FLOOD INSURANCE STUDY
FOR
TRILBY WASH

COMMUNITY: UNINCORPORATED AREA OF MARICOPA COUNTY
COUNTY: MARICOPA
STATE: ARIZONA

PREPARED FOR:

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
2801 W. DURANGO STREET
PHOENIX, ARIZONA 85009
CONTRACT FCD 90-24
P&D TECHNOLOGIES PROJECT NO. 10320.00

TECHNICAL DATA NOTEBOOK

BOOK 2 OF 3

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10290
RAMESH I.
PATEL
Date Signed 2/26/92
ARIZONA, U.S.A.

SUBMITTED BY:

P&D TECHNOLOGIES
1702 E. HIGHLAND AVENUE
SUITE 200
PHOENIX, AZ 85016
(602) 264-3335

FEBRUARY 1992

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Ramesh I. Patel

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SECTION 3: HYDROLOGIC ANALYSIS

3.1 METHOD DESCRIPTIONS

The Trilby Wash Study area is contained within the Wittmann Area Drainage Master Study (ADMS). The ADMS was developed by the WLB Group under contract with the Flood Control District of Maricopa County and is used for the basis of this hydrologic study. The aforementioned study was completed in May 1989. The purpose of the ADMS was to identify existing drainage problems and to plan for future development of stormwater management.

The watershed was modeled utilizing methodology used in the Wittmann ADMS. The Wittmann ADMS uses the HEC-1 rainfall-runoff computer model developed by the U.S. Army Corps. of Engineers. The ADMS uses the 1985 Version of HEC-1 with a 900 ordinate capability.

3.2 PARAMETER ESTIMATION

Watershed Delineation:

As was mentioned above, Trilby Wash was delineated as part of the Wittmann ADMS. This study applied the Wittmann ADMS by redelineating pertinent subwatersheds within Trilby Wash. These watersheds were broken down into smaller subwatersheds where new concentration points were needed in order to evaluate the peak discharges.

The parameters in the new model were revised for the necessary parameters using the 7.5' U.S.G.S. topographic maps.

Land Use:

The watershed is rural in nature and essentially consists of desert terrain. There is some existing private residential development which consists of single family lots in excess of 1 acre in size. Individual dwelling units are very scattered.

Soils:

The watershed is characterized by flat desert valley, and the typical soils type is a sandy loam. This correlates to an SCS Hydrologic Group 'A' soil, so therefore the watershed can be characterized as having a low runoff potential.

Precipitation:

The 100-year, 6-hour storm total of 4.21 inches for the entire watershed was determined using the "NOAA Atlas No. 2, Precipitation - Frequency Atlas of the Western United States, Vol. VIII - Arizona", dated 1973. Rainfall was distributed in time using the SCS Type II, 24 hour rainfall distribution. The time increment used in the distribution was 15 minutes.

Point rainfall values were aerially reduced by the use of the depth area curve in the NOAA Atlas.

Rainfall Excess:

The Soil Conservation Service curve number method was used to calculate precipitation losses. Curve numbers were interpolated from SCS Technical Release No. 55. This document relates curve number to the hydrologic soil group, soil cover, land use type, and antecedent moisture conditions.

Unit Hydrographs:

The unit hydrograph for this watershed was determined using the Corps of Engineers S-Graph computations for unit hydrographs. The S-Graph program has been developed for the Phoenix Mountain and Phoenix Valley areas. This should give a more reliable unit hydrograph for the HEC-1 program to utilize within the Wittmann ADMS area.

Channel Routing:

The washes is the study area are natural with no lining or improvements and therefore significant storage and attenuation of the flood hydrographs would be expected. To account for attenuation, the Muskingum routing method was used.

The Muskingum x coefficient (wedge storage factor) was set equal to 0.2 which is commonly used in absence of observed data. The Muskingum K coefficient (HEC-1 variable AMSKK) was set equal to the travel time in the routing reach. The number of routing steps (HEC-1 variable NSTPS) was set equal to 1 for each reach.

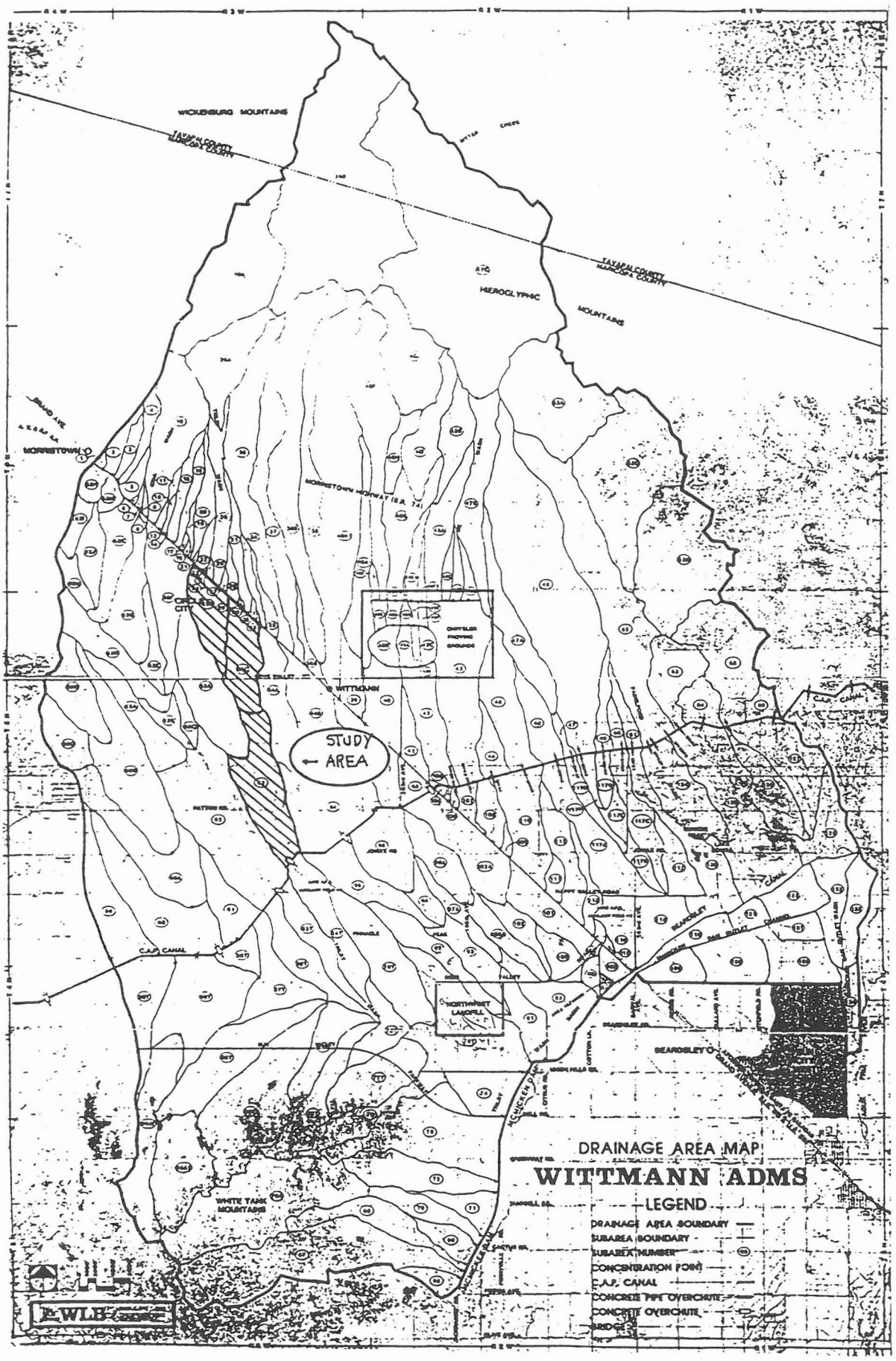

WICKENBURG MOUNTAINS
HIEROGLYPHIC
MOUNTAINS
MORRISTOWN
WITTMANN
STUDY
AREA
CAP CANAL
WHITE TANK
MOUNTAINS
DRAINAGE AREA MAP
WITTMANN ADMS
LEGEND
DRAINAGE AREA BOUNDARY
SUBAREA BOUNDARY
SUBAREA NUMBER
CONCENTRATION POINT
C.A.P. CANAL
CONCRETE PIPE OVERCHUTE
CONCRETE OVERCHUTE
BRIDGE
WLB

Figure 1

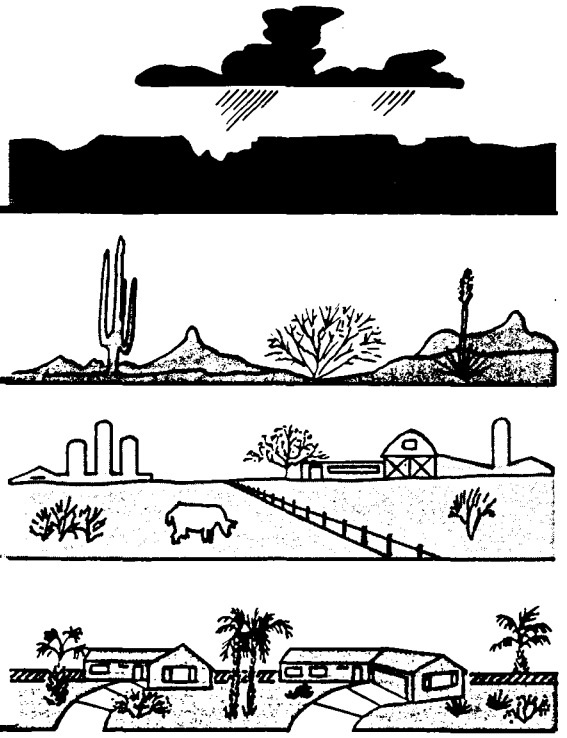
3.5 FINAL RESULTS/COMPUTER RUNS

Due to the nature of these hydrologic computer simulations and the sensitivity of the kinematic wave, the results obtained by the newly developed model did not compare well with those estimated in the ADMS at matching concentration points. The differences at the CAP were approximately 10 percent. Therefore, we pro-rated these values based on the rates developed by the new, more detailed model. The results are listed on the Table below.

TRILBY WASH 100-YEAR PEAK DISCHARGE

CONCENTRATION POINT	Wittmann ADMS DISCHARGE-cfs	FCD DETAIL DISCHARGE-cfs
Sta. 17.262	2,785	2,785
63B2	* ------	2,995
63B3	* ------	3,020
63B	3,035	3,035
63C	3,322	3,322
C631	* ------	3,706
C632	* ------	3,756
C633	* ------	3,805
C63	3,851	3,851
Sta. 10.444	3,845	3,845
Sta. 10.382	3,780	3,780

* CONCENTRATION POINTS OF THE TRILBY WASH FIS CONCERNS.



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

OD CONTROL
DISTRICT
ARICOPA
OUNTY

Report on

A HYDROLOGIC ANALYSIS OF TRILBY WASH WATERSHED

Prepared by

Flood Control District of Maricopa County
Hydrology Division

August 1991

A HYDROLOGIC ANALYSIS
OF
TRILBY WASH WATERSHED

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INTRODUCTION

1.1 Purpose

The purpose of this project is to develop the 100 year discharges at critical points along the main branch of Trilby Wash, which is contained within the Wittmann ADMS, from its crossing of State Route 60-89, to its crossing of the Central Arizona Project (CAP).

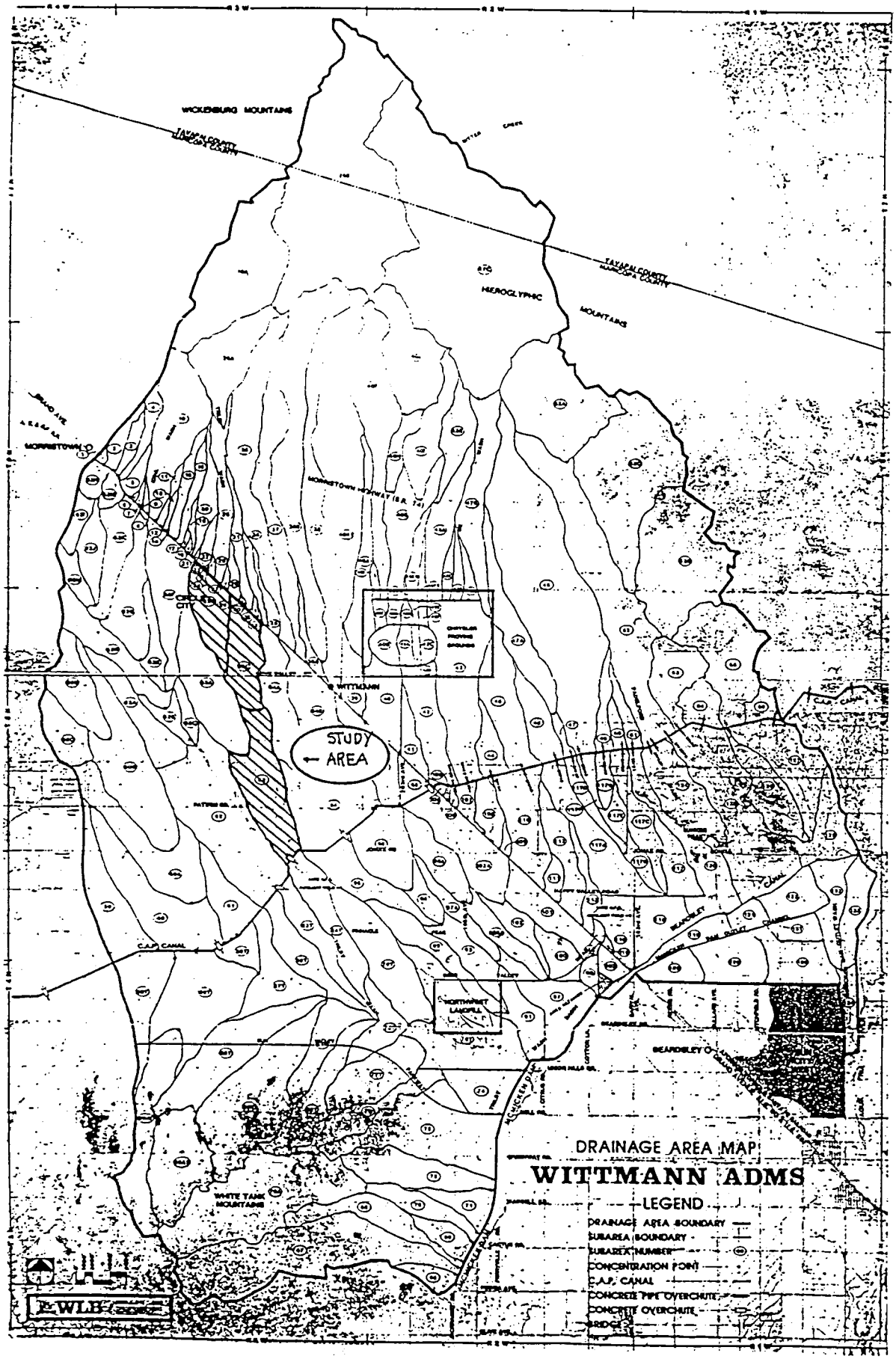
1.2 Background

The Wittmann ADMS covers the largely undeveloped 322 square mile basin that drains into McMicken Dam and the McMicken Dam Outlet Channel. The purpose of the ADMS was to identify existing drainage problems and to plan for future development and stormwater management. Trilby Wash is contained within the Wittmann watershed. The hydrology was accepted and approved by FEMA in 1989.

1.3 Study Area

Trilby Wash is an ephemeral wash in central Maricopa County located approximately 30 miles northwest of Metropolitan Phoenix as outlined on Figure 1. The watershed is characterized with broad slopes prone to sheet flow and with few small incised channels as tributaries. Trilby Wash carries flows southeasterly into the McMicken Dam storage basin.

The Trilby Wash study area is contained within the Wittmann Area Drainage Master Study (ADMS). The ADMS was developed by the WLB Group under contract with the Flood Control District (FCD) of Maricopa County, and is used for the basis of this hydrologic study. The aforementioned study was completed in May 1989.


WICKENBURG MOUNTAINS
HIEROGLYPHIC
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MORRISTOWN
WITTMANN
STUDY
AREA
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CONCRETE OVERCHUTE
BRIDGE
WLB

Figure 1

WATERSHED CHARACTERISTICS

2.1 Watershed Delineation

As was mentioned above, Trilby Wash was delineated as part of the Wittmann ADMS. This study applied the Wittmann ADMS by redelineating pertinent subwatersheds within Trilby Wash. These watersheds were broken down into smaller subwatersheds where new concentration points were needed in order to evaluate the peak discharges.

The parameters in the new model were revised for the necessary parameters using the 7.5' U.S.G.S topographic maps.

2.2 Land Use

The watershed is rural in nature and essentially consists of desert terrain. There is some existing private residential development which consists of single family lots in excess of 1 acre in size. Individual dwelling units are very scattered.

2.3 Soils

The watershed is characterized by flat desert valley, and the typical soils type is a (sandy loam). This correlates to an SCS Hydrologic Group (A) soil, so therefore the watershed can be characterized as having a low runoff potential.

HYDROLOGIC METHODS

3.1 Model

The watershed was modeled utilizing methodology used in the Wittmann ADMS. The Wittmann ADMS uses the HEC-1 rainfall-runoff computer model developed by the U.S. Army Corps of Engineers. The ADMS uses the 1985 version of HEC-1 with a 900 ordinate capability.

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The washes in the study area are natural with no lining or improvements and therefore significant storage and attenuation of the flood hydrographs would be expected. To account for attenuation, the Muskingum routing method was used.

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RESULTS

Due to the nature of these hydrologic computer simulations and the sensitivity of the kinematic wave, the results obtained by the newly developed model did not compare well with those estimated in the ADMS at matching concentration points. The differences at the CAP were approximately 10 percent. Therefore, we pro-rated these values based on the rates developed by the new, more detailed model. The results are listed on Table 1.

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C633	* -----	3,805
C63	3,851	3,851
Sta. 10.444	3,845	3,845
Sta. 10.382	3,780	3,780

* Concentration points of the Trilby Wash FIS concerns

REFERENCES

1. The WLB Group Inc., Wittmann Area Drainage Master Study, Prepared for the Flood Control District of Maricopa County, May 1989.

APPENDIX A-1

Subbasin Areas

1 sq mile = 28127389

Basin	Plan. Count	area	-7% adjusted	WLB area
6300	4484675.3	0.159	0.148	
6302	22692045.0	0.807	0.750	
6304	11485522	0.408	0.379	
6305	4794676	0.170	0.158	
63 B	43896087 [1.56]	→ [1.54]	$\xrightarrow[-7\%]{}$	1.44

1 sq mile = 0.9926218

			Adjusted (+14%)	
6306	0.386225	0.389	0.443	
6307	1.0734252	1.081	1.232	
63C	1.4685465 [1.48]	→ [1.47]	$\xrightarrow[+14\%]{}$	1.70

			adjusted (-8%)	
6308	0.3232136	0.326	0.300	
6310	0.5537628	0.558	0.513	
6312	0.4195847	0.423	0.389	
6314	0.9133010	0.920	0.846	
6316	0.1890355	0.190	0.175	
6318	0.5693305	0.574	0.528	
63	3.0675647 [3.09]	→ [2.99]	$\xrightarrow[-8\%]{}$	2.78

Total	6.13	6.00	5.92

kk ~~C~~63 B

BA 1.44

LS — 81

Uk	250	0.015	0.12	100				971
Rk	2100	0.0111	.05	.20	TRAP	—	15	12.50
Rk	14500	0.0111	.05	—	TRAP	25	20	

kk ~~C~~63 C

BA 1.70

LS — 83

Uk	200	0.015	0.12	100				
Rk	2000	0.0100	.05	.28	TRAP	—	15	1300
Rk	15250	0.0100	.05	—	TRAP	25	20	12.45

kk 63

BA 2.78

LS — 78

Uk	400	.01	0.12	100				
Rk	3000	.0076	0.05	0.70	TRAP	10	25	975
Rk	20750	.0076	0.05	—	TRAP	60	40	13.25

Outlet CAP 3851 14.43

APPENDIX B-1

Subbasin Characteristics

APPENDIX C-1

HEC-1 Output

Basin Char

Basin # 6300 Area: 0.159

Sheet Flow

Top elev.: 1862 Cover: <10%

Bottom elev.: 1850 Fric. Factor: 0.8

length: 400

slope: 0.03

Shallow Conc. Flow:

Top elev.: 1850 Cover:

Bottom elev.: 1840 Fric. Factor:

length: 300

Slope: 0.03

Channel Flow:

Top elev.: 1840 Cover:

Bottom elev.: 1785 Frict. Factor

length: 4200

Slope: 0.013

Basin Char

Basin # 6304 Area : 0.408

Sheet Flow

Top elev. : 1850 Cover: <20%
Bottom elev. : 1848 Fric. Factor:
length: 100
slope : 0.02

Shallow Conc. Flow:

Top elev. : 1848 Cover:
Bottom elev. : 1840 Fric. Factor:
length : 300
slope : 0.027

Channel Flow:

Top elev. : 1840 Cover:
Bottom elev. : 1754 Frict. Factor
length : 4800
slope : 0.018

Basin Char

Basin # 630S Area: 0.170

Sheet Flow

Top elev.: 1803 Cover: < 20%
Bottom elev.: 1800 Fric. Factor: 0.08
length: 100
slope: 0.03

Shallow Conc. Flow:

Top elev.: 1800 Cover:
Bottom elev.: 1790 Fric. Factor:
length: 300
slope: $0.0\bar{3}$

Channel Flow:

Top elev.: 1790 Cover:
Bottom elev.: 1732 Frict. Factor
length: 5400
slope: 0.01

Basin Char

Basin # 6302 Area: 0.807 mi^2

Sheet Flow (Typical)

Top elev.: 1865
Bottom elev.: 1860
length: 200
slope: 0.025

Cover: Sparse (<10%)
Fric. Factor. 0.8

Shallow Conc. Flow:

Top elev.: 1860
Bottom elev.: 1850
length: 620
Slope: 0.016

Cover:
Fric. Factor: 0.07

Channel Flow:

Top elev.: 1850
Bottom elev.: 1754
length: 6600
Slope: 0.014

Cover: dense on banks
Frict. Factor

Basin Char.

Basin # 6307 Area: 1.081

Sheet Flow

Top elev.: 1835 Cover: <10%
Bottom elev.: 1830 Fric. Factor:
length: 200
slope: 0.025

Shallow Conc. Flow:

Top elev.: 1830 Cover:
Bottom elev.: 1760 Fric. Factor:
length: 3900
slope: 0.018

Channel Flow:

Top elev.: 1760 Cover:
Bottom elev.: 1675 Frict. Factor
length: 7600
slope: 0.011

Basin Char

Basin # 6306 Area: 0.389

Sheet Flow

Top elev.: 1803
Bottom elev.: 1800
length: 100
slope: 0.03

Cover: < 20%
Fric. Factor: 0.08

Shallow Conc. Flow:

Top elev.: 1800
Bottom elev.: 1710
length: 6000
Slope: 0.015

Cover:
Fric. Factor:

Channel Flow:

Top elev.: 1710
Bottom elev.: 1675
length: 3600
Slope: 0.001

Cover:
Frict. Factor

Basin Char.

Basin # 6308 Area: 0.326

Sheet Flow

Top elev.: 1682 Cover: < 10%

Bottom elev.: 1680 Fric. Factor:

length: 200

slope: 0.01

Shallow Conc. Flow:

Top elev.: 1680 Cover:

Bottom elev.: 1655 Fric. Factor:

length: 2000

slope: 0.0125

Channel Flow:

Top elev.: 1655 Cover:

Bottom elev.: 1601 Frict. Factor

length: 5200

slope: 0.010

Basin Char

Basin # 6310 Area: 0.558

Sheet Flow

Top elev.: 1703 Cover: < 10%
Bottom elev.: 1690 Fric. Factor:
length: 600
slope: 0.022

Shallow Conc. Flow:

Top elev.: 1690 Cover:
Bottom elev.: 1640 Fric. Factor:
length: 4800
slope: 0.01

Channel Flow:

Top elev.: 1640 Cover:
Bottom elev.: 1601 Fric. Factor
length: 3600
slope: 0.011

Basin Char.

Basin # 6312 Area: 0.423

Sheet Flow

Top elev.: 1640
Bottom elev.: 1630
length: 1600
slope: 0.006

Cover:
Fric. Factor:

Shallow Conc. Flow:

Top elev.: 1630
Bottom elev.: 1590
length: 3200
slope: 0.0125

Cover:
Fric. Factor:

Channel Flow:

Top elev.: 1590
Bottom elev.: 1579
length: 1600
slope: 0.007

Cover:
Frict. Factor

Basin Char.

Basin # 6314 Area: 0.920

Sheet Flow

Top elev.: 1665
Bottom elev.: 1660
length: 220
slope: 0.23

Cover:
Fric. Factor:

Shallow Conc. Flow:

Top elev.: 1660
Bottom elev.: 1620
length: 4000
slope: 0.01

Cover:
Fric. Factor:

Channel Flow:

Top elev.: 1620
Bottom elev.: 1548
length: 5200
slope: 0.014

Cover:
Frict. Factor

Basin Char.

Basin # 6316 Area: 0.190

Sheet Flow

Top elev.: 1595
Bottom elev.: 1590
length: 500
slope: 0.01

Cover:
Fric. Factor:

Shallow Conc. Flow:

Top elev.: 1550
Bottom elev.: 1550
length: 2600
Slope: 0.015

Cover:
Fric. Factor:

Channel Flow:

Top elev.: 1550
Bottom elev.: 1548
length: 1000
slope: 0.002

Cover:
Frict. Factor

Basin Char

Basin # 6318 Area: 0.574

Sheet Flow

Top elev.: 1598 Cover:
Bottom elev.: 1595 Fric. Factor:
length: 300
slope: 0.01

Shallow Conc. Flow:

Top elev.: 1595 Cover:
Bottom elev.: 1548 Fric. Factor:
length: 4400
slope: 0.01

Channel Flow:

Top elev.: 1548 Cover:
Bottom elev.: 1540 Frict. Factor
length: 1600
slope: 0.005

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*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *
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*        REVISED 14 JUN 85               *
*                                        *
*  RUN DATE: 09/13/1991                  *
*       TIME: 11:22:13.55                *
*                                        *
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*                                        *
*   U.S. ARMY CORPS OF ENGINEERS         *
* THE HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET              *
*       DAVIS, CALIFORNIA 95616          *
*                                        *
* (916) 551-1748 OR (FTS) 448-3285       *
*                                        *
******************************************
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X     X  XXXXXXX   XXXXX          X
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X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THE VERSION RELEASED 31JAN85 CONTAINS NEW OPTIONS ON RL AND BA RECORDS, AND ADDS THE HL RECORD. SEE JANUARY 1985 INPUT DESCRIPTION FOR NEW DEFINITIONS.

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:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
:::            900 ORDINATES            :::
:::            Version  3.2c            :::
:::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::
```


==========
H A E S T A D M E T H O D S
==========

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1         ID        WTM100YR
  2         ID
  3         ID
  4         ID        THIS IS THE HEC-1 COMPUTER MODEL FOR THE WITTMANN AREA DRAINAGE MASTER
  5         ID        STUDY.  THIS STUDY IS PREPARED FOR THE FLOOD CONTROL DISTRICT OF
  6         ID        MARICOPA COUNTY BY THE WLB GROUP, INC.
  7         ID
  8         ID        THIS IS THE 100 YEAR MODEL FOR THE STUDY AREA AND INCLUDES STORAGE
  9         ID        ROUTING AND DIVERSIONS ALONG THE A.T. & S.F. RAILROAD, THE CAP CANAL,
 10         ID        AND THE BEARDSLEY CANAL.
 11         ID
 12         ID
 13         ID
 14         ID
 15         ID   !!!!!!!!!!THIS PROGRAM IS MODIFIED BY THE FLOOD CONTROL DISTRICT !!!!!!!!!!!!
 16         ID   !!!!!!!!!!OF MARICOPA COUNTY BY DEVIDING THE ORIGINAL WLB SUBBASINS!!!!!!!!!!
 17         ID   !!!!!!!!!!63,63B AND 63C INTO SMALLER SUBBASINS. AMM/1/22/90 !!!!!!!!!!!!!!!!
 18         ID
 19         ID
 20         ID  !!!!!!!!!!!!INCLUDES CHANGE IN ROUTING PARAMETERS WITHIN 63B,63C,63!!!!!!!!!!!
 21         ID
 22         ID
            *DIAGRAM
 23         IT       3 26JAN87    1200     640
 24         IN      15 26JAN87    1200
 25         IO       5
 26         JD    4.21     .001
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 28         PC    .029     .032     .035     .038     .041     .044     .048     .052     .056     .060
 29         PC    .064     .068     .072     .076     .080     .085     .090     .095     .100     .105
 30         PC    .110     .115     .120     .126     .133     .140     .147     .155     .163     .172
 31         PC    .181     .191     .203     .218     .236     .257     .283     .387     .663     .707
 32         PC    .735     .758     .776     .791     .804     .815     .825     .834     .842     .849
 33         PC    .856     .863     .869     .875     .881     .887     .893     .898     .903     .908
 34         PC    .913     .918     .922     .926     .930     .934     .938     .942     .946     .950
 35         PC    .953     .956     .959     .962     .965     .968     .971     .974     .977     .980
 36         PC    .983     .986     .989     .992     .995     .998     1.00     1.000    1.000    1.000
 37         JD    4.17       10
 38         JD    4.00       50
 39         JD    3.93      100
 40         JD    3.82      350

 41         KK       1
 42         KM        RUNOFF FROM SUBWATERSHED 1.
 43         KM        UNIT HYDROGRAPHS HAVE BEEN COMPUTED FOR EACH SUBWATERSHED USING THE
 44         KM        CORPS OF ENGINEERS S-GRAPH COMPUTATIONS FOR UNIT HYDROGRAPHS.  THE
 45         KM        S-GRAPH PROGRAM HAS BEEN DEVELOPED FOR THE PHOENIX MOUNTAIN AND PHOENIX
 46         KM        VALLEY AREAS.  THIS SHOULD GIVE A MORE RELIABLE UNIT HYDROGRAPH FOR THE
 47         KM        HEC-1 PROGRAM TO UTILIZE WITHIN THE WITTMANN ADMS AREA.
 48         BA    .088
 49         UK     200   .0160     .11     100
```

```
                                                                                  0       25
  92          RK    8500   .0082     .05

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  93          KK    62J
  94          KM        RUNOFF FROM SUBWATERSHED 62J.
  95          BA    .88
  96          LS      0      77       0
  97          UK    250   .0150     .07     100
  98          RK   2600   .0089     .05     .05                0       15
  99          RK  12875   .0089     .05                        0       25

 100          KK    C62H
 101          KM        ADD HYDROGRAPHS AT C62H.
 102          HC      3

 103          KK    C62K
 104          KM        ROUTE FLOW FROM C62H TO C62K
 105          RM      1     .13      .2

 106          KK      2
 107          KM        RUNOFF FROM SUBWATERSHED 2.
 108          BA    .50
 109          LS              78
 110          UK    150   .0160     .11     100
 111          RK  10725   .0146     .05                        0       35

 112          KK      C2
 113          KM        STORAGE ROUTE THROUGH C2.  6'X4' BC ON GRAND AV.
 114          RS      1    STOR      0       0
 115          SV      0     .82    3.61
 116          SQ      0      72     468
 117          SE  1965.5    1968   1970

 118          KK    C62M
 119          KM        ROUTE FLOW FROM C2 TO C62M
 120          RM      1     .33      .2

 121          KK    62M
 122          KM        RUNOFF FROM SUBWATERSHED 62M
 123          BA    .24
 124          LS      0      71       0
 125          UK    200   .0150     .12     100
 126          RK    800   .0090     .05     .08                0       15
 127          RK   5000   .0090     .05                       10       15

 128          KK    C62M
 129          KM        ADD HYDROGRAPHS AT C62M
 130          HC      2

 131          KK      3
 132          KM        RUNOFF FROM SUBWATERSHED 3.
 133          BA    .55
```

```
134        LS              81
135        UK     100    .0160     .11     100
136        RK    9250    .0132     .05             TRAP      0      25
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

137        KK     C3
138        KM        STORAGE ROUTE THROUGH C3.  50"X30" CMPA ON GRAND AV.
139        RS      1    STOR       0       0
140        SV      0     .19    1.36    2.17
141        SQ      0     5.5      56     335
142        SE  1966.5    1967    1968  1968.5

143        KK    C62K
144        KM        ROUTE FLOW FROM C3 TO C62M.
145        RM      1     .49      .2

146        KK      4
147        KM        RUNOFF FROM SUBWATERSHED 4.
148        BA    .65
149        LS              80
150        UK     100   .0160     .11     100
151        RK    2800   .0103     .05    .325                0      50
152        RK   13000   .0103     .05                        0      30

153        KK     C4
154        KM        STORAGE ROUTE THROUGH C4.  48" CMP ON GRAND AV.
155        RS      1    STOR       0       0
156        SV      0     .19     .48     .95    1.69
157        SQ      0      24      74     110     445
158        SE   1962    1964  1965.5    1966    1967

159        KK     C4
160        KM        DIVERT FLOW AT C4.
161        DT    DIV4
162        DI      0      74     110     445
163        DQ      0       0      36     350

164        KK    C62K
165        KM        ROUTE FLOW FROM C4 TO C62M.
166        RM      1     .47      .2

167        KK    C62M
168        KM        ADD HYDROGRAPHS AT C62M.
169        HC      3

170        KK    C62K
171        KM        ROUTE FLOW FROM C62M TO C62K
172        RM      1    1.01      .2

173        KK     C4
174        KM        RETURN DIVERTED FLOW AT C4.
175        DR    DIV4
```

```
176        KK     C5
177        KM       ROUTE DIVERTED FLOW FROM C4 TO C5.
178        RM     1     .21      .2
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

179        KK     5
180        KM       RUNOFF FROM SUBWATERSHED 5.
181        BA    .35
182        LS            78
183        UK    100   .0160     .11     100
184        RK   7625   .0126     .05                        25       8

185        KK     C5
186        KM       ADD HYDROGRAPHS AT C5.
187        HC     2

188        KK     C5
189        KM       STORAGE ROUTE THROUGH C5.  48" CMP AND 4'X4' BC ON R.R.
190        RS     1    STOR       0       0
191        SV     0     .25    1.01    2.91    6.52    8.88    11.5
192        SQ     0      34      92     148     168     267     533
193        SE  1940    1942    1944    1946    1947    1948    1949

194        KK     C5
195        KM       DIVERT FLOW AT C5.
196        DT   DIV5
197        DI     0     168     267     533
198        DQ     0       0      75     333

199        KK   C62K
200        KM       ROUTE FLOW FROM C5 TO C62K.
201        RM     1    1.45      .2

202        KK   C62K
203        KM       ADD HYDROGRAPHS AT C62K.
204        HC     3

205        KK     C5
206        KM       RETURN DIVERTED FLOW AT C5.
207        DR   DIV5

208        KK     C6
209        KM       ROUTE DIVERTED FLOW FROM C5 TO C6.
210        RM     1     .16      .2

211        KK     6
212        KM       RUNOFF FROM SUBWATERSHED 6.
213        BA    .03
214        LS            81
215        UK    100   0160     .10     100
216        RK   1400   .0107     .05                         0      20
```

```
217          KK      C6
218          KM        ADD HYDROGRAPHS AT C6.
219          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

220          KK      C6
221          KM        STORAGE ROUTE THROUGH C6.  36" CMP ON R.R.
222          RS       1    STOR       0       0
223          SV       0     .06     .47    1.20    2.32
224          SQ       0       4      12      95     392
225          SE  1945.5    1946    1947    1948    1949

226          KK      C6
227          KM        DIVERT FLOW AT C6.
228          DT    DIV6
229          DI       0      12      95     392
230          DQ       0       0      68     350

231          KK    C62K
232          KM        ROUTE FLOW FROM C6 TO C62K.
233          RM       1    2.29      .2

234          KK      C6
235          KM        RETURN DIVERTED FLOW AT C6.
236          DR    DIV6

237          KK      C7
238          KM        ROUTE DIVERTED FLOW AT C6 TO C7.
239          RM       1     .08      .2

240          KK       7
241          KM        RUNOFF FROM SUBWATERSHED 7.
242          BA     .04
243          LS              81
244          UK     150   .0160     .10     100
245          RK    3125   .0138     .05                       0      25

246          KK      C7
247          KM        ADD HYDROGRAPHS AT C7.
248          HC       2

249          KK      C7
250          KM        STORAGE ROUTE THROUGH C7.  48" ORCP ON R.R.
251          RS       1    STOR       0       0
252          SV       0     .63    3.73    6.87   10.75
253          SQ       0      23      70      90     250
254          SE    1940    1942    1944    1945    1946

255          KK      C7
256          KM        DIVERT FLOW AT C7.
257          DT    DIV7
```

```
258        DI      0      90     250
259        DQ      0       0     135
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

260        KK    C62K
261        KM        ROUTE FLOW FROM C7 TO C62K.
262        RM      1    1.72      .2

263        KK     62K
264        KM        RUNOFF FROM SUBWATERSHED 62K
265        BA    1.40
266        LS      0      76       0
267        UK    400   .0150     .11     100
268        RK   3600   .0093     .05     .23                0      25
269        RK  17125   .0093     .05                       20      25

270        KK    C62K
271        KM        ADD HYDROGRAPHS AT C62K
272        HC      4

273        KK    C62G
274        KM        ROUTE FLOW FROM C62K TO C62G
275        RM      1     .45      .2

276        KK     C7
277        KM        RETURN DIVERTED FLOW AT C7.
278        DR    DIV7

279        KK     C8
280        KM        ROUTE DIVERTED FLOW AT C7 TO C8.
281        RM      1     .06      .2

282        KK      8
283        KM        RUNOFF FROM SUBWATERSHED 8
284        BA    .01
285        LS      0      81       0
286        UK    100   .0160     .10     100
287        RK   1000   .0100     .05                        0      30

288        KK     C8
289        KM        ADD HYDROGRAPHS AT C8.
290        HC      2

291        KK     C8
292        KM        STORAGE ROUTE THROUGH C8.  36" RCP ON R.R.
293        RS      1    STOR       0       0
294        SV      0     .15     .42     .84
295        SQ      0      11      20      71
296        SE  1938.5    1940    1941    1942

297        KK     C8
298        KM        DIVERT FLOW AT C8.
```

```
299        DT    DIV8
300        DI       0      20      71
301        DQ       0       0      29
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

302        KK    C62G
303        KM       ROUTE FLOW FROM C8 TO C62G
304        RM       1    3.78      .2

305        KK      C8
306        KM       RETURN DIVERTED FLOW AT C8.
307        DR    DIV8

308        KK      C9
309        KM       ROUTE DIVERTED FLOW AT C8 TO C9.
310        RM       1     .13      .2

311        KK       9
312        KM       RUNOFF FROM SUBWATERSHED 9
313        BA     .08
314        LS       0      81       0
315        UK     150   .0160     .10     100
316        RK    4750   .0114     .05                    0      25

317        KK      C9
318        KM       ADD HYDROGRAPHS AT C9.
319        HC       2

320        KK      C9
321        KM       STORAGE ROUTE THROUGH C9.  2'X4' BC ON R.R.
322        RS       1    STOR       0       0
323        SV       0     .24     .85
324        SQ       0      12     122
325        SE    1932    1933    1934

326        KK      C9
327        KM       DIVERT FLOW AT C9.
328        DT    DIV9
329        DI       0      12     122
330        DQ       0       0      90

331        KK    C62G
332        KM       ROUTE FLOW FROM C9 TO C62G
333        RM       1    3.11      .2

334        KK     62G
335        KM       RUNOFF FROM SUBWATERSHED 62G
336        BA    1.86
337        LS       0      78       0
338        UK     300   .0150     .12     100
339        RK    3500   .0105     .05     .27            0      25
340        RK   18250   .0105     .05                   10      25
```

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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 341        KK    C62G
 342        KM        ADD HYDROGRAPHS AT C62G
 343        HC      4

 344        KK    C62E
 345        KM        ROUTE FLOW FROM C62G TO C62E
 346        RM      1      .33      .2

 347        KK     62E
 348        KM        RUNOFF FROM SUBWATERSHED 62E
 349        BA     .68
 350        LS       0       78       0
 351        UK     400     .015     .13     100
 352        RK    3000    .0101     .05     .23    TRAP              20
 353        RK   13625    .0101     .05            TRAP      10      15

 354        KK    C62E
 355        KM        ADD HYDROGRAPHS AT C62E
 356        HC      2

 357        KK     10A
 358        KM        RUNOFF FROM SUBWATERSHED 10A.
 359        BA    4.94
 360        LS       0       83       0
 361        UI       0      160     400     819    1346    1859    1920    2040    1795    1415
 362        UI    1167      991     837     663     560     464     434     408     334     259
 363        UI     246      157     125     120     106      68      66      63      61      59
 364        UI      46       30      29      29      28      24       0       0       0       0

 365        KK     C10
 366        KM        ROUTE FLOW FROM C10A TO C10.
 367        RM      1     1.36      .2

 368        KK      C9
 369        KM        RETURN DIVERTED FLOW AT C9.
 370        DR    DIV9

 371        KK     C10
 372        KM        ROUTE DIVERTED FLOW AT C9 TO C10.
 373        RM      1      .13      .2

 374        KK      10
 375        KM        RUNOFF FROM SUBWATERSHED 10.
 376        BA    3.93
 377        LS              79
 378        UK     300     .025     .10     100
 379        RK    5500    .0123     .05     .26    TRAP              12
 380        RK   31875    .0123     .05            TRAP      40      12

 381        KK     C10
```

```
382        KM      ADD HYDROGRAPHS AT C10.
383        HC      3
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

384        KK      C10
385        KM        STORAGE ROUTE THROUGH C1.  IONA WASH HAS A 168' BRIDGE ON THE R.R.
386        KM        ASSUMED 12-14'X7' BC'S
387        RS       1    STOR       0       0
388        SV       0     .76     2.0    4.34    8.08   13.24   19.74
389        SQ       0    1568    3192    7392   10416   13440   14784
390        SE    1920    1922    1924    1926    1928    1930    1931

391        KK      C62E
392        KM        ROUTE FLOW FROM C10 TO C62E.
393        RM       1    1.28      .2

394        KK      11
395        KM        RUNOFF FROM SUBWATERSHED 11
396        BA     .20
397        LS       0      81       0
398        UK     200   .0190     .10     100
399        RK    1300   .0155     .05     .10    TRAP              15
400        RK    7750   .0155     .05            TRAP      15      10

401        KK      12
402        KM        RUNOFF FROM SUBWATERSHED 12
403        BA    .002
404        LS       0      81       0
405        UK     100   .0118     .10     100
406        RK     850   .0118     .05    .002    TRAP              20

407        KK      C11
408        KM        ADD HYDROGRAPHS AT C11.
409        HC       2

410        KK      C11
411        KM        STORAGE ROUTE THROUGH C11.  2'X1.5' BC AND 34"X36" CPA.
412        RS       1    STOR       0       0
413        SV       0     .57    4.63   16.79
414        SQ       0      35      75     115
415        SE    1913    1916    1920    1924

416        KK      C62E
417        KM        ROUTE FLOW FROM C11 TO C62E
418        RM       1    2.88      .2

419        KK      13
420        KM        RUNOFF FROM SUBWATERSHED 13
421        BA     .10
422        LS       0      81       0
423        UK     150   .0250     .11     100
424        RK    2200   .0162     .05     .05    TRAP       0      30
```

```
425          RK    5250   .0162     .05            TRAP      15       10

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

426          KK    C13
427          KM       STORAGE ROUTE THROUGH C13.  2-42" RCP ON R.R.
428          RS      1    STOR       0       0
429          SV      0     .19    2.33    6.89    11.2
430          SQ      0      24     164     250     280
431          SE  1906.5    1908    1912    1916    1918

432          KK    C62E
433          KM       ROUTE FLOW FROM C13 TO C62E
434          RM      1    2.70      .2

435          KK    C62E
436          KM       ADD HYDROGRAPHS AT C62E.
437          HC      4

438          KK     14
439          KM       RUNOFF FROM SUBWATERSHED 14
440          BA    .01
441          LS      0      81       0
442          UK    100   .0106     .10     100
443          RK    850   .0106     .05     .01    TRAP              30

444          KK    C62E
445          KM       ROUTE FLOW FROM C14 TO C62E
446          RM      1    3.93      .2

447          KK     15
448          KM       RUNOFF FROM SUBWATERSHED 15
449          BA    .57
450          LS      0      81       0
451          UK    200   .0200     .10     100
452          RK   3500   .0159     .05     .11    TRAP              25
453          RK  13875   .0159     .05            TRAP      25       5

454          KK    C15
455          KM       STORAGE ROUTE THROUGH C15.  4'X4' CPA AND 2'X1.5' BC ON R.R.
456          RS      1    STOR       0       0
457          SV      0    2.78    9.36   17.15   18.85
458          SQ      0      92     188     295     500
459          SE   1898    1902    1906    1909  1909.5

460          KK    C15
461          KM       DIVERT FLOW AT C15.
462          DT   DIV15
463          DI      0     188     295     500
464          DQ      0       0      55     250

465          KK    C62E
466          KM       ROUTE FLOW FROM C15 TO C62E
```

```
467          RM      1    2.00      .2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

468          KK     16
469          KM        RUNOFF FROM SUBWATERSHED 16
470          BA    .62
471          LS      0      81       0
472          UK    200    .025     .10     100
473          RK   2600   .0166     .05     .09    TRAP              20
474          RK  13500   .0166     .05            TRAP      25      10

475          KK    C15
476          KM        RETURN DIVERT AT C15.
477          DR  DIV15

478          KK    C16
479          KM        ROUTE DIVERTED FLOW AT C15 TO C16.
480          RM      1     .10      .2

481          KK    C16
482          KM        ADD HYDROGRAPHS AT C16.
483          HC      2

484          KK    C16
485          KM        STORAGE ROUTE THROUGH C16.  24" RCP AND  36"X42" CPA ON R.R.
486          RS      1    STOR       0       0
487          SV      0     .56    3.22    8.05    9.51   11.06   14.36
488          SQ      0      42      82      90     125     225     720
489          SE 1892.5    1896    1900  1902.5    1903  1903.5  1904.5

490          KK    C16
491          KM        DIVERT FLOW AT C16
492          DT  DIV16
493          DI      0      90     125     225     720
494          DQ      0       0      25     115     600

495          KK   C62E
496          KM        ROUTE FLOW FROM C16 TO C62E
497          RM      1    2.29      .2

498          KK     17
499          KM        RUNOFF FROM SUBWATERSHED 17
500          BA    .05
501          LS      0      81       0
502          UK    200   .0250     .10     100
503          RK   2500   .0180     .05     .05    TRAP              20

504          KK    C16
505          KM        RETURN DIVERTED FLOW AT C16.
506          DR  DIV16

507          KK    C17
```

```
508          KM        ROUTE DIVERTED FLOW AT C16 TO C17.
509          RM      1     .04      .2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

510          KK     C17
511          KM        ADD HYDROGRAPHS AT C17.
512          HC      2

513          KK     C17
514          KM        STORAGE ROUTE THROUGH C17.  42" ORCP ON R.R.
515          RS      1    STOR       0       0
516          SV      0     .28     1.7    2.26    2.92    4.30
517          SQ      0      42      85     104     166     480
518          SE   1895    1898  1900.5    1901  1901.5  1902.5

519          KK     C17
520          KM        DIVERT FLOW AT C17.
521          DT   DIV17
522          DI      0      85     104     166     480
523          DQ      0       0      14      68     375

524          KK    C62E
525          KM        ROUTE FLOW FROM C17 TO C62E
526          RM      1    2.34      .2

527          KK    C62E
528          KM        ADD HYDROGRAPHS AT C62E.
529          HC      5

530          KK     18
531          KM        RUNOFF FROM SUBWATERSHED 18
532          BA    .04
533          LS      0      81       0
534          UK    200   .0250     .10     100
535          RK   2100   .0143     .05     .04    TRAP              15

536          KK     C17
537          KM        RETURN DIVERT AT C17.
538          DR   DIV17

539          KK     C18
540          KM        ROUTE DIVERTED FLOW AT C17 TO C18.
541          RM      1     .08      .2

542          KK     C18
543          KM        ADD HYDROGRAPHS AT C18.
544          HC      2

545          KK     C18
546          KM        STORAGE ROUTE THROUGH C18.  2'X1.5' BC, 24" RCP, AND 36" RCP ON R.R.
547          RS      1    STOR       0       0
548          SV      0     1.4    2.31    5.99    7.27
```

```
549          SQ       0      19      87     140     347
550          SE  1888.5  1890.5  1891.5  1894.5  1895.5
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

551          KK     C18
552          KM        DIVERT FLOW AT C18.
553          DT   DIV18
554          DI       0      19      87     140     347
555          DQ       0       0      52      70     267

556          KK    C62E
557          KM        ROUTE FLOW FROM C18 TO C62E
558          RM       1    2.71      .2

559          KK      19
560          KM        RUNOFF FROM SUBWATERSHED 19.
561          BA     .14
562          LS       0      81       0
563          UK     200   .0250     .10     100
564          RK    2500   .0144     .05     .07    TRAP          15
565          RK    7625   .0144     .05            TRAP          15

566          KK     C18
567          KM        RETURN DIVERT AT C18.
568          DR   DIV18

569          KK     C19
570          KM        ROUTE DIVERTED FLOW AT C18 TO C19.
571          RM       1    .024      .2

572          KK     C19
573          KM        ADD HYDROGRAPHS AT C19.
574          HC       2

575          KK     C19
576          KM        STORAGE ROUTE THROUGH C19.  36" RCP ON R.R.
577          RS       1    STOR       0       0
578          SV       0     .10     .57    1.67    8.22    9.31   10.42
579          SQ       0      11      42      65     100     226     410
580          SE  1884.5    1886    1888    1890  1894.5    1895  1895.5

581          KK     C19
582          KM        DIVERT FLOW AT C19.
583          DT   DIV19
584          DI       0     100     226     410
585          DQ       0       0     106     300

586          KK    C62E
587          KM        ROUTE FLOW FROM C19 TO C62E
588          RM       1    2.31      .2

589          KK      20
```

```
590     KM      RUNOFF FROM SUBWATERSHED 20
591     BA    .70
592     LS      0      80      0
593     UK    200   .0200     .10     100
594     RK   3500   .0159     .05     .10   TRAP            15
595     RK  16375   .0159     .05           TRAP     30     10
```



```
LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

596     KK    C19
597     KM      RETURN DIVERT AT C19.
598     DR  DIV19

599     KK    C20
600     KM      ROUTE DIVERTED FLOW AT C19 TO C20.
601     RM      1    .021      .2

602     KK    C20
603     KM      ADD HYDROGRAPHS AT C20.
604     HC      2

605     KK    C20
606     KM      STORAGE ROUTE THROUGH C20.  2-3'X3' BC'S.
607     RS      1   STOR      0      0
608     SV      0     .16    1.20   1.60   2.10   3.25   3.86
609     SQ      0      72     156    182    234    550    760
610     SE  1883.5    1886  1888.5   1889  1889.5   1891  1891.5

611     KK    C20
612     KM      DIVERT FLOW AT C20.
613     DT  DIV20
614     DI      0     156     182    234    550    760
615     DQ      0       0       8     36    340    540

616     KK   C62E
617     KM      ROUTE FLOW FROM C20 TO C62E
618     RM      1   1.81      .2

619     KK     21
620     KM      RUNOFF FROM SUBWATERSHED 21
621     BA    .02
622     LS      0      72      0
623     UK    100   .0142     .11     100
624     RK   1550   .0142     .05     .02   TRAP            30

625     KK    C20
626     KM      RETURN DIVERTED FLOW AT C20.
627     DR  DIV20

628     KK    C21
629     KM      ROUTE DIVERTED FLOW AT C20 TO C21.
630     RM      1     .06      .2
```

```
631        KK     C21
632        KM        ADD HYDROGRAPHS AT C21.
633        HC       2

634        KK     C21
635        KM        STORAGE ROUTE THROUGH C21.  2'X1.5' BC ON R.R.
636        RS       1    STOR       0       0
637        SV       0     .06     .38     .94    1.26
638        SQ       0       6      75     345     588
639        SE  1886.5  1887.5  1888.5  1889.5    1890
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

640        KK     C21
641        KM        DIVERT FLOW AT C21.
642        DT   DIV21
643        DI       0       6      75     345     588
644        DQ       0       0      59     323     564

645        KK    C62E
646        KM        ROUTE FLOW FROM C21 TO C62E
647        RM       1    3.36      .2

648        KK    C62E
649        KM        ADD HYDROGRAPHS AT C62E.
650        HC       5

651        KK     62F
652        KM        RUNOFF FROM SUBWATERSHED 62F.
653        BA    2.18
654        LS              77
655        UK     400    .015     .12     100
656        RK    5500   .0095     .05    .545    TRAP              15
657        RK   22000   .0095     .05            TRAP      50      15

658        KK    C62E
659        KM        ADD HYDROGRAPHS AT C62E.
660        HC       2

661        KK    C62D
662        KM        ROUTE FLOW FROM C62E TO C62D
663        RM       1     .12      .2

664        KK     62D
665        KM        RUNOFF FROM SUBWATERSHED 62D
666        BA    1.66
667        LS       0      81       0
668        UK     350   .0110     .13     100
669        RK    2600    .007     .05     .06    TRAP              20
670        RK   19750    .007     .05            TRAP      20      15

671        KK    C62D
672        KM        ADD HYDROGRAPHS AT C62D
```

```
673        HC     2

674        KK     C62B
675        KM        ROUTE FLOW FROM C62D TO C62B
676        RM     1     .29      .2

677        KK     62B
678        KM        RUNOFF FROM SUBWATERSHED 62B
679        BA     0.49
680        LS     0     74       0
681        UK     200   .011     .12      100
682        RK     1500  .0072    .05      .245     TRAP          25
683        RK     9750  .0072    .05               TRAP     35   30
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

684        KK     62C
685        KM        RUNOFF FROM SUBWATERSHED 62C
686        BA     0.40
687        LS     0     81       0
688        UK     200   .012     .12      100
689        RK     1200  .0076    .05      .20      TRAP          20
690        RK     9250  .0076    .05               TRAP     20   15

691        KK     C62B
692        KM        ADD HYDROGRAPHS AT C62B
693        HC     3

694        KK     C62
695        KM        ROUTE FLOW FROM C62B TO C62
696        RM     1     1.30     .2

697        KK     62A
698        KM        RUNOFF FROM SUBWATERSHED 62A
699        BA     1.58
700        LS     0     81       0
701        UK     300   .011     .11      100
702        RK     2000  .0069    .05      .395     TRAP          30
703        RK     18000 .0069    .05               TRAP     35   25

704        KK     C62
705        KM        ROUTE FLOW FROM C62A TO C62
706        RM     1     2.15     .2

707        KK     62
708        KM        RUNOFF FROM SUBWATERSHED 62
709        BA     5.09
710        LS     0     76       0
711        UK     600   .0065    .11      100
712        RK     4200  .0045    .05      .73      TRAP          45
713        RK     22000 .0045    .05               [illegible]   [illegible]5   40

714        KK     C62
```

```
715     KM      ADD HYDROGRAPHS AT C62
716     HC     3

717     KK    C62
718     KM      STORAGE ROUTE THROUGH C62.  47.3' WIDE OVERCHUTE ON CAP WEST OF GRAND.
719     RS     1    STOR       0       0
720     SV     0   16.23  133.39  466.23  584.29  733.69
721     SQ     0       0     662    2460    8081   34672
722     SE  1542  1545.2    1548    1552    1553    1554

723     KK   C83T
724     KM      ROUTE FLOW AT C62 TO C83T.
725     RM     1    1.25      .2
```



```
LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

726     KK    83T
727     KM      RUNOFF FROM SUBWATERSHED 83T
728     BA   1.29
729     LS     0      75       0
730     UK   300    .008     .12     100
731     RK  2700   .0053     .06     .22    TRAP       0      35
732     RK 21000   .0053     .05            TRAP      20      30

733     KK   C83T
734     KM      ADD HYDROGRAPHS AT C83T.
735     HC     2

736     KK    C21
737     KM      RETURN DIVERT AT C21.
738     DR  DIV21

739     KK    C22
740     KM      ROUTE DIVERTED FLOW FROM C21 TO C22.
741     RM     1     .12      .2

742     KK     22
743     KM      RUNOFF FROM SUBWATERSHED 22.
744     BA    .26
745     LS            72
746     UK   400    .020     .10     100
747     RK  7200   .0132     .05     .26    TRAP              15

748     KK    C22
749     KM      ADD HYDROGRAPHS AT C22.
750     HC     2

751     KK    C22
752     KM      STORAGE ROUTE THROUGH C22.  2'X1' BC AND 36"X42" CPA ON R.R.
753     RS     1    STOR       0       0
754     SV     0     .10     .74    2.33    2.89    3.48
755     SQ     0      11      42      70     135     280     500
756     SE  1872.5   1874    1876    1878  1878.5    1879  1879.5
```

```
757        KK     C22
758        KM        DIVERT FLOW AT C22.
759        DT   DIV22
760        DI       0      70     135     280     500
761        DQ       0       0      60     200     415

762        KK     C63B
763        KM        ROUTE FLOW FROM C22 TO  63B2 (FCD)
764        RM       1    1.28      .2

765        KK     C22
766        KM        RETURN DIVERTED FLOW AT C22.
767        DR   DIV22
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

768        KK     C23
769        KM        ROUTE DIVERTED FLOW AT C22 TO C23.
770        RM       1    .033      .2

771        KK      23
772        KM        RUNOFF FROM  SUBWATERSHED 23.
773        BA    .006
774        LS              72
775        UK     100   .0143     .10     100
776        RK     700   .0143     .05    .006    TRAP       0       30

777        KK     C23
778        KM        ADD HYDROGRAPHS AT C23.
779        HC       2

780        KK     C23
781        KM        STORAGE ROUTE THROUGH C23.  2-10'X4' BC ON R.R.
782        RS       1    STOR       0       0
783        SV       0     .14     .51     .88
784        SQ       0     110     460     707
785        SE  1870.5    1872  1874.5  1875.5

786        KK     C23
787        KM        DIVERT FLOW AT C23.
788        DT   DIV23
789        DI       0     460     707
790        DQ       0       0      87

791        KK     C63B
792        KM        ROUTE FLOW FROM C23 TO  63B2 (FCD)
793        RM       1   0.847     .2

794        KK     C23
795        KM        RETURN DIVERT AT C23.
796        DR   DIV23
```

```
797          KK     C24
798          KM        ROUTE DIVERTED FLOW AT C23 TO C24.
799          RM       1     .11      .2

800          KK      24
801          KM        RUNOFF FROM SUBWATERSHED 24.
802          BA    .006
803          LS              72
804          UK      50   .0118     .10     100
805          RK     850   .0118     .05    .004    TRAP              30

806          KK     C24
807          KM        ADD HYDROGRAPHS AT C24.
808          HC       2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

809          KK     C24
810          KM        STORAGE ROUTE THROUGH C24.  24" ORCP ON R.R.
811          RS       1    STOR       0       0
812          SV       0     .67     .94    1.24
813          SQ       0      17      44     150
814          SE  1870.5    1873  1873.5    1874

815          KK     C24
816          KM        DIVERT FLOW  AT C24.
817          DT   DIV24
818          DI       0      17      44     150
819          DQ       0       0      23     126

820          KK    C63B
821          KM        ROUTE FLOW FROM C24 TO  63B1 (FCD)
822          RM       1    1.15      .2

823          KK     C24
824          KM           RETURN DIVERT AT C24.
825          DR   DIV24

826          KK     C25
827          KM        ROUTE DIVERTED FLOW AT C24 TO C25.
828          RM       1     .11      .2

829          KK      25
830          KM        RUNOFF FROM SUBWATERSHED 25.
831          BA     .05
832          LS              72
833          UK     150   .0200     .10     100
834          RK    2450   .0143     .05     .05    TRAP              40

835          KK     C25
836          KM        ADD HYDROGRAPHS AT C25.
837          HC       2
```

```
838     KK    C25
839     KM       STORAGE ROUTE THROUGH C25.  48" ORCP ON R.R.
840     RS     1    STOR      0      0
841     SV     0     .38     .58     .8    1.04
842     SQ     0      23      52     99     171
843     SE  1860.5  1862.5   1863  1863.5   1864

844     KK    C25
845     KM       DIVERT FLOW AT C25.
846     DT   DIV25
847     DI     0      23      52     99     171
848     DQ     0       0      15     52     113
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

849     KK    C63B
850     KM       ROUTE FLOW FROM C25 TO  63B2 (FCD)
851     RM     1    1.38      .2

852     KK    6302
853     KM       RUNOFF FROM SUBWATERSHED 6302 (FCD)
854     BA    .750
855     LS            81
856     UK    220    .025     .14    100
857     RK    620    .016     .08    .30   TRAP          15
858     RK   6600    .014     .08          TRAP    25    20

859     KK   63B2A
860     KM       ADD HYDROGRAPHS AT C63B.
861     HC     5

862     KK    26B
863     KM       RUNOFF FROM SUBWATERSHED 26B.
864     BA   12.72
865     LS            86
866     UI     0    338     778   1523   2576   3691   4131   4635   4635   4085
867     UI  3258   2817    2330   2215   1580   1471   1204   1050    990    937
868     UI   858    602     574    536    295    283    272    259    157    151
869     UI   146    141     137    163     71     69     67     65     64     62
870     UI    33      0       0      0      0      0      0      0      0      0

871     KK    C26A
872     KM       ROUTE FLOW FROM C26B TO C26A.
873     RM     1     .46      .2

874     KK    26A
875     KM       RUNOFF FROM SUBWATERSHED 26A.
876     BA    2.26
877     LS            79
878     UI     0    110     333    715   1044   1207   1152    847    664    559
879     UI   399    325     268    246    200    131    121     75     70     52
880     UI    39     37      36     32     18     17     17     16      0      0
```

```
881        KK    C26A
882        KM       ADD HYDROGRAPHS AT C26A.
883        HC      2

884        KK     C26
885        KM       ROUTE FLOW FROM C26A TO C26.
886        RM      1     .67      .2

887        KK     C25
888        KM       RETURN DIVERTED FLOW AT C25.
889        DR   DIV25
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

890        KK     C26
891        KM       ROUTE DIVERTED FLOW AT C25 TO C26.
892        RM      1     .09      .2

893        KK      26
894        KM       RUNOFF FROM SUBWATERSHED 26.
895        BA    1.12
896        LS              74
897        UK     200   .0180     .10     100
898        RK    5500   .0135     .05     .22   TRAP              20
899        RK   19100   .0135     .05           TRAP      60      15

900        KK     C26
901        KM       ADD HYDROGRAPHS AT C26.
902        HC      3

903        KK     C26
904        KM       STORAGE ROUTE THROUGH C26.  TRIBLY WASH, 237' 17-SPAN 237' BRIDGE.
905        KM       ASSUME 24-10'X4' BC'S.
906        RS      1    STOR       0       0
907        SV      0     .51    1.65    2.63
908        SQ      0    2040    5520    7200
909        SE   1854    1856    1858    1859

910        KK    C63B
911        KM       ROUTE FLOW FROM C26 TO 63B1 (FCD)
912        RM      1     .24      .2

913        KK      27
914        KM       RUNOFF FROM SUBWATERSHED 27.
915        BA     .06
916        LS              72
917        UK     200    .020     .10     100
918        RK    2700   .0130     .05     .06   TRAP              30

919        KK     C27
920        KM       STORAGE ROUTE THROUGH C27.  3'X2.5' BC AND 36" ORCP ON R.R.
921        RS      1    STOR       0       0
922        SV      0     .14     .40     .58
```

```
923          SQ       0      11      24      91
924          SE  1846.5    1848    1849  1849.5

925          KK     C27
926          KM        DIVERT FLOW AT C27.
927          DT   DIV27
928          DI       0      24      91
929          DQ       0       0      56

930          KK    C63B
931          KM        ROUTE FLOW FROM C27 TO  63B1 (FCD)
932          RM       1    1.70      .2
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

933          KK    6300
934          KM        RUNOFF FROM SUBWATERSHED 6300 (FCD)
935          BA   0.148
936          LS              81
937          UK     400    0.03     .14     100
938          RK     300    0.03     .08      .3   TRAP            15
939          RK    4200   0.013     .08           TRAP     25     20

940          KK    63B1
941          HC       3

942          KK   R6300
943          KM        ROUTE 6300 TO 63B2
944          RK    2000   0.016     .08           TRAP     30     20

945          KK    63B2
946          KM        CONC. POINT 63B2
947          HC       2

948          KK   R63B2
949          KM        ROUTE 63B2 TO 63B3
950          RK    1600   0.014    0.05           TRAP     35     25

951          KK    6304
952          KM        RUNOFF FROM SUBWATERSHED 6304 (FCD)
953          BA   0.379
954          LS              81
955          UK     100    0.02    0.14     100
956          RK     300   0.027    0.08           TRAP            15
957          RK    4800   0.018    0.08           TRAP     25     20

958          KK    63B3
959          KM        CONC. POINT 63B3
960          HC       2

96           KK   R63B3
962          KM        ROUTE 63B3 TO 63B
963          RK    1600   0.010    0.08           TRAP     30     20
```

```
964     KK    6305
965     KM        RUNOFF FROM SUBWATERSHED 6305 (FCD)
966     BA   0.158
967     LS              81
968     UK     100    0.03    0.14     100
969     RK     300    0.03    0.08            TRAP              15
970     RK    5400    0.01    0.08            TRAP      25      20

971     KK     63B
972     KM        CONC. POINT 63B
973     HC       2
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

974     KK    C63C
975     KM        ROUTE FLOW FROM C63B TO C63C.
976     RM       1     .32      .2

977     KK     C27
978     KM        RETURN DIVERTED FLOW AT C27.
979     DR   DIV27

980     KK     C28
981     KM        ROUTE DIVERTED FLOW AT C27 TO C28.
982     RM       1     .25      .2

983     KK      28
984     KM        RUNOFF FROM SUBWATERSHED 28.
985     BA     .24
986     LS              75
987     UK     200    .020     .10     100
988     RK    2000   .0147     .05     .08   TRAP              25
989     RK    7500   .0147     .05           TRAP      10       8

990     KK     C28
991     KM        ADD HYDROGRAPHS AT C28.
992     HC       2

993     KK     C28
994     KM        STORAGE ROUTE THROUGH C28.  36"X42" ORCP ON R.R.
995     RS       1    STOR       0       0
996     SV       0     .10     .55    1.18    2.14    3.46
997     SQ       0      11      43      60     172     453
998     SE  1820.5    1822    1824    1825    1826    1827

999     KK     C28
1000    KM        DIVERT FLOW AT C28.
1001    DT   DIV28
1002    DI       0      60     172     453
1003    DQ       0       0     102     373

1004    KK    C63C
```

```
1005        KM        ROUTE FLOW FROM C28 TO C63C.
1006        RM      1    4.04      .2

1007        KK     C28
1008        KM        RETURN DIVERTED FLOW AT C28.
1009        DR   DIV28

1010        KK     C29
1011        KM        ROUTE DIVERTED FLOW AT C28 TO C29.
1012        RM      1    .044      .2
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1013        KK      29
1014        KM        RUNOFF FROM SUBWATERSHED 29.
1015        BA     .01
1016        LS              81
1017        UK     100   .0300     .10     100
1018        RK    1150   .0174     .05     .01    TRAP              40

1019        KK     C29
1020        KM        ADD HYDROGRAPHS AT C29.
1021        HC      2

1022        KK     C29
1023        KM        STORAGE ROUTE THROUGH C29.  36" ORCP ON R.R.
1024        RS      1    STOR       0       0
1025        SV      0     .38     .95    1.62
1026        SQ      0      11      24     225
1027        SE  1820.5    1822    1823    1824

1028        KK     C29
1029        KM        DIVERT FLOW AT C29.
1030        DT   DIV29
1031        DI      0      24     225
1032        DQ      0       0     183

1033        KK    C63C
1034        KM        ROUTE FLOW FROM C29 TO C63C.
1035        RM      1    4.69      .2

1036        KK     C29
1037        KM        RETURN DIVERT AT C29.
1038        DR   DIV29

1039        KK     C30
1040        KM        ROUTE DIVERTED FLOW AT C29 TO C30.
1041        RM      1    .029      .2

1042        KK      30
10[illegible]        KM        RUNOFF FROM SUBWATERSHED 30.
1044        BA     .01
1045        LS              81
```

```
1046        UK     100   .0300     .10     100
1047        RK    1100   .0182     .05     .01    TRAP              15

1048        KK     C30
1049        KM        ADD HYDROGRAPHS AT C30.
1050        HC       2

1051        KK     C30
1052        KM        STORAGE ROUTE THROUGH C30.  48" ORCP ON R.R.
1053        RS       1    STOR       0       0
1054        SV       0     .51    1.78    2.51
1055        SQ       0      45     100     285
1056        SE    1823    1826  1828.5  1829.5
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1057        KK     C30
1058        KM        DIVERT FLOW AT C30.
1059        DT   DIV30
1060        DI       0     100     285
1061        DQ       0       0     160

1062        KK    C63C
1063        KM        ROUTE FLOW FROM C30 TO C63C.
1064        RM       1    3.88      .2

1065        KK     C30
1066        KM        RETURN DIVERTED FLOW AT C30.
1067        DR   DIV30

1068        KK     C31
1069        KM        ROUTE DIVERTED FLOW AT C30 TO C31.
1070        RM       1    .053      .2

1071        KK      31
1072        KM        RUNOFF FROM SUBWATERSHED 31.
1073        BA     .63
1074        LS              77
1075        UK     200   .0300     .10     100
1076        RK    3000  . 0143     .05     .16    TRAP              10
1077        RK   17500   .0143     .05            TRAP      15      12

1078        KK     C31
1079        KM        ADD HYDROGRAPHS AT C31.
1080        HC       2

1081        KK     C31
1082        KM        STORAGE ROUTE THROUGH C31.  2-3'X4' BC ON R.R.
1083        RS       1    STOR       0       0
1084        SV       0     .24    1.45    6.53    9.87
1085        SQ       0      33     114     222     467
1086        SE  1804.3    1806    1808  1810.5  1811.5
```

```
1087        KK     C31
1088        KM        DIVERT FLOW AT C31.
1089        DT   DIV31
1090        DI       0     222     467
1091        DQ       0       0     215

1092        KK    C63C
1093        KM        ROUTE FLOW FROM C31 TO C63C.
1094        RM       1    2.74      .2

1095        KK    C63C
1096        KM        ADD HYDROGRAPHS AT C63C.
1097        HC       5
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1098        KK     C31
1099        KM        RETURN DIVERT AT C31.
1100        DR   DIV31

1101        KK     C32
1102        KM        ROUTE DIVERTED FLOW AT C31 TO C32.
1103        RM       1    .103      .2

1104        KK      32
1105        KM        RUNOFF FROM SUBWATERSHED 32.
1106        BA     .05
1107        LS              81
1108        UK     200   .0200     .10     100
1109        RK    3000   .0133     .05     .05    TRAP              35

1110        KK     C32
1111        KM        ADD HYDROGRAPHS AT C32.
1112        HC       2

1113        KK     C32
1114        KM        STORAGE ROUTE THROUGH C32.  42" ORCP ON R.R.
1115        RS       1    STOR       0       0
1116        SV       0     .38     .89    1.65
1117        SQ       0      21      40     110
1118        SE    1798    1800    1801    1802

1119        KK     C32
1120        KM        DIVERT FLOW AT C32.
1121        DT   DIV32
1122        DI       0      40     110
1123        DQ       0       0      50

1124        KK    C63C
1125        KM        ROUTE FLOW FROM C32 TO C63C.
1126        RM       1    3.76      .2

1127        KK     C32
```

```
1128        KM        RETURN DIVERT AT C32.
1129        DR    DIV32

1130        KK     C33
1131        KM        ROUTE DIVERTED FLOW AT C32 TO C33.
1132        RM       1      .09       .2

1133        KK      33
1134        KM        RUNOFF FROM SUBWATERSHED 33.
1135        BA     .02
1136        LS              81
1137        UK     100    .0200      .10      100
1138        RK    1250    .0160      .05      .02    TRAP              30
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1139        KK     C33
1140        KM        ADD HYDROGRAPHS AT C33.
1141        HC       2

1142        KK     C33
1143        KM        STORAGE ROUTE THROUGH C33.  24" CP AND 24" ORCP ON R.R.
1144        RS       1    STOR       0       0
1145        SV       0     .83    1.39
1146        SQ       0      16     154
1147        SE  1787.5  1790.5  1791.5

1148        KK     C33
1149        KM        DIVERT FLOW AT C33.
1150        DT   DIV33
1151        DI       0      16     154
1152        DQ       0       0     128

1153        KK    C63C
1154        KM        ROUTE FLOW FROM C33 TO C63C.
1155        RM       1    4.85       .2

1156        KK    6306
1157        KM        RUNOFF FROM SUBWATERSHED 6306 (FCD)
1158        BA    .443
1159        LS              83
1160        UK     100     .03      .14      100
1161        RK    6000    .015      .08      .35    TRAP              15
1162        RK    3600    .015      .08             TRAP      30      20

1163        KK    6307
1164        KM        RUNOFF FROM SUBWATERSHED 6307 (FCD)
1165        BA   1.232
1166        LS              83
1167        UK     200    .025     0.14      100
1168        RK    3900   0.018     0.08     0.35    TRAP              15
1169        RK    7600   0.011     0.08             TRAP      30      20
```

```
1170        KK    63C
1171        KM       CONC. POINT 63C
1172        HC     2

1173        KK    C63C
1174        KM       ADD HYDROGRAPHS AT C63C.
1175        HC     4

1176        KK    C63
1177        KM       ROUTE FLOW FROM C63C TO C631 (FCD)
1178        RM     1    0.50      .2
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1179        KK    63A
1180        KM       RUNOFF FROM SUBWATERSHED 63A.
1181        BA    2.67
1182        LS              78
1183        UK    350      .01      .12     100
1184        RK    5200     .010     .05     .24    TRAP              20
1185        RK    21250    .010     .05            TRAP     25       25

1186        KK    R63A
1187        KM       ROUTE 63A TO C631 (FCD)
1188        RM     1     0.3      .2

1189        KK    6308
1190        KM       RUNOFF FROM SUBWATERSHED 6308    (FCD)
1191        BA    0.300
1192        LS              78
1193        UK    200      .01      .14     100
1194        RK    2000     .0125    .08      .7    TRAP     10       25
1195        RK    5200     .010     .08            TRAP     60       40

1196        KK    6310
1197        KM       RUNOFF FROM SUBWATERSHED 6310    (FCD)
1198        BA    0.513
1199        LS              78
1200        UK    600      0.022    0.14    100
1201        RK    4800     0.01     0.08     .7    TRAP     10       25
1202        RK    3600     0.011    0.08           TRAP     60       40

1203        KK    C631
1204        KM       CONC. POINT C631
1205        HC     4

1206        KK    RC631
1207        KM       ROUTE C631 TO C632
1208        RK    2800     0.008    0.08           TRAP     60       40

1209        KK    6312
1210        KM       RUNOFF FROM SUBWATERSHED 6312    (FCD)
1211        BA    .389
```

```
1212    LS              78
1213    UK    1600   0.006    0.14     100
1214    RK    3200  0.0125    0.08     0.7    TRAP     10     25
1215    RK    1600   0.007    0.08            TRAP     60     40

1216    KK    C632
1217    KM        CONC. POINT C632
1218    HC       2

1219    KK    RC632
1220    KM        ROUTE C632 TO C633
1221    RK    4000   0.007    0.08            TRAP     60     40
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1222    KK    6314
1223    KM        RUNOFF FROM SUBWATERSHED 6314   (FCD)
1224    BA    .846
1225    LS              78
1226    UK     220   0.023    0.14     100
1227    RK    4000    0.01    0.08      .7    TRAP     10     25
1228    RK    5200   0.014    0.08            TRAP     60     40

1229    KK    C633
1230    KM        CONC. POINT C633
1231    HC       2

1232    KK    RC633
1233    KM        ROUTE C633 TO C63
1234    RK     600   0.017    0.08            TRAP     60     40

1235    KK    6316
1236    KM        RUNOFF FROM SBWATERSHED 6316  (FCD)
1237    BA    .175
1238    LS              78
1239    UK     500    0.01    0.14     100
1240    RK    2600   0.015    0.08      .7    TRAP     10     25
1241    RK    1000   0.002    0.08            TRAP     60     40

1242    KK    6318
1243    KM        RUNOFF FROM SUBWATERSHED 6318  (FCD)
1244    BA    .528
1245    LS              78
1246    UK     300    0.01    0.14     100
1247    RK    4400    0.01    0.08      .7    TRAP     10     25
1248    RK    1600   0.005    0.08            TRAP     60     40

1249    KK     C63
1250    KM        CONC. POINT C63
1251    HC       3

1252    KK     C63
1253    KM        STORAGE ROUTE THROUGH C63.  135.8' WIDE OVERCHUTE ON CAP WEST OF GRAND.
```

```
1254          RS       1    STOR       0       0
1255          SV       0    5.34   60.37   122.3
1256          SQ       0    2310    9506   20740
1257          SE  1544.9    1548  1553.4    1556

1258          KK    C83T
1259          KM        ROUTE FLOW FROM C63 TO C83T
1260          RM       1    1.69      .2

1261          KK     84T
1262          KM        RUNOFF FROM SUBWATERSHED 84T
1263          BA    1.81
1264          LS       0      74       0
1265          UK     400    .006     .13     100
1266          RK    6000   .0037     .06     .36    TRAP      0      35
1267          RK   21800   .0037     .05            TRAP     40      30
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1268          KK    C83T
1269          KM        ADD HYDROGRAPHS AT C83T
1270          HC       2

1271          KK    C83T
1272          KM        ADD HYDROGRAPHS AT C83T.
1273          HC       2
1274          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

 NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

 41          1
             V
             V
 51         C1
             V
             V
 57       C62L
             .
             .
 60          .        62L
             .          .
             .          .
 67       C62L............
             V
             V
 70       C62I
             .
             .
 73          .        62I
             .          .
```

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                .          .
80          C62I............
              V
              V
83          C62H
                .
                .
86              .        62H
                .          .
                .          .
93              .          .          62J
                .          .            .
                .          .            .
100         C62H........................
              V
              V
103         C62K
                .
                .
106             .          2
                .          V
                .          V
112             .         C2
                .          V
                .          V
118             .        C62M
                .          .
                .          .
121             .          .          62M
                .          .            .
                .          .            .
128             .        C62M............
                .          .
                .          .
131             .          .            3
                .          .            V
                .          .            V
137             .          .           C3
                .          .            V
                .          .            V
143             .          .          C62K
                .          .            .
                .          .            .
146             .          .            .          4
                .          .            .          V
                .          .            .          V
153             .          .            .         C4
                .          .            .          .
                .          .            .          .
161             .          .            .          .-------->    DIV4
159             .          .            .         C4
                .          .            .          V
                .          .            .          V
164             .          .            .        C62K
```

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                .          .          .          .
                .          .          .          .
167             .       C62M.......................
                .          V
                .          V
170             .       C62K
                .          .
                .          .
175             .          .          .<-------     DIV4
173             .          .       C4
                .          .        V
                .          .        V
176             .          .       C5
                .          .        .
                .          .        .
179             .          .        .          5
                .          .        .          .
                .          .        .          .
185             .          .       C5............
                .          .        V
                .          .        V
188             .          .       C5
                .          .        .
                .          .        .
196             .          .        .------->    DIV5
194             .          .       C5
                .          .        V
                .          .        V
199             .          .     C62K
                .          .        .
                .          .        .
202          C62K........................
                .
                .
207             .          .<-------     DIV5
205             .       C5
                .        V
                .        V
208             .       C6
                .        .
                .        .
211             .        .          6
                .        .          .
                .        .          .
217             .       C6............
                .        V
                .        V
220             .       C6
                .        .
                .        .
228             .        .------->    DIV6
226             .       C6
                .        V
                .        V
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231          .        C62K
             .          .
             .          .
236          .          .          .<-------    DIV6
234          .          .        C6
             .          .         V
             .          .         V
237          .          .        C7
             .          .         .
             .          .         .
240          .          .         .          7
             .          .         .          .
             .          .         .          .
246          .          .        C7............
             .          .         V
             .          .         V
249          .          .        C7
             .          .         .
             .          .         .
257          .          .         .------->    DIV7
255          .          .        C7
             .          .         V
             .          .         V
260          .          .       C62K
             .          .         .
             .          .         .
263          .          .         .         62K
             .          .         .          .
             .          .         .          .
270       C62K.................................
             V
             V
273       C62G
             .
             .
278          .          .<-------    DIV7
276          .        C7
             .         V
             .         V
279          .        C8
             .         .
             .         .
282          .         .          8
             .         .          .
             .         .          .
288          .        C8............
             .         V
             .         V
291          .        C8
             .         .
             .         .
299          .         .------->    DIV8
             .        C8
             .         V
```

```
                .          V
302             .        C62G
                .          .
                .          .
307             .          .          .<-------     DIV8
305             .          .        C8
                .          .         V
                .          .         V
308             .          .        C9
                .          .         .
                .          .         .
311             .          .         .          9
                .          .         .          .
                .          .         .          .
317             .          .        C9............
                .          .         V
                .          .         V
320             .          .        C9
                .          .         .
                .          .         .
328             .          .         .-------->    DIV9
326             .          .        C9
                .          .         V
                .          .         V
331             .          .       C62G
                .          .         .
                .          .         .
334             .          .         .          62G
                .          .         .           .
                .          .         .           .
341          C62G.................................
                V
                V
344          C62E
                .
                .
347             .        62E
                .          .
                .          .
354          C62E............
                .
                .
357             .        10A
                .          V
                .          V
365             .        C10
                .          .
                .          .
370             .          .          .<-------     DIV9
368             .          .        C9
                .          .         V
                .          .         V
371             .          .        C10
                .          .         .
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374                                  10
                                      .
                                      .
381          C10.......................
                V
                V
384          C10
                V
                V
391          C62E
                .
                .
394                    11
                        .
                        .
401                                  12
                                      .
                                      .
407                    C11............
                        V
                        V
410                    C11
                        V
                        V
416                    C62E
                        .
                        .
419                                  13
                                      V
                                      V
426                                 C13
                                      V
                                      V
432                                C62E
                                      .
                                      .
435  C62E.................................
                .
                .
438          14
                V
                V
444          C62E
                .
                .
447                    15
                        V
                        V
454                    C15
                        .
                        .
                        .-------->   DIV15
460                    C15
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                 .         .         V
                 .         .         V
465              .         .       C62E
                 .         .         .
                 .         .         .
468              .         .         .        16
                 .         .         .         .
                 .         .         .         .
477              .         .         .         .          .<-------   DIV15
475              .         .         .         .        C15
                 .         .         .         .          V
                 .         .         .         .          V
478              .         .         .         .        C16
                 .         .         .         .          .
                 .         .         .         .          .
481              .         .         .       C16............
                 .         .         .         V
                 .         .         .         V
484              .         .         .       C16
                 .         .         .         .
                 .         .         .         .
492              .         .         .         .-------->   DIV16
490              .         .         .       C16
                 .         .         .         V
                 .         .         .         V
495              .         .         .       C62E
                 .         .         .         .
                 .         .         .         .
498              .         .         .         .          17
                 .         .         .         .           .
                 .         .         .         .           .
506              .         .         .         .           .          .<-------   DIV16
504              .         .         .         .           .        C16
                 .         .         .         .           .          V
                 .         .         .         .           .          V
507              .         .         .         .           .        C17
                 .         .         .         .           .          .
                 .         .         .         .           .          .
510              .         .         .         .         C17............
                 .         .         .         .           V
                 .         .         .         .           V
513              .         .         .         .         C17
                 .         .         .         .           .
                 .         .         .         .           .
521              .         .         .         .           .-------->   DIV17
519              .         .         .         .         C17
                 .         .         .         .           V
                 .         .         .         .           V
524              .         .         .         .         C62E
                 .         .         .         .           .
                 .         .         .         .           .
527          C62E.............................................
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530   .      18
      .       .
      .       .
538   .       .          .<-------   DIV17
536   .       .       C17
      .       .         V
      .       .         V
539   .       .       C18
      .       .         .
      .       .         .
542   .     C18............
      .       V
      .       V
545   .     C18
      .       .
      .       .
553   .       .------->   DIV18
551   .     C18
      .       V
      .       V
556   .    C62E
      .       .
      .       .
559   .       .         19
      .       .          .
      .       .          .
568   .       .          .          .<-------   DIV18
566   .       .          .        C18
      .       .          .          V
      .       .          .          V
569   .       .          .        C19
      .       .          .          .
      .       .          .          .
572   .       .       C19............
      .       .         V
      .       .         V
575   .       .       C19
      .       .         .
      .       .         .
583   .       .          .------->   DIV19
581   .       .       C19
      .       .         V
      .       .         V
586   .       .      C62E
      .       .         .
      .       .         .
589   .       .          .         20
      .       .          .          .
      .       .          .          .
598   .       .          .          .          .<-------   DIV19
596   .       .          .          .        C19
      .       .          .          .          V
      .                  .          .          V
599   .       .          .          .        C20
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                .         .         .         .         .
                .         .         .         .         .
602             .         .         .       C20.........
                .         .         .         V
                .         .         .         V
605             .         .         .       C20
                .         .         .         .
                .         .         .         .
613             .         .         .         .-------->   DIV20
611             .         .         .       C20
                .         .         .         V
                .         .         .         V
616             .         .         .       C62E
                .         .         .         .
                .         .         .         .
619             .         .         .         .         21
                .         .         .         .         .
                .         .         .         .         .
627             .         .         .         .         .          .<-------   DIV20
625             .         .         .         .         .        C20
                .         .         .         .         .          V
                .         .         .         .         .          V
628             .         .         .         .         .        C21
                .         .         .         .         .          .
                .         .         .         .         .          .
631             .         .         .         .       C21.........
                .         .         .         .         V
                .         .         .         .         V
634             .         .         .         .       C21
                .         .         .         .         .
                .         .         .         .         .
642             .         .         .         .         .-------->   DIV21
640             .         .         .         .       C21
                .         .         .         .         V
                .         .         .         .         V
645             .         .         .         .       C62E
                .         .         .         .         .
                .         .         .         .         .
648          C62E.........................................
                .
                .
651             .       62F
                .         .
                .         .
658          C62E........
                V
                V
661          C62D
                .
                .
664             .       62D
                .         .
                .         .
671          C62D........
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                V
                V
674          C62B
                .
                .
677             .          62B
                .            .
                .            .
684             .            .          62C
                .            .           .
                .            .           .
691          C62B.......................
                V
                V
694           C62
                .
                .
697             .          62A
                .            V
                .            V
704             .          C62
                .            .
                .            .
707             .            .          62
                .            .           .
                .            .           .
714           C62.......................
                V
                V
717           C62
                V
                V
723          C83T
                .
                .
726             .          83T
                .            .
                .            .
733          C83T............
                .
                .
738             .            .<-------   DIV21
736             .          C21
                .            V
                .            V
739             .          C22
                .            .
                .            .
742             .            .          22
                .            .           .
                .            .           .
748             .          C22............
                .            V
                .            V
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751          .        C22
             .         .
             .         .
759          .         .-------->  DIV22
757          .        C22
             .         V
             .         V
762          .        C63B
             .         .
             .         .
767          .         .          .<-------   DIV22
765          .         .        C22
             .         .         V
             .         .         V
768          .         .        C23
             .         .         .
             .         .         .
771          .         .         .          23
             .         .         .           .
             .         .         .           .
777          .         .        C23............
             .         .         V
             .         .         V
780          .         .        C23
             .         .         .
             .         .         .
788          .         .         .-------->  DIV23
786          .         .        C23
             .         .         V
             .         .         V
791          .         .        C63B
             .         .         .
             .         .         .
796          .         .         .           .<-------   DIV23
794          .         .         .          C23
             .         .         .           V
             .         .         .           V
797          .         .         .          C24
             .         .         .           .
             .         .         .           .
800          .         .         .           .          24
             .         .         .           .           .
             .         .         .           .           .
806          .         .         .          C24............
             .         .         .           V
             .         .         .           V
809          .         .         .          C24
             .         .         .           .
             .         .         .           .
817          .         .         .           .-------->  DIV24
815          .         .         .          C24
             .         .         .           V
             .         .         .           V
820          .         .         .          C63B
```

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825                                  .<-------   DIV24
823                                C24
                                     V
                                     V
826                                C25
                                     .
                                     .
829                                  .          25
                                     .           .
                                     .           .
835                                C25............
                                     V
                                     V
838                                C25
                                     .
                                     .
846                                  .-------->  DIV25
844                                C25
                                     V
                                     V
849                                C63B
                                     .
                                     .
852                                  .        6302
                                     .           .
                                     .           .
859                  63B2A.......................................
                        .
                        .
862                  26B
                       V
                       V
871                  C26A
                       .
                       .
874                    .        26A
                       .          .
                       .          .
881                  C26A............
                       V
                       V
884                  C26
                       .
                       .
889                    .          .<-------   DIV25
887                    .        C25
                       .          V
                       .          V
890                    .        C26
                       .          .
                       .          .
893                    .          .
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                .         .         .         .         .
                .         .         .         .         .
900             .         .       C26.......................
                .         .        V
                .         .        V
903             .         .       C26
                .         .        V
                .         .        V
910             .         .      C63B
                .         .         .
                .         .         .
913             .         .         .        27
                .         .         .         V
                .         .         .         V
919             .         .         .       C27
                .         .         .         .
                .         .         .         .
927             .         .         .         .-------->   DIV27
925             .         .         .       C27
                .         .         .         V
                .         .         .         V
930             .         .         .       C63B
                .         .         .         .
                .         .         .         .
933             .         .         .         .        6300
                .         .         .         .          .
                .         .         .         .          .
940             .         .       63B1.......................
                .         .        V
                .         .        V
942             .         .      R6300
                .         .         .
                .         .         .
945             .       63B2............
                .        V
                .        V
948             .      R63B2
                .         .
                .         .
951             .         .       6304
                .         .         .
                .         .         .
958             .       63B3............
                .        V
                .        V
961             .      R63B3
                .         .
                .         .
964             .         .       6305
                .         .         .
                .         .         .
971             .        63B............
                .         V
                .         V
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974          .        C63C
             .          .
             .          .
979          .          .        .<-------   DIV27
977          .          .      C27
             .          .        V
             .          .        V
980          .          .      C28
             .          .        .
             .          .        .
983          .          .        .          28
             .          .        .           .
             .          .        .           .
990          .          .      C28............
             .          .        V
             .          .        V
993          .          .      C28
             .          .        .
             .          .        .
1001         .          .        .-------->  DIV28
999          .          .      C28
             .          .        V
             .          .        V
1004         .          .      C63C
             .          .        .
             .          .        .
1009         .          .        .           .<-------   DIV28
1007         .          .        .         C28
             .          .        .           V
             .          .        .           V
1010         .          .        .         C29
             .          .        .           .
             .          .        .           .
1013         .          .        .           .          29
             .          .        .           .           .
             .          .        .           .           .
1019         .          .        .         C29............
             .          .        .           V
             .          .        .           V
1022         .          .        .         C29
             .          .        .           .
             .          .        .           .
1030         .          .        .           .-------->  DIV29
1028         .          .        .         C29
             .          .        .           V
             .          .        .           V
1033         .          .        .         C63C
             .          .        .           .
             .          .        .           .
1038         .          .        .           .           .<-------   DIV29
1036         .          .        .           .         C29
             .          .        .           .           V
             .          .        .           .           V
1039         .          .        .           .           C29
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1042                                                  30
                                                       .
                                                       .
1048                                        C30............
                                              V
                                              V
1051                                        C30
                                              .
                                              .
1059                                          .-------> DIV30
1057                                        C30
                                              V
                                              V
1062                                        C63C
                                              .
                                              .
1067                                                .<------- DIV30
1065                                                C30
                                                      V
                                                      V
1068                                                C31
                                                      .
                                                      .
1071                                                .          31
                                                    .           .
                                                    .           .
1078                                                C31............
                                                      V
                                                      V
1081                                                C31
                                                      .
                                                      .
1089                                                .-------> DIV31
1087                                                C31
                                                      V
                                                      V
1092                                                C63C
                                                      .
                                                      .
1095                 C63C.............................................
                                                      .
                                                      .
1100                          .<------- DIV31
1098                       C31
                             V
                             V
1101                       C32
                             .
                             .
1104                         .          32
                             .           .
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1110                C32............
                     V
                     V
1113                C32
                     .
                     .
1121                 .-------->  DIV32
1119                C32
                     V
                     V
1124                C63C
                     .
                     .
1129                 .<--------  DIV32
1127                       C32
                            V
                            V
1130                       C33
                            .
                            .
1133                        .          33
                            .           .
                            .           .
1139                       C33............
                            V
                            V
1142                       C33
                            .
                            .
1150                        .-------->  DIV33
1148                       C33
                            V
                            V
1153                       C63C
                            .
                            .
1156                        .         6306
                            .           .
                            .           .
1163                        .           .          6307
                            .           .           .
                            .           .           .
1170                        .         63C............
                            .           .
                            .           .
1173          C63C.................................
               V
               V
1176          C63
               .
               .
1179                63A
                     V
                     V
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1186 .   .   .   R63A
     .   .   .     .
     .   .   .     .
1189 .   .   .     .     6308
     .   .   .     .       .
     .   .   .     .       .
1196 .   .   .     .       .       6310
     .   .   .     .       .         .
     .   .   .     .       .         .
1203 .   C631.......................................
     .     V
     .     V
1206 .   RC631
     .     .
     .     .
1209 .     .     6312
     .     .       .
     .     .       .
1216 .   C632............
     .     V
     .     V
1219 .   RC632
     .     .
     .     .
1222 .     .     6314
     .     .       .
     .     .       .
1229 .   C633............
     .     V
     .     V
1232 .   RC633
     .     .
     .     .
1235 .     .     6316
     .     .       .
     .     .       .
1242 .     .       .     6318
     .     .       .       .
     .     .       .       .
1249 .   C63........................
     .     V
     .     V
1252 .   C63
     .     V
     .     V
1258 .   C83T
     .     .
     .     .
1261 .   .     .     84T
     .     .       .
     .     .       .
1268 .   C83T............
     .     .
     .     .
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1271 C83T............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION **

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*****************************************                    ****************************************
*                                       *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*             FEBRUARY 1981             *                    *  THE HYDROLOGIC ENGINEERING CENTER   *
*           REVISED 14 JUN 85           *                    *          609 SECOND STREET           *
*                                       *                    *       DAVIS, CALIFORNIA 95616        *
*        RUN DATE: 09/13/1991           *                    *                                      *
*            TIME: 11:23:36.65          *                    *  (916) 551-1748 OR (FTS) 448-3285    *
*                                       *                    *                                      *
*****************************************                    ****************************************
```

WTM100YR

THIS IS THE HEC-1 COMPUTER MODEL FOR THE WITTMANN AREA DRAINAGE MASTER STUDY. THIS STUDY IS PREPARED FOR THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY BY THE WLB GROUP, INC.

THIS IS THE 100 YEAR MODEL FOR THE STUDY AREA AND INCLUDES STORAGE ROUTING AND DIVERSIONS ALONG THE A.T. & S.F. RAILROAD, THE CAP CANAL, AND THE BEARDSLEY CANAL.

!!!!!!!!!!THIS PROGRAM IS MODIFIED BY THE FLOOD CONTROL DISTRICT !!!!!!!!!!!!
!!!!!!!!!!OF MARICOPA COUNTY BY DEVIDING THE ORIGINAL WLB SUBBASINS!!!!!!!!!!
!!!!!!!!!!63,63B AND 63C INTO SMALLER SUBBASINS. AMM/1/22/90 !!!!!!!!!!!!!!!!

!!!!!!!!!!!!INCLUDES CHANGE IN ROUTING PARAMETERS WITHIN 63B,63C,63!!!!!!!!!!!

```
25 IO         OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                     NMIN          3  MINUTES IN COMPUTATION INTERVAL
                    IDATE    26JAN87  STARTING DATE
                    ITIME       1200  STARTING TIME
                       NQ        640  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE    27JAN87  ENDING DATE
                   NDTIME       1957  ENDING TIME

                COMPUTATION INTERVAL    0.05 HOURS
```

TOTAL TIME BASE 31.95 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

26 JD INDEX STORM NO. 1

STRM	4.21	PRECIPITATION DEPTH
TRDA	0.00	TRANSPOSITION DRAINAGE AREA

27 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

37 JD INDEX STORM NO. 2

STRM 4.17 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

38 JD INDEX STORM NO. 3

STRM 4.00 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

39 JD INDEX STORM NO. 4

STRM 3.93 PRECIPITATION DEPTH

TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

40 JD INDEX STORM NO. 5

STRM 3.82 PRECIPITATION DEPTH

TRDA 350.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 13440.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 345. TO 588.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 707.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 7200.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	1	230.	12.05	27.	9.	7.	0.09		
ROUTED TO	C1	200.	12.15	27.	9.	7.	0.09		
ROUTED TO	C62L	99.	12.45	27.	9.	7.	0.09		
HYDROGRAPH AT	62L	356.	12.25	62.	19.	14.	0.36		
2 COMBINED AT	C62L	439.	12.30	88.	29.	22.	0.45		
ROUTED TO	C62I	247.	12.80	88.	29.	22.	0.45		
HYDROGRAPH AT	62I	403.	12.55	98.	31.	23.	0.54		
2 COMBINED AT	C62I	624.	12.60	185.	59.	45.	0.99		
ROUTED TO	C62H	461.	13.10	184.	59.	45.	0.99		
HYDROGRAPH AT	62H	422.	12.50	103.	32.	24.	0.55		
HYDROGRAPH AT	62J	442.	12.75	139.	44.	33.	0.88		

3 COMBINED AT	C62H	1139.	12.75	423.	135.	102.	2.42
ROUTED TO	C62K	1120.	12.90	422.	135.	102.	2.42
HYDROGRAPH AT	2	332.	12.40	85.	27.	20.	0.50
ROUTED TO	C2	325.	12.50	85.	27.	20.	0.50
ROUTED TO	C62M	281.	12.80	85.	27.	20.	0.50
HYDROGRAPH AT	62M	150.	12.30	30.	9.	7.	0.24
2 COMBINED AT	C62M	353.	12.65	114.	36.	27.	0.74
HYDROGRAPH AT	3	303.	12.30	67.	21.	16.	0.35
ROUTED TO	C3	301.	12.30	67.	21.	16.	0.35
ROUTED TO	C62K	218.	12.70	66.	21.	16.	0.35
HYDROGRAPH AT	4	374.	12.65	116.	37.	27.	0.65
ROUTED TO	C4	374.	12.65	116.	37.	27.	0.65
DIVERSION TO	DIV4	283.	12.65	56.	14.	10.	0.65
HYDROGRAPH AT	C4	91.	12.65	60.	23.	17.	0.65
ROUTED TO	C62K	84.	13.25	59.	23.	17.	0.65
3 COMBINED AT	C62M	642.	12.70	239.	79.	60.	1.74
ROUTED TO	C62K	430.	13.55	232.	79.	59.	1.74
HYDROGRAPH AT	C4	283.	12.65	56.	14.	10.	0.65
ROUTED TO	C5	268.	12.85	56.	14.	10.	0.65
HYDROGRAPH AT	5	337.	12.15	59.	18.	14.	0.35
2 COMBINED AT	C5	375.	12.65	115.	32.	24.	0.35
ROUTED TO	C5	364.	12.85	115.	32.	24.	0.35
DIVERSION TO	DIV5	169.	12.85	24.	6.	4.	0.35
HYDROGRAPH AT	C5	195.	12.85	91.	26.	20.	0.35
ROUTED TO	C62K	158.	14.65	88.	26.	20.	0.35
3 COMBINED AT	C62K	1530.	13.05	735.	240.	181.	4.51
HYDROGRAPH AT	C5	169.	12.85	24.	6.	4.	0.35

ROUTED TO	C6	160.	13.05	24.	6.	4.	0.35
HYDROGRAPH AT	6	58.	12.05	6.	2.	1.	0.03
2 COMBINED AT	C6	168.	13.05	30.	8.	6.	0.03
ROUTED TO	C6	167.	13.10	30.	8.	6.	0.03
DIVERSION TO	DIV6	136.	13.10	20.	5.	4.	0.03
HYDROGRAPH AT	C6	31.	13.10	10.	3.	2.	0.03
ROUTED TO	C62K	16.	14.20	9.	3.	2.	0.03
HYDROGRAPH AT	C6	136.	13.10	20.	5.	4.	0.03
ROUTED TO	C7	134.	13.15	20.	5.	4.	0.03
HYDROGRAPH AT	7	57.	12.15	8.	2.	2.	0.04
2 COMBINED AT	C7	141.	13.15	28.	7.	6.	0.04
ROUTED TO	C7	77.	13.60	28.	7.	6.	0.04
DIVERSION TO	DIV7	0.	0.05	0.	0.	0.	0.04
HYDROGRAPH AT	C7	77.	13.60	28.	7.	6.	0.04
ROUTED TO	C62K	52.	14.65	26.	7.	6.	0.04
HYDROGRAPH AT	62K	532.	13.05	207.	68.	51.	1.40
4 COMBINED AT	C62K	2074.	13.05	975.	318.	239.	5.98
ROUTED TO	C62G	1871.	13.55	966.	318.	239.	5.98
HYDROGRAPH AT	C7	0.	0.05	0.	0.	0.	0.04
ROUTED TO	C8	0.	0.05	0.	0.	0.	0.04
HYDROGRAPH AT	8	19.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C8	19.	12.05	2.	1.	0.	0.01
ROUTED TO	C8	12.	12.15	2.	1.	0.	0.01
DIVERSION TO	DIV8	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C8	12.	12.15	2.	1.	0.	0.01
ROUTED TO	C62G	2.	13.45	2.	1.	0.	0.01
HYDROGRAPH AT	C8	0.	0.05	0.	0.	0.	0.01

ROUTED TO	C9	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	9	87.	12.20	15.	5.	4.	0.08
2 COMBINED AT	C9	87.	12.20	15.	5.	4.	0.08
ROUTED TO	C9	84.	12.25	15.	5.	4.	0.08
DIVERSION TO	DIV9	59.	12.25	6.	2.	1.	0.08
HYDROGRAPH AT	C9	25.	12.25	9.	3.	2.	0.08
ROUTED TO	C62G	9.	14.75	8.	3.	2.	0.08
HYDROGRAPH AT	62G	874.	12.85	303.	98.	73.	1.86
4 COMBINED AT	C62G	2471.	13.35	1265.	419.	315.	7.93
ROUTED TO	C62E	2363.	13.70	1258.	419.	315.	7.93
HYDROGRAPH AT	62E	345.	12.80	111.	36.	27.	0.68
2 COMBINED AT	C62E	2525.	13.65	1360.	454.	342.	8.61
HYDROGRAPH AT	10A	1788.	12.25	314.	97.	73.	4.94
ROUTED TO	C10	724.	12.95	312.	97.	73.	4.94
HYDROGRAPH AT	C9	59.	12.25	6.	2.	1.	0.08
ROUTED TO	C10	54.	12.40	6.	2.	1.	0.08
HYDROGRAPH AT	10	1635.	12.95	652.	213.	160.	3.93
3 COMBINED AT	C10	2371.	12.95	967.	311.	234.	8.87
ROUTED TO	C10	2372.	12.95	967.	311.	234.	8.87
ROUTED TO	C62E	1588.	14.00	930.	311.	233.	8.87
HYDROGRAPH AT	11	203.	12.25	38.	12.	9.	0.20
HYDROGRAPH AT	12	4.	12.05	0.	0.	0.	0.00
2 COMBINED AT	C11	204.	12.25	38.	12.	9.	0.20
ROUTED TO	C11	79.	12.75	38.	12.	9.	0.20
ROUTED TO	C62E	46.	15.25	33.	12.	9.	0.20
HYDROGRAPH AT	13	108.	12.25	19.	6.	4.	0.10
ROUTED TO	C13	87.	12.40	19.	6.	4.	0.10

ROUTED TO	C62E	26.	13.60	17.	6.	4.	0.10
4 COMBINED AT	C62E	4012.	13.80	2272.	764.	574.	17.78
HYDROGRAPH AT	14	20.	12.05	2.	1.	0.	0.01
ROUTED TO	C62E	2.	13.25	2.	1.	0.	0.01
HYDROGRAPH AT	15	435.	12.45	106.	33.	25.	0.57
ROUTED TO	C15	244.	12.95	105.	33.	25.	0.57
DIVERSION TO	DIV15	29.	12.95	4.	1.	1.	0.57
HYDROGRAPH AT	C15	215.	12.95	101.	32.	24.	0.57
ROUTED TO	C62E	138.	14.65	93.	32.	24.	0.57
HYDROGRAPH AT	16	479.	12.40	115.	36.	27.	0.62
HYDROGRAPH AT	C15	29.	12.95	4.	1.	1.	0.57
ROUTED TO	C16	28.	13.05	4.	1.	1.	0.57
2 COMBINED AT	C16	479.	12.40	119.	37.	28.	0.62
ROUTED TO	C16	409.	12.60	119.	37.	28.	0.62
DIVERSION TO	DIV16	295.	12.60	38.	9.	7.	0.62
HYDROGRAPH AT	C16	114.	12.60	81.	28.	21.	0.62
ROUTED TO	C62E	84.	16.45	70.	28.	21.	0.62
HYDROGRAPH AT	17	84.	12.10	10.	3.	2.	0.05
HYDROGRAPH AT	C16	295.	12.60	38.	9.	7.	0.62
ROUTED TO	C17	292.	12.65	38.	9.	7.	0.62
2 COMBINED AT	C17	309.	12.65	48.	12.	9.	0.05
ROUTED TO	C17	285.	12.75	48.	12.	9.	0.05
DIVERSION TO	DIV17	184.	12.75	15.	4.	3.	0.05
HYDROGRAPH AT	C17	101.	12.75	33.	9.	7.	0.05
ROUTED TO	C62E	62.	14.40	31.	9.	7.	0.05
5 COMBINED AT	C62E	4220.	13.85	2450.	829.	623.	19.03
HYDROGRAPH AT	18	70.	12.10	8.	2.	2.	0.04

HYDROGRAPH AT	C17	184.	12.75	15.	4.	3.	0.05
ROUTED TO	C18	170.	12.85	15.	4.	3.	0.05
2 COMBINED AT	C18	179.	12.85	23.	6.	5.	0.04
ROUTED TO	C18	106.	13.15	23.	6.	5.	0.04
DIVERSION TO	DIV18	58.	13.15	9.	2.	2.	0.04
HYDROGRAPH AT	C18	47.	13.15	14.	4.	3.	0.04
ROUTED TO	C62E	19.	14.35	12.	4.	3.	0.04
HYDROGRAPH AT	19	123.	12.35	26.	8.	6.	0.14
HYDROGRAPH AT	C18	58.	13.15	9.	2.	2.	0.04
ROUTED TO	C19	58.	13.15	9.	2.	2.	0.04
2 COMBINED AT	C19	132.	12.35	35.	10.	8.	0.14
ROUTED TO	C19	78.	13.55	35.	10.	8.	0.14
DIVERSION TO	DIV19	0.	0.05	0.	0.	0.	0.14
HYDROGRAPH AT	C19	78.	13.55	35.	10.	8.	0.14
ROUTED TO	C62E	56.	14.85	32.	10.	8.	0.14
HYDROGRAPH AT	20	422.	12.55	124.	39.	30.	0.70
HYDROGRAPH AT	C19	0.	0.05	0.	0.	0.	0.14
ROUTED TO	C20	0.	0.05	0.	0.	0.	0.14
2 COMBINED AT	C20	422.	12.55	124.	39.	30.	0.70
ROUTED TO	C20	420.	12.60	124.	39.	30.	0.70
DIVERSION TO	DIV20	215.	12.60	26.	6.	5.	0.70
HYDROGRAPH AT	C20	205.	12.60	99.	33.	25.	0.70
ROUTED TO	C62E	138.	14.25	91.	33.	25.	0.70
HYDROGRAPH AT	21	24.	12.10	3.	1.	1.	0.02
HYDROGRAPH AT	C20	215.	12.60	26.	6.	5.	0.70
ROUTED TO	C21	212.	12.65	26.	6.	5.	0.70
2 COMBINED AT	C21	220.	12.65	29.	7.	6.	0.02

ROUTED TO	C21	219.	12.70	29.	7.	6.	0.02
DIVERSION TO	DIV21	200.	12.70	24.	6.	4.	0.02
HYDROGRAPH AT	C21	19.	12.70	5.	1.	1.	0.02
ROUTED TO	C62E	7.	14.05	4.	1.	1.	0.02
5 COMBINED AT	C62E	4399.	13.85	2578.	874.	657.	19.93
HYDROGRAPH AT	62F	805.	13.10	330.	110.	82.	2.18
2 COMBINED AT	C62E	4928.	13.75	2871.	976.	733.	22.11
ROUTED TO	C62D	4911.	13.90	2868.	976.	733.	22.11
HYDROGRAPH AT	62D	790.	13.00	302.	98.	74.	1.66
2 COMBINED AT	C62D	5365.	13.80	3130.	1067.	802.	23.77
ROUTED TO	C62B	5250.	14.10	3116.	1067.	801.	23.77
HYDROGRAPH AT	62B	194.	12.75	67.	22.	16.	0.49
HYDROGRAPH AT	62C	296.	12.45	75.	23.	18.	0.40
3 COMBINED AT	C62B	5360.	14.10	3207.	1108.	833.	24.66
ROUTED TO	C62	4319.	15.35	3055.	1104.	829.	24.66
HYDROGRAPH AT	62A	744.	12.90	287.	92.	69.	1.58
ROUTED TO	C62	393.	14.25	260.	92.	69.	1.58
HYDROGRAPH AT	62	1412.	13.80	713.	247.	185.	5.09
3 COMBINED AT	C62	5326.	15.05	3846.	1414.	1062.	31.33
ROUTED TO	C62	5030.	15.75	3331.	1379.	1036.	31.33
ROUTED TO	C83T	4143.	17.15	3206.	1358.	1020.	31.33
HYDROGRAPH AT	83T	317.	13.85	174.	60.	45.	1.29
2 COMBINED AT	C83T	4216.	17.15	3270.	1413.	1061.	32.62
HYDROGRAPH AT	C21	200.	12.70	24.	6.	4.	0.02
ROUTED TO	C22	190.	12.80	24.	6.	4.	0.02
HYDROGRAPH AT	22	153.	12.40	34.	11.	8.	0.26
2 COMBINED AT	C22	276.	12.75	58.	17.	13.	0.26

ROUTED TO	C22	273.	12.80	58.	17.	13.	0.26
DIVERSION TO	DIV22	193.	12.80	22.	6.	4.	0.26
HYDROGRAPH AT	C22	80.	12.80	35.	11.	8.	0.26
ROUTED TO	C63B	61.	14.15	34.	11.	8.	0.26
HYDROGRAPH AT	C22	193.	12.80	22.	6.	4.	0.26
ROUTED TO	C23	192.	12.85	22.	6.	4.	0.26
HYDROGRAPH AT	23	8.	12.05	1.	0.	0.	0.01
2 COMBINED AT	C23	198.	12.85	24.	6.	5.	0.01
ROUTED TO	C23	198.	12.85	24.	6.	5.	0.01
DIVERSION TO	DIV23	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C23	198.	12.85	24.	6.	5.	0.01
ROUTED TO	C63B	112.	13.35	24.	6.	5.	0.01
HYDROGRAPH AT	C23	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C24	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	24	8.	12.05	1.	0.	0.	0.01
2 COMBINED AT	C24	8.	12.05	1.	0.	0.	0.01
ROUTED TO	C24	3.	12.20	1.	0.	0.	0.01
DIVERSION TO	DIV24	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C24	3.	12.20	1.	0.	0.	0.01
ROUTED TO	C63B	2.	13.15	1.	0.	0.	0.01
HYDROGRAPH AT	C24	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C25	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	25	51.	12.15	7.	2.	2.	0.05
2 COMBINED AT	C25	51.	12.15	7.	2.	2.	0.05
ROUTED TO	C25	41.	12.25	7.	2.	2.	0.05
DIVERSION TO	DIV25	9.	12.25	0.	0.	0.	0.05
HYDROGRAPH AT	C25	32.	12.25	6.	2.	2.	0.05

ROUTED TO	C63B	12.	13.10	6.	2.	2.	0.05
HYDROGRAPH AT	6302	772.	12.25	144.	45.	33.	0.75
5 COMBINED AT	63B2A	769.	12.25	205.	64.	48.	1.07
HYDROGRAPH AT	26B	4685.	12.25	882.	275.	206.	12.72
ROUTED TO	C26A	3254.	12.60	880.	275.	206.	12.72
HYDROGRAPH AT	26A	812.	12.20	125.	38.	29.	2.26
2 COMBINED AT	C26A	3550.	12.55	997.	311.	233.	14.98
ROUTED TO	C26	2629.	13.15	993.	311.	233.	14.98
HYDROGRAPH AT	C25	9.	12.25	0.	0.	0.	0.05
ROUTED TO	C26	8.	12.35	0.	0.	0.	0.05
HYDROGRAPH AT	26	363.	13.05	149.	50.	37.	1.12
3 COMBINED AT	C26	2970.	13.15	1135.	359.	269.	16.10
ROUTED TO	C26	2970.	13.15	1135.	359.	269.	16.10
ROUTED TO	C63B	2864.	13.40	1134.	359.	269.	16.10
HYDROGRAPH AT	27	53.	12.20	8.	2.	2.	0.06
ROUTED TO	C27	51.	12.25	8.	2.	2.	0.06
DIVERSION TO	DIV27	23.	12.25	1.	0.	0.	0.06
HYDROGRAPH AT	C27	28.	12.25	7.	2.	2.	0.06
ROUTED TO	C63B	12.	13.40	7.	2.	2.	0.06
HYDROGRAPH AT	6300	138.	12.30	28.	9.	7.	0.15
3 COMBINED AT	63B1	2904.	13.40	1165.	369.	277.	16.31
ROUTED TO	R6300	2901.	13.50	1167.	370.	278.	16.31
2 COMBINED AT	63B2	3184.	13.45	1358.	431.	323.	17.38
ROUTED TO	R63B2	3182.	13.50	1358.	430.	323.	17.38
HYDROGRAPH AT	6304	468.	12.15	72.	22.	17.	0.38
2 COMBINED AT	63B3	3234.	13.50	1424.	452.	339.	17.76
ROUTED TO	R63B3	3234.	13.55	1423.	452.	339.	17.76

HYDROGRAPH AT	63D5	125.	12.35	30.	9.	7.	0.16
2 COMBINED AT	63B	3261.	13.55	1451.	461.	346.	17.92
ROUTED TO	C63C	3112.	13.85	1446.	461.	346.	17.92
HYDROGRAPH AT	C27	23.	12.25	1.	0.	0.	0.06
ROUTED TO	C28	12.	12.40	1.	0.	0.	0.06
HYDROGRAPH AT	28	176.	12.35	35.	11.	8.	0.24
2 COMBINED AT	C28	188.	12.35	36.	11.	8.	0.24
ROUTED TO	C28	168.	12.45	36.	11.	8.	0.24
DIVERSION TO	DIV28	99.	12.45	8.	2.	1.	0.24
HYDROGRAPH AT	C28	70.	12.45	28.	9.	7.	0.24
ROUTED TO	C63C	26.	14.80	21.	9.	7.	0.24
HYDROGRAPH AT	C28	99.	12.45	8.	2.	1.	0.24
ROUTED TO	C29	97.	12.50	8.	2.	1.	0.24
HYDROGRAPH AT	29	20.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C29	102.	12.50	10.	3.	2.	0.01
ROUTED TO	C29	98.	12.55	10.	3.	2.	0.01
DIVERSION TO	DIV29	67.	12.55	4.	1.	1.	0.01
HYDROGRAPH AT	C29	31.	12.55	6.	2.	1.	0.01
ROUTED TO	C63C	7.	14.20	5.	2.	1.	0.01
HYDROGRAPH AT	C29	67.	12.55	4.	1.	1.	0.01
ROUTED TO	C30	67.	12.60	4.	1.	1.	0.01
HYDROGRAPH AT	30	20.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C30	69.	12.60	6.	2.	1.	0.01
ROUTED TO	C30	50.	12.75	6.	2.	1.	0.01
DIVERSION TO	DIV30	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C30	50.	12.75	6.	2.	1.	0.01
ROUTED TO	C63C	9.	13.45	5.	2.	1.	0.01

HYDROGRAPH AT	C30	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C31	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	31	288.	12.85	99.	32.	24.	0.63
2 COMBINED AT	C31	288.	12.85	99.	32.	24.	0.63
ROUTED TO	C31	240.	13.20	99.	32.	24.	0.63
DIVERSION TO	DIV31	16.	13.20	1.	0.	0.	0.63
HYDROGRAPH AT	C31	224.	13.20	98.	32.	24.	0.63
ROUTED TO	C63C	122.	14.95	85.	32.	24.	0.63
5 COMBINED AT	C63C	3217.	13.85	1541.	502.	377.	18.81
HYDROGRAPH AT	C31	16.	13.20	1.	0.	0.	0.63
ROUTED TO	C32	13.	13.30	1.	0.	0.	0.63
HYDROGRAPH AT	32	66.	12.15	10.	3.	2.	0.05
2 COMBINED AT	C32	66.	12.15	10.	3.	2.	0.05
ROUTED TO	C32	46.	12.35	10.	3.	2.	0.05
DIVERSION TO	DIV32	4.	12.35	0.	0.	0.	0.05
HYDROGRAPH AT	C32	42.	12.35	10.	3.	2.	0.05
ROUTED TO	C63C	12.	14.10	8.	3.	2.	0.05
HYDROGRAPH AT	C32	4.	12.35	0.	0.	0.	0.05
ROUTED TO	C33	3.	12.40	0.	0.	0.	0.05
HYDROGRAPH AT	33	41.	12.05	4.	1.	1.	0.02
2 COMBINED AT	C33	41.	12.05	4.	1.	1.	0.02
ROUTED TO	C33	14.	12.20	4.	1.	1.	0.02
DIVERSION TO	DIV33	0.	0.05	0.	0.	0.	0.02
HYDROGRAPH AT	C33	14.	12.20	4.	1.	1.	0.02
ROUTED TO	C63C	4.	14.65	3.	1.	1.	0.02
HYDROGRAPH AT	6306	461.	12.35	89.	28.	21.	0.44
HYDROGRAPH AT	6307	1103.	12.45	248.	77.	58.	1.23

2 COMBINED AT	63C	1545.	12.40	336.	105.	79.	1.67
4 COMBINED AT	C63C	3488.	13.85	1858.	606.	455.	20.55
ROUTED TO	C63	3281.	14.30	1842.	606.	455.	20.55
HYDROGRAPH AT	63A	1088.	13.15	427.	141.	106.	2.67
ROUTED TO	R63A	1025.	13.40	425.	140.	106.	2.67
HYDROGRAPH AT	6308	176.	12.60	49.	16.	12.	0.30
HYDROGRAPH AT	6310	334.	12.65	85.	27.	20.	0.51
4 COMBINED AT	C631	4061.	14.10	2360.	778.	584.	24.04
ROUTED TO	RC631	4053.	14.20	2352.	777.	584.	24.04
HYDROGRAPH AT	6312	130.	13.35	59.	20.	15.	0.39
2 COMBINED AT	C632	4135.	14.20	2407.	796.	598.	24.42
ROUTED TO	RC632	4123.	14.40	2393.	794.	597.	24.42
HYDROGRAPH AT	6314	623.	12.50	141.	44.	33.	0.85
2 COMBINED AT	C633	4208.	14.35	2476.	836.	628.	25.27
ROUTED TO	RC633	4208.	14.40	2475.	835.	628.	25.27
HYDROGRAPH AT	6316	137.	12.45	29.	9.	7.	0.17
HYDROGRAPH AT	6318	420.	12.45	88.	28.	21.	0.53
3 COMBINED AT	C63	4277.	14.40	2556.	870.	653.	25.97
ROUTED TO	C63	4266.	14.45	2555.	870.	653.	25.97
ROUTED TO	C83T	3360.	15.80	2380.	864.	649.	25.97
HYDROGRAPH AT	84T	348.	14.75	218.	80.	60.	1.81
2 COMBINED AT	C83T	3611.	15.70	2568.	938.	705.	27.78
2 COMBINED AT	C83T	7012.	16.65	5364.	2282.	1714.	60.40

*** NORMAL END OF HEC-1 ***

3 COMBINED AT	C62H	1139.	12.75	423.	135.	102.	2.42
ROUTED TO	C62K	1120.	12.90	422.	135.	102.	2.42
HYDROGRAPH AT	2	332.	12.40	85.	27.	20.	0.50
ROUTED TO	C2	325.	12.50	85.	27.	20.	0.50
ROUTED TO	C62M	281.	12.80	85.	27.	20.	0.50
HYDROGRAPH AT	62M	150.	12.30	30.	9.	7.	0.24
2 COMBINED AT	C62M	353.	12.65	114.	36.	27.	0.74
HYDROGRAPH AT	3	303.	12.30	67.	21.	16.	0.35
ROUTED TO	C3	301.	12.30	67.	21.	16.	0.35
ROUTED TO	C62K	218.	12.70	66.	21.	16.	0.35
HYDROGRAPH AT	4	374.	12.65	116.	37.	27.	0.65
ROUTED TO	C4	374.	12.65	116.	37.	27.	0.65
DIVERSION TO	DIV4	283.	12.65	56.	14.	10.	0.65
HYDROGRAPH AT	C4	91.	12.65	60.	23.	17.	0.65
ROUTED TO	C62K	84.	13.25	59.	23.	17.	0.65
3 COMBINED AT	C62M	642.	12.70	239.	79.	60.	1.74
ROUTED TO	C62K	430.	13.55	232.	79.	59.	1.74
HYDROGRAPH AT	C4	283.	12.65	56.	14.	10.	0.65
ROUTED TO	C5	268.	12.85	56.	14.	10.	0.65
HYDROGRAPH AT	5	337.	12.15	59.	18.	14.	0.35
2 COMBINED AT	C5	375.	12.65	115.	32.	24.	0.35
ROUTED TO	C5	364.	12.85	115.	32.	24.	0.35
DIVERSION TO	DIV5	169.	12.85	24.	6.	4.	0.35
HYDROGRAPH AT	C5	195.	12.85	91.	26.	20.	0.35
ROUTED TO	C62K	158.	14.65	88.	26.	20.	0.35
3 COMBINED AT	C62K	1530.	13.05	735.	240.	181.	4.51
HYDROGRAPH AT	C5	169.	12.85	24.	6.	4.	0.35

ROUTED TO	C6	160.	13.05	24.	6.	4.	0.35
HYDROGRAPH AT	6	58.	12.05	6.	2.	1.	0.03
2 COMBINED AT	C6	168.	13.05	30.	8.	6.	0.03
ROUTED TO	C6	167.	13.10	30.	8.	6.	0.03
DIVERSION TO	DIV6	136.	13.10	20.	5.	4.	0.03
HYDROGRAPH AT	C6	31.	13.10	10.	3.	2.	0.03
ROUTED TO	C62K	16.	14.20	9.	3.	2.	0.03
HYDROGRAPH AT	C6	136.	13.10	20.	5.	4.	0.03
ROUTED TO	C7	134.	13.15	20.	5.	4.	0.03
HYDROGRAPH AT	7	57.	12.15	8.	2.	2.	0.04
2 COMBINED AT	C7	141.	13.15	28.	7.	6.	0.04
ROUTED TO	C7	77.	13.60	28.	7.	6.	0.04
DIVERSION TO	DIV7	0.	0.05	0.	0.	0.	0.04
HYDROGRAPH AT	C7	77.	13.60	28.	7.	6.	0.04
ROUTED TO	C62K	52.	14.65	26.	7.	6.	0.04
HYDROGRAPH AT	62K	532.	13.05	207.	68.	51.	1.40
4 COMBINED AT	C62K	2074.	13.05	975.	318.	239.	5.98
ROUTED TO	C62G	1871.	13.55	966.	318.	239.	5.98
HYDROGRAPH AT	C7	0.	0.05	0.	0.	0.	0.04
ROUTED TO	C8	0.	0.05	0.	0.	0.	0.04
HYDROGRAPH AT	8	19.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C8	19.	12.05	2.	1.	0.	0.01
ROUTED TO	C8	12.	12.15	2.	1.	0.	0.01
DIVERSION TO	DIV8	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C8	12.	12.15	2.	1.	0.	0.01
ROUTED TO	C62G	2.	13.45	2.	1.	0.	0.01
HYDROGRAPH AT	C8	0.	0.05	0.	0.	0.	0.01

ROUTED TO	C9	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	9	87.	12.20	15.	5.	4.	0.08
2 COMBINED AT	C9	87.	12.20	15.	5.	4.	0.08
ROUTED TO	C9	84.	12.25	15.	5.	4.	0.08
DIVERSION TO	DIV9	59.	12.25	6.	2.	1.	0.08
HYDROGRAPH AT	C9	25.	12.25	9.	3.	2.	0.08
ROUTED TO	C62G	9.	14.75	8.	3.	2.	0.08
HYDROGRAPH AT	62G	874.	12.85	303.	98.	73.	1.86
4 COMBINED AT	C62G	2471.	13.35	1265.	419.	315.	7.93
ROUTED TO	C62E	2363.	13.70	1258.	419.	315.	7.93
HYDROGRAPH AT	62E	345.	12.80	111.	36.	27.	0.68
2 COMBINED AT	C62E	2525.	13.65	1360.	454.	342.	8.61
HYDROGRAPH AT	10A	1788.	12.25	314.	97.	73.	4.94
ROUTED TO	C10	724.	12.95	312.	97.	73.	4.94
HYDROGRAPH AT	C9	59.	12.25	6.	2.	1.	0.08
ROUTED TO	C10	54.	12.40	6.	2.	1.	0.08
HYDROGRAPH AT	10	1635.	12.95	652.	213.	160.	3.93
3 COMBINED AT	C10	2371.	12.95	967.	311.	234.	8.87
ROUTED TO	C10	2372.	12.95	967.	311.	234.	8.87
ROUTED TO	C62E	1588.	14.00	930.	311.	233.	8.87
HYDROGRAPH AT	11	203.	12.25	38.	12.	9.	0.20
HYDROGRAPH AT	12	4.	12.05	0.	0.	0.	0.00
2 COMBINED AT	C11	204.	12.25	38.	12.	9.	0.20
ROUTED TO	C11	79.	12.75	38.	12.	9.	0.20
ROUTED TO	C62E	46.	15.25	33.	12.	9.	0.20
HYDROGRAPH AT	13	108.	12.25	19.	6.	4.	0.10
ROUTED TO	C13	87.	12.40	19.	6.	4.	0.10

ROUTED TO	C62E	26.	13.60	17.	6.	4.	0.10
4 COMBINED AT	C62E	4012.	13.80	2272.	764.	574.	17.78
HYDROGRAPH AT	14	20.	12.05	2.	1.	0.	0.01
ROUTED TO	C62E	2.	13.25	2.	1.	0.	0.01
HYDROGRAPH AT	15	435.	12.45	106.	33.	25.	0.57
ROUTED TO	C15	244.	12.95	105.	33.	25.	0.57
DIVERSION TO	DIV15	29.	12.95	4.	1.	1.	0.57
HYDROGRAPH AT	C15	215.	12.95	101.	32.	24.	0.57
ROUTED TO	C62E	138.	14.65	93.	32.	24.	0.57
HYDROGRAPH AT	16	479.	12.40	115.	36.	27.	0.62
HYDROGRAPH AT	C15	29.	12.95	4.	1.	1.	0.57
ROUTED TO	C16	28.	13.05	4.	1.	1.	0.57
2 COMBINED AT	C16	479.	12.40	119.	37.	28.	0.62
ROUTED TO	C16	409.	12.60	119.	37.	28.	0.62
DIVERSION TO	DIV16	295.	12.60	38.	9.	7.	0.62
HYDROGRAPH AT	C16	114.	12.60	81.	28.	21.	0.62
ROUTED TO	C62E	84.	16.45	70.	28.	21.	0.62
HYDROGRAPH AT	17	84.	12.10	10.	3.	2.	0.05
HYDROGRAPH AT	C16	295.	12.60	38.	9.	7.	0.62
ROUTED TO	C17	292.	12.65	38.	9.	7.	0.62
2 COMBINED AT	C17	309.	12.65	48.	12.	9.	0.05
ROUTED TO	C17	285.	12.75	48.	12.	9.	0.05
DIVERSION TO	DIV17	184.	12.75	15.	4.	3.	0.05
HYDROGRAPH AT	C17	101.	12.75	33.	9.	7.	0.05
ROUTED TO	C62E	62.	14.40	31.	9.	7.	0.05
5 COMBINED AT	C62E	4220.	13.85	2450.	829.	623.	19.03
HYDROGRAPH AT	18	70.	12.10	8.	2.	2.	0.04

HYDROGRAPH AT	C17	184.	12.75	15.	4.	3.	0.05
ROUTED TO	C18	170.	12.85	15.	4.	3.	0.05
2 COMBINED AT	C18	179.	12.85	23.	6.	5.	0.04
ROUTED TO	C18	106.	13.15	23.	6.	5.	0.04
DIVERSION TO	DIV18	58.	13.15	9.	2.	2.	0.04
HYDROGRAPH AT	C18	47.	13.15	14.	4.	3.	0.04
ROUTED TO	C62E	19.	14.35	12.	4.	3.	0.04
HYDROGRAPH AT	19	123.	12.35	26.	8.	6.	0.14
HYDROGRAPH AT	C18	58.	13.15	9.	2.	2.	0.04
ROUTED TO	C19	58.	13.15	9.	2.	2.	0.04
2 COMBINED AT	C19	132.	12.35	35.	10.	8.	0.14
ROUTED TO	C19	78.	13.55	35.	10.	8.	0.14
DIVERSION TO	DIV19	0.	0.05	0.	0.	0.	0.14
HYDROGRAPH AT	C19	78.	13.55	35.	10.	8.	0.14
ROUTED TO	C62E	56.	14.85	32.	10.	8.	0.14
HYDROGRAPH AT	20	422.	12.55	124.	39.	30.	0.70
HYDROGRAPH AT	C19	0.	0.05	0.	0.	0.	0.14
ROUTED TO	C20	0.	0.05	0.	0.	0.	0.14
2 COMBINED AT	C20	422.	12.55	124.	39.	30.	0.70
ROUTED TO	C20	420.	12.60	124.	39.	30.	0.70
DIVERSION TO	DIV20	215.	12.60	26.	6.	5.	0.70
HYDROGRAPH AT	C20	205.	12.60	99.	33.	25.	0.70
ROUTED TO	C62E	138.	14.25	91.	33.	25.	0.70
HYDROGRAPH AT	21	24.	12.10	3.	1.	1.	0.02
HYDROGRAPH AT	C20	215.	12.60	26.	6.	5.	0.70
ROUTED TO	C21	212.	12.65	26.	6.	5.	0.70
2 COMBINED AT	C21	220.	12.65	29.	7.	6.	0.02

ROUTED TO	C21	219.	12.70	29.	7.	6.	0.02
DIVERSION TO	DIV21	200.	12.70	24.	6.	4.	0.02
HYDROGRAPH AT	C21	19.	12.70	5.	1.	1.	0.02
ROUTED TO	C62E	7.	14.05	4.	1.	1.	0.02
5 COMBINED AT	C62E	4399.	13.85	2578.	874.	657.	19.93
HYDROGRAPH AT	62F	805.	13.10	330.	110.	82.	2.18
2 COMBINED AT	C62E	4928.	13.75	2871.	976.	733.	22.11
ROUTED TO	C62D	4911.	13.90	2868.	976.	733.	22.11
HYDROGRAPH AT	62D	790.	13.00	302.	98.	74.	1.66
2 COMBINED AT	C62D	5365.	13.80	3130.	1067.	802.	23.77
ROUTED TO	C62B	5250.	14.10	3116.	1067.	801.	23.77
HYDROGRAPH AT	62B	194.	12.75	67.	22.	16.	0.49
HYDROGRAPH AT	62C	296.	12.45	75.	23.	18.	0.40
3 COMBINED AT	C62B	5360.	14.10	3207.	1108.	833.	24.66
ROUTED TO	C62	4319.	15.35	3055.	1104.	829.	24.66
HYDROGRAPH AT	62A	744.	12.90	287.	92.	69.	1.58
ROUTED TO	C62	393.	14.25	260.	92.	69.	1.58
HYDROGRAPH AT	62	1412.	13.80	713.	247.	185.	5.09
3 COMBINED AT	C62	5326.	15.05	3846.	1414.	1062.	31.33
ROUTED TO	C62	5030.	15.75	3331.	1379.	1036.	31.33
ROUTED TO	C83T	4143.	17.15	3206.	1358.	1020.	31.33
HYDROGRAPH AT	83T	317.	13.85	174.	60.	45.	1.29
2 COMBINED AT	C83T	4216.	17.15	3270.	1413.	1061.	32.62
HYDROGRAPH AT	C21	200.	12.70	24.	6.	4.	0.02
ROUTED TO	C22	190.	12.80	24.	6.	4.	0.02
HYDROGRAPH AT	22	153.	12.40	34.	11.	8.	0.26
2 COMBINED AT	C22	276.	12.75	58.	17.	13.	0.26

ROUTED TO	C22	273.	12.80	58.	17.	13.	0.26
DIVERSION TO	DIV22	193.	12.80	22.	6.	4.	0.26
HYDROGRAPH AT	C22	80.	12.80	35.	11.	8.	0.26
ROUTED TO	C63B	61.	14.15	34.	11.	8.	0.26
HYDROGRAPH AT	C22	193.	12.80	22.	6.	4.	0.26
ROUTED TO	C23	192.	12.85	22.	6.	4.	0.26
HYDROGRAPH AT	23	8.	12.05	1.	0.	0.	0.01
2 COMBINED AT	C23	198.	12.85	24.	6.	5.	0.01
ROUTED TO	C23	198.	12.85	24.	6.	5.	0.01
DIVERSION TO	DIV23	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C23	198.	12.85	24.	6.	5.	0.01
ROUTED TO	C63B	112.	13.35	24.	6.	5.	0.01
HYDROGRAPH AT	C23	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C24	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	24	8.	12.05	1.	0.	0.	0.01
2 COMBINED AT	C24	8.	12.05	1.	0.	0.	0.01
ROUTED TO	C24	3.	12.20	1.	0.	0.	0.01
DIVERSION TO	DIV24	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C24	3.	12.20	1.	0.	0.	0.01
ROUTED TO	C63B	2.	13.15	1.	0.	0.	0.01
HYDROGRAPH AT	C24	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C25	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	25	51.	12.15	7.	2.	2.	0.05
2 COMBINED AT	C25	51.	12.15	7.	2.	2.	0.05
ROUTED TO	C25	41.	12.25	7.	2.	2.	0.05
DIVERSION TO	DIV25	9.	12.25	0.	0.	0.	0.05
HYDROGRAPH AT	C25	32.	12.25	6.	2.	2.	0.05

ROUTED TO	C63B	12.	13.10	6.	2.	2.	0.05
HYDROGRAPH AT	6302	772.	12.25	144.	45.	33.	0.75
5 COMBINED AT	63B2A	769.	12.25	205.	64.	48.	1.07
HYDROGRAPH AT	26B	4685.	12.25	882.	275.	206.	12.72
ROUTED TO	C26A	3254.	12.60	880.	275.	206.	12.72
HYDROGRAPH AT	26A	812.	12.20	125.	38.	29.	2.26
2 COMBINED AT	C26A	3550.	12.55	997.	311.	233.	14.98
ROUTED TO	C26	2629.	13.15	993.	311.	233.	14.98
HYDROGRAPH AT	C25	9.	12.25	0.	0.	0.	0.05
ROUTED TO	C26	8.	12.35	0.	0.	0.	0.05
HYDROGRAPH AT	26	363.	13.05	149.	50.	37.	1.12
3 COMBINED AT	C26	2970.	13.15	1135.	359.	269.	16.10
ROUTED TO	C26	2970.	13.15	1135.	359.	269.	16.10
ROUTED TO	C63B	2864.	13.40	1134.	359.	269.	16.10
HYDROGRAPH AT	27	53.	12.20	8.	2.	2.	0.06
ROUTED TO	C27	51.	12.25	8.	2.	2.	0.06
DIVERSION TO	DIV27	23.	12.25	1.	0.	0.	0.06
HYDROGRAPH AT	C27	28.	12.25	7.	2.	2.	0.06
ROUTED TO	C63B	12.	13.40	7.	2.	2.	0.06
HYDROGRAPH AT	6300	138.	12.30	28.	9.	7.	0.15
3 COMBINED AT	63B1	2904.	13.40	1165.	369.	277.	16.31
ROUTED TO	R6300	2901.	13.50	1167.	370.	278.	16.31
2 COMBINED AT	63B2	3184.	13.45	1358.	431.	323.	17.38
ROUTED TO	R63B2	3182.	13.50	1358.	430.	323.	17.38
HYDROGRAPH AT	6304	468.	12.15	72.	22.	17.	0.38
2 COMBINED AT	63B3	3234.	13.50	1424.	452.	339.	17.76
ROUTED TO	R63B3	3234.	13.55	1423.	452.	339.	17.76

HYDROGRAPH AT	6305	125.	12.35	30.	9.	7.	0.16
2 COMBINED AT	63B	3261.	13.55	1451.	461.	346.	17.92
ROUTED TO	C63C	3112.	13.85	1446.	461.	346.	17.92
HYDROGRAPH AT	C27	23.	12.25	1.	0.	0.	0.06
ROUTED TO	C28	12.	12.40	1.	0.	0.	0.06
HYDROGRAPH AT	28	176.	12.35	35.	11.	8.	0.24
2 COMBINED AT	C28	188.	12.35	36.	11.	8.	0.24
ROUTED TO	C28	168.	12.45	36.	11.	8.	0.24
DIVERSION TO	DIV28	99.	12.45	8.	2.	1.	0.24
HYDROGRAPH AT	C28	70.	12.45	28.	9.	7.	0.24
ROUTED TO	C63C	26.	14.80	21.	9.	7.	0.24
HYDROGRAPH AT	C28	99.	12.45	8.	2.	1.	0.24
ROUTED TO	C29	97.	12.50	8.	2.	1.	0.24
HYDROGRAPH AT	29	20.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C29	102.	12.50	10.	3.	2.	0.01
ROUTED TO	C29	98.	12.55	10.	3.	2.	0.01
DIVERSION TO	DIV29	67.	12.55	4.	1.	1.	0.01
HYDROGRAPH AT	C29	31.	12.55	6.	2.	1.	0.01
ROUTED TO	C63C	7.	14.20	5.	2.	1.	0.01
HYDROGRAPH AT	C29	67.	12.55	4.	1.	1.	0.01
ROUTED TO	C30	67.	12.60	4.	1.	1.	0.01
HYDROGRAPH AT	30	20.	12.05	2.	1.	0.	0.01
2 COMBINED AT	C30	69.	12.60	6.	2.	1.	0.01
ROUTED TO	C30	50.	12.75	6.	2.	1.	0.01
DIVERSION TO	DIV30	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	C30	50.	12.75	6.	2.	1.	0.01
ROUTED TO	C63C	9.	13.45	5.	2.	1.	0.01

HYDROGRAPH AT	C30	0.	0.05	0.	0.	0.	0.01
ROUTED TO	C31	0.	0.05	0.	0.	0.	0.01
HYDROGRAPH AT	31	288.	12.85	99.	32.	24.	0.63
2 COMBINED AT	C31	288.	12.85	99.	32.	24.	0.63
ROUTED TO	C31	240.	13.20	99.	32.	24.	0.63
DIVERSION TO	DIV31	16.	13.20	1.	0.	0.	0.63
HYDROGRAPH AT	C31	224.	13.20	98.	32.	24.	0.63
ROUTED TO	C63C	122.	14.95	85.	32.	24.	0.63
5 COMBINED AT	C63C	3217.	13.85	1541.	502.	377.	18.81
HYDROGRAPH AT	C31	16.	13.20	1.	0.	0.	0.63
ROUTED TO	C32	13.	13.30	1.	0.	0.	0.63
HYDROGRAPH AT	32	66.	12.15	10.	3.	2.	0.05
2 COMBINED AT	C32	66.	12.15	10.	3.	2.	0.05
ROUTED TO	C32	46.	12.35	10.	3.	2.	0.05
DIVERSION TO	DIV32	4.	12.35	0.	0.	0.	0.05
HYDROGRAPH AT	C32	42.	12.35	10.	3.	2.	0.05
ROUTED TO	C63C	12.	14.10	8.	3.	2.	0.05
HYDROGRAPH AT	C32	4.	12.35	0.	0.	0.	0.05
ROUTED TO	C33	3.	12.40	0.	0.	0.	0.05
HYDROGRAPH AT	33	41.	12.05	4.	1.	1.	0.02
2 COMBINED AT	C33	41.	12.05	4.	1.	1.	0.02
ROUTED TO	C33	14.	12.20	4.	1.	1.	0.02
DIVERSION TO	DIV33	0.	0.05	0.	0.	0.	0.02
HYDROGRAPH AT	C33	14.	12.20	4.	1.	1.	0.02
ROUTED TO	C63C	4.	14.65	3.	1.	1.	0.02
HYDROGRAPH AT	6306	461.	12.35	89.	28.	21.	0.44
HYDROGRAPH AT	6307	1103.	12.45	248.	77.	58.	1.23

2 COMBINED AT	63C	1545.	12.40	336.	105.	79.	1.67
4 COMBINED AT	C63C	3488.	13.85	1858.	606.	455.	20.55
ROUTED TO	C63	3281.	14.30	1842.	606.	455.	20.55
HYDROGRAPH AT	63A	1088.	13.15	427.	141.	106.	2.67
ROUTED TO	R63A	1025.	13.40	425.	140.	106.	2.67
HYDROGRAPH AT	6308	176.	12.60	49.	16.	12.	0.30
HYDROGRAPH AT	6310	334.	12.65	85.	27.	20.	0.51
4 COMBINED AT	C631	4061.	14.10	2360.	778.	584.	24.04
ROUTED TO	RC631	4053.	14.20	2352.	777.	584.	24.04
HYDROGRAPH AT	6312	130.	13.35	59.	20.	15.	0.39
2 COMBINED AT	C632	4135.	14.20	2407.	796.	598.	24.42
ROUTED TO	RC632	4123.	14.40	2393.	794.	597.	24.42
HYDROGRAPH AT	6314	623.	12.50	141.	44.	33.	0.85
2 COMBINED AT	C633	4208.	14.35	2476.	836.	628.	25.27
ROUTED TO	RC633	4208.	14.40	2475.	835.	628.	25.27
HYDROGRAPH AT	6316	137.	12.45	29.	9.	7.	0.17
HYDROGRAPH AT	6318	420.	12.45	88.	28.	21.	0.53
3 COMBINED AT	C63	4277.	14.40	2556.	870.	653.	25.97
ROUTED TO	C63	4266.	14.45	2555.	870.	653.	25.97
ROUTED TO	C83T	3360.	15.80	2380.	864.	649.	25.97
HYDROGRAPH AT	84T	348.	14.75	218.	80.	60.	1.81
2 COMBINED AT	C83T	3611.	15.70	2568.	938.	705.	27.78
2 COMBINED AT	C83T	7012.	16.65	5364.	2282.	1714.	60.40

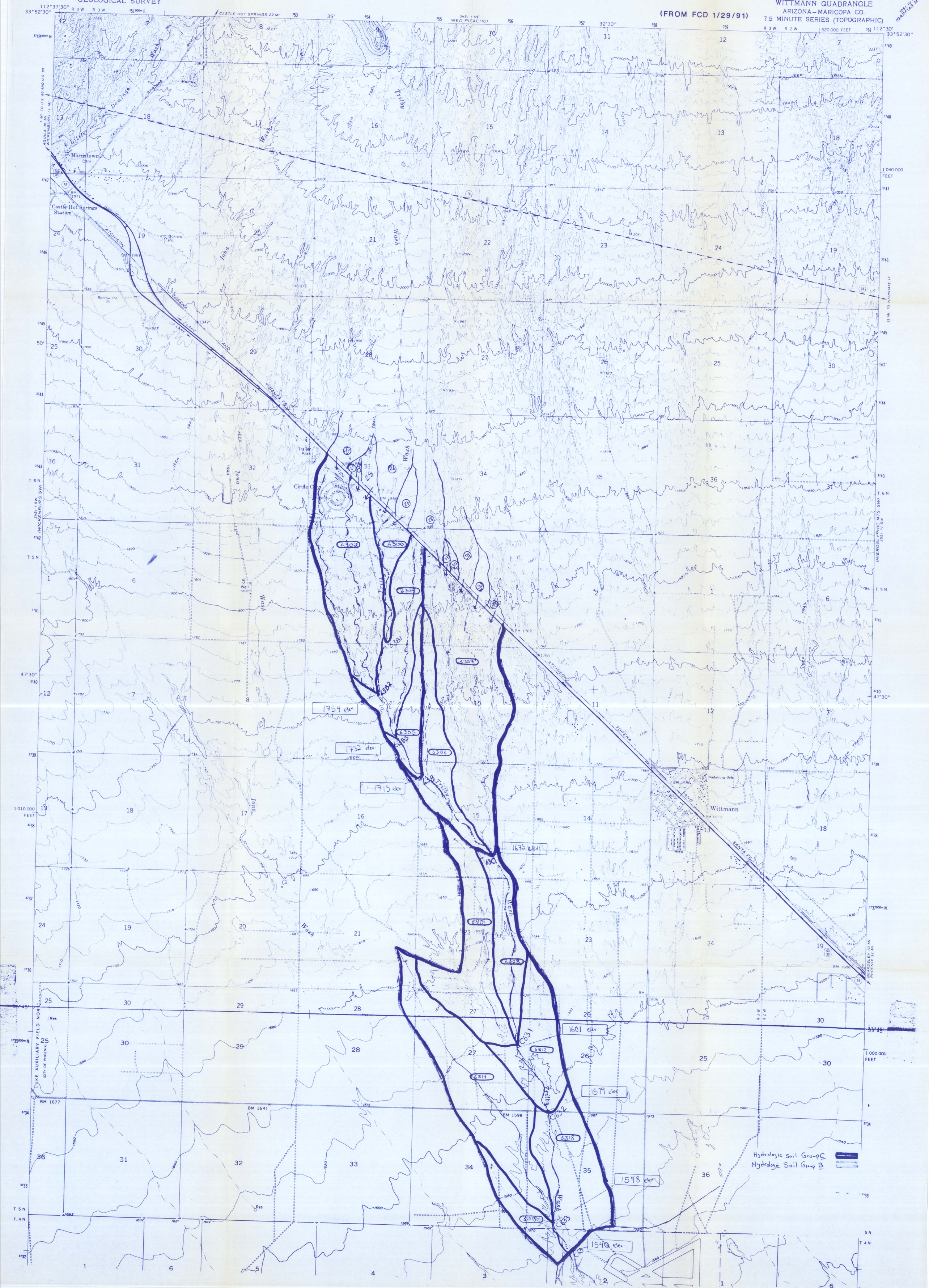
** NORMAL END OF HEC-1 ***

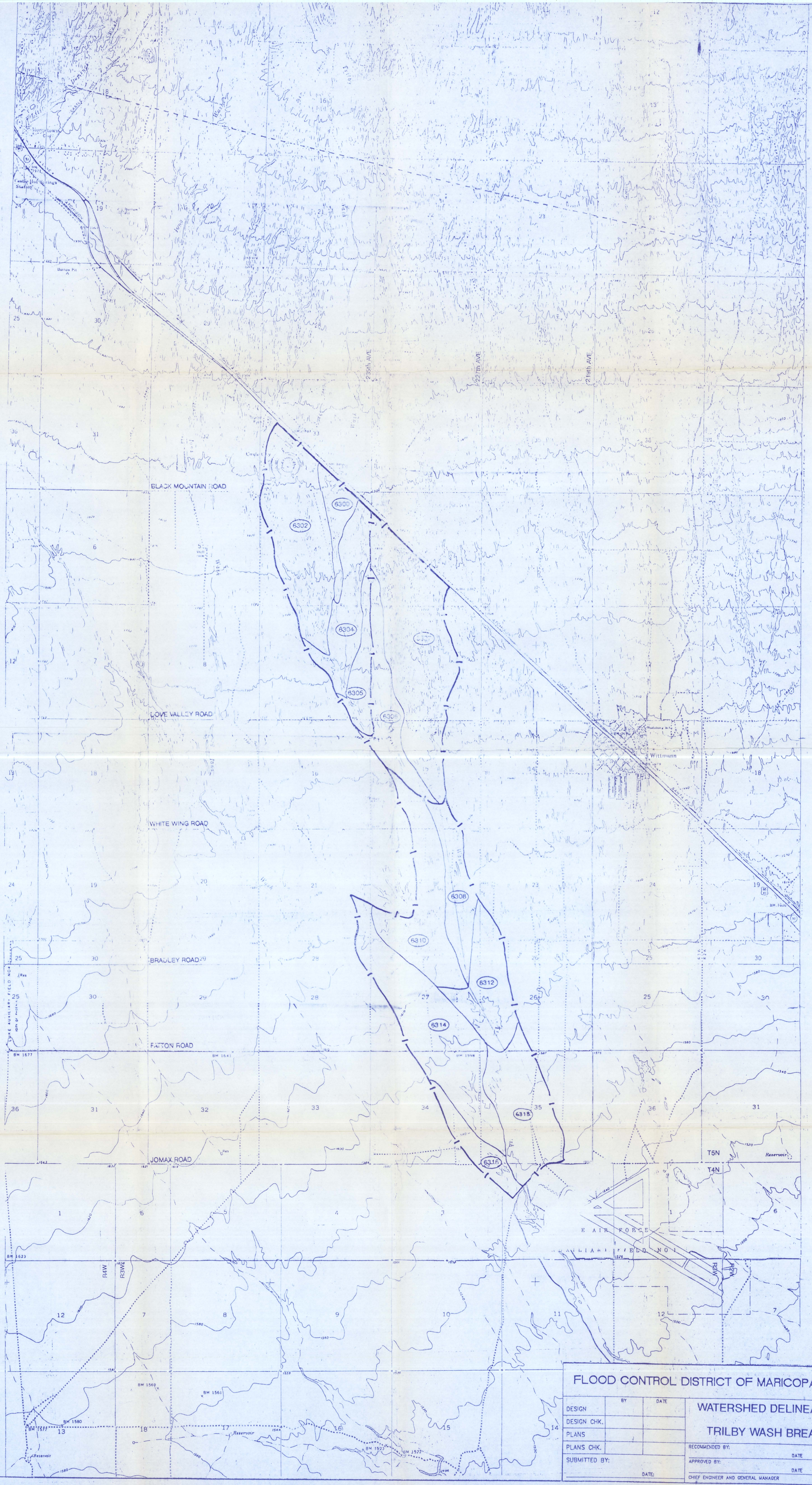
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

EXHIBIT 4 - DRAINAGE MAP

(FROM FCD 1/29/91)

WITTMANN QUADRANGLE
ARIZONA – MARICOPA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)





FLOOD CONTROL DISTRICT OF MARICOPA COUNTY			
	BY	DATE	WATERSHED DELINEATION FOR TRILBY WASH BREAKDOWN
DESIGN			
DESIGN CHK.			
PLANS			
PLANS CHK.			
SUBMITTED BY: DATE:			RECOMMENDED BY: DATE APPROVED BY: DATE CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

	BY	DATE
DESIGN		
DESIGN CHK.		
PLANS		
PLANS CHK.		

SUBMITTED BY: DATE:

SCHEMATIC ROUTING FOR

TRILBY WASH BREAKDOWN

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER

SHEET OF

3.6 FINAL MODELING

SECTION 4: HYDRAULIC ANALYSIS

4.1 METHOD DESCRIPTION

Software employed is HEC-2, Version 4.6.0, dated February, 1991. This software was obtained from Boss Corporation Version 2.50. Their phone number is (608) 258-9910.

The starting water surface elevation used was assumed critical depth. This was chosen due to the fact that the first cross-section of the study is located in the concrete CAP overchute structure; were, the actual depth will be critical depth under storm event conditions.

4.2 PARAMETER ESTIMATION

APPENDIX E

MANNING'S 'N' VALUE DETERMINATION REPORT

MANNING'S 'n' VALUE DETERMINATION REPORT
FOR
TRILBY WASH

FROM THE CAP AQUEDUCT TO GRAND AVENUE NEAR CIRCLE CITY
MARICOPA COUNTY, ARIZONA

PREPARED FOR:

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
2801 W. DURANGO ST.
PHOENIX, ARIZONA 85009

CONTRACT NO. 90-24
P&D TECHNOLOGIES PROJECT NO. 10320.00

Ramesh I. Patel.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10290
RAMESH I.
PATEL
Date Signed 3/29/91
ARIZONA, U.S.A.

SUBMITTED BY:

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NOVEMBER 27, 1990

Revised December 18, 1990
Revised March 28, 1991

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EXHIBIT 2:	Culvert "As-Built" Patton Road/Trilby Wash	Map Pocket
EXHIBIT 3:	C.A.P. Overchute "As-Built" Drawing	Map Pocket

Registered Professional Engineer (Civil)
CERTIFICATE NO.
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ARIZONA, U.S.A.

MANNING'S "n" VALUE ESTIMATION FROM FIELD INSPECTION 11/20/90

1.0 INTRODUCTION

P & D Technologies was contracted by the Flood Control District of Maricopa County on August 13, 1990 to perform a Flood Insurance Study (FIS). The project consists of topographic mapping, as well as floodplain and floodway delineation of approximately 6.7 river miles of Trilby Wash. The downstream study limits being the Central Arizona Project Aqueduct (CAP), the upstream limits being Grand Avenue at Circle City. The hydrology portion of this study will be supplied by the Maricopa County Flood Control District.

The purpose of this report is to summarize the field inspection of the site made on Tuesday, November 20, 1990. The site inspection was conducted to evaluate and photograph the existing channel and overbank conditions in terms of Manning's roughness coefficient ("n"). The Manning's "n" values determined from this field inspection will be incorporated into the HEC-2 computer model.

2.0 EXISTING FIELD CONDITIONS

Weather conditions on this day were partially sunny with no visible rain over the site. The air temperature ranged from approximately 59 to 80 degrees Fahrenheit with an average up around 70. Winds were light at approximately 5 miles per hour.

The site was inspected by the following team:

Geave "Besian" Khatiblou	Maricopa County FCD
Ramesh Patel	P & D Technologies
Lisa T.M. Vomero	P & D Technologies

2.1 EXISTING DRAINAGE PATTERN

The wash drains from north to south-southeast towards McMicken Dam. The immediate study area is undeveloped with the exception of a few scattered homes. The closest residential subdivision of note is unincorporated Circle City which is accessible from Grand Avenue north of the Trilby Wash crossing (Refer to Exhibit 1). The drainage area is very flat having an average slope of roughly 0.8 percent.

The predominant soil type encountered in this reach of our study area is best characterized by Hydrologic Group "B". In addition, there is a small amount of intermixed Soil Group "C" in the northeast area of the study. Soil Group "B" is best defined as a porous soil comprised of sand, silt, and loam; while, Soil Group "C" is less porous and contains clay, loam and rock fragments. The vegetative cover density is roughly 30 to 40 percent throughout. The majority of the overbank area is well vegetated; however, the main channel bottom is predominantly void of vegetation. The type of vegetation encountered includes: Palo Verde and Mesquite (Ironwood) comprise the large trees, creosote and sage are the common bush variety and there is little to no grass cover.

2.2 DRAINAGE CHARACTERISTICS

The channel geometry of this reach of Trilby Wash changes often within short transition distances. In the area that the study begins, at the Grand Avenue bridge, the channel is well defined. It is characterized by a broad undulating channel bottom that varies approximately 3 feet in depth across its width. The banks of the Wash are composed exclusively of alluvial sediment with no rock outcroppings observed; as such, they are prone to erosion. The side slopes of the banks vary from steep, in some cases vertical, to as flat as roughly 12:1. The thalweg of the channel is characterized by meandering bends over relatively short distances. The bends are sometimes accompanied by steep vertical sides 5 to 6 feet in height on one side and small terraced benches on the opposite side at gentle slopes.

Within the main channel itself, there are signs of channel braiding. In addition, there are several areas where the channel splits and braids forming "islands" of noticeably higher ground in the middle. There is one area of a significant split flow in which a secondary channel forms and breaks away from the main channel. This occurs in Township 5 North, Range 3 West, at approximately the northern boundary of Section Line 9. Farther downstream at the southern boundary of Section Line 9 as well as in other areas of this study, the wash appears to form natural levees were secondary channels return to the main channel as well as were there is tributary inflow. Special care will be given in modelling these existing channel conditions.

2.3 EXISTING STRUCTURE(S)

There is only one significant hydraulic structure to be modelled in this reach of Trilby Wash with the exception of the CAP Canal. It occurs at the intersection of Trilby Wash and Patton Road and consists of eight (8) very large 68-inch CMP culverts. For the record, P & D staff did visit the Maricopa County Highway Department on 11/8/90 for the purpose of obtaining "as-built" plans for Patton Road were it crosses Trilby Wash; however, we were informed that there are no plans for this road improvement on file. In addition, their staff informed us that it was probably an "eye-ball overlay job" which means that to their best available knowledge those existing, newly installed CMP culverts were not sized according to any recorded method. It appeared that this portion of the road was recently improved in early 1990 because it had been newly paved and striped at the time of the first field inspection on 6/5/90. P&D's Survey Department did preform an "as-built" survey of Patton Road, a corresponding "as-built" drawing of this crossing is included as Exhibit 2.

It was noted during the field inspection that the west side of Patton Road crossing the Wash has a small dip in it. Also noted, was the fact that the west side of the Patton Road crossing of Trilby Wash had been damaged from overbank flooding and erosion. This was evidenced by a very recent patch job on the West side of the wash/roadway crossing as well as undercutting of previously placed concrete bank protection.

As a result, it appears that for purposes of modelling the Patton Road Culvert crossing and adjacent dip section appear to form a weir structure during periods of high flow. This is further illustrated by Photo Sets 17 through 19, in Appendix I.

2.4 CONSTRICTIONS/EXPANSIONS

It appears that the channel has a uniform width versus depth ratio throughout with very few areas of sudden expansion or contraction. Over the entire course of the wash, the width of the main channel varies from roughly 20 feet across to as wide as 135 feet 10 inches at the CAP flume crossing. An "as-built" drawing of the CAP overchute at Trilby Wash has been completed by P&D Technologies and is included in this report as Exhibit 3. The wash also widens at the Patton Road crossing were it measures roughly 95 feet. In general it appears that the average main channel flow width is probably 30 to 50 feet with a corresponding average depth of roughly 3 to 4 feet.

3.0 MANNING'S "n" VALUES

Manning's roughness coefficient ("n") were chosen with the aid of aerial photographs as well as several selected reference which are listed in Section 6.0 of this report.

From the site inspection Manning's "n" values were assigned. Overall, the values ranged from a low of 0.045 to a high of 0.10. The "n" values in the channel ranged from 0.045 to 0.075; the overbanks ranged from 0.065 to 0.10. In addition, this reach of the wash contained several split flow areas of varying size as well the occurrence of "islands" between the splits in the flow line. The "n" values for these island areas ranged from 0.060 to 0.10.

4.0 RESULTS

The results of this field inspection are the assignment of Manning's "n" values for use in the HEC-2 model. A representative sampling of the assigned values for the different conditions encountered are depicted by the photographs in Appendix I. In addition, the approximate area in which the photographs were taken are depicted on the Field Inspection Location Map which is included as Exhibit 1 in the Map Pocket at the end of this report.

5.0 SUMMARY

From the site inspection Manning's "n" values were assigned. Overall, the values ranged from a low of 0.045 to a high of 0.10. The "n" values in the channel ranged from 0.045 to 0.075; the overbanks ranged from 0.065 to 0.10. In addition, this reach of the wash contained several split flow areas of varying size as well the occurrence of "islands" between the splits in the flow line. The "n" values for these island areas ranged form 0.060 to 0.10. These changes in values will be incorporated into the HEC-2 Model.

It should be noted that, the Manning's "n" values are estimated based on field observations and water depth assumptions. The accuracy of these initial assumptions will be verified. If necessary, the "n" values will be adjusted during the course of HEC-2 modeling, per request from the Maricopa County Flood Control District.

The submittal of this report concludes the field inspection summary phase of the Flood Insurance Study and represents the completion of Task 4.4.1 as outlined in the Scope of Work. This summary report will be keep as part of the job file and will be turned over to ADWR for archive files as outlined in TR 90-3. In addition, as outlined in the Scope of Work, this Summary Report will be included in both the draft and final Flood Insurance Study as an Appendix.

6.0 SELECTED REFERENCES

Aldridge, B.N., and Garrett, J.M.; 1973; Roughness Coefficients for Stream Channels in Arizona: U.S. Geological Survey, Open File Report (Prepared in cooperation with the Arizona Highway Department); 87 p.; unpublished.

Arizona Department of Water Resources (A.D.W.R.); 8/90; Instructions for Organizing and Submitting Technical Documentation for Flood Studies (TR 90-3): Engineering Division, Flood Management Section; unpublished; 13 p.

Chow, Ven, T.; 1959; Open-Channel Hydraulics; McGraw Hill (Publishing Company) Civil Engineering Series; New York; pages 98 through 127.

Barnes, H.H., Jr.; 1967; Roughness Characteristics of Natural Channels: U.S. Geological Survey, Water-Supply Paper 1849; U.S. Government Printing Office; Washington, D.C.; 213 p.

National Flood Insurance Program; 5/11/90 (Rev.); Flood Insurance Rate Maps (FIRM), all or portions of the following: Map Numbers 04013C0679 E, 04013C0687 E, and 04013C1110 E; corresponding to Panel Numbers 679, 687 and 1110 of 4350, respectively; Maricopa County, Arizona and Incorporated Areas: Federal Emergency Management Agency (FEMA).

Soil Conservation Service; 1985; Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona: U.S. Department of Agriculture; U.S. Government Printing Office; No. 1985-167-S/20007.

THE ARIZONA REPUBLIC; November 20, 1990; Section "A"; Phoenix, Arizona.

The WLB Group, Inc.; 3/89; Wittmann Area Drainage Master Study Part A: Hydrology and Hydraulics; Prepared for The Flood Control District of Maricopa County; Phoenix, AZ; unpublished.

U.S.G.S. Quadrangle Maps of Arizona: Wittmann (1981) and White Tank Mountains, N.E. (1978)

APPENDIX I:

FIELD INSPECTION PHOTOGRAPHS
(Taken November 20th, 1990)

PHOTO SET 1: AT&SF Railroad crossing at Trilby Wash north of Grand Avenue, looking north upstream. (Match to previous study by the WLB Group of 0.080 for both east and west overbank and 0.050 for the main channel).

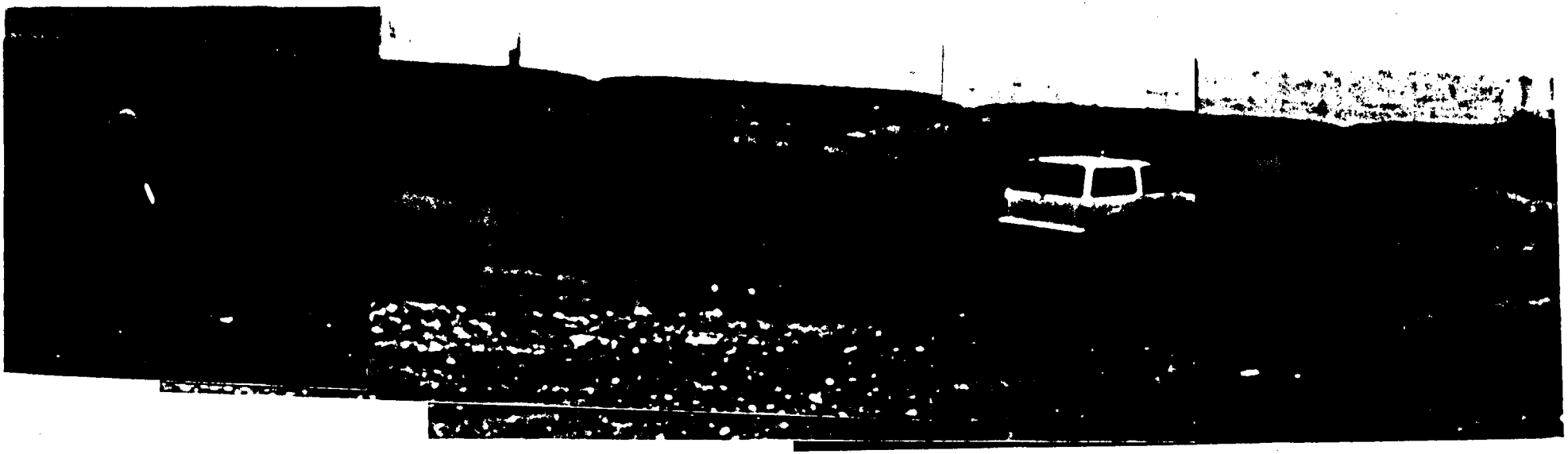


PHOTO SET 2: Grand Avenue crossing at Trilby Wash looking north upstream. (Match to previous study by The WLB Group, Inc. of 0.080 for the east and west overbank and 0.050 for the main channel).

PHOTO SET 3: Dove Valley Road crossing at Trilby Wash looking north upstream. (Match to previous study by The WLB Group, Inc. of 0.080 for the east and west overbank and 0.050 for the main channel).

Mileage = 0.0

West Overbank n = 0.080

Main Channel n = 0.050

East Overbank n = 0.080

PHOTO SET 4: Dove Valley Road at Trilby Wash looking south downstream.

Mileage = 0.0

East Bank n = 0.080

Main Channel n = 0.065

West Bank n = 0.080

PHOTO SET 5: In Trilby Wash looking south downstream.

(Mileage = 0.1)

East Bank "n" = 0.085

Main Channel "n" = 0.050

West Bank "n" = 0.085

PHOTO SET 6: In Trilby Wash looking south downstream.

(Mileage = 0.45)

East Bank "n" = 0.080

Main Channel "n" = 0.045

West Bank "n" = 0.080

East Bank "n" - 0.085 Main Channel "n" = 0.045 West Bank "n" =0.070

PHOTO SET 7: In Trilby Wash looking south downstream (Mileage = 0.050).

East Bank "n" 0.080

Main Channel "n" = 0.055

PHOTO SET 8: In Trilby Wash looking south downstream (Mileage = 0.72)

West Bank "n" = 0.080 looking west and downstream across secondary wash.

West Bank "n" = 0.080 looking north upstream.

PHOTO SET 8 (Cont.): In Trilby Wash (Mileage = 0.72).

PHOTO SET 9: At major split flow in Trilby Wash Section 9, T.5 N., R.3 W, looking south downstream.

(Mileage = 1.19)

Main Channel "n" = 0.050

West Bank "n" = 0.080

Split flow secondary channel cut in West Bank "n" = 0.050

PHOTO SET 10: Secondary Channel in West Bank of Trilby Wash looking north upstream.

(Mileage = 1.88)

Taken on the top of split flow "island".
Average "n" value of 0.060.

Taken in secondary channel looking north upstream, average "n" value of 0.060.

West Bank "n" = 0.10 "Island n" = 0.10 East Bank "n" = 0.10

"n" both channels 0.050

PHOTO SET 11: At split flow confluence in Trilby Wash, looking north upstream (Mileage = 2.00).

PHOTO SET 12: At Lone Mountain Road and Trilby Wash looking north upstream (Reset mileage at 0.0) Average "n" = 0.070.

PHOTO SET 13: In Trilby Wash looking south downstream.

(Mileage = 1.2)

East Bank "n" = 0.080

Main Channel "n" =0.040

West Bank "n" = 0.080

East Bank "n" =0.080 Main Channel "n" = 0.055 West Bank "n" =0.095

PHOTO SET 14: In Trilby Wash looking south downstream (Mileage = 1.50).

East Bank "n" =0.085 Both Channels "n" = 0.055 "Island n" =0.090 West Bank "n" =0.085

PHOTO SET 15: In Trilby Wash looking south downstream at minor split flow condition (Mileage = 1.70).

Channel "n" = 0.055

PHOTO SET 15 (Cont.): In Trilby Wash looking north upstream in main channel (Mileage = 1.70).

PHOTO SET 16: In Trilby Wash looking south downstream. Wash is braided forming several vegetated islands. The banks are steep to vertical (note: top of east bank, far left side, middle of photograph). Mileage = 1.78

PHOTO SET 17: Patton Road crossing at Trilby Wash looking south downstream.

(Mileage = 2.2)

East slope "n" =0.075
East bank "n" = 0.080

Main Channel "n" = 0.050

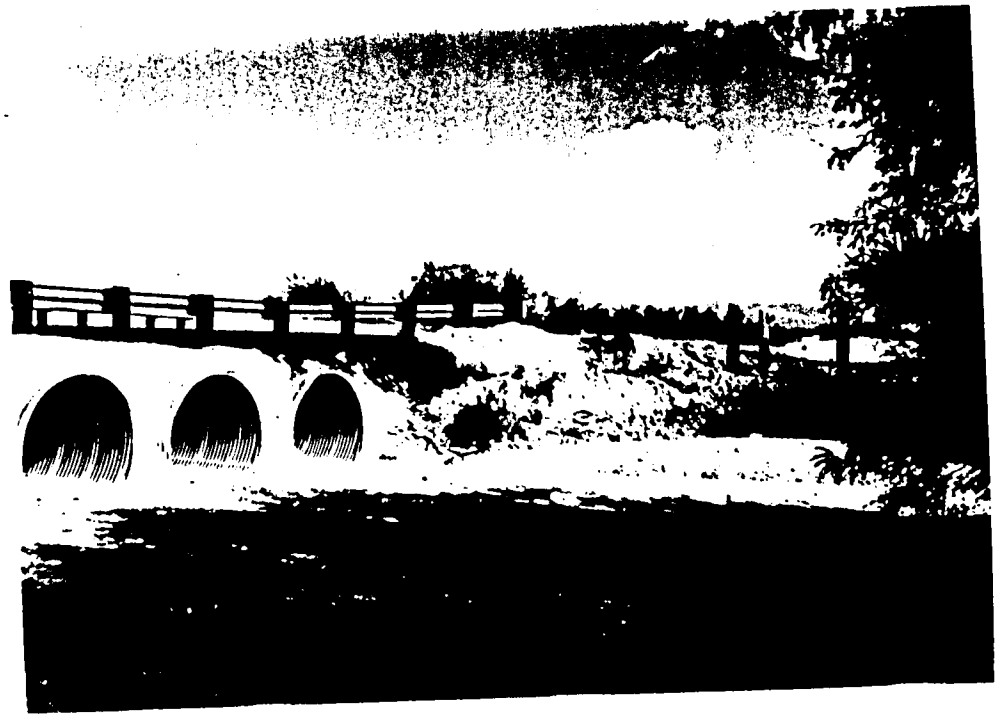
West Bank "n" = 0.080

Water appears to flow over Patton Road on the west side of culvert crossing as evidenced by road and bank undercutting.

Main Channel "n" = 0.050
<u>Note:</u> sediment deposition in culverts

PHOTO SET 18: Patton Road crossing at Trilby Wash looking north upstream (Reset mileage = 0.0).

Main Channel "n" = 0.050



East Bank "n" = 0.085

PHOTO SET 18 (Cont.): Patton Road crossing at Trilby Wash looking north upstream (Reset Mileage = 0.0).

PHOTO SET 19: Photo taken at centerline of Patton Road crossing Trilby Wash looking south downstream.

(Mileage = 0.0)

East Bank "n" = 0.085

Channel "n" = 0.050

Channel "n" = 0.050
West Bank "n" = 0.085

West Bank "n" = 0.085 Channel "n" = 0.055 East Bank "n" = 0.090

PHOTO SET 20: In Trilby Wash looking north upstream at typical island (Mileage = 1.09).

West Bank "n" = 0.085 Channel "n" = 0.060 East Bank "n" = 0.090

PHOTO SET 21: CAP crossing at Trilby Wash looking north upstream. Photo taken from on top of west wall of CAP Flume Structure. (Mileage = 1.25).

Prior to concrete CAP crossing, channel "n" = 0.065
At CAP crossing Flume is a concrete lined rectangle channel "n" = 0.013 (Match "n" values with previous study by The WLB Group, Inc.)

PHOTO SET 22: CAP Crossing at Trilby Wash looking south downstream (Mileage = 1.25)

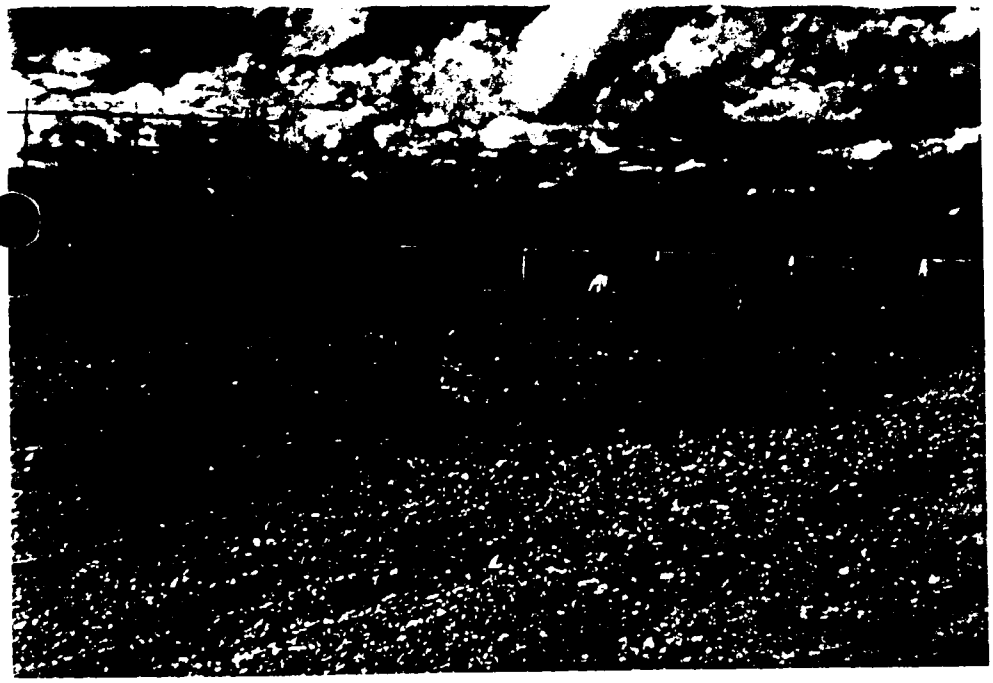
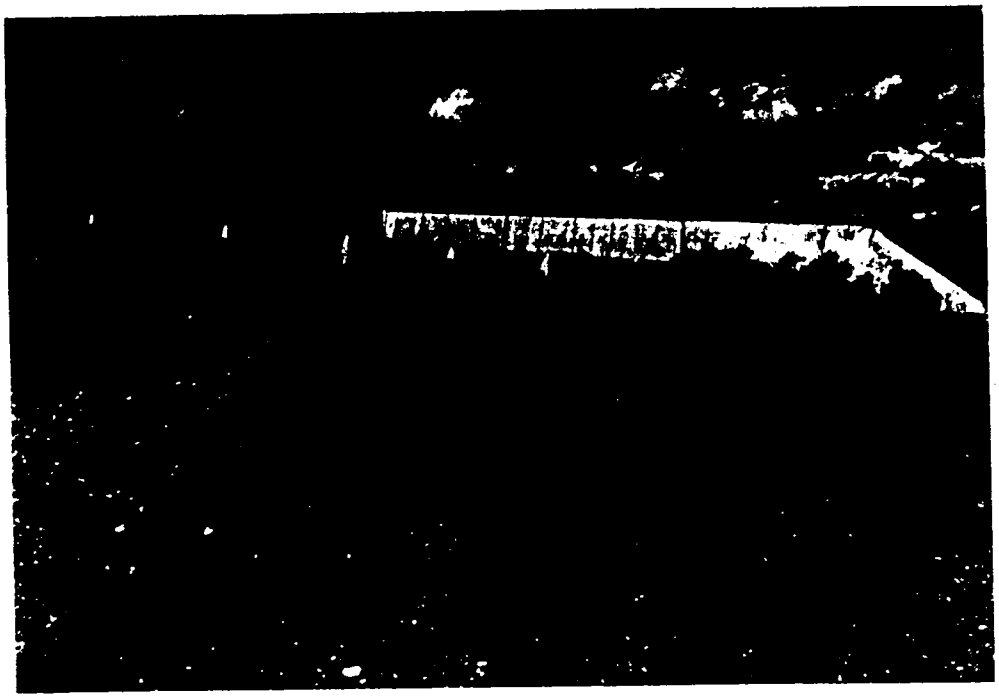
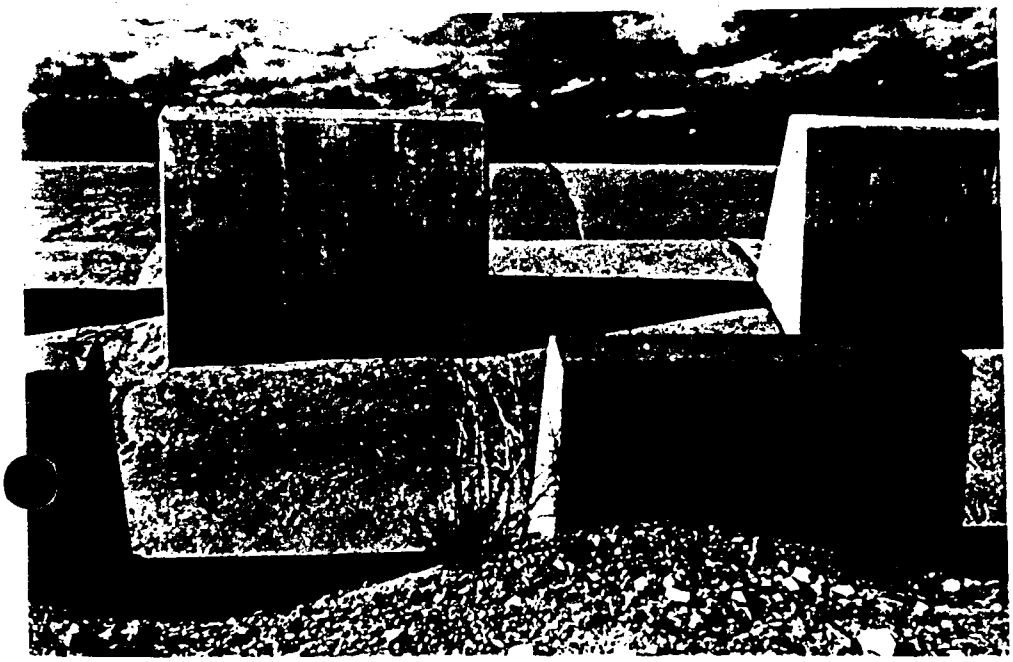


PHOTO SET 23: Downstream from concrete CAP crossing at Trilby Wash looking north upstream. (Match "n" values with previous study by The WLB Group).





Close up of energy dissipators.

PHOTO SET 24: Earthen dam stock pond on west bank of tributary to Trilby Wash located in T.5 N, R. 3 W., Section 27.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
D.E. SAGRAMOSO, CHIEF ENGINEER AND GENERAL MANAGER

TRILBY WASH FLOOD INSURANCE STUDY 6.7 RIVER MILES FROM THE CAP AQUEDUCT TO GRAND AVENUE AT CIRCLE CITY

LEGEND

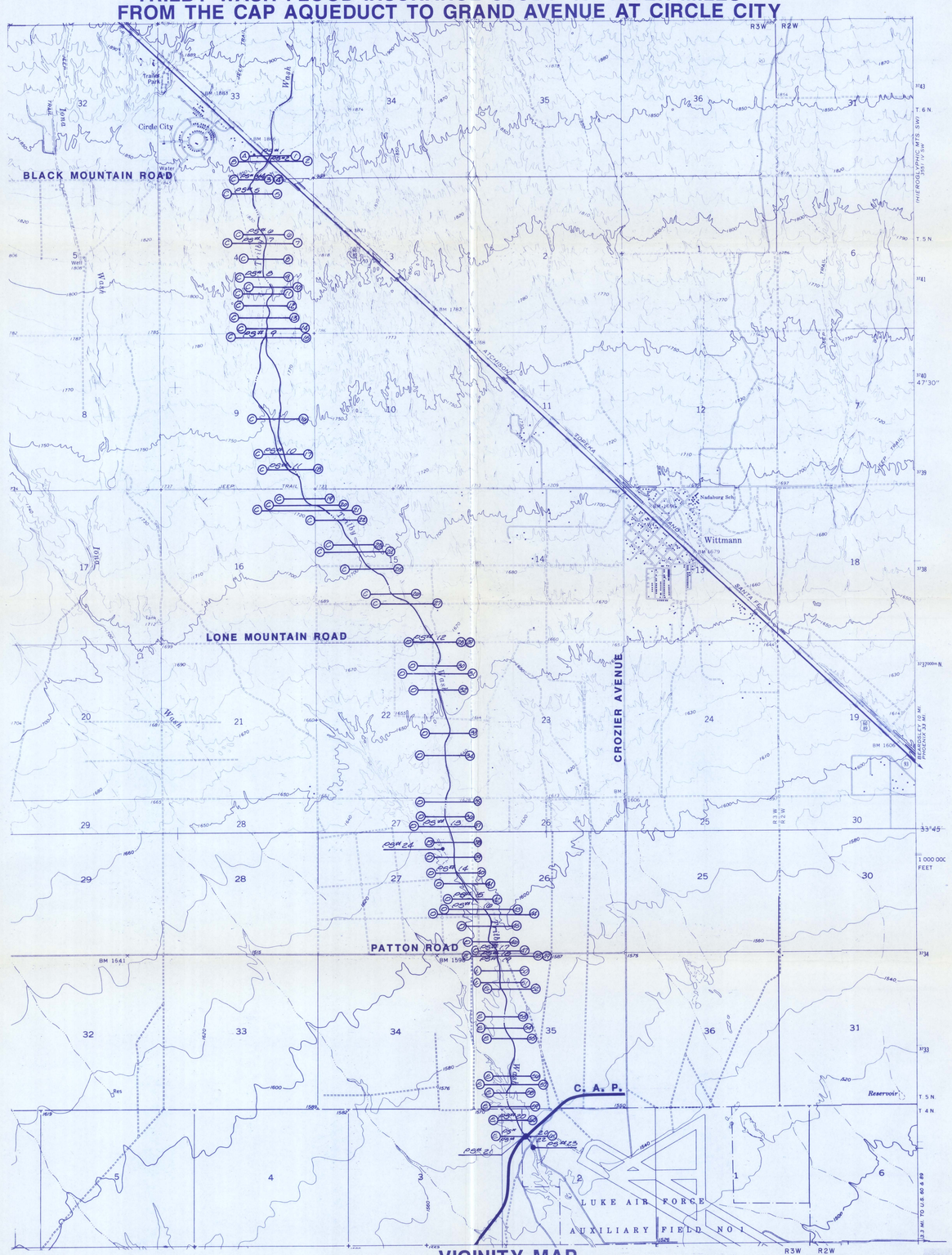
T4N	INDICATES TOWNSHIP
R3W	INDICATES RANGE
Ⓐ-----○	SECTION "A" RAILROAD CROSSING
Ⓑ-----○	SECTION "B" GRAND AVENUE
Ⓒ-----○	"C" DENOTES APPROXIMATE MILEAGE DOWNSTREAM FROM LONE MOUNTAIN ROAD
Ⓓ-----○	"D" DENOTES APPROXIMATE MILEAGE DOWNSTREAM FROM DOVE VALLEY ROAD
Ⓔ-----○	"E" DENOTES APPROXIMATE MILEAGE FROM PATTON ROAD
○ PS1 ○	"PS1" DENOTES PHOTO SET NUMBER
○-----①	"1" DENOTES CROSS-SECTION NUMBER

MANNING'S "n" VALUES

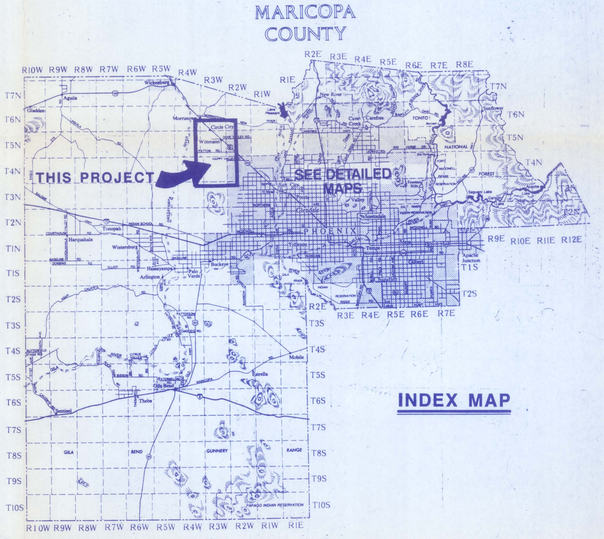
CROSS SECTION NUMBER	WEST OVERBANK	MAIN CHANNEL	EAST OVERBANK	OTHER	PHOTO SET NUMBER
1	Match with previous study at Railroad Crossing				1
2	0.080	0.050	0.080	at Grand Ave.	2
3	0.080	0.050	0.080	**Black Mtn. Rd.**	3
4	0.080	0.065	0.080	**Black Mtn. Rd.**	4
5	0.085	0.050	0.085		5
6	0.080	0.045	0.080		6
7	0.070	0.045	0.085		7
8	0.080	0.045	0.070		-
9	0.080	0.055	0.080		8
10	0.080	0.050	0.080		-
11	0.075	0.050	0.080		-
12	0.080	0.050	0.065		-
13	0.080	0.065	0.080		-
14	0.080	0.050	0.080		-
15	0.080	0.050 (2)	0.080	island "n" = 0.080	9
16	0.080	0.060	0.080		-
17	0.10	0.060	0.10		10
18	0.10	0.050 (2)	0.10	island "n" = 0.10	11
19	0.075	0.075	0.075		-
20	0.085	0.055	0.085		-
21	0.070	0.065	0.070		-
22	0.080	0.050	0.080		-
23	0.085	0.050 (2)	0.085	island "n" = 0.085	-
24	0.085	0.050	0.085		-
25	0.085	0.050 (2)	0.085	island "n" = 0.090	-
26	0.085	0.050	0.085		-
27	0.080	0.050	0.080		-
28	0.070	0.070	0.070	At Lone Mtn. Rd.	12
29	0.080	0.050	0.080		-
30	0.090	0.055	0.080		-
31	0.085	0.055	0.075		-
32	0.085	0.055	0.085		-
33	0.085	0.060	0.085		-
34	0.080	0.060	0.080		-
35	0.080	0.050	0.080		-
36	0.080	0.040	0.080		-
37	0.080	0.040	0.080		13
38	0.080	0.060	0.080		-
39	0.080	0.050	0.080		-
40	0.095	0.055	0.080		-
41	0.085	0.060	0.085		-
42	0.085	0.055 (2)	0.085	island "n" = 0.090	15
43	0.080	0.055	0.080		16
44	0.080	0.055	0.085		-
45	0.070	0.050	0.085		-
46	0.085	0.055	0.080		-
47	0.080	0.050	0.080	east slope "n" = 0.075	17
48	0.080	0.050	0.080	Patton Road	18
49	0.085	0.050	0.085	Patton Road	19
50	0.085	0.060	0.080		-
51	0.085	0.070	0.080		-
52	0.085	0.050	0.085		-
53	0.085	0.050 (2)	0.085	island "n" = 0.090	-
54	0.085	0.055	0.085		-
55	0.085	0.055 (2)	0.085	island "n" = 0.090	-
56	0.090	0.055	0.080		-
57	0.090	0.055 (2)	0.080	island "n" = 0.090	-
58	0.090	0.050	0.085		-
59	0.090	0.055 (2)	0.085	island "n" = 0.090	-
60	0.090	0.055	0.085		-
61	Match with previous study				20-23*

(2) Denotes presence of both a main and secondary channel having the same "n" value.

* Note: PHOTO SET 24 (Last one) is taken at the earthen dam stock pond on the west bank of tributary to Trilby Wash in T.5 N., R.3W., Section 27.



VICINITY MAP



INDEX MAP

SCALE: 1" = 2000'

MARICOPA COUNTY, UNINCORPORATED AREAS, ARIZONA

Ramesh S. Patel
10290
RAMESH S. PATEL
11/21/95

EXHIBIT 1

P&D Technologies
1702 East Highland Ave., Suite 410
Phoenix, AZ 85016 602•264•3335

FIELD INSPECTION LOCATION MAP

JOB # 10320.00

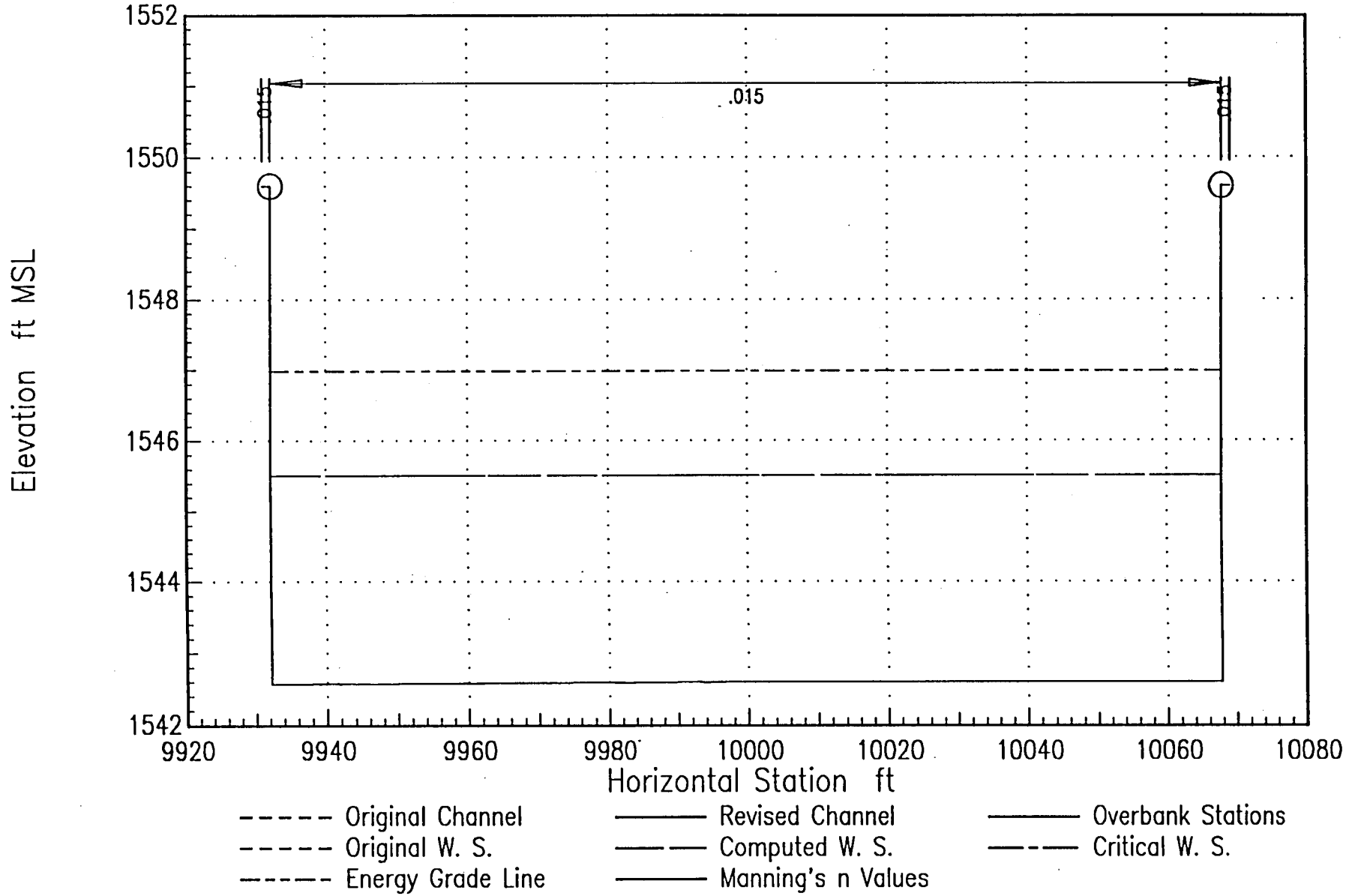
4.3 CROSS-SECTION DESCRIPTION

TRILBY WASH MAIN CHANNEL

ENCROACHED

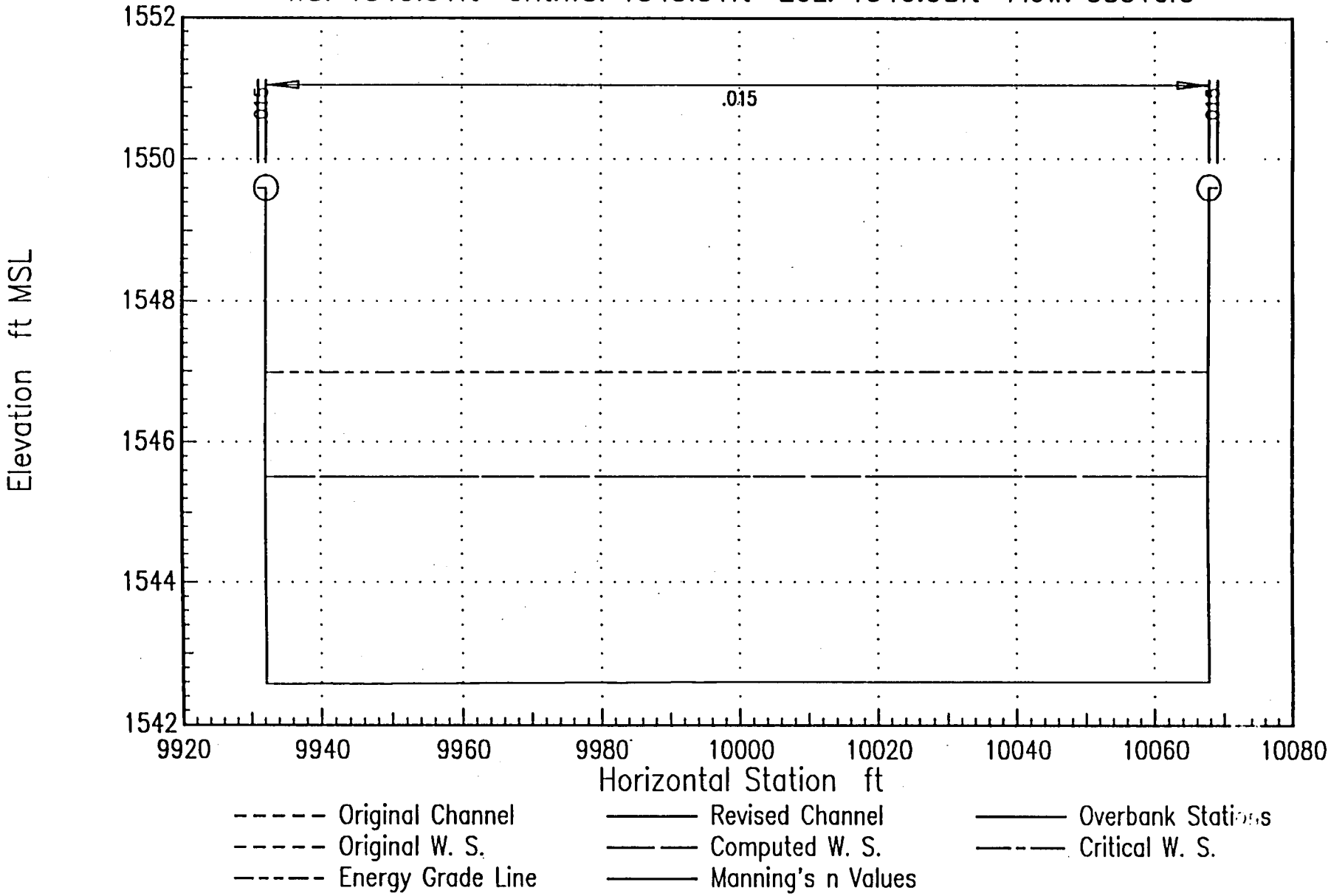
Revised Cross-Section Plot 10.445

WS: 1545.51ft Crit.WS: 1545.51ft EGL: 1546.98ft Flow: 3851cfs



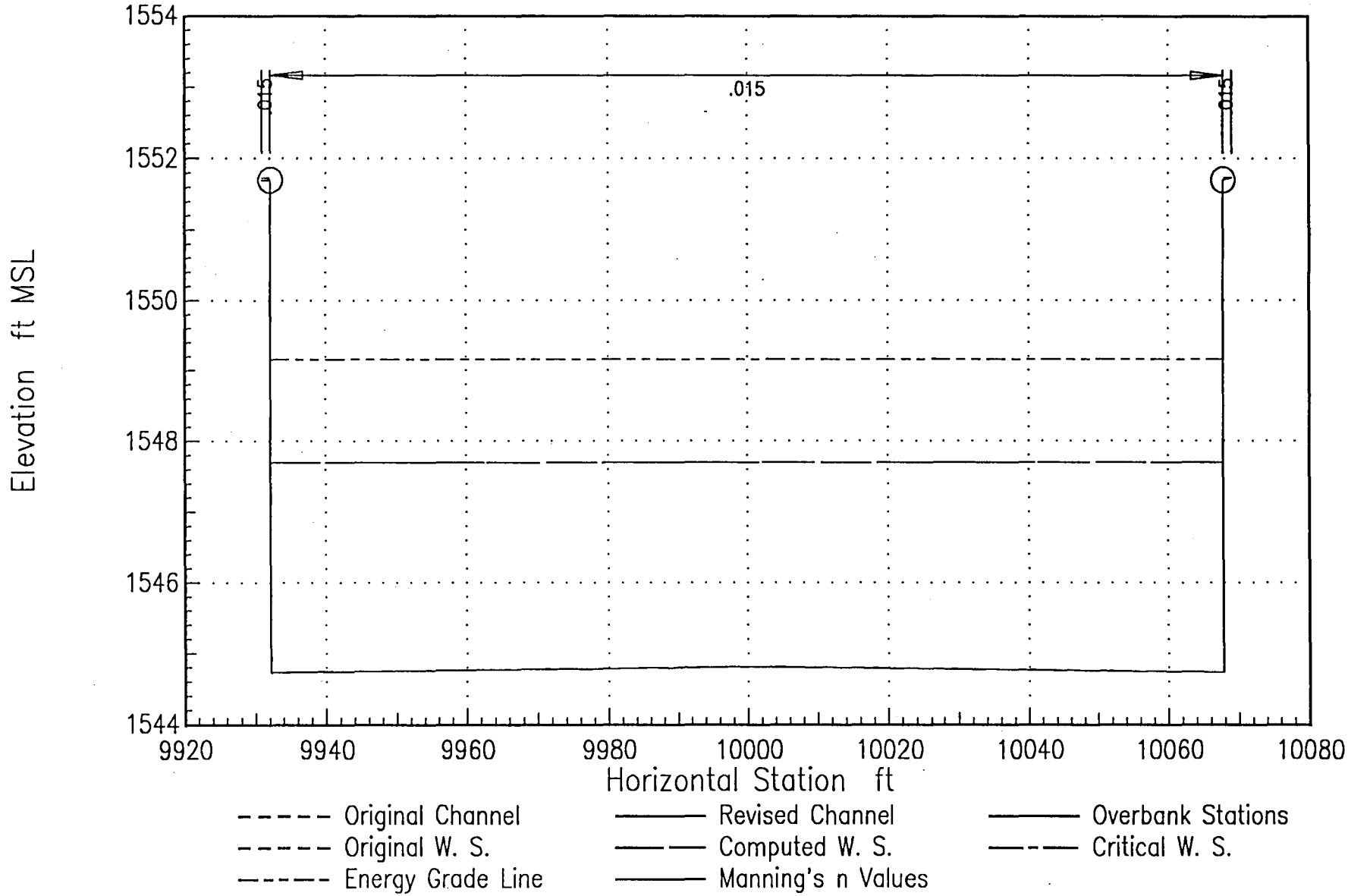
Revised Cross-Section Plot 10.445

WS: 1545.51ft Crit.WS: 1545.51ft EGL: 1546.98ft Flow: 3851cfs



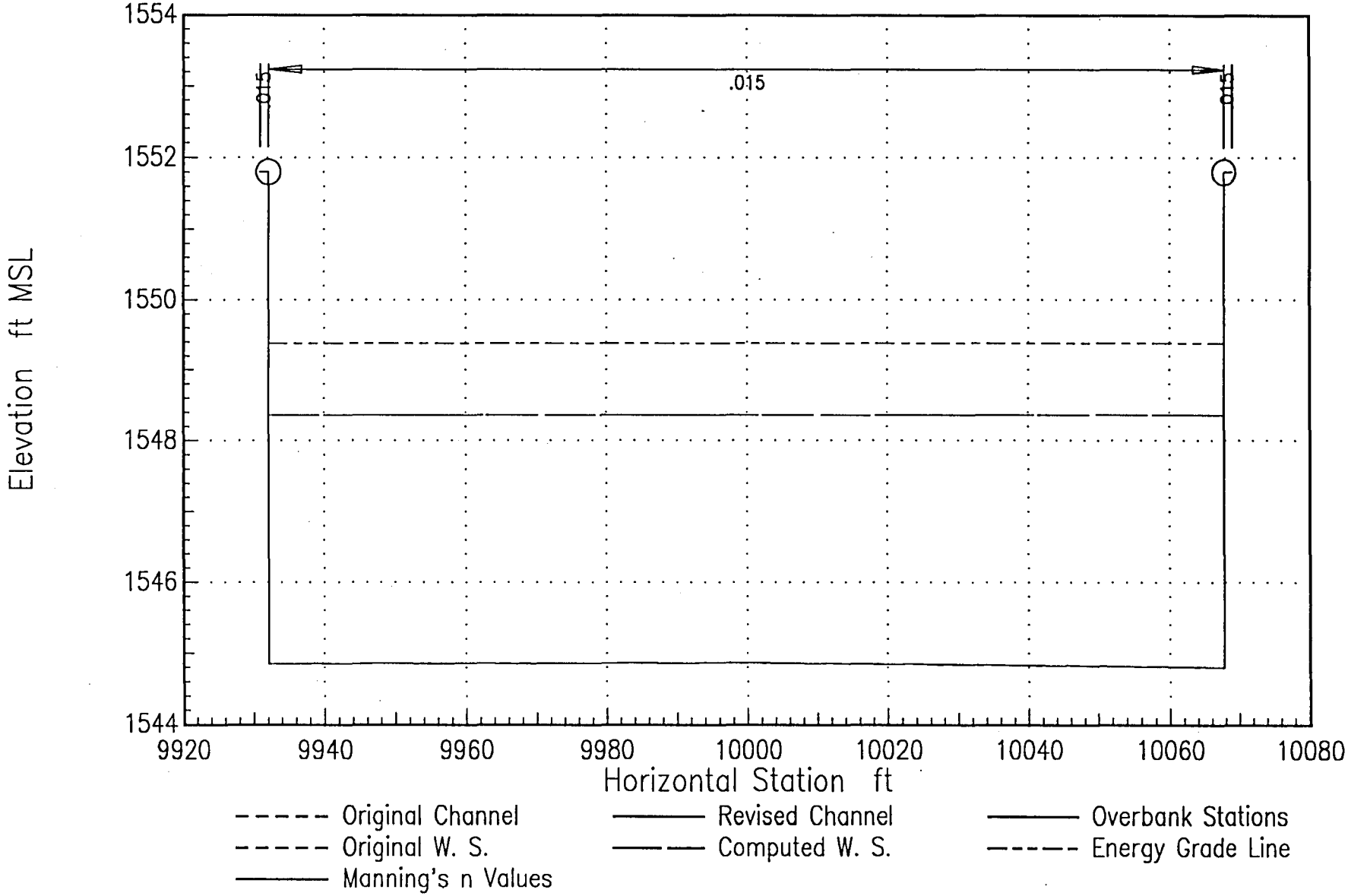
Revised Cross-Section Plot 10.45

WS: 1547.69ft Crit.WS: 1547.69ft EGL: 1549.15ft Flow: 3851cfs



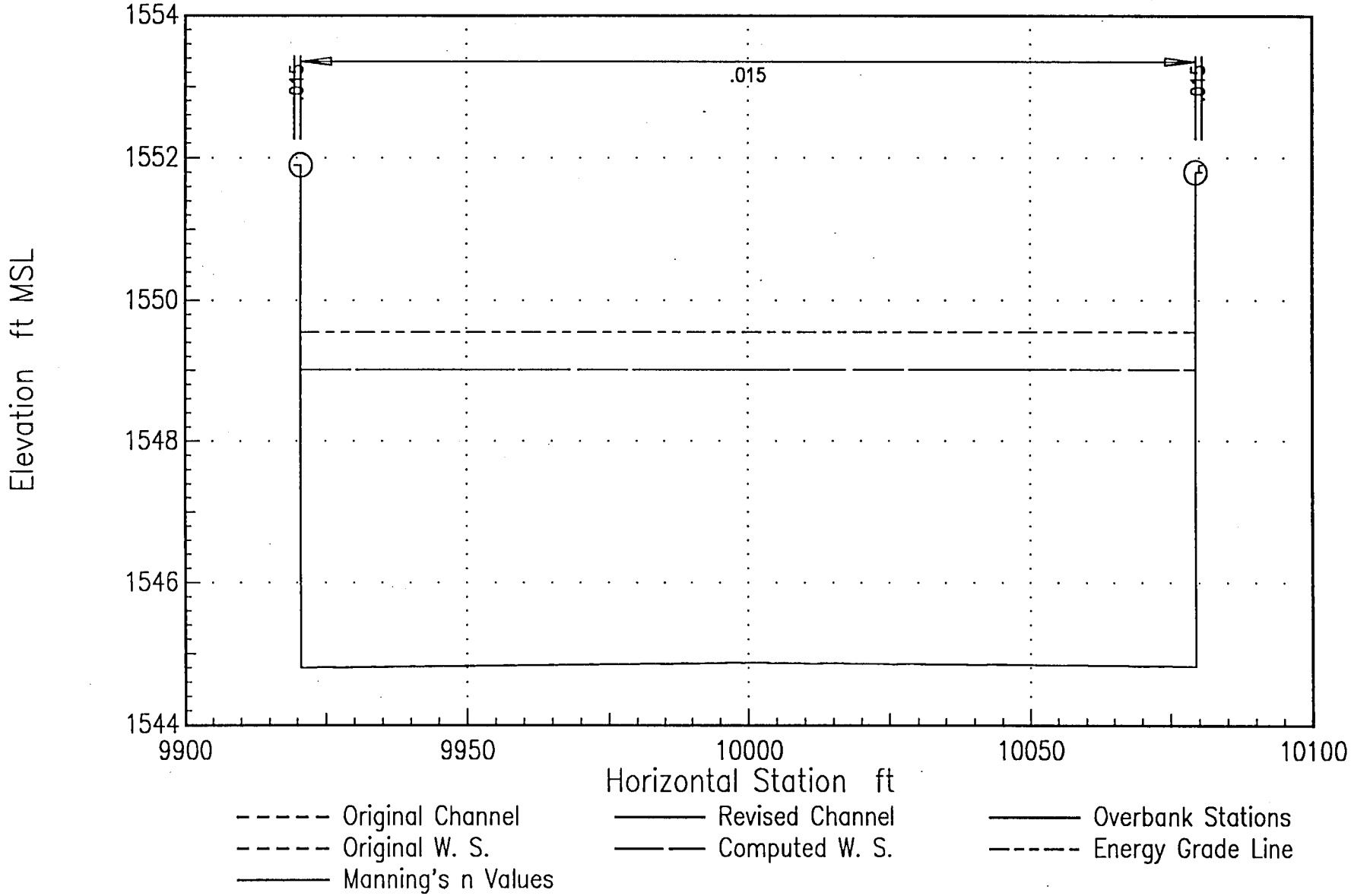
Revised Cross-Section Plot 10.468

WS Elev: 1548.35 ft EGL Elev: 1549.37 ft Flow: 3851 cfs



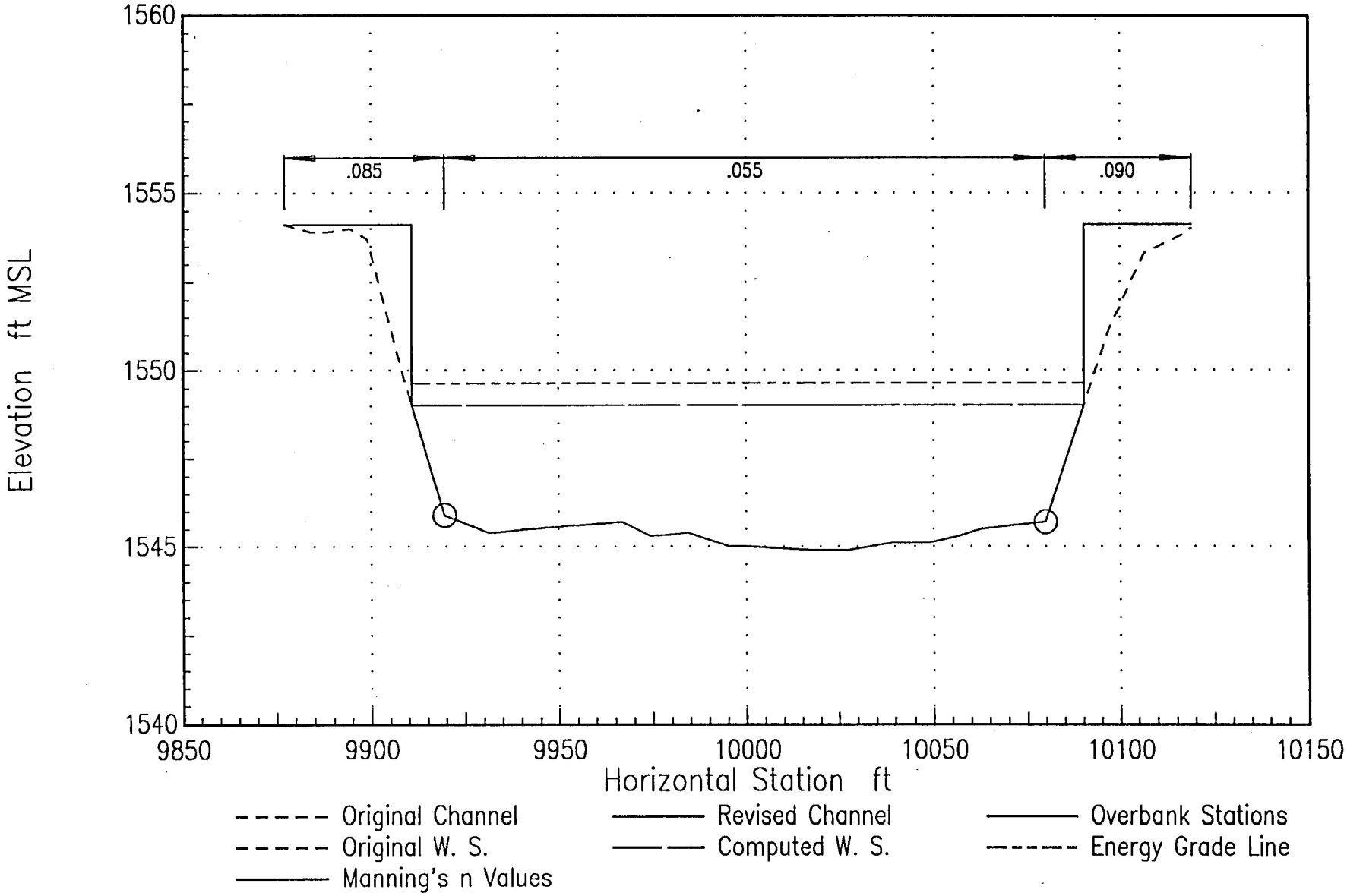
Revised Cross-Section Plot 10.473

WS Elev: 1549.01 ft EGL Elev: 1549.54 ft Flow: 3851 cfs



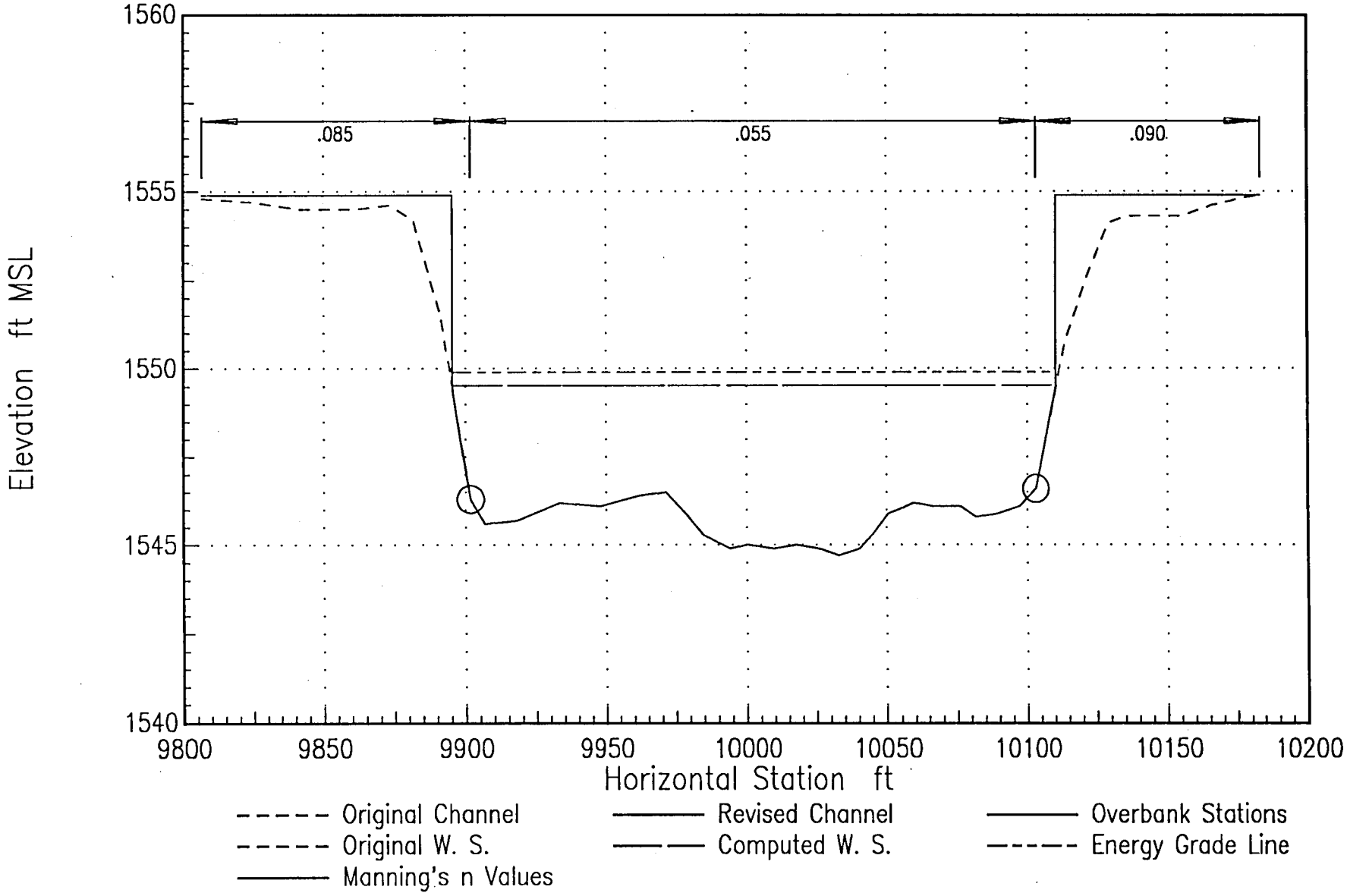
Revised Cross-Section Plot 10.474

WS Elev: 1549.00 ft EGL Elev: 1549.62 ft Flow: 3851 cfs



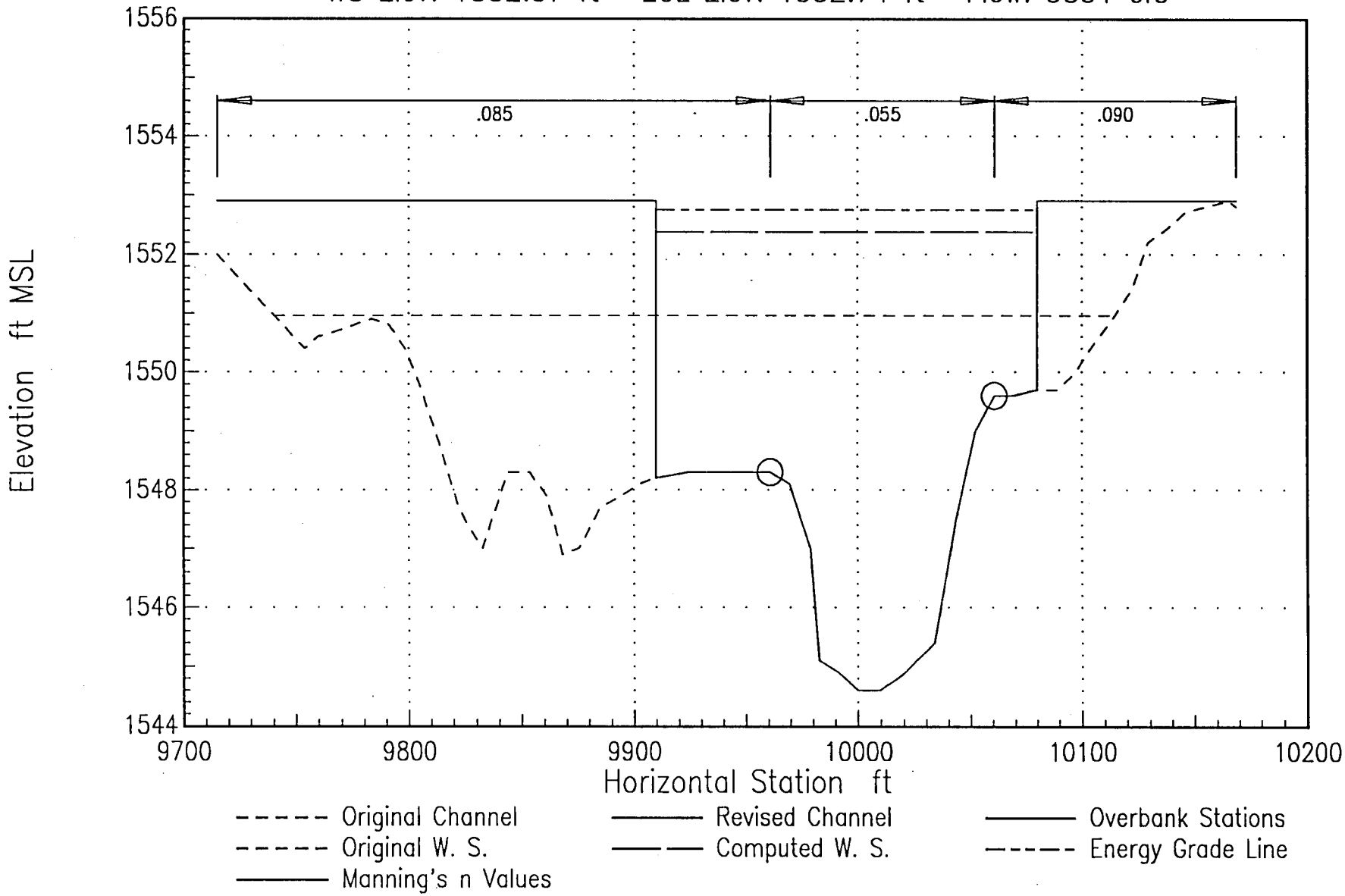
Revised Cross-Section Plot 10.479

WS Elev: 1549.51 ft EGL Elev: 1549.89 ft Flow: 3851 cfs



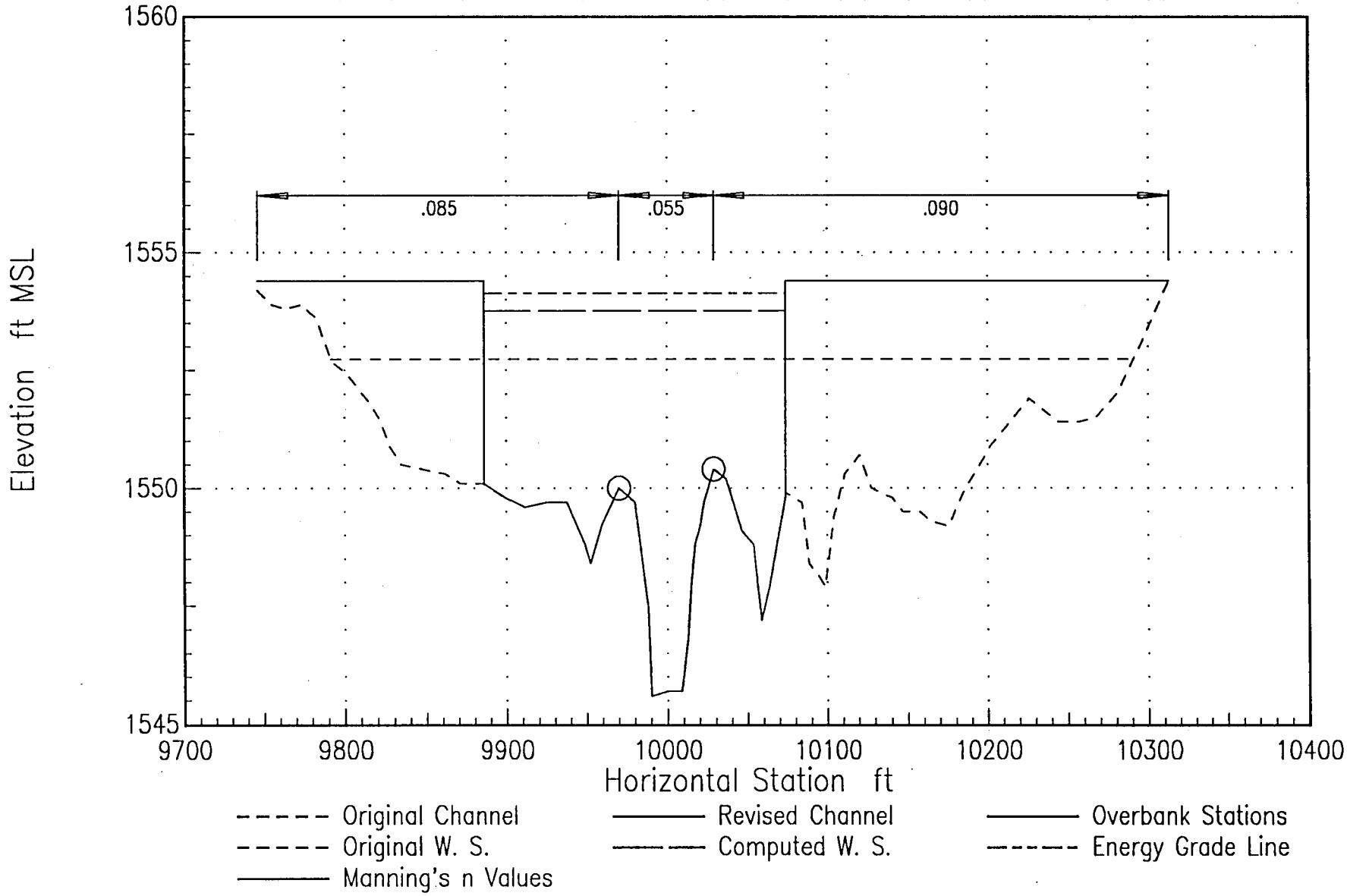
Revised Cross-Section Plot 10.528

WS Elev: 1552.37 ft EGL Elev: 1552.74 ft Flow: 3851 cfs



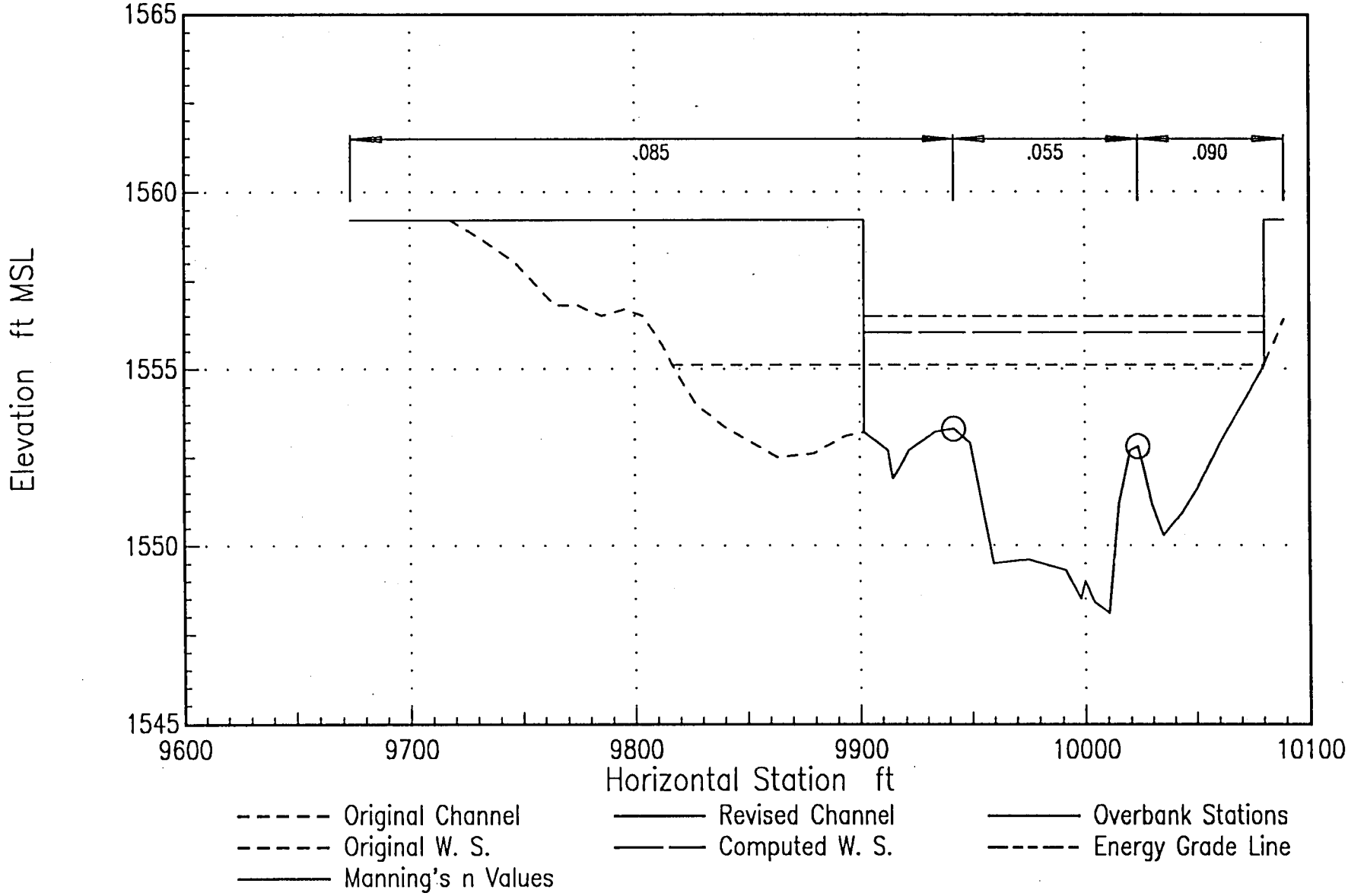
Revised Cross-Section Plot 10.592

WS Elev: 1553.76 ft EGL Elev: 1554.13 ft Flow: 3851 cfs



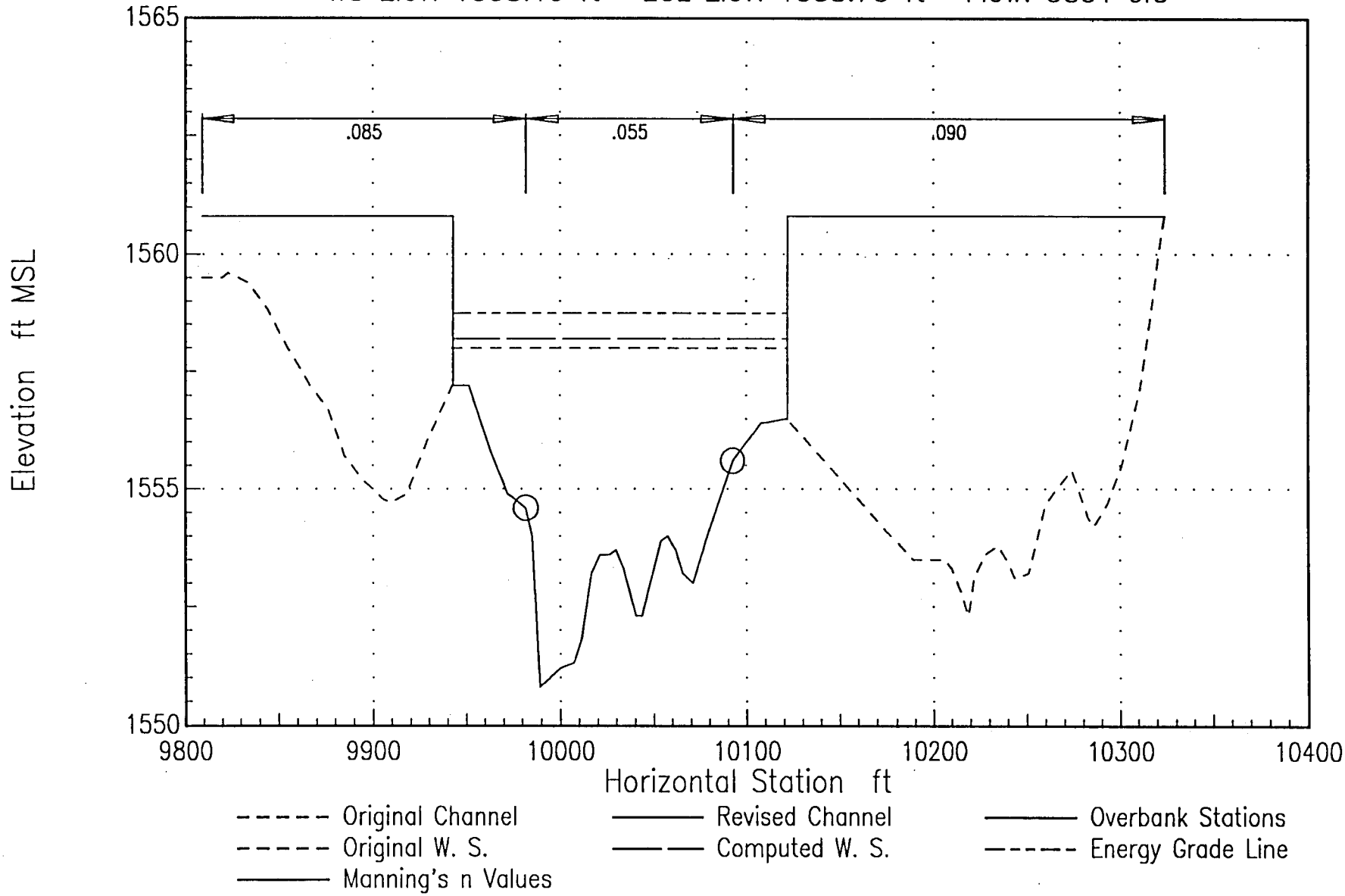
Revised Cross-Section Plot 10.683

WS Elev: 1556.02 ft EGL Elev: 1556.48 ft Flow: 3851 cfs



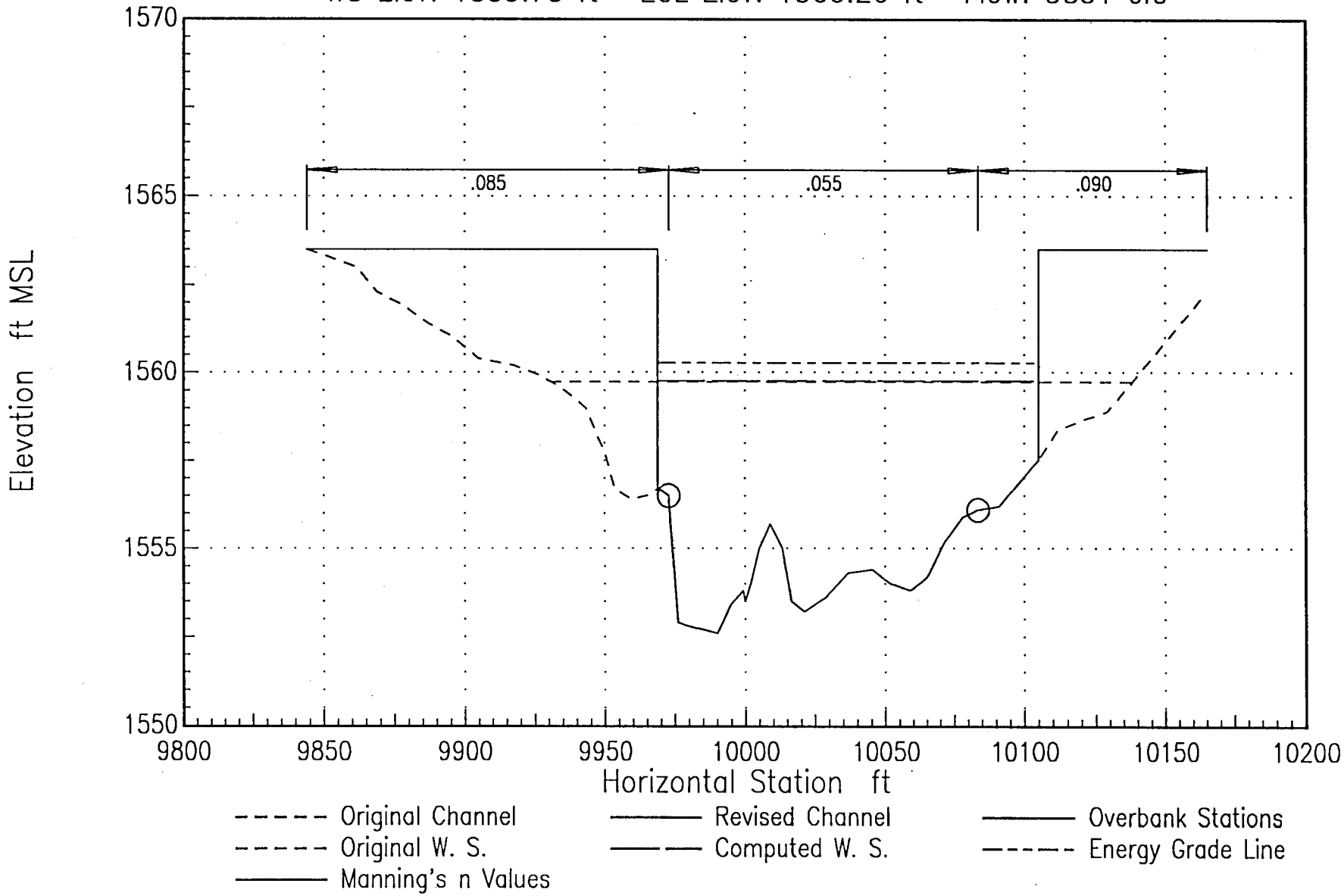
Revised Cross-Section Plot 10.761

WS Elev: 1558.19 ft EGL Elev: 1558.73 ft Flow: 3851 cfs



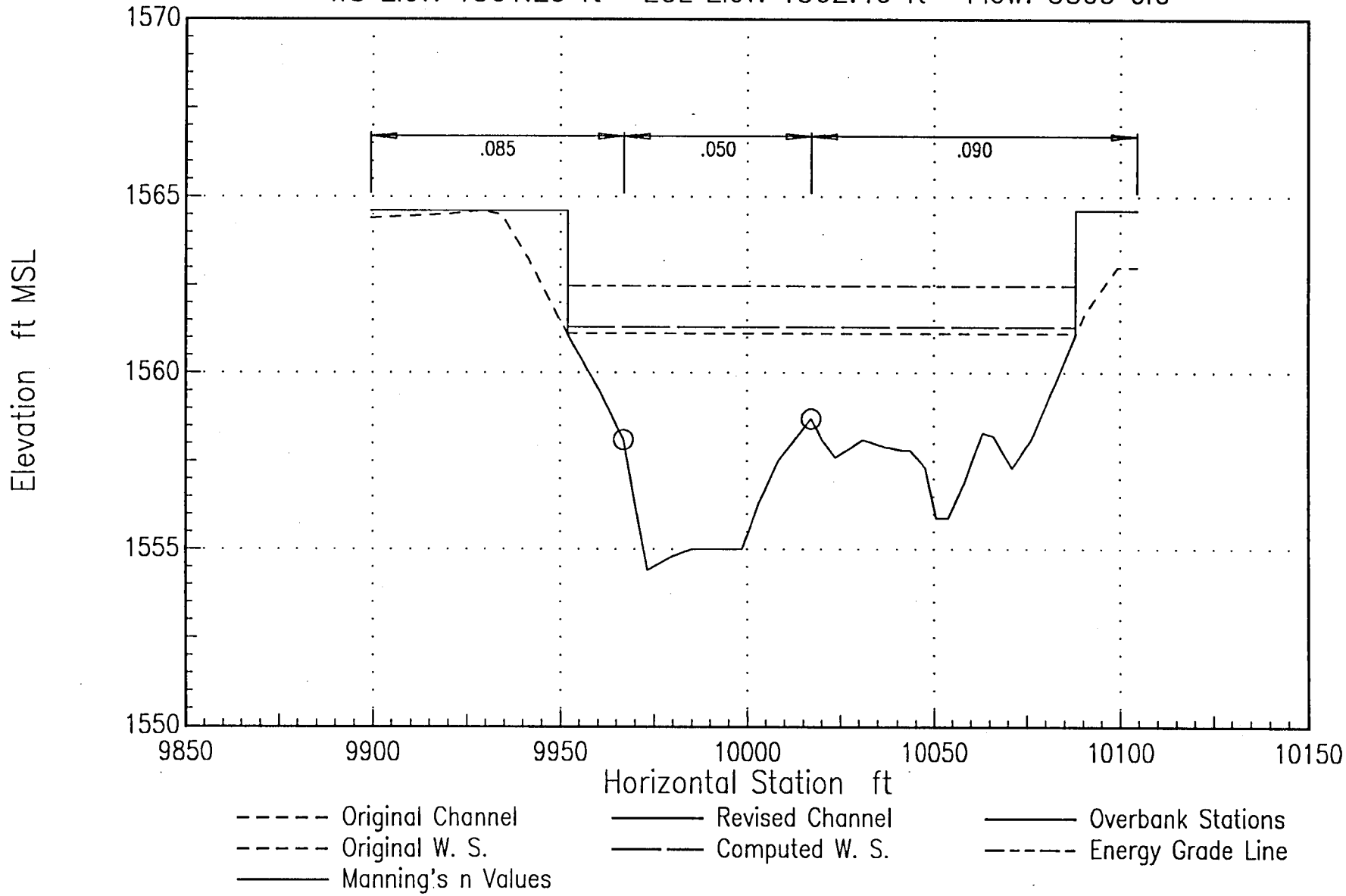
Revised Cross-Section Plot 10.815

WS Elev: 1559.75 ft EGL Elev: 1560.26 ft Flow: 3851 cfs



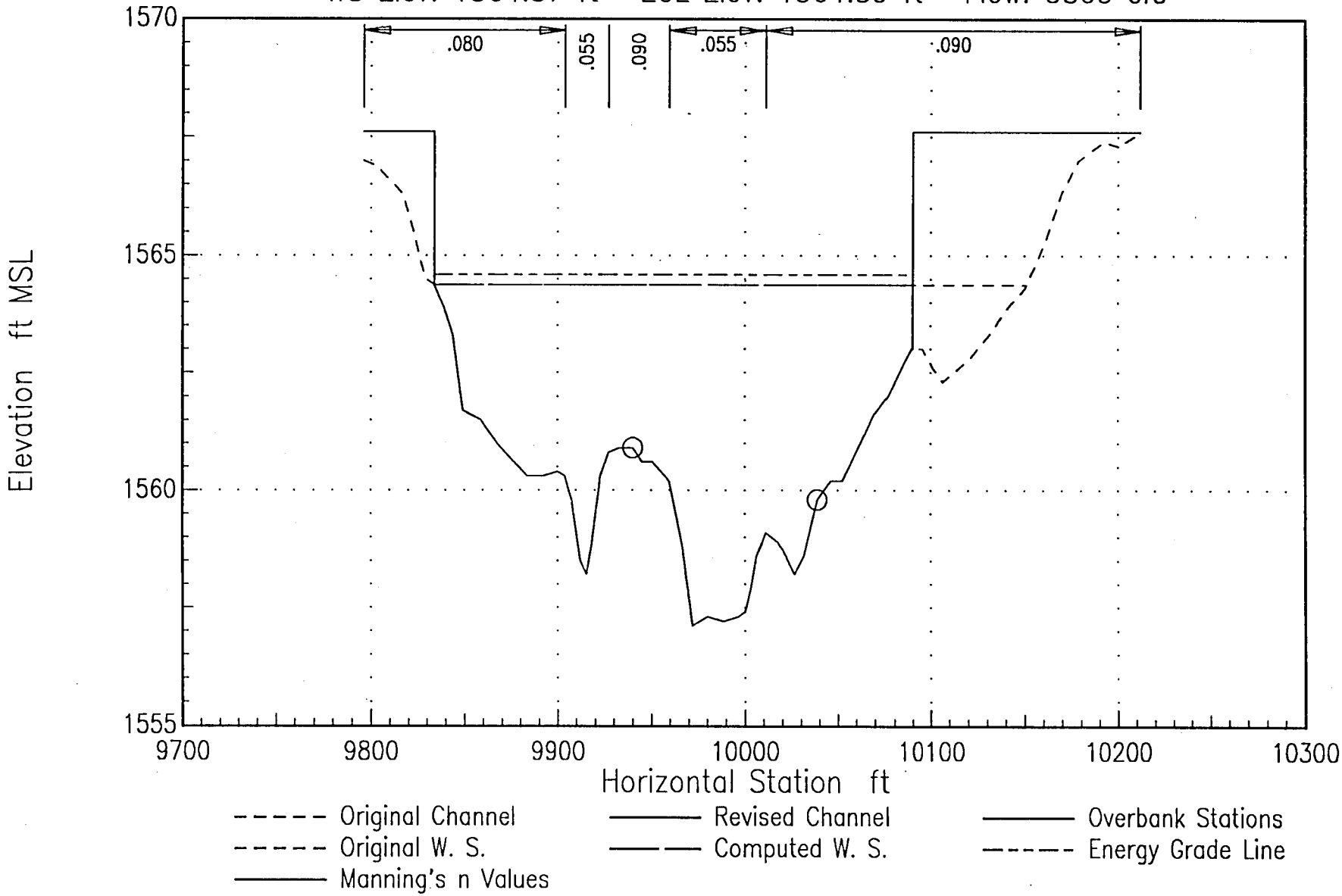
Revised Cross-Section Plot 10.876

WS Elev: 1561.29 ft EGL Elev: 1562.46 ft Flow: 3805 cfs



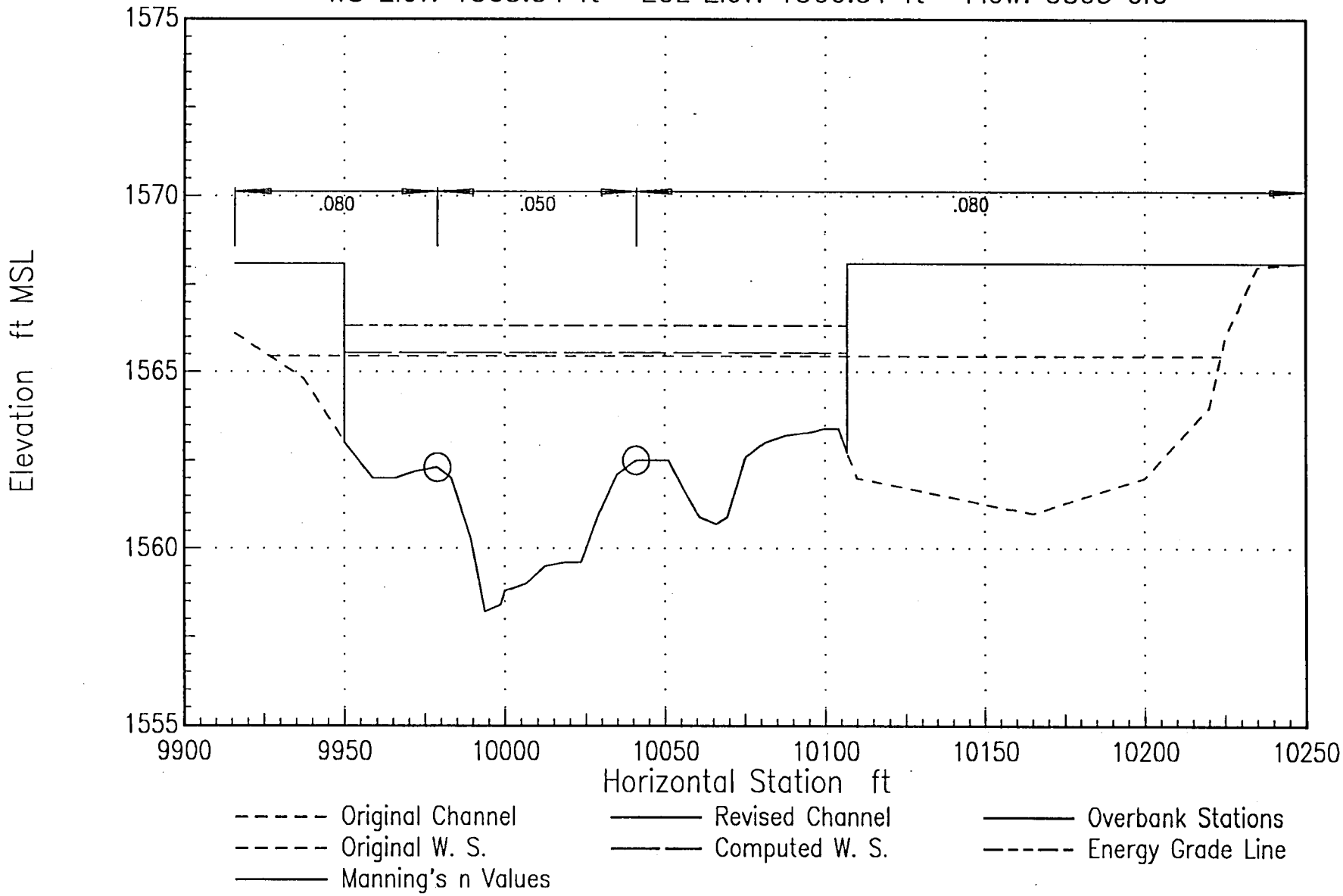
Revised Cross-Section Plot 10.945

WS Elev: 1564.37 ft EGL Elev: 1564.59 ft Flow: 3805 cfs



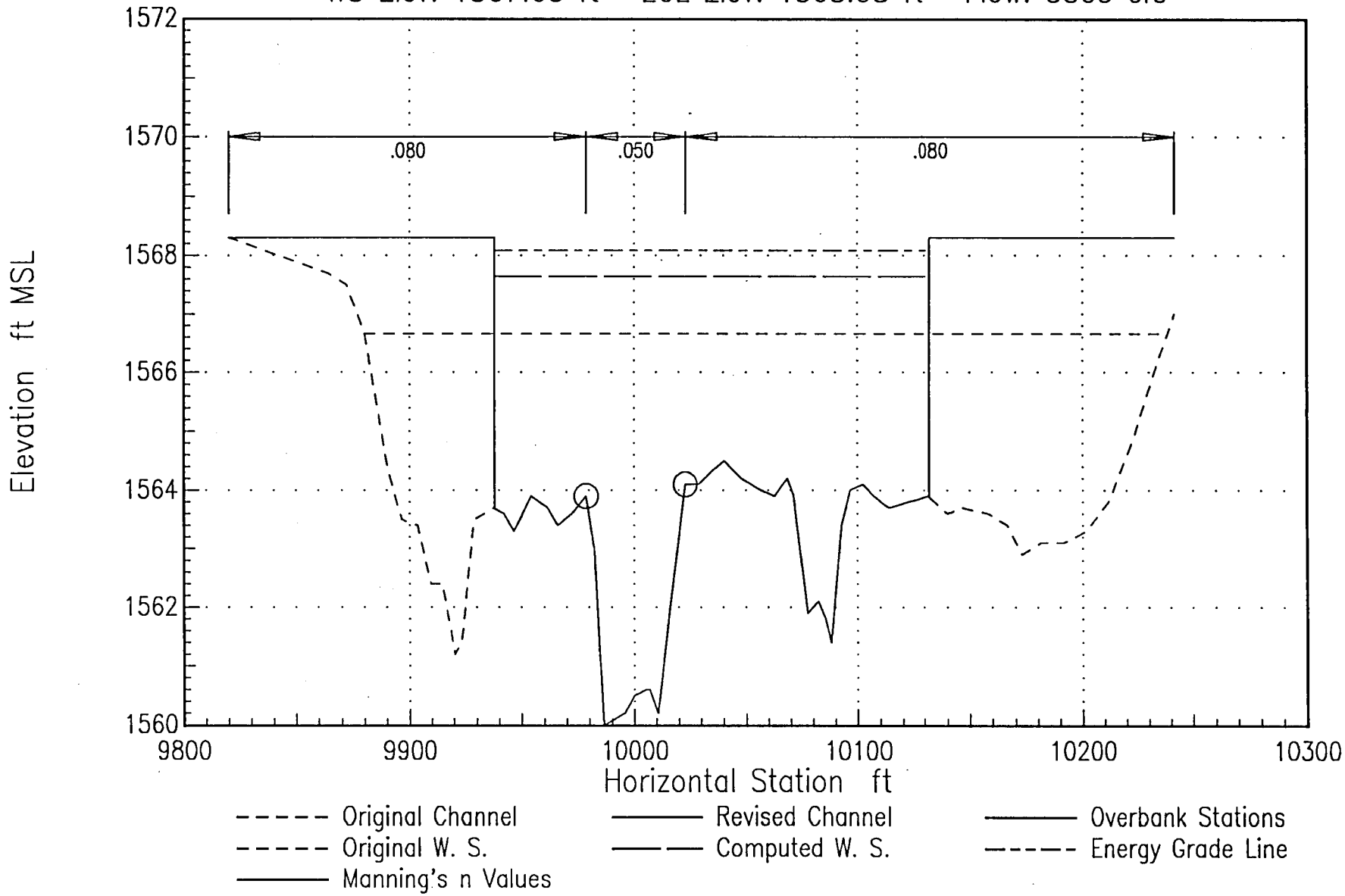
Revised Cross-Section Plot 11.006

WS Elev: 1565.54 ft EGL Elev: 1566.31 ft Flow: 3805 cfs



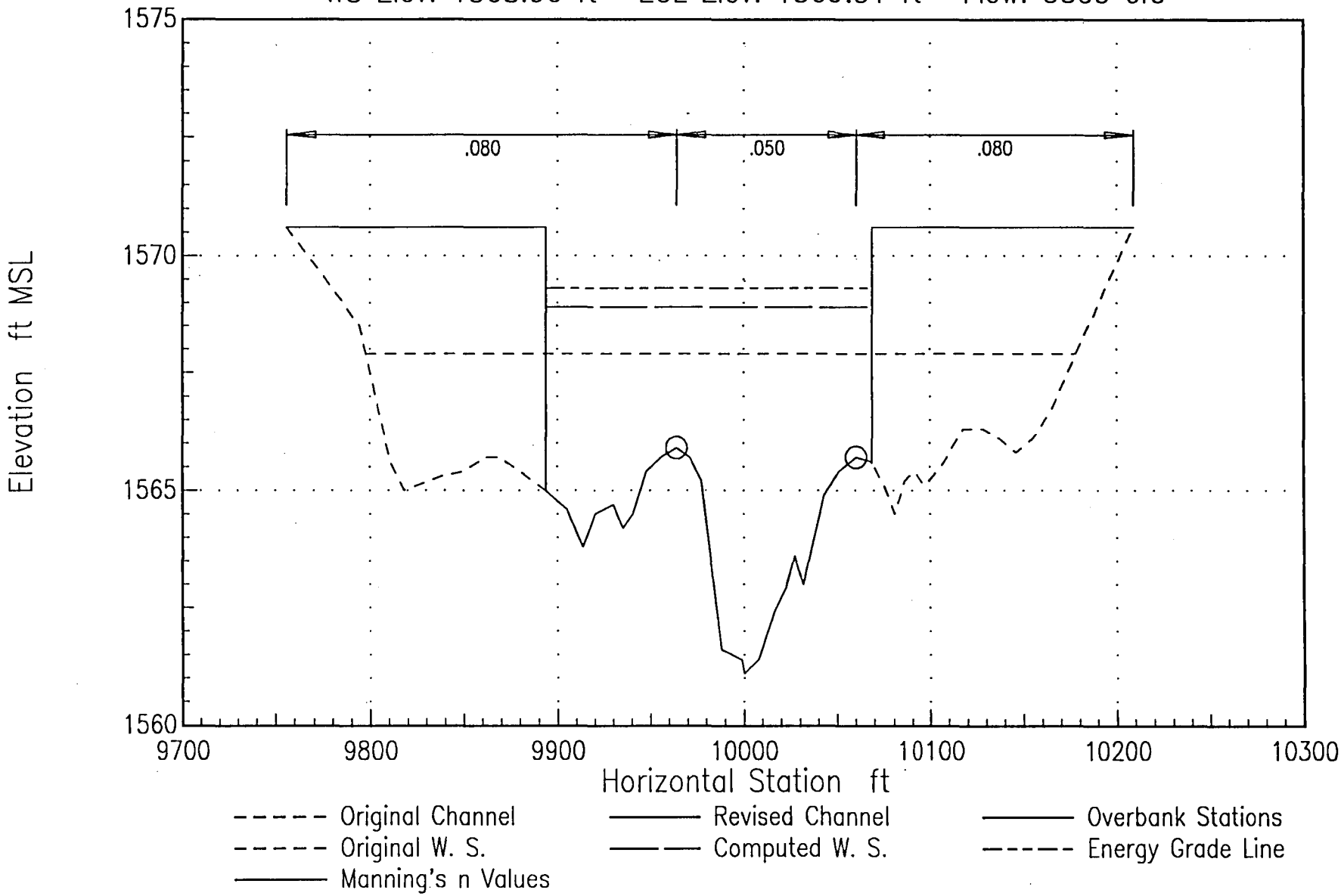
Revised Cross-Section Plot 11.062

WS Elev: 1567.63 ft EGL Elev: 1568.08 ft Flow: 3805 cfs



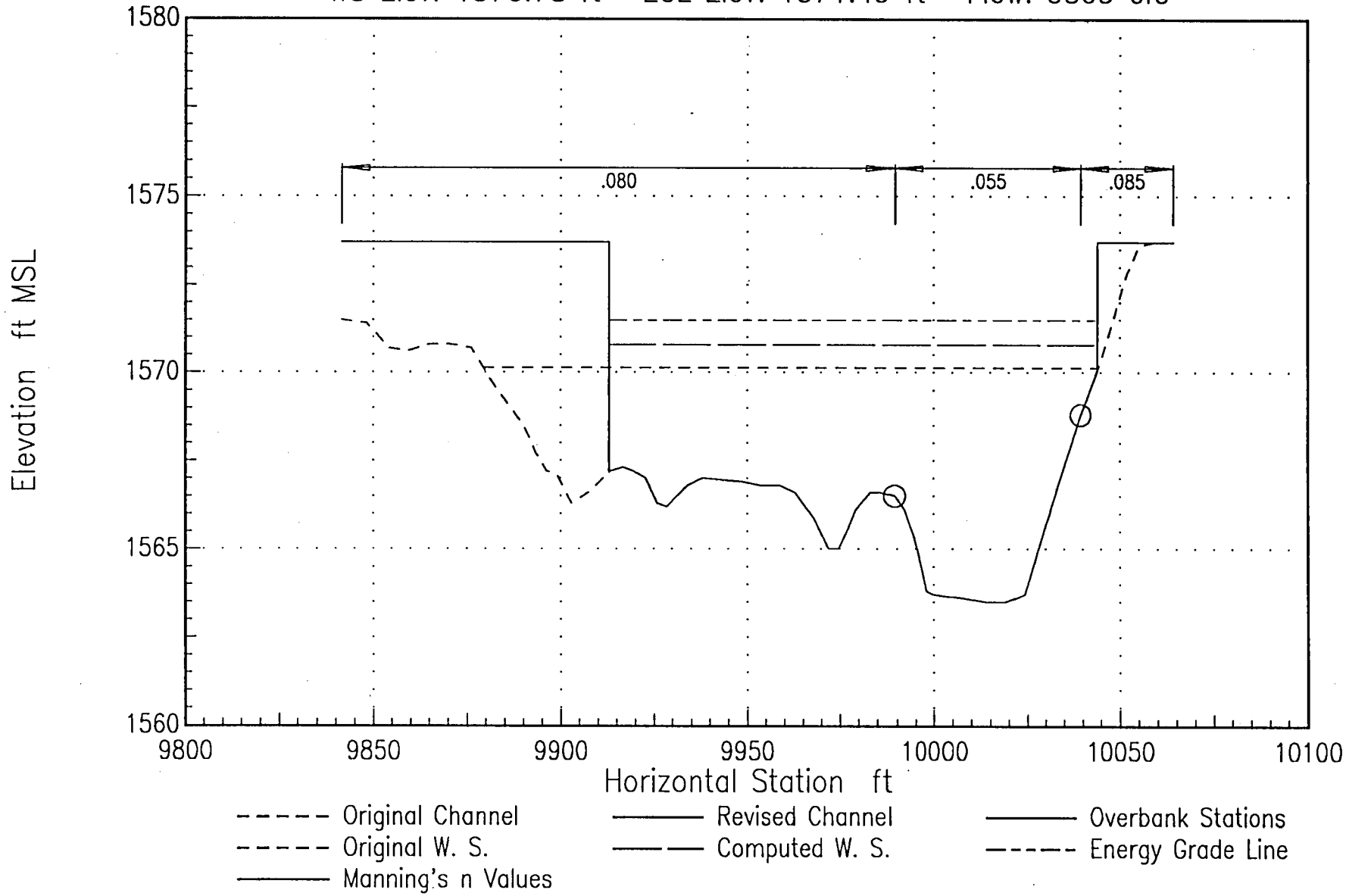
Revised Cross-Section Plot 11.118

WS Elev: 1568.90 ft EGL Elev: 1569.31 ft Flow: 3805 cfs



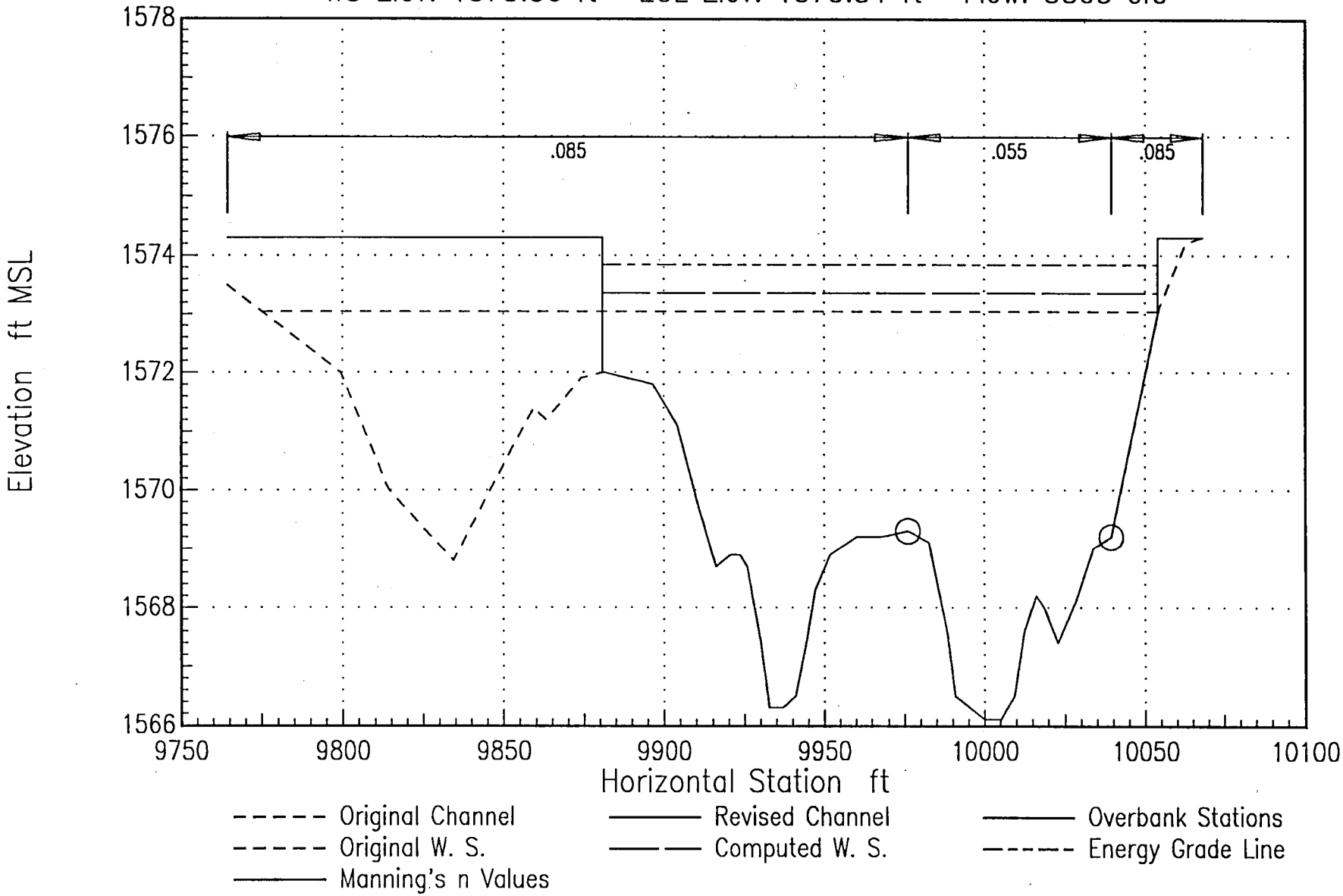
Revised Cross-Section Plot 11.19

WS Elev: 1570.78 ft EGL Elev: 1571.49 ft Flow: 3805 cfs



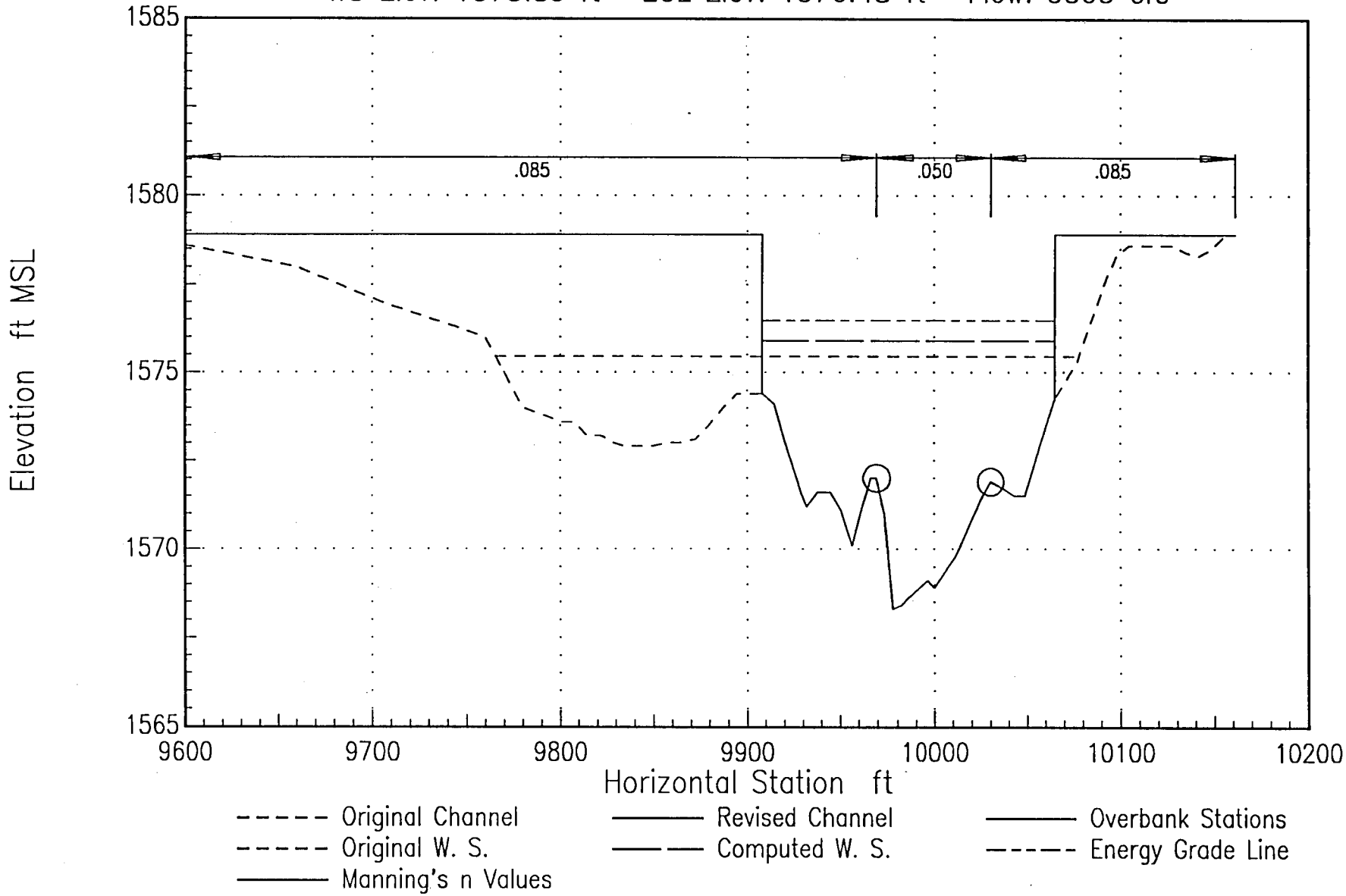
Revised Cross-Section Plot 11.259

WS Elev: 1573.36 ft EGL Elev: 1573.84 ft Flow: 3805 cfs



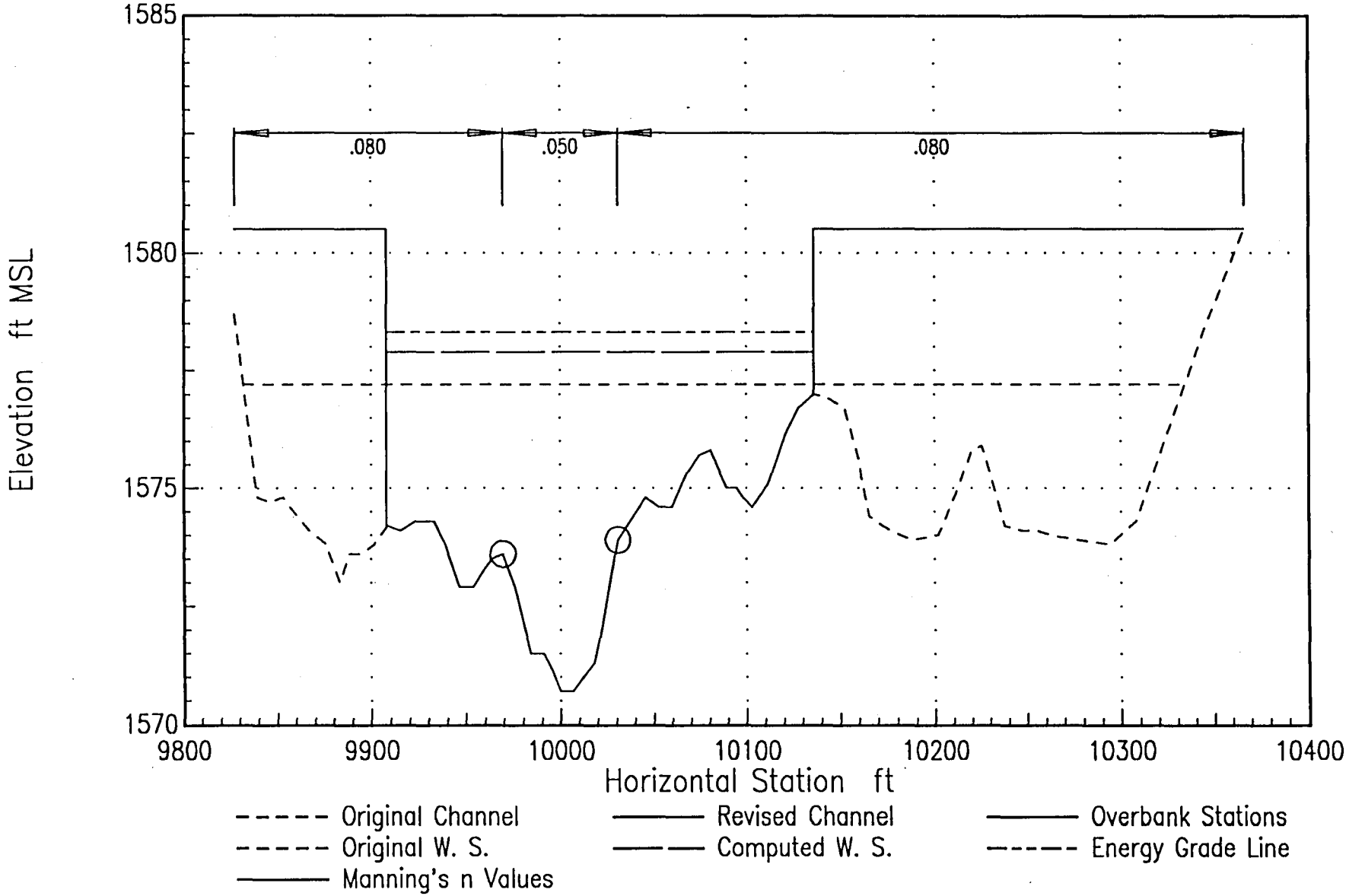
Revised Cross-Section Plot 11.351

WS Elev: 1575.89 ft EGL Elev: 1576.48 ft Flow: 3805 cfs



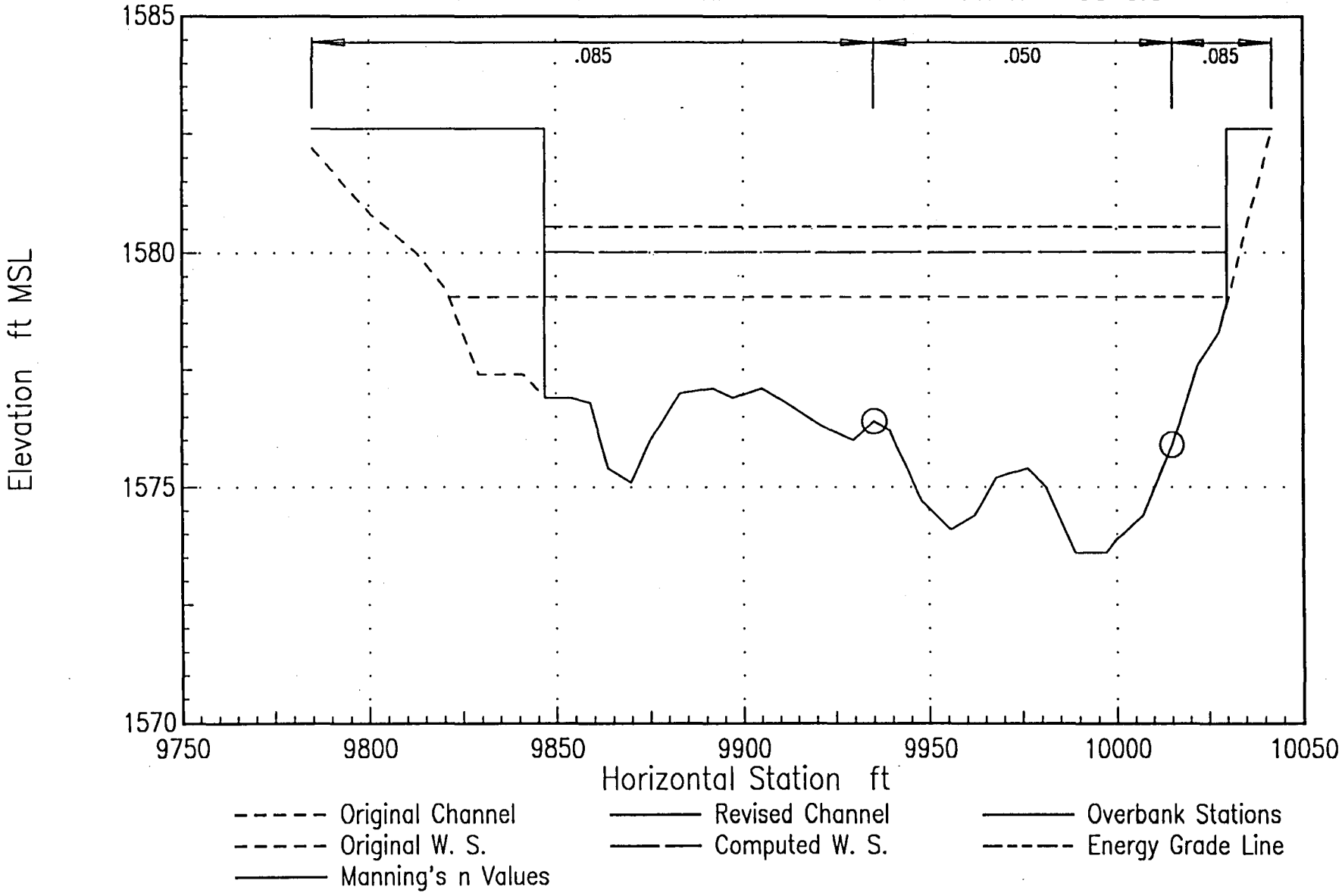
Revised Cross-Section Plot 11.426

WS Elev: 1577.88 ft EGL Elev: 1578.31 ft Flow: 3805 cfs



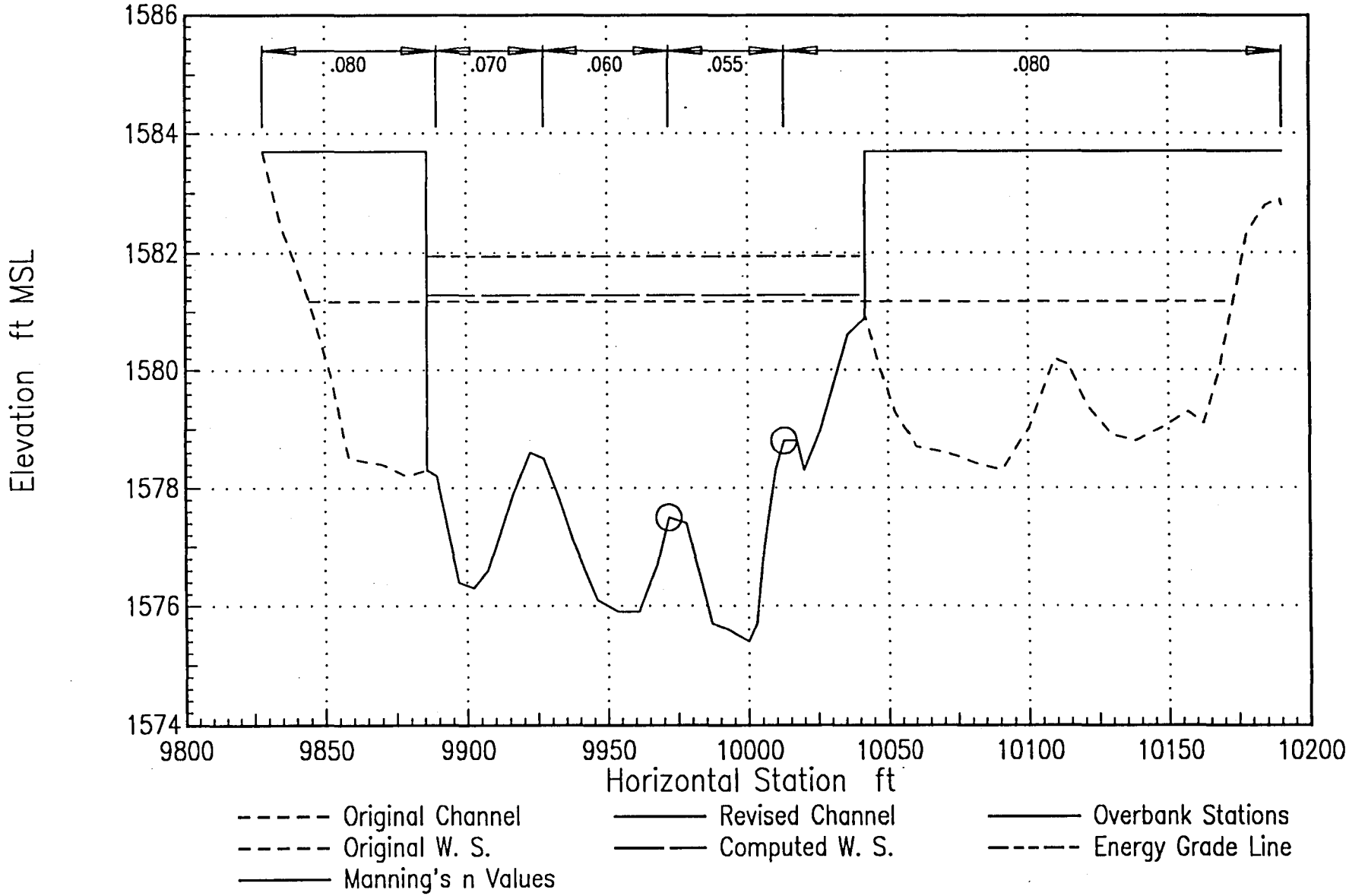
Revised Cross-Section Plot 11.515

WS Elev: 1580.01 ft EGL Elev: 1580.54 ft Flow: 3805 cfs



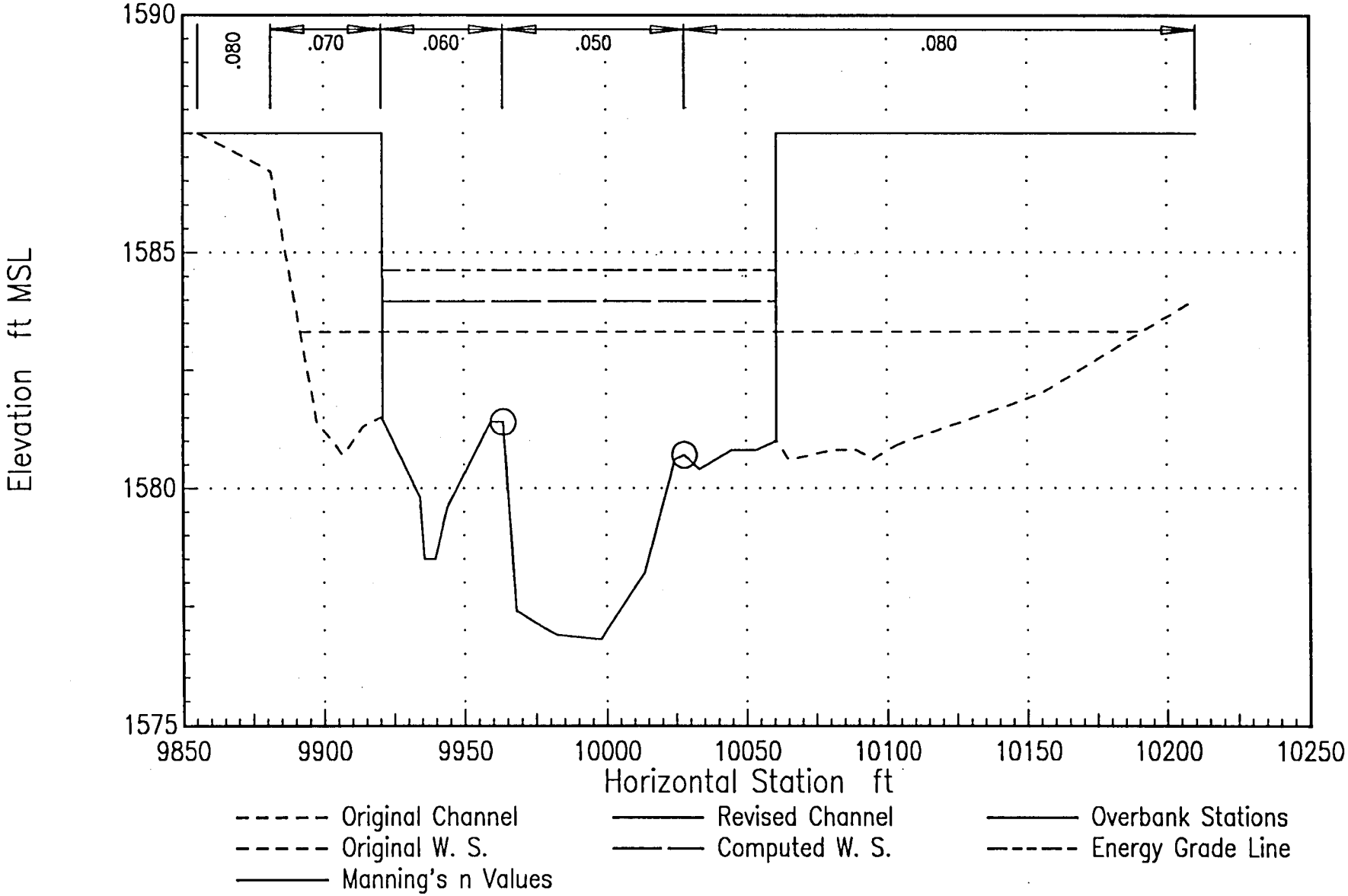
Revised Cross-Section Plot 11.554

WS Elev: 1581.28 ft EGL Elev: 1581.93 ft Flow: 3805 cfs



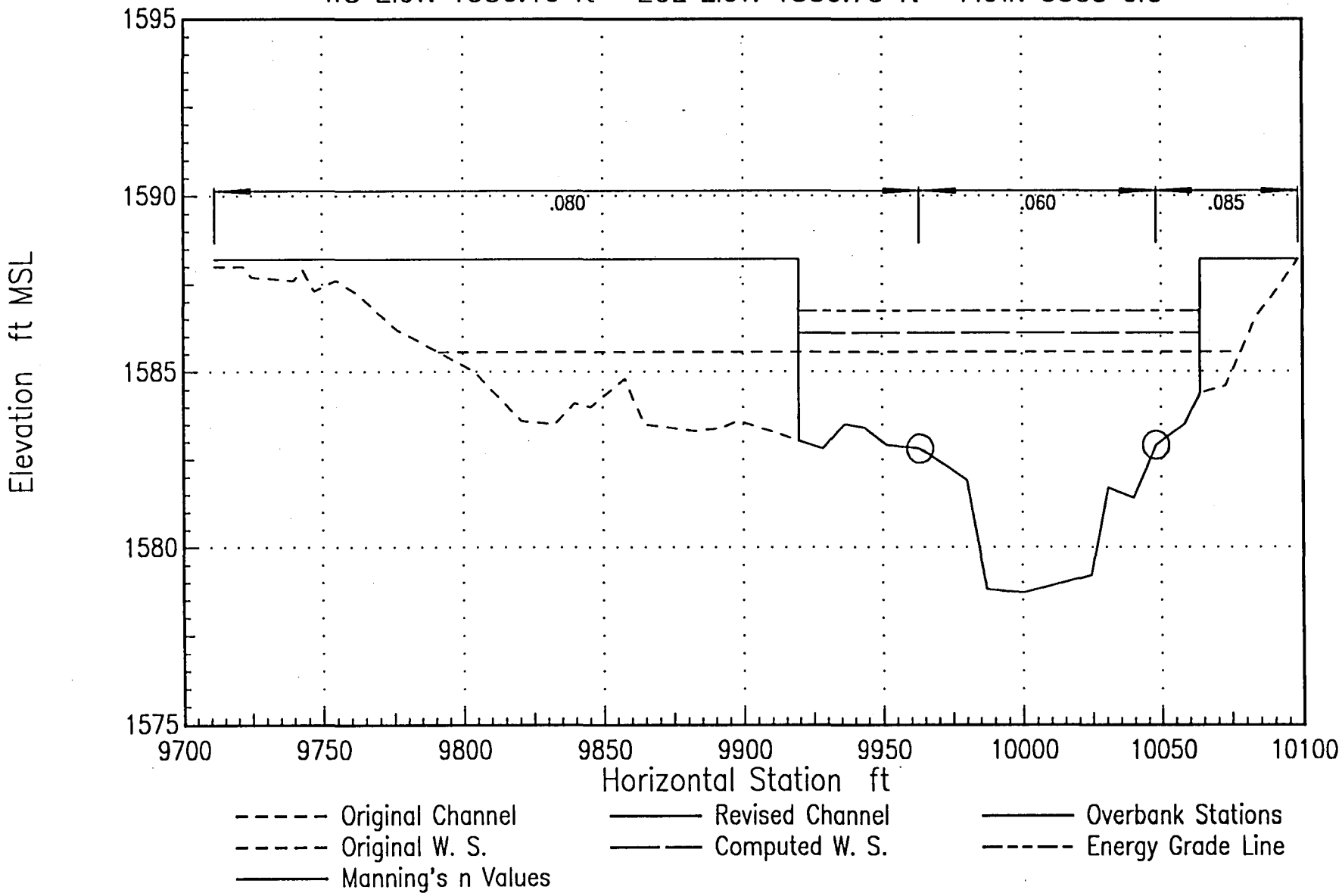
Revised Cross-Section Plot 11.626

WS Elev: 1583.97 ft EGL Elev: 1584.62 ft Flow: 3805 cfs



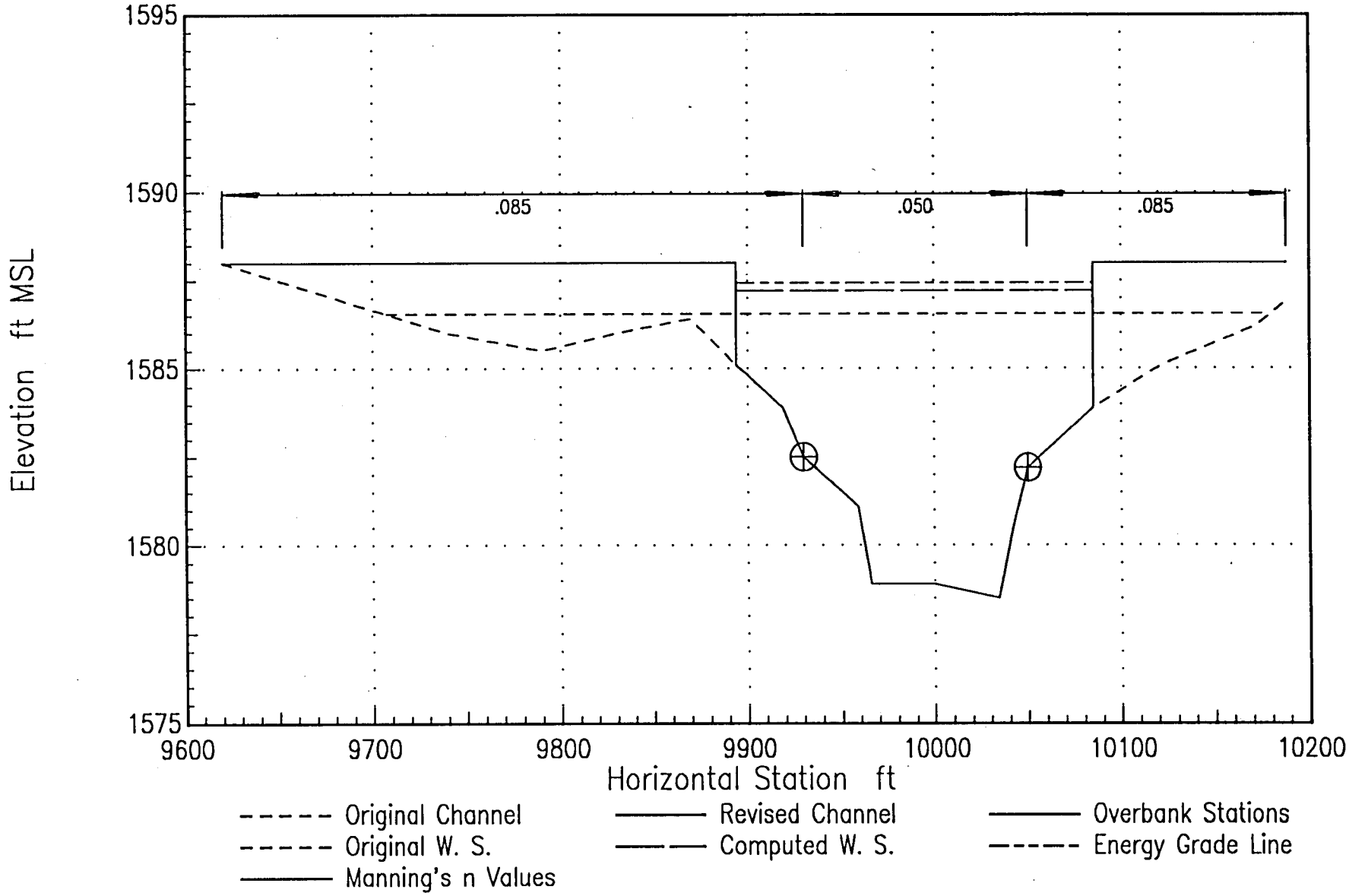
Revised Cross-Section Plot 11.688

WS Elev: 1586.10 ft EGL Elev: 1586.73 ft Flow: 3805 cfs



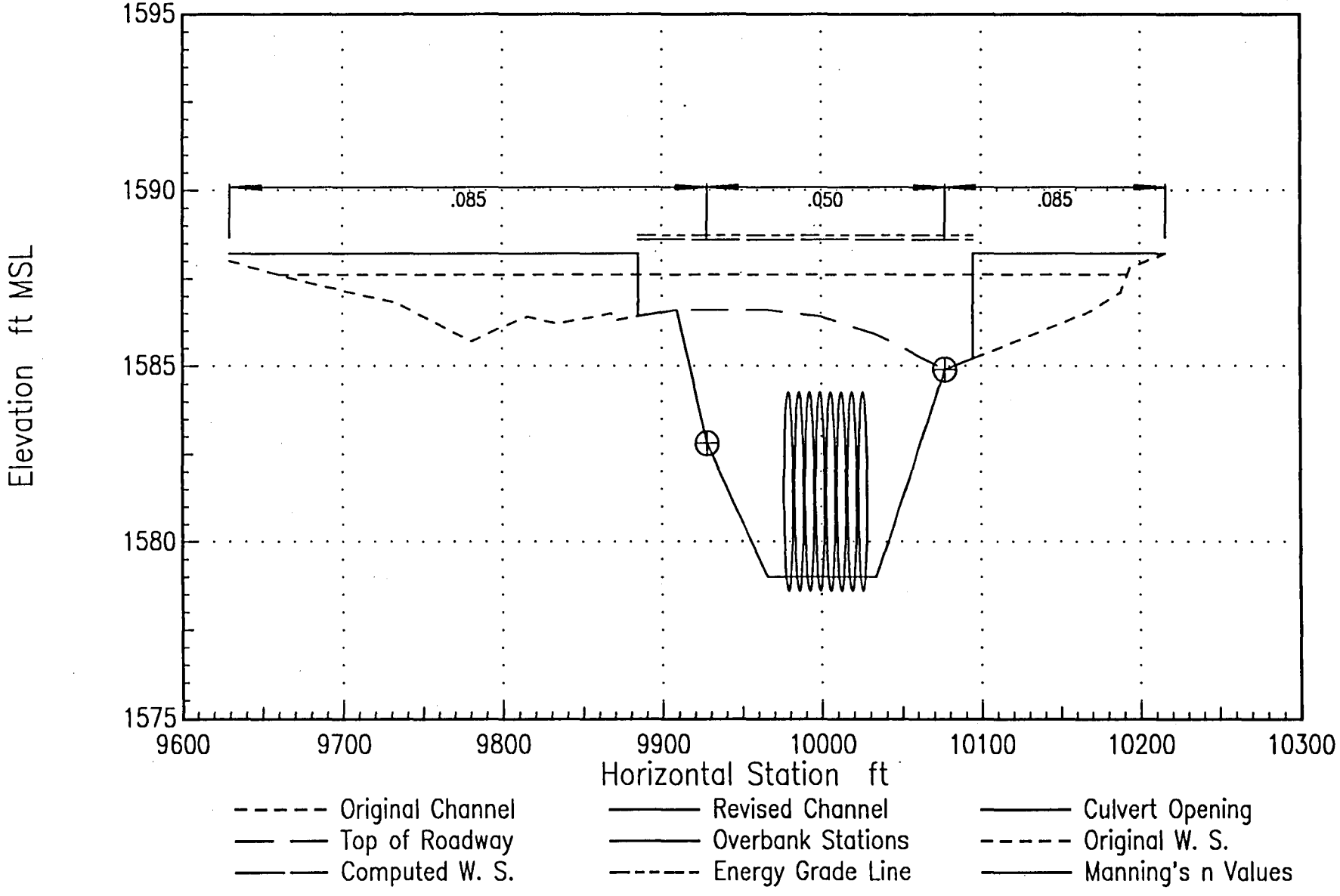
Revised Cross-Section Plot 11.722

WS Elev: 1587.21 ft EGL Elev: 1587.42 ft Flow: 3805 cfs



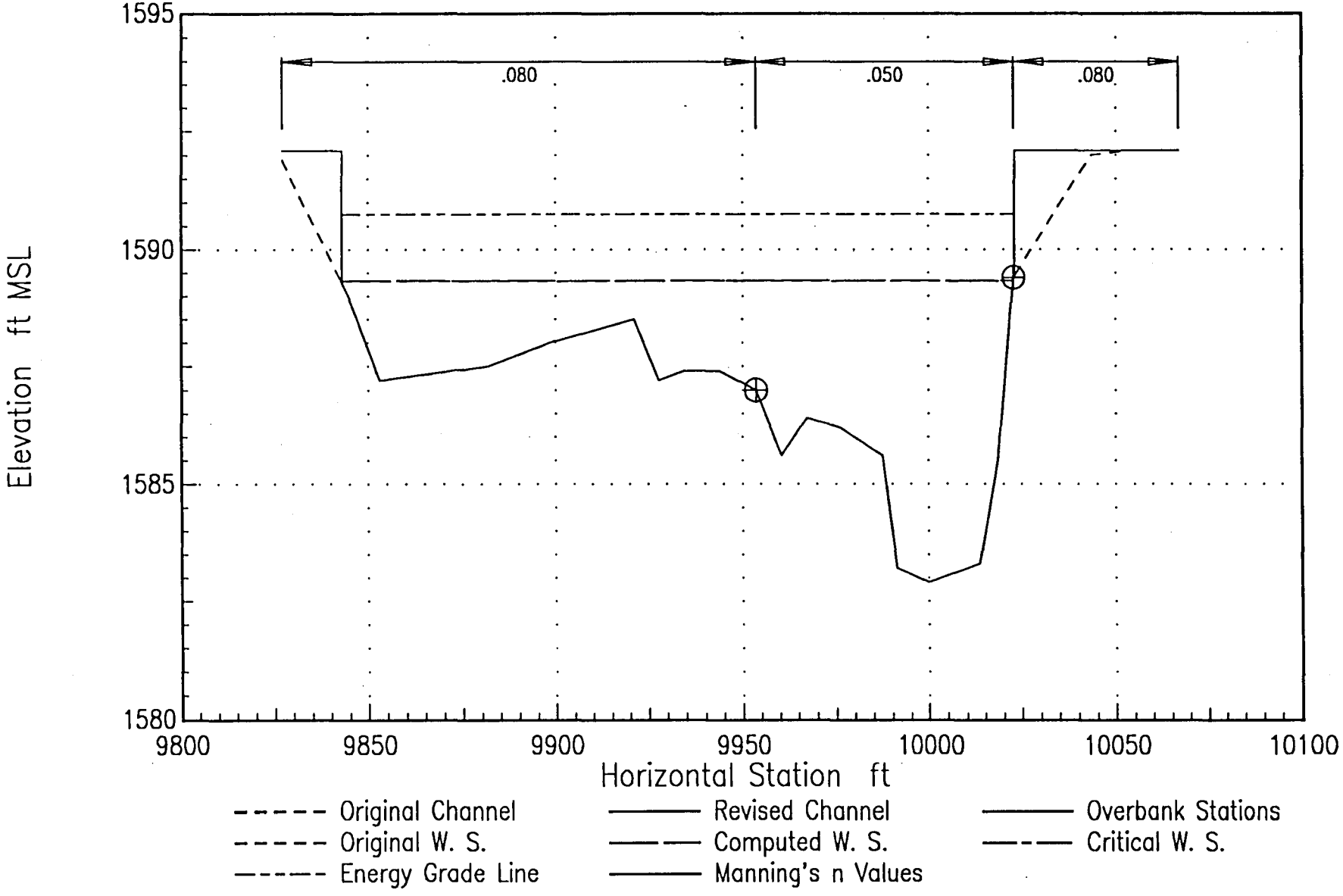
Revised Culvert Cross-Section Plot 11.734

WS Elev: 1588.58 ft EGL Elev: 1588.71 ft Flow: 3805 cfs



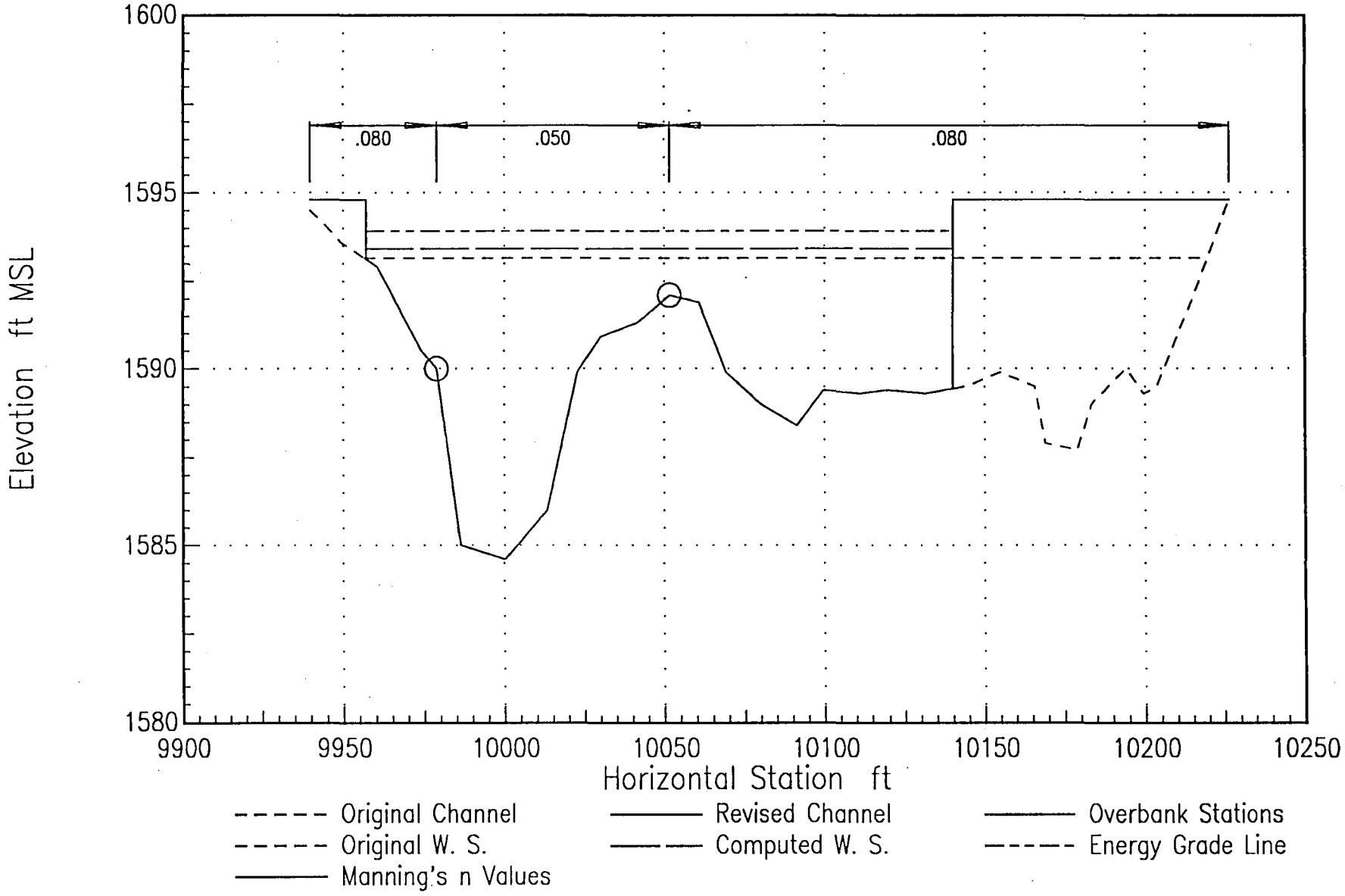
Revised Cross-Section Plot 11.811

WS: 1589.32ft Crit.WS: 1589.32ft EGL: 1590.74ft Flow: 3756cfs



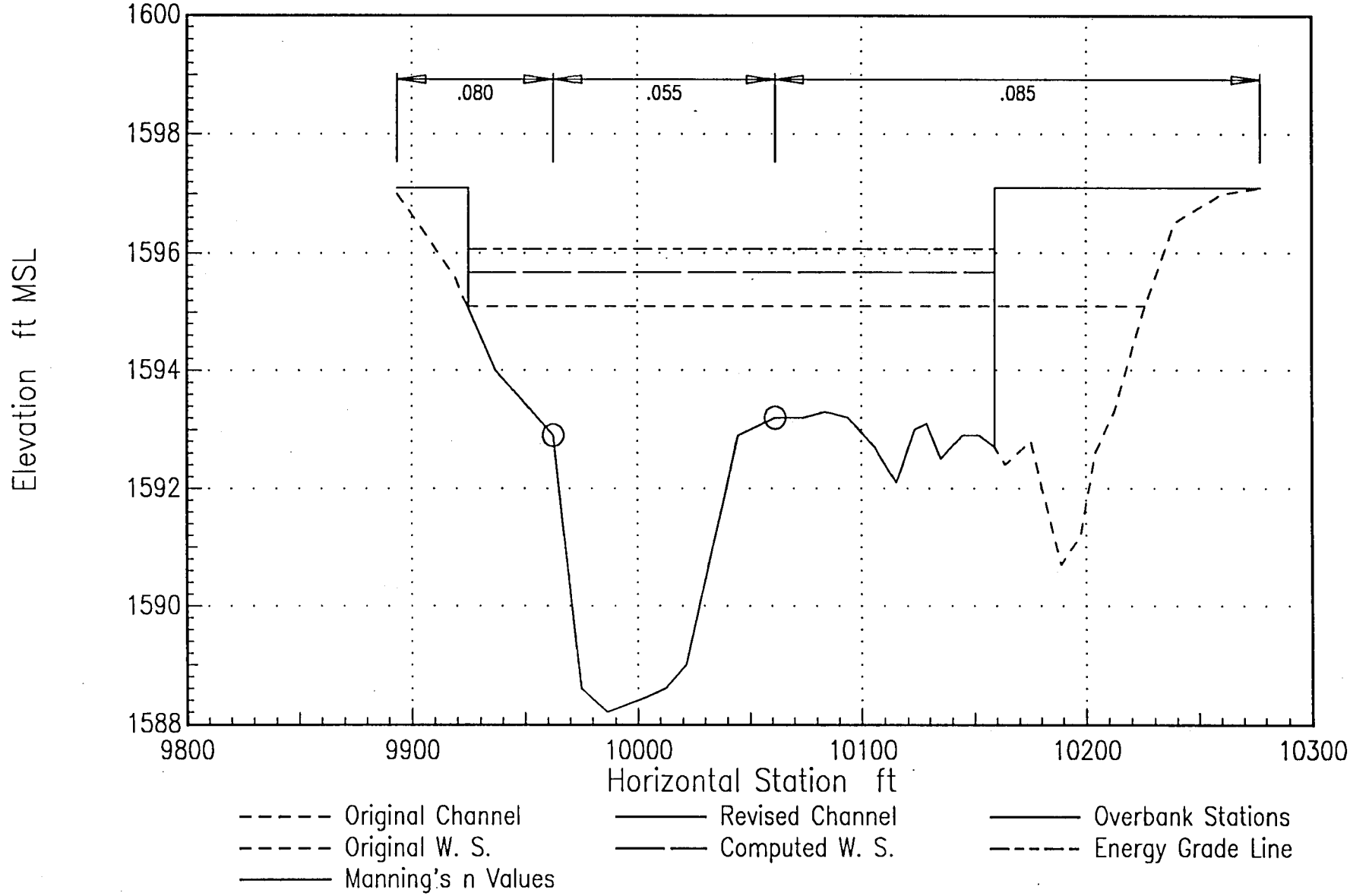
Revised Cross-Section Plot 11.876

WS Elev: 1593.40 ft EGL Elev: 1593.91 ft Flow: 3756 cfs



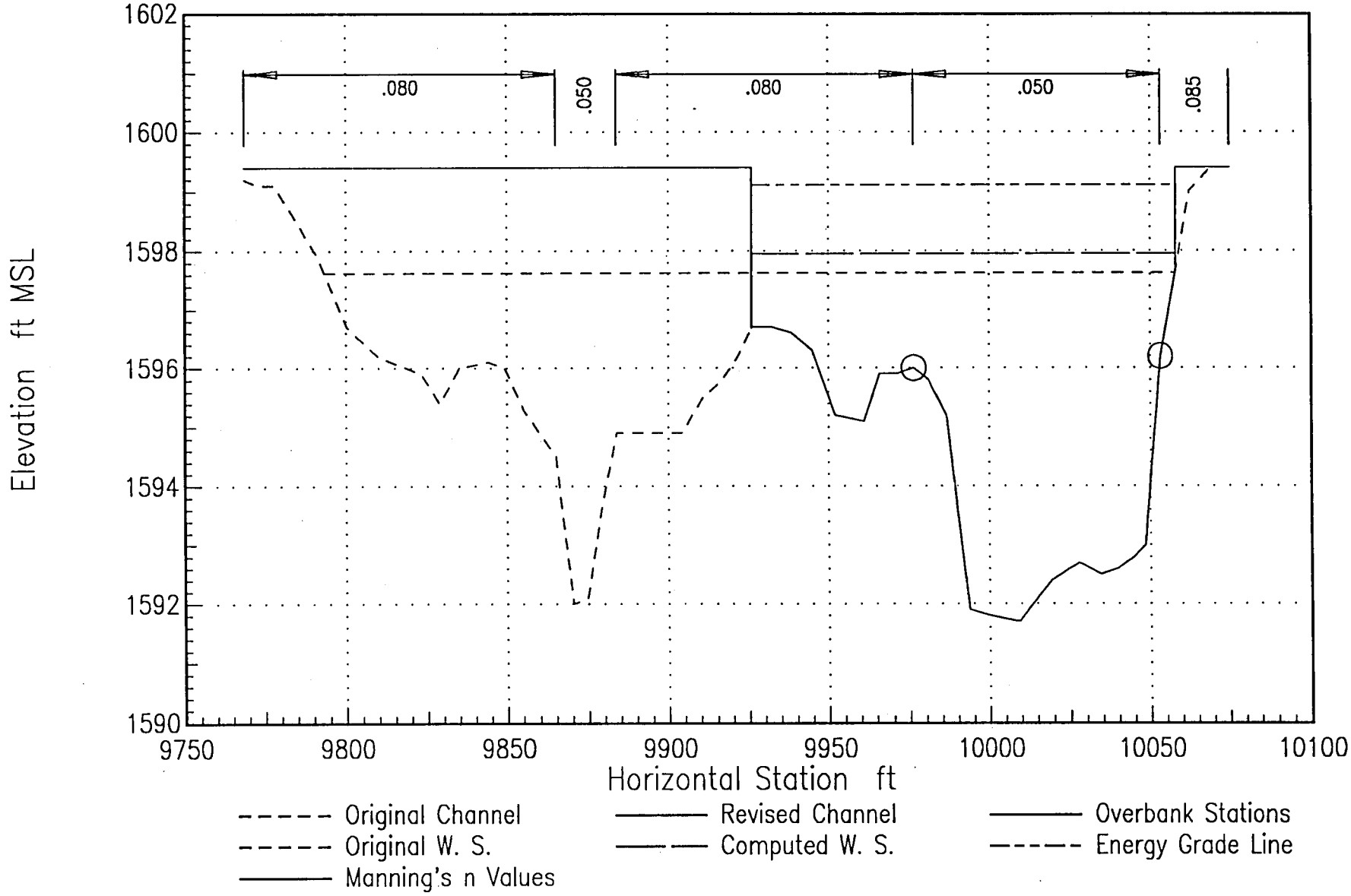
Revised Cross-Section Plot 11.96

WS Elev: 1595.67 ft EGL Elev: 1596.06 ft Flow: 3756 cfs



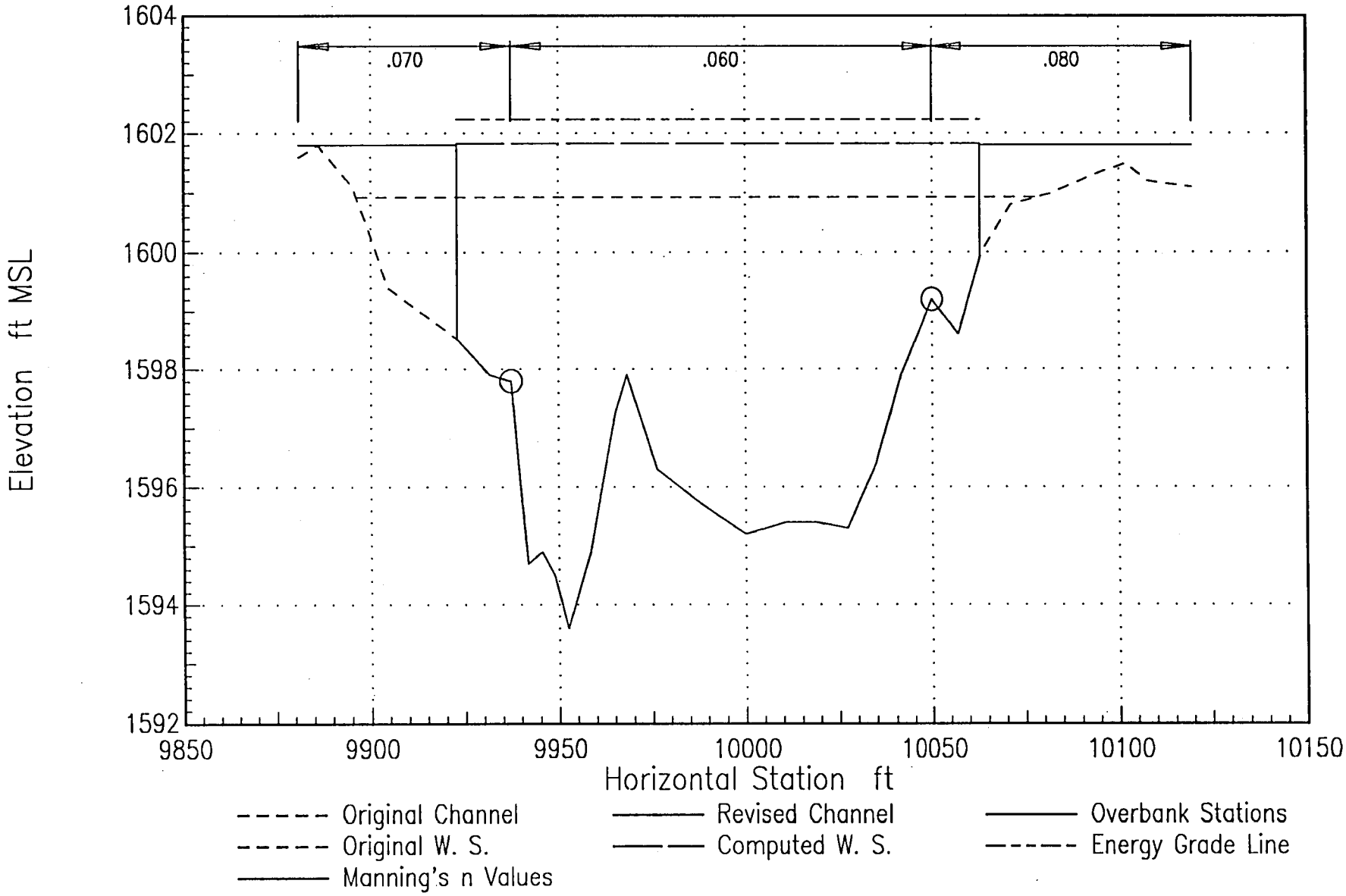
Revised Cross-Section Plot 12.041

WS Elev: 1597.94 ft EGL Elev: 1599.11 ft Flow: 3756 cfs



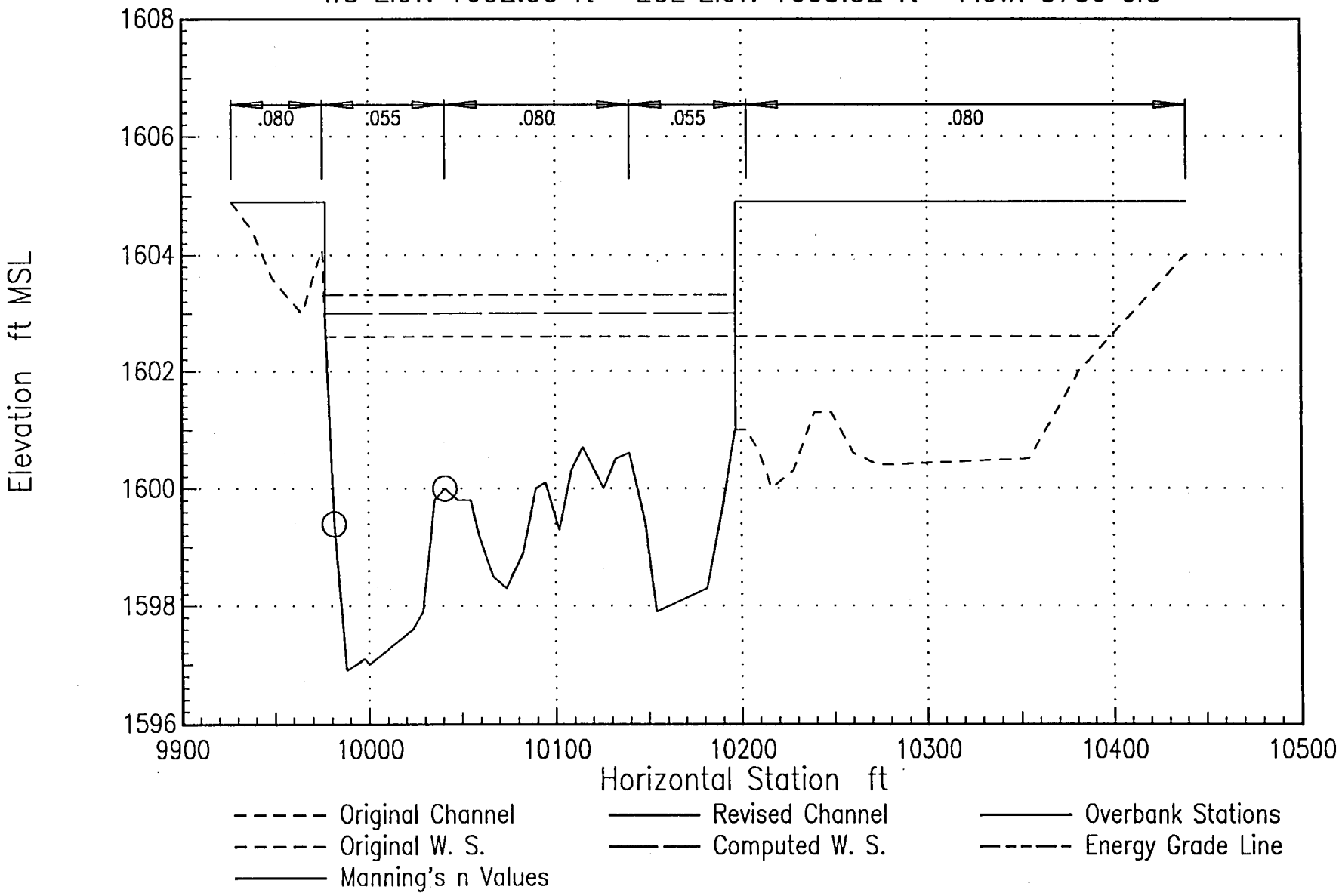
Revised Cross-Section Plot 12.128

WS Elev: 1601.82 ft EGL Elev: 1602.23 ft Flow: 3756 cfs



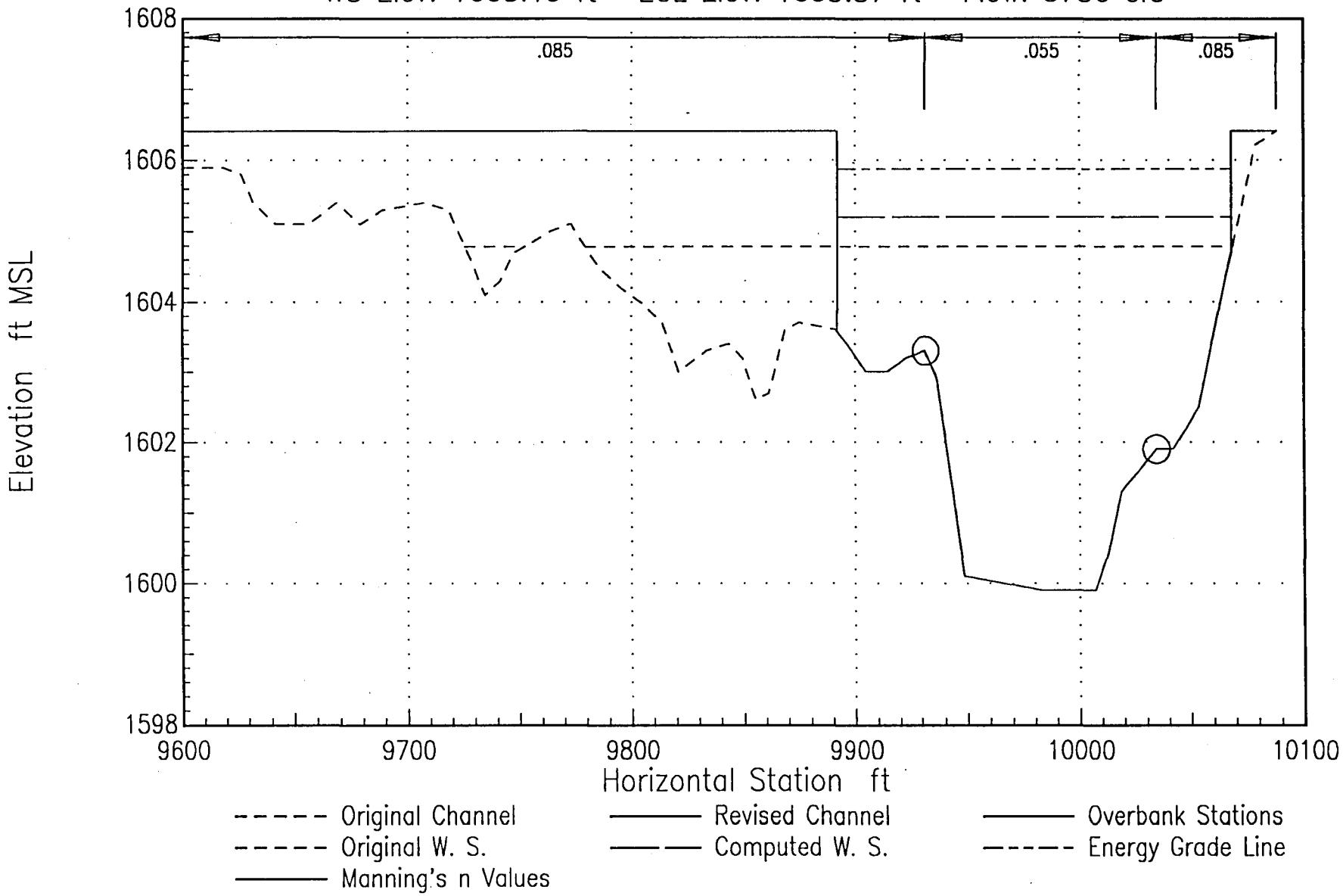
Revised Cross-Section Plot 12.174

WS Elev: 1602.99 ft EGL Elev: 1603.32 ft Flow: 3756 cfs



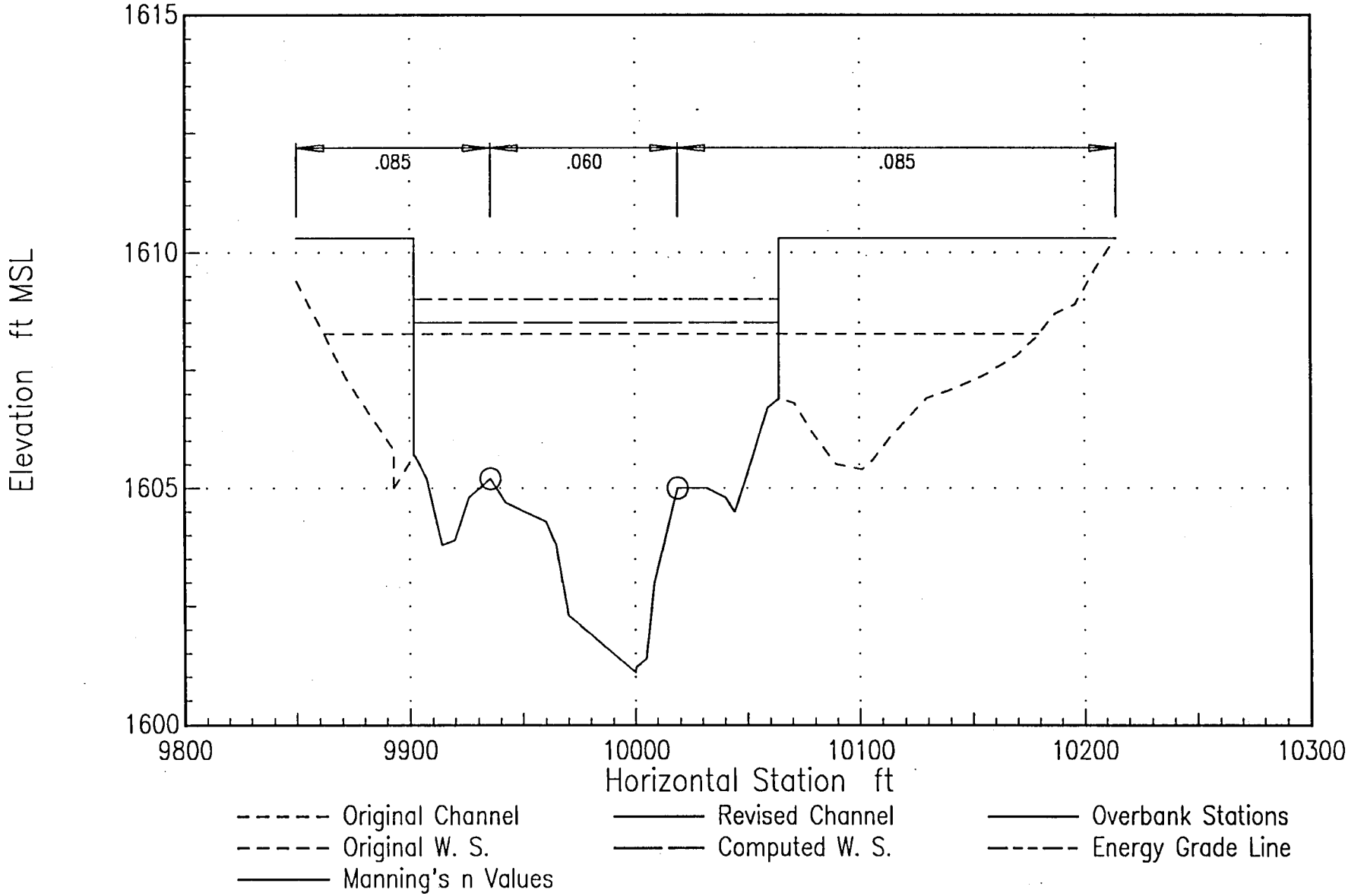
Revised Cross-Section Plot 12.249

WS Elev: 1605.19 ft EGL Elev: 1605.87 ft Flow: 3756 cfs



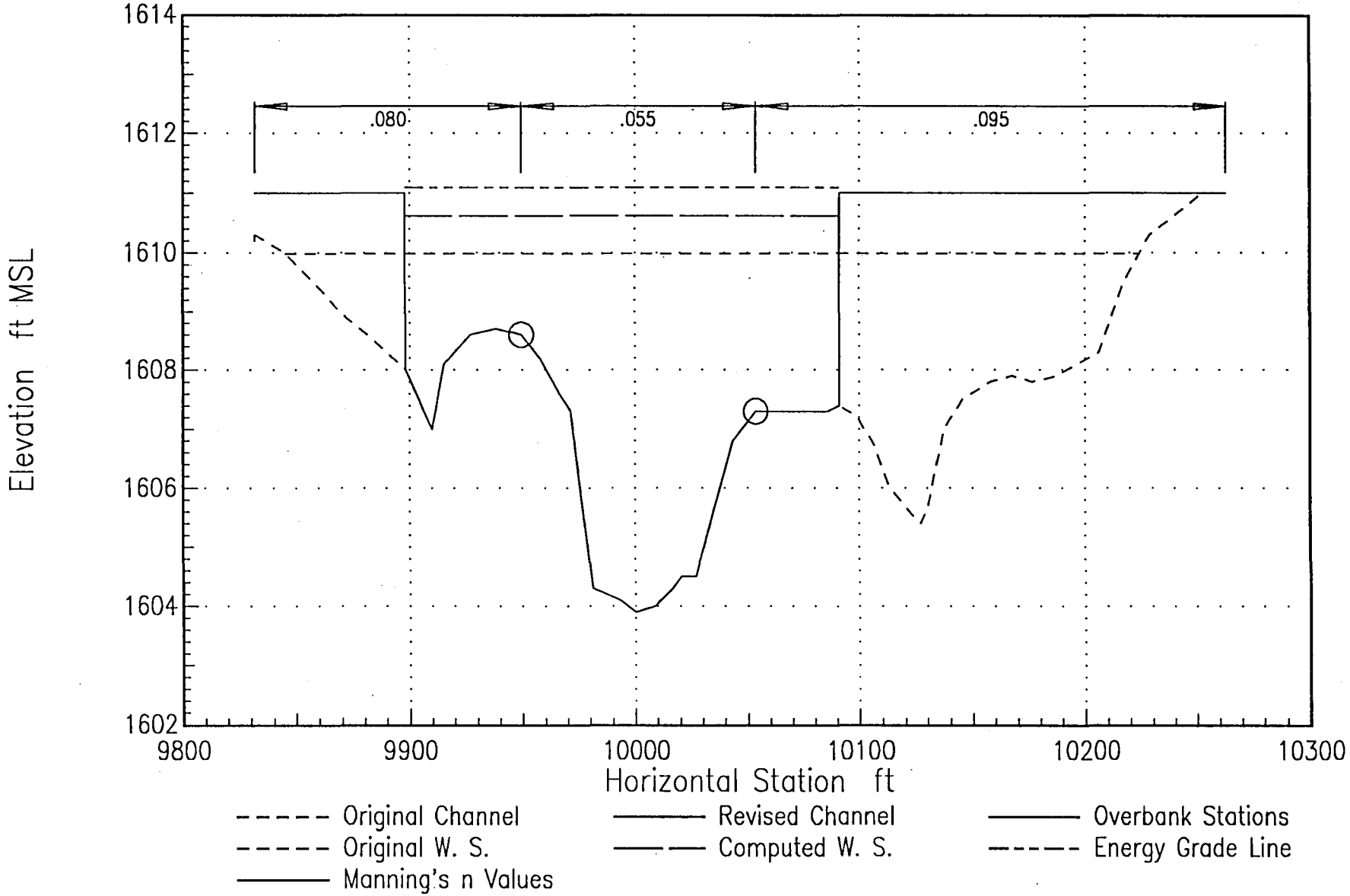
Revised Cross-Section Plot 12.325

WS Elev: 1608.50 ft EGL Elev: 1609.00 ft Flow: 3756 cfs



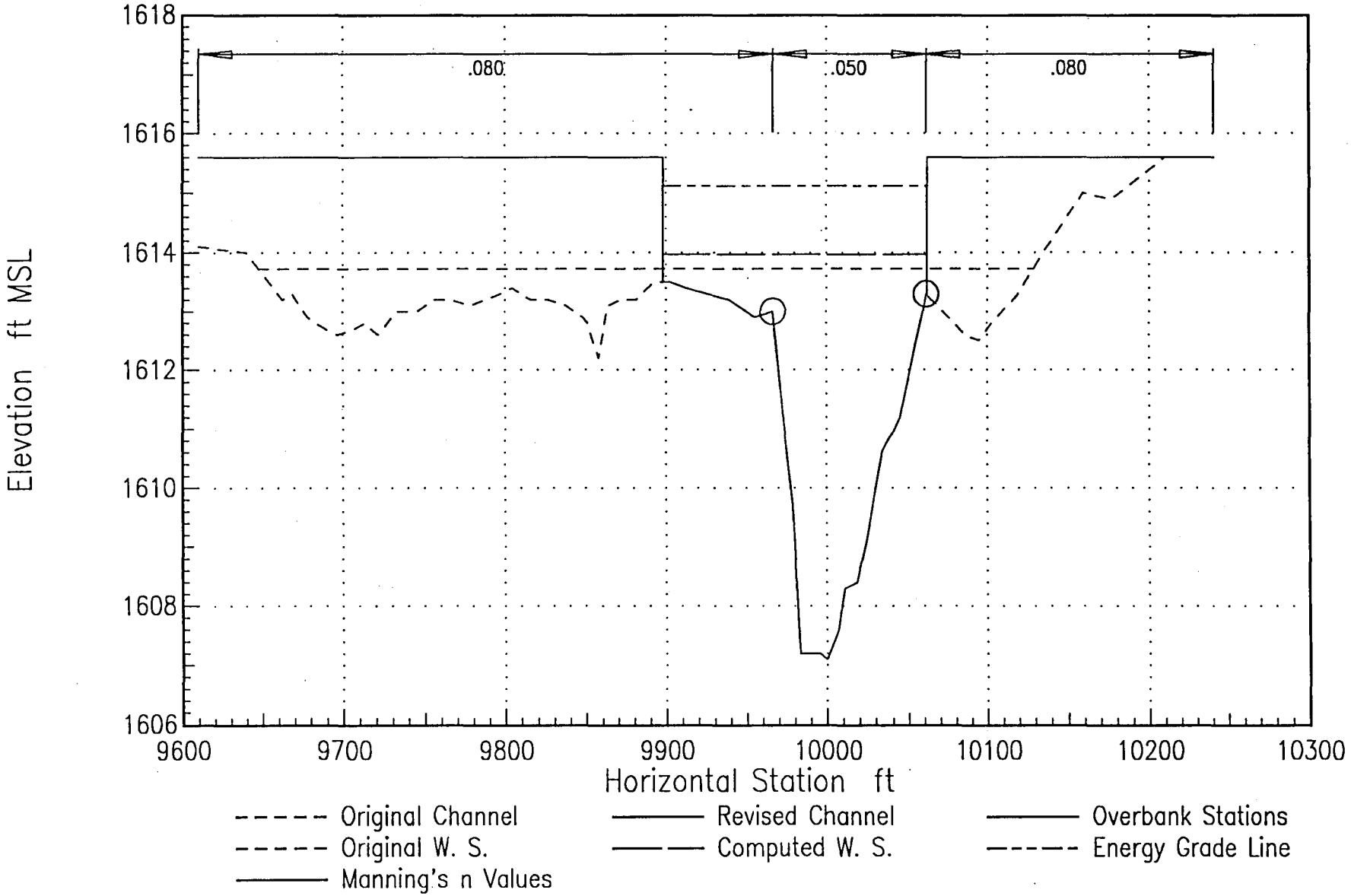
Revised Cross-Section Plot 12.395

WS Elev: 1610.61 ft EGL Elev: 1611.09 ft Flow: 3756 cfs



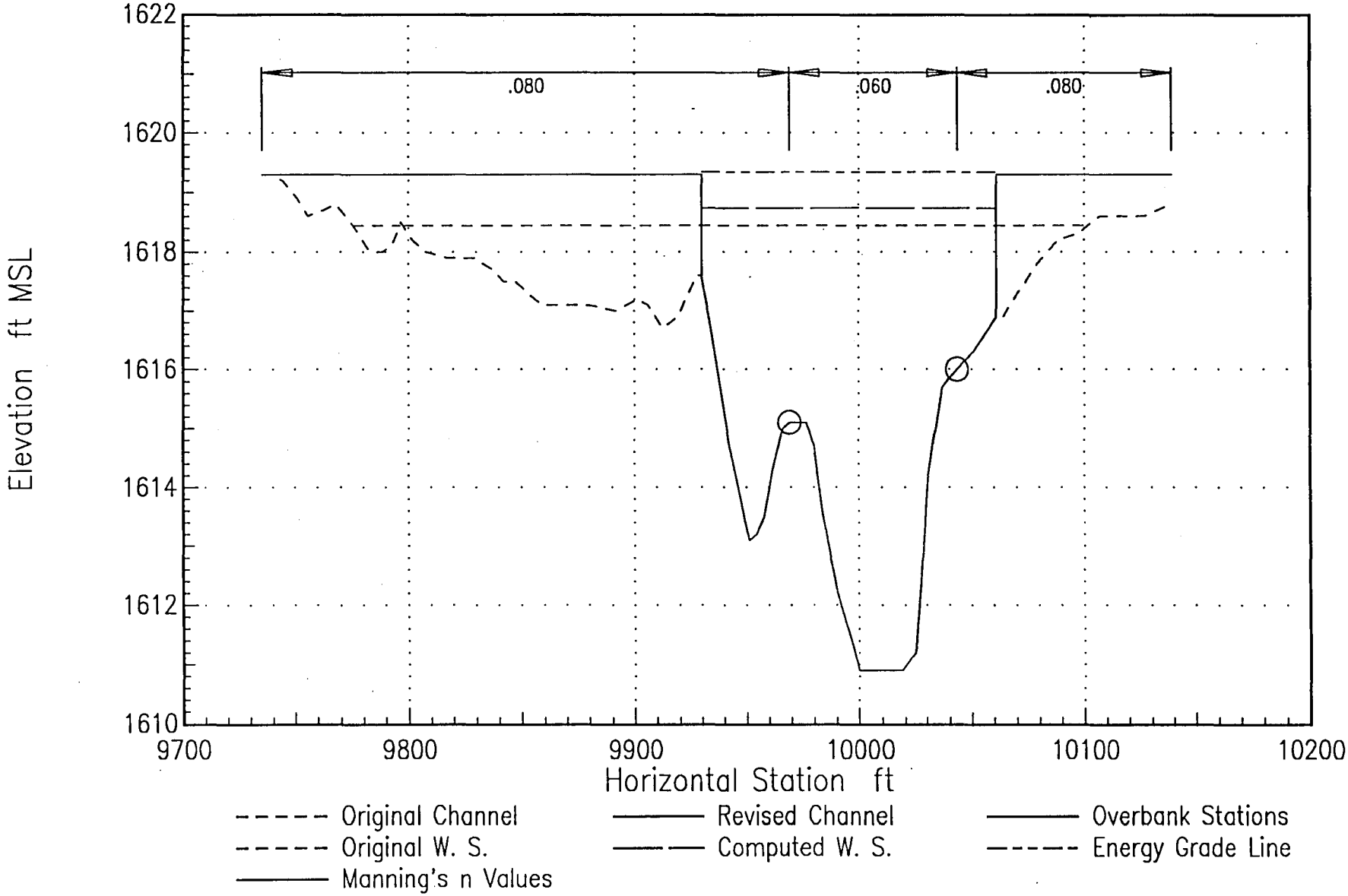
Revised Cross-Section Plot 12.484

WS Elev: 1613.96 ft EGL Elev: 1615.12 ft Flow: 3706 cfs



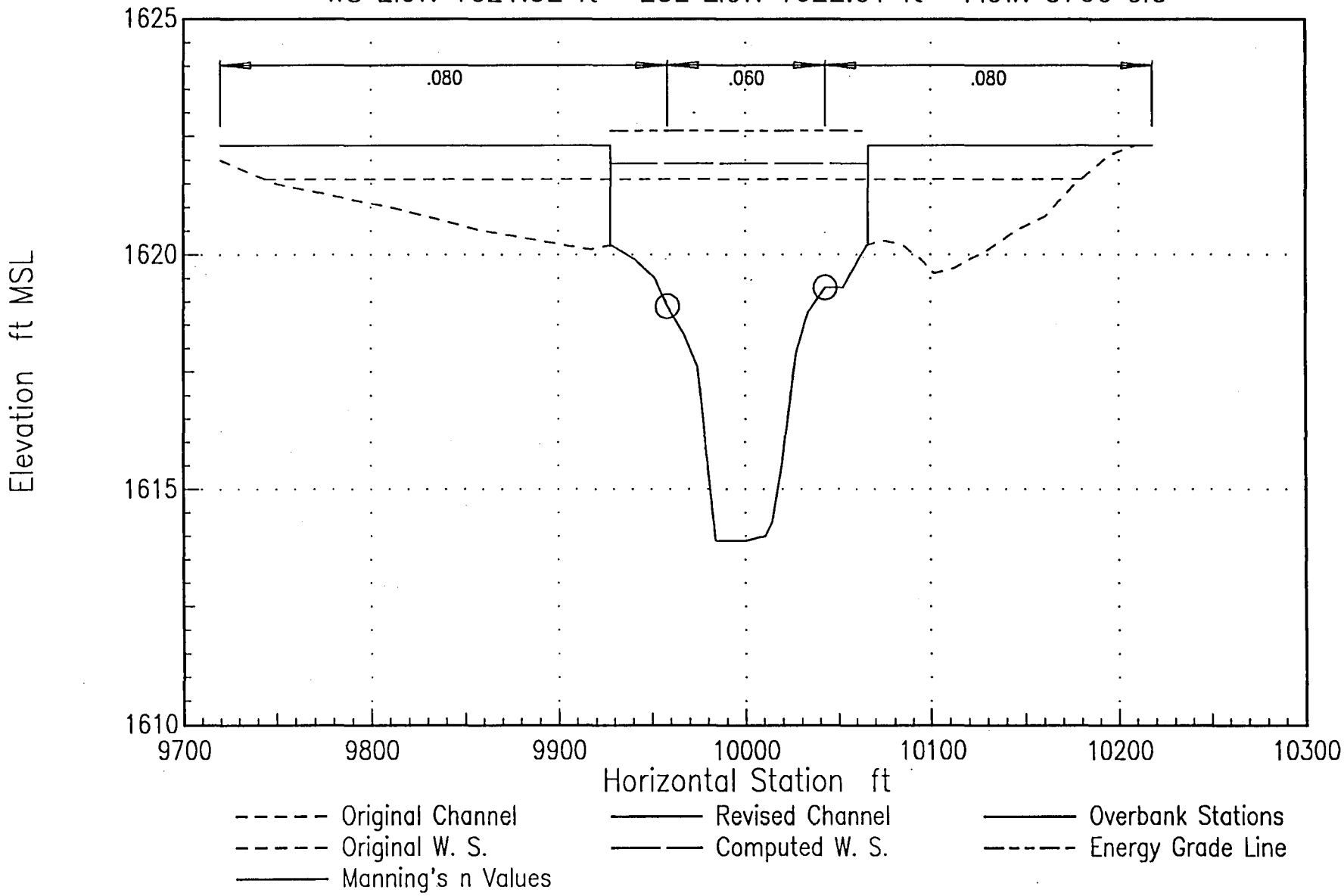
Revised Cross-Section Plot 12.568

WS Elev: 1618.72 ft EGL Elev: 1619.34 ft Flow: 3706 cfs



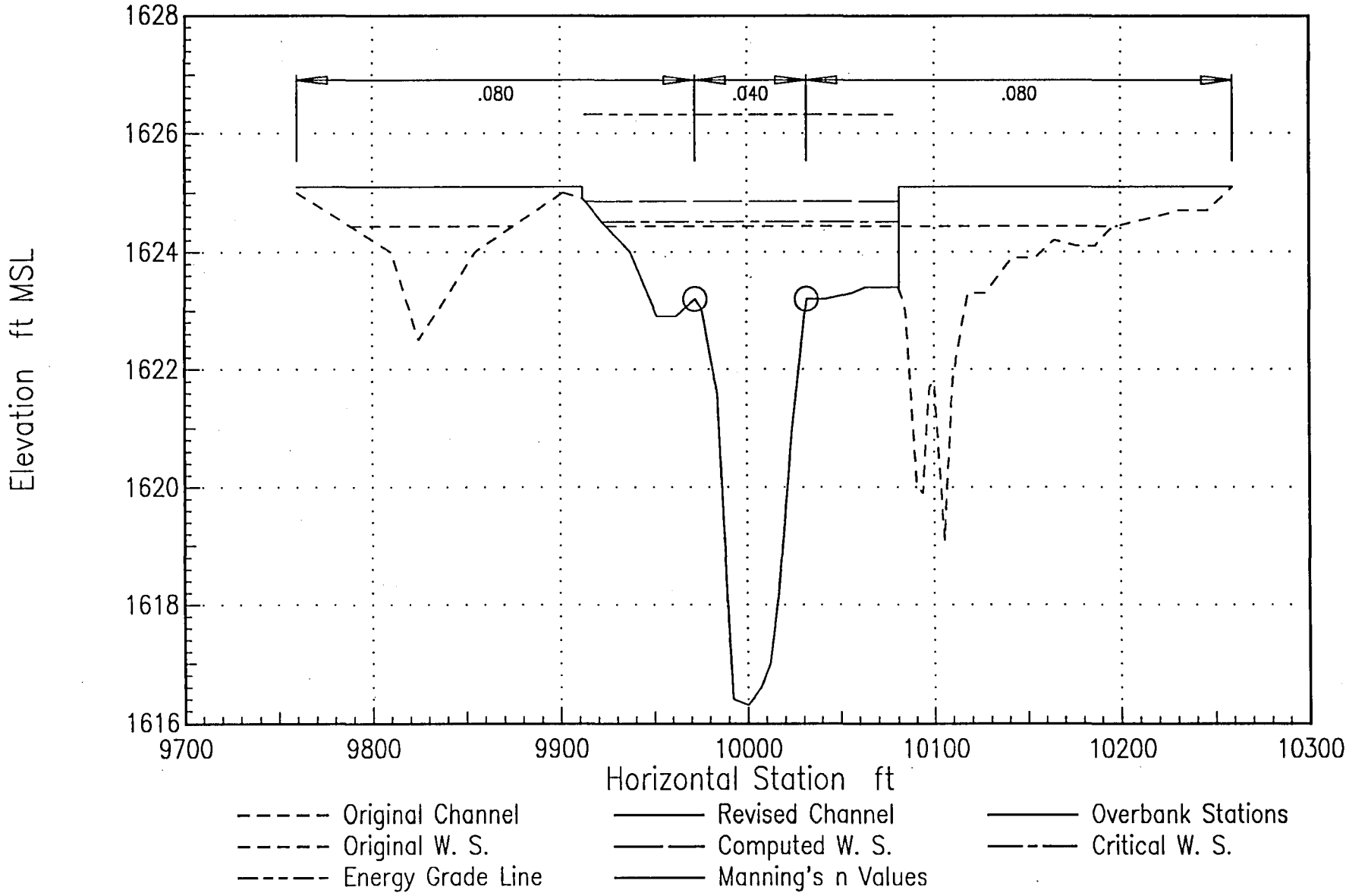
Revised Cross-Section Plot 12.65

WS Elev: 1621.92 ft EGL Elev: 1622.61 ft Flow: 3706 cfs



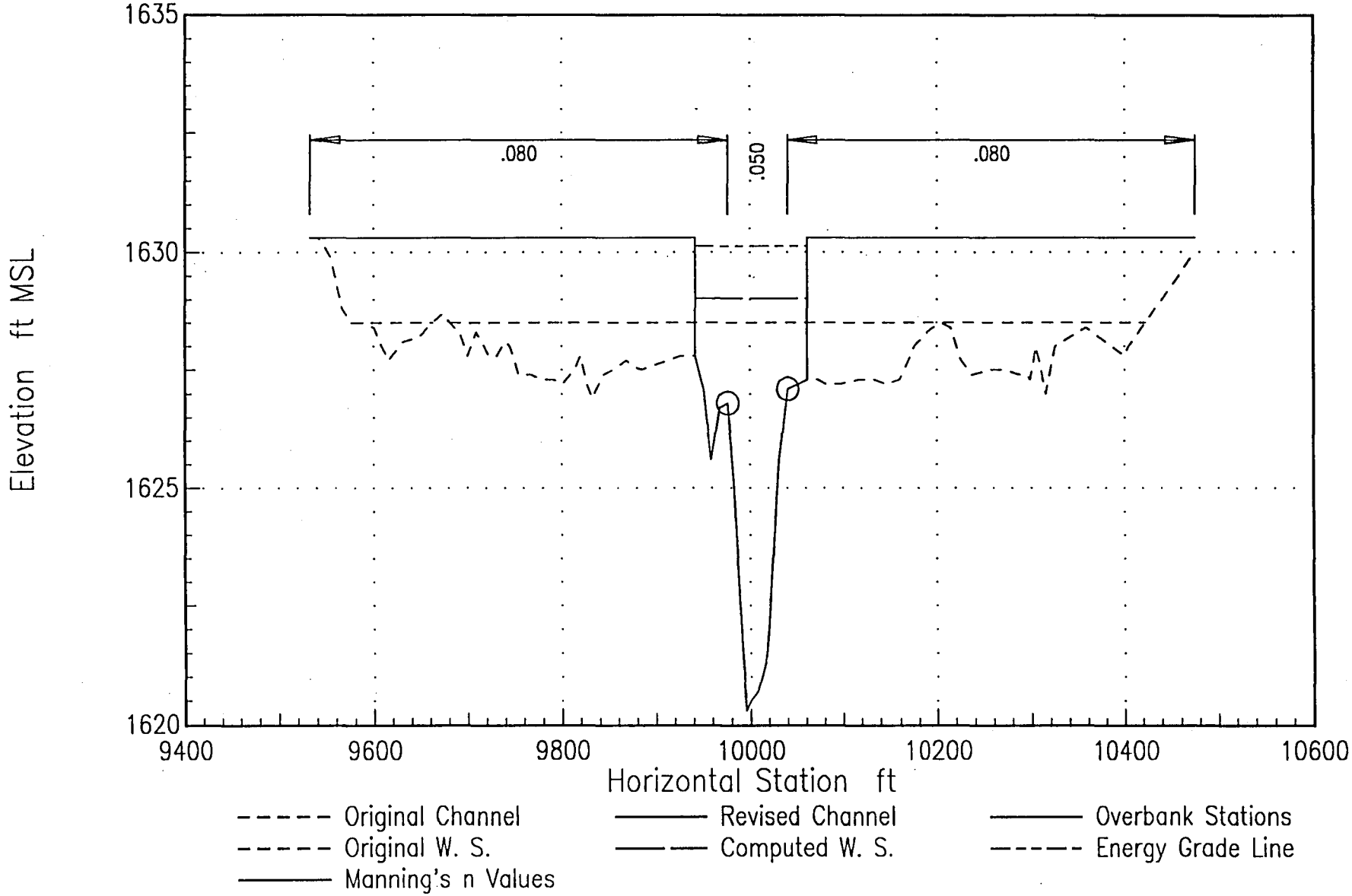
Revised Cross-Section Plot 12.734

WS: 1624.85ft Crit.WS: 1624.50ft EGL: 1626.31ft Flow: 3706cfs



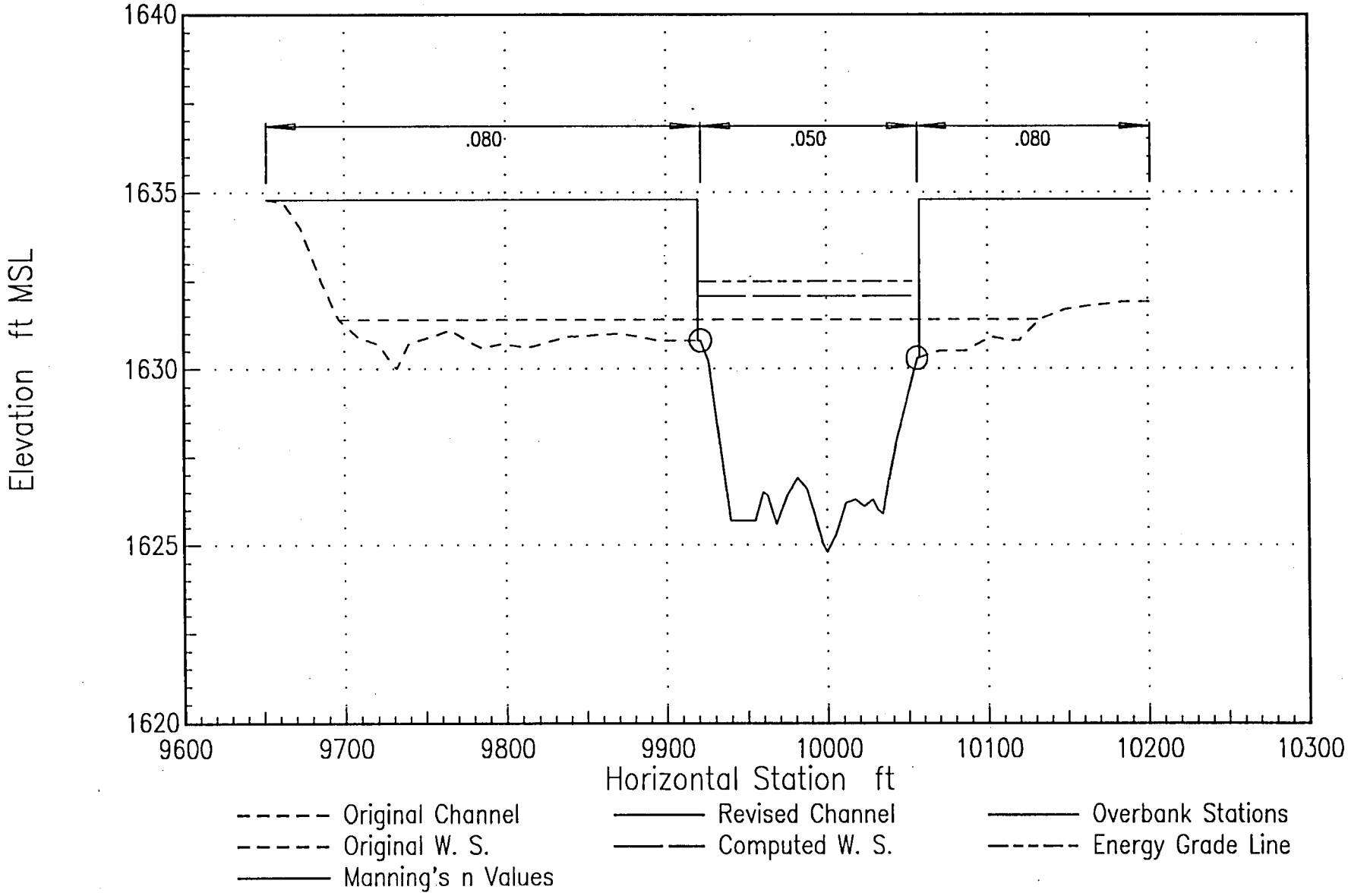
Revised Cross-Section Plot 12.822

WS Elev: 1629.01 ft EGL Elev: 1630.12 ft Flow: 3706 cfs



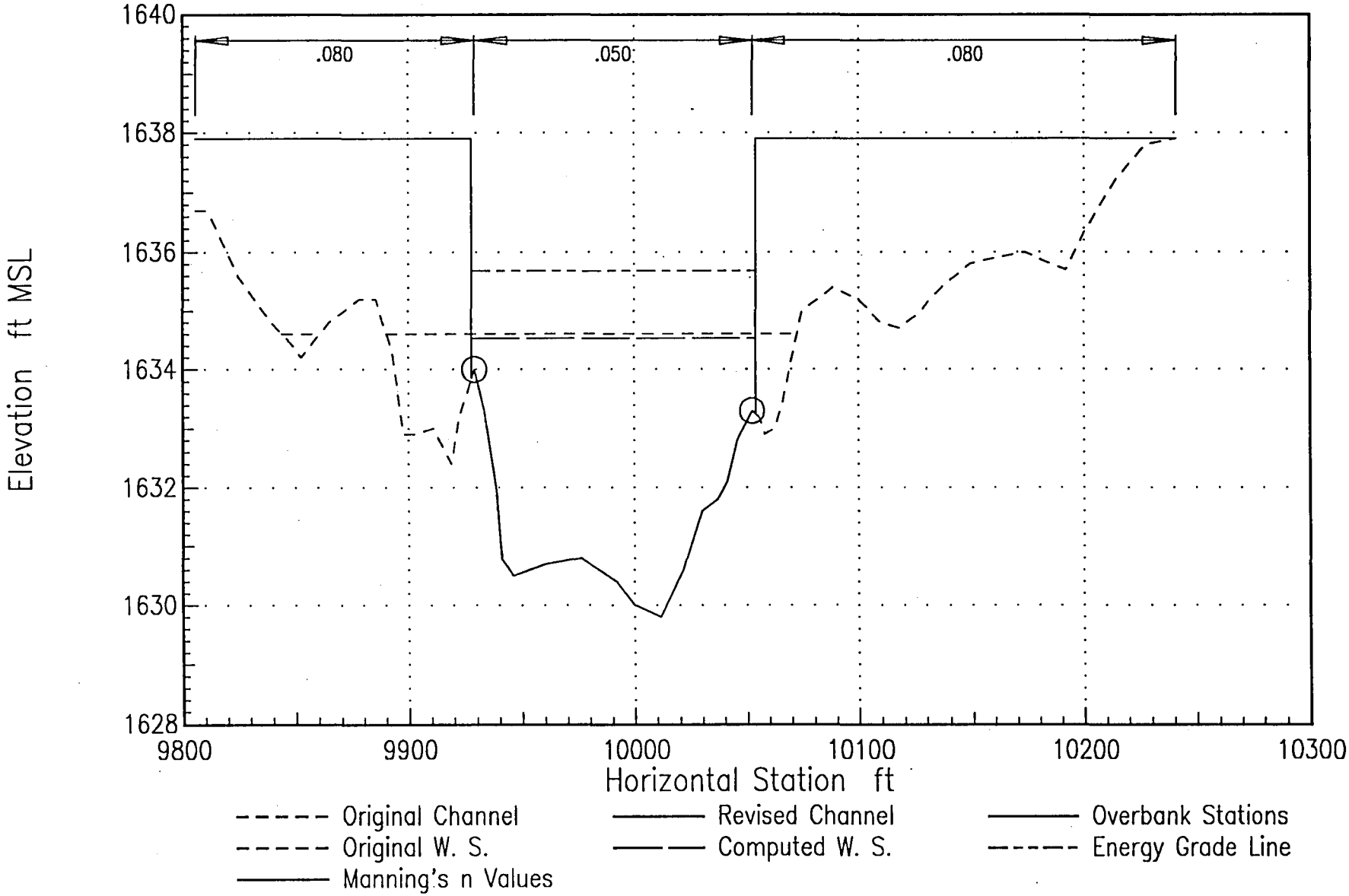
Revised Cross-Section Plot 12.909

WS Elev: 1632.07 ft EGL Elev: 1632.48 ft Flow: 3706 cfs



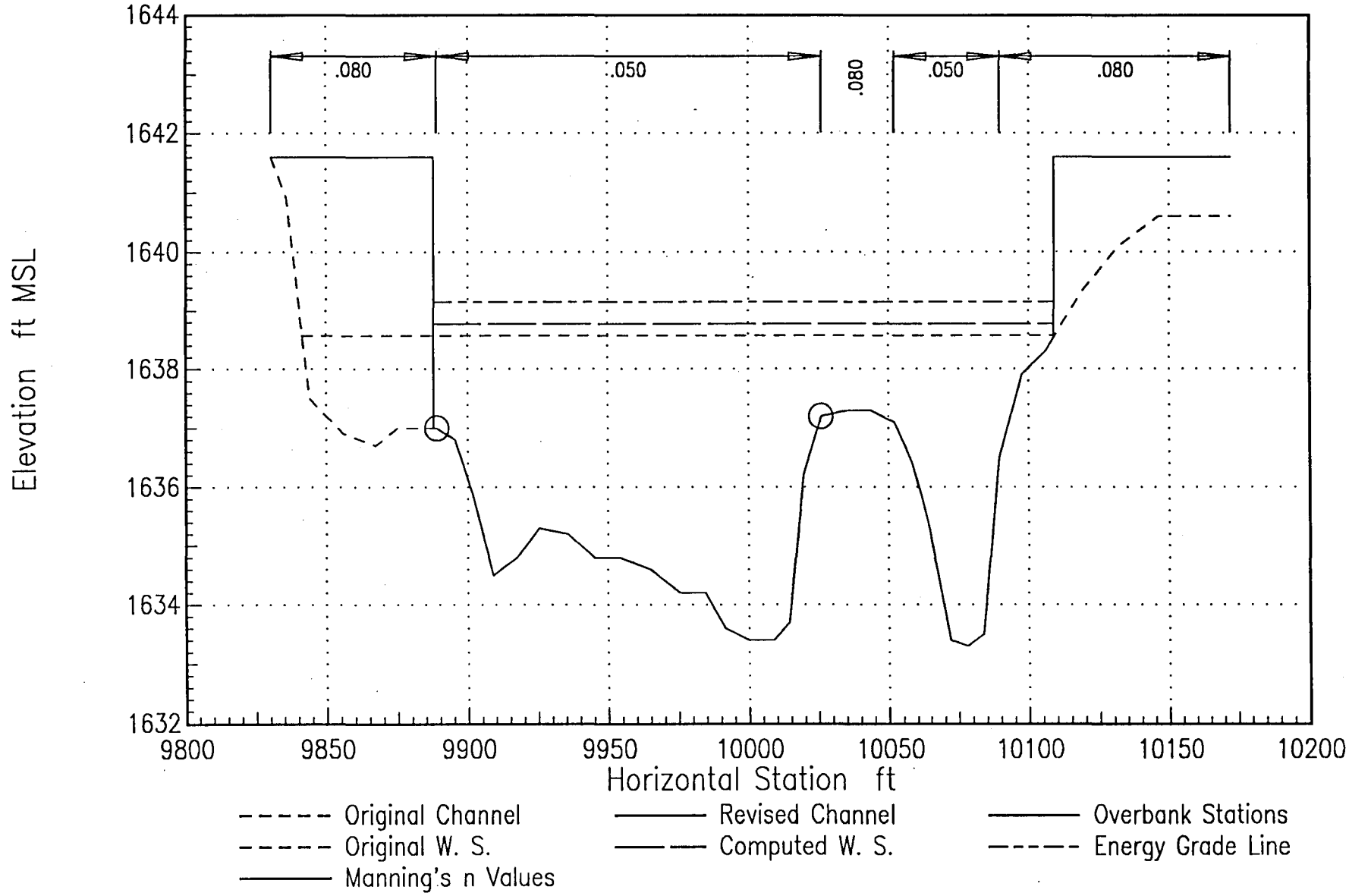
Revised Cross-Section Plot 13

WS Elev: 1634.52 ft EGL Elev: 1635.68 ft Flow: 3706 cfs



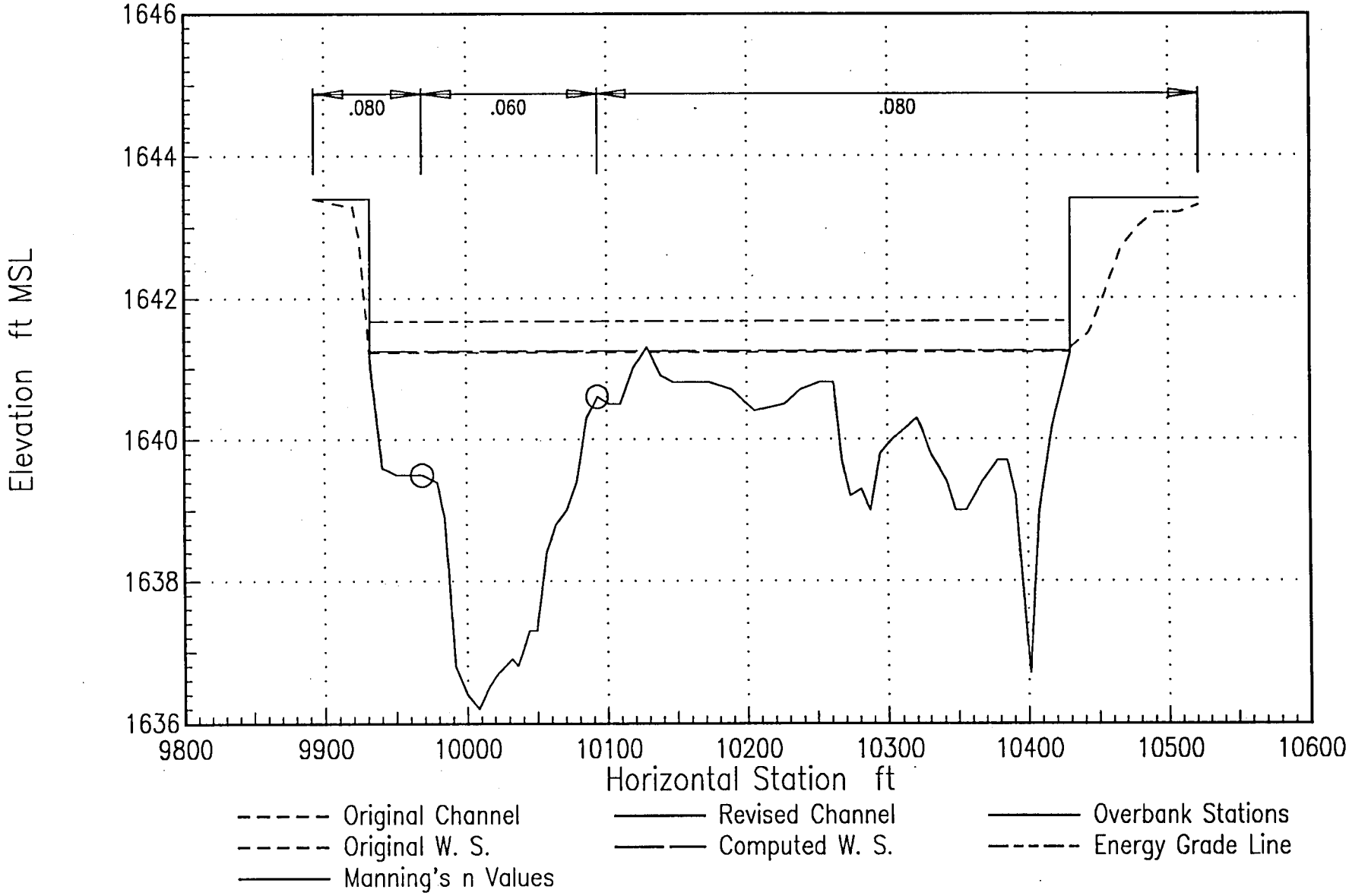
Revised Cross-Section Plot 13.079

WS Elev: 1638.77 ft EGL Elev: 1639.15 ft Flow: 3706 cfs



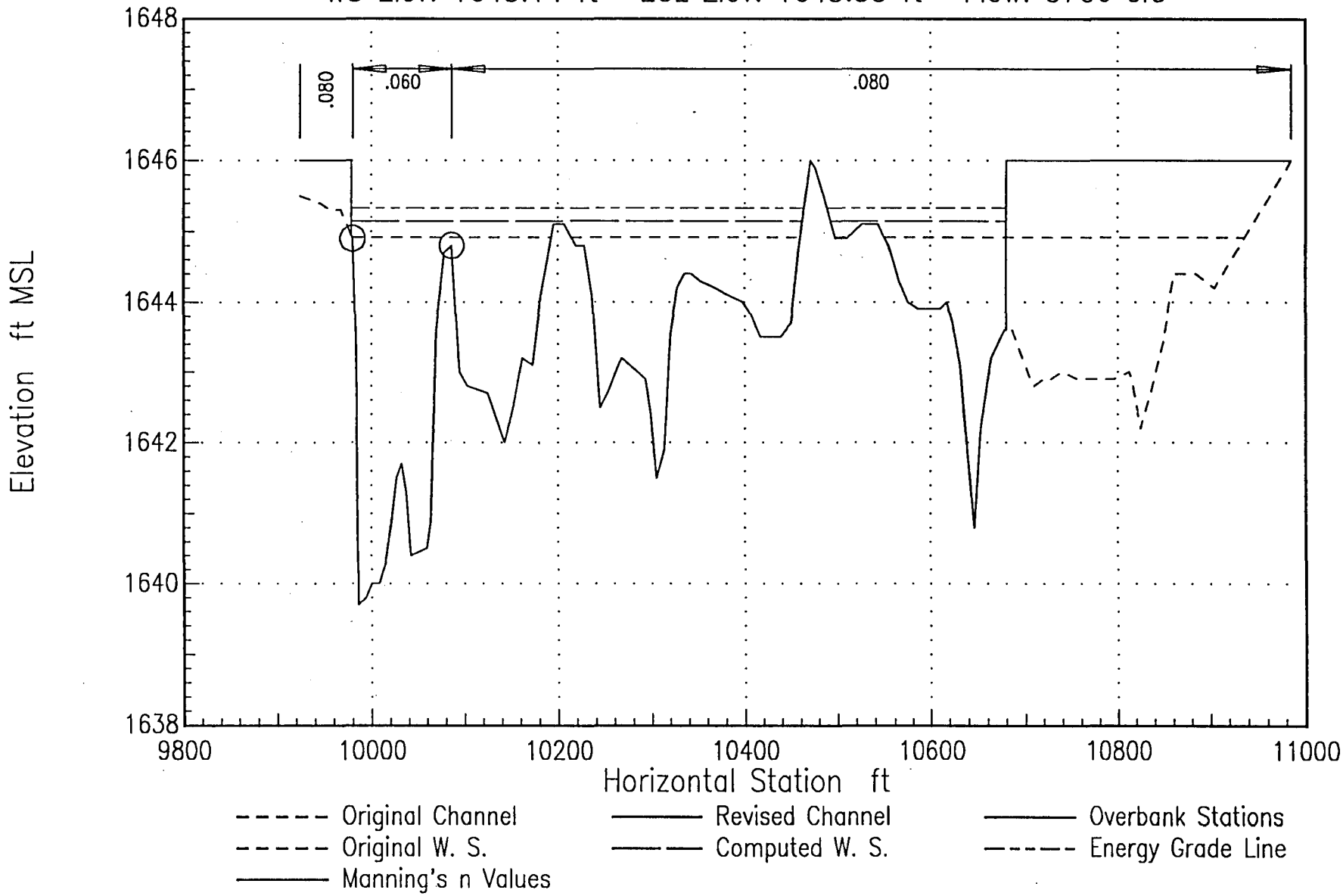
Revised Cross-Section Plot 13.141

WS Elev: 1641.24 ft EGL Elev: 1641.66 ft Flow: 3706 cfs



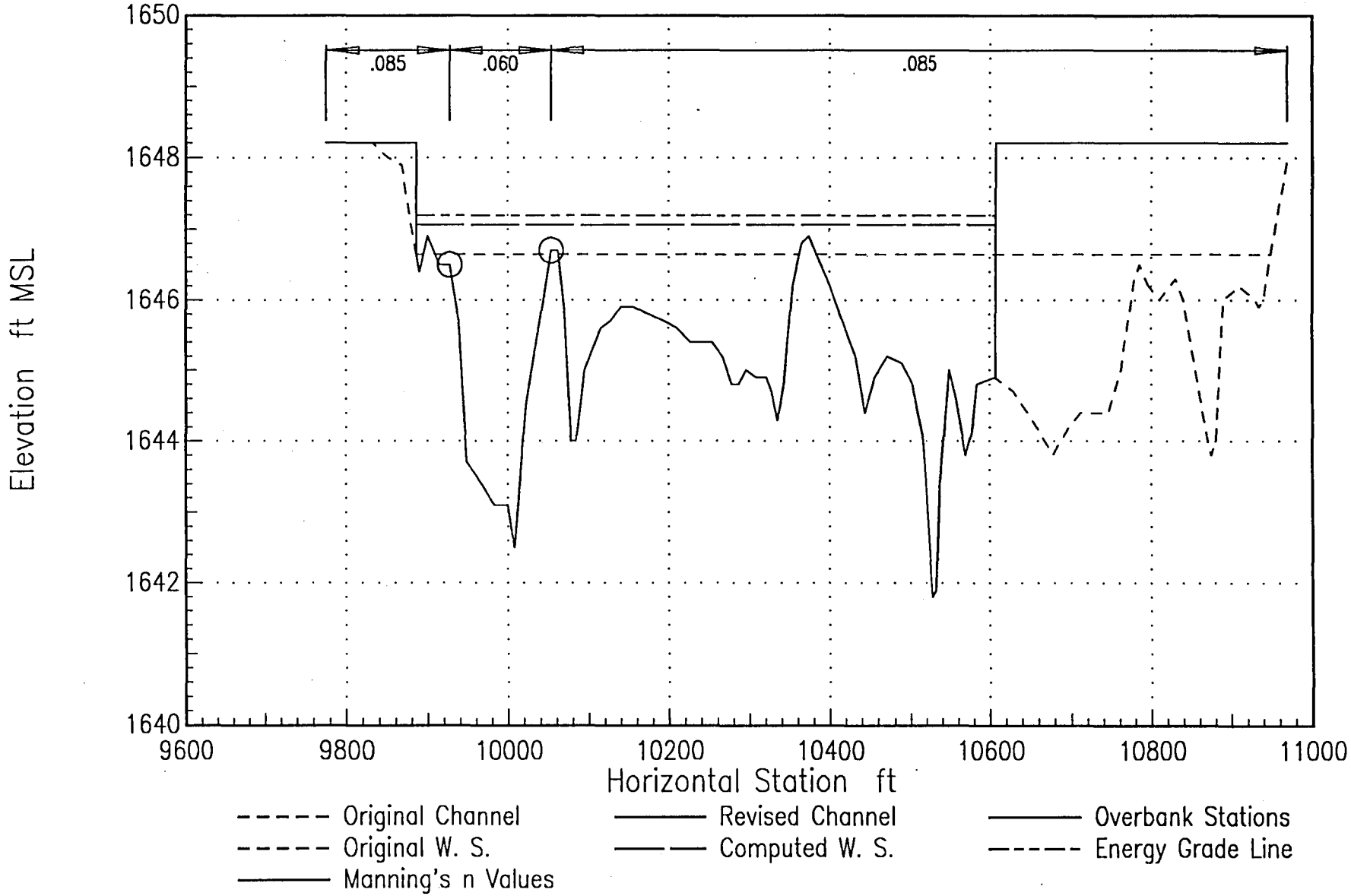
Revised Cross-Section Plot 13.223

WS Elev: 1645.14 ft EGL Elev: 1645.33 ft Flow: 3706 cfs



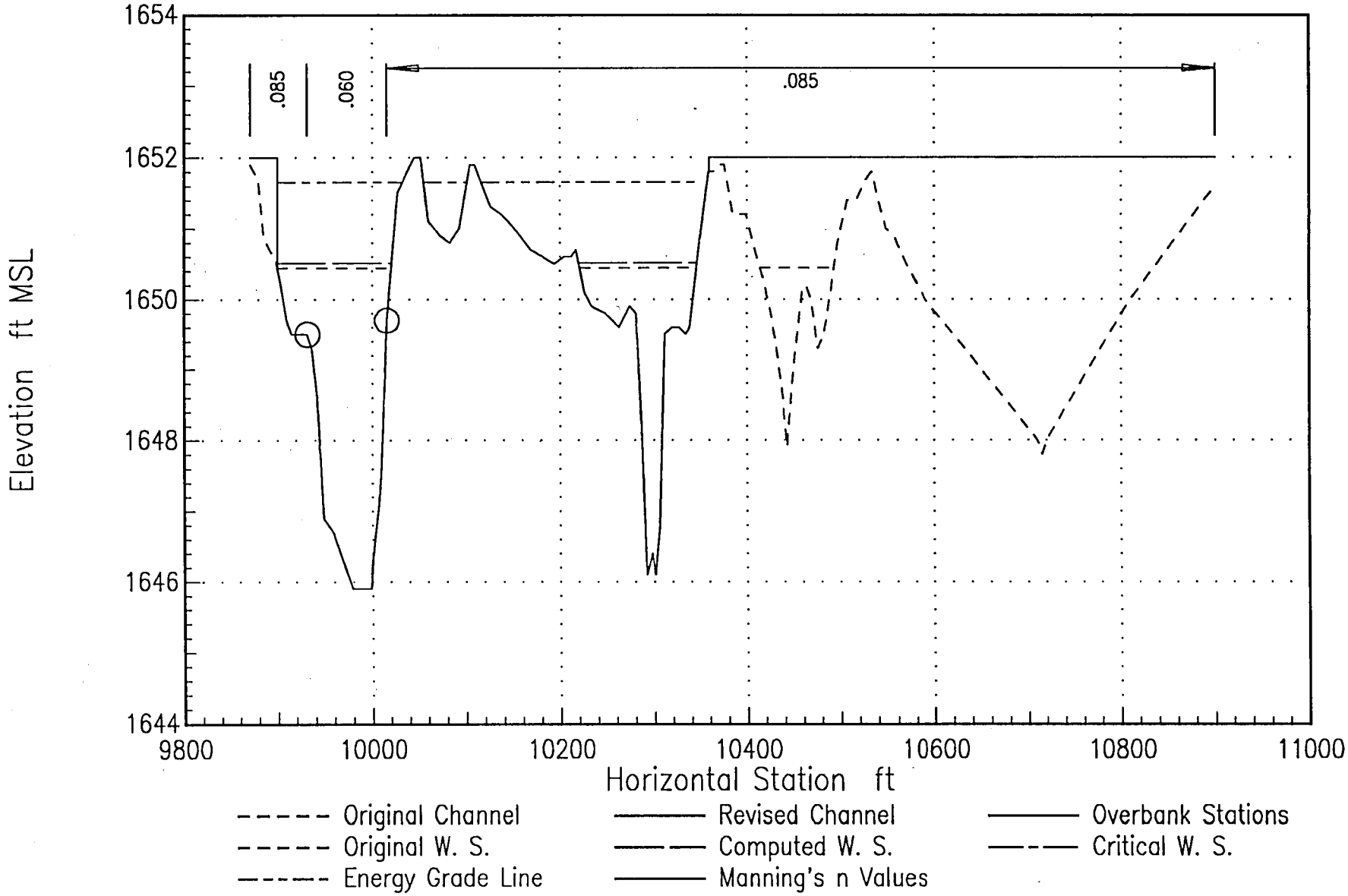
Revised Cross-Section Plot 13.286

WS Elev: 1647.06 ft EGL Elev: 1647.19 ft Flow: 3706 cfs



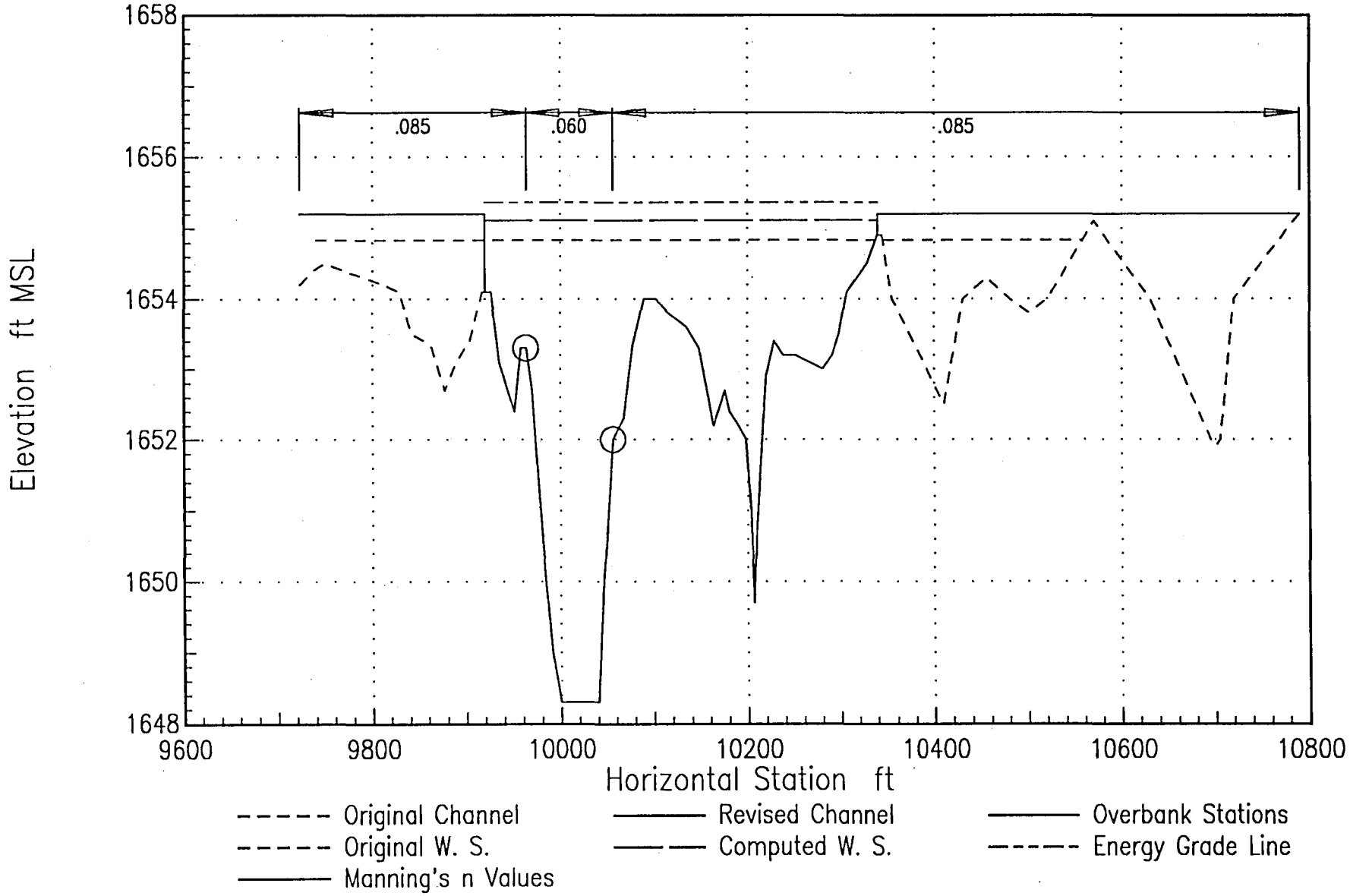
Revised Cross-Section Plot 13.354

WS: 1650.51ft Crit.WS: 1650.51ft EGL: 1651.65ft Flow: 3706cfs



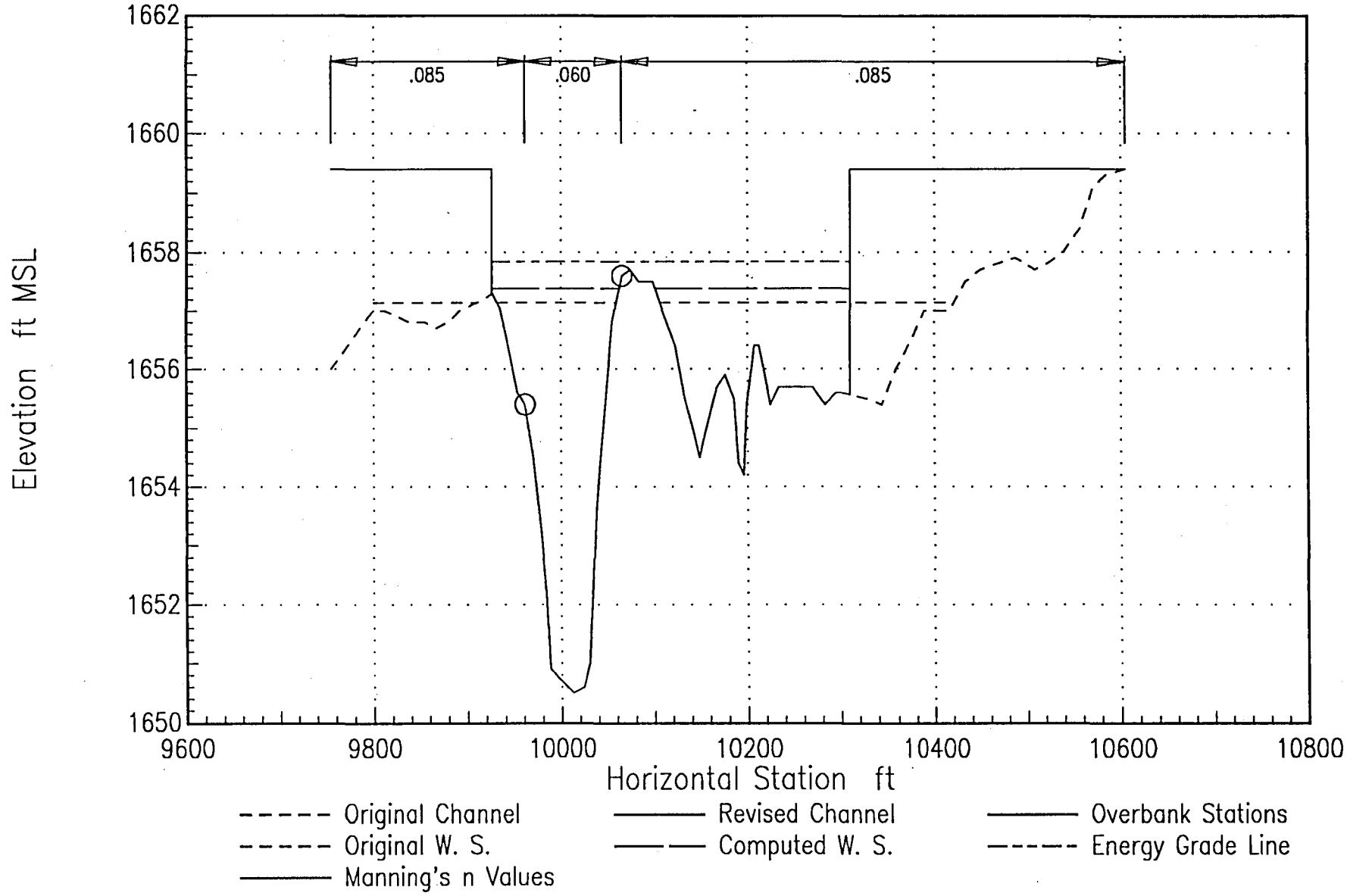
Revised Cross-Section Plot 13.435

WS Elev: 1655.10 ft EGL Elev: 1655.36 ft Flow: 3706 cfs



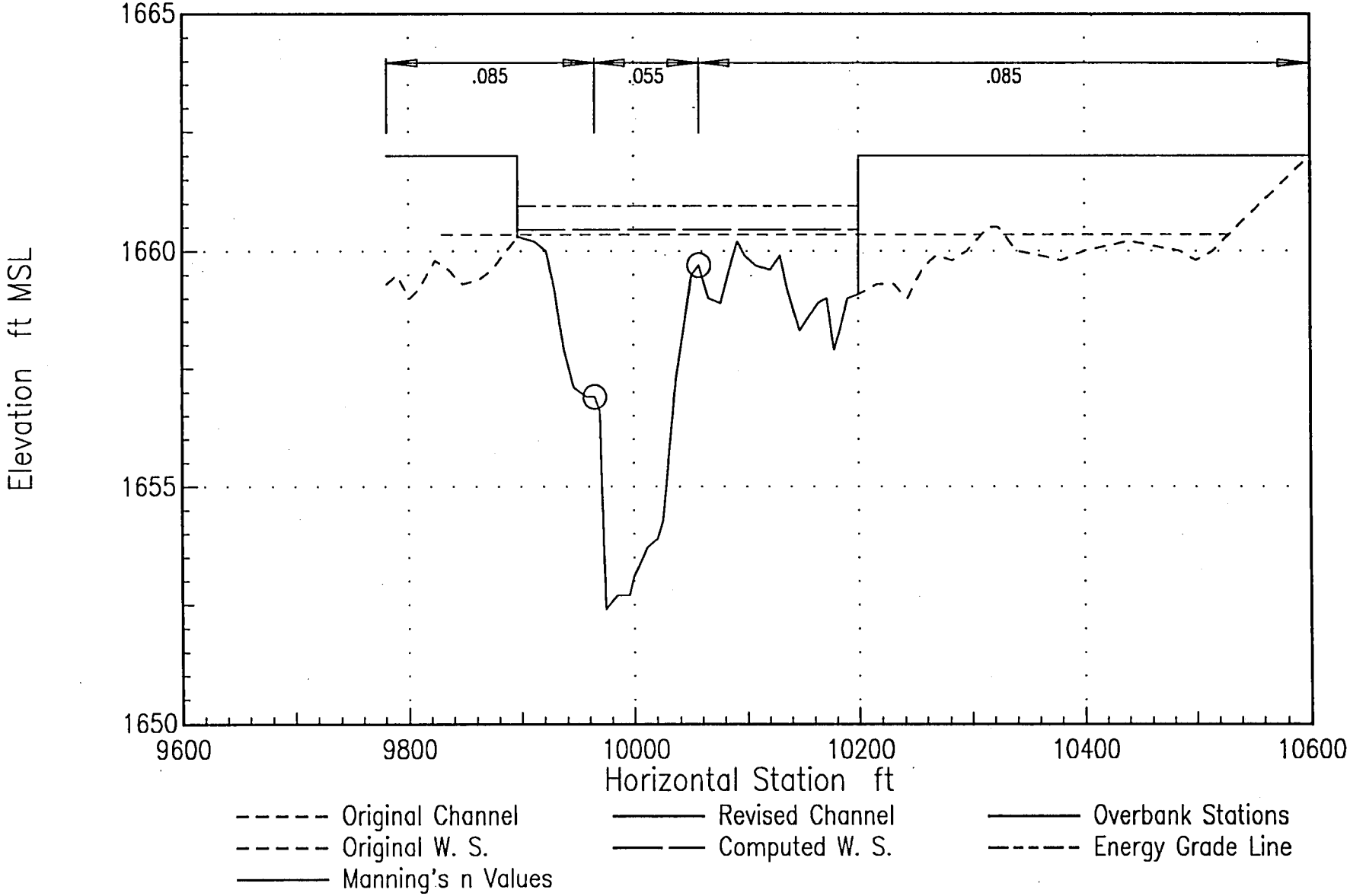
Revised Cross-Section Plot 13.519

WS Elev: 1657.38 ft EGL Elev: 1657.84 ft Flow: 3706 cfs



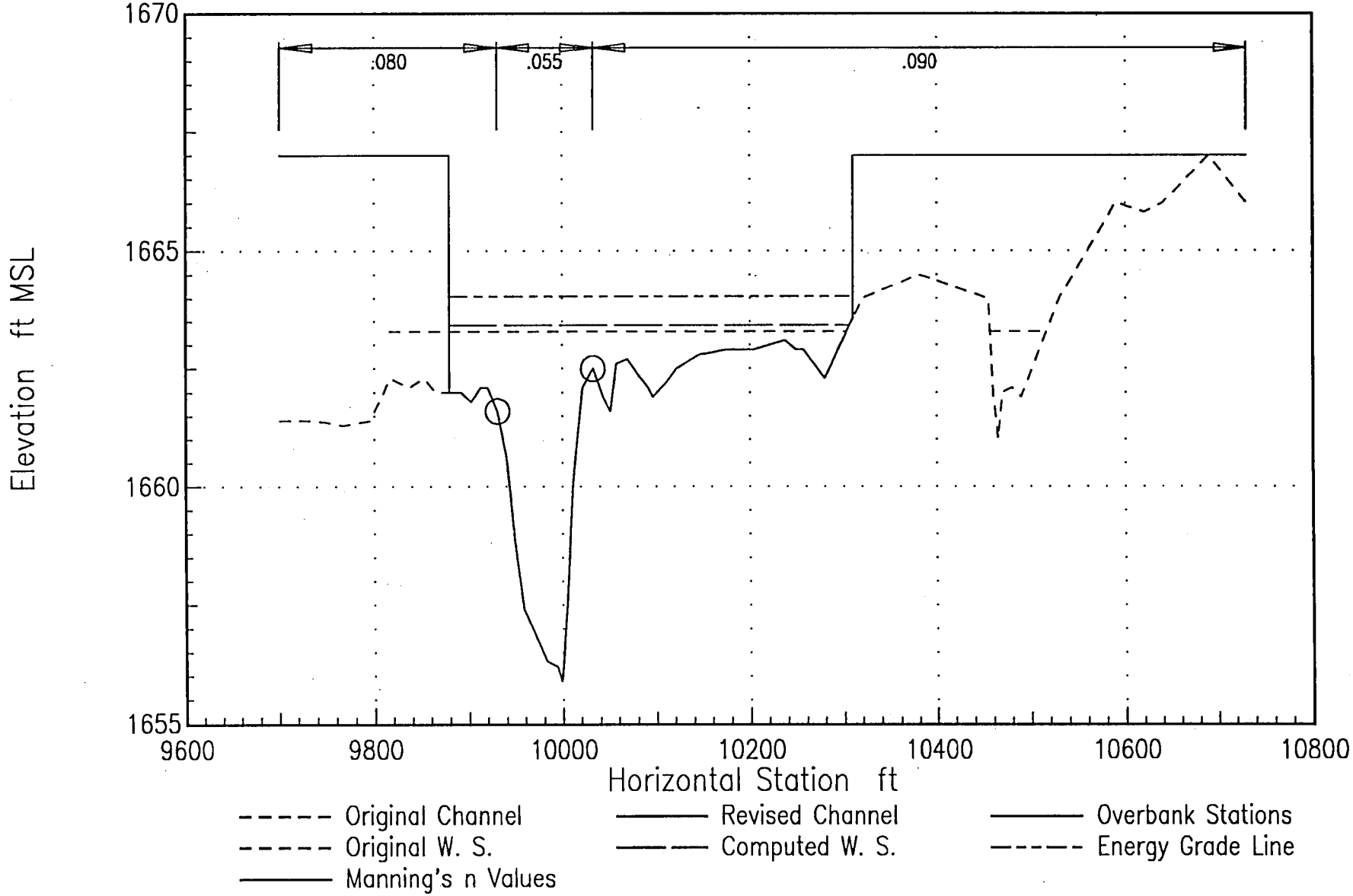
Revised Cross-Section Plot 13.603

WS Elev: 1660.44 ft EGL Elev: 1660.94 ft Flow: 3706 cfs



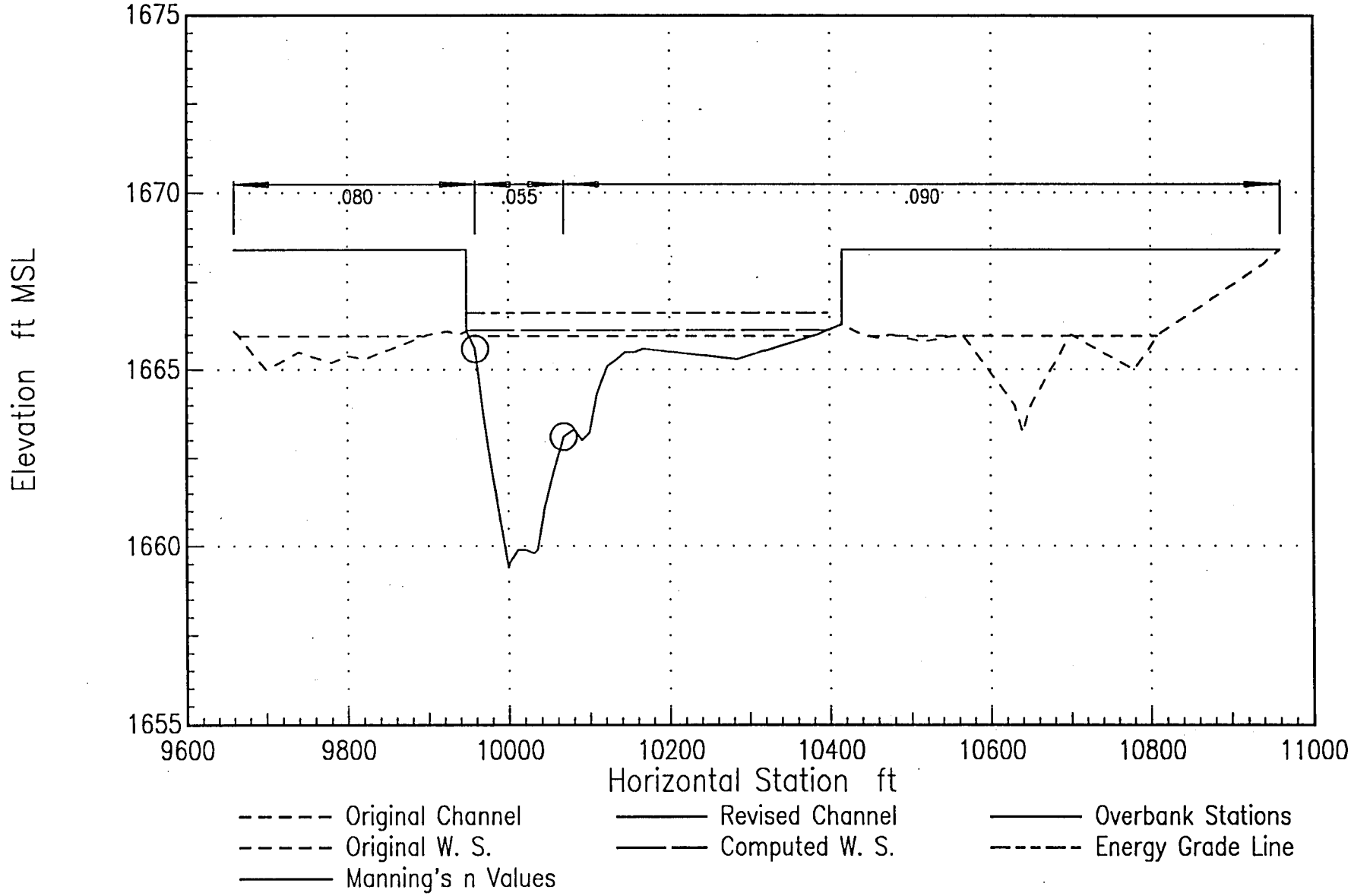
Revised Cross-Section Plot 13.691

WS Elev: 1663.42 ft EGL Elev: 1664.04 ft Flow: 3706 cfs



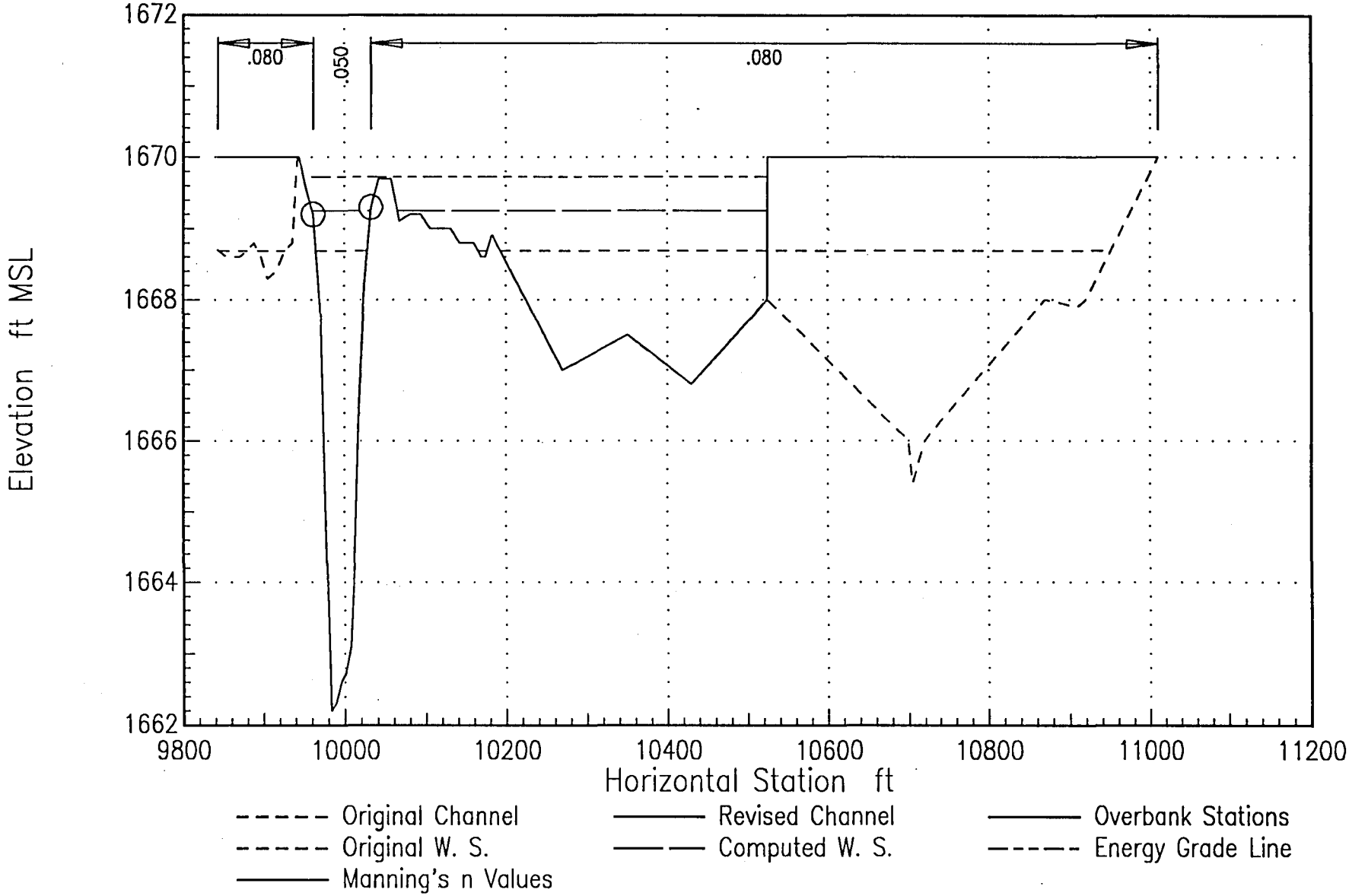
Revised Cross-Section Plot 13.761

WS Elev: 1666.12 ft EGL Elev: 1666.63 ft Flow: 3706 cfs



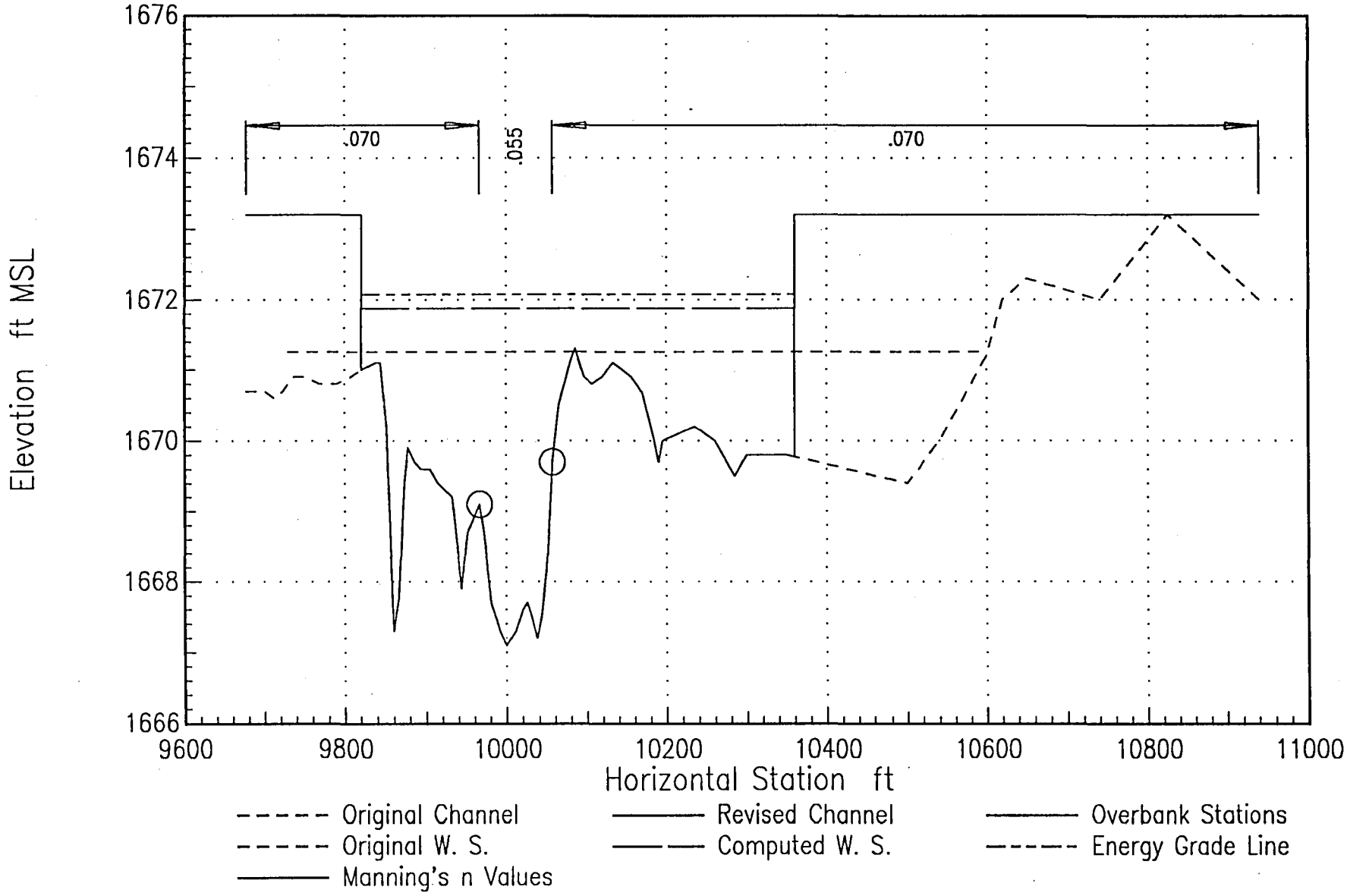
Revised Cross-Section Plot 13.841

WS Elev: 1669.24 ft EGL Elev: 1669.72 ft Flow: 3706 cfs



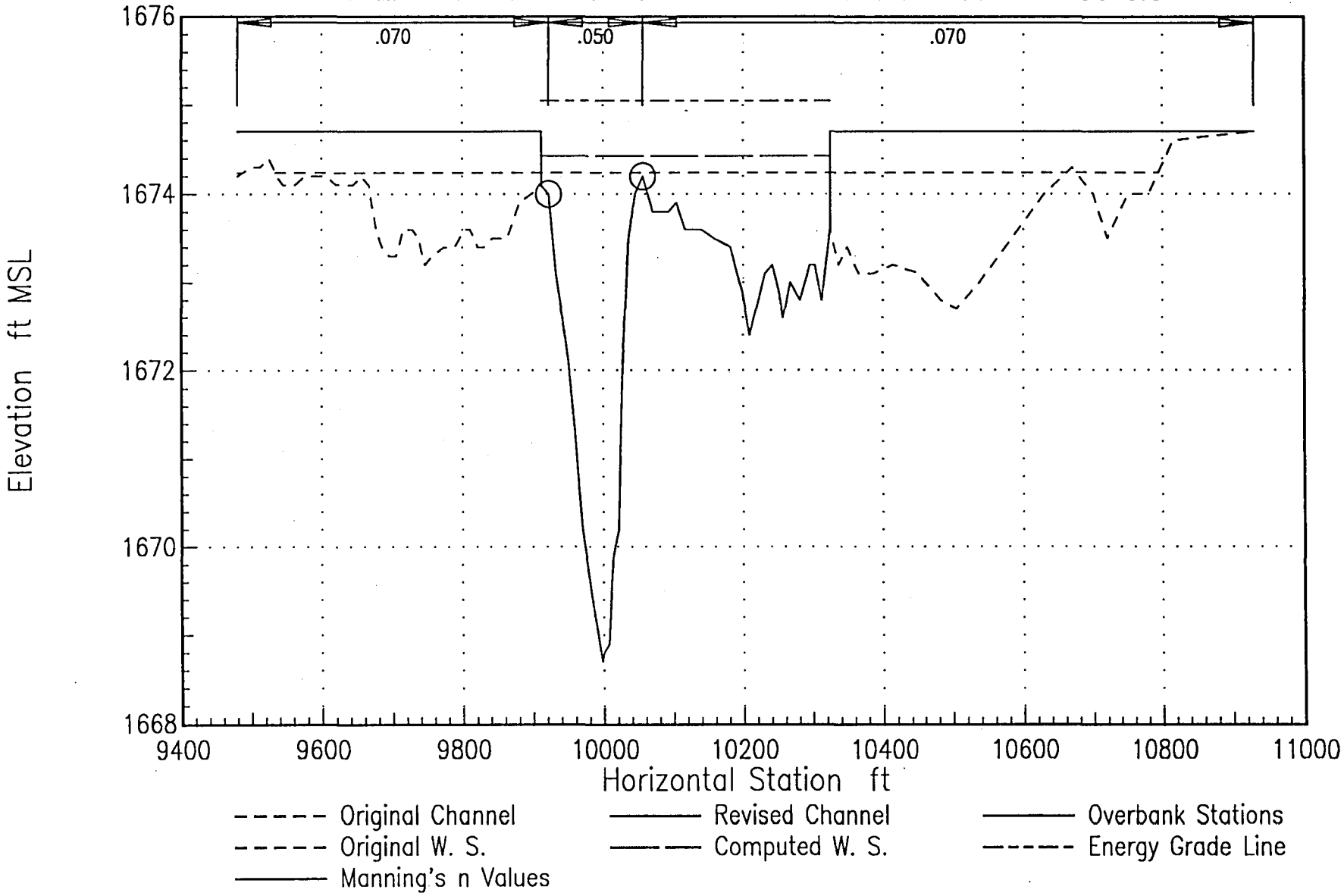
Revised Cross-Section Plot 13.912

WS Elev: 1671.87 ft EGL Elev: 1672.07 ft Flow: 3706 cfs



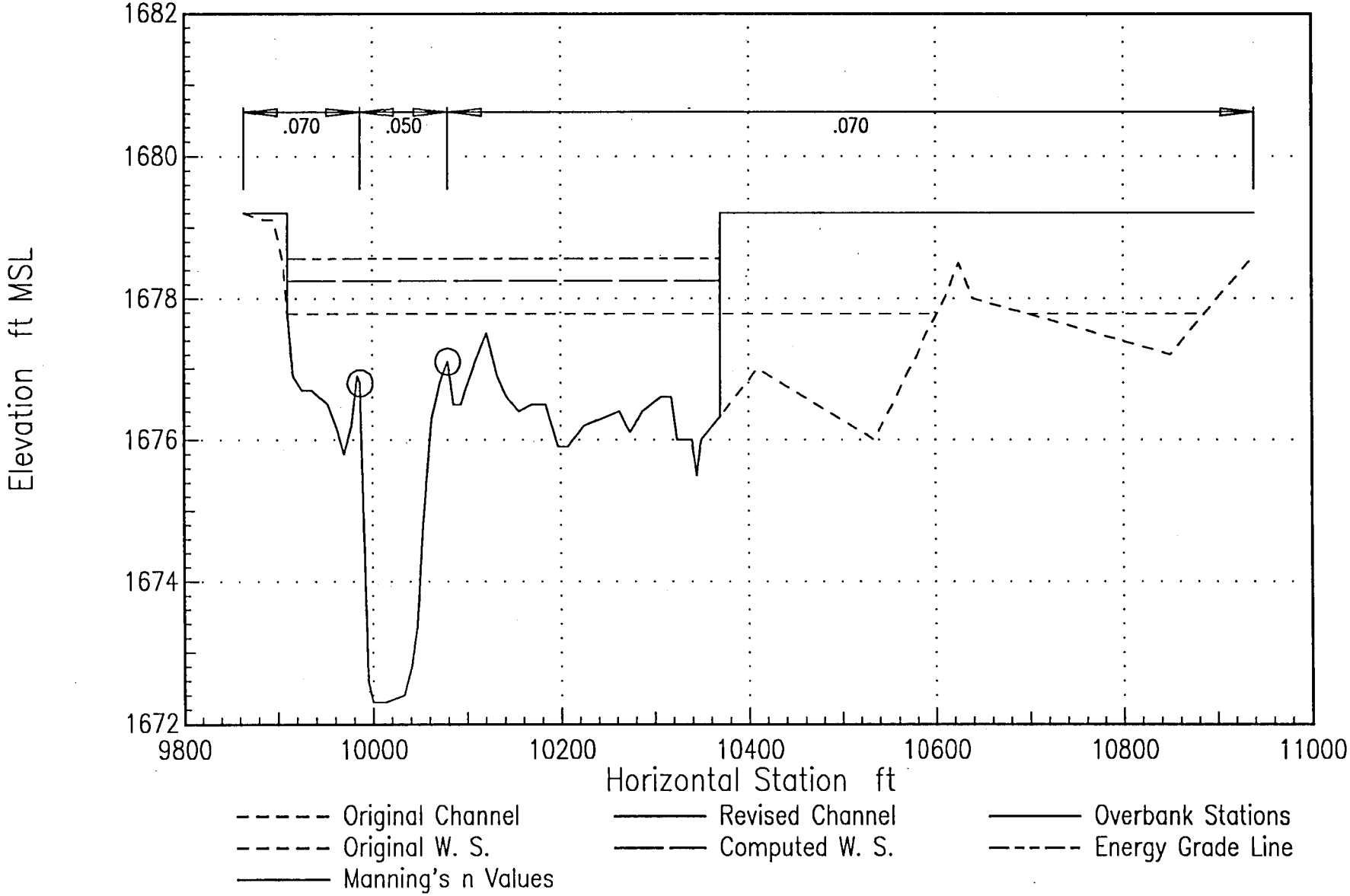
Revised Cross-Section Plot 13.987

WS Elev: 1674.42 ft EGL Elev: 1675.04 ft Flow: 3706 cfs



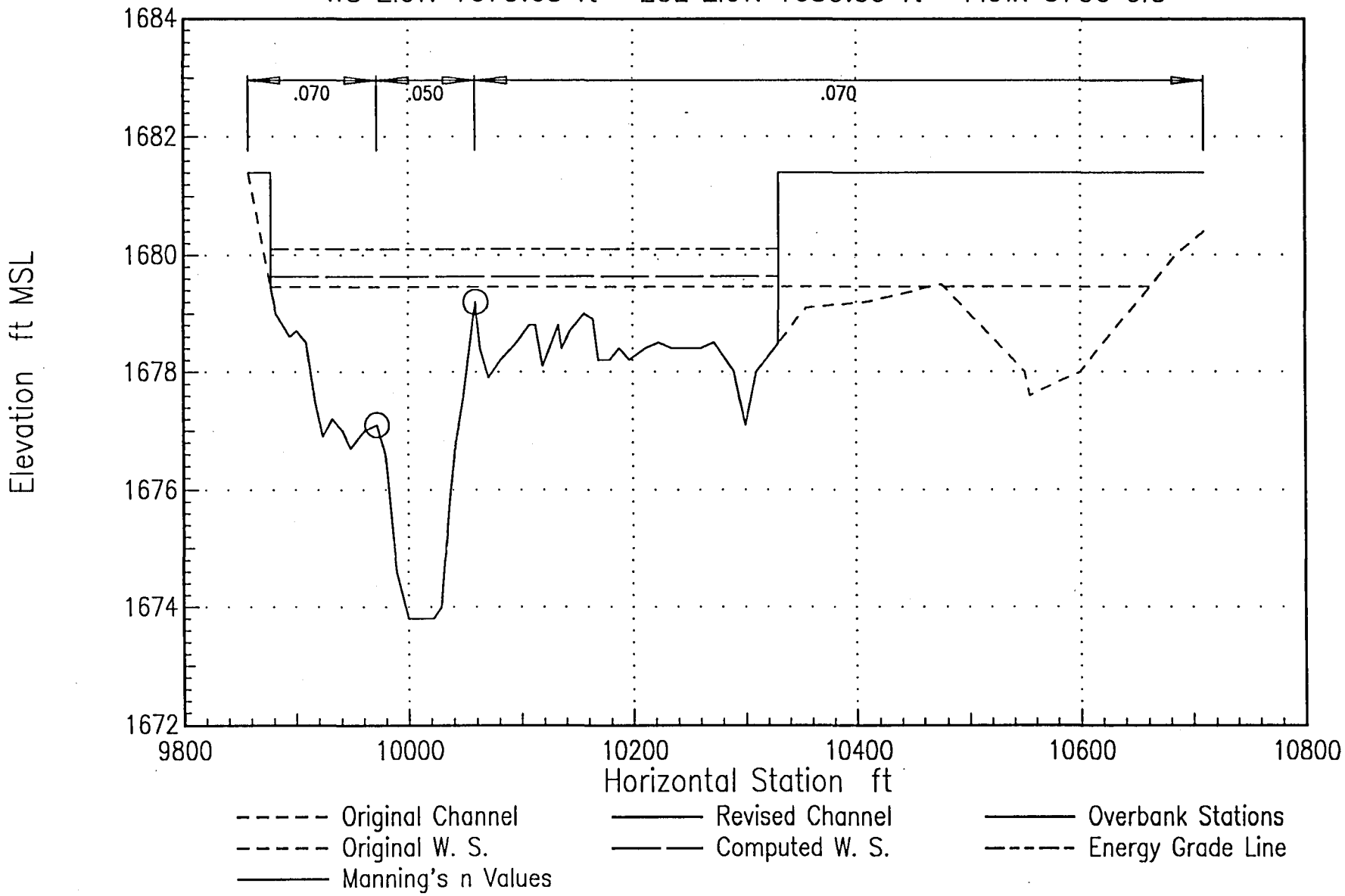
Revised Cross-Section Plot 14.076

WS Elev: 1678.25 ft EGL Elev: 1678.55 ft Flow: 3706 cfs



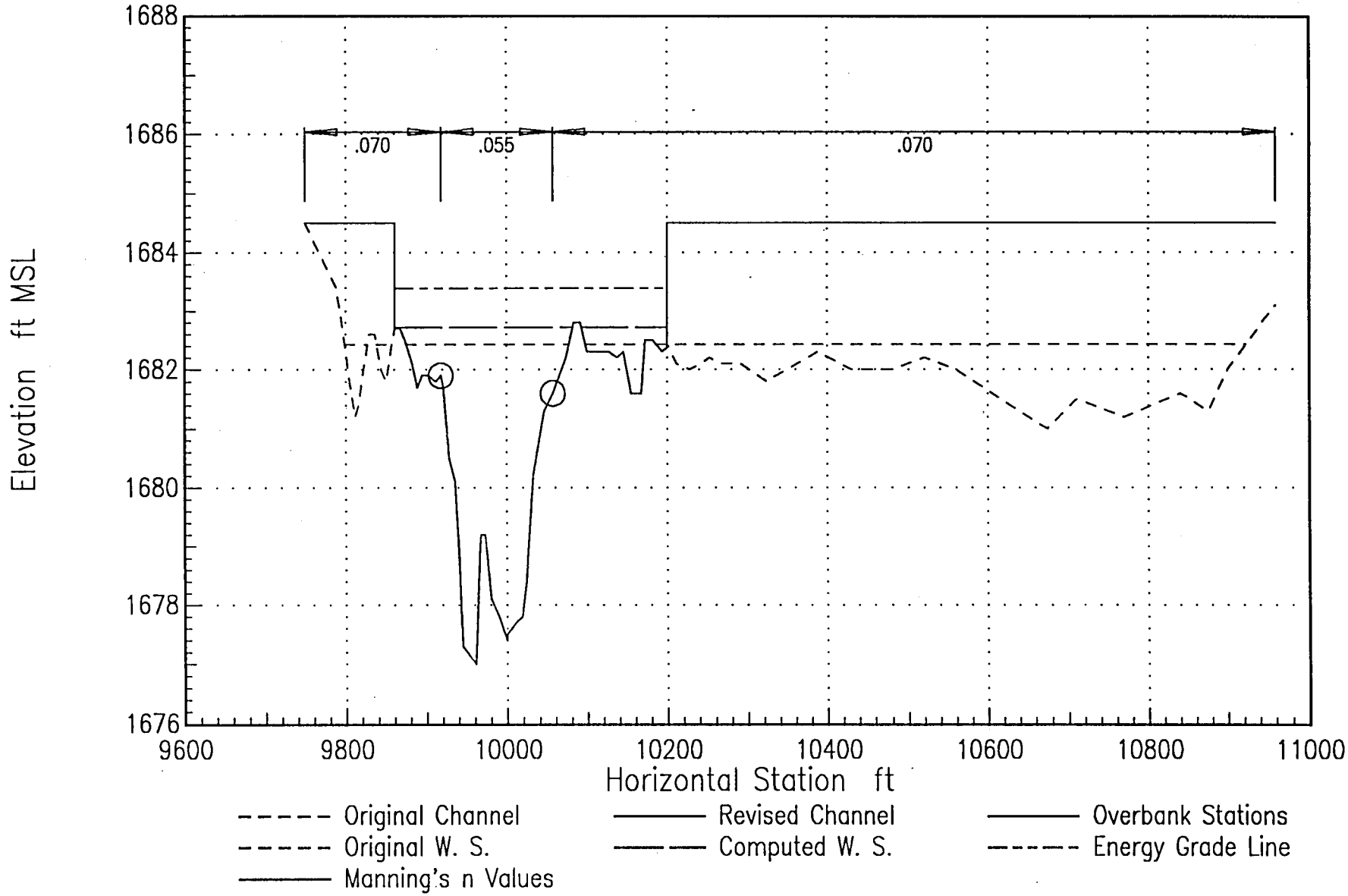
Revised Cross-Section Plot 14.126

WS Elev: 1679.63 ft EGL Elev: 1680.09 ft Flow: 3706 cfs



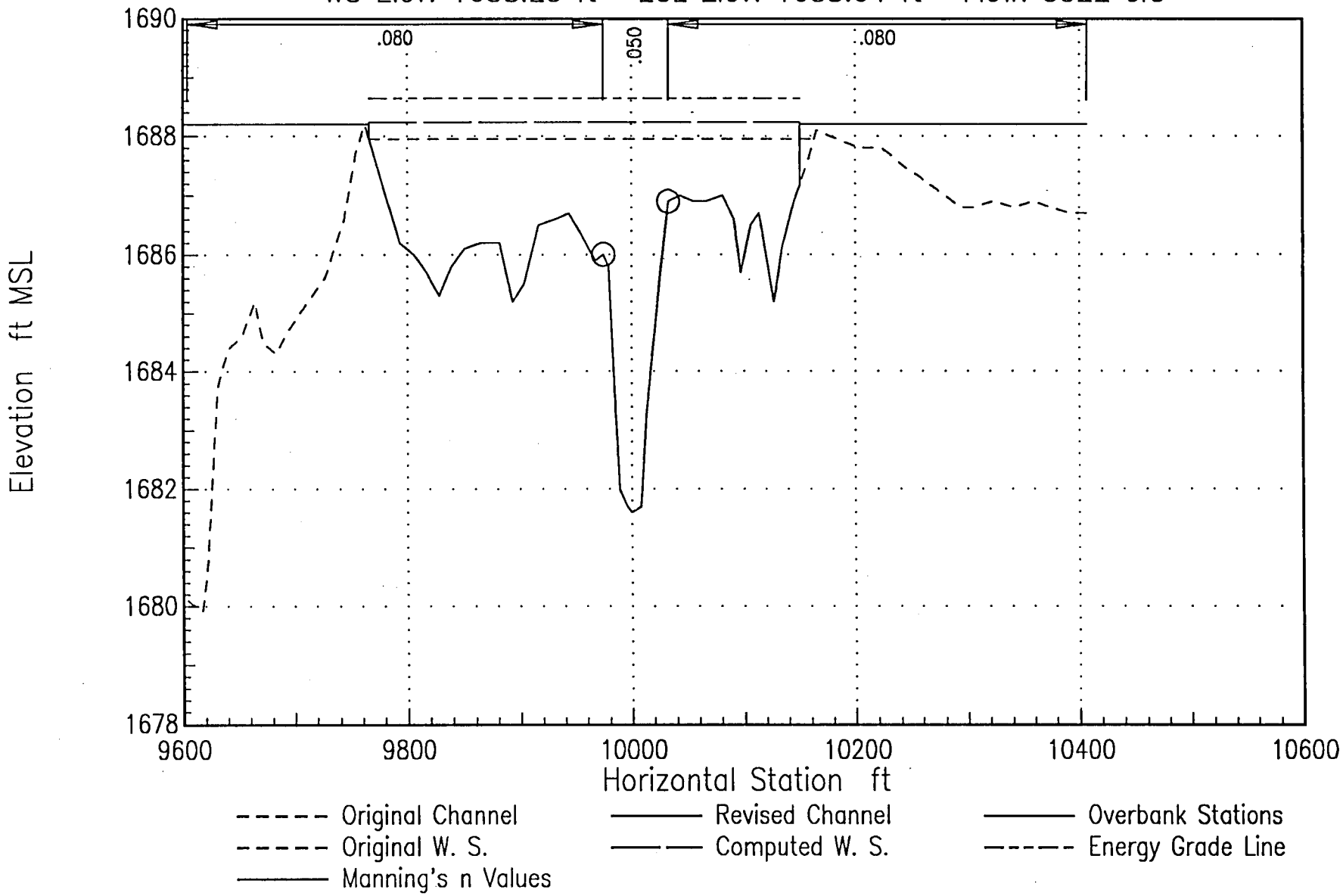
Revised Cross-Section Plot 14.197

WS Elev: 1682.72 ft EGL Elev: 1683.39 ft Flow: 3706 cfs



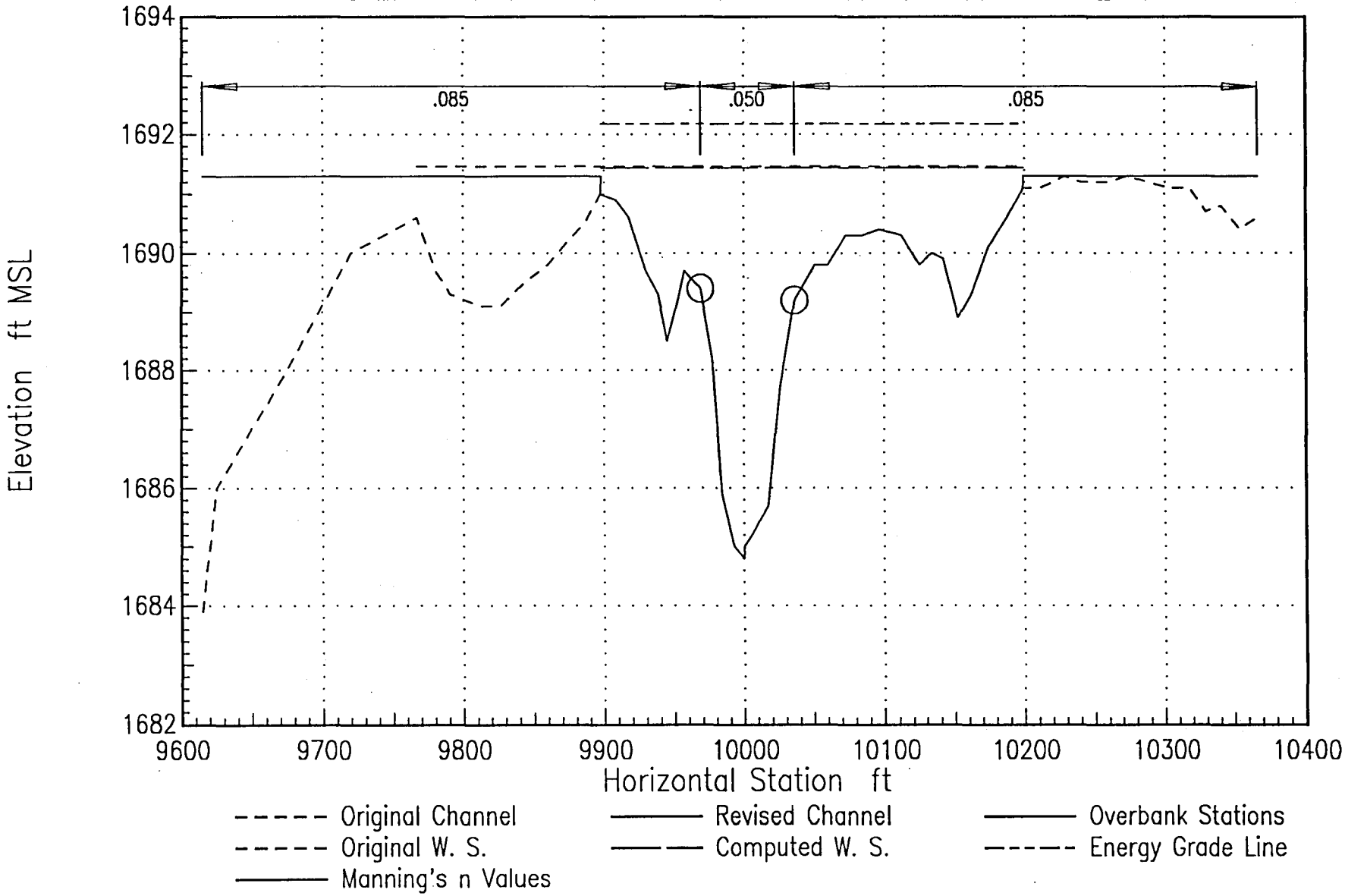
Revised Cross-Section Plot 14.31

WS Elev: 1688.23 ft EGL Elev: 1688.64 ft Flow: 3322 cfs



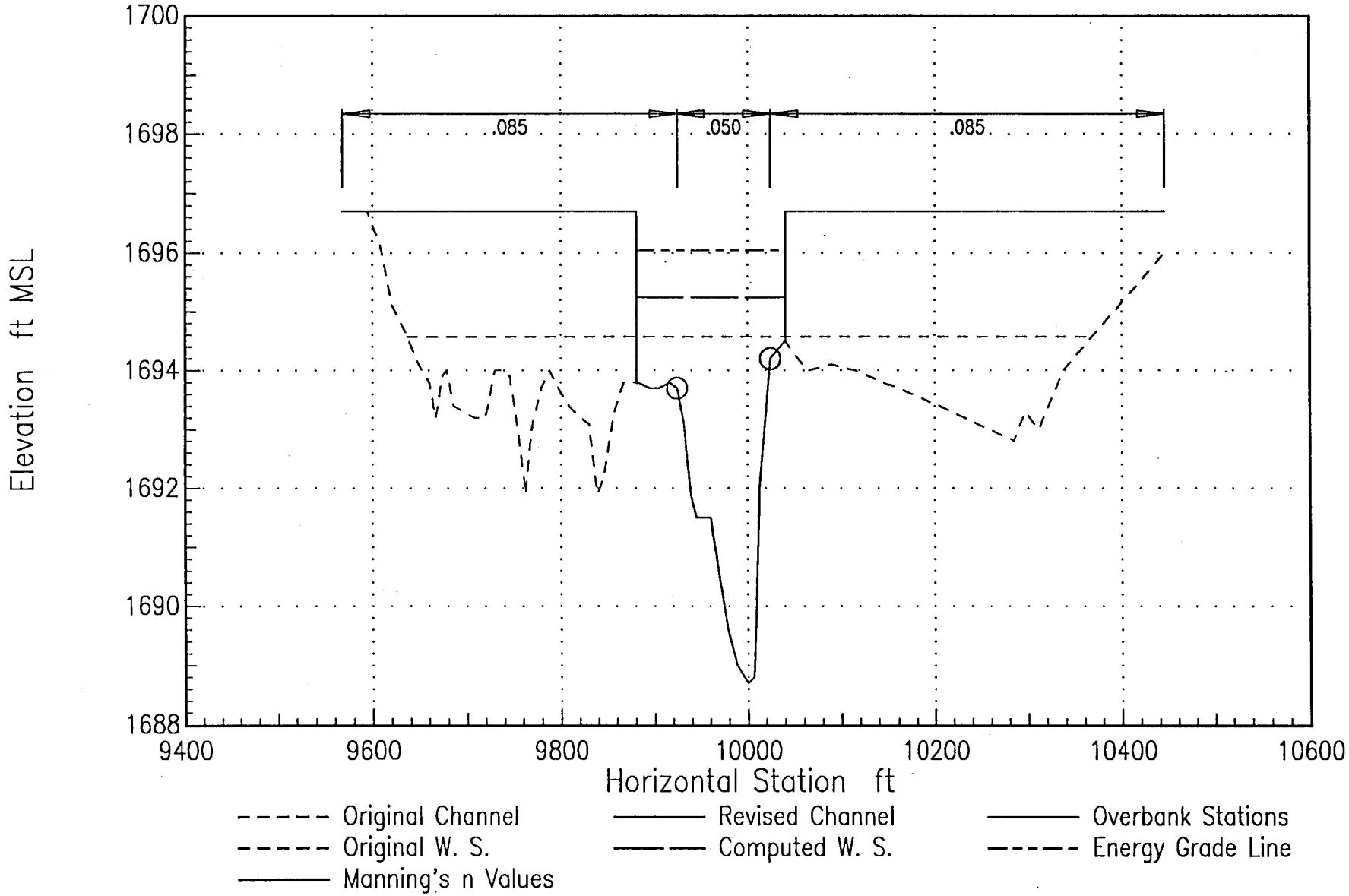
Revised Cross-Section Plot 14.396

WS Elev: 1691.44 ft EGL Elev: 1692.17 ft Flow: 3322 cfs



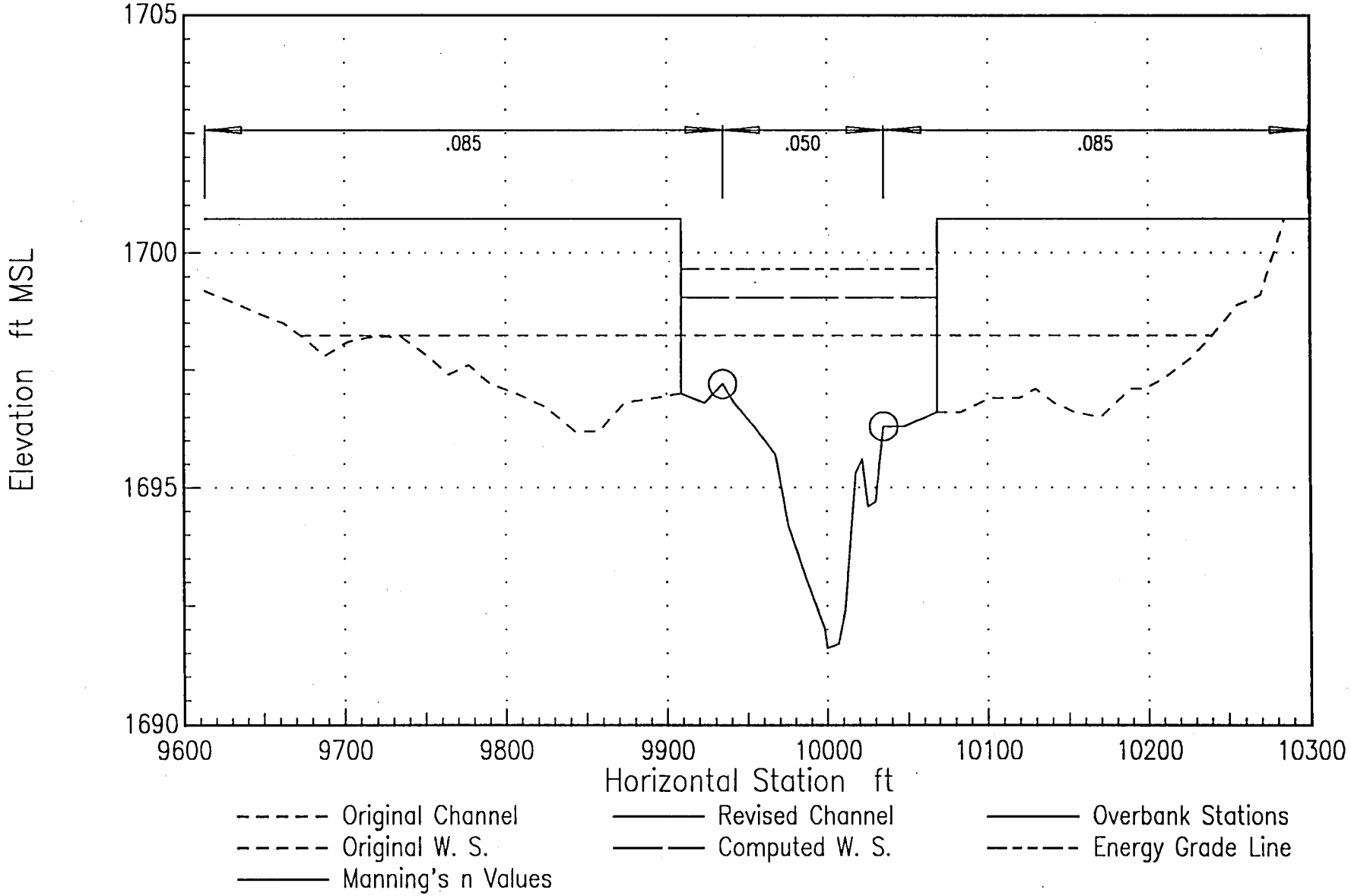
Revised Cross-Section Plot 14.481

WS Elev: 1695.24 ft EGL Elev: 1696.03 ft Flow: 3322 cfs



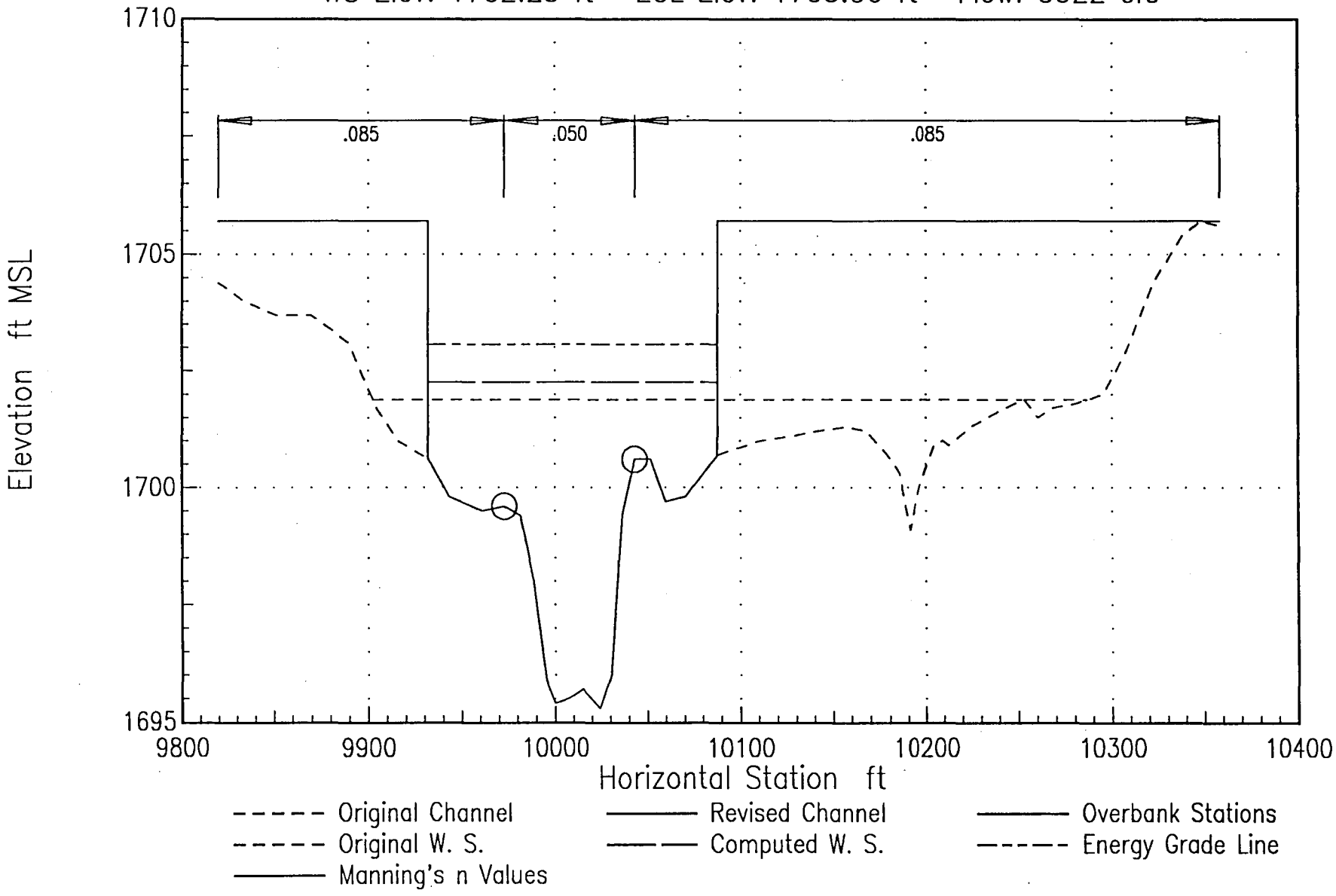
Revised Cross-Section Plot 14.569

WS Elev: 1699.05 ft EGL Elev: 1699.65 ft Flow: 3322 cfs



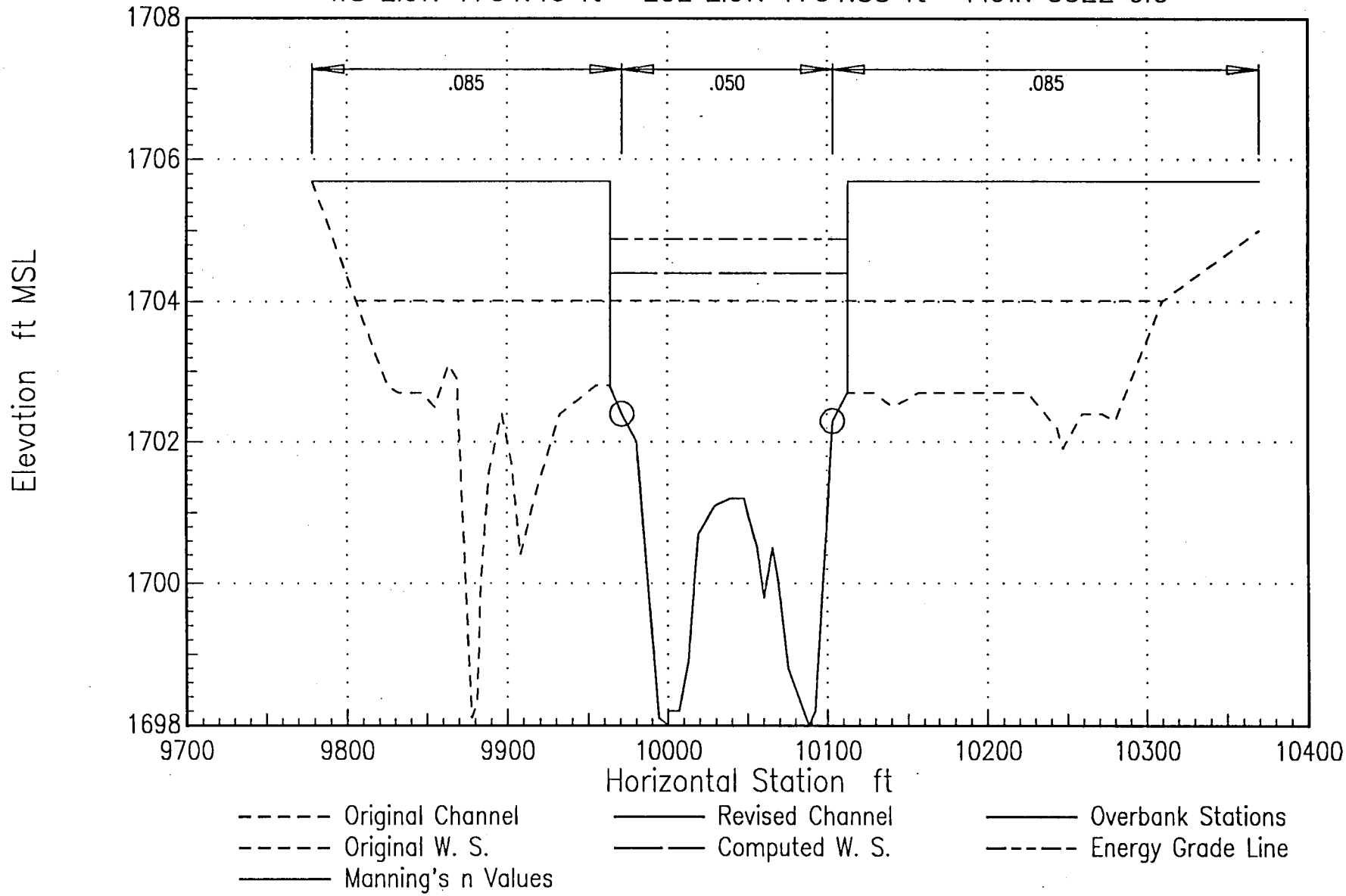
Revised Cross-Section Plot 14.656

WS Elev: 1702.25 ft EGL Elev: 1703.06 ft Flow: 3322 cfs



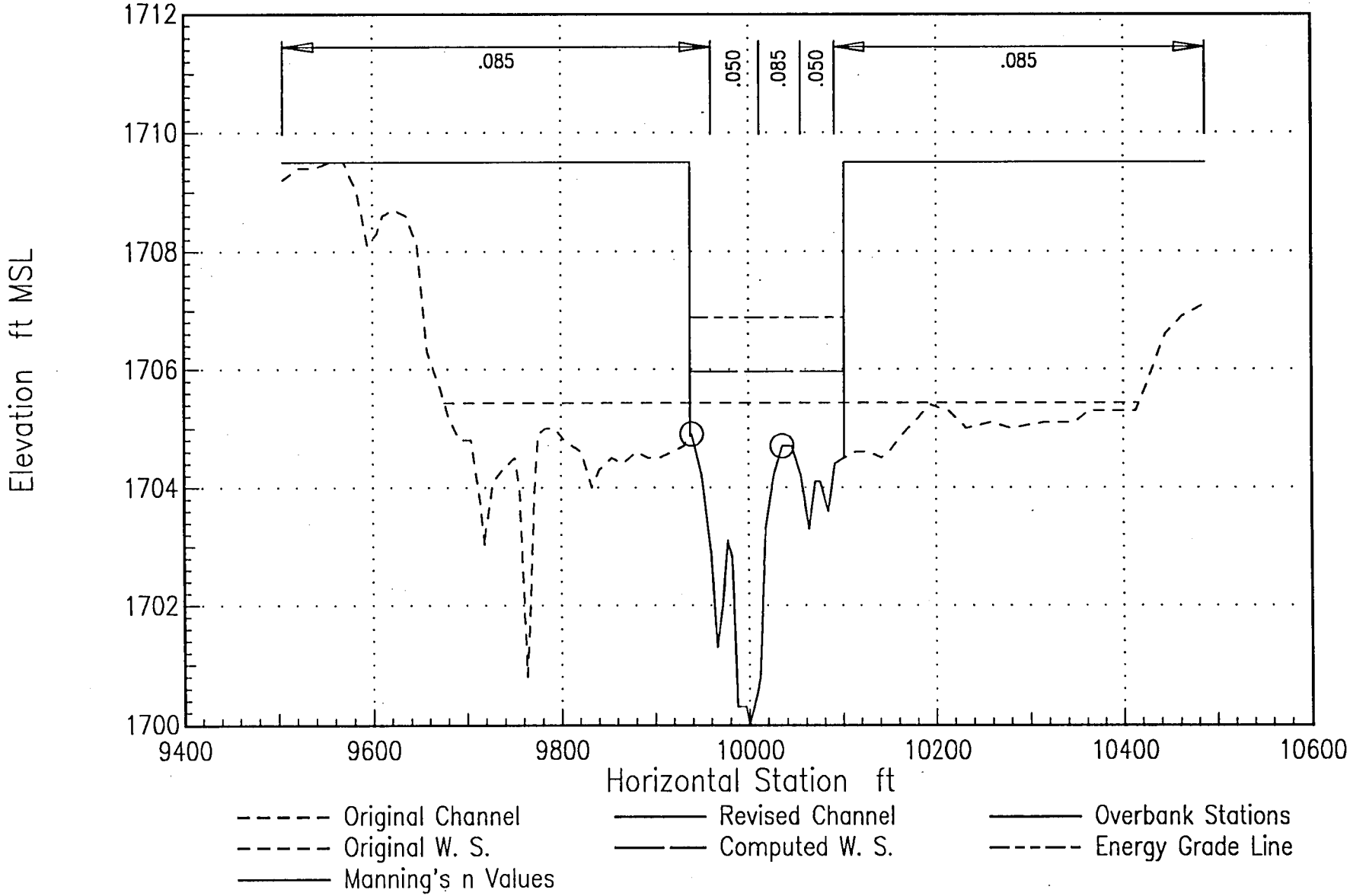
Revised Cross-Section Plot 14.711

WS Elev: 1704.40 ft EGL Elev: 1704.88 ft Flow: 3322 cfs



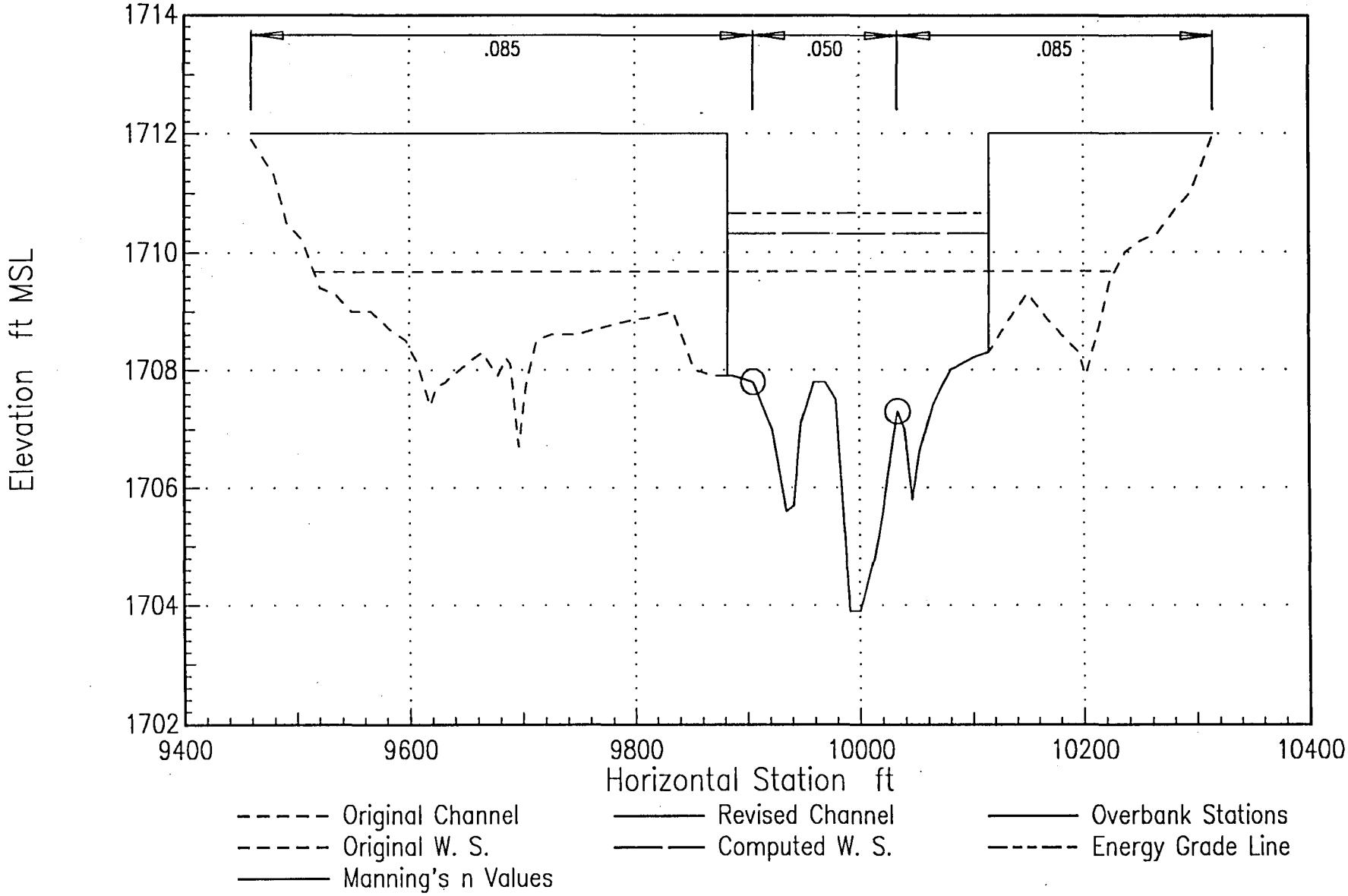
Revised Cross-Section Plot 14.754

WS Elev: 1705.96 ft EGL Elev: 1706.88 ft Flow: 3322 cfs



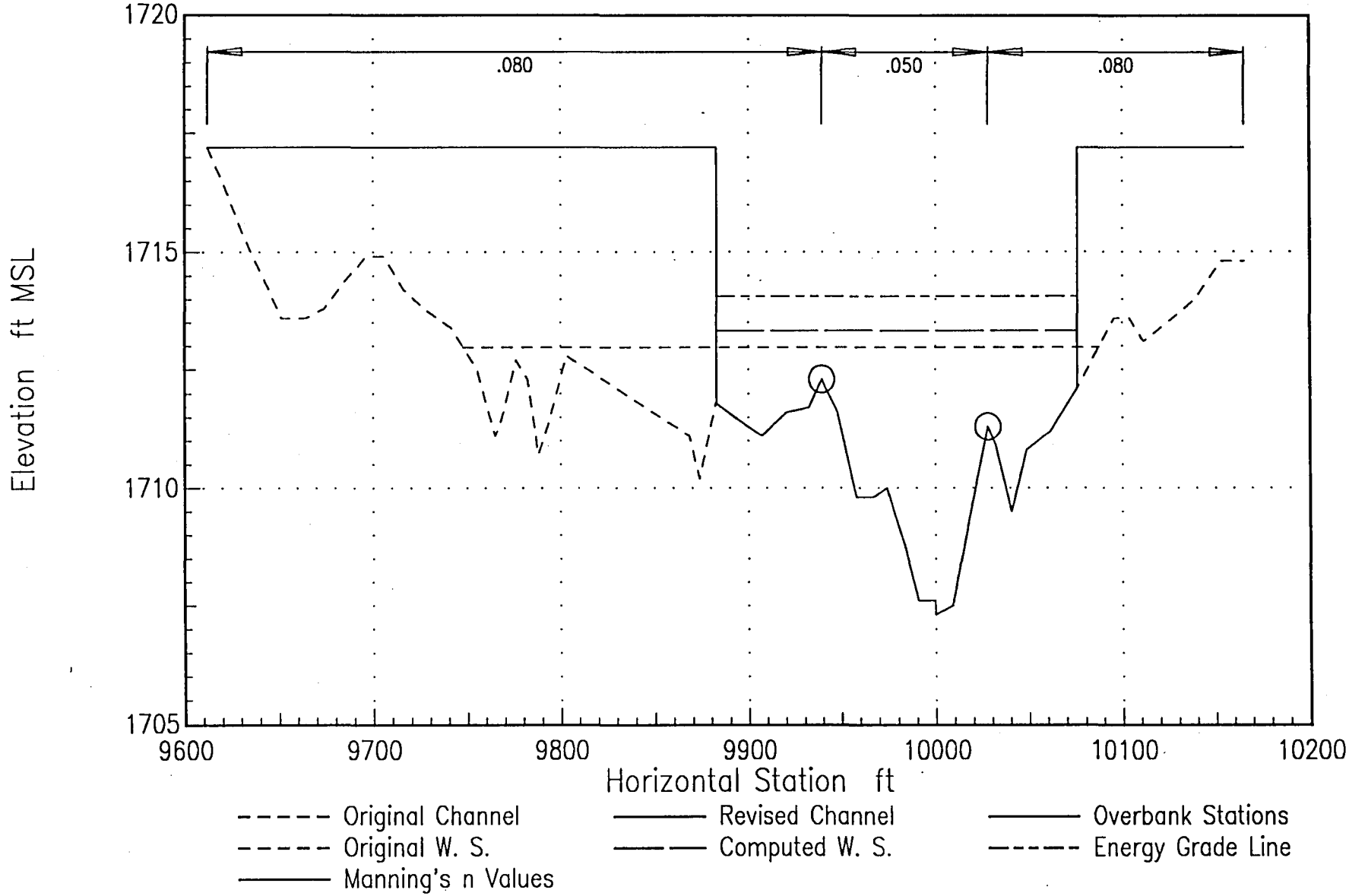
Revised Cross-Section Plot 14.845

WS Elev: 1710.31 ft EGL Elev: 1710.65 ft Flow: 3322 cfs



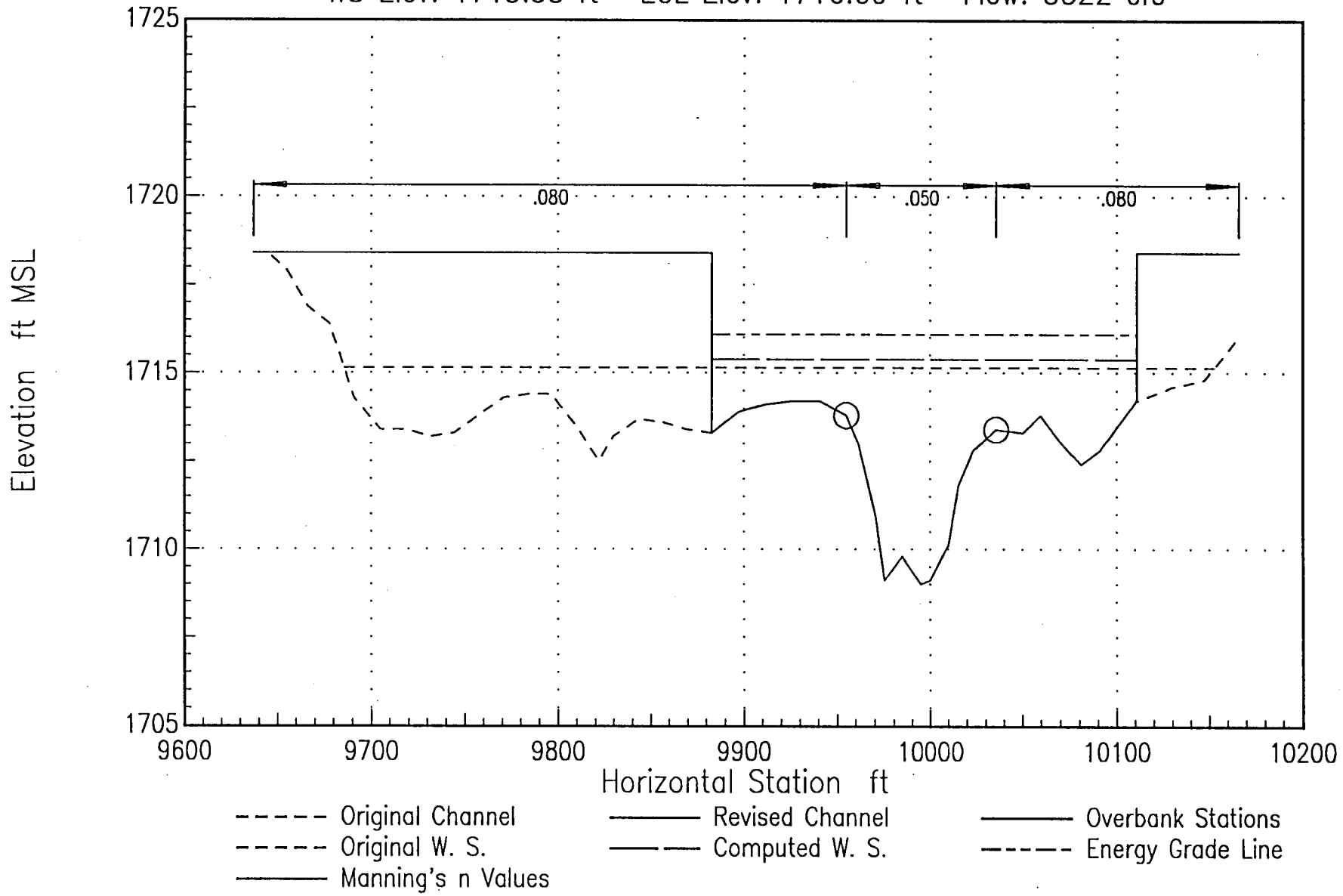
Revised Cross-Section Plot 14.937

WS Elev: 1713.32 ft EGL Elev: 1714.06 ft Flow: 3322 cfs



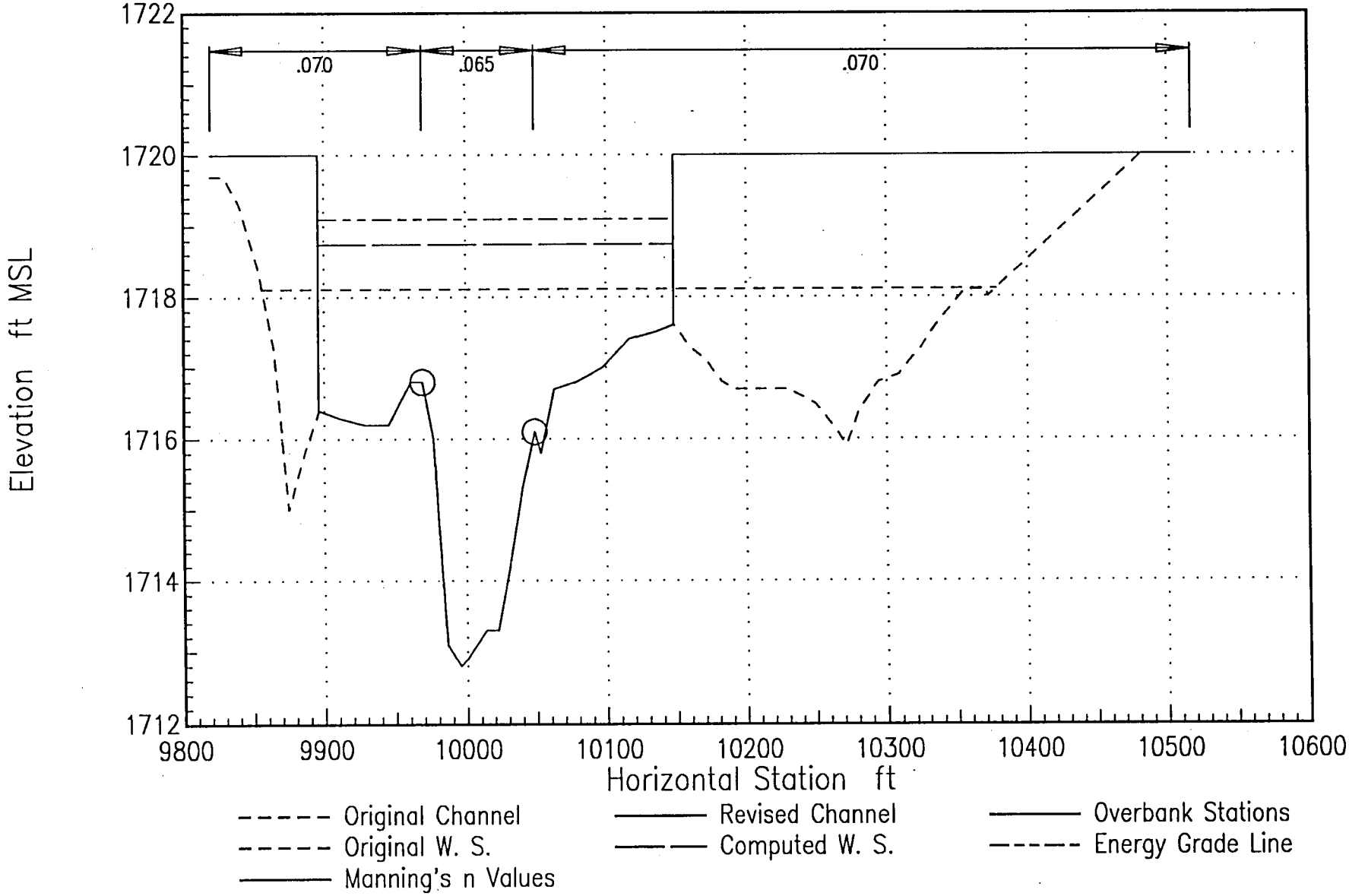
Revised Cross-Section Plot 14.976

WS Elev: 1715.38 ft EGL Elev: 1716.09 ft Flow: 3322 cfs



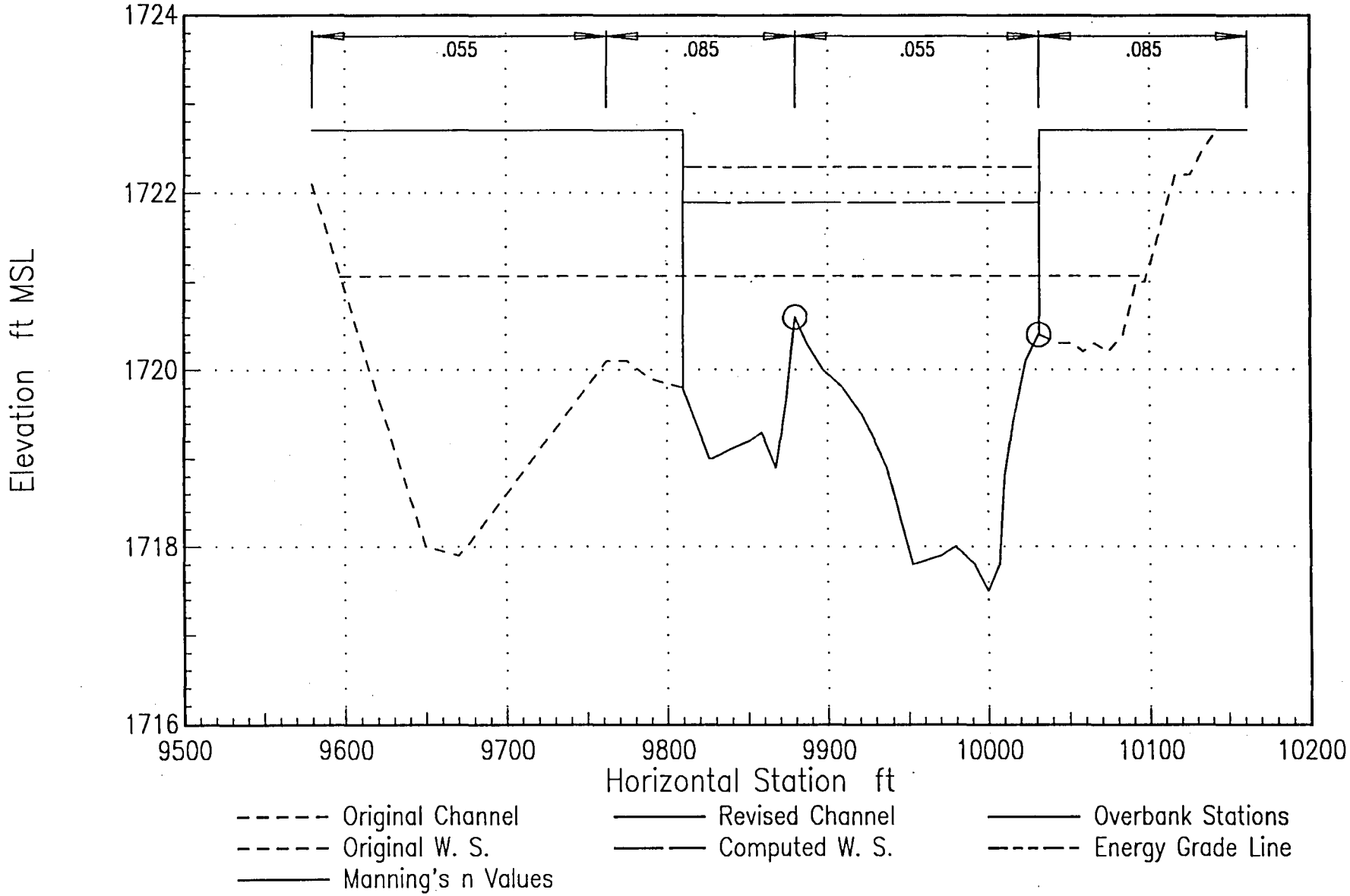
Revised Cross-Section Plot 15.044

WS Elev: 1718.74 ft EGL Elev: 1719.09 ft Flow: 3035 cfs



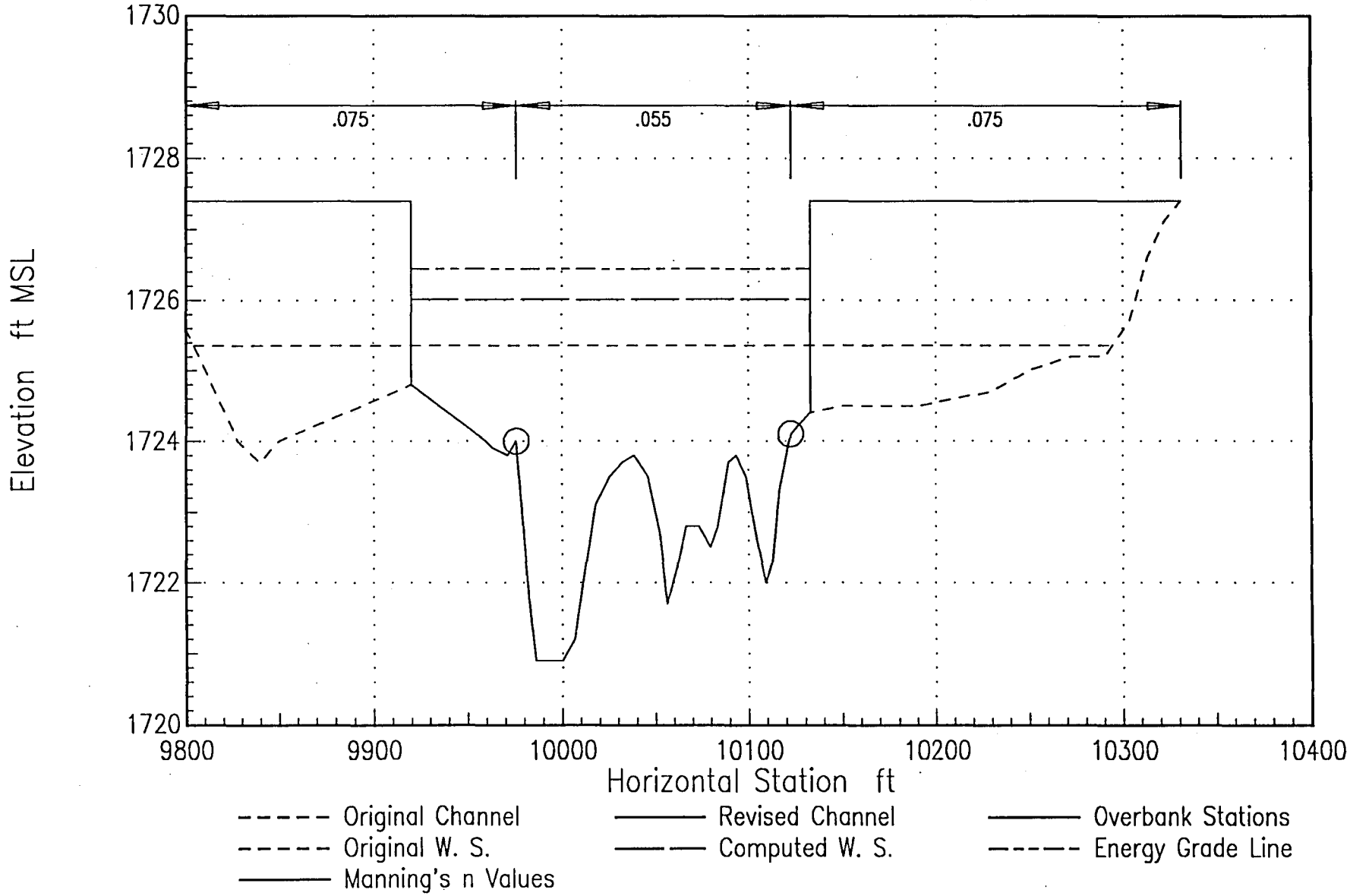
Revised Cross-Section Plot 15.118

WS Elev: 1721.89 ft EGL Elev: 1722.28 ft Flow: 3035 cfs



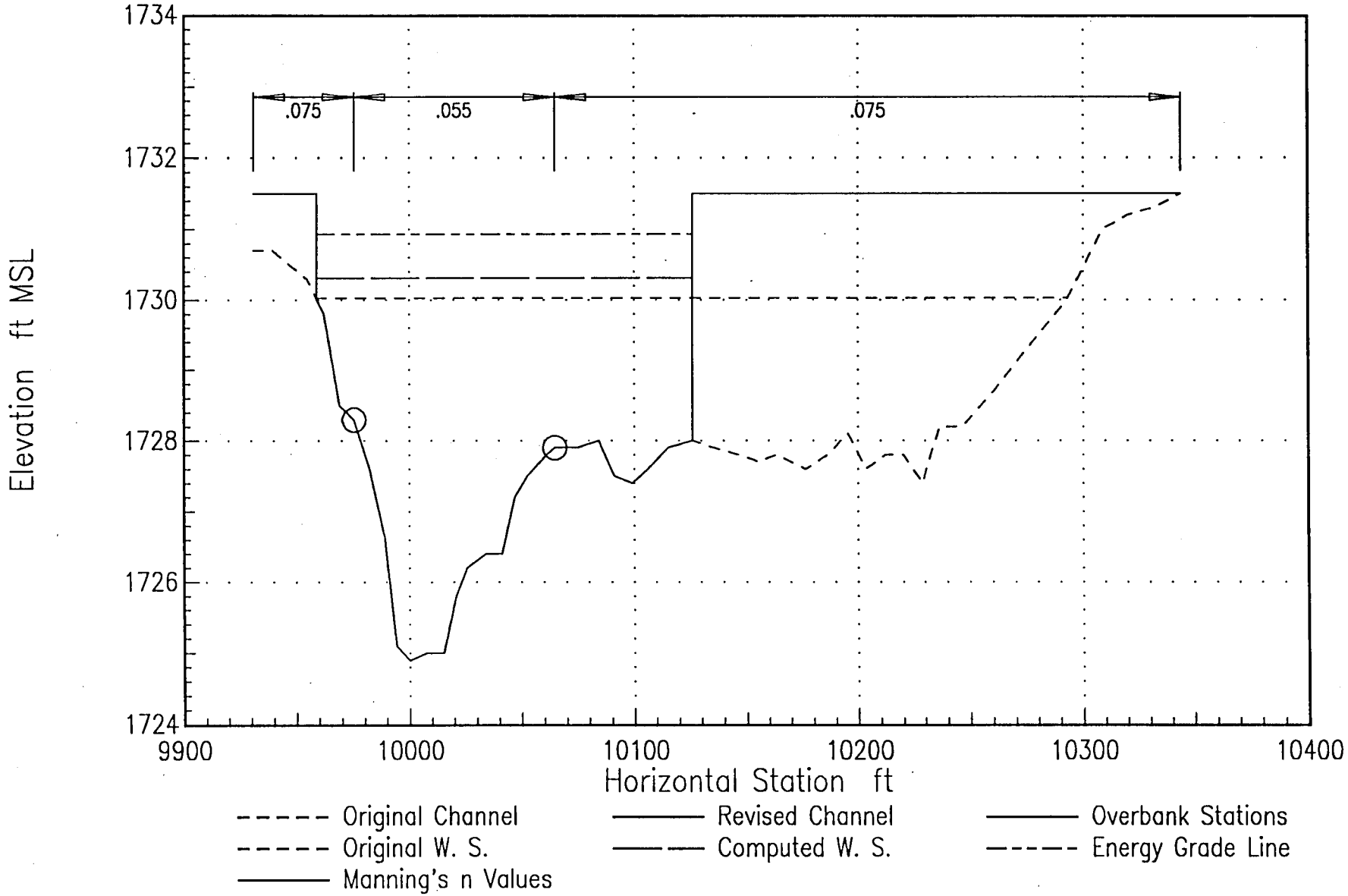
Revised Cross-Section Plot 15.208

WS Elev: 1726.01 ft EGL Elev: 1726.44 ft Flow: 3035 cfs



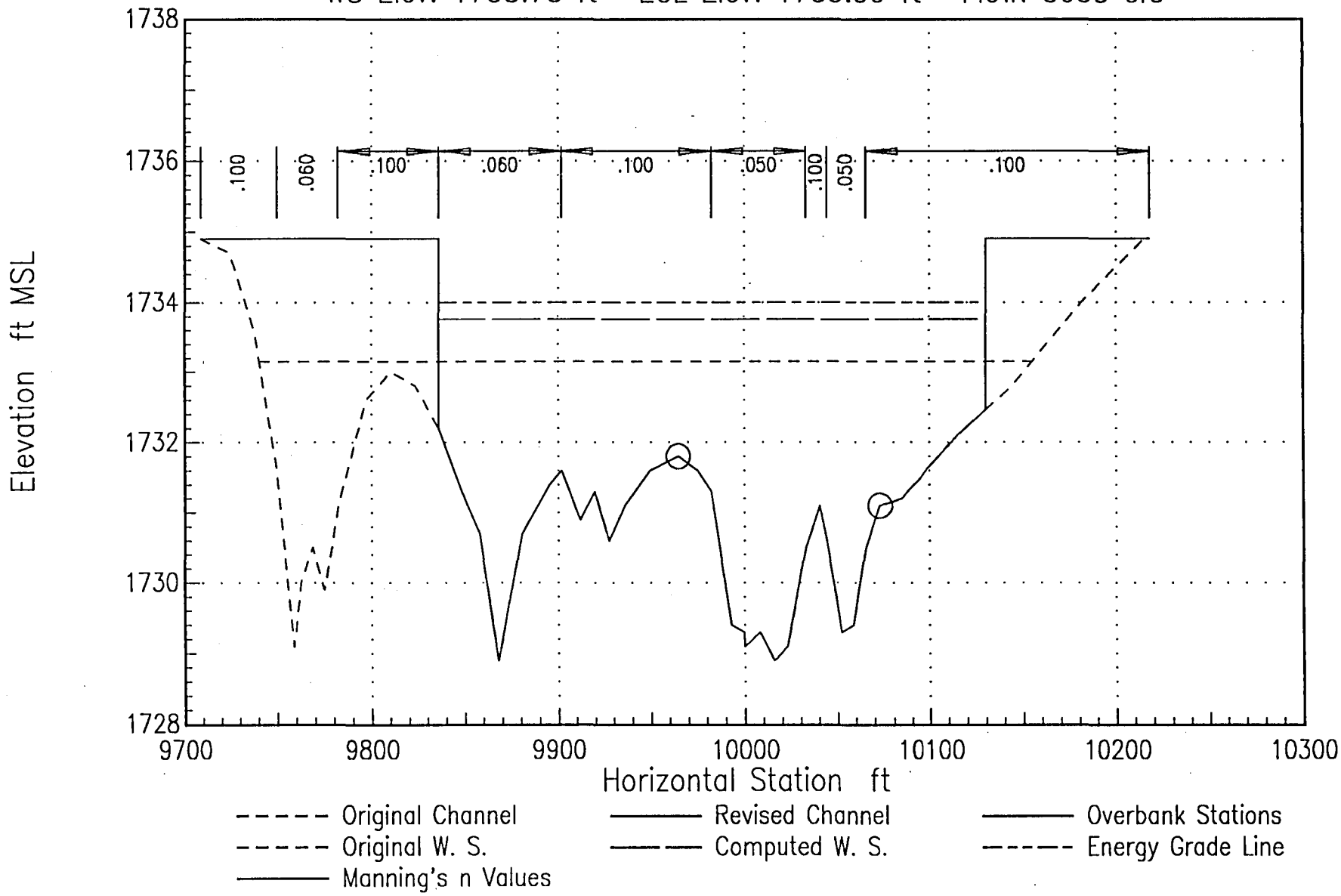
Revised Cross-Section Plot 15.298

WS Elev: 1730.31 ft EGL Elev: 1730.92 ft Flow: 3035 cfs



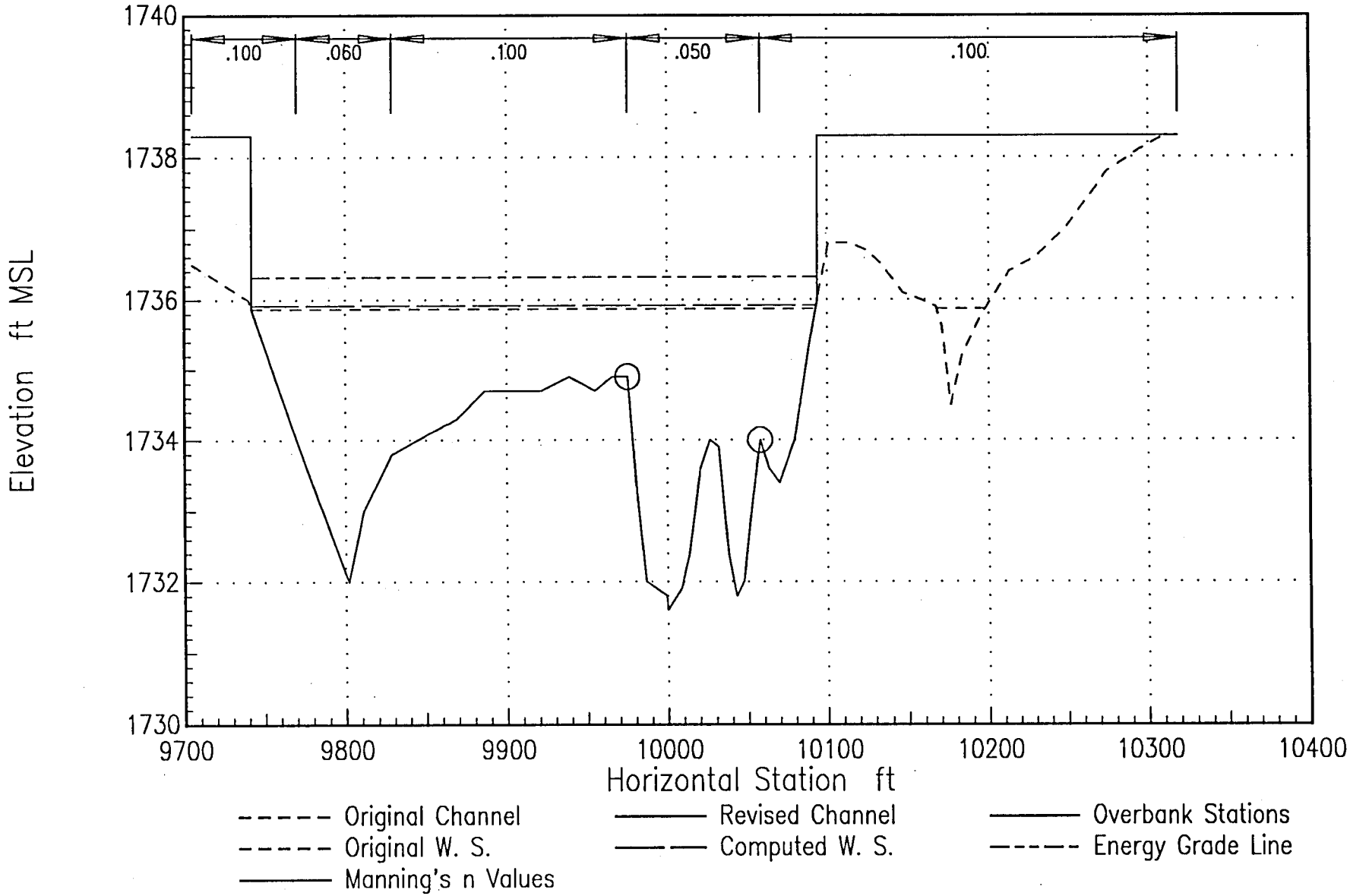
Revised Cross-Section Plot 15.379

WS Elev: 1733.75 ft EGL Elev: 1733.99 ft Flow: 3035 cfs



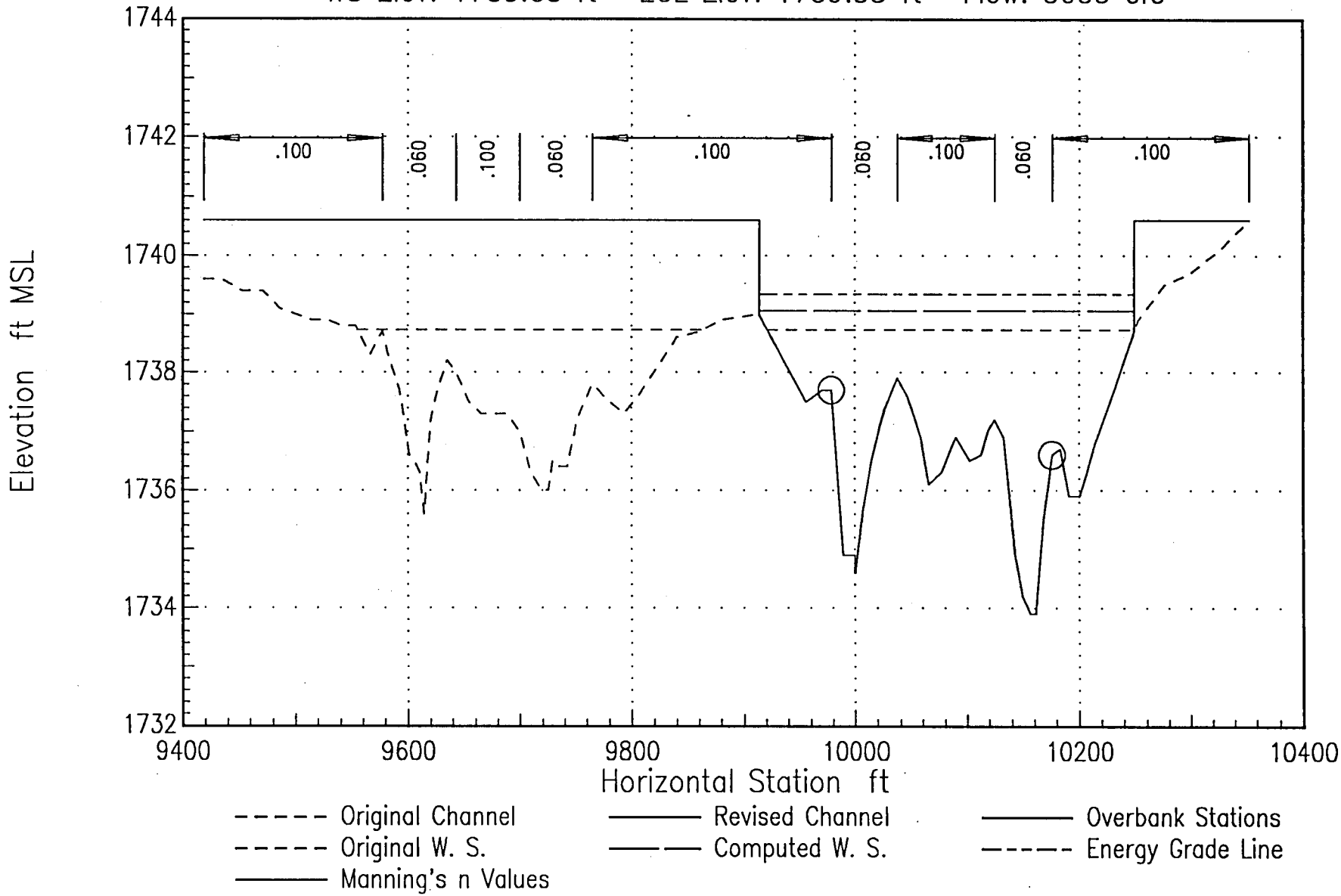
Revised Cross-Section Plot 15.443

WS Elev: 1735.91 ft EGL Elev: 1736.31 ft Flow: 3035 cfs



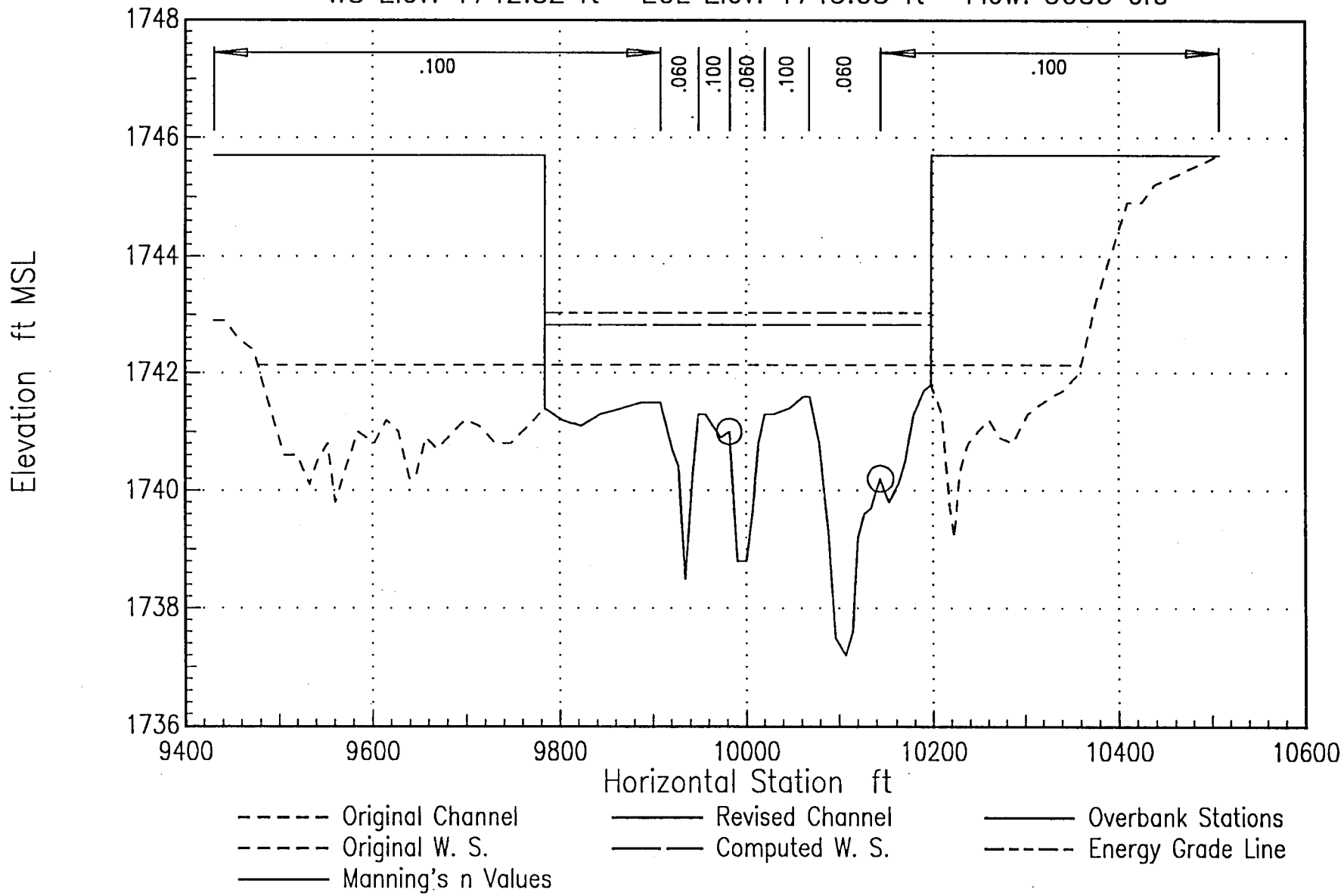
Revised Cross-Section Plot 15.5

WS Elev: 1739.05 ft EGL Elev: 1739.33 ft Flow: 3035 cfs



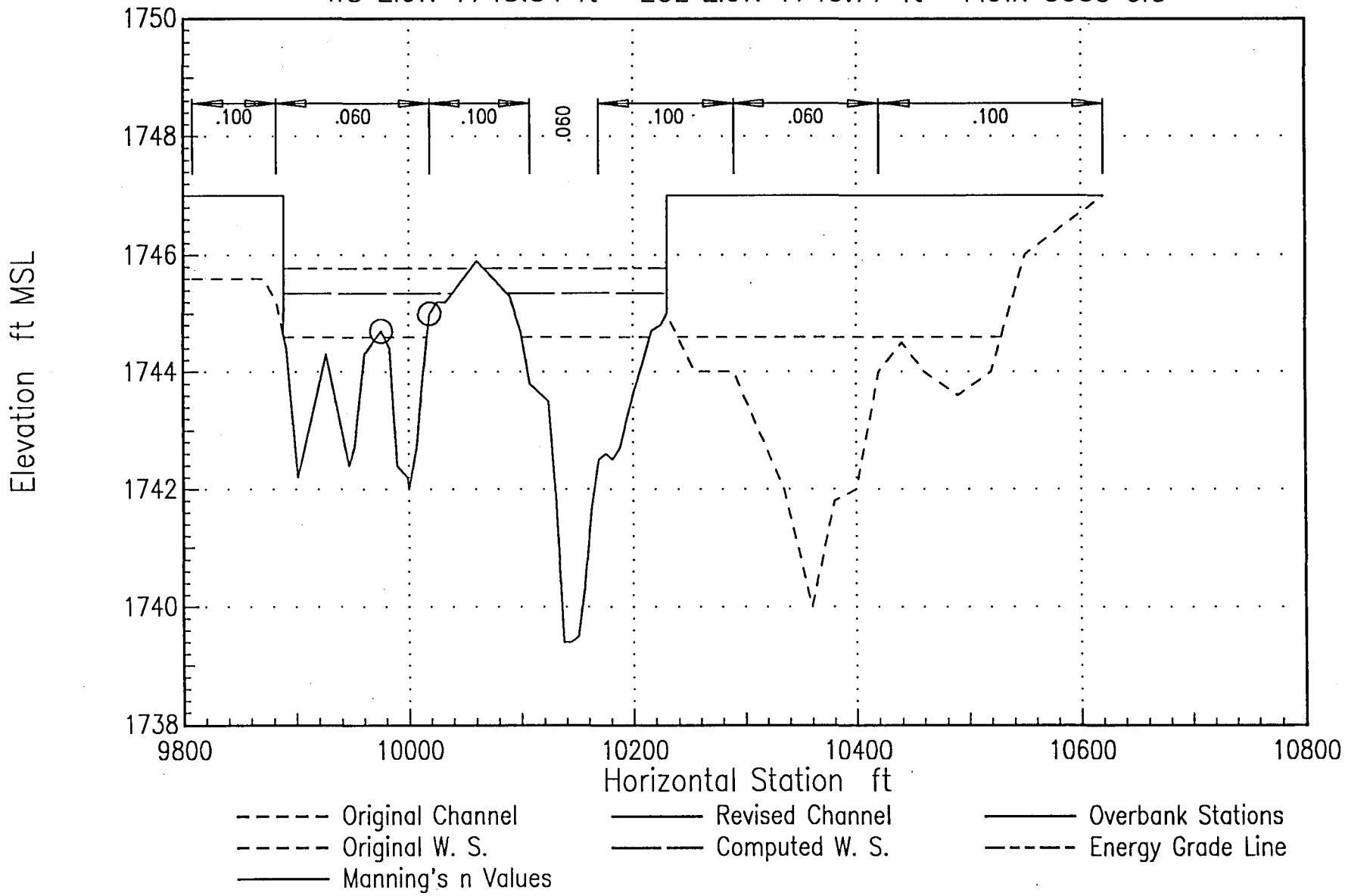
Revised Cross-Section Plot 15.581

WS Elev: 1742.82 ft EGL Elev: 1743.03 ft Flow: 3035 cfs



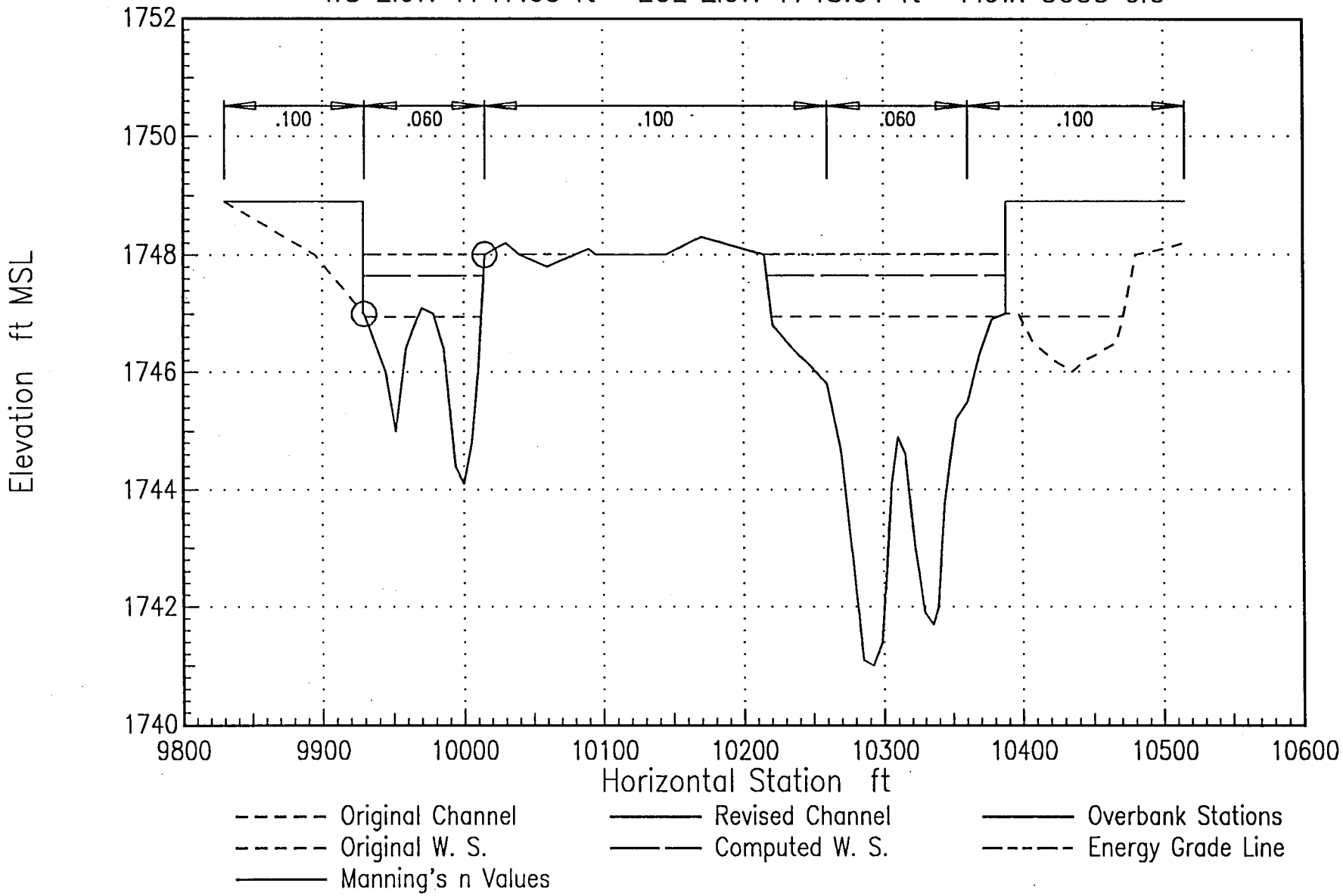
Revised Cross-Section Plot 15.637

WS Elev: 1745.34 ft EGL Elev: 1745.77 ft Flow: 3035 cfs



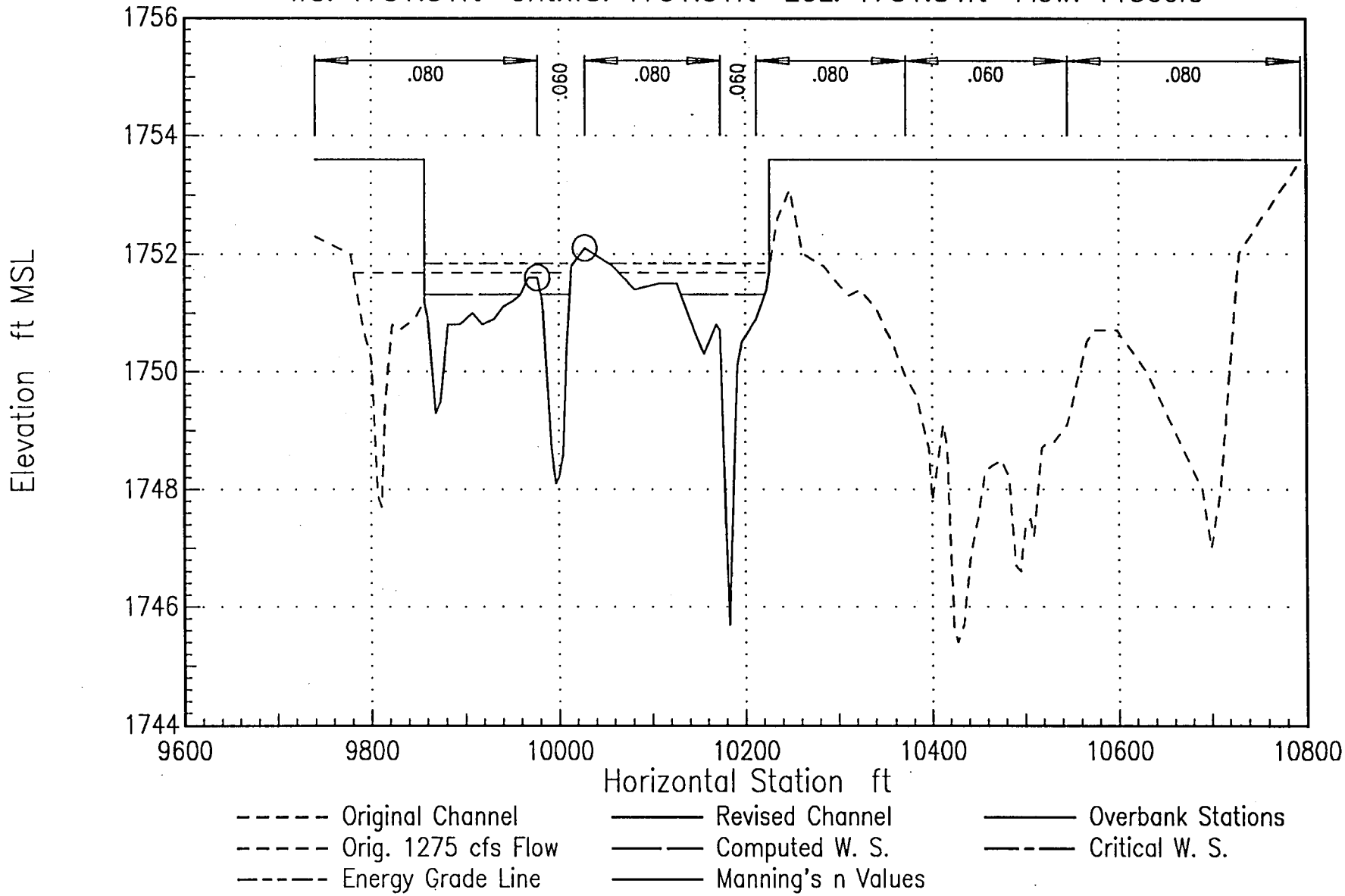
Revised Cross-Section Plot 15.683

WS Elev: 1747.65 ft EGL Elev: 1748.01 ft Flow: 3035 cfs



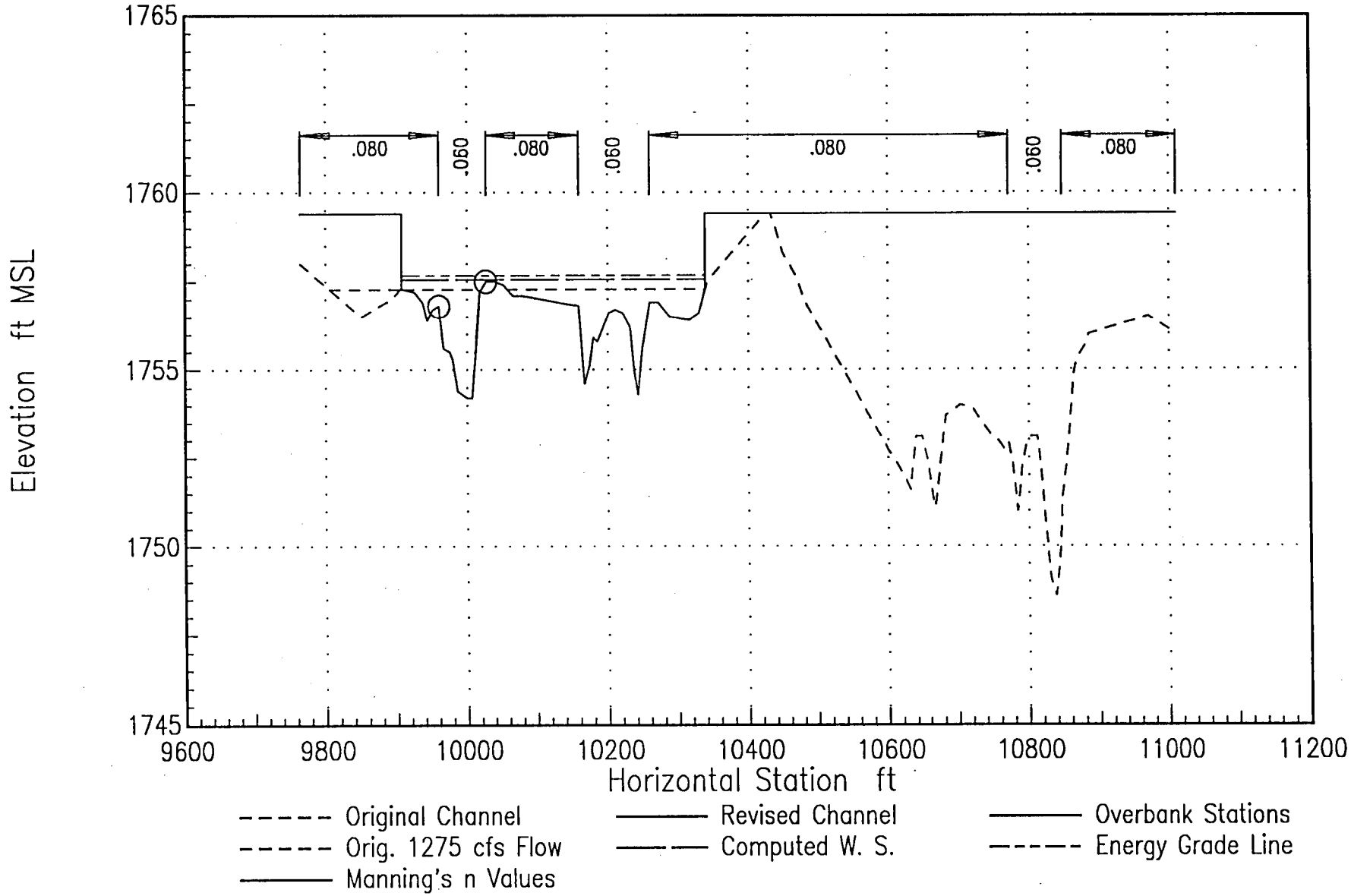
Revised Cross-Section Plot 15.749

WS: 1751.31ft Crit.WS: 1751.31ft EGL: 1751.84ft Flow: 1150cfs



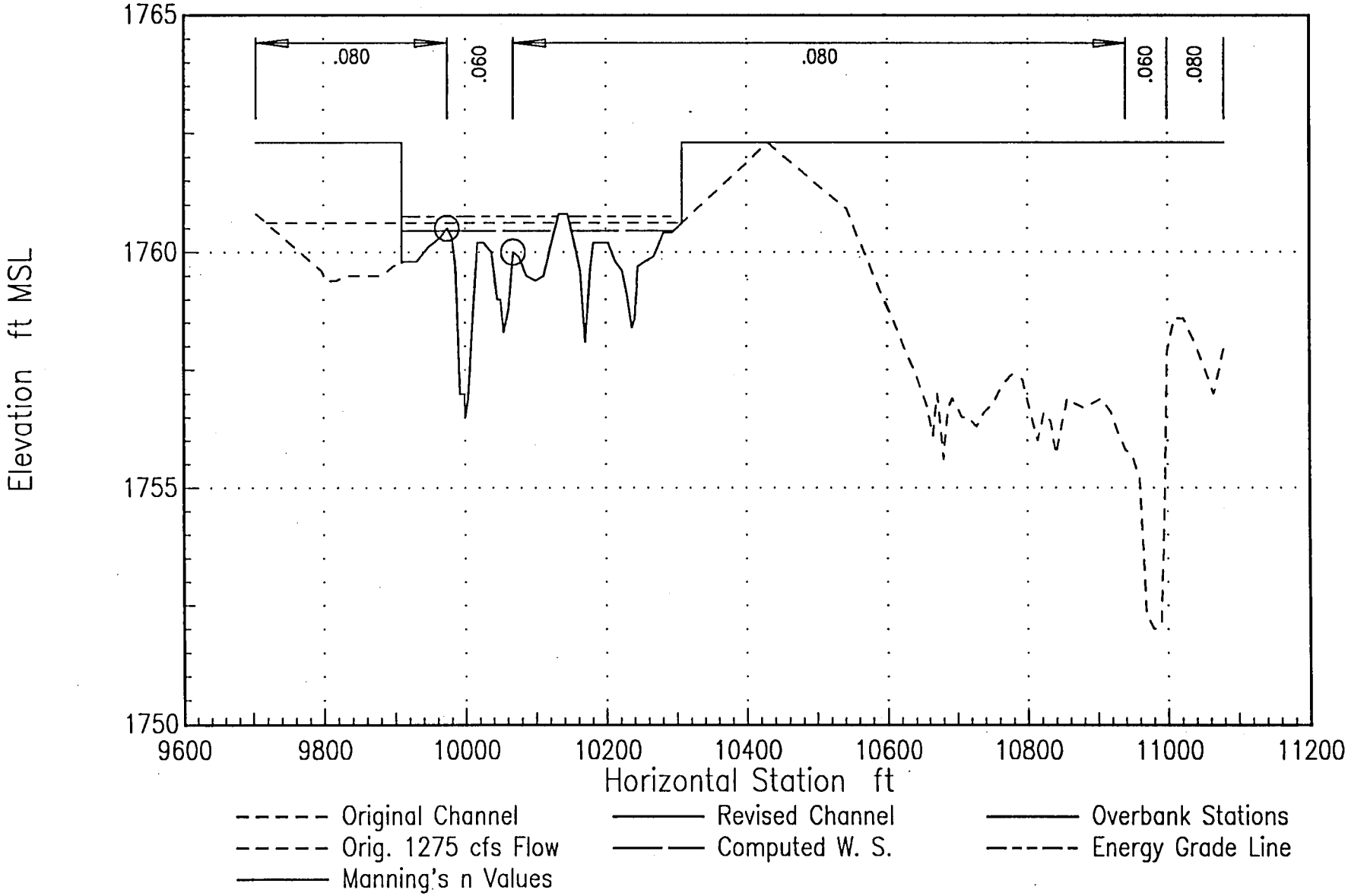
Revised Cross-Section Plot 15.842

WS Elev: 1757.55 ft EGL Elev: 1757.66 ft Flow: 1150 cfs



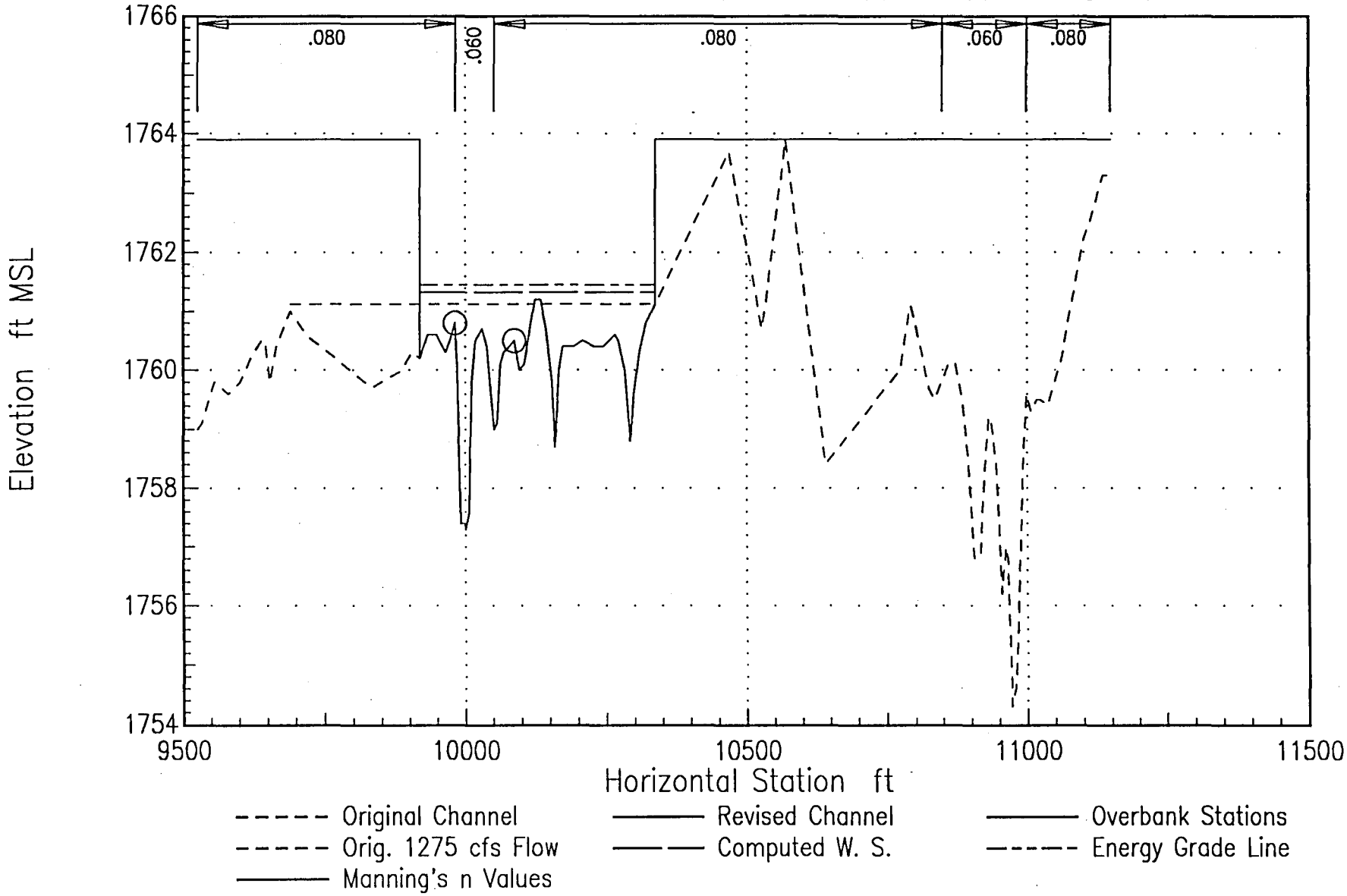
Revised Cross-Section Plot 15.89

WS Elev: 1760.44 ft EGL Elev: 1760.74 ft Flow: 1150 cfs



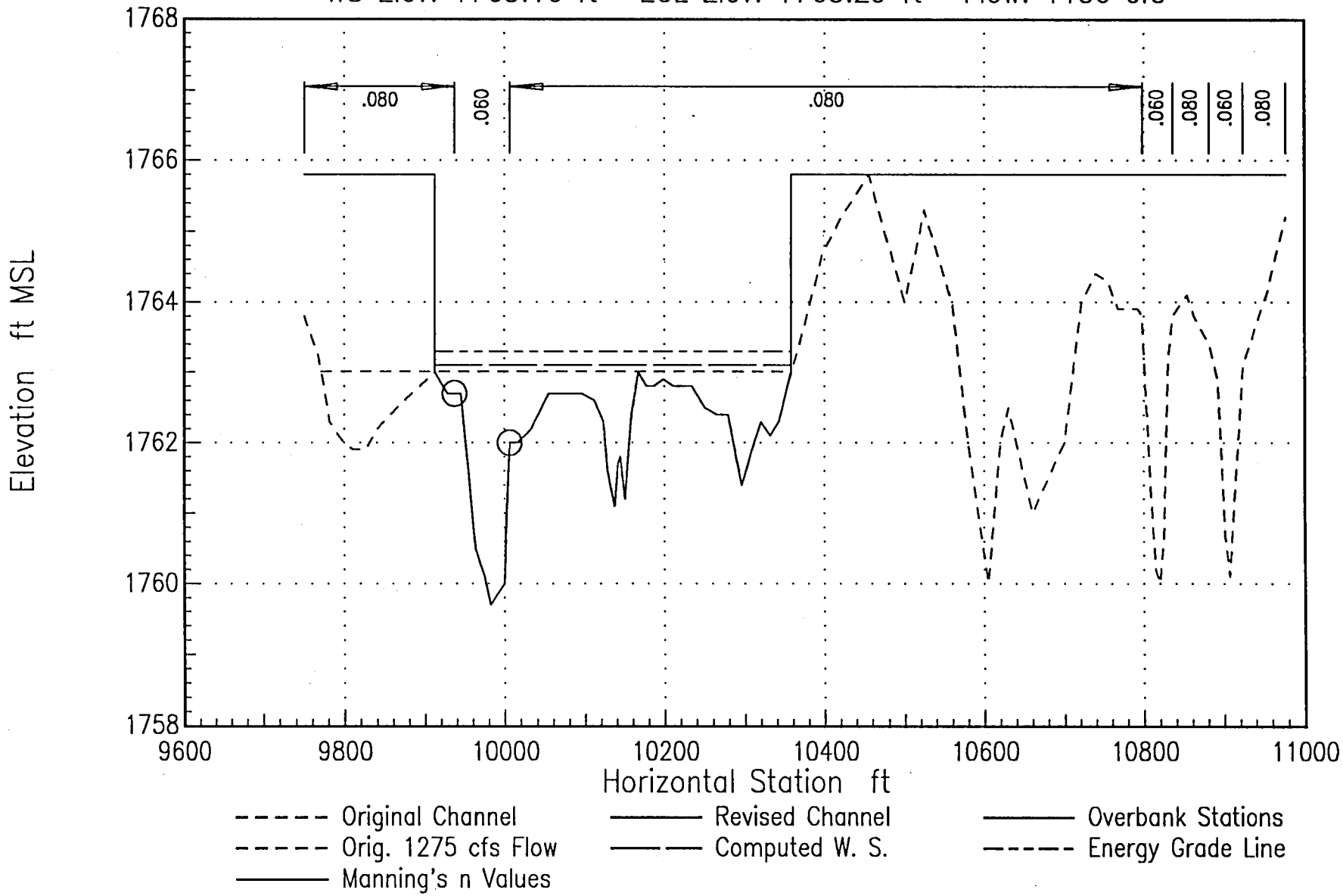
Revised Cross-Section Plot 15.898

WS Elev: 1761.32 ft EGL Elev: 1761.44 ft Flow: 1150 cfs



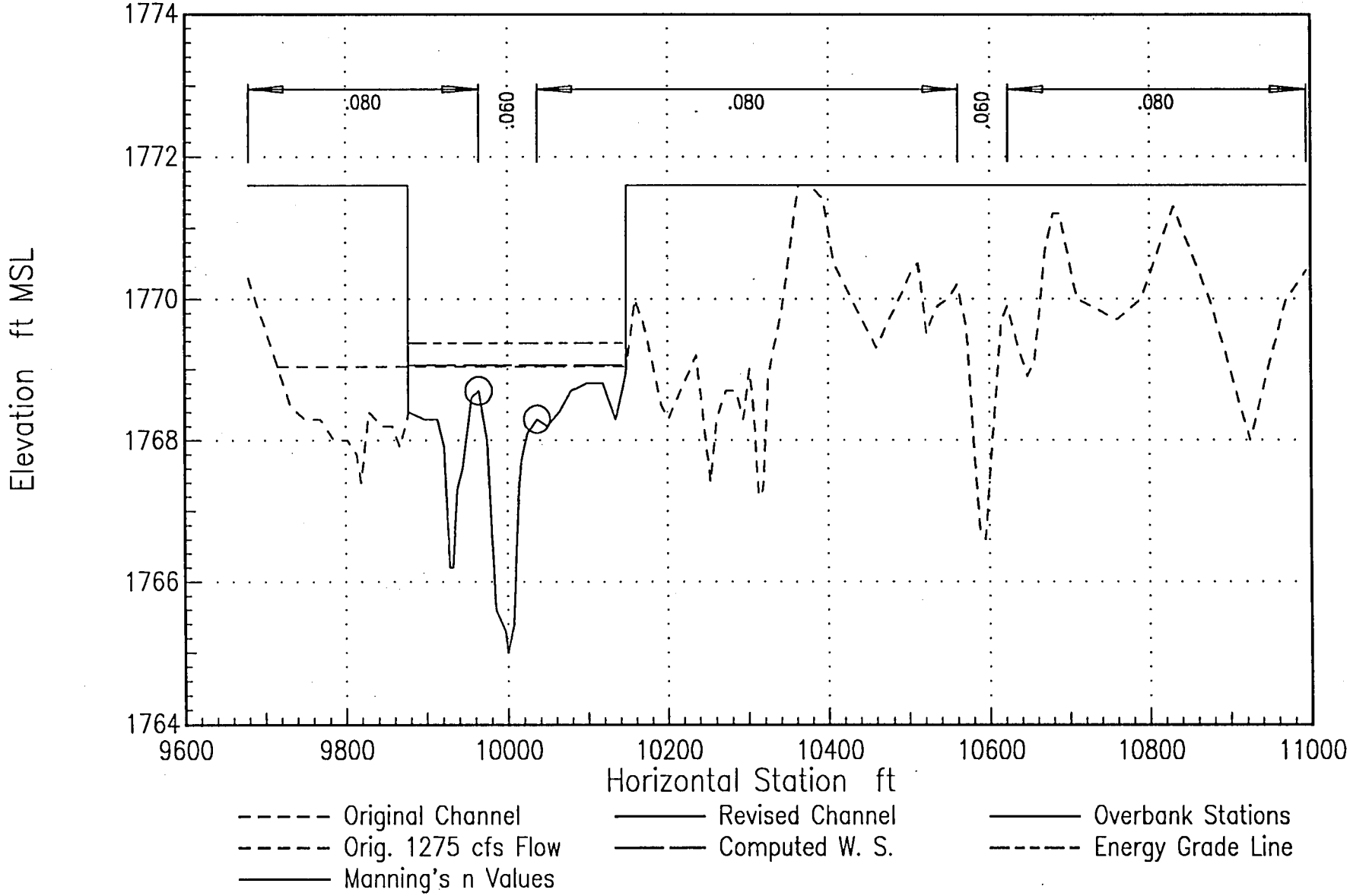
Revised Cross-Section Plot 15.932

WS Elev: 1763.10 ft EGL Elev: 1763.29 ft Flow: 1150 cfs



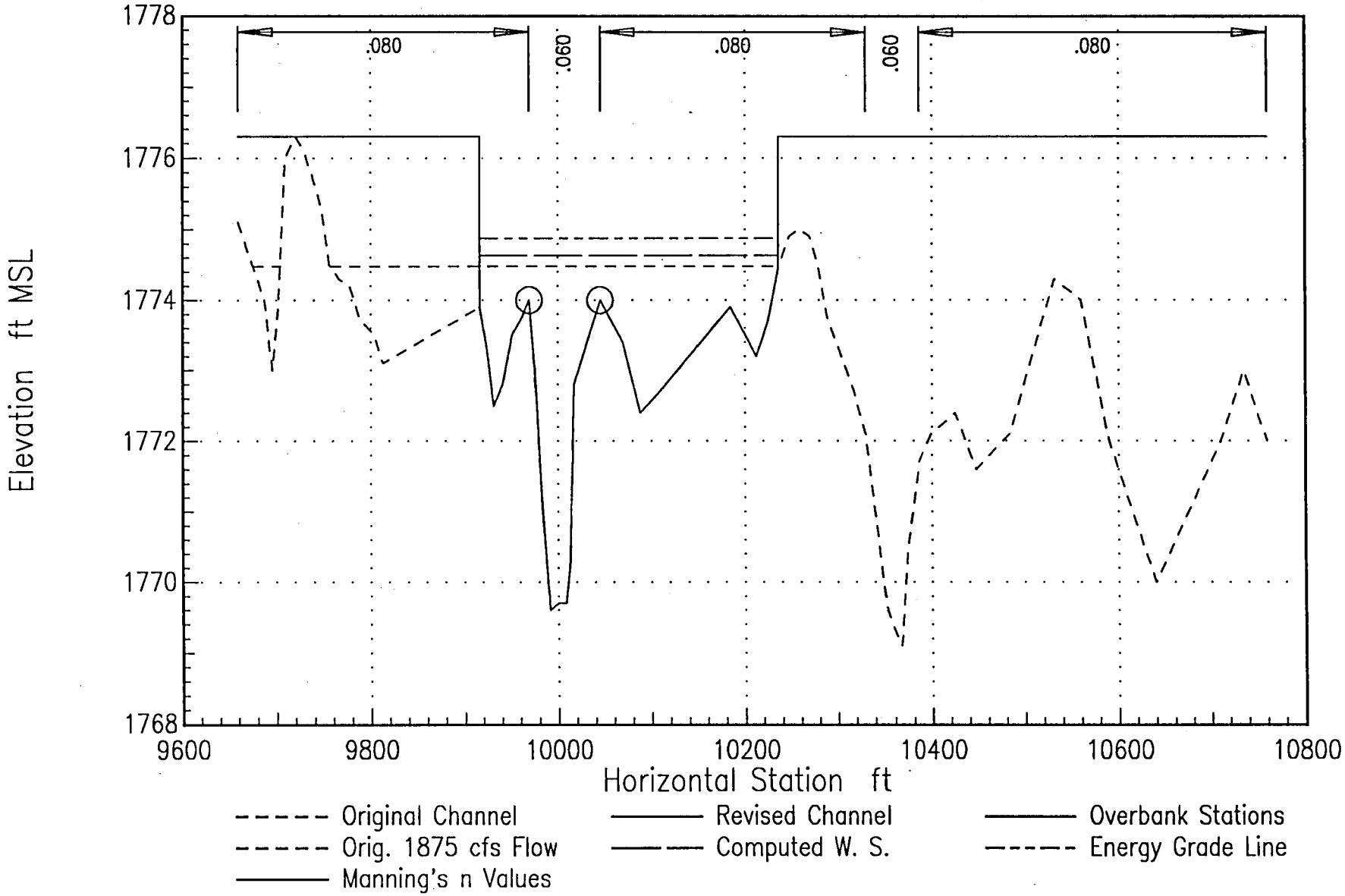
Revised Cross-Section Plot 16.021

WS Elev: 1769.05 ft EGL Elev: 1769.36 ft Flow: 1150 cfs



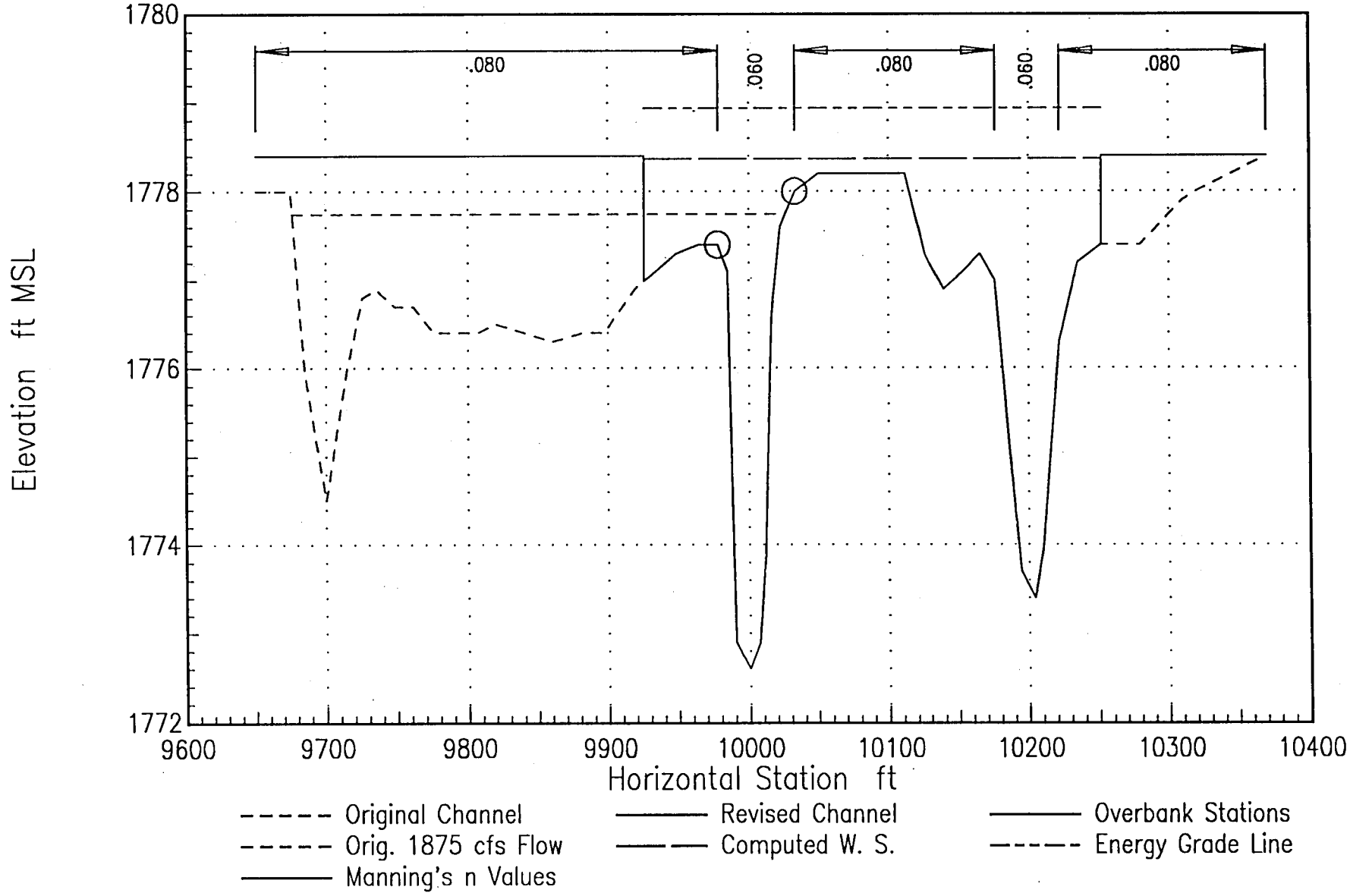
Revised Cross-Section Plot 16.112

WS Elev: 1774.63 ft EGL Elev: 1774.87 ft Flow: 1750 cfs



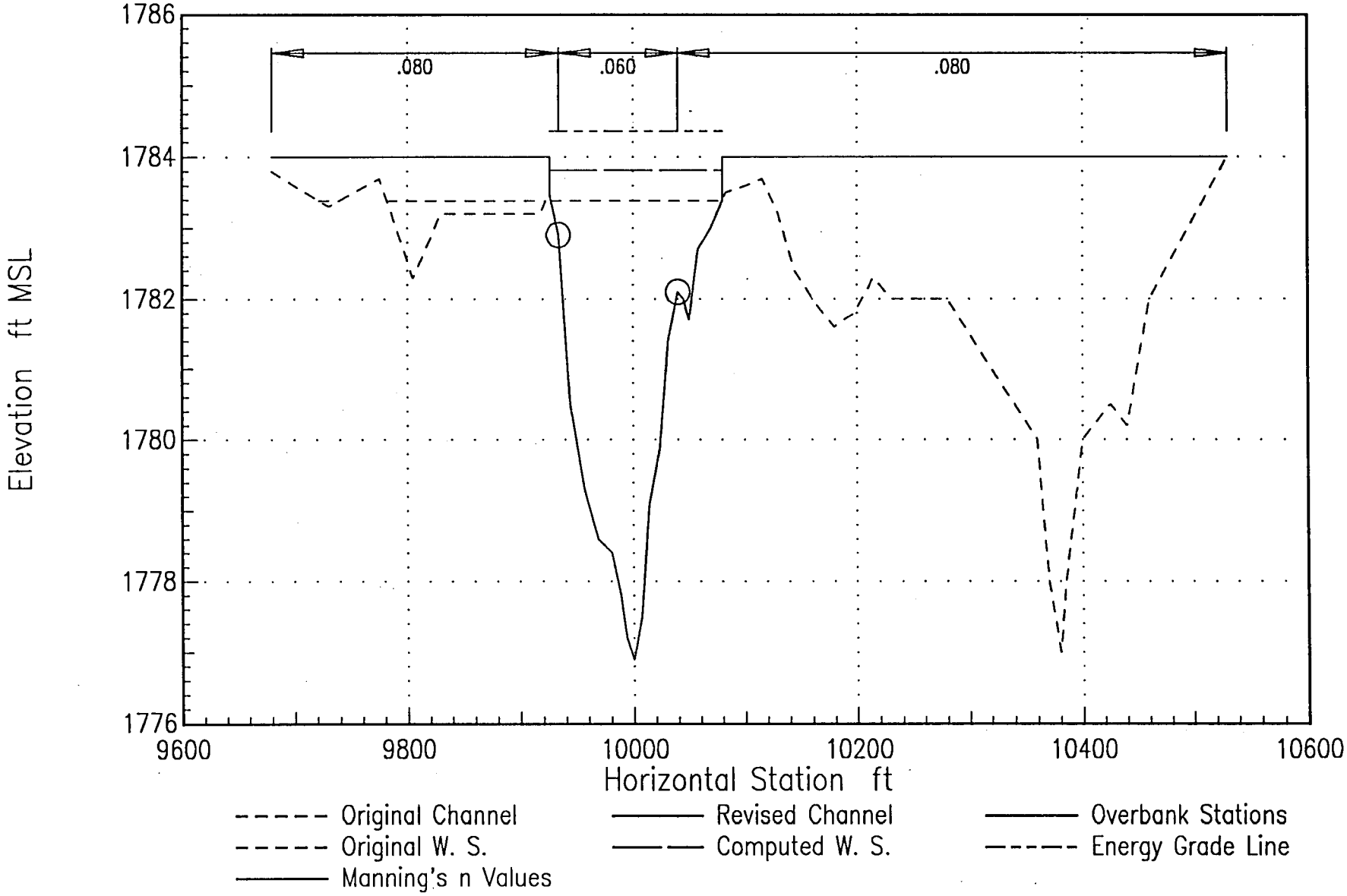
Revised Cross-Section Plot 16.164

WS Elev: 1778.36 ft EGL Elev: 1778.93 ft Flow: 2995 cfs



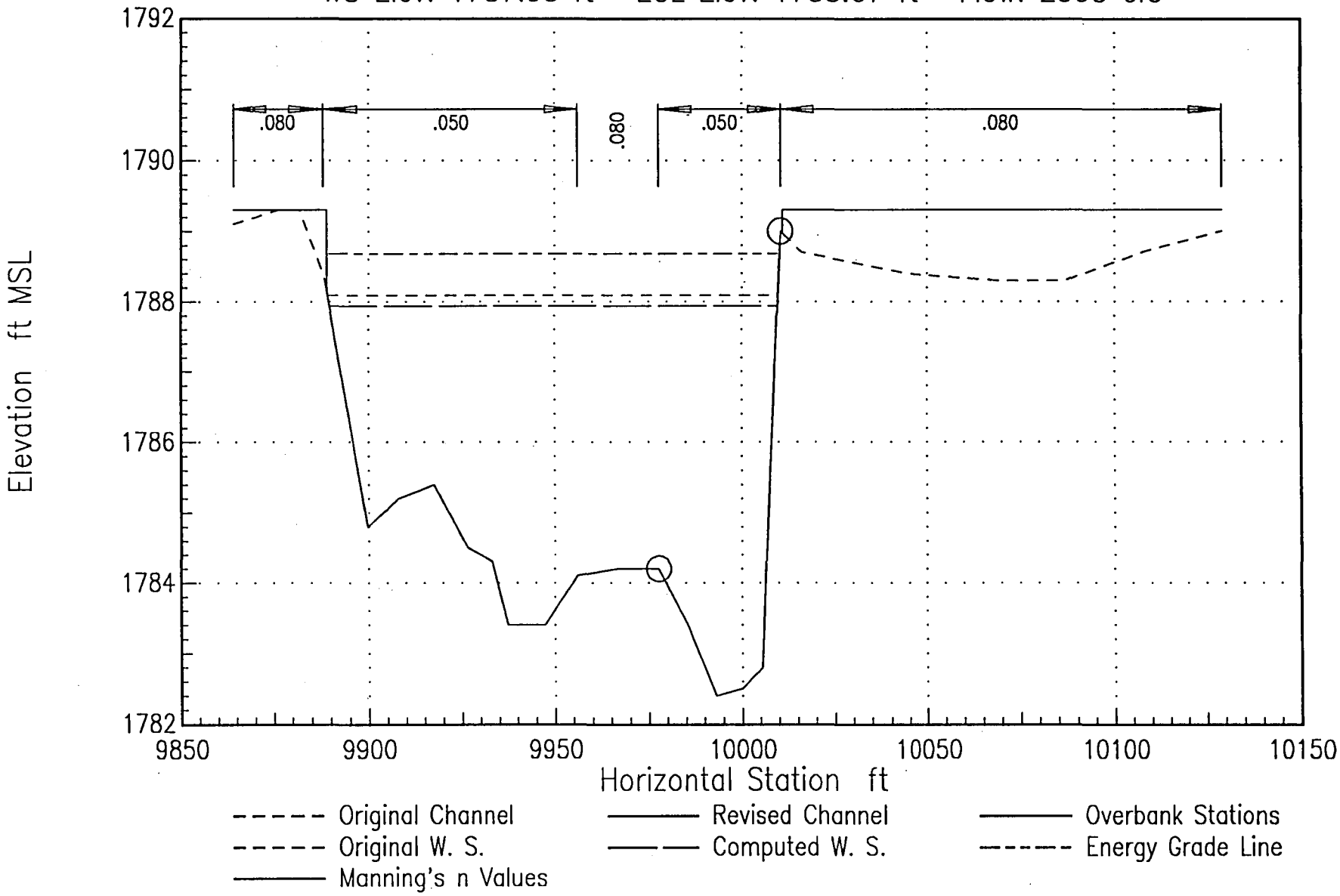
Revised Cross-Section Plot 16.254

WS Elev: 1783.81 ft EGL Elev: 1784.35 ft Flow: 2995 cfs



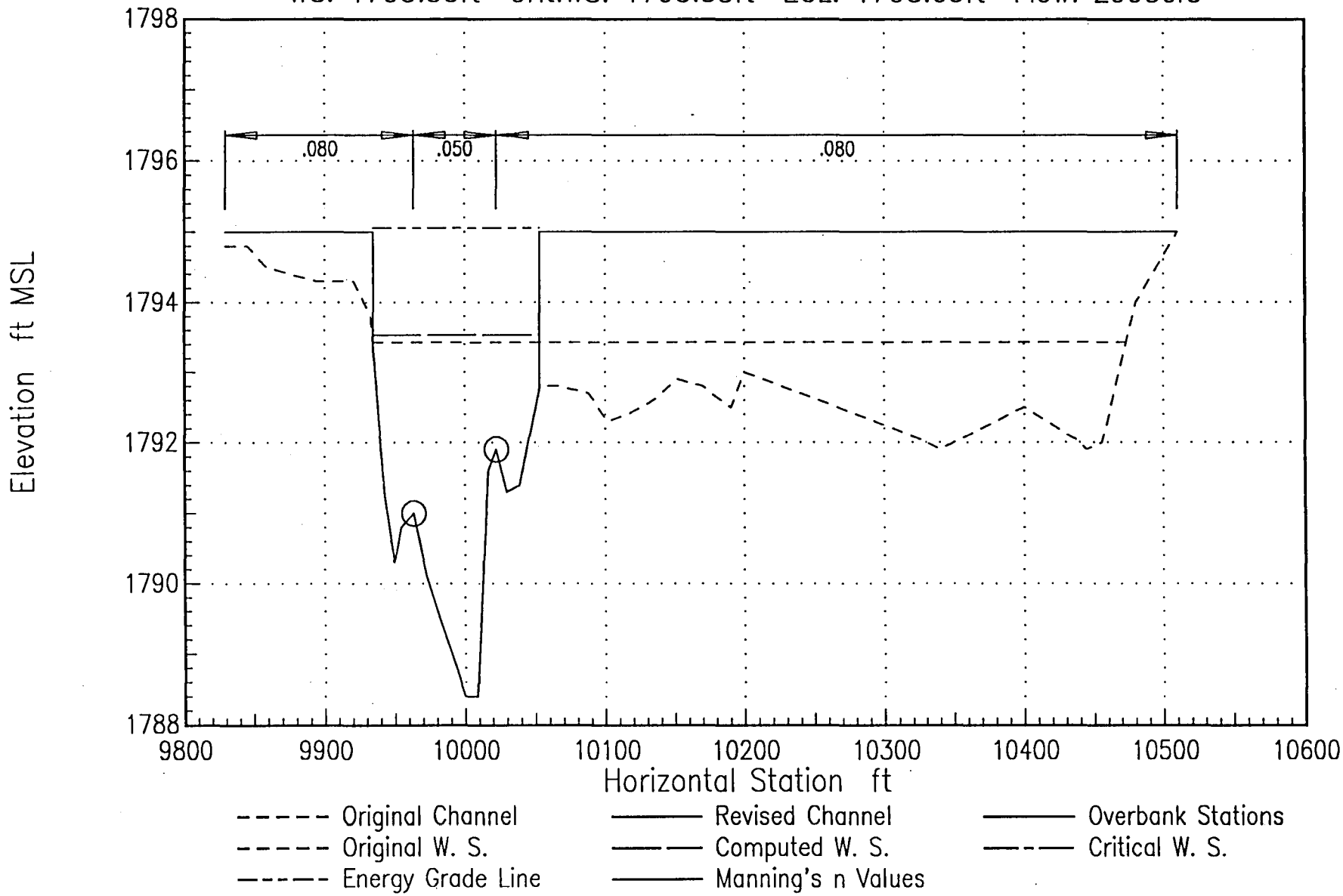
Revised Cross-Section Plot 16.345

WS Elev: 1787.93 ft EGL Elev: 1788.67 ft Flow: 2995 cfs



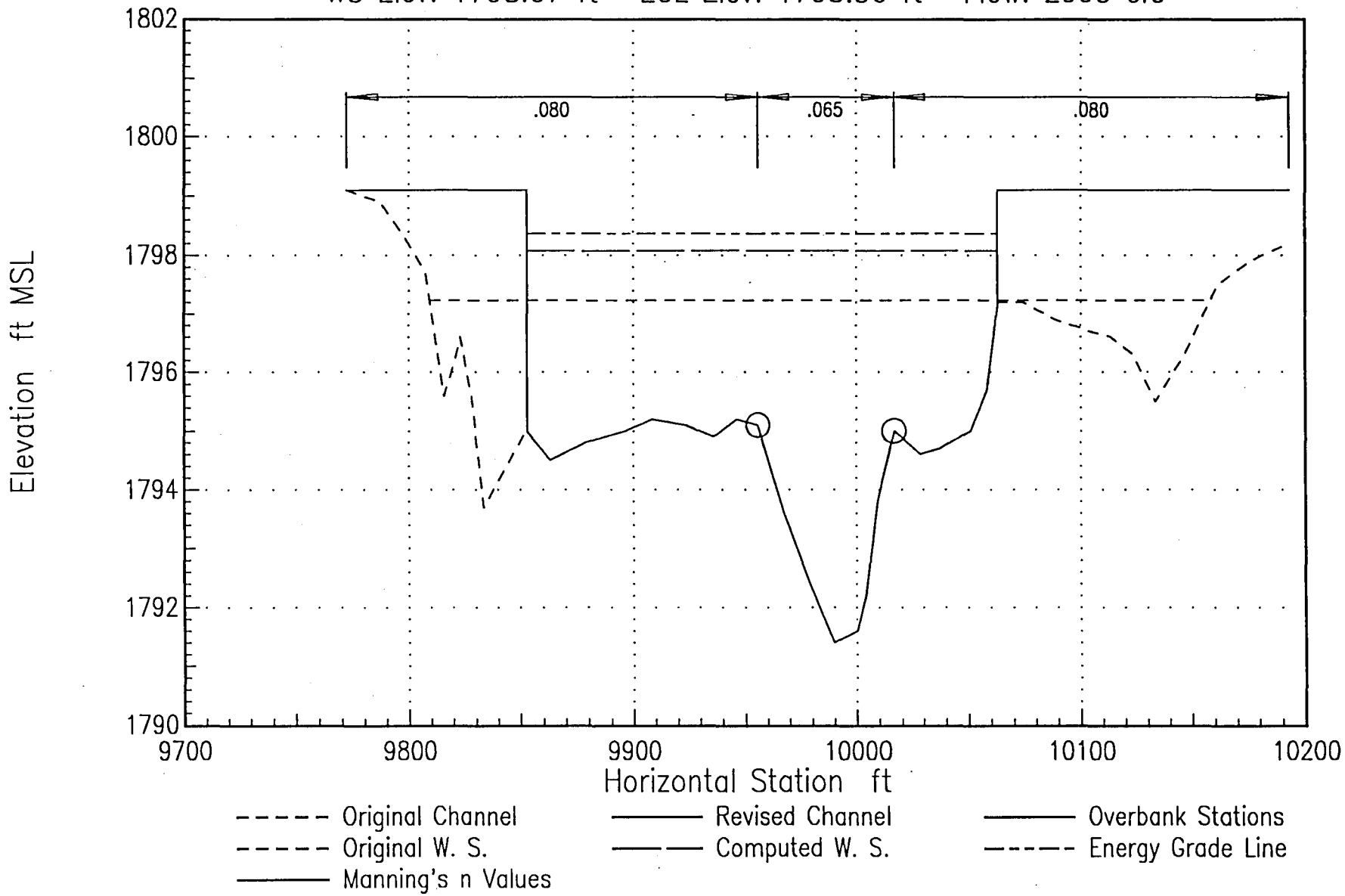
Revised Cross-Section Plot 16.421

WS: 1793.53ft Crit.WS: 1793.53ft EGL: 1795.05ft Flow: 2995cfs



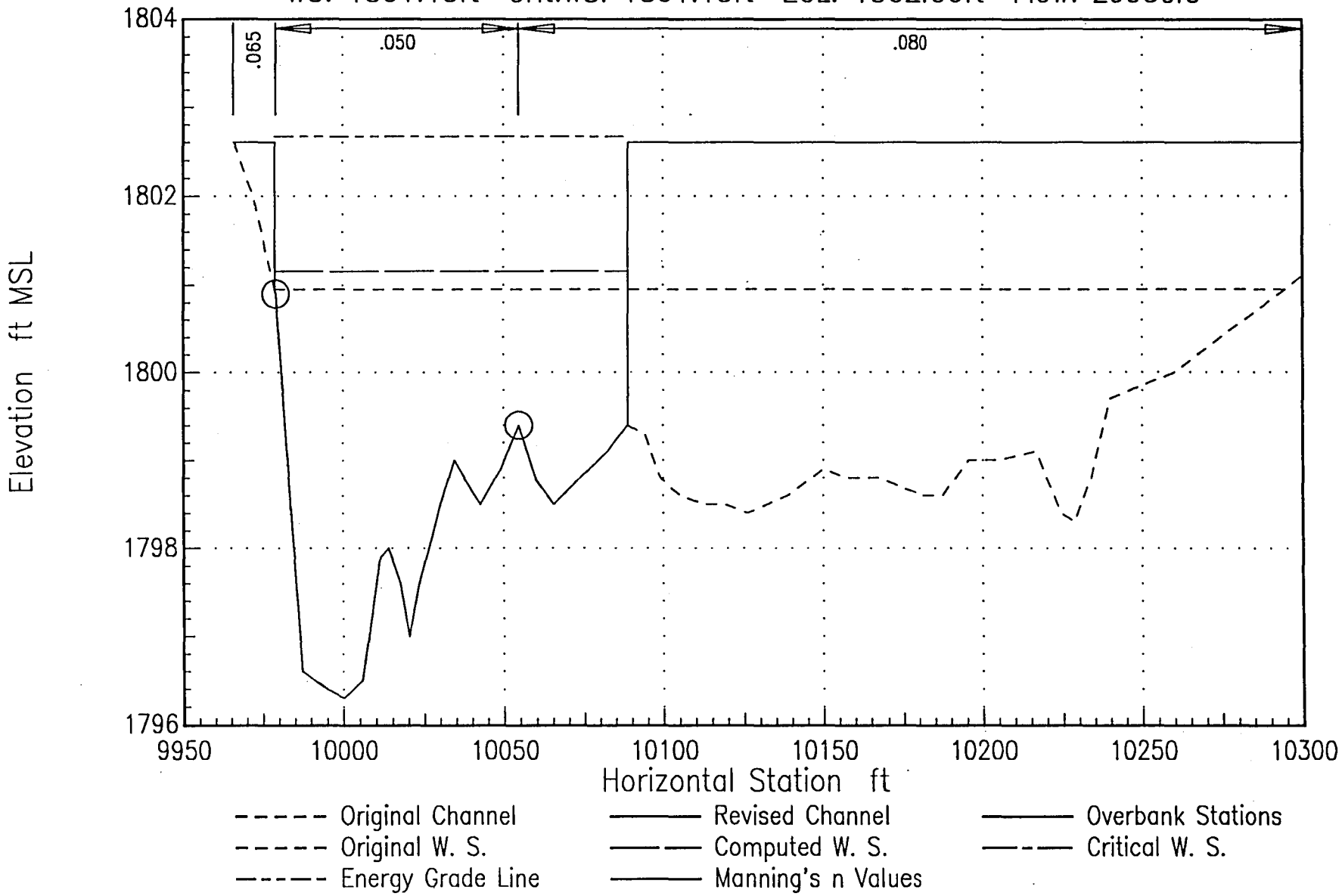
Revised Cross-Section Plot 16.481

WS Elev: 1798.07 ft EGL Elev: 1798.36 ft Flow: 2995 cfs



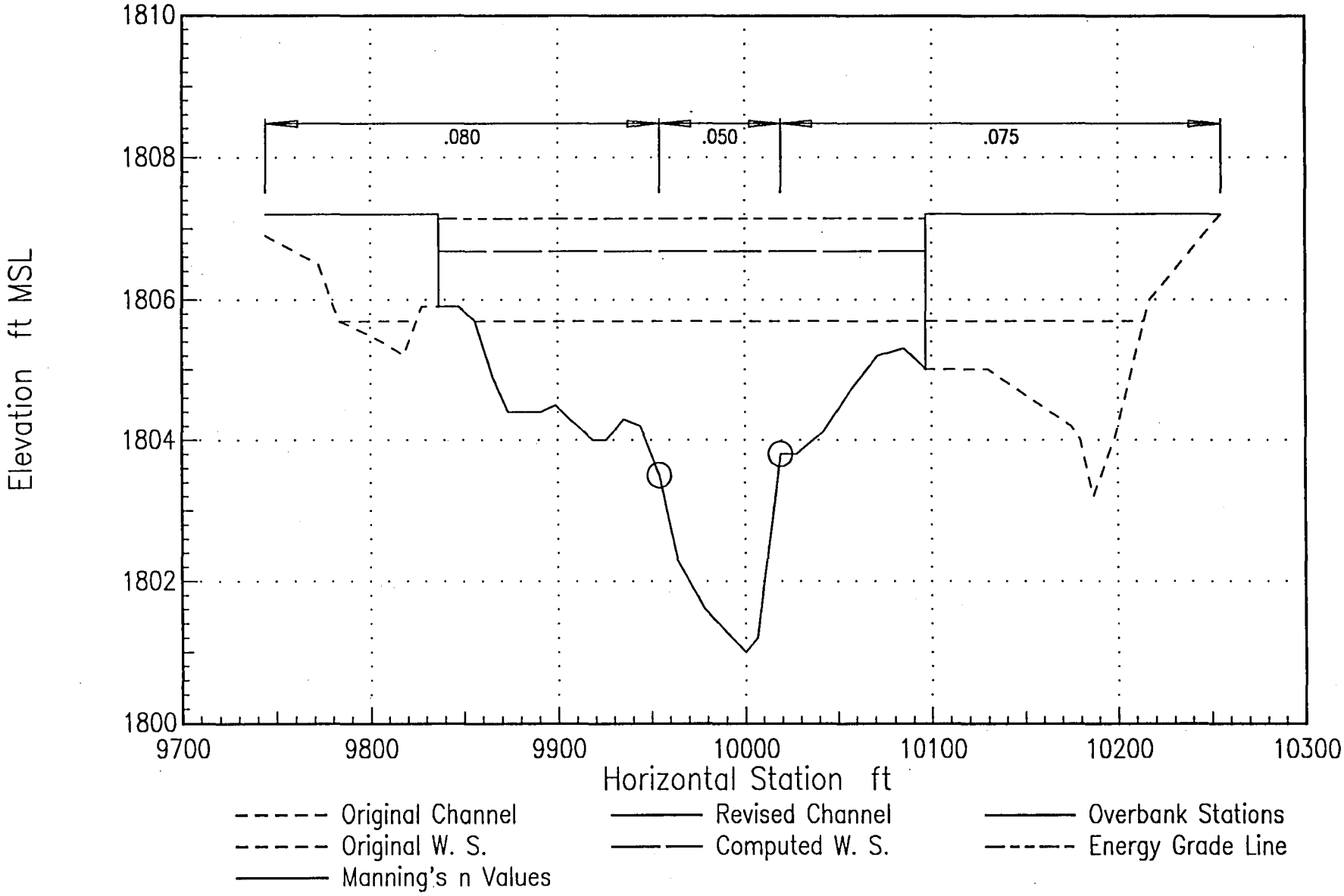
Revised Cross-Section Plot 16.551

WS: 1801.15ft Crit.WS: 1801.15ft EGL: 1802.66ft Flow: 2995cfs



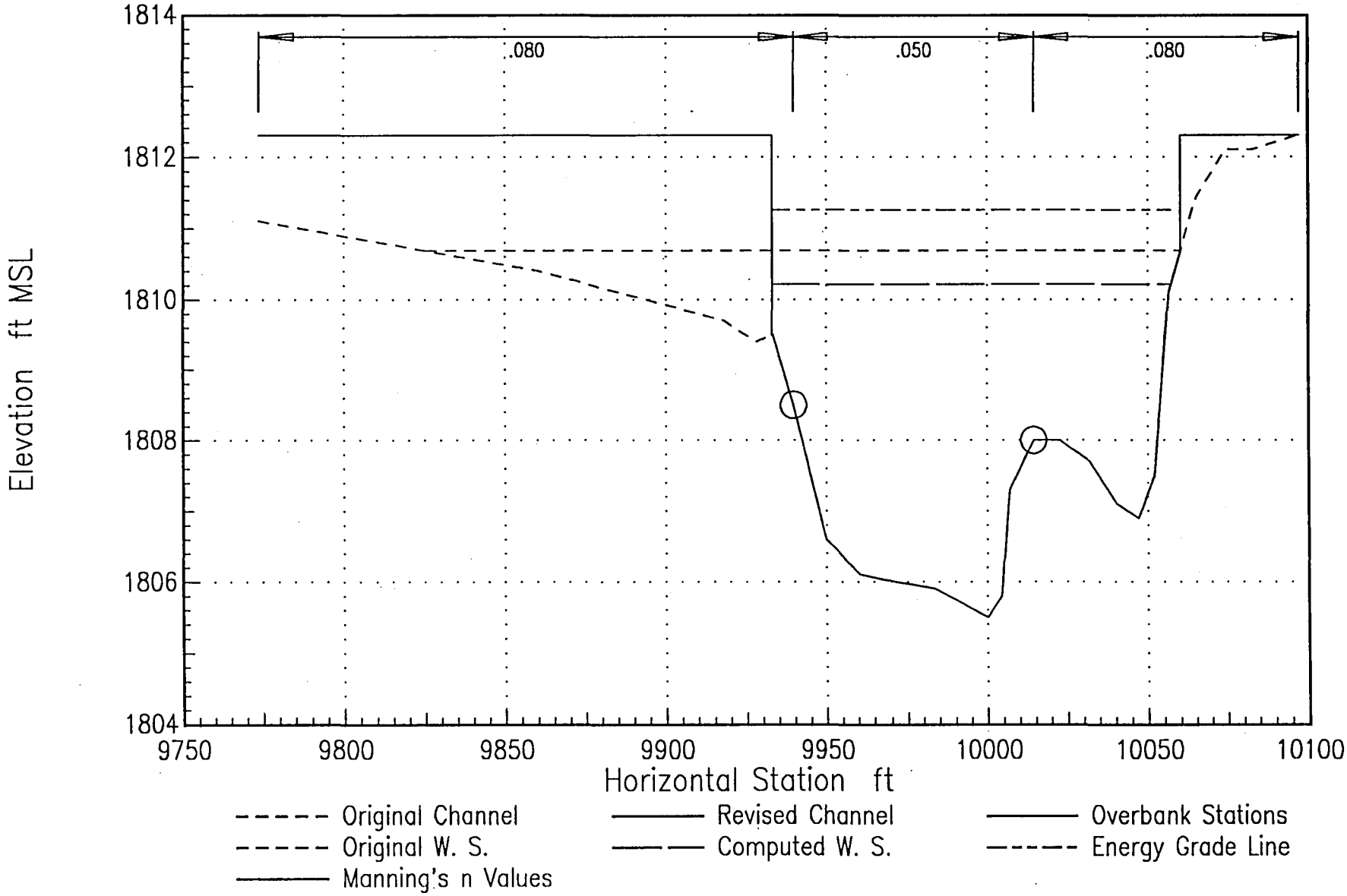
Revised Cross-Section Plot 16.628

WS Elev: 1806.67 ft EGL Elev: 1807.13 ft Flow: 2995 cfs



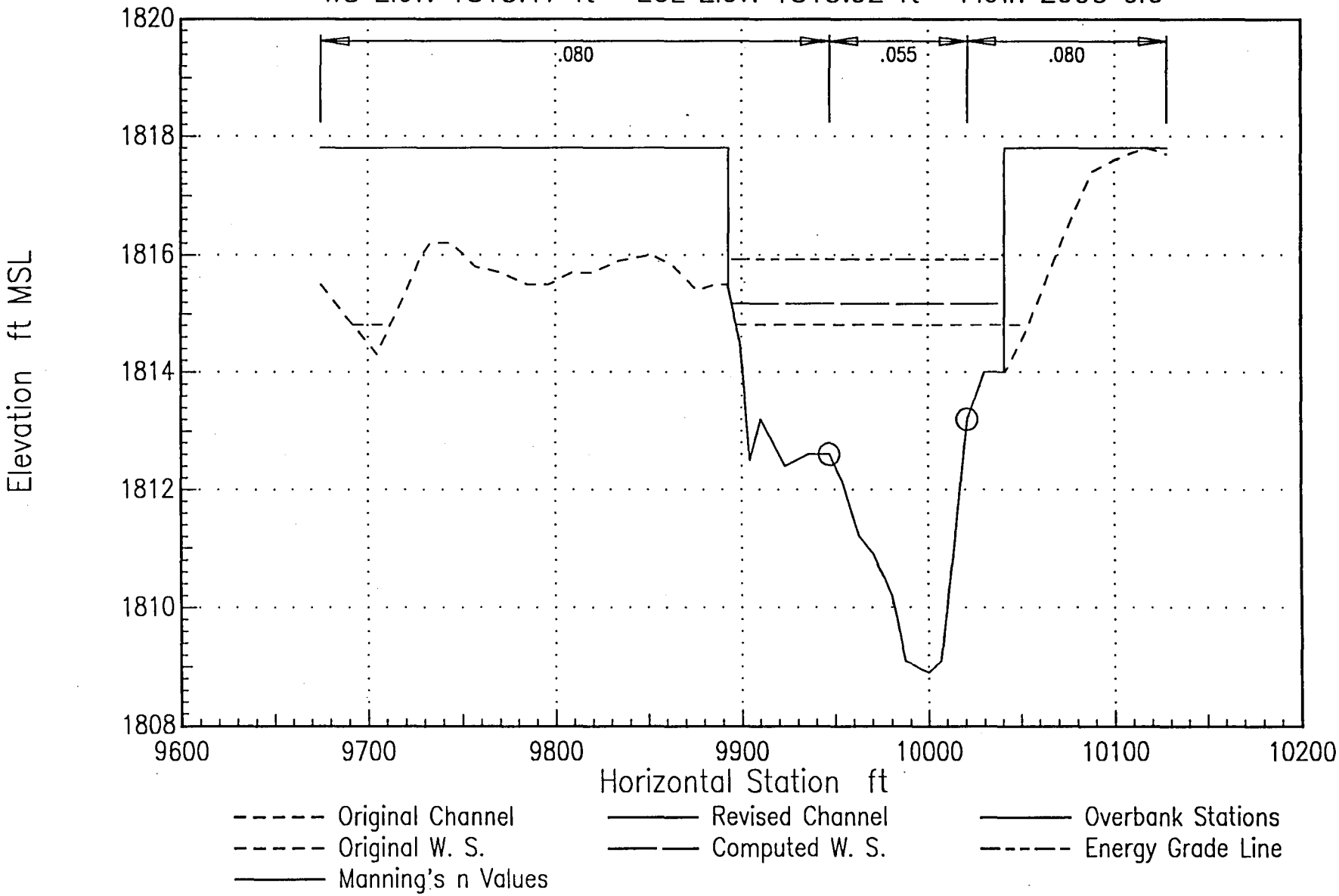
Revised Cross-Section Plot 16.714

WS Elev: 1810.21 ft EGL Elev: 1811.25 ft Flow: 2995 cfs



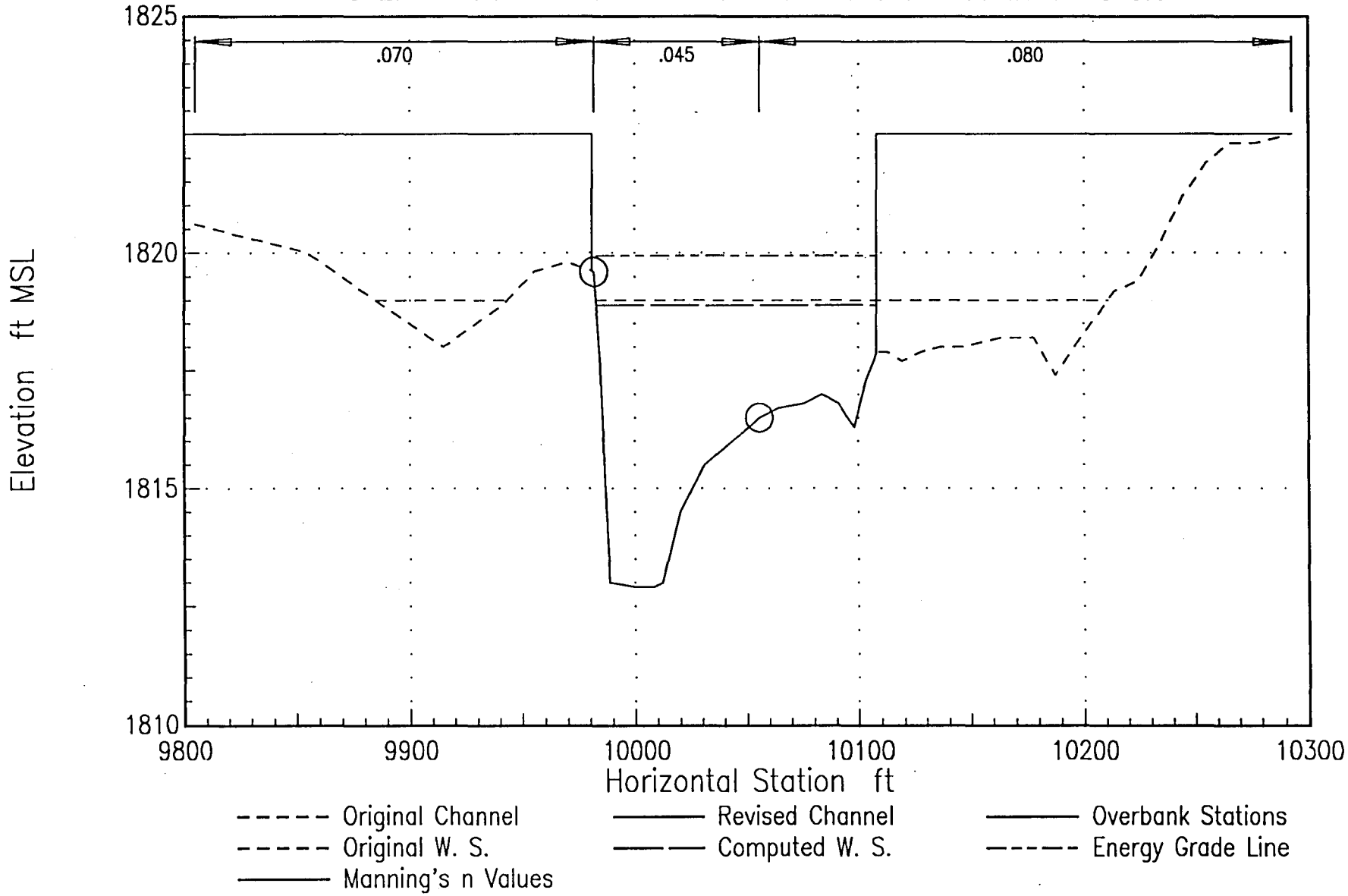
Revised Cross-Section Plot 16.788

WS Elev: 1815.17 ft EGL Elev: 1815.92 ft Flow: 2995 cfs



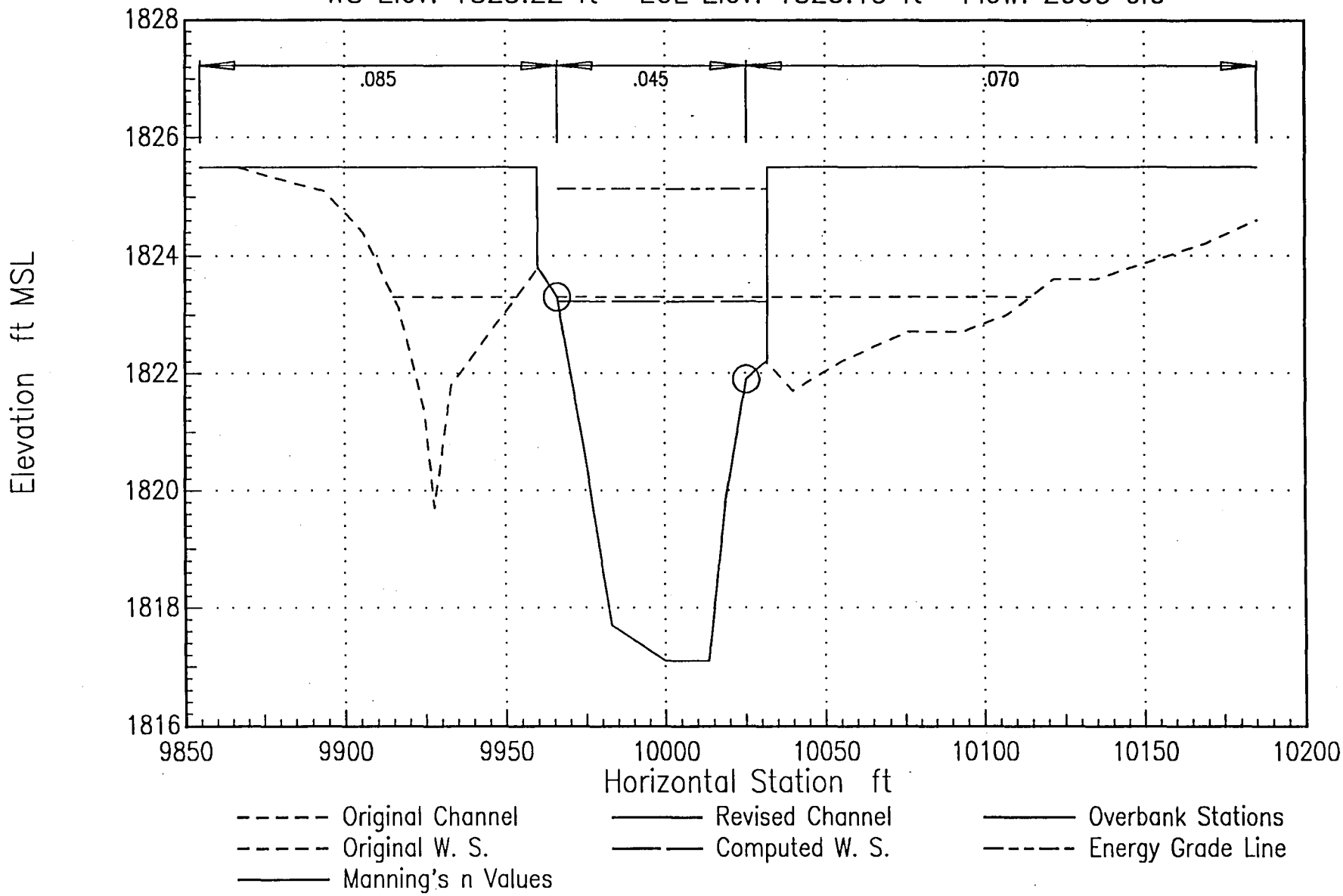
Revised Cross-Section Plot 16.861

WS Elev: 1818.89 ft EGL Elev: 1819.93 ft Flow: 2995 cfs



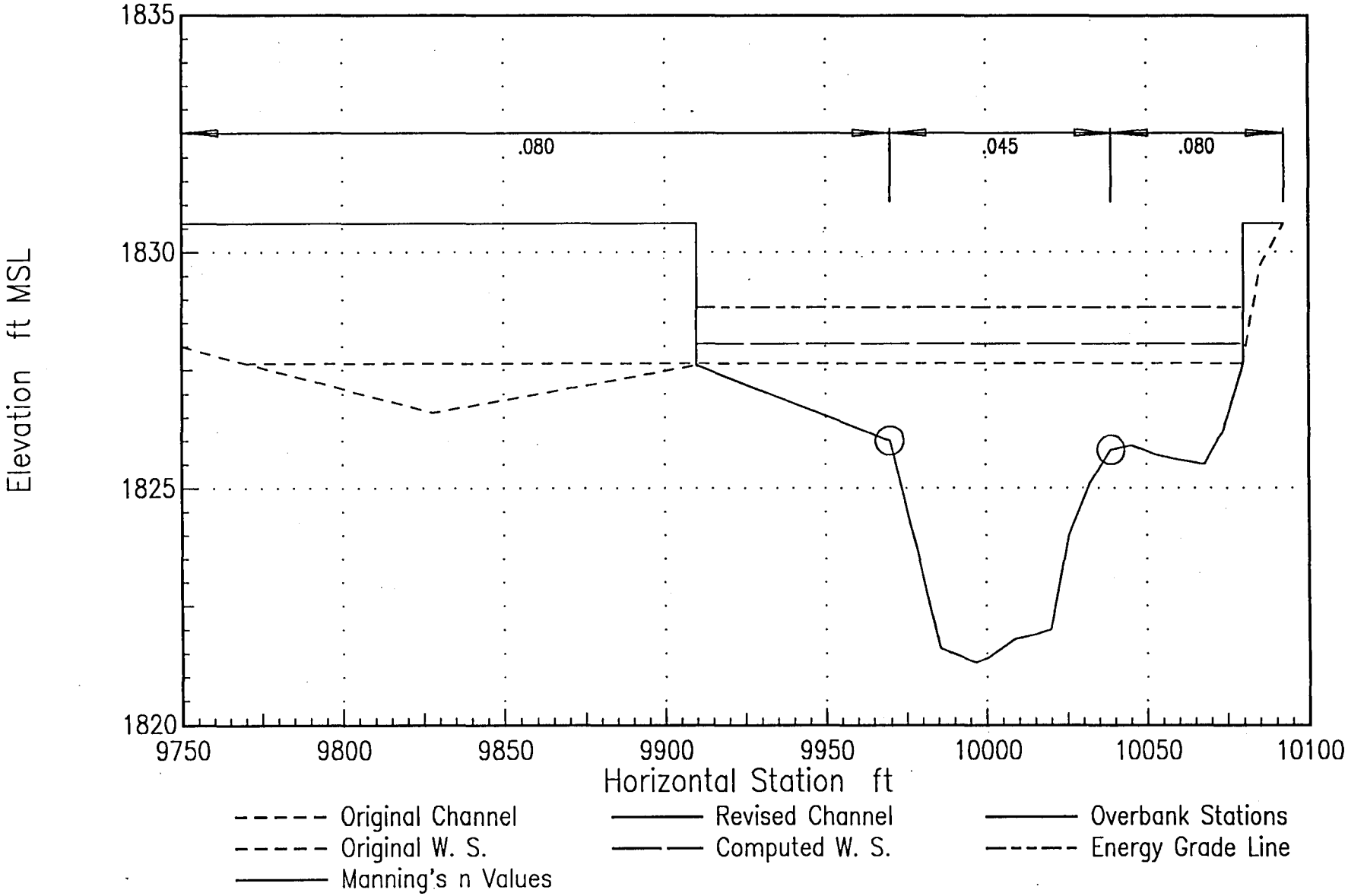
Revised Cross-Section Plot 16.936

WS Elev: 1823.22 ft EGL Elev: 1825.13 ft Flow: 2995 cfs



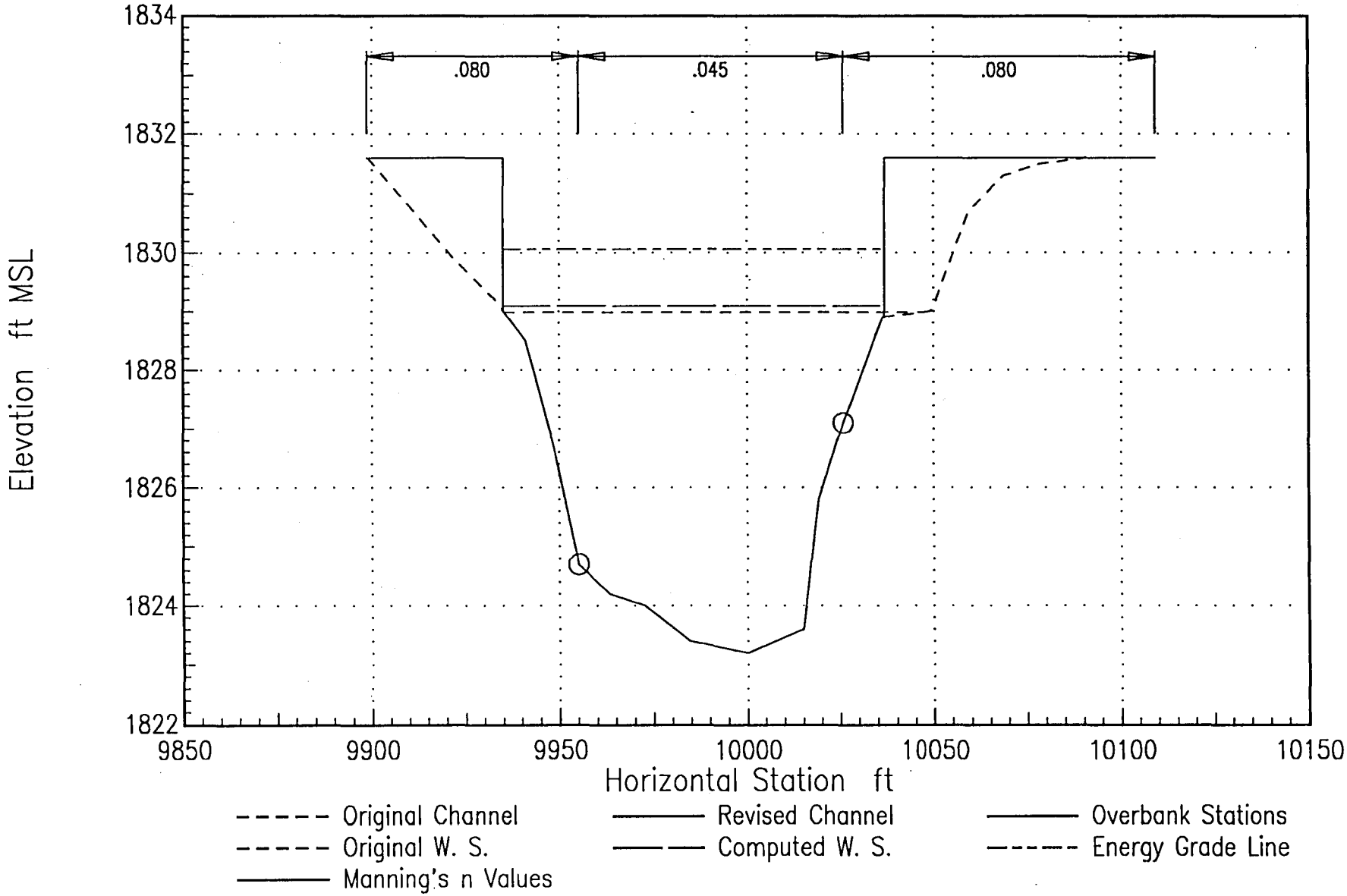
Revised Cross-Section Plot 17.011

WS Elev: 1828.05 ft EGL Elev: 1828.83 ft Flow: 2995 cfs



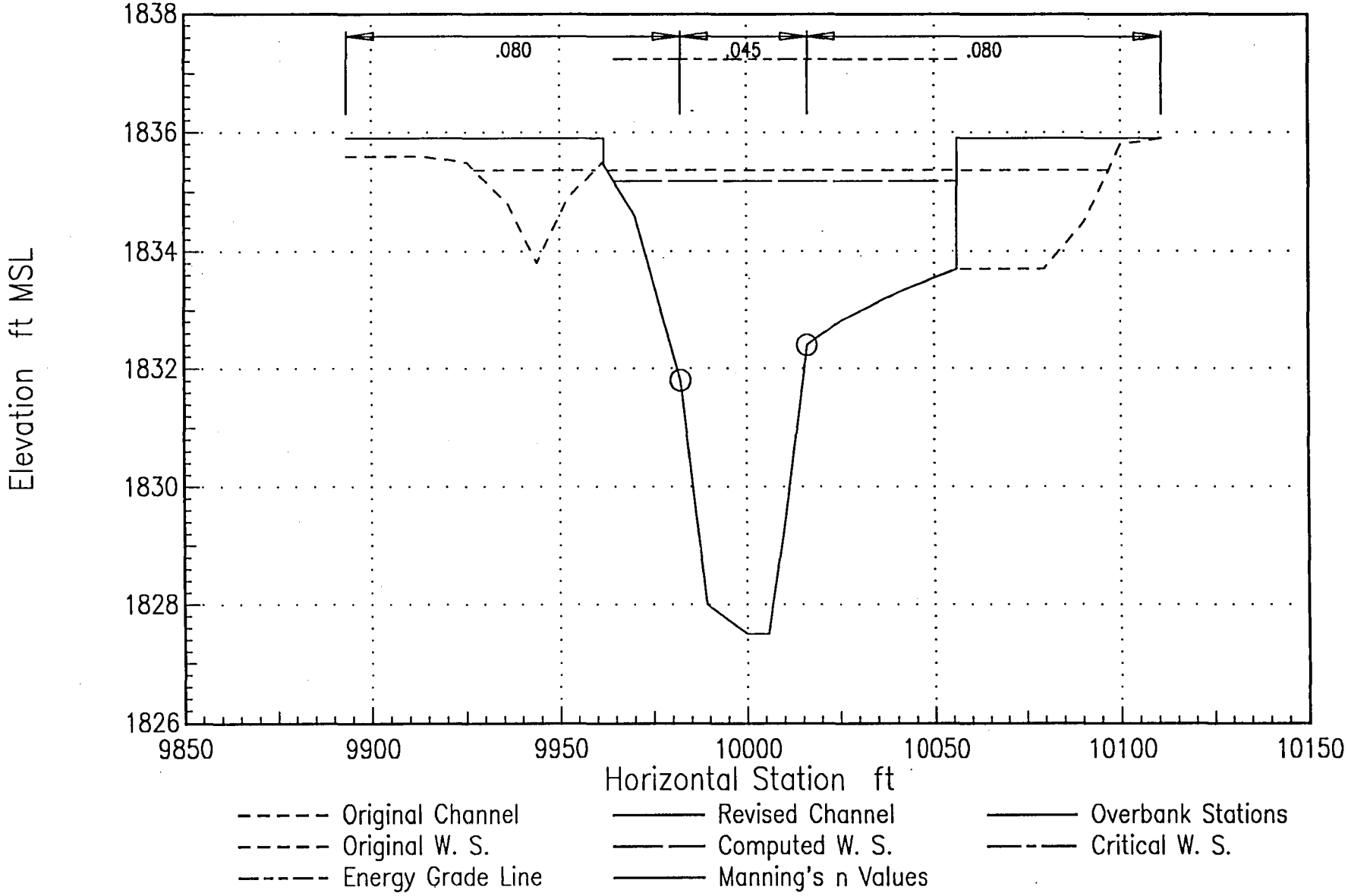
Revised Cross-Section Plot 17.046

WS Elev: 1829.09 ft EGL Elev: 1830.05 ft Flow: 2995 cfs



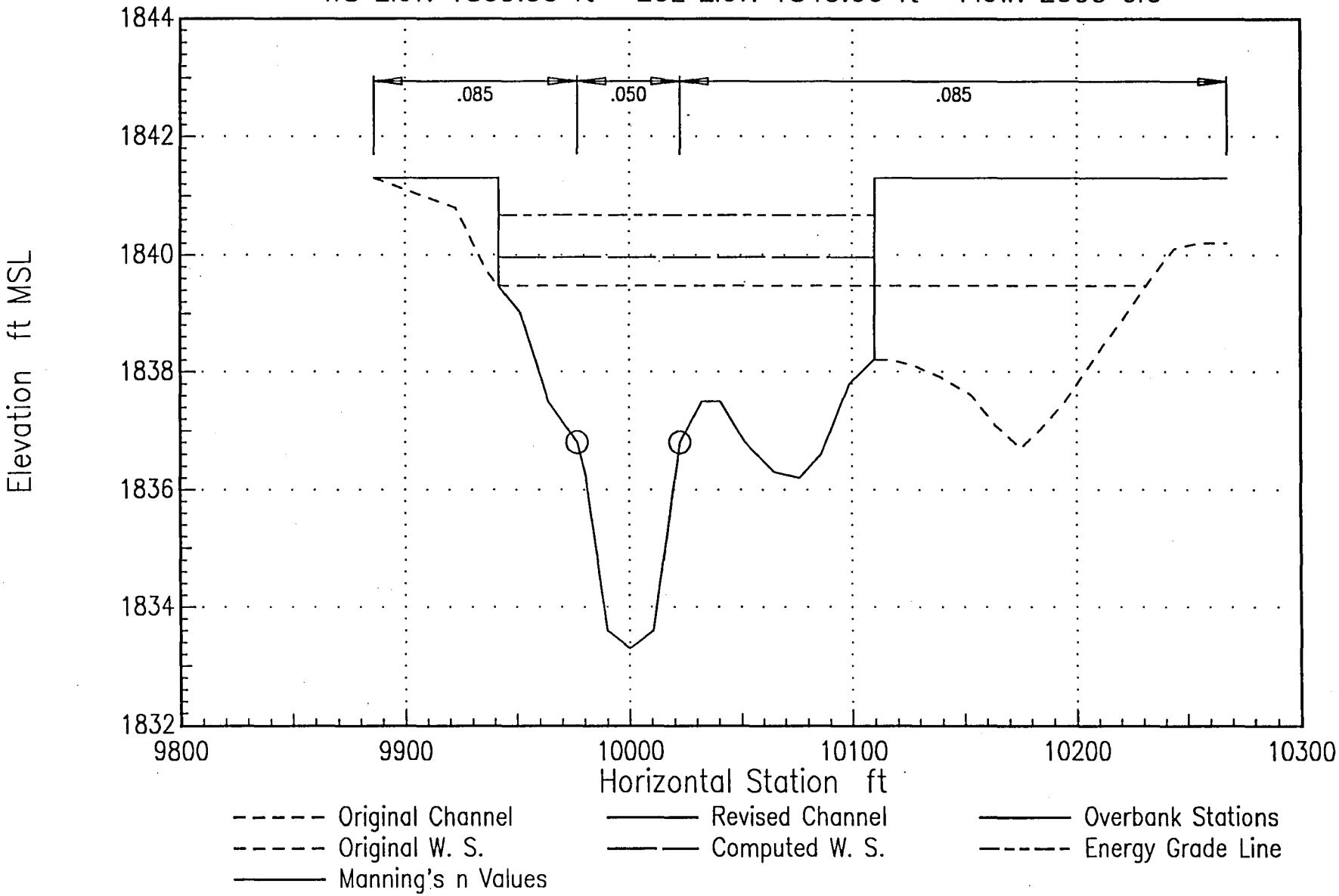
Revised Cross-Section Plot 17.135

WS: 1835.18ft Crit.WS: 1835.18ft EGL: 1837.23ft Flow: 2995cfs



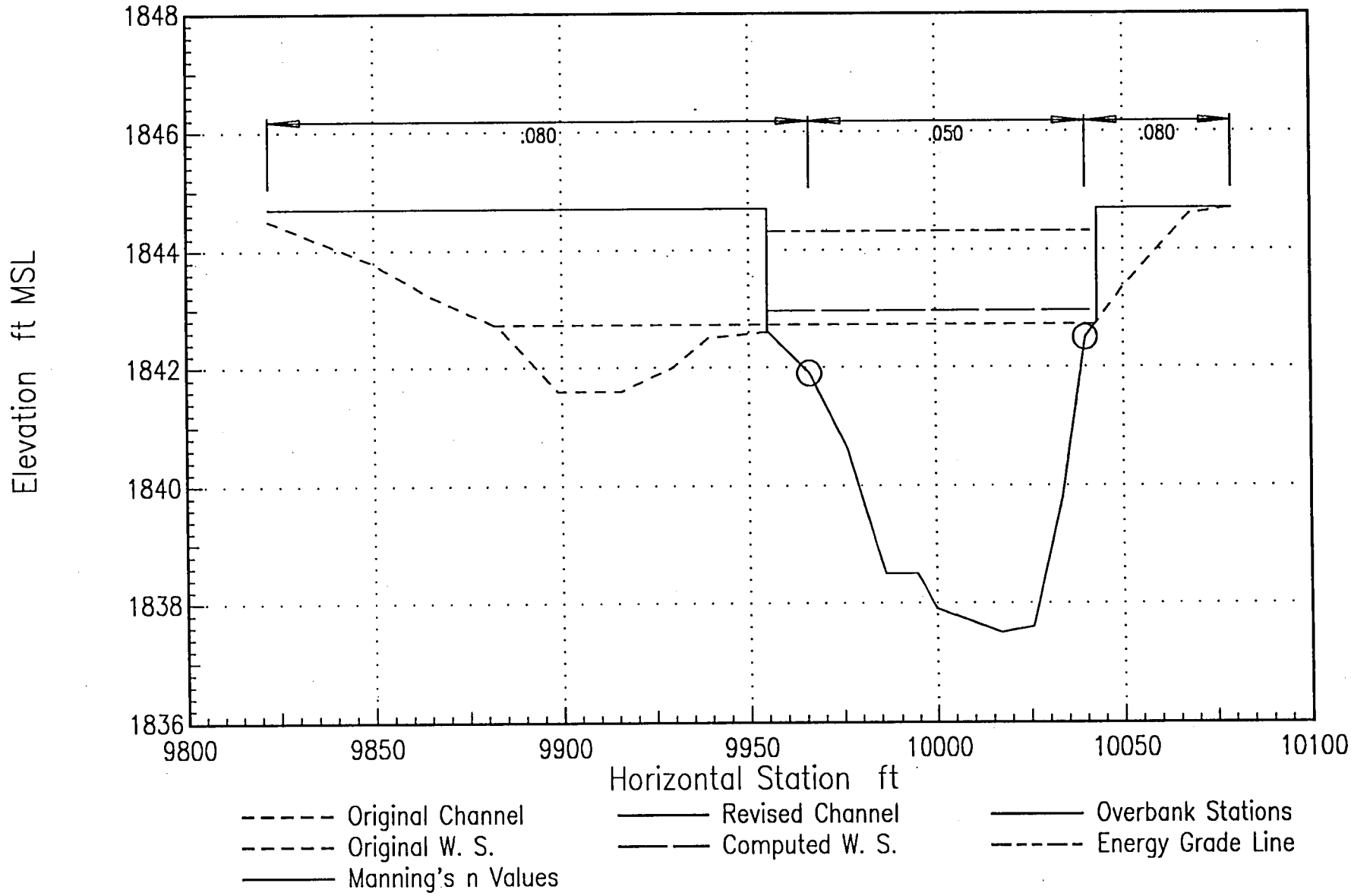
Revised Cross-Section Plot 17.2

WS Elev: 1839.95 ft EGL Elev: 1840.66 ft Flow: 2995 cfs



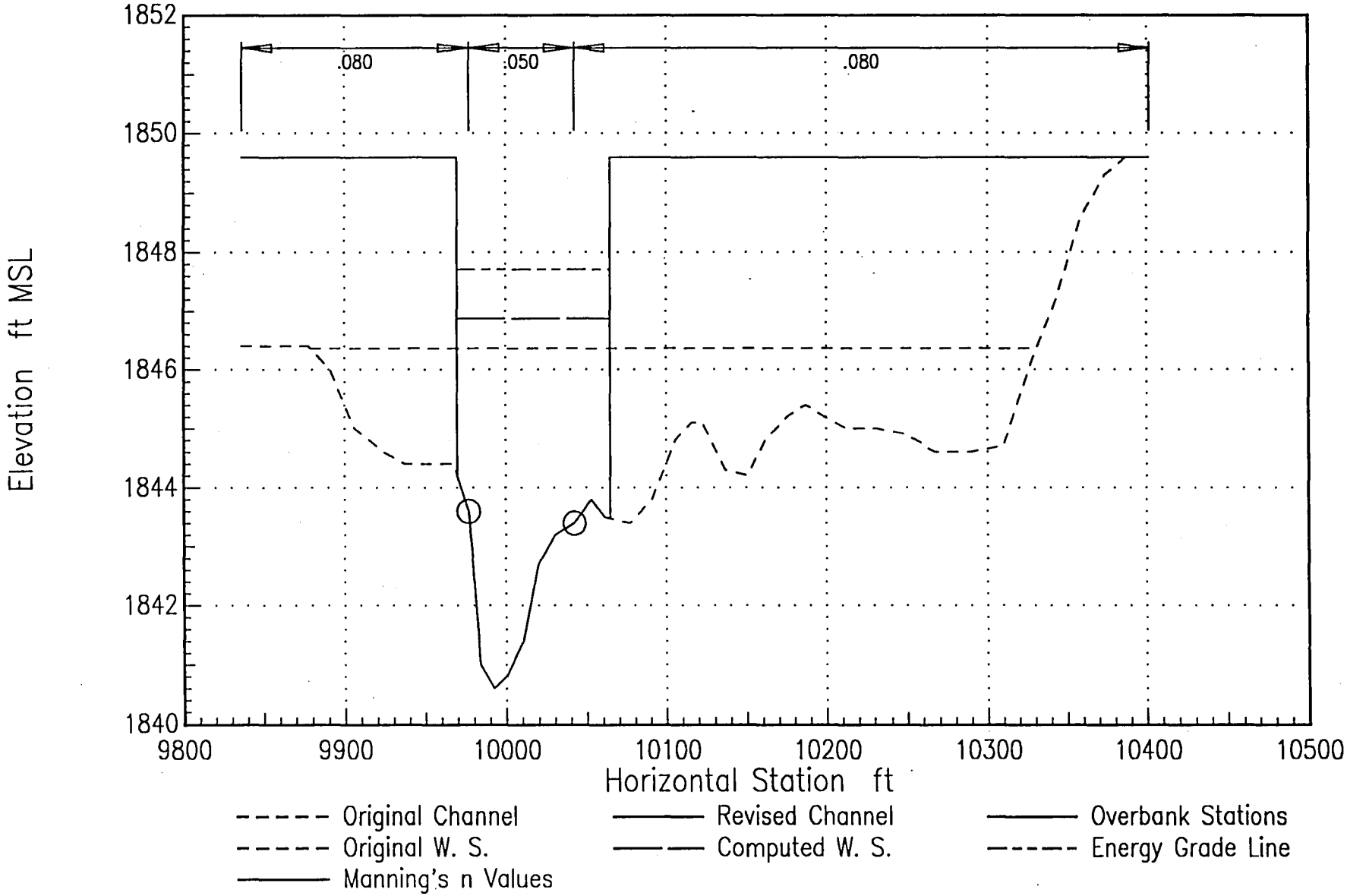
Revised Cross-Section Plot 17.262

WS Elev: 1842.96 ft EGL Elev: 1844.31 ft Flow: 2785 cfs



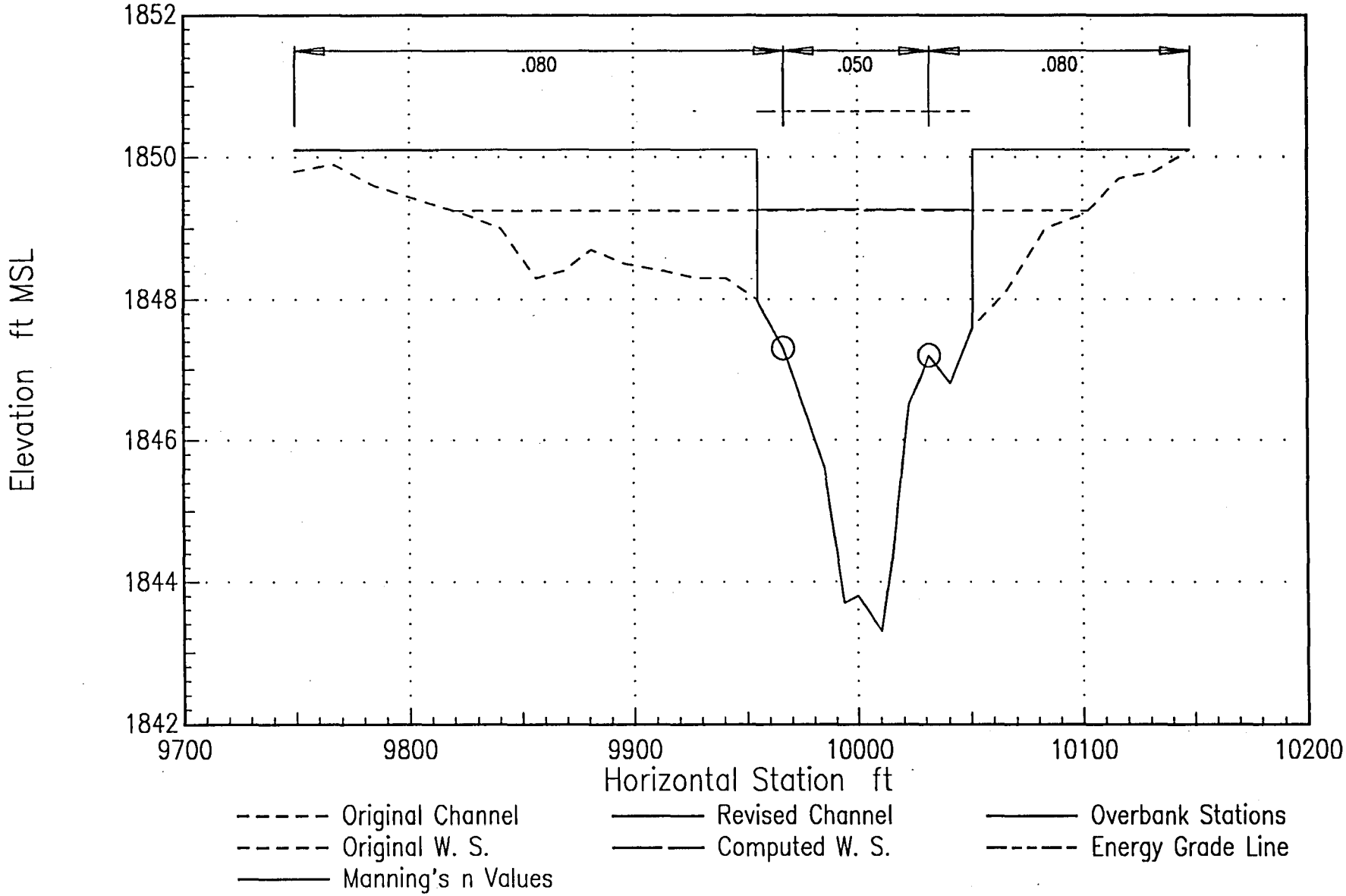
Revised Cross-Section Plot 17.319

WS Elev: 1846.86 ft EGL Elev: 1847.70 ft Flow: 2785 cfs



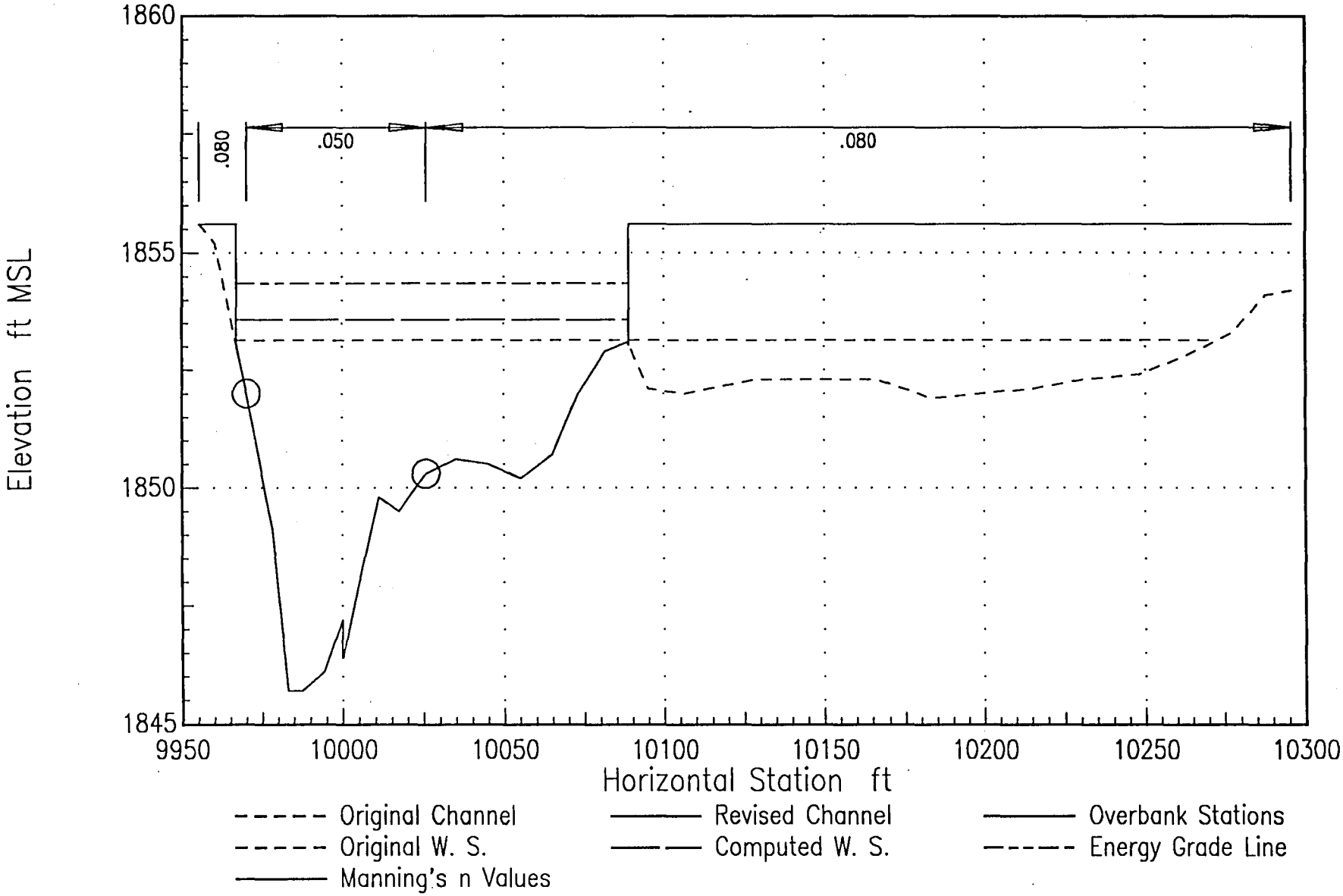
Revised Cross-Section Plot 17.364

WS Elev: 1849.26 ft EGL Elev: 1850.64 ft Flow: 2785 cfs



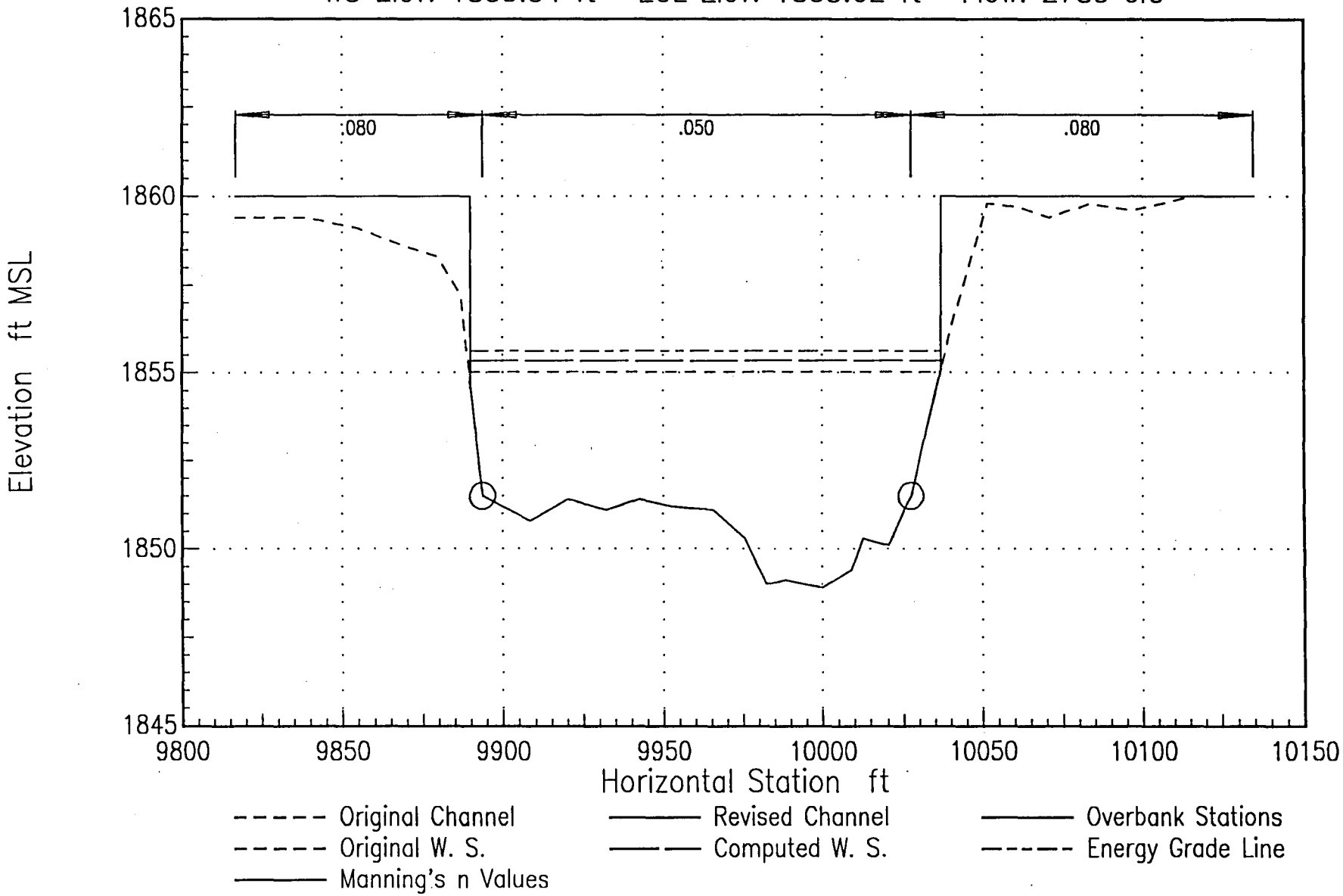
Revised Cross-Section Plot 17.425

WS Elev: 1853.57 ft EGL Elev: 1854.35 ft Flow: 2785 cfs



Revised Cross-Section Plot 17.476

WS Elev: 1855.34 ft EGL Elev: 1855.62 ft Flow: 2785 cfs

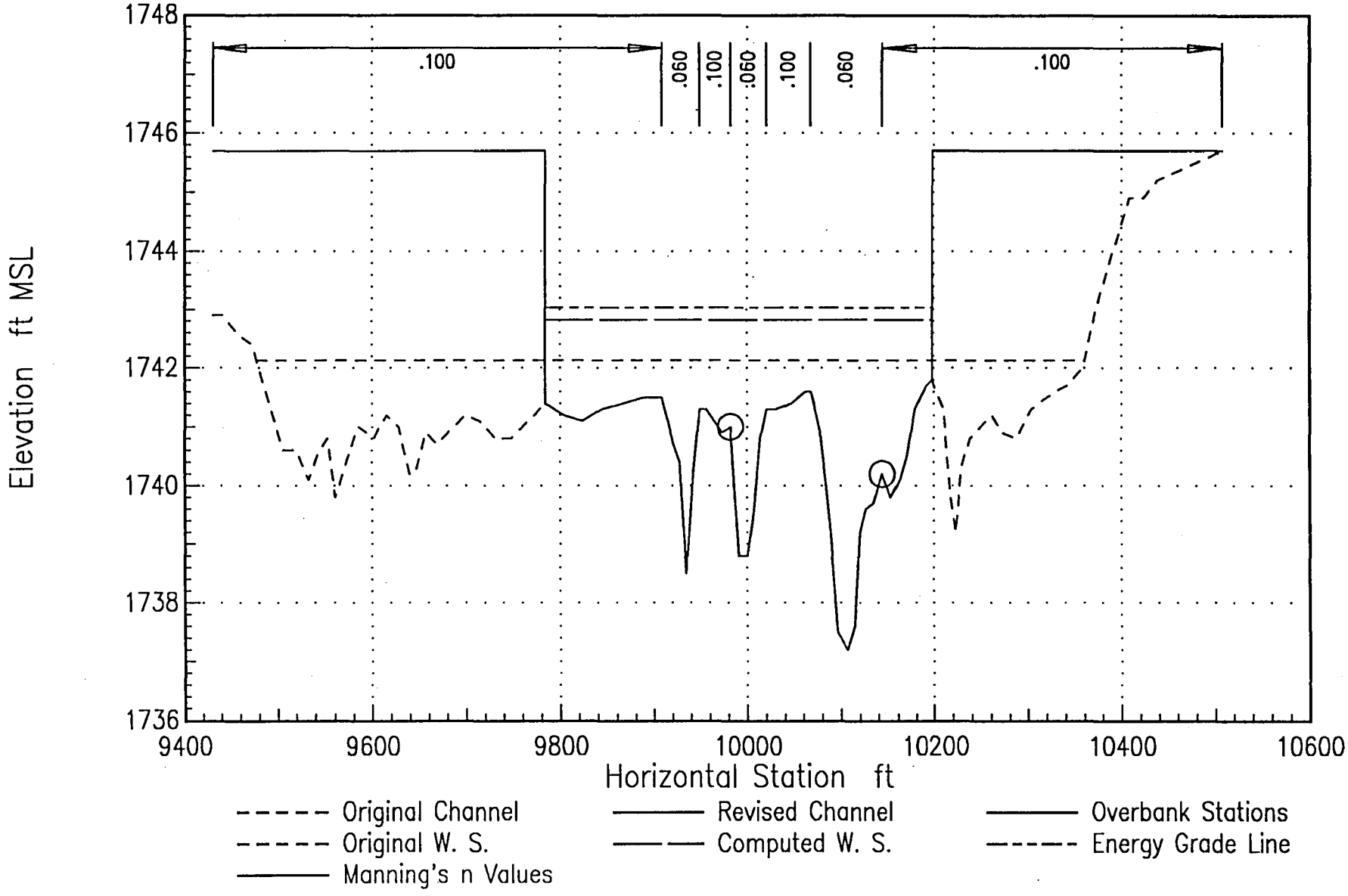


WEST CHANNEL AT SPLIT - TRILBY WASH

ENCROACHED

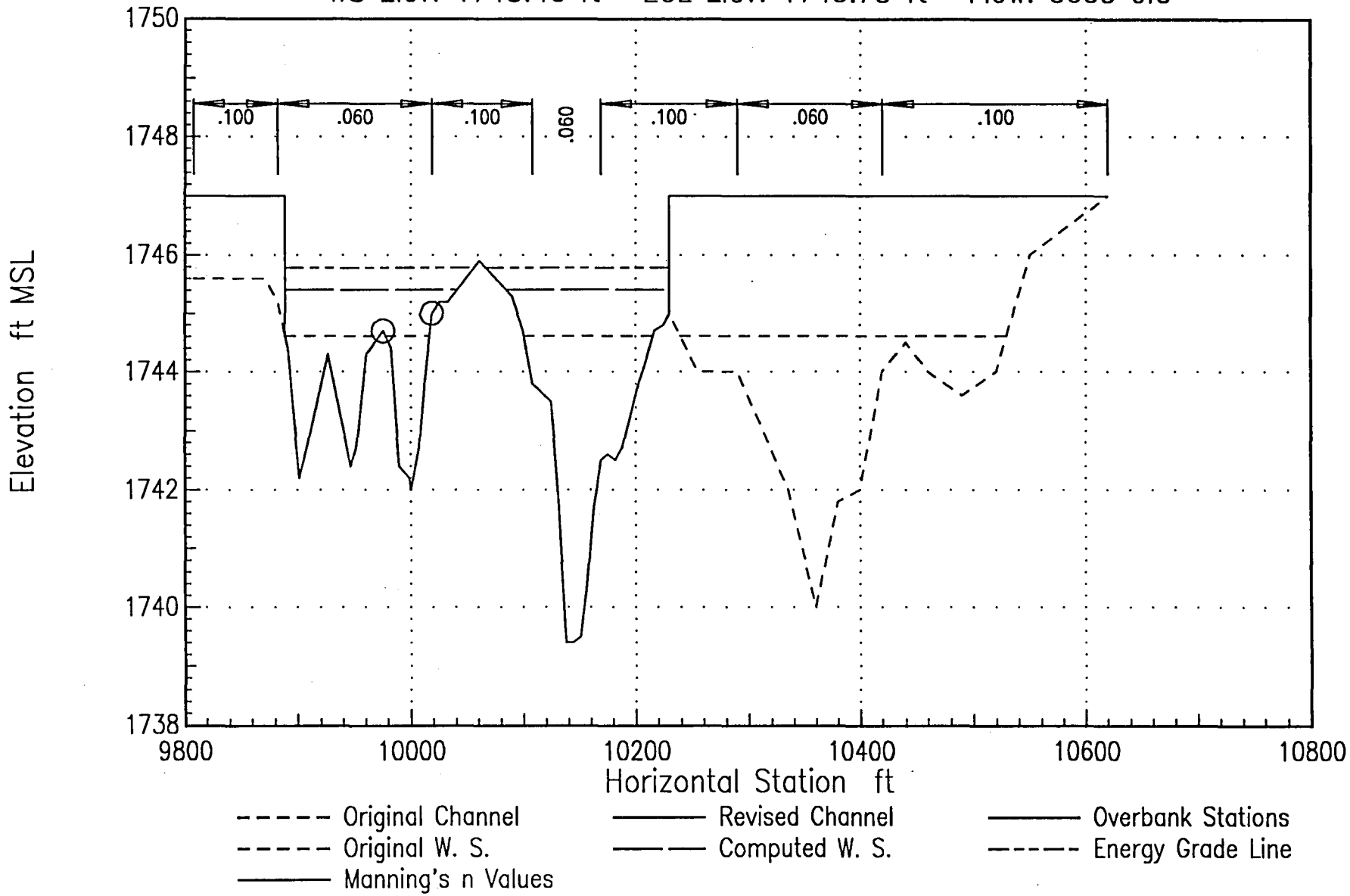
Revised Cross-Section Plot 15.581

WS Elev: 1742.82 ft EGL Elev: 1743.03 ft Flow: 3035 cfs



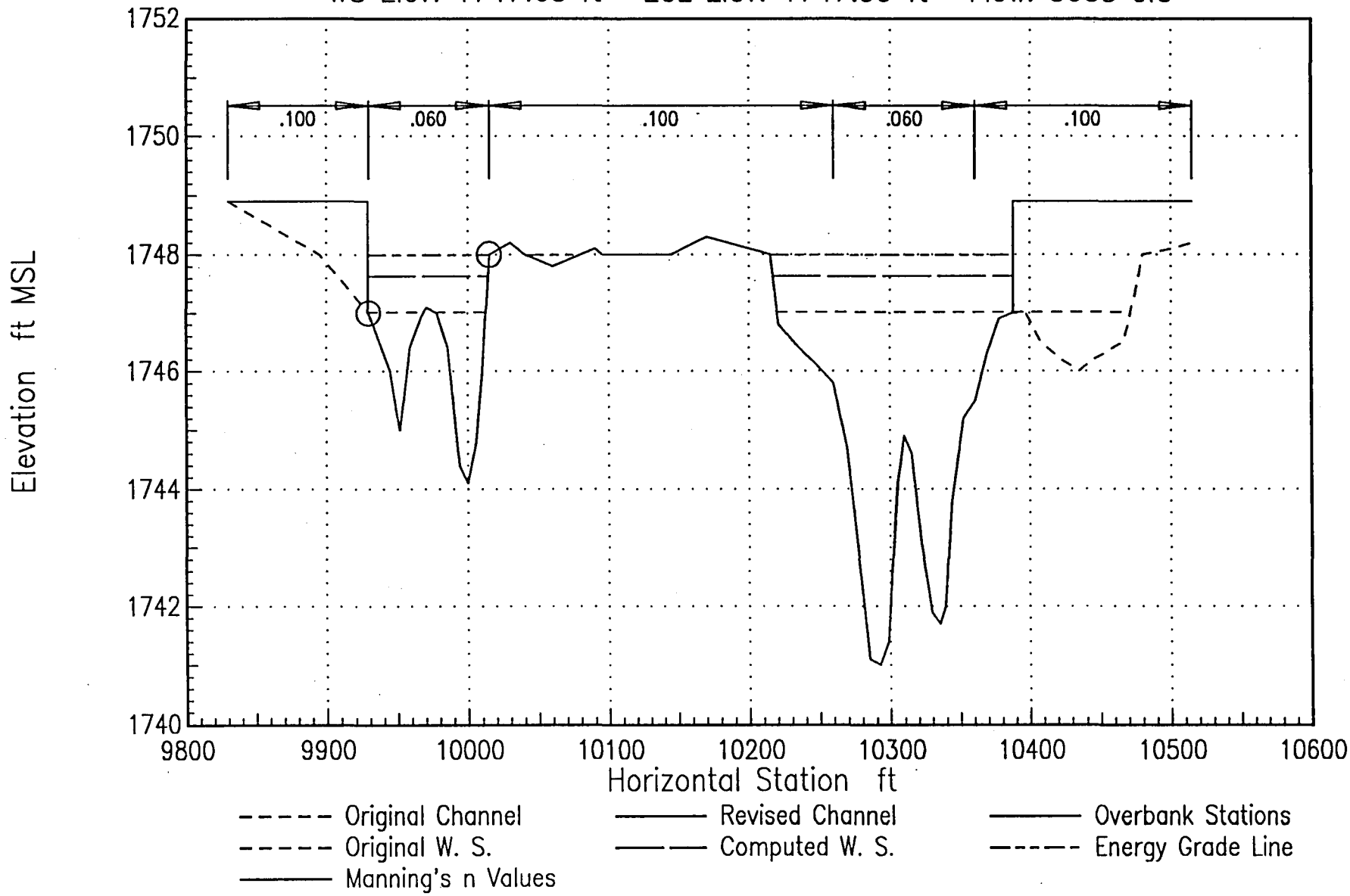
Revised Cross-Section Plot 15.637

WS Elev: 1745.40 ft EGL Elev: 1745.78 ft Flow: 3035 cfs



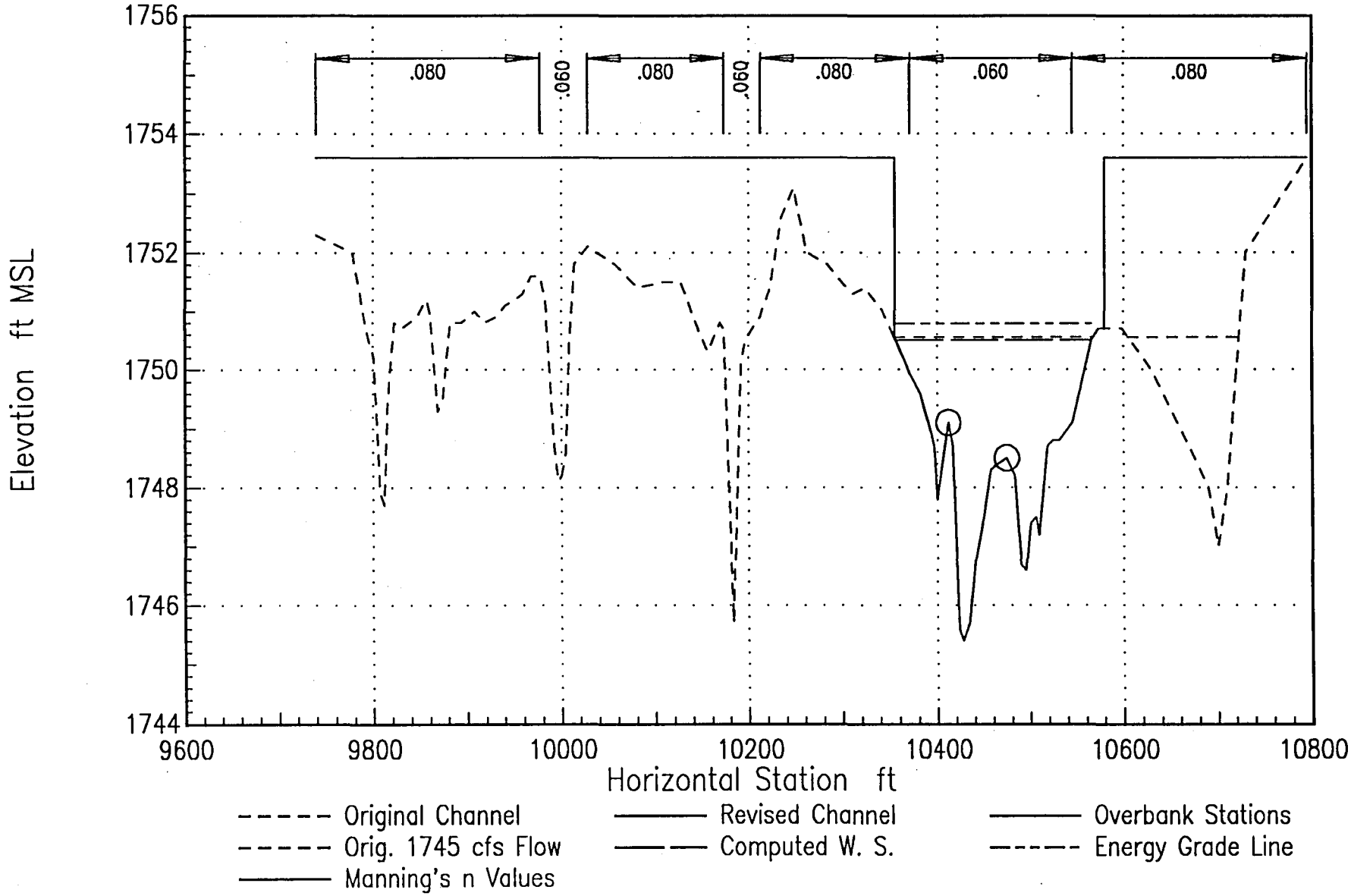
Revised Cross-Section Plot 15.683

WS Elev: 1747.63 ft EGL Elev: 1747.99 ft Flow: 3035 cfs



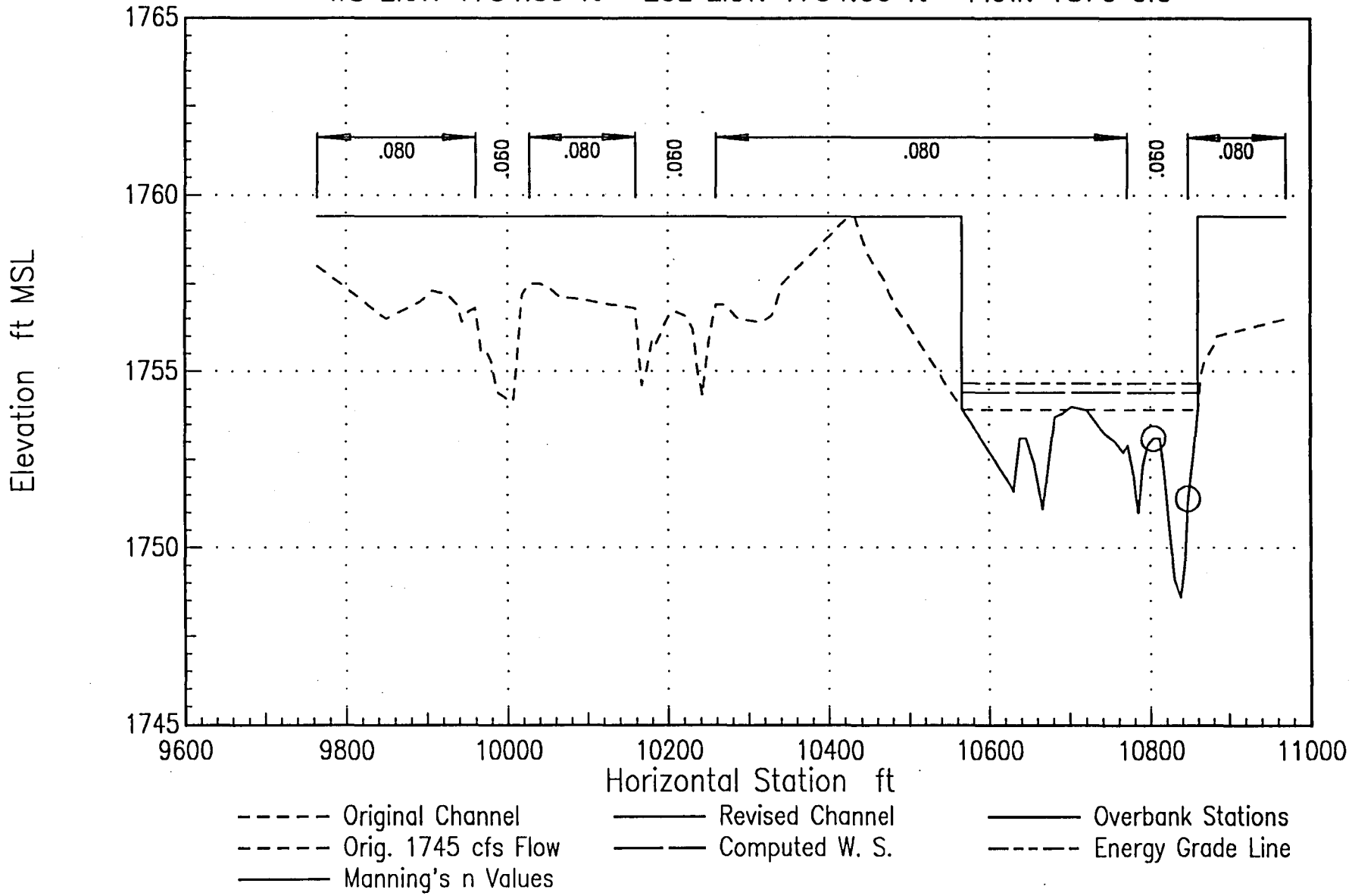
Revised Cross-Section Plot 15.749

WS Elev: 1750.50 ft EGL Elev: 1750.78 ft Flow: 1870 cfs



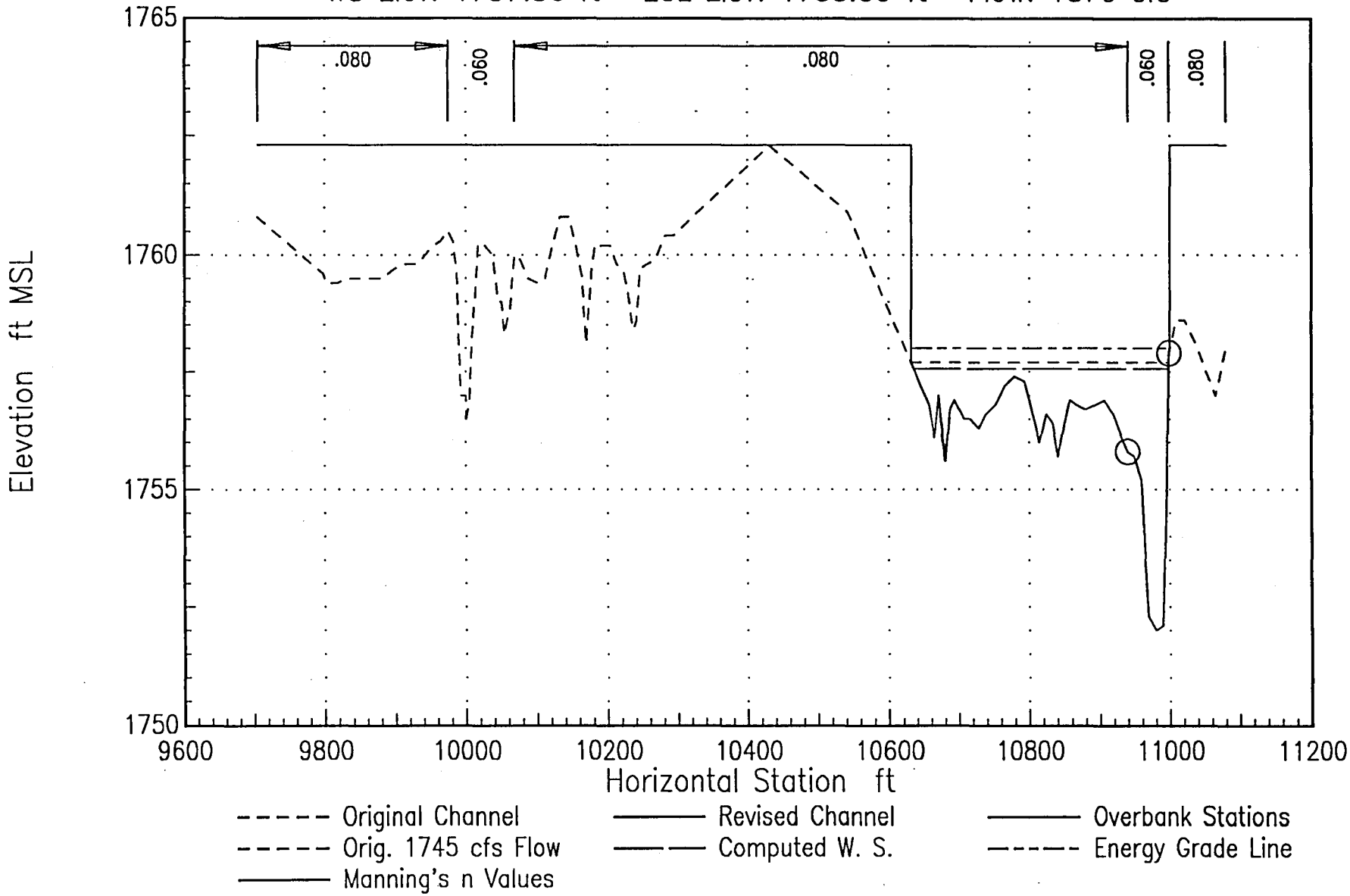
Revised Cross-Section Plot 15.842

WS Elev: 1754.39 ft EGL Elev: 1754.66 ft Flow: 1870 cfs



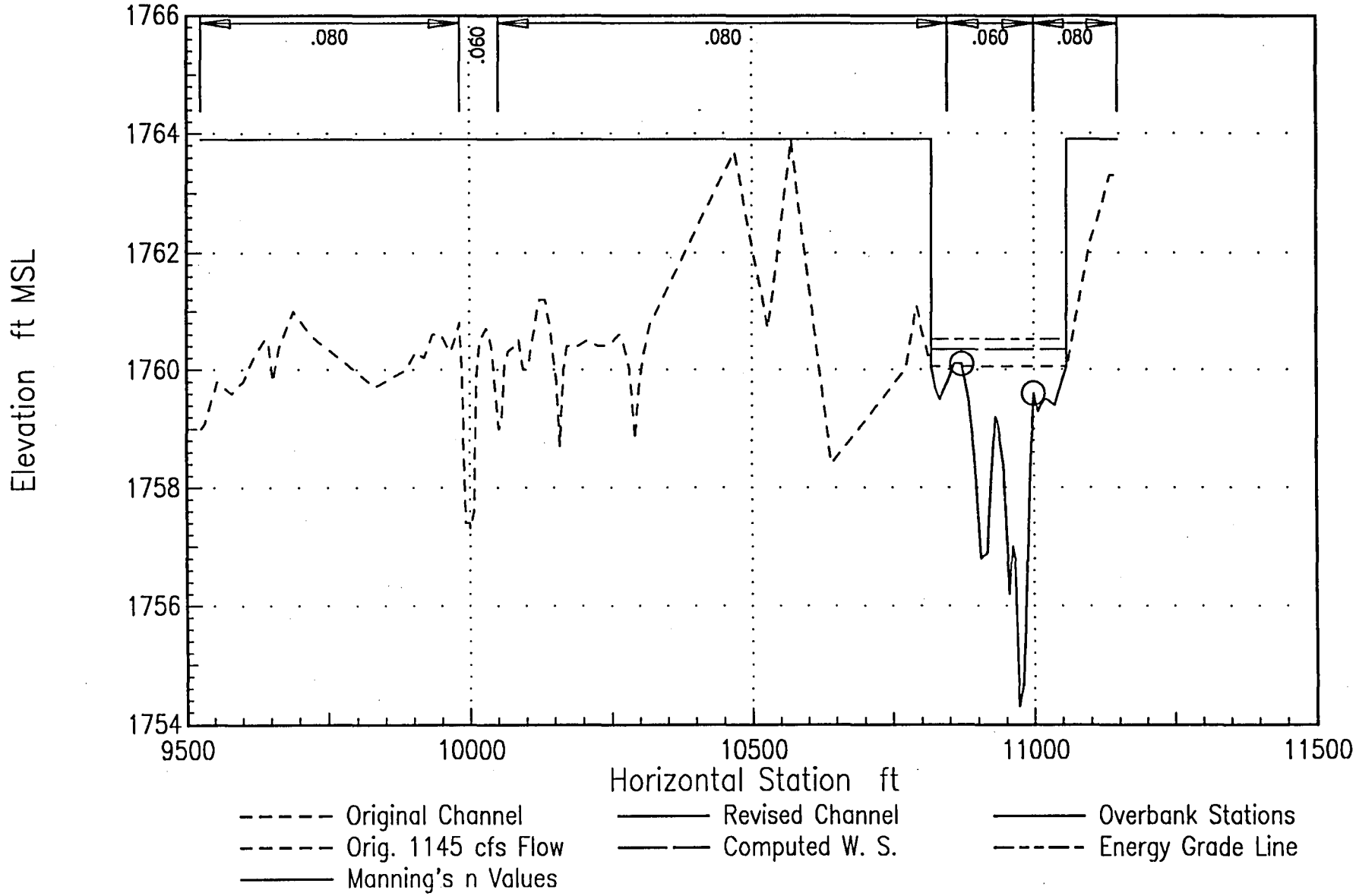
Revised Cross-Section Plot 15.89

WS Elev: 1757.56 ft EGL Elev: 1758.00 ft Flow: 1870 cfs



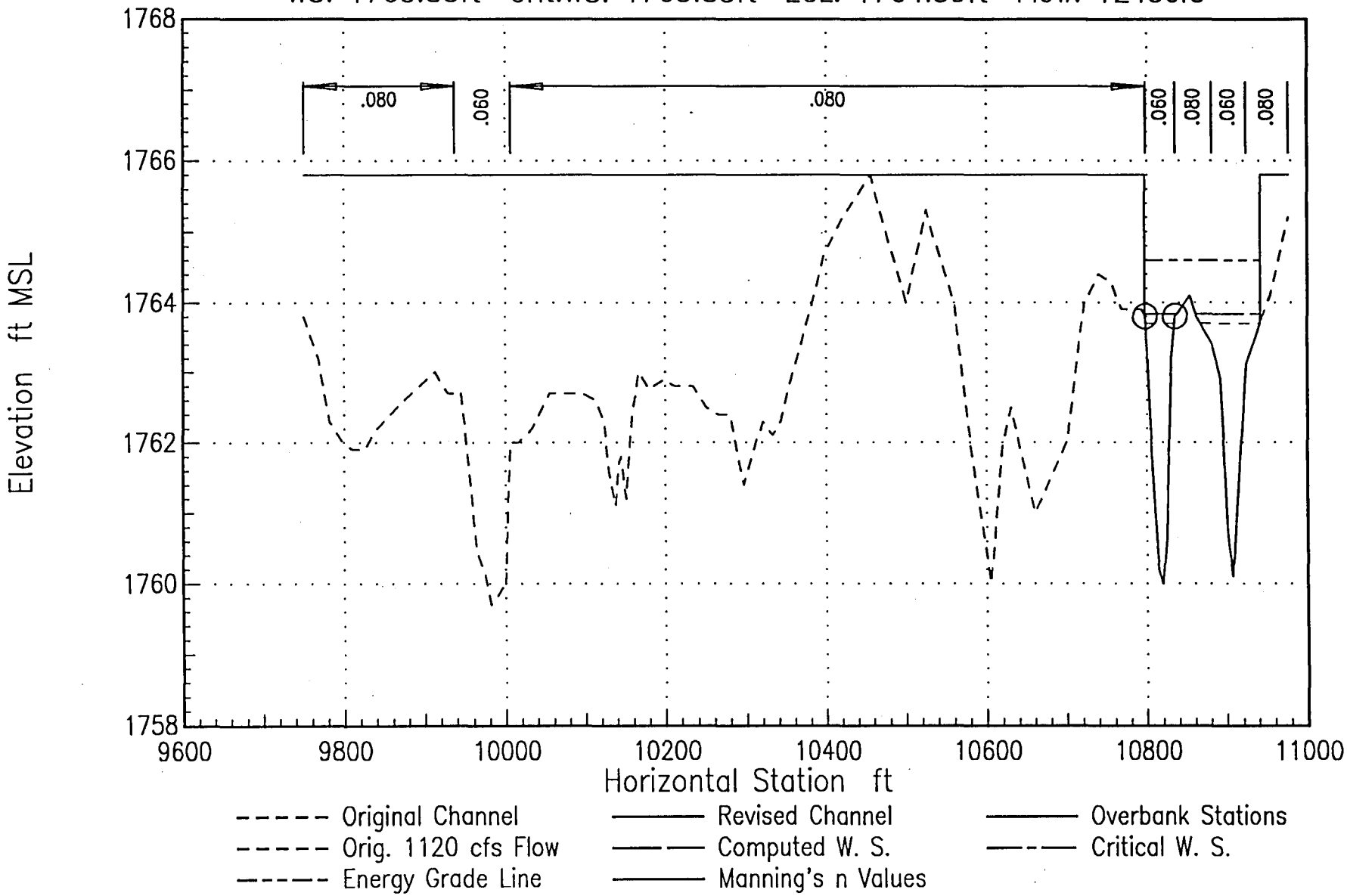
Revised Cross-Section Plot 15.898

WS Elev: 1760.34 ft EGL Elev: 1760.51 ft Flow: 1270 cfs



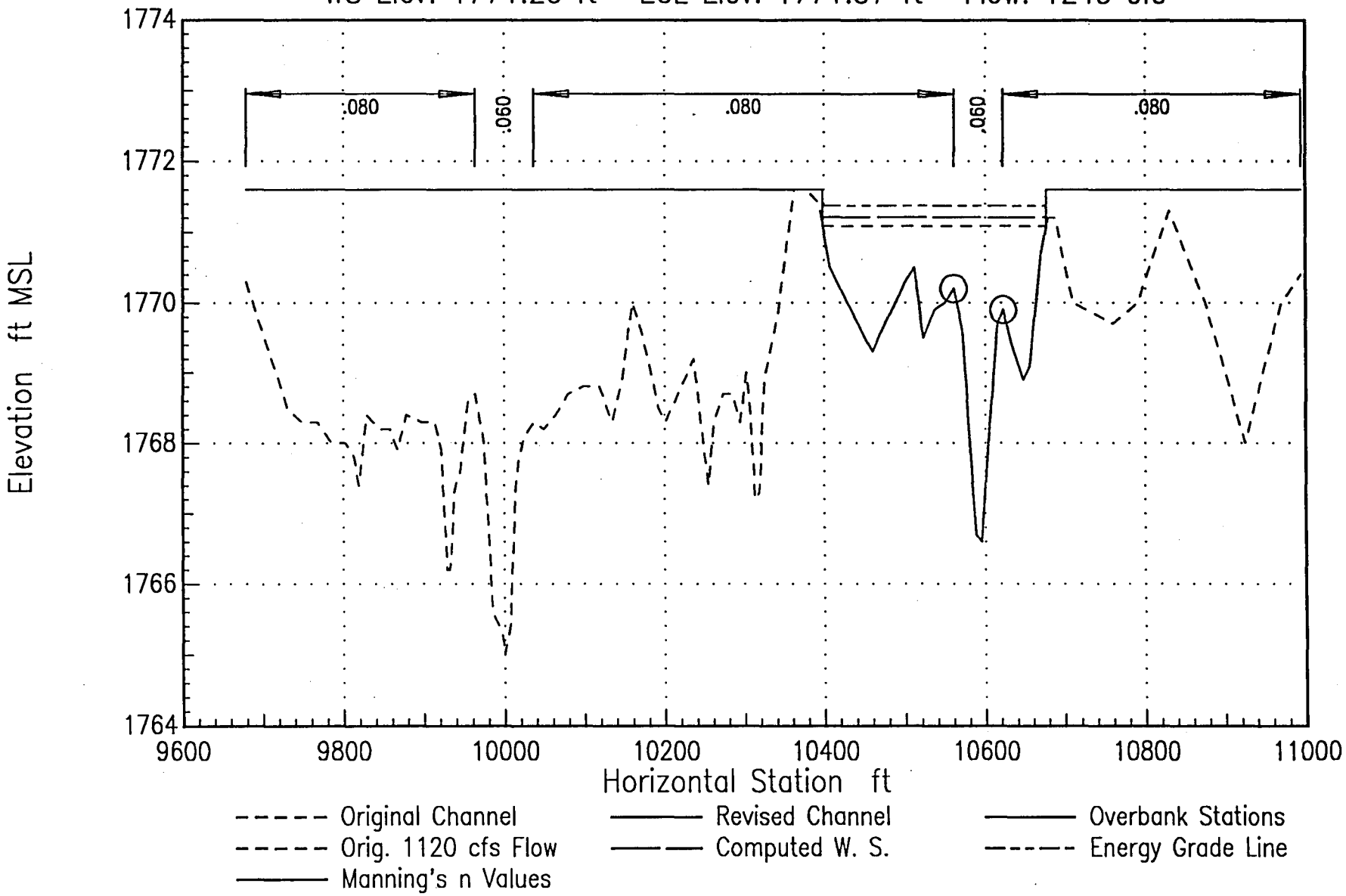
Revised Cross-Section Plot 15.932

WS: 1763.83ft Crit.WS: 1763.83ft EGL: 1764.59ft Flow: 1245cfs



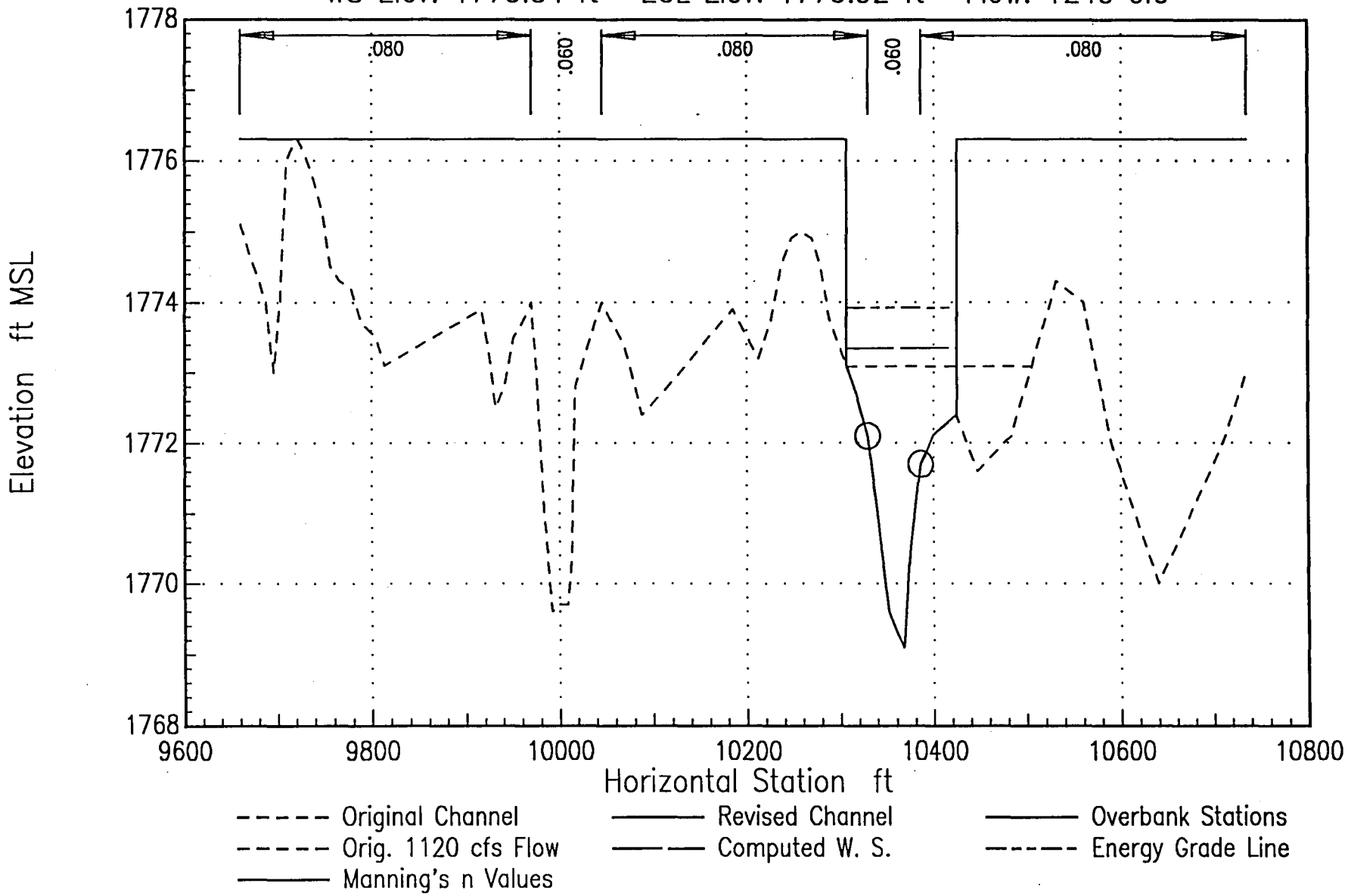
Revised Cross-Section Plot 16.021

WS Elev: 1771.20 ft EGL Elev: 1771.37 ft Flow: 1245 cfs



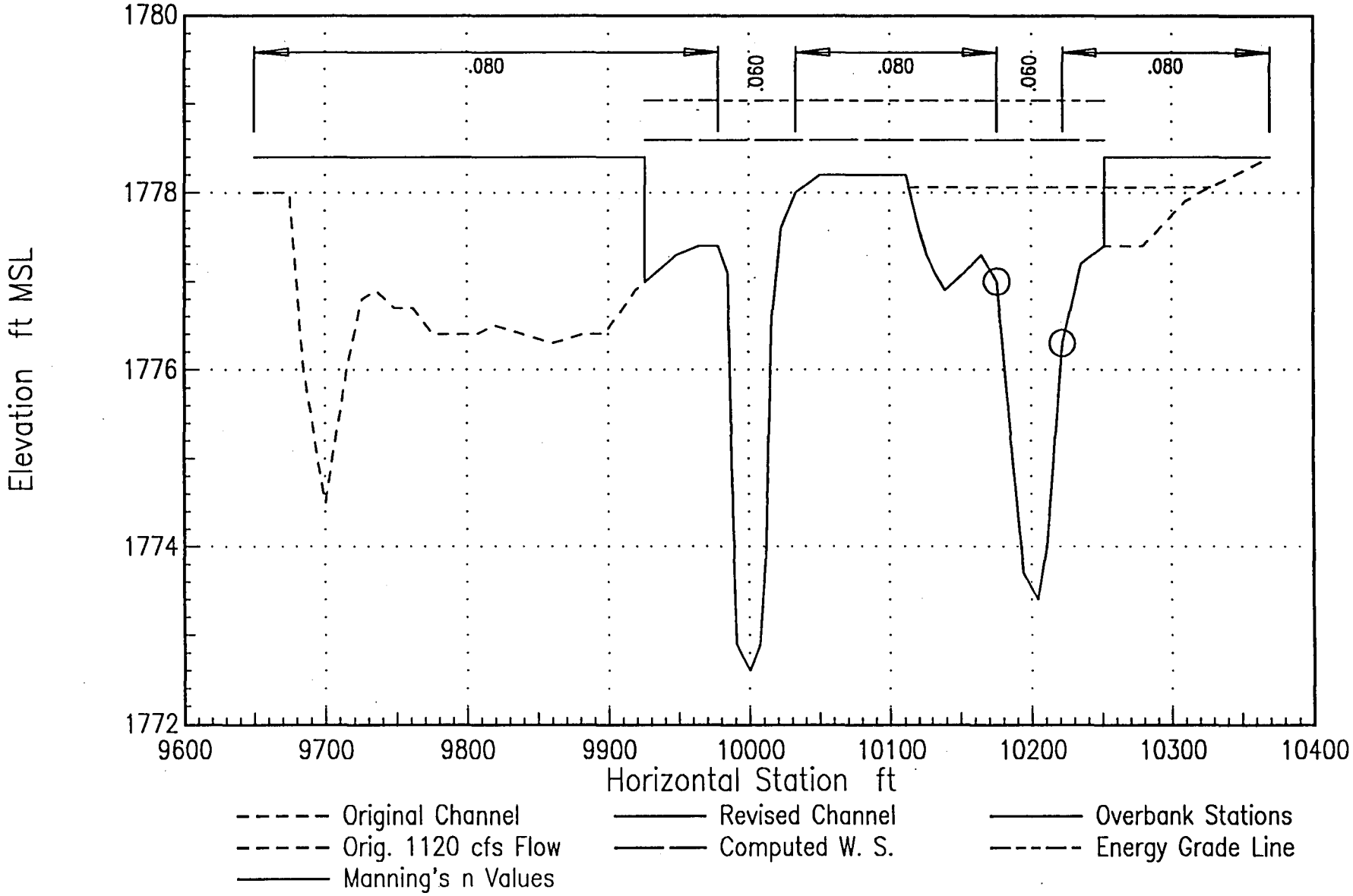
Revised Cross-Section Plot 16.112

WS Elev: 1773.34 ft EGL Elev: 1773.92 ft Flow: 1245 cfs



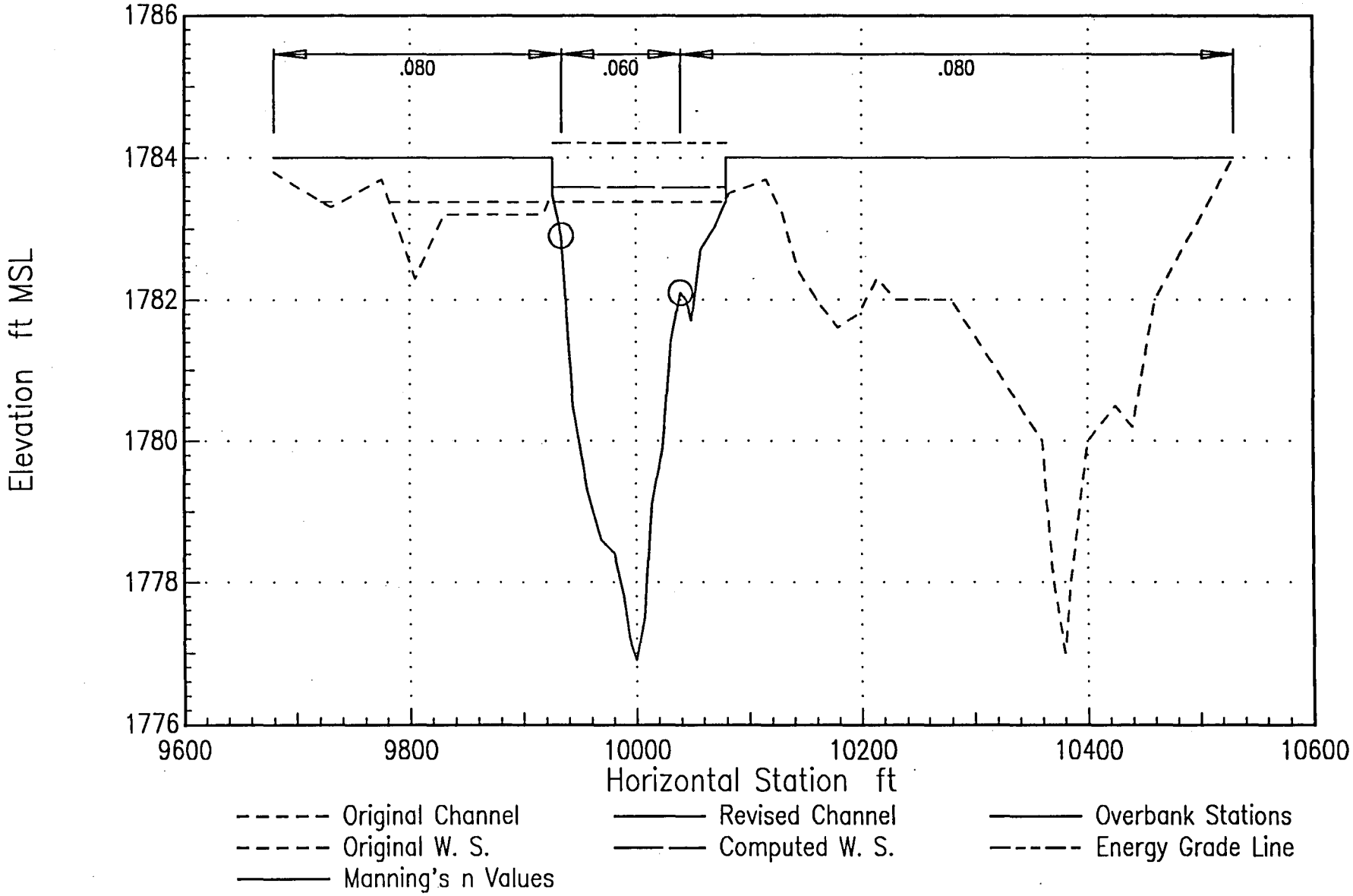
Revised Cross-Section Plot 16.164

WS Elev: 1778.59 ft EGL Elev: 1779.04 ft Flow: 2995 cfs



Revised Cross-Section Plot 16.254

WS Elev: 1783.58 ft EGL Elev: 1784.20 ft Flow: 2995 cfs

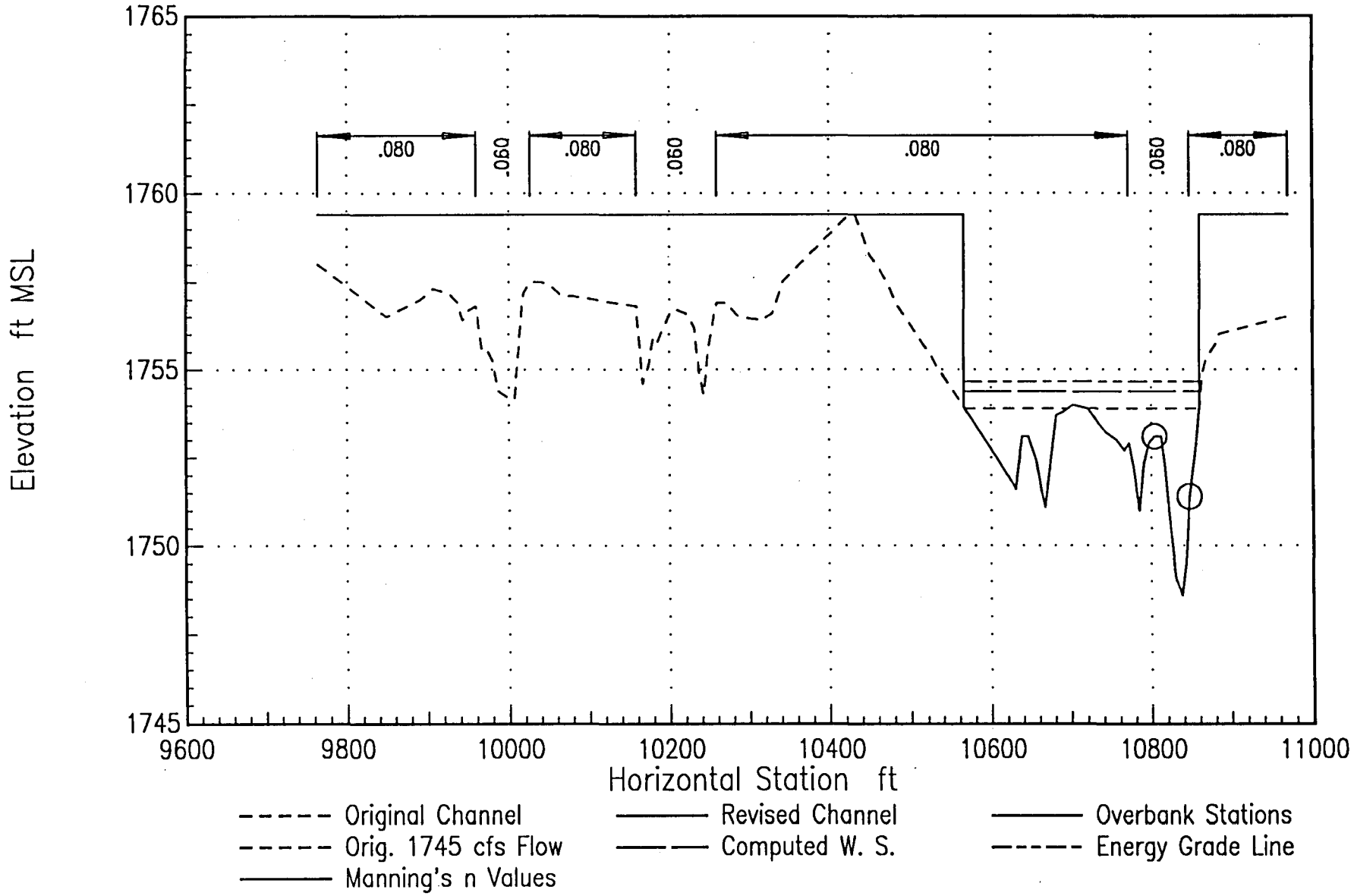


MIDDLE CHANNEL AT SPLIT - TRILBY WASH

ENCROACHED

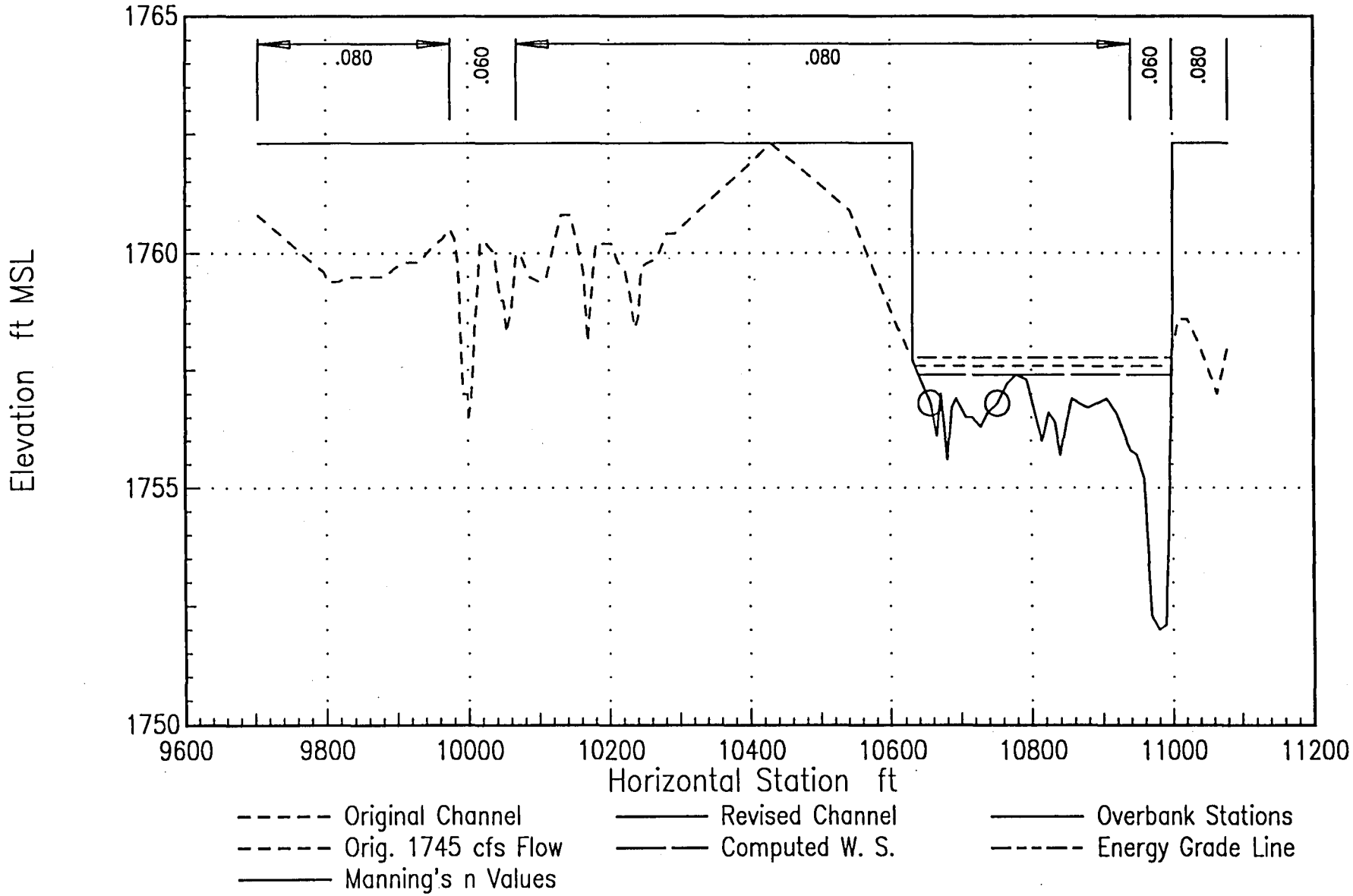
Revised Cross-Section Plot 15.842

WS Elev: 1754.39 ft EGL Elev: 1754.66 ft Flow: 1870 cfs



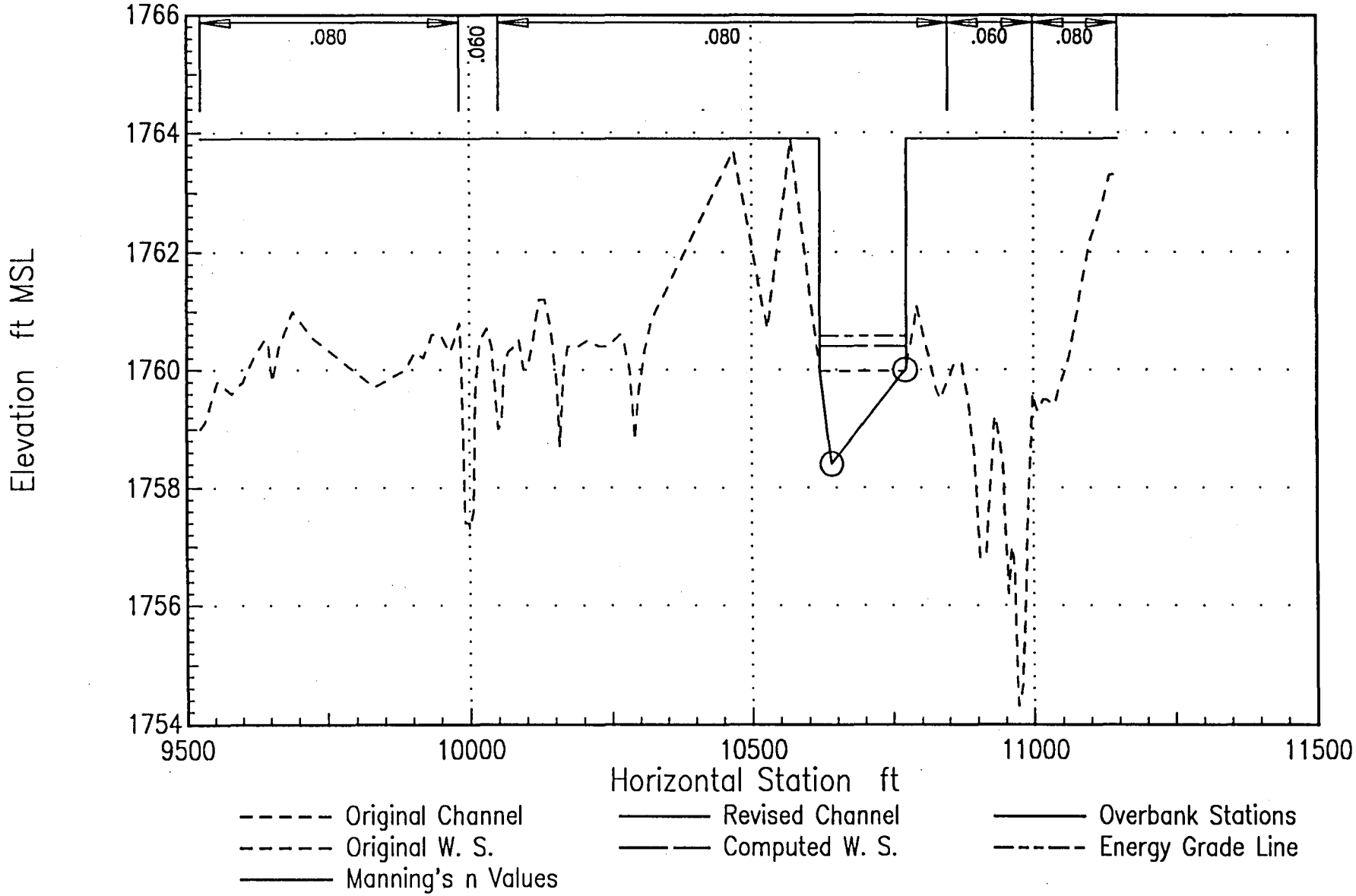
Revised Cross-Section Plot 15.89

WS Elev: 1757.39 ft EGL Elev: 1757.76 ft Flow: 1870 cfs



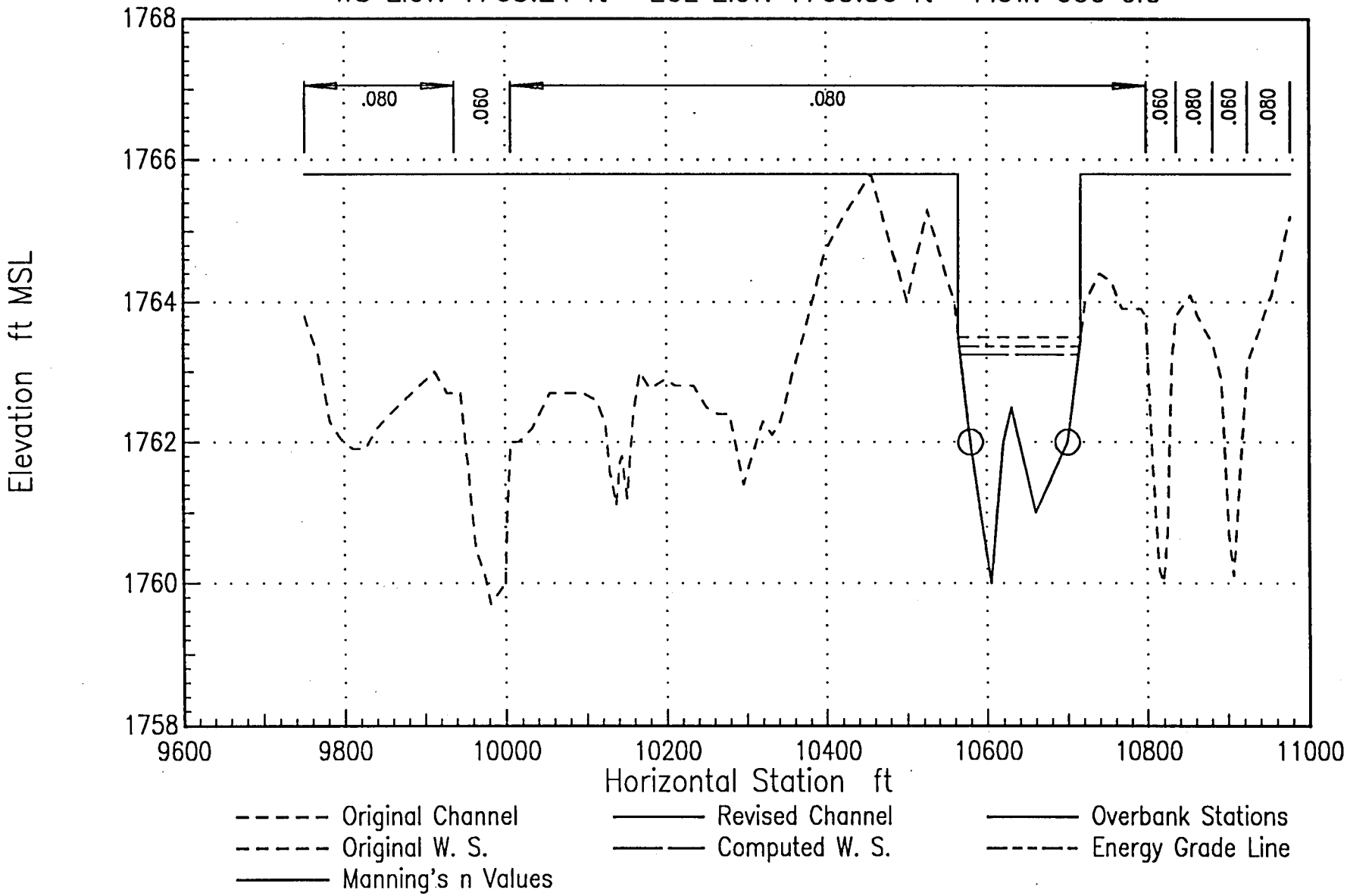
Revised Cross-Section Plot 15.898

WS Elev: 1760.40 ft EGL Elev: 1760.57 ft Flow: 600 cfs



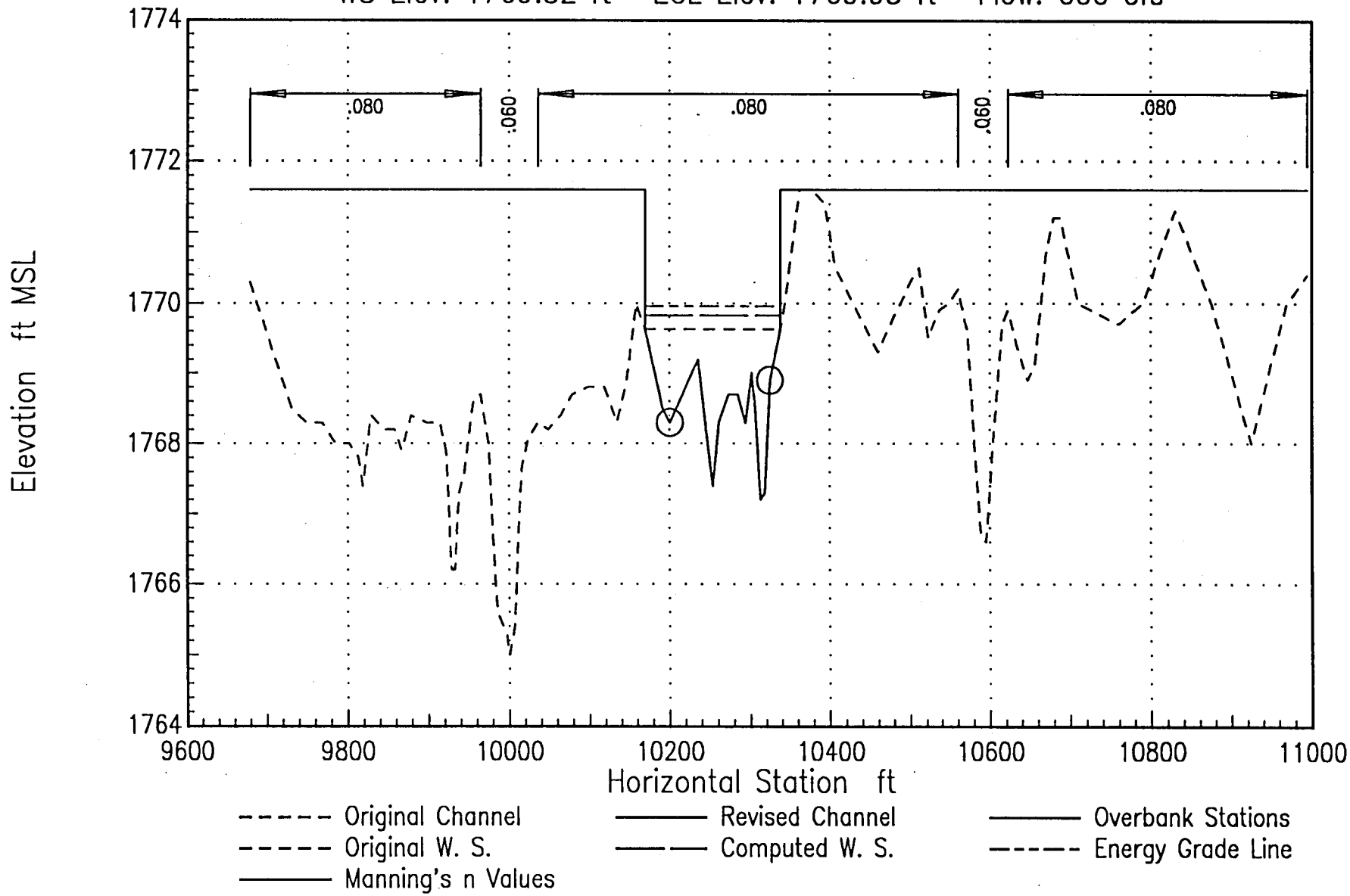
Revised Cross-Section Plot 15.932

WS Elev: 1763.24 ft EGL Elev: 1763.36 ft Flow: 600 cfs



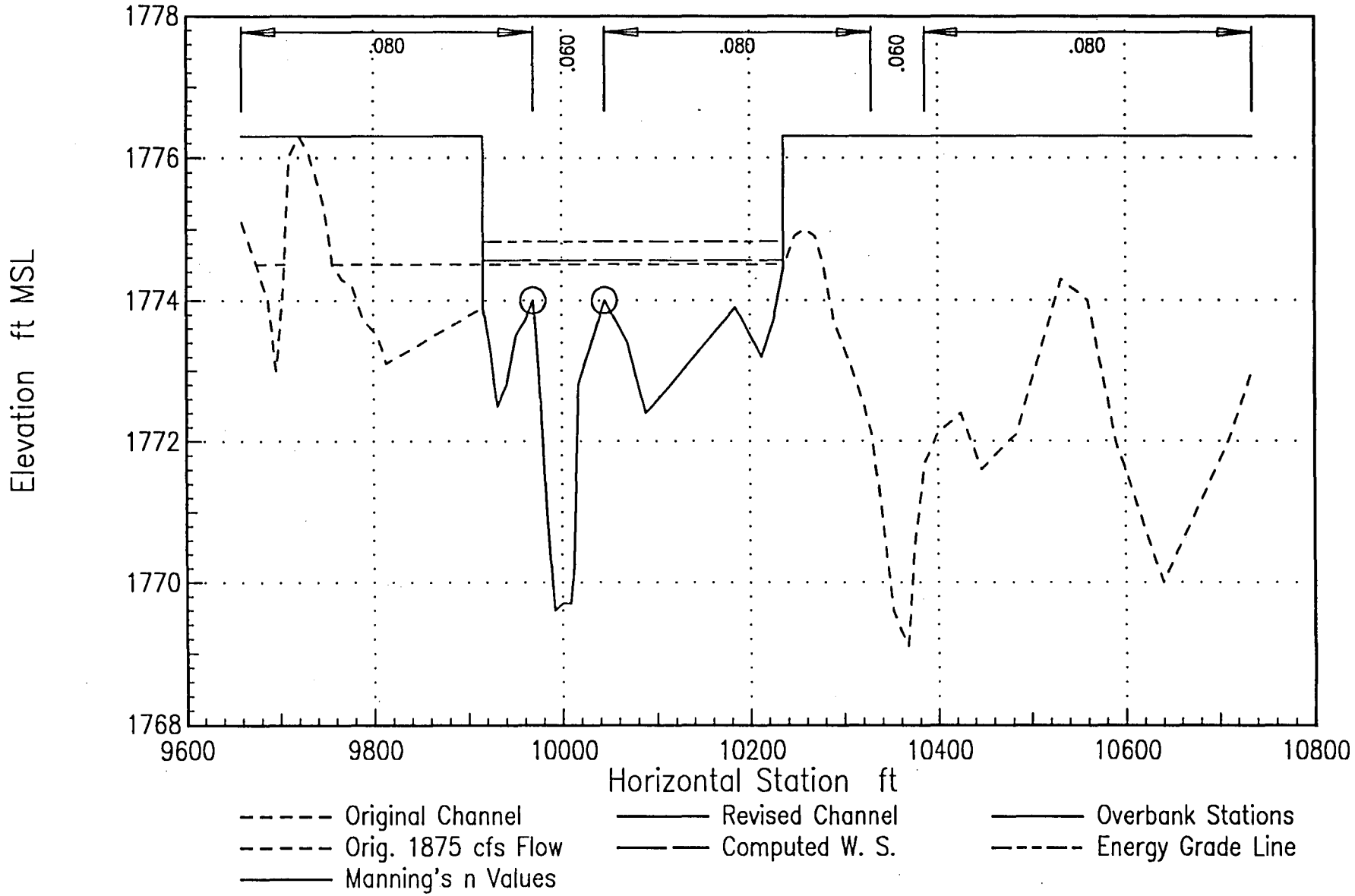
Revised Cross-Section Plot 16.021

WS Elev: 1769.82 ft EGL Elev: 1769.95 ft Flow: 600 cfs



Revised Cross-Section Plot 16.112

WS Elev: 1774.56 ft EGL Elev: 1774.82 ft Flow: 1750 cfs



4.4 CALIBRATION

Cross-section data for the analyses were determined by obtaining digitized cross-sections from topographic maps, at a scale of 1" = 200 feet and 2-foot contour intervals, prepared specifically for this project by Cooper Aerial Mapping of Phoenix, Inc. The Patton Road Culvert Crossing and C.A.P. overchute were surveyed to obtain elevation and structural geometry. Copies of these two (2) "as built" drawings are included as a part of Section 2.8 Miscellaneous Maps.

4.5 SPECIAL PROBLEMS/SOLUTIONS

- There are several areas of lateral flooding which occurs in this reach of Trilby Wash. In these areas, the flow is not contained within the banks and under present condition, run-off will leave the Trilby Wash and the watershed reach. In these areas, Encroachment Method 1, which specifies the location of encroachment for a given cross-section is used to calculate flood profile under natural condition. At these cross-sections, encroachment for natural condition are specified in field seven and eight of the ET. card. This methodology allows the most conservative water surface elevation profile.

- Split flow of Trilby Wash occurs between cross-section 15.581 and 16.254. Trilby Wash split into westerly branch which is referred as a west channel at approximately 15.581 cross-section. West channel again split into another branch that run toward the Main Trilby Wash which is referred to as a middle channel at approximately 15.842 cross-section. Middle Channel meet the Trilby Wash at cross-section 16.112 while the West Channel meet the Trilby Wash at cross-section 16.254.

  Flood Profiles for each branch are calculated by trial and error method. Flow is split in each branch with trial and error method such that water surface elevations at upstream end (where the branches meet together again) is approximately the same. Under natural condition, run-off is contained within each branch by the used of Encroachment Method 1. Encroachment for natural condition are specified in field seven and eight of the ET card.

  For the encroached (floodway) condition, flow is also split in each branch with trial and error method, such that water surface elevations at upstream end (where branches meet together again) is approximately the same. Under floodway condition, Encroachment Method 1 is used and the encroachments are specified in field nine and ten of the ET card. For the floodway condition, no additional encroachment of the interior portion of the island (i.e., west side of main channel, east side of west channel and both sides of middle channel), is allowed. Therefore, encroachment station for floodway condition on west side of main channel, eastside of west channel and both sides of middle channel are from natural condition run where the water surface intersects the ground.

4.6 FLOODWAY MODELING

Test run for Encroachment Method 4, which is based on equal conveyance reduction from each side of the floodplain, was run to begin encroachment. Final Encroachment was done with the use of Encroachment Method 1. Encroachment was set such that the maximum increase in flood height was limited to 1 foot, provided that the severe flow velocity distributions; unwarranted water depths in the floodway fringe and undulating flow boundaries were not produced.