208.6
ET                         9.1                                                 9949.57   10166.77
          **************************      DAM  6      ******************************
           HEC-1   C560 Storage Route Rating Curve          WSEL =  1832.4 feet
```

HEC-1 C560 Inflow Hydrograph Q = 1990 cfs
Reference: HEC-1 Output File: EX100-6.OH1
HEC-1 Concentration Point C560I: 6-hr storm controls

```
X1    4.839      30    9992.8   10054.8      1050      1040    1067.6
X5        2  1832.4    1832.4
GR  1840.5    9752.4  1839.8    9782.1    1838.6    9816.5    1838.1    9841.5   1837.6    9873.6
GR  1837.3    9902.4  1837.1    9925.7    1836.3    9936.8    1832.3    9949.9   1826.3    9966.7
GR  1824.8    9973.9  1824.5    9992.8    1823.3    9997.0    1823.4   10000.0   1823.5   10010.6
GR  1823.9   10034.0  1822.8   10045.1    1826.5   10054.8    1829.0   10068.3   1828.8   10074.1
GR  1828.8   10088.1  1829.0   10105.9    1827.9   10121.6    1828.2   10126.7   1830.6   10136.0
GR  1831.5   10147.4  1831.3   10155.3    1832.7   10169.9    1836.7   10186.6   1842.6   10208.6

NH        3     .055    9994.1     .045   10017.2      .06    10206.7
ET                      9.1                                              9967.57  10042.27
X1    4.954      29    9994.1   10017.2       600       605      608.2
GR  1848.5    9716.2  1848.8    9724.9    1847.9    9751.6    1847.0    9789.3   1845.4    9823.8
GR  1844.7    9845.0  1844.1    9857.2    1844.0    9867.5    1844.4    9878.9   1844.1    9894.2
GR  1843.9    9911.5  1844.9    9935.3    1842.7    9946.5    1839.1    9965.8   1836.6    9976.4
GR  1834.8    9994.1  1832.3   10000.0    1832.5   10010.5    1834.5   10013.8   1835.8   10017.2
GR  1837.7   10039.2  1843.1   10056.1    1847.0   10074.7    1846.7   10108.7   1846.7   10139.6
1
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GR  1847.7   10175.7  1846.1   10183.5    1847.4   10194.0    1848.8   10206.7
```

HEC-1 Concentration Point C558

```
QT        2     1920    1920

NH        3     .055    9990.4     .045   10012.3      .06    10130.9
ET                      9.1                                              9910.00  10012.31
```

HEC-1 Concentration Point C558: 6-hr storm controls.

```
X1    5.076      35    9990.4   10012.3       620       630      641.3
GR  1864.3    9682.8  1864.0    9707.8    1865.0    9716.5    1864.3    9731.5   1863.9    9737.2
GR  1863.1    9761.7  1862.6    9792.2    1862.2    9810.7    1861.2    9837.3   1862.1    9845.6
GR  1861.4    9853.8  1859.2    9874.1    1859.4    9881.3    1858.0    9885.9   1857.6    9898.1
GR  1853.0    9907.6  1850.2    9917.4    1848.9    9920.5    1847.7    9930.5   1849.7    9936.4
GR  1850.6    9957.7  1850.9    9978.9    1851.2    9990.4    1848.7    9997.0   1848.5   10000.0
GR  1848.3   10004.8  1852.7   10012.3    1856.3   10022.7    1859.8   10033.8   1860.3   10048.1
GR  1860.6   10074.2  1860.2   10081.0    1860.6   10097.3    1862.5   10109.4   1869.0   10130.9

NH        3     .055    9988.2     .045   10000        .06    10259.9
ET                      9.1                                              9975.59  10079.29
X1    5.182      31    9975.6   10000        535       540      558.9
GR  1879.5    9712.7  1879.7    9736.2    1880.1    9768.3    1879.6    9804.3   1879.1    9825.6
GR  1878.3    9865.9  1877.5    9912.1    1876.3    9942.3    1875.7    9949.4   1875.6    9959.8
GR  1871.1    9975.6  1866.7    9988.2    1866.4    9993.7    1867.4   10000.0   1867.3   10006.8
GR  1867.5   10032.3  1866.0   10038.7    1867.1   10050.3    1867.4   10063.7   1868.1   10073.9
GR  1874.6   10097.3  1875.4   10107.2    1876.0   10121.4    1876.4   10138.5   1876.9   10154.3
GR  1874.7   10167.2  1876.3   10181.4    1875.3   10205.8    1877.2   10220.2   1879.6   10240.9
GR  1883.6   10259.9

NH        3     .055    9994.5     .045   10015.2      .06    10187.4
ET                      9.1                                              9980.63  10077.27
X1    5.277      24    9982.4   10015.2       500       470      504.7
GR  1890.4    9686.5  1890.5    9700.0    1887.7    9775.4    1888.2    9793.6   1888.4    9812.3
GR  1887.9    9850.0  1887.0    9912.1    1886.9    9932.2    1886.8    9954.1   1884.5    9972.7
GR  1882.2    9982.4  1878.4    9994.5    1878.7   10000.0    1879.0   10006.0   1880.0   10015.2
GR  1880.3   10038.3  1879.6   10062.5    1880.5   10070.8    1884.5   10083.0   1887.1   10095.4
GR  1888.3   10121.4  1889.0   10147.8    1890.3   10176.1    1890.9   10187.4

NH        3     .055    9994.8     .045   10019.3      .06    10171.2
ET                      9.1                                              9983.36  10086.44
X1    5.349      25    9986.0   10019.3       380       375      379.8
GR  1898.6    9765.8  1898.3    9776.6    1896.8    9784.9    1896.5    9847.8   1896.4    9893.0
GR  1894.1    9897.5  1893.8    9904.6    1894.5    9920.5    1894.4    9933.3   1893.5    9947.8
GR  1892.9    9979.6  1891.1    9986.0    1887.8    9994.8    1888.5   10000.0   1889.3   10004.4
GR  1889.9   10019.3  1889.8   10053.1    1888.7   10062.1    1889.7   10079.3   1893.0   10090.3
GR  1896.6   10106.5  1896.9   10123.0    1897.6   10143.3    1899.2   10158.4   1902.7   10171.2
1
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NH        3     .055    9981.4     .045   10024.2      .06    10185.6
ET                      9.1                                              9959.50  10055.26
X1    5.436      33    9981.4   10024.2       450       440      458.7
GR  1910.1    9641.3  1908.9    9687.7    1907.6    9707.3    1906.9    9733.1   1906.5    9749.5
GR  1906.9    9765.3  1906.9    9782.9    1906.8    9796.0    1907.1    9819.1   1907.3    9838.8
GR  1906.9    9855.6  1906.6    9878.0    1906.8    9903.7    1906.6    9919.8   1905.9    9928.5
GR  1905.6    9940.1  1902.0    9956.3    1899.2    9969.6    1899.1    9981.4   1898.2    9989.2
GR  1896.1    9995.6  1896.3   10000.0    1898.2   10008.8    1898.8   10024.2   1898.7   10042.1
GR  1900.6   10052.5  1907.2   10077.6    1906.7   10083.0    1906.7   10109.3   1907.6   10120.2
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GR   1907.8     10146.6      1908.3     10172.6      1910.7     10185.6

   ********************************************************************************
   ***************************     Culvert   557     ****************************
   ********************************************************************************

         HEC-1 Concentration Point C557

QT         2        1880        1880

NH         3        .055        9971        .045        10000         .06      10070.8
ET                                9.1                                                        9932.58     10007.51
          HEC-1 Concentration Point C557:  6-hr storm controls.
          CULVERT  557:  ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
            Culvert 557      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1     5.519          26        9971     10007.5         435          435        436.4
GR    1920.6      9665.7      1919.3      9697.8      1918.5       9737.7       1918.1      9762.1      1918.1      9787.0
GR    1916.6      9797.6      1916.9      9812.8      1916.9       9826.4       1917.5      9833.5      1917.9      9840.4
GR    1917.7      9847.5      1917.1      9858.8      1918.1       9872.3       1918.3      9879.2      1918.0      9892.1
GR    1916.9      9910.1      1911.7      9925.3      1905.5       9940.8       1905.6      9954.1      1906.0      9971.0
GR    1905.5      9988.7      1903.9     10000.0      1908.8      10007.5       1919.5     10042.3      1919.8     10055.7
GR    1920.4     10070.8

         Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                                  0.3         0.5
NH         3       0.055      9984.2       0.045     10010.8       0.060      10074.0
ET                                9.1                                                        9974.98     10028.09
            Culvert 557  Outlet.   1-60" CMP          (SECTION 2 OF SC ROUTINE)
              Base Channel Elevations were lowered to Culvert Invert EL 1905.77
X1     5.542          24        9997      10003         120          120        121.8
X3        10                                                                    1911.5      1911.5
GR    1920.1      9764.4      1919.9      9807.5      1919.6       9812.0       1919.7      9825.7      1919.9      9838.6
GR    1919.5      9848.7      1919.4      9864.3      1918.9       9881.7       1918.8      9891.1      1920.1      9914.5
GR    1920.3      9936.0      1919.7      9957.9      1915.8       9966.7       1915.8      9974.4      1914.7      9984.2
GR    1905.8        9997     1905.77     10000.0     1905.77        10003       1913.9     10010.8      1915.0     10026.0
GR    1915.0     10026.0      1920.8     10042.5      1922.2      10054.4       1925.4     10074.0

1
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SC    1.024         0.9        2.63           0           5           0          110         2.3      1909.38     1905.77
NH        3       0.055        9974       0.045       10019       0.060        10062

ET                                9.1                                                        9911.73     10058.53
            Culvert 557  Inlet.    1-60" CMP          (SECTION 3 OF SC ROUTINE)
              Photogrammetric x-sec. located 2' Upstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1909.38
            Culvert 557 BT information Surveyed by ALS:west top curb, p. 10 BK 2
            Culvert 622 BT information coded per Figure 3.16 on left overbank.
              see Figure 3.16 HEC-2, Sept 1990.
X1     5.563          18        9997      10003         110          110        110
X2                     2     1914.38     1919.7
X3        10                                                                    1919.55     1919.55

BT       -12        9813      1924.4                  9845       1924.0                      9876      1923.7
BT                  9911      1923.1                  9919       1922.4                      9932      1919.8
BT                  9936      1919.6                  9950      1919.55                     10000     1920.11
BT                 10050     1922.46                 10057       1922.7                     10062      1923.8
GR    1924.4        9813      1924.0        9845      1923.7         9876       1923.1       9911      1922.4        9919
GR    1919.8        9932      1918.8        9951      1918.8         9974       1917.1       9983      1912.4        9992
GR    1909.4        9997     1909.38       10000     1909.38        10003       1914.7      10008      1918.2       10019
GR    1920.3       10033      1922.7       10057      1923.8        10062

         Return  Contraction and Expansion coefficients to Normal

NC    0.055       0.060       0.045         0.1         0.3

NH        3       .055        9983.2       .045        10022.7       .06        10090.3
ET                                9.1                                                        9929.00     10068.79
            Culvert 557      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1     5.572          23        9983.2     10022.7          55           40         47.4
GR    1928.2      9781.7      1926.8      9809.3      1926.0       9827.6       1925.3      9857.6      1924.7      9875.6
GR    1925.2      9885.0      1924.8      9910.3      1923.9       9926.3       1921.8      9934.0      1916.4      9948.9
GR    1914.2      9959.7      1913.5      9969.1      1913.2       9983.2       1912.3      9989.3      1912.2     10000.0
GR    1912.3     10005.7      1914.3     10022.7      1915.1      10036.0       1917.8     10050.9      1918.9     10056.5
GR    1922.4     10067.0      1927.4     10078.7      1930.1      10090.3


NH        3       .055        9989.7       .045        10003         .06       10230.2
ET                                9.1                                                        9981.55     10081.49
X1     5.651          24        9989.7       10003         400          390        417.3
GR    1933.3      9783.6      1938.5      9827.7      1938.4       9838.9       1935.6      9861.9      1933.5      9885.1
GR    1931.2      9893.1      1930.8      9926.9      1929.9       9964.6       1929.9      9964.6      1928.9      9969.6
GR    1920.8      9989.7      1920.4     10000.0      1922.1      10003.0       1922.0     10023.9      1921.1     10048.6
GR    1921.5     10067.3      1922.8     10077.1      1927.3      10092.5       1934.3     10114.8      1934.5     10142.6
GR    1933.9     10157.5      1933.8     10170.1      1934.9      10194.5       1939.8     10230.2

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NH      3      .055     9994.4      .045    10011.7      .06    10180.7
ET                       9.1                                    9984.52   10088.12
X1   5.765        17     9994.4   10011.7       590      595      601.1
GR  1950.0    9925.2     1949.2    9935.9     1948.6   9948.7     1949.2    9956.4    1943.3    9972.9
GR  1935.8    9994.4     1935.4   10000.0     1936.7  10011.7     1936.1   10024.0    1936.6   10032.6
GR  1937.2   10057.8     1937.8   10084.5     1941.2  10093.0     1946.5   10105.7    1947.5   10127.9
GR  1948.2   10152.4     1949.6   10180.7

NH      3      .055     9966.1      .045    10013.3      .06    10170.3
ET                       9.1                                    9949.75   10056.36
X1   5.873        17     9966.1   10013.3       565      585      573.1
GR  1968.0    9913.2     1959.5    9936.1     1952.0   9954.5     1951.3    9966.1    1950.9    9986.4
GR  1950.6    9998.6     1950.7   10000.0     1950.8  10005.2     1951.5   10013.3    1952.8   10051.9
GR  1960.0   10080.1     1961.3   10103.8     1964.1  10120.8     1962.4   10131.4    1962.8   10144.8
GR  1967.1   10159.5     1972.3   10170.3

NH      3      .055     9990.4      .045    10005.1      .06    10147.1
ET                       9.1                                    9945.14   10056.38
X1   5.978        20     9990.4   10005.1       540      540      552.2
GR  1980.0    9888.9     1977.5    9901.1     1976.5   9912.4     1976.6    9919.9    1975.4    9927.2
GR  1973.6    9932.9     1967.7    9948.7     1966.9   9961.2     1966.4    9990.4    1964.7    9995.5
GR  1965.0   10000.0     1965.9   10005.1     1966.8  10030.1     1967.7   10050.0    1969.7   10059.6
GR  1977.1   10078.6     1977.9   10098.6     1978.1  10110.7     1979.5   10123.9    1980.7   10147.1

        HEC-1 Concentration Point C556

QT      2      1750       1750

NH      3      .055     9992.2      .045    10010.8      .06    10083.9
ET                       9.1                                    9960.97   10042.75
        HEC-1 Concentration Point C556:  6-hr storm controls.
X1   6.073        14     9992.2   10010.8       505      505      504.0
GR  1995.8    9918.9     1994.8    9933.0     1987.7   9949.6     1981.6    9964.8    1980.4    9978.2
GR  1979.9    9992.2     1977.9    9997.6     1978.1  10000.0     1978.0   10002.6    1980.7   10010.8
GR  1980.7   10032.8     1982.8   10041.9     1993.4  10068.4     1993.4   10083.9

NH      3      .055     9989.4      .045    10010.3      .06    10123.8
ET                       9.1                                    9962.54   10034.36
X1   6.118        15     9989.4   10010.3       250      220      237.4
GR  1999.3    9928.4     1999.6    9944.7     1985.6   9965.8     1984.3    9979.8    1984.6    9989.4
GR  1984.2   10000.0     1984.2   10007.2     1984.9  10010.3     1985.3   10026.4    1988.3   10036.1
GR  1993.5   10045.1     1993.8   10064.9     1994.7  10089.9     1995.7   10116.4    1999.7   10123.8
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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

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=     .100 CEHV=     .300
*SECNO 1.521
          HEC-1 Concentration Point C627:  24-Hr storm controls.
                START Similar Hydraulic Reach  AS1
                See Exhibit 1, Manning's n Value Map.
                Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
                Left overbank is non effective flow area:  Hard coded GR's
                          from STA 9804.9 to 9826.6 @ EL 1505
     1.521      4.44   1503.74   1503.15   1503.70   1505.04      1.29       .00       .00   1499.80
    3190.0      65.9    3090.2      34.0      16.9      333.9       9.6        .0        .0   1499.50
       .00      3.90      9.25      3.53      .080       .060      .080       .000   1499.30   9944.73
   .020218        0.        0.        0.         0         11         3       .00     91.50  10036.23


*SECNO 1.523
                Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
                Left overbank is non effective flow area:  Hard coded GR's
                          from STA 9804.9 to 9826.6 @ EL 1505
     1.523      4.45   1503.95   1503.35       .00   1505.24      1.29       .20       .00   1500.00
    3190.0      65.9    3090.1      34.0      16.9      334.1       9.6        .1        .0   1499.70
       .00      3.89      9.25      3.53      .080       .060      .080       .000   1499.50   9944.72
   .020183       10.       10.       10.         0         11         0       .00     91.51  10036.23


*SECNO 1.525
                Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
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```
                Left overbank is non effective flow area:  Hard coded GR's
                          from STA 9804.9 to 9826.6 @ EL 1505
     1.525      4.45    1504.15   1503.55      .00    1505.44      1.29       .20       .00    1500.20
    3190.0      66.0     3090.0      34.0     17.0      334.4       9.6        .2        .0    1499.90
       .00      3.89       9.24      3.53     .080       .060      .080      .000   1499.70    9944.71
   .020130       10.         10.       10.        0         11         0       .00     91.52   10036.23

 1490 NH CARD USED
 *SECNO 1.527
                Left overbank is non effective flow area:  Hard coded GR's
                          from STA 9804.9 to 9826.6 @ EL 1505
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
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

      1.527      4.45    1504.35   1503.75      .00    1505.64      1.29       .20       .00    1500.40
     3190.0      66.0     3089.9      34.0     17.0      334.7       9.6        .2        .1    1500.10
        .00      3.89       9.23      3.53     .080       .060      .080      .000   1499.90    9944.71
    .020073       10.         10.       10.        0         11         0       .00     91.53   10036.24

 1490 NH CARD USED
 *SECNO 1.577

 3301 HV CHANGED MORE THAN HVINS

      1.577      5.69    1508.89   1507.50      .00    1509.53       .64      3.82       .06    1504.30
     3190.0    1214.8     1560.3     414.9    244.8      201.0      96.4       3.1        .8    1504.50
        .01      4.96       7.76      4.30     .080       .060      .080      .000   1503.20    9918.34
    .010443       320.        259.      250.        2          8         0       .00     132.17  10050.50

 1490 NH CARD USED
 *SECNO 1.602

 3301 HV CHANGED MORE THAN HVINS

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

      1.602      3.81    1510.71   1510.49      .00    1511.92      1.21      2.22       .17    1507.80
     3190.0      36.0     3122.9      31.1      9.5      350.9       8.7       4.5        1.2    1508.10
        .02      3.80       8.90      3.58     .080       .060      .080      .000   1506.90    9945.09
    .028613       135.        136.      150.        2         14         0       .00     126.45  10071.55

 1490 NH CARD USED
 *SECNO 1.636
                Channel has been filled.  GR Data Surveyed By ALS.
      1.636      5.18    1515.78   1515.43      .00    1516.54       .76      4.57       .05    1518.85
     3190.0        .0     1721.9     1468.1       .0      205.0     304.3       6.4        1.8    1512.85
        .02       .00       8.40      4.83     .000       .067      .080      .000   1510.60   10005.70
    .022712       170.        180.      180.        3         11         0       .00     186.52  10192.22

 1490 NH CARD USED
 *SECNO 1.686
                Channel has been filled.  GR Data Surveyed By ALS.
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

      1.686      7.89    1520.00   1519.36      .00    1520.63       .63      4.08       .01    1516.21
     3190.0    1116.6     1847.7     225.7    296.6      238.4      74.5       9.6        3.0    1518.11
        .04      3.76       7.75      3.03     .080       .060      .080      .000   1512.11    9871.80
    .011704       250.        263.      250.        3         11         0       .00     207.73  10079.53

 1490 NH CARD USED
 *SECNO 1.727

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .69

          HEC-1 Concentration Point C626:  24-Hr storm controls.
      1.727      4.16    1523.36   1522.90      .00    1524.06       .70      3.41       .02    1520.60
     3180.0    2027.0     1133.7      19.3    376.2      131.8       6.0       12.3        3.9    1520.60
        .05      5.39       8.60      3.23     .080       .060      .080      .000   1519.20    9881.69
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   .024756      200.      214.      220.         2        14         0       .00    198.94  10080.63

1490 NH CARD USED
*SECNO 1.855

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.49

     1.855      7.05   1534.45   1533.55       .00   1535.02       .57     10.95       .01  1532.20
    3180.0      64.0    1732.5    1383.5      24.9     234.0     349.9      21.1       7.0  1531.50
       .08      2.57      7.41      3.95      .080      .060      .080      .000   1527.40  9967.78
   .011223      680.      677.      700.         5        14         0       .00    193.11  10160.89


1490 NH CARD USED
*SECNO 1.980

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

               START Hydraulically Similar Reach AS2
               See Exhibit 1, Manning's n Value Map.
     1.980      5.28   1545.68   1544.28       .00   1546.06       .38     11.02       .02  1543.00
    3180.0     424.0    2725.4      30.6      112.3     533.5      11.5      30.6       9.9  1542.50
       .12      3.78      5.11      2.66      .113      .123      .120      .000   1540.40  9927.73
   .027936      660.      659.      640.         4        11         0       .00    192.10  10119.83


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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

1490 NH CARD USED
*SECNO 2.071

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.46

     2.071      7.52   1554.72   1552.43       .00   1554.97       .25      8.90       .01  1551.60
    3180.0      29.5    2782.1     368.4      15.0     665.8     122.3      38.7      12.0  1551.40
       .15      1.96      4.18      3.01      .113      .118      .120      .000   1547.20  9939.26
   .013163      490.      480.      475.         4         6         0       .00    186.49  10125.75


1490 NH CARD USED
*SECNO 2.095

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

          HEC-1 Concentration Point C549:  24-Hr storm controls.
                BALBOA WASH Tributary
     2.095      5.14   1557.04   1555.57       .00   1557.40       .36      2.40       .03  1554.10
    3100.0     127.1    1584.4    1388.5      41.7     306.9     303.1      40.9      12.6  1553.60
       .16      3.05      5.16      4.58      .113      .121      .120      .000   1551.90  9894.22
   .027113      120.      129.      140.         2        11         0       .00    206.72  10100.95


1490 NH CARD USED
*SECNO 2.200
          HEC-1 Concentration Point C549R:  24-Hr storm controls.
     2.200      5.02   1564.92   1562.48       .00   1565.02       .11      7.59       .03  1560.80
    2110.0    1156.9     859.5      93.6     447.7     313.4      49.8      50.0      15.3  1559.90
       .21      2.58      2.74      1.88      .113      .125      .120      .000   1559.90  9827.06
   .007010      570.      553.      490.         5         8         0       .00    227.84  10054.90


1490 NH CARD USED
*SECNO 2.279

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

     2.279      3.79   1568.89   1567.27       .00   1569.06       .17      4.02       .02  1566.00
    2110.0     723.5    1381.7       4.8     225.7     415.9       3.5      56.7      17.3  1567.00
       .25      3.21      3.32      1.38      .113      .125      .120      .000   1565.10  9840.32
   .015606      380.      416.      430.         3        18         0       .00    212.16  10052.48


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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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1490 NH CARD USED
*SECNO 2.304
     2.304      5.08   1570.38   1568.00       .00   1570.50       .12      1.43       .01   1566.30
    2110.0      30.7    1827.1     252.3      17.3     650.6      114.0      58.8      17.9   1567.30
      .26      1.77      2.81      2.21       .113      .122       .120       .000   1565.30   9856.22
  .008020       115.      134.      150.         1        19          0       .00    207.37  10063.59


1490 NH CARD USED
*SECNO 2.382

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .61

          HEC-1 Concentration Point C622:  24-Hr storm controls.
         CULVERT  622:  ASHBROOK WASH and SAGUARO BOULEVARD
           Culvert 622      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     2.382      4.06   1575.26   1573.86       .00   1575.47       .22      4.94       .03   1573.20
    2050.0     721.6    1076.9     251.5      200.9     273.4      76.6      65.1      19.8   1572.50
      .29      3.59      3.94      3.28       .113      .125       .120       .000   1571.20   9878.25
  .020676       405.      410.      405.         2        11          0       .00    187.10  10065.35


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 2.405

3235 SLOPE TOO STEEP, EXCEEDS        .10


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1581.98 ELREA=      1581.98

            Culvert 622  Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 28' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were  raised to Culvert Invert EL  1574.0
     2.405      7.00   1581.00   1581.00       .00   1584.54      3.54      5.05      1.66   1574.00
    2050.0        .0    2050.0        .0        .0     135.8        .0      66.1      20.1   1574.00
      .29       .00     15.09       .00       .000      .125       .000       .000   1574.00   9992.30
  .120349       115.      123.      130.         0        14          0       .00     19.40  10011.70


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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


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     3          .024       .90      2.63       .00      5.00       .00    121.00       2         3    1575.82   1574.01

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5130, EGIC= 1645.46..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1645.12 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO 2.428

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1586.61

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  7.42

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1645.46   1645.12      2.08      1328.      714.     2.706      58.9   1584.12      245.


            Culvert 622  Inlet.   3-60" CMP's          (SECTION 3 OF SC ROUTINE)
              Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1575.82
            Culvert 622 BT information surveyed by ALS. West top of curb.
            Culvert 622 BT information coded per figure 3.16 (HEC-2, Sept 90)
            Right overbank is non effective flow area:  Hard coded GR's
                from STA 10194.7 to STA 10308.4 @ EL 1587.6
     2.428     10.74   1586.54       .00       .00   1586.61       .07      2.08       .00   1575.82
    2050.0     867.6     499.3     683.1     466.9     184.5     328.7      67.6      20.4   1575.82
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      .31       1.86       2.71       2.08       .123       .125       .124       .000   1575.80   9853.96
   .002189       121.       121.       121.          2          0          0        .00    237.54  10091.50


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.448
            Culvert 622     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                LEGEND WASH Tributary
     2.448       7.97    1586.77    1582.07       .00    1586.81       .04       .20       .00   1580.70
    2050.0      961.4      586.6      502.0      559.7      344.8      339.7       70.3       21.0   1581.40
       .33       1.72       1.70       1.48       .113       .125       .120       .000   1578.80   9887.27
   .001581       105.       105.       110.          3         17          0        .00    232.38  10119.65


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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


1490 NH CARD USED
*SECNO 2.494
          HEC-1 Concentration Point C622R:  24-hr storm controls.
                START Hydraulically Similar Reach AS3
                See Exhibit 1, Manning's n Value Map.
          CULVERT  M7 :  ASHBROOK WASH and BAYFIELD DRIVE
             Culvert M7       Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     2.494       5.85    1587.05    1584.31       .00    1587.20       .15       .35       .03   1583.00
    1380.0      154.6      1217.2        8.2      126.5      368.8       12.4       75.3       22.0   1584.00
       .35       1.22        3.30        .66       .100       .045       .100       .000   1581.20   9936.33
   .001238       260.       246.       220.          2         18          0        .00    122.37  10058.71


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 2.529

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1589.94 ELREA=      1589.94

            Culvert M7   Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 12' Downstream. (No Elev. Adjust.)
     2.529       5.67    1588.82    1588.82       .00    1591.59       2.77       .56       1.31   1583.25
    1380.0         .0      1380.0         .0         .0      103.3         .0       76.6       22.3   1583.15
       .35        .00       13.36        .00       .000       .045       .000       .000   1583.15   9991.00
   .016769       195.       181.       170.          0          8          0        .00    18.70  10009.70


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     3          .024        .90       2.63        .00       5.00        .00       84.00      2          3        1584.98    1584.71

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
5130, EGIC= 1618.02..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1606.29 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO 2.545

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1594.49
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


3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.75

SPECIAL CULVERT
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     EGIC       EGOC        H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
  1618.02    1606.29      2.89       740.       654.      5.039       58.9    1592.50       110.


                Right bank is non effective flow area:  Hard coded GR's
                          from STA 10072.3 to 10248.3 @ EL 1600
              Culvert M7     Inlet.   3-60"   CMP's        (SECTION 3 OF SC ROUTINE)
                Photogrammetric x-sec. located 12' Upstream. (No Elev. Adjust.)
                 Base Channel Elevations were lowered to Culvert Invert EL 1584.98
              Culvert M7  BT information Surveyed by ALS. North top of curb.
              Culvert M7  BT information coded per figure 3.16 (HEC-2, Sept 90)
     2.545      9.28   1594.26       .00       .00   1594.49       .23      2.89       .00   1584.98
    1380.0     292.2     659.2     428.7     148.6     130.8     177.4      77.1      22.4   1584.98
       .36      1.97      5.04      2.42      .067      .045      .060      .000   1584.98   9945.80
   .001194       84.       84.       84.         2         0         0       .00    106.48  10052.29


 FLOW DISTRIBUTION FOR SECNO=       2.55          CWSEL=   1594.26

 STA=     9946.     9987.     9994.    10008.    10015.    10031.    10052.
   PER Q=     8.5      12.7      47.8      16.0       8.4       6.6
    AREA=   102.4      46.2     130.8      55.3      77.6      44.5
     VEL=     1.1       3.8       5.0       4.0       1.5       2.0
   DEPTH=     2.5       7.2       9.3       7.4       5.0       2.1

 CCHV=      .100 CEHV=      .300
 1490 NH CARD USED
 *SECNO 2.558
              Culvert M7       Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     2.558      7.45   1594.45   1590.71       .00   1594.58       .13       .08       .01   1588.50
    1380.0     478.2     579.9     322.0     304.8     143.9     227.0      78.0      22.7   1588.40
       .37      1.57      4.03      1.42      .100      .045      .100      .000   1587.00   9930.61
   .001161       70.       71.       70.         2        18         0       .00    184.20  10114.81


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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


 1490 NH CARD USED
 *SECNO 2.670

 3235 SLOPE TOO STEEP, EXCEEDS        .10


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
     2.670      3.74   1596.34   1596.34       .00   1597.27       .93      2.26       .24   1595.00
    1380.0     180.4    1199.6        .0      28.7     151.5        .0      83.8      24.6   1599.00
       .39      6.28      7.92       .00      .100      .096      .000      .000   1592.60   9938.75
   .111360       575.      594.      610.         0         8         0       .00     99.27  10038.02


 1490 NH CARD USED
 *SECNO 2.785

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.28

             Left overbank is non effective flow area:  Hard coded GR's
                 from STA 9927.3 to 9946.4 @ EL 1607.5
     2.785      6.01   1606.41   1605.23       .00   1607.00       .59      9.70       .03   1602.60
    1380.0     92.1      885.2     402.7      43.6     118.6     153.4      87.3      26.0   1601.70
       .42      2.11      7.46      2.62      .100      .045      .100      .000   1600.40   9949.46
   .006068       610.      607.      610.         9        11         0       .00     96.50  10045.96


 1490 NH CARD USED
 *SECNO 2.807
     2.807      5.20   1607.50   1605.79       .00   1607.73       .23       .69       .04   1604.40
    1380.0     553.6     820.4       6.0     212.9     184.2       6.4      88.2      26.2   1606.00
       .43      2.60      4.45       .95      .100      .064      .100      .000   1602.30   9934.70
   .006075       115.      112.      120.         4        14         0       .00    120.89  10055.59


 1490 NH CARD USED
 *SECNO 2.899

 3301 HV CHANGED MORE THAN HVINS

1
    29MAR95       14:48:42                                                                    PAGE   32
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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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .44

     2.899      3.10    1612.70    1612.56       .00    1613.62       .92       5.69       .21    1611.00
    1380.0      18.4     977.1      384.5        7.9     112.4       83.7       91.6      27.5    1610.60
       .45      2.31       8.69       4.59      .100       .054      .100       .000    1609.60    9980.85
   .030692       485.       489.       490.         2         11         0        .00      94.02   10074.87


1490 NH CARD USED
*SECNO 3.008

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

     3.008      4.15    1621.95    1621.07       .00    1622.52       .57       8.86       .03    1621.10
    1380.0       1.0     1187.1      192.0        1.2     183.0       81.4       94.8      28.8    1620.50
       .47       .78       6.49       2.36      .100       .045      .100       .000    1617.80    9959.81
   .009142       575.       574.       600.         5         12         0        .00      104.26   10064.07


1490 NH CARD USED
*SECNO 3.121

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
                ARROW WASH Tributary
     3.121      5.50    1631.30    1631.30       .00    1632.63      1.33       7.12       .23    1628.90
    1380.0      216.9     1130.2      32.9       73.2     111.5       15.3       97.9      30.1    1629.30
       .49      2.96      10.14       2.16      .100       .045      .100       .000    1625.80    9948.20
   .016282       565.       598.       600.         0         11         0        .00      84.67   10032.87


1490 NH CARD USED
*SECNO 3.208
          HEC-1 Concentration Point C621:  6-hr storm controls.
     3.208      3.60    1639.50    1639.36       .00    1640.41       .91       7.73       .04    1638.20
    1180.0      10.8     1169.2         .0        6.9     152.2         .0       99.6      30.8    1639.70
       .51      1.55       7.68        .00      .100       .046      .000       .000    1635.90    9969.39
   .019426       260.       456.       335.         2         14         0        .00      79.26   10048.65


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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


1490 NH CARD USED
*SECNO 3.241
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     3.241      3.51    1644.41    1644.41       .00    1645.64      1.23       3.40       .10    1641.40
    1180.0      39.6     1064.8      75.6       15.2     113.9       28.8       100.3     31.1    1641.90
       .51      2.61       9.35       2.62      .100       .045      .100       .000    1640.90    9988.22
   .018910       175.       177.       175.         0          8         0        .00      70.59   10058.81


1490 NH CARD USED
*SECNO 3.323

3301 HV CHANGED MORE THAN HVINS

          HEC-1 Concentration Point C613:  24-hr storm controls.
     3.323      3.70    1653.50    1652.53       .00    1653.73       .24       7.99       .10    1654.50
     970.0         .0      475.0      495.0         .0     110.3      143.0       102.3     32.0    1652.00
       .54       .00       4.30       3.46      .000       .080      .100       .000    1649.80    9988.50
   .017970       420.       430.       440.         4         19         0        .00      111.85   10100.35


1490 NH CARD USED
*SECNO 3.421
     3.421      2.91    1662.91    1662.56       .00    1663.53       .62       9.68       .12    1662.40
     970.0         .3      834.4      135.3         .3     124.1       48.0       104.8     33.2    1661.00
       .57       .80       6.73       2.82      .100       .056      .100       .000    1660.00    9976.51
   .019757       510.       518.       505.         2         19         0        .00      84.89   10061.39


1490 NH CARD USED
*SECNO 3.487
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3265 DIVIDED FLOW

          HEC-1 Concentration Point C608:  24-Hr storm controls.
         CULVERT  608:  ASHBROOK WASH and HAMPSTEAD DRIVE
           Culvert 608      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
    3.487      2.89   1669.49   1669.46      .00   1670.56      1.07      6.90       .14   1668.00
    970.0       9.4     953.2       7.4      5.6     113.7       7.1     106.0      33.8   1668.60
      .58      1.69      8.38      1.04     .100      .045      .100      .000   1666.60   9965.79
 .019595      350.      352.      340.        2         5         0       .00     75.42  10048.85

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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

CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 3.519

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1678.50 ELREA=      1678.50

           Culvert 608  Outlet.   3-10'x 7' Box       (SECTION 2 OF SC ROUTINE)
             Photogrammetric x-sec. located 24.4' Downstream. (No Elev. Adjust.
    3.519      3.44   1674.04   1674.04      .00   1675.70      1.67      3.34       .30   1670.80
    970.0        .0     970.0        .0       .0     93.7        .0     106.4      34.0   1670.60
      .58       .00     10.36       .00     .000      .045      .000      .000   1670.60   9988.70
 .020042      170.      168.      170.        0        11         0       .00     28.40  10017.10


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     3          .013       .50      2.63       .00     7.00     10.00      61.50       8         1    1673.19   1672.71

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

1490 NH CARD USED
*SECNO 3.531

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1678.266  EGOC =   1678.773  PCWSE=   1674.037  ELTRD=   1681.950


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.07

SPECIAL CULVERT

     EGIC      EGOC       H4      QWEIR     QCULV      VCH      ACULV     ELTRD    WEIRLN
   1678.27   1678.77     3.07         0.      970.    4.957      210.0   1681.95        0.

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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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1681.57 ELREA=      1681.57

           Culvert 608  Inlet.    3-10'x7'  Box       (SECTION 3 OF SC ROUTINE)
             Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
           Culvert 608 BT information Surveyed by ALS. West top of curb.
    3.531      6.69   1678.39       .00       .00   1678.77       .38      3.07       .00   1673.10
    970.0        .0     970.0        .0        .0     195.7        .0     106.6      34.0   1671.70
      .59       .00      4.96       .00      .000      .045      .000      .000   1671.70   9980.80
 .002122        62.       62.       62.         2         0         0       .00     33.00  10013.80


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
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*SECNO 3.544

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43

          Culvert 608     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     3.544      5.16   1678.86   1675.78      .00   1678.91      .05      .10      .03   1676.90
     970.0      87.0     857.4      25.6     151.4     464.9     32.7    107.3     34.3   1676.70
       .60       .57      1.84       .78      .100      .069     .100     .000  1673.70   9820.10
   .001031       75.      71.        75.         2        17        0      .00   253.07  10073.17


1490 NH CARD USED
*SECNO 3.621

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
               START Hydraulically Similar Reach AS4
               See Exhibit 1, Manning's n Value Map.
     3.621      3.85   1682.15   1682.15      .00   1682.93      .78     1.13      .22   1681.90
     970.0        .2     969.4        .4        .2     136.7        .2    111.0     35.8   1681.90
       .61       1.00      7.09      2.21      .055      .045     .025     .000  1678.30   9953.70
   .022328       390.      403.      390.         0        14        0      .00    82.02  10035.72


1490 NH CARD USED
*SECNO 3.701
     3.701      4.24   1689.04   1688.61      .00   1689.59      .54     6.63      .02   1687.90
     970.0      14.7     951.1       4.2       6.3     159.3      1.1    112.4     36.6   1688.10
       .63      2.32      5.97      3.71      .055      .045     .025     .000  1684.80   9980.06
   .011686       385.      422.      420.         5         5        0      .00    85.04  10065.10


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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


1490 NH CARD USED
*SECNO 3.764
     3.764      3.48   1693.18   1692.94      .00   1693.83      .64     4.21      .03   1691.80
     970.0     102.4     853.1      14.5      21.7     128.3      6.5    113.7     37.3   1692.70
       .65      4.73      6.65      2.22      .046      .045     .044     .000  1689.70   9962.68
   .013766       330.      333.      315.         4        19        0      .00    88.84  10051.51


1490 NH CARD USED
*SECNO 4.058
 WATER EL=X5 CARD=   1715.800

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .15

                    SECTION 4.058 USING REVISED MAPPING.
               START Hydraulically Similar Reach AS3
               See Exhibit 1, Manning's n Value Map.
          ************************     DAM  4     ****************************
           HEC-1   C599 Storage Route Rating Curve          WSEL =  1715.8 feet
           HEC-1   C585 Inflow Hydrograph (Ashbrook Wash)     Q =     300 cfs
           Reference:       HEC-1  Output  File:  EX100-6.OH1
          HEC-1 Concentration Point C585:  6-hr storm controls.

         CULVERT  585:  ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
            Culvert 585     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     4.058      1.68   1716.38   1716.37      .00   1717.04      .66    27.83      .00   1718.00
     300.0        .0     298.9       1.1        .0      45.8       .9    117.3     39.5   1716.00
       .71       .00      6.52      1.23      .000      .070     .100     .000  1714.70   9994.90
   .061707      1500.     1552.     1490.         0        11        0      .00    37.71  10032.61


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 4.065

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.41


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1731.40 ELREA=      1731.40

            Culvert 585  Outlet.   2-8'x 4' Box        (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 5.9' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1714.73
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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
4.065	2.52	1717.22	1716.69	.00	1717.83	.61	.78	.01	1714.70
300.0	.0	300.0	.0	.0	47.8	.0	117.3	39.5	1714.73
.72	.00	6.28	.00	.000	.045	.000	.000	1714.70	10000.00
.010642	36.	37.	33.	2	8	0	.00	19.10	10019.10

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	2	.013	.50	2.63	.00	4.00	8.00	242.00	8	1	1722.47	1714.73

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

CCHV= .300 CEHV= .500
1490 NH CARD USED
*SECNO 4.110

SPECIAL CULVERT OUTLET CONTROL
EGIC = 1725.977 EGOC = 1726.301 PCWSE= 1717.222 ELTRD= 1740.820

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.47

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1725.98	1726.30	8.47	0.	300.	8.287	64.0	1740.82	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1739.78 ELREA= 1739.78

Culvert 585 Inlet. 2-8'x 4' Box (SECTION 3 OF SC ROUTINE)
Photogrammetric x-sec. located 30' Upstream. (No Elev. Adjust.)
Base Channel Elevations were lowered to Culvert Invert EL 1722.47
Culvert 585 BT information taken from AS-BUILTS (Set #10).
Culvert 585 BT information coded per figure 3.16 (HEC-2, Sept 90)
START Hydraulically Similar Reach AS5
See Exhibit 1, Manning's n Value Map.

4.110	2.83	1725.23	.00	.00	1726.30	1.07	8.47	.00	1722.40
300.0	.0	300.0	.0	.0	36.2	.0	117.5	39.6	1722.47
.72	.00	8.29	.00	.000	.025	.000	.000	1722.40	9987.10
.004910	242.	242.	242.	4	0	0	.00	12.90	10000.00

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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

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 4.119

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.33

Culvert 585 Upstream: expanded flow. (SECTION 4 OF SC ROUTINE)
SECTION 4.119 USING REVISED MAPPING.

4.119	3.92	1726.39	1724.21	.00	1726.48	.10	.08	.10	1724.00
300.0	4.8	295.1	.0	5.2	117.4	.1	117.6	39.6	1726.00
.73	.92	2.51	.28	.050	.038	.050	.000	1722.47	9972.63
.000904	45.	48.	45.	3	14	0	.00	42.15	10014.77

1490 NH CARD USED
*SECNO 4.177

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4.177	2.40	1745.30	1745.30	.00	1746.04	.74	.63	.19	1744.90
300.0	.7	299.3	.0	.8	43.4	.0	118.2	39.9	1747.00
.74	.92	6.89	.00	.050	.025	.000	.000	1742.90	9983.92
.008281	295.	306.	300.	0	14	0	.00	33.18	10017.10

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1490 NH CARD USED
*SECNO 4.252
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     4.252      3.57   1757.77   1757.77       .00   1758.35       .58      2.52       .02   1756.30
     300.0      30.2     202.8      67.0      14.5      27.8      33.0     118.8      40.4   1756.60
       .76      2.09      7.30      2.03      .050      .025      .050      .000   1754.20   9956.12
   .005059      390.      395.      400.         0        11         0       .00     68.35  10024.47


1490 NH CARD USED
*SECNO 4.311
7185 MINIMUM SPECIFIC ENERGY
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


3720 CRITICAL DEPTH ASSUMED
               START Hydraulically Similar Reach AS6
               See Exhibit 1, Manning's n Value Map.
          CULVERT  M5 :  ASHBROOK WASH and SIERRA MADRE
             Culvert M5       Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     4.311      1.14   1766.54   1766.54       .00   1766.96       .42      3.18       .02   1766.10
     300.0        .5     293.9       5.6        .3      55.7       2.5     119.2      40.9   1765.80
       .78      1.66      5.27      2.22      .055      .045      .060      .000   1765.40   9971.11
   .030568      310.      312.      310.         0        17         0       .00     72.01  10043.12


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 4.335

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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1772.61 ELREA=      1772.61

             Culvert M5   Outlet.  5-10'x 3' Box        (SECTION 2 OF SC ROUTINE)
               Photogrammetric x-sec. located 17.2' Downstream. (No Elev. Adjust.
     4.335      1.86   1769.16   1768.87       .00   1769.47       .31      2.48       .03   1768.30
     300.0        .0     300.0        .0        .0      67.2        .0     119.4      41.1   1768.60
       .79       .00      4.47       .00      .000      .045      .000      .000   1767.30   9967.50
   .013021      130.      130.      130.         4        11         0       .00     52.00  10019.50


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     5          .013        .50       2.63        .00       3.00      10.00      74.50      8          1       1770.06    1768.95

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

1490 NH CARD USED
*SECNO 4.349

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1771.685  EGOC =   1771.876  PCWSE=   1769.165  ELTRD=   1775.190


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.46

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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


SPECIAL CULVERT

      EGIC       EGOC         H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
   1771.68    1771.88       2.40         0.        300.      3.538      150.0    1775.19         0.


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1775.00 ELREA=      1775.00

             Culvert M5   Inlet.   5-10'x 3' Box        (SECTION 3 OF SC ROUTINE)
             Culvert M5  BT information Surveyed by ALS. South top of curb.
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          Culvert M5  BT information coded per figure 3.16 (HEC-2, Sept 90)
     4.349      1.68   1771.68      .00      .00   1771.88      .19     2.40      .00   1770.10
     300.0        .0     300.0        .0       .0     84.8        .0    119.5     41.1   1770.20
       .79       .00      3.54      .00     .000     .045      .000     .000  1770.00   9972.60
   .006075       75.       75.       75.        2        0         0      .00    52.60  10025.20


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 4.362
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          Culvert M5      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     4.362      1.19   1772.69   1772.69      .00   1773.06      .37      .72      .05   1772.20
     300.0      28.6     268.8       2.6     12.4     53.1      1.2    119.7     41.3   1771.90
       .80      2.30      5.06      2.11     .055     .045     .060     .000  1771.50   9943.02
   .025961       65.       66.       75.        0       19         0      .00    93.16  10036.18


1490 NH CARD USED
*SECNO 4.412
     4.412      1.48   1778.68   1778.57      .00   1778.91      .23     5.84      .01   1777.90
     300.0      42.2     257.8        .0     19.1     64.2        .0    120.1     41.9   1779.50
       .82      2.21      4.02      .00     .055     .046     .000     .000  1777.20   9889.46
   .018586       290.      265.      250.        5       11         0      .00    116.79  10006.25


1490 NH CARD USED
*SECNO 4.493
     4.493      1.76   1785.96   1785.69      .00   1786.27      .31     7.34      .02   1785.10
     300.0      88.3     155.7      55.9     23.7     30.6     16.5    120.9     42.8   1784.70
       .84      3.73      5.09      3.40     .055     .045     .060     .000  1784.20   9967.35
   .015193       470.      430.      420.        5        5         0      .00    57.38  10024.74


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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


1490 NH CARD USED
*SECNO 4.559
     4.559      2.13   1791.93   1791.91      .00   1792.53      .60     6.17      .09   1790.90
     300.0      12.4     281.2       6.4      4.9     44.0      3.5    121.4     43.2   1791.20
       .86      2.53      6.39      1.85     .055     .045     .060     .000  1789.80   9970.19
   .021505       345.      344.      340.        0       11         0      .00    47.99  10018.18


1490 NH CARD USED
*SECNO 4.637
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     4.637      2.13   1801.33   1801.33      .00   1802.04      .71     9.02      .03   1800.40
     300.0      27.4     251.8      20.8      7.2     34.9      6.3    121.9     43.6   1799.60
       .88      3.80      7.22      3.28     .055     .045     .060     .000  1799.20   9981.67
   .022141       410.      414.      415.        0        5         0      .00    35.16  10016.83


1490 NH CARD USED
*SECNO 4.839
 WATER EL=X5 CARD=   1832.400

3301 HV CHANGED MORE THAN HVINS

          **************************     DAM  6     ****************************
           HEC-1   C560 Storage Route Rating Curve        WSEL =  1832.4 feet
           HEC-1   C560 Inflow Hydrograph                   Q =    1990 cfs
           Reference:      HEC-1  Output  File:  EX100-6.OH1
          HEC-1 Concentration Point C560I:  6-hr storm controls

     4.839      9.60   1832.40   1826.65      .00   1832.46      .06      .43     24.39   1824.50
    1990.0     412.7    1231.0     346.4     247.9     536.9     337.5    136.1     46.7   1826.50
      1.03      1.66      2.29      1.03     .055     .048     .060     .000  1822.80   9949.57
   .000319      1050.     1068.     1040.        0       17         0      .00    217.20  10166.77


1490 NH CARD USED
*SECNO 4.954

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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
4.954	6.38	1838.68	1838.68	.00	1840.26	1.58	.58	.45	1834.80
1990.0	370.3	1428.3	191.4	62.0	125.3	44.0	145.5	48.7	1835.80
1.05	5.98	11.40	4.35	.055	.045	.060	.000	1832.30	9967.57
.013441	600.	608.	605.	0	19	0	.00	74.70	10042.27

1490 NH CARD USED
*SECNO 5.076
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
HEC-1 Concentration Point C558: 6-hr storm controls.

5.076	4.61	1852.31	1852.31	.00	1853.43	1.12	11.26	.05	1851.20
1920.0	1334.3	585.7	.0	171.5	59.2	.0	148.8	49.9	1852.70
1.07	7.78	9.89	.00	.055	.045	.000	.000	1847.70	9910.00
.025101	620.	641.	630.	0	16	0	.00	101.63	10011.64

1490 NH CARD USED
*SECNO 5.182
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.182	3.60	1869.60	1869.60	.00	1870.74	1.14	16.05	.01	1871.10
1920.0	.0	439.7	1480.3	.0	45.8	179.3	151.6	51.2	1867.40
1.08	.00	9.60	8.26	.000	.049	.060	.000	1866.00	9979.90
.035250	535.	559.	540.	0	15	0	.00	99.40	10079.29

1490 NH CARD USED
*SECNO 5.277

5.277	4.21	1882.61	1882.39	.00	1883.59	.98	12.84	.02	1882.20
1920.0	.5	936.3	983.2	.4	101.8	149.8	154.3	52.3	1880.00
1.10	1.35	9.20	6.56	.055	.049	.060	.000	1878.40	9980.63
.020794	500.	505.	470.	3	8	0	.00	96.64	10077.27

1490 NH CARD USED
*SECNO 5.349
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.349	4.04	1891.84	1891.84	.00	1893.00	1.16	9.34	.05	1891.10
1920.0	2.3	867.6	1050.1	1.0	86.6	143.7	156.4	53.1	1889.90
1.11	2.35	10.02	7.31	.055	.048	.060	.000	1887.80	9983.36
.029993	380.	380.	375.	0	11	0	.00	103.07	10086.44

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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

1490 NH CARD USED
*SECNO 5.436

5.436	5.23	1901.33	1901.15	.00	1902.43	1.10	9.42	.01	1899.10
1920.0	181.4	1396.3	342.3	36.4	149.6	64.6	158.8	54.2	1898.80
1.13	4.98	9.33	5.30	.055	.045	.060	.000	1896.10	9959.50
.015351	450.	459.	440.	4	11	0	.00	95.77	10055.26

1490 NH CARD USED
*SECNO 5.519
HEC-1 Concentration Point C557: 6-hr storm controls.
CULVERT 557: ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
Culvert 557 Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)

5.519	4.89	1908.79	1908.47	.00	1909.89	1.10	7.46	.00	1906.00
1880.0	813.7	1066.3	.0	107.1	118.3	.0	161.2	55.0	1908.80
1.14	7.60	9.02	.00	.055	.049	.000	.000	1903.90	9932.58
.019273	435.	436.	435.	4	15	0	.00	74.90	10007.48

CCHV= .300 CEHV= .500
1490 NH CARD USED
*SECNO 5.542

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Culvert 557 Outlet. 1-60" CMP (SECTION 2 OF SC ROUTINE)
Base Channel Elevations were lowered to Culvert Invert EL 1905.77

5.542	9.96	1915.73	1915.73	.00	1917.66	1.92	1.52	.41	1905.80

1880.0	602.1	858.4	419.5	75.0	59.7	66.3	161.8	55.2	1905.77
1.15	8.03	14.37	6.33	.045	.045	.047	.000	1905.77	9974.98
.008837	120.	122.	120.	0	14	0	.00	53.11	10028.09

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	1	.024	.90	2.63	.00	5.00	.00	110.00	2	3	1909.38	1905.77

CHART 2 - CORRUGATED METAL PIPE CULVERT
SCALE 3 - PIPE PROJECTING FROM FILL

5130, EGIC= 2418.97..MAY BE TOO LARGE IF INLET CONTROLS.

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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

5135, EGOC= 2381.56 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO 5.563

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG = 1923.19

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.54

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
2418.97	2381.56	5.54	1601.	279.	5.009	19.6	1919.70	154.

Culvert 557 Inlet. 1-60" CMP (SECTION 3 OF SC ROUTINE)
Photogrammetric x-sec. located 2' Upstream. (No Elev. Adjust.)
Base Channel Elevations were lowered to Culvert Invert EL 1909.38
Culvert 557 BT information Surveyed by ALS:west top curb, p. 10 BK 2
Culvert 622 BT information coded per Figure 3.16 on left overbank.
see Figure 3.16 HEC-2, Sept 1990.

5.563	13.66	1923.04	.00	.00	1923.19	.16	5.54	.00	1909.40
1880.0	952.0	410.3	517.7	376.9	81.9	217.5	162.9	55.4	1909.38
1.16	2.53	5.01	2.38	.049	.045	.048	.000	1909.38	9911.73
.000705	110.	110.	110.	2	0	0	.00	146.79	10058.53

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 5.572

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.81

Culvert 557 Upstream: expanded flow. (SECTION 4 OF SC ROUTINE)

5.572	10.96	1923.16	1916.17	.00	1923.22	.06	.02	.01	1913.20
1880.0	595.4	942.4	342.3	374.8	410.2	266.7	163.9	55.6	1914.30
1.16	1.59	2.30	1.28	.055	.045	.060	.000	1912.20	9929.00
.000215	55.	47.	40.	2	14	0	.00	139.79	10068.79

1490 NH CARD USED
*SECNO 5.651

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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

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.651	3.68	1924.08	1924.08	.00	1925.24	1.16	.29	.33	1920.80
1880.0	77.7	519.9	1282.4	13.4	44.4	178.9	169.8	56.7	1922.10
1.18	5.81	11.71	7.17	.055	.045	.060	.000	1920.40	9981.55
.026393	400.	417.	390.	0	22	0	.00	99.94	10081.49

1490 NH CARD USED

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*SECNO 5.765
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     5.765      3.85   1939.25   1939.25       .00   1940.39      1.14     14.94       .00   1935.80
    1880.0      98.1     655.9    1126.0      17.0      57.8     168.3     173.1      58.1    1936.70
      1.20      5.76     11.35      6.69      .055      .045      .060      .000   1935.40    9984.52
   .023779      590.      601.      595.         0         8         0       .00    103.59   10088.12


1490 NH CARD USED
*SECNO 5.873
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     5.873      3.34   1953.94   1953.94       .00   1955.07      1.13     12.38       .00   1951.30
    1880.0     189.5    1333.8     356.7      31.1     140.3      71.5     176.4      59.5    1951.50
      1.22      6.08      9.51      4.99      .055      .045      .060      .000   1950.60    9949.75
   .019432      565.      573.      585.         0        15         0       .00    106.61   10056.36


1490 NH CARD USED
*SECNO 5.978
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     5.978      4.33   1969.03   1969.03       .00   1970.09      1.06     10.95       .01   1966.40
    1880.0     608.4     615.5     656.2      93.4      54.8     106.6     179.5      60.9    1965.90
      1.24      6.51     11.23      6.16      .055      .045      .060      .000   1964.70    9945.14
   .020683      540.      552.      540.         0        11         0       .00    111.24   10056.38


1490 NH CARD USED
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 6.073
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         HEC-1 Concentration Point C556:  6-hr storm controls.
     6.073      5.24   1983.14   1983.14       .00   1984.43      1.29      9.63       .07   1979.90
    1750.0      489.0     891.1     369.9      73.4      79.5      66.4     182.2      62.0    1980.70
      1.25      6.66     11.21      5.57      .055      .045      .060      .000   1977.90    9960.97
   .017558      505.      504.      505.         0        11         0       .00     81.78   10042.75


1490 NH CARD USED
*SECNO 6.118
     6.118      3.56   1987.76   1987.75       .00   1989.13      1.37      4.68       .02   1984.60
    1750.0      613.0     792.5     344.4      74.7      71.3      52.7     183.4      62.4    1984.90
      1.26      8.20     11.12      6.54      .055      .045      .060      .000   1984.20    9962.54
   .022211      250.      237.      220.         2        14         0       .00     71.83   10034.36


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 T1   *  Fountain Hills North FIS
 T2   *  For:  FCDMC #92-04          By:  GVSCE #35
 T3   *  Ashbrook Wash 100 Year Floodway  Method 1
 T4   *  GR data taken from stereo model; received 19 Oct 93 from KAM.
 T4   *  Extended section GR data received 19 Oct 93 from KAM.
 T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
 T6   *  with survey control by Anderson Nelson 12-11-92.
 T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
 T8   *           Files: EX100-6.OH1 and EX100-24.OH1
 T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
 T9   *  Special culvert routine used.   Sub Critical Analysis.
 T9   *  Floodway Method 1, Target 1 foot, No Encroachment at Culverts.
 T9   *  Floodplain limits are plotted at each cross section using starting
 T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
 T9   *  or a conflict with topographic contours, in which case, the contours are
 T9   *  used to plot the floodplain.

 J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                  3                                0.02                                     1503.7

 J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       15                   -1                                          -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

*PROF 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1.521

3470 ENCROACHMENT STATIONS= 9944.7 10036.2 TYPE= 1 TARGET= 91.500
HEC-1 Concentration Point C627: 24-Hr storm controls.
START Similar Hydraulic Reach AS1
See Exhibit 1, Manning's n Value Map.
Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
Left overbank is non effective flow area: Hard coded GR's
from STA 9804.9 to 9826.6 @ EL 1505

1.521	4.45	1503.75	1503.15	1503.74	1505.04	1.29	.00	.00	1499.80
3190.0	66.0	3090.0	34.0	17.0	334.4	9.6	.0	.0	1499.50
.00	3.89	9.24	3.53	.080	.060	.080	.000	1499.30	9944.73
.020121	0.	0.	0.	0	11	3	.00	91.50	10036.23

*SECNO 1.523

3470 ENCROACHMENT STATIONS= 9944.7 10036.2 TYPE= 1 TARGET= 91.511
Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
Left overbank is non effective flow area: Hard coded GR's
from STA 9804.9 to 9826.6 @ EL 1505

1.523	4.45	1503.95	1503.35	1503.95	1505.24	1.29	.20	.00	1500.00
3190.0	66.0	3090.0	34.0	17.0	334.5	9.6	.1	.0	1499.70
.00	3.89	9.24	3.53	.080	.060	.080	.000	1499.50	9944.72
.020102	10.	10.	10.	0	11	0	.00	91.51	10036.23

*SECNO 1.525

3470 ENCROACHMENT STATIONS= 9944.7 10036.2 TYPE= 1 TARGET= 91.521
Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
Left overbank is non effective flow area: Hard coded GR's
from STA 9804.9 to 9826.6 @ EL 1505

1.525	4.45	1504.15	1503.55	1504.15	1505.44	1.29	.20	.00	1500.20
3190.0	66.0	3089.9	34.0	17.0	334.7	9.6	.2	.0	1499.90
.00	3.89	9.23	3.53	.080	.060	.080	.000	1499.70	9944.71
.020073	10.	10.	10.	0	11	0	.00	91.52	10036.23

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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

1490 NH CARD USED
*SECNO 1.527

3470 ENCROACHMENT STATIONS= 9944.7 10036.2 TYPE= 1 TARGET= 91.530
Left overbank is non effective flow area: Hard coded GR's
from STA 9804.9 to 9826.6 @ EL 1505
STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.

1.527	4.46	1504.36	1503.75	1504.35	1505.64	1.29	.20	.00	1500.40
3190.0	66.1	3089.9	34.0	17.0	334.8	9.7	.2	.1	1500.10
.00	3.89	9.23	3.52	.080	.060	.080	.000	1499.90	9944.71
.020042	10.	10.	10.	0	11	0	.00	91.53	10036.24

1490 NH CARD USED
*SECNO 1.577

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 9918.3 10050.5 TYPE= 1 TARGET= 132.160

1.577	5.69	1508.89	1507.50	1508.89	1509.53	.64	3.82	.06	1504.30
3190.0	1214.7	1560.4	414.8	244.7	200.9	96.4	3.1	.8	1504.50
.01	4.96	7.77	4.30	.080	.060	.080	.000	1503.20	9918.34
.010453	320.	259.	250.	2	8	0	.00	132.16	10050.50

1490 NH CARD USED
*SECNO 1.602

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS=     9945.1   10071.5  TYPE=      1  TARGET=      126.460
     1.602      3.81   1510.71   1510.49   1510.71   1511.92      1.21      2.22       .17   1507.80
    3190.0      36.0    3122.9      31.1       9.5     350.9       8.7       4.5       1.2   1508.10
       .02      3.80      8.90      3.58      .080      .060      .080      .000   1506.90   9945.09
   .028598      135.      136.      150.         2        14         0       .00    126.46  10071.55


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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


1490 NH CARD USED
*SECNO 1.636

3470 ENCROACHMENT STATIONS=     9995.4   10192.2  TYPE=      1  TARGET=      196.830
             Channel has been filled.  GR Data Surveyed By ALS.
     1.636      5.18   1515.78   1515.43   1515.78   1516.54       .76      4.57       .04   1518.85
    3190.0        .0    1722.1    1467.9        .0     205.0     304.2       6.4       1.8   1512.85
       .02        .00       8.40      4.83      .000      .067      .080      .000   1510.60  10005.70
   .022723      170.      180.      180.         3        11         0       .00    186.52  10192.22


1490 NH CARD USED
*SECNO 1.686

3470 ENCROACHMENT STATIONS=     9871.8   10079.5  TYPE=      1  TARGET=      207.730
             Channel has been filled.  GR Data Surveyed By ALS.
     1.686      7.89   1520.00   1519.36   1520.00   1520.62       .63      4.07       .01   1516.21
    3190.0    1117.3    1846.7     226.0     297.0     238.5      74.7       9.6       3.0   1518.11
       .04      3.76      7.74      3.03      .080      .060      .080      .000   1512.11   9871.80
   .011663      250.      263.      250.         2        11         0       .00    207.73  10079.53


1490 NH CARD USED
*SECNO 1.727

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

3470 ENCROACHMENT STATIONS=     9881.7   10080.6  TYPE=      1  TARGET=      198.939
          HEC-1 Concentration Point C626:  24-Hr storm controls.
     1.727      4.15   1523.35   1522.90   1523.36   1524.05       .70      3.41       .02   1520.60
    3180.0    2026.4    1134.4      19.3     375.2     131.6       5.9      12.3       3.9   1520.60
       .05      5.40      8.62      3.24      .080      .060      .080      .000   1519.20   9881.70
   .024941      200.      214.      220.         2        14         0       .00    198.91  10080.61


1490 NH CARD USED
*SECNO 1.855

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.49

3470 ENCROACHMENT STATIONS=     9967.8   10160.9  TYPE=      1  TARGET=      193.109
1
   29MAR95      14:48:42                                                                          PAGE   51

    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


     1.855      7.06   1534.46   1533.55   1534.45   1535.03       .57     10.96       .01   1532.20
    3180.0      64.2    1731.6    1384.3      25.0     234.2     350.5      21.1       7.0   1531.50
       .08      2.57      7.39      3.95      .080      .060      .080      .000   1527.40   9967.78
   .011175      680.      677.      700.         5        14         0       .00    193.11  10160.89


1490 NH CARD USED
*SECNO 1.980

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

3470 ENCROACHMENT STATIONS=     9927.7   10119.8  TYPE=      1  TARGET=      192.100
               START Hydraulically Similar Reach AS2
               See Exhibit 1, Manning's n Value Map.
     1.980      5.28   1545.68   1544.28   1545.68   1546.05       .38     11.01       .02   1543.00
    3180.0     423.3    2726.2      30.5     112.0     532.8      11.5      30.6       9.9   1542.50
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```
      .12       3.78       5.12       2.66       .113       .123       .120       .000    1540.40    9927.75
  .028084        660.       659.       640.          4         11          0        .00     192.06   10119.81

 1490 NH CARD USED
 *SECNO 2.071

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.46

 3470 ENCROACHMENT STATIONS=     9939.3   10125.8  TYPE=       1  TARGET=      186.490
     2.071       7.52    1554.72    1552.43    1554.72    1554.97        .25       8.91        .01    1551.60
    3180.0       29.6     2781.9      368.6       15.1      666.2      122.4       38.7       12.0    1551.40
       .15       1.96       4.18       3.01       .113       .118       .120       .000    1547.20    9939.26
  .013134        490.       480.       475.          4          6          0        .00     186.49   10125.75

 1490 NH CARD USED
 *SECNO 2.095

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

 3470 ENCROACHMENT STATIONS=     9894.2   10101.0  TYPE=       1  TARGET=      206.730
          HEC-1 Concentration Point C549:  24-Hr storm controls.
                BALBOA WASH Tributary
1
    29MAR95       14:48:42                                                                          PAGE   52

     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

      2.095       5.14    1557.04    1555.57    1557.04    1557.40        .36       2.39        .03    1554.10
     3100.0      127.1     1584.4     1388.5       41.7      306.9      303.1       40.9       12.6    1553.60
        .16       3.05       5.16       4.58       .113       .121       .120       .000    1551.90    9894.22
    .027116        120.       129.       140.          2         11          0        .00     206.72   10100.95

 1490 NH CARD USED
 *SECNO 2.200

 3470 ENCROACHMENT STATIONS=     9827.1   10054.9  TYPE=       1  TARGET=      227.841
          HEC-1 Concentration Point C549R:  24-Hr storm controls.
      2.200       5.02    1564.92    1562.48    1564.92    1565.02        .11       7.59        .03    1560.80
     2110.0     1156.9      859.5       93.6       447.7      313.4       49.8       50.0       15.3    1559.90
        .21       2.58       2.74       1.88       .113       .125       .120       .000    1559.90    9827.06
    .007010        570.       553.       490.          5          8          0        .00     227.84   10054.90

 1490 NH CARD USED
 *SECNO 2.279

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

 3470 ENCROACHMENT STATIONS=     9840.3   10052.5  TYPE=       1  TARGET=      212.160
      2.279       3.79    1568.89    1567.27    1568.89    1569.06        .17       4.02        .02    1566.00
     2110.0      723.5     1381.7        4.8       225.7      415.9        3.5       56.7       17.3    1567.00
        .25       3.21       3.32       1.38       .113       .125       .120       .000    1565.10    9840.32
    .015604        380.       416.       430.          3         18          0        .00     212.16   10052.48

 1490 NH CARD USED
 *SECNO 2.304

 3470 ENCROACHMENT STATIONS=     9856.2   10063.6  TYPE=       1  TARGET=      207.370
      2.304       5.08    1570.38    1568.00    1570.38    1570.50        .12       1.43        .01    1566.30
     2110.0       30.7     1827.1      252.3       17.3      650.6      114.0       58.8       17.9    1567.30
        .26       1.77       2.81       2.21       .113       .122       .120       .000    1565.30    9856.22
    .008021        115.       134.       150.          1         19          0        .00     207.37   10063.59

 1490 NH CARD USED
 *SECNO 2.382
1
    29MAR95       14:48:42                                                                          PAGE   53

     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

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .61
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3470 ENCROACHMENT STATIONS=     9878.3   10065.3  TYPE=       1  TARGET=      187.100
         HEC-1 Concentration Point C622:  24-Hr storm controls.
        CULVERT  622:  ASHBROOK WASH and SAGUARO BOULEVARD
           Culvert 622     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     2.382       4.06   1575.26   1573.86   1575.26   1575.47       .22       4.94       .03   1573.20
    2050.0      721.6    1076.9     251.5     200.9     273.4      76.6       65.1      19.8   1572.50
       .29       3.59      3.94      3.28      .113      .125      .120       .000   1571.20   9878.25
   .020673       405.      410.      405.         2        11         0        .00    187.10  10065.35


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 2.405

3235 SLOPE TOO STEEP, EXCEEDS        .10


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9992.3   10011.7  TYPE=       1  TARGET=       19.410

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1581.98 ELREA=      1581.98

            Culvert 622  Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 28' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were  raised to Culvert Invert EL  1574.0
     2.405       7.00   1581.00   1581.00   1581.00   1584.54      3.54       5.64      1.66   1574.00
    2050.0         .0    2050.0        .0        .0     135.8        .0       66.1      20.1   1574.00
       .29        .00     15.09       .00      .000      .125      .000       .000   1574.00   9992.30
   .181497       115.      123.      130.         0        14         0        .00     19.40  10011.70


1
   29MAR95      14:48:42                                                                          PAGE   54

    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

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     3         .024       .90      2.63       .00      5.00       .00    121.00       2         3    1575.82   1574.01

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5130, EGIC= 1645.46..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1645.12 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO 2.428

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1586.61

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  9.11

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1645.46   1645.12      2.08     1328.      714.     2.706      58.9   1584.12      245.


3470 ENCROACHMENT STATIONS=     9854.0   10091.5  TYPE=       1  TARGET=      237.540
            Culvert 622  Inlet.   3-60" CMP's          (SECTION 3 OF SC ROUTINE)
              Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1575.82
            Culvert 622 BT information surveyed by ALS. West top of curb.
            Culvert 622 BT information coded per figure 3.16 (HEC-2, Sept 90)
            Right overbank is non effective flow area:  Hard coded GR's
                from STA 10194.7 to STA 10308.4 @ EL 1587.6
     2.428      10.74   1586.54       .00   1586.54   1586.61       .07       2.08       .00   1575.82
    2050.0      867.6     499.3     683.1     466.9     184.5     328.7       67.6      20.4   1575.82
       .31       1.86      2.71      2.08      .123      .125      .124       .000   1575.80   9853.96
   .002189       121.      121.      121.         2         0         0        .00    237.54  10091.50


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 2.448
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 3470 ENCROACHMENT STATIONS=     9887.3   10119.7  TYPE=      1  TARGET=      232.381
             Culvert 622     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                LEGEND WASH Tributary
      2.448      7.97   1586.77   1582.07   1586.77   1586.81       .04       .20       .00   1580.70
     2050.0     961.4      586.6     502.0     559.8     344.8     339.8      70.3      21.0   1581.40
        .33      1.72       1.70      1.48      .113      .125      .120      .000   1578.80   9887.27
    .001580      105.       105.      110.         3        17         0       .00    232.38  10119.65


1
    29MAR95       14:48:42                                                                                PAGE   55

     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


 1490 NH CARD USED
 *SECNO 2.494

 3470 ENCROACHMENT STATIONS=     9936.3   10058.7  TYPE=      1  TARGET=      122.380
           HEC-1 Concentration Point C622R:  24-hr storm controls.
                START Hydraulically Similar Reach AS3
                See Exhibit 1, Manning's n Value Map.
          CULVERT  M7 :  ASHBROOK WASH and BAYFIELD DRIVE
             Culvert M7      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      2.494      5.85   1587.05   1584.31   1587.05   1587.20       .15       .35       .03   1583.00
     1380.0     154.6      1217.2      8.2     126.5     368.8      12.4      75.3      22.0   1584.00
        .35      1.22       3.30       .66      .100      .045      .100      .000   1581.20   9936.33
    .001238      260.       246.      220.         2        18         0       .00    122.37  10058.71


 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO 2.529

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9991.0   10009.7  TYPE=      1  TARGET=       18.710

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1589.94 ELREA=      1589.94

             Culvert M7   Outlet.  3-60" CMP's          (SECTION 2 OF SC ROUTINE)
               Photogrammetric x-sec. located 12' Downstream. (No Elev. Adjust.)
      2.529      5.67   1588.82   1588.82   1588.82   1591.59      2.77       .60      1.31   1583.25
     1380.0        .0      1380.0       .0        .0     103.3        .0      76.6      22.3   1583.15
        .35       .00      13.36       .00      .000      .045      .000      .000   1583.15   9991.00
    .023874      195.       181.      170.         0         8         0       .00     18.70  10009.70


 SPECIAL CULVERT

 SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
      3          .024      .90       2.63      .00       5.00      .00       84.00     2         3       1584.98   1584.71

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

1
    29MAR95       14:48:42                                                                                PAGE   56

     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


 5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
 5130, EGIC= 1618.02..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 1606.29 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO 2.545

 SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1594.49

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.47

 SPECIAL CULVERT

      EGIC      EGOC       H4      QWEIR     QCULV      VCH       ACULV     ELTRD     WEIRLN
    1618.02   1606.29      2.89      740.      654.     5.038       58.9   1592.50       110.
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3470 ENCROACHMENT STATIONS=     9945.8   10052.3  TYPE=       1  TARGET=      106.490
                Right bank is non effective flow area:  Hard coded GR's
                          from STA 10072.3 to 10248.3 @ EL 1600
             Culvert M7    Inlet.   3-60"   CMP's        (SECTION 3 OF SC ROUTINE)
               Photogrammetric x-sec. located 12' Upstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1584.98
             Culvert M7  BT information Surveyed by ALS. North top of curb.
             Culvert M7  BT information coded per figure 3.16 (HEC-2, Sept 90)
     2.545      9.28   1594.26       .00   1594.26   1594.49       .23      2.89       .00   1584.98
    1380.0     292.2     659.1     428.7     148.6     130.8     177.4      77.1      22.4   1584.98
       .36      1.97      5.04      2.42      .067      .045      .060      .000   1584.98   9945.80
   .001194       84.       84.       84.         2         0         0       .00    106.49  10052.29


FLOW DISTRIBUTION FOR SECNO=      2.55          CWSEL=   1594.26

STA=    9946.    9987.    9994.   10008.   10015.   10031.   10052.
  PER Q=     8.5     12.7     47.8     16.0      8.4      6.6
   AREA=   102.4     46.2    130.8     55.3     77.6     44.5
    VEL=     1.1      3.8      5.0      4.0      1.5      2.0
  DEPTH=     2.5      7.2      9.3      7.4      5.0      2.1

CCHV=     .100 CEHV=     .300
1
   29MAR95      14:48:42                                                                    PAGE   57

    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


1490 NH CARD USED
*SECNO 2.558

3470 ENCROACHMENT STATIONS=     9930.6   10114.8  TYPE=       1  TARGET=      184.199
             Culvert M7      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     2.558      7.45   1594.45   1590.71   1594.45   1594.58       .13       .08       .01   1588.50
    1380.0     478.2     579.8     322.0     304.9     144.0     227.2      78.0      22.7   1588.40
       .37      1.57      4.03      1.42      .100      .045      .100      .000   1587.00   9930.61
   .001160       70.       71.       70.         2        18         0       .00    184.20  10114.81


1490 NH CARD USED
*SECNO 2.670

3235 SLOPE TOO STEEP, EXCEEDS        .10


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9938.8   10044.5  TYPE=       1  TARGET=      105.760
     2.670      3.75   1596.35   1596.35   1596.34   1597.27       .92      2.26       .24   1595.00
    1380.0     180.6    1199.4        .0      28.8     151.8        .0      83.8      24.6   1599.00
       .39      6.26      7.90       .00      .100      .096      .000      .000   1592.60   9938.75
   .110502       575.      594.      610.         0         8         0       .00     99.28  10038.03


1490 NH CARD USED
*SECNO 2.785

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.26


3470 ENCROACHMENT STATIONS=     9949.5   10046.0  TYPE=       1  TARGET=       96.500
            Left overbank is non effective flow area:  Hard coded GR's
                from STA 9927.3 to 9946.4 @ EL 1607.5
     2.785      6.01   1606.41   1605.23   1606.41   1607.00       .59      9.70       .03   1602.60
    1380.0     92.1      885.4     402.6      43.6     118.6     153.3      87.3      26.0   1601.70
       .42      2.11      7.47      2.63      .100      .045      .100      .000   1600.40   9949.47
   .006079       610.      607.      610.         9        11         0       .00     96.48  10045.95


1
   29MAR95      14:48:42                                                                    PAGE   58

    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


1490 NH CARD USED
*SECNO 2.807
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 3470 ENCROACHMENT STATIONS=     9934.7   10055.6  TYPE=      1  TARGET=      120.890
      2.807      5.20   1607.50   1605.79   1607.50   1607.73       .23       .69       .04   1604.40
     1380.0     553.6     820.4       6.0     212.8     184.2       6.4      88.2      26.2   1606.00
        .43      2.60      4.45       .95      .100      .064      .100      .000   1602.30   9934.70
    .006076      115.      112.      120.         4        14         0       .00    120.88  10055.58


 1490 NH CARD USED
 *SECNO 2.899

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .45


 3470 ENCROACHMENT STATIONS=     9980.8   10074.9  TYPE=      1  TARGET=       94.021
      2.899      3.10   1612.70   1612.56   1612.70   1613.62       .92      5.69       .21   1611.00
     1380.0      18.4     977.1     384.5       8.0     112.4      83.8      91.6      27.4   1610.60
        .45      2.31      8.69      4.59      .100      .054      .100      .000   1609.60   9980.85
    .030682      485.      489.      490.         2        11         0       .00     94.02  10074.87


 1490 NH CARD USED
 *SECNO 3.008

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


 3470 ENCROACHMENT STATIONS=     9959.8   10064.1  TYPE=      1  TARGET=      104.261
      3.008      4.15   1621.95   1621.07   1621.95   1622.52       .57      8.87       .03   1621.10
     1380.0       1.0     1187.1     192.0       1.2     183.0      81.4      94.8      28.8   1620.50
        .47       .78      6.49      2.36      .100      .045      .100      .000   1617.80   9959.81
    .009145      575.      574.      600.         5        12         0       .00    104.26  10064.07


 1490 NH CARD USED
 *SECNO 3.121
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


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9948.2   10032.9  TYPE=      1  TARGET=       84.670
                ARROW WASH Tributary
      3.121      5.52   1631.32   1631.32   1631.30   1632.63      1.31      7.06       .22   1628.90
     1380.0     218.3     1128.3      33.4      73.9     112.0      15.5      98.0      30.1   1629.30
        .49      2.95      10.07      2.15      .100      .045      .100      .000   1625.80   9948.20
    .015963      565.      598.      600.         0        11         0       .00     84.67  10032.87


 1490 NH CARD USED
 *SECNO 3.208

 3470 ENCROACHMENT STATIONS=     9969.4   10050.6  TYPE=      1  TARGET=       81.210
          HEC-1 Concentration Point C621:  6-hr storm controls.
      3.208      3.58   1639.48   1639.36   1639.50   1640.41       .93      7.74       .04   1638.20
     1180.0      10.4     1169.6        .0       6.7     150.7        .0      99.6      30.8   1639.70
        .51      1.56      7.76       .00      .100      .046      .000      .000   1635.90   9969.57
    .019965      260.      456.      335.         2        14         0       .00     78.87  10048.44


 1490 NH CARD USED
 *SECNO 3.241
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9988.2   10058.8  TYPE=      1  TARGET=       70.590
      3.241      3.50   1644.40   1644.40   1644.41   1645.65      1.25      3.47       .10   1641.40
     1180.0      39.5     1065.4      75.2      15.1     113.5      28.6     100.3      31.1   1641.90
        .51      2.62      9.39      2.63      .100      .045      .100      .000   1640.90   9988.26
    .019172      175.      177.      175.         0         5         0       .00     70.48  10058.73


 1490 NH CARD USED
 *SECNO 3.323

 3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 9986.8 10100.3 TYPE= 1 TARGET= 113.560
HEC-1 Concentration Point C613: 24-hr storm controls.

3.323	3.71	1653.51	1652.53	1653.50	1653.74	.23	7.99	.10	1654.50
970.0	.0	474.8	495.2	.0	110.8	143.7	102.3	32.0	1652.00
.54	.00	4.28	3.45	.000	.080	.100	.000	1649.80	9988.49
.017705	420.	430.	440.	4	19	0	.00	111.86	10100.35

1490 NH CARD USED
*SECNO 3.421

3470 ENCROACHMENT STATIONS= 9976.5 10061.4 TYPE= 1 TARGET= 84.880

3.421	2.89	1662.89	1662.56	1662.91	1663.52	.63	9.66	.12	1662.40
970.0	.3	834.8	135.0	.3	123.6	47.7	104.8	33.1	1661.00
.57	.79	6.75	2.83	.100	.056	.100	.000	1660.00	9976.53
.019998	510.	518.	505.	2	19	0	.00	84.83	10061.36

1490 NH CARD USED
*SECNO 3.487

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 9965.8 10048.8 TYPE= 1 TARGET= 83.060
HEC-1 Concentration Point C608: 24-Hr storm controls.
CULVERT 608: ASHBROOK WASH and HAMPSTEAD DRIVE
Culvert 608 Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)

3.487	2.90	1669.50	1669.48	1669.49	1670.56	1.07	6.91	.13	1668.00
970.0	9.5	952.9	7.6	5.6	114.0	7.3	106.0	33.8	1668.60
.58	1.69	8.36	1.04	.100	.045	.100	.000	1666.60	9965.79
.019424	350.	352.	340.	2	5	0	.00	75.57	10048.85

CCHV= .300 CEHV= .500
1490 NH CARD USED
*SECNO 3.519

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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

3470 ENCROACHMENT STATIONS= 9988.7 10017.1 TYPE= 1 TARGET= 28.409

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1678.50 ELREA= 1678.50

Culvert 608 Outlet. 3-10'x 7' Box (SECTION 2 OF SC ROUTINE)
Photogrammetric x-sec. located 24.4' Downstream. (No Elev. Adjust.

3.519	3.44	1674.04	1674.04	1674.04	1675.70	1.67	3.58	.30	1670.80
970.0	.0	970.0	.0	.0	93.6	.0	106.5	34.0	100000.00
.58	.00	10.36	.00	.000	.045	.000	.000	1670.60	9988.70
.023364	170.	168.	170.	0	11	0	.00	28.40	10017.10

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	3	.013	.50	2.63	.00	7.00	10.00	61.50	8	1	1673.19	1672.71

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

1490 NH CARD USED
*SECNO 3.531

SPECIAL CULVERT OUTLET CONTROL
EGIC = 1678.266 EGOC = 1678.773 PCWSE= 1674.036 ELTRD= 1681.950

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.94

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1678.27	1678.77	3.07	0.	970.	4.957	210.0	1681.95	0.

3470 ENCROACHMENT STATIONS= 9980.8 10013.8 TYPE= 1 TARGET= 33.010

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1681.57 ELREA= 1681.57

Culvert 608 Inlet. 3-10'x7' Box (SECTION 3 OF SC ROUTINE)
Photogrammetric x-sec. located 10' Upstream. (No Elev. Adjust.)
Culvert 608 BT information Surveyed by ALS. West top of curb.

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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
3.531	6.69	1678.39	.00	1678.39	1678.77	.38	3.07	.00	1673.10
970.0	.0	970.0	.0	.0	195.7	.0	106.7	34.0	100000.00
.59	.00	4.96	.00	.000	.045	.000	.000	1671.70	9980.80
.002710	62.	62.	62.	2	0	0	.00	33.00	10013.80

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 3.544

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

3470 ENCROACHMENT STATIONS= 9950.2 10057.3 TYPE= 1 TARGET= 107.119
Culvert 608 Upstream: expanded flow. (SECTION 4 OF SC ROUTINE)

3.544	5.17	1678.87	1675.78	1678.86	1678.94	.07	.13	.03	1676.90
970.0	.0	970.0	.0	.0	465.7	.0	107.2	34.1	1676.70
.60	.01	2.08	.00	.100	.069	.000	.000	1673.70	9950.19
.001348	75.	71.	75.	2	17	0	.00	107.11	10057.30

1490 NH CARD USED
*SECNO 3.621

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9955.4 10034.2 TYPE= 1 TARGET= 78.820
START Hydraulically Similar Reach AS4
See Exhibit 1, Manning's n Value Map.

3.621	3.83	1682.13	1682.13	1682.15	1682.93	.80	1.41	.22	1681.90
970.0	.0	970.0	.0	.0	135.3	.0	110.0	35.0	1681.90
.61	.04	7.17	.00	.055	.045	.000	.000	1678.30	9955.39
.023236	390.	403.	390.	0	14	0	.00	78.81	10034.20

1490 NH CARD USED
*SECNO 3.701

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.43

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

3470 ENCROACHMENT STATIONS= 9980.1 10065.1 TYPE= 1 TARGET= 85.030

3.701	4.26	1689.06	1688.62	1689.04	1689.59	.54	6.64	.03	1687.90
970.0	15.1	950.5	4.4	6.5	160.6	1.2	111.5	35.8	1688.10
.63	2.32	5.92	3.74	.055	.045	.025	.000	1684.80	9980.06
.011371	385.	422.	420.	5	5	0	.00	85.03	10065.09

1490 NH CARD USED

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*SECNO 3.764

3470 ENCROACHMENT STATIONS=     9962.7   10051.5  TYPE=       1  TARGET=       88.830
     3.764       3.47    1693.17   1692.94   1693.18   1693.82       .65       4.19        .03   1691.80
     970.0      102.0      854.1      13.9      21.4      127.5       6.3      112.7       36.5   1692.70
       .65       4.76       6.70      2.20      .046       .045      .044       .000    1689.70   9962.71
   .014067       330.       333.      315.         4         15         0        .00      88.73  10051.44


1490 NH CARD USED
*SECNO 4.058
 WATER EL=X5 CARD=   1715.800

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .15


3470 ENCROACHMENT STATIONS=     9990.0   10032.6  TYPE=       1  TARGET=       42.610
                    SECTION 4.058 USING REVISED MAPPING.
               START Hydraulically Similar Reach AS3
               See Exhibit 1, Manning's n Value Map.
          *************************      DAM  4     ****************************
           HEC-1   C599 Storage Route Rating Curve          WSEL =  1715.8 feet
           HEC-1   C585 Inflow Hydrograph (Ashbrook Wash)     Q =     300 cfs
           Reference:      HEC-1  Output  File:  EX100-6.OH1
          HEC-1 Concentration Point C585:  6-hr storm controls.

         CULVERT  585:  ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
            Culvert 585      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     4.058       1.72    1716.42   1716.40   1716.38   1717.04       .62      28.06        .00   1718.00
     300.0         .0      298.6       1.4        .0      47.0       1.0      116.3       38.7   1716.00
       .71        .00       6.35      1.31      .000      .070      .100       .000    1714.70   9994.79
   .056984       1500.      1552.     1490.         0         8         0        .00      37.82  10032.61


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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


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 4.065

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.21


3470 ENCROACHMENT STATIONS=    10000.0   10019.1  TYPE=       1  TARGET=       19.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1731.40 ELREA=      1731.40

            Culvert 585  Outlet.   2-8'x 4' Box        (SECTION 2 OF SC ROUTINE)
              Photogrammetric x-sec. located 5.9' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1714.73
     4.065       2.58    1717.28   1716.69   1717.22   1717.86       .58       .81        .01   1714.70
     300.0         .0      300.0        .0        .0      48.9        .0      116.3       38.7 100000.00
       .72        .00       6.13       .00      .000      .045      .000       .000    1714.70  10000.00
   .011622       36.        37.       33.         2         8         0        .00      19.10  10019.10


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     2          .013       .50      2.63       .00      4.00      8.00     242.00       8         1      1722.47   1714.73

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

CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 4.110

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1725.977  EGOC =   1726.295  PCWSE=   1717.279  ELTRD=   1740.820


3301 HV CHANGED MORE THAN HVINS

SPECIAL CULVERT

      EGIC      EGOC       H4      QWEIR     QCULV       VCH      ACULV     ELTRD     WEIRLN
   1725.98   1726.29      8.43        0.       300.     8.360       64.0   1740.82         0.


3470 ENCROACHMENT STATIONS=     9987.1   10000.0  TYPE=       1  TARGET=       12.900
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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

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1739.78 ELREA= 1739.78

Culvert 585 Inlet. 2-8'x 4' Box (SECTION 3 OF SC ROUTINE)
Photogrammetric x-sec. located 30' Upstream. (No Elev. Adjust.)
Base Channel Elevations were lowered to Culvert Invert EL 1722.47
Culvert 585 BT information taken from AS-BUILTS (Set #10).
Culvert 585 BT information coded per figure 3.16 (HEC-2, Sept 90)
START Hydraulically Similar Reach AS5
See Exhibit 1, Manning's n Value Map.

4.110	2.81	1725.21	.00	1725.23	1726.29	1.09	8.43	.00	1722.40
300.0	.0	300.0	.0	.0	35.9	.0	116.6	38.8	100000.00
.72	.00	8.36	.00	.000	.025	.000	.000	1722.40	9987.10
.006541	242.	242.	242.	4	0	0	.00	12.90	10000.00

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 4.119

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.69

3470 ENCROACHMENT STATIONS= 9972.6 10014.8 TYPE= 1 TARGET= 42.140
Culvert 585 Upstream: expanded flow. (SECTION 4 OF SC ROUTINE)
SECTION 4.119 USING REVISED MAPPING.

4.119	3.92	1726.39	1724.21	1726.39	1726.48	.10	.09	.10	1724.00
300.0	4.8	295.1	.0	5.2	117.5	.2	116.7	38.8	1726.00
.73	.92	2.51	.28	.050	.038	.050	.000	1722.47	9972.63
.000902	45.	48.	45.	3	14	0	.00	42.14	10014.77

1490 NH CARD USED
*SECNO 4.177

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

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= 9983.9 10027.7 TYPE= 1 TARGET= 43.790

4.177	2.41	1745.31	1745.31	1745.30	1746.04	.73	.62	.19	1744.90
300.0	.8	299.2	.0	.8	43.6	.0	117.2	39.1	1747.00
.74	.93	6.87	.00	.050	.025	.000	.000	1742.90	9983.92
.008195	295.	306.	300.	0	14	0	.00	33.22	10017.14

1490 NH CARD USED
*SECNO 4.252
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9956.1 10024.5 TYPE= 1 TARGET= 68.350

4.252	3.56	1757.76	1757.76	1757.77	1758.35	.59	2.53	.01	1756.30
300.0	30.1	203.2	66.7	14.4	27.7	32.7	117.8	39.6	1756.60
.76	2.09	7.33	2.04	.050	.025	.050	.000	1754.20	9956.14
.005120	390.	395.	400.	0	11	0	.00	68.31	10024.45

1490 NH CARD USED
*SECNO 4.311
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9971.1 10043.1 TYPE= 1 TARGET= 72.000
START Hydraulically Similar Reach AS6
See Exhibit 1, Manning's n Value Map.
CULVERT M5 : ASHBROOK WASH and SIERRA MADRE

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          Culvert M5      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
    4.311      1.14   1766.54   1766.54   1766.54   1766.96      .42      3.19      .02   1766.10
    300.0        .5     293.9       5.6        .3      56.0       2.5     118.3     40.1   1765.80
      .78      1.67      5.25      2.21      .055      .045      .060      .000  1765.40   9971.12
  .030075      310.      312.      310.         0        17         0       .00    72.00  10043.12


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 4.335

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

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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=     9967.5   10019.5  TYPE=       1  TARGET=       52.010

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1772.61 ELREA=      1772.61

          Culvert M5   Outlet.  5-10'x 3' Box        (SECTION 2 OF SC ROUTINE)
            Photogrammetric x-sec. located 17.2' Downstream. (No Elev. Adjust.
    4.335      1.86   1769.16   1768.87   1769.16   1769.47      .31      2.47      .03   1768.30
    300.0        .0     300.0        .0        .0      67.3        .0     118.4     40.2   1768.60
      .79      .00       4.46      .00       .000      .045      .000      .000  1767.30   9967.50
  .013100      130.      130.      130.         5        11         0       .00    52.00  10019.50


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     5          .013      .50       2.63      .00       3.00      10.00     74.50     8         1      1770.06   1768.95

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

1490 NH CARD USED
*SECNO 4.349

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1771.685  EGOC =   1771.876  PCWSE=   1769.158  ELTRD=   1775.190


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.44

SPECIAL CULVERT

     EGIC      EGOC       H4      QWEIR     QCULV      VCH       ACULV     ELTRD     WEIRLN
   1771.68   1771.88      2.41        0.      300.     3.538      150.0   1775.19        0.


3470 ENCROACHMENT STATIONS=     9972.6   10025.2  TYPE=       1  TARGET=       52.620

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1775.00 ELREA=      1775.00

          Culvert M5   Inlet.   5-10'x 3' Box        (SECTION 3 OF SC ROUTINE)
          Culvert M5  BT information Surveyed by ALS. South top of curb.
          Culvert M5  BT information coded per figure 3.16 (HEC-2, Sept 90)
    4.349      1.68   1771.68       .00   1771.68   1771.88       .19      2.41      .00   1770.10
    300.0        .0     300.0        .0        .0      84.8        .0     118.6     40.3   1770.20
      .79      .00       3.54      .00       .000      .045      .000      .000  1770.00   9972.60
  .006305       75.       75.       75.         2         0         0       .00    52.60  10025.20


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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


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 4.362
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9943.0   10036.2  TYPE=       1  TARGET=       93.160
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          Culvert M5      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     4.362      1.19   1772.69   1772.69   1772.69   1773.06       .36       .74       .05   1772.20
     300.0      28.8     268.6       2.6      12.5      53.3       1.2     118.7      40.4   1771.90
       .80      2.30      5.04      2.10      .055      .045      .060      .000   1771.50   9943.02
   .025651       65.       66.       75.         0        19         0       .00     93.16  10036.18


1490 NH CARD USED
*SECNO 4.412

3470 ENCROACHMENT STATIONS=     9889.5   10009.7  TYPE=       1  TARGET=      120.250
     4.412      1.48   1778.68   1778.57   1778.68   1778.91       .23      5.84       .01   1777.90
     300.0      42.1     257.9        .0      19.0      64.0        .0     119.2      41.1   1779.50
       .82      2.22      4.03       .00      .055      .046      .000      .000   1777.20   9889.47
   .018776       290.      265.      250.         5        11         0       .00     116.76  10006.24


1490 NH CARD USED
*SECNO 4.493

3470 ENCROACHMENT STATIONS=     9967.3   10024.7  TYPE=       1  TARGET=       57.391
     4.493      1.77   1785.97   1785.69   1785.96   1786.27       .30      7.34       .02   1785.10
     300.0      88.4     155.7      56.0      23.8      30.7      16.5     119.9      42.0   1784.70
       .84      3.72      5.08      3.39      .055      .045      .060      .000   1784.20   9967.35
   .015070       470.      430.      420.         5         5         0       .00      57.39  10024.74


1490 NH CARD USED
*SECNO 4.559
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.2   10018.2  TYPE=       1  TARGET=       47.989
     4.559      2.14   1791.94   1791.94   1791.93   1792.53       .58      6.05       .08   1790.90
     300.0      12.7     280.6       6.7       5.0      44.4       3.6     120.4      42.4   1791.20
       .86      2.53      6.32      1.86      .055      .045      .060      .000   1789.80   9970.19
   .020759       345.      344.      340.         0        11         0       .00      47.99  10018.18


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   29MAR95      14:48:42                                                                                PAGE   69

    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


1490 NH CARD USED
*SECNO 4.637
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9981.7   10016.8  TYPE=       1  TARGET=       35.160
     4.637      2.14   1801.34   1801.34   1801.33   1802.04       .70      8.72       .03   1800.40
     300.0      27.7     251.3      21.0       7.3      35.2       6.4     120.9      42.8   1799.60
       .88      3.77      7.14      3.26      .055      .045      .060      .000   1799.20   9981.67
   .021432       410.      414.      415.         0         5         0       .00      35.16  10016.83


1490 NH CARD USED
*SECNO 4.839
 WATER EL=X5 CARD=   1832.400

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9949.6   10166.8  TYPE=       1  TARGET=      217.199
          *************************      DAM 6      ****************************
           HEC-1   C560 Storage Route Rating Curve          WSEL =  1832.4 feet
           HEC-1   C560 Inflow Hydrograph                    Q =    1990 cfs
           Reference:      HEC-1  Output  File:  EX100-6.OH1
          HEC-1 Concentration Point C560I:  6-hr storm controls

     4.839      9.60   1832.40   1826.65   1832.40   1832.46       .06       .43      24.29   1824.50
    1990.0     412.7    1231.0     346.4     247.9     536.9     337.5     135.1       45.8   1826.50
      1.03      1.66      2.29      1.03      .055      .048      .060      .000   1822.80   9949.57
   .000319      1050.     1068.     1040.         0        17         0       .00     217.20  10166.77


1490 NH CARD USED
*SECNO 4.954

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9967.6   10042.3  TYPE=       1  TARGET=       74.699
     4.954      6.44   1838.74   1838.74   1838.68   1840.26      1.52       .58       .44   1834.80
```

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    1990.0     375.0    1418.1     196.9      63.6     126.8      45.6     144.5      47.9    1835.80
      1.05      5.90      11.19      4.32      .055      .045      .060      .000   1832.30    9967.57
   .012757      600.       608.       605.         0        20         0       .00     74.70   10042.27
```



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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

1490 NH CARD USED
*SECNO 5.076
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9910.0   10012.3  TYPE=       1  TARGET=      102.310
          HEC-1 Concentration Point C558:  6-hr storm controls.
     5.076      4.61   1852.31   1852.31   1853.43      1.12     10.92       .04   1851.20
    1920.0    1334.2     585.8        .0     171.5      59.2        .0     147.9      49.1   1852.70
      1.07      7.78      9.89       .00      .055      .045      .000      .000   1847.70   9910.01
   .025113      620.       641.       630.         0        16         0       .00     101.63  10011.64


1490 NH CARD USED
*SECNO 5.182
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9975.6   10079.3  TYPE=       1  TARGET=      103.700
     5.182      3.60   1869.60   1869.60   1870.74      1.14     16.05       .01   1871.10
    1920.0        .0     439.7    1480.3        .0      45.8     179.3     150.7      50.4   1867.40
      1.08       .00      9.60      8.26      .000      .049      .060      .000   1866.00   9979.90
   .035274      535.       559.       540.         0        15         0       .00      99.39  10079.29


1490 NH CARD USED
*SECNO 5.277

3470 ENCROACHMENT STATIONS=     9980.6   10077.3  TYPE=       1  TARGET=       96.640
     5.277      4.21   1882.61   1882.39   1882.61   1883.59       .98     12.83       .02   1882.20
    1920.0        .5     936.2     983.3        .4     101.8     149.9     153.4      51.5   1880.00
      1.10      1.35      9.20      6.56      .055      .049      .060      .000   1878.40   9980.63
   .020779      500.       505.       470.         3         8         0       .00      96.64  10077.27


1490 NH CARD USED
*SECNO 5.349
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9983.4   10086.4  TYPE=       1  TARGET=      103.080
     5.349      4.05   1891.85   1891.85   1891.84   1893.00      1.15      9.31       .05   1891.10
    1920.0        2.3     867.4    1050.3        1.0      86.7     144.0     155.5      52.3   1889.90
      1.11      2.36      10.00      7.29      .055      .048      .060      .000   1887.80   9983.36
   .029819      380.       380.       375.         0        11         0       .00     103.08  10086.44
```



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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

1490 NH CARD USED
*SECNO 5.436

3470 ENCROACHMENT STATIONS=     9959.5   10055.3  TYPE=       1  TARGET=       95.760
     5.436      5.22   1901.32   1901.16   1901.33   1902.43      1.10      9.42       .01   1899.10
    1920.0     181.2    1396.7     342.1      36.4     149.4      64.5     158.0      53.4   1898.80
      1.13      4.98      9.35      5.31      .055      .045      .060      .000   1896.10   9959.51
   .015414      450.       459.       440.         4        11         0       .00      95.73  10055.25


1490 NH CARD USED
*SECNO 5.519

3470 ENCROACHMENT STATIONS=     9932.6   10007.5  TYPE=       1  TARGET=       74.930
          HEC-1 Concentration Point C557:  6-hr storm controls.
         CULVERT  557:  ASHBROOK WASH and GOLDEN EAGLE BOULEVARD
            Culvert 557      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     5.519      4.89   1908.79   1908.47   1908.79   1909.89      1.10      7.47       .00   1906.00
    1880.0     813.9    1066.1        .0     107.2     118.4        .0     160.3      54.2   1908.80
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      1.14       7.59       9.00        .00       .055       .049       .000       .000    1903.90    9932.58
   .019196        435.       436.       435.          4         15          0        .00      74.91   10007.49


 CCHV=     .300 CEHV=     .500
 1490 NH CARD USED
 *SECNO 5.542

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9975.0   10028.1  TYPE=       1  TARGET=       53.109
             Culvert 557  Outlet.   1-60"  CMP          (SECTION 2 OF SC ROUTINE)
               Base Channel Elevations were lowered to Culvert Invert EL 1905.77
     5.542      9.80    1915.57    1915.57    1915.73    1917.66       2.09       1.60        .49    1905.80
    1880.0      596.3      874.2      409.5       71.4       58.7       62.2      160.9       54.4    1905.77
      1.15       8.35      14.88       6.59       .045       .045       .047       .000    1905.77    9976.47
   .009698        120.       122.       120.          0         14          0        .00      51.14   10027.61


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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


 SPECIAL CULVERT

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      1          .024        .90       2.63        .00       5.00        .00     110.00        2          3     1909.38    1905.77

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

 5130, EGIC= 2418.97..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 2381.39 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO 5.563

 SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1923.19

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.70

 SPECIAL CULVERT

      EGIC       EGOC         H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
   2418.97    2381.39       5.53       1595.       279.      5.016       19.6    1919.70       153.


 3470 ENCROACHMENT STATIONS=     9911.7   10058.5  TYPE=       1  TARGET=      146.800
             Culvert 557  Inlet.    1-60"  CMP          (SECTION 3 OF SC ROUTINE)
               Photogrammetric x-sec. located 2' Upstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1909.38
             Culvert 557 BT information Surveyed by ALS:west top curb, p. 10 BK 2
             Culvert 622 BT information coded per Figure 3.16 on left overbank.
                 see Figure 3.16 HEC-2, Sept 1990.
     5.563      13.65    1923.03        .00    1923.04    1923.19        .16       5.53        .00    1909.40
    1880.0      951.8      410.6      517.5      376.3       81.9      217.2      162.0       54.6    1909.38
      1.16       2.53       5.02       2.38       .049       .045       .048       .000    1909.38    9911.81
   .000708        110.       110.       110.          2          0          0        .00     146.69   10058.50


 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO 5.572

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.81


 3470 ENCROACHMENT STATIONS=     9929.0   10068.8  TYPE=       1  TARGET=      139.790
             Culvert 557      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
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
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    5.572     10.96   1923.16   1916.17   1923.16   1923.22       .06       .02       .01   1913.20
   1880.0     595.3     942.6     342.1     374.5     410.0     266.4     163.0      54.8   1914.30
     1.16      1.59      2.30      1.28      .055      .045      .060      .000   1912.20   9929.02
  .000215       55.       47.       40.         2        14         0       .00    139.75  10068.77


1490 NH CARD USED
*SECNO 5.651

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9981.5   10081.5  TYPE=       1  TARGET=       99.940
     5.651      3.69   1924.09   1924.09   1924.08   1925.24      1.15       .29       .33   1920.80
    1880.0      77.9     519.3    1282.8      13.4      44.5     179.4     168.9      55.9   1922.10
      1.18      5.80     11.68      7.15      .055      .045      .060      .000   1920.40   9981.55
   .026158       400.      417.      390.         0        22         0       .00     99.94  10081.49


1490 NH CARD USED
*SECNO 5.765
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9984.5   10088.1  TYPE=       1  TARGET=       103.601
     5.765      3.85   1939.25   1939.25   1939.25   1940.39      1.13      14.79       .00   1935.80
    1880.0      98.3     655.1    1126.6      17.1      58.0     168.9     172.2      57.3   1936.70
      1.20      5.75     11.31      6.67      .055      .045      .060      .000   1935.40   9984.52
   .023537       590.      601.      595.         0         8         0       .00    103.60  10088.12


1490 NH CARD USED
*SECNO 5.873
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9949.8   10056.4  TYPE=       1  TARGET=       106.610
     5.873      3.34   1953.94   1953.94   1953.94   1955.07      1.12      12.27       .00   1951.30
    1880.0     189.6     1333.1     357.3      31.2     140.5      71.8     175.5      58.7   1951.50
      1.22      6.07      9.49      4.98      .055      .045      .060      .000   1950.60   9949.75
   .019304       565.      573.      585.         0        15         0       .00    106.61  10056.36


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   29MAR95      14:48:42                                                                          PAGE   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


1490 NH CARD USED
*SECNO 5.978
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9945.1   10056.4  TYPE=       1  TARGET=       111.240
     5.978      4.33   1969.03   1969.03   1969.03   1970.09      1.06      10.90       .01   1966.40
    1880.0     608.5     615.3     656.3      93.5      54.8     106.7     178.6      60.0   1965.90
      1.24      6.51     11.22      6.15      .055      .045      .060      .000   1964.70   9945.14
   .020633       540.      552.      540.         0        11         0       .00    111.24  10056.38


1490 NH CARD USED
*SECNO 6.073
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9961.0   10042.8  TYPE=       1  TARGET=       81.780
         HEC-1 Concentration Point C556:  6-hr storm controls.
     6.073      5.24   1983.14   1983.14   1983.14   1984.43      1.29       9.61       .07   1979.90
    1750.0     489.0     891.1     369.9      73.5      79.5      66.4     181.3      61.2   1980.70
      1.25      6.66     11.21      5.57      .055      .045      .060      .000   1977.90   9960.97
   .017553       505.      504.      505.         0        11         0       .00     81.78  10042.75


1490 NH CARD USED
*SECNO 6.118

3470 ENCROACHMENT STATIONS=     9962.5   10034.4  TYPE=       1  TARGET=       71.820
     6.118      3.56   1987.76   1987.76   1987.76   1989.13      1.37       4.68       .02   1984.60
    1750.0     613.0     792.5     344.4      74.7      71.3      52.7     182.5      61.6   1984.90
      1.26      8.21     11.12      6.54      .055      .045      .060      .000   1984.20   9962.54
   .022223       250.      237.      220.         2        14         0       .00     71.82  10034.36


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THIS RUN EXECUTED 29MAR95 14:48:57

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Ashbrook Wash 100 Year

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG
*	2.428	1645.12	1580.82	1645.46	1584.12	714.30	1327.78	16.00	2.08	10.74	1586.54	2.71	1586.61
*	2.428	1645.12	1580.82	1645.46	1584.12	714.30	1327.78	16.00	2.08	10.74	1586.54	2.71	1586.61
*	2.545	1606.29	1589.98	1618.02	1592.50	653.88	739.56	16.00	2.89	9.28	1594.26	5.04	1594.49
*	2.545	1606.29	1589.98	1618.02	1592.50	653.89	739.70	16.00	2.89	9.28	1594.26	5.04	1594.49
*	3.531	1678.77	1680.19	1678.27	1681.95	970.00	.00	7.00	3.07	6.69	1678.39	4.96	1678.77
*	3.531	1678.77	1680.19	1678.27	1681.95	970.00	.00	7.00	3.07	6.69	1678.39	4.96	1678.77
*	4.110	1726.30	1726.47	1725.98	1740.82	300.00	.00	7.00	8.47	2.83	1725.23	8.29	1726.30
	4.110	1726.29	1726.47	1725.98	1740.82	300.00	.00	7.00	8.43	2.81	1725.21	8.36	1726.29
*	4.349	1771.88	1773.06	1771.68	1775.19	300.00	.00	7.00	2.40	1.68	1771.68	3.54	1771.88
*	4.349	1771.88	1773.06	1771.68	1775.19	300.00	.00	7.00	2.41	1.68	1771.68	3.54	1771.88
*	5.563	2381.56	1914.38	2418.97	1919.70	279.39	1600.79	16.00	5.54	13.66	1923.04	5.01	1923.19
*	5.563	2381.39	1914.38	2418.97	1919.70	279.32	1595.35	16.00	5.53	13.65	1923.03	5.02	1923.19

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Ashbrook Wash 100 Year

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	1.521	1503.74	.04	1505.04	91.50	65.86	3090.18	33.96	.00	.00	9953.30	10031.70	.00
	1.521	1503.75	.01	1505.04	91.50	66.03	3089.98	33.99	91.50	9944.73	9953.30	10031.70	10036.23
	1.523	1503.95	.00	1505.24	91.51	65.91	3090.12	33.97	.00	.00	9953.30	10031.70	.00
	1.523	1503.95	.00	1505.24	91.51	66.03	3089.97	34.00	91.51	9944.72	9953.30	10031.70	10036.23
	1.525	1504.15	.00	1505.44	91.52	65.97	3090.03	34.00	.00	.00	9953.30	10031.70	.00
	1.525	1504.15	.00	1505.44	91.52	66.04	3089.93	34.02	91.52	9944.71	9953.30	10031.70	10036.23
	1.527	1504.35	.00	1505.64	91.53	66.04	3089.94	34.02	.00	.00	9953.30	10031.70	.00
	1.527	1504.36	.00	1505.64	91.53	66.09	3089.88	34.03	91.53	9944.71	9953.30	10031.70	10036.24
	1.577	1508.89	.00	1509.53	132.17	1214.79	1560.31	414.90	.00	.00	9983.50	10020.70	.00
	1.577	1508.89	.00	1509.53	132.16	1214.74	1560.41	414.85	132.16	9918.34	9983.50	10020.70	10050.50
*	1.602	1510.71	.00	1511.92	126.45	36.02	3122.89	31.10	.00	.00	9951.60	10064.90	.00
*	1.602	1510.71	.00	1511.92	126.46	36.02	3122.88	31.10	126.46	9945.09	9951.60	10064.90	10071.55
	1.636	1515.78	.00	1516.54	186.52	.00	1721.90	1468.10	.00	.00	9995.40	10056.40	.00
	1.636	1515.78	.00	1516.54	186.52	.00	1722.06	1467.94	196.83	9995.39	9995.40	10056.40	10192.22
	1.686	1520.00	.00	1520.63	207.73	1116.60	1847.71	225.69	.00	.00	9990.00	10037.00	.00
	1.686	1520.00	-.01	1520.62	207.73	1117.29	1846.67	226.04	207.73	9871.80	9990.00	10037.00	10079.53
*	1.727	1523.36	.00	1524.06	198.94	2027.02	1133.67	19.31	.00	.00	10036.30	10076.30	.00
*	1.727	1523.35	-.01	1524.05	198.91	2026.35	1134.38	19.27	198.94	9881.69	10036.30	10076.30	10080.63
*	1.855	1534.45	.00	1535.02	193.11	63.99	1732.53	1383.48	.00	.00	9987.00	10035.20	.00
*	1.855	1534.46	.00	1535.03	193.11	64.19	1731.56	1384.26	193.11	9967.78	9987.00	10035.20	10160.89
*	1.980	1545.68	.00	1546.06	192.10	424.00	2725.44	30.56	.00	.00	9980.00	10112.60	.00
*	1.980	1545.68	-.01	1546.05	192.06	423.33	2726.18	30.49	192.10	9927.73	9980.00	10112.60	10119.83
*	2.071	1554.72	.00	1554.97	186.49	29.51	2782.12	368.37	.00	.00	9948.90	10084.30	.00
*	2.071	1554.72	.00	1554.97	186.49	29.57	2781.87	368.56	186.49	9939.26	9948.90	10084.30	10125.75
*	2.095	1557.04	.00	1557.40	206.72	127.12	1584.39	1388.49	.00	.00	9925.40	10000.00	.00
*	2.095	1557.04	.00	1557.40	206.72	127.11	1584.40	1388.49	206.73	9894.22	9925.40	10000.00	10100.95

	2.200	1564.92	.00	1565.02	227.84	1156.90	859.51	93.59	.00	.00	9955.40	10023.90	.00
	2.200	1564.92	.00	1565.02	227.84	1156.90	859.51	93.59	227.84	9827.06	9955.40	10023.90	10054.90
*	2.279	1568.89	.00	1569.06	212.16	723.46	1381.72	4.82	.00	.00	9924.60	10048.80	.00
*	2.279	1568.89	.00	1569.06	212.16	723.47	1381.72	4.81	212.16	9840.32	9924.60	10048.80	10052.48
	2.304	1570.38	.00	1570.50	207.37	30.66	1827.08	252.26	.00	.00	9864.70	10021.30	.00
	2.304	1570.38	.00	1570.50	207.37	30.66	1827.09	252.26	207.37	9856.22	9864.70	10021.30	10063.59

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	2.382	1575.26	.00	1575.47	187.10	721.59	1076.95	251.46	.00	.00	9955.70	10033.70	.00
*	2.382	1575.26	.00	1575.47	187.10	721.60	1076.93	251.46	187.10	9878.25	9955.70	10033.70	10065.35
*	2.405	1581.00	.00	1584.54	19.40	.00	2050.00	.00	.00	.00	9992.30	10011.70	.00
*	2.405	1581.00	.00	1584.54	19.40	.00	2050.00	.00	19.41	9992.30	9992.30	10011.70	10011.71
*	2.428	1586.54	.00	1586.61	237.54	867.62	499.29	683.10	.00	.00	9995.00	10012.20	.00
*	2.428	1586.54	.00	1586.61	237.54	867.62	499.29	683.10	237.54	9853.96	9995.00	10012.20	10091.50
	2.448	1586.77	.00	1586.81	232.38	961.42	586.58	502.00	.00	.00	9987.00	10037.30	.00
	2.448	1586.77	.00	1586.81	232.38	961.42	586.56	502.02	232.38	9887.27	9987.00	10037.30	10119.65
	2.494	1587.05	.00	1587.20	122.37	154.63	1217.19	8.18	.00	.00	9973.90	10050.60	.00
	2.494	1587.05	.00	1587.20	122.37	154.63	1217.19	8.18	122.38	9936.33	9973.90	10050.60	10058.71
*	2.529	1588.82	.00	1591.59	18.70	.00	1380.00	.00	.00	.00	9991.00	10009.70	.00
*	2.529	1588.82	.00	1591.59	18.70	.00	1380.00	.00	18.71	9991.00	9991.00	10009.70	10009.71
*	2.545	1594.26	.00	1594.49	106.48	292.18	659.15	428.67	.00	.00	9993.70	10007.80	.00
*	2.545	1594.26	.00	1594.49	106.49	292.19	659.10	428.71	106.49	9945.80	9993.70	10007.80	10052.29
	2.558	1594.45	.00	1594.58	184.20	478.17	579.86	321.97	.00	.00	9989.80	10010.80	.00
	2.558	1594.45	.00	1594.58	184.20	478.18	579.81	322.01	184.20	9930.61	9989.80	10010.80	10114.81
*	2.670	1596.34	.00	1597.27	99.27	180.42	1199.58	.00	.00	.00	9959.80	10044.50	.00
*	2.670	1596.35	.00	1597.27	99.28	180.64	1199.35	.00	105.76	9938.75	9959.80	10044.50	10044.51
*	2.785	1606.41	.00	1607.00	96.50	92.10	885.22	402.68	.00	.00	9968.90	9992.60	.00
*	2.785	1606.41	.00	1607.00	96.48	92.05	885.35	402.59	96.50	9949.46	9968.90	9992.60	10045.96
	2.807	1607.50	.00	1607.73	120.89	553.58	820.38	6.04	.00	.00	10000.00	10047.10	.00
	2.807	1607.50	.00	1607.73	120.88	553.58	820.38	6.04	120.89	9934.70	10000.00	10047.10	10055.59
*	2.899	1612.70	.00	1613.62	94.02	18.37	977.13	384.49	.00	.00	9990.20	10036.90	.00
*	2.899	1612.70	.00	1613.62	94.02	18.38	977.13	384.49	94.02	9980.85	9990.20	10036.90	10074.87
*	3.008	1621.95	.00	1622.52	104.26	.97	1187.06	191.97	.00	.00	9962.70	10023.90	.00
*	3.008	1621.95	.00	1622.52	104.26	.97	1187.07	191.95	104.26	9959.81	9962.70	10023.90	10064.07
*	3.121	1631.30	.00	1632.63	84.67	216.94	1130.16	32.90	.00	.00	9988.70	10017.80	.00
*	3.121	1631.32	.02	1632.63	84.67	218.29	1128.27	33.44	84.67	9948.20	9988.70	10017.80	10032.87
	3.208	1639.50	.00	1640.41	79.26	10.76	1169.24	.00	.00	.00	9980.00	10050.60	.00
	3.208	1639.48	-.02	1640.41	78.87	10.44	1169.55	.00	81.21	9969.40	9980.00	10050.60	10050.61
*	3.241	1644.41	.00	1645.64	70.59	39.58	1064.80	75.62	.00	.00	9998.30	10036.80	.00
*	3.241	1644.40	-.01	1645.65	70.48	39.46	1065.37	75.16	70.59	9988.22	9998.30	10036.80	10058.81
	3.323	1653.50	.00	1653.73	111.85	.00	474.97	495.03	.00	.00	9986.80	10035.60	.00
	3.323	1653.51	.01	1653.74	111.86	.00	474.83	495.17	113.56	9986.79	9986.80	10035.60	10100.35

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	3.421	1662.91	.00	1663.53	84.89	.26	834.39	135.35	.00	.00	9977.80	10028.90	.00
	3.421	1662.89	-.01	1663.52	84.83	.25	834.76	134.99	84.88	9976.51	9977.80	10028.90	10061.39
	3.487	1669.49	.00	1670.56	75.42	9.43	953.17	7.40	.00	.00	9973.30	10019.60	.00
	3.487	1669.50	.01	1670.56	75.57	9.51	952.94	7.55	83.06	9965.79	9973.30	10019.60	10048.85
*	3.519	1674.04	.00	1675.70	28.40	.00	970.00	.00	.00	.00	9988.70	10017.10	.00
*	3.519	1674.04	.00	1675.70	28.40	.00	970.00	.00	28.41	9988.69	9988.70	10017.10	10017.10
*	3.531	1678.39	.00	1678.77	33.00	.00	970.00	.00	.00	.00	9980.80	10013.80	.00
*	3.531	1678.39	.00	1678.77	33.00	.00	970.00	.00	33.01	9980.79	9980.80	10013.80	10013.80
*	3.544	1678.86	.00	1678.91	253.07	87.02	857.41	25.57	.00	.00	9950.20	10057.30	.00
*	3.544	1678.87	.01	1678.94	107.11	.00	970.00	.00	107.12	9950.19	9950.20	10057.30	10057.31
*	3.621	1682.15	.00	1682.93	82.02	.21	969.36	.42	.00	.00	9955.40	10034.20	.00
*	3.621	1682.13	-.02	1682.93	78.81	.00	970.00	.00	78.82	9955.39	9955.40	10034.20	10034.21
	3.701	1689.04	.00	1689.59	85.04	14.68	951.12	4.20	.00	.00	9990.00	10062.70	.00

*	3.701	1689.06	.02	1689.59	85.03	15.08	950.54	4.39	85.03	9980.06	9990.00	10062.70	10065.09
	3.764	1693.18	.00	1693.83	88.84	102.40	853.11	14.50	.00	.00	9978.80	10035.20	.00
	3.764	1693.17	-.01	1693.82	88.73	101.98	854.13	13.89	88.83	9962.68	9978.80	10035.20	10051.51
*	4.058	1716.38	.00	1717.04	37.71	.00	298.91	1.08	.00	.00	9990.00	10028.00	.00
*	4.058	1716.42	.04	1717.04	37.82	.00	298.62	1.38	42.61	9990.00	9990.00	10028.00	10032.61
*	4.065	1717.22	.00	1717.83	19.10	.00	300.00	.00	.00	.00	10000.00	10019.10	.00
*	4.065	1717.28	.06	1717.86	19.10	.00	300.00	.00	19.10	10000.00	10000.00	10019.10	10019.10
*	4.110	1725.23	.00	1726.30	12.90	.00	300.00	.00	.00	.00	9987.10	10000.00	.00
	4.110	1725.21	-.03	1726.29	12.90	.00	300.00	.00	12.90	9987.10	9987.10	10000.00	10000.00
*	4.119	1726.39	.00	1726.48	42.15	4.81	295.15	.04	.00	.00	9977.00	10014.00	.00
*	4.119	1726.39	.00	1726.48	42.14	4.82	295.14	.04	42.14	9972.63	9977.00	10014.00	10014.77
*	4.177	1745.30	.00	1746.04	33.18	.73	299.27	.00	.00	.00	9987.90	10027.70	.00
*	4.177	1745.31	.01	1746.04	33.22	.76	299.24	.00	43.79	9983.92	9987.90	10027.70	10027.71
*	4.252	1757.77	.00	1758.35	68.35	30.21	202.83	66.96	.00	.00	9971.90	9983.30	.00
*	4.252	1757.76	-.01	1758.35	68.31	30.10	203.23	66.67	68.35	9956.12	9971.90	9983.30	10024.47
*	4.311	1766.54	.00	1766.96	72.01	.50	293.93	5.56	.00	.00	9972.50	10036.30	.00
*	4.311	1766.54	.00	1766.96	72.00	.52	293.86	5.62	72.00	9971.12	9972.50	10036.30	10043.12
*	4.335	1769.16	.00	1769.47	52.00	.00	300.00	.00	.00	.00	9967.50	10019.50	.00
*	4.335	1769.16	-.01	1769.47	52.00	.00	300.00	.00	52.01	9967.50	9967.50	10019.50	10019.51
*	4.349	1771.68	.00	1771.88	52.60	.00	300.00	.00	.00	.00	9972.60	10025.20	.00
*	4.349	1771.68	.00	1771.88	52.60	.00	300.00	.00	52.62	9972.59	9972.60	10025.20	10025.21

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	4.362	1772.69	.00	1773.06	93.16	28.61	268.82	2.57	.00	.00	9975.90	10033.10	.00
*	4.362	1772.69	.00	1773.06	93.16	28.80	268.62	2.58	93.16	9943.02	9975.90	10033.10	10036.18
	4.412	1778.68	.00	1778.91	116.79	42.22	257.78	.00	.00	.00	9933.80	10009.70	.00
	4.412	1778.68	.00	1778.91	116.76	42.06	257.94	.00	120.25	9889.46	9933.80	10009.70	10009.71
	4.493	1785.96	.00	1786.27	57.38	88.32	155.73	55.94	.00	.00	9988.20	10010.00	.00
	4.493	1785.97	.00	1786.27	57.39	88.35	155.69	55.96	57.39	9967.35	9988.20	10010.00	10024.74
	4.559	1791.93	.00	1792.53	47.99	12.37	281.19	6.44	.00	.00	9979.70	10008.60	.00
*	4.559	1791.94	.01	1792.53	47.99	12.70	280.57	6.73	47.99	9970.19	9979.70	10008.60	10018.18
*	4.637	1801.33	.00	1802.04	35.16	27.39	251.81	20.79	.00	.00	9990.00	10009.50	.00
*	4.637	1801.34	.02	1802.04	35.16	27.69	251.28	21.02	35.16	9981.67	9990.00	10009.50	10016.83
*	4.839	1832.40	.00	1832.46	217.20	412.68	1230.96	346.36	.00	.00	9992.80	10054.80	.00
*	4.839	1832.40	.00	1832.46	217.20	412.68	1230.96	346.36	217.20	9949.57	9992.80	10054.80	10166.77
*	4.954	1838.68	.00	1840.26	74.70	370.28	1428.34	191.38	.00	.00	9994.10	10017.20	.00
*	4.954	1838.74	.06	1840.26	74.70	375.03	1418.08	196.89	74.70	9967.57	9994.10	10017.20	10042.27
*	5.076	1852.31	.00	1853.43	101.63	1334.26	585.74	.00	.00	.00	9990.40	10012.30	.00
*	5.076	1852.31	.00	1853.43	101.63	1334.24	585.76	.00	102.31	9910.00	9990.40	10012.30	10012.31
*	5.182	1869.60	.00	1870.74	99.40	.00	439.69	1480.31	.00	.00	9975.60	10000.00	.00
*	5.182	1869.60	.00	1870.74	99.39	.00	439.71	1480.29	103.70	9975.59	9975.60	10000.00	10079.29
	5.277	1882.61	.00	1883.59	96.64	.50	936.27	983.23	.00	.00	9982.40	10015.20	.00
	5.277	1882.61	.00	1883.59	96.64	.50	936.23	983.26	96.64	9980.63	9982.40	10015.20	10077.27
*	5.349	1891.84	.00	1893.00	103.07	2.30	867.59	1050.10	.00	.00	9986.00	10019.30	.00
*	5.349	1891.85	.00	1893.00	103.08	2.33	867.37	1050.29	103.08	9983.36	9986.00	10019.30	10086.44
	5.436	1901.33	.00	1902.43	95.77	181.38	1396.32	342.30	.00	.00	9981.40	10024.20	.00
	5.436	1901.32	.00	1902.43	95.73	181.18	1396.75	342.07	95.76	9959.50	9981.40	10024.20	10055.26
	5.519	1908.79	.00	1909.89	74.90	813.74	1066.26	.00	.00	.00	9971.00	10007.50	.00
	5.519	1908.79	.00	1909.89	74.91	813.91	1066.09	.00	74.93	9932.58	9971.00	10007.50	10007.51
*	5.542	1915.73	.00	1917.66	53.11	602.07	858.41	419.52	.00	.00	9997.00	10003.00	.00
*	5.542	1915.57	-.17	1917.66	51.14	596.34	874.20	409.46	53.11	9974.98	9997.00	10003.00	10028.09
*	5.563	1923.04	.00	1923.19	146.79	952.04	410.28	517.67	.00	.00	9997.00	10003.00	.00
*	5.563	1923.03	-.01	1923.19	146.69	951.83	410.65	517.52	146.80	9911.73	9997.00	10003.00	10058.53
*	5.572	1923.16	.00	1923.22	139.79	595.37	942.38	342.25	.00	.00	9983.20	10022.70	.00
*	5.572	1923.16	-.01	1923.22	139.75	595.31	942.57	342.12	139.79	9929.00	9983.20	10022.70	10068.79
*	5.651	1924.08	.00	1925.24	99.94	77.72	519.85	1282.43	.00	.00	9989.70	10003.00	.00
*	5.651	1924.09	.01	1925.24	99.94	77.86	519.30	1282.84	99.94	9981.55	9989.70	10003.00	10081.49

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	5.765	1939.25	.00	1940.39	103.59	98.11	655.94	1125.95	.00	.00	9994.40	10011.70	.00
*	5.765	1939.25	.01	1940.39	103.60	98.30	655.14	1126.55	103.60	9984.52	9994.40	10011.70	10088.12
*	5.873	1953.94	.00	1955.07	106.61	189.47	1333.80	356.73	.00	.00	9966.10	10013.30	.00
*	5.873	1953.94	.01	1955.07	106.61	189.61	1333.13	357.26	106.61	9949.75	9966.10	10013.30	10056.36
*	5.978	1969.03	.00	1970.09	111.24	608.35	615.49	656.15	.00	.00	9990.40	10005.10	.00
*	5.978	1969.03	.00	1970.09	111.24	608.48	615.26	656.26	111.24	9945.14	9990.40	10005.10	10056.38
*	6.073	1983.14	.00	1984.43	81.78	488.98	891.14	369.89	.00	.00	9992.20	10010.80	.00
*	6.073	1983.14	.00	1984.43	81.78	488.99	891.10	369.90	81.78	9960.97	9992.20	10010.80	10042.75
	6.118	1987.76	.00	1989.13	71.83	613.05	792.52	344.43	.00	.00	9989.40	10010.30	.00
	6.118	1987.76	.00	1989.13	71.82	613.04	792.55	344.41	71.82	9962.54	9989.40	10010.30	10034.36

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Ashbrook Wash 100 Year

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1.521	.00	.00	.00	1499.30	3190.00	1503.74	1503.15	1505.04	202.18	9.25	360.46	224.35
	1.521	.00	.00	.00	1499.30	3190.00	1503.75	1503.15	1505.04	201.21	9.24	361.00	224.89
	1.523	10.00	.00	.00	1499.50	3190.00	1503.95	1503.35	1505.24	201.83	9.25	360.66	224.54
	1.523	10.00	.00	.00	1499.50	3190.00	1503.95	1503.35	1505.24	201.02	9.24	361.12	224.99
	1.525	10.00	.00	.00	1499.70	3190.00	1504.15	1503.55	1505.44	201.30	9.24	360.96	224.84
	1.525	10.00	.00	.00	1499.70	3190.00	1504.15	1503.55	1505.44	200.73	9.23	361.28	225.16
	1.527	10.00	.00	.00	1499.90	3190.00	1504.35	1503.75	1505.64	200.73	9.23	361.29	225.16
	1.527	10.00	.00	.00	1499.90	3190.00	1504.36	1503.75	1505.64	200.42	9.23	361.46	225.33
	1.577	259.40	.00	.00	1503.20	3190.00	1508.89	1507.50	1509.53	104.43	7.76	542.23	312.16
	1.577	259.40	.00	.00	1503.20	3190.00	1508.89	1507.50	1509.53	104.53	7.77	542.07	312.02
*	1.602	136.10	.00	.00	1506.90	3190.00	1510.71	1510.49	1511.92	286.13	8.90	369.06	188.58
*	1.602	136.10	.00	.00	1506.90	3190.00	1510.71	1510.49	1511.92	285.98	8.90	369.12	188.63
	1.636	180.10	.00	.00	1510.60	3190.00	1515.78	1515.43	1516.54	227.12	8.40	509.24	211.67
	1.636	180.10	.00	.00	1510.60	3190.00	1515.78	1515.43	1516.54	227.23	8.40	509.15	211.62
	1.686	262.60	.00	.00	1512.11	3190.00	1520.00	1519.36	1520.63	117.04	7.75	609.49	294.86
	1.686	262.60	.00	.00	1512.11	3190.00	1520.00	1519.36	1520.62	116.63	7.74	610.25	295.38
*	1.727	213.90	.00	.00	1519.20	3180.00	1523.36	1522.90	1524.06	247.56	8.60	513.94	202.11
*	1.727	213.90	.00	.00	1519.20	3180.00	1523.35	1522.90	1524.05	249.41	8.62	512.73	201.36
*	1.855	677.40	.00	.00	1527.40	3180.00	1534.45	1533.55	1535.02	112.23	7.41	608.72	300.17
*	1.855	677.40	.00	.00	1527.40	3180.00	1534.46	1533.55	1535.03	111.75	7.39	609.61	300.82
*	1.980	659.30	.00	.00	1540.40	3180.00	1545.68	1544.28	1546.06	279.36	5.11	657.32	190.26
*	1.980	659.30	.00	.00	1540.40	3180.00	1545.68	1544.28	1546.05	280.84	5.12	656.21	189.76
*	2.071	480.40	.00	.00	1547.20	3180.00	1554.72	1552.43	1554.97	131.63	4.18	803.10	277.17
*	2.071	480.40	.00	.00	1547.20	3180.00	1554.72	1552.43	1554.97	131.34	4.18	803.67	277.47
*	2.095	128.70	.00	.00	1551.90	3100.00	1557.04	1555.57	1557.40	271.13	5.16	651.63	188.27
*	2.095	128.70	.00	.00	1551.90	3100.00	1557.04	1555.57	1557.40	271.16	5.16	651.61	188.26
	2.200	552.70	.00	.00	1559.90	2110.00	1564.92	1562.48	1565.02	70.10	2.74	810.88	252.02
	2.200	552.70	.00	.00	1559.90	2110.00	1564.92	1562.48	1565.02	70.10	2.74	810.88	252.02
*	2.279	415.50	.00	.00	1565.10	2110.00	1568.89	1567.27	1569.06	156.06	3.32	645.12	168.90
*	2.279	415.50	.00	.00	1565.10	2110.00	1568.89	1567.27	1569.06	156.04	3.32	645.15	168.91
	2.304	134.10	.00	.00	1565.30	2110.00	1570.38	1568.00	1570.50	80.20	2.81	781.97	235.61
	2.304	134.10	.00	.00	1565.30	2110.00	1570.38	1568.00	1570.50	80.21	2.81	781.95	235.59

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2.382	410.20	.00	.00	1571.20	2050.00	1575.26	1573.86	1575.47	206.76	3.94	550.84	142.57
*	2.382	410.20	.00	.00	1571.20	2050.00	1575.26	1573.86	1575.47	206.73	3.94	550.86	142.58
*	2.405	123.10	.00	.00	1574.00	2050.00	1581.00	1581.00	1584.54	1203.49	15.09	135.82	59.09
*	2.405	123.10	.00	.00	1574.00	2050.00	1581.00	1581.00	1584.54	1814.97	15.09	135.82	48.12
*	2.428	121.00	1584.12	1580.82	1575.80	2050.00	1586.54	.00	1586.61	21.89	2.71	980.19	438.20
*	2.428	121.00	1584.12	1580.82	1575.80	2050.00	1586.54	.00	1586.61	21.89	2.71	980.19	438.20

	2.448	104.60	.00	.00	1578.80	2050.00	1586.77	1582.07	1586.81	15.81	1.70	1244.19	515.54
	2.448	104.60	.00	.00	1578.80	2050.00	1586.77	1582.07	1586.81	15.80	1.70	1244.41	515.69
	2.494	245.90	.00	.00	1581.20	1380.00	1587.05	1584.31	1587.20	12.38	3.30	507.69	392.13
	2.494	245.90	.00	.00	1581.20	1380.00	1587.05	1584.31	1587.20	12.38	3.30	507.69	392.13
*	2.529	180.70	.00	.00	1583.15	1380.00	1588.82	1588.82	1591.59	167.69	13.36	103.29	106.57
*	2.529	180.70	.00	.00	1583.15	1380.00	1588.82	1588.82	1591.59	238.74	13.36	103.29	89.31
*	2.545	84.00	1592.50	1589.98	1584.98	1380.00	1594.26	.00	1594.49	11.94	5.04	456.77	399.36
*	2.545	84.00	1592.50	1589.98	1584.98	1380.00	1594.26	.00	1594.49	11.94	5.04	456.83	399.43
	2.558	71.30	.00	.00	1587.00	1380.00	1594.45	1590.71	1594.58	11.61	4.03	675.76	404.96
	2.558	71.30	.00	.00	1587.00	1380.00	1594.45	1590.71	1594.58	11.60	4.03	676.05	405.15
*	2.670	593.50	.00	.00	1592.60	1380.00	1596.34	1596.34	1597.27	1113.60	7.92	180.25	41.35
*	2.670	593.50	.00	.00	1592.60	1380.00	1596.35	1596.35	1597.27	1105.02	7.90	180.69	41.51
*	2.785	607.20	.00	.00	1600.40	1380.00	1606.41	1605.23	1607.00	60.68	7.46	315.71	177.16
*	2.785	607.20	.00	.00	1600.40	1380.00	1606.41	1605.23	1607.00	60.79	7.47	315.49	177.00
	2.807	112.30	.00	.00	1602.30	1380.00	1607.50	1605.79	1607.73	60.75	4.45	403.45	177.06
	2.807	112.30	.00	.00	1602.30	1380.00	1607.50	1605.79	1607.73	60.76	4.45	403.42	177.04
*	2.899	489.40	.00	.00	1609.60	1380.00	1612.70	1612.56	1613.62	306.92	8.69	204.08	78.77
*	2.899	489.40	.00	.00	1609.60	1380.00	1612.70	1612.56	1613.62	306.82	8.69	204.10	78.78
*	3.008	573.70	.00	.00	1617.80	1380.00	1621.95	1621.07	1622.52	91.42	6.49	265.66	144.33
*	3.008	573.70	.00	.00	1617.80	1380.00	1621.95	1621.07	1622.52	91.45	6.49	265.63	144.31
*	3.121	598.00	.00	.00	1625.80	1380.00	1631.30	1631.30	1632.63	162.82	10.14	199.88	108.15
*	3.121	598.00	.00	.00	1625.80	1380.00	1631.32	1631.32	1632.63	159.63	10.07	201.49	109.22
	3.208	456.40	.00	.00	1635.90	1180.00	1639.50	1639.36	1640.41	194.26	7.68	159.11	84.66
	3.208	456.40	.00	.00	1635.90	1180.00	1639.48	1639.36	1640.41	199.65	7.76	157.43	83.51
*	3.241	177.30	.00	.00	1640.90	1180.00	1644.41	1644.41	1645.64	189.10	9.35	157.94	85.81
*	3.241	177.30	.00	.00	1640.90	1180.00	1644.40	1644.40	1645.65	191.72	9.39	157.15	85.22
	3.323	429.50	.00	.00	1649.80	970.00	1653.50	1652.53	1653.73	179.70	4.30	253.34	72.36
	3.323	429.50	.00	.00	1649.80	970.00	1653.51	1652.53	1653.74	177.05	4.28	254.53	72.90

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3.421	518.20	.00	.00	1660.00	970.00	1662.91	1662.56	1663.53	197.57	6.73	172.38	69.01
	3.421	518.20	.00	.00	1660.00	970.00	1662.89	1662.56	1663.52	199.98	6.75	171.69	68.59
	3.487	351.50	.00	.00	1666.60	970.00	1669.49	1669.46	1670.56	195.95	8.38	126.45	69.29
	3.487	351.50	.00	.00	1666.60	970.00	1669.50	1669.48	1670.56	194.24	8.36	126.91	69.60
*	3.519	168.30	.00	.00	1670.60	970.00	1674.04	1674.04	1675.70	200.42	10.36	93.65	68.52
*	3.519	168.30	.00	.00	1670.60	970.00	1674.04	1674.04	1675.70	233.64	10.36	93.62	63.46
*	3.531	61.50	1681.95	1680.19	1671.70	970.00	1678.39	.00	1678.77	21.22	4.96	195.68	210.55
*	3.531	61.50	1681.95	1680.19	1671.70	970.00	1678.39	.00	1678.77	27.10	4.96	195.67	186.32
*	3.544	71.30	.00	.00	1673.70	970.00	1678.86	1675.78	1678.91	10.31	1.84	648.94	302.03
*	3.544	71.30	.00	.00	1673.70	970.00	1678.87	1675.78	1678.94	13.48	2.08	465.70	264.19
*	3.621	403.40	.00	.00	1678.30	970.00	1682.15	1682.15	1682.93	223.28	7.09	137.14	64.92
*	3.621	403.40	.00	.00	1678.30	970.00	1682.13	1682.13	1682.93	232.36	7.17	135.33	63.63
	3.701	421.70	.00	.00	1684.80	970.00	1689.04	1688.61	1689.59	116.86	5.97	166.80	89.73
*	3.701	421.70	.00	.00	1684.80	970.00	1689.06	1688.62	1689.59	113.71	5.92	168.26	90.96
	3.764	332.80	.00	.00	1689.70	970.00	1693.18	1692.94	1693.83	137.66	6.65	156.43	82.67
	3.764	332.80	.00	.00	1689.70	970.00	1693.17	1692.94	1693.82	140.67	6.70	155.27	81.78
*	4.058	1552.30	.00	.00	1714.70	300.00	1716.38	1716.37	1717.04	617.07	6.52	46.71	12.08
*	4.058	1552.30	.00	.00	1714.70	300.00	1716.42	1716.40	1717.04	569.84	6.35	48.07	12.57
*	4.065	36.60	.00	.00	1714.70	300.00	1717.22	1716.69	1717.83	106.42	6.28	47.78	29.08
*	4.065	36.60	.00	.00	1714.70	300.00	1717.28	1716.69	1717.86	116.22	6.13	48.93	27.83
*	4.110	242.00	1740.82	1726.47	1722.40	300.00	1725.23	.00	1726.30	49.10	8.29	36.20	42.81
	4.110	242.00	1740.82	1726.47	1722.40	300.00	1725.21	.00	1726.29	65.41	8.36	35.88	37.09
*	4.119	47.50	.00	.00	1722.47	300.00	1726.39	1724.21	1726.48	9.04	2.51	122.73	99.75
*	4.119	47.50	.00	.00	1722.47	300.00	1726.39	1724.21	1726.48	9.02	2.51	122.83	99.88
*	4.177	306.20	.00	.00	1742.90	300.00	1745.30	1745.30	1746.04	82.81	6.89	44.22	32.97
*	4.177	306.20	.00	.00	1742.90	300.00	1745.31	1745.31	1746.04	81.95	6.87	44.40	33.14
*	4.252	395.20	.00	.00	1754.20	300.00	1757.77	1757.77	1758.35	50.59	7.30	75.24	42.18
*	4.252	395.20	.00	.00	1754.20	300.00	1757.76	1757.76	1758.35	51.20	7.33	74.84	41.93

* 4.311	311.50	.00	.00	1765.40	300.00	1766.54	1766.54	1766.96	305.68	5.27	58.55	17.16
* 4.311	311.50	.00	.00	1765.40	300.00	1766.54	1766.54	1766.96	300.75	5.25	58.85	17.30
* 4.335	130.00	.00	.00	1767.30	300.00	1769.16	1768.87	1769.47	130.21	4.47	67.17	26.29
* 4.335	130.00	.00	.00	1767.30	300.00	1769.16	1768.87	1769.47	131.00	4.46	67.34	26.21
* 4.349	74.50	1775.19	1773.06	1770.00	300.00	1771.68	.00	1771.88	60.75	3.54	84.78	38.49
* 4.349	74.50	1775.19	1773.06	1770.00	300.00	1771.68	.00	1771.88	63.05	3.54	84.78	37.78

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	4.362	65.50	.00	.00	1771.50	300.00	1772.69	1772.69	1773.06	259.61	5.06	66.73	18.62
*	4.362	65.50	.00	.00	1771.50	300.00	1772.69	1772.69	1773.06	256.51	5.04	67.00	18.73
	4.412	264.60	.00	.00	1777.20	300.00	1778.68	1778.57	1778.91	185.86	4.02	83.25	22.01
	4.412	264.60	.00	.00	1777.20	300.00	1778.68	1778.57	1778.91	187.76	4.03	82.96	21.89
	4.493	430.20	.00	.00	1784.20	300.00	1785.96	1785.69	1786.27	151.93	5.09	70.73	24.34
	4.493	430.20	.00	.00	1784.20	300.00	1785.97	1785.69	1786.27	150.70	5.08	70.91	24.44
	4.559	344.30	.00	.00	1789.80	300.00	1791.93	1791.91	1792.53	215.05	6.39	52.38	20.46
*	4.559	344.30	.00	.00	1789.80	300.00	1791.94	1791.94	1792.53	207.59	6.32	53.06	20.82
*	4.637	413.70	.00	.00	1799.20	300.00	1801.33	1801.33	1802.04	221.41	7.22	48.43	20.16
*	4.637	413.70	.00	.00	1799.20	300.00	1801.34	1801.34	1802.04	214.32	7.14	48.96	20.49
*	4.839	1067.60	.00	.00	1822.80	1990.00	1832.40	1826.65	1832.46	3.19	2.29	1122.29	1114.45
*	4.839	1067.60	.00	.00	1822.80	1990.00	1832.40	1826.65	1832.46	3.19	2.29	1122.29	1114.45
*	4.954	608.20	.00	.00	1832.30	1990.00	1838.68	1838.68	1840.26	134.41	11.40	231.30	171.65
*	4.954	608.20	.00	.00	1832.30	1990.00	1838.74	1838.74	1840.26	127.57	11.19	235.92	176.19
*	5.076	641.30	.00	.00	1847.70	1920.00	1852.31	1852.31	1853.43	251.01	9.89	230.77	121.19
*	5.076	641.30	.00	.00	1847.70	1920.00	1852.31	1852.31	1853.43	251.13	9.89	230.74	121.16
*	5.182	558.90	.00	.00	1866.00	1920.00	1869.60	1869.60	1870.74	352.50	9.60	225.11	102.26
*	5.182	558.90	.00	.00	1866.00	1920.00	1869.60	1869.60	1870.74	352.74	9.60	225.06	102.23
	5.277	504.70	.00	.00	1878.40	1920.00	1882.61	1882.39	1883.59	207.94	9.20	252.00	133.15
	5.277	504.70	.00	.00	1878.40	1920.00	1882.61	1882.39	1883.59	207.79	9.20	252.05	133.20
*	5.349	379.80	.00	.00	1887.80	1920.00	1891.84	1891.84	1893.00	299.93	10.02	231.26	110.86
*	5.349	379.80	.00	.00	1887.80	1920.00	1891.85	1891.85	1893.00	298.19	10.00	231.69	111.19
	5.436	458.70	.00	.00	1896.10	1920.00	1901.33	1901.15	1902.43	153.51	9.33	250.59	154.97
	5.436	458.70	.00	.00	1896.10	1920.00	1901.32	1901.16	1902.43	154.14	9.35	250.23	154.65
	5.519	436.40	.00	.00	1903.90	1880.00	1908.79	1908.47	1909.89	192.73	9.02	225.34	135.42
	5.519	436.40	.00	.00	1903.90	1880.00	1908.79	1908.47	1909.89	191.96	9.00	225.64	135.69
*	5.542	121.80	.00	.00	1905.77	1880.00	1915.73	1915.73	1917.66	88.37	14.37	201.02	199.99
*	5.542	121.80	.00	.00	1905.77	1880.00	1915.57	1915.57	1917.66	96.98	14.88	192.30	190.91
*	5.563	110.00	1919.70	1914.38	1909.38	1880.00	1923.04	.00	1923.19	7.05	5.01	676.34	707.94
*	5.563	110.00	1919.70	1914.38	1909.38	1880.00	1923.03	.00	1923.19	7.08	5.02	675.37	706.74
*	5.572	47.40	.00	.00	1912.20	1880.00	1923.16	1916.17	1923.22	2.15	2.30	1051.73	1282.48
*	5.572	47.40	.00	.00	1912.20	1880.00	1923.16	1916.17	1923.22	2.15	2.30	1050.85	1280.92
*	5.651	417.30	.00	.00	1920.40	1880.00	1924.08	1924.08	1925.24	263.93	11.71	236.65	115.72
*	5.651	417.30	.00	.00	1920.40	1880.00	1924.09	1924.09	1925.24	261.58	11.68	237.33	116.24

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	5.765	601.10	.00	.00	1935.40	1880.00	1939.25	1939.25	1940.39	237.79	11.35	243.13	121.92
*	5.765	601.10	.00	.00	1935.40	1880.00	1939.25	1939.25	1940.39	235.37	11.31	243.94	122.54
*	5.873	573.10	.00	.00	1950.60	1880.00	1953.94	1953.94	1955.07	194.32	9.51	242.95	134.87
*	5.873	573.10	.00	.00	1950.60	1880.00	1953.94	1953.94	1955.07	193.04	9.49	243.49	135.31
*	5.978	552.20	.00	.00	1964.70	1880.00	1969.03	1969.03	1970.09	206.83	11.23	254.82	130.72
*	5.978	552.20	.00	.00	1964.70	1880.00	1969.03	1969.03	1970.09	206.33	11.22	255.03	130.88
*	6.073	504.00	.00	.00	1977.90	1750.00	1983.14	1983.14	1984.43	175.58	11.21	219.40	132.07
*	6.073	504.00	.00	.00	1977.90	1750.00	1983.14	1983.14	1984.43	175.53	11.21	219.42	132.09
	6.118	237.40	.00	.00	1984.20	1750.00	1987.76	1987.75	1989.13	222.11	11.12	198.69	117.42
	6.118	237.40	.00	.00	1984.20	1750.00	1987.76	1987.76	1989.13	222.23	11.12	198.65	117.39

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Ashbrook Wash 100 Year

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1.521	3190.00	1503.74	.00	.00	.04	91.50	.00
	1.521	3190.00	1503.75	.01	.00	.01	91.50	.00
	1.523	3190.00	1503.95	.00	.20	.00	91.51	10.00
	1.523	3190.00	1503.95	.00	.20	.00	91.51	10.00
	1.525	3190.00	1504.15	.00	.20	.00	91.52	10.00
	1.525	3190.00	1504.15	.00	.20	.00	91.52	10.00
	1.527	3190.00	1504.35	.00	.20	.00	91.53	10.00
	1.527	3190.00	1504.36	.00	.20	.00	91.53	10.00
	1.577	3190.00	1508.89	.00	4.53	.00	132.17	259.40
	1.577	3190.00	1508.89	.00	4.53	.00	132.16	259.40
*	1.602	3190.00	1510.71	.00	1.82	.00	126.45	136.10
*	1.602	3190.00	1510.71	.00	1.83	.00	126.46	136.10
	1.636	3190.00	1515.78	.00	5.07	.00	186.52	180.10
	1.636	3190.00	1515.78	.00	5.07	.00	186.52	180.10
	1.686	3190.00	1520.00	.00	4.22	.00	207.73	262.60
	1.686	3190.00	1520.00	-.01	4.22	-.01	207.73	262.60
*	1.727	3180.00	1523.36	.00	3.36	.00	198.94	213.90
*	1.727	3180.00	1523.35	-.01	3.36	-.01	198.91	213.90
*	1.855	3180.00	1534.45	.00	11.09	.00	193.11	677.40
*	1.855	3180.00	1534.46	.00	11.10	.00	193.11	677.40
*	1.980	3180.00	1545.68	.00	11.23	.00	192.10	659.30
*	1.980	3180.00	1545.68	-.01	11.22	-.01	192.06	659.30
*	2.071	3180.00	1554.72	.00	9.04	.00	186.49	480.40
*	2.071	3180.00	1554.72	.00	9.05	.00	186.49	480.40
*	2.095	3100.00	1557.04	.00	2.32	.00	206.72	128.70
*	2.095	3100.00	1557.04	.00	2.32	.00	206.72	128.70
	2.200	2110.00	1564.92	.00	7.88	.00	227.84	552.70
	2.200	2110.00	1564.92	.00	7.88	.00	227.84	552.70
*	2.279	2110.00	1568.89	.00	3.98	.00	212.16	415.50
*	2.279	2110.00	1568.89	.00	3.98	.00	212.16	415.50
	2.304	2110.00	1570.38	.00	1.49	.00	207.37	134.10
	2.304	2110.00	1570.38	.00	1.49	.00	207.37	134.10

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2.382	2050.00	1575.26	.00	4.87	.00	187.10	410.20
*	2.382	2050.00	1575.26	.00	4.87	.00	187.10	410.20
*	2.405	2050.00	1581.00	.00	5.74	.00	19.40	123.10
*	2.405	2050.00	1581.00	.00	5.74	.00	19.40	123.10
*	2.428	2050.00	1586.54	.00	5.54	.00	237.54	121.00
*	2.428	2050.00	1586.54	.00	5.54	.00	237.54	121.00
	2.448	2050.00	1586.77	.00	.23	.00	232.38	104.60
	2.448	2050.00	1586.77	.00	.23	.00	232.38	104.60
	2.494	1380.00	1587.05	.00	.28	.00	122.37	245.90
	2.494	1380.00	1587.05	.00	.28	.00	122.37	245.90
*	2.529	1380.00	1588.82	.00	1.78	.00	18.70	180.70
*	2.529	1380.00	1588.82	.00	1.78	.00	18.70	180.70
*	2.545	1380.00	1594.26	.00	5.43	.00	106.48	84.00
*	2.545	1380.00	1594.26	.00	5.43	.00	106.49	84.00
	2.558	1380.00	1594.45	.00	.20	.00	184.20	71.30
	2.558	1380.00	1594.45	.00	.20	.00	184.20	71.30
*	2.670	1380.00	1596.34	.00	1.89	.00	99.27	593.50
*	2.670	1380.00	1596.35	.00	1.89	.00	99.28	593.50
*	2.785	1380.00	1606.41	.00	10.07	.00	96.50	607.20
*	2.785	1380.00	1606.41	.00	10.06	.00	96.48	607.20

2.807	1380.00	1607.50	.00	1.09	.00	120.89	112.30
2.807	1380.00	1607.50	.00	1.10	.00	120.88	112.30
* 2.899	1380.00	1612.70	.00	5.20	.00	94.02	489.40
* 2.899	1380.00	1612.70	.00	5.20	.00	94.02	489.40
* 3.008	1380.00	1621.95	.00	9.25	.00	104.26	573.70
* 3.008	1380.00	1621.95	.00	9.25	.00	104.26	573.70
* 3.121	1380.00	1631.30	.00	9.35	.00	84.67	598.00
* 3.121	1380.00	1631.32	.02	9.37	.02	84.67	598.00
3.208	1180.00	1639.50	.00	8.20	.00	79.26	456.40
3.208	1180.00	1639.48	-.02	8.16	-.02	78.87	456.40
* 3.241	1180.00	1644.41	.00	4.91	.00	70.59	177.30
* 3.241	1180.00	1644.40	-.01	4.92	-.01	70.48	177.30
3.323	970.00	1653.50	.00	9.09	.00	111.85	429.50
3.323	970.00	1653.51	.01	9.11	.01	111.86	429.50

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
3.421	970.00	1662.91	.00	9.41	.00	84.89	518.20
3.421	970.00	1662.89	-.01	9.39	-.01	84.83	518.20
3.487	970.00	1669.49	.00	6.58	.00	75.42	351.50
3.487	970.00	1669.50	.01	6.60	.01	75.57	351.50
* 3.519	970.00	1674.04	.00	4.55	.00	28.40	168.30
* 3.519	970.00	1674.04	.00	4.54	.00	28.40	168.30
* 3.531	970.00	1678.39	.00	4.35	.00	33.00	61.50
* 3.531	970.00	1678.39	.00	4.35	.00	33.00	61.50
* 3.544	970.00	1678.86	.00	.47	.00	253.07	71.30
* 3.544	970.00	1678.87	.01	.48	.01	107.11	71.30
* 3.621	970.00	1682.15	.00	3.29	.00	82.02	403.40
* 3.621	970.00	1682.13	-.02	3.26	-.02	78.81	403.40
3.701	970.00	1689.04	.00	6.89	.00	85.04	421.70
* 3.701	970.00	1689.06	.02	6.92	.02	85.03	421.70
3.764	970.00	1693.18	.00	4.14	.00	88.84	332.80
3.764	970.00	1693.17	-.01	4.11	-.01	88.73	332.80
* 4.058	300.00	1716.38	.00	23.20	.00	37.71	1552.30
* 4.058	300.00	1716.42	.04	23.25	.04	37.82	1552.30
* 4.065	300.00	1717.22	.00	.84	.00	19.10	36.60
* 4.065	300.00	1717.28	.06	.86	.06	19.10	36.60
* 4.110	300.00	1725.23	.00	8.01	.00	12.90	242.00
4.110	300.00	1725.21	-.03	7.93	-.03	12.90	242.00
* 4.119	300.00	1726.39	.00	1.15	.00	42.15	47.50
* 4.119	300.00	1726.39	.00	1.18	.00	42.14	47.50
* 4.177	300.00	1745.30	.00	18.91	.00	33.18	306.20
* 4.177	300.00	1745.31	.01	18.92	.01	33.22	306.20
* 4.252	300.00	1757.77	.00	12.47	.00	68.35	395.20
* 4.252	300.00	1757.76	-.01	12.46	-.01	68.31	395.20
* 4.311	300.00	1766.54	.00	8.77	.00	72.01	311.50
* 4.311	300.00	1766.54	.00	8.78	.00	72.00	311.50
* 4.335	300.00	1769.16	.00	2.63	.00	52.00	130.00
* 4.335	300.00	1769.16	-.01	2.62	-.01	52.00	130.00
* 4.349	300.00	1771.68	.00	2.52	.00	52.60	74.50
* 4.349	300.00	1771.68	.00	2.52	.00	52.60	74.50

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 4.362	300.00	1772.69	.00	1.01	.00	93.16	65.50
* 4.362	300.00	1772.69	.00	1.01	.00	93.16	65.50
4.412	300.00	1778.68	.00	5.99	.00	116.79	264.60
4.412	300.00	1778.68	.00	5.98	.00	116.76	264.60
4.493	300.00	1785.96	.00	7.28	.00	57.38	430.20

	4.493	300.00	1785.97	.00	7.29	.00	57.39	430.20
	4.559	300.00	1791.93	.00	5.97	.00	47.99	344.30
*	4.559	300.00	1791.94	.01	5.97	.01	47.99	344.30
*	4.637	300.00	1801.33	.00	9.40	.00	35.16	413.70
*	4.637	300.00	1801.34	.02	9.40	.02	35.16	413.70
*	4.839	1990.00	1832.40	.00	31.07	.00	217.20	1067.60
*	4.839	1990.00	1832.40	.00	31.06	.00	217.20	1067.60
*	4.954	1990.00	1838.68	.00	6.28	.00	74.70	608.20
*	4.954	1990.00	1838.74	.06	6.34	.06	74.70	608.20
*	5.076	1920.00	1852.31	.00	13.63	.00	101.63	641.30
*	5.076	1920.00	1852.31	.00	13.57	.00	101.63	641.30
*	5.182	1920.00	1869.60	.00	17.29	.00	99.40	558.90
*	5.182	1920.00	1869.60	.00	17.29	.00	99.39	558.90
	5.277	1920.00	1882.61	.00	13.01	.00	96.64	504.70
	5.277	1920.00	1882.61	.00	13.01	.00	96.64	504.70
*	5.349	1920.00	1891.84	.00	9.23	.00	103.07	379.80
*	5.349	1920.00	1891.85	.00	9.23	.00	103.08	379.80
	5.436	1920.00	1901.33	.00	9.49	.00	95.77	458.70
	5.436	1920.00	1901.32	.00	9.48	.00	95.73	458.70
	5.519	1880.00	1908.79	.00	7.46	.00	74.90	436.40
	5.519	1880.00	1908.79	.00	7.47	.00	74.91	436.40
*	5.542	1880.00	1915.73	.00	6.94	.00	53.11	121.80
*	5.542	1880.00	1915.57	-.17	6.78	-.17	51.14	121.80
*	5.563	1880.00	1923.04	.00	7.30	.00	146.79	110.00
*	5.563	1880.00	1923.03	-.01	7.46	-.01	146.69	110.00
*	5.572	1880.00	1923.16	.00	.13	.00	139.79	47.40
*	5.572	1880.00	1923.16	-.01	.13	-.01	139.75	47.40
*	5.651	1880.00	1924.08	.00	.92	.00	99.94	417.30
*	5.651	1880.00	1924.09	.01	.93	.01	99.94	417.30

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 5.765	1880.00	1939.25	.00	15.16	.00	103.59	601.10
* 5.765	1880.00	1939.25	.01	15.16	.01	103.60	601.10
* 5.873	1880.00	1953.94	.00	14.69	.00	106.61	573.10
* 5.873	1880.00	1953.94	.01	14.69	.01	106.61	573.10
* 5.978	1880.00	1969.03	.00	15.09	.00	111.24	552.20
* 5.978	1880.00	1969.03	.00	15.09	.00	111.24	552.20
* 6.073	1750.00	1983.14	.00	14.11	.00	81.78	504.00
* 6.073	1750.00	1983.14	.00	14.11	.00	81.78	504.00
6.118	1750.00	1987.76	.00	4.62	.00	71.83	237.40
6.118	1750.00	1987.76	.00	4.62	.00	71.82	237.40

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SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 1.602 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.602 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.727 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.727 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.855 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.855 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.980 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.980 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 2.071 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 2.071 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 2.095 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 2.095 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=       2.279  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.279  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       2.382  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.382  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       2.405  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.405  PROFILE=  1  SLOPE TOO STEEP
 CAUTION SECNO=       2.405  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       2.405  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.405  PROFILE=  2  SLOPE TOO STEEP
 CAUTION SECNO=       2.405  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       2.428  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.428  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       2.529  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.529  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       2.529  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.529  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       2.545  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.545  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       2.670  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.670  PROFILE=  1  SLOPE TOO STEEP
 CAUTION SECNO=       2.670  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       2.670  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       2.670  PROFILE=  2  SLOPE TOO STEEP
 CAUTION SECNO=       2.670  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       2.785  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.785  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=       2.899  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       2.899  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       3.008  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       3.008  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       3.121  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.121  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       3.121  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.121  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=       3.241  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.241  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       3.241  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.241  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=       3.519  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.519  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       3.519  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.519  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       3.531  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       3.531  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       3.544  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       3.544  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       3.621  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.621  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       3.621  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       3.621  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       3.701  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 NOTE    SECNO=       4.058  PROFILE=  1  WSEL BASED ON X5 CARD
 WARNING SECNO=       4.058  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 NOTE    SECNO=       4.058  PROFILE=  2  WSEL BASED ON X5 CARD
 WARNING SECNO=       4.058  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       4.065  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       4.065  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       4.110  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       4.119  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       4.119  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       4.177  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       4.177  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=      4.252  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      4.252  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      4.311  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.311  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      4.311  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.311  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      4.335  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      4.335  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      4.349  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      4.349  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      4.362  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      4.362  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.362  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      4.559  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.559  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      4.637  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.637  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      4.637  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.637  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 NOTE    SECNO=      4.839  PROFILE=  1  WSEL BASED ON X5 CARD
 NOTE    SECNO=      4.839  PROFILE=  2  WSEL BASED ON X5 CARD

 CAUTION SECNO=      4.954  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      4.954  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=      5.182  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      5.349  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      5.349  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      5.542  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      5.542  PROFILE=  2  MINIMUM SPECIFIC ENERGY

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 WARNING SECNO=      5.563  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      5.572  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      5.572  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=      5.765  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 CAUTION SECNO=      5.873  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      5.978  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO= 6.073 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 6.073 PROFILE= 2 MINIMUM SPECIFIC ENERGY

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Floodway width summary: Ashbrook Wash 100 Year
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
1.521	.01	91.50	9944.73	47.77	9992.50	43.73	10036.23
1.523	.00	91.51	9944.72	47.78	9992.50	43.73	10036.23
1.525	.00	91.52	9944.71	47.79	9992.50	43.73	10036.23
1.527	.00	91.53	9944.71	47.79	9992.50	43.74	10036.24
1.577	.00	132.16	9918.34	83.76	10002.10	48.40	10050.50
1.602	.00	126.46	9945.09	63.16	10008.25	63.30	10071.55
1.636	.00	196.83	9995.39	30.51	10025.90	166.32	10192.22
1.686	-.01	207.73	9871.80	141.70	10013.50	66.03	10079.53
1.727	-.01	198.94	9881.69	174.61	10056.30	24.33	10080.63
1.855	.00	193.11	9967.78	43.32	10011.10	149.79	10160.89
1.980	-.01	192.10	9927.73	118.57	10046.30	73.53	10119.83
2.071	.00	186.49	9939.26	77.34	10016.60	109.15	10125.75
2.095	.00	206.73	9894.22	68.48	9962.70	138.25	10100.95
2.200	.00	227.84	9827.06	162.59	9989.65	65.25	10054.90
2.279	.00	212.16	9840.32	146.38	9986.70	65.78	10052.48
2.304	.00	207.37	9856.22	86.78	9943.00	120.59	10063.59
2.382	.00	187.10	9878.25	116.45	9994.70	70.65	10065.35
2.405	.00	19.41	9992.30	9.70	10002.00	9.71	10011.71
2.428	.00	237.54	9853.96	149.64	10003.60	87.90	10091.50
2.448	.00	232.38	9887.27	124.88	10012.15	107.50	10119.65
2.494	.00	122.38	9936.33	75.92	10012.25	46.46	10058.71
2.529	.00	18.71	9991.00	9.35	10000.35	9.36	10009.71
2.545	.00	106.49	9945.80	54.95	10000.75	51.54	10052.29
2.558	.00	184.20	9930.61	69.69	10000.30	114.51	10114.81
2.670	.00	105.76	9938.75	63.40	10002.15	42.36	10044.51
2.785	.00	96.50	9949.46	31.29	9980.75	65.21	10045.96
2.807	.00	120.89	9934.70	88.85	10023.55	32.04	10055.59
2.899	.00	94.02	9980.85	32.70	10013.55	61.32	10074.87
3.008	.00	104.26	9959.81	33.49	9993.30	70.77	10064.07
3.121	.02	84.67	9948.20	55.05	10003.25	29.62	10032.87
3.208	-.02	81.21	9969.40	45.90	10015.30	35.31	10050.61
3.241	-.01	70.59	9988.22	29.33	10017.55	41.26	10058.81
3.323	.01	113.56	9986.79	24.41	10011.20	89.15	10100.35
3.421	-.01	84.88	9976.51	26.84	10003.35	58.04	10061.39
3.487	.01	83.06	9965.79	30.66	9996.45	52.40	10048.85
3.519	.00	28.41	9988.69	14.21	10002.90	14.20	10017.10
3.531	.00	33.01	9980.79	16.51	9997.30	16.50	10013.80
3.544	.01	107.12	9950.19	53.56	10003.75	53.56	10057.31
3.621	-.02	78.82	9955.39	39.41	9994.80	39.41	10034.21
3.701	.02	85.03	9980.06	46.29	10026.35	38.74	10065.09
3.764	-.01	88.83	9962.68	44.32	10007.00	44.51	10051.51
4.058	.04	42.61	9990.00	19.00	10009.00	23.61	10032.61
4.065	.06	19.10	10000.00	9.55	10009.55	9.55	10019.10
4.110	-.03	12.90	9987.10	6.45	9993.55	6.45	10000.00
4.119	.00	42.14	9972.63	22.87	9995.50	19.27	10014.77
4.177	.01	43.79	9983.92	23.88	10007.80	19.91	10027.71
4.252	-.01	68.35	9956.12	21.48	9977.60	46.87	10024.47

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4.311	.00	72.00	9971.12	33.28	10004.40	38.72	10043.12
4.335	-.01	52.01	9967.50	26.00	9993.50	26.01	10019.51
4.349	.00	52.62	9972.59	26.31	9998.90	26.31	10025.21
4.362	.00	93.16	9943.02	61.48	10004.50	31.68	10036.18
4.412	.00	120.25	9889.46	82.29	9971.75	37.96	10009.71
4.493	.00	57.39	9967.35	31.75	9999.10	25.64	10024.74
4.559	.01	47.99	9970.19	23.96	9994.15	24.03	10018.18
4.637	.02	35.16	9981.67	18.08	9999.75	17.08	10016.83
4.839	.00	217.20	9949.57	74.23	10023.80	142.97	10166.77
4.954	.06	74.70	9967.57	38.08	10005.65	36.62	10042.27
5.076	.00	102.31	9910.00	91.35	10001.35	10.96	10012.31
5.182	.00	103.70	9975.59	12.21	9987.80	91.49	10079.29
5.277	.00	96.64	9980.63	18.17	9998.80	78.47	10077.27
5.349	.00	103.08	9983.36	19.29	10002.65	83.79	10086.44
5.436	.00	95.76	9959.50	43.30	10002.80	52.46	10055.26
5.519	.00	74.93	9932.58	56.67	9989.25	18.26	10007.51
5.542	-.17	53.11	9974.98	25.02	10000.00	28.09	10028.09
5.563	-.01	146.80	9911.73	88.27	10000.00	58.53	10058.53
5.572	-.01	139.79	9929.00	73.95	10002.95	65.84	10068.79
5.651	.01	99.94	9981.55	14.80	9996.35	85.14	10081.49
5.765	.01	103.60	9984.52	18.53	10003.05	85.07	10088.12
5.873	.01	106.61	9949.75	39.95	9989.70	66.66	10056.36
5.978	.00	111.24	9945.14	52.61	9997.75	58.63	10056.38

6.073	.00	81.78	9960.97	40.53	10001.50	41.25	10042.75
6.118	.00	71.82	9962.54	37.31	9999.85	34.51	10034.36

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FLOODWAY DATA, Ashbrook Wash 100 Year
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1.521	91.	361.	8.8	1503.7	1503.7	.0
1.523	92.	361.	8.8	1503.9	1503.9	.0
1.525	92.	361.	8.8	1504.2	1504.2	.0
1.527	92.	361.	8.8	1504.4	1504.4	.0
1.577	132.	542.	5.9	1508.9	1508.9	.0
1.602	126.	369.	8.6	1510.7	1510.7	.0
1.636	187.	509.	6.3	1515.8	1515.8	.0
1.686	208.	610.	5.2	1520.0	1520.0	.0
1.727	199.	513.	6.2	1523.4	1523.4	.0
1.855	193.	610.	5.2	1534.5	1534.5	.0
1.980	192.	656.	4.8	1545.7	1545.7	.0
2.071	186.	804.	4.0	1554.7	1554.7	.0
2.095	207.	652.	4.8	1557.0	1557.0	.0
2.200	228.	811.	2.6	1564.9	1564.9	.0
2.279	212.	645.	3.3	1568.9	1568.9	.0
2.304	207.	782.	2.7	1570.4	1570.4	.0
2.382	187.	551.	3.7	1575.3	1575.3	.0
2.405	19.	136.	15.1	1581.0	1581.0	.0
2.428	238.	980.	2.1	1586.5	1586.5	.0
2.448	232.	1244.	1.6	1586.8	1586.8	.0
2.494	122.	508.	2.7	1587.0	1587.0	.0
2.529	19.	103.	13.4	1588.8	1588.8	.0
2.545	106.	457.	3.0	1594.3	1594.3	.0
2.558	184.	676.	2.0	1594.5	1594.5	.0
2.670	99.	181.	7.6	1596.3	1596.3	.0
2.785	96.	315.	4.4	1606.4	1606.4	.0
2.807	121.	403.	3.4	1607.5	1607.5	.0
2.899	94.	204.	6.8	1612.7	1612.7	.0
3.008	104.	266.	5.2	1621.9	1621.9	.0
3.121	85.	201.	6.8	1631.3	1631.3	.0
3.208	79.	157.	7.5	1639.5	1639.5	.0
3.241	70.	157.	7.5	1644.4	1644.4	.0
3.323	112.	255.	3.8	1653.5	1653.5	.0
3.421	85.	172.	5.6	1662.9	1662.9	.0
3.487	83.	127.	7.6	1669.5	1669.5	.0
3.519	28.	94.	10.4	1674.0	1674.0	.0
3.531	33.	196.	5.0	1678.4	1678.4	.0
3.544	107.	466.	2.1	1678.9	1678.9	.0
3.621	79.	135.	7.2	1682.2	1682.2	.0
3.701	85.	168.	5.8	1689.0	1689.0	.0
3.764	89.	155.	6.2	1693.2	1693.2	.0
4.058	38.	48.	6.2	1716.4	1716.4	.0

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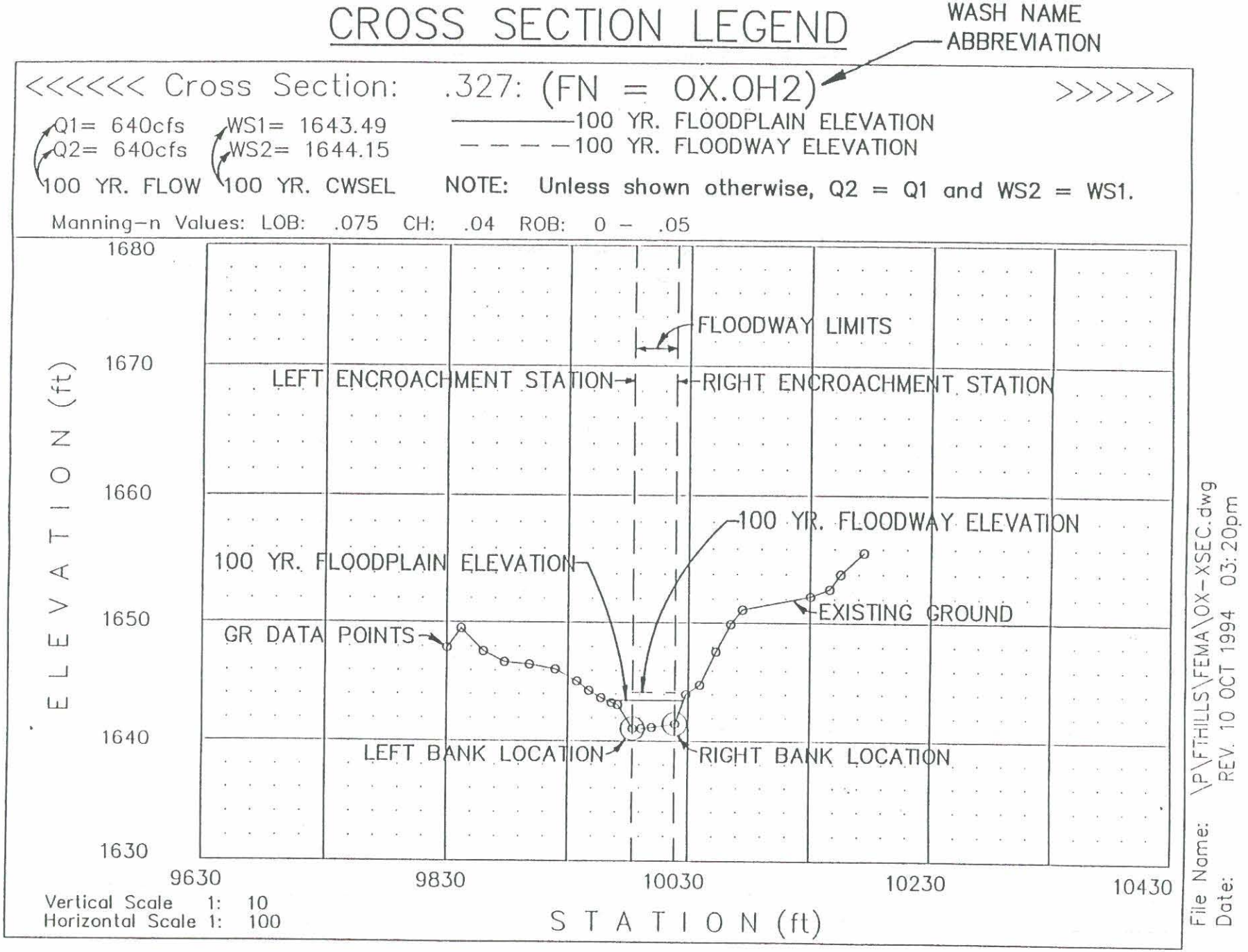
FLOODWAY DATA, Ashbrook Wash 100 Year
PROFILE NO. 2

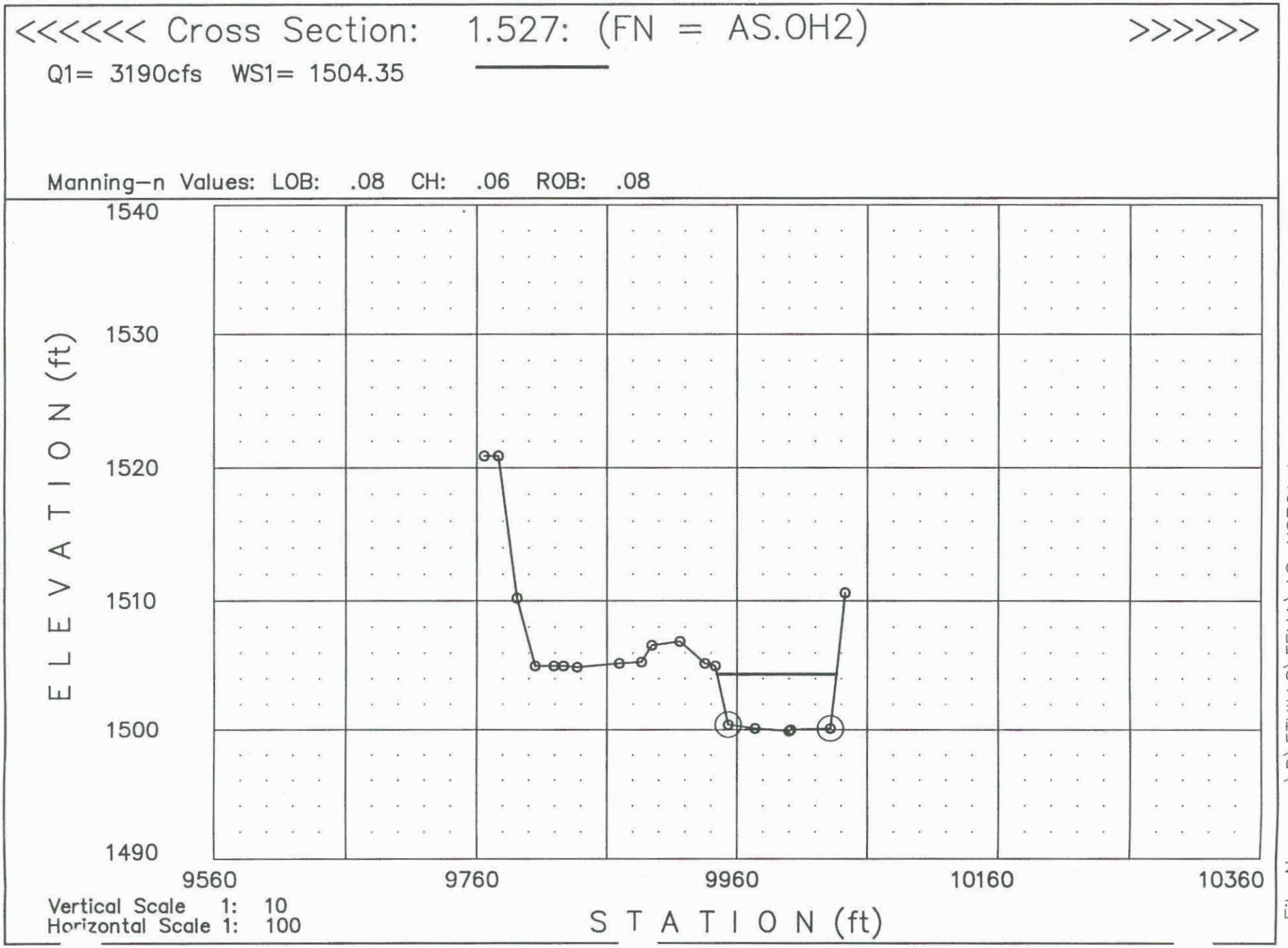
STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
4.065	19.	49.	6.1	1717.3	1717.2	.1
4.110	13.	36.	8.4	1725.2	1725.2	.0
4.119	42.	123.	2.4	1726.4	1726.4	.0
4.177	33.	44.	6.8	1745.3	1745.3	.0
4.252	68.	75.	4.0	1757.8	1757.8	.0
4.311	72.	59.	5.1	1766.5	1766.5	.0
4.335	52.	67.	4.5	1769.2	1769.2	.0
4.349	53.	85.	3.5	1771.7	1771.7	.0
4.362	93.	67.	4.5	1772.7	1772.7	.0
4.412	117.	83.	3.6	1778.7	1778.7	.0
4.493	57.	71.	4.2	1786.0	1786.0	.0
4.559	48.	53.	5.7	1791.9	1791.9	.0
4.637	35.	49.	6.1	1801.3	1801.3	.0
4.839	217.	1122.	1.8	1832.4	1832.4	.0
4.954	75.	236.	8.4	1838.8	1838.7	.1
5.076	102.	231.	8.3	1852.3	1852.3	.0
5.182	99.	225.	8.5	1869.6	1869.6	.0
5.277	97.	252.	7.6	1882.6	1882.6	.0
5.349	103.	232.	8.3	1891.8	1891.8	.0

5.436	96.	250.	7.7	1901.3	1901.3	.0
5.519	75.	226.	8.3	1908.8	1908.8	.0
5.542	51.	192.	9.8	1915.5	1915.7	-.2
5.563	147.	675.	2.8	1923.0	1923.0	.0
5.572	140.	1051.	1.8	1923.2	1923.2	.0
5.651	100.	237.	7.9	1924.1	1924.1	.0
5.765	104.	244.	7.7	1939.2	1939.2	.0
5.873	107.	243.	7.7	1953.9	1953.9	.0
5.978	111.	255.	7.4	1969.0	1969.0	.0
6.073	82.	219.	8.0	1983.1	1983.1	.0
6.118	72.	199.	8.8	1987.8	1987.8	.0

CROSS SECTIONS

CROSS SECTION LEGEND

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1540
1530
1520
1510
1500
1490
ELEVATION (ft)
9560
9760
9960
10160
10360
STATION (ft)
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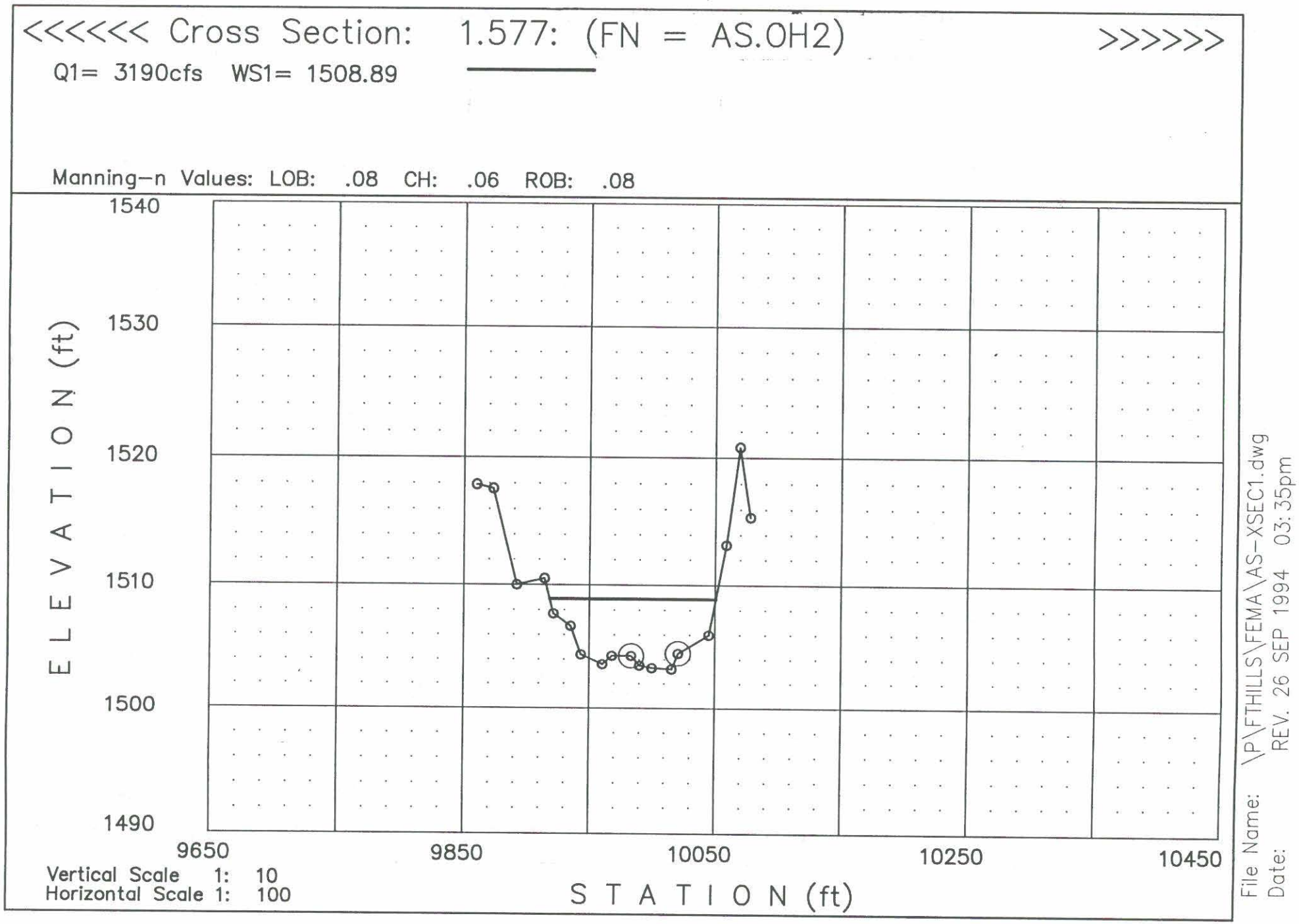
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1540
1530
1520
1510
1500
1490
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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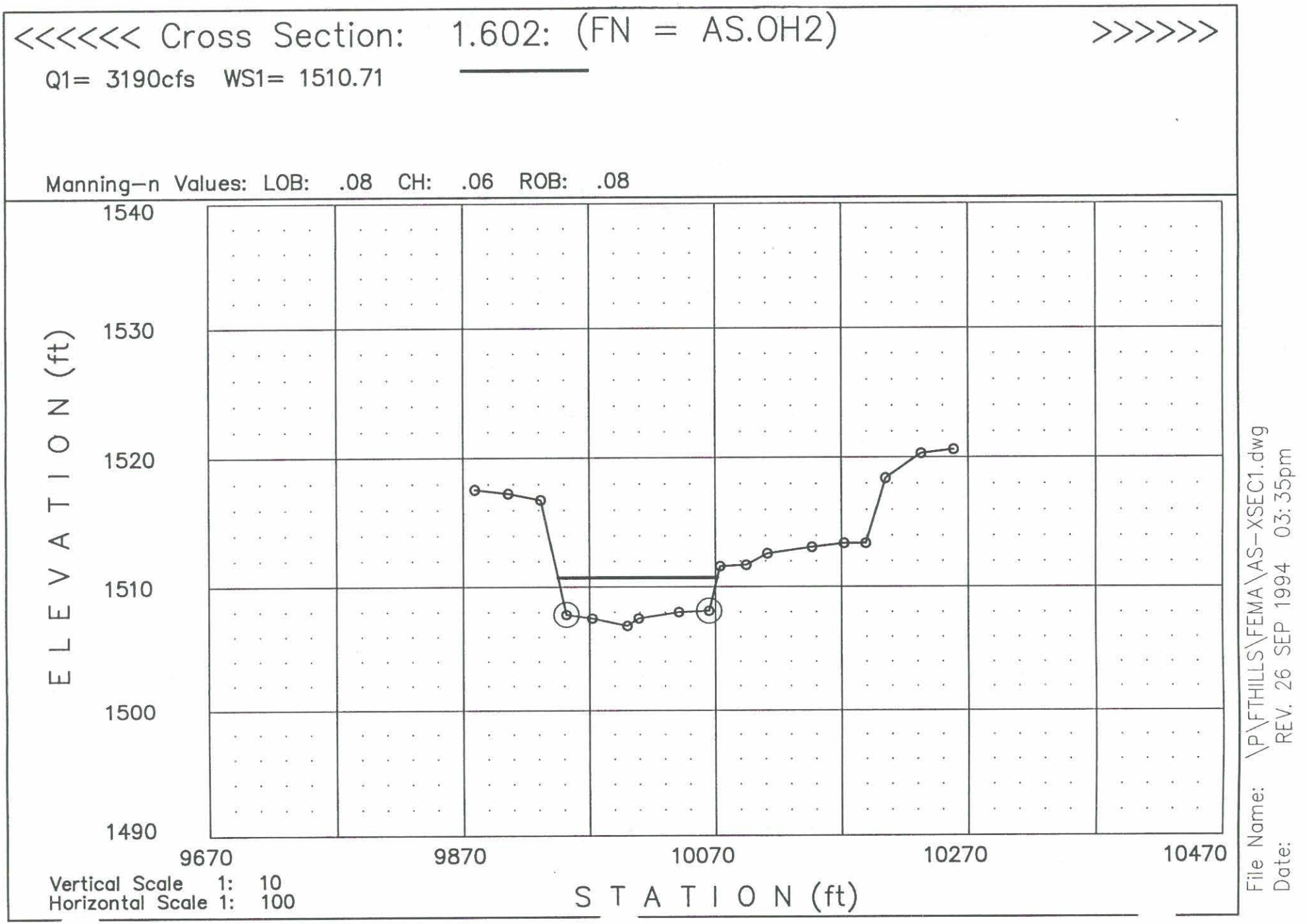
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Manning-n Values: LOB: .08 CH: .06 ROB: .08
1540
1530
1520
1510
1500
1490
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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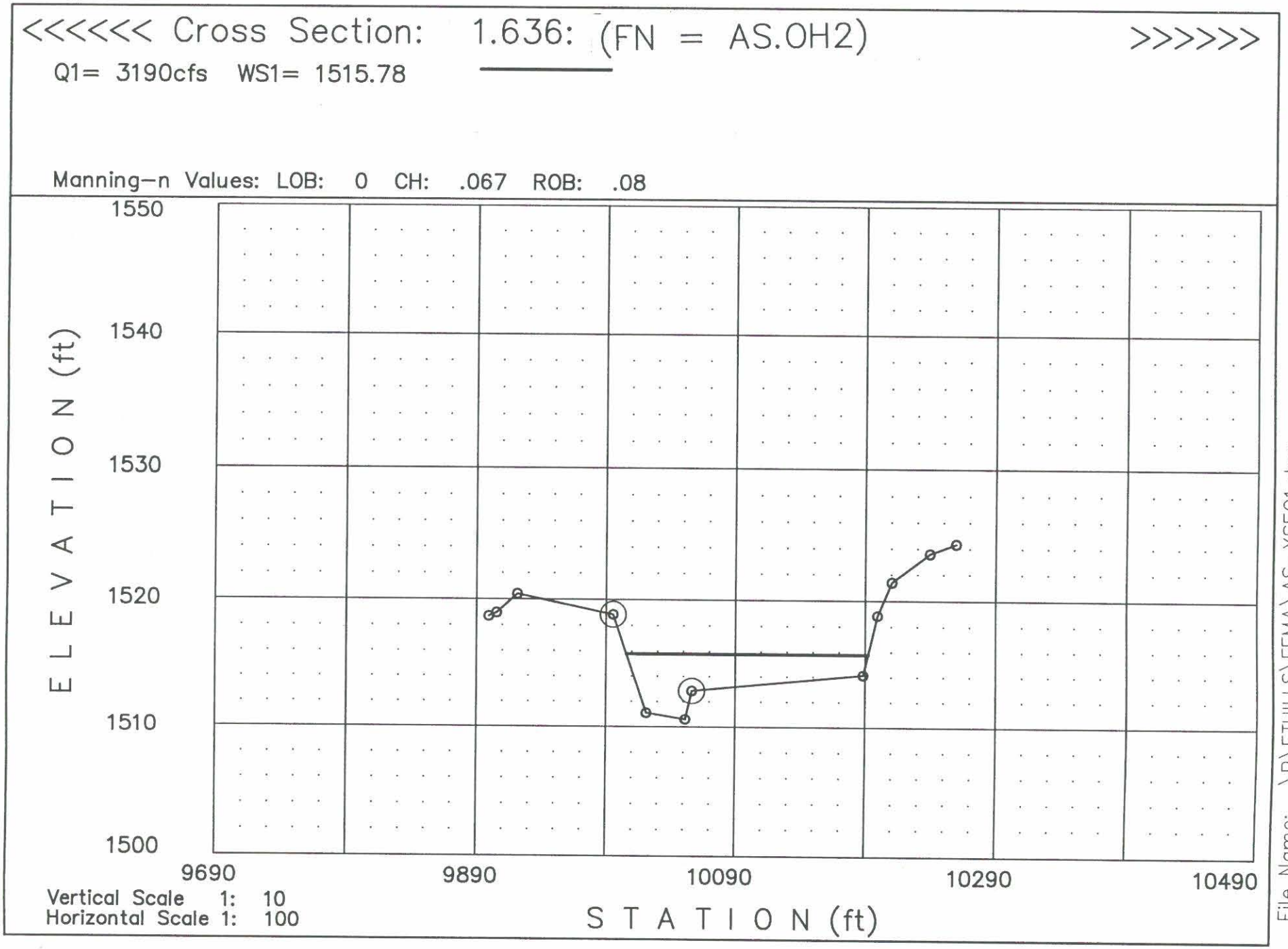
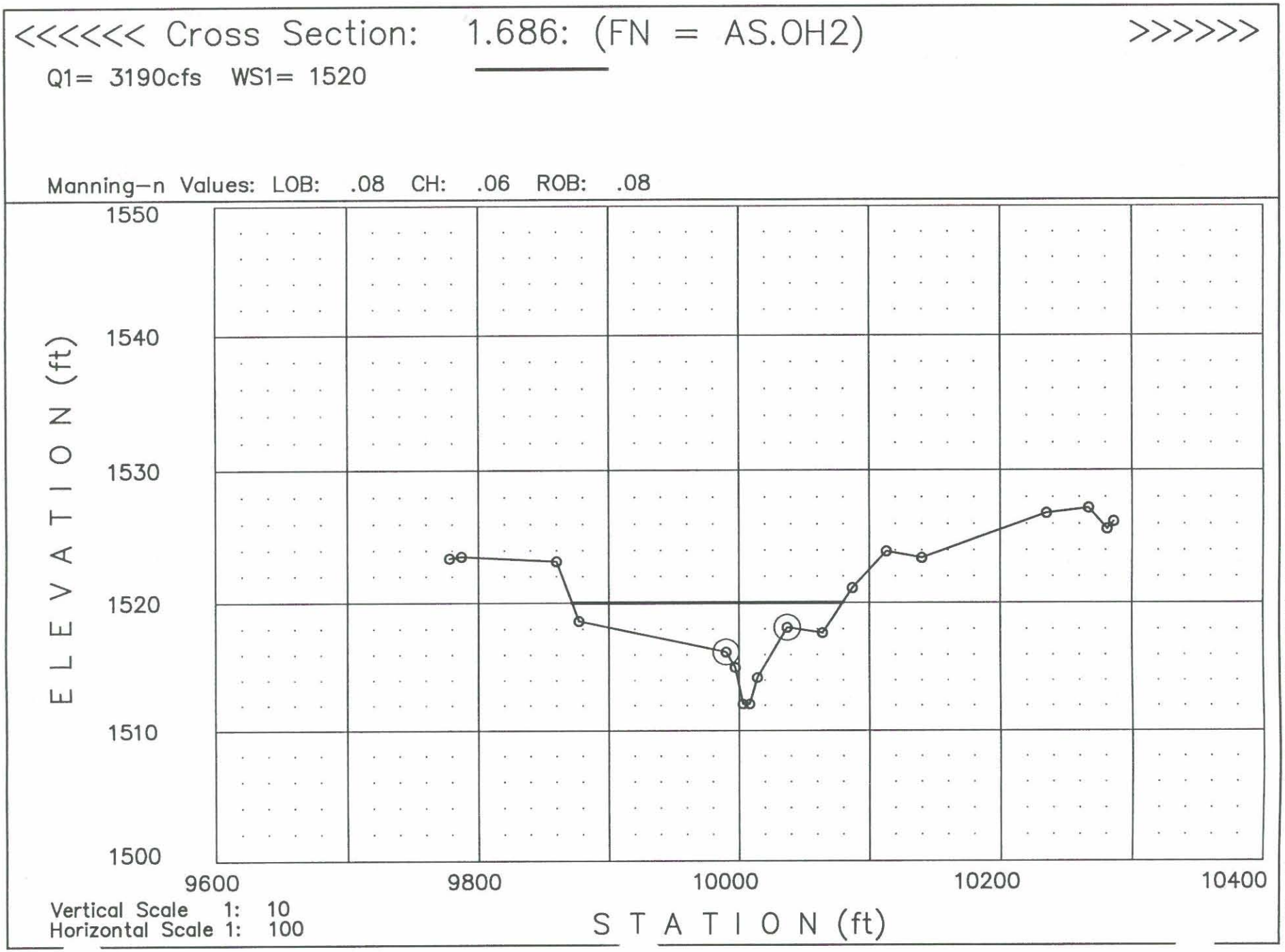
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 1.636: (FN = AS.OH2) >>>>>>
Q1= 3190cfs WS1= 1515.78
Manning-n Values: LOB: 0 CH: .067 ROB: .08
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 1.686: (FN = AS.OH2) >>>>>>
Q1= 3190cfs WS1= 1520
Manning-n Values: LOB: .08 CH: .06 ROB: .08
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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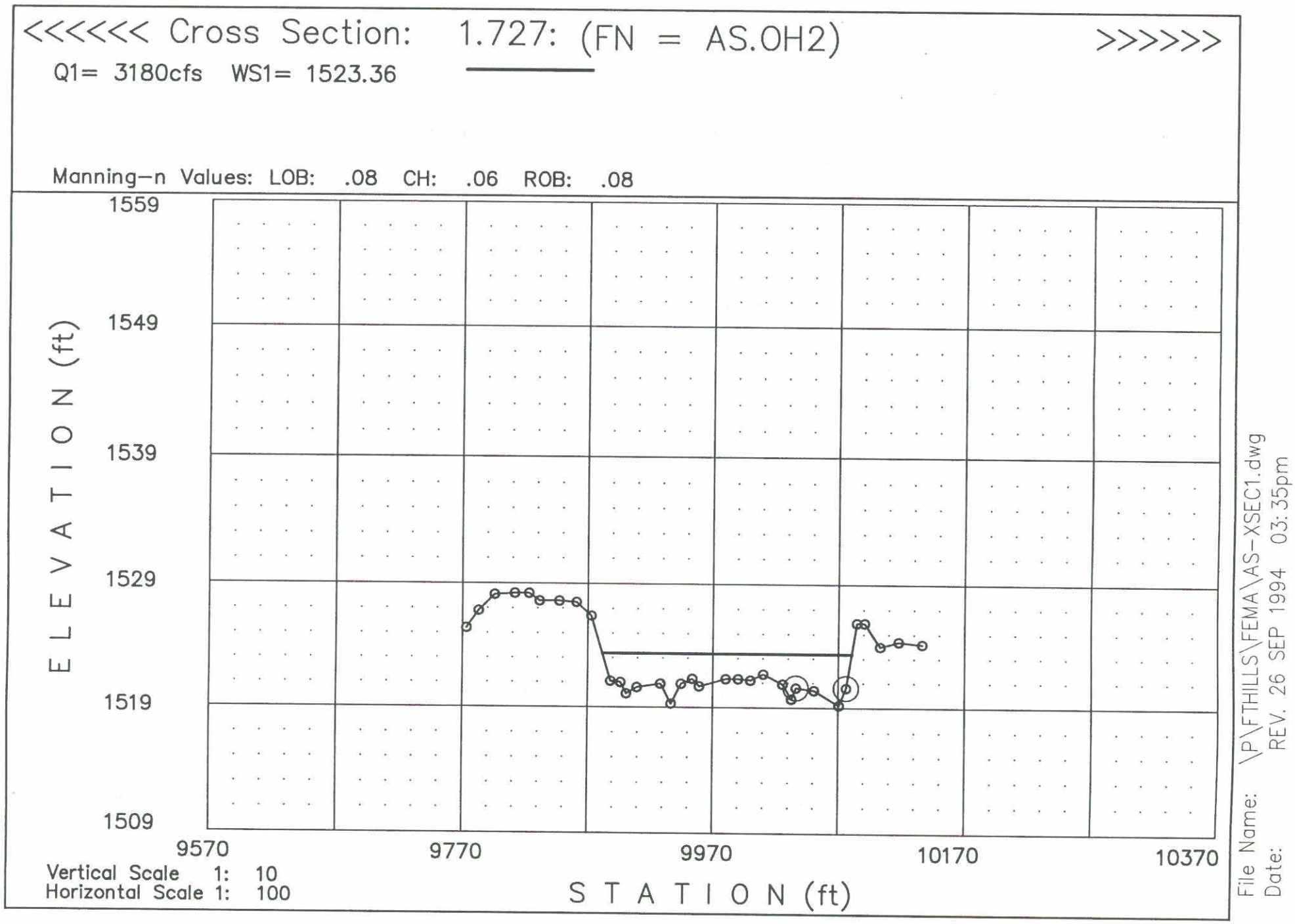
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 1.727: (FN = AS.OH2) >>>>>>
Q1= 3180cfs WS1= 1523.36
Manning-n Values: LOB: .08 CH: .06 ROB: .08
1559
1549
1539
1529
1519
1509
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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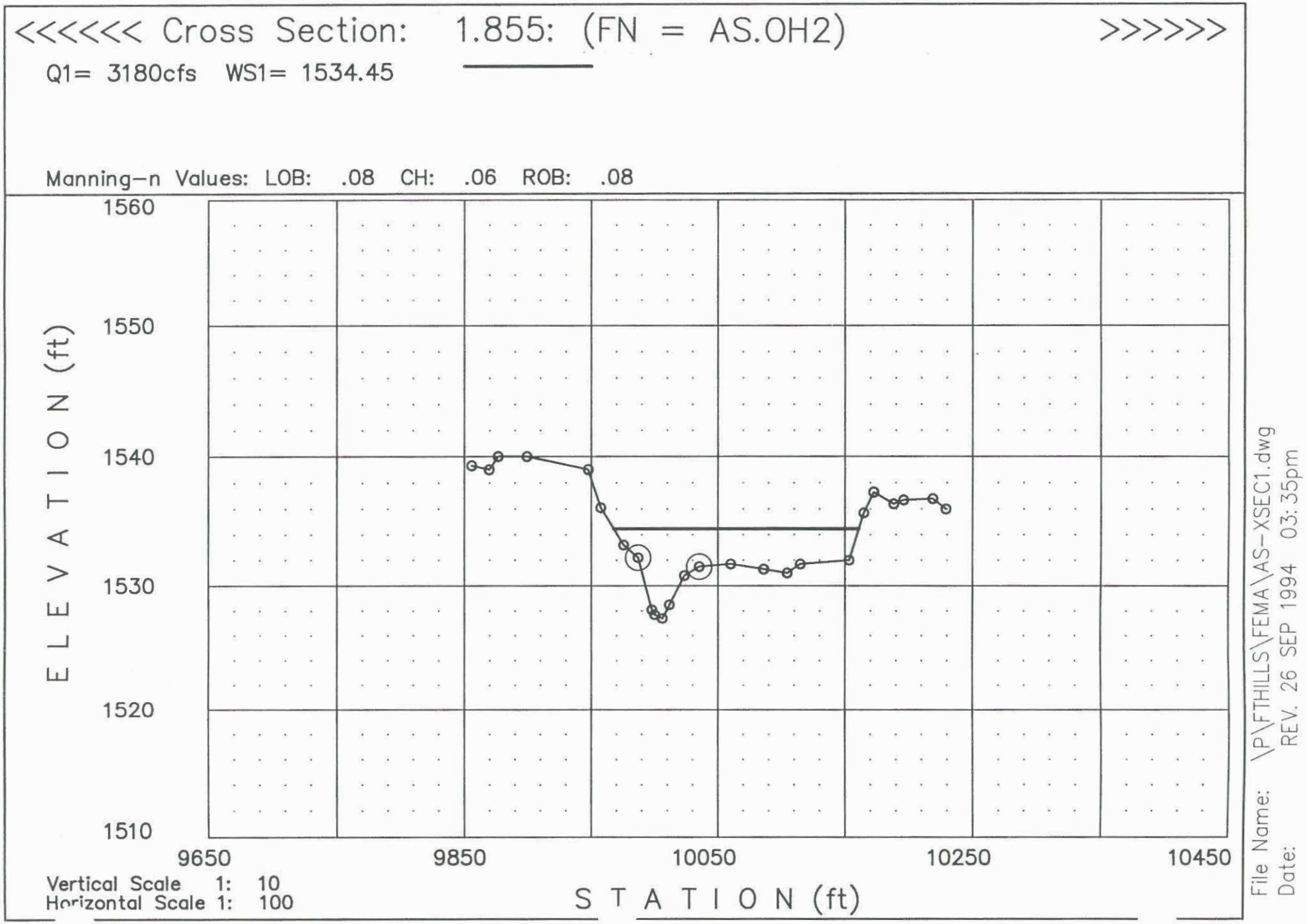
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 1.855: (FN = AS.OH2) >>>>>>
Q1= 3180cfs WS1= 1534.45
Manning-n Values: LOB: .08 CH: .06 ROB: .08
1560
1550
1540
1530
1520
1510
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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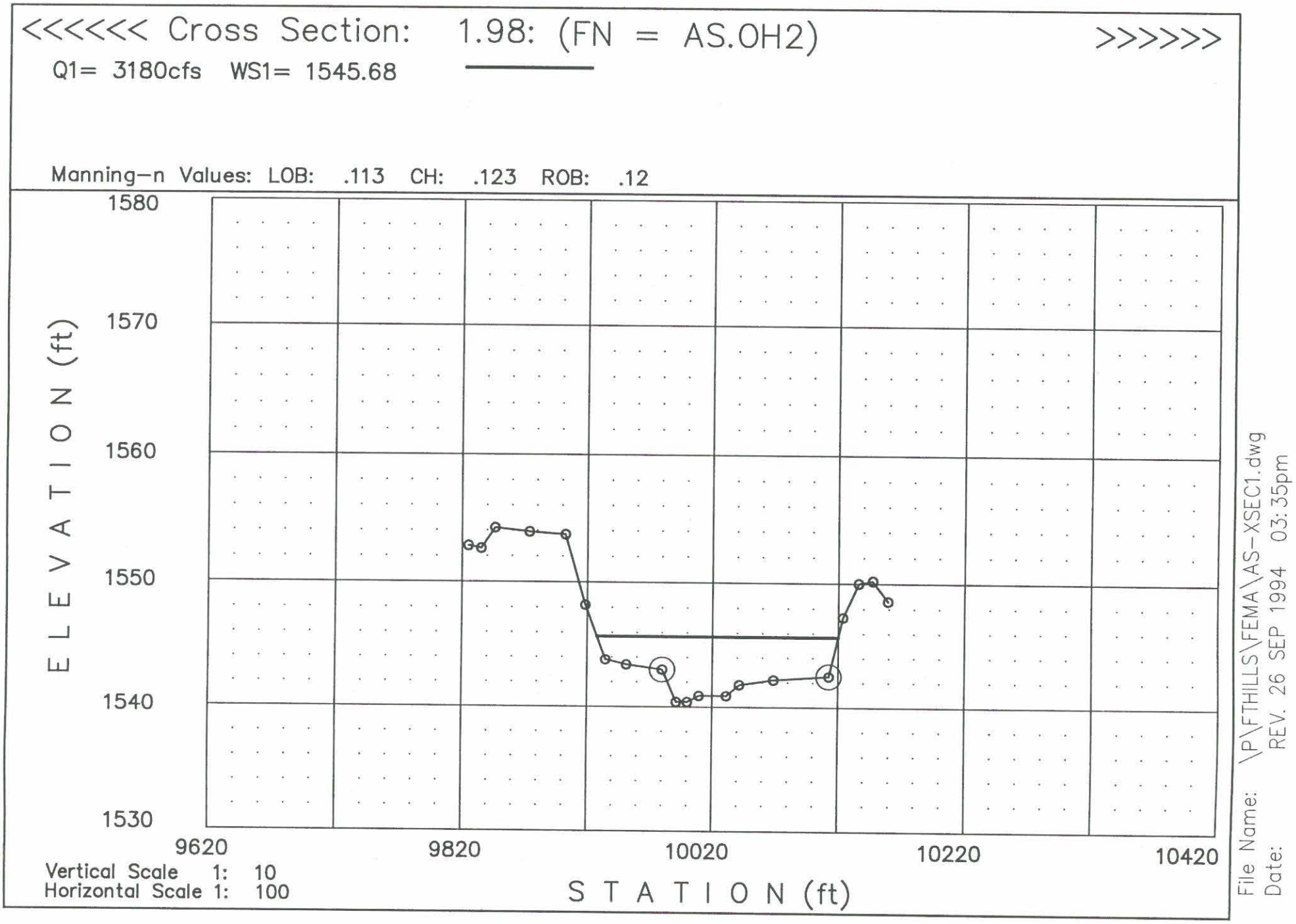
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 1.98: (FN = AS.OH2) >>>>>>
Q1= 3180cfs WS1= 1545.68
Manning-n Values: LOB: .113 CH: .123 ROB: .12
1580
1570
1560
1550
1540
1530
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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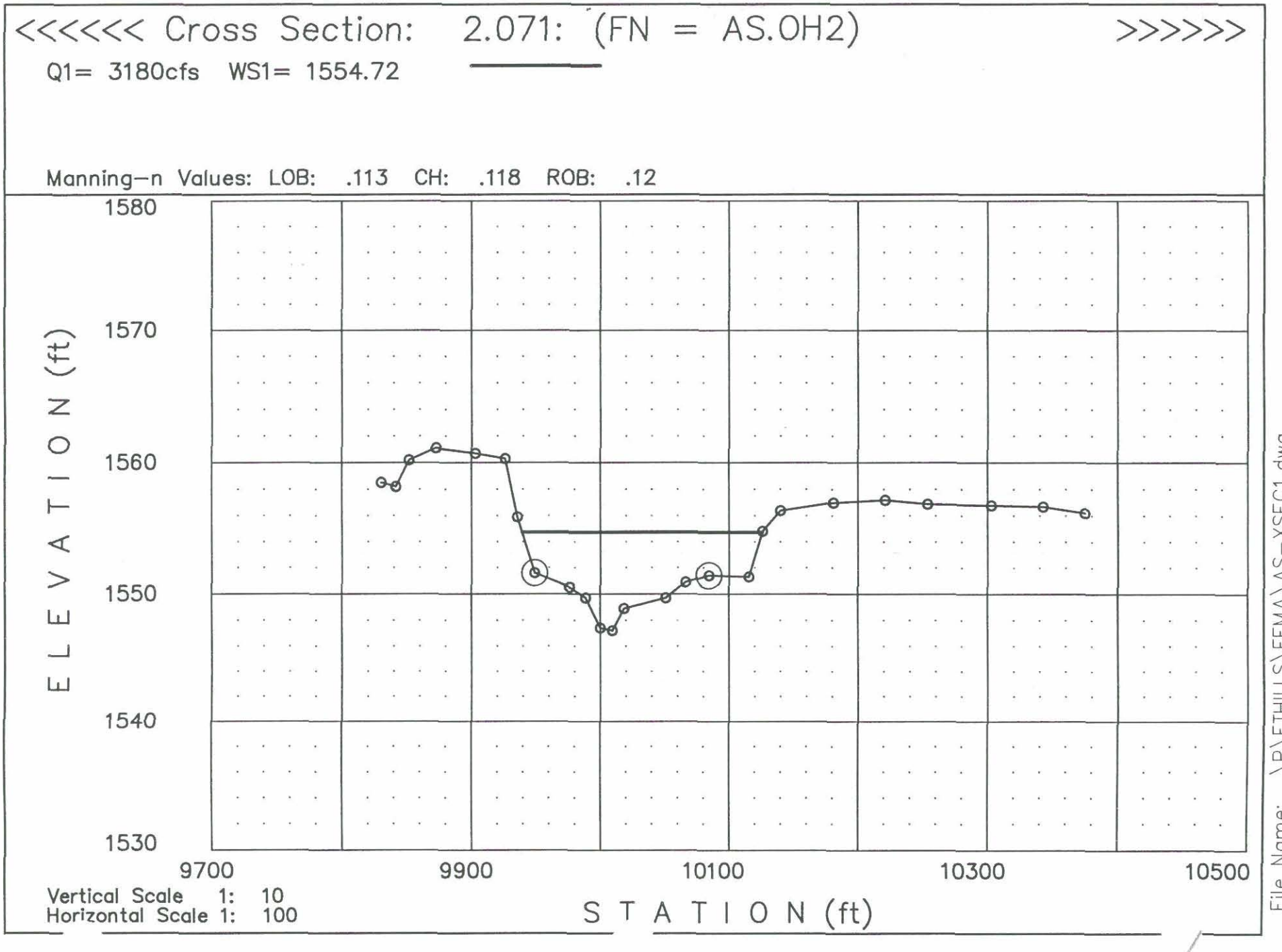
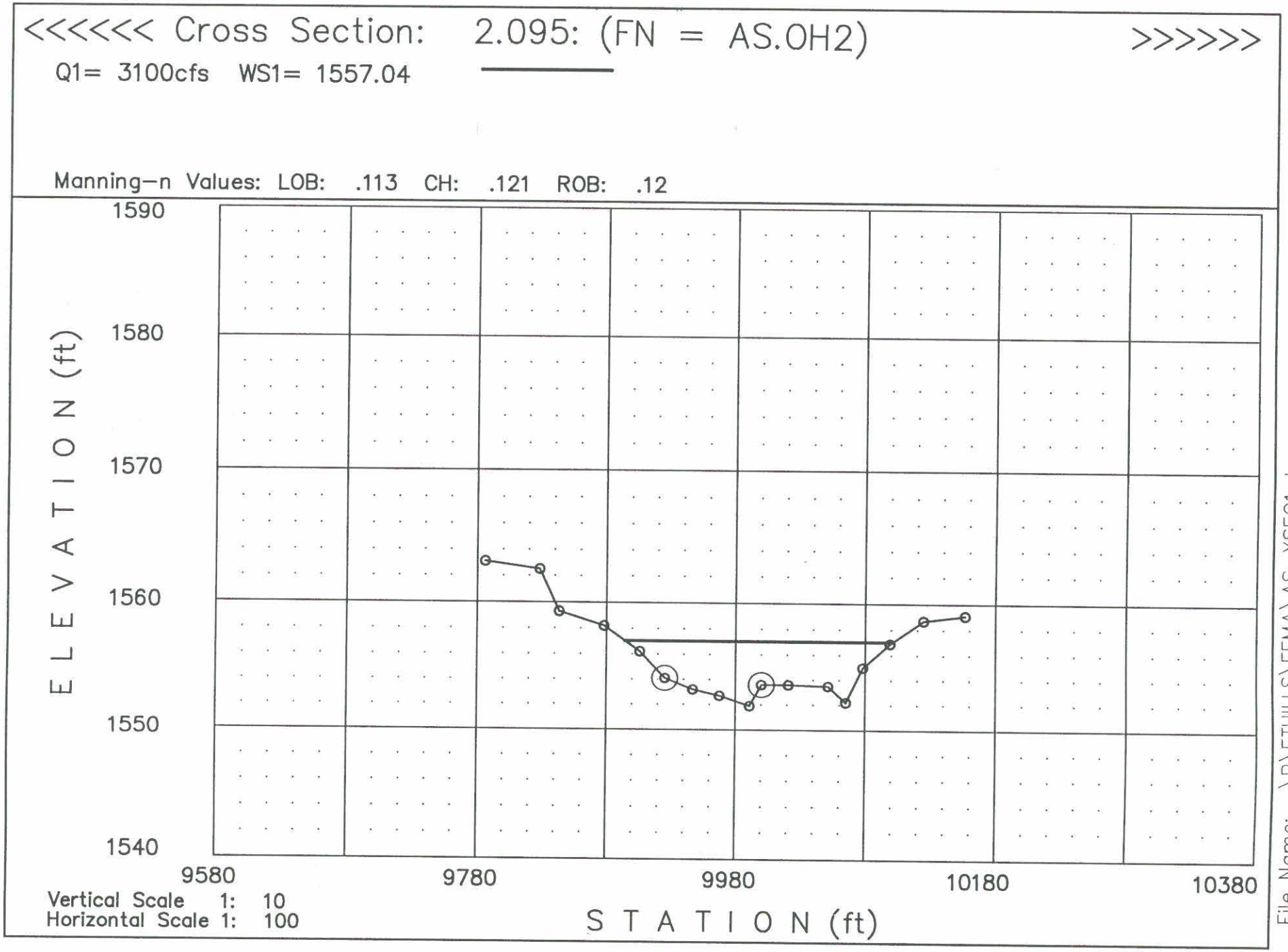
Date: REV. 26 SEP 1994 03:35pm

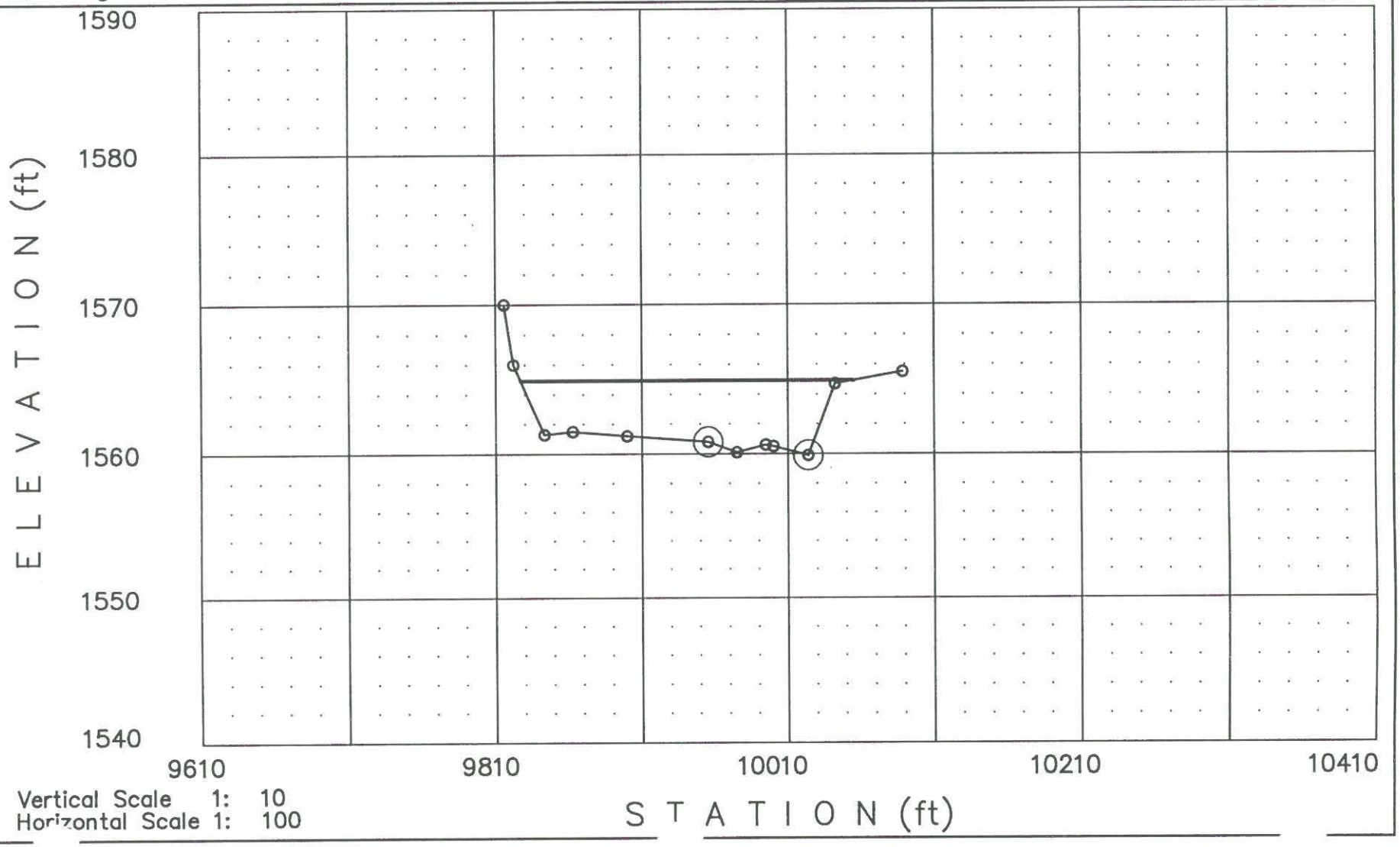

<<<<<< Cross Section: 2.071: (FN = AS.0H2) >>>>>>
Q1= 3180cfs WS1= 1554.72
Manning-n Values: LOB: .113 CH: .118 ROB: .12
1580
1570
1560
1550
1540
1530
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.095: (FN = AS.OH2) >>>>>>
Q1= 3100cfs WS1= 1557.04
Manning-n Values: LOB: .113 CH: .121 ROB: .12
1590
1580
1570
1560
1550
1540
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

<<<<<< Cross Section: 2.2: (FN = AS.OH2) >>>>>>

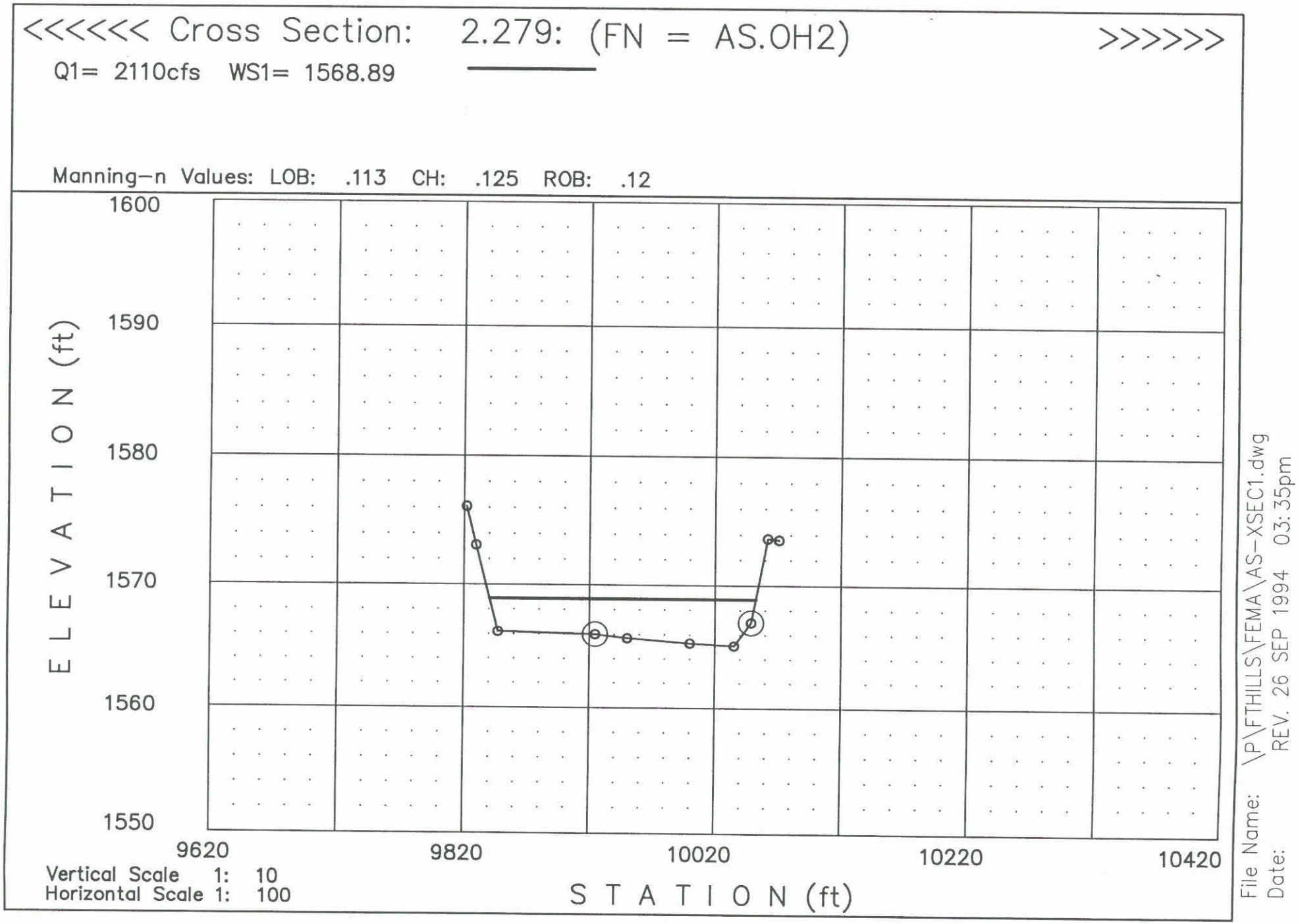
Q1= 2110cfs WS1= 1564.92

Manning-n Values: LOB: .113 CH: .125 ROB: .12



Vertical Scale 1: 10
Horizontal Scale 1: 100

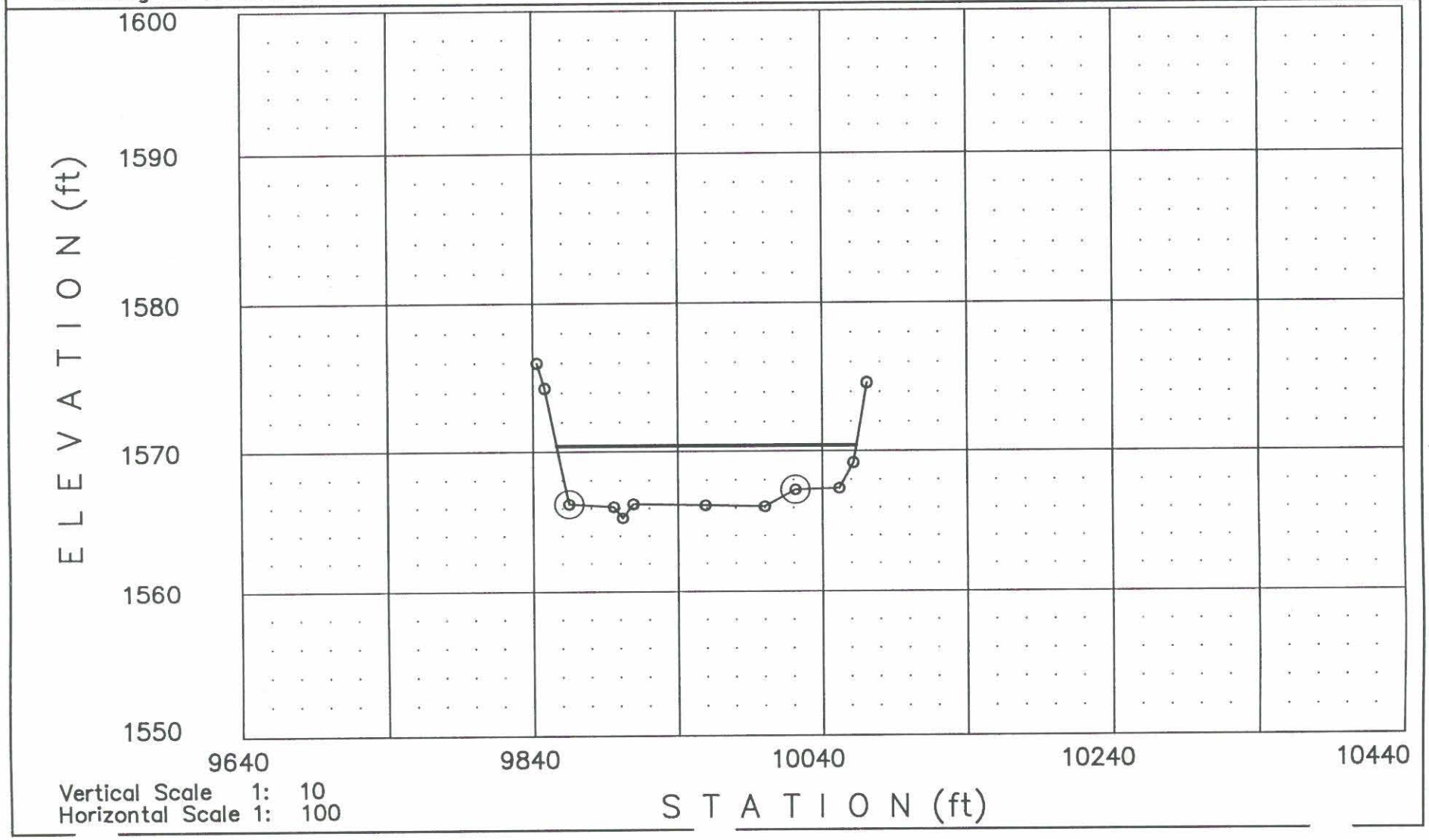
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.279: (FN = AS.OH2) >>>>>>
Q1= 2110cfs WS1= 1568.89
Manning-n Values: LOB: .113 CH: .125 ROB: .12
1600
1590
1580
1570
1560
1550
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

<<<<<< Cross Section: 2.304: (FN = AS.OH2) >>>>>>

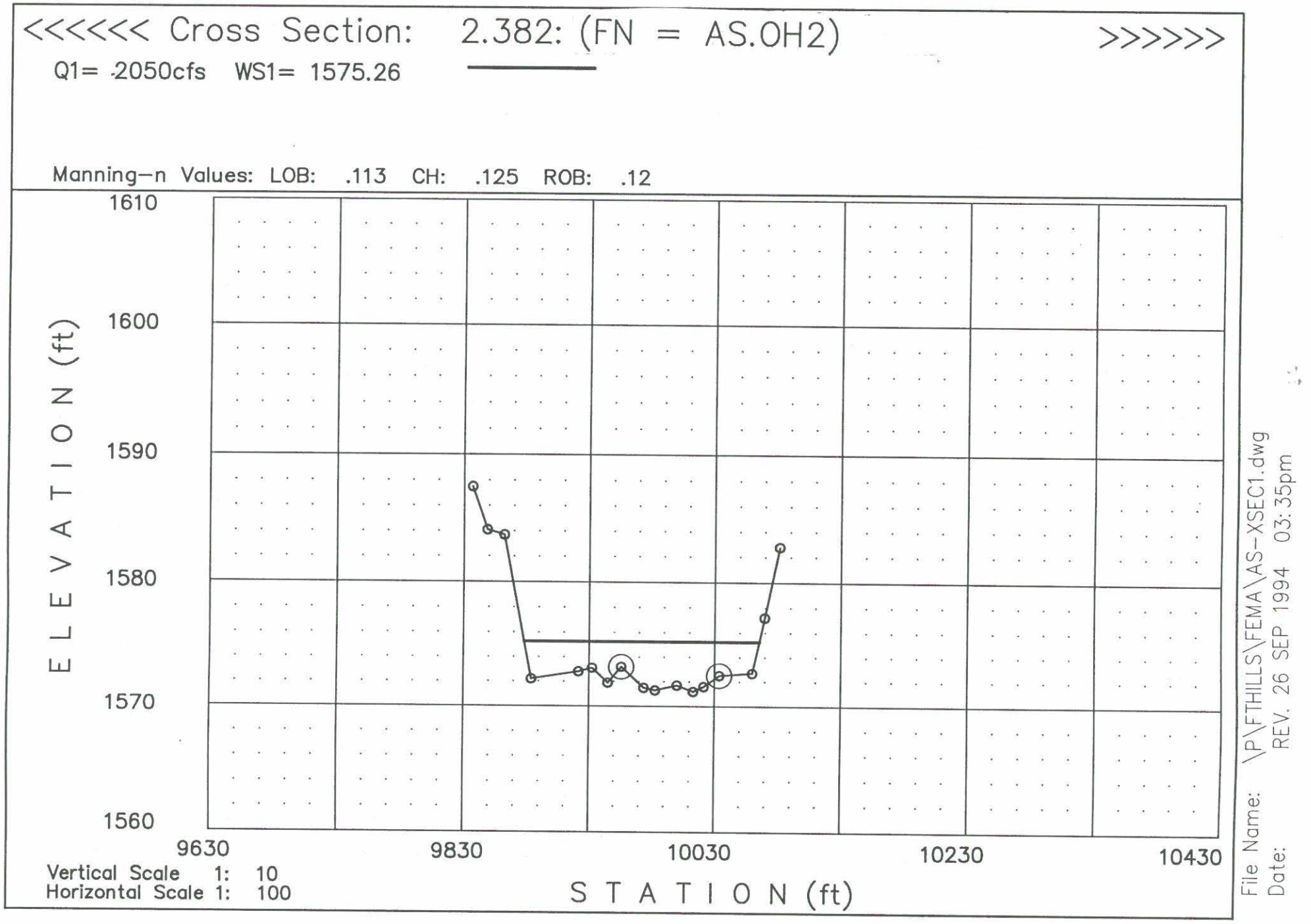
Q1= 2110cfs WS1= 1570.38

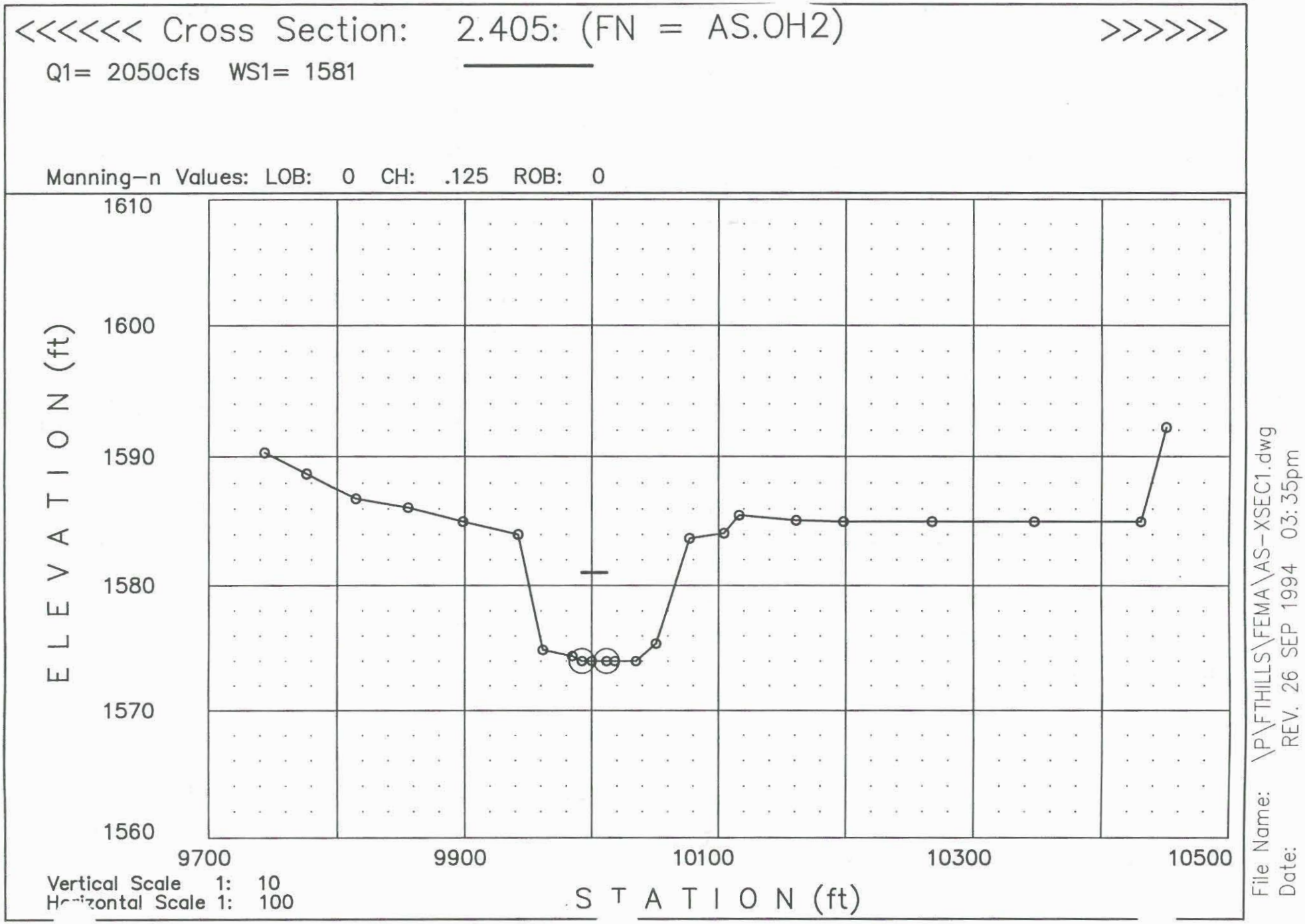
Manning-n Values: LOB: .113 CH: .122 ROB: .12

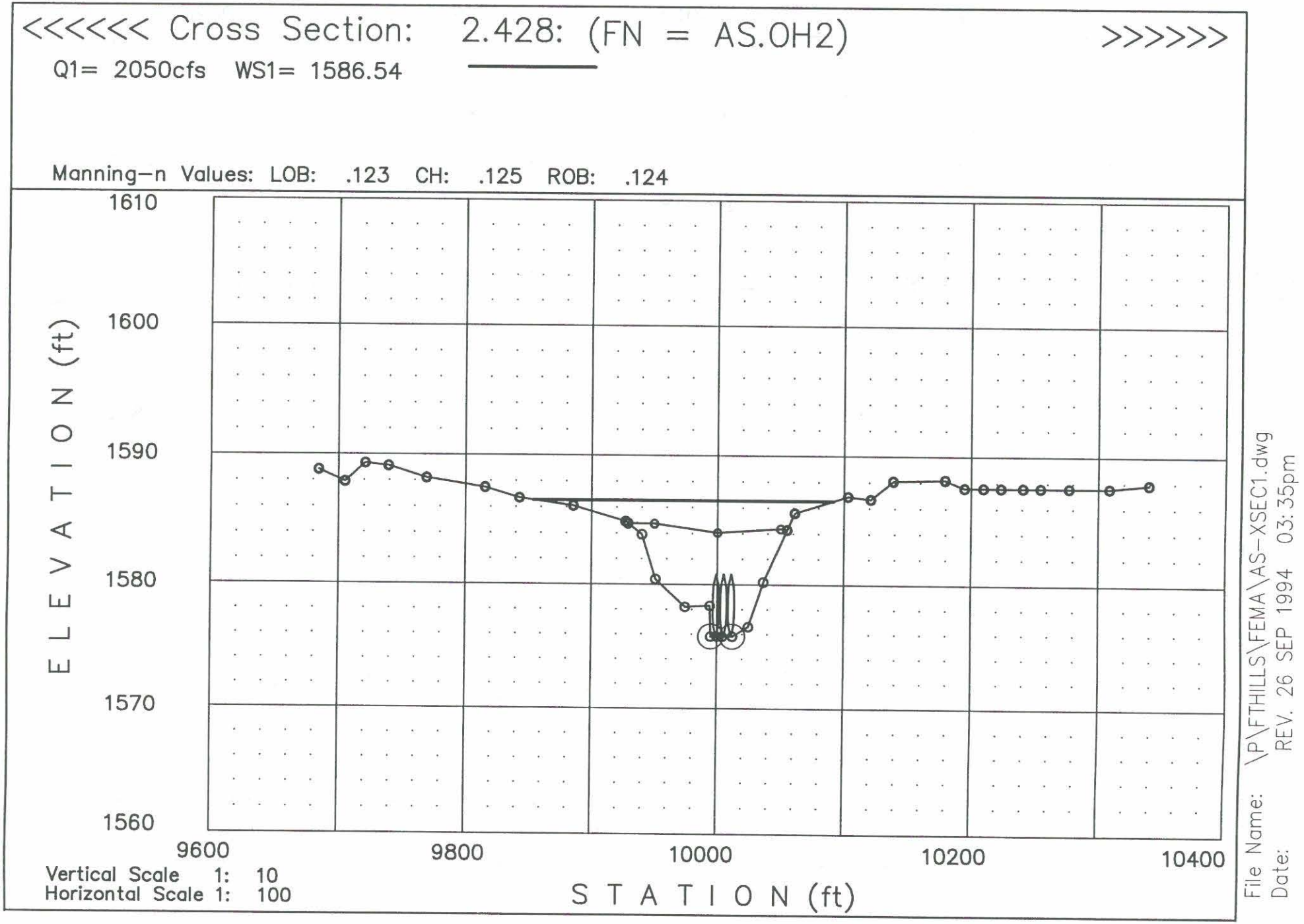


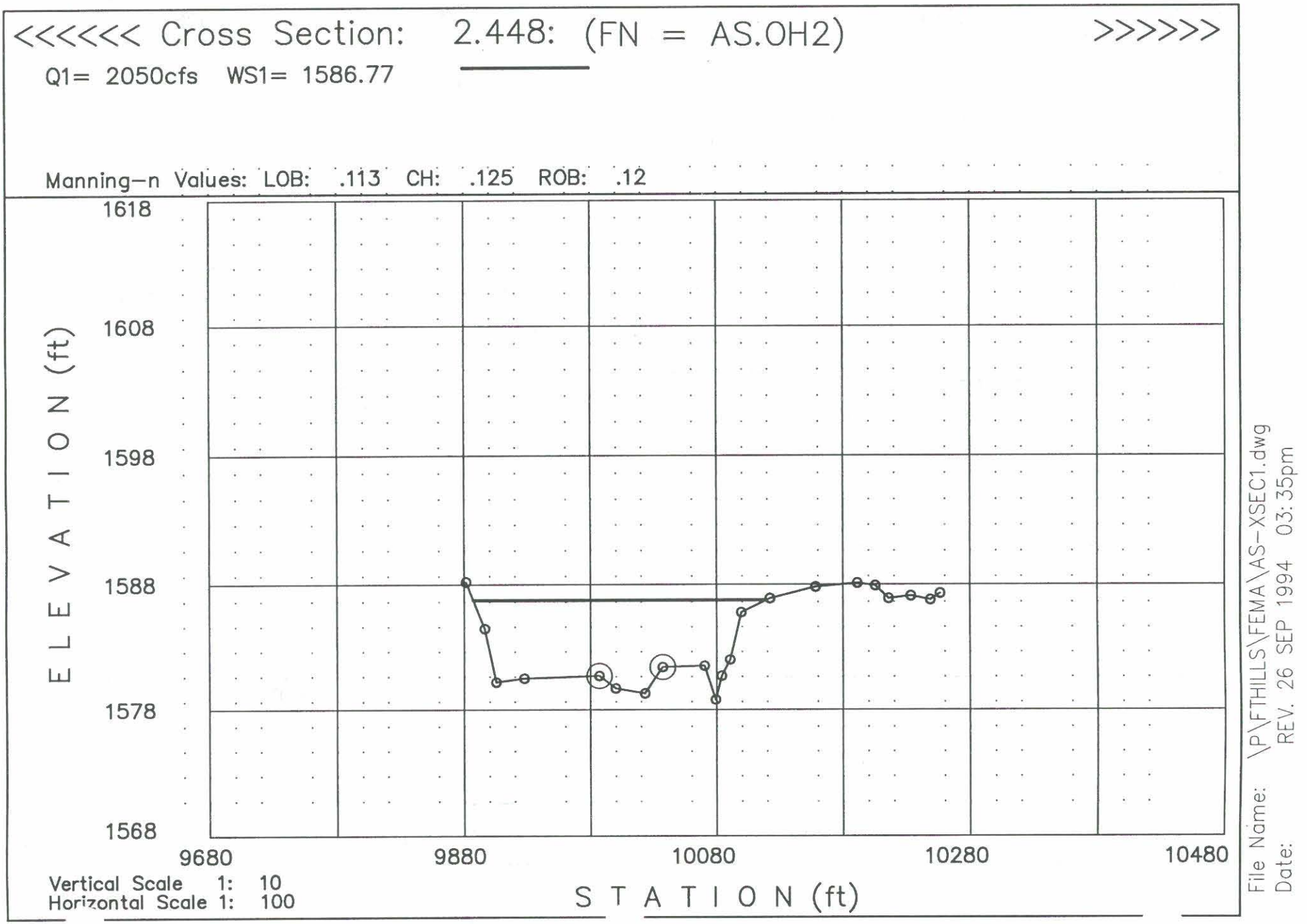
Vertical Scale 1: 10
Horizontal Scale 1: 100

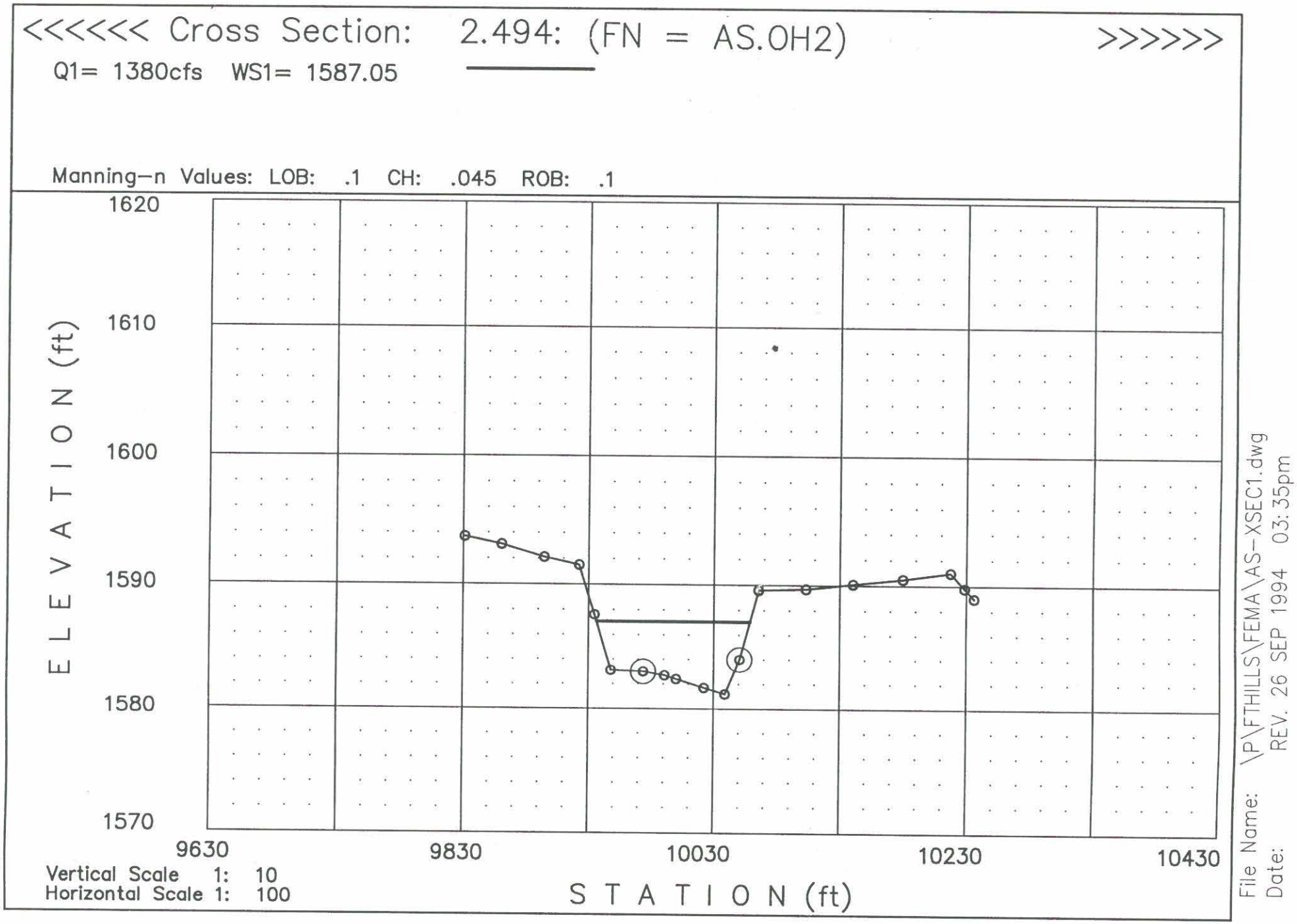
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

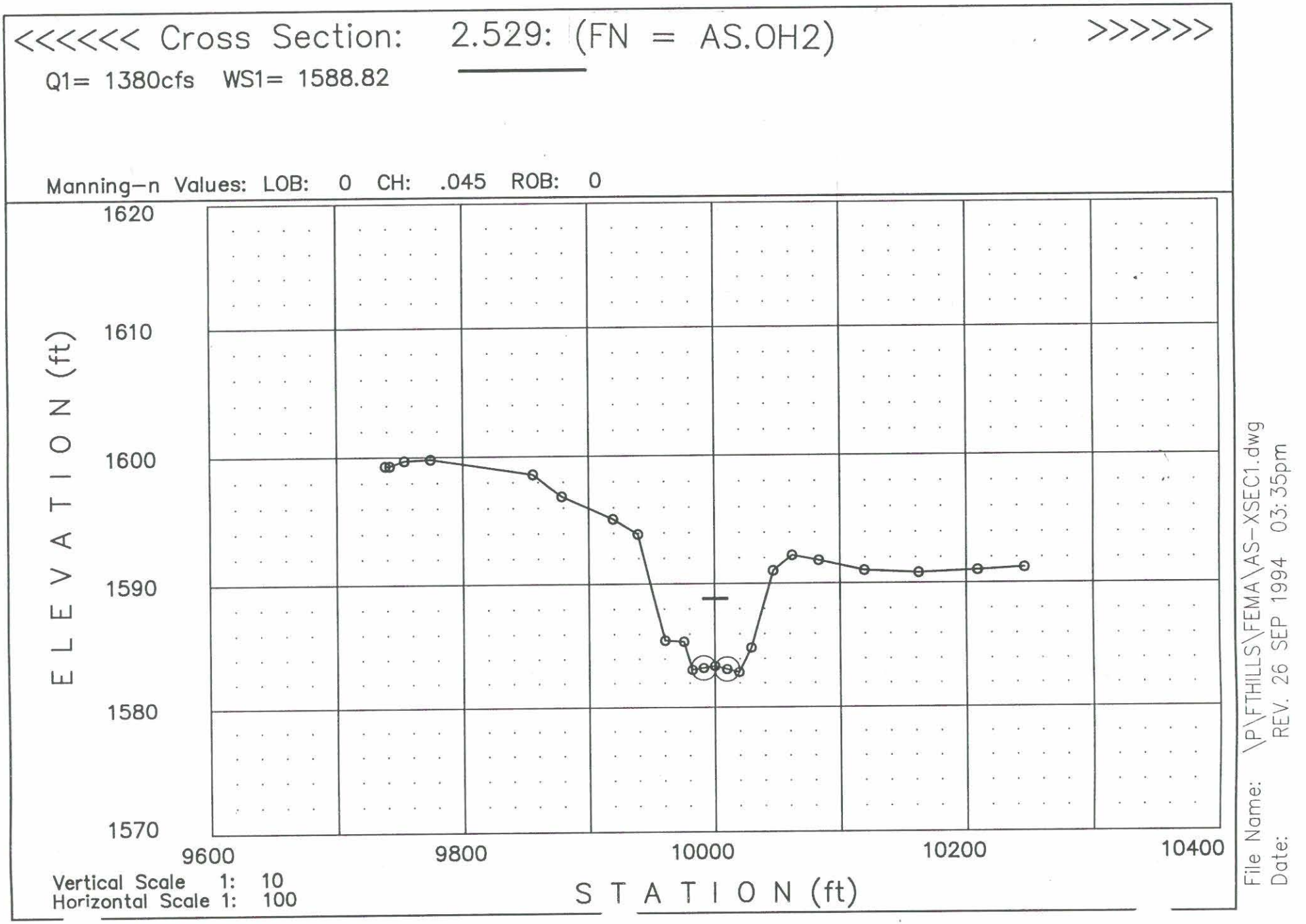

<<<<<< Cross Section: 2.382: (FN = AS.OH2) >>>>>>
Q1= 2050cfs WS1= 1575.26
Manning-n Values: LOB: .113 CH: .125 ROB: .12
1610
1600
1590
1580
1570
1560
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

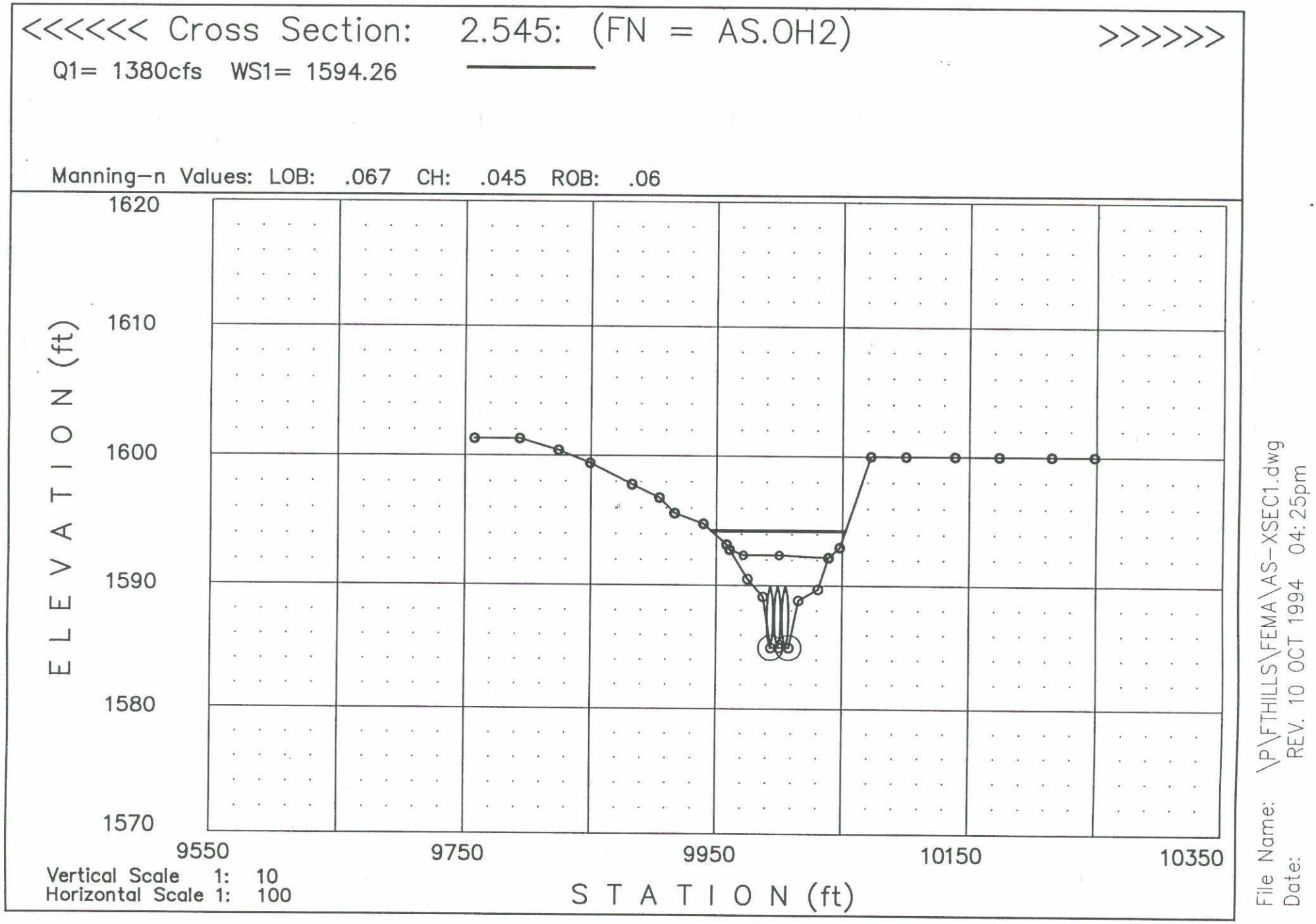

<<<<<< Cross Section: 2.405: (FN = AS.OH2) >>>>>>
Q1= 2050cfs WS1= 1581
Manning-n Values: LOB: 0 CH: .125 ROB: 0
1610
1600
1590
1580
1570
1560
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.428: (FN = AS.OH2) >>>>>>
Q1= 2050cfs WS1= 1586.54
Manning-n Values: LOB: .123 CH: .125 ROB: .124
1610
1600
1590
1580
1570
1560
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.448: (FN = AS.OH2) >>>>>>
Q1= 2050cfs WS1= 1586.77
Manning-n Values: LOB: .113 CH: .125 ROB: .12
ELEVATION (ft)
1618
1608
1598
1588
1578
1568
9680
9880
10080
10280
10480
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.494: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1587.05
Manning-n Values: LOB: .1 CH: .045 ROB: .1
1620
1610
1600
1590
1580
1570
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.529: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1588.82
Manning-n Values: LOB: 0 CH: .045 ROB: 0
ELEVATION (ft)
1620
1610
1600
1590
1580
1570
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.545: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1594.26
Manning-n Values: LOB: .067 CH: .045 ROB: .06
1620
1610
1600
1590
1580
1570
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
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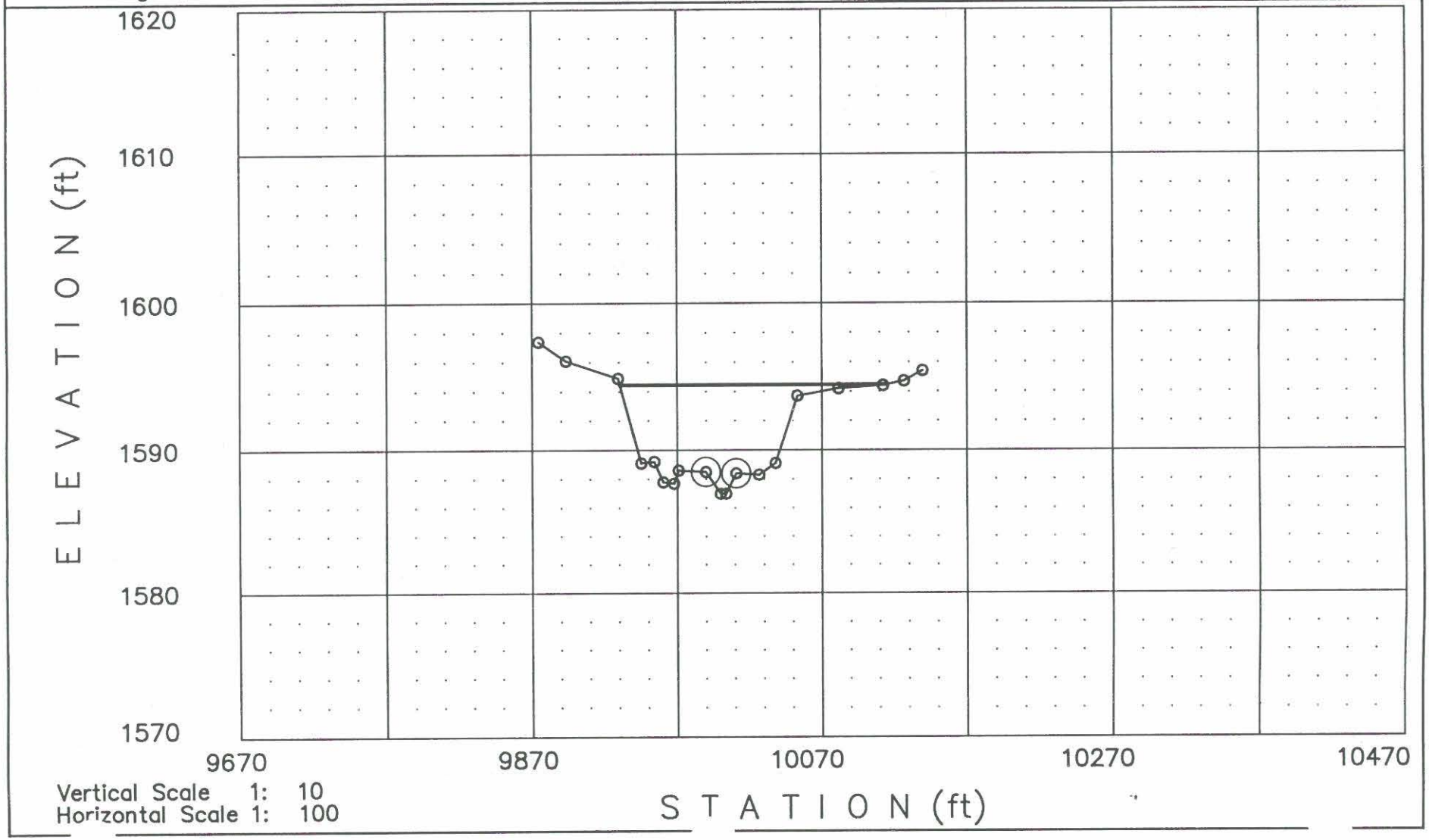
<<<<<< Cross Section: 2.558: (FN = AS.OH2) >>>>>>

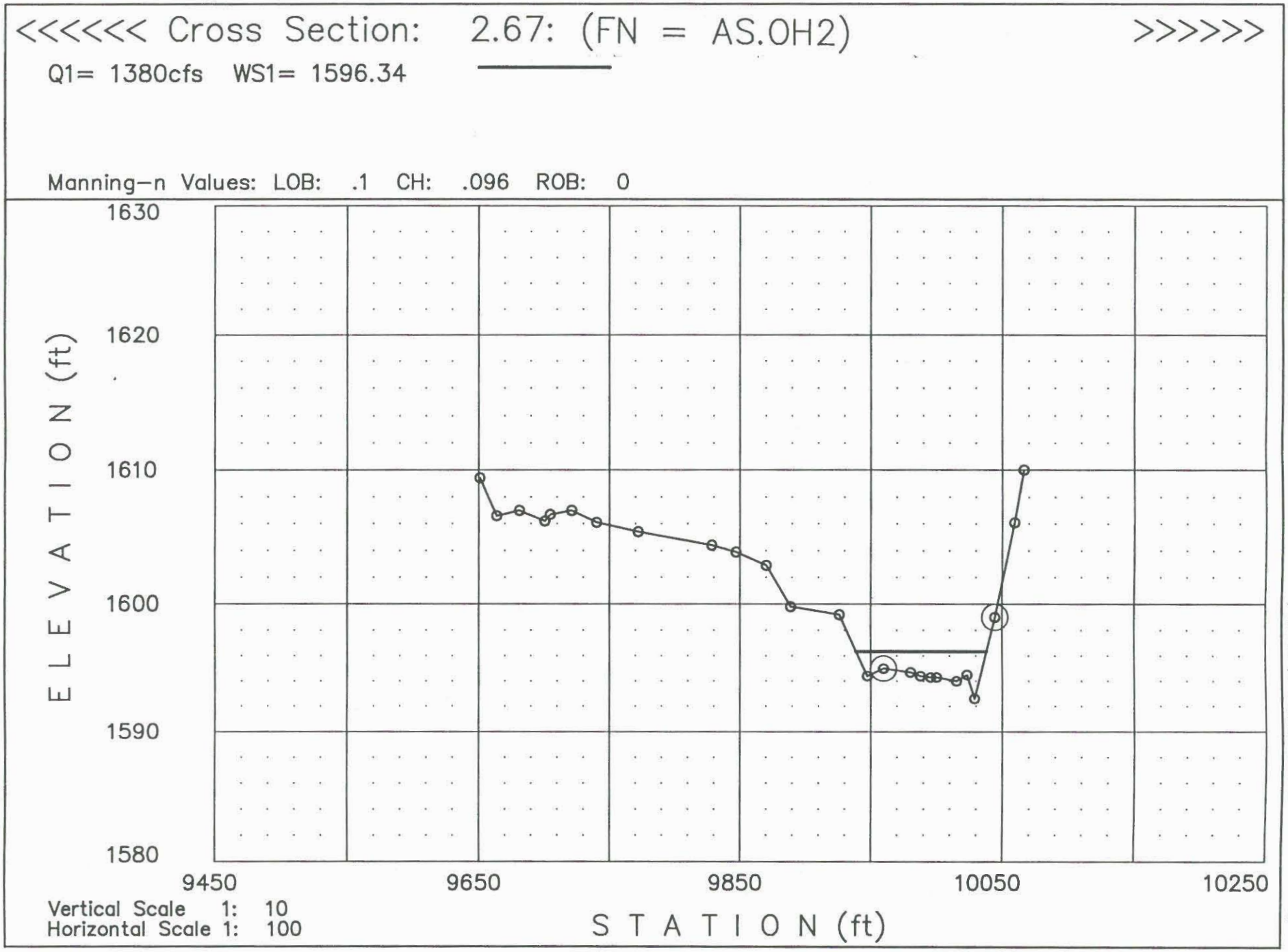
Q1= 1380cfs WS1= 1594.45

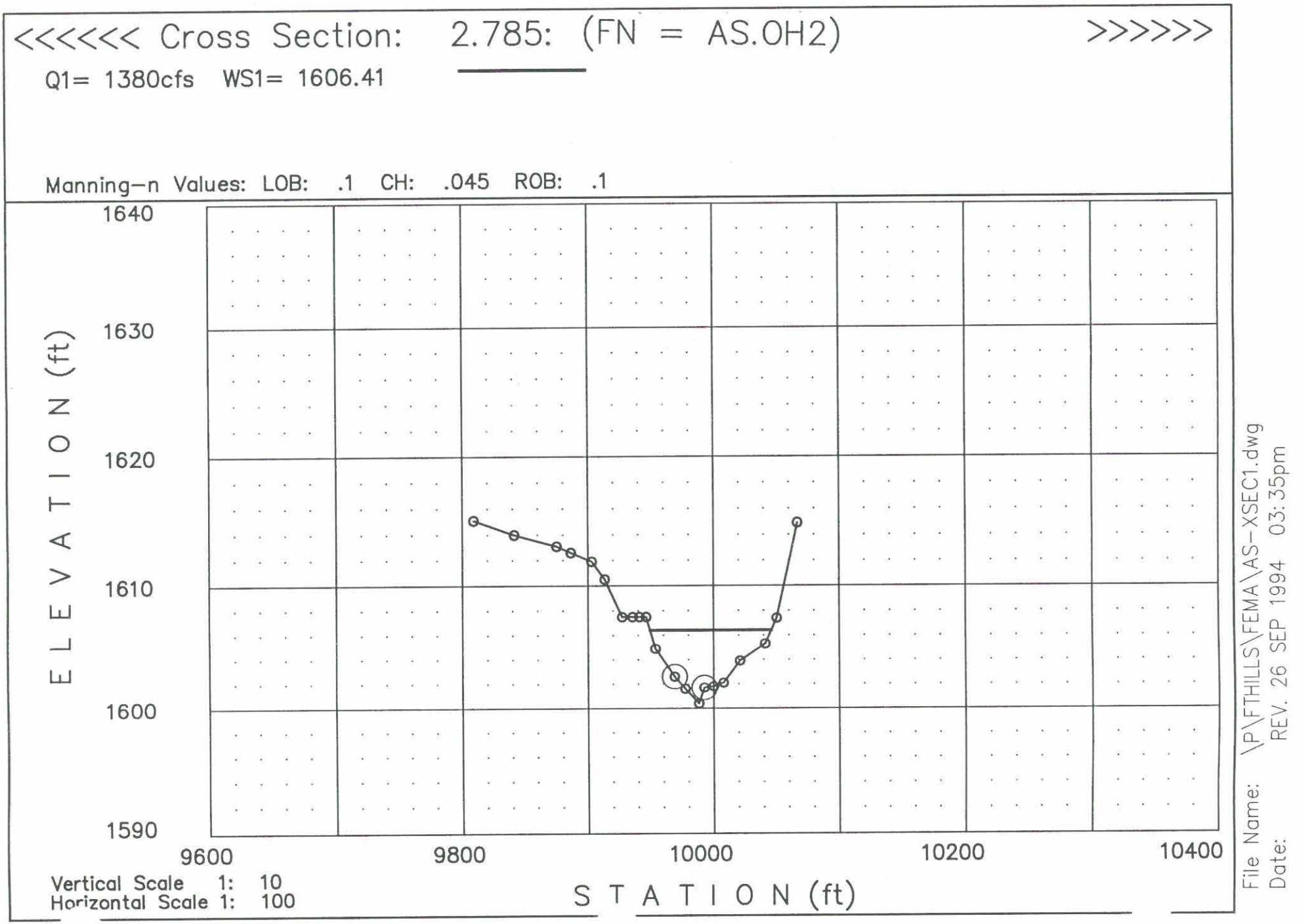
Manning-n Values: LOB: .1 CH: .045 ROB: .1

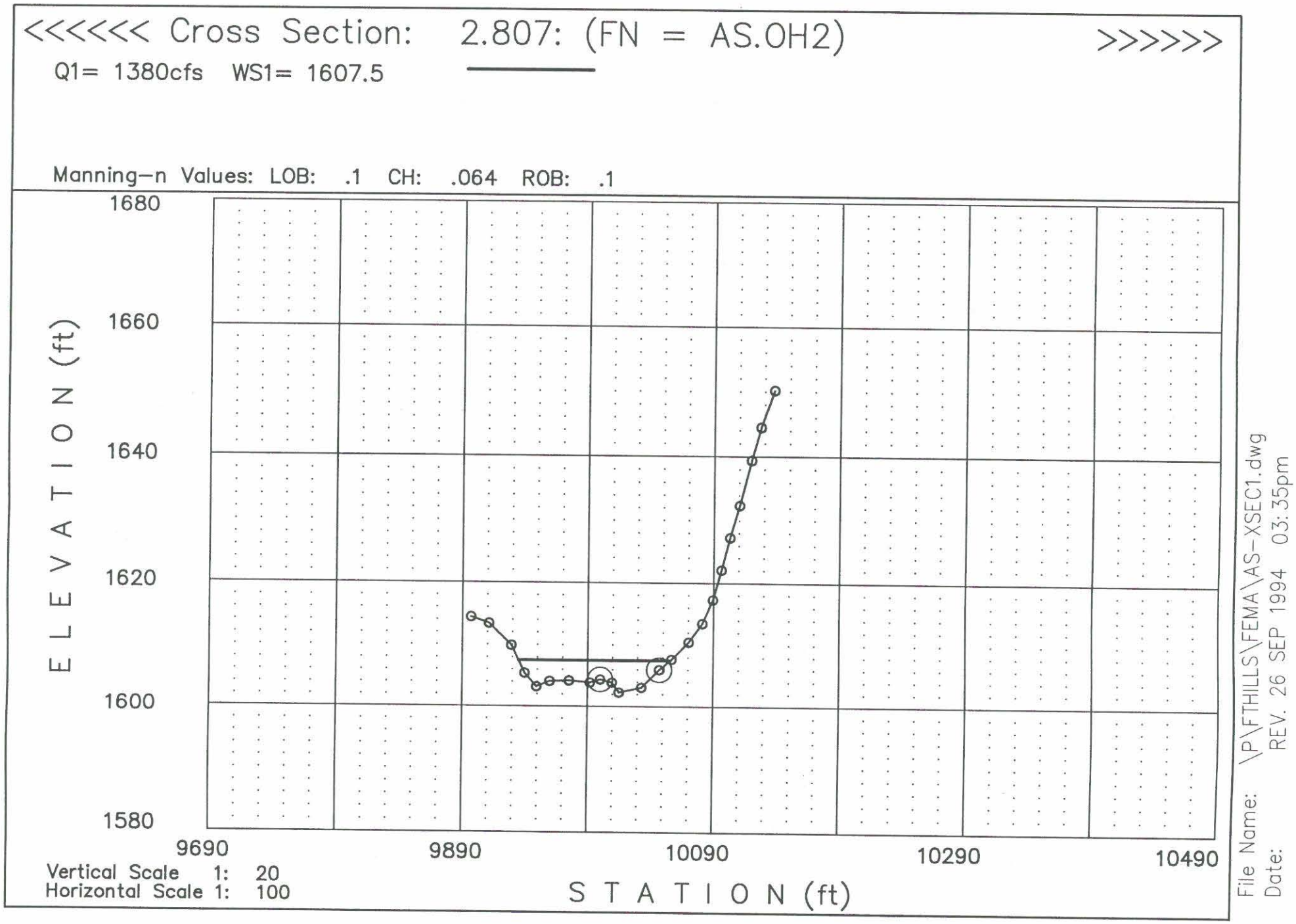


Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.67: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1596.34
Manning-n Values: LOB: .1 CH: .096 ROB: 0
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9450
9650
9850
10050
10250
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.785: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1606.41
Manning-n Values: LOB: .1 CH: .045 ROB: .1
1640
1630
1620
1610
1600
1590
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 2.807: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1607.5
Manning-n Values: LOB: .1 CH: .064 ROB: .1
1680
1660
1640
1620
1600
1580
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 20
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
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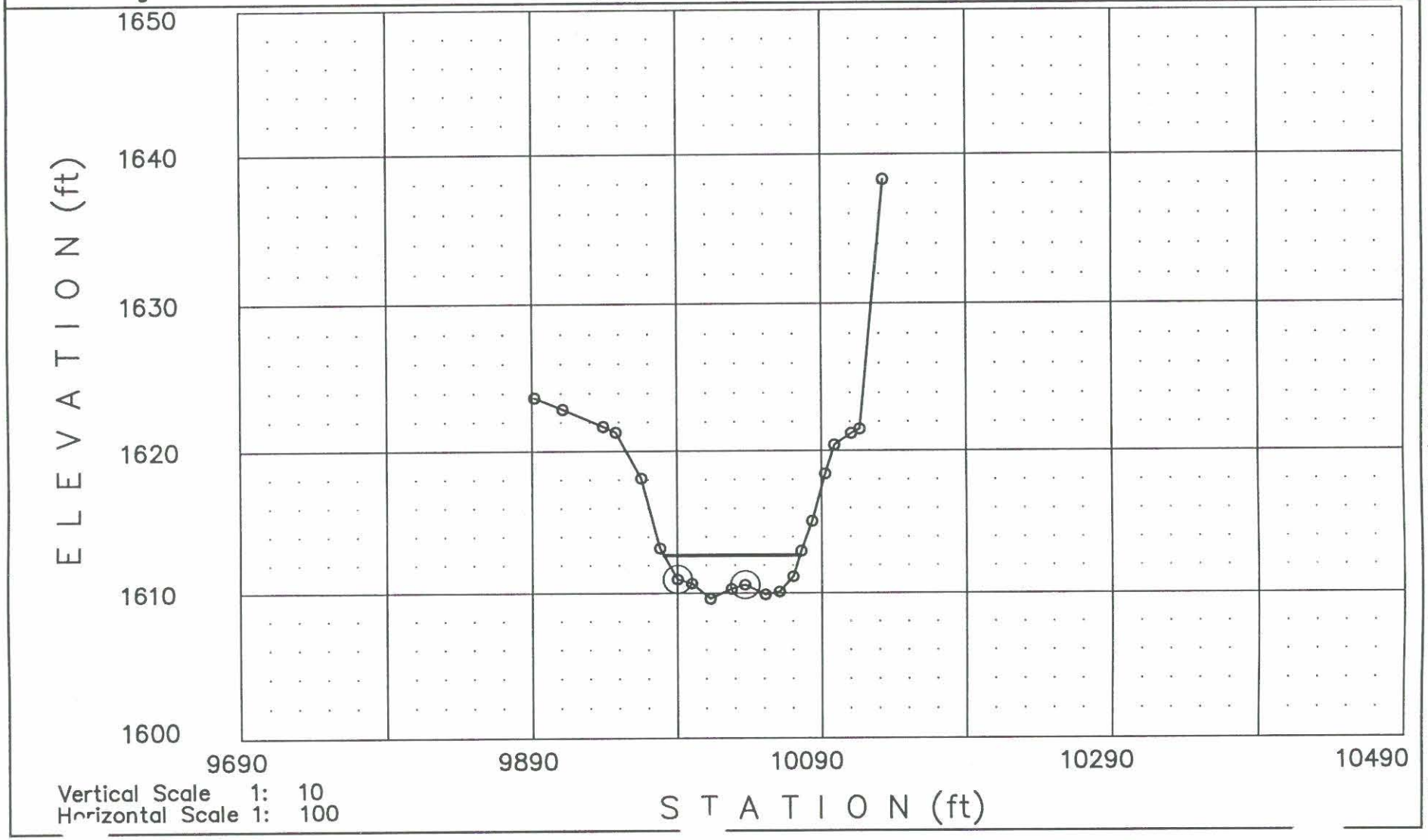
<<<<<< Cross Section: 2.899: (FN = AS.OH2) >>>>>>

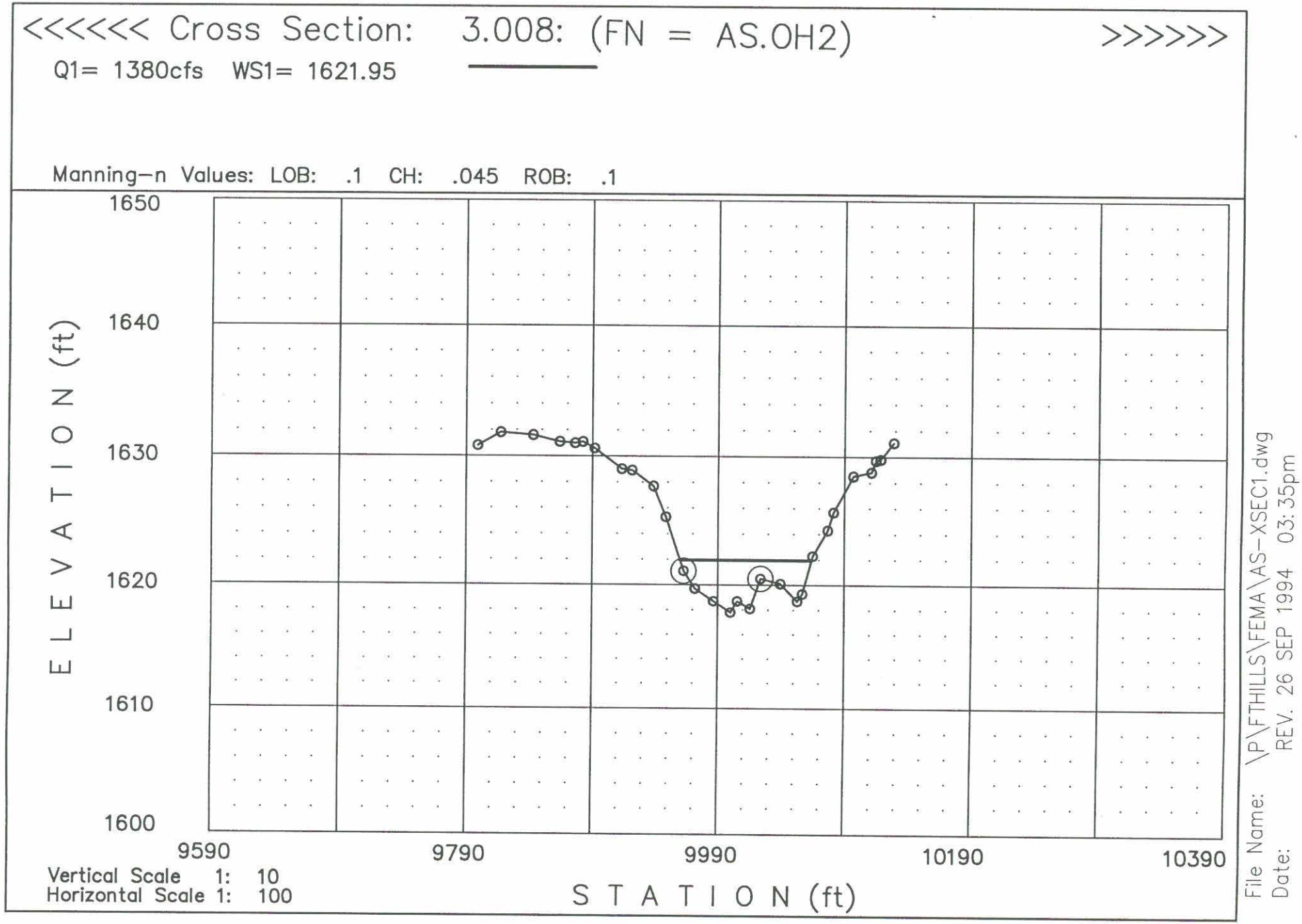
Q1= 1380cfs WS1= 1612.7

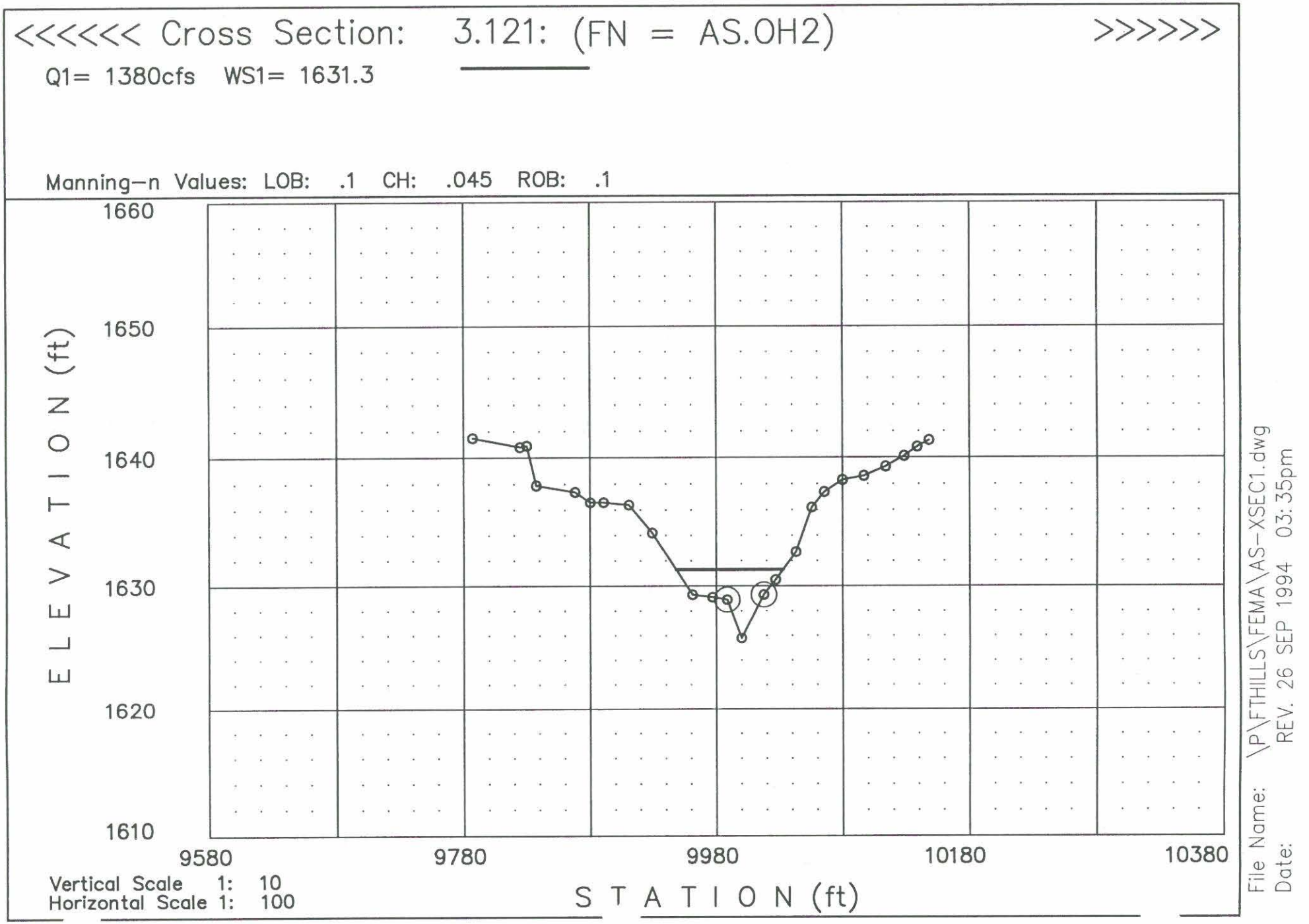
Manning-n Values: LOB: .1 CH: .054 ROB: .1

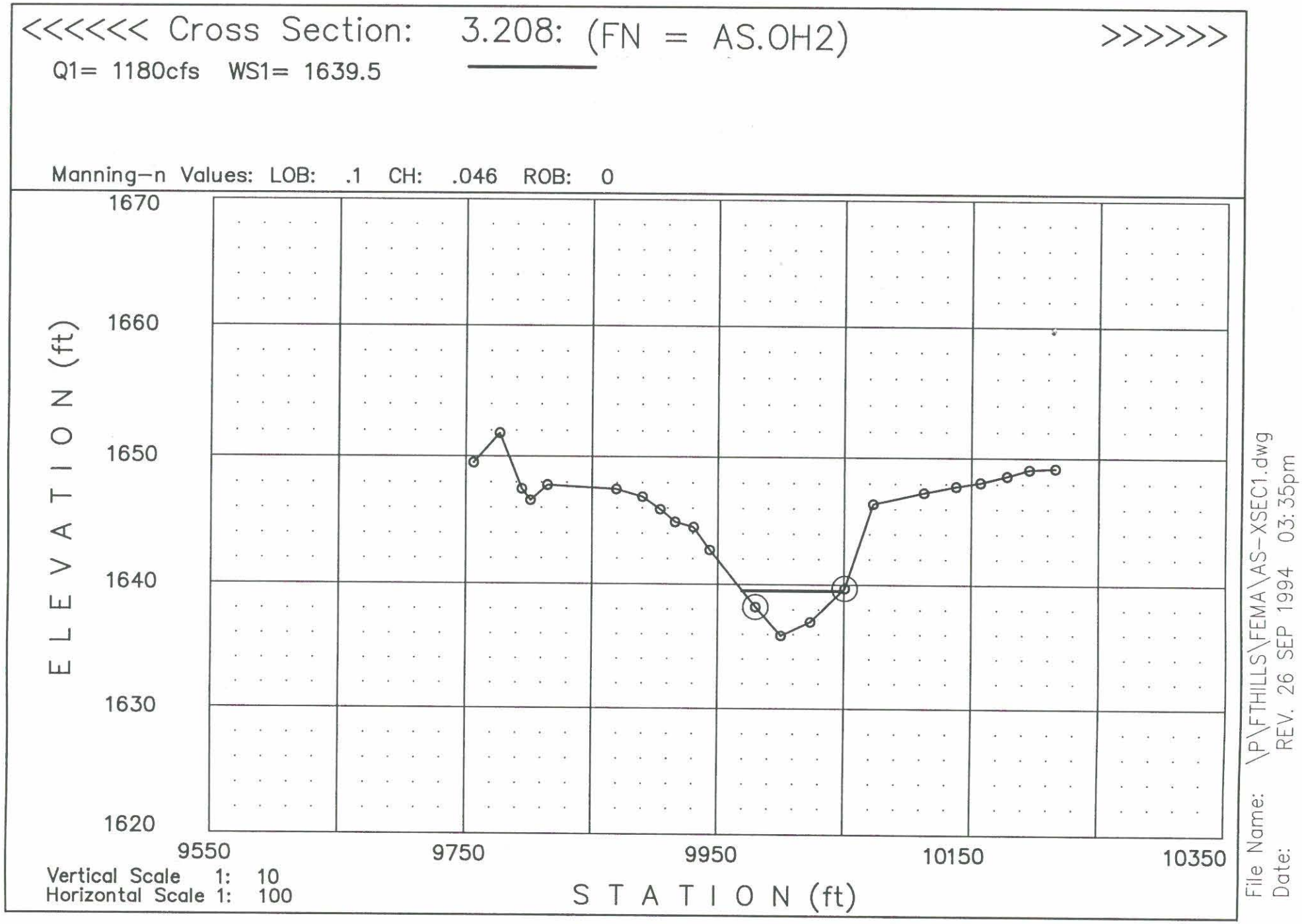


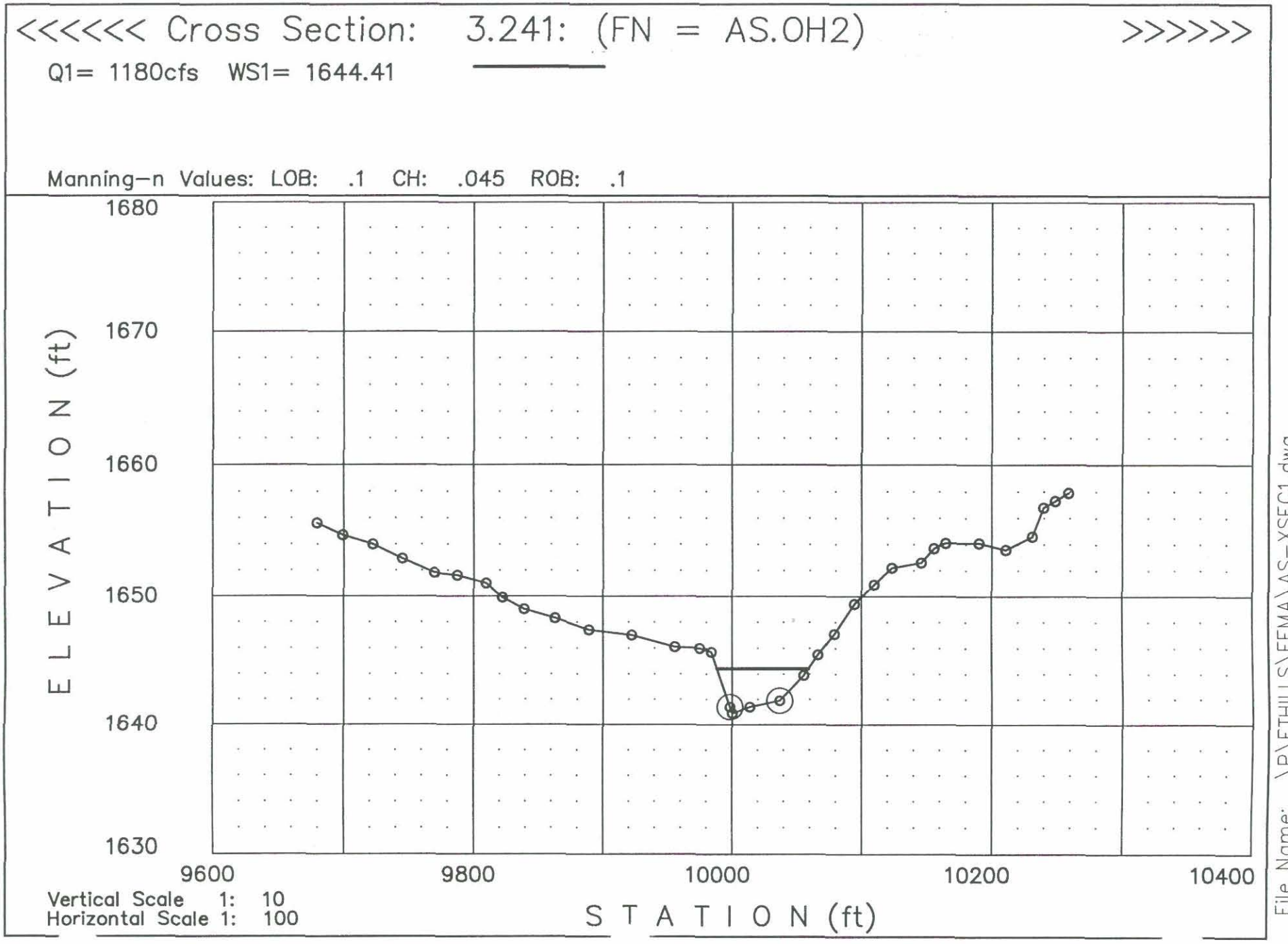
Vertical Scale 1: 10
Horizontal Scale 1: 100

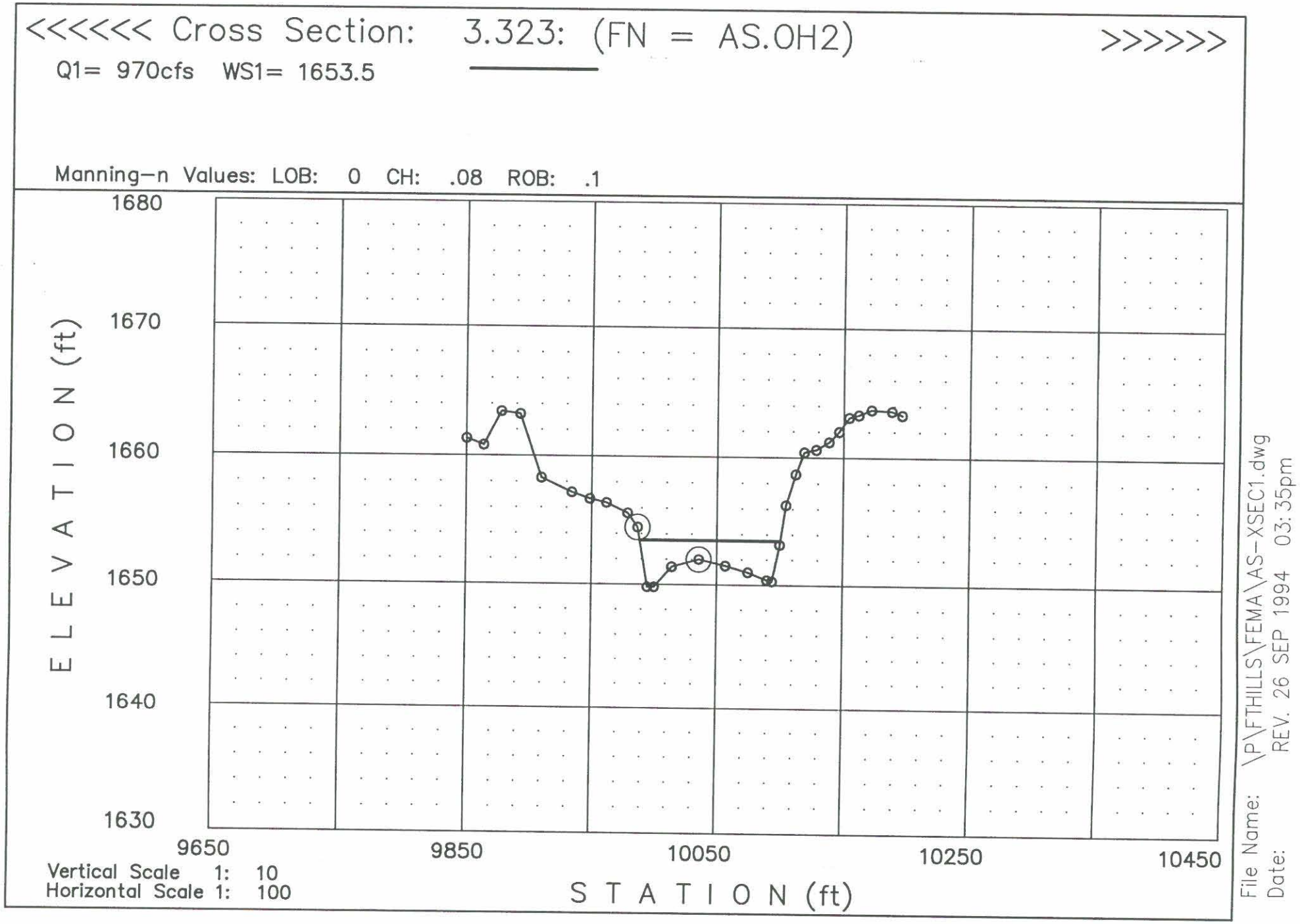
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

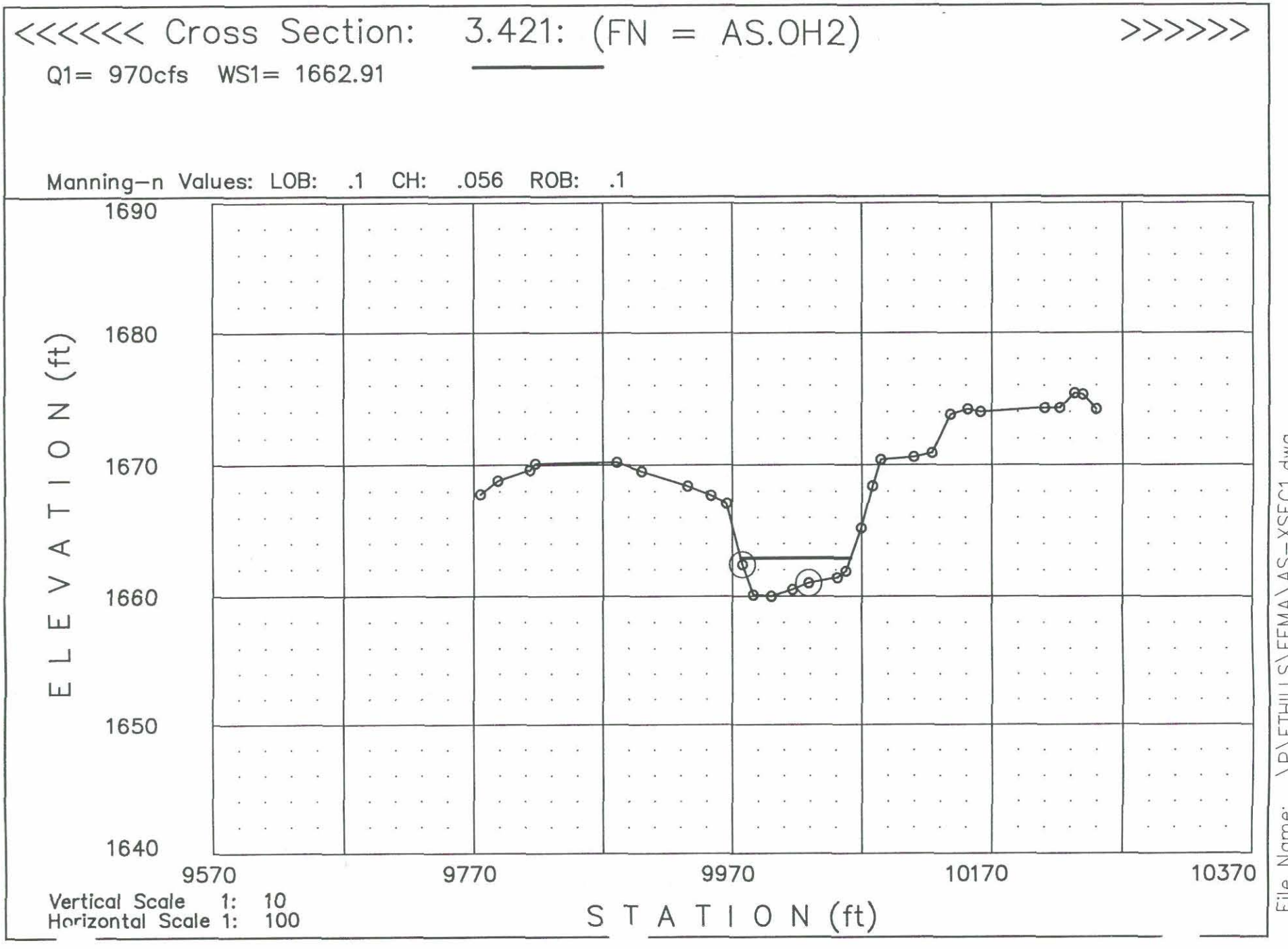

<<<<<< Cross Section: 3.008: (FN = AS.0H2) >>>>>>
Q1= 1380cfs WS1= 1621.95
Manning-n Values: LOB: .1 CH: .045 ROB: .1
1650
1640
1630
1620
1610
1600
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.121: (FN = AS.OH2) >>>>>>
Q1= 1380cfs WS1= 1631.3
Manning-n Values: LOB: .1 CH: .045 ROB: .1
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.208: (FN = AS.OH2) >>>>>>
Q1= 1180cfs WS1= 1639.5
Manning-n Values: LOB: .1 CH: .046 ROB: 0
1670
1660
1650
1640
1630
1620
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.241: (FN = AS.OH2) >>>>>>
Q1= 1180cfs WS1= 1644.41
Manning-n Values: LOB: .1 CH: .045 ROB: .1
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.323: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1653.5
Manning-n Values: LOB: 0 CH: .08 ROB: .1
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.421: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1662.91
Manning-n Values: LOB: .1 CH: .056 ROB: .1
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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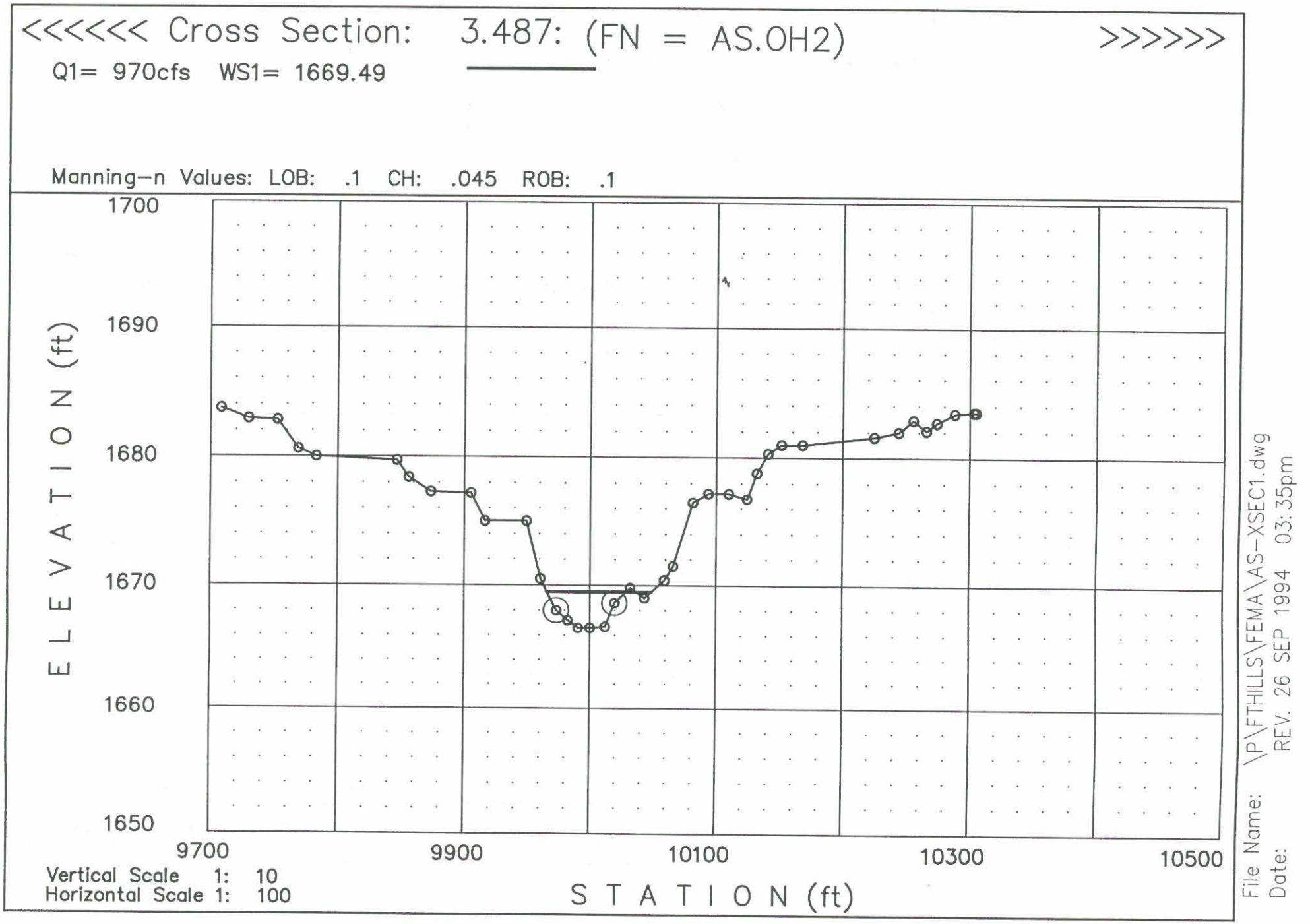
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.487: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1669.49
Manning–n Values: LOB: .1 CH: .045 ROB: .1
1700
1690
1680
1670
1660
1650
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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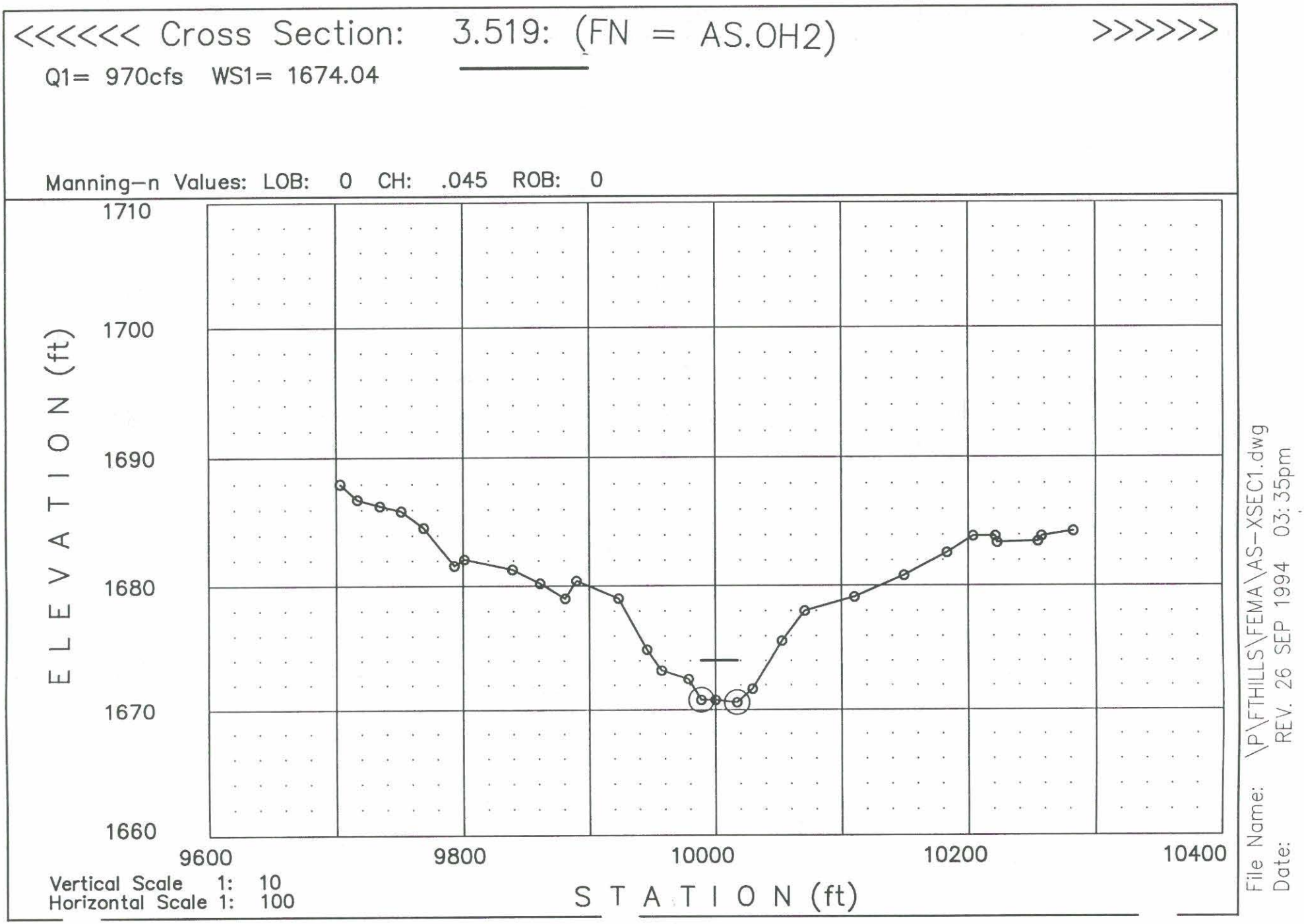
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.519: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1674.04
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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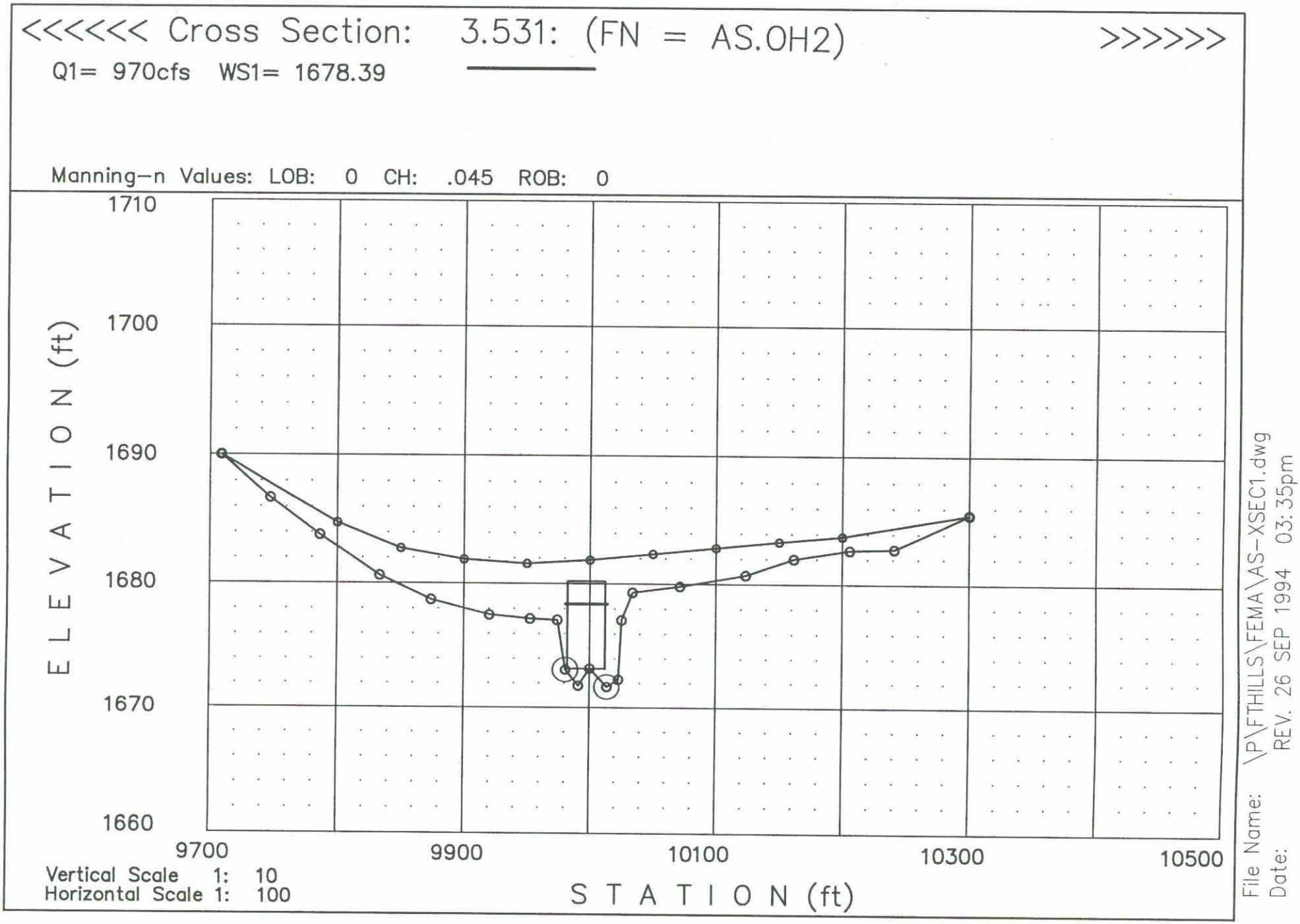
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 3.531: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1678.39
Manning–n Values: LOB: 0 CH: .045 ROB: 0
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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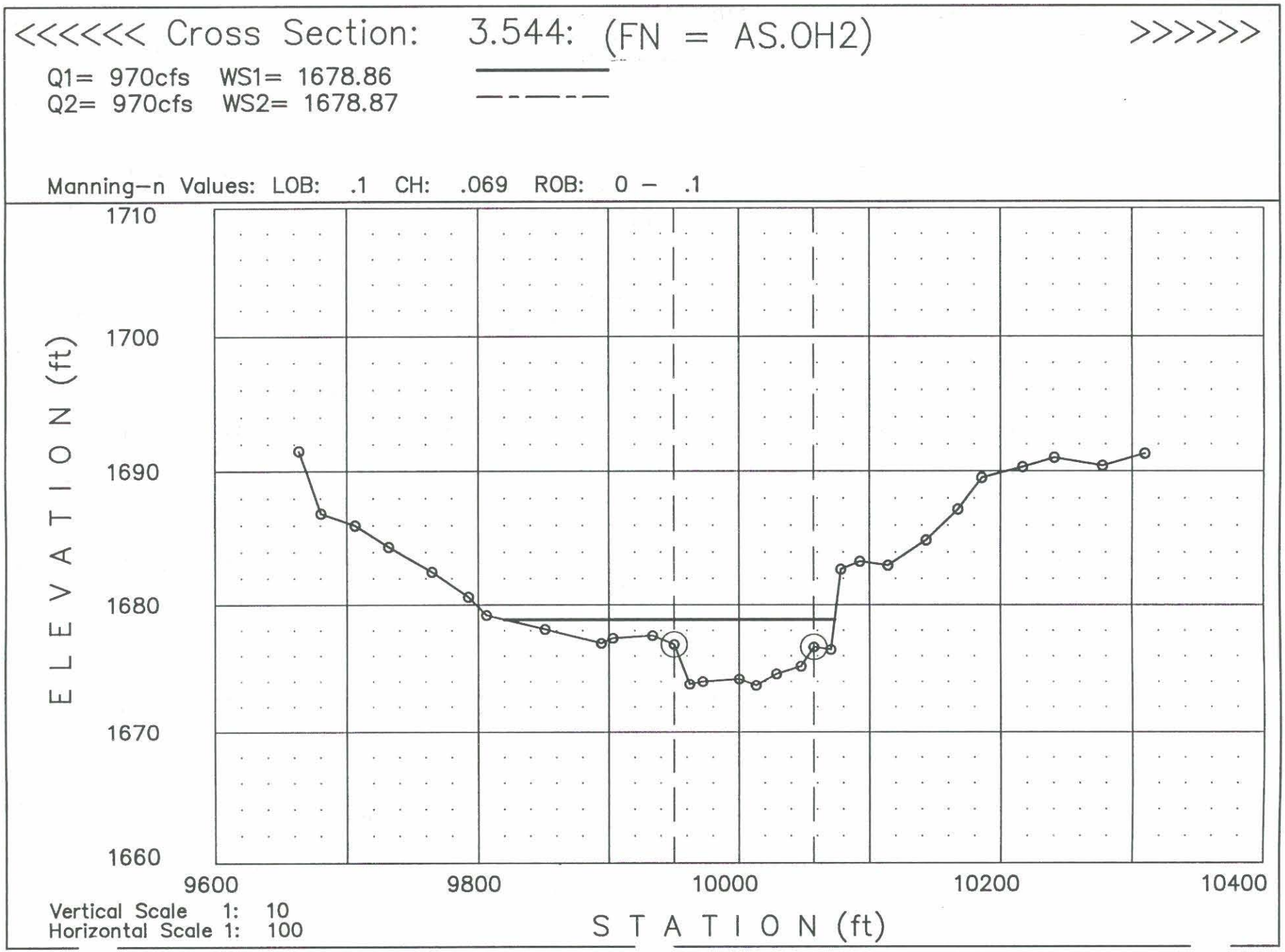
Date: REV. 26 SEP 1994 03:35pm



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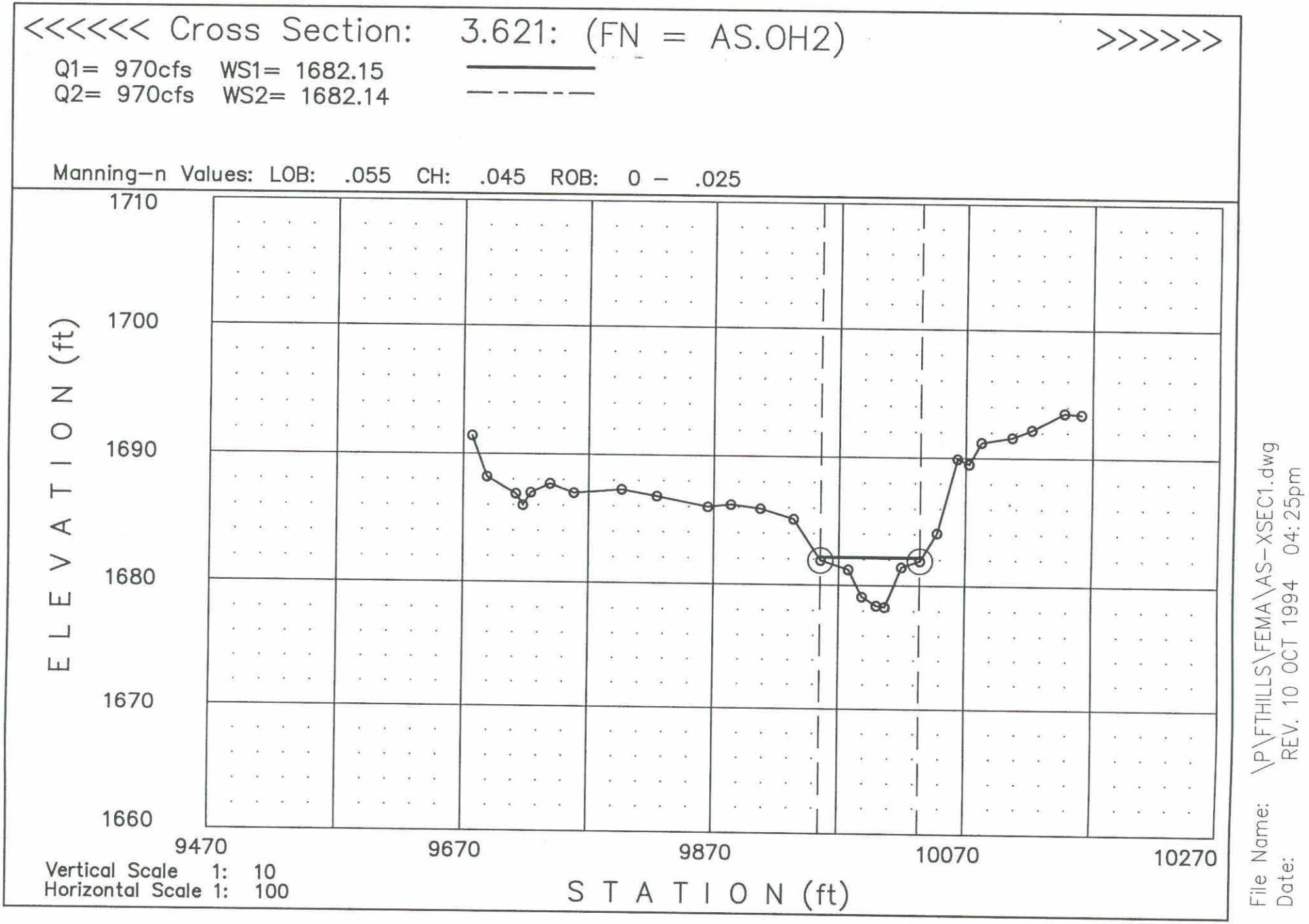
Date: REV. 10 OCT 1994 04:25pm


<<<<<< Cross Section: 3.621: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1682.15
Q2= 970cfs WS2= 1682.14
Manning-n Values: LOB: .055 CH: .045 ROB: 0 - .025
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9470
9670
9870
10070
10270
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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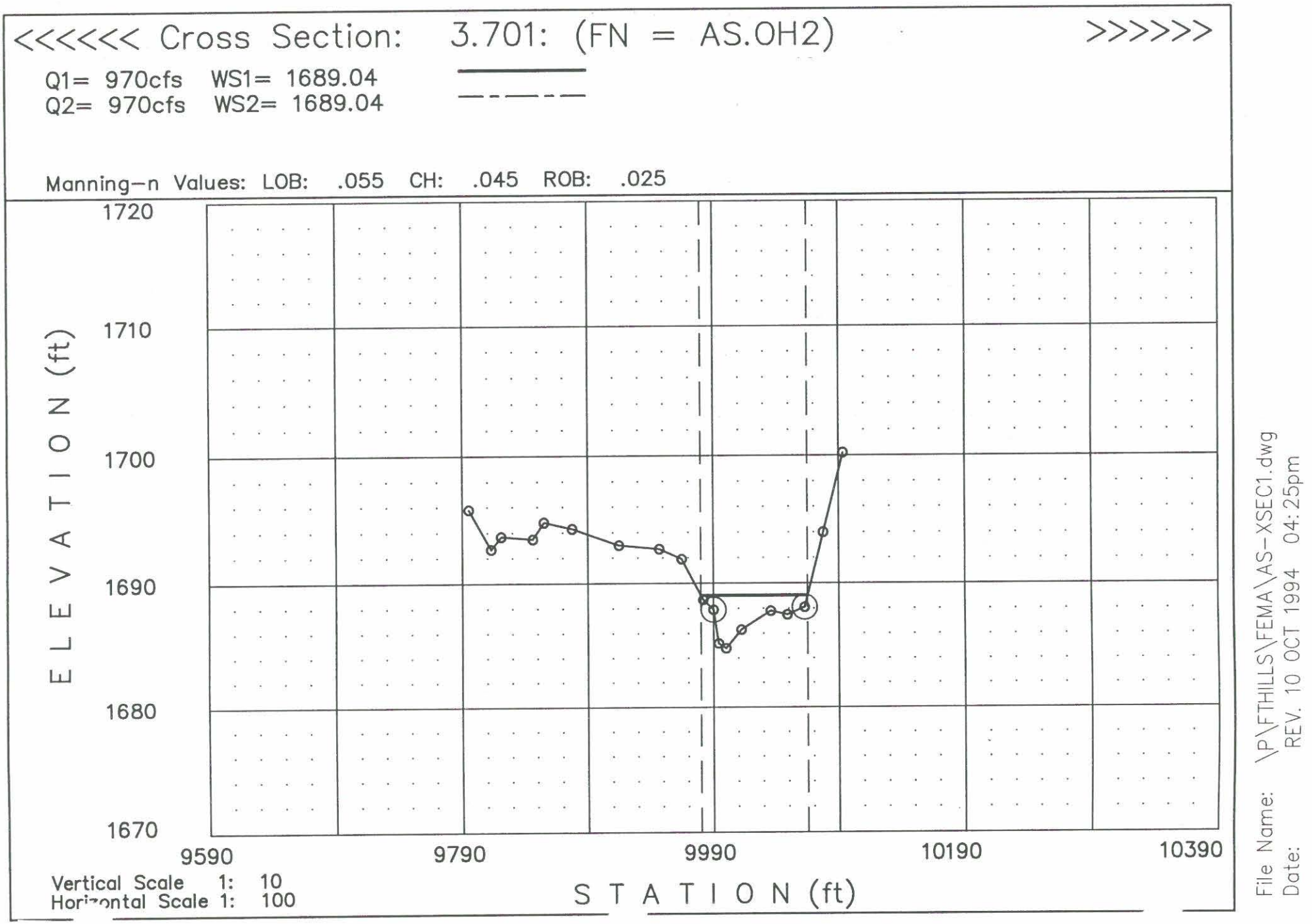
<<<<<< Cross Section: 3.701: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1689.04
Q2= 970cfs WS2= 1689.04
Manning-n Values: LOB: .055 CH: .045 ROB: .025
1720
1710
1700
1690
1680
1670
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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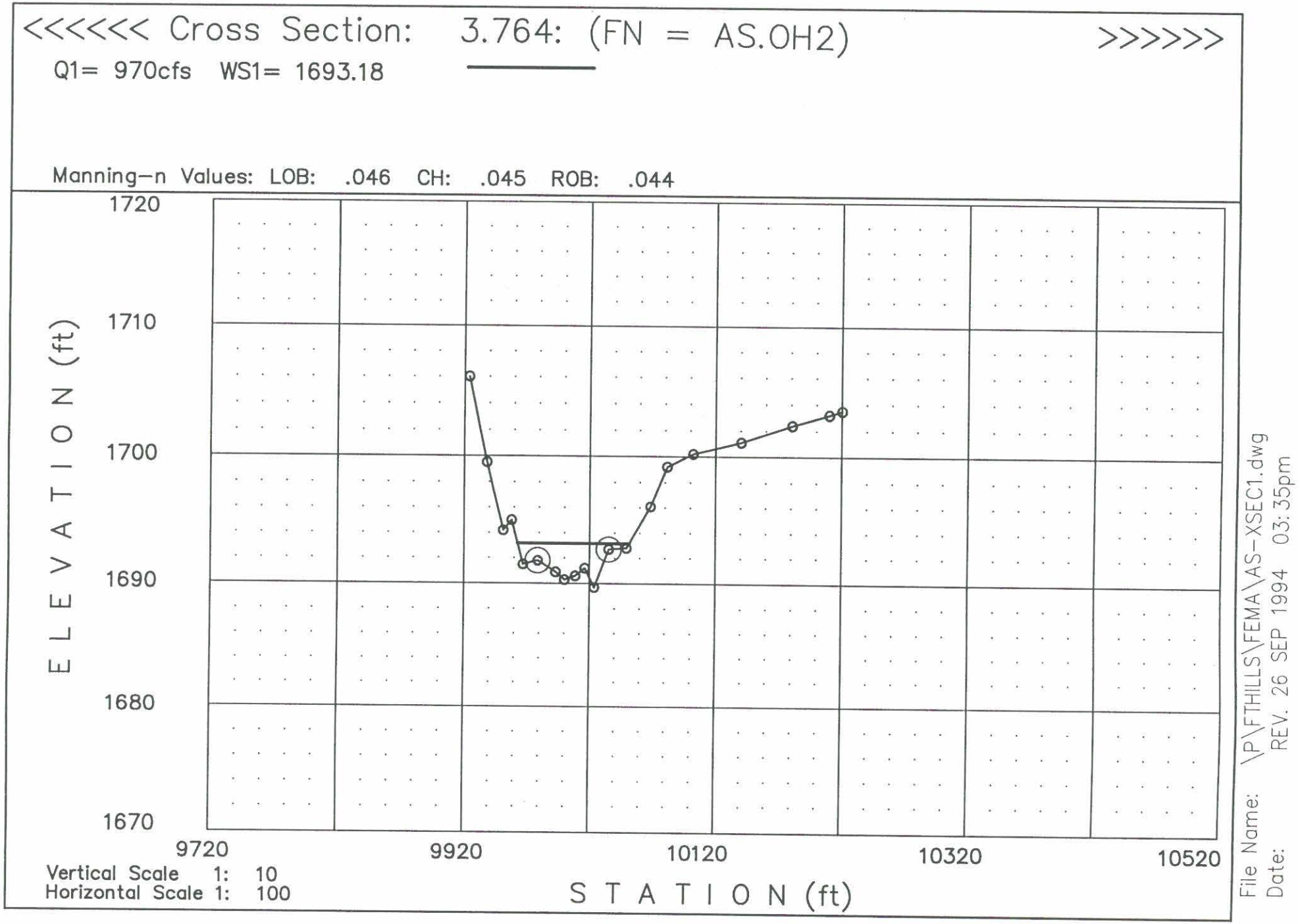
<<<<<< Cross Section: 3.764: (FN = AS.OH2) >>>>>>
Q1= 970cfs WS1= 1693.18
Manning-n Values: LOB: .046 CH: .045 ROB: .044
1720
1710
1700
1690
1680
1670
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
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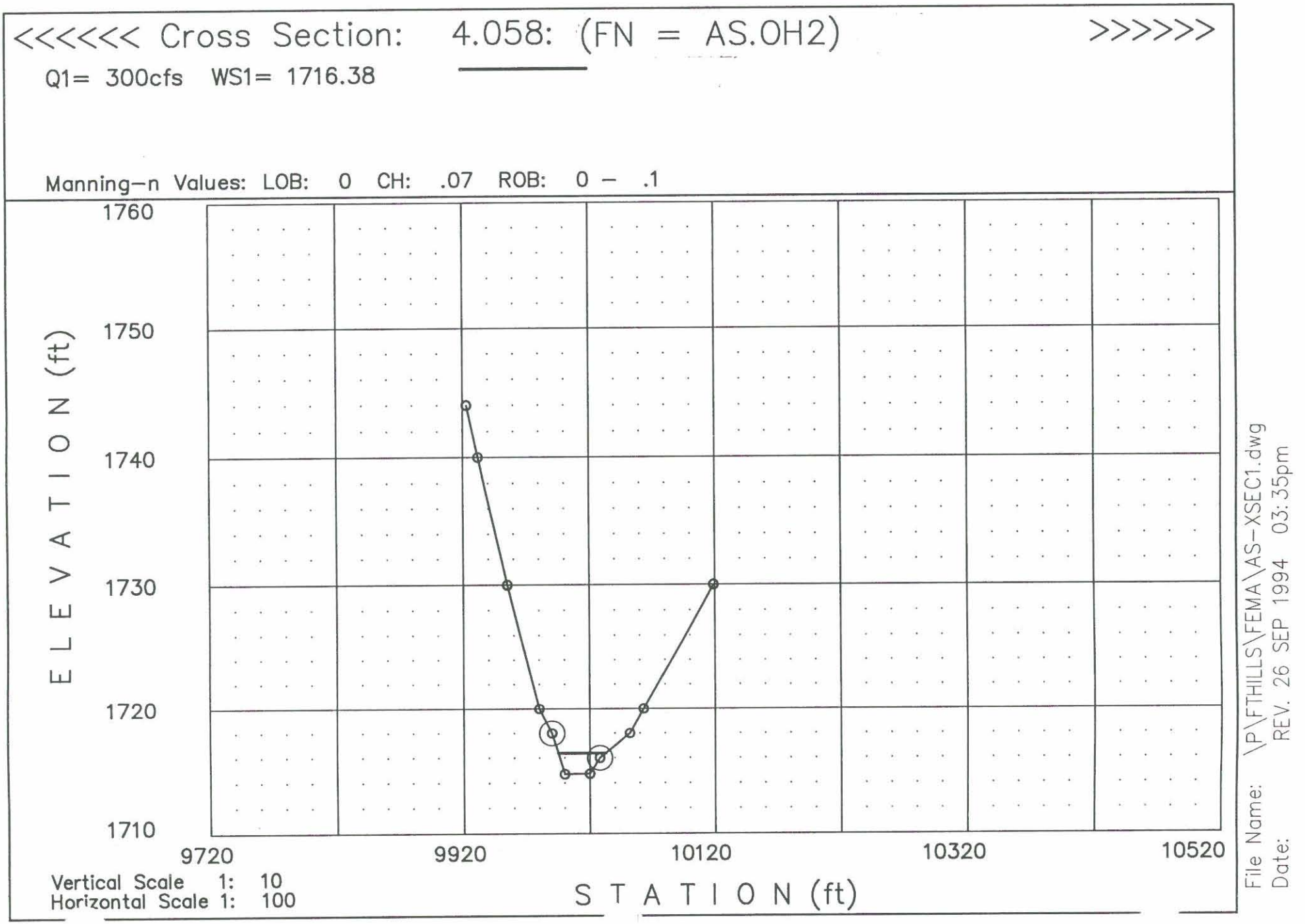
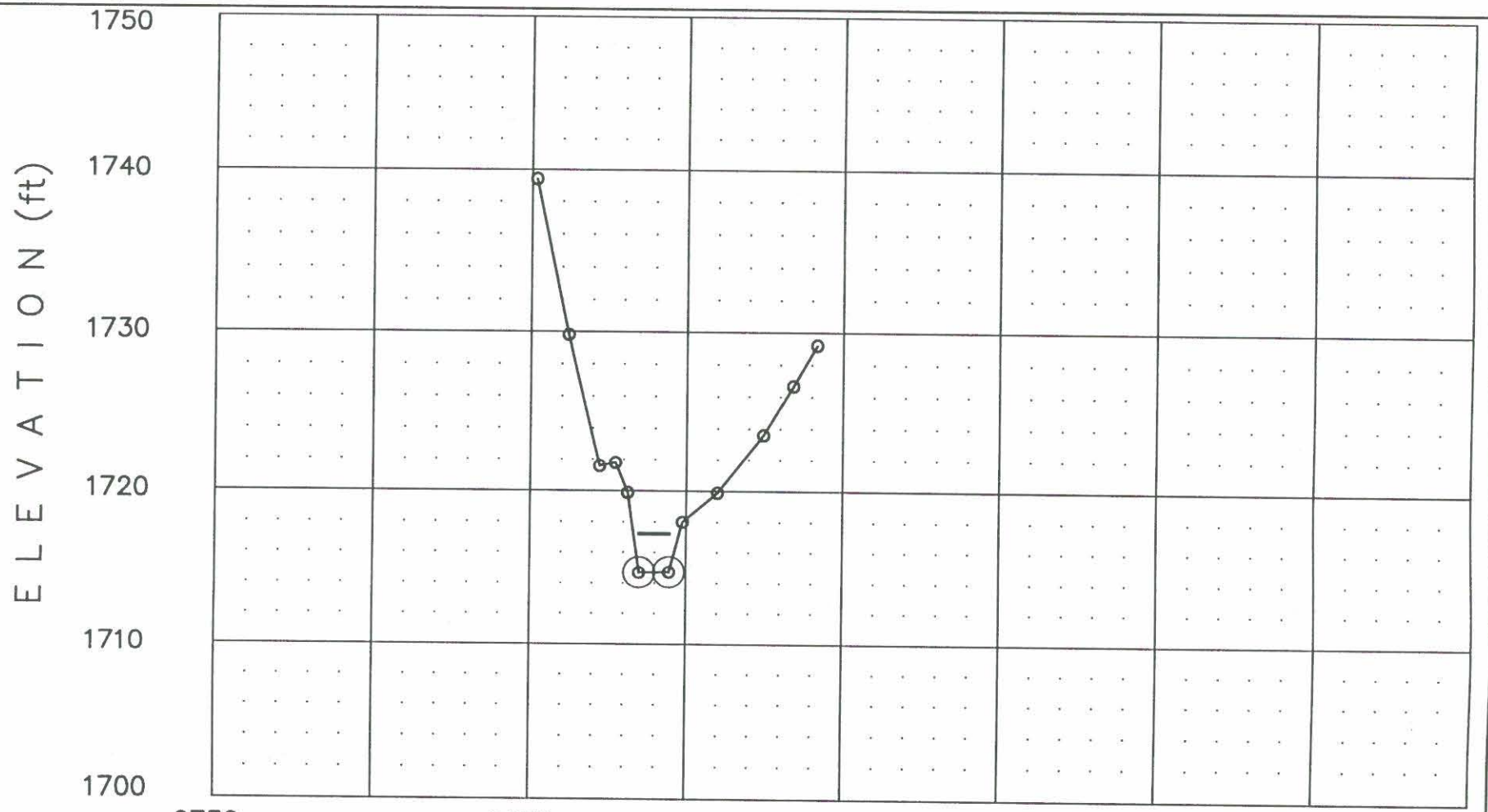

<<<<<< Cross Section: 4.058: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1716.38
Manning-n Values: LOB: 0 CH: .07 ROB: 0 - .1
1760
1750
1740
1730
1720
1710
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

<<<<<< Cross Section: 4.065: (FN = AS.OH2) >>>>>>

Q1= 300cfs WS1= 1717.22

Manning–n Values: LOB: 0 CH: .045 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

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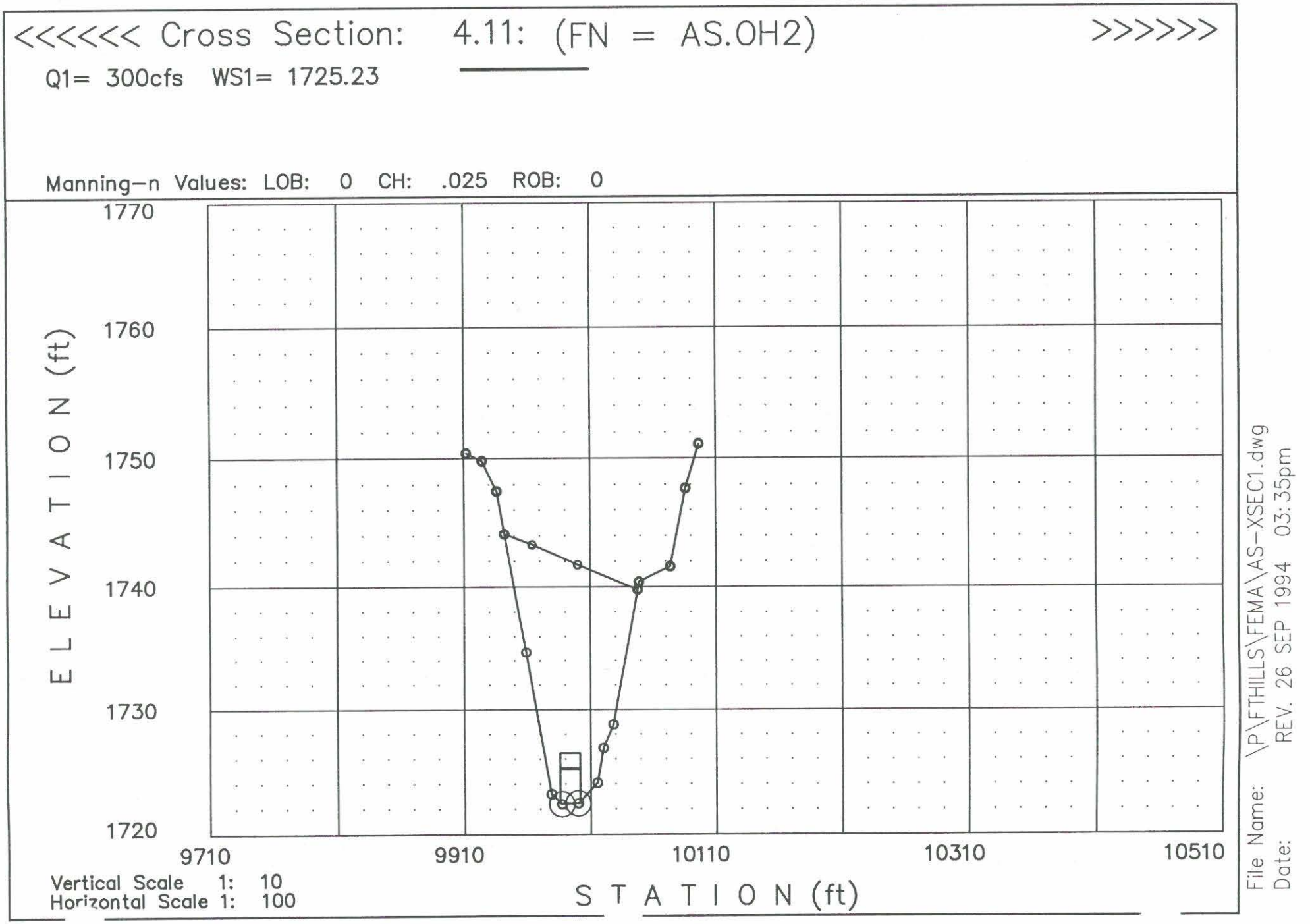
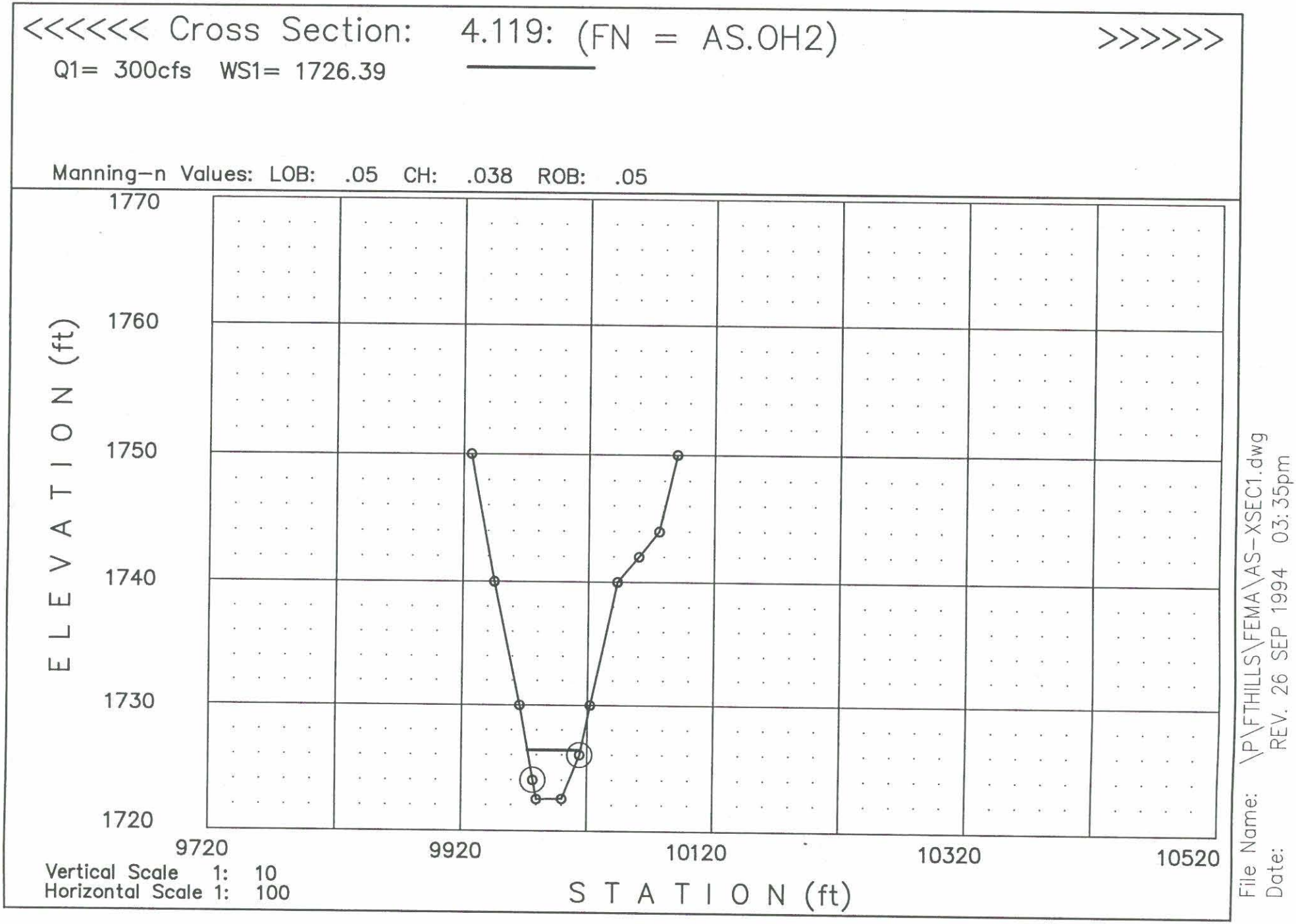
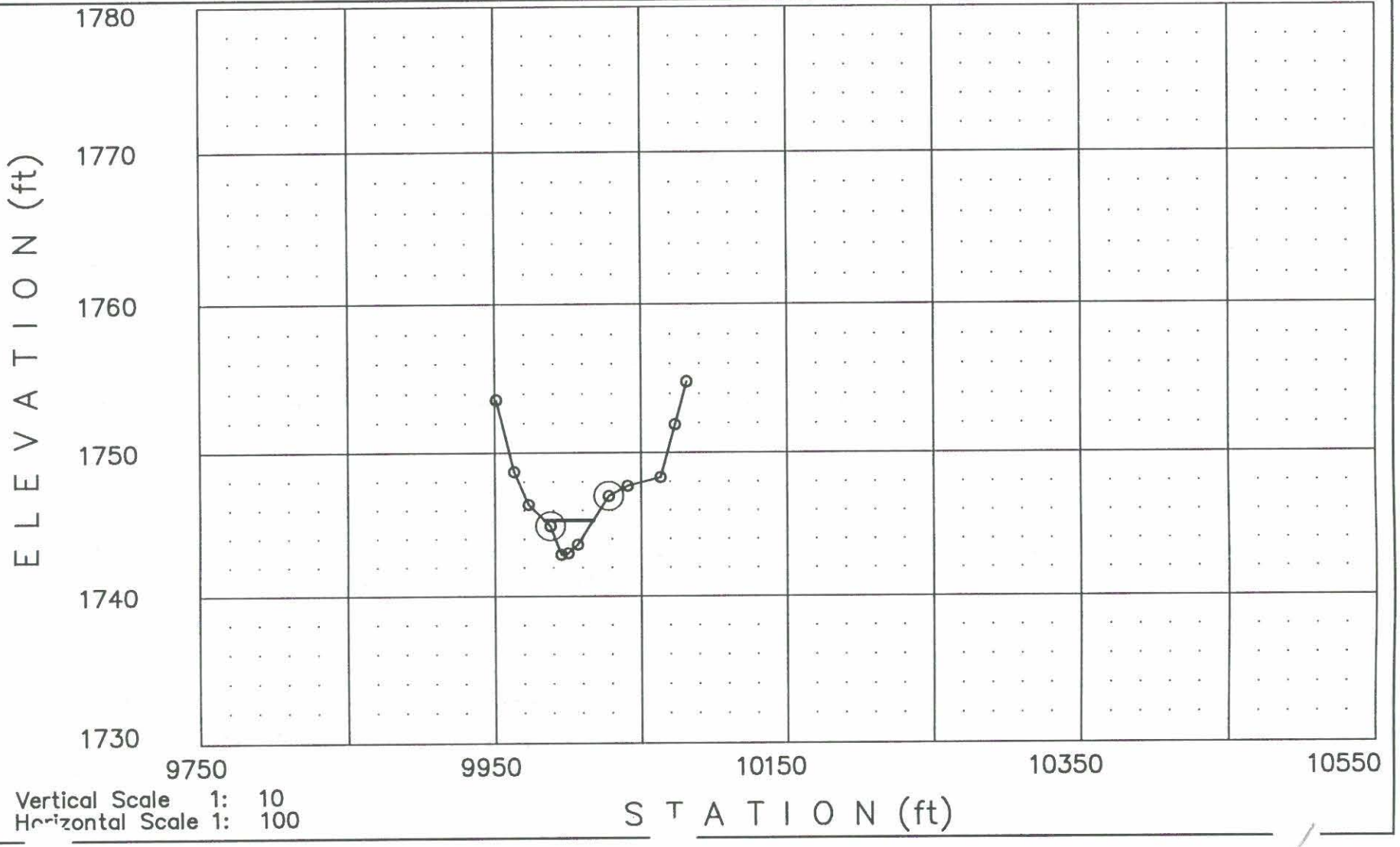

<<<<<< Cross Section: 4.11: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1725.23
Manning-n Values: LOB: 0 CH: .025 ROB: 0
1770
1760
1750
1740
1730
1720
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm


<<<<<< Cross Section: 4.119: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1726.39
Manning-n Values: LOB: .05 CH: .038 ROB: .05
ELEVATION (ft)
1770
1760
1750
1740
1730
1720
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC1.dwg
Date: REV. 26 SEP 1994 03:35pm

<<<<<< Cross Section: 4.177: (FN = AS.OH2) >>>>>>

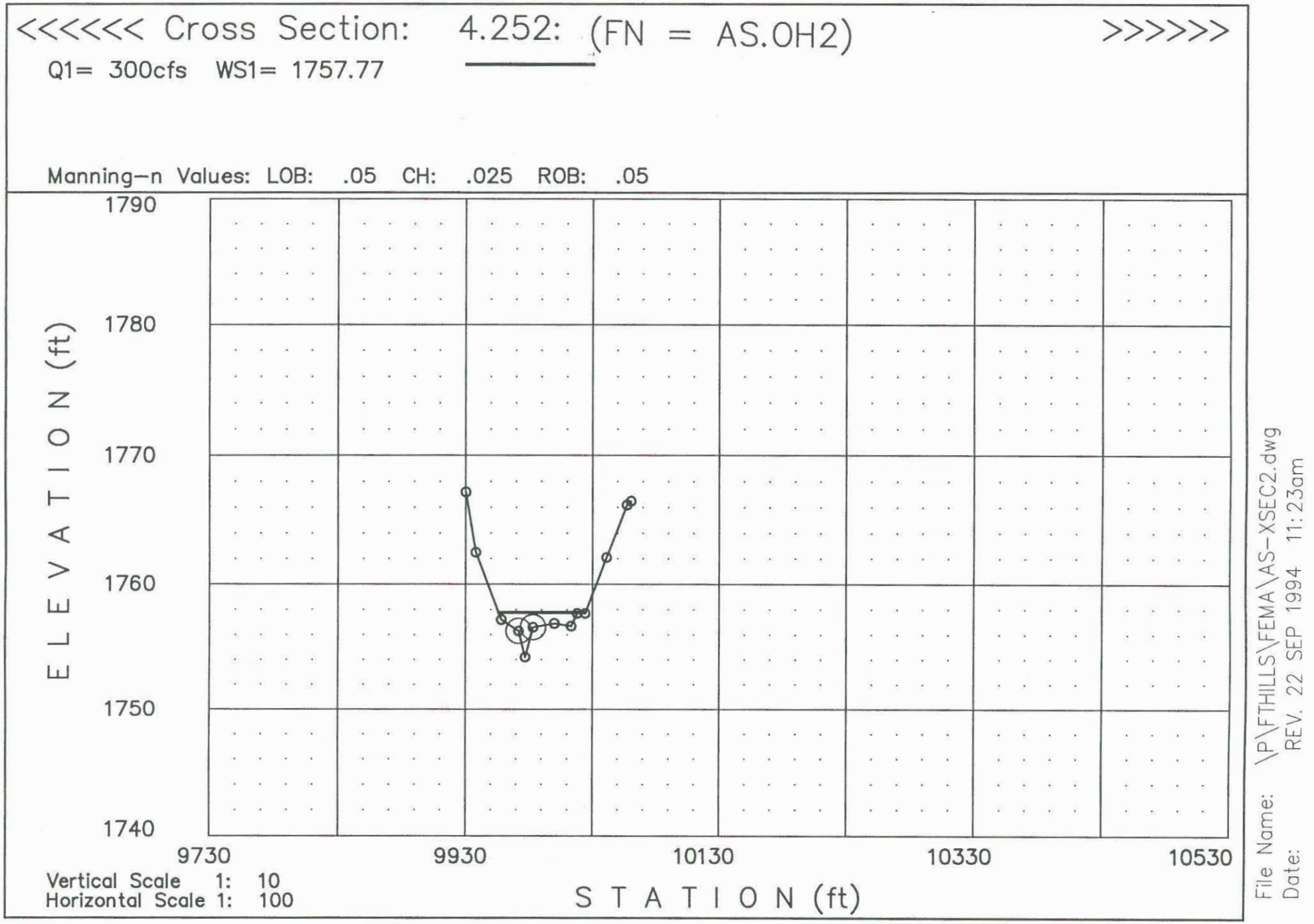
Q1= 300cfs WS1= 1745.3

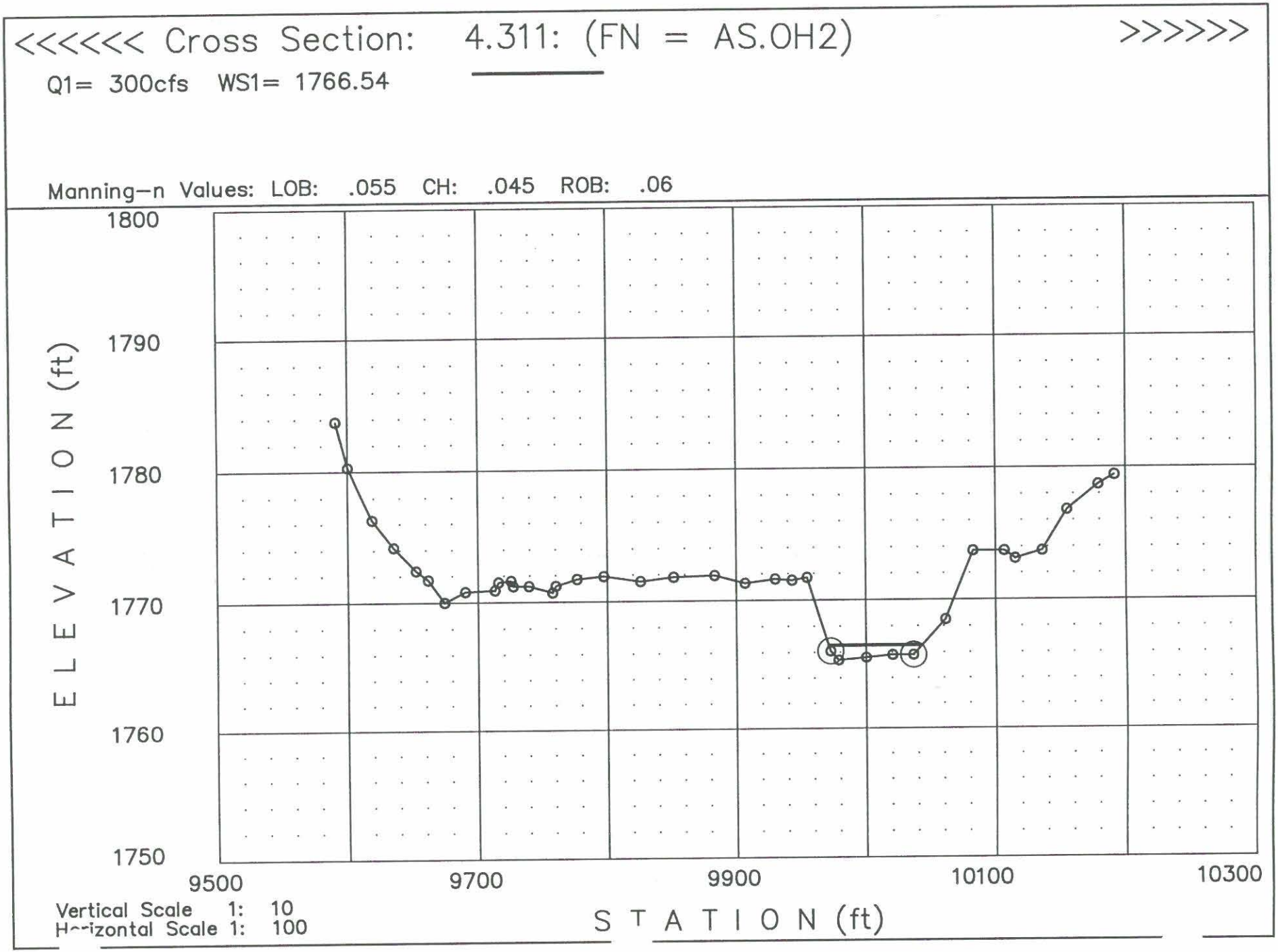
Manning–n Values: LOB: .05 CH: .025 ROB: 0

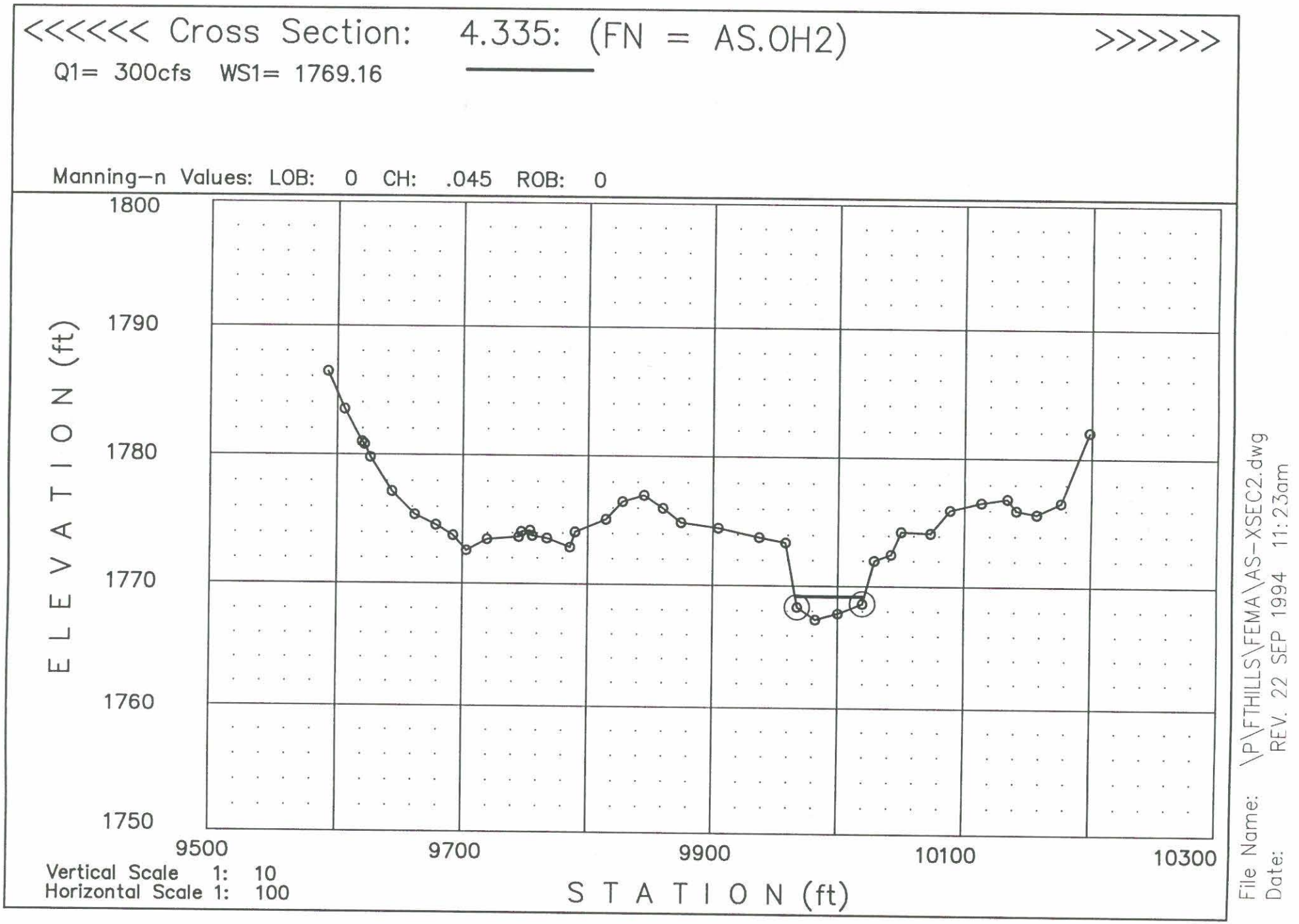


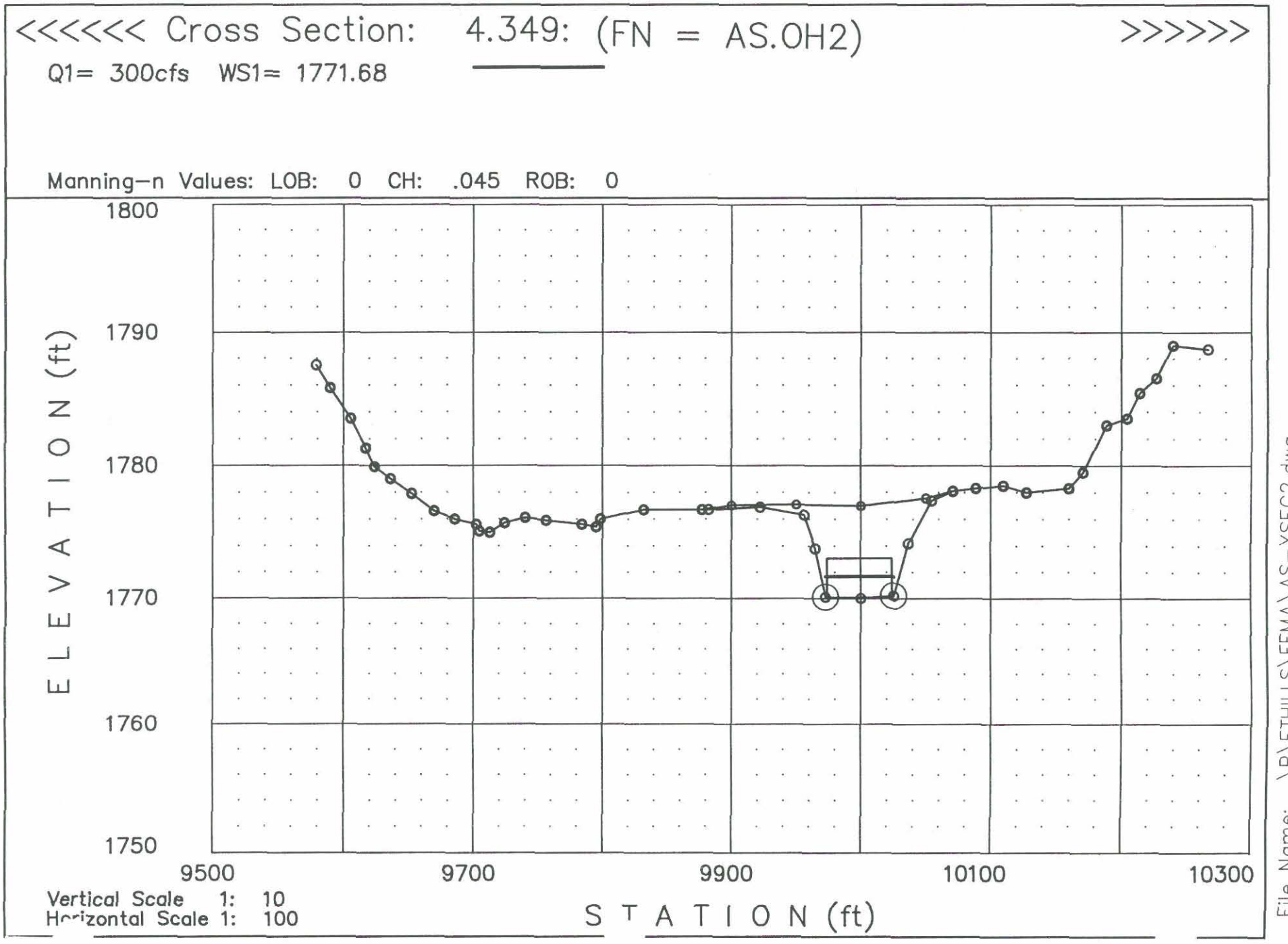
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.252: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1757.77
Manning-n Values: LOB: .05 CH: .025 ROB: .05
1790
1780
1770
1760
1750
1740
ELEVATION (ft)
9730
9930
10130
10330
10530
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.311: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1766.54
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1800
1790
1780
1770
1760
1750
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.335: (FN = AS.0H2) >>>>>>
Q1= 300cfs WS1= 1769.16
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1800
1790
1780
1770
1760
1750
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.349: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1771.68
Manning-n Values: LOB: 0 CH: .045 ROB: 0
1800
1790
1780
1770
1760
1750
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
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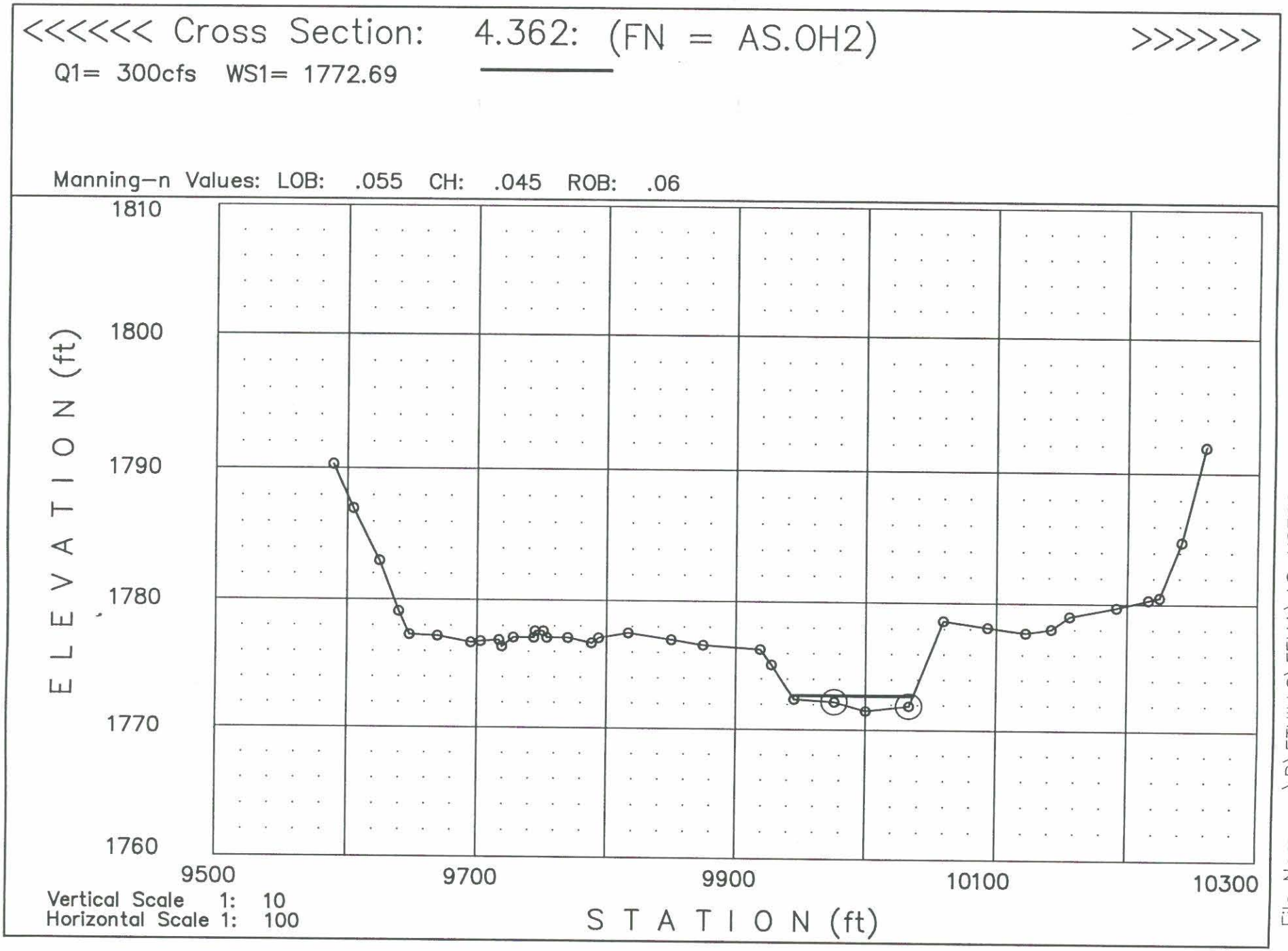
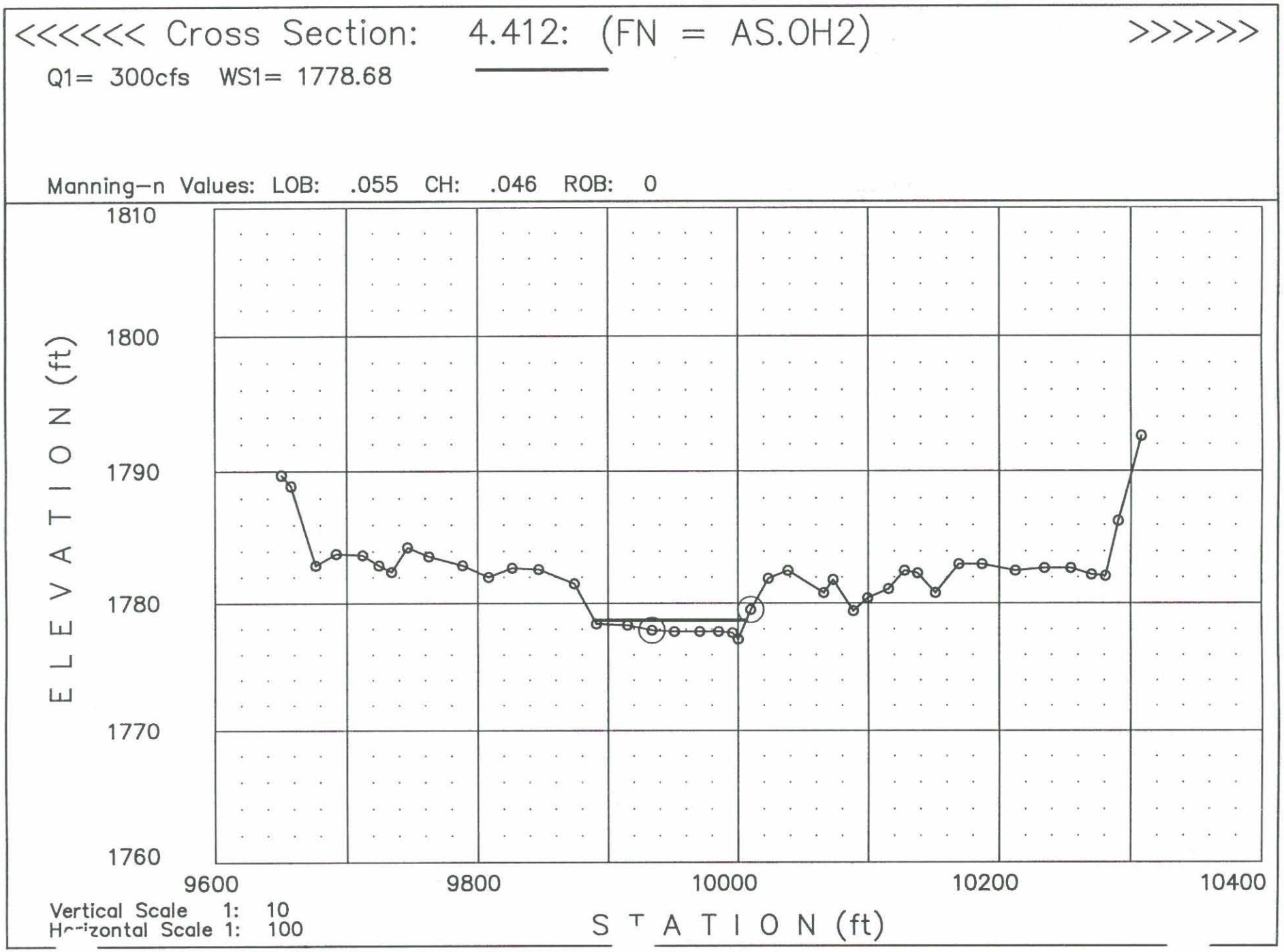
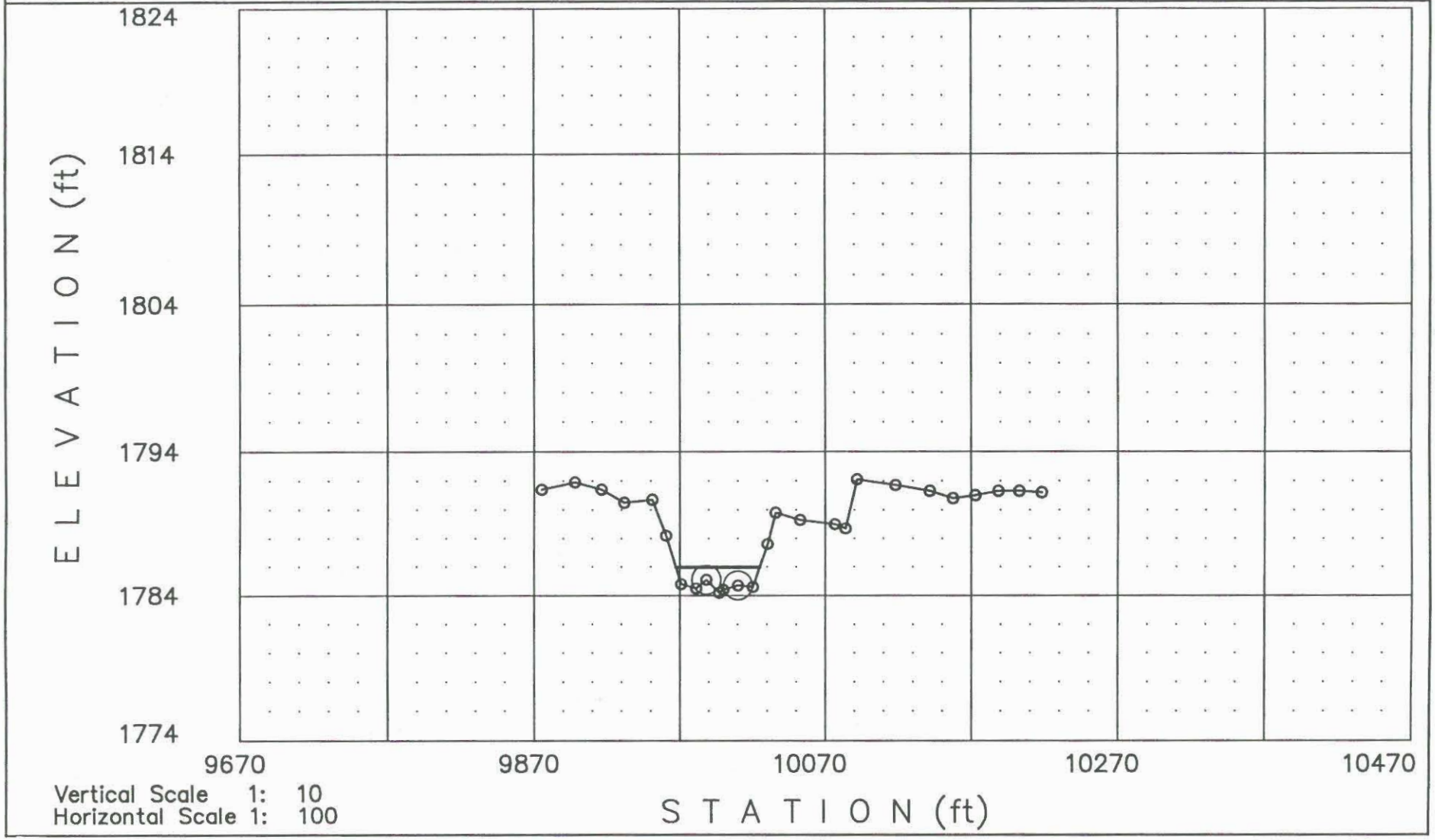

<<<<<< Cross Section: 4.362: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1772.69
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1810
1800
1790
1780
1770
1760
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.412: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1778.68
Manning-n Values: LOB: .055 CH: .046 ROB: 0
1810
1800
1790
1780
1770
1760
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

<<<<<< Cross Section: 4.493: (FN = AS.OH2) >>>>>>

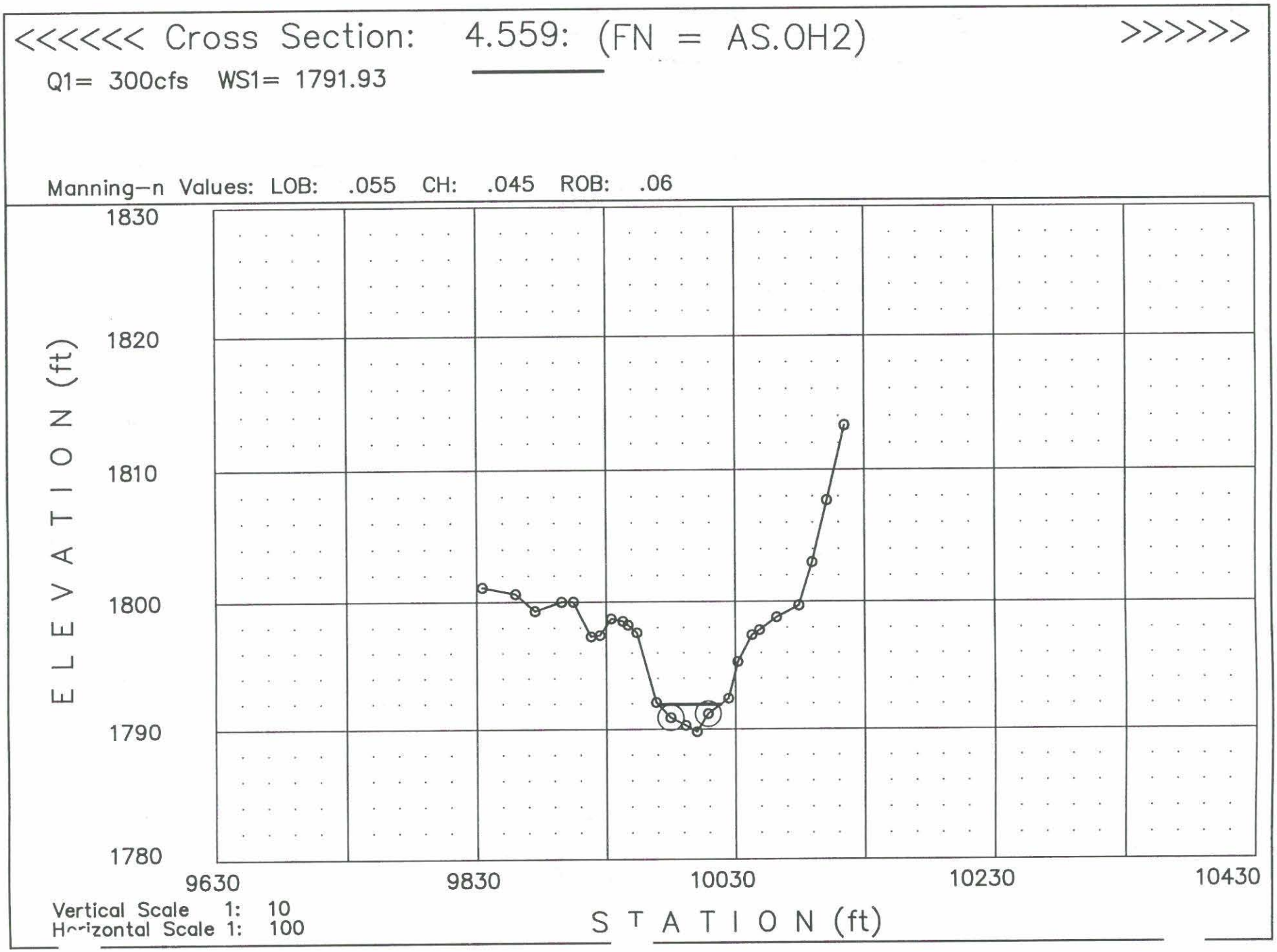
Q1= 300cfs WS1= 1785.96

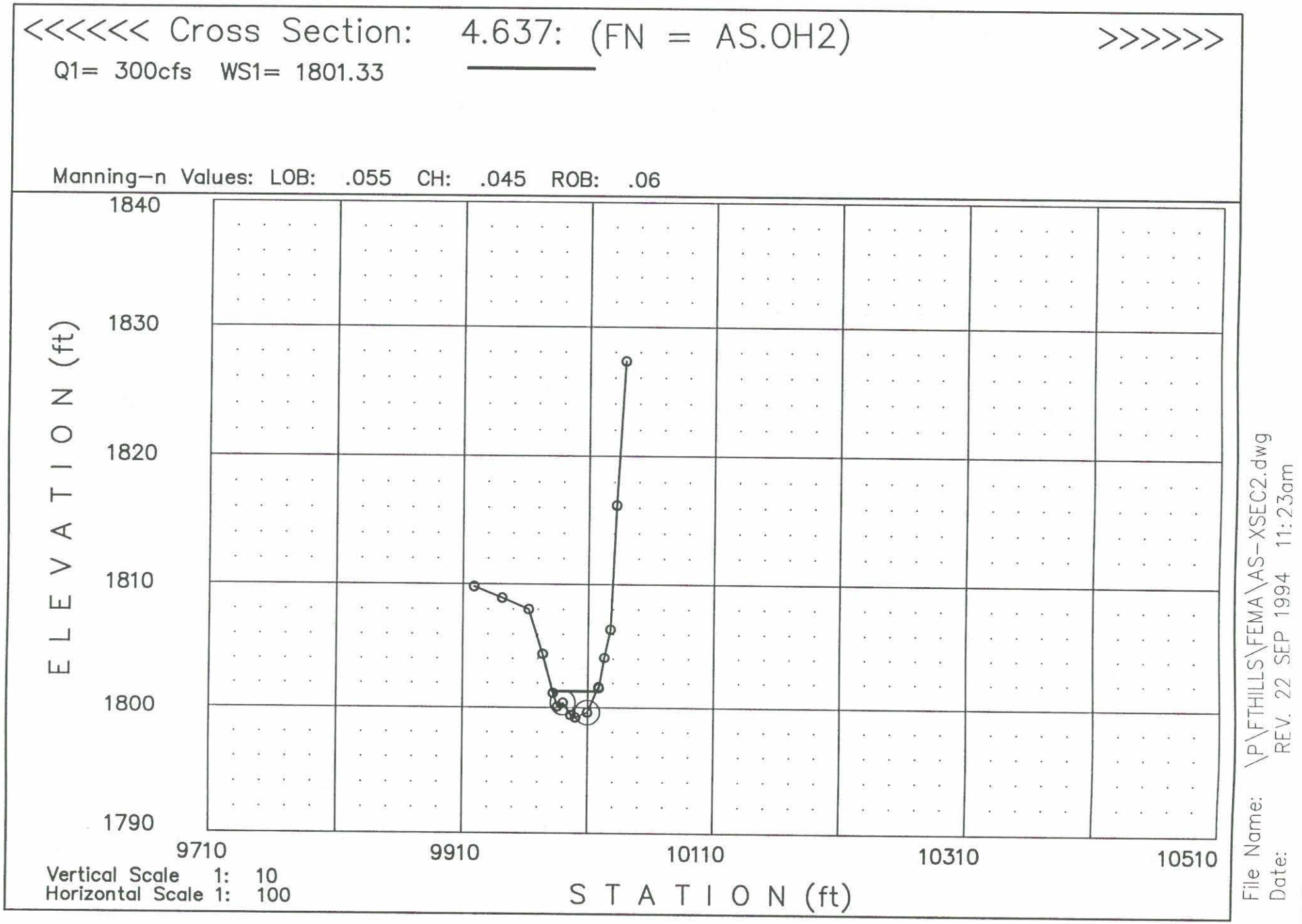
Manning-n Values: LOB: .055 CH: .045 ROB: .06

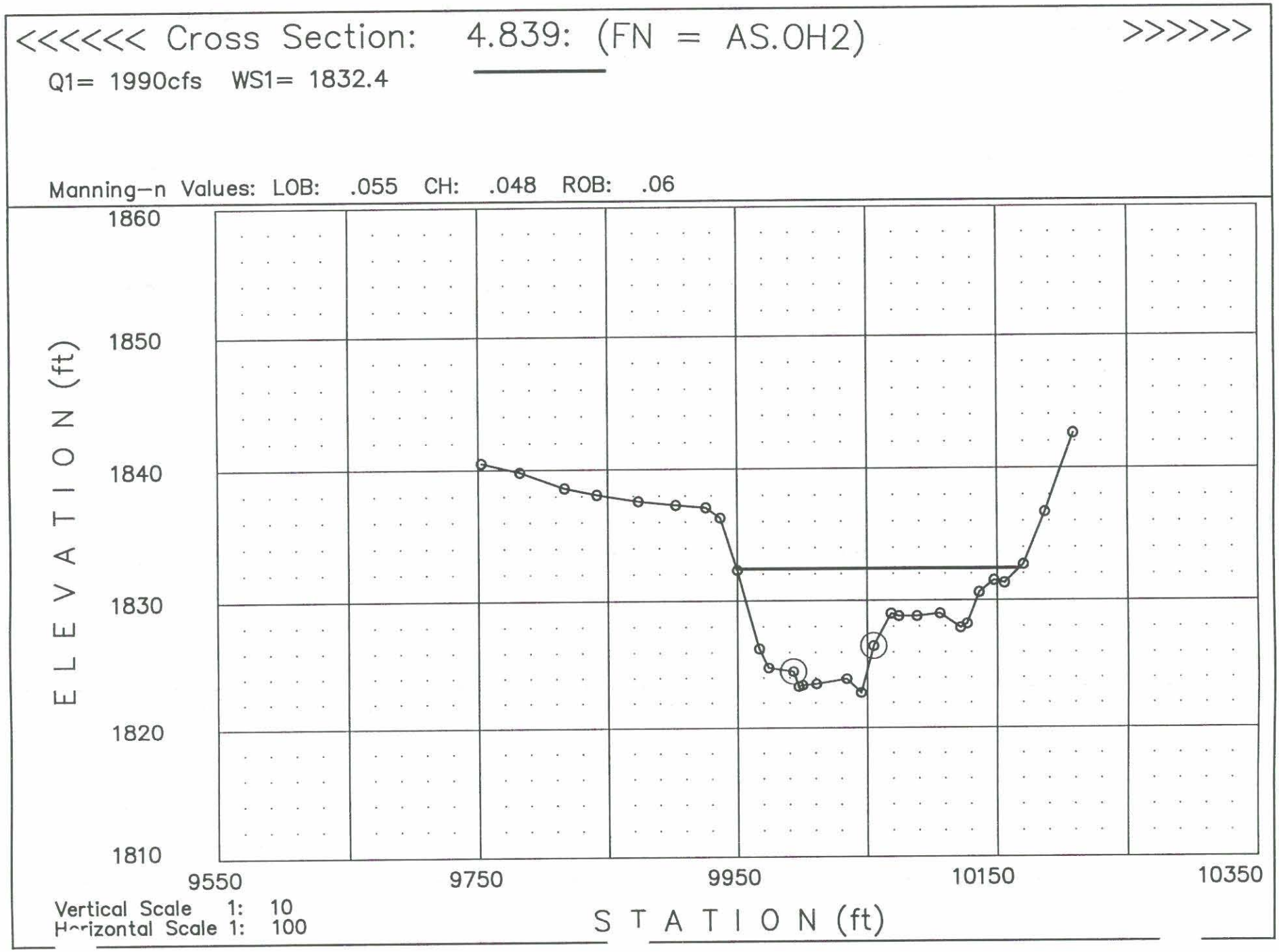


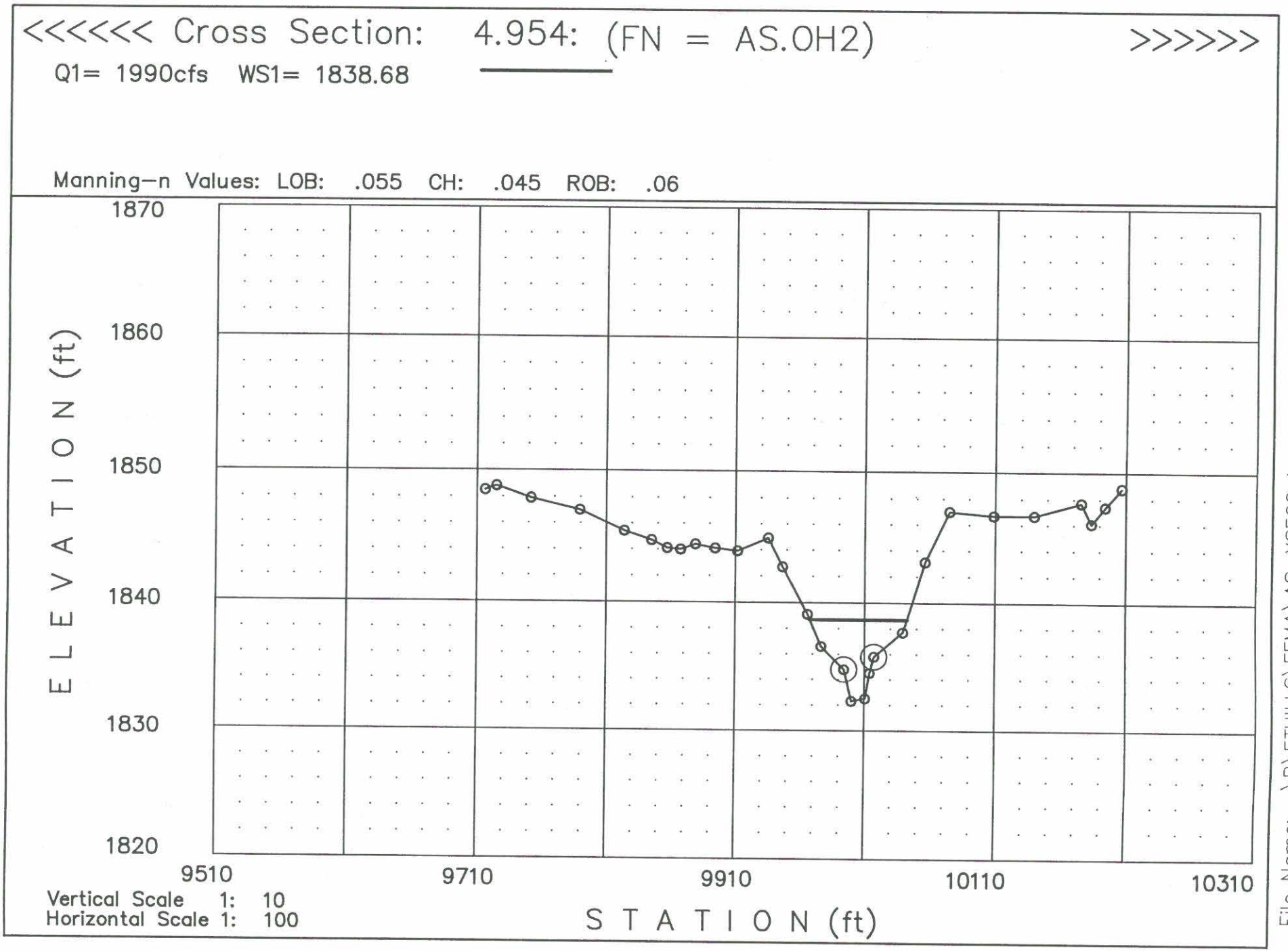
Vertical Scale 1: 10
Horizontal Scale 1: 100

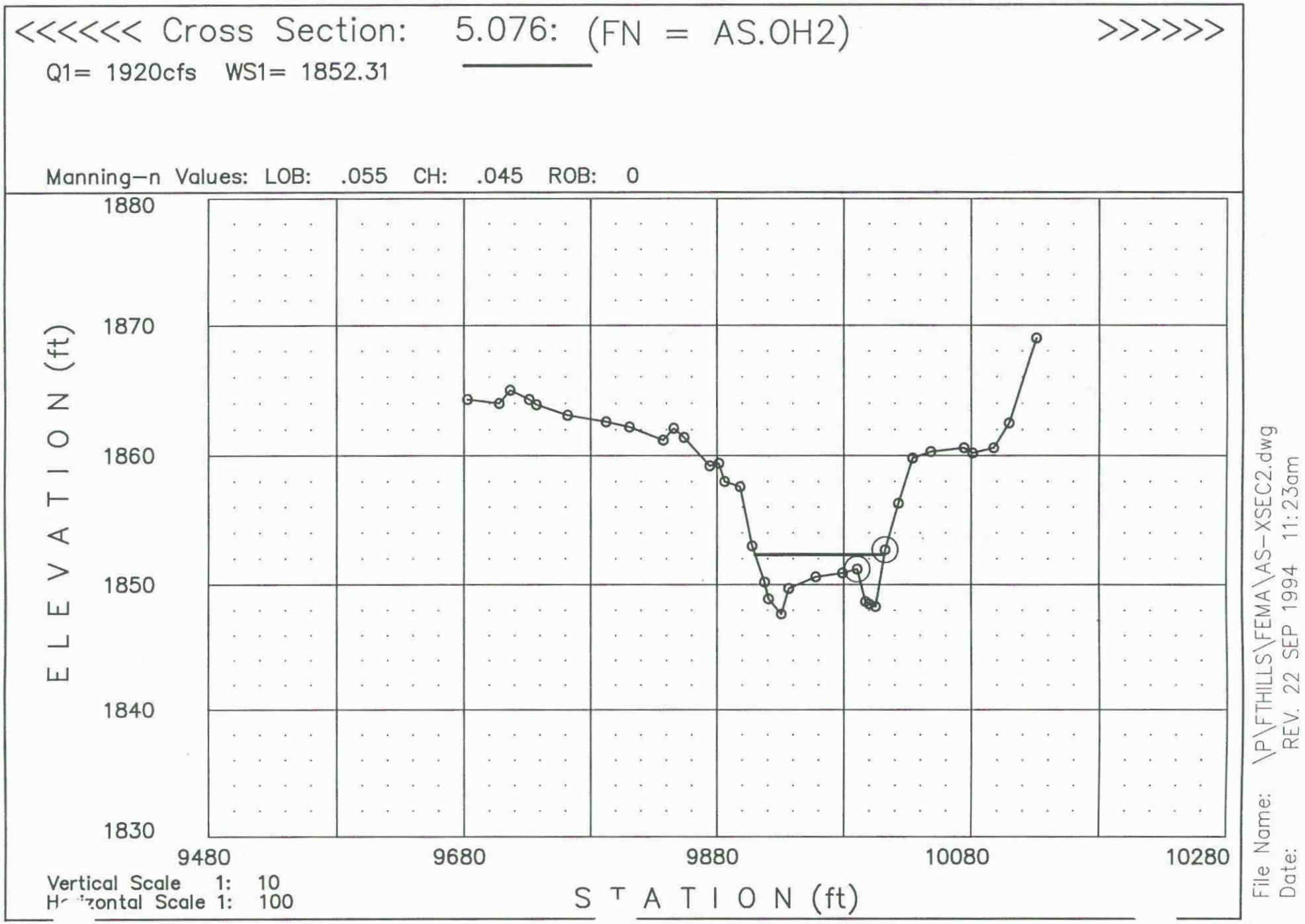
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

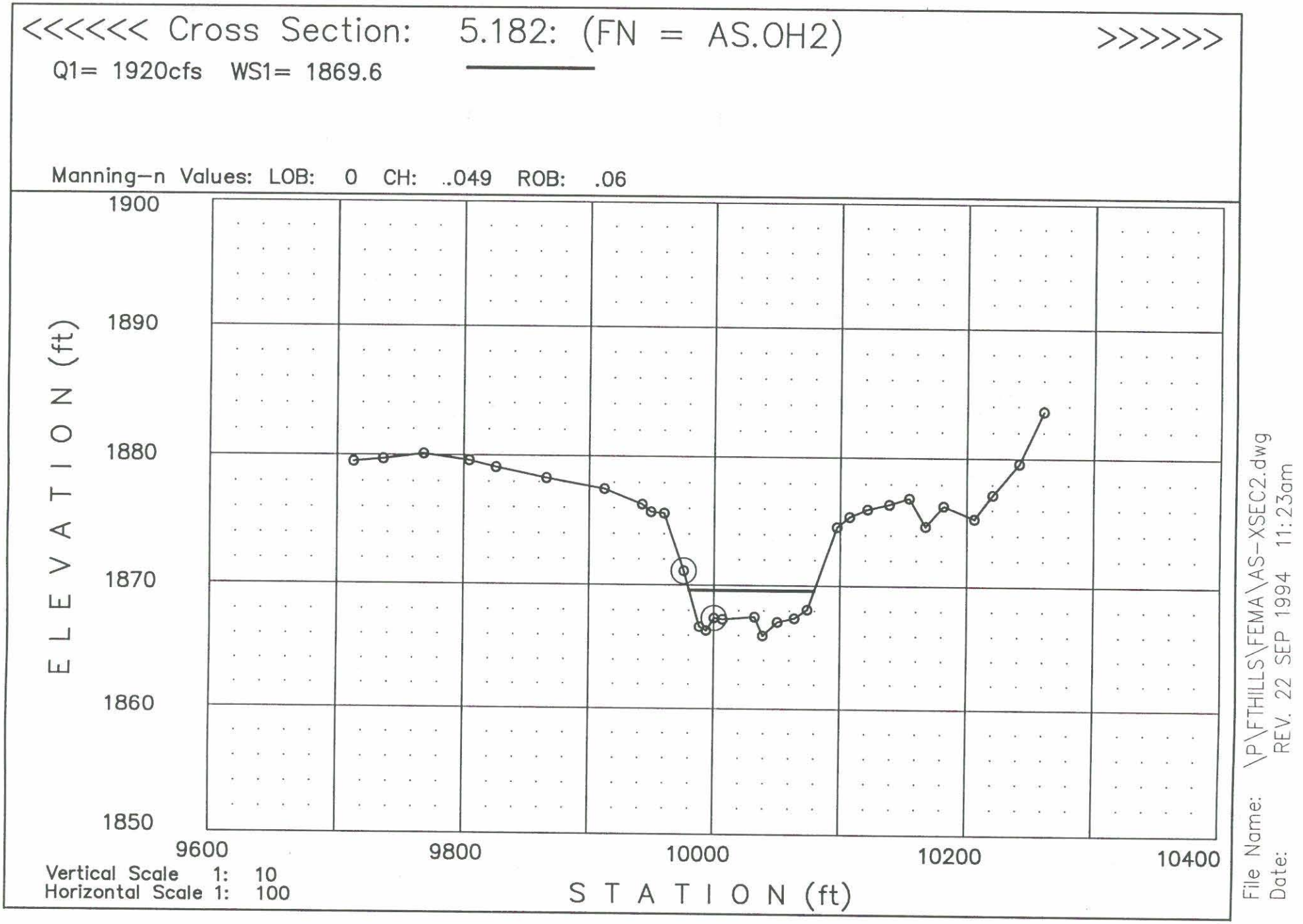

<<<<<< Cross Section: 4.559: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1791.93
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1830
1820
1810
1800
1790
1780
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

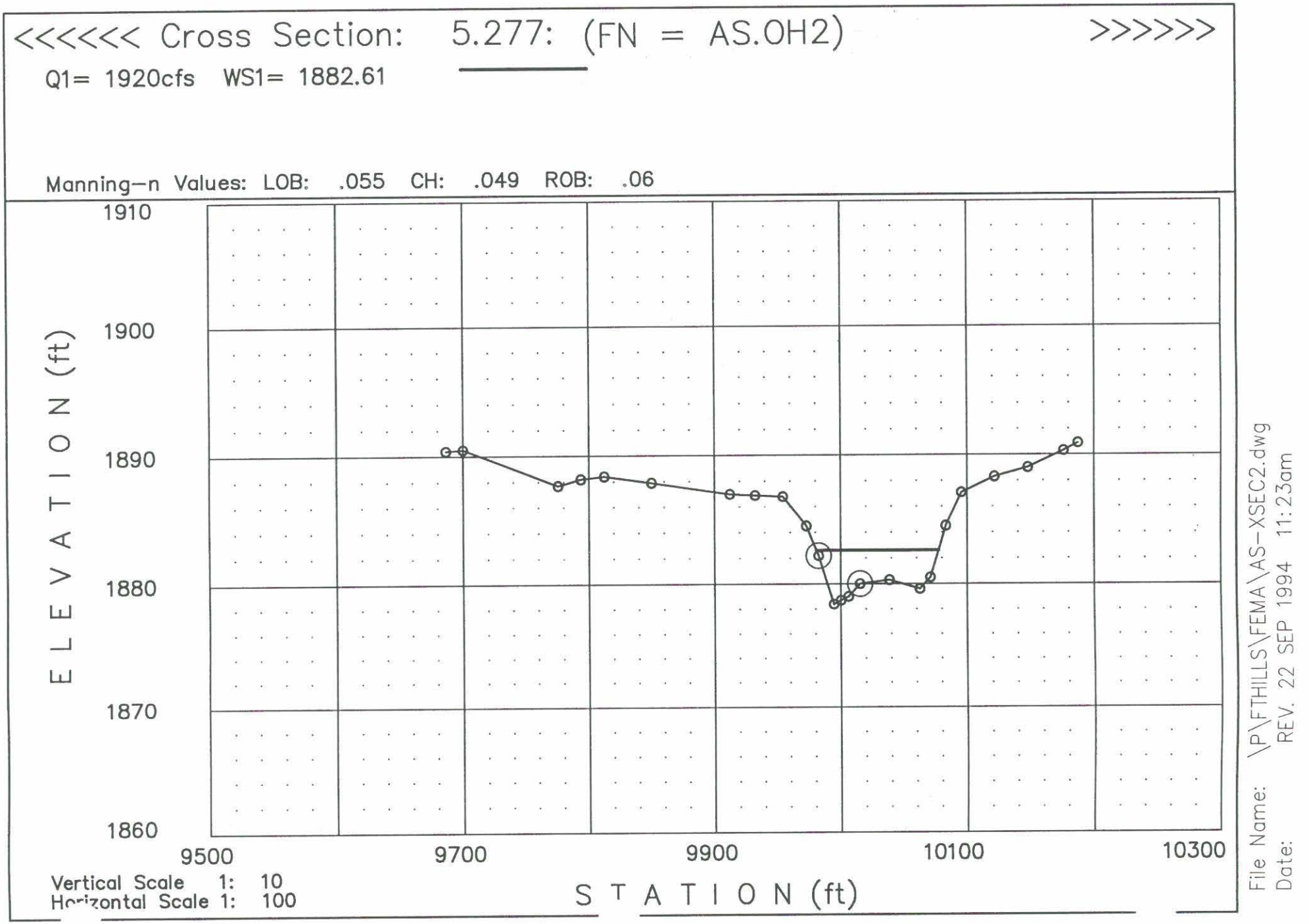

<<<<<< Cross Section: 4.637: (FN = AS.OH2) >>>>>>
Q1= 300cfs WS1= 1801.33
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1840
1830
1820
1810
1800
1790
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.839: (FN = AS.OH2) >>>>>>
Q1= 1990cfs WS1= 1832.4
Manning-n Values: LOB: .055 CH: .048 ROB: .06
1860
1850
1840
1830
1820
1810
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 4.954: (FN = AS.OH2) >>>>>>
Q1= 1990cfs WS1= 1838.68
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1870
1860
1850
1840
1830
1820
ELEVATION (ft)
9510
9710
9910
10110
10310
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 5.076: (FN = AS.0H2) >>>>>>
Q1= 1920cfs WS1= 1852.31
Manning-n Values: LOB: .055 CH: .045 ROB: 0
1880
1870
1860
1850
1840
1830
ELEVATION (ft)
9480
9680
9880
10080
10280
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 5.182: (FN = AS.OH2) >>>>>>
Q1= 1920cfs WS1= 1869.6
Manning-n Values: LOB: 0 CH: .049 ROB: .06
1900
1890
1880
1870
1860
1850
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 5.277: (FN = AS.OH2) >>>>>>
Q1= 1920cfs WS1= 1882.61
Manning-n Values: LOB: .055 CH: .049 ROB: .06
1910
1900
1890
1880
1870
1860
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
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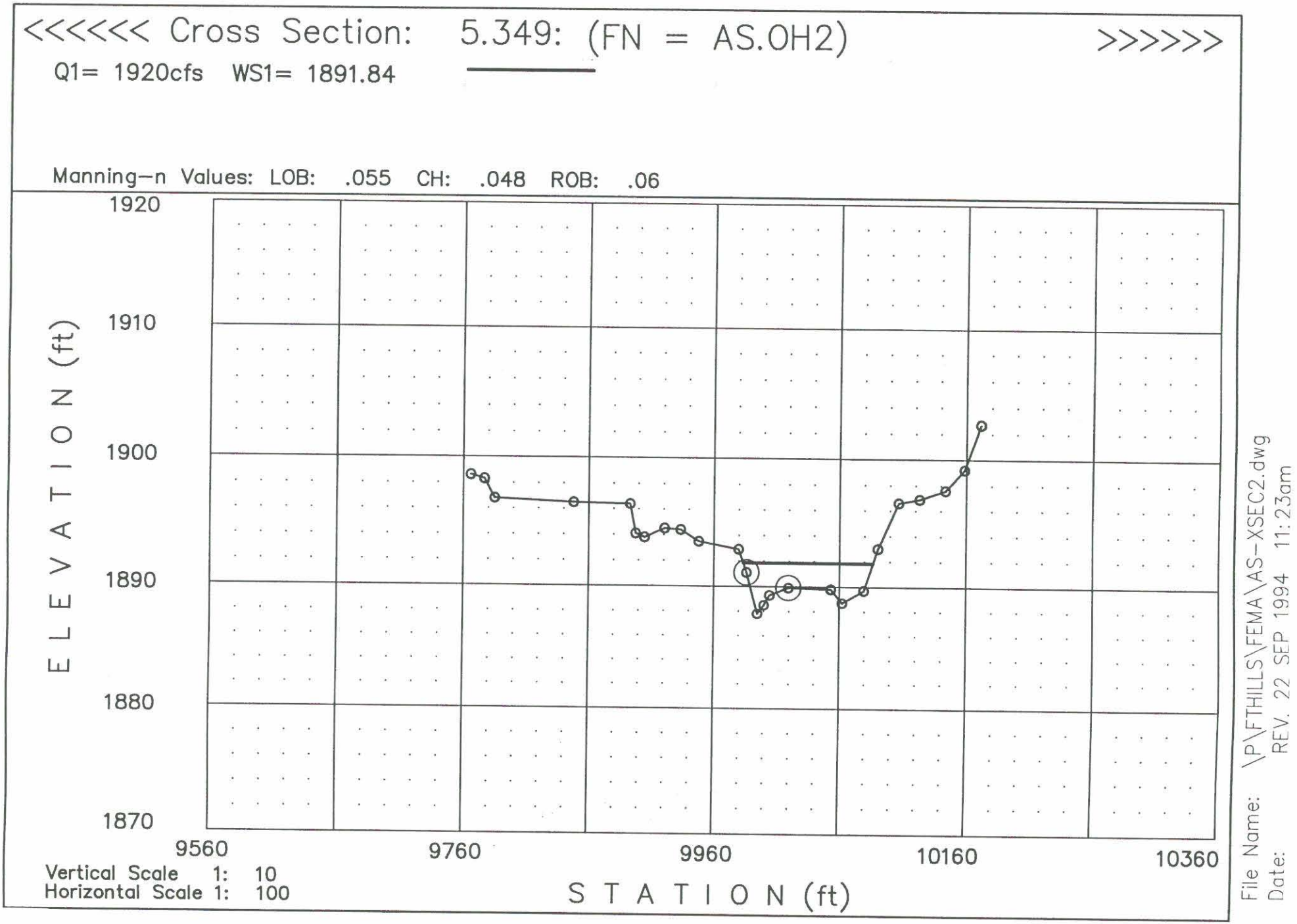
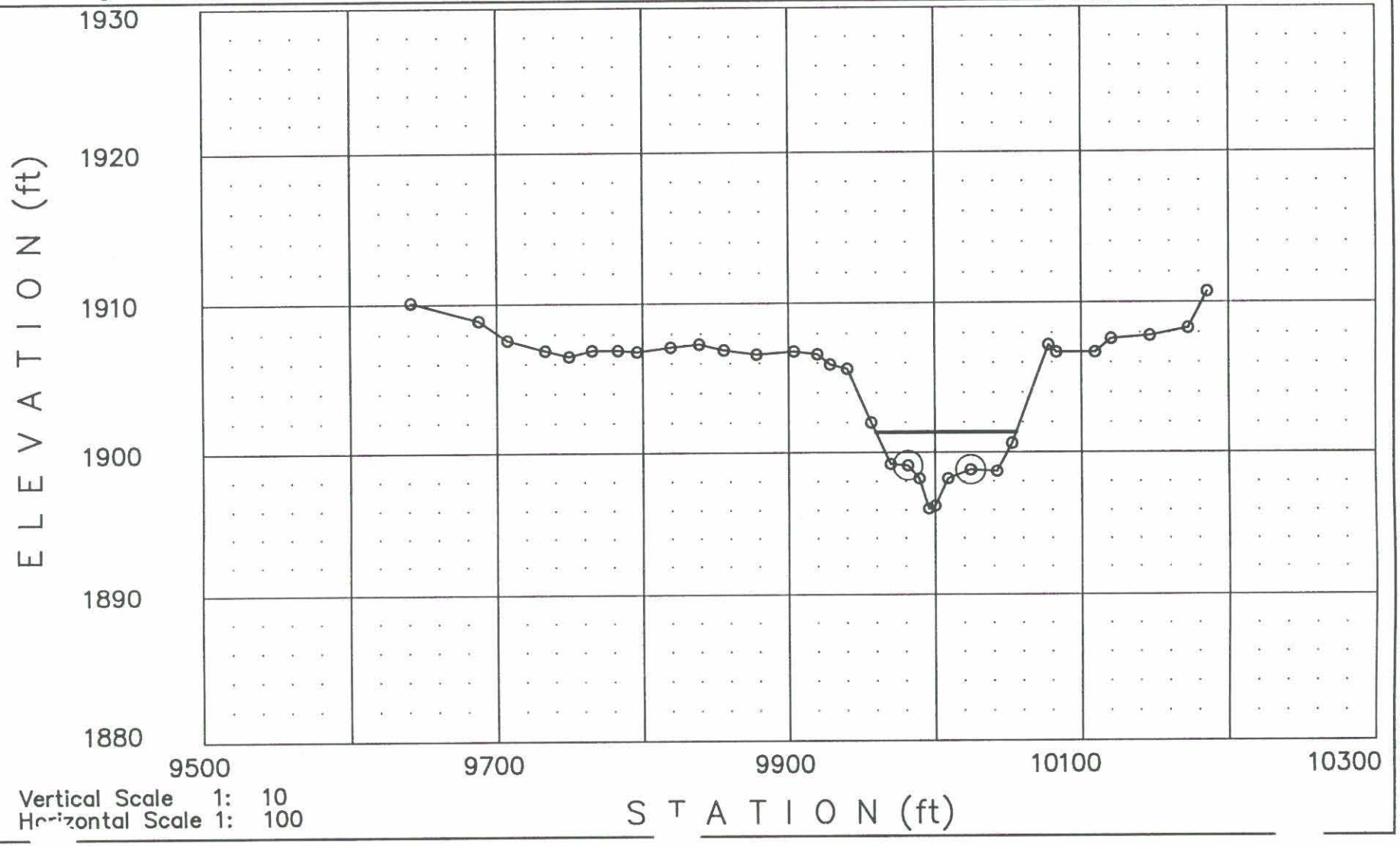

<<<<<< Cross Section: 5.349: (FN = AS.OH2) >>>>>>
Q1= 1920cfs WS1= 1891.84
Manning-n Values: LOB: .055 CH: .048 ROB: .06
1920
1910
1900
1890
1880
1870
ELEVATION (ft)
9560
9760
9960
10160
10360
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

<<<<<< Cross Section: 5.436: (FN = AS.OH2) >>>>>>

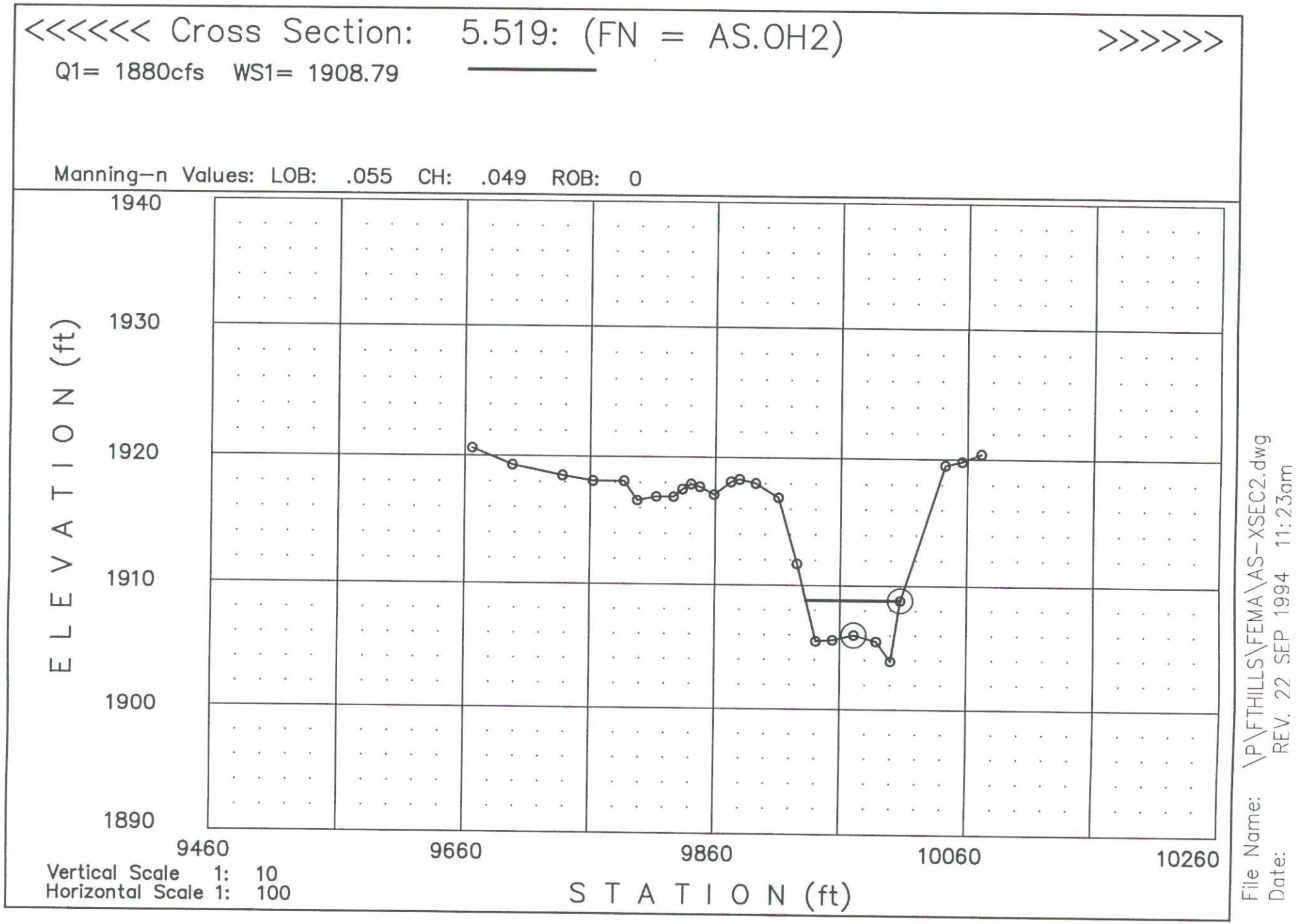
Q1= 1920cfs WS1= 1901.33

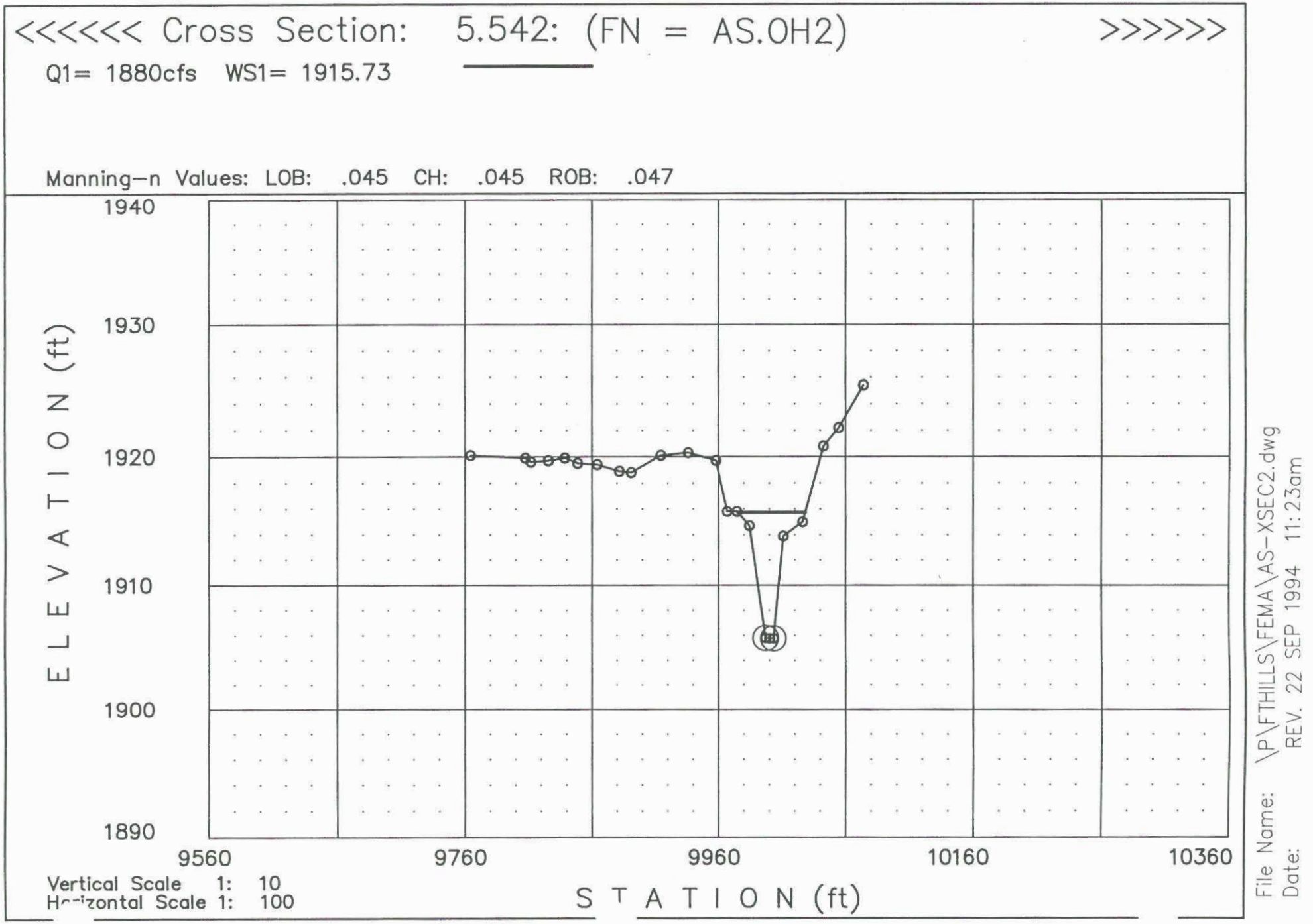
Manning–n Values: LOB: .055 CH: .045 ROB: .06



Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

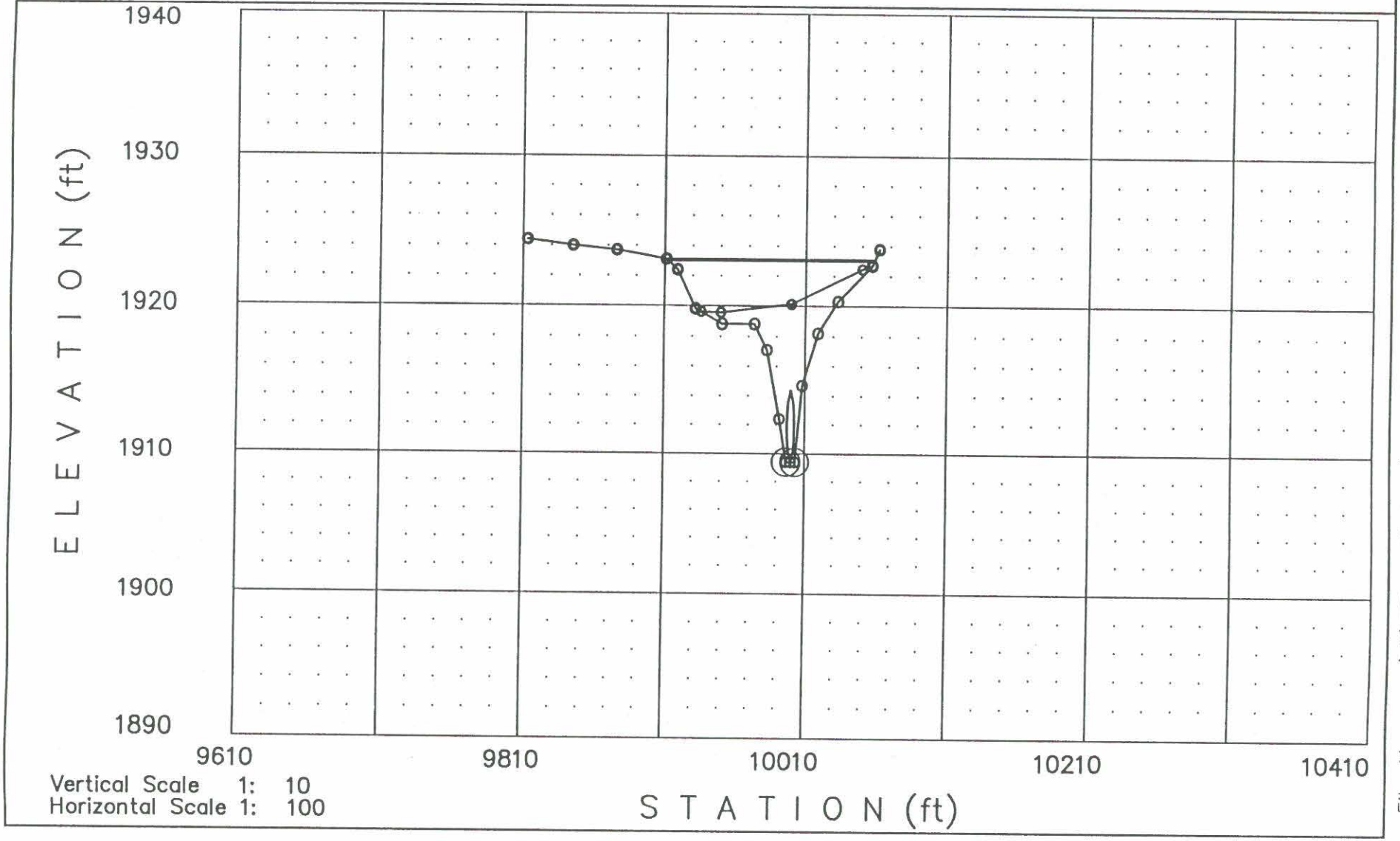

<<<<<< Cross Section: 5.519: (FN = AS.OH2) >>>>>>
Q1= 1880cfs WS1= 1908.79
Manning-n Values: LOB: .055 CH: .049 ROB: 0
1940
1930
1920
1910
1900
1890
ELEVATION (ft)
9460
9660
9860
10060
10260
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 5.542: (FN = AS.0H2) >>>>>>
Q1= 1880cfs WS1= 1915.73
Manning-n Values: LOB: .045 CH: .045 ROB: .047
1940
1930
1920
1910
1900
1890
ELEVATION (ft)
9560
9760
9960
10160
10360
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

<<<<<< Cross Section: 5.563: (FN = AS.0H2) >>>>>>

Q1= 1880cfs WS1= 1923.04

Manning-n Values: LOB: .049 CH: .045 ROB: .048



Vertical Scale 1: 10
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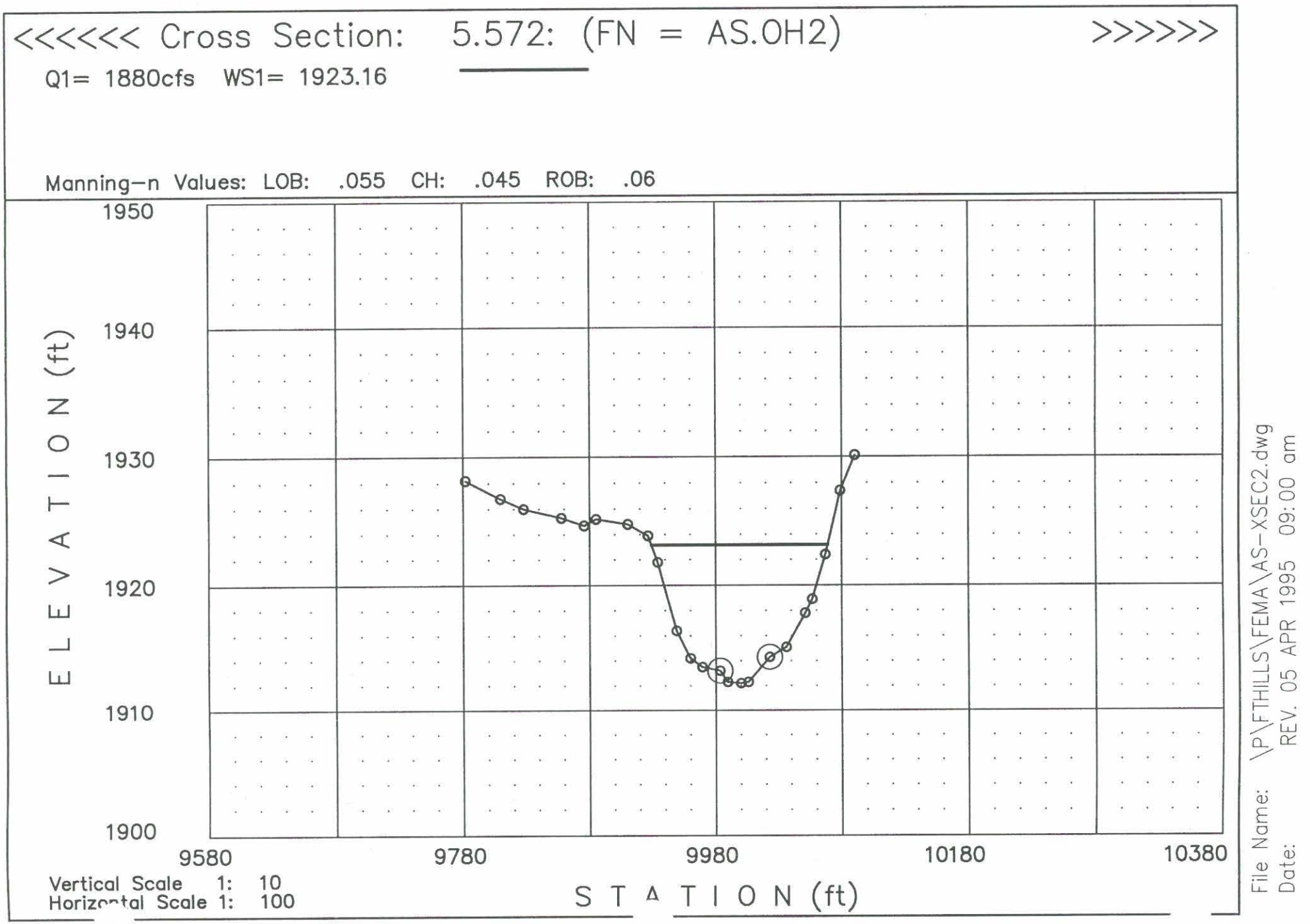
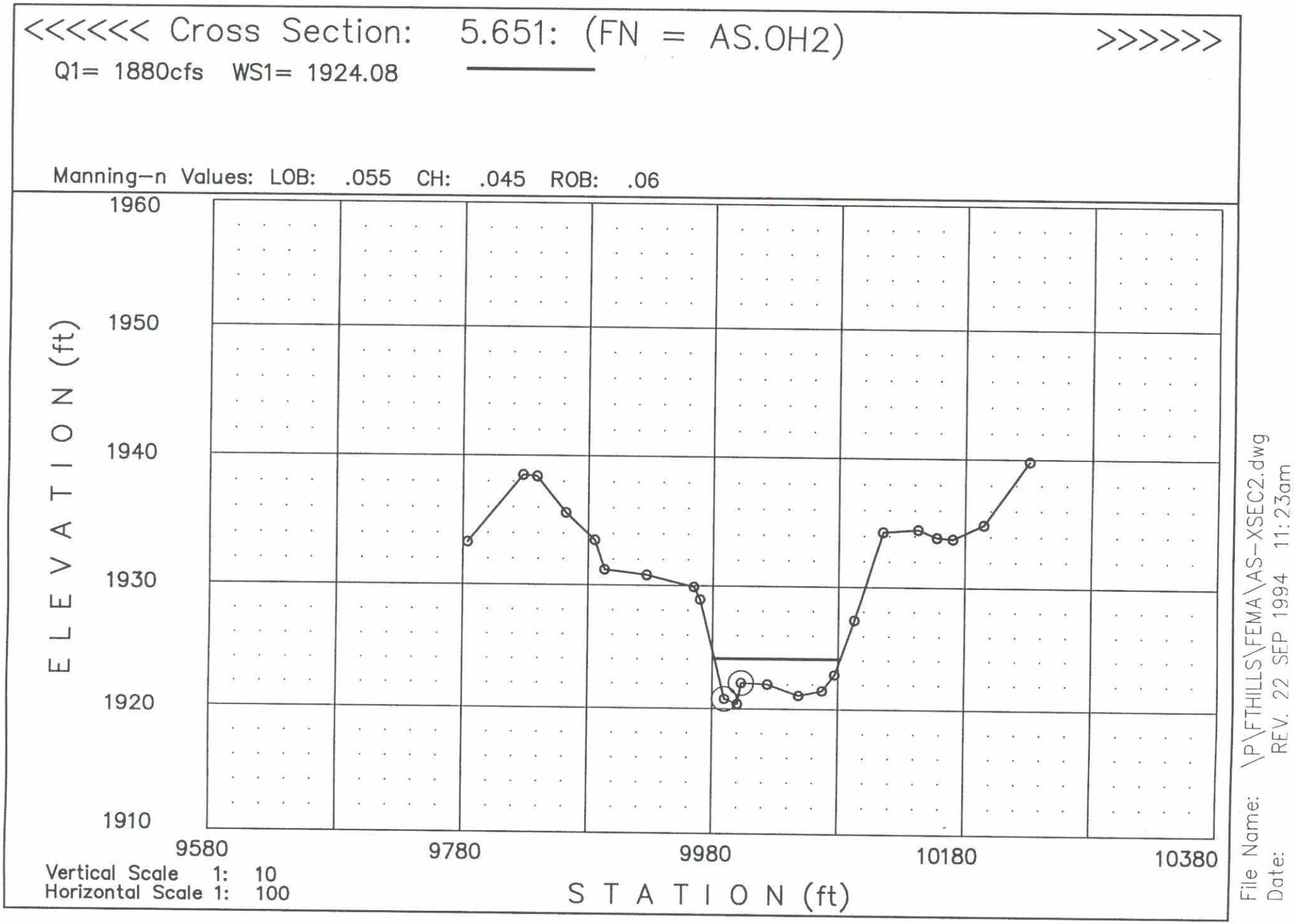
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 05 APR 1995 09:00 am

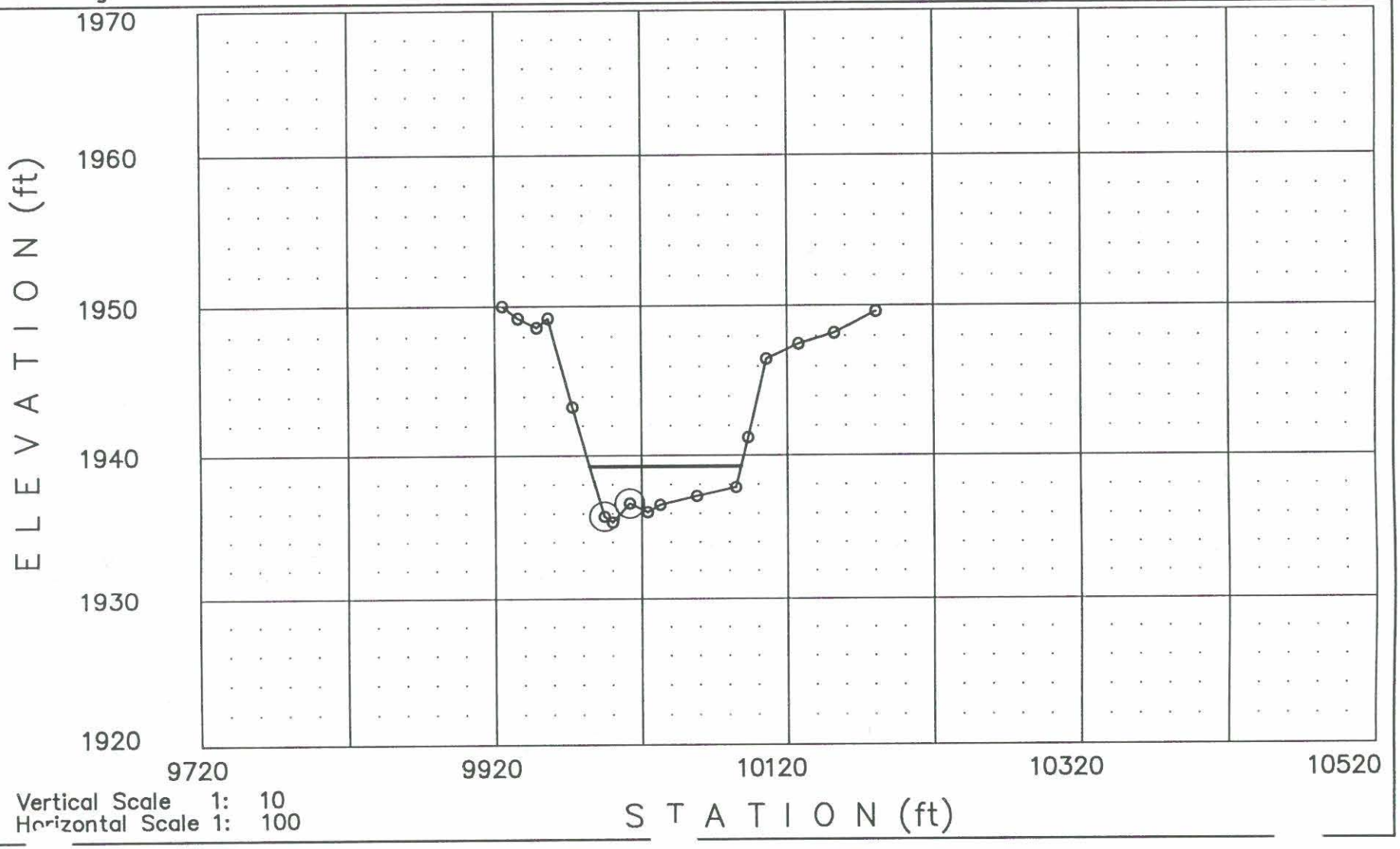

<<<<<< Cross Section: 5.572: (FN = AS.0H2) >>>>>>
Q1= 1880cfs WS1= 1923.16
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1950
1940
1930
1920
1910
1900
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 05 APR 1995 09:00 am


<<<<<< Cross Section: 5.651: (FN = AS.OH2) >>>>>>
Q1= 1880cfs WS1= 1924.08
Manning–n Values: LOB: .055 CH: .045 ROB: .06
1960
1950
1940
1930
1920
1910
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

<<<<<< Cross Section: 5.765: (FN = AS.OH2) >>>>>>

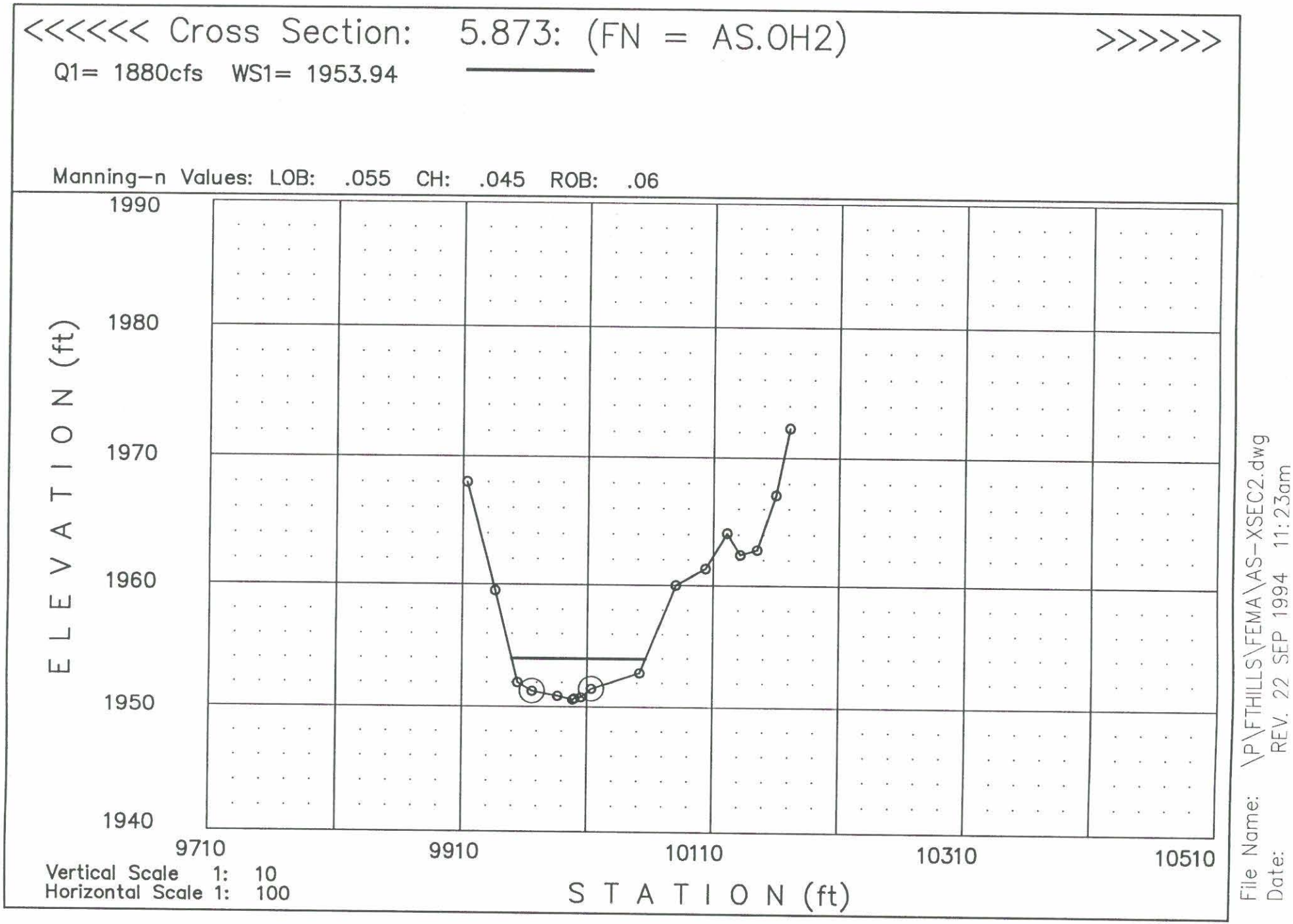
Q1= 1880cfs WS1= 1939.25

Manning-n Values: LOB: .055 CH: .045 ROB: .06



Vertical Scale 1: 10
Horizontal Scale 1: 100

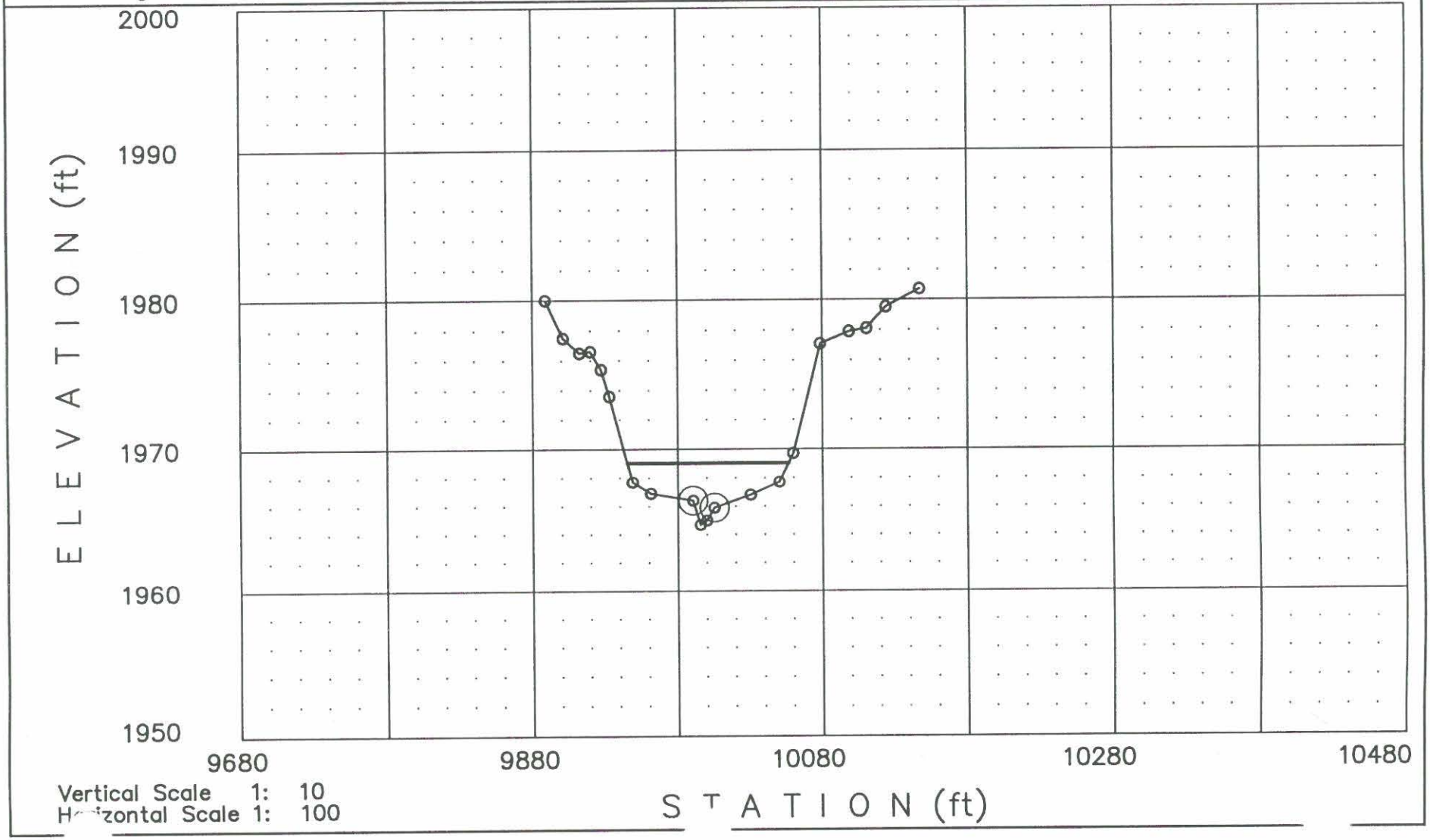
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 5.873: (FN = AS.OH2) >>>>>>
Q1= 1880cfs WS1= 1953.94
Manning-n Values: LOB: .055 CH: .045 ROB: .06
1990
1980
1970
1960
1950
1940
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

<<<<<< Cross Section: 5.978: (FN = AS.OH2) >>>>>>

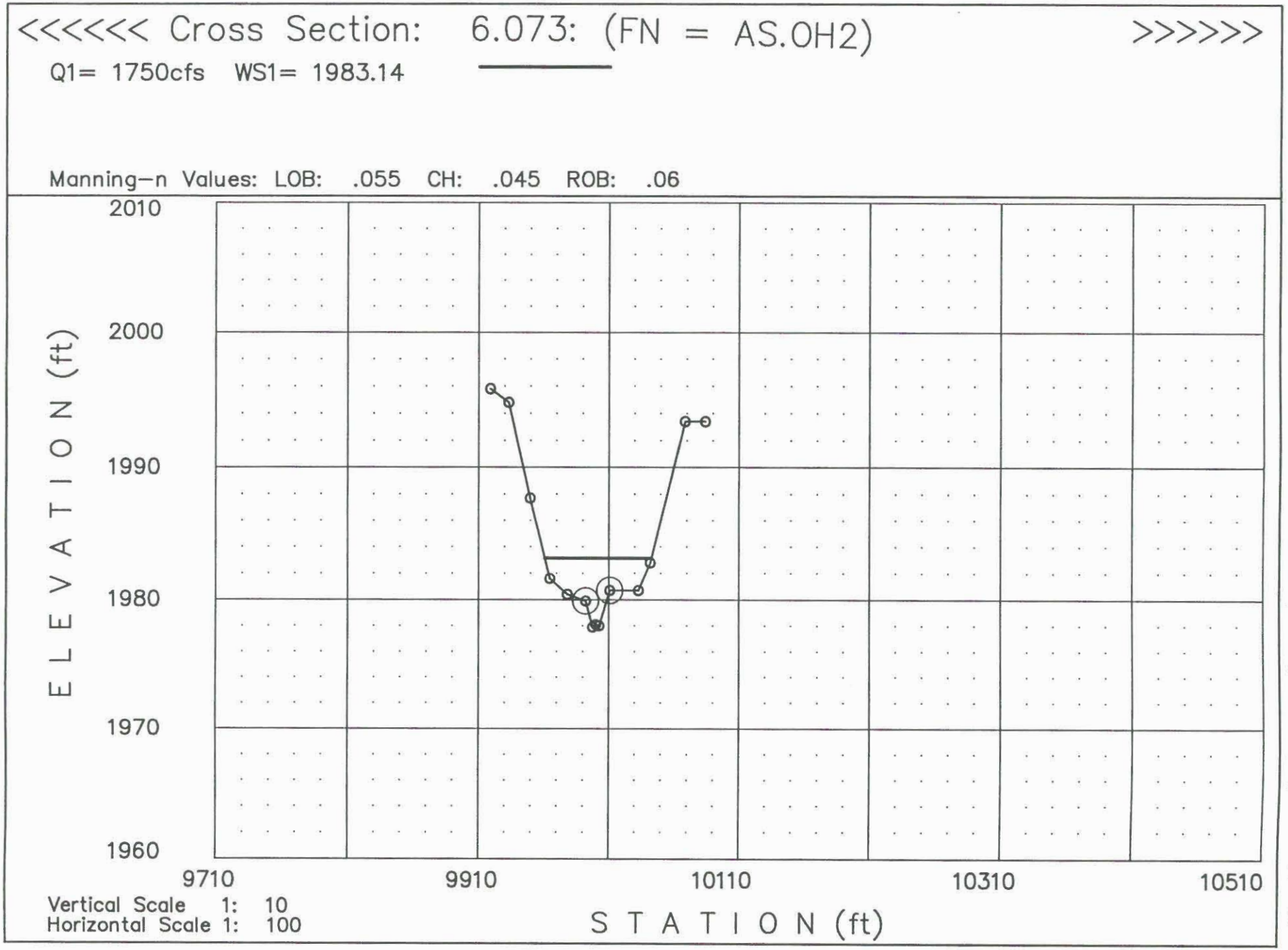
Q1= 1880cfs WS1= 1969.03

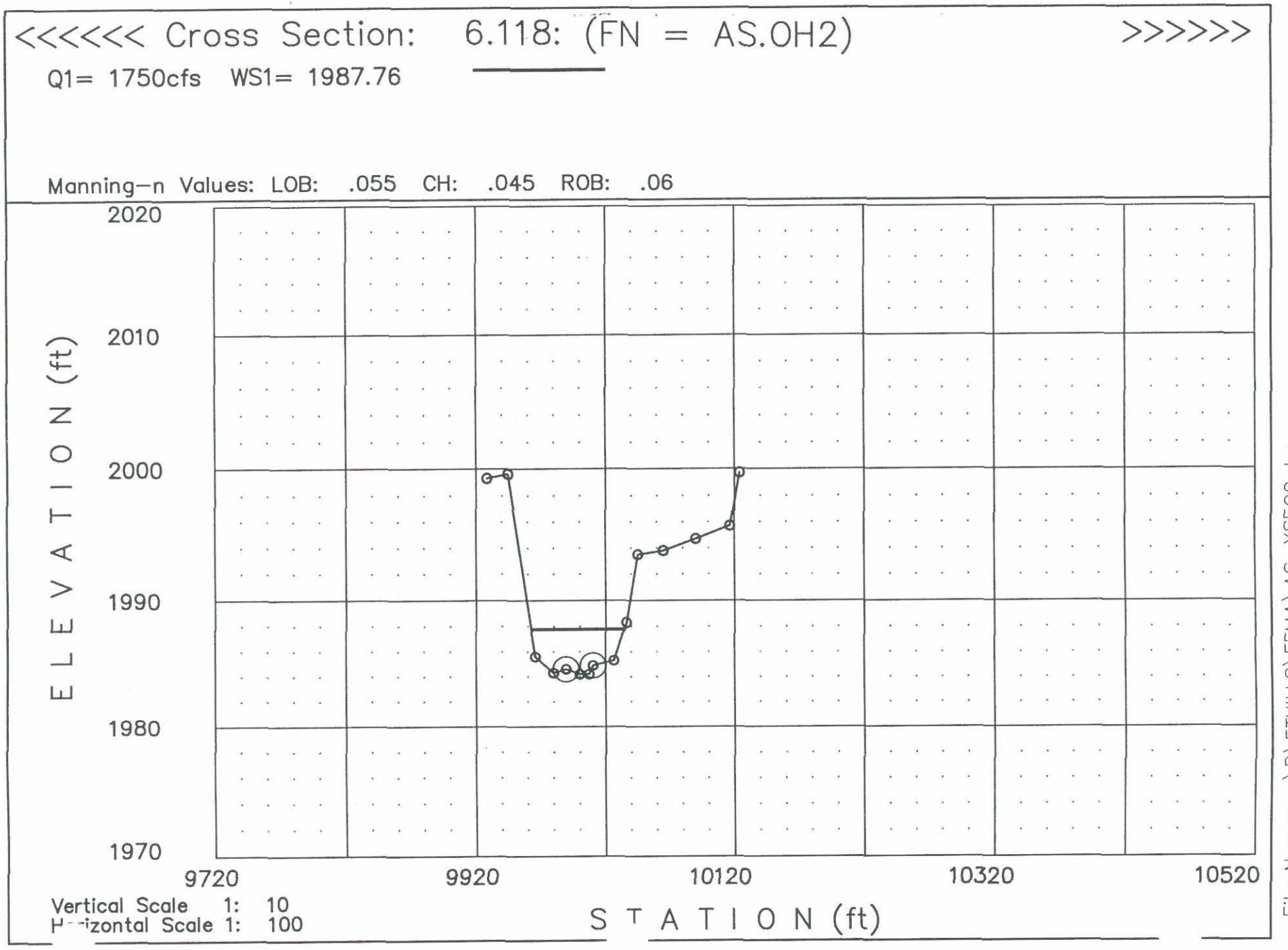
Manning–n Values: LOB: .055 CH: .045 ROB: .06



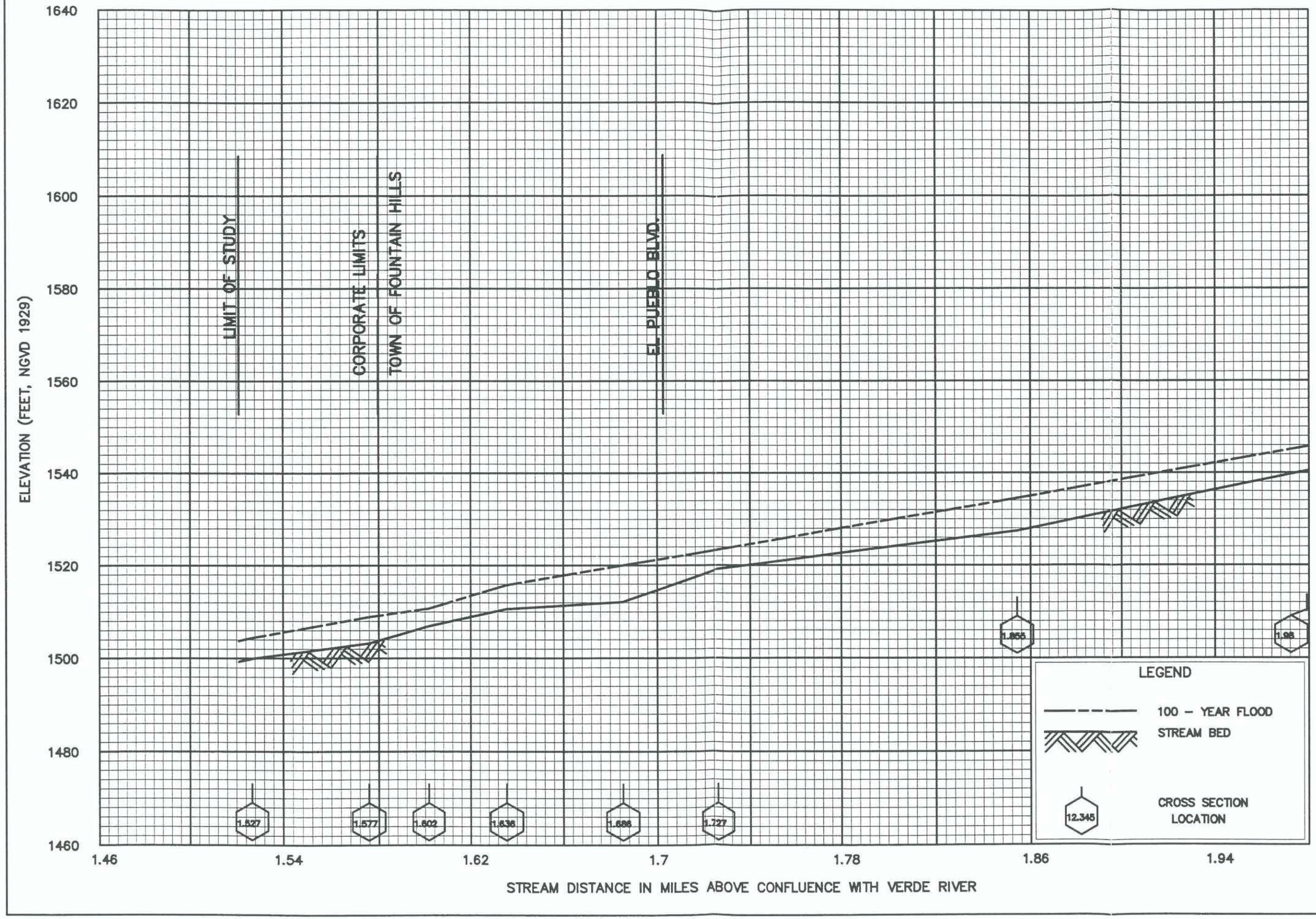
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 6.073: (FN = AS.OH2) >>>>>>
Q1= 1750cfs WS1= 1983.14
Manning-n Values: LOB: .055 CH: .045 ROB: .06
2010
2000
1990
1980
1970
1960
ELEVATION (ft)
9710
9910
10110
10310
10510
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am


<<<<<< Cross Section: 6.118: (FN = AS.OH2) >>>>>>
Q1= 1750cfs WS1= 1987.76
Manning-n Values: LOB: .055 CH: .045 ROB: .06
2020
2010
2000
1990
1980
1970
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AS-XSEC2.dwg
Date: REV. 22 SEP 1994 11:23am

FLOOD PROFILES

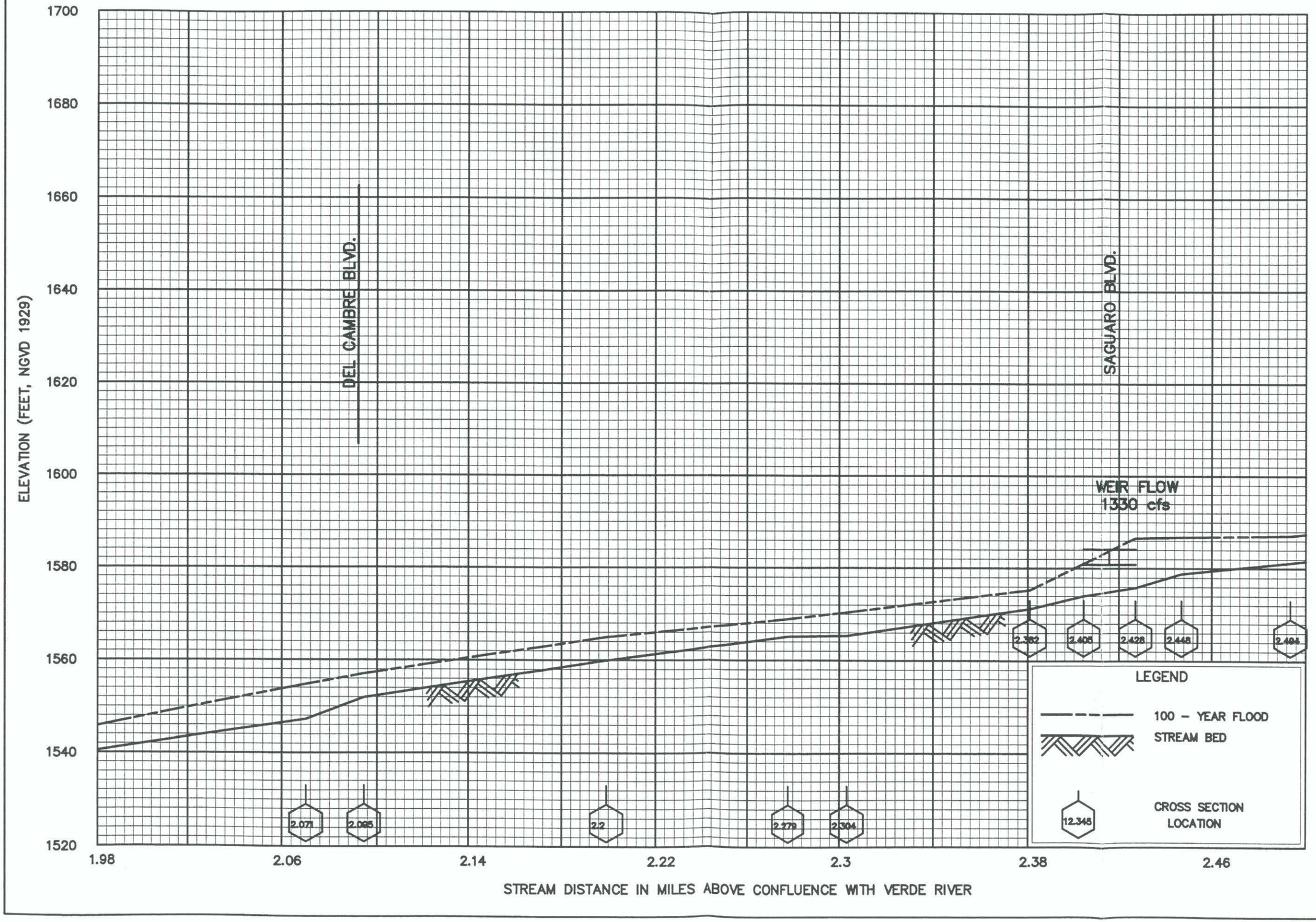


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 1 of 9)
Date: REV. 27 SEP 1994 10:15am

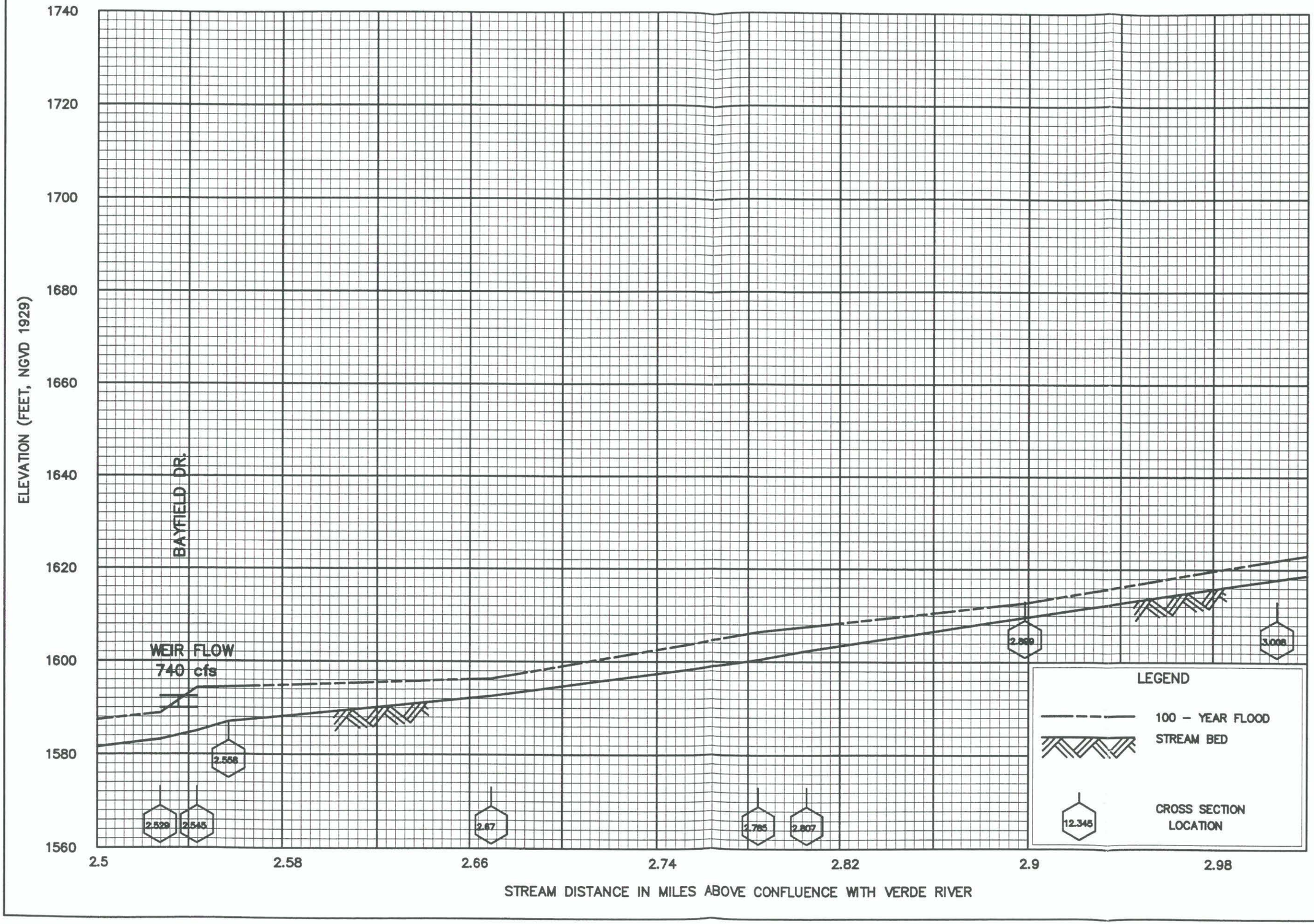


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 2 of 9)
Date: REV 27 SEP 1994 10:15am

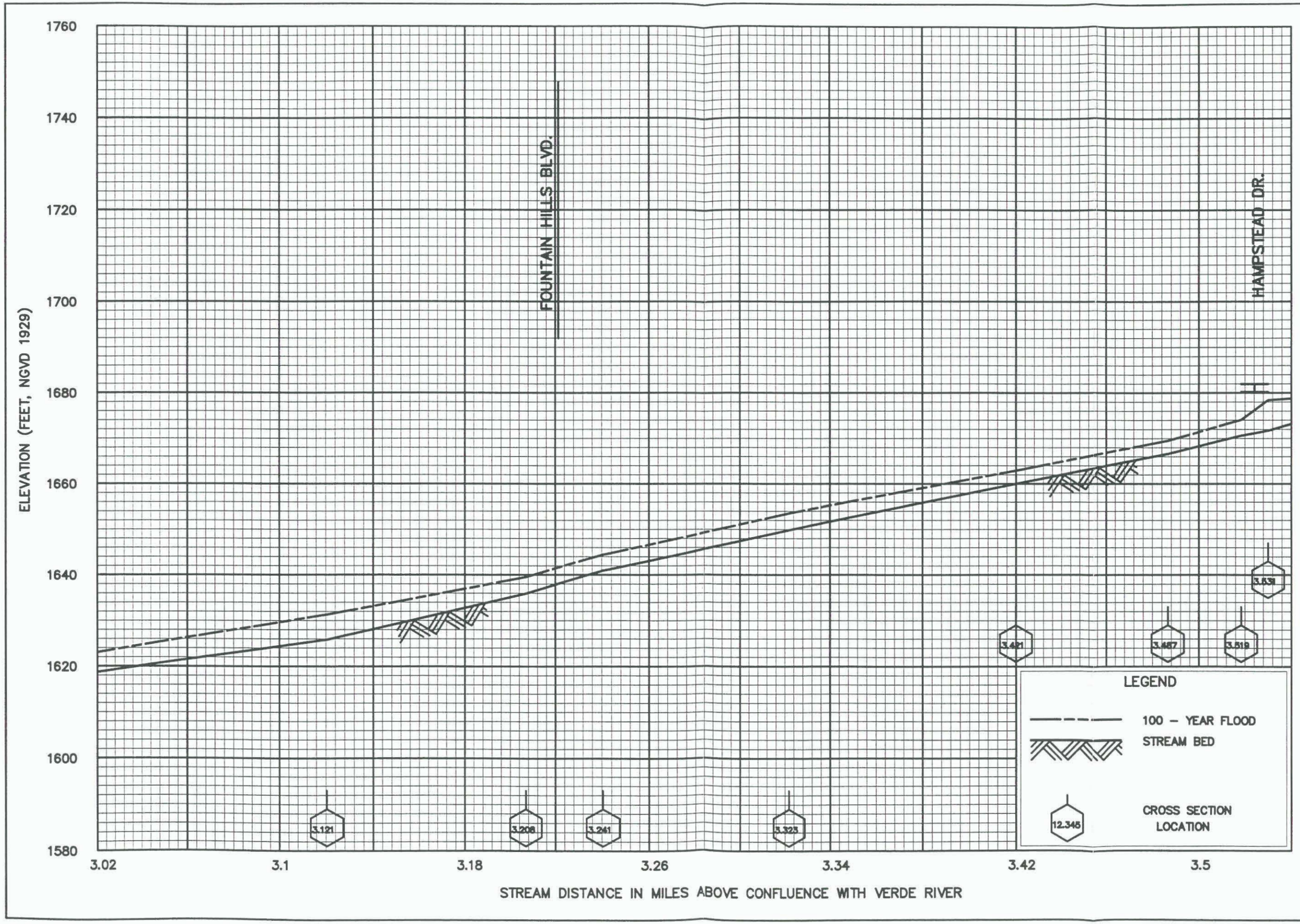


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 3 of 9)
Date: RFV 27 SEP 1994 10:15am



FLOOD PROFILES

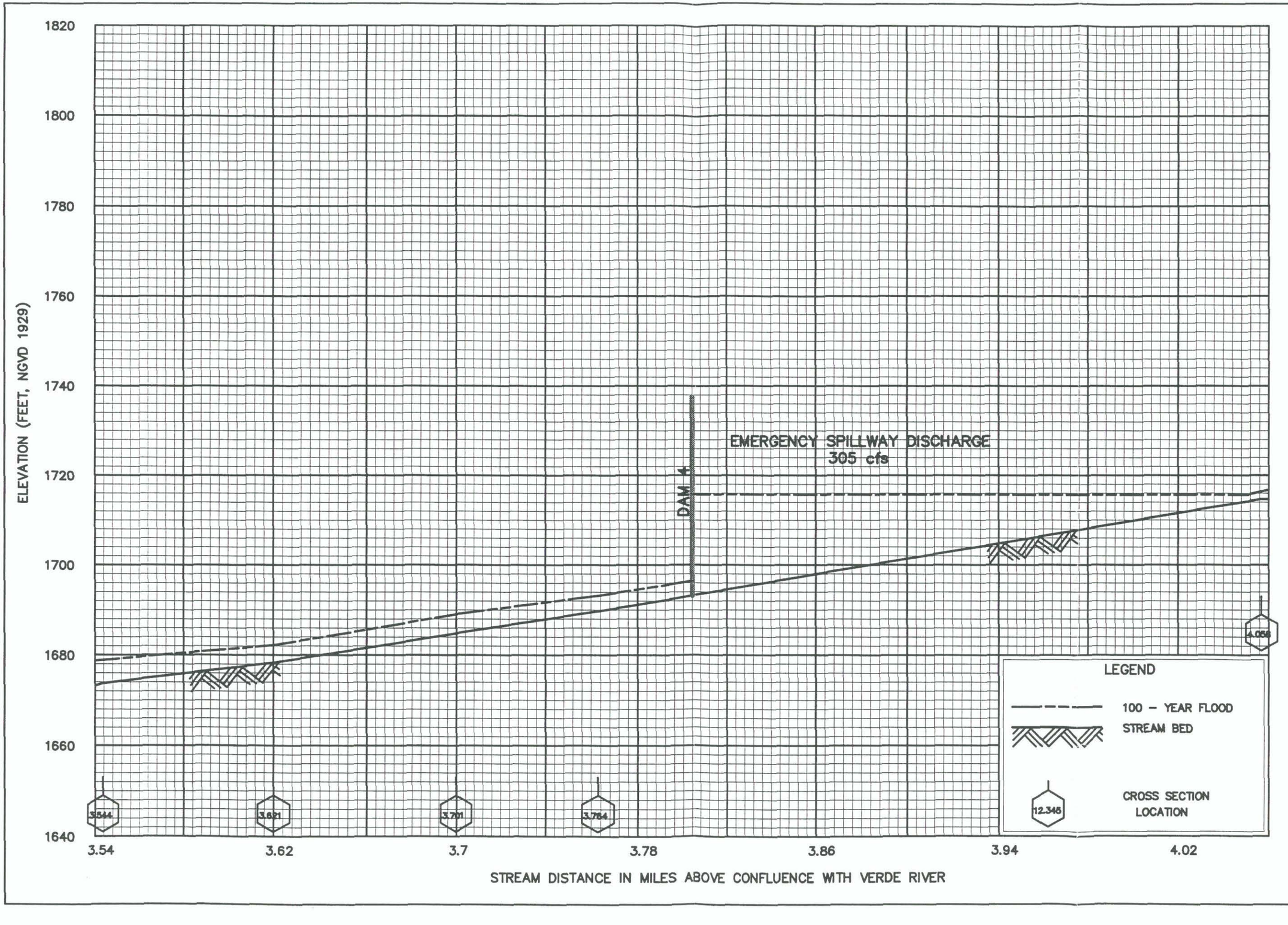
ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 4 of 9)
Date: RFV 27 SEP 1994 10:15am

FLOOD PROFILES

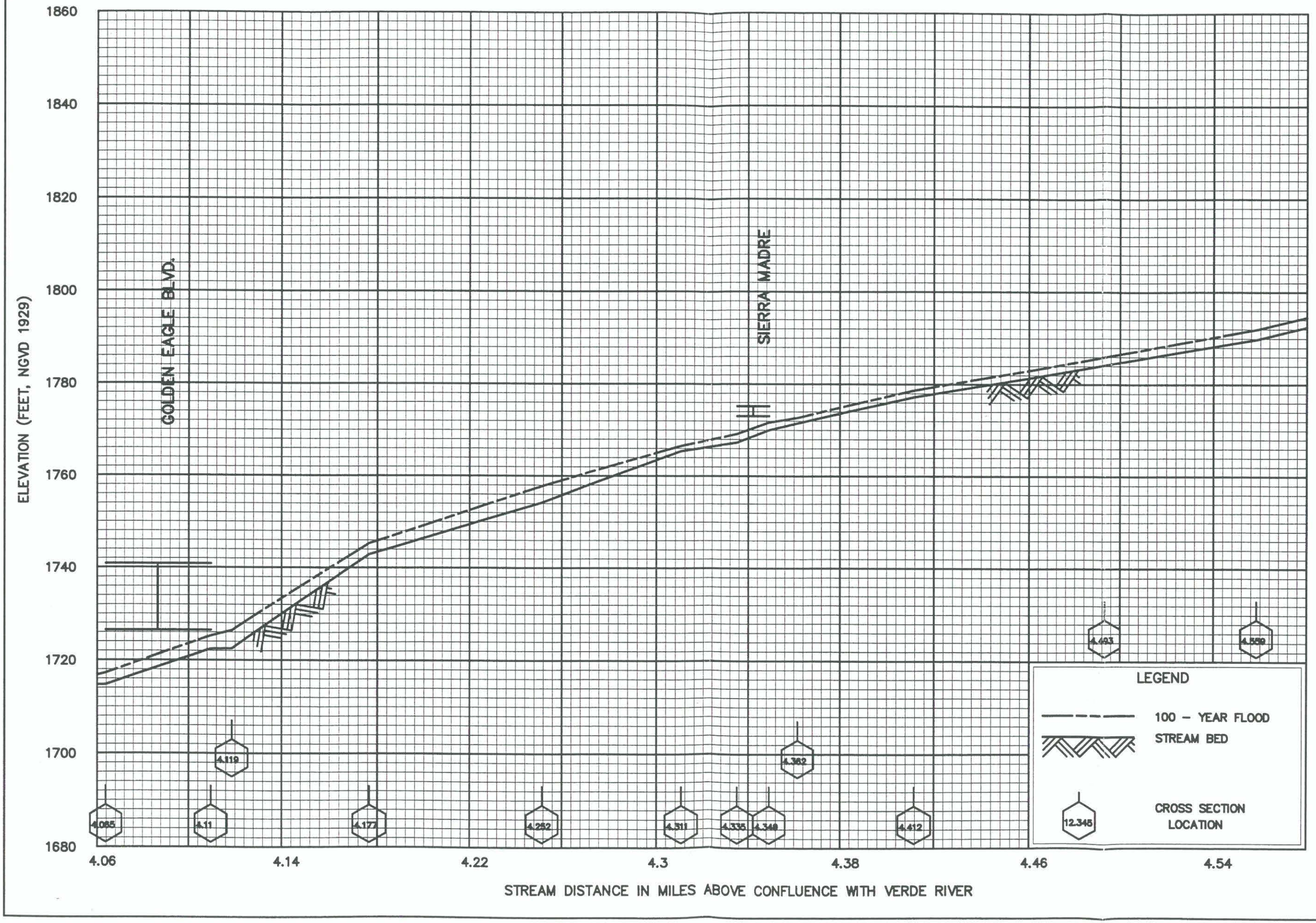
ASHBROOK WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 5 of 9)
Date: REV. 29 SEP 1994 10:45am

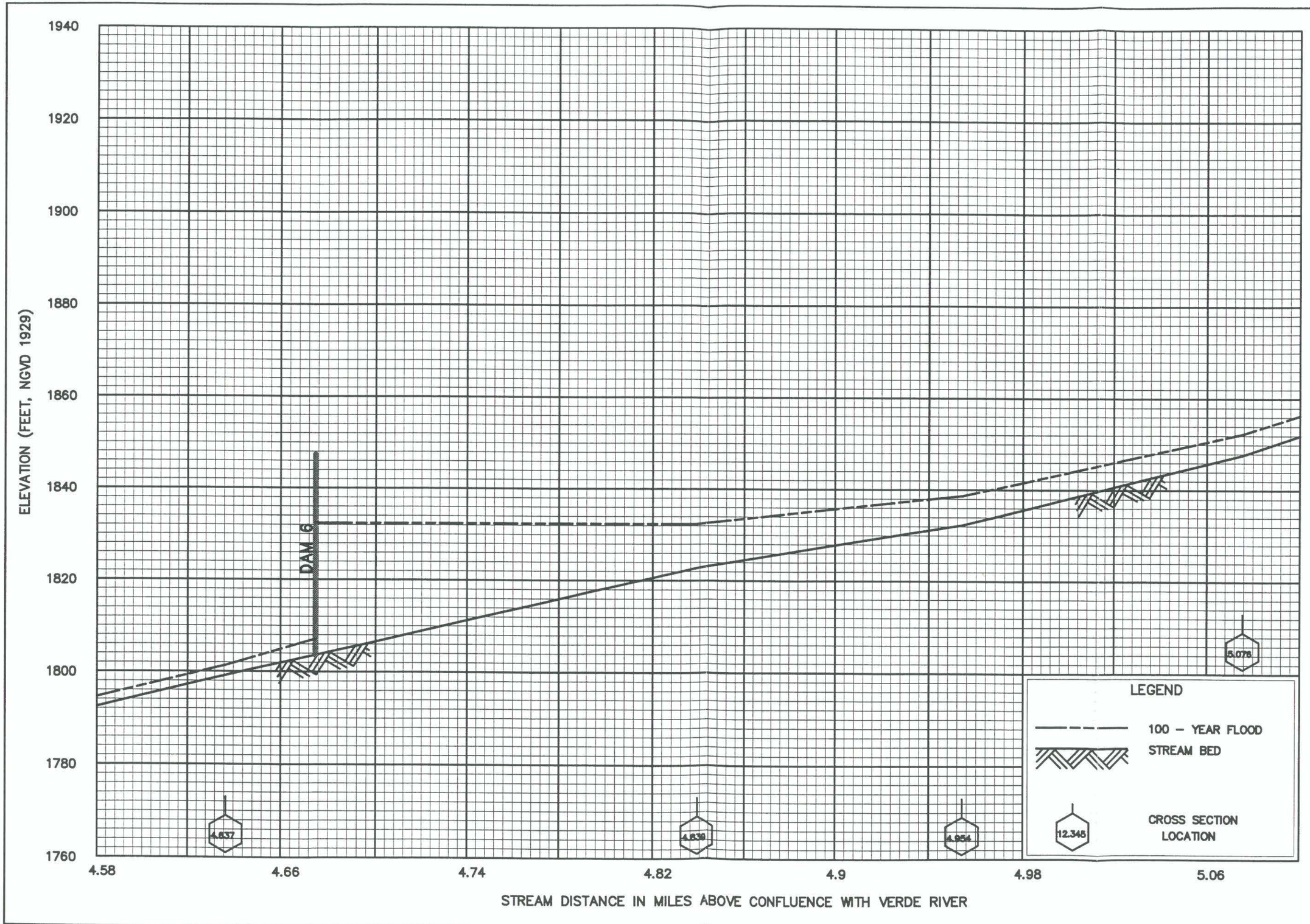


FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 6 of 9)
Date: RFV 27 SEP 1994 10:15am



FLOOD PROFILES

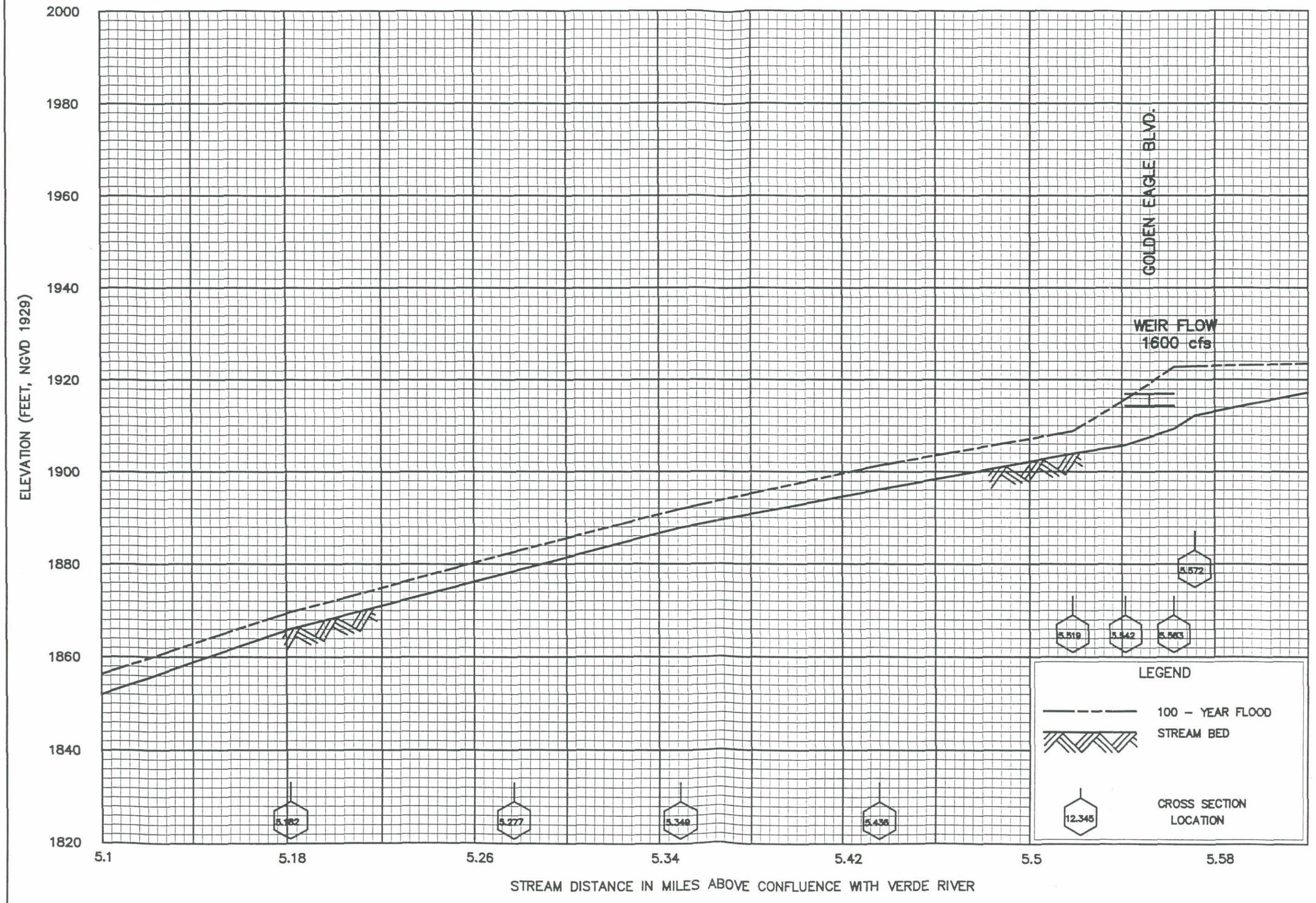
ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 7 of 9)
Date: RFV 27 SEP 1994 10:15am

FLOOD PROFILES

ASHBROOK WASH



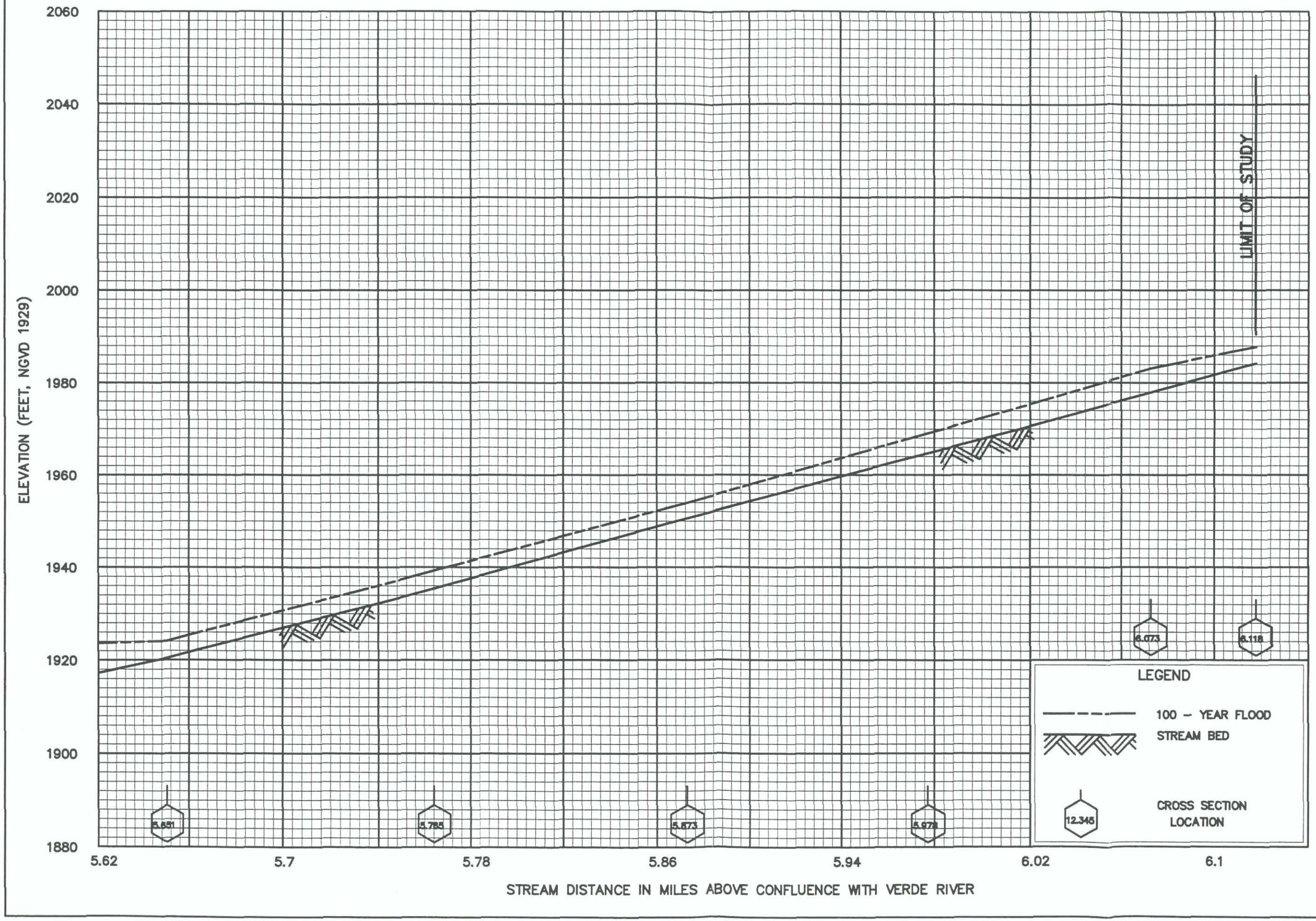
FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH

FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 8 of 9)

Date: RIV. 31 MAR 1995 9:45am



FLOOD PROFILES

ASHBROOK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOODPLAIN DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AS-PROF.dwg (sheet 9 of 9)
Date: REV. 29 SEP 1994 10:45am

ARROW WASH

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    29MAR95    TIME   14:50:34  *
 *****************************************
```

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

```
1
    29MAR95      14:50:34                                                    PAGE    1


                                                        THIS RUN EXECUTED 29MAR95    14:50:34

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

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

```
T1   *  Fountain Hills North FIS                        File:        AR.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35       DTP & F8   12-17-93
T3   *        Arrow Wash 100-Year Floodplain          Revised:   03-29-95
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92, field survey Aug. 91
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0         0         0         0         0   1631.30

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200

         HEC-1 Concentration Point C622R

QT         2      1380      1380

         ASHBROOK WASH Section 3.121
NC                                        0.1         0.3
NH         3        .1    9988.7        .04   10017.8          .1    10148.2
ET                            9.1                                                  9948.04   10033.05
1
    29MAR95      14:50:34                                                              PAGE    2


                 ASHBROOK WASH  Section 3.121    Start with CWSEL 1631.30 feet
                       24-hr storm controls.                Q =     1380 cfs
                 START Hydraulically Similar Reach AS 3
                 See Exhibit 1, Manning's n Value Map.
X1    3.121        24    9988.7   10017.8         0         0         0
GR  1641.5    9787.2    1640.8    9824.7    1640.9    9830.1    1637.9    9837.6    1637.4    9868.2
GR  1636.6    9880.2    1636.6    9890.8    1636.4    9910.9    1634.2    9929.4    1629.3    9961.2
GR  1629.1    9977.0    1628.9    9988.7    1625.8   10000.0    1629.3   10017.8    1630.5   10027.0
```

```
GR   1632.7    10043.1     1636.2    10055.6     1637.4    10065.6     1638.3    10080.0     1638.6    10096.9
GR   1639.3    10113.9     1640.1    10128.6     1640.8    10138.9     1641.3    10148.2

          ARROW/ASHBROOK Confluence

        HEC-1 Concentration Point C620

QT        2        490        490

  ******************************************************************************
  *************************    Culvert   M2     *****************************
  ******************************************************************************

       START Hydraulically Similar Reach    AR 1
             See Exhibit 1, Manning's n Value Map.

NC    0.050      0.050      0.050       0.1         0.3

  Culvert M2    Downstream fully expanded flow. Special Culvert Section # 1

ET                            9.1                                                    9970.50    10016.41
          HEC-1 Concentration Point C620:  6-hr storm controls.
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
                START Hydraulically Similar Reach AR 1
                See Exhibit 1, Manning's n Value Map.
            Culvert M2  Arrow Wash and Arrow Drive
            Culvert M2      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    0.038         30     9970.5    10016.4         320         220       259.7
X3       10                                                              1643.1     1642.7

GR   1650.3     9713.0     1651.6     9721.7     1650.5     9760.5     1648.9     9823.3     1646.6     9878.4
GR   1645.0     9926.5     1643.7     9953.6     1643.1     9970.5     1636.2     9991.6     1636.1    10000.0
GR   1636.1    10002.1     1642.7    10016.4     1642.5    10046.2     1642.1    10099.7     1641.5    10152.6
GR   1641.3    10203.4     1640.7    10252.8     1640.0    10306.2     1638.9    10365.8     1637.9    10415.4
GR   1637.1    10445.3     1634.1    10455.6     1633.2    10463.2     1636.9    10473.3     1637.0    10510.4
GR   1636.0    10562.3     1632.2    10577.2     1632.7    10591.1     1632.2    10612.2     1640.1    10628.3

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC    0.050      0.050      0.050       0.3         0.5
NH        3      0.050       9983     0.050       10020       0.050       10515

        Culvert M2  OUTLET              Special Culvert Section # 2

1
   29MAR95      14:50:34                                                                                  PAGE     3

ET                            9.1                                                    9983.00    10020.01
                Right bank is non effective flow area:  Hard coded GR's
                          from STA 10165 to 10515 @ EL 1645
            Culvert M2   Outlet.   3-54"  CMPs          (SECTION 2 OF SC ROUTINE)
            Section Surveyed by ALS
X1    0.058         25       9983      10020         105         100       107.3
X3       10                                                           1644.08    1644.08
GR   1653.1       9775     1652.5       9815     1651.0       9865     1648.5       9915     1647.8       9965
GR   1646.5       9983     1641.7       9994     1641.6      10000     1641.6      10006     1641.8      10010
GR   1646.9      10020     1646.1      10065     1645.2      10115       1645      10165       1645      10215
GR     1645      10215       1645      10265       1645      10315       1645      10365       1645      10415
GR     1645      10451       1645      10456       1645      10459       1645      10465       1645      10515

      3-54"  CMPs

SC    3.022        0.7       2.63          0         4.5          0       72.3        2.2    1642.65    1641.71

        Culvert M2  INLET               Special Culvert Section # 3

        BT information surveyed by ALS    South top of curb.
        Section 0.071 Surveyed by ALS

NH        3      0.050       9971     0.050       10032       0.050       10527

ET                            9.1                                                    9971.00    10032.01
            Culvert M2   Inlet.    3-54"  CMPs          (SECTION 3 OF SC ROUTINE)
                Right bank is non effective flow area:  Hard coded GR's
                          from STA 10427 to 10445 @ EL 1650
            Culvert M2  BT information surveyed by ALS.     South top of curb
X1    0.071         26       9971      10032        72.3        72.3        72.3
X2                             2     1647.15      1647.3
X3       10                                                           1647.11    1647.11
BT      -11       9824    1652.48                  9874    1651.74                9924    1650.29
BT                9974    1649.08                  9975       1649               10000    1648.83
BT               10019     1648.6                 10029    1648.54               10074    1648.09
BT               10124    1647.11                 10125       1653

GR   1657.0       9787     1656.8       9827     1656.2       9877     1655.9       9927     1656.2       9971
GR     1649       9975     1642.9       9993     1642.4      10000     1642.3      10007     1648.6      10019
GR   1655.8      10032     1656.0      10127     1655.5      10139     1649.2      10165     1648.9      10182
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GR   1655.2      10202      1655.2      10227      1654.4      10277      1653.8      10327      1653.4      10377
GR   1653.2      10411        1650      10427        1650      10445      1652.4      10457      1652.2      10477
GR   1652.1      10527

          Return  Contraction and Expansion coefficients to Normal

NC    0.050      0.050      0.050        0.1        0.3

  Culvert M2     Upstream fully expanded flow.  Special Culvert Section # 4

ET                             9.1                                                    9973.20    10029.91
1
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            Culvert M2      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    0.081         14      9973.2     10029.9          50          55        41.9
GR   1655.1     9775.8      1657.3      9783.8      1657.1      9820.9      1656.4      9884.7      1656.1      9926.8
GR   1656.1     9973.2      1646.7      9994.9      1646.6     10000.0      1646.6     10004.9      1650.8     10015.1
GR   1657.7    10029.9      1656.9     10048.8      1657.1     10066.9      1657.3     10082.9

ET                             9.1                                                    9984.09    10019.21
X1    0.115         17      9984.1     10019.2         180         175       176.9
X3       10                                                                 1659.8      1659.6
GR   1663.5     9837.4      1662.2      9878.8      1661.3      9929.6      1659.8      9984.1      1654.9      9995.8
GR   1654.8    10000.0      1654.9     10005.1      1659.6     10019.2      1659.2     10056.4      1658.4     10100.4
GR   1657.3    10142.8      1657.4     10169.4      1661.5     10171.9      1664.0     10216.9      1665.4     10218.8
GR   1666.0    10267.8      1667.2     10274.0

ET                             9.1                                                    9971.99    10018.51
X1    0.151         20      9972.0     10018.5         195         190       192.9
GR   1672.1     9788.5      1672.6      9794.9      1671.1      9865.5      1670.0      9909.3      1669.3      9960.1
GR   1668.7     9972.0      1659.8      9990.2      1659.7      9994.5      1659.6     10000.0      1665.0     10008.1
GR   1668.7    10018.5      1668.8     10042.3      1669.4     10091.3      1669.3     10124.7      1669.0     10175.2
GR   1669.1    10242.8      1669.2     10268.5      1670.6     10274.8      1671.2     10286.4      1671.8     10288.6

ET                             9.1                                                    9968.09    10011.11
            Culvert 619  Outlet at Palisades Blvd.
X1    0.165         20      9968.1     10011.1          70          70        71.5
GR   1673.4     9777.6      1672.8      9815.4      1672.0      9869.1      1670.0      9908.1      1669.5      9930.9
GR   1669.2     9951.4      1668.0      9968.1      1660.8      9982.3      1660.2      9992.3      1660.2      9995.5
GR   1662.6    10000.0      1669.3     10011.1      1669.4     10038.3      1669.3     10104.8      1669.5     10164.1
GR   1669.3    10230.1      1669.7     10254.5      1670.3     10257.2      1671.2     10272.2      1674.4     10287.5

        HEC-1 Concentration Point C619I

QT         2         520        520

       START Hydraulically Similar Reach    AR 2

NH         3         .07     9992.1         .06      10000          .07     10133.7
ET                             9.1                                                    9954.49    10082.81
          HEC-1 Concentration Point C619I:  6-hr storm controls.
            Culvert 619 Arrow Wash and Fountain Hills Blvd.

            Special Culvert Routine not used on culvert 619 hydraulic analysis.
            See THYSYS analysis for hydraulic characteristics of culvert 619.
          ********************************************************************
          ***************************** Culvert 619 ****************************
          ********************************************************************
1
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            HEC-1  C619O Storage Route Rating Curve        WSEL =  1693.2 feet
            HEC-1  C619I Inflow Hydrograph                    Q =      520 cfs
            Reference:       HEC-1  Output  File:  EX100-6.OH1
X1    0.338         13      9954.5     10082.8         915         915       913.9
X5        2     1693.2      1693.2
GR   1696.0     9945.6      1695.8      9954.5      1690.1      9970.6      1677.5      9992.1      1677.2     10000.0
GR   1678.2    10004.2      1678.9     10024.6      1680.0     10051.7      1683.7     10062.7      1695.1     10082.8
GR   1695.8    10102.0      1696.0     10126.3      1696.3     10133.7

NH         3         .07     9989.5         .06      10000          .07     10109.7
ET                             9.1                                                    9952.49    10012.91
X1    0.441         16      9952.5     10012.9         530         540       544.9
GR   1708.2     9863.9      1705.2      9885.9      1703.7      9902.1      1699.4      9922.2      1697.8      9952.5
GR   1691.0     9970.9      1690.4      9981.5      1688.8      9989.5      1688.4     10000.0      1691.5     10003.4
GR   1698.4    10012.9      1698.6     10030.9      1699.0     10050.5      1700.8     10067.5      1705.2     10085.9
GR   1710.6    10109.7

  ************************************************************************
  ************************    Culvert  M1    ******************************
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```
  Culvert M1    Downstream fully expanded flow. Special Culvert Section # 1

NH        3       .07     9997.2       .06     10006.3        .07     10239.9
ET                          9.1                                                  9986.49   10011.39
             Culvert M1 Arrow Wash and Mountainside Drive.
             Culvert M1      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    0.541        19      9986.5    10006.3        510         525       527.1
GR   1739.3    9840.5      1737.0     9854.5     1730.8      9881.4      1723.7   9912.1    1718.5    9940.3
GR   1716.9    9956.2      1716.5     9986.5     1709.6      9997.2      1709.5  10000.0    1714.0   10006.3
GR   1715.6   10017.3      1717.7    10049.6     1719.0     10069.9      1719.7  10088.8    1724.7   10125.0
GR   1729.4   10154.6      1734.3    10193.3     1736.3     10215.3      1739.4  10239.9

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC    0.070       0.070       0.070       0.3         0.5
NH        3       0.070      9989.9     0.060     10010.7       0.070     10209.2

ET                          9.1                                                  9997.99   10002.01
             Culvert M1   Outlet.   1-36"  CMP          (SECTION 2 OF SC ROUTINE)
                Photogrammetric xsec. located 2.4' Downstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1714.47
X1    0.561        18        9998       10002          95         105       102.1
X3       10                                                             1724.74   1724.74
X4        2    1714.47        9998     1714.47       10002
GR   1739.1    9811.7      1736.8     9836.4     1733.5      9858.7      1729.3   9892.5    1726.0    9921.1
GR   1723.1    9948.2      1721.8     9982.6     1720.0      9989.9      1714.4  10000.0    1719.4   10010.7
GR   1720.8   10032.3      1721.9    10056.4     1722.9     10077.1      1726.9  10106.4    1731.0   10133.5
GR   1735.7   10162.6      1737.3    10180.7     1740.0     10209.2

1
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       1-36"  CMP

SC    1.024        0.9        2.63          0           3           0       120.7       2.3    1717.61   1714.47

         Culvert M1  INLET                Special Culvert Section # 3

NH        3       0.070      9986.7     0.060     10014.1       0.070     10167.4
ET                          9.1                                                  9928.76   10063.57
             Culvert M1   Inlet.    1-36"  CMP          (SECTION 3 OF SC ROUTINE)
              Base Channel Elevations were lowered to Culvert Invert EL 1717.61
             Culvert M1 BT information surveyed by Town.
             Culvert M1 BT information coded per figure 3.16 (HEC-2, Sept 90)
X1    0.583        19        9998       10002       120.7       120.7       120.7
X2                              2     1720.61     1725.16
X3       10                                                             1725.15   1725.15
X4        2    1717.61        9998     1717.61       10002
BT      -12     9872.7      1739.8                  9909.3      1731.3               9925.4   1727.75
BT             9950.0      1726.16                   10000      1725.15               10050   1725.99
BT            10061.2      1726.55                 10075.5      1729.3              10092.7   1731.2
BT            10113.6      1733.5                  10143.6      1736.8              10167.4   1739.7

GR   1739.8    9872.7      1731.3     9909.3     1727.75      9925.4      1726.6   9930.6    1723.3    9951.1
GR   1722.9    9962.6      1722.6     9972.6     1720.9      9986.7      1717.6  10000.0    1720.8   10014.1
GR   1721.3   10028.9      1722.6    10041.1     1725.9     10057.8      1726.55 10061.2    1729.3   10075.5
GR   1731.2   10092.7      1733.5    10113.6     1736.8     10143.6      1739.7  10167.4
          Return  Contraction and Expansion coefficients to Normal

NC                                      0.1         0.3

  Culvert M1     Upstream fully expanded flow.  Special Culvert Section # 4

NH        3       .07     9989.3       .06     10023.5        .07     10081.8
ET                          9.1                                                  9918.49   10038.71
             Culvert M1      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    0.602        15      9918.5    10033.2        115          90        99.0
GR   1738.8    9856.1      1733.0     9882.5     1728.4      9906.9      1727.5   9918.5    1720.9    9930.8
GR   1720.8    9935.2      1721.3     9940.8     1721.6      9967.6      1721.6   9989.3    1721.4   10000.0
GR   1721.7   10023.5      1725.4    10033.2     1730.5     10050.6      1736.4  10075.0    1739.2   10081.8
  **************************************************************************
  *************************    Culvert   618    *****************************
  **************************************************************************

        HEC-1 Concentration Point C618

QT        2         400         400

  Culvert 618   Downstream fully expanded flow. Special Culvert Section # 1

NH        3       .07     9994.9       .06     10003.5        .07     10086.7
ET                          9.1                                                  9986.99   10033.71
1
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          HEC-1 Concentration Point C618:  6-hr storm controls.
            Culvert 618 Arrow Wash and Mimosa Drive
            Culvert 618     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    0.645        13        9987     10033.7         215         220       227.8
GR   1749.9    9874.9      1743.8      9906.9      1734.8      9953.1      1734.1   9973.8   1734.1   9987.0
GR   1728.9    9994.9      1728.6     10000.0      1729.0     10003.5      1727.8  10020.1   1738.2  10033.7
GR   1743.9   10044.2      1749.3     10051.5      1750.0     10086.7

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC    0.070     0.070       0.070         0.3         0.5
NH        3     0.070       10000       0.060     10009.2       0.070    10133.2

        Culvert 618 OUTLET              Special Culvert Section # 2
        HEC-1 Concentration Point C6180
QT        2       370         370

ET                              9.1                                                  9995.66  10013.22
          HEC-1 Concentration Point C6180:  6-hr storm controls.
            Culvert 618  Outlet.   1-36" CMP          (SECTION 2 OF SC ROUTINE)
            Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
              Photogrammetric xsec. located 15.5' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1729.08
X1    0.654        14       10003       10006          45          45        43.6
X3       10                                                            1735.71  1735.71
X4        2   1729.08       10003     1729.08       10006
GR   1747.5    9906.0      1741.2      9939.8      1743.0      9946.1      1744.6   9956.6   1743.9   9968.7
GR   1740.4    9980.6      1734.5     10000.0      1735.0     10009.2      1739.9  10033.2   1748.4  10048.0
GR   1749.2   10063.7      1748.9     10096.1      1748.5     10119.6      1748.7  10133.2

        1-36"  CMP          7/8 full of sediment on downstream end (adverse slope)
                            Inlet is clear.  Use effective flow area of 0.75' Dia.

SC    1.024       0.9        2.63           0        0.75           0          97       2.3   1732.7   1729.08

        Culvert 618 INLET               Special Culvert Section # 3

NH        3     0.070       9986.6       0.060     10002.7       0.070    10134.0

ET                              9.1                                                  9943.62  10116.34
            Culvert 618  Inlet.    1-36"  CMP          (SECTION 3 OF SC ROUTINE)
            Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
            Base Channel Elevations were revised to Culvert sediment EL 1732.7
            Culvert 618 BT information surveyed  by ALS.  WEST TOP OF CURB
X1    0.672        18        9995        9998          97          97        97
X2                              2     1733.44     1744.35
X3       10                                                            1744.35  1744.35
X4        2    1732.7        9995      1732.7        9998
BT       -8      9880      1753.2                   9930      1749.24              9950   1747.65
BT                10000     1744.97                  10050     1744.35             10100   1745.43
1
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BT             10120.2      1746.9                   10150     1749.09

GR   1753.2      9880      1746.6      9933.7      1745.0      9959.0      1740.1   9971.0   1740.1   9978.5
GR   1735.8    9986.6      1732.7     10000.0      1736.3     10002.7      1737.4  10015.6   1740.1  10028.8
GR   1741.3   10045.8      1741.4     10054.1      1739.9     10067.5      1740.3  10076.7   1740.0  10091.5
GR   1744.5   10110.2      1746.9     10120.2      1750.3     10134.0

          Return  Contraction and Expansion coefficients to Normal

NC                                        0.1         0.3

  Culvert 618    Upstream fully expanded flow.  Special Culvert Section # 4

        HEC-1 Concentration Point C618I
QT        2       370         370
NH        3       .07        9997         .06     10013.4         .07      10124
ET                              9.1                                                  9948.92  10104.90
          HEC-1 Concentration Point C618I:  6-hr storm controls.
            Culvert 618 Upstream:  expanded flow.      (SECTION 4 OF SC ROUTINE)
X1    0.679        16        9961.2      10083.7          40          40        35.7
GR   1750.1    9927.9      1749.8      9935.0      1746.4      9946.7      1743.6   9961.2   1734.3   9984.3
GR   1734.4    9997.0      1733.4     10000.0      1733.4     10002.6      1734.0  10013.4   1738.2  10025.0
GR   1739.3   10037.4      1739.0     10052.4      1739.5     10072.0      1740.7  10083.7   1745.6  10103.3
GR   1750.4   10124.0

NH        3       .07        9967.2       .06        9971.5       .07      10054.2
ET                              9.1                                                  9927.13  10014.04
X1    0.757        14        9959.9      9992.4          385         380       413.9
GR   1755.1    9904.5      1751.9      9910.8      1746.2      9925.5      1744.4   9934.5   1744.8   9959.9
GR   1742.8    9967.2      1742.9      9971.5      1743.6      9983.5      1745.1   9992.4   1745.7  10000.0
GR   1745.4   10008.4      1746.6     10022.7      1751.4     10035.3      1754.8  10054.2
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NH        3       .07     9985.9       .06     10018.2       .07     10078.8
ET                          9.1                                      9971.54    10022.19
X1    0.836        10     9985.9    10018.2         390        420       419.0
GR   1766.5    9964.4     1757.8     9972.8      1757.6     9980.9      1758.3    9985.9     1757.6    10000.0
GR   1758.0   10018.2     1761.1    10029.4      1761.9    10040.1      1767.9   10062.1     1770.8    10078.8

NH        3       .07     9989.8       .06     10005.6       .07     10063.1
ET                          9.1                                      9983.60    10028.39
X1    0.916        10     9989.8    10008.6         410        410       418.3
GR   1782.4    9958.2     1781.5     9964.8      1773.1     9989.8      1773.0   10000.0     1772.9    10005.6
GR   1773.2   10008.6     1774.7    10020.1      1775.9    10040.7      1778.9   10054.5     1782.2    10063.1

NH        3       .07     9994.2       .06     10005.3       .07     10077.4
ET                          9.1                                      9992.63    10023.70
1
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X1    0.984        10     9994.2    10020.7         350        350       362.0
GR   1797.5    9981.0     1793.1     9988.7      1786.2     9994.2      1786.2   10000.0     1786.1    10005.3
GR   1786.8   10020.7     1791.8    10031.6      1793.3    10049.1      1796.6   10066.5     1798.6    10077.4

NH        3       .07     9987.6       .06       10000       .07     10045.7
ET                          9.1                                      9977.29    10012.42
X1    1.013         8     9977.3    10010.8         150        150       150.5
GR   1802.8    9963.8     1797.3     9977.3      1793.8     9987.6      1794.3   10000.0     1795.4    10010.8
GR   1804.8   10029.3     1805.1    10040.5      1805.2    10045.7

     ********************************************************************************
     ****************************    Culvert   617    ****************************
     ********************************************************************************


          HEC-1 Concentration Point C617

QT        2       270         270

NH        3     0.020    10012.7       0.060     10021.1       0.070     10053.9

ET                          9.1                                      9960.29    10034.31
          HEC-1 Concentration Point C617:  6-hr storm controls.
            Culvert 617 Arrow Wash and Cavern Drive
            Culvert 617 is totaly clogged by boulders on downstream side.
                        Inlet is also plugged, thus culvert 617 is not modeled.
            Section 1.032 is BT data for culvert 617.
X1    1.032        10     9960.3    10034.3         105        105       101.9
GR   1810.5    9893.6     1808.7     9926.9      1807.1     9960.3      1806.1    9985.4     1805.7    10000.0
GR   1805.5   10012.7     1805.5    10021.1      1808.5    10034.3      1809.7   10047.2     1811.3    10053.9

NH        3       .07     9992.3       .06     10006.2       .07     10048.9
ET                          9.1                                      9982.67    10029.57
X1    1.039        10     9992.3    10009.4          50         35       36.8
GR   1810.5    9926.6     1808.9     9956.5      1807.4     9982.6      1802.8    9992.3     1801.5    10000.0
GR   1804.3   10006.2     1805.4    10009.4      1805.4    10021.0      1807.3   10029.2     1810.8    10048.9

NH        3       .07    10007.9       .06     10014.5       .07       10044
ET                          9.1                                      9969.89    10023.41
X1    1.061        11     9969.9    10023.4         110        120       116.7
GR   1815.6    9889.0     1812.4     9911.8      1810.4     9942.2      1808.3    9969.9     1806.2     9982.4
GR   1805.0   10000.0     1803.9    10007.9      1803.9    10014.5      1810.2   10023.4     1814.8    10036.0
GR   1816.7   10044.0

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


 *PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=      .100 CEHV=      .300
 1490 NH CARD USED
 *SECNO 3.121
 3720 CRITICAL DEPTH ASSUMED
                 ASHBROOK WASH  Section 3.121    Start with CWSEL 1631.30 feet
```

```
                    24-hr storm controls.                          Q =    1380 cfs
                 START Hydraulically Similar Reach AS 3
                 See Exhibit 1, Manning's n Value Map.
     3.121       5.53    1631.33   1631.33   1631.30   1632.71      1.38       .00       .00   1628.90
    1380.0       198.3    1151.2      30.5      74.2      112.2      15.6        .0        .0   1629.30
       .00        2.67     10.26      1.95      .100       .040      .100       .000   1625.80   9948.04
   .013068         0.        0.         0.         0          4         0       .00     85.01  10033.05

 CCHV=      .100 CEHV=      .300
 *SECNO  .038
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1643.10 ELREA=       1642.70

           HEC-1 Concentration Point C620:  6-hr storm controls.
                 STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
                 START Hydraulically Similar Reach AR 1
                 See Exhibit 1, Manning's n Value Map.
              Culvert M2  Arrow Wash and Arrow Drive
              Culvert M2       Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .038       3.18    1639.28   1639.28       .00   1640.37      1.09       4.15       .03   1643.10
    490.0          .0      490.0        .0        .0      58.4         .0         .8        .4   1642.70
       .01         .00       8.39       .00       .000      .050       .000       .000   1636.10   9982.18
   .029883       320.      260.       220.         0         11         0       .00     26.80  10008.99

 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO  .058
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
1
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                 Right bank is non effective flow area:  Hard coded GR's
                       from STA 10165 to 10515 @ EL 1645
              Culvert M2   Outlet.   3-54"  CMPs          (SECTION 2 OF SC ROUTINE)
              Section Surveyed by ALS
      .058       2.78    1644.38   1644.38       .00   1645.47      1.09       3.23       .00   1646.50
    490.0          .0      490.0        .0        .0      58.5         .0        1.0        .4   1646.90
       .01         .00       8.38       .00       .000      .050       .000       .000   1641.60   9987.86
   .030265       105.      107.       100.         0         12         0       .00     27.20  10015.06


 SPECIAL CULVERT

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      3          .022        .70       2.63        .00       4.50        .00       72.30        2          2     1642.65    1641.71

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  2 - MITERED TO CONFORM TO SLOPE

 5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
 1490 NH CARD USED
 *SECNO  .071

 SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1648.47

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.98

 SPECIAL CULVERT

      EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
   1650.95    1648.32       3.01       116.       371.      3.069       47.7    1647.30       89.


              Culvert M2   Inlet.   3-54"  CMPs          (SECTION 3 OF SC ROUTINE)
                  Right bank is non effective flow area:  Hard coded GR's
                       from STA 10427 to 10445 @ EL 1650
              Culvert M2  BT information surveyed by ALS.     South top of curb
      .071       6.03    1648.33       .00       .00   1648.47       .15       3.01       .00   1656.20
    490.0          .0      490.0        .0        .0      159.6         .0        1.1        .5   1655.80
       .02         .00       3.07       .00       .000      .050       .000       .000   1642.30   9976.98
   .001907        72.       72.        72.          2          0         0       .00     41.50  10018.48

 CCHV=      .100 CEHV=      .300
 *SECNO  .081

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
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          Culvert M2      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      .081      3.27   1649.87   1649.87       .00   1651.02       1.14       .20       .30   1656.10
    490.0        .0     490.0        .0        .0      57.1         .0       1.2        .5   1657.70
      .02       .00      8.59       .00      .000      .050       .000      .000   1646.60   9987.58
   .030129       50.       42.       55.         0        11          0       .00     25.27  10012.84


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  .115
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1659.80 ELREA=      1659.60

      .115      3.32   1658.12   1658.12       .00   1659.22       1.10      5.30       .00   1659.80
    490.0        .0     490.0        .0        .0      58.3         .0       1.5         .6   1659.60
      .03       .00      8.41       .00      .000      .050       .000      .000   1654.80   9988.12
   .029814       180.      177.      175.        0         5          0       .00     26.64  10014.75


*SECNO  .151
      .151      3.73   1663.33   1663.13       .00   1664.40       1.07      5.18       .00   1668.70
    490.0        .0     490.0        .0        .0      59.0         .0       1.7         .7   1668.70
      .03       .00      8.31       .00      .000      .050       .000      .000   1659.60   9982.97
   .024353       195.      193.      190.        3         8          0       .00     22.64  10005.61


*SECNO  .165

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.89

          Culvert 619  Outlet at Palisades Blvd.
      .165      4.70   1664.90   1663.44       .00   1665.31        .41       .84       .07   1668.00
    490.0        .0     490.0        .0        .0      95.6         .0       1.9         .8   1669.30
      .04       .00      5.12       .00      .000      .050       .000      .000   1660.20   9974.22
   .006852       70.       72.       70.         2        11          0       .00     29.58  10003.80


1490 NH CARD USED
*SECNO  .338
 WATER EL=X5 CARD=   1693.200
          HEC-1 Concentration Point C619I:  6-hr storm controls.
            Culvert 619 Arrow Wash and Fountain Hills Blvd.

            Special Culvert Routine not used on culvert 619 hydraulic analysis.
            See THYSYS analysis for hydraulic characteristics of culvert 619.
          ************************************************************************
          ***************************** Culvert 619 ******************************
1
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          ************************************************************************
           HEC-1  C619O Storage Route Rating Curve          WSEL =  1693.2 feet
           HEC-1  C619I Inflow Hydrograph                     Q =     520 cfs
           Reference:      HEC-1  Output  File:  EX100-6.OH1
      .338     16.00   1693.20   1679.99       .00   1693.20        .00       .05     14.93   1695.80
    520.0        .0     520.0        .0        .0     1281.9         .0      16.3        2.3   1695.10
      .66       .00       .41       .00      .000      .069       .000      .000   1677.20   9961.84
   .000016       915.      914.      915.        0        14          0       .00    117.61  10079.45


1490 NH CARD USED
*SECNO  .441

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .04

      .441      4.61   1693.01   1691.67       .00   1693.33        .31       .03       .09   1697.80
    520.0        .0     520.0        .0        .0      115.8         .0      25.1        3.3   1698.40
      .70       .00      4.49       .00      .000      .068       .000      .000   1688.40   9965.44
   .010895       530.      545.      540.        2        21          0       .00     40.04  10005.49


1490 NH CARD USED
*SECNO  .541

3301 HV CHANGED MORE THAN HVINS
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 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
            Culvert M1 Arrow Wash and Mountainside Drive.
            Culvert M1      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .541      5.24   1714.74   1714.74      .00   1716.15      1.41     10.44      .33   1716.50
     520.0       .0     515.6       4.4       .0      53.9       1.9      26.1       3.7   1714.00
       .71      .00      9.57      2.35      .000      .065      .070      .000   1709.50   9989.23
   .046611      510.      527.      525.         0         8         0       .00     22.17  10011.39

 CCHV=     .300 CEHV=     .500
 1490 NH CARD USED
 *SECNO  .561

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1724.74 ELREA=      1724.74

            Culvert M1   Outlet.   1-36" CMP          (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 2.4' Downstream. (No Elev. Adjust.)
1
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            Base Channel Elevations were lowered to Culvert Invert EL 1714.47
      .561      8.07   1722.47   1722.47      .00   1726.53      4.06      3.52      1.33   1714.47
     520.0        .0     520.0        .0       .0      32.2        .0      26.2       3.7   1714.47
       .71      .00     16.17       .00      .000      .060      .000      .000   1714.40   9998.00
   .026503       95.      102.      105.         0        14         0       .00      4.00  10002.00


 SPECIAL CULVERT

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      1          .024       .90       2.63        .00       3.00        .00      120.70        2          3      1717.61    1714.47

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

 5130, EGIC= 2018.46..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 2132.18 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO  .583

 SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1727.01

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 13.85

 SPECIAL CULVERT

      EGIC       EGOC        H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
   2018.46    2132.18        .48       465.       55.      1.296        7.1    1725.16       127.


            Culvert M1   Inlet.    1-36" CMP          (SECTION 3 OF SC ROUTINE)
             Base Channel Elevations were lowered to Culvert Invert EL 1717.61
            Culvert M1 BT information surveyed by Town.
            Culvert M1 BT information coded per figure 3.16 (HEC-2, Sept 90)
      .583      9.40   1727.00       .00       .00   1727.01       .01       .48       .00   1717.61
     520.0     225.3      48.7     245.9     291.7      37.6     293.4      27.1       3.9   1717.61
       .75       .77      1.30       .84      .066      .060      .066      .000   1717.60   9928.76
   .000138      121.      121.      121.         1         0         0       .00    134.81  10063.57

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .602
            Culvert M1       Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      .602      6.22   1727.02   1722.43       .00   1727.03       .01       .02       .00   1727.50
     520.0        .0     518.9       1.1       .0     583.2       4.5      28.5       4.2   1725.40
       .78       .00       .89       .25      .000      .067      .070      .000   1720.80   9919.40
   .000188      115.       99.       90.         2        25         0       .00    119.31  10038.71

 1490 NH CARD USED
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
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*SECNO  .645

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C618:  6-hr storm controls.
            Culvert 618 Arrow Wash and Mimosa Drive
            Culvert 618     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .645      2.59   1730.39   1730.39      .00   1731.27       .88       .12       .26   1734.10
    400.0        .0     400.0        .0        .0     53.1        .0      30.2       4.6   1738.20
      .79       .00      7.53       .00      .000     .067      .000      .000   1727.80   9992.63
   .059950      215.      228.      220.         0       18         0       .00     30.86  10023.49


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO  .654

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C618O:  6-hr storm controls.
            Culvert 618  Outlet.   1-36" CMP          (SECTION 2 OF SC ROUTINE)
            Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
              Photogrammetric xsec. located 15.5' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1729.08
      .654      6.74   1735.82   1735.82      .00   1737.34      1.52      1.35       .32   1729.08
    370.0       68.7     239.4      61.9      15.0     20.2      13.7      30.2       4.6   1729.08
      .79       4.59     11.84      4.50      .061     .060      .060      .000   1729.08   9995.66
   .017944       45.       44.       45.         0       18         0       .00     17.56  10013.22


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     1         .024       .90      2.63       .00       .75       .00      97.00       2         3     1732.70   1729.08

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5130, EGIC=40521.66..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC=******** ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO  .672

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1745.97
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


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 28.36

SPECIAL CULVERT

     EGIC       EGOC        H4      QWEIR     QCULV       VCH      ACULV     ELTRD    WEIRLN
 40521.66  187804.50      8.63       366.        3.      .656         .4   1744.35       126.


            Culvert 618  Inlet.    1-36" CMP          (SECTION 3 OF SC ROUTINE)
            Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
            Base Channel Elevations were revised to Culvert sediment EL 1732.7
            Culvert 618 BT information surveyed  by ALS.  WEST TOP OF CURB
      .672      13.27   1745.97       .00       .00   1745.97       .00      8.63       .00   1732.70
    370.0       104.7      26.1     239.1     256.0      39.8     684.2      31.4       4.8   1732.70
      .86         .41       .66       .35       .065      .060      .069      .000   1732.70   9943.62
   .000022       97.       97.       97.         0         0         0       .00     172.71  10116.34


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .679
          HEC-1 Concentration Point C618I:  6-hr storm controls.
            Culvert 618 Upstream:  expanded flow.       (SECTION 4 OF SC ROUTINE)
      .679      12.57   1745.97   1735.63       .00   1745.97       .00       .00       .00   1743.60
    370.0        1.4     359.3       9.3      14.6    1018.0      55.6      32.3       5.0   1740.70
      .89         .09       .35       .17       .070      .069      .070      .000   1733.40   9948.92
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.000016	40.	36.	40.	2	20	0	.00	155.98	10104.90

1490 NH CARD USED
*SECNO .757

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .04

.757	3.07	1745.87	1745.19	.00	1746.05	.18	.02	.05	1744.80
370.0	90.5	271.1	8.5	37.8	73.2	7.6	38.0	6.1	1745.10
.93	2.40	3.70	1.11	.070	.069	.070	.000	1742.80	9927.13
.010120	385.	414.	380.	2	25	0	.00	86.91	10014.04

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

1490 NH CARD USED
*SECNO .836
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

.836	1.50	1759.10	1759.10	.00	1759.71	.61	8.03	.13	1758.30
370.0	102.1	260.9	7.0	18.0	40.0	2.2	38.8	6.7	1758.00
.95	5.68	6.52	3.18	.070	.060	.070	.000	1757.60	9971.54
.052152	390.	419.	420.	0	11	0	.00	50.65	10022.19

1490 NH CARD USED
*SECNO .916

.916	2.28	1775.18	1775.09	.00	1775.82	.63	16.10	.01	1773.10
370.0	23.5	284.3	62.3	6.5	40.7	16.2	39.4	7.2	1773.20
.96	3.64	6.99	3.85	.070	.061	.070	.000	1772.90	9983.60
.029840	410.	418.	410.	5	11	0	.00	44.79	10028.39

1490 NH CARD USED
*SECNO .984

.984	2.07	1788.17	1788.13	.00	1788.99	.82	13.12	.05	1786.20
370.0	5.1	358.1	6.8	1.6	48.7	2.1	39.9	7.5	1786.80
.98	3.27	7.35	3.30	.070	.065	.070	.000	1786.10	9992.63
.045369	350.	362.	350.	3	11	0	.00	31.07	10023.70

1490 NH CARD USED
*SECNO 1.013
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.013	2.42	1796.22	1796.22	.00	1797.05	.83	7.49	.00	1797.30
370.0	.0	368.3	1.7	.0	50.4	.7	40.1	7.6	1795.40
.98	.00	7.31	2.54	.000	.066	.070	.000	1793.80	9980.47
.054866	150.	151.	150.	0	11	0	.00	31.94	10012.42

1490 NH CARD USED
*SECNO 1.032
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
HEC-1 Concentration Point C617: 6-hr storm controls.
Culvert 617 Arrow Wash and Cavern Drive
Culvert 617 is totaly clogged by boulders on downstream side.

1

Inlet is also plugged, thus culvert 617 is not modeled.
Section 1.032 is BT data for culvert 617.

1.032	1.33	1806.83	1806.83	.00	1807.27	.43	3.16	.04	1807.10
270.0	.0	270.0	.0	.0	51.2	.0	40.2	7.7	1808.50
.99	.00	5.28	.00	.000	.033	.000	.000	1805.50	9966.99
.017268	105.	102.	105.	0	11	0	.00	59.98	10026.97

1490 NH CARD USED
*SECNO 1.039

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.14

1.039	5.87	1807.37	1804.74	.00	1807.45	.09	.15	.03	1802.80
270.0	31.7	199.2	39.2	22.0	75.9	31.1	40.3	7.8	1805.40
.99	1.44	2.62	1.26	.070	.062	.070	.000	1801.50	9982.67
.001756	50.	37.	35.	2	20	0	.00	46.90	10029.57

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1490 NH CARD USED
*SECNO 1.061

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

     1.061      3.78   1807.68   1806.18       .00   1807.78       .11       .33       .01   1808.30
     270.0        .0     270.0        .0        .0     103.5        .0      40.6       7.9   1810.20
      1.01       .00      2.61       .00      .000      .069      .000      .000   1803.90   9973.62
   .005168       110.      117.      120.         2        18         0       .00     46.22  10019.83


1
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T1   *  Fountain Hills North FIS
T2   *  For:  FCDMC #92-04        By:  GVSCE #35
T3   *        Arrow Wash 100-Year Floodway
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92, field survey Aug. 91
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         3         0         0         0         0         0         0   1631.30

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

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

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

 *PROF 2

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO 3.121
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9948.0   10033.0  TYPE=       1  TARGET=       85.010
                 ASHBROOK WASH  Section 3.121    Start with CWSEL 1631.30 feet
                       24-hr storm controls.                Q =     1380 cfs
                 START Hydraulically Similar Reach AS 3
                 See Exhibit 1, Manning's n Value Map.
      3.121       5.55   1631.35   1631.35   1631.33   1632.71      1.36       .00       .00   1628.90
     1380.0      199.7     1149.3      31.0      75.0      112.8      16.0        .0        .0   1629.30
        .00       2.66      10.19      1.94      .100       .040      .100      .000   1625.80   9948.04
    .012784         0.        0.        0.         0          4         0       .00     85.01  10033.05


 CCHV=     .100 CEHV=     .300
 *SECNO  .038
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9970.5   10016.4  TYPE=       1  TARGET=       45.910

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1643.10 ELREA=      1642.70

           HEC-1 Concentration Point C620:  6-hr storm controls.
                 STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
                 START Hydraulically Similar Reach AR 1
                 See Exhibit 1, Manning's n Value Map.
             Culvert M2  Arrow Wash and Arrow Drive
             Culvert M2      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
       .038       3.18   1639.28   1639.28   1639.28   1640.37      1.09      4.08       .03   1643.10
      490.0         .0     490.0        .0        .0      58.4         .0        .8        .4   1642.70
        .01        .00      8.39       .00      .000      .050      .000      .000   1636.10   9982.19
    .029924       320.      260.      220.         0        11         0       .00     26.80  10008.99
```

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

CCHV= .300 CEHV= .500
1490 NH CARD USED
*SECNO .058
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9983.0 10020.0 TYPE= 1 TARGET= 37.010
Right bank is non effective flow area: Hard coded GR's
from STA 10165 to 10515 @ EL 1645
Culvert M2 Outlet. 3-54" CMPs (SECTION 2 OF SC ROUTINE)
Section Surveyed by ALS

.058	2.78	1644.38	1644.38	1644.38	1645.47	1.09	3.23	.00	1646.50
490.0	.0	490.0	.0	.0	58.6	.0	1.0	.4	1646.90
.01	.00	8.37	.00	.000	.050	.000	.000	1641.60	9987.86
.030192	105.	107.	100.	0	11	0	.00	27.20	10015.06

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	3	.022	.70	2.63	.00	4.50	.00	72.30	2	2	1642.65	1641.71

CHART 2 - CORRUGATED METAL PIPE CULVERT
SCALE 2 - MITERED TO CONFORM TO SLOPE

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1490 NH CARD USED
*SECNO .071

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG = 1648.47

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.98

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1650.95	1648.32	3.00	116.	371.	3.071	47.7	1647.30	88.

3470 ENCROACHMENT STATIONS= 9971.0 10032.0 TYPE= 1 TARGET= 61.010
Culvert M2 Inlet. 3-54" CMPs (SECTION 3 OF SC ROUTINE)
Right bank is non effective flow area: Hard coded GR's
from STA 10427 to 10445 @ EL 1650
Culvert M2 BT information surveyed by ALS. South top of curb

.071	6.03	1648.33	.00	1648.33	1648.47	.15	3.00	.00	1656.20
490.0	.0	490.0	.0	.0	159.6	.0	1.2	.5	1655.80
.02	.00	3.07	.00	.000	.050	.000	.000	1642.30	9976.99
.001909	72.	72.	72.	2	0	0	.00	41.49	10018.48

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

CCHV= .100 CEHV= .300
*SECNO .081

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9973.2 10029.9 TYPE= 1 TARGET= 56.710
Culvert M2 Upstream: expanded flow. (SECTION 4 OF SC ROUTINE)

.081	3.27	1649.87	1649.87	1649.87	1651.02	1.15	.20	.30	1656.10
490.0	.0	490.0	.0	.0	57.0	.0	1.3	.5	1657.70
.02	.00	8.59	.00	.000	.050	.000	.000	1646.60	9987.58
.030148	50.	42.	55.	0	11	0	.00	25.26	10012.84

```
*SECNO  .115
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9984.1   10019.2  TYPE=       1  TARGET=       35.120

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1659.80 ELREA=      1659.60

      .115      3.32   1658.12   1658.12   1658.12   1659.22      1.10      5.31       .00   1659.80
    490.0        .0     490.0        .0        .0      58.3        .0       1.5        .6   1659.60
      .03       .00      8.41       .00      .000      .050       .000      .000   1654.80   9988.12
  .029841      180.      177.      175.         0         5          0       .00     26.64  10014.75


*SECNO  .151

3470 ENCROACHMENT STATIONS=     9972.0   10018.5  TYPE=       1  TARGET=       46.520
      .151      3.73   1663.33   1663.13   1663.33   1664.40      1.07      5.18       .00   1668.70
    490.0        .0     490.0        .0        .0      59.0        .0       1.7        .7   1668.70
      .03       .00      8.31       .00      .000      .050       .000      .000   1659.60   9982.97
  .024333      195.      193.      190.         3         8          0       .00     22.64  10005.61


*SECNO  .165

3301 HV CHANGED MORE THAN HVINS

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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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.88

3470 ENCROACHMENT STATIONS=     9968.1   10011.1  TYPE=       1  TARGET=       43.021
           Culvert 619  Outlet at Palisades Blvd.
      .165      4.70   1664.90   1663.44   1664.90   1665.31       .41       .84       .07   1668.00
    490.0        .0     490.0        .0        .0      95.6        .0       1.9        .8   1669.30
      .04       .00      5.12       .00      .000      .050       .000      .000   1660.20   9974.22
  .006853       70.       72.       70.         2        11          0       .00     29.58  10003.80


1490 NH CARD USED
*SECNO  .338
 WATER EL=X5 CARD=   1693.200

3470 ENCROACHMENT STATIONS=     9954.5   10082.8  TYPE=       1  TARGET=      128.319
          HEC-1 Concentration Point C619I:  6-hr storm controls.
            Culvert 619 Arrow Wash and Fountain Hills Blvd.

            Special Culvert Routine not used on culvert 619 hydraulic analysis.
            See THYSYS analysis for hydraulic characteristics of culvert 619.
           ************************************************************************
           ***************************** Culvert 619 ******************************
           ************************************************************************
            HEC-1  C619O Storage Route Rating Curve         WSEL =  1693.2 feet
            HEC-1  C619I Inflow Hydrograph                     Q =     520 cfs
            Reference:      HEC-1  Output  File:  EX100-6.OH1
      .338     16.00   1693.20   1679.99   1693.20   1693.20       .00       .05     14.93   1695.80
    520.0        .0     520.0        .0        .0     1281.9        .0      16.3       2.3   1695.10
      .66       .00       .41       .00      .000      .069       .000      .000   1677.20   9961.84
  .000016      915.      914.      915.         0        14          0       .00    117.61  10079.45


1490 NH CARD USED
*SECNO  .441

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .04

3470 ENCROACHMENT STATIONS=     9952.5   10012.9  TYPE=       1  TARGET=       60.420
      .441      4.61   1693.01   1691.67   1693.01   1693.33       .31       .03       .09   1697.80
    520.0        .0     520.0        .0        .0     115.8        .0      25.1       3.3   1698.40
      .70       .00      4.49       .00      .000      .068       .000      .000   1688.40   9965.44
  .010895      530.      545.      540.         2        21          0       .00     40.04  10005.49


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
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     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

 1490 NH CARD USED
 *SECNO  .541

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9986.5   10011.4  TYPE=       1  TARGET=       24.899
             Culvert M1 Arrow Wash and Mountainside Drive.
             Culvert M1      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
       .541       5.26   1714.76   1714.76   1714.74   1716.15      1.39      10.36       .32   1715.50
     520.0         .0      515.2       4.8        .0      54.3       2.0       26.1       3.7   1714.00
       .71        .00       9.50      2.41       .000      .065      .070       .000   1709.50   9989.19
   .045596       510.       527.       525.          0         8         0        .00     22.20  10011.39

 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO  .561

 3235 SLOPE TOO STEEP, EXCEEDS        .10


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9998.0   10002.0  TYPE=       1  TARGET=        4.020

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1724.74 ELREA=      1724.74

             Culvert M1   Outlet.   1-36"  CMP          (SECTION 2 OF SC ROUTINE)
                Photogrammetric xsec. located 2.4' Downstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1714.47
       .561       8.07   1722.47   1722.47   1722.47   1726.53      4.06       7.01       1.34   1714.47
     520.0         .0      520.0        .0        .0      32.1         .0       26.2        3.7   1714.47
       .71        .00       16.18      .00       .000      .060      .000       .000   1714.40   9998.00
   .114694       95.       102.       105.          0        14         0        .00      4.00  10002.00

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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


 SPECIAL CULVERT

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      1          .024        .90       2.63        .00       3.00        .00     120.70        2          3     1717.61    1714.47

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

 5130, EGIC= 2018.46..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 2132.18 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO  .583

 SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1727.01

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 28.82

 SPECIAL CULVERT

      EGIC       EGOC        H4       QWEIR      QCULV       VCH        ACULV      ELTRD      WEIRLN
   2018.46    2132.18        .48        465.       55.      1.296          7.1    1725.16        127.


 3470 ENCROACHMENT STATIONS=     9928.8   10063.6  TYPE=       1  TARGET=      134.811
             Culvert M1   Inlet.    1-36"  CMP          (SECTION 3 OF SC ROUTINE)
              Base Channel Elevations were lowered to Culvert Invert EL 1717.61
             Culvert M1 BT information surveyed by Town.
             Culvert M1 BT information coded per figure 3.16 (HEC-2, Sept 90)
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      .583      9.40   1727.00       .00   1727.00   1727.01       .01       .48       .00   1717.61
    520.0     225.3      48.7     245.9     291.7      37.6     293.5      27.1       3.9   1717.61
      .75       .77      1.30       .84       .066      .060      .066      .000   1717.60   9928.76
  .000138       121.      121.      121.         1         0         0       .00    134.81  10063.57


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .602

3470 ENCROACHMENT STATIONS=     9918.5   10038.7  TYPE=       1  TARGET=      120.220
           Culvert M1      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      .602      6.22   1727.02   1722.43   1727.02   1727.03       .01       .02       .00   1727.50
    520.0        .0     518.9       1.1        .0     583.2       4.5      28.5       4.2   1725.40
      .78       .00        .89       .25       .000      .067      .070      .000   1720.80   9919.40
  .000188       115.       99.       90.         2        25         0       .00    119.31  10038.71


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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

1490 NH CARD USED
*SECNO  .645

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9987.0   10033.7  TYPE=       1  TARGET=       46.720
         HEC-1 Concentration Point C618:  6-hr storm controls.
           Culvert 618 Arrow Wash and Mimosa Drive
           Culvert 618     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .645      2.59   1730.39   1730.39   1730.39   1731.27       .88       .12       .26   1734.10
    400.0        .0     400.0        .0        .0      53.1        .0      30.2       4.6   1738.20
      .79       .00        7.53       .00       .000      .067      .000      .000   1727.80   9992.63
  .060013       215.      228.      220.         0        18         0       .00     30.86  10023.49


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO  .654

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9995.7   10013.2  TYPE=       1  TARGET=       17.560
         HEC-1 Concentration Point C6180:  6-hr storm controls.
           Culvert 618  Outlet.   1-36" CMP          (SECTION 2 OF SC ROUTINE)
           Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
             Photogrammetric xsec. located 15.5' Upstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1729.08
      .654      6.77   1735.85   1735.85   1735.82   1737.34      1.50      1.33       .31   1729.08
    370.0      69.1      238.7      62.3      15.2      20.3      13.9      30.2       4.6   1729.08
      .79       4.56      11.76       4.47       .061      .060      .060      .000   1729.08   9995.66
  .017602        45.       44.       45.         0        18         0       .00     17.56  10013.22


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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


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     1          .024      .90      2.63       .00       .75       .00     97.00      2         3      1732.70   1729.08

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5130, EGIC=40521.66..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC=******** ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO  .672
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SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1745.97

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 28.07

SPECIAL CULVERT

     EGIC       EGOC        H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
 40521.66  187804.50      8.63        365.         3.       .656         .4    1744.35        126.


3470 ENCROACHMENT STATIONS=     9943.6   10116.3  TYPE=       1  TARGET=      172.720
           Culvert 618  Inlet.    1-36"  CMP          (SECTION 3 OF SC ROUTINE)
           Inlet is free, but outlet is 7/8 plugged.  Model using 0.75' Dia.
           Base Channel Elevations were revised to Culvert sediment EL 1732.7
           Culvert 618 BT information surveyed  by ALS.  WEST TOP OF CURB
      .672      13.27   1745.97       .00   1745.97   1745.97       .00      8.63       .00   1732.70
    370.0      104.7      26.1      239.1     255.9      39.8      683.9      31.4       4.8   1732.70
      .86        .41       .66        .35      .065      .060       .069      .000   1732.70   9943.66
  .000022        97.       97.        97.         0         0          0       .00    172.67  10116.33


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO  .679

3470 ENCROACHMENT STATIONS=     9948.9   10104.9  TYPE=       1  TARGET=      155.980
         HEC-1 Concentration Point C618I:  6-hr storm controls.
           Culvert 618 Upstream:  expanded flow.      (SECTION 4 OF SC ROUTINE)
      .679      12.57   1745.97   1735.62   1745.97   1745.97       .00       .00       .00   1743.60
    370.0        1.4     359.3       9.3      14.5    1017.7      55.5      32.3       5.0   1740.70
      .89        .09       .35        .17      .070      .069       .070      .000   1733.40   9948.93
  .000016        40.       36.        40.         2        20          0       .00    155.96  10104.89


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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

1490 NH CARD USED
*SECNO  .757

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .04

3470 ENCROACHMENT STATIONS=     9927.1   10014.0  TYPE=       1  TARGET=       86.910
      .757       3.07   1745.87   1745.19   1745.87   1746.05       .18       .02       .05   1744.80
    370.0       90.4     271.2       8.4      37.7      73.1       7.6      38.0       6.1   1745.10
      .93       2.40      3.71       1.11      .070      .069       .070      .000   1742.80   9927.15
  .010168        385.      414.       380.         2        25          0       .00     86.86  10014.01


1490 NH CARD USED
*SECNO  .836
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9971.5   10022.2  TYPE=       1  TARGET=       50.650
      .836       1.51   1759.11   1759.11   1759.10   1759.71       .60      8.04       .13   1758.30
    370.0      102.1      260.9       7.0      18.0      40.1       2.2      38.8       6.7   1758.00
      .95       5.67       6.51       3.18      .070      .060       .070      .000   1757.60   9971.54
  .051825        390.      419.       420.         0        11          0       .00     50.65  10022.19


1490 NH CARD USED
*SECNO  .916

3470 ENCROACHMENT STATIONS=     9983.6   10028.4  TYPE=       1  TARGET=       44.790
      .916       2.28   1775.18   1775.09   1775.18   1775.82       .64     16.10       .01   1773.10
    370.0       23.4      284.4       62.2       6.4      40.6      16.1      39.4       7.2   1773.20
      .96       3.64       7.00       3.86      .070      .061       .070      .000   1772.90   9983.61
  .029976        410.      418.       410.         5        11          0       .00     44.74  10028.34


1490 NH CARD USED
*SECNO  .984

3470 ENCROACHMENT STATIONS=     9992.6   10023.7  TYPE=       1  TARGET=       31.070
      .984       2.08   1788.18   1788.14   1788.17   1788.99       .81     13.12       .05   1786.20
    370.0        5.1     358.1       6.8       1.6      48.8       2.1      39.9       7.5   1786.80
      .98       3.27       7.34       3.30      .070      .065       .070      .000   1786.10   9992.63
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   .045134      350.      362.      350.         3        11         0       .00     31.07  10023.70

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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


1490 NH CARD USED
*SECNO 1.013
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9977.3   10012.4  TYPE=       1  TARGET=       35.130
     1.013      2.42   1796.22   1796.22   1796.22   1797.05       .82      7.45       .00   1797.30
     370.0        .0     368.3       1.7        .0      50.4        .7      40.1       7.6   1795.40
       .98       .00      7.30      2.54      .000      .066      .070      .000   1793.80   9980.47
   .054578      150.      151.      150.         0        11         0       .00     31.95  10012.42


1490 NH CARD USED
*SECNO 1.032
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9960.3   10034.3  TYPE=       1  TARGET=       74.020
          HEC-1 Concentration Point C617:  6-hr storm controls.
            Culvert 617 Arrow Wash and Cavern Drive
            Culvert 617 is totaly clogged by boulders on downstream side.
                        Inlet is also plugged, thus culvert 617 is not modeled.
            Section 1.032 is BT data for culvert 617.
     1.032      1.33   1806.83   1806.83   1806.83   1807.27       .43      3.15       .04   1807.10
     270.0        .0     270.0        .0        .0      51.2        .0      40.2       7.7   1808.50
       .99       .00      5.27       .00      .000      .033      .000      .000   1805.50   9966.97
   .017233      105.      102.      105.         0        11         0       .00     60.00  10026.97


1490 NH CARD USED
*SECNO 1.039

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.13


3470 ENCROACHMENT STATIONS=     9982.7   10029.6  TYPE=       1  TARGET=       46.900
     1.039      5.87   1807.37   1804.74   1807.37   1807.45       .09       .15       .03   1802.80
     270.0      31.7     199.2      39.2      22.0      75.9      31.1      40.3       7.8   1805.40
       .99      1.44      2.62      1.26      .070      .062      .070      .000   1801.50   9982.67
   .001756       50.       37.       35.         2        20         0       .00     46.89  10029.57


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   29MAR95      14:50:34                                                                          PAGE   30

    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


1490 NH CARD USED
*SECNO 1.061

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


3470 ENCROACHMENT STATIONS=     9969.9   10023.4  TYPE=       1  TARGET=       53.521
     1.061      3.78   1807.68   1806.18   1807.68   1807.78       .11       .33       .01   1808.30
     270.0        .0     270.0        .0        .0     103.5        .0      40.6       7.9   1810.20
      1.01       .00      2.61       .00      .000      .069      .000      .000   1803.90   9973.62
   .005168      110.      117.      120.         2        18         0       .00     46.22  10019.83


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   29MAR95      14:50:34                                                                          PAGE   31


                                                                    THIS RUN EXECUTED 29MAR95    14:50:39

 ************************************
 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

Arrow Wash 100-Year

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG
*	.071	1648.32	1647.15	1650.95	1647.30	371.10	116.20	16.00	3.01	6.03	1648.33	3.07	1648.47
*	.071	1648.32	1647.15	1650.95	1647.30	371.04	115.76	16.00	3.00	6.03	1648.33	3.07	1648.47
*	.583	2132.18	1720.61	2018.46	1725.16	54.73	464.57	17.00	.48	9.40	1727.00	1.30	1727.01
*	.583	2132.18	1720.61	2018.46	1725.16	54.74	464.77	17.00	.48	9.40	1727.00	1.30	1727.01
*	.672	187804.50	1733.44	40521.66	1744.35	2.73	366.10	17.00	8.63	13.27	1745.97	.66	1745.97
*	.672	187804.50	1733.44	40521.66	1744.35	2.73	364.97	17.00	8.63	13.27	1745.97	.66	1745.97

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Arrow Wash 100-Year

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	3.121	1631.33	.03	1632.71	85.01	198.30	1151.24	30.46	.00	.00	9988.70	10017.80	.00
*	3.121	1631.35	.02	1632.71	85.01	199.72	1149.26	31.02	85.01	9948.04	9988.70	10017.80	10033.05
*	.038	1639.28	.00	1640.37	26.80	.00	490.00	.00	.00	.00	9970.50	10016.40	.00
*	.038	1639.28	.00	1640.37	26.80	.00	490.00	.00	45.91	9970.50	9970.50	10016.40	10016.41
*	.058	1644.38	.00	1645.47	27.20	.00	490.00	.00	.00	.00	9983.00	10020.00	.00
*	.058	1644.38	.00	1645.47	27.20	.00	490.00	.00	37.01	9983.00	9983.00	10020.00	10020.01
*	.071	1648.33	.00	1648.47	41.50	.00	490.00	.00	.00	.00	9971.00	10032.00	.00
*	.071	1648.33	.00	1648.47	41.49	.00	490.00	.00	61.01	9971.00	9971.00	10032.00	10032.01
*	.081	1649.87	.00	1651.02	25.27	.00	490.00	.00	.00	.00	9973.20	10029.90	.00
*	.081	1649.87	.00	1651.02	25.26	.00	490.00	.00	56.71	9973.20	9973.20	10029.90	10029.91
*	.115	1658.12	.00	1659.22	26.64	.00	490.00	.00	.00	.00	9984.10	10019.20	.00
*	.115	1658.12	.00	1659.22	26.64	.00	490.00	.00	35.12	9984.09	9984.10	10019.20	10019.21
	.151	1663.33	.00	1664.40	22.64	.00	490.00	.00	.00	.00	9972.00	10018.50	.00
	.151	1663.33	.00	1664.40	22.64	.00	490.00	.00	46.52	9971.99	9972.00	10018.50	10018.51
*	.165	1664.90	.00	1665.31	29.58	.00	490.00	.00	.00	.00	9968.10	10011.10	.00
*	.165	1664.90	.00	1665.31	29.58	.00	490.00	.00	43.02	9968.09	9968.10	10011.10	10011.11
*	.338	1693.20	.00	1693.20	117.61	.00	520.00	.00	.00	.00	9954.50	10082.80	.00
*	.338	1693.20	.00	1693.20	117.61	.00	520.00	.00	128.32	9954.49	9954.50	10082.80	10082.81
*	.441	1693.01	.00	1693.33	40.04	.00	520.00	.00	.00	.00	9952.50	10012.90	.00
*	.441	1693.01	.00	1693.33	40.04	.00	520.00	.00	60.42	9952.49	9952.50	10012.90	10012.91
*	.541	1714.74	.00	1716.15	22.17	.00	515.57	4.43	.00	.00	9986.50	10006.30	.00
*	.541	1714.76	.02	1716.15	22.20	.00	515.18	4.82	24.90	9986.49	9986.50	10006.30	10011.39
*	.561	1722.47	.00	1726.53	4.00	.00	520.00	.00	.00	.00	9998.00	10002.00	.00
*	.561	1722.47	.00	1726.53	4.00	.00	520.00	.00	4.02	9997.99	9998.00	10002.00	10002.01
*	.583	1727.00	.00	1727.01	134.81	225.32	48.75	245.93	.00	.00	9998.00	10002.00	.00
*	.583	1727.00	.00	1727.01	134.81	225.33	48.75	245.93	134.81	9928.76	9998.00	10002.00	10063.57
	.602	1727.02	.00	1727.03	119.31	.00	518.91	1.09	.00	.00	9918.50	10033.20	.00
	.602	1727.02	.00	1727.03	119.31	.00	518.91	1.09	120.22	9918.49	9918.50	10033.20	10038.71
*	.645	1730.39	.00	1731.27	30.86	.00	400.00	.00	.00	.00	9987.00	10033.70	.00
*	.645	1730.39	.00	1731.27	30.86	.00	400.00	.00	46.72	9986.99	9987.00	10033.70	10033.71
*	.654	1735.82	.00	1737.34	17.56	68.67	239.42	61.91	.00	.00	10003.00	10006.00	.00
*	.654	1735.85	.03	1737.34	17.56	69.06	238.67	62.26	17.56	9995.66	10003.00	10006.00	10013.22

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	.672	1745.97	.00	1745.97	172.71	104.74	26.12	239.14	.00	.00	9995.00	9998.00	.00
*	.672	1745.97	.00	1745.97	172.67	104.75	26.12	239.13	172.72	9943.62	9995.00	9998.00	10116.34
	.679	1745.97	.00	1745.97	155.98	1.38	359.33	9.29	.00	.00	9961.20	10083.70	.00
	.679	1745.97	.00	1745.97	155.96	1.38	359.34	9.28	155.98	9948.92	9961.20	10083.70	10104.90

*	.757	1745.87	.00	1746.05	86.91	90.46	271.07	8.47	.00	.00	9959.90	9992.40	.00
*	.757	1745.87	.00	1746.05	86.86	90.37	271.22	8.40	86.91	9927.13	9959.90	9992.40	10014.04
*	.836	1759.10	.00	1759.71	50.65	102.07	260.91	7.01	.00	.00	9985.90	10018.20	.00
*	.836	1759.11	.00	1759.71	50.65	102.06	260.91	7.03	50.65	9971.54	9985.90	10018.20	10022.19
	.916	1775.18	.00	1775.82	44.79	23.47	284.25	62.28	.00	.00	9989.80	10008.60	.00
	.916	1775.18	.00	1775.82	44.74	23.45	284.37	62.18	44.79	9983.60	9989.80	10008.60	10028.39
	.984	1788.17	.00	1788.99	31.07	5.08	358.12	6.80	.00	.00	9994.20	10020.70	.00
	.984	1788.18	.00	1788.99	31.07	5.09	358.09	6.82	31.07	9992.63	9994.20	10020.70	10023.70
*	1.013	1796.22	.00	1797.05	31.94	.00	368.31	1.69	.00	.00	9977.30	10010.80	.00
*	1.013	1796.22	.00	1797.05	31.95	.00	368.30	1.70	35.13	9977.29	9977.30	10010.80	10012.42
*	1.032	1806.83	.00	1807.27	59.98	.00	270.00	.00	.00	.00	9960.30	10034.30	.00
*	1.032	1806.83	.00	1807.27	60.00	.00	270.00	.00	74.02	9960.29	9960.30	10034.30	10034.31
*	1.039	1807.37	.00	1807.45	46.90	31.67	199.15	39.17	.00	.00	9992.30	10009.40	.00
*	1.039	1807.37	.00	1807.45	46.89	31.67	199.16	39.16	46.90	9982.67	9992.30	10009.40	10029.57
*	1.061	1807.68	.00	1807.78	46.22	.00	270.00	.00	.00	.00	9969.90	10023.40	.00
*	1.061	1807.68	.00	1807.78	46.22	.00	270.00	.00	53.52	9969.89	9969.90	10023.40	10023.41

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Arrow Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	3.121	.00	.00	.00	1625.80	1380.00	1631.33	1631.33	1632.71	130.68	10.26	201.97	120.72
*	3.121	.00	.00	.00	1625.80	1380.00	1631.35	1631.35	1632.71	127.84	10.19	203.79	122.05
*	.038	259.70	.00	.00	1636.10	490.00	1639.28	1639.28	1640.37	298.83	8.39	58.41	28.35
*	.038	259.70	.00	.00	1636.10	490.00	1639.28	1639.28	1640.37	299.24	8.39	58.38	28.33
*	.058	107.30	.00	.00	1641.60	490.00	1644.38	1644.38	1645.47	302.65	8.38	58.51	28.17
*	.058	107.30	.00	.00	1641.60	490.00	1644.38	1644.38	1645.47	301.92	8.37	58.56	28.20
*	.071	72.30	1647.30	1647.15	1642.30	490.00	1648.33	.00	1648.47	19.07	3.07	159.65	112.22
*	.071	72.30	1647.30	1647.15	1642.30	490.00	1648.33	.00	1648.47	19.09	3.07	159.57	112.14
*	.081	41.90	.00	.00	1646.60	490.00	1649.87	1649.87	1651.02	301.29	8.59	57.06	28.23
*	.081	41.90	.00	.00	1646.60	490.00	1649.87	1649.87	1651.02	301.48	8.59	57.05	28.22
*	.115	176.90	.00	.00	1654.80	490.00	1658.12	1658.12	1659.22	298.14	8.41	58.30	28.38
*	.115	176.90	.00	.00	1654.80	490.00	1658.12	1658.12	1659.22	298.41	8.41	58.28	28.37
	.151	192.90	.00	.00	1659.60	490.00	1663.33	1663.13	1664.40	243.53	8.31	58.97	31.40
	.151	192.90	.00	.00	1659.60	490.00	1663.33	1663.13	1664.40	243.33	8.31	58.99	31.41
*	.165	71.50	.00	.00	1660.20	490.00	1664.90	1663.44	1665.31	68.52	5.12	95.63	59.20
*	.165	71.50	.00	.00	1660.20	490.00	1664.90	1663.44	1665.31	68.53	5.12	95.63	59.19
*	.338	913.90	.00	.00	1677.20	520.00	1693.20	1679.99	1693.20	.16	.41	1281.89	1297.12
*	.338	913.90	.00	.00	1677.20	520.00	1693.20	1679.99	1693.20	.16	.41	1281.89	1297.12
*	.441	544.90	.00	.00	1688.40	520.00	1693.01	1691.67	1693.33	108.95	4.49	115.76	49.82
*	.441	544.90	.00	.00	1688.40	520.00	1693.01	1691.67	1693.33	108.95	4.49	115.76	49.82
*	.541	527.10	.00	.00	1709.50	520.00	1714.74	1714.74	1716.15	466.11	9.57	55.76	24.09
*	.541	527.10	.00	.00	1709.50	520.00	1714.76	1714.76	1716.15	455.96	9.50	56.25	24.35
*	.561	102.10	.00	.00	1714.40	520.00	1722.47	1722.47	1726.53	265.03	16.17	32.15	31.94
*	.561	102.10	.00	.00	1714.40	520.00	1722.47	1722.47	1726.53	1146.94	16.18	32.15	15.35
*	.583	120.70	1725.16	1720.61	1717.60	520.00	1727.00	.00	1727.01	1.38	1.30	622.72	442.52
*	.583	120.70	1725.16	1720.61	1717.60	520.00	1727.00	.00	1727.01	1.38	1.30	622.79	442.59
	.602	99.00	.00	.00	1720.80	520.00	1727.02	1722.43	1727.03	1.88	.89	587.62	379.56
	.602	99.00	.00	.00	1720.80	520.00	1727.02	1722.43	1727.03	1.88	.89	587.64	379.57
*	.645	227.80	.00	.00	1727.80	400.00	1730.39	1730.39	1731.27	599.50	7.53	53.13	16.34
*	.645	227.80	.00	.00	1727.80	400.00	1730.39	1730.39	1731.27	600.13	7.53	53.11	16.33
*	.654	43.60	.00	.00	1729.08	370.00	1735.82	1735.82	1737.34	179.44	11.84	48.93	27.62
*	.654	43.60	.00	.00	1729.08	370.00	1735.85	1735.85	1737.34	176.02	11.76	49.39	27.89

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K

*	.672	97.00	1744.35	1733.44	1732.70	370.00	1745.97	.00	1745.97	.22	.66	980.05	783.29
*	.672	97.00	1744.35	1733.44	1732.70	370.00	1745.97	.00	1745.97	.22	.66	979.65	782.86
	.679	35.70	.00	.00	1733.40	370.00	1745.97	1735.63	1745.97	.16	.35	1088.17	915.98
	.679	35.70	.00	.00	1733.40	370.00	1745.97	1735.62	1745.97	.16	.35	1087.81	915.52
*	.757	413.90	.00	.00	1742.80	370.00	1745.87	1745.19	1746.05	101.20	3.70	118.59	36.78
*	.757	413.90	.00	.00	1742.80	370.00	1745.87	1745.19	1746.05	101.68	3.71	118.37	36.69
*	.836	419.00	.00	.00	1757.60	370.00	1759.10	1759.10	1759.71	521.52	6.52	60.18	16.20
*	.836	419.00	.00	.00	1757.60	370.00	1759.11	1759.11	1759.71	518.25	6.51	60.30	16.25
	.916	418.30	.00	.00	1772.90	370.00	1775.18	1775.09	1775.82	298.40	6.99	63.29	21.42
	.916	418.30	.00	.00	1772.90	370.00	1775.18	1775.09	1775.82	299.76	7.00	63.18	21.37
	.984	362.00	.00	.00	1786.10	370.00	1788.17	1788.13	1788.99	453.69	7.35	52.34	17.37
	.984	362.00	.00	.00	1786.10	370.00	1788.18	1788.14	1788.99	451.34	7.34	52.43	17.42
*	1.013	150.50	.00	.00	1793.80	370.00	1796.22	1796.22	1797.05	548.66	7.31	51.02	15.80
*	1.013	150.50	.00	.00	1793.80	370.00	1796.22	1796.22	1797.05	545.78	7.30	51.11	15.84
*	1.032	101.90	.00	.00	1805.50	270.00	1806.83	1806.83	1807.27	172.68	5.28	51.17	20.55
*	1.032	101.90	.00	.00	1805.50	270.00	1806.83	1806.83	1807.27	172.33	5.27	51.20	20.57
*	1.039	36.80	.00	.00	1801.50	270.00	1807.37	1804.74	1807.45	17.56	2.62	129.01	64.44
*	1.039	36.80	.00	.00	1801.50	270.00	1807.37	1804.74	1807.45	17.56	2.62	128.99	64.43
*	1.061	116.70	.00	.00	1803.90	270.00	1807.68	1806.18	1807.78	51.68	2.61	103.48	37.56
*	1.061	116.70	.00	.00	1803.90	270.00	1807.68	1806.18	1807.78	51.68	2.61	103.48	37.56

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Arrow Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	3.121	1380.00	1631.33	.00	.00	.03	85.01	.00
*	3.121	1380.00	1631.35	.02	.00	.02	85.01	.00
*	.038	490.00	1639.28	.00	7.95	.00	26.80	259.70
*	.038	490.00	1639.28	.00	7.93	.00	26.80	259.70
*	.058	490.00	1644.38	.00	5.10	.00	27.20	107.30
*	.058	490.00	1644.38	.00	5.10	.00	27.20	107.30
*	.071	490.00	1648.33	.00	3.95	.00	41.50	72.30
*	.071	490.00	1648.33	.00	3.94	.00	41.49	72.30
*	.081	490.00	1649.87	.00	1.54	.00	25.27	41.90
*	.081	490.00	1649.87	.00	1.55	.00	25.26	41.90
*	.115	490.00	1658.12	.00	8.25	.00	26.64	176.90
*	.115	490.00	1658.12	.00	8.25	.00	26.64	176.90
	.151	490.00	1663.33	.00	5.21	.00	22.64	192.90
	.151	490.00	1663.33	.00	5.21	.00	22.64	192.90
*	.165	490.00	1664.90	.00	1.57	.00	29.58	71.50
*	.165	490.00	1664.90	.00	1.57	.00	29.58	71.50
*	.338	520.00	1693.20	.00	28.30	.00	117.61	913.90
*	.338	520.00	1693.20	.00	28.30	.00	117.61	913.90
*	.441	520.00	1693.01	.00	-.19	.00	40.04	544.90
*	.441	520.00	1693.01	.00	-.19	.00	40.04	544.90
*	.541	520.00	1714.74	.00	21.73	.00	22.17	527.10
*	.541	520.00	1714.76	.02	21.75	.02	22.20	527.10
*	.561	520.00	1722.47	.00	7.73	.00	4.00	102.10
*	.561	520.00	1722.47	.00	7.71	.00	4.00	102.10
*	.583	520.00	1727.00	.00	4.53	.00	134.81	120.70
*	.583	520.00	1727.00	.00	4.53	.00	134.81	120.70
	.602	520.00	1727.02	.00	.02	.00	119.31	99.00
	.602	520.00	1727.02	.00	.02	.00	119.31	99.00
*	.645	400.00	1730.39	.00	3.38	.00	30.86	227.80
*	.645	400.00	1730.39	.00	3.38	.00	30.86	227.80
*	.654	370.00	1735.82	.00	5.43	.00	17.56	43.60
*	.654	370.00	1735.85	.03	5.45	.03	17.56	43.60

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.672	370.00	1745.97	.00	10.15	.00	172.71	97.00
*	.672	370.00	1745.97	.00	10.12	.00	172.67	97.00
	.679	370.00	1745.97	.00	.00	.00	155.98	35.70
	.679	370.00	1745.97	.00	.00	.00	155.96	35.70
*	.757	370.00	1745.87	.00	-.10	.00	86.91	413.90
*	.757	370.00	1745.87	.00	-.10	.00	86.86	413.90
*	.836	370.00	1759.10	.00	13.23	.00	50.65	419.00
*	.836	370.00	1759.11	.00	13.24	.00	50.65	419.00
	.916	370.00	1775.18	.00	16.08	.00	44.79	418.30
	.916	370.00	1775.18	.00	16.07	.00	44.74	418.30
	.984	370.00	1788.17	.00	12.99	.00	31.07	362.00
	.984	370.00	1788.18	.00	12.99	.00	31.07	362.00
*	1.013	370.00	1796.22	.00	8.05	.00	31.94	150.50
*	1.013	370.00	1796.22	.00	8.05	.00	31.95	150.50
*	1.032	270.00	1806.83	.00	10.61	.00	59.98	101.90
*	1.032	270.00	1806.83	.00	10.61	.00	60.00	101.90
*	1.039	270.00	1807.37	.00	.53	.00	46.90	36.80
*	1.039	270.00	1807.37	.00	.53	.00	46.89	36.80
*	1.061	270.00	1807.68	.00	.31	.00	46.22	116.70
*	1.061	270.00	1807.68	.00	.31	.00	46.22	116.70

1

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=      3.121  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.121  PROFILE=  2  CRITICAL DEPTH ASSUMED

CAUTION SECNO=       .038  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .038  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .038  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .038  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .058  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .058  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .058  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .058  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .071  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .071  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .081  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .081  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .081  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .081  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .115  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .115  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .115  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .115  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .165  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .165  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

NOTE    SECNO=       .338  PROFILE=  1  WSEL BASED ON X5 CARD
NOTE    SECNO=       .338  PROFILE=  2  WSEL BASED ON X5 CARD

WARNING SECNO=       .441  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .441  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .541  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .541  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=       .561  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=       .561  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .561  PROFILE=  2  SLOPE TOO STEEP
CAUTION SECNO=       .561  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=       .583  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       .583  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=       .645  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .645  PROFILE=  1  MINIMUM SPECIFIC ENERGY
1
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 CAUTION SECNO=       .645  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .645  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=       .654  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .654  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=       .654  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=       .654  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=       .672  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=       .672  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=       .757  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=      1.039  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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 WARNING SECNO=      1.061  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.061  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

1
    29MAR95      14:50:34                                                    PAGE   40

 Floodway width summary:       Arrow Wash 100-Year
 Profile No.  2
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Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
3.121	.02	85.01	9948.04	55.21	10003.25	29.80	10033.05
.038	.00	45.91	9970.50	22.95	9993.45	22.96	10016.41
.058	.00	37.01	9983.00	18.50	10001.50	18.51	10020.01
.071	.00	61.01	9971.00	30.50	10001.50	30.51	10032.01
.081	.00	56.71	9973.20	28.35	10001.55	28.36	10029.91
.115	.00	35.12	9984.09	17.56	10001.65	17.56	10019.21
.151	.00	46.52	9971.99	23.26	9995.25	23.26	10018.51
.165	.00	43.02	9968.09	21.51	9989.60	21.51	10011.11
.338	.00	128.32	9954.49	64.16	10018.65	64.16	10082.81
.441	.00	60.42	9952.49	30.21	9982.70	30.21	10012.91
.541	.02	24.90	9986.49	9.91	9996.40	14.99	10011.39
.561	.00	4.02	9997.99	2.01	10000.00	2.01	10002.01
.583	.00	134.81	9928.76	71.24	10000.00	63.57	10063.57
.602	.00	120.22	9918.49	57.36	9975.85	62.86	10038.71
.645	.00	46.72	9986.99	23.36	10010.35	23.36	10033.71
.654	.03	17.56	9995.66	8.84	10004.50	8.72	10013.22
.672	.00	172.72	9943.62	52.88	9996.50	119.84	10116.34
.679	.00	155.98	9948.92	73.53	10022.45	82.45	10104.90
.757	.00	86.91	9927.13	49.02	9976.15	37.89	10014.04
.836	.00	50.65	9971.54	30.51	10002.05	20.14	10022.19
.916	.00	44.79	9983.60	15.60	9999.20	29.19	10028.39
.984	.00	31.07	9992.63	14.82	10007.45	16.25	10023.70
1.013	.00	35.13	9977.29	16.76	9994.05	18.37	10012.42
1.032	.00	74.02	9960.29	37.01	9997.30	37.01	10034.31
1.039	.00	46.90	9982.67	18.18	10000.85	28.72	10029.57
1.061	.00	53.52	9969.89	26.76	9996.65	26.76	10023.41

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1
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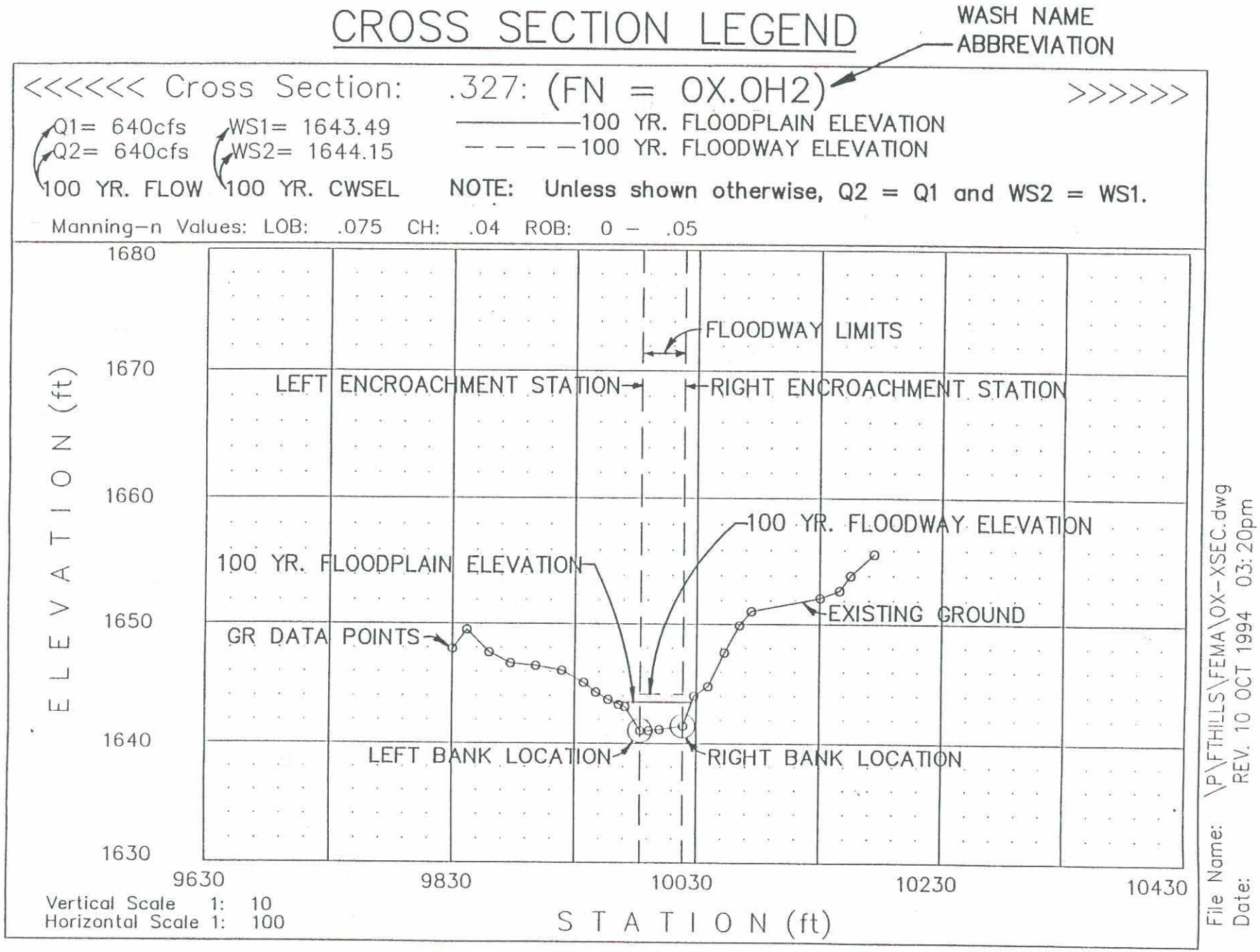
 FLOODWAY DATA,        Arrow Wash 100-Year
 PROFILE NO.  2
```

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
3.121	85.	204.	6.8	1631.3	1631.3	.0
.038	27.	58.	8.4	1639.3	1639.3	.0
.058	27.	59.	8.4	1644.4	1644.4	.0
.071	41.	160.	3.1	1648.3	1648.3	.0
.081	25.	57.	8.6	1649.9	1649.9	.0
.115	27.	58.	8.4	1658.1	1658.1	.0
.151	23.	59.	8.3	1663.3	1663.3	.0
.165	30.	96.	5.1	1664.9	1664.9	.0
.338	118.	1282.	.4	1693.2	1693.2	.0
.441	40.	116.	4.5	1693.0	1693.0	.0
.541	22.	56.	9.2	1714.7	1714.7	.0
.561	4.	32.	16.2	1722.5	1722.5	.0
.583	135.	623.	.8	1727.0	1727.0	.0
.602	119.	588.	.9	1727.0	1727.0	.0
.645	31.	53.	7.5	1730.4	1730.4	.0
.654	18.	49.	7.5	1735.8	1735.8	.0
.672	173.	980.	.4	1746.0	1746.0	.0
.679	156.	1088.	.3	1746.0	1746.0	.0
.757	87.	118.	3.1	1745.9	1745.9	.0
.836	51.	60.	6.1	1759.1	1759.1	.0
.916	45.	63.	5.9	1775.2	1775.2	.0
.984	31.	52.	7.1	1788.2	1788.2	.0
1.013	32.	51.	7.2	1796.2	1796.2	.0
1.032	60.	51.	5.3	1806.8	1806.8	.0
1.039	47.	129.	2.1	1807.4	1807.4	.0
1.061	46.	103.	2.6	1807.7	1807.7	.0

CROSS SECTIONS

CROSS SECTION LEGEND



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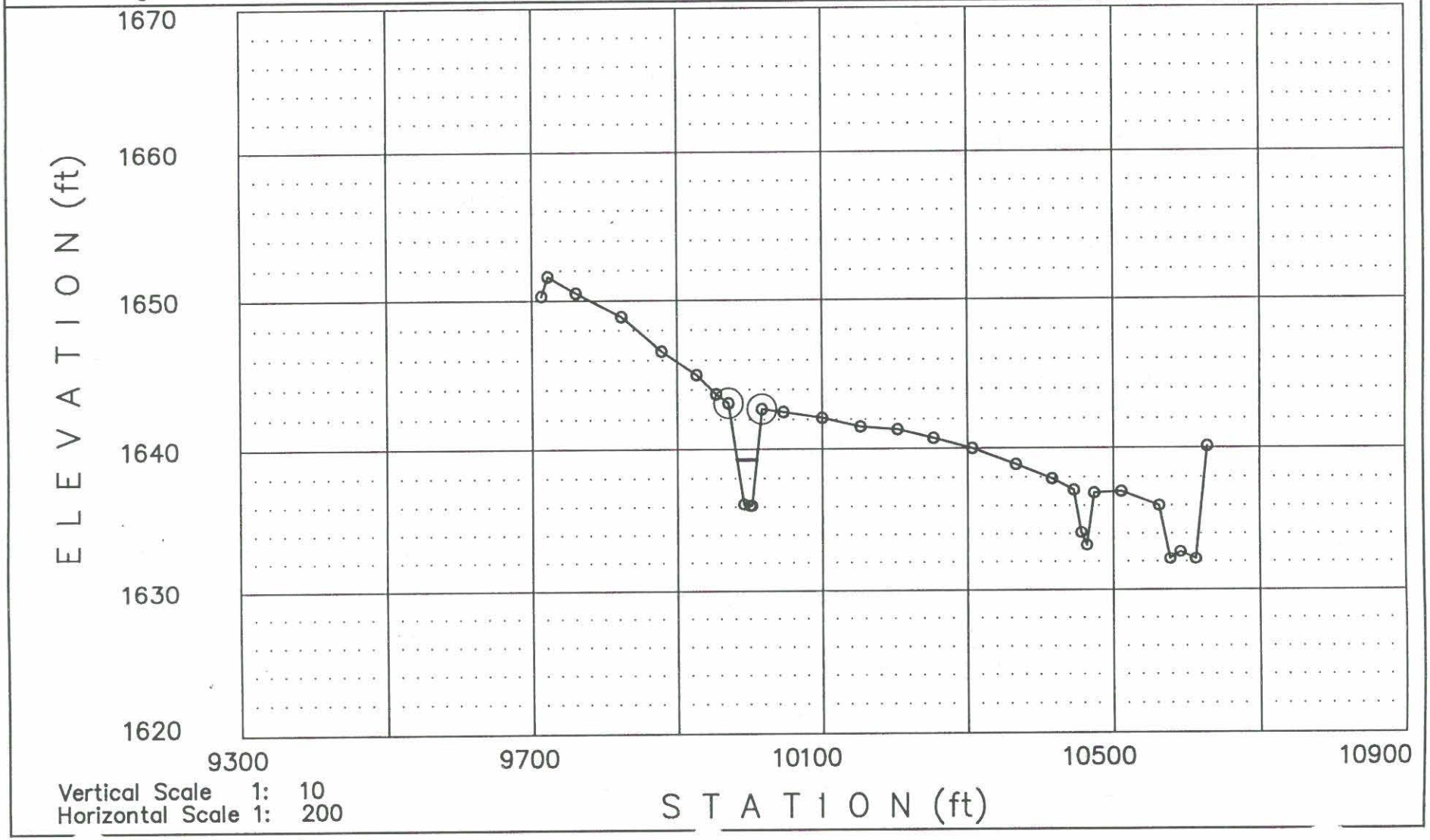
Q1= 490cfs WS1= 1639.28

Manning-n Values: LOB: 0 CH: .05 ROB: 0



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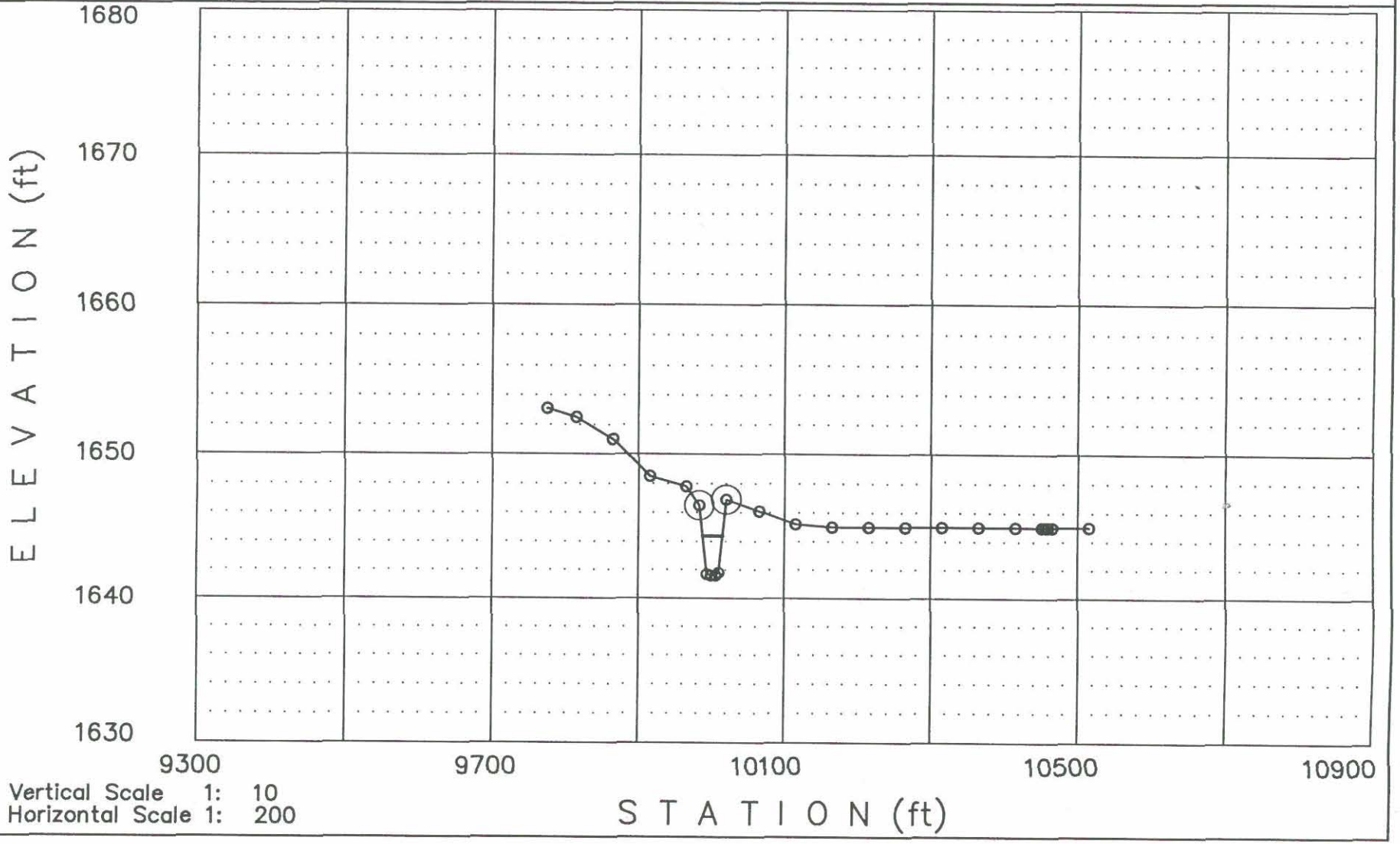
<<<<<< Cross Section: .058: (FN = AR.OH2) >>>>>>

Q1= 490cfs WS1= 1644.38

Manning–n Values: LOB: 0 CH: .05 ROB: 0



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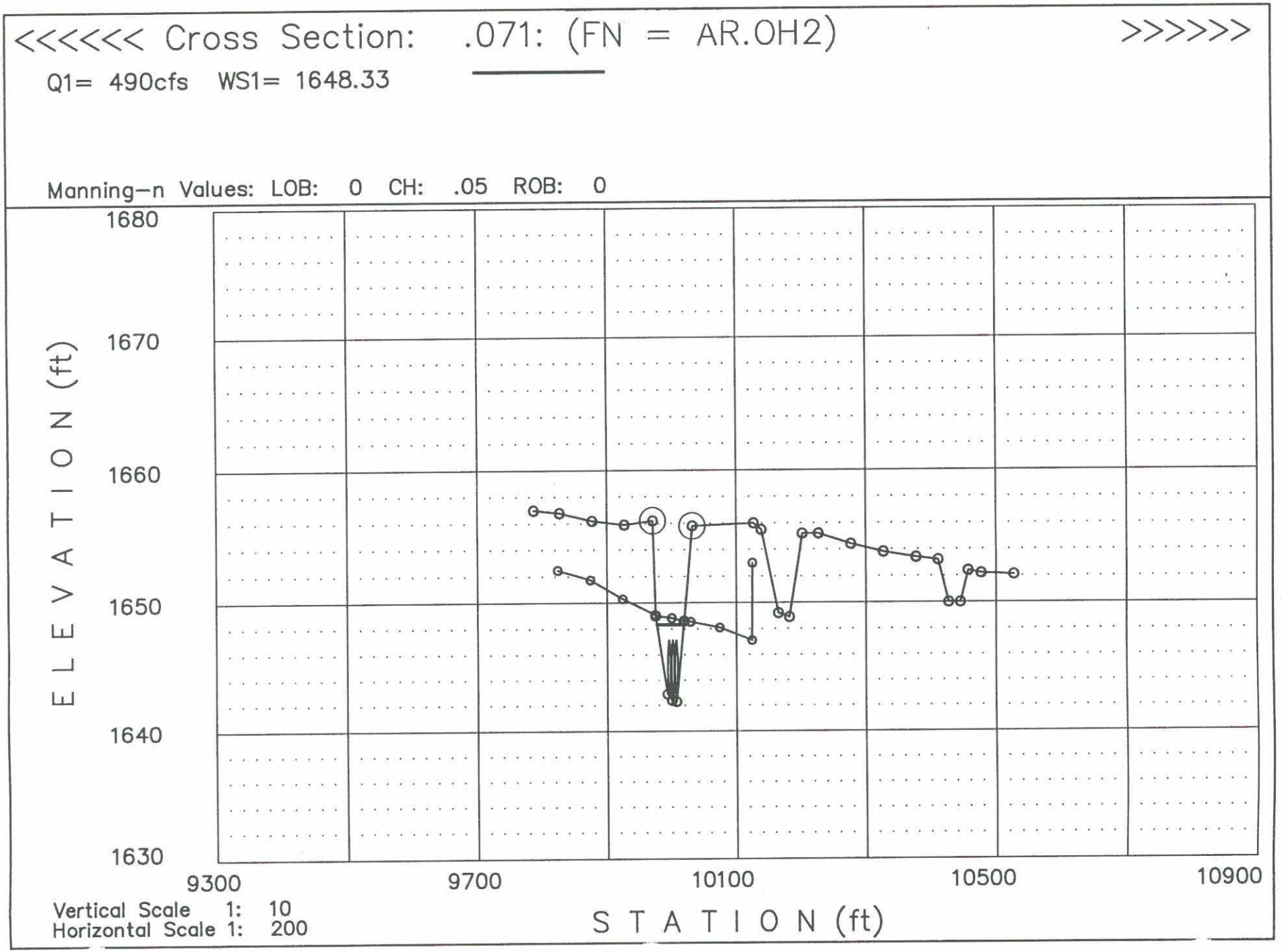
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Q1= 490cfs WS1= 1648.33
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9300
9700
10100
10500
10900
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 200
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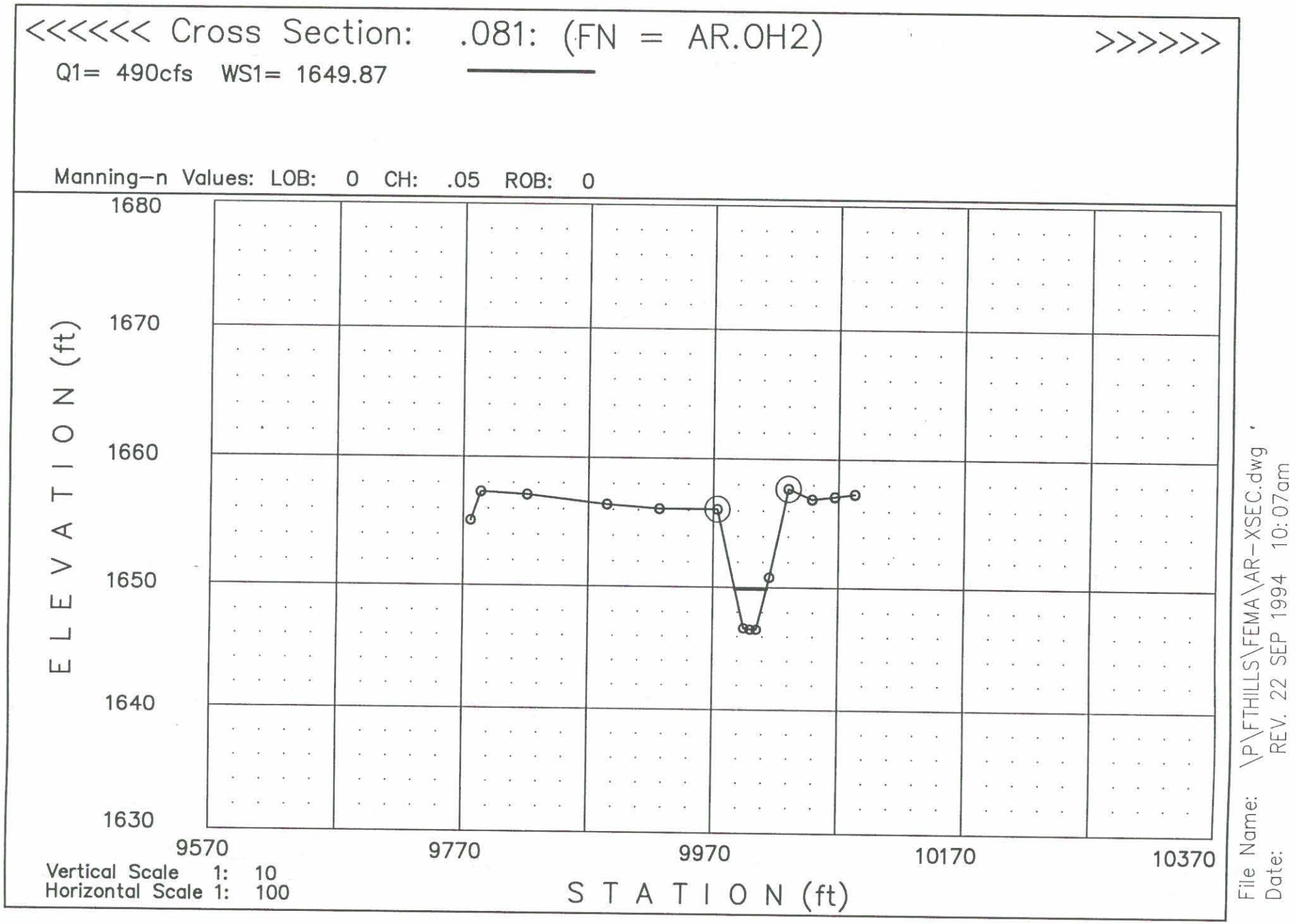
<<<<<< Cross Section: .081: (FN = AR.OH2) >>>>>>
Q1= 490cfs WS1= 1649.87
Manning–n Values: LOB: 0 CH: .05 ROB: 0
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
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Horizontal Scale 1: 100
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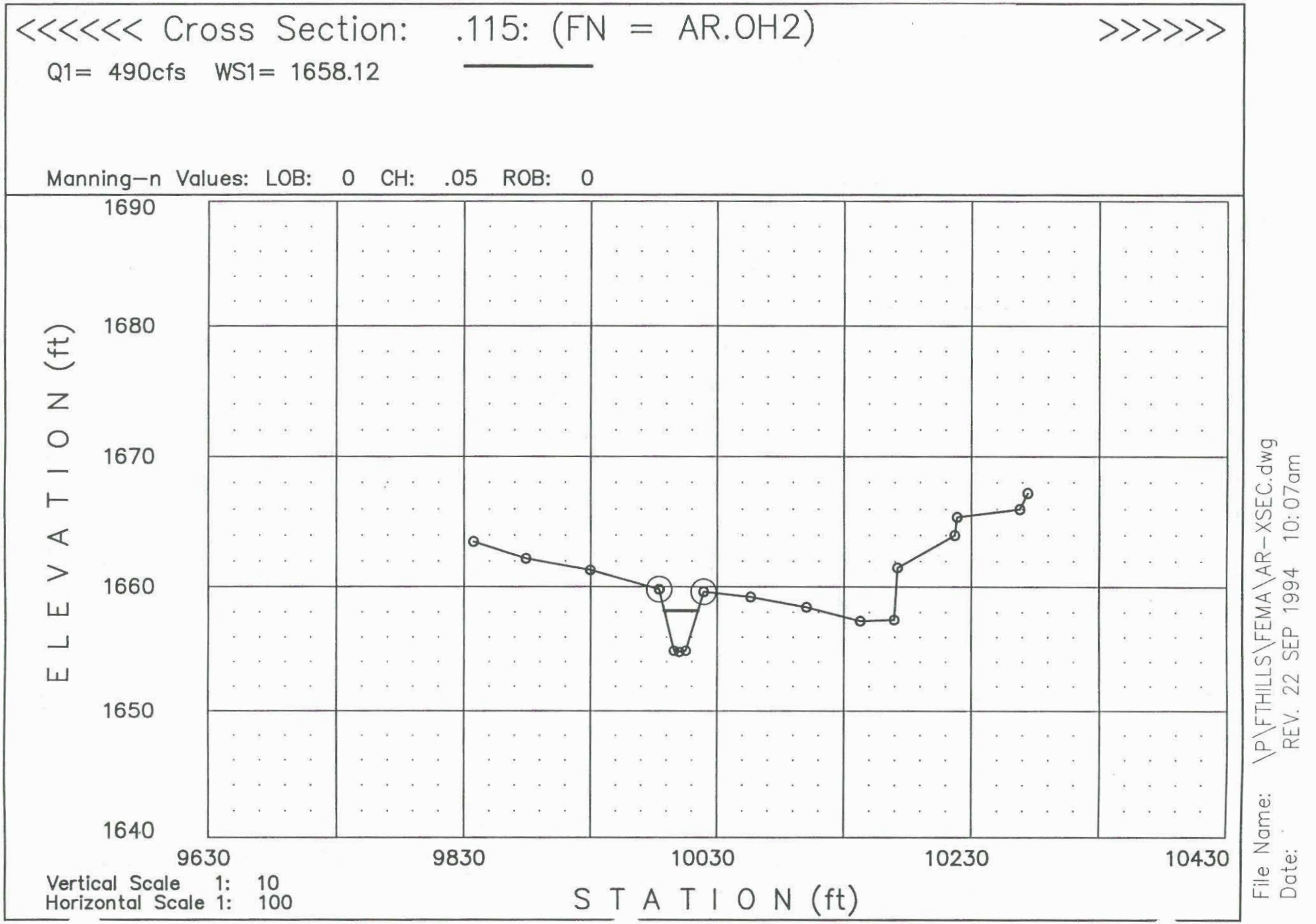
<<<<<< Cross Section: .115: (FN = AR.OH2) >>>>>>
Q1= 490cfs WS1= 1658.12
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
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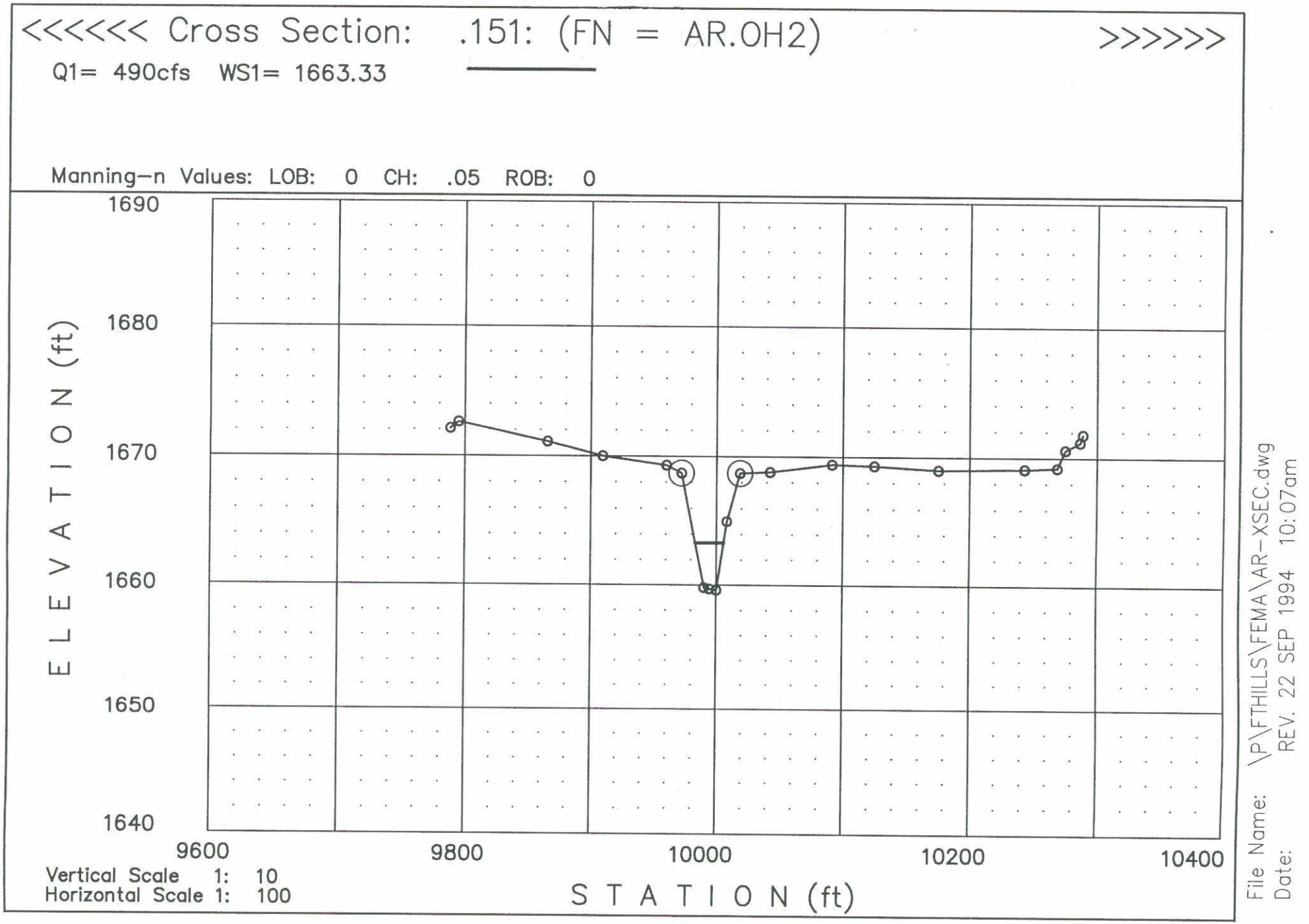
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Q1= 490cfs WS1= 1663.33
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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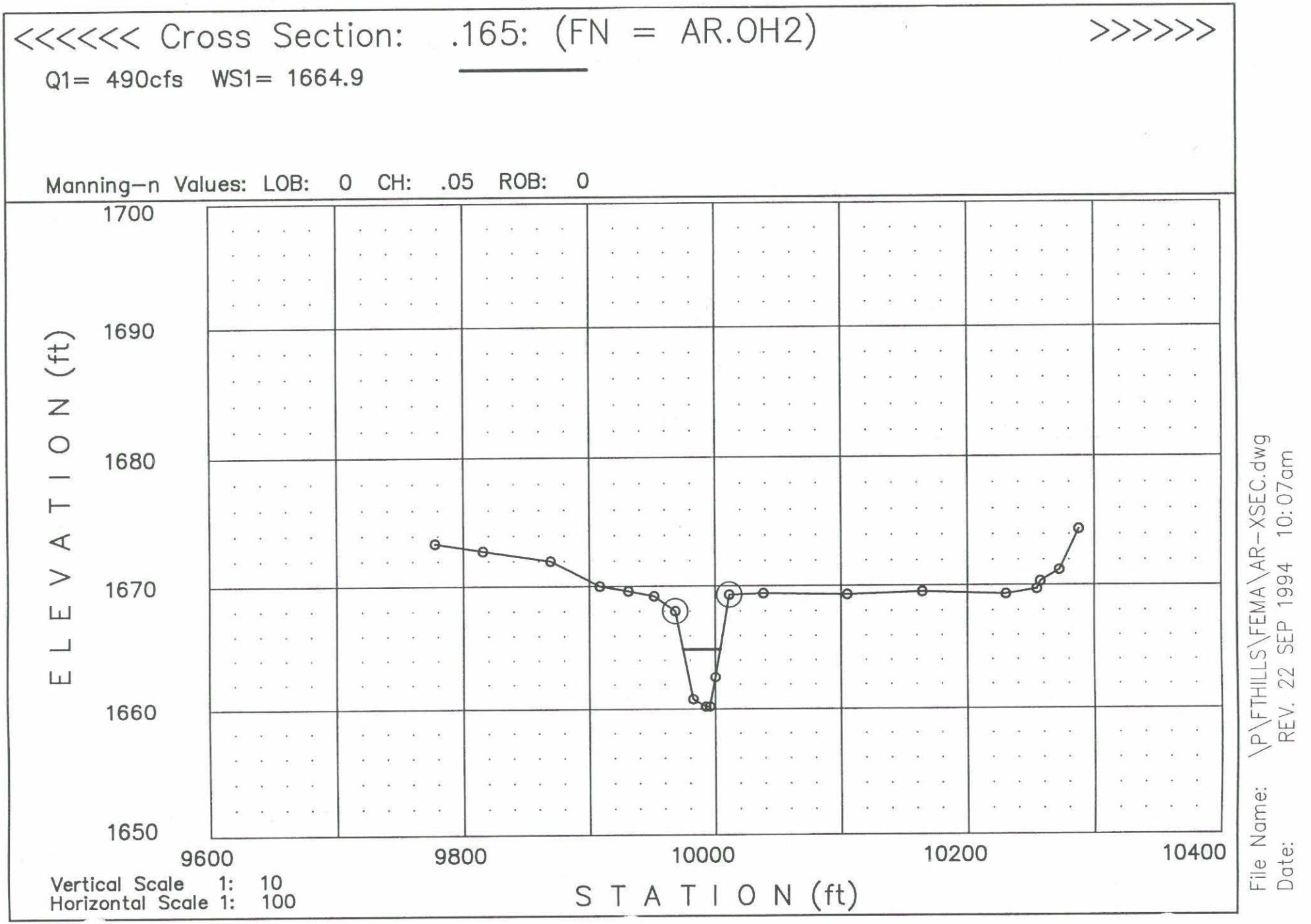
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Q1= 490cfs WS1= 1664.9
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1700
1690
1680
1670
1660
1650
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
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Horizontal Scale 1: 100
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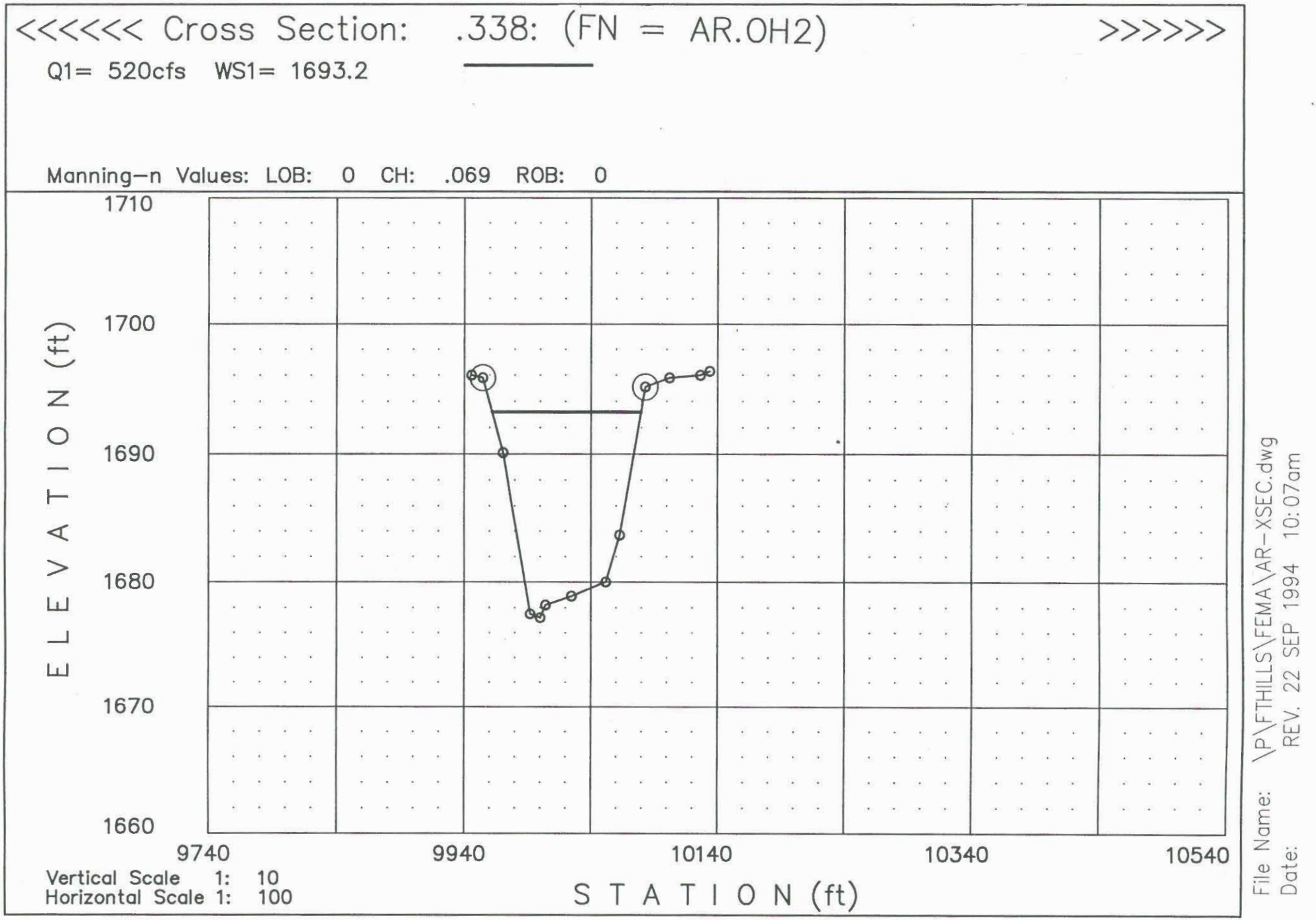
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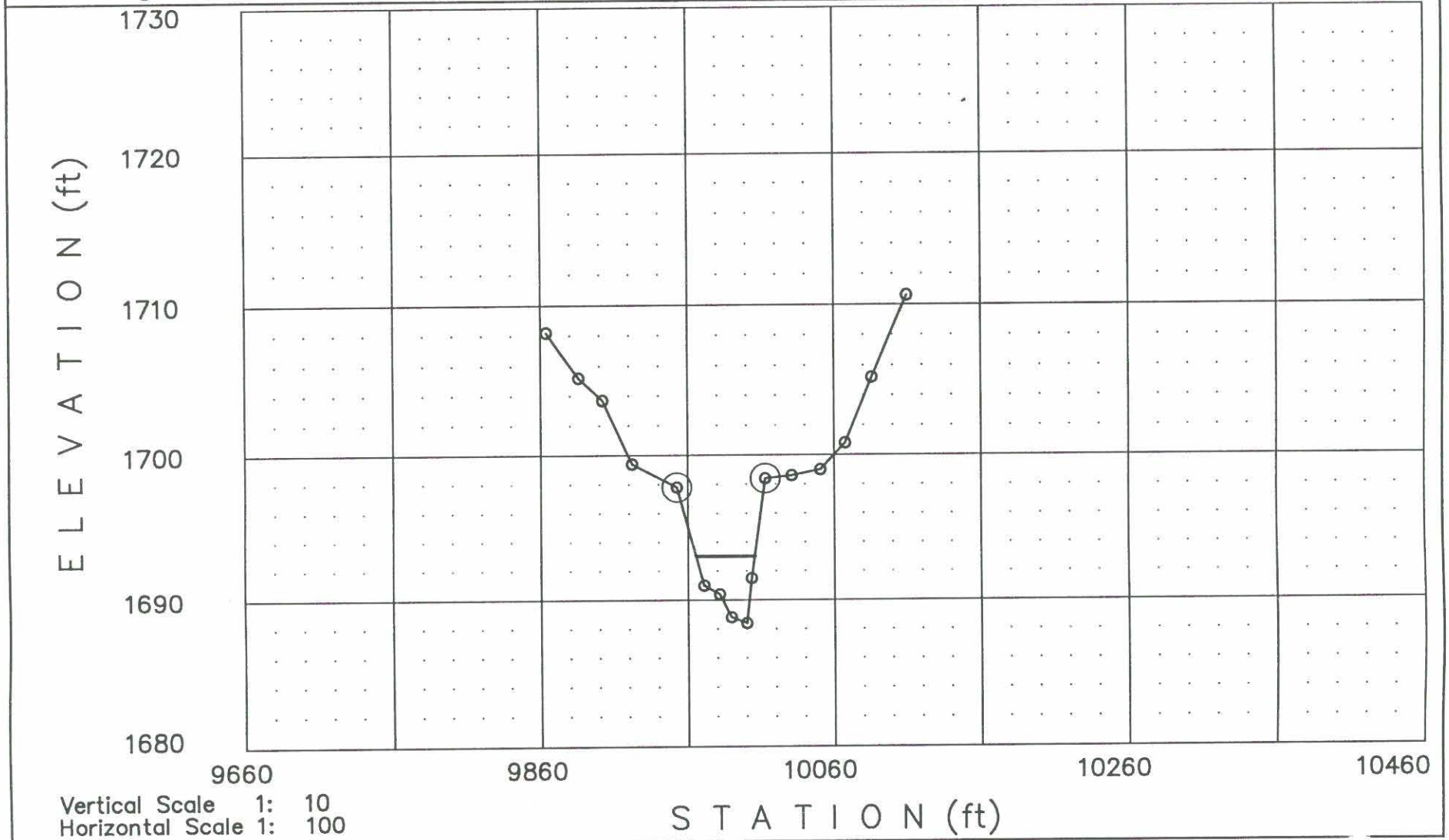
Q1= 520cfs WS1= 1693.2
Manning-n Values: LOB: 0 CH: .069 ROB: 0
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9740
9940
10140
10340
10540
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: .441: (FN = AR.OH2) >>>>>>

Q1= 520cfs WS1= 1693.01

Manning–n Values: LOB: 0 CH: .068 ROB: 0



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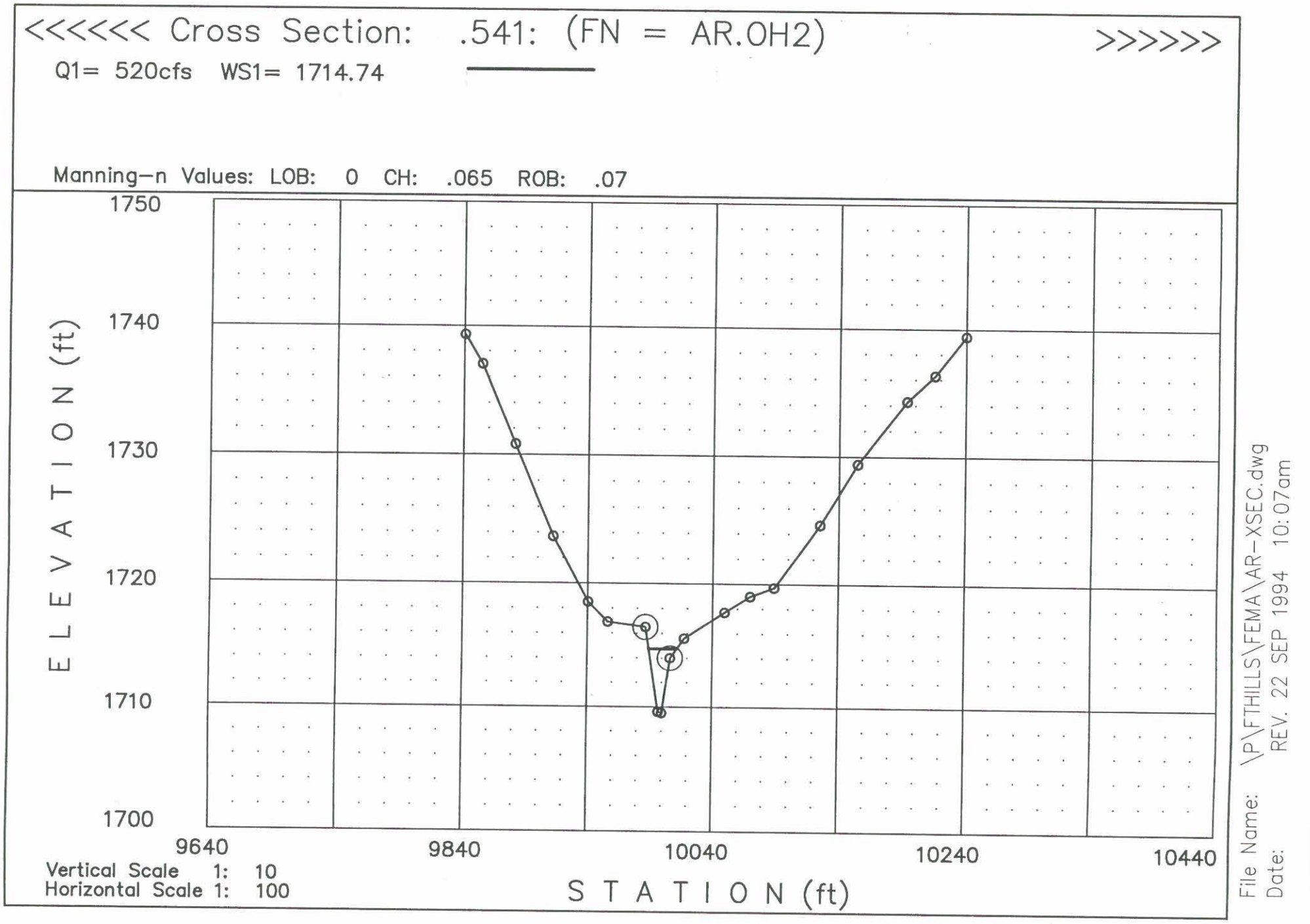
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Q1= 520cfs WS1= 1714.74
Manning-n Values: LOB: 0 CH: .065 ROB: .07
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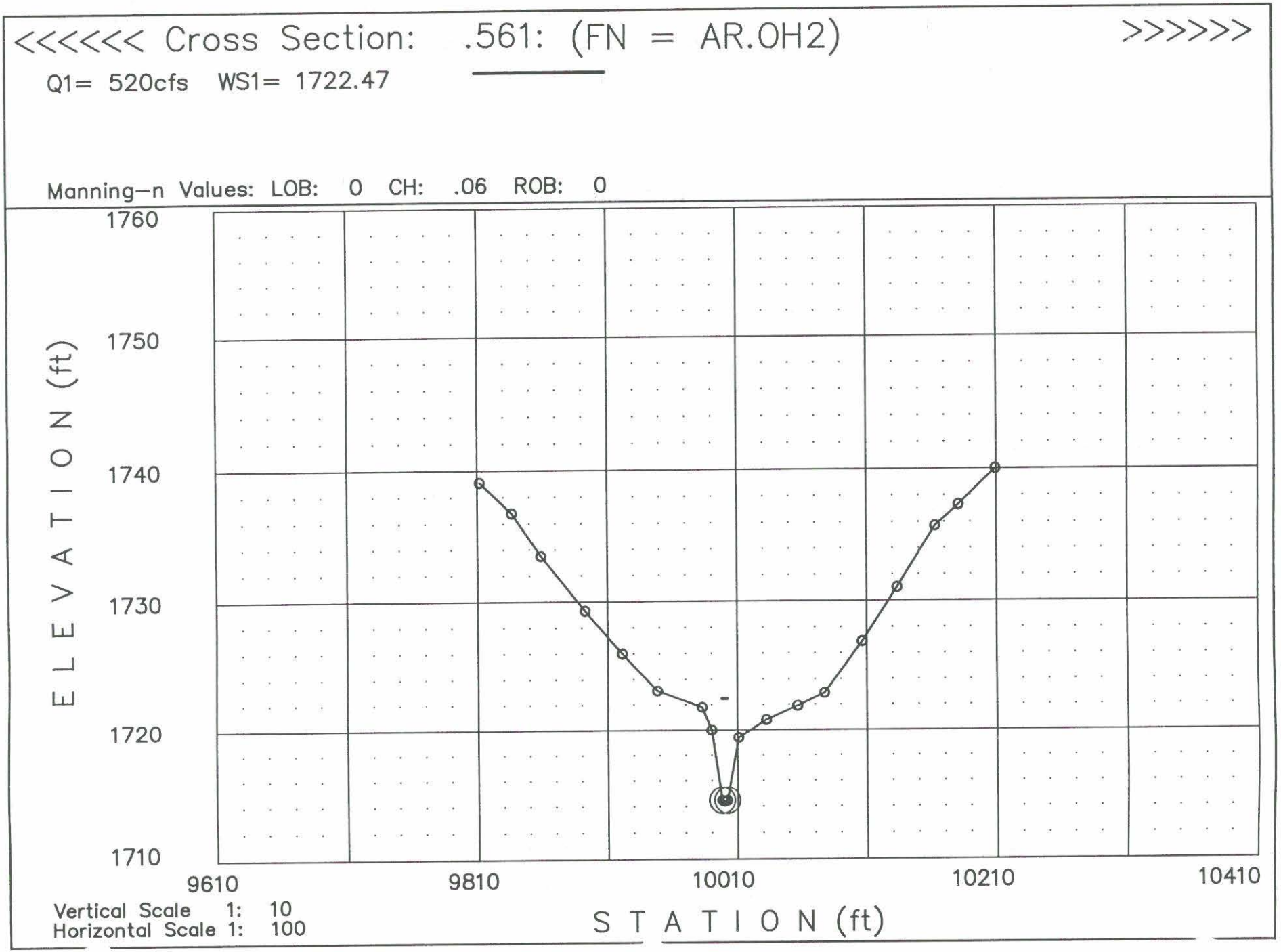
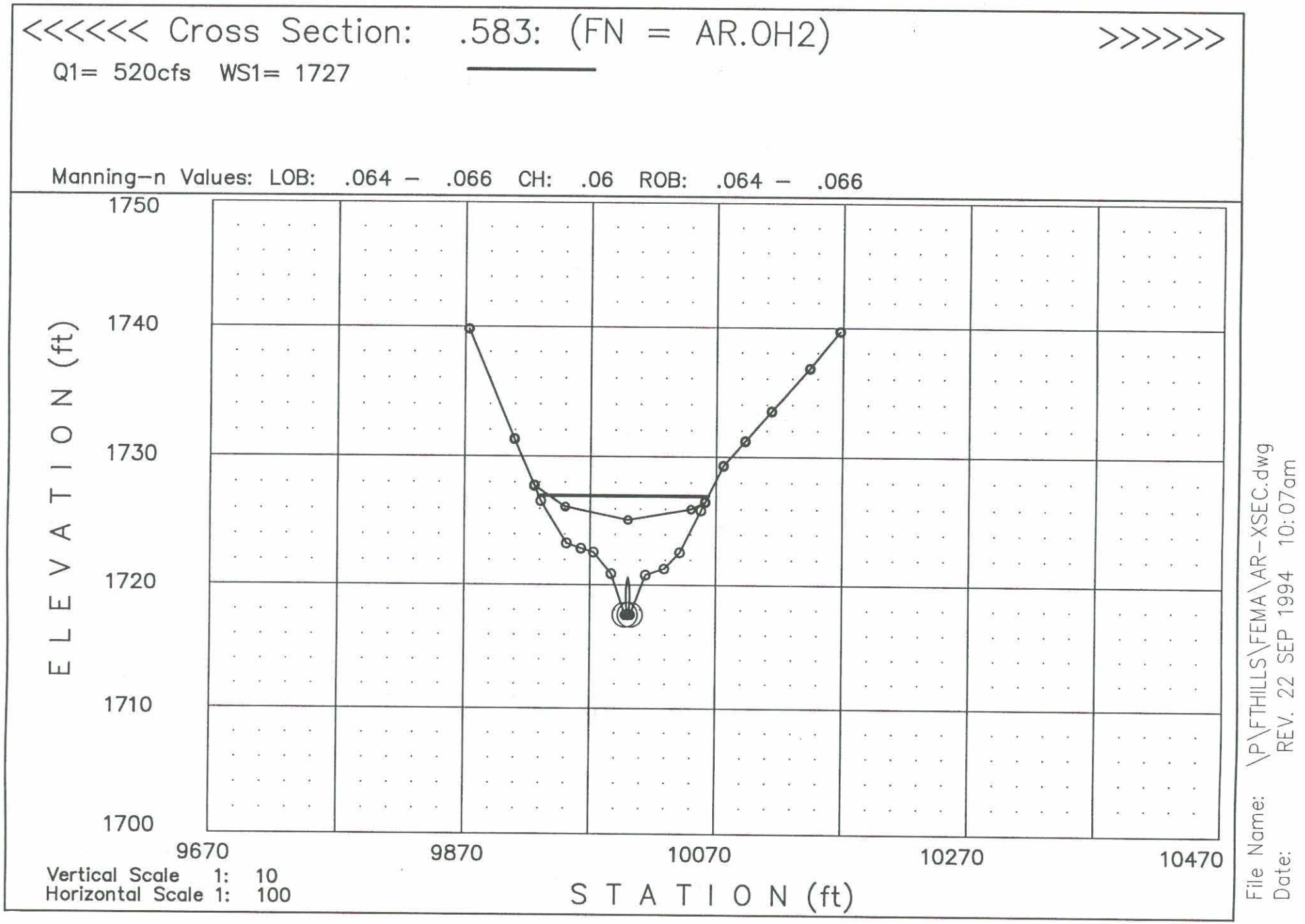
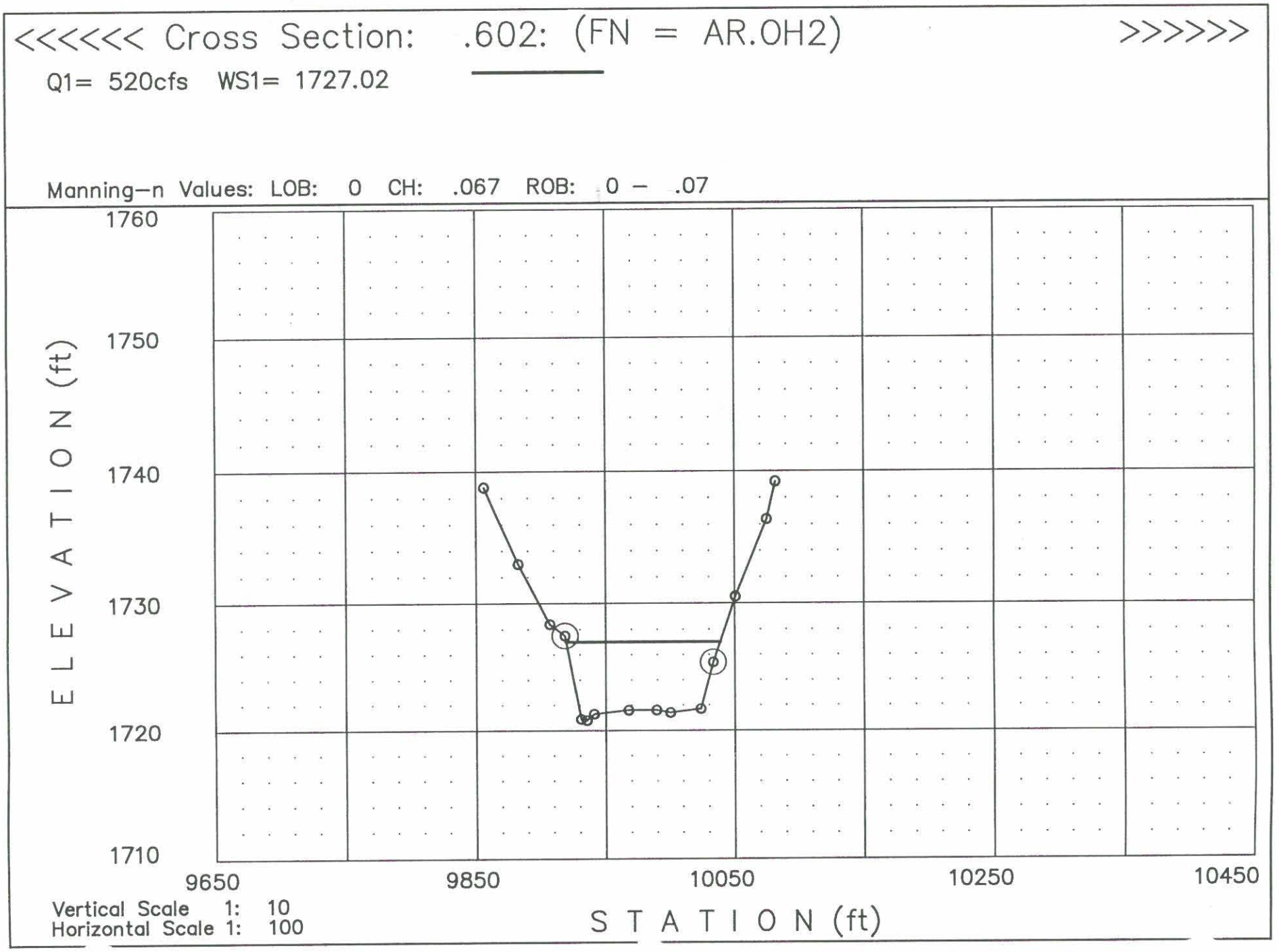
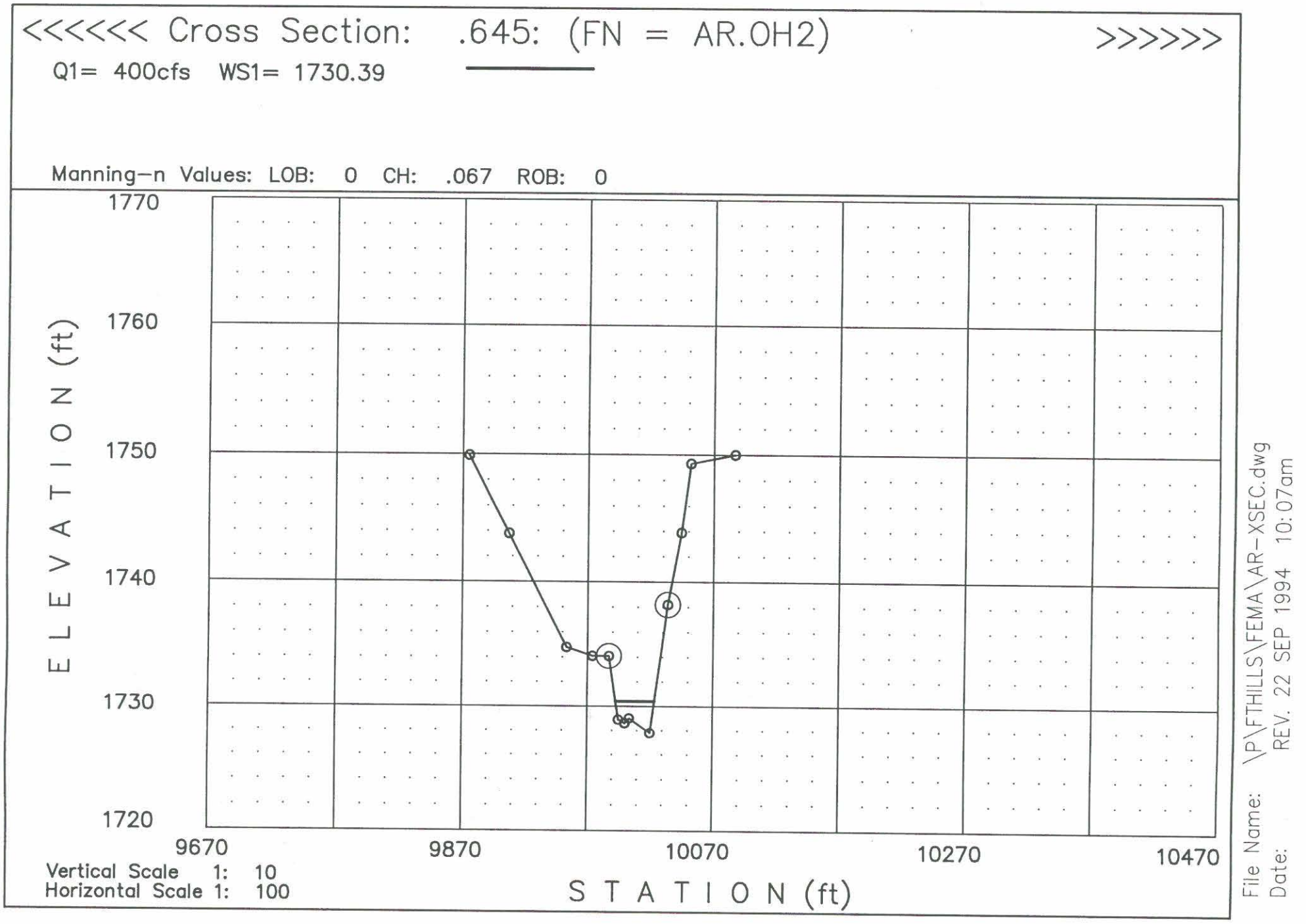
1740
1730
1720
1710
1700
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: .561: (FN = AR.OH2) >>>>>>
Q1= 520cfs WS1= 1722.47
Manning-n Values: LOB: 0 CH: .06 ROB: 0
1760
1750
1740
1730
1720
1710
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: .583: (FN = AR.0H2) >>>>>>
Q1= 520cfs WS1= 1727
Manning-n Values: LOB: .064 - .066 CH: .06 ROB: .064 - .066
1750
1740
1730
1720
1710
1700
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

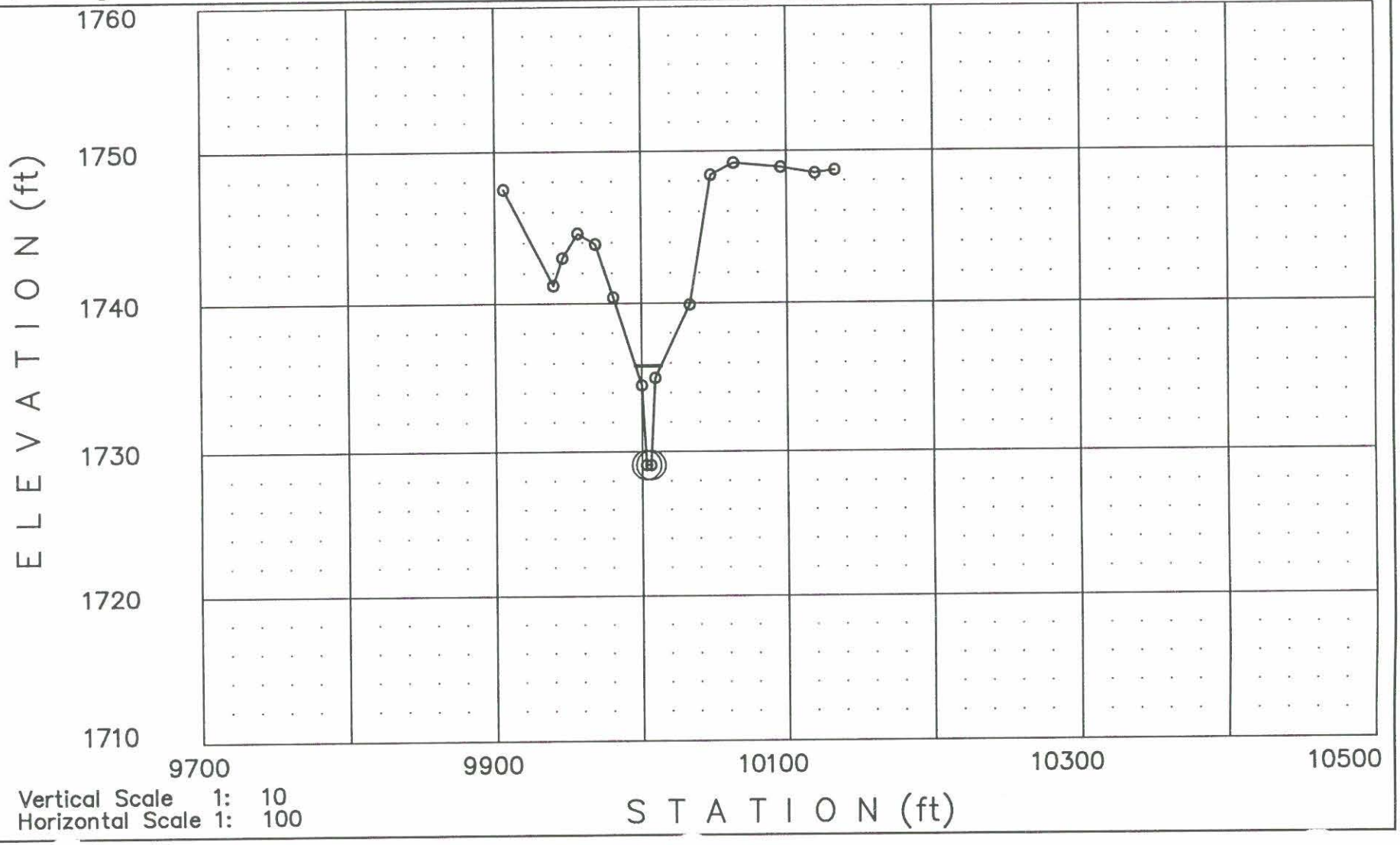

<<<<<< Cross Section: .602: (FN = AR.0H2) >>>>>>
Q1= 520cfs WS1= 1727.02
Manning-n Values: LOB: 0 CH: .067 ROB: 0 - .07
1760
1750
1740
1730
1720
1710
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: .645: (FN = AR.OH2) >>>>>>
Q1= 400cfs WS1= 1730.39
Manning-n Values: LOB: 0 CH: .067 ROB: 0
1770
1760
1750
1740
1730
1720
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: .654: (FN = AR.0H2) >>>>>>

Q1= 370cfs WS1= 1735.82

Manning-n Values: LOB: .061 CH: .06 ROB: .06



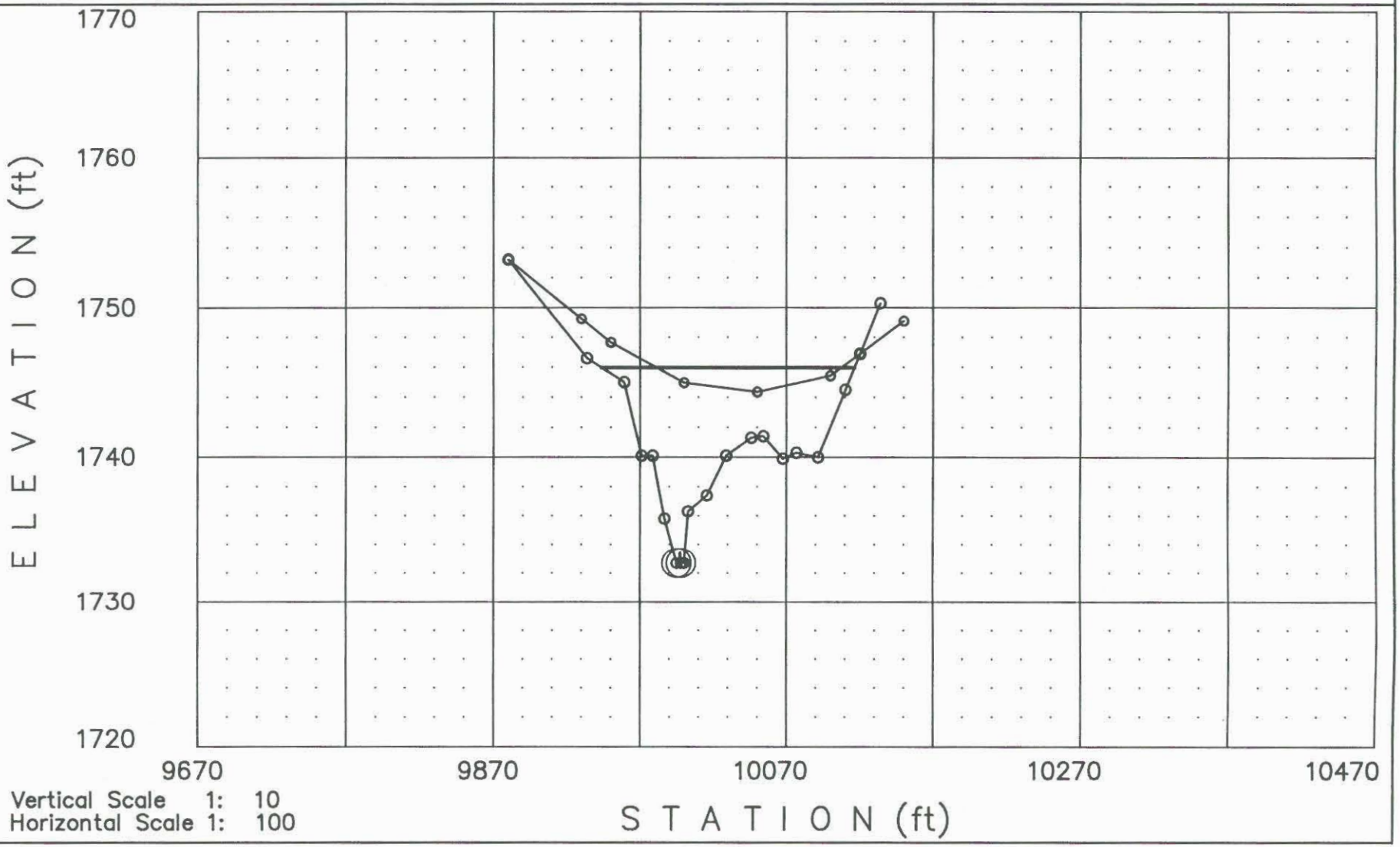
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: .672: (FN = AR.OH2) >>>>>>

Q1= 370cfs WS1= 1745.97

Manning–n Values: LOB: .065 CH: .06 ROB: .069



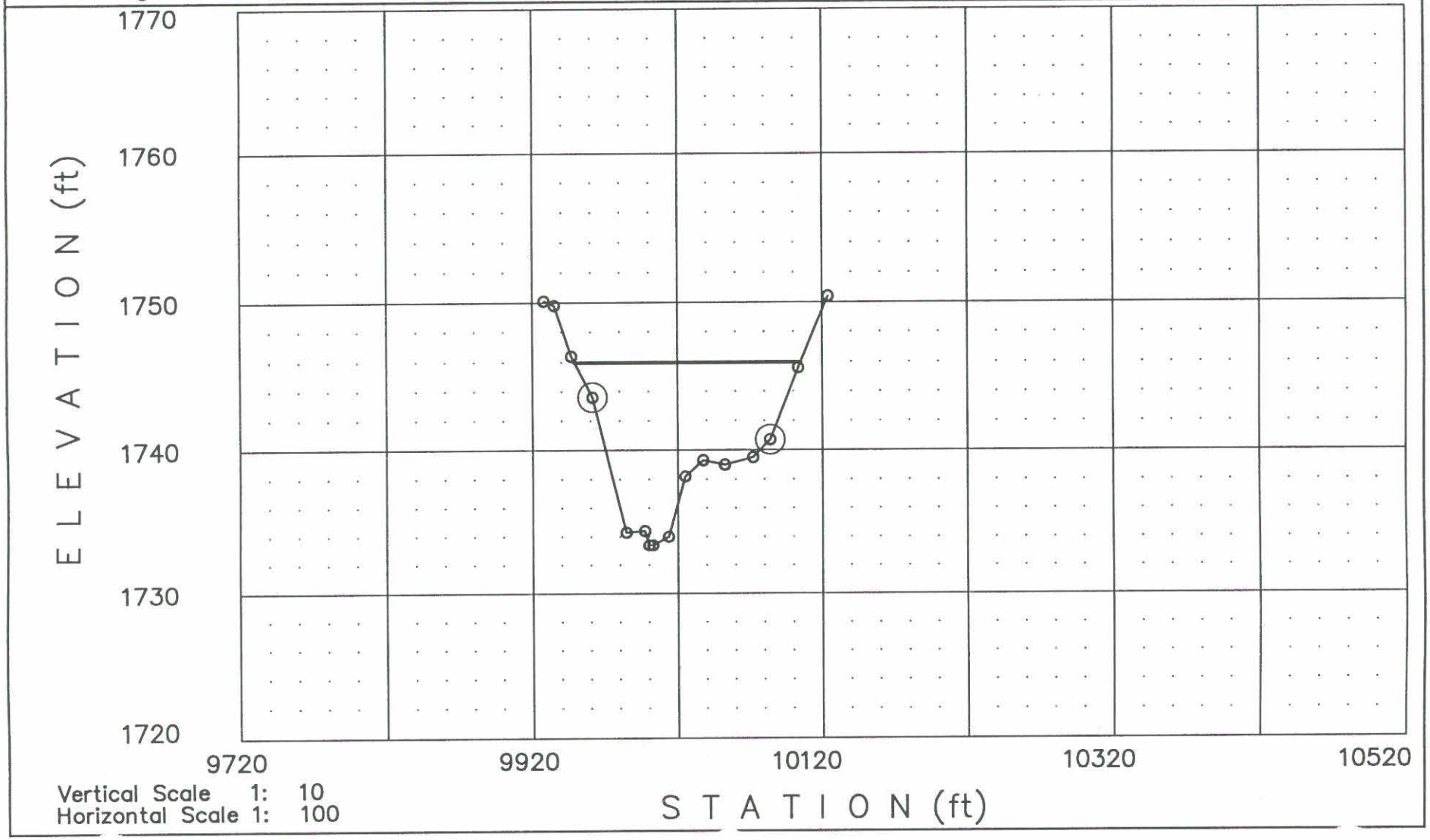
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

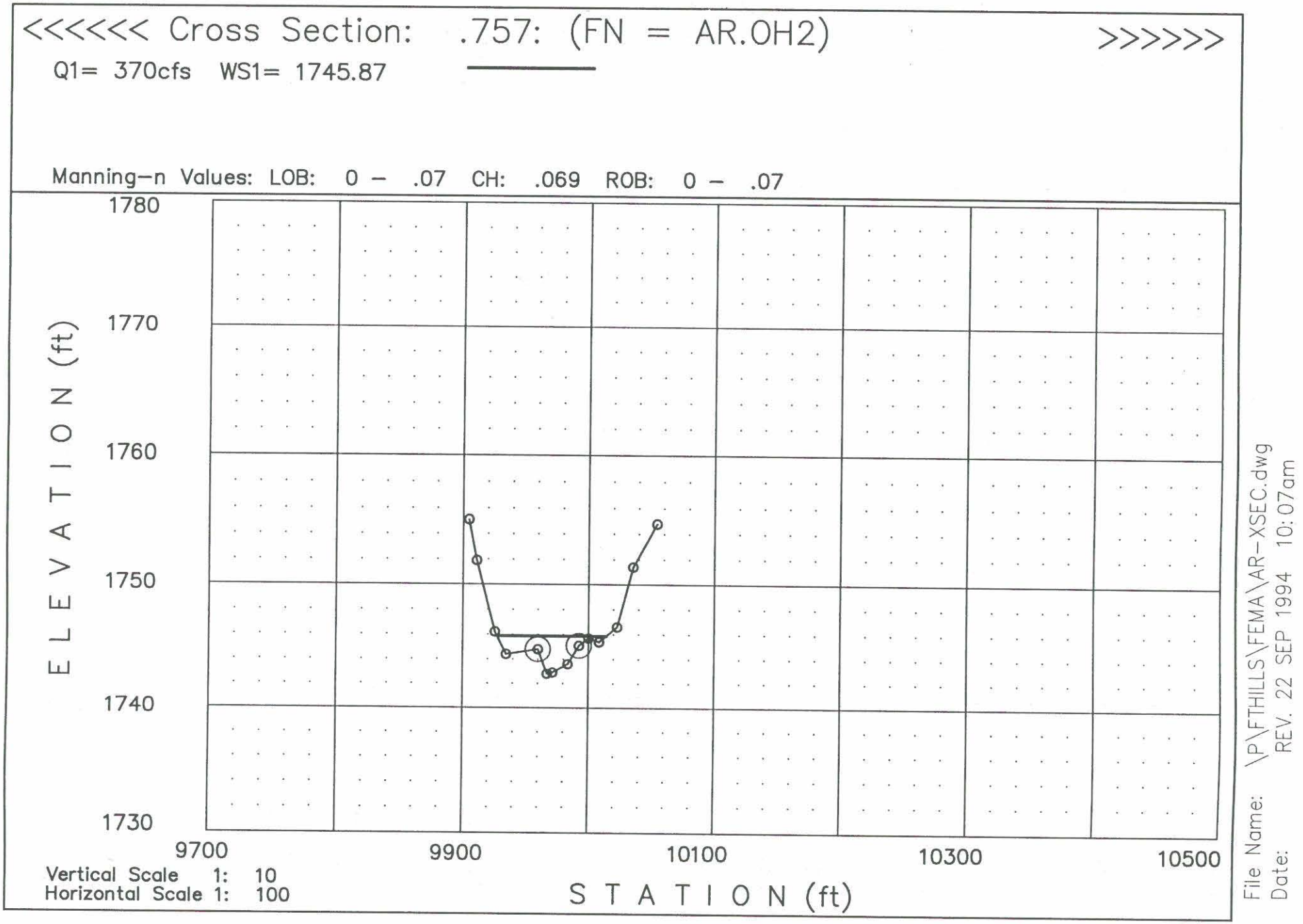
<<<<<< Cross Section: .679: (FN = AR.OH2) >>>>>>

Q1= 370cfs WS1= 1745.97

Manning-n Values: LOB: 0 - .07 CH: .069 ROB: 0 - .07



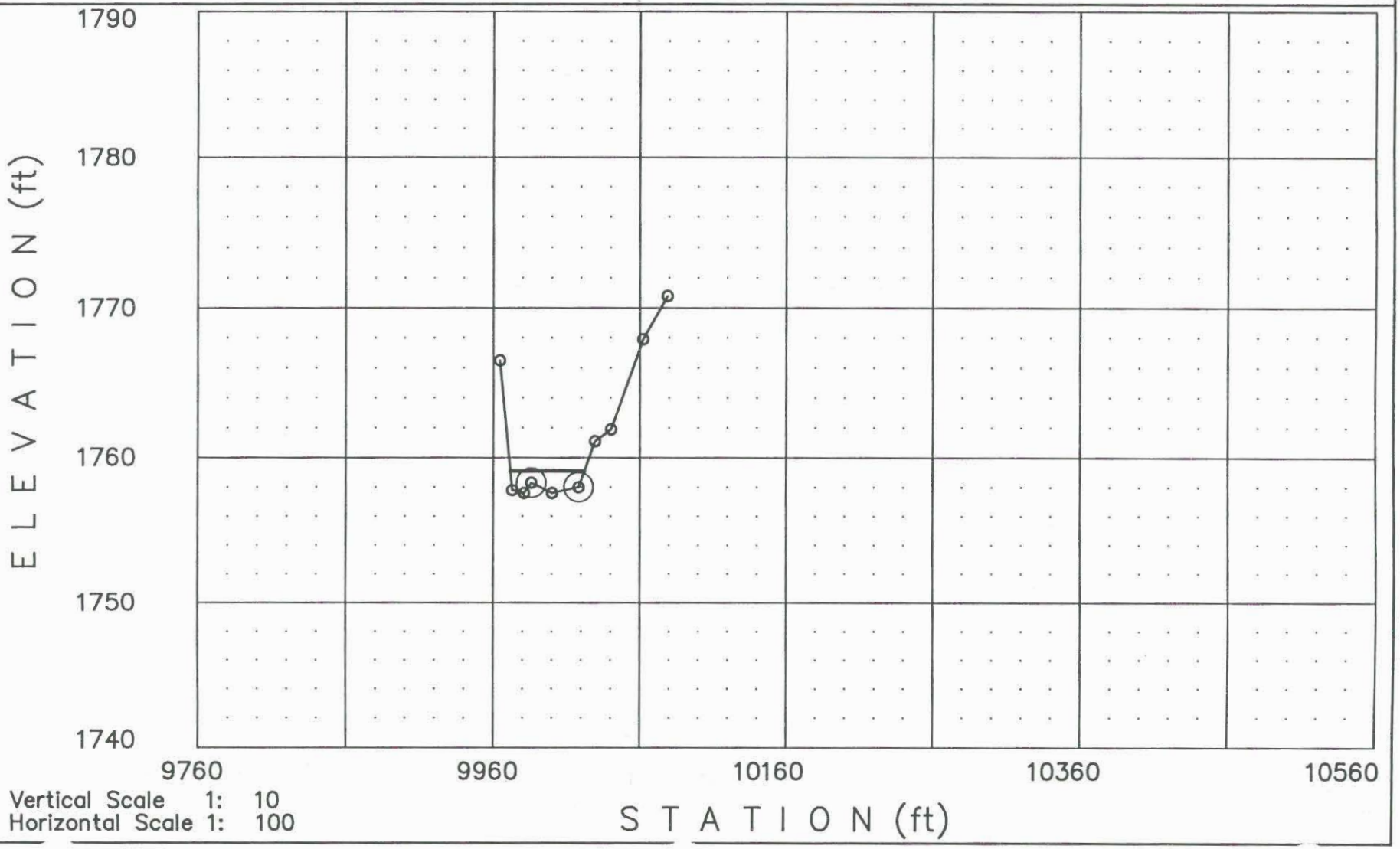
Vertical Scale 1: 10
Horizontal Scale 1: 100


<<<<<< Cross Section: .757: (FN = AR.OH2) >>>>>>
Q1= 370cfs WS1= 1745.87
Manning-n Values: LOB: 0 - .07 CH: .069 ROB: 0 - .07
1780
1770
1760
1750
1740
1730
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: .836: (FN = AR.OH2) >>>>>>

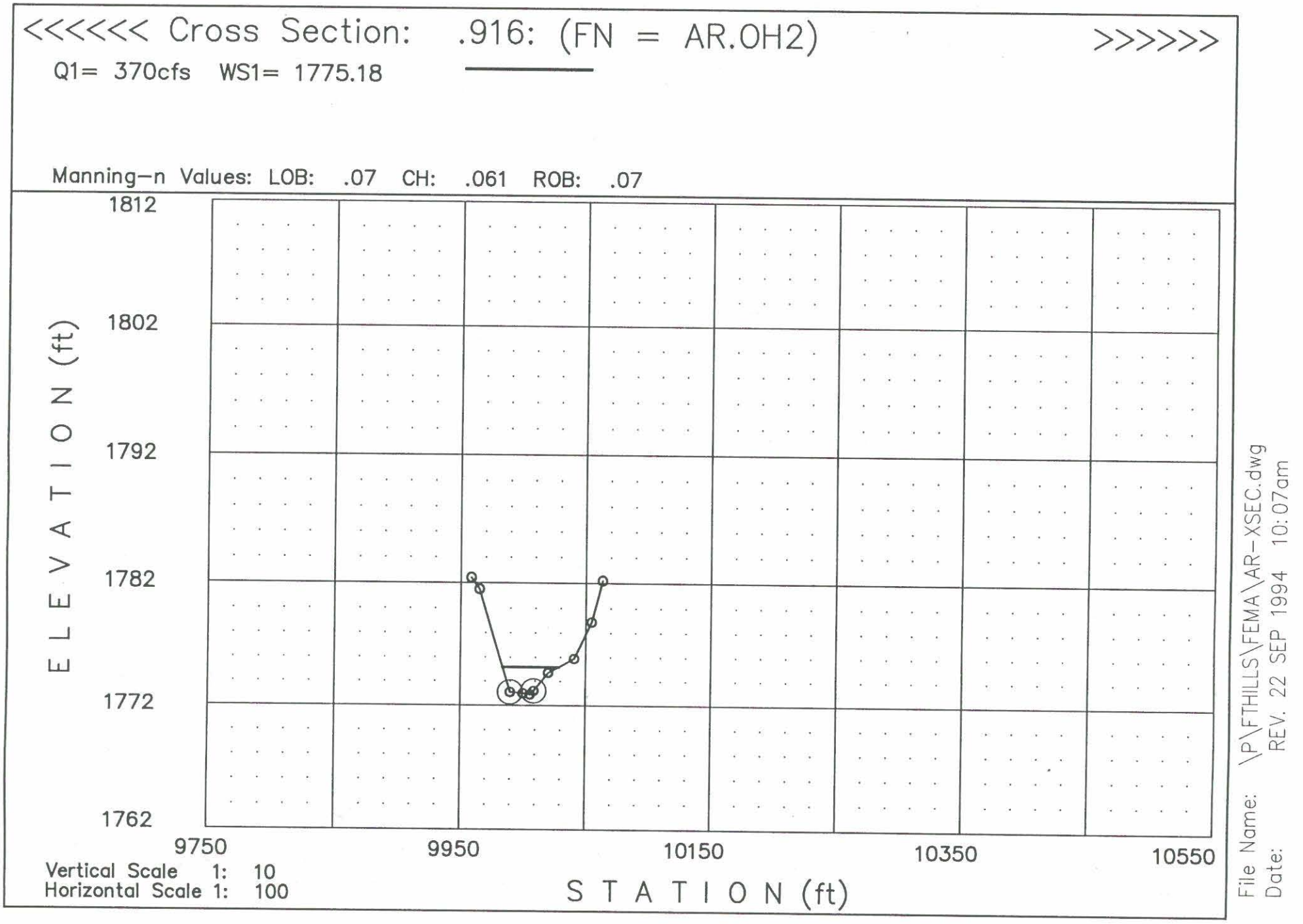
Q1= 370cfs WS1= 1759.1

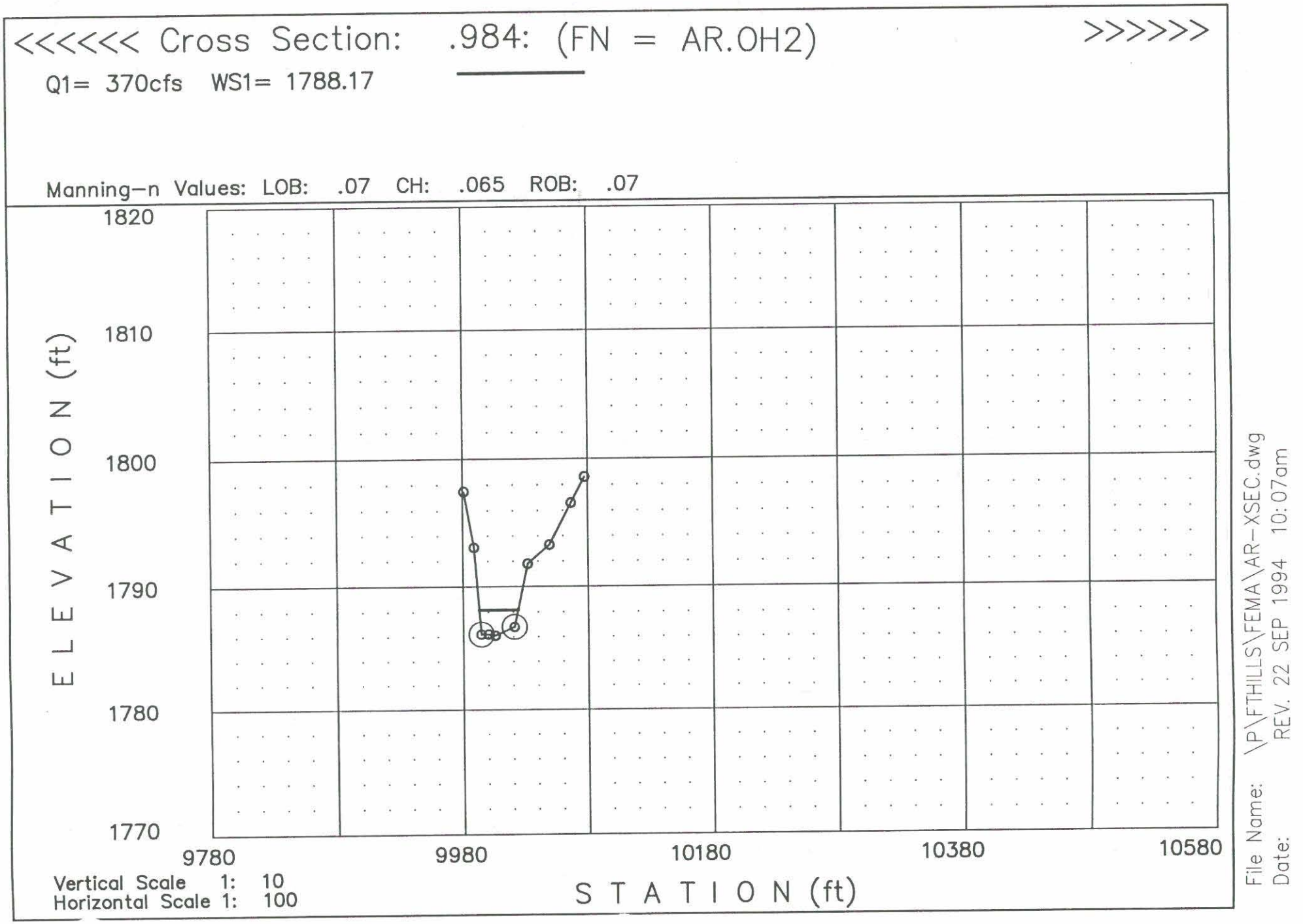
Manning–n Values: LOB: .07 CH: .06 ROB: .07

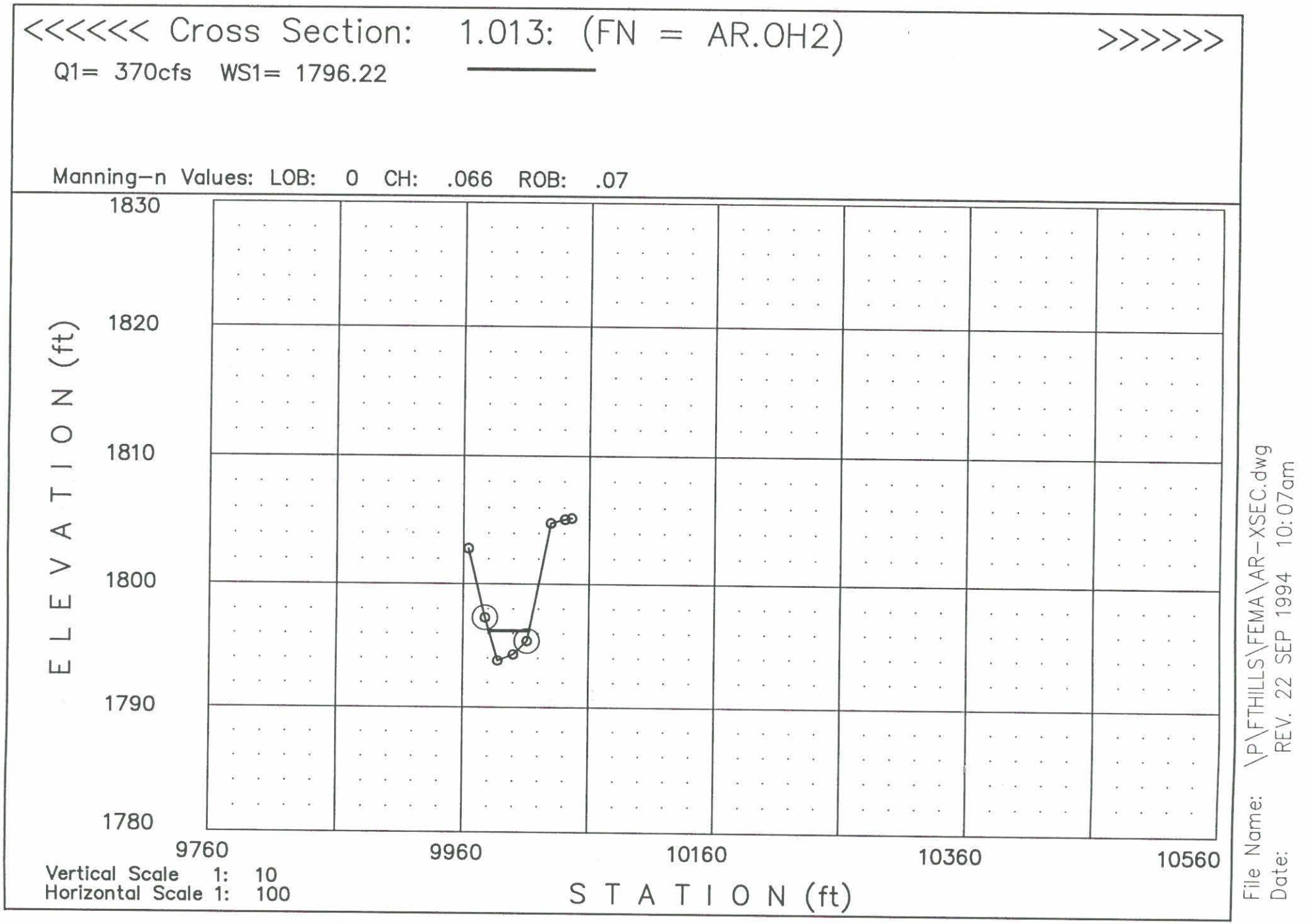


Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: .916: (FN = AR.0H2) >>>>>>
Q1= 370cfs WS1= 1775.18
Manning-n Values: LOB: .07 CH: .061 ROB: .07
1812
1802
1792
1782
1772
1762
ELEVATION (ft)
9750
9950
10150
10350
10550
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

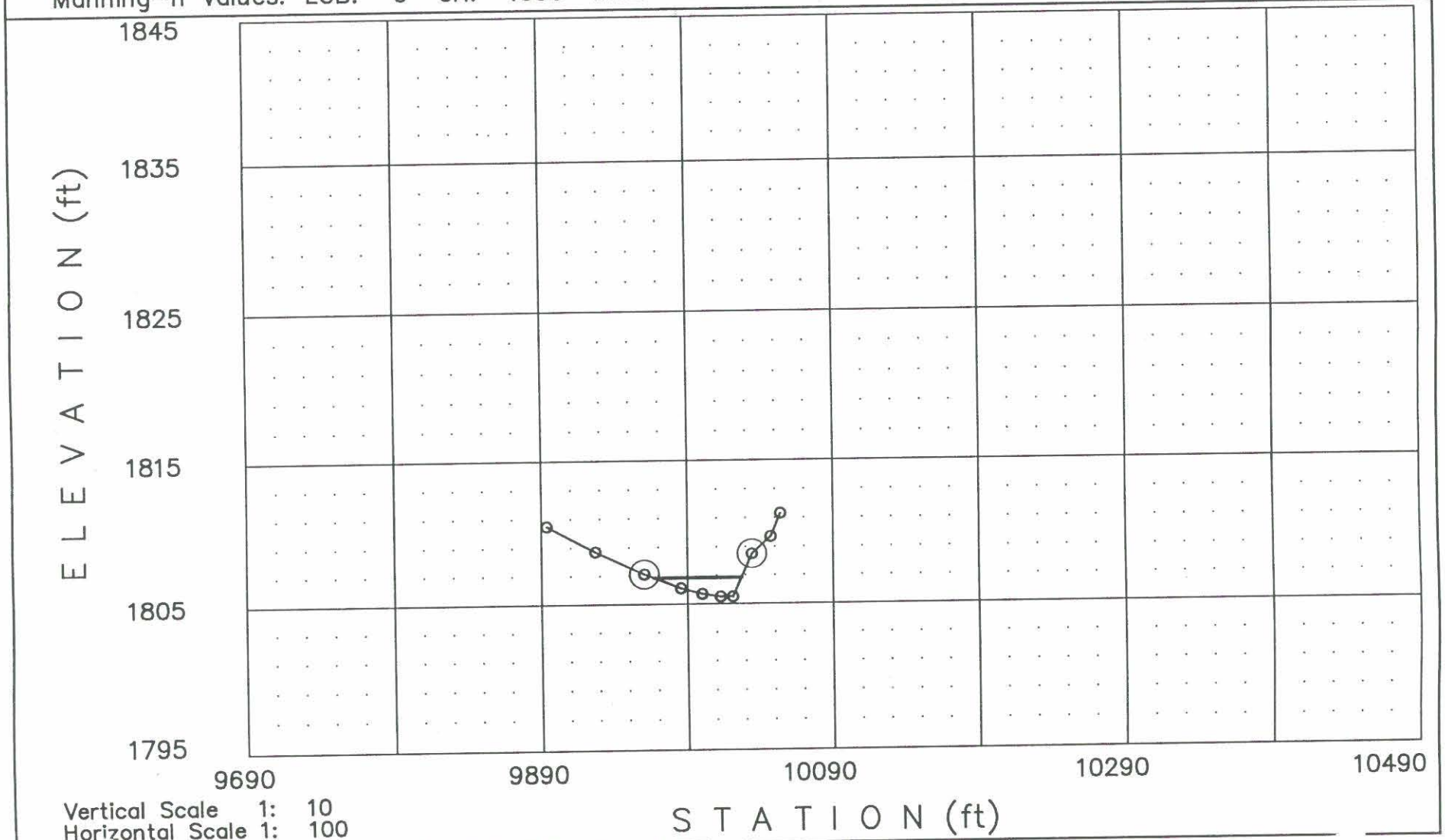

<<<<<< Cross Section: .984: (FN = AR.OH2) >>>>>>
Q1= 370cfs WS1= 1788.17
Manning-n Values: LOB: .07 CH: .065 ROB: .07
1820
1810
1800
1790
1780
1770
ELEVATION (ft)
9780
9980
10180
10380
10580
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: 1.013: (FN = AR.OH2) >>>>>>
Q1= 370cfs WS1= 1796.22
Manning-n Values: LOB: 0 CH: .066 ROB: .07
1830
1820
1810
1800
1790
1780
ELEVATION (ft)
9760
9960
10160
10360
10560
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: 1.032: (FN = AR.OH2) >>>>>>

Q1= 270cfs WS1= 1806.83

Manning-n Values: LOB: 0 CH: .033 ROB: 0



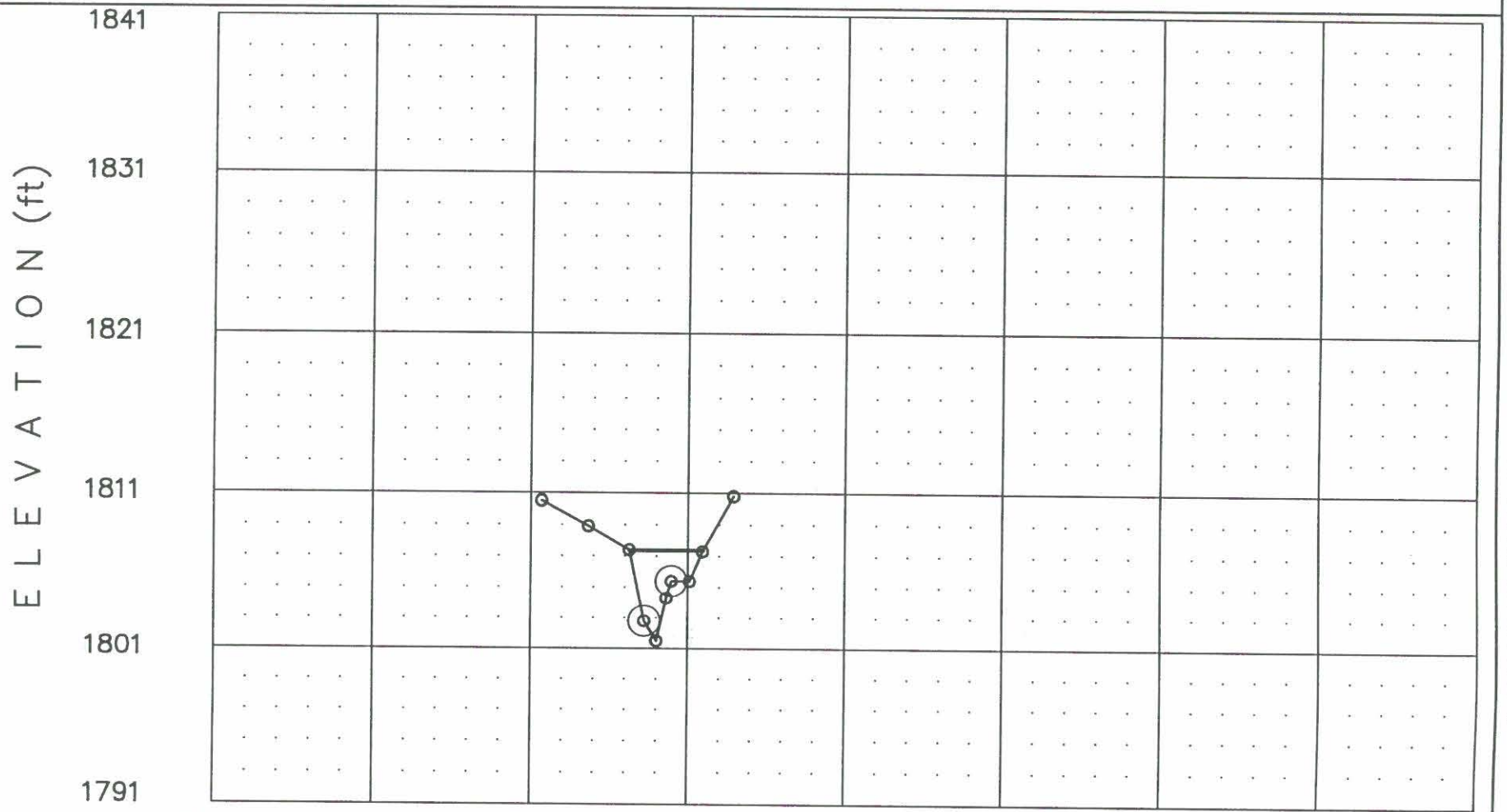
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

<<<<<< Cross Section: 1.039: (FN = AR.OH2) >>>>>>

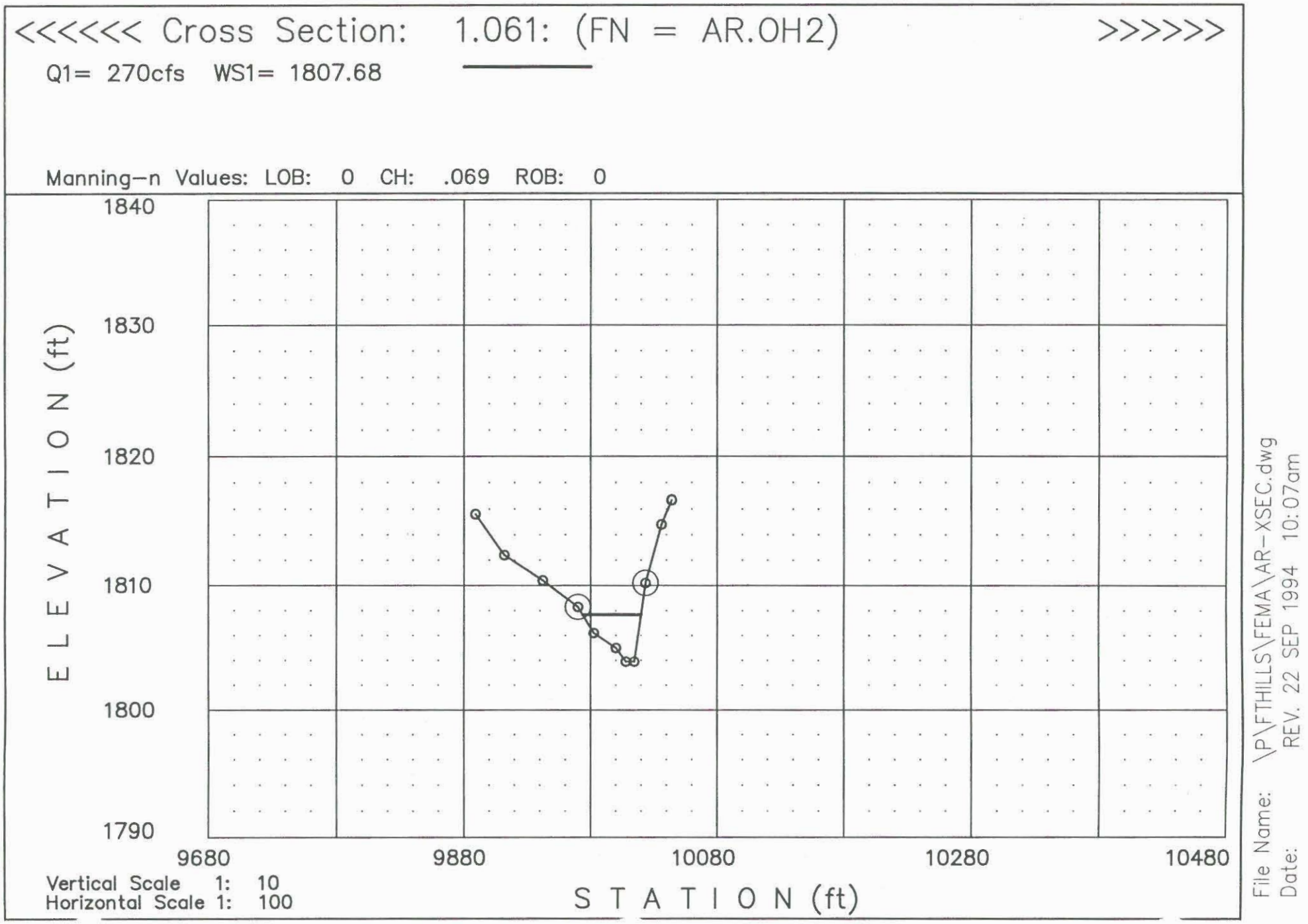
Q1= 270cfs WS1= 1807.37

Manning–n Values: LOB: .07 CH: .062 ROB: .07

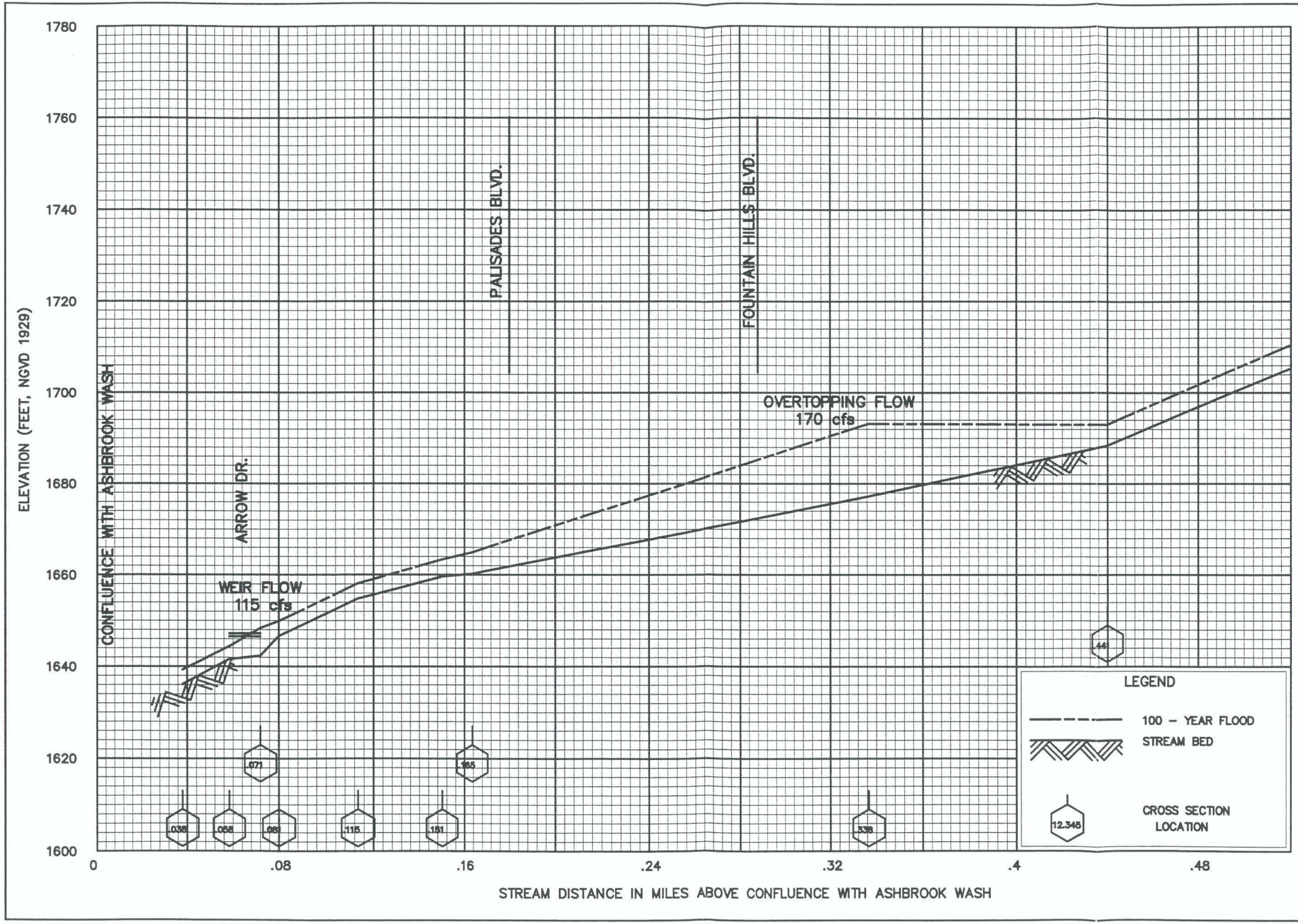


Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am


<<<<<< Cross Section: 1.061: (FN = AR.OH2) >>>>>>
Q1= 270cfs WS1= 1807.68
Manning-n Values: LOB: 0 CH: .069 ROB: 0
1840
1830
1820
1810
1800
1790
ELEVATION (ft)
9680
9880
10080
10280
10480
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\AR-XSEC.dwg
Date: REV. 22 SEP 1994 10:07am

FLOOD PROFILES



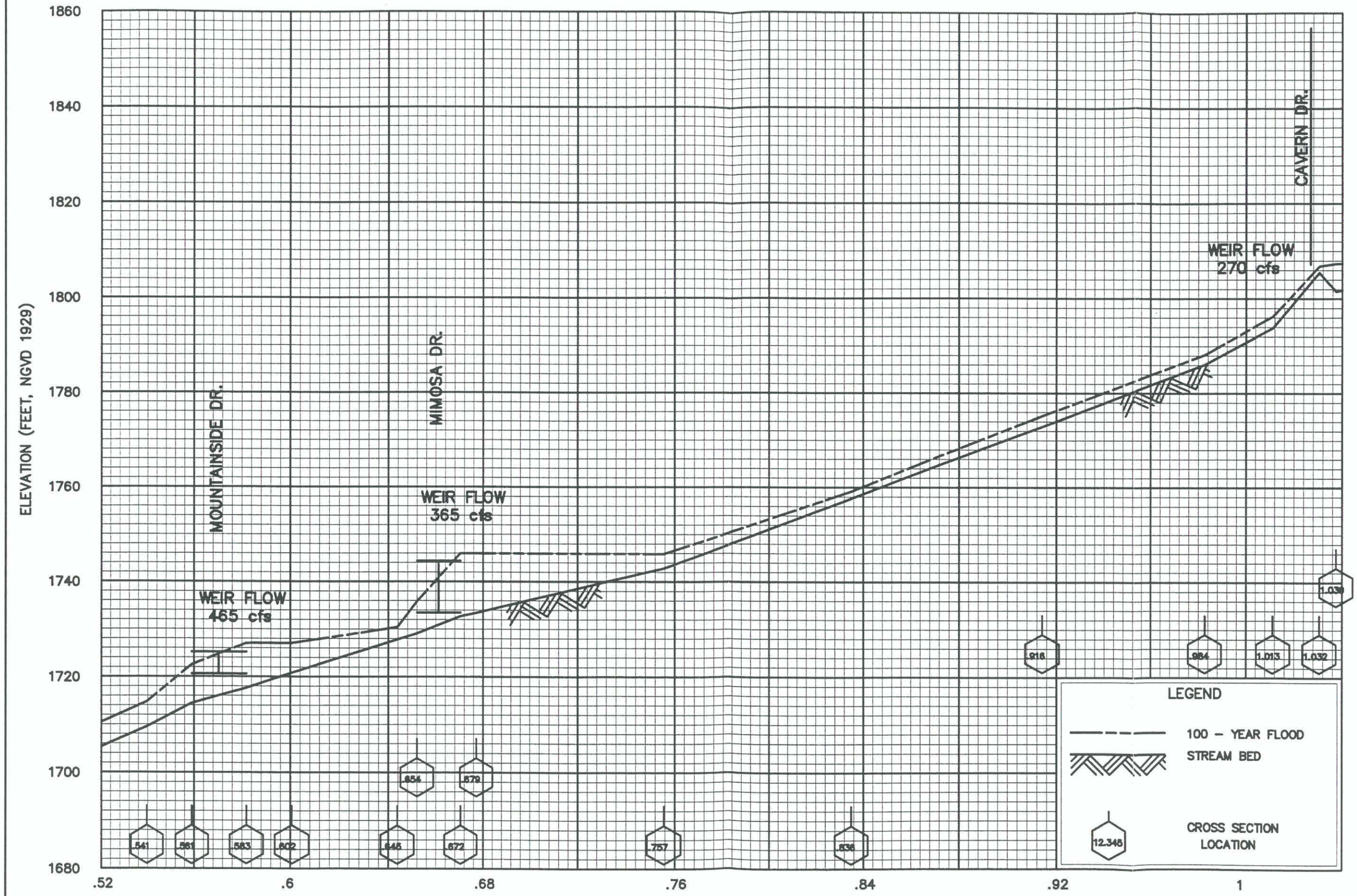
FLOOD PROFILES

ARROW WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AR-PROF.dwg (sheet 1 of 3)
Date: REV. 27 SEP 1994 09:30am

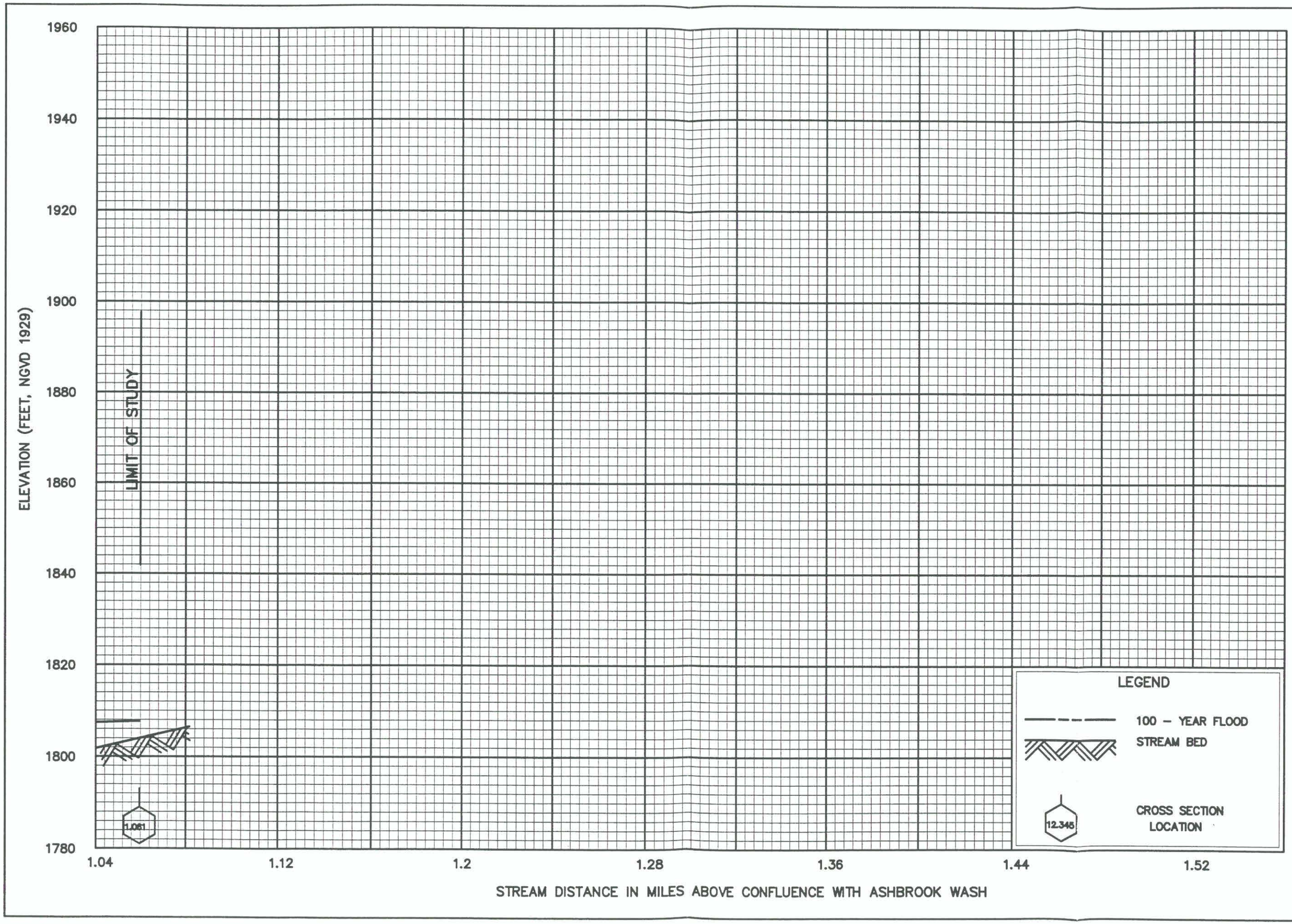


FLOOD PROFILES

ARROW WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AR-PROF.dwg (sheet 2 of 3)
Date: REV. 27 SEP 1994 09:30am



FLOOD PROFILES

ARROW WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\AR-PROF.dwg (sheet 3 of 3)

BALBOA/HESPERUS WASH

```
1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    29MAR95    TIME   14:51:05  *
 *******************************************
```

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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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1
   29MAR95      14:51:05                                                                    PAGE    1


                                                                  THIS RUN EXECUTED 29MAR95    14:51:05

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

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

```
T1   *  Fountain Hills North FIS                          File:     BA&HE.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35         DTP & FB   12-17-93
T3   *  Balboa/Hesperus 100-Year Floodplain.             Revised:   03-29-95
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.
T9   *  No island analysis needed, due to dynamic nature of thalweg, entire wash
T9   *  bottom is in floodplain/floodway.

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0         0         0         0         0   1557.04

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1         0        -1         0         0         0        -1         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200

         HEC-1 Concentration Point C549

QT         2       3100       3100
        START Hydraulically Similar Reach   AS2
                 See Exhibit 1, Manning's n Value Map.
NC                                    0.1        0.3
NH         3       .113     9946.9       .125       10000         .12     10156.6
        ASHBROOK WASH Section 2.095
ET                               9.1                                                  9894.18    10100.99
1
   29MAR95      14:51:05                                                                    PAGE    2


                 ASHBROOK WASH  Section 2.095    Start with CWSEL 1557.04 feet
                          24-hr storm controls                 Q =    3100 cfs
X1    2.095         17     9946.9      10000         120         140       150.8
GR   1563.1     9785.9     1562.5     9828.1      1559.3      9843.4      1558.2     9878.0     1556.2     9905.9
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GR   1554.1     9925.4     1553.2     9946.9     1552.7     9967.5     1551.9     9990.9     1553.6     10000.0
GR   1553.6     10020.9    1553.5     10051.4    1552.2     10065.1    1555.0     10078.1    1556.9     10099.0
GR   1558.7     10124.6    1559.1     10156.6

        ASHBROOK/BALBOA   Confluence

        HEC-1 Concentration Point C549L

QT        2        1130       1130

       START Hydraulically Similar Reach     BA 1
             See Exhibit 1, Manning's n Value Map.

NH        3        .07        10015        .08        10057.9        .07        10096.1
ET                                9.1                                                      9956.87    10072.34
          HEC-1 Concentration Point C549L:    6-hr storm controls.
               STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
           START Hydraulically Similar Reach BA 1
               See Exhibit 1, Manning's n Value Map.
X1    0.131         17         10015      10057.9        605        660        619
GR    1577.7     9705.6     1577.7     9797.4     1577.7     9889.2     1577.8     9903.7     1572.6     9917.5
GR    1572.4     9930.8     1568.6     9951.1     1565.4     9966.7     1564.9     9980.9     1564.7     10000.0
GR    1564.7     10015.0    1562.4     10024.2    1563.2     10032.6    1563.6     10057.9    1568.7     10077.2
GR    1576.6     10094.1    1576.8     10096.1

NH        3        .07        9993.2       .08        10031.8        .07        10082.2
ET                                9.1                                                      9953.49    10038.56
X1    0.246         11         9993.2     10031.8        600        610        611.1
GR    1585.9     9892.0     1586.4     9904.2     1585.5     9916.4     1577.8     9941.5     1573.5     9963.5
GR    1573.8     9993.2     1573.3     10000.0    1573.0     10031.8    1579.4     10049.4    1585.8     10069.9
GR    1586.4     10082.2

NH        3        .07        9995.6       .08        10020.5        .07        10110.2
ET                                9.1                                                      9982.94    10079.85
X1    0.364         13         9988.4     10020.5        620        615        622.1
GR    1597.4     9924.8     1597.8     9938.0     1594.8     9952.0     1594.5     9963.8     1589.2     9976.8
GR    1584.8     9988.4     1583.1     9995.6     1583.0     10000.0    1583.7     10020.5    1583.5     10046.8
GR    1584.3     10070.4    1589.8     10090.6    1597.3     10110.2

NH        3        .07        9988.7       .08        10036.9        .07        10115.8
ET                                9.1                                                      9982.33    10074.85
X1    0.482         13         9988.7     10036.9        620        610        623.1
GR    1610.5     9932.9     1610.6     9943.1     1604.6     9954.4     1604.4     9963.5     1600.0     9976.0
GR    1595.9     9988.7     1596.0     10000.0    1596.6     10036.9    1595.9     10045.4    1595.7     10062.3
GR    1597.8     10074.5    1608.3     10097.8    1608.4     10115.8

        HEC-1 Concentration Point C548
1
   29MAR95      14:51:05                                                                                    PAGE    3


QT        2        1040       1040

       START Hydraulically Similar Reach     BA 2
             See Exhibit 1, Manning's n Value Map.
NH        3        .06        9976.6       .0456        10007          .06        10203.3
ET                                9.1                                                      9949.89    10044.98
          HEC-1 Concentration Point C548:  6-hr storm controls.
          START Hydraulically Similar Reach BA 2
               See Exhibit 1, Manning's n Value Map.
X1    0.608         30         9976.6       10007          665        650        666.9
GR    1622.9     9754.7     1622.8     9767.0     1623.3     9778.9     1624.1     9785.5     1623.7     9810.3
GR    1623.3     9863.8     1623.1     9887.3     1620.4     9898.9     1620.2     9921.5     1612.3     9942.9
GR    1608.2     9954.3     1607.8     9976.6     1606.0     9990.1     1605.2     10000.0    1606.9     10007.0
GR    1607.1     10021.7    1608.6     10026.7    1610.0     10048.3    1615.7     10064.0    1618.9     10069.9
GR    1619.0     10090.7    1619.7     10097.0    1619.8     10123.6    1619.8     10124.7    1620.1     10144.4
GR    1620.7     10152.3    1620.9     10160.8    1621.1     10188.8    1621.7     10190.8    1621.7     10203.3

  ********************************************************************************
  **************************    Culvert   M10    ***************************
  ********************************************************************************

        HEC-1 Concentration Point C548L

QT        2        335        335

  Culvert M10  Downstream fully expanded flow.  Special Culvert Section # 1
NH        3        .06        9981.9       .045         10009.4        .06        10194.1
ET                                9.1                                                      9980.06    10043.32
          HEC-1 Concentration Point C548L:  24-hr storm controls.
               Q = Q(C548L) - Qweir = 720 - 385 = 335 cfs
            Culvert M10     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    0.728         24         9981.9     10009.4        640        615        631.1
GR    1634.3     9770.4     1633.8     9785.7     1635.1     9799.3     1635.1     9827.0     1634.4     9871.0
GR    1633.7     9915.2     1632.7     9954.8     1624.6     9973.0     1618.5     9981.9     1617.7     10000.0
GR    1617.7     10004.4    1619.7     10009.4    1619.8     10018.9    1618.2     10026.4    1619.5     10033.8
```

```
GR   1620.3     10062.9      1621.2     10076.0      1628.7     10094.5      1628.5     10112.0      1628.7     10127.5
GR   1628.5     10142.5      1629.2     10152.4      1629.4     10179.8      1629.2     10194.1

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                       0.3          0.5
NH        3      0.060        9990.9     0.045      10022.5      0.060      10188.7

ET                              9.1                                                      9970.18    10039.81
            Culvert M10  Outlet.       2-54"  CMP        (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 13' Downstream. Bott elev adjust.)
X1    0.759         20        10000      10008.7          155          155        161.1
X3       10                                                          1623.57    1623.57
GR   1635.0      9806.3       1637.3     9820.3       1636.6      9857.8       1635.4     9902.0     1634.5     9944.1
GR   1630.1      9956.9       1623.8     9972.7       1623.9      9990.9       1623.77    10000.0    1623.77    10008.7
GR   1624.0     10022.5       1623.9     10037.2      1630.1      10055.1      1629.9     10073.6    1630.4     10094.1
GR   1630.4     10109.6       1630.1     10123.0      1630.0      10146.7      1630.4     10171.9    1631.1     10188.7
1
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SC    2.024        0.9         2.63          0            4.5           0          121.5        2.3      1625.37    1623.77
        Add diverted weir flow back to Balboa Wash.
QT       2         720         720

NH        3      0.060        9995.2     0.045      10013.8      0.060      10087.4
ET                              9.1                                                      9943.05    10050.83
            HEC-1 Concentration Point C548L:  24-hr storm controls.
              Culvert M10  Inlet.       2-54"  CMP        (SECTION 3 OF SC ROUTINE)
                Photogrammetric xsec. located 28.8' Upstream. (No Elev. Adjust.)
                 Base Channel Elevations were lowered to Culvert Invert EL 1625.37
              Culvert M10 BT information surveyed by ALS. CL of Fountain Hills Blv
              BT Sta. 10000 = ALS original survey Sta. 3+50
              BT coded per figure 3.16 (HEC-2, Sept 1990)
              Assume 100% of weir flow is diverted to Oxford Wash.
X1    0.782         18        9995.2     10013.8          122          122        121.5
X2                                 2      1629.87      1631.92
X3       10                                                          1631.9     1631.9
BT      -10      9789.2       1640.1                   9838.1       1639.1                  9898.6     1637.7
BT               9935.8       1636.9                   9944.7       1632.9                  9950       1632.9
BT                 10000      1632.33                    10046      1631.9                  10054.6    1635.0
BT               10087.4      1635.4

GR   1640.1      9789.2       1639.1     9838.1       1637.7      9898.6       1636.9     9935.8     1632.9     9944.7
GR   1632.0      9945.8       1628.1     9956.7       1628.0      9963.7       1626.9     9973.2     1628.2     9982.0
GR   1625.3      9995.2       1625.3     10000.0      1625.37     10013.8      1627.2     10025.1    1627.2     10035.1
GR   1631.9       10046       1635.0     10054.6      1635.4      10087.4

          Return  Contraction and Expansion coefficients to Normal

NC                                       0.1          0.3
NH        3        .06          9969      .045       10005.6        .06      10220.8
ET                              9.1                                                      9949.01    10055.26
                  Right bank is non effective flow area:  Hard coded GR's
                          from STA 10200 to 10220.8 @ EL 1635
              Culvert M10      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    0.796         19           9969     10005.6           80           70         74.9
GR   1640.2      9839.6       1639.2     9885.1       1637.8      9940.8       1633.8     9948.8     1628.9     9955.7
GR   1628.8      9969.0       1627.7     9978.7       1628.4      9985.1       1628.1     10000.0    1628.9     10005.6
GR   1628.6     10017.7       1628.4     10039.7      1631.0      10049.0      1635.4     10059.4    1635.6     10111.0
GR   1635.2     10156.7         1635     10200.2        1635      10215.4        1635     10220.8


NH        3        .06          9984.8     .045       10020.5        .06      10055.8
ET                              9.1                                                      9949.59    10039.17
X1    0.905         17           9984.8     10020.5          560          590        576.6
GR   1647.8      9754.0       1646.5     9804.9       1646.4      9825.7       1644.8     9839.3     1644.8     9892.9
GR   1645.0      9908.4       1644.2     9937.5       1638.4      9950.8       1637.9     9965.0     1637.5     9984.8
GR   1636.7      9989.8       1636.6     10000.0      1637.0      10005.9      1637.7     10020.5    1637.9     10037.5
GR   1646.2     10051.0       1649.0     10055.8

        HEC-1 Concentration Point C541
1
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QT       2         660         660

NH        3        .06          9973.6     .045       10029.5        .06      10155.4
ET                              9.1                                                      9956.19    10042.67
            HEC-1 Concentration Point C541:  24-hr storm controls.
X1    1.007         28           9973.6     10029.5          530          540        539.1
GR   1660.1      9769.4       1657.7     9786.8       1656.3      9806.7       1654.3     9819.7     1653.9     9830.8
GR   1654.1      9842.0       1653.9     9852.5       1653.5      9874.9       1653.8     9894.2     1653.8     9913.7
GR   1653.7      9939.5       1649.9     9948.7       1645.4      9964.5       1646.8     9973.6     1645.8     9980.1
GR   1645.7      9993.3       1645.3     10000.0      1646.0      10014.6      1646.7     10029.5    1647.9     10044.3
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GR   1649.7    10050.1    1656.4    10066.6    1656.6    10081.2    1657.3    10096.8    1657.6    10111.4
GR   1658.3    10130.9    1659.0    10146.1    1659.7    10155.4

NH       3        .06     9984.8        .045     10011        .06     10282.7
ET                         9.1                                                  9930.70   10031.95
X1   1.105         35     9984.8       10011       500        520       515.1
GR   1670.0     9730.7    1669.0     9758.4    1667.7     9782.7    1665.2     9806.2    1664.9     9810.7
GR   1663.9     9835.8    1663.1     9853.3    1662.7     9867.3    1663.3     9890.1    1663.3     9905.8
GR   1662.5     9926.2    1657.7     9932.0    1658.0     9951.9    1657.7     9967.7    1657.1     9984.8
GR   1655.8     9992.2    1656.8     9997.0    1655.8    10000.0    1658.1    10011.0    1658.1    10029.8
GR   1660.3    10036.8    1662.4    10042.3    1663.7    10050.5    1664.1    10068.3    1664.0    10071.9
GR   1664.6    10087.3    1666.1    10102.3    1667.8    10119.5    1667.1    10134.2    1666.6    10150.3
GR   1667.1    10170.3    1667.4    10245.4    1667.9    10259.1    1668.4    10270.2    1669.0    10282.7

          START Hydraulically Similar Reach    BA 3
                See Exhibit 1, Manning's n Value Map.

NH       3        .065    9978.1        .035    10007.7        .065    10022.6
ET                         9.1                                                  9647.17   10008.95
          START Hydraulically Similar Reach BA 3
                See Exhibit 1, Manning's n Value Map.
X1   1.223         34     9978.1      10007.7       610        600       625.2
GR   1680.9     9604.5    1677.7     9618.1    1672.5     9636.1    1672.0     9645.1    1668.9     9652.1
GR   1668.7     9672.0    1668.9     9685.9    1670.9     9692.6    1671.3     9704.3    1673.0     9717.6
GR   1672.6     9727.2    1671.6     9751.7    1671.1     9762.9    1672.1     9777.5    1671.6     9793.3
GR   1672.2     9805.2    1670.9     9823.9    1670.1     9833.9    1672.6     9855.2    1672.6     9863.0
GR   1670.4     9881.1    1670.5     9889.0    1672.4     9897.5    1672.2     9917.8    1671.2     9936.7
GR   1670.6     9942.3    1669.0     9950.5    1671.2     9960.9    1671.6     9978.1    1670.9     9987.1
GR   1670.3    10000.0    1669.8    10007.7    1678.5    10016.2    1681.0    10022.6

NH       3        .065       9981        .035    10008.6        .065    10082.4
ET                         9.1                                                  9655.53   10008.61
X1   1.302         32        9981    10008.6       420        405       417.8
GR   1695.4     9636.2    1689.4     9646.6    1680.7     9653.2    1677.0     9664.8    1679.4     9675.6
GR   1680.0     9685.6    1680.7     9709.4    1682.2     9723.2    1681.5     9741.0    1682.0     9756.9
GR   1681.8     9781.3    1679.8     9798.4    1681.3     9811.1    1680.8     9821.7    1680.9     9841.0
GR   1677.5     9861.5    1678.7     9878.4    1677.5     9894.2    1682.2     9914.4    1683.2     9929.6
GR   1682.3     9948.0    1679.6     9963.0    1680.5     9981.0    1678.5    10000.0    1680.7    10008.6
GR   1681.0    10026.8    1682.2    10037.7    1684.0    10045.0    1686.2    10053.8    1687.8    10060.4
GR   1688.6    10067.1    1692.1    10082.4
1
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NH       3        .065     9983.6        .035     10013        .065     10083.6
ET                         9.1                                                  9753.51   10013.01
X1   1.393         27     9983.6       10013       480        480       479.5
GR   1700.9     9704.0    1696.1     9715.5    1693.1     9731.1    1692.2     9746.4    1690.9     9762.6
GR   1691.4     9775.0    1692.5     9783.6    1692.9     9808.0    1692.5     9822.1    1692.7     9846.5
GR   1692.9     9855.5    1692.6     9876.5    1692.3     9889.9    1692.7     9902.4    1690.5     9918.2
GR   1688.8     9930.0    1690.1     9945.9    1690.8     9955.0    1690.9     9969.4    1691.5     9983.6
GR   1689.8    10000.0    1692.0    10013.0    1693.3    10028.0    1695.1    10041.3    1696.7    10057.2
GR   1698.2    10069.1    1700.4    10083.6

NH       3        .065     9979.7        .035    10017.1        .065    10202.8
ET                         9.1                                                  9818.06   10166.15
X1   1.517         31     9979.7      10071.1       635        650       654.6
GR   1720.9     9712.3    1718.1     9731.9    1714.1     9749.9    1711.1     9767.7    1709.5     9774.6
GR   1706.2     9797.3    1704.4     9812.7    1701.8     9829.6    1703.0     9841.6    1702.8     9855.9
GR   1701.4     9864.7    1702.2     9877.1    1702.6     9891.9    1702.9     9908.2    1703.5     9927.3
GR   1702.9     9938.3    1704.6     9951.3    1704.9     9965.9    1704.8     9979.7    1701.4    10000.0
GR   1703.7    10017.1    1705.0    10039.5    1704.0    10064.3    1702.8    10088.4    1702.2    10114.1
GR   1703.4    10141.4    1702.1    10158.1    1702.2    10163.8    1709.0    10175.4    1715.3    10185.4
GR   1722.0    10202.8

NH       3        .065       9983        .035    10012.4        .065    10341.5
ET                         9.1                                                  9969.95   10110.90
          Potential exhists for flooding in this area, thus zone A.
X1   1.645         26        9983    10012.4       690        670       674.7
GR   1727.3     9957.7    1715.2     9973.8    1716.6     9983.0    1715.6     9990.7    1715.4    10000.0
GR   1717.0    10012.4    1717.9    10029.8    1718.3    10058.3    1716.7    10076.4    1717.6    10081.3
GR   1717.6    10099.6    1716.5    10104.4    1718.9    10114.2    1719.3    10137.4    1718.9    10156.3
GR   1718.3    10167.8    1718.9    10183.8    1720.6    10202.0    1720.2    10228.5    1720.0    10249.1
GR   1719.6    10270.2    1718.9    10292.0    1718.8    10298.8    1720.9    10311.2    1724.4    10325.8
GR   1729.4    10341.5

NH       3        .065     9988.6        .035    10011.8        .065    10238.8
ET                         9.1                                                  9970.82   10145.41
          Potential exhists for flooding in this area, thus zone A.
          End Balboa Wash  (Section 1.715 is Uppermost Section of Balboa Wash)
X1   1.715         21     9988.6      10011.8       390        360       372.6
GR   1735.7     9952.9    1734.6     9964.4    1721.5     9972.6    1722.4     9983.0    1722.4     9988.6
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GR   1721.6    10000.0     1723.4    10011.8     1725.4    10033.2     1724.8    10047.7     1723.4    10061.6
GR   1722.8    10070.2     1726.2    10083.4     1726.0    10101.2     1726.7    10128.6     1724.1    10143.7
GR   1726.2    10158.6     1726.2    10178.3     1726.2    10193.8     1726.2    10212.3     1727.0    10222.6
GR   1733.0    10238.8
   ********************************************************************************
   **************          START Hesperus Wash  END Balboa Wash          ************
   ********************************************************************************


        HEC-1 Concentration Point C540
1
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QT        2        560        560

        START Hydraulically Similar Reach    HE 1
              See Exhibit 1, Manning's n Value Map.
NH        3       .075      9989.4        .05     10013.8        .075     10095.6
ET                            9.1                                                        9888.43    10084.85
          HEC-1 Concentration Point C540:  24-hr storm controls.
          ********************************************************************
          ********          START Hesperus Wash  END Balboa Wash          ************
          ********************************************************************


          START Hydraulically Similar Reach HE 1
                See Exhibit 1, Manning's n Value Map.
X1     1.803          18      9989.4     10013.8         675         450        461.0
GR    1746.9      9826.5      1746.4      9842.5      1738.0      9861.2      1735.4      9874.4      1734.0      9898.2
GR    1734.1      9927.4      1734.7      9947.4      1733.5      9957.7      1734.6      9975.0      1734.7      9989.4
GR    1732.1     10000.0      1733.8     10013.8      1734.0     10031.9      1733.8     10050.3      1732.8     10064.2
GR    1732.4     10076.5      1734.9     10086.1      1743.6     10095.6

NH        3       .075      9994.8        .05     10017.1        .075     10068.6
ET                            9.1                                                        9832.05    10054.86
X1     1.858          23      9965.2     10017.1         290         295        290.4
GR    1749.3      9797.7      1744.3      9812.1      1742.4      9824.7      1737.4      9838.0      1737.7      9854.0
GR    1739.4      9861.6      1737.1      9879.0      1739.4      9893.4      1740.2      9911.1      1739.8      9927.6
GR    1738.1      9934.8      1740.4      9947.4      1740.1      9965.2      1739.0      9981.9      1738.0      9994.8
GR    1736.8     10000.0      1736.4     10006.1      1740.5     10017.1      1741.4     10025.1      1741.3     10042.3
GR    1739.2     10054.2      1742.7     10059.5      1749.1     10068.6

NH        3       .075      9970.5        .05      10000        .075      10043
ET                            9.1                                                        9687.82    10005.61
X1     1.947          25      9970.5     10005.6         470         465        469.6
GR    1754.2      9675.6      1747.8      9689.8      1747.8      9702.9      1749.5      9719.7      1750.8      9738.5
GR    1751.4      9767.2      1751.8      9784.4      1751.0      9803.2      1750.7      9815.0      1752.3      9829.2
GR    1752.4      9845.4      1751.1      9867.4      1750.0      9876.4      1751.6      9888.5      1751.2      9913.6
GR    1750.2      9934.4      1748.8      9955.9      1747.6      9970.5      1746.6      9986.3      1745.1     10000.0
GR    1752.8     10005.6      1758.1     10012.6      1757.9     10022.9      1758.1     10037.5      1758.4     10043.0

NH        3       .075      9980.7        .05     10012.0        .075     10166.2
ET                            9.1                                                        9928.18    10139.80
X1     1.990          23      9980.7      10012         230         245        229.9
GR    1767.1      9907.6      1755.8      9922.4      1753.2      9937.6      1753.3      9941.5      1755.5      9950.2
GR    1754.9      9967.9      1754.1      9971.1      1754.8      9980.7      1753.7      9987.8      1752.4     10000.0
GR    1754.1     10012.0      1754.8     10024.7      1753.1     10039.7      1754.3     10051.4      1754.8     10069.8
GR    1754.9     10087.2      1754.9     10107.4      1753.5     10121.7      1751.8     10131.9      1756.3     10143.7
GR    1763.6     10151.6      1766.2     10158.4      1768.5     10166.2
1
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NH        3       .075      9988.6        .05     10009.4        .075     10034.1
ET                            9.1                                                        9962.19    10015.71
X1     2.084          16      9962.2     10015.7         490         490        495.4
GR    1780.1      9798.5      1778.5      9821.5      1776.9      9843.4      1776.4      9873.0      1772.3      9883.7
GR    1766.4      9895.1      1765.7      9917.4      1765.3      9932.3      1765.2      9951.4      1765.9      9962.2
GR    1762.8      9975.5      1760.5      9988.6      1759.5     10000.0      1760.4     10009.4      1764.9     10015.7
GR    1800.8     10034.1
   ********************************************************************************
   **************************    Culvert  538    ******************************
   ********************************************************************************

        HEC-1 Concentration Point C5380

QT        2        450        450

NH        3       .075      9981.8        .05     10010.2        .075     10051.7
ET                            9.1                                                        9968.24    10015.91
          HEC-1 Concentration Point C5380:  24-hr storm controls.
            Culvert 538     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
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X1    2.173       29     9981.8    10015.9       465       455       469.5
GR   1791.5     9647.9   1787.6     9662.4    1786.4     9689.2    1785.2    9717.7    1785.4    9736.9
GR   1784.7     9751.2   1784.5     9774.5    1784.4     9789.6    1783.9    9809.2    1783.5    9817.3
GR   1784.2     9837.9   1784.4     9852.8    1783.8     9872.4    1783.3    9895.2    1782.0    9916.7
GR   1781.0     9935.0   1780.7     9947.4    1774.6     9961.1    1771.2    9973.3    1771.3    9981.8
GR   1770.6     9989.6   1771.1    10000.0    1770.0    10010.2    1774.3   10015.9    1777.7   10023.2
GR   1784.7    10033.3   1787.8    10039.1    1788.5    10044.9    1790.2   10051.7

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                    0.3       0.5
NH         3      0.075     9988.3    0.050    10006.9     0.075    10078.2

ET                             9.1                                              9995.09   10000.01
          Culvert 538  Outlet.   1-60"  CMP          (SECTION 2 OF SC ROUTINE)
            Photogrammetric xsec. located 20' Downstream. (No Elev. Adjust.)
X1    2.198       28     9995.1      10000       140       130       135.0
X3       10                                                          1781.22   1781.22
                1779.79
GR   1793.7     9675.7   1787.0     9690.8    1787.1     9707.8    1787.2    9742.8    1787.2    9765.5
GR   1785.8     9794.8   1786.4     9814.7    1785.8     9828.6    1785.8    9842.1    1785.6    9858.5
GR   1785.7     9873.9   1785.7     9893.6    1784.1     9906.6    1784.4    9930.9    1783.5    9952.3
GR   1784.0     9961.0   1784.2     9969.4    1778.8     9978.3    1774.3    9988.3    1773.9    9995.1
GR   1774.0    10000.0   1774.7    10006.9    1777.4    10018.2    1786.2   10038.1    1786.3   10046.2
GR   1785.6    10058.2   1785.3    10072.8    1786.7    10078.2

1
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SC    1.024       0.9       2.63         0         5         0       164         2.3    1778.02   1775.76

NH         3      0.075      10000     0.050    10012.1     0.075    10140.2

ET                             9.1                                              9959.24   10132.93
          Culvert 538  Inlet.    1-60"  CMP          (SECTION 3 OF SC ROUTINE)
            Photogrammetric xsec. located 8.7' Upstream. (No Elev. Adjust.)
             Base Channel Elevations were lowered to Culvert Invert EL 1778.02
          Culvert 538 BT information supplied by KAM, Photo-Digitized HE8
         Weir Sect. on BT more or less parallel to 2.229 and not on CL of road
            Culvert 538 BT coded per figure 3.16 (HEC-2, Sept 1990)
X1    2.229       20      10003      10009     164.3     164.3     164.3
X2                 2     1783.02    1788.24
X3       10                                                          1788.2    1788.2
X4        2   1778.02      10003    1778.02     10009
BT      -18     9924.9     1797.4               9951.1    1792.6               9966.6    1788.5
BT              9968.7     1788.2               9979.0    1789.8               9999.0    1789.5
BT             10005.0     1789.7              10021.8    1790.2              10027.7    1790.3
BT             10034.4     1790.5              10038.0    1790.0              10046.5    1790.5
BT             10056.3     1790.5              10072.6    1789.7              10089.4    1791.2
BT             10110.9     1790.5              10132.0    1789.7              10140.2    1796.3

GR   1797.4     9924.9   1792.6     9951.1    1788.5     9966.6    1785.5    9978.0    1782.7    9981.7
GR   1783.7     9985.5   1783.0    10000.0    1778.02   10007.8    1782.6   10012.1    1785.6   10020.0
GR   1790.3    10027.7   1790.5    10034.4    1790.0    10038.0    1790.5   10046.5    1790.5   10056.3
GR   1789.7    10072.6   1791.2    10089.4    1790.5    10110.9    1789.7   10132.0    1796.3   10140.2

          Return  Contraction and Expansion coefficients to Normal

NC                                    0.1       0.3
NH         3       .075     9989.7      .05     10007       .075    10148.9

        HEC-1 Concentration Point C538I
QT         2        490        490

ET                             9.1                                              9960.46   10035.70
          HEC-1 Concentration Point C538I:  24-hr storm controls.
            Culvert 538 upstream   expanded flow.       (SECTION 4 OF SC ROUTINE)
X1    2.238       21     9989.7      10007        45        45        46.3
GR   1799.0     9908.9   1800.7     9917.6    1799.9     9935.7    1793.7    9954.7    1782.7    9974.3
GR   1781.9     9989.7   1779.6     9995.5    1781.4    10000.0    1781.9   10007.0    1782.4   10020.1
GR   1788.1    10030.4   1792.3    10039.8    1791.9    10047.5    1791.2   10050.0    1791.5   10067.8
GR   1791.2    10087.5   1792.0    10090.9    1792.8    10105.0    1792.2   10124.5    1791.6   10138.6
GR   1795.9    10148.9


NH         3       .075     9972.1      .05    10016.6       .075    10064.1
ET                             9.1                                              9957.80   10030.54
X1    2.332       22        9959      10030        475       505       496.4
GR   1808.7     9776.4   1808.4     9781.3    1805.1     9789.9    1805.0    9810.2    1805.2    9822.8
GR   1805.1     9872.4   1795.7     9892.8    1795.1     9919.2    1794.8    9944.2    1790.2    9959.0
GR   1786.5     9972.1   1786.7     9982.1    1787.1     9993.5    1787.2   10000.0    1786.5   10016.6
GR   1790.4    10030.0   1793.8    10040.7    1793.8    10040.7    1794.2   10049.9    1796.4   10057.3
1
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GR   1797.6    10060.6   1805.0    10064.1
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NH       3      .075     9984.2       .05     10013.1       .075     10054.3
ET                       9.1                                                    9972.89    10034.81
X1   2.418         21     9972.9    10034.8         435        445        457.7
GR   1812.7     9773.5     1813.4     9775.9      1809.3     9795.6     1808.0     9806.0     1807.9     9871.2
GR   1806.3     9887.8     1806.0     9907.3      1805.9     9929.0     1804.9     9947.7     1801.4     9960.2
GR   1797.3     9972.9     1795.1     9978.7      1795.7     9984.2     1795.5    10000.0     1795.4    10013.1
GR   1796.2    10023.0     1799.2    10034.8      1801.5    10042.2     1802.8    10045.9     1804.6    10050.4
GR   1810.0    10054.3

NH       3      .075        9989       .05     10005.2       .075     10107.3
ET                       9.1                                                    9988.03    10040.80
X1   2.493         13        9989    10036.5         390        395        394.5
GR   1817.1     9946.0     1815.6     9957.5      1808.9     9978.5     1806.2     9989.0     1803.2     9994.6
GR   1803.2    10000.0     1804.1    10005.2      1804.4    10020.0     1805.3    10036.5     1810.3    10055.2
GR   1814.5    10070.0     1815.0    10088.2      1815.2    10107.3

NH       3      .075     9995.6       .05       10004       .075     10137.2
ET                       9.1                                                    9973.69    10017.31
X1   2.579         21     9973.7    10017.3         445        455        455.2
GR   1830.1     9884.3     1828.1     9894.1      1826.4     9914.0     1825.6     9933.3     1823.9     9954.7
GR   1819.8     9973.7     1816.8     9980.2      1815.9     9990.3     1816.5     9995.6     1816.1    10000.0
GR   1815.7    10004.0     1818.9    10017.3      1819.0    10029.2     1819.5    10033.2     1819.4    10042.3
GR   1821.9    10051.2     1826.2    10082.3      1826.5    10103.8     1827.4    10118.0     1827.2    10131.9
GR   1829.1    10137.2

        HEC-1 Concentration Point C537

QT       2         350        350

NH       3      .075     9983.5       .05     10008.6       .075     10057.8
ET                       9.1                                                    9961.25    10028.96
        HEC-1 Concentration Point C537:  24-hr storm controls.
X1   2.655         15     9983.5    10008.6         400        405        401.8
GR   1840.3     9923.1     1839.7     9928.8      1835.9     9940.3     1830.6     9957.8     1827.1     9964.2
GR   1827.1     9983.5     1826.8     9995.9      1826.8    10000.0     1826.8    10005.7     1827.4    10008.6
GR   1827.5    10027.2     1832.4    10034.3      1838.5    10045.3     1840.6    10054.7     1841.3    10057.8

NH       3      .075       10000       .05     10018.3       .075     10044.8
ET                       9.1                                                    9967.10    10031.01
X1   2.729         13       10000      10031         385        385        389.6
GR   1846.8     9893.8     1846.2     9900.4      1844.7     9923.0     1842.8     9942.0     1839.0     9954.8
GR   1834.4     9971.2     1834.7     9981.3      1834.4     9994.6     1834.4    10000.0     1833.6    10018.3
GR   1836.9    10031.0     1838.9    10037.2      1842.8    10044.8
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NH       3      .075     9991.7       .05     10011.1       .075       10096
ET                       9.1                                                    9983.53    10024.00
X1   2.792         14     9991.7    10011.1         340        330        336.5
GR   1853.2     9949.5     1844.5     9964.4      1843.9     9979.9     1843.9     9979.9     1842.3     9988.0
GR   1842.2     9991.7     1840.0    10000.0      1840.1    10004.4     1841.5    10011.1     1842.6    10023.1
GR   1848.8    10032.7     1854.4    10047.2      1855.1    10073.0     1856.1    10096.0

NH       3      .075     9983.8       .05     10001.0       .075     10046.2
ET                       9.1                                                    9972.78    10015.33
X1   2.849         16     9983.8      10001         310        290        298.1
GR   1860.1     9847.4     1858.9     9866.4      1857.5     9895.6     1856.3     9929.8     1855.6     9954.3
GR   1855.2     9958.1     1849.2     9977.1      1849.3     9983.8     1848.5     9990.8     1848.4     9996.0
GR   1848.4    10000.0     1849.4    10001.0      1849.3    10011.5     1852.7    10021.8     1860.3    10037.2
GR   1860.8    10046.2

        HEC-1 Concentration Point C536I

QT       2        2590       2590

NH       3       .075    10015.3       .05     10053.7       .075     10303.2
ET                       9.1                                                    9877.56    10282.39
         ************************     DAM 36     ****************************
          HEC-1   C536 Storage Route Rating Curve         WSEL =  1883.3 feet
          HEC-1   C536 Inflow Hydrograph                    Q =     2590 cfs
          Reference:      HEC-1  Output  File:  EX100-6.OH1
                                                (6-hr storm)
X1   3.030         29     9975.2    10174.1         910        950        956.1
X5       2     1883.3     1883.3
GR   1889.3     9787.0     1888.3     9804.7      1886.9     9836.8     1886.3     9856.2     1885.4     9868.8
GR   1882.5     9880.9     1879.4     9898.5      1877.9     9913.4     1876.3     9939.9     1875.6     9961.1
GR   1874.4     9971.4     1871.9     9975.2      1871.6    10000.0     1871.0    10015.3     1870.6    10037.8
GR   1870.8    10053.7     1870.3    10093.7      1870.2    10115.5     1870.9    10143.0     1870.9    10148.2
GR   1872.1    10174.1     1872.1    10184.0      1875.3    10203.3     1878.5    10220.9     1880.6    10240.9
GR   1881.7    10257.6     1882.4    10279.4      1885.5    10289.7     1891.1    10303.2
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NH       3      .075     9990.3       .05     10010.7       .075     10223.3
ET                         9.1                                                  9958.50   10185.51
X1   3.105         23     9985.1    10010.7         395        415        394.1
GR   1890.1     9949.0    1884.9     9961.8      1883.3     9968.4     1882.7    9978.2    1883.3    9985.1
GR   1882.3     9990.3    1880.3     9996.9      1880.2    10000.0     1880.4   10002.4    1882.9   10010.7
GR   1884.2    10020.0    1884.2    10035.3      1883.3    10044.1     1883.9   10054.9    1883.6   10077.9
GR   1886.4    10096.3    1885.4    10107.3      1885.3    10128.9     1885.3   10160.7    1886.2   10184.0
GR   1886.6    10198.5    1889.0    10217.3      1889.9    10223.3

NH       3      .075     9986.5       .05     10014.6       .075     10361.3
ET                         9.1                                                  9933.08   10227.89
1
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X1   3.187         32     9986.5    10014.6         435        425        437.9
GR   1905.7     9908.2    1903.8     9913.5      1897.3     9926.2     1894.3    9936.9    1894.2    9945.7
GR   1895.3     9957.8    1894.1     9966.7      1892.3     9978.7     1892.1    9986.5    1890.6    9993.3
GR   1890.5    10000.0    1890.4    10004.8      1892.1    10014.6     1892.6   10032.8    1894.1   10046.0
GR   1894.4    10059.9    1892.7    10096.8      1893.3    10105.0     1893.3   10120.4    1894.5   10132.2
GR   1894.1    10146.8    1895.6    10165.0      1895.5    10187.2     1895.0   10207.2    1893.6   10223.4
GR   1896.6    10231.0    1898.8    10242.1      1899.3    10265.5     1899.5   10295.6    1900.1   10329.5
GR   1900.8    10343.9    1900.4    10361.3

NH       3      .075     9983.1       .05     10021.4       .075     10182.7
ET                         9.1                                                  9866.60   10143.13
X1   3.275         26     9975.2    10021.4         460        460        462.9
GR   1911.9     9851.9    1907.5     9860.8      1904.7     9871.1     1905.3    9875.7    1905.5    9899.5
GR   1905.4     9922.2    1904.7     9928.6      1904.5     9938.0     1906.1    9946.1    1907.3    9956.7
GR   1905.7     9964.0    1902.2     9975.2      1901.9     9983.1     1901.1   10000.0    1901.2   10013.6
GR   1902.1    10021.4    1902.0    10032.7      1905.7    10050.0     1905.8   10059.1    1903.3   10071.0
GR   1905.3    10083.5    1905.5    10107.3      1905.4    10140.5     1908.8   10157.6    1911.2   10173.5
GR   1913.2    10182.7

NH       3      .075     9987.4       .05     10003.4       .075     10041.9
ET                         9.1                                                  9856.93   10016.28
X1   3.349         25     9983.3    10014.2         390        375        389.8
GR   1921.5     9787.8    1917.5     9799.7      1915.1     9811.1     1915.5    9820.4    1915.1    9836.3
GR   1914.0     9848.0    1913.4     9871.3      1912.4     9880.7     1913.4    9897.0    1913.4    9913.0
GR   1912.0     9930.5    1911.6     9946.5      1909.2     9956.4     1909.3    9960.1    1910.1    9968.0
GR   1910.1     9977.4    1910.3     9983.3      1909.6     9987.4     1909.4    9993.3    1909.1   10000.0
GR   1909.1    10003.4    1913.5    10014.2      1914.8    10024.2     1922.4   10037.6    1922.3   10041.9

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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

 *PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=      .100 CEHV=      .300
 1490 NH CARD USED
 *SECNO 2.095
                  ASHBROOK WASH  Section 2.095    Start with CWSEL 1557.04 feet
                                 24-hr storm controls                Q =    3100 cfs
      2.095        5.14   1557.04   1555.57   1557.04   1557.40       .36        .00        .00   1553.20
     3100.0       482.8    1228.6    1388.6      114.7      234.2      303.4         .0         .0   1553.60
        .00        4.21      5.25      4.58       .113       .125       .120       .000    1551.90   9894.18
    .027035         120.       151.       140.          0         18          0        .00     206.81  10100.99


 1490 NH CARD USED
 *SECNO  .131
           HEC-1 Concentration Point C549L:    6-hr storm controls.
                 STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
            START Hydraulically Similar Reach BA 1
                 See Exhibit 1, Manning's n Value Map.
       .131        5.02   1567.42   1565.88        .00   1567.60       .18      10.19        .02   1564.70
     1130.0       401.9      658.6      69.5      132.8      176.0      27.6        7.1        2.3   1563.60
        .05        3.03      3.74      2.52       .070       .080       .070       .000    1562.40   9956.87
    .006243         605.       619.       660.          5         20          0        .00     115.48  10072.34


 1490 NH CARD USED
 *SECNO  .246

 3301 HV CHANGED MORE THAN HVINS
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 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .34

      .246      2.46   1575.46   1575.35       .00   1576.26       .80      8.47       .19   1573.80
    1130.0     442.9     641.7      45.4      63.5      86.3       8.3      10.6       3.7   1573.00
       .07      6.98      7.43      5.47       .070      .080      .070      .000   1573.00   9953.49
   .054798      600.      611.      610.          3        14         0       .00     85.07  10038.56


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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

 1490 NH CARD USED
 *SECNO  .364

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.54

      .364      3.87   1586.87   1585.42       .00   1587.12       .25     10.81       .06   1584.80
    1130.0      10.8     438.1     681.1       5.7     110.1     168.4      13.7       5.0   1583.70
       .12      1.91      3.98      4.05       .070      .078      .070      .000   1583.00   9982.94
   .008464      620.      622.      615.          7         5         0       .00     96.91  10079.85


 1490 NH CARD USED
 *SECNO  .482

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
      .482      2.26   1597.96   1597.96       .00   1598.79       .84     11.22       .18   1595.90
    1130.0      34.7     569.1     526.2       6.5      83.8      65.7      16.8       6.4   1596.60
       .14      5.29      6.79      8.01       .070      .080      .070      .000   1595.70   9982.33
   .064009      620.      623.      610.          0        11         0       .00     92.51  10074.85


 1490 NH CARD USED
 *SECNO  .608

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.69

           HEC-1 Concentration Point C548:  6-hr storm controls.
           START Hydraulically Similar Reach BA 2
                 See Exhibit 1, Manning's n Value Map.
      .608      4.58   1609.78   1609.14       .00   1610.27       .49     11.44       .04   1607.80
    1040.0     131.6     687.2     221.2      43.3      106.5      61.4      19.6       7.8   1606.90
       .17      3.04      6.45      3.60       .060      .046      .060      .000   1605.20   9949.89
   .007478      665.      667.      650.          7        14         0       .00     95.09  10044.98


 1490 NH CARD USED
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  .728

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
           HEC-1 Concentration Point C548L:  24-hr storm controls.
                 Q = Q(C548L) - Qweir = 720 - 385 = 335 cfs
             Culvert M10     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .728      2.06   1619.76   1619.76       .00   1620.36       .60      5.79       .03   1618.50
     335.0       2.7     291.3      41.0       1.2      44.5      13.9      21.6       8.9   1619.70
       .20      2.33      6.55      2.96       .060      .045      .060      .000   1617.70   9980.06
   .021154      640.      631.      615.          0        14         0       .00     59.43  10043.32


 CCHV=     .300 CEHV=     .500
 1490 NH CARD USED
 *SECNO  .759
 7185 MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
            Culvert M10  Outlet.      2-54"  CMP       (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 13' Downstream. Bott elev adjust.)
      .759      1.04   1624.81   1624.81      .00   1625.26       .45      4.38       .04   1623.77
     335.0     140.6      59.3     135.1     27.5       9.0       26.5      21.8       9.1   1623.77
       .21      5.12      6.58      5.11     .054      .045       .051      .000   1623.77   9970.18
   .037875      155.      161.      155.        0         8          0       .00     69.64  10039.81


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     2          .024        .90       2.63        .00       4.50        .00     121.50        2          3      1625.37    1623.77

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1490 NH CARD USED
*SECNO  .782

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1633.67

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 34.61

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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


SPECIAL CULVERT

     EGIC       EGOC        H4       QWEIR      QCULV        VCH       ACULV      ELTRD     WEIRLN
  1633.90    1632.44      8.41        397.        328.      1.638        31.8    1631.92       108.


          HEC-1 Concentration Point C548L:  24-hr storm controls.
            Culvert M10  Inlet.       2-54"  CMP       (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 28.8' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1625.37
            Culvert M10 BT information surveyed by ALS. CL of Fountain Hills Blv
            BT Sta. 10000 = ALS original survey Sta. 3+50
            BT coded per figure 3.16 (HEC-2, Sept 1990)
            Assume 100% of weir flow is diverted to Oxford Wash.
      .782       8.34   1633.64       .00        .00   1633.67       .02       8.41       .00   1625.30
     720.0      273.1      253.4     193.5      283.7     154.7      196.4       22.8       9.4   1625.37
       .24        .96       1.64       .99       .060      .045       .060       .000   1625.30   9943.05
   .000146      122.       122.       122.          2         0          0       .00     107.79  10050.83


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .796

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

                Right bank is non effective flow area:  Hard coded GR's
                          from STA 10200 to 10220.8 @ EL 1635
            Culvert M10      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      .796       5.95   1633.65   1629.86        .00   1633.69       .04        .02       .00   1628.80
     720.0       91.6      358.6     269.8       79.7      197.5      217.6       23.7       9.5   1628.90
       .25       1.15       1.82      1.24       .060      .045       .060       .000   1627.70   9949.01
   .000321       80.        75.       70.          2        14          0       .00     106.25  10055.26


1490 NH CARD USED
*SECNO  .905

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .905       2.33   1638.93   1638.93        .00   1639.60       .67        .59       .19   1637.50
     720.0      136.1      506.3      77.5       35.7      68.0       20.0       27.9      10.8   1637.70
       .28       3.81       7.45      3.87       .060      .045       .060       .000   1636.60   9949.59
   .021619      560.       577.      590.          0        18          0       .00      89.58  10039.17


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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

1490 NH CARD USED
*SECNO 1.007
HEC-1 Concentration Point C541: 24-hr storm controls.

1.007	2.47	1647.77	1647.39	.00	1648.18	.41	8.55	.03	1646.80
660.0	86.3	561.2	12.5	25.0	103.4	7.0	29.4	11.9	1646.70
.31	3.45	5.43	1.78	.060	.045	.060	.000	1645.30	9956.19
.011922	530.	539.	540.	5	11	0	.00	86.48	10042.67

1490 NH CARD USED
*SECNO 1.105
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1.105	2.97	1658.77	1658.77	.00	1659.39	.61	7.55	.06	1657.10
660.0	205.7	420.1	34.2	57.2	56.6	13.4	31.0	13.0	1658.10
.33	3.60	7.43	2.55	.060	.045	.060	.000	1655.80	9930.70
.018685	500.	515.	520.	0	11	0	.00	101.25	10031.95

1490 NH CARD USED
*SECNO 1.223

3265 DIVIDED FLOW

START Hydraulically Similar Reach BA 3
See Exhibit 1, Manning's n Value Map.

1.223	2.38	1671.08	1670.83	.00	1671.40	.32	11.99	.03	1671.60
660.0	594.7	63.7	1.5	130.6	14.4	.8	32.9	14.7	1669.80
.37	4.55	4.43	1.91	.065	.035	.065	.000	1668.70	9647.17
.020324	610.	625.	600.	5	19	0	.00	134.63	10008.95

1490 NH CARD USED
*SECNO 1.302

3265 DIVIDED FLOW

1.302	2.96	1679.96	1679.61	.00	1680.29	.33	8.88	.00	1680.50
660.0	587.8	72.2	.0	129.1	14.3	.0	34.3	15.9	1680.70
.39	4.55	5.06	.00	.065	.035	.000	.000	1677.00	9655.53
.022052	420.	418.	405.	5	8	0	.00	118.86	10005.70

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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

1490 NH CARD USED
*SECNO 1.393

3265 DIVIDED FLOW

1.393	2.83	1691.63	1691.59	.00	1692.09	.46	11.76	.04	1691.50
660.0	484.5	175.5	.0	100.1	25.9	.0	35.8	17.2	1692.00
.42	4.84	6.77	.00	.065	.035	.000	.000	1688.80	9753.51
.027390	480.	480.	480.	3	10	0	.00	123.99	10010.81

1490 NH CARD USED
*SECNO 1.517

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

1.517	2.17	1703.57	1703.33	.00	1703.75	.18	11.63	.03	1704.80
660.0	309.1	160.2	190.6	112.8	31.7	78.3	38.4	20.0	1704.00
.48	2.74	5.05	2.43	.065	.035	.065	.000	1701.40	9818.06
.012864	635.	655.	650.	6	20	0	.00	247.86	10166.15

1490 NH CARD USED
*SECNO 1.645

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
Potential exhists for flooding in this area, thus zone A.

```
     1.645      2.89   1718.09   1718.09       .00   1718.76       .67      8.23       .15   1716.60
     660.0      97.6     472.8      89.5      25.7      62.9      47.3      41.2      22.9   1717.00
       .51      3.79      7.52      1.89      .065      .035      .065      .000   1715.20   9969.95
   .011452       690.      675.      670.         0        11         0       .00    123.79  10110.90


1490 NH CARD USED
*SECNO 1.715
1
   29MAR95      14:51:05                                                                                PAGE   19

    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

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
            Potential exhists for flooding in this area, thus zone A.
           End Balboa Wash  (Section 1.715 is Uppermost Section of Balboa Wash)
     1.715      2.84   1724.34   1724.34       .00   1725.17       .83      4.98       .05   1722.40
     660.0     180.9     417.2      61.9      38.3      48.4      24.8      42.2      23.7   1723.40
       .52      4.73      8.62      2.50      .065      .035      .065      .000   1721.50   9970.82
   .015596       390.      373.      360.         0         8         0       .00     78.08  10145.41


1490 NH CARD USED
*SECNO 1.803

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


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

          HEC-1 Concentration Point C540:  24-hr storm controls.
        **************************************************************************
        ********        START Hesperus Wash  END Balboa Wash         ************
        **************************************************************************

          START Hydraulically Similar Reach HE 1
                See Exhibit 1, Manning's n Value Map.
     1.803      2.48   1734.58   1734.47       .00   1734.91       .33      9.69       .05   1734.70
     560.0      69.6     212.3     278.1      35.9      34.9      75.7      43.7      25.3   1733.80
       .55      1.94      6.08      3.67      .075      .050      .075      .000   1732.10   9888.43
   .025837       675.      461.      450.         3         9         0       .00    175.84  10084.85


1490 NH CARD USED
*SECNO 1.858

3265 DIVIDED FLOW

1
   29MAR95      14:51:05                                                                                PAGE   20

    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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.48

     1.858      3.23   1739.63   1738.87       .00   1739.83       .20      4.91       .01   1740.10
     560.0     289.6     269.9        .5     104.6      62.0        .7      44.8      26.3   1740.50
       .58      2.77      4.35       .76      .075      .047      .075      .000   1736.40   9832.05
   .011845       290.      290.      295.         5         9         0       .00    127.30  10054.86


1490 NH CARD USED
*SECNO 1.947

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.947      3.59   1748.69   1748.69       .00   1749.44       .74      8.03       .16   1747.60
```

```
      560.0      60.1     499.9       .0      23.8      68.9       .0      46.2      27.4   1752.80
        .59      2.52      7.26      .00      .075      .054      .000      .000   1745.10   9687.82
    .026789      470.      470.      465.         0         8         0       .00     69.36  10002.61

 1490 NH CARD USED
 *SECNO 1.990

 3265 DIVIDED FLOW

      1.990      3.01   1754.81   1754.56       .00   1755.10       .29      5.62       .04   1754.80
      560.0      60.3     242.7     257.0      22.7      44.2      78.0      46.8      28.0   1754.10
        .61      2.66      5.49      3.29      .075      .050      .075      .000   1751.80   9928.18
    .021782      230.      230.      245.         3        15         0       .00    154.29  10139.80

 1490 NH CARD USED
 *SECNO 2.084
      2.084      4.03   1763.53   1762.58       .00   1763.96       .43      8.82       .04   1765.90
      560.0        .0     560.0        .0        .0     106.6        .0      48.3      29.1   1764.90
        .64       .00      5.25       .00      .000      .063      .000      .000   1759.50   9972.36
    .014895      490.      495.      490.         5         8         0       .00     41.42  10013.78

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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

 1490 NH CARD USED
 *SECNO 2.173

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

          HEC-1 Concentration Point C5380:  24-hr storm controls.
            Culvert 538     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      2.173      2.61   1772.61   1772.51       .00   1773.28       .67      9.25       .07   1771.30
      450.0      58.1     391.9        .0      15.1      56.8        .0      49.2      29.6   1774.30
        .66      3.84      6.90       .00      .075      .054      .000      .000   1770.00   9968.24
    .029856      465.      470.      455.         3        14         0       .00     45.42  10013.66

 CCHV=     .300 CEHV=     .500
 1490 NH CARD USED
 *SECNO 2.198

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1781.22 ELREA=      1781.22

            Culvert 538  Outlet.   1-60"  CMP          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 20' Downstream. (No Elev. Adjust.)
      2.198      6.43   1780.33   1780.33       .00   1783.55      3.22      3.26      1.27   1773.90
      450.0        .0     450.0        .0        .0      31.3        .0      49.4      29.6   1774.00
        .66       .00     14.40       .00      .000      .050      .000      .000   1773.90   9995.10
    .019840      140.      135.      130.         0        17         0       .00      4.90  10000.00


 SPECIAL CULVERT

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      1          .024        .90       2.63        .00       5.00        .00     164.00        2          3     1778.02    1775.76

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

 5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
 5130, EGIC= 1809.73..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 1804.76 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO 2.229

 SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1790.48
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
```

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 10.75

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
1809.73	1804.76	6.93	190.	261.	2.090	19.6	1788.24	132.

Culvert 538 Inlet. 1-60" CMP (SECTION 3 OF SC ROUTINE)
Photogrammetric xsec. located 8.7' Upstream. (No Elev. Adjust.)
Base Channel Elevations were lowered to Culvert Invert EL 1778.02
Culvert 538 BT information supplied by KAM, Photo-Digitized HE8
Weir Sect. on BT more or less parallel to 2.229 and not on CL of road
Culvert 538 BT coded per figure 3.16 (HEC-2, Sept 1990)

2.229	12.43	1790.45	.00	.00	1790.48	.03	6.93	.00	1778.02
450.0	201.8	155.8	92.4	230.2	74.6	120.1	50.2	29.9	1778.02
.69	.88	2.09	.77	.071	.050	.064	.000	1778.02	9959.24
.000172	164.	164.	164.	2	0	0	.00	128.41	10132.93

CCHV= .100 CEHV= .300
1490 NH CARD USED
*SECNO 2.238
HEC-1 Concentration Point C538I: 24-hr storm controls.
Culvert 538 upstream expanded flow. (SECTION 4 OF SC ROUTINE)

2.238	10.87	1790.47	1783.53	.00	1790.49	.02	.01	.00	1781.90
490.0	135.0	226.3	128.7	179.5	162.9	169.0	50.7	30.0	1781.90
.71	.75	1.39	.76	.075	.050	.075	.000	1779.60	9960.46
.000117	45.	46.	45.	2	17	0	.00	75.24	10035.70

1490 NH CARD USED
*SECNO 2.332

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .26

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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
2.332	4.07	1790.57	1788.28	.00	1790.65	.07	.15	.02	1790.20
490.0	.1	489.9	.0	.2	223.2	.0	54.9	30.8	1790.40
.77	.26	2.19	.01	.075	.060	.075	.000	1786.50	9957.80
.001750	475.	496.	505.	2	20	0	.00	72.74	10030.54

1490 NH CARD USED
*SECNO 2.418

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2.418	1.98	1797.08	1797.08	.00	1797.77	.69	2.20	.19	1797.30
490.0	.0	490.0	.0	.0	73.3	.0	56.5	31.5	1799.20
.79	.00	6.68	.00	.000	.056	.000	.000	1795.10	9973.48
.041422	435.	458.	445.	0	11	0	.00	52.98	10026.46

1490 NH CARD USED
*SECNO 2.493

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.69

2.493	3.25	1806.45	1805.80	.00	1806.81	.36	9.00	.03	1806.20
490.0	.1	486.0	4.0	.1	100.8	2.5	57.3	32.0	1805.30
.81	.58	4.82	1.61	.075	.060	.075	.000	1803.20	9988.03
.014419	390.	395.	395.	7	11	0	.00	52.76	10040.80

1490 NH CARD USED
*SECNO 2.579

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY

```
3720 CRITICAL DEPTH ASSUMED
     2.579      2.58   1818.28   1818.28       .00   1819.16       .88     11.97       .16   1819.80
     490.0        .0     490.0        .0        .0      65.1        .0      58.1      32.4   1818.90
       .83       .00      7.53       .00      .000      .070      .000      .000   1815.70   9976.99
    .062311      445.      455.      455.         0        15         0       .00     37.75  10014.74


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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

1490 NH CARD USED
*SECNO 2.655

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

         HEC-1 Concentration Point C537:  24-hr storm controls.
     2.655      1.92   1828.72   1828.20       .00   1828.94       .22      9.71       .07   1827.10
     350.0      90.3     202.9      56.8      33.6      45.3      24.6      58.9      32.9   1827.40
       .86      2.69      4.48      2.31      .075      .050      .075      .000   1826.80   9961.25
    .010348      400.      402.      405.         7        11         0       .00     67.71  10028.96

1490 NH CARD USED
*SECNO 2.729

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .51

     2.729      1.95   1835.55   1835.50       .00   1836.03       .48      7.01       .08   1834.40
     350.0     125.6     224.4        .0      32.1      35.8        .0      59.7      33.5   1836.90
       .88      3.92      6.27       .00      .075      .058      .000      .000   1833.60   9967.09
    .039358      385.      390.      385.         5         5         0       .00     58.73  10025.82

1490 NH CARD USED
*SECNO 2.792

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62

     2.792      3.18   1843.18   1842.94       .00   1843.76       .57      7.70       .03   1842.20
     350.0      10.7     303.5      35.9       5.4      47.0      13.8      60.2      33.9   1841.50
       .89      1.97      6.45      2.59      .075      .050      .075      .000   1840.00   9983.53
    .014912      340.      337.      330.         4        11         0       .00     40.47  10024.00

1490 NH CARD USED
*SECNO 2.849
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.849      2.16   1850.56   1850.56       .00   1851.28       .71      6.01       .04   1849.30
     350.0      43.0     252.3      54.7      11.8      33.0      15.2      60.6      34.2   1849.40
       .91      3.66      7.65      3.60      .075      .050      .075      .000   1848.40   9972.78
    .028831      310.      298.      290.         0        19         0       .00     42.55  10015.33


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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

1490 NH CARD USED
*SECNO 3.030
 WATER EL=X5 CARD=   1883.300

3301 HV CHANGED MORE THAN HVINS

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

          **************************      DAM  36     ****************************
          HEC-1   C536 Storage Route Rating Curve          WSEL =  1883.3 feet
          HEC-1   C536 Inflow Hydrograph                     Q =    2590 cfs
          Reference:       HEC-1  Output  File:  EX100-6.OH1
                                                 (6-hr storm)
     3.030     13.10   1883.30   1872.64       .00   1883.31       .01       .06       .07   1871.90
    2590.0     268.7     2035.2     286.1     556.2     2466.8     548.3     100.1      39.0   1872.10
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      1.26       .48       .83       .52       .075      .068      .075      .000   1870.20   9877.56
   .000050      910.      956.      950.         0         8         0       .00    404.83  10282.39


1490 NH CARD USED
*SECNO 3.105

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     3.105      6.04   1886.24   1886.24       .00   1887.18       .94       .07       .28   1883.30
    2590.0     365.3    1249.8     974.9      70.5     121.5     251.6     118.5      41.9   1882.90
      1.27      5.18     10.29      3.88      .075      .052      .075      .000   1880.20   9958.50
   .016618      395.      394.      415.         0        15         0       .00    224.24  10185.51


1490 NH CARD USED
*SECNO 3.187

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   29MAR95      14:51:05                                                                    PAGE   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


     3.187      4.97   1895.37   1895.37       .00   1896.22       .85      6.99       .01   1892.10
    2590.0     294.9    1228.8    1066.2      76.2     123.6     282.6     123.1      44.3   1892.10
      1.29      3.87      9.94      3.77      .075      .050      .075      .000   1890.40   9933.08
   .015740      435.      438.      425.         0        12         0       .00    264.64  10227.89


1490 NH CARD USED
*SECNO 3.275

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     3.275      4.82   1905.92   1905.92       .00   1906.90       .98      6.93       .04   1902.20
    2590.0     185.4    1856.6     548.0      75.5     203.5     146.5     127.9      47.1   1902.10
      1.31      2.46      9.12      3.74      .075      .052      .075      .000   1901.10   9866.60
   .014309      460.      463.      460.         0         8         0       .00    258.73  10143.13


1490 NH CARD USED
*SECNO 3.349

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

     3.349      4.67   1913.77   1913.70       .00   1914.80      1.03      7.89       .02   1910.30
    2590.0    1486.1    1103.6        .3      219.0     113.7        .3     131.2      48.9   1913.50
      1.32      6.79      9.71       .91      .075      .063      .075      .000   1909.10   9856.93
   .031065      390.      390.      375.         2         8         0       .00    159.35  10016.28


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 T1   *  Fountain Hills North FIS
 T2   *  For:  FCDMC #92-04        By:  GVSCE #35
 T3   *  Balboa/Hesperus 100-Year Floodway
 T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
 T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
 T6   *  with survey control by Anderson Nelson 12-11-92.
 T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
 T8   *           Files: EX100-6.OH1 and EX100-24.OH1
 T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
 T9   *  Special culvert routine used.   Sub Critical Analysis.
 T9   *  Floodplain limits are plotted at each cross section using starting
 T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
 T9   *  or a conflict with topographic contours, in which case, the contours are
 T9   *  used to plot the floodplain.
 T9   *  No island analysis needed, due to dynamic nature of thalweg, entire wash
 T9   *  bottom is in floodplain/floodway.
```

```
 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0        3         0         0         0         0         0         0   1557.04
 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
       15        0        -1         0         0         0        -1         0         0         0
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

 *PROF 2

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO 2.095

 3470 ENCROACHMENT STATIONS=     9894.2   10101.0  TYPE=       1  TARGET=      206.811
                ASHBROOK WASH  Section 2.095    Start with CWSEL 1557.04 feet
                     24-hr storm controls                Q =    3100 cfs
      2.095      5.14   1557.04   1555.57   1557.04   1557.40       .36       .00       .00   1553.20
     3100.0    482.8     1228.6    1388.6     114.7     234.2     303.4        .0        .0   1553.60
        .00     4.21       5.25      4.58      .113      .125      .120      .000   1551.90   9894.18
    .027035     120.       151.      140.         0        18         0       .00    206.81  10100.99


 1490 NH CARD USED
 *SECNO  .131

 3470 ENCROACHMENT STATIONS=     9956.9   10072.3  TYPE=       1  TARGET=      115.470
          HEC-1 Concentration Point C549L:    6-hr storm controls.
               STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
           START Hydraulically Similar Reach BA 1
               See Exhibit 1, Manning's n Value Map.
       .131      5.02   1567.42   1565.88   1567.42   1567.60       .18     10.19       .02   1564.70
    1130.0     401.9     658.6      69.6     132.8     176.0      27.6       7.1       2.3   1563.60
       .05      3.03      3.74      2.52      .070      .080      .070      .000   1562.40   9956.87
    .006243     605.      619.      660.         5        20         0       .00    115.47  10072.34


 1490 NH CARD USED
 *SECNO  .246

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .34


 3470 ENCROACHMENT STATIONS=     9953.5   10038.6  TYPE=       1  TARGET=       85.069
       .246      2.46   1575.46   1575.35   1575.46   1576.26       .80      8.47       .19   1573.80
    1130.0     442.9     641.7      45.4      63.4      86.3       8.3      10.6       3.7   1573.00
       .07      6.98      7.43      5.47      .070      .080      .070      .000   1573.00   9953.49
    .054821     600.      611.      610.         3        14         0       .00     85.06  10038.55


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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

 1490 NH CARD USED
 *SECNO  .364

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.55


 3470 ENCROACHMENT STATIONS=     9982.9   10079.8  TYPE=       1  TARGET=       96.909
       .364      3.87   1586.87   1585.42   1586.87   1587.12       .25     10.81       .06   1584.80
    1130.0      10.8     438.1     681.1       5.7     110.1     168.4      13.7       5.0   1583.70
       .12      1.91      3.98      4.04      .070      .078      .070      .000   1583.00   9982.94
    .008462     620.      622.      615.         7         5         0       .00     96.91  10079.85
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1490 NH CARD USED
*SECNO  .482

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9982.3   10074.8  TYPE=       1  TARGET=       92.520
      .482      2.26   1597.96   1597.96   1597.96   1598.79       .84     11.20       .18   1595.90
    1130.0      34.7     569.1     526.2       6.6      83.9       65.7      16.8       6.4   1596.60
       .14      5.29      6.79      8.00      .070      .080       .070      .000   1595.70   9982.33
   .063800      620.      623.      610.         0        11          0       .00     92.52  10074.85


1490 NH CARD USED
*SECNO  .608

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.69


3470 ENCROACHMENT STATIONS=     9949.9   10045.0  TYPE=       1  TARGET=       95.091
          HEC-1 Concentration Point C548:  6-hr storm controls.
          START Hydraulically Similar Reach BA 2
                See Exhibit 1, Manning's n Value Map.
      .608      4.58   1609.78   1609.14   1609.78   1610.27       .49     11.44       .03   1607.80
    1040.0     131.5     687.3     221.1      43.3     106.5       61.4      19.6       7.8   1606.90
       .17      3.04      6.45      3.60      .060      .046       .060      .000   1605.20   9949.90
   .007487      665.      667.      650.         7        14          0       .00     95.07  10044.97


1
   29MAR95      14:51:05                                                                          PAGE   30

    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


1490 NH CARD USED
*SECNO  .728

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9980.1   10043.3  TYPE=       1  TARGET=       63.261
          HEC-1 Concentration Point C548L:  24-hr storm controls.
                Q = Q(C548L) - Qweir = 720 - 385 = 335 cfs
             Culvert M10     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .728      2.07   1619.77   1619.77   1619.76   1620.36       .59      5.78       .03   1618.50
    335.0        2.7     290.9      41.4       1.2      44.7      14.1      21.6       8.9   1619.70
       .20      2.32      6.51      2.93      .060      .045       .060      .000   1617.70   9980.06
   .020751      640.      631.      615.         0        14          0       .00     60.25  10043.32


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO  .759
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.2   10039.8  TYPE=       1  TARGET=       69.630
             Culvert M10  Outlet.      2-54"  CMP        (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 13' Downstream. Bott elev adjust.)
      .759      1.03   1624.80   1624.80   1624.81   1625.26       .45      4.34       .04   1623.77
    335.0      140.6      59.3     135.1      27.5       9.0      26.4      21.8       9.1   1623.77
       .21      5.12      6.59      5.11      .054      .045       .051      .000   1623.77   9970.18
   .038024      155.      161.      155.         0         8          0       .00     69.63  10039.81


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     2          .024       .90      2.63       .00      4.50       .00    121.50       2         3    1625.37   1623.77

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1490 NH CARD USED
*SECNO  .782

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1633.67
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 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 34.69

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

 SPECIAL CULVERT

      EGIC       EGOC         H4       QWEIR      QCULV        VCH       ACULV      ELTRD     WEIRLN
   1633.90    1632.44       8.41         397.       328.      1.638        31.8    1631.92        108.


 3470 ENCROACHMENT STATIONS=      9943.0    10050.8  TYPE=       1  TARGET=       107.780
           HEC-1 Concentration Point C548L:  24-hr storm controls.
             Culvert M10  Inlet.        2-54"  CMP        (SECTION 3 OF SC ROUTINE)
               Photogrammetric xsec. located 28.8' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1625.37
             Culvert M10 BT information surveyed by ALS. CL of Fountain Hills Blv
             BT Sta. 10000 = ALS original survey Sta. 3+50
             BT coded per figure 3.16 (HEC-2, Sept 1990)
             Assume 100% of weir flow is diverted to Oxford Wash.
       .782       8.34    1633.64        .00    1633.64    1633.67        .02        8.41        .00    1625.30
     720.0       273.1      253.4       193.5      283.7      154.7      196.4        22.8         9.4    1625.37
       .24         .96       1.64         .99       .060       .045       .060        .000    1625.30    9943.05
   .000146        122.       122.        122.          2          0          0         .00     107.78   10050.83

 CCHV=      .100 CEHV=      .300
 1490 NH CARD USED
 *SECNO  .796

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

 3470 ENCROACHMENT STATIONS=      9949.0    10055.3  TYPE=       1  TARGET=       106.250
                 Right bank is non effective flow area:  Hard coded GR's
                          from STA 10200 to 10220.8 @ EL 1635
              Culvert M10      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
       .796       5.95    1633.65    1629.86    1633.65    1633.69        .04        .02        .00    1628.80
     720.0        91.6       358.6      269.8       79.7      197.5      217.7        23.7         9.6    1628.90
       .25        1.15       1.82       1.24       .060       .045       .060        .000    1627.70    9949.01
   .000321         80.        75.         70.          2         14          0         .00     106.25   10055.26

 1490 NH CARD USED
 *SECNO  .905
1
    29MAR95       14:51:05                                                                                    PAGE   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


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9949.6    10039.2  TYPE=       1  TARGET=        89.580
       .905       2.34    1638.94    1638.94    1638.93    1639.60        .66        .59        .19    1637.50
     720.0       137.1      504.8       78.1       36.2       68.5       20.3        27.9       10.9    1637.70
       .28        3.78       7.36       3.84       .060       .045       .060        .000    1636.60    9949.59
   .020914         560.       577.        590.          0         19          0         .00      89.58   10039.17

 1490 NH CARD USED
 *SECNO 1.007

 3470 ENCROACHMENT STATIONS=      9956.2    10042.7  TYPE=       1  TARGET=        86.479
           HEC-1 Concentration Point C541:  24-hr storm controls.
      1.007       2.45    1647.75    1647.40    1647.77    1648.17        .42        8.55        .02    1646.80
     660.0        86.2       561.6       12.2       24.8       102.7       6.9        29.5       11.9    1646.70
       .31        3.48       5.47       1.78       .060       .045       .060        .000    1645.30    9956.23
   .012237         530.       539.        540.          3         12          0         .00      86.27   10042.50

 1490 NH CARD USED
 *SECNO 1.105
 7185 MINIMUM SPECIFIC ENERGY
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```
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9930.7   10032.0  TYPE=      1  TARGET=      101.250
     1.105      2.98   1658.78   1658.78   1658.77   1659.39       .61      7.64       .06   1657.10
     660.0     205.9     419.8      34.3      57.3      56.6      13.5      31.0      13.0   1658.10
       .33      3.59      7.41      2.55      .060      .045      .060      .000   1655.80   9930.70
   .018590      500.      515.      520.         0        11         0       .00    101.25  10031.95


1490 NH CARD USED
*SECNO 1.223

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9647.2   10009.0  TYPE=      1  TARGET=      361.780
1
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          START Hydraulically Similar Reach BA 3
                See Exhibit 1, Manning's n Value Map.
     1.223      2.38   1671.08   1670.83   1671.08   1671.40       .32     11.98       .03   1671.60
     660.0     594.9      63.6       1.5     130.4      14.3        .8      32.9      14.7   1669.80
       .37      4.56      4.43      1.91      .065      .035      .065      .000   1668.70   9647.18
   .020432      610.      625.      600.         5        19         0       .00    134.41  10008.95


1490 NH CARD USED
*SECNO 1.302

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9655.5   10008.6  TYPE=      1  TARGET=      353.080
     1.302      2.96   1679.96   1679.61   1679.96   1680.29       .33      8.88       .00   1680.50
     660.0     587.7      72.3        .0     129.4      14.3        .0      34.3      15.9   1680.70
       .39      4.54      5.05       .00      .065      .035      .000      .000   1677.00   9655.53
   .021933      420.      418.      405.         5         8         0       .00    119.05  10005.71


1490 NH CARD USED
*SECNO 1.393

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9753.5   10013.0  TYPE=      1  TARGET=      259.500
     1.393      2.82   1691.62   1691.59   1691.63   1692.08       .46     11.75       .04   1691.50
     660.0     484.6     175.4        .0      99.9      25.9        .0      35.8      17.2   1692.00
       .42      4.85      6.78       .00      .065      .035      .000      .000   1688.80   9753.54
   .027520      480.      480.      480.         2        10         0       .00    123.93  10010.80


1490 NH CARD USED
*SECNO 1.517

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.46


3470 ENCROACHMENT STATIONS=     9818.1   10166.2  TYPE=      1  TARGET=      348.091
     1.517      2.17   1703.57   1703.31   1703.57   1703.75       .18     11.64       .03   1704.80
     660.0     309.1     160.2     190.7     112.9      31.7      78.4      38.4      20.0   1704.00
       .48      2.74      5.05      2.43      .065      .035      .065      .000   1701.40   9818.06
   .012834      635.      655.      650.         6        19         0       .00    247.89  10166.15


1
   29MAR95       14:51:05                                                                    PAGE   34

    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


1490 NH CARD USED
*SECNO 1.645

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9970.0   10110.9  TYPE=      1  TARGET=      140.950
             Potential exhists for flooding in this area, thus zone A.
```

```
     1.645       2.90    1718.10    1718.10    1718.09    1718.76        .66       8.16        .15    1716.60
     660.0       97.5      472.1       90.4       25.8       63.1       47.8       41.2       22.9    1717.00
       .51       3.78       7.48       1.89       .065       .035       .065       .000    1715.20    9969.95
   .011296        690.       675.       670.          0         11          0        .00     124.36   10110.90

 1490 NH CARD USED
 *SECNO 1.715

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9970.8   10145.4  TYPE=       1  TARGET=      174.590
             Potential exhists for flooding in this area, thus zone A.
            End Balboa Wash  (Section 1.715 is Uppermost Section of Balboa Wash)
     1.715       2.84    1724.34    1724.34    1724.34    1725.17        .83       4.94        .05    1722.40
     660.0      180.9      417.2       62.0       38.3       48.4       24.8       42.2       23.7    1723.40
       .52       4.73       8.62       2.50       .065       .035       .065       .000    1721.50    9970.82
   .015583        390.       373.       360.          0          8          0        .00      78.09   10145.41

 1490 NH CARD USED
 *SECNO 1.803

 3265 DIVIDED FLOW

 3301 HV CHANGED MORE THAN HVINS

1
   29MAR95       14:51:05                                                                                  PAGE   35

    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


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

 3470 ENCROACHMENT STATIONS=     9888.4   10084.8  TYPE=       1  TARGET=      196.420
           HEC-1 Concentration Point C540:  24-hr storm controls.
         **************************************************************************
         ********         START Hesperus Wash  END Balboa Wash         ************
         **************************************************************************

           START Hydraulically Similar Reach HE 1
                 See Exhibit 1, Manning's n Value Map.
     1.803       2.48    1734.58    1734.48    1734.58    1734.91        .33       9.68        .05    1734.70
     560.0       69.6      212.3      278.1       35.9       34.9       75.7       43.8       25.3    1733.80
       .55       1.94       6.08       3.67       .075       .050       .075       .000    1732.10    9888.44
   .025856        675.       461.       450.          3          9          0        .00     175.82   10084.85

 1490 NH CARD USED
 *SECNO 1.858

 3265 DIVIDED FLOW

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.48

 3470 ENCROACHMENT STATIONS=     9832.0   10054.9  TYPE=       1  TARGET=      222.811
     1.858       3.23    1739.63    1738.87    1739.63    1739.83        .20       4.91        .01    1740.10
     560.0      289.6      269.9         .5      104.6       62.0         .7       44.8       26.3    1740.50
       .58       2.77       4.35        .76       .075       .047       .075       .000    1736.40    9832.05
   .011851        290.       290.       295.          5          9          0        .00     127.27   10054.86

 1490 NH CARD USED
 *SECNO 1.947

 3265 DIVIDED FLOW

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
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

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9687.8   10005.6  TYPE=      1  TARGET=      317.790
     1.947      3.60    1748.70   1748.70   1748.69   1749.44      .74      8.02      .16   1747.60
     560.0      60.2     499.8       .0      23.9      68.9       .0      46.2      27.4   1752.80
       .59      2.52      7.25      .00      .075      .054      .000      .000   1745.10   9687.82
   .026719      470.      470.      465.         0         8         0       .00     69.38  10002.62


1490 NH CARD USED
*SECNO 1.990

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9928.2   10139.8  TYPE=      1  TARGET=      211.620
     1.990      3.01    1754.81   1754.55   1754.81   1755.10      .29      5.62      .04   1754.80
     560.0      60.3     242.7     257.0      22.6      44.2      78.0      46.9      28.0   1754.10
       .61      2.66      5.49      3.30      .075      .050      .075      .000   1751.80   9928.19
   .021839      230.      230.      245.         3        15         0       .00    154.09  10139.79


1490 NH CARD USED
*SECNO 2.084

3470 ENCROACHMENT STATIONS=     9962.2   10015.7  TYPE=      1  TARGET=       53.520
     2.084      4.03    1763.53   1762.58   1763.53   1763.96      .43      8.82      .04   1765.90
     560.0        .0     560.0        .0        .0     106.7        .0      48.3      29.1   1764.90
       .64       .00      5.25       .00      .000      .063      .000      .000   1759.50   9972.35
   .014866      490.      495.      490.         5         8         0       .00     41.43  10013.79


1490 NH CARD USED
*SECNO 2.173

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


3470 ENCROACHMENT STATIONS=     9968.2   10015.9  TYPE=      1  TARGET=       47.670
          HEC-1 Concentration Point C5380:  24-hr storm controls.
            Culvert 538     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     2.173      2.61    1772.61   1772.51   1772.61   1773.28      .67      9.25      .07   1771.30
     450.0      58.0     392.0        .0      15.1      56.8        .0      49.2      29.6   1774.30
       .66      3.84      6.91      .00      .075      .054      .000      .000   1770.00   9968.24
   .029938      465.      470.      455.         3        14         0       .00     45.42  10013.66


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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


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 2.198

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9995.1   10000.0  TYPE=      1  TARGET=        4.920

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1781.22 ELREA=      1781.22

            Culvert 538  Outlet.   1-60"  CMP          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 20' Downstream. (No Elev. Adjust.)
     2.198      6.43    1780.33   1780.33   1780.33   1783.55      3.22      5.56      1.27   1773.90
     450.0        .0     450.0        .0        .0      31.3        .0      49.4      29.6   1774.00
       .66       .00     14.39       .00      .000      .050      .000      .000   1773.90   9995.10
   .059887      140.      135.      130.         0        17         0       .00      4.90  10000.00


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     1          .024       .90      2.63       .00      5.00       .00    164.00       2         3    1778.02   1775.76

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL
```

```
5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
5130, EGIC= 1809.73..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1804.76 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO 2.229

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1790.48

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 18.67

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

SPECIAL CULVERT

     EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
  1809.73    1804.76      6.93         189.       261.     2.090        19.6    1788.24       132.


3470 ENCROACHMENT STATIONS=     9959.2   10132.9  TYPE=       1  TARGET=      173.689
           Culvert 538  Inlet.    1-60"  CMP          (SECTION 3 OF SC ROUTINE)
             Photogrammetric xsec. located 8.7' Upstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1778.02
           Culvert 538 BT information supplied by KAM, Photo-Digitized HE8
         Weir Sect. on BT more or less parallel to 2.229 and not on CL of road
           Culvert 538 BT coded per figure 3.16 (HEC-2, Sept 1990)
    2.229      12.43   1790.45       .00   1790.45   1790.48       .03       6.93       .00   1778.02
    450.0      201.8     155.8       92.3     230.1      74.6     120.0       50.3       29.9   1778.02
      .69        .88      2.09        .77      .071      .050      .064       .000   1778.02   9959.25
 .000172       164.      164.       164.         2         0         0        .00    128.21  10132.92

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.238

3470 ENCROACHMENT STATIONS=     9960.5   10035.7  TYPE=       1  TARGET=       75.240
          HEC-1 Concentration Point C538I:  24-hr storm controls.
            Culvert 538 upstream   expanded flow.       (SECTION 4 OF SC ROUTINE)
    2.238      10.86   1790.46   1783.53   1790.47   1790.48       .02       .01       .00   1781.90
    490.0      135.0     226.3     128.7     179.5     162.9     168.9       50.8       30.0   1781.90
      .71        .75      1.39       .76      .075      .050      .075       .000   1779.60   9960.46
 .000117         45.       46.       45.         2        17         0        .00     75.23  10035.69


1490 NH CARD USED
*SECNO 2.332

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .26


3470 ENCROACHMENT STATIONS=     9957.8   10030.5  TYPE=       1  TARGET=       72.740
    2.332       4.07   1790.57   1788.28   1790.57   1790.65       .07       .15       .02   1790.20
    490.0         .1     489.9        .0        .2     223.1        .0       54.9       30.8   1790.40
      .77        .26      2.20       .01      .075      .060      .075       .000   1786.50   9957.80
 .001753        475.      496.      505.         2        20         0        .00     72.73  10030.54


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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

1490 NH CARD USED
*SECNO 2.418

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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3470 ENCROACHMENT STATIONS=     9972.9   10034.8  TYPE=       1  TARGET=       61.920
     2.418       1.98    1797.08   1797.08   1797.08   1797.77       .69       2.21       .19   1797.30
     490.0         .0      490.0        .0        .0      73.3        .0       56.5      31.5   1799.20
       .79        .00       6.69       .00      .000      .056      .000       .000   1795.10   9973.48
   .041490       435.       458.       445.         0        11         0        .00     52.97  10026.46


1490 NH CARD USED
*SECNO 2.493

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.70


3470 ENCROACHMENT STATIONS=     9988.0   10040.8  TYPE=       1  TARGET=       52.770
     2.493       3.25    1806.45   1805.80   1806.45   1806.81       .36       9.00       .03   1806.20
     490.0         .1      486.0       4.0        .1     100.8       2.5       57.3      32.0   1805.30
       .81        .58       4.82      1.61      .075      .060      .075       .000   1803.20   9988.03
   .014405       390.       395.       395.         7        11         0        .00     52.77  10040.80


1490 NH CARD USED
*SECNO 2.579

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9973.7   10017.3  TYPE=       1  TARGET=       43.619
     2.579       2.58    1818.28   1818.28   1818.28   1819.16       .88      11.95       .16   1819.80
     490.0         .0      490.0        .0        .0      65.1        .0       58.2      32.4   1818.90
       .83        .00       7.52       .00      .000      .070      .000       .000   1815.70   9976.98
   .062182       445.       455.       455.         0        15         0        .00     37.76  10014.74


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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


1490 NH CARD USED
*SECNO 2.655

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75


3470 ENCROACHMENT STATIONS=     9961.3   10029.0  TYPE=       1  TARGET=       67.710
         HEC-1 Concentration Point C537:  24-hr storm controls.
     2.655       1.92    1828.72   1828.20   1828.72   1828.94       .22       9.71       .07   1827.10
     350.0       90.3      202.9      56.8      33.5      45.3      24.6       58.9      32.9   1827.40
       .86       2.69       4.48      2.31      .075      .050      .075       .000   1826.80   9961.25
   .010358       400.       402.       405.         7        11         0        .00     67.71  10028.96


1490 NH CARD USED
*SECNO 2.729

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .51


3470 ENCROACHMENT STATIONS=     9967.1   10031.0  TYPE=       1  TARGET=       63.910
     2.729       1.95    1835.55   1835.50   1835.55   1836.03       .48       7.02       .08   1834.40
     350.0      125.7      224.3        .0      32.1      35.8        .0       59.7      33.5   1836.90
       .88       3.92       6.27       .00      .075      .058      .000       .000   1833.60   9967.10
   .039308       385.       390.       385.         5         5         0        .00     58.72  10025.82


1490 NH CARD USED
*SECNO 2.792

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.62


3470 ENCROACHMENT STATIONS=     9983.5   10024.0  TYPE=       1  TARGET=       40.470
     2.792       3.18    1843.18   1842.94   1843.18   1843.76       .57       7.70       .03   1842.20
     350.0       10.7      303.5      35.8       5.4      47.0      13.8       60.2      33.9   1841.50
       .89       1.97       6.46      2.59      .075      .050      .075       .000   1840.00   9983.54
   .014924       340.       337.       330.         4        11         0        .00     40.46  10024.00


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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

 1490 NH CARD USED
 *SECNO 2.849
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9972.8   10015.3  TYPE=       1  TARGET=       42.550
      2.849       2.17    1850.57    1850.57    1850.56    1851.28       .70       5.97       .04    1849.30
      350.0       43.2      251.9       54.9       11.9       33.1       15.3       60.6       34.2    1849.40
        .91       3.64       7.60       3.58       .075       .050       .075       .000    1848.40    9972.78
    .028269       310.       298.       290.          0         19          0        .00      42.55   10015.33


 1490 NH CARD USED
 *SECNO 3.030
  WATER EL=X5 CARD=    1883.300

 3301 HV CHANGED MORE THAN HVINS


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


 3470 ENCROACHMENT STATIONS=      9877.6   10282.4  TYPE=       1  TARGET=       404.830
           ************************      DAM  36    ****************************
            HEC-1    C536 Storage Route Rating Curve          WSEL =  1883.3 feet
            HEC-1    C536 Inflow Hydrograph                   Q =     2590 cfs
            Reference:       HEC-1  Output  File:  EX100-6.OH1
                                                  (6-hr storm)
      3.030      13.10    1883.30    1872.64    1883.30    1883.31        .01        .06        .07    1871.90
     2590.0      268.7     2035.2      286.1      556.2     2466.8      548.3      100.2       39.0    1872.10
       1.26        .48        .83        .52        .075       .068       .075       .000    1870.20    9877.56
    .000050       910.       956.       950.          0          8          0        .00      404.83   10282.39


 1490 NH CARD USED
 *SECNO 3.105

 3265 DIVIDED FLOW


 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
1
    29MAR95       14:51:05                                                                                  PAGE   42

     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

 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9958.5   10185.5  TYPE=       1  TARGET=       227.010
      3.105       6.04    1886.24    1886.24    1886.24    1887.18        .94        .07        .28    1883.30
     2590.0      365.3     1250.3      974.3       70.4       121.4      251.3      118.5       41.9    1882.90
       1.27       5.19      10.30       3.88       .075       .052       .075       .000    1880.20    9958.50
    .016651       395.       394.       415.          0         15          0        .00      224.14   10185.45


 1490 NH CARD USED
 *SECNO 3.187

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9933.1   10227.9  TYPE=       1  TARGET=       294.810
      3.187       4.97    1895.37    1895.37    1895.37    1896.22        .85       7.00        .01    1892.10
     2590.0      294.9     1228.9     1066.2       76.2       123.6      282.5      123.1       44.3    1892.10
       1.29       3.87       9.94       3.77       .075       .050       .075       .000    1890.40    9933.08
    .015742       435.       438.       425.          0         12          0        .00      264.64   10227.88


 1490 NH CARD USED
 *SECNO 3.275

 3265 DIVIDED FLOW

 7185 MINIMUM SPECIFIC ENERGY
```

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 9866.6 10143.1 TYPE= 1 TARGET= 276.530

3.275	4.82	1905.92	1905.92	1905.92	1906.90	.98	6.92	.04	1902.20
2590.0	185.6	1856.3	548.1	75.5	203.6	146.6	127.9	47.1	1902.10
1.31	2.46	9.12	3.74	.075	.052	.075	.000	1901.10	9866.60
.014297	460.	463.	460.	0	8	0	.00	258.75	10143.13

1490 NH CARD USED
*SECNO 3.349

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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

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

3470 ENCROACHMENT STATIONS= 9856.9 10016.3 TYPE= 1 TARGET= 159.351

3.349	4.67	1913.77	1913.68	1913.77	1914.80	1.03	7.89	.02	1910.30
2590.0	1486.0	1103.7	.3	218.9	113.7	.3	131.3	48.9	1913.50
1.32	6.79	9.71	.91	.075	.063	.075	.000	1909.10	9856.97
.031099	390.	390.	375.	2	11	0	.00	159.30	10016.27

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THIS RUN EXECUTED 29MAR95 14:51:14

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Balboa/Hesperus 100-Year

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG
*	.782	1632.44	1629.87	1633.90	1631.92	328.46	396.82	16.00	8.41	8.34	1633.64	1.64	1633.67
*	.782	1632.44	1629.87	1633.90	1631.92	328.48	397.16	16.00	8.41	8.34	1633.64	1.64	1633.67
*	2.229	1804.76	1783.02	1809.73	1788.24	261.28	189.66	16.00	6.93	12.43	1790.45	2.09	1790.48
*	2.229	1804.76	1783.02	1809.73	1788.24	261.26	189.09	16.00	6.93	12.43	1790.45	2.09	1790.48

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Balboa/Hesperus 100-Year

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	2.095	1557.04	.00	1557.40	206.81	482.78	1228.60	1388.62	.00	.00	9946.90	10000.00	.00
	2.095	1557.04	.00	1557.40	206.81	482.78	1228.60	1388.62	206.81	9894.18	9946.90	10000.00	10100.99
	.131	1567.42	.00	1567.60	115.48	401.89	658.56	69.55	.00	.00	10015.00	10057.90	.00
	.131	1567.42	.00	1567.60	115.47	401.89	658.55	69.55	115.47	9956.87	10015.00	10057.90	10072.34
*	.246	1575.46	.00	1576.26	85.07	442.95	641.66	45.39	.00	.00	9993.20	10031.80	.00
*	.246	1575.46	.00	1576.26	85.06	442.94	641.68	45.38	85.07	9953.49	9993.20	10031.80	10038.56
*	.364	1586.87	.00	1587.12	96.91	10.83	438.11	681.06	.00	.00	9988.40	10020.50	.00
*	.364	1586.87	.00	1587.12	96.91	10.83	438.11	681.06	96.91	9982.94	9988.40	10020.50	10079.85
*	.482	1597.96	.00	1598.79	92.51	34.66	569.12	526.22	.00	.00	9988.70	10036.90	.00
*	.482	1597.96	.00	1598.79	92.52	34.69	569.12	526.19	92.52	9982.33	9988.70	10036.90	10074.85
*	.608	1609.78	.00	1610.27	95.09	131.59	687.24	221.17	.00	.00	9976.60	10007.00	.00
*	.608	1609.78	.00	1610.27	95.07	131.54	687.32	221.14	95.09	9949.89	9976.60	10007.00	10044.98

*	.728	1619.76	.00	1620.36	59.43	2.71	291.26	41.03	.00	.00	9981.90	10009.40	.00
*	.728	1619.77	.01	1620.36	60.25	2.73	290.91	41.36	63.26	9980.06	9981.90	10009.40	10043.32
*	.759	1624.81	.00	1625.26	69.64	140.62	59.26	135.11	.00	.00	10000.00	10008.70	.00
*	.759	1624.80	.00	1625.26	69.63	140.63	59.27	135.10	69.63	9970.18	10000.00	10008.70	10039.81
*	.782	1633.64	.00	1633.67	107.79	273.14	253.39	193.47	.00	.00	9995.20	10013.80	.00
*	.782	1633.64	.00	1633.67	107.78	273.14	253.38	193.47	107.78	9943.05	9995.20	10013.80	10050.83
*	.796	1633.65	.00	1633.69	106.25	91.58	358.61	269.81	.00	.00	9969.00	10005.60	.00
*	.796	1633.65	.00	1633.69	106.25	91.58	358.60	269.82	106.25	9949.01	9969.00	10005.60	10055.26
*	.905	1638.93	.00	1639.60	89.58	136.11	506.35	77.54	.00	.00	9984.80	10020.50	.00
*	.905	1638.94	.02	1639.60	89.58	137.14	504.80	78.06	89.58	9949.59	9984.80	10020.50	10039.17
	1.007	1647.77	.00	1648.18	86.48	86.30	561.21	12.49	.00	.00	9973.60	10029.50	.00
	1.007	1647.75	-.02	1648.17	86.27	86.19	561.58	12.23	86.48	9956.19	9973.60	10029.50	10042.67
*	1.105	1658.77	.00	1659.39	101.25	205.72	420.09	34.18	.00	.00	9984.80	10011.00	.00
*	1.105	1658.78	.00	1659.39	101.25	205.93	419.78	34.30	101.25	9930.70	9984.80	10011.00	10031.95
	1.223	1671.08	.00	1671.40	134.63	594.73	63.73	1.53	.00	.00	9978.10	10007.70	.00
	1.223	1671.08	.00	1671.40	134.41	594.91	63.56	1.53	361.78	9647.17	9978.10	10007.70	10008.95
	1.302	1679.96	.00	1680.29	118.86	587.83	72.16	.00	.00	.00	9981.00	10008.60	.00
	1.302	1679.96	.00	1680.29	119.05	587.71	72.29	.00	353.08	9655.53	9981.00	10008.60	10008.61
	1.393	1691.63	.00	1692.09	123.99	484.48	175.52	.00	.00	.00	9983.60	10013.00	.00
	1.393	1691.62	-.01	1692.08	123.93	484.58	175.42	.00	259.50	9753.51	9983.60	10013.00	10013.01

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.517	1703.57	.00	1703.75	247.86	309.12	160.23	190.64	.00	.00	9979.70	10064.30	.00
*	1.517	1703.57	.00	1703.75	247.89	309.12	160.20	190.68	348.09	9818.06	9979.70	10064.30	10166.15
*	1.645	1718.09	.00	1718.76	123.79	97.64	472.84	89.52	.00	.00	9983.00	10012.40	.00
*	1.645	1718.10	.01	1718.76	124.36	97.50	472.14	90.36	140.95	9969.95	9983.00	10012.40	10110.90
*	1.715	1724.34	.00	1725.17	78.08	180.89	417.18	61.93	.00	.00	9988.60	10011.80	.00
*	1.715	1724.34	.00	1725.17	78.09	180.87	417.16	61.96	174.59	9970.82	9988.60	10011.80	10145.41
*	1.803	1734.58	.00	1734.91	175.84	69.64	212.27	278.09	.00	.00	9989.40	10013.80	.00
*	1.803	1734.58	.00	1734.91	175.82	69.62	212.29	278.09	196.42	9888.43	9989.40	10013.80	10084.85
*	1.858	1739.63	.00	1739.83	127.30	289.60	269.88	.52	.00	.00	9965.20	10017.10	.00
*	1.858	1739.63	.00	1739.83	127.27	289.59	269.89	.52	222.81	9832.05	9965.20	10017.10	10054.86
*	1.947	1748.69	.00	1749.44	69.36	60.12	499.88	.00	.00	.00	9970.50	10005.60	.00
*	1.947	1748.70	.00	1749.44	69.38	60.23	499.77	.00	317.79	9687.82	9970.50	10005.60	10005.61
	1.990	1754.81	.00	1755.10	154.29	60.31	242.70	256.99	.00	.00	9980.70	10012.00	.00
	1.990	1754.81	.00	1755.10	154.09	60.29	242.73	256.98	211.62	9928.18	9980.70	10012.00	10139.80
	2.084	1763.53	.00	1763.96	41.42	.00	560.00	.00	.00	.00	9962.20	10015.70	.00
	2.084	1763.53	.00	1763.96	41.43	.00	560.00	.00	53.52	9962.19	9962.20	10015.70	10015.71
*	2.173	1772.61	.00	1773.28	45.42	58.06	391.94	.00	.00	.00	9981.80	10015.90	.00
*	2.173	1772.61	.00	1773.28	45.42	58.03	391.97	.00	47.67	9968.24	9981.80	10015.90	10015.91
*	2.198	1780.33	.00	1783.55	4.90	.00	450.00	.00	.00	.00	9995.10	10000.00	.00
*	2.198	1780.33	.00	1783.55	4.90	.00	450.00	.00	4.92	9995.09	9995.10	10000.00	10000.01
*	2.229	1790.45	.00	1790.48	128.41	201.83	155.80	92.36	.00	.00	10003.00	10009.00	.00
*	2.229	1790.45	.00	1790.48	128.21	201.83	155.83	92.35	173.69	9959.24	10003.00	10009.00	10132.93
	2.238	1790.47	.00	1790.49	75.24	135.00	226.28	128.72	.00	.00	9989.70	10007.00	.00
	2.238	1790.46	.00	1790.48	75.23	134.99	226.29	128.72	75.24	9960.46	9989.70	10007.00	10035.70
*	2.332	1790.57	.00	1790.65	72.74	.06	489.94	.00	.00	.00	9959.00	10030.00	.00
*	2.332	1790.57	.00	1790.65	72.73	.06	489.94	.00	72.74	9957.80	9959.00	10030.00	10030.54
*	2.418	1797.08	.00	1797.77	52.98	.00	490.00	.00	.00	.00	9972.90	10034.80	.00
*	2.418	1797.08	.00	1797.77	52.97	.00	490.00	.00	61.92	9972.89	9972.90	10034.80	10034.81
*	2.493	1806.45	.00	1806.81	52.76	.07	485.97	3.96	.00	.00	9989.00	10036.50	.00
*	2.493	1806.45	.00	1806.81	52.77	.07	485.96	3.97	52.77	9988.03	9989.00	10036.50	10040.80
*	2.579	1818.28	.00	1819.16	37.75	.00	490.00	.00	.00	.00	9973.70	10017.30	.00
*	2.579	1818.28	.00	1819.16	37.76	.00	490.00	.00	43.62	9973.69	9973.70	10017.30	10017.31
*	2.655	1828.72	.00	1828.94	67.71	90.28	202.90	56.81	.00	.00	9983.50	10008.60	.00
*	2.655	1828.72	.00	1828.94	67.71	90.28	202.91	56.81	67.71	9961.25	9983.50	10008.60	10028.96

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	2.729	1835.55	.00	1836.03	58.73	125.64	224.36	.00	.00	.00	10000.00	10031.00	.00
*	2.729	1835.55	.00	1836.03	58.72	125.67	224.33	.00	63.91	9967.10	10000.00	10031.00	10031.01
*	2.792	1843.18	.00	1843.76	40.47	10.69	303.46	35.85	.00	.00	9991.70	10011.10	.00
*	2.792	1843.18	.00	1843.76	40.46	10.68	303.48	35.84	40.47	9983.53	9991.70	10011.10	10024.00
*	2.849	1850.56	.00	1851.28	42.55	43.02	252.32	54.66	.00	.00	9983.80	10001.00	.00
*	2.849	1850.57	.01	1851.28	42.55	43.19	251.92	54.89	42.55	9972.78	9983.80	10001.00	10015.33
*	3.030	1883.30	.00	1883.31	404.83	268.74	2035.19	286.07	.00	.00	9975.20	10174.10	.00
*	3.030	1883.30	.00	1883.31	404.83	268.74	2035.19	286.07	404.83	9877.56	9975.20	10174.10	10282.39
*	3.105	1886.24	.00	1887.18	224.24	365.31	1249.82	974.87	.00	.00	9985.10	10010.70	.00
*	3.105	1886.24	.00	1887.18	224.14	365.32	1250.35	974.34	227.01	9958.50	9985.10	10010.70	10185.51
*	3.187	1895.37	.00	1896.22	264.64	294.94	1228.84	1066.22	.00	.00	9986.50	10014.60	.00
*	3.187	1895.37	.00	1896.22	264.64	294.93	1228.88	1066.19	294.81	9933.08	9986.50	10014.60	10227.89
*	3.275	1905.92	.00	1906.90	258.73	185.43	1856.55	548.01	.00	.00	9975.20	10021.40	.00
*	3.275	1905.92	.00	1906.90	258.75	185.57	1856.28	548.15	276.53	9866.60	9975.20	10021.40	10143.13
*	3.349	1913.77	.00	1914.80	159.35	1486.14	1103.61	.26	.00	.00	9983.30	10014.20	.00
*	3.349	1913.77	.00	1914.80	159.30	1486.01	1103.73	.25	159.35	9856.93	9983.30	10014.20	10016.28

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Balboa/Hesperus 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2.095	.00	.00	.00	1551.90	3100.00	1557.04	1555.57	1557.40	270.35	5.25	652.26	188.54
	2.095	.00	.00	.00	1551.90	3100.00	1557.04	1555.57	1557.40	270.35	5.25	652.26	188.54
	.131	619.00	.00	.00	1562.40	1130.00	1567.42	1565.88	1567.60	62.43	3.74	336.38	143.02
	.131	619.00	.00	.00	1562.40	1130.00	1567.42	1565.88	1567.60	62.43	3.74	336.38	143.02
*	.246	611.10	.00	.00	1573.00	1130.00	1575.46	1575.35	1576.26	547.98	7.43	158.08	48.27
*	.246	611.10	.00	.00	1573.00	1130.00	1575.46	1575.35	1576.26	548.21	7.43	158.05	48.26
*	.364	622.10	.00	.00	1583.00	1130.00	1586.87	1585.42	1587.12	84.64	3.98	284.10	122.82
*	.364	622.10	.00	.00	1583.00	1130.00	1586.87	1585.42	1587.12	84.62	3.98	284.12	122.84
*	.482	623.10	.00	.00	1595.70	1130.00	1597.96	1597.96	1598.79	640.09	6.79	156.00	44.66
*	.482	623.10	.00	.00	1595.70	1130.00	1597.96	1597.96	1598.79	638.00	6.79	156.16	44.74
*	.608	666.90	.00	.00	1605.20	1040.00	1609.78	1609.14	1610.27	74.78	6.45	211.27	120.27
*	.608	666.90	.00	.00	1605.20	1040.00	1609.78	1609.14	1610.27	74.87	6.45	211.18	120.20
*	.728	631.10	.00	.00	1617.70	335.00	1619.76	1619.76	1620.36	211.54	6.55	59.50	23.03
*	.728	631.10	.00	.00	1617.70	335.00	1619.77	1619.77	1620.36	207.51	6.51	59.99	23.26
*	.759	161.10	.00	.00	1623.77	335.00	1624.81	1624.81	1625.26	378.75	6.58	62.96	17.21
*	.759	161.10	.00	.00	1623.77	335.00	1624.80	1624.80	1625.26	380.24	6.59	62.88	17.18
*	.782	121.50	1631.92	1629.87	1625.30	720.00	1633.64	.00	1633.67	1.46	1.64	634.73	595.82
*	.782	121.50	1631.92	1629.87	1625.30	720.00	1633.64	.00	1633.67	1.46	1.64	634.81	595.93
*	.796	74.90	.00	.00	1627.70	720.00	1633.65	1629.86	1633.69	3.21	1.82	494.83	401.72
*	.796	74.90	.00	.00	1627.70	720.00	1633.65	1629.86	1633.69	3.21	1.82	494.92	401.84
*	.905	576.60	.00	.00	1636.60	720.00	1638.93	1638.93	1639.60	216.19	7.45	123.74	48.97
*	.905	576.60	.00	.00	1636.60	720.00	1638.94	1638.94	1639.60	209.14	7.36	125.13	49.79
	1.007	539.10	.00	.00	1645.30	660.00	1647.77	1647.39	1648.18	119.22	5.43	135.48	60.45
	1.007	539.10	.00	.00	1645.30	660.00	1647.75	1647.40	1648.17	122.37	5.47	134.30	59.66
*	1.105	515.10	.00	.00	1655.80	660.00	1658.77	1658.77	1659.39	186.85	7.43	127.20	48.28
*	1.105	515.10	.00	.00	1655.80	660.00	1658.78	1658.78	1659.39	185.90	7.41	127.43	48.41
	1.223	625.20	.00	.00	1668.70	660.00	1671.08	1670.83	1671.40	203.24	4.43	145.84	46.30
	1.223	625.20	.00	.00	1668.70	660.00	1671.08	1670.83	1671.40	204.32	4.43	145.52	46.17
	1.302	417.80	.00	.00	1677.00	660.00	1679.96	1679.61	1680.29	220.52	5.06	143.37	44.44
	1.302	417.80	.00	.00	1677.00	660.00	1679.96	1679.61	1680.29	219.33	5.05	143.66	44.56
	1.393	479.50	.00	.00	1688.80	660.00	1691.63	1691.59	1692.09	273.90	6.77	126.01	39.88
	1.393	479.50	.00	.00	1688.80	660.00	1691.62	1691.59	1692.08	275.20	6.78	125.78	39.78

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.517	654.60	.00	.00	1701.40	660.00	1703.57	1703.33	1703.75	128.64	5.05	222.84	58.19
*	1.517	654.60	.00	.00	1701.40	660.00	1703.57	1703.31	1703.75	128.34	5.05	223.02	58.26
*	1.645	674.70	.00	.00	1715.20	660.00	1718.09	1718.09	1718.76	114.52	7.52	135.90	61.67
*	1.645	674.70	.00	.00	1715.20	660.00	1718.10	1718.10	1718.76	112.96	7.48	136.76	62.10
*	1.715	372.60	.00	.00	1721.50	660.00	1724.34	1724.34	1725.17	155.96	8.62	111.46	52.85
*	1.715	372.60	.00	.00	1721.50	660.00	1724.34	1724.34	1725.17	155.83	8.62	111.50	52.87
*	1.803	461.00	.00	.00	1732.10	560.00	1734.58	1734.47	1734.91	258.37	6.08	146.50	34.84
*	1.803	461.00	.00	.00	1732.10	560.00	1734.58	1734.48	1734.91	258.56	6.08	146.45	34.83
*	1.858	290.40	.00	.00	1736.40	560.00	1739.63	1738.87	1739.83	118.45	4.35	167.32	51.45
*	1.858	290.40	.00	.00	1736.40	560.00	1739.63	1738.87	1739.83	118.51	4.35	167.29	51.44
*	1.947	469.60	.00	.00	1745.10	560.00	1748.69	1748.69	1749.44	267.89	7.26	92.71	34.21
*	1.947	469.60	.00	.00	1745.10	560.00	1748.70	1748.70	1749.44	267.19	7.25	92.81	34.26
	1.990	229.90	.00	.00	1751.80	560.00	1754.81	1754.56	1755.10	217.82	5.49	144.92	37.94
	1.990	229.90	.00	.00	1751.80	560.00	1754.81	1754.55	1755.10	218.39	5.49	144.77	37.89
	2.084	495.40	.00	.00	1759.50	560.00	1763.53	1762.58	1763.96	148.95	5.25	106.58	45.88
	2.084	495.40	.00	.00	1759.50	560.00	1763.53	1762.58	1763.96	148.66	5.25	106.66	45.93
*	2.173	469.50	.00	.00	1770.00	450.00	1772.61	1772.51	1773.28	298.56	6.90	71.93	26.04
*	2.173	469.50	.00	.00	1770.00	450.00	1772.61	1772.51	1773.28	299.38	6.91	71.87	26.01
*	2.198	135.00	.00	.00	1773.90	450.00	1780.33	1780.33	1783.55	198.40	14.40	31.26	31.95
*	2.198	135.00	.00	.00	1773.90	450.00	1780.33	1780.33	1783.55	598.87	14.39	31.27	18.39
*	2.229	164.30	1788.24	1783.02	1778.02	450.00	1790.45	.00	1790.48	1.72	2.09	424.84	343.41
*	2.229	164.30	1788.24	1783.02	1778.02	450.00	1790.45	.00	1790.48	1.72	2.09	424.64	343.28
	2.238	46.30	.00	.00	1779.60	490.00	1790.47	1783.53	1790.49	1.17	1.39	511.39	453.68
	2.238	46.30	.00	.00	1779.60	490.00	1790.46	1783.53	1790.48	1.17	1.39	511.31	453.59
*	2.332	496.40	.00	.00	1786.50	490.00	1790.57	1788.28	1790.65	17.50	2.19	223.50	117.14
*	2.332	496.40	.00	.00	1786.50	490.00	1790.57	1788.28	1790.65	17.53	2.20	223.39	117.04
*	2.418	457.70	.00	.00	1795.10	490.00	1797.08	1797.08	1797.77	414.22	6.68	73.30	24.08
*	2.418	457.70	.00	.00	1795.10	490.00	1797.08	1797.08	1797.77	414.90	6.69	73.27	24.06
*	2.493	394.50	.00	.00	1803.20	490.00	1806.45	1805.80	1806.81	144.19	4.82	103.39	40.81
*	2.493	394.50	.00	.00	1803.20	490.00	1806.45	1805.80	1806.81	144.05	4.82	103.42	40.83
*	2.579	455.20	.00	.00	1815.70	490.00	1818.28	1818.28	1819.16	623.11	7.53	65.08	19.63
*	2.579	455.20	.00	.00	1815.70	490.00	1818.28	1818.28	1819.16	621.82	7.52	65.13	19.65
*	2.655	401.80	.00	.00	1826.80	350.00	1828.72	1828.20	1828.94	103.48	4.48	103.48	34.41
*	2.655	401.80	.00	.00	1826.80	350.00	1828.72	1828.20	1828.94	103.58	4.48	103.44	34.39

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	2.729	389.60	.00	.00	1833.60	350.00	1835.55	1835.50	1836.03	393.58	6.27	67.83	17.64
*	2.729	389.60	.00	.00	1833.60	350.00	1835.55	1835.50	1836.03	393.08	6.27	67.86	17.65
*	2.792	336.50	.00	.00	1840.00	350.00	1843.18	1842.94	1843.76	149.12	6.45	66.29	28.66
*	2.792	336.50	.00	.00	1840.00	350.00	1843.18	1842.94	1843.76	149.24	6.46	66.27	28.65
*	2.849	298.10	.00	.00	1848.40	350.00	1850.56	1850.56	1851.28	288.31	7.65	59.91	20.61
*	2.849	298.10	.00	.00	1848.40	350.00	1850.57	1850.57	1851.28	282.69	7.60	60.32	20.82
*	3.030	956.10	.00	.00	1870.20	2590.00	1883.30	1872.64	1883.31	.50	.83	3571.32	3661.53
*	3.030	956.10	.00	.00	1870.20	2590.00	1883.30	1872.64	1883.31	.50	.83	3571.32	3661.53
*	3.105	394.10	.00	.00	1880.20	2590.00	1886.24	1886.24	1887.18	166.18	10.29	443.50	200.92
*	3.105	394.10	.00	.00	1880.20	2590.00	1886.24	1886.24	1887.18	166.51	10.30	443.12	200.71
*	3.187	437.90	.00	.00	1890.40	2590.00	1895.37	1895.37	1896.22	157.40	9.94	482.37	206.44
*	3.187	437.90	.00	.00	1890.40	2590.00	1895.37	1895.37	1896.22	157.42	9.94	482.34	206.43
*	3.275	462.90	.00	.00	1901.10	2590.00	1905.92	1905.92	1906.90	143.09	9.12	425.54	216.52
*	3.275	462.90	.00	.00	1901.10	2590.00	1905.92	1905.92	1906.90	142.97	9.12	425.73	216.61
*	3.349	389.80	.00	.00	1909.10	2590.00	1913.77	1913.70	1914.80	310.65	9.71	332.96	146.95
*	3.349	389.80	.00	.00	1909.10	2590.00	1913.77	1913.68	1914.80	310.99	9.71	332.80	146.87

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Balboa/Hesperus 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2.095	3100.00	1557.04	.00	.00	.00	206.81	.00
	2.095	3100.00	1557.04	.00	.00	.00	206.81	.00
	.131	1130.00	1567.42	.00	10.38	.00	115.48	619.00
	.131	1130.00	1567.42	.00	10.38	.00	115.47	619.00
*	.246	1130.00	1575.46	.00	8.04	.00	85.07	611.10
*	.246	1130.00	1575.46	.00	8.04	.00	85.06	611.10
*	.364	1130.00	1586.87	.00	11.42	.00	96.91	622.10
*	.364	1130.00	1586.87	.00	11.42	.00	96.91	622.10
*	.482	1130.00	1597.96	.00	11.08	.00	92.51	623.10
*	.482	1130.00	1597.96	.00	11.08	.00	92.52	623.10
*	.608	1040.00	1609.78	.00	11.83	.00	95.09	666.90
*	.608	1040.00	1609.78	.00	11.83	.00	95.07	666.90
*	.728	335.00	1619.76	.00	9.98	.00	59.43	631.10
*	.728	335.00	1619.77	.01	9.99	.01	60.25	631.10
*	.759	335.00	1624.81	.00	5.04	.00	69.64	161.10
*	.759	335.00	1624.80	.00	5.03	.00	69.63	161.10
*	.782	720.00	1633.64	.00	8.84	.00	107.79	121.50
*	.782	720.00	1633.64	.00	8.84	.00	107.78	121.50
*	.796	720.00	1633.65	.00	.01	.00	106.25	74.90
*	.796	720.00	1633.65	.00	.01	.00	106.25	74.90
*	.905	720.00	1638.93	.00	5.28	.00	89.58	576.60
*	.905	720.00	1638.94	.02	5.29	.02	89.58	576.60
	1.007	660.00	1647.77	.00	8.84	.00	86.48	539.10
	1.007	660.00	1647.75	-.02	8.81	-.02	86.27	539.10
*	1.105	660.00	1658.77	.00	11.01	.00	101.25	515.10
*	1.105	660.00	1658.78	.00	11.02	.00	101.25	515.10
	1.223	660.00	1671.08	.00	12.31	.00	134.63	625.20
	1.223	660.00	1671.08	.00	12.30	.00	134.41	625.20
	1.302	660.00	1679.96	.00	8.88	.00	118.86	417.80
	1.302	660.00	1679.96	.00	8.88	.00	119.05	417.80
	1.393	660.00	1691.63	.00	11.67	.00	123.99	479.50
	1.393	660.00	1691.62	-.01	11.66	-.01	123.93	479.50

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.517	660.00	1703.57	.00	11.94	.00	247.86	654.60
*	1.517	660.00	1703.57	.00	11.95	.00	247.89	654.60
*	1.645	660.00	1718.09	.00	14.52	.00	123.79	674.70
*	1.645	660.00	1718.10	.01	14.53	.01	124.36	674.70
*	1.715	660.00	1724.34	.00	6.25	.00	78.08	372.60
*	1.715	660.00	1724.34	.00	6.24	.00	78.09	372.60
*	1.803	560.00	1734.58	.00	10.24	.00	175.84	461.00
*	1.803	560.00	1734.58	.00	10.24	.00	175.82	461.00
*	1.858	560.00	1739.63	.00	5.05	.00	127.30	290.40
*	1.858	560.00	1739.63	.00	5.05	.00	127.27	290.40
*	1.947	560.00	1748.69	.00	9.07	.00	69.36	469.60
*	1.947	560.00	1748.70	.00	9.07	.00	69.38	469.60
	1.990	560.00	1754.81	.00	6.12	.00	154.29	229.90
	1.990	560.00	1754.81	.00	6.11	.00	154.09	229.90
	2.084	560.00	1763.53	.00	8.72	.00	41.42	495.40
	2.084	560.00	1763.53	.00	8.72	.00	41.43	495.40
*	2.173	450.00	1772.61	.00	9.08	.00	45.42	469.50
*	2.173	450.00	1772.61	.00	9.08	.00	45.42	469.50
*	2.198	450.00	1780.33	.00	7.72	.00	4.90	135.00
*	2.198	450.00	1780.33	.00	7.72	.00	4.90	135.00
*	2.229	450.00	1790.45	.00	10.12	.00	128.41	164.30
*	2.229	450.00	1790.45	.00	10.12	.00	128.21	164.30

	2.238	490.00	1790.47	.00	.02	.00	75.24	46.30
	2.238	490.00	1790.46	.00	.02	.00	75.23	46.30
*	2.332	490.00	1790.57	.00	.11	.00	72.74	496.40
*	2.332	490.00	1790.57	.00	.11	.00	72.73	496.40
*	2.418	490.00	1797.08	.00	6.51	.00	52.98	457.70
*	2.418	490.00	1797.08	.00	6.51	.00	52.97	457.70
*	2.493	490.00	1806.45	.00	9.37	.00	52.76	394.50
*	2.493	490.00	1806.45	.00	9.37	.00	52.77	394.50
*	2.579	490.00	1818.28	.00	11.83	.00	37.75	455.20
*	2.579	490.00	1818.28	.00	11.84	.00	37.76	455.20
*	2.655	350.00	1828.72	.00	10.43	.00	67.71	401.80
*	2.655	350.00	1828.72	.00	10.43	.00	67.71	401.80

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	2.729	350.00	1835.55	.00	6.84	.00	58.73	389.60
*	2.729	350.00	1835.55	.00	6.84	.00	58.72	389.60
*	2.792	350.00	1843.18	.00	7.63	.00	40.47	336.50
*	2.792	350.00	1843.18	.00	7.63	.00	40.46	336.50
*	2.849	350.00	1850.56	.00	7.38	.00	42.55	298.10
*	2.849	350.00	1850.57	.01	7.39	.01	42.55	298.10
*	3.030	2590.00	1883.30	.00	32.74	.00	404.83	956.10
*	3.030	2590.00	1883.30	.00	32.73	.00	404.83	956.10
*	3.105	2590.00	1886.24	.00	2.94	.00	224.24	394.10
*	3.105	2590.00	1886.24	.00	2.94	.00	224.14	394.10
*	3.187	2590.00	1895.37	.00	9.13	.00	264.64	437.90
*	3.187	2590.00	1895.37	.00	9.13	.00	264.64	437.90
*	3.275	2590.00	1905.92	.00	10.55	.00	258.73	462.90
*	3.275	2590.00	1905.92	.00	10.55	.00	258.75	462.90
*	3.349	2590.00	1913.77	.00	7.85	.00	159.35	389.80
*	3.349	2590.00	1913.77	.00	7.85	.00	159.30	389.80

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SUMMARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=       .246  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .246  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=       .364  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .364  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .482  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .482  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .482  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .482  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .608  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .608  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .728  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .728  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .728  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .728  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .759  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .759  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .759  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .759  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .782  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .782  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=       .796  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .796  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .905  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .905  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .905  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=       .905  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      1.105  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.105  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.105  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.105  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      1.517  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.517  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.645  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.645  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.645  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.645  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=      1.715  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.715  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.715  PROFILE=  2  CRITICAL DEPTH ASSUMED
1
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 CAUTION SECNO=      1.715  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      1.803  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.803  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      1.858  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      1.858  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      1.947  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.947  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      1.947  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      1.947  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.173  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.173  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.198  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.198  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.198  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.198  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.229  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.229  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      2.332  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.332  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.418  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.418  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.418  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.418  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.493  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.493  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.579  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.579  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.579  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.579  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.655  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.655  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      2.729  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.729  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      2.792  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.792  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.849  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=      2.849  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.849  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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 NOTE    SECNO=      3.030  PROFILE=  1  WSEL BASED ON X5 CARD
 WARNING SECNO=      3.030  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 NOTE    SECNO=      3.030  PROFILE=  2  WSEL BASED ON X5 CARD
 WARNING SECNO=      3.030  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      3.105  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.105  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      3.105  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      3.105  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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CAUTION SECNO=      3.187  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.187  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      3.187  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.187  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=      3.275  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.275  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      3.275  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      3.275  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      3.349  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      3.349  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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Floodway width summary: Balboa/Hesperus 100-Year
Profile No.  2
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Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
2.095	.00	206.81	9894.18	79.27	9973.45	127.54	10100.99
.131	.00	115.47	9956.87	79.58	10036.45	35.89	10072.34
.246	.00	85.07	9953.49	59.01	10012.50	26.06	10038.56
.364	.00	96.91	9982.94	21.51	10004.45	75.40	10079.85
.482	.00	92.52	9982.33	30.47	10012.80	62.05	10074.85
.608	.00	95.09	9949.89	41.91	9991.80	53.18	10044.98
.728	.01	63.26	9980.06	15.59	9995.65	47.67	10043.32
.759	.00	69.63	9970.18	34.17	10004.35	35.46	10039.81
.782	.00	107.78	9943.05	61.45	10004.50	46.33	10050.83
.796	.00	106.25	9949.01	38.29	9987.30	67.96	10055.26
.905	.02	89.58	9949.59	53.06	10002.65	36.52	10039.17
1.007	-.02	86.48	9956.19	45.36	10001.55	41.12	10042.67
1.105	.00	101.25	9930.70	67.20	9997.90	34.05	10031.95
1.223	.00	361.78	9647.17	345.73	9992.90	16.05	10008.95
1.302	.00	353.08	9655.53	339.27	9994.80	13.81	10008.61
1.393	-.01	259.50	9753.51	244.79	9998.30	14.71	10013.01
1.517	.00	348.09	9818.06	203.94	10022.00	144.15	10166.15
1.645	.01	140.95	9969.95	27.75	9997.70	113.20	10110.90
1.715	.00	174.59	9970.82	29.38	10000.20	145.21	10145.41
1.803	.00	196.42	9888.43	113.17	10001.60	83.25	10084.85
1.858	.00	222.81	9832.05	159.10	9991.15	63.71	10054.86
1.947	.00	317.79	9687.82	300.23	9988.05	17.56	10005.61
1.990	.00	211.62	9928.18	68.17	9996.35	143.45	10139.80
2.084	.00	53.52	9962.19	26.76	9988.95	26.76	10015.71
2.173	.00	47.67	9968.24	30.61	9998.85	17.06	10015.91
2.198	.00	4.92	9995.09	2.46	9997.55	2.46	10000.01
2.229	.00	173.69	9959.24	46.76	10006.00	126.93	10132.93
2.238	.00	75.24	9960.46	37.89	9998.35	37.35	10035.70
2.332	.00	72.74	9957.80	36.70	9994.50	36.04	10030.54
2.418	.00	61.92	9972.89	30.96	10003.85	30.96	10034.81
2.493	.00	52.77	9988.03	24.72	10012.75	28.05	10040.80
2.579	.00	43.62	9973.69	21.81	9995.50	21.81	10017.31
2.655	.00	67.71	9961.25	34.80	9996.05	32.91	10028.96
2.729	.00	63.91	9967.10	48.40	10015.50	15.51	10031.01
2.792	.00	40.47	9983.53	17.87	10001.40	22.60	10024.00
2.849	.01	42.55	9972.78	19.62	9992.40	22.93	10015.33
3.030	.00	404.83	9877.56	197.09	10074.65	207.74	10282.39
3.105	.00	227.01	9958.50	39.40	9997.90	187.61	10185.51
3.187	.00	294.81	9933.08	67.47	10000.55	227.34	10227.89
3.275	.00	276.53	9866.60	131.70	9998.30	144.83	10143.13
3.349	.00	159.35	9856.93	141.82	9998.75	17.53	10016.28

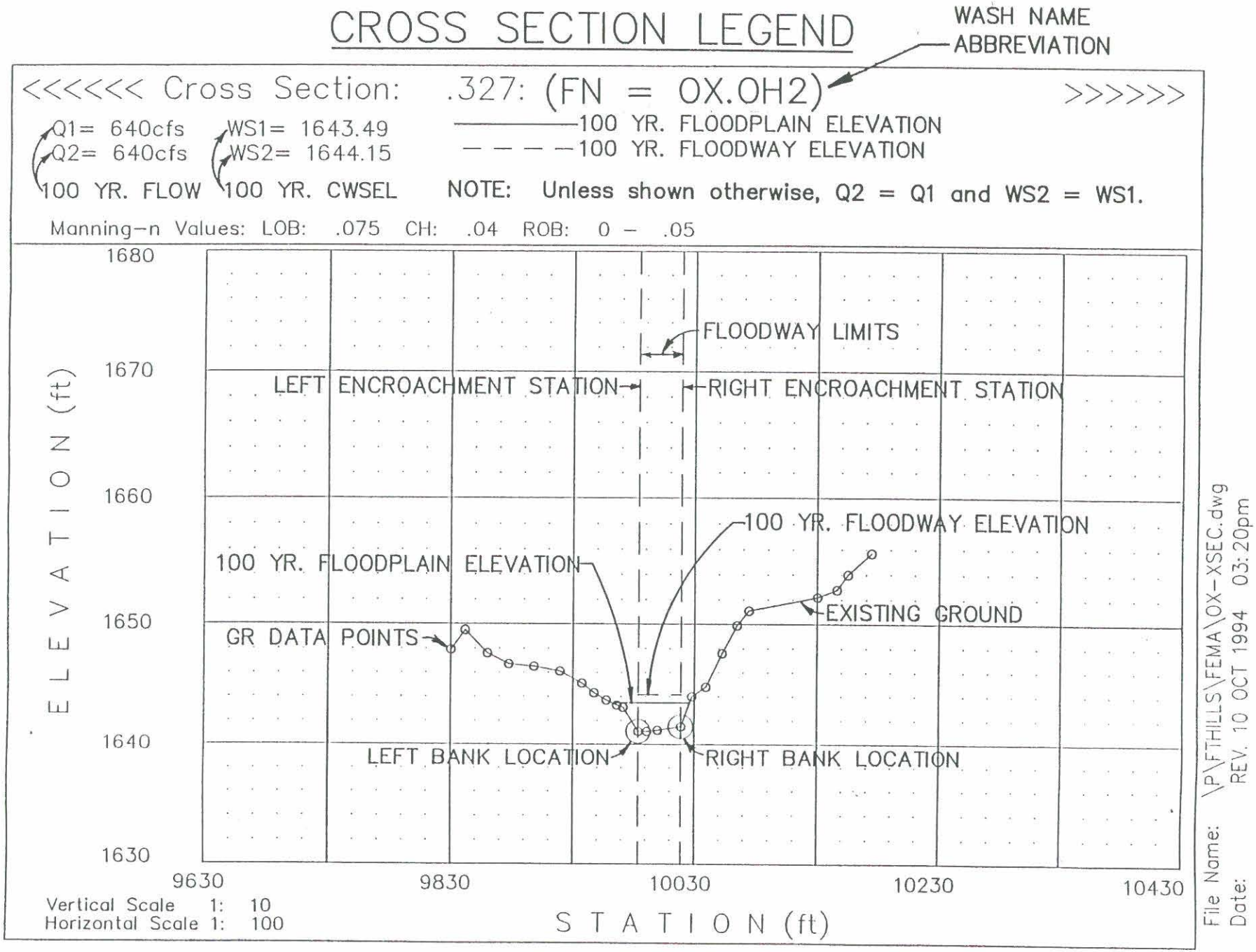
```
1
   29MAR95      14:51:05                                                    PAGE   58

FLOODWAY DATA,   Balboa/Hesperus 100-Year
PROFILE NO.  2
```

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
2.095	207.	652.	4.8	1557.0	1557.0	.0
.131	115.	336.	3.4	1567.4	1567.4	.0
.246	85.	158.	7.1	1575.5	1575.5	.0
.364	97.	284.	4.0	1586.9	1586.9	.0
.482	93.	156.	7.2	1598.0	1598.0	.0
.608	95.	211.	4.9	1609.8	1609.8	.0
.728	63.	60.	5.6	1619.8	1619.8	.0
.759	70.	63.	5.3	1624.8	1624.8	.0
.782	108.	635.	1.1	1633.6	1633.6	.0
.796	106.	495.	1.5	1633.6	1633.6	.0

.905	90.	125.	5.8	1638.9	1638.9	.0
1.007	86.	134.	4.9	1647.8	1647.8	.0
1.105	101.	127.	5.2	1658.8	1658.8	.0
1.223	362.	146.	4.5	1671.1	1671.1	.0
1.302	350.	144.	4.6	1680.0	1680.0	.0
1.393	257.	126.	5.2	1691.6	1691.6	.0
1.517	348.	223.	3.0	1703.6	1703.6	.0
1.645	141.	137.	4.8	1718.1	1718.1	.0
1.715	175.	111.	5.9	1724.3	1724.3	.0
1.803	196.	146.	3.8	1734.6	1734.6	.0
1.858	223.	167.	3.3	1739.6	1739.6	.0
1.947	315.	93.	6.0	1748.7	1748.7	.0
1.990	212.	145.	3.9	1754.8	1754.8	.0
2.084	41.	107.	5.3	1763.5	1763.5	.0
2.173	45.	72.	6.3	1772.6	1772.6	.0
2.198	5.	31.	14.4	1780.3	1780.3	.0
2.229	174.	425.	1.1	1790.4	1790.4	.0
2.238	75.	511.	1.0	1790.5	1790.5	.0
2.332	73.	223.	2.2	1790.6	1790.6	.0
2.418	53.	73.	6.7	1797.1	1797.1	.0
2.493	53.	103.	4.7	1806.4	1806.4	.0
2.579	38.	65.	7.5	1818.3	1818.3	.0
2.655	68.	103.	3.4	1828.7	1828.7	.0
2.729	59.	68.	5.2	1835.6	1835.6	.0
2.792	40.	66.	5.3	1843.2	1843.2	.0
2.849	43.	60.	5.8	1850.6	1850.6	.0
3.030	405.	3571.	.7	1883.3	1883.3	.0
3.105	227.	443.	5.8	1886.2	1886.2	.0
3.187	295.	482.	5.4	1895.4	1895.4	.0
3.275	277.	426.	6.1	1905.9	1905.9	.0
3.349	159.	333.	7.8	1913.8	1913.8	.0

CROSS SECTIONS

CROSS SECTION LEGEND



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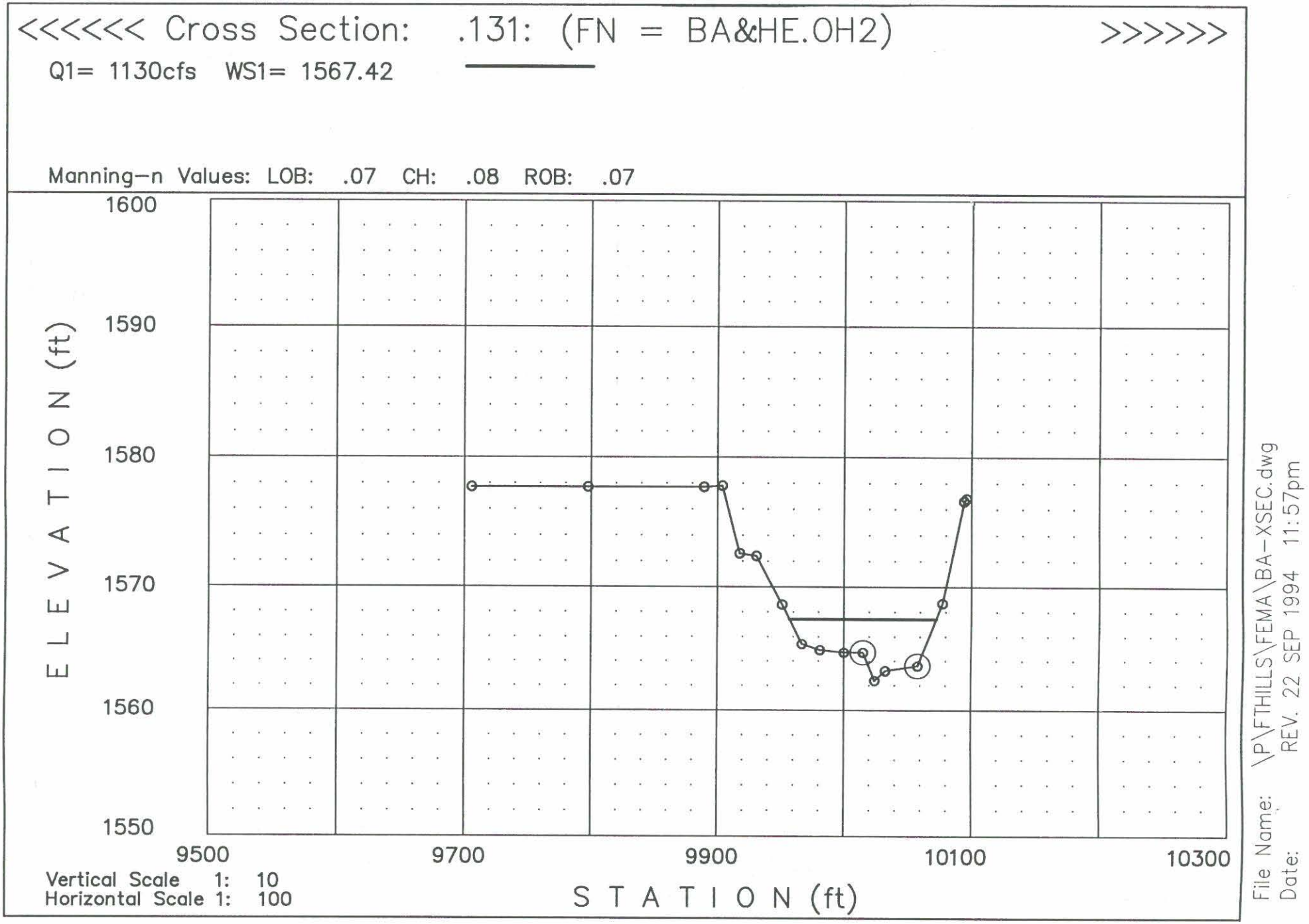
<<<<<< Cross Section: .131: (FN = BA&HE.OH2) >>>>>>
Q1= 1130cfs WS1= 1567.42
Manning-n Values: LOB: .07 CH: .08 ROB: .07
1600
1590
1580
1570
1560
1550
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
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Horizontal Scale 1: 100
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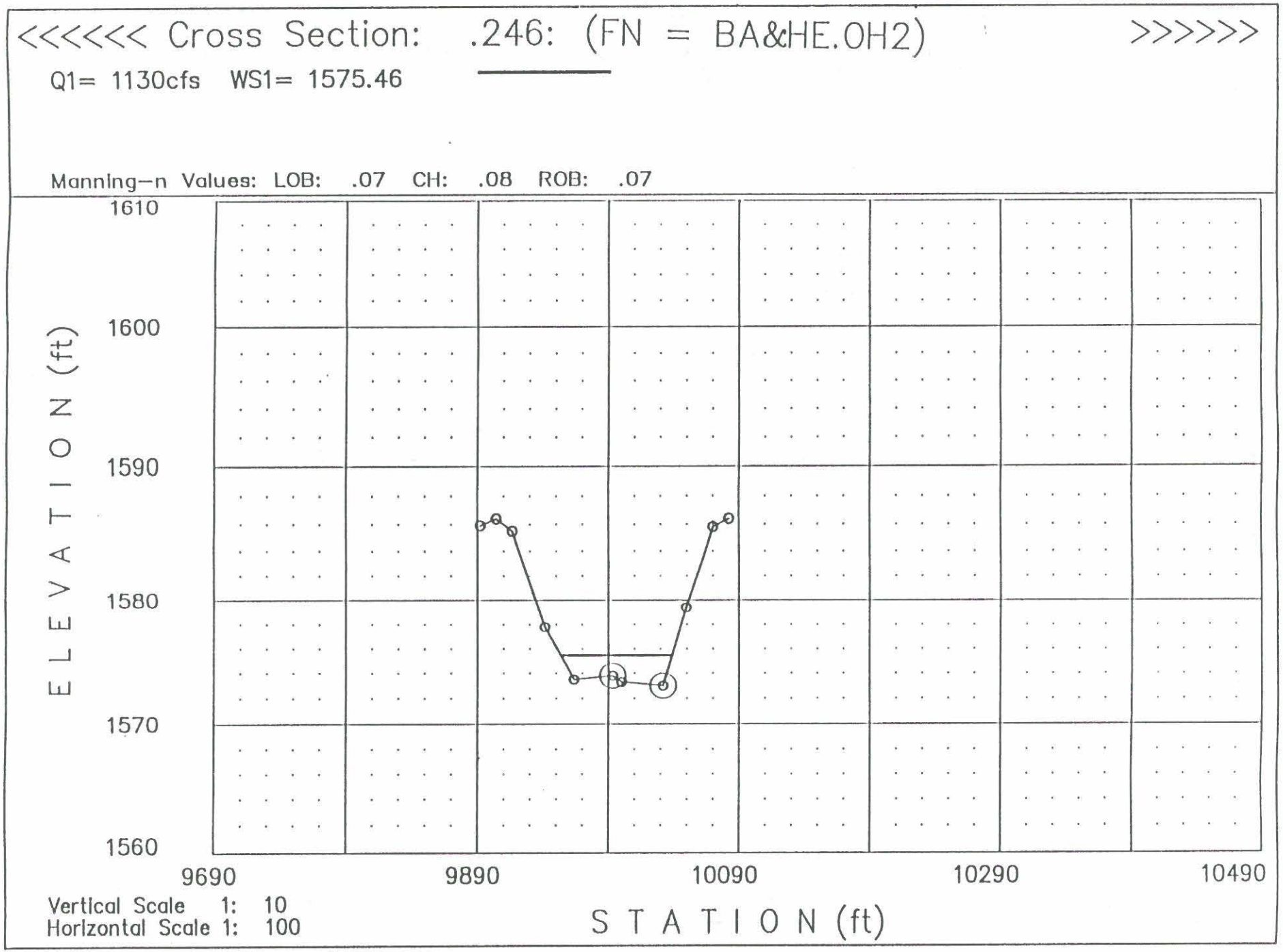
<<<<<< Cross Section: .246: (FN = BA&HE.0H2) >>>>>>
Q1= 1130cfs WS1= 1575.46
Manning-n Values: LOB: .07 CH: .08 ROB: .07
1610
1600
1590
1580
1570
1560
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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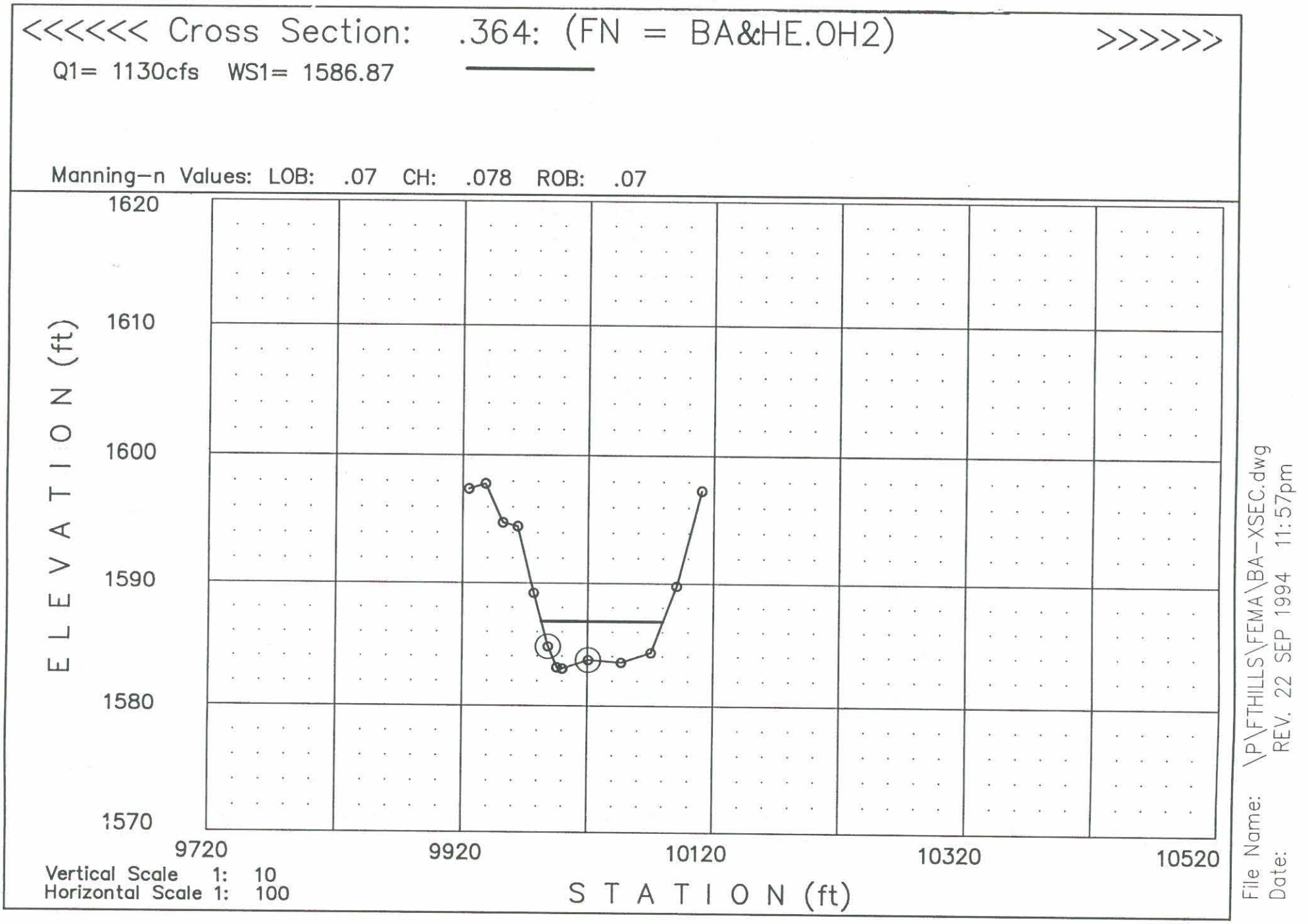
<<<<<< Cross Section: .364: (FN = BA&HE.OH2) >>>>>>
Q1= 1130cfs WS1= 1586.87
Manning-n Values: LOB: .07 CH: .078 ROB: .07
1620
1610
1600
1590
1580
1570
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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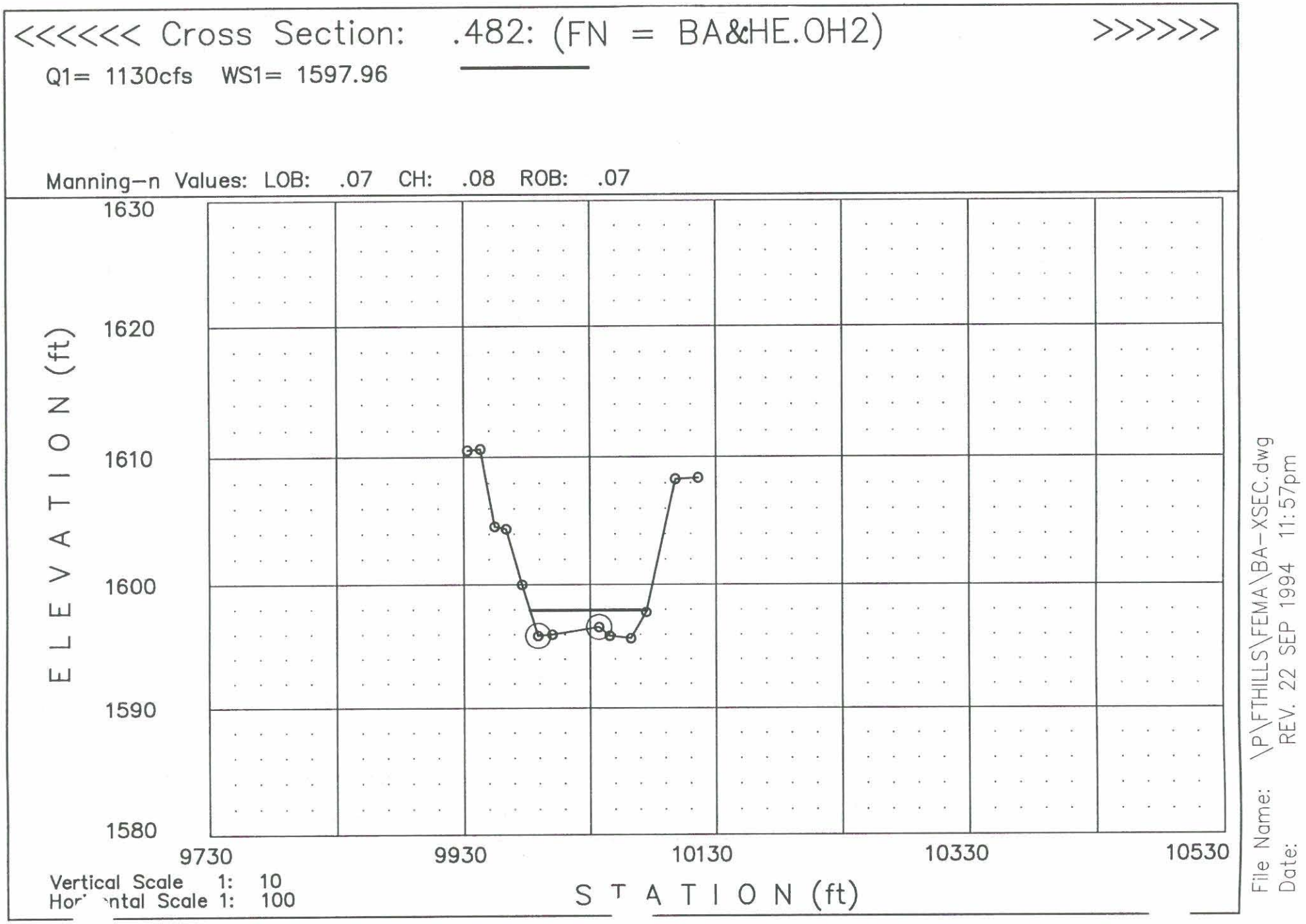
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: .482: (FN = BA&HE.OH2) >>>>>>
Q1= 1130cfs WS1= 1597.96
Manning-n Values: LOB: .07 CH: .08 ROB: .07
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9730
9930
10130
10330
10530
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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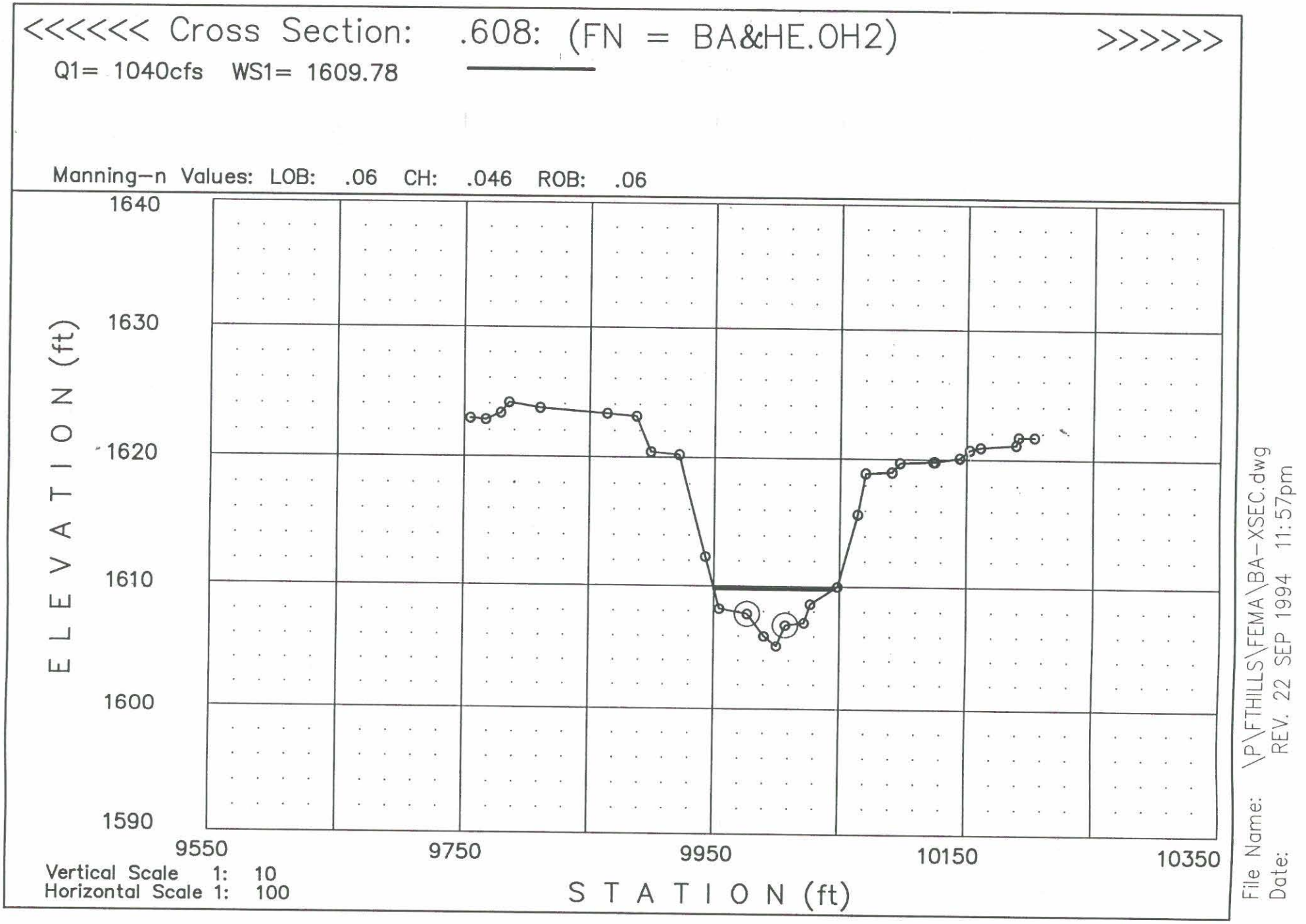
<<<<<< Cross Section: .608: (FN = BA&HE.OH2) >>>>>>
Q1= 1040cfs WS1= 1609.78
Manning–n Values: LOB: .06 CH: .046 ROB: .06
1640
1630
1620
1610
1600
1590
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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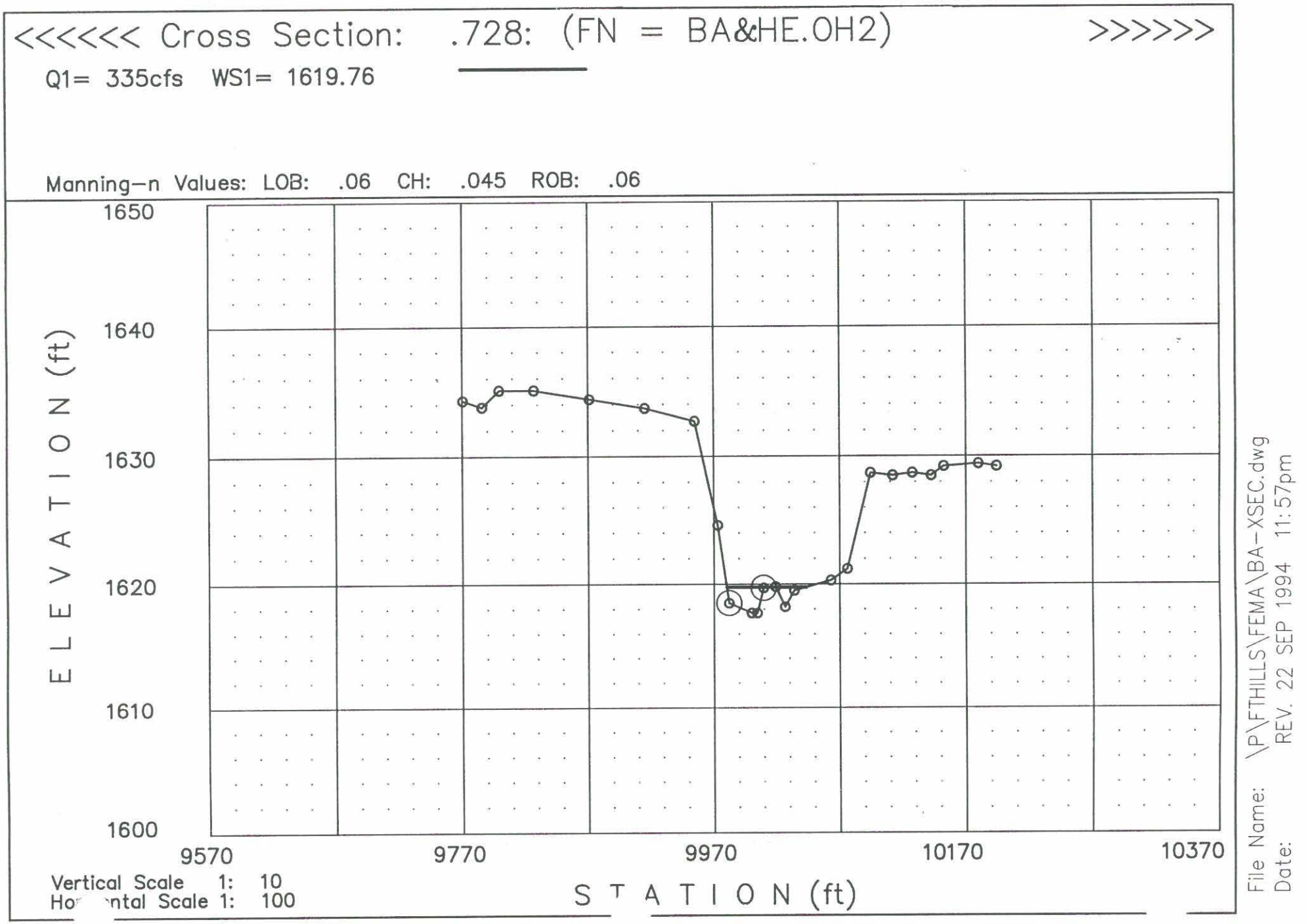
<<<<<< Cross Section: .728: (FN = BA&HE.0H2) >>>>>>
Q1= 335cfs WS1= 1619.76
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1650
1640
1630
1620
1610
1600
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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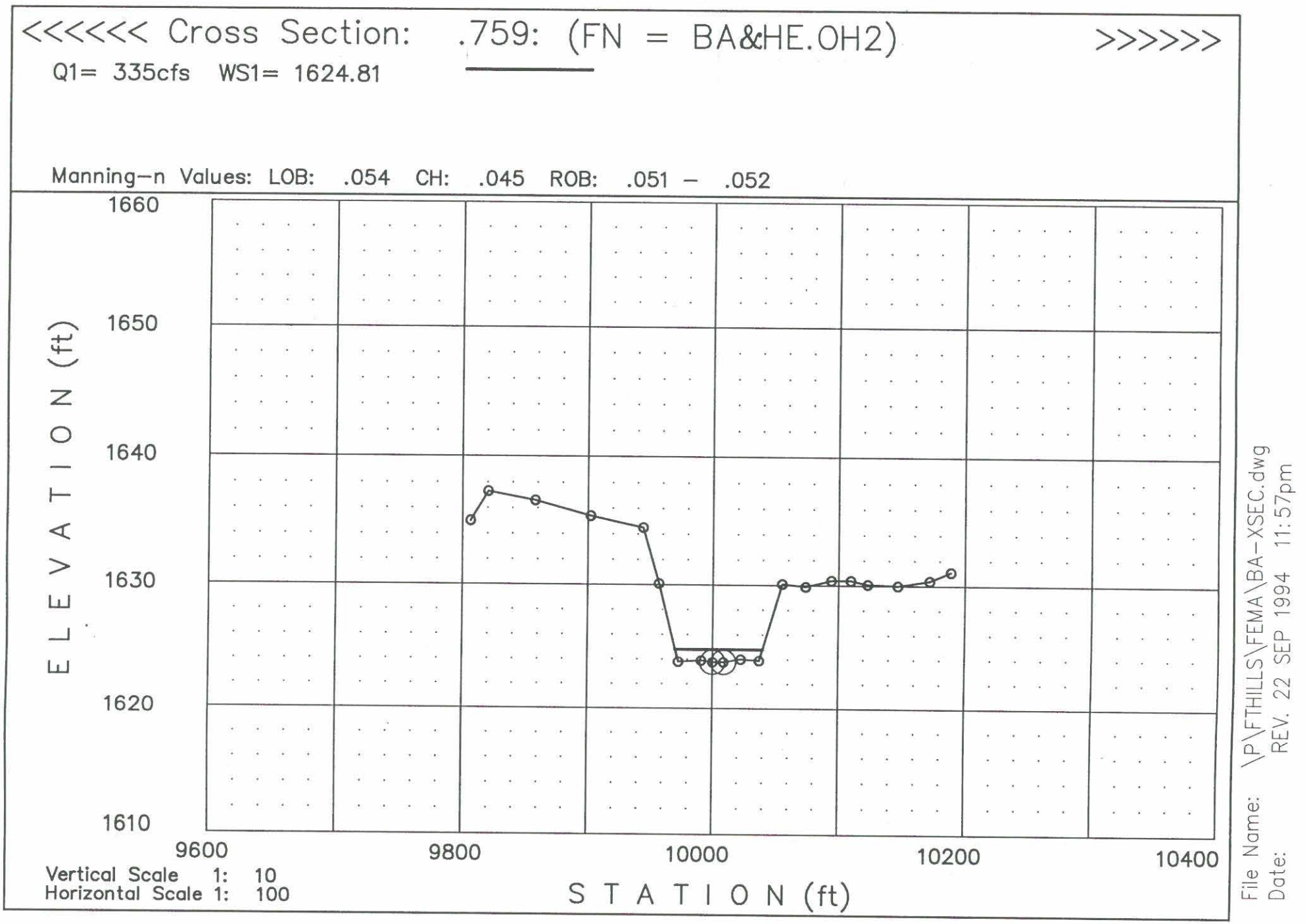
<<<<<< Cross Section: .759: (FN = BA&HE.OH2) >>>>>>
Q1= 335cfs WS1= 1624.81
Manning-n Values: LOB: .054 CH: .045 ROB: .051 - .052
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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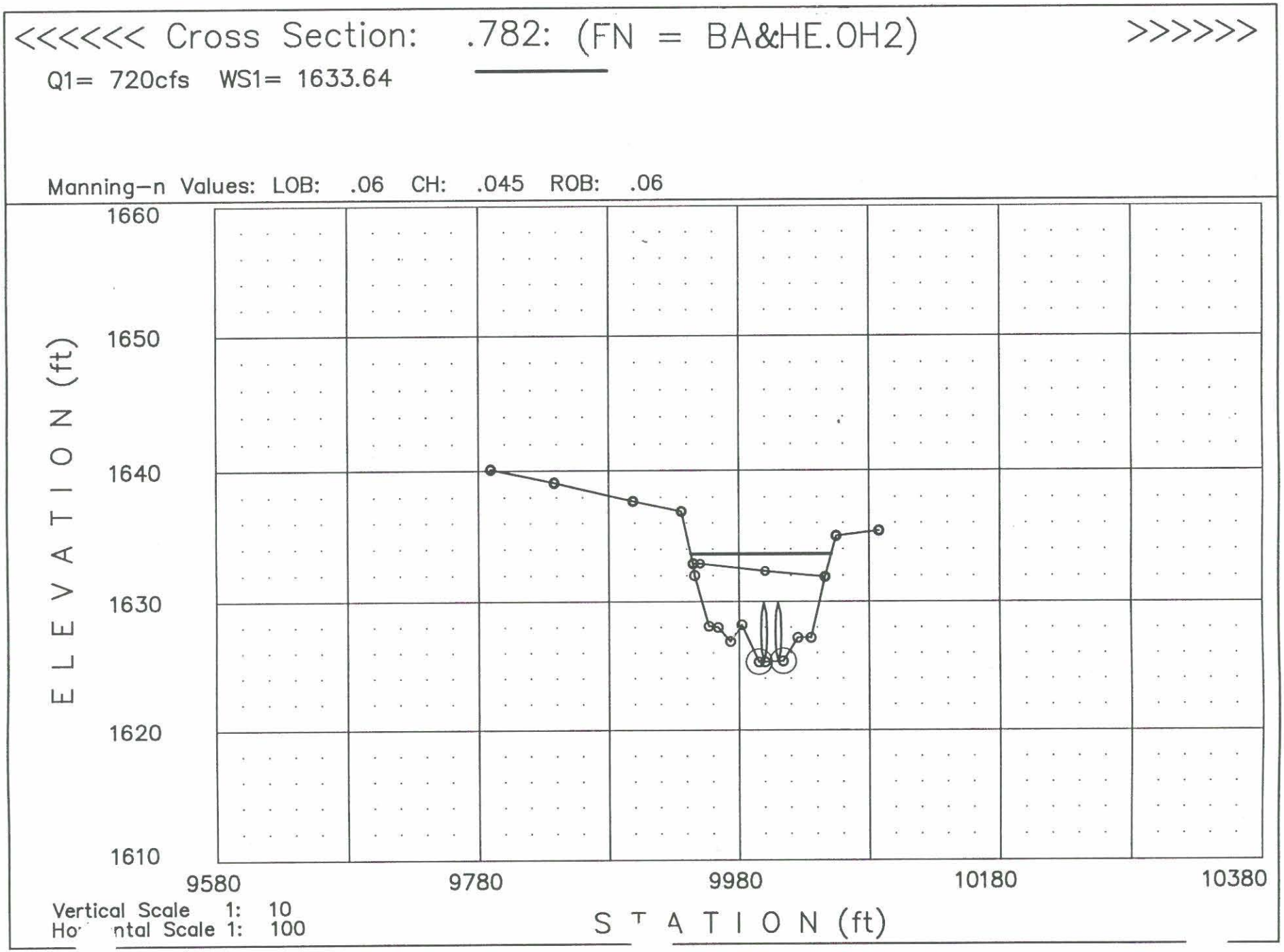
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: .782: (FN = BA&HE.0H2) >>>>>>
Q1= 720cfs WS1= 1633.64
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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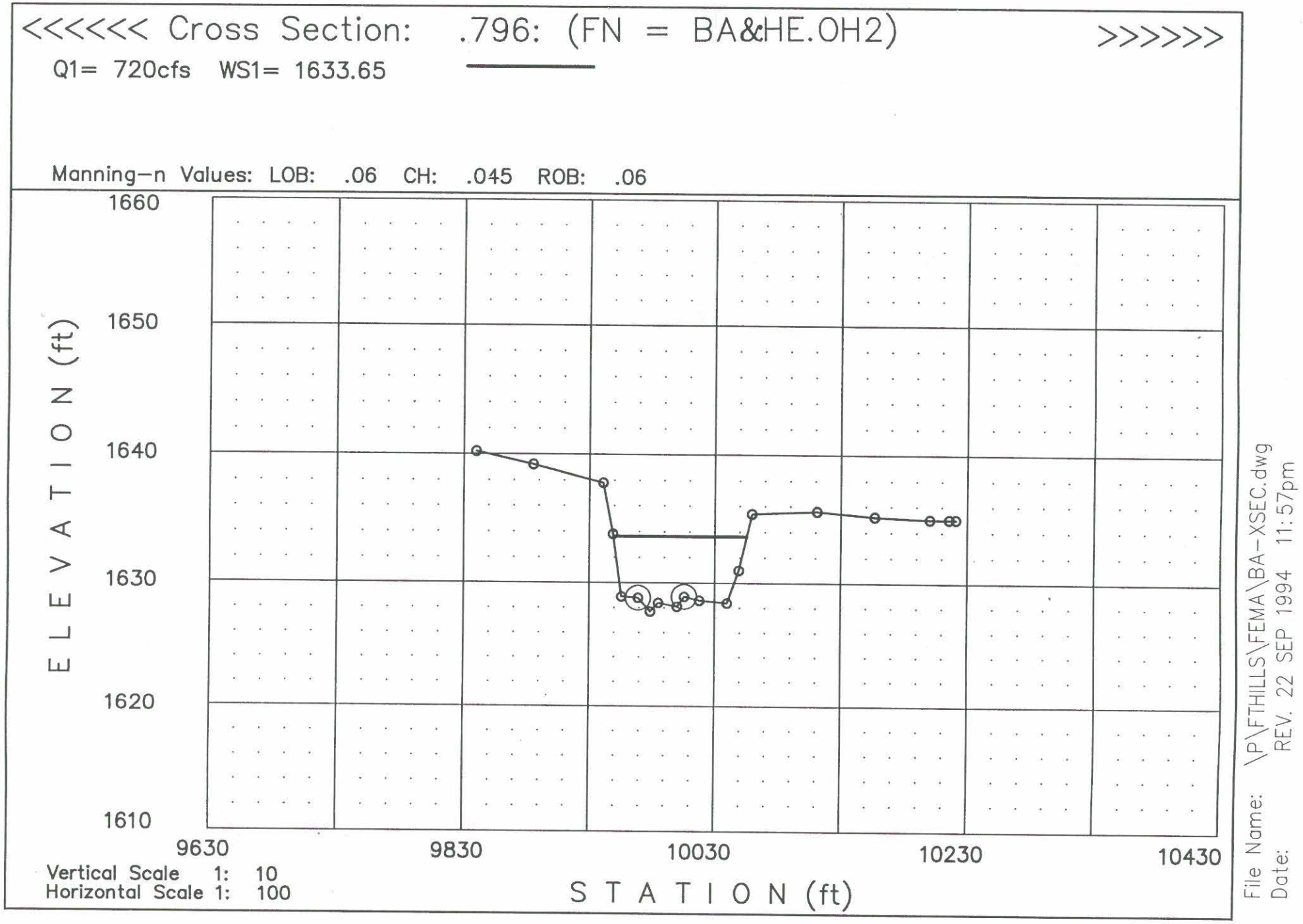
<<<<<< Cross Section: .796: (FN = BA&HE.OH2) >>>>>>
Q1= 720cfs WS1= 1633.65
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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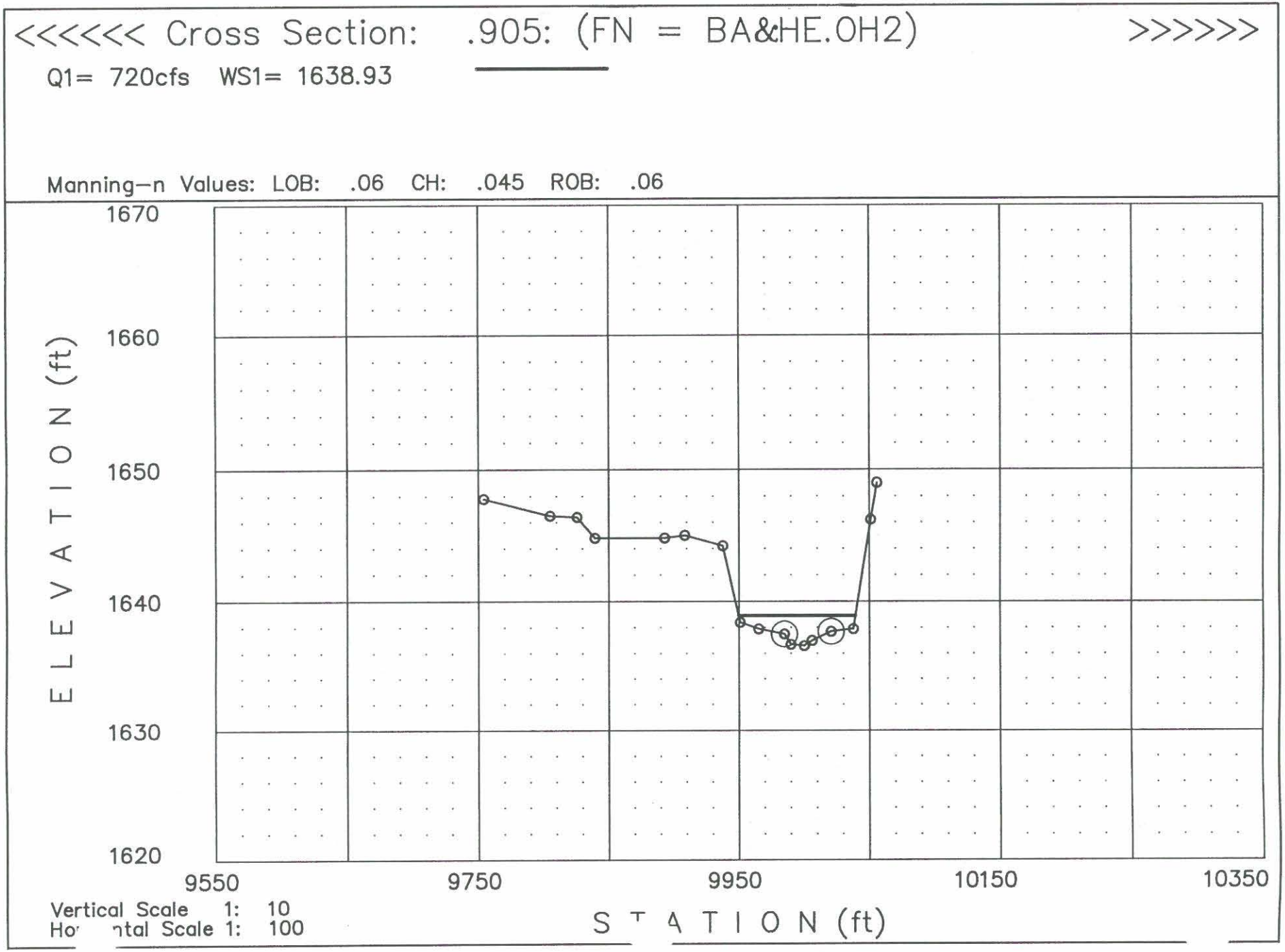
<<<<<< Cross Section: .905: (FN = BA&HE.OH2) >>>>>>
Q1= 720cfs WS1= 1638.93
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1670
1660
1650
1640
1630
1620
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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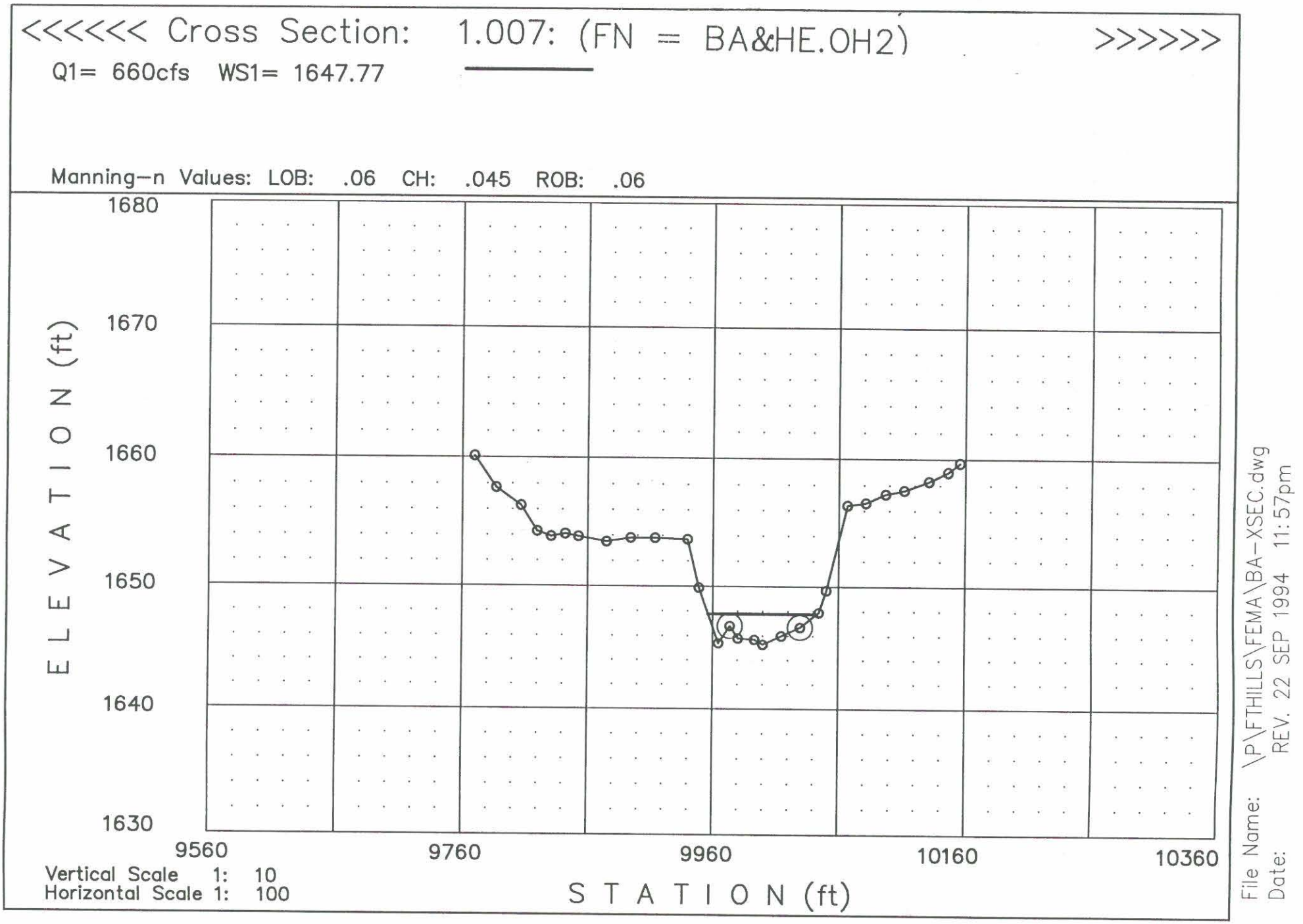
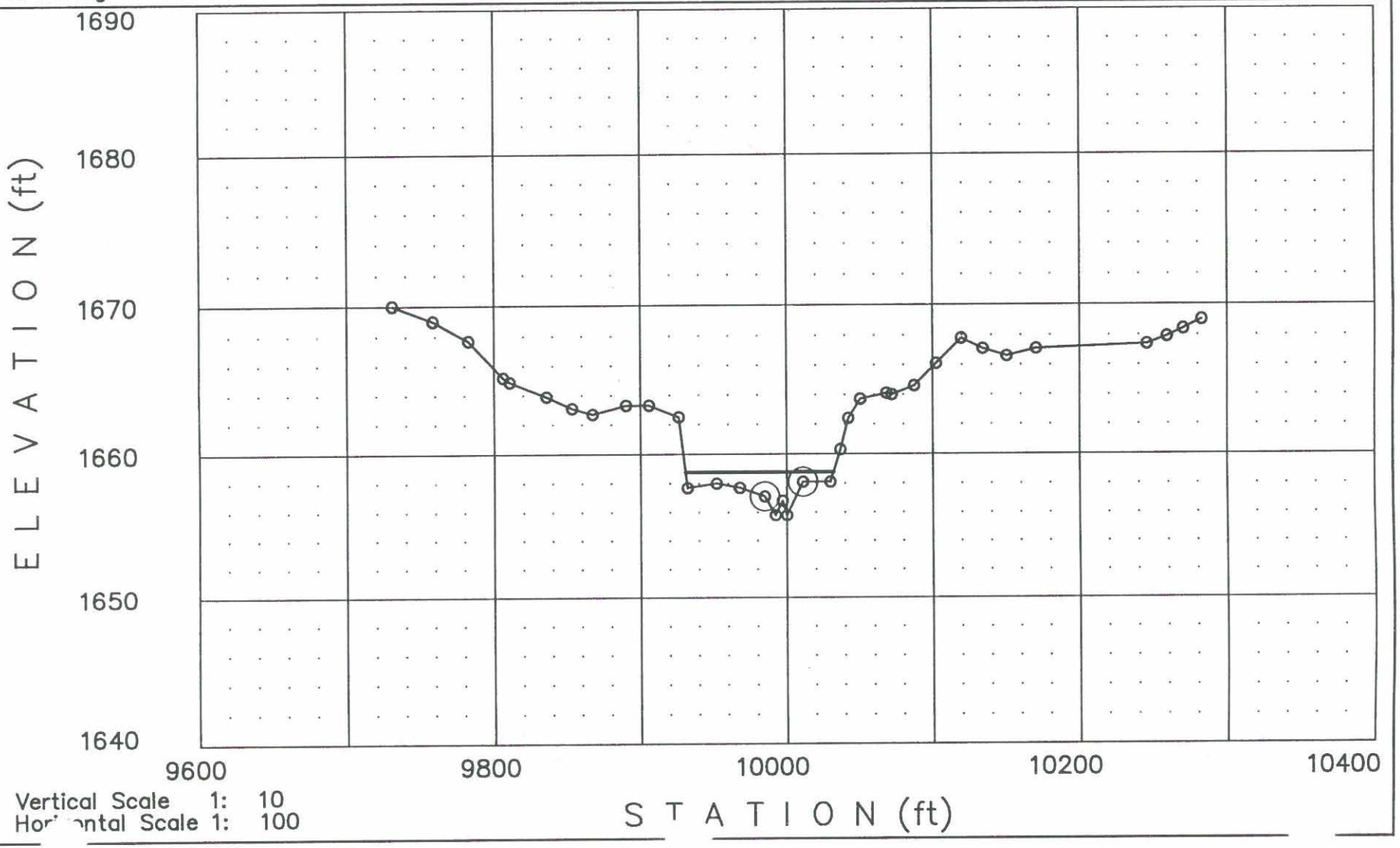

<<<<<< Cross Section: 1.007: (FN = BA&HE.OH2) >>>>>>
Q1= 660cfs WS1= 1647.77
Manning-n Values: LOB: .06 CH: .045 ROB: .06
ELEVATION (ft)
1680
1670
1660
1650
1640
1630
9560
9760
9960
10160
10360
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 1.105: (FN = BA&HE.OH2) >>>>>>

Q1= 660cfs WS1= 1658.77

Manning-n Values: LOB: .06 CH: .045 ROB: .06



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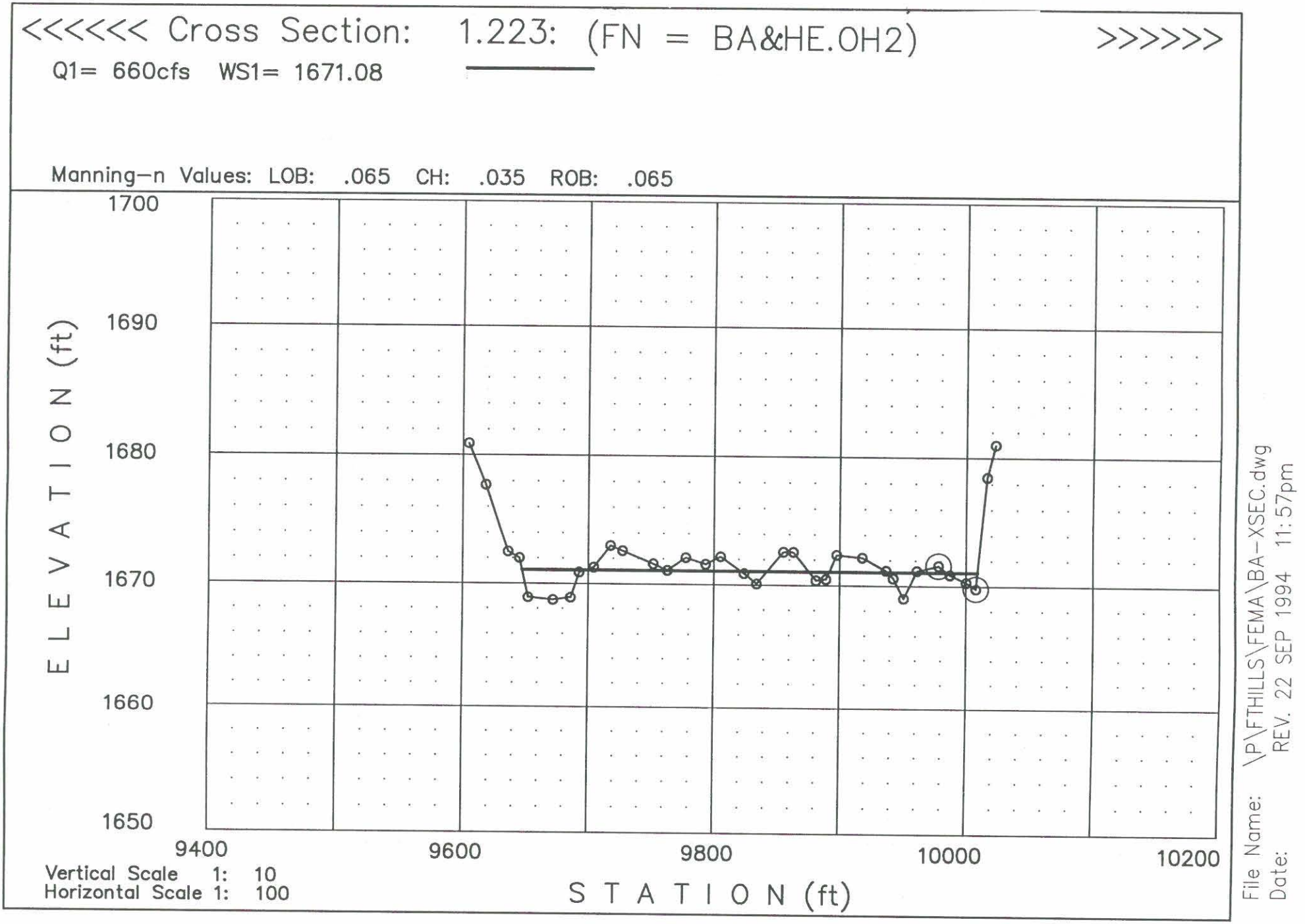
<<<<<< Cross Section: 1.223: (FN = BA&HE.OH2) >>>>>>
Q1= 660cfs WS1= 1671.08
Manning-n Values: LOB: .065 CH: .035 ROB: .065
1700
1690
1680
1670
1660
1650
ELEVATION (ft)
9400
9600
9800
10000
10200
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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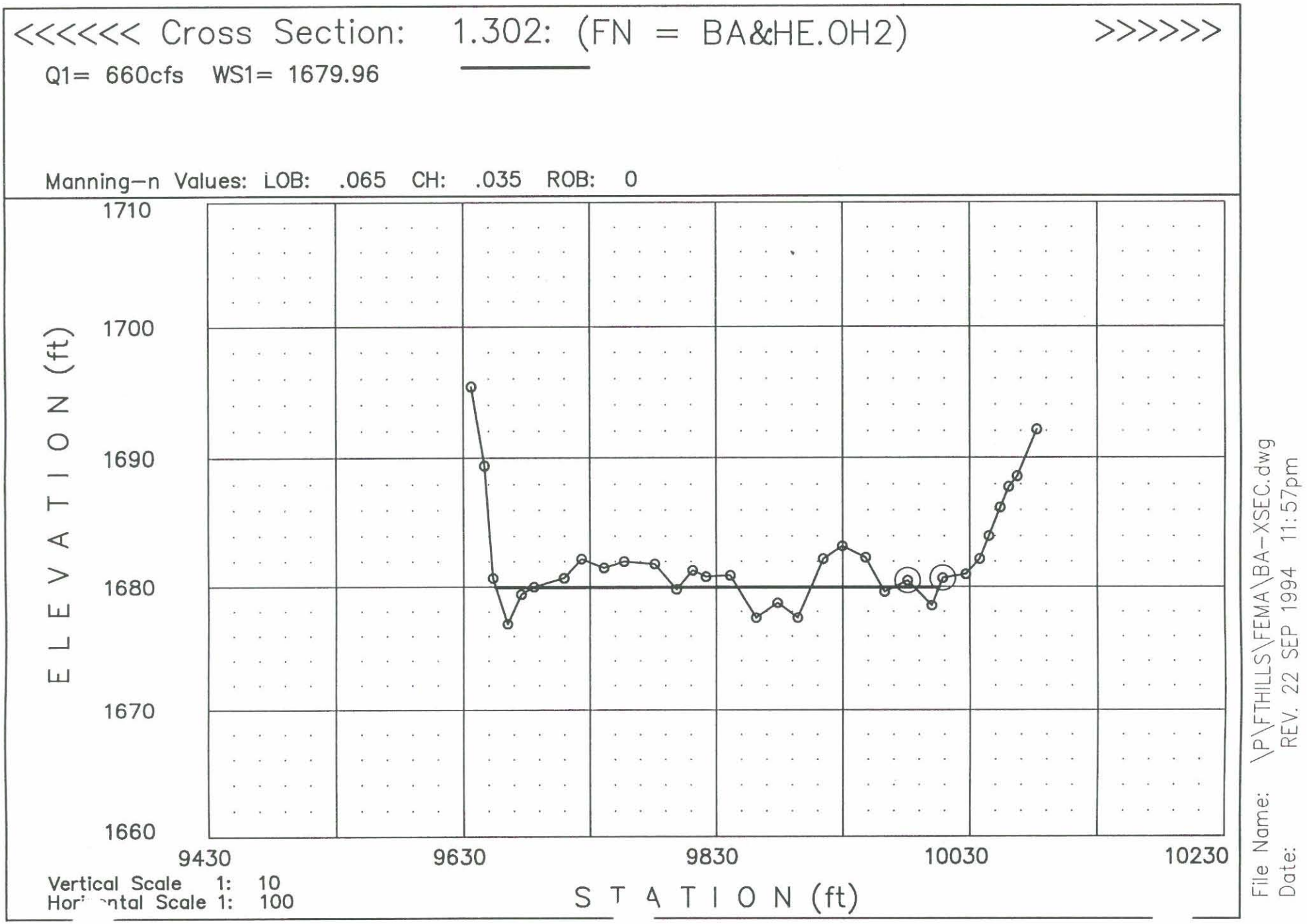
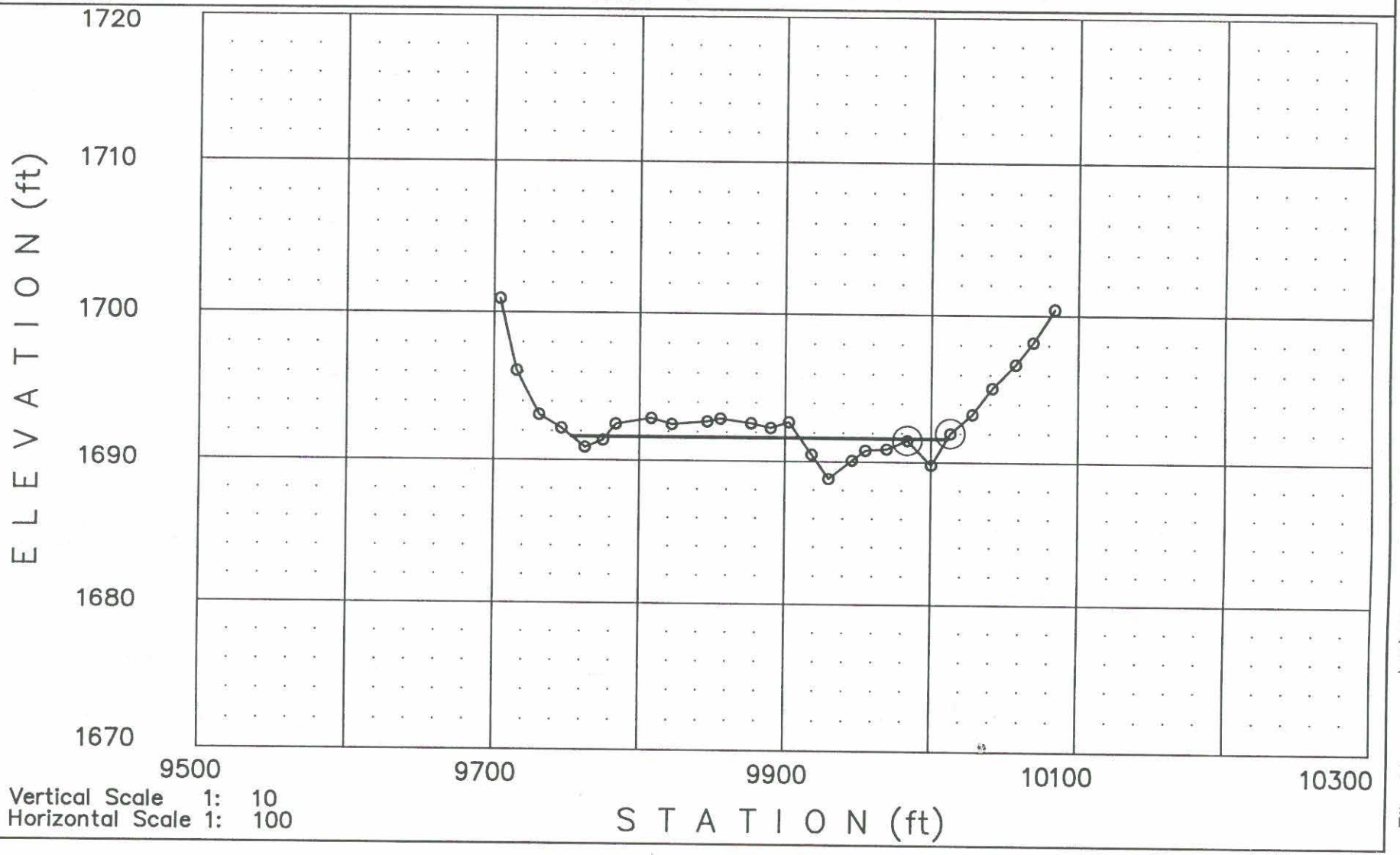

<<<<<< Cross Section: 1.302: (FN = BA&HE.0H2) >>>>>>
Q1= 660cfs WS1= 1679.96
Manning-n Values: LOB: .065 CH: .035 ROB: 0
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9430
9630
9830
10030
10230
STATION (ft)
Vertical Scale 1: 10
Hori ntal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 1.393: (FN = BA&HE.OH2) >>>>>>

Q1= 660cfs WS1= 1691.63

Manning-n Values: LOB: .065 CH: .035 ROB: 0



Vertical Scale 1: 10
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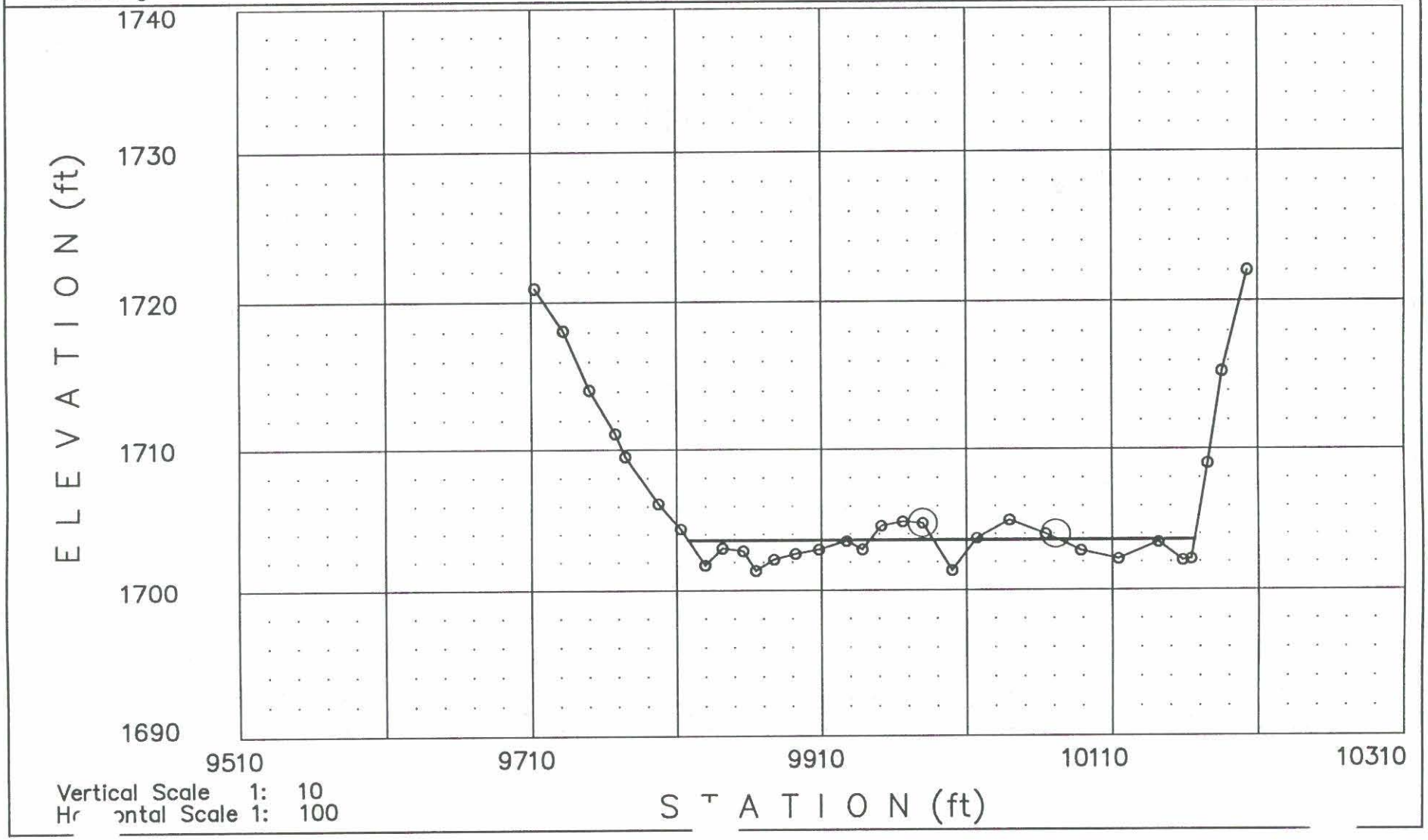
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 1.517: (FN = BA&HE.OH2) >>>>>>

Q1= 660cfs WS1= 1703.57

Manning-n Values: LOB: .065 CH: .035 ROB: .065



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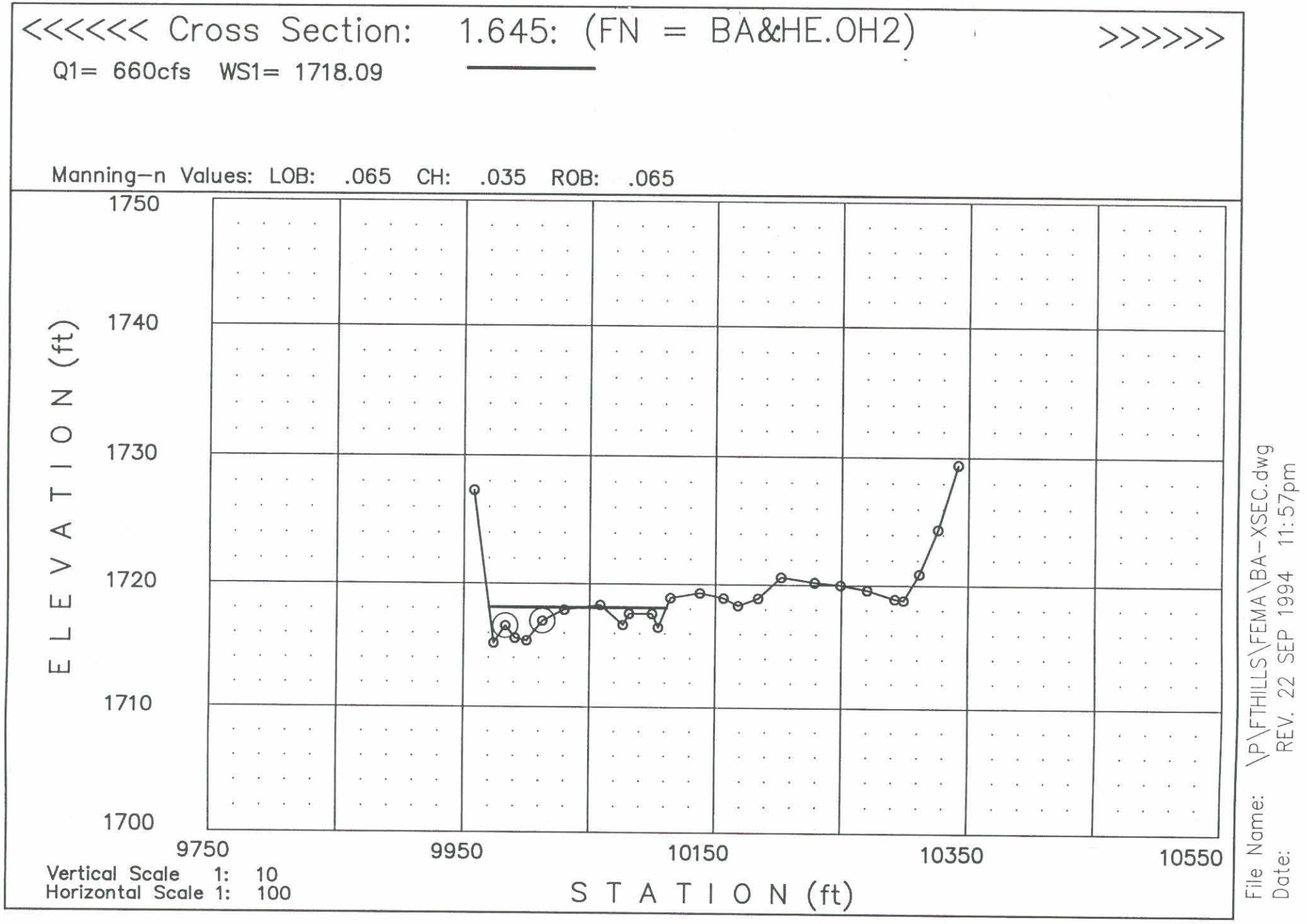
<<<<<< Cross Section: 1.645: (FN = BA&HE.OH2) >>>>>>
Q1= 660cfs WS1= 1718.09
Manning–n Values: LOB: .065 CH: .035 ROB: .065
1750
1740
1730
1720
1710
1700
ELEVATION (ft)
9750
9950
10150
10350
10550
STATION (ft)
Vertical Scale 1: 10
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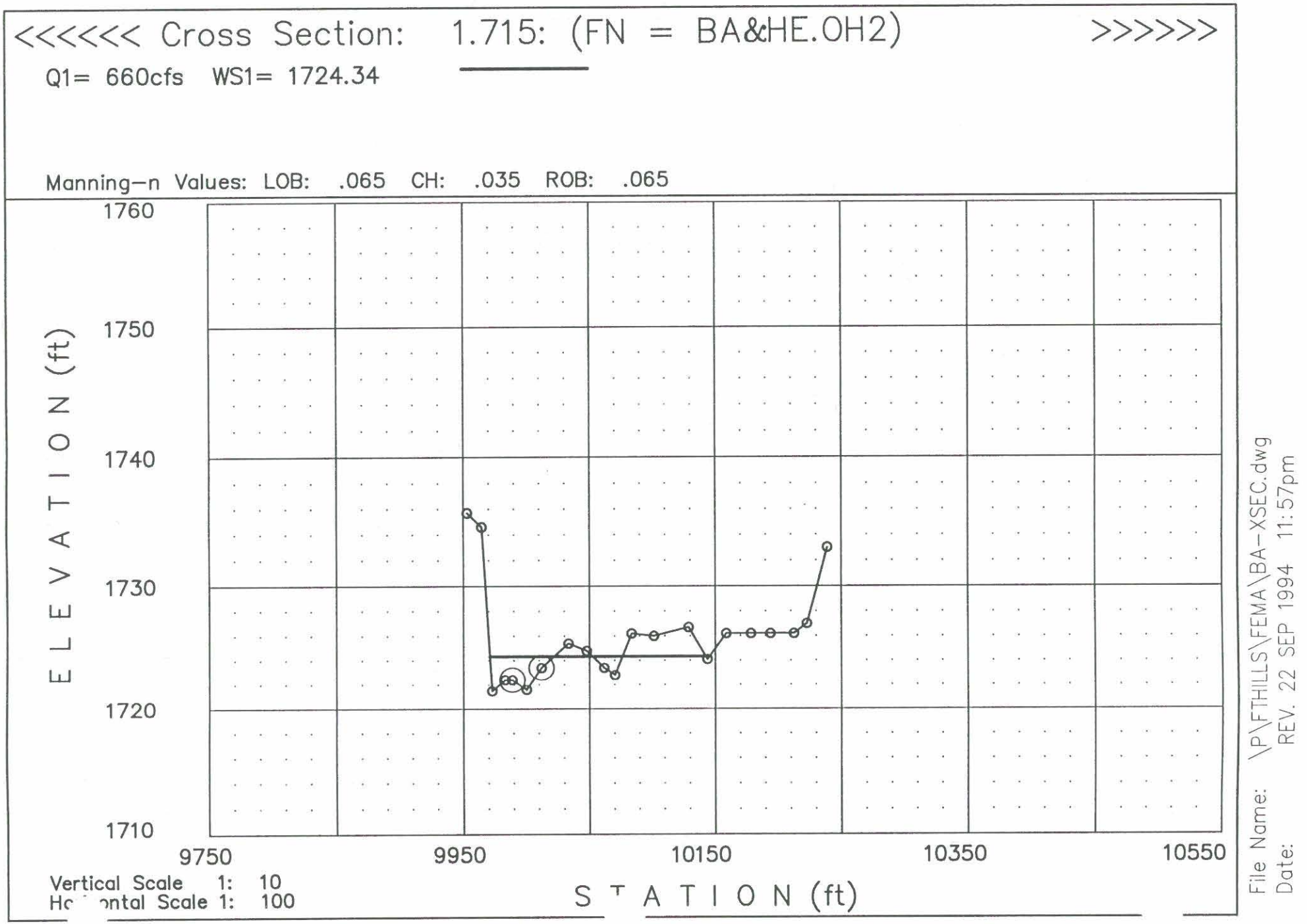
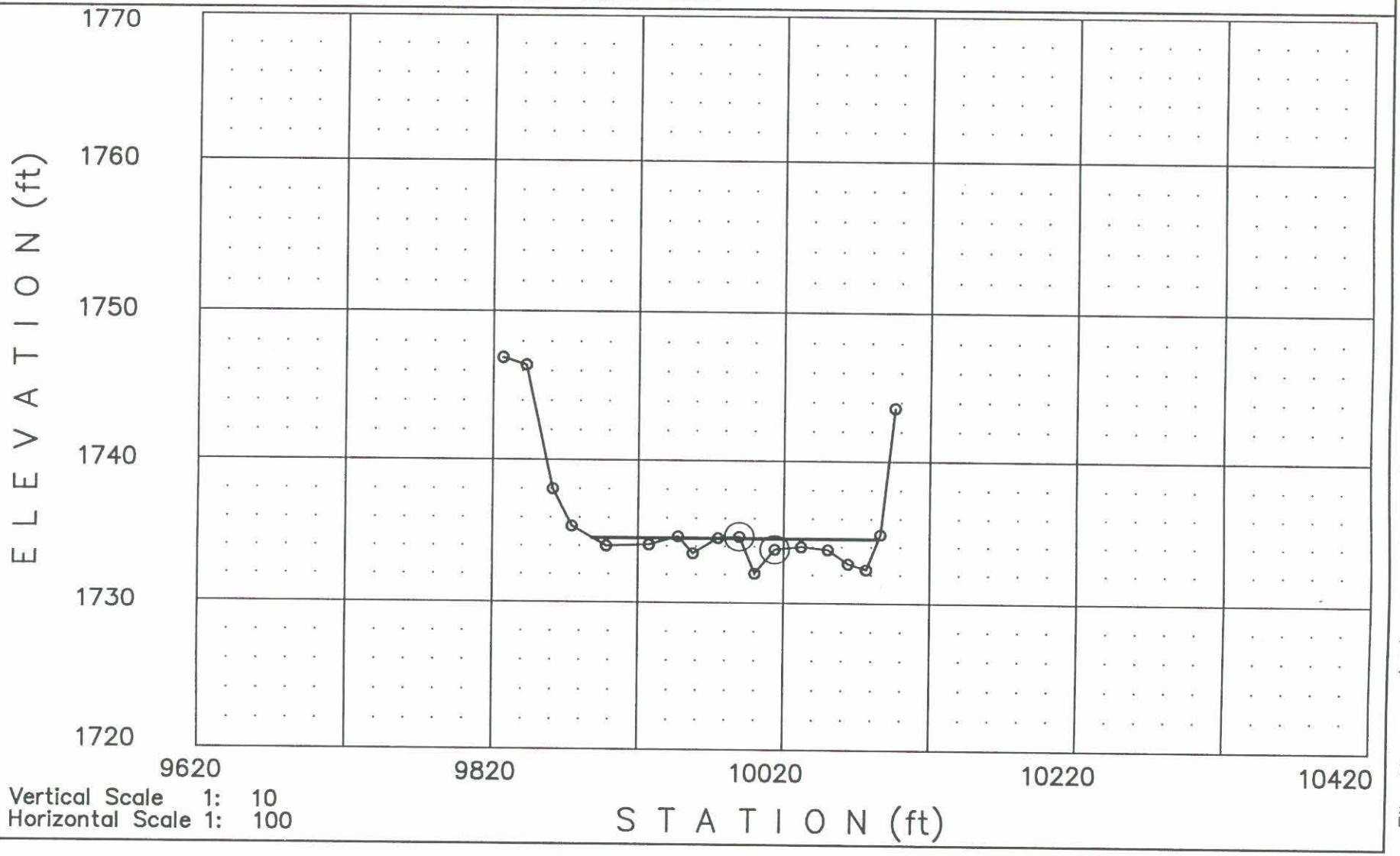

<<<<<< Cross Section: 1.715: (FN = BA&HE.OH2) >>>>>>
Q1= 660cfs WS1= 1724.34
Manning-n Values: LOB: .065 CH: .035 ROB: .065
1760
1750
1740
1730
1720
1710
ELEVATION (ft)
9750
9950
10150
10350
10550
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 1.803: (FN = BA&HE.OH2) >>>>>>

Q1= 560cfs WS1= 1734.58

Manning-n Values: LOB: .075 CH: .05 ROB: .075



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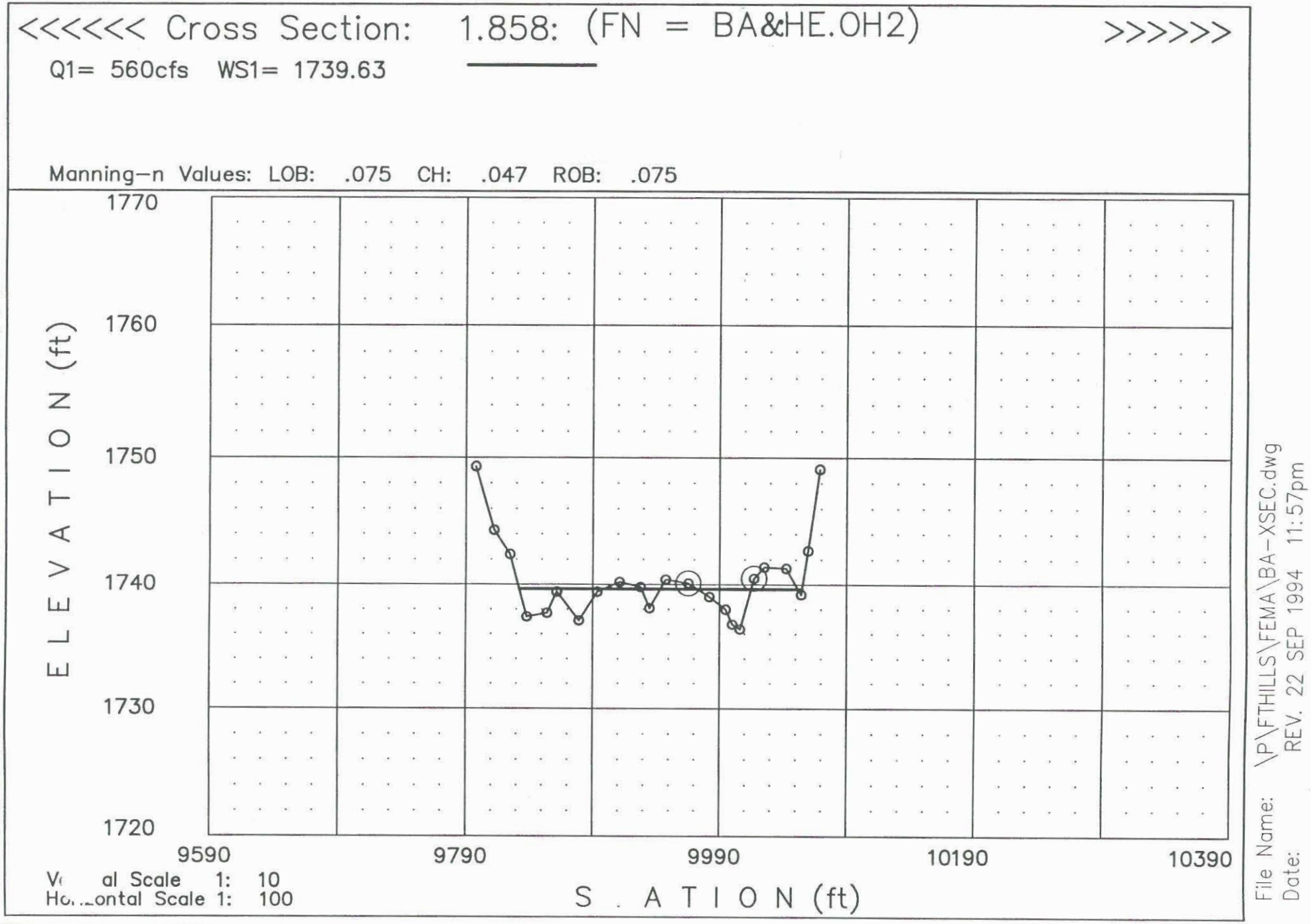
<<<<<< Cross Section: 1.858: (FN = BA&HE.OH2) >>>>>>
Q1= 560cfs WS1= 1739.63
Manning-n Values: LOB: .075 CH: .047 ROB: .075
1770
1760
1750
1740
1730
1720
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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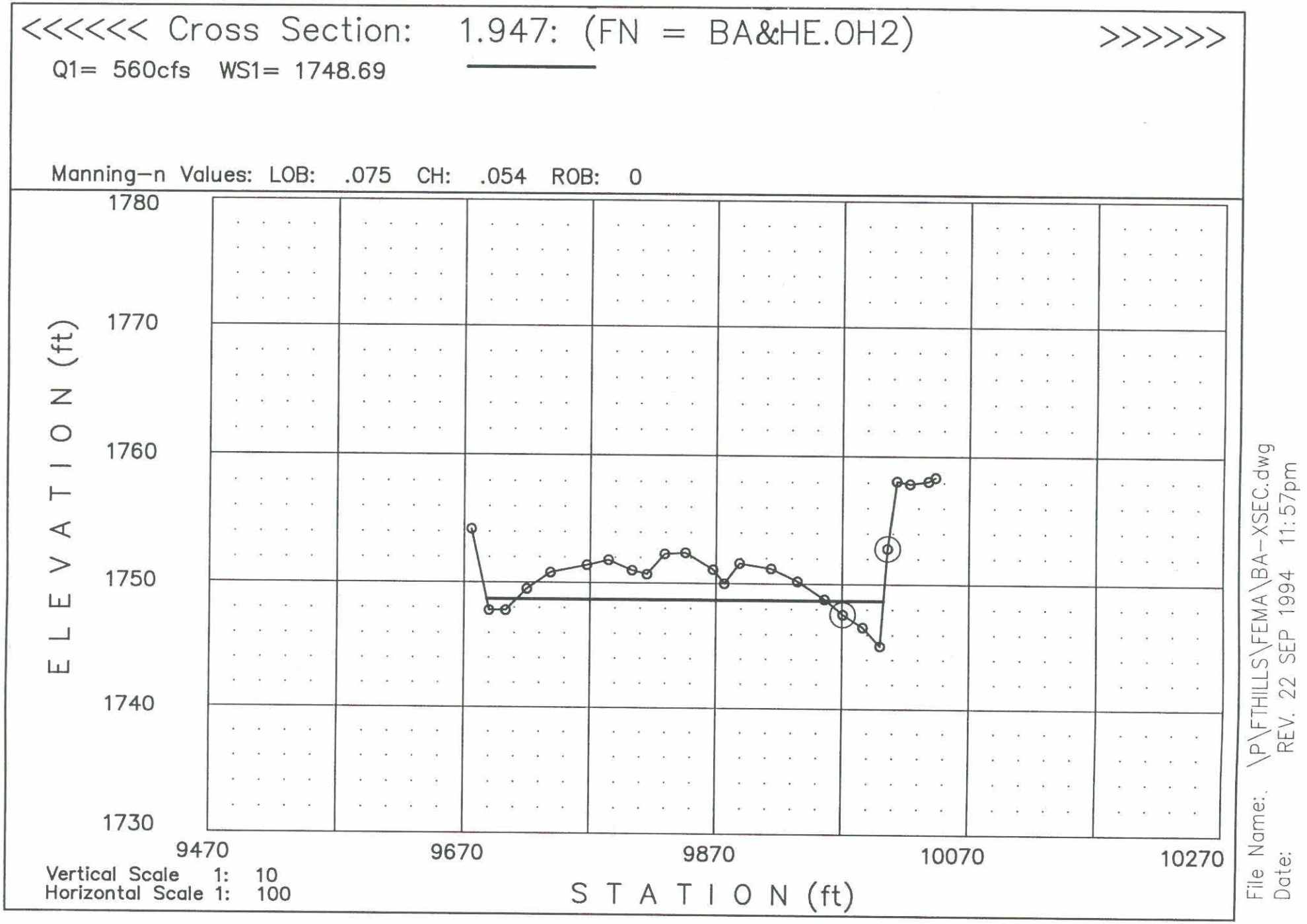
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 1.947: (FN = BA&HE.OH2) >>>>>>
Q1= 560cfs WS1= 1748.69
Manning-n Values: LOB: .075 CH: .054 ROB: 0
1780
1770
1760
1750
1740
1730
ELEVATION (ft)
9470
9670
9870
10070
10270
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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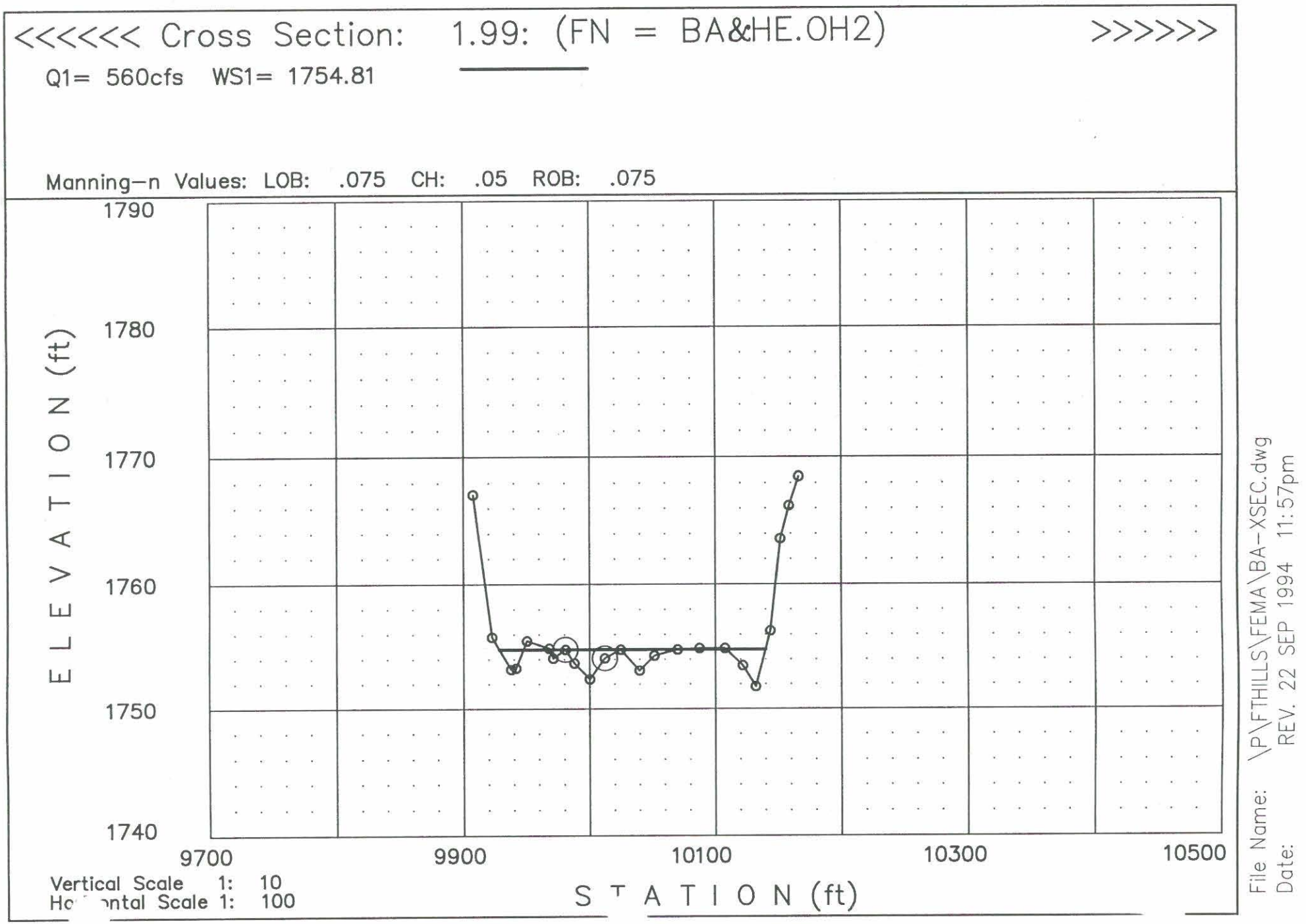
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 1.99: (FN = BA&HE.OH2) >>>>>>
Q1= 560cfs WS1= 1754.81
Manning-n Values: LOB: .075 CH: .05 ROB: .075
1790
1780
1770
1760
1750
1740
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
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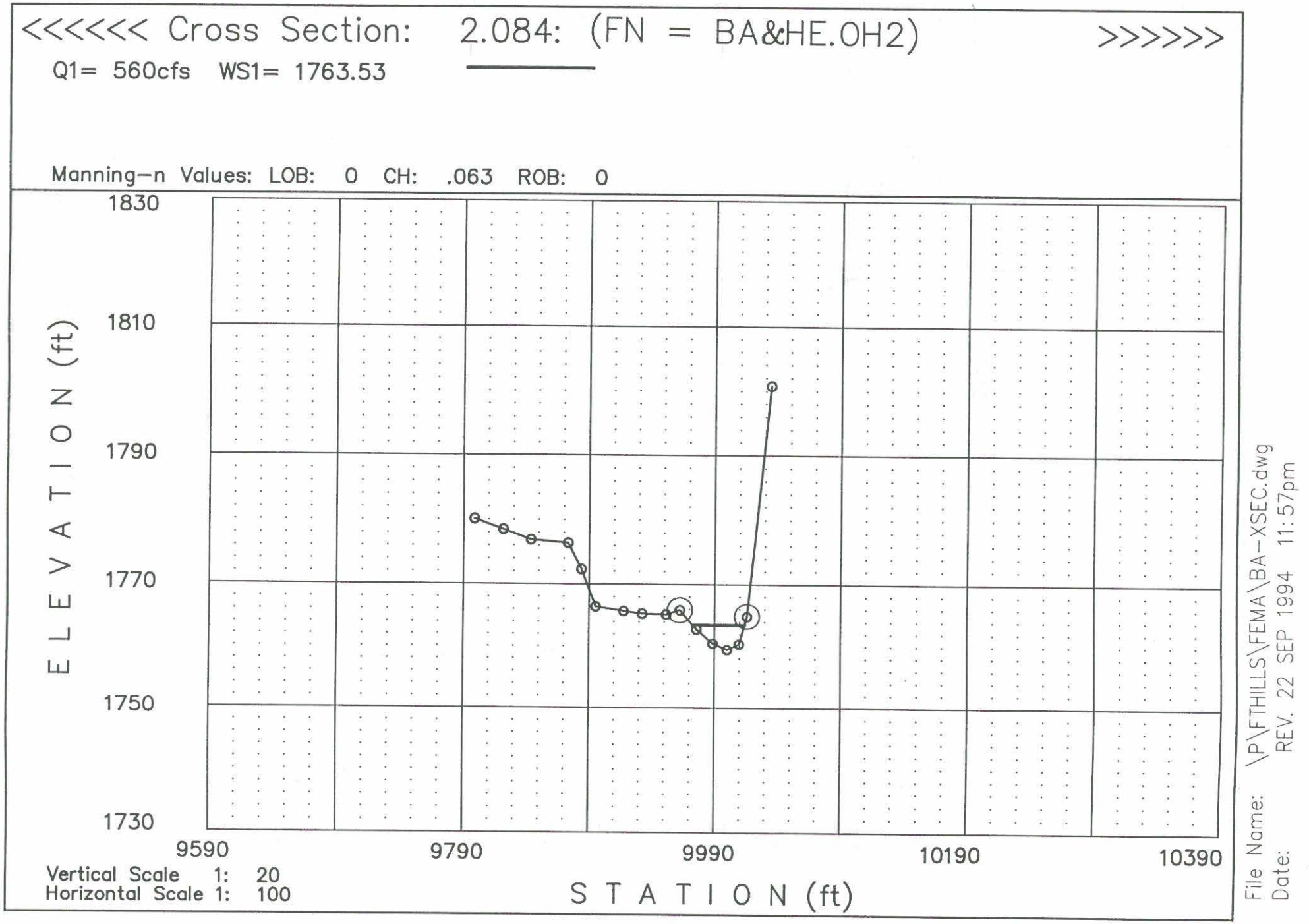
<<<<<< Cross Section: 2.084: (FN = BA&HE.OH2) >>>>>>
Q1= 560cfs WS1= 1763.53
Manning-n Values: LOB: 0 CH: .063 ROB: 0
1830
1810
1790
1770
1750
1730
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 20
Horizontal Scale 1: 100
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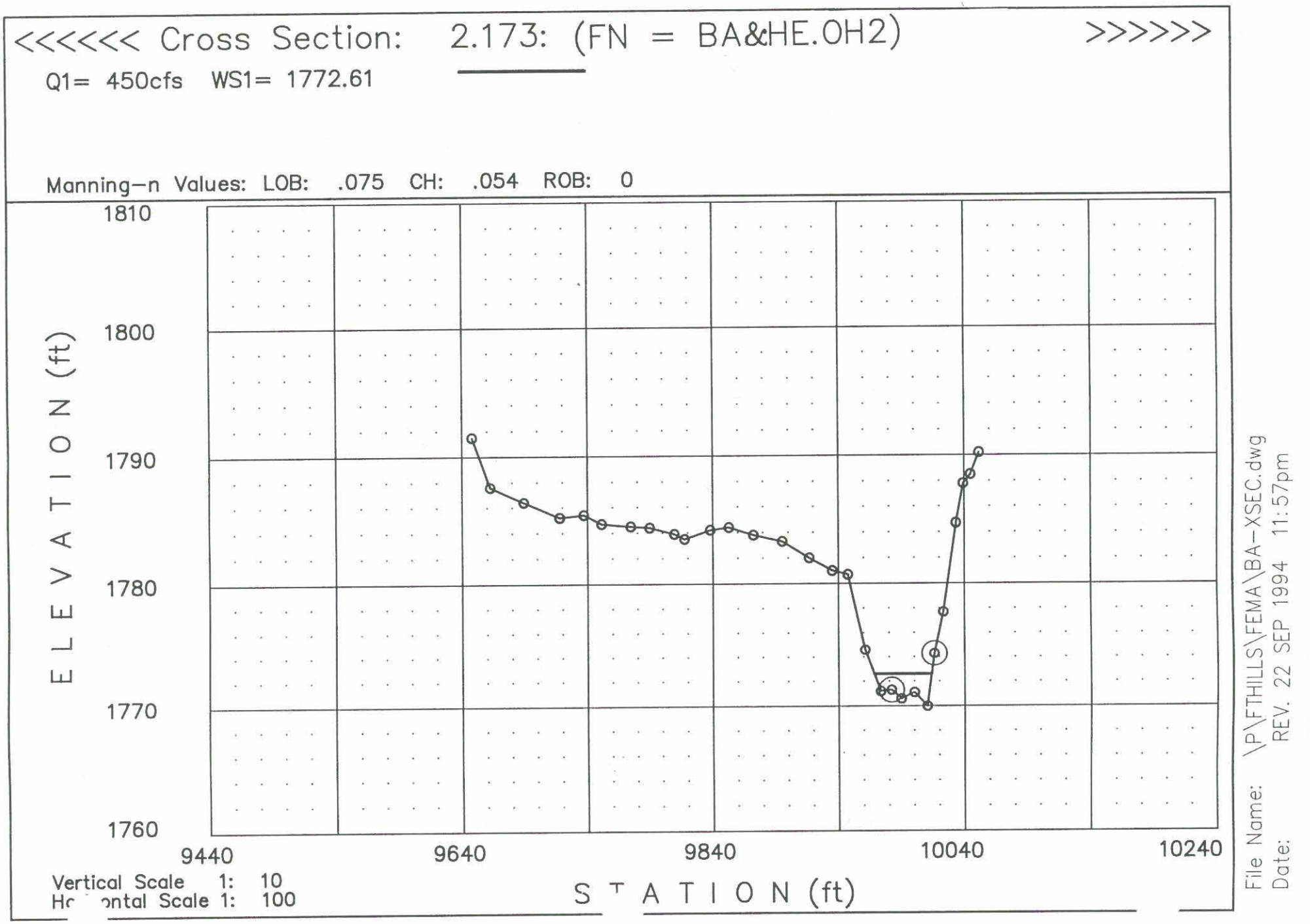
<<<<<< Cross Section: 2.173: (FN = BA&HE.OH2) >>>>>>
Q1= 450cfs WS1= 1772.61
Manning-n Values: LOB: .075 CH: .054 ROB: 0
1810
1800
1790
1780
1770
1760
ELEVATION (ft)
9440
9640
9840
10040
10240
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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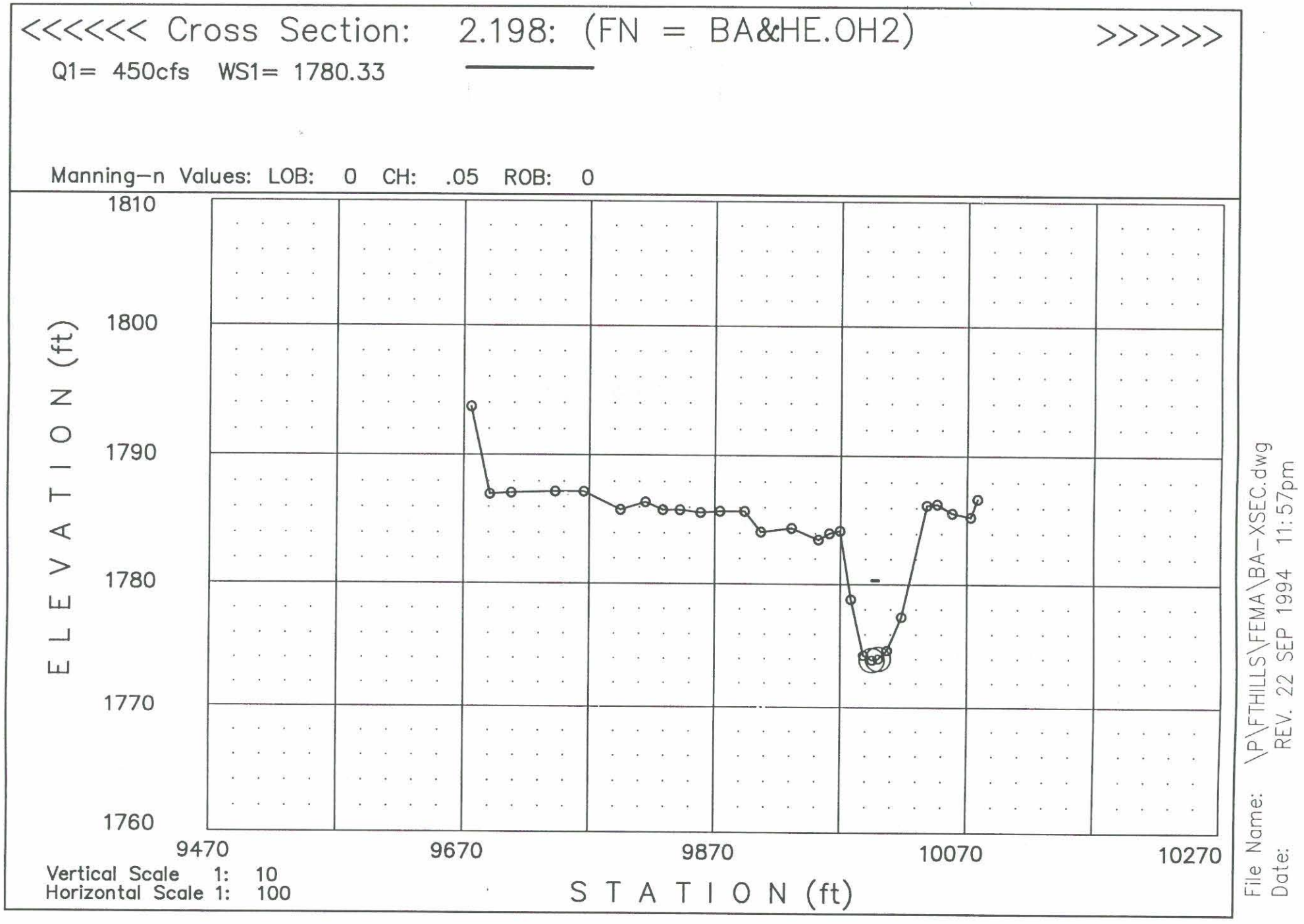
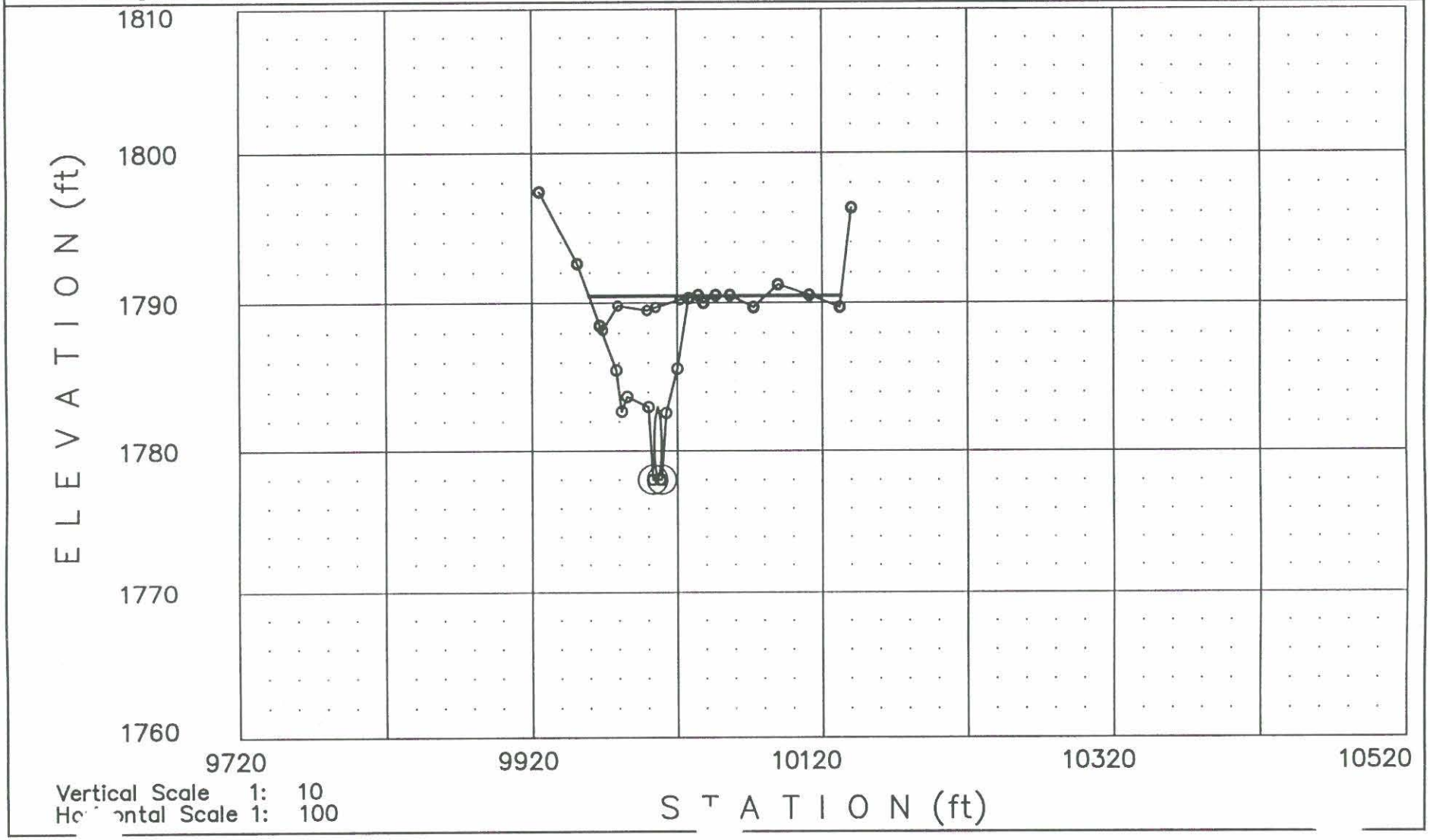

<<<<<< Cross Section: 2.198: (FN = BA&HE.OH2) >>>>>>
Q1= 450cfs WS1= 1780.33
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1810
1800
1790
1780
1770
1760
ELEVATION (ft)
9470
9670
9870
10070
10270
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 2.229: (FN = BA&HE.OH2) >>>>>>

Q1= 450cfs WS1= 1790.45

Manning-n Values: LOB: .071 CH: .05 ROB: .064 - .065



Vertical Scale 1: 10
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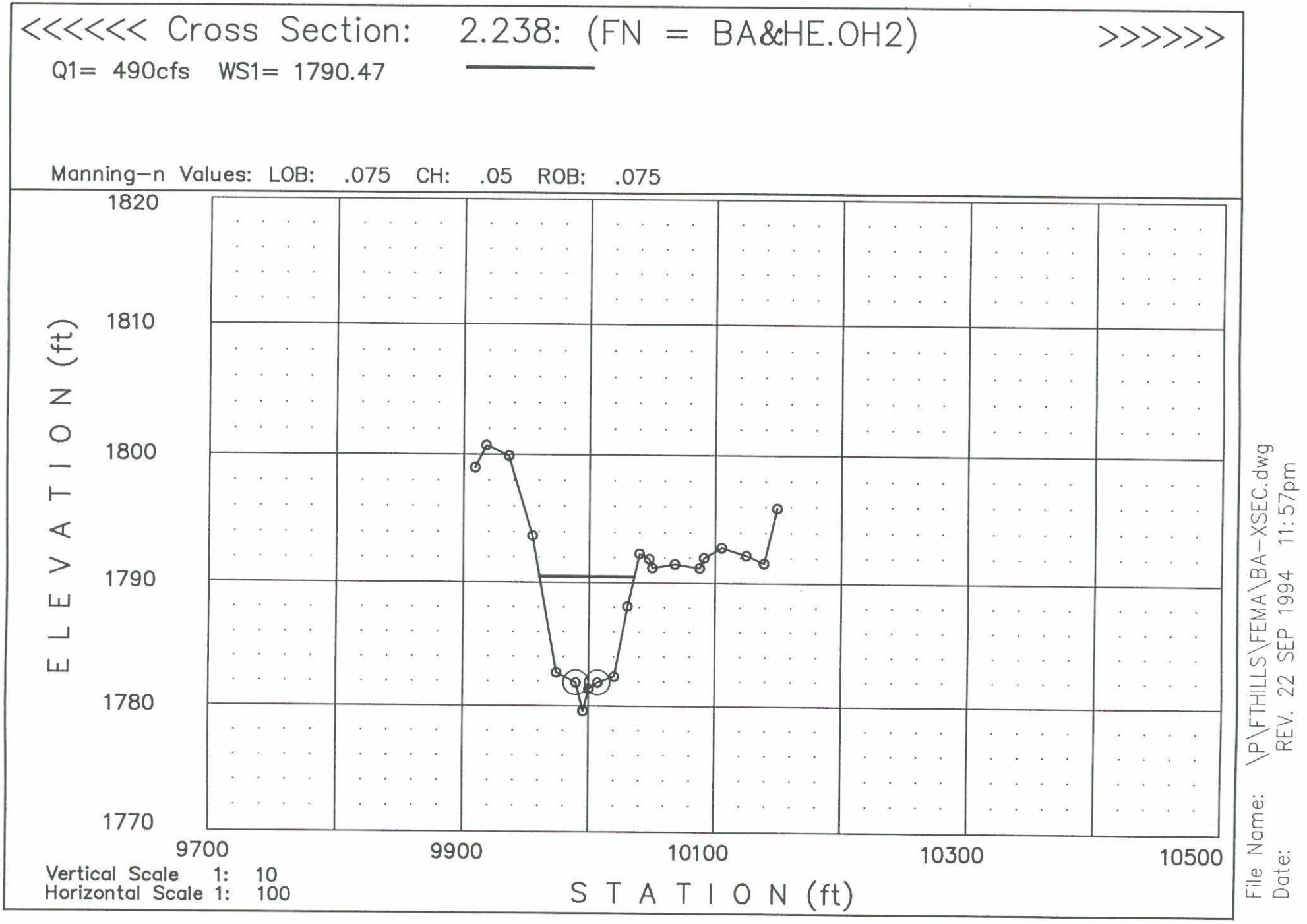
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 2.238: (FN = BA&HE.OH2) >>>>>>
Q1= 490cfs WS1= 1790.47
Manning-n Values: LOB: .075 CH: .05 ROB: .075
1820
1810
1800
1790
1780
1770
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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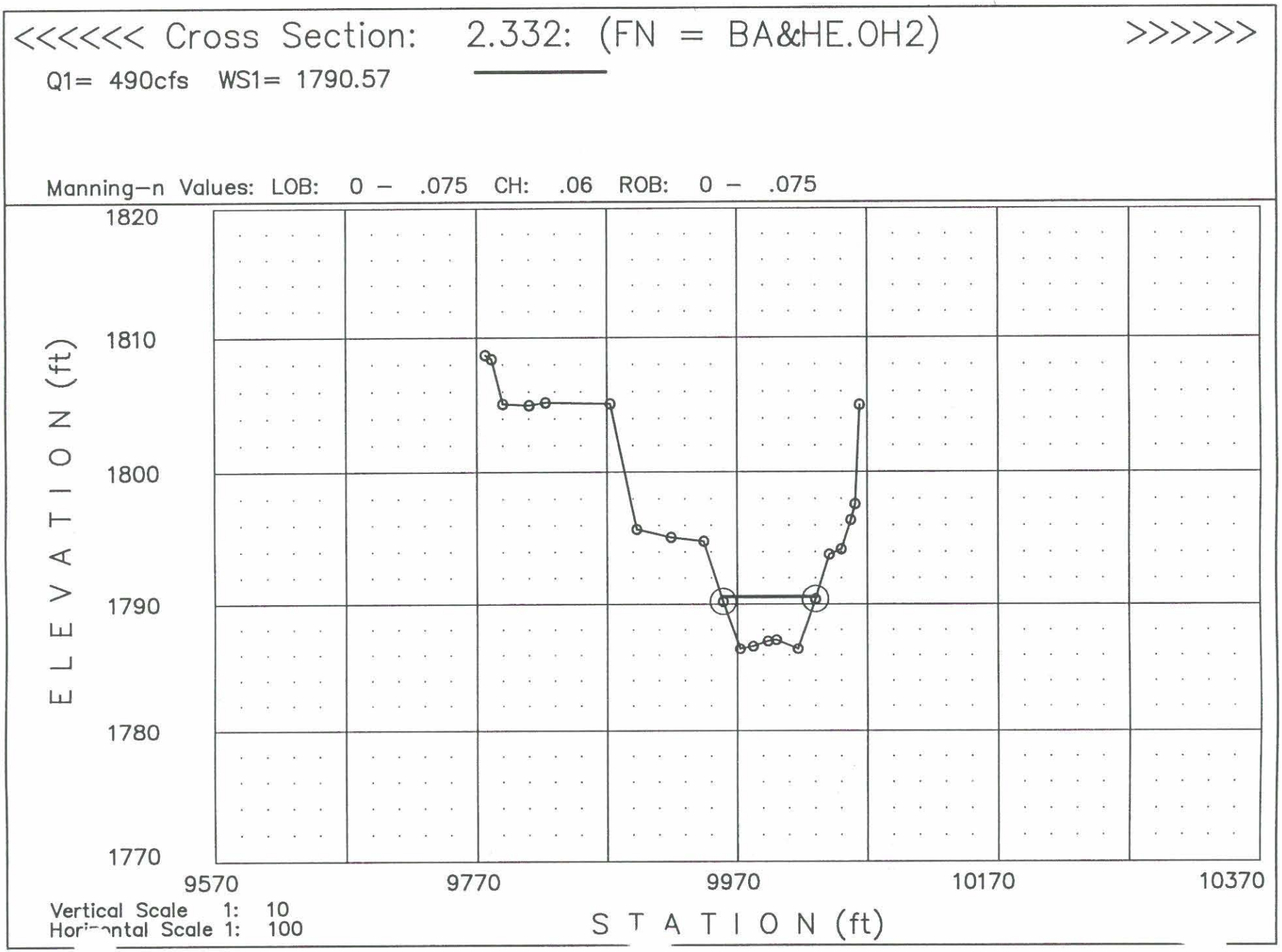
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 2.332: (FN = BA&HE.OH2) >>>>>>
Q1= 490cfs WS1= 1790.57
Manning-n Values: LOB: 0 - .075 CH: .06 ROB: 0 - .075
1820
1810
1800
1790
1780
1770
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
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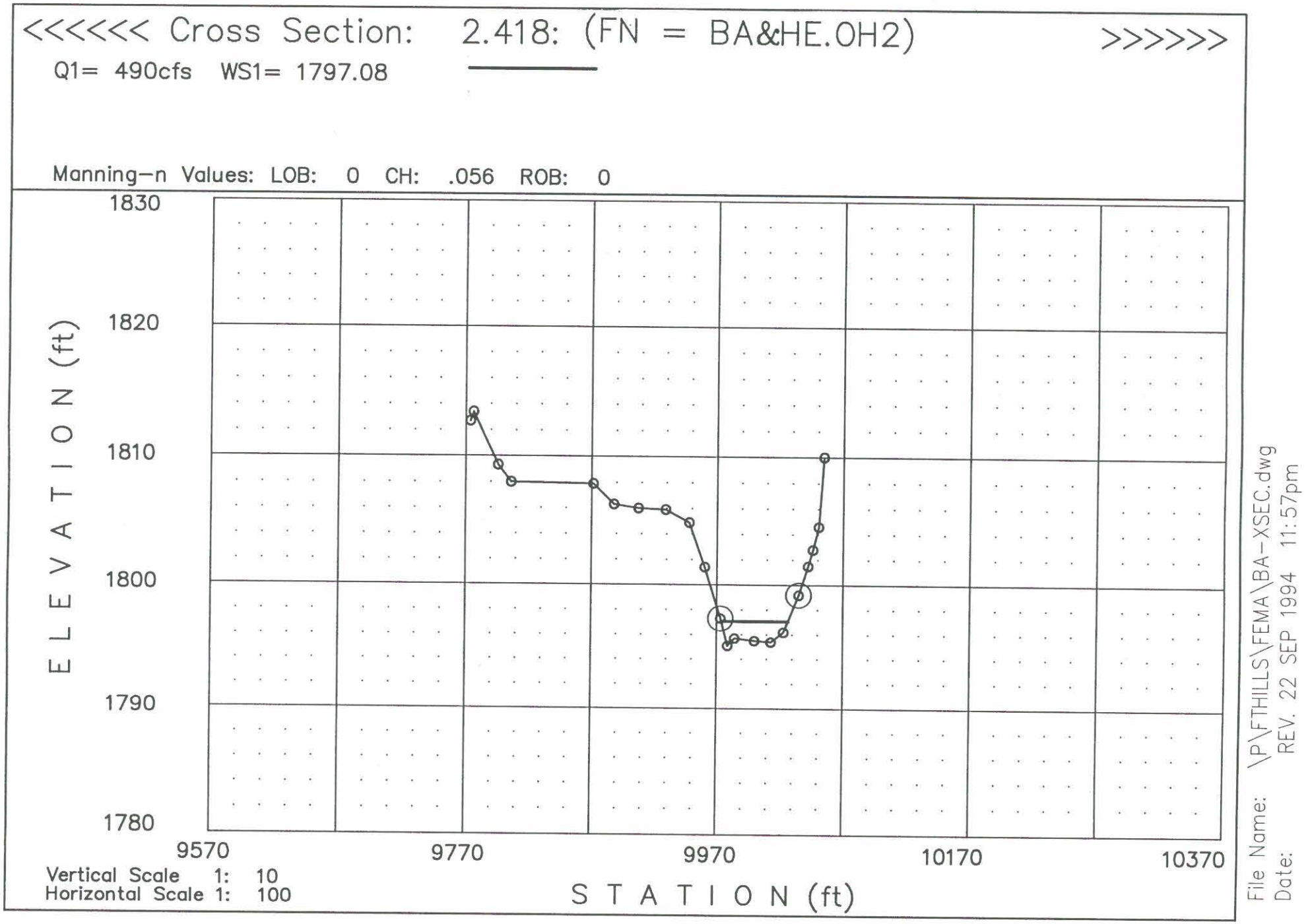
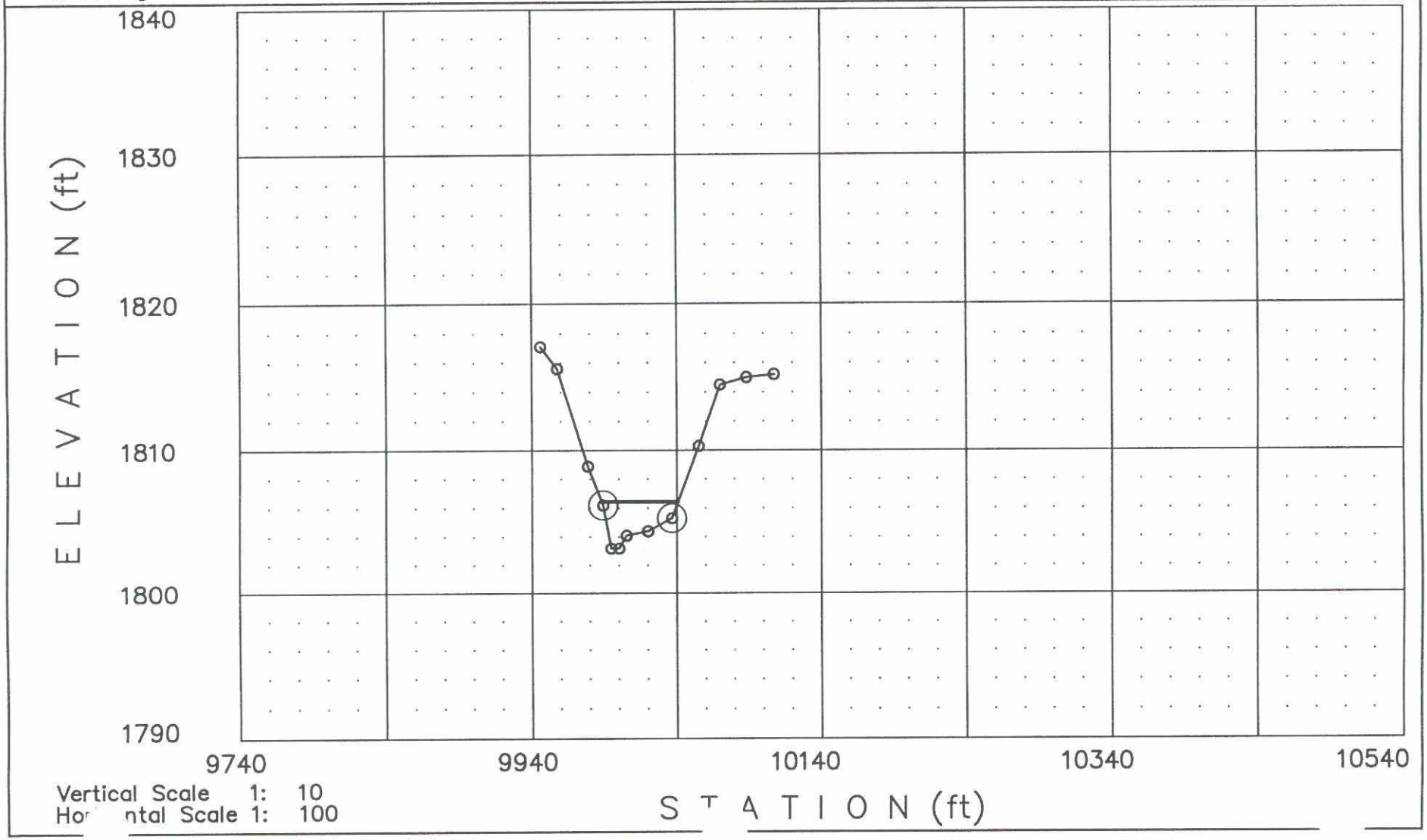

<<<<<< Cross Section: 2.418: (FN = BA&HE.0H2) >>>>>>
Q1= 490cfs WS1= 1797.08
Manning-n Values: LOB: 0 CH: .056 ROB: 0
1830
1820
1810
1800
1790
1780
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 2.493: (FN = BA&HE.OH2) >>>>>>

Q1= 490cfs WS1= 1806.45

Manning-n Values: LOB: .075 CH: .06 ROB: .075



Vertical Scale 1: 10
Horizontal Scale 1: 100

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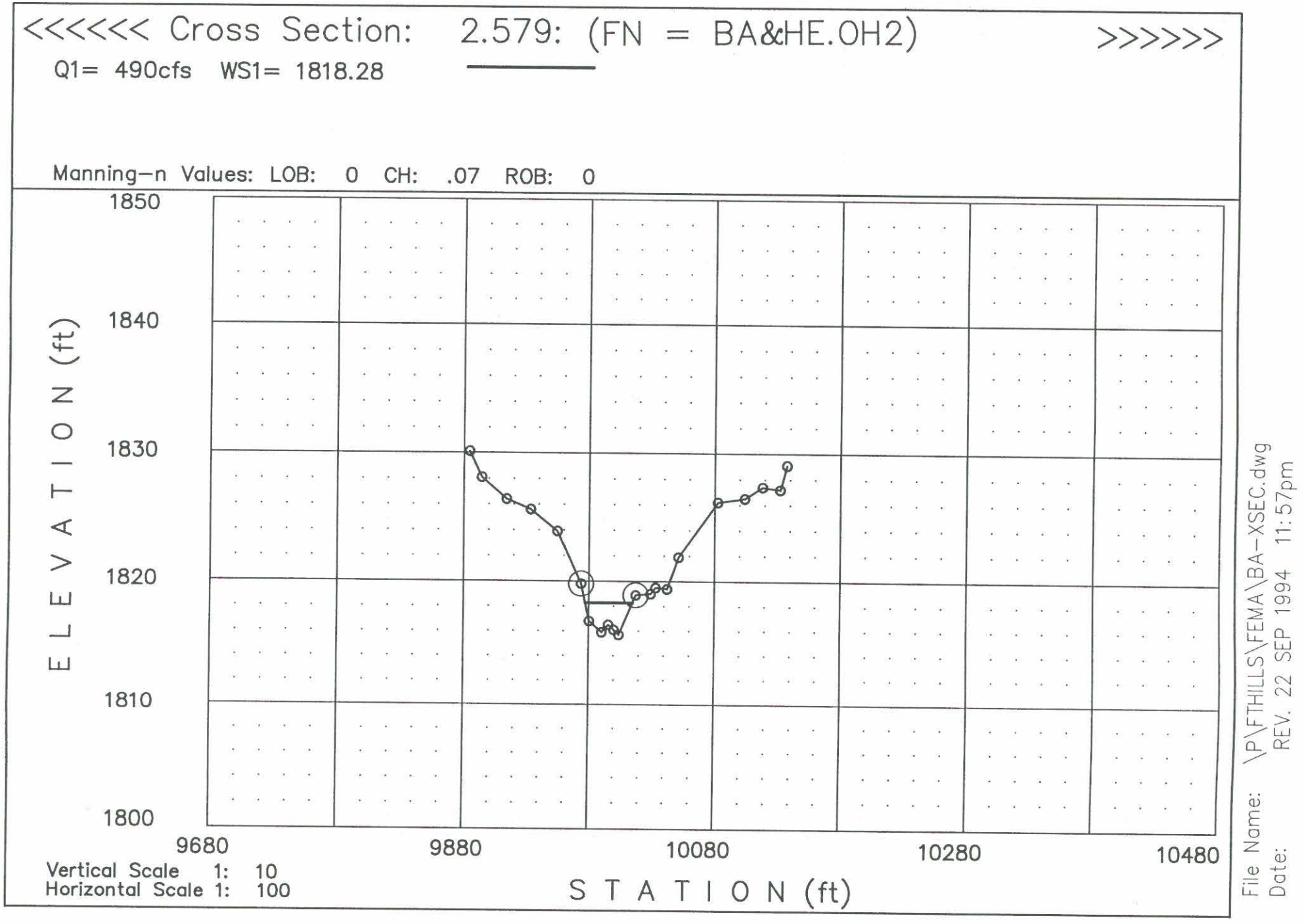
<<<<<< Cross Section: 2.579: (FN = BA&HE.OH2) >>>>>>
Q1= 490cfs WS1= 1818.28
Manning-n Values: LOB: 0 CH: .07 ROB: 0
1850
1840
1830
1820
1810
1800
ELEVATION (ft)
9680
9880
10080
10280
10480
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
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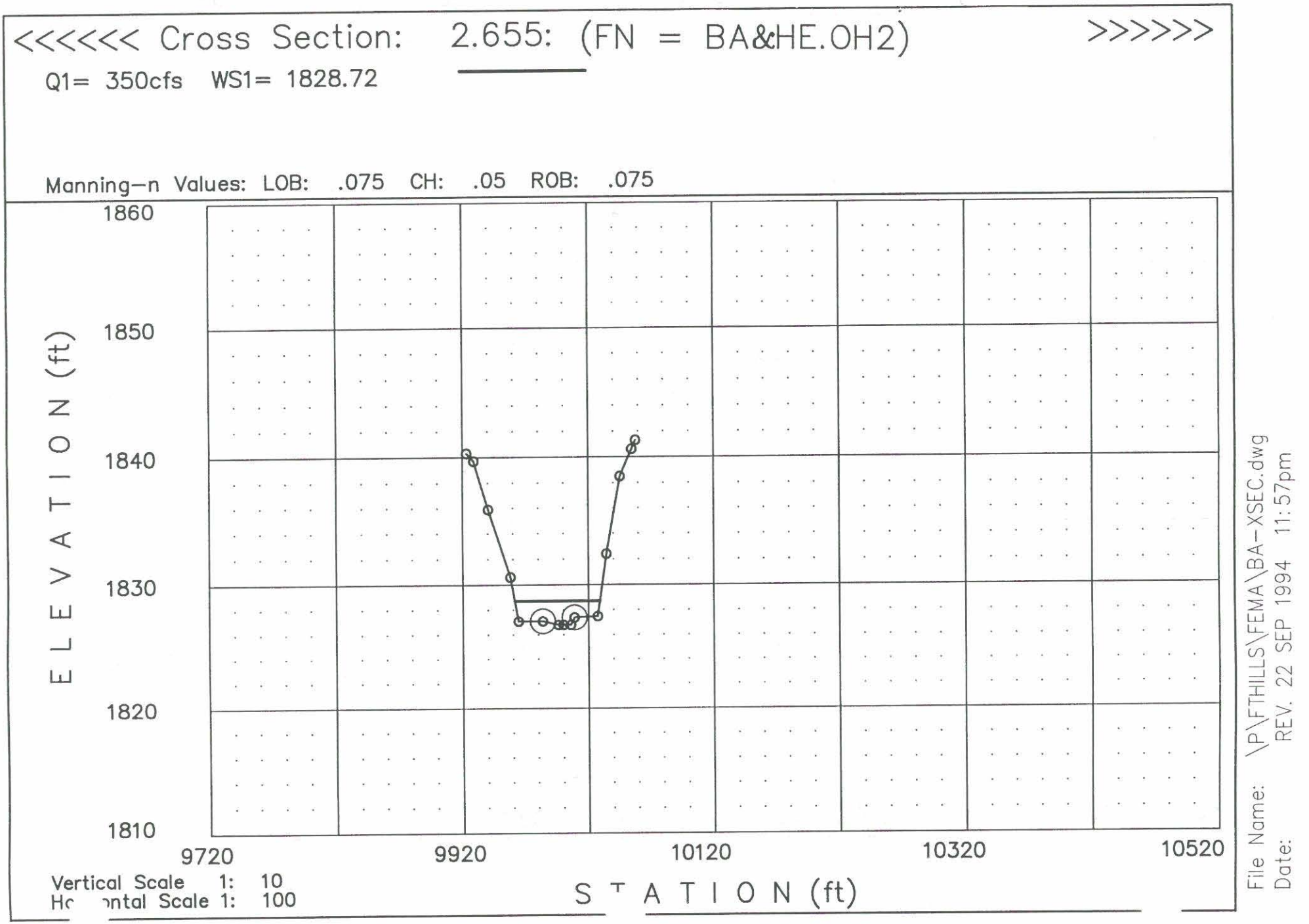
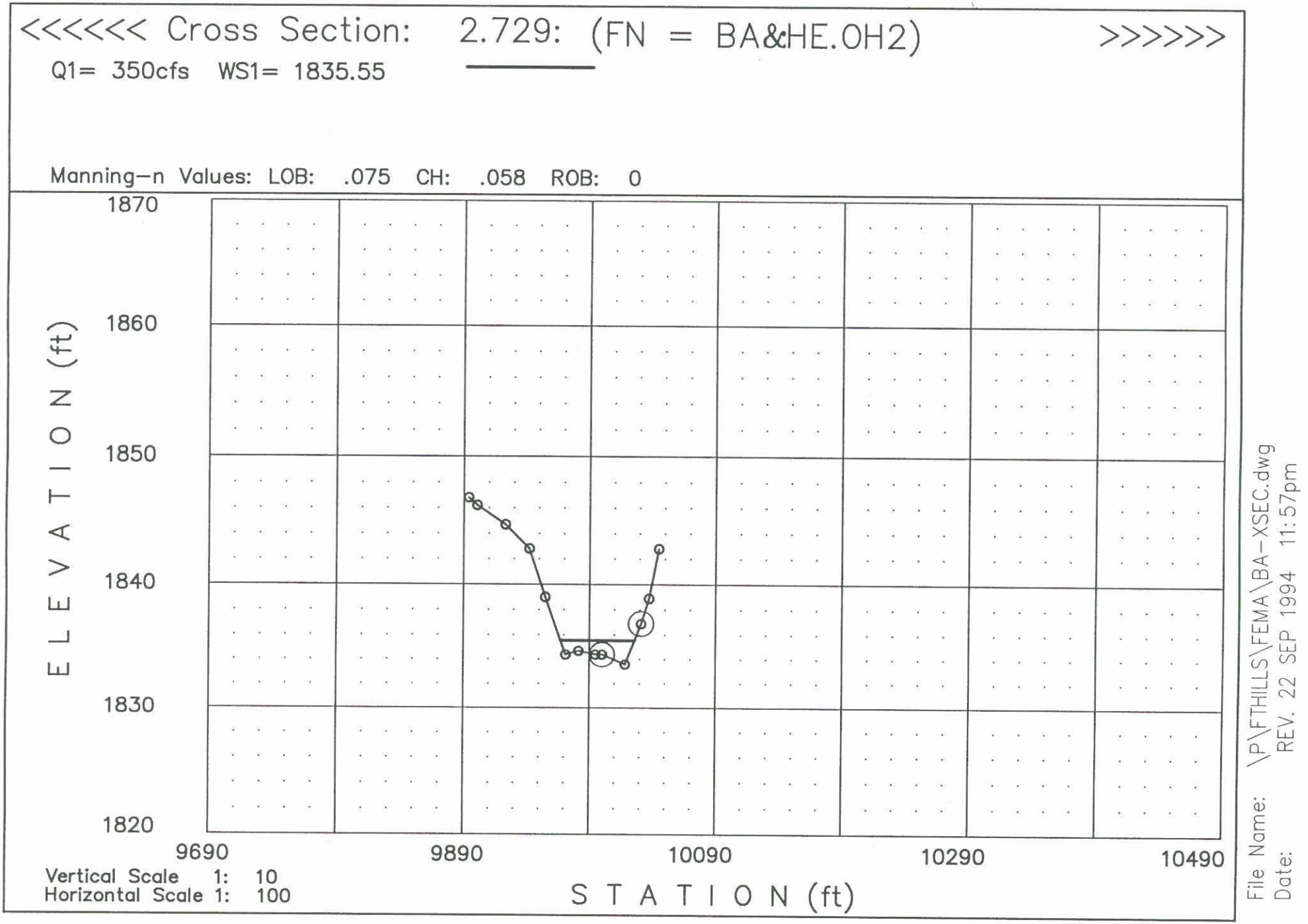

<<<<<< Cross Section: 2.655: (FN = BA&HE.OH2) >>>>>>
Q1= 350cfs WS1= 1828.72
Manning-n Values: LOB: .075 CH: .05 ROB: .075
1860
1850
1840
1830
1820
1810
ELEVATION (ft)
9720
9920
10120
10320
10520
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 2.729: (FN = BA&HE.OH2) >>>>>>
Q1= 350cfs WS1= 1835.55
Manning-n Values: LOB: .075 CH: .058 ROB: 0
1870
1860
1850
1840
1830
1820
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 10
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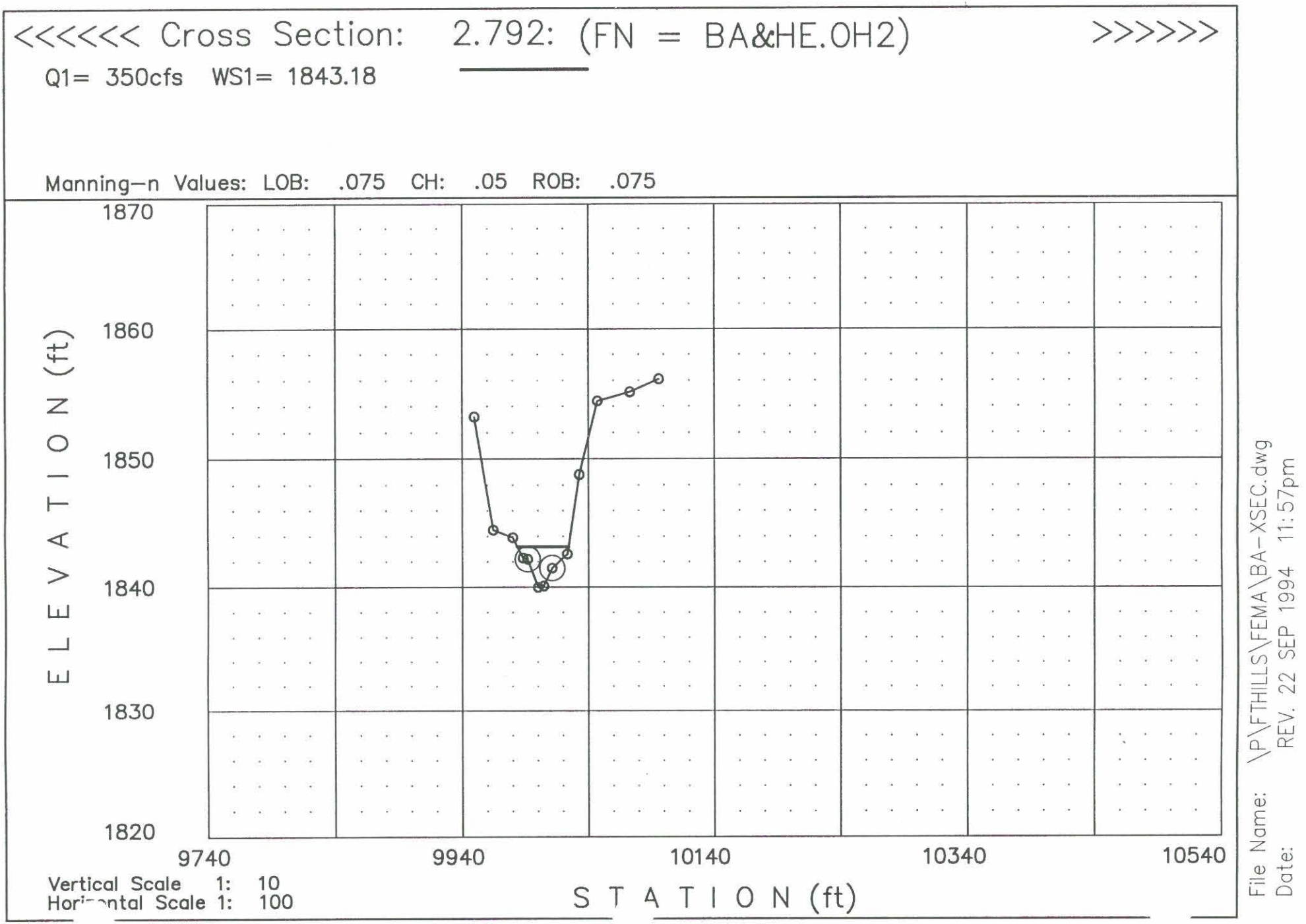
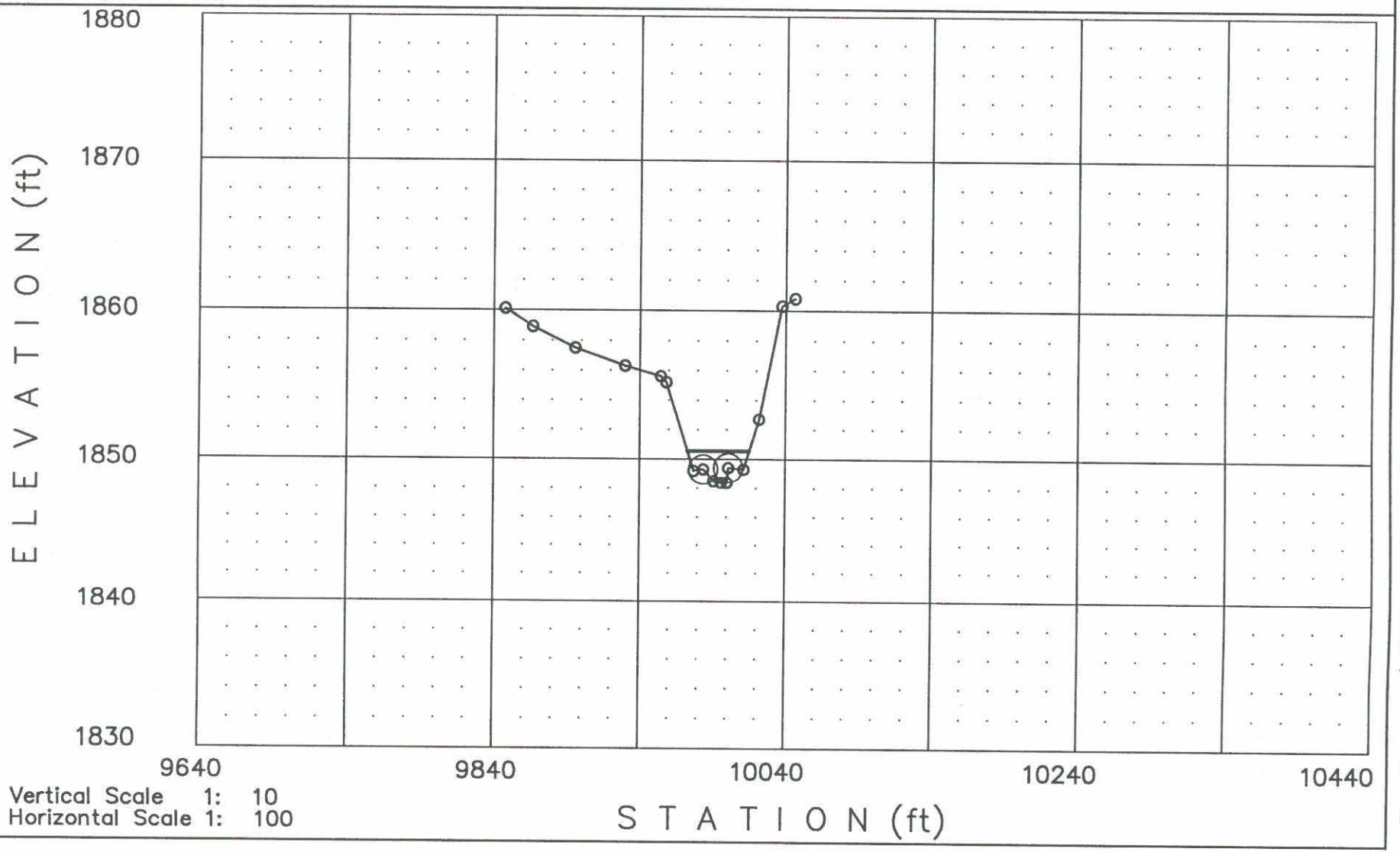
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 2.792: (FN = BA&HE.OH2) >>>>>>
Q1= 350cfs WS1= 1843.18
Manning-n Values: LOB: .075 CH: .05 ROB: .075
1870
1860
1850
1840
1830
1820
ELEVATION (ft)
9740
9940
10140
10340
10540
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 2.849: (FN = BA&HE.OH2) >>>>>>

Q1= 350cfs WS1= 1850.56

Manning–n Values: LOB: .075 CH: .05 ROB: .075



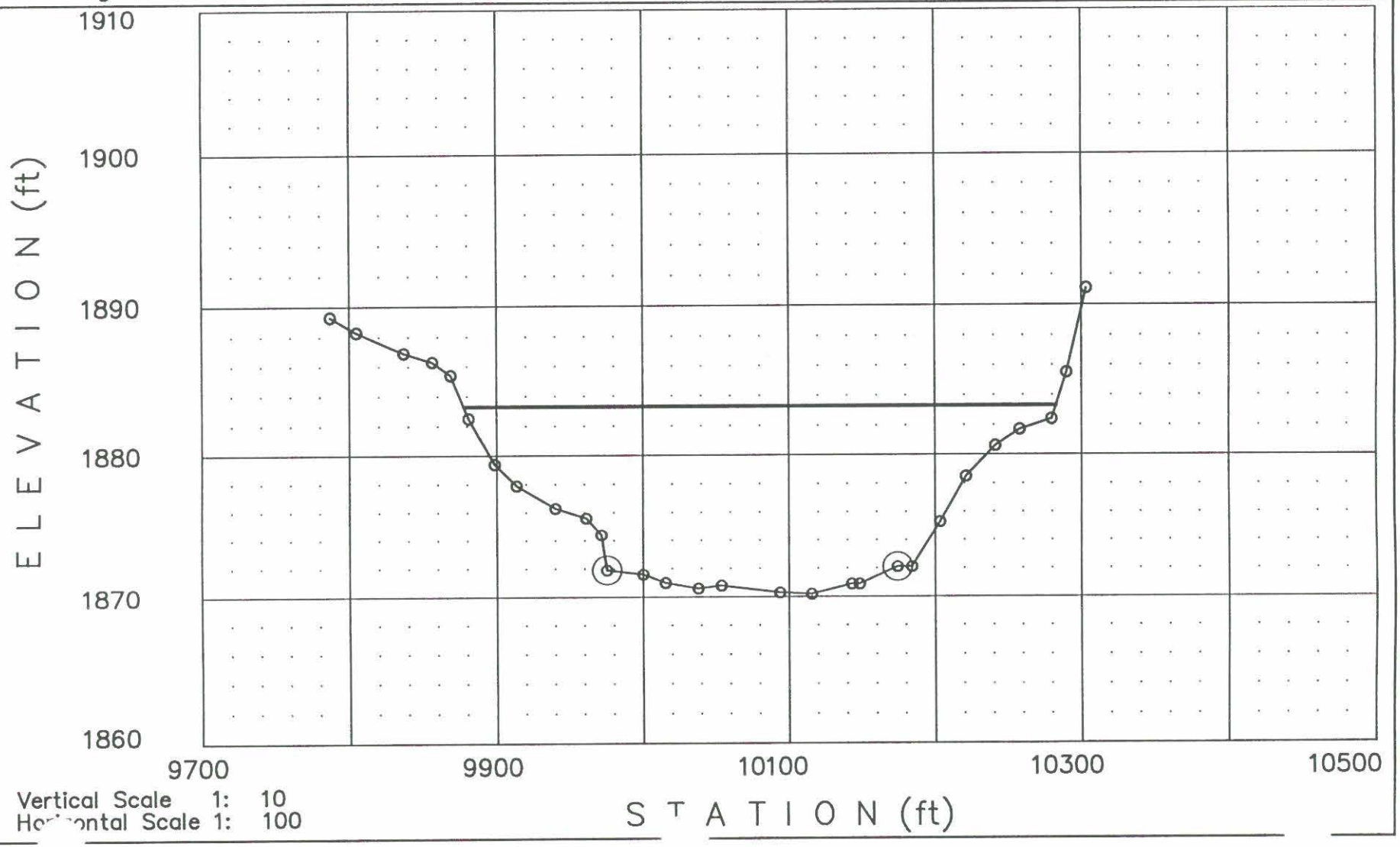
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

<<<<<< Cross Section: 3.03: (FN = BA&HE.OH2) >>>>>>

Q1= 2590cfs WS1= 1883.3

Manning-n Values: LOB: .075 CH: .068 ROB: .075



Vertical Scale 1: 10
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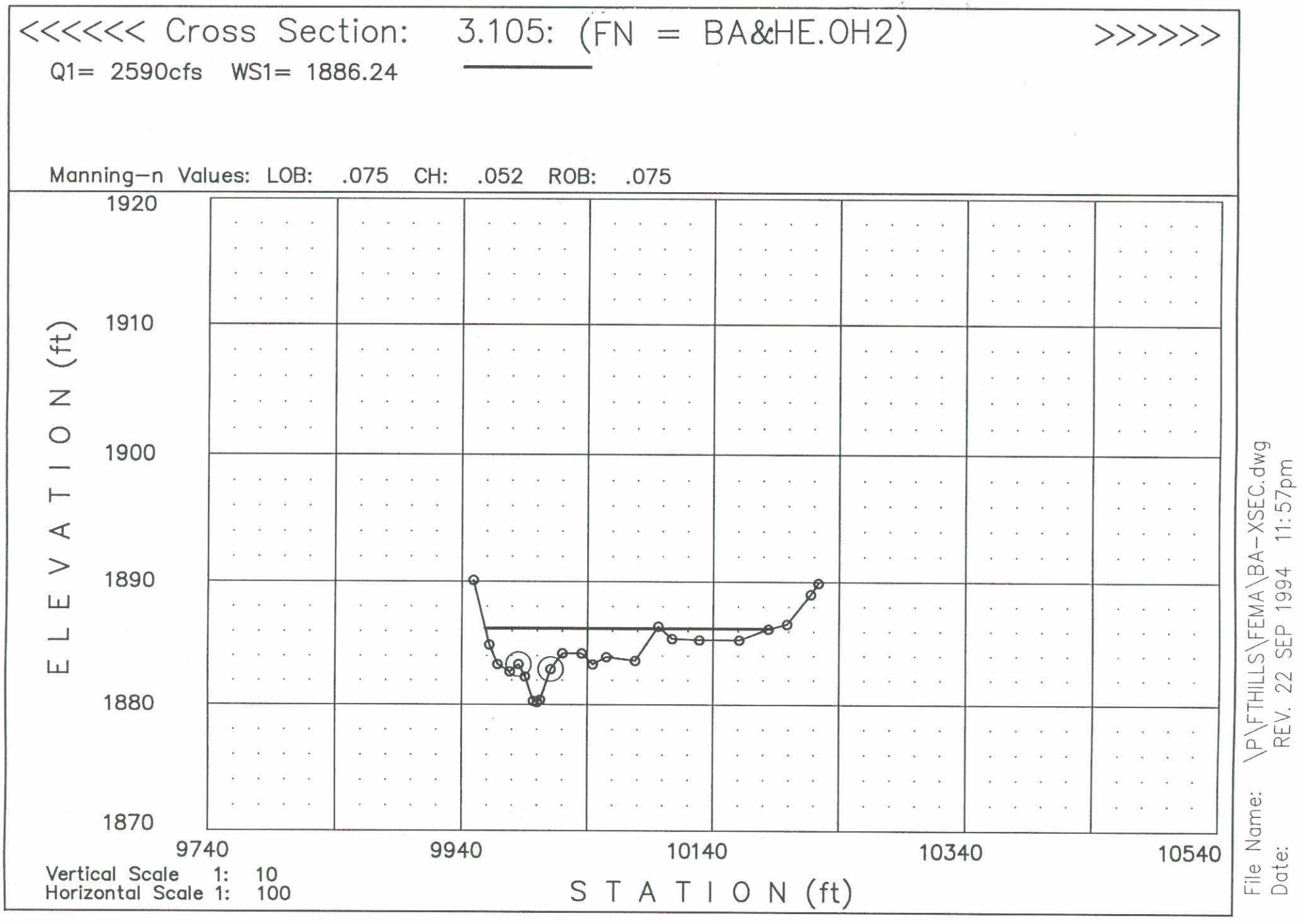
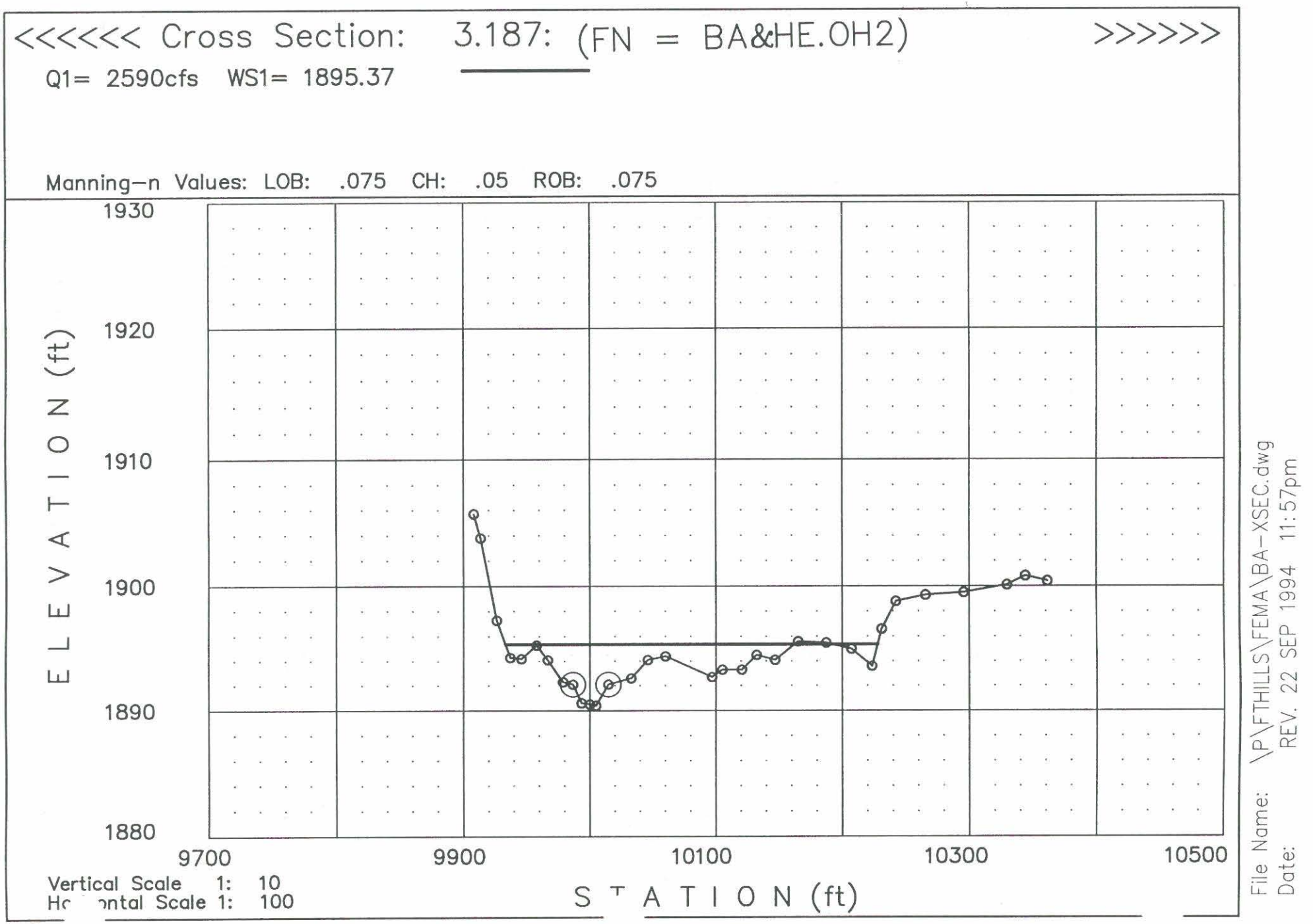
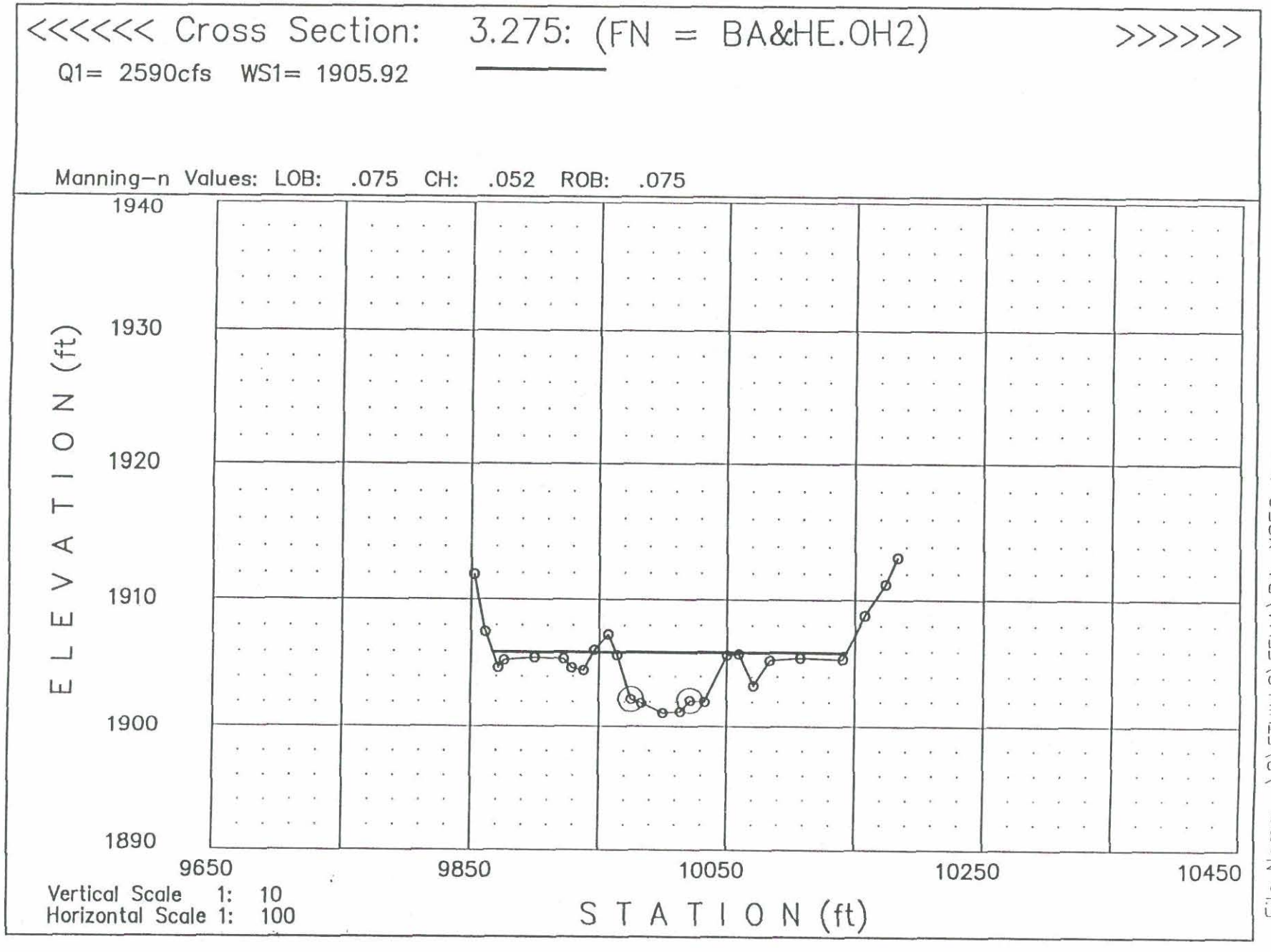
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 3.105: (FN = BA&HE.OH2) >>>>>>
Q1= 2590cfs WS1= 1886.24
Manning-n Values: LOB: .075 CH: .052 ROB: .075
1920
1910
1900
1890
1880
1870
ELEVATION (ft)
9740
9940
10140
10340
10540
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 3.187: (FN = BA&HE.OH2) >>>>>>
Q1= 2590cfs WS1= 1895.37
Manning-n Values: LOB: .075 CH: .05 ROB: .075
1930
1920
1910
1900
1890
1880
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm


<<<<<< Cross Section: 3.275: (FN = BA&HE.OH2) >>>>>>
Q1= 2590cfs WS1= 1905.92
Manning-n Values: LOB: .075 CH: .052 ROB: .075
1940
1930
1920
1910
1900
1890
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
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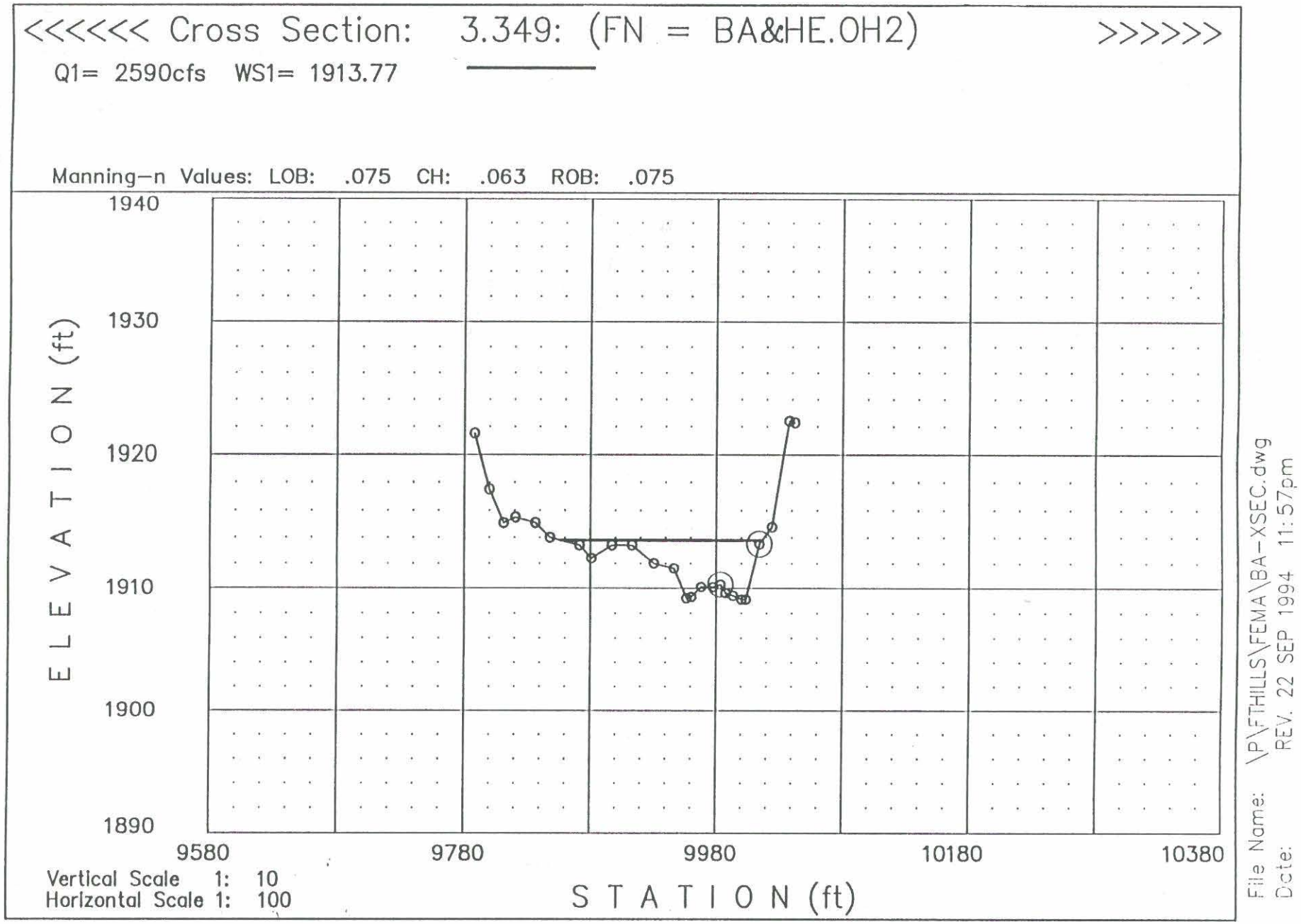
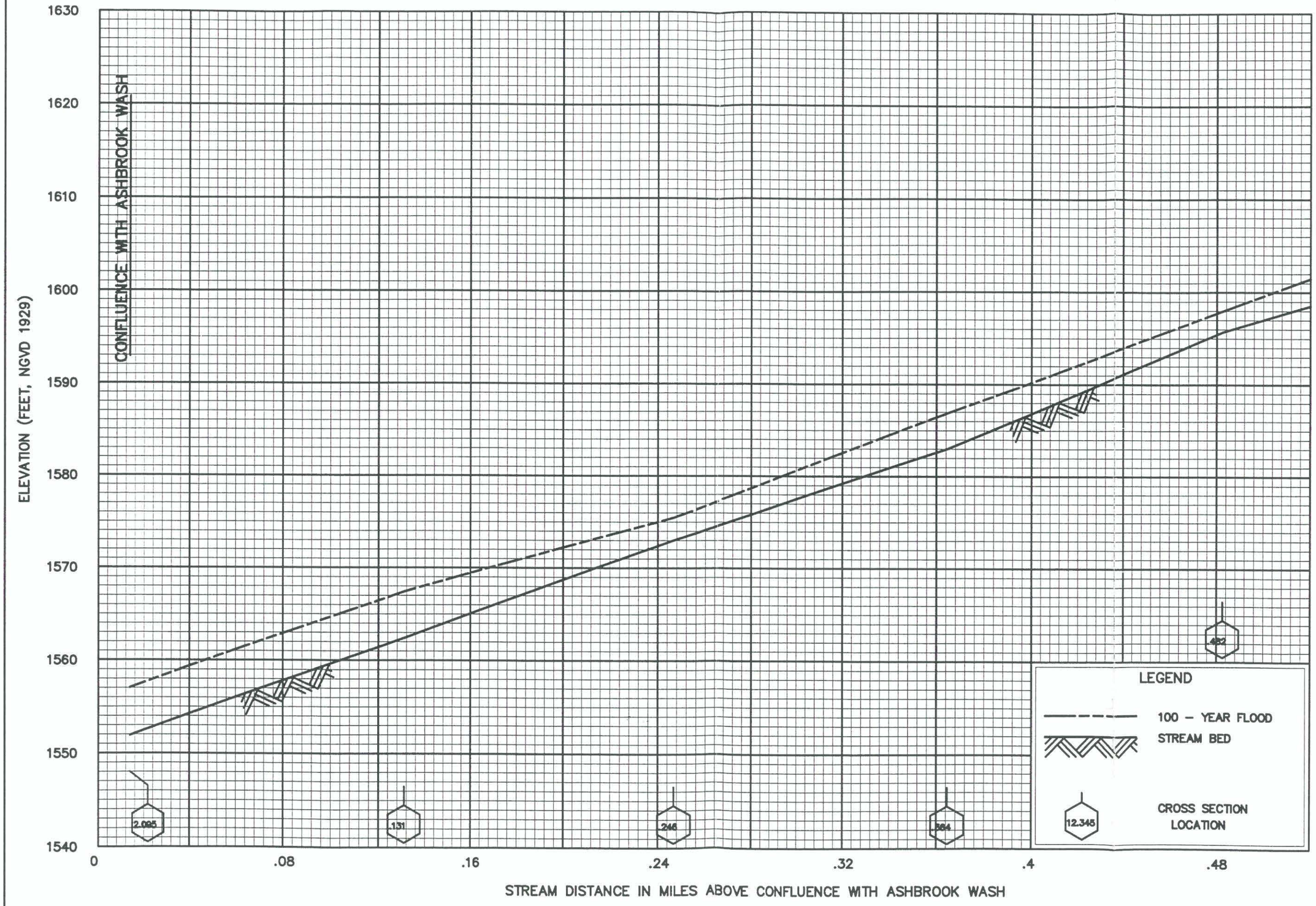

<<<<<< Cross Section: 3.349: (FN = BA&HE.OH2) >>>>>>
Q1= 2590cfs WS1= 1913.77
Manning-n Values: LOB: .075 CH: .063 ROB: .075
1940
1930
1920
1910
1900
1890
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\BA-XSEC.dwg
Date: REV. 22 SEP 1994 11:57pm

FLOOD PROFILES



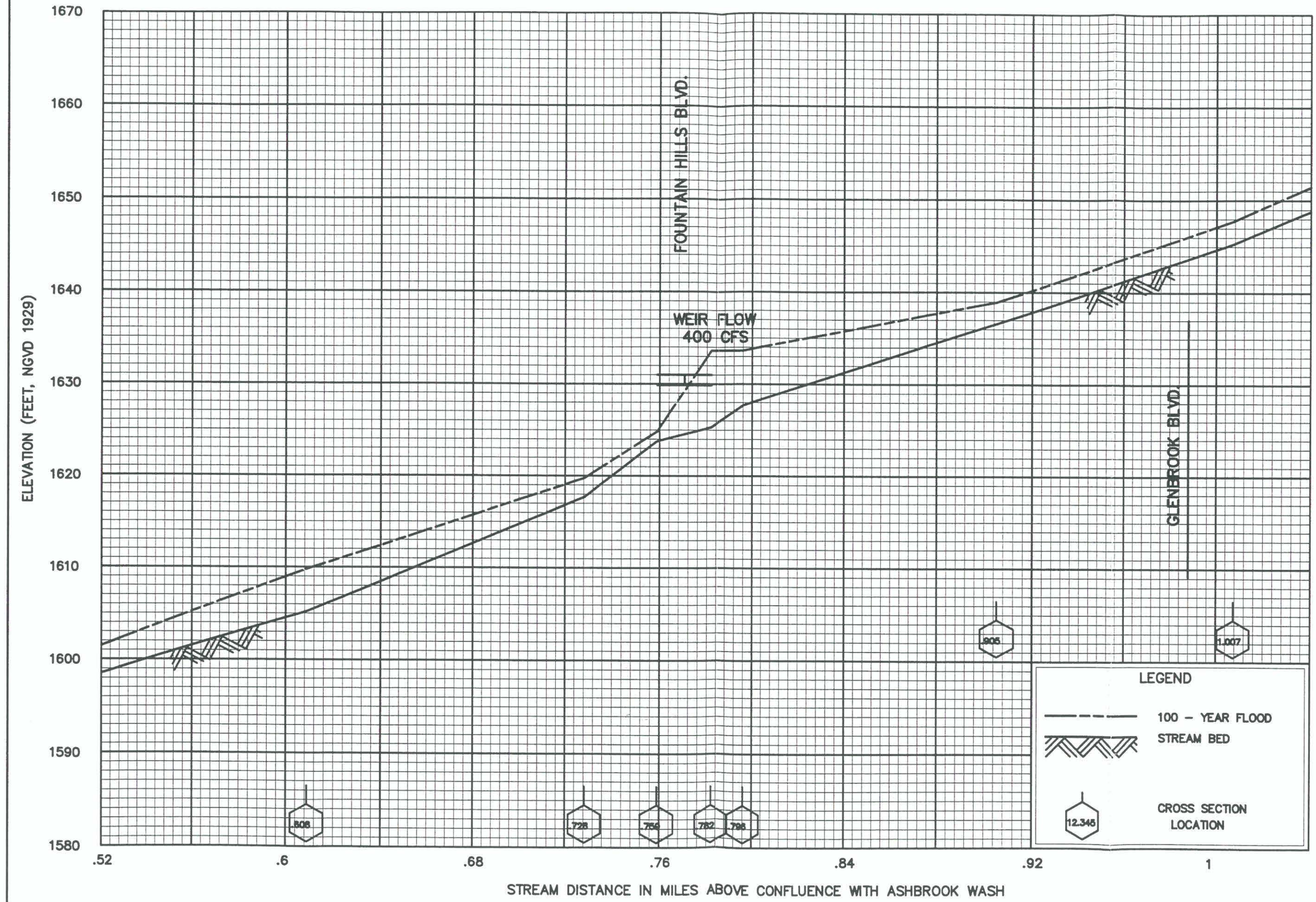
FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 1 of 7)
Date: REV. 27 SEP 1994 10:35am

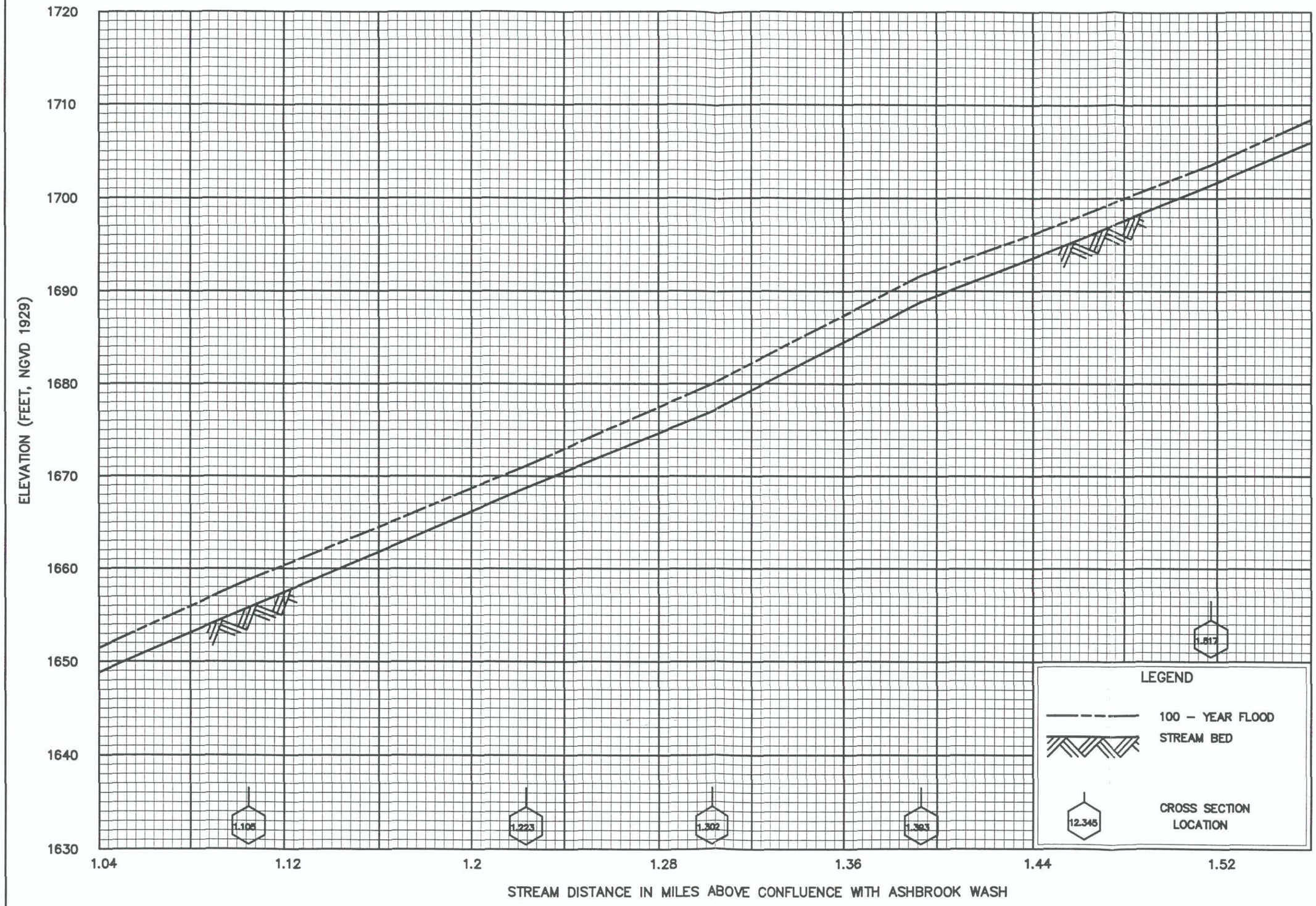


FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 2 of 7)
Date: REV. 27 SEP 1994 10:35am



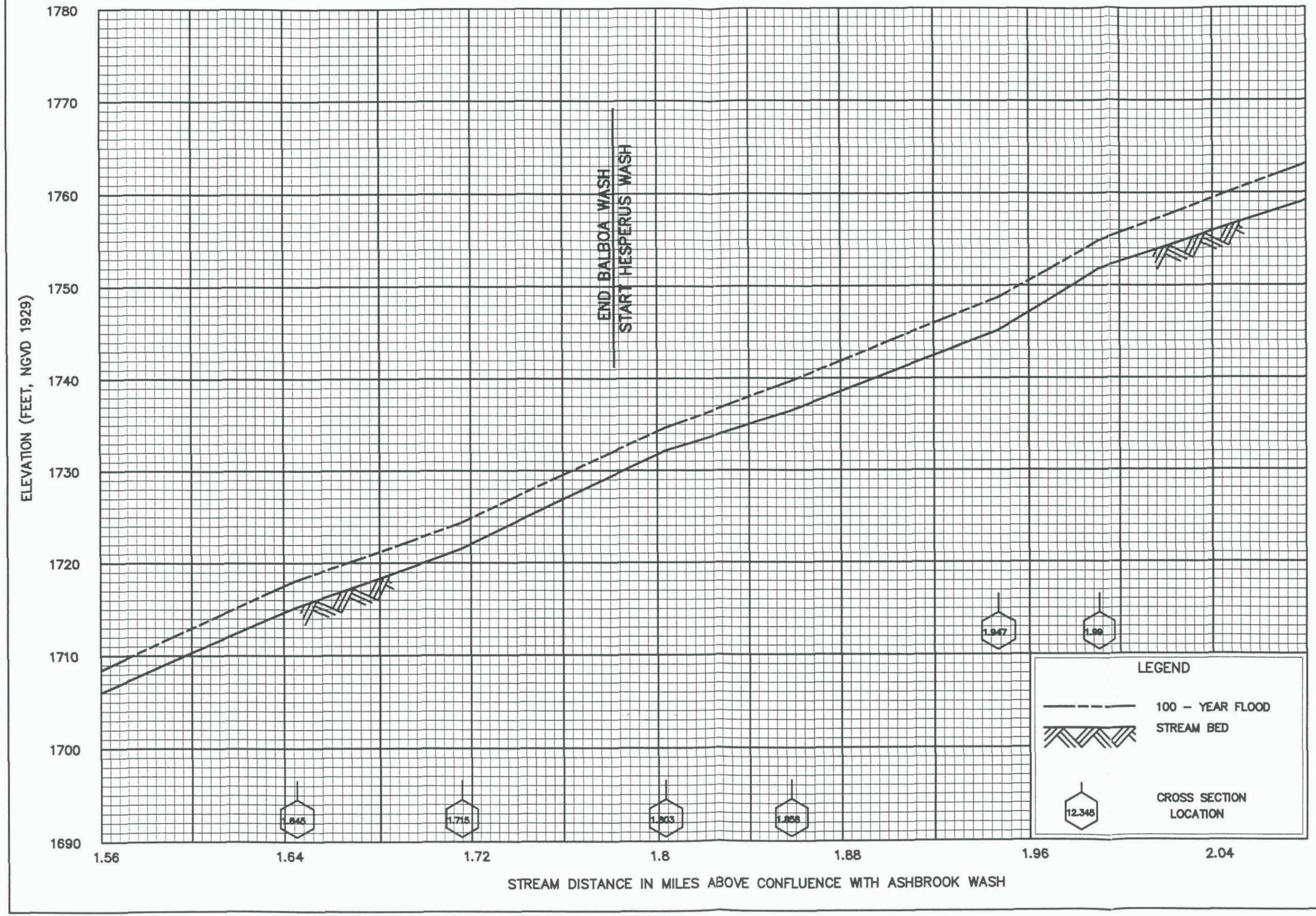
FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 3 of 7)
Date: REV. 27 SEP 1994 10:35am



FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 4 of 7)
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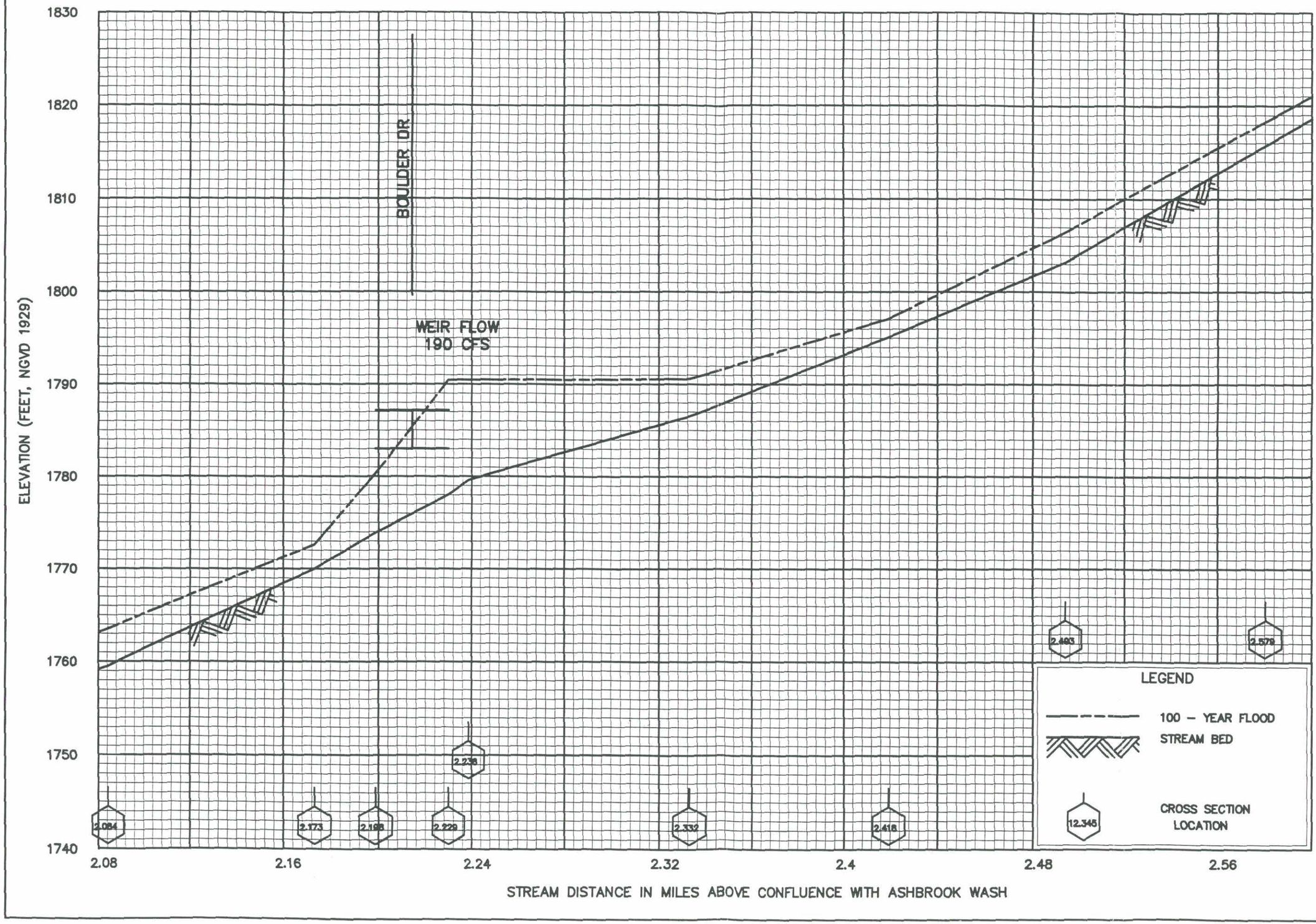

FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 5 of 7)
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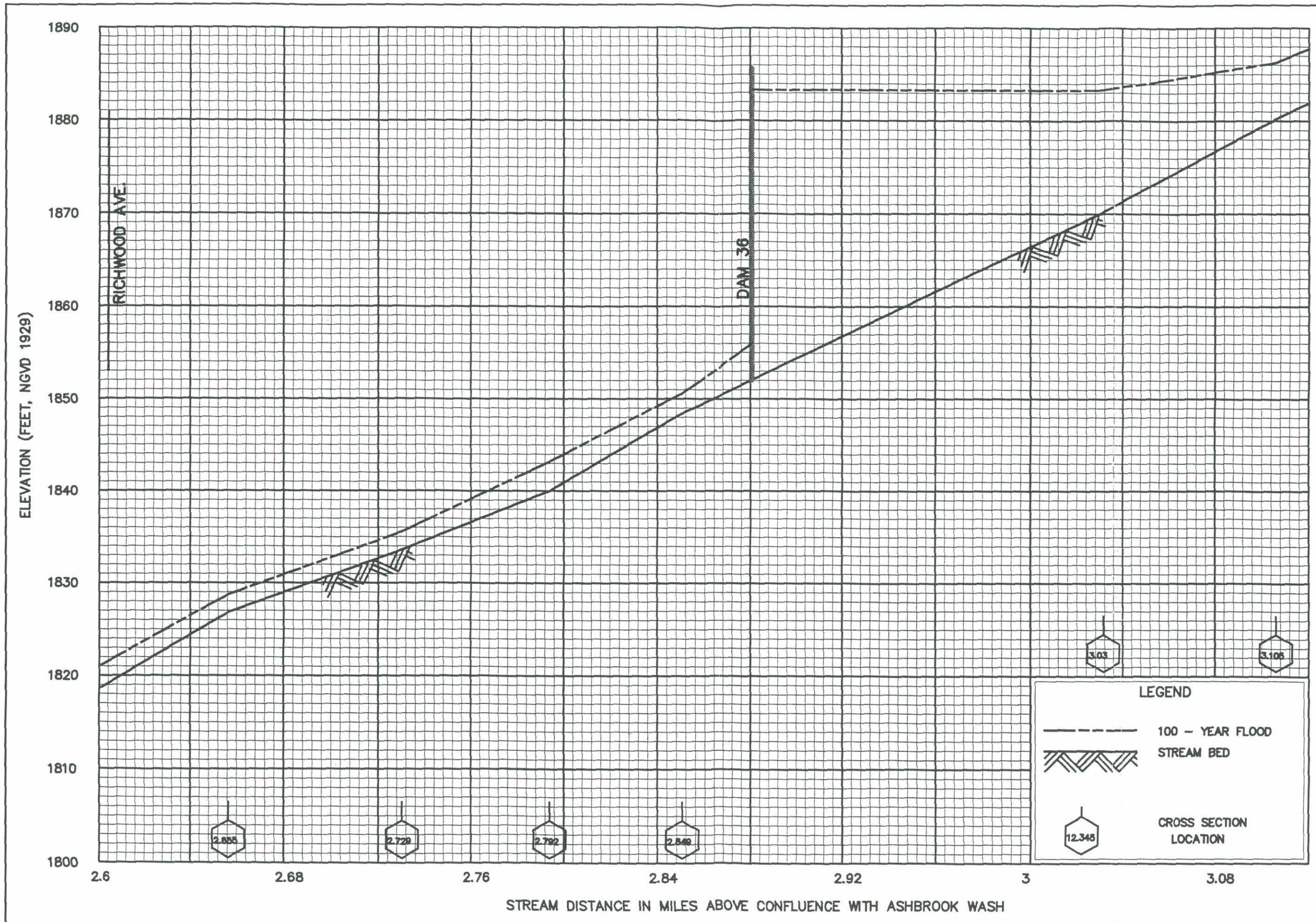
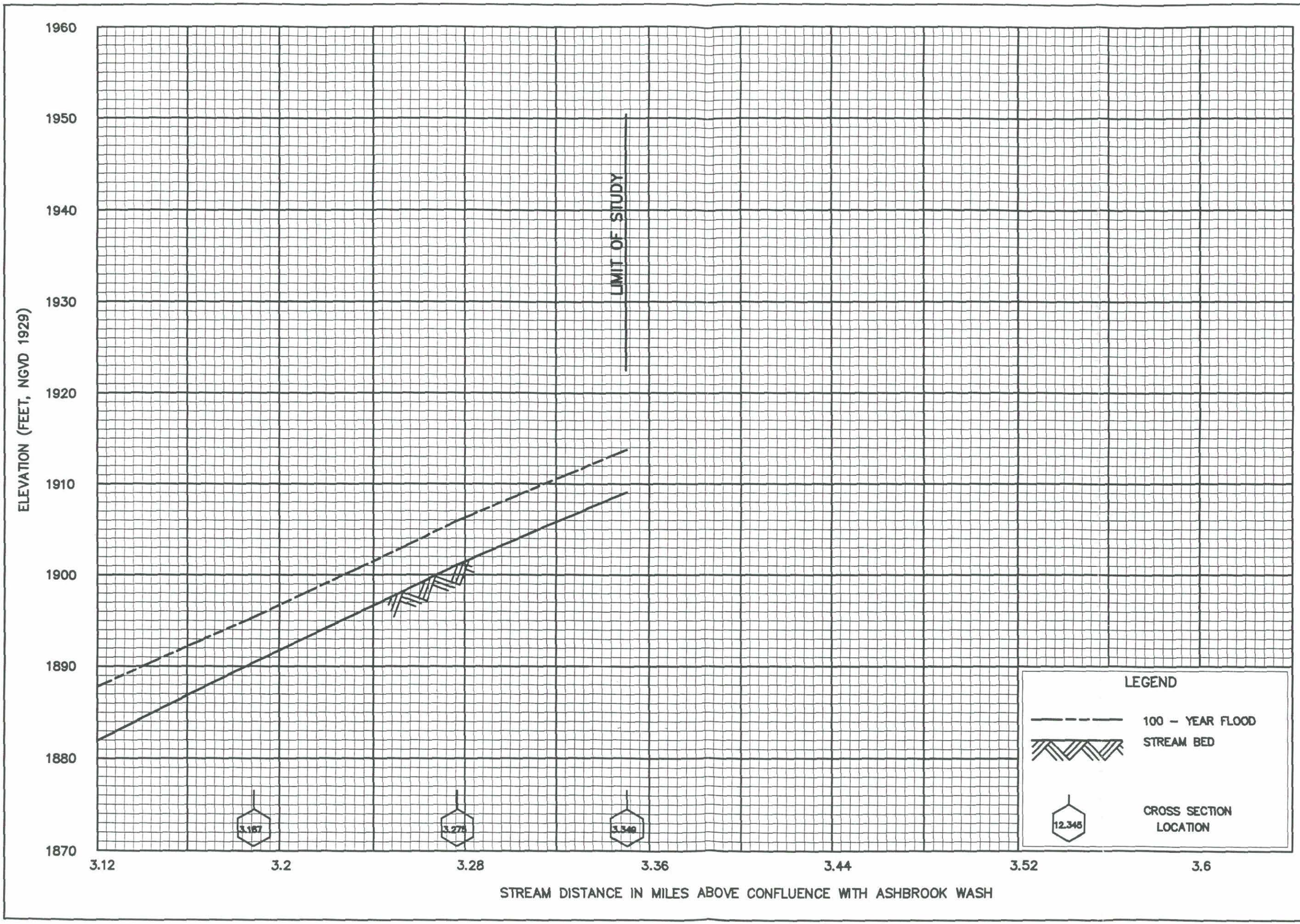


FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 6 of 7)
Date: REV. 27 SEP 1994 10:35am



FLOOD PROFILES

BALBOA / HESPERUS WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\BA-PROF.dwg (sheet 7 of 7)
Date: REV. 27 SEP 1994 10:35am

CALIENTE WASH

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    29MAR95    TIME   14:51:53 *
 *****************************************
```

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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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1
    29MAR95       14:51:53                                                    PAGE    1


                                                                THIS RUN EXECUTED 29MAR95    14:51:53

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

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


T1   *  Fountain Hills North FIS                          File:        CA.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35        DTP & FB   05-31-94
T3   *   Caliente Wash 100-Year Floodplain.             Revised:   03-29-95
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0         2          0          0     0.0182          0          0          0     1522.6

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

       1         0         -1          0          0          0         -1          0          0          0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150        101        110        115        200

        HEC-1 Concentration Point C527

QT         2        670        670

       START Hydraulically Similar Reach    CA 1
             See Exhibit 1, Manning's n Value Map.
NC      .065       .065       .07        0.1        0.3

  Section 1.026 is section 1 of 3 for Normal Depth Calculation
ET                            9.1                                                    9954.20    10011.65
1
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             STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
          HEC-1 Concentration Point C527:  6-hr storm controls.
          START Hydraulically Similar Reach CA 1
             See Exhibit 1, Manning's n Value Map.
             Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1    1.026         21     9990.2    10004.2           0          0          0                -0.55
```

```
GR   1530.3     9782.3     1528.5     9803.3     1527.5     9827.9     1525.8     9859.4     1526.4     9880.6
GR   1525.4     9900.3     1524.5     9917.1     1524.6     9935.4     1523.6     9948.9     1521.4     9974.8
GR   1520.6     9984.9     1519.6     9990.2     1519.0    10000.0     1520.3    10004.2     1525.2    10017.0
GR   1526.8    10026.0     1527.7    10042.4     1528.1    10068.2     1528.8    10077.6     1529.6    10096.9
GR   1530.0    10110.0

  Section 1.028 is section 2 of 3 for Normal Depth Calculation

ET                              9.1                                                             9954.25    10011.63
                Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1   1.028        21     9990.2     10004.2         10         10         10                    -0.36
GR   1530.3     9782.3     1528.5     9803.3     1527.5     9827.9     1525.8     9859.4     1526.4     9880.6
GR   1525.4     9900.3     1524.5     9917.1     1524.6     9935.4     1523.6     9948.9     1521.4     9974.8
GR   1520.6     9984.9     1519.6     9990.2     1519.0    10000.0     1520.3    10004.2     1525.2    10017.0
GR   1526.8    10026.0     1527.7    10042.4     1528.1    10068.2     1528.8    10077.6     1529.6    10096.9
GR   1530.0    10110.0

  Section 1.030 is section 3 of 3 for Normal Depth Calculation

ET                              9.1                                                             9954.20    10011.65
                Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1   1.030        21     9990.2     10004.2         10         10         10                    -0.18
GR   1530.3     9782.3     1528.5     9803.3     1527.5     9827.9     1525.8     9859.4     1526.4     9880.6
GR   1525.4     9900.3     1524.5     9917.1     1524.6     9935.4     1523.6     9948.9     1521.4     9974.8
GR   1520.6     9984.9     1519.6     9990.2     1519.0    10000.0     1520.3    10004.2     1525.2    10017.0
GR   1526.8    10026.0     1527.7    10042.4     1528.1    10068.2     1528.8    10077.6     1529.6    10096.9
GR   1530.0    10110.0


NH       3        .065     9990.2         .07     10004.2         .065     10110
ET                              9.1                                                             9954.09    10011.67
X1   1.032        21     9990.2     10004.2         10         10         10
GR   1530.3     9782.3     1528.5     9803.3     1527.5     9827.9     1525.8     9859.4     1526.4     9880.6
GR   1525.4     9900.3     1524.5     9917.1     1524.6     9935.4     1523.6     9948.9     1521.4     9974.8
GR   1520.6     9984.9     1519.6     9990.2     1519.0    10000.0     1520.3    10004.2     1525.2    10017.0
GR   1526.8    10026.0     1527.7    10042.4     1528.1    10068.2     1528.8    10077.6     1529.6    10096.9
GR   1530.0    10110.0


NH       3        .065     9977.0         .07     10004.3         .065     10141.9
ET                              9.1                                                             9976.99    10025.92
                Left overbank is non effective flow area:  Hard coded GR's
                          for STA 9954.7 @ EL 1525.5
X1   1.054        20     9977.0     10023.6         110         115         112.6
GR   1532.8     9778.9     1530.7     9806.5     1529.0     9814.2     1528.2     9837.7     1528.3     9869.3
GR   1528.2     9897.3     1527.7     9931.1     1526.5     9939.2     1525.5     9954.7     1525.5     9977.0
GR   1519.9    10000.0     1521.4    10004.3     1524.8    10023.6     1528.8    10043.5     1530.3    10062.4
GR   1531.7    10078.7     1532.7    10096.2     1533.1    10112.1     1532.2    10133.5     1531.8    10141.9
1
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        START Hydraulically Similar Reach    CA 2
                See Exhibit 1, Manning's n Value Map.

   ********************************************************************************
   **************************    Culvert  527     *********************************
   ********************************************************************************


NH       3         .05       10000         .035     10018.5           .06     10126.3
ET                              9.1                                                             9932.95    10035.94
            START Hydraulically Similar Reach CA 2
                  See Exhibit 1, Manning's n Value Map.
            CULVERT 527 :  CALIENTE WASH and DIRT ROAD next to Reservation
               Culvert 527      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1   1.083        21       10000     10018.5         165         150         158.1
GR   1531.4     9854.5     1530.6     9869.6     1529.9     9883.6     1528.3     9905.4     1528.2     9923.0
GR   1527.4     9937.4     1526.7     9970.3     1525.4     9979.4     1525.9    10000.0     1525.7    10005.8
GR   1525.4    10009.6     1526.2    10018.5     1525.8    10029.4     1527.6    10035.8     1532.7    10051.0
GR   1533.2    10070.5     1534.1    10084.4     1534.4    10098.4     1534.4    10099.9     1534.2    10117.6
GR   1533.7    10126.3

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                        0.3        0.5
NH       3       0.050     10004.5        0.035    10022.6          0.060     10107.7
ET                              9.1                                                             9996.46    10044.48
               Culvert 527  Outlet.   1-42" CMP            (SECTION 2 OF SC ROUTINE)
                 Photogrammetric xsec. located 4.1' Downstream. (No Elev. Adjust.)
                  Base Channel Elevations were lowered to Culvert Invert EL 1526.10
X1   1.093        16       10011       10016         55          60          50.6
X3      10                                                                              1528.19    1528.19
X4       2    1526.10       10011     1526.10      10016
GR   1536.0     9807.7     1535.3     9842.7     1534.2     9869.5     1533.2     9899.6     1531.9     9921.3
GR   1531.4     9952.4     1530.6     9991.9     1528.4    10000.0     1527.0    10004.5     1527.0    10022.6
GR   1528.4    10038.3     1531.5    10058.2     1534.9    10072.1     1536.1    10081.9     1536.7    10105.7
GR   1536.3    10107.7
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SC    1.022        0.9        2.63          0         3.5          0          25         2.3     1527.08     1526.10

NH        3      0.050      9975.7      0.035       10000      0.060     10094.4

ET                             9.1                                                                9931.17     10057.99
                Culvert 527   Inlet.   1-42"     CMP       (SECTION 3 OF SC ROUTINE)
                   Base Channel Elevations were lowered to Culvert Invert EL 1527.08
                Culvert 527 BT information Surveyed by ALS @ CL of Dirt Road.
1
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                Culvert 527 BT left side   coded per figure 3.16 (HEC-2, Sept 90)
X1    1.098          15      9986.5      9990.5          25         25         25.0
X2                    2     1530.58     1530.64
X3       10                                                                  1530.34     1530.34
X4        1     1530.34     9984.04

BT      -10      9830.7      1537.1                 9851.7      1536.7                  9882.3      1534.8
BT               9922.9      1532.9                 9948.0      1531.4                  9975.7      1530.4
BT               9984.04     1530.34                 10000      1531.0                   10050      1532.1
BT                10090      1537.5

GR    1537.1     9830.7      1536.7      9851.7      1534.8      9882.3      1532.9      9922.9      1531.4      9948.0
GR    1530.4     9975.7     1527.08      9986.5     1527.08     9988.5     1527.08      9990.5      1530.3      10000.0
GR    1531.0    10011.6      1531.8     10037.4      1532.5     10061.2      1536.3     10076.4      1537.6     10094.4

          Return  Contraction and Expansion coefficients to Normal

NC                                          0.1         0.3

NH        3        .05      9985.7        .035     10022.3         .06     10074.5
ET                             9.1                                                                9956.82     10046.63
                Culvert 527     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    1.107          14      9976.1     10022.3          50         60         50.2
GR    1536.3     9793.6      1537.0      9801.8      1537.5      9821.2      1537.0      9843.5      1535.8      9864.3
GR    1534.8     9896.2      1533.5      9935.6      1532.5      9962.6      1529.3      9976.1      1528.7      9985.7
GR    1528.5    10000.0      1528.9     10022.3      1532.5     10045.3      1537.2     10074.5


NH        3        .05      9975.6        .035     10006.6         .06     10154.7
ET                             9.1                                                                9968.75     10024.20
X1    1.186          22      9975.6     10006.6          410        415        415.5
GR    1540.2     9793.3      1540.1      9808.3      1542.4      9819.2      1544.9      9831.5      1545.2      9841.7
GR    1545.0     9874.1      1544.7      9902.0      1543.0      9910.4      1541.3      9927.5      1540.0      9937.3
GR    1539.4     9964.1      1536.7      9975.6      1536.4      9985.5      1536.0     10000.0      1536.3     10006.6
GR    1536.3    10017.8      1539.0     10026.4      1539.9     10042.9      1540.9     10080.0      1541.8     10123.8
GR    1541.8    10144.4      1541.7     10154.7


NH        3        .05         9995        .035     10006.2         .06     10151.9
ET                             9.1                                                                9968.93     10020.84
X1    1.311          18      9992.3     10014.3          660        645        658.4
GR    1556.2     9840.5      1556.0      9854.9      1556.5      9906.4      1555.3      9929.9      1552.5      9937.7
GR    1551.4     9965.9      1548.8      9973.5      1548.6      9992.3      1547.7      9995.0      1547.6     10000.0
GR    1547.5    10006.2      1549.1     10014.3      1552.5     10031.9      1553.3     10045.8      1553.8     10084.3
GR    1554.5    10111.4      1554.4     10140.5      1554.3     10151.9


NH        3        .05      9995.3        .035     10005.7         .06     10151.5
ET                             9.1                                                                9971.56     10016.23
X1    1.384          19      9995.3     10010.7          390        390        388.2
GR    1567.6     9815.5      1567.4      9825.8      1567.4      9837.8      1566.4      9860.0      1565.2      9926.5
GR    1564.8     9945.4      1562.6      9959.0      1559.4      9966.1      1555.8      9978.3      1556.0      9995.3
GR    1554.0    10000.0      1553.9     10005.7      1556.2     10010.7      1562.0     10030.9      1562.9     10056.3
GR    1563.9    10091.3      1564.0     10127.5      1563.5     10148.3      1563.2     10151.5
1
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NH        3        .05        10000        .035     10007.4         .06     10197.9
ET                             9.1                                                                9965.17     10026.37
X1    1.480          27      9970.5     10021.2          510        500        508.2
GR    1586.0     9711.6      1586.4      9720.2      1586.2      9750.5      1584.5      9772.2      1582.6      9774.5
GR    1582.3     9804.5      1582.6      9809.7      1582.0      9837.7      1580.7      9849.9      1579.0      9856.6
GR    1577.8     9877.6      1576.6      9899.7      1574.4      9932.7      1572.8      9943.3      1565.2      9970.5
GR    1564.6     9986.2      1564.1     10000.0      1564.2     10007.4      1565.1     10012.0      1565.6     10021.2
GR    1568.8    10036.4      1569.5     10049.9      1570.3     10072.0      1572.7     10088.9      1572.7     10119.8
GR    1572.3    10171.2      1571.4     10197.9

        HEC-1 Concentration Point C526

QT        2         520         520

NH        3        .05      9985.1        .035     10014.4         .06     10126.1
ET                             9.1                                                                9967.19     10030.01
          HEC-1 Concentration Point C526:  6-hr storm controls.
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X1    1.504       19      9970.9     10030       125       120      121.7
GR   1580.5   9845.7      1578.9    9854.3    1575.2    9896.5     1574.0   9920.2   1571.7    9957.7
GR   1566.9   9970.9      1566.3    9985.1    1565.9   10000.0     1565.7  10014.4   1568.6   10030.0
GR   1570.7  10044.3      1572.2   10062.9    1572.5   10076.6     1575.2  10088.9   1577.9   10100.2
GR   1578.8  10108.7      1578.2   10114.8    1579.2   10121.9     1579.5  10126.1

NH        3       .05     10024.2       .035     10036.8       .06      10089.6
ET                          9.1                                                  9987.44   10044.71
X1    1.573       17     10024.2    10044.7       365       370      366.9
GR   1583.1   9839.4      1581.7    9892.8    1579.7    9945.7     1577.1   9979.1   1574.8    9984.4
GR   1572.2   9991.5      1572.0   10000.0    1572.7   10012.6     1572.4  10024.2   1571.2   10029.4
GR   1571.5  10036.8      1574.5   10044.7    1578.4   10059.2     1581.8  10068.6   1581.8   10078.0
GR   1584.7  10084.2      1585.0   10089.6

NH        3       .05      9996.5       .035     10015.5       .06       10111
ET                          9.1                                                  9984.76   10023.06
X1    1.663       14      9996.5    10015.5       470       485      477.7
GR   1591.5   9829.5      1591.2    9842.8    1591.9    9851.3     1592.6   9877.0   1592.8    9906.2
GR   1592.2   9947.3      1591.7    9974.0    1586.7    9986.5     1585.0   9996.5   1584.9   10000.0
GR   1584.8  10015.5      1591.5   10035.0    1592.2   10048.5     1592.2  10111.0

**********************************************************************
**********************    Culvert   525    **********************
**********************************************************************

        HEC-1 Concentration Point C525

QT        2       360       360

NH        3       .05      9984.4       .035     10007.5       .06      10100.7
ET                          9.1                                                  9980.83   10028.73
1
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         CULVERT 525 :  CALIENTE WASH and DEERSKIN DRIVE
          HEC-1 Concentration Point C525:  6-hr storm controls.
            Culvert 525     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    1.763       21      9984.4    10007.5       520       530      527.7
GR   1605.6   9776.4      1605.3    9788.3    1605.9    9792.3     1606.1   9807.1   1605.3    9825.6
GR   1604.2   9855.6      1603.0    9879.7    1602.9    9891.3     1602.3   9925.9   1601.0    9961.6
GR   1597.6   9976.0      1594.7    9984.4    1594.0    9994.0     1594.3  10000.0   1594.9   10007.5
GR   1594.5  10017.4      1594.7   10024.9    1598.6   10037.0     1602.7  10051.8   1603.4   10081.6
GR   1604.4  10100.7

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                          0.3       0.5
NH        3      0.050      9995.8       0.035     10014.6       0.060      10170.4
ET                          9.1                                                  10000.00  10014.60
            Culvert 525  Outlet.  3-70"x60"  CMPA's    (SECTION 2 OF SC ROUTINE)
                    Model as 3-66" CMPs   (A = 23.75 ft^2)
              Photogrammetric xsec. located 10' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1595.72
X1    1.778       20       10000     10014.6        78        80       77.7
X3       10                                                        1601.71   1601.71

GR   1605.7   9788.9      1605.2    9806.6    1605.3    9823.0     1604.3   9859.7   1603.3    9892.9
GR   1602.7   9911.4      1601.5    9944.8    1599.9    9976.4     1598.9   9986.2   1595.7    9995.8
GR   1595.7  10000.0      1595.72  10014.6    1596.0   10025.6     1599.0  10035.0   1600.9   10050.8
GR   1602.3  10067.2      1603.4   10096.1    1604.4   10117.6     1605.0  10137.3   1605.2   10170.4

SC    3.022       0.5      2.63          0         5.5         0         55       2.1   1597.06   1595.72
NH        3      0.050     10000.0       0.035     10013.9       0.060      10060.1

ET                          9.1                                                  9994.79   10013.91
            Culvert 525  Inlet.  3-70"x60"  CMP       (SECTION 3 OF SC ROUTINE)
                    Model as 3-66" CMPs   (A = 23.75 ft^2)
              Photogrammetric xsec. located 16.6' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1597.06
            Culvert 525 BT information Surveyed by Town.  West top of curb.
X1    1.789       17      9994.8    10013.9        55        55       55.0
X2                            2     1602.56    1604.19
X3       10                                                        1603.95   1603.95

BT       -6      9850     1604.71                9900     1604.45               9950   1604.17
BT               10000     1603.95               10050     1604.19              10100   1604.39

GR   1607.2   9856.3      1606.8    9878.1    1606.3    9899.2     1605.0   9916.3   1603.8    9949.5
GR   1602.7   9961.0      1597.1    9980.9    1597.0    9984.7     1597.06  9994.8   1597.06  10000.0
GR   1596.7  10008.0      1596.8   10013.9    1600.3   10020.2     1604.0  10029.0   1605.7   10038.7
GR   1606.9  10051.6      1607.2   10060.1

          Return  Contraction and Expansion coefficients to Normal
1
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NC                                        0.1        0.3

NH       3        .05      10000        .035     10010.9         .06     10062.9
ET                            9.1                                                  9968.98   10022.77
             Culvert 525     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    1.805         15     9996.5    10019.8          90          90        85.9
GR    1608.8     9829.7     1608.0     9856.0     1606.8     9887.1     1605.5     9928.2     1604.1     9962.7
GR    1601.8     9969.5     1599.5     9978.6     1599.5     9996.5     1599.0    10000.0     1598.6    10002.8
GR    1598.4    10010.9     1601.0    10019.8     1605.2    10032.6     1607.0    10043.3     1607.9    10062.9


NH       3        .05      10000        .035     10005.2         .06     10094.4
ET                            9.1                                                  9981.48   10016.47
X1    1.898         18     9998.2    10015.5          490         495        491.9
GR    1618.1     9819.4     1617.4     9874.8     1617.0     9921.0     1617.1     9929.8     1616.9     9948.2
GR    1615.9     9964.9     1612.9     9975.9     1609.6     9986.3     1609.5     9998.2     1609.3    10000.0
GR    1608.6    10005.2     1610.9    10015.5     1615.0    10032.7     1615.7    10041.0     1617.1    10047.3
GR    1617.2    10056.4     1617.6    10078.7     1618.1    10094.4


NH       3        .05      10000        .035     10015.6         .06     10237.5
ET                            9.1                                                  9990.93   10023.05
X1    1.970         25     9993.8    10015.6          180         185        380.4
GR    1627.2     9782.8     1627.3     9799.4     1626.4     9817.3     1625.2     9839.1     1624.7     9870.8
GR    1624.0     9877.4     1624.9     9887.2     1623.3     9927.3     1624.5     9939.4     1623.7     9948.1
GR    1623.3     9964.8     1623.6     9981.9     1621.0     9990.0     1619.1     9993.8     1618.6    10000.0
GR    1618.4    10015.6     1623.3    10032.7     1624.1    10050.6     1625.1    10086.1     1625.7    10126.2
GR    1626.2    10177.4     1625.4    10195.9     1623.0    10208.0     1623.2    10219.2     1623.8    10237.5

        START Hydraulically Similar Reach    CA 3
              See Exhibit 1, Manning's n Value Map.

        HEC-1 Concentration Point C524

QT       2        280       280

NH       3        .08      10000         .05     10020.5         .075    10365.5
ET                            9.1                                                  9995.25   10025.46
          HEC-1 Concentration Point C524:  6-hr storm controls.
          START Hydraulically Similar Reach CA 3
                See Exhibit 1, Manning's n Value Map.
X1    1.998         27     10000    10020.5          155         150        149.4
GR    1629.6     9740.9     1628.8     9801.5     1626.1     9824.7     1626.1     9838.9     1625.6     9858.2
GR    1626.2     9861.3     1627.7     9886.2     1628.4     9944.0     1627.9     9984.7     1622.4    10000.0
GR    1622.4    10008.6     1622.4    10020.5     1625.4    10029.2     1626.2    10059.0     1627.1    10113.3
GR    1628.2    10128.4     1628.8    10148.9     1629.0    10175.4     1626.8    10187.6     1627.3    10193.4
GR    1627.3    10202.5     1626.6    10206.9     1628.3    10217.2     1629.4    10258.4     1629.7    10333.1
GR    1628.2    10343.4     1628.8    10365.5

  ****************************************************************************
  **************************    Culvert M11     ******************************
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1
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NH       3      0.080      10000       0.050     10016.5       0.075     10206.1
ET                            9.11                                                 9986.80   10039.10
                Right bank is non effective flow area due to side channel
          CULVERT M11 :  CALIENTE WASH and IVORY DRIVE
             Culvert M11     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    2.072         24     9986.8    10039.1          380         380        390.7
X3       10                                                                 1633.3      1636
GR    1640.2     9825.4     1640.1     9836.3     1640.1     9836.3     1639.1     9869.4     1638.7     9919.0
GR    1636.1     9924.8     1635.3     9950.0     1634.6     9968.7     1634.5     9980.4     1633.3     9986.8
GR    1629.3    10000.0     1629.7    10003.2     1630.1    10016.5     1631.4    10025.1     1631.7    10039.1
GR    1631.0    10053.1     1631.5    10066.9     1633.0    10078.1     1633.4    10097.3     1633.5    10122.8
GR    1634.1    10140.8     1635.5    10161.4     1636.1    10179.3     1636.3    10206.1

        Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                        0.3        0.5
NH       3      0.080      10000       0.050     10031.8       0.075     10381.6
ET                            9.1                                                  9999.99   10031.80
             Culvert M11  Outlet.  3-10'x 3'  Box       (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 4.1' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1634.12
X1    2.109         25     10000    10031.8          195         195        195.8
X3       10                                                                 1637.87     1637.87

GR    1640.0     9869.5     1639.0     9901.7     1637.3     9954.8     1636.1     9990.0     1634.12    10000.0
GR    1634.1    10031.8     1636.3    10045.6     1636.4    10067.5     1636.6    10089.9     1636.8    10118.6
GR    1637.4    10135.2     1637.5    10152.5     1636.9    10170.0     1637.0    10195.0     1637.1    10219.7
GR    1637.8    10239.1     1637.9    10261.4     1637.3    10276.7     1636.3    10298.5     1636.4    10305.7
GR    1637.1    10328.6     1636.7    10332.6     1637.8    10341.1     1638.8    10358.7     1640.0    10381.6


SC    3.012         0.4      2.63         0          3          10         55         9.2     1634.65     1634.12
NH       3      0.080      10000       0.050     10022.2       0.075     10489.4
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ET                          9.1                                                    9993.99    10026.01
            Culvert M11  Inlet.   3-10'x 3'  Box       (SECTION 3 OF SC ROUTINE)
               Base Channel Elevations were lowered to Culvert Invert EL 1634.65
            Culvert M11 BT information surveyed by Town.  West top of curb.
X1    2.120       31       9994      10026         55         55        55.0
X2                             2    1637.65    1638.96
X3       10                                                          1638.7     1638.7
X4        2    1634.65       9994    1634.65      10026

BT       -9       9792    1641.73                 9850    1640.71                9900    1639.95
BT                9950    1639.63                10000    1639.49               10050    1638.92
BT               10100    1638.85               10117.9    1638.7               10120       1639

GR    1641.7     9826.1    1640.8     9871.5    1639.9     9903.1    1639.2     9934.2    1638.4     9959.8
GR    1636.8     9989.7    1634.4    10000.0    1634.6    10022.2    1636.0    10028.8    1636.9    10051.3
GR    1637.8    10070.1    1638.4    10093.0    1638.7    10117.9    1638.3    10140.5    1638.1    10168.1
GR    1637.6    10190.4    1637.9    10209.3    1638.5    10234.8    1639.1    10271.7    1639.2    10310.3
GR    1639.2    10320.7    1639.7    10340.5    1639.7    10358.7    1640.3    10365.8    1640.2    10382.3
GR    1641.1    10390.0    1641.6    10404.5    1642.0    10416.9    1642.7    10440.2    1643.7    10467.8
1
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GR    1644.0    10489.4

         Return  Contraction and Expansion coefficients to Normal

NC                                        0.1        0.3

NH        3        .08      10000         .05    10022.1         .075    10123.7
ET                            9.1                                                    9989.58    10029.91
            Culvert M11     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    2.131        16       9992.3    10029.9         60         60        59.6
GR    1642.2    9884.7    1641.8     9921.0    1641.2     9933.0    1641.4     9947.7    1640.6     9963.4
GR    1638.4    9979.7    1637.2     9992.3    1635.9    10000.0    1636.0    10022.1    1638.3    10029.9
GR    1638.3   10033.5    1640.1    10051.8    1640.6    10080.1    1641.1    10085.6    1641.2    10111.7
GR    1640.9   10123.7


NH        3        .08    10006.1         .05    10024.1         .075    10365.6
ET                            9.1                                                    9984.74    10068.35
X1    2.218        28    10006.1    10032.9         460         465       458.9
GR    1660.5    9848.0    1659.5     9869.2    1657.9     9891.8    1655.5     9916.1    1652.1     9939.1
GR    1647.8    9964.3    1646.9     9982.0    1644.5     9990.9    1644.5    10000.0    1644.6    10006.1
GR    1644.0   10011.7    1644.5    10024.1    1645.3    10032.9    1645.2    10051.7    1646.4    10072.5
GR    1646.5   10100.7    1647.1    10113.2    1648.7    10125.3    1649.4    10147.0    1650.7    10164.9
GR    1651.4   10185.4    1651.3    10211.0    1651.5    10237.6    1652.2    10259.0    1653.2    10289.5
GR    1653.6   10309.6    1653.3    10336.7    1653.7    10365.6

   ********************************************************************************
   **************************    Culvert   523    ***************************
   ********************************************************************************

         HEC-1 Concentration Point C5230

QT        2        290        290

NH        3        .08     9995.8         .05    10004.8         .075    10217.5
ET                            9.1                                                    9979.09    10022.11
            HEC-1 Concentration Point C5230:  6-hr storm controls.
           CULVERT 523 :  CALIENTE WASH and McDOWELL MOUNTAIN ROAD
            Culvert 523     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    2.274        21     9979.1    10022.1         300         290       296.0
GR    1659.6    9840.3    1657.5     9869.8    1655.2     9905.0    1653.7     9928.2    1652.3     9962.3
GR    1651.3    9979.1    1648.0     9995.8    1647.8    10000.0    1647.9    10004.8    1649.7    10013.1
GR    1651.5   10022.1    1651.1    10043.8    1651.6    10078.9    1652.0    10094.0    1653.3    10105.6
GR    1654.0   10117.8    1653.3    10121.6    1657.3    10169.5    1659.1    10196.0    1659.4    10210.5
GR    1658.2   10217.5

         Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC                                        0.3        0.5
NH        3       0.080        9988      0.050      10017       0.075      10080
ET                            9.1                                                    9997.99    10004.01
1
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            Culvert 523  Outlet.  1-66"  CMP          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 30'  Upstream. (No Elev. Adjust.)
              PER REVISED MAPPING 3-08-94
X1    2.287        13       9998      10004         50         50        66.6
X3       10                                                          1654.94    1654.94

GR     1660      9920      1658       9930      1656       9945      1654       9970      1653       9980
GR     1652      9988    1649.17      9998    1649.17      10000   1649.17      10004     1652       10017
GR     1653     10043      1654      10055      1656      10080

       1-66"   CMP
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SC    1.022       0.9       2.63          0         5.5           0         100         2.3     1650.28     1649.17

          HEC-1 Concentration Point C523I
QT        2         390       390

NH        3       0.080     9986.4      0.050     10007.0       0.075     10271.0

ET                            9.1                                                                9935.52     10269.59
            HEC-1 Concentration Point C523I:  6-hr storm controls.
              Culvert 523  Inlet.    1-66" CMP          (SECTION 3 OF SC ROUTINE)
                Photogrammetric xsec. located 13.2' Upstream. (No Elev. Adjust.)
                 Base Channel Elevations were lowered to Culvert Invert EL 1650.28
              Culvert 523 BT information surveyed  by TRL.  West edge of pavement
                          Imaginary wall used to model flow split.
X1    2.306         22        9997        10003         100           100       100.0
X2                             2       1655.78       1659.2
X3       10                                                                    1659.2      1659.2
X4        2     1650.28        9997      1650.28       10003
BT      -14     9813.8       1668.9                     9933          1663.5                 9983      1662.1
BT              10000        1661.7                    10008        1661.55                10033      1661.0
BT              10083        1660.0                    10133         1659.4                10183      1659.2
BT              10233        1659.2                    10265         1659.3                10283      1659.3
BT              10320        1659.4                  10320.1           1663

GR   1668.9     9813.8       1666.3      9835.3       1663.9        9868.2       1661.8     9907.2      1659.8      9934.2
GR   1657.9     9955.6       1655.9      9971.8       1652.2        9986.4       1650.28    10000.0     1651.7      10007.0
GR   1653.4    10027.9       1654.5     10051.1       1655.7       10069.9       1657.0     10091.3     1657.1      10118.8
GR   1657.3    10141.2       1656.4     10169.9       1656.2       10193.3       1656.4     10214.4     1656.9      10232.3
GR   1659.3      10265       1659.8      10271.0

          Return  Contraction and Expansion coefficients to Normal

NC                                                    0.1           0.3

NH        3         .08       9992.2        .05       10011.7         .075      10235.1
ET                            9.1                                                                9963.53     10234.31
              Culvert 523     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
1
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                  Right bank is non effective flow area:  Hard coded GR's
                              from STA 10150.0 to STA 10227.2 @ EL 1659.5
X1    2.317           20        9992.2      10011.7           65            70        60.9
GR   1669.4     9843.1       1667.2      9866.6       1665.4        9894.7       1662.6     9933.8      1660.9      9956.5
GR   1657.5     9976.1       1651.9      9992.2       1651.5        9998.3       1651.5     10000.0     1652.6      10011.7
GR   1654.4    10037.6       1655.3     10068.0       1656.9       10093.7       1658.3     10126.9     1659.5      10150.0
GR   1659.5    10178.9       1659.5     10191.8       1659.5       10205.0       1659.5     10227.2     1659.7      10235.1


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

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=      .100 CEHV=      .300
*SECNO 1.026
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
            HEC-1 Concentration Point C527:  6-hr storm controls.
            START Hydraulically Similar Reach CA 1
                See Exhibit 1, Manning's n Value Map.
                Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.026       4.15    1522.60    1522.09    1522.60    1523.16        .56        .00        .00    1519.05
     670.0      268.2      361.8       40.0       55.9       52.4       10.6         .0         .0    1519.75
        .00       4.80       6.90       3.77       .065       .070       .065       .000    1518.45    9954.20
   .018542         0.         0.         0.          0         14          0        .00      57.45   10011.65


*SECNO 1.028
                Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.028       4.14    1522.78    1522.28        .00    1523.34        .56        .19        .00    1519.24
     670.0      268.0      362.1       39.9       55.7       52.4       10.6         .0         .0    1519.94
        .00       4.81       6.92       3.77       .065       .070       .065       .000    1518.64    9954.25
   .018651        10.        10.        10.          0         15          0        .00      57.38   10011.63


*SECNO 1.030
                Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.030       4.15    1522.97    1522.46        .00    1523.53        .56        .19        .00    1519.42
     670.0      268.2      361.8       40.0       55.9       52.4       10.6         .1         .0    1520.12
        .00       4.80       6.90       3.77       .065       .070       .065       .000    1518.82    9954.20
   .018540        10.        10.        10.          0         15          0        .00      57.45   10011.65
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1490 NH CARD USED
*SECNO 1.032
     1.032      4.16   1523.16   1522.64       .00   1523.71       .55       .18       .00   1519.60
     670.0     268.7     361.2      40.1      56.2      52.6      10.7        .1        .0   1520.30
       .00      4.78      6.87      3.75      .065      .070      .065      .000   1519.00   9954.09
   .018339       10.       10.       10.         0        15         0       .00     57.57  10011.67


1490 NH CARD USED
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 1.054
                Left overbank is non effective flow area:  Hard coded GR's
                      for STA 9954.7 @ EL 1525.5
     1.054      5.38   1525.28   1524.34       .00   1525.75       .48      2.03       .01   1525.50
     670.0        .0     669.4        .6        .0     120.9        .5        .4        .2   1524.80
       .01       .00      5.53      1.15      .000      .068      .065      .000   1519.90   9977.95
   .017905       110.      113.      115.         1         8         0       .00     47.99  10025.93


1490 NH CARD USED
*SECNO 1.083
          START Hydraulically Similar Reach CA 2
                See Exhibit 1, Manning's n Value Map.
          CULVERT 527 :  CALIENTE WASH and DIRT ROAD next to Reservation
             Culvert 527      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     1.083      2.24   1527.64   1527.48       .00   1528.12       .48      2.37       .00   1525.90
     670.0     329.4     255.4      85.2      75.9      35.1      24.0        .9        .5   1526.20
       .02      4.34      7.27      3.55      .050      .035      .060      .000   1525.40   9932.95
   .012522       165.      158.      150.         3        18         0       .00    102.99  10035.94


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.093
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
             Culvert 527  Outlet.   1-42" CMP          (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 4.1' Downstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1526.10
     1.093      3.26   1529.36   1529.36       .00   1530.34       .98       .70       .25   1526.10
     670.0     212.2     172.9     284.9      27.5      16.3      47.6       1.0        .5   1526.10
       .02      7.72     10.60      5.98      .038      .035      .044      .000   1526.10   9996.46
   .012872       55.       51.       60.         0        14         0       .00     48.03  10044.48


 SPECIAL CULVERT

 SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
      1          .022      .90      2.63       .00      3.50       .00     25.00     2         3        1527.08   1526.10

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  3 - PIPE PROJECTING FROM FILL

 5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1
   29MAR95      14:51:53                                                                                PAGE   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


 5130, EGIC= 1797.08..MAY BE TOO LARGE IF INLET CONTROLS.
 5135, EGOC= 1629.12 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
 1490 NH CARD USED
 *SECNO 1.098

 SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1532.74

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.91

 SPECIAL CULVERT

      EGIC      EGOC       H4      QWEIR     QCULV      VCH       ACULV     ELTRD     WEIRLN
   1797.08   1629.12      2.40       593.      80.     7.694        9.6   1530.64        129.
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          Culvert 527   Inlet.   1-42"     CMP       (SECTION 3 OF SC ROUTINE)
             Base Channel Elevations were lowered to Culvert Invert EL 1527.08
          Culvert 527 BT information Surveyed by ALS @ CL of Dirt Road.
          Culvert 527 BT left side   coded per figure 3.16 (HEC-2, Sept 90)
    1.098      5.32   1532.40      .00      .00   1532.74      .34      2.40      .00   1527.08
    670.0     214.0     163.9     292.0     76.2      21.3     87.8       1.1       .6   1527.08
      .02      2.81      7.69      3.32     .042      .035     .042      .000   1527.08   9931.17
 .003531       25.       25.       25.        3         0        0       .00    126.82  10057.99

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.107

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.90

          Culvert 527     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
    1.107      4.21   1532.71   1530.57      .00   1532.85      .14       .09       .02   1529.30
    670.0      33.4     579.9      56.8     25.1     184.0     46.5       1.4        .7   1528.90
      .02      1.33      3.15      1.22     .050      .037     .060      .000   1528.50   9956.82
 .000977       50.       50.       60.        2        18        0       .00     89.82  10046.63

1490 NH CARD USED
*SECNO 1.186
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


3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.186      2.31   1538.31   1538.31      .00   1539.23      .92      1.04       .24   1536.70
    670.0      17.3     523.1     129.6      5.5      62.2     28.9       3.0       1.4   1536.30
      .04      3.14      8.41      4.48     .050      .035     .060      .000   1536.00   9968.75
 .015509       410.      416.      415.        0        11        0       .00     55.44  10024.20

1490 NH CARD USED
*SECNO 1.311
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    1.311      2.86   1550.36   1550.36      .00   1551.28      .92     12.04       .00   1548.60
    670.0     206.1     452.8      11.0     34.8      53.7      4.1       4.5       2.2   1549.10
      .06      5.92      8.43      2.67     .050      .047     .060      .000   1547.50   9968.93
 .021953       660.      658.      645.        0        11        0       .00     51.91  10020.84

1490 NH CARD USED
*SECNO 1.384
    1.384      3.89   1557.79   1557.78      .00   1558.80     1.00      7.49       .03   1556.00
    670.0     215.5     442.7      11.9     38.8      48.7      4.4       5.3       2.7   1556.20
      .08      5.55      9.09      2.70     .050      .044     .060      .000   1553.90   9971.56
 .017043       390.      388.      390.        3        11        0       .00     44.67  10016.23

1490 NH CARD USED
*SECNO 1.480
    1.480      2.59   1566.69   1566.45      .00   1567.32      .64      8.49       .04   1565.20
    670.0      12.1     652.1       5.9      4.0     100.8      2.8       6.4       3.3   1565.60
      .10      3.05      6.47      2.08     .050      .046     .060      .000   1564.10   9965.17
 .016375       510.      508.      500.        4        14        0       .00     61.20  10026.37

1490 NH CARD USED
*SECNO 1.504
          HEC-1 Concentration Point C526:  6-hr storm controls.
    1.504      2.55   1568.25   1567.68      .00   1568.60      .35      1.25       .03   1566.90
    520.0       4.4     515.6        .0      2.5     108.4       .0       6.8       3.5   1568.60
      .11      1.75      4.76       .00     .050      .038     .000      .000   1565.70   9967.18
 .006362       125.      122.      120.        3        15        0       .00     60.95  10028.13

1
   29MAR95      14:51:53                                                                    PAGE   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
```

```
1490 NH CARD USED
*SECNO 1.573
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.573      2.49   1573.69   1573.69       .00   1574.40       .71      4.10       .11   1572.40
     520.0     260.2     259.8        .0      46.7      33.5        .0       7.6       3.9   1574.50
       .12      5.57      7.76       .00      .050      .044      .000      .000   1571.20   9987.43
   .024556      365.      367.      370.         0         5         0       .00     55.15  10042.57


1490 NH CARD USED
*SECNO 1.663
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     1.663      2.60   1587.40   1587.40       .00   1588.41      1.01      8.04       .09   1585.00
     520.0      68.6     420.5      30.9      16.1      48.0       9.8       8.4       4.4   1584.80
       .14      4.27      8.76      3.16      .050      .035      .060      .000   1584.80   9984.76
   .012351      470.      478.      485.         0         8         0       .00     38.30  10023.06


1490 NH CARD USED
*SECNO 1.763
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
         CULVERT 525 :  CALIENTE WASH and DEERSKIN DRIVE
          HEC-1 Concentration Point C525:  6-hr storm controls.
            Culvert 525     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     1.763      1.93   1595.93   1595.93       .00   1596.61       .67      7.35       .03   1594.70
     360.0       5.9     264.8      89.3       2.2      35.9      24.6       9.2       5.0   1594.90
       .16      2.69      7.38      3.63      .050      .035      .060      .000   1594.00   9980.83
   .016828      520.      528.      530.         0        19         0       .00     47.90  10028.73


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 1.778

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
1
   29MAR95      14:51:53                                                                          PAGE   17

    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


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1601.71 ELREA=      1601.71

            Culvert 525  Outlet.  3-70"x60"  CMPA's     (SECTION 2 OF SC ROUTINE)
                    Model as 3-66" CMPs   (A = 23.75 ft^2)
              Photogrammetric xsec. located 10' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1595.72
     1.778      2.66   1598.36   1598.36       .00   1599.70      1.34      1.15       .33   1595.70
     360.0        .0     360.0        .0        .0      38.8        .0       9.3       5.0   1595.72
       .16       .00      9.29       .00      .000      .035      .000      .000   1595.70  10000.00
   .013016       78.       78.       80.         0        11         0       .00     14.60  10014.60


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
     3         .022       .50      2.63       .00      5.50       .00      55.00     2         1      1597.06   1595.72

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  1 - HEADWALL

1490 NH CARD USED
*SECNO 1.789

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1601.464  EGOC =   1601.948  PCWSE=   1598.365  ELTRD=   1604.190


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.27

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
   1601.46   1601.95      2.24        0.      360.     3.908      71.3   1604.19        0.
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1603.95 ELREA=      1603.95

          Culvert 525  Inlet.   3-70"x60"  CMP       (SECTION 3 OF SC ROUTINE)
                  Model as 3-66" CMPs   (A = 23.75 ft^2)
            Photogrammetric xsec. located 16.6' Upstream. (No Elev. Adjust.)
             Base Channel Elevations were lowered to Culvert Invert EL 1597.06
          Culvert 525 BT information Surveyed by Town.  West top of curb.
1
    29MAR95      14:51:53                                                                    PAGE   18

     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

      1.789       5.01    1601.71        .00        .00    1601.95        .24       2.24        .00    1597.06
      360.0         .0      360.0         .0         .0       92.1         .0        9.4        5.0    1596.80
        .17         .00      3.91        .00       .000       .038       .000       .000    1596.70    9994.80
    .001220         55.       55.        55.          2          0          0        .00      19.10   10013.90

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.805

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

          Culvert 525     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      1.805       3.57    1601.97    1600.63        .00    1602.11        .14        .15        .01    1599.50
      360.0      145.6      213.3         1.1       56.4       66.8        1.4        9.6        5.1    1601.00
        .18       2.58       3.19         .76       .050       .048       .060       .000    1598.40    9968.98
    .002640         90.       86.        90.          2         14          0        .00      53.79   10022.77

1490 NH CARD USED
*SECNO 1.898

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      1.898       2.53    1611.13    1611.13        .00    1611.90        .77       3.15        .19    1609.50
      360.0      154.2      205.7         .1       22.5       28.7         .1       10.6        5.6    1610.90
        .20       6.85       7.17        1.05       .050       .052       .060       .000    1608.60    9981.48
    .033080        490.       492.        495.          0         19          0        .00      34.99   10016.47

1490 NH CARD USED
*SECNO 1.970
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      1.970       2.13    1620.53    1620.53        .00    1621.41        .88       7.32        .03    1619.10
      360.0        5.7      328.9        25.3        2.1       42.2        7.9       11.0        5.9    1618.40
        .21       2.80       7.80        3.19       .050       .037       .060       .000    1618.40    9990.93
    .016001        180.       380.        185.          0         15          0        .00      32.11   10023.05

1
    29MAR95      14:51:53                                                                    PAGE   19

     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

1490 NH CARD USED
*SECNO 1.998
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C524:  6-hr storm controls.
          START Hydraulically Similar Reach CA 3
                See Exhibit 1, Manning's n Value Map.
      1.998       1.71    1624.11    1624.11        .00    1624.88        .77       3.06        .01    1622.40
      280.0       11.2      256.2        12.5        4.1       35.0        4.2       11.1        6.0    1622.40
        .21       2.77       7.31        2.96       .080       .050       .075       .000    1622.40    9995.25
    .029646        155.       149.        150.          0         15          0        .00      30.21   10025.46

1490 NH CARD USED
*SECNO 2.072

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1633.30 ELREA=      1636.00

              Right bank is non effective flow area due to side channel
          CULVERT M11 :  CALIENTE WASH and IVORY DRIVE
             Culvert M11      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
    2.072       3.01   1632.31   1631.63       .00   1632.50       .19       7.56       .06   1633.30
    280.0         .0     280.0       .0         .0      80.1         .0       11.7       6.3   1631.70
      .24         .00      3.50      .00       .000      .068       .000       .000   1629.30   9990.07
  .013650       380.      391.      380.         6        11          0        .00     49.03  10039.10


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO 2.109

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1637.87 ELREA=      1637.87

            Culvert M11  Outlet.  3-10'x 3'  Box       (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 4.1' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1634.12
    2.109       1.48   1635.58   1635.45       .00   1636.13       .55       3.45       .18   1634.12
    280.0         .0     280.0       .0         .0      47.1         .0       12.0       6.5   1634.10
      .25         .00      5.94      .00       .000      .050       .000       .000   1634.10  10000.00
  .023662       195.      196.      195.         3        14          0        .00     31.80  10031.80


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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


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     3          .012       .40       2.63        .00       3.00      10.00      55.00       9          2       1634.65    1634.12

CHART  9 - BOX CULVERT WITH FLARED WINGWALL AND INLET TOP EDGE BEVEL
SCALE  2 - WINGWALL FLARED 18 TO 33.7 DEGREES; INLET TOP EDGE BEVEL = 0.083D

1490 NH CARD USED
*SECNO 2.120

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1636.805  EGOC =   1637.006  PCWSE=   1635.585  ELTRD=   1638.960


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.81

SPECIAL CULVERT

      EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
   1636.80    1637.01        .87         0.        280.     3.877        90.0    1638.96         0.


3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1638.70 ELREA=      1638.70

            Culvert M11  Inlet.   3-10'x 3'  Box       (SECTION 3 OF SC ROUTINE)
               Base Channel Elevations were lowered to Culvert Invert EL 1634.65
            Culvert M11 BT information surveyed by Town.  West top of curb.
    2.120       2.37   1636.77       .00       .00   1637.01       .23       .87       .00   1634.65
    280.0         .0     280.0       .0         .0      72.2         .0       12.1       6.5   1634.65
      .26         .00      3.88      .00       .000      .056       .000       .000   1634.40   9994.00
  .007199        55.       55.       55.         2         0          0        .00     32.00  10026.00


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.131
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
             Culvert M11      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
    2.131       1.56   1637.46   1637.46       .00   1638.09       .63       .90       .12   1637.20
    280.0         .4     279.6       .0         .4      44.0         .0       12.1       6.6   1638.30
      .26         1.07      6.36      .00       .080      .061       .000       .000   1635.90   9989.57
  .050493        60.       60.       60.         0        14          0        .00     37.48  10027.05


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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
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    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 2.218

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.37

     2.218      2.16    1646.16    1645.66       .00    1646.32       .16       8.19       .05    1644.60
     280.0      69.0      171.5       39.5      30.1       45.2      25.1       12.9        7.2    1645.30
       .30      2.30       3.79       1.57      .080       .053      .075       .000    1644.00    9984.74
   .009018      460.       459.       465.         7          8         0        .00      83.61   10068.35


1490 NH CARD USED
*SECNO 2.274

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

         HEC-1 Concentration Point C5230:  6-hr storm controls.
        CULVERT 523 :  CALIENTE WASH and McDOWELL MOUNTAIN ROAD
          Culvert 523     Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     2.274      2.75    1650.55    1650.10       .00    1650.95       .40       4.56       .07    1651.30
     290.0        .0      290.0         .0        .0       56.9         .0       13.4        7.6    1651.50
       .32        .00       5.10       .00      .000       .071      .000       .000    1647.80    9982.90
   .031059      300.       296.       290.         4          8         0        .00      34.45   10017.35


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 2.287

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1654.94 ELREA=      1654.94

            Culvert 523  Outlet.  1-66"  CMP          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 30'  Upstream. (No Elev. Adjust.)
              PER REVISED MAPPING 3-08-94
     2.287      4.17    1653.34    1653.34       .00    1655.43      2.08       1.75       .84    1649.17
     290.0        .0      290.0         .0        .0       25.0         .0       13.5        7.7    1649.17
       .32        .00       11.59      .00      .000       .050      .000       .000    1649.17    9998.00
   .022638      50.        67.        50.          0         11         0        .00       6.00   10004.00


1
   29MAR95      14:51:53                                                                                PAGE   22

    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

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     1          .022       .90       2.63        .00       5.50        .00      100.00      2          3       1650.28    1649.17

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1490 NH CARD USED
*SECNO 2.306

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1659.68

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 38.82

SPECIAL CULVERT

     EGIC       EGOC        H4       QWEIR      QCULV       VCH       ACULV      ELTRD     WEIRLN
  1661.46    1658.49       4.26        132.       257.       .690       23.8    1659.20        211.


          HEC-1 Concentration Point C523I:  6-hr storm controls.
            Culvert 523  Inlet.    1-66"  CMP          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 13.2' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1650.28
            Culvert 523 BT information surveyed  by TRL.  West edge of pavement
                        Imaginary wall used to model flow split.
     2.306      9.40    1659.68        .00        .00    1659.68        .00       4.26        .00    1650.28
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     390.0      91.7      38.9     259.3     234.7      56.4     941.0      14.9       8.0  1650.28
       .40       .39       .69       .28       .061      .050      .073      .000  1650.28  9935.52
   .000027      100.      100.      100.         0         0         0       .00   334.07 10269.59


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.317

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

           Culvert 523     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
               Right bank is non effective flow area:  Hard coded GR's
                     from STA 10150.0 to STA 10227.2 @ EL 1659.5
     2.317      8.18   1659.68   1654.09       .00   1659.69       .01       .00       .00  1651.90
     390.0      36.1     143.8     210.1      93.9     151.9     500.5      16.5       8.5  1652.60
       .43       .38       .95       .42       .080      .050      .075      .000  1651.50  9963.53
   .000066       65.       61.       70.         2        14         0       .00   270.78 10234.31


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   29MAR95      14:51:53                                                                    PAGE   23

T1   *  Fountain Hills North FIS
T2   *  For:  FCDMC #92-04         By:  GVSCE #35
T3   *   Caliente Wash 100-Year Floodway
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        3         0         0    0.0182         0         0         0    1522.6

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

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

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

*PROF 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=     .100 CEHV=     .300
*SECNO 1.026

3470 ENCROACHMENT STATIONS=     9954.2   10011.7  TYPE=       1  TARGET=       57.450
               STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
          HEC-1 Concentration Point C527:  6-hr storm controls.
          START Hydraulically Similar Reach CA 1
               See Exhibit 1, Manning's n Value Map.
               Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.026      4.15   1522.60   1522.09   1522.60   1523.16       .56       .00       .00  1519.05
     670.0     268.2     361.8      39.9      55.9      52.4      10.6        .0        .0  1519.75
       .00      4.80      6.90      3.77       .065      .070      .065      .000  1518.45  9954.20
   .018543        0.        0.        0.         0        10         0       .00     57.44 10011.64


*SECNO 1.028

3470 ENCROACHMENT STATIONS=     9954.3   10011.6  TYPE=       1  TARGET=       57.380
               Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.028      4.14   1522.78   1522.28   1522.78   1523.34       .56       .19       .00  1519.24
     670.0     268.0     362.1      39.9      55.7      52.4      10.6        .0        .0  1519.94
       .00      4.81      6.92      3.77       .065      .070      .065      .000  1518.64  9954.25
   .018651       10.       10.       10.         0        11         0       .00     57.38 10011.63


*SECNO 1.030

3470 ENCROACHMENT STATIONS=     9954.2   10011.7  TYPE=       1  TARGET=       57.450
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                Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     1.030      4.15   1522.97   1522.46   1522.97   1523.53      .56       .19       .00   1519.42
     670.0     268.2     361.8      40.0      55.9      52.4     10.6        .1        .0   1520.12
       .00      4.80      6.90      3.77      .065      .070     .065      .000   1518.82   9954.20
   .018540       10.       10.       10.         0        11        0       .00     57.44  10011.64


1490 NH CARD USED
*SECNO 1.032

3470 ENCROACHMENT STATIONS=     9954.1   10011.7  TYPE=       1  TARGET=       57.580
1
   29MAR95      14:51:53                                                                          PAGE   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

     1.032      4.16   1523.16   1522.64   1523.16   1523.71      .55       .18       .00   1519.60
     670.0     268.7     361.2      40.1      56.2      52.6     10.7        .1        .0   1520.30
       .00      4.78      6.87      3.75      .065      .070     .065      .000   1519.00   9954.09
   .018340       10.       10.       10.         0        11        0       .00     57.57  10011.67


1490 NH CARD USED
*SECNO 1.054

3470 ENCROACHMENT STATIONS=     9977.0   10025.9  TYPE=       1  TARGET=       48.930
                Left overbank is non effective flow area:  Hard coded GR's
                      for STA 9954.7 @ EL 1525.5
     1.054      5.38   1525.28   1524.34   1525.28   1525.75      .48      2.03       .01   1525.50
     670.0        .0     669.4        .6        .0     120.9        .5        .4        .2   1524.80
       .01       .00      5.53      1.15      .000      .068     .065      .000   1519.90   9977.95
   .017905       110.      113.      115.         1         8        0       .00     47.97  10025.92


1490 NH CARD USED
*SECNO 1.083

3470 ENCROACHMENT STATIONS=     9933.0   10035.9  TYPE=       1  TARGET=      102.990
          START Hydraulically Similar Reach CA 2
                See Exhibit 1, Manning's n Value Map.
          CULVERT 527 :  CALIENTE WASH and DIRT ROAD next to Reservation
             Culvert 527      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     1.083      2.24   1527.64   1527.48   1527.64   1528.12      .48      2.37       .00   1525.90
     670.0     329.4     255.4      85.2      75.9      35.1     24.0        .9        .5   1526.20
       .02      4.34      7.27      3.55      .050      .035     .060      .000   1525.40   9932.95
   .012522       165.      158.      150.         3        18        0       .00     102.99  10035.94


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 1.093
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9996.5   10044.5  TYPE=       1  TARGET=       48.021
             Culvert 527  Outlet.   1-42" CMP            (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 4.1' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1526.10
     1.093      3.26   1529.36   1529.36   1529.36   1530.34      .98       .70       .25   1526.10
     670.0     212.2     172.9     284.9      27.5      16.3     47.7       1.0        .5   1526.10
       .02      7.72     10.59      5.98      .038      .035     .044      .000   1526.10   9996.46
   .012859       55.       51.       60.         0        14        0       .00     48.02  10044.48


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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


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     1          .022        .90       2.63        .00       3.50        .00      25.00        2          3     1527.08    1526.10

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
5130, EGIC= 1797.08..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1629.12 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
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1490 NH CARD USED
*SECNO 1.098

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1532.74

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.91

SPECIAL CULVERT

     EGIC      EGOC       H4     QWEIR     QCULV       VCH      ACULV     ELTRD    WEIRLN
  1797.08   1629.12     2.40       593.      80.     7.702        9.6   1530.64       129.


3470 ENCROACHMENT STATIONS=     9931.2   10058.0  TYPE=       1  TARGET=      126.820
            Culvert 527   Inlet.   1-42"     CMP       (SECTION 3 OF SC ROUTINE)
               Base Channel Elevations were lowered to Culvert Invert EL 1527.08
            Culvert 527 BT information Surveyed by ALS @ CL of Dirt Road.
            Culvert 527 BT left side   coded per figure 3.16 (HEC-2, Sept 90)
     1.098      5.32   1532.40       .00   1532.40   1532.74        .34      2.40       .00   1527.08
     670.0     213.9     164.0     292.0      76.1      21.3      87.7       1.1        .6   1527.08
       .02      2.81      7.70      3.33      .042      .035      .042      .000   1527.08   9931.20
   .003540       25.       25.       25.         3         0         0       .00    126.72  10057.93


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 1.107

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.90


3470 ENCROACHMENT STATIONS=     9956.8   10046.6  TYPE=       1  TARGET=       89.810
            Culvert 527     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     1.107      4.21   1532.71   1530.57   1532.71   1532.85       .14       .09       .02   1529.30
     670.0      33.3     579.9      56.7      25.1     184.0      46.4       1.4        .7   1528.90
       .02      1.33      3.15      1.22      .050      .037      .060      .000   1528.50   9956.85
   .000978       50.       50.       60.         2        18         0       .00     89.78  10046.62


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   29MAR95      14:51:53                                                                                PAGE   27

    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


1490 NH CARD USED
*SECNO 1.186

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9968.8   10024.2  TYPE=       1  TARGET=       55.450
     1.186      2.33   1538.33   1538.33   1538.31   1539.23       .90      1.03       .23   1536.70
     670.0      17.7     522.5     129.8       5.7      62.9      29.3       3.0        1.4   1536.30
       .04      3.13      8.31      4.43      .050      .035      .060      .000   1536.00   9968.75
   .014918       410.      416.      415.         0        11         0       .00     55.45  10024.20


1490 NH CARD USED
*SECNO 1.311
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9968.9   10020.8  TYPE=       1  TARGET=       51.910
     1.311      2.87   1550.37   1550.37   1550.36   1551.28       .90     11.68       .00   1548.60
     670.0     206.7     452.1      11.2      35.1      54.0       4.2       4.5        2.2   1549.10
       .06      5.89      8.38      2.67      .050      .047      .060      .000   1547.50   9968.93
   .021536       660.      658.      645.         0        11         0       .00     51.91  10020.84


1490 NH CARD USED
*SECNO 1.384
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9971.6   10016.2  TYPE=       1  TARGET=       44.671
     1.384      3.89   1557.79   1557.79   1557.79   1558.79      1.00      7.41       .03   1556.00
     670.0     215.6     442.5      11.9      38.9      48.7       4.4       5.3        2.7   1556.20
       .08      5.55      9.08      2.70      .050      .044      .060      .000   1553.90   9971.56
   .016974       390.      388.      390.         0        11         0       .00     44.67  10016.23
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 1490 NH CARD USED
 *SECNO 1.480

 3470 ENCROACHMENT STATIONS=    9965.2   10026.4  TYPE=      1  TARGET=      61.200
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

      1.480       2.59    1566.69    1566.45    1566.69    1567.32        .64       8.49        .04    1565.20
      670.0       12.0      652.1        5.8        4.0      100.7        2.8        6.5        3.3    1565.60
        .10       3.05       6.48       2.08       .050       .046       .060       .000    1564.10    9965.18
     .016442       510.       508.       500.          4         14          0        .00      61.18   10026.36


 1490 NH CARD USED
 *SECNO 1.504

 3470 ENCROACHMENT STATIONS=    9967.2   10030.0  TYPE=      1  TARGET=      62.819
          HEC-1 Concentration Point C526:  6-hr storm controls.
      1.504       2.55    1568.25    1567.68    1568.25    1568.60        .35       1.25        .03    1566.90
      520.0        4.4      515.6         .0        2.5      108.4         .0        6.8        3.5    1568.60
        .11       1.75       4.76        .00       .050       .038       .000       .000    1565.70    9967.19
     .006366       125.       122.       120.          3         15          0        .00      60.94   10028.13


 1490 NH CARD USED
 *SECNO 1.573
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=    9987.4   10044.7  TYPE=      1  TARGET=      57.270
      1.573       2.49    1573.69    1573.69    1573.69    1574.40        .71       4.10        .11    1572.40
      520.0      260.1      259.9         .0       46.7       33.5         .0        7.6        3.9    1574.50
        .12       5.57       7.77        .00       .050       .044       .000       .000    1571.20    9987.44
     .024633       365.       367.       370.          0          5          0        .00      55.13   10042.57


 1490 NH CARD USED
 *SECNO 1.663
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=    9984.8   10023.1  TYPE=      1  TARGET=      38.300
      1.663       2.62    1587.42    1587.42    1587.40    1588.40        .99       7.91        .08    1585.00
      520.0       69.1      419.7       31.2       16.3       48.4       10.0        8.4        4.4    1584.80
        .14       4.24       8.67       3.13       .050       .035       .060       .000    1584.80    9984.76
     .011975       470.       478.       485.          0          8          0        .00      38.30   10023.06


 1490 NH CARD USED
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 1.763
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=    9980.8   10028.7  TYPE=      1  TARGET=      47.900
          CULVERT 525 :  CALIENTE WASH and DEERSKIN DRIVE
           HEC-1 Concentration Point C525:  6-hr storm controls.
             Culvert 525      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      1.763       1.94    1595.94    1595.94    1595.93    1596.61        .66       7.15        .03    1594.70
      360.0        6.0      264.5       89.5        2.2       36.1       24.8        9.3        5.0    1594.90
        .16       2.68       7.33       3.61       .050       .035       .060       .000    1594.00    9980.83
     .016467       520.       528.       530.          0         19          0        .00      47.90   10028.73


 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO 1.778

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=   10000.0   10014.6  TYPE=      1  TARGET=      14.600
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3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1601.71 ELREA=      1601.71

           Culvert 525  Outlet.  3-70"x60"  CMPA's    (SECTION 2 OF SC ROUTINE)
                  Model as 3-66" CMPs   (A = 23.75 ft^2)
             Photogrammetric xsec. located 10' Downstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1595.72
     1.778      2.67   1598.37   1598.37   1598.36   1599.70      1.34      1.28       .34   1595.70
     360.0        .0     360.0        .0        .0      38.8        .0       9.3       5.0 100000.00
       .16       .00      9.28       .00      .000      .035      .000      .000   1595.70  10000.00
   .016233       78.       78.       80.         0        11         0       .00     14.60  10014.60


SPECIAL CULVERT

1
   29MAR95      14:51:53                                                                          PAGE   30

    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

SC  CUNO      CUNV      ENTLC     COFQ      RDLEN     RISE      SPAN      CULVLN    CHRT      SCL       ELCHU     ELCHD
    3          .022       .50      2.63       .00      5.50       .00      55.00     2         1      1597.06   1595.72

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  1 - HEADWALL

1490 NH CARD USED
*SECNO 1.789

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1601.464  EGOC =   1601.948  PCWSE=   1598.366  ELTRD=   1604.190


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  3.11

SPECIAL CULVERT

     EGIC      EGOC        H4     QWEIR     QCULV       VCH     ACULV     ELTRD    WEIRLN
  1601.46   1601.95      2.24        0.       360.     3.908      71.3   1604.19        0.


3470 ENCROACHMENT STATIONS=     9994.8   10013.9  TYPE=       1  TARGET=       19.120

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1603.95 ELREA=      1603.95

           Culvert 525  Inlet.   3-70"x60"  CMP       (SECTION 3 OF SC ROUTINE)
                  Model as 3-66" CMPs   (A = 23.75 ft^2)
             Photogrammetric xsec. located 16.6' Upstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1597.06
           Culvert 525 BT information Surveyed by Town.  West top of curb.
     1.789      5.01   1601.71       .00   1601.71   1601.95       .24      2.24       .00   1597.06
     360.0        .0     360.0        .0        .0      92.1        .0       9.4       5.0   1596.80
       .17       .00      3.91       .00      .000      .038      .000      .000   1596.70   9994.80
   .001677       55.       55.       55.         2         0         0       .00     19.10  10013.90


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.805

3470 ENCROACHMENT STATIONS=     9969.0   10022.8  TYPE=       1  TARGET=       53.789
           Culvert 525     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     1.805      3.60   1602.00   1600.63   1601.97   1602.14       .13       .18       .01   1599.50
     360.0     146.1     212.8       1.2      57.3      67.6       1.5       9.6       5.1   1601.00
       .18      2.55      3.15       .77      .050      .048      .060      .000   1598.40   9968.98
   .002534       90.       86.       90.         2        14         0       .00     53.79  10022.77


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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


1490 NH CARD USED
*SECNO 1.898

3301 HV CHANGED MORE THAN HVINS
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 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9981.5   10016.5  TYPE=      1  TARGET=       34.989
      1.898      2.53   1611.13   1611.13   1611.13   1611.90       .77      3.05       .19   1609.50
      360.0     154.2     205.7        .1      22.5      28.7        .1      10.6        5.6   1610.90
        .20      6.85      7.18      1.05      .050      .052      .060      .000    1608.60   9981.48
    .033122      490.      492.      495.         0        19         0       .00      34.98  10016.46


 1490 NH CARD USED
 *SECNO 1.970
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9990.9   10023.0  TYPE=      1  TARGET=       32.120
      1.970      2.16   1620.56   1620.56   1620.53   1621.41       .85      7.12       .02   1619.10
      360.0       5.9     328.4      25.7       2.1      42.7       8.1      11.0        5.9   1618.40
        .21      2.78      7.68      3.15      .050      .037      .060      .000    1618.40   9990.93
    .015258      180.      380.      185.         0        15         0       .00      32.12  10023.05


 1490 NH CARD USED
 *SECNO 1.998
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9995.3   10025.5  TYPE=      1  TARGET=       30.210
           HEC-1 Concentration Point C524:  6-hr storm controls.
           START Hydraulically Similar Reach CA 3
                 See Exhibit 1, Manning's n Value Map.
      1.998      1.73   1624.13   1624.13   1624.11   1624.88       .75      2.93       .01   1622.40
      280.0      11.4     255.9      12.7       4.2      35.5       4.3      11.2        6.0   1622.40
        .21      2.74      7.21      2.93      .080      .050      .075      .000    1622.40   9995.25
    .028366      155.      149.      150.         0        15         0       .00      30.21  10025.46

1
    29MAR95      14:51:53                                                                          PAGE   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


 1490 NH CARD USED
 *SECNO 2.072

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.42


 3470 ENCROACHMENT STATIONS=     9986.8   10039.1  TYPE=      1  TARGET=       52.300

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1633.30 ELREA=      1636.00

                Right bank is non effective flow area due to side channel
          CULVERT M11 :  CALIENTE WASH and IVORY DRIVE
             Culvert M11      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      2.072      3.00   1632.30   1631.63   1632.31   1632.50       .19      7.56       .06   1633.30
      280.0        .0     280.0        .0        .0      79.8        .0      11.7        6.3 100000.00
        .25       .00      3.51       .00      .000      .068      .000      .000    1629.30   9990.08
    .014067      380.      391.      380.         5        11         0       .00      49.01  10039.10


 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO 2.109

 3470 ENCROACHMENT STATIONS=    10000.0   10031.8  TYPE=      1  TARGET=       31.810

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1637.87 ELREA=      1637.87

              Culvert M11  Outlet.  3-10'x 3'  Box       (SECTION 2 OF SC ROUTINE)
                Photogrammetric xsec. located 4.1' Upstream. (No Elev. Adjust.)
                Base Channel Elevations were lowered to Culvert Invert EL 1634.12
      2.109      1.53   1635.63   1635.45   1635.58   1636.15       .52      3.49       .17   1634.12
      280.0        .0     280.0        .0        .0      48.2        .0      12.0        6.5 100000.00
        .26       .00      5.80       .00      .000      .050      .000      .000    1634.10  10000.00
    .023296      195.      196.      195.         4        14         0       .00      31.80  10031.80


1
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
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```
    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

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     3          .012       .40       2.63        .00       3.00      10.00       55.00      9          2        1634.65    1634.12

CHART  9 - BOX CULVERT WITH FLARED WINGWALL AND INLET TOP EDGE BEVEL
SCALE  2 - WINGWALL FLARED 18 TO 33.7 DEGREES; INLET TOP EDGE BEVEL = 0.083D

1490 NH CARD USED
*SECNO 2.120

SPECIAL CULVERT OUTLET CONTROL
EGIC =   1636.805  EGOC =   1637.001  PCWSE=   1635.627  ELTRD=   1638.960

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.75

SPECIAL CULVERT

     EGIC       EGOC         H4       QWEIR      QCULV        VCH       ACULV      ELTRD     WEIRLN
  1636.80    1637.00        .85          0.       280.      3.889        90.0    1638.96         0.


3470 ENCROACHMENT STATIONS=     9994.0    10026.0  TYPE=       1  TARGET=       32.020

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=       1638.70 ELREA=       1638.70

            Culvert M11  Inlet.   3-10'x 3'  Box       (SECTION 3 OF SC ROUTINE)
               Base Channel Elevations were lowered to Culvert Invert EL 1634.65
            Culvert M11 BT information surveyed by Town.  West top of curb.
     2.120       2.37    1636.77        .00    1636.77    1637.00        .23        .85        .00    1634.65
     280.0         .0      280.0         .0         .0       72.0         .0       12.1        6.5    1634.65
       .26         .00      3.89        .00       .000       .055       .000       .000    1634.40    9994.00
   .007590        55.        55.        55.          2          0          0        .00      32.00   10026.00


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 2.131
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9989.6    10029.9  TYPE=       1  TARGET=       40.330
            Culvert M11      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     2.131       1.56    1637.46    1637.46    1637.46    1638.09        .62        .94        .12    1637.20
     280.0         .4      279.6         .0         .4       44.1         .0       12.2        6.6    1638.30
       .26        1.08       6.34        .00       .080       .061       .000       .000    1635.90    9989.58
   .050113        60.        60.        60.          0         14          0        .00      37.48   10027.06


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


 1490 NH CARD USED
 *SECNO 2.218

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.35


 3470 ENCROACHMENT STATIONS=     9984.7    10068.3  TYPE=       1  TARGET=       83.609
      2.218       2.16    1646.16    1645.66    1646.16    1646.32        .16       8.19        .05    1644.60
      280.0       69.0      171.6       39.4       30.0       45.2       25.1       13.0        7.2    1645.30
        .30        2.30       3.80       1.57       .080       .053       .075       .000    1644.00    9984.75
    .009048        460.       459.       465.          7          8          0        .00      83.58   10068.33


 1490 NH CARD USED
 *SECNO 2.274

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


 3470 ENCROACHMENT STATIONS=     9979.1    10022.1  TYPE=       1  TARGET=       43.021
          HEC-1 Concentration Point C5230:  6-hr storm controls.
         CULVERT 523 :  CALIENTE WASH and McDOWELL MOUNTAIN ROAD
            Culvert 523      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      2.274       2.75    1650.55    1650.10    1650.55    1650.95        .40       4.56        .07    1651.30
```

```
     290.0        .0     290.0        .0        .0       57.0        .0      13.5       7.6   1651.50
       .32        .00      5.09       .00      .000       .071      .000      .000   1647.80   9982.88
   .030911      300.      296.      290.         5          8         0       .00     34.48  10017.36


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 2.287

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9998.0   10004.0  TYPE=       1  TARGET=        6.020

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1654.94 ELREA=      1654.94

            Culvert 523  Outlet.  1-66"  CMP          (SECTION 2 OF SC ROUTINE)
1
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             Photogrammetric xsec. located 30' Upstream. (No Elev. Adjust.)
             PER REVISED MAPPING 3-08-94
    2.287       4.17   1653.34   1653.34   1653.34   1655.43      2.09      2.48       .84   1649.17
    290.0         .0     290.0        .0        .0      25.0         .0      13.6       7.7   1649.17
      .32        .00     11.59       .00       .000      .050      .000      .000   1649.17   9998.00
  .045762       50.       67.       50.         0         11         0       .00      6.00  10004.00


SPECIAL CULVERT

SC  CUNO      CUNV      ENTLC      COFQ      RDLEN      RISE      SPAN      CULVLN     CHRT      SCL       ELCHU     ELCHD
     1         .022       .90      2.63        .00      5.50       .00      100.00        2        3     1650.28   1649.17

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  3 - PIPE PROJECTING FROM FILL

5140, NORMAL DEPTH EXCEEDS CULVERT HEIGHT
1490 NH CARD USED
*SECNO 2.306

SPECIAL CULVERT INLET CONTROL + WEIR FLOW, EG =   1659.68

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO = 55.20

SPECIAL CULVERT

     EGIC       EGOC        H4      QWEIR      QCULV       VCH      ACULV      ELTRD     WEIRLN
   1661.46    1658.49      4.26        132.       257.       .690       23.8    1659.20        211.


3470 ENCROACHMENT STATIONS=     9935.5   10269.6  TYPE=       1  TARGET=      334.070
          HEC-1 Concentration Point C523I:  6-hr storm controls.
            Culvert 523  Inlet.    1-66"  CMP          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 13.2' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1650.28
            Culvert 523 BT information surveyed  by TRL.  West edge of pavement
                        Imaginary wall used to model flow split.
    2.306       9.40   1659.68       .00   1659.68   1659.68       .00      4.26       .00   1650.28
    390.0       91.7      38.9     259.3     234.7      56.4     941.1      15.0       8.0   1650.28
      .40        .39       .69       .28       .061      .050      .073      .000   1650.28   9935.52
  .000027      100.      100.      100.         0          0         0       .00     334.07  10269.59


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 2.317

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


3470 ENCROACHMENT STATIONS=     9963.5   10234.3  TYPE=       1  TARGET=      270.779
1
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            Culvert 523     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
               Right bank is non effective flow area:  Hard coded GR's
                        from STA 10150.0 to STA 10227.2 @ EL 1659.5
    2.317       8.18   1659.68   1654.09   1659.68   1659.69       .01       .00       .00   1651.90
    390.0       36.1      143.8     210.1      93.9     151.9     500.6      16.5       8.5   1652.60
      .43        .38       .95       .42       .080      .050      .075      .000   1651.50   9963.53
  .000066       65.       61.       70.         2          14         0       .00     270.78  10234.31
```

THIS RUN EXECUTED 29MAR95 14:51:59

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Caliente Wash 100-Year

SUMMARY PRINTOUT TABLE 101

	SECNO	EGOC	ELLC	EGIC	ELTRD	QCULV	QWEIR	CLASS	H4	DEPTH	CWSEL	VCH	EG
*	1.098	1629.12	1530.58	1797.08	1530.64	80.18	593.35	16.00	2.40	5.32	1532.40	7.69	1532.74
*	1.098	1629.12	1530.58	1797.08	1530.64	80.17	592.58	16.00	2.40	5.32	1532.40	7.70	1532.74
*	1.789	1601.95	1602.56	1601.46	1604.19	360.00	.00	7.00	2.24	5.01	1601.71	3.91	1601.95
*	1.789	1601.95	1602.56	1601.46	1604.19	360.00	.00	7.00	2.24	5.01	1601.71	3.91	1601.95
*	2.120	1637.01	1637.65	1636.80	1638.96	280.00	.00	7.00	.87	2.37	1636.77	3.88	1637.01
*	2.120	1637.00	1637.65	1636.80	1638.96	280.00	.00	7.00	.85	2.37	1636.77	3.89	1637.00
*	2.306	1658.49	1655.78	1661.46	1659.20	256.85	132.25	16.00	4.26	9.40	1659.68	.69	1659.68
*	2.306	1658.49	1655.78	1661.46	1659.20	256.85	132.31	16.00	4.26	9.40	1659.68	.69	1659.68

Caliente Wash 100-Year

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	1.026	1522.60	.00	1523.16	57.45	268.21	361.82	39.96	.00	.00	9990.20	10004.20	.00
	1.026	1522.60	.00	1523.16	57.44	268.22	361.83	39.95	57.45	9954.20	9990.20	10004.20	10011.65
	1.028	1522.78	.00	1523.34	57.38	267.97	362.13	39.90	.00	.00	9990.20	10004.20	.00
	1.028	1522.78	.00	1523.34	57.38	267.97	362.13	39.90	57.38	9954.25	9990.20	10004.20	10011.63
	1.030	1522.97	.00	1523.53	57.45	268.22	361.82	39.96	.00	.00	9990.20	10004.20	.00
	1.030	1522.97	.00	1523.53	57.44	268.23	361.82	39.95	57.45	9954.20	9990.20	10004.20	10011.65
	1.032	1523.16	.00	1523.71	57.57	268.69	361.24	40.07	.00	.00	9990.20	10004.20	.00
	1.032	1523.16	.00	1523.71	57.57	268.69	361.25	40.06	57.58	9954.09	9990.20	10004.20	10011.67
	1.054	1525.28	.00	1525.75	47.99	.00	669.37	.63	.00	.00	9977.00	10023.60	.00
	1.054	1525.28	.00	1525.75	47.97	.00	669.37	.63	48.93	9976.99	9977.00	10023.60	10025.92
	1.083	1527.64	.00	1528.12	102.99	329.40	255.42	85.18	.00	.00	10000.00	10018.50	.00
	1.083	1527.64	.00	1528.12	102.99	329.40	255.42	85.18	102.99	9932.95	10000.00	10018.50	10035.94
*	1.093	1529.36	.00	1530.34	48.03	212.20	172.89	284.91	.00	.00	10011.00	10016.00	.00
*	1.093	1529.36	.00	1530.34	48.02	212.20	172.87	284.93	48.02	9996.46	10011.00	10016.00	10044.48
*	1.098	1532.40	.00	1532.74	126.82	214.05	163.91	292.05	.00	.00	9986.50	9990.50	.00
*	1.098	1532.40	.00	1532.74	126.72	213.94	164.03	292.03	126.82	9931.17	9986.50	9990.50	10057.99
*	1.107	1532.71	.00	1532.85	89.82	33.37	579.86	56.77	.00	.00	9976.10	10022.30	.00
*	1.107	1532.71	.00	1532.85	89.78	33.35	579.91	56.75	89.81	9956.82	9976.10	10022.30	10046.63
*	1.186	1538.31	.00	1539.23	55.44	17.30	523.07	129.62	.00	.00	9975.60	10006.60	.00
*	1.186	1538.33	.02	1539.23	55.45	17.72	522.50	129.78	55.45	9968.75	9975.60	10006.60	10024.20
*	1.311	1550.36	.00	1551.28	51.91	206.13	452.85	11.02	.00	.00	9992.30	10014.30	.00
*	1.311	1550.37	.01	1551.28	51.91	206.68	452.08	11.24	51.91	9968.93	9992.30	10014.30	10020.84
	1.384	1557.79	.00	1558.80	44.67	215.45	442.68	11.87	.00	.00	9995.30	10010.70	.00
*	1.384	1557.79	.00	1558.79	44.67	215.62	442.47	11.91	44.67	9971.56	9995.30	10010.70	10016.23
	1.480	1566.69	.00	1567.32	61.20	12.08	652.07	5.86	.00	.00	9970.50	10021.20	.00
	1.480	1566.69	.00	1567.32	61.18	12.05	652.12	5.83	61.20	9965.17	9970.50	10021.20	10026.37
	1.504	1568.25	.00	1568.60	60.95	4.41	515.59	.00	.00	.00	9970.90	10030.00	.00
	1.504	1568.25	.00	1568.60	60.94	4.41	515.59	.00	62.82	9967.19	9970.90	10030.00	10030.01
*	1.573	1573.69	.00	1574.40	55.15	260.16	259.84	.00	.00	.00	10024.20	10044.70	.00
*	1.573	1573.69	.00	1574.40	55.13	260.06	259.94	.00	57.27	9987.44	10024.20	10044.70	10044.71

*	1.663	1587.40	.00	1588.41	38.30	68.58	420.47	30.95	.00	.00	9996.50	10015.50	.00
*	1.663	1587.42	.02	1588.40	38.30	69.10	419.67	31.22	38.30	9984.76	9996.50	10015.50	10023.06

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.763	1595.93	.00	1596.61	47.90	5.92	264.78	89.29	.00	.00	9984.40	10007.50	.00
*	1.763	1595.94	.01	1596.61	47.90	6.00	264.54	89.46	47.90	9980.83	9984.40	10007.50	10028.73
*	1.778	1598.36	.00	1599.70	14.60	.00	360.00	.00	.00	.00	10000.00	10014.60	.00
*	1.778	1598.37	.00	1599.70	14.60	.00	360.00	.00	14.60	10000.00	10000.00	10014.60	10014.60
*	1.789	1601.71	.00	1601.95	19.10	.00	360.00	.00	.00	.00	9994.80	10013.90	.00
*	1.789	1601.71	.00	1601.95	19.10	.00	360.00	.00	19.12	9994.79	9994.80	10013.90	10013.91
*	1.805	1601.97	.00	1602.11	53.79	145.61	213.29	1.10	.00	.00	9996.50	10019.80	.00
*	1.805	1602.00	.03	1602.14	53.79	146.05	212.76	1.19	53.79	9968.98	9996.50	10019.80	10022.77
*	1.898	1611.13	.00	1611.90	34.99	154.16	205.72	.12	.00	.00	9998.20	10015.50	.00
*	1.898	1611.13	.00	1611.90	34.98	154.15	205.73	.12	34.99	9981.48	9998.20	10015.50	10016.47
*	1.970	1620.53	.00	1621.41	32.11	5.75	328.94	25.31	.00	.00	9993.80	10015.60	.00
*	1.970	1620.56	.03	1621.41	32.12	5.92	328.40	25.67	32.12	9990.93	9993.80	10015.60	10023.05
*	1.998	1624.11	.00	1624.88	30.21	11.23	256.24	12.53	.00	.00	10000.00	10020.50	.00
*	1.998	1624.13	.02	1624.88	30.21	11.42	255.85	12.73	30.21	9995.25	10000.00	10020.50	10025.46
*	2.072	1632.31	.00	1632.50	49.03	.00	280.00	.00	.00	.00	9986.80	10039.10	.00
*	2.072	1632.30	-.01	1632.50	49.01	.00	280.00	.00	52.30	9986.80	9986.80	10039.10	10039.10
	2.109	1635.58	.00	1636.13	31.80	.00	280.00	.00	.00	.00	10000.00	10031.80	.00
	2.109	1635.63	.04	1636.15	31.80	.00	280.00	.00	31.81	9999.99	10000.00	10031.80	10031.80
*	2.120	1636.77	.00	1637.01	32.00	.00	280.00	.00	.00	.00	9994.00	10026.00	.00
*	2.120	1636.77	-.01	1637.00	32.00	.00	280.00	.00	32.02	9993.99	9994.00	10026.00	10026.01
*	2.131	1637.46	.00	1638.09	37.48	.38	279.62	.00	.00	.00	9992.30	10029.90	.00
*	2.131	1637.46	.00	1638.09	37.48	.39	279.60	.00	40.33	9989.58	9992.30	10029.90	10029.91
*	2.218	1646.16	.00	1646.32	83.61	68.98	171.52	39.49	.00	.00	10006.10	10032.90	.00
*	2.218	1646.16	.00	1646.32	83.58	68.99	171.57	39.44	83.61	9984.74	10006.10	10032.90	10068.35
*	2.274	1650.55	.00	1650.95	34.45	.00	290.00	.00	.00	.00	9979.10	10022.10	.00
*	2.274	1650.55	.00	1650.95	34.48	.00	290.00	.00	43.02	9979.09	9979.10	10022.10	10022.11
*	2.287	1653.34	.00	1655.43	6.00	.00	290.00	.00	.00	.00	9998.00	10004.00	.00
*	2.287	1653.34	.00	1655.43	6.00	.00	290.00	.00	6.02	9997.99	9998.00	10004.00	10004.01
*	2.306	1659.68	.00	1659.68	334.07	91.74	38.93	259.32	.00	.00	9997.00	10003.00	.00
*	2.306	1659.68	.00	1659.68	334.07	91.74	38.93	259.32	334.07	9935.52	9997.00	10003.00	10269.59
*	2.317	1659.68	.00	1659.69	270.78	36.14	143.77	210.09	.00	.00	9992.20	10011.70	.00
*	2.317	1659.68	.00	1659.69	270.78	36.14	143.76	210.10	270.78	9963.53	9992.20	10011.70	10234.31

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Caliente Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1.026	.00	.00	.00	1518.45	670.00	1522.60	1522.09	1523.16	185.42	6.90	118.95	49.20
	1.026	.00	.00	.00	1518.45	670.00	1522.60	1522.09	1523.16	185.43	6.90	118.95	49.20
	1.028	10.00	.00	.00	1518.64	670.00	1522.78	1522.28	1523.34	186.51	6.92	118.68	49.06
	1.028	10.00	.00	.00	1518.64	670.00	1522.78	1522.28	1523.34	186.51	6.92	118.68	49.06
	1.030	10.00	.00	.00	1518.82	670.00	1522.97	1522.46	1523.53	185.40	6.90	118.95	49.21
	1.030	10.00	.00	.00	1518.82	670.00	1522.97	1522.46	1523.53	185.40	6.90	118.95	49.21
	1.032	10.00	.00	.00	1519.00	670.00	1523.16	1522.64	1523.71	183.39	6.87	119.45	49.47
	1.032	10.00	.00	.00	1519.00	670.00	1523.16	1522.64	1523.71	183.40	6.87	119.45	49.47
	1.054	112.60	.00	.00	1519.90	670.00	1525.28	1524.34	1525.75	179.05	5.53	121.48	50.07
	1.054	112.60	.00	.00	1519.90	670.00	1525.28	1524.34	1525.75	179.05	5.53	121.48	50.07
	1.083	158.10	.00	.00	1525.40	670.00	1527.64	1527.48	1528.12	125.22	7.27	135.03	59.88
	1.083	158.10	.00	.00	1525.40	670.00	1527.64	1527.48	1528.12	125.22	7.27	135.03	59.88
*	1.093	50.60	.00	.00	1526.10	670.00	1529.36	1529.36	1530.34	128.72	10.60	91.44	59.05
*	1.093	50.60	.00	.00	1526.10	670.00	1529.36	1529.36	1530.34	128.59	10.59	91.47	59.08
*	1.098	25.00	1530.64	1530.58	1527.08	670.00	1532.40	.00	1532.74	35.31	7.69	185.38	112.76

*	1.098	25.00	1530.64	1530.58	1527.08	670.00	1532.40	.00	1532.74	35.40	7.70	185.15	112.61
*	1.107	50.20	.00	.00	1528.50	670.00	1532.71	1530.57	1532.85	9.77	3.15	255.59	214.33
*	1.107	50.20	.00	.00	1528.50	670.00	1532.71	1530.57	1532.85	9.78	3.15	255.48	214.21
*	1.186	415.50	.00	.00	1536.00	670.00	1538.31	1538.31	1539.23	155.09	8.41	96.62	53.80
*	1.186	415.50	.00	.00	1536.00	670.00	1538.33	1538.33	1539.23	149.18	8.31	97.85	54.86
*	1.311	658.40	.00	.00	1547.50	670.00	1550.36	1550.36	1551.28	219.53	8.43	92.66	45.22
*	1.311	658.40	.00	.00	1547.50	670.00	1550.37	1550.37	1551.28	215.36	8.38	93.26	45.66
	1.384	388.20	.00	.00	1553.90	670.00	1557.79	1557.78	1558.80	170.43	9.09	91.87	51.32
*	1.384	388.20	.00	.00	1553.90	670.00	1557.79	1557.79	1558.79	169.74	9.08	92.00	51.43
	1.480	508.20	.00	.00	1564.10	670.00	1566.69	1566.45	1567.32	163.75	6.47	107.60	52.36
	1.480	508.20	.00	.00	1564.10	670.00	1566.69	1566.45	1567.32	164.42	6.48	107.45	52.25
	1.504	121.70	.00	.00	1565.70	520.00	1568.25	1567.68	1568.60	63.62	4.76	110.90	65.19
	1.504	121.70	.00	.00	1565.70	520.00	1568.25	1567.68	1568.60	63.66	4.76	110.87	65.17
*	1.573	366.90	.00	.00	1571.20	520.00	1573.69	1573.69	1574.40	245.56	7.76	80.22	33.18
*	1.573	366.90	.00	.00	1571.20	520.00	1573.69	1573.69	1574.40	246.33	7.77	80.13	33.13
*	1.663	477.70	.00	.00	1584.80	520.00	1587.40	1587.40	1588.41	123.51	8.76	73.90	46.79
*	1.663	477.70	.00	.00	1584.80	520.00	1587.42	1587.42	1588.40	119.75	8.67	74.69	47.52

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.763	527.70	.00	.00	1594.00	360.00	1595.93	1595.93	1596.61	168.28	7.38	62.66	27.75
*	1.763	527.70	.00	.00	1594.00	360.00	1595.94	1595.94	1596.61	164.67	7.33	63.11	28.05
*	1.778	77.70	.00	.00	1595.70	360.00	1598.36	1598.36	1599.70	130.16	9.29	38.76	31.55
*	1.778	77.70	.00	.00	1595.70	360.00	1598.37	1598.37	1599.70	162.33	9.28	38.77	28.26
*	1.789	55.00	1604.19	1602.56	1596.70	360.00	1601.71	.00	1601.95	12.20	3.91	92.12	103.06
*	1.789	55.00	1604.19	1602.56	1596.70	360.00	1601.71	.00	1601.95	16.77	3.91	92.12	87.90
*	1.805	85.90	.00	.00	1598.40	360.00	1601.97	1600.63	1602.11	26.40	3.19	124.70	70.06
	1.805	85.90	.00	.00	1598.40	360.00	1602.00	1600.63	1602.14	25.34	3.15	126.38	71.51
*	1.898	491.90	.00	.00	1608.60	360.00	1611.13	1611.13	1611.90	330.80	7.17	51.29	19.79
*	1.898	491.90	.00	.00	1608.60	360.00	1611.13	1611.13	1611.90	331.22	7.18	51.27	19.78
*	1.970	380.40	.00	.00	1618.40	360.00	1620.53	1620.53	1621.41	160.01	7.80	52.17	28.46
*	1.970	380.40	.00	.00	1618.40	360.00	1620.56	1620.56	1621.41	152.58	7.68	53.01	29.14
*	1.998	149.40	.00	.00	1622.40	280.00	1624.11	1624.11	1624.88	296.46	7.31	43.33	16.26
*	1.998	149.40	.00	.00	1622.40	280.00	1624.13	1624.13	1624.88	283.66	7.21	43.97	16.62
*	2.072	390.70	.00	.00	1629.30	280.00	1632.31	1631.63	1632.50	136.50	3.50	80.08	23.97
*	2.072	390.70	.00	.00	1629.30	280.00	1632.30	1631.63	1632.50	140.67	3.51	79.78	23.61
	2.109	195.80	.00	.00	1634.10	280.00	1635.58	1635.45	1636.13	236.62	5.94	47.12	18.20
	2.109	195.80	.00	.00	1634.10	280.00	1635.63	1635.45	1636.15	232.96	5.80	48.24	18.34
*	2.120	55.00	1638.96	1637.65	1634.40	280.00	1636.77	.00	1637.01	71.99	3.88	72.22	33.00
*	2.120	55.00	1638.96	1637.65	1634.40	280.00	1636.77	.00	1637.00	75.90	3.89	71.99	32.14
*	2.131	59.60	.00	.00	1635.90	280.00	1637.46	1637.46	1638.09	504.93	6.36	44.35	12.46
*	2.131	59.60	.00	.00	1635.90	280.00	1637.46	1637.46	1638.09	501.13	6.34	44.46	12.51
*	2.218	458.90	.00	.00	1644.00	280.00	1646.16	1645.66	1646.32	90.18	3.79	100.38	29.48
*	2.218	458.90	.00	.00	1644.00	280.00	1646.16	1645.66	1646.32	90.48	3.80	100.26	29.44
*	2.274	296.00	.00	.00	1647.80	290.00	1650.55	1650.10	1650.95	310.59	5.10	56.86	16.46
*	2.274	296.00	.00	.00	1647.80	290.00	1650.55	1650.10	1650.95	309.11	5.09	56.97	16.49
*	2.287	66.60	.00	.00	1649.17	290.00	1653.34	1653.34	1655.43	226.38	11.59	25.03	19.27
*	2.287	66.60	.00	.00	1649.17	290.00	1653.34	1653.34	1655.43	457.62	11.59	25.03	13.56
*	2.306	100.00	1659.20	1655.78	1650.28	390.00	1659.68	.00	1659.68	.27	.69	1232.13	748.25
*	2.306	100.00	1659.20	1655.78	1650.28	390.00	1659.68	.00	1659.68	.27	.69	1232.17	748.28
*	2.317	60.90	.00	.00	1651.50	390.00	1659.68	1654.09	1659.69	.66	.95	746.25	479.98
*	2.317	60.90	.00	.00	1651.50	390.00	1659.68	1654.09	1659.69	.66	.95	746.39	480.06

Caliente Wash 100-Year

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH

	1.026	670.00	1522.60	.00	.00	.00	57.45	.00
	1.026	670.00	1522.60	.00	.00	.00	57.44	.00
	1.028	670.00	1522.78	.00	.18	.00	57.38	10.00
	1.028	670.00	1522.78	.00	.18	.00	57.38	10.00
	1.030	670.00	1522.97	.00	.19	.00	57.45	10.00
	1.030	670.00	1522.97	.00	.19	.00	57.44	10.00
	1.032	670.00	1523.16	.00	.19	.00	57.57	10.00
	1.032	670.00	1523.16	.00	.19	.00	57.57	10.00
	1.054	670.00	1525.28	.00	2.12	.00	47.99	112.60
	1.054	670.00	1525.28	.00	2.12	.00	47.97	112.60
	1.083	670.00	1527.64	.00	2.36	.00	102.99	158.10
	1.083	670.00	1527.64	.00	2.36	.00	102.99	158.10
*	1.093	670.00	1529.36	.00	1.72	.00	48.03	50.60
*	1.093	670.00	1529.36	.00	1.72	.00	48.02	50.60
*	1.098	670.00	1532.40	.00	3.04	.00	126.82	25.00
*	1.098	670.00	1532.40	.00	3.04	.00	126.72	25.00
*	1.107	670.00	1532.71	.00	.31	.00	89.82	50.20
*	1.107	670.00	1532.71	.00	.31	.00	89.78	50.20
*	1.186	670.00	1538.31	.00	5.59	.00	55.44	415.50
*	1.186	670.00	1538.33	.02	5.62	.02	55.45	415.50
*	1.311	670.00	1550.36	.00	12.06	.00	51.91	658.40
*	1.311	670.00	1550.37	.01	12.04	.01	51.91	658.40
	1.384	670.00	1557.79	.00	7.43	.00	44.67	388.20
*	1.384	670.00	1557.79	.00	7.42	.00	44.67	388.20
	1.480	670.00	1566.69	.00	8.90	.00	61.20	508.20
	1.480	670.00	1566.69	.00	8.89	.00	61.18	508.20
	1.504	520.00	1568.25	.00	1.56	.00	60.95	121.70
	1.504	520.00	1568.25	.00	1.57	.00	60.94	121.70
*	1.573	520.00	1573.69	.00	5.44	.00	55.15	366.90
*	1.573	520.00	1573.69	.00	5.44	.00	55.13	366.90
*	1.663	520.00	1587.40	.00	13.70	.00	38.30	477.70
*	1.663	520.00	1587.42	.02	13.73	.02	38.30	477.70

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.763	360.00	1595.93	.00	8.54	.00	47.90	527.70
*	1.763	360.00	1595.94	.01	8.53	.01	47.90	527.70
*	1.778	360.00	1598.36	.00	2.43	.00	14.60	77.70
*	1.778	360.00	1598.37	.00	2.42	.00	14.60	77.70
*	1.789	360.00	1601.71	.00	3.35	.00	19.10	55.00
*	1.789	360.00	1601.71	.00	3.34	.00	19.10	55.00
*	1.805	360.00	1601.97	.00	.26	.00	53.79	85.90
	1.805	360.00	1602.00	.03	.29	.03	53.79	85.90
*	1.898	360.00	1611.13	.00	9.16	.00	34.99	491.90
*	1.898	360.00	1611.13	.00	9.13	.00	34.98	491.90
*	1.970	360.00	1620.53	.00	9.40	.00	32.11	380.40
*	1.970	360.00	1620.56	.03	9.43	.03	32.12	380.40
*	1.998	280.00	1624.11	.00	3.58	.00	30.21	149.40
*	1.998	280.00	1624.13	.02	3.57	.02	30.21	149.40
*	2.072	280.00	1632.31	.00	8.20	.00	49.03	390.70
*	2.072	280.00	1632.30	-.01	8.17	-.01	49.01	390.70
	2.109	280.00	1635.58	.00	3.27	.00	31.80	195.80
	2.109	280.00	1635.63	.04	3.32	.04	31.80	195.80
*	2.120	280.00	1636.77	.00	1.19	.00	32.00	55.00
*	2.120	280.00	1636.77	-.01	1.14	-.01	32.00	55.00
*	2.131	280.00	1637.46	.00	.69	.00	37.48	59.60
*	2.131	280.00	1637.46	.00	.70	.00	37.48	59.60
*	2.218	280.00	1646.16	.00	8.70	.00	83.61	458.90
*	2.218	280.00	1646.16	.00	8.70	.00	83.58	458.90
*	2.274	290.00	1650.55	.00	4.39	.00	34.45	296.00

*	2.274	290.00	1650.55	.00	4.39	.00	34.48	296.00
*	2.287	290.00	1653.34	.00	2.79	.00	6.00	66.60
*	2.287	290.00	1653.34	.00	2.79	.00	6.00	66.60
*	2.306	390.00	1659.68	.00	6.34	.00	334.07	100.00
*	2.306	390.00	1659.68	.00	6.34	.00	334.07	100.00
*	2.317	390.00	1659.68	.00	.00	.00	270.78	60.90
*	2.317	390.00	1659.68	.00	.00	.00	270.78	60.90

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.093 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.093 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.093 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.093 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1.098 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.098 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.107 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.107 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1.186 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.186 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.186 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.186 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.311 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.311 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.311 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.311 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.384 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.384 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.573 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.573 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.573 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.573 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.663 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.663 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.663 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.663 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.763 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.763 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.763 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.763 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.778 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.778 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.778 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.778 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 1.789 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 1.789 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 1.805 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 1.898 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.898 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.898 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.898 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.970 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.970 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.970 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.970 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1.998 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.998 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1.998 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1.998 PROFILE= 2 MINIMUM SPECIFIC ENERGY

WARNING SECNO= 2.072 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 2.072 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 WARNING SECNO=      2.120  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.120  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.131  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.131  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.131  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.131  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.218  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.218  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      2.274  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.274  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=      2.287  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.287  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=      2.287  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=      2.287  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=      2.306  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.306  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=      2.317  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=      2.317  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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Floodway width summary: Caliente Wash 100-Year
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
1.026	.00	57.45	9954.20	43.00	9997.20	14.45	10011.65
1.028	.00	57.38	9954.25	42.95	9997.20	14.43	10011.63
1.030	.00	57.45	9954.20	43.00	9997.20	14.45	10011.65
1.032	.00	57.58	9954.09	43.11	9997.20	14.47	10011.67
1.054	.00	48.93	9976.99	23.31	10000.30	25.62	10025.92
1.083	.00	102.99	9932.95	76.30	10009.25	26.69	10035.94
1.093	.00	48.02	9996.46	17.04	10013.50	30.98	10044.48
1.098	.00	126.82	9931.17	57.33	9988.50	69.49	10057.99
1.107	.00	89.81	9956.82	42.38	9999.20	47.43	10046.63
1.186	.02	55.45	9968.75	22.35	9991.10	33.10	10024.20
1.311	.01	51.91	9968.93	34.37	10003.30	17.54	10020.84
1.384	.00	44.67	9971.56	31.44	10003.00	13.23	10016.23
1.480	.00	61.20	9965.17	30.68	9995.85	30.52	10026.37
1.504	.00	62.82	9967.19	33.26	10000.45	29.56	10030.01
1.573	.00	57.27	9987.44	47.01	10034.45	10.26	10044.71
1.663	.02	38.30	9984.76	21.24	10006.00	17.06	10023.06
1.763	.01	47.90	9980.83	15.12	9995.95	32.78	10028.73
1.778	.00	14.60	10000.00	7.30	10007.30	7.30	10014.60
1.789	.00	19.12	9994.79	9.56	10004.35	9.56	10013.91
1.805	.03	53.79	9968.98	39.17	10008.15	14.62	10022.77
1.898	.00	34.99	9981.48	25.37	10006.85	9.62	10016.47
1.970	.03	32.12	9990.93	13.77	10004.70	18.35	10023.05
1.998	.02	30.21	9995.25	15.00	10010.25	15.21	10025.46
2.072	-.01	52.30	9986.80	26.15	10012.95	26.15	10039.10
2.109	.04	31.81	9999.99	15.91	10015.90	15.90	10031.80
2.120	-.01	32.02	9993.99	16.01	10010.00	16.01	10026.01
2.131	.00	40.33	9989.58	21.52	10011.10	18.81	10029.91
2.218	.00	83.61	9984.74	34.76	10019.50	48.85	10068.35
2.274	.00	43.02	9979.09	21.51	10000.60	21.51	10022.11
2.287	.00	6.02	9997.99	3.01	10001.00	3.01	10004.01
2.306	.00	334.07	9935.52	64.48	10000.00	269.59	10269.59
2.317	.00	270.78	9963.53	38.42	10001.95	232.36	10234.31

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1
    29MAR95       14:51:53                                                  PAGE   47
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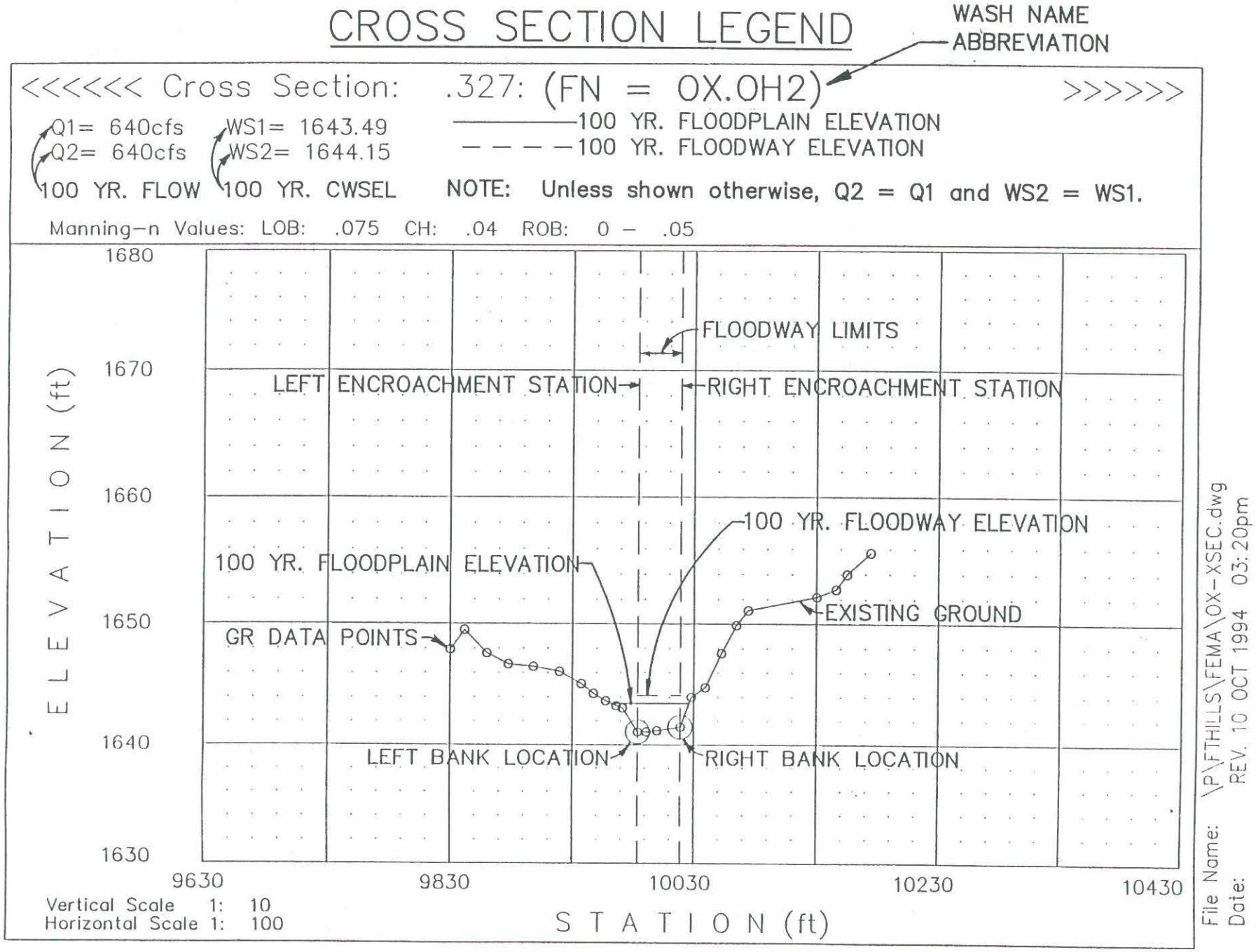
FLOODWAY DATA, Caliente Wash 100-Year
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
1.026	57.	119.	5.6	1522.6	1522.6	.0
1.028	57.	119.	5.6	1522.8	1522.8	.0
1.030	57.	119.	5.6	1523.0	1523.0	.0
1.032	58.	119.	5.6	1523.2	1523.2	.0
1.054	48.	121.	5.5	1525.3	1525.3	.0
1.083	103.	135.	5.0	1527.6	1527.6	.0
1.093	48.	91.	7.3	1529.4	1529.4	.0
1.098	127.	185.	3.6	1532.4	1532.4	.0

1.107	90.	255.	2.6	1532.7	1532.7	.0
1.186	55.	98.	6.8	1538.3	1538.3	.0
1.311	52.	93.	7.2	1550.4	1550.4	.0
1.384	45.	92.	7.3	1557.8	1557.8	.0
1.480	61.	107.	6.2	1566.7	1566.7	.0
1.504	61.	111.	4.7	1568.3	1568.3	.0
1.573	55.	80.	6.5	1573.7	1573.7	.0
1.663	38.	75.	7.0	1587.4	1587.4	.0
1.763	48.	63.	5.7	1595.9	1595.9	.0
1.778	15.	39.	9.3	1598.4	1598.4	.0
1.789	19.	92.	3.9	1601.7	1601.7	.0
1.805	54.	126.	2.8	1602.0	1602.0	.0
1.898	35.	51.	7.0	1611.1	1611.1	.0
1.970	32.	53.	6.8	1620.5	1620.5	.0
1.998	30.	44.	6.4	1624.1	1624.1	.0
2.072	49.	80.	3.5	1632.3	1632.3	.0
2.109	32.	48.	5.8	1635.6	1635.6	.0
2.120	32.	72.	3.9	1636.8	1636.8	.0
2.131	37.	44.	6.3	1637.5	1637.5	.0
2.218	84.	100.	2.8	1646.2	1646.2	.0
2.274	34.	57.	5.1	1650.5	1650.5	.0
2.287	6.	25.	11.6	1653.3	1653.3	.0
2.306	334.	1232.	.3	1659.7	1659.7	.0
2.317	271.	746.	.5	1659.7	1659.7	.0

CROSS SECTIONS

CROSS SECTION LEGEND



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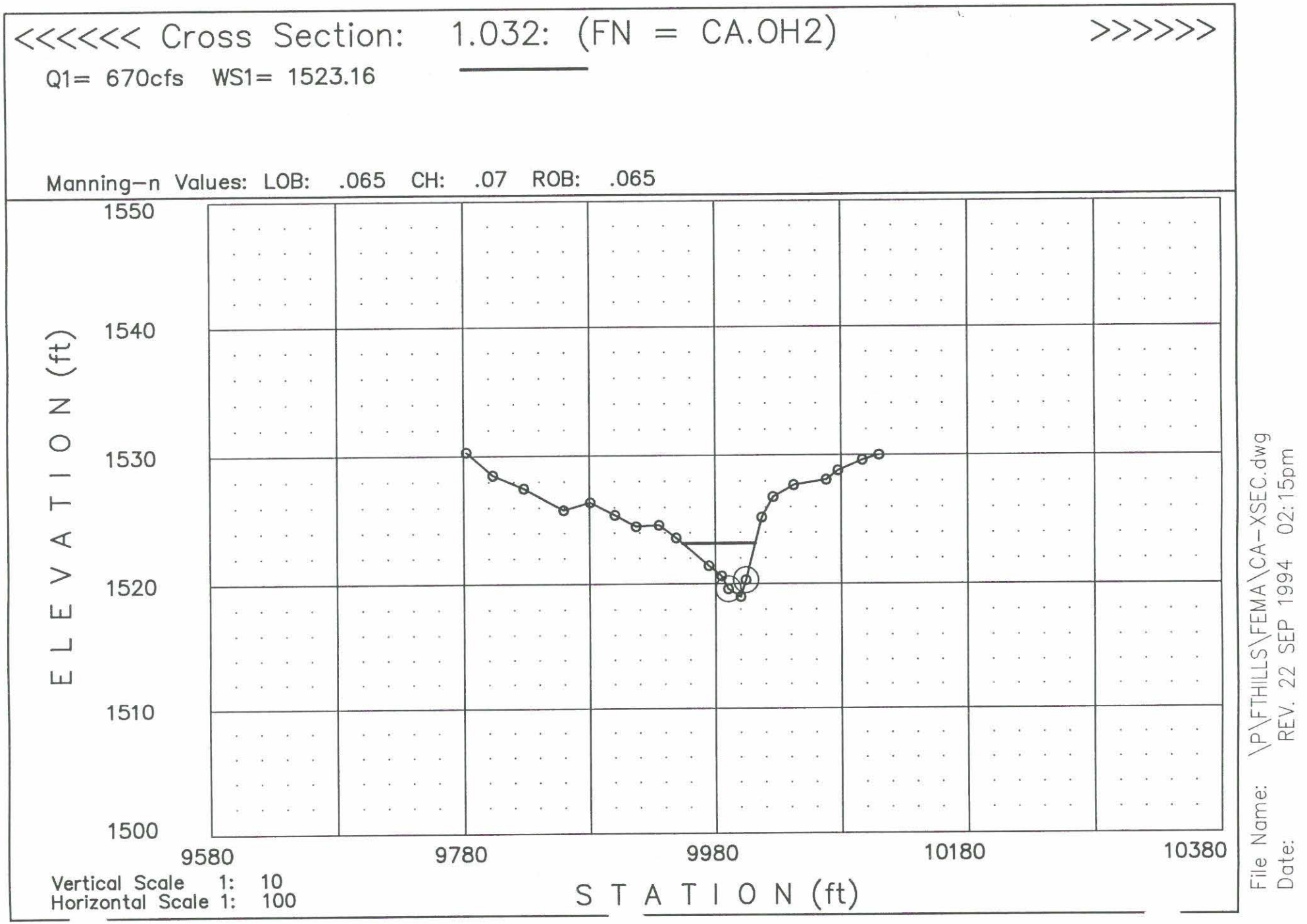
<<<<<< Cross Section: 1.032: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1523.16
Manning-n Values: LOB: .065 CH: .07 ROB: .065
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
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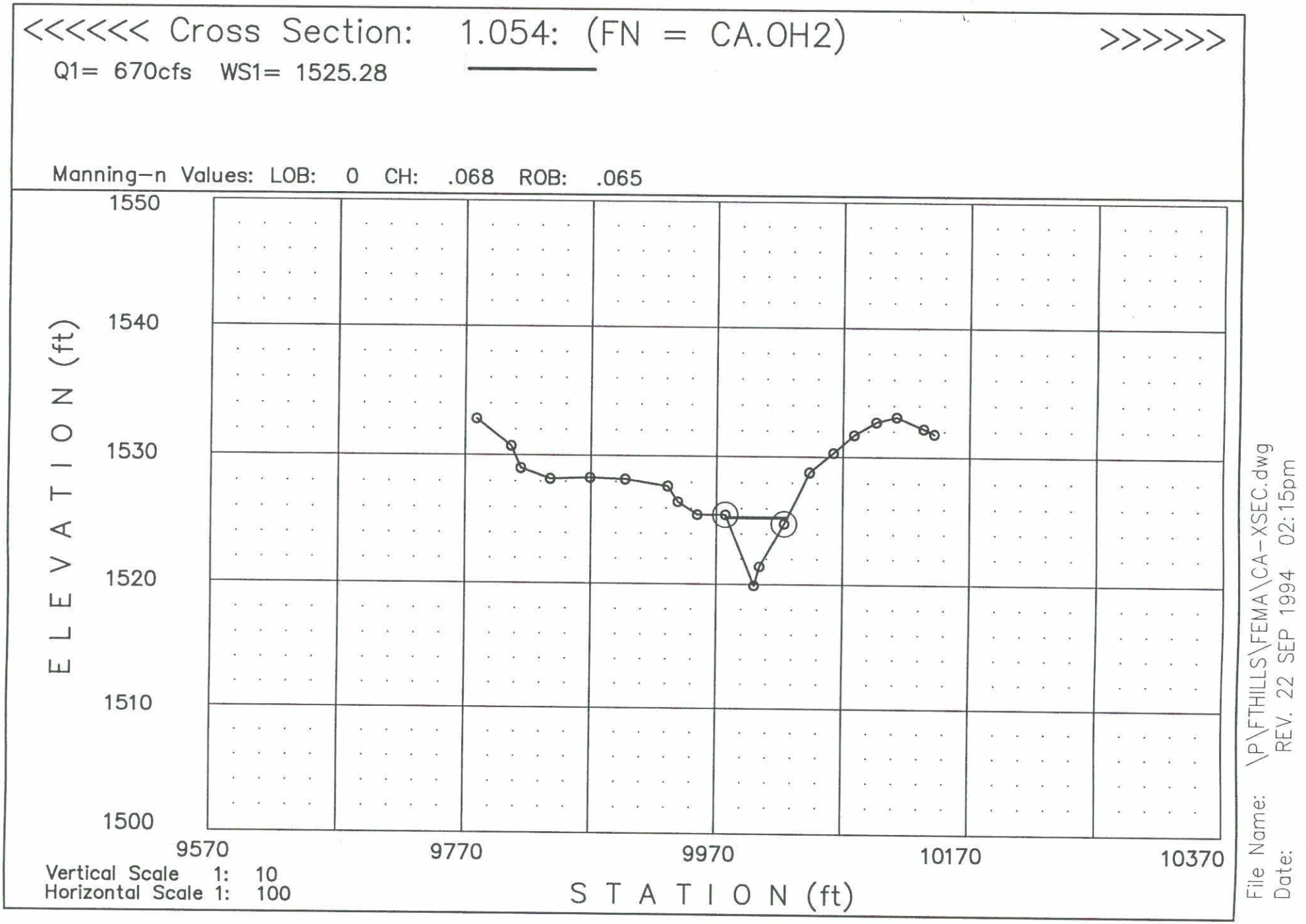
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 1.054: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1525.28
Manning-n Values: LOB: 0 CH: .068 ROB: .065
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
Vertical Scale 1: 10
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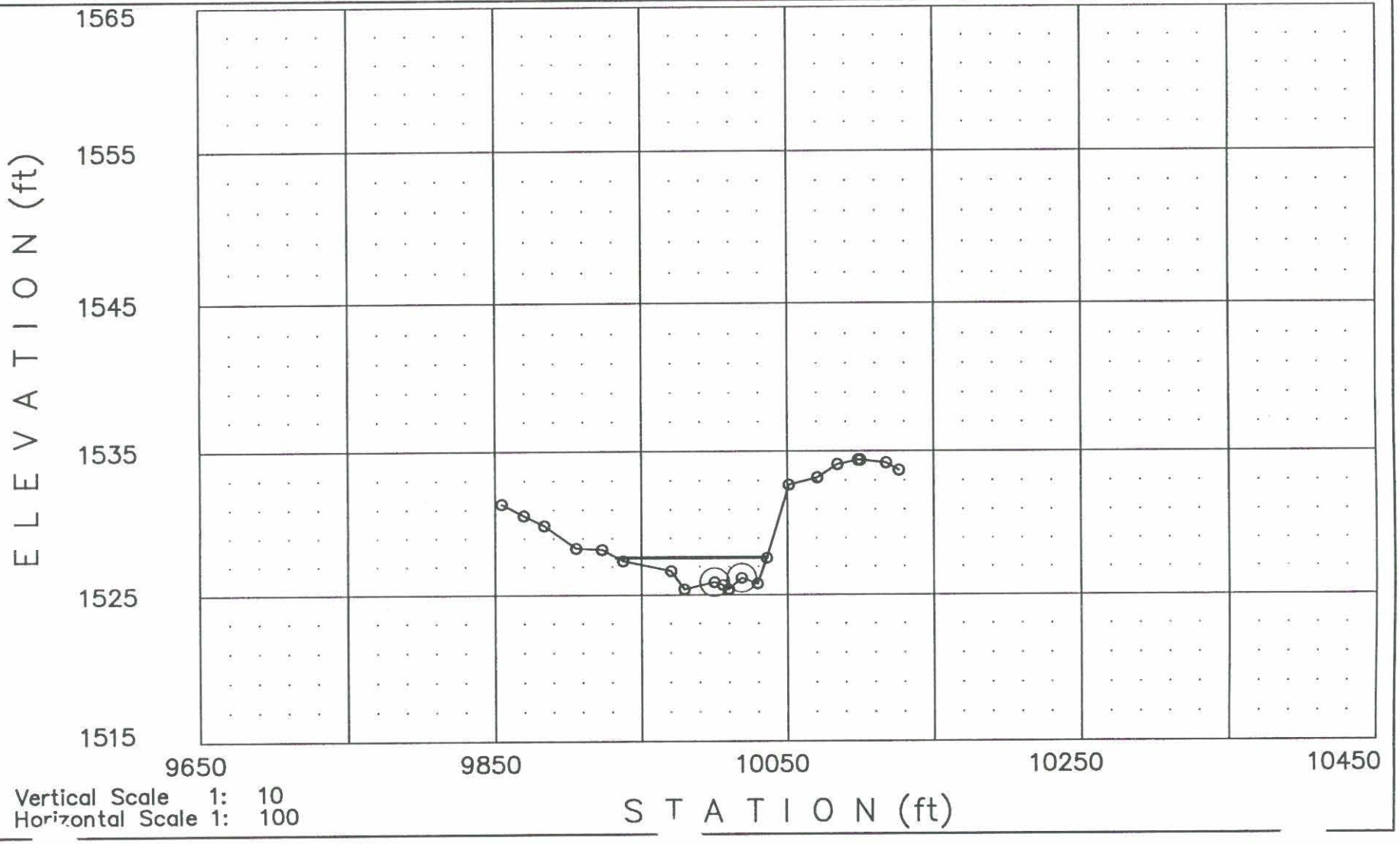
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 1.083: (FN = CA.OH2) >>>>>>

Q1= 670cfs WS1= 1527.64

Manning-n Values: LOB: .05 CH: .035 ROB: .06



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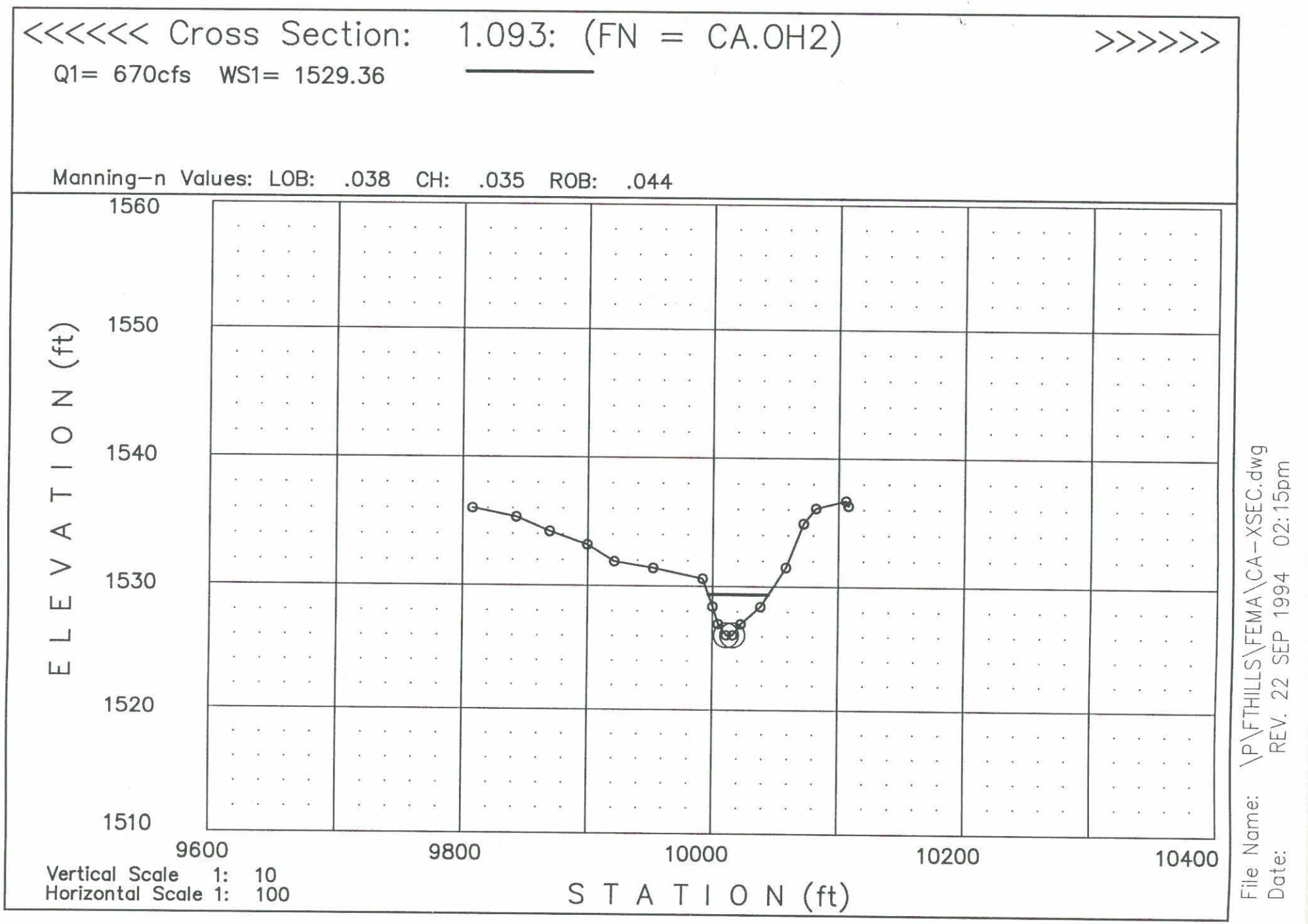
<<<<<< Cross Section: 1.093: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1529.36
Manning-n Values: LOB: .038 CH: .035 ROB: .044
1560
1550
1540
1530
1520
1510
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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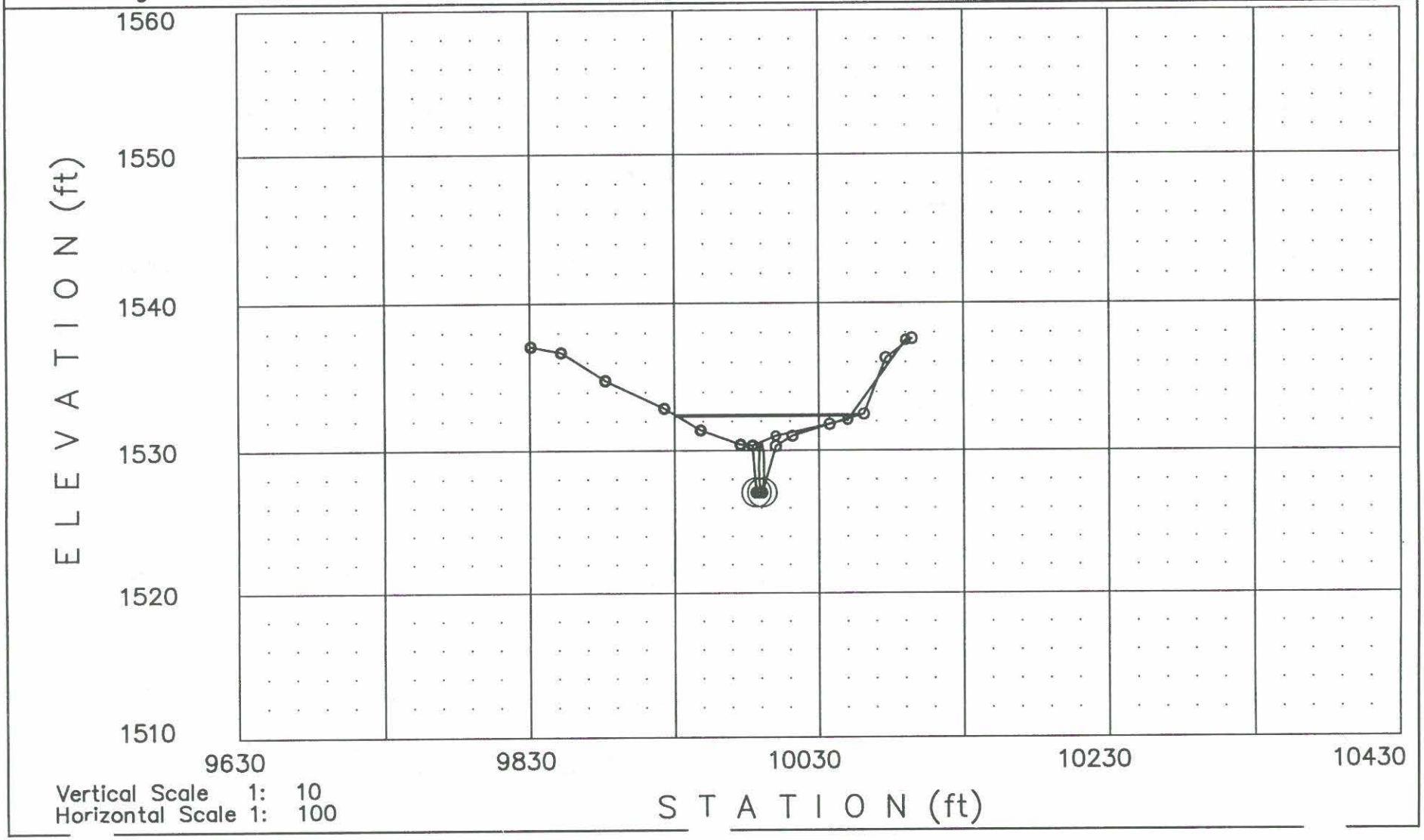
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 1.098: (FN = CA.OH2) >>>>>>

Q1= 670cfs WS1= 1532.4

Manning-n Values: LOB: .042 CH: .035 ROB: .042



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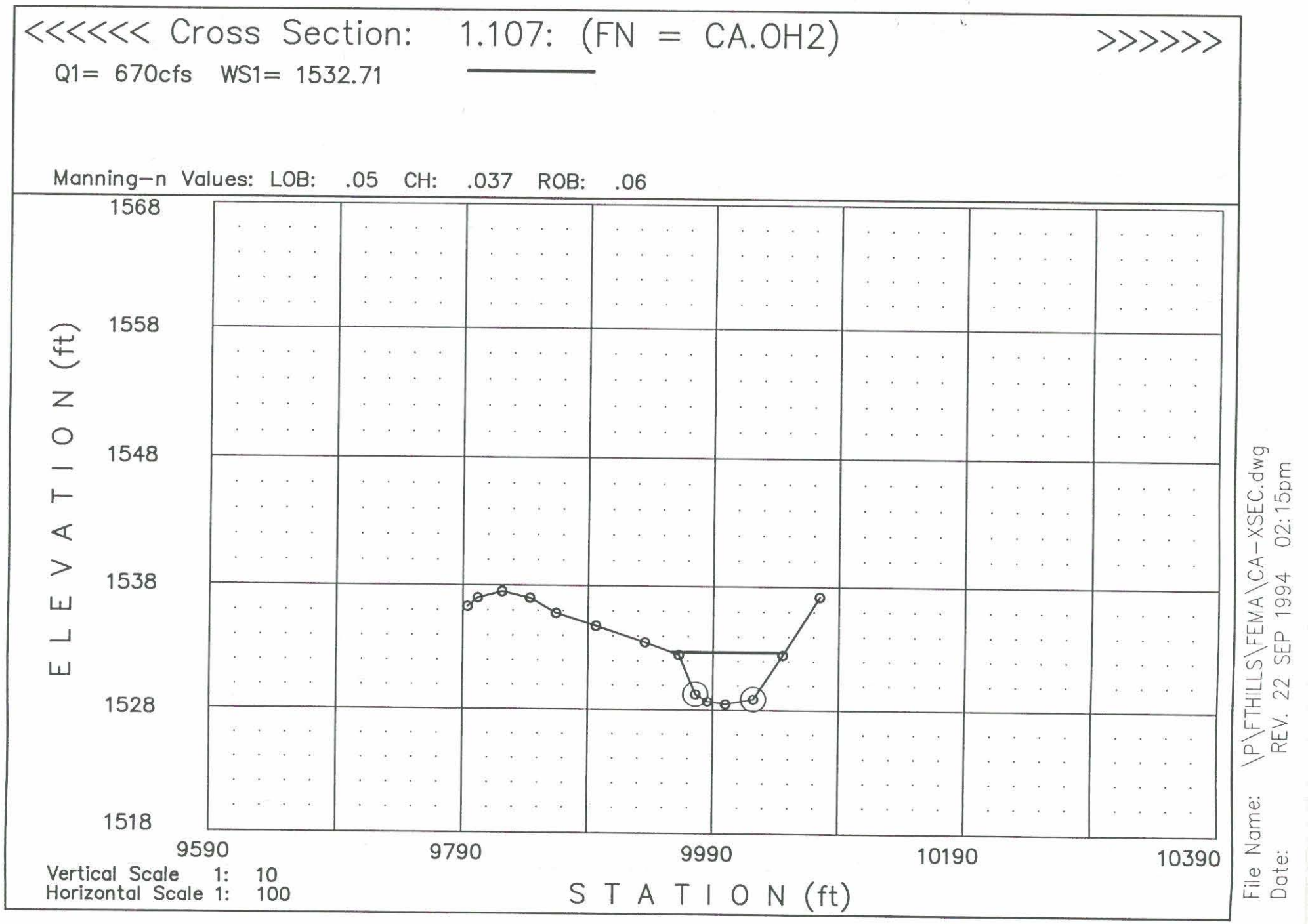
<<<<<< Cross Section: 1.107: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1532.71
Manning-n Values: LOB: .05 CH: .037 ROB: .06
1568
1558
1548
1538
1528
1518
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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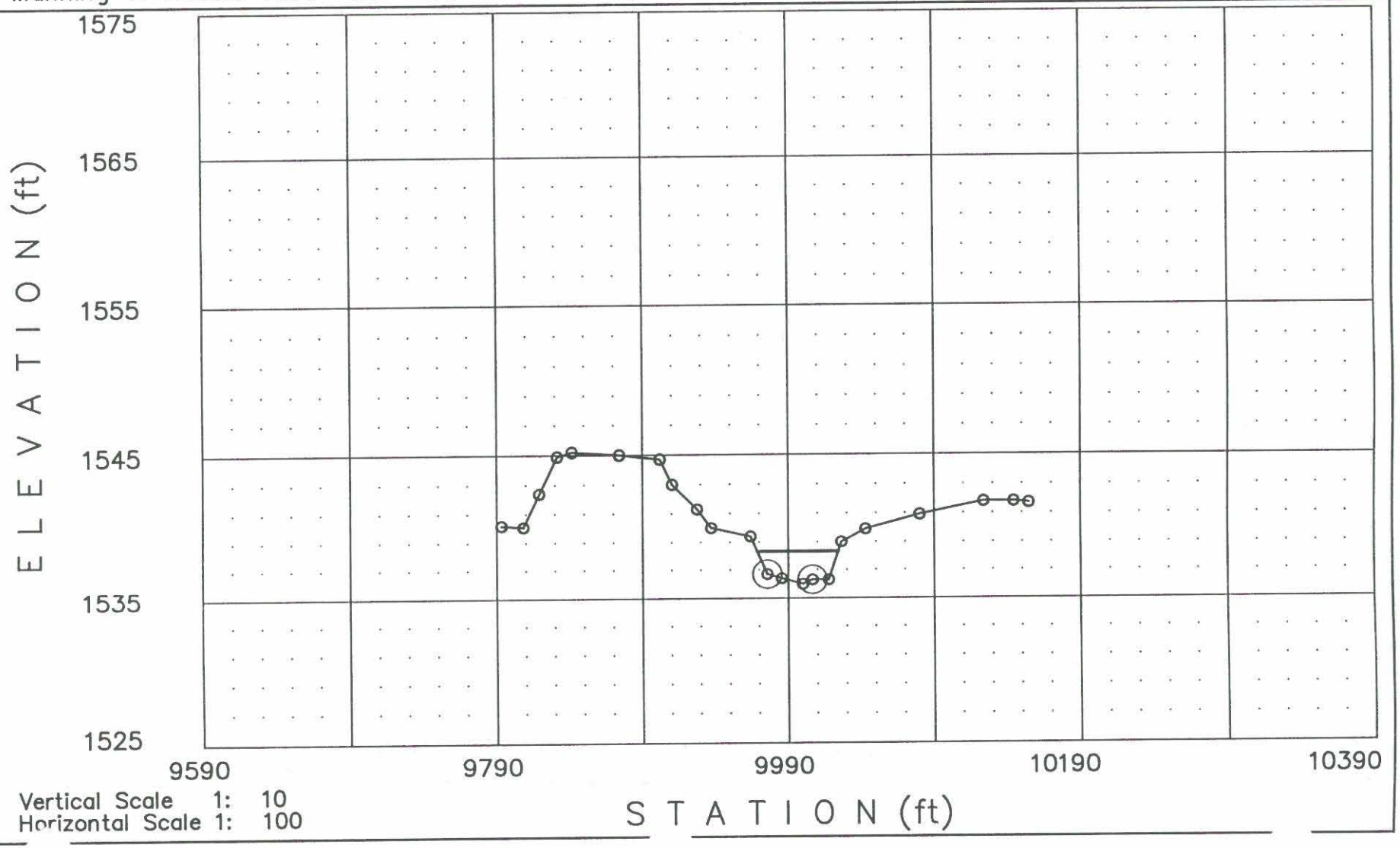
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 1.186: (FN = CA.OH2) >>>>>>

Q1= 670cfs WS1= 1538.31

Manning-n Values: LOB: .05 CH: .035 ROB: .06



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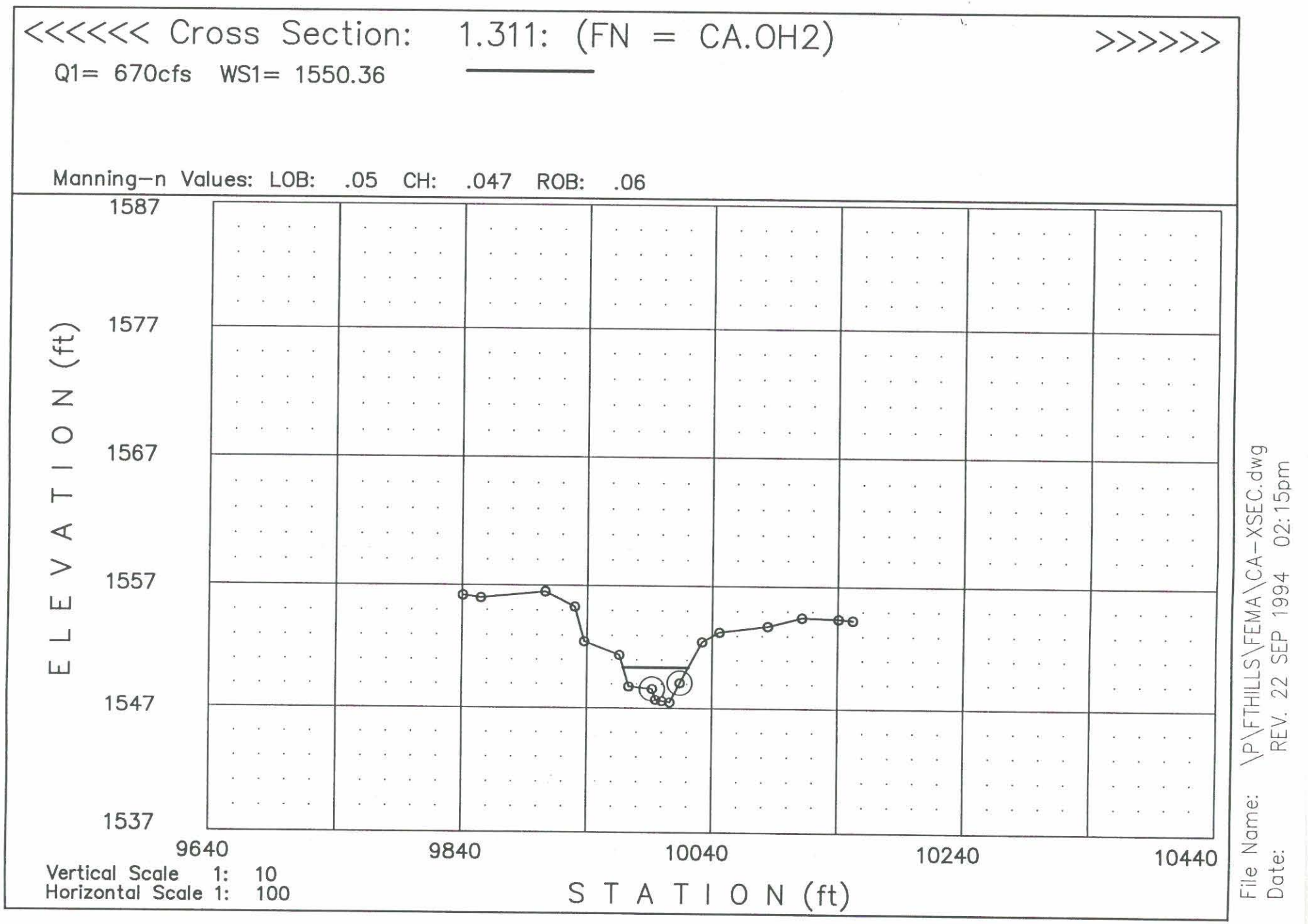
<<<<<< Cross Section: 1.311: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1550.36
Manning-n Values: LOB: .05 CH: .047 ROB: .06
1587
1577
1567
1557
1547
1537
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
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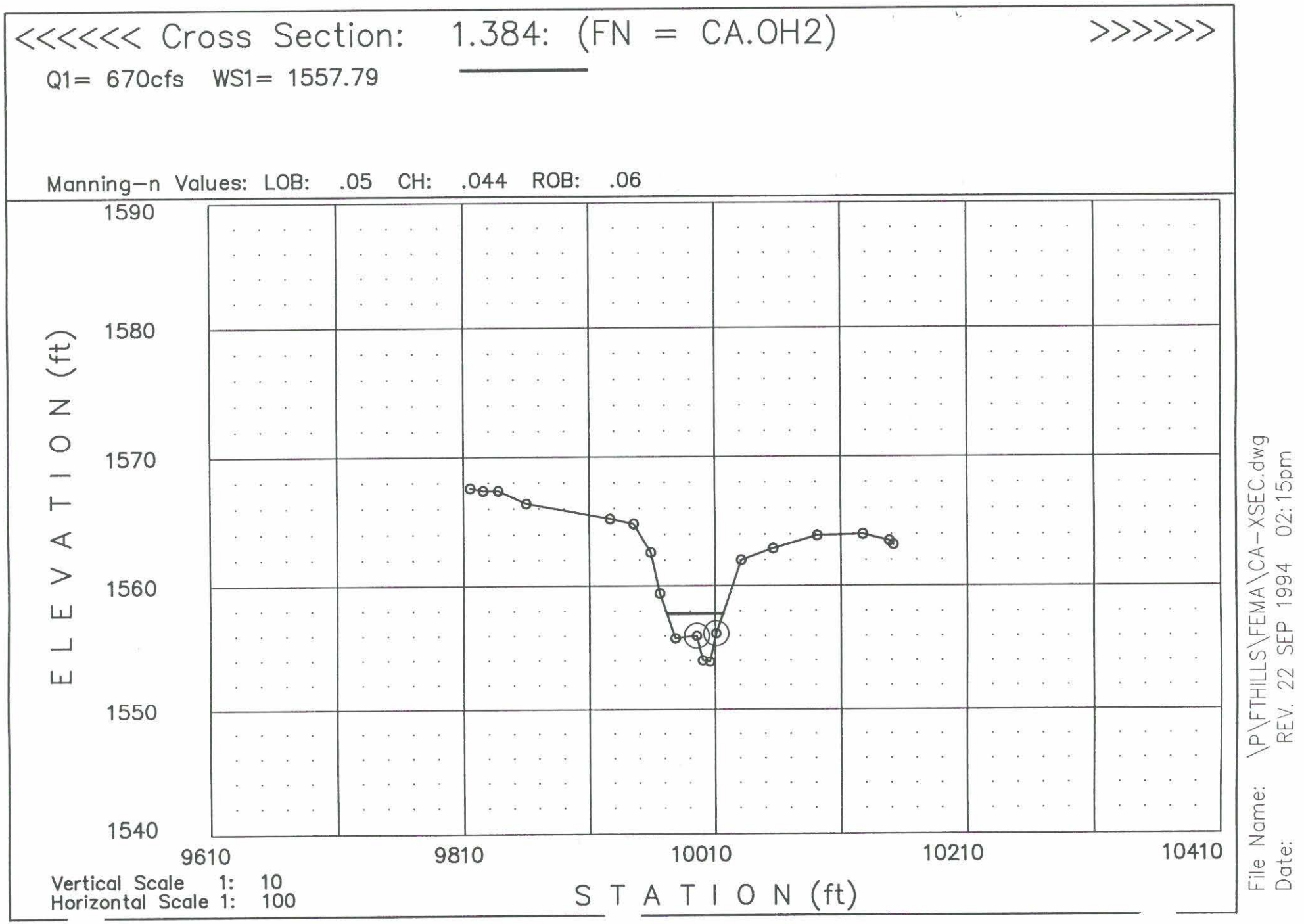
<<<<<< Cross Section: 1.384: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1557.79
Manning-n Values: LOB: .05 CH: .044 ROB: .06
1590
1580
1570
1560
1550
1540
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
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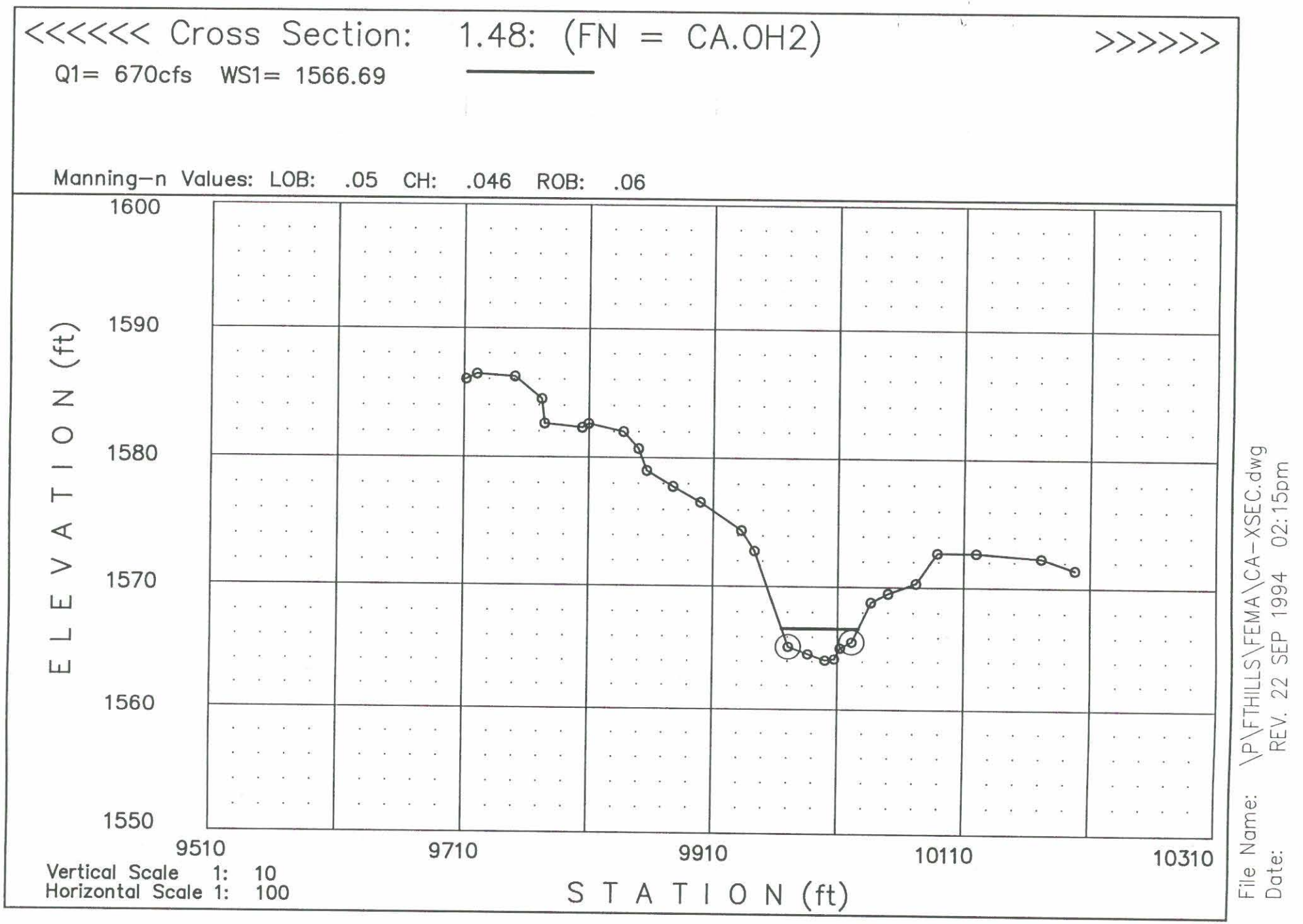
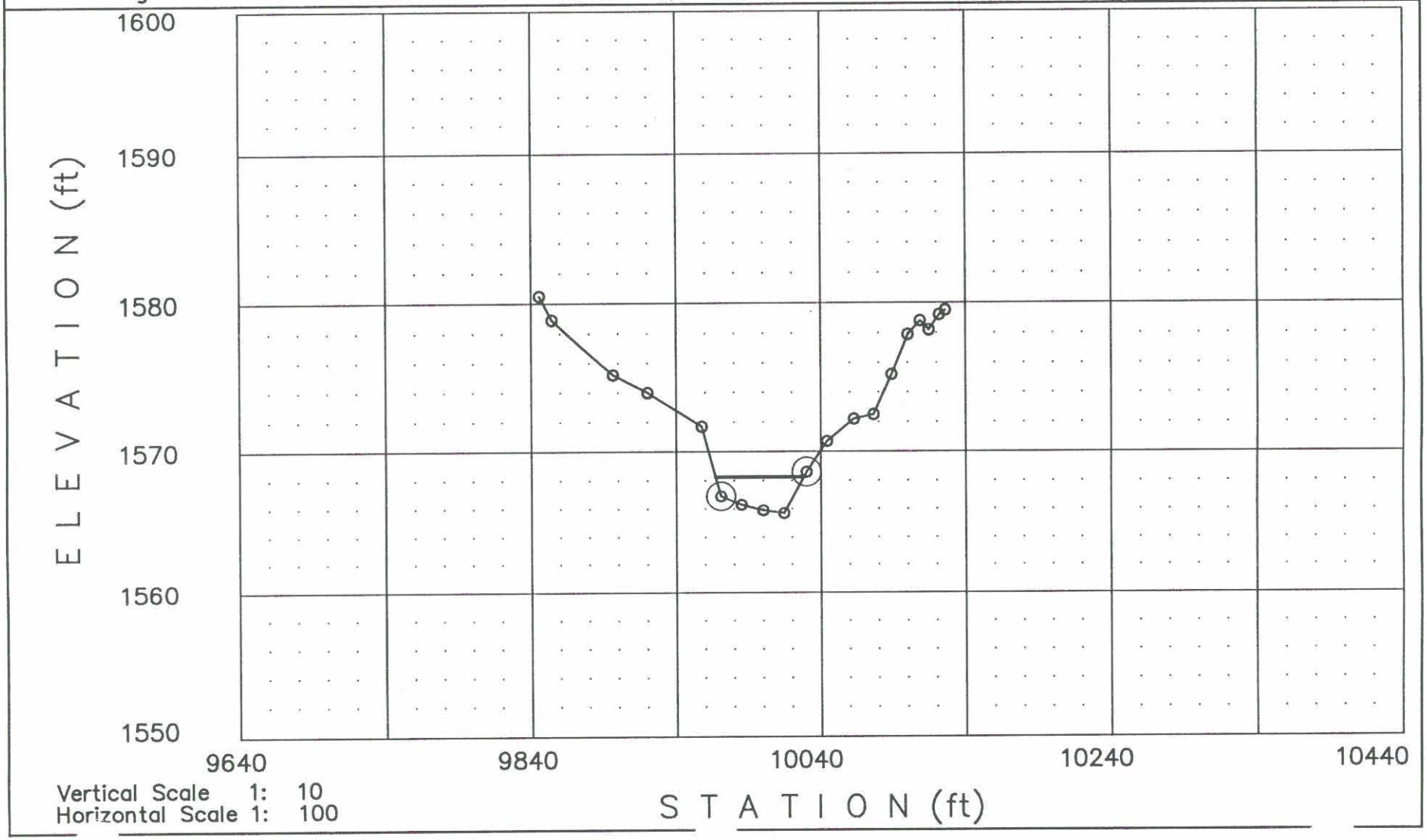

<<<<<< Cross Section: 1.48: (FN = CA.OH2) >>>>>>
Q1= 670cfs WS1= 1566.69
Manning-n Values: LOB: .05 CH: .046 ROB: .06
1600
1590
1580
1570
1560
1550
ELEVATION (ft)
9510
9710
9910
10110
10310
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 1.504: (FN = CA.OH2) >>>>>>

Q1= 520cfs WS1= 1568.25

Manning-n Values: LOB: .05 CH: .038 ROB: 0



Vertical Scale 1: 10
Horizontal Scale 1: 100

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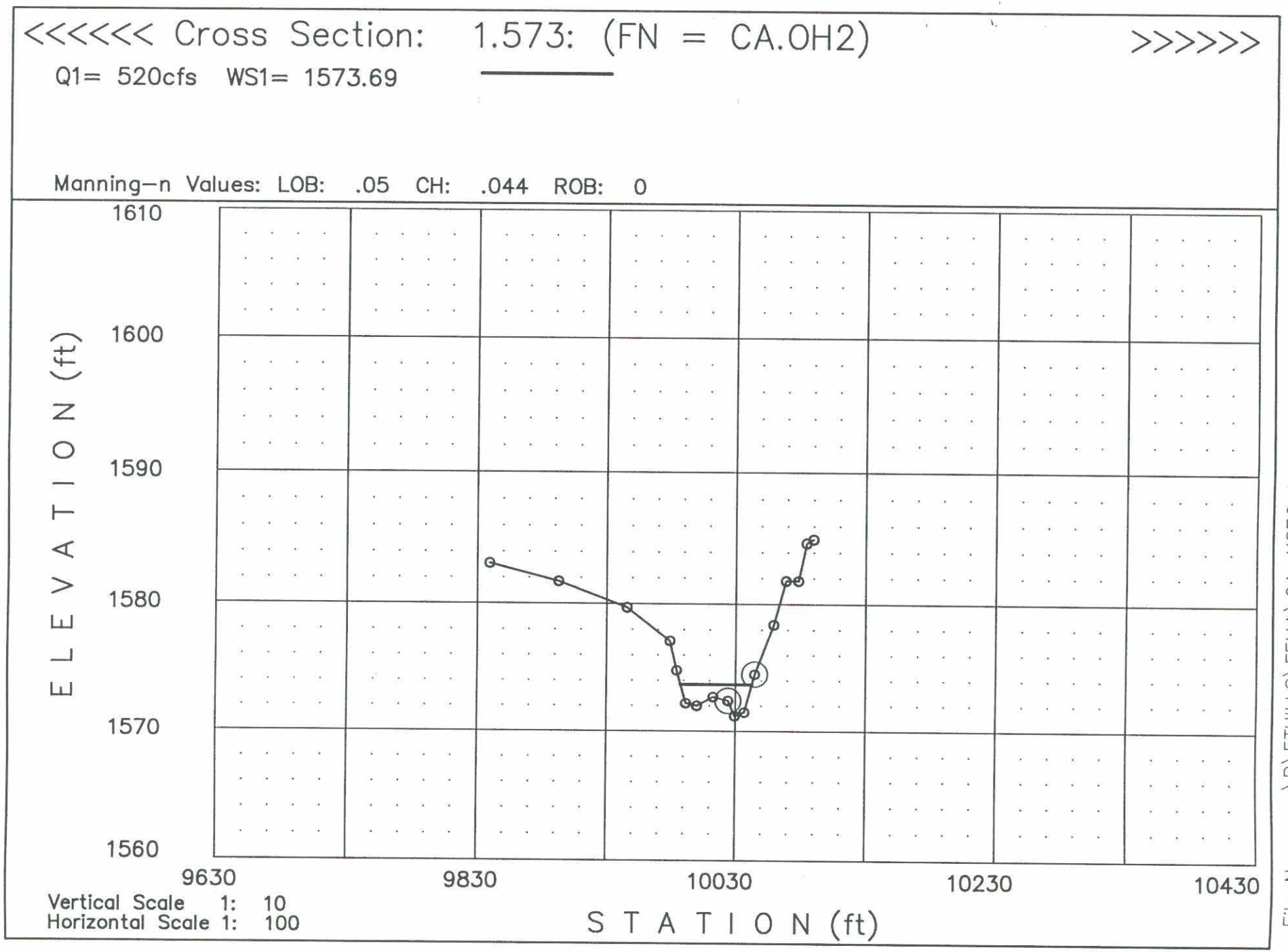
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 1.573: (FN = CA.OH2) >>>>>>
Q1= 520cfs WS1= 1573.69
Manning-n Values: LOB: .05 CH: .044 ROB: 0
1610
1600
1590
1580
1570
1560
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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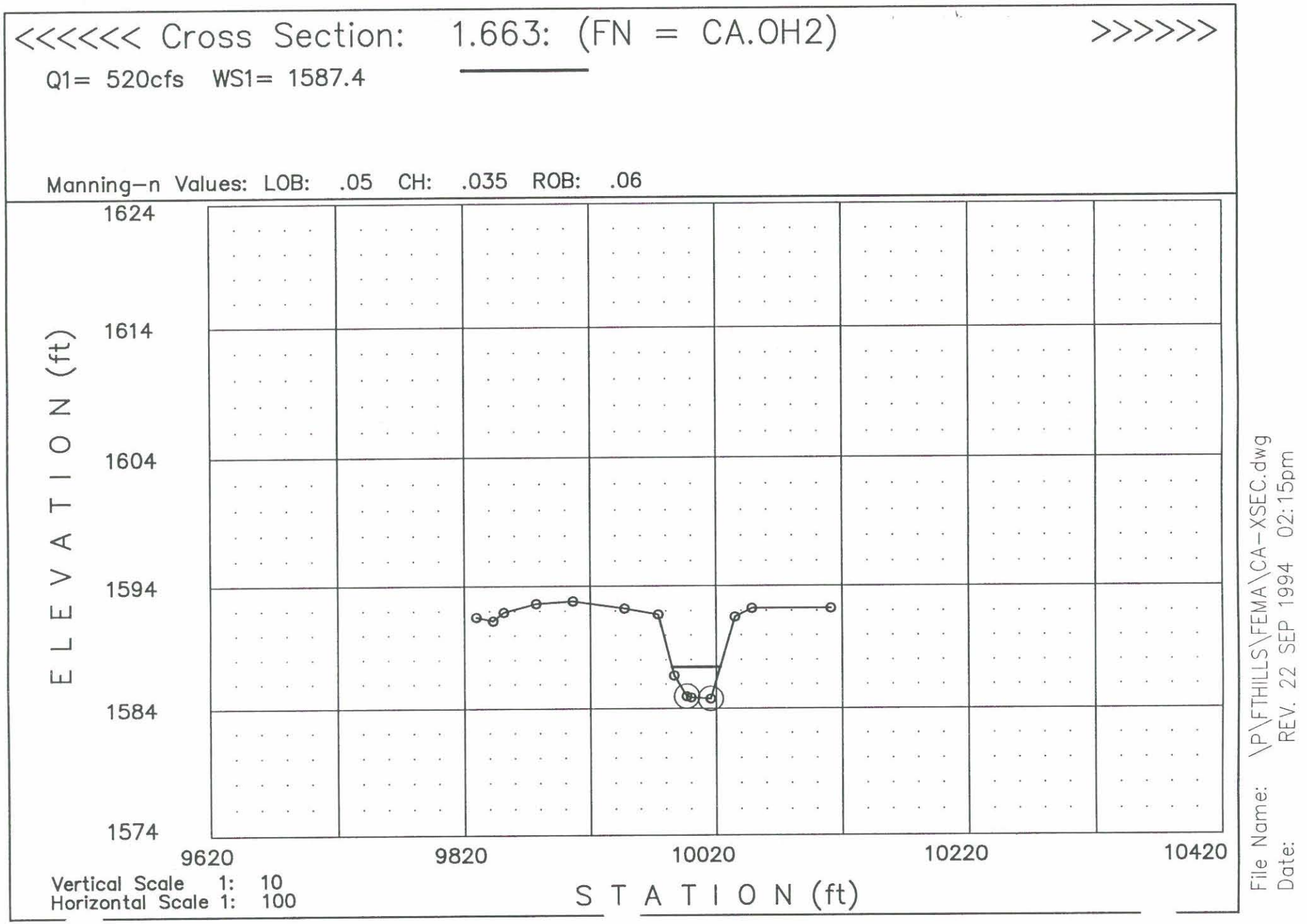
<<<<<< Cross Section: 1.663: (FN = CA.OH2) >>>>>>
Q1= 520cfs WS1= 1587.4
Manning-n Values: LOB: .05 CH: .035 ROB: .06
1624
1614
1604
1594
1584
1574
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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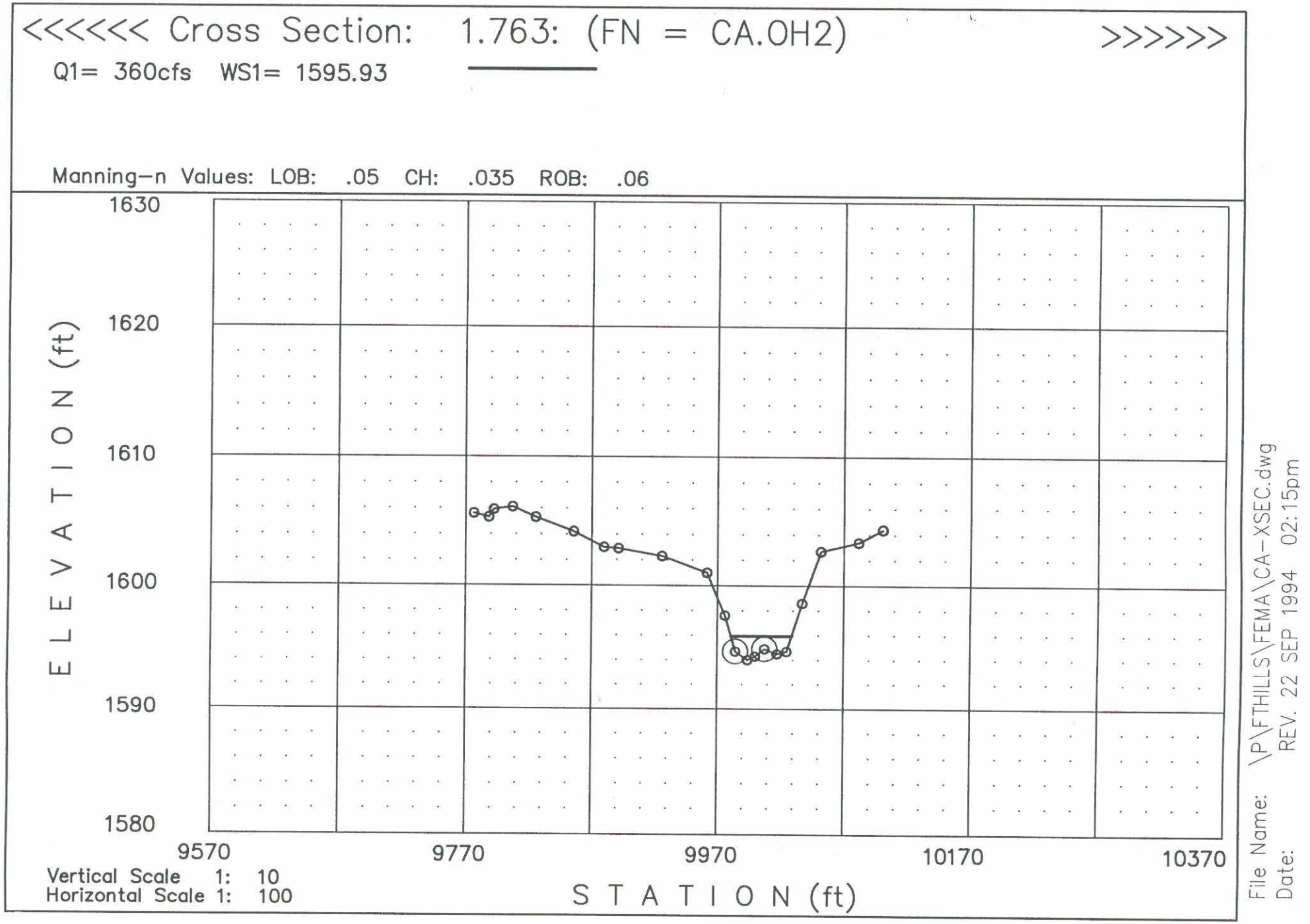
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 1.763: (FN = CA.OH2) >>>>>>
Q1= 360cfs WS1= 1595.93
Manning-n Values: LOB: .05 CH: .035 ROB: .06
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9570
9770
9970
10170
10370
STATION (ft)
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Horizontal Scale 1: 100
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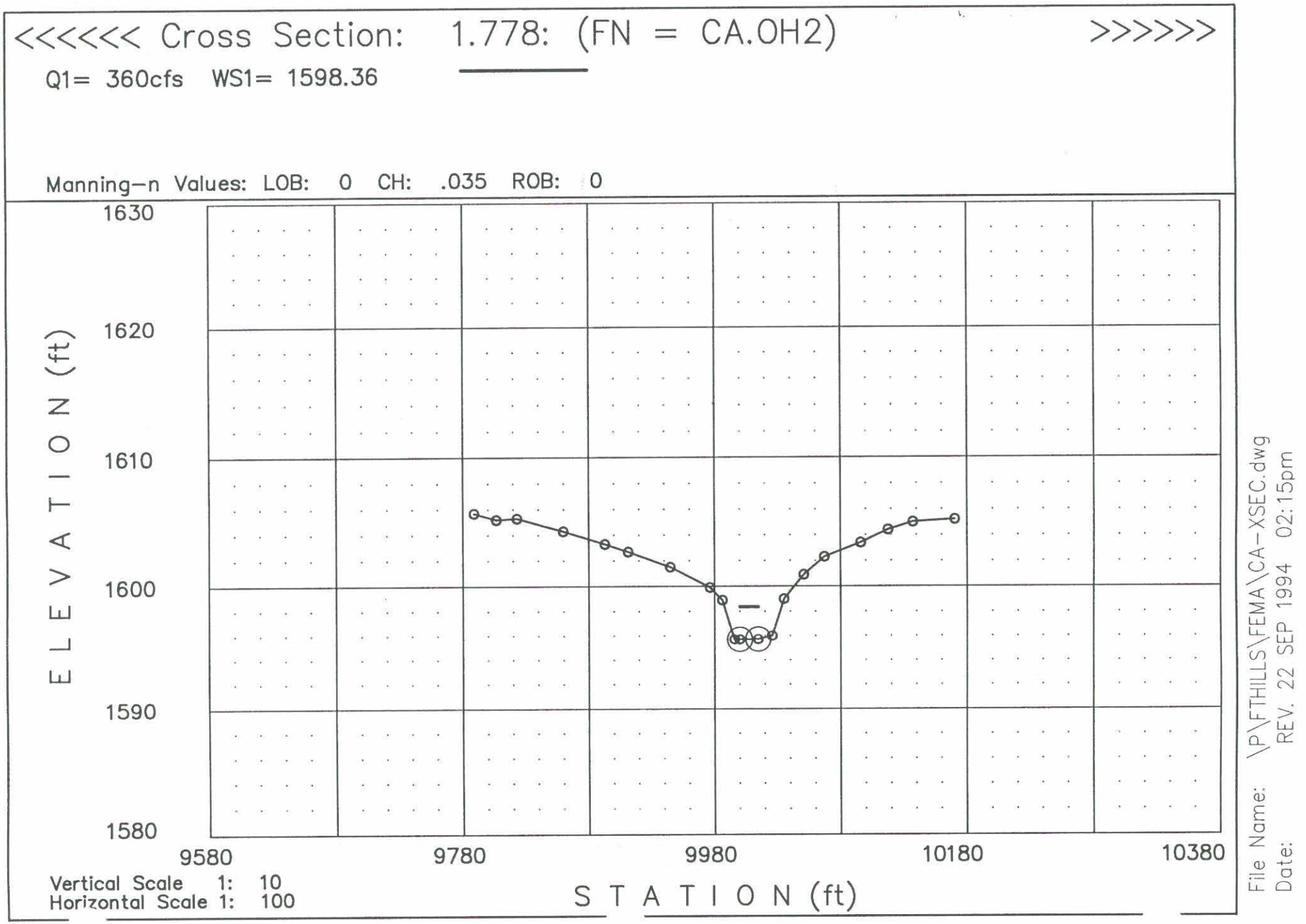
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 1.778: (FN = CA.OH2) >>>>>>
Q1= 360cfs WS1= 1598.36
Manning-n Values: LOB: 0 CH: .035 ROB: 0
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9580
9780
9980
10180
10380
STATION (ft)
Vertical Scale 1: 10
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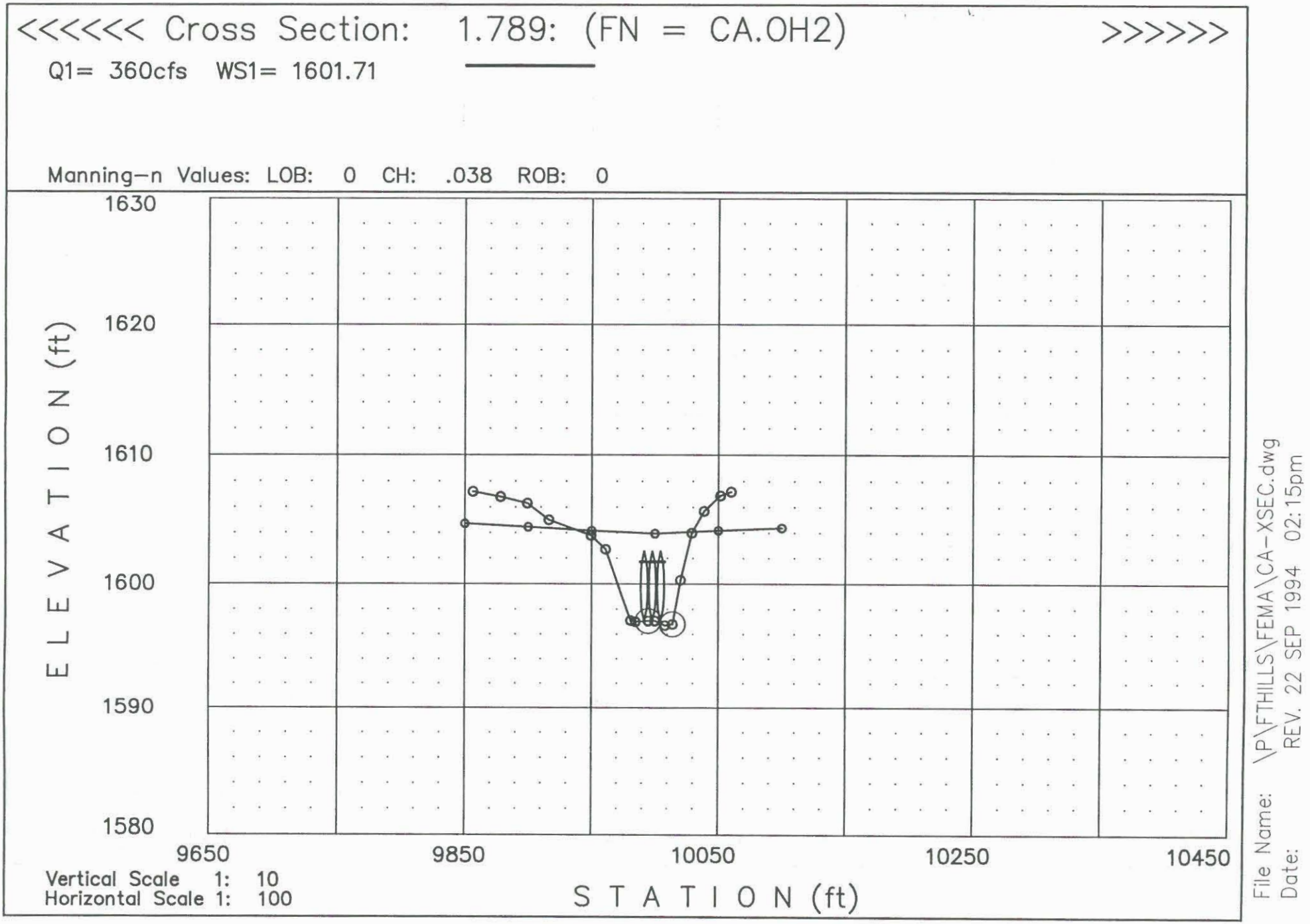
<<<<<< Cross Section: 1.789: (FN = CA.OH2) >>>>>>
Q1= 360cfs WS1= 1601.71
Manning-n Values: LOB: 0 CH: .038 ROB: 0
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
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Horizontal Scale 1: 100
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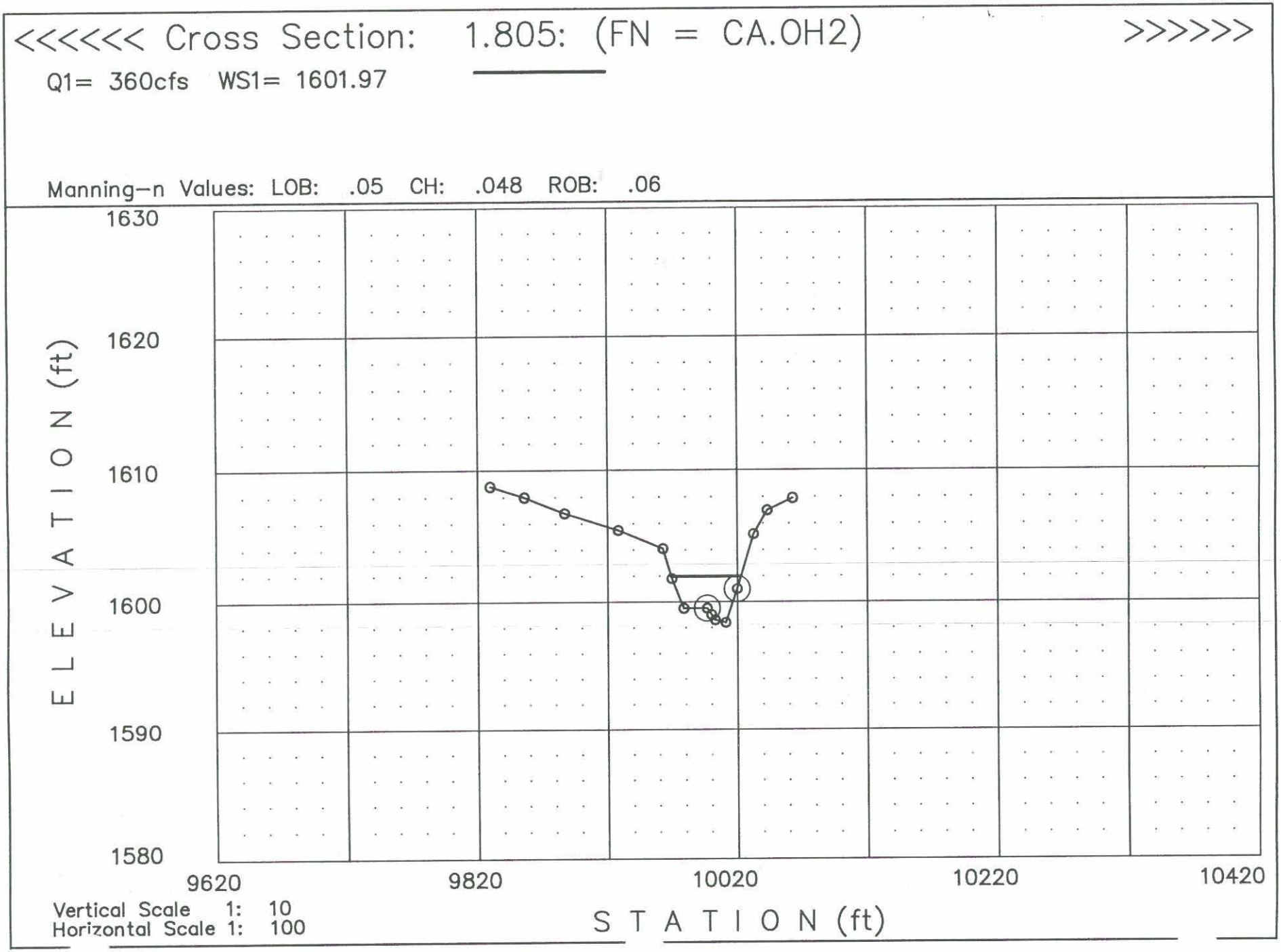
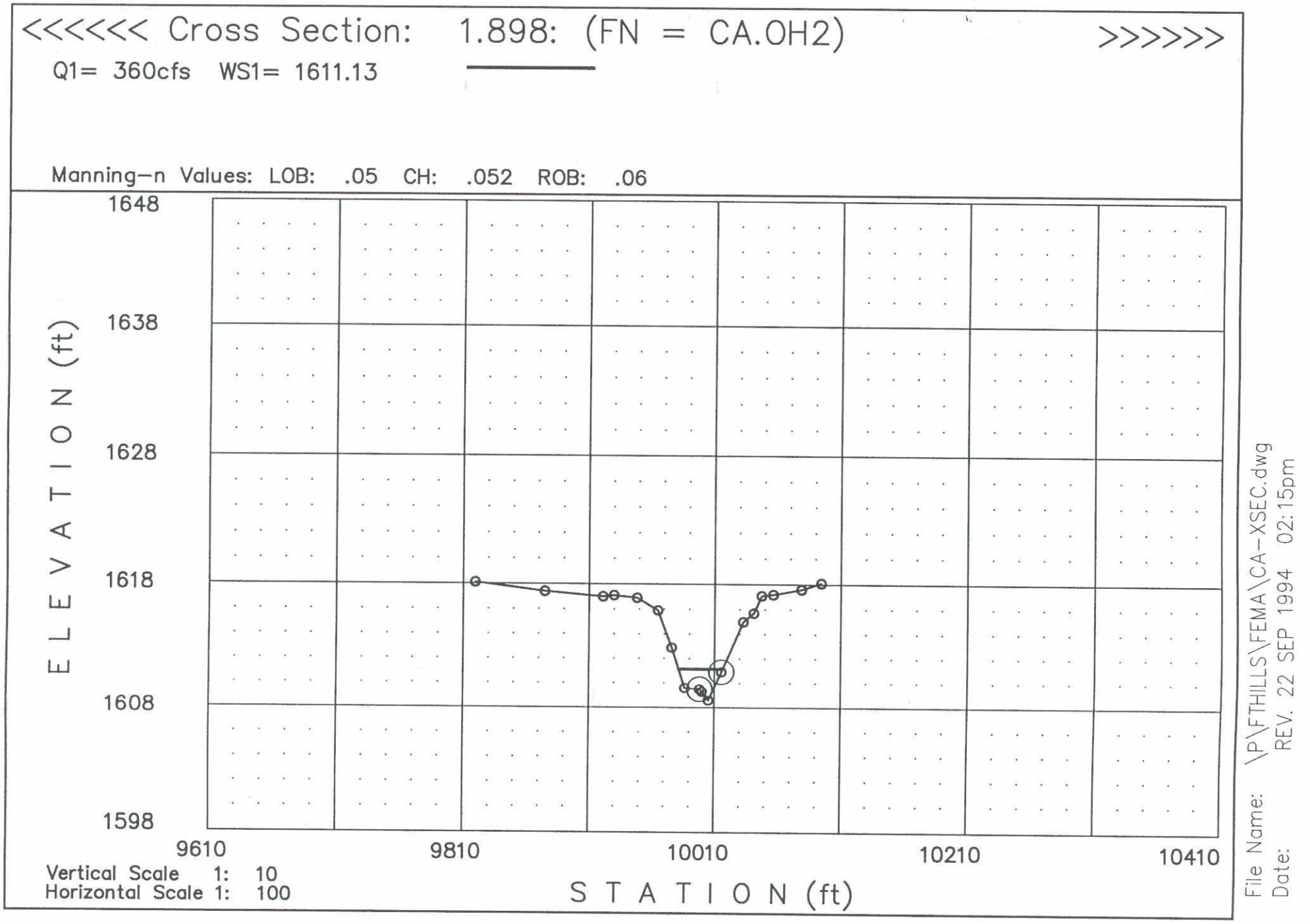

<<<<<< Cross Section: 1.805: (FN = CA.OH2) >>>>>>
Q1= 360cfs WS1= 1601.97
Manning-n Values: LOB: .05 CH: .048 ROB: .06
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100


<<<<<< Cross Section: 1.898: (FN = CA.OH2) >>>>>>
Q1= 360cfs WS1= 1611.13
Manning-n Values: LOB: .05 CH: .052 ROB: .06
1648
1638
1628
1618
1608
1598
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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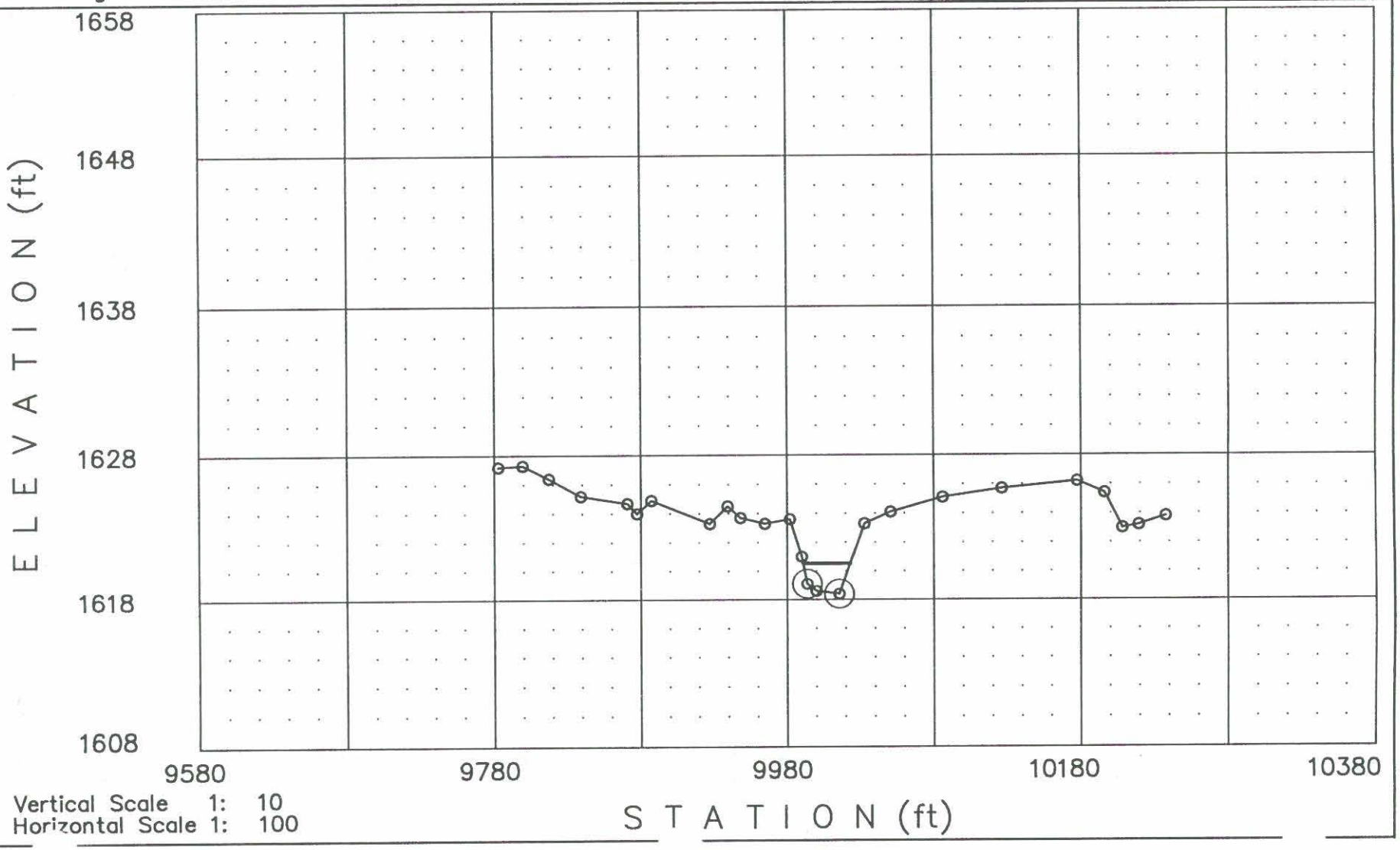
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 1.97: (FN = CA.OH2) >>>>>>

Q1= 360cfs WS1= 1620.53

Manning-n Values: LOB: .05 CH: .037 ROB: .06



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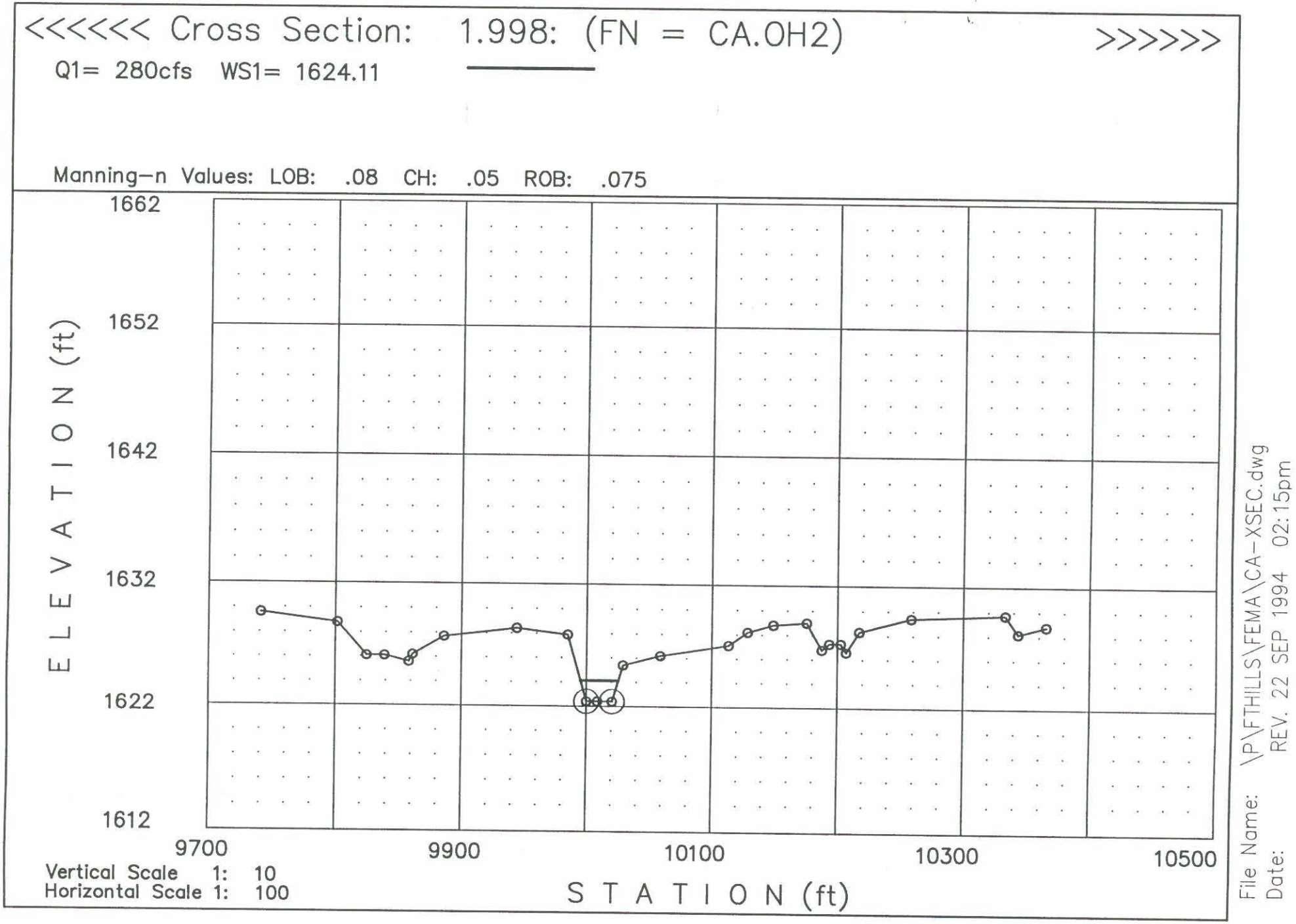
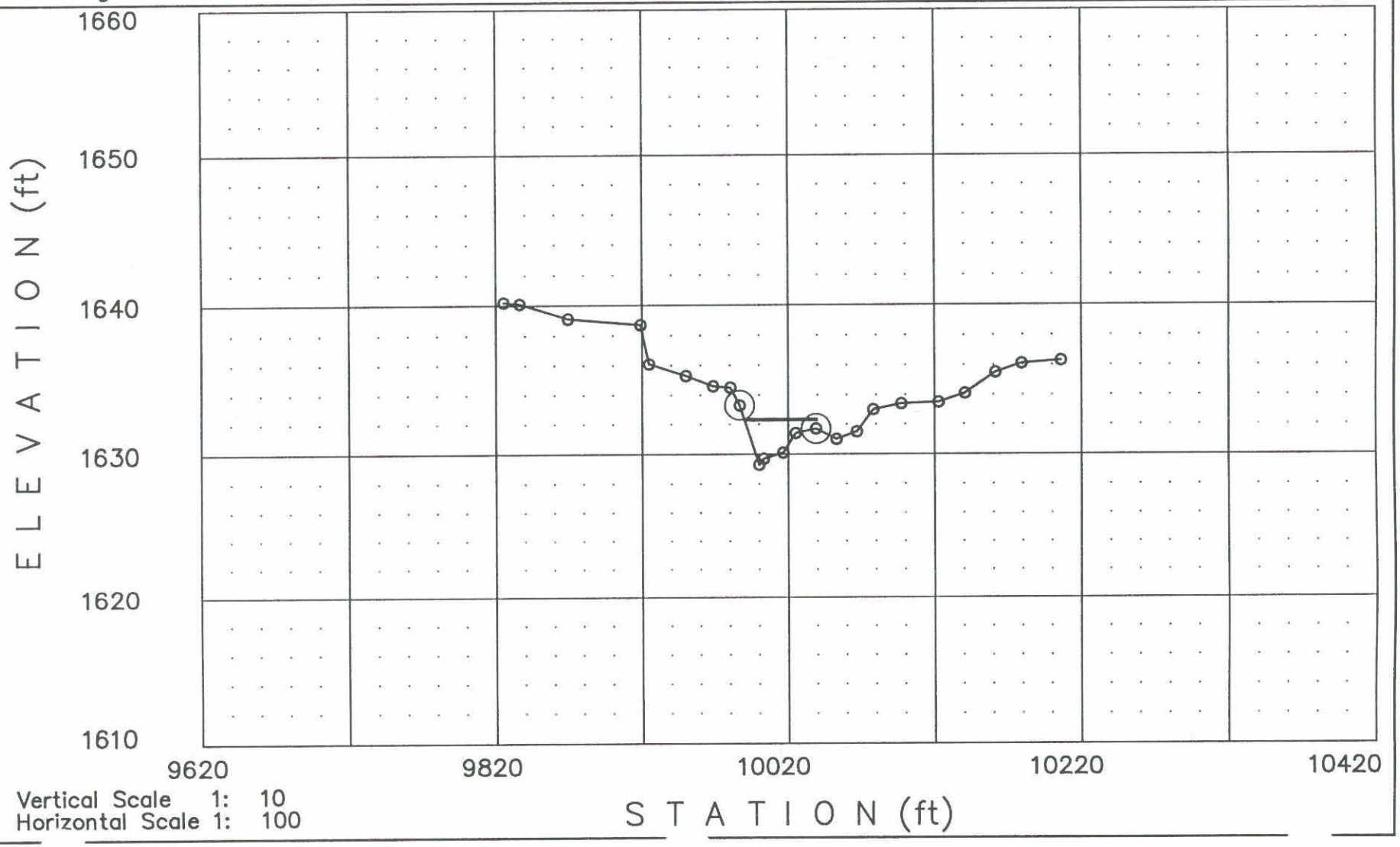

<<<<<< Cross Section: 1.998: (FN = CA.OH2) >>>>>>
Q1= 280cfs WS1= 1624.11
Manning-n Values: LOB: .08 CH: .05 ROB: .075
1662
1652
1642
1632
1622
1612
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 2.072: (FN = CA.OH2) >>>>>>

Q1= 280cfs WS1= 1632.31

Manning–n Values: LOB: 0 CH: .068 ROB: 0



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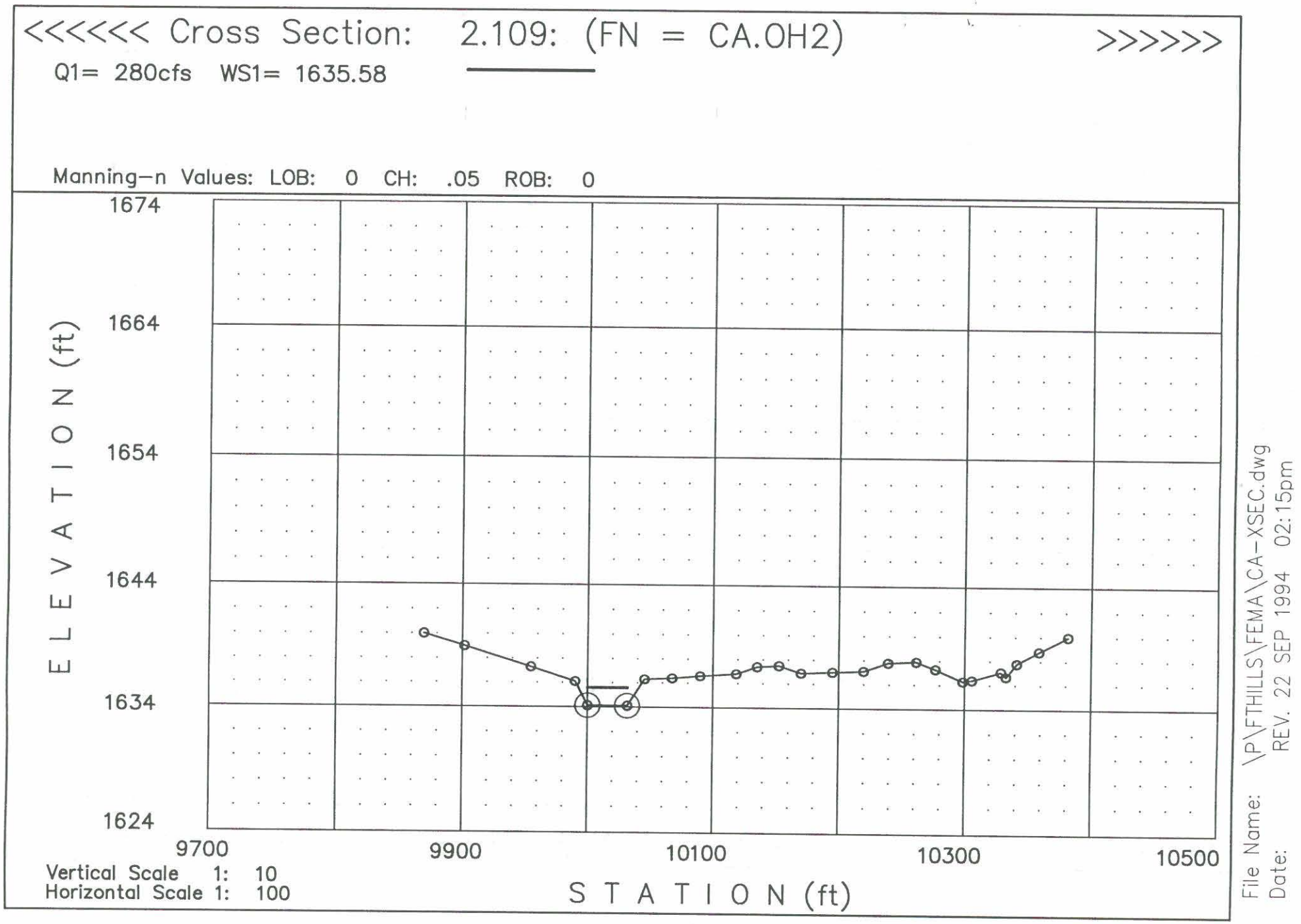
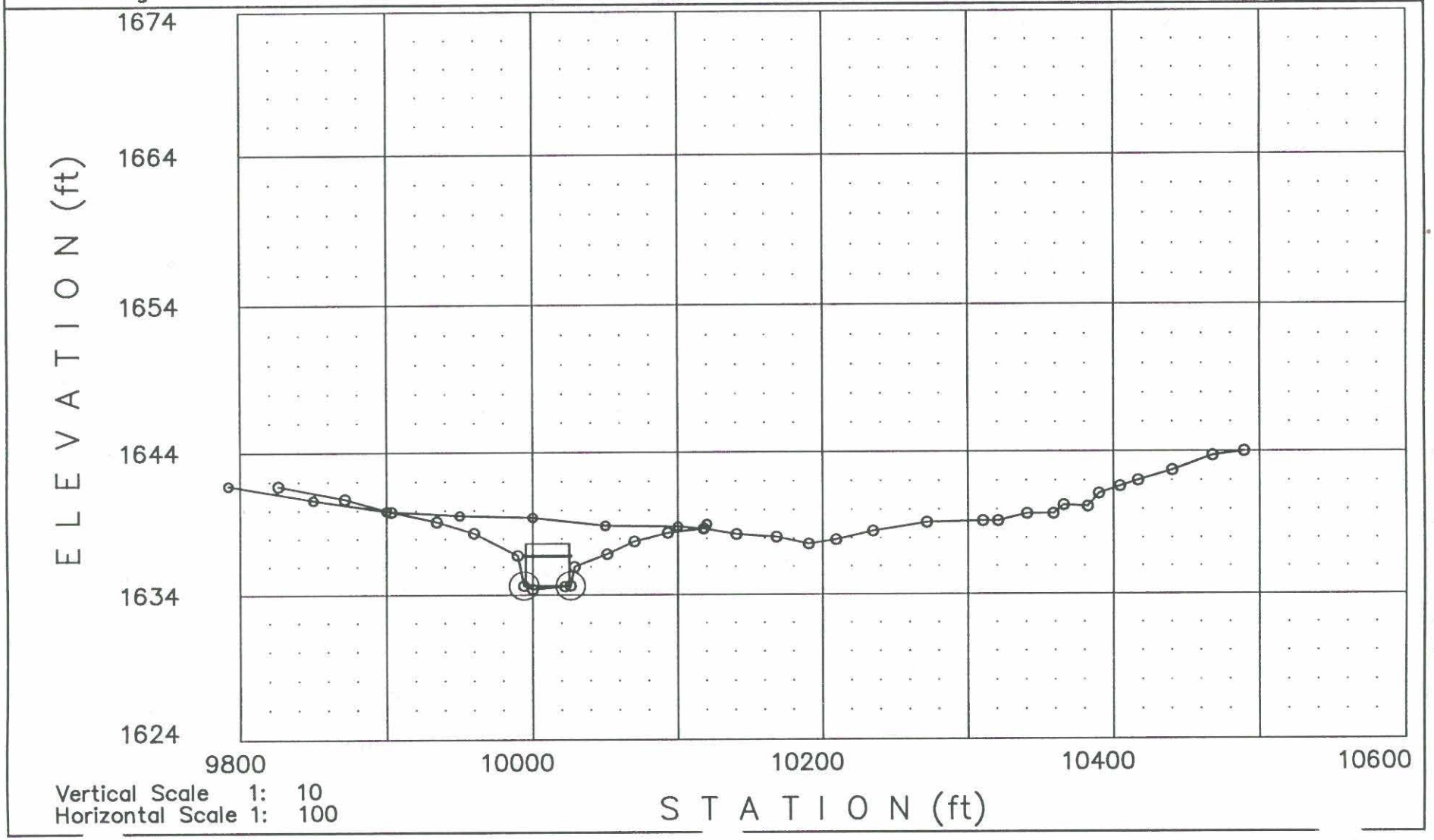

<<<<<< Cross Section: 2.109: (FN = CA.OH2) >>>>>>
Q1= 280cfs WS1= 1635.58
Manning-n Values: LOB: 0 CH: .05 ROB: 0
1674
1664
1654
1644
1634
1624
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 2.12: (FN = CA.OH2) >>>>>>

Q1= 280cfs WS1= 1636.77

Manning–n Values: LOB: 0 CH: .056 ROB: 0



Vertical Scale 1: 10
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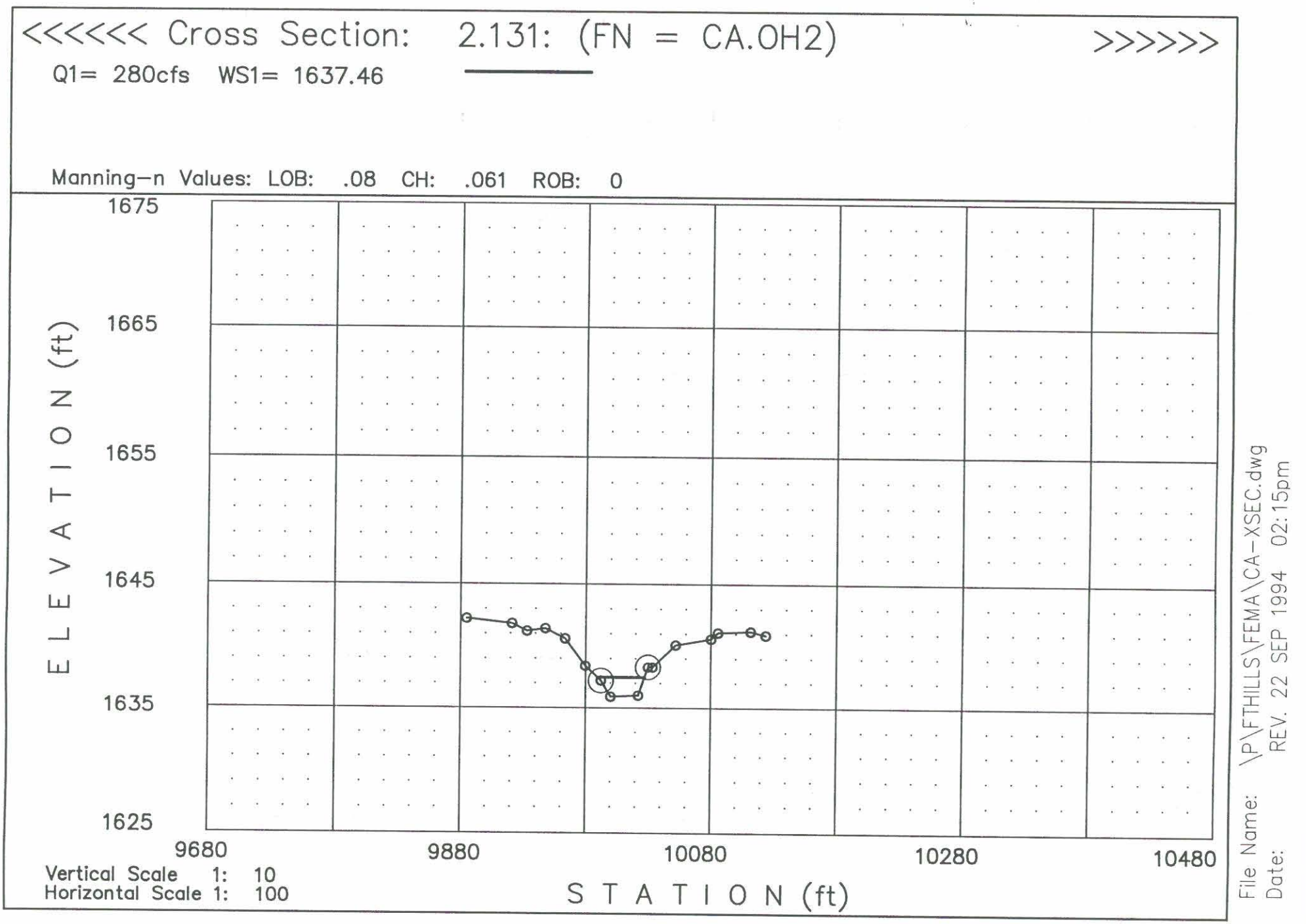
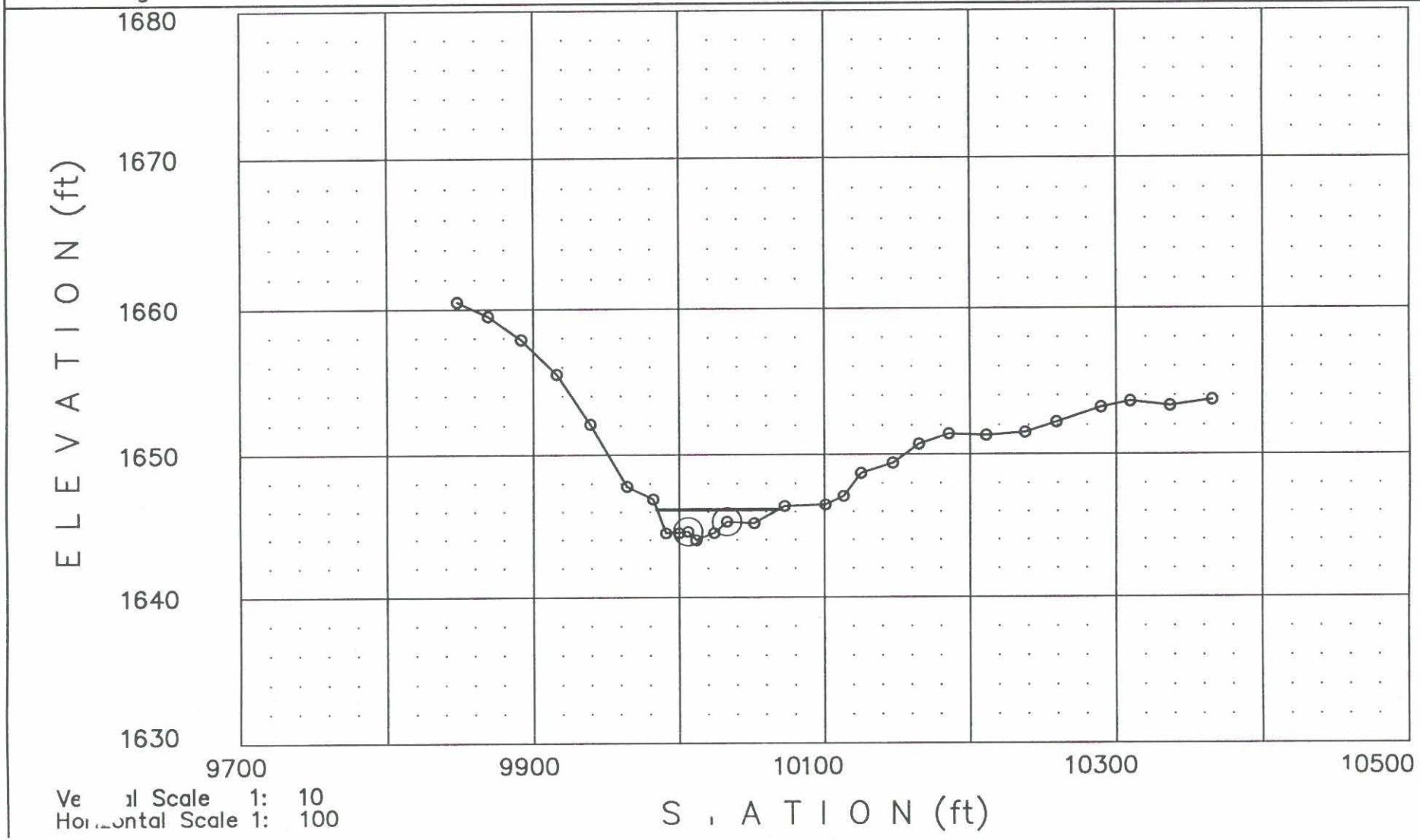

<<<<<< Cross Section: 2.131: (FN = CA.OH2) >>>>>>
Q1= 280cfs WS1= 1637.46
Manning-n Values: LOB: .08 CH: .061 ROB: 0
1675
1665
1655
1645
1635
1625
ELEVATION (ft)
9680
9880
10080
10280
10480
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 2.218: (FN = CA.OH2) >>>>>>

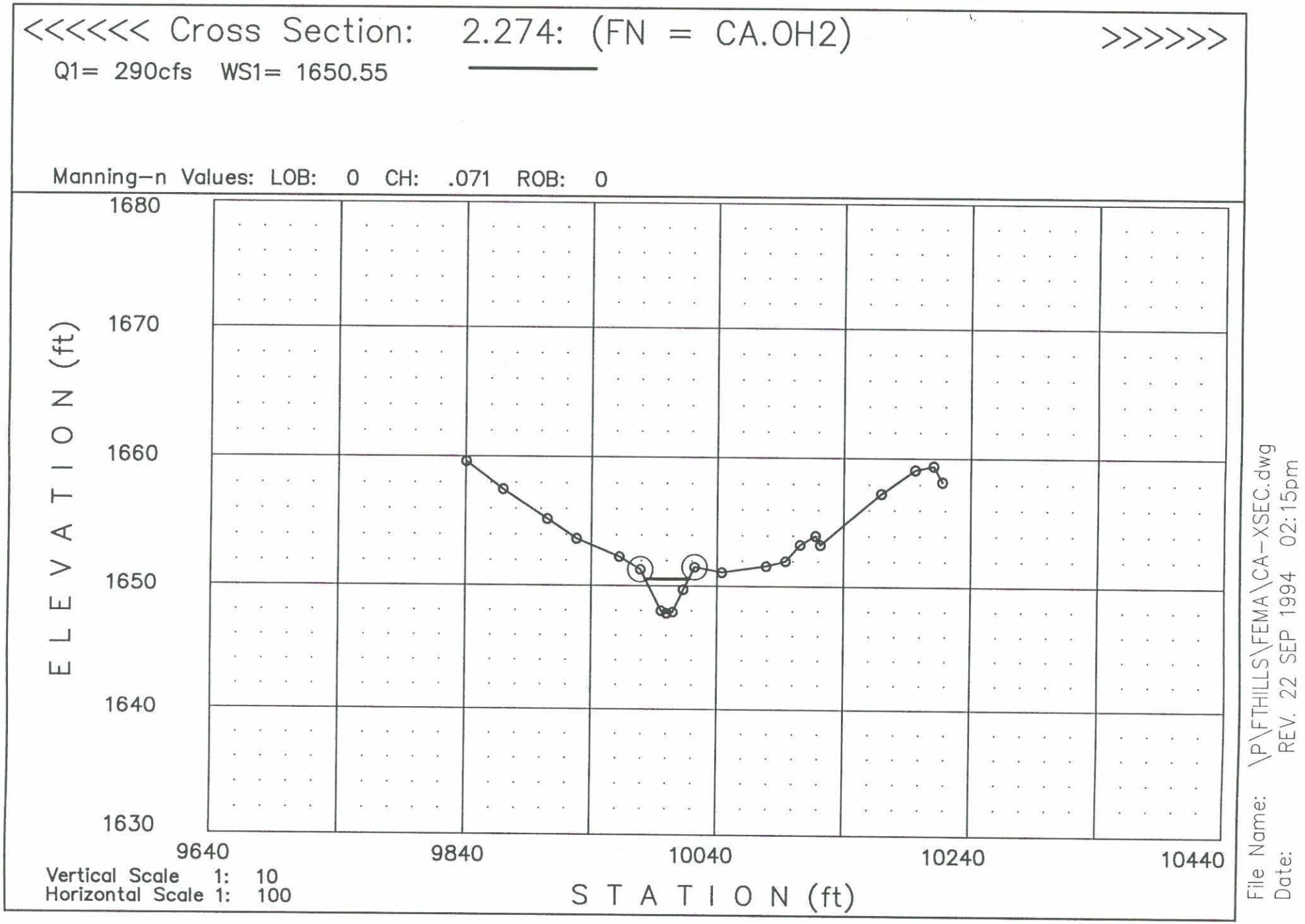
Q1= 280cfs WS1= 1646.16

Manning-n Values: LOB: .08 CH: .053 ROB: .075



Vertical Scale 1: 10
Horizontal Scale 1: 100

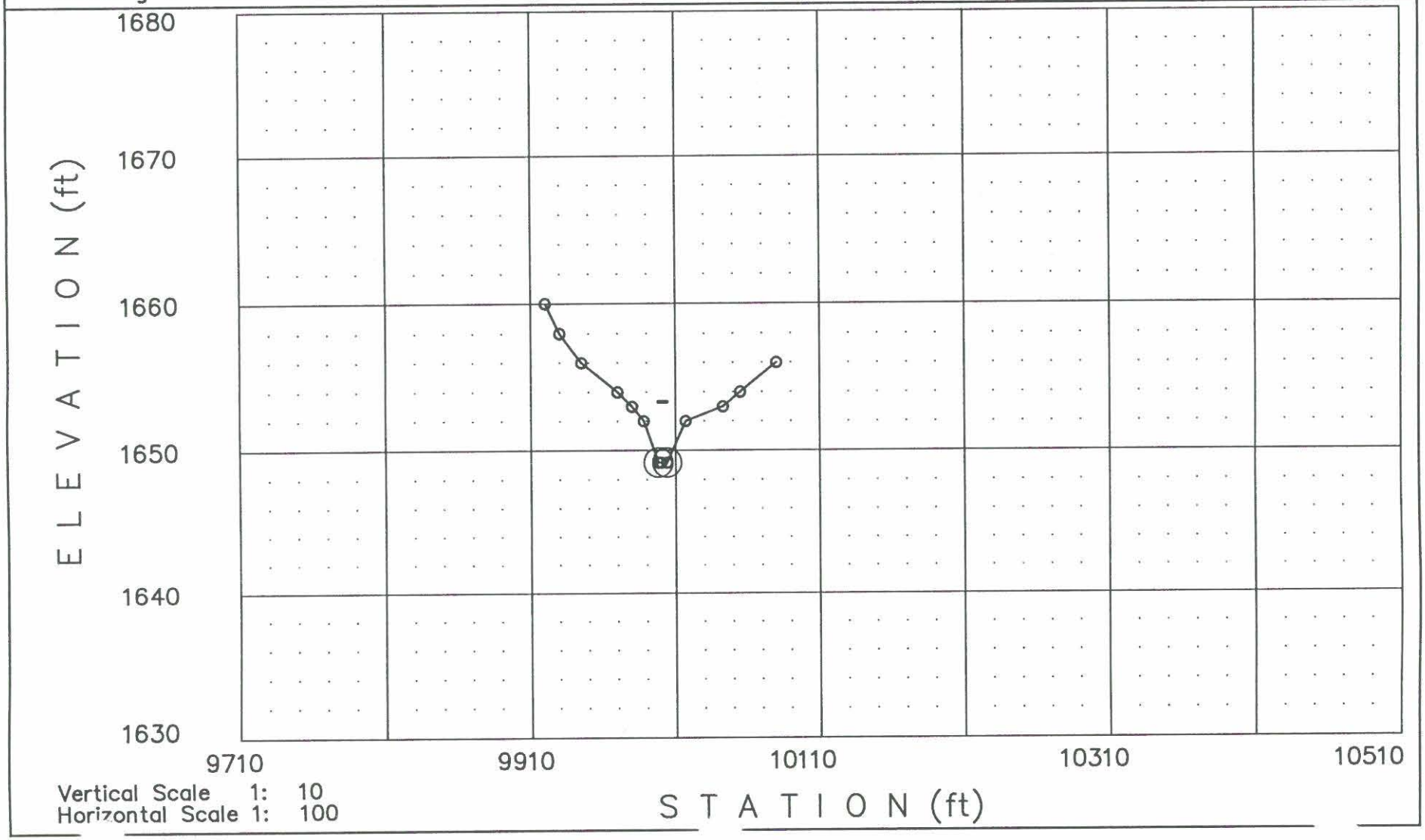
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 2.274: (FN = CA.OH2) >>>>>>
Q1= 290cfs WS1= 1650.55
Manning-n Values: LOB: 0 CH: .071 ROB: 0
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

<<<<<< Cross Section: 2.287: (FN = CA.OH2) >>>>>>

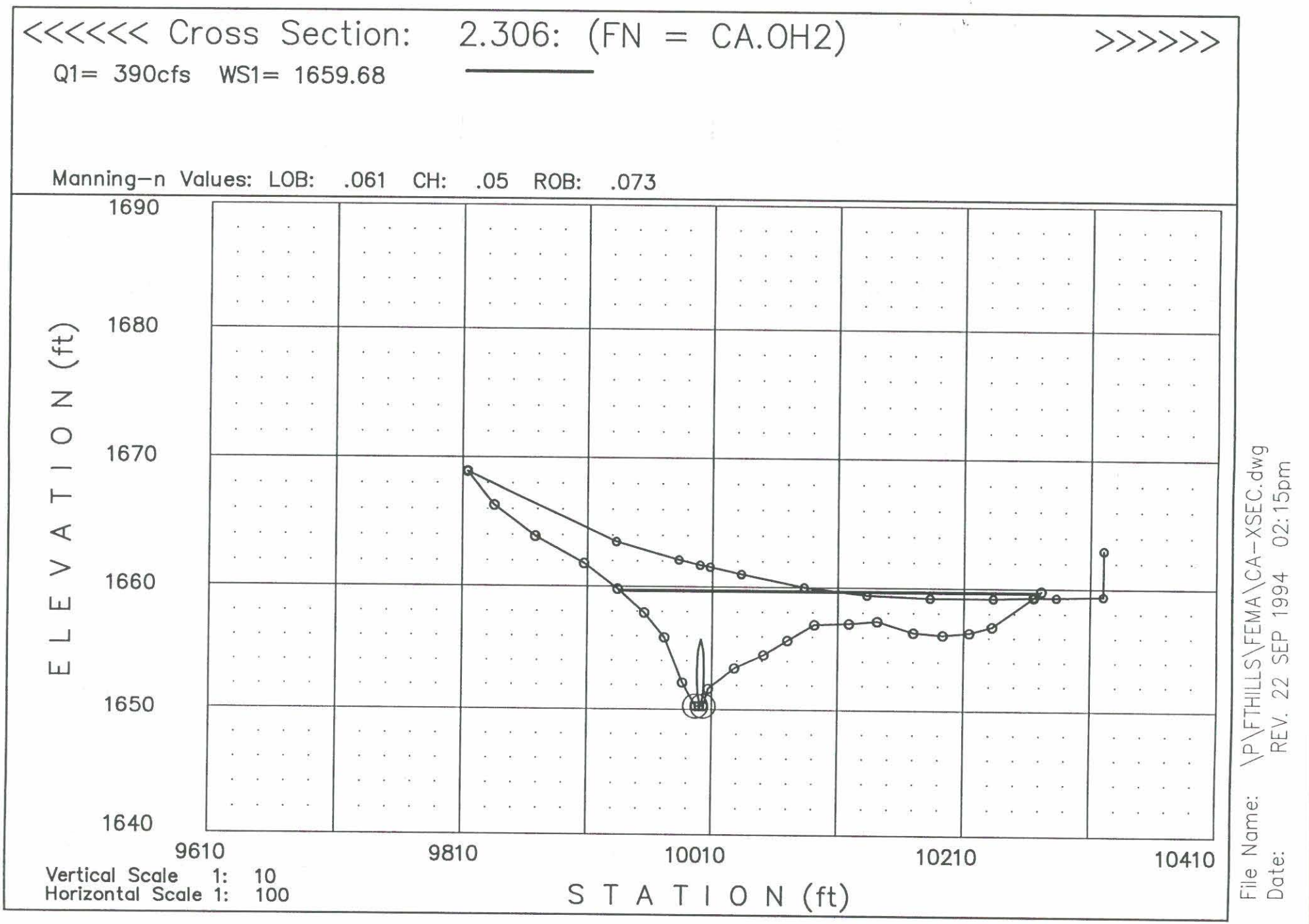
Q1= 290cfs WS1= 1653.34

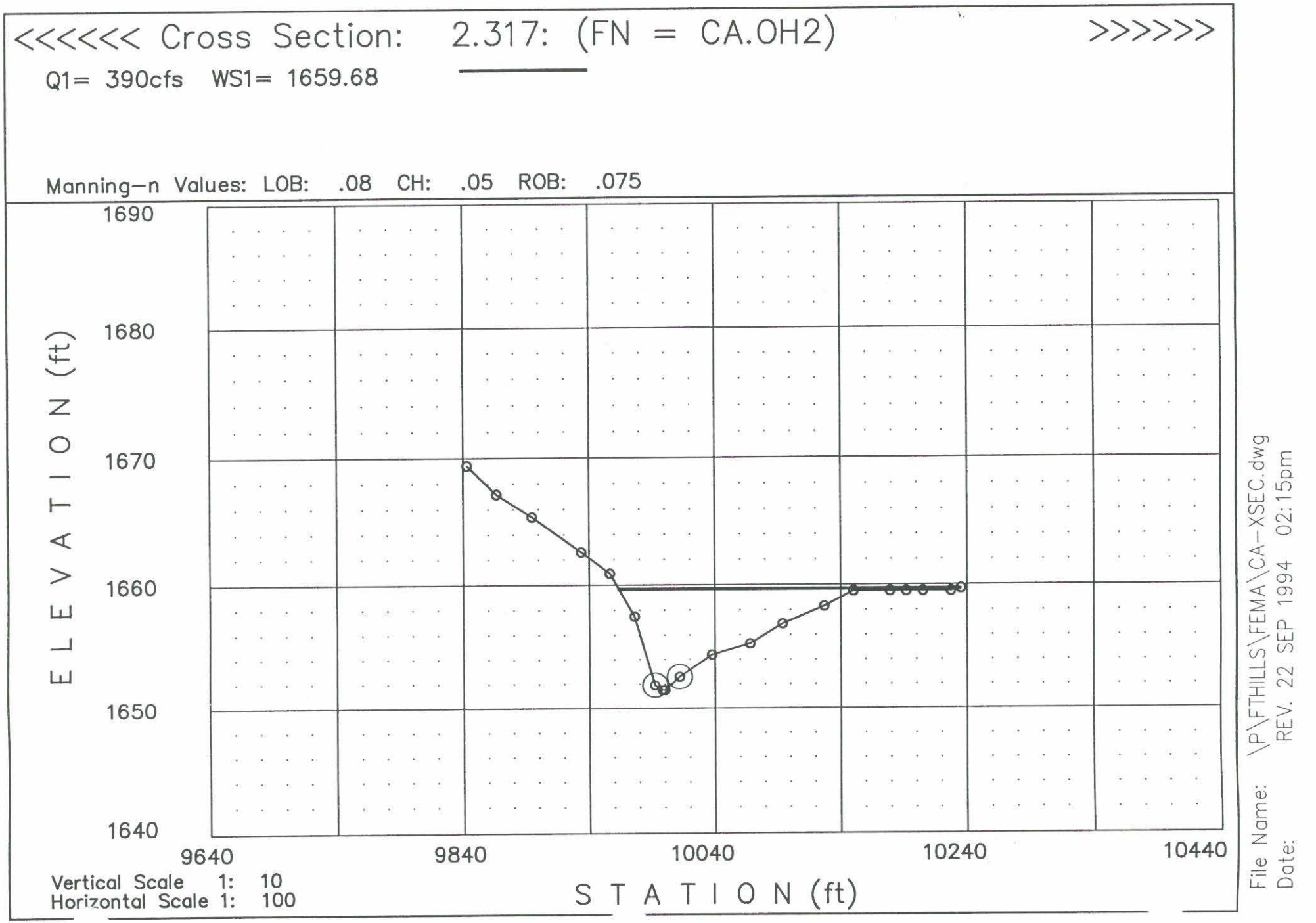
Manning–n Values: LOB: 0 CH: .05 ROB: 0



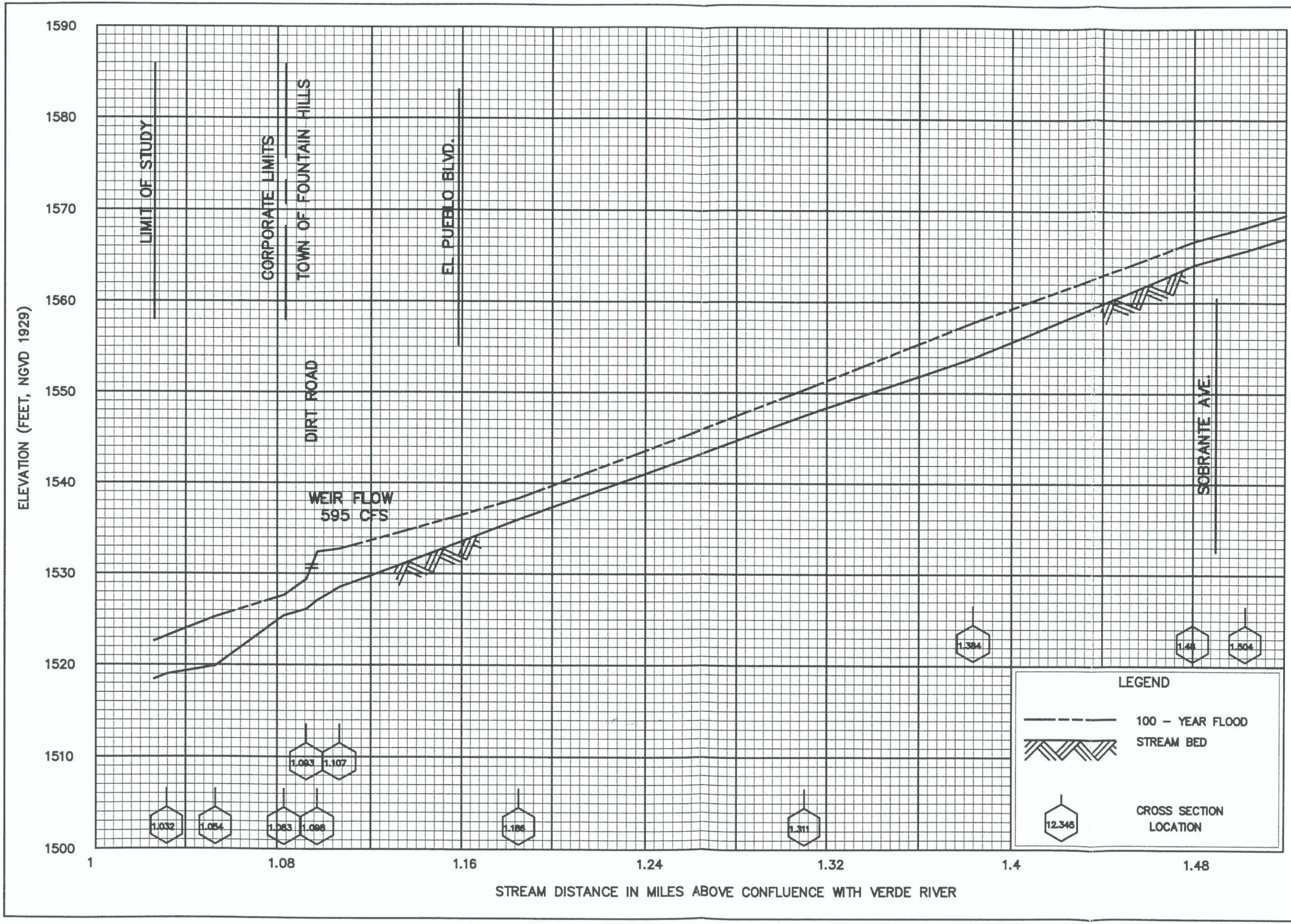
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 2.306: (FN = CA.OH2) >>>>>>
Q1= 390cfs WS1= 1659.68
Manning-n Values: LOB: .061 CH: .05 ROB: .073
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm


<<<<<< Cross Section: 2.317: (FN = CA.OH2) >>>>>>
Q1= 390cfs WS1= 1659.68
Manning-n Values: LOB: .08 CH: .05 ROB: .075
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\CA-XSEC.dwg
Date: REV. 22 SEP 1994 02:15pm

FLOOD PROFILES

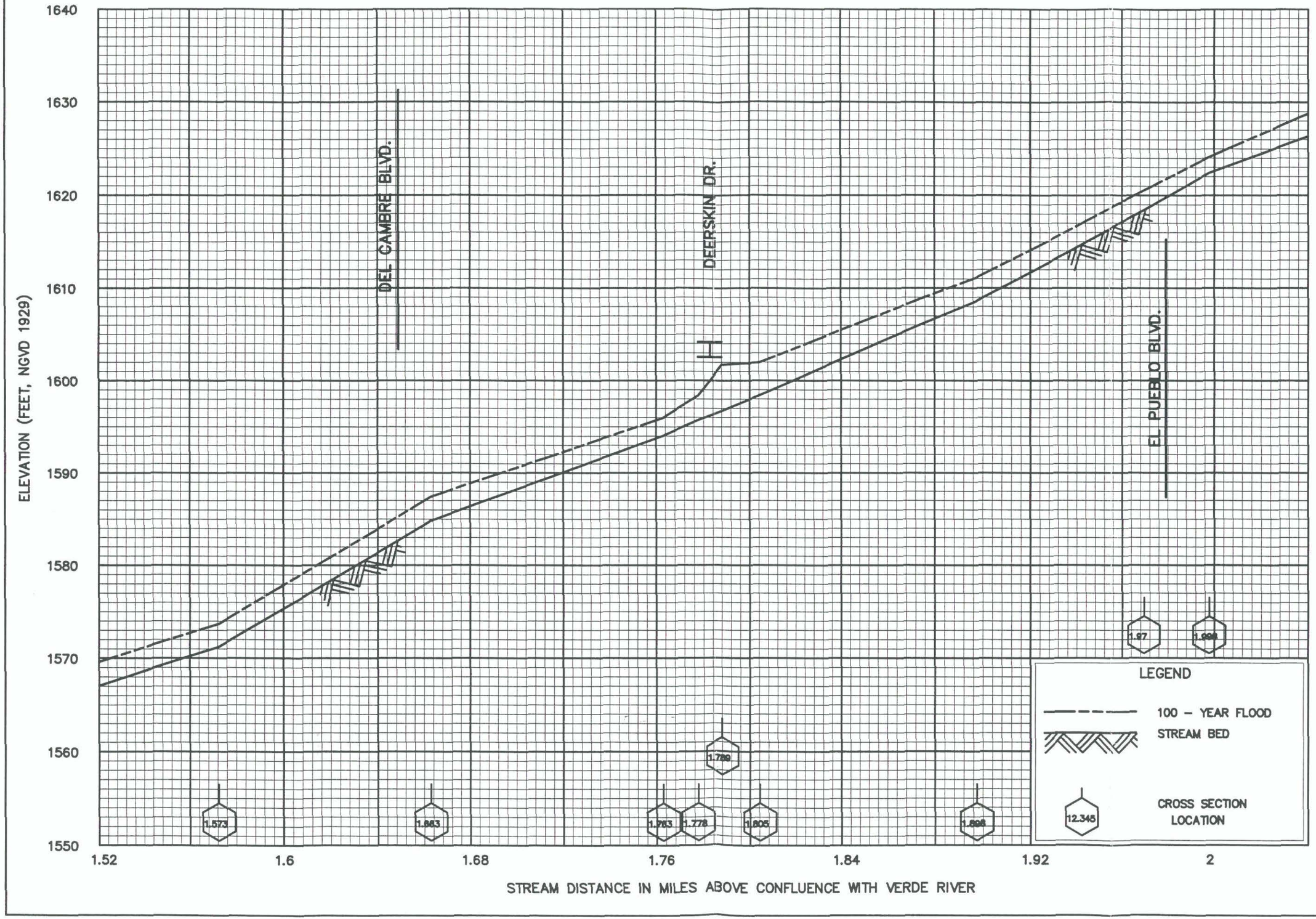


FLOOD PROFILES

CALIENTE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\CA-PROF.dwg (sheet 1 of 3)
Date: REV. 27 SEP 1994 10:42am



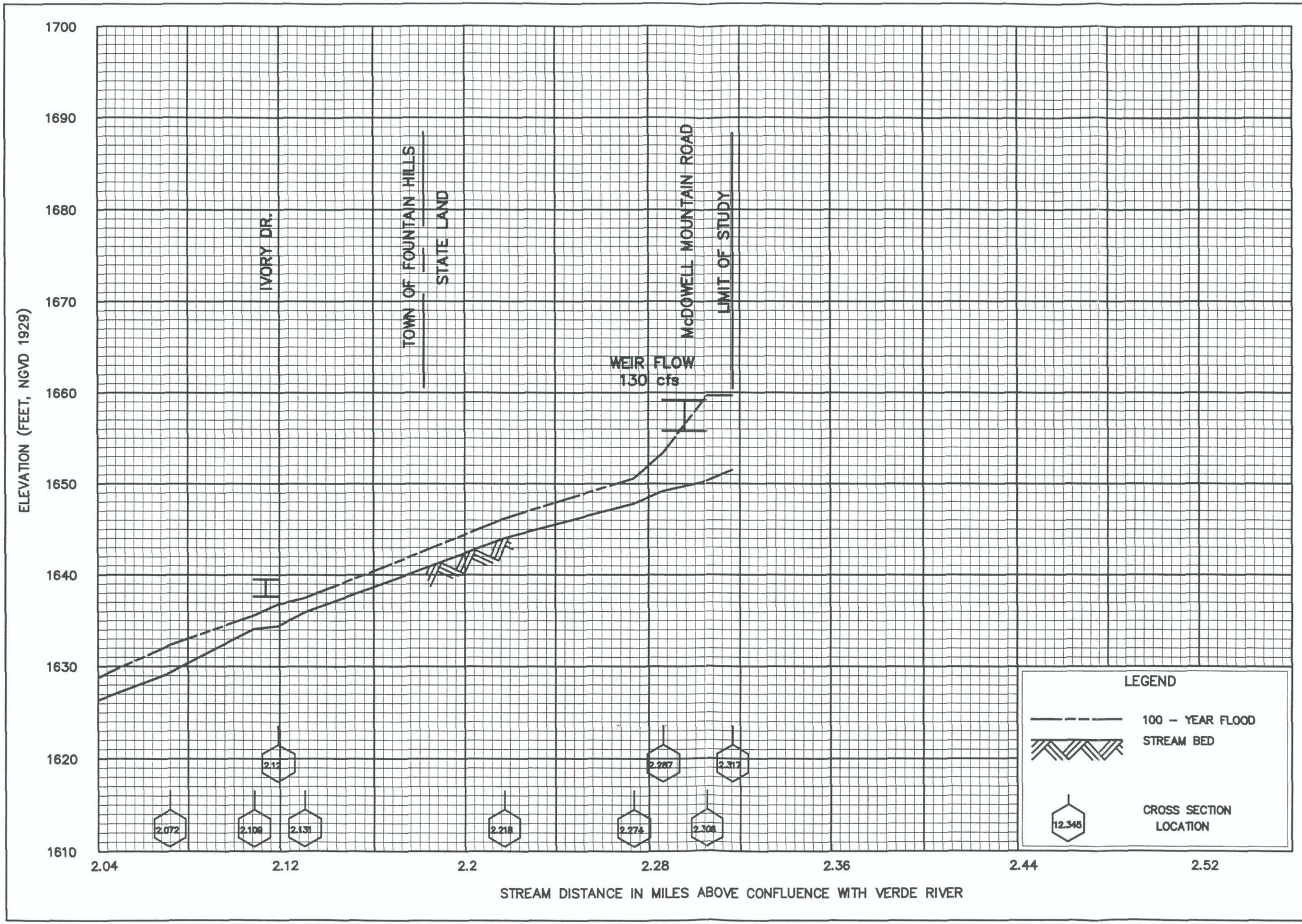
FLOOD PROFILES

CALIENTE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\CA-PROF.dwg (sheet 2 of 3)
Date: REV. 27 SEP 1994 10:42am



FLOOD PROFILES

CALIENTE WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\CA-PROF.dwg (sheet 3 of 3)
Date: REV. 27 SEP 1994 10:42am

ESCALANTE WASH

```
1*******************************************
*  HEC-2 WATER SURFACE PROFILES           *
*                                         *
*  Version   4.6.2;  May 1991             *
*                                         *
*  RUN DATE    29MAR95    TIME   14:52:18  *
*******************************************
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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     X
XXXXXXX  XXXX     X           XXXXX   XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

1

29MAR95 14:52:18 PAGE 1

THIS RUN EXECUTED 29MAR95 14:52:18

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

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

```
T1   *  Fountain Hills North FIS                        File:        ES.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35       DTP & FB   03-15-94
T3   *  Escalante Wash 100-Year Floodplain.            Revised:   03-29-95
T4   *  GR data taken from stereo model; received 12 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0    0.0133         0         0         0    1514.7

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0        -1         0         0         0        -1         0         0         0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200

        HEC-1 Concentration Point C521

QT        2      1410      1410
NC    0.060     0.075     0.045       0.1       0.3

  Section 2.496 is section 1 of 3 for Normal Depth Calculation
NH        3       .06    9992.6      .045   10009.4      .075   10160.5
ET                 9.1                                                  9924.05   10054.59
               STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
          HEC-1 Concentration Point C521:  6-hr storm controls.
          START Hydraulically Similar Reach ES 1
```

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```
               See Exhibit 1, Manning's n Value Map.
               Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1    2.496       21    9985.3   10019.5       0.0       0.0       0.0              -0.40
GR   1525.0    9798.9    1525.2    9838.3    1524.3    9881.7    1523.3    9899.5    1514.9    9925.1
GR   1514.0    9939.4    1514.2    9961.6    1513.6    9985.3    1511.0    9992.6    1511.0   10000.0
GR   1510.8   10009.4    1512.3   10019.5    1512.0   10030.5    1514.8   10042.2    1515.3   10056.1
GR   1516.1   10067.8    1517.1   10080.8    1518.1   10108.4    1518.3   10127.8    1519.1   10133.7
GR   1521.2   10160.5

  Section 2.498 is section 2 of 3 for Normal Depth Calculation
```

```
NH       3        .06      9992.6       .045     10009.4       .075     10160.5
ET                         9.1                                                    9924.03    10054.73
                Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1    2.498         21      9985.3     10019.5          10          10          10                -0.27
GR   1525.0     9798.9      1525.2      9838.3      1524.3      9881.7      1523.3    9899.5    1514.9     9925.1
GR   1514.0     9939.4      1514.2      9961.6      1513.6      9985.3      1511.0    9992.6    1511.0    10000.0
GR   1510.8    10009.4      1512.3     10019.5      1512.0     10030.5      1514.8   10042.2    1515.3    10056.1
GR   1516.1    10067.8      1517.1     10080.8      1518.1     10108.4      1518.3   10127.8    1519.1    10133.7
GR   1521.2    10160.5

  Section 2.500 is section 3 of 3 for Normal Depth Calculation

NH       3        .06      9992.6       .045     10009.4       .075     10160.5
ET                         9.1                                                    9924.04    10054.66
                Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
X1    2.500         21      9985.3     10019.5          10          10          10                -0.13
GR   1525.0     9798.9      1525.2      9838.3      1524.3      9881.7      1523.3    9899.5    1514.9     9925.1
GR   1514.0     9939.4      1514.2      9961.6      1513.6      9985.3      1511.0    9992.6    1511.0    10000.0
GR   1510.8    10009.4      1512.3     10019.5      1512.0     10030.5      1514.8   10042.2    1515.3    10056.1
GR   1516.1    10067.8      1517.1     10080.8      1518.1     10108.4      1518.3   10127.8    1519.1    10133.7
GR   1521.2    10160.5


NH       3        .06      9992.6       .045     10009.4       .075     10160.5
ET                         9.1                                                    9924.03    10054.74
X1    2.502         21      9985.3     10019.5          10          10          10
GR   1525.0     9798.9      1525.2      9838.3      1524.3      9881.7      1523.3    9899.5    1514.9     9925.1
GR   1514.0     9939.4      1514.2      9961.6      1513.6      9985.3      1511.0    9992.6    1511.0    10000.0
GR   1510.8    10009.4      1512.3     10019.5      1512.0     10030.5      1514.8   10042.2    1515.3    10056.1
GR   1516.1    10067.8      1517.1     10080.8      1518.1     10108.4      1518.3   10127.8    1519.1    10133.7
GR   1521.2    10160.5


NH       3        .06      9996.5       .045     10012.4       .075      10117
ET                         9.1                                                    9969.86    10025.61
X1    2.519         17      9985.8     10025.6          90          90       89.5
GR   1525.8     9842.8      1524.2      9883.0      1519.3      9901.6      1518.5    9939.0    1517.6     9963.4
GR   1516.1     9980.0      1516.1      9985.8      1512.0      9996.5      1512.0   10000.0    1511.7    10012.4
GR   1520.2    10025.6      1520.9     10046.3      1521.0     10061.4      1520.4   10072.5    1520.5    10088.8
GR   1522.4    10107.7      1524.2     10117.0

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NH       3        .06      9991.9       .045     10019.3       .075     10171.8
ET                         9.1                                                    9938.32    10048.11
X1    2.541         23      9959.3     10031.7         115         120       119.2
GR   1528.0     9813.5      1526.9      9817.3      1526.0      9849.9      1525.0    9861.7    1522.5     9868.5
GR   1522.2     9886.9      1520.5      9917.9      1518.3      9959.3      1516.4    9968.2    1514.4     9980.6
GR   1513.7     9991.9      1513.8     10000.0      1513.7     10019.3      1518.6   10031.7    1518.6    10031.7
GR   1518.5    10047.0      1523.1     10052.6      1525.1     10068.7      1526.7   10080.2    1527.5    10122.3
GR   1527.4    10146.4      1526.8     10162.6      1527.2     10171.8


NH       3        .09      9977.8         .05     10017.6        .085     10176.8
ET                         9.1                                                    9908.77    10054.31
          START Hydraulically Similar Reach ES 2
                See Exhibit 1, Manning's n Value Map.
X1    2.555         21      9977.8     10031.9          80          75        72.9
GR   1528.0     9828.8      1523.8      9852.5      1520.8      9890.5      1519.1    9920.1    1517.3     9944.7
GR   1515.4     9954.3      1515.2      9977.8      1515.3      9989.5      1514.9   10000.0    1514.4    10004.2
GR   1514.4    10014.0      1515.0     10017.6      1515.9     10031.9      1518.5   10043.0    1520.6    10062.0
GR   1522.5    10076.5      1524.2     10096.1      1526.3     10117.9      1528.7   10146.9    1528.9    10159.7
GR   1528.9    10176.8


NH       3        .09      9977.3         .05     10028.7        .085     10156.9
ET                         9.1                                                    9944.47    10033.74
X1    2.614         17      9951.3     10028.7         310         310       311.6
GR   1529.8     9796.6      1530.3      9806.6      1529.1      9831.6      1527.1    9876.3    1525.2     9896.8
GR   1524.9     9927.1      1523.5      9938.3      1520.5      9951.3      1519.9    9977.3    1519.8    10000.0
GR   1519.7    10028.7      1527.3     10044.8      1529.3     10053.0      1530.2   10060.5    1531.4    10106.5
GR   1531.8    10149.6      1532.2     10156.9

        HEC-1 Concentration Point C591

QT       2        1400        1400

NH       3        .09      9946.2         .05     10012.9        .085     10146.7
ET                         9.1                                                    9935.15    10023.29
          HEC-1 Concentration Point C591:  6-hr storm controls.
X1    2.695         20      9946.2     10017.3         440         435       426.6
GR   1540.7     9821.2      1539.9      9841.8      1538.6      9860.2      1537.8    9877.6    1536.6     9890.6
GR   1536.2     9914.8      1533.0      9928.6      1528.3      9946.2      1528.5    9966.0    1528.4     9986.0
GR   1528.3     9993.3      1528.1     10000.0      1528.0     10012.9      1529.7   10017.3    1534.0    10033.9
GR   1537.3    10046.5      1538.7     10058.1      1538.4     10090.1      1539.0   10118.4    1539.6    10146.7
```

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NH        3       .09     9981.8       .05     10019.6       .085     10214.1
ET                          9.1                                                  9970.08    10050.38
X1    2.764         20     9973.4    10019.6         335        375      364.8
GR   1542.4     9860.1     1541.7     9890.0      1542.5     9914.8     1543.8     9931.5     1543.5     9957.2
GR   1542.4     9962.0     1538.0     9973.4      1535.8     9981.8     1535.7    10000.0     1535.5    10012.1
GR   1538.2    10019.6     1538.5    10043.5      1540.7    10062.9     1544.9    10089.6     1546.2    10105.0
GR   1546.9    10135.0     1546.4    10162.9      1545.2    10179.7     1545.4    10199.0     1543.2    10214.1

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   29MAR95      14:52:18                                                                                  PAGE    4


NH        3       .09     9985.3       .05      10013        .085     10224.3
ET                          9.1                                                  9969.09    10061.11
X1    2.780         20     9969.1      10013          85         85      82.3
GR   1543.9     9872.8     1544.2     9891.6      1545.8     9915.9     1545.2     9934.6     1543.9     9956.5
GR   1542.6     9969.1     1536.9     9985.3      1537.2    10000.0     1537.2    10003.3     1539.3    10013.0
GR   1540.2    10036.9     1540.5    10058.1      1545.8    10071.1     1546.5    10083.2     1547.2    10090.5
GR   1547.5    10144.0     1547.7    10178.7      1546.7    10201.7     1545.6    10219.1     1545.0    10224.3


NH        3       .09     9989.8       .05     10012.3       .085     10074.8
ET                          9.1                                                  9951.32    10034.50
X1    2.882         13     9979.6    10022.2         545        525      541.9
GR   1556.2     9931.7     1552.8     9945.8      1548.9     9957.9     1548.5     9979.6     1547.6     9989.8
GR   1545.7    10000.0     1546.1    10003.7      1545.9    10012.3     1548.3    10022.2     1553.1    10043.9
GR   1555.5    10054.2     1556.1    10068.8      1556.6    10074.8

        HEC-1 Concentration Point C519

QT        2       1410        1410

NH        3       .09     9980.2       .05     10024.1       .085     10117.8
ET                          9.1                                                  9972.52    10046.78
        HEC-1 Concentration Point C519:  6-hr storm controls.
X1    2.930         16     9980.2    10024.1         260        220      253.7
GR   1561.2     9944.2     1560.1     9956.2      1555.7     9967.7     1550.9     9980.2     1550.0     9995.3
GR   1549.9    10000.0     1549.8    10020.1      1550.2    10024.1     1550.4    10041.0     1554.1    10047.2
GR   1554.5    10061.1     1553.9    10071.0      1558.1    10086.4     1560.2    10100.9     1561.0    10109.5
GR   1561.7    10117.8

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   29MAR95      14:52:18                                                                                  PAGE    5

    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
1490 NH CARD USED
*SECNO 2.496
            STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
         HEC-1 Concentration Point C521:  6-hr storm controls.
         START Hydraulically Similar Reach ES 1
               See Exhibit 1, Manning's n Value Map.
               Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     2.496      4.45   1514.85   1514.49   1514.70   1515.46       .62       .00       .00   1513.20
    1410.0     220.2     947.6     242.2      68.9     131.1      58.4        .0        .0   1511.90
       .00      3.20      7.23      4.15      .060      .058      .075      .000   1510.40   9924.05
   .013500        0.        0.        0.         0        11         4       .00    130.54  10054.59


1490 NH CARD USED
*SECNO 2.498
               Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     2.498      4.45   1514.98   1514.62       .00   1515.60       .61       .13       .00   1513.33
    1410.0     221.1     946.6     242.3      69.2     131.3      58.6        .1        .0   1512.03
       .00      3.20      7.21      4.14      .060      .058      .075      .000   1510.53   9924.03
   .013414       10.       10.       10.         0        11         0       .00    130.69  10054.73


1490 NH CARD USED
*SECNO 2.500
               Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
     2.500      4.45   1515.12   1514.76       .00   1515.73       .61       .13       .00   1513.47
    1410.0     220.6     947.1     242.3      69.0     131.2      58.5        .1        .1   1512.17
       .00      3.20      7.22      4.14      .060      .058      .075      .000   1510.67   9924.04
   .013456       10.       10.       10.         0        11         0       .00    130.62  10054.66


1490 NH CARD USED
*SECNO 2.502
     2.502      4.45   1515.25   1514.89       .00   1515.87       .61       .13       .00   1513.60
```

```
    1410.0     221.2     946.5     242.3      69.2     131.3      58.6       .2       .1  1512.30
       .00      3.19      7.21      4.14      .060      .058      .075      .000  1510.80  9924.03
   .013406       10.       10.       10.         0        11         0       .00   130.71 10054.74


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   29MAR95      14:52:18                                                                        PAGE    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

1490 NH CARD USED
*SECNO 2.519

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.519      5.32  1517.02   1517.02       .00  1518.59      1.58      1.69       .29  1516.10
    1410.0      32.4    1377.6        .0      10.0     135.3        .0        .6        .3  1520.20
       .00      3.25     10.18       .00      .060      .058      .000      .000  1511.70  9969.86
   .028386       90.       90.       90.         0         8         0       .00    50.80 10020.66


1490 NH CARD USED
*SECNO 2.541

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.74

     2.541      5.71  1519.41   1516.98       .00  1519.69       .28       .97       .13  1518.30
    1410.0      12.1    1383.0       15.0      11.7     324.5      13.7       1.3        .5  1518.60
       .01      1.03      4.26       1.09      .060      .058      .075      .000  1513.70  9938.32
   .003788       115.      119.      120.         3        14         0       .00   109.80 10048.11


1490 NH CARD USED
*SECNO 2.555
          START Hydraulically Similar Reach ES 2
                See Exhibit 1, Manning's n Value Map.
     2.555      5.35  1519.75   1517.38       .00  1519.93       .19       .24       .01  1515.20
    1410.0     351.4    1006.6       52.0     179.1     255.0      35.4       2.0        .7  1515.90
       .02      1.96      3.95       1.47      .090      .055      .085      .000  1514.40  9908.77
   .002713        80.       73.       75.         2        11         0       .00   145.54 10054.31


1490 NH CARD USED
*SECNO 2.614

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
1
   29MAR95      14:52:18                                                                        PAGE    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


3720 CRITICAL DEPTH ASSUMED
     2.614      2.38  1522.08   1522.08       .00  1523.12      1.04      2.08       .26  1520.50
    1410.0      14.1    1375.1       20.8       5.4     166.1       6.0       4.3       1.6  1519.70
       .03      2.62      8.28       3.47      .090      .056      .085      .000  1519.70  9944.47
   .035770       310.      312.      310.         0        14         0       .00    89.27 10033.74


1490 NH CARD USED
*SECNO 2.695

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.63

          HEC-1 Concentration Point C591:  6-hr storm controls.
     2.695      3.25  1531.25   1530.62       .00  1531.90       .65      8.74       .04  1528.30
    1400.0      39.2    1353.1        7.7      16.3     205.9       4.6       6.3       2.4  1529.70
       .05      2.40      6.57       1.66      .090      .053      .085      .000  1528.00  9935.15
   .013209       440.      427.      435.         6         8         0       .00    88.13 10023.29


1490 NH CARD USED
*SECNO 2.764

3301 HV CHANGED MORE THAN HVINS
```

```
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
     2.764      3.78   1539.28   1539.28       .00   1540.49      1.21      6.73       .17   1538.00
    1400.0       4.1    1330.2      65.6       2.1     147.0      24.9       7.9       3.1   1538.20
       .06      1.94      9.05      2.64      .090      .058      .085      .000   1535.50   9970.08
   .027608      335.      365.      375.         0         8         0       .00     80.29  10050.38

1490 NH CARD USED
*SECNO 2.780
     2.780      4.83   1541.73   1541.32       .00   1542.46       .73      1.92       .05   1542.60
    1400.0        .0    1124.9     275.1         .0     150.5      78.3       8.3       3.3   1539.30
       .06       .00      7.47      3.51      .000      .065      .085      .000   1536.90   9971.58
   .019811        85.       82.       85.         2         8         0       .00     89.53  10061.11

1490 NH CARD USED
*SECNO 2.882
     2.882      5.32   1551.02   1550.07       .00   1551.61       .60      9.14       .01   1548.50
    1400.0     190.1    1167.2      42.7      57.3     175.8      16.7      11.3       4.4   1548.30
       .09      3.32      6.64      2.55      .090      .069      .085      .000   1545.70   9951.32
   .014619      545.      542.      525.         5        15         0       .00     83.18  10034.50

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   29MAR95      14:52:18                                                                          PAGE    8

    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

1490 NH CARD USED
*SECNO 2.930
          HEC-1 Concentration Point C519:  6-hr storm controls.
     2.930      4.04   1553.84   1552.80       .00   1554.47       .62      2.85       .01   1550.90
    1410.0      22.0    1133.9     254.1      11.3     165.4      69.9      12.7       4.8   1550.20
       .10      1.95      6.86      3.63      .090      .050      .085      .000   1549.80   9972.52
   .009093      260.      254.      220.         3        11         0       .00     74.25  10046.78

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   29MAR95      14:52:18                                                                          PAGE    9

T1   *  Fountain Hills North FIS
T2   *  For:  FCDMC #92-04        By:  GVSCE #35
T3   *  Escalante Wash 100-Year Floodway
T4   *  GR data taken from stereo model; received 12 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0         3          0          0     0.0133          0          0          0     1514.7

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

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

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   29MAR95      14:52:18                                                                          PAGE   10

    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 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 2.496

3470 ENCROACHMENT STATIONS=      9924.0    10054.6  TYPE=       1  TARGET=       130.540
```

```
          STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH VERDE RIVER.
     HEC-1 Concentration Point C521:  6-hr storm controls.
     START Hydraulically Similar Reach ES 1
          See Exhibit 1, Manning's n Value Map.
          Section 1 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
   2.496     4.45   1514.85   1514.49   1514.85   1515.46      .61      .00      .00   1513.20
  1410.0     220.6     947.1     242.3      69.0     131.2     58.5       .0       .0   1511.90
     .00      3.20      7.22      4.14      .060      .058      .075     .000  1510.40   9924.05
 .013458       0.        0.        0.         0        11         4      .00   130.54  10054.59


1490 NH CARD USED
*SECNO 2.498

3470 ENCROACHMENT STATIONS=     9924.0   10054.7  TYPE=       1  TARGET=      130.700
          Section 2 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
   2.498     4.46   1514.99   1514.62   1514.98   1515.60      .61      .13      .00   1513.33
  1410.0     221.4     946.3     242.3      69.3     131.3     58.6       .1       .0   1512.03
     .00      3.19      7.21      4.13      .060      .058      .075     .000  1510.53   9924.03
 .013381       10.       10.       10.         0        11         0      .00   130.70  10054.73


1490 NH CARD USED
*SECNO 2.500

3470 ENCROACHMENT STATIONS=     9924.0   10054.7  TYPE=       1  TARGET=      130.620
          Section 3 of 3 for SLOPE-AREA METHOD (Normal Depth Calculation)
   2.500     4.45   1515.12   1514.76   1515.12   1515.73      .61      .13      .00   1513.47
  1410.0     220.9     946.8     242.3      69.1     131.2     58.5       .1       .1   1512.17
     .00      3.20      7.22      4.14      .060      .058      .075     .000  1510.67   9924.04
 .013433       10.       10.       10.         0        11         0      .00   130.62  10054.66


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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


1490 NH CARD USED
*SECNO 2.502

3470 ENCROACHMENT STATIONS=     9924.0   10054.7  TYPE=       1  TARGET=      130.710
   2.502     4.45   1515.25   1514.89   1515.25   1515.87      .61      .13      .00   1513.60
  1410.0     221.3     946.4     242.3      69.3     131.3     58.6       .2       .1   1512.30
     .00      3.19      7.21      4.13      .060      .058      .075     .000  1510.80   9924.03
 .013389       10.       10.       10.         0        11         0      .00   130.71  10054.74


1490 NH CARD USED
*SECNO 2.519

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.9   10025.6  TYPE=       1  TARGET=       55.750
   2.519     5.33   1517.03   1517.03   1517.02   1518.59     1.56     1.68      .28   1516.10
  1410.0     33.4     1376.6        .0      10.2     135.8        .0       .6       .3   1520.20
     .00      3.27      10.13      .00      .060      .058      .000     .000  1511.70   9969.86
 .028026       90.       90.       90.         0         8         0      .00    50.82  10020.68


1490 NH CARD USED
*SECNO 2.541

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.72

3470 ENCROACHMENT STATIONS=     9938.3   10048.1  TYPE=       1  TARGET=      109.790
   2.541     5.71   1519.41   1516.98   1519.41   1519.69      .28      .97      .13   1518.30
  1410.0     12.0     1383.1      14.9      11.6     324.2     13.7      1.3       .5   1518.60
     .01      1.03      4.27      1.09      .060      .058      .075     .000  1513.70   9938.39
 .003799       115.      119.      120.         3        14         0      .00   109.72  10048.11


1490 NH CARD USED
1
   29MAR95      14:52:18                                                                  PAGE   12

    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 2.555

 3470 ENCROACHMENT STATIONS=      9908.8   10054.3  TYPE=       1  TARGET=       145.540
           START Hydraulically Similar Reach ES 2
                 See Exhibit 1, Manning's n Value Map.
       2.555       5.34    1519.74    1517.38    1519.75    1519.93        .19        .24        .01    1515.20
      1410.0      351.4     1006.7       51.9      178.9      254.9        35.3        2.0         .7    1515.90
         .02       1.96       3.95       1.47       .090       .055        .085       .000    1514.40    9908.81
     .002718        80.        73.        75.          2         11           0        .00     145.48   10054.29


 1490 NH CARD USED
 *SECNO 2.614

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=      9944.5   10033.7  TYPE=       1  TARGET=        89.271
       2.614       2.39    1522.09    1522.09    1522.08    1523.12        1.03       2.07        .25    1520.50
      1410.0       14.3     1374.8       20.9        5.5      167.1         6.0        4.3         1.6    1519.70
         .03       2.62       8.23       3.45       .090       .057        .085       .000    1519.70    9944.47
     .035107        310.       312.       310.          0         14           0        .00      89.27   10033.74


 1490 NH CARD USED
 *SECNO 2.695

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.61


 3470 ENCROACHMENT STATIONS=      9935.2   10023.3  TYPE=       1  TARGET=        88.140
           HEC-1 Concentration Point C591:  6-hr storm controls.
       2.695       3.24    1531.24    1530.62    1531.25    1531.90         .66       8.74        .04    1528.30
      1400.0       39.1     1353.3        7.6       16.2      205.2         4.6        6.3         2.4    1529.70
         .05       2.41       6.59       1.66       .090       .053        .085       .000    1528.00    9935.19
     .013357        440.       427.       435.          6          8           0        .00      88.06   10023.25


 1490 NH CARD USED
 *SECNO 2.764
1
    29MAR95       14:52:18                                                                                    PAGE   13

     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=      9970.1   10050.4  TYPE=       1  TARGET=        80.300
       2.764       3.79    1539.29    1539.29    1539.28    1540.49        1.21       6.76        .17    1538.00
      1400.0        4.2     1329.7       66.1        2.1      147.2        25.1        7.9         3.1    1538.20
         .06       1.95       9.03       2.64       .090       .058        .085       .000    1535.50    9970.08
     .027420        335.       365.       375.          0          8           0        .00      80.30   10050.38


 1490 NH CARD USED
 *SECNO 2.780

 3470 ENCROACHMENT STATIONS=      9969.1   10061.1  TYPE=       1  TARGET=        92.021
       2.780       4.82    1541.72    1541.32    1541.73    1542.46         .74       1.92        .05    1542.60
      1400.0         .0     1125.5       274.5         .0      150.3        78.1        8.3         3.3    1539.30
         .06        .00       7.49       3.52       .000       .065        .085       .000    1536.90    9971.59
     .019908         85.        82.        85.          2          8           0        .00      89.50   10061.10


 1490 NH CARD USED
 *SECNO 2.882

 3470 ENCROACHMENT STATIONS=      9951.3   10034.5  TYPE=       1  TARGET=        83.180
       2.882       5.32    1551.02    1550.07    1551.02    1551.62         .60       9.14        .01    1548.50
      1400.0      190.3     1166.9       42.8       57.4      176.0        16.8       11.3         4.4    1548.30
         .09       3.31       6.63       2.55       .090       .069        .085       .000    1545.70    9951.32
     .014570        545.       542.       525.          5         15           0        .00      83.18   10034.50


 1490 NH CARD USED
 *SECNO 2.930
```

```
3470 ENCROACHMENT STATIONS=     9972.5   10046.8  TYPE=       1  TARGET=       74.261
          HEC-1 Concentration Point C519:  6-hr storm controls.
      2.930       4.04    1553.84    1552.80    1553.84    1554.47        .63       2.84        .01    1550.90
     1410.0       22.0     1133.9      254.1       11.3      165.4       69.9       12.7        4.8    1550.20
        .10       1.95       6.86       3.63       .090       .050       .085       .000    1549.80    9972.52
    .009095       260.       254.       220.          3         11          0        .00      74.25   10046.78


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    29MAR95       14:52:18                                                                                PAGE   14


                                                                                    THIS RUN EXECUTED 29MAR95    14:52:21

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

Escalante Wash 100-Year

SUMMARY PRINTOUT TABLE  101

      SECNO      EGOC       ELLC       EGIC      ELTRD      QCULV      QWEIR      CLASS         H4      DEPTH      CWSEL        VCH         EG

1
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Escalante Wash 100-Year

SUMMARY PRINTOUT TABLE  110

      SECNO      CWSEL     DIFKWS         EG     TOPWID       QLOB        QCH       QROB     PERENC     STENCL     STCHL      STCHR     STENCR

       2.496    1514.85        .15    1515.46     130.54     220.19     947.59     242.22        .00        .00   9985.30   10019.50        .00
       2.496    1514.85        .00    1515.46     130.54     220.62     947.12     242.26     130.54    9924.05   9985.30   10019.50   10054.59

       2.498    1514.98        .00    1515.60     130.69     221.06     946.64     242.30        .00        .00   9985.30   10019.50        .00
       2.498    1514.99        .00    1515.60     130.70     221.41     946.26     242.33     130.70    9924.03   9985.30   10019.50   10054.73

       2.500    1515.12        .00    1515.73     130.62     220.64     947.10     242.26        .00        .00   9985.30   10019.50        .00
       2.500    1515.12        .00    1515.73     130.62     220.87     946.84     242.28     130.62    9924.04   9985.30   10019.50   10054.66

       2.502    1515.25        .00    1515.87     130.71     221.15     946.54     242.31        .00        .00   9985.30   10019.50        .00
       2.502    1515.25        .00    1515.87     130.71     221.32     946.35     242.32     130.71    9924.03   9985.30   10019.50   10054.74

*      2.519    1517.02        .00    1518.59      50.80      32.43    1377.57        .00        .00        .00   9985.80   10025.60        .00
*      2.519    1517.03        .01    1518.59      50.82      33.41    1376.59        .00      55.75    9969.86   9985.80   10025.60   10025.61

*      2.541    1519.41        .00    1519.69     109.80      12.07    1382.97      14.96        .00        .00   9959.30   10031.70        .00
*      2.541    1519.41        .00    1519.69     109.72      11.98    1383.15      14.88     109.79    9938.32   9959.30   10031.70   10048.11

       2.555    1519.75        .00    1519.93     145.54     351.43    1006.60      51.97        .00        .00   9977.80   10031.90        .00
       2.555    1519.74        .00    1519.93     145.48     351.36    1006.72      51.92     145.54    9908.77   9977.80   10031.90   10054.31

*      2.614    1522.08        .00    1523.12      89.27      14.11    1375.13      20.76        .00        .00   9951.30   10028.70        .00
*      2.614    1522.09        .01    1523.12      89.27      14.32    1374.80      20.87      89.27    9944.47   9951.30   10028.70   10033.74

*      2.695    1531.25        .00    1531.90      88.13      39.17    1353.13       7.70        .00        .00   9946.20   10017.30        .00
*      2.695    1531.24       -.01    1531.90      88.06      39.06    1353.33       7.62      88.14    9935.15   9946.20   10017.30   10023.29

*      2.764    1539.28        .00    1540.49      80.29       4.13    1330.24      65.63        .00        .00   9973.40   10019.60        .00
*      2.764    1539.29        .01    1540.49      80.30       4.17    1329.69      66.14      80.30    9970.08   9973.40   10019.60   10050.38

       2.780    1541.73        .00    1542.46      89.53        .00    1124.90     275.10        .00        .00   9969.10   10013.00        .00
       2.780    1541.72        .00    1542.46      89.50        .00    1125.54     274.46      92.02    9969.09   9969.10   10013.00   10061.11

       2.882    1551.02        .00    1551.61      83.18     190.13    1167.16      42.71        .00        .00   9979.60   10022.20        .00
       2.882    1551.02        .00    1551.62      83.18     190.33    1166.86      42.81      83.18    9951.32   9979.60   10022.20   10034.50

       2.930    1553.84        .00    1554.47      74.25      22.04    1133.88     254.08        .00        .00   9980.20   10024.10        .00
       2.930    1553.84        .00    1554.47      74.25      22.03    1133.89     254.08      74.26    9972.52   9980.20   10024.10   10046.78

1
    29MAR95       14:52:18                                                                                PAGE   16

Escalante Wash 100-Year

SUMMARY PRINTOUT TABLE  150
```

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	2.496	.00	.00	.00	1510.40	1410.00	1514.85	1514.49	1515.46	135.00	7.23	258.38	121.35
	2.496	.00	.00	.00	1510.40	1410.00	1514.85	1514.49	1515.46	134.58	7.22	258.70	121.54
	2.498	10.00	.00	.00	1510.53	1410.00	1514.98	1514.62	1515.60	134.14	7.21	259.04	121.74
	2.498	10.00	.00	.00	1510.53	1410.00	1514.99	1514.62	1515.60	133.81	7.21	259.29	121.89
	2.500	10.00	.00	.00	1510.67	1410.00	1515.12	1514.76	1515.73	134.56	7.22	258.72	121.55
	2.500	10.00	.00	.00	1510.67	1410.00	1515.12	1514.76	1515.73	134.33	7.22	258.89	121.66
	2.502	10.00	.00	.00	1510.80	1410.00	1515.25	1514.89	1515.87	134.06	7.21	259.10	121.78
	2.502	10.00	.00	.00	1510.80	1410.00	1515.25	1514.89	1515.87	133.89	7.21	259.23	121.86
*	2.519	89.50	.00	.00	1511.70	1410.00	1517.02	1517.02	1518.59	283.86	10.18	145.28	83.69
*	2.519	89.50	.00	.00	1511.70	1410.00	1517.03	1517.03	1518.59	280.26	10.13	146.04	84.22
*	2.541	119.20	.00	.00	1513.70	1410.00	1519.41	1516.98	1519.69	37.88	4.26	349.94	229.10
*	2.541	119.20	.00	.00	1513.70	1410.00	1519.41	1516.98	1519.69	37.99	4.27	349.53	228.75
	2.555	72.90	.00	.00	1514.40	1410.00	1519.75	1517.38	1519.93	27.13	3.95	469.46	270.68
	2.555	72.90	.00	.00	1514.40	1410.00	1519.74	1517.38	1519.93	27.18	3.95	469.14	270.44
*	2.614	311.60	.00	.00	1519.70	1410.00	1522.08	1522.08	1523.12	357.70	8.28	177.49	74.55
*	2.614	311.60	.00	.00	1519.70	1410.00	1522.09	1522.09	1523.12	351.07	8.23	178.57	75.25
*	2.695	426.60	.00	.00	1528.00	1400.00	1531.25	1530.62	1531.90	132.09	6.57	226.84	121.81
*	2.695	426.60	.00	.00	1528.00	1400.00	1531.24	1530.62	1531.90	133.57	6.59	226.01	121.14
*	2.764	364.80	.00	.00	1535.50	1400.00	1539.28	1539.28	1540.49	276.08	9.05	174.00	84.26
*	2.764	364.80	.00	.00	1535.50	1400.00	1539.29	1539.29	1540.49	274.20	9.03	174.47	84.55
	2.780	82.30	.00	.00	1536.90	1400.00	1541.73	1541.32	1542.46	198.11	7.47	228.82	99.47
	2.780	82.30	.00	.00	1536.90	1400.00	1541.72	1541.32	1542.46	199.08	7.49	228.39	99.22
	2.882	541.90	.00	.00	1545.70	1400.00	1551.02	1550.07	1551.61	146.19	6.64	249.84	115.79
	2.882	541.90	.00	.00	1545.70	1400.00	1551.02	1550.07	1551.62	145.70	6.63	250.14	115.99
	2.930	253.70	.00	.00	1549.80	1410.00	1553.84	1552.80	1554.47	90.93	6.86	246.60	147.86
	2.930	253.70	.00	.00	1549.80	1410.00	1553.84	1552.80	1554.47	90.95	6.86	246.58	147.85

1

29MAR95 14:52:18 PAGE 17

Escalante Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2.496	1410.00	1514.85	.00	.00	.15	130.54	.00
	2.496	1410.00	1514.85	.00	.00	.00	130.54	.00
	2.498	1410.00	1514.98	.00	.14	.00	130.69	10.00
	2.498	1410.00	1514.99	.00	.14	.00	130.70	10.00
	2.500	1410.00	1515.12	.00	.13	.00	130.62	10.00
	2.500	1410.00	1515.12	.00	.13	.00	130.62	10.00
	2.502	1410.00	1515.25	.00	.14	.00	130.71	10.00
	2.502	1410.00	1515.25	.00	.14	.00	130.71	10.00
*	2.519	1410.00	1517.02	.00	1.76	.00	50.80	89.50
*	2.519	1410.00	1517.03	.01	1.78	.01	50.82	89.50
*	2.541	1410.00	1519.41	.00	2.40	.00	109.80	119.20
*	2.541	1410.00	1519.41	.00	2.38	.00	109.72	119.20
	2.555	1410.00	1519.75	.00	.33	.00	145.54	72.90
	2.555	1410.00	1519.74	.00	.33	.00	145.48	72.90
*	2.614	1410.00	1522.08	.00	2.33	.00	89.27	311.60
*	2.614	1410.00	1522.09	.01	2.35	.01	89.27	311.60
*	2.695	1400.00	1531.25	.00	9.17	.00	88.13	426.60
*	2.695	1400.00	1531.24	-.01	9.15	-.01	88.06	426.60
*	2.764	1400.00	1539.28	.00	8.03	.00	80.29	364.80
*	2.764	1400.00	1539.29	.01	8.04	.01	80.30	364.80
	2.780	1400.00	1541.73	.00	2.45	.00	89.53	82.30
	2.780	1400.00	1541.72	.00	2.44	.00	89.50	82.30
	2.882	1400.00	1551.02	.00	9.29	.00	83.18	541.90
	2.882	1400.00	1551.02	.00	9.30	.00	83.18	541.90
	2.930	1410.00	1553.84	.00	2.83	.00	74.25	253.70
	2.930	1410.00	1553.84	.00	2.82	.00	74.25	253.70

SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=      2.519  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.519  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      2.519  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.519  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      2.541  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      2.541  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      2.614  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.614  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      2.614  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.614  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=      2.695  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      2.695  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      2.764  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.764  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      2.764  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      2.764  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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Floodway width summary: Escalante Wash 100-Year
Profile No. 2

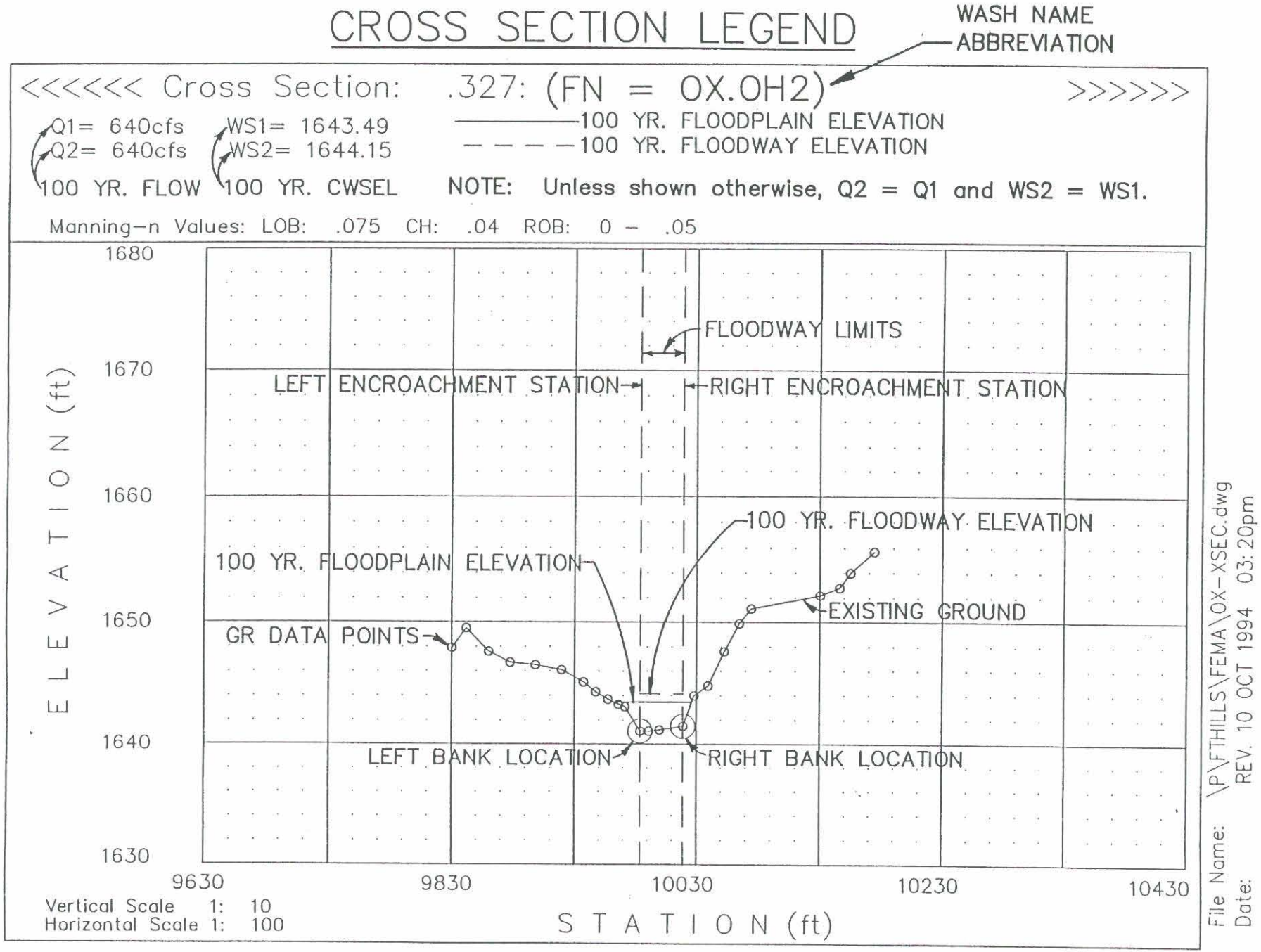
Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
2.496	.00	130.54	9924.05	78.35	10002.40	52.19	10054.59
2.498	.00	130.70	9924.03	78.37	10002.40	52.33	10054.73
2.500	.00	130.62	9924.04	78.36	10002.40	52.26	10054.66
2.502	.00	130.71	9924.03	78.37	10002.40	52.34	10054.74
2.519	.01	55.75	9969.86	35.84	10005.70	19.91	10025.61
2.541	.00	109.79	9938.32	57.18	9995.50	52.61	10048.11
2.555	.00	145.54	9908.77	96.08	10004.85	49.46	10054.31
2.614	.01	89.27	9944.47	45.53	9990.00	43.74	10033.74
2.695	-.01	88.14	9935.15	46.60	9981.75	41.54	10023.29
2.764	.01	80.30	9970.08	26.42	9996.50	53.88	10050.38
2.780	.00	92.02	9969.09	21.96	9991.05	70.06	10061.11
2.882	.00	83.18	9951.32	49.58	10000.90	33.60	10034.50
2.930	.00	74.26	9972.52	29.63	10002.15	44.63	10046.78

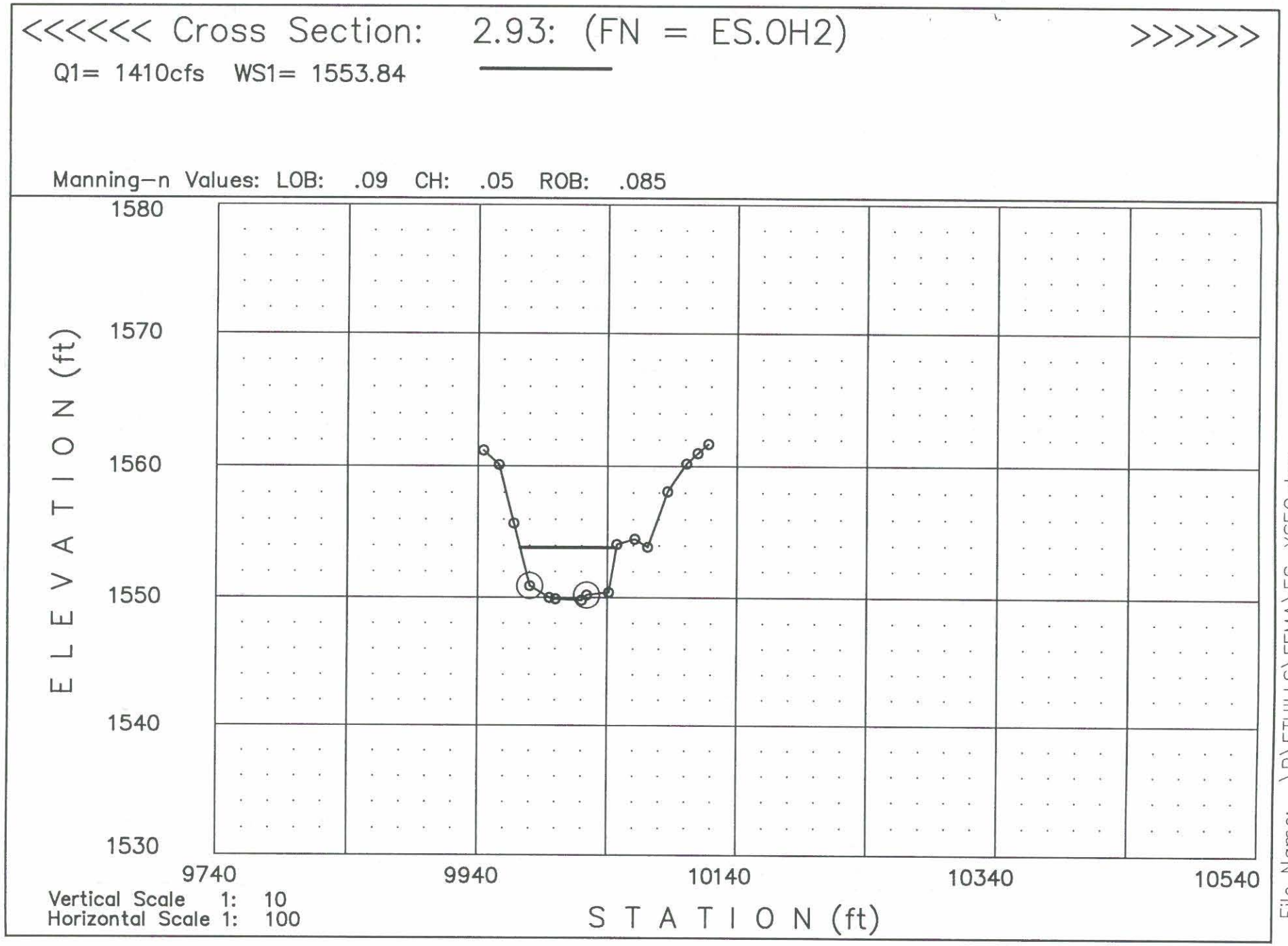
FLOODWAY DATA, Escalante Wash 100-Year
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
2.496	131.	259.	5.5	1514.8	1514.8	.0
2.498	131.	259.	5.4	1515.0	1515.0	.0
2.500	131.	259.	5.4	1515.1	1515.1	.0
2.502	131.	259.	5.4	1515.3	1515.3	.0
2.519	51.	146.	9.7	1517.0	1517.0	.0
2.541	110.	350.	4.0	1519.4	1519.4	.0
2.555	145.	469.	3.0	1519.7	1519.7	.0
2.614	89.	179.	7.9	1522.1	1522.1	.0
2.695	88.	226.	6.2	1531.2	1531.2	.0
2.764	80.	174.	8.0	1539.3	1539.3	.0
2.780	90.	228.	6.1	1541.7	1541.7	.0
2.882	83.	250.	5.6	1551.0	1551.0	.0
2.930	74.	247.	5.7	1553.8	1553.8	.0

CROSS SECTIONS

CROSS SECTION LEGEND

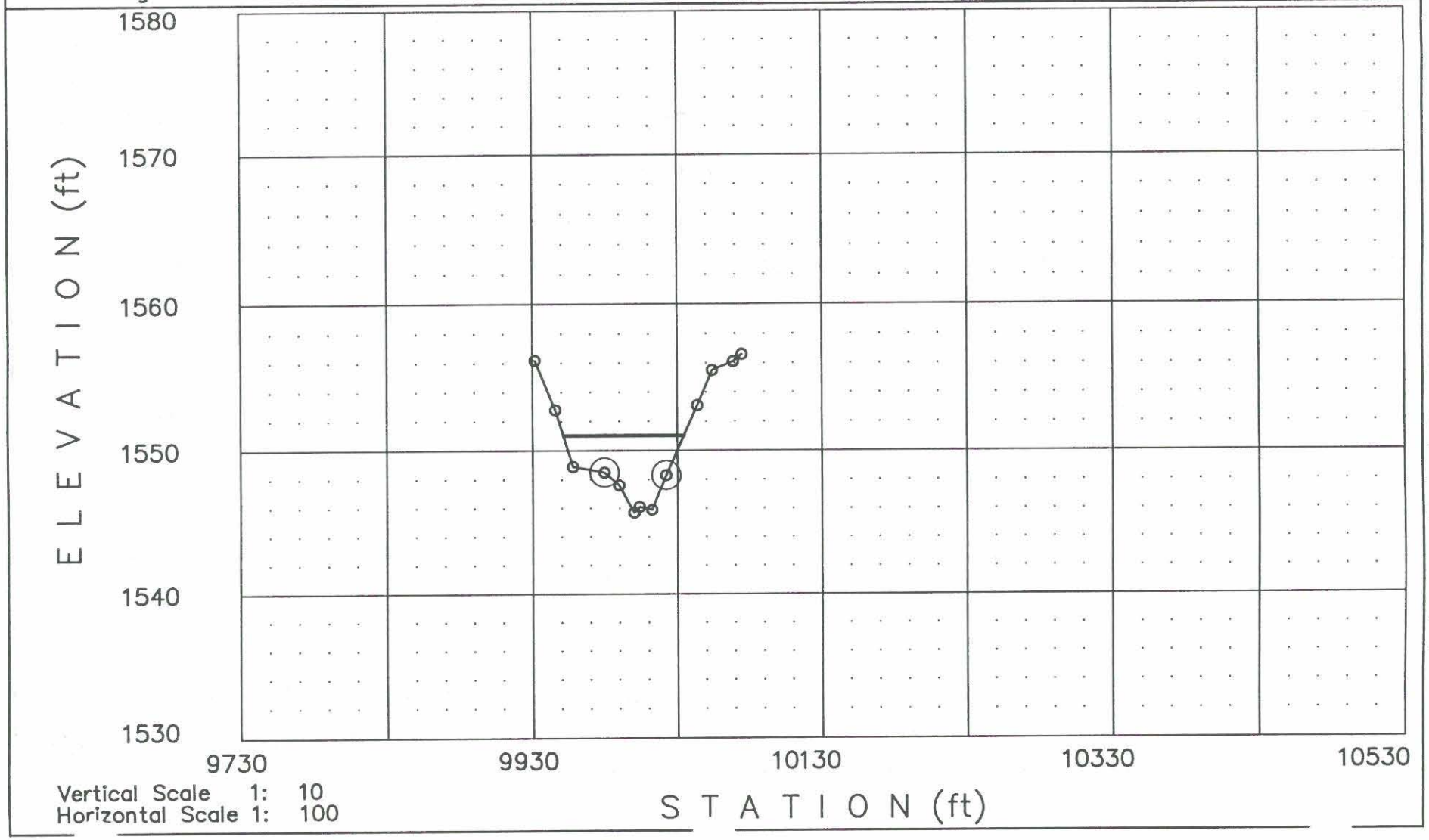



<<<<<< Cross Section: 2.93: (FN = ES.OH2) >>>>>>
Q1= 1410cfs WS1= 1553.84
Manning-n Values: LOB: .09 CH: .05 ROB: .085
1580
1570
1560
1550
1540
1530
ELEVATION (ft)
9740
9940
10140
10340
10540
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\ES-XSEC.dwg
Date: REV. 29 SEP 1994 01:48pm

<<<<<< Cross Section: 2.882: (FN = ES.OH2) >>>>>>

Q1= 1400cfs WS1= 1551.02

Manning-n Values: LOB: .09 CH: .069 ROB: .085



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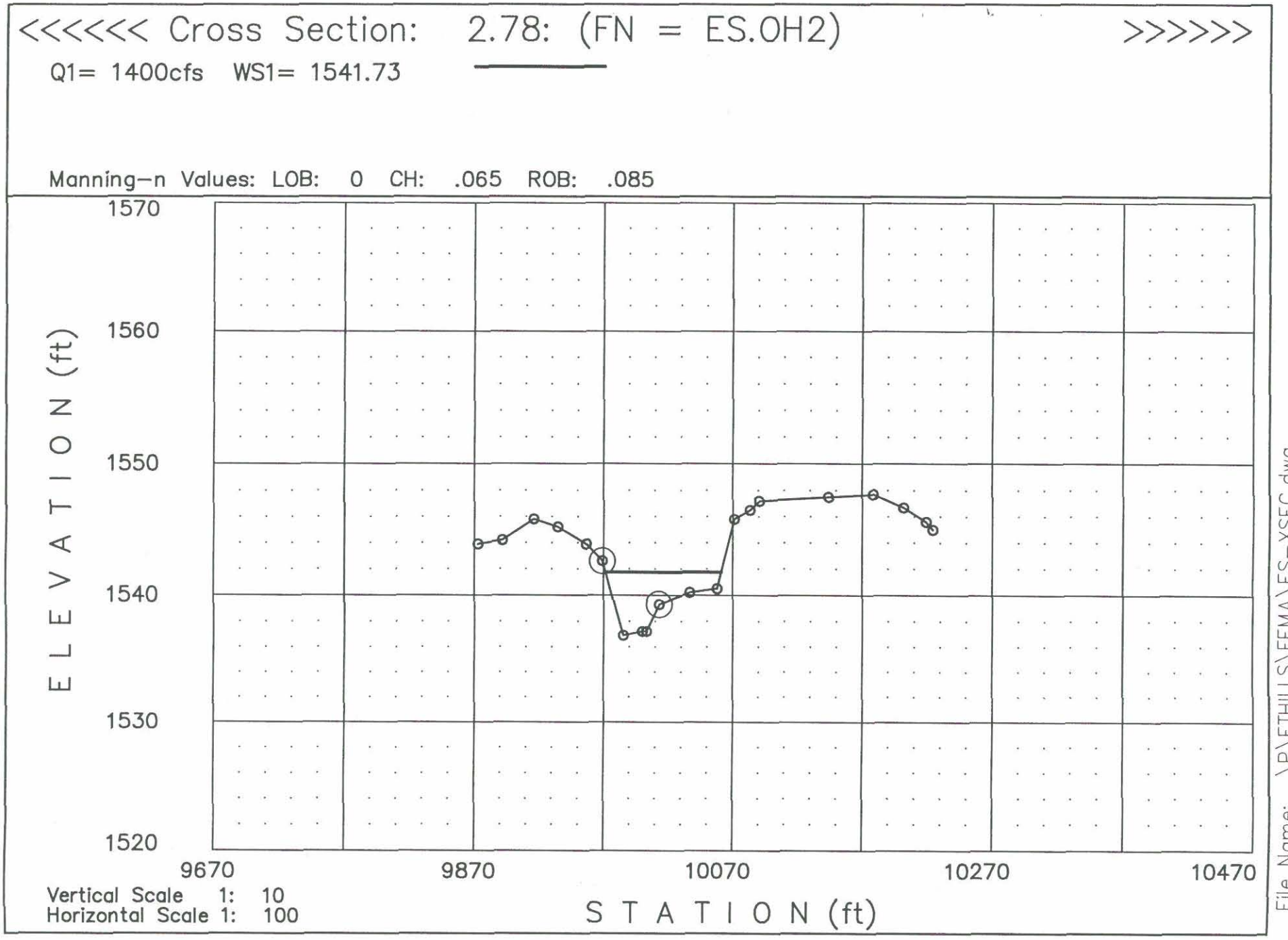
<<<<<< Cross Section: 2.78: (FN = ES.OH2) >>>>>>
Q1= 1400cfs WS1= 1541.73
Manning-n Values: LOB: 0 CH: .065 ROB: .085
1570
1560
1550
1540
1530
1520
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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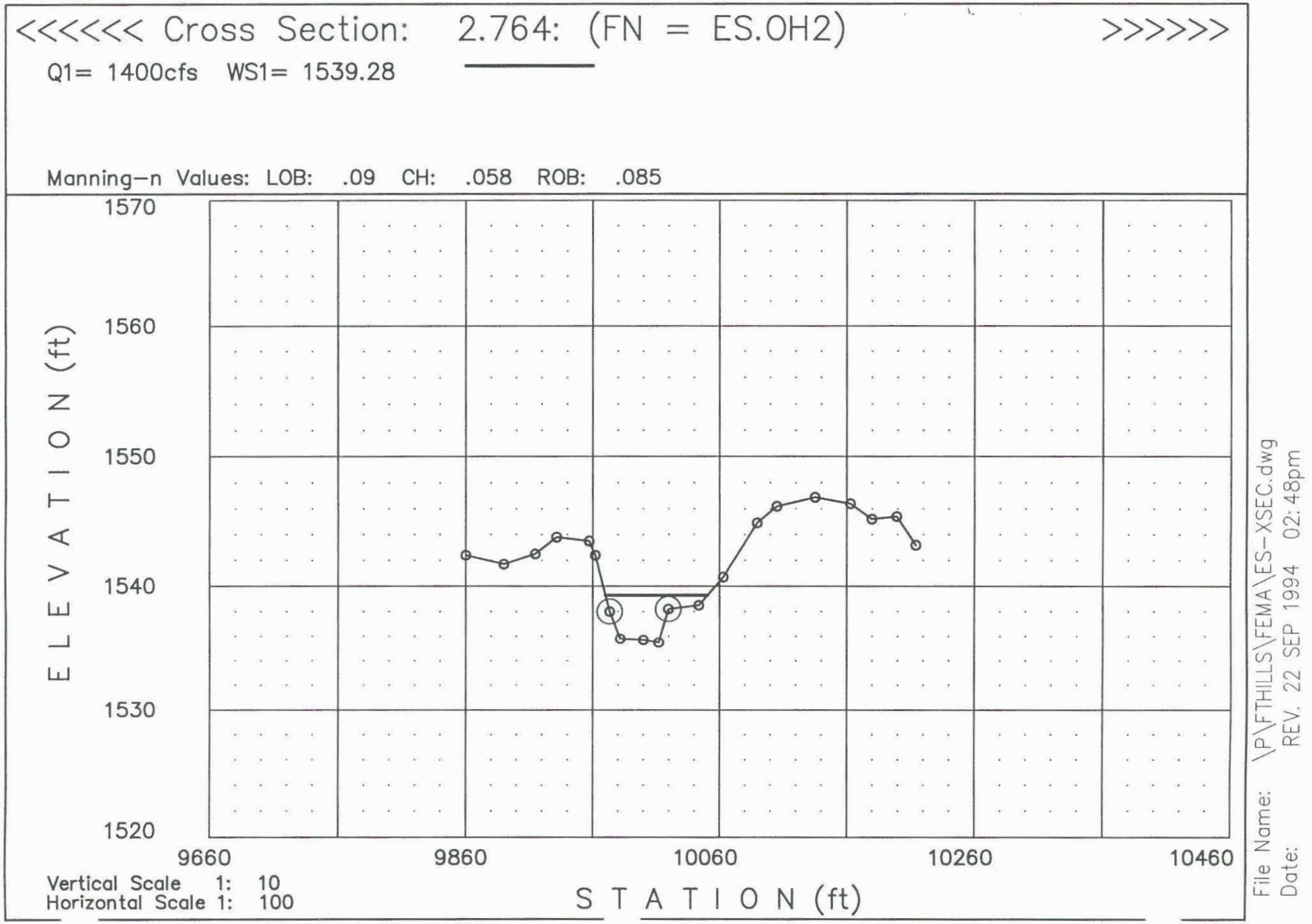
<<<<<< Cross Section: 2.764: (FN = ES.OH2) >>>>>>
Q1= 1400cfs WS1= 1539.28
Manning-n Values: LOB: .09 CH: .058 ROB: .085
1570
1560
1550
1540
1530
1520
ELEVATION (ft)
9660
9860
10060
10260
10460
STATION (ft)
Vertical Scale 1: 10
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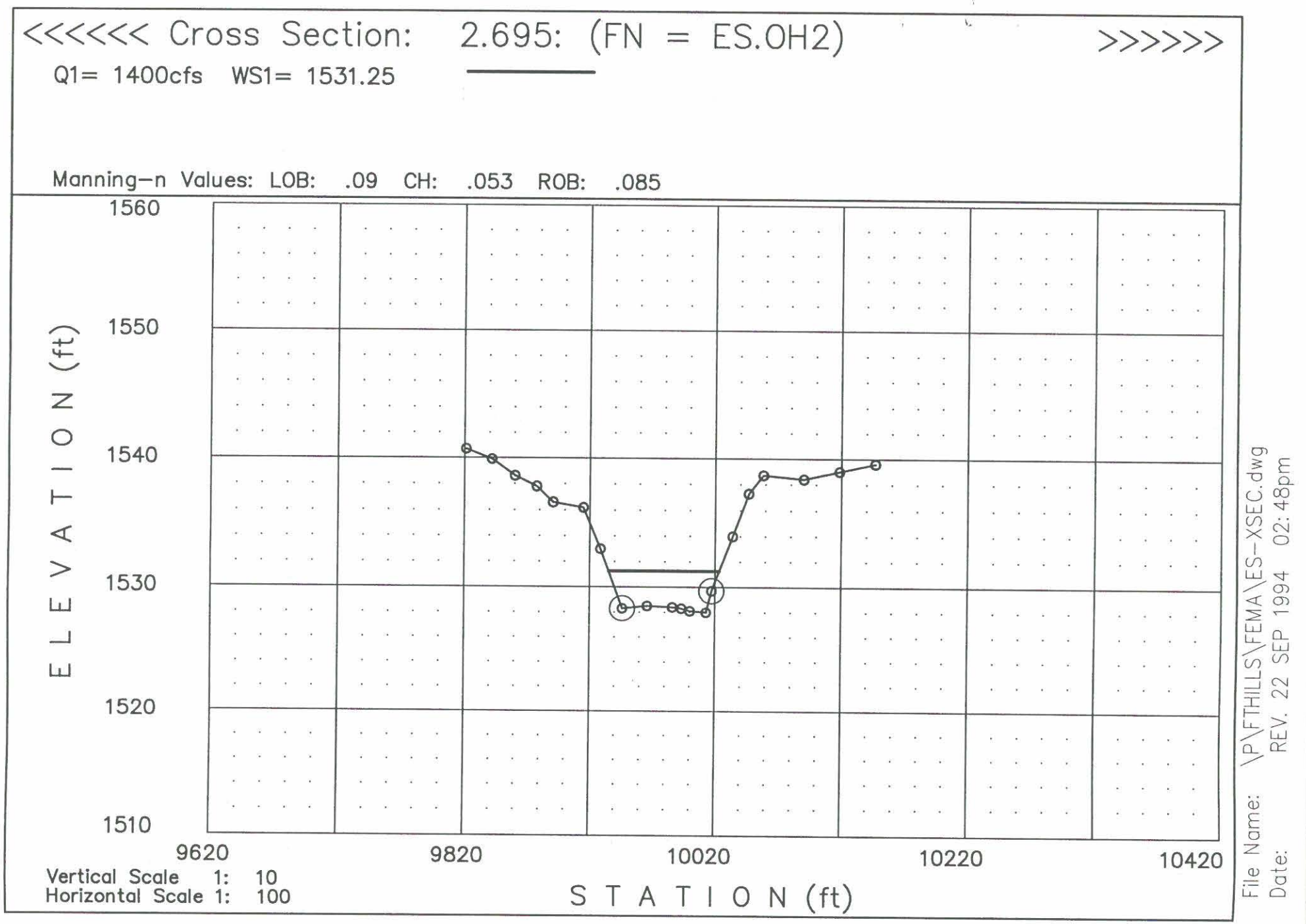
<<<<<< Cross Section: 2.695: (FN = ES.OH2) >>>>>>
Q1= 1400cfs WS1= 1531.25
Manning-n Values: LOB: .09 CH: .053 ROB: .085
1560
1550
1540
1530
1520
1510
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
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Horizontal Scale 1: 100
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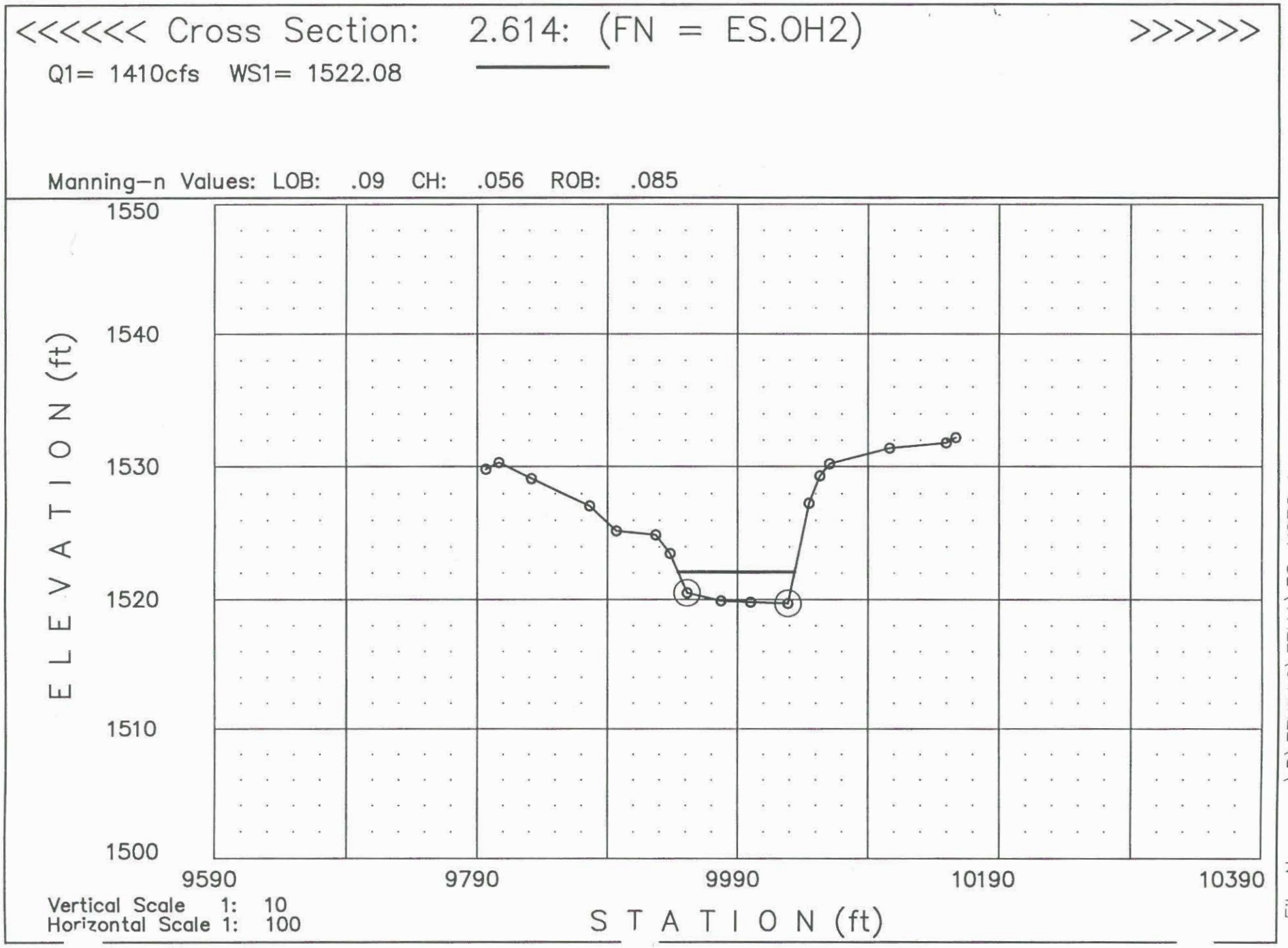
<<<<<< Cross Section: 2.614: (FN = ES.OH2) >>>>>>
Q1= 1410cfs WS1= 1522.08
Manning-n Values: LOB: .09 CH: .056 ROB: .085
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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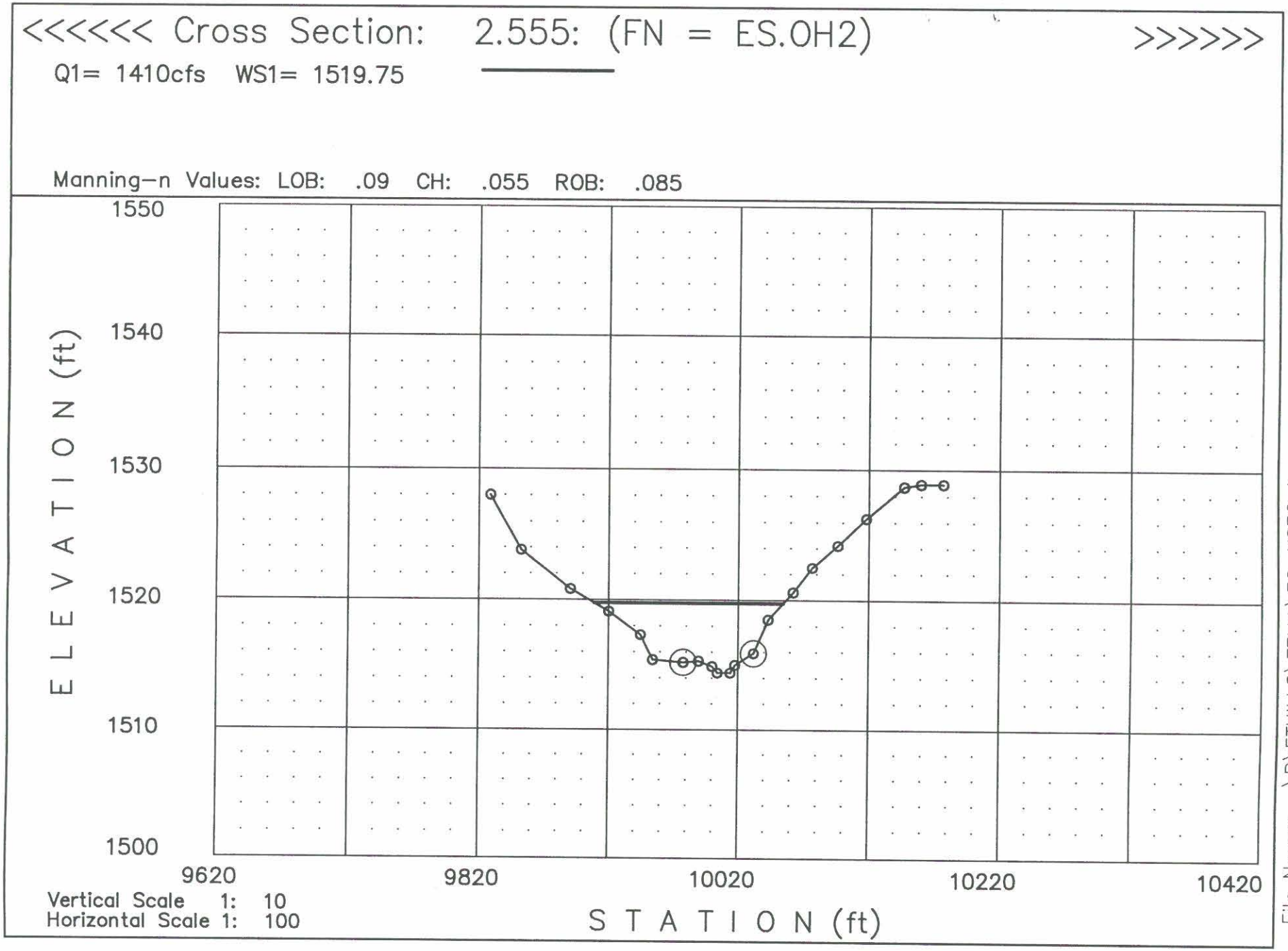
<<<<<< Cross Section: 2.555: (FN = ES.OH2) >>>>>>
Q1= 1410cfs WS1= 1519.75
Manning-n Values: LOB: .09 CH: .055 ROB: .085
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\ES-XSEC.dwg
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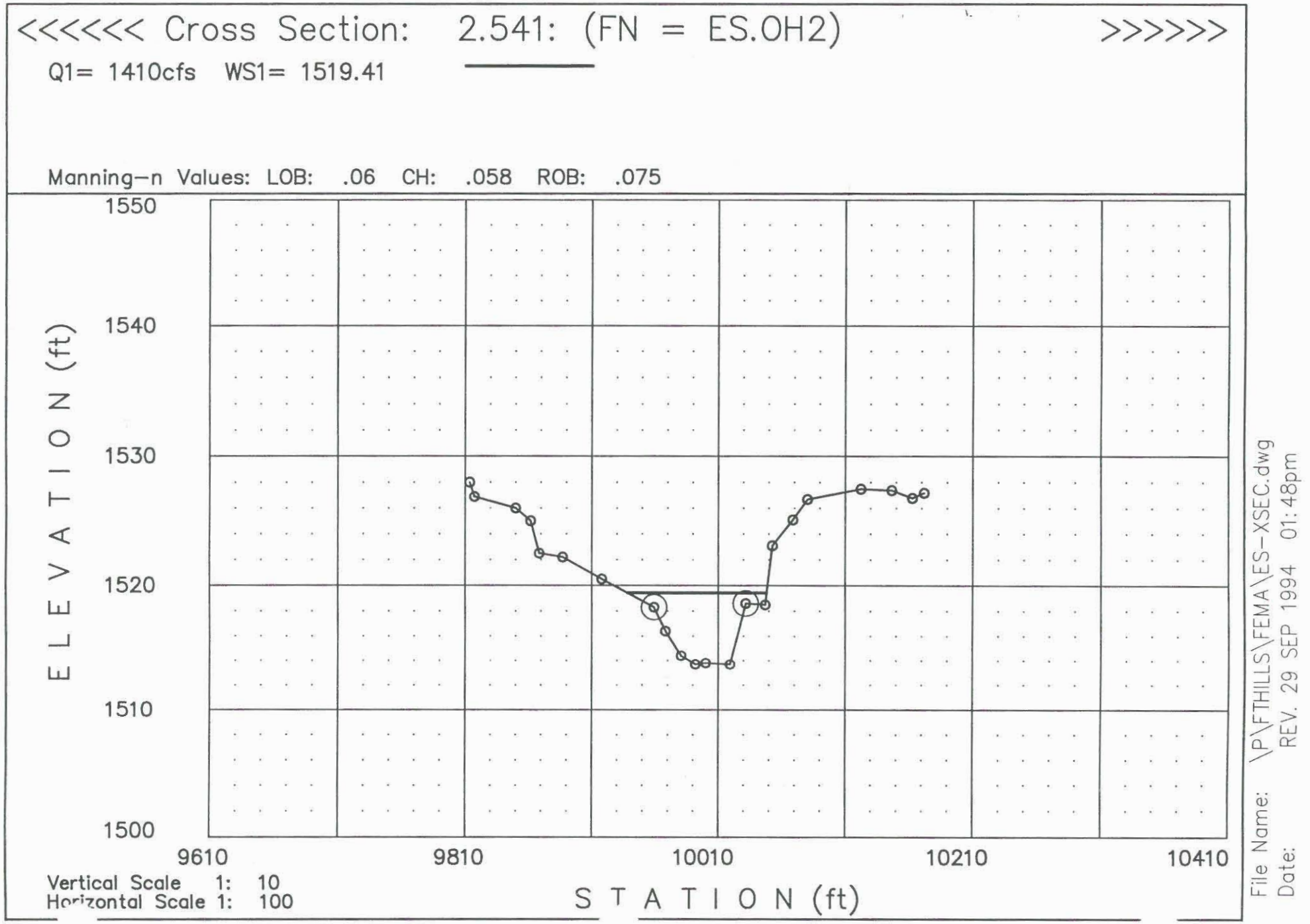
<<<<<< Cross Section: 2.541: (FN = ES.OH2) >>>>>>
Q1= 1410cfs WS1= 1519.41
Manning-n Values: LOB: .06 CH: .058 ROB: .075
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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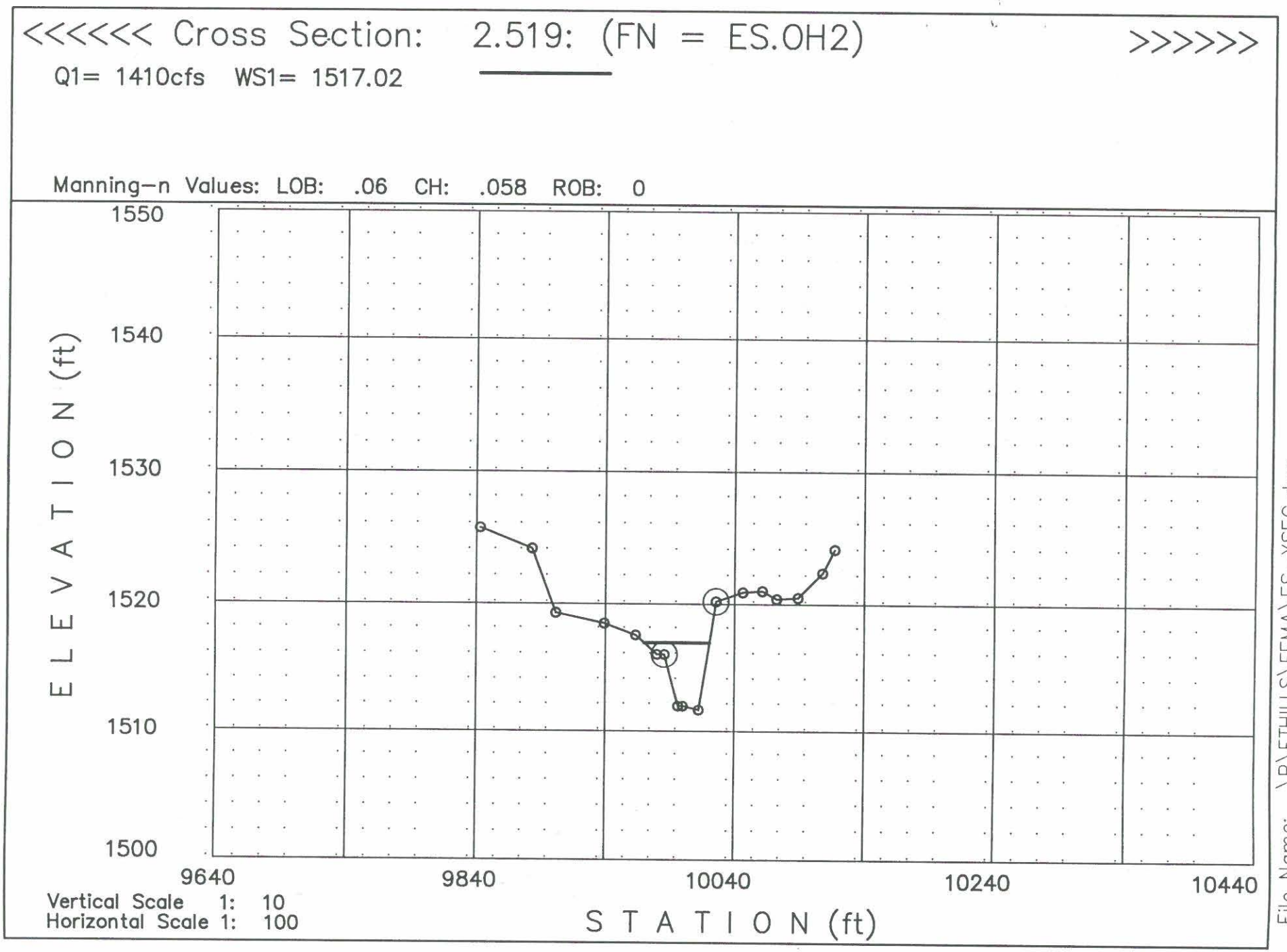
<<<<<< Cross Section: 2.519: (FN = ES.OH2) >>>>>>
Q1= 1410cfs WS1= 1517.02
Manning-n Values: LOB: .06 CH: .058 ROB: 0
1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
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Horizontal Scale 1: 100
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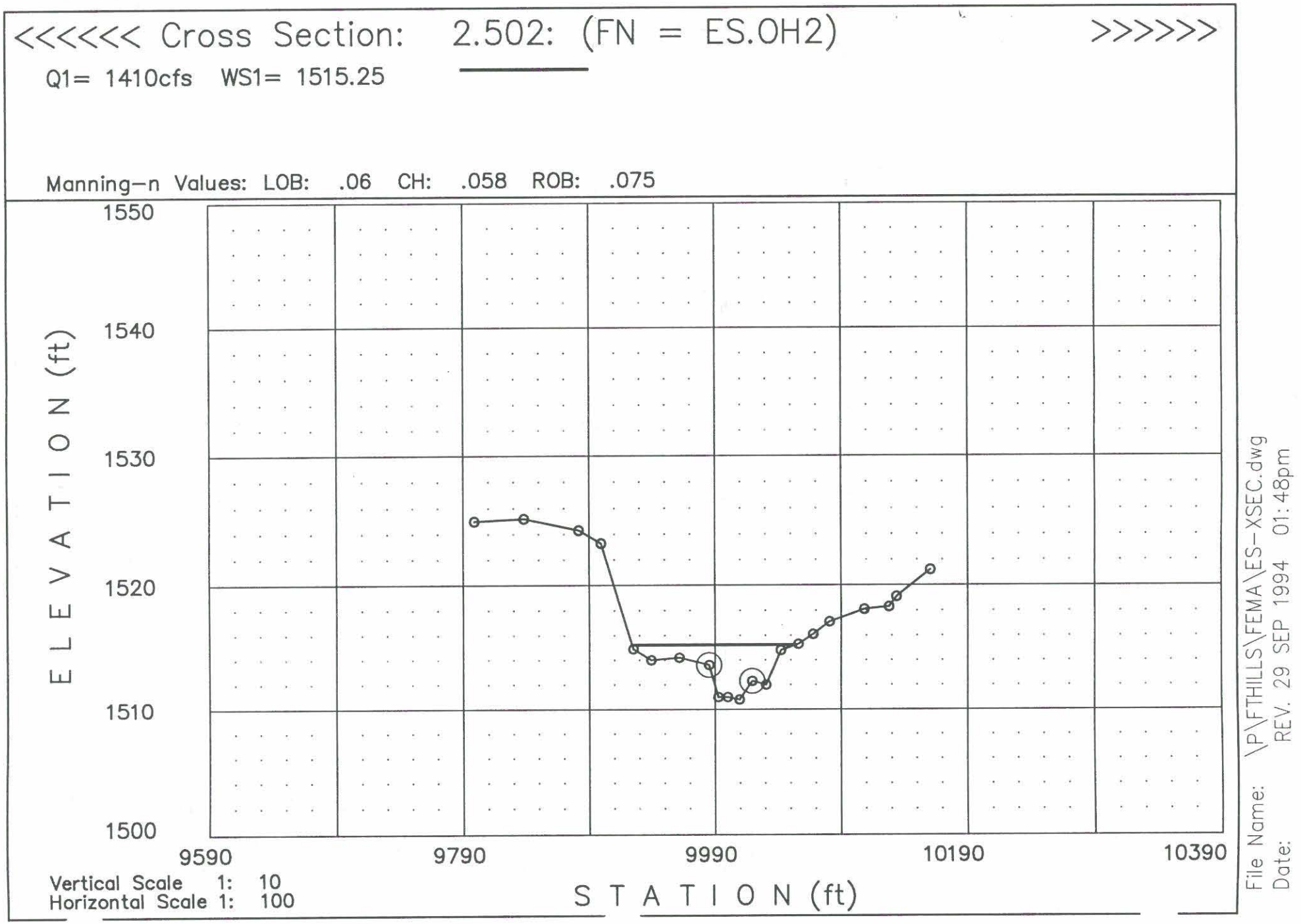
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Q1= 1410cfs WS1= 1515.25
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1550
1540
1530
1520
1510
1500
ELEVATION (ft)
9590
9790
9990
10190
10390
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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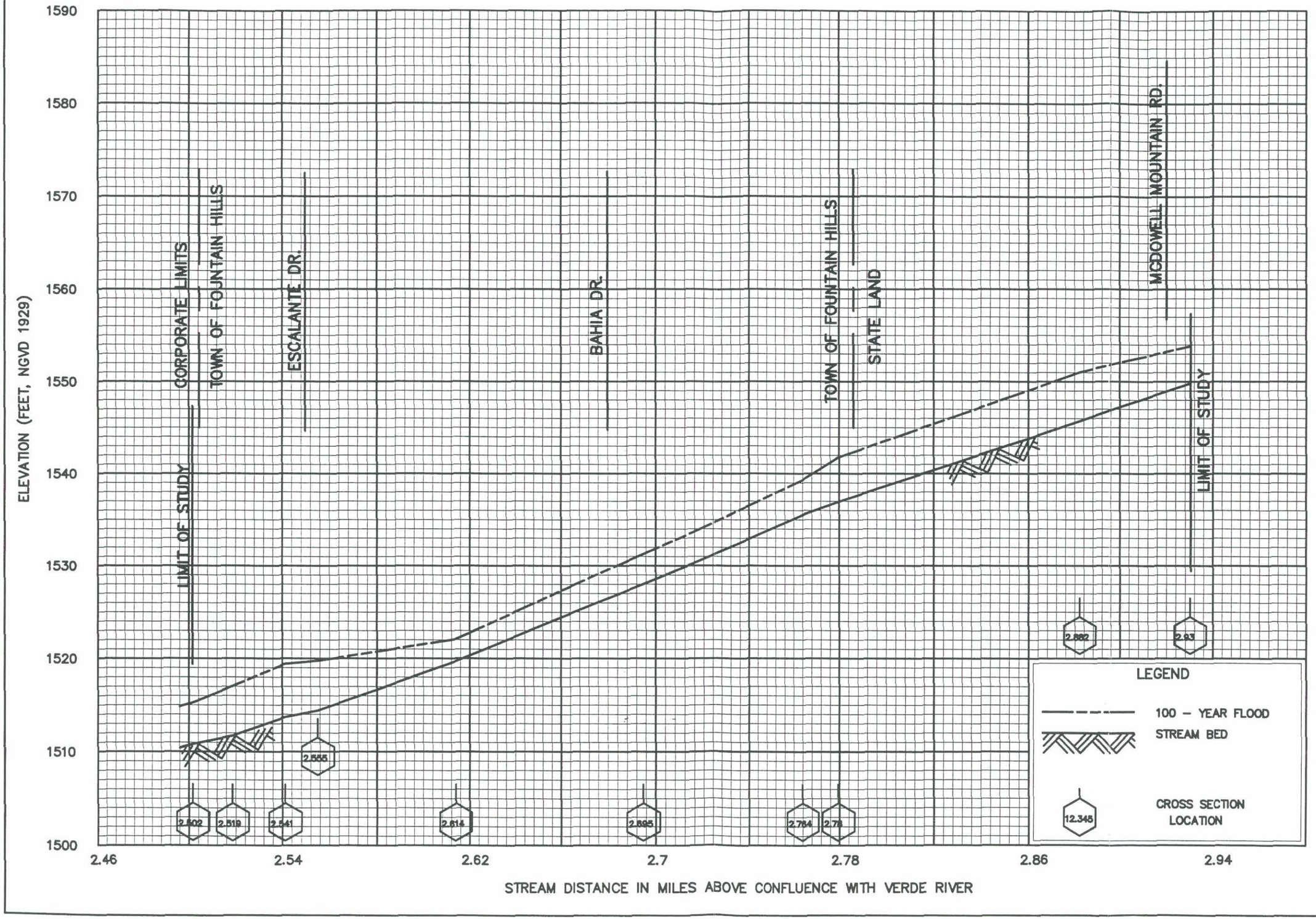
Date: REV. 29 SEP 1994 01:48pm

FLOOD PROFILES

FLOOD PROFILES

ESCALANTE WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\ES-PROF.dwg (sheet 1 of 1)
Date: REV. 29 SEP 1994 02:05pm

LEGEND/TULIP WASH

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 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    29MAR95    TIME   14:52:40  *
 *******************************************
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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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1
    29MAR95       14:52:40                                                                    PAGE    1


                                                                    THIS RUN EXECUTED 29MAR95    14:52:40

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

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


  T1   *  Fountain Hills North FIS                          File:     LE&TU.IH2
 T2    *  For:  FCDMC #92-04          By:  GVSCE #35        DTP & FB   03-27-94
 T3    *  Legend/Tulip Wash 100-Yr Floodplain.              Revised:   03-29-95
 T4    *  GR data taken from stereo model; received 06 Aug 93 from KAM.
 T5    *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
 T6    *  with survey control by Anderson Nelson 12-11-92.
 T7    *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
 T8    *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
 T8    *           Files: EX100-6.OH1 and EX100-24.OH1
 T8    *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
 T9    *  Special culvert routine used.   Sub Critical Analysis.
 T9    *  Floodplain limits are plotted at each cross section using starting
 T9    *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
 T9    *  or a conflict with topographic contours, in which case, the contours are
 T9    *  used to plot the floodplain.

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0         0         0         0         0   1586.77

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1         0        -1         0         0         0        -1         0         0         0


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     150       101       110       115       200

         HEC-1 Concentration Point C622

 QT        2       2050      2050

 NC                                        0.1       0.3
   Culvert 622    Upstream fully expanded flow.  Special Culvert Section # 4
          ASHBROOK WASH    Section  2.448

 NH        3       .113      9987      .125      10037.3         .12       10256.5
 ET                            9.1                                                                 9887.28   10119.62
1
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                  ASHBROOK WASH    Section  2.448         (24-hr storm controls)
                                   WSEL =  1586.77            Q = 2050
               Culvert 622     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                  LEGEND WASH TRIBUTARY
 X1    2.448         21        9987     10037.3       105       110       104.6
 GR    1588.2     9881.6     1584.5      9896.3    1580.2    9905.4    1580.5    9927.7    1580.7    9987.0
 GR    1579.7    10000.0     1579.3     10023.3    1581.4   10037.3    1581.5   10070.4    1578.8   10079.3
 GR    1580.7    10084.0     1582.0     10090.7    1585.8   10099.6    1586.9   10122.3    1587.8   10158.4
 GR    1588.1    10191.4     1587.9     10205.6    1586.9   10215.9    1587.1   10233.5    1586.8   10248.9
 GR    1587.3    10256.5
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        LEGEND/ASHBROOK Tributary

        HEC-1 Concentration Point C622L

QT        2       1120       1120

        START Hydraulically Similar Reach    LE 1
              See Exhibit 1, Manning's n Value Map.
NC    0.060     0.060      0.045      0.1        0.3

NH        3     0.060     9981.6     0.045     10000     0.060    10196.4
ET                          9.1                                   9972.73   10050.14
              HEC-1 Concentration Point C622L:  6-hr storm controls.
                    STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
              START Hydraulically Similar Reach LE 1
                    See Exhibit 1, Manning's n Value Map.
X1    0.115        22     9981.6    10012.8       375       420      394.2
GR   1592.1    9870.6    1593.5     9877.4    1593.6    9894.0    1592.8   9913.4   1592.1    9941.1
GR   1590.4    9968.3    1585.0     9981.6    1585.3    9986.8    1585.5   9996.8   1585.6   10000.0
GR   1585.5   10008.0    1587.2    10012.8    1587.4   10029.5    1586.9  10040.9   1588.2   10048.8
GR   1593.2   10065.5    1595.4    10084.5    1596.9   10107.2    1598.3  10137.4   1598.9   10176.9
GR   1597.9   10191.1    1598.0    10196.4

NH        3     0.060     9992.1     0.045     10000     0.060    10218.1
ET                          9.1                                   9984.57   10065.61
X1    0.209        18     9992.1     10007       485       500      499.5
GR   1606.2    9899.3    1602.8     9938.0    1601.0    9959.4    1598.4   9982.8   1594.3    9992.1
GR   1594.2   10000.0    1595.0    10007.0    1595.3   10028.1    1595.1  10055.2   1598.2   10068.0
GR   1601.8   10080.4    1602.9    10103.4    1604.0   10140.8    1604.2  10165.9   1605.3   10193.9
GR   1604.8   10203.8    1603.9    10211.4    1604.0   10218.1

NH        3     0.060     9996.6     0.045     10010     0.060    10196.1
ET                          9.1                                   9986.24   10050.63
X1    0.287        18     9996.6    10031.8       410       405      411.2
GR   1618.7    9884.4    1619.0     9927.0    1618.4    9933.9    1614.8   9950.6   1611.6    9968.3
GR   1607.6    9979.1    1601.9     9996.6    1601.9   10000.0    1602.6  10010.0   1603.2   10031.8
GR   1603.2   10042.2    1606.2    10054.4    1608.8   10070.5    1609.9  10110.7   1610.3   10147.4
GR   1610.4   10181.4    1609.1    10192.3    1609.1   10196.1

1
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NH        3     0.060      10000     0.045    10010.2     0.060    10120.4
ET                          9.1                                   9981.06   10055.20
X1    0.371        22     9993.4    10017.5       440       430      443.8
GR   1621.5    9859.2    1621.4     9881.0    1621.2    9906.8    1620.3   9924.0   1619.1    9941.8
GR   1618.8    9954.7    1618.0     9962.0    1616.1    9972.8    1613.9   9985.5   1612.7    9993.4
GR   1610.7   10000.0    1611.2    10010.2    1611.9   10017.5    1612.2  10042.6   1614.6   10055.0
GR   1616.9   10061.5    1617.3    10073.0    1619.6   10078.8    1622.9  10084.6   1623.3   10094.8
GR   1623.8   10105.1    1623.8    10120.4

NH        3     0.060      10000     0.045    10015.5     0.060    10087.2
ET                          9.1                                   9963.07   10035.79
X1    0.434        23     9997.8    10025.5       330       335      333.2
GR   1625.3    9811.9    1625.6     9829.6    1625.2    9853.1    1625.1   9873.4   1625.1    9916.8
GR   1624.6    9935.4    1623.7     9950.5    1621.7    9960.0    1619.7   9966.8   1618.4    9972.4
GR   1617.8    9979.9    1618.8     9986.8    1618.8    9997.8    1618.4  10000.0   1617.6   10015.5
GR   1618.7   10025.5    1620.4    10034.4    1622.4   10041.4    1625.3  10049.2   1626.7   10057.8
GR   1628.0   10066.6    1628.4    10077.3    1628.1   10087.2

NH        3     0.060     9986.2     0.045     10000     0.060    10101.5
ET                          9.1                                   9972.29   10053.18
X1    0.507        23     9976.5    10043.6       370       390      381.0
GR   1632.5    9807.9    1633.8     9824.1    1633.0    9851.5    1633.8   9866.4   1633.2    9895.3
GR   1632.5    9921.3    1631.7     9944.7    1630.6    9955.6    1629.5   9970.3   1627.9    9976.5
GR   1626.4    9986.2    1625.8     9994.0    1625.7   10000.0    1626.7  10009.3   1627.0   10033.4
GR   1627.4   10043.6    1628.6    10051.3    1630.8   10062.0    1633.0  10070.6   1634.7   10077.8
GR   1635.6   10086.5    1635.6    10095.5    1635.8   10101.5

        HEC-1 Concentration Point C603

QT        2       940        940

NH        3     0.060     10007.6     0.045    10018.2     0.060    10171.7
ET                          9.1                                   9985.45   10027.43
              HEC-1 Concentration Point C603:  6-hr storm controls.
X1    0.577        31     9991.6    10018.2       370       370      370.7
GR   1640.2    9651.7    1639.9     9675.9    1640.0    9744.3    1640.6   9762.0   1641.1    9780.9
GR   1641.5    9840.6    1641.8     9859.2    1641.7    9867.2    1641.4   9933.4   1641.1    9940.8
GR   1641.2    9952.9    1641.6     9969.2    1641.7    9976.9    1636.4   9986.7   1634.6    9991.6
GR   1633.8   10000.0    1633.1    10007.6    1634.4   10018.2    1638.4  10032.0   1638.6   10040.7
GR   1639.3   10055.8    1639.4    10064.0    1640.4   10076.9    1641.4  10097.1   1641.8   10109.9
GR   1642.0   10123.3    1641.5    10137.1    1641.5   10150.8    1643.5  10158.7   1646.0   10165.6
GR   1645.7   10171.7
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NH       3       .06      10000       .045     10014.3        .06     10189.2
ET                            9.1                                                 9978.00   10019.03
X1    0.672        21     9985.6    10014.3         500        495        504.5
GR   1653.3    9893.4     1653.7     9925.6      1653.9     9945.3     1653.5    9954.4     1653.7     9967.3
GR   1649.3    9975.2     1646.2     9985.6      1644.9     9993.0     1644.0   10000.0     1646.3    10014.3
GR   1650.1   10022.6     1651.0    10047.7      1651.3    10071.7     1651.9   10085.4     1652.7    10104.2
GR   1653.5   10117.7     1654.3    10133.3      1655.4    10149.8     1656.8   10163.5     1657.1    10181.8
1
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GR   1656.9   10189.2

NH       3       .06      9987.9       .045      10000        .06     10251.9
ET                            9.1                                                 9978.08   10016.08
X1    0.768        27     9982.3    10007.6         495        505        504.9
GR   1668.5    9834.8     1668.8     9851.8      1668.7     9875.3     1668.7    9893.8     1668.2     9930.2
GR   1667.7    9946.1     1667.6     9953.7      1667.7     9962.4     1662.6    9973.6     1659.0     9982.3
GR   1656.9    9987.9     1657.1    10000.0      1657.7    10007.6     1661.4   10017.9     1664.1    10026.6
GR   1665.3   10031.3     1665.1    10034.1      1665.1    10053.3     1666.1   10067.9     1667.2    10087.2
GR   1668.1   10109.5     1668.4    10170.9      1668.5    10187.3     1668.8   10211.6     1668.9    10230.0
GR   1669.0   10243.0     1669.2    10251.9

NH       3       .06      9988.2       .045      10009.4        .06     10285.3
ET                            9.1                                                 9980.20   10020.04
X1    0.855        25     9988.2    10009.4         460        450        459.1
GR   1678.5    9890.1     1678.1     9908.2      1677.3     9924.1     1676.1    9944.5     1674.5     9956.9
GR   1673.8    9967.0     1669.2     9978.8      1664.2     9988.2     1664.3   10000.0     1664.4    10009.4
GR   1670.0   10024.1     1670.0    10061.5      1671.0    10074.5     1670.9   10088.9     1670.4    10111.2
GR   1670.2   10133.3     1670.3    10155.7      1670.3    10167.9     1670.7   10180.3     1670.7    10206.9
GR   1671.1   10228.0     1671.7    10249.2      1672.3    10261.4     1672.7   10272.8     1673.2    10285.3

NH       3       .06      9994.7       .045      10000        .06     10052.4
ET                            9.1                                                 9978.85   10014.20
          End Legend Wash   (Section 0.945 is Uppermost Section in Legend)
X1    0.945        19     9984.5    10007.8         475        460        474.8
GR   1679.7    9829.0     1679.8     9852.4      1679.1     9881.7     1679.1    9902.3     1679.4     9914.1
GR   1679.2    9933.1     1678.8     9942.6      1679.2     9952.5     1679.2    9972.0     1676.9     9978.4
GR   1674.3    9984.5     1671.8     9994.7      1672.2    10000.0     1674.8   10007.8     1677.9    10018.2
GR   1678.7   10030.1     1679.3    10039.8      1680.3    10051.5     1679.9   10052.4

  ********************************************************************************
  **************          START Tulip Wash   END Legend Wash
  ********************************************************************************

       HEC-1 Concentration Point C602

QT        2        640        640

       START Hydraulically Similar Reach    TU 1
             See Exhibit 1, Manning's n Value Map.
NC    0.065      0.055      0.040

NH       3        .065     9987.4         .04     10009.5         .055     10088.5
ET                            9.1                                                 9982.24   10015.11
          HEC-1 Concentration Point C602:  6-hr storm controls.
          START Hydraulically Similar Reach TU 1
1
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             See Exhibit 1, Manning's n Value Map.
             NAME CHANGE  (From Legend To Tulip)  at  0.971 River Miles
          Start Tulip Wash   (Section 1.043 is Lowermost Section in Tulip Wash)
X1    1.043         13     9987.4    10009.5         500        540        517.2
GR   1690.1    9901.9     1690.6     9925.1      1690.6     9956.3     1690.7    9976.2     1684.5     9987.4
GR   1684.3   10000.0     1684.4    10009.5      1688.3    10016.9     1693.1   10029.7     1694.3    10037.3
GR   1694.6   10062.7     1694.9    10084.3      1694.5    10088.5

NH       3       .065       10000         .04     10009.1         .055     10148.1
ET                            9.1                                                 9982.46   10019.29
X1    1.102         19     9989.2    10009.1         320        310        314.1
GR   1697.4    9811.3     1698.9     9826.0      1699.5     9873.4     1699.1    9897.6     1700.1     9920.5
GR   1700.2    9945.5     1699.6     9969.0      1693.6     9979.9     1689.7    9989.2     1689.9    10000.0
GR   1688.8   10009.1     1696.0    10028.8      1697.4    10046.2     1698.0   10076.4     1698.1    10100.3
GR   1697.9   10120.5     1697.3    10135.3      1697.6    10142.4     1697.8   10148.1

       START Hydraulically Similar Reach    TU 2
             See Exhibit 1, Manning's n Value Map.

NC    0.080      0.080      0.118

NH       3         .08     9990.5         .118      10012         .08     10136.5
ET                            9.1                                                 9981.05   10021.53
X1    1.213         12     9990.5     10012.          580        570        585.6
GR   1707.9    9939.9     1707.1     9973.7      1703.6     9983.3     1700.2    9990.5     1699.9    10000.0
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GR   1699.7    10012.0     1704.9    10022.5     1706.8    10042.5     1707.5    10066.3     1707.3    10098.5
GR   1707.3    10128.9     1707.0    10136.5

   ********************************************************************************
   **************************    Culvert   601    ***************************
   ********************************************************************************


         HEC-1 Concentration Point C601

QT        2        460         460

NH        3        .08      9990.1        .118     10017.2          .08     10064.2
ET                             9.1                                                    9981.22     10039.96
          HEC-1 Concentration Point C601:  6-hr storm controls.
          CULVERT  601:  TULIP WASH and GLENBROOK BOULEVARD
             Culvert 601      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    1.329         15      9990.1     10017.2          610         610       613.3
GR   1716.9     9823.8     1716.9      9831.1     1717.5      9832.5     1717.5     9864.6     1717.0     9919.0
GR   1715.8     9966.9     1714.1      9977.8     1708.8      9990.1     1708.7     9998.8     1708.6     10000.0
GR   1708.3    10017.2     1711.5     10024.0     1711.0     10033.8     1714.7    10047.8     1718.8     10064.2

         Use NC Record to set Contraction and Expansion Coefficients for Culvert.
1
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NC                                                0.3         0.5
NH        3      0.080      9992.9       0.118     10013.5       0.080     10054.1

ET                             9.1                                                    9979.23     10028.25
             Culvert 601  Outlet.   2-60"  CMPs          (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 14.8' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1708.10
X1    1.349         16        9998       10010          100          95       101.7
X3       10                                                                  1713.54     1713.54
X4        2    1708.10        9998     1708.10       10010
GR   1718.4     9845.5     1718.8      9847.2     1718.0      9876.7     1718.5     9898.7     1718.3     9921.0
GR   1718.3     9941.8     1717.0      9974.0     1712.7      9980.5     1711.9     9989.8     1710.5     9992.9
GR   1708.1    10000.0     1709.7     10013.5     1713.0     10019.6     1714.0    10035.6     1715.0     10042.2
GR   1718.6    10054.1


SC    2.022        0.4        2.63           0           5           0          88         2.1     1709.07     1708.10
NH        3      0.080      9992.3       0.118     10008.3       0.080     10052.9

ET                             9.1                                                    9979.95     10022.62
             Culvert 601  Inlet.    2-60"  CMPs          (SECTION 3 OF SC ROUTINE)
               Photogrammetric xsec. located 5' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1709.07
             Culvert 601 BT information surveyed by ALS. West top of curb.
             Culvert 601 BT information coded per figure 3.16 (HEC-2, Sept 90)
X1    1.365         14        9994       10006           88          88          88
X2                               2     1714.07      1716.13
X3       10                                                                  1716.04     1716.04
X4        3    1709.07        9994     1709.07       10006     1716.16      9981.91

BT      -12      9802.7     1722.8                  9831.1     1721.8                 9851.3     1721.0
BT               9894.0     1720.9                  9926.3     1720.6                 9972.3     1719.6
BT               9981.91   1716.16                   10004     1716.04                10020.21   1716.36
BT              10023.6     1717.1                 10037.7     1718.3                 10052.9     1720.6

GR   1722.8     9802.7     1721.8      9831.1     1721.0      9851.3     1720.9     9894.0     1720.6     9926.3
GR   1719.6     9972.3     1715.4      9984.1     1711.0      9992.3     1709.07    10000.0     1710.8     10008.3
GR   1714.7    10013.8     1717.1     10023.6     1718.3     10037.7     1720.6    10052.9

          Return  Contraction and Expansion coefficients to Normal

NC                                                0.1         0.3

NH        3        .08      9986.8        .118     10004.9          .08     10068.9
ET                             9.1                                                    9978.80     10033.41
             Culvert 601      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    1.373         16      9986.8     10011.2           40          40       41.3
GR   1723.5     9816.3     1721.7      9845.0     1720.5      9857.0     1720.8     9891.7     1720.9     9931.9
GR   1720.5     9971.1     1717.4      9978.1     1712.5      9986.8     1711.2     9995.8     1711.3     10000.0
GR   1711.3    10004.9     1712.0     10011.2     1712.0     10019.2     1716.1    10027.2     1718.8     10045.7
GR   1723.0    10068.9

1
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         START Hydraulically Similar Reach    TU 3

NC    0.040       0.040       0.025         0.1         0.3
NH        3         .04     10014.7        .025     10023.7          .04     10036.6
ET                             9.1                                                    9975.33     10026.82
X1    1.455         13     10001.6     10023.7           420         440       435.2
GR   1725.5     9921.4     1724.2      9939.2     1723.8      9948.8     1725.1     9958.3     1724.0     9964.3
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GR   1718.2     9977.6     1717.8     9993.5     1718.0     10000.0     1717.9     10001.6     1717.1     10014.7
GR   1717.0    10023.7     1725.0    10035.1     1725.2     10036.6
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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

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.448
                ASHBROOK WASH    Section  2.448          (24-hr storm controls)
                                 WSEL =  1586.77            Q = 2050
          Culvert 622      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                LEGEND WASH TRIBUTARY
     2.448      7.97   1586.77   1582.07   1586.77   1586.81      .04      .00      .00   1580.70
    2050.0     961.4     586.6     502.0     559.5     344.7     339.6       .0       .0   1581.40
       .00      1.72      1.70      1.48      .113      .125      .120      .000  1578.80   9887.28
   .001583       105.      105.      110.         0        17         0      .00   232.34  10119.62

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .115

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C622L:  6-hr storm controls.
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
          START Hydraulically Similar Reach LE 1
                See Exhibit 1, Manning's n Value Map.
      .115      3.60   1588.60   1588.60      .00   1589.61      1.01      1.12      .29   1585.00
    1120.0      78.4     847.0     194.6      16.0      95.0      46.9       6.3      1.4   1587.20
       .01      4.91      8.92      4.15      .060      .049      .060      .000  1585.00   9972.73
   .019854       375.      394.      420.         0        18         0      .00    77.41  10050.14

1490 NH CARD USED
*SECNO  .209
      .209      3.42   1597.62   1597.14      .00   1598.23       .60      8.58      .04   1594.30
    1120.0      50.2     375.9     693.9      12.5      47.8     130.8       8.3      2.3   1595.00
       .04      4.01      7.87      5.30      .060      .050      .060      .000  1594.20   9984.57
   .015038       485.      500.      500.         4        15         0      .00    81.04  10065.61
```



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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

1490 NH CARD USED
*SECNO  .287
      .287      3.37   1605.27   1605.26      .00   1606.36      1.09      7.99      .15   1601.90
    1120.0      96.3     847.2     176.5      17.5      93.4      30.3       9.9      3.0   1603.20
       .05      5.52      9.07      5.83      .060      .051      .060      .000  1601.90   9986.24
   .026440       410.      411.      405.         2         8         0      .00    64.39  10050.63

1490 NH CARD USED
*SECNO  .371
      .371      3.97   1614.67   1614.25      .00   1615.39       .72      8.99      .04   1612.70
    1120.0      44.6     623.1     452.2      12.5      80.3      81.5      11.5      3.7   1611.90
       .07      3.56      7.76      5.55      .060      .054      .060      .000  1610.70   9981.06
   .016275       440.      444.      430.         4         8         0      .00    74.13  10055.20

1490 NH CARD USED
*SECNO  .434
      .434      3.19   1620.79   1620.64      .00   1621.67       .87      6.23      .05   1618.80
    1120.0     440.8     632.5      46.7      71.2      74.6      11.4      12.7      4.3   1618.70
       .08      6.19      8.48      4.11      .060      .050      .060      .000  1617.60   9963.07
   .021771       330.      333.      335.         3        15         0      .00    72.71  10035.79
```

```
1490 NH CARD USED
*SECNO  .507
      .507      3.29   1628.99   1628.73      .00   1629.73      .74      8.05       .01   1627.90
    1120.0       5.3    1087.6      27.1       2.3     155.4       8.0      14.1       4.9   1627.40
       .10      2.32      7.00      3.40      .060      .053      .060      .000   1625.70   9972.29
   .020718      370.      381.      390.         4        11         0       .00     80.90  10053.18


1490 NH CARD USED
*SECNO  .577

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C603:  6-hr storm controls.
      .577      3.97   1637.07   1637.07      .00   1638.42      1.35      8.30       .18   1634.60
    940.0      39.7     843.6      56.7       8.1      86.9      12.3      15.3       5.4   1634.40
       .11      4.88      9.70      4.60      .060      .053      .060      .000   1633.10   9985.45
   .024672      370.      371.      370.         0        11         0       .00     41.98  10027.43


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   29MAR95      14:52:40                                                                          PAGE   10

    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


1490 NH CARD USED
*SECNO  .672
      .672      4.46   1648.46   1648.30      .00   1649.71      1.25     11.27       .01   1646.20
    940.0      32.1     890.0      17.9       8.6      97.1       5.1      16.6       5.9   1646.30
       .12      3.73      9.17      3.50      .060      .052      .060      .000   1644.00   9978.00
   .020378      500.      505.      495.         3         8         0       .00     41.02  10019.03


1490 NH CARD USED
*SECNO  .768
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .768      3.85   1660.75   1660.75      .00   1662.20      1.45     11.44       .06   1659.00
    940.0      12.6     862.6      64.8       3.7      86.4      12.9      17.8       6.4   1657.70
       .14      3.42      9.98      5.01      .060      .053      .060      .000   1656.90   9978.08
   .025360      495.      505.      505.         0        11         0       .00     38.00  10016.08


1490 NH CARD USED
*SECNO  .855

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52

      .855      4.26   1668.46   1667.91      .00   1669.53      1.08      7.30       .04   1664.20
    940.0      67.1     787.4      85.5      17.0      88.2      21.6      19.0       6.8   1664.40
       .15      3.94      8.93      3.96      .060      .045      .060      .000   1664.20   9980.20
   .010918      460.      459.      450.         4         8         0       .00     39.84  10020.04


1490 NH CARD USED
*SECNO  .945
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          End Legend Wash   (Section 0.945 is Uppermost Section in Legend)
      .945      4.91   1676.71   1676.71      .00   1678.24      1.53      7.75       .14   1674.30
    940.0      29.7     886.9      23.4       6.8      87.3       6.1      20.2       7.2   1674.80
       .17      4.36     10.16      3.84      .060      .057      .060      .000   1671.80   9978.85
   .027100      475.      475.      460.         0         8         0       .00     35.35  10014.20


1490 NH CARD USED
*SECNO 1.043
          HEC-1 Concentration Point C602:  6-hr storm controls.
1
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          START Hydraulically Similar Reach TU 1
                See Exhibit 1, Manning's n Value Map.
                NAME CHANGE  (From Legend To Tulip)  at  0.971 River Miles
          Start Tulip Wash   (Section 1.043 is Lowermost Section in Tulip Wash)
    1.043      3.06   1687.36   1687.21      .00   1688.50      1.14     10.23       .04   1684.50
    640.0      22.7     586.3      31.1       7.4      65.8       8.3      21.3       7.6   1684.40
       .18      3.07      8.90      3.74      .065      .040      .055      .000   1684.30   9982.24
   .013399      500.      517.      540.         4        14         0       .00     32.88  10015.11


1490 NH CARD USED
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*SECNO 1.102
     1.102      3.72   1692.52   1692.33       .00   1693.51       .98      4.99       .02   1689.70
     640.0      35.9     501.0     103.1       9.5      58.3       19.0      21.9       7.9   1688.80
       .20      3.77      8.59      5.43      .065      .049       .055      .000   1688.80   9982.46
   .019165      320.      314.      310.         3         8          0       .00     36.83  10019.29


1490 NH CARD USED
*SECNO 1.213

3301 HV CHANGED MORE THAN HVINS

     1.213      4.72   1704.42   1702.66       .00   1704.76       .33     11.18       .06   1700.20
     640.0      82.3     462.2      95.5       19.1      97.0       22.5      23.4       8.4   1699.70
       .23      4.31      4.77      4.24       .080      .118       .080      .000   1699.70   9981.05
   .019222      580.      586.      570.          4        15          0       .00     40.49  10021.53


1490 NH CARD USED
*SECNO 1.329
          HEC-1 Concentration Point C601:  6-hr storm controls.
        CULVERT  601:  TULIP WASH and GLENBROOK BOULEVARD
          Culvert 601      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
     1.329      4.33   1712.63   1710.51       .00   1712.75       .12      7.97       .02   1708.80
     460.0      42.1     324.6      93.3       17.0      110.4       37.1      25.6       9.1   1708.30
       .29      2.48      2.94      2.52       .080      .118       .080      .000   1708.30   9981.22
   .008387      610.      613.      610.          5        14          0       .00     58.74  10039.96


CCHV=      .300 CEHV=      .500
1490 NH CARD USED
*SECNO 1.349
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
            Culvert 601  Outlet.   2-60"  CMPs          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 14.8' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1708.10
     1.349      5.44   1713.54   1711.66       .00   1713.73       .18       .91       .92   1708.10
     460.0     113.7     253.1      93.2       41.0      65.3       31.9      25.9       9.2   1708.10
       .30      2.78      3.88      2.92       .102      .118       .102      .000   1708.10   9979.23
   .009904      100.      102.       95.         20        15          0       .00     49.02  10028.25

1
   29MAR95      14:52:40                                                                                PAGE   12

    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

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     2          .022        .40       2.63        .00       5.00        .00       88.00        2          1    1709.07    1708.10

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  1 - HEADWALL

1490 NH CARD USED
*SECNO 1.365

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1716.96

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

SPECIAL CULVERT

     EGIC       EGOC         H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
  1717.69    1718.49       3.24         77.        382.      2.830       39.3    1716.13        43.


            Culvert 601  Inlet.    2-60"  CMPs          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 5' Upstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1709.07
            Culvert 601 BT information surveyed by ALS. West top of curb.
            Culvert 601 BT information coded per figure 3.16 (HEC-2, Sept 90)
     1.365      7.79   1716.86       .00        .00   1716.96        .10      3.24       .00   1709.07
     460.0      95.3     264.6      100.1       44.7      93.5       48.1      26.2       9.3   1709.07
       .31      2.13      2.83       2.08       .089      .118       .094      .000   1709.07   9979.95
   .003270       88.       88.       88.          2         0          0       .00     42.67  10022.62


CCHV=      .100 CEHV=      .300
1490 NH CARD USED
*SECNO 1.373
            Culvert 601      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     1.373      5.81   1717.01   1713.51       .00   1717.08        .07       .11       .00   1712.50
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     460.0      25.9     283.6     150.5      18.0     132.3      66.5      26.4       9.3   1712.00
       .31      1.44      2.14      2.26      .080      .105      .080      .000   1711.20   9978.80
   .002441       40.       41.       40.         2        17         0       .00     54.61  10033.41


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.455

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
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

3720 CRITICAL DEPTH ASSUMED
     1.455      2.19   1719.19   1719.19       .00   1719.90       .71      1.94       .19   1717.90
     460.0     131.0     316.8      12.2      30.4      41.4       3.4      27.9       9.9   1717.00
       .33      4.30      7.65      3.57      .040      .030      .040      .000   1717.00   9975.33
   .010656      420.      435.      440.         0        22         0       .00     51.50  10026.82


1
   29MAR95      14:52:40                                                                          PAGE   14

T1   *  Fountain Hills North FIS
T2   *  For:  FCDMC #92-04          By:  GVSCE #35
T3   *  Legend/Tulip Wash 100-Yr Floodway
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92.
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        3         0         0         0         0         0         0   1586.77

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

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

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

*PROF 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 2.448

3470 ENCROACHMENT STATIONS=     9887.3   10119.6  TYPE=       1  TARGET=      232.340
                ASHBROOK WASH    Section  2.448          (24-hr storm controls)
                                 WSEL =  1586.77             Q = 2050
            Culvert 622     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
                LEGEND WASH TRIBUTARY
     2.448      7.97   1586.77   1582.07   1586.77   1586.81       .04       .00       .00   1580.70
    2050.0     961.4     586.6     502.0     559.5     344.7     339.6        .0        .0   1581.40
       .00      1.72      1.70      1.48      .113      .125      .120      .000   1578.80   9887.28
   .001583       105.      105.      110.         0        17         0       .00    232.34  10119.62


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .115
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3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9972.7   10050.1  TYPE=       1  TARGET=       77.409
          HEC-1 Concentration Point C622L:  6-hr storm controls.
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH ASHBROOK WASH.
          START Hydraulically Similar Reach LE 1
                See Exhibit 1, Manning's n Value Map.
      .115      3.61   1588.61   1588.61   1588.60   1589.61      1.00      1.12       .29   1585.00
    1120.0      78.6     845.6     195.8      16.1      95.3      47.3       6.3       1.4   1587.20
       .01      4.89      8.87      4.14      .060      .049      .060      .000   1585.00   9972.73
   .019548       375.      394.      420.         0        18         0       .00     77.41  10050.14


1490 NH CARD USED
*SECNO  .209
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


3470 ENCROACHMENT STATIONS=     9984.6   10065.6  TYPE=       1  TARGET=       81.040
      .209      3.41   1597.61   1597.15   1597.62   1598.22       .61      8.57       .04   1594.30
    1120.0      50.1     376.4     693.5      12.4      47.6     130.2       8.3       2.3   1595.00
       .04      4.03      7.90      5.32      .060      .050      .060      .000   1594.20   9984.59
   .015230       485.      500.      500.         4        15         0       .00     80.97  10065.56


1490 NH CARD USED
*SECNO  .287

3470 ENCROACHMENT STATIONS=     9986.2   10050.6  TYPE=       1  TARGET=       64.390
      .287      3.38   1605.28   1605.26   1605.27   1606.36      1.08      8.00       .14   1601.90
    1120.0      96.6     846.5     176.9      17.6      93.8      30.5       9.9       3.0   1603.20
       .05      5.50      9.03      5.80      .060      .051      .060      .000   1601.90   9986.24
   .026084       410.      411.      405.         2         5         0       .00     64.39  10050.63


1490 NH CARD USED
*SECNO  .371

3470 ENCROACHMENT STATIONS=     9981.1   10055.2  TYPE=       1  TARGET=       74.141
      .371      3.96   1614.66   1614.26   1614.67   1615.38       .73      8.99       .04   1612.70
    1120.0      44.4     623.8     451.8      12.4      80.1      81.2      11.5       3.7   1611.90
       .07      3.57      7.79      5.57      .060      .054      .060      .000   1610.70   9981.11
   .016444       440.      444.      430.         4         8         0       .00     74.06  10055.17


1490 NH CARD USED
*SECNO  .434

3470 ENCROACHMENT STATIONS=     9963.1   10035.8  TYPE=       1  TARGET=       72.720
      .434      3.20   1620.80   1620.64   1620.79   1621.67       .87      6.24       .04   1618.80
    1120.0     441.0     632.1      46.9      71.4      74.8      11.4      12.7       4.3   1618.70
       .08      6.17      8.45      4.10      .060      .050      .060      .000   1617.60   9963.07
   .021571       330.      333.      335.         3        15         0       .00     72.72  10035.79


1490 NH CARD USED
*SECNO  .507

3470 ENCROACHMENT STATIONS=     9972.3   10053.2  TYPE=       1  TARGET=       80.890
      .507      3.28   1628.98   1628.73   1628.99   1629.73       .75      8.05       .01   1627.90
    1120.0       5.3     1087.8      26.9       2.3     155.0       7.9      14.1       4.9   1627.40
       .10      2.33      7.02      3.40      .060      .053      .060      .000   1625.70   9972.31
   .020895       370.      381.      390.         4        11         0       .00     80.84  10053.15

1
   29MAR95       14:52:40                                                                        PAGE   17

    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


1490 NH CARD USED
*SECNO  .577

3301 HV CHANGED MORE THAN HVINS
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7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9985.5   10027.4  TYPE=       1  TARGET=       41.979
         HEC-1 Concentration Point C603:  6-hr storm controls.
       .577      4.01   1637.10   1637.10   1637.07   1638.42      1.32      8.22       .17   1634.60
     940.0       40.3     841.9      57.7       8.3      87.7      12.6      15.3       5.4   1634.40
       .11       4.85      9.60      4.58      .060      .053      .060      .000   1633.10   9985.45
   .023840       370.      371.      370.         0        11         0       .00     41.98  10027.43


1490 NH CARD USED
*SECNO  .672

3470 ENCROACHMENT STATIONS=     9978.0   10019.0  TYPE=       1  TARGET=       41.030
      .672      4.43   1648.43   1648.30   1648.46   1649.70      1.27     11.28       .00   1646.20
     940.0      31.5     891.0      17.5       8.4      96.2       5.0      16.6       5.9   1646.30
       .12       3.76      9.26      3.52      .060      .052      .060      .000   1644.00   9978.11
   .021053       500.      505.      495.         3         8         0       .00     40.85  10018.96


1490 NH CARD USED
*SECNO  .768
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9978.1   10016.1  TYPE=       1  TARGET=       38.000
      .768      3.89   1660.79   1660.79   1660.75   1662.19      1.41     11.39       .04   1659.00
     940.0      13.2      860.8      66.0       3.9      87.5      13.3      17.8       6.4   1657.70
       .14       3.43      9.84      4.98      .060      .053      .060      .000   1656.90   9978.08
   .024259       495.      505.      505.         0        11         0       .00     38.00  10016.08


1490 NH CARD USED
*SECNO  .855

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.47

1
   29MAR95      14:52:40                                                                          PAGE   18

    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=     9980.2   10020.0  TYPE=       1  TARGET=       39.840
      .855      4.23   1668.43   1667.92   1668.46   1669.52      1.10      7.30       .03   1664.20
     940.0      66.7      788.4      84.9       16.8      87.5      21.2      19.0       6.8   1664.40
       .15       3.98      9.01      4.00      .060      .045      .060      .000   1664.20   9980.26
   .011242       460.      459.      450.         4         8         0       .00     39.70  10019.96


1490 NH CARD USED
*SECNO  .945
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9978.8   10014.2  TYPE=       1  TARGET=       35.351
          End Legend Wash   (Section 0.945 is Uppermost Section in Legend)
      .945      4.94   1676.74   1676.74   1676.71   1678.23      1.50      7.79       .12   1674.30
     940.0      30.3      885.4      24.2       7.0      88.0       6.3      20.3       7.2   1674.80
       .17       4.35     10.07      3.85      .060      .057      .060      .000   1671.80   9978.85
   .026297       475.      475.      460.         0        11         0       .00     35.35  10014.20


1490 NH CARD USED
*SECNO 1.043

3470 ENCROACHMENT STATIONS=     9982.2   10015.1  TYPE=       1  TARGET=       32.870
         HEC-1 Concentration Point C602:  6-hr storm controls.
         START Hydraulically Similar Reach TU 1
               See Exhibit 1, Manning's n Value Map.
               NAME CHANGE  (From Legend To Tulip)  at  0.971 River Miles
         Start Tulip Wash   (Section 1.043 is Lowermost Section in Tulip Wash)
     1.043      3.03   1687.33   1687.22   1687.36   1688.50      1.17     10.23       .03   1684.50
     640.0      22.4      586.8      30.8       7.2      65.2       8.1      21.3       7.6   1684.40
       .18       3.10      8.99      3.78      .065      .040      .055      .000   1684.30   9982.29
   .013840       500.      517.      540.         3        11         0       .00     32.77  10015.06


1490 NH CARD USED
*SECNO 1.102

3470 ENCROACHMENT STATIONS=     9982.5   10019.3  TYPE=       1  TARGET=       36.830
     1.102      3.75   1692.55   1692.33   1692.52   1693.51       .96      4.99       .02   1689.70
     640.0      36.4      500.0      103.7       9.7      58.9      19.3      21.9       7.8   1688.80
       .20       3.75      8.49      5.38      .065      .049      .055      .000   1688.80   9982.46
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    .018477      320.      314.      310.         3         8         0       .00     36.83  10019.29

1
    29MAR95      14:52:40                                                                          PAGE   19

     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


 1490 NH CARD USED
 *SECNO 1.213

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=     9981.0   10021.5  TYPE=       1  TARGET=       40.480
      1.213       4.69    1704.39    1702.66    1704.42    1704.73        .34      11.16        .06    1700.20
      640.0       81.5      463.5       95.1       18.7       96.2       22.2       23.4        8.4    1699.70
        .23       4.35       4.82       4.29       .080       .118       .080       .000    1699.70    9981.15
    .019859        580.       586.       570.          3         15          0        .00      40.31   10021.46


 1490 NH CARD USED
 *SECNO 1.329

 3470 ENCROACHMENT STATIONS=     9981.2   10040.0  TYPE=       1  TARGET=       58.740
           HEC-1 Concentration Point C601:  6-hr storm controls.
          CULVERT  601:  TULIP WASH and GLENBROOK BOULEVARD
            Culvert 601      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      1.329       4.35    1712.65    1710.51    1712.63    1712.77        .12       8.01        .02    1708.80
      460.0       42.3      323.8       93.9       17.2       110.9       37.5       25.6        9.1    1708.30
        .29       2.47       2.92       2.51       .080       .118       .080       .000    1708.30    9981.22
    .008218        610.       613.       610.          5         14          0        .00      58.74   10039.96


 CCHV=      .300 CEHV=      .500
 1490 NH CARD USED
 *SECNO 1.349
 3685 20 TRIALS ATTEMPTED WSEL,CWSEL
 3710 WSEL ASSUMED BASED ON MIN DIFF

 3470 ENCROACHMENT STATIONS=     9979.2   10028.3  TYPE=       1  TARGET=       49.020
             Culvert 601  Outlet.   2-60"  CMPs          (SECTION 2 OF SC ROUTINE)
               Photogrammetric xsec. located 14.8' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1708.10
      1.349       5.44    1713.54    1711.66    1713.54    1713.73        .18        .90        .90    1708.10
      460.0       113.7      253.1       93.2       41.0       65.3       32.0       25.9        9.2    1708.10
        .30       2.78       3.88       2.92       .102       .118       .102       .000    1708.10    9979.23
    .009892        100.       102.        95.         20         15          0        .00      49.02   10028.25


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    29MAR95      14:52:40                                                                          PAGE   20

     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

 SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
      2          .022        .40       2.63        .00       5.00        .00       88.00        2          1     1709.07    1708.10

 CHART  2 - CORRUGATED METAL PIPE CULVERT
 SCALE  1 - HEADWALL

 1490 NH CARD USED
 *SECNO 1.365

 SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1716.96

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.74

 SPECIAL CULVERT

      EGIC       EGOC        H4       QWEIR      QCULV       VCH        ACULV      ELTRD      WEIRLN
    1717.69    1718.49       3.23        77.        382.      2.830        39.3    1716.13          43.


 3470 ENCROACHMENT STATIONS=     9980.0   10022.6  TYPE=       1  TARGET=       42.670
             Culvert 601  Inlet.    2-60"  CMPs          (SECTION 3 OF SC ROUTINE)
               Photogrammetric xsec. located 5' Upstream. (No Elev. Adjust.)
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            Base Channel Elevations were lowered to Culvert Invert EL 1709.07
          Culvert 601 BT information surveyed by ALS. West top of curb.
          Culvert 601 BT information coded per figure 3.16 (HEC-2, Sept 90)
    1.365      7.79   1716.86      .00   1716.86   1716.96      .10      3.23      .00   1709.07
    460.0      95.3     264.6     100.1      44.7      93.5      48.1      26.2       9.3   1709.07
      .31      2.13      2.83      2.08      .089      .118      .094      .000   1709.07   9979.95
 .003270       88.       88.       88.         2         0         0       .00     42.67  10022.62


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO 1.373

3470 ENCROACHMENT STATIONS=     9978.8   10033.4  TYPE=       1  TARGET=       54.610
          Culvert 601     Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
    1.373      5.81   1717.01   1713.51   1717.01   1717.08       .07       .11       .00   1712.50
    460.0      25.9     283.6     150.5      18.0     132.3      66.5      26.4       9.3   1712.00
      .31      1.44      2.14      2.26      .080      .105      .080      .000   1711.20   9978.80
 .002441       40.       41.       40.         2        17         0       .00     54.61  10033.41


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
1
   29MAR95       14:52:40                                                                    PAGE   21

    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 1.455

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9975.3   10026.8  TYPE=       1  TARGET=       51.490
    1.455      2.19   1719.19   1719.19   1719.19   1719.90       .71      1.93       .19   1717.90
    460.0     131.2     316.6      12.2      30.5      41.5       3.4      27.9       9.8   1717.00
      .33      4.30      7.63      3.56      .040      .030      .040      .000   1717.00   9975.33
 .010582       420.      435.      440.         0        22         0       .00     51.49  10026.82


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   29MAR95       14:52:40                                                                    PAGE   22


                                                                    THIS RUN EXECUTED 29MAR95     14:52:44

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

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

 NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

 Legend/Tulip Wash 100-Yr

 SUMMARY PRINTOUT TABLE  101

       SECNO      EGOC      ELLC      EGIC      ELTRD     QCULV     QWEIR     CLASS      H4      DEPTH     CWSEL      VCH       EG
 *      1.365   1718.49   1714.07   1717.69   1716.13    382.44     77.37     17.00     3.24      7.79   1716.86      2.83   1716.96
 *      1.365   1718.49   1714.07   1717.69   1716.13    382.40     77.42     17.00     3.23      7.79   1716.86      2.83   1716.96

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   29MAR95       14:52:40                                                                    PAGE   23

 Legend/Tulip Wash 100-Yr

 SUMMARY PRINTOUT TABLE  110

       SECNO      CWSEL     DIFKWS       EG      TOPWID      QLOB       QCH       QROB     PERENC     STENCL     STCHL      STCHR      STENCR
        2.448   1586.77        .00   1586.81      232.34    961.42    586.62    501.96        .00        .00   9987.00   10037.30        .00
        2.448   1586.77        .00   1586.81      232.34    961.42    586.62    501.96     232.34    9887.28   9987.00   10037.30   10119.62

 *       .115   1588.60        .00   1589.61       77.41     78.44    847.00    194.55        .00        .00   9981.60   10012.80        .00
 *       .115   1588.61        .01   1589.61       77.41     78.60    845.55    195.85      77.41    9972.73   9981.60   10012.80   10050.14
```

.209	1597.62	.00	1598.23	81.04	50.18	375.94	693.88	.00	.00	9992.10	10007.00	.00
.209	1597.61	-.01	1598.22	80.97	50.10	376.43	693.47	81.04	9984.57	9992.10	10007.00	10065.61
.287	1605.27	.00	1606.36	64.39	96.35	847.16	176.49	.00	.00	9996.60	10031.80	.00
.287	1605.28	.01	1606.36	64.39	96.56	846.50	176.94	64.39	9986.24	9996.60	10031.80	10050.63
.371	1614.67	.00	1615.39	74.13	44.64	623.15	452.21	.00	.00	9993.40	10017.50	.00
.371	1614.66	-.01	1615.38	74.06	44.37	623.79	451.84	74.14	9981.06	9993.40	10017.50	10055.20
.434	1620.79	.00	1621.67	72.71	440.80	632.50	46.70	.00	.00	9997.80	10025.50	.00
.434	1620.80	.01	1621.67	72.72	440.96	632.13	46.91	72.72	9963.07	9997.80	10025.50	10035.79
.507	1628.99	.00	1629.73	80.90	5.32	1087.60	27.08	.00	.00	9976.50	10043.60	.00
.507	1628.98	-.01	1629.73	80.84	5.27	1087.82	26.91	80.89	9972.29	9976.50	10043.60	10053.18
* .577	1637.07	.00	1638.42	41.98	39.68	843.57	56.74	.00	.00	9991.60	10018.20	.00
* .577	1637.10	.03	1638.42	41.98	40.33	841.92	57.75	41.98	9985.45	9991.60	10018.20	10027.43
.672	1648.46	.00	1649.71	41.02	32.09	890.02	17.88	.00	.00	9985.60	10014.30	.00
.672	1648.43	-.03	1649.70	40.85	31.46	891.04	17.50	41.03	9978.00	9985.60	10014.30	10019.03
* .768	1660.75	.00	1662.20	38.00	12.59	862.64	64.77	.00	.00	9982.30	10007.60	.00
* .768	1660.79	.04	1662.19	38.00	13.22	860.75	66.02	38.00	9978.08	9982.30	10007.60	10016.08
* .855	1668.46	.00	1669.53	39.84	67.06	787.41	85.53	.00	.00	9988.20	10009.40	.00
* .855	1668.43	-.03	1669.52	39.70	66.65	788.45	84.90	39.84	9980.20	9988.20	10009.40	10020.04
* .945	1676.71	.00	1678.24	35.35	29.66	886.91	23.43	.00	.00	9984.50	10007.80	.00
* .945	1676.74	.03	1678.23	35.35	30.34	885.43	24.23	35.35	9978.85	9984.50	10007.80	10014.20
1.043	1687.36	.00	1688.50	32.88	22.66	586.28	31.06	.00	.00	9987.40	10009.50	.00
1.043	1687.33	-.03	1688.50	32.77	22.44	586.77	30.78	32.87	9982.24	9987.40	10009.50	10015.11
1.102	1692.52	.00	1693.51	36.83	35.91	501.03	103.06	.00	.00	9989.20	10009.10	.00
1.102	1692.55	.03	1693.51	36.83	36.37	499.97	103.65	36.83	9982.46	9989.20	10009.10	10019.29
1.213	1704.42	.00	1704.76	40.49	82.26	462.23	95.51	.00	.00	9990.50	10012.00	.00
1.213	1704.39	-.03	1704.73	40.31	81.47	463.46	95.07	40.48	9981.05	9990.50	10012.00	10021.53
1.329	1712.63	.00	1712.75	58.74	42.12	324.57	93.31	.00	.00	9990.10	10017.20	.00
1.329	1712.65	.02	1712.77	58.74	42.33	323.75	93.92	58.74	9981.22	9990.10	10017.20	10039.96

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	1.349	1713.54	.00	1713.73	49.02	113.70	253.10	93.20	.00	.00	9998.00	10010.00	.00
*	1.349	1713.54	.00	1713.73	49.02	113.73	253.05	93.22	49.02	9979.23	9998.00	10010.00	10028.25
*	1.365	1716.86	.00	1716.96	42.67	95.31	264.57	100.13	.00	.00	9994.00	10006.00	.00
*	1.365	1716.86	.00	1716.96	42.67	95.31	264.56	100.13	42.67	9979.95	9994.00	10006.00	10022.62
	1.373	1717.01	.00	1717.08	54.61	25.95	283.58	150.48	.00	.00	9986.80	10011.20	.00
	1.373	1717.01	.00	1717.08	54.61	25.95	283.57	150.48	54.61	9978.80	9986.80	10011.20	10033.41
*	1.455	1719.19	.00	1719.90	51.50	131.02	316.78	12.20	.00	.00	10001.60	10023.70	.00
*	1.455	1719.19	.00	1719.90	51.49	131.19	316.61	12.20	51.49	9975.33	10001.60	10023.70	10026.82

Legend/Tulip Wash 100-Yr

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
2.448	.00	.00	.00	1578.80	2050.00	1586.77	1582.07	1586.81	15.83	1.70	1243.76	515.28
2.448	.00	.00	.00	1578.80	2050.00	1586.77	1582.07	1586.81	15.83	1.70	1243.76	515.28
* .115	394.20	.00	.00	1585.00	1120.00	1588.60	1588.60	1589.61	198.54	8.92	157.82	79.49
* .115	394.20	.00	.00	1585.00	1120.00	1588.61	1588.61	1589.61	195.48	8.87	158.69	80.11
.209	499.50	.00	.00	1594.20	1120.00	1597.62	1597.14	1598.23	150.38	7.87	191.08	91.33
.209	499.50	.00	.00	1594.20	1120.00	1597.61	1597.15	1598.22	152.30	7.90	190.29	90.75
.287	411.20	.00	.00	1601.90	1120.00	1605.27	1605.26	1606.36	264.40	9.07	141.18	68.88
.287	411.20	.00	.00	1601.90	1120.00	1605.28	1605.26	1606.36	260.84	9.03	141.82	69.35
.371	443.80	.00	.00	1610.70	1120.00	1614.67	1614.25	1615.39	162.75	7.76	174.30	87.79
.371	443.80	.00	.00	1610.70	1120.00	1614.66	1614.26	1615.38	164.44	7.79	173.69	87.34
.434	333.20	.00	.00	1617.60	1120.00	1620.79	1620.64	1621.67	217.71	8.48	157.21	75.91
.434	333.20	.00	.00	1617.60	1120.00	1620.80	1620.64	1621.67	215.71	8.45	157.69	76.26
.507	381.00	.00	.00	1625.70	1120.00	1628.99	1628.73	1629.73	207.18	7.00	165.68	77.81
.507	381.00	.00	.00	1625.70	1120.00	1628.98	1628.73	1629.73	208.95	7.02	165.20	77.48

*	.577	370.70	.00	.00	1633.10	940.00	1637.07	1637.07	1638.42	246.72	9.70	107.43	59.84
*	.577	370.70	.00	.00	1633.10	940.00	1637.10	1637.10	1638.42	238.40	9.60	108.68	60.88
	.672	504.50	.00	.00	1644.00	940.00	1648.46	1648.30	1649.71	203.78	9.17	110.76	65.85
	.672	504.50	.00	.00	1644.00	940.00	1648.43	1648.30	1649.70	210.53	9.26	109.51	64.78
*	.768	504.90	.00	.00	1656.90	940.00	1660.75	1660.75	1662.20	253.60	9.98	103.02	59.03
*	.768	504.90	.00	.00	1656.90	940.00	1660.79	1660.79	1662.19	242.59	9.84	104.59	60.35
*	.855	459.10	.00	.00	1664.20	940.00	1668.46	1667.91	1669.53	109.18	8.93	126.81	89.96
*	.855	459.10	.00	.00	1664.20	940.00	1668.43	1667.92	1669.52	112.42	9.01	125.50	88.65
*	.945	474.80	.00	.00	1671.80	940.00	1676.71	1676.71	1678.24	271.00	10.16	100.17	57.10
*	.945	474.80	.00	.00	1671.80	940.00	1676.74	1676.74	1678.23	262.97	10.07	101.23	57.97
	1.043	517.20	.00	.00	1684.30	640.00	1687.36	1687.21	1688.50	133.99	8.90	81.53	55.29
	1.043	517.20	.00	.00	1684.30	640.00	1687.33	1687.22	1688.50	138.40	8.99	80.63	54.40
	1.102	314.10	.00	.00	1688.80	640.00	1692.52	1692.33	1693.51	191.65	8.59	86.81	46.23
	1.102	314.10	.00	.00	1688.80	640.00	1692.55	1692.33	1693.51	184.77	8.49	87.88	47.08
	1.213	585.60	.00	.00	1699.70	640.00	1704.42	1702.66	1704.76	192.22	4.77	138.57	46.16
	1.213	585.60	.00	.00	1699.70	640.00	1704.39	1702.66	1704.73	198.59	4.82	137.08	45.42
	1.329	613.30	.00	.00	1708.30	460.00	1712.63	1710.51	1712.75	83.87	2.94	164.44	50.23
	1.329	613.30	.00	.00	1708.30	460.00	1712.65	1710.51	1712.77	82.18	2.92	165.53	50.74

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.349	101.70	.00	.00	1708.10	460.00	1713.54	1711.66	1713.73	99.04	3.88	138.17	46.22
*	1.349	101.70	.00	.00	1708.10	460.00	1713.54	1711.66	1713.73	98.92	3.88	138.23	46.25
*	1.365	88.00	1716.13	1714.07	1709.07	460.00	1716.86	.00	1716.96	32.70	2.83	186.21	80.44
*	1.365	88.00	1716.13	1714.07	1709.07	460.00	1716.86	.00	1716.96	32.70	2.83	186.22	80.45
	1.373	41.30	.00	.00	1711.20	460.00	1717.01	1713.51	1717.08	24.41	2.14	216.85	93.10
	1.373	41.30	.00	.00	1711.20	460.00	1717.01	1713.51	1717.08	24.41	2.14	216.86	93.10
*	1.455	435.20	.00	.00	1717.00	460.00	1719.19	1719.19	1719.90	106.56	7.65	75.27	44.56
*	1.455	435.20	.00	.00	1717.00	460.00	1719.19	1719.19	1719.90	105.82	7.63	75.45	44.72

Legend/Tulip Wash 100-Yr

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	2.448	2050.00	1586.77	.00	.00	.00	232.34	.00
	2.448	2050.00	1586.77	.00	.00	.00	232.34	.00
*	.115	1120.00	1588.60	.00	1.83	.00	77.41	394.20
*	.115	1120.00	1588.61	.01	1.84	.01	77.41	394.20
	.209	1120.00	1597.62	.00	9.02	.00	81.04	499.50
	.209	1120.00	1597.61	-.01	9.00	-.01	80.97	499.50
	.287	1120.00	1605.27	.00	7.65	.00	64.39	411.20
	.287	1120.00	1605.28	.01	7.67	.01	64.39	411.20
	.371	1120.00	1614.67	.00	9.39	.00	74.13	443.80
	.371	1120.00	1614.66	-.01	9.37	-.01	74.06	443.80
	.434	1120.00	1620.79	.00	6.13	.00	72.71	333.20
	.434	1120.00	1620.80	.01	6.14	.01	72.72	333.20
	.507	1120.00	1628.99	.00	8.20	.00	80.90	381.00
	.507	1120.00	1628.98	-.01	8.18	-.01	80.84	381.00
*	.577	940.00	1637.07	.00	8.09	.00	41.98	370.70
*	.577	940.00	1637.10	.03	8.12	.03	41.98	370.70
	.672	940.00	1648.46	.00	11.38	.00	41.02	504.50
	.672	940.00	1648.43	-.03	11.32	-.03	40.85	504.50
*	.768	940.00	1660.75	.00	12.29	.00	38.00	504.90
*	.768	940.00	1660.79	.04	12.36	.04	38.00	504.90
*	.855	940.00	1668.46	.00	7.71	.00	39.84	459.10
*	.855	940.00	1668.43	-.03	7.64	-.03	39.70	459.10
*	.945	940.00	1676.71	.00	8.25	.00	35.35	474.80

*	.945	940.00	1676.74	.03	8.31	.03	35.35	474.80
	1.043	640.00	1687.36	.00	10.65	.00	32.88	517.20
	1.043	640.00	1687.33	-.03	10.59	-.03	32.77	517.20
	1.102	640.00	1692.52	.00	5.17	.00	36.83	314.10
	1.102	640.00	1692.55	.03	5.22	.03	36.83	314.10
	1.213	640.00	1704.42	.00	11.90	.00	40.49	585.60
	1.213	640.00	1704.39	-.03	11.84	-.03	40.31	585.60
	1.329	460.00	1712.63	.00	8.21	.00	58.74	613.30
	1.329	460.00	1712.65	.02	8.25	.02	58.74	613.30

1

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.349	460.00	1713.54	.00	.91	.00	49.02	101.70
*	1.349	460.00	1713.54	.00	.90	.00	49.02	101.70
*	1.365	460.00	1716.86	.00	3.32	.00	42.67	88.00
*	1.365	460.00	1716.86	.00	3.32	.00	42.67	88.00
	1.373	460.00	1717.01	.00	.15	.00	54.61	41.30
	1.373	460.00	1717.01	.00	.15	.00	54.61	41.30
*	1.455	460.00	1719.19	.00	2.18	.00	51.50	435.20
*	1.455	460.00	1719.19	.00	2.19	.00	51.49	435.20

1

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SUMMARY OF ERRORS AND SPECIAL NOTES

```
CAUTION SECNO=       .115  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .115  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .115  PROFILE=  2  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=       .577  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .768  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .768  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .768  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .768  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .855  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .855  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .945  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=       .945  PROFILE=  2  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=      1.349  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=      1.349  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=      1.349  PROFILE=  2  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=      1.349  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO=      1.365  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=      1.365  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=      1.455  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.455  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=      1.455  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=      1.455  PROFILE=  2  MINIMUM SPECIFIC ENERGY
```

1

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Floodway width summary: Legend/Tulip Wash 100-Yr
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
2.448	.00	232.34	9887.28	124.87	10012.15	107.47	10119.62
.115	.01	77.41	9972.73	24.47	9997.20	52.94	10050.14

.209	-.01	81.04	9984.57	14.98	9999.55	66.06	10065.61
.287	.01	64.39	9986.24	27.96	10014.20	36.43	10050.63
.371	-.01	74.14	9981.06	24.39	10005.45	49.75	10055.20
.434	.01	72.72	9963.07	48.58	10011.65	24.14	10035.79
.507	-.01	80.89	9972.29	37.76	10010.05	43.13	10053.18
.577	.03	41.98	9985.45	19.45	10004.90	22.53	10027.43
.672	-.03	41.03	9978.00	21.95	9999.95	19.08	10019.03
.768	.04	38.00	9978.08	16.87	9994.95	21.13	10016.08
.855	-.03	39.84	9980.20	18.60	9998.80	21.24	10020.04
.945	.03	35.35	9978.85	17.30	9996.15	18.05	10014.20
1.043	-.03	32.87	9982.24	16.21	9998.45	16.66	10015.11
1.102	.03	36.83	9982.46	16.69	9999.15	20.14	10019.29
1.213	-.03	40.48	9981.05	20.20	10001.25	20.28	10021.53
1.329	.02	58.74	9981.22	22.43	10003.65	36.31	10039.96
1.349	.00	49.02	9979.23	24.77	10004.00	24.25	10028.25
1.365	.00	42.67	9979.95	20.05	10000.00	22.62	10022.62
1.373	.00	54.61	9978.80	20.20	9999.00	34.41	10033.41
1.455	.00	51.49	9975.33	37.32	10012.65	14.17	10026.82

1

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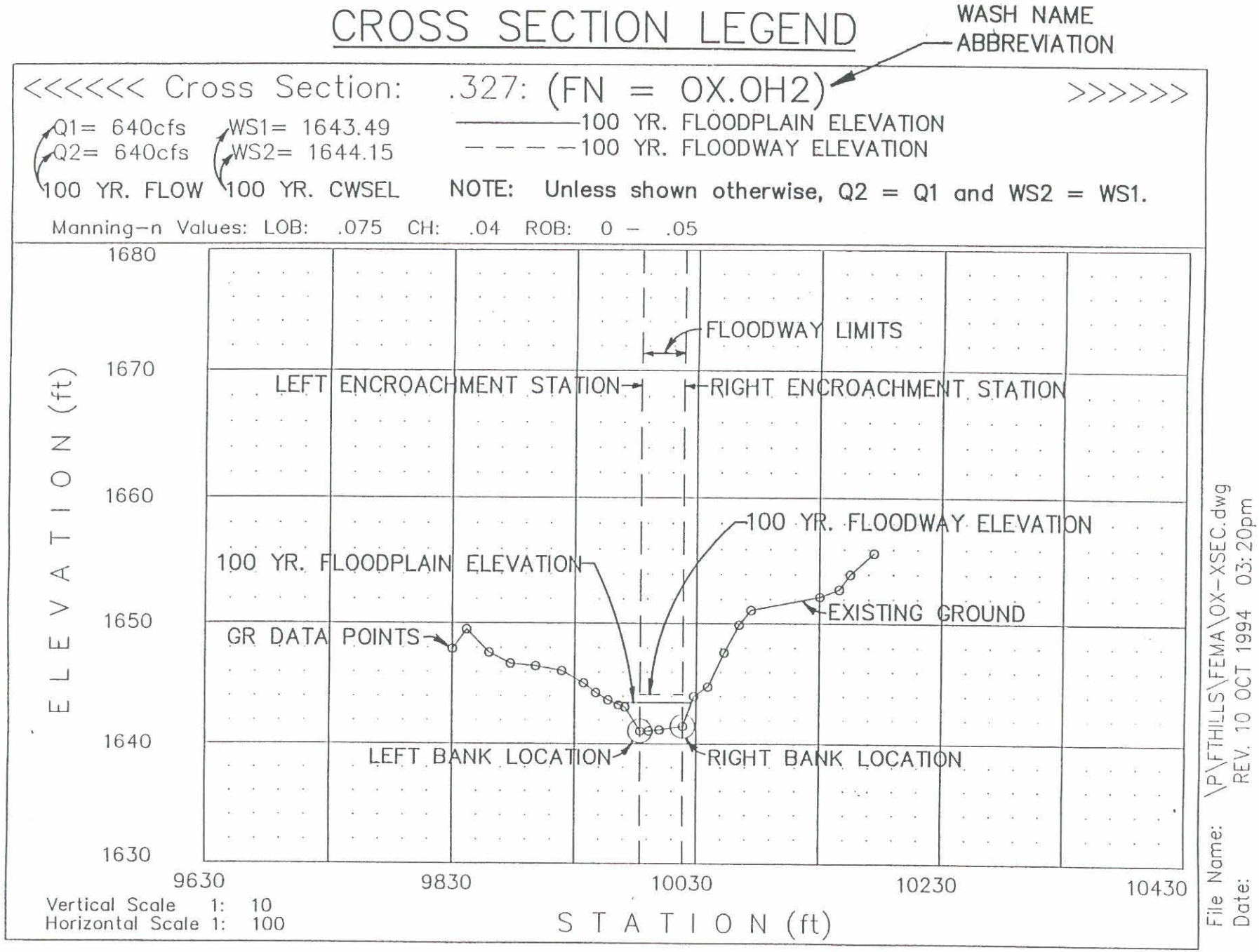
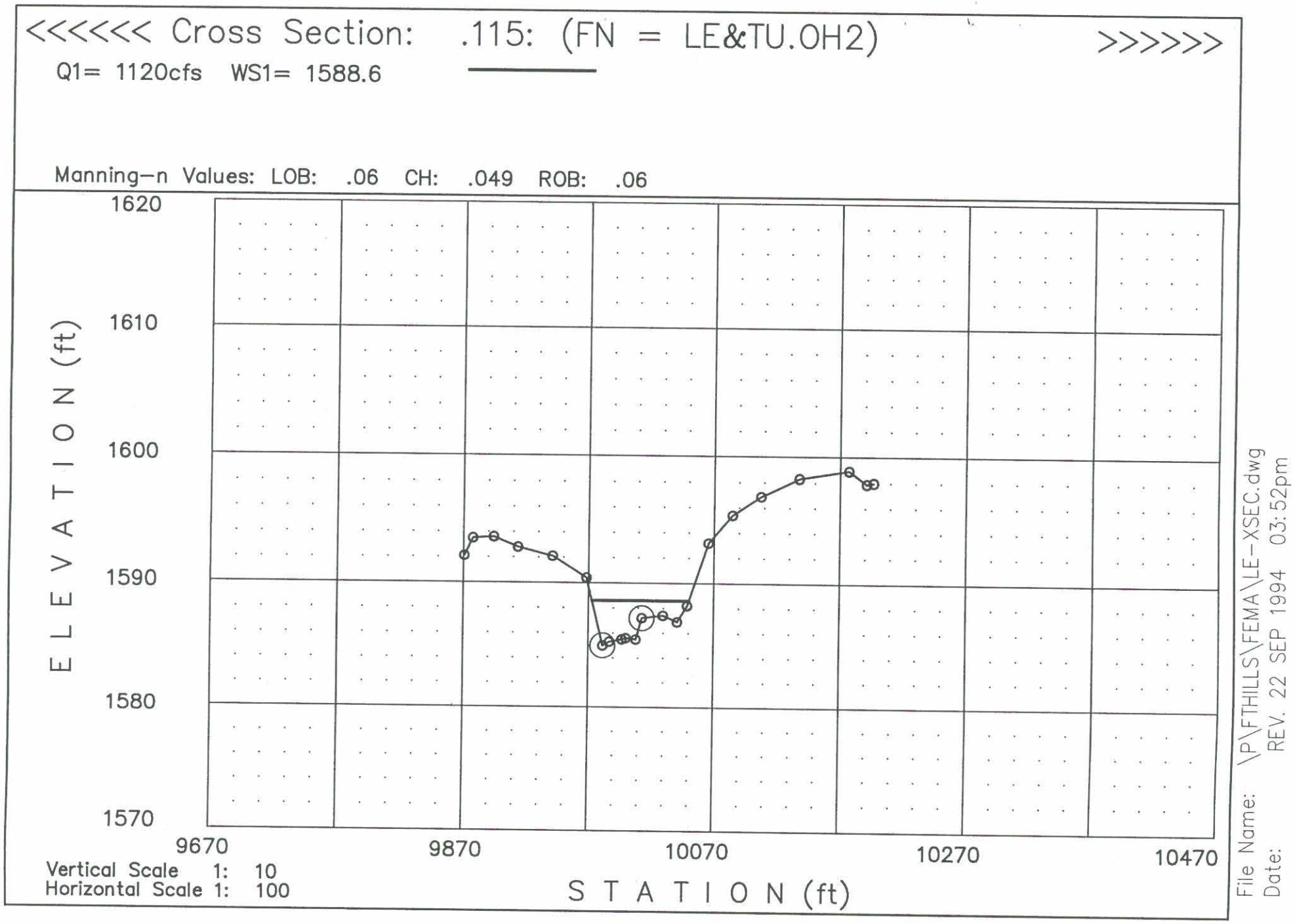
FLOODWAY DATA, Legend/Tulip Wash 100-Yr
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
2.448	232.	1244.	1.6	1586.8	1586.8	.0
.115	77.	159.	7.1	1588.6	1588.6	.0
.209	81.	190.	5.9	1597.6	1597.6	.0
.287	64.	142.	7.9	1605.3	1605.3	.0
.371	74.	174.	6.4	1614.7	1614.7	.0
.434	73.	158.	7.1	1620.8	1620.8	.0
.507	81.	165.	6.8	1629.0	1629.0	.0
.577	42.	109.	8.6	1637.1	1637.1	.0
.672	41.	110.	8.6	1648.5	1648.5	.0
.768	38.	105.	9.0	1660.7	1660.7	.0
.855	40.	125.	7.5	1668.5	1668.5	.0
.945	35.	101.	9.3	1676.7	1676.7	.0
1.043	33.	81.	7.9	1687.4	1687.4	.0
1.102	37.	88.	7.3	1692.5	1692.5	.0
1.213	40.	137.	4.7	1704.4	1704.4	.0
1.329	59.	166.	2.8	1712.6	1712.6	.0
1.349	49.	138.	3.3	1713.5	1713.5	.0
1.365	43.	186.	2.5	1716.9	1716.9	.0
1.373	55.	217.	2.1	1717.0	1717.0	.0
1.455	51.	75.	6.1	1719.2	1719.2	.0

CROSS SECTIONS

CROSS SECTION LEGEND

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Q1= 1120cfs WS1= 1588.6
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1620
1610
1600
1590
1580
1570
ELEVATION (ft)
9670
9870
10070
10270
10470
STATION (ft)
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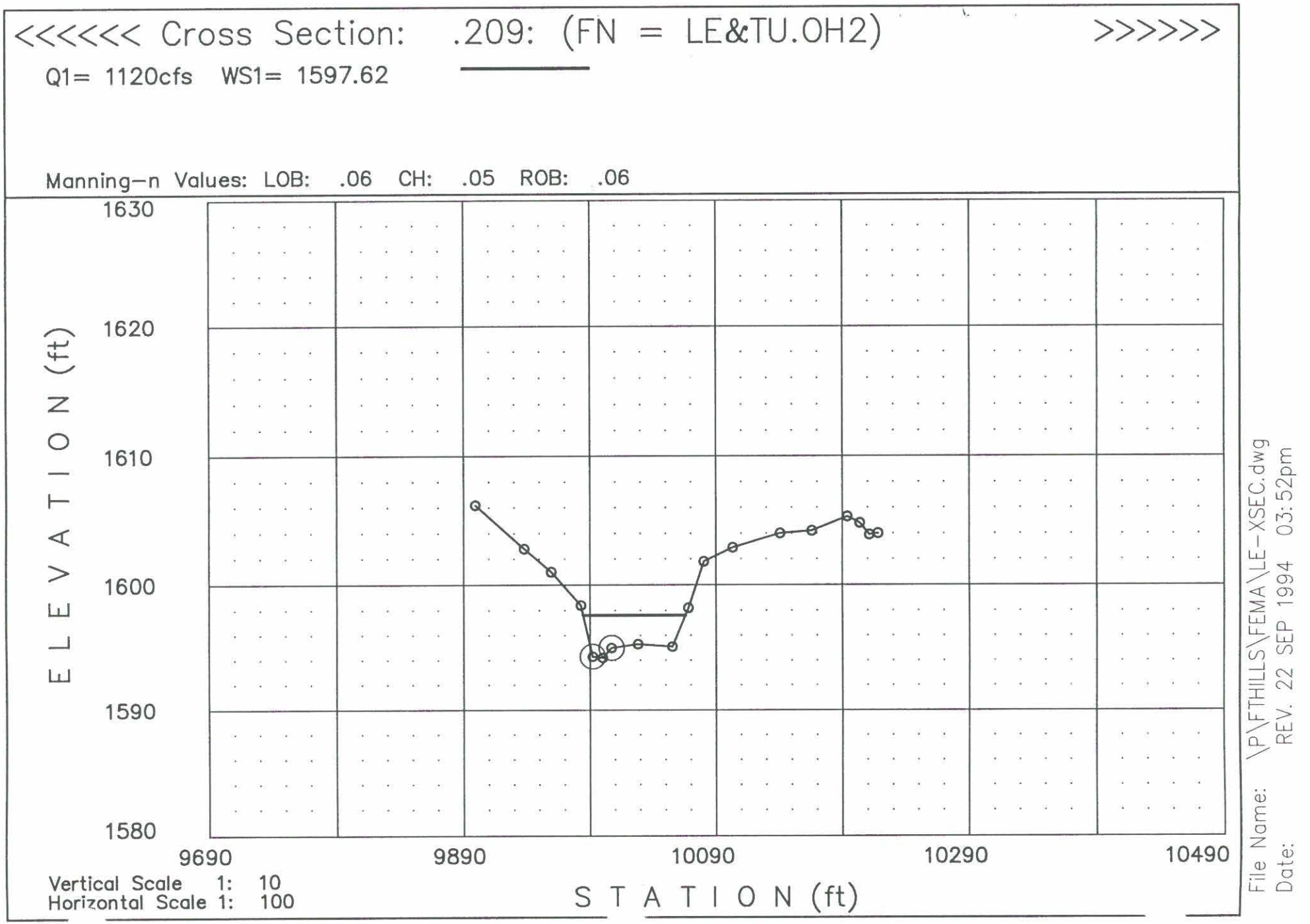
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Q1= 1120cfs WS1= 1597.62
Manning-n Values: LOB: .06 CH: .05 ROB: .06
1630
1620
1610
1600
1590
1580
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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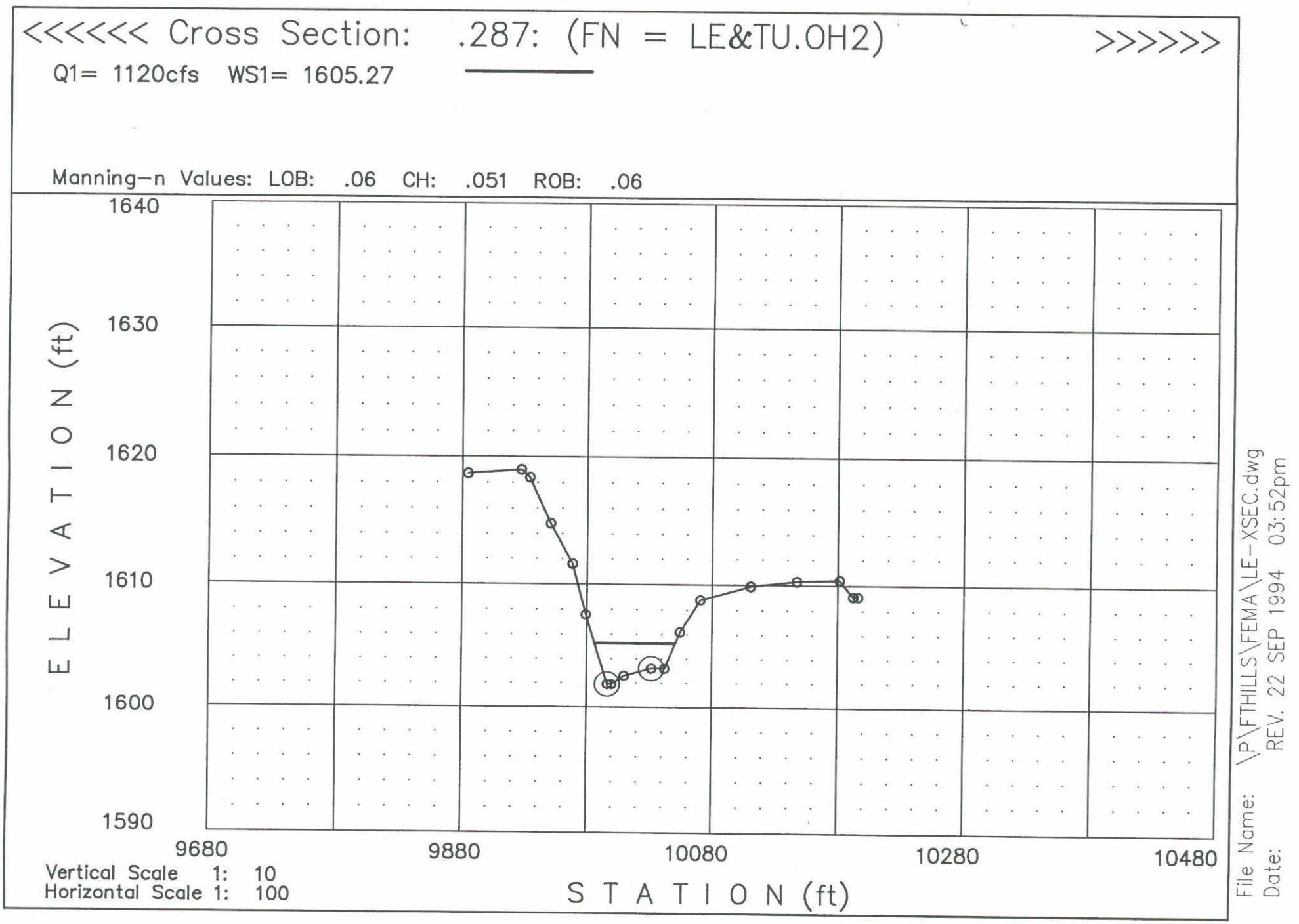
<<<<<< Cross Section: .287: (FN = LE&TU.OH2) >>>>>>
Q1= 1120cfs WS1= 1605.27
Manning-n Values: LOB: .06 CH: .051 ROB: .06
1640
1630
1620
1610
1600
1590
ELEVATION (ft)
9680
9880
10080
10280
10480
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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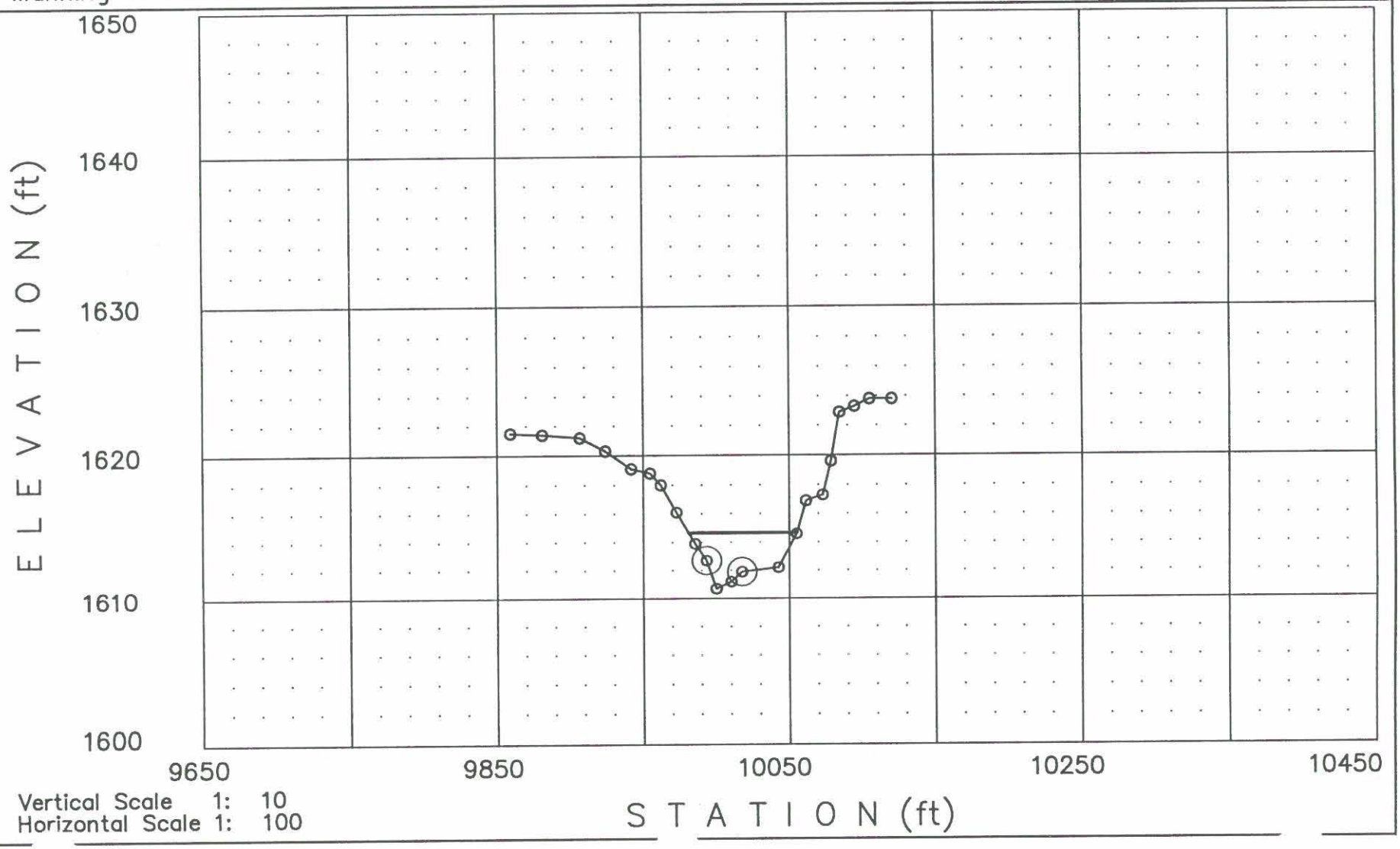
<<<<<< Cross Section: .371: (FN = LE&TU.OH2) >>>>>>

Q1= 1120cfs WS1= 1614.67

Manning-n Values: LOB: .06 CH: .054 ROB: .06



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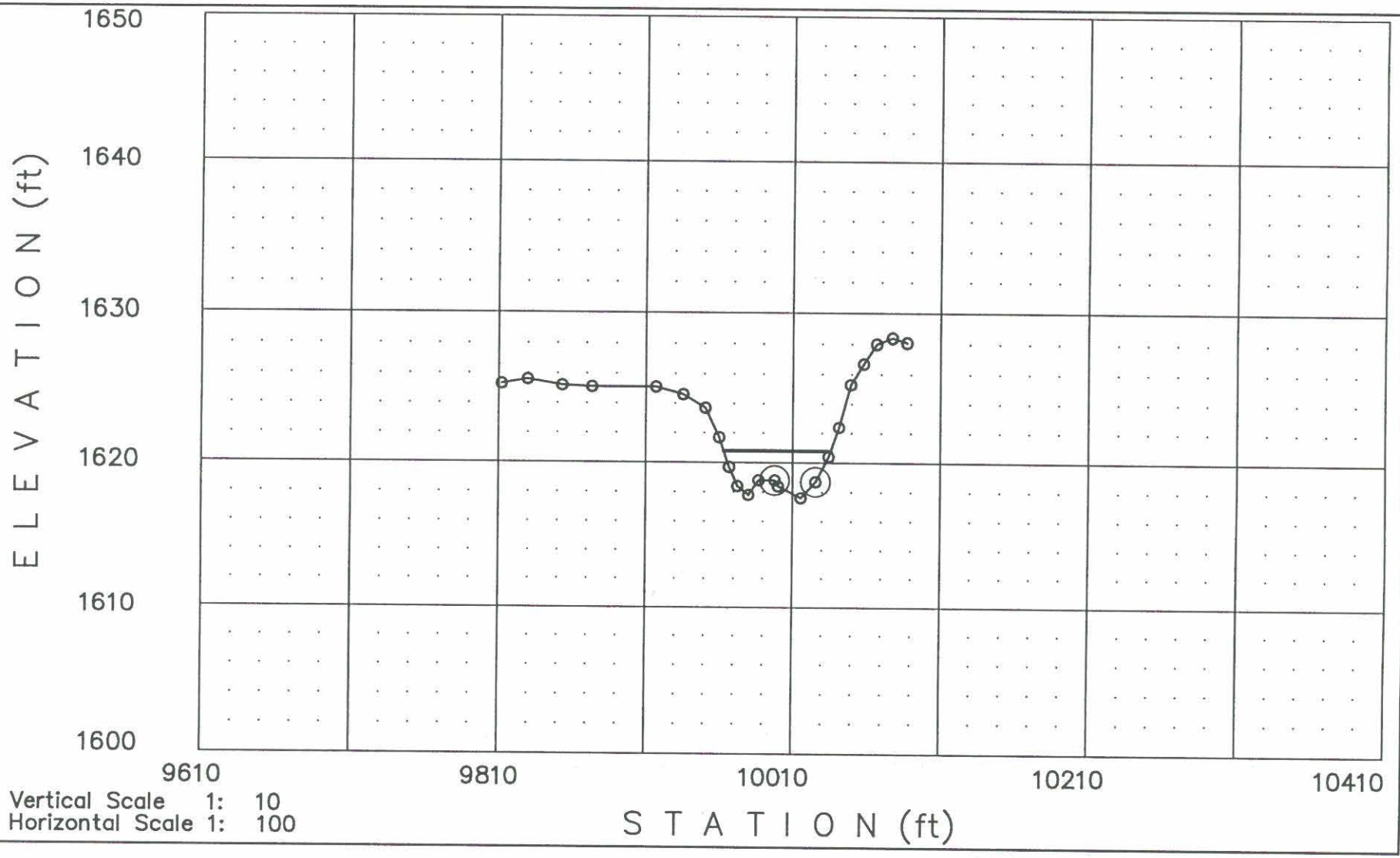
Q1= 1120cfs WS1= 1620.79

Manning-n Values: LOB: .06 CH: .05 ROB: .06



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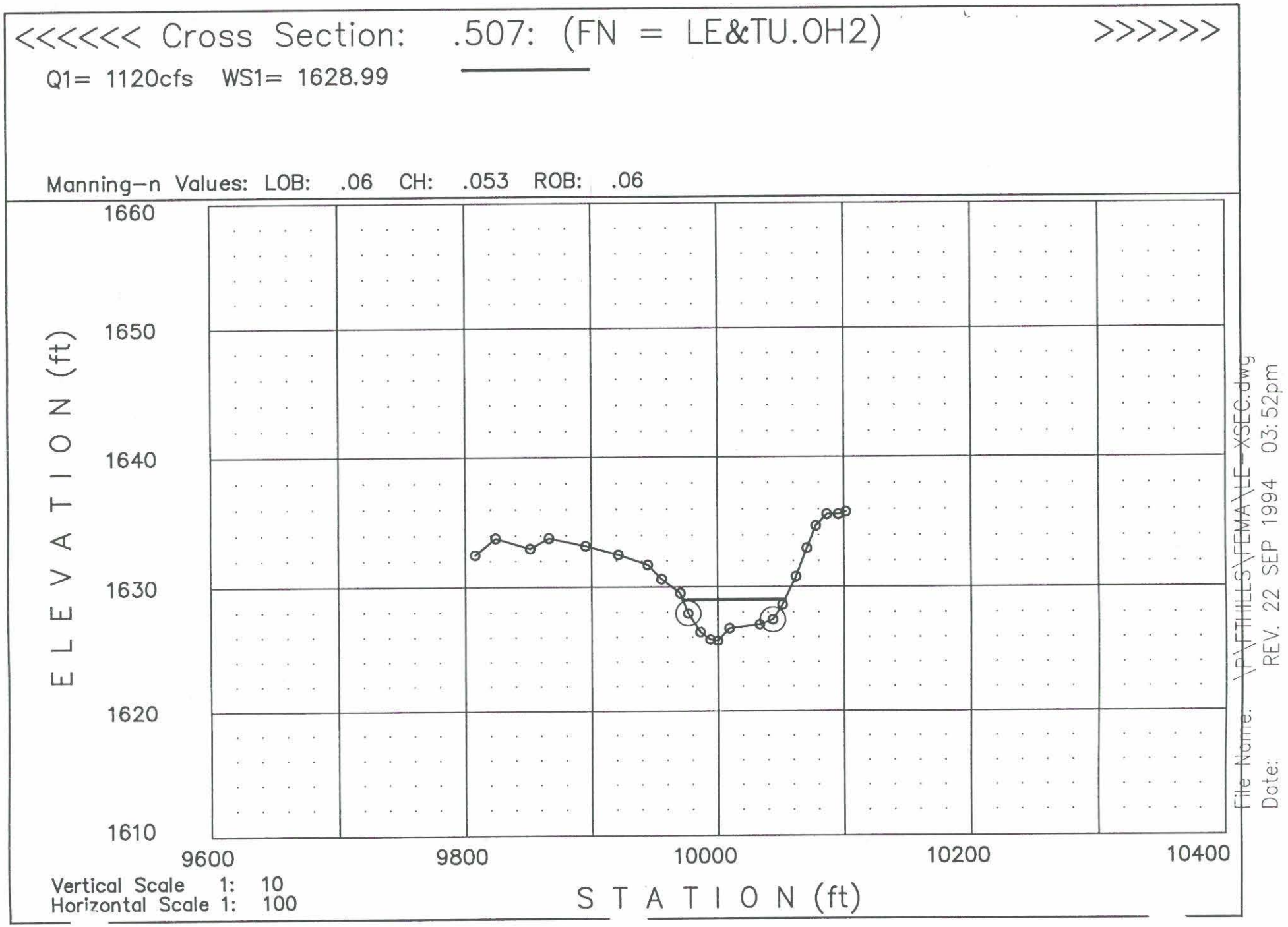
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Q1= 1120cfs WS1= 1628.99
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1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
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Horizontal Scale 1: 100
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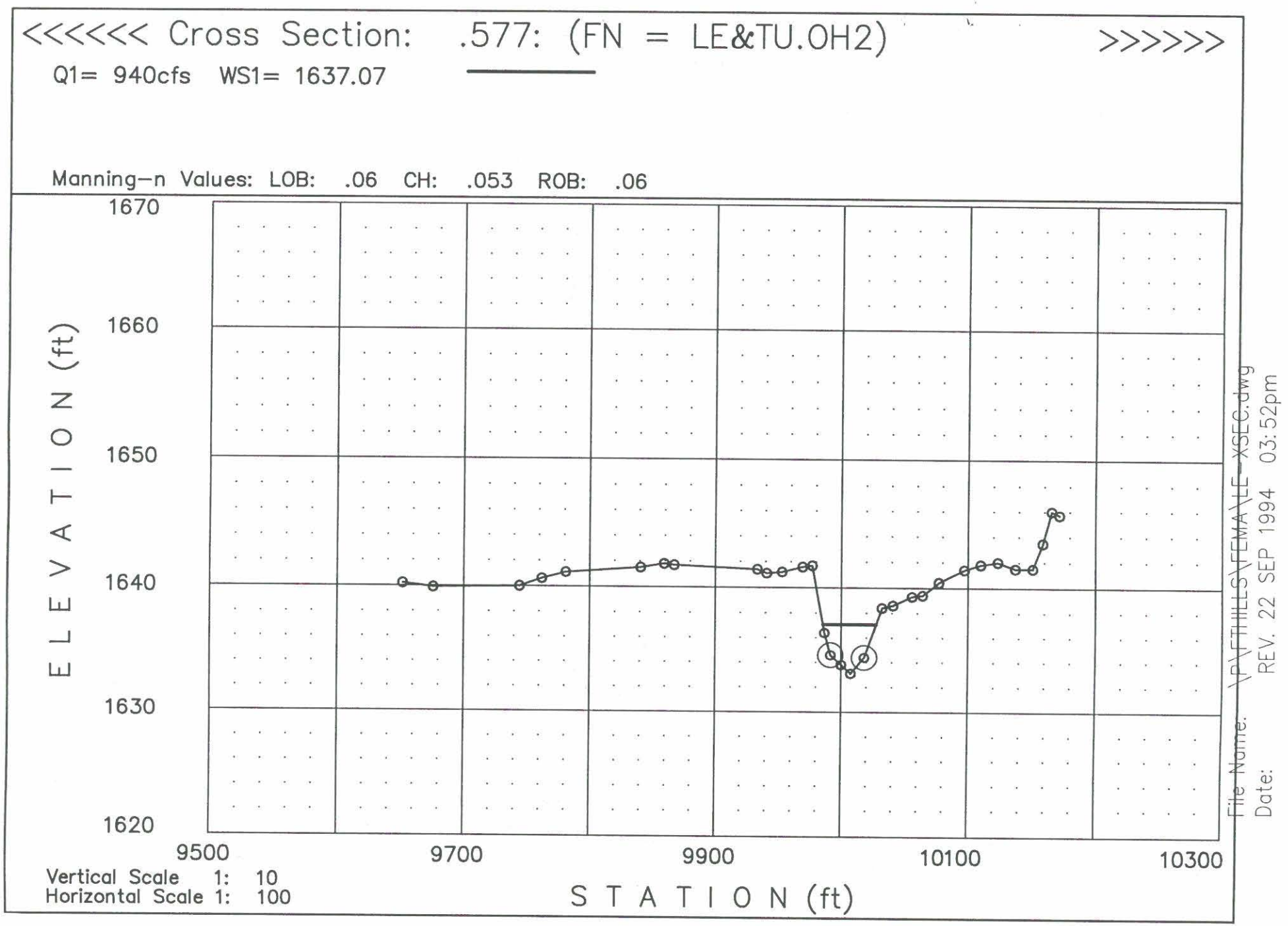
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Q1= 940cfs WS1= 1637.07
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1670
1660
1650
1640
1630
1620
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
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Horizontal Scale 1: 100
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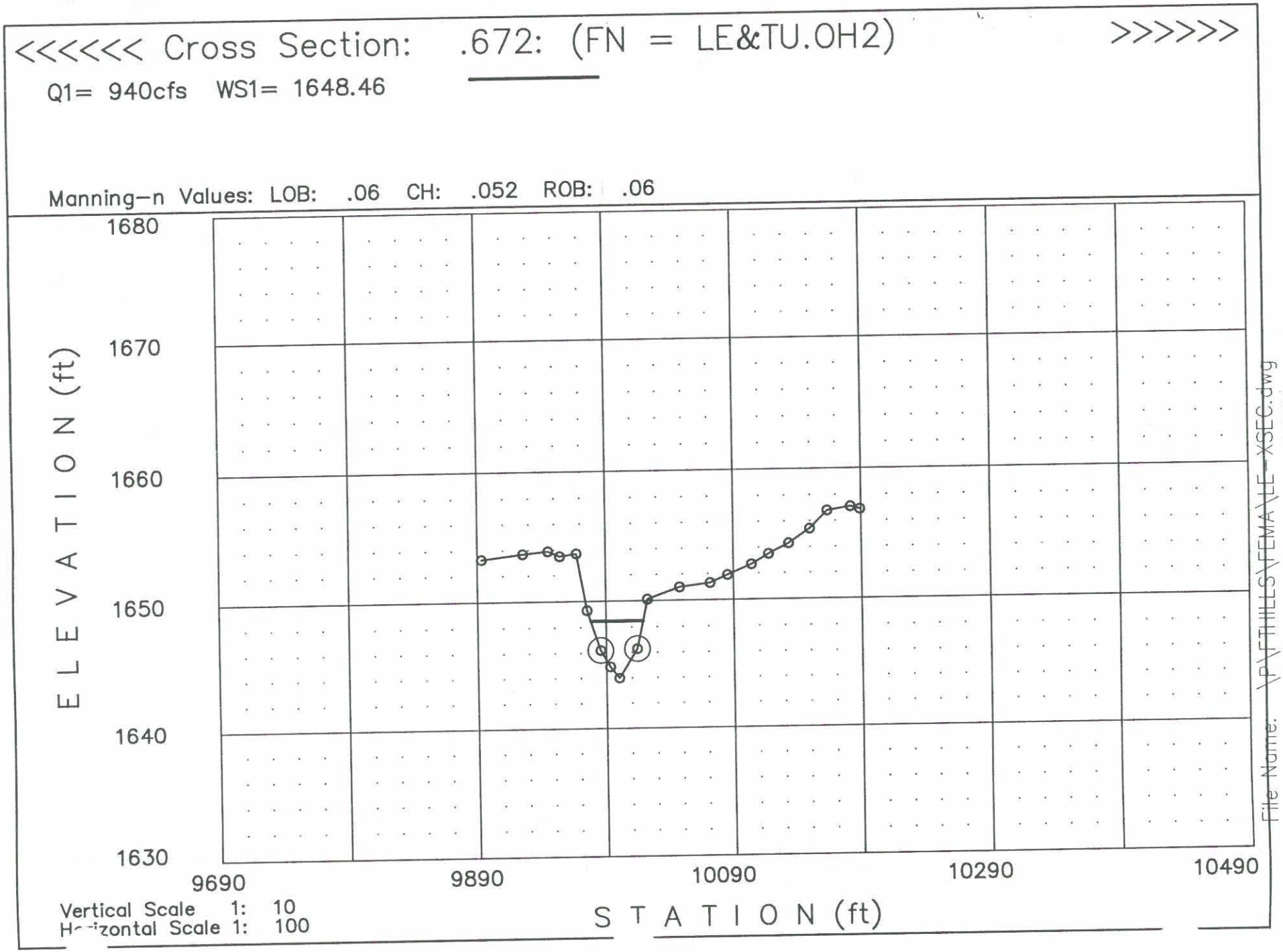
<<<<<< Cross Section: .672: (FN = LE&TU.OH2) >>>>>>
Q1= 940cfs WS1= 1648.46
Manning-n Values: LOB: .06 CH: .052 ROB: .06
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
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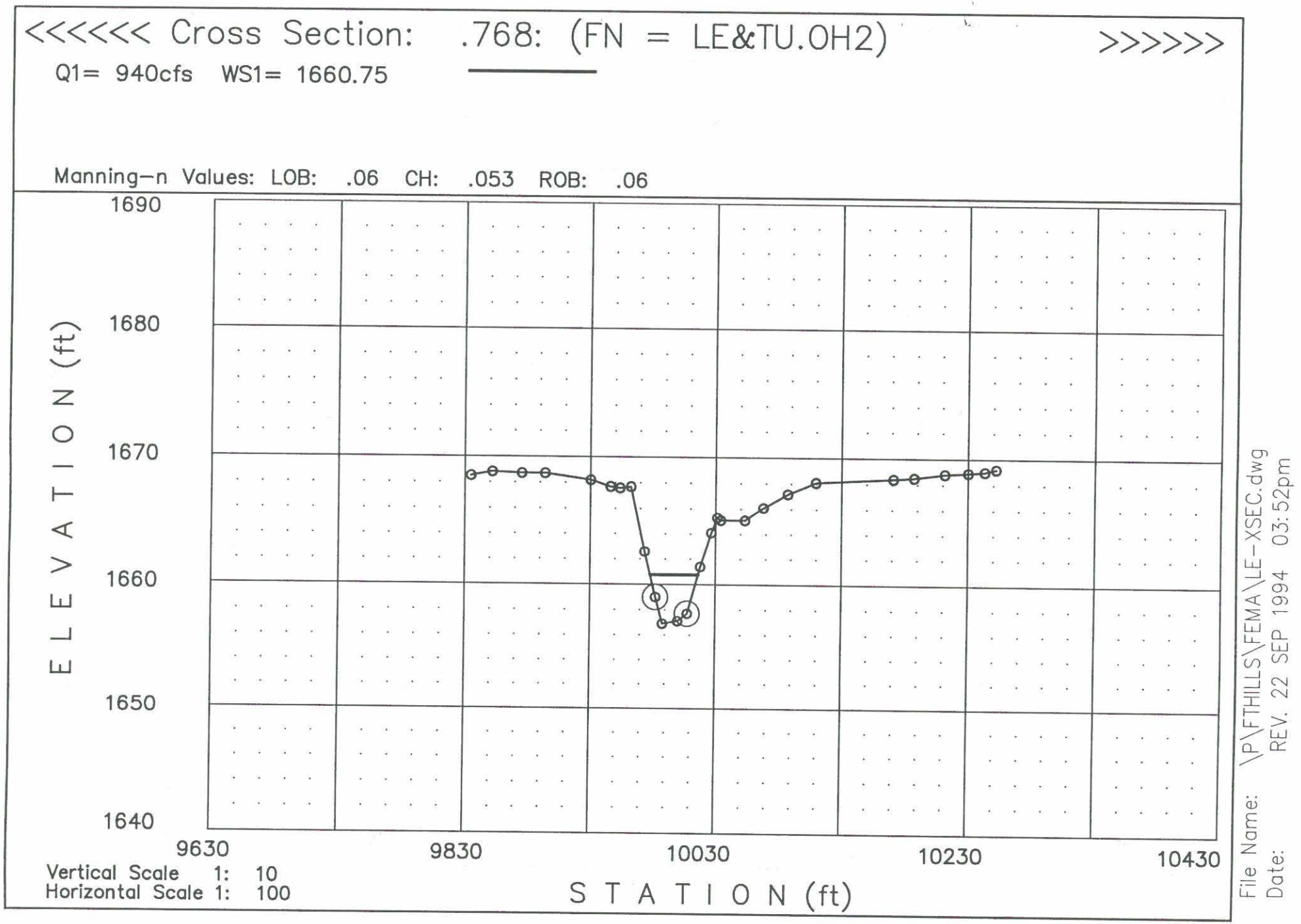
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Q1= 940cfs WS1= 1660.75
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1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
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Horizontal Scale 1: 100
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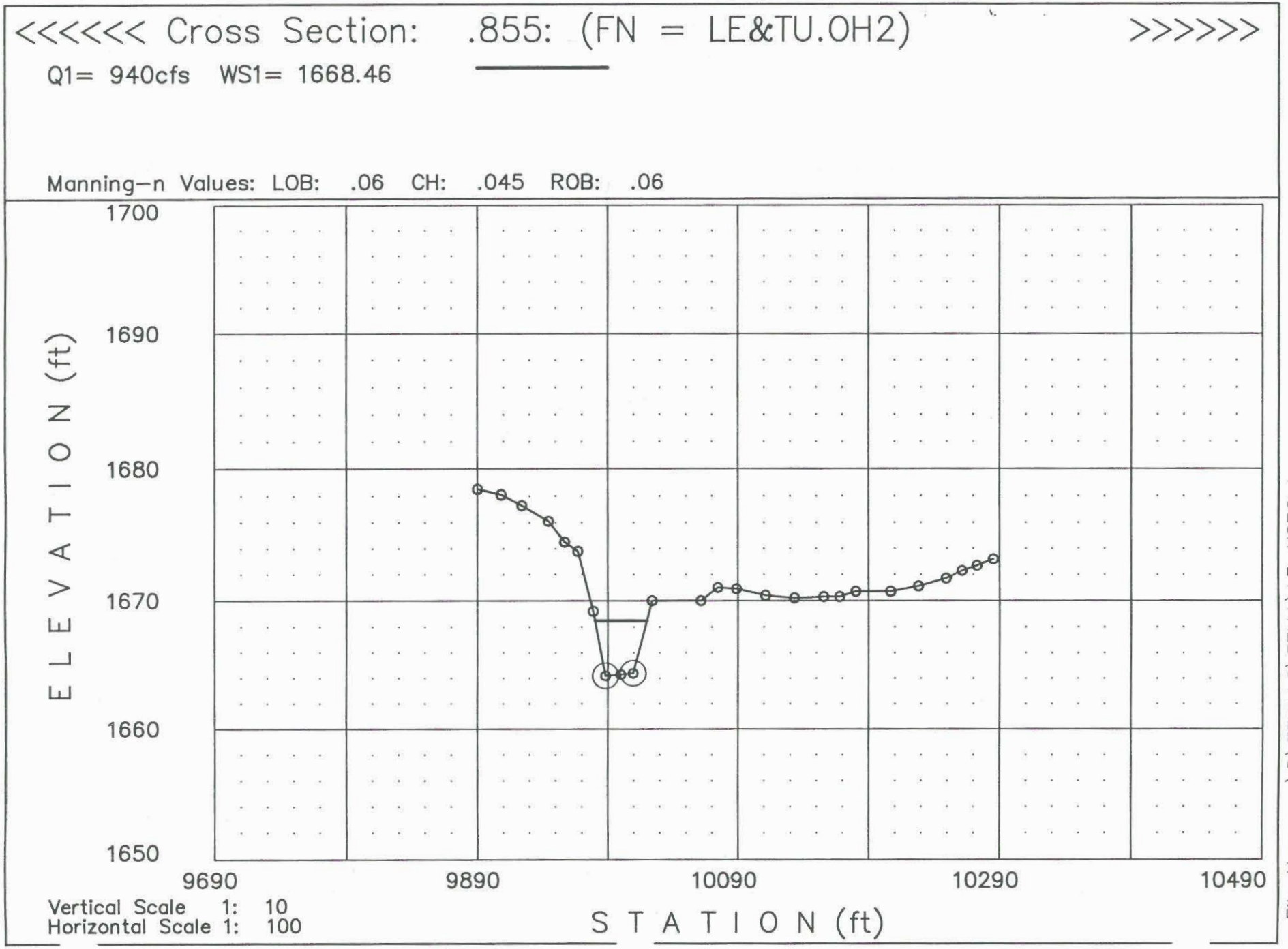
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Q1= 940cfs WS1= 1668.46
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1700
1690
1680
1670
1660
1650
ELEVATION (ft)
9690
9890
10090
10290
10490
STATION (ft)
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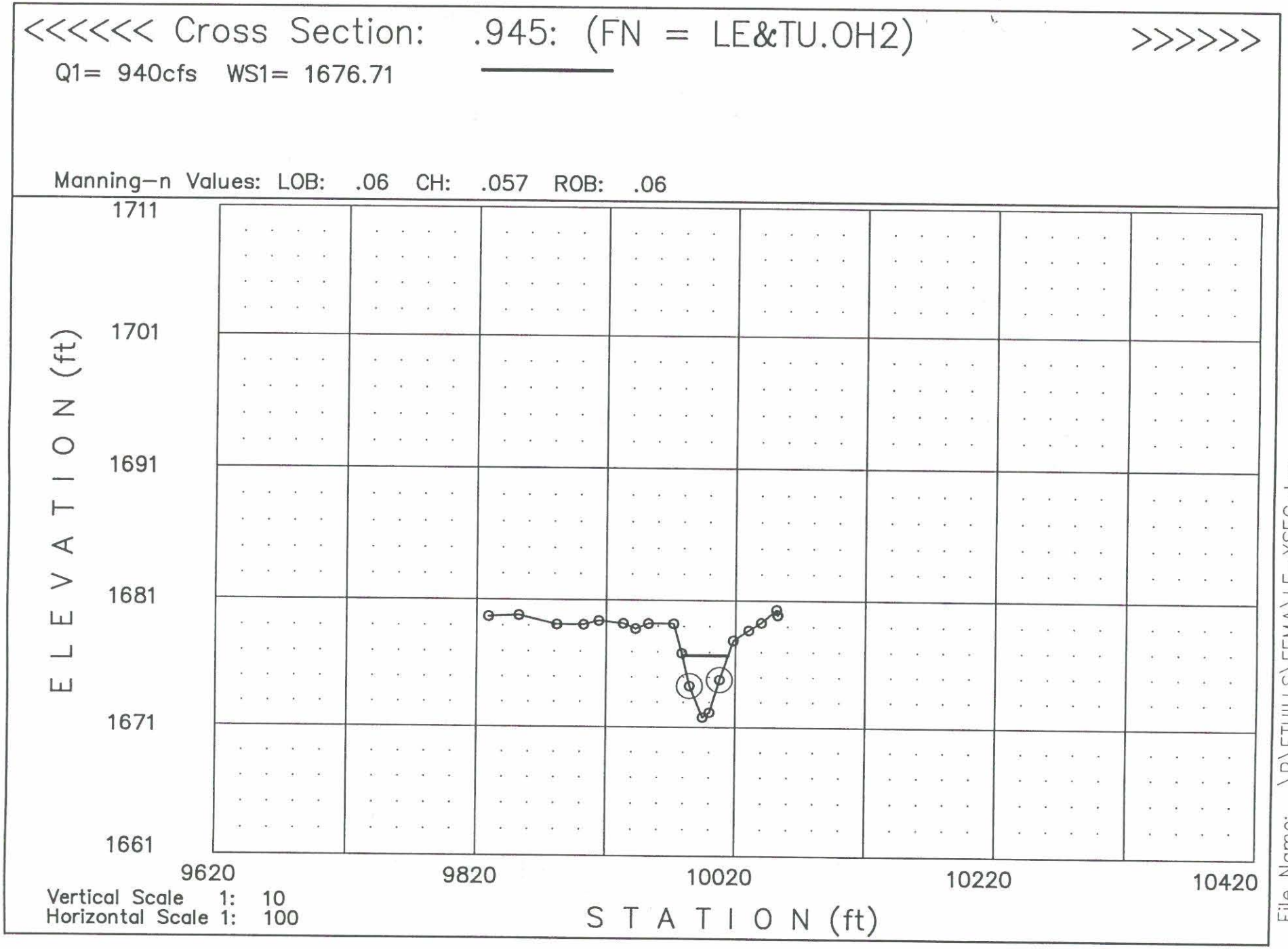
<<<<<< Cross Section: .945: (FN = LE&TU.OH2) >>>>>>
Q1= 940cfs WS1= 1676.71
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1701
1691
1681
1671
1661
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
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Horizontal Scale 1: 100
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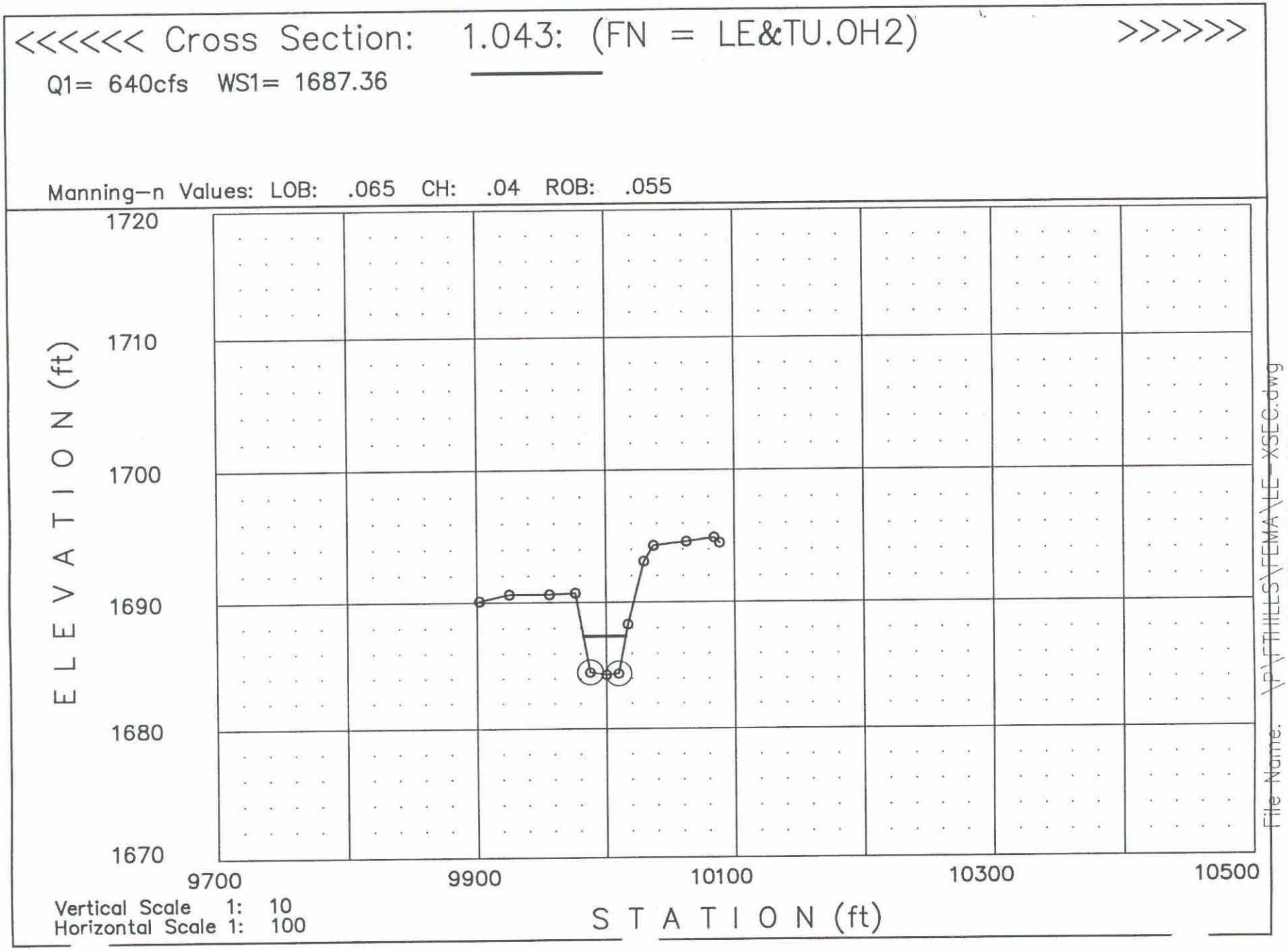
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Q1= 640cfs WS1= 1687.36
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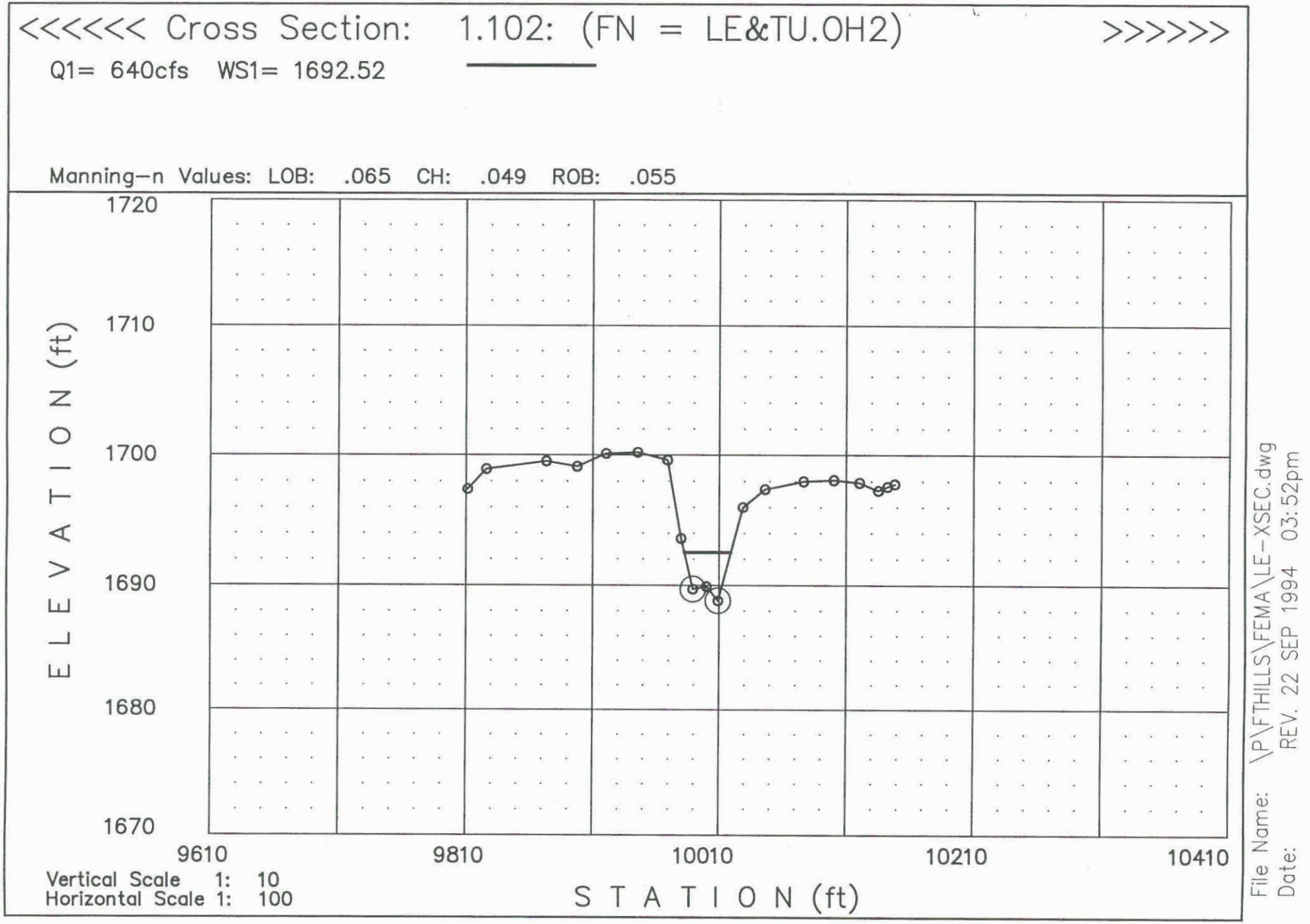
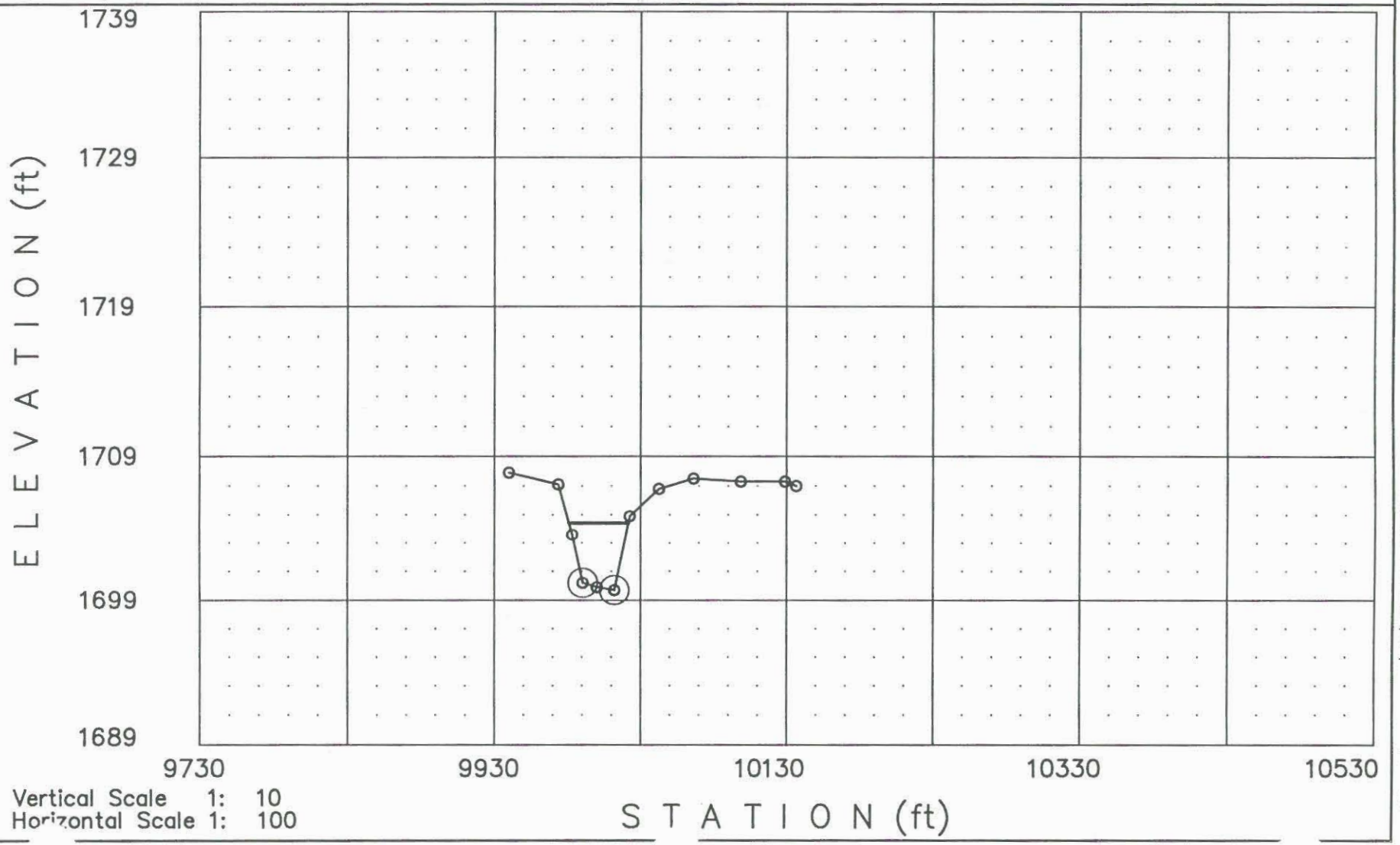
1710
1700
1690
1680
1670
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm


<<<<<< Cross Section: 1.102: (FN = LE&TU.OH2) >>>>>>
Q1= 640cfs WS1= 1692.52
Manning-n Values: LOB: .065 CH: .049 ROB: .055
1720
1710
1700
1690
1680
1670
ELEVATION (ft)
9610
9810
10010
10210
10410
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm

<<<<<< Cross Section: 1.213: (FN = LE&TU.OH2) >>>>>>

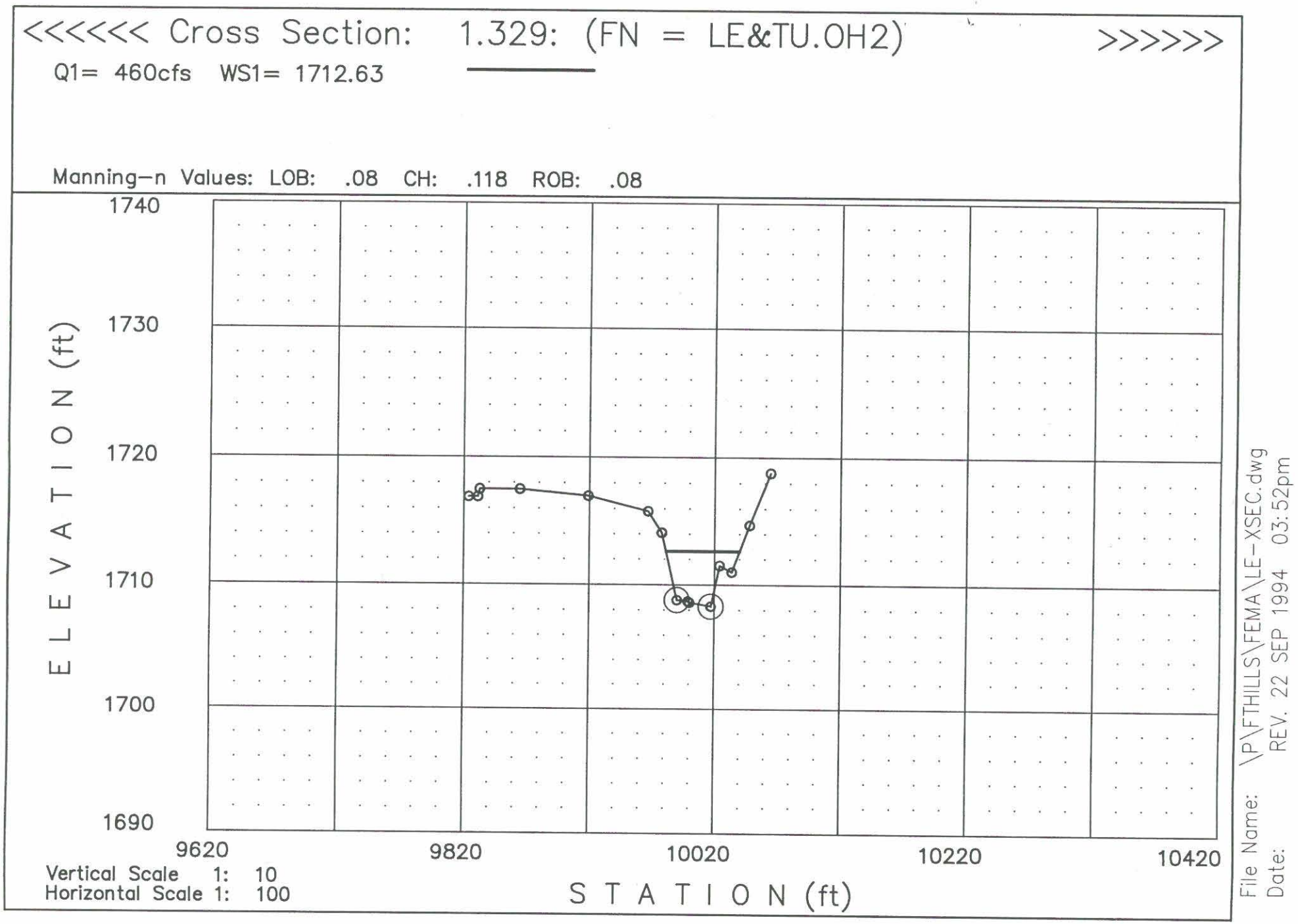
Q1= 640cfs WS1= 1704.42

Manning-n Values: LOB: .08 CH: .118 ROB: .08



Vertical Scale 1: 10
Horizontal Scale 1: 100

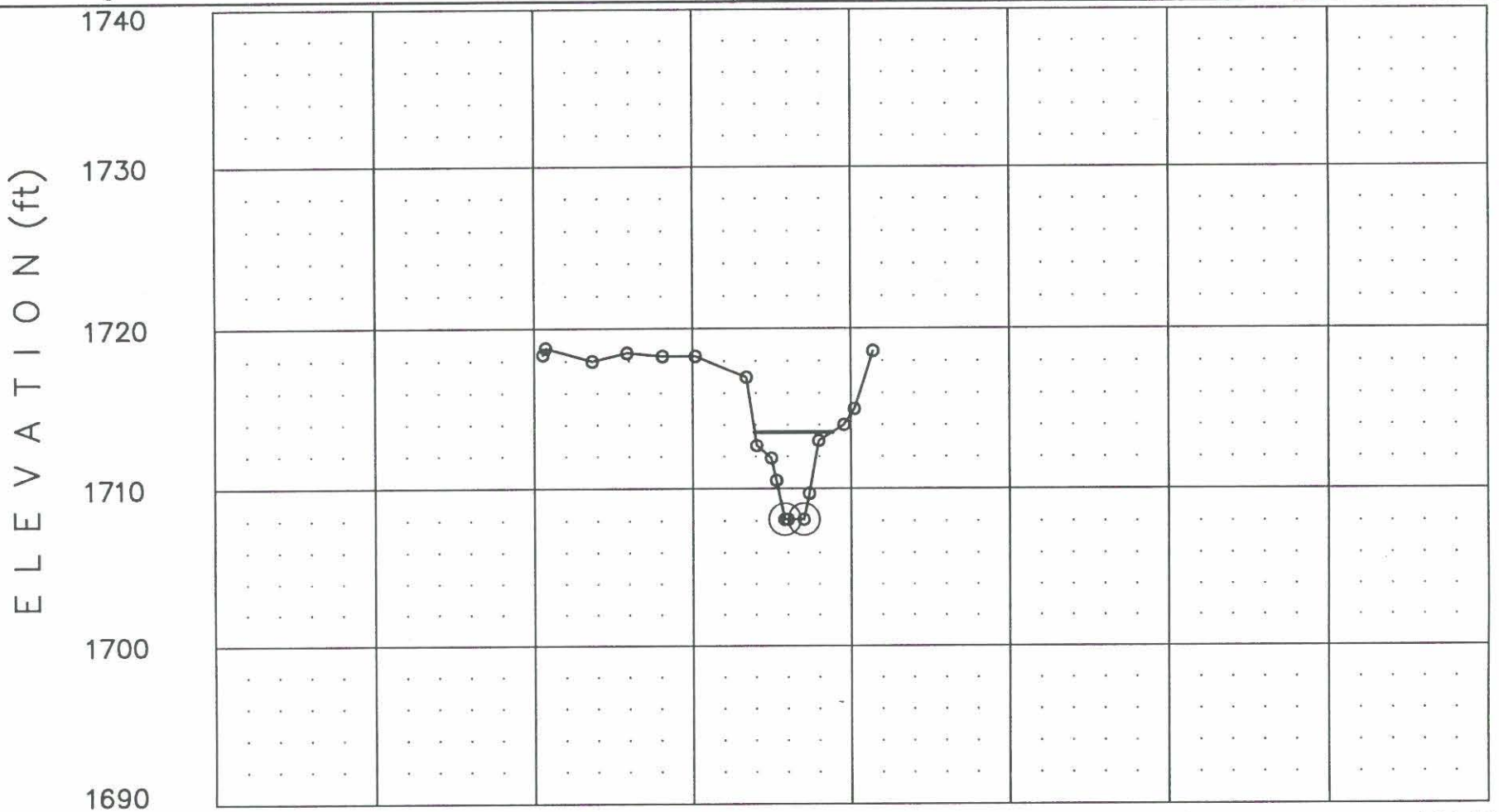
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm


<<<<<< Cross Section: 1.329: (FN = LE&TU.OH2) >>>>>>
Q1= 460cfs WS1= 1712.63
Manning-n Values: LOB: .08 CH: .118 ROB: .08
1740
1730
1720
1710
1700
1690
ELEVATION (ft)
9620
9820
10020
10220
10420
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm

<<<<<< Cross Section: 1.349: (FN = LE&TU.OH2) >>>>>>

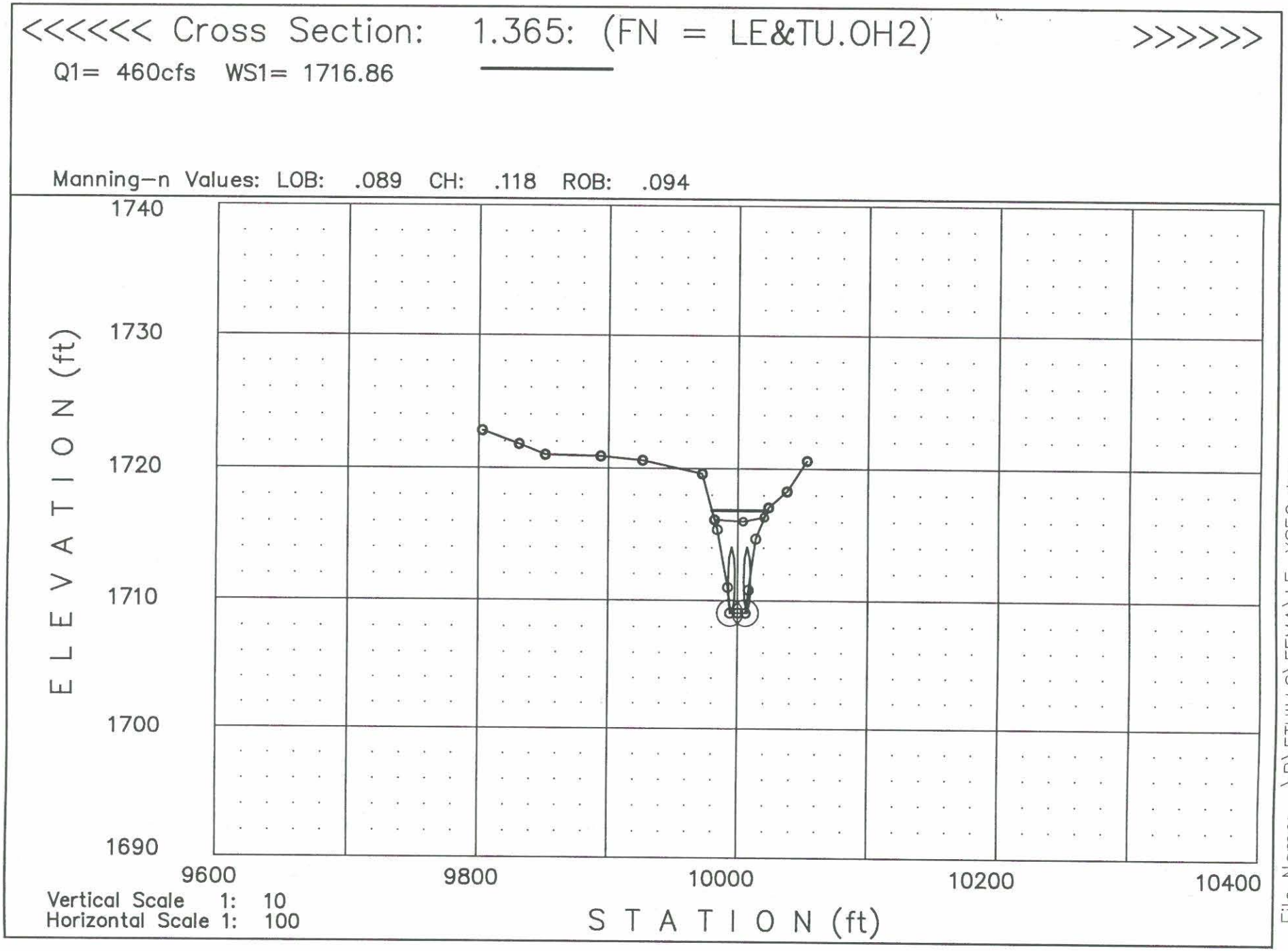
Q1= 460cfs WS1= 1713.54

Manning-n Values: LOB: .102 CH: .118 ROB: .102



Vertical Scale 1: 10
Horizontal Scale 1: 100

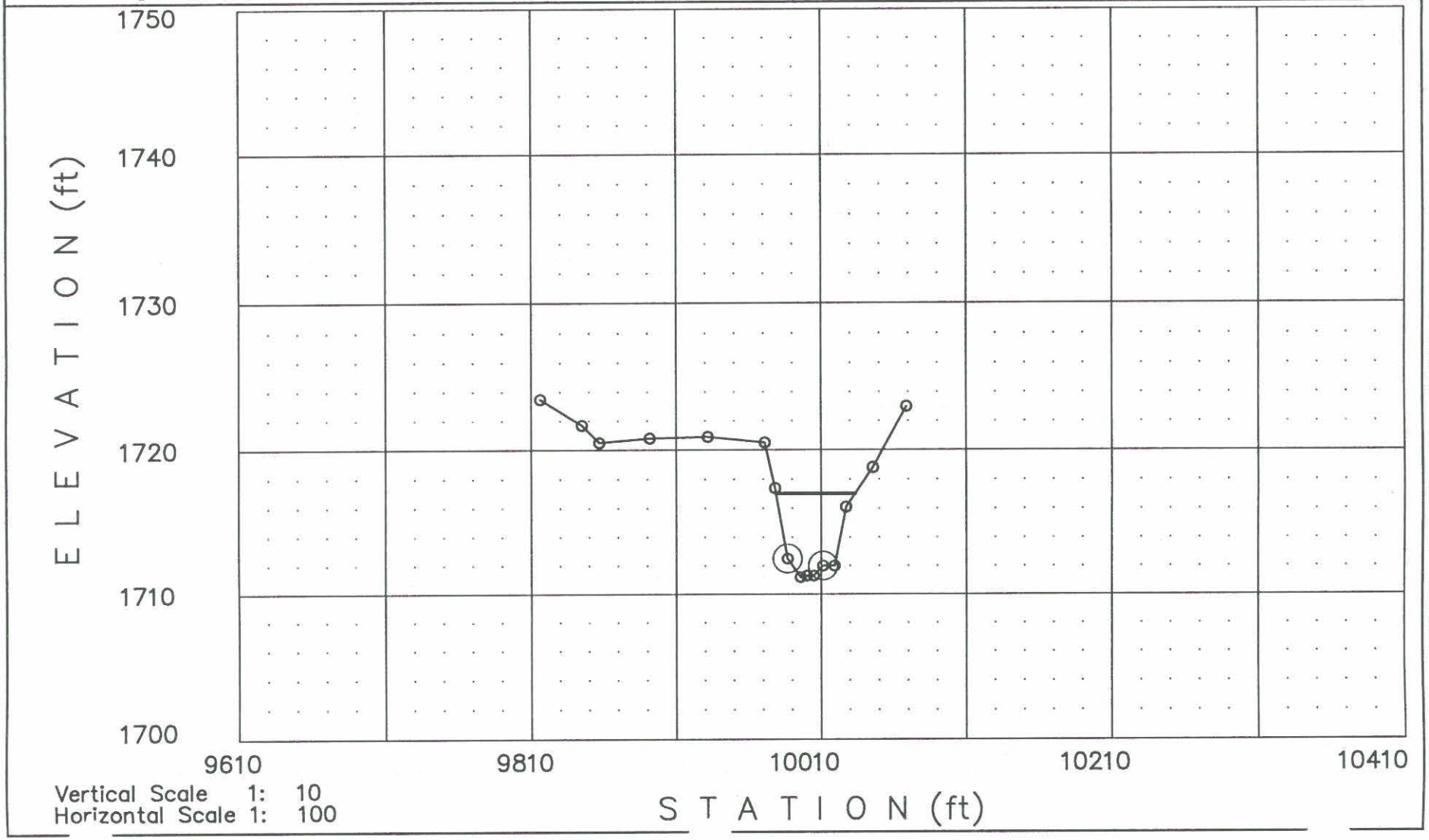
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm


<<<<<< Cross Section: 1.365: (FN = LE&TU.OH2) >>>>>>
Q1= 460cfs WS1= 1716.86
Manning-n Values: LOB: .089 CH: .118 ROB: .094
1740
1730
1720
1710
1700
1690
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm

<<<<<< Cross Section: 1.373: (FN = LE&TU.OH2) >>>>>>

Q1= 460cfs WS1= 1717.01

Manning-n Values: LOB: .08 CH: .105 ROB: .08



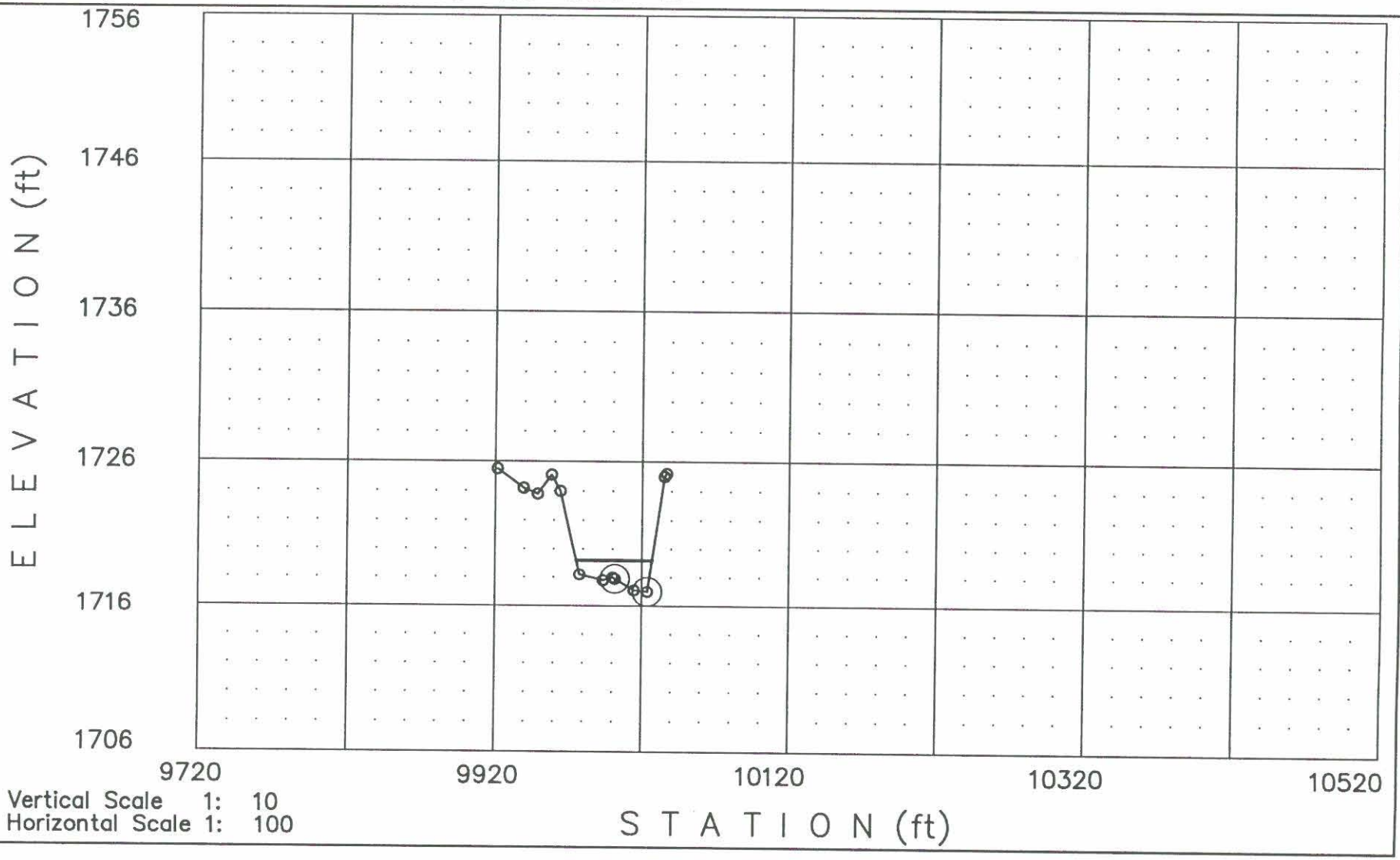
Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm

<<<<<< Cross Section: 1.455: (FN = LE&TU.OH2) >>>>>>

Q1= 460cfs WS1= 1719.19

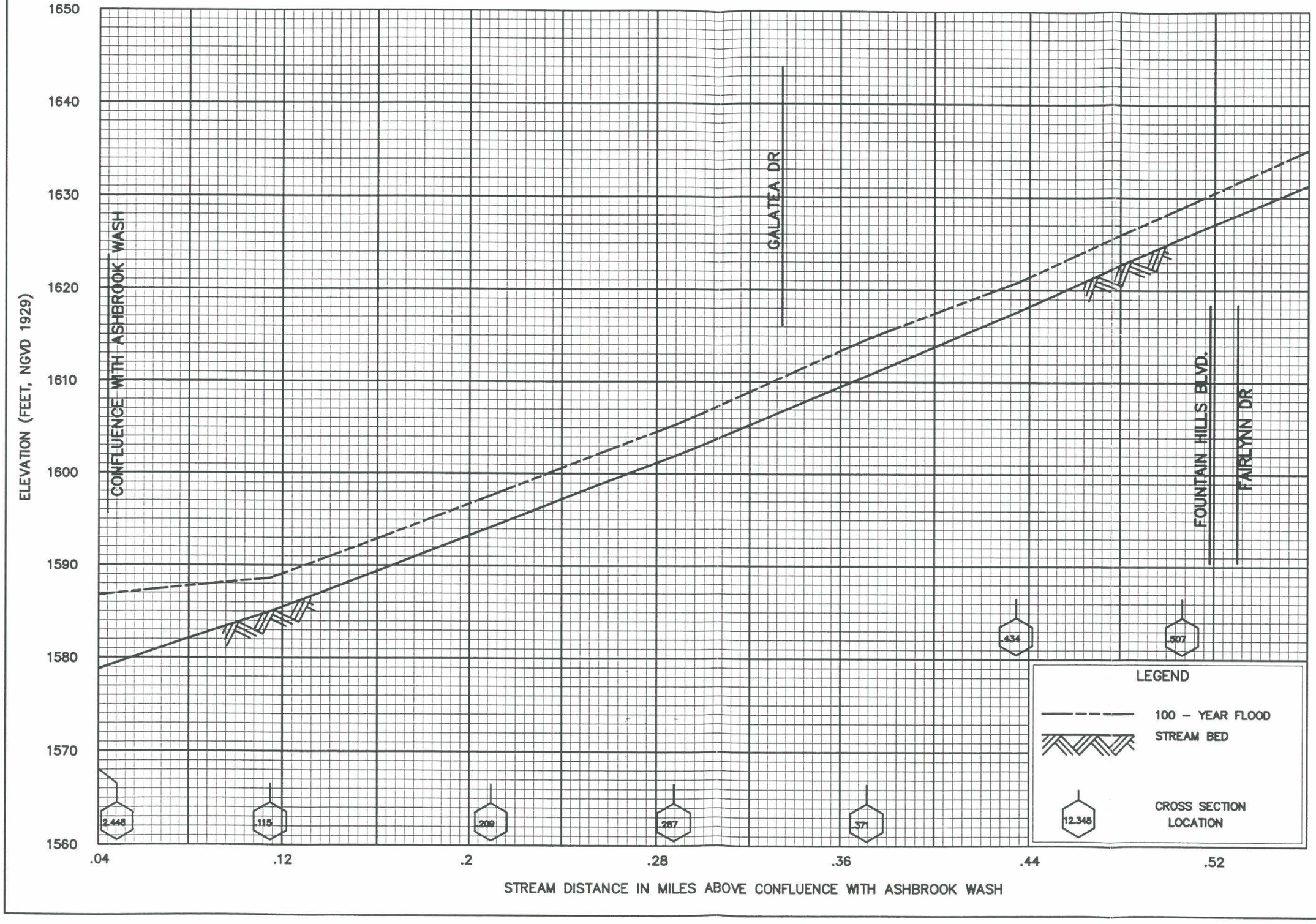
Manning-n Values: LOB: .04 CH: .03 ROB: .04



Vertical Scale 1: 10
Horizontal Scale 1: 100

File Name: \P\FTHILLS\FEMA\LE-XSEC.dwg
Date: REV. 22 SEP 1994 03:52pm

FLOOD PROFILES



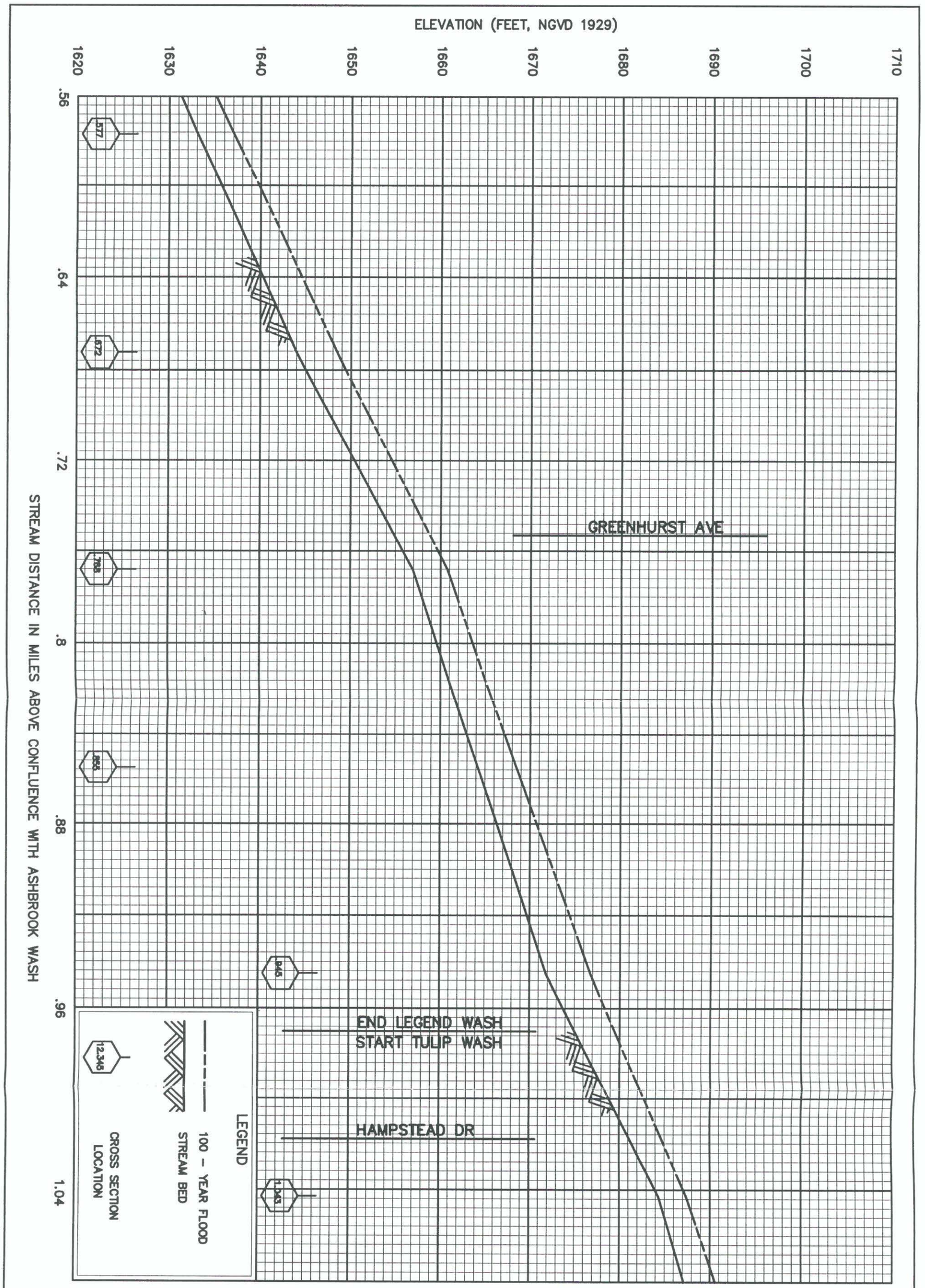
FLOOD PROFILES

LEGEND / TULIP WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\LE-PROF.dwg (sheet 1 of 3)
Date: REV. 27 SEP 1994 10:48am



FEDERAL EMERGENCY MANAGEMENT AGENCY

FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

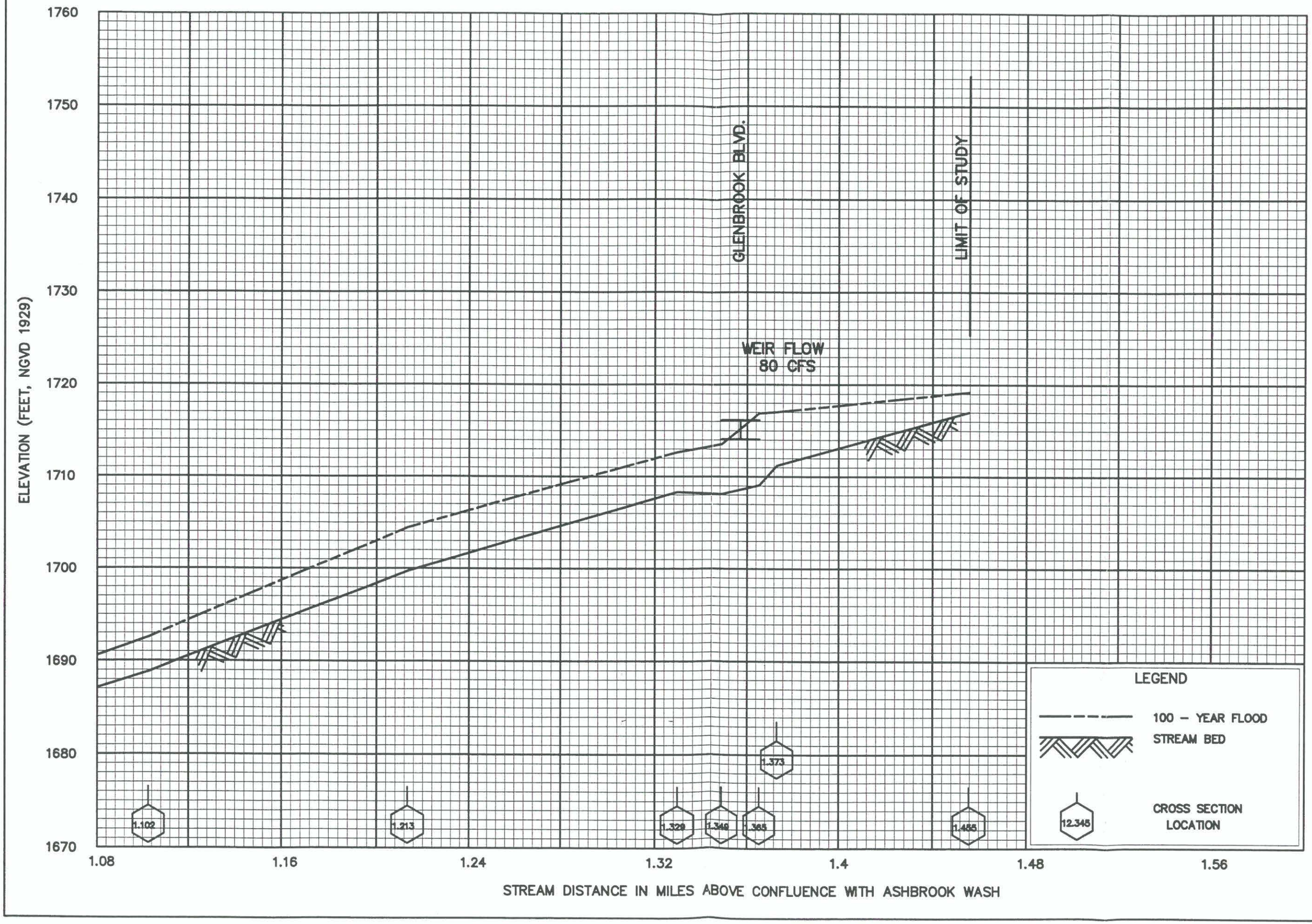
FLOOD PROFILES

LEGEND / TULIP WASH

Dwg. Name: \P\FTHILLS\FEMA\LE-PROF.dwg (sheet 2 of 3)
Date: REV. 27 SEP 1994 10:48am

FLOOD PROFILES

LEGEND / TULIP WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\LE-PROF.dwg (sheet 3 of 3)
Date: REV. 28 OCT 1994 02:20pm

OXFORD WASH

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    29MAR95    TIME   14:53:09 *
 *****************************************
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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     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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1
    29MAR95       14:53:09                                                    PAGE    1


                                                        THIS RUN EXECUTED 29MAR95    14:53:09

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

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


T1   *  Fountain Hills North FIS                        File:        OX.IH2
T2   *  For:  FCDMC #92-04        By:  GVSCE #35       DTP & FB   12-17-93
T3   *     Oxford Wash 100-Year Floodplain.           Revised:   03-29-95
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92; field survey Aug. 91
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodway Method 1, No Encroachment at Culverts.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0   1609.78

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1         0         0         0        -1         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150       101       110       115       200

        HEC-1 Concentration Point C548

QT        2       1040       1040

       START Hydraulically Similar Reach    BA 2
                See Exhibit 1, Manning's n Value Map.
NC    0.060      0.060      0.045       0.1         0.3

ET                              9.1                                                          9949.91    10044.91
1
    29MAR95       14:53:09                                                                    PAGE    2


                  BALBOA  WASH  Section 0.608    Start with CWSEL 1609.78 feet
                        6-hr storm controls                 Q =    1040 cfs
             START Hydraulically Similar Reach BA 2
                  See Exhibit 1, Manning's n Value Map.
X1    0.608        30     9976.6     10007          0         0         0
GR   1622.9     9754.7    1622.8    9767.0     1623.3    9778.9    1624.1    9785.5    1623.7    9810.3
GR   1623.3     9863.8    1623.1    9887.3     1620.4    9898.9    1620.2    9921.5    1612.3    9942.9
GR   1608.2     9954.3    1607.8    9976.6     1606.0    9990.1    1605.2   10000.0    1606.9   10007.0
GR   1607.1    10021.7    1608.6   10026.7     1610.0   10048.3    1615.7   10064.0    1618.9   10069.9
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GR   1619.0    10090.7    1619.7    10097.0    1619.8    10123.6    1619.8    10124.7    1620.1    10144.4
GR   1620.7    10152.3    1620.9    10160.8    1621.1    10188.8    1621.7    10190.8    1621.7    10203.3


        BALBOA/OXFORD Confluence

        HEC-1 Concentration Point C548R

QT        2        1020        1020

ET                              9.1                                                          9978.71    10106.27
          HEC-1 Concentration Point C548R:  6-hr storm controls.
           Diversion from Balboa Wash.  Q = 635 + 385 = 1020 cfs
               STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH BALBOA WASH.
           START Hydraulically Similar Reach OX 1
                 See Exhibit 1, Manning's n Value Map.
X1    0.071          18      9994.5     10021.4         425         385       419.2
GR   1626.5      9956.8     1626.6      9971.0      1622.1      9994.5      1618.4    10000.0    1618.4    10003.3
GR   1621.5     10009.4     1624.6     10021.4      1624.6     10064.8      1624.7    10086.2    1624.9    10100.6
GR   1625.4     10113.3     1625.6     10177.0      1625.7     10251.3      1625.6    10277.8    1625.4    10362.7
GR   1626.1     10379.4     1625.8     10399.6      1628.1     10413.3

ET                              9.1                                                          9978.62    10024.46
X1    0.075          23      9978.8     10014.5          25          25        24.0
GR   1627.4      9946.4     1627.1      9963.0      1625.3      9978.8      1621.6     9993.0    1618.9    10000.0
GR   1619.2     10002.4     1624.3     10014.5      1625.2     10021.8      1625.9    10037.3    1626.2    10067.0
GR   1625.8     10087.5     1625.6     10102.1      1625.6     10158.7      1625.8    10233.1    1626.3    10238.3
GR   1626.2     10280.6     1625.4     10290.3      1625.7     10307.0      1625.7    10318.8    1627.3    10334.7
GR   1627.9     10379.1     1628.0     10405.8      1626.6     10422.5

    Section Surveyed by ALS  15' back of curb along Fountain Hills Blvd.

ET                              9.1                                                          9964.91    10149.30
          Section Surveyed by ALS
          Building located 20 ft downstream.  Left end X-S vertical @ Bldg.
X1    0.129          25         9990        10008         280         285       285.1
X4        1      1629.8         9965
GR     1640        9964     1629.5          9982      1629.0          9990      1627.0     10000    1628.7    10008
GR   1629.2     10029.5     1628.7         10030      1628.8         10032      1629.2     10054    1629.7    10054.5
GR   1630.0       10082     1630.5         10132      1631.1         10182      1633.6     10232    1634.5      10254
GR   1634.1     10254.5     1634.3       10270.5      1634.6         10271      1634.7     10282    1636.3    10323.5
GR   1635.8       10324     1635.8         10332      1635.9         10341      1636.3    10341.5    1637.0      10382

1
    29MAR95      14:53:09                                                                                    PAGE    3


    Section Surveyed by ALS     CL of Fountain Hills Blvd.
     HEC-1 Concentration Point C548R

QT        2         640         640

NH        1       0.020       10350
ET                              9.1                                                          9799.90    10138.38
          HEC-1 Concentration Point C548R:  6-hr storm controls.
               Subtract diverted flow: Q = 1020- 385 = 635 cfs
           Section Surveyed by ALS      CL of Fountain Hills Blvd.
           GR Sta. 10,000 = ALS original survey station 7 + 50
X1    0.140          12         9990        10020          55          60        56.6
X4        3      1629.1         9990      1629.28       10020     1630.44        9800
GR     1640        9799     1630.3          9850      1630.0          9900      1629.5      9950    1629.0      10000
GR   1629.7       10050     1630.6         10100      1631.6         10150      1632.7     10200    1633.9      10250
GR   1635.2       10300     1636.5         10350


        START Hydraulically Similar Reach    OX 2
              See Exhibit 1, Manning's n Value Map.

NC    0.075       0.050      0.040         0.1         0.3
NH        3       0.075     9991.0       0.040     10018.3       0.050     10191.0
ET                              9.1                                                          9964.69    10024.81
          START Hydraulically Similar Reach OX 2
              See Exhibit 1, Manning's n Value Map.
           X3 added since wash discharge not in street; NH adjusts n values.
X1    0.158          25      9964.7     10024.8          95          95        94.6
X3       10                                                                    1633.4     1631.4
GR   1635.4        9670     1634.8      9718.9      1634.3      9739.1      1635.2     9752.5    1631.7     9805.3
GR   1631.9      9817.1     1633.4      9827.2      1633.8      9851.1      1633.5     9922.8    1633.4     9945.0
GR   1633.4      9964.7     1632.8      9975.3      1631.0      9987.0      1630.2     9991.0    1630.2    10000.0
GR   1631.4     10018.3     1633.3     10024.8      1634.6     10029.8      1635.3    10035.7    1635.7    10110.2
GR   1639.0     10120.8     1639.6     10136.1      1639.9     10150.3      1639.9    10187.4    1639.5    10191.0


NH        3        .075      9988.7         .04       10000         .05     10067.4
ET                              9.1                                                          9977.31    10002.81
          Left overbank can not contain the flow,thus a Zone AE is recommended.
X1    0.235          15      9978.5         10000         395         400       405.6
GR   1638.7      9908.9     1638.6      9935.4      1638.5      9953.1      1638.3     9965.5    1636.7     9978.5
GR   1636.0      9983.2     1635.4      9988.7      1636.3     10000.0      1636.5    10011.7    1639.2    10019.0
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GR   1642.0    10030.8    1642.5    10041.0    1642.7    10049.8    1642.7    10059.0    1642.9    10067.4

NH        3      0.075     9984.1      0.04      10019       0.05     10174.1
ET                           9.1                                                 9984.09   10019.01
X1    0.327         24     9984.1     10019        490        480       485.0
GR   1647.9    9830.1    1649.5    9841.7    1647.6    9860.1    1646.7    9877.6    1646.5    9898.1
GR   1646.1    9919.3    1645.1    9937.4    1644.3    9947.4    1643.7    9957.6    1643.3    9966.3
GR   1643.1    9971.6    1641.1    9984.1    1641.1    9991.3    1641.2   10000.0    1641.5   10019.0
GR   1644.0   10028.0    1644.8   10039.4    1647.6   10052.6    1649.9   10064.8    1651.1   10074.5
GR   1652.2   10130.2    1652.8   10146.1    1654.0   10155.0    1655.7   10174.1

1
     29MAR95      14:53:09                                                                    PAGE    4

NH        3       .075      9995       .04      10015       .05      10120
ET                           9.1                                                 9989.99   10030.01
X1    0.338         16      9990      10030         60         60         60
GR   1650.5      9855      1650       9870       1648       9890       1646       9940       1644       9950
GR     1642      9990    1641.8       9995   1641.29      10000   1641.29      10005    1641.7      10015
GR     1642     10030      1644      10040       1646      10070       1648      10090       1650      10108
GR     1652     10120

NH        3       .075      9988.1     .04      10021.5     .05      10112
ET                           9.1                                                 9983.29   10021.51
X1    0.397         19      9984.3    10021.5       310        310       312.6
GR   1651.8    9885.6    1652.6    9900.7    1652.5    9925.0    1651.4    9951.0    1651.4    9965.4
GR   1650.5    9971.4    1648.1    9977.3    1646.3    9984.3    1646.2    9988.1    1645.9   10000.0
GR   1646.3   10013.3    1646.5   10021.5    1649.5   10028.5    1651.6   10038.1    1652.0   10048.2
GR   1651.7   10060.9    1651.2   10084.6    1652.5   10093.9    1652.2   10112.0

         HEC-1 Concentration Point C547

QT        2        530       530

NH        3       .075     9995.8      .04       10021       .05     10072.9
ET                           9.1                                                 9990.75   10027.80
         HEC-1 Concentration Point C547:  6-hr storm controls.
X1    0.473         13     9994.5    10026.2       395        385       398.9
GR   1668.4    9965.1    1662.4    9979.1    1655.2    9994.5    1654.5    9995.8    1654.8   10000.0
GR   1654.8   10010.3    1654.9   10021.0    1656.1   10026.2    1661.5   10036.3    1666.8   10046.1
GR   1668.6   10050.5    1668.2   10061.3    1668.3   10072.9

NH        3       .075     9985.9      .04     10011.2       .05     10174.5
ET                           9.1                                                 9981.94   10020.76
X1    0.542         37     9985.9     10020        360        370       363.8
GR   1674.0    9633.6    1674.1    9653.2    1674.2    9670.3    1673.6    9676.9    1673.5    9700.8
GR   1673.9    9709.0    1673.4    9725.3    1672.7    9733.7    1673.9    9743.2    1674.4    9757.1
GR   1674.4    9771.3    1674.9    9790.4    1674.1    9847.7    1673.9    9865.7    1674.2    9882.7
GR   1674.2    9904.8    1673.9    9921.0    1673.8    9939.0    1673.8    9954.9    1673.9    9963.3
GR   1670.8    9971.1    1665.6    9979.6    1663.2    9985.9    1662.6    9992.6    1662.2   10000.0
GR   1662.5   10011.2    1664.3   10020.0    1670.7   10031.9    1676.5   10040.6    1680.8   10050.6
GR   1681.2   10062.8    1681.2   10075.0    1681.1   10081.6    1680.9   10128.6    1681.0   10144.9
GR   1681.0   10157.4    1681.3   10174.5

  ********************************************************************************
  **************************    Culvert   M9     ***************************
  ********************************************************************************

  Culvert M9   Downstream fully expanded flow.  Special Culvert Section # 1

1
     29MAR95      14:53:09                                                                    PAGE    5

NH        3       .075     9992.2      .04     10017.6       .05     10100.5
ET                           9.1                                                 9986.28   10025.04
           CULVERT M9     Oxford Wash and Tanglewood Court
            Culvert M9      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
X1    0.638         30        9989    10017.6       500        505       505.6
GR   1690.5    9724.3    1689.2    9737.5    1687.6    9754.5    1685.1    9761.3    1681.1    9771.0
GR   1681.4    9782.8    1681.9    9795.7    1682.2    9804.0    1682.3    9814.0    1682.1    9824.1
GR   1681.9    9835.2    1683.3    9843.0    1684.1    9857.2    1684.0    9881.4    1684.1    9905.5
GR   1683.5    9926.8    1683.3    9944.8    1683.5    9964.8    1683.6    9976.7    1680.2    9984.4
GR   1676.9    9989.0    1676.8    9992.2    1676.5   10000.0    1677.0   10017.6    1678.3   10024.2
GR   1686.7   10037.1    1687.7   10042.4    1687.7   10062.3    1687.6   10083.3    1690.0   10100.5

         Use NC Record to set Contraction and Expansion Coefficients for Culvert.

NC    0.075      0.050      0.040        0.3        0.5
NH        3      0.075     9993.1      0.040     10013.0      0.050     10094.9

         Culvert M9  OUTLET              Special Culvert Section # 2

         Base channel elevations adjusted to culvert Invert ELEV  1677.40
```

```
ET                          9.1                                                    9985.48   10022.24
            Culvert M9   Outlet.   3-42"  CMPs          (SECTION 2 OF SC ROUTINE)
              Photogrammetric xsec. located 1' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1677.40
X1    0.656        32     9998.7    10010.7        95         95        95.1
X3       10                                                          1681.1    1681.1
X4        2   1677.40     9998.7    1677.40    10010.7
GR  1690.0     9746.4    1689.1     9758.5     1684.7     9764.6    1682.7    9772.7    1682.9    9783.3
GR  1683.5     9791.8    1684.0     9802.4     1683.9     9817.1    1683.3    9828.2    1683.2    9832.0
GR  1684.5     9839.4    1685.4     9851.6     1686.0     9866.8    1685.9    9883.8    1685.6    9899.8
GR  1685.4     9914.3    1685.5     9930.3     1684.9     9952.1    1685.6    9963.0    1686.4    9972.4
GR  1684.5     9978.7    1680.4     9986.9     1679.1     9993.1    1677.40   10000.0   1679.3    10013.0
GR  1680.2    10020.5    1683.8    10027.4     1687.1    10035.3    1688.1    10041.6   1687.8    10054.6
GR  1688.2    10069.3    1689.0    10094.9

    3-42"  CMPs

SC    3.022       0.7       2.63          0         3.5          0        71.4       2.2    1677.78   1677.40

      Culvert M9  INLET                Special Culvert Section # 3

      BT information surveyed by Town.   West top of curb.
      BT effective top of road revised per figure 3.16 (HEC-2, Sept 90)
            Left Intersection Point          9983.6  1683.6
            Right Intersection Point        10024.0  1685.1
      Base channel elevations adjusted to culvert Invert ELEV  1677.78

NH        3      0.075     9990.8       0.040     10018.6        0.050     10097.4

ET                          9.1                                                    9978.59   10024.95
1
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            Culvert M9   Inlet.    3-42"  CMPs          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 5' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1677.78
            Culvert M9  BT information surveyed by Town.West top of curb.
            Culvert M9  BT information coded per figure 3.16 (HEC-2, Sept 90)
             BT left intersection point   1683.6  9983.6
             BT right intersection point  1685.1   10024
            Wash discharge does not flow in street; fill in street:recode BT& GR
           for photogrammetric x-sec Sta. 9763.3 to Sta. 9837.7 at elev. 1687.0
X1    0.669        27     9998.7    10010.7        71.4       71.4        71.4
X2                  2     1681.28   1683.66
X3       10                                                          1683.5    1683.5
X4        4    1683.6     9983.6    1677.78     9998.7    1677.78   10010.7    1685.1     10024
BT      -27    9752.5     1689.3                9763.3       1687               9771.4      1687
BT             9782.0       1687                9795.0       1687               9803.6      1687
BT             9821.2       1687                9837.7       1687               9852.0    1686.5
BT             9861.8     1686.5                9878.2     1686.5               9902.3    1687.1
BT             9929.8     1687.3                9942.2     1687.2               9957.2    1687.5
BT             9973.4     1687.7                9982.0     1684.1               9983.6    1683.6
BT              10000    1683.50                 10024     1685.1              10024.1    1685.2
BT            10031.9     1688.2                10051.4    1688.3              10066.4    1688.5
BT            10082.1     1688.7                10089.7    1688.8              10097.4    1689.9

GR  1689.3     9752.5    1687.0     9763.3     1687.0     9771.4    1687.0    9782.0    1687.0    9795.0
GR  1687.0     9803.6    1687.0     9821.2     1687.0     9837.7    1686.5    9852.0    1686.5    9861.8
GR  1686.5     9878.2    1687.1     9902.3     1687.3     9929.8    1687.2    9942.2    1687.5    9957.2
GR  1687.7     9973.4    1684.1     9982.0     1681.5     9990.8   1677.78   10000.0    1681.9   10018.6
GR  1685.2    10024.1    1688.2    10031.9     1688.3    10051.4    1688.5   10066.4    1688.7   10082.1
GR  1688.8    10089.7    1689.9    10097.4

          Return  Contraction and Expansion coefficients to Normal

NC                                              0.1        0.3

  Culvert M9      Upstream fully expanded flow.  Special Culvert Section # 4

NH        3       .075     9983.9        .04     10010.0         .05       10084
ET                          9.1                                                    9976.17   10018.93
                Left overbank is non effective flow area:  Hard coded GR's
                   from STA 9765.6 to 9971.6 & STA 9825.1 @ EL 1686
             Culvert M9      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
X1    0.678        29     9979.9    10015.3          45         45        49.2
GR  1689.3     9730.8    1689.3     9746.5     1686.5     9755.9      1686    9765.6      1686    9771.6
GR  1686.2     9782.8    1686.7     9797.5     1686.2     9810.9      1686    9825.1    1686.5    9830.1
GR  1687.5     9841.2    1687.6     9867.4     1688.2     9896.7    1688.6    9910.8    1688.5    9927.4
GR  1688.6     9951.2    1688.8     9968.6     1686.4     9973.9    1683.6    9979.9    1682.7    9983.9
GR  1682.5    10000.0    1682.7    10010.0     1683.2    10015.3    1686.5   10020.9    1689.9   10027.2
GR  1689.9    10041.7    1689.7    10054.7     1689.5    10064.9    1689.4   10084.0

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NH        3      0.075     9990.1       0.040     10013.6        0.050     10093.4
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ET                          9.1                                                                 9969.49   10021.10
                X3 added since wash discharge not in street; NH adjusts n values.
X1    0.751        39     9969.5    10021.1       390        390       384.6
X3       10                                                                    1698.5    1693.7
GR   1702.0    9553.2    1700.9     9560.6    1701.3     9592.7    1701.6    9610.4    1701.5    9635.0
GR   1700.5    9649.4    1700.0     9659.8    1696.9     9684.3    1696.0    9703.8    1695.9    9715.3
GR   1695.8    9732.2    1696.1     9738.6    1695.8     9746.8    1693.3    9763.5    1694.0    9772.8
GR   1694.5    9790.8    1694.6     9796.3    1694.2     9809.6    1693.4    9819.5    1693.2    9825.7
GR   1694.8    9833.3    1696.1     9839.3    1697.8     9862.8    1698.2    9881.9    1698.4    9912.8
GR   1697.8    9930.7    1698.3     9946.2    1698.5     9969.5    1695.6    9980.7    1693.4    9990.1
GR   1693.3   10000.0    1693.7    10013.6    1696.4    10021.1    1698.5   10027.0    1702.3   10032.6
GR   1705.0   10041.2    1705.9    10062.6    1705.5    10082.3    1707.8   10093.4

NH       3       .075    9989.2        .04   10023.7         .05   10106.5
ET                          9.1                                                                 9984.45   10027.74
X1    0.832        22     9989.2    10023.7       435        425       428.7
GR   1721.4    9804.0    1717.4     9824.4    1710.8     9845.0    1711.8    9850.1    1711.9    9869.9
GR   1711.8    9884.0    1710.6     9900.9    1710.3     9908.9    1711.8    9919.5    1712.2    9934.5
GR   1712.2    9956.4    1712.4     9971.6    1712.0     9976.0    1707.8    9989.2    1707.2    9996.0
GR   1707.3   10000.0    1707.5    10023.7    1712.7    10035.3    1712.8   10055.6    1713.0   10082.3
GR   1713.0   10099.4    1716.2    10106.5

        HEC-1 Concentration Point C543

QT       2        210        210

NH       3       .075    9988.7        .04   10014.8         .05   10047.9
ET                          9.1                                                                 9980.73   10016.87
                HEC-1 Concentration Point C543:  6-hr storm controls.
X1    0.888        25     9980.8    10014.8       280        295       295.6
GR   1729.2    9755.1    1725.8     9770.2    1721.1     9789.3    1719.3    9806.1    1719.7    9827.4
GR   1719.7    9847.9    1719.8     9864.0    1718.1     9873.7    1716.7    9883.5    1717.5    9897.8
GR   1717.6    9911.6    1717.5     9919.8    1717.2     9931.7    1716.5    9943.1    1716.6    9947.3
GR   1718.3    9953.1    1719.4     9960.4    1719.7     9969.5    1715.6    9980.8    1714.0    9988.7
GR   1714.2   10000.0    1714.8    10014.8    1718.8    10024.8    1723.7   10032.4    1728.4   10047.9

NH       3       .075    9983.3        .04   10011.8         .05   10033.8
ET                          9.1                                                                 9979.09   10013.90
X1    0.931        14     9983.3    10011.8       220        240       229.3
GR   1731.1    9846.8    1727.6     9863.9    1722.6     9881.7    1723.1    9912.8    1723.2    9936.3
GR   1723.5    9964.5    1721.5     9972.5    1716.2     9983.3    1716.6    9989.7    1716.3   10000.0
GR   1717.2   10011.8    1721.4    10020.1    1725.6    10030.4    1728.3   10033.8

        HEC-1 Concentration Point C542 = runoff from sub basin 206H
1
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QT       2        150        150

NH       3       .075    9981.8        .04   10010.4         .05   10031.8
ET                          9.1                                                                 9974.01   10018.38
                HEC-1 Concentration Point C542:  6-hr storm controls.
X1    0.986        13     9981.8    10010.4       280        290       288.9
GR   1730.2    9900.2    1727.4     9915.4    1724.1     9928.2    1723.2    9937.1    1722.9    9965.3
GR   1718.9    9974.0    1715.6     9981.8    1715.7     9993.5    1715.7   10000.0    1716.9   10010.4
GR   1719.5   10020.8    1720.9    10024.5    1724.7    10031.8


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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


 *PROF 1

 CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

 CCHV=     .100 CEHV=     .300
 *SECNO  .608
                   BALBOA  WASH  Section 0.608    Start with CWSEL 1609.78 feet
                          6-hr storm controls                Q =    1040 cfs
             START Hydraulically Similar Reach BA 2
                   See Exhibit 1, Manning's n Value Map.
      .608      4.58   1609.78   1609.11   1609.78   1610.27       .49       .00       .00   1607.80
   1040.0      130.2     690.7     219.1      43.2     106.4      61.3        .0        .0   1606.90
      .00       3.02      6.49      3.58      .060      .045      .060      .000   1605.20   9949.91
  .007392        0.        0.        0.         0        14         0       .00     95.00  10044.91


 *SECNO  .071
 7185 MINIMUM SPECIFIC ENERGY
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3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C548R:  6-hr storm controls.
           Diversion from Balboa Wash.  Q = 635 + 385 = 1020 cfs
                STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH BALBOA WASH.
           START Hydraulically Similar Reach OX 1
                See Exhibit 1, Manning's n Value Map.
      .071      6.72   1625.12   1625.12       .00   1626.06       .94      3.76       .13   1622.10
   1020.0       82.2     876.3      61.5      23.9     105.4      38.1       1.8        1.0   1624.60
      .02       3.44      8.31      1.61      .060      .045      .060      .000    1618.40   9978.71
  .011419       425.      419.      385.         0        15         0       .00     127.56  10106.27


*SECNO  .075
      .075      6.42   1625.32   1624.86       .00   1626.41      1.09       .30        .05   1625.30
   1020.0         .0    1011.6       8.4         .0    120.3       4.3       1.9        1.1   1624.30
      .02        .03      8.41      1.93      .000      .045      .060      .000    1618.90   9978.62
  .013819        25.       24.       25.         2        11         0       .00      45.83  10024.46


*SECNO  .129

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
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


3720 CRITICAL DEPTH ASSUMED
           Section Surveyed by ALS
           Building located 20 ft downstream.  Left end X-S vertical @ Bldg.
      .129      3.71   1630.71   1630.71       .00   1631.29       .58      4.37       .05   1629.00
   1020.0       107.1     420.7      492.2      29.7      49.9      129.0       3.0        1.8   1628.70
      .03       3.61      8.43      3.81      .060      .045      .060      .000    1627.00   9964.91
  .017164       280.      285.      285.         0        14         0       .00     184.39  10149.30


1490 NH CARD USED
*SECNO  .140

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.15

          HEC-1 Concentration Point C548R:  6-hr storm controls.
               Subtract diverted flow: Q = 1020- 385 = 635 cfs
           Section Surveyed by ALS       CL of Fountain Hills Blvd.
           GR Sta. 10,000 = ALS original survey station 7 + 50
      .140      2.37   1631.37   1630.32       .00   1631.40       .03       .05        .06   1629.10
   640.0        362.4     115.8      161.8      274.4      67.7      132.0       3.4        2.2   1629.28
      .04       1.32      1.71      1.23      .020      .020      .020      .000    1629.00   9799.90
  .000179        55.       57.       60.         2        19         0       .00     338.48  10138.38


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .158

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1633.40 ELREA=      1631.40

           START Hydraulically Similar Reach OX 2
                See Exhibit 1, Manning's n Value Map.
            X3 added since wash discharge not in street; NH adjusts n values.
      .158      2.65   1632.85   1632.85       .00   1633.73       .87       .06        .25   1633.40
   640.0          .0     640.0         .0         .0     85.3         .0       4.0        2.6   1633.30
      .05        .00      7.51      .00      .000      .054      .000      .000    1630.20   9974.36
  .036169        95.       95.       95.         0         8         0       .00      48.91  10023.27


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
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1490 NH CARD USED
*SECNO  .235
3280 CROSS SECTION        .23 EXTENDED        .40 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.21

          Left overbank can not contain the flow,thus a Zone AE is recommended.
      .235      3.70   1639.10   1638.35       .00   1639.47       .36      5.69       .05   1636.70
    640.0      83.6      372.4     184.1      51.4      68.4      40.8       5.1       3.3   1636.30
      .07      1.63       5.44      4.51      .075      .051      .050      .000   1635.40   9908.90
  .007430      395.       406.      400.         7         8         0       .00    109.84  10018.74


1490 NH CARD USED
*SECNO  .327
      .327      2.39   1643.49   1643.33       .00   1644.22       .73      4.65       .11   1641.10
    640.0      50.3      566.2      23.5      19.4      78.4       7.2       6.6       4.3   1641.50
      .09      2.59       7.22      3.28      .075      .040      .050      .000   1641.10   9962.04
  .012827      490.       485.      480.         4        14         0       .00     64.15  10026.19


1490 NH CARD USED
*SECNO  .338

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65

      .338      3.16   1644.45   1643.56       .00   1644.71       .25       .44       .05   1642.00
    640.0     101.6      499.7      38.7      58.7     111.8      16.1       6.8       4.4   1642.00
      .09      1.73       4.47      2.40      .075      .045      .050      .000   1641.29   9947.72
  .004686       60.        60.       60.         2        11         0       .00     99.10  10046.83


1490 NH CARD USED
*SECNO  .397

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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

      .397      2.33   1648.23   1648.23       .00   1649.16       .94      2.61       .20   1646.30
    640.0      19.6      608.2      12.2       7.2      76.7       3.5       7.8       4.9   1646.50
      .10      2.72       7.93      3.51      .075      .042      .050      .000   1645.90   9976.99
  .019029      310.       313.      310.         0        15         0       .00     48.54  10025.53


1490 NH CARD USED
*SECNO  .473
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          HEC-1 Concentration Point C547:  6-hr storm controls.
      .473      2.46   1656.96   1656.96       .00   1657.94       .99      8.06       .02   1655.20
    530.0       8.3      520.2       1.6       3.3      64.7        .7       8.5       5.3   1656.10
      .12      2.51       8.04      2.29      .075      .044      .050      .000   1654.50   9990.75
  .021778      395.       399.      385.         0         8         0       .00     37.05  10027.80


1490 NH CARD USED
*SECNO  .542
      .542      2.51   1664.71   1664.70       .00   1665.65       .93      7.70       .01   1663.20
    530.0       6.7      523.1        .2       3.0      67.1        .2       9.1       5.6   1664.30
      .13      2.25       7.80      1.35      .075      .043      .050      .000   1662.20   9981.94
  .020578      360.       364.      370.         2         5         0       .00     38.81  10020.76


1490 NH CARD USED
*SECNO  .638
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
          CULVERT M9      Oxford Wash and Tanglewood Court
           Culvert M9       Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .638      2.35   1678.85   1678.85       .00   1679.80       .95     10.01       .00   1676.90
    530.0       6.2      487.2      36.6       2.6      60.5       8.2       9.9       6.1   1677.00
      .15      2.34       8.05      4.49      .075      .042      .050      .000   1676.50   9986.28
  .019066      500.       506.      505.         0        11         0       .00     38.76  10025.04


CCHV=      .300 CEHV=      .500
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1490 NH CARD USED
*SECNO  .656
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
            Culvert M9   Outlet.   3-42"  CMPs          (SECTION 2 OF SC ROUTINE)
1
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             Photogrammetric xsec. located 1' Downstream. (No Elev. Adjust.)
              Base Channel Elevations were lowered to Culvert Invert EL 1677.40
     .656      3.71   1681.11   1681.11      .00   1681.82       .71      1.08      .07   1677.40
   530.0      119.0      343.9      67.1      25.0      44.5      17.3      10.1      6.2   1677.40
     .15       4.77       7.73      3.87      .045      .040      .045      .000  1677.40   9985.48
 .007528       95.        95.       95.         0        15         0       .00    36.76  10022.24


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ      RDLEN      RISE       SPAN      CULVLN     CHRT       SCL       ELCHU      ELCHD
     3          .022        .70      2.63        .00      3.50        .00       71.40        2         2     1677.78    1677.40

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  2 - MITERED TO CONFORM TO SLOPE

5130, EGIC= 1696.03..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1696.32 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO  .669

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1685.63

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.11

SPECIAL CULVERT

     EGIC       EGOC         H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
  1696.03    1696.32       3.81       243.       289.      3.067       28.9    1683.66        47.


            Culvert M9   Inlet.    3-42"  CMPs          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 5' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1677.78
            Culvert M9  BT information surveyed by Town.West top of curb.
            Culvert M9  BT information coded per figure 3.16 (HEC-2, Sept 90)
             BT left intersection point   1683.6  9983.6
             BT right intersection point  1685.1   10024
            Wash discharge does not flow in street; fill in street:recode BT& GR
          for photogrammetric x-sec Sta. 9763.3 to Sta. 9837.7 at elev. 1687.0
     .669      7.75   1685.53       .00       .00   1685.63       .10      3.81      .00   1677.78
   530.0      131.4      285.1     113.4      73.1      93.0      56.0      10.4      6.2   1677.78
     .16       1.80       3.07      2.02      .045      .040      .041      .000  1677.78   9978.59
 .000445       71.        71.       71.         2         0         0       .00    46.36  10024.95


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .678

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .23

1
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              Left overbank is non effective flow area:  Hard coded GR's
                 from STA 9765.6 to 9971.6 & STA 9825.1 @ EL 1686
            Culvert M9      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
     .678      2.83   1685.33   1684.62      .00   1685.80       .47       .06       .11   1683.60
   530.0        5.0      515.1       9.9       3.2      92.9       3.9      10.5      6.3   1683.20
     .16       1.53       5.54      2.55      .075      .046      .050      .000  1682.50   9976.17
 .008233       45.        49.       45.         2        14         0       .00    42.76  10018.93


1490 NH CARD USED
*SECNO  .751
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1698.50 ELREA=      1693.70

            X3 added since wash discharge not in street; NH adjusts n values.
     .751      2.38   1695.68   1695.68      .00   1696.59       .91      5.63       .13   1698.50
   530.0         .0      530.0        .0        .0      69.3        .0      11.3      6.7   1696.40
     .18        .00       7.65       .00      .000      .051      .000      .000  1693.30   9980.39
 .032921       390.       385.      390.         0        15         0       .00    38.71  10019.10
```

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1490 NH CARD USED
*SECNO  .832
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
      .832      2.11   1709.31   1709.31       .00   1710.21       .90     10.30       .00   1707.80
    530.0        7.7     509.3      13.0       3.6      65.9       3.7      12.0       7.1   1707.50
      .19       2.15      7.73      3.54      .075      .040      .050      .000   1707.20   9984.45
   .018314       435.      429.      425.         0        11         0       .00     43.29  10027.74


1490 NH CARD USED
*SECNO  .888

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .35

          HEC-1 Concentration Point C543:  6-hr storm controls.
      .888      1.63   1715.63   1715.48       .00   1716.03       .41      5.78       .05   1715.60
    210.0         .0     208.0       2.0         .0      40.4         .9      12.4       7.3   1714.80
      .21        .00      5.14      2.39      .000      .049      .050      .000   1714.00   9980.73
   .023266       280.      296.      295.         3        19         0       .00     36.14  10016.87


1490 NH CARD USED
*SECNO  .931
1
   29MAR95      14:53:09                                                                          PAGE   15

    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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.94

      .931      2.06   1718.26   1717.72       .00   1718.52       .26      2.48       .01   1716.20
    210.0        6.4     202.0       1.6        4.3      48.5       1.1      12.6       7.5   1717.20
      .23       1.48      4.17      1.42      .075      .040      .050      .000   1716.20   9979.09
   .006209       220.      229.      240.         4        11         0       .00     34.81  10013.90


1490 NH CARD USED
*SECNO  .986

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.69

          HEC-1 Concentration Point C542:  6-hr storm controls.
      .986      3.29   1718.89   1716.82       .00   1718.93       .04       .39       .02   1715.60
    150.0        7.0     138.1       4.8       12.8      85.7       8.0      13.1       7.8   1716.90
      .28        .55      1.61       .61      .075      .040      .050      .000   1715.60   9974.01
   .000437       280.      289.      290.         4        14         0       .00     44.37  10018.38


1
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T1   *  Fountain Hills North FIS
T2   *  For:  FCDMC #92-04        By:  GVSCE #35
T3   *     Oxford Wash 100-Year Floodway
T4   *  GR data taken from stereo model; received 06 Aug 93 from KAM.
T5   *  200 scale 2 ft CI mapping flown by Kenny Aerial Mapping on 8/29/91,
T6   *  with survey control by Anderson Nelson 12-11-92; field survey Aug. 91
T7   *  Supplemental cross section data (GR & BT) surveyed by ALS as noted.
T8   *  Source of 100-yr Flowrate from HEC-1 Analysis By GVSCE.
T8   *           Files: EX100-6.OH1 and EX100-24.OH1
T8   *  X5 Records are from Hydrology Report, Section 3.5, Table F8.
T9   *  Special culvert routine used.   Sub Critical Analysis.
T9   *  Floodway Method 1, No Encroachment at Culverts.
T9   *  Floodplain limits are plotted at each cross section using starting
T9   *  (SSTA) and ending (ENDST) stations unless there is ineffective flow area
T9   *  or a conflict with topographic contours, in which case, the contours are
T9   *  used to plot the floodplain.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                3                                                                 1609.78

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

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

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
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    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*PROF 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV=     .100 CEHV=     .300
*SECNO  .608

3470 ENCROACHMENT STATIONS=     9949.9   10044.9  TYPE=       1  TARGET=       95.000
                BALBOA  WASH  Section 0.608    Start with CWSEL 1609.78 feet
                      6-hr storm controls                Q =     1040 cfs
          START Hydraulically Similar Reach BA 2
              See Exhibit 1, Manning's n Value Map.
      .608      4.58   1609.78   1609.11   1609.78   1610.27       .49       .00       .00   1607.80
   1040.0      130.2      690.7     219.1      43.2      106.4      61.3        .0        .0   1606.90
      .00       3.02       6.49      3.58      .060       .045      .060      .000   1605.20   9949.91
  .007392        0.         0.        0.         0         14         0       .00     95.00  10044.91


*SECNO  .071
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9978.7   10106.3  TYPE=       1  TARGET=      127.560
         HEC-1 Concentration Point C548R:  6-hr storm controls.
          Diversion from Balboa Wash.  Q = 635 + 385 = 1020 cfs
              STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH BALBOA WASH.
          START Hydraulically Similar Reach OX 1
              See Exhibit 1, Manning's n Value Map.
      .071      6.75   1625.15   1625.15   1625.12   1626.06       .91      3.69       .12   1622.10
   1020.0      83.2      870.0      66.8      24.3      106.2      40.7       1.8       1.0   1624.60
      .02       3.42       8.19      1.64      .060       .045      .060      .000   1618.40   9978.71
  .010973       425.       419.      385.         0         14         0       .00     127.56  10106.27


*SECNO  .075

3470 ENCROACHMENT STATIONS=     9978.6   10024.5  TYPE=       1  TARGET=       45.840
      .075      6.42   1625.32   1624.86   1625.32   1626.41       1.09       .30       .05   1625.30
   1020.0        .0      1011.6      8.4        .0      120.4      4.3       1.9       1.1   1624.30
      .02        .03       8.40      1.94      .000       .045      .060      .000   1618.90   9978.62
  .013793       25.        24.       25.         2         12         0       .00      45.84  10024.46


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  .129

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9964.9   10149.3  TYPE=       1  TARGET=      184.390
          Section Surveyed by ALS
          Building located 20 ft downstream.  Left end X-S vertical @ Bldg.
      .129      3.71   1630.71   1630.71   1631.29       .59      4.38       .05   1629.00
   1020.0      107.0      421.1     491.9      29.6       49.9      128.7      3.0       1.8   1628.70
      .03       3.61       8.44      3.82      .060       .045      .060      .000   1627.00   9964.91
  .017244       280.       285.      285.         0         14         0       .00     184.21  10149.12


1490 NH CARD USED
*SECNO  .140

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  6.17


3470 ENCROACHMENT STATIONS=     9799.9   10138.4  TYPE=       1  TARGET=      338.479
         HEC-1 Concentration Point C548R:  6-hr storm controls.
              Subtract diverted flow: Q = 1020- 385 = 635 cfs
          Section Surveyed by ALS      CL of Fountain Hills Blvd.
          GR Sta. 10,000 = ALS original survey station 7 + 50
      .140      2.37   1631.37   1630.32   1631.37   1631.40       .03       .05       .06   1629.10
   640.0      362.4      115.7     161.8     274.5      67.7      132.0      3.4       2.2   1629.28
      .04       1.32       1.71      1.23      .020       .020      .020      .000   1629.00   9799.90
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    .000178       55.       57.       60.         2         19         0       .00    338.48  10138.38

 CCHV=     .100 CEHV=     .300
 1490 NH CARD USED
 *SECNO  .158

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
1
    29MAR95      14:53:09                                                                          PAGE   19

     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


 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9964.7   10024.8  TYPE=       1  TARGET=       60.119

 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1633.40 ELREA=      1631.40

           START Hydraulically Similar Reach OX 2
               See Exhibit 1, Manning's n Value Map.
            X3 added since wash discharge not in street; NH adjusts n values.
       .158       2.65    1632.85    1632.85    1632.85    1633.73        .87        .06        .25    1633.40
     640.0          .0     640.0         .0         .0        85.3         .0        4.0        2.6    1633.30
       .05        .00       7.51       .00       .000        .054       .000       .000    1630.20    9974.36
    .036169       95.       95.        95.          0          8          0        .00       48.91   10023.27


 1490 NH CARD USED
 *SECNO  .235

 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.93


 3470 ENCROACHMENT STATIONS=     9977.3   10002.8  TYPE=       1  TARGET=       25.500
         Left overbank can not contain the flow,thus a Zone AE is recommended.
       .235       4.42    1639.82    1638.73    1639.10    1640.56        .74       6.82        .01    1636.70
     640.0          6.4      594.9       38.7        3.6        83.8        9.8        4.9        2.9    1636.30
       .06        1.78       7.10       3.94        .075        .051       .050       .000    1635.40    9977.31
    .009682       395.      406.       400.          6          11          0        .00       25.50   10002.81


 1490 NH CARD USED
 *SECNO  .327

 3470 ENCROACHMENT STATIONS=     9984.1   10019.0  TYPE=       1  TARGET=       34.920
       .327       3.05    1644.15    1643.43    1643.49    1644.77        .62       4.20        .01    1641.10
     640.0          .0      640.0         .0         .0        101.0         .0        6.0        3.3    1641.50
       .08        .02       6.34       .00        .075        .040       .000       .000    1641.10    9984.09
    .007788       490.      485.       480.          5          11          0        .00       34.91   10019.00


 1490 NH CARD USED
 *SECNO  .338

 3470 ENCROACHMENT STATIONS=     9990.0   10030.0  TYPE=       1  TARGET=       40.020
1
    29MAR95      14:53:09                                                                          PAGE   20

     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


       .338       3.49    1644.78    1643.65    1644.45    1645.19        .41        .40        .02    1642.00
     640.0          .0      640.0         .0         .0        124.9         .0        6.1        3.3    1642.00
       .09        .01       5.12       .00        .075        .045       .000       .000    1641.29    9989.99
    .005711       60.       60.        60.          2          15          0        .00       40.01   10030.00


 1490 NH CARD USED
 *SECNO  .397

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9983.3   10021.5  TYPE=       1  TARGET=       38.220
       .397       2.34    1648.24    1648.24    1648.23    1649.29       1.05       3.12        .19    1646.30
     640.0          4.1      635.9         .0        1.8        77.1         .0        6.9        3.6    1646.50
       .10        2.24       8.25       .00        .075        .042       .000       .000    1645.90    9983.29
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   .021776      310.      313.      310.         0        14         0       .00     38.21  10021.50


1490 NH CARD USED
*SECNO  .473
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9990.8   10027.8  TYPE=       1  TARGET=       37.050
         HEC-1 Concentration Point C547:  6-hr storm controls.
      .473      2.46   1656.96   1656.96   1656.96   1657.94       .98      8.63       .01   1655.20
    530.0        8.3     520.1       1.6       3.3      65.0        .7       7.5       4.0   1656.10
      .11       2.51      8.00      2.30      .075      .044      .050      .000   1654.50   9990.75
   .021469      395.      399.      385.         0         8         0       .00     37.05  10027.80


1490 NH CARD USED
*SECNO  .542
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF

3470 ENCROACHMENT STATIONS=     9981.9   10020.8  TYPE=       1  TARGET=       38.819
      .542      2.52   1664.72   1664.70   1664.71   1665.64       .92      7.53     -2.46   1663.20
    530.0        6.8     522.9        .2       3.0      67.7        .2       8.1       4.3   1664.30
      .12       2.24      7.73      1.39      .075      .043      .050      .000   1662.20   9981.94
   .019973      360.      364.      370.        20         5         0       .00     38.82  10020.76


1
   29MAR95      14:53:09                                                                                PAGE   21

    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


1490 NH CARD USED
*SECNO  .638
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9986.3   10025.0  TYPE=       1  TARGET=       38.760
          CULVERT M9     Oxford Wash and Tanglewood Court
           Culvert M9      Downstream: expanded flow. (SECTION 1 OF SC ROUTINE)
      .638      2.35   1678.85   1678.85   1678.85   1679.80       .95      9.84       .01   1676.90
    530.0        6.2     487.1      36.6       2.7      60.6       8.2       9.0       4.7   1677.00
      .14       2.34      8.04      4.48      .075      .042      .050      .000   1676.50   9986.28
   .018976      500.      506.      505.         0        11         0       .00     38.76  10025.04


CCHV=     .300 CEHV=     .500
1490 NH CARD USED
*SECNO  .656
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9985.5   10022.2  TYPE=       1  TARGET=       36.760
          Culvert M9   Outlet.   3-42"  CMPs          (SECTION 2 OF SC ROUTINE)
            Photogrammetric xsec. located 1' Downstream. (No Elev. Adjust.)
             Base Channel Elevations were lowered to Culvert Invert EL 1677.40
      .656      3.71   1681.11   1681.11   1681.11   1681.82       .71      1.07       .07   1677.40
    530.0      119.0      343.8      67.2      25.0      44.6      17.4       9.1       4.8   1677.40
      .15       4.76      7.71      3.86      .045      .040      .045      .000   1677.40   9985.48
   .007492      95.       95.       95.          0        15         0       .00     36.76  10022.24


SPECIAL CULVERT

SC  CUNO       CUNV       ENTLC      COFQ       RDLEN      RISE       SPAN       CULVLN     CHRT       SCL        ELCHU      ELCHD
     3          .022        .70       2.63        .00       3.50        .00       71.40      2          2       1677.78    1677.40

CHART  2 - CORRUGATED METAL PIPE CULVERT
SCALE  2 - MITERED TO CONFORM TO SLOPE

5130, EGIC= 1696.03..MAY BE TOO LARGE IF INLET CONTROLS.
5135, EGOC= 1696.32 ..MAY BE TOO LARGE IF OUTLET CONTROLS.
1490 NH CARD USED
*SECNO  .669

SPECIAL CULVERT OUTLET CONTROL + WEIR FLOW EG =   1685.63

3301 HV CHANGED MORE THAN HVINS

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


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  4.10

SPECIAL CULVERT

     EGIC       EGOC        H4      QWEIR      QCULV        VCH      ACULV      ELTRD     WEIRLN
  1696.03    1696.32      3.81       243.       289.      3.067       28.9    1683.66        47.


3470 ENCROACHMENT STATIONS=     9978.6   10025.0  TYPE=       1  TARGET=       46.360
            Culvert M9   Inlet.    3-42"  CMPs          (SECTION 3 OF SC ROUTINE)
              Photogrammetric xsec. located 5' Downstream. (No Elev. Adjust.)
               Base Channel Elevations were lowered to Culvert Invert EL 1677.78
            Culvert M9  BT information surveyed by Town.West top of curb.
            Culvert M9  BT information coded per figure 3.16 (HEC-2, Sept 90)
             BT left intersection point   1683.6  9983.6
             BT right intersection point  1685.1   10024
            Wash discharge does not flow in street; fill in street:recode BT& GR
          for photogrammetric x-sec Sta. 9763.3 to Sta. 9837.7 at elev. 1687.0
      .669       7.75    1685.53        .00    1685.53    1685.63        .10       3.81        .00    1677.78
    530.0       131.4      285.1      113.4       73.1       93.0       56.0        9.4        4.9    1677.78
      .15        1.80       3.07       2.02       .045       .040       .041       .000    1677.78    9978.59
  .000445         71.        71.        71.          2          0          0        .00      46.36   10024.95


CCHV=     .100 CEHV=     .300
1490 NH CARD USED
*SECNO  .678

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .23


3470 ENCROACHMENT STATIONS=     9976.2   10018.9  TYPE=       1  TARGET=       42.760
              Left overbank is non effective flow area:  Hard coded GR's
                 from STA 9765.6 to 9971.6 & STA 9825.1 @ EL 1686
            Culvert M9      Upstream:  expanded flow.  (SECTION 4 OF SC ROUTINE)
      .678       2.83    1685.33    1684.62    1685.33    1685.80        .47        .06        .11    1683.60
    530.0        5.0      515.1        9.9        3.2       92.9        3.9        9.6        4.9    1683.20
      .16        1.53       5.54       2.55       .075       .046       .050       .000    1682.50    9976.17
  .008229         45.        49.        45.          2         14          0        .00      42.76   10018.93


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   29MAR95      14:53:09                                                                                    PAGE   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


1490 NH CARD USED
*SECNO  .751
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9969.5   10021.1  TYPE=       1  TARGET=       51.609

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1698.50 ELREA=      1693.70

          X3 added since wash discharge not in street; NH adjusts n values.
      .751       2.38    1695.68    1695.68    1695.68    1696.59        .91       5.63        .13    1698.50
    530.0         .0      530.0         .0         .0       69.3         .0       10.3        5.3 100000.00
      .17        .00       7.65        .00       .000       .051       .000       .000    1693.30    9980.39
  .032897         390.       385.       390.          0         15          0        .00      38.71   10019.10


1490 NH CARD USED
*SECNO  .832
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9984.5   10027.7  TYPE=       1  TARGET=       43.290
      .832       2.12    1709.32    1709.32    1709.31    1710.21        .88      10.16        .00    1707.80
    530.0         7.8      509.1       13.1        3.7       66.3        3.7       11.0        5.7    1707.50
      .19        2.15       7.68       3.53       .075       .040       .050       .000    1707.20    9984.45
  .017885         435.       429.       425.          0         11          0        .00      43.29   10027.74


1490 NH CARD USED
*SECNO  .888

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .34
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3470 ENCROACHMENT STATIONS=     9980.7   10016.9  TYPE=      1  TARGET=       36.140
         HEC-1 Concentration Point C543:  6-hr storm controls.
      .888      1.60   1715.60   1715.48   1715.63   1716.02       .42      5.77       .05   1715.60
    210.0        .0     208.0       2.0        .0      39.7        .8      11.4       5.9    1714.80
      .20       .00      5.24      2.43      .000      .049      .050      .000   1714.00    9980.79
   .024803      280.      296.      295.         7        19         0       .00     36.02   10016.81


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   29MAR95      14:53:09                                                                                PAGE   24

    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


1490 NH CARD USED
*SECNO  .931

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.02


3470 ENCROACHMENT STATIONS=     9979.1   10013.9  TYPE=      1  TARGET=       34.811
      .931      2.07   1718.27   1717.73   1718.26   1718.53       .26      2.49       .02   1716.20
    210.0        6.5     201.9       1.6        4.4      48.8        1.1      11.6       6.1    1717.20
      .22       1.47      4.14      1.42       .075      .040      .050      .000   1716.20    9979.09
   .006066      220.      229.      240.         4         8         0       .00     34.81   10013.90


1490 NH CARD USED
*SECNO  .986

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.67


3470 ENCROACHMENT STATIONS=     9974.0   10018.4  TYPE=      1  TARGET=       44.370
         HEC-1 Concentration Point C542:  6-hr storm controls.
      .986      3.30   1718.90   1716.82   1718.89   1718.93       .04       .38       .02   1715.60
    150.0        7.0     138.1       4.9       12.9      85.8        8.0      12.2       6.4    1716.90
      .27        .55      1.61       .61       .075      .040      .050      .000   1715.60    9974.01
   .000435      280.      289.      290.         4        11         0       .00     44.37   10018.38


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   29MAR95      14:53:09                                                                                PAGE   25


                                                                                THIS RUN EXECUTED 29MAR95     14:53:13

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

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


NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST


   Oxford Wash 100-Year

SUMMARY PRINTOUT TABLE  101

      SECNO      EGOC      ELLC      EGIC      ELTRD     QCULV     QWEIR     CLASS     H4        DEPTH     CWSEL     VCH       EG

*       .669   1696.32   1681.28   1696.03   1683.66    289.00    243.30     17.00     3.81      7.75   1685.53      3.07   1685.63
*       .669   1696.32   1681.28   1696.03   1683.66    288.86    243.27     17.00     3.81      7.75   1685.53      3.07   1685.63

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   29MAR95      14:53:09                                                                                PAGE   26


   Oxford Wash 100-Year

SUMMARY PRINTOUT TABLE  110

      SECNO     CWSEL     DIFKWS      EG        TOPWID    QLOB      QCH       QROB      PERENC    STENCL    STCHL     STCHR     STENCR

       .608   1609.78        .00   1610.27        95.00   130.20    690.74    219.06        .00       .00   9976.60  10007.00        .00
       .608   1609.78        .00   1610.27        95.00   130.20    690.74    219.06      95.00   9949.91   9976.60  10007.00   10044.91

*      .071   1625.12        .00   1626.06       127.56    82.20    876.29     61.50        .00       .00   9994.50  10021.40        .00
*      .071   1625.15        .03   1626.06       127.56    83.16    870.01     66.83     127.56   9978.71   9994.50  10021.40   10106.27

       .075   1625.32        .00   1626.41        45.83      .00   1011.64      8.36        .00       .00   9978.80  10014.50        .00
       .075   1625.32        .00   1626.41        45.84      .00   1011.60      8.40      45.84   9978.62   9978.80  10014.50   10024.46
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*	.129	1630.71	.00	1631.29	184.39	107.07	420.73	492.20	.00	.00	9990.00	10008.00	.00
*	.129	1630.71	.00	1631.29	184.21	107.00	421.14	491.86	184.39	9964.91	9990.00	10008.00	10149.30
*	.140	1631.37	.00	1631.40	338.48	362.42	115.76	161.82	.00	.00	9990.00	10020.00	.00
*	.140	1631.37	.00	1631.40	338.48	362.43	115.74	161.83	338.48	9799.90	9990.00	10020.00	10138.38
*	.158	1632.85	.00	1633.73	48.91	.00	640.00	.00	.00	.00	9964.70	10024.80	.00
*	.158	1632.85	.00	1633.73	48.91	.00	640.00	.00	60.12	9964.69	9964.70	10024.80	10024.81
*	.235	1639.10	.00	1639.47	109.84	83.57	372.37	184.05	.00	.00	9978.50	10000.00	.00
*	.235	1639.82	.72	1640.56	25.50	6.44	594.89	38.67	25.50	9977.31	9978.50	10000.00	10002.81
	.327	1643.49	.00	1644.22	64.15	50.26	566.22	23.52	.00	.00	9984.10	10019.00	.00
	.327	1644.15	.66	1644.77	34.91	.00	640.00	.00	34.92	9984.09	9984.10	10019.00	10019.01
*	.338	1644.45	.00	1644.71	99.10	101.56	499.74	38.70	.00	.00	9990.00	10030.00	.00
	.338	1644.78	.33	1645.19	40.01	.00	640.00	.00	40.02	9989.99	9990.00	10030.00	10030.01
*	.397	1648.23	.00	1649.16	48.54	19.58	608.20	12.23	.00	.00	9984.30	10021.50	.00
*	.397	1648.24	.01	1649.29	38.21	4.09	635.91	.00	38.22	9983.29	9984.30	10021.50	10021.51
*	.473	1656.96	.00	1657.94	37.05	8.27	520.16	1.57	.00	.00	9994.50	10026.20	.00
*	.473	1656.96	.01	1657.94	37.05	8.34	520.06	1.60	37.05	9990.75	9994.50	10026.20	10027.80
	.542	1664.71	.00	1665.65	38.81	6.71	523.08	.21	.00	.00	9985.90	10020.00	.00
*	.542	1664.72	.01	1665.64	38.82	6.84	522.93	.23	38.82	9981.94	9985.90	10020.00	10020.76
*	.638	1678.85	.00	1679.80	38.76	6.21	487.21	36.59	.00	.00	9989.00	10017.60	.00
*	.638	1678.85	.00	1679.80	38.76	6.22	487.14	36.65	38.76	9986.28	9989.00	10017.60	10025.04
*	.656	1681.11	.00	1681.82	36.76	118.97	343.93	67.10	.00	.00	9998.70	10010.70	.00
*	.656	1681.11	.00	1681.82	36.76	119.03	343.76	67.21	36.76	9985.48	9998.70	10010.70	10022.24
*	.669	1685.53	.00	1685.63	46.36	131.45	285.12	113.44	.00	.00	9998.70	10010.70	.00
*	.669	1685.53	.00	1685.63	46.36	131.44	285.12	113.44	46.36	9978.59	9998.70	10010.70	10024.95
*	.678	1685.33	.00	1685.80	42.76	4.97	515.11	9.92	.00	.00	9979.90	10015.30	.00
*	.678	1685.33	.00	1685.80	42.76	4.98	515.10	9.92	42.76	9976.17	9979.90	10015.30	10018.93

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	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	.751	1695.68	.00	1696.59	38.71	.00	530.00	.00	.00	.00	9969.50	10021.10	.00
*	.751	1695.68	.00	1696.59	38.71	.00	530.00	.00	51.61	9969.49	9969.50	10021.10	10021.10
*	.832	1709.31	.00	1710.21	43.29	7.73	509.30	12.96	.00	.00	9989.20	10023.70	.00
*	.832	1709.32	.01	1710.21	43.29	7.85	509.06	13.09	43.29	9984.45	9989.20	10023.70	10027.74
*	.888	1715.63	.00	1716.03	36.14	.00	207.95	2.04	.00	.00	9980.80	10014.80	.00
*	.888	1715.60	-.03	1716.02	36.02	.00	208.04	1.96	36.14	9980.73	9980.80	10014.80	10016.87
*	.931	1718.26	.00	1718.52	34.81	6.44	201.97	1.59	.00	.00	9983.30	10011.80	.00
*	.931	1718.27	.01	1718.53	34.81	6.47	201.90	1.63	34.81	9979.09	9983.30	10011.80	10013.90
*	.986	1718.89	.00	1718.93	44.37	7.02	138.15	4.84	.00	.00	9981.80	10010.40	.00
*	.986	1718.90	.00	1718.93	44.37	7.02	138.13	4.85	44.37	9974.01	9981.80	10010.40	10018.38

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Oxford Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	.608	.00	.00	.00	1605.20	1040.00	1609.78	1609.11	1610.27	73.92	6.49	210.80	120.96
	.608	.00	.00	.00	1605.20	1040.00	1609.78	1609.11	1610.27	73.92	6.49	210.80	120.96
*	.071	419.20	.00	.00	1618.40	1020.00	1625.12	1625.12	1626.06	114.19	8.31	167.42	95.45
*	.071	419.20	.00	.00	1618.40	1020.00	1625.15	1625.15	1626.06	109.73	8.19	171.25	97.37
	.075	24.00	.00	.00	1618.90	1020.00	1625.32	1624.86	1626.41	138.19	8.41	124.62	86.77
	.075	24.00	.00	.00	1618.90	1020.00	1625.32	1624.86	1626.41	137.93	8.40	124.70	86.85
*	.129	285.10	.00	.00	1627.00	1020.00	1630.71	1630.71	1631.29	171.64	8.43	208.66	77.86
*	.129	285.10	.00	.00	1627.00	1020.00	1630.71	1630.71	1631.29	172.44	8.44	208.26	77.68
*	.140	56.60	.00	.00	1629.00	640.00	1631.37	1630.32	1631.40	1.79	1.71	474.08	478.80
*	.140	56.60	.00	.00	1629.00	640.00	1631.37	1630.32	1631.40	1.78	1.71	474.25	479.05
*	.158	94.60	.00	.00	1630.20	640.00	1632.85	1632.85	1633.73	361.69	7.51	85.26	33.65
*	.158	94.60	.00	.00	1630.20	640.00	1632.85	1632.85	1633.73	361.69	7.51	85.26	33.65
*	.235	405.60	.00	.00	1635.40	640.00	1639.10	1638.35	1639.47	74.30	5.44	160.59	74.25

*	.235	405.60	.00	.00	1635.40	640.00	1639.82	1638.73	1640.56	96.82	7.10	97.27	65.04
	.327	485.00	.00	.00	1641.10	640.00	1643.49	1643.33	1644.22	128.27	7.22	105.04	56.51
	.327	485.00	.00	.00	1641.10	640.00	1644.15	1643.43	1644.77	77.88	6.34	100.98	72.52
*	.338	60.00	.00	.00	1641.29	640.00	1644.45	1643.56	1644.71	46.86	4.47	186.67	93.49
	.338	60.00	.00	.00	1641.29	640.00	1644.78	1643.65	1645.19	57.11	5.12	124.94	84.69
*	.397	312.60	.00	.00	1645.90	640.00	1648.23	1648.23	1649.16	190.29	7.93	87.37	46.39
*	.397	312.60	.00	.00	1645.90	640.00	1648.24	1648.24	1649.29	217.76	8.25	78.93	43.37
*	.473	398.90	.00	.00	1654.50	530.00	1656.96	1656.96	1657.94	217.78	8.04	68.70	35.91
*	.473	398.90	.00	.00	1654.50	530.00	1656.96	1656.96	1657.94	214.69	8.00	69.01	36.17
	.542	363.80	.00	.00	1662.20	530.00	1664.71	1664.70	1665.65	205.78	7.80	70.21	36.95
*	.542	363.80	.00	.00	1662.20	530.00	1664.72	1664.70	1665.64	199.73	7.73	70.88	37.50
*	.638	505.60	.00	.00	1676.50	530.00	1678.85	1678.85	1679.80	190.66	8.05	71.31	38.38
*	.638	505.60	.00	.00	1676.50	530.00	1678.85	1678.85	1679.80	189.76	8.04	71.42	38.47
*	.656	95.10	.00	.00	1677.40	530.00	1681.11	1681.11	1681.82	75.28	7.73	86.82	61.09
*	.656	95.10	.00	.00	1677.40	530.00	1681.11	1681.11	1681.82	74.92	7.71	86.97	61.23
*	.669	71.40	1683.66	1681.28	1677.78	530.00	1685.53	.00	1685.63	4.45	3.07	222.06	251.35
*	.669	71.40	1683.66	1681.28	1677.78	530.00	1685.53	.00	1685.63	4.45	3.07	222.05	251.34
*	.678	49.20	.00	.00	1682.50	530.00	1685.33	1684.62	1685.80	82.33	5.54	100.05	58.41
*	.678	49.20	.00	.00	1682.50	530.00	1685.33	1684.62	1685.80	82.29	5.54	100.07	58.43

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	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	.751	384.60	.00	.00	1693.30	530.00	1695.68	1695.68	1696.59	329.21	7.65	69.27	29.21
*	.751	384.60	.00	.00	1693.30	530.00	1695.68	1695.68	1696.59	328.97	7.65	69.29	29.22
*	.832	428.70	.00	.00	1707.20	530.00	1709.31	1709.31	1710.21	183.14	7.73	73.11	39.16
*	.832	428.70	.00	.00	1707.20	530.00	1709.32	1709.32	1710.21	178.85	7.68	73.68	39.63
*	.888	295.60	.00	.00	1714.00	210.00	1715.63	1715.48	1716.03	232.66	5.14	41.30	13.77
*	.888	295.60	.00	.00	1714.00	210.00	1715.60	1715.48	1716.02	248.03	5.24	40.50	13.33
*	.931	229.30	.00	.00	1716.20	210.00	1718.26	1717.72	1718.52	62.09	4.17	53.94	26.65
*	.931	229.30	.00	.00	1716.20	210.00	1718.27	1717.73	1718.53	60.66	4.14	54.34	26.96
*	.986	288.90	.00	.00	1715.60	150.00	1718.89	1716.82	1718.93	4.37	1.61	106.52	71.78
*	.986	288.90	.00	.00	1715.60	150.00	1718.90	1716.82	1718.93	4.35	1.61	106.64	71.90

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Oxford Wash 100-Year

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.608	1040.00	1609.78	.00	.00	.00	95.00	.00
	.608	1040.00	1609.78	.00	.00	.00	95.00	.00
*	.071	1020.00	1625.12	.00	15.34	.00	127.56	419.20
*	.071	1020.00	1625.15	.03	15.37	.03	127.56	419.20
	.075	1020.00	1625.32	.00	.20	.00	45.83	24.00
	.075	1020.00	1625.32	.00	.17	.00	45.84	24.00
*	.129	1020.00	1630.71	.00	5.39	.00	184.39	285.10
*	.129	1020.00	1630.71	.00	5.38	.00	184.21	285.10
*	.140	640.00	1631.37	.00	.66	.00	338.48	56.60
*	.140	640.00	1631.37	.00	.66	.00	338.48	56.60
*	.158	640.00	1632.85	.00	1.48	.00	48.91	94.60
*	.158	640.00	1632.85	.00	1.48	.00	48.91	94.60
*	.235	640.00	1639.10	.00	6.25	.00	109.84	405.60
*	.235	640.00	1639.82	.72	6.96	.72	25.50	405.60
	.327	640.00	1643.49	.00	4.39	.00	64.15	485.00
	.327	640.00	1644.15	.66	4.33	.66	34.91	485.00
*	.338	640.00	1644.45	.00	.96	.00	99.10	60.00
	.338	640.00	1644.78	.33	.64	.33	40.01	60.00
*	.397	640.00	1648.23	.00	3.78	.00	48.54	312.60
*	.397	640.00	1648.24	.01	3.46	.01	38.21	312.60

*	.473	530.00	1656.96	.00	8.73	.00	37.05	398.90
*	.473	530.00	1656.96	.01	8.73	.01	37.05	398.90
	.542	530.00	1664.71	.00	7.76	.00	38.81	363.80
*	.542	530.00	1664.72	.01	7.76	.01	38.82	363.80
*	.638	530.00	1678.85	.00	14.14	.00	38.76	505.60
*	.638	530.00	1678.85	.00	14.13	.00	38.76	505.60
*	.656	530.00	1681.11	.00	2.26	.00	36.76	95.10
*	.656	530.00	1681.11	.00	2.26	.00	36.76	95.10
*	.669	530.00	1685.53	.00	4.42	.00	46.36	71.40
*	.669	530.00	1685.53	.00	4.41	.00	46.36	71.40
*	.678	530.00	1685.33	.00	-.20	.00	42.76	49.20
*	.678	530.00	1685.33	.00	-.20	.00	42.76	49.20

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	.751	530.00	1695.68	.00	10.35	.00	38.71	384.60
*	.751	530.00	1695.68	.00	10.35	.00	38.71	384.60
*	.832	530.00	1709.31	.00	13.63	.00	43.29	428.70
*	.832	530.00	1709.32	.01	13.64	.01	43.29	428.70
*	.888	210.00	1715.63	.00	6.32	.00	36.14	295.60
*	.888	210.00	1715.60	-.03	6.28	-.03	36.02	295.60
*	.931	210.00	1718.26	.00	2.64	.00	34.81	229.30
*	.931	210.00	1718.27	.01	2.67	.01	34.81	229.30
*	.986	150.00	1718.89	.00	.63	.00	44.37	288.90
*	.986	150.00	1718.90	.00	.62	.00	44.37	288.90

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=       .071  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .071  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .071  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .071  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .129  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .129  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .129  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .129  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .140  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .140  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=       .158  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .158  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .158  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .158  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .235  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .235  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=       .338  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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CAUTION SECNO=       .473  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .473  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .473  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .473  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=       .542  PROFILE=  2  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=       .542  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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WARNING SECNO=       .678  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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1
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CAUTION SECNO=       .751  PROFILE=  1  CRITICAL DEPTH ASSUMED
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CAUTION SECNO=       .832  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .832  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=       .832  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .832  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=       .888  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .888  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=       .931  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=       .986  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=       .986  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

1
   29MAR95      14:53:09                                                    PAGE   34

Floodway width summary:    Oxford Wash 100-Year
Profile No.  2
```

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
.608	.00	95.00	9949.91	41.89	9991.80	53.11	10044.91
.071	.03	127.56	9978.71	29.24	10007.95	98.32	10106.27
.075	.00	45.84	9978.62	18.03	9996.65	27.81	10024.46
.129	.00	184.39	9964.91	34.09	9999.00	150.30	10149.30
.140	.00	338.48	9799.90	205.10	10005.00	133.38	10138.38
.158	.00	60.12	9964.69	30.06	9994.75	30.06	10024.81
.235	.72	25.50	9977.31	11.94	9989.25	13.56	10002.81
.327	.66	34.92	9984.09	17.46	10001.55	17.46	10019.01
.338	.33	40.02	9989.99	20.01	10010.00	20.01	10030.01
.397	.01	38.22	9983.29	19.61	10002.90	18.61	10021.51
.473	.01	37.05	9990.75	19.60	10010.35	17.45	10027.80
.542	.01	38.82	9981.94	21.01	10002.95	17.81	10020.76
.638	.00	38.76	9986.28	17.02	10003.30	21.74	10025.04
.656	.00	36.76	9985.48	19.22	10004.70	17.54	10022.24
.669	.00	46.36	9978.59	26.11	10004.70	20.25	10024.95
.678	.00	42.76	9976.17	21.43	9997.60	21.33	10018.93
.751	.00	51.61	9969.49	25.81	9995.30	25.80	10021.10
.832	.01	43.29	9984.45	22.00	10006.45	21.29	10027.74
.888	-.03	36.14	9980.73	17.07	9997.80	19.07	10016.87
.931	.01	34.81	9979.09	18.46	9997.55	16.35	10013.90
.986	.00	44.37	9974.01	22.09	9996.10	22.28	10018.38

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1
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FLOODWAY DATA,      Oxford Wash 100-Year
PROFILE NO.  2
```
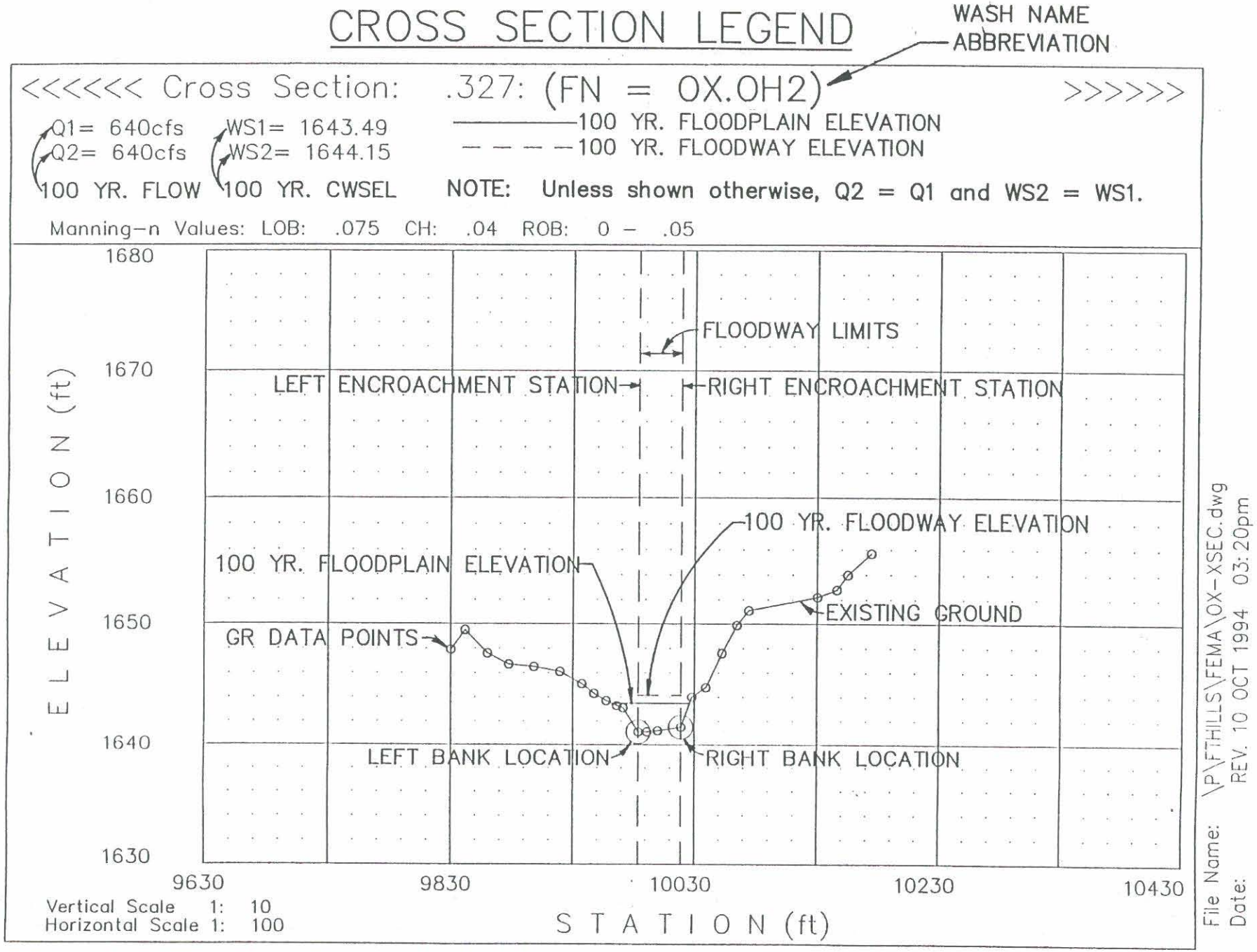

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
.608	95.	211.	4.9	1609.8	1609.8	.0
.071	128.	171.	6.0	1625.1	1625.1	.0
.075	46.	125.	8.2	1625.3	1625.3	.0
.129	184.	208.	4.9	1630.7	1630.7	.0
.140	338.	474.	1.3	1631.4	1631.4	.0
.158	49.	85.	7.5	1632.9	1632.9	.0
.235	25.	97.	6.6	1639.8	1639.1	.7
.327	35.	101.	6.3	1644.2	1643.5	.7
.338	40.	125.	5.1	1644.8	1644.5	.3
.397	38.	79.	8.1	1648.2	1648.2	.0
.473	37.	69.	7.7	1657.0	1657.0	.0
.542	39.	71.	7.5	1664.7	1664.7	.0

.638	39.	71.	7.4	1678.8	1678.8	.0
.656	37.	87.	6.1	1681.1	1681.1	.0
.669	46.	222.	2.4	1685.5	1685.5	.0
.678	43.	100.	5.3	1685.3	1685.3	.0
.751	39.	69.	7.6	1695.7	1695.7	.0
.832	43.	74.	7.2	1709.3	1709.3	.0
.888	36.	40.	5.2	1715.6	1715.6	.0
.931	35.	54.	3.9	1718.3	1718.3	.0
.986	44.	107.	1.4	1718.9	1718.9	.0

CROSS SECTIONS

CROSS SECTION LEGEND



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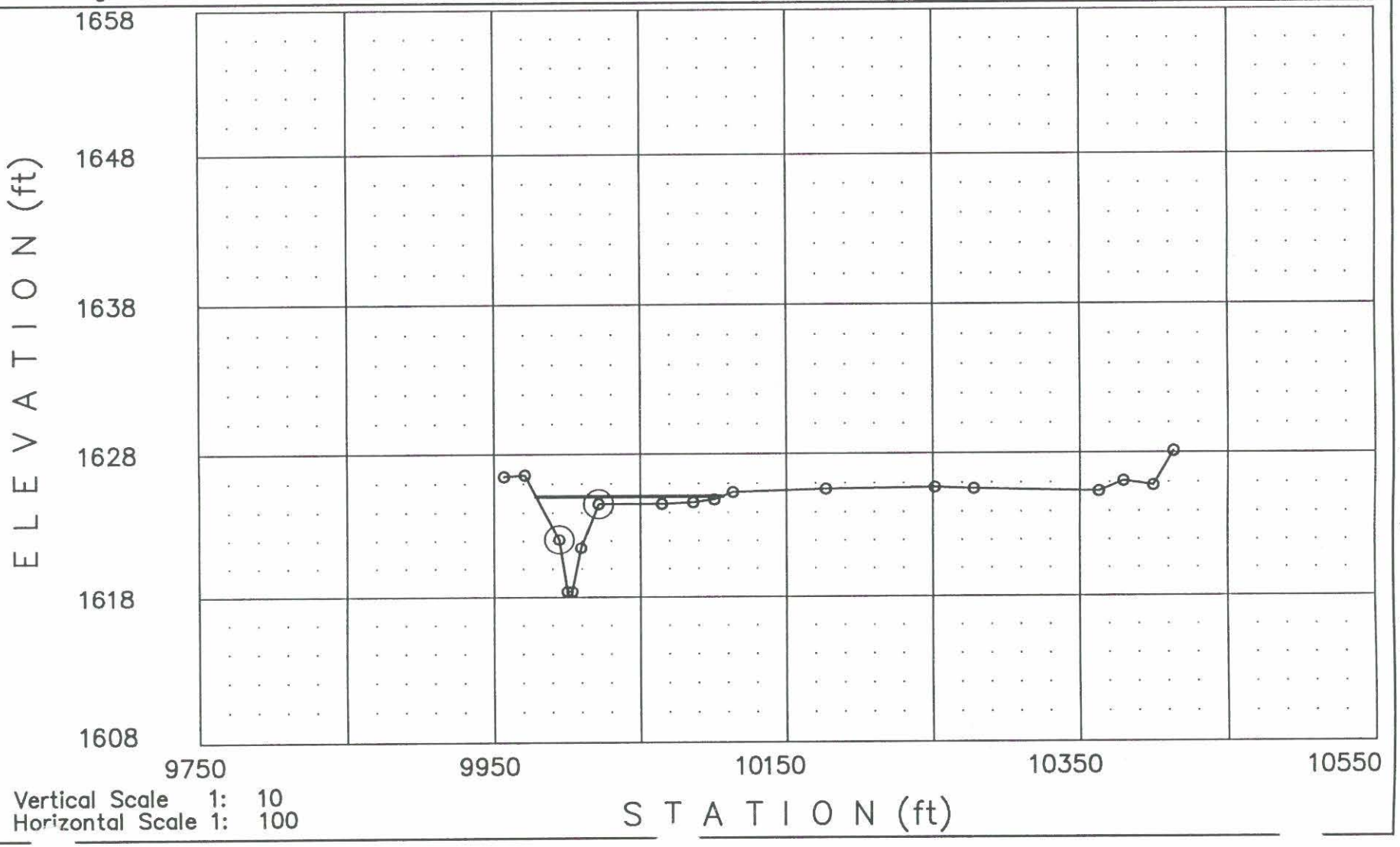
Q1= 1020cfs WS1= 1625.12

Manning–n Values: LOB: .06 CH: .045 ROB: .06



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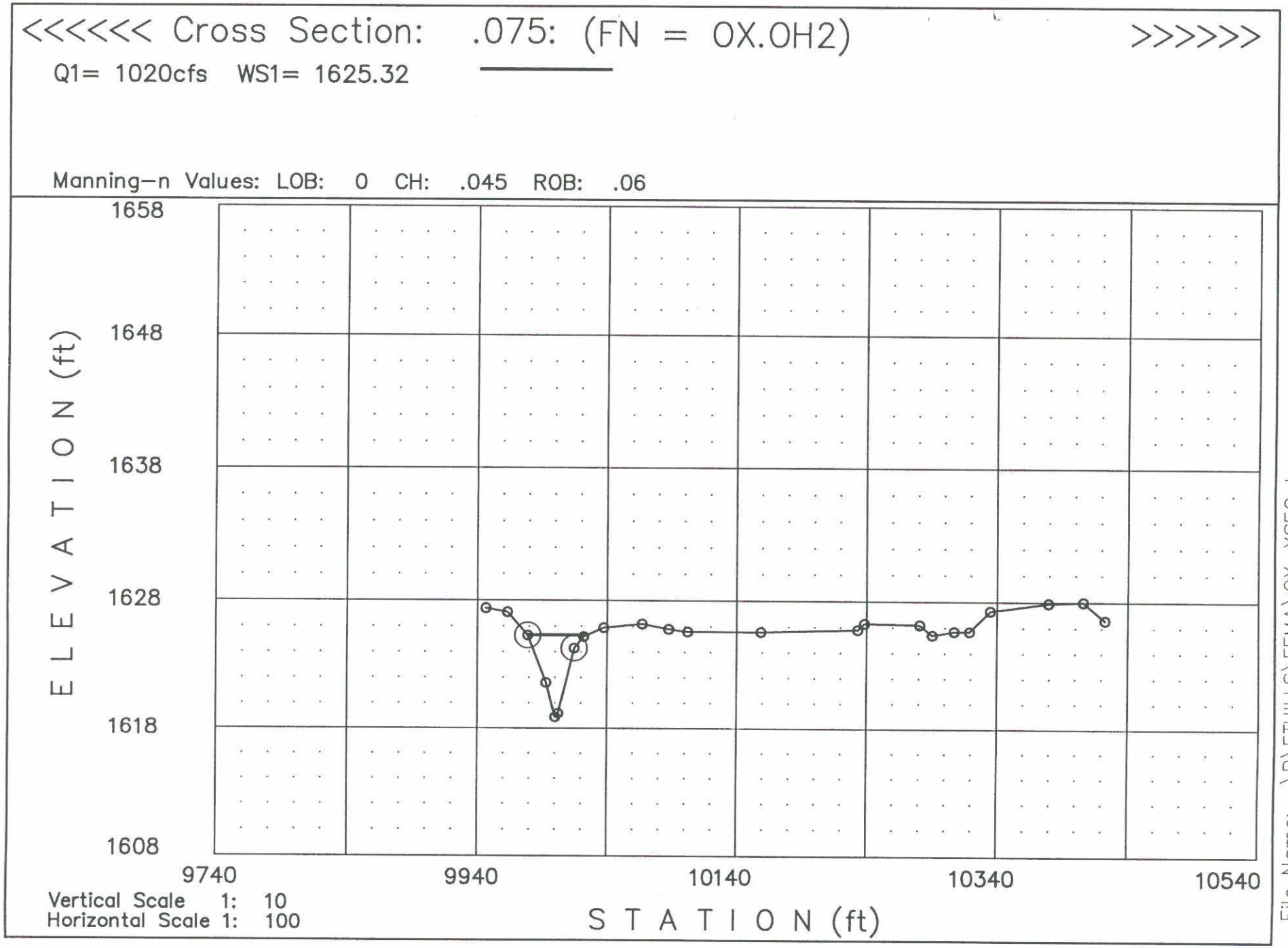
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Q1= 1020cfs WS1= 1625.32
Manning-n Values: LOB: 0 CH: .045 ROB: .06
1658
1648
1638
1628
1618
1608
ELEVATION (ft)
9740
9940
10140
10340
10540
STATION (ft)
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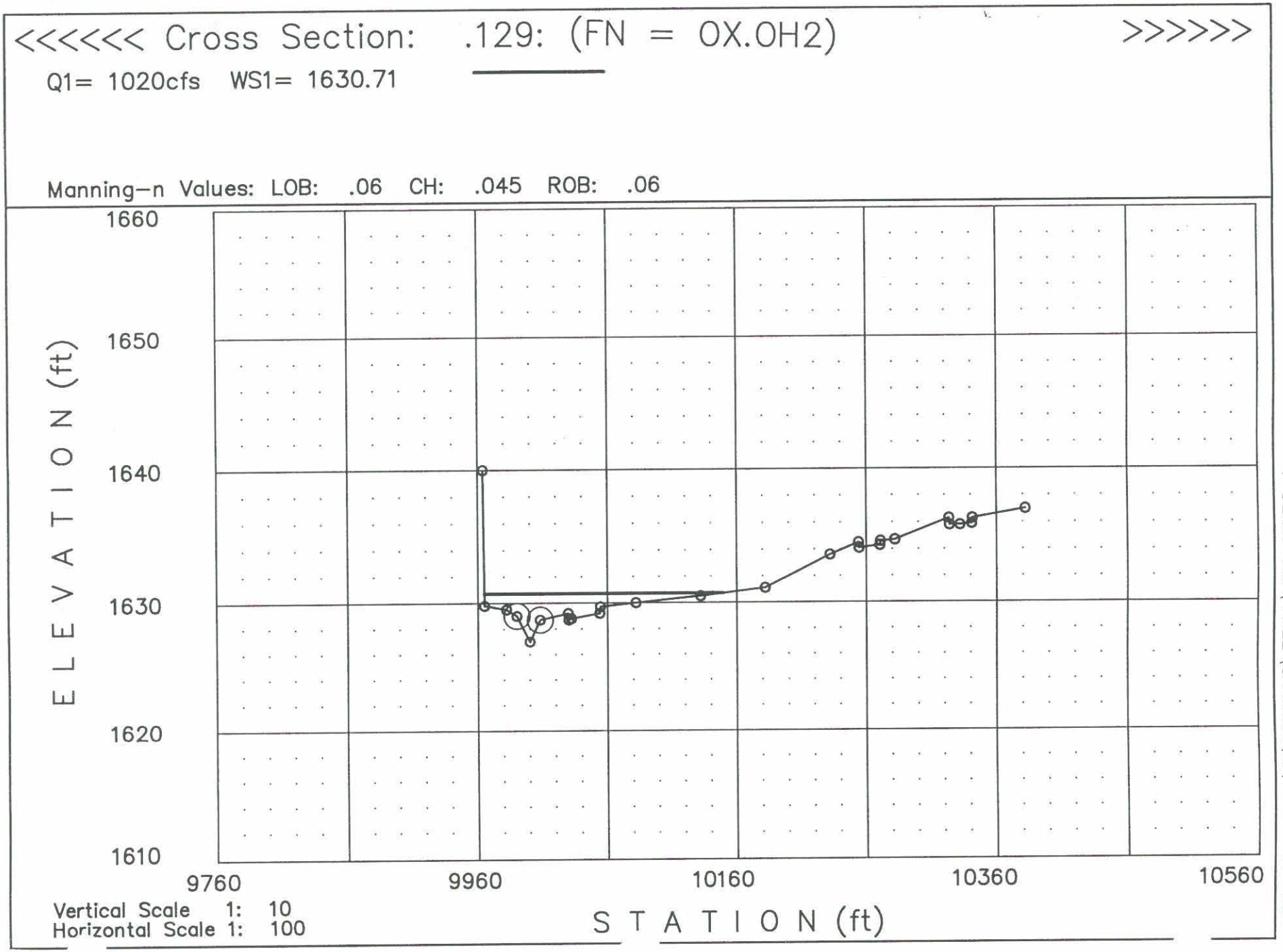
<<<<<< Cross Section: .129: (FN = 0X.0H2) >>>>>>
Q1= 1020cfs WS1= 1630.71
Manning-n Values: LOB: .06 CH: .045 ROB: .06
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9760
9960
10160
10360
10560
STATION (ft)
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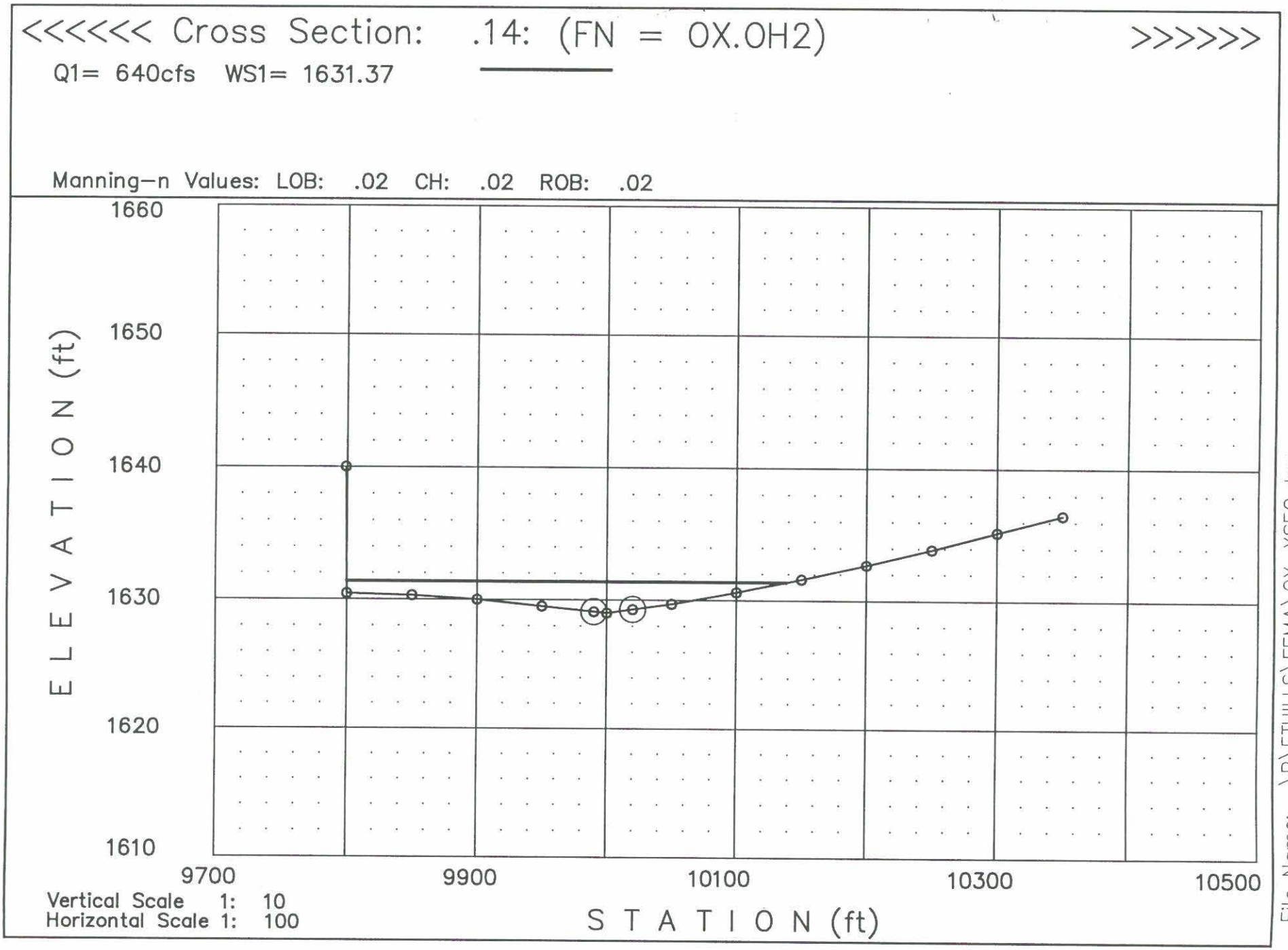
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Q1= 640cfs WS1= 1631.37
Manning-n Values: LOB: .02 CH: .02 ROB: .02
1660
1650
1640
1630
1620
1610
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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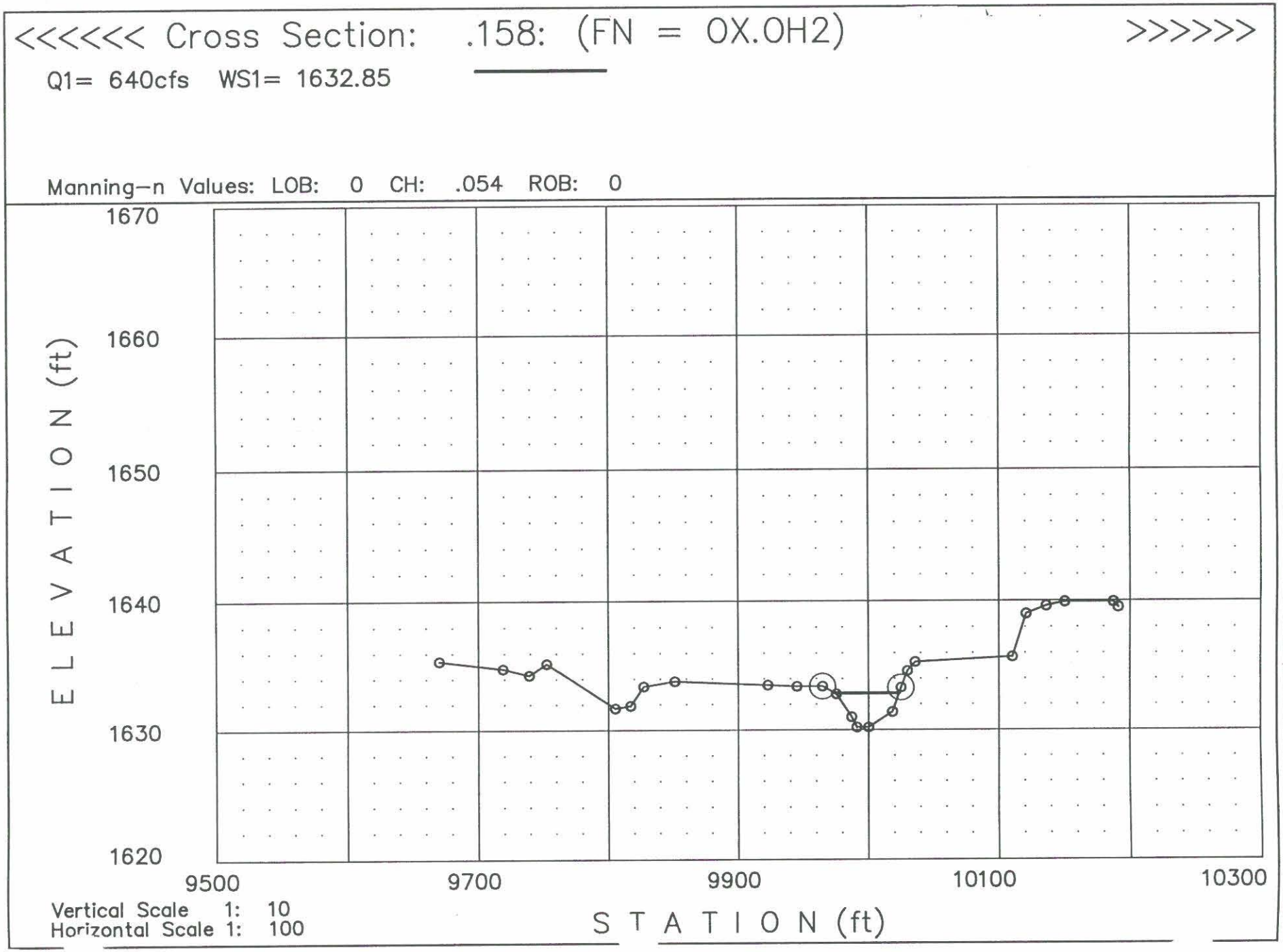
<<<<<< Cross Section: .158: (FN = 0X.0H2) >>>>>>
Q1= 640cfs WS1= 1632.85
Manning-n Values: LOB: 0 CH: .054 ROB: 0
1670
1660
1650
1640
1630
1620
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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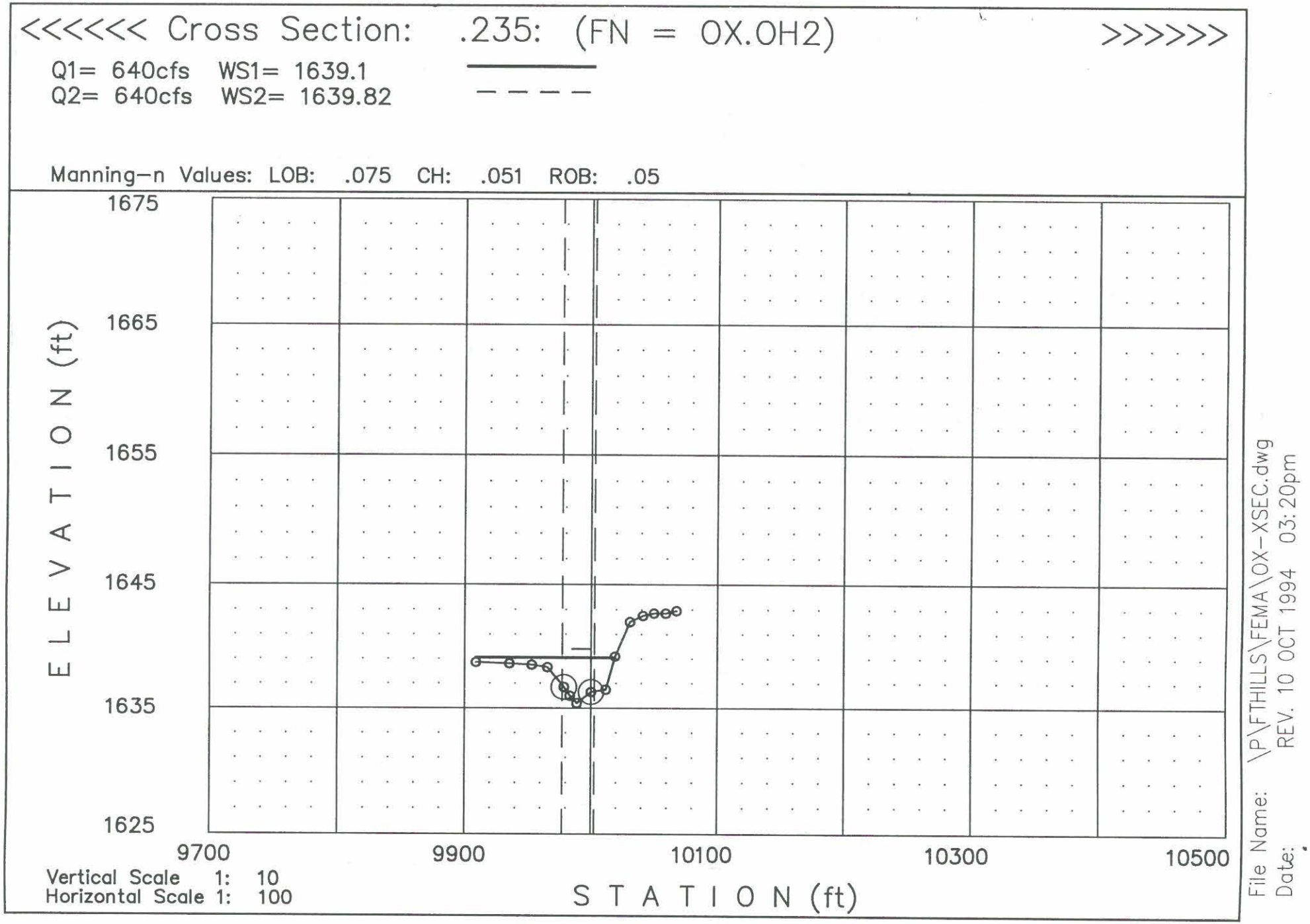
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Q1= 640cfs WS1= 1639.1
Q2= 640cfs WS2= 1639.82
Manning-n Values: LOB: .075 CH: .051 ROB: .05
1675
1665
1655
1645
1635
1625
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
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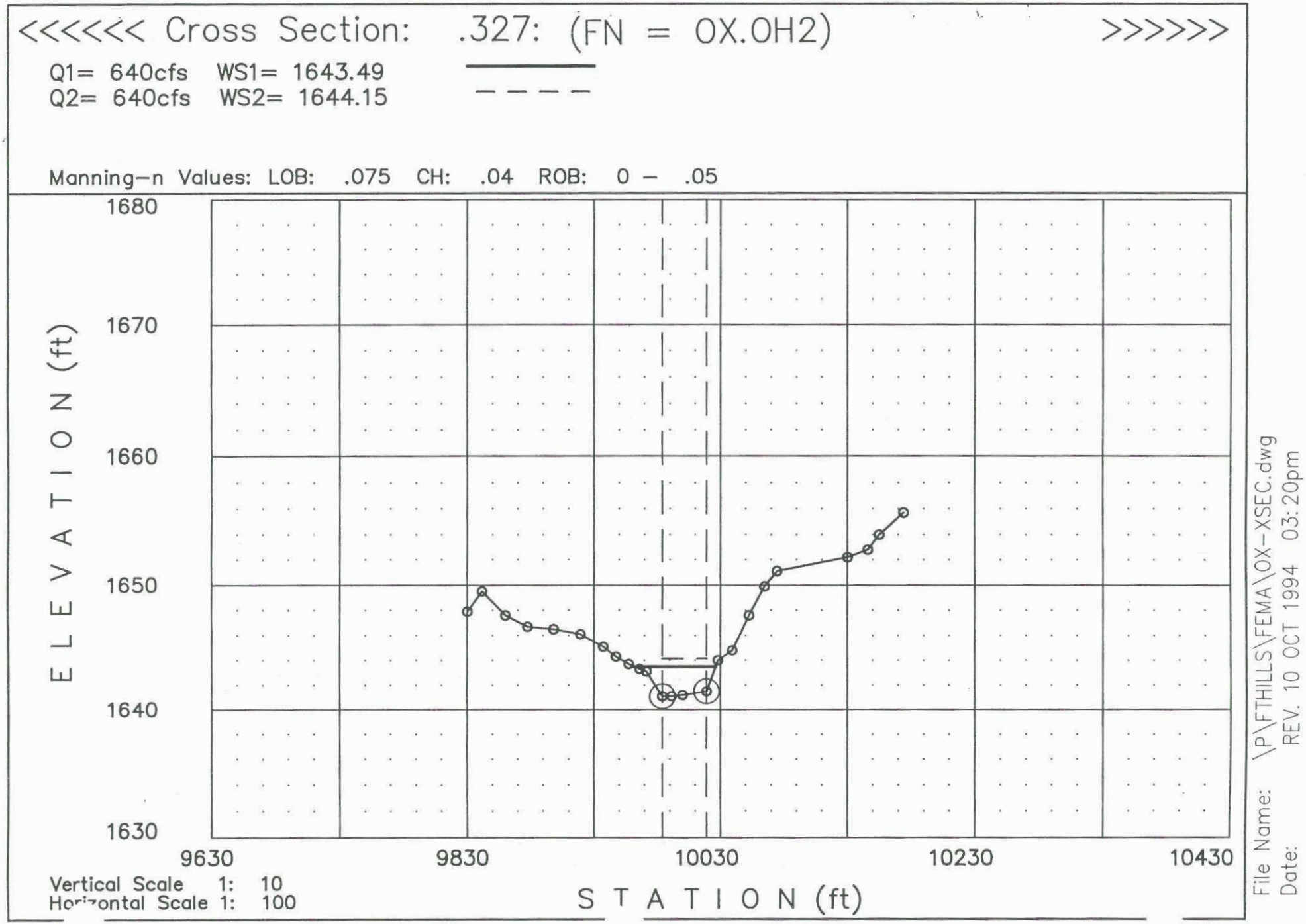
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Q1= 640cfs WS1= 1643.49
Q2= 640cfs WS2= 1644.15
Manning-n Values: LOB: .075 CH: .04 ROB: 0 - .05
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9630
9830
10030
10230
10430
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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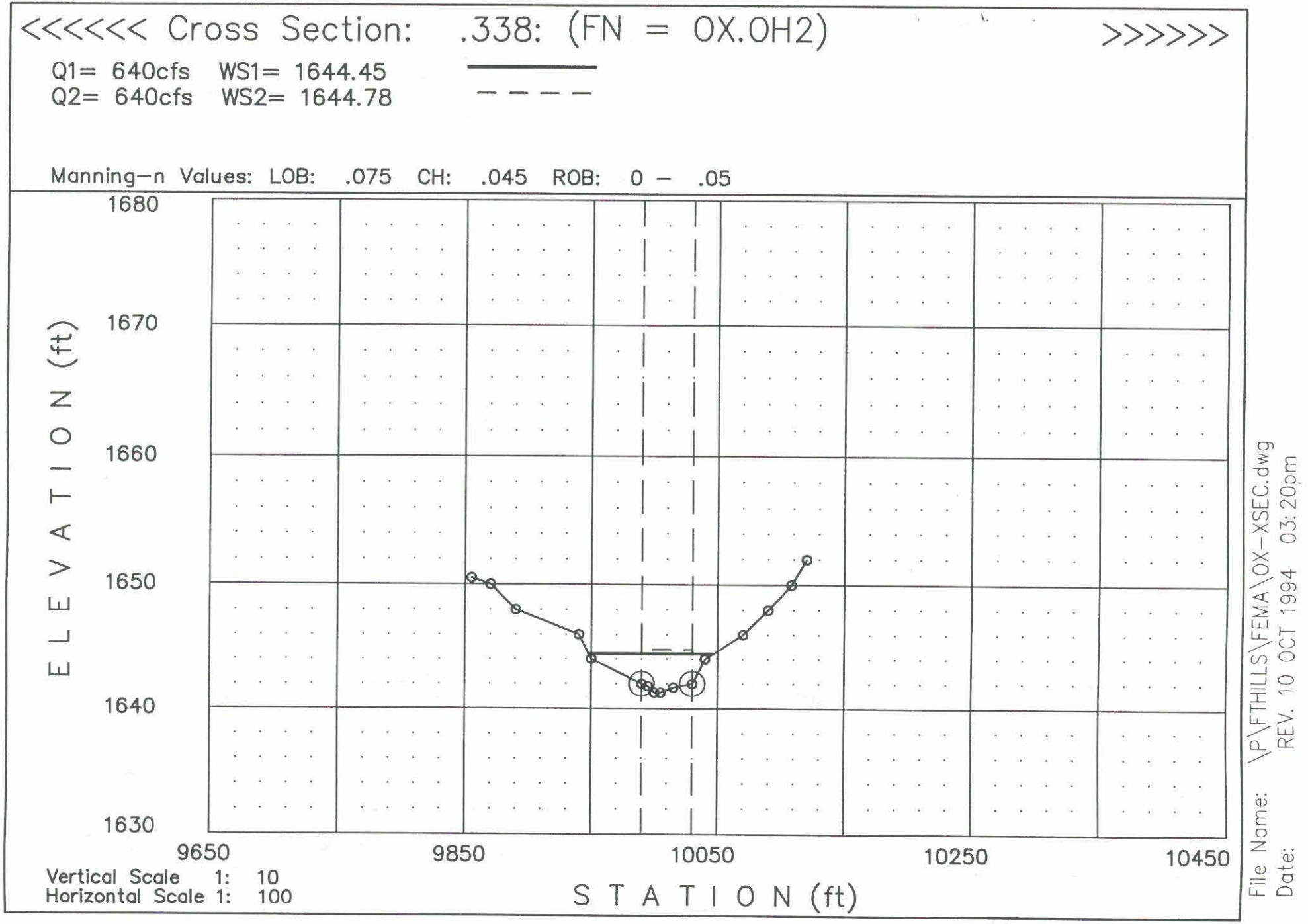
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Q1= 640cfs WS1= 1644.45
Q2= 640cfs WS2= 1644.78
Manning-n Values: LOB: .075 CH: .045 ROB: 0 - .05
1680
1670
1660
1650
1640
1630
ELEVATION (ft)
9650
9850
10050
10250
10450
STATION (ft)
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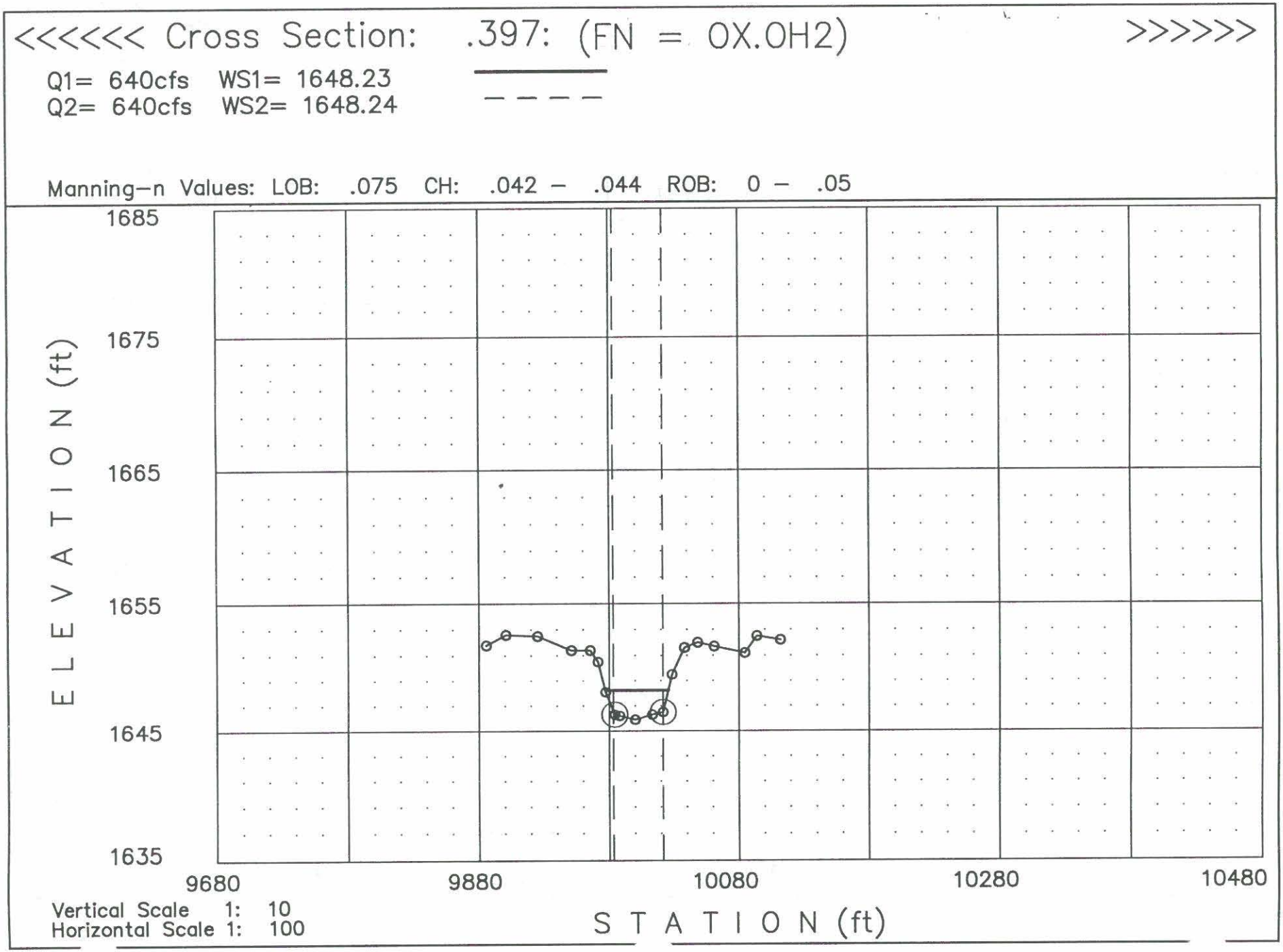
<<<<<< Cross Section: .397: (FN = 0X.0H2) >>>>>>
Q1= 640cfs WS1= 1648.23
Q2= 640cfs WS2= 1648.24
Manning-n Values: LOB: .075 CH: .042 - .044 ROB: 0 - .05
1685
1675
1665
1655
1645
1635
ELEVATION (ft)
9680
9880
10080
10280
10480
STATION (ft)
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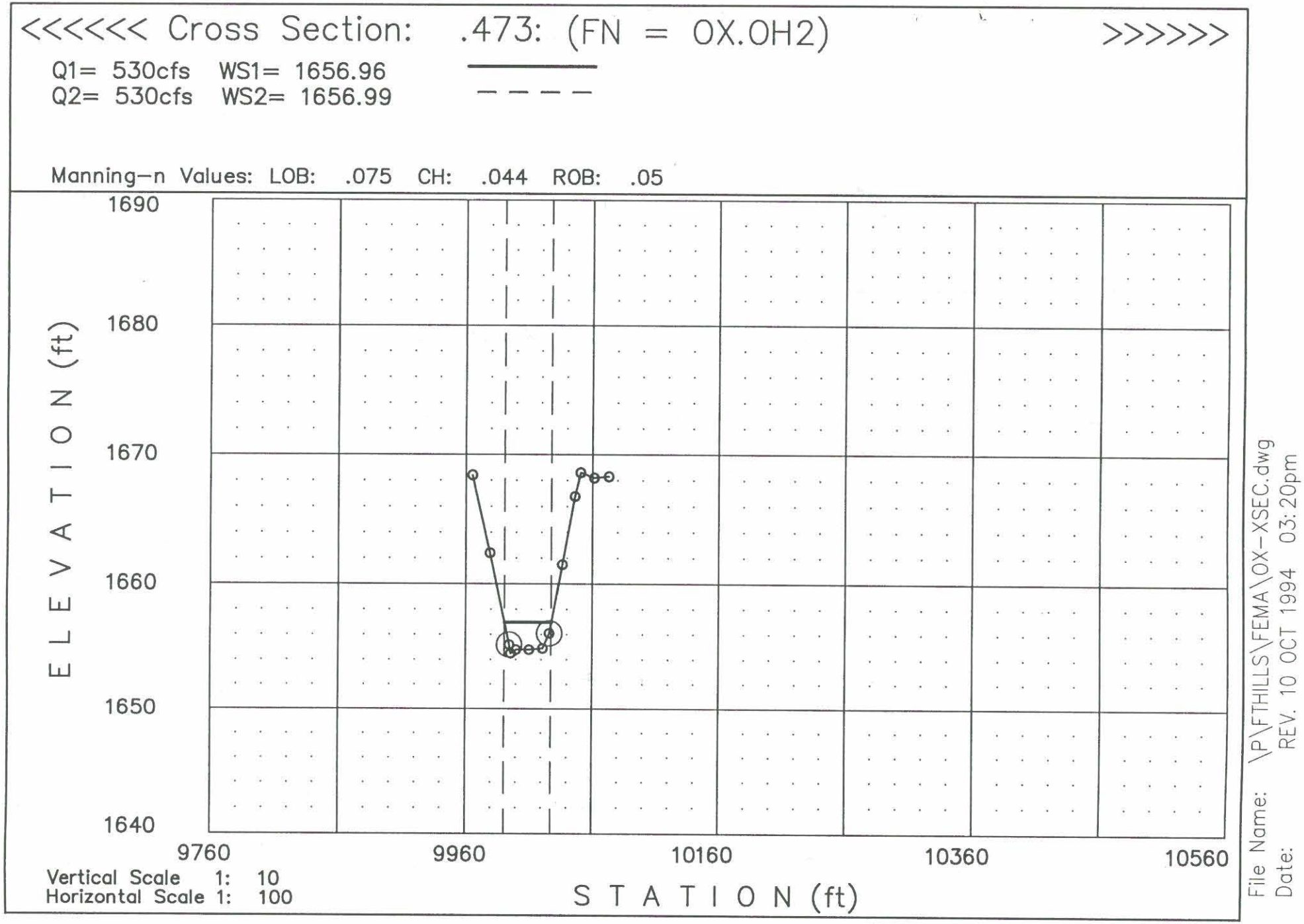
<<<<<< Cross Section: .473: (FN = 0X.0H2) >>>>>>
Q1= 530cfs WS1= 1656.96
Q2= 530cfs WS2= 1656.99
Manning-n Values: LOB: .075 CH: .044 ROB: .05
1690
1680
1670
1660
1650
1640
ELEVATION (ft)
9760
9960
10160
10360
10560
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
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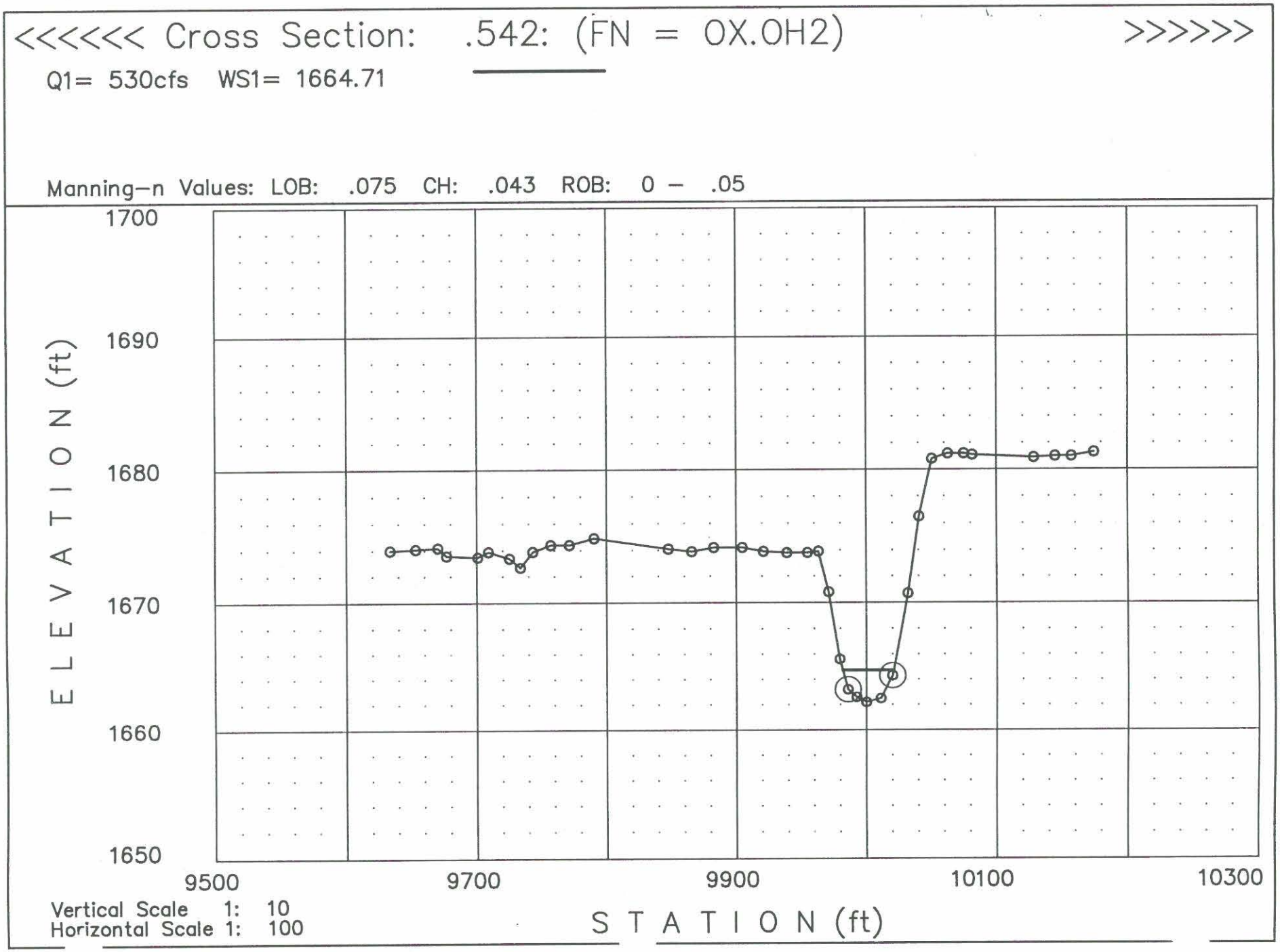
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Q1= 530cfs WS1= 1664.71
Manning-n Values: LOB: .075 CH: .043 ROB: 0 - .05
1700
1690
1680
1670
1660
1650
ELEVATION (ft)
9500
9700
9900
10100
10300
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
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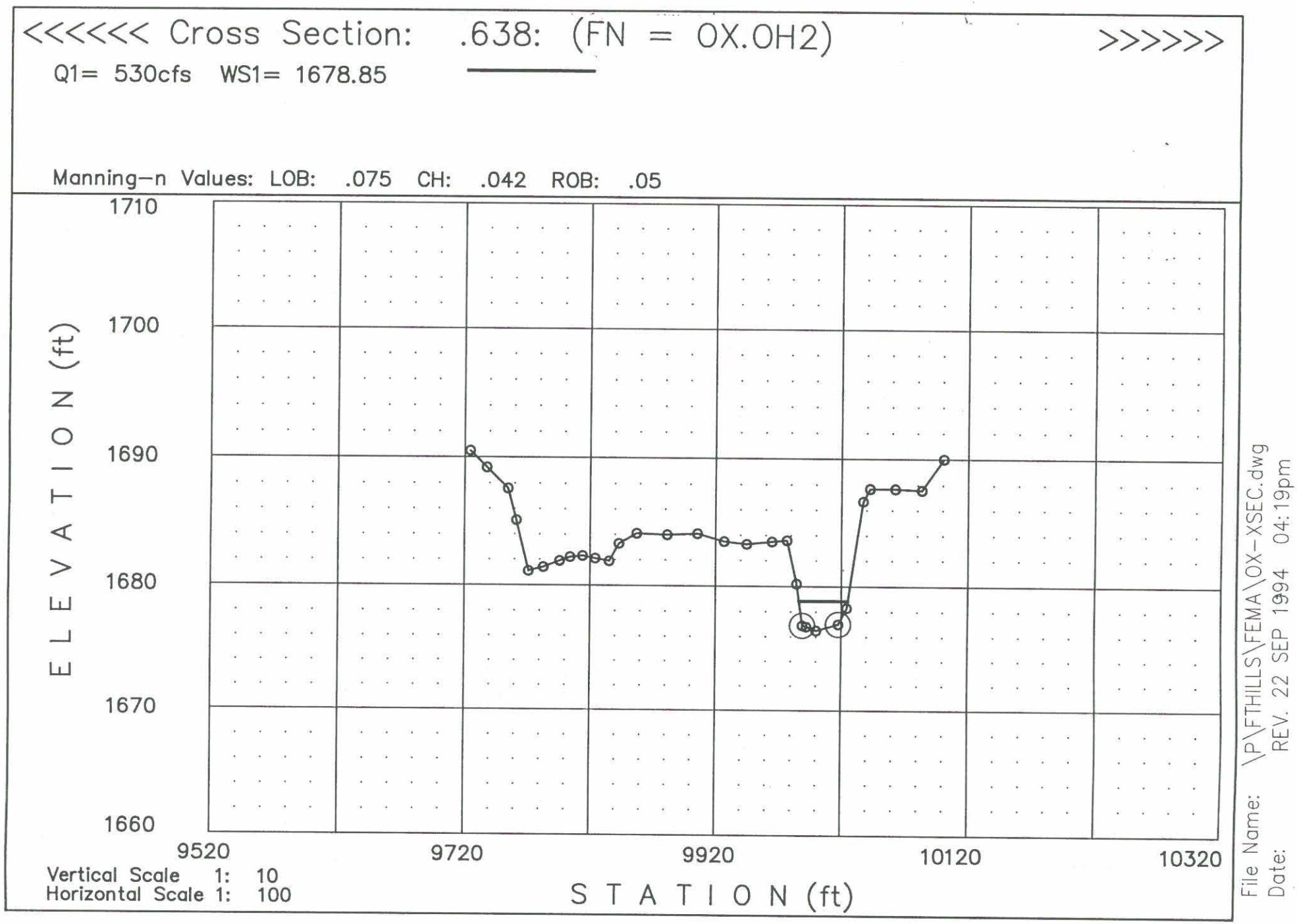
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Q1= 530cfs WS1= 1678.85
Manning-n Values: LOB: .075 CH: .042 ROB: .05
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9520
9720
9920
10120
10320
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\OX-XSEC.dwg
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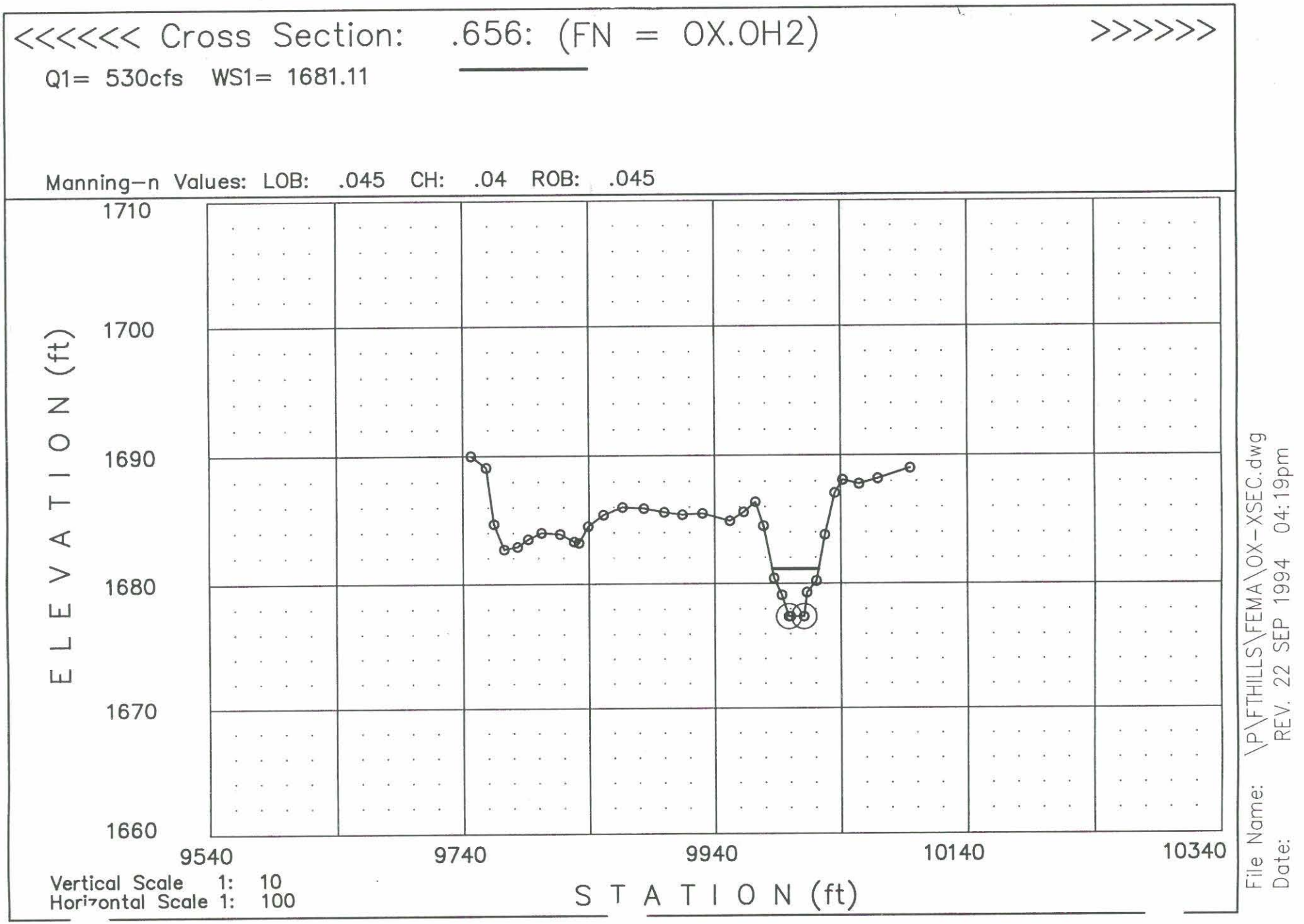
<<<<<< Cross Section: .656: (FN = 0X.0H2) >>>>>>
Q1= 530cfs WS1= 1681.11
Manning-n Values: LOB: .045 CH: .04 ROB: .045
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9540
9740
9940
10140
10340
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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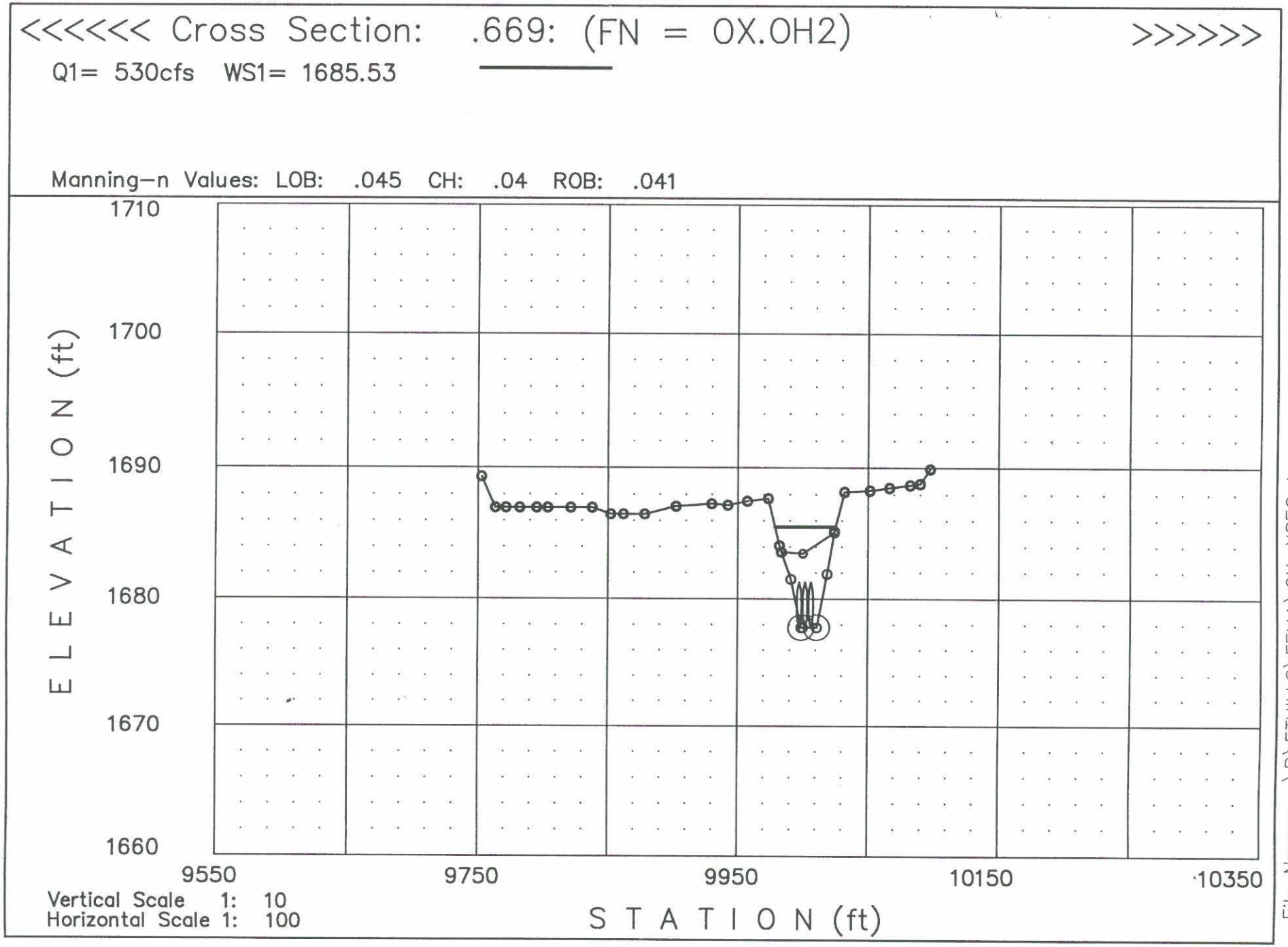
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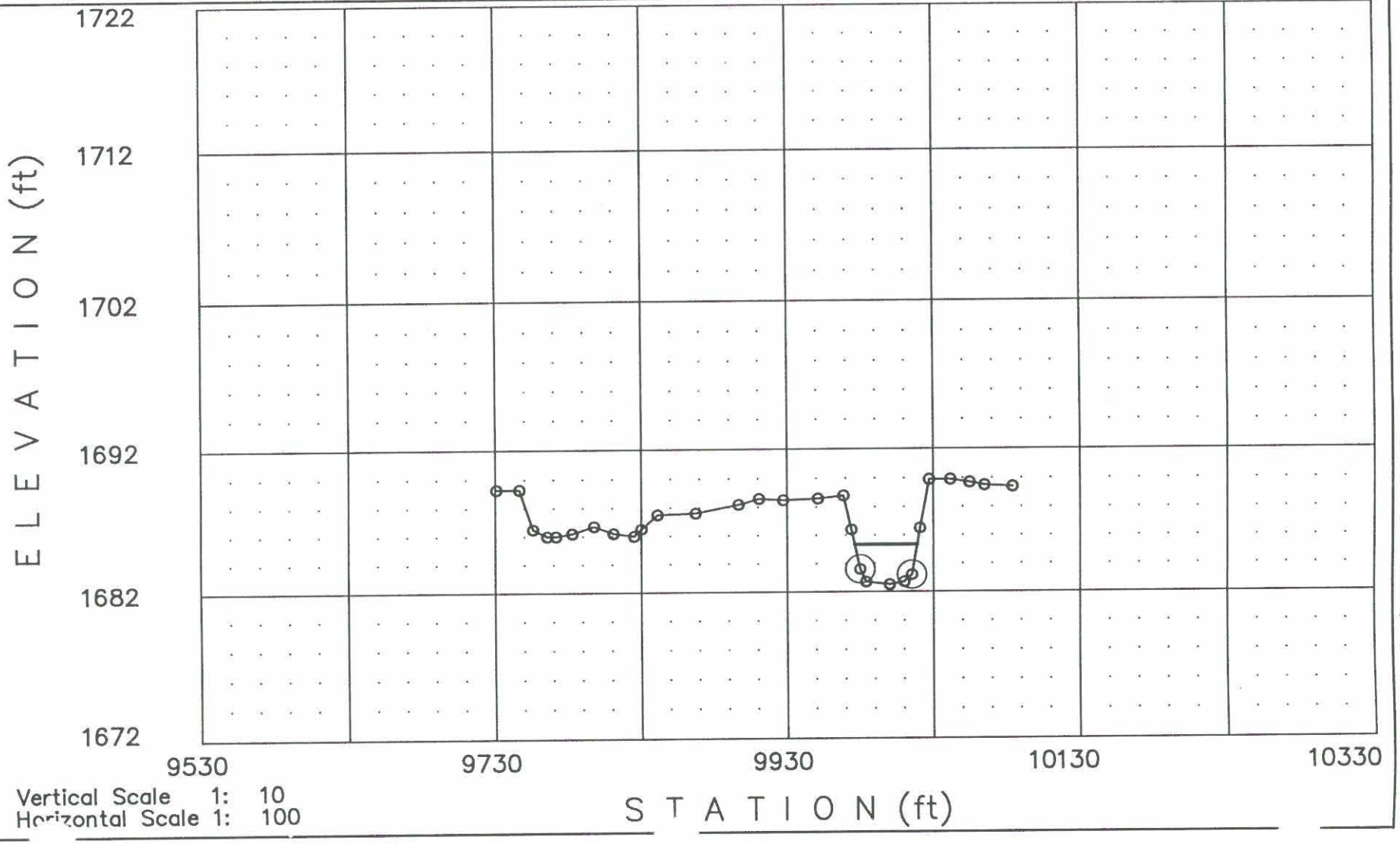
Q1= 530cfs WS1= 1685.53
Manning-n Values: LOB: .045 CH: .04 ROB: .041
1710
1700
1690
1680
1670
1660
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
Date: REV. 22 SEP 1994 04:19pm

<<<<<< Cross Section: .678: (FN = 0X.0H2) >>>>>>

Q1= 530cfs WS1= 1685.33

Manning-n Values: LOB: .075 CH: .046 ROB: .05



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Horizontal Scale 1: 100

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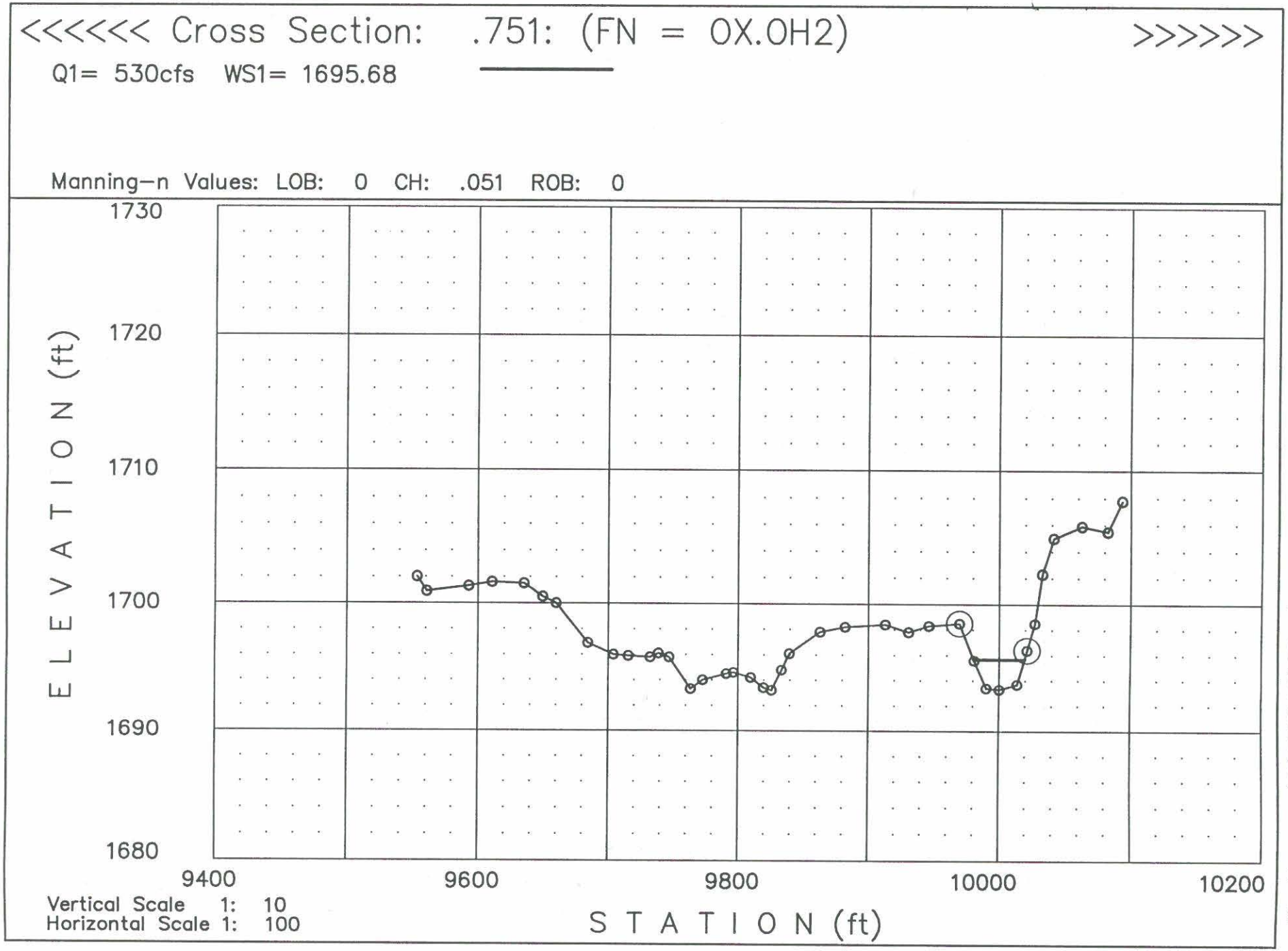
Date: REV. 22 SEP 1994 04:19pm


<<<<<< Cross Section: .751: (FN = 0X.0H2) >>>>>>
Q1= 530cfs WS1= 1695.68
Manning-n Values: LOB: 0 CH: .051 ROB: 0
1730
1720
1710
1700
1690
1680
ELEVATION (ft)
9400
9600
9800
10000
10200
STATION (ft)
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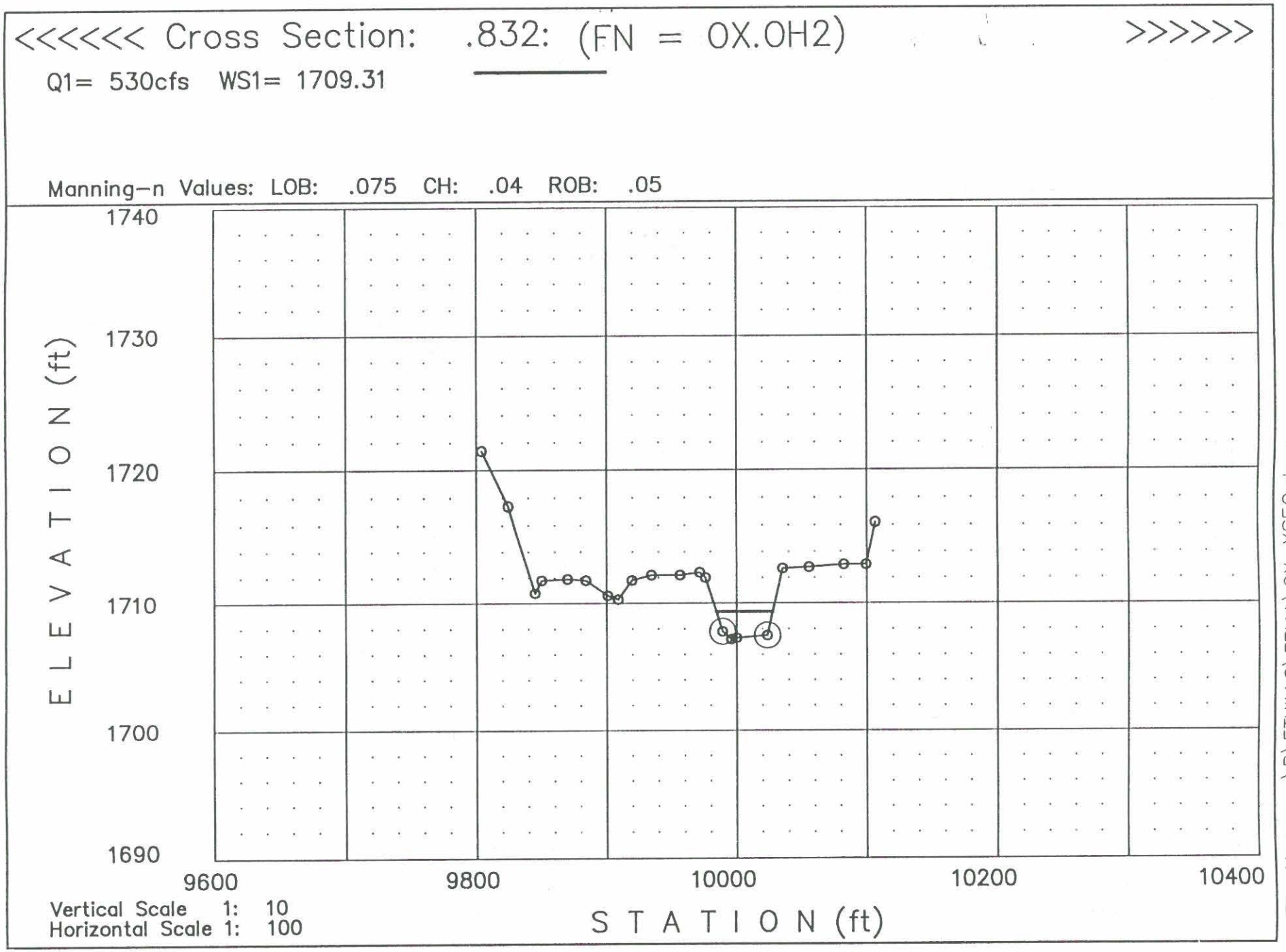
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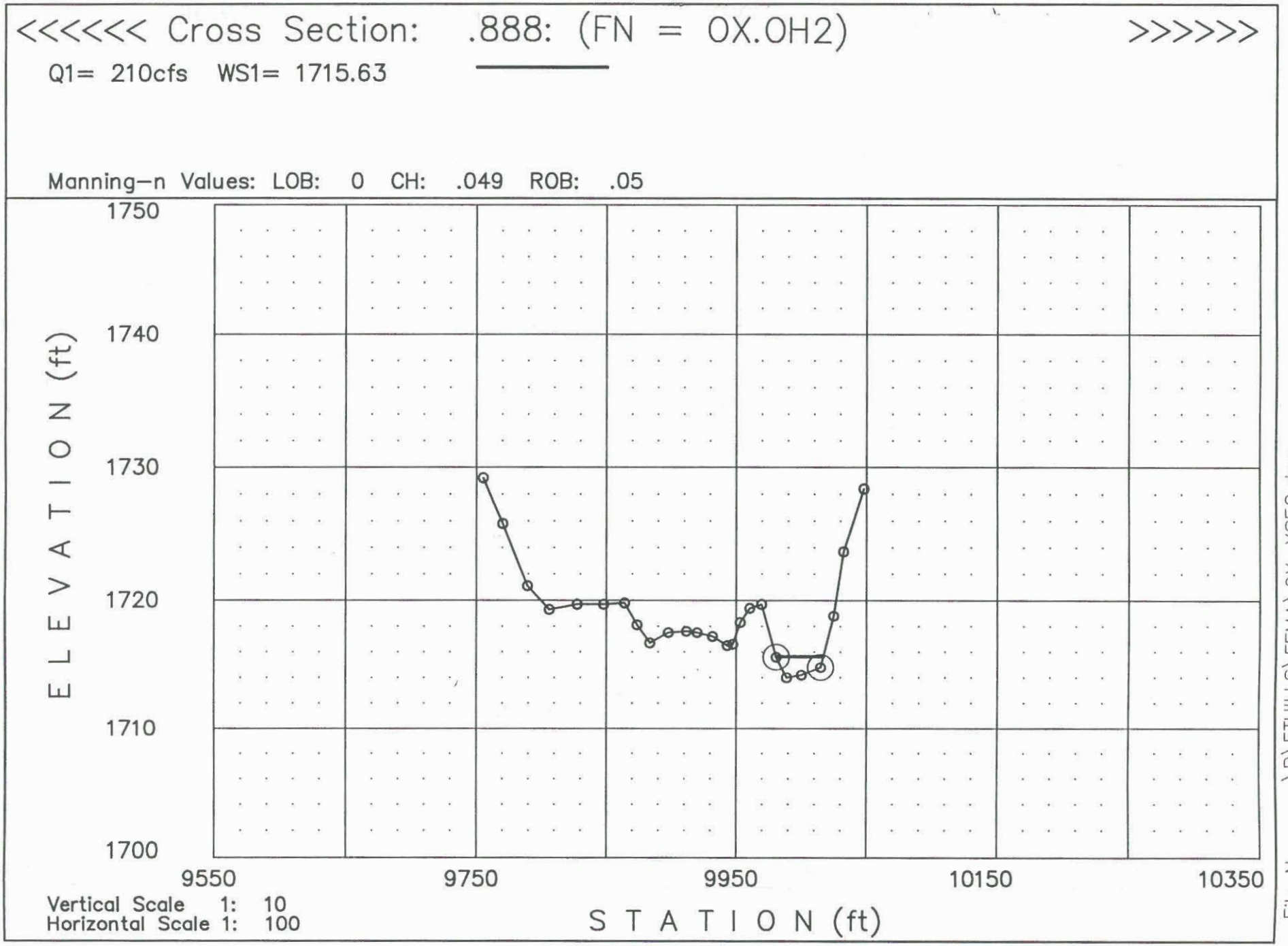
Q1= 530cfs WS1= 1709.31
Manning-n Values: LOB: .075 CH: .04 ROB: .05
1740
1730
1720
1710
1700
1690
ELEVATION (ft)
9600
9800
10000
10200
10400
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
Date: REV. 22 SEP 1994 04:19pm


<<<<<< Cross Section: .888: (FN = 0X.0H2) >>>>>>
Q1= 210cfs WS1= 1715.63
Manning–n Values: LOB: 0 CH: .049 ROB: .05
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1740
1730
1720
1710
1700
ELEVATION (ft)
9550
9750
9950
10150
10350
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
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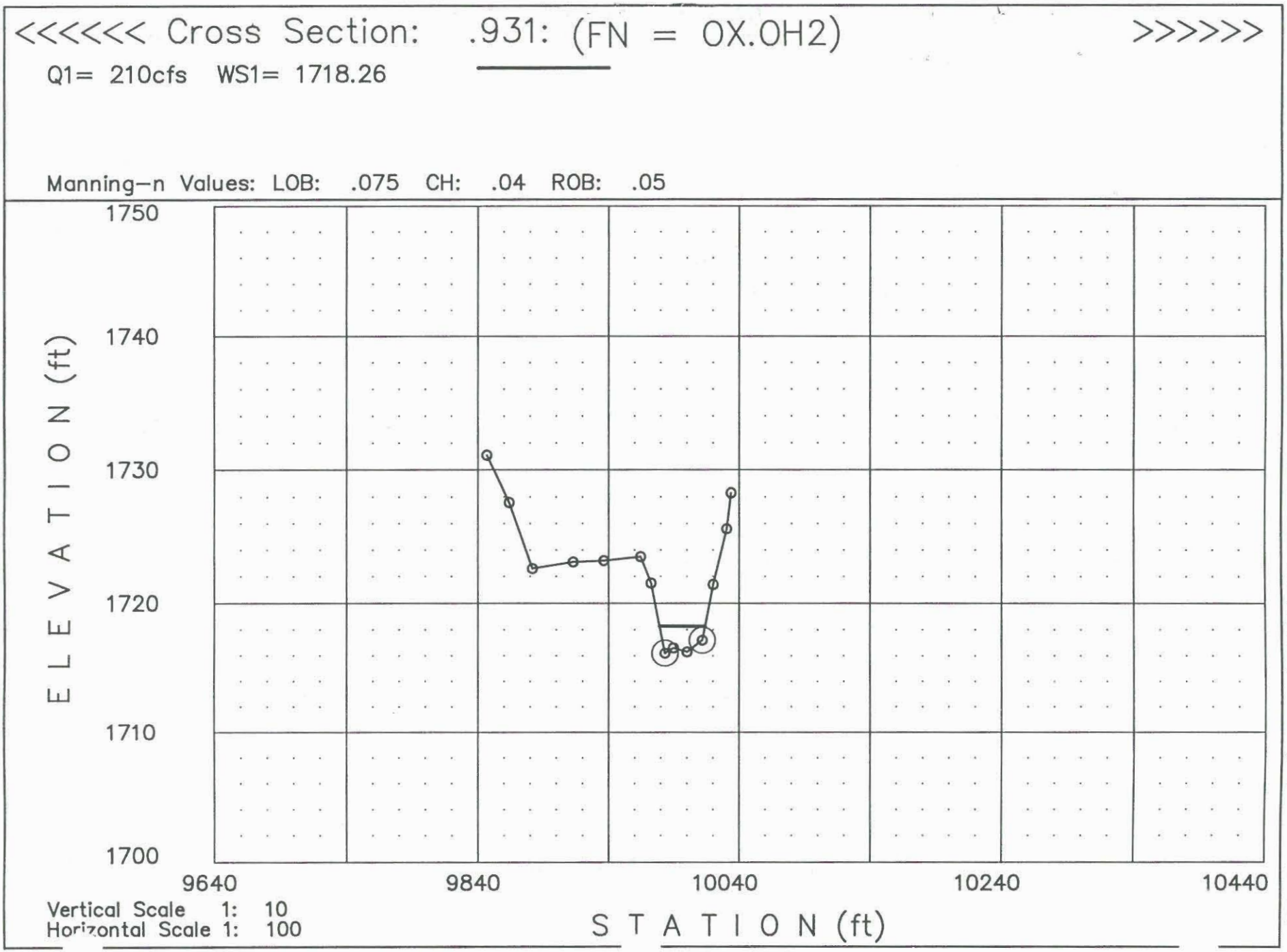
Date: REV. 22 SEP 1994 04:19pm


<<<<<< Cross Section: .931: (FN = 0X.0H2) >>>>>>
Q1= 210cfs WS1= 1718.26
Manning-n Values: LOB: .075 CH: .04 ROB: .05
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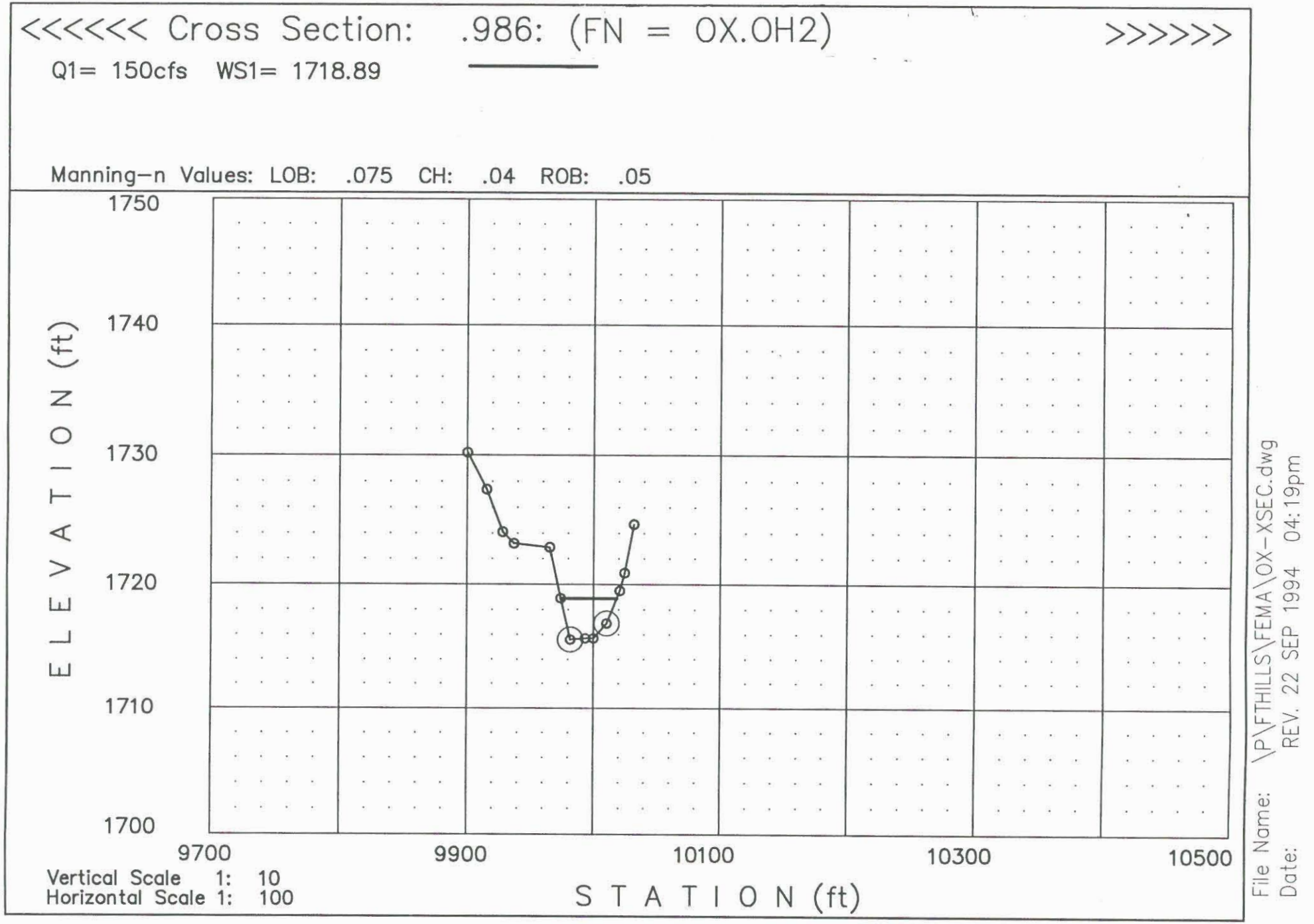
1740
1730
1720
1710
1700
ELEVATION (ft)
9640
9840
10040
10240
10440
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
Date: REV. 22 SEP 1994 04:19pm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Q1= 150cfs WS1= 1718.89
Manning-n Values: LOB: .075 CH: .04 ROB: .05
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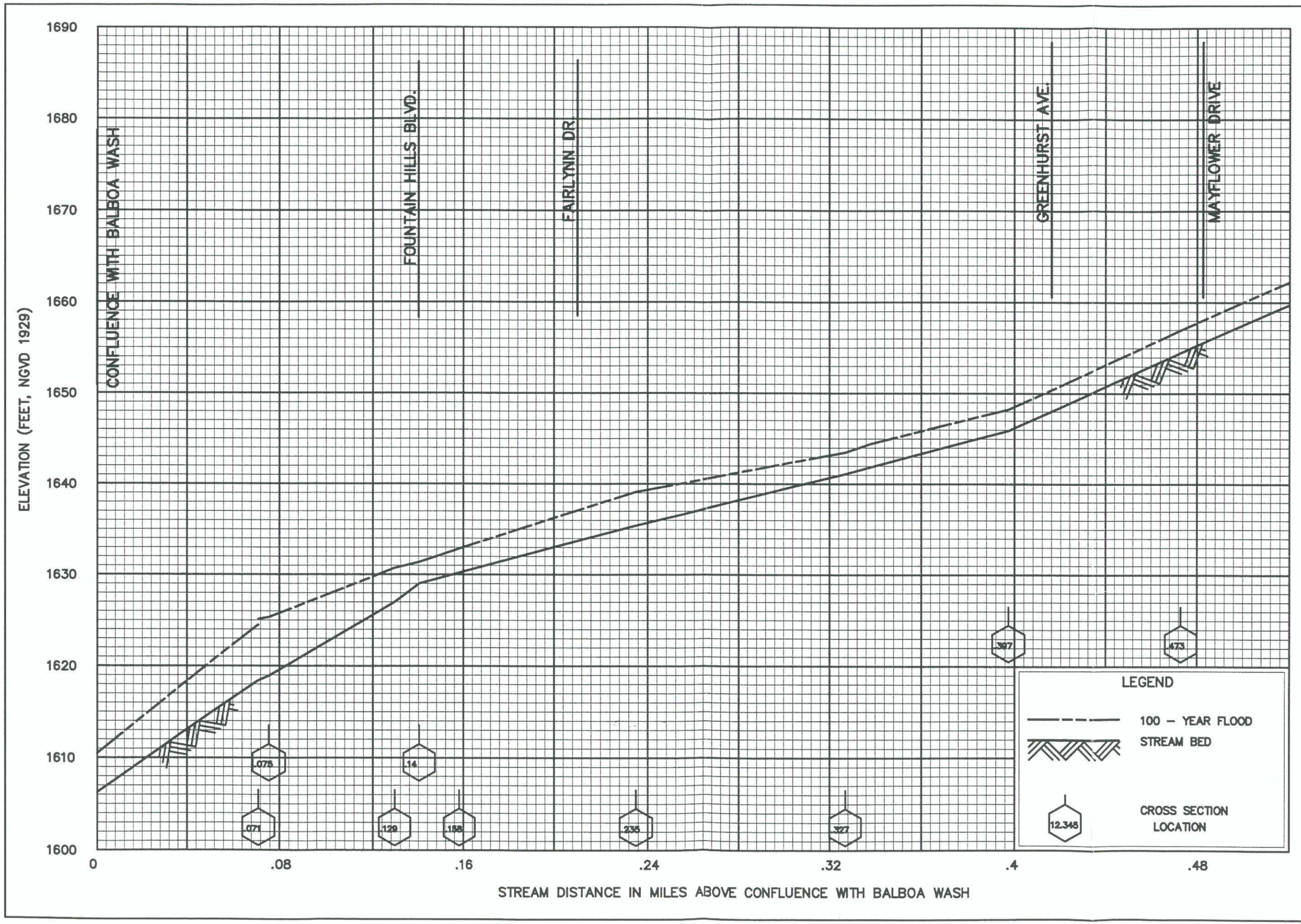
1740
1730
1720
1710
1700
ELEVATION (ft)
9700
9900
10100
10300
10500
STATION (ft)
Vertical Scale 1: 10
Horizontal Scale 1: 100
File Name: \P\FTHILLS\FEMA\0X-XSEC.dwg
Date: REV. 22 SEP 1994 04:19pm

FLOOD PROFILES



FLOOD PROFILES

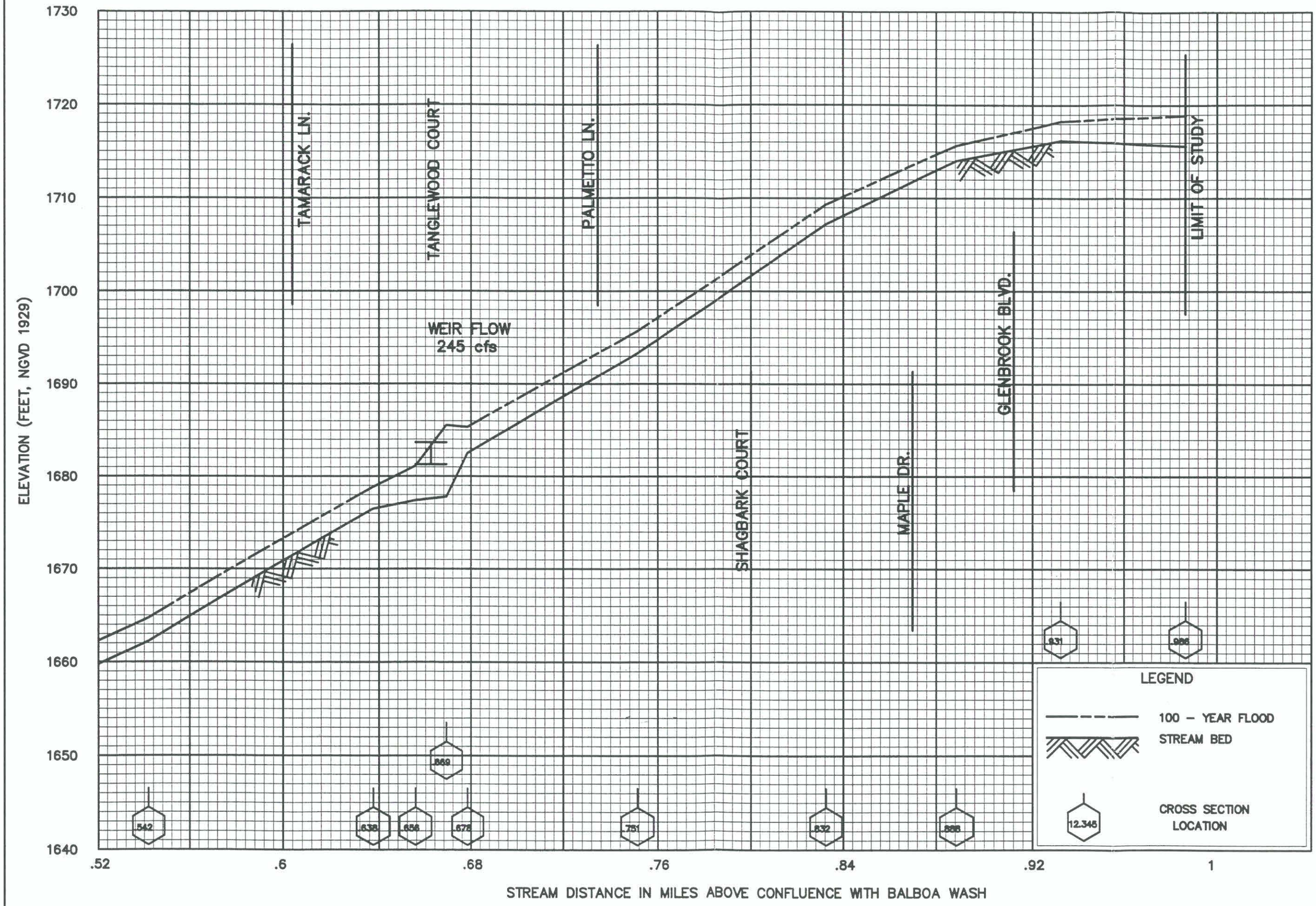
OXFORD WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\OX-PROF.dwg (sheet 1 of 2)
Date: REV. 28 OCT 1994 02:25pm

FLOOD PROFILES

OXFORD WASH



FEDERAL EMERGENCY MANAGEMENT AGENCY
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

Dwg. Name: \P\FTHILLS\FEMA\OX-PROF.dwg (sheet 2 of 2)
Date: REV. 27 SEP 1994 10:55am

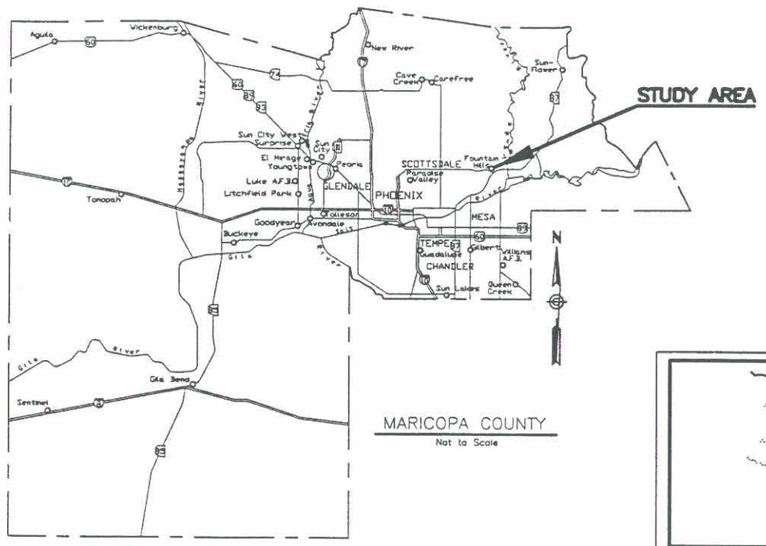
APPENDIX F

Floodplain and Floodway Maps (reduced size)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

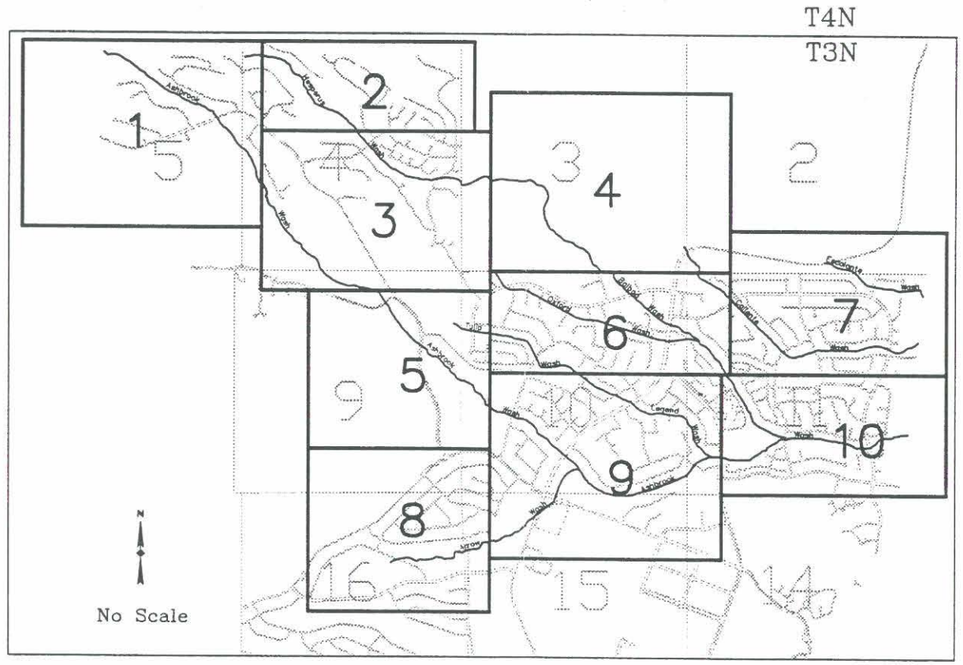
FOUNTAIN HILLS NORTH
FLOOD DELINEATION STUDY

FCD 92-04



MARICOPA COUNTY
Not to Scale

LOCATION MAP



STUDY AREA MAP
AND SHEET INDEX

SHEET INDEX

Sheet 1-10 Flood Delineation Study

DATUM

HORIZONTAL: North American Datum of 1983
VERTICAL: National Geodetic Vertical Datum of 1929

Datum Note: There is Another set of topographic maps in use by the Town of Fountain Hills, on local datum. This other set of mapping was also prepared by Kenney Aerial Mapping, at same scale and flight date as this mapping;

Elevation Equation:

NGVD 1929 = Local Datum -1.26 feet

[Source: Anderson-Nelson Inc. Letter dated 8-24-92]

NOTES

1. Floodplain Limits in this Study are Plotted at each HEC-2 Cross Section on the Basis of Starting (SSTA) and Ending (ENDST) Stations Unless there is Ineffective Flow Area or a Conflict with Topographic Contours, in which Case, the Contours take Precedence.

2. Detailed contour mapping is shown only along major washes.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY 1959

AERIAL MAPPING

Kenney Aerial Mapping
1130 W. Fillmore
Phoenix, Arizona 85007 (602) 258-6471

KAM JOB # 910804-1
FLIGHT DATE: August 29, 1991
CONTOUR INTERVAL: 2 Feet

GROUND CONTROL

Anderson-Nelson, Inc.
4441 E. McDowell Road
Phoenix, Arizona 85008 (602) 273-1850

ADDITIONAL SURVEY

Alcocer Land Surveyors
3501 N. 16th Street, Suite C
Phoenix, Arizona 85015 (602) 263-7846

HYDROLOGY

George V. Sabol Consulting Engineers, Inc.
7950 E. Acoma Drive, Suite 211
Scottsdale, Arizona 85260-5962 (602) 483-3368

HYDRAULICS

McLaughlin Kmetty Engineers, Ltd.
3501 N. 16th Street
Phoenix, Arizona 85016 (602) 248-7702

LEGEND

Section Line .....

Section Label 9

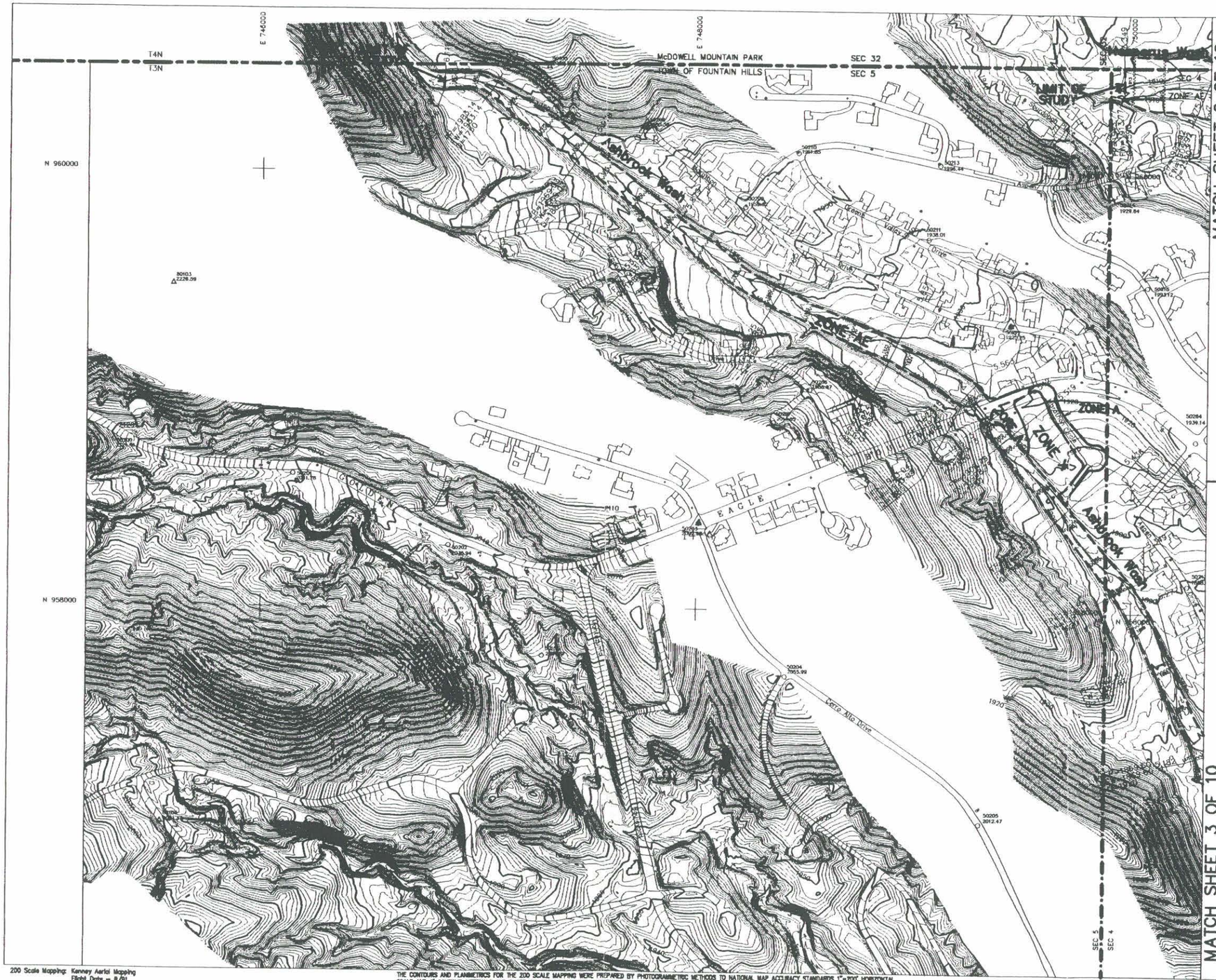
Sheet Limits ———

Sheet Number 9

Stucy Wash ———

GEORGE V. SABOL CONSULTING ENGINEERS, INC. in association with McLAUGHLIN KMETTY ENGINEERS, LTD.			
DESIGN	BY FEB	DATE 3/94	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	TRL	3/94	RECOMMENDED BY: DATE
PLANS	PJK	9/94	APPROVED BY: DATE
PLANS CHK.	FEB/TRL	3/95	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY: DATE:			COVER SHEET

Dwg. Name: V:\92404001\ACAD\FHCOVER.dwg
Date: REV. May 10, 1995 06:00am rgs



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE & RIVER MILE — 2.0

CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519

ELEVATION REFERENCE MARK — 6-C

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

SECTION LINE — Section Boundary

ELEVATION REFERENCE MARKS

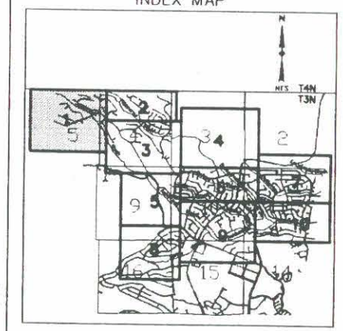
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
9-A	1924.94	Top of Brass Cap at the intersection of Marathon Drive and Greene Valley Drive, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.
9-B	1998.84	Top of Brass Cap at the North end of Marathon Drive cul-de-sac, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.
14-A	2091.39	Top of Brass Cap (Fountain Hills panel point 8203 elev = 2092.98) at the intersection of Golden Eagle Boulevard and Cerro Alto Drive, being in the Northeast 1/4 of Section 5, Township 3 North, Range 6 East.

NOTES

1. Marathon Circle and associated drainage easement have been located from the Paving Plans for Fountain Hills Final Plat #516 at Fountain Hills, Arizona, prepared by Greiner, Inc., As-Built Certification dated February 27, 1996.

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

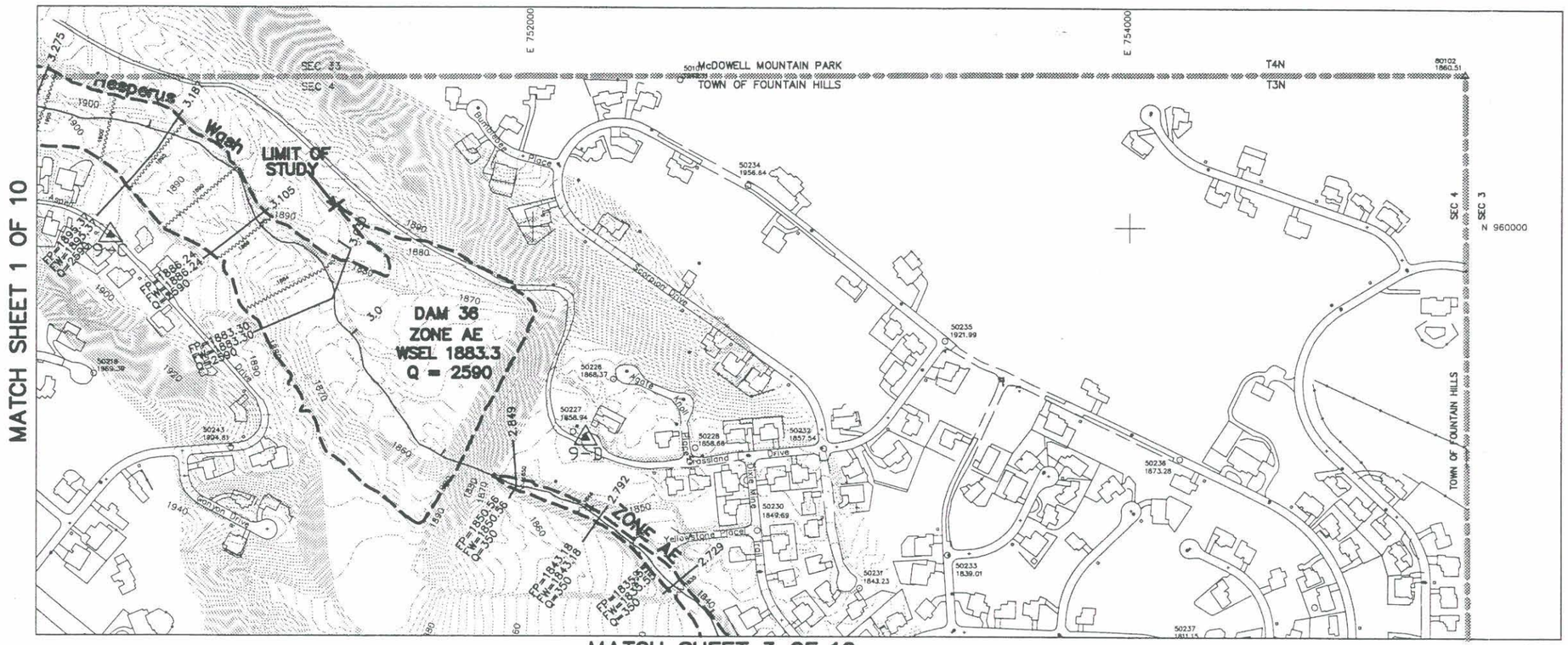
SUBMITTED BY: DATE

SHEET 1 OF 10

Dwg. Name: V:\9240\dgn\ACAD\1-01.dwg
Date: REV. July 15, 1997

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE & RIVER MILE	2.0
CROSS SECTION	FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
ELEVATION REFERENCE MARK	6-C
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
SECTION LINE	Section Boundary

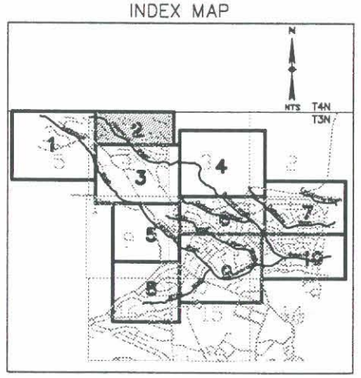
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
9-C	1893.64	Top of Brass Cap at a point of curvature on the centerline of Aspen Drive, approximately 700 Feet Southeast of the intersection of Aspen Drive and Sourdough Place, (opposite 16644 N. Aspen Drive) being in the Northwest 1/4 of Section 4, Township 3 North, Range 6 East.
9-D	1856.71	Top of Brass Cap at the West end of Grassland Drive cul-de-sac, being in the Northwest 1/4 of Section 4, Township 3 North, Range 6 East.

NOTES

INDEX MAP



200 0' 200 400

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 2 OF 10

Dwg. Name: \P\9240400\ACAD\fr-02.dwg
Date: REV. May 11, 1995 06:35am rgs

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

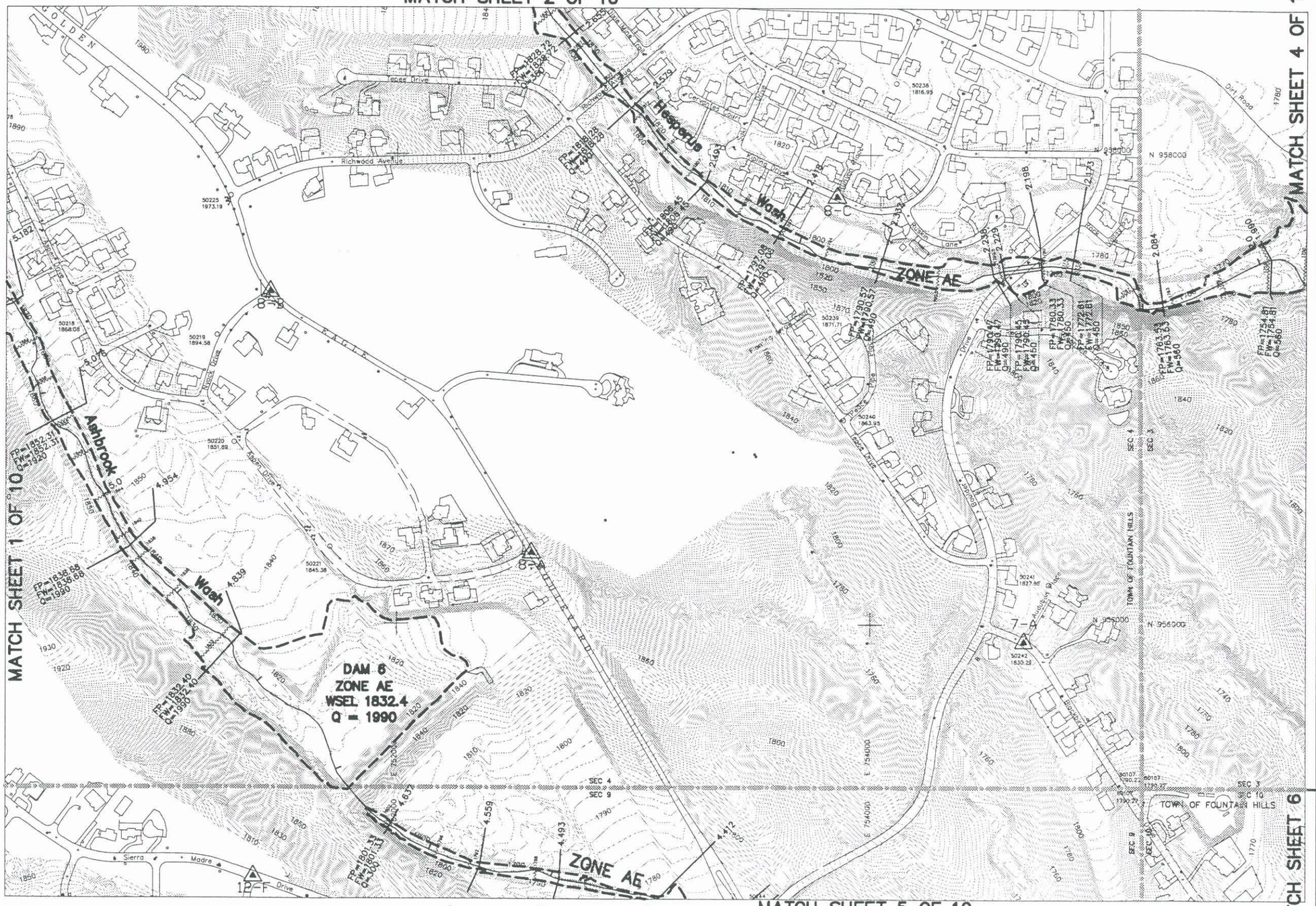
MATCH SHEET 2 OF 10

MATCH SHEET 1 OF 10

MATCH SHEET 4 OF 10

MATCH SHEET 5 OF 10

MATCH SHEET 6



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK 6-C
- BASE FLOOD ELEVATIONS 1221
- ZONE DESIGNATIONS: ZONE AE
- CORPORATE LIMITS: Corporate Limits
- SECTION LINE: Section Boundary

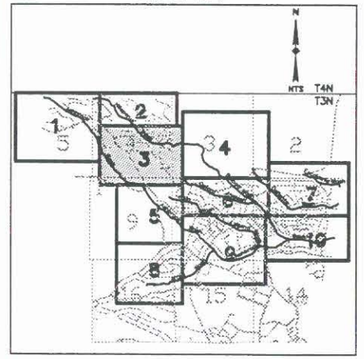
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
7-A	1830.08	Top of Brass Cap at the intersection of Blackbird Drive and Audubon Place, being in the Southeast 1/4 of Section 4, Township 3 North, Range 6 East.
8-A	1876.03	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Aspen Drive, being in the Southwest 1/4 of Section 4, Township 3 North, Range 6 East.
8-B	1925.49	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Nyack Drive, being in the Southwest 1/4 of Section 4, Township 3 North, Range 6 East.
8-C	1809.90	Top of Brass Cap at the intersection of Kipling Drive and Runyon Place, being in the Southeast 1/4 of Section 4, Township 3 North, Range 6 East.
12-F	1822.68	Top of Brass Cap at the intersection of Sierra Madre Drive and Lorna Lane, being in the Northwest 1/4 of Section 9, Township 3 North, Range 6 East.

NOTES

INDEX MAP



200 0' 200 400

SCALE: 1" = 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 3 OF 10

Dwg. Name: \P\92404001\ACAD\h-03.dwg
Date: REV. April 11, 1995 3:04pm

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE — 2.0
- CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
- ELEVATION REFERENCE MARK — 6-C
- BASE FLOOD ELEVATIONS — 1221
- ZONE DESIGNATIONS — ZONE AE
- CORPORATE LIMITS — Corporate Limits
- SECTION LINE — Section Boundary

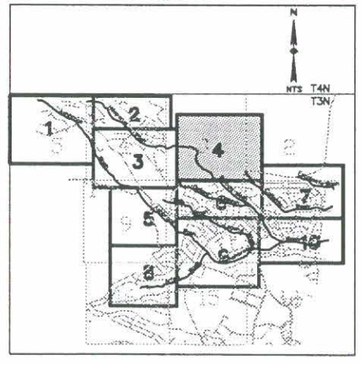
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
1-D	1655.56	Top of Brass Cap, at point of curvature of centerline of McDowell Mountain Road, approximately 80 feet North of the South line of Section 3, Township 3 North, Range 6 East.
16-A	1772.83	Top of Brass Cap in concrete, N37° 15'03"W 1013.30 feet from center of cul-de-sac at station 15+09.47 of Blue Jay Place, being in the Southwest 1/4 Section 3, Township 3 North, Range 6 East.

NOTES

INDEX MAP



SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 4 OF 10

Dwg. Name: \P\92404001\ACAD\h-04.dwg
Date: REV. April 06, 1995 08:20am

MATCH SHEET 3 OF 10

MATCH SHEET 7 OF 10

MATCH SHEET 6 OF 10

TOWN OF FOUNTAIN HILLS

SEC 3 SEC 10 SEC 2 SEC 11

River Mile 1.715: End Balboa Wash, Begin Hesperus Wash.

Hesperus Wash

Balboa Wash

Dirt Road

McDOWELL MTN ROAD

Caliente Wash

ZONE A

ZONE AE

LIMIT OF STUDY

LIMIT OF STUDY

16-A

1-D

50117
1768.22

N 958000

N 956000

N 955000

FP=1748.69 FW=1748.69 Q=560

FP=1739.63 FW=1739.63 Q=560

FP=1734.58 FW=1734.58 Q=560

FP=1724.34 FW=1724.34 Q=680

FP=1718.09 FW=1718.09 Q=680

FP=1703.57 FW=1703.57 Q=660

FP=1691.83 FW=1691.83 Q=680

FP=1679.98 FW=1679.98 Q=660

FP=1671.08 FW=1671.08 Q=660

FP=1659.68 FW=1659.68 Q=390

FP=1653.34 FW=1653.34 Q=290

FP=1650.55 FW=1650.55 Q=290

FP=1646.16 FW=1646.16 Q=280

1.947 1.856 1.803 1.715 1.645 1.517 1.383 1.302 1.223 1.106

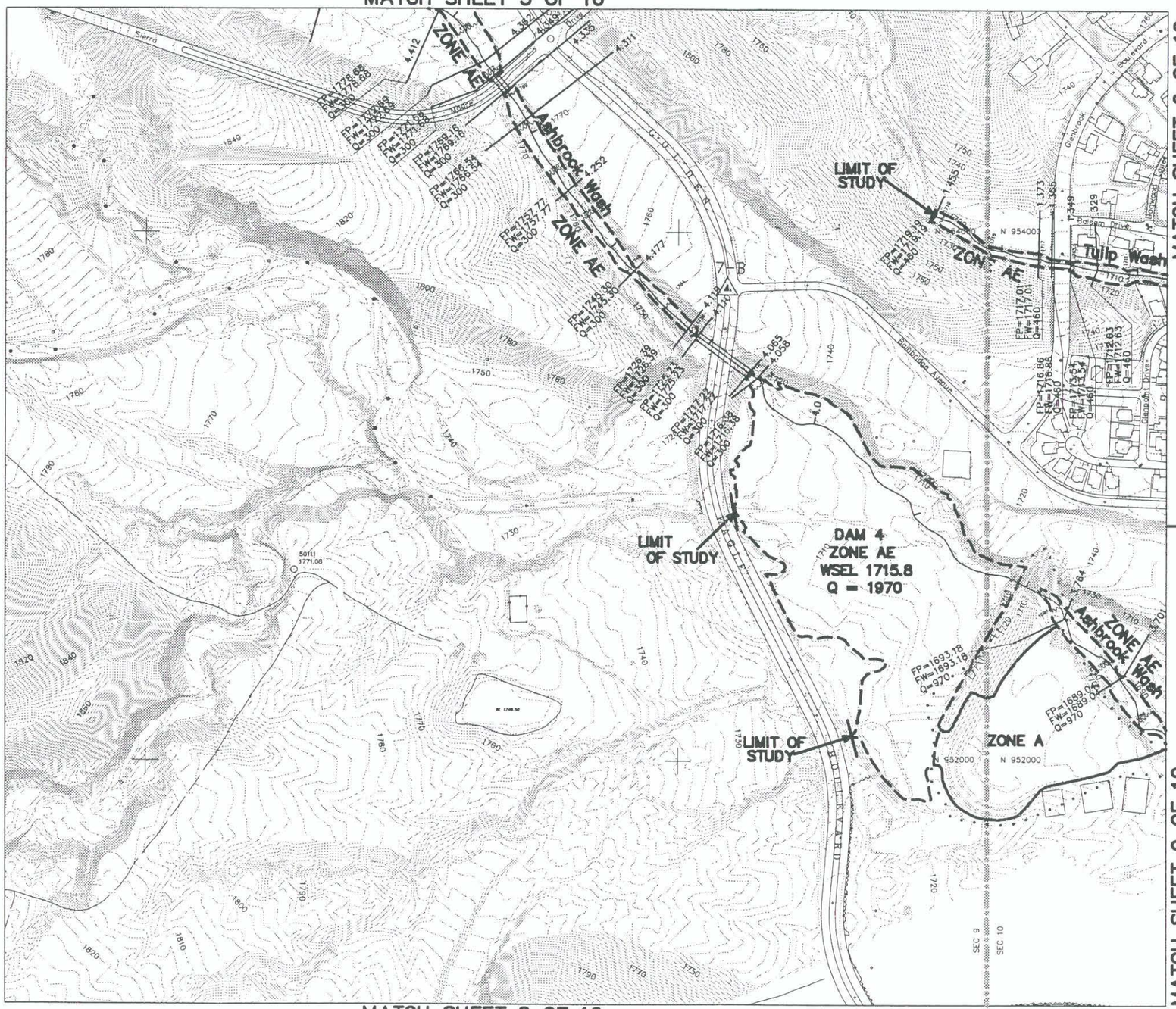
2.317 2.306 2.281 2.274 2.218

90349
1730.74

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

MATCH SHEET 3 OF 10



MATCH SHEET 6 OF 10

MATCH SHEET 9 OF 10

MATCH SHEET 8 OF 10

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE — 2.0
- CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
- ELEVATION REFERENCE MARK — 6-C
- BASE FLOOD ELEVATIONS — 1221
- ZONE DESIGNATIONS — ZONE AE
- CORPORATE LIMITS — Corporate Limits
- SECTION LINE — Section Boundary
- LIMITS OF MKE MAPPING

ELEVATION REFERENCE MARKS

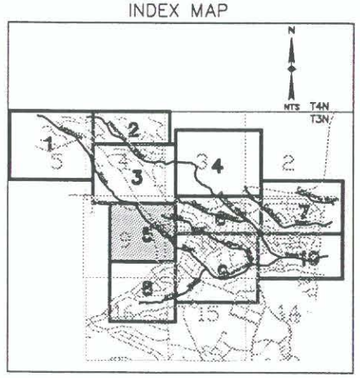
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
7-B	1753.17	Top of Brass Cap at the intersection of Golden Eagle Boulevard and Bainbridge Avenue, being in the Northeast 1/4 of Section 9, Township 3 North, Range 6 East.

NOTES

1. The topographical data within "Limits of MKE Mapping" were obtained by field information provided by Alcocer Land Surveyors.

INDEX MAP



200' 0' 200' 400'

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE:

APPROVED BY: DATE:

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 5 OF 10

Dwg. Name: \P\92404001\ACAD\h-05.dwg
Date: REV: April 06, 1995 09:30am

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

MATCH SHEET 3 OF 10

LIMIT OF STUDY

MATCH SHEET 4 OF 10

MATCH SHEET 5 OF 10

MATCH SHEET 9 OF 10

MATCH SHEET 7 OF 10

MATCH SHEET 9 OF 10

MATCH SHEET 10 OF 10

River Mile 0.971:
End Legend Wash,
Begin Tulip Wash.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE — 2.0
- CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
- ELEVATION REFERENCE MARK — 6-C
- BASE FLOOD ELEVATIONS — 1221
- ZONE DESIGNATIONS — ZONE AE
- CORPORATE LIMITS — Corporate Limits
- SECTION LINE — Section Boundary
- LIMITS OF MKE MAPPING

ELEVATION REFERENCE MARKS

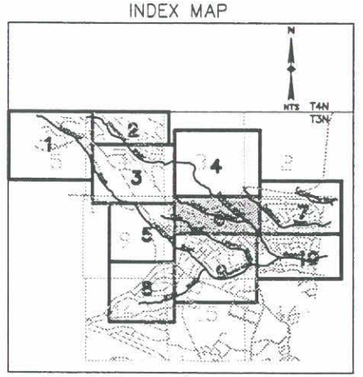
NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
2-A	1630.62	Top of Brass Cap in concrete at the middle of Northeast curb return at intersection of Fountain Hills Boulevard and Kings Way, being in the Northeast 1/4 of Section 10, Township 3 North, Range 6 East.
5-A	1684.27	Top of Brass Cap at the intersection of Glenbrook Boulevard and Tanglewood Court, being in the Northwest 1/4 of Section 10, Township 3 North, Range 6 East.

NOTES

1. The topographic data within "Limits of MKE Mapping" were obtained by field information provided by Alcocer Land Surveyors.

INDEX MAP



200' 0' 200' 400'
SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

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DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

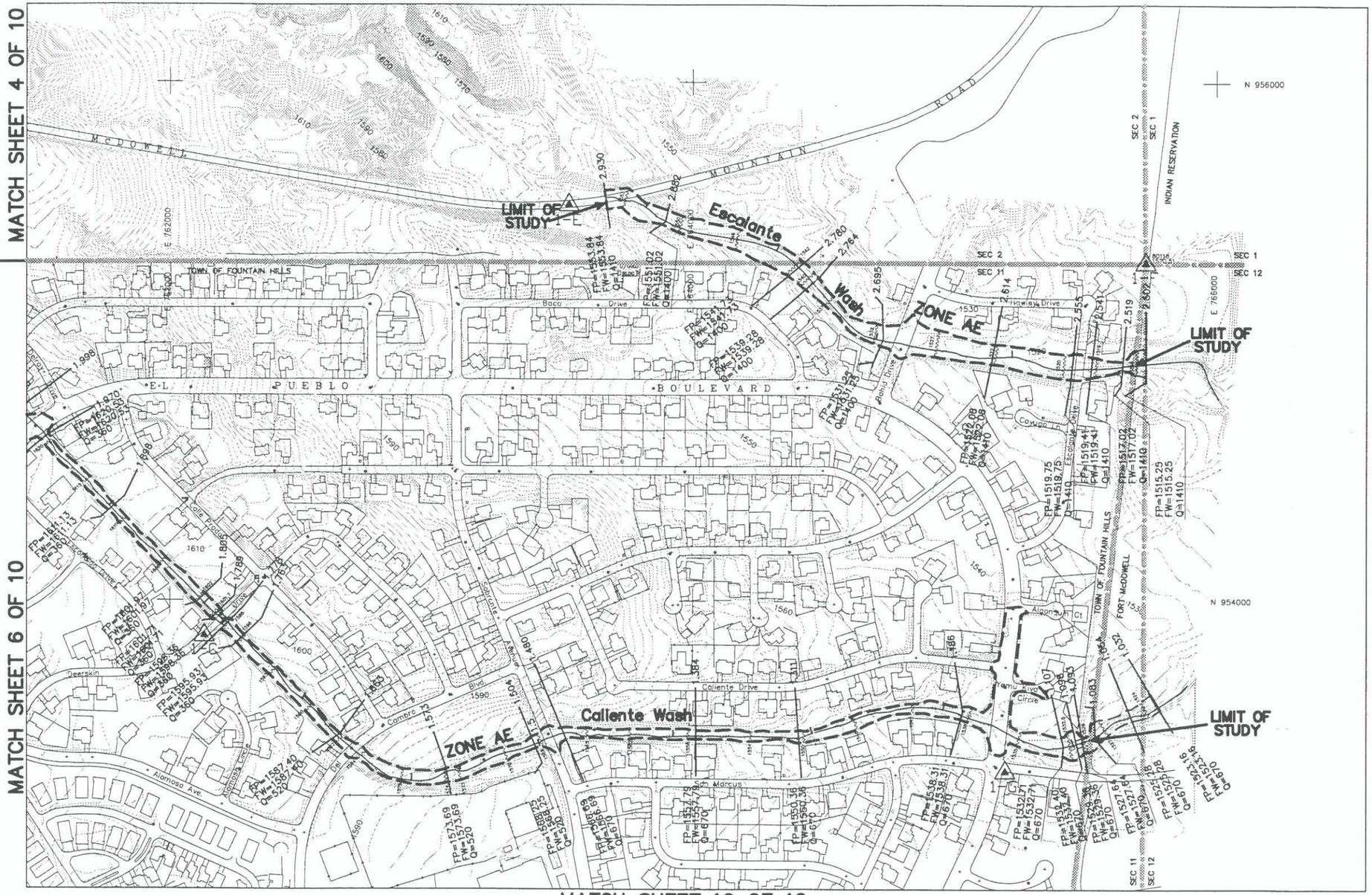
SHEET 6 OF 10

Dwg. Name: \P\92404001\ACAD\h-06.dwg
Date: REV. April 11, 1995 03:59pm

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

MATCH SHEET 4 OF 10



MATCH SHEET 6 OF 10

MATCH SHEET 10 OF 10

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

- 100-YR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE & RIVER MILE (2.0)
- CROSS SECTION (FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow) 5.519
- ELEVATION REFERENCE MARK (6-C)
- BASE FLOOD ELEVATIONS (1221)
- ZONE DESIGNATIONS: ZONE AE
- CORPORATE LIMITS: Corporate Limits
- SECTION LINE: Section Boundary

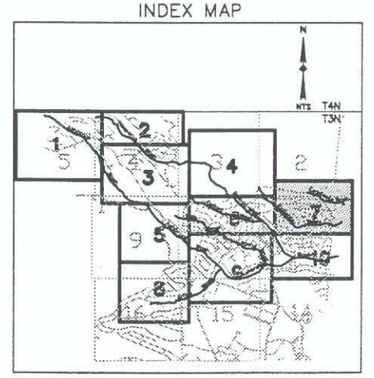
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
1-C	1603.59	Top of Brass Cap on centerline of Deersken Drive, approximately 190 Feet Northeast from the intersection of Deersken Drive and Escondido Drive, being in the Northwest 1/4 of Section 11 Township 3 North, Range 6 East.
1-E	1551.77	Top of Brass Cap at Station 41+33 on McDowell Mountain Road, approximately 185 Feet West of Escalante Wash, being in the Southeast 1/4 of Section 2, Township 3 North, Range 6 East.
1-F	1521.64	Top of Brass Cap set by G.L.O. stamped 1/16 Section 1 and 12, Located approximately 36 Feet East of the Southwest corner of Section 1, Township 3 North, Range 6 East.
1-G	1537.66	Brass Cap in concrete at center of Northeast curb return at Southeast corner of intersection of San Marcus and El Pueblo Boulevard, being in the Northeast 1/4 of Section 11 Township 3 North, Range 6 East.

NOTES

INDEX MAP



200' 0' 200' 400'

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

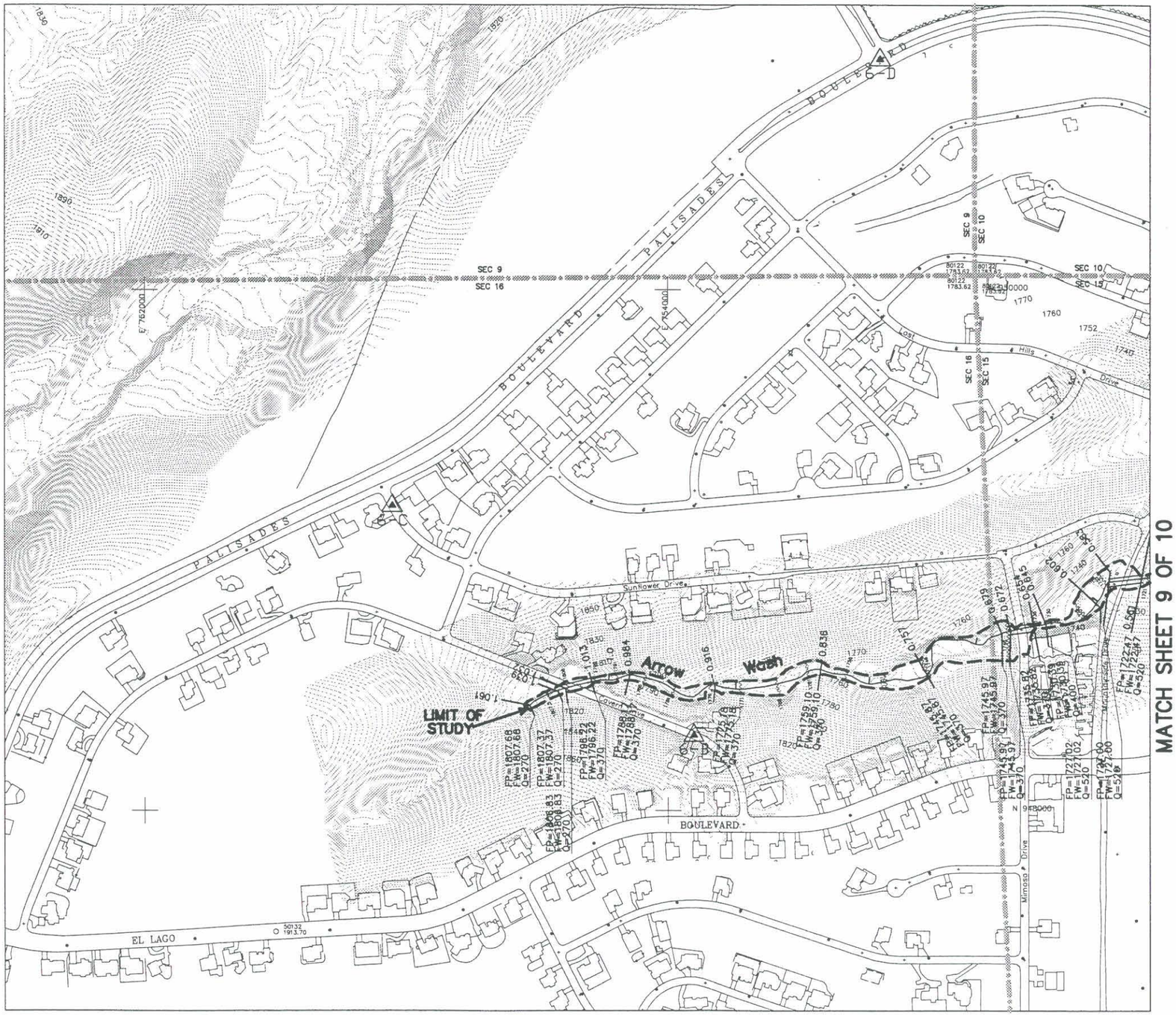
SHEET 7 OF 10

Dwg. Name: \P\92404001\ACAD\h-07.dwg
Date: REV. April 12,1995 06:55am

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

MATCH SHEET 5 OF 10



MATCH SHEET 9 OF 10

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. **FCD 92-04**

LEGEND

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE & RIVER MILE — 2.0

CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519

ELEVATION REFERENCE MARK — 6-C

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

SECTION LINE — Section Boundary

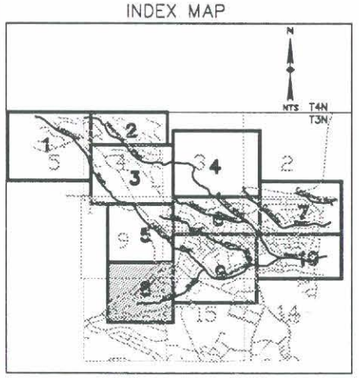
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
6-B	1813.51	Top of Brass Cap at a point of tangency on Cavern Drive approximately 430 Feet Northeast of the intersection of El Lago Boulevard and Cavern Drive, being in the Northeast 1/4 of Section 16, Township 3 North, Range 6 East.
6-C	1869.71	Top of Brass Cap at a point of tangency on Sunflower Drive, approximately 80 Feet Southeast of the intersection of Palisades Boulevard and Sunflower Drive, being in the Northeast 1/4 of Section 16, Township 3 North, Range 6 East.
6-D	1730.12	Top of Brass Cap at the intersection of Palisades Boulevard and Golden Eagle Boulevard, being in the Southeast 1/4 of Section 9, Township 3 North, Range 6 East.

NOTES

INDEX MAP



200' 0' 200' 400'

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95
SUBMITTED BY:		DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 10

Dwg. Name: \P\92404001\ACAD\h-08.dwg
Date: REV. April 12, 1995 07:11am

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

MATCH SHEET 5 OF 10

MATCH SHEET 6 OF 10

MATCH SHEET 10 OF 10

MATCH SHEET 8 OF 10

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

100-YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

HYDRAULIC BASE LINE & RIVER MILE — 20 — 1

CROSS SECTION — FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519

ELEVATION REFERENCE MARK — 6-C

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

CORPORATE LIMITS — Corporate Limits

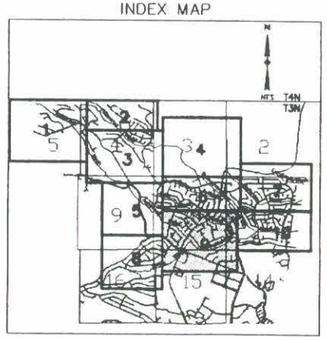
SECTION LINE — Section Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
2-B	1619.45	Top of Brass Cap at the intersection of Saguaro Boulevard and Sterling Way, being in the Southwest 1/4 of Section 11, Township 3 North, Range 6 East.
3-A	1644.18	Top of Brass Cap at center of cul-de-sac at the South end of Arrow Drive, near the Southwest corner of Southeast 1/4 of Section 10, Township 3 North, Range 6 East.
3-B	1636.82	Top of Brass Cap in concrete at middle of Southeast curb return at the intersection of Fountain Hills Boulevard and Edgeworth Drive, being in the Southeast 1/4 of Section 10, Township 3 North, Range 6 East.
4-A	1700.67	Top of Brass Cap at the intersection of Hempstead Drive and Bainbridge Avenue, being in the Northwest 1/4 of Section 10, Township 3 North, Range 6 East.
6-A	1707.36	Top of Brass Cap at the intersection of Mountainside Drive and Lost Hills Drive, being in the Northeast 1/4 of Section 15, Township 3 North, Range 6 East.

INDEX MAP



SCALE: 1"= 200'
CONTOUR INTERVAL = 2' FEET

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② FP=1663.33 FW=1663.33 Q=490	⑥ FP=1644.38 FW=1644.38 Q=490	⑩ FP=1594.26 FW=1594.26 Q=1380	
③ FP=1658.12 FW=1658.12 Q=490	⑦ FP=1639.28 FW=1639.28 Q=490	⑪ FP=1588.82 FW=1588.82 Q=1380	
④ FP=1649.87 FW=1649.87 Q=490	⑧ FP=1631.30 FW=1631.30 Q=1380	⑫ FP=1587.05 FW=1587.05 Q=1380	

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SUBMITTED BY: DATE

SHEET 9 OF 10

Dwg. Name: V:\92404001\ACAD\1-08.dwg
Date: REV. May 10, 1995 07:10am

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 6/91

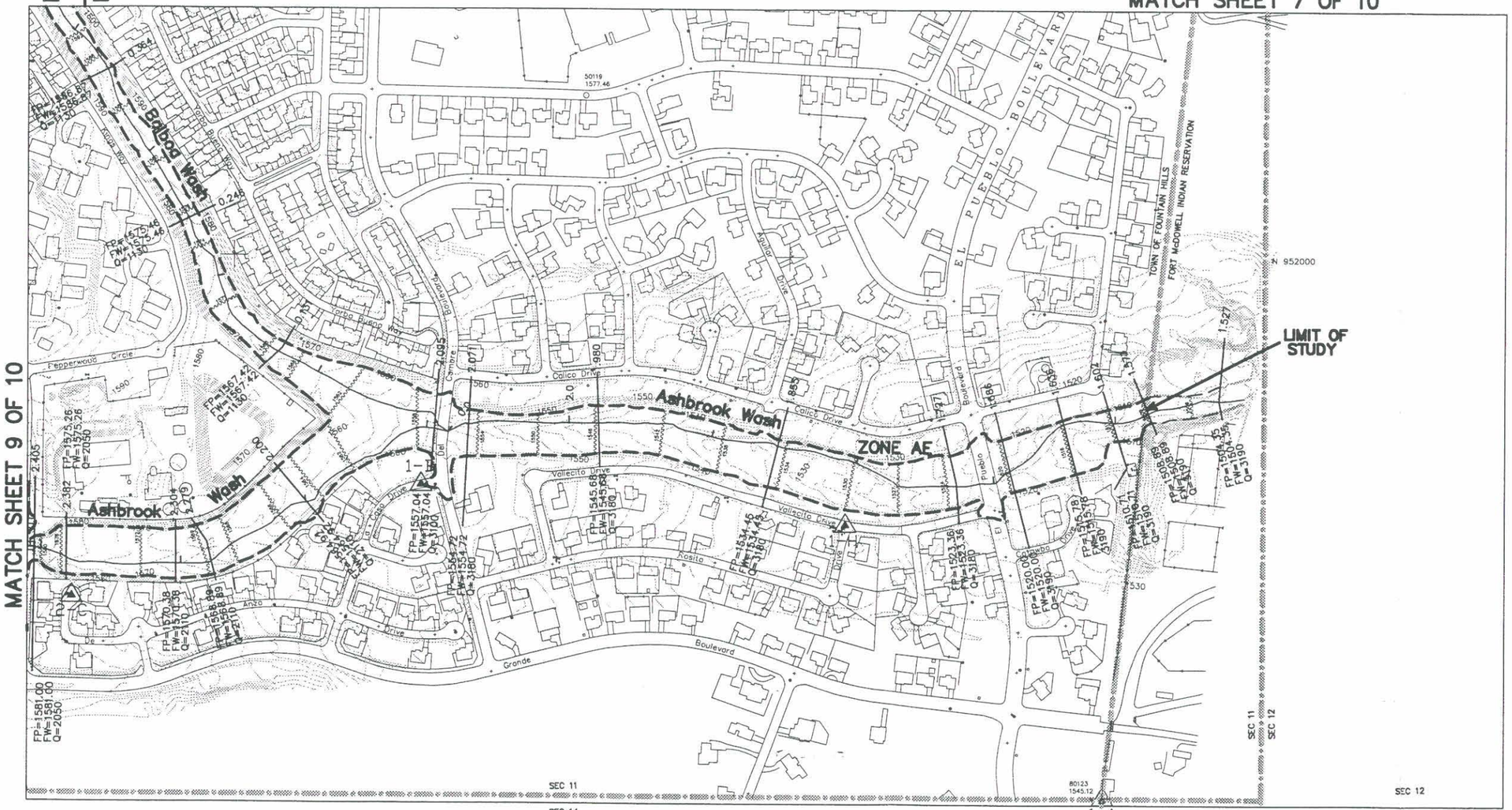
THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS 1"=200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS AND BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY ANDERSON-NELSON, INC.

MATCH SHEET 6 OF 10

MATCH SHEET 7 OF 10

MATCH SHEET 9 OF 10

MATCH SHEET 7 OF 10



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD DELINEATION STUDY OF FOUNTAIN HILLS NORTH

F.C.D. CONTRACT NO. FCD 92-04

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE & RIVER MILE	2.0
CROSS SECTION	FP=100 Yr WSEL / FW=Floodway WSEL / Q=100 Yr Flow — 5.519
ELEVATION REFERENCE MARK	6-C
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
SECTION LINE	Section Boundary

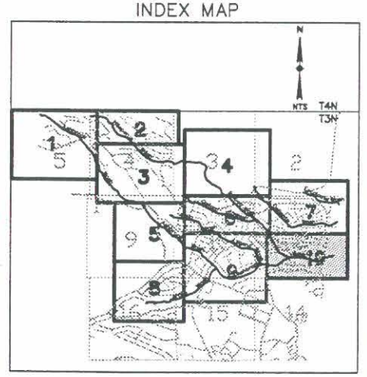
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

I.D. NUM.	ELEV. (FT)	DESCRIPTION/LOCATION
1-A	1544.63	Top of Brass Cap set by G.L.O. Southeast of the intersection of Grande Boulevard and El Pueblo Boulevard, at the intersection of the South line of Section 11 Township 3 North, Range 6 East and the West boundary of Fort McDowell Indian Reservation.
1-B	1556.30	Top of Brass Cap, at a point of curvature of center line of La Casa Drive approximately 80 feet West of Del Cambre Avenue, being in the Southwest 1/4 of Section 11, Township 3 North, Range 6 East.
1-H	1529.73	Top of Brass Cap at intersection of Vallecito Drive and Rosita Drive, being in the Southeast 1/4 of Section 11, Township 3 North, Range 6 East.
2-C	1581.56	Top of Brass Cap at the center of the cul-de-sac at the West end of De Anza Drive, being in the Southwest 1/4 of Section 11, Township 3 north, Range 6 East.

NOTES

INDEX MAP



200' 0' 200' 400'

SCALE: 1"= 200'

CONTOUR INTERVAL = 2' FEET

GEORGE V. SABOL CONSULTING ENGINEERS, INC.
in association with
McLAUGHLIN KMETTY ENGINEERS, LTD.

	BY	DATE
DESIGN	FEB	3/94
DESIGN CHK.	TRL	3/94
PLANS	PJK	3/94
PLANS CHK.	FEB/TRL	3/95

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET 10 OF 10

Drg. Name: \P\9240401\ACAD\FHCOVER.dwg
Date: REV. April 12, 1995 07:20am

200 Scale Mapping: Kenney Aerial Mapping
Flight Date = 8/91

THE CONTOURS AND PLANIMETRICS FOR THE 200 SCALE MAPPING WERE 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 ANDERSON-NELSON, INC.

APPENDIX G

Draft Flood Insurance Study Report

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DRAFT FLOOD INSURANCE STUDY

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SECTION 1: INTRODUCTION

1.1 Purpose of Study

The Town of Fountain Hills is a residential community through which several desert washes traverse. It is important to know the extent of flooding due to development along the washes and the continued trend for residential development. This Flood Insurance Study for Fountain Hills (North) determines the extent of 100-year floodplains and the severity of flood hazards by using detailed methods for nine washes within the northern portion of the Town.

The Town of Fountain Hills and Maricopa County should utilize the floodplain information to regulate floodplain development, and to promote sound land use and floodplain management.

1.2 Authority for Study

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by George V. Sabol Consulting Engineers, Inc., for the Flood Control District of Maricopa County (FCDMC), in association with their subconsultant McLaughlin Kmetty Engineers, Ltd., under Contract FCD 92-04. The hydrologic analyses were completed in November 1994, and the hydraulic analyses were completed in March 1995.

1.3 Coordination and Acknowledgements

Coordination of information occurred between the engineering consultants, the Town of Fountain Hills, appropriate governmental agencies and the Flood Control District of Maricopa County. Intermediate review meetings were conducted between appropriate study personnel. Due to the significant size of the study area, the north half and the south half were studied separately by two different engineering consultants. The south half Study Contractor is AGK Engineers, Inc. The following agencies were contacted for

information, published reports or manuals, perspective and comments during the study:

Arizona State Land Department
Arizona Department of Water Resources (ADWR)
Flood Control District of Maricopa County (FCDMC)
Maricopa County Department of Transportation (MCDOT)
Maricopa County Parks and Recreation Department
Town of Fountain Hills

1.4 Public Notification and Contact

An initial public meeting informed the residents of Fountain Hills of this study and contact names for the north and south study portions. The study was publicized in local newspapers, and subsequent responses from the public were noted or discussed. Letters concerning Right-of-Entry for surveying purposes were sent to the appropriate property owners along the study washes. A final public meeting is intended to present the study results prior to FEMA submittal.

SECTION 2: AREA STUDIED

2.1 Scope of Study

This Flood Delineation Study covers approximately 16.5 square miles of watershed area within central Maricopa County, about 20 miles northeast of Phoenix, Arizona, as shown in Figure 2-1. The study area contains the northern portion of the Town of Fountain Hills and some State-owned land. This project is within Sections 2-5, 9-11, and 15-16 of Township 3 North, Range 6 East. The study area is bounded on the north by the McDowell Mountain Park and by State Land, on the east by the Fort McDowell Indian Reservation, on the south by the Fountain Hills (South) Floodplain Delineation Study, and on the west by the City of Scottsdale. The McDowell Mountains lie to the west of the study area. The study area is northwesterly of the confluence of the Verde River with the Salt River, and due west of the Verde River, as shown in Figure 2-2.

Flooding along the following nine washes are studied by detailed methods:

Arrow Wash
Ashbrook Wash
Balboa Wash
Caliente Wash
Escalante Wash
Hesperus Wash
Legend Wash
Oxford Wash
Tulip Wash

Only three of these washes leave the study area: Ashbrook Wash, Caliente Wash, and Escalante Wash. The remaining washes are tributaries to Ashbrook Wash. Some of those washes are hydraulically the same wash, simply undergoing a name change, thus the following terminology is applied: Balboa/Hesperus Wash and Legend/Tulip Wash. Table 1 presents the Study Washes and Limits of Study for the detailed Study.

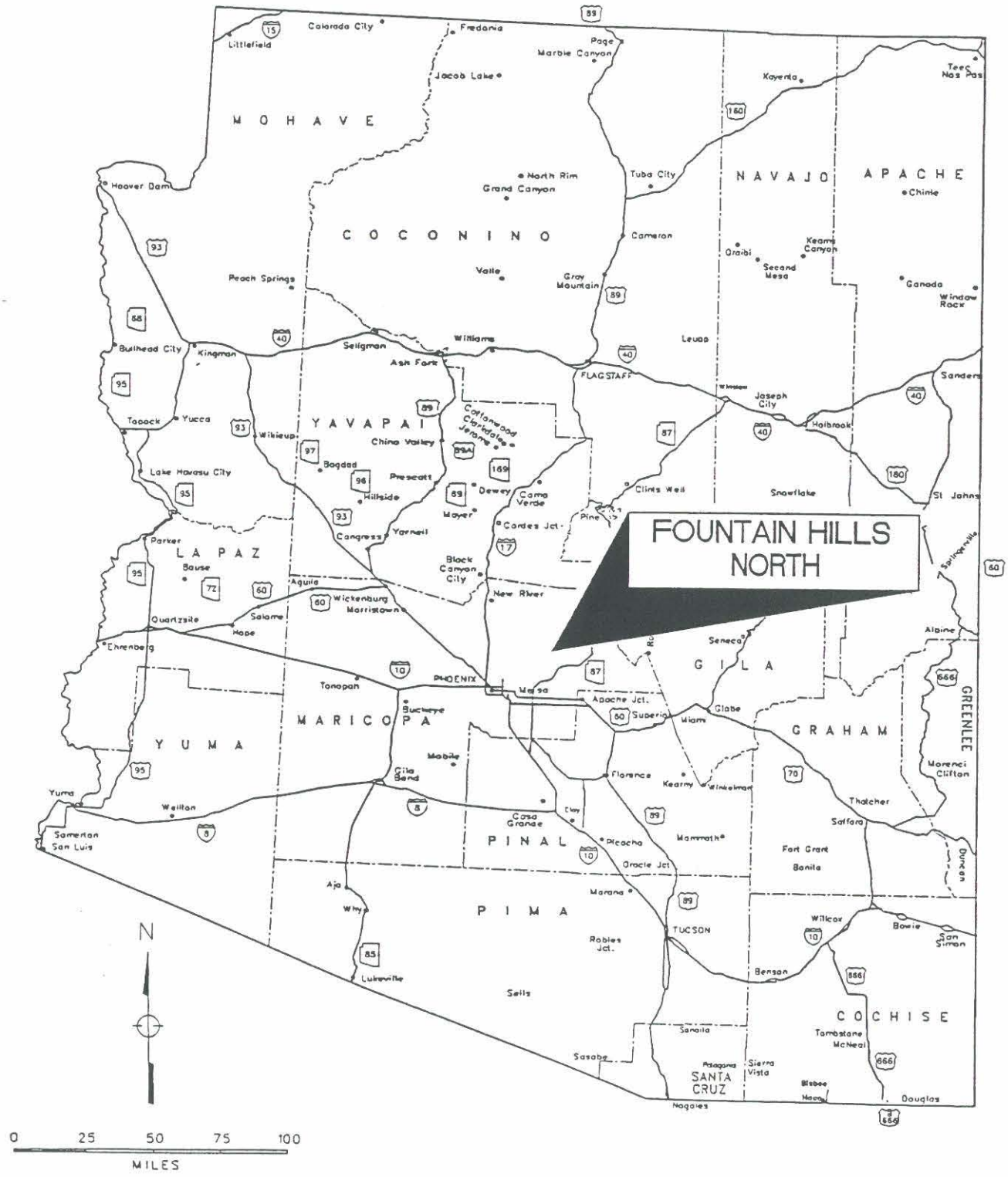

FIGURE 2-1

Location Map

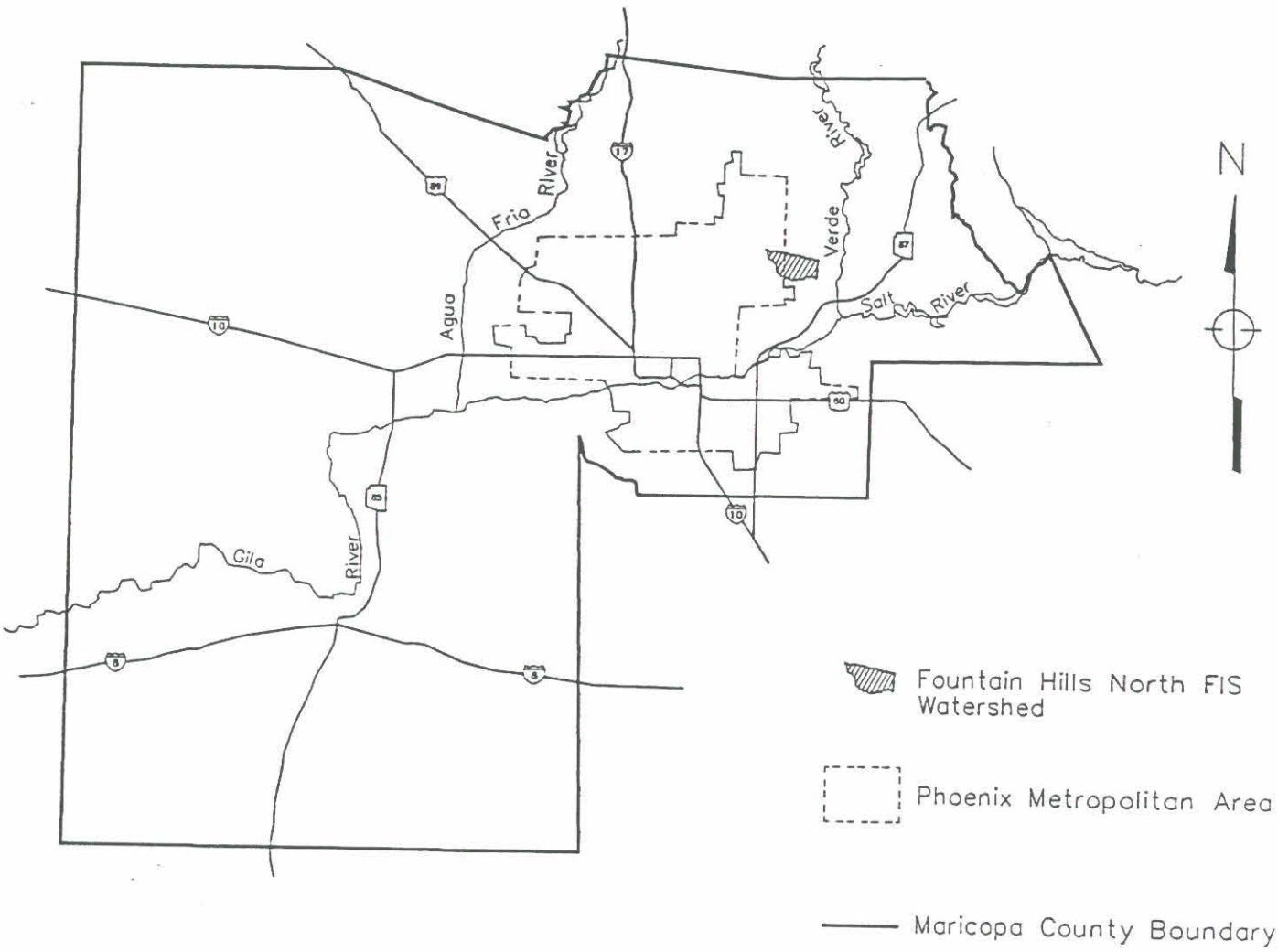

FIGURE 2-2

Study Area Map

TABLE 2-1

DETAILED-STUDY SOURCES

Flooding source (1)	Limits of Study (2)
Arrow Wash	From confluence with Ashbrook Wash to Cavern Drive (River Mile 1.061)
Ashbrook Wash	From Indian Reservation Boundary to Town of Fountain Hills Corporate Boundary (River Mile 6.118)
Balboa/Hesperus Wash	From confluence with Ashbrook Wash to Town of Fountain Hills Corporate Boundary (River Mile 3.349)
Caliente Wash	From Indian Reservation Boundary to McDowell Mountain Road (River Mile 2.317)
Escalante Wash	From Indian Reservation Boundary to McDowell Mountain Road (River Mile 2.930)
Legend/Tulip Wash	From confluence with Ashbrook Wash to near Glenbrook Boulevard (River Mile 1.455)
Oxford Wash	From confluence with Balboa Wash to Glenbrook Boulevard (River Mile 0.986)

2.2 Community Description

Maricopa County is located in south-central Arizona and contains 9,238 square miles. In 1990, the total county population was 2.1 million. The Town of Fountain Hills has a population of approximately 12,000. The community is primarily residential development with a small portion of commercial development. The Town incorporated in December 1989 and contains 11,340 acres. The Town's namesake is a technologically advanced water fountain capable of achieving a water spout 560 feet in the air.

The washes in the study area drain primarily southeasterly toward the Verde River. The terrain is the relatively steep desert terrace lying east of the McDowell Mountains. The climate is comprised of the mild, short winters and the long, hot summers of the Sonoran Desert. All of the study washes are in designated (platted) drainage easements.

2.3 Principal Flood Problems

The principal flood hazard is produced as runoff flows in the study washes towards the Verde River. Many road crossings are unsafe to cross during flood events. There are several buildings on the edge of the 100-year floodway, and one building within a Zone A floodplain.

There are 19 culverts under roads and two of those are plugged. There are 27 road crossings using a dip section with no culvert. There are very few traffic signs warning not to cross when flooded. A small problem has occurred when sediment is deposited at a dip crossing after a runoff event. Current practices are for the Town to remove the sediment from the street. There is one flow split at the Balboa Wash culvert crossing of Fountain Hills Boulevard. Overtopping runoff does not return directly to the wash, rather it flows to Oxford Wash via Fountain Hills Boulevard.

Significant ponding occurs at the flood control dams within the community. Pedestrian access is not restricted and the ponding depth could pose a problem, but to date no problems are reported.

2.4 Flood Protection Measures

The Town of Fountain Hills is aware of the need for more culvert crossings, and will be adding them in several key areas, such as at Ashbrook Wash and Fountain Hills Boulevard. The flood retarding structures, referred to as dams, provide a great benefit to the Town. The dams are of earthen construction with principal and emergency spillways, designed to pass at least the 1/2 Probable Maximum Flood (PMF). The Arizona Department of Water Resources regulates those dams. The dams are very effective in reducing peak discharges; therefore, the Town does not have a uniform on-site detention or retention policy. There is one regional detention pond on a non-study wash that is effective in reducing the peak flowrate to a study wash. At four culverts there is enough natural storage volume to slightly reduce the peak flow.

SECTION 3: ENGINEERING METHODS

3.1 Hydrologic Analyses

Hydrologic parameters are derived using the methodology contained in the Hydrologic Design Manual for Maricopa County. The watershed is modeled using the U.S. Army Corps of Engineers' HEC-1 computer program. The 100-year storm event, which has a one-percent chance of occurrence in any one year, is modeled in order to obtain peak discharges for the hydraulic analyses. The 100-year storm flood represents a long-term average period between flood, and such a flood could occur more frequently. Streamgage data are not available for the study area. Both the 6-hour and 24-hour storm durations were modeled to determine the peak rate of runoff. The 6-hour storm provides the peak rate for the majority of the study area. Runoff model input includes Green and Ampt infiltration losses, the Clark unit hydrograph, and normal depth Modified Puls routing method. A comprehensive discussion of the derivation of input data, assumptions and procedures utilized for the hydrologic model are contained in a separate report, "Fountain Hills North Floodplain Delineation Study, Hydrology Report" prepared by George V. Sabol Consulting Engineers, Inc. The 100-year peak flow rates, resulting from either the 24-hour or the 6-hour storm, are tabulated in Table 3-1.

The peak discharges shown in Table 3-1 at hydrologic concentration points C548L and C548R do not match the discharges used in the HEC-2 models downstream of those locations. Flow splits were analyzed as a part of the hydraulic modeling in more detail than the hydrologic modeling at those locations. The actual flow rate used in the HEC-2 models is listed in the asterisk comments in Table 3-1. The hydrologic models are not revised to include those flow splits because only short reaches of channel are affected and the splits are therefore not hydrologically significant.

TABLE 3-1

SUMMARY OF DISCHARGES

Flooding Source and Location	Hydrologic Concentration Points	Drainage Area	100-Year
		sq. mi.	cfs
(1)	(2)	(3)	(4)
Arrow Wash			
Above confluence with Ashbrook Wash	C620	0.42	490
Below Fountain Hills Boulevard	C619O	0.25	360
Above Fountain Hills Boulevard	C619I	0.25	520
Below Mimosa Drive	C618	0.19	400
Above Mimosa Drive	C618O	0.18	370
At Cavern Drive	C617	0.13	270
Ashbrook Wash			
At Indian Reservation Boundary	C627	13.32	3190
At El Pueblo Boulevard	C626	13.28	3180
At Del Cambre Boulevard	C549	13.06	3100
Above Confluence with Balboa/Hesperus Wash	C549R	8.87	2110
At Saguaro Boulevard	C622	8.78	2050
Above Confluence with Legend/Tulip Wash	C622R	8.14	1380
Below Fountain Hills Boulevard	C621	7.93	1180
Above Fountain Hills Boulevard	C613	7.55	970
At Hampstead Drive	C608	7.37	970
Below Dam 4	C599O	7.13	970
Above Dam 4	C599I	7.13	1970
At Golden Eagle Boulevard (River Mile 4.1)	C585	2.27	300
Below Dam 6	C560O	2.15	300
Above Dam 6	C560I	2.15	1990
About 0.3 mile above Dam 6	C558	1.97	1920
At Golden Eagle Boulevard	C557	1.85	1880
About 0.4 mile above Golden Eagle Blvd. (River Mile 6.0)	C556	1.64	1750

TABLE 3-1 (continued)

SUMMARY OF DISCHARGES

Flooding Source and Location	Hydrologic Concentration Points	Drainage Area	100-Year
		sq. mi.	cfs
(1)	(2)	(3)	(4)
Balboa/Hesperus Wash			
Above Confluence with Ashbrook Wash	C549L	4.19	1130
Below Confluence with Oxford Wash	C548	4.04	1040
Above Confluence with Oxford Wash	C548L	3.72	720*
At Glenbrook Boulevard	C541	3.40	660
About 0.5 mile below Boulder Drive	C540	3.24	560
Below Boulder Drive	C538O	3.14	450
Above Boulder Drive	C538I	3.14	490
At Richmond Avenue	C537	3.04	350
Below Dam 36	C536O	2.91	330
Above Dam 36	C536I	2.91	2590
About 0.5 mile above Dam 36	C535	2.62	2520

*Effective flow is 335 cfs due to flow split (loss) at Fountain Hills Boulevard

Caliente Wash			
At Indian Reservation Boundary	C527	0.50	670
At El Sobrante Avenue	C526	0.43	520
At Deerskin Drive	C525	0.35	360
At El Pueblo Boulevard	C524	0.31	280
Below McDowell Mountain Road	C523O	0.23	290
Above McDowell Mountain Road	C523I	0.23	390

TABLE 3-1 (continued)

SUMMARY OF DISCHARGES

Flooding Source and Location (1)	Hydrologic Concentration Points (2)	Drainage Area sq. mi. (3)	100-Year cfs (4)
Escalante Wash			
At Indian Reservation Boundary	C521	1.99	1410
At Bahia Drive	C591	1.83	1400
At McDowell Mountain Road	C519	1.59	1410
Legend/Tulip Wash			
Above Confluence with Ashbrook Wash	C622L	0.63	1120
At Fountain Hills Boulevard	C603	0.52	940
At Hampstead Drive	C602	0.37	640
At Glenbrook Boulevard	C601	0.25	460
Oxford Wash			
Above Confluence with Balboa Wash	C548R	0.32	640**
At Greenhurst Avenue	C547	0.26	530
At Glenbrook Boulevard	C543	0.08	210

**Effective flow is 1,020 cfs due to flow split (gain) at Fountain Hills Boulevard

3.2 Hydraulic Analyses

Open channel flow constitutes the flood hazard to the community; therefore, the HEC-2 Water Surface Profiles Program is used to determine the extent of flooding. Mapping is based upon aerial photography flown in August 1991. Two-foot contour interval maps at 1 inch = 200 feet scale are used to depict the floodplains. The coordinate grid and elevations are based on NAD 1983 and NGVD 1929 datum. Photogrammetric cross sections are obtained from the aerial photographs for the majority of cross sections. A field survey was done to obtain cross section information at some locations. For this and other important information, there is complete comment record documentation in the HEC-2 output file. Where the photogrammetric data differs from the contour maps, the contours take precedence. Certain 100-year flood problem areas were reviewed by field investigation with FCDMC Staff and during a meeting with the Floodplain Administrator for the Town of Fountain Hills.

Cross sections were located at close intervals above and below bridges in order to compute the significant backwater effects of those structures. All bridges and culverts were investigated and surveyed to obtain as-built elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles in Appendix E of the Technical Data Notebook (TDN). Those cross sections are also shown on the Floodplain and Floodway Maps (reduced size are in Appendix F of the TDN and fullsize maps are bound separately).

Hydraulic roughness coefficients (Manning's n values) were selected on the basis of field inspection and engineering judgment. Table 3-2 gives the range of Manning's n values for each flooding source studied by detailed methods.

Starting water-surface elevations for the three riverine flooding sources at the downstream Limit of Study were developed using the slope-area method. For the tributary washes, the starting water surface elevations are from the main stem wash or by known water surface elevations at ponding locations.

The 100-year Floodplain and Floodways Maps are bound separately. Those maps

contain both the floodplain and the floodways for the Study washes. The floodplain water surface elevation calculations are contained in Section 4.7 of the TDN, with index tabs for each study wash.

TABLE 3-2

RANGE OF HYDRAULIC ROUGHNESS COEFFICIENTS

FLOODING SOURCE	(Mannings n) CHANNEL (Min - Max)	OVERBANKS (Min - Max)
(1)	(2)	(3)
Arrow Wash	0.050 - 0.060	0.050 - 0.070
Ashbrook Wash	0.025 - 0.045	0.025 - 0.120
Balboa/Hesperus Wash	0.035 - 0.080	0.060 - 0.075
Caliente Wash	0.035 - 0.070	0.050 - 0.080
Escalante Wash	0.045 - 0.050	0.060 - 0.090
Legend/Tulip Wash	0.025 - 0.118	0.040 - 0.080
Oxford Wash	0.040 - 0.045	0.045 - 0.080

The hydraulic analyses for this study are based on unobstructed flow through the culverts and an unobstructed emergency spillway at Dam 4. The flood elevations at culverts are considered valid if hydraulic structures remain unobstructed, operate properly, do not fail, and the road embankment does not fail. The flood elevations at the dams are considered valid only if principal and emergency spillways remain unobstructed and the earthen embankment does not fail. Elevation reference marks and descriptions used in this study are shown on the maps.

The study was limited to fixed-bed modeling for the hydraulic analyses. However, due to the sand and gravel composition of the riverbed, changes in the riverbed could occur during a 100-year flood, particularly where the bottom slope is very non-uniform and/or where other structures, such as culverts, cause local increases in the velocity. Therefore some changes in the water-surface elevations can be expected as a normal occurrence for riverine flooding.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks and descriptions used in this study are shown on the maps. A list is included in Appendix A of the TDN.

3.3 Problem Areas

Of the 46 street crossings of the study washes, only 19 crossings have culverts, and the roadway is overtopped at 14 of those culverts. Thus, overtopping flow at roadways can be an impediment to vehicular and pedestrian traffic, including emergency vehicles.

A flow split at Balboa Wash and Fountain Hills Boulevard allows runoff to flow to Oxford Wash, thereby increasing flood depths in Oxford Wash. That area is near the confluence of Balboa Wash and Oxford Wash. The buildings near that confluence area are surrounded by floodplains (Zone X), thus limiting ingress and egress during flood events.

There is one fire station within a Zone A floodplain, one sewage lift station within a Zone AE floodway and three private residential structures on the fringe of a Zone AE floodway.

There are ten buildings within a Zone X designation that will be surrounded by flood waters during a 100-year flood.

The emergency spillway of Dam 4 would operate during the 100-year flood. The area downstream of the spillway is comprised of athletic event bleachers and athletic fields.

SECTION 4: FLOODPLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound floodplain management programs. This study, therefore, includes a flood boundary map designed to assist communities in developing sound floodplain management measures.

This study has been performed to meet the standards of the National Flood Insurance Program as defined by the Flood Insurance Study Guidelines (Reference 6).

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, 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 has been delineated using flood elevations determined at each survey cross section; between survey cross sections, the boundaries were interpolated using contour information from the topographic maps with contour intervals of 2 feet.

The boundary of the 100-year flood is shown on the Floodplain and Floodway Maps (bound separately).

4.2 Floodways

A floodway is used as a floodplain management tool to show the effect of encroachment within the floodplain, without increasing the flood depth more than 1 foot, and without producing hazardous velocities. Examples of encroachment are structures, including walls, fences, or buildings, and fill materials. The 1 foot or less rise in flood depth is according to Federal standards. The floodway must be kept free of encroachment so that the 100-year flood can be safely conveyed.

The floodways shown in this study are based upon equal-conveyance reduction on each side of the floodplain, so that a particular property on one bank is not favored over a property on the other bank. Floodways are shown for all of the washes within the study

area as coincident with the 100-year floodplain, with two exceptions: Ashbrook Wash upstream of Hampstead Drive, and Oxford Wash between Fairlynn Drive and Greenhurst Avenue. The floodways are shown coincident with the floodplain (exceptions noted) because of steep channel banks, the presence of platted drainage easements for the washes, and for floodplain management purposes. The standard Floodway Tables are contained in Section 4.7 of TDN, with index tabs for each wash.

SECTION 5: INSURANCE APPLICATION AND CRS SUMMARY

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. Those 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 Floodplain Delineation Study by approximate methods. No base flood elevations or depths are shown within this zone.

Zone AE: Zone AE is the flood insurance rate zone that corresponds to 100-year floodplains that are determined in the Floodplain Delineation Study by detailed methods. In most instances, whole-foot base flood elevations derived from 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 (usually areas of ponding) where average depths are between 1 and 3 feet. The base flood elevations derived from the detailed hydraulic analyses are shown 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. Average whole-foot depths derived from the detailed hydraulic analyses are shown 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 BFE's or depths are shown within this zone.

SECTION 6: OTHER STUDIES

There are no other significant published flood studies of record for the study washes.

Flood Delineation Study

This study is authoritative for the purposes of the flood insurance program, and the data presented herein depict the 100-year floodways and floodplains for Fountain Hills North.

SECTION 7: LOCATION OF DATA

The majority of data generated by this Study is contained in the Technical Data Notebook (TDN), which is part of this report. Any other survey, hydrologic, hydraulic, and other pertinent data used in this study may be obtained from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009.

SECTION 8: REFERENCES AND BIBLIOGRAPHY

1. Arizona Department of Water Resources, Engineering Division, Flood Management Section, September 1991. Instructions for Organizing and Submitting Technical Documentation for Flood Study.

2. Arizona Department of Water Resources, Engineering Division, Flood Management Section, December 1991. Requirement For Floodplain Delineation In Riverine Environments.

3. Chow, V.T., Open Channel Hydraulics, McGraw-Hill, 1959.

4. Dodson & Associates, Inc. 1991. ProHEC2 User's Manual and Program Reference.

5. Federal Emergency Management Agency, September 4, 1991. Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas, Volumes 1 through 7.

6. Federal Emergency Management Agency, March, 1991. FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Contractors.

7. Flood Control District of Maricopa County, September, 1992. Drainage Design Manual for Maricopa County, Volume II, Hydraulics.

8. Hoggan, Daniel H. 1989. Computer-Assisted Floodplain Hydrology & Hydraulics.

9. Ohio Department of Natural Resources, October 1987. Uneven Weir Program, Fortran version.

10. U.S. Army, Corps of Engineers, September, 1990. HEC-2 Water Surface Profiles Users Manual.

11. U.S. Department of Transportation, September, 1985. Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5, FHWA Report No. 1P-85-15.

12. U.S. Department of Transportation, May 1987. HY8 Culvert Analysis Microcomputer Program Applications Guide.

13. U.S. Geological Survey, 1991. Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona.