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April 5, 1993

Concept Drainage Report

Squaw Peak Highway - Section 4

Prepared for

Arizona Department of Transportation
205 South 17th Avenue
Phoenix, Arizona 85007

Prepared by

Michael Baker, Jr., Inc.
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Registered Professional Engineer (Civil)
CERTIFICATE NO. 11587
TIMOTHY J. KELLY
Date Signed 4-2-93
ARIZONA, U.S.A.

Baker
Michael Baker Jr., Inc.
Phoenix, Arizona

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CONCEPT DRAINAGE REPORT
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I. INTRODUCTION

The purpose of this study and report is to finalize the recommended drainage facilities for the Squaw Peak Highway, between Shea Boulevard on the south to Hearn Road in the north.

The drainage facilities are discussed in detail in Section II, Existing Drainage conditions and in Section IV - Recommended Improvements. Section II describes the pre-development condition hydrologic and hydraulic models used for the evaluation of the adequacy of the present drainage facilities in Indian Bend Wash. These models are the basis for the recommend drainage improvements.

Section III - discusses alternatives evaluated before the recommended plan was arrived at.

Section IV - Recommended Drainage Improvements described the development of the hydraulic models used in the conceptual design of the drainage facilities in the Indian Bend Wash after construction of the Squaw Peak Highway. Each of the recommended drainage facilities are discussed in this section.

This study includes the sizing of all the drainage facilities to insure the system will function under the design flow for a 50-year return period with the capacity to handle flows for the 100-year return period. The flows on the west side of the Squaw Peak Highway from Shea Boulevard to Sweetwater Avenue are collected in a channel/retention system and flows to Sweetwater Avenue and then to Indian Bend Wash and 40th Street does not exceed the flows which determined the floodway for Indian Bend Wash.

Because the Squaw Peak Highway crosses Indian Bend Wash, the flows in Indian Bend Wash must be carried across the Squaw Peak Freeway.

To accommodate the flows, the volume proceeding along Indian Bend Wash was to remain at two-thirds (2/3) of the present flow with one-third (1/3) being diverted south along the west side of the Squaw Peak Highway to an open channel and then a box culvert under the Squaw Peak Highway back to Indian Bend Wash.

The system as described in Section IV of this report is compatible with a linear park which is proposed by the City of Phoenix.

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II. EXISTING CONDITIONS

A. Hydrology

For this study, all flows used in the HEC-2 modeling, were taken from "Final Hydrology Report: Squaw Peak Highway", by Michael Baker, Jr., Inc., November, 1988. No additional HEC-1 analysis was performed.

B. Indian Bend Wash Floodplain

A HEC-2 model using the flows as described above was run to represent the pre-development conditions in Indian Bend Wash from Hearn Road to 40th Street. Conditions used in the development of the HEC-2 program include:

- Sweetwater Avenue box culvert modeled with a four-foot sediment build-up.
- Downstream of Sweetwater Avenue, overbank stations were set at the outer limits of the open space of Indian Bend Wash.
- "n" values of 0.035 were set for the channel.
- Ineffective flow encroachments were used at the overbank stations.
- Upstream of Sweetwater Avenue, overbank stations were set at the natural low-flow channel.
- "n" value used for overbanks upstream of Sweetwater Avenue is 0.040.
- Ineffective flow encroachments were used at the open space corridor limits upstream of Sweetwater Avenue.

The floodplain extends beyond the boundaries (open corridor limits) of the Indian Bend Wash and affects approximately 900 homes.

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Downstream of 36th Street, floodwaters break-out beyond the open corridor limits and flow along the residential street as shallow flooding. These floodwater eventually return to the main channel of the Indian Bend Wash downstream. The path is uncertain and this analysis is beyond the scope of this study.

For comparison only, the FEMA 100-year floodplain was plotted along with the results of the pre-improvement conditions. In most cases the separate floodplains matched fairly closely. Any difference can be attributed to the FEMA study not being done under existing conditions. Because of limited available data from the Flood Control District of Maricopa County and the City of Phoenix uncertainty exists as to the assumptions and parameters used for the FEMA floodplain-study. The HEC-2 model used for the floodplain study is not available and there was no attempt to duplicate the model for this study.

Baker

III. ALTERNATIVES EVALUATED

The following is a list of scenarios evaluated before the recommended plan was established:

Alternative No. 1

This model increases the capacity of Indian Bend Wash downstream of Sweetwater Avenue. No improvements were modeled upstream of Sweetwater Avenue. A constant slope, tying into the minimum cross-section elevation at section 500 (see Sheet 2), and the invert elevation of the box culvert at Sweetwater Avenue was used for the improved channel. The 100-year Channel Water Surface Elevation (CWSE) exceeded the pre-development condition at section 4800 by 0.14 feet.

Alternative No. 2

This model was used to determine the minimum channel improvements necessary to carry the post-development flows entirely within the Indian Bend Wash channel.

All channel improvements were limited to the northeast boundary of the 100-year wide City of Phoenix flood control channel property and the southwest boundary of the adjacent 50-foot wide private property. Upstream of Sweetwater Avenue, all improvements were within the City of Phoenix property.

A constant slope between cross-section 500 and the invert of the box culvert at Sweetwater Avenue was used. A bottom width of 40 feet, 4:1 side slopes and a 3-foot minimum depth was used downstream of Sweetwater Avenue for the low flow channel. A variable width with 8:1 side slopes was used for the secondary excavation.

A 10-foot bottom width, with 1-foot minimum depth and 4:1 side slopes were used for the low flow channel upstream of Sweetwater Avenue. Between Sweetwater Avenue and Emile Zola Avenue on 200-foot bottom width and 8:1 side slopes were used for the second excavation. A 50-foot bottom width with 8:1 side slopes was used upstream of Emile Zola Avenue.

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With this scenario shows the flows downstream of Sweetwater Avenue are carried within the improved channel but upstream of Sweetwater, there are breakout areas due to back water created by the undersized culvert at Sweetwater Avenue and the roadway embankment of Sweetwater Avenue.

Alternative No. 3

For this scenario, downstream of Sweetwater Avenue, the conditions are the same as scenario 2. From Sweetwater Avenue to Hearn Road, the channelization is modified to accommodate a retention basin between Thunderbird Road and Presidio Road. The Sweetwater Avenue Road box is also modified.

The improved channel north of Sweetwater Avenue consists of 50-foot bottom width with 4:1 side slopes. Depths vary from 5 to 8 feet and no low flow channel is used.

At Sweetwater Avenue, an encroachment is used at the left overbank and the roadway elevations of Sweetwater Avenue are raised by 2-feet.

Alternative No. 4

This scenario is the same as number 3 except the flow lines are lower downstream of Sweetwater Avenue. Channel flow lines were also lowered near the retention basin between Thunderbird Road and Presidio Road to maintain flow within the Indian Bend Wash right-of-way.

The results of these improvements is that all flow is confined to the Indian Bend Wash right-of-way from 40th Street to Hearn. From Sweetwater Avenue to approximately 800 feet north, minor berming of 1 to 2 feet is necessary.

Alternative No. 5

This scenario uses the same channel geometry and profile as number 4 with the addition of a concrete lined channel between 36th Street and Sweetwater Avenue and a 20-foot (low flow) lining between Sweetwater Avenue and Thunderbird Road. The concrete lined section reduces the backwater created at the Sweetwater Avenue crossing.

Baker

IV. RECOMMENDED DRAINAGE SYSTEM

With the proposed channel improvement in place, the 100-year floodplain will be contained within the Indian Bend Wash open space corridor. The 800 feet immediately upstream of Sweetwater Avenue, will require some berming (1 to 2 feet) to contain the 100-year flow rate.

The following is the detailed list of improvements recommended. The numbers correspond with the numbers shown on sheets 2 and 3.

1. Grass-Lined Channel

   This channel is designed to convey one-third of the flows originating north of Thunderbird Road southward along the west side of the Squaw Peak Highway. The channel carries a flow of 628 cfs, has a bottom width of 10 feet, side slopes of 4:1, and a depth of 5 feet.

2. Thunderbird Road Box Culvert (West)

   This 10' x 8' - 150' box culvert carries flows from the grass-lined channel (1.) underneath Thunderbird Road to the grass-lined channel (3.), and also serves as a pedestrian/equestrian crossing. The 60-inch storm drain under Thunderbird Road will have an outlet into this box culvert.

3. Grass-Lined Channel

   This channel is a continuation of the grass-lined channel upstream of Thunderbird Road, and has the same cross-section geometry. Flow is carried from the west Thunderbird Road box culvert southward to Emile Zola Avenue, where it enters another box culvert to carry it to Indian Bend Wash.

4. Emile Zola Avenue Box Culvert

   This 2-barrel, 10' x 8' - 300' box culvert is designed to carry flows from both the grass-lined channel between Emile Zola and Thunderbird Road and from the north half of subarea 28. Thus, the culvert is designed for a peak flow of 1,051 cfs. The majority of the flow originating in subarea 28A enters the box culvert via Emile Zola Avenue.

Baker

5. Thunderbird Road Box Culvert (East)

This 2-barrel, 10' x 8' - 750' box culvert carries two-thirds of the flow from Indian Bend Wash north of Thunderbird Road southeastward underneath the Squaw Peak Highway and Thunderbird Road to the improved channel/retention facility immediately south of Thunderbird Road. The culvert is designed for a peak flow of 1255 cfs.

6&7. Retention Basin/Spillway

This facility is intended to serve as a recreation area as well as a storm water retention facility. As a retention facility, the basin is sized to contain approximately 8 acre-feet of water. This storage volume is the result of "clipping" the peak 300 cfs off the combined hydrograph of flows from the Thunderbird box culvert (east) and from Thunderbird Road itself. This 300 cfs is diverted into the basin by a side weir, a 200-foot long, 1-foot deep notch in the basin/channel embankment. The notch and spillway are constructed of concrete; the spillway slope is 6:1 to minimize erosion of the basin bottom. The basin depth is approximately 3 feet, but the average depth available for storage is only 2 feet due to a bottom slope of 1.25%. With the exception of the spillway, side slopes are 4:1 for the entire basin. The basin will be emptied by a pipe to Indian Bend Wash.

8. Grass And Concrete-Lined Channel, Presidio Road to Thunderbird Road

This channel carries flow from the east Thunderbird Road box culvert down the Indian Bend Wash right-of-way. The channel shares its west embankment with the retention basin (6.) east embankment. The channel is sized for a 100-year peak flow of 1,918 cfs; the cross-section geometry includes a 50-foot bottom width approximately 20 feet of which is concrete low-flow channel, 4:1 side slopes, and a depth of 6.7 feet. This depth is the maximum depth necessary to ensure proper functioning of the side weir spillway into the retention basin, and to ensure that the 100-year floodplain stays within the Indian Bend Wash right-of-way.

Baker

9. Channel Improvement, Sweetwater Avenue to Presidio Road

Channelization of this reach of Indian Bend Wash is designed to tie into the channelization/retention improvements of the previous section and into the existing Sweetwater Avenue box culvert on the downstream end. Thus, a bottom width of 50 feet,a 20-foot concrete "apron" or low-flow channel, and side slopes of 4:1 are used. A constant slope of 0.00466 is used for this reach.

11. New 36-Inch Storm Drain (1300 LF)

In order to increase the capacity of the existing Sweetwater Road box culvert, a portion of the existing 36-inch storm drain, which passes through one of the culvert barrels, must be removed. A new 36-inch storm drain replaces the existing 36-inch storm drain between the existing manholes #7 and #10, and follows a similar alignment between 0 and 20 feet to the west of the existing pipeline.

12. New Sweetwater Avenue Box Culvert

This 3-barrel, 10' x 8' - 1200 LF culvert carries flow from the collection and conveyance channel STO5 west of the Squaw Peak Highway and from the proposed channel (Item 20) north of Sweetwater Avenue to Indian Bend Wash south of Sweetwater Avenue. The culvert is designed for a 100-year peak flow of 2.893 cfs. Flow from the proposed channel north of Sweetwater Avenue enters the new Sweetwater Avenue box culvert through a new 5' x 8' - 100 L.F. box culvert (Item 21) under Sweetwater Avenue. See Sheet 2 of 3.

13. Drop Inlet

This drop inlet captures nuisance flows exiting from the proposed Sweetwater Avenue box culvert to the proposed 36" CIPP storm drain at a point just south of Sweetwater Avenue.

14. Channel Improvements: 40th Street to Sweetwater Avenue

This reach of Indian Bend Wash channelization comprises two channel excavations: a low-flow channel and a high-flow "bench" excavation. A bottom width of 40 feet, 4:1 side slopes and a minimum depth of 3 feet is used for the low-flow channel. A variable bottom width and 8:1 side slopes are used for the second excavation. The 8:1 slopes tie in to the residential

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area boundary line. Between 36th Street and Sweetwater Avenue, the entire excavated channel is concrete; downstream of 36th Street, it is grass-lined.

15. Remove 1,266 LF of Existing 36" CIPP Storm Drain

In order to increase the capacity of the existing Sweetwater Avenue box culvert, a portion of the existing 36" CIPP storm drain that passes through one of the culvert barrels must be removed. Flow carried by the portion of pipe to be removed will be carried instead by the new 36" CIPP that ties into existing manholes #7 and #10. This 36" CIPP is discussed in a previous section.

16. Existing 4-barrel 10' x 8' - 90 LF RCBC at Sweetwater Avenue

This box culvert is presently half-filled to provide cover for the existing 36" storm drain that passes through one of its barrels. As part of the Indian Bend Wash channelization, this box culvert must be cleaned out in order to increase its capacity to the maximum possible. In so doing, a portion of the existing 36" storm drain must be removed as described in the previous section.

18. Sweetwater Avenue Modifications/Earth Embankment

As part of the improvements necessary to increase the capacity of the existing Sweetwater Avenue box culvert, it is recommended that the Sweetwater Avenue roadway be raised approximately 2 feet at the Indian Bend Wash crossing; this allows a higher head water elevation on the upstream side of the culvert, further increasing the flow through the culvert. To minimize flooding risk to the properties east of Indian Bend Wash near Sweetwater Avenue, an earth embankment is needed northwest of the intersection of Sweetwater Avenue and 36th Street. The embankment crest elevation must be at least equal to the (raised) top-of-roadway elevation at the box culvert.

The berm should be of sufficient height to insure that the flows proceed along Indian Bend Wash and do not leave the channel upstream of Sweetwater Avenue.

Baker

19. Earth Berm North of Sweetwater Avenue

Due to the backwater created by the Sweetwater Avenue crossing, the 100-year flood flows within approximately 800 feet north of Sweetwater Avenue cannot be entirely contained within the Indian Bend Wash right-of-way by excavation channel improvements done. Therefore, an earthen berm approximately 2 feet in height (above the existing ground) is necessary to minimize flooding risk to surrounding properties. This berm will tie into the earth embankment at Sweetwater Avenue.

20. Proposed Channel

This grass-lined channel collects flow from the subarea S28B between Emile Zola Avenue and Sweetwater Avenue and carries it south to the new Sweetwater box culvert. The channel is designed for a flow of 366 cfs, and has a 10-foot bottom width and 4:1 side slopes.

21. Box Culvert

The grass-lined channel of Item 20 discharges into the new Sweetwater box culvert via this 6' x 8' - 100 LF box culvert which passes under Sweetwater Avenue.

22. Proposed Box Culvert

The proposed channel improvements between 40th Street and Sweetwater Avenue require excavation below the present vertical alignment of the 36th Street Indian Bend Wash crossing. Therefore, a 6 - 10' x 8' - 70 LF box culvert/bridge is necessary at this location in order to minimize the effect on the improved post-development floodplain.

23. Nuisance Flow Storm Drain

This 18" - 200 LF pipeline carries nuisance flows from the outlet of the new Sweetwater Avenue box culvert to the new 36" CIPP storm drain. In the final design, it is recommended to optimize the storage/pump capacity relationship. By trying various combinations of storage/pump capacity, a least costly optimum solution can be found.

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STO1. Collection and Conveyance Channel

This channel collects runoff originating in the area west of the Squaw Peak Highway between Shea Boulevard and Desert Cove Avenue, and conveys flow originating south of Shea Boulevard and draining to the north. A portion of the flow from south of Shea Boulevard is discharged into the STO1 channel via an existing 78" storm drain under Shea Boulevard. A total of 633 cfs enters the STO1 channel at the south end. Near the Desert Cove Avenue alignment, a spillway structure consisting of a 14-foot high check dam and two 24" outlet pipes discharges water to the collection and conveyance channel STO2.

STO2. Collection and Conveyance Channel

This channel collects runoff from the area west of the Squaw Peak Highway between Desert Cove Avenue and Cholla Street and conveys flows discharged from STO1 south of Desert Cove Avenue towards the north. A total of 1,648 cfs is collected and conveyed in this channel to the outlet structure just south of Cholla Street, which consists of a 10-foot-high embankment with two 24" pipes. The 100-year flow discharges to the next collection and conveyance channel, STO3, both be weir flow over this embankment and through the outlet pipes.

STO3. Collection and Conveyance Channel

Discharge from STO2 is conveyed north to Cactus Road, and runoff from the area west of the Squaw Peak Highway between Cholla Street and Cactus Road is collected in this channel. A total of 2,202 is carried to the outlet structure just south of Cactus Road consisting of a 10-foot-high embankment and four, 36-inch pipes.

STO4. Collection and Conveyance Channel

This channel conveys flow from STO3 northward to the STO5 channel and collects runoff from the area west of the Squaw Peak Highway between Cactus Road and the Bloomfield Road alignment. The outlet structure, consisting of a 9-foot-high embankment and eight 48-inch pipelines, discharges into the final collection and conveyance channel in the series, STO5.

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STO5. Collection and Conveyance Channel

Outflow from STO4 is conveyed northward to Sweetwater Avenue, and runoff from the area west of the Squaw Peak Highway between the Bloomfield Road alignment and Sweetwater Avenue is collected in this channel. Flow is discharged from STO5 into the new Sweetwater Avenue 3 - 10' x 8' box culvert (Item #12).

E. Cactus Road Pump Station

This facility pumps storm water runoff collected from catch basins along the Squaw Peak Highway between 29th Street and a point approximately 1,400 feet north of Cactus Road.

Flow arriving at the pump station was estimated using data from the Baker storm drain analysis (Shea Boulevard north to the pump station) and from the report "Squaw Peak Highway - S.R. 51 Section 3" by Entranco. HEC-1 models were used to simulate the performance of the pump station; the report "Storm Water Pump Station Design Documents, Volume I, Design Guidelines" by A.D.O.T. was used as a guide in setting up these models.

The HEC-1 models use the SCS dimensionless unit hydrograph and the 50-year and 100-year, 24-hour storms to compute flows from two subareas; one south of the pump station and one north of the pump station. For the subarea south of the pump station, the drainage area and time of concentration were obtained from the Baker calculations. North of the pump station, contributing drainage area was measured using roadway cross-section plots, and time of concentration was estimated to be 10 minutes (minimum). For both subareas, a weighted curve number of 91 was used. The two subareas' hydrographs are combined and the resulting hydrograph is "routed" through the pump station.

The pump station is modeled using a storage reservoir with a capacity of 2.77 acre-feet; this storage can be in the form of 2,400 L.F. of 96" pipe or a 120' x 125' x 8' tank. For the 50-year storm, four pumps with

Baker

a capacity of 40 cfs each are required; for the 100-year storm, five pumps operating at 40 cfs are needed.

In the final design, it is recommended to optimize the storage/pump capacity relationship. By trying various combinations of storage/pump capacity, a least costly optimum solution can be found.

A cursory evaluation has been completed for the Cactus Road Pump Station. This study and any previous costs associated with the drainage system are based upon the ADOT standards for the design of vertical turbine or mixed-flow pump stations.

With only this cursory evaluation, we believe the following items should be further evaluated for cost savings.

- The mixed-flow or vertical turbine pumps require a certain head above the suction to operate so there is not cavitation. Because of this, the storage volume necessary is high before the first pump can start. An evaluation to add a 8-foot deep by 10' wide by the length of the sump should be evaluated for use so the pumps can be started early enough to eliminate some storage requirements.

- The 26' 6" area is an excessive area as the system would operate by lowering the sump by approximately 8 feet and this area could be eliminated. The 26' 6" area is shown on the standard pump station plans.

- The trash rack is of excessive size.

- There is a recirculation system included but the volume of water that can be stored in the discharge box is not of sufficient volume to test a vertical turbine pump because of the size of the storage reservoir of the pump station. Therefore, it is a useless item to test pumps.

- By changing the sump configuration the box culvert storage system could be eliminated.

Baker

V. REFERENCES

1. Arizona Department of Transportation, "Squaw Peak Highway - S.R. 51 Section 3", May 1992.

2. Arizona Department of Transportation, "Storm Water Pump Station Design Documents, Volume I, Design Guidelines", 1991.

3. Arizona Department of Transportation, "Squaw Peak Highway, Value Engineering Study No. 91.1", February, 1991.

4. Baker, Michael Jr., "Final Hydrology Report: Squaw Peak Highway", November, 1988.

APPENDIX

Sheet 1 Existing Floodplain Delineation - Indian Bend Wash.

Sheet 2 Recommended Drainage System - Indian Bend Wash

Sheet 3 Recommended Drainage System, Indian Bend Wash.

HEC-2 Cross Sections
HEC-1 and HEC-2 Files

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1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
* RUN DATE  08/26/1992  TIME  14:10:33 *
*                                      *
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*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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1                                          HEC-1 INPUT                                                    PAGE  1

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

        1           ID   SQUAW PEAK HIGHWAY       SECTIONS 4 & 5      DRAINAGE TO 40TH STREET
        2           ID   100-YR STORM             DATE:8-10-92                HEC-1 FILE: SQPD122.DAT
        3           ID   MODEL BASED ON TR-20 RUN  IN FINAL HYDROLOGY MANUAL, NOV88
        4           ID   ****************************LAG TIMES FROM TR-20 INPUT TCONCS**************
        5           ID   ****************************PRECIP. IS 24-HR  EVENT************************
        6           ID   ****************************TRIAL: STO5 MODIFIED***************************
        7           IT       5  120991            300
        8           IO       5
        9           JR            .868     1.0
                    *DIAGRAM

       10           KK    S084
       11           KM     SUBAREA 084 HYDROGRAPH
                    *
       12           PH                     .73    1.44    2.53    2.76    2.91     3.2     3.5     3.8
                    *
       13           BA    0.69
       14           LS    0.65    77.7
       15           UD    0.68
                    *

       16           KK    S086
       17           KM     SUBAREA 086 HYDROGRAPH
       18           BA    0.11
       19           LS     0.0    77.8
       20           UD    0.18
                    *
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 21          KK     R07
 22          KM   ROUTE 086 6600' SW
 23          RM       2    0.48    0.10
             *

 24          KK    S088
 25          KM     SUBAREA 088 HYDROGRAPH
 26          BA    0.43
 27          LS    0.55    82.4
 28          UD    0.38
             *

 29          KK    C109
 30          KM     COMBINE HYDROGRAPHS S088 + R07B + S084
 31          HC       3
             *

 32          KK     R09
 33          KM     ROUTE C109 6500' S
 34          RM       1    0.32     0.1
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 35          KK    S010
 36          KM     SUBAREA 010 HYDROGRAPH
 37          BA    0.27
 38          LS    0.55    82.5
 39          UD    0.41
             *

 40          KK    S012
 41          KM     SUBAREA 012 HYDROGRAPH
 42          BA    0.26
 43          LS    0.55    77.6
 44          UD    0.45
             *

 45          KK    S014
 46          KM     SUBAREA 014 HYDROGRAPH
 47          BA    0.36
 48          LS     0.1    84.5
 49          UD    0.16
             *

 50          KK    C114
 51          KM     COMBINE HYDROGRAPHS S010 + S012 + S014 + R09
 52          HC       4    2.12
             *

 53          KK    R015
 54          KM     ROUTE C114 2650' S
 55          RM       1    0.26    0.20
             *

 56          KK    S098
 57          KM     SUBAREA 098 HYDROGRAPH
 58          BA    0.09
 59          LS     0.0      85
 60          UD    0.27
             *

 61          KK    D098
 62          KM     DIVERT PHX 54" SD TO C118
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 63          DT  PHX54"
 64          DI       0      50     270     500    1500
 65          DQ       0      25     135     135     135
             *

 66          KK    R099
 67          KM     ROUTE 098 7500'
 68          RM       1    0.27    0.05
             *
```



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

 69          KK    S100
 70          KM     SUBAREA 100 HYDROGRAPH
 71          BA    0.30
 72          LS     0.0    82.0
 73          UD    0.46
             *

 74          KK    S022
 75          KM     SUBAREA 022 HYDROGRAPH
 76          BA    0.29
 77          LS     0.0    83.6
 78          UD    0.19
             *

 79          KK    C122
 80          KM     COMBINE HYDROGRAPHS R015 + R099 + 100 + 022
 81          HC       4
             *

 82          KK    D122
 83          KM     SPLIT FLOWS AT TBIRD "V.E."
 84          DT   VESOU
 85          DI       0     250     500    1000    1500    2400
 86          DQ       0       0      50     200     500     800
             *

 87          KK   S006A
 88          KM    SUBAREA 6A HYDROGRAPH
 89          BA    0.13
 90          LS     0.0    78.2
 91          UD    0.23
             *

 92          KK    R06A
 93          KM     ROUTE 6A FLOWS 4000' S IN 72" RCP
 94          KM        (ZERO ROUTING - ADD K TO R17/6A BELOW
 95          RN
             *

 96          KK   S006B
 97          KM     SUBAREA 6B HYDROGRAPH
 98          BA    0.19
 99          LS     0.0    78.2
100          UD    0.45
             *

101          KK    S016
102          KM     SUBAREA 016 HYDROGRAPH
103          BA    0.16
104          LS     0.0      80
105          UD    0.35
             *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 106          KK    C116
 107          KM     COMBINE HYDROGRAPHS R06A + S016 + S006B
 108          HC       3    0.48
              *

 109          KK   R116A
 110          KM     ROUTE C116 4300' S IN 6' X 6' CBC
 111          RM       1    0.20    0.50
              *

 112          KK    S018
 113          KM     SUBAREA 018 HYDROGRAPH
 114          BA    0.15
 115          LS     0.0    77.8
 116          UD    0.35
              *

 117          KK    R118
 118          KM     RETRIEVE PHX 54" SD
 119          DR  PHX54"
              *

 120          KK    C118
 121          KM     COMBINE HYDROGRAPHS R116A + S018 + R118
 122          HC       3
              *

 123          KK    R019
 124          KM     ROUTE C118 8400' S IN 8' X 6' CBC AND 10' X 6' CBC
 125          RM       1    0.20    0.50
              *

 126          KK    S020
 127          KM     SUBAREA 020 HYDROGRAPH
 128          BA    0.20
 129          LS     0.0    83.4
 130          UD    0.36
              *

 131          KK    C120
 132          KM     COMBINE HYDROGRAPHS R019 + 020
 133          HC       2
              *

 134          KK    C124
 135          KM   COMBINE C120 + D122
 136          HC       2
              *
```



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

 137          KK   R023A
 138          KM   ROUTE C124 1450' IN IMPROVED IBW CHANNEL (ASSUME V=3.1 FPS)
 139          RM       1    0.13    0.25
              *

 140          KK   D122R
 141          KM     RETRIEVE V.E. DIVERSION
 142          DR   VESOU
```

```
                *

143             KK    R122
144             KM     ROUTE VESOU 1300' SOUTH CHANNEL (ASSUME V=5.2 FPS)
145             RM       1    0.07    0.20
                *

146             KK    S28A
147             KM     SUBAREA 28A HYDROGRAPH           NORTH OF EMILE ZOLA
148             BA    .358
149             LS      .5    83.0
150             UD     .42
                *

151             KK     C28
152             KM     COMBINE R122 + S28A
153             HC       2
                *

154             KK     R28
155             KM   ROUTE C28 650' ALONG EMILE ZOLA TO C125 (V = 2.2 FPS)
156             RM       1   0.082    0.20
                *

157             KK    C125
158             KM   COMBINE R023A AND R28 AT EMILE ZOLA AVENUE
159             HC       2
                *

160             KK   R023B
161             KM   ROUTE C125 1650' IN IMPROVED IBW CHANNEL (ASSUME V=3.1 FPS)
162             RM       1    0.15     .25
                *

163             KK    S024
164             KM     SUBAREA 024 HYDROGRAPH
165             BA    0.23
166             LS     0.0    82.1
167             UD    0.40
                *
```



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

168             KK    R025
169             KM     ROUTE 024 4900'
170             RM       1    0.25    0.15
                *

171             KK    S026
172             KM     SUBAREA 026 HYDROGRAPH
173             BA    0.21
174             LS     0.0    84.0
175             UD    0.28
                *

176             KK    S030
177             KM     SUBAREA 030 HYDROGRAPH
178             BA    0.04
179             LS      0.      84
180             UD    0.20
                *

181             KK    C127
182             KM   COMBINE R023 + R025 + S26 + 030
```

```
183          HC       4
             *

184          KK     S48
185          KM   SUBAREA 48 HYDROGRAPH    SP4CHEC1*BEGIN SECTION 4 DETENTION SYSTEM MODEL*
186          BA    0.80
187          LS    0.37    87.1
188          UD    0.34
             *

189          KK    DS48
190          KM   ALLOW PORTION OF S48 N. R.O. PLUS CAPACITY OF 78" INTO STO1(SPLIT SUBAREA RO)
191          KM   DIVERT 60% (INFLOW -165CFS) TO STO2
192          DT      D1
193          DI     165     665    1165    1665
194          DQ       0     300     600     900

195          KK    STO1
196          KM   STORAGE ROUTING       RETARD BETWEEN SHEA & DESERT COVE, SILL ELEV.= 1413.0
197          KM                                                            WIDTH= 25'
198          RS       1    ELEV  1399.4       0
199          SV     0.0    1.19    2.56    4.17    6.01    8.58   10.05   11.63   13.34   15.17
200          SV   17.12   19.19   21.39   23.42   26.09
201          SE  1399.4   1402.   1404.   1406.   1408.   1410.   1411.   1412.   1413.   1414.
202          SE   1415.   1416.   1417.   1418.   1419.
203          SQ     0.0     40.     54.     54.     54.     54.     54.     54.     54.    132.
204          SQ    273.    457.    674.    921.  1193.2
             *
```



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

205          KK     S46
206          KM   SUBAREA 46 HYDROGRAPH
207          BA    0.82
208          LS    0.41    85.8
209          UD    0.50
             *

210          KK    DS46
211          KM    DIVERT 38% OF S46 HYDROGRAPH TO STO3
212          DT      D2
213          DI       0     500    1000    1500
214          DQ       0     190     380     570
             *

215          KK    RS48
216          KM   RETRIEVE DIVERTED PORTION OF S48
217          DR      D1
             *

218          KK     C48
219          KM   COMBINE STO1 & D1 & DS46     S OF CHOLLA
220          HC       3
             *

221          KK    STO2
222          KM   STORAGE ROUTING       RETARD BETWEEN DESERT COVE & CHOLLA, SILL ELEV=1407.0
223          KM                                                            WIDTH = 35'
224          RS       1    ELEV  1396.8       0
225          SV     0.0    1.65    4.36    7.62   11.46   15.86   18.28   19.91   23.53   26.37
226          SV   29.35   32.48   35.74
227          SE  1396.8   1400.   1402.   1404.   1406.   1408.   1409.   1410.   1411.   1412.
228          SE   1413.   1414.   1415.
229          SQ     0.0     46.     64.     77.     77.    185.    384.    640.    945.   1290.
```

```
230          SQ   1671.   2086.   2532.
             *

231          KK    RS46
232          KM   RETRIEVE DIVERTED PORTION OF S46
233          DR      D2
             *

234          KK    C46N
235          KM   COMBINE STO2 & D2 NORTH OF CHOLLA
236          HC       2
             *

237          KK     S42
238          KM   SUBAREA 42 HYDROGRAPH
239          BA    0.90
240          LS    0.47    83.9
241          UD    0.47
             *
```



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

242          KK    DS42
243          KM   DIVERT CAPACITY 78" SS (S=.37%) ALONG CACTUS TO IBW
244          DT   D3IBW
245          DI       0     175     346     500    1000    2000
246          DQ       0     175     346     346     346     346
             *

247          KK    DC42
248          KM   DIVERT 59% REMAINING RUNOFF FROM S42 N. TO STO 4 (SPLIT SUBAREA RO)
249          DT      D4
250          DI       0     250     500    1000    1500
251          DQ       0     148     295     590     885
             *

252          KK    C42S
253          KM   COMBINE DC46 & C46N NORTH OF CHOLLA
254          HC       2
             *

255          KK    STO3
256          KM   STORAGE ROUTING          RETARD SOUTH OF CACTUS (70' WIDTH)
257          KM                                                SILL ELEV. = 1403.0
258          RS       1    ELEV  1393.2       0
259          SV       0    4.83    7.04   11.96   14.66   17.53   20.57   23.77   27.13   30.66
260          SV   34.35   38.16
261          SE  1393.2    1397    1398    1400    1401    1402    1403    1404    1405    1406
262          SE    1407   1408.
263          SQ     0.0    214.    256.    282.    282.    282.    282.    499.    895.   1409.
264          SQ   2018.   2708.
             *

265          KK    RS42
266          KM   RETRIEVE DIVERTED PORTION OF S42 N. OF CACTUS ROAD
267          DR      D4
             *

268          KK    C42N
269          KM   COMBINE STO3 & D4         NORTH OF CACTUS
270          HC       2
             *

271          KK     S38
```

```
272          KM    SUBAREA 38 HYDROGRAPH
273          BA    1.34
274          LS      .5     83.
275          UD     .55
             *

276          KK    DS38
277          KM   DIVERT 65% OF S38 RUNOFF
278          DT      D5
279          DI       0     250     500    1000    2000
280          DQ       0     163     325     650    1300
             *
```



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

281          KK   DS38A
282          KM   DIVERT 32 ST AND 28 ST CAPACITIES (45%)
283          DT      D6
284          DI       0     250     500    1000    2000
285          DQ       0     113     225     450     900
             *

286          KK    C38A
287          KM   COMBINE DS38A & C42N
288          HC       2
             *
289          **  KK  STO4

290          KK   RDS38
291          KM   RETRIEVE DIVERTED HYDROGRAPH (65% OF S38)
292          DR      D5
             *

293          KK    DSWW
294          KM   DIVERT STORM DRAIN (60" S=.28%) EAST ALONG  SWEETWATER TOWARDS IBW
295          DT   SWEST            149
296          DI       0      10     100     149     500    1500
297          DQ       0      10     100     149     149     149
             *

298          KK     RD6
299          KM   RETRIEVE DIVERTED HYDROGRAPH
300          DR      D6
             *

301          KK   DSWTE
302          KM   DIVERT CAPAC. OF SWEETWATER TO IBW.  ASSUME REMAINDER GOES TO STO 5.
303          DT      D7
304          DI       0     100     122     200     400     600
305          DQ       0     100     122     122     122     122
             *

306          KK     C38
307          KM   COMBINE STO4 & DSWW & (D6-D7)        AT SWEETWATER
308          HC       3
             *

309          KK    STO5
310          KO              2
311          KM   STORAGE ROUTING          RETARD SOUTH OF SWEETWATER, CREST WIDTH= 55'
312          KM                                                        CREST ELEV= 1395.
313          RS       1    ELEV  1388.1       0
314          SV     0.0    1.86    7.27   13.46   20.72   28.57   33.41   38.44   43.63   48.99
315          SV   54.52   60.23
```

```
 316          SE   1388.    1391    1392    1393    1394    1395    1396    1397    1398    1399
 317          SE    1400    1401
 318          SQ     0.0    300.    720.     960   1290.    1590   1950.    2250    2430    2670
 319          SQ    2880   3030.
              *
```



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

 320          KK    S28B
 321          KM   SUBAREA 28B HYDROGRAPH
 322          BA    .292
 323          LS      .5     .83
 324          UD     .42
              *

 325          KK    C129
 326          KM   COMBINE  STO5 AND S28B
 327          HC       2
              *

 328          KK     R29
 329          KM   ROUTE C129 1500' V=12 FPS                        (ZERO ROUTING)
 330          RN
              *

 331          KK    C131
 332          KM     COMBINE HYDROGRAPHS R029 + C127
 333          HC       2
              *

 334          KK    R031
 335          KM     ROUTE C131 4500' IMPROVED IBW CHANNEL (ASSUME V=4.5 FPS)
 336          RM       1    0.28    0.20
              *

 337          KK    S032
 338          KM     SUBAREA 032 HYDROGRAPH
 339          BA    0.56
 340          LS     0.0    80.2
 341          UD    0.25
              *

 342          KK    R033
 343          KM     ROUTE 032 8500'
 344          RM       1    0.39    0.10
              *

 345          KK    S034
 346          KM     SUBAREA 034 HYDROGRAPH
 347          BA    0.93
 348          LS     0.0    79.4
 349          UD    0.55
              *

 350          KK    C134
 351          KM     COMBINE HYDROGRAPHS R033 + 034
 352          HC       2
              *
```



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

 353          KK    R035
```

```
354          KM     ROUTE C134 8400'
355          RM       1    0.35    0.10
             *

356          KK   S036A
357          KM     SUBAREA 036 WEST OF 40TH STREET
358          BA    0.58
359          LS    0.50    82.3
360          UD    0.49
             *

361          KK    S040
362          KM     SUBAREA 040 HYDROGRAPH
363          BA    0.23
364          LS     0.0    82.0
365          UD    0.36
             *

366          KK    C141
367          KM   COMBINE R031 + R035 + 036 + 040
368          HC       4
             *

369          KK   RDSWW
370          KM   RETRIEVE HYDROGRAPH SWEST
371          DR   SWEST
             *

372          KK    S044
373          KM     SUBAREA 044 HYDROGRAPH
374          BA    0.16
375          LS     0.0    82.0
376          UD    0.34
             *

377          KK    C145
378          KM     SWEETWATER 60" SS + SUBAREA 44 RUNOFF - COMBINE AT IBW DOWNSTREAM
379          KM     OF EXISTING CHANNEL IMPROVEMENTS AT 40 ST AND IBW
380          KM     COMBINE HYDROGRAPHS  044 + C141 + SWEST
381          HC       3
382          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   10        S084
               .
               .
   16          .        S086
               .           V
               .           V
   21          .         R07
               .           .
               .           .
   24          .           .        S088
               .           .           .
               .           .           .
   29        C109.......................
              V
              V
   32        R09
               .
               .
```

```
35          .       S010
            .          .
            .          .
40          .          .       S012
            .          .          .
            .          .          .
45          .          .          .       S014
            .          .          .          .
            .          .          .          .
50       C114.................................
            V
            V
53       R015
            .
            .
56          .       S098
            .          .
            .          .
63          .          .-------> PHX54"
61          .       D098
            .          V
            .          V
66          .       R099
            .          .
            .          .
69          .          .       S100
            .          .          .
            .          .          .
74          .          .          .       S022
            .          .          .          .
            .          .          .          .
79       C122.................................
            .
            .
84          .------->  VESOU
82       D122
            .
            .
87          .      S006A
            .          V
            .          V
92          .       R06A
            .          .
            .          .
96          .          .      S006B
            .          .          .
            .          .          .
101         .          .          .       S016
            .          .          .          .
            .          .          .          .
106         .       C116........................
            .          V
            .          V
109         .      R116A
            .          .
            .          .
112         .          .       S018
            .          .          .
            .          .          .
119         .          .          .          .<------- PHX54"
117         .          .          .       R118
            .          .          .          .
            .          .          .          .
120         .       C118........................
            .          V
            .          V
```

```
123          .        R019
             .          .
             .          .
126          .          .        S020
             .          .          .
             .          .          .
131          .        C120............
             .          .
             .          .
134       C124............
             V
             V
137      R023A
             .
             .
142          .          .<-------   VESOU
140          .      D122R
             .          V
             .          V
143          .        R122
             .          .
             .          .
146          .          .        S28A
             .          .          .
             .          .          .
151          .         C28............
             .          V
             .          V
154          .         R28
             .          .
             .          .
157       C125............
             V
             V
160      R023B
             .
             .
163          .        S024
             .          V
             .          V
168          .        R025
             .          .
             .          .
171          .          .        S026
             .          .          .
             .          .          .
176          .          .          .        S030
             .          .          .          .
             .          .          .          .
181       C127.................................
             .
             .
184          .         S48
             .          .
             .          .
192          .          .------->      D1
189          .       DS48
             .          V
             .          V
195          .       STO1
             .          .
             .          .
205          .          .         S46
             .          .          .
             .          .          .
212          .          .          .------->      D2
```

```
210          .          .        DS46
             .          .          .
             .          .          .
217          .          .          .          .<-------      D1
215          .          .          .        RS48
             .          .          .          .
             .          .          .          .
218          .        C48.........................
             .          V
             .          V
221          .       STO2
             .          .
             .          .
233          .          .          .<-------      D2
231          .          .        RS46
             .          .          .
             .          .          .
234          .       C46N............
             .          .
             .          .
237          .          .         S42
             .          .          .
             .          .          .
244          .          .          .------->   D3IBW
242          .          .        DS42
             .          .          .
             .          .          .
249          .          .          .------->      D4
247          .          .        DC42
             .          .          .
             .          .          .
252          .       C42S............
             .          V
             .          V
255          .       STO3
             .          .
             .          .
267          .          .          .<-------      D4
265          .          .        RS42
             .          .          .
             .          .          .
268          .       C42N............
             .          .
             .          .
271          .          .         S38
             .          .          .
             .          .          .
278          .          .          .------->      D5
276          .          .        DS38
             .          .          .
             .          .          .
283          .          .          .------->      D6
281          .          .      DS38A
             .          .          .
             .          .          .
286          .       C38A............
             .          .
             .          .
292          .          .          .<-------      D5
290          .          .      RDS38
             .          .          .
             .          .          .
295          .          .          .------->   SWEST
293          .          .       DSWW
             .          .          .
             .          .          .
```

```
300          .          .          .          .<-------      D6
298          .          .          .        RD6
             .          .          .          .
             .          .          .          .
303          .          .          .          .------->      D7
301          .          .          .      DSWTE
             .          .          .          .
             .          .          .          .
306          .        C38.......................
             .          V
             .          V
309          .       STO5
             .          .
             .          .
320          .          .       S28B
             .          .          .
             .          .          .
325          .       C129............
             .          V
             .          V
328          .        R29
             .          .
             .          .
331       C131............
             V
             V
334       R031
             .
             .
337          .       S032
             .          V
             .          V
342          .       R033
             .          .
             .          .
345          .          .       S034
             .          .          .
             .          .          .
350          .       C134............
             .          V
             .          V
353          .       R035
             .          .
             .          .
356          .          .      S036A
             .          .          .
             .          .          .
361          .          .          .       S040
             .          .          .          .
             .          .          .          .
366       C141.................................
             .
             .
371          .          .<-------   SWEST
369          .      RDSWW
             .          .
             .          .
372          .          .       S044
             .          .          .
             .          .          .
377       C145........................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************                    *****************************************
 *                                       *                    *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS
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```
*          SEPTEMBER 1990          *                                          *   HYDROLOGIC ENGINEERING CENTER
*           VERSION 4.0            *                                          *         609 SECOND STREET
*                                  *                                          *      DAVIS, CALIFORNIA 95616
* RUN DATE  08/26/1992  TIME  14:10:33 *                                      *          (916) 756-1104
*                                  *                                          *
****************************************                                      ****************************************


                        SQUAW PEAK HIGHWAY       SECTIONS 4 & 5      DRAINAGE TO 40TH STREET
                        100-YR STORM             DATE:8-10-92                HEC-1 FILE: SQPD122.DAT
                        MODEL BASED ON TR-20 RUN  IN FINAL HYDROLOGY MANUAL, NOV88
                        ******************************LAG TIMES FROM TR-20 INPUT TCONCS***************
                        ******************************PRECIP. IS 24-HR  EVENT************************
                        ******************************TRIAL: STO5 MODIFIED****************************

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE     120991  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2  91  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   24.92 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

    JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .87      1.00
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R015.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R015.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH   R116A.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH   R116A.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R019.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R019.
      REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

*** HEC-1 ERROR 1 *** INVALID CARD IDENTIFICATION CODE OR CARD OUT OF SEQUENCE
    CARD NO.  289     **  KK  STO4
```

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** **

            **************
            *            *
 309 KK     *     STO5   *
            *            *
            **************

 310 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          2  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
1                                                STATION     STO5

                       (I) INFLOW,   (O) OUTFLOW
        0.      400.      800.     1200.     1600.     2000.     2400.       0.        0.        0.        0.        0.        0
                                                                                   (S) STORAGE
        0.        0.        0.        0.        0.        0.        0.      10.       20.       30.       40.        0.        0
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------
 10005   2I         .         .         .         .         .         S         .         .         .         .         .
 10010   3I         .         .         .         .         .         S         .         .         .         .         .
 10015   4I         .         .         .         .         .         S         .         .         .         .         .
 10020   5I         .         .         .         .         .         S         .         .         .         .         .
 10025   6I         .         .         .         .         .         S         .         .         .         .         .
 10030   7I         .         .         .         .         .         S         .         .         .         .         .
 10035   8I         .         .         .         .         .         S         .         .         .         .         .
 10040   9I         .         .         .         .         .         S         .         .         .         .         .
 10045  10I         .         .         .         .         .         S         .         .         .         .         .
 10050  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10055  12I         .         .         .         .         .         S         .         .         .         .         .
 10100  13I         .         .         .         .         .         S         .         .         .         .         .
 10105  14I         .         .         .         .         .         S         .         .         .         .         .
 10110  15I         .         .         .         .         .         S         .         .         .         .         .
 10115  16I         .         .         .         .         .         S         .         .         .         .         .
 10120  17I         .         .         .         .         .         S         .         .         .         .         .
 10125  18I         .         .         .         .         .         S         .         .         .         .         .
 10130  19I         .         .         .         .         .         S         .         .         .         .         .
 10135  20I         .         .         .         .         .         S         .         .         .         .         .
 10140  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10145  22I         .         .         .         .         .         S         .         .         .         .         .
 10150  23I         .         .         .         .         .         S         .         .         .         .         .
 10155  24I         .         .         .         .         .         S         .         .         .         .         .
 10200  25I         .         .         .         .         .         S         .         .         .         .         .
 10205  26I         .         .         .         .         .         S         .         .         .         .         .
 10210  27I         .         .         .         .         .         S         .         .         .         .         .
 10215  28I         .         .         .         .         .         S         .         .         .         .         .
 10220  29I         .         .         .         .         .         S         .         .         .         .         .
 10225  30I         .         .         .         .         .         S         .         .         .         .         .
 10230  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10235  32I         .         .         .         .         .         S         .         .         .         .         .
 10240  33I         .         .         .         .         .         S         .         .         .         .         .
 10245  34I         .         .         .         .         .         S         .         .         .         .         .
 10250  35I         .         .         .         .         .         S         .         .         .         .         .
 10255  36I         .         .         .         .         .         S         .         .         .         .         .
 10300  37I         .         .         .         .         .         S         .         .         .         .         .
 10305  38I         .         .         .         .         .         S         .         .         .         .         .
 10310  39I         .         .         .         .         .         S         .         .         .         .         .
 10315  40I         .         .         .         .         .         S         .         .         .         .         .
 10320  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10325  42I         .         .         .         .         .         S         .         .         .         .         .
 10330  43I         .         .         .         .         .         S         .         .         .         .         .
 10335  44I         .         .         .         .         .         S         .         .         .         .         .
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10340  45I      .         .         .         .         .         S         .         .         .         .         .
10345  46I      .         .         .         .         .         S         .         .         .         .         .
10350  47I      .         .         .         .         .         S         .         .         .         .         .
10355  48I      .         .         .         .         .         S         .         .         .         .         .
10400  49I      .         .         .         .         .         S         .         .         .         .         .
10405  50I      .         .         .         .         .         S         .         .         .         .         .
10410  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10415  52I      .         .         .         .         .         S         .         .         .         .         .
10420  53I      .         .         .         .         .         S         .         .         .         .         .
10425  54I      .         .         .         .         .         S         .         .         .         .         .
10430  55I      .         .         .         .         .         S         .         .         .         .         .
10435  56I      .         .         .         .         .         S         .         .         .         .         .
10440  57I      .         .         .         .         .         S         .         .         .         .         .
10445  58I      .         .         .         .         .         S         .         .         .         .         .
10450  59I      .         .         .         .         .         S         .         .         .         .         .
10455  60I      .         .         .         .         .         S         .         .         .         .         .
10500  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10505  62I      .         .         .         .         .         S         .         .         .         .         .
10510  63I      .         .         .         .         .         S         .         .         .         .         .
10515  64I      .         .         .         .         .         S         .         .         .         .         .
10520  65I      .         .         .         .         .         S         .         .         .         .         .
10525  66I      .         .         .         .         .         S         .         .         .         .         .
10530  67I      .         .         .         .         .         S         .         .         .         .         .
10535  68I      .         .         .         .         .         S         .         .         .         .         .
10540  69I      .         .         .         .         .         S         .         .         .         .         .
10545  70I      .         .         .         .         .         S         .         .         .         .         .
10550  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10555  72I      .         .         .         .         .         S         .         .         .         .         .
10600  73I      .         .         .         .         .         S         .         .         .         .         .
10605  74I      .         .         .         .         .         S         .         .         .         .         .
10610  75I      .         .         .         .         .         S         .         .         .         .         .
10615  76I      .         .         .         .         .         S         .         .         .         .         .
10620  77I      .         .         .         .         .         S         .         .         .         .         .
10625  78I      .         .         .         .         .         S         .         .         .         .         .
10630  79I      .         .         .         .         .         S         .         .         .         .         .
10635  80I      .         .         .         .         .         S         .         .         .         .         .
10640  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10645  82I      .         .         .         .         .         S         .         .         .         .         .
10650  83I      .         .         .         .         .         S         .         .         .         .         .
10655  84I      .         .         .         .         .         S         .         .         .         .         .
10700  85I      .         .         .         .         .         S         .         .         .         .         .
10705  86I      .         .         .         .         .         S         .         .         .         .         .
10710  87I      .         .         .         .         .         S         .         .         .         .         .
10715  88I      .         .         .         .         .         S         .         .         .         .         .
10720  89I      .         .         .         .         .         S         .         .         .         .         .
10725  90I      .         .         .         .         .         S         .         .         .         .         .
10730  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10735  92I      .         .         .         .         .         S         .         .         .         .         .
10740  93I      .         .         .         .         .         S         .         .         .         .         .
10745  94I      .         .         .         .         .         S         .         .         .         .         .
10750  95I      .         .         .         .         .         S         .         .         .         .         .
10755  96I      .         .         .         .         .         S         .         .         .         .         .
10800  97I      .         .         .         .         .         S         .         .         .         .         .
10805  98I      .         .         .         .         .         S         .         .         .         .         .
10810  99I      .         .         .         .         .         S         .         .         .         .         .
10815 100I      .         .         .         .         .         S         .         .         .         .         .
10820 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10825 102I      .         .         .         .         .         S         .         .         .         .         .
10830 103I      .         .         .         .         .         S         .         .         .         .         .
10835 104I      .         .         .         .         .         S         .         .         .         .         .
10840 105I      .         .         .         .         .         S         .         .         .         .         .
10845 106I      .         .         .         .         .         S         .         .         .         .         .
10850 107I      .         .         .         .         .         S         .         .         .         .         .
10855 108I      .         .         .         .         .         S         .         .         .         .         .
10900 109I      .         .         .         .         .         S         .         .         .         .         .
10905 110I      .         .         .         .         .         S         .         .         .         .         .
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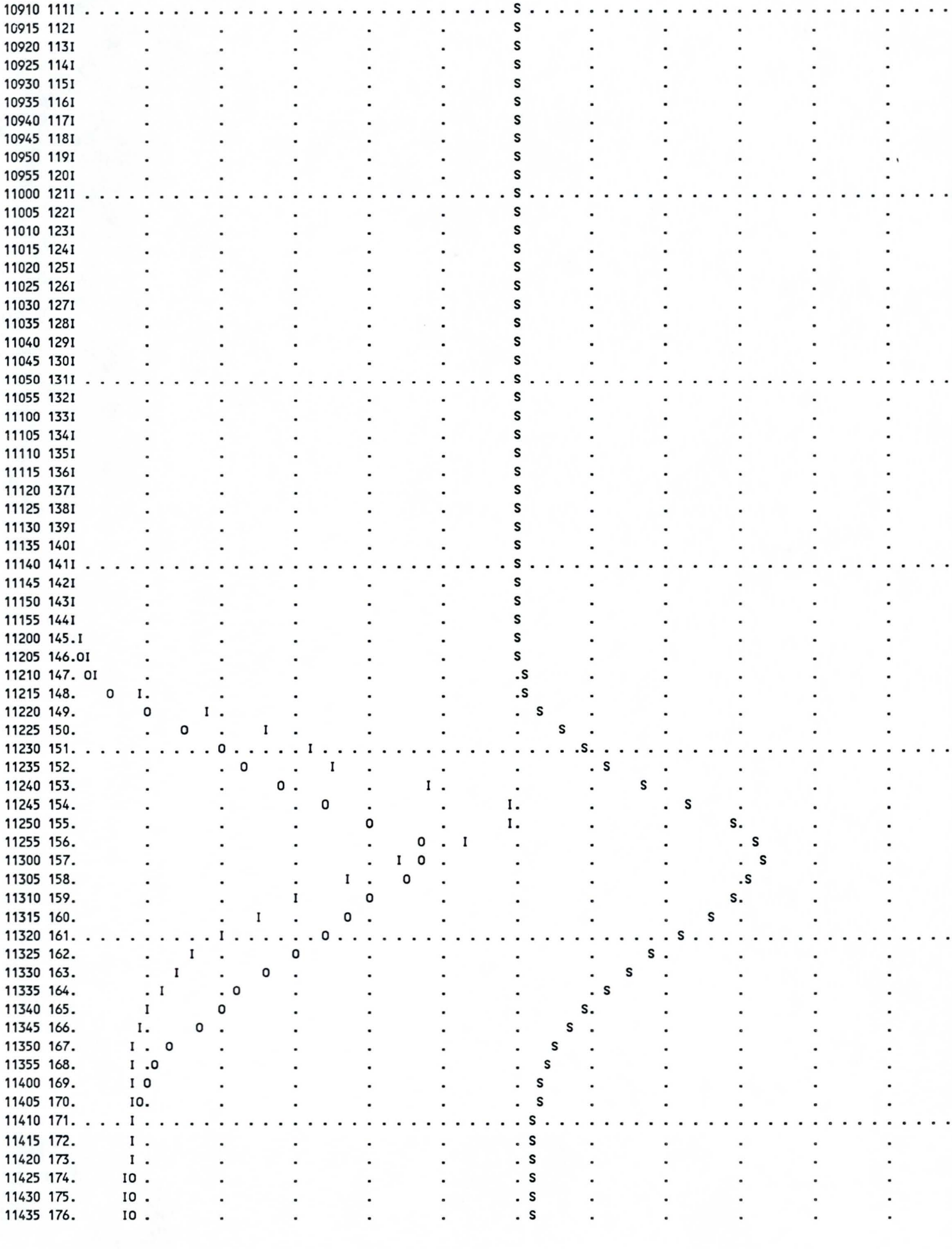

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11440 177.      I .         .         .         .         .         . S       .         .         .         .         .         .
11445 178.      I .         .         .         .         .         . S       .         .         .         .         .         .
11450 179.      I .         .         .         .         .         . S       .         .         .         .         .         .
11455 180.      I .         .         .         .         .         . S       .         .         .         .         .         .
11500 181. . . .I. . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11505 182.      I .         .         .         .         .         . S       .         .         .         .         .         .
11510 183.     IO .         .         .         .         .         . S       .         .         .         .         .         .
11515 184.     I  .         .         .         .         .         . S       .         .         .         .         .         .
11520 185.     I  .         .         .         .         .         .S        .         .         .         .         .         .
11525 186.    I   .         .         .         .         .         .S        .         .         .         .         .         .
11530 187.   IO   .         .         .         .         .         .S        .         .         .         .         .         .
11535 188.   I    .         .         .         .         .         .S        .         .         .         .         .         .
11540 189.  IO    .         .         .         .         .         .S        .         .         .         .         .         .
11545 190.  I     .         .         .         .         .         .S        .         .         .         .         .         .
11550 191. .I. . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11555 192.  I     .         .         .         .         .         .S        .         .         .         .         .         .
11600 193.  I     .         .         .         .         .         .S        .         .         .         .         .         .
11605 194.  I     .         .         .         .         .         .S        .         .         .         .         .         .
11610 195.  I     .         .         .         .         .         .S        .         .         .         .         .         .
11615 196. IO     .         .         .         .         .         .S        .         .         .         .         .         .
11620 197. I      .         .         .         .         .         .S        .         .         .         .         .         .
11625 198. I      .         .         .         .         .         .S        .         .         .         .         .         .
11630 199. I      .         .         .         .         .         .S        .         .         .         .         .         .
11635 200. I      .         .         .         .         .         .S        .         .         .         .         .         .
11640 201. I . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11645 202. I      .         .         .         .         .         .S        .         .         .         .         .         .
11650 203. I      .         .         .         .         .         .S        .         .         .         .         .         .
11655 204. I      .         .         .         .         .         .S        .         .         .         .         .         .
11700 205. I      .         .         .         .         .         .S        .         .         .         .         .         .
11705 206. I      .         .         .         .         .         .S        .         .         .         .         .         .
11710 207. I      .         .         .         .         .         .S        .         .         .         .         .         .
11715 208. I      .         .         .         .         .         .S        .         .         .         .         .         .
11720 209. I      .         .         .         .         .         .S        .         .         .         .         .         .
11725 210. I      .         .         .         .         .         .S        .         .         .         .         .         .
11730 211. I . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11735 212. I      .         .         .         .         .         .S        .         .         .         .         .         .
11740 213. I      .         .         .         .         .         .S        .         .         .         .         .         .
11745 214. I      .         .         .         .         .         .S        .         .         .         .         .         .
11750 215. I      .         .         .         .         .         .S        .         .         .         .         .         .
11755 216. I      .         .         .         .         .         .S        .         .         .         .         .         .
11800 217. I      .         .         .         .
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                                                            .         .S        .         .         .         .         .
11805 218. I        .         .         .         .         .         .S        .         .         .         .         .
11810 219. I        .         .         .         .         .         .S        .         .         .         .         .
11815 220. I        .         .         .         .         .         .S        .         .         .         .         .
11820 221. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11825 222. I        .         .         .         .         .         .S        .         .         .         .         .
11830 223. I        .         .         .         .         .         .S        .         .         .         .         .
11835 224. I        .         .         .         .         .         .S        .         .         .         .         .
11840 225. I        .         .         .         .         .         .S        .         .         .         .         .
11845 226. I        .         .         .         .         .         .S        .         .         .         .         .
11850 227. I        .         .         .         .         .         .S        .         .         .         .         .
11855 228. I        .         .         .         .         .         .S        .         .         .         .         .
11900 229. I        .         .         .         .         .         .S        .         .         .         .         .
11905 230. I        .         .         .         .         .         .S        .         .         .         .         .
11910 231. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . .
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11915 232. I      .      .      .      .      .      .S     .      .      .      .      .
11920 233. I      .      .      .      .      .      .S     .      .      .      .      .
11925 234. I      .      .      .      .      .      .S     .      .      .      .      .
11930 235. I      .      .      .      .      .      .S     .      .      .      .      .
11935 236. I      .      .      .      .      .      .S     .      .      .      .      .
11940 237. I      .      .      .      .      .      .S     .      .      .      .      .
11945 238. I      .      .      .      .      .      .S     .      .      .      .      .
11950 239. I      .      .      .      .      .      .S     .      .      .      .      .
11955 240. I      .      .      .      .      .      S      .      .      .      .      .
12000 241. I .......................................S.......................................
12005 242. I      .      .      .      .      .      S      .      .      .      .      .
12010 243. I      .      .      .      .      .      S      .      .      .      .      .
12015 244. I      .      .      .      .      .      S      .      .      .      .      .
12020 245. I      .      .      .      .      .      S      .      .      .      .      .
12025 246. I      .      .      .      .      .      S      .      .      .      .      .
12030 247. I      .      .      .      .      .      S      .      .      .      .      .
12035 248. I      .      .      .      .      .      S      .      .      .      .      .
12040 249. I      .      .      .      .      .      S      .      .      .      .      .
12045 250. I      .      .      .      .      .      S      .      .      .      .      .
12050 251. I .......................................S.......................................
12055 252. I      .      .      .      .      .      S      .      .      .      .      .
12100 253.IO      .      .      .      .      .      S      .      .      .      .      .
12105 254.I       .      .      .      .      .      S      .      .      .      .      .
12110 255.I       .      .      .      .      .      S      .      .      .      .      .
12115 256.I       .      .      .      .      .      S      .      .      .      .      .
12120 257.I       .      .      .      .      .      S      .      .      .      .      .
12125 258.I       .      .      .      .      .      S      .      .      .      .      .
12130 259.I       .      .      .      .      .      S      .      .      .      .      .
12135 260.I       .      .      .      .      .      S      .      .      .      .      .
12140 261.I.......................................S.......................................
12145 262.I       .      .      .      .      .      S      .      .      .      .      .
12150 263.I       .      .      .      .      .      S      .      .      .      .      .
12155 264.I       .      .      .      .      .      S      .      .      .      .      .
12200 265.I       .      .      .      .      .      S      .      .      .      .      .
12205 266.I       .      .      .      .      .      S      .      .      .      .      .
12210 267.I       .      .      .      .      .      S      .      .      .      .      .
12215 268.I       .      .      .      .      .      S      .      .      .      .      .
12220 269.I       .      .      .      .      .      S      .      .      .      .      .
12225 270.I       .      .      .      .      .      S      .      .      .      .      .
12230 271.I.......................................S.......................................
12235 272.I       .      .      .      .      .      S      .      .      .      .      .
12240 273.I       .      .      .      .      .      S      .      .      .      .      .
12245 274.I       .      .      .      .      .      S      .      .      .      .      .
12250 275.I       .      .      .      .      .      S      .      .      .      .      .
12255 276.I       .      .      .      .      .      S      .      .      .      .      .
12300 277.I       .      .      .      .      .      S      .      .      .      .      .
12305 278.I       .      .      .      .      .      S      .      .      .      .      .
12310 279.I       .      .      .      .      .      S      .      .      .      .      .
12315 280.I       .      .      .      .      .      S      .      .      .      .      .
12320 281.I.......................................S.......................................
12325 282.I       .      .      .      .      .      S      .      .      .      .      .
12330 283.I       .      .      .      .      .      S      .      .      .      .      .
12335 284IO       .      .      .      .      .      S      .      .      .      .      .
12340 285I        .      .      .      .      .      S      .      .      .      .      .
12345 286I        .      .      .      .      .      S      .      .      .      .      .
12350 287I        .      .      .      .      .      S      .      .      .      .      .
12355 288I        .      .      .      .      .      S      .      .      .      .      .
20000 289I        .      .      .      .      .      S      .      .      .      .      .
20005 290I        .      .      .      .      .      S      .      .      .      .      .
20010 291I .......................................S.......................................
20015 292I        .      .      .      .      .      S      .      .      .      .      .
20020 293I        .      .      .      .      .      S      .      .      .      .      .
20025 294I        .      .      .      .      .      S      .      .      .      .      .
20030 295I        .      .      .      .      .      S      .      .      .      .      .
20035 296I        .      .      .      .      .      S      .      .      .      .      .
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 20040 297I        .         .         .         .         .         S         .         .         .         .         .
 20045 298I        .         .         .         .         .         S         .         .         .         .         .
 20050 299I        .         .         .         .         .         S         .         .         .         .         .
 20055 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------
1
1                                                   STATION     STO5

                    (I) INFLOW,   (O) OUTFLOW
        0.      400.      800.     1200.     1600.     2000.     2400.     2800.     3200.     3600.       0.       0.       0
                                                                                  (S) STORAGE
        0.       0.        0.        0.        0.        0.        0.       20.       40.       60.       0.       0.       0
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------
 10005   2I        .         .         .         .         .         S         .         .         .         .         .
 10010   3I        .         .         .         .         .         S         .         .         .         .         .
 10015   4I        .         .         .         .         .         S         .         .         .         .         .
 10020   5I        .         .         .         .         .         S         .         .         .         .         .
 10025   6I        .         .         .         .         .         S         .         .         .         .         .
 10030   7I        .         .         .         .         .         S         .         .         .         .         .
 10035   8I        .         .         .         .         .         S         .         .         .         .         .
 10040   9I        .         .         .         .         .         S         .         .         .         .         .
 10045  10I        .         .         .         .         .         S         .         .         .         .         .
 10050  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10055  12I        .         .         .         .         .         S         .         .         .         .         .
 10100  13I        .         .         .         .         .         S         .         .         .         .         .
 10105  14I        .         .         .         .         .         S         .         .         .         .         .
 10110  15I        .         .         .         .         .         S         .         .         .         .         .
 10115  16I        .         .         .         .         .         S         .         .         .         .         .
 10120  17I        .         .         .         .         .         S         .         .         .         .         .
 10125  18I        .         .         .         .         .         S         .         .         .         .         .
 10130  19I        .         .         .         .         .         S         .         .         .         .         .
 10135  20I        .         .         .         .         .         S         .         .         .         .         .
 10140  21I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10145  22I        .         .         .         .         .         S         .         .         .         .         .
 10150  23I        .         .         .         .         .         S         .         .         .         .         .
 10155  24I        .         .         .         .         .         S         .         .         .         .         .
 10200  25I        .         .         .         .         .         S         .         .         .         .         .
 10205  26I        .         .         .         .         .         S         .         .         .         .         .
 10210  27I        .         .         .         .         .         S         .         .         .         .         .
 10215  28I        .         .         .         .         .         S         .         .         .         .         .
 10220  29I        .         .         .         .         .         S         .         .         .         .         .
 10225  30I        .         .         .         .         .         S         .         .         .         .         .
 10230  31I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10235  32I        .         .         .         .         .         S         .         .         .         .         .
 10240  33I        .         .         .         .         .         S         .         .         .         .         .
 10245  34I        .         .         .         .         .         S         .         .         .         .         .
 10250  35I        .         .         .         .         .         S         .         .         .         .         .
 10255  36I        .         .         .         .         .         S         .         .         .         .         .
 10300  37I        .         .         .         .         .         S         .         .         .         .         .
 10305  38I        .         .         .         .         .         S         .         .         .         .         .
 10310  39I        .         .         .         .         .         S         .         .         .         .         .
 10315  40I        .         .         .         .         .         S         .         .         .         .         .
 10320  41I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10325  42I        .         .         .         .         .         S         .         .         .         .         .
 10330  43I        .         .         .         .         .         S         .         .         .         .         .
 10335  44I        .         .         .         .         .         S         .         .         .         .         .
 10340  45I        .         .         .         .         .         S         .         .         .         .         .
 10345  46I        .         .         .         .         .         S         .         .         .         .         .
 10350  47I        .         .         .         .         .         S         .         .         .         .         .
 10355  48I        .         .         .         .         .         S         .         .         .         .         .
 10400  49I        .         .         .         .         .         S         .         .         .         .         .
 10405  50I        .         .         .         .         .         S         .         .         .         .         .
 10410  51I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10415  52I        .         .         .         .         .         S         .         .         .         .         .
 10420  53I        .         .         .         .         .         S         .         .         .         .         .
 10425  54I        .         .         .         .         .         S         .         .         .         .         .
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10430  55I      .         .         .         .         .         S         .         .         .         .         .
10435  56I      .         .         .         .         .         S         .         .         .         .         .
10440  57I      .         .         .         .         .         S         .         .         .         .         .
10445  58I      .         .         .         .         .         S         .         .         .         .         .
10450  59I      .         .         .         .         .         S         .         .         .         .         .
10455  60I      .         .         .         .         .         S         .         .         .         .         .
10500  61I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10505  62I      .         .         .         .         .         S         .         .         .         .         .
10510  63I      .         .         .         .         .         S         .         .         .         .         .
10515  64I      .         .         .         .         .         S         .         .         .         .         .
10520  65I      .         .         .         .         .         S         .         .         .         .         .
10525  66I      .         .         .         .         .         S         .         .         .         .         .
10530  67I      .         .         .         .         .         S         .         .         .         .         .
10535  68I      .         .         .         .         .         S         .         .         .         .         .
10540  69I      .         .         .         .         .         S         .         .         .         .         .
10545  70I      .         .         .         .         .         S         .         .         .         .         .
10550  71I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10555  72I      .         .         .         .         .         S         .         .         .         .         .
10600  73I      .         .         .         .         .         S         .         .         .         .         .
10605  74I      .         .         .         .         .         S         .         .         .         .         .
10610  75I      .         .         .         .         .         S         .         .         .         .         .
10615  76I      .         .         .         .         .         S         .         .         .         .         .
10620  77I      .         .         .         .         .         S         .         .         .         .         .
10625  78I      .         .         .         .         .         S         .         .         .         .         .
10630  79I      .         .         .         .         .         S         .         .         .         .         .
10635  80I      .         .         .         .         .         S         .         .         .         .         .
10640  81I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10645  82I      .         .         .         .         .         S         .         .         .         .         .
10650  83I      .         .         .         .         .         S         .         .         .         .         .
10655  84I      .         .         .         .         .         S         .         .         .         .         .
10700  85I      .         .         .         .         .         S         .         .         .         .         .
10705  86I      .         .         .         .         .         S         .         .         .         .         .
10710  87I      .         .         .         .         .         S         .         .         .         .         .
10715  88I      .         .         .         .         .         S         .         .         .         .         .
10720  89I      .         .         .         .         .         S         .         .         .         .         .
10725  90I      .         .         .         .         .         S         .         .         .         .         .
10730  91I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10735  92I      .         .         .         .         .         S         .         .         .         .         .
10740  93I      .         .         .         .         .         S         .         .         .         .         .
10745  94I      .         .         .         .         .         S         .         .         .         .         .
10750  95I      .         .         .         .         .         S         .         .         .         .         .
10755  96I      .         .         .         .         .         S         .         .         .         .         .
10800  97I      .         .         .         .         .         S         .         .         .         .         .
10805  98I      .         .         .         .         .         S         .         .         .         .         .
10810  99I      .         .         .         .         .         S         .         .         .         .         .
10815 100I      .         .         .         .         .         S         .         .         .         .         .
10820 101I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10825 102I      .         .         .         .         .         S         .         .         .         .         .
10830 103I      .         .         .         .         .         S         .         .         .         .         .
10835 104I      .         .         .         .         .         S         .         .         .         .         .
10840 105I      .         .         .         .         .         S         .         .         .         .         .
10845 106I      .         .         .         .         .         S         .         .         .         .         .
10850 107I      .         .         .         .         .         S         .         .         .         .         .
10855 108I      .         .         .         .         .         S         .         .         .         .         .
10900 109I      .         .         .         .         .         S         .         .         .         .         .
10905 110I      .         .         .         .         .         S         .         .         .         .         .
10910 111I . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
10915 112I      .         .         .         .         .         S         .         .         .         .         .
10920 113I      .         .         .         .         .         S         .         .         .         .         .
10925 114I      .         .         .         .         .         S         .         .         .         .         .
10930 115I      .         .         .         .         .         S         .         .         .         .         .
10935 116I      .         .         .         .         .         S         .         .         .         .         .
10940 117I      .         .         .         .         .         S         .         .         .         .         .
10945 118I      .         .         .         .         .         S         .         .         .         .         .
10950 119I      .         .         .         .         .         S         .         .         .         .         .
10955 120I      .         .         .         .         .         S         .         .         .         .         .
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11000 121I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11005 122I         .         .         .         .         .         S         .         .         .         .         .
11010 123I         .         .         .         .         .         S         .         .         .         .         .
11015 124I         .         .         .         .         .         S         .         .         .         .         .
11020 125I         .         .         .         .         .         S         .         .         .         .         .
11025 126I         .         .         .         .         .         S         .         .         .         .         .
11030 127I         .         .         .         .         .         S         .         .         .         .         .
11035 128I         .         .         .         .         .         S         .         .         .         .         .
11040 129I         .         .         .         .         .         S         .         .         .         .         .
11045 130I         .         .         .         .         .         S         .         .         .         .         .
11050 131I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11055 132I         .         .         .         .         .         S         .         .         .         .         .
11100 133I         .         .         .         .         .         S         .         .         .         .         .
11105 134I         .         .         .         .         .         S         .         .         .         .         .
11110 135I         .         .         .         .         .         S         .         .         .         .         .
11115 136I         .         .         .         .         .         S         .         .         .         .         .
11120 137I         .         .         .         .         .         S         .         .         .         .         .
11125 138I         .         .         .         .         .         S         .         .         .         .         .
11130 139I         .         .         .         .         .         S         .         .         .         .         .
11135 140I         .         .         .         .         .         S         .         .         .         .         .
11140 141I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11145 142I         .         .         .         .         .         S         .         .         .         .         .
11150 143OI        .         .         .         .         .         S         .         .         .         .         .
11155 144.I        .         .         .         .         .         S         .         .         .         .         .
11200 145.I        .         .         .         .         .         S         .         .         .         .         .
11205 146. I       .         .         .         .         .         S         .         .         .         .         .
11210 147.   O I   .         .         .         .         .         S         .         .         .         .         .
11215 148.       O .    I    .         .         .         .         .S        .         .         .         .         .
11220 149.         .  O      .     I   .         .         .         . S       .         .         .         .         .
11225 150.         .         O         .     I   .         .         .    S    .         .         .         .         .
11230 151. . . . . . . . . . . O . . . . . . . . .I. . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . .
11235 152.         .         .         .  O      .         .         .      I  .S        .         .         .         .
11240 153.         .         .         .         .    O    .         .         .     S   .    I    .         .         .
11245 154.         .         .         .         .         .       O .         .         S       I .         .         .
11250 155.         .         .         .         .         .         .    O    .         .I  S     .         .         .
11255 156.         .         .         .         .         .         .       O I         .    S    .         .         .
11300 157.         .         .         .         .         .       I .      O  .         .    S    .         .         .
11305 158.         .         .         .         .       I .         .  O      .         .  S      .         .         .
11310 159.         .         .         .        I.         .       O .         .         S         .         .         .
11315 160.         .         .         .I        .         . O       .         .       S .         .         .         .
11320 161. . . . . . . . . . . . .I. . . . . . . . .O. . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . .
11325 162.         .         I         .      O  .         .         .         .  S      .         .         .         .
11330 163.         .      I  .         .  O      .         .         .         .S        .         .         .         .
11335 164.         .   I     .       O .         .         .         .       S .         .         .         .         .
11340 165.         . I       .   O     .         .         .         .      S  .         .         .         .         .
11345 166.         .I        .O        .         .         .         .    S    .         .         .         .         .
11350 167.        I.       O .         .         .         .         .   S     .         .         .         .         .
11355 168.       I .    O    .         .         .         .         .  S      .         .         .         .         .
11400 169.       I . O       .         .         .         .         . S       .         .         .         .         .
11405 170.       I O         .         .         .         .         . S       .         .         .         .         .
11410 171. . . . IO. . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
11415 172.       IO.         .         .         .         .         .S        .         .         .         .         .
11420 173.       I .         .         .         .         .         .S        .         .         .         .         .
11425 174.       I .         .         .         .         .         .S        .         .         .         .         .
11430 175.       I .         .         .         .         .         .S        .         .         .         .         .
11435 176.      IO .         .         .         .         .         .S        .         .         .         .         .
11440 177.      IO .         .         .         .         .         .S        .         .         .         .         .
11445 178.      IO .         .         .         .         .         .S        .         .         .         .         .
11450 179.      I  .         .         .         .         .         .S        .         .         .         .         .
11455 180.      I  .         .         .         .         .         .S        .         .         .         .         .
11500 181. . . .I. . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
11505 182.      I  .         .         .         .         .         .S        .         .         .         .         .
11510 183.      I  .         .         .         .         .         .S        .         .         .         .         .
11515 184.      I  .         .         .         .         .         .S        .         .         .         .         .
11520 185.     IO  .         .         .         .         .         .S        .         .         .         .         .
11525 186.     I   .         .         .         .         .         .S        .         .         .         .         .
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11530 187.     I   .         .         .         .         .        .S         .         .         .         .         .
11535 188.    I    .         .         .         .         .        .S         .         .         .         .         .
11540 189.   IO    .         .         .         .         .        .S         .         .         .         .         .
11545 190.   I     .         .         .         .         .        .S         .         .         .         .         .
11550 191. .IO . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11555 192. I       .         .         .         .         .         S         .         .         .         .         .
11600 193. I       .         .         .         .         .         S         .         .         .         .         .
11605 194. I       .         .         .         .         .         S         .         .         .         .         .
11610 195. I       .         .         .         .         .         S         .         .         .         .         .
11615 196. I       .         .         .         .         .         S         .         .         .         .         .
11620 197. I       .         .         .         .         .         S         .         .         .         .         .
11625 198. I       .         .         .         .         .         S         .         .         .         .         .
11630 199. IO      .         .         .         .         .         S         .         .         .         .         .
11635 200. I       .         .         .         .         .         S         .         .         .         .         .
11640 201. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11645 202. I       .         .         .         .         .         S         .         .         .         .         .
11650 203. I       .         .         .         .         .         S         .         .         .         .         .
11655 204. I       .         .         .         .         .         S         .         .         .         .         .
11700 205. I       .         .         .         .         .         S         .         .         .         .         .
11705 206. I       .         .         .         .         .         S         .         .         .         .         .
11710 207. I       .         .         .         .         .         S         .         .         .         .         .
11715 208. I       .         .         .         .         .         S         .         .         .         .         .
11720 209. I       .         .         .         .         .         S         .         .         .         .         .
11725 210. I       .         .         .         .         .         S         .         .         .         .         .
11730 211. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11735 212. I       .         .         .         .         .         S         .         .         .         .         .
11740 213. I       .         .         .         .         .         S         .         .         .         .         .
11745 214. I       .         .         .         .         .         S         .         .         .         .         .
11750 215. I       .         .         .         .         .         S         .         .         .         .         .
11755 216. I       .         .         .         .         .         S         .         .         .         .         .
11800 217. I       .         .         .         .         .         S         .         .         .         .         .
11805 218. I       .         .         .         .         .         S         .         .         .         .         .
11810 219. I       .         .         .         .         .         S         .         .         .         .         .
11815 220. I       .         .         .         .         .         S         .         .         .         .         .
11820 221. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11825 222. I       .         .         .         .         .         S         .         .         .         .         .
11830 223. I       .         .         .         .         .         S         .         .         .         .         .
11835 224. I       .         .         .         .         .         S         .         .         .         .         .
11840 225. I       .         .         .         .         .         S         .         .         .         .         .
11845 226. I       .         .         .         .         .         S         .         .         .         .         .
11850 227. I       .         .         .         .         .         S         .         .         .         .         .
11855 228. I       .         .         .         .         .         S         .         .         .         .         .
11900 229. I       .         .         .         .         .         S         .         .         .         .         .
11905 230. I       .         .         .         .         .         S         .         .         .         .         .
11910 231. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
11915 232. I       .         .         .         .         .         S         .         .         .         .         .
11920 233. I       .         .         .         .         .         S         .         .         .         .         .
11925 234. I       .         .         .         .         .         S         .         .         .         .         .
11930 235. I       .         .         .         .         .         S         .         .         .         .         .
11935 236. I       .         .         .         .         .         S         .         .         .         .         .
11940 237. I       .         .         .         .         .         S         .         .         .         .         .
11945 238. I       .         .         .         .         .         S         .         .         .         .         .
11950 239. I       .         .         .         .         .         S         .         .         .         .         .
11955 240. I       .         .         .         .         .         S         .         .         .         .         .
12000 241. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
12005 242. I       .         .         .         .         .         S         .         .         .         .         .
12010 243. I       .         .         .         .         .         S         .         .         .         .         .
12015 244. I       .         .         .         .         .         S         .         .         .         .         .
12020 245. I       .         .         .         .         .         S         .         .         .         .         .
12025 246. I       .         .         .         .         .         S         .         .         .         .         .
12030 247. I       .         .         .         .         .         S         .         .         .         .         .
12035 248. I       .         .         .         .         .         S         .         .         .         .         .
12040 249. I       .         .         .         .         .         S         .         .         .         .         .
12045 250. I       .         .         .         .         .         S         .         .         .         .         .
12050 251. I . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
12055 252. I       .         .         .         .         .         S         .         .         .         .         .
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 12100 253. I      .         .         .         .         .         S         .         .         .         .         .
 12105 254. I      .         .         .         .         .         S         .         .         .         .         .
 12110 255. I      .         .         .         .         .         S         .         .         .         .         .
 12115 256. I      .         .         .         .         .         S         .         .         .         .         .
 12120 257. I      .         .         .         .         .         S         .         .         .         .         .
 12125 258. I      .         .         .         .         .         S         .         .         .         .         .
 12130 259. I      .         .         .         .         .         S         .         .         .         .         .
 12135 260. I      .         .         .         .         .         S         .         .         .         .         .
 12140 261.IO . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 12145 262.I       .         .         .         .         .         S         .         .         .         .         .
 12150 263.I       .         .         .         .         .         S         .         .         .         .         .
 12155 264.I       .         .         .         .         .         S         .         .         .         .         .
 12200 265.I       .         .         .         .         .         S         .         .         .         .         .
 12205 266.I       .         .         .         .         .         S         .         .         .         .         .
 12210 267.I       .         .         .         .         .         S         .         .         .         .         .
 12215 268.I       .         .         .         .         .         S         .         .         .         .         .
 12220 269.I       .         .         .         .         .         S         .         .         .         .         .
 12225 270.I       .         .         .         .         .         S         .         .         .         .         .
 12230 271.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 12235 272.I       .         .         .         .         .         S         .         .         .         .         .
 12240 273.I       .         .         .         .         .         S         .         .         .         .         .
 12245 274.I       .         .         .         .         .         S         .         .         .         .         .
 12250 275.I       .         .         .         .         .         S         .         .         .         .         .
 12255 276.I       .         .         .         .         .         S         .         .         .         .         .
 12300 277.I       .         .         .         .         .         S         .         .         .         .         .
 12305 278.I       .         .         .         .         .         S         .         .         .         .         .
 12310 279.I       .         .         .         .         .         S         .         .         .         .         .
 12315 280.I       .         .         .         .         .         S         .         .         .         .         .
 12320 281.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 12325 282.I       .         .         .         .         .         S         .         .         .         .         .
 12330 283.I       .         .         .         .         .         S         .         .         .         .         .
 12335 284.I       .         .         .         .         .         S         .         .         .         .         .
 12340 285.I       .         .         .         .         .         S         .         .         .         .         .
 12345 286.I       .         .         .         .         .         S         .         .         .         .         .
 12350 287.I       .         .         .         .         .         S         .         .         .         .         .
 12355 288.I       .         .         .         .         .         S         .         .         .         .         .
 20000 289.I       .         .         .         .         .         S         .         .         .         .         .
 20005 290.I       .         .         .         .         .         S         .         .         .         .         .
 20010 291.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 20015 292.I       .         .         .         .         .         S         .         .         .         .         .
 20020 293.I       .         .         .         .         .         S         .         .         .         .         .
 20025 294.I       .         .         .         .         .         S         .         .         .         .         .
 20030 295.I       .         .         .         .         .         S         .         .         .         .         .
 20035 296IO       .         .         .         .         .         S         .         .         .         .         .
 20040 297I        .         .         .         .         .         S         .         .         .         .         .
 20045 298I        .         .         .         .         .         S         .         .         .         .         .
 20050 299I        .         .         .         .         .         S         .         .         .         .         .
 20055 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------
1
 ***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R031.
       REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
 ***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    R031.
       REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                          TIME TO PEAK IN HOURS


                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN              RATIO 1  RATIO 2
                                                          .87     1.00

 HYDROGRAPH AT
+                 S084       .69     1   FLOW          375.     494.
```

				TIME	12.83	12.83
HYDROGRAPH AT						
+	S086	.11	1	FLOW	138.	179.
				TIME	12.25	12.25
ROUTED TO						
+	R07	.11	1	FLOW	78.	102.
				TIME	12.67	12.67
HYDROGRAPH AT						
+	S088	.43	1	FLOW	428.	546.
				TIME	12.50	12.50
3 COMBINED AT						
+	C109	1.23	1	FLOW	789.	1027.
				TIME	12.58	12.58
ROUTED TO						
+	R09	1.23	1	FLOW	649.	845.
				TIME	12.92	12.92
HYDROGRAPH AT						
+	S010	.27	1	FLOW	259.	332.
				TIME	12.50	12.50
HYDROGRAPH AT						
+	S012	.26	1	FLOW	199.	258.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S014	.36	1	FLOW	689.	836.
				TIME	12.25	12.25
4 COMBINED AT						
+	C114	2.12	1	FLOW	1147.	1473.
				TIME	12.58	12.58
ROUTED TO						
+	R015	2.12	1	FLOW	1069.	1372.
				TIME	12.83	12.83
HYDROGRAPH AT						
+	S098	.09	1	FLOW	130.	162.
				TIME	12.33	12.33
DIVERSION TO						
+	PHX54"	.09	1	FLOW	65.	81.
				TIME	12.33	12.33
HYDROGRAPH AT						
+	D098	.09	1	FLOW	65.	81.
				TIME	12.33	12.33
ROUTED TO						
+	R099	.09	1	FLOW	47.	59.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S100	.30	1	FLOW	278.	351.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S022	.29	1	FLOW	469.	585.
				TIME	12.25	12.25

4 COMBINED AT						
+	C122	2.80	1	FLOW	1486.	1883.
				TIME	12.58	12.58
DIVERSION TO						
+	VESOU	2.80	1	FLOW	491.	628.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	D122	2.80	1	FLOW	994.	1255.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S006A	.13	1	FLOW	146.	189.
				TIME	12.33	12.33
ROUTED TO						
+	R06A	.13	1	FLOW	146.	189.
				TIME	12.33	12.33
HYDROGRAPH AT						
+	S006B	.19	1	FLOW	148.	192.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S016	.16	1	FLOW	158.	203.
				TIME	12.42	12.42
3 COMBINED AT						
+	C116	.48	1	FLOW	419.	541.
				TIME	12.42	12.42
ROUTED TO						
+	R116A	.48	1	FLOW	408.	528.
				TIME	12.58	12.58
HYDROGRAPH AT						
+	S018	.15	1	FLOW	132.	172.
				TIME	12.42	12.42
HYDROGRAPH AT						
+	R118	.00	1	FLOW	65.	81.
				TIME	12.33	12.33
3 COMBINED AT						
+	C118	.63	1	FLOW	569.	732.
				TIME	12.58	12.58
ROUTED TO						
+	R019	.63	1	FLOW	562.	725.
				TIME	12.75	12.75
HYDROGRAPH AT						
+	S020	.20	1	FLOW	229.	287.
				TIME	12.42	12.42
2 COMBINED AT						
+	C120	.83	1	FLOW	714.	916.
				TIME	12.67	12.67
2 COMBINED AT						
+	C124	3.63	1	FLOW	1705.	2168.
				TIME	12.67	12.67
ROUTED TO						
+	R023A	3.63	1	FLOW	1667.	2107.

				TIME	12.83	12.83
HYDROGRAPH AT						
+	D122R	.00	1	FLOW	491.	628.
				TIME	12.58	12.58
ROUTED TO						
+	R122	.00	1	FLOW	488.	625.
				TIME	12.67	12.67
HYDROGRAPH AT						
+	S28A	.36	1	FLOW	353.	448.
				TIME	12.50	12.50
2 COMBINED AT						
+	C28	.36	1	FLOW	820.	1051.
				TIME	12.58	12.58
ROUTED TO						
+	R28	.36	1	FLOW	807.	1038.
				TIME	12.67	12.67
2 COMBINED AT						
+	C125	3.99	1	FLOW	2450.	3116.
				TIME	12.75	12.75
ROUTED TO						
+	R023B	3.99	1	FLOW	2377.	3022.
				TIME	12.92	12.92
HYDROGRAPH AT						
+	S024	.23	1	FLOW	235.	296.
				TIME	12.50	12.50
ROUTED TO						
+	R025	.23	1	FLOW	196.	247.
				TIME	12.75	12.75
HYDROGRAPH AT						
+	S026	.21	1	FLOW	284.	355.
				TIME	12.33	12.33
HYDROGRAPH AT						
+	S030	.04	1	FLOW	64.	80.
				TIME	12.25	12.25
4 COMBINED AT						
+	C127	4.47	1	FLOW	2627.	3338.
				TIME	12.83	12.83
HYDROGRAPH AT						
+	S48	.80	1	FLOW	1085.	1335.
				TIME	12.42	12.42
DIVERSION TO						
+	D1	.80	1	FLOW	552.	702.
				TIME	12.42	12.42
HYDROGRAPH AT						
+	DS48	.80	1	FLOW	533.	633.
				TIME	12.42	12.42
ROUTED TO						
+	STO1	.80	1	FLOW	359.	474.
				TIME	12.75	12.67

```
                                        ** PEAK STAGES IN FEET **
                                        1   STAGE      1415.47  1416.08
                                            TIME         12.75    12.67

 HYDROGRAPH AT
+                   S46       .82       1   FLOW          829.     1031.
                                            TIME         12.58    12.58

 DIVERSION TO
+                    D2       .82       1   FLOW          315.      392.
                                            TIME         12.58    12.58

 HYDROGRAPH AT
+                  DS46       .82       1   FLOW          514.      639.
                                            TIME         12.58    12.58

 HYDROGRAPH AT
+                  RS48       .00       1   FLOW          552.      702.
                                            TIME         12.42    12.42

  3 COMBINED AT
+                   C48      1.62       1   FLOW         1241.     1648.
                                            TIME         12.58    12.58

 ROUTED TO
+                  STO2      1.62       1   FLOW         1134.     1537.
                                            TIME         12.75    12.67

                                        ** PEAK STAGES IN FEET **
                                        1   STAGE      1411.55  1412.65
                                            TIME         12.75    12.67

 HYDROGRAPH AT
+                  RS46       .00       1   FLOW          315.      392.
                                            TIME         12.58    12.58

  2 COMBINED AT
+                  C46N      1.62       1   FLOW         1426.     1919.
                                            TIME         12.67    12.67

 HYDROGRAPH AT
+                   S42       .90       1   FLOW          862.     1085.
                                            TIME         12.58    12.58

 DIVERSION TO
+                 D3IBW       .90       1   FLOW          346.      346.
                                            TIME         12.25    12.17

 HYDROGRAPH AT
+                  DS42       .90       1   FLOW          516.      739.
                                            TIME         12.58    12.58

 DIVERSION TO
+                    D4       .90       1   FLOW          305.      436.
                                            TIME         12.58    12.58

 HYDROGRAPH AT
+                  DC42       .90       1   FLOW          212.      303.
                                            TIME         12.58    12.58

  2 COMBINED AT
+                  C42S      2.52       1   FLOW         1624.     2202.
                                            TIME         12.67    12.67

 ROUTED TO
+                  STO3      2.52       1   FLOW         1453.     2070.
```

```
                                        TIME          12.83    12.75

                                   ** PEAK STAGES IN FEET **
                                   1  STAGE       1406.07  1407.08
                                        TIME          12.83    12.75

 HYDROGRAPH AT
+                  RS42       .00    1  FLOW          305.     436.
                                        TIME          12.58    12.58

  2 COMBINED AT
+                  C42N      2.52    1  FLOW         1632.    2419.
                                        TIME          12.83    12.75

 HYDROGRAPH AT
+                   S38      1.34    1  FLOW         1105.    1401.
                                        TIME          12.67    12.67

 DIVERSION TO
+                    D5      1.34    1  FLOW          718.     911.
                                        TIME          12.67    12.67

 HYDROGRAPH AT
+                  DS38      1.34    1  FLOW          387.     491.
                                        TIME          12.67    12.67

 DIVERSION TO
+                    D6      1.34    1  FLOW          174.     221.
                                        TIME          12.67    12.67

 HYDROGRAPH AT
+                 DS38A      1.34    1  FLOW          212.     270.
                                        TIME          12.67    12.67

  2 COMBINED AT
+                  C38A      3.86    1  FLOW         1823.    2680.
                                        TIME          12.83    12.75

 HYDROGRAPH AT
+                 RDS38       .00    1  FLOW          718.     911.
                                        TIME          12.67    12.67

 DIVERSION TO
+                 SWEST       .00    1  FLOW          149.     149.
                                        TIME          12.17    12.17

 HYDROGRAPH AT
+                  DSWW       .00    1  FLOW          569.     762.
                                        TIME          12.67    12.67

 HYDROGRAPH AT
+                   RD6       .00    1  FLOW          174.     221.
                                        TIME          12.67    12.67

 DIVERSION TO
+                    D7       .00    1  FLOW          122.     122.
                                        TIME          12.42    12.33

 HYDROGRAPH AT
+                 DSWTE       .00    1  FLOW           52.      99.
                                        TIME          12.67    12.67

  3 COMBINED AT
+                   C38      3.86    1  FLOW         2364.    3504.
                                        TIME          12.75    12.75
```

```
ROUTED TO
+                    ST05      3.86    1   FLOW        1897.    2704.
                                           TIME       13.00    12.92

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE     1395.85  1399.16
                                           TIME       13.00    12.92

HYDROGRAPH AT
+                    S28B       .29    1   FLOW           1.       1.
                                           TIME       12.58    12.58

 2 COMBINED AT
+                    C129      4.15    1   FLOW        1897.    2705.
                                           TIME       13.00    12.92

ROUTED TO
+                     R29      4.15    1   FLOW        1897.    2705.
                                           TIME       13.00    12.92

 2 COMBINED AT
+                    C131      8.62    1   FLOW        4489.    6031.
                                           TIME       12.92    12.92

ROUTED TO
+                    R031      8.62    1   FLOW        4027.    5423.
                                           TIME       13.17    13.17

HYDROGRAPH AT
+                    S032       .56    1   FLOW         674.     861.
                                           TIME       12.33    12.33

ROUTED TO
+                    R033       .56    1   FLOW         425.     546.
                                           TIME       12.58    12.58

HYDROGRAPH AT
+                    S034       .93    1   FLOW         675.     868.
                                           TIME       12.67    12.67

 2 COMBINED AT
+                    C134      1.49    1   FLOW        1097.    1407.
                                           TIME       12.67    12.67

ROUTED TO
+                    R035      1.49    1   FLOW         871.    1122.
                                           TIME       12.92    12.92

HYDROGRAPH AT
+                   S036A       .58    1   FLOW         507.     645.
                                           TIME       12.58    12.58

HYDROGRAPH AT
+                    S040       .23    1   FLOW         246.     311.
                                           TIME       12.42    12.42

 4 COMBINED AT
+                    C141     10.92    1   FLOW        5072.    6772.
                                           TIME       13.17    13.08

HYDROGRAPH AT
+                   RDSWW       .00    1   FLOW         149.     149.
                                           TIME       12.17    12.17

HYDROGRAPH AT
+                    S044       .16    1   FLOW         179.     226.
```

```
                                        TIME        12.42    12.42

 3 COMBINED AT
+                C145     11.08     1   FLOW        5254.    6969.
                                        TIME        13.08    13.08


***    1 ERROR(S) DETECTED BY HEC-1 ***
```

Section 4800, profile 1, conveyance change outside acceptable range.

Section 5300, profile 1, critical depth assumed.

Section 5300, profile 1, probable minimum specific energy.

Section 5300, profile 1, 20 trials attempted to balance water surface elevation.

Section 7655, profile 1, water surface elevation based upon the X5 card.

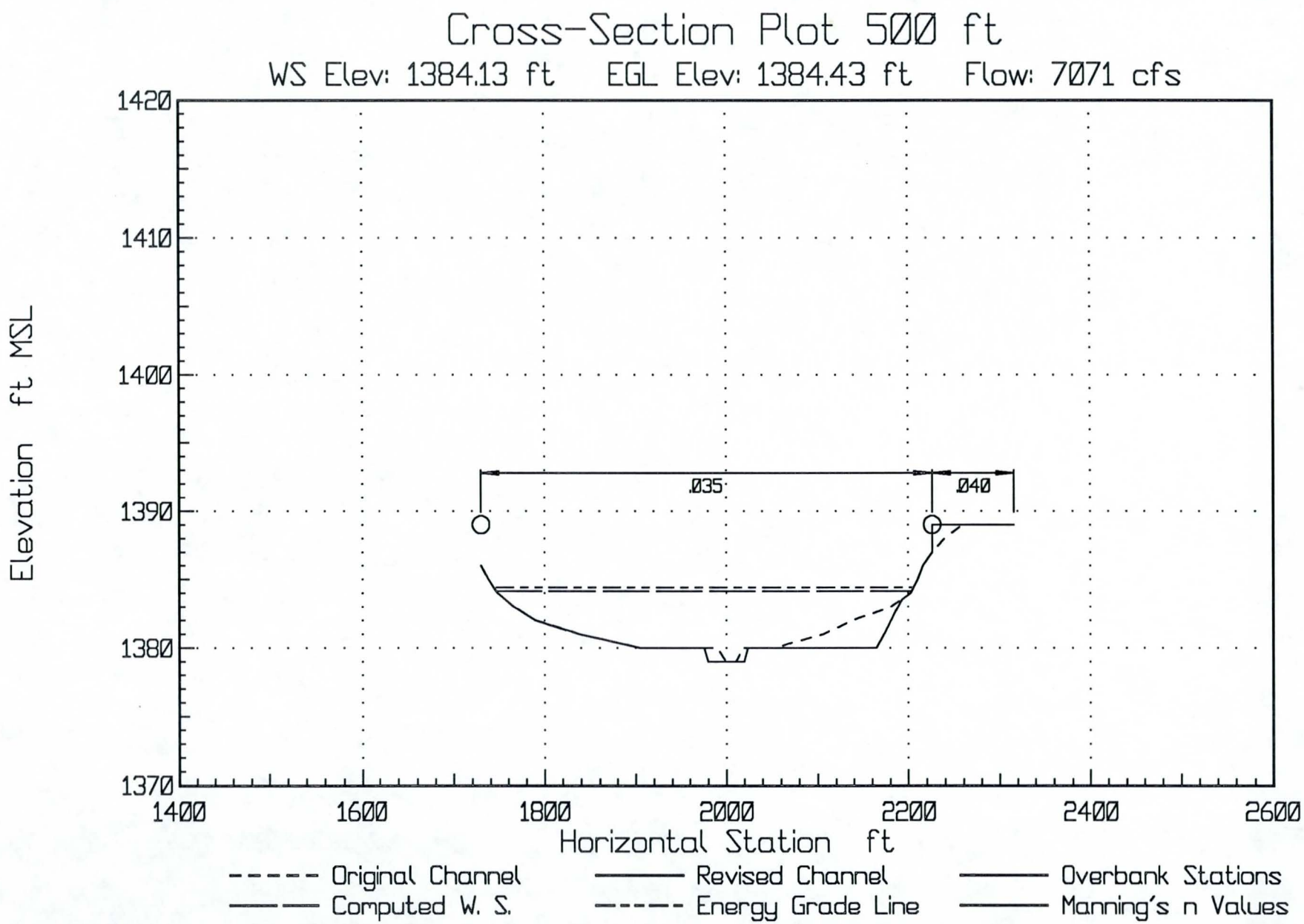
Section 8155, profile 1, critical depth assumed.

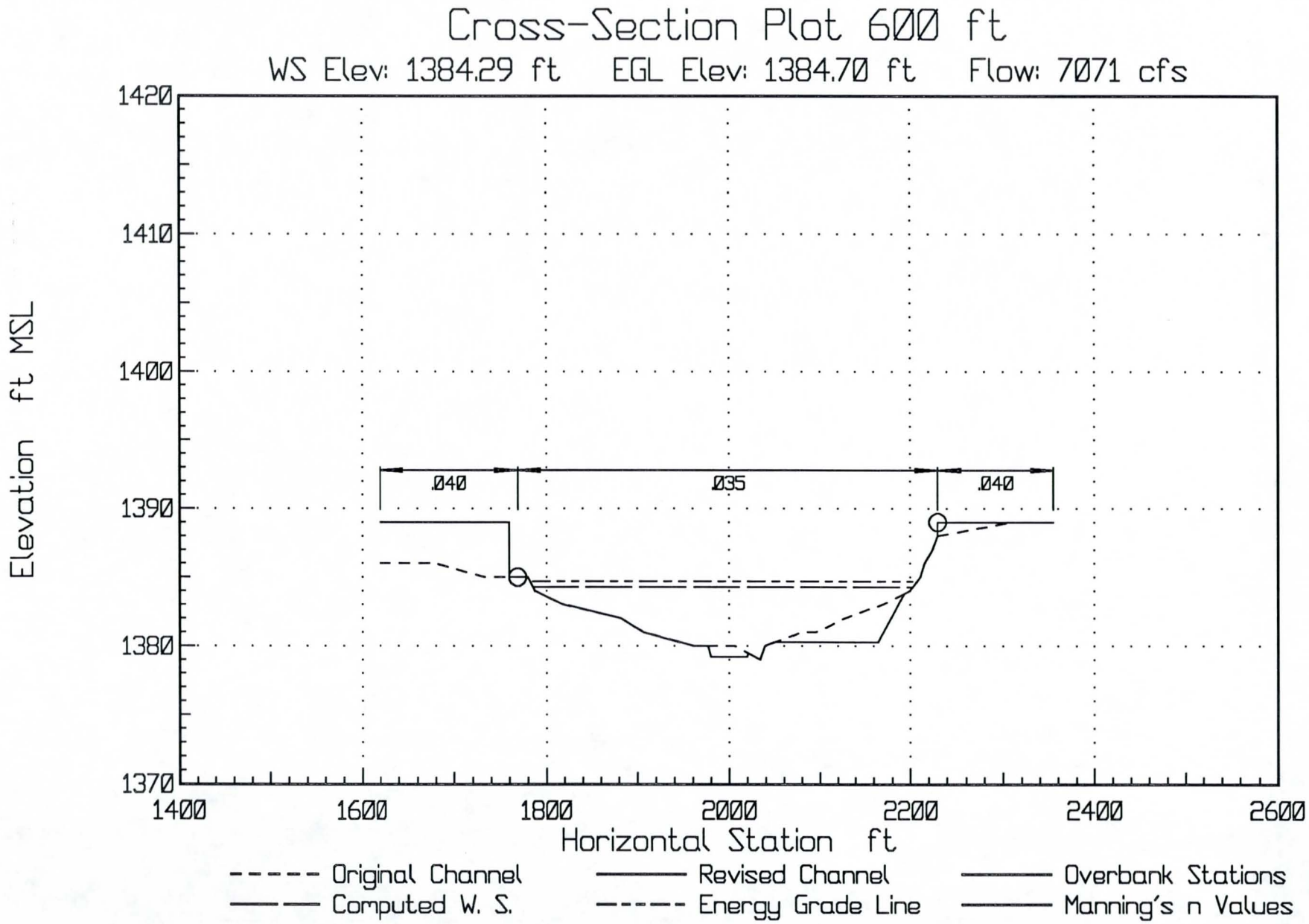
Section 8155, profile 1, probable minimum specific energy.

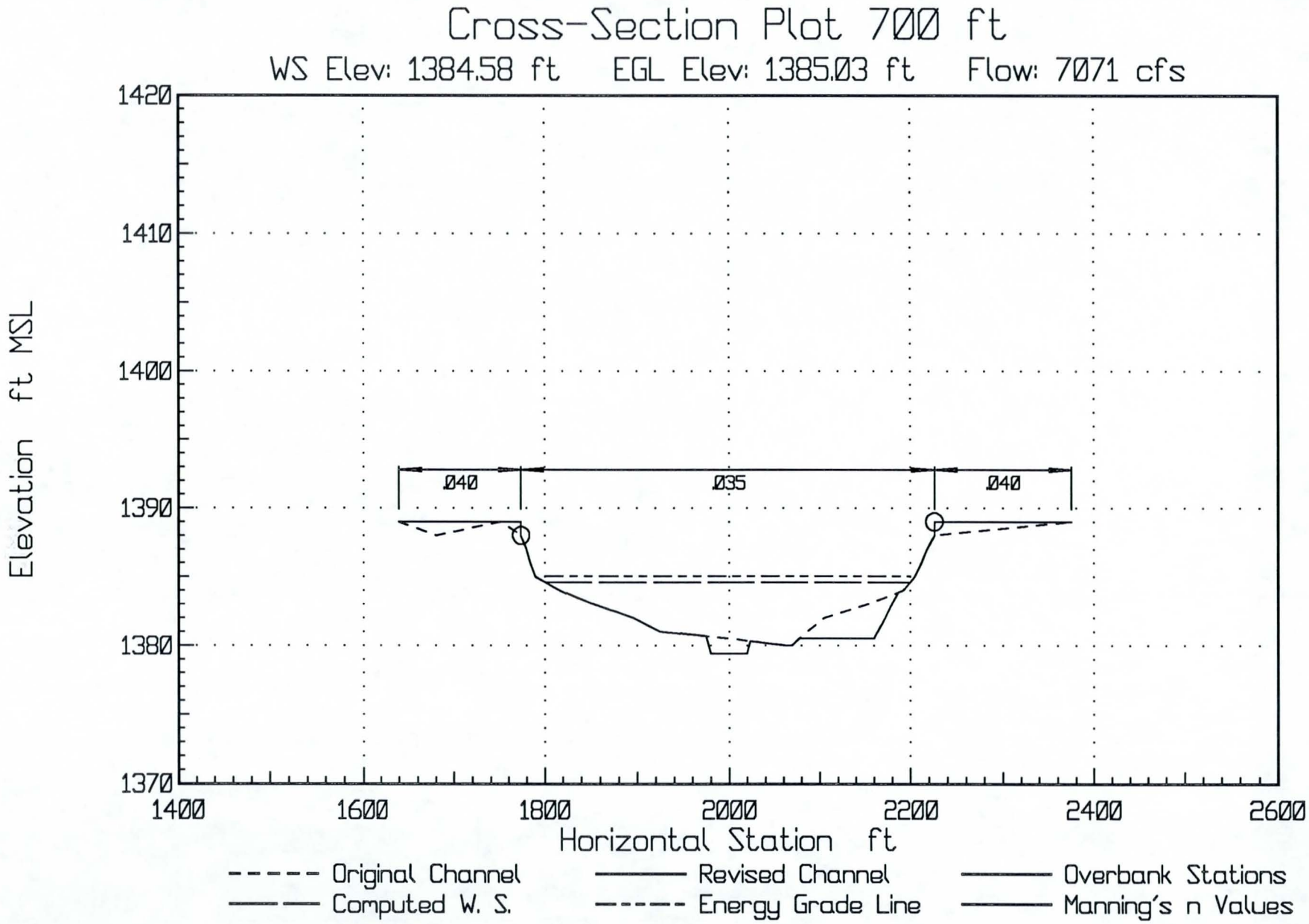
Section 8155, profile 1, 20 trials attempted to balance water surface elevation.

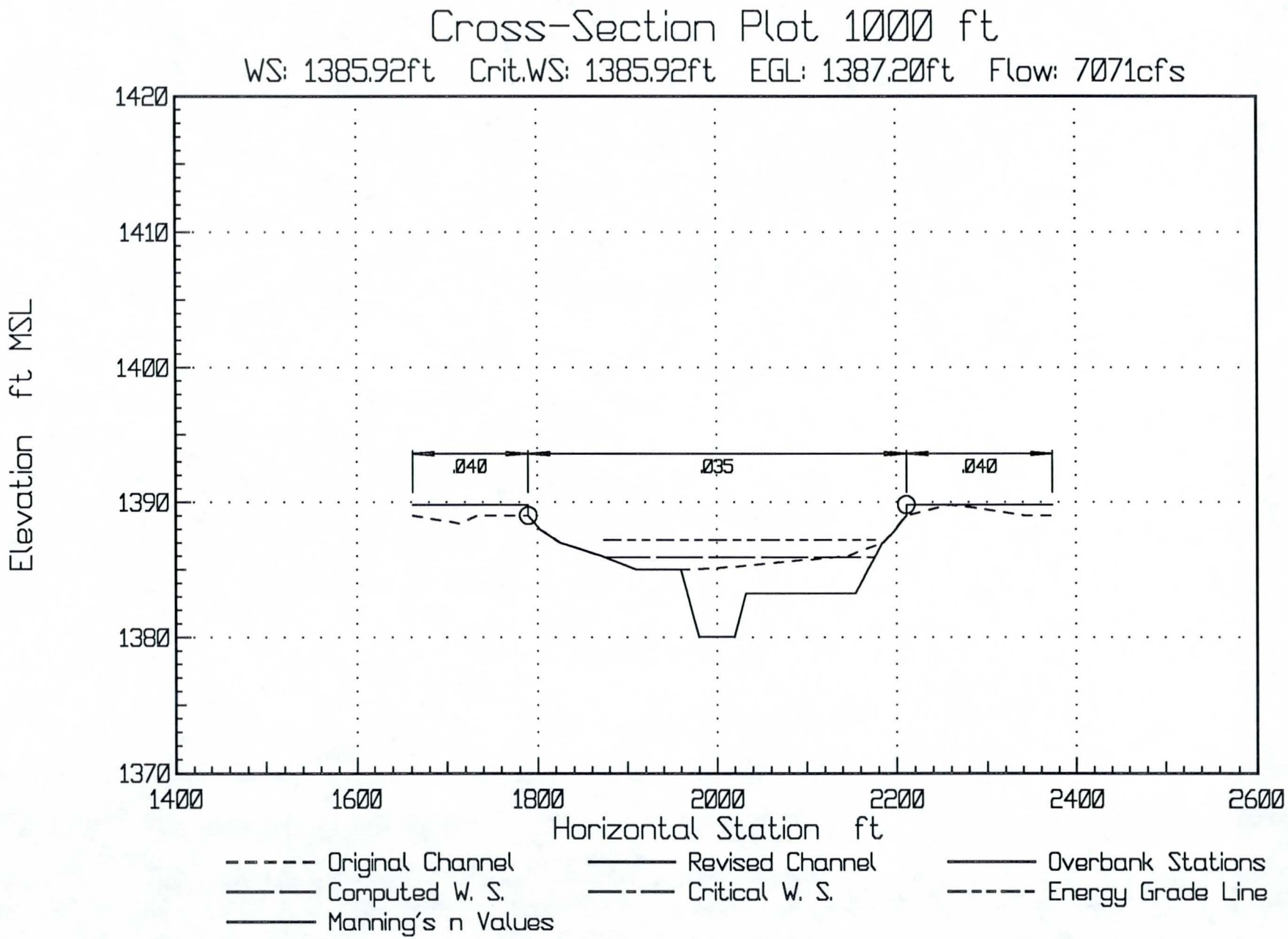
17 Warning and status message(s) generated

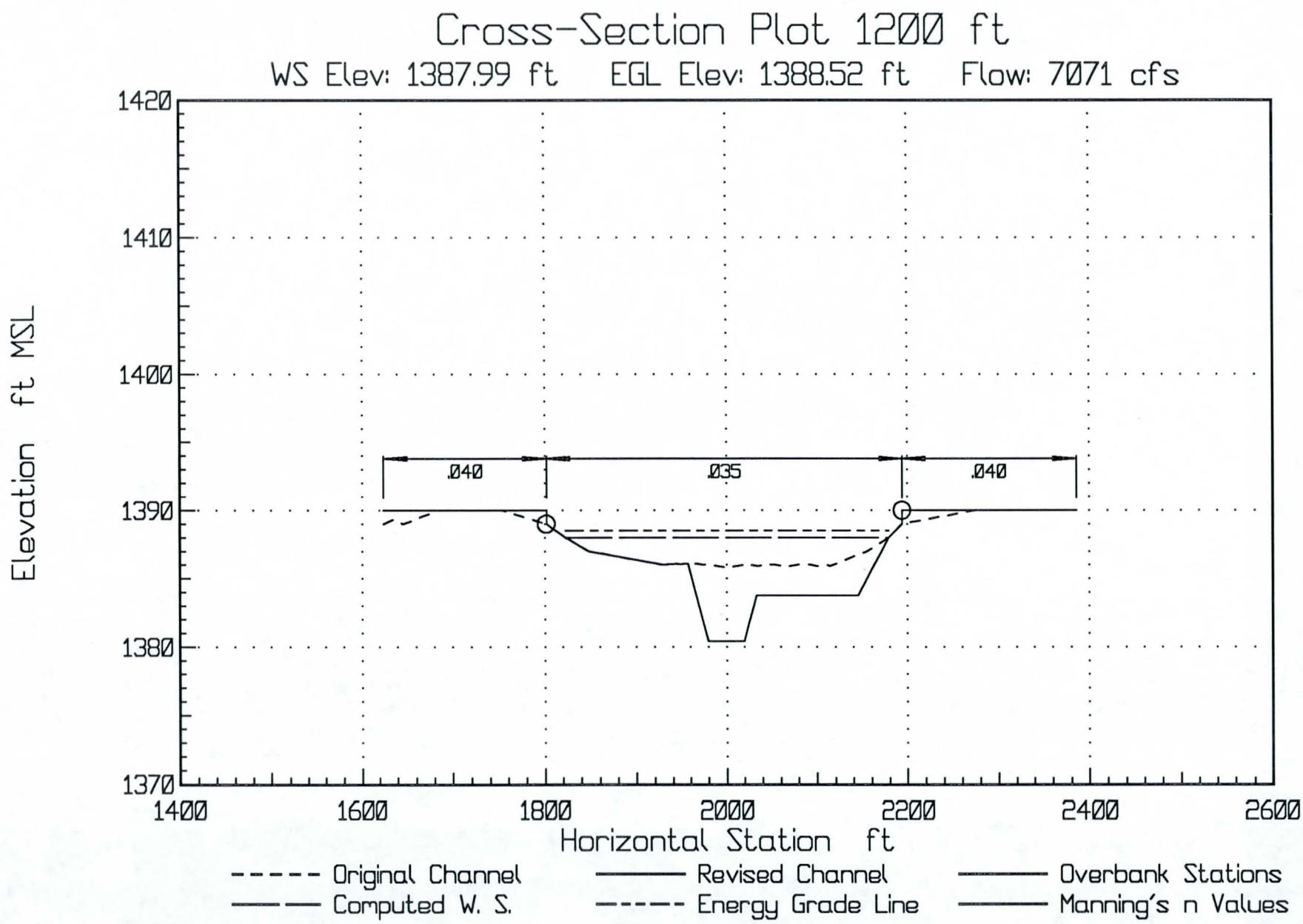
END OF OUTPUT

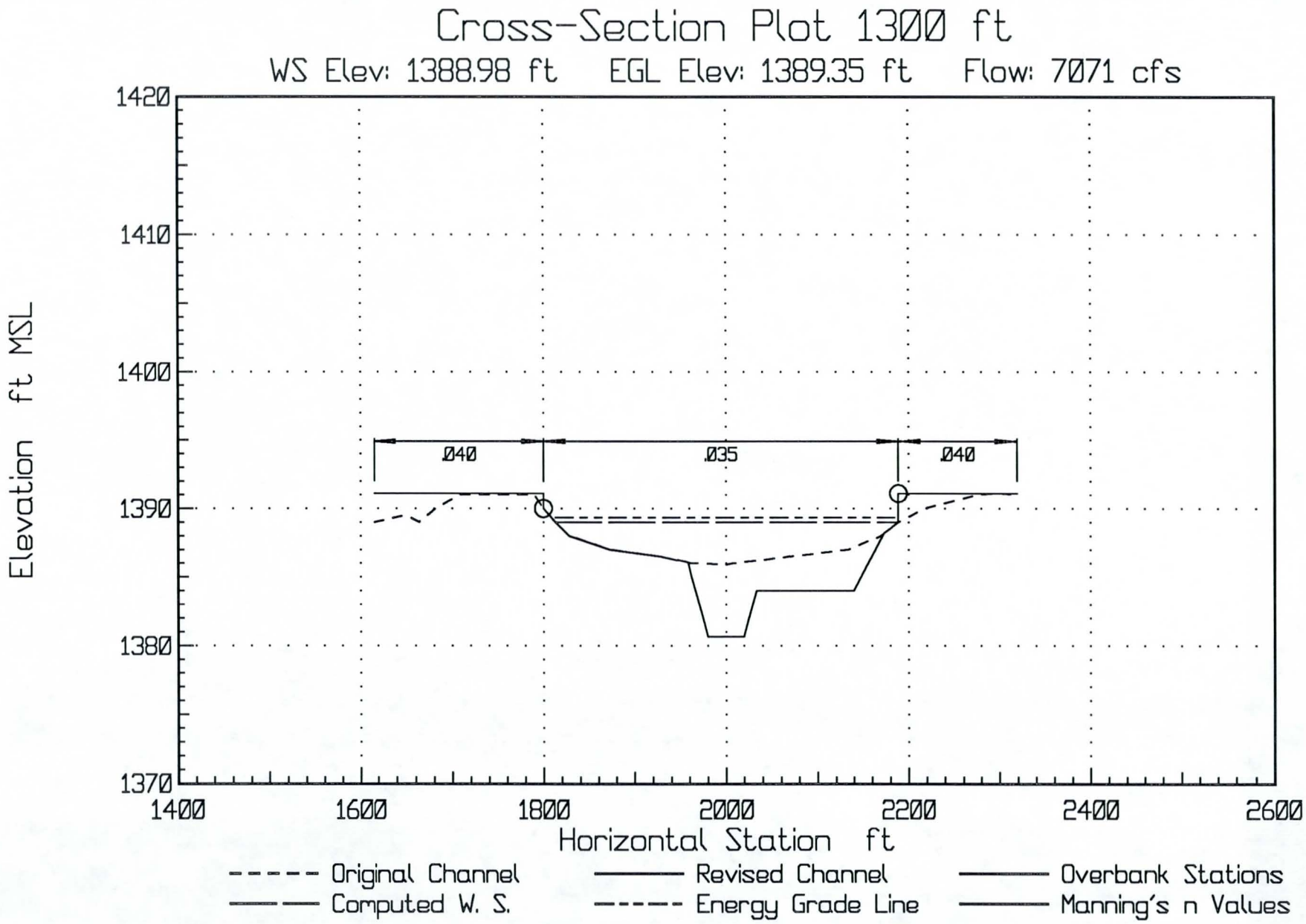

Cross-Section Plot 500 ft
WS Elev: 1384.13 ft
EGL Elev: 1384.43 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

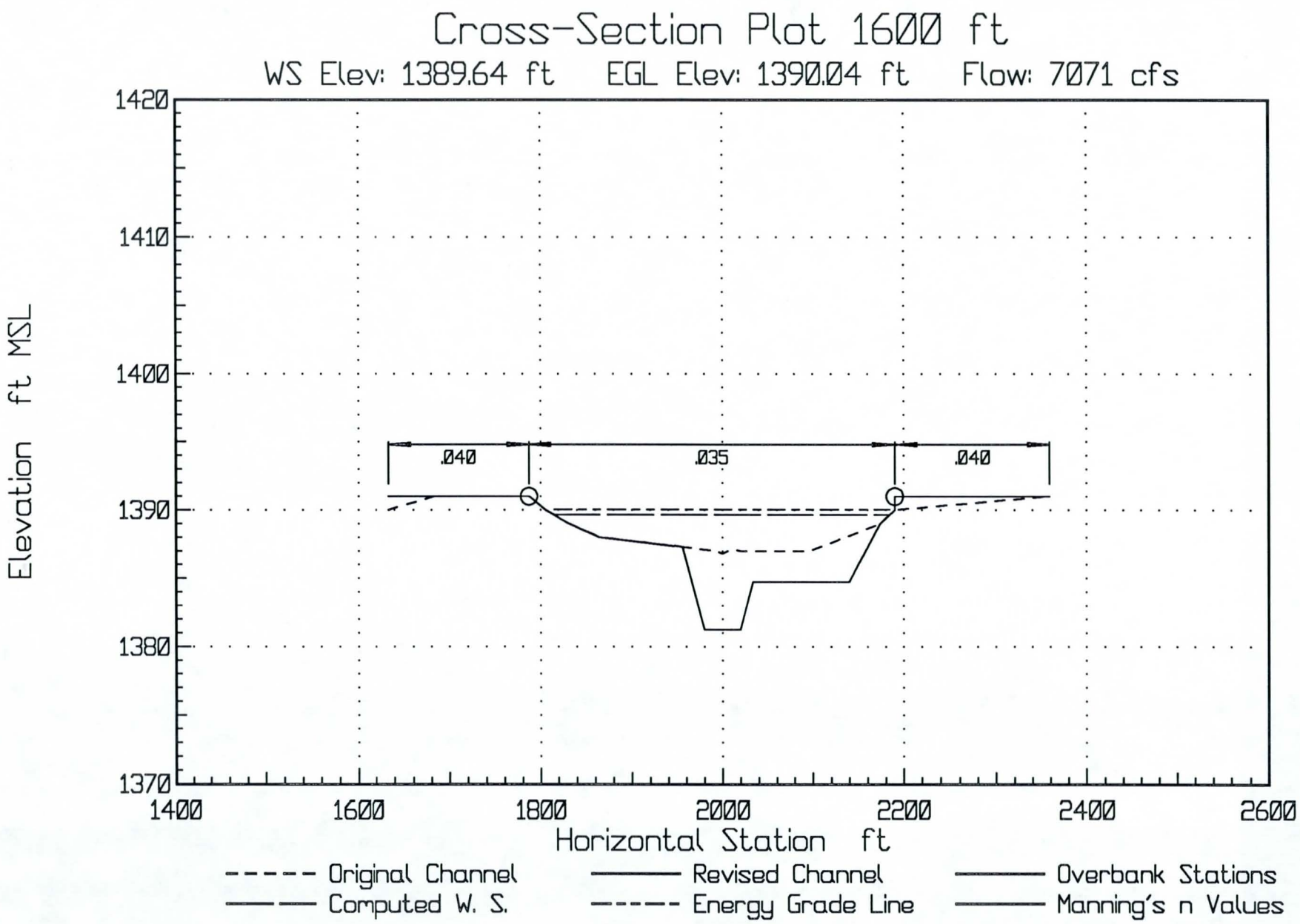

Cross-Section Plot 600 ft
WS Elev: 1384.29 ft
EGL Elev: 1384.70 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

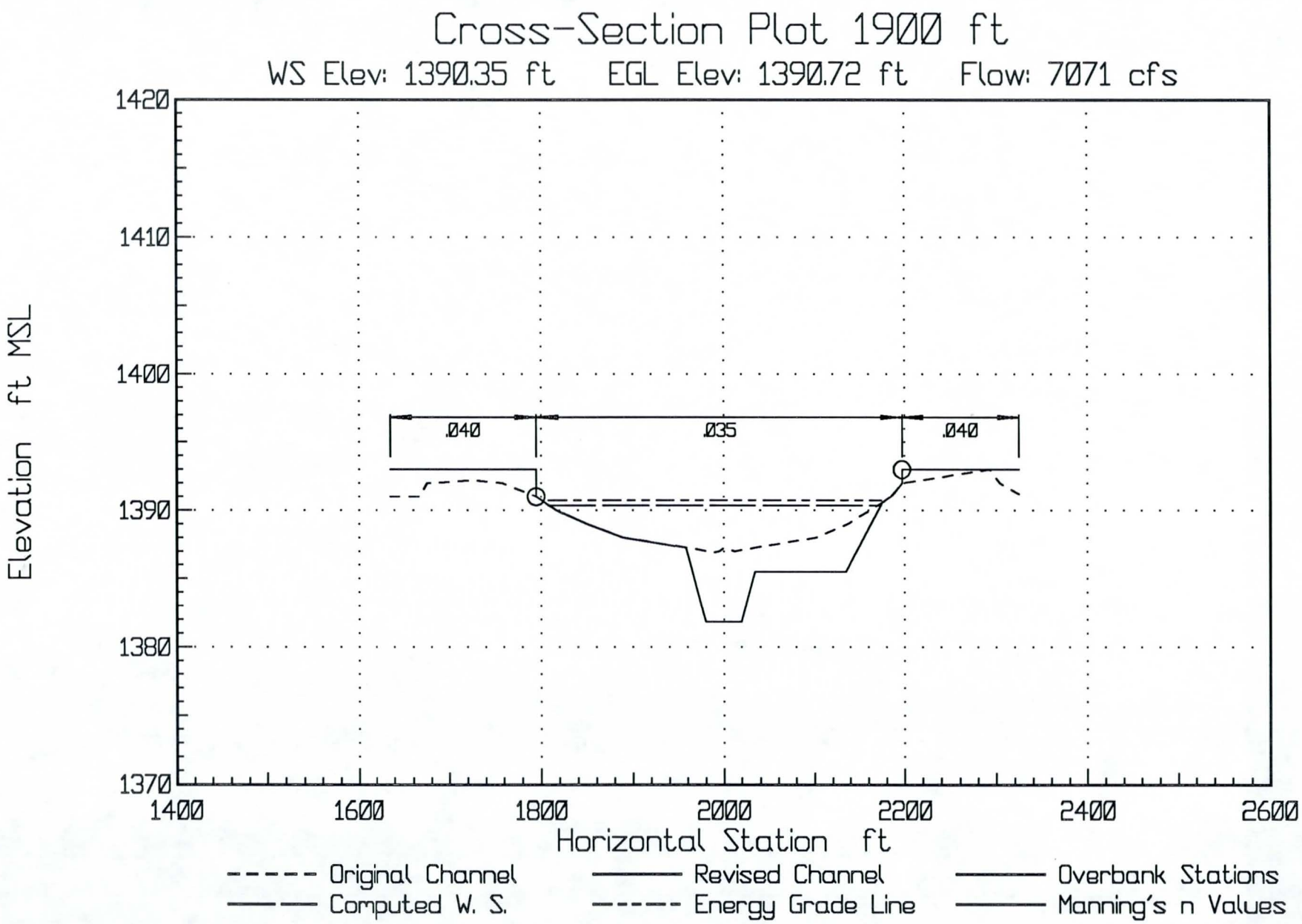

Cross-Section Plot 700 ft
WS Elev: 1384.58 ft
EGL Elev: 1385.03 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
040
035
040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

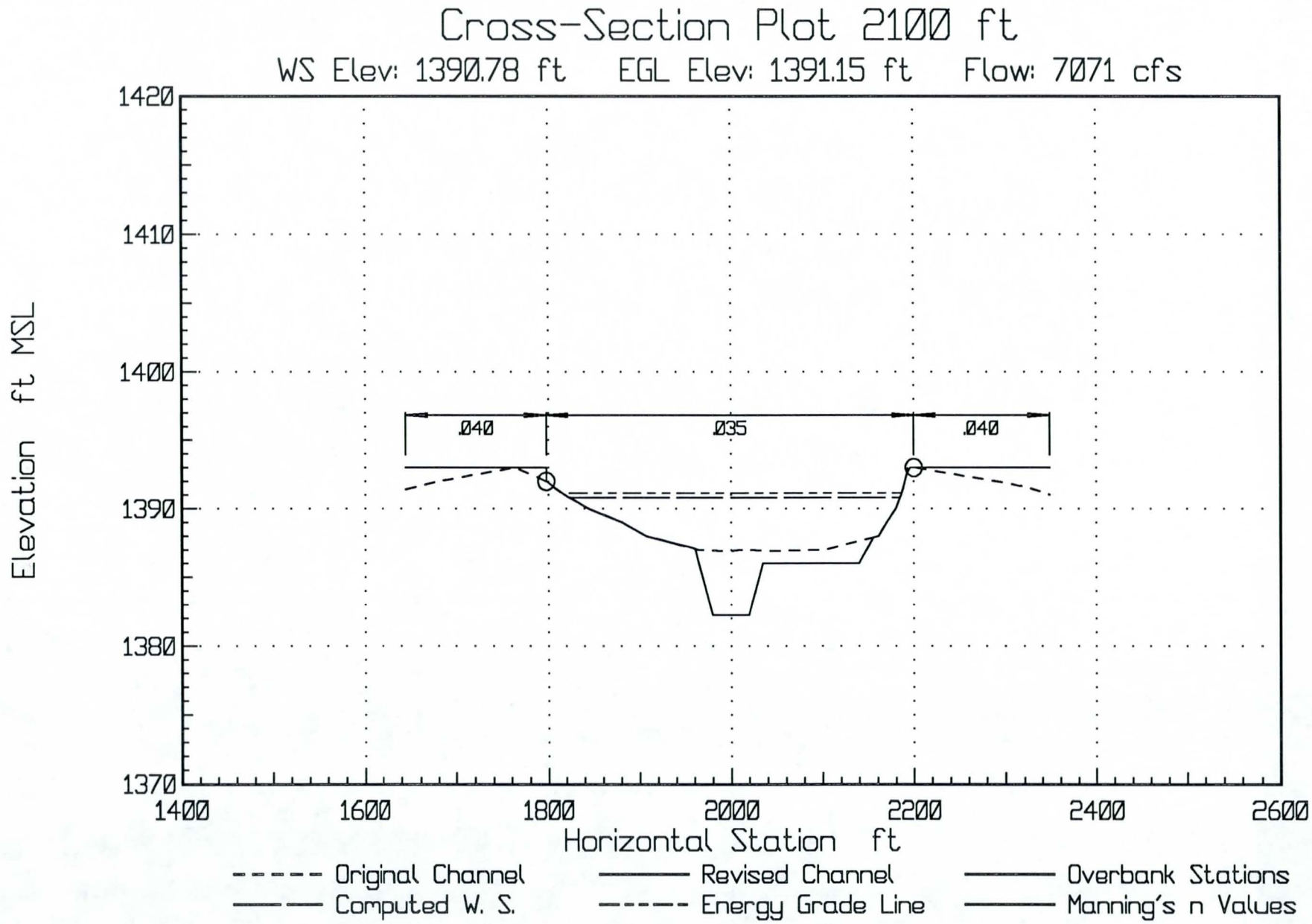

Cross-Section Plot 1000 ft
WS: 1385.92ft Crit.WS: 1385.92ft EGL: 1387.20ft Flow: 7071cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
.040
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values

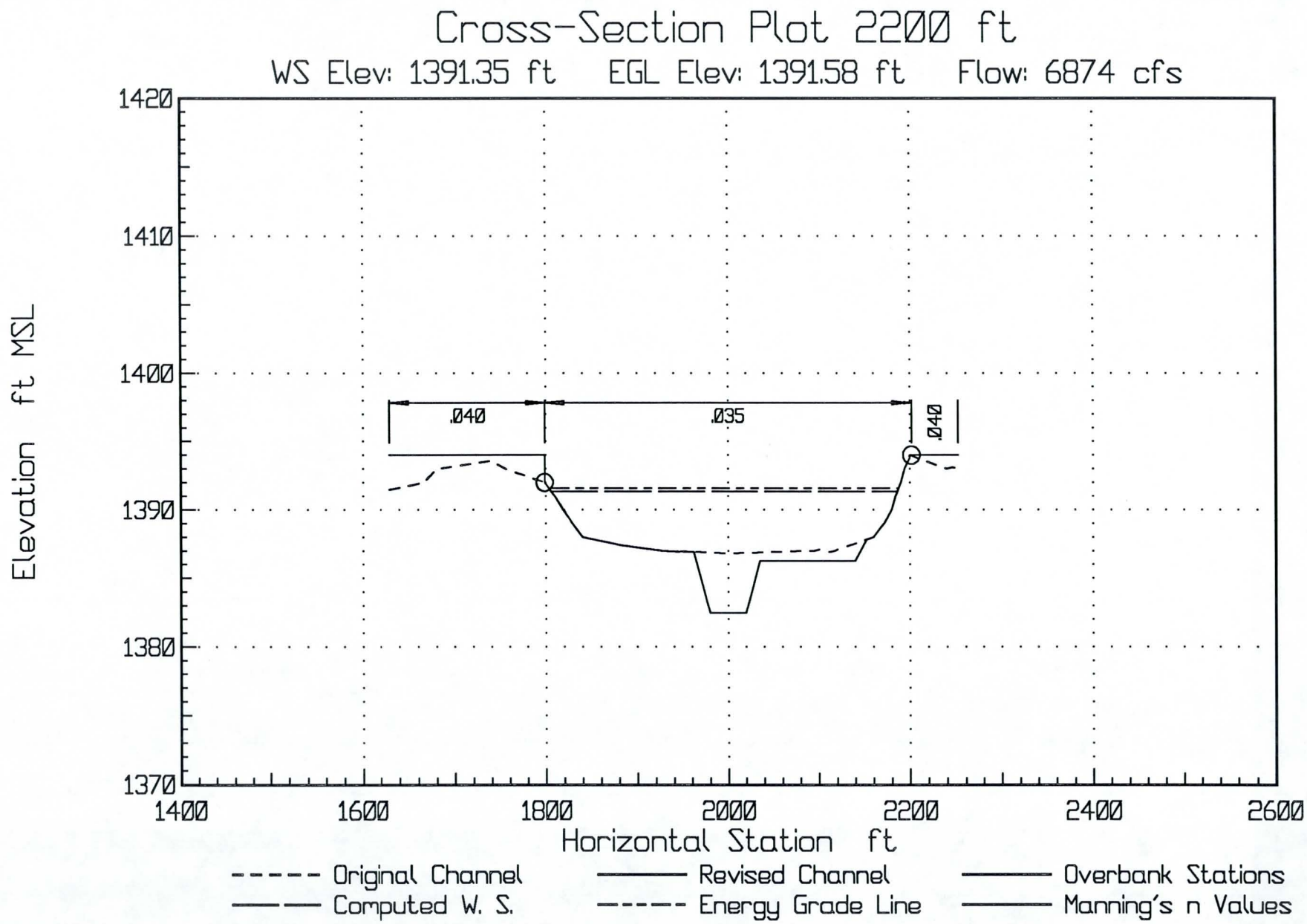

Cross-Section Plot 1200 ft
WS Elev: 1387.99 ft
EGL Elev: 1388.52 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

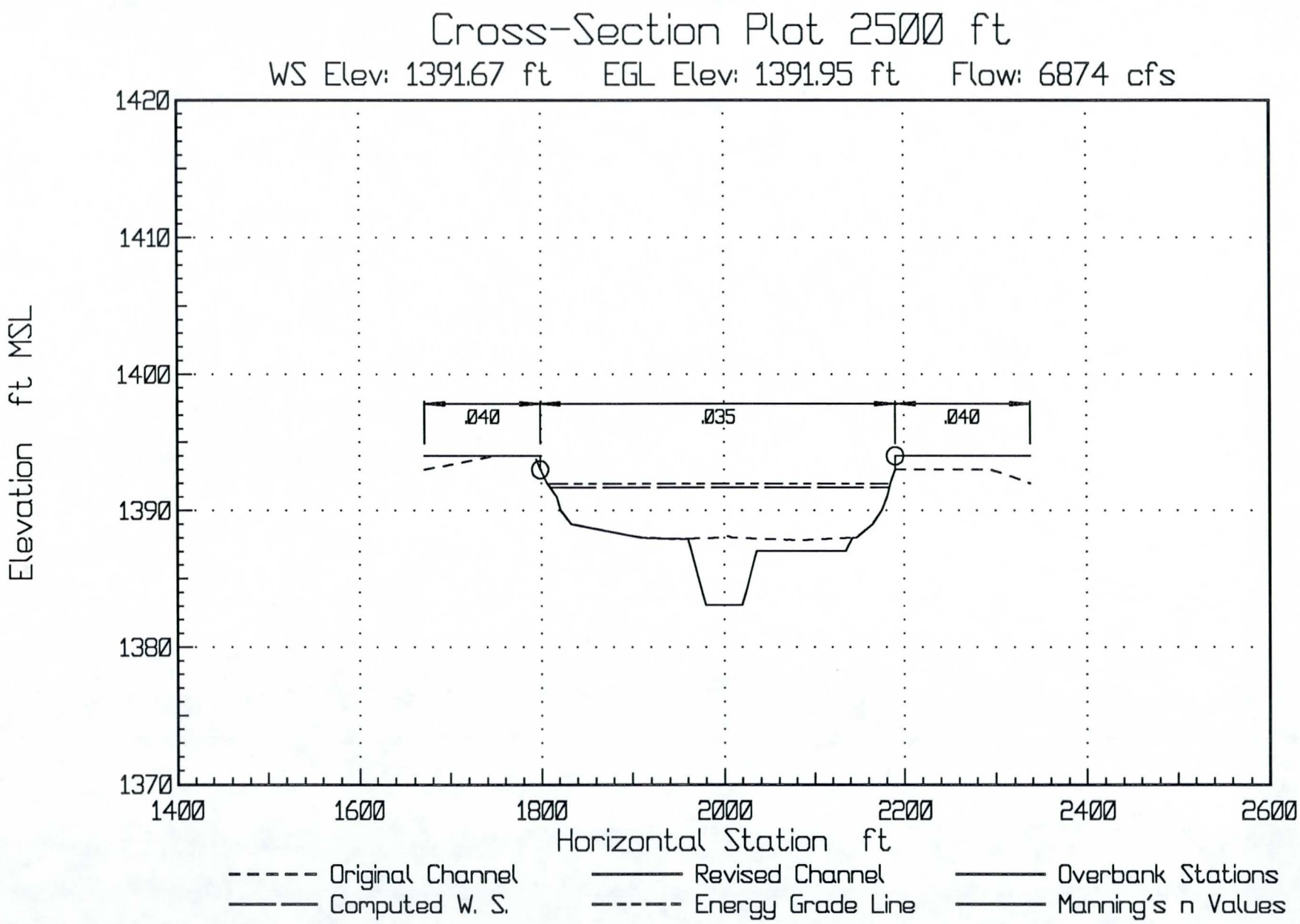

Cross-Section Plot 1300 ft
WS Elev: 1388.98 ft
EGL Elev: 1389.35 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
.040
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

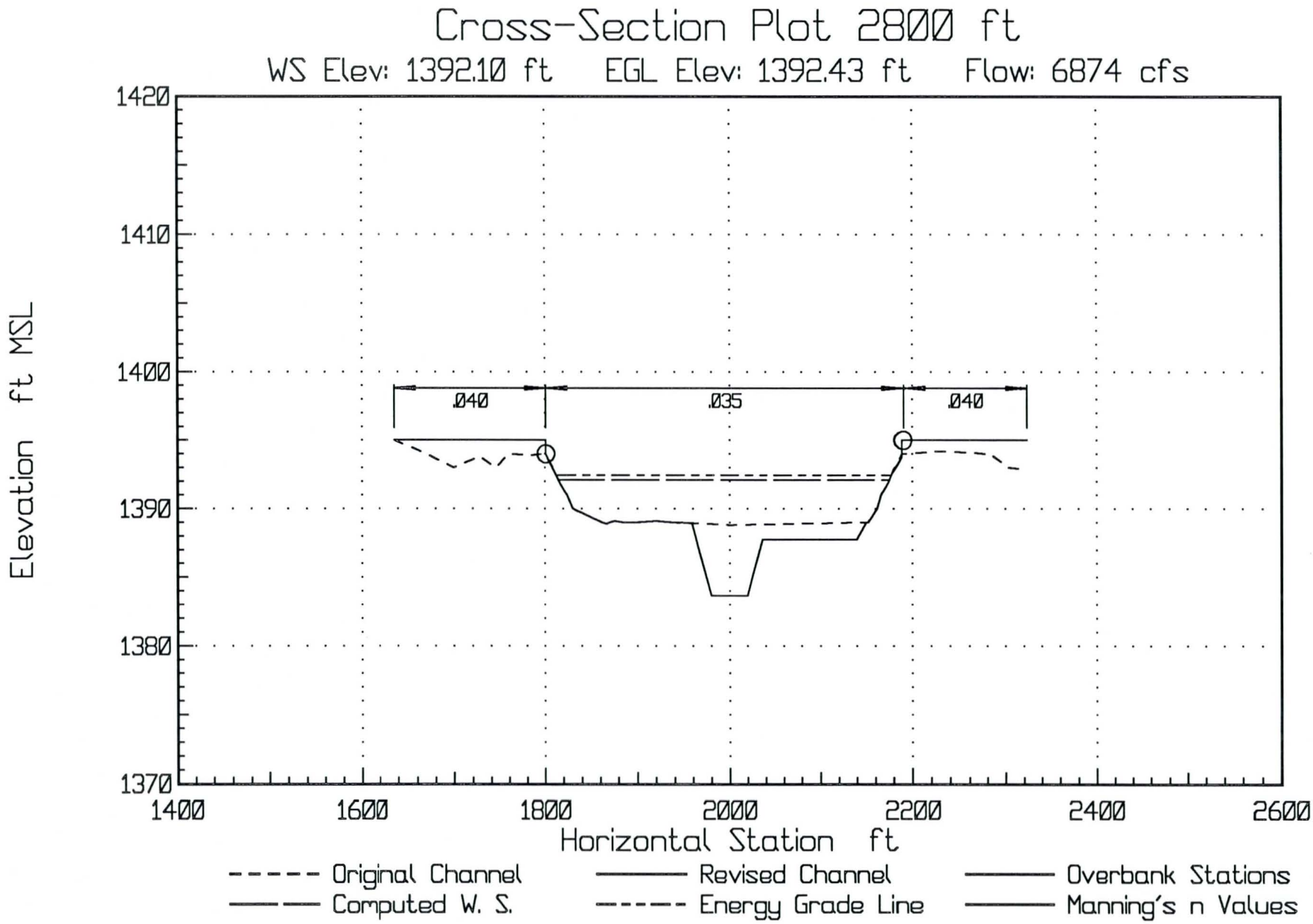

Cross-Section Plot 1600 ft
WS Elev: 1389.64 ft
EGL Elev: 1390.04 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

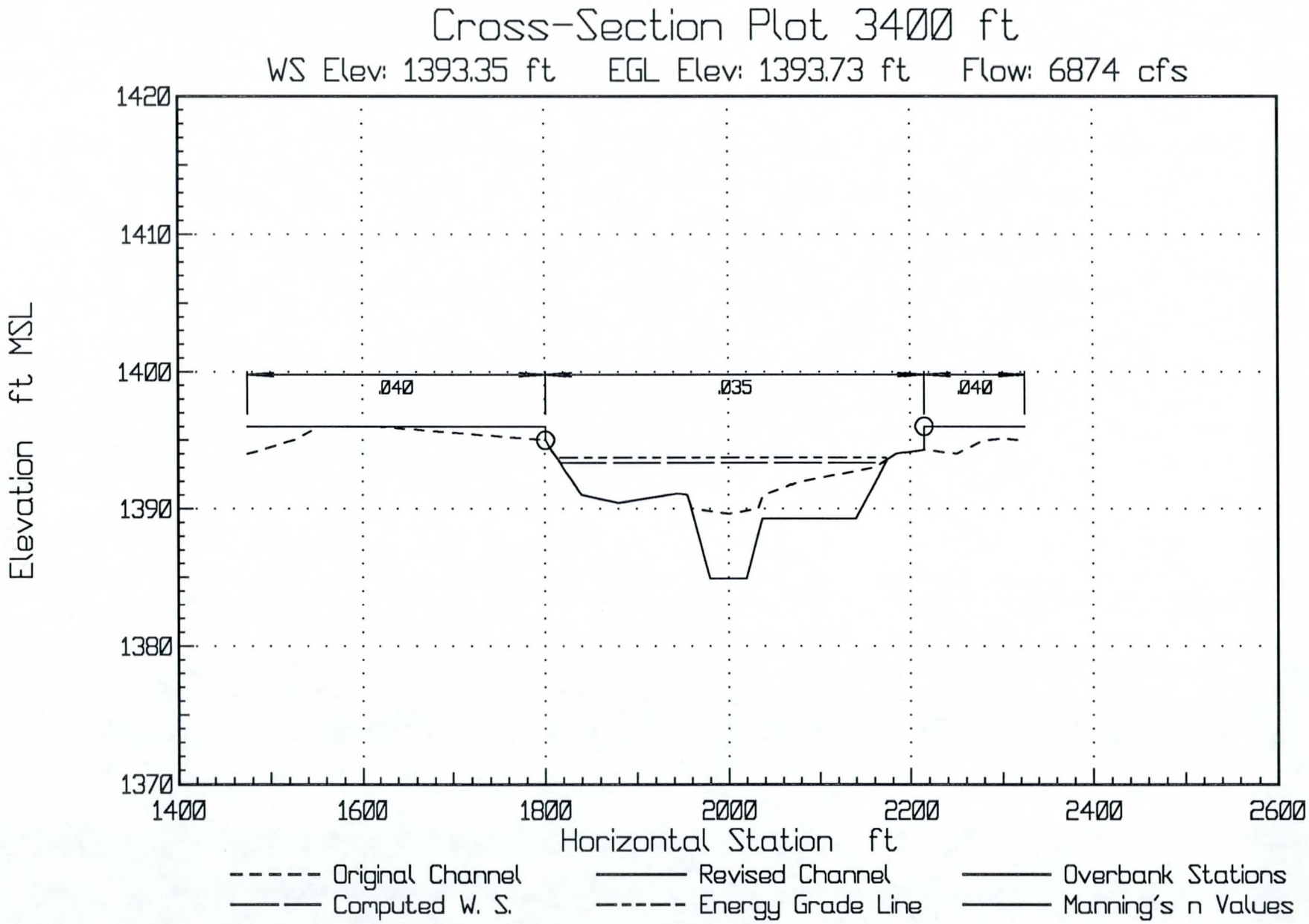

Cross-Section Plot 1900 ft
WS Elev: 1390.35 ft
EGL Elev: 1390.72 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

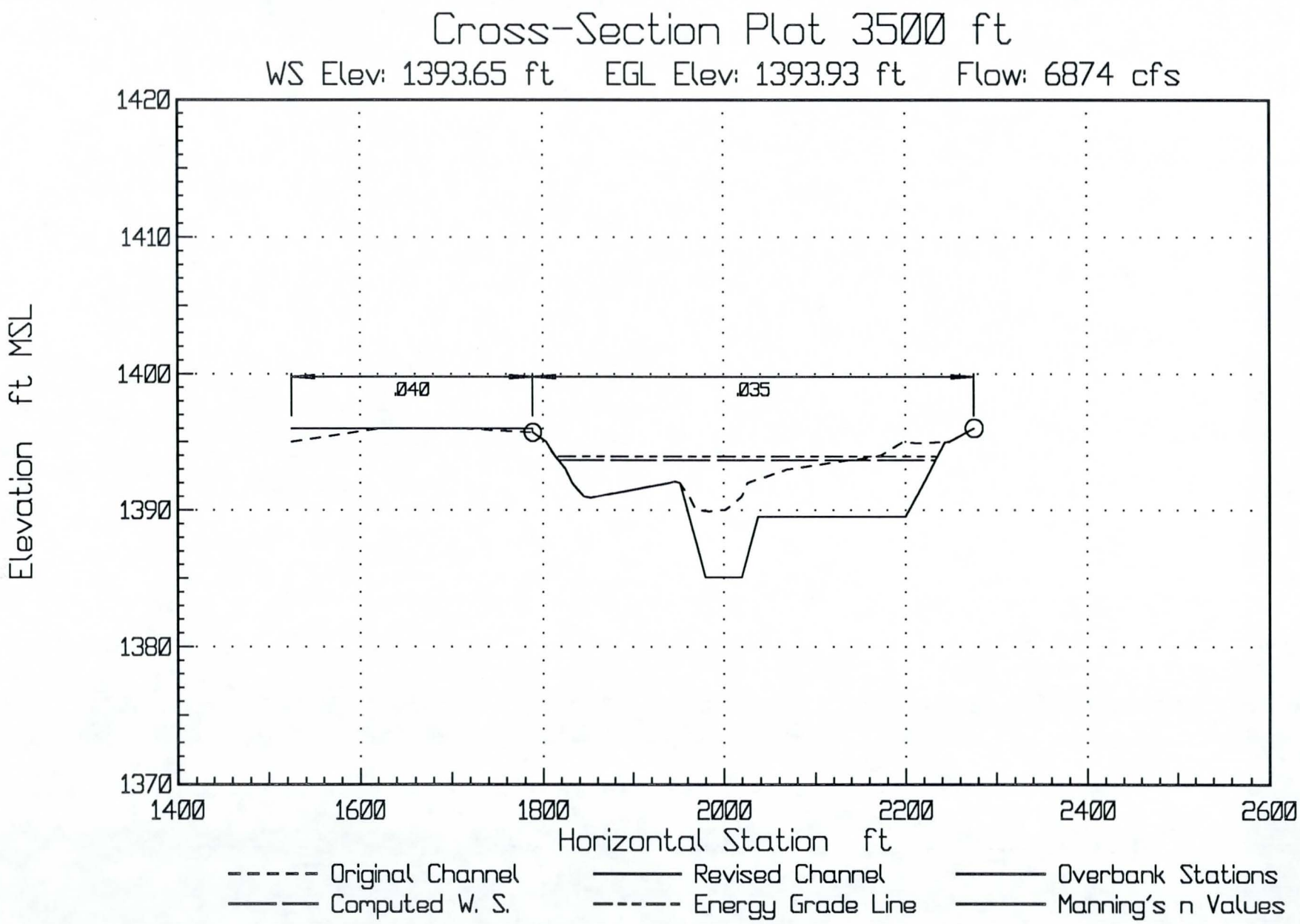

Cross-Section Plot 2100 ft
WS Elev: 1390.78 ft
EGL Elev: 1391.15 ft
Flow: 7071 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

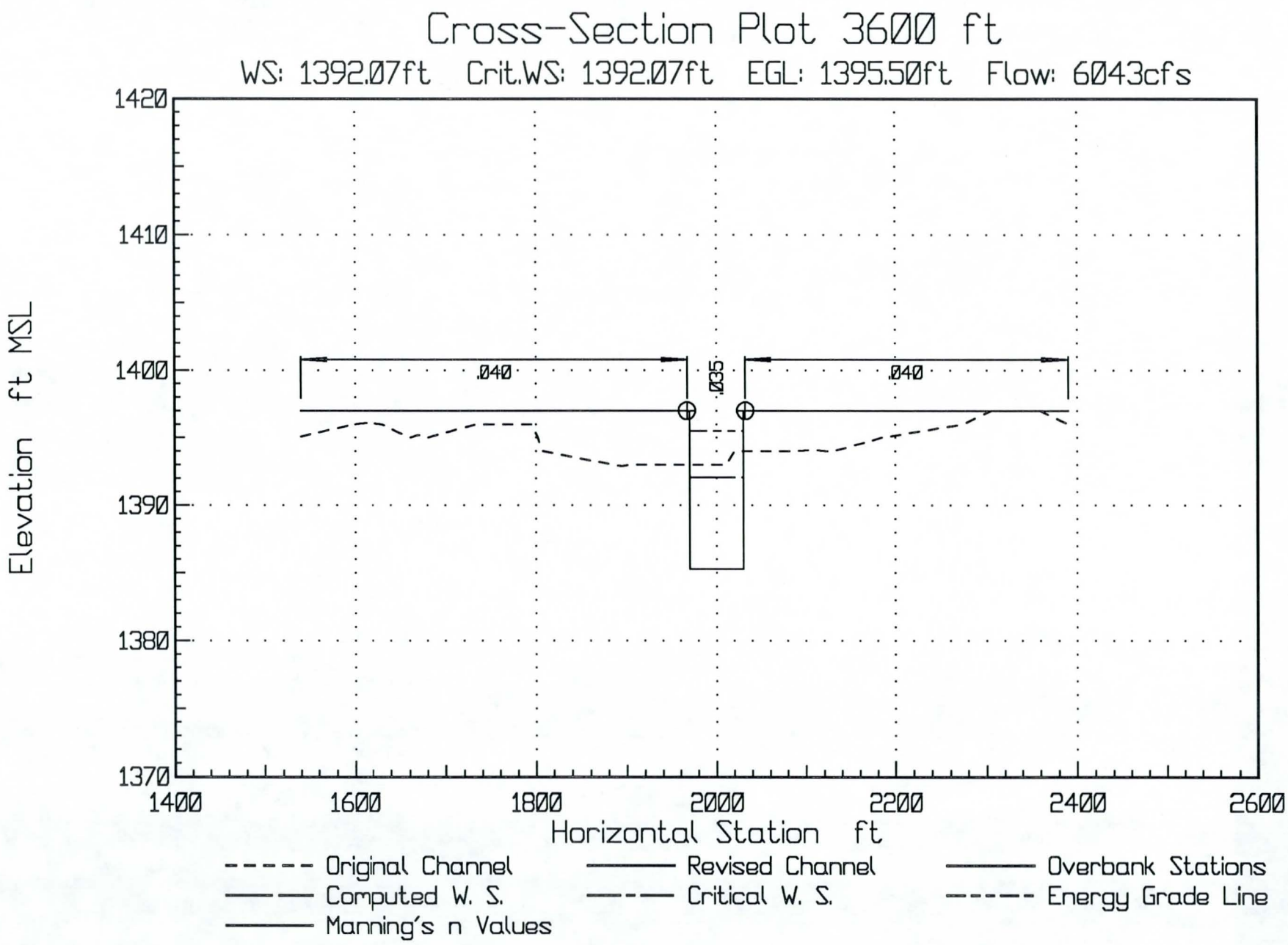

Cross-Section Plot 2200 ft
WS Elev: 1391.35 ft
EGL Elev: 1391.58 ft
Flow: 6874 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 2500 ft
WS Elev: 1391.67 ft
EGL Elev: 1391.95 ft
Flow: 6874 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 2800 ft
WS Elev: 1392.10 ft
EGL Elev: 1392.43 ft
Flow: 6874 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

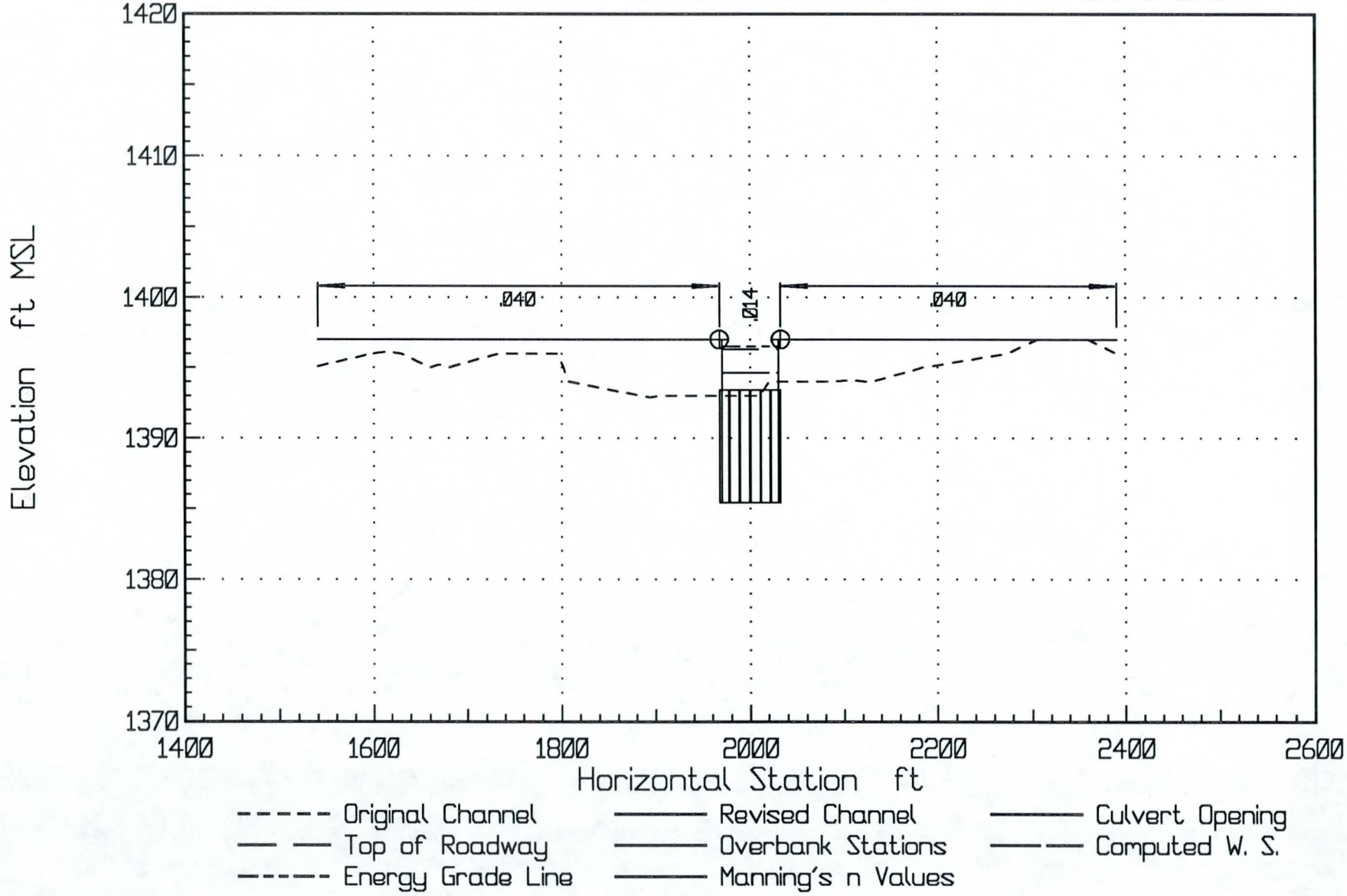

Cross-Section Plot 3400 ft
WS Elev: 1393.35 ft
EGL Elev: 1393.73 ft
Flow: 6874 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

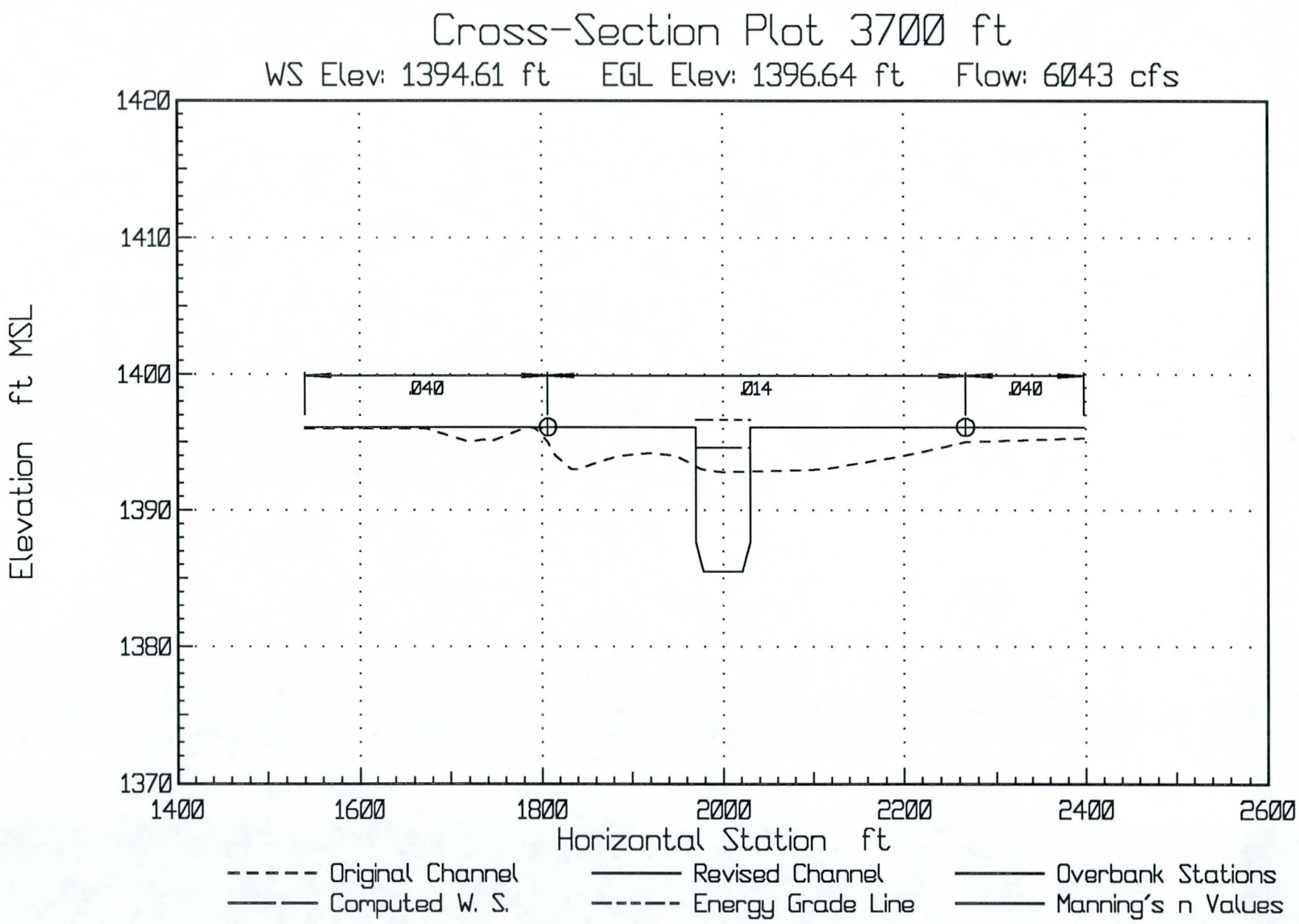

Cross-Section Plot 3500 ft
WS Elev: 1393.65 ft
EGL Elev: 1393.93 ft
Flow: 6874 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.040
.035
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

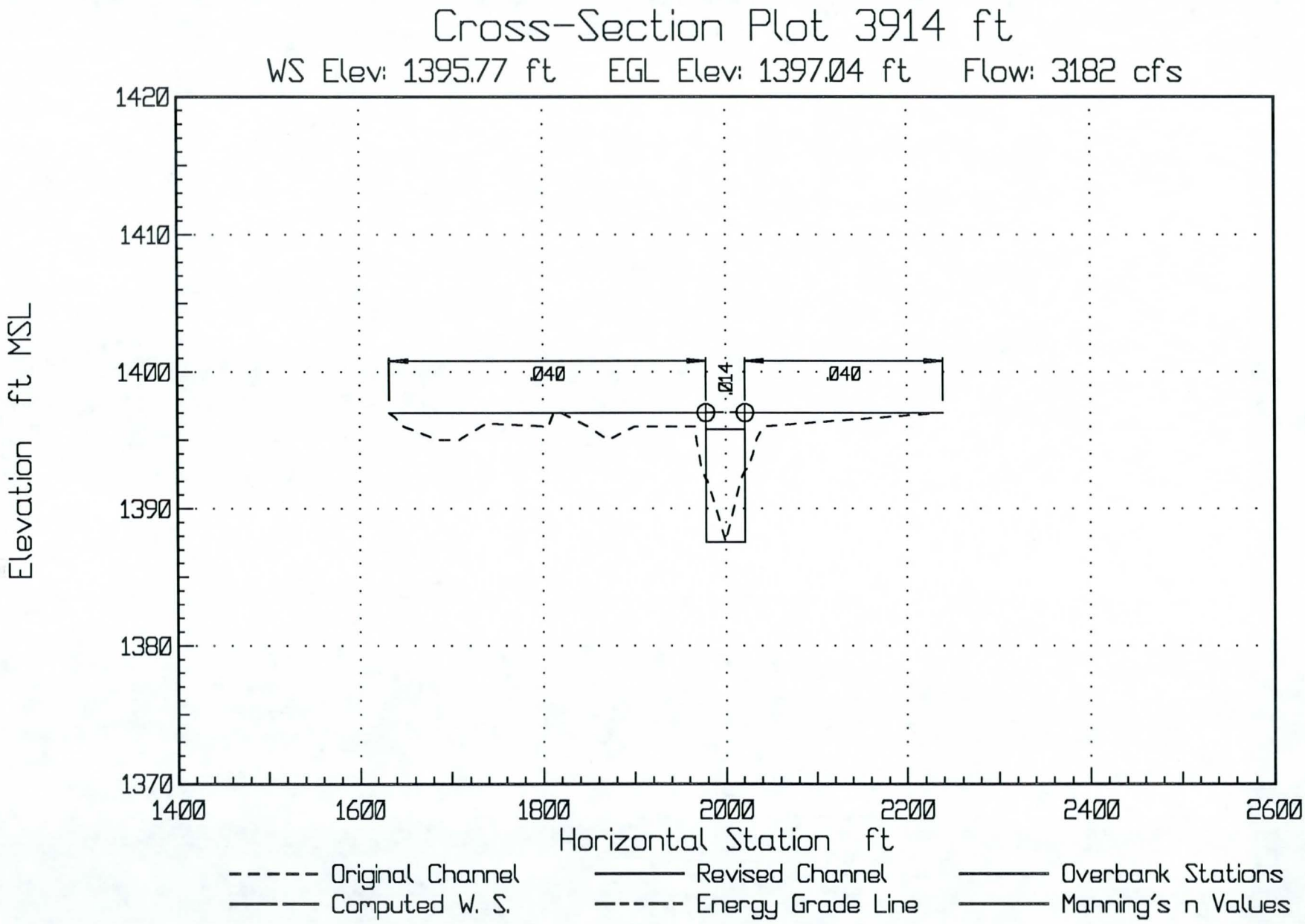

Cross-Section Plot 3600 ft
WS: 1392.07ft Crit.WS: 1392.07ft EGL: 1395.50ft Flow: 6043cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values

Culvert Cross-Section Plot 3670 ft

WS Elev: 1394.64 ft EGL Elev: 1396.49 ft Flow: 6043 cfs

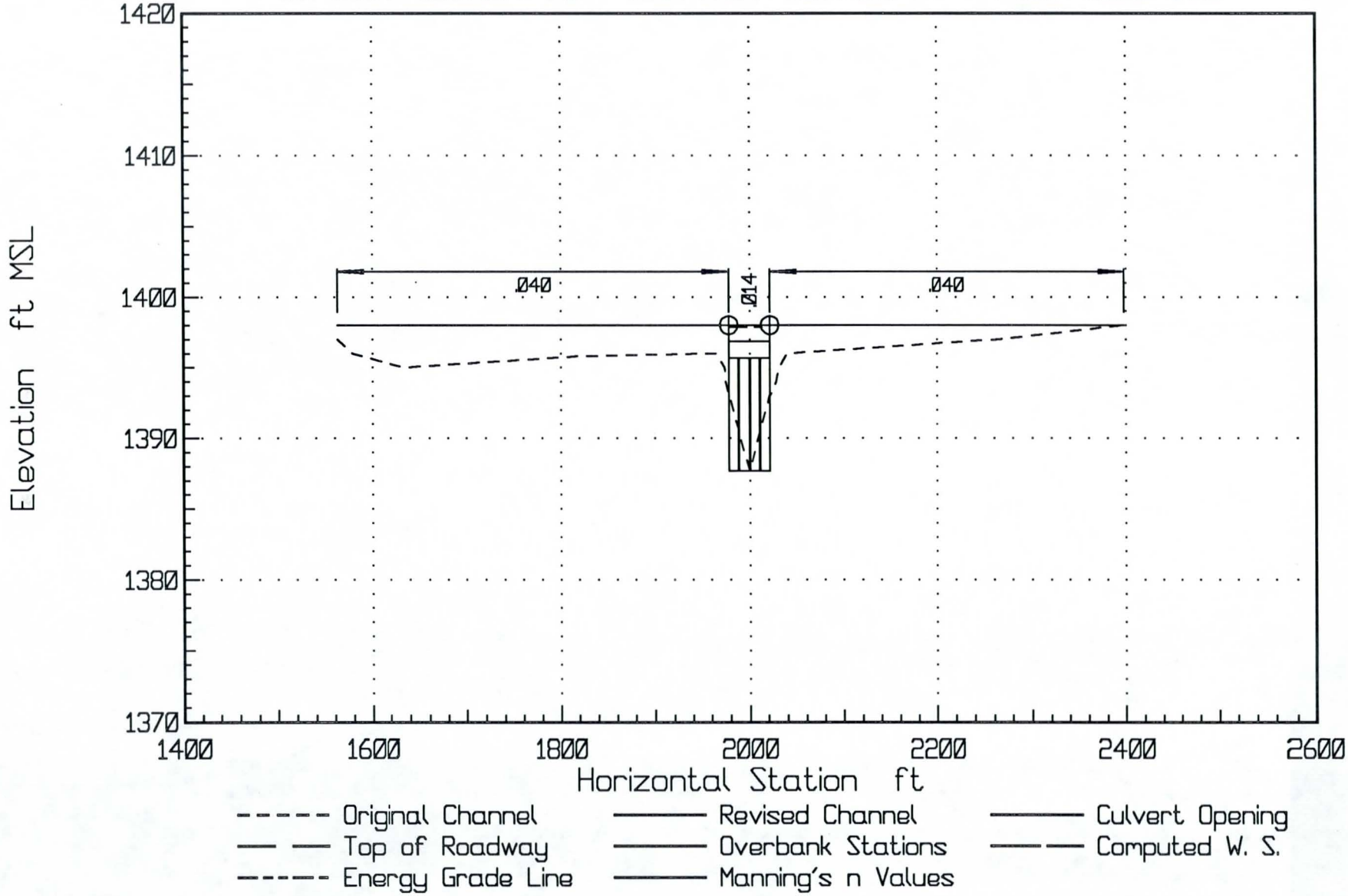


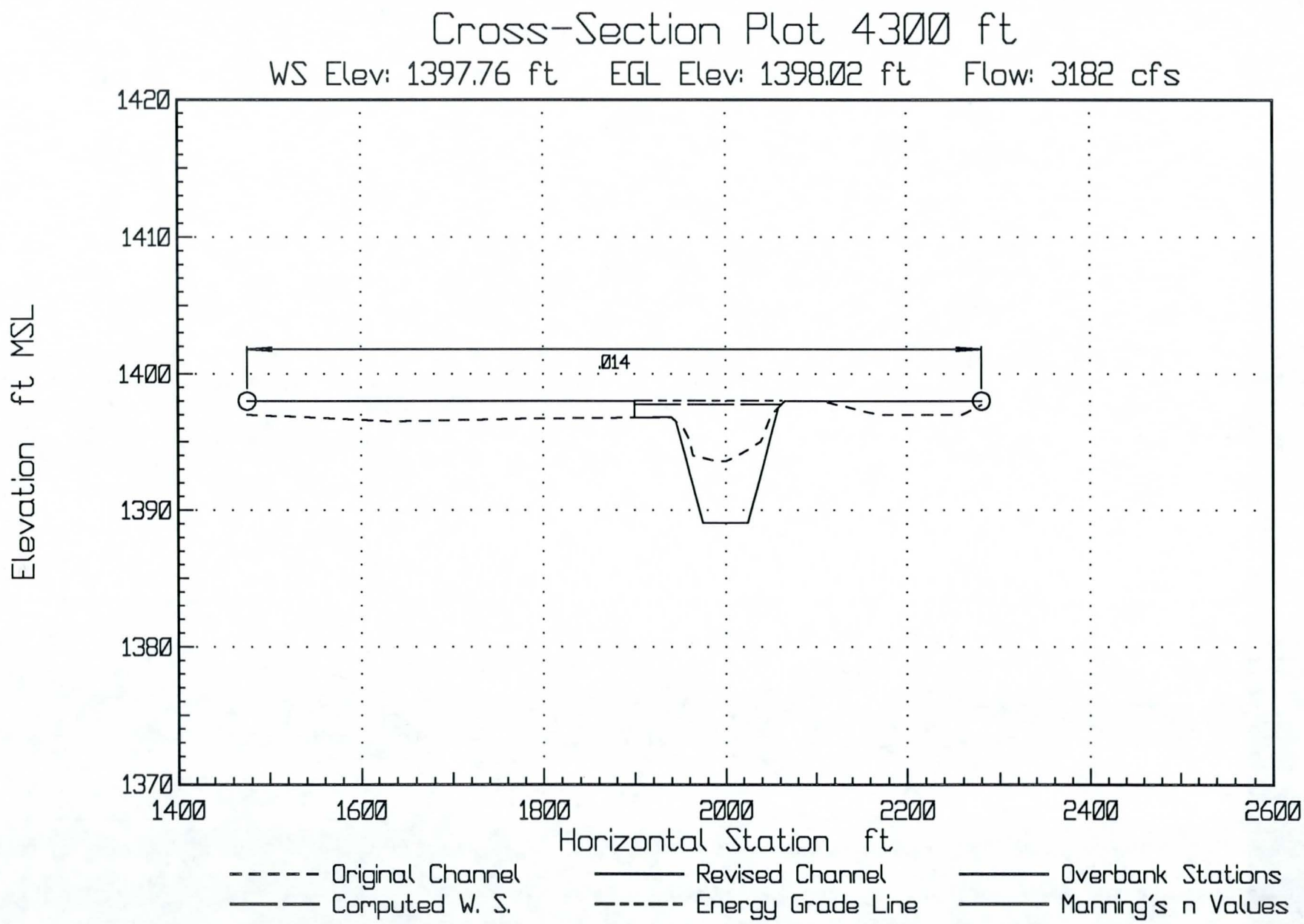

Cross-Section Plot 3700 ft
WS Elev: 1394.61 ft
EGL Elev: 1396.64 ft
Flow: 6043 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.014
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

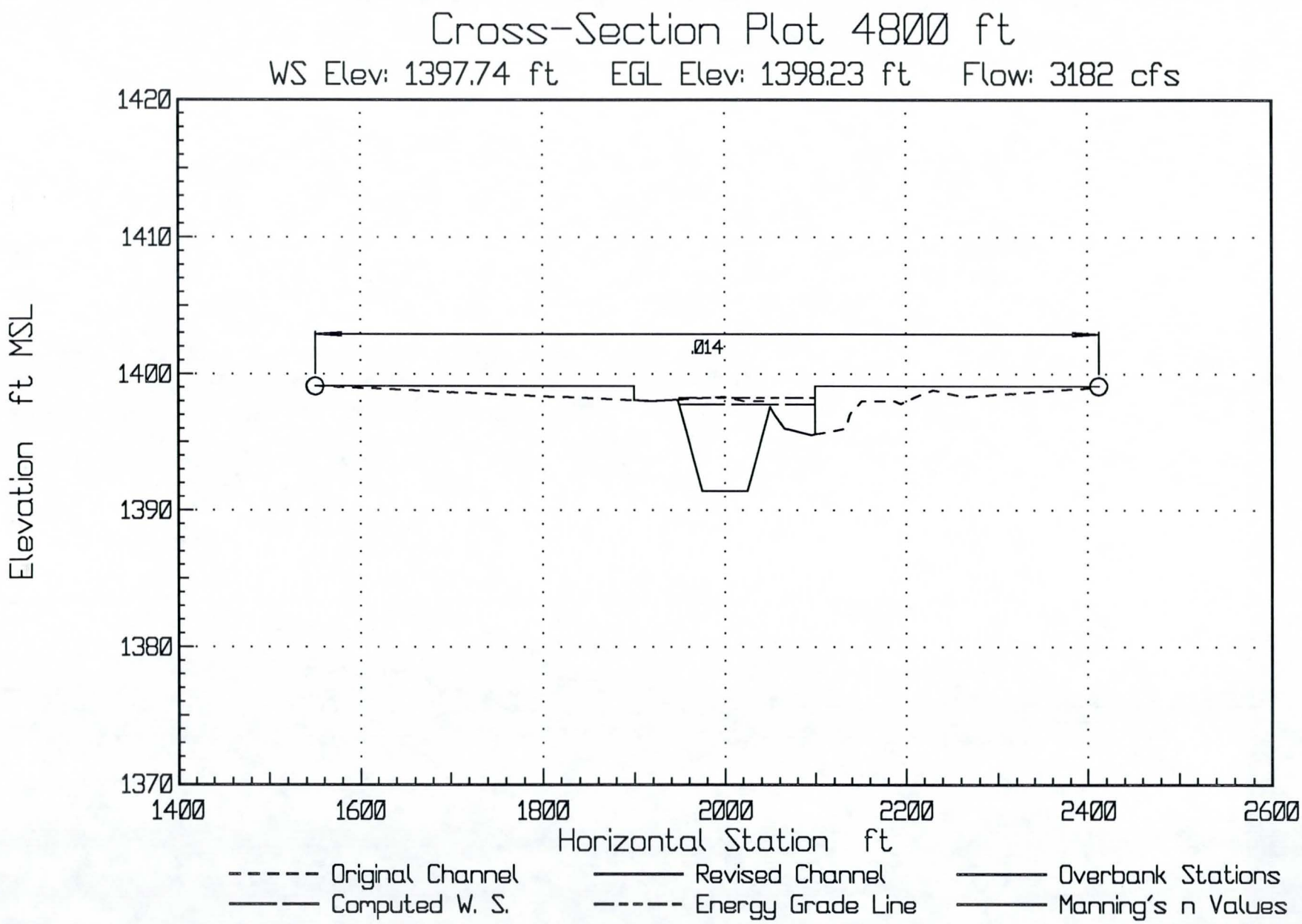

Cross-Section Plot 3914 ft
WS Elev: 1395.77 ft
EGL Elev: 1397.04 ft
Flow: 3182 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.014
.040
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

Culvert Cross-Section Plot 4004 ft

WS Elev: 1396.84 ft EGL Elev: 1397.86 ft Flow: 3182 cfs

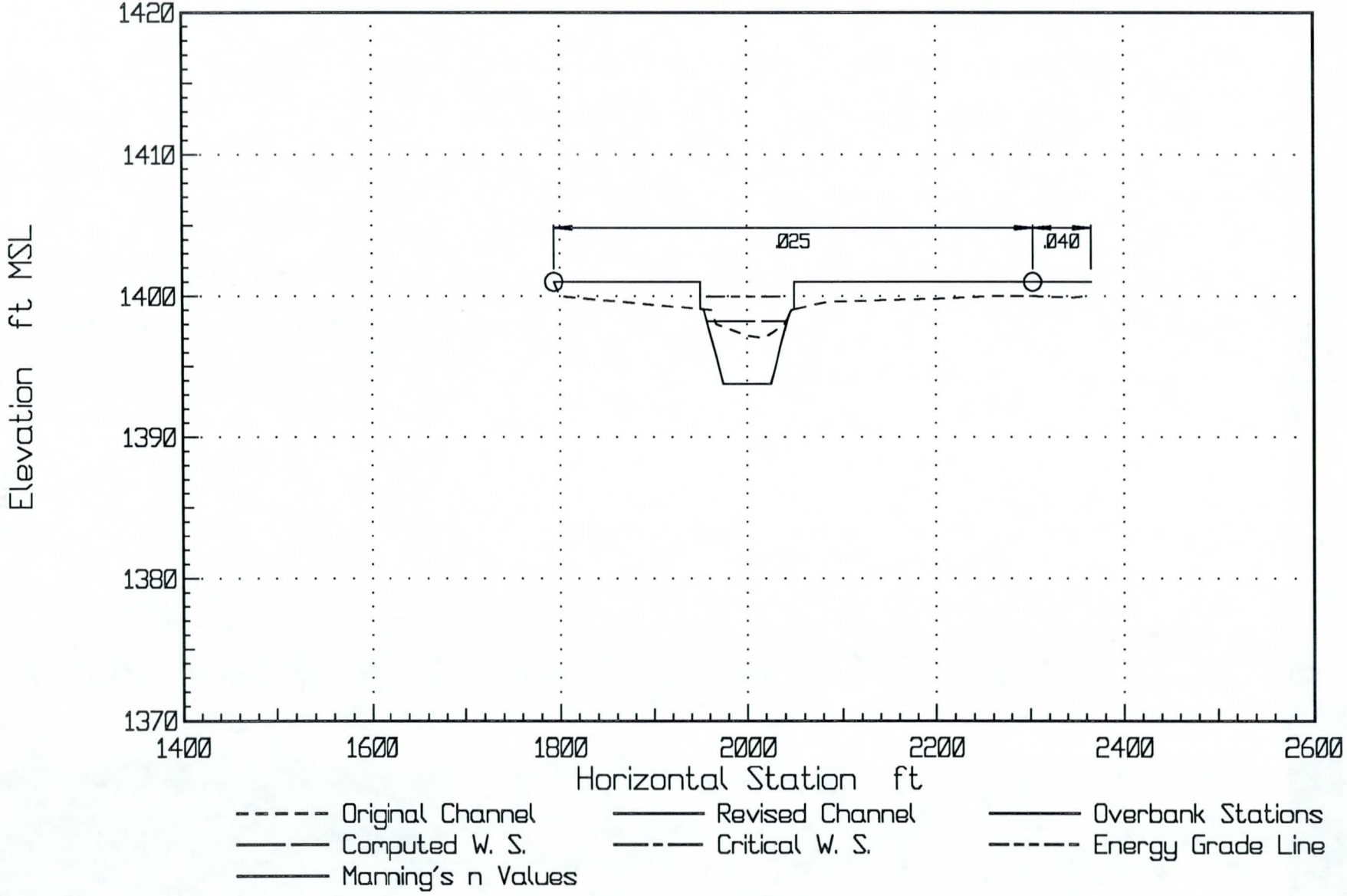


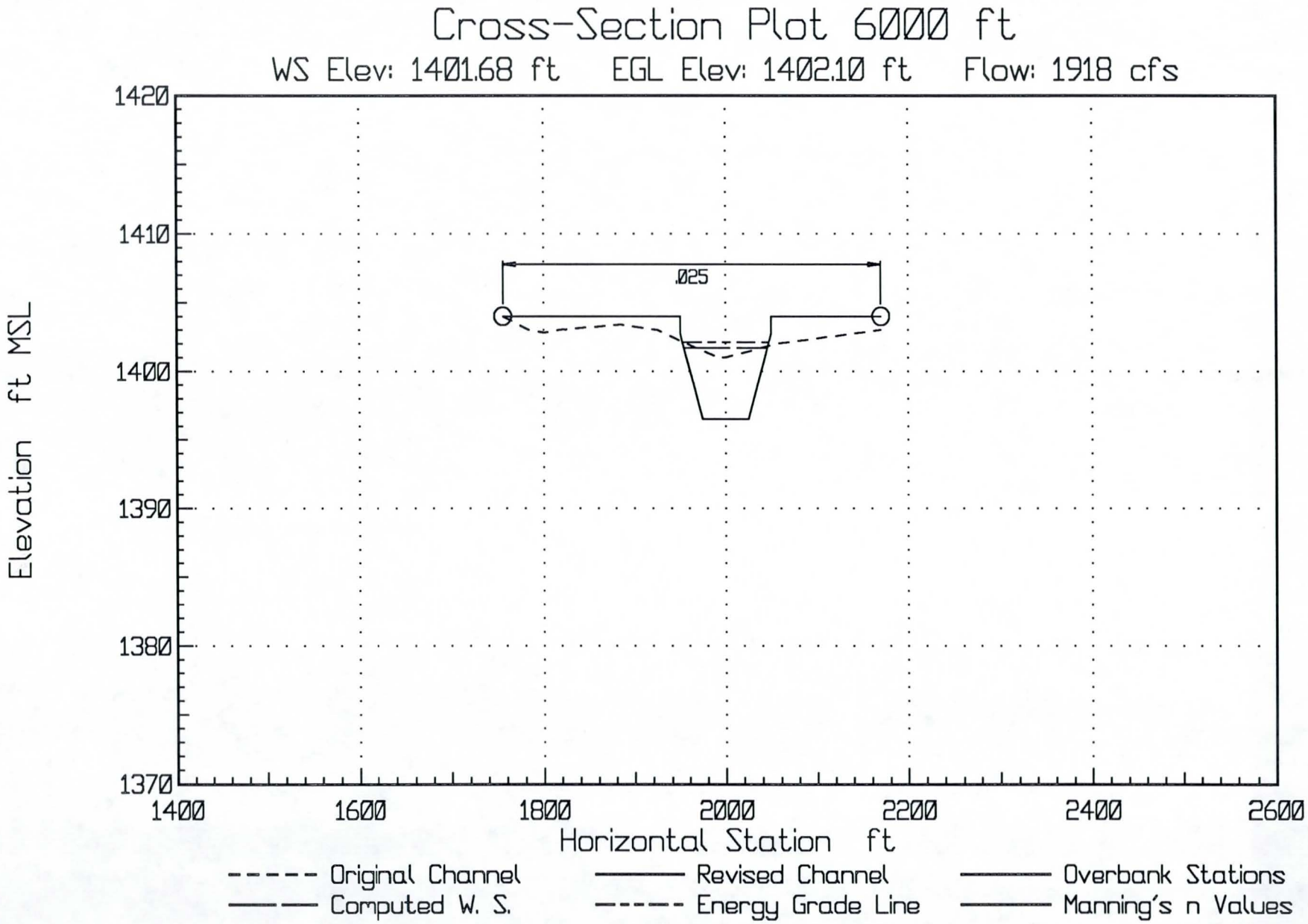

Cross-Section Plot 4300 ft
WS Elev: 1397.76 ft
EGL Elev: 1398.02 ft
Flow: 3182 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.014
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

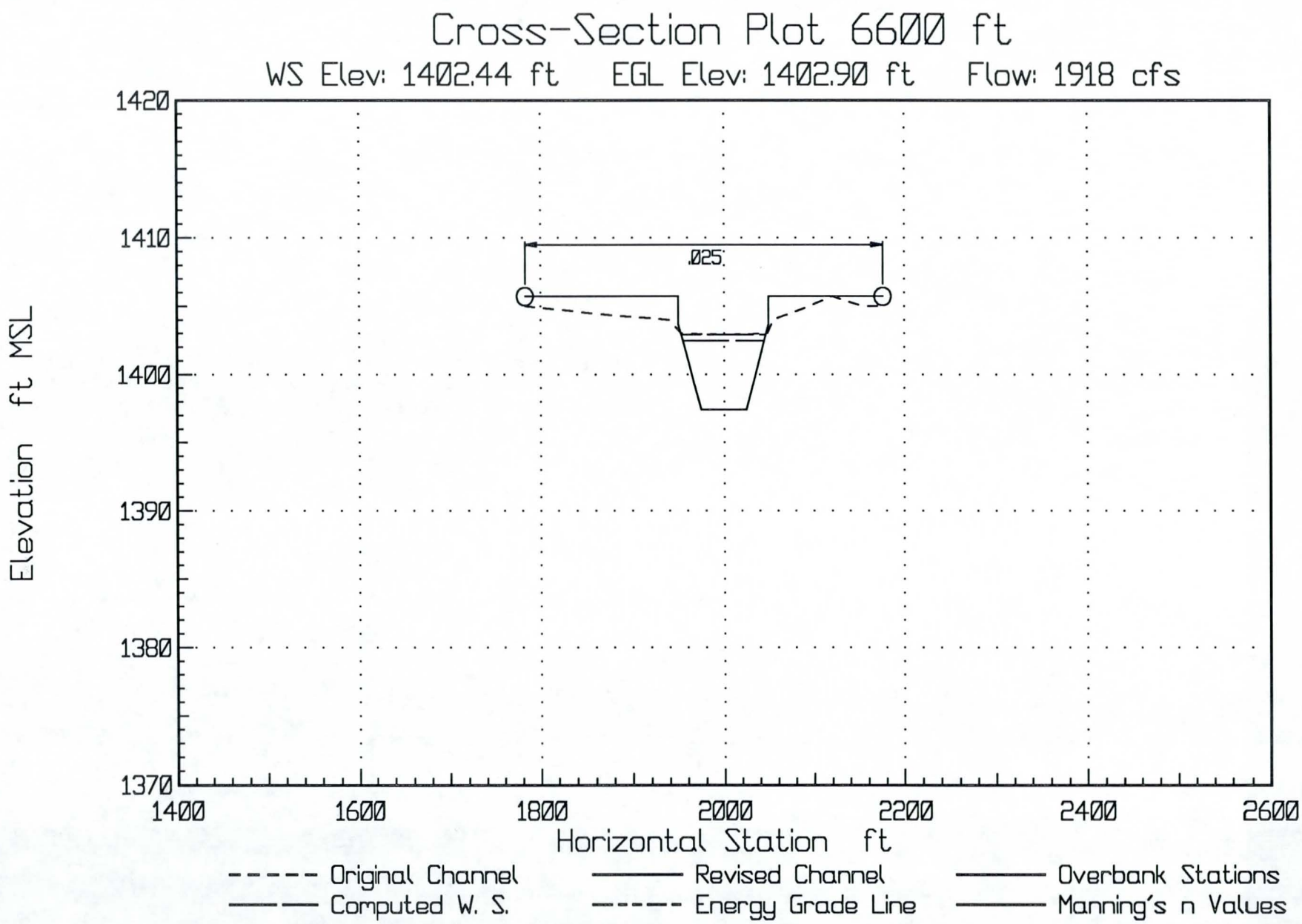

Cross-Section Plot 4800 ft
WS Elev: 1397.74 ft
EGL Elev: 1398.23 ft
Flow: 3182 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.014
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

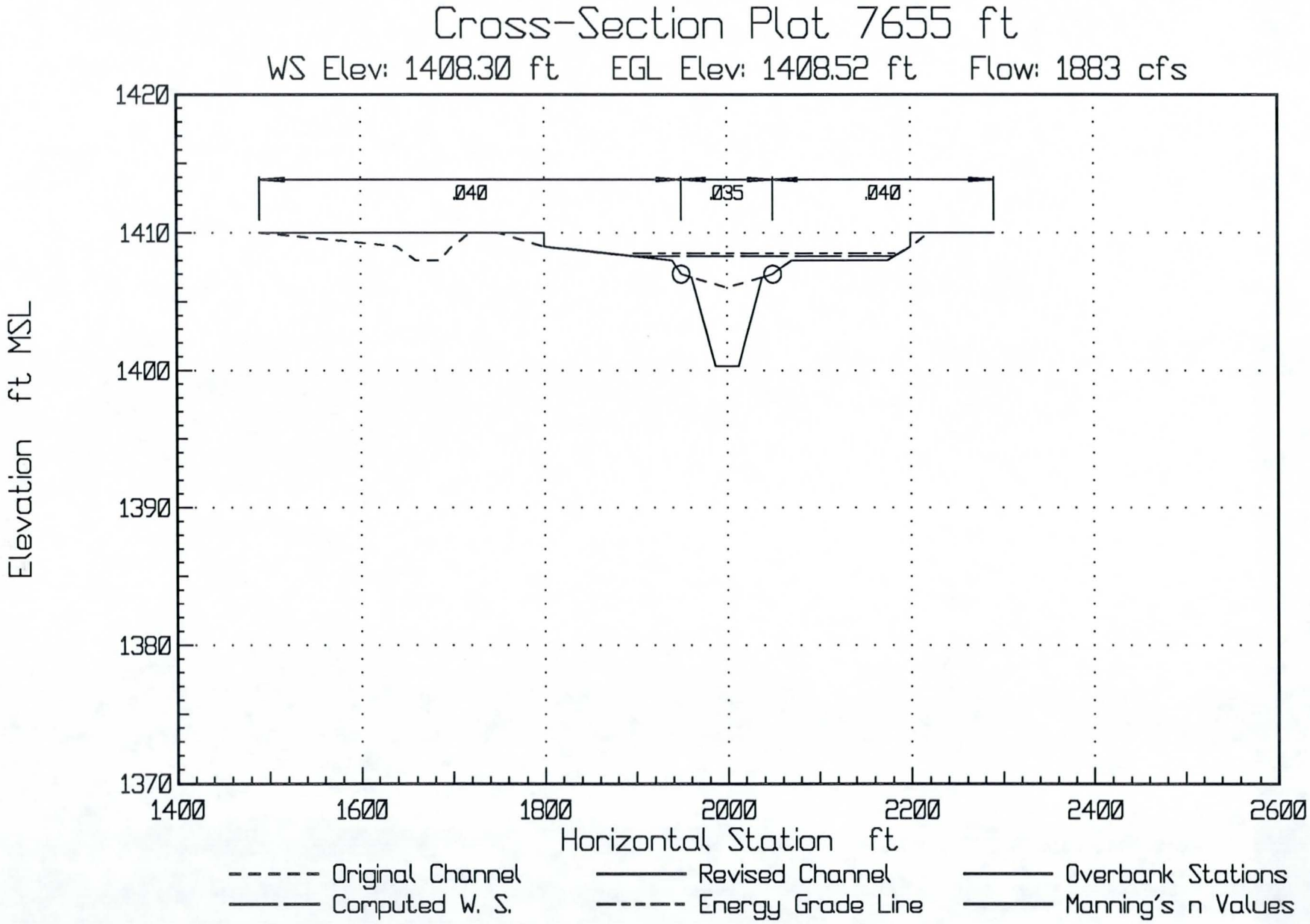
Cross-Section Plot 5300 ft

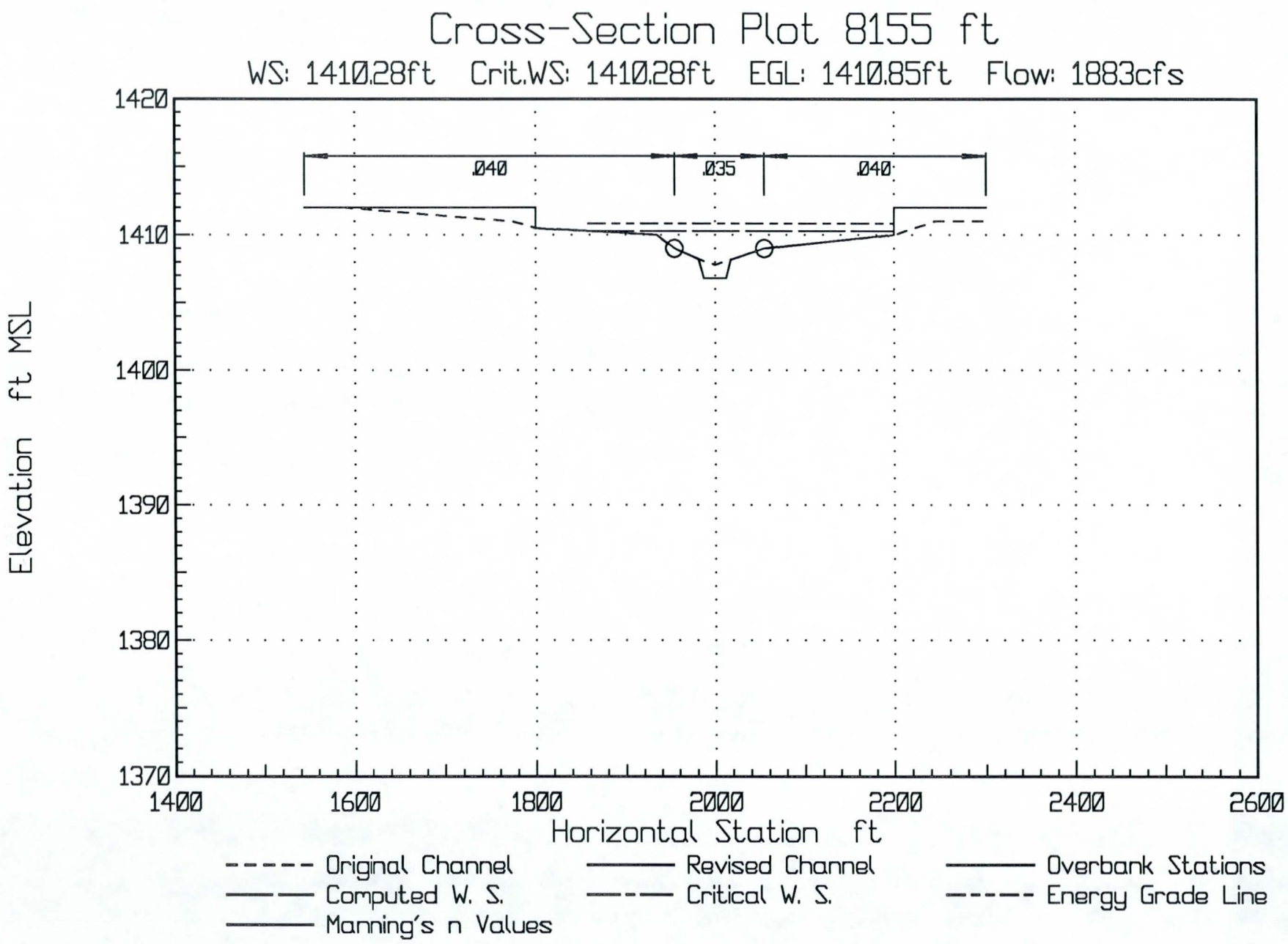
WS: 1398.19ft Crit.WS: 1398.19ft EGL: 1399.95ft Flow: 3182cfs




Cross-Section Plot 6000 ft
WS Elev: 1401.68 ft
EGL Elev: 1402.10 ft
Flow: 1918 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.025
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

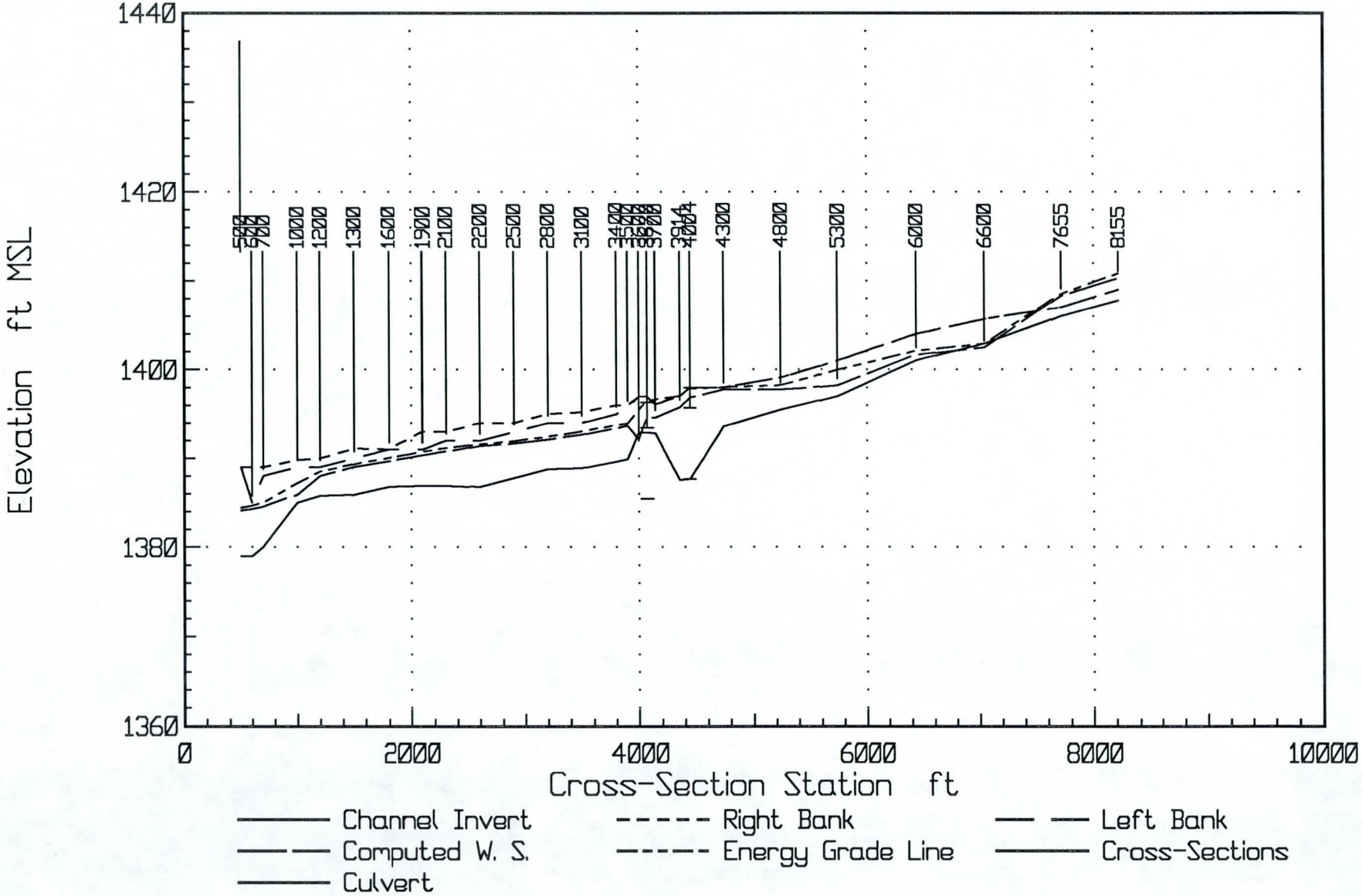

Cross-Section Plot 6600 ft
WS Elev: 1402.44 ft
EGL Elev: 1402.90 ft
Flow: 1918 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.025
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 7655 ft
WS Elev: 1408.30 ft
EGL Elev: 1408.52 ft
Flow: 1883 cfs
.040
.035
.040
1420
1410
1400
1390
1380
1370
Elevation ft MSL
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 8155 ft
WS: 1410.28ft Crit.WS: 1410.28ft EGL: 1410.85ft Flow: 1883cfs
.040
.035
.040
1420
1410
1400
1390
1380
1370
Elevation ft MSL
1400
1600
1800
2000
2200
2400
2600
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values

Water Surface Profile Plot 1

Subcritical Profile Flow 1883-7071 cfs



==========
B O S S H E C - 2 (tm)
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Version : 3.10
Serial Number : 0010276.250

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PROGRAM ORIGIN :

Boss Hec-2 (tm) is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : INDIAN BEND WASH - CHANNEL IMPROVEMENTS
PROJECT NUMBER : 92833
DESCRIPTION : 40TH STREET TO HEARN
ENGINEER :
DATE OF RUN : 1/28/1993
TIME OF RUN : 2:57 pm

```
T1      92833
T2      INDIAN BEND WASH - CHANNEL IMPROVEMENTS
T3      40TH STREET TO HEARN
T4      CONCRETE CHANNEL USED BETWEEN XSECT 3670 AND THUNDERBIRD RD
T4      CULVERT AT 36TH STREET
T4      LOWERED CROSS SECTIONS 700 TO 3700, 4800 TO 6600
T4      CULVERTS MODELED WITH SPECIAL CULVERT ROUTINE


JOB PARAMETERS :
----------------

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0     0.002       0      0.0    7071.0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        1       0.0      0.0      0.0      0.0      0.0     -6.0      0.0


USER-DEFINED SUMMARY TABLES (J3) :
----------------------------------

     38       39        1       42        8       43       26       25        4       51
     17        3        5
REQUESTED CROSS-SECTION PRINTOUTS (J5) :
----------------------------------------

    -10      -10

NC    0.040     0.040     0.035       0.1       0.3
  UPSTREAM OF 40TH STREET
UPSTREAM OF 40TH STREET

X1      500       26     1730.0    2226.0       0.0       0.0       0.0       1.0       0.0
CI   2000.0   1379.0      0.035       4.0       4.0      40.0      0.01
CI   2070.0   1380.0      0.035       1.0       8.0     190.0      0.01
X3        0      0.0        0.0    1730.0       0.0    2226.0       0.0       0.0       0.0
GR   1386.0   1730.0     1385.0    1738.0    1384.0    1748.0    1383.0    1766.0    1382.0    1790.0
GR   1381.0   1838.0     1380.0    1905.0    1380.0    1971.0    1380.0    1990.0    1379.0    2000.0
GR   1379.0   2003.0     1379.0    2008.0    1379.0    2011.0    1380.0    2018.0    1380.0    2030.0
GR   1380.0   2053.0     1381.0    2106.0    1382.0    2139.0    1383.0    2181.0    1384.0    2203.0
GR   1385.0   2210.0     1386.0    2216.0    1387.0    2226.0    1388.0    2240.0    1389.0    2259.0
GR   1389.0   2316.0

X1      600       28     1769.0    2230.0     100.0     100.0     100.0       1.0       0.0
CI   2000.0   1379.20   100.035       4.0       4.0      40.0      0.01
CI   2070.0   1380.25   100.035       1.0       8.0     190.0      0.01
```

```
X3       0       0.0       0.0    1760.0       0.0    2230.0       0.0       0.0       0.0
GR  1386.0    1620.0    1386.0    1660.0    1386.0    1680.0    1385.0    1733.0    1385.0    1769.0
GR  1385.0    1780.0    1384.0    1787.0    1383.0    1818.0    1382.0    1882.0    1381.0    1906.0
GR  1380.0    1961.0    1380.0    1970.0    1380.0    2000.0    1380.0    2006.0    1379.0    2034.0
GR  1380.0    2039.0    1381.0    2080.0    1381.0    2090.0    1381.0    2096.0    1382.0    2128.0
GR  1383.0    2170.0    1384.0    2199.0    1385.0    2211.0    1386.0    2216.0    1387.0    2224.0
GR  1388.0    2230.0    1389.0    2310.0    1389.0    2355.0

X1     700        23    1774.0    2226.0     100.0     100.0     100.0       1.0       0.0
CI  2000.0   1379.41   100.035       4.0       4.0      40.0      0.01
CI  2070.0    1380.5   100.035       1.0       8.0     180.0      0.01
X3       0       0.0       0.0    1774.0       0.0    2226.0       0.0       0.0       0.0
GR  1389.0    1640.0    1388.0    1681.0    1389.0    1752.0    1388.0    1774.0    1387.0    1780.0
GR  1386.0    1784.0    1385.0    1790.0    1384.0    1816.0    1383.0    1853.0    1382.0    1896.0
GR  1381.0    1925.0    1380.5    2000.0    1380.0    2062.0    1380.0    2069.0    1381.0    2086.0
GR  1382.0    2105.0    1383.0    2153.0    1384.0    2192.0    1385.0    2205.0    1386.0    2212.0
GR  1387.0    2218.0    1388.0    2226.0    1389.0    2375.0

X1    1000        22    1790.0    2211.0     300.0     300.0     300.0       1.0       0.0
CI  2000.0   1380.02   300.035       4.0       4.0      40.0      0.01
CI  2080.0   1383.25   300.035       1.0       8.0     150.0      0.01
X3       0       0.0       0.0    1790.0       0.0    2211.0       0.0       0.0       0.0
GR  1389.0    1662.0    1388.4    1715.0    1389.0    1734.0    1389.0    1790.0    1388.0    1803.0
GR  1387.0    1825.0    1386.0    1871.0    1385.0    1910.0    1385.0    1913.0    1385.0    1936.0
GR  1385.0    1945.0    1385.0    1961.0    1385.0    1971.0    1385.1    2000.0    1386.0    2146.0
GR  1387.0    2186.0    1388.0    2199.0    1389.0    2211.0    1389.8    2260.0    1389.0    2341.0
GR  1389.0    2365.0    1389.0    2373.0

X1    1200        30    1802.0    2194.0     200.0     200.0     200.0       1.0       0.0
CI  2000.0   1380.42   200.035       4.0       4.0      40.0      0.01
CI  2070.0   1383.75   200.035       1.0       8.0     150.0      0.01
X3       0       0.0       0.0    1802.0       0.0    2194.0       0.0       0.0       0.0
GR  1389.0    1625.0    1389.3    1635.0    1389.0    1646.0    1390.0    1684.0    1390.0    1754.0
GR  1389.0    1802.0    1388.0    1823.0    1387.0    1848.0    1386.0    1929.0    1386.1    1967.0
GR  1386.0    1974.0    1386.0    1981.0    1385.8    2000.0    1386.0    2019.0    1386.0    2028.0
GR  1385.9    2035.0    1386.0    2043.0    1386.0    2053.0    1385.9    2068.0    1386.0    2080.0
GR  1386.0    2092.0    1385.9    2100.0    1386.0    2106.0    1386.0    2110.0    1385.9    2114.0
GR  1387.0    2155.0    1388.0    2179.0    1389.0    2194.0    1390.0    2275.0    1390.0    2386.0

X1    1300        25    1800.0    2189.0     300.0     300.0     300.0       1.0       0.0
CI  2000.0   1380.63   100.035       4.0       4.0      40.0      0.01
CI  2070.0    1384.0   300.035       1.0       8.0     140.0      0.01
X3       0       0.0       0.0    1800.0       0.0    2189.0       0.0       0.0       0.0
GR  1389.0    1615.0    1389.5    1650.0    1389.0    1664.0    1390.0    1682.0    1391.0    1708.0
GR  1391.0    1738.0    1391.0    1775.0    1391.0    1790.0    1390.0    1800.0    1389.0    1813.0
GR  1388.0    1828.0    1387.0    1873.0    1386.5    1928.0    1386.0    1963.0    1386.0    1963.0
GR  1386.0    1968.0    1385.9    2000.0    1386.0    2008.0    1387.0    2134.0    1388.0    2170.0
GR  1389.0    2189.0    1390.0    2218.0    1391.0    2276.0    1391.1    2300.0    1391.0    2319.0

X1    1600        16    1787.0    2190.0     300.0     300.0     300.0       1.0       0.0
CI  2000.0   1381.23   300.035       4.0       4.0      40.0      0.01
CI  2070.0   1384.75   300.035       1.0       8.0     140.0      0.01
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X3        0       0.0       0.0    1787.0       0.0    2190.0       0.0       0.0       0.0
GR   1390.0    1633.0    1391.0    1684.0    1391.0    1787.0    1390.0    1806.0    1389.0    1831.0
GR   1388.0    1865.0    1387.0    1993.0    1386.8    2000.0    1387.0    2007.0    1387.1    2012.0
GR   1387.0    2020.0    1387.0    2096.0    1388.0    2136.0    1389.0    2174.0    1390.0    2190.0
GR   1391.0    2359.0

X1     1900        22    1795.0    2197.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0   1381.84   300.035       4.0       4.0      40.0      0.01
CI   2065.0   1385.51   300.035       1.0       8.0     140.0      0.01
X3        0       0.0       0.0    1795.0       0.0    2197.0       0.0       0.0       0.0
GR   1391.0    1635.0    1391.0    1668.0    1392.0    1675.0    1392.2    1730.0    1392.0    1758.0
GR   1391.0    1795.0    1390.0    1816.0    1389.0    1850.0    1388.0    1889.0    1387.0    1982.0
GR   1386.9    1989.0    1387.0    1995.0    1387.2    2000.0    1387.0    2012.0    1388.0    2102.0
GR   1389.0    2137.0    1390.0    2162.0    1391.0    2185.0    1392.0    2197.0    1393.0    2293.0
GR   1392.0    2304.0    1391.2    2325.0

X1     2100        24    1798.0    2200.0     200.0     200.0     200.0       1.0       0.0
CI   2000.0   1382.25   200.035       4.0       4.0      40.0      0.01
CI   2070.0   1386.01   200.035       1.0       8.0     140.0      0.01
X3        0       0.0       0.0    1798.0       0.0    2200.0       0.0       0.0       0.0
GR   1391.4    1645.0    1392.0    1680.0    1393.0    1764.0    1392.0    1798.0    1391.0    1818.0
GR   1390.0    1844.0    1389.0    1881.0    1388.0    1907.0    1387.0    1965.0    1386.9    2000.0
GR   1387.0    2009.0    1386.9    2050.0    1387.0    2090.0    1387.0    2103.0    1388.0    2161.0
GR   1389.0    2170.0    1390.0    2180.0    1391.0    2186.0    1392.0    2190.0    1393.0    2193.0
GR   1393.0    2200.0    1392.0    2291.0    1391.6    2323.0    1391.0    2348.0

QT        1    6874.0
X1     2200        28    1799.0    2200.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0   1382.45   100.035       4.0       4.0      40.0      0.01
CI   2070.0   1386.26   300.035       1.0       8.0     140.0      0.01
X3        0       0.0       0.0    1799.0       0.0    2200.0       0.0       0.0       0.0
GR   1391.5    1630.0    1392.0    1667.0    1393.0    1680.0    1393.6    1740.0    1393.0    1755.0
GR   1392.0    1799.0    1391.0    1810.0    1390.0    1819.0    1389.0    1829.0    1388.0    1840.0
GR   1387.4    1882.0    1387.0    1928.0    1386.8    2000.0    1387.0    2095.0    1387.1    2102.0
GR   1387.0    2107.0    1386.9    2112.0    1387.0    2117.0    1388.0    2160.0    1389.0    2172.0
GR   1390.0    2180.0    1391.0    2184.0    1392.0    2190.0    1393.0    2194.0    1394.0    2200.0
GR   1393.0    2240.0    1393.1    2246.0    1393.0    2252.0

X1     2500        22    1799.0    2190.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0   1383.06   300.035       4.0       4.0      40.0      0.01
CI   2065.0   1387.01   300.035       1.0       8.0     140.0      0.01
X3        0       0.0       0.0    1799.0       0.0    2190.0       0.0       0.0       0.0
GR   1393.0    1672.0    1394.0    1750.0    1394.0    1793.0    1393.0    1799.0    1392.0    1807.0
GR   1391.0    1817.0    1390.0    1822.0    1389.0    1833.0    1388.0    1910.0    1387.9    1955.0
GR   1388.0    2000.0    1388.1    2005.0    1388.0    2009.0    1387.8    2080.0    1388.0    2147.0
GR   1389.0    2165.0    1390.0    2175.0    1391.0    2181.0    1392.0    2185.0    1393.0    2190.0
GR   1393.0    2295.0    1392.0    2338.0

X1     2800        32    1801.0    2188.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0   1383.67   300.035       4.0       4.0      40.0      0.01
CI   2070.0   1387.76   300.035       1.0       8.0     140.0      0.01
X3        0       0.0       0.0    1801.0       0.0    2188.0       0.0       0.0       0.0
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GR   1395.0    1635.0    1394.7    1647.0    1394.0    1670.0    1393.0    1700.0    1393.8    1728.0
GR   1393.0    1745.0    1394.0    1760.0    1393.9    1780.0    1394.0    1801.0    1393.0    1808.0
GR   1392.0    1815.0    1391.0    1824.0    1390.0    1830.0    1389.0    1862.0    1388.9    1867.0
GR   1389.0    1870.0    1389.1    1876.0    1389.0    1885.0    1389.0    1900.0    1389.1    1920.0
GR   1389.0    1938.0    1388.8    2000.0    1389.0    2152.0    1390.0    2162.0    1391.0    2166.0
GR   1392.0    2175.0    1393.0    2181.0    1394.0    2188.0    1394.2    2230.0    1394.0    2284.0
GR   1393.0    2303.0    1392.9    2324.0

X1     3100      24    1799.0    2192.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0  1384.28   300.035       4.0       4.0      40.0      0.01
CI   2065.0  1388.51   300.035       1.0       8.0     135.0      0.01
X3        0     0.0       0.0    1799.0       0.0    2192.0       0.0       0.0       0.0
GR   1393.0    1618.0    1394.0    1632.0    1395.0    1703.0    1394.9    1712.0    1395.0    1719.0
GR   1394.0    1799.0    1393.0    1809.0    1392.0    1821.0    1391.0    1840.0    1390.0    1870.0
GR   1389.7    2000.0    1389.0    2052.0    1388.9    2056.0    1389.0    2061.0    1390.0    2145.0
GR   1391.0    2156.0    1392.0    2167.0    1393.0    2177.0    1394.0    2185.0    1395.0    2192.0
GR   1395.2    2255.0    1395.0    2297.0    1394.0    2311.0    1393.0    2362.0

X1     3400      25    1801.0    2215.0     300.0     300.0     300.0       1.0       0.0
CI   2000.0  1384.89   300.035       4.0       4.0      40.0      0.01
CI   2070.0  1389.26   300.035       1.0       8.0     140.0      0.01
X3        0     0.0       0.0    1801.0       0.0    2215.0       0.0       0.0       0.0
GR   1394.0    1475.0    1395.0    1525.0    1396.0    1553.0    1396.0    1615.0    1395.0    1801.0
GR   1394.0    1810.0    1393.0    1820.0    1392.0    1830.0    1391.0    1840.0    1390.4    1880.0
GR   1391.0    1935.0    1391.1    1945.0    1391.0    1955.0    1390.0    1960.0    1389.6    2000.0
GR   1390.0    2033.0    1391.0    2038.0    1392.0    2080.0    1393.0    2160.0    1394.0    2184.0
GR   1394.3    2215.0    1394.0    2250.0    1395.0    2280.0    1395.1    2300.0    1395.0    2325.0

X1     3500      27    1789.0    2276.0     100.0     100.0     100.0       1.0       0.0
CI   2000.0  1385.09   100.035       4.0       4.0      40.0      0.01
CI   2100.0  1389.51   100.035       1.0       8.0     200.0      0.01
X3        0     0.0       0.0    1789.0       0.0    2276.0       0.0       0.0       0.0
GR   1395.0    1525.0    1396.0    1622.0    1396.0    1707.0    1395.7    1789.0    1395.0    1804.0
GR   1394.0    1813.0    1393.0    1825.0    1392.0    1832.0    1391.0    1845.0    1390.9    1853.0
GR   1391.0    1860.0    1392.0    1940.0    1392.1    1947.0    1392.0    1952.0    1391.0    1962.0
GR   1390.0    1970.0    1389.9    1985.0    1390.0    2000.0    1390.0    2002.0    1391.0    2020.0
GR   1392.0    2026.0    1393.0    2070.0    1394.0    2173.0    1395.0    2197.0    1394.9    2212.0
GR   1395.0    2249.0    1396.0    2276.0

QT        1    6043.0
  DOWNSTREAM FACE OF 36TH STREET CULVERT
DOWNSTREAM FACE OF 36TH STREET CULVERT

X1     3600      28    1967.5    2032.5     130.0     130.0     130.0       1.0       0.0
CI   2000.0  1385.30   100.035     0.001     0.001     -65.0      0.01
X3       10     0.0       0.0    1970.0       0.0    2030.0       0.0       0.0       0.0
GR   1395.1    1540.0    1396.0    1600.0    1396.1    1615.0    1396.0    1630.0    1395.0    1660.0
GR   1395.2    1670.0    1395.0    1680.0    1396.0    1734.0    1396.0    1795.0    1395.0    1802.0
GR   1394.0    1808.0    1393.0    1885.0    1392.9    1895.0    1393.0    1904.0    1393.0    1967.5
GR   1393.0    1980.0    1393.0    2000.0    1393.0    2011.0    1394.0    2020.0    1394.0    2032.5
GR   1394.0    2085.0    1394.1    2105.0    1394.0    2130.0    1395.0    2184.0    1396.0    2274.0
GR   1397.0    2305.0    1397.0    2360.0    1396.0    2390.0
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SC    6.013       0.3       2.63      400.0       8.0      10.0      70.0      11.4   1385.44    1385.3
  UPSTREAM FACE OF 36TH STREET CULVERT
UPSTREAM FACE OF 36TH STREET CULVERT

X1     3670        28    1967.5    2032.5     130.0     130.0     130.0       1.0       0.0
CI   2000.0   1385.44    70.014     0.001     0.001     -60.0      0.01
X2      0.0       0.0         2       0.0    1396.3       0.0         0       0.0       0.0
X3       10       0.0       0.0    1970.0       0.0    2030.0       0.0       0.0       0.0
GR   1395.1    1540.0    1396.0    1600.0    1396.1    1615.0    1396.0    1630.0    1395.0    1660.0
GR   1395.2    1670.0    1395.0    1680.0    1396.0    1734.0    1396.0    1795.0    1395.0    1802.0
GR   1394.0    1808.0    1393.0    1885.0    1392.9    1895.0    1393.0    1904.0    1393.0    1967.5
GR   1393.0    1980.0    1393.0    2000.0    1393.0    2011.0    1394.0    2020.0    1394.0    2032.5
GR   1394.0    2085.0    1394.1    2105.0    1394.0    2130.0    1395.0    2184.0    1396.0    2274.0
GR   1397.0    2305.0    1397.0    2360.0    1396.0    2390.0

NC      0.0       0.0     0.014       0.3       0.5
X1     3700        21    1807.0    2267.0      70.0      70.0      70.0       1.0       0.0
CI   2000.0    1385.5    30.014       4.0       4.0      43.0      0.01
CI   2100.0   1390.01    70.014       1.0       8.0     200.0      0.01
X3       10       0.0       0.0    1970.0       0.0    2030.0       0.0       0.0       0.0
GR   1396.0    1540.0    1396.0    1673.0    1395.0    1720.0    1395.2    1736.0    1395.0    1742.0
GR   1396.0    1780.0    1396.1    1787.0    1396.0    1793.0    1395.0    1807.0    1394.0    1815.0
GR   1393.0    1833.0    1393.0    1839.0    1394.0    1885.0    1394.2    1920.0    1394.0    1949.0
GR   1393.0    1977.0    1392.8    2000.0    1393.0    2110.0    1394.0    2200.0    1395.0    2267.0
GR   1395.3    2398.0

NC      0.0       0.0     0.014       0.0       0.0
QT        1    3182.0
  DOWNSTREAM FACE OF SWEETWATER AVE CULVERT
DOWNSTREAM FACE OF SWEETWATER AVE CULVERT

X1     3914        27    1978.5    2021.5     185.0     293.0     214.0       1.0       0.0
CI   2000.0   1387.55   214.014     0.001     0.001     -43.0      0.01
X2      0.0       0.0         0       0.0       0.0       0.0         0       0.0       0.0        15
X3       10       0.0       0.0    1978.5       0.0    2021.5       0.0       0.0       0.0
GR   1397.0    1633.0    1396.0    1649.0    1395.0    1686.0    1395.0    1708.0    1396.2    1738.0
GR   1396.0    1806.0    1397.0    1812.0    1397.0    1820.0    1396.0    1849.0    1395.0    1871.0
GR   1396.0    1900.0    1396.0    1967.0    1395.0    1968.0    1394.0    1971.0    1393.0    1973.0
GR   1392.1    1978.5   1392.14    1979.0    1392.0    1980.0   1387.55    2000.0    1392.0    2016.0
GR   1392.7    2021.0   1392.75    2021.5    1393.0    2025.0    1394.0    2030.0    1395.0    2034.0
GR   1396.0    2042.0    1397.0    2239.0

SC    4.013       0.2       2.63      400.0       8.0      10.0      90.0      11.4   1387.69   1387.55
  UPSTREAM FACE OF SWEETWATER AVE CULVERT
UPSTREAM FACE OF SWEETWATER AVE CULVERT

X1     4004        17    1978.5    2021.5      86.0      90.0      90.0       1.0       0.0
CI   2000.0   1387.69    90.014     0.001     0.001     -43.0      0.01
X2      0.0       0.0         2       0.0    1398.0       0.0         0       0.0       0.0        15
X3       10       0.0       0.0    1978.5       0.0    2021.5       0.0       0.0       0.0
GR   1397.0    1563.0    1396.0    1579.0    1395.0    1633.0    1395.8    1818.0    1396.0    1965.0
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GR   1395.0    1974.0    1394.0    1975.0    1393.0    1978.5    1393.0    1979.0   1387.69    2000.0
GR   1393.0    2021.0    1393.0    2021.5    1394.0    2028.0    1395.0    2031.0    1396.0    2040.0
GR   1397.0    2266.0    1398.0    2398.0

NC      0.0       0.0       0.0       0.1       0.3
X1     4300        19    1476.0    2280.0     310.0     200.0     296.0       1.0       0.0
CI   2000.0   1389.07   296.014       4.0       4.0      50.0      0.01
X3        0       0.0       0.0    1900.0       0.0    2100.0       0.0       0.0       0.0
GR   1397.0    1476.0    1396.5    1637.0    1396.7    1782.0    1396.8    1940.0    1396.0    1954.0
GR   1395.0    1961.0    1394.0    1964.0    1393.6    1990.0    1393.6    2000.0    1394.0    2014.0
GR   1395.0    2039.0    1396.0    2045.0    1397.0    2051.0    1398.0    2066.0    1398.0    2105.0
GR   1397.0    2170.0    1397.0    2243.0    1397.0    2259.0    1397.7    2280.0

NC      0.0       0.0     0.025       0.0       0.0
X1     4800        17    1550.0    2412.0     475.0     515.0     500.0       1.0       0.0
CI   2000.0   1391.40   500.014       4.0       4.0      50.0      0.01
X3        0       0.0       0.0    1900.0       0.0    2100.0       0.0       0.0       0.0
GR   1399.1    1550.0    1398.0    1920.0    1398.3    2000.0    1398.0    2021.0    1398.0    2046.0
GR   1397.0    2055.0    1396.0    2066.0    1395.5    2096.0    1396.0    2134.0    1397.0    2138.0
GR   1398.0    2151.0    1398.0    2188.0    1397.8    2194.0    1398.0    2199.0    1398.8    2230.0
GR   1398.3    2264.0    1399.0    2412.0

NC      0.0       0.0     0.025       0.0       0.0
  DOWNSTREAM OF EMILE ZOLA AVENUE
DOWNSTREAM OF EMILE ZOLA AVENUE

X1     5300        15    1794.0    2303.0     495.0     535.0     518.0       1.0       0.0
CI   2000.0   1393.78   500.025       4.0       4.0      50.0      0.01
X3        0       0.0       0.0    1950.0       0.0    2050.0       0.0       0.0       0.0
GR   1401.0    1794.0    1400.0    1800.0    1399.5    1880.0    1399.0    1962.0    1398.0    1967.0
GR   1397.2    2000.0    1397.0    2018.0    1398.0    2040.0    1399.0    2047.0    1399.6    2085.0
GR   1399.8    2195.0    1400.0    2264.0    1400.0    2303.0    1399.9    2344.0    1400.0    2365.0

NC      0.0       0.0     0.025       0.0       0.0
QT        1    1918.0
  UPSTREAM OF EMILE ZOLA AVENUE
UPSTREAM OF EMILE ZOLA AVENUE

X1     6000        11    1756.0    2170.0     690.0     715.0     700.0       1.0       0.0
CI   2000.0    1396.5   700.025       4.0       4.0     -50.0      0.01
X3        0       0.0       0.0    1950.0       0.0    2050.0       0.0       0.0       0.0
GR   1404.0    1756.0    1403.0    1784.0    1402.8    1800.0    1403.0    1817.0    1403.4    1886.0
GR   1403.0    1925.0    1402.0    1957.0    1401.0    1992.0    1401.0    2000.0    1402.0    2055.0
GR   1403.0    2170.0

NC      0.0       0.0     0.025       0.0       0.0
X1     6600        12    1783.0    2176.0     600.0     600.0     600.0       1.0       0.0
CI   2000.0   1397.42   600.025       4.0       4.0     -50.0      0.01
X3        0       0.0       0.0    1950.0       0.0    2050.0       0.0       0.0       0.0
GR   1405.0    1783.0    1404.3    1881.0    1404.0    1940.0    1403.0    1953.0    1402.9    2000.0
GR   1403.0    2049.0    1404.0    2055.0    1405.0    2095.0    1405.7    2120.0    1405.0    2154.0
GR   1405.0    2168.0    1405.0    2176.0
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NC      0.0       0.0     0.035       0.0       0.0
QT        1    1883.0
X1     7655        17    1950.0    2050.0     680.0     680.0     680.0       1.0       0.0
CI   2000.0    1400.3   675.035       4.0       4.0      25.0      0.01
X3        0       0.0       0.0    1800.0       0.0    2200.0       0.0       0.0       0.0
X5        1    1408.3
GR   1410.0    1490.0    1409.0    1640.0    1408.0    1660.0    1408.0    1685.0    1409.0    1700.0
GR   1410.0    1720.0    1410.0    1750.0    1409.0    1800.0    1408.0    1940.0    1407.0    1950.0
GR   1406.0    2000.0    1407.0    2050.0    1408.0    2070.0    1408.0    2175.0    1409.0    2200.0
GR   1410.0    2220.0    1410.0    2290.0
  HEARN ROAD

HEARN ROAD

X1     8155        13    1955.0    2055.0     500.0     500.0     500.0       1.0       0.0
CI   2000.0    1406.8   500.035       4.0       4.0      25.0      0.01
X3        0       0.0       0.0    1800.0       0.0    2200.0       0.0       0.0       0.0
GR   1412.0    1545.0    1412.0    1590.0    1411.0    1775.0    1410.5    1800.0    1410.0    1935.0
GR   1409.0    1955.0    1408.0    1990.0    1407.8    2000.0    1408.0    2010.0    1409.0    2055.0
GR   1410.0    2200.0    1411.0    2245.0    1411.0    2300.0


FLOW DISTRIBUTION :
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   Cross-Section Number (SECNO)                                  3914.000
   Total Discharge (cfs, Q)                                         3182
   Computed Water Surface Elevation (ft MSL, CWSEL)              1395.78

   Station (ft) =     1978.5    2021.5
        Flow (%)      =      100.0
        Area (sq ft) =       353.6
        Vel (ft/s)    =       9.00
        Depth (ft)    =       8.22

FLOW DISTRIBUTION :
-------------------

   Cross-Section Number (SECNO)                                  4004.000
   Total Discharge (cfs, Q)                                         3182
   Computed Water Surface Elevation (ft MSL, CWSEL)              1396.85

   Station (ft) =     1978.5    2021.5
        Flow (%)      =      100.0
        Area (sq ft) =       393.7
        Vel (ft/s)    =       8.08
        Depth (ft)    =       9.16
```

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT : INDIAN BEND WASH - CHANNEL IMPROVEMENTS
40TH STREET TO HEARN
92833

Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Computed W. S. Elevation (ft MSL) CWSEL	Minimum C. S. Elevation (ft MSL) ELMIN	Flow Depth (ft) DEPTH	Discharge Flow (cfs) Q	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Water Surface Top Width (ft) TOPWID	W.S. Elev Diff per Section (ft) DIFWSX	Channel Manning n * 1,000 K*XNCH	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S
500.000	.00	1384.13	1379.00	5.13	7071.00	4.39	1608.97	457.24	.00	35.00	1384.43	20.05
600.000	100.00	1384.30	1379.00	5.30	7071.00	5.14	1376.36	417.66	.17	35.00	1384.71	29.91
700.000	100.00	1384.58	1379.41	5.17	7071.00	5.43	1303.00	398.68	.28	35.00	1385.04	33.75
* 1000.000	300.00	1385.92	1380.02	5.90	7071.00	9.10	776.79	302.31	1.34	35.00	1387.21	131.32
* 1200.000	200.00	1388.00	1380.42	7.58	7071.00	5.78	1224.38	355.84	2.08	35.00	1388.52	35.81
1300.000	300.00	1388.99	1380.63	8.36	7071.00	4.84	1460.75	375.61	.99	35.00	1389.35	21.36
1600.000	300.00	1389.65	1381.23	8.42	7071.00	5.04	1401.67	369.36	.66	35.00	1390.04	23.98
1900.000	300.00	1390.35	1381.84	8.51	7071.00	4.93	1435.08	365.12	.71	35.00	1390.73	21.83
2100.000	200.00	1390.79	1382.25	8.54	7071.00	4.84	1460.74	361.18	.44	35.00	1391.15	20.28
2200.000	300.00	1391.36	1382.45	8.91	6874.00	3.81	1803.20	380.10	.57	35.00	1391.58	10.17
2500.000	300.00	1391.68	1383.06	8.62	6874.00	4.21	1633.62	373.49	.32	35.00	1391.95	13.81
2800.000	300.00	1392.11	1383.67	8.44	6874.00	4.60	1495.19	361.42	.43	35.00	1392.44	17.76
3100.000	300.00	1392.67	1384.28	8.39	6874.00	4.98	1380.19	360.83	.57	35.00	1393.06	23.13
3400.000	300.00	1393.36	1384.89	8.47	6874.00	4.92	1396.01	356.36	.68	35.00	1393.74	21.92
3500.000	100.00	1393.65	1385.09	8.56	6874.00	4.27	1608.20	415.97	.29	35.00	1393.94	16.80
* 3600.000	100.00	1392.08	1385.30	6.78	6043.00	14.86	406.74	60.00	-1.57	35.00	1395.51	125.24

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Computed W. S. Elevation (ft MSL) CWSEL	Minimum C. S. Elevation (ft MSL) ELMIN	Flow Depth (ft) DEPTH	Discharge Flow (cfs) Q	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Water Surface Top Width (ft) TOPWID	W.S. Elev Diff per Section (ft) DIFWSX	Channel Manning n * 1,000 K*XNCH	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S
*	3670.000	70.00	1394.64	1385.44	9.20	6043.00	10.94	552.51	60.00	2.56	14.00	1396.50	7.86
	3700.000	70.00	1394.61	1385.50	9.11	6043.00	11.43	528.58	60.00	-.03	14.00	1396.64	8.51
*	3914.000	214.00	1395.78	1387.55	8.23	3182.00	9.00	353.64	43.00	1.17	14.01	1397.04	6.67
	4004.000	90.00	1396.85	1387.69	9.16	3182.00	8.08	393.71	43.00	1.06	14.00	1397.86	4.86
*	4300.000	296.00	1397.76	1389.07	8.69	3182.00	4.09	778.56	162.41	.92	14.01	1398.02	1.88
*	4800.000	500.00	1397.74	1391.40	6.34	3182.00	5.66	562.35	150.36	-.02	14.01	1398.24	5.07
*	5300.000	500.00	1398.19	1393.78	4.41	3182.00	10.66	298.62	85.31	.45	24.99	1399.96	61.46
	6000.000	700.00	1401.68	1396.50	5.18	1918.00	5.23	366.58	91.46	3.49	25.02	1402.11	12.42
	6600.000	600.00	1402.45	1397.42	5.03	1918.00	5.44	352.49	90.22	.76	25.02	1402.91	13.89
*	7655.000	675.00	1408.30	1400.30	8.00	1883.00	3.83	542.49	284.51	5.85	34.97	1408.52	10.29
*	8155.000	500.00	1410.28	1406.80	3.48	1883.00	6.65	365.81	341.60	1.98	35.00	1410.86	83.34

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 1000, profile 1, critical depth assumed.

Section 1000, profile 1, minimum specific energy.

Section 1200, profile 1, conveyance change outside acceptable range.

Section 3600, profile 1, critical depth assumed.

Section 3600, profile 1, probable minimum specific energy.

Section 3600, profile 1, 20 trials attempted to balance water surface elevation.

Section 3670, profile 1, conveyance change outside acceptable range.

Section 3914, profile 1, conveyance change outside acceptable range.

Section 4300, profile 1, conveyance change outside acceptable range.

==========
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PROJECT DESCRIPTION :

PROJECT TITLE : INDIAN BEND WASH - EXISTING CONDITIONS
PROJECT NUMBER : 92833
DESCRIPTION : 40TH STREET TO HEARN
ENGINEER :
DATE OF RUN : 8/14/1992
TIME OF RUN : 10:57 am

```
T1      92833
T2      INDIAN BEND WASH - EXISTING CONDITIONS
T3      40TH STREET TO HEARN
T4      ALL FLOWS OBTAINED FROM MICHAEL BAKER, JR., INC., "FINAL HYDROLOGY
T4      REPORT:  SQUAW PEAK HIGHWAY," NOVEMBER 1988.


JOB PARAMETERS :
----------------

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0     0.002       0      0.0   10260.0   1385.0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

     -1        1       0.0      0.0      0.0      0.0      0.0     -6.0      0.0

REQUESTED CROSS-SECTION PRINTOUTS (J5) :
----------------------------------------

    -10      -10

NC   0.040    0.040    0.035    0.1      0.3
  UPSTREAM OF 40TH STREET
UPSTREAM OF 40TH STREET

X1     500       26   1730.0   2226.0      0.0      0.0      0.0      1.0      0.0
X3       0      0.0      0.0   1730.0      0.0   2226.0      0.0      0.0      0.0
GR  1386.0   1730.0   1385.0   1738.0   1384.0   1748.0   1383.0   1766.0   1382.0   1790.0
GR  1381.0   1838.0   1380.0   1905.0   1380.0   1971.0   1380.0   1990.0   1379.0   2000.0
GR  1379.0   2003.0   1379.0   2008.0   1379.0   2011.0   1380.0   2018.0   1380.0   2030.0
GR  1380.0   2053.0   1381.0   2106.0   1382.0   2139.0   1383.0   2181.0   1384.0   2203.0
GR  1385.0   2210.0   1386.0   2216.0   1387.0   2226.0   1388.0   2240.0   1389.0   2259.0
GR  1389.0   2316.0

X1     600       28   1769.0   2230.0    100.0    100.0    100.0      1.0      0.0
X3       0      0.0      0.0   1760.0      0.0   2230.0      0.0      0.0      0.0
GR  1386.0   1620.0   1386.0   1660.0   1386.0   1680.0   1385.0   1733.0   1385.0   1769.0
GR  1385.0   1780.0   1384.0   1787.0   1383.0   1818.0   1382.0   1882.0   1381.0   1906.0
GR  1380.0   1961.0   1380.0   1970.0   1380.0   2000.0   1380.0   2006.0   1379.0   2034.0
GR  1380.0   2039.0   1381.0   2080.0   1381.0   2090.0   1381.0   2096.0   1382.0   2128.0
GR  1383.0   2170.0   1384.0   2199.0   1385.0   2211.0   1386.0   2216.0   1387.0   2224.0
GR  1388.0   2230.0   1389.0   2310.0   1389.0   2355.0

X1     700       23   1774.0   2226.0    100.0    100.0    100.0      1.0      0.0
X3       0      0.0      0.0   1774.0      0.0   2226.0      0.0      0.0      0.0
GR  1389.0   1640.0   1388.0   1681.0   1389.0   1752.0   1388.0   1774.0   1387.0   1780.0
GR  1386.0   1784.0   1385.0   1790.0   1384.0   1816.0   1383.0   1853.0   1382.0   1896.0
GR  1381.0   1925.0   1380.5   2000.0   1380.0   2062.0   1380.0   2069.0   1381.0   2086.0
```

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GR   1382.0    2105.0    1383.0    2153.0    1384.0    2192.0    1385.0    2205.0    1386.0    2212.0
GR   1387.0    2218.0    1388.0    2226.0    1389.0    2375.0

X1      1000      22    1790.0    2211.0     300.0     300.0     300.0       1.0       0.0
X3         0     0.0       0.0    1790.0       0.0    2211.0       0.0       0.0       0.0
GR   1389.0    1662.0    1388.4    1715.0    1389.0    1734.0    1389.0    1790.0    1388.0    1803.0
GR   1387.0    1825.0    1386.0    1871.0    1385.0    1910.0    1385.0    1913.0    1385.0    1936.0
GR   1385.0    1945.0    1385.0    1961.0    1385.0    1971.0    1385.1    2000.0    1386.0    2146.0
GR   1387.0    2186.0    1388.0    2199.0    1389.0    2211.0    1389.8    2260.0    1389.0    2341.0
GR   1389.0    2365.0    1389.0    2373.0

X1      1200      30    1802.0    2194.0     200.0     200.0     200.0       1.0       0.0
X3         0     0.0       0.0    1802.0       0.0    2194.0       0.0       0.0       0.0
GR   1389.0    1625.0    1389.3    1635.0    1389.0    1646.0    1390.0    1684.0    1390.0    1754.0
GR   1389.0    1802.0    1388.0    1823.0    1387.0    1848.0    1386.0    1929.0    1386.1    1967.0
GR   1386.0    1974.0    1386.0    1981.0    1385.8    2000.0    1386.0    2019.0    1386.0    2028.0
GR   1385.9    2035.0    1386.0    2043.0    1386.0    2053.0    1385.9    2068.0    1386.0    2080.0
GR   1386.0    2092.0    1385.9    2100.0    1386.0    2106.0    1386.0    2110.0    1385.9    2114.0
GR   1387.0    2155.0    1388.0    2179.0    1389.0    2194.0    1390.0    2275.0    1390.0    2386.0

X1      1300      25    1800.0    2189.0     300.0     300.0     300.0       1.0       0.0
X3         0     0.0       0.0    1800.0       0.0    2189.0       0.0       0.0       0.0
GR   1389.0    1615.0    1389.5    1650.0    1389.0    1664.0    1390.0    1682.0    1391.0    1708.0
GR   1391.0    1738.0    1391.0    1775.0    1391.0    1790.0    1390.0    1800.0    1389.0    1813.0
GR   1388.0    1828.0    1387.0    1873.0    1386.5    1928.0    1386.0    1963.0    1386.0    1963.0
GR   1386.0    1968.0    1385.9    2000.0    1386.0    2008.0    1387.0    2134.0    1388.0    2170.0
GR   1389.0    2189.0    1390.0    2218.0    1391.0    2276.0    1391.1    2300.0    1391.0    2319.0

X1      1600      16    1787.0    2190.0     300.0     300.0     300.0       1.0       0.0
X3         0     0.0       0.0    1787.0       0.0    2190.0       0.0       0.0       0.0
GR   1390.0    1633.0    1391.0    1684.0    1391.0    1787.0    1390.0    1806.0    1389.0    1831.0
GR   1388.0    1865.0    1387.0    1993.0    1386.8    2000.0    1387.0    2007.0    1387.1    2012.0
GR   1387.0    2020.0    1387.0    2096.0    1388.0    2136.0    1389.0    2174.0    1390.0    2190.0
GR   1391.0    2359.0

X1      1900      22    1795.0    2197.0     300.0     300.0     300.0       1.0       0.0
X3         0     0.0       0.0    1795.0       0.0    2197.0       0.0       0.0       0.0
GR   1391.0    1635.0    1391.0    1668.0    1392.0    1675.0    1392.2    1730.0    1392.0    1758.0
GR   1391.0    1795.0    1390.0    1816.0    1389.0    1850.0    1388.0    1889.0    1387.0    1982.0
GR   1386.9    1989.0    1387.0    1995.0    1387.2    2000.0    1387.0    2012.0    1388.0    2102.0
GR   1389.0    2137.0    1390.0    2162.0    1391.0    2185.0    1392.0    2197.0    1393.0    2293.0
GR   1392.0    2304.0    1391.2    2325.0

X1      2100      24    1798.0    2200.0     200.0     200.0     200.0       1.0       0.0
X3         0     0.0       0.0    1798.0       0.0    2200.0       0.0       0.0       0.0
GR   1391.4    1645.0    1392.0    1680.0    1393.0    1764.0    1392.0    1798.0    1391.0    1818.0
GR   1390.0    1844.0    1389.0    1881.0    1388.0    1907.0    1387.0    1965.0    1386.9    2000.0
GR   1387.0    2009.0    1386.9    2050.0    1387.0    2090.0    1387.0    2103.0    1388.0    2161.0
GR   1389.0    2170.0    1390.0    2180.0    1391.0    2186.0    1392.0    2190.0    1393.0    2193.0
GR   1393.0    2200.0    1392.0    2291.0    1391.6    2323.0    1391.0    2348.0

QT         1    6535.0
```

X1	2200	28	1799.0	2200.0	300.0	300.0	300.0	1.0	0.0	
X3	0	0.0	0.0	1799.0	0.0	2200.0	0.0	0.0	0.0	
GR	1391.5	1630.0	1392.0	1667.0	1393.0	1680.0	1393.6	1740.0	1393.0	1755.0
GR	1392.0	1799.0	1391.0	1810.0	1390.0	1819.0	1389.0	1829.0	1388.0	1840.0
GR	1387.4	1882.0	1387.0	1928.0	1386.8	2000.0	1387.0	2095.0	1387.1	2102.0
GR	1387.0	2107.0	1386.9	2112.0	1387.0	2117.0	1388.0	2160.0	1389.0	2172.0
GR	1390.0	2180.0	1391.0	2184.0	1392.0	2190.0	1393.0	2194.0	1394.0	2200.0
GR	1393.0	2240.0	1393.1	2246.0	1393.0	2252.0				
X1	2500	22	1799.0	2190.0	300.0	300.0	300.0	1.0	0.0	
X3	0	0.0	0.0	1799.0	0.0	2190.0	0.0	0.0	0.0	
GR	1393.0	1672.0	1394.0	1750.0	1394.0	1793.0	1393.0	1799.0	1392.0	1807.0
GR	1391.0	1817.0	1390.0	1822.0	1389.0	1833.0	1388.0	1910.0	1387.9	1955.0
GR	1388.0	2000.0	1388.1	2005.0	1388.0	2009.0	1387.8	2080.0	1388.0	2147.0
GR	1389.0	2165.0	1390.0	2175.0	1391.0	2181.0	1392.0	2185.0	1393.0	2190.0
GR	1393.0	2295.0	1392.0	2338.0						
X1	2800	32	1801.0	2188.0	300.0	300.0	300.0	1.0	0.0	
X3	0	0.0	0.0	1801.0	0.0	2188.0	0.0	0.0	0.0	
GR	1395.0	1635.0	1394.7	1647.0	1394.0	1670.0	1393.0	1700.0	1393.8	1728.0
GR	1393.0	1745.0	1394.0	1760.0	1393.9	1780.0	1394.0	1801.0	1393.0	1808.0
GR	1392.0	1815.0	1391.0	1824.0	1390.0	1830.0	1389.0	1862.0	1388.9	1867.0
GR	1389.0	1870.0	1389.1	1876.0	1389.0	1885.0	1389.0	1900.0	1389.1	1920.0
GR	1389.0	1938.0	1388.8	2000.0	1389.0	2152.0	1390.0	2162.0	1391.0	2166.0
GR	1392.0	2175.0	1393.0	2181.0	1394.0	2188.0	1394.2	2230.0	1394.0	2284.0
GR	1393.0	2303.0	1392.9	2324.0						
X1	3100	24	1799.0	2192.0	300.0	300.0	300.0	1.0	0.0	
X3	0	0.0	0.0	1799.0	0.0	2192.0	0.0	0.0	0.0	
GR	1393.0	1618.0	1394.0	1632.0	1395.0	1703.0	1394.9	1712.0	1395.0	1719.0
GR	1394.0	1799.0	1393.0	1809.0	1392.0	1821.0	1391.0	1840.0	1390.0	1870.0
GR	1389.7	2000.0	1389.0	2052.0	1388.9	2056.0	1389.0	2061.0	1390.0	2145.0
GR	1391.0	2156.0	1392.0	2167.0	1393.0	2177.0	1394.0	2185.0	1395.0	2192.0
GR	1395.2	2255.0	1395.0	2297.0	1394.0	2311.0	1393.0	2362.0		
X1	3400	25	1801.0	2215.0	300.0	300.0	300.0	1.0	0.0	
X3	0	0.0	0.0	1801.0	0.0	2215.0	0.0	0.0	0.0	
GR	1394.0	1475.0	1395.0	1525.0	1396.0	1553.0	1396.0	1615.0	1395.0	1801.0
GR	1394.0	1810.0	1393.0	1820.0	1392.0	1830.0	1391.0	1840.0	1390.4	1880.0
GR	1391.0	1935.0	1391.1	1945.0	1391.0	1955.0	1390.0	1960.0	1389.6	2000.0
GR	1390.0	2033.0	1391.0	2038.0	1392.0	2080.0	1393.0	2160.0	1394.0	2184.0
GR	1394.3	2215.0	1394.0	2250.0	1395.0	2280.0	1395.1	2300.0	1395.0	2325.0
X1	3500	27	1789.0	2276.0	100.0	100.0	100.0	1.0	0.0	
X3	0	0.0	0.0	1789.0	0.0	2276.0	0.0	0.0	0.0	
GR	1395.0	1525.0	1396.0	1622.0	1396.0	1707.0	1395.7	1789.0	1395.0	1804.0
GR	1394.0	1813.0	1393.0	1825.0	1392.0	1832.0	1391.0	1845.0	1390.9	1853.0
GR	1391.0	1860.0	1392.0	1940.0	1392.1	1947.0	1392.0	1952.0	1391.0	1962.0
GR	1390.0	1970.0	1389.9	1985.0	1390.0	2000.0	1390.0	2002.0	1391.0	2020.0
GR	1392.0	2026.0	1393.0	2070.0	1394.0	2173.0	1395.0	2197.0	1394.9	2212.0
GR	1395.0	2249.0	1396.0	2276.0						

```
X1     3600       17    1803.0    2272.0     100.0     100.0     100.0       1.0       0.0
X3        0      0.0       0.0    1803.0       0.0    2272.0       0.0       0.0       0.0
GR   1395.0   1570.0    1396.0    1683.0    1396.0    1794.0    1395.0    1803.0    1394.0    1811.0
GR   1393.0   1821.0    1392.4    1855.0    1393.0    1889.0    1393.0    1943.0    1393.5    2000.0
GR   1394.0   2137.0    1395.0    2186.0    1396.0    2258.0    1397.0    2272.0    1397.0    2350.0
GR   1396.0   2388.0    1396.5    2405.0
  36TH STREET

36TH STREET

X1     3630       25    1795.0    2274.0     130.0     130.0     130.0       1.0       0.0
X3        0      0.0       0.0    1795.0       0.0    2274.0       0.0       0.0       0.0
GR   1395.1   1540.0    1396.0    1600.0    1396.1    1615.0    1396.0    1630.0    1395.0    1660.0
GR   1395.2   1670.0    1395.0    1680.0    1396.0    1734.0    1396.0    1795.0    1395.0    1802.0
GR   1394.0   1808.0    1393.0    1885.0    1392.9    1895.0    1393.0    1904.0    1393.0    2000.0
GR   1393.0   2011.0    1394.0    2020.0    1394.0    2085.0    1394.1    2105.0    1394.0    2130.0
GR   1395.0   2184.0    1396.0    2274.0    1397.0    2305.0    1397.0    2360.0    1396.0    2390.0

NC      0.0      0.0       0.0       0.3       0.5
X1     3700       21    1807.0    2267.0      70.0      70.0      70.0       1.0       0.0
X3        0      0.0       0.0    1802.0       0.0    2267.0       0.0       0.0       0.0
GR   1396.0   1540.0    1396.0    1673.0    1395.0    1720.0    1395.2    1736.0    1395.0    1742.0
GR   1396.0   1780.0    1396.1    1787.0    1396.0    1793.0    1395.0    1807.0    1394.0    1815.0
GR   1393.0   1833.0    1393.0    1839.0    1394.0    1885.0    1394.2    1920.0    1394.0    1949.0
GR   1393.0   1977.0    1392.8    2000.0    1393.0    2110.0    1394.0    2200.0    1395.0    2267.0
GR   1395.3   2398.0

NC      0.0      0.0     0.035       0.0       0.0
QT        1   2810.0
  DOWNSTREAM FACE OF SWEETWATER AVE CULVERTS
DOWNSTREAM FACE OF SWEETWATER AVE CULVERTS

X1     3914       25    1633.0    2239.0     185.0     293.0     214.0       1.0       0.0
X2      0.0      0.0         0       0.0       0.0       0.0         0       0.0       0.0        15
X3       10  1391.55       0.0    1979.0    1395.0    2021.0    1396.4       0.0       0.0
GR   1397.0   1633.0    1396.0    1649.0    1395.0    1686.0    1395.0    1708.0    1396.2    1738.0
GR   1396.0   1806.0    1397.0    1812.0    1397.0    1820.0    1396.0    1849.0    1395.0    1871.0
GR   1396.0   1900.0    1396.0    1967.0    1395.0    1968.0    1394.0    1971.0    1393.0    1973.0
GR   1392.1   1979.0    1392.0    1980.0   1387.55    2000.0    1392.0    2016.0   1392.75    2021.0
GR   1393.0   2025.0    1394.0    2030.0    1395.0    2034.0    1396.0    2042.0    1397.0    2239.0

QT        1   2810.0
SC    4.015      0.5      2.63       0.0       8.0      10.0    72.125      11.4   1387.69   1387.55
  UPSTREAM FACE OF SWEETWATER AVE CULVERTS
UPSTREAM FACE OF SWEETWATER AVE CULVERTS

X1     4004       15    1563.0    2266.0      86.0      90.0      90.0       1.0       0.0
X2      0.0      0.0         2       0.0    1395.0       0.0         0       0.0       0.0        15
X3       10  1391.69       0.0    1979.0    1395.0    2021.0    1396.4       0.0       0.0
BT      -10   1593.0    1397.0       0.0    1617.0    1396.0       0.0    1650.0    1395.0       0.0
BT            1672.0    1395.0       0.0    1703.0    1396.0       0.0    1918.5    1396.0       0.0
BT            2000.0    1396.6       0.0    2090.0    1396.4       0.0    2174.0    1396.7       0.0
```

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BT          2373.0    1397.6    0.0
GR  1397.0  1563.0    1396.0    1579.0    1395.0    1633.0    1395.8    1818.0    1396.0    1965.0
GR  1395.0  1974.0    1394.0    1975.0    1393.0    1979.0    1387.69   2000.0    1393.0    2021.0
GR  1394.0  2028.0    1395.0    2031.0    1396.0    2040.0    1397.0    2266.0    1398.0    2398.0

NC    0.0     0.0     0.0       0.1       0.3
X1    4300    19      1940.0    2066.0    310.0     200.0     296.0     1.0       0.0
X3    0       0.0     0.0       1530.0    0.0       0.0       0.0       0.0       0.0
GR  1397.0  1476.0    1396.5    1637.0    1396.7    1782.0    1396.8    1940.0    1396.0    1954.0
GR  1395.0  1961.0    1394.0    1964.0    1393.6    1990.0    1393.6    2000.0    1394.0    2014.0
GR  1395.0  2039.0    1396.0    2045.0    1397.0    2051.0    1398.0    2066.0    1398.0    2105.0
GR  1397.0  2170.0    1397.0    2243.0    1397.0    2259.0    1397.7    2280.0

X1    4800    16      2046.0    2151.0    475.0     515.0     500.0     1.0       0.0
X3    0       0.0     0.0       1980.0    0.0       2300.0    0.0       0.0       0.0
GR  1398.0  1920.0    1398.3    2000.0    1398.0    2021.0    1398.0    2046.0    1397.0    2055.0
GR  1396.0  2066.0    1395.5    2096.0    1396.0    2134.0    1397.0    2138.0    1398.0    2151.0
GR  1398.0  2188.0    1397.8    2194.0    1398.0    2199.0    1398.8    2230.0    1398.3    2264.0
GR  1399.0  2412.0
  DOWNSTREAM OF EMILE ZOLA AVENUE

DOWNSTREAM OF EMILE ZOLA AVENUE

X1    5300    15      1880.0    2085.0    495.0     535.0     518.0     1.0       0.0
X3    0       0.0     0.0       1835.0    0.0       0.0       0.0       0.0       0.0
GR  1401.0  1794.0    1400.0    1800.0    1399.5    1880.0    1399.0    1962.0    1398.0    1967.0
GR  1397.2  2000.0    1397.0    2018.0    1398.0    2040.0    1399.0    2047.0    1399.6    2085.0
GR  1399.8  2195.0    1400.0    2264.0    1400.0    2303.0    1399.9    2344.0    1400.0    2365.0
  UPSTREAM OF EMILE ZOLA AVENUE

UPSTREAM OF EMILE ZOLA AVENUE

X1    6000    11      1957.0    2055.0    690.0     715.0     700.0     1.0       0.0
X3    0       0.0     0.0       1800.0    0.0       0.0       0.0       0.0       0.0
GR  1404.0  1756.0    1403.0    1784.0    1402.8    1800.0    1403.0    1817.0    1403.4    1886.0
GR  1403.0  1925.0    1402.0    1957.0    1401.0    1992.0    1401.0    2000.0    1402.0    2055.0
GR  1403.0  2170.0

QT    1     2130.0
X1    6600    12      1940.0    2055.0    600.0     600.0     600.0     1.0       0.0
X3    0       0.0     0.0       1800.0    0.0       0.0       0.0       0.0       0.0
GR  1405.0  1783.0    1404.3    1881.0    1404.0    1940.0    1403.0    1953.0    1402.9    2000.0
GR  1403.0  2049.0    1404.0    2055.0    1405.0    2095.0    1405.7    2120.0    1405.0    2154.0
GR  1405.0  2168.0    1405.0    2176.0
  THUNDERBIRD ROAD

THUNDERBIRD ROAD

X1    6980    9       1850.0    2140.0    380.0     380.0     380.0     1.0       0.0
X3    0       0.0     0.0       1800.0    0.0       2200.0    0.0       0.0       0.0
GR  1407.0  1665.0    1406.0    1725.0    1405.0    1850.0    1404.0    1935.0    1404.0    2000.0
GR  1404.0  2030.0    1405.0    2140.0    1406.0    2335.0    1407.0    2650.0
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X1     7655       17    1950.0    2050.0     680.0     680.0     680.0       1.0       0.0
X3        0      0.0       0.0    1800.0       0.0    2200.0       0.0       0.0       0.0
GR   1410.0    1490.0    1409.0    1640.0    1408.0    1660.0    1408.0    1685.0    1409.0    1700.0
GR   1410.0    1720.0    1410.0    1750.0    1409.0    1800.0    1408.0    1940.0    1407.0    1950.0
GR   1406.0    2000.0    1407.0    2050.0    1408.0    2070.0    1408.0    2175.0    1409.0    2200.0
GR   1410.0    2220.0    1410.0    2290.0
  HEARN ROAD

HEARN ROAD

X1     8815       13    1955.0    2055.0     500.0     500.0     500.0       1.0       0.0
X3        0      0.0       0.0    1800.0       0.0    2200.0       0.0       0.0       0.0
GR   1412.0    1545.0    1412.0    1590.0    1411.0    1775.0    1410.5    1800.0    1410.0    1935.0
GR   1409.0    1955.0    1408.0    1990.0    1407.8    2000.0    1408.0    2010.0    1409.0    2055.0
GR   1410.0    2200.0    1411.0    2245.0    1411.0    2300.0


FLOW DISTRIBUTION :
-------------------

   Cross-Section Number (SECNO)                                  3914.000
   Total Discharge (cfs, Q)                                          2810
   Computed Water Surface Elevation (ft MSL, CWSEL)              1397.74

   Station (ft) =     1633.0    2239.0
        Flow (%)      =      100.0
        Area (sq ft) =     1137.3
        Vel (ft/s)    =       2.47
        Depth (ft)    =       1.88

FLOW DISTRIBUTION :
-------------------

   Cross-Section Number (SECNO)                                  4004.000
   Total Discharge (cfs, Q)                                          2810
   Computed Water Surface Elevation (ft MSL, CWSEL)              1397.77

   Station (ft) =     1563.0    2266.0    2368.1
        Flow (%)      =       99.2        .8
        Area (sq ft) =     1409.5      39.5
        Vel (ft/s)    =       1.98       .58
        Depth (ft)    =       2.01       .39
```

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 150 : INDIAN BEND WASH - EXISTING CONDITIONS
40TH STREET TO HEARN
92833

Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
500.000	.00	.00	.00	1379.00	10260.00	1385.49	.00	1385.88	20.09	5.01	2047.64	2289.24
600.000	100.00	.00	.00	1379.00	10260.00	1385.63	.00	1386.17	31.15	5.88	1748.40	1838.38
700.000	100.00	.00	.00	1380.00	10260.00	1385.92	.00	1386.52	36.18	6.26	1639.14	1705.66
* 1000.000	300.00	.00	.00	1385.00	10260.00	1388.56	1388.56	1389.92	131.07	9.36	1096.06	896.17
* 1200.000	200.00	.00	.00	1385.80	10260.00	1390.59	.00	1391.25	36.65	6.48	1582.94	1694.80
1300.000	300.00	.00	.00	1385.90	10260.00	1391.62	.00	1392.11	22.67	5.62	1824.69	2154.84
1600.000	300.00	.00	.00	1386.80	10260.00	1392.33	.00	1392.84	25.53	5.75	1784.52	2030.52
1900.000	300.00	.00	.00	1386.90	10260.00	1393.08	.00	1393.54	21.11	5.44	1886.51	2232.88
2100.000	200.00	.00	.00	1386.90	10260.00	1393.53	.00	1393.89	14.07	4.82	2129.53	2735.65
2200.000	300.00	.00	.00	1386.80	6535.00	1394.02	.00	1394.13	3.29	2.60	2510.93	3605.27
2500.000	300.00	.00	.00	1387.80	6535.00	1394.12	.00	1394.26	4.96	2.97	2197.53	2935.04
2800.000	300.00	.00	.00	1388.80	6535.00	1394.27	.00	1394.46	8.31	3.49	1871.03	2266.63
3100.000	300.00	.00	.00	1388.90	6535.00	1394.54	.00	1394.78	12.12	3.90	1674.97	1876.77
3400.000	300.00	.00	.00	1389.60	6535.00	1394.97	.00	1395.31	24.60	4.71	1387.51	1317.60
3500.000	100.00	.00	.00	1389.90	6535.00	1395.21	.00	1395.69	49.46	5.59	1168.14	929.27
* 3600.000	100.00	.00	.00	1392.40	6535.00	1395.67	.00	1396.58	132.02	7.67	851.95	568.76

Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
* 3630.000	130.00	.00	.00	1392.90	6535.00	1396.99	.00	1397.32	27.55	4.59	1423.12	1244.94
3700.000	70.00	.00	.00	1392.80	6535.00	1397.25	.00	1397.48	14.46	3.84	1706.91	1718.62
* 3914.000	214.00	.00	.00	1391.55	2810.00	1397.74	.00	1397.83	14.91	2.47	1137.31	727.65
4004.000	90.00	1395.00	.00	1391.69	2810.00	1397.77	.00	1397.83	8.69	1.98	1449.03	953.46
* 4300.000	296.00	.00	.00	1393.60	2810.00	1398.07	.00	1398.21	17.74	3.79	1112.24	667.24
* 4800.000	500.00	.00	.00	1395.50	2810.00	1399.23	.00	1399.84	61.28	6.91	528.37	358.97
* 5300.000	518.00	.00	.00	1397.00	2810.00	1401.27	.00	1401.41	17.12	3.40	1024.91	679.20
* 6000.000	700.00	.00	.00	1401.00	2810.00	1403.80	1403.80	1404.45	102.58	7.57	499.67	277.44
* 6600.000	600.00	.00	.00	1402.90	2130.00	1406.34	.00	1406.47	13.29	3.42	807.72	584.27
6980.000	380.00	.00	.00	1404.00	2130.00	1406.83	.00	1406.92	10.45	2.53	906.42	659.01
* 7655.000	680.00	.00	.00	1406.00	2130.00	1408.80	1408.80	1409.41	89.37	7.00	406.45	225.32
* 8815.000	500.00	.00	.00	1407.80	2130.00	1411.25	.00	1411.43	22.14	4.04	712.55	452.68

SUMMARY PRINTOUT TABLE 150 : INDIAN BEND WASH - EXISTING CONDITIONS
---------- 40TH STREET TO HEARN
92833

Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
500.000	10260.00	1385.49	.00	.00	.49	478.81	.00
600.000	10260.00	1385.63	.00	.14	.00	454.15	100.00
700.000	10260.00	1385.92	.00	.29	.00	426.90	100.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	1000.000	10260.00	1388.56	.00	2.64	.00	410.01	300.00
*	1200.000	10260.00	1390.59	.00	2.03	.00	392.00	200.00
	1300.000	10260.00	1391.62	.00	1.03	.00	389.00	300.00
	1600.000	10260.00	1392.33	.00	.71	.00	403.00	300.00
	1900.000	10260.00	1393.08	.00	.75	.00	402.00	300.00
	2100.000	10260.00	1393.53	.00	.45	.00	402.00	200.00
	2200.000	6535.00	1394.02	.00	.49	.00	401.00	300.00
	2500.000	6535.00	1394.12	.00	.10	.00	391.00	300.00
	2800.000	6535.00	1394.27	.00	.15	.00	387.00	300.00
	3100.000	6535.00	1394.54	.00	.27	.00	389.78	300.00
	3400.000	6535.00	1394.97	.00	.43	.00	413.71	300.00
	3500.000	6535.00	1395.21	.00	.24	.00	455.00	100.00
*	3600.000	6535.00	1395.67	.00	.46	.00	431.29	100.00
*	3630.000	6535.00	1396.99	.00	1.32	.00	479.00	130.00
	3700.000	6535.00	1397.25	.00	.26	.00	465.00	70.00
*	3914.000	2810.00	1397.74	.00	.49	.00	606.00	214.00
	4004.000	2810.00	1397.77	.00	.03	.00	805.13	90.00
*	4300.000	2810.00	1398.07	.00	.30	.00	750.00	296.00
*	4800.000	2810.00	1399.23	.00	1.16	.00	320.00	500.00
*	5300.000	2810.00	1401.27	.00	2.04	.00	530.00	518.00
*	6000.000	2810.00	1403.80	.00	2.53	.00	370.00	700.00
*	6600.000	2130.00	1406.34	.00	2.54	.00	376.00	600.00

Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
6980.000	2130.00	1406.83	.00	.49	.00	400.00	380.00
* 7655.000	2130.00	1408.80	.00	1.97	.00	367.29	680.00
* 8815.000	2130.00	1411.25	.00	2.45	.00	400.00	500.00

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 1000, profile 1, critical depth assumed.

Section 1000, profile 1, probable minimum specific energy.

Section 1000, profile 1, 20 trials attempted to balance water surface elevation.

Section 1200, profile 1, conveyance change outside acceptable range.

Section 3600, profile 1, conveyance change outside acceptable range.

Section 3630, profile 1, conveyance change outside acceptable range.

Section 3914, profile 1, conveyance change outside acceptable range.

Section 4300, profile 1, conveyance change outside acceptable range.

Section 4800, profile 1, conveyance change outside acceptable range.

Section 5300, profile 1, conveyance change outside acceptable range.

Section 6000, profile 1, critical depth assumed.

Section 6000, profile 1, minimum specific energy.

Section 6600, profile 1, conveyance change outside acceptable range.

Section 7655, profile 1, critical depth assumed.

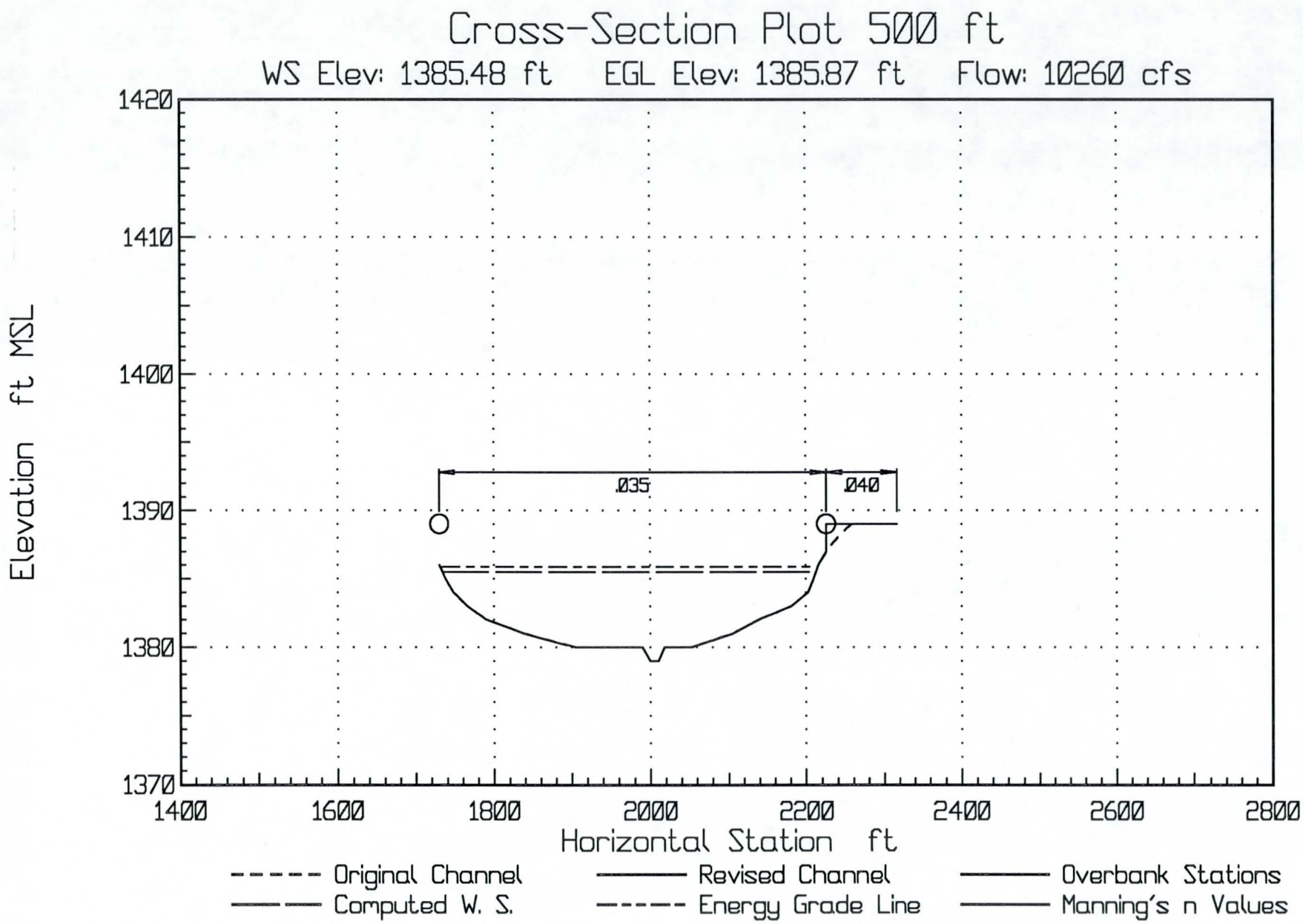
Section 7655, profile 1, probable minimum specific energy.

Section 7655, profile 1, 20 trials attempted to balance water surface elevation.

Section 8815, profile 1, conveyance change outside acceptable range.

17 Warning and status message(s) generated

END OF OUTPUT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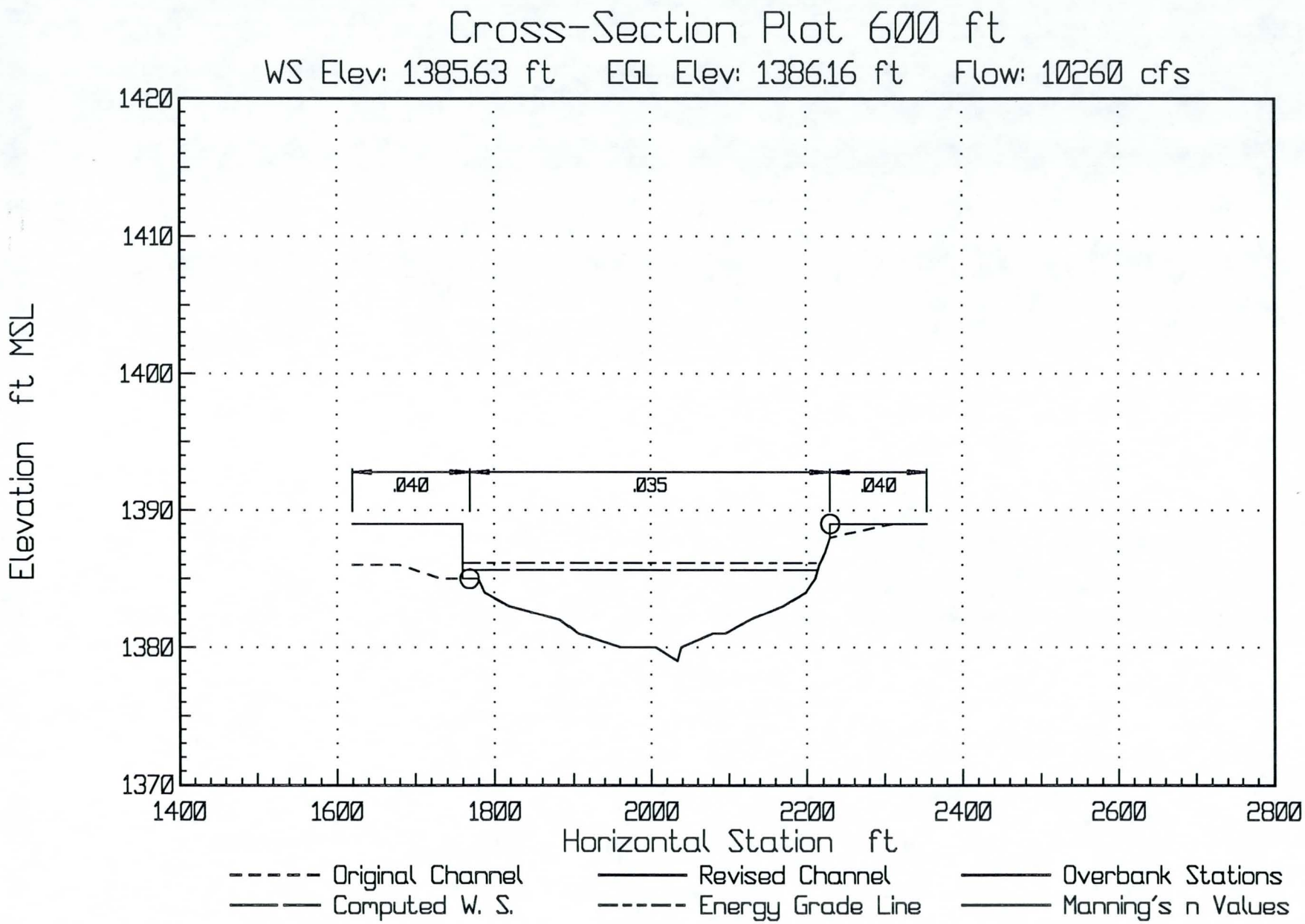
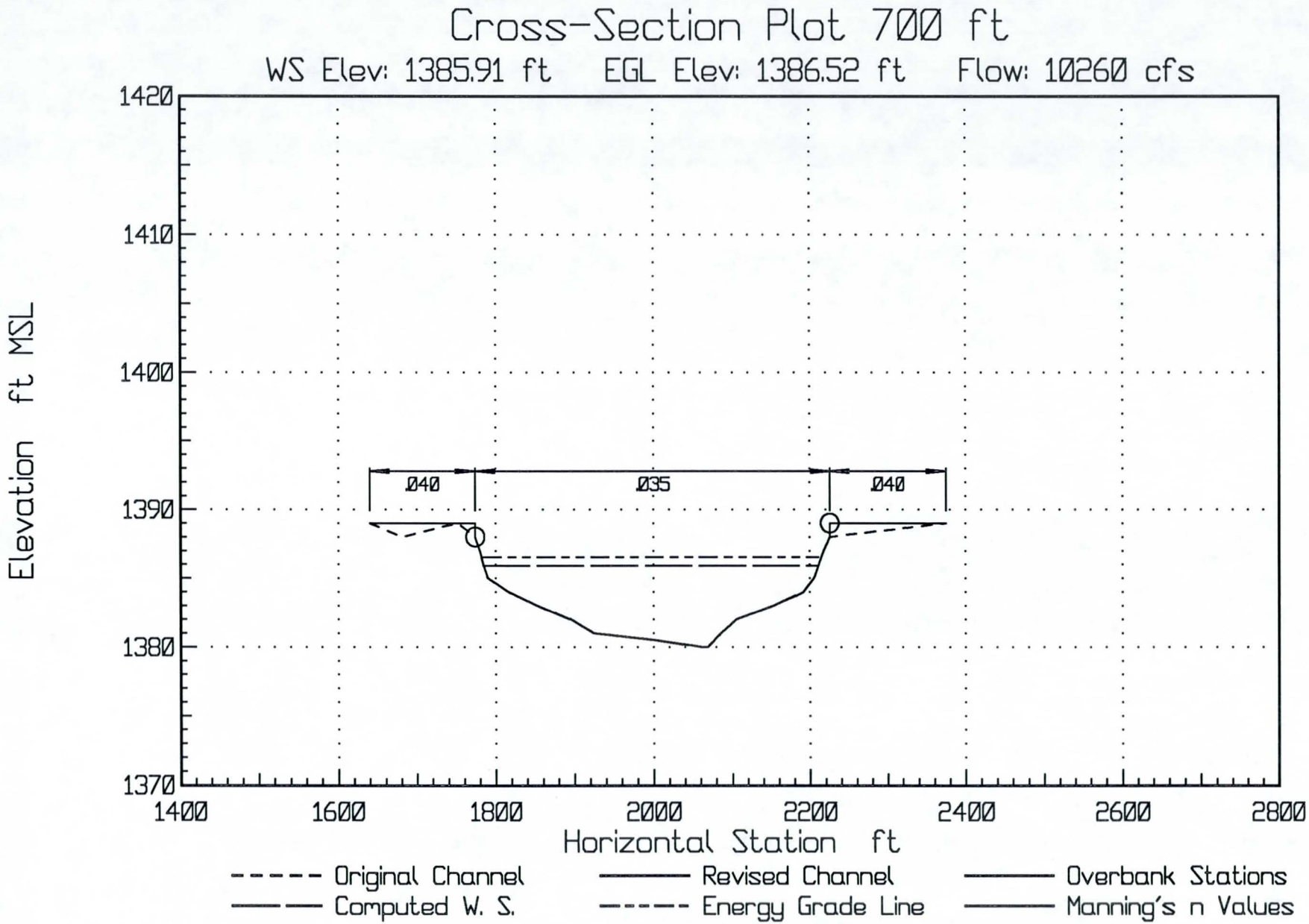
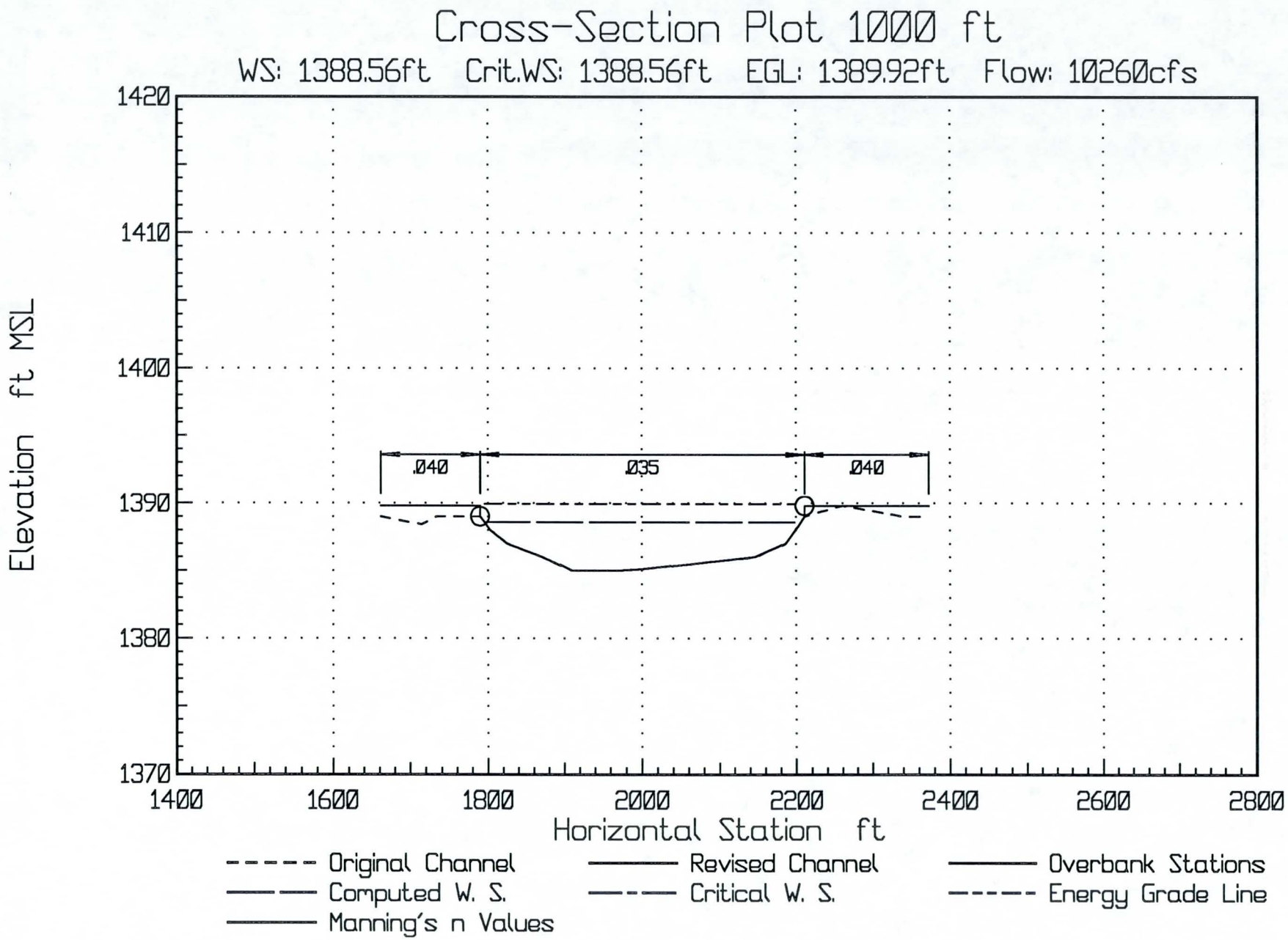
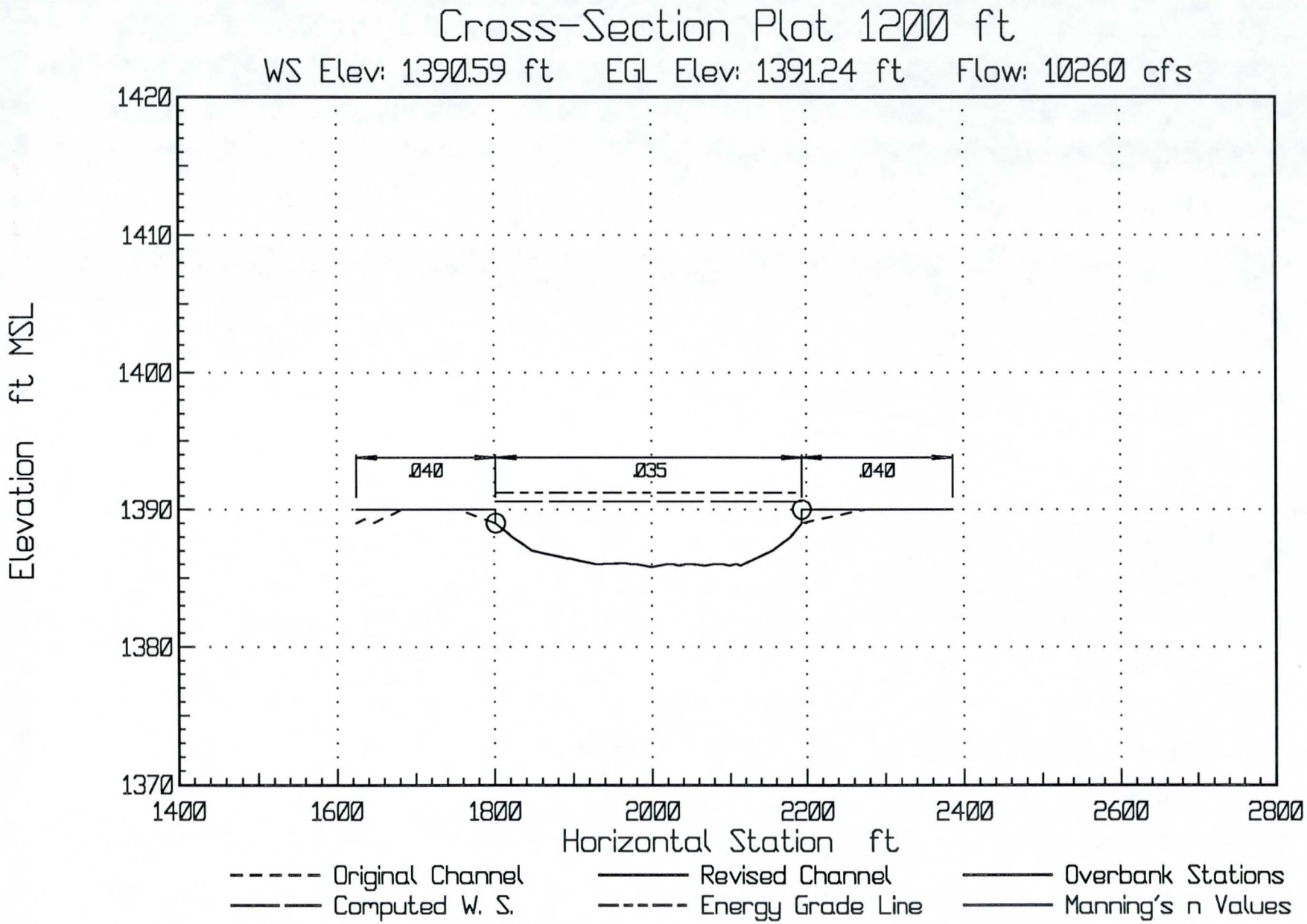
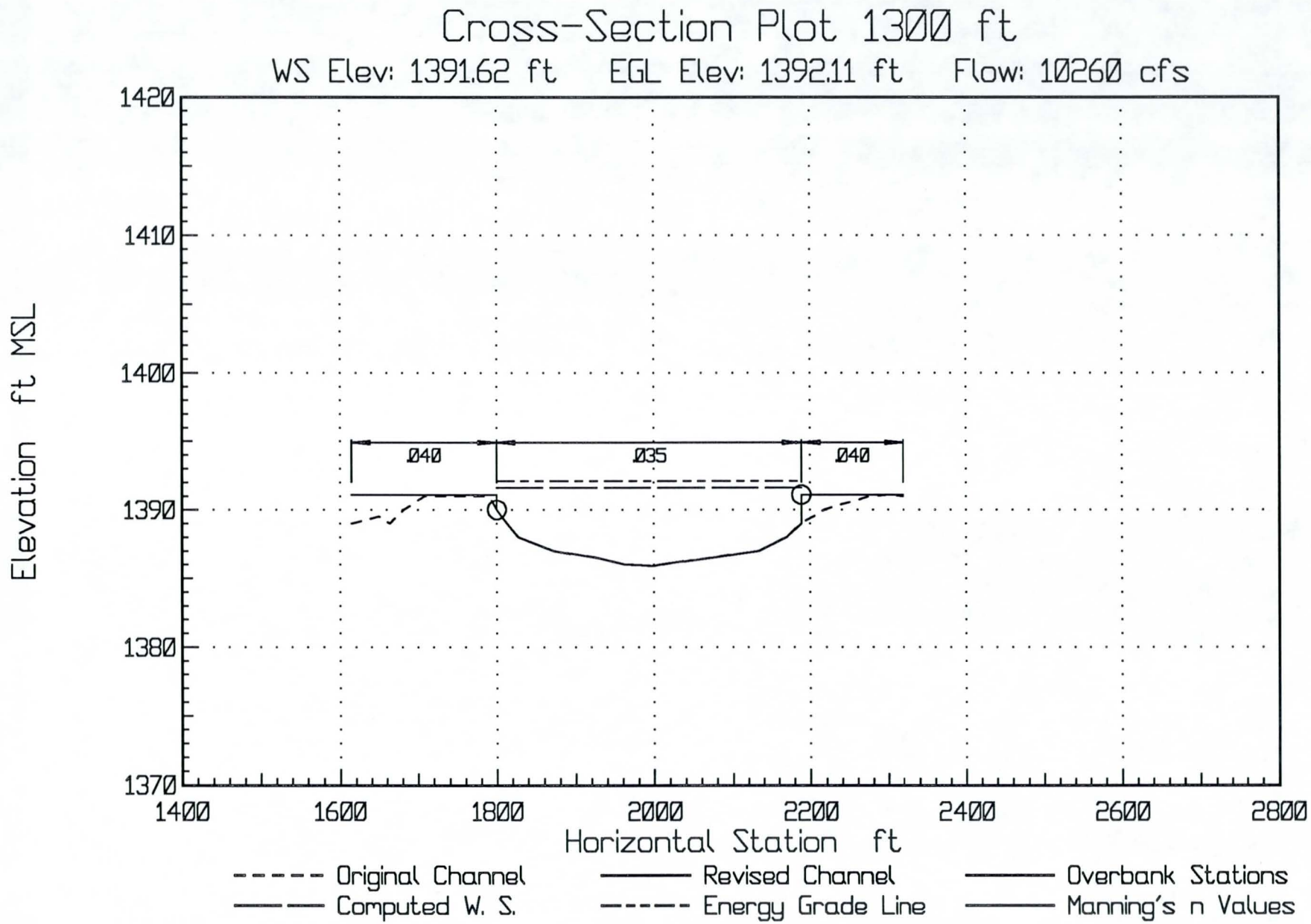
WS Elev: 1385.48 ft
EGL Elev: 1385.87 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

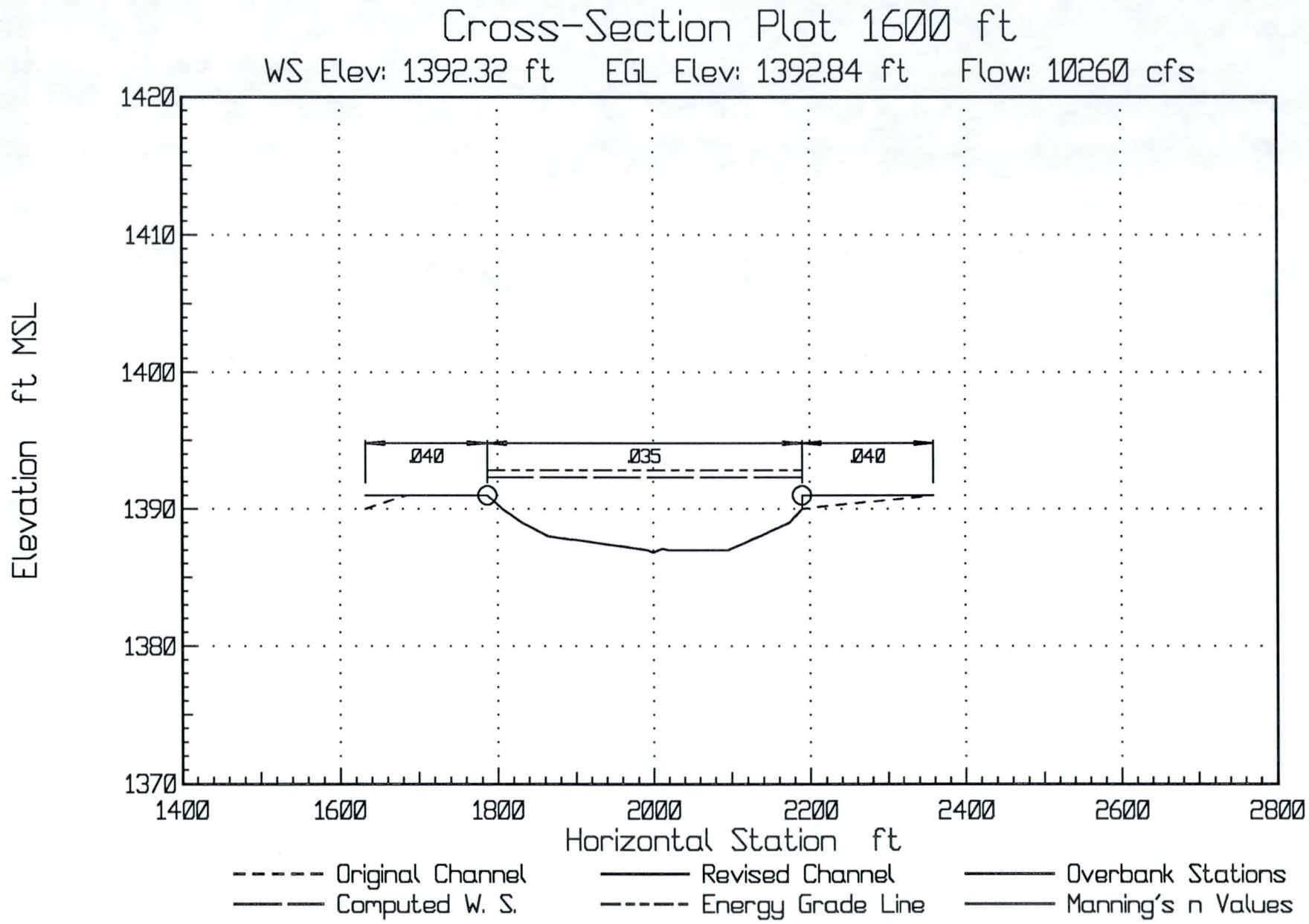

Cross-Section Plot 600 ft
WS Elev: 1385.63 ft
EGL Elev: 1386.16 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

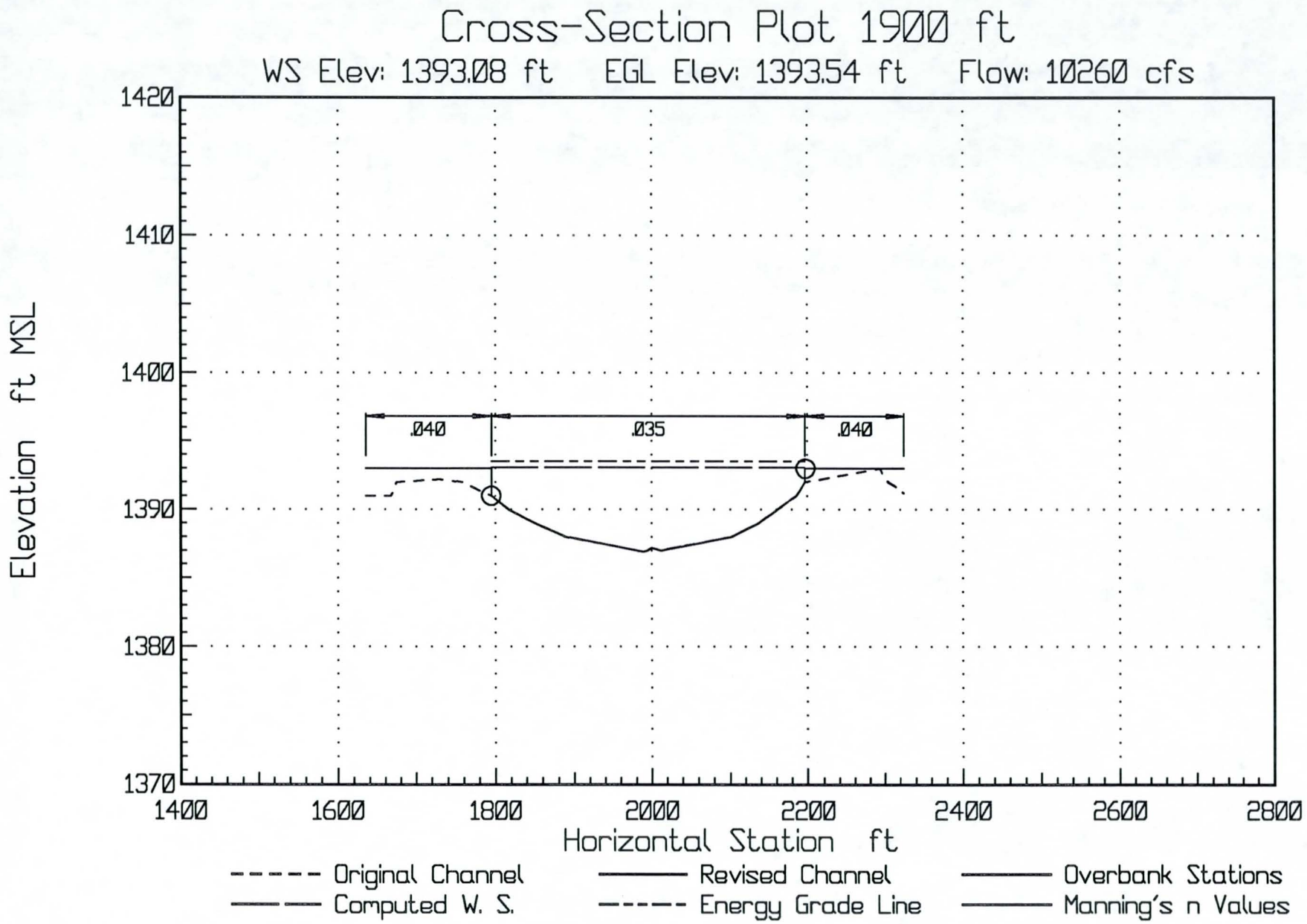

Cross-Section Plot 700 ft
WS Elev: 1385.91 ft
EGL Elev: 1386.52 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
040
035
040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

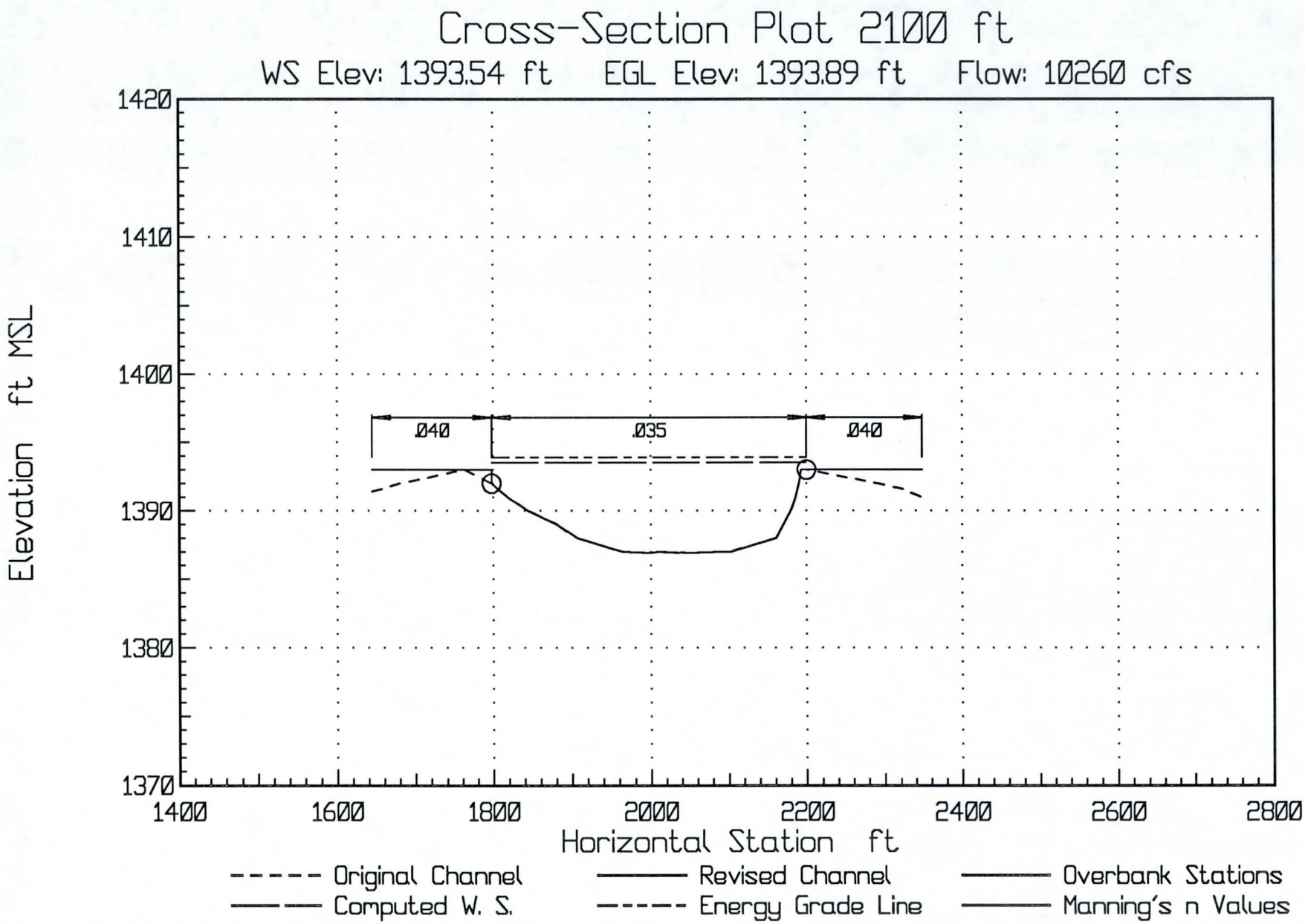

Cross-Section Plot 1000 ft
WS: 1388.56ft Crit.WS: 1388.56ft EGL: 1389.92ft Flow: 10260cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
.040
035
040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values

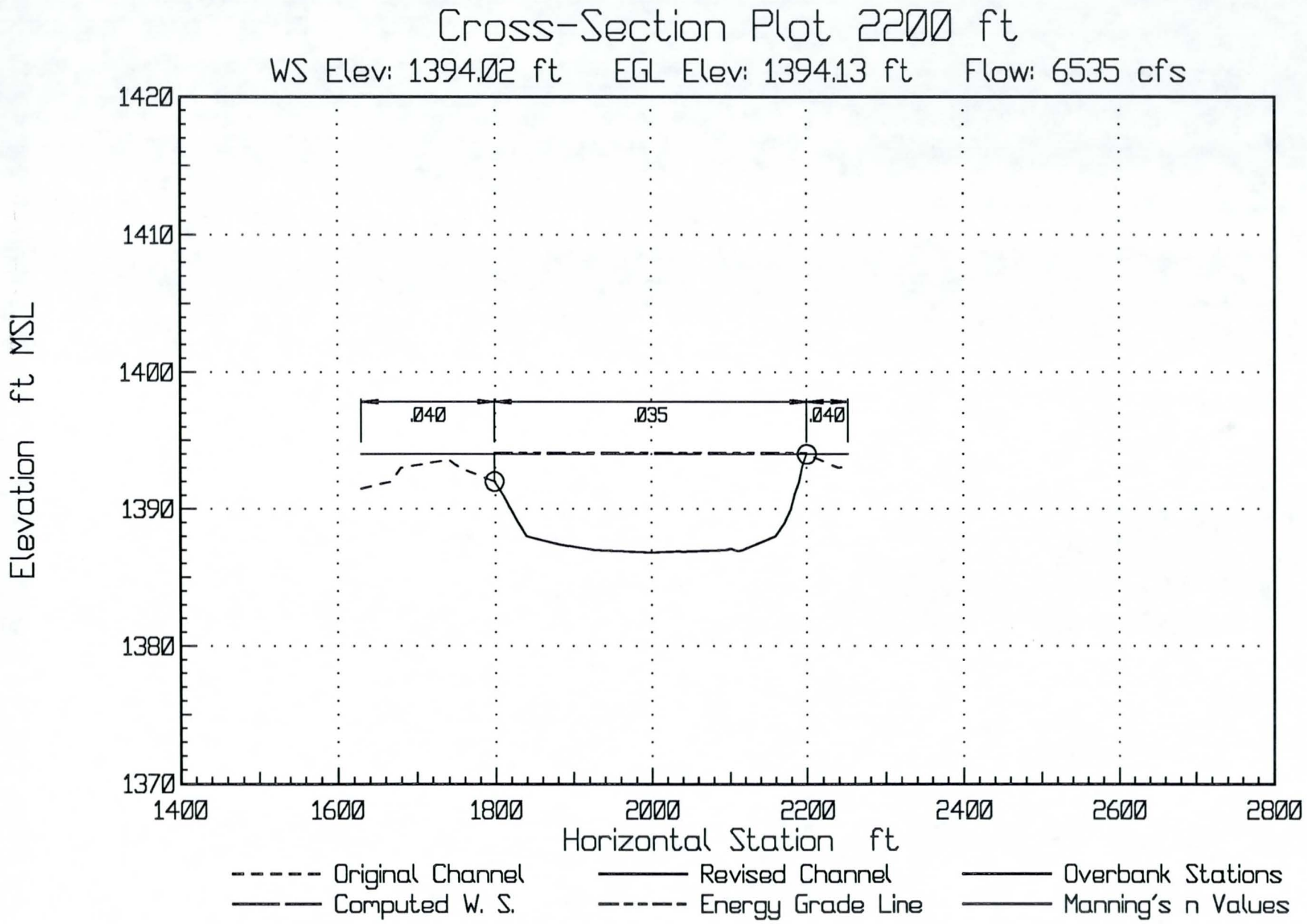

Cross-Section Plot 1200 ft
WS Elev: 1390.59 ft
EGL Elev: 1391.24 ft
Flow: 10260 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

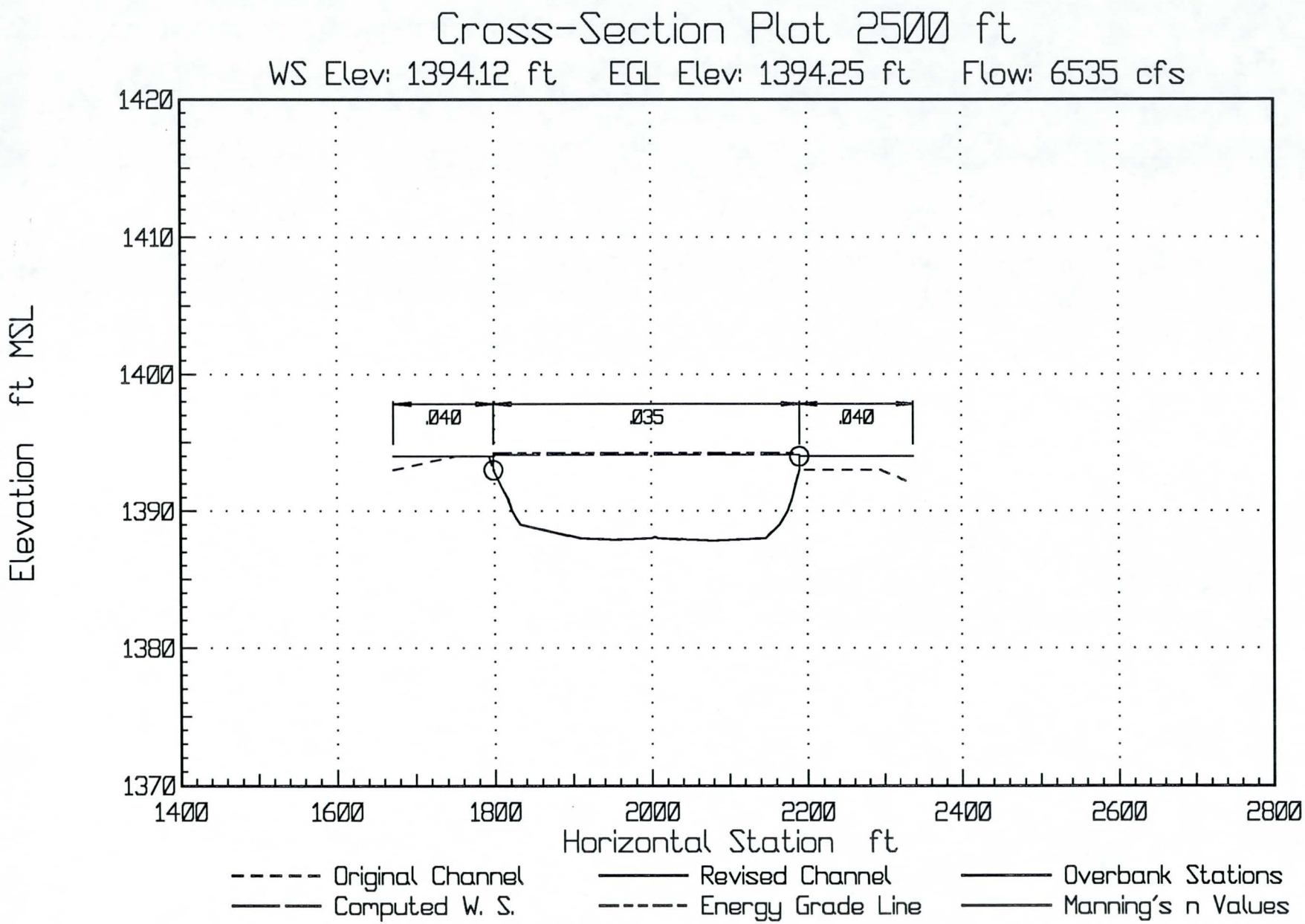

Cross-Section Plot 1300 ft
WS Elev: 1391.62 ft
EGL Elev: 1392.11 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
040
035
040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

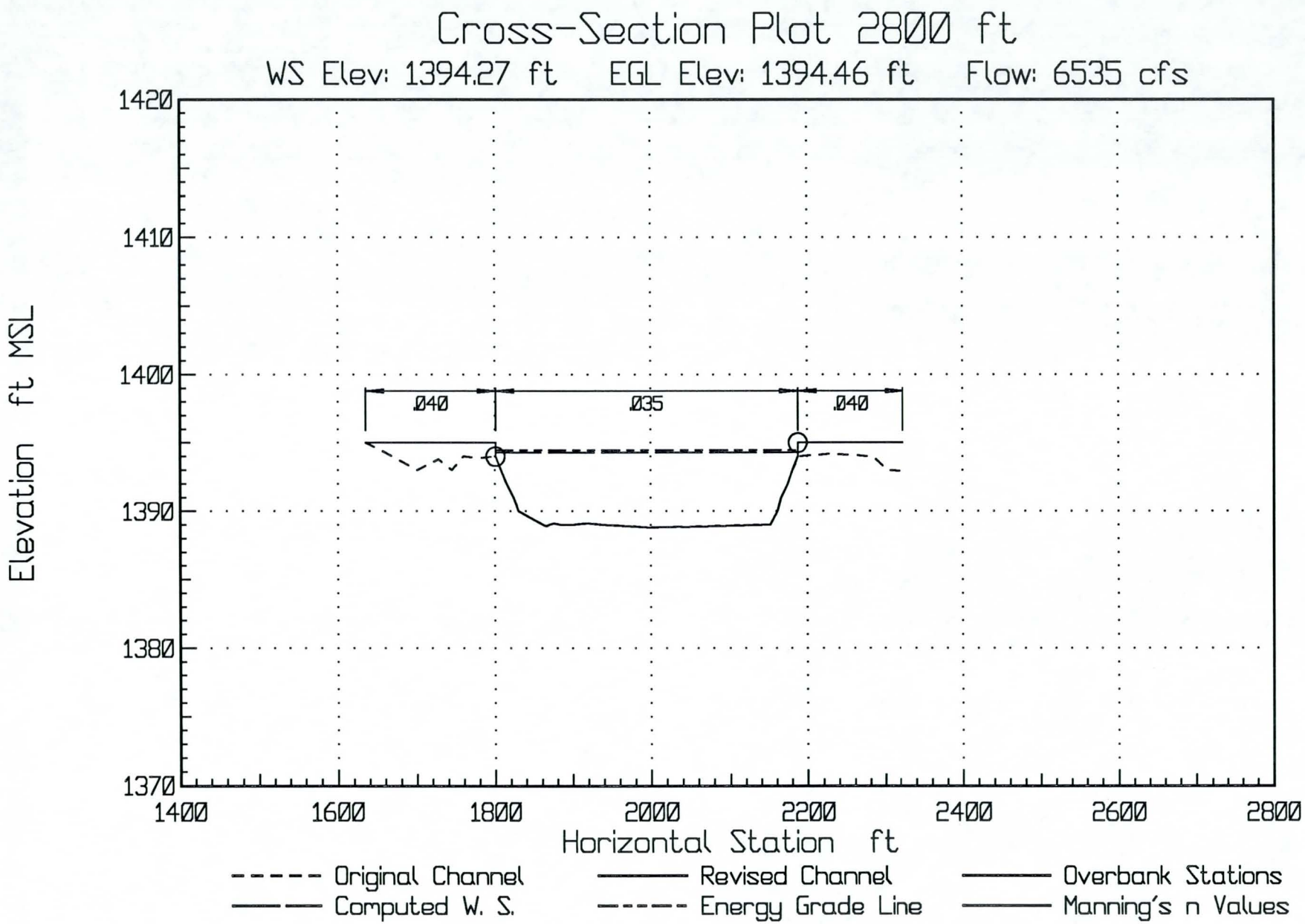

Cross-Section Plot 1600 ft
WS Elev: 1392.32 ft
EGL Elev: 1392.84 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
040
035
040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

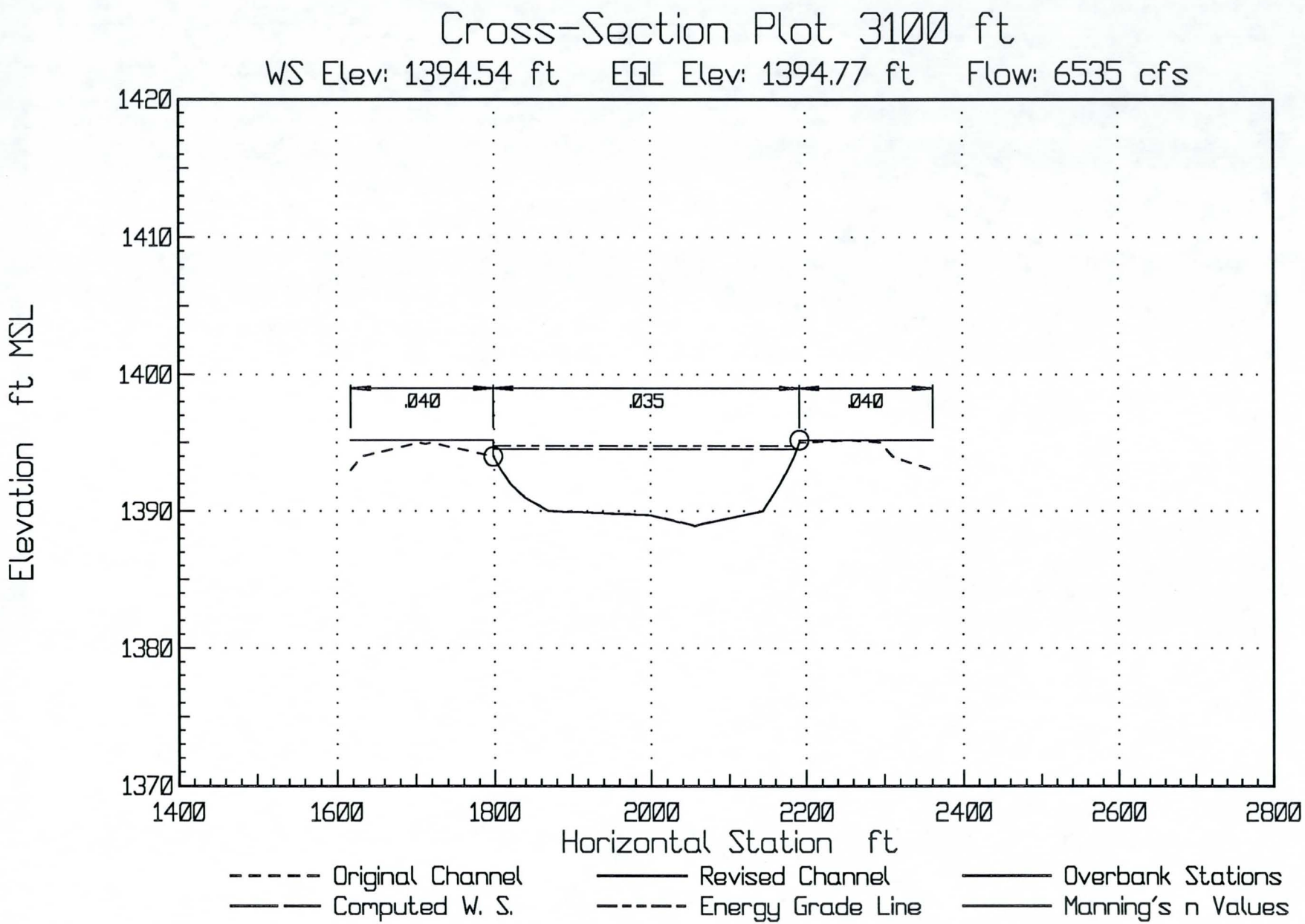

Cross-Section Plot 1900 ft
WS Elev: 1393.08 ft
EGL Elev: 1393.54 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

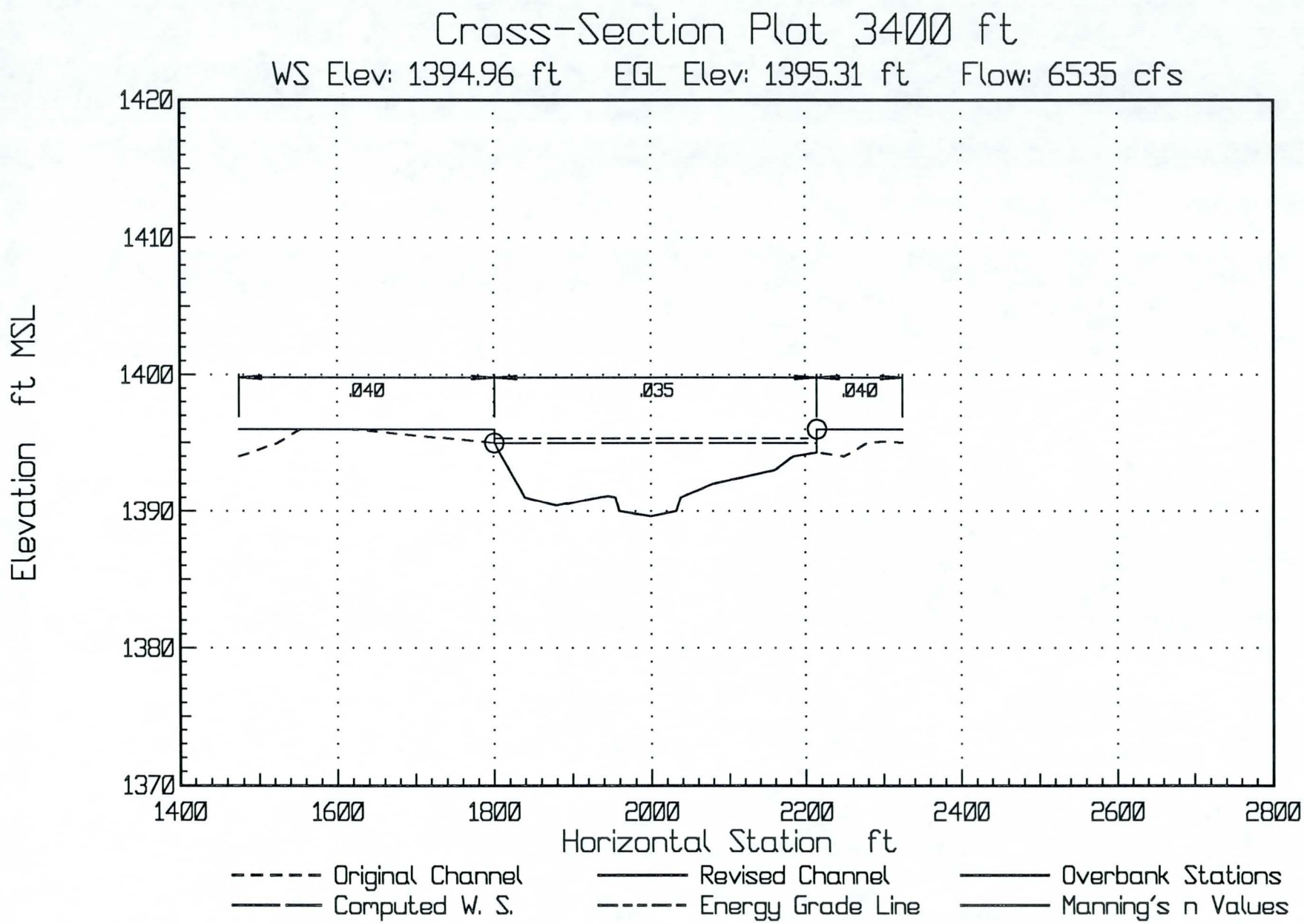

Cross-Section Plot 2100 ft
WS Elev: 1393.54 ft
EGL Elev: 1393.89 ft
Flow: 10260 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
.040
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

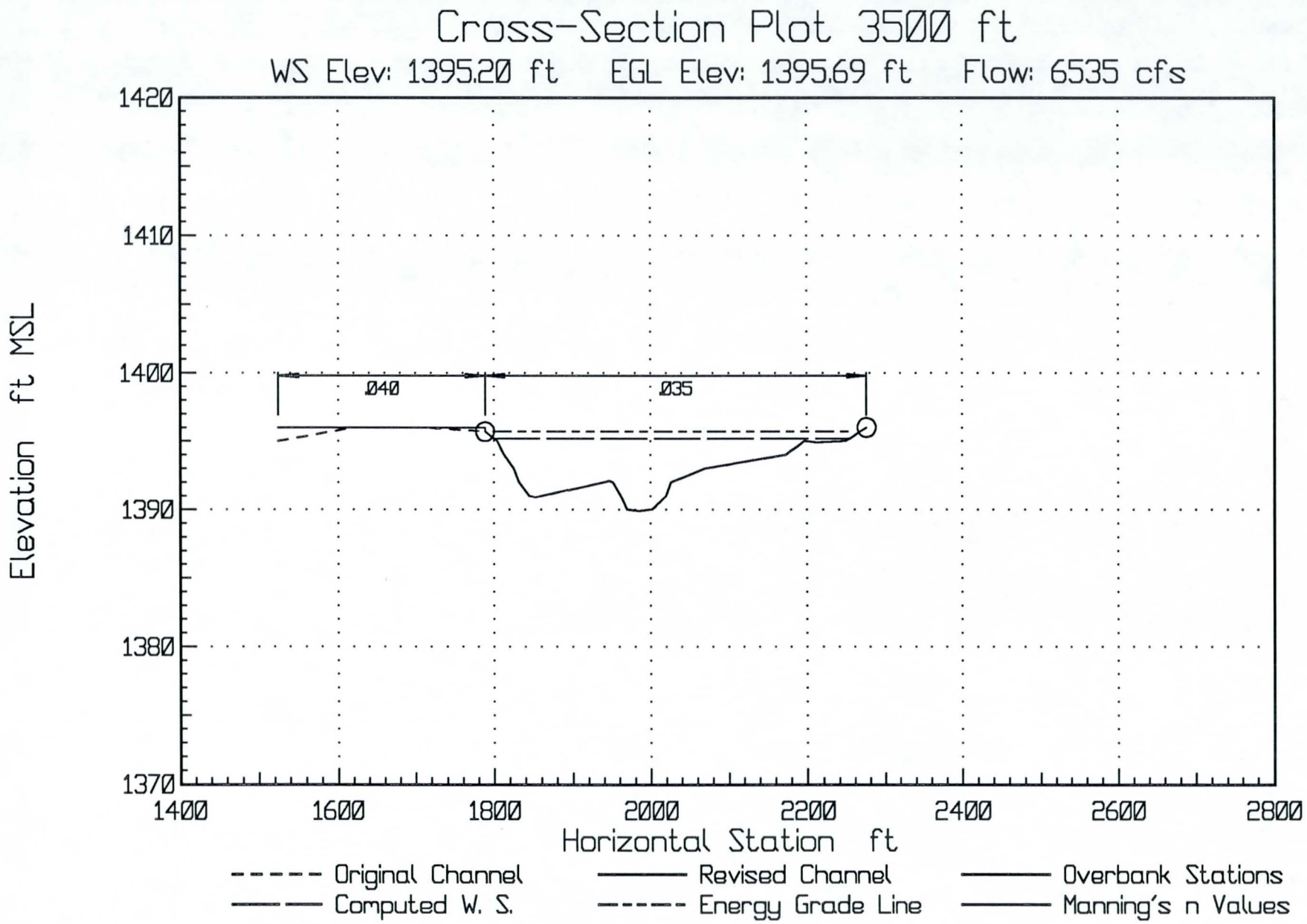

Cross-Section Plot 2200 ft
WS Elev: 1394.02 ft
EGL Elev: 1394.13 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

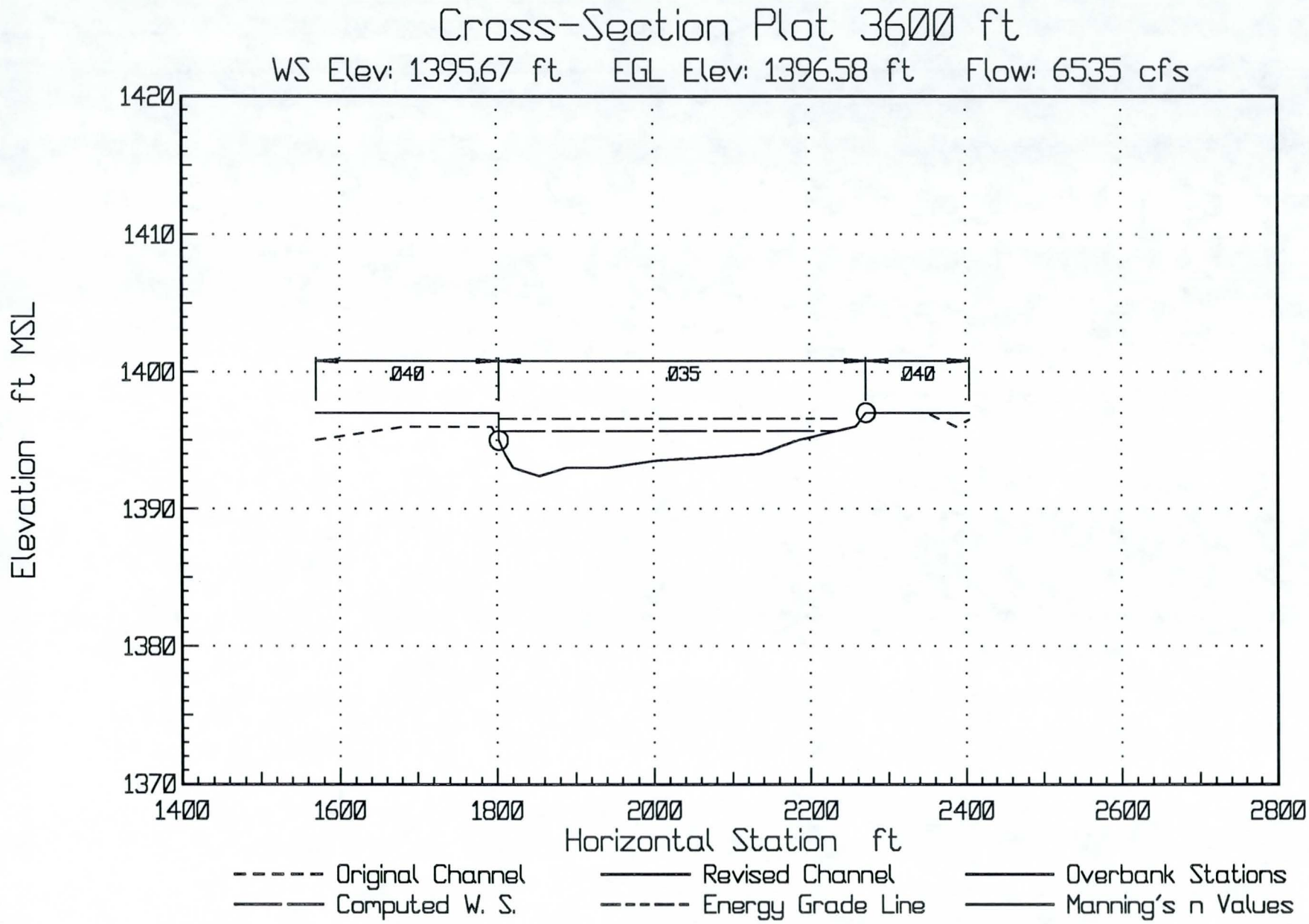

Cross-Section Plot 2500 ft
WS Elev: 1394.12 ft
EGL Elev: 1394.25 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

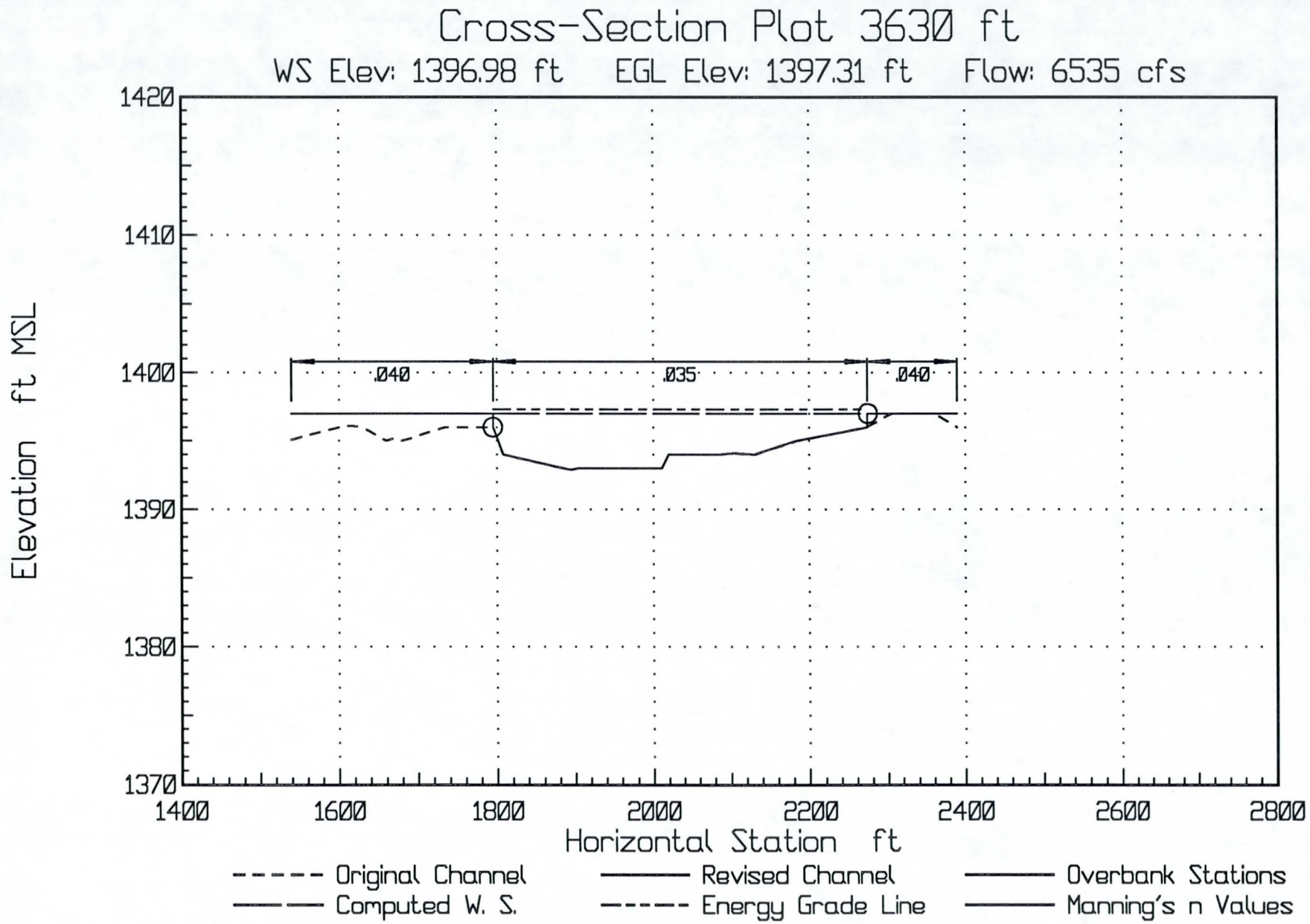

Cross-Section Plot 2800 ft
WS Elev: 1394.27 ft
EGL Elev: 1394.46 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

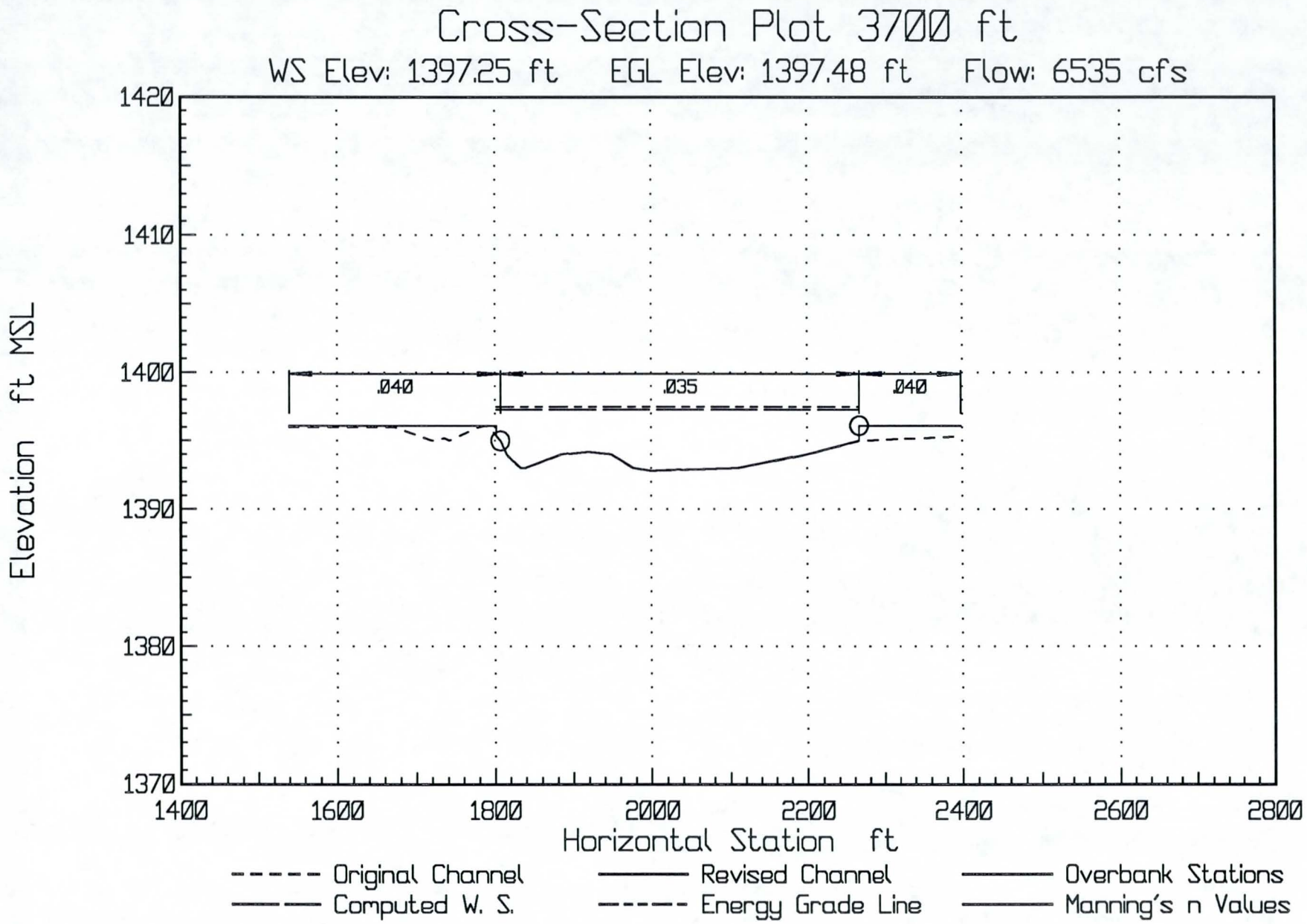

Cross-Section Plot 3100 ft
WS Elev: 1394.54 ft
EGL Elev: 1394.77 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

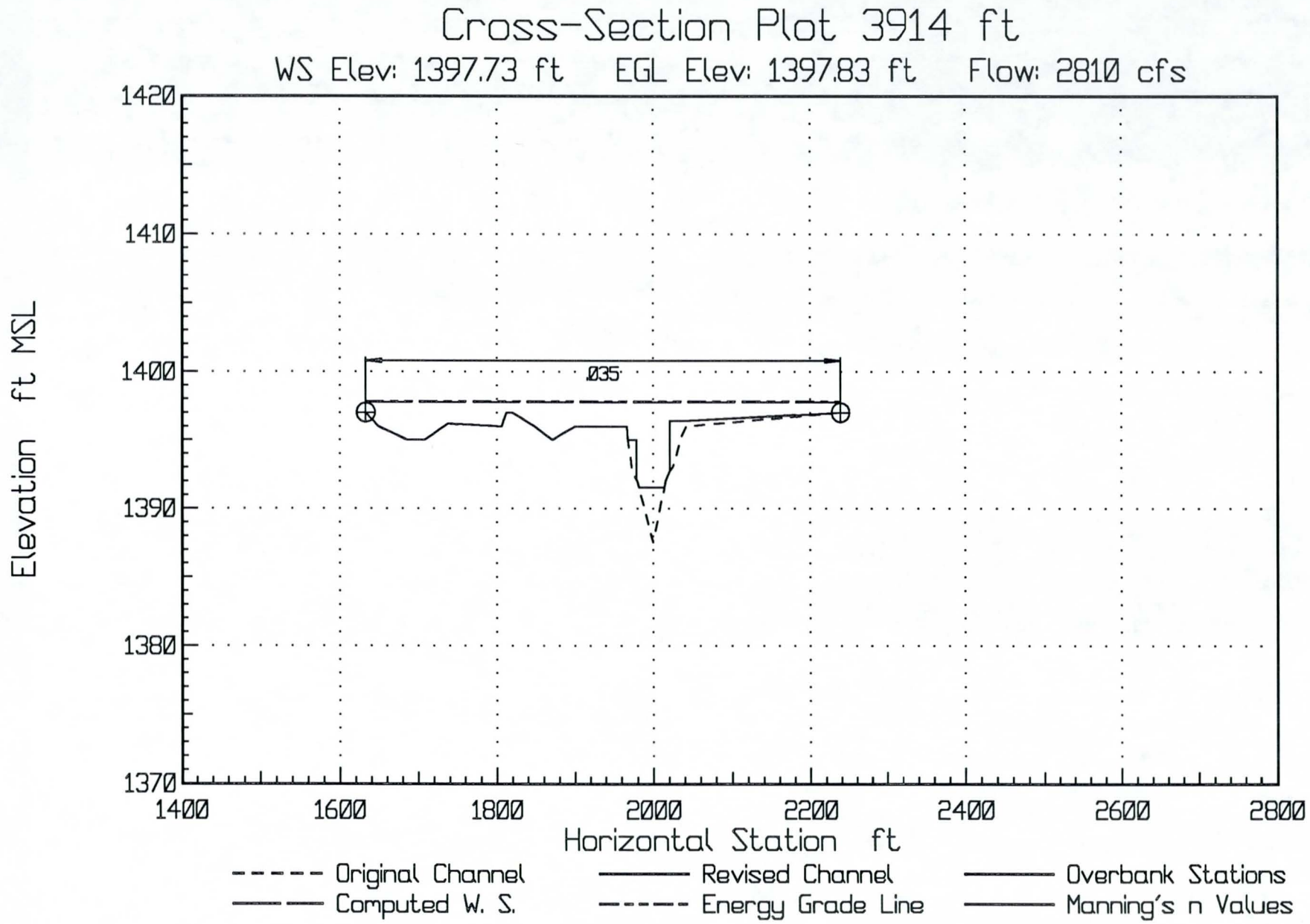

Cross-Section Plot 3400 ft
WS Elev: 1394.96 ft
EGL Elev: 1395.31 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

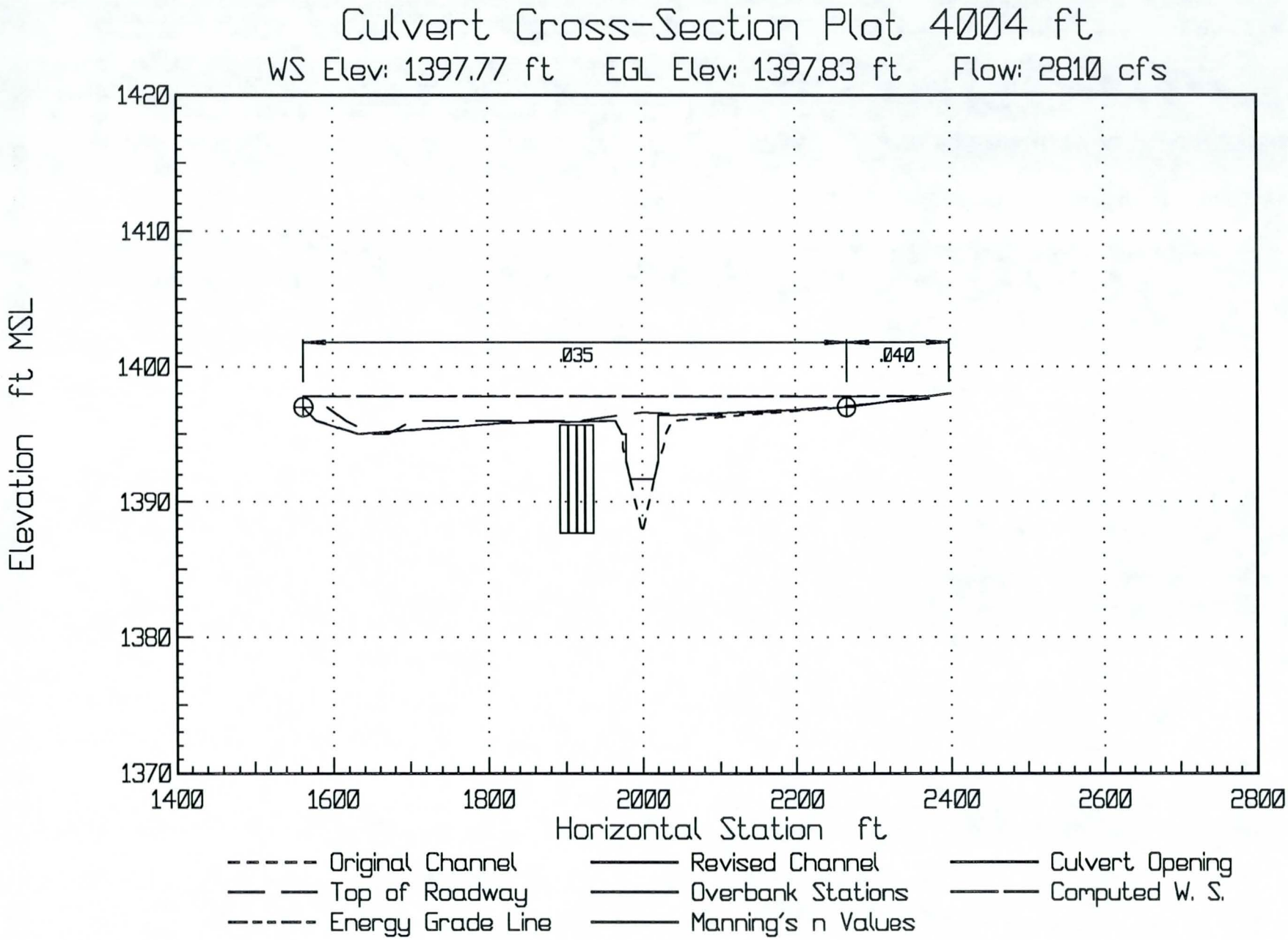

Cross-Section Plot 3500 ft
WS Elev: 1395.20 ft
EGL Elev: 1395.69 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
040
035
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

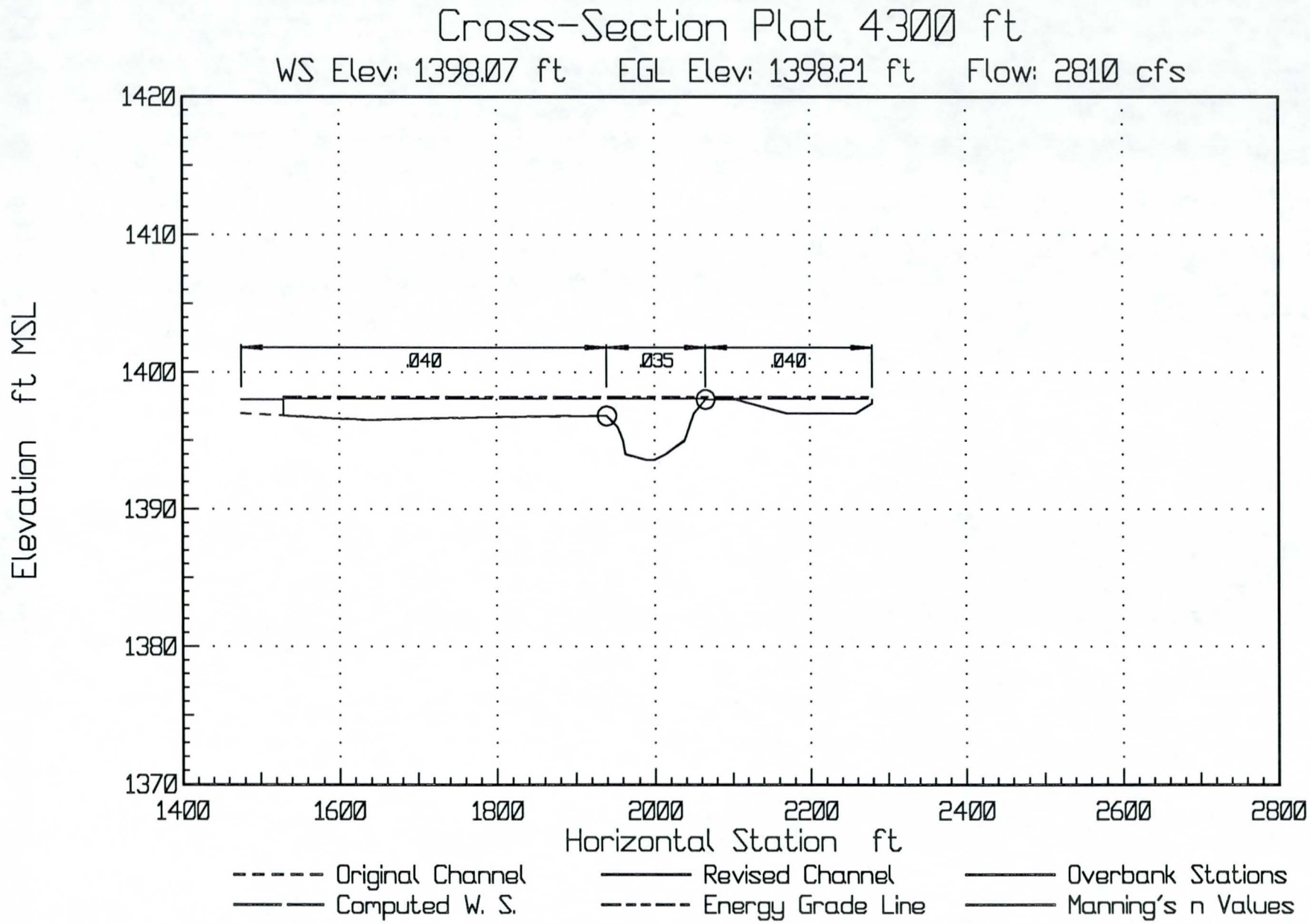

Cross-Section Plot 3600 ft
WS Elev: 1395.67 ft
EGL Elev: 1396.58 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

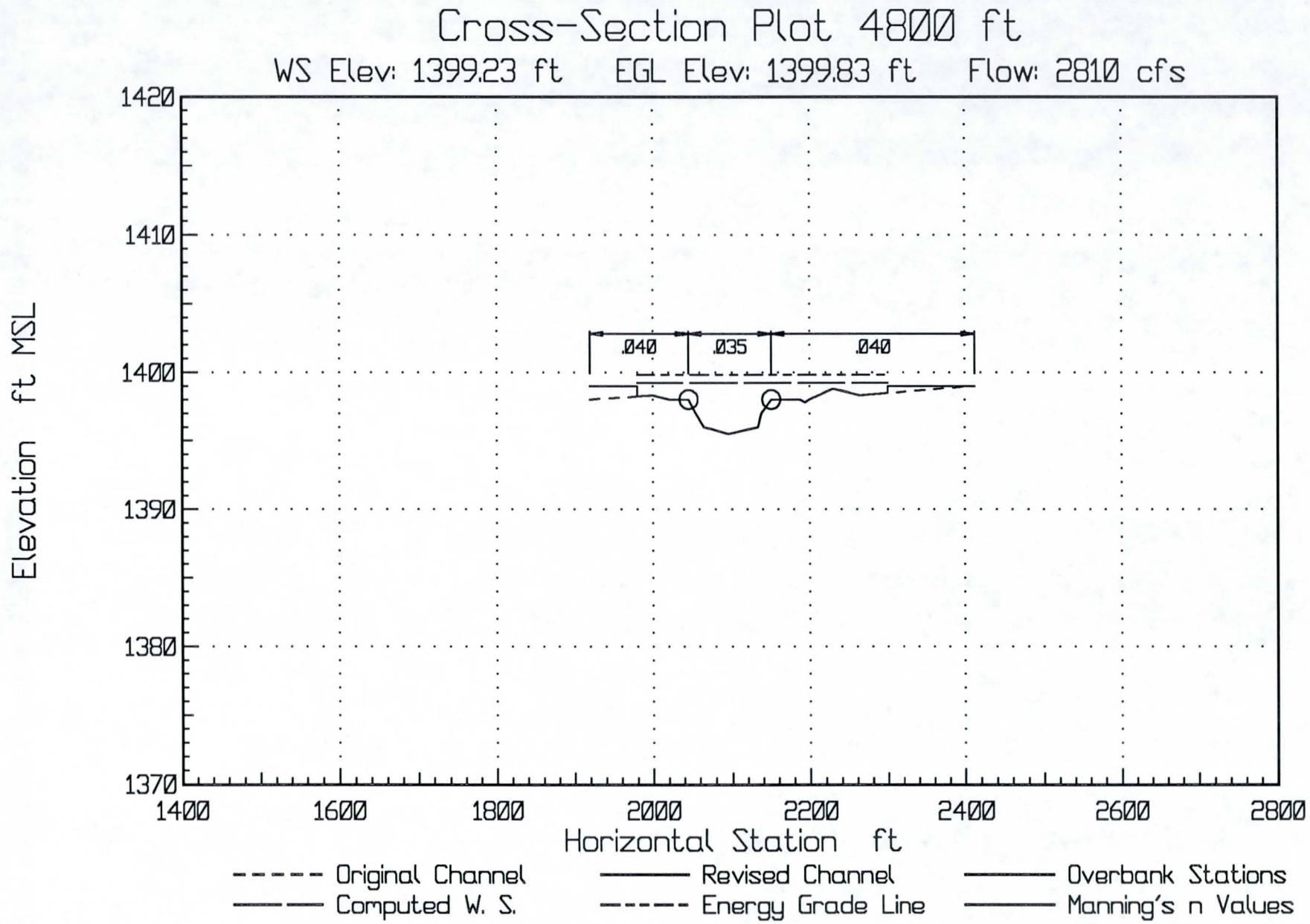

Cross-Section Plot 3630 ft
WS Elev: 1396.98 ft
EGL Elev: 1397.31 ft
Flow: 6535 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

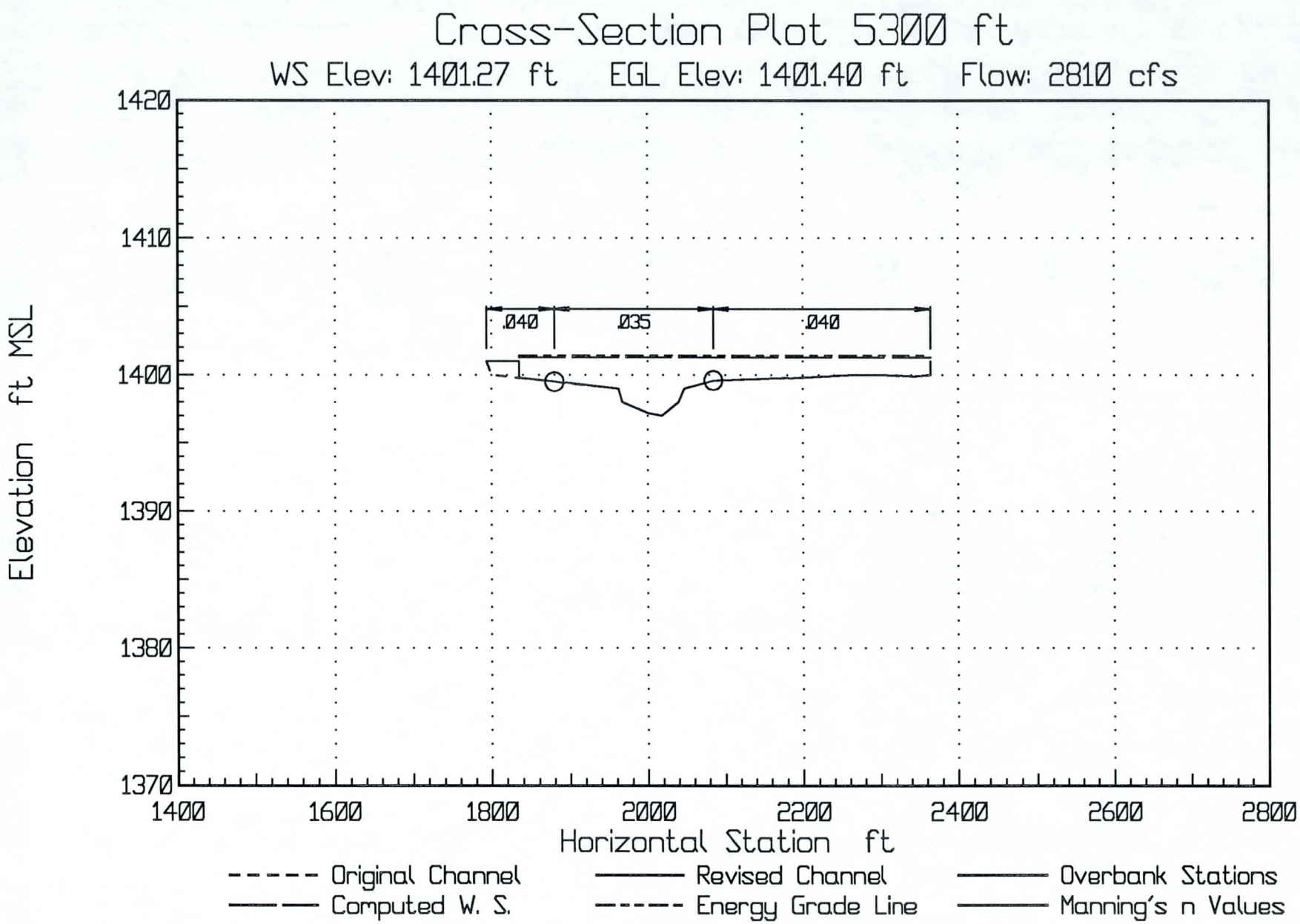

Cross-Section Plot 3700 ft
WS Elev: 1397.25 ft
EGL Elev: 1397.48 ft
Flow: 6535 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

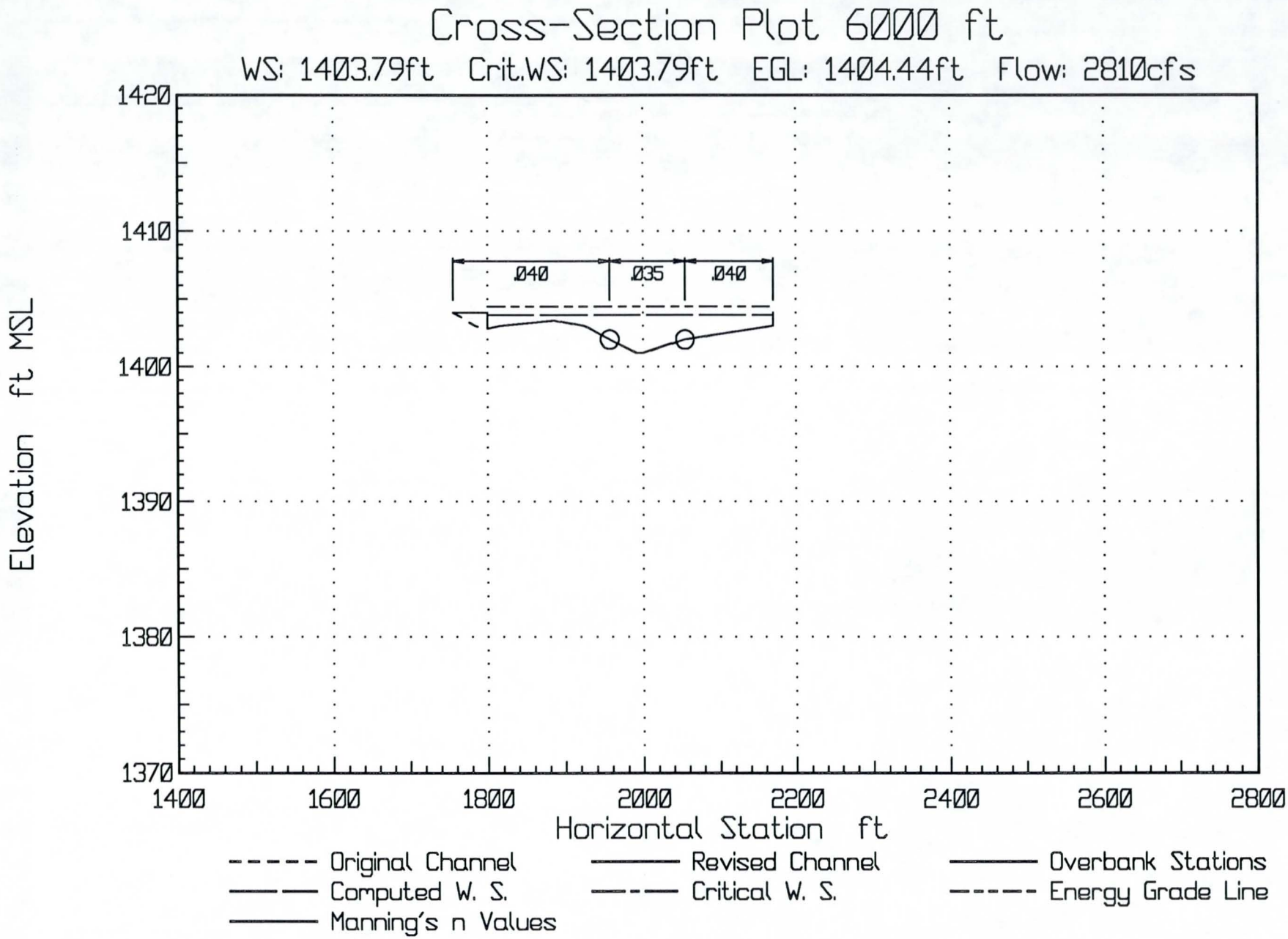

Cross-Section Plot 3914 ft
WS Elev: 1397.73 ft
EGL Elev: 1397.83 ft
Flow: 2810 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.035
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

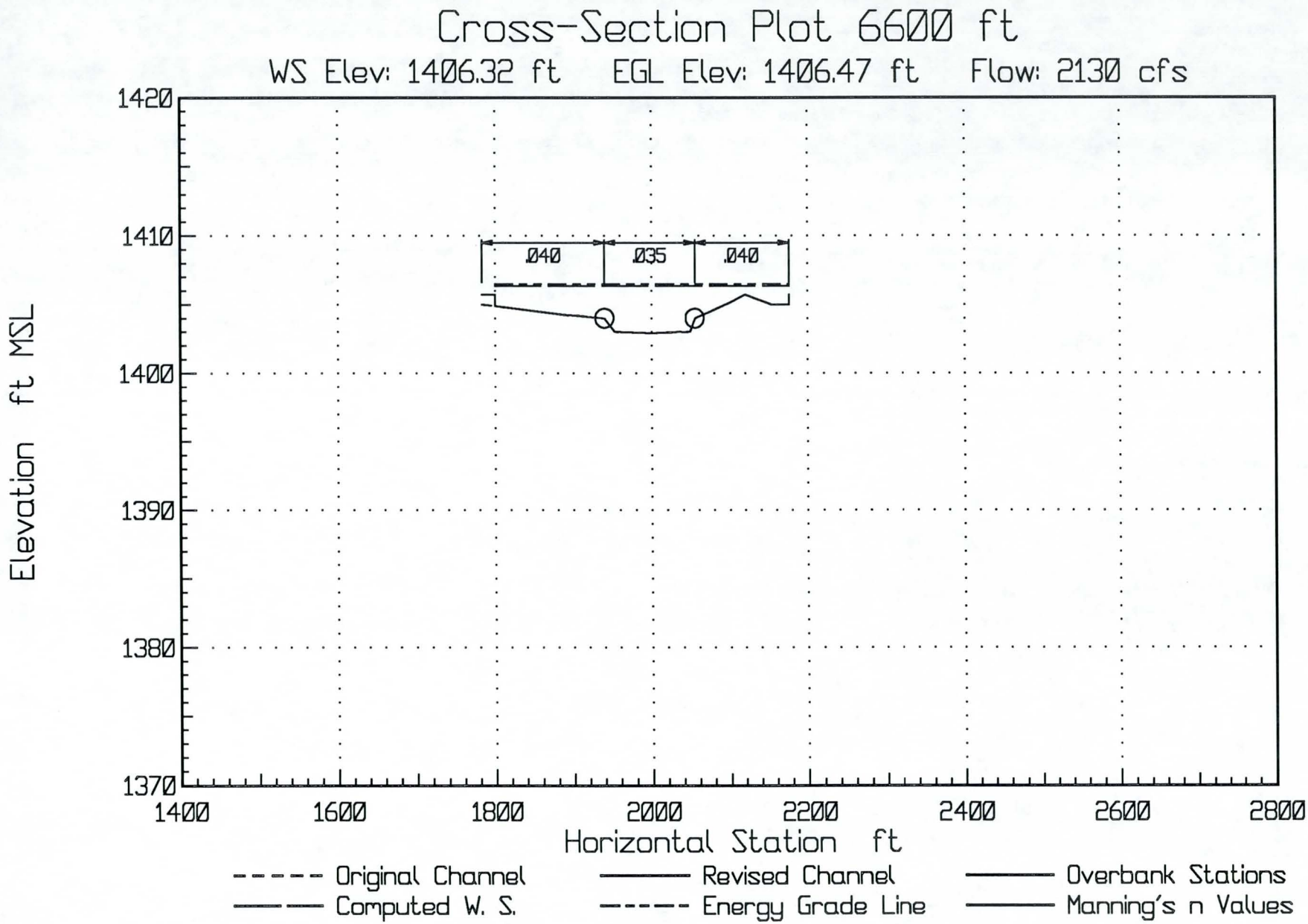

Culvert Cross-Section Plot 4004 ft
WS Elev: 1397.77 ft
EGL Elev: 1397.83 ft
Flow: 2810 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Top of Roadway
Energy Grade Line
Revised Channel
Overbank Stations
Manning's n Values
Culvert Opening
Computed W. S.

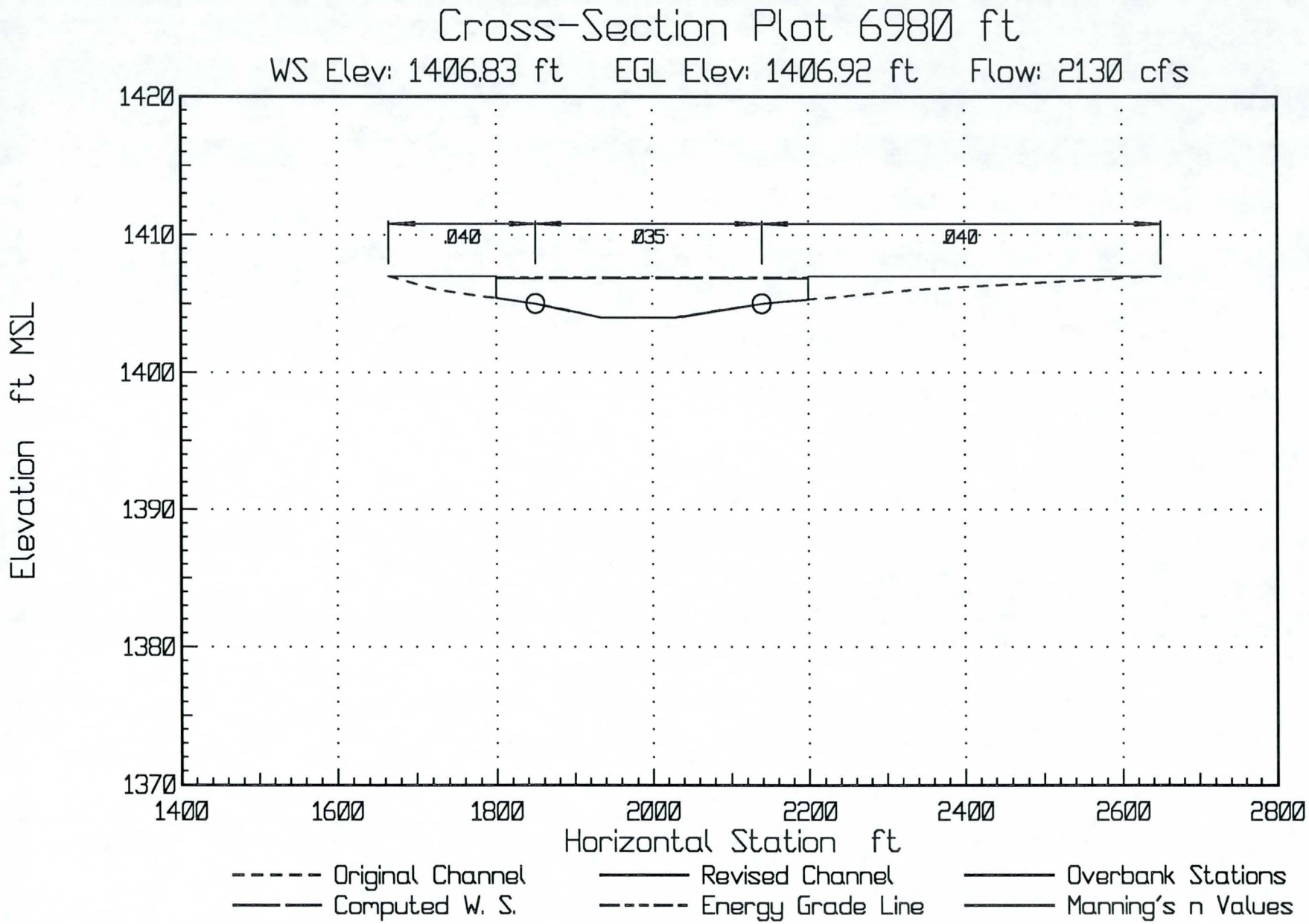

Cross-Section Plot 4300 ft
WS Elev: 1398.07 ft
EGL Elev: 1398.21 ft
Flow: 2810 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

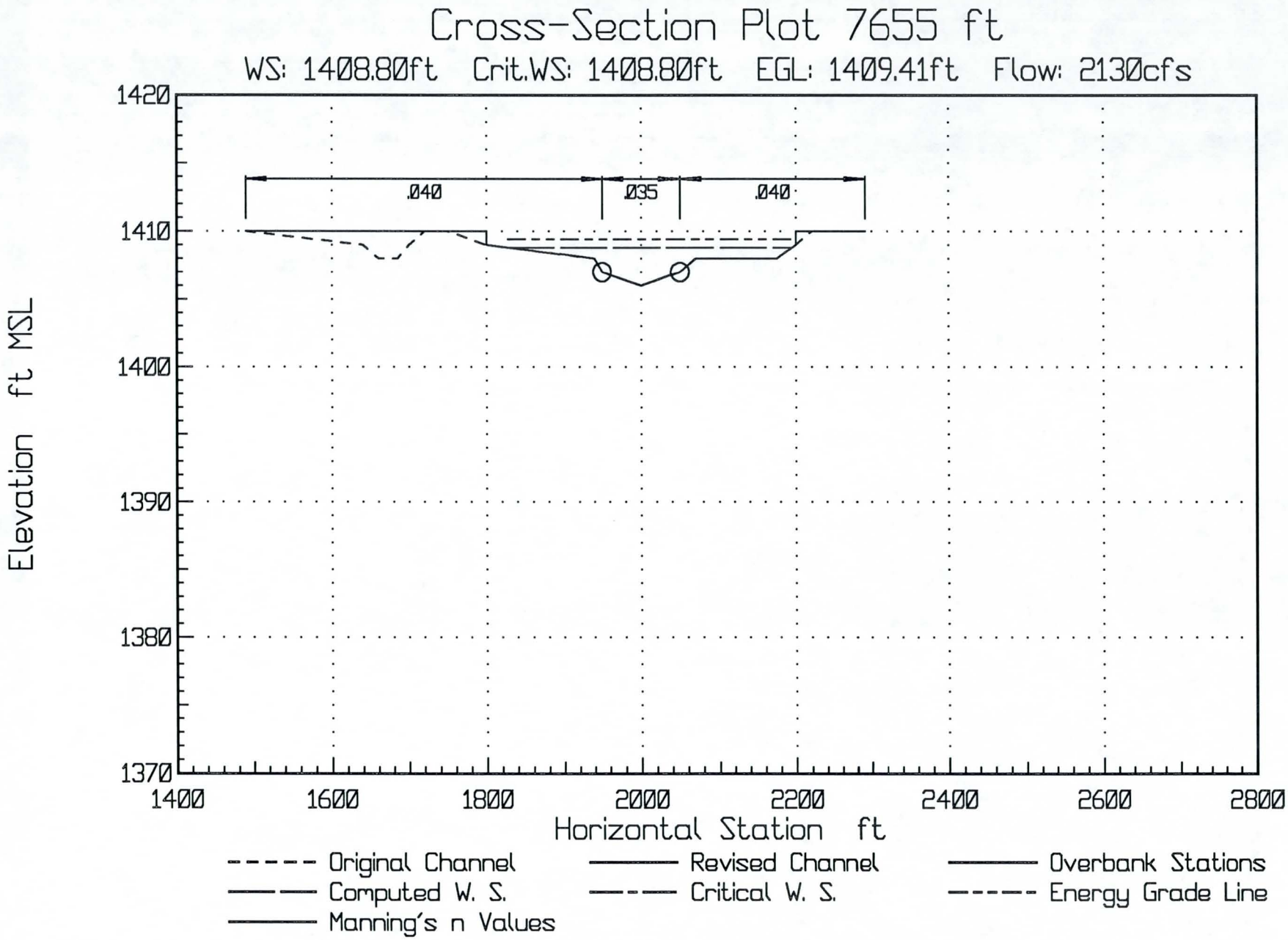

Cross-Section Plot 4800 ft
WS Elev: 1399.23 ft
EGL Elev: 1399.83 ft
Flow: 2810 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

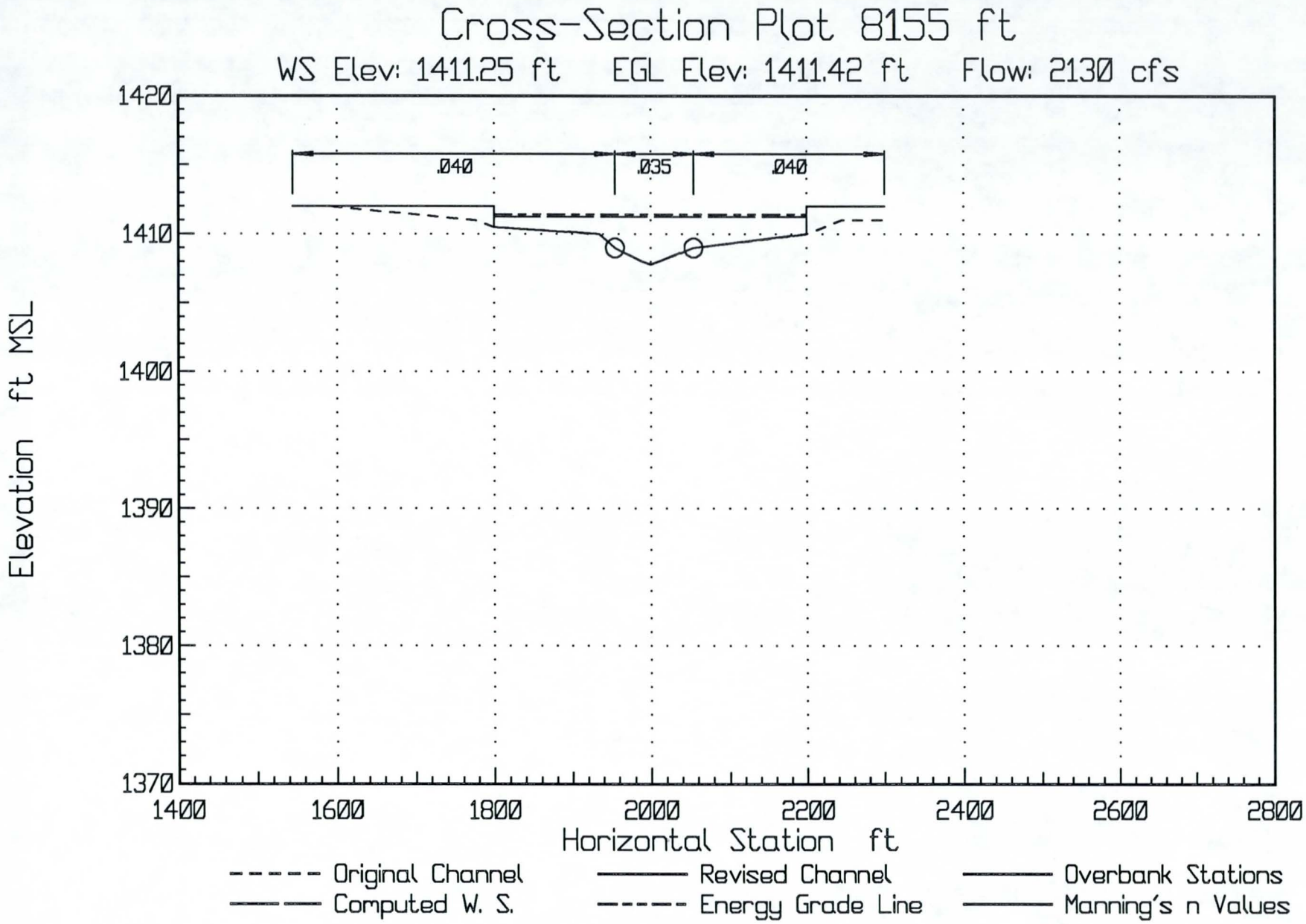

Cross-Section Plot 5300 ft
WS Elev: 1401.27 ft
EGL Elev: 1401.40 ft
Flow: 2810 cfs
1420
1410
1400
1390
1380
1370
Elevation ft MSL
.040
.035
.040
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 6000 ft
WS: 1403.79ft Crit.WS: 1403.79ft EGL: 1404.44ft Flow: 2810cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
.040
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 6600 ft
WS Elev: 1406.32 ft
EGL Elev: 1406.47 ft
Flow: 2130 cfs
Elevation ft MSL
1420
1410
1400
1390
1380
1370
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
.040
.035
.040
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

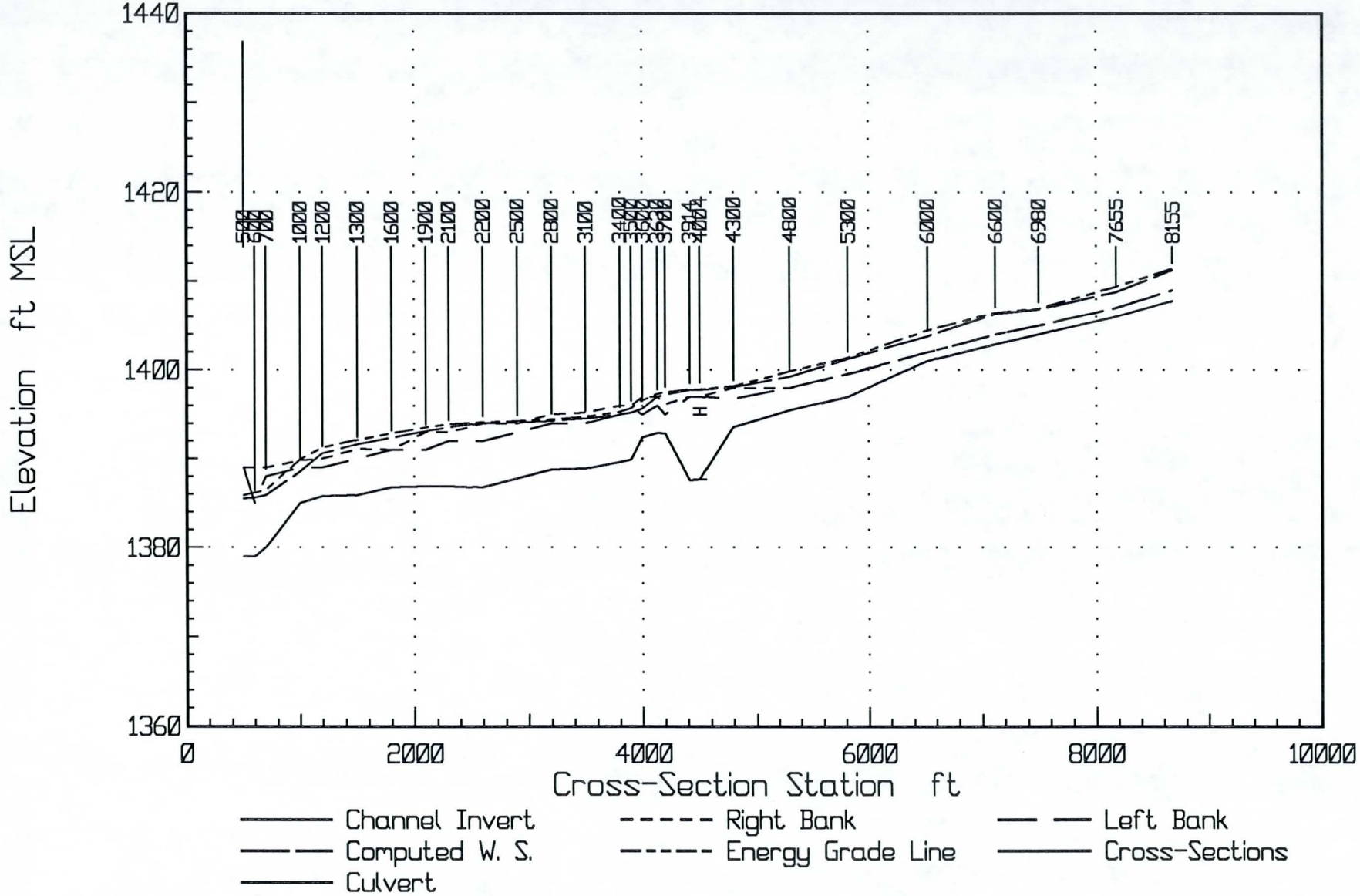

Cross-Section Plot 6980 ft
WS Elev: 1406.83 ft
EGL Elev: 1406.92 ft
Flow: 2130 cfs
.040
.035
.040
1420
1410
1400
1390
1380
1370
Elevation ft MSL
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

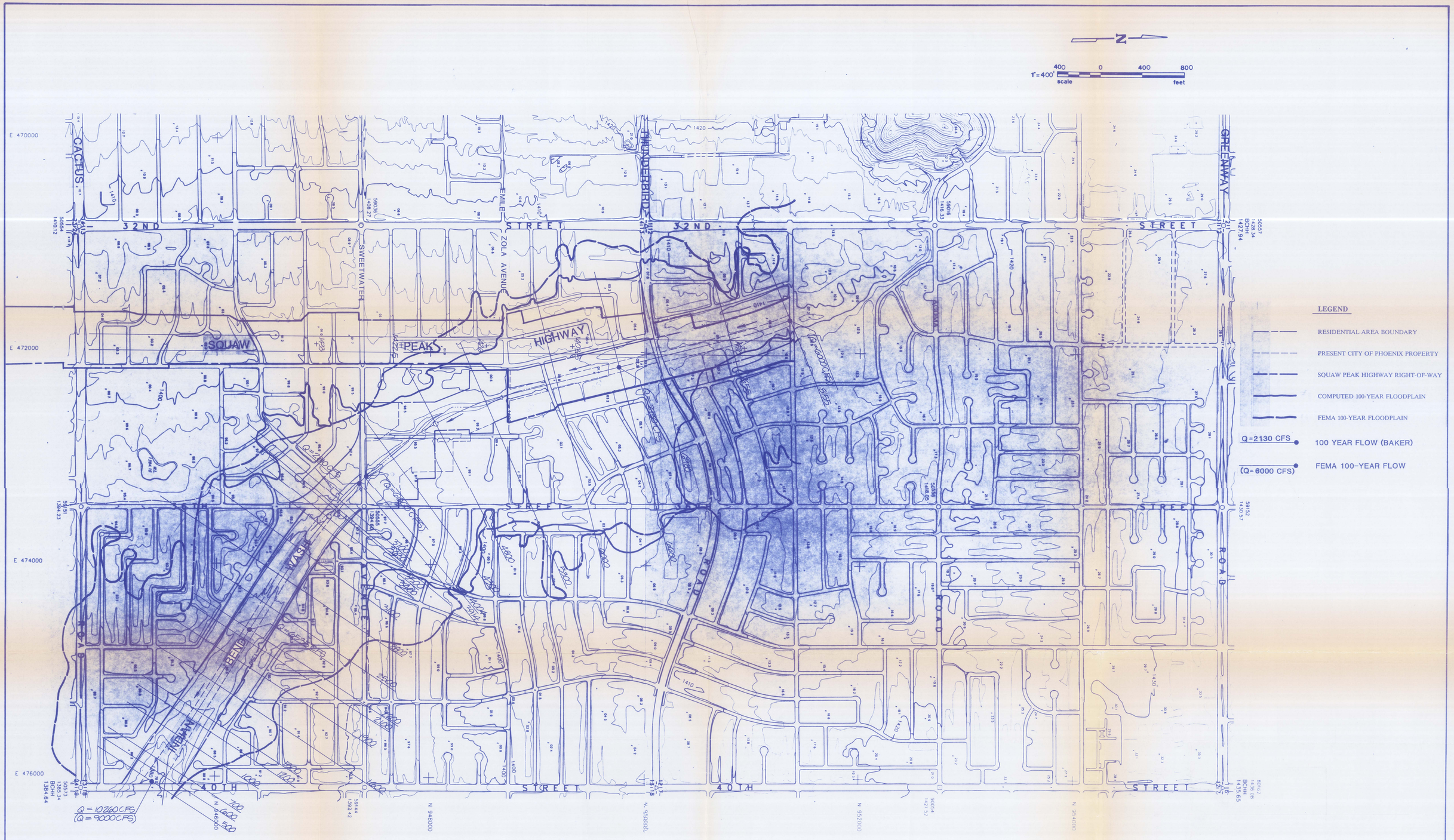

Cross-Section Plot 7655 ft
WS: 1408.80ft Crit.WS: 1408.80ft EGL: 1409.41ft Flow: 2130cfs
.040
.035
.040
1420
1410
1400
1390
1380
1370
Elevation ft MSL
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Critical W. S.
Energy Grade Line
Manning's n Values


Cross-Section Plot 8155 ft
WS Elev: 1411.25 ft
EGL Elev: 1411.42 ft
Flow: 2130 cfs
.040
.035
.040
1420
1410
1400
1390
1380
1370
Elevation ft MSL
1400
1600
1800
2000
2200
2400
2600
2800
Horizontal Station ft
Original Channel
Revised Channel
Overbank Stations
Computed W. S.
Energy Grade Line
Manning's n Values

Water Surface Profile Plot 1

Subcritical Profile Flow 2130-10260 cfs

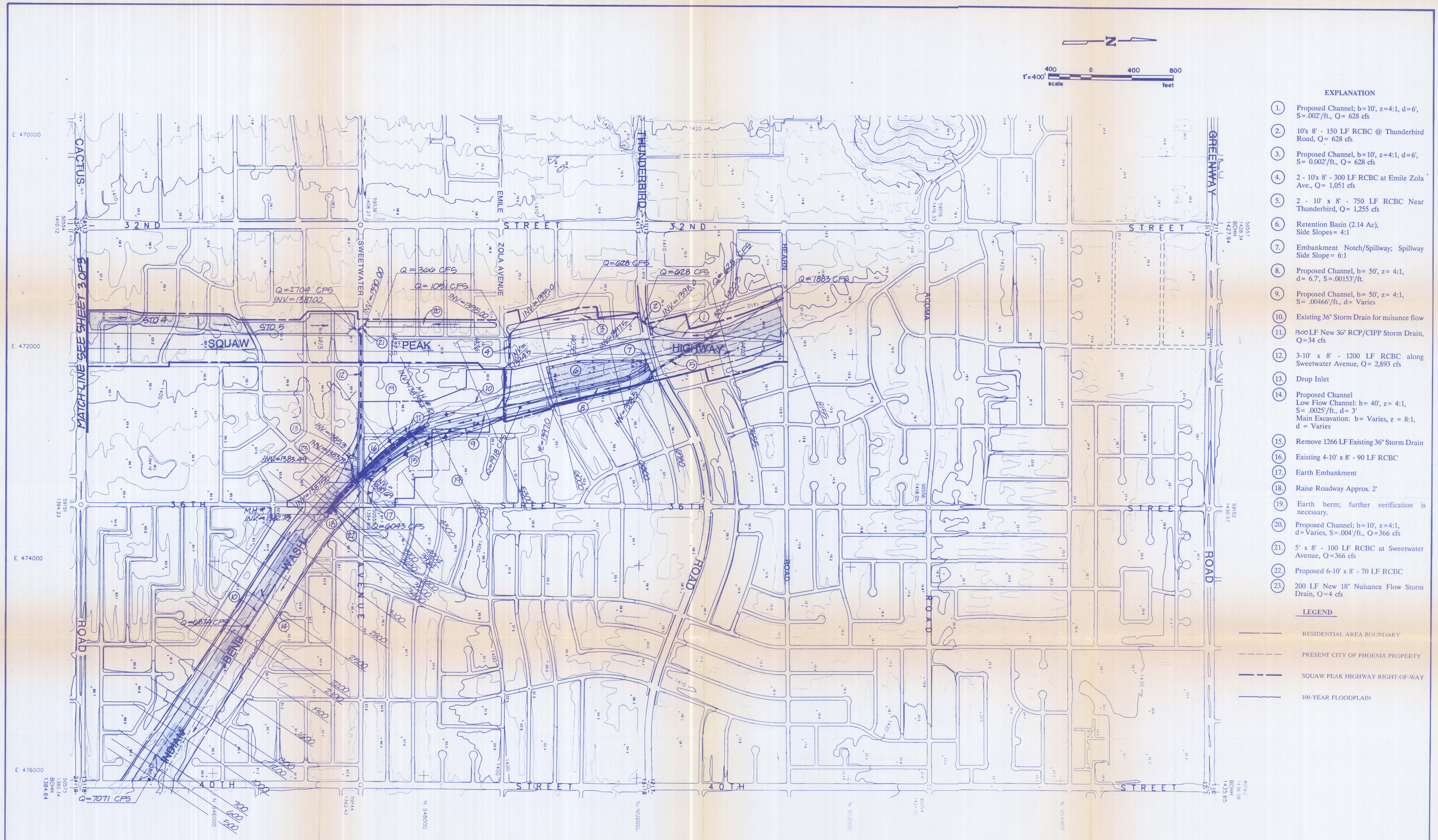




EXISTING FLOODPLAIN DELINEATION
INDIAN BEND WASH
DRAINAGE PLAN

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 957-3149

SCALE 1" = 400'	SHEET 1 OF 3
DATE AUG. 1992	JOB NO. 92833
DESIGN A.J.R.	CHECK A.C.P.
DRAWN J.G.	FILE



EXPLANATION

1. Proposed Channel; b=10', z=4:1, d=6', S=.002'/ft., Q= 628 cfs
2. 10'x 8' - 150 LF RCBC @ Thunderbird Road, Q= 628 cfs
3. Proposed Channel, b=10', z=4:1, d=6', S= 0.002'/ft., Q= 628 cfs
4. 2 - 10'x 8' - 300 LF RCBC at Emile Zola Ave., Q= 1,051 cfs
5. 2 - 10' x 8' - 750 LF RCBC Near Thunderbird, Q= 1,255 cfs
6. Retention Basin (2.14 Ac), Side Slopes= 4:1
7. Embankment Notch/Spillway; Spillway Side Slope= 6:1
8. Proposed Channel, b= 50', z= 4:1, d= 6.7', S=.00153'/ft.
9. Proposed Channel, b= 50', z= 4:1, S= .00466'/ft., d= Varies
10. Existing 36" Storm Drain for nuisance flow
11. 1300 LF New 36" RCP/CIPP Storm Drain, Q=34 cfs
12. 3-10' x 8' - 1200 LF RCBC along Sweetwater Avenue, Q= 2,893 cfs
13. Drop Inlet
14. Proposed Channel
    Low Flow Channel: b= 40', z= 4:1, S= .0025'/ft., d= 3'
    Main Excavation: b= Varies, z = 8:1, d = Varies
15. Remove 1266 LF Existing 36" Storm Drain
16. Existing 4-10' x 8' - 90 LF RCBC
17. Earth Embankment
18. Raise Roadway Approx. 2'
19. Earth berm; further verification is necessary.
20. Proposed Channel; b=10', z=4:1, d=Varies, S=.004'/ft., Q=366 cfs
21. 5' x 8' - 100 LF RCBC at Sweetwater Avenue, Q=366 cfs
22. Proposed 6-10' x 8' - 70 LF RCBC
23. 200 LF New 18" Nuisance Flow Storm Drain, Q=4 cfs

LEGEND

- RESIDENTIAL AREA BOUNDARY
- PRESENT CITY OF PHOENIX PROPERTY
- SQUAW PEAK HIGHWAY RIGHT-OF-WAY
- 100-YEAR FLOODPLAIN

SQUAW PEAK HIGHWAY, SECTION 4
RECOMMENDED DRAINAGE SYSTEM
INDIAN BEND WASH

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
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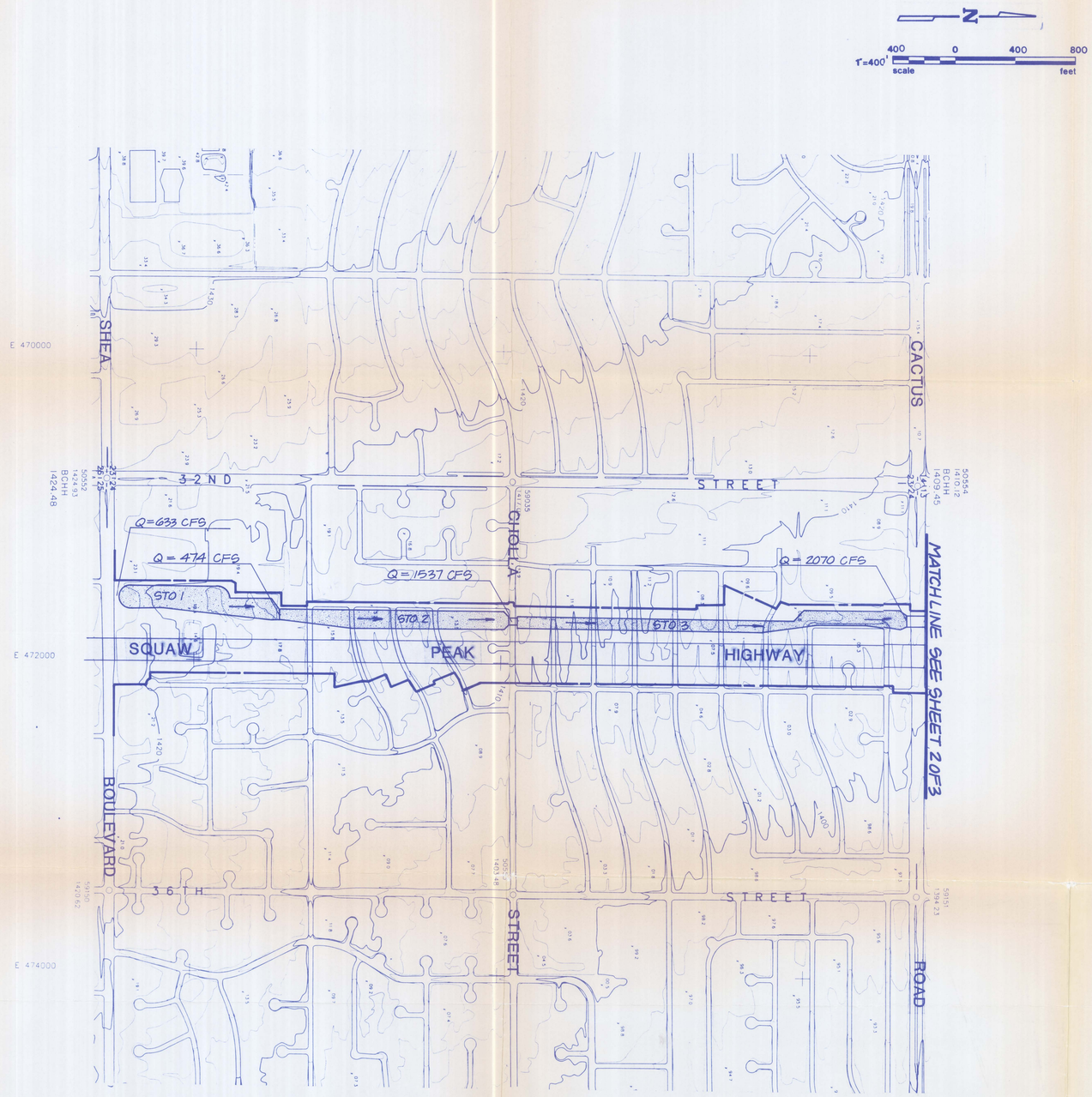
SCALE 1"=400'	SHEET 2 OF 3
DATE AUG. 1992	JOB NO. 92833
DESIGN A.J.R.	CHECK A.C.P.
DRAWN T.G.	FILE



SQUAW PEAK HIGHWAY, SECTION 4
RECOMMENDED DRAINAGE SYSTEM
INDIAN BEND WASH

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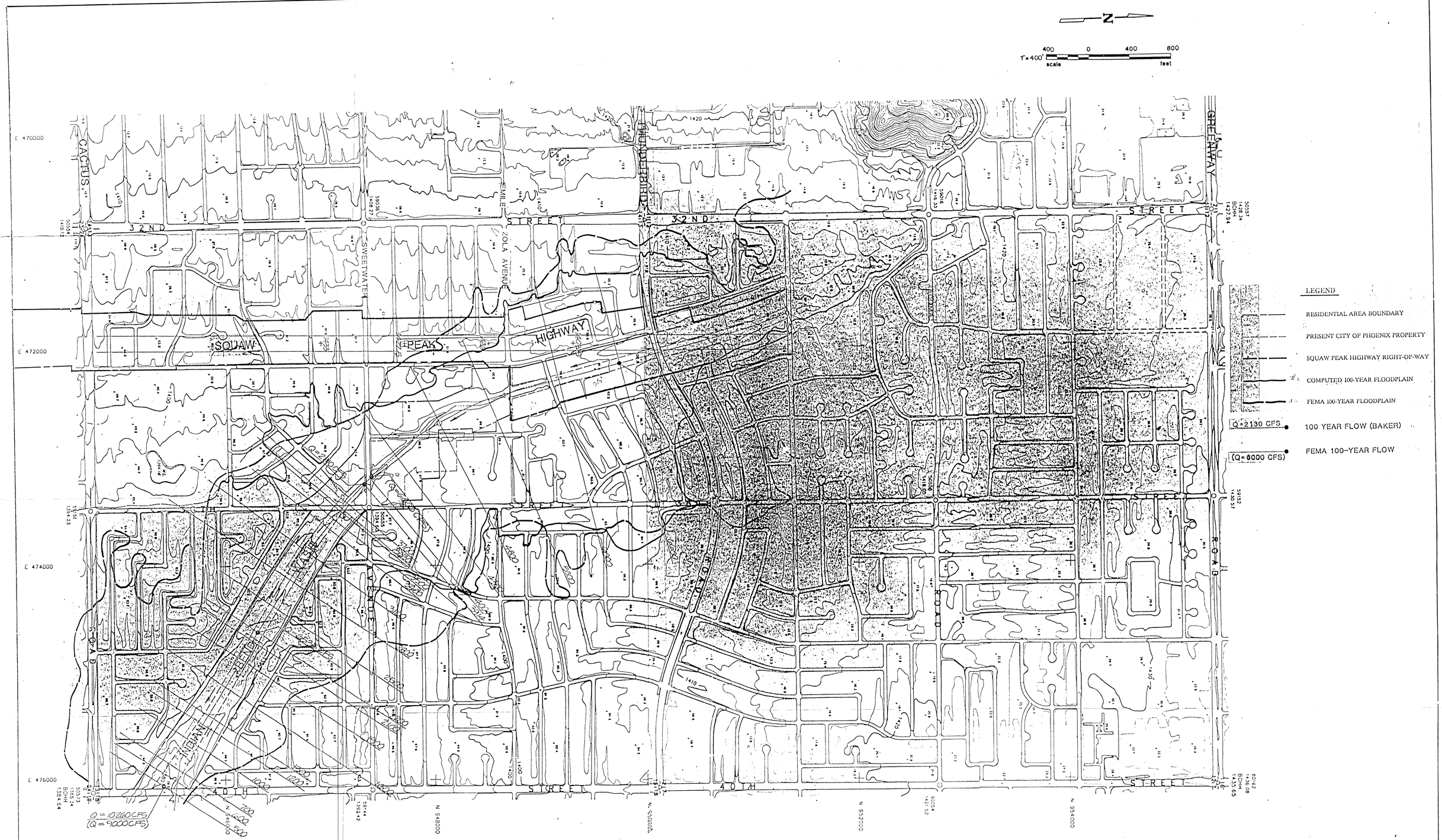
SCALE 1"=400'	SHEET 3 OF 3
DATE AUG. 1992	JOB NO. JOB 92833
DESIGN A.U.R. / DRAWN Z.G.	CHECK ACP / FILE



EXISTING FLOODPLAIN DELINEATION
INDIAN BEND WASH
DRAINAGE PLAN

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SCALE 1"=400'	SHEET 1 OF 3
DATE AUG. 1992	JOB NO. 92833
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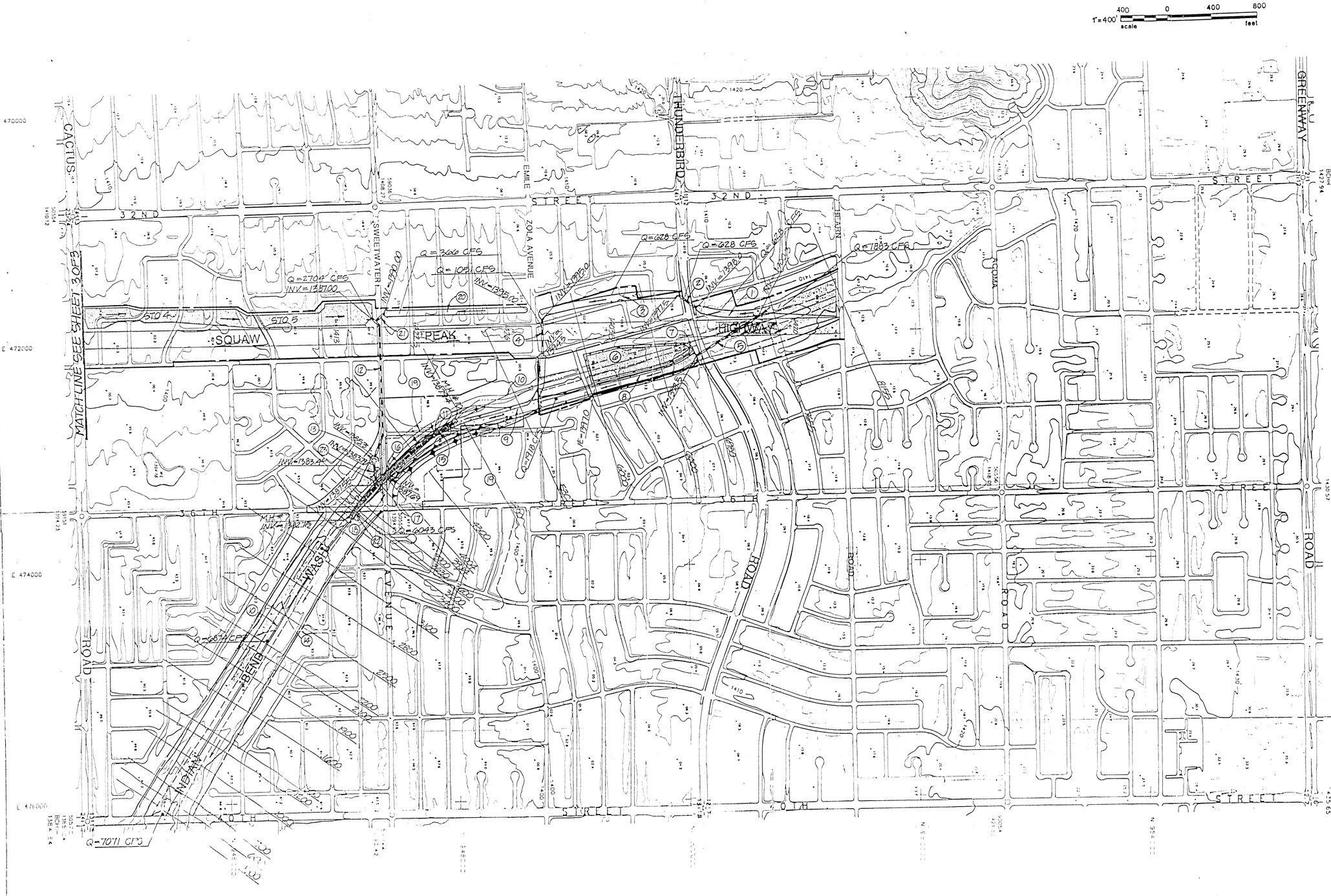
#5



EXPLANATION

1. Proposed Channel; b=10', z=4:1, d=6', S=.002'/ft., Q= 628 cfs
2. 10'x 8' - 150 LF RCBC @ Thunderbird Road, Q= 628 cfs
3. Proposed Channel, b=10', z=4:1, d=6', S= 0.002'/ft., Q= 628 cfs
4. 2 - 10'x 8' - 300 LF RCBC at Emile Zola Ave., Q= 1,051 cfs
5. 2 - 10' x 8' - 750 LF RCBC Near Thunderbird, Q= 1,255 cfs
6. Retention Basin (2.14 Ac), Side Slopes= 4:1
7. Embankment Notch/Spillway; Spillway Side Slope= 6:1
8. Proposed Channel, b= 50', z= 4:1, d= 6.7', S=.00153'/ft.
9. Proposed Channel, b= 50', z= 4:1, S= .00466'/ft., d= Varies
10. Existing 36" Storm Drain for nuisance flow
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LEGEND

- RESIDENTIAL AREA BOUNDARY
- PRESENT CITY OF PHOENIX PROPERTY
- SQUAW PEAK HIGHWAY RIGHT-OF-WAY
- 100-YEAR FLOODPLAIN

SQUAW PEAK HIGHWAY SECTION 4 RECOMMENDED DRAINAGE SYSTEM INDIAN BEND WASH

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SCALE	SHEET
1"=400'	2 OF 3
DATE	JOB NO.
AUG. 1992	92833
DESIGN A.J.P.	CHECK A.C.P.
DRAWN A.C.	FILE

SQUAW PEAK HIGHWAY SECTION 4
RECOMMENDED DRAINAGE SYSTEM
INDIAN BEND WASH

WOOD/PATEL ASSOCIATES Civil Engineers Hydrologists Land Surveyors (602) 957-3149	SCALE 1"=400'	SHEET 3 OF 3
	DATE AUG. 1992	JOB NO. JOB 92833
	DESIGN A.J.R. / DRAWN E.G.	CHECK A.C.P. / FILE