*Easterling & Associates, Inc.*

SAD 223 - LOMR
ENCLOSURE 3

# SAD NO. 223

# CABEZON CHANNEL CAPACITY ANALYSIS

## JUNE 1993

REVISED 9/28/95
JOB # 3302

**EASTERLING & ASSOCIATES, INC.**
Construction Office:
10131 Coors Road, NW, Suite H-7
ALBUQUERQUE, NEW MEXICO 87114-4048
**(505) 890-1630/FAX (505) 890-1647**
Main Office:
(505) 898-8021/FAX (505) 898-8501

# LETTER OF TRANSMITTAL

| | | | |
|---|---|---|---|
| Date | 10/4/95 | Job No. | 3315 |
| Attention | Fred Aguirre | | |
| Re: | Cabezon Channel Capacity | | |
| | Analysis Addendum | | |

TO City of Albuquerque
Hydrology Division
One Civic Plaza
Albuquerque, NM 87103

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via courier the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications
☒ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 10/95 | | Drainage Information Sheet |
| 1 | 9/28/95 | | Cabezon Channel Capacity Analysis Addendum |
| 1 | 10/3/95 | | Letter Regarding Swale and Culvert Capacity |
| 1 | | | Chalmers Ford Drainage Plan Markup |
| 1 | | | Revised Chalmers Ford Drainage Plan |
| | | | |
| | | | |
| | | | |

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☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Copy To

Received by Paula A Manfre Date: 10-4-95

SIGNED: D S Harrison
David S. Harrison

*If enclosures are not as noted, kindly notify us at once.*

Form Rev. 3/15/95

**EASTERLING & ASSOCIATES 'C.**
Construction Office:
10131 Coors Road, NW, Suite H-7
ALBUQUERQUE, NEW MEXICO 87114-4048
**(505) 890-1630/FAX (505) 890-1647**
Main Office:
(505) 898-8021/FAX (505) 898-8501

# LETT_R OF TRANSMITTAL

| | | | |
|---|---|---|---|
| Date | 10/4/95 | Job No. | 3315 |
| Attention | Kurt Browning | | |
| Re: | Cabezon Channel Capacity | | |
| | Analysis Addendum | | |

TO Albuquerque Metropolitan Arroyo Flood
Control Authority
2600 Prospect Avenue, NE
Albuquerque, NM 87107

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| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 9/28/95 | | Cabezon Channel Capacity Analysis Addendum |
| 1 | | | 3½" Disk Containing Addendum HYMO and HEC–2 Files |
| 1 | 10/3/95 | | Copy of Letter to Fred Aguirre Regarding Culvert Capacity |
| | | | |
| | | | |
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| | | | |

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☐FOR BIDS DUE ____ 19 ____ ☐PRINTS RETURNED AFTER LOAN TO US

REMARKS Kurt —

Please substitute the attached Cabezon Channel Capacity Analysis Addendum documents for those received at our meeting on September 29, 1995. No significant change, just a matter of some land use bookkeeping and drafting errors. If you have any questions or need additional information, please call me.

Copy To

SIGNED: David S. Harrison

Received by: Irene Jeffries Date: 10-4-95

*If enclosures are not as noted, kindly notify us at once.*

Form Rev. 3/15/95

**EASTERLING & ASSOCIATES, C.**
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# LETTER OF TRANSMITTAL

| | | | |
|---|---|---|---|
| Date | 10/4/95 | Job No. | 3315 |
| Attention | Lee Lunsford | | |
| Re: | Cabezon Channel Capacity | | |
| | Analysis Addendum | | |

TO City of Albuquerque
PWD/Special Assessments
One Civic Plaza
Albuquerque, NM 87103

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☒ Copy of letter ☐ Change order ☐ _____

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 9/28/95 | | Cabezon Channel Capacity Analysis Addendum |
| 1 | 10/3/95 | | Letter Regarding Swale and Culvert Capacity |
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REMARKS

Lee Lunsford

Copy To

SIGNED: D S Harrison
David S. Harrison

Received by: _____ Date: _____

*If enclosures are not as noted, kindly notify us at once.*

Form Rev. 3/15/95

*Easterling & Associates, Inc.*

10131 Coors Rd., NW, Suite H-7
Albuquerque, New Mexico 87114
(505) 898-8021
FAX (505) 898-8501

September 29, 1995

Mr. Fred Aguirre
City of Albuquerque
Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

**RE: SAD 223 - Cabezon Channel Capacity Analysis Addendum**

Dear Fred:

In response to your request we have updated a portion of the Cabezon Channel Capacity Analysis to reflect the new conditions generated by the Coors Bypass/NM 528 Underpass construction. The updated information is presented on the revised Cabezon Channel Watershed Drainage Basin data supplement (CCWDBDS), Sheet 1 of 4, attached. A description of the new condition and resulting analysis are as follows: (SEE POCKETS IN BACK OF REPORT

**New Hydrologic Condition**

Runoff from approximately 11 acres of Tract B-9J and NM 528 R/W is diverted from the Coors Bypass storm drain to the asphalt swale running along the North/East side of NM 528. The resulting new basin boundary is shown on CCWDBDS as the portion of basin 310.05 lying to the southwest of the old basin 310 boundary, now shown as a dot-dashed line.

**Assumptions**

The following assumptions were made after a cursory review and discussion of the new condition.

- Only area No. 1 - Condition 4 (fully developed/worst case) of the Cabezon Channel Capacity Analysis would be updated.
- Storm drain routing of Coors Bypass/NM 528 Underpass runoff will not significantly impact the overall results and was not considered in the analysis.
- The allowable release rate from the Tract B-9J pond will remain at 23.8 CFS as shown on Sheet 1 of 4 of the SAD 223 Drainage Management Plan.
- The basin boundaries for the Coors Bypass storm drain did not change enough to warrant revision of the flow rates shown in the SAD 223 Drainage Management Plan.

**Modifications**

The analysis of the new condition resulted in the following modifications to the Area No. 1 Condition 4 Hydrological Model.

- Basin 310 boundary and area was revised.

- Basin 310.05 was added.

- Allowable release rate for undeveloped properties within basin 310 was reduced from 1.88 CFS/AC to 0.5 CFS/AC.

**Results**

The net effects of the new hydrologic conditions and modifications discussed above are as follows:

- The 100-year discharge where the asphalt swale crosses under old Ellison Drive (Analysis point AP-13) was reduced from 95.36 CFS to 86.08 CFS.

- The 100-year discharge from the Cabezon desilting/detention pond at the headwater of Cabezon Channel increased 5.4 CFS from 417.09 CFS to 422.49 CFS.

- The overall 100-year flow rate in the Cabezon Channel increased approximately 15 CFS. The additional 10 CFS was generated by correcting a timing discrepancy on the SAD 223 Hydrograph with respect to the hydrograph from the high ditch portion of the analysis.

- The additional 15 CFS constitutes a 3% increase in the Cabezon Channel discharge but results in only a 0.03 ft.± increase in flow depth.

**Conclusion**

Based on these results, the reduced release rate of 0.5 CFS/AC for properties within Basin 310 reasonably distributes the impacts of the additional runoff generated by the Coors Bypass/NM 528 Underpass construction.

If I can be of further assistance in this matter, please do not hesitate to call me.

Sincerely,

Dave S. Harrison
Staff Engineer

DSH/mjg
Job No. 3315

cc: Kurt Browning, AMAFCA
Lee Lunsford, City of Albuquerque
Susan Calongne, City of Albuquerque
Jerome P. Fossenier - City of Rio Rancho

*Easterling & Associates, Inc.*

10131 Coors Rd., NW, Suite H-7
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October 3, 1995

Mr. Fred Aguirre
Hydrology Section
Public Works Department
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

**RE: SAD 223 — Coors Bypass/NM 528 Underpass Drainage Analysis Summary**

Dear Fred:

Pursuant to the Cabezon Channel Capacity Analysis Addendum dated September 28, 1995, Easterling & Associates has reviewed the downstream capacity of the existing asphalt swale/culvert along the north/east side of NM 528. The capacities of these structures were analyzed for both interim and developed conditions.

Developed Conditions

Developed Conditions are defined as follows:

- Coors Bypass/NM 528 Underpass Construction Complete.
- Basin 310 Fully Developed with a Controlled Release of 0.5 cfs/ac.

The resulting flow at analysis point AP–13 as shown on the Cabezon Channel Watershed Drainage Basin Data Supplement Revised September 28, 1995 is $Q_D$ = 85.46 cfs.

Interim Conditions

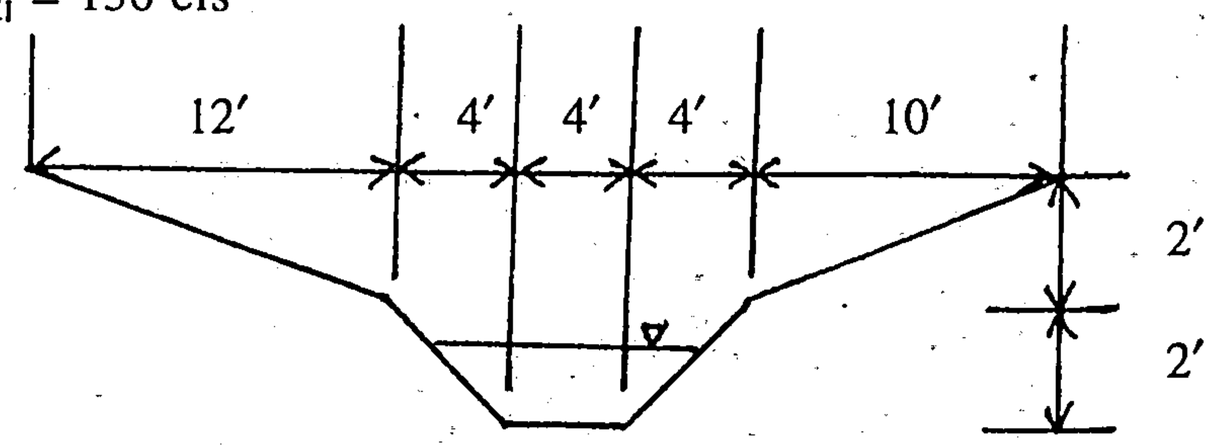
Interim Conditions are defined as follows:

- Coors Bypass/NM 528 Underpass Construction Complete.
- No development within Basin 310 and an existing conditions release rate of ~ 1.65 cfs/ac.

The resulting flow rate is $Q_I$ = 136.3 cfs which again corresponds to AP–13, but was not included as part of the Cabezon Channel Capacity Addendum.

Asphalt Swale Capacity

The capacity of the asphalt swale was analyzed for the worst case or Interim Conditions $Q_I$ = 136 cfs




$Q_I$ = 136.30 *cfs*

$S$ = 3.33%
$SS1$ = 2:1
$SS2$ = 2:1
$n$ = 0.017

Normal Depth Analysis

$d$ = 1.36 *ft.*
$v$ = 14.93 *fps*
$f$ = 2.68

$d_I$ = 1.36 *ft.* < 2 *ft.* ∴ *okay*

Charter Bank Driveway Crossing Capacity

The crossing is currently comprised of (2) 36″ CMP culverts. The capacity of the culverts was determined using the orifice equation assuming inlet control. This method is conservative when you consider the flow is approaching the culvert at a velocity of approximately 15 fps.

- Orifice Analysis for One Culvert

$Q = CA\sqrt{2gh}$

$C = 0.67$

$A = 7.07\ ft^2$

$hmax = 3.5\ ft.$

$HW = 3.5 + \frac{1}{2}(3') = 5'$

$Q_1 = 0.67\ (7.07)\ \sqrt{2(32.2)\ 3.5}$

$Q_1 = 71.17\ cfs$

$Q_T = 2 \times Q_1 = 142.23\ cfs$

$Q_T = 142.23\ cfs > Q_D$ *and* $Q_I$ ∴ *okay*

Old Ellison Road Crossing

The crossing is currently comprised of (2) 24″ x 36″ squash pipes. The capacity analysis for these culverts assumed a 27″ equivalent pipe diameter and inlet control.

$Q = CA\sqrt{2gh}$

$C = 0.67$
$A = 3.98\ ft^2$
$hmax = 2.2\ ft.$

$Q_1 = 0.67\ (3.98)\ \sqrt{2(32.2)\ 2.2}$

$Q_1 = 31.74\ cfs$
$Q_T = 2 \times Q_1 = 63.48\ cfs$
$Q_T = 63.48\ cfs > Q_D$ *and* $Q_I$ ∴ *under capacity*

Results

The results of the analysis are as follows:

- The existing asphalt swale and the (2) 36″ CMP culverts at the Charter Bank crossing have adequate capacity in both the fully developed and interim conditions.

- The (2) 24″ x 36″ CMP culverts at the Old Ellison crossing are not adequate under either condition.

Recommendation

The culvert capacity at Old Ellison Drive should be improved by installing an additional 36″ CMP. This work should be incorporated into the SAD 223 Coors Bypass/NM 528 Underpass construction.

If you have any questions or need additional information, please call me.

Sincerely,

David S. Harrison

DSH/das
Job No. 3315

cc: John Castillo, Transportation Development, City of Albuquerque
Lee Lunsford, PWD/Special Assessments, City of Albuquerque
Kurt Browning, Albuquerque Metropolitan Arroyo Flood Control Authority
Roger Paul, c/o Bernalillo County Public Works Department
Jerry Fossenier, Public Works Department, City of Rio Rancho

# SAD NO. 223

# CABEZON CHANNEL CAPACITY ANALYSIS

**JUNE 1993**

**PREPARED FOR:**

**PUBLIC WORKS DEPARTMENT**
**CITY OF ALBUQUERQUE**
**POST OFFICE BOX 1293**
**ALBUQUERQUE, NEW MEXICO 87103**

**PREPARED BY:**

**EASTERLING & ASSOCIATES, INC.**
**10131 COORS ROAD, N.W.**
**SUITE H-7**
**ALBUQUERQUE, NEW MEXICO 87114-4048**
**TELEPHONE (505) 898-8021**

I, Charles M. Easterling, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

Charles M. Easterling, P.E.
NMPE No. 6411

6-15-93
Date

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APPENDIX B — HEC–2 Input/Output

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APPENDIX D — Cost Estimates

APPENDIX E — Cabezon Channel Box Culvert — Model Study

SAD NO. 223

# CABEZON CHANNEL CAPACITY ANALYSIS

## 1 PURPOSE AND AUTHORIZATION

The preparation of this document was authorized by the Public Works Department, City of Albuquerque, in conjunction with City of Albuquerque Project No. 4193.

The purpose of this report is to outline a conceptual plan for drainage management within the Cabezon Channel Watershed and identify what improvements or policies may be required to implement the plan in sufficient detail to obtain Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) approval of proposed SAD 223 drainage improvements and tract development.

## 2 HYDROLOGY

### 2.1 Modeling

The Cabezon Channel Watershed was analyzed using AHYMO 392 and the 100–year 24–hour rainfall distribution with time increments of (3 minutes) 0.05 hours. This rainfall distribution was modified by adding approximately 5.5 hours of very small incremental values to the front of the distribution to allow enough time for the irrigation base flows to fill the Corrales Main Canal before the start of the storm. This technique eliminates any potential peak attenuation that may occur by routing storm flows through an empty ditch.

### 2.2 Basins

For the purpose of modeling the Cabezon Channel Watershed, it was subdivided into three (3) areas described below:

- Area No. 1 — The area within SAD No. 223 and the area north of 528 which drains to the desilting basin of the Cabezon Channel.
- Area No. 2 — The area within Corrales which drains to the Cabezon Channel via the Corrales Main Canal.
- Area No. 3 — The area north of 528 which drains to the Cabezon Channel itself.

#### 2.2.1 Area No. 1

The hydrologic models for Area No. 1 were developed as part of the SAD 223 Drainage Management Plan (Easterling & Associates, Inc., May 1991, revised

March 1992, July 1992). Area No. 1 was modeled under several different conditions in order to determine the effect development will have on channel capacity. The conditions modeled are as follows:

| Condition | Description |
|---|---|
| 1 | Existing conditions<br>(File Name: CCIE1A.HMI) |
| 2 | SAD 223 infrastructure only with existing conditions everywhere else<br>(File Name: CCSADI.HMI/HMO) |
| 3 | SAD 223 fully developed with existing conditions everywhere else<br>(File Name: CCISAD1A.HMI/HMO) |
| 4 | Combination of development conditions which result in a worst case runoff condition (i.e. fully developed condition with the exception of Basin 310 and 320 which remain in the existing condition state)<br>(File Name: CCIFUL1A.HMI/HMO) |

The original models submitted in conjunction with the SAD 223 Drainage Management Plan were revised or supplemented as described below. A model was developed for Condition No. 2 in order to determine the effect of development on channel capacity. The model assumes construction of SAD 223 infrastructure and temporary detention/sedimentation ponds with existing conditions everywhere else. The temporary detention/sedimentation ponds are outlined on Plate No. 2 SAD No. 223 Drainage Improvement Map[1/]. The other revisions include: Modification of the rainfall distribution; adjustment of drainage areas for Basins 330 and 350; the addition of drainage basins 360A and 360B; and the enlargement of the Skyview Pond as shown on Sheet No. 1. The results of this analysis have been summarized on Sheet No. 2. Copies of the AHYMO input/output files are contained in Appendix A.

### 2.2.2 Area No. 2

The watershed for the Corrales Main Canal (Area No. 2 — Approx. 2,124 Acres) is bounded by the Main Canal on the east; the Skyview Diversion Channel, and the Outfall for Dam Nos. 1 and 4 on the west; the Los Montoyas Arroyo on the north; and the Cabezon Channel on the south. As shown on Figure No. 1, the Main Canal Watershed also receives runoff from the Urban Center Pond System located west of the escarpment in Rio Rancho.

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1/ SAD 223 Drainage Management Plan, Easterling & Associates, Inc., May 1991, Revised March 1992, July 1992.

The original model for the Main Canal was developed by Community Sciences, Inc. as part of their Urban Center Pond Outfall design. The model makes the following assumptions and/or simplifications:

- Assumes that the proposed outfall from Dam Nos. 1 and 4 is in place thereby diverting the 100–year discharge from the dams to the Los Montoyas Arroyo. (Dam Nos. 1 and 4 currently discharge into the Corrales Main Canal Watershed.)

- Assumes that detention/sedimentation ponds of the size required will be constructed at the bottom of each basin to control the discharge into the Main Canal.

- Does not consider existing crossing structures or check structures within the Main Canal.

- Does not include ~ 1.96 Ac–Ft of runoff from Basin 350 which currently pond along the west side of Loma Larga and does not enter the system.

For the purpose of our analysis, Easterling & Associates, Inc. has modified the original model as follows:

- Assumes 50 cfs base irrigation flow in the Main Canal.

- Subbasins 6 and 7 were modified by enlarging them to reflect the approved Dam Nos. 1 and 4 outfall alignment (See Figure No. 1).

- The drainage area for Subbasin No. 1 was reduced to account for areas already analyzed in the SAD 223 models.

- The release rate from the hypothetical basin ponds was increased from 0.02 cfs/ac. to 0.04 cfs/ac in accordance with AMAFCA comments.

- The storm duration was increased from 6 hours to 24 hours to conform to City of Albuquerque and AMAFCA standards.

- The rainfall distribution was modified by adding approximately 5.5 hours of very small incremental values to the front of the distribution. This was done to eliminate any peak attenuation that may occur from routing the storm through an empty ditch.

- The existing canal section had to be modified at the downstream end in order to accommodate the proposed 100–year flow of ~ 130 cfs. The canal section was modified by increasing the height of the eastern berm. The berm height was raised by projecting existing slopes approximately 3 feet vertically.

The results of the Main Canal analysis have been summarized on Sheet No. 2. Copies of the AHYMO input/output files are contained in Appendix A.

The hydrograph from the Corrales Main Canal was appended to the SAD 223 models to produce a composite inflow hydrograph for the Cabezon Channel model.

### 2.2.3 Area No. 3

Area No. 3 is bounded by NM 528 on the south; Corrales Road on the east; Cabezon Channel on the north; and the SAD 223 Storm Drain on the west. A graphic representation of the watershed is shown on Sheet No. 1.

The runoff from this area enters the Cabezon Channel through a series of tributary channel and storm drains. A summary of the tributary facilities by tract is provided below:

<u>Tract D–1 → Puerta de Corrales Phase I</u>

- 24″ Storm Drain — Cabezon Baseline Sta. ~ 20+26
- 24″ Storm Drain — Cabezon Baseline Sta. ~ 15+61
- Side Channel — Cabezon Baseline Sta. ~ 13+01

<u>Tract D–2 → Puerta de Corrales Phase II</u>

- 24″ Storm Drain — Cabezon Baseline Sta. ~ 7+68
- Side Channel — Cabezon Baseline Sta. ~ 6+44

<u>Tract D–4</u>

- Detention pond with an allowable release rate of 41.3 cfs. This pond discharges into the Phase II Side Channel.

<u>Tract B–1</u>

- Detention pond with an allowable release rate of 16.5 cfs. This pond discharges into the Phase I Side Channel.

Area No. 3 was analyzed for the existing (partially developed) condition and the fully developed condition. The analysis of Subbasins D–1 and D–2 were simplified in that they were modeled as single basins with the runoff entering the channel at the northeast corner of the basin. In reality, the runoff from subbasins is further subdivided and enters the main channel via the small storm drains and side channel described above.

The results of this analysis have been summarized on Sheet No. 1. Copies of the AHYMO input/output files are contained in Appendix A.

### 2.2.4 Composites

Hydrogaphs from the three areas described above were combined to form a composite hydrologic model of Cabezon Channel. The hydrograph from Area No. 2 was added to the end of the model for Area No. 1. The hydrograph produced by this combination was used as the starting hydrograph in the channel model. Hydrographs from Area No. 3 were then added to the channel model at the appropriate tributary locations. The composite model examined the four conditions described in Section 2.2.1 of this report. A list of the files used, complete with description are provided below:

- Condition No. 1 — Existing Condition

  File name:

  CCIE1A.HMI/HMO → Area No. 1 (SAD 223)
  24HDITCH.HMI/HMO → Area No. 2 (High Ditch)
  S–CBZN–E.HMI/HMO → Area No. 3 (Tributary)
  CABEZN–E.HMI/HMO → Composite

- Condition No. 2 — Existing Conditions with SAD 223 Infrastructure in Place

  File name:

  CCISADI.HMI/HMO → Area No. 1 (SAD 223)
  24HDITCH.HMI/HMO → Area No. 2 (High Ditch)
  S–CBZN–E.HMI/HMO → Area No. 3 (Tributary)
  CABEZNSI.HMI/HMO → Composite

- Condition No. 3 — Existing Conditions with SAD 223 Fully Developed

  File name:

  CCISAD1A.HMI/HMO → Area No. 1 (SAD 223)
  24HDITCH.HMI/HMO → Area No. 2 (High Ditch)
  S–CBZN–E.HMI/HMO → Area No. 3 (Tributary)
  CABEZNSF.HMI/HMO → Composite

- Condition No. 4 — Fully Developed Condition Except for Subbasins 310 & 320 which Remain in Existing Conditions

File name:

CCIFUT1A.HMI/HMO
24HDITCH.HMI/HMO
S–CBZN–F.HMI/HMO
CABEZN–F.HMI/HMO

### 2.3 Pond Analysis

2.3.1 The Cabezon Channel capacity analysis included determining what effect enlarging the existing pond at the Cabezon Channel headwaters would have on the 100–year flow rate entering the channel. This was accomplished by revising the existing hydrologic models to represent the enlarged pond shown in Figure No. 2. The resulting pond inflow/outflow hydrographs are shown on Sheet No. 4. Based on the results summarized on Sheet No. 4, it appears that the reduction in peak outflow of ~ 30 cfs will not be cost effective when compared to the estimated cost to acquire the property and enlarge the pond.

2.3.2 Skyview Pond

The Skyview Pond is located approximately ¼ mile north of the Cabezon Channel on the west side of Loma Larga. The pond was built to demonstrate the type of ponds described in the Corrales High Ditch Study[2/] The pond is a very small version of the ponds currently assumed to exist in this report's analysis of the Main Canal. The analysis of the Skyview Pond focused on what effect enlarging the pond, as shown on Figure No. 3, would have on the existing Cabezon System. The results indicate that approximately 11.75 acres of basins 350 and 330 could be diverted to the Skyview Pond, provided that a means of conveyance is provided.

## 3 HYDRAULICS

### 3.1 HEC–2 Analysis

The existing channel as defined by the as–built drawings dated December 1985 was modeled using the U.S. Army Corps of Engineers HEC–2, Version 4.6.2, May 1991, Water Surface Profile Computer Program. The channel was modeled under the four (4) conditions described in the hydrologic section of the report. The channel was modeled using both supercritical and subcritical flow regimes. A review of the supercritical/subcritical models indicates that the channel can be divided into two reaches based on flow regime. The first reach runs from the river (Sta. 0+00) to the lower transition structure (Sta. 40+57). This reach is basically subcritical due to the backwater condition produced by the 10–year WSEL in the Rio Grande. The second reach covers that portion of the channel from the lower transition structure (Sta. 40+57) to the outlet from the Cabezon Pond at the channel headwaters (Sta.

---

2/ Master Plan for Corrales High Ditch Combined Flood Control/Irrigation Facility, March 1985.

66+80). This reach operates primarily in the supercritical range during 100–year runoff events. Therefore this report assumes the following:

- A subcritical model can be used to analyze that portion of the channel downstream of the lower transition structure.
- A supercritical model can be used to model that portion of the channel upstream of the lower transition structure.

The channel was further broken up into reaches based on physical characteristics such as slope, channel section, and changes in flow rate (Q). The HEC–2 values of channel depth, velocity and Froude number were averaged for each reach. For supercritical reaches, the conjugate depth was approximated by utilizing the formula:

$$\frac{Y_2}{Y_1} = 0.5\left(\sqrt{1 + 8F^2} - 1\right)$$

Where $Y_2$ is the Conjugate Depth (Subcritical Depth)
$Y_1$ is the Sequent Depth (Supercritical Depth)
F is the Froude No.

The averaged values were compared to the depth of the channel to determine the amount of freeboard available for that reach. The results of the analysis have been summarized in tabular form on Sheet No. 3.

### 3.2 Box Culvert

Cabezon Channel crosses under Corrales Road via a standard three barrel, 4 feet by 8 feet New Mexico State Highway Department Box Culvert. The box is located just downstream of the Cabezon Channel lower transition structure. The lower transition structure is a complicated structure, which separates irrigation flow from flood flow. The complexity of this structure makes conventional analysis of the box impractical. Therefore, this structure was physically modeled by Dr. Richard Haggen at the University of New Mexico Hydraulics Lab. The results of the Model Study are contained in Appendix E.

### 3.3 Tributary Structures

The proposed fully developed flow rate in the Cabezon Channel exceeds the original 100–year design discharge of 385 cfs by approximately 100 cfs in the reach where the tributary structures currently enter the channel. This increase warranted an analysis of the major tributary structures to insure that they would continue to meet their design intent.

The major tributary structures that were analyzed are as follows:

- Phase II Side Channel — Cabezon Baseline ~ Sta. 6+44 Centerline ~ Sta. 48+56.
- 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 7+68 Centerline ~ Sta. 49+70.
- Phase I Side Channel — Cabezon Baseline ~ Sta. 13+01 Centerline ~ Sta. 55+25.
- 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 15+61 Centerline ~ Sta. 58+88.
- 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 20+26 Centerline ~ Sta. 62+65.

A more specific hydrologic investigation of Subbasins D–1 and D–2 was performed in order to establish the hydraulic parameters necessary to analyze these structures. This analysis is included in Appendix C.

### 3.3.1 Phase II Side Channel — Cabezon Baseline Sta. 6+44

A field survey of the Phase II Side Channel indicated that the eastern channel side slope does not comply with the original design. However, the channel does have the capacity to carry the design 100–year discharge rate of 42.78 cfs with ~ 1 foot of freeboard. It is important to note that a breach of the eastern bank will only impact the undeveloped tract to the east at present.

It is also important to realize that this deficiency will be corrected when the eastern tract (Tract D–3) is developed. A copy of the analysis performed is contained in Appendix C.

### 3.3.2 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 7+68

This storm drain is 101 feet long with an ungrated inlet which is located in a small pond at the northeast corner of Tract D–2. The fully developed 100–year water surface elevation (WSEL) in the channel will result in water standing approximately (~) 1 foot deep in the bottom of the pipe inlet. The analysis assumes that the storm drain will operate in pressure flow during the 100–year event. The HGL computations presented in Appendix C indicate a WSEL ~ 1.5 feet below the maximum WSEL of the pond. Therefore, the 100–year runoff of 23.01 cfs will discharge through the pipe before spilling through the emergency spillway of the pond. If for some reason the emergency spillway did run, it will discharge into a parking area and eventually enter the channel via the Phase II Side Channel without damage to surrounding improvements.

### 3.3.3 Phase I Side Channel — Cabezon Baseline ~ Sta. 13+01

The analysis of the Phase I Side Channel indicates that the as–built channel has the capacity to carry the required discharge of 28.78 cfs with ~ 2+ feet of freeboard. A copy of the analysis performed is contained in Appendix C.

### 3.3.4 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 15+61

This storm drain is 180 feet long with a 3 feet deep grated inlet. The fully developed 100–year WSEL in the channel will result in water standing ~ 1.8 feet deep in the storm drain inlet. The analysis assumes that the storm drain will operate in pressure flow during the 100–year event. The HGL computations presented in Appendix C indicate a WSEL ~ 0.87 feet below the top of the inlet grate. Therefore, no additional ponding will be required to discharge the 100–year event through the pipe.

### 3.3.5 24″ RCP Storm Drain — Cabezon Baseline ~ Sta. 20+26

This storm drain is 286 feet long with a 2.75 feet deep grated inlet. The fully developed 100–year WSEL in the channel will result in water standing ~ 0.84 feet deep in the storm drain inlet. The analysis assumes that the storm drain will operate in pressure flow during the 100–year event. The HGL computations presented in Appendix C indicate a WSEL ~ 0.75 feet below the top of the inlet grate. Therefore, no additional ponding will be required in order to discharge the 100–year event through the pipe.

## 3.4 Concrete Trapezoidal Channel

The hydraulic performance of the trapezoidal channel is controlled by the water surface elevation in the Rio Grande. The analysis presented in the report used the 10–year WSEL in the Rio Grande as the starting WSEL, which is in accordance with the original design criteria. The 10–year WSEL in the Rio Grande is 4995.2 at the Riverside Drain outlet. This will back water all the way up to the box culvert under Corrales Road and will essentially create a subcritical flow regime for the trapezoidal channel. The subcritical HEC–2 analysis summarized on Sheet No. 3 indicates that the channel walls just downstream of the box culvert will need to be raised in order to provide the minimum 2 feet of freeboard.

The available freeboard was calculated using the maximum maintenance road elevations shown on the plans. There is some question as to whether the existing maintenance road meets the design elevation. This needs to be confirmed and corrected if deficient.

# 4 RECOMMENDED IMPROVEMENTS / ESTIMATED COSTS

## 4.1 Cabezon Channel — General

The analysis present in this report indicates that the channel has less than 2 feet of freeboard even under existing conditions. This fact eliminates the possibility of delaying improvements until some specific percentage of development is reached. Therefore, this report will only present improvements necessary to provide the required freeboard for the fully developed 100–year flow rate. The amount of freeboard required is still in question. The original design was for 2 feet of freeboard. However, current Federal Emergency Management Agency regulations require 3 feet of freeboard for all levees and because a portion of Cabezon Channel is perched, its banks might be considered levees. This report will determine the improvements necessary to restore the designed freeboard of 2 feet, as well as those improvements necessary to provide 3 feet of freeboard.

## 4.2 Cabezon Channel Combined Irrigation/Flood Control Channel

### 4.2.1 Two Feet of Freeboard

In order to restore the designed freeboard, the existing channel banks need to be raised anywhere from 0 feet to 1.02 feet. The most practical way to increase the channel depth by this small amount would be to raise the earth berms.

#### 4.2.1.1 Raised Earth Berm

Raising the earth berm as shown on Section 1 on Sheet No. 3 will encroach into the existing channel conveyance. However, HEC–2 analysis indicates that this has little effect on the 100–year WSEL. Adding earth to the existing berms will require removal and replacement of existing landscaping, irrigation system, and fences. The unretained slopes of the new berms will encroach on the Cabezon Road right–of–way and the private property located just south of the channel. Even though the encroachments will be relatively small, some negotiation with adjacent property owners will be required to solidify the feasibility of this option. There is currently a good possibility of obtaining an additional easement along the undeveloped Track D–3. The cost to provide 2 feet of freeboard by this type of construction is estimated to be $75,000.00, excluding right–of–way costs. A copy of the cost estimate for this alternative is provided in Appendix D.

### 4.2.2 Three Feet of Freeboard

In order to provide 3 feet of freeboard, the existing channel banks need to be raised anywhere from 1 foot to 2.02 feet. Some of the ways in which the berms could be raised by this amount include: Raised earth berm, CMU walls, or a combination of the two.

#### 4.2.2.1 Raised Earth Berm

Raising the earth berm as shown on Section 2 on Sheet No. 3 will increase the encroachment into the channel conveyance, Cabezon Road and private development to the south. Again, HEC–2 shows that the encroachment has little effect on the 100–year WSEL. However, the intrusion of the slopes on Cabezon Road and the development on the south may prohibit the use of this option without retaining walls. The cost to provide 3 feet of freeboard by this type of construction is estimated to be $125,000.00. A copy of the cost estimate for this alternative is provided in Appendix D.

#### 4.2.2.2 CMU Walls

Constructing a CMU wall to provide 3 feet of freeboard will be less intrusive on the existing landscaping, irrigation system, and fences. It will also eliminate the need for encroachments on the Cabezon Road right–of–way and the developed property on the south side of the channel. The disadvantages of CMU walls are that they are easy targets for graffiti and are more expensive to build. The estimated construction cost to provide 3 feet of freeboard by this type of construction is $241,000.00. A copy of the cost estimate for this alternative has been provided in Appendix D.

#### 4.2.2.3 Combination — CMU Walls/Raised Earth Berms

This alternative will utilize components from the two previously discussed options in an attempt to maximize the advantages. The construction would consist primarily of raised earth berms with CMU retaining walls being placed where necessary to avoid conflicts with existing structures. The cost to provide 3 feet of freeboard by this type of construction is estimated to be $156,000.00. A copy of the cost estimate for this alternative is provided in Appendix D. The same advantages and disadvantages exist as described above for either solution alone, but to a lesser degree.

### 4.3 Cabezon Channel Concrete Box Culvert Under Corrales Road

Please refer to the Model Study report contained in Appendix E for recommended improvements or modifications.

### 4.4 Cabezon Channel Concrete Trapezoidal Channel

The trapezoidal channel reach of the Cabezon Channel is located east of Corrales Road between the Road and the Riverside Drain. The HEC–2 analysis presented in this report indicates that the channel depth needs to be increased anywhere from 0 to 0.88 feet in order to provide the minimum 2 feet of freeboard required.

Consequently, the depth will need to be increased anywhere from 1 foot to 1.88 feet in order to provide 3 feet of freeboard. One way of providing the additional depth required would be to install CMU splash blocks on the channel sill. The cost of constructing these improvements for 2 feet and 3 feet of freeboard are estimated to be $1,590.00 and $7,800.00 respectively.

Another way of providing the freeboard required would be to raise the maintenance road. It appears that there is sufficient right–of–way to accomplish this without effecting the adjoining properties. The costs of raising the maintenance road to provide 2 feet and 3 feet of freeboard are $2,250.00 and $9,075.00 respectively.

A copy of cost estimates for the improvement discussed above is contained is Appendix D.

### 4.5 Skyview Pond

The analysis shows that enlarging the pond as shown on Figure No. 3 will not significantly reduce the flow entering the channel. However, the pond still needs to be enlarged for the following reasons:

- The expansion is necessary to accommodate increased runoff generated by the new hydrology.

- This is one of the last vacant areas, in this portion of the High Ditch/Cabezon Channel Watershed, where this type of pond can be constructed.

- Floodwater detention storage should be maximized in the Skyview Acres area in order to reduce the high peak discharge that currently impacts the High Ditch/Cabezon System.

- Enlarging the pond will improve the potential for addressing the drainage problem that currently exists along Loma Larga between Cabezon Road and the Skyview Pond at some point in the future.

The estimated cost of the enlargement is $81,707.50, including a $1.45/SF property acquisition cost. A copy of the cost estimate is contained in Appendix D.

It is important to note that some coordination will be required with Bernalillo County Public Works Department in order to insure that the County's proposed improvements provide the capacity for the additional drainage area.

### 4.6 Miscellaneous

The miscellaneous improvements identified during the analysis include:

- The construction of a temporary pond on Tract "O" of Seven Bar Ranch could reduce the peak discharge from the existing CMPA's under NM 528 from the

existing condition peak of 120 cfs to something more on the order of the allowable fully developed peak of 40 cfs.

- The eastern bank of the Puerta de Corrales Phase II Side Channel needs to be brought up to design elevation.

- Improvements at the intersection of Cabezon Road, Loma Larga, and Cielo Vista Del Norte are needed to insure all runoff from Skyview Acres is diverted into the Cabezon Pond and not allowed to cross the Main Canal over Cabezon Road.

## 5 RECOMMENDATIONS

Based on the information presented in this document, the following recommendations are offered:

- **Cabezon Channel Combined Irrigation/Flood Control Channel Reach**

  Provide 3 feet of freeboard for the combined irrigation/flood control channel using a combination of raised earth berms and CMU walls at an estimated cost of $164,277.50, excluding right–of–way costs.

- **Cabezon Channel Concrete Trapezoidal Channel Reach**

  Provide 3 feet of freeboard for the concrete trapezoidal channel using a combination of raised earth berms and CMU walls at an estimated cost of $7,797.00.

- **Cabezon Channel Concrete Box Culvert Under Corrales Road**

  Implementation of improvements or modification described in the physical Model Study report contained in Appendix E.

- **Cabezon Desilting Pond**

  Enlargement of the Cabezon Desilting Pond within the existing drainage easement area in accordance with the SAD 223 plans.

- **Skyview Pond**

  Enlargement of the Skyview Pond in accordance with Figure No. 3 at an estimated cost of $119,622.65, including land costs.

- **Miscellaneous**

  All the minor improvements described in Section 4.6 of the report should be considered for inclusion in the improvements package.

# APPENDIX A

## AHYMO
## Input Files
## and
## Summary Tables

REFER TO DISKS 1 & 2
(INSIDE BACK COVER)

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = cciela.hmi USER NO.= D_HARRIS.892



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= 2.660 |
| COMPUTE NM HYD | 300.00 | - | 2 | .18000 | 138.92 | 4.357 | .45390 | 5.600 | 1.206 | PER IMP= .00 |
| DIVIDE HYD | 301.00 | 2 | 3 | .17437 | 120.00 | 4.221 | .45390 | 5.550 | 1.075 | |
| | 302.00 | AND | 4 | .00563 | 18.92 | .136 | .45390 | 5.600 | 5.249 | |
| COMPUTE NM HYD | 310.00 | - | 2 | .07940 | 95.36 | 4.048 | .95602 | 5.600 | 1.876 | PER IMP= 20.00 |
| ROUTE | 310.10 | 2 | 4 | .07940 | 90.85 | 4.048 | .95602 | 5.650 | 1.788 | |
| ADD HYD | 310.20 | 3& 4 | 2 | .25377 | 210.85 | 8.269 | .61101 | 5.650 | 1.298 | |
| ROUTE | 242.00 | 2 | 3 | .25377 | 210.88 | 8.270 | .61101 | 5.650 | 1.298 | |
| COMPUTE NM HYD | 320.00 | - | 2 | .02520 | 32.88 | 1.206 | .89758 | 5.550 | 2.039 | PER IMP= 19.00 |
| ADD HYD | 320.10 | 2& 3 | 4 | .27897 | 238.88 | 9.476 | .63689 | 5.600 | 1.338 | |
| COMPUTE NM HYD | 330.00 | - | 2 | .11580 | 144.54 | 5.549 | .89854 | 5.600 | 1.950 | PER IMP= 14.00 |
| ADD HYD | 330.30 | 4& 2 | 3 | .39477 | 383.42 | 15.025 | .71364 | 5.600 | 1.518 | |
| ROUTE RESERVOIR | 517.00 | 3 | 5 | .39477 | 372.03 | 15.025 | .71364 | 5.650 | 1.472 | AC-FT= 1.208 |
| RECALL HYD | 101.10 | - | 4 | 3.31900 | 127.34 | 203.557 | 1.14995 | 11.200 | .060 | |
| COMPUTE NM HYD | 100.00 | - | 1 | .05680 | 95.36 | 3.518 | 1.16137 | 5.550 | 2.623 | PER IMP= 26.20 |
| COMPUTE NM HYD | 200.00 | - | 2 | .02290 | 38.46 | 1.418 | 1.16137 | 5.550 | 2.624 | PER IMP= 26.20 |
| ADD HYD | 300.00 | 2& 1 | 2 | .07970 | 133.82 | 4.937 | 1.16136 | 5.550 | 2.624 | |
| ROUTE RESERVOIR | 400.00 | 2 | 3 | .07970 | 18.99 | 4.921 | 1.15774 | 6.100 | .372 | AC-FT= 2.996 |
| ADD HYD | 101.20 | 4& 3 | 2 | 3.39870 | 129.41 | 208.478 | 1.15013 | 10.900 | .059 | |
| ADD HYD | 340.00 | 5& 2 | 3 | 3.79347 | 433.35 | 223.503 | 1.10471 | 5.650 | .178 | |
| COMPUTE NM HYD | 350.00 | - | 1 | .03125 | 42.16 | 1.961 | 1.17667 | 5.600 | 2.108 | PER IMP= 26.00 |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = ccisadi.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= | .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= | 2.660 |
| COMPUTE NM HYD | 701.00 | - | 1 | .06100 | 46.81 | 1.429 | .43936 | 5.600 | 1.199 | PER IMP= | .00 |
| ROUTE | 801.00 | 1 | 2 | .06100 | 44.27 | 1.429 | .43928 | 5.633 | 1.134 | | |
| COMPUTE NM HYD | 702.00 | - | 3 | .03050 | 29.10 | .864 | .53100 | 5.550 | 1.491 | PER IMP= | 2.20 |
| ADD HYD | 802.00 | 2& 3 | 1 | .09150 | 71.72 | 2.287 | .46859 | 5.600 | 1.225 | | |
| COMPUTE NM HYD | 703.00 | - | 2 | .01970 | 17.56 | .525 | .49966 | 5.550 | 1.393 | PER IMP= | 2.30 |
| ROUTE | 803.00 | 2 | 3 | .01970 | 14.53 | .521 | .49546 | 5.633 | 1.152 | | |
| ADD HYD | 804.00 | 1& 3 | 2 | .11120 | 85.54 | 2.807 | .47335 | 5.600 | 1.202 | | |
| ROUTE | 805.00 | 2 | 1 | .11120 | 81.52 | 2.807 | .47328 | 5.633 | 1.145 | | |
| COMPUTE NM HYD | 704.00 | - | 2 | .01970 | 17.45 | .510 | .48511 | 5.550 | 1.384 | PER IMP= | 1.30 |
| ADD HYD | 806.00 | 2& 1 | 3 | .13090 | 96.40 | 3.314 | .47471 | 5.633 | 1.151 | | |
| COMPUTE NM HYD | 705.00 | - | 1 | .00410 | 9.23 | .371 | 1.69626 | 5.550 | 3.519 | PER IMP= | 45.00 |
| ADD HYD | 807.00 | 1& 3 | 5 | .13500 | 103.44 | 3.669 | .50952 | 5.633 | 1.197 | | |
| DIVIDE HYD | 807.10 | 5 | 3 | .01539 | 11.79 | .418 | .50952 | 5.633 | 1.197 | | |
| | 807.20 | AND | 1 | .11961 | 91.65 | 3.250 | .50952 | 5.633 | 1.197 | | |
| ADD HYD | 807.30 | 3& 5 | 6 | .15039 | 115.24 | 4.087 | .50952 | 5.633 | 1.197 | | |
| ROUTE | 808.00 | 6 | 2 | .15039 | 114.03 | 4.086 | .50945 | 5.633 | 1.185 | | |
| COMPUTE NM HYD | 132.10 | - | 4 | .04496 | 82.76 | 4.587 | 1.91333 | 5.600 | 2.876 | PER IMP= | 66.00 |
| COMPUTE NM HYD | 132.20 | - | 1 | .02640 | 15.22 | .619 | .43936 | 5.650 | .901 | PER IMP= | .00 |
| DIVIDE HYD | 132.30 | 1 | 3 | .00301 | 1.73 | .071 | .43936 | 5.650 | .901 | | |
| | 131.40 | AND | 5 | .02339 | 13.48 | .548 | .43936 | 5.650 | .901 | | |
| ADD HYD | 133.00 | 3& 1 | 5 | .02941 | 16.95 | .689 | .43934 | 5.650 | .901 | | |
| ADD HYD | 706.00 | 5& 4 | 3 | .07437 | 99.35 | 5.277 | 1.33036 | 5.600 | 2.087 | | |
| ADD HYD | 134.00 | 2& 4 | 5 | .19535 | 195.39 | 8.404 | .80664 | 5.633 | 1.563 | | |
| COMPUTE NM HYD | 710.00 | - | 2 | .02870 | 23.59 | .673 | .43936 | 5.550 | 1.284 | PER IMP= | .00 |
| COMPUTE NM HYD | 711.00 | - | 8 | .02200 | 18.08 | .516 | .43936 | 5.550 | 1.284 | PER IMP= | .00 |
| ADD HYD | 810.00 | 2& 8 | 9 | .05070 | 41.67 | 1.188 | .43936 | 5.550 | 1.284 | | |
| DIVIDE HYD | 811.00 | 9 | 10 | .00654 | 5.38 | .153 | .43936 | 5.550 | 1.284 | | |
| | 812.00 | AND | 11 | .04416 | 36.30 | 1.035 | .43936 | 5.550 | 1.284 | | |
| ADD HYD | 813.00 | 9&10 | 11 | .05724 | 47.05 | 1.341 | .43935 | 5.550 | 1.284 | | |
| ROUTE RESERVOIR | 901.00 | 11 | 8 | .05724 | 4.28 | 1.341 | .43935 | 6.050 | .117 | AC-FT= | 1.004 |
| ROUTE RESERVOIR | 1901.00 | 11 | 7 | .05724 | .00 | .005 | .00175 | 9.150 | .000 | AC-FT= | 1.341 |
| ROUTE | 138.00 | 8 | 9 | .05724 | 4.28 | 1.330 | .43565 | 6.067 | .117 | | |
| COMPUTE NM HYD | 141.10 | - | 6 | .00109 | 2.35 | .102 | 1.76218 | 5.550 | 3.374 | PER IMP= | 58.00 |
| COMPUTE NM HYD | 141.20 | - | 1 | .00144 | 3.10 | .135 | 1.76218 | 5.550 | 3.370 | PER IMP= | 58.00 |
| ADD HYD | 141.30 | 1& 6 | 2 | .00253 | 5.45 | .237 | 1.76193 | 5.550 | 3.372 | | |
| ROUTE | 142.00 | 2 | 3 | .00253 | 5.29 | .224 | 1.66446 | 5.567 | 3.269 | | |
| COMPUTE NM HYD | 141.40 | - | 1 | .00052 | 1.12 | .049 | 1.76218 | 5.550 | 3.396 | PER IMP= | 58.00 |
| ADD HYD | 142.10 | 1& 3 | 2 | .00304 | 6.37 | .270 | 1.66417 | 5.567 | 3.270 | | |
| ADD HYD | 143.00 | 9& 2 | 1 | .06028 | 8.29 | 1.600 | .49766 | 5.600 | .215 | | |
| ROUTE | 144.00 | 1 | 3 | .06028 | 8.26 | 1.600 | .49762 | 5.633 | .214 | | |
| COMPUTE NM HYD | 141.50 | - | 1 | .00067 | 1.46 | .063 | 1.76218 | 5.550 | 3.387 | PER IMP= | 58.00 |
| ADD HYD | 142.10 | 1& 3 | 4 | .06096 | 9.56 | 1.660 | .51047 | 5.600 | .245 | | |
| ROUTE | 145.00 | 4 | 2 | .06096 | 9.49 | 1.659 | .51037 | 5.633 | .243 | | |
| ROUTE | 145.10 | 2 | 3 | .06096 | 9.52 | 1.659 | .51027 | 5.633 | .244 | | |
| COMPUTE NM HYD | 145.20 | - | 1 | .00175 | 3.78 | .165 | 1.76218 | 5.550 | 3.368 | PER IMP= | 58.00 |
| DIVIDE HYD | 145.30 | 1 | 13 | .00164 | 2.60 | .154 | 1.76200 | 5.500 | 2.483 | | |
| | 145.40 | AND | 14 | .00012 | 1.18 | .011 | 1.76200 | 5.550 | 15.780 | | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 145.50 | 14 | 4 | .00012 | .69 | .011 | 1.80858 | 5.600 | 9.239 | |
| ADD HYD | 145.60 | 3&13 | 6 | .06259 | 12.12 | 1.803 | .54018 | 5.633 | .303 | |
| ROUTE | 145.70 | 6 | 2 | .06259 | 12.11 | 1.803 | .54011 | 5.633 | .302 | |
| COMPUTE NM HYD | 146.00 | - | 3 | .00069 | 1.49 | .065 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ADD HYD | 146.10 | 3& 4 | 1 | .00081 | 2.03 | .072 | 1.68516 | 5.567 | 3.937 | |
| ADD HYD | 146.20 | 1& 2 | 1 | .06340 | 13.85 | 1.875 | .55466 | 5.633 | .341 | |
| ROUTE | 146.30 | 1 | 2 | .06340 | 13.87 | 1.875 | .55464 | 5.633 | .342 | |
| COMPUTE NM HYD | 146.40 | - | 3 | .00522 | 11.23 | .491 | 1.76218 | 5.550 | 3.359 | PER IMP= 58.00 |
| DIVIDE HYD | 146.50 | 3 | 13 | .00500 | 8.60 | .470 | 1.76212 | 5.500 | 2.689 | |
| | 146.60 | AND | 14 | .00023 | 2.63 | .021 | 1.76212 | 5.550 | 18.192 | |
| ADD HYD | 147.00 | 2&13 | 4 | .06840 | 22.31 | 2.318 | .63538 | 5.600 | .510 | |
| ROUTE | 147.10 | 4 | 2 | .06840 | 22.28 | 2.318 | .63536 | 5.600 | .509 | |
| ADD HYD | 148.00 | 14& 2 | 3 | .06862 | 23.68 | 2.337 | .63862 | 5.600 | .539 | |
| ROUTE | 148.10 | 3 | 2 | .06862 | 23.67 | 2.337 | .63863 | 5.600 | .539 | |
| ADD HYD | 149.00 | 5& 2 | 19 | .26397 | 217.60 | 10.741 | .76297 | 5.633 | 1.288 | |
| COMPUTE NM HYD | 720.00 | - | 2 | .01990 | 18.12 | .512 | .48230 | 5.550 | 1.422 | PER IMP= .00 |
| COMPUTE NM HYD | 721.00 | - | 4 | .00540 | 4.44 | .127 | .43936 | 5.550 | 1.285 | PER IMP= .00 |
| ADD HYD | 820.00 | 4& 2 | 1 | .02530 | 22.56 | .638 | .47313 | 5.550 | 1.393 | |
| COMPUTE NM HYD | 722.00 | - | 3 | .05875 | 52.26 | 1.479 | .47195 | 5.550 | 1.390 | PER IMP= .00 |
| ADD HYD | 821.00 | 3& 1 | 2 | .08405 | 74.82 | 2.117 | .47230 | 5.550 | 1.391 | |
| DIVIDE HYD | 822.00 | 2 | 4 | .02034 | 18.11 | .512 | .47230 | 5.550 | 1.391 | |
| | 823.00 | AND | 5 | .06371 | 56.71 | 1.605 | .47230 | 5.550 | 1.391 | |
| ADD HYD | 824.00 | 2& 4 | 5 | .10439 | 92.92 | 2.630 | .47230 | 5.550 | 1.391 | |
| ROUTE RESERVOIR | 902.00 | 5 | 4 | .10439 | 18.94 | 2.502 | .44948 | 5.900 | .284 | AC-FT= 1.718 |
| ROUTE RESERVOIR | 1902.00 | 5 | 6 | .10439 | .01 | .011 | .00189 | 9.350 | .000 | AC-FT= 2.628 |
| ROUTE | 151.00 | 4 | 2 | .10439 | 19.04 | 2.312 | .41521 | 5.867 | .285 | |
| COMPUTE NM HYD | 152.00 | - | 4 | .00070 | 1.52 | .066 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ROUTE | 153.00 | 4 | 5 | .00070 | 1.46 | .062 | 1.66479 | 5.567 | 3.268 | |
| COMPUTE NM HYD | 154.00 | - | 4 | .00140 | 3.02 | .131 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ROUTE | 155.00 | 4 | 6 | .00140 | 2.90 | .124 | 1.66482 | 5.567 | 3.241 | |
| ADD HYD | 156.00 | 5& 6 | 4 | .00210 | 4.36 | .186 | 1.66481 | 5.567 | 3.250 | |
| ROUTE | 157.00 | 4 | 5 | .00210 | 4.40 | .186 | 1.66438 | 5.567 | 3.281 | |
| COMPUTE NM HYD | 158.00 | - | 4 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 159.00 | 4 | 6 | .00102 | 2.12 | .091 | 1.66484 | 5.567 | 3.252 | |
| ADD HYD | 160.00 | 5& 6 | 4 | .00312 | 6.53 | .277 | 1.66453 | 5.567 | 3.271 | |
| COMPUTE NM HYD | 161.00 | - | 5 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 162.00 | 5 | 6 | .00102 | 2.12 | .091 | 1.66485 | 5.567 | 3.251 | |
| ADD HYD | 163.00 | 4& 6 | 5 | .00414 | 8.65 | .368 | 1.66461 | 5.567 | 3.266 | |
| ROUTE | 164.00 | 5 | 4 | .00414 | 8.70 | .367 | 1.66439 | 5.567 | 3.283 | |
| ADD HYD | 165.00 | 2& 4 | 5 | .10853 | 23.97 | 2.679 | .46286 | 5.667 | .345 | |
| ROUTE | 166.00 | 5 | 2 | .10853 | 23.65 | 2.678 | .46273 | 5.667 | .341 | |
| COMPUTE NM HYD | 167.00 | - | 4 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 168.00 | 4 | 5 | .00132 | 2.74 | .117 | 1.66480 | 5.567 | 3.243 | |
| ADD HYD | 169.00 | 2& 5 | 4 | .10985 | 25.52 | 2.795 | .47715 | 5.667 | .363 | |
| COMPUTE NM HYD | 170.00 | - | 2 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 171.00 | 2 | 5 | .00132 | 2.73 | .117 | 1.66482 | 5.567 | 3.242 | |
| ADD HYD | 172.00 | 4& 5 | 2 | .11117 | 27.39 | 2.912 | .49123 | 5.667 | .385 | |
| ROUTE | 173.00 | 2 | 6 | .11117 | 27.53 | 2.911 | .49107 | 5.700 | .387 | |
| COMPUTE NM HYD | 174.00 | - | 4 | .01297 | 28.24 | 1.245 | 1.79997 | 5.550 | 3.403 | PER IMP= 60.00 |
| ROUTE RESERVOIR | 509.00 | 4 | 5 | .01297 | 8.19 | 1.228 | 1.77483 | 5.900 | .987 | AC-FT= .571 |
| COMPUTE NM HYD | 175.00 | - | 2 | .01156 | 9.51 | .271 | .43936 | 5.550 | 1.285 | PER IMP= .00 |
| DIVIDE HYD | 731.00 | 2 | 1 | .00149 | 1.23 | .035 | .43935 | 5.550 | 1.285 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 732.00 | AND | 3 | .01007 | 8.28 | .236 | .43935 | 5.550 | 1.285 |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ADD HYD | 830.00 | 2& 1 | 3 | .01305 | 10.73 | .306 | .43933 | 5.550 | 1.285 | |
| ROUTE RESERVOIR | 510.00 | 3 | 4 | .01305 | 3.13 | .306 | .43933 | 5.800 | .375 | AC-FT= .166 |
| ADD HYD | 176.00 | 5& 4 | 2 | .02602 | 11.30 | 1.533 | 1.10487 | 5.900 | .678 | |
| ROUTE | 177.00 | 2 | 4 | .02602 | 11.31 | 1.437 | 1.03508 | 5.900 | .679 | |
| ADD HYD | 178.00 | 6& 4 | 2 | .13719 | 37.20 | 4.348 | .59427 | 5.700 | .424 | |
| ROUTE | 179.00 | 2 | 4 | .13719 | 37.47 | 4.347 | .59416 | 5.700 | .427 | |
| COMPUTE NM HYD | 180.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 424.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 425.00 | 12& 2 | 13 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 426.00 | - | 5 | .00136 | 2.93 | .128 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| DIVIDE HYD | 427.00 | 5 | 16 | .00133 | 2.50 | .125 | 1.76196 | 5.500 | 2.932 | |
| | 428.00 | AND | 17 | .00002 | .43 | .002 | 1.76196 | 5.550 | 26.844 | |
| ADD HYD | 429.00 | 13&17 | 14 | .00209 | 4.89 | .197 | 1.76189 | 5.550 | 3.656 | |
| ROUTE | 181.00 | 14 | 13 | .00209 | 4.63 | .186 | 1.66484 | 5.567 | 3.461 | |
| ROUTE | 430.00 | 16 | 15 | .00133 | 2.52 | .118 | 1.66491 | 5.533 | 2.958 | |
| COMPUTE NM HYD | 182.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 432.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 433.00 | 2&12 | 10 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 434.00 | - | 5 | .00210 | 4.52 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| DIVIDE HYD | 435.00 | 5 | 17 | .00207 | 4.00 | .195 | 1.76204 | 5.550 | 3.013 | |
| | 436.00 | AND | 18 | .00002 | .52 | .002 | 1.76204 | 5.550 | 33.969 | |
| ROUTE | 437.00 | 17 | 20 | .00207 | 4.03 | .184 | 1.66574 | 5.600 | 3.039 | |
| ADD HYD | 183.00 | 10&18 | 12 | .00209 | 4.98 | .196 | 1.76189 | 5.550 | 3.725 | |
| ADD HYD | 438.00 | 13&12 | 6 | .00418 | 9.29 | .371 | 1.66419 | 5.567 | 3.471 | |
| ROUTE | 184.00 | 6 | 5 | .00418 | 9.30 | .371 | 1.66419 | 5.567 | 3.473 | |
| ADD HYD | 185.00 | 4& 5 | 2 | .14137 | 42.40 | 4.719 | .62582 | 5.700 | .469 | |
| ROUTE | 186.00 | 2 | 4 | .14137 | 42.34 | 4.718 | .62568 | 5.700 | .468 | |
| ROUTE | 187.00 | 4 | 8 | .14137 | 42.07 | 4.716 | .62553 | 5.700 | .465 | |
| COMPUTE NM HYD | 188.00 | - | 9 | .00384 | 9.79 | .465 | 2.27230 | 5.550 | 3.986 | PER IMP= 85.00 |
| COMPUTE NM HYD | 189.00 | - | 2 | .00689 | 12.55 | .365 | .99307 | 5.550 | 2.848 | PER IMP= .00 |
| ADD HYD | 190.00 | 9& 2 | 10 | .01072 | 22.34 | .830 | 1.45077 | 5.550 | 3.255 | |
| ADD HYD | 191.00 | 19&10 | 4 | .27469 | 234.83 | 11.540 | .78773 | 5.633 | 1.336 | |
| ROUTE RESERVOIR | 511.00 | 4 | 2 | .27469 | 9.19 | 8.277 | .56499 | 7.133 | .052 | AC-FT= 8.469 |
| ROUTE | 192.00 | 2 | 4 | .27469 | 9.19 | 8.266 | .56421 | 7.167 | .052 | |
| ADD HYD | 193.00 | 4&20 | 6 | .27677 | 9.54 | 8.450 | .57247 | 6.100 | .054 | |
| ADD HYD | 194.00 | 15& 6 | 16 | .27810 | 10.24 | 8.568 | .57770 | 5.867 | .058 | |
| ROUTE | 195.00 | 16 | 2 | .27810 | 10.26 | 8.567 | .57758 | 5.833 | .058 | |
| ADD HYD | 196.00 | 8& 2 | 4 | .41947 | 50.09 | 13.283 | .59374 | 5.733 | .187 | |
| ROUTE | 197.00 | 4 | 3 | .41947 | 50.25 | 13.280 | .59359 | 5.733 | .187 | |
| COMPUTE NM HYD | 198.00 | - | 1 | .00185 | 3.99 | .174 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| ADD HYD | 199.00 | 3& 1 | 2 | .42132 | 52.18 | 13.436 | .59795 | 5.733 | .194 | |
| ROUTE | 200.00 | 2 | 8 | .42132 | 51.93 | 13.433 | .59780 | 5.733 | .193 | |
| COMPUTE NM HYD | 201.00 | - | 1 | .00214 | 4.60 | .201 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 202.00 | 8& 1 | 2 | .42346 | 54.15 | 13.618 | .60298 | 5.733 | .200 | |
| COMPUTE NM HYD | 203.00 | - | 1 | .00140 | 3.02 | .132 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 204.00 | 2& 1 | 10 | .42486 | 55.62 | 13.742 | .60648 | 5.733 | .205 | |
| ROUTE | 205.00 | 10 | 8 | .42486 | 55.57 | 13.743 | .60650 | 5.733 | .204 | |
| COMPUTE NM HYD | 206.00 | - | 3 | .06690 | 58.72 | 1.745 | .48894 | 5.550 | 1.371 | PER IMP= 2.00 |
| DIVIDE HYD | 741.00 | 3 | 4 | .00803 | 7.05 | .209 | .48893 | 5.550 | 1.371 | |
| | 742.00 | AND | 5 | .05887 | 51.67 | 1.535 | .48893 | 5.550 | 1.371 | |
| ADD HYD | 840.00 | 3& 4 | 2 | .07493 | 65.77 | 1.954 | .48893 | 5.550 | 1.371 | |
| ROUTE RESERVOIR | 513.00 | 2 | 4 | .07493 | 5.98 | 1.573 | .39364 | 6.100 | .125 | AC-FT= 1.523 |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| COMPUTE NM HYD | 207.00 | - | 3 | .00382 | 10.14 | .490 | 2.40456 | 5.550 | 4.148 | PER IMP= 92.00 |
| ROUTE | 208.00 | 3 | 6 | .00382 | 9.75 | .458 | 2.24962 | 5.567 | 3.990 | |
| COMPUTE NM HYD | 209.00 | - | 3 | .00046 | 1.24 | .059 | 2.40456 | 5.550 | 4.190 | PER IMP= 92.00 |
| ADD HYD | 210.00 | 6& 3 | 7 | .00428 | 10.94 | .514 | 2.24905 | 5.567 | 3.993 | |
| COMPUTE NM HYD | 211.00 | - | 5 | .00117 | 3.11 | .150 | 2.40456 | 5.550 | 4.162 | PER IMP= 92.00 |
| ADD HYD | 212.00 | 7& 5 | 6 | .00545 | 13.93 | .654 | 2.24924 | 5.567 | 3.992 | |
| ROUTE | 213.00 | 6 | 5 | .00545 | 13.95 | .654 | 2.24793 | 5.567 | 3.999 | |
| ADD HYD | 214.00 | 4& 5 | 3 | .08038 | 14.32 | 1.976 | .46088 | 5.567 | .278 | |
| ROUTE | 215.00 | 3 | 4 | .08038 | 14.33 | 1.975 | .46080 | 5.567 | .278 | |
| ADD HYD | 216.00 | 8& 4 | 3 | .50524 | 64.46 | 15.718 | .58332 | 5.733 | .199 | |
| ROUTE | 217.00 | 3 | 2 | .50524 | 64.28 | 15.716 | .58323 | 5.733 | .199 | |
| COMPUTE NM HYD | 218.00 | - | 3 | .00144 | 3.11 | .136 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 219.00 | 2& 3 | 4 | .50668 | 65.79 | 15.838 | .58609 | 5.733 | .203 | |
| COMPUTE NM HYD | 221.00 | - | 3 | .00100 | 2.15 | .094 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ADD HYD | 222.00 | 4& 3 | 2 | .50768 | 66.83 | 15.926 | .58820 | 5.733 | .206 | |
| ROUTE | 223.00 | 2 | 15 | .50768 | 66.73 | 15.924 | .58812 | 5.767 | .205 | |
| COMPUTE NM HYD | 224.00 | - | 3 | .01452 | 12.73 | .379 | .48894 | 5.550 | 1.370 | PER IMP= 2.00 |
| DIVIDE HYD | 751.00 | 3 | 4 | .00174 | 1.53 | .045 | .48892 | 5.550 | 1.370 | |
| | 752.00 | AND | 5 | .01278 | 11.20 | .333 | .48892 | 5.550 | 1.370 | |
| ADD HYD | 850.00 | 3& 4 | 3 | .01627 | 14.26 | .423 | .48783 | 5.550 | 1.370 | |
| ROUTE RESERVOIR | 514.00 | 3 | 2 | .01627 | .91 | .423 | .48783 | 6.250 | .087 | AC-FT= .329 |
| ADD HYD | 225.00 | 15& 2 | 3 | .52394 | 67.55 | 16.331 | .58443 | 5.767 | .201 | |
| ROUTE | 226.00 | 3 | 2 | .52394 | 67.56 | 16.326 | .58426 | 5.767 | .201 | |
| COMPUTE NM HYD | 227.00 | - | 3 | .00210 | 4.51 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 228.00 | 2& 3 | 4 | .52604 | 69.49 | 16.507 | .58837 | 5.767 | .206 | |
| ROUTE | 229.00 | 4 | 6 | .52604 | 69.45 | 16.505 | .58832 | 5.767 | .206 | |
| COMPUTE NM HYD | 230.00 | - | 5 | .00066 | 1.42 | .062 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ADD HYD | 231.00 | 6& 5 | 14 | .52669 | 70.06 | 16.559 | .58950 | 5.767 | .208 | |
| COMPUTE NM HYD | 232.00 | - | 6 | .00275 | 5.92 | .258 | 1.76218 | 5.550 | 3.363 | PER IMP= 58.00 |
| COMPUTE NM HYD | 234.00 | - | 3 | .01559 | 13.67 | .407 | .48894 | 5.550 | 1.370 | PER IMP= 2.00 |
| DIVIDE HYD | 761.00 | 3 | 4 | .00187 | 1.64 | .049 | .48892 | 5.550 | 1.370 | |
| | 762.00 | AND | 5 | .01372 | 12.03 | .358 | .48892 | 5.550 | 1.370 | |
| ADD HYD | 860.00 | 3& 4 | 2 | .01747 | 15.31 | .454 | .48784 | 5.550 | 1.370 | |
| ROUTE RESERVOIR | 906.00 | 2 | 1 | .01747 | .86 | .454 | .48784 | 6.300 | .077 | AC-FT= .361 |
| ROUTE RESERVOIR | 1906.00 | 2 | 7 | .01747 | .00 | .003 | .00321 | 28.200 | .000 | AC-FT= .452 |
| ADD HYD | 233.00 | 6& 1 | 5 | .02021 | 6.24 | .713 | .66112 | 5.550 | .482 | |
| ADD HYD | 235.00 | 14& 5 | 3 | .54691 | 74.69 | 17.238 | .59098 | 5.633 | .213 | |
| ROUTE | 236.10 | 3 | 2 | .54691 | 74.73 | 17.238 | .59100 | 5.633 | .213 | |
| COMPUTE NM HYD | 236.20 | - | 4 | .00195 | 5.20 | .247 | 2.37601 | 5.550 | 4.169 | PER IMP= 88.50 |
| ADD HYD | 236.30 | 4& 2 | 3 | .54886 | 78.60 | 17.468 | .59674 | 5.633 | .224 | |
| ROUTE | 236.00 | 3 | 2 | .54886 | 78.83 | 17.468 | .59674 | 5.633 | .224 | |
| ROUTE | 237.00 | 2 | 4 | .54886 | 77.75 | 17.457 | .59637 | 5.633 | .221 | |
| COMPUTE NM HYD | 237.10 | - | 1 | .00340 | 8.30 | .364 | 2.00879 | 5.550 | 3.816 | PER IMP= 65.00 |
| ROUTE | 237.20 | 1 | 2 | .00340 | 7.99 | .344 | 1.89926 | 5.567 | 3.674 | |
| COMPUTE NM HYD | 237.30 | - | 1 | .00090 | 1.98 | .080 | 1.67706 | 5.550 | 3.432 | PER IMP= 48.00 |
| ADD HYD | 237.40 | 2& 1 | 3 | .00430 | 9.90 | .421 | 1.83550 | 5.567 | 3.597 | |
| ROUTE | 237.50 | 3 | 1 | .00430 | 9.94 | .421 | 1.83470 | 5.567 | 3.613 | |
| COMPUTE NM HYD | 237.60 | - | 2 | .00190 | 4.75 | .213 | 2.10254 | 5.550 | 3.910 | PER IMP= 71.00 |
| ADD HYD | 237.70 | 1& 2 | 3 | .00620 | 14.51 | .622 | 1.88000 | 5.567 | 3.656 | |
| ADD HYD | 237.80 | 4& 3 | 1 | .55506 | 89.84 | 18.079 | .61071 | 5.633 | .253 | |
| ROUTE | 237.90 | 1 | 10 | .55506 | 88.88 | 18.067 | .61033 | 5.633 | .250 | |
| COMPUTE NM HYD | 238.00 | - | 2 | .09266 | 44.13 | 2.523 | .51053 | 5.700 | .744 | PER IMP= 2.50 |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 239.00 | 2 | 11 | .09266 | 44.06 | 2.501 | .50618 | 5.733 | .743 | |
| COMPUTE NM HYD | 310.00 | - | 2 | .07940 | 95.36 | 4.048 | .95602 | 5.600 | 1.876 | PER IMP= 20.00 |
| ROUTE | 310.10 | 2 | 4 | .07940 | 90.85 | 4.048 | .95602 | 5.650 | 1.788 | |
| ADD HYD | 310.20 | 11& 4 | 2 | .17206 | 129.94 | 6.403 | .69774 | 5.667 | 1.180 | |
| ROUTE | 242.00 | 2 | 3 | .17206 | 129.94 | 6.400 | .69747 | 5.667 | 1.180 | |
| COMPUTE NM HYD | 320.00 | - | 2 | .02520 | 32.88 | 1.206 | .89758 | 5.550 | 2.039 | PER IMP= 19.00 |
| ADD HYD | 320.10 | 2& 3 | 4 | .19726 | 153.29 | 7.563 | .71889 | 5.633 | 1.214 | |
| COMPUTE NM HYD | 330.00 | - | 2 | .11580 | 144.54 | 5.549 | .89854 | 5.600 | 1.950 | PER IMP= 14.00 |
| ADD HYD | 330.30 | 4& 2 | 3 | .31306 | 288.63 | 12.966 | .77658 | 5.600 | 1.441 | |
| COMPUTE NM HYD | 340.00 | - | 2 | .00260 | 6.44 | .302 | 2.17784 | 5.550 | 3.872 | PER IMP= 80.00 |
| ADD HYD | 340.10 | 2& 3 | 3 | .31566 | 294.30 | 13.249 | .78697 | 5.600 | 1.457 | |
| ADD HYD | 330.40 | 3&10 | 2 | .87071 | 382.29 | 31.316 | .67437 | 5.633 | .686 | |
| ROUTE RESERVOIR | 517.00 | 2 | 5 | .87071 | 372.43 | 31.255 | .67304 | 5.667 | .668 | AC-FT= 1.209 |
| RECALL HYD | 101.10 | - | 4 | 3.31900 | 127.34 | 203.557 | 1.14995 | 11.200 | .060 | |
| COMPUTE NM HYD | 100.00 | - | 1 | .05680 | 95.36 | 3.518 | 1.16137 | 5.550 | 2.623 | PER IMP= 26.20 |
| COMPUTE NM HYD | 200.00 | - | 2 | .02290 | 38.46 | 1.418 | 1.16137 | 5.550 | 2.624 | PER IMP= 26.20 |
| ADD HYD | 300.00 | 2& 1 | 2 | .07970 | 133.82 | 4.937 | 1.16136 | 5.550 | 2.624 | |
| ROUTE RESERVOIR | 400.00 | 2 | 3 | .07970 | 18.99 | 4.921 | 1.15774 | 6.100 | .372 | AC-FT= 2.996 |
| ADD HYD | 101.20 | 4& 3 | 2 | 3.39870 | 129.41 | 208.478 | 1.15013 | 10.900 | .059 | |
| ADD HYD | 340.00 | 5& 2 | 3 | 4.26941 | 434.40 | 175.793 | .77203 | 5.667 | .159 | |
| COMPUTE NM HYD | 350.00 | - | 1 | .03125 | 42.16 | 1.961 | 1.17667 | 5.600 | 2.108 | PER IMP= 26.00 |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = ccisadla.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= | .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= | 2.660 |
| COMPUTE NM HYD | 101.00 | - | 1 | .02344 | 54.50 | 2.486 | 1.98890 | 5.550 | 3.633 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 501.00 | 1 | 2 | .02344 | 10.23 | 2.480 | 1.98426 | 6.100 | .682 | AC-FT= | 1.265 |
| ROUTE | 102.00 | 2 | 3 | .02344 | 10.18 | 2.305 | 1.84426 | 6.167 | .679 | | |
| COMPUTE NM HYD | 103.00 | - | 5 | .00206 | 5.18 | .244 | 2.21563 | 5.550 | 3.921 | PER IMP= | 82.00 |
| ADD HYD | 104.00 | 3& 5 | 6 | .02550 | 11.28 | 2.533 | 1.86263 | 6.033 | .691 | | |
| COMPUTE NM HYD | 105.00 | - | 5 | .00078 | 1.96 | .092 | 2.21562 | 5.550 | 3.940 | PER IMP= | 82.00 |
| ADD HYD | 106.00 | 6& 5 | 3 | .02628 | 11.77 | 2.619 | 1.86895 | 6.000 | .700 | | |
| ROUTE | 107.00 | 3 | 2 | .02628 | 11.77 | 2.619 | 1.86877 | 6.000 | .700 | | |
| COMPUTE NM HYD | 108.00 | - | 1 | .04781 | 111.17 | 5.072 | 1.98890 | 5.550 | 3.633 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 502.00 | 1 | 3 | .04781 | 20.87 | 5.060 | 1.98433 | 6.100 | .682 | AC-FT= | 2.579 |
| ROUTE | 109.00 | 3 | 4 | .04781 | 20.86 | 4.713 | 1.84839 | 6.100 | .682 | | |
| ADD HYD | 110.00 | 2& 4 | 3 | .07409 | 32.55 | 7.333 | 1.85562 | 6.067 | .686 | | |
| COMPUTE NM HYD | 111.00 | - | 2 | .00078 | 1.70 | .074 | 1.76218 | 5.550 | 3.385 | PER IMP= | 58.00 |
| ADD HYD | 112.00 | 3& 2 | 4 | .07487 | 32.90 | 7.400 | 1.85312 | 6.067 | .687 | | |
| ROUTE | 113.00 | 4 | 2 | .07487 | 32.86 | 7.392 | 1.85110 | 6.100 | .686 | | |
| COMPUTE NM HYD | 114.00 | - | 3 | .00365 | 7.85 | .343 | 1.76218 | 5.550 | 3.361 | PER IMP= | 58.00 |
| ADD HYD | 115.00 | 2& 3 | 4 | .07852 | 34.49 | 7.714 | 1.84200 | 6.033 | .686 | | |
| COMPUTE NM HYD | 116.00 | - | 2 | .01094 | 25.44 | 1.160 | 1.98890 | 5.550 | 3.634 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 503.00 | 2 | 3 | .01094 | 4.77 | 1.158 | 1.98433 | 6.100 | .682 | AC-FT= | .590 |
| ROUTE | 117.00 | 3 | 2 | .01094 | 4.69 | 1.075 | 1.84250 | 6.233 | .670 | | |
| COMPUTE NM HYD | 118.00 | - | 3 | .00301 | 7.54 | .355 | 2.21562 | 5.550 | 3.917 | PER IMP= | 82.00 |
| ADD HYD | 119.00 | 2& 3 | 5 | .01395 | 8.12 | 1.408 | 1.89282 | 5.567 | .910 | | |
| COMPUTE NM HYD | 120.00 | - | 2 | .02016 | 43.89 | 1.935 | 1.79997 | 5.550 | 3.402 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 504.00 | 2 | 3 | .02016 | 8.62 | 1.932 | 1.79701 | 6.100 | .668 | AC-FT= | .976 |
| ADD HYD | 121.00 | 5& 3 | 6 | .03410 | 14.92 | 3.216 | 1.76810 | 6.000 | .684 | | |
| COMPUTE NM HYD | 122.00 | - | 2 | .00067 | 1.69 | .079 | 2.21562 | 5.550 | 3.945 | PER IMP= | 82.00 |
| ADD HYD | 123.00 | 6& 2 | 3 | .03477 | 15.38 | 3.290 | 1.77379 | 5.967 | .691 | | |
| COMPUTE NM HYD | 124.00 | - | 2 | .02641 | 57.49 | 2.535 | 1.79997 | 5.550 | 3.402 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 505.00 | 2 | 1 | .02641 | 10.83 | 2.530 | 1.79641 | 6.100 | .641 | AC-FT= | 1.300 |
| ADD HYD | 125.00 | 3& 1 | 2 | .06118 | 26.12 | 5.656 | 1.73350 | 6.033 | .667 | | |
| ROUTE | 126.00 | 2 | 3 | .06118 | 26.12 | 5.656 | 1.73349 | 6.033 | .667 | | |
| ADD HYD | 127.00 | 4& 3 | 2 | .13970 | 60.61 | 13.370 | 1.79448 | 6.033 | .678 | | |
| ROUTE | 128.00 | 2 | 3 | .13970 | 60.62 | 13.370 | 1.79442 | 6.033 | .678 | | |
| COMPUTE NM HYD | 129.00 | - | 2 | .00532 | 11.43 | .500 | 1.76218 | 5.550 | 3.359 | PER IMP= | 58.00 |
| ADD HYD | 130.00 | 3& 2 | 4 | .14502 | 63.36 | 13.840 | 1.78940 | 5.933 | .683 | | |
| ROUTE | 131.00 | 4 | 3 | .14502 | 63.36 | 13.840 | 1.78942 | 5.933 | .683 | | |
| ROUTE | 132.00 | 3 | 7 | .14502 | 63.35 | 13.839 | 1.78933 | 5.967 | .683 | | |
| COMPUTE NM HYD | 133.00 | - | 4 | .07136 | 95.40 | 5.070 | 1.33224 | 5.600 | 2.089 | PER IMP= | 40.00 |
| ADD HYD | 134.00 | 7& 4 | 5 | .21638 | 155.07 | 18.648 | 1.61590 | 5.633 | 1.120 | | |
| COMPUTE NM HYD | 135.00 | - | 2 | .00984 | 22.90 | 1.044 | 1.98890 | 5.550 | 3.635 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 506.00 | 2 | 6 | .00984 | 4.29 | 1.042 | 1.98436 | 6.100 | .681 | AC-FT= | .531 |
| COMPUTE NM HYD | 136.00 | - | 3 | .00410 | 9.91 | .460 | 2.10226 | 5.550 | 3.777 | PER IMP= | 76.00 |
| ADD HYD | 137.00 | 6& 3 | 2 | .01394 | 11.98 | 1.501 | 2.01900 | 5.550 | 1.342 | | |
| COMPUTE NM HYD | 139.00 | - | 8 | .01531 | 33.35 | 1.470 | 1.79997 | 5.550 | 3.403 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 507.00 | 8 | 6 | .01531 | 6.16 | 1.468 | 1.79718 | 6.100 | .629 | AC-FT= | .757 |
| ADD HYD | 140.00 | 2& 6 | 4 | .02926 | 15.38 | 2.969 | 1.90290 | 5.600 | .821 | | |
| ROUTE | 138.00 | 4 | 9 | .02926 | 15.43 | 2.776 | 1.77906 | 5.600 | .824 | | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| COMPUTE NM HYD | 141.10 | - | 6 | .00109 | 2.35 | .102 | 1.76218 | 5.550 | 3.374 | PER IMP= 58.00 |
| COMPUTE NM HYD | 141.20 | - | 1 | .00144 | 3.10 | .135 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 141.30 | 1& 6 | 2 | .00253 | 5.45 | .237 | 1.76193 | 5.550 | 3.372 | |
| ROUTE | 142.00 | 2 | 3 | .00253 | 5.29 | .224 | 1.66446 | 5.567 | 3.269 | |
| COMPUTE NM HYD | 141.40 | - | 1 | .00052 | 1.12 | .049 | 1.76218 | 5.550 | 3.396 | PER IMP= 58.00 |
| ADD HYD | 142.10 | 1& 3 | 2 | .00304 | 6.37 | .270 | 1.66417 | 5.567 | 3.270 | |
| ADD HYD | 143.00 | 9& 2 | 1 | .03230 | 21.50 | 3.046 | 1.76823 | 5.567 | 1.040 | |
| ROUTE | 144.00 | 1 | 3 | .03230 | 21.48 | 3.046 | 1.76793 | 5.600 | 1.039 | |
| ROUTE | 145.00 | 3 | 2 | .03230 | 21.45 | 3.044 | 1.76721 | 5.600 | 1.038 | |
| ROUTE | 145.10 | 2 | 3 | .03230 | 21.46 | 3.044 | 1.76710 | 5.600 | 1.038 | |
| COMPUTE NM HYD | 145.20 | - | 1 | .00180 | 3.88 | .169 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| ADD HYD | 145.30 | 3& 1 | 6 | .03410 | 24.91 | 3.203 | 1.76121 | 5.600 | 1.142 | |
| ROUTE | 145.40 | 6 | 2 | .03410 | 24.97 | 3.203 | 1.76124 | 5.600 | 1.144 | |
| ADD HYD | 145.50 | 2& 5 | 6 | .25048 | 179.23 | 21.851 | 1.63569 | 5.600 | 1.118 | |
| COMPUTE NM HYD | 146.00 | - | 3 | .00200 | 4.31 | .188 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| COMPUTE NM HYD | 147.00 | - | 4 | .00400 | 8.60 | .376 | 1.76218 | 5.550 | 3.361 | PER IMP= 58.00 |
| ADD HYD | 148.00 | 3& 4 | 5 | .00600 | 12.91 | .564 | 1.76209 | 5.550 | 3.363 | |
| COMPUTE NM HYD | 148.10 | - | 3 | .00050 | 1.09 | .047 | 1.76218 | 5.550 | 3.401 | PER IMP= 58.00 |
| ADD HYD | 148.20 | 5& 3 | 4 | .00650 | 14.00 | .611 | 1.76206 | 5.550 | 3.366 | |
| ADD HYD | 149.00 | 6& 4 | 3 | .25698 | 191.70 | 22.426 | 1.63632 | 5.600 | 1.166 | |
| COMPUTE NM HYD | 150.00 | - | 2 | .05875 | 127.89 | 5.640 | 1.79997 | 5.550 | 3.401 | PER IMP= 60.00 |
| ROUTE RESERVOIR | 508.00 | 2 | 4 | .05875 | 24.08 | 5.629 | 1.79634 | 6.100 | .640 | AC-FT= 2.893 |
| ROUTE | 151.00 | 4 | 2 | .05875 | 24.07 | 5.265 | 1.68020 | 6.100 | .640 | |
| COMPUTE NM HYD | 152.00 | - | 4 | .00070 | 1.52 | .066 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ROUTE | 153.00 | 4 | 5 | .00070 | 1.46 | .062 | 1.66479 | 5.567 | 3.268 | |
| COMPUTE NM HYD | 154.00 | - | 4 | .00140 | 3.02 | .131 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ROUTE | 155.00 | 4 | 6 | .00140 | 2.90 | .124 | 1.66482 | 5.567 | 3.241 | |
| ADD HYD | 156.00 | 5& 6 | 4 | .00210 | 4.36 | .186 | 1.66481 | 5.567 | 3.250 | |
| ROUTE | 157.00 | 4 | 5 | .00210 | 4.40 | .186 | 1.66438 | 5.567 | 3.281 | |
| COMPUTE NM HYD | 158.00 | - | 4 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 159.00 | 4 | 6 | .00102 | 2.12 | .091 | 1.66484 | 5.567 | 3.252 | |
| ADD HYD | 160.00 | 5& 6 | 4 | .00312 | 6.53 | .277 | 1.66453 | 5.567 | 3.271 | |
| COMPUTE NM HYD | 161.00 | - | 5 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 162.00 | 5 | 6 | .00102 | 2.12 | .091 | 1.66485 | 5.567 | 3.251 | |
| ADD HYD | 163.00 | 4& 6 | 5 | .00414 | 8.65 | .368 | 1.66461 | 5.567 | 3.266 | |
| ROUTE | 164.00 | 5 | 4 | .00414 | 8.70 | .367 | 1.66439 | 5.567 | 3.283 | |
| ADD HYD | 165.00 | 2& 4 | 5 | .06289 | 26.08 | 5.632 | 1.67916 | 5.933 | .648 | |
| ROUTE | 166.00 | 5 | 2 | .06289 | 26.08 | 5.631 | 1.67881 | 5.900 | .648 | |
| COMPUTE NM HYD | 167.00 | - | 4 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 168.00 | 4 | 5 | .00132 | 2.74 | .117 | 1.66480 | 5.567 | 3.243 | |
| ADD HYD | 169.00 | 2& 5 | 4 | .06421 | 27.27 | 5.748 | 1.67853 | 5.700 | .664 | |
| COMPUTE NM HYD | 170.00 | - | 2 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 171.00 | 2 | 5 | .00132 | 2.73 | .117 | 1.66482 | 5.567 | 3.242 | |
| ADD HYD | 172.00 | 4& 5 | 2 | .06553 | 28.85 | 5.865 | 1.67825 | 5.700 | .688 | |
| ROUTE | 173.00 | 2 | 6 | .06553 | 28.87 | 5.864 | 1.67787 | 5.667 | .688 | |
| COMPUTE NM HYD | 174.00 | - | 4 | .01297 | 28.24 | 1.245 | 1.79997 | 5.550 | 3.403 | PER IMP= 60.00 |
| ROUTE RESERVOIR | 509.00 | 4 | 5 | .01297 | 8.19 | 1.228 | 1.77483 | 5.900 | .987 | AC-FT= .571 |
| COMPUTE NM HYD | 175.00 | - | 2 | .01156 | 23.47 | .994 | 1.61103 | 5.550 | 3.172 | PER IMP= 50.00 |
| ROUTE RESERVOIR | 510.00 | 2 | 4 | .01156 | 4.42 | .992 | 1.60835 | 6.100 | .597 | AC-FT= .515 |
| ADD HYD | 176.00 | 5& 4 | 2 | .02453 | 12.52 | 2.219 | 1.69636 | 5.900 | .797 | |
| ROUTE | 177.00 | 2 | 4 | .02453 | 12.52 | 2.063 | 1.57668 | 5.900 | .797 | |
| ADD HYD | 178.00 | 6& 4 | 2 | .09006 | 40.26 | 7.927 | 1.65030 | 5.900 | .699 | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 179.00 | 2 | 4 | .09006 | 40.26 | 7.925 | 1.65007 | 5.900 | .698 | |
| COMPUTE NM HYD | 180.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 424.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 425.00 | 12& 2 | 13 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 426.00 | - | 5 | .00136 | 2.93 | .128 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| DIVIDE HYD | 427.00 | 5 | 16 | .00133 | 2.50 | .125 | 1.76196 | 5.500 | 2.932 | |
| | 428.00 | AND | 17 | .00002 | .43 | .002 | 1.76196 | 5.550 | 26.844 | |
| ADD HYD | 429.00 | 13&17 | 14 | .00209 | 4.89 | .197 | 1.76189 | 5.550 | 3.656 | |
| ROUTE | 181.00 | 14 | 13 | .00209 | 4.63 | .186 | 1.66484 | 5.567 | 3.461 | |
| ROUTE | 430.00 | 16 | 15 | .00133 | 2.52 | .118 | 1.66491 | 5.533 | 2.958 | |
| COMPUTE NM HYD | 182.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 432.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 433.00 | 2&12 | 10 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 434.00 | - | 5 | .00210 | 4.52 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| DIVIDE HYD | 435.00 | 5 | 17 | .00207 | 4.00 | .195 | 1.76204 | 5.550 | 3.013 | |
| | 436.00 | AND | 18 | .00002 | .52 | .002 | 1.76204 | 5.550 | 33.969 | |
| ROUTE | 437.00 | 17 | 20 | .00207 | 4.03 | .184 | 1.66574 | 5.600 | 3.039 | |
| ADD HYD | 183.00 | 10&18 | 12 | .00209 | 4.98 | .196 | 1.76189 | 5.550 | 3.725 | |
| ADD HYD | 438.00 | 13&12 | 6 | .00418 | 9.29 | .371 | 1.66419 | 5.567 | 3.471 | |
| ROUTE | 184.00 | 6 | 5 | .00418 | 9.30 | .371 | 1.66419 | 5.567 | 3.473 | |
| ADD HYD | 185.00 | 4& 5 | 2 | .09424 | 44.14 | 8.297 | 1.65069 | 5.700 | .732 | |
| ROUTE | 186.00 | 2 | 4 | .09424 | 44.13 | 8.295 | 1.65044 | 5.733 | .732 | |
| ROUTE | 187.00 | 4 | 8 | .09424 | 44.13 | 8.294 | 1.65016 | 5.733 | .732 | |
| COMPUTE NM HYD | 188.00 | - | 9 | .00384 | 9.79 | .465 | 2.27230 | 5.550 | 3.986 | PER IMP= 85.00 |
| COMPUTE NM HYD | 189.00 | - | 2 | .00689 | 12.55 | .365 | .99307 | 5.550 | 2.848 | PER IMP= .00 |
| ADD HYD | 190.00 | 9& 2 | 10 | .01072 | 22.34 | .830 | 1.45077 | 5.550 | 3.255 | |
| ADD HYD | 191.00 | 3&10 | 4 | .26770 | 211.74 | 23.227 | 1.62683 | 5.600 | 1.236 | |
| ROUTE RESERVOIR | 511.00 | 4 | 2 | .26770 | 11.84 | 12.987 | .90965 | 9.467 | .069 | AC-FT= 16.222 |
| ROUTE | 192.00 | 2 | 4 | .26770 | 11.84 | 12.954 | .90730 | 9.500 | .069 | |
| ADD HYD | 193.00 | 4&20 | 6 | .26977 | 11.87 | 13.138 | .91313 | 9.467 | .069 | |
| ADD HYD | 194.00 | 15& 6 | 16 | .27110 | 11.89 | 13.256 | .91682 | 9.433 | .069 | |
| ROUTE | 195.00 | 16 | 2 | .27110 | 11.89 | 13.251 | .91645 | 9.467 | .069 | |
| ADD HYD | 196.00 | 8& 2 | 4 | .36535 | 54.02 | 21.545 | 1.10571 | 5.767 | .231 | |
| ROUTE | 197.00 | 4 | 3 | .36535 | 54.02 | 21.537 | 1.10529 | 5.767 | .231 | |
| COMPUTE NM HYD | 198.00 | - | 1 | .00185 | 3.99 | .174 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| ADD HYD | 199.00 | 3& 1 | 2 | .36720 | 55.73 | 21.671 | 1.10658 | 5.767 | .237 | |
| ROUTE | 200.00 | 2 | 8 | .36720 | 55.53 | 21.664 | 1.10622 | 5.800 | .236 | |
| COMPUTE NM HYD | 201.00 | - | 1 | .00214 | 4.60 | .201 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 202.00 | 8& 1 | 2 | .36933 | 57.42 | 21.841 | 1.10880 | 5.767 | .243 | |
| COMPUTE NM HYD | 203.00 | - | 1 | .00140 | 3.02 | .132 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 204.00 | 2& 1 | 10 | .37073 | 59.04 | 21.965 | 1.11089 | 5.633 | .249 | |
| ROUTE | 205.00 | 10 | 8 | .37073 | 59.02 | 21.966 | 1.11096 | 5.633 | .249 | |
| COMPUTE NM HYD | 206.00 | - | 3 | .06690 | 165.42 | 7.771 | 2.17784 | 5.550 | 3.863 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 513.00 | 3 | 4 | .06690 | 31.04 | 7.751 | 2.17232 | 6.150 | .725 | AC-FT= 3.925 |
| COMPUTE NM HYD | 207.00 | - | 3 | .00382 | 10.14 | .490 | 2.40456 | 5.550 | 4.148 | PER IMP= 92.00 |
| ROUTE | 208.00 | 3 | 6 | .00382 | 9.75 | .458 | 2.24962 | 5.567 | 3.990 | |
| COMPUTE NM HYD | 209.00 | - | 3 | .00046 | 1.24 | .059 | 2.40456 | 5.550 | 4.190 | PER IMP= 92.00 |
| ADD HYD | 210.00 | 6& 3 | 7 | .00428 | 10.94 | .514 | 2.24905 | 5.567 | 3.993 | |
| COMPUTE NM HYD | 211.00 | - | 5 | .00117 | 3.11 | .150 | 2.40456 | 5.550 | 4.162 | PER IMP= 92.00 |
| ADD HYD | 212.00 | 7& 5 | 6 | .00545 | 13.93 | .654 | 2.24924 | 5.567 | 3.992 | |
| ROUTE | 213.00 | 6 | 5 | .00545 | 13.95 | .654 | 2.24793 | 5.567 | 3.999 | |
| ADD HYD | 214.00 | 4& 5 | 3 | .07235 | 34.76 | 7.849 | 2.03406 | 5.900 | .751 | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 215.00 | 3 | 4 | .07235 | 34.77 | 7.848 | 2.03391 | 5.933 | .751 | |
| ADD HYD | 216.00 | 8& 4 | 3 | .44309 | 93.23 | 29.815 | 1.26167 | 5.767 | .329 | |
| ROUTE | 217.00 | 3 | 2 | .44309 | 93.23 | 29.812 | 1.26154 | 5.800 | .329 | |
| COMPUTE NM HYD | 218.00 | - | 3 | .00144 | 3.11 | .136 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 219.00 | 2& 3 | 4 | .44453 | 95.12 | 29.923 | 1.26215 | 5.633 | .334 | |
| COMPUTE NM HYD | 221.00 | - | 3 | .00100 | 2.15 | .094 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ADD HYD | 222.00 | 4& 3 | 2 | .44552 | 96.76 | 30.012 | 1.26305 | 5.633 | .339 | |
| ROUTE | 223.00 | 2 | 5 | .44552 | 96.43 | 30.007 | 1.26287 | 5.667 | .338 | |
| COMPUTE NM HYD | 224.00 | - | 3 | .01452 | 35.93 | 1.687 | 2.17784 | 5.550 | 3.866 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 514.00 | 3 | 2 | .01452 | 6.76 | 1.682 | 2.17212 | 6.150 | .727 | AC-FT= .853 |
| ADD HYD | 225.00 | 5& 2 | 3 | .46005 | 101.66 | 31.557 | 1.28616 | 5.667 | .345 | |
| ROUTE | 226.00 | 3 | 2 | .46005 | 101.42 | 31.548 | 1.28580 | 5.800 | .344 | |
| COMPUTE NM HYD | 227.00 | - | 3 | .00210 | 4.51 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 228.00 | 2& 3 | 4 | .46214 | 104.32 | 31.719 | 1.28692 | 5.667 | .353 | |
| ROUTE | 229.00 | 4 | 6 | .46214 | 104.14 | 31.717 | 1.28682 | 5.667 | .352 | |
| COMPUTE NM HYD | 230.00 | - | 5 | .00066 | 1.42 | .062 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ADD HYD | 231.00 | 6& 5 | 4 | .46280 | 105.06 | 31.764 | 1.28689 | 5.667 | .355 | |
| COMPUTE NM HYD | 232.00 | - | 6 | .00275 | 5.92 | .258 | 1.76218 | 5.550 | 3.363 | PER IMP= 58.00 |
| COMPUTE NM HYD | 234.00 | - | 3 | .01559 | 38.58 | 1.811 | 2.17784 | 5.550 | 3.865 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 515.00 | 3 | 2 | .01559 | 7.24 | 1.807 | 2.17214 | 6.150 | .726 | AC-FT= .915 |
| ADD HYD | 233.00 | 6& 2 | 5 | .01834 | 9.83 | 2.065 | 2.11068 | 5.600 | .837 | |
| ADD HYD | 235.00 | 4& 5 | 3 | .48114 | 114.53 | 33.685 | 1.31268 | 5.667 | .372 | |
| ROUTE | 236.10 | 3 | 2 | .48114 | 114.51 | 33.686 | 1.31273 | 5.667 | .372 | |
| COMPUTE NM HYD | 236.20 | - | 4 | .00195 | 5.20 | .247 | 2.37601 | 5.550 | 4.169 | PER IMP= 88.50 |
| ADD HYD | 236.30 | 4& 2 | 3 | .48309 | 117.80 | 33.912 | 1.31623 | 5.667 | .381 | |
| ROUTE | 236.00 | 3 | 20 | .48309 | 117.73 | 33.913 | 1.31626 | 5.667 | .381 | |
| ROUTE | 237.00 | 20 | 4 | .48309 | 116.10 | 33.892 | 1.31543 | 5.700 | .376 | |
| COMPUTE NM HYD | 237.10 | - | 1 | .00340 | 8.30 | .364 | 2.00879 | 5.550 | 3.816 | PER IMP= 65.00 |
| ROUTE | 237.20 | 1 | 2 | .00340 | 7.99 | .344 | 1.89926 | 5.567 | 3.674 | |
| COMPUTE NM HYD | 237.30 | - | 1 | .00090 | 1.98 | .080 | 1.67706 | 5.550 | 3.432 | PER IMP= 48.00 |
| ADD HYD | 237.40 | 2& 1 | 3 | .00430 | 9.90 | .421 | 1.83550 | 5.567 | 3.597 | |
| ROUTE | 237.50 | 3 | 1 | .00430 | 9.94 | .421 | 1.83470 | 5.567 | 3.613 | |
| COMPUTE NM HYD | 237.60 | - | 2 | .00190 | 4.75 | .213 | 2.10254 | 5.550 | 3.910 | PER IMP= 71.00 |
| ADD HYD | 237.70 | 1& 2 | 3 | .00620 | 14.51 | .622 | 1.88000 | 5.567 | 3.656 | |
| ADD HYD | 237.80 | 4& 3 | 1 | .48929 | 126.17 | 34.514 | 1.32259 | 5.667 | .403 | |
| ROUTE | 237.90 | 1 | 10 | .48929 | 124.81 | 34.490 | 1.32170 | 5.667 | .399 | |
| COMPUTE NM HYD | 238.00 | - | 2 | .09266 | 198.55 | 10.295 | 2.08337 | 5.600 | 3.348 | PER IMP= 75.00 |
| ROUTE RESERVOIR | 516.00 | 2 | 3 | .09266 | 41.25 | 10.269 | 2.07812 | 6.150 | .696 | AC-FT= 5.126 |
| ROUTE | 239.00 | 3 | 11 | .09266 | 41.23 | 9.544 | 1.93133 | 6.167 | .695 | |
| ADD HYD | 239.10 | 20&11 | 1 | .57575 | 151.79 | 43.457 | 1.41525 | 5.833 | .412 | |
| COMPUTE NM HYD | 310.00 | - | 2 | .07940 | 95.36 | 4.048 | .95602 | 5.600 | 1.876 | PER IMP= 20.00 |
| ROUTE | 310.10 | 2 | 4 | .07940 | 90.85 | 4.048 | .95602 | 5.650 | 1.788 | |
| ADD HYD | 310.20 | 11& 4 | 2 | .17206 | 116.06 | 13.442 | 1.46489 | 5.667 | 1.054 | |
| ROUTE | 242.00 | 2 | 3 | .17206 | 115.82 | 13.433 | 1.46385 | 5.667 | 1.052 | |
| COMPUTE NM HYD | 320.00 | - | 2 | .02520 | 32.88 | 1.206 | .89758 | 5.550 | 2.039 | PER IMP= 19.00 |
| ADD HYD | 320.10 | 2& 3 | 4 | .19726 | 139.38 | 14.593 | 1.38711 | 5.633 | 1.104 | |
| COMPUTE NM HYD | 330.00 | - | 2 | .11580 | 144.54 | 5.549 | .89854 | 5.600 | 1.950 | PER IMP= 14.00 |
| ADD HYD | 330.30 | 4& 2 | 3 | .31306 | 276.21 | 19.996 | 1.19762 | 5.600 | 1.379 | |
| ADD HYD | 330.40 | 3&10 | 2 | .80235 | 397.26 | 54.486 | 1.27329 | 5.633 | .774 | |
| ROUTE RESERVOIR | 517.00 | 2 | 5 | .80235 | 387.59 | 54.289 | 1.26867 | 5.667 | .755 | AC-FT= 1.250 |
| RECALL HYD | 101.10 | - | 4 | 3.31900 | 127.34 | 203.557 | 1.14995 | 11.200 | .060 | |
| COMPUTE NM HYD | 100.00 | - | 1 | .05680 | 95.36 | 3.518 | 1.16137 | 5.550 | 2.623 | PER IMP= 26.20 |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| COMPUTE NM HYD | 200.00 | - | 2 | .02290 | 38.46 | 1.418 | 1.16137 | 5.550 | 2.624 | PER IMP= 26.20 |
| ADD HYD | 300.00 | 2& 1 | 2 | .07970 | 133.82 | 4.937 | 1.16136 | 5.550 | 2.624 | |
| ROUTE RESERVOIR | 400.00 | 2 | 3 | .07970 | 18.99 | 4.921 | 1.15774 | 6.100 | .372 | AC-FT= 2.996 |
| ADD HYD | 101.20 | 4& 3 | 2 | 3.39870 | 129.41 | 208.478 | 1.15013 | 10.900 | .059 | |
| ADD HYD | 340.00 | 5& 2 | 3 | 4.20105 | 449.56 | 198.801 | .88728 | 5.667 | .167 | |
| COMPUTE NM HYD | 350.00 | - | 1 | .03125 | 42.16 | 1.961 | 1.17667 | 5.600 | 2.108 | PER IMP= 26.00 |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = ccifutla.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= | .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= | 2.660 |
| COMPUTE NM HYD | 101.00 | - | 1 | .02344 | 54.50 | 2.486 | 1.98890 | 5.550 | 3.633 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 501.00 | 1 | 2 | .02344 | 10.23 | 2.480 | 1.98426 | 6.100 | .682 | AC-FT= | 1.265 |
| ROUTE | 102.00 | 2 | 3 | .02344 | 10.18 | 2.305 | 1.84426 | 6.167 | .679 | | |
| COMPUTE NM HYD | 103.00 | - | 5 | .00206 | 5.18 | .244 | 2.21563 | 5.550 | 3.921 | PER IMP= | 82.00 |
| ADD HYD | 104.00 | 3& 5 | 6 | .02550 | 11.28 | 2.533 | 1.86263 | 6.033 | .691 | | |
| COMPUTE NM HYD | 105.00 | - | 5 | .00078 | 1.96 | .092 | 2.21562 | 5.550 | 3.940 | PER IMP= | 82.00 |
| ADD HYD | 106.00 | 6& 5 | 3 | .02628 | 11.77 | 2.619 | 1.86895 | 6.000 | .700 | | |
| ROUTE | 107.00 | 3 | 2 | .02628 | 11.77 | 2.619 | 1.86877 | 6.000 | .700 | | |
| COMPUTE NM HYD | 108.00 | - | 1 | .04781 | 111.17 | 5.072 | 1.98890 | 5.550 | 3.633 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 502.00 | 1 | 3 | .04781 | 20.87 | 5.060 | 1.98433 | 6.100 | .682 | AC-FT= | 2.579 |
| ROUTE | 109.00 | 3 | 4 | .04781 | 20.86 | 4.713 | 1.84839 | 6.100 | .682 | | |
| ADD HYD | 110.00 | 2& 4 | 3 | .07409 | 32.55 | 7.333 | 1.85562 | 6.067 | .686 | | |
| COMPUTE NM HYD | 111.00 | - | 2 | .00078 | 1.70 | .074 | 1.76218 | 5.550 | 3.385 | PER IMP= | 58.00 |
| ADD HYD | 112.00 | 3& 2 | 4 | .07487 | 32.90 | 7.400 | 1.85312 | 6.067 | .687 | | |
| ROUTE | 113.00 | 4 | 2 | .07487 | 32.86 | 7.392 | 1.85110 | 6.100 | .686 | | |
| COMPUTE NM HYD | 114.00 | - | 3 | .00365 | 7.85 | .343 | 1.76218 | 5.550 | 3.361 | PER IMP= | 58.00 |
| ADD HYD | 115.00 | 2& 3 | 4 | .07852 | 34.49 | 7.714 | 1.84200 | 6.033 | .686 | | |
| COMPUTE NM HYD | 116.00 | - | 2 | .01094 | 25.44 | 1.160 | 1.98890 | 5.550 | 3.634 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 503.00 | 2 | 3 | .01094 | 4.77 | 1.158 | 1.98433 | 6.100 | .682 | AC-FT= | .590 |
| ROUTE | 117.00 | 3 | 2 | .01094 | 4.69 | 1.075 | 1.84250 | 6.233 | .670 | | |
| COMPUTE NM HYD | 118.00 | - | 3 | .00301 | 7.54 | .355 | 2.21562 | 5.550 | 3.917 | PER IMP= | 82.00 |
| ADD HYD | 119.00 | 2& 3 | 5 | .01395 | 8.12 | 1.408 | 1.89282 | 5.567 | .910 | | |
| COMPUTE NM HYD | 120.00 | - | 2 | .02016 | 43.89 | 1.935 | 1.79997 | 5.550 | 3.402 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 504.00 | 2 | 3 | .02016 | 8.62 | 1.932 | 1.79701 | 6.100 | .668 | AC-FT= | .976 |
| ADD HYD | 121.00 | 5& 3 | 6 | .03410 | 14.92 | 3.216 | 1.76810 | 6.000 | .684 | | |
| COMPUTE NM HYD | 122.00 | - | 2 | .00067 | 1.69 | .079 | 2.21562 | 5.550 | 3.945 | PER IMP= | 82.00 |
| ADD HYD | 123.00 | 6& 2 | 3 | .03477 | 15.38 | 3.290 | 1.77379 | 5.967 | .691 | | |
| COMPUTE NM HYD | 124.00 | - | 2 | .02641 | 57.49 | 2.535 | 1.79997 | 5.550 | 3.402 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 505.00 | 2 | 1 | .02641 | 10.83 | 2.530 | 1.79641 | 6.100 | .641 | AC-FT= | 1.300 |
| ADD HYD | 125.00 | 3& 1 | 2 | .06118 | 26.12 | 5.656 | 1.73350 | 6.033 | .667 | | |
| ROUTE | 126.00 | 2 | 3 | .06118 | 26.12 | 5.656 | 1.73349 | 6.033 | .667 | | |
| ADD HYD | 127.00 | 4& 3 | 2 | .13970 | 60.61 | 13.370 | 1.79448 | 6.033 | .678 | | |
| ROUTE | 128.00 | 2 | 3 | .13970 | 60.62 | 13.370 | 1.79442 | 6.033 | .678 | | |
| COMPUTE NM HYD | 129.00 | - | 2 | .00532 | 11.43 | .500 | 1.76218 | 5.550 | 3.359 | PER IMP= | 58.00 |
| ADD HYD | 130.00 | 3& 2 | 4 | .14502 | 63.36 | 13.840 | 1.78940 | 5.933 | .683 | | |
| ROUTE | 131.00 | 4 | 3 | .14502 | 63.36 | 13.840 | 1.78942 | 5.933 | .683 | | |
| ROUTE | 132.00 | 3 | 7 | .14502 | 63.35 | 13.839 | 1.78933 | 5.967 | .683 | | |
| COMPUTE NM HYD | 133.00 | - | 4 | .07136 | 95.40 | 5.070 | 1.33224 | 5.600 | 2.089 | PER IMP= | 40.00 |
| ADD HYD | 134.00 | 7& 4 | 5 | .21638 | 155.07 | 18.648 | 1.61590 | 5.633 | 1.120 | | |
| COMPUTE NM HYD | 135.00 | - | 2 | .00984 | 22.90 | 1.044 | 1.98890 | 5.550 | 3.635 | PER IMP= | 70.00 |
| ROUTE RESERVOIR | 506.00 | 2 | 6 | .00984 | 4.29 | 1.042 | 1.98436 | 6.100 | .681 | AC-FT= | .531 |
| COMPUTE NM HYD | 136.00 | - | 3 | .00410 | 9.91 | .460 | 2.10226 | 5.550 | 3.777 | PER IMP= | 76.00 |
| ADD HYD | 137.00 | 6& 3 | 2 | .01394 | 11.98 | 1.501 | 2.01900 | 5.550 | 1.342 | | |
| COMPUTE NM HYD | 139.00 | - | 8 | .01531 | 33.35 | 1.470 | 1.79997 | 5.550 | 3.403 | PER IMP= | 60.00 |
| ROUTE RESERVOIR | 507.00 | 8 | 6 | .01531 | 6.16 | 1.468 | 1.79718 | 6.100 | .629 | AC-FT= | .757 |
| ADD HYD | 140.00 | 2& 6 | 4 | .02926 | 15.38 | 2.969 | 1.90290 | 5.600 | .821 | | |
| ROUTE | 138.00 | 4 | 9 | .02926 | 15.43 | 2.776 | 1.77906 | 5.600 | .824 | | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| COMPUTE NM HYD | 141.10 | - | 6 | .00109 | 2.35 | .102 | 1.76218 | 5.550 | 3.374 | PER IMP= 58.00 |
| COMPUTE NM HYD | 141.20 | - | 1 | .00144 | 3.10 | .135 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 141.30 | 1& 6 | 2 | .00253 | 5.45 | .237 | 1.76193 | 5.550 | 3.372 | |
| ROUTE | 142.00 | 2 | 3 | .00253 | 5.29 | .224 | 1.66446 | 5.567 | 3.269 | |
| COMPUTE NM HYD | 141.40 | - | 1 | .00052 | 1.12 | .049 | 1.76218 | 5.550 | 3.396 | PER IMP= 58.00 |
| ADD HYD | 142.10 | 1& 3 | 2 | .00304 | 6.37 | .270 | 1.66417 | 5.567 | 3.270 | |
| ADD HYD | 143.00 | 9& 2 | 1 | .03230 | 21.50 | 3.046 | 1.76823 | 5.567 | 1.040 | |
| ROUTE | 144.00 | 1 | 3 | .03230 | 21.48 | 3.046 | 1.76793 | 5.600 | 1.039 | |
| ROUTE | 145.00 | 3 | 2 | .03230 | 21.45 | 3.044 | 1.76721 | 5.600 | 1.038 | |
| ROUTE | 145.10 | 2 | 3 | .03230 | 21.46 | 3.044 | 1.76710 | 5.600 | 1.038 | |
| COMPUTE NM HYD | 145.20 | - | 1 | .00180 | 3.88 | .169 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| ADD HYD | 145.30 | 3& 1 | 6 | .03410 | 24.91 | 3.203 | 1.76121 | 5.600 | 1.142 | |
| ROUTE | 145.40 | 6 | 2 | .03410 | 24.97 | 3.203 | 1.76124 | 5.600 | 1.144 | |
| ADD HYD | 145.50 | 2& 5 | 6 | .25048 | 179.23 | 21.851 | 1.63569 | 5.600 | 1.118 | |
| COMPUTE NM HYD | 146.00 | - | 3 | .00200 | 4.31 | .188 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| COMPUTE NM HYD | 147.00 | - | 4 | .00400 | 8.60 | .376 | 1.76218 | 5.550 | 3.361 | PER IMP= 58.00 |
| ADD HYD | 148.00 | 3& 4 | 5 | .00600 | 12.91 | .564 | 1.76209 | 5.550 | 3.363 | |
| COMPUTE NM HYD | 148.10 | - | 3 | .00050 | 1.09 | .047 | 1.76218 | 5.550 | 3.401 | PER IMP= 58.00 |
| ADD HYD | 148.20 | 5& 3 | 4 | .00650 | 14.00 | .611 | 1.76206 | 5.550 | 3.366 | |
| ADD HYD | 149.00 | 6& 4 | 3 | .25698 | 191.70 | 22.426 | 1.63632 | 5.600 | 1.166 | |
| COMPUTE NM HYD | 150.00 | - | 2 | .05875 | 127.89 | 5.640 | 1.79997 | 5.550 | 3.401 | PER IMP= 60.00 |
| ROUTE RESERVOIR | 508.00 | 2 | 4 | .05875 | 24.08 | 5.629 | 1.79634 | 6.100 | .640 | AC-FT= 2.893 |
| ROUTE | 151.00 | 4 | 2 | .05875 | 24.07 | 5.265 | 1.68020 | 6.100 | .640 | |
| COMPUTE NM HYD | 152.00 | - | 4 | .00070 | 1.52 | .066 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ROUTE | 153.00 | 4 | 5 | .00070 | 1.46 | .062 | 1.66479 | 5.567 | 3.268 | |
| COMPUTE NM HYD | 154.00 | - | 4 | .00140 | 3.02 | .131 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ROUTE | 155.00 | 4 | 6 | .00140 | 2.90 | .124 | 1.66482 | 5.567 | 3.241 | |
| ADD HYD | 156.00 | 5& 6 | 4 | .00210 | 4.36 | .186 | 1.66481 | 5.567 | 3.250 | |
| ROUTE | 157.00 | 4 | 5 | .00210 | 4.40 | .186 | 1.66438 | 5.567 | 3.281 | |
| COMPUTE NM HYD | 158.00 | - | 4 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 159.00 | 4 | 6 | .00102 | 2.12 | .091 | 1.66484 | 5.567 | 3.252 | |
| ADD HYD | 160.00 | 5& 6 | 4 | .00312 | 6.53 | .277 | 1.66453 | 5.567 | 3.271 | |
| COMPUTE NM HYD | 161.00 | - | 5 | .00102 | 2.21 | .096 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ROUTE | 162.00 | 5 | 6 | .00102 | 2.12 | .091 | 1.66485 | 5.567 | 3.251 | |
| ADD HYD | 163.00 | 4& 6 | 5 | .00414 | 8.65 | .368 | 1.66461 | 5.567 | 3.266 | |
| ROUTE | 164.00 | 5 | 4 | .00414 | 8.70 | .367 | 1.66439 | 5.567 | 3.283 | |
| ADD HYD | 165.00 | 2& 4 | 5 | .06289 | 26.08 | 5.632 | 1.67916 | 5.933 | .648 | |
| ROUTE | 166.00 | 5 | 2 | .06289 | 26.08 | 5.631 | 1.67881 | 5.900 | .648 | |
| COMPUTE NM HYD | 167.00 | - | 4 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 168.00 | 4 | 5 | .00132 | 2.74 | .117 | 1.66480 | 5.567 | 3.243 | |
| ADD HYD | 169.00 | 2& 5 | 4 | .06421 | 27.27 | 5.748 | 1.67853 | 5.700 | .664 | |
| COMPUTE NM HYD | 170.00 | - | 2 | .00132 | 2.84 | .124 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| ROUTE | 171.00 | 2 | 5 | .00132 | 2.73 | .117 | 1.66482 | 5.567 | 3.242 | |
| ADD HYD | 172.00 | 4& 5 | 2 | .06553 | 28.85 | 5.865 | 1.67825 | 5.700 | .688 | |
| ROUTE | 173.00 | 2 | 6 | .06553 | 28.87 | 5.864 | 1.67787 | 5.667 | .688 | |
| COMPUTE NM HYD | 174.00 | - | 4 | .01297 | 28.24 | 1.245 | 1.79997 | 5.550 | 3.403 | PER IMP= 60.00 |
| ROUTE RESERVOIR | 509.00 | 4 | 5 | .01297 | 8.19 | 1.228 | 1.77483 | 5.900 | .987 | AC-FT= .571 |
| COMPUTE NM HYD | 175.00 | - | 2 | .01156 | 23.47 | .994 | 1.61103 | 5.550 | 3.172 | PER IMP= 50.00 |
| ROUTE RESERVOIR | 510.00 | 2 | 4 | .01156 | 4.42 | .992 | 1.60835 | 6.100 | .597 | AC-FT= .515 |
| ADD HYD | 176.00 | 5& 4 | 2 | .02453 | 12.52 | 2.219 | 1.69636 | 5.900 | .797 | |
| ROUTE | 177.00 | 2 | 4 | .02453 | 12.52 | 2.063 | 1.57668 | 5.900 | .797 | |
| ADD HYD | 178.00 | 6& 4 | 2 | .09006 | 40.26 | 7.927 | 1.65030 | 5.900 | .699 | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 179.00 | 2 | 4 | .09006 | 40.26 | 7.925 | 1.65007 | 5.900 | .698 | |
| COMPUTE NM HYD | 180.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 424.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 425.00 | 12& 2 | 13 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 426.00 | - | 5 | .00136 | 2.93 | .128 | 1.76218 | 5.550 | 3.371 | PER IMP= 58.00 |
| DIVIDE HYD | 427.00 | 5 | 16 | .00133 | 2.50 | .125 | 1.76196 | 5.500 | 2.932 | |
| | 428.00 | AND | 17 | .00002 | .43 | .002 | 1.76196 | 5.550 | 26.844 | |
| ADD HYD | 429.00 | 13&17 | 14 | .00209 | 4.89 | .197 | 1.76189 | 5.550 | 3.656 | |
| ROUTE | 181.00 | 14 | 13 | .00209 | 4.63 | .186 | 1.66484 | 5.567 | 3.461 | |
| ROUTE | 430.00 | 16 | 15 | .00133 | 2.52 | .118 | 1.66491 | 5.533 | 2.958 | |
| COMPUTE NM HYD | 182.00 | - | 2 | .00149 | 3.21 | .140 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| COMPUTE NM HYD | 432.00 | - | 12 | .00058 | 1.26 | .054 | 1.76218 | 5.550 | 3.393 | PER IMP= 58.00 |
| ADD HYD | 433.00 | 2&12 | 10 | .00207 | 4.47 | .194 | 1.76189 | 5.550 | 3.377 | |
| COMPUTE NM HYD | 434.00 | - | 5 | .00210 | 4.52 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| DIVIDE HYD | 435.00 | 5 | 17 | .00207 | 4.00 | .195 | 1.76204 | 5.550 | 3.013 | |
| | 436.00 | AND | 18 | .00002 | .52 | .002 | 1.76204 | 5.550 | 33.969 | |
| ROUTE | 437.00 | 17 | 20 | .00207 | 4.03 | .184 | 1.66574 | 5.600 | 3.039 | |
| ADD HYD | 183.00 | 10&18 | 12 | .00209 | 4.98 | .196 | 1.76189 | 5.550 | 3.725 | |
| ADD HYD | 438.00 | 13&12 | 6 | .00418 | 9.29 | .371 | 1.66419 | 5.567 | 3.471 | |
| ROUTE | 184.00 | 6 | 5 | .00418 | 9.30 | .371 | 1.66419 | 5.567 | 3.473 | |
| ADD HYD | 185.00 | 4& 5 | 2 | .09424 | 44.14 | 8.297 | 1.65069 | 5.700 | .732 | |
| ROUTE | 186.00 | 2 | 4 | .09424 | 44.13 | 8.295 | 1.65044 | 5.733 | .732 | |
| ROUTE | 187.00 | 4 | 8 | .09424 | 44.13 | 8.294 | 1.65016 | 5.733 | .732 | |
| COMPUTE NM HYD | 188.00 | - | 9 | .00384 | 9.79 | .465 | 2.27230 | 5.550 | 3.986 | PER IMP= 85.00 |
| COMPUTE NM HYD | 189.00 | - | 2 | .00689 | 12.55 | .365 | .99307 | 5.550 | 2.848 | PER IMP= .00 |
| ADD HYD | 190.00 | 9& 2 | 10 | .01072 | 22.34 | .830 | 1.45077 | 5.550 | 3.255 | |
| ADD HYD | 191.00 | 3&10 | 4 | .26770 | 211.74 | 23.227 | 1.62683 | 5.600 | 1.236 | |
| ROUTE RESERVOIR | 511.00 | 4 | 2 | .26770 | 11.84 | 12.987 | .90965 | 9.467 | .069 | AC-FT= 16.222 |
| ROUTE | 192.00 | 2 | 4 | .26770 | 11.84 | 12.954 | .90730 | 9.500 | .069 | |
| ADD HYD | 193.00 | 4&20 | 6 | .26977 | 11.87 | 13.138 | .91313 | 9.467 | .069 | |
| ADD HYD | 194.00 | 15& 6 | 16 | .27110 | 11.89 | 13.256 | .91682 | 9.433 | .069 | |
| ROUTE | 195.00 | 16 | 2 | .27110 | 11.89 | 13.251 | .91645 | 9.467 | .069 | |
| ADD HYD | 196.00 | 8& 2 | 4 | .36535 | 54.02 | 21.545 | 1.10571 | 5.767 | .231 | |
| ROUTE | 197.00 | 4 | 3 | .36535 | 54.02 | 21.537 | 1.10529 | 5.767 | .231 | |
| COMPUTE NM HYD | 198.00 | - | 1 | .00185 | 3.99 | .174 | 1.76218 | 5.550 | 3.367 | PER IMP= 58.00 |
| ADD HYD | 199.00 | 3& 1 | 2 | .36720 | 55.73 | 21.671 | 1.10658 | 5.767 | .237 | |
| ROUTE | 200.00 | 2 | 8 | .36720 | 55.53 | 21.664 | 1.10622 | 5.800 | .236 | |
| COMPUTE NM HYD | 201.00 | - | 1 | .00214 | 4.60 | .201 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 202.00 | 8& 1 | 2 | .36933 | 57.42 | 21.841 | 1.10880 | 5.767 | .243 | |
| COMPUTE NM HYD | 203.00 | - | 1 | .00140 | 3.02 | .132 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 204.00 | 2& 1 | 10 | .37073 | 59.04 | 21.965 | 1.11089 | 5.633 | .249 | |
| ROUTE | 205.00 | 10 | 8 | .37073 | 59.02 | 21.966 | 1.11096 | 5.633 | .249 | |
| COMPUTE NM HYD | 206.00 | - | 3 | .06690 | 165.42 | 7.771 | 2.17784 | 5.550 | 3.863 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 513.00 | 3 | 4 | .06690 | 31.04 | 7.751 | 2.17232 | 6.150 | .725 | AC-FT= 3.925 |
| COMPUTE NM HYD | 207.00 | - | 3 | .00382 | 10.14 | .490 | 2.40456 | 5.550 | 4.148 | PER IMP= 92.00 |
| ROUTE | 208.00 | 3 | 6 | .00382 | 9.75 | .458 | 2.24962 | 5.567 | 3.990 | |
| COMPUTE NM HYD | 209.00 | - | 3 | .00046 | 1.24 | .059 | 2.40456 | 5.550 | 4.190 | PER IMP= 92.00 |
| ADD HYD | 210.00 | 6& 3 | 7 | .00428 | 10.94 | .514 | 2.24905 | 5.567 | 3.993 | |
| COMPUTE NM HYD | 211.00 | - | 5 | .00117 | 3.11 | .150 | 2.40456 | 5.550 | 4.162 | PER IMP= 92.00 |
| ADD HYD | 212.00 | 7& 5 | 6 | .00545 | 13.93 | .654 | 2.24924 | 5.567 | 3.992 | |
| ROUTE | 213.00 | 6 | 5 | .00545 | 13.95 | .654 | 2.24793 | 5.567 | 3.999 | |
| ADD HYD | 214.00 | 4& 5 | 3 | .07235 | 34.76 | 7.849 | 2.03406 | 5.900 | .751 | |

| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI). | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| ROUTE | 215.00 | 3 | 4 | .07235 | 34.77 | 7.848 | 2.03391 | 5.933 | .751 | |
| ADD HYD | 216.00 | 8& 4 | 3 | .44309 | 93.23 | 29.815 | 1.26167 | 5.767 | .329 | |
| ROUTE | 217.00 | 3 | 2 | .44309 | 93.23 | 29.812 | 1.26154 | 5.800 | .329 | |
| COMPUTE NM HYD | 218.00 | - | 3 | .00144 | 3.11 | .136 | 1.76218 | 5.550 | 3.370 | PER IMP= 58.00 |
| ADD HYD | 219.00 | 2& 3 | 4 | .44453 | 95.12 | 29.923 | 1.26215 | 5.633 | .334 | |
| COMPUTE NM HYD | 221.00 | - | 3 | .00100 | 2.15 | .094 | 1.76218 | 5.550 | 3.378 | PER IMP= 58.00 |
| ADD HYD | 222.00 | 4& 3 | 2 | .44552 | 96.76 | 30.012 | 1.26305 | 5.633 | .339 | |
| ROUTE | 223.00 | 2 | 5 | .44552 | 96.43 | 30.007 | 1.26287 | 5.667 | .338 | |
| COMPUTE NM HYD | 224.00 | - | 3 | .01452 | 35.93 | 1.687 | 2.17784 | 5.550 | 3.866 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 514.00 | 3 | 2 | .01452 | 6.76 | 1.682 | 2.17212 | 6.150 | .727 | AC-FT= .853 |
| ADD HYD | 225.00 | 5& 2 | 3 | .46005 | 101.66 | 31.557 | 1.28616 | 5.667 | .345 | |
| ROUTE | 226.00 | 3 | 2 | .46005 | 101.42 | 31.548 | 1.28580 | 5.800 | .344 | |
| COMPUTE NM HYD | 227.00 | - | 3 | .00210 | 4.51 | .197 | 1.76218 | 5.550 | 3.365 | PER IMP= 58.00 |
| ADD HYD | 228.00 | 2& 3 | 4 | .46214 | 104.32 | 31.719 | 1.28692 | 5.667 | .353 | |
| ROUTE | 229.00 | 4 | 6 | .46214 | 104.14 | 31.717 | 1.28682 | 5.667 | .352 | |
| COMPUTE NM HYD | 230.00 | - | 5 | .00066 | 1.42 | .062 | 1.76218 | 5.550 | 3.387 | PER IMP= 58.00 |
| ADD HYD | 231.00 | 6& 5 | 4 | .46280 | 105.06 | 31.764 | 1.28689 | 5.667 | .355 | |
| COMPUTE NM HYD | 232.00 | - | 6 | .00275 | 5.92 | .258 | 1.76218 | 5.550 | 3.363 | PER IMP= 58.00 |
| COMPUTE NM HYD | 234.00 | - | 3 | .01559 | 38.58 | 1.811 | 2.17784 | 5.550 | 3.865 | PER IMP= 80.00 |
| ROUTE RESERVOIR | 515.00 | 3 | 2 | .01559 | 7.24 | 1.807 | 2.17214 | 6.150 | .726 | AC-FT= .915 |
| ADD HYD | 233.00 | 6& 2 | 5 | .01834 | 9.83 | 2.065 | 2.11068 | 5.600 | .837 | |
| ADD HYD | 235.00 | 4& 5 | 3 | .48114 | 114.53 | 33.685 | 1.31268 | 5.667 | .372 | |
| ROUTE | 236.10 | 3 | 2 | .48114 | 114.51 | 33.686 | 1.31273 | 5.667 | .372 | |
| COMPUTE NM HYD | 236.20 | - | 4 | .00195 | 5.20 | .247 | 2.37601 | 5.550 | 4.169 | PER IMP= 88.50 |
| ADD HYD | 236.30 | 4& 2 | 3 | .48309 | 117.80 | 33.912 | 1.31623 | 5.667 | .381 | |
| ROUTE | 236.00 | 3 | 2 | .48309 | 117.73 | 33.913 | 1.31626 | 5.667 | .381 | |
| ROUTE | 237.00 | 2 | 4 | .48309 | 116.10 | 33.892 | 1.31543 | 5.700 | .376 | |
| COMPUTE NM HYD | 237.10 | - | 1 | .00340 | 8.30 | .364 | 2.00879 | 5.550 | 3.816 | PER IMP= 65.00 |
| ROUTE | 237.20 | 1 | 2 | .00340 | 7.99 | .344 | 1.89926 | 5.567 | 3.674 | |
| COMPUTE NM HYD | 237.30 | - | 1 | .00090 | 1.98 | .080 | 1.67706 | 5.550 | 3.432 | PER IMP= 48.00 |
| ADD HYD | 237.40 | 2& 1 | 3 | .00430 | 9.90 | .421 | 1.83550 | 5.567 | 3.597 | |
| ROUTE | 237.50 | 3 | 1 | .00430 | 9.94 | .421 | 1.83470 | 5.567 | 3.613 | |
| COMPUTE NM HYD | 237.60 | - | 2 | .00190 | 4.75 | .213 | 2.10254 | 5.550 | 3.910 | PER IMP= 71.00 |
| ADD HYD | 237.70 | 1& 2 | 3 | .00620 | 14.51 | .622 | 1.88000 | 5.567 | 3.656 | |
| ADD HYD | 237.80 | 4& 3 | 1 | .48929 | 126.17 | 34.514 | 1.32259 | 5.667 | .403 | |
| ROUTE | 237.90 | 1 | 10 | .48929 | 124.81 | 34.490 | 1.32170 | 5.667 | .399 | |
| COMPUTE NM HYD | 238.00 | - | 2 | .09266 | 198.55 | 10.295 | 2.08337 | 5.600 | 3.348 | PER IMP= 75.00 |
| ROUTE RESERVOIR | 516.00 | 2 | 3 | .09266 | 41.25 | 10.269 | 2.07812 | 6.150 | .696 | AC-FT= 5.126 |
| ROUTE | 239.00 | 3 | 11 | .09266 | 41.23 | 9.544 | 1.93133 | 6.167 | .695 | |
| COMPUTE NM HYD | 310.00 | - | 2 | .07940 | 95.36 | 4.048 | .95602 | 5.600 | 1.876 | PER IMP= 20.00 |
| ROUTE | 310.10 | 2 | 4 | .07940 | 90.85 | 4.048 | .95602 | 5.650 | 1.788 | |
| ADD HYD | 310.20 | 11& 4 | 2 | .17206 | 116.06 | 13.442 | 1.46489 | 5.667 | 1.054 | |
| ROUTE | 242.00 | 2 | 3 | .17206 | 115.82 | 13.433 | 1.46385 | 5.667 | 1.052 | |
| COMPUTE NM HYD | 320.00 | - | 2 | .02520 | 32.88 | 1.206 | .89758 | 5.550 | 2.039 | PER IMP= 19.00 |
| ADD HYD | 320.10 | 2& 3 | 4 | .19726 | 139.38 | 14.593 | 1.38711 | 5.633 | 1.104 | |
| COMPUTE NM HYD | 330.00 | - | 2 | .11580 | 178.33 | 7.430 | 1.20305 | 5.600 | 2.406 | PER IMP= 26.00 |
| ADD HYD | 330.30 | 4& 2 | 3 | .31306 | 310.00 | 21.751 | 1.30275 | 5.600 | 1.547 | |
| ADD HYD | 330.40 | 3&10 | 2 | .80235 | 427.33 | 56.242 | 1.31431 | 5.633 | .832 | |
| ROUTE RESERVOIR | 517.00 | 2 | 5 | .80235 | 417.09 | 56.041 | 1.30963 | 5.667 | .812 | AC-FT= 1.329 |
| RECALL HYD | 101.10 | - | 4 | 3.31900 | 127.34 | 203.557 | 1.14995 | 11.200 | .060 | |
| COMPUTE NM HYD | 100.00 | - | 1 | .05680 | 95.36 | 3.518 | 1.16137 | 5.550 | 2.623 | PER IMP= 26.20 |
| COMPUTE NM HYD | 200.00 | - | 2 | .02290 | 38.46 | 1.418 | 1.16137 | 5.550 | 2.624 | PER IMP= 26.20 |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/10/1993

INPUT FILE = cabeznsi.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RECALL HYD | 340.00 | - | 5 | 4.26940 | 434.40 | 175.793 | .77203 | 5.667 | .159 | |
| ROUTE | 500.11 | 5 | 3 | 4.26940 | 417.01 | 175.358 | .77012 | 5.700 | .153 | |
| RECALL HYD | 500.40 | - | 4 | .03100 | 53.50 | 2.684 | 1.62368 | 5.600 | 2.697 | |
| ADD HYD | 350.21 | 3& 4 | 5 | 4.30040 | 456.69 | 177.597 | .77434 | 5.700 | .166 | |
| ROUTE | 500.12 | 5 | 3 | 4.30040 | 441.67 | 177.320 | .77313 | 5.733 | .160 | |
| RECALL HYD | 500.50 | - | 5 | .04700 | 68.63 | 5.126 | 2.04479 | 5.600 | 2.281 | |
| ADD HYD | 350.22 | 3& 5 | 6 | 4.34740 | 501.50 | 181.973 | .78484 | 5.733 | .180 | |
| ROUTE | 500.13 | 6 | 3 | 4.34740 | 488.28 | 181.695 | .78364 | 5.767 | .175 | |
| DIVIDE HYD | 350.50 | 3 | 4 | 1.67759 | 50.00 | 70.113 | .78364 | 5.333 | .047 | |
| | 350.60 | AND | 5 | 2.66981 | 438.28 | 111.582 | .78364 | 5.767 | .257 | |
| RECALL HYD | 104.00 | - | 7 | .03530 | 48.57 | 2.547 | 1.35296 | 5.600 | 2.150 | |
| ADD HYD | 350.22 | 5& 7 | 6 | 2.70511 | 470.80 | 113.961 | .78990 | 5.767 | .272 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = 24hditch.hmi USER NO.= D_HARRIS.892



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= 2.660 |
| STORE HYD | 299.00 | - | 6 | .01000 | 50.00 | 103.306 | 193.69840 | .000 | 7.812 | |
| COMPUTE NM HYD | 701.00 | - | 1 | .60000 | 536.78 | 31.439 | .98246 | 7.150 | 1.398 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 701.10 | 1 | 2 | .60000 | 15.36 | 20.482 | .64007 | 9.050 | .040 | AC-FT= 25.371 |
| ADD HYD | 701.20 | 2& 6 | 2 | .61000 | 65.36 | 119.656 | 3.67794 | 9.050 | .167 | |
| ROUTE | 701.20 | 2 | 3 | .61000 | 64.41 | 118.111 | 3.63045 | 10.850 | .165 | |
| COMPUTE NM HYD | 601.00 | - | 4 | 1.40800 | 1226.41 | 73.774 | .98243 | 7.150 | 1.361 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 601.10 | 4 | 5 | 1.40800 | 36.04 | 48.098 | .64050 | 9.100 | .040 | AC-FT= 59.390 |
| ADD HYD | 601.20 | 3& 5 | 6 | 2.01800 | 99.72 | 166.208 | 1.54430 | 9.800 | .077 | |
| COMPUTE NM HYD | 501.00 | - | 7 | .26300 | 329.44 | 13.784 | .98268 | 7.000 | 1.957 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 501.10 | 7 | 8 | .26300 | 6.47 | 8.699 | .62019 | 8.500 | .038 | AC-FT= 11.421 |
| ADD HYD | 501.20 | 6& 8 | 9 | 2.28100 | 106.01 | 174.908 | 1.43775 | 9.650 | .073 | |
| ROUTE | 501.30 | 9 | 10 | 2.28100 | 104.97 | 173.135 | 1.42318 | 10.450 | .072 | |
| COMPUTE NM HYD | 401.00 | - | 11 | .39100 | 620.72 | 20.493 | .98274 | 6.950 | 2.481 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 401.10 | 11 | 12 | .39100 | 9.65 | 12.910 | .61906 | 8.200 | .039 | AC-FT= 17.185 |
| ADD HYD | 401.20 | 10&12 | 13 | 2.67200 | 114.03 | 186.044 | 1.30551 | 10.300 | .067 | |
| ROUTE | 401.30 | 13 | 14 | 2.67200 | 113.67 | 185.059 | 1.29860 | 10.650 | .066 | |
| COMPUTE NM HYD | 301.00 | - | 15 | .14200 | 218.17 | 7.443 | .98275 | 6.950 | 2.401 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 301.10 | 15 | 16 | .14200 | 3.49 | 4.679 | .61782 | 8.250 | .038 | AC-FT= 6.231 |
| ADD HYD | 301.20 | 14&16 | 17 | 2.81400 | 116.92 | 189.738 | 1.26424 | 10.600 | .065 | |
| ROUTE | 301.30 | 17 | 18 | 2.81400 | 116.68 | 188.967 | 1.25911 | 10.750 | .065 | |
| COMPUTE NM HYD | 201.00 | - | 19 | .28000 | 371.54 | 14.675 | .98270 | 7.000 | 2.073 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 201.10 | 19 | 20 | .28000 | 6.88 | 9.244 | .61899 | 8.450 | .038 | AC-FT= 12.198 |
| ADD HYD | 201.20 | 18&20 | 1 | 3.09400 | 123.12 | 198.210 | 1.20118 | 10.700 | .062 | |
| ROUTE | 201.30 | 1 | 2 | 3.09400 | 122.13 | 195.959 | 1.18753 | 11.350 | .062 | |
| COMPUTE NM HYD | 101.00 | - | 3 | .22500 | 332.45 | 11.793 | .98274 | 6.950 | 2.309 | PER IMP= 17.00 |
| ROUTE RESERVOIR | 101.10 | 3 | 4 | .22500 | 5.76 | 7.598 | .63314 | 8.250 | .040 | AC-FT= 9.839 |
| ADD HYD | 101.20 | 2& 4 | 5 | 3.31900 | 127.34 | 203.557 | 1.14995 | 11.200 | .060 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = s-cbzn-e.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= 2.660 |
| COMPUTE NM HYD | 401.00 | - | 1 | .01700 | 35.68 | 1.803 | 1.98890 | 5.550 | 3.280 | PER IMP= 70.00 |
| COMPUTE NM HYD | 405.00 | - | 2 | .00300 | 3.87 | .107 | .66636 | 5.550 | 2.017 | PER IMP= .00 |
| ROUTE | 500.11 | 2 | 3 | .00300 | 2.78 | .107 | .66662 | 5.650 | 1.446 | |
| COMPUTE NM HYD | 201.00 | - | 4 | .00800 | 11.52 | .366 | .85718 | 5.550 | 2.249 | PER IMP= 10.10 |
| ROUTE RESERVOIR | 500.20 | 4 | 6 | .00800 | 8.83 | .366 | .85714 | 5.650 | 1.726 | AC-FT= .075 |
| COMPUTE NM HYD | 301.00 | - | 5 | .00300 | 8.31 | .409 | 2.55571 | 5.550 | 4.331 | PER IMP= 100.00 |
| ADD HYD | 500.30 | 3& 5 | 7 | .00600 | 10.02 | .516 | 1.61099 | 5.550 | 2.610 | |
| ADD HYD | 500.40 | 7& 6 | 3 | .01400 | 18.01 | .881 | 1.18021 | 5.600 | 2.010 | |
| ROUTE | 500.31 | 3 | 5 | .01400 | 17.53 | .881 | 1.18026 | 5.650 | 1.957 | |
| ADD HYD | 500.40 | 1& 3 | 4 | .03100 | 53.50 | 2.684 | 1.62367 | 5.600 | 2.697 | |
| COMPUTE NM HYD | 402.00 | - | 1 | .01600 | 35.96 | 1.697 | 1.98890 | 5.550 | 3.511 | PER IMP= 70.00 |
| COMPUTE NM HYD | 302.00 | - | 2 | .00200 | 5.39 | .273 | 2.55571 | 5.550 | 4.213 | PER IMP= 100.00 |
| COMPUTE NM HYD | 404.00 | - | 3 | .02900 | 70.61 | 3.156 | 2.04044 | 5.550 | 3.805 | PER IMP= 68.72 |
| ROUTE RESERVOIR | 502.00 | 3 | 5 | .02900 | 36.42 | 3.156 | 2.04043 | 5.700 | 1.962 | AC-FT= .830 |
| ADD HYD | 501.20 | 2& 5 | 6 | .03100 | 39.54 | 3.428 | 2.07365 | 5.700 | 1.993 | |
| ROUTE | 501.30 | 6 | 3 | .03100 | 39.41 | 3.428 | 2.07367 | 5.700 | 1.987 | |
| ADD HYD | 500.50 | 1& 3 | 5 | .04700 | 66.88 | 5.126 | 2.04479 | 5.600 | 2.223 | |
| COMPUTE NM HYD | 403.00 | - | 1 | .01600 | 16.28 | .556 | .65099 | 5.550 | 1.590 | PER IMP= 10.00 |
| COMPUTE NM HYD | 101.00 | - | 2 | .01300 | 34.09 | 1.641 | 2.36677 | 5.550 | 4.097 | PER IMP= 90.00 |
| ROUTE | 101.10 | 2 | 3 | .01300 | 32.25 | 1.641 | 2.36680 | 5.550 | 3.876 | |
| COMPUTE NM HYD | 102.00 | - | 6 | .00500 | 5.10 | .174 | .65099 | 5.550 | 1.592 | PER IMP= 10.00 |
| ADD HYD | 103.00 | 3& 6 | 8 | .01800 | 37.35 | 1.815 | 1.89014 | 5.550 | 3.242 | |
| COMPUTE NM HYD | 501.30 | - | 3 | .00130 | 3.61 | .177 | 2.55571 | 5.550 | 4.336 | PER IMP= 100.00 |
| ADD HYD | 104.00 | 8& 3 | 6 | .01930 | 40.95 | 1.992 | 1.93495 | 5.550 | 3.316 | |
| ROUTE | 103.10 | 6 | 3 | .01930 | 34.17 | 1.992 | 1.93498 | 5.650 | 2.767 | |
| ADD HYD | 104.00 | 1& 3 | 7 | .03530 | 48.57 | 2.547 | 1.35298 | 5.600 | 2.150 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/07/1993

INPUT FILE = s-cbzn-d.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= 2.660 |
| COMPUTE NM HYD | 401.00 | - | 1 | .01700 | 35.68 | 1.803 | 1.98890 | 5.550 | 3.280 | PER IMP= 70.00 |
| COMPUTE NM HYD | 405.00 | - | 2 | .00300 | 7.88 | .379 | 2.36677 | 5.550 | 4.103 | PER IMP= 90.00 |
| ROUTE | 500.11 | 2 | 3 | .00300 | 6.19 | .379 | 2.36674 | 5.600 | 3.224 | |
| COMPUTE NM HYD | 201.00 | - | 4 | .00800 | 20.98 | 1.010 | 2.36677 | 5.550 | 4.099 | PER IMP= 90.00 |
| ROUTE RESERVOIR | 500.20 | 4 | 6 | .00800 | 16.21 | 1.010 | 2.36674 | 5.650 | 3.166 | AC-FT= .138 |
| COMPUTE NM HYD | 301.00 | - | 5 | .00300 | 8.31 | .409 | 2.55571 | 5.550 | 4.331 | PER IMP= 100.00 |
| ADD HYD | 500.30 | 3& 5 | 7 | .00600 | 13.58 | .788 | 2.46115 | 5.550 | 3.538 | |
| ADD HYD | 500.40 | 7& 6 | 3 | .01400 | 29.58 | 1.797 | 2.40719 | 5.600 | 3.301 | |
| ROUTE | 500.31 | 3 | 5 | .01400 | 28.78 | 1.797 | 2.40719 | 5.650 | 3.212 | |
| ADD HYD | 500.40 | 1& 3 | 4 | .03100 | 65.07 | 3.601 | 2.17779 | 5.600 | 3.280 | |
| COMPUTE NM HYD | 402.00 | - | 1 | .01600 | 35.96 | 1.697 | 1.98890 | 5.550 | 3.511 | PER IMP= 70.00 |
| COMPUTE NM HYD | 302.00 | - | 2 | .00200 | 5.39 | .273 | 2.55571 | 5.550 | 4.213 | PER IMP= 100.00 |
| COMPUTE NM HYD | 404.00 | - | 3 | .02900 | 76.27 | 3.677 | 2.37716 | 5.550 | 4.109 | PER IMP= 90.55 |
| ROUTE RESERVOIR | 502.00 | 3 | 5 | .02900 | 39.71 | 3.677 | 2.37715 | 5.700 | 2.140 | AC-FT= .910 |
| ADD HYD | 501.20 | 2& 5 | 6 | .03100 | 42.83 | 3.949 | 2.38865 | 5.700 | 2.159 | |
| ROUTE | 501.30 | 6 | 3 | .03100 | 42.78 | 3.949 | 2.38867 | 5.700 | 2.156 | |
| ADD HYD | 500.50 | 1& 3 | 5 | .04700 | 70.09 | 5.646 | 2.25256 | 5.600 | 2.330 | |
| COMPUTE NM HYD | 403.00 | - | 1 | .01600 | 37.22 | 1.697 | 1.98890 | 5.550 | 3.634 | PER IMP= 70.00 |
| COMPUTE NM HYD | 101.00 | - | 2 | .01300 | 34.09 | 1.641 | 2.36677 | 5.550 | 4.097 | PER IMP= 90.00 |
| ROUTE | 101.10 | 2 | 3 | .01300 | 32.25 | 1.641 | 2.36680 | 5.550 | 3.876 | |
| COMPUTE NM HYD | 102.00 | - | 6 | .00500 | 11.64 | .530 | 1.98890 | 5.550 | 3.637 | PER IMP= 70.00 |
| ADD HYD | 103.00 | 3& 6 | 8 | .01800 | 43.89 | 2.171 | 2.26178 | 5.550 | 3.810 | |
| COMPUTE NM HYD | 501.30 | - | 3 | .00130 | 3.61 | .177 | 2.55571 | 5.550 | 4.336 | PER IMP= 100.00 |
| ADD HYD | 104.00 | 8& 3 | 6 | .01930 | 47.50 | 2.348 | 2.28156 | 5.550 | 3.845 | |
| ROUTE | 103.10 | 6 | 3 | .01930 | 39.60 | 2.349 | 2.28159 | 5.650 | 3.206 | |
| ADD HYD | 104.00 | 1& 3 | 7 | .03530 | 72.35 | 4.046 | 2.14890 | 5.600 | 3.203 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/10/1993

INPUT FILE = cabezn-e.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RECALL HYD | 340.00 | - | 5 | 3.79350 | 433.35 | 223.503 | 1.10470 | 5.650 | .178 | |
| ROUTE | 500.11 | 5 | 3 | 3.79350 | 413.57 | 223.278 | 1.10359 | 5.700 | .170 | |
| RECALL HYD | 500.40 | - | 4 | .03100 | 53.50 | 2.684 | 1.62368 | 5.600 | 2.697 | |
| ADD HYD | 350.21 | 3& 4 | 5 | 3.82450 | 453.24 | 225.962 | 1.10780 | 5.700 | .185 | |
| ROUTE | 500.12 | 5 | 3 | 3.82450 | 435.72 | 225.736 | 1.10669 | 5.750 | .178 | |
| RECALL HYD | 500.50 | - | 5 | .04700 | 68.63 | 5.126 | 2.04479 | 5.600 | 2.281 | |
| ADD HYD | 350.22 | 3& 5 | 6 | 3.87150 | 494.17 | 230.862 | 1.11808 | 5.700 | .199 | |
| ROUTE | 500.13 | 6 | 3 | 3.87150 | 483.55 | 230.636 | 1.11699 | 5.750 | .195 | |
| DIVIDE HYD | 350.50 | 3 | 4 | 1.85874 | 50.00 | 110.730 | 1.11699 | 5.350 | .042 | |
| | 350.60 | AND | 5 | 2.01276 | 433.55 | 119.906 | 1.11699 | 5.750 | .337 | |
| RECALL HYD | 104.00 | - | 7 | .03530 | 48.57 | 2.547 | 1.35296 | 5.600 | 2.150 | |
| ADD HYD | 350.22 | 5& 7 | 6 | 2.04806 | 467.76 | 122.453 | 1.12106 | 5.750 | .357 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/10/1993

INPUT FILE = cabeznsf.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RECALL HYD | 340.00 | - | 5 | 4.20100 | 449.56 | 198.801 | .88729 | 5.667 | .167 | |
| ROUTE | 500.11 | 5 | 3 | 4.20100 | 432.54 | 198.358 | .88531 | 5.733 | .161 | |
| RECALL HYD | 500.40 | - | 4 | .03100 | 53.50 | 2.684 | 1.62368 | 5.600 | 2.697 | |
| ADD HYD | 350.21 | 3& 4 | 5 | 4.23200 | 471.63 | 200.580 | .88867 | 5.700 | .174 | |
| ROUTE | 500.12 | 5 | 3 | 4.23200 | 457.83 | 200.288 | .88738 | 5.767 | .169 | |
| RECALL HYD | 500.50 | - | 5 | .04700 | 68.63 | 5.126 | 2.04479 | 5.600 | 2.281 | |
| ADD HYD | 350.22 | 3& 5 | 6 | 4.27900 | 516.25 | 204.930 | .89798 | 5.733 | .189 | |
| ROUTE | 500.13 | 6 | 3 | 4.27900 | 505.22 | 204.638 | .89669 | 5.800 | .184 | |
| DIVIDE HYD | 350.50 | 3 | 4 | 1.46607 | 50.00 | 70.113 | .89669 | 5.333 | .053 | |
| | 350.60 | AND | 5 | 2.81293 | 455.22 | 134.525 | .89669 | 5.800 | .253 | |
| RECALL HYD | 104.00 | - | 7 | .03530 | 48.57 | 2.547 | 1.35296 | 5.600 | 2.150 | |
| ADD HYD | 350.22 | 5& 7 | 6 | 2.84823 | 485.31 | 136.892 | .90117 | 5.767 | .266 | |
| FINISH | | | | | | | | | | |

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/10/1993

INPUT FILE = cabezn-f.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RECALL HYD | 340.00 | - | 5 | 4.20100 | 479.05 | 200.553 | .89511 | 5.667 | .178 | |
| ROUTE | 500.11 | 5 | 3 | 4.20100 | 461.70 | 200.110 | .89313 | 5.700 | .172 | |
| RECALL HYD | 500.40 | - | 4 | .03100 | 65.07 | 3.601 | 2.17777 | 5.600 | 3.280 | |
| ADD HYD | 350.21 | 3& 4 | 5 | 4.23200 | 510.61 | 203.164 | .90012 | 5.700 | .189 | |
| ROUTE | 500.12 | 5 | 3 | 4.23200 | 495.52 | 202.872 | .89883 | 5.733 | .183 | |
| RECALL HYD | 500.50 | - | 5 | .04700 | 72.23 | 5.646 | 2.25255 | 5.600 | 2.401 | |
| ADD HYD | 350.22 | 3& 5 | 6 | 4.27900 | 558.80 | 207.974 | .91132 | 5.733 | .204 | |
| ROUTE | 500.13 | 6 | 3 | 4.27900 | 545.84 | 207.681 | .91003 | 5.767 | .199 | |
| DIVIDE HYD | 350.50 | 3 | 4 | 1.44461 | 50.00 | 70.114 | .91003 | 5.333 | .054 | |
| | 350.60 | AND | 5 | 2.83439 | 495.84 | 137.567 | .91003 | 5.767 | .273 | |
| RECALL HYD | 104.00 | - | 7 | .03530 | 72.35 | 4.046 | 2.14890 | 5.600 | 3.203 | |
| ADD HYD | 350.22 | 5& 7 | 6 | 2.86969 | 540.96 | 141.320 | .92336 | 5.767 | .295 | |
| FINISH | | | | | | | | | | |

# APPENDIX B

## HEC-2
## Input/Output

REFER TO DISK 3
(INSIDE BACK COVER)

cu-sp-E.sum

THIS RUN EXECUTED 17MAY93 14:20:15

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 66.820 | .00 | 5012.90 | 440.83 | 5014.99 | 5015.21 | 5016.27 | 9.07 | 48.59 | 26.44 | 2.09 | 1.18 |
| * | 66.620 | 20.00 | 5012.80 | 440.83 | 5014.89 | 5015.11 | 5016.17 | 9.07 | 48.59 | 26.44 | 2.09 | 1.18 |
| * | 66.480 | 24.00 | 5012.70 | 440.83 | 5015.35 | 5015.35 | 5016.09 | 7.08 | 74.36 | 66.63 | 2.65 | .83 |
| * | 65.800 | 68.00 | 5012.40 | 440.83 | 5015.26 | 5015.26 | 5015.97 | 7.08 | 80.54 | 66.48 | 2.86 | .82 |
| * | 65.160 | 64.00 | 5012.10 | 440.83 | 5015.19 | 5015.19 | 5015.86 | 7.24 | 87.52 | 68.58 | 3.09 | .81 |
| * | 64.260 | 90.00 | 5011.70 | 440.83 | 5014.53 | 5014.75 | 5015.50 | 8.50 | 71.90 | 64.55 | 2.83 | 1.01 |
| | 63.540 | 72.00 | 5011.40 | 440.83 | 5014.18 | 5014.44 | 5015.22 | 8.76 | 69.46 | 64.65 | 2.78 | 1.05 |
| | 63.535 | .50 | 5010.80 | 440.83 | 5013.89 | 5014.28 | 5015.15 | 9.23 | 58.60 | 63.18 | 3.09 | 1.08 |
| * | 62.140 | 140.50 | 5010.10 | 440.83 | 5012.73 | 5013.15 | 5014.12 | 9.95 | 58.44 | 62.08 | 2.63 | 1.24 |
| * | 61.990 | 14.00 | 5009.60 | 440.83 | 5012.46 | 5012.49 | 5013.22 | 7.07 | 68.68 | 68.55 | 2.86 | .89 |
| * | 61.400 | 60.00 | 5009.60 | 440.83 | 5012.88 | 5012.88 | 5013.52 | 7.01 | 84.25 | 64.77 | 3.28 | .78 |
| * | 60.300 | 110.00 | 5009.60 | 440.83 | 5012.68 | 5012.68 | 5013.33 | 7.16 | 88.91 | 68.19 | 3.08 | .81 |
| * | 58.760 | 154.00 | 5008.90 | 440.83 | 5011.71 | 5011.96 | 5012.71 | 8.76 | 72.00 | 66.97 | 2.81 | 1.04 |
| | 57.450 | 131.00 | 5008.30 | 440.83 | 5011.09 | 5011.37 | 5012.19 | 8.93 | 65.88 | 58.74 | 2.79 | 1.07 |
| | 57.445 | .50 | 5007.70 | 440.83 | 5010.73 | 5011.18 | 5012.10 | 9.55 | 54.92 | 60.89 | 3.03 | 1.13 |
| * | 56.780 | 66.50 | 5007.40 | 440.83 | 5010.01 | 5010.50 | 5011.59 | 10.40 | 52.44 | 53.87 | 2.61 | 1.30 |
| | 56.000 | 78.00 | 5007.00 | 440.83 | 5009.64 | 5010.07 | 5011.07 | 10.01 | 55.74 | 53.74 | 2.64 | 1.24 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 54.480 | 152.00 | 5006.30 | 460.53 | 5009.15 | 5009.40 | 5010.25 | 8.88 | 66.34 | 53.10 | 2.85 | 1.05 |
| | 51.840 | 264.00 | 5005.10 | 460.53 | 5007.84 | 5008.21 | 5009.11 | 9.57 | 64.42 | 61.88 | 2.74 | 1.16 |
| | 50.000 | 184.00 | 5004.20 | 460.53 | 5006.95 | 5007.33 | 5008.25 | 9.56 | 61.69 | 58.16 | 2.75 | 1.16 |
| | 49.900 | 10.00 | 5003.50 | 460.53 | 5006.60 | 5007.08 | 5008.13 | 10.02 | 51.53 | 56.42 | 3.10 | 1.17 |
| | 49.430 | 47.00 | 5003.40 | 502.28 | 5006.63 | 5006.91 | 5007.72 | 8.88 | 70.95 | 56.02 | 3.23 | 1.00 |
| | 48.570 | 86.00 | 5003.40 | 502.28 | 5006.15 | 5006.46 | 5007.36 | 9.00 | 64.70 | 57.40 | 2.75 | 1.13 |
| * | 48.440 | 13.00 | 5003.40 | 502.28 | 5006.60 | 5006.60 | 5007.38 | 7.81 | 89.91 | 59.77 | 3.20 | .86 |
| * | 47.820 | 62.00 | 5003.10 | 502.28 | 5006.38 | 5006.38 | 5007.22 | 8.01 | 83.69 | 52.61 | 3.28 | .88 |
| * | 45.570 | 229.00 | 5002.20 | 502.28 | 5005.19 | 5005.47 | 5006.35 | 9.25 | 72.49 | 57.22 | 2.99 | 1.06 |
| | 43.270 | 226.00 | 5001.30 | 502.28 | 5004.20 | 5004.50 | 5005.45 | 9.52 | 67.81 | 48.99 | 2.90 | 1.11 |
| * | 42.000 | 202.00 | 5000.80 | 502.28 | 5004.06 | 5004.14 | 5004.85 | 7.78 | 93.38 | 70.88 | 3.26 | .85 |
| * | 41.440 | 66.00 | 5000.60 | 502.28 | 5003.59 | 5003.83 | 5004.59 | 8.75 | 83.64 | 74.45 | 2.99 | 1.00 |



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 66.620 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66.480 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66.480 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.800 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.800 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.800 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.160 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.160 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.160 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 64.260 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 62.140 PROFILE= 1 INTERPOLATED X-SECTIONS USED

```
CAUTION SECNO=     61.990  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=     61.990  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     61.400  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     61.400  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     61.400  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     60.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     60.300  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     60.300  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     58.760  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     56.780  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     54.480  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     48.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     48.440  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     48.440  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     47.820  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     47.820  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     47.820  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     45.570  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     42.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     41.440  PROFILE=  1  INTERPOLATED X-SECTIONS USED
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cu-SP-SE.sum

THIS RUN EXECUTED 17MAY93 14:21:01

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 66.820 | .00 | 5012.90 | 436.53 | 5014.98 | 5015.20 | 5016.25 | 9.04 | 48.28 | 26.40 | 2.08 | 1.18 |
| * | 66.620 | 20.00 | 5012.80 | 436.53 | 5014.88 | 5015.10 | 5016.15 | 9.04 | 48.28 | 26.40 | 2.08 | 1.18 |
| * | 66.480 | 24.00 | 5012.70 | 436.53 | 5015.35 | 5015.35 | 5016.08 | 7.02 | 74.20 | 66.61 | 2.65 | .82 |
| * | 65.800 | 68.00 | 5012.40 | 436.53 | 5015.26 | 5015.26 | 5015.96 | 7.04 | 79.99 | 66.44 | 2.86 | .81 |
| * | 65.160 | 64.00 | 5012.10 | 436.53 | 5015.18 | 5015.18 | 5015.85 | 7.22 | 86.82 | 68.52 | 3.08 | .81 |
| * | 64.260 | 90.00 | 5011.70 | 436.53 | 5014.53 | 5014.74 | 5015.49 | 8.47 | 71.36 | 64.50 | 2.83 | 1.01 |
| | 63.540 | 72.00 | 5011.40 | 436.53 | 5014.18 | 5014.44 | 5015.21 | 8.73 | 68.92 | 64.61 | 2.78 | 1.05 |
| | 63.535 | .50 | 5010.80 | 436.53 | 5013.87 | 5014.27 | 5015.14 | 9.22 | 57.80 | 63.11 | 3.07 | 1.08 |
| * | 62.140 | 140.50 | 5010.10 | 436.53 | 5012.72 | 5013.14 | 5014.11 | 9.92 | 57.89 | 62.03 | 2.62 | 1.24 |
| * | 61.990 | 14.00 | 5009.60 | 436.53 | 5012.44 | 5012.47 | 5013.21 | 7.10 | 67.14 | 68.44 | 2.84 | .89 |
| * | 61.400 | 60.00 | 5009.60 | 436.53 | 5012.88 | 5012.88 | 5013.51 | 6.97 | 83.81 | 64.74 | 3.28 | .77 |
| * | 60.300 | 110.00 | 5009.60 | 436.53 | 5012.67 | 5012.67 | 5013.31 | 7.14 | 88.14 | 68.11 | 3.07 | .81 |
| * | 58.760 | 154.00 | 5008.90 | 436.53 | 5011.70 | 5011.95 | 5012.70 | 8.73 | 71.41 | 66.91 | 2.80 | 1.04 |
| | 57.450 | 131.00 | 5008.30 | 436.53 | 5011.08 | 5011.36 | 5012.17 | 8.91 | 65.28 | 58.69 | 2.78 | 1.07 |
| | 57.445 | .50 | 5007.70 | 436.53 | 5010.72 | 5011.17 | 5012.09 | 9.54 | 54.12 | 60.83 | 3.02 | 1.13 |
| * | 56.780 | 66.50 | 5007.40 | 436.53 | 5010.00 | 5010.49 | 5011.57 | 10.37 | 51.91 | 53.81 | 2.60 | 1.30 |
| | 56.000 | 78.00 | 5007.00 | 436.53 | 5009.65 | 5010.06 | 5011.05 | 9.90 | 55.85 | 53.75 | 2.65 | 1.23 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 54.480 | 152.00 | 5006.30 | 458.94 | 5009.15 | 5009.39 | 5010.24 | 8.84 | 66.39 | 53.10 | 2.85 | 1.05 |
| | 51.840 | 264.00 | 5005.10 | 458.94 | 5007.84 | 5008.20 | 5009.11 | 9.56 | 64.24 | 61.86 | 2.74 | 1.16 |
| | 50.000 | 184.00 | 5004.20 | 458.94 | 5006.94 | 5007.33 | 5008.24 | 9.57 | 61.32 | 58.12 | 2.73 | 1.17 |
| | 49.900 | 10.00 | 5003.50 | 458.94 | 5006.59 | 5007.08 | 5008.12 | 10.02 | 51.23 | 55.90 | 3.09 | 1.18 |
| * | 49.430 | 47.00 | 5003.40 | 503.85 | 5006.67 | 5006.91 | 5007.72 | 8.74 | 72.60 | 56.18 | 3.27 | .98 |
| | 48.570 | 86.00 | 5003.40 | 503.85 | 5006.16 | 5006.46 | 5007.35 | 8.96 | 65.32 | 57.45 | 2.76 | 1.12 |
| * | 48.440 | 13.00 | 5003.40 | 503.85 | 5006.61 | 5006.61 | 5007.38 | 7.80 | 90.32 | 59.79 | 3.21 | .86 |
| * | 47.820 | 62.00 | 5003.10 | 503.85 | 5006.39 | 5006.39 | 5007.23 | 8.00 | 84.05 | 52.65 | 3.29 | .87 |
| * | 45.570 | 229.00 | 5002.20 | 503.85 | 5005.20 | 5005.47 | 5006.36 | 9.23 | 72.97 | 57.28 | 3.00 | 1.06 |
| | 43.270 | 226.00 | 5001.30 | 503.85 | 5004.21 | 5004.50 | 5005.45 | 9.53 | 68.02 | 49.02 | 2.91 | 1.11 |
| * | 42.000 | 202.00 | 5000.80 | 503.85 | 5004.08 | 5004.14 | 5004.85 | 7.76 | 94.08 | 70.94 | 3.28 | .84 |
| * | 41.440 | 66.00 | 5000.60 | 503.85 | 5003.58 | 5003.84 | 5004.60 | 8.83 | 82.95 | 74.37 | 2.98 | 1.01 |



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 66.620 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66.480 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66.480 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.800 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.800 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.800 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.160 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.160 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.160 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 64.260 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 62.140 PROFILE= 1 INTERPOLATED X-SECTIONS USED

```
CAUTION SECNO=     61.990  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=     61.990  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     61.400  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     61.400  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     61.400  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     60.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     60.300  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     60.300  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     58.760  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     56.780  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     54.480  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     49.430  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=     49.430  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     48.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     48.440  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     48.440  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     47.820  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     47.820  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     47.820  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     45.570  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     42.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     41.440  PROFILE=  1  INTERPOLATED X-SECTIONS USED
1
```

Cu-SP-SF.sum

THIS RUN EXECUTED 17MAY93 14:20:38

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 66.820 | .00 | 5012.90 | 456.48 | 5015.04 | 5015.27 | 5016.34 | 9.18 | 49.75 | 26.57 | 2.14 | 1.18 |
| * | 66.620 | 20.00 | 5012.80 | 456.48 | 5014.93 | 5015.17 | 5016.24 | 9.18 | 49.75 | 26.57 | 2.13 | 1.18 |
| * | 66.480 | 24.00 | 5012.70 | 456.48 | 5015.40 | 5015.40 | 5016.14 | 7.09 | 78.12 | 66.99 | 2.70 | .82 |
| * | 65.800 | 68.00 | 5012.40 | 456.48 | 5015.31 | 5015.31 | 5016.02 | 7.14 | 83.30 | 66.71 | 2.91 | .81 |
| * | 65.160 | 64.00 | 5012.10 | 456.48 | 5015.22 | 5015.22 | 5015.90 | 7.32 | 90.00 | 68.81 | 3.12 | .82 |
| * | 64.260 | 90.00 | 5011.70 | 456.48 | 5014.57 | 5014.79 | 5015.55 | 8.58 | 74.17 | 64.77 | 2.87 | 1.01 |
| | 63.540 | 72.00 | 5011.40 | 456.48 | 5014.22 | 5014.48 | 5015.27 | 8.85 | 71.61 | 64.82 | 2.82 | 1.05 |
| | 63.535 | .50 | 5010.80 | 456.48 | 5013.93 | 5014.29 | 5015.20 | 9.30 | 61.29 | 63.38 | 3.13 | 1.08 |
| * | 62.140 | 140.50 | 5010.10 | 456.48 | 5012.76 | 5013.18 | 5014.17 | 10.04 | 60.50 | 62.26 | 2.66 | 1.24 |
| * | 61.990 | 14.00 | 5009.60 | 456.48 | 5012.50 | 5012.53 | 5013.28 | 7.14 | 71.49 | 68.75 | 2.90 | .89 |
| * | 61.400 | 60.00 | 5009.60 | 456.48 | 5012.92 | 5012.92 | 5013.56 | 7.09 | 86.44 | 64.93 | 3.32 | .78 |
| * | 60.300 | 110.00 | 5009.60 | 456.48 | 5012.71 | 5012.71 | 5013.37 | 7.24 | 91.28 | 68.42 | 3.11 | .81 |
| * | 58.760 | 154.00 | 5008.90 | 456.48 | 5011.73 | 5011.99 | 5012.76 | 8.88 | 73.86 | 67.15 | 2.83 | 1.05 |
| | 57.450 | 131.00 | 5008.30 | 456.48 | 5011.12 | 5011.41 | 5012.23 | 9.01 | 68.09 | 58.93 | 2.82 | 1.07 |
| | 57.445 | .50 | 5007.70 | 456.48 | 5010.79 | 5011.20 | 5012.15 | 9.57 | 57.99 | 61.13 | 3.09 | 1.12 |
| * | 56.780 | 66.50 | 5007.40 | 456.48 | 5010.05 | 5010.54 | 5011.64 | 10.47 | 54.52 | 54.10 | 2.65 | 1.30 |
| | 56.000 | 78.00 | 5007.00 | 456.48 | 5009.69 | 5010.12 | 5011.13 | 10.08 | 57.84 | 53.91 | 2.69 | 1.24 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 54.480 | 152.00 | 5006.30 | 478.82 | 5009.19 | 5009.44 | 5010.31 | 8.98 | 68.65 | 53.39 | 2.89 | 1.06 |
| | 51.840 | 264.00 | 5005.10 | 478.82 | 5007.88 | 5008.25 | 5009.17 | 9.69 | 66.69 | 62.16 | 2.78 | 1.16 |
| | 50.000 | 184.00 | 5004.20 | 478.82 | 5006.99 | 5007.37 | 5008.31 | 9.67 | 63.97 | 58.43 | 2.79 | 1.17 |
| | 49.900 | 10.00 | 5003.50 | 478.82 | 5006.66 | 5007.13 | 5008.19 | 10.08 | 54.76 | 56.73 | 3.16 | 1.17 |
| | 49.430 | 47.00 | 5003.40 | 523.61 | 5006.60 | 5006.95 | 5007.85 | 9.48 | 68.90 | 55.81 | 3.20 | 1.07 |
| | 48.570 | 86.00 | 5003.40 | 523.61 | 5006.16 | 5006.52 | 5007.47 | 9.36 | 64.87 | 57.42 | 2.76 | 1.17 |
| * | 48.440 | 13.00 | 5003.40 | 523.61 | 5006.65 | 5006.65 | 5007.44 | 7.89 | 93.04 | 59.93 | 3.25 | .86 |
| * | 47.820 | 62.00 | 5003.10 | 523.61 | 5006.43 | 5006.43 | 5007.29 | 8.11 | 86.55 | 52.96 | 3.33 | .88 |
| * | 45.570 | 229.00 | 5002.20 | 523.61 | 5005.22 | 5005.52 | 5006.41 | 9.37 | 75.04 | 57.52 | 3.02 | 1.07 |
| | 43.270 | 226.00 | 5001.30 | 523.61 | 5004.25 | 5004.54 | 5005.51 | 9.62 | 70.38 | 49.34 | 2.95 | 1.10 |
| * | 42.000 | 202.00 | 5000.80 | 523.61 | 5004.01 | 5004.16 | 5004.93 | 8.39 | 89.76 | 70.62 | 3.21 | .92 |
| | 41.440 | 66.00 | 5000.60 | 523.61 | 5003.60 | 5003.89 | 5004.68 | 9.11 | 83.78 | 74.47 | 3.00 | 1.04 |



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 66.620 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 66.480 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 66.480 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.800 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.800 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.800 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.160 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 65.160 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 65.160 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 64.260 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 62.140 PROFILE= 1 INTERPOLATED X-SECTIONS USED

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CAUTION SECNO=     61.990  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=     61.990  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     61.400  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     61.400  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     61.400  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     60.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     60.300  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     60.300  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     58.760  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     56.780  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     54.480  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     48.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     48.440  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     48.440  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     47.820  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     47.820  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     47.820  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     45.570  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     42.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
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cu-sp-f.sum THIS RUN EXECUTED 27SEP95 11:19:46

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

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

Q's UPDATED IN HEC-2 FILE ONLY SUMMARY TABLES NOT REPRINTED 10-4-95. INSIGNIFICANT EFFECT ON RESULTS.

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 66.820 | .00 | 5012.90 | ~~496.08~~ 496.12 | 5015.14 | 5015.38 | 5016.52 | 9.43 | 52.60 | 26.90 | 2.24 | 1.19 |
| * | 66.620 | 20.00 | 5012.80 | 496.08 | 5015.04 | 5015.27 | 5016.42 | 9.43 | 52.60 | 26.90 | 2.24 | 1.19 |
| * | 66.480 | 24.00 | 5012.70 | 496.08 | 5015.10 | 5015.51 | 5016.41 | 9.26 | 58.37 | 57.32 | 2.40 | 1.14 |
| * | 65.800 | 68.00 | 5012.40 | 496.08 | 5015.12 | 5015.41 | 5016.23 | 8.78 | 70.67 | 65.68 | 2.72 | 1.05 |
| * | 65.160 | 64.00 | 5012.10 | 496.08 | 5015.06 | 5015.32 | 5016.10 | 8.87 | 79.13 | 67.81 | 2.96 | 1.02 |
| | 64.260 | 90.00 | 5011.70 | 496.08 | 5014.56 | 5014.87 | 5015.72 | 9.34 | 74.07 | 64.76 | 2.86 | 1.10 |
| * | 63.540 | 72.00 | 5011.40 | 496.08 | 5014.27 | 5014.58 | 5015.43 | 9.33 | 74.40 | 65.03 | 2.87 | 1.10 |
| | 63.535 | .50 | 5010.80 | 496.08 | 5013.99 | 5014.40 | 5015.36 | 9.72 | 65.01 | 63.67 | 3.19 | 1.11 |
| * | 62.140 | 140.50 | 5010.10 | 496.08 | 5012.84 | 5013.27 | 5014.29 | 10.29 | 65.31 | 62.68 | 2.74 | 1.25 |
| * | 61.990 | 14.00 | 5009.60 | 496.08 | 5012.63 | 5012.64 | 5013.40 | 7.16 | 80.50 | 69.39 | 3.03 | .86 |
| * | 61.400 | 60.00 | 5009.60 | 496.08 | 5012.99 | 5012.99 | 5013.67 | 7.32 | 91.43 | 65.30 | 3.39 | .79 |
| * | 60.300 | 110.00 | 5009.60 | 496.08 | 5012.77 | 5012.77 | 5013.49 | 7.58 | 95.30 | 68.81 | 3.17 | .84 |
| * | 58.760 | 154.00 | 5008.90 | 496.08 | 5011.80 | 5012.08 | 5012.87 | 9.13 | 78.93 | 67.64 | 2.90 | 1.06 |
| | 57.450 | 131.00 | 5008.30 | 496.08 | 5011.22 | 5011.50 | 5012.35 | 9.19 | 73.55 | 59.40 | 2.92 | 1.07 |
| | 57.445 | .50 | 5007.70 | 496.08 | 5010.89 | 5011.32 | 5012.27 | 9.73 | 64.31 | 61.61 | 3.19 | 1.11 |
| * | 56.780 | 66.50 | 5007.40 | 496.08 | 5010.12 | 5010.63 | 5011.79 | 10.82 | 58.34 | 54.53 | 2.72 | 1.32 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 56.000 | 78.00 | 5007.00 | 496.08 | 5009.76 | 5010.20 | 5011.27 | 10.38 | 61.96 | 54.25 | 2.76 | 1.25 |



| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 54.480 | 152.00 | 5006.30 | 533.00 | 5009.31 | 5009.57 | 5010.50 | 9.35 | 74.37 | 54.11 | 3.01 | 1.07 |
| | 51.840 | 264.00 | 5005.10 | 533.00 | 5007.97 | 5008.37 | 5009.34 | 10.08 | 72.64 | 62.87 | 2.87 | 1.18 |
| | 50.000 | 184.00 | 5004.20 | 533.00 | 5007.09 | 5007.50 | 5008.47 | 10.01 | 70.22 | 59.16 | 2.89 | 1.18 |
| | 49.900 | 10.00 | 5003.50 | 533.00 | 5006.80 | 5007.27 | 5008.37 | 10.30 | 62.98 | 57.43 | 3.30 | 1.16 |
| | 49.430 | 47.00 | 5003.40 | 580.71 | 5006.65 | 5007.07 | 5008.09 | 10.24 | 71.20 | 56.04 | 3.25 | 1.15 |
| | 48.570 | 86.00 | 5003.40 | 580.71 | 5006.21 | 5006.63 | 5007.68 | 9.97 | 68.44 | 57.71 | 2.81 | 1.23 |
| * | 48.440 | 13.00 | 5003.40 | 580.71 | 5006.77 | 5006.77 | 5007.60 | 8.19 | 100.05 | 60.29 | 3.37 | .87 |
| * | 47.820 | 62.00 | 5003.10 | 580.71 | 5006.56 | 5006.56 | 5007.47 | 8.39 | 93.54 | 53.80 | 3.46 | .89 |
| * | 45.570 | 229.00 | 5002.20 | 580.71 | 5005.35 | 5005.64 | 5006.59 | 9.66 | 81.94 | 58.31 | 3.15 | 1.07 |
| | 43.270 | 226.00 | 5001.30 | 580.71 | 5004.38 | 5004.68 | 5005.69 | 9.90 | 76.77 | 50.19 | 3.08 | 1.11 |
| * | 42.000 | 202.00 | 5000.80 | 580.71 | 5004.12 | 5004.28 | 5005.08 | 8.67 | 97.62 | 71.20 | 3.32 | .93 |
| | 41.440 | 66.00 | 5000.60 | 580.71 | 5003.70 | 5004.00 | 5004.82 | 9.42 | 91.09 | 75.28 | 3.10 | 1.06 |



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 66.620 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66.480 PROFILE= 1 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 66.480 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.800 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 65.160 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 63.540 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 62.140 PROFILE= 1 INTERPOLATED X-SECTIONS USED

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CAUTION SECNO=    61.990  PROFILE=  1  WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO=    61.990  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    61.400  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    51.400  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    61.400  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    60.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    60.300  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    60.300  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    58.760  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    56.780  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    54.480  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    48.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    48.440  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    48.440  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    47.820  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    47.820  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=    47.820  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=    45.570  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    42.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
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THIS RUN EXECUTED 17MAY93 14:19:55

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 66.820 | .00 | 5012.90 | 483.25 | 5015.11 | 5015.36 | 5016.47 | 9.35 | 51.69 | 26.80 | 2.21 | 1.19 |
| * | 66.620 | 20.00 | 5012.80 | 483.25 | 5015.01 | 5015.25 | 5016.36 | 9.35 | 51.69 | 26.80 | 2.21 | 1.19 |
| * | 66.480 | 24.00 | 5012.70 | 483.25 | 5015.08 | 5015.47 | 5016.36 | 9.12 | 57.21 | 55.64 | 2.38 | 1.13 |
| * | 65.800 | 68.00 | 5012.40 | 483.25 | 5015.08 | 5015.38 | 5016.20 | 8.77 | 68.17 | 65.47 | 2.68 | 1.05 |
| * | 65.160 | 64.00 | 5012.10 | 483.25 | 5015.03 | 5015.29 | 5016.07 | 8.85 | 76.85 | 67.60 | 2.93 | 1.03 |
| | 64.260 | 90.00 | 5011.70 | 483.25 | 5014.54 | 5014.84 | 5015.69 | 9.30 | 72.14 | 64.58 | 2.83 | 1.10 |
| * | 63.540 | 72.00 | 5011.40 | 483.25 | 5014.24 | 5014.55 | 5015.39 | 9.28 | 72.46 | 64.88 | 2.84 | 1.10 |
| | 63.535 | .50 | 5010.80 | 483.25 | 5013.95 | 5014.36 | 5015.32 | 9.68 | 62.90 | 63.51 | 3.15 | 1.11 |
| * | 62.140 | 140.50 | 5010.10 | 483.25 | 5012.81 | 5013.24 | 5014.26 | 10.22 | 63.66 | 62.54 | 2.71 | 1.25 |
| * | 61.990 | 14.00 | 5009.60 | 483.25 | 5011.64 | 5012.61 | 5014.25 | 12.95 | 37.31 | 26.51 | 2.04 | 1.92 |
| * | 61.400 | 60.00 | 5009.60 | 483.25 | 5012.94 | 5012.94 | 5013.64 | 7.37 | 88.25 | 65.07 | 3.34 | .81 |
| * | 60.300 | 110.00 | 5009.60 | 483.25 | 5012.74 | 5012.74 | 5013.45 | 7.52 | 93.28 | 68.61 | 3.14 | .84 |
| * | 58.760 | 154.00 | 5008.90 | 483.25 | 5011.79 | 5012.05 | 5012.84 | 9.04 | 77.45 | 67.50 | 2.89 | 1.05 |
| | 57.450 | 131.00 | 5008.30 | 483.25 | 5011.19 | 5011.47 | 5012.31 | 9.15 | 71.64 | 59.24 | 2.89 | 1.07 |
| | 57.445 | .50 | 5007.70 | 483.25 | 5010.86 | 5011.28 | 5012.24 | 9.70 | 62.15 | 61.44 | 3.16 | 1.12 |
| * | 56.780 | 66.50 | 5007.40 | 483.25 | 5010.10 | 5010.60 | 5011.74 | 10.72 | 57.09 | 54.39 | 2.70 | 1.31 |
| | 56.000 | 78.00 | 5007.00 | 483.25 | 5009.73 | 5010.18 | 5011.23 | 10.30 | 60.51 | 54.13 | 2.73 | 1.25 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 54.480 | 152.00 | 5006.30 | 517.25 | 5009.28 | 5009.54 | 5010.45 | 9.21 | 73.08 | 53.95 | 2.98 | 1.06 |
| | 51.840 | 264.00 | 5005.10 | 517.25 | 5007.95 | 5008.33 | 5009.29 | 9.97 | 70.93 | 62.66 | 2.85 | 1.18 |
| | 50.000 | 184.00 | 5004.20 | 517.25 | 5007.05 | 5007.46 | 5008.42 | 9.92 | 68.38 | 58.95 | 2.85 | 1.18 |
| | 49.900 | 10.00 | 5003.50 | 517.25 | 5006.76 | 5007.23 | 5008.32 | 10.23 | 60.72 | 57.24 | 3.26 | 1.16 |
| * | 49.430 | 47.00 | 5003.40 | 565.91 | 5006.67 | 5007.04 | 5008.01 | 9.89 | 71.91 | 56.11 | 3.27 | 1.11 |
| | 48.570 | 86.00 | 5003.40 | 565.91 | 5006.20 | 5006.61 | 5007.60 | 9.74 | 68.22 | 57.69 | 2.80 | 1.20 |
| * | 48.440 | 13.00 | 5003.40 | 565.91 | 5006.74 | 5006.74 | 5007.56 | 8.11 | 98.26 | 60.20 | 3.34 | .87 |
| * | 47.820 | 62.00 | 5003.10 | 565.91 | 5006.53 | 5006.53 | 5007.43 | 8.32 | 91.75 | 53.58 | 3.43 | .88 |
| * | 45.570 | 229.00 | 5002.20 | 565.91 | 5005.33 | 5005.61 | 5006.54 | 9.56 | 80.46 | 58.15 | 3.13 | 1.07 |
| | 43.270 | 226.00 | 5001.30 | 565.91 | 5004.35 | 5004.64 | 5005.65 | 9.83 | 75.15 | 49.98 | 3.05 | 1.11 |
| * | 42.000 | 202.00 | 5000.80 | 565.91 | 5004.10 | 5004.25 | 5005.04 | 8.58 | 95.81 | 71.06 | 3.30 | .93 |
| | 41.440 | 66.00 | 5000.60 | 565.91 | 5003.67 | 5003.97 | 5004.79 | 9.34 | 89.22 | 75.07 | 3.07 | 1.05 |



SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 66.620 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 66.480 PROFILE= 1 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 66.480 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 65.800 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 65.160 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 63.540 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 62.140 PROFILE= 1 INTERPOLATED X-SECTIONS USED

CAUTION SECNO= 61.990 PROFILE= 1 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 61.990 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 61.400 PROFILE= 1 INTERPOLATED X-SECTIONS USED

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CAUTION SECNO=     60.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     60.300  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     60.300  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     58.760  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     56.780  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     54.480  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     49.430  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     48.440  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     48.440  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     48.440  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     47.820  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     47.820  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     47.820  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO=     45.570  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     42.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED
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THIS RUN EXECUTED 17MAY93 15:44:57

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991

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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .500 | .00 | 4988.66 | 475.37 | 4995.20 | 4991.18 | 4995.27 | 2.08 | 228.27 | 48.12 | 6.54 | .17 |
| | 1.800 | 130.00 | 4988.80 | 475.37 | 4995.21 | 4991.82 | 4995.31 | 2.54 | 187.41 | 43.29 | 6.41 | .21 |
| | 4.000 | 220.00 | 4989.02 | 475.37 | 4995.26 | 4992.18 | 4995.38 | 2.75 | 172.96 | 42.06 | 6.24 | .24 |
| | 6.600 | 260.00 | 4989.30 | 475.37 | 4995.38 | 4991.63 | 4995.45 | 2.20 | 215.63 | 46.06 | 6.08 | .18 |
| * | 9.200 | 260.00 | 4989.50 | 475.37 | 4995.38 | 4992.55 | 4995.56 | 3.40 | 139.97 | 35.57 | 5.88 | .30 |
| | 12.000 | 280.00 | 4989.90 | 475.37 | 4995.54 | 4992.96 | 4995.75 | 3.65 | 130.20 | 34.14 | 5.64 | .33 |
| | 14.200 | 220.00 | 4990.10 | 475.37 | 4995.70 | 4993.15 | 4995.91 | 3.69 | 128.98 | 34.09 | 5.60 | .33 |
| | 17.000 | 280.00 | 4990.30 | 475.37 | 4995.90 | 4993.34 | 4996.11 | 3.64 | 130.48 | 34.63 | 5.60 | .33 |
| | 19.200 | 220.00 | 4990.60 | 475.37 | 4996.05 | 4993.64 | 4996.28 | 3.81 | 124.89 | 33.81 | 5.45 | .35 |
| | 21.500 | 230.00 | 4990.80 | 475.37 | 4996.23 | 4993.85 | 4996.46 | 3.82 | 124.49 | 33.73 | 5.43 | .35 |
| | 24.100 | 260.00 | 4991.00 | 475.37 | 4996.46 | 4993.86 | 4996.65 | 3.57 | 133.03 | 34.77 | 5.46 | .32 |
| | 26.500 | 240.00 | 4991.30 | 475.37 | 4996.60 | 4994.37 | 4996.86 | 4.04 | 117.68 | 32.38 | 5.30 | .37 |
| | 29.100 | 260.00 | 4991.50 | 475.37 | 4996.86 | 4994.46 | 4997.08 | 3.77 | 126.00 | 34.04 | 5.36 | .35 |
| | 31.750 | 265.00 | 4991.77 | 475.37 | 4997.13 | 4994.52 | 4997.32 | 3.43 | 138.67 | 36.77 | 5.36 | .31 |
| | 32.495 | 74.50 | 4991.84 | 475.37 | 4997.18 | 4995.10 | 4997.46 | 4.25 | 111.94 | 31.91 | 5.34 | .40 |
| | 32.500 | .50 | 4993.11 | 475.37 | 4996.80 | 4996.36 | 4997.63 | 7.31 | 65.02 | 25.25 | 3.69 | .80 |
| | 32.600 | 10.00 | 4993.14 | 475.37 | 4996.79 | 4996.40 | 4997.65 | 7.41 | 64.15 | 25.11 | 3.65 | .82 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33.000 | 40.00 | 4993.26 | 475.37 | 4996.79 | 4996.52 | 4997.73 | 7.78 | 61.13 | 24.60 | 3.53 | .87 |
| | 33.500 | 50.00 | 4993.41 | 475.37 | 4996.79 | 4996.67 | 4997.85 | 8.27 | 57.48 | 23.98 | 3.38 | .94 |
| * | 34.000 | 50.00 | 4993.55 | 475.37 | 4996.85 | 4996.85 | 4998.08 | 8.89 | 53.49 | 22.41 | 3.30 | 1.01 |
| * | 34.500 | 50.00 | 4993.70 | 475.37 | 4997.02 | 4997.02 | 4998.22 | 8.82 | 53.87 | 22.48 | 3.32 | 1.00 |
| * | 35.000 | 50.00 | 4993.85 | 475.37 | 4997.16 | 4997.16 | 4998.37 | 8.82 | 53.90 | 22.48 | 3.32 | 1.00 |
| * | 35.500 | 50.00 | 4993.99 | 475.37 | 4997.31 | 4997.31 | 4998.52 | 8.83 | 53.82 | 22.47 | 3.32 | 1.01 |
| * | 36.000 | 50.00 | 4994.14 | 475.37 | 4997.46 | 4997.46 | 4998.67 | 8.83 | 53.82 | 22.47 | 3.32 | 1.01 |
| * | 36.500 | 50.00 | 4994.29 | 475.37 | 4997.60 | 4997.60 | 4998.82 | 8.84 | 53.79 | 22.46 | 3.31 | 1.01 |
| * | 37.000 | 50.00 | 4994.45 | 475.37 | 4997.94 | 4997.70 | 4998.94 | 8.00 | 59.45 | 24.09 | 3.49 | .90 |
| | 37.500 | 50.00 | 4994.60 | 475.37 | 4997.94 | 4997.87 | 4999.06 | 8.50 | 55.95 | 23.50 | 3.34 | .97 |
| | 38.000 | 50.00 | 4994.74 | 475.37 | 4998.21 | 4997.99 | 4999.16 | 7.83 | 60.68 | 24.92 | 3.47 | .88 |
| | 38.300 | 30.00 | 4994.83 | 475.37 | 4998.22 | 4998.06 | 4999.23 | 8.06 | 58.98 | 24.82 | 3.39 | .92 |
| * | 38.360 | 6.00 | 4994.85 | 475.37 | 4998.14 | 4998.14 | 4999.33 | 8.74 | 54.41 | 23.03 | 3.29 | 1.00 |
| * | 38.460 | 10.00 | 4994.88 | 475.37 | 4998.92 | 4997.80 | 4999.41 | 5.61 | 84.78 | 28.25 | 4.04 | .57 |
| | 38.600 | 14.00 | 4994.93 | 475.37 | 4999.14 | 4997.43 | 4999.43 | 4.39 | 108.33 | 30.40 | 4.21 | .41 |
| | 38.750 | 15.00 | 4994.98 | 475.37 | 4999.12 | 4997.21 | 4999.45 | 4.59 | 103.53 | 25.01 | 4.14 | .40 |
| | 40.560 | 181.00 | 4994.98 | 441.16 | 4999.12 | .00 | 4999.45 | 4.21 | 104.75 | 25.01 | 4.14 | .36 |
| | 40.570 | 1.00 | 4995.40 | 441.16 | 4999.10 | 4997.58 | 4999.48 | 4.96 | 88.91 | 24.01 | 3.70 | .45 |
| * | 40.700 | 12.00 | 4997.10 | 441.16 | 4998.90 | 4998.90 | 4999.77 | 7.45 | 59.19 | 34.61 | 1.80 | 1.00 |



SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 9.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 34.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

```
CAUTION SECNO=     34.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     34.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     34.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     37.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     38.360  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     38.360  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     38.460  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     40.700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     40.700  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

CD-SB-SI.SUM

THIS RUN EXECUTED 17MAY93 15:47:15

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991

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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .500 | .00 | 4988.66 | 473.16 | 4995.20 | 4991.17 | 4995.27 | 2.07 | 228.27 | 48.12 | 6.54 | .17 |
| | 1.800 | 130.00 | 4988.80 | 473.16 | 4995.21 | 4991.82 | 4995.30 | 2.52 | 187.48 | 43.30 | 6.41 | .21 |
| | 4.000 | 220.00 | 4989.02 | 473.16 | 4995.26 | 4992.17 | 4995.38 | 2.74 | 172.92 | 42.06 | 6.24 | .24 |
| | 6.600 | 260.00 | 4989.30 | 473.16 | 4995.38 | 4991.63 | 4995.45 | 2.19 | 215.61 | 46.06 | 6.08 | .18 |
| * | 9.200 | 260.00 | 4989.50 | 473.16 | 4995.38 | 4992.54 | 4995.56 | 3.38 | 139.92 | 35.56 | 5.88 | .30 |
| | 12.000 | 280.00 | 4989.90 | 473.16 | 4995.54 | 4992.95 | 4995.75 | 3.64 | 130.10 | 34.13 | 5.64 | .33 |
| | 14.200 | 220.00 | 4990.10 | 473.16 | 4995.69 | 4993.15 | 4995.90 | 3.67 | 128.84 | 34.08 | 5.59 | .33 |
| | 17.000 | 280.00 | 4990.30 | 473.16 | 4995.90 | 4993.34 | 4996.10 | 3.63 | 130.35 | 34.61 | 5.60 | .33 |
| | 19.200 | 220.00 | 4990.60 | 473.16 | 4996.05 | 4993.64 | 4996.27 | 3.79 | 124.73 | 33.79 | 5.45 | .35 |
| | 21.500 | 230.00 | 4990.80 | 473.16 | 4996.23 | 4993.84 | 4996.45 | 3.81 | 124.27 | 33.71 | 5.43 | .35 |
| | 24.100 | 260.00 | 4991.00 | 473.16 | 4996.45 | 4993.86 | 4996.65 | 3.57 | 132.42 | 34.71 | 5.45 | .32 |
| | 26.500 | 240.00 | 4991.30 | 473.16 | 4996.60 | 4994.37 | 4996.85 | 4.03 | 117.43 | 32.35 | 5.30 | .37 |
| | 29.100 | 260.00 | 4991.50 | 473.16 | 4996.85 | 4994.45 | 4997.07 | 3.76 | 125.73 | 34.01 | 5.35 | .34 |
| | 31.750 | 265.00 | 4991.77 | 473.16 | 4997.12 | 4994.51 | 4997.31 | 3.42 | 138.36 | 36.73 | 5.35 | .31 |
| | 32.495 | 74.50 | 4991.84 | 473.16 | 4997.17 | 4995.09 | 4997.45 | 4.24 | 111.59 | 31.86 | 5.33 | .40 |
| | 32.500 | .50 | 4993.11 | 473.16 | 4996.79 | 4996.36 | 4997.62 | 7.30 | 64.79 | 25.21 | 3.68 | .80 |
| | 32.600 | 10.00 | 4993.14 | 473.16 | 4996.79 | 4996.40 | 4997.64 | 7.39 | 64.01 | 25.08 | 3.65 | .82 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33.000 | 40.00 | 4993.26 | 473.16 | 4996.78 | 4996.51 | 4997.72 | 7.77 | 60.93 | 24.57 | 3.52 | .87 |
| | 33.500 | 50.00 | 4993.41 | 473.16 | 4996.78 | 4996.66 | 4997.84 | 8.26 | 57.27 | 23.95 | 3.37 | .94 |
| * | 34.000 | 50.00 | 4993.55 | 473.16 | 4996.84 | 4996.84 | 4998.07 | 8.88 | 53.31 | 22.38 | 3.29 | 1.01 |
| * | 34.500 | 50.00 | 4993.70 | 473.16 | 4997.01 | 4997.01 | 4998.21 | 8.81 | 53.68 | 22.44 | 3.31 | 1.00 |
| * | 35.000 | 50.00 | 4993.85 | 473.16 | 4997.16 | 4997.16 | 4998.36 | 8.81 | 53.71 | 22.45 | 3.31 | 1.00 |
| * | 35.500 | 50.00 | 4993.99 | 473.16 | 4997.30 | 4997.30 | 4998.51 | 8.82 | 53.64 | 22.44 | 3.31 | 1.01 |
| * | 36.000 | 50.00 | 4994.14 | 473.16 | 4997.45 | 4997.45 | 4998.66 | 8.82 | 53.64 | 22.44 | 3.31 | 1.01 |
| * | 36.500 | 50.00 | 4994.29 | 473.16 | 4997.60 | 4997.60 | 4998.81 | 8.82 | 53.64 | 22.44 | 3.31 | 1.01 |
| * | 37.000 | 50.00 | 4994.45 | 473.16 | 4997.99 | 4997.70 | 4998.93 | 7.75 | 61.03 | 24.35 | 3.54 | .86 |
| | 37.500 | 50.00 | 4994.60 | 473.16 | 4997.98 | 4997.86 | 4999.05 | 8.30 | 56.98 | 23.67 | 3.38 | .94 |
| | 38.000 | 50.00 | 4994.74 | 473.16 | 4998.12 | 4997.98 | 4999.14 | 8.12 | 58.30 | 24.50 | 3.38 | .93 |
| | 38.300 | 30.00 | 4994.83 | 473.16 | 4998.14 | 4998.05 | 4999.21 | 8.28 | 57.16 | 24.50 | 3.31 | .96 |
| * | 38.360 | 6.00 | 4994.85 | 473.16 | 4998.12 | 4998.12 | 4999.32 | 8.79 | 53.81 | 22.93 | 3.27 | 1.01 |
| * | 38.460 | 10.00 | 4994.88 | 473.16 | 4998.91 | 4997.79 | 4999.40 | 5.60 | 84.56 | 28.24 | 4.03 | .57 |
| | 38.600 | 14.00 | 4994.93 | 473.16 | 4999.13 | 4997.43 | 4999.43 | 4.38 | 108.08 | 30.40 | 4.20 | .41 |
| | 38.750 | 15.00 | 4994.98 | 473.16 | 4999.11 | 4997.20 | 4999.44 | 4.58 | 103.34 | 25.01 | 4.13 | .40 |
| | 40.560 | 181.00 | 4994.98 | 440.64 | 4999.11 | .00 | 4999.44 | 4.22 | 104.54 | 25.01 | 4.13 | .36 |
| | 40.570 | 1.00 | 4995.40 | 440.64 | 4999.09 | 4997.58 | 4999.47 | 4.97 | 88.63 | 24.01 | 3.69 | .46 |
| * | 40.700 | 12.00 | 4997.10 | 440.64 | 4998.90 | 4998.90 | 4999.77 | 7.45 | 59.13 | 34.61 | 1.80 | 1.00 |



SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 9.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 34.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

```
CAUTION SECNO=     34.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     34.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     34.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     37.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     38.360  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     38.360  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     38.460  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     40.700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     40.700  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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THIS RUN EXECUTED 17MAY93 15:46:08

CO-SB-SF. Sum

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .500 | .00 | 4988.66 | 492.68 | 4995.20 | 4991.22 | 4995.27 | 2.16 | 228.27 | 48.12 | 6.54 | .17 |
| | 1.800 | 130.00 | 4988.80 | 492.68 | 4995.21 | 4991.87 | 4995.31 | 2.63 | 187.45 | 43.29 | 6.41 | .22 |
| | 4.000 | 220.00 | 4989.02 | 492.68 | 4995.27 | 4992.25 | 4995.39 | 2.85 | 173.13 | 42.08 | 6.25 | .25 |
| | 6.600 | 260.00 | 4989.30 | 492.68 | 4995.39 | 4991.67 | 4995.47 | 2.28 | 216.19 | 46.10 | 6.09 | .19 |
| * | 9.200 | 260.00 | 4989.50 | 492.68 | 4995.40 | 4992.62 | 4995.59 | 3.51 | 140.46 | 35.63 | 5.90 | .31 |
| | 12.000 | 280.00 | 4989.90 | 492.68 | 4995.57 | 4993.02 | 4995.79 | 3.76 | 131.04 | 34.24 | 5.67 | .34 |
| | 14.200 | 220.00 | 4990.10 | 492.68 | 4995.73 | 4993.22 | 4995.95 | 3.79 | 130.09 | 34.22 | 5.63 | .34 |
| | 17.000 | 280.00 | 4990.30 | 492.68 | 4995.94 | 4993.40 | 4996.16 | 3.74 | 131.87 | 34.79 | 5.65 | .34 |
| | 19.200 | 220.00 | 4990.60 | 492.68 | 4996.10 | 4993.71 | 4996.34 | 3.89 | 126.63 | 34.02 | 5.50 | .36 |
| | 21.500 | 230.00 | 4990.80 | 492.68 | 4996.29 | 4993.92 | 4996.53 | 3.90 | 126.29 | 33.95 | 5.49 | .36 |
| | 24.100 | 260.00 | 4991.00 | 492.68 | 4996.52 | 4993.92 | 4996.73 | 3.64 | 135.27 | 35.02 | 5.52 | .33 |
| | 26.500 | 240.00 | 4991.30 | 492.68 | 4996.67 | 4994.43 | 4996.93 | 4.11 | 119.85 | 32.63 | 5.37 | .38 |
| | 29.100 | 260.00 | 4991.50 | 492.68 | 4996.93 | 4994.51 | 4997.16 | 3.83 | 128.53 | 34.33 | 5.43 | .35 |
| | 31.750 | 265.00 | 4991.77 | 492.68 | 4997.21 | 4994.58 | 4997.40 | 3.48 | 141.61 | 37.09 | 5.44 | .31 |
| | 32.495 | 74.50 | 4991.84 | 492.68 | 4997.26 | 4995.17 | 4997.55 | 4.30 | 114.49 | 32.23 | 5.42 | .40 |
| | 32.500 | .50 | 4993.11 | 492.68 | 4996.88 | 4996.43 | 4997.72 | 7.35 | 67.01 | 25.57 | 3.77 | .80 |
| | 32.600 | 10.00 | 4993.14 | 492.68 | 4996.87 | 4996.46 | 4997.73 | 7.44 | 66.18 | 25.44 | 3.73 | .81 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33.000 | 40.00 | 4993.26 | 492.68 | 4996.87 | 4996.58 | 4997.82 | 7.81 | 63.08 | 24.93 | 3.61 | .87 |
| | 33.500 | 50.00 | 4993.41 | 492.68 | 4996.86 | 4996.73 | 4997.93 | 8.30 | 59.38 | 24.31 | 3.46 | .94 |
| * | 34.000 | 50.00 | 4993.55 | 492.68 | 4996.94 | 4996.94 | 4998.16 | 8.89 | 55.40 | 22.73 | 3.39 | 1.00 |
| * | 34.500 | 50.00 | 4993.70 | 492.68 | 4997.08 | 4997.08 | 4998.31 | 8.92 | 55.25 | 22.70 | 3.38 | 1.01 |
| * | 35.000 | 50.00 | 4993.85 | 492.68 | 4997.23 | 4997.23 | 4998.46 | 8.89 | 55.39 | 22.73 | 3.38 | 1.00 |
| * | 35.500 | 50.00 | 4993.99 | 492.68 | 4997.37 | 4997.37 | 4998.61 | 8.92 | 55.23 | 22.70 | 3.38 | 1.01 |
| * | 36.000 | 50.00 | 4994.14 | 492.68 | 4997.53 | 4997.53 | 4998.76 | 8.90 | 55.35 | 22.72 | 3.38 | 1.01 |
| * | 36.500 | 50.00 | 4994.29 | 492.68 | 4997.67 | 4997.67 | 4998.90 | 8.91 | 55.27 | 22.71 | 3.38 | 1.01 |
| | 37.000 | 50.00 | 4994.45 | 492.68 | 4997.98 | 4997.78 | 4999.02 | 8.18 | 60.20 | 24.22 | 3.52 | .91 |
| | 37.500 | 50.00 | 4994.60 | 492.68 | 4997.97 | 4997.93 | 4999.15 | 8.72 | 56.47 | 23.59 | 3.37 | .99 |
| | 38.000 | 50.00 | 4994.74 | 492.68 | 4998.27 | 4998.03 | 4999.26 | 7.98 | 61.71 | 25.09 | 3.53 | .90 |
| | 38.300 | 30.00 | 4994.83 | 492.68 | 4998.30 | 4998.12 | 4999.31 | 8.05 | 61.21 | 25.22 | 3.47 | .91 |
| * | 38.360 | 6.00 | 4994.85 | 492.68 | 4998.21 | 4998.21 | 4999.42 | 8.82 | 55.86 | 23.28 | 3.36 | 1.00 |
| * | 38.460 | 10.00 | 4994.88 | 492.68 | 4999.00 | 4997.86 | 4999.50 | 5.67 | 86.93 | 28.38 | 4.12 | .57 |
| | 38.600 | 14.00 | 4994.93 | 492.68 | 4999.21 | 4997.49 | 4999.52 | 4.45 | 110.71 | 30.40 | 4.28 | .41 |
| | 38.750 | 15.00 | 4994.98 | 492.68 | 4999.20 | 4997.27 | 4999.54 | 4.67 | 105.39 | 25.01 | 4.22 | .40 |
| | 40.560 | 181.00 | 4994.98 | 461.74 | 4999.25 | .00 | 4999.54 | 4.33 | 106.69 | 25.01 | 4.27 | .37 |
| | 40.570 | 1.00 | 4995.40 | 461.74 | 4999.17 | 4997.65 | 4999.57 | 5.10 | 90.59 | 24.01 | 3.77 | .46 |
| * | 40.700 | 12.00 | 4997.10 | 461.74 | 4998.95 | 4998.95 | 4999.85 | 7.60 | 60.78 | 34.70 | 1.85 | 1.01 |



SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 9.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 34.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

```
CAUTION SECNO=     34.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     34.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     34.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     38.360  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     38.360  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     38.460  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     40.700  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     40.700  PROFILE=  1  MINIMUM SPECIFIC ENERGY
```

THIS RUN EXECUTED 17MAY93 15:45:36

CO-SB-F.SUM

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

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

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CARELON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .500 | .00 | 4988.66 | 548.35 | 4995.20 | 4991.37 | 4995.29 | 2.40 | 228.27 | 48.12 | 6.54 | .19 |
| | 1.800 | 130.00 | 4988.80 | 548.35 | 4995.21 | 4992.02 | 4995.34 | 2.92 | 187.52 | 43.30 | 6.41 | .25 |
| | 4.000 | 220.00 | 4989.02 | 548.35 | 4995.29 | 4992.39 | 4995.44 | 3.15 | 173.87 | 42.14 | 6.27 | .27 |
| | 6.600 | 260.00 | 4989.30 | 548.35 | 4995.43 | 4991.82 | 4995.53 | 2.51 | 218.29 | 46.22 | 6.13 | .20 |
| * | 9.200 | 260.00 | 4989.50 | 548.35 | 4995.44 | 4992.80 | 4995.68 | 3.86 | 142.10 | 35.81 | 5.94 | .34 |
| | 12.000 | 280.00 | 4989.90 | 548.35 | 4995.65 | 4993.21 | 4995.91 | 4.10 | 133.79 | 34.55 | 5.75 | .37 |
| | 14.200 | 220.00 | 4990.10 | 548.35 | 4995.84 | 4993.42 | 4996.10 | 4.09 | 134.18 | 34.69 | 5.74 | .37 |
| | 17.000 | 280.00 | 4990.30 | 548.35 | 4996.09 | 4993.61 | 4996.33 | 4.00 | 137.15 | 35.40 | 5.79 | .36 |
| | 19.200 | 220.00 | 4990.60 | 548.35 | 4996.26 | 4993.91 | 4996.53 | 4.15 | 132.10 | 34.65 | 5.66 | .37 |
| | 21.500 | 230.00 | 4990.80 | 548.35 | 4996.47 | 4994.12 | 4996.74 | 4.16 | 131.96 | 34.61 | 5.67 | .38 |
| | 24.100 | 260.00 | 4991.00 | 548.35 | 4996.72 | 4994.11 | 4996.95 | 3.85 | 142.58 | 35.80 | 5.72 | .34 |
| | 26.500 | 240.00 | 4991.30 | 548.35 | 4996.89 | 4994.63 | 4997.18 | 4.32 | 127.00 | 33.46 | 5.59 | .39 |
| | 29.100 | 260.00 | 4991.50 | 548.35 | 4997.16 | 4994.71 | 4997.41 | 4.01 | 136.62 | 35.25 | 5.66 | .36 |
| | 31.750 | 265.00 | 4991.77 | 548.35 | 4997.46 | 4994.76 | 4997.67 | 3.63 | 151.19 | 38.13 | 5.69 | .32 |
| | 32.495 | 74.50 | 4991.84 | 548.35 | 4997.51 | 4995.37 | 4997.82 | 4.47 | 122.64 | 33.25 | 5.67 | .41 |
| | 32.500 | .50 | 4993.11 | 548.35 | 4997.12 | 4996.63 | 4997.99 | 7.47 | 73.38 | 26.58 | 4.01 | .79 |
| | 32.600 | 10.00 | 4993.14 | 548.35 | 4997.12 | 4996.67 | 4998.01 | 7.57 | 72.43 | 26.44 | 3.98 | .81 |

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33.000 | 40.00 | 4993.26 | 548.35 | 4997.11 | 4996.79 | 4998.09 | 7.92 | 69.20 | 25.92 | 3.85 | .85 |
| | 33.500 | 50.00 | 4993.41 | 548.35 | 4997.11 | 4996.93 | 4998.20 | 8.38 | 65.40 | 25.31 | 3.70 | .92 |
| * | 34.000 | 50.00 | 4993.55 | 548.35 | 4997.15 | 4997.15 | 4998.43 | 9.09 | 60.31 | 23.53 | 3.60 | 1.00 |
| * | 34.500 | 50.00 | 4993.70 | 548.35 | 4997.29 | 4997.29 | 4998.58 | 9.12 | 60.12 | 23.50 | 3.59 | 1.00 |
| * | 35.000 | 50.00 | 4993.85 | 548.35 | 4997.43 | 4997.43 | 4998.73 | 9.13 | 60.04 | 23.49 | 3.59 | 1.01 |
| * | 35.500 | 50.00 | 4993.99 | 548.35 | 4997.58 | 4997.58 | 4998.88 | 9.12 | 60.15 | 23.50 | 3.59 | 1.00 |
| * | 36.000 | 50.00 | 4994.14 | 548.35 | 4997.73 | 4997.73 | 4999.02 | 9.12 | 60.12 | 23.50 | 3.59 | 1.00 |
| * | 36.500 | 50.00 | 4994.29 | 548.35 | 4997.88 | 4997.88 | 4999.17 | 9.13 | 60.04 | 23.49 | 3.59 | 1.01 |
| * | 37.000 | 50.00 | 4994.45 | 548.35 | 4998.26 | 4997.99 | 4999.29 | 8.13 | 67.48 | 25.40 | 3.81 | .88 |
| | 37.500 | 50.00 | 4994.60 | 548.35 | 4998.25 | 4998.14 | 4999.41 | 8.62 | 63.58 | 24.77 | 3.65 | .95 |
| | 38.000 | 50.00 | 4994.74 | 548.35 | 4998.40 | 4998.25 | 4999.50 | 8.42 | 65.14 | 25.67 | 3.66 | .93 |
| | 38.300 | 30.00 | 4994.83 | 548.35 | 4998.44 | 4998.33 | 4999.56 | 8.48 | 64.64 | 25.80 | 3.61 | .94 |
| * | 38.360 | 6.00 | 4994.85 | 548.35 | 4998.39 | 4998.39 | 4999.68 | 9.09 | 60.30 | 24.02 | 3.54 | 1.01 |
| * | 38.460 | 10.00 | 4994.88 | 548.35 | 4999.23 | 4998.05 | 4999.76 | 5.86 | 93.57 | 28.79 | 4.35 | .57 |
| | 38.600 | 14.00 | 4994.93 | 548.35 | 4999.46 | 4997.66 | 4999.79 | 4.64 | 118.07 | 30.40 | 4.52 | .42 |
| | 38.750 | 15.00 | 4994.98 | 548.35 | 4999.43 | 4997.44 | 4999.81 | 4.93 | 111.27 | 25.01 | 4.45 | .41 |
| | 40.560 | 181.00 | 4994.98 | 503.23 | 4999.84 | .00 | 5000.11 | 4.14 | 121.53 | 25.01 | 4.86 | .33 |
| | 40.570 | 1.00 | 4995.40 | 503.23 | 4999.78 | 4997.79 | 5000.13 | 4.79 | 105.16 | 24.01 | 4.38 | .40 |
| * | 40.700 | 12.00 | 4997.10 | 503.23 | 4999.66 | 4999.06 | 5000.19 | 5.83 | 86.34 | 36.14 | 2.56 | .66 |



SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 9.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 34.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

```
CAUTION SECNO=     34.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     34.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     34.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     35.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     35.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     36.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     36.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     37.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=     38.360  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     38.360  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     38.460  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     40.700  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

CD-SB-F, SUM

THIS RUN EXECUTED 27SEP95 15:40:42

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

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

Q'S UPDATED IN HEC 2 FILE ONLY SUMMARY TABLES NOT REFORMATTED 10-4-95. INSIGNIFICANT EFFECT ON RESULTS

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

CABEZON CHANNEL

SUMMARY PRINTOUT

| | SECNO | XLCH | ELMIN | Q | CWSEL | CRIWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | .500 | .00 | 4988.66 | ~~563.95~~ 564.06 | 4995.20 | 4991.40 | 4995.29 | 2.47 | 228.27 | 48.12 | 6.54 | .20 |
| | 1.800 | 130.00 | 4988.80 | 563.95 | 4995.21 | 4992.08 | 4995.35 | 3.01 | 187.54 | 43.30 | 6.41 | .25 |
| | 4.000 | 220.00 | 4989.02 | 563.95 | 4995.29 | 4992.44 | 4995.45 | 3.24 | 174.03 | 42.15 | 6.27 | .28 |
| | 6.600 | 260.00 | 4989.30 | 563.95 | 4995.45 | 4991.85 | 4995.55 | 2.58 | 218.87 | 46.26 | 6.15 | .21 |
| * | 9.200 | 260.00 | 4989.50 | 563.95 | 4995.46 | 4992.86 | 4995.70 | 3.95 | 142.60 | 35.87 | 5.96 | .35 |
| | 12.000 | 280.00 | 4989.90 | 563.95 | 4995.67 | 4993.27 | 4995.94 | 4.19 | 134.62 | 34.65 | 5.77 | .37 |
| | 14.200 | 220.00 | 4990.10 | 563.95 | 4995.87 | 4993.48 | 4996.14 | 4.18 | 135.00 | 34.78 | 5.77 | .37 |
| | 17.000 | 280.00 | 4990.30 | 563.95 | 4996.13 | 4993.66 | 4996.39 | 4.07 | 138.62 | 35.57 | 5.83 | .36 |
| | 19.200 | 220.00 | 4990.60 | 563.95 | 4996.31 | 4993.97 | 4996.59 | 4.22 | 133.73 | 34.84 | 5.71 | .38 |
| | 21.500 | 230.00 | 4990.80 | 563.95 | 4996.52 | 4994.17 | 4996.80 | 4.21 | 133.81 | 34.82 | 5.72 | .38 |
| | 24.100 | 260.00 | 4991.00 | 563.95 | 4996.78 | 4994.17 | 4997.02 | 3.90 | 144.56 | 36.01 | 5.78 | .34 |
| | 26.500 | 240.00 | 4991.30 | 563.95 | 4996.95 | 4994.69 | 4997.24 | 4.27 | 128.97 | 33.69 | 5.65 | .39 |
| | 29.100 | 260.00 | 4991.50 | 563.95 | 4997.23 | 4994.76 | 4997.48 | 4.06 | 138.92 | 35.50 | 5.73 | .36 |
| | 31.750 | 265.00 | 4991.77 | 563.95 | 4997.53 | 4994.81 | 4997.74 | 3.67 | 153.79 | 38.40 | 5.76 | .32 |
| | 32.495 | 74.50 | 4991.84 | 563.95 | 4997.58 | 4995.42 | 4997.89 | 4.52 | 124.86 | 33.53 | 5.74 | .41 |
| | 32.500 | .50 | 4993.11 | 563.95 | 4997.19 | 4995.69 | 4998.06 | 7.50 | 75.21 | 26.87 | 4.08 | .79 |
| | 32.600 | 10.00 | 4993.14 | 563.95 | 4997.18 | 4996.73 | 4998.09 | 7.60 | 74.21 | 26.71 | 4.04 | .80 |

| | SECNO | XLCH | ELMIN | Q | QWSEL | CRTWS | EG | VCH | AREA | TOPWID | DEPTH | FRCH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33.000 | 40.00 | 4993.26 | 564.00 ~~563.95~~ | 4997.18 | 4996.84 | 4998.16 | 7.95 | 70.93 | 26.20 | 3.92 | .85 |
| | 33.500 | 50.00 | 4993.41 | 563.95 | 4997.17 | 4996.98 | 4998.27 | 8.41 | 67.08 | 25.58 | 3.77 | .92 |
| * | 34.000 | 50.00 | 4993.55 | 563.95 | 4997.18 | 4997.18 | 4998.50 | 9.24 | 61.04 | 23.65 | 3.63 | 1.01 |
| * | 34.500 | 50.00 | 4993.70 | 563.95 | 4997.34 | 4997.34 | 4998.65 | 9.19 | 61.39 | 23.70 | 3.64 | 1.01 |
| * | 35.000 | 50.00 | 4993.85 | 563.95 | 4997.49 | 4997.49 | 4998.80 | 9.17 | 61.47 | 23.71 | 3.65 | 1.00 |
| * | 35.500 | 50.00 | 4993.99 | 563.95 | 4997.64 | 4997.64 | 4998.95 | 9.17 | 61.47 | 23.71 | 3.65 | 1.00 |
| * | 36.000 | 50.00 | 4994.14 | 563.95 | 4997.79 | 4997.79 | 4999.10 | 9.17 | 61.47 | 23.71 | 3.65 | 1.00 |
| * | 36.500 | 50.00 | 4994.29 | 563.95 | 4997.94 | 4997.94 | 4999.24 | 9.17 | 61.47 | 23.71 | 3.65 | 1.00 |
| * | 37.000 | 50.00 | 4994.45 | 563.95 | 4998.29 | 4998.05 | 4999.35 | 8.27 | 68.21 | 25.52 | 3.84 | .89 |
| | 37.500 | 50.00 | 4994.60 | 563.95 | 4998.29 | 4998.19 | 4999.47 | 8.75 | 64.43 | 24.91 | 3.69 | .96 |
| | 38.000 | 50.00 | 4994.74 | 563.95 | 4998.44 | 4998.31 | 4999.57 | 8.54 | 66.02 | 25.82 | 3.70 | .94 |
| | 38.300 | 30.00 | 4994.83 | 563.95 | 4998.52 | 4998.38 | 4999.62 | 8.44 | 66.83 | 26.17 | 3.69 | .93 |
| * | 38.360 | 6.00 | 4994.85 | 563.95 | 4998.47 | 4998.47 | 4999.75 | 9.08 | 62.09 | 24.32 | 3.62 | 1.00 |
| * | 38.460 | 10.00 | 4994.88 | 563.95 | 4999.29 | 4998.11 | 4999.83 | 5.92 | 95.29 | 28.89 | 4.41 | .57 |
| | 38.600 | 14.00 | 4994.93 | 563.95 | 4999.52 | 4997.71 | 4999.86 | 4.70 | 119.93 | 30.40 | 4.59 | .42 |
| | 38.750 | 15.00 | 4994.98 | 563.95 | 4999.49 | 4997.48 | 4999.88 | 5.00 | 112.77 | 25.01 | 4.51 | .42 |
| | 40.560 | 181.00 | 4994.98 | 518.75 ~~518.75~~ | 4999.94 | .00 | 5000.21 | 4.19 | 123.94 | 25.01 | 4.96 | .33 |
| | 40.570 | 1.00 | 4995.40 | 518.75 | 4999.87 | 4997.82 | 5000.24 | 4.83 | 107.45 | 24.01 | 4.47 | .40 |
| * | 40.700 | 12.00 | 4997.10 | 518.75 | 4999.77 | 4999.10 | 5000.29 | 5.75 | 90.27 | 36.36 | 2.67 | .64 |

SUMMARY OF ERRORS AND SPECIAL NOTES

```
WARNING SECNO=     9.200  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=    34.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    34.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    34.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    35.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    35.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    35.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    35.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    36.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    36.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    36.500  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    36.500  PROFILE=  1  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=    37.000  PROFILE=  1  INTERPOLATED X-SECTIONS USED

CAUTION SECNO=    38.360  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=    38.360  PROFILE=  1  MINIMUM SPECIFIC ENERGY

WARNING SECNO=    38.460  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=    40.700  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

# APPENDIX C

## Tributary Structures
## Hydraulic Analysis

```
START                    TIME=0.0 HR
**********************ONE HUNDRED YEAR TWENTY FOUR HOUR STORM*******************
* CABEZON CHANNEL CAPACITY ANALYSIS - FILE NAME: (S-CBZN-I.HMI)                *
* CONDITION: FULLY DEVELOPED CONDITIONS FOR WATERSHED CONTRIBUTING TO THE      *
* CABEZON SYSTEM AND BOUNDED BY NM528 ON THE SOUTH; CORRALES ROAD ON THE EAST;*
* CABEZON CHANNEL ON THE NORTH AND SAD223 STORM DRAIN ON THE WEST              *
* MODEL: DETAILED ANALYSIS OF SUBASINS WITHIN TRACTS D-1 AND D-2 USED TO       *
* ESTABLISH HYDRAULIC PARAMETERS NECESSARY TO ANALYZE THE TRIBUTARY STRUCTURES*
*******************************************************************************
** EXPANDED RAINFALL DISTRIBUTION: APPROXIMATELY 5.5 HRS HAS BEEN ADDED TO THE
** TO THE FRONT OF THE RAINFALL DISTRIBUTION IN ORDER TO BE CONSISTANT WITH
** OTHER MODELS.
RAINFALL                 TYPE=0.0 DT=0.05
                         MASS RAIN=                0.00000 0.00001 0.00002 0.00003
                         0.00004 0.00005 0.00006 0.00007 0.00008 0.00009 0.00010
                         0.00011 0.00012 0.00013 0.00014 0.00015 0.00016 0.00017
                         0.00018 0.00019 0.00020 0.00021 0.00022 0.00023 0.00024
                         0.00025 0.00026 0.00027 0.00028 0.00029 0.00030 0.00031
                         0.00032 0.00033 0.00034 0.00035 0.00036 0.00037 0.00038
                         0.00039 0.00040 0.00041 0.00042 0.00043 0.00044 0.00045
                         0.00046 0.00047 0.00048 0.00049 0.00050 0.00051 0.00052
                         0.00053 0.00054 0.00055 0.00056 0.00057 0.00058 0.00059
                         0.00060 0.00061 0.00062 0.00063 0.00064 0.00065 0.00066
                         0.00067 0.00068 0.00069 0.00070 0.00071 0.00072 0.00073
                         0.00074 0.00075 0.00076 0.00077 0.00078 0.00079 0.00080
                         0.00081 0.00250 0.00500 0.00760 0.01030 0.01310 0.01600
                         0.01900 0.02220 0.02540 0.02890 0.03240 0.03620 0.04010
                         0.04430 0.04870 0.05340 0.05840 0.06370 0.06950 0.07580
                         0.08370 0.09240 0.11760 0.17730 0.27980 0.43840 0.66680
                         0.97900 1.22530 1.33660 1.42950 1.51090 1.58360 1.64950
                         1.70960 1.76480 1.81560 1.86240 1.90570 1.94580 1.95480
                         1.96310 1.97080 1.97800 1.98480 1.99120 1.99730 2.00310
                         2.00870 2.01400 2.01910 2.02400 2.02870 2.03330 2.03770
                         2.04200 2.04620 2.05020 2.05420 2.05800 2.06170 2.06530
                         2.06890 2.07240 2.07570 2.07910 2.08230 2.08550 2.08860
                         2.09160 2.09460 2.09760 2.10050 2.10330 2.10610 2.10880
                         2.11150 2.11420 2.11680 2.11930 2.12190 2.12440 2.12680
                         2.12930 2.13160 2.13400 2.13630 2.13860 2.14090 2.14310
                         2.14530 2.14750 2.14970 2.15180 2.15390 2.15600 2.15800
                         2.16010 2.16210 2.16410 2.16600 2.16800 2.16990 2.17180
                         2.17370 2.17560 2.17740 2.17930 2.18110 2.18290 2.18470
                         2.18640 2.18820 2.18990 2.19160 2.19330 2.19500 2.19670
                         2.19840 2.20000 2.20200 2.20390 2.20590 2.20780 2.20970
                         2.21170 2.21360 2.21550 2.21740 2.21930 2.22120 2.22310
                         2.22490 2.22680 2.22870 2.23050 2.23240 2.23420 2.23610
                         2.23790 2.23980 2.24160 2.24340 2.24520 2.24700 2.24880
                         2.25060 2.25240 2.25420 2.25590 2.25770 2.25950 2.26120
                         2.26300 2.26470 2.26650 2.26820 2.27000 2.27170 2.27340
                         2.27510 2.27680 2.27850 2.28020 2.28190 2.28360 2.28530
                         2.28700 2.28870 2.29030 2.29200 2.29370 2.29530 2.29700
                         2.29860 2.30020 2.30190 2.30350 2.30510 2.30680 2.30840
                         2.31000 2.31160 2.31320 2.31480 2.31640 2.31800 2.31960
                         2.32120 2.32270 2.32430 2.32590 2.32740 2.32900 2.33050
                         2.33210 2.33360 2.33520 2.33670 2.33830 2.33980 2.34130
                         2.34280 2.34440 2.34590 2.34740 2.34890 2.35040 2.35190
                         2.35340 2.35490 2.35630 2.35780 2.35930 2.36080 2.36220
```

```
2.36370 2.36520 2.36660 2.36810 2.36950 2.37100 2.37240
2.37390 2.37530 2.37670 2.37820 2.37960 2.38100 2.38240
2.38390 2.38530 2.38670 2.38810 2.38950 2.39090 2.39230
2.39370 2.39510 2.39650 2.39780 2.39920 2.40060 2.40200
2.40330 2.40470 2.40610 2.40740 2.40880 2.41010 2.41150
2.41280 2.41420 2.41550 2.41680 2.41820 2.41950 2.42080
2.42220 2.42350 2.42480 2.42610 2.42740 2.42870 2.43000
2.43140 2.43270 2.43400 2.43520 2.43650 2.43780 2.43910
2.44040 2.44170 2.44300 2.44420 2.44550 2.44680 2.44800
2.44930 2.45060 2.45180 2.45310 2.45430 2.45560 2.45680
2.45810 2.45930 2.46060 2.46180 2.46300 2.46430 2.46550
2.46670 2.46800 2.46920 2.47040 2.47160 2.47280 2.47400
2.47530 2.47650 2.47770 2.47890 2.48010 2.48130 2.48250
2.48370 2.48490 2.48600 2.48720 2.48840 2.48960 2.49080
2.49190 2.49310 2.49430 2.49550 2.49660 2.49780 2.49900
2.50010 2.50130 2.50240 2.50360 2.50470 2.50590 2.50700
2.50820 2.50930 2.51050 2.51160 2.51270 2.51390 2.51500
2.51610 2.51720 2.51840 2.51950 2.52060 2.52170 2.52290
2.52400 2.52510 2.52620 2.52730 2.52840 2.52950 2.53060
2.53170 2.53280 2.53390 2.53500 2.53610 2.53720 2.53830
2.53940 2.54040 2.54150 2.54260 2.54370 2.54480 2.54580
2.54690 2.54800 2.54900 2.55010 2.55120 2.55220 2.55330
2.55440 2.55540 2.55650 2.55750 2.55860 2.55960 2.56070
2.56170 2.56280 2.56380 2.56490 2.56590 2.56690 2.56800
2.56900 2.57000 2.57110 2.57210 2.57310 2.57410 2.57520
2.57620 2.57720 2.57820 2.57920 2.58030 2.58130 2.58230
2.58330 2.58430 2.58530 2.58630 2.58730 2.58830 2.58930
2.59030 2.59130 2.59230 2.59330 2.59430 2.59530 2.59630
2.59730 2.59820 2.59920 2.60020 2.60120 2.60220 2.60310
2.60410 2.60510 2.60610 2.60700 2.60800 2.60900 2.60990
2.61090 2.61190 2.61280 2.61380 2.61480 2.61570 2.61670
2.61760 2.61860 2.61950 2.62050 2.62140 2.62240 2.62330
2.62430 2.62520 2.62610 2.62710 2.62800 2.62900 2.62990
2.63080 2.63180 2.63270 2.63360 2.63460 2.63550 2.63640
2.63730 2.63830 2.63920 2.64010 2.64100 2.64190 2.64280
2.64380 2.64470 2.64560 2.64650 2.64740 2.64830 2.64920
2.65010 2.65100 2.65190 2.65280 2.65370 2.65460 2.65550
2.65640 2.65730 2.65820 2.65910 2.66000
* COMPUTE HYDROGRAPH FOR BASIN D-1\6
* AREA DRAINING TO PHASE I STORM DRAIN STA.15+61
COMPUTE NM HYD          ID=1 HYD NO=401.6 DA=0.00414 SQ MI
                        PER A=0.0 PER B=30.0 PER C=0.0 PER D=70.0
                        TP=-0.1333 HR MASS RAIN=-1
PRINT HYD               ID=1 CODE=5
* COMPUTE HYDROGRAPH FOR BASIN D-1\9
* AREA DRAINING TO PHASE I STORM DRAIN STA. 20+26
COMPUTE NM HYD          ID=2 HYD NO=401.9 DA=0.00433 SQ MI
                        PER A=0.0 PER B=30.0 PER C=0.0 PER D=70.0
                        TP=-0.1333HR MASS RAIN=-1
PRINT HYD               ID=2 CODE=5
* COMPUTE HYDROGRAPH FOR BASIN D-2\A5
* AREA DRAINING TO PHASE II STORM DRAIN STA. 7+68
COMPUTE NM HYD          ID=4 HYD NO=402.5 DA=0.00989 SQ MI
                        PER A=0.0 PER B=30.0 PER C=0.0 PER D=70.0
                        TP=-0.1333 HR MASS RAIN=-1
PRINT HYD               ID=4 CODE=5
FINISH
```

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992 RUN DATE (MON/DAY/YR) =05/13/1993

INPUT FILE = s-cbzn-i.hmi USER NO.= D_HARRIS.S92



| COMMAND | HYDROGRAPH IDENTIFICATION | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|
| START | | | | | | | | | | TIME= .00 |
| RAINFALL TYPE= 0 | | | | | | | | | | RAIN= 2.660 |
| COMPUTE NM HYD | 401.60 | - | 1 | .00414 | 9.64 | .439 | 1.98890 | 5.550 | 3.638 | PER IMP= 70.00 |
| COMPUTE NM HYD | 401.90 | - | 2 | .00433 | 10.08 | .459 | 1.98890 | 5.550 | 3.638 | PER IMP= 70.00 |
| COMPUTE NM HYD | 402.50 | - | 4 | .00989 | 23.01 | 1.049 | 1.98890 | 5.550 | 3.635 | PER IMP= 70.00 |
| FINISH | | | | | | | | | | |

**Easterling & Associates, Inc.**
10131 Coors Rd., NW, Suite H-7
Albuquerque, New Mexico 87114
(505) 898-8021
FAX (505) 898-8501

Project Name SAD223 - CABEZON ANALYSIS
Project No. 3302.2 Date 4-9-93
Subject PHASE I APARTMENT STORM DRAINS
By DSH Sheet 1 of 3

PHASE I STORM DRAIN @ BASELINE STA 20+26 CHANNEL STA 62+65

DATA

MAIN CHANNEL

STA 62+65
$Q_{100}$ = 479.60
CHANNEL INV. 5010.36
$D_{AVG}$ (HEC-2) = 2.92 FT
WSEL = 5013.28

INLET BASIN

BASIN AREA = 2.77 AC
$Q_{100}$ = 10.08 CFS
(SEE AHYMO FILE: S-CBZN-I.HMI)

STORM DRAIN

INV OUT = 5011.47 PLAN 11.58 AS-BUILT
INV IN = 12.33 PLAN 12.44 PROJECTED
TOP OF GRATE = 15.08 PLAN 15.19 PROJECTED
LENGTH = 286 FT
SLOPE = 0.003 FT/FT
DIA = 24"
TYPE = RCP

ANALYSIS

BASED ON THE DATA IT APPEARS THAT WATER WILL BE STANDING 0.94 FT DEEP IN THE BOTTOM OF THE INLET. THEREFORE THE ANALYSIS ASSUMES THE PIPE WILL BE OPERATING IN PRESSURE FLOW DURING THE 100YR EVENT.

24" RCP (PRESSURE FLOW)

SEE THE ATTACHED SPREADSHEET FOR HGL COMPUTATIONS THE SPREADSHEET INDICATES A HGL ELEV AT THE INLET OF 5014.44 WHICH IS LESS THAN THE TOP OF GRATE ELEV OF 5015.19

∴ NO BACKFLOW.

**Easterling & Associates, Inc.**
10131 Coors Rd., NW, Suite H-7
Albuquerque, New Mexico 87114
(505) 898-8021
FAX (505) 898-8501

Project Name SAD 223 - CABEZON ANALYSIS
Project No. 3302.2 Date 4-9-97
Subject PHASE I APARTMENT STORM DRAINS
By DSH Sheet 2 of 3

## PHASE I STORM DRAIN @ BASELINE STA. 15+61 CHANNEL STA. 58+88

### DATA

**MAIN CHANNEL**

STA. 58+88
$Q_{100}$ =
CHANNEL INV 5008.91
DAVG (HEC-2) = 2.87
WSEL = 5011.81

**INLET BASIN**

BASIN AREA = 2.65 AC
$Q_{100}$ = 9.64 CFS
(SEE AHYMO FILE: S-CBZN.HMI)

**STORM DRAIN**

INV OUT 5010.05 PLAN 9.56 AS-BUILT
INV IN 10.50 PLAN 10.01 PROJECTED
TOP OF GRATE 13.50 PLAN 13.01 PROJECTED
LENGTH = 180 LF
SLOPE = 0.0025 FT/FT
DIA. = 24"
TYPE = RCP

### ANALYSIS

BASED ON THE DATA IT APPEARS THAT WATER WILL BE STANDING 1.8 FT DEEP IN THE BOTTOM OF THE INLET. THEREFORE THE ANALYSIS ASSUMES THE PIPE WILL BE OPERATING IN PRESSURE FLOW.

**24" RCP (PRESSURE FLOW)**

SEE THE ATTACHED SPREADSHEET FOR HGL COMPUTATIONS THE SPREAD SHEET INDICATED A HGL ELEV AT THE INLET OF 5012.14 WHICH IS LESS THAN THE TOP OF GRATE ELEV. OF 5013.01.

∴ NO BACKFLOW.

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(505) 898-8021
FAX (505) 898-8501

Project Name SAO 223 - CABEZON ANALYSIS
Project No. 33021.2 Date 4-12-93
Subject PHASE II APARTMENT STORM DRAIN
By DSH Sheet 3 of 3

PHASE II STORM DRAIN @ BASELINE STA 7+68 CHANNEL STA 49+70

DATA

MAIN CHANNEL

STA 49+70
$Q_{100}$ = 506 CFS
CHANNEL INV = 5003.39
DANG (HEC-2) = 3.54
WSEL = 5006.93

INLET BASIN

BASIN AREA = 6.23 AC
$Q_{100}$ = 23.01 CFS
(SEE AHYMO FILE : S-CBZN-I.HMI)

STORM DRAIN

INV OUT = 5005.19 AS-BUILT
INV IN = 5005.89 AS-BUILT
LENGTH = 101 FT PLAN 103.51 FT AS-BUILT
SLOPE = 0.00713 FT/FT PLAN 0.0068 FT/FT ASBUILT
DIA = 24"
TYPE = RCP

ANALYSIS

BASED ON THE DATA IT APPEARS THAT WATER WILL BE STANDING 1.04 FT DEEP IN THE BOTTOM OF THE PIPE. THEREFORE THE ANALYSIS ASSUMES THE PIPE WILL BE OPERATING IN PRESSURE FLOW DURING THE 100YR EVENT. THE PIPE INLET IS LOCATED IN A SMALL POND WITH A SPILLWAY ELEV. OF 5009.50

24" RCP (PRESSURE FLOW)

SEE THE ATTACHED SPREAD SHEET FOR HGL COMPUTATIONS THE SPREAD SHEET INDICATES A HGL ELEV AT THE INLET OF 5007.90 WHICH IS LESS THAN THE SPILLWAY ELEV. OF 5009.50

∴ NO BACKFLOW

ANALYSIS BY: *EASTERLING & ASSOCIATES*

DATE: 05/13/93
TIME: 11:56 AM
JOB#: 3302.2

STARTING CONDITIONS:
TAILWATER ELEVATION = 5006.83
MANNING'S ROUGHNESS = 0.013
ASSUMED STARTING HGL ELEV.= 5006.83

LOCATION: CABEZON CHANNEL PHASE II S.D. @ BASELINE STA. 7+68 CHANNEL STA. 49+70

| PIPE LINK DESCRIPTION FROM | TO | MAINLINE FLOW RATE (cfs) | PIPE DIA. (inches) | MANNING'S ROUGHNESS ("n") | LAY LENGTH (feet) | PIPE SLOPE (fpf) | INVERT DOWN STREAM (elev.) | INVERT UP STREAM (elev.) | HYDRAULIC GRADE LINE COMPUTATIONS: FRICTION LOSS Hf | MANHOLE LOSS Hm | ANGLE PT. LOSS Hb | JUNCTION LOSS Hj | EXPANSION LOSS Hx | SUM OF LOSSES | ENERGY GRADE LINE ELEVATION | HYDRAULIC GRADE LINE ELEVATION | FINISHED GRADE ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STORM DRAIN OUTFALL INITIAL CONDITIONS ——> @ | | | | | | OUTLET | 5005.19 | | | | | | | | 5006.83 | 5006.83 | |
| OUTLET | INLET | 23.0 | 24 | 0.013 | 101.00 | 0.0070 | 5005.19 | 5005.90 | 1.045 | 0.000 | 0.000 | 0.000 | 0.833 | 1.878 | 5008.73 | 5007.90 | 5009.50 |
| INLET | DUMMMY | 23.0 | 24 | 0.013 | 5.00 | 0.0070 | 5005.89 | 5005.93 | 0.052 | 0.000 | 0.000 | 0.000 | 0.000 | 0.052 | 5008.78 | 5007.95 | 5009.50 |

LOCATION: CABEZON CHANNEL PHASE I S.D. @ BASELINE STA. 15+61 CHANNEL STA. 58+88

STARTING CONDITIONS:
TAILWATER ELEVATION = 5011.81
MANNING'S ROUGHNESS = 0.013
ASSUMED STARTING HGL ELEV.= 5011.81

| PIPE LINK DESCRIPTION FROM | TO | MAINLINE FLOW RATE (cfs) | PIPE DIA. (inches) | MANNING'S ROUGHNESS ("n") | LAY LENGTH (feet) | PIPE SLOPE (fpf) | INVERT DOWN STREAM (elev.) | INVERT UP STREAM (elev.) | HYDRAULIC GRADE LINE COMPUTATIONS: FRICTION LOSS Hf | MANHOLE LOSS Hm | ANGLE PT. LOSS Hb | JUNCTION LOSS Hj | EXPANSION LOSS Hx | SUM OF LOSSES | ENERGY GRADE LINE ELEVATION | HYDRAULIC GRADE LINE ELEVATION | FINISHED GRADE ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STORM DRAIN OUTFALL INITIAL CONDITIONS ——> @ | | | | | | OUTLET | 5009.56 | | | | | | | | 5011.81 | 5011.81 | |
| OUTLET | INLET | 9.6 | 24 | 0.013 | 180.00 | 0.0025 | 5009.56 | 5010.01 | 0.327 | 0.000 | 0.000 | 0.000 | 0.146 | 0.473 | 5012.28 | 5012.14 | 5013.01 |
| INLET | DUMMMY | 9.6 | 24 | 0.013 | 5.00 | 0.0025 | 5010.10 | 5010.11 | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 | 5012.29 | 5012.15 | 5013.01 |

LOCATION: CABEZON CHANNEL PHASE I S.D. @ BASELINE STA. 20+26 CHANNEL STA. 62+65

STARTING CONDITIONS:
TAILWATER ELEVATION = 5013.28
MANNING'S ROUGHNESS = 0.013
ASSUMED STARTING HGL ELEV.= 5013.28

| PIPE LINK DESCRIPTION FROM | TO | MAINLINE FLOW RATE (cfs) | PIPE DIA. (inches) | MANNING'S ROUGHNESS ("n") | LAY LENGTH (feet) | PIPE SLOPE (fpf) | INVERT DOWN STREAM (elev.) | INVERT UP STREAM (elev.) | HYDRAULIC GRADE LINE COMPUTATIONS: FRICTION LOSS Hf | MANHOLE LOSS Hm | ANGLE PT. LOSS Hb | JUNCTION LOSS Hj | EXPANSION LOSS Hx | SUM OF LOSSES | ENERGY GRADE LINE ELEVATION | HYDRAULIC GRADE LINE ELEVATION | FINISHED GRADE ELEVATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STORM DRAIN OUTFALL INITIAL CONDITIONS ——> @ | | | | | | OUTLET | 5011.58 | | | | | | | | 5013.28 | 5013.28 | |
| OUTLET | INLET | 10.1 | 24 | 0.013 | 286.00 | 0.0030 | 5011.58 | 5012.44 | 0.568 | 0.000 | 0.000 | 0.000 | 0.160 | 0.728 | 5014.60 | 5014.44 | 5015.19 |
| INLET | DUMMMY | 10.1 | 24 | 0.013 | 5.00 | 0.0030 | 5012.44 | 5012.46 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 5014.61 | 5014.46 | 5015.19 |

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Project Name SA0223 - CABEZON ANALYSIS
Project No. 3302.2 Date 4-12-93
Subject PHASE I SIDE CHANNEL
By DSH Sheet 1 of 1

PHASE I SIDE CHANNEL @ BASELINE STA 13+01 CHANNEL STA 55+25

DATA

MAIN CHANNEL

STA. ~ 55+25
$Q_{100}$ = 479.60
CHANNEL INV = 5006.66
$D_{AVG}$ (HEC-2) = 2.87
WSEL = 5009.53

SIDE CHANNEL

SECTION - SEE SKETCH TITLED PHASE I SIDE CHANNEL
$Q_{100}$ = 22.57 CFS
L = 542.59 FT
S = 0.005 FT/FT
n = 0.013 CONCRETE
n = 0.027 GRASS

ANALYSIS

BASED ON THE NORMAL DEPTH CALCULATIONS ON THE FOLLOWING PAGES THE EXISTING CHANNEL SECTION HAS THE CAPACITY TO CARRY THE INTENDED DISCHARGE WITH APPROXIMATELY 2+ FT OF FREEBOARD.

# Trapezoidal Channel Analysis & Design

## Open Channel - Uniform flow

Worksheet Name: S-CHNL1

Description: CABEZON ANALYSIS-PHASE I SIDE CHANNEL

Solve For Depth

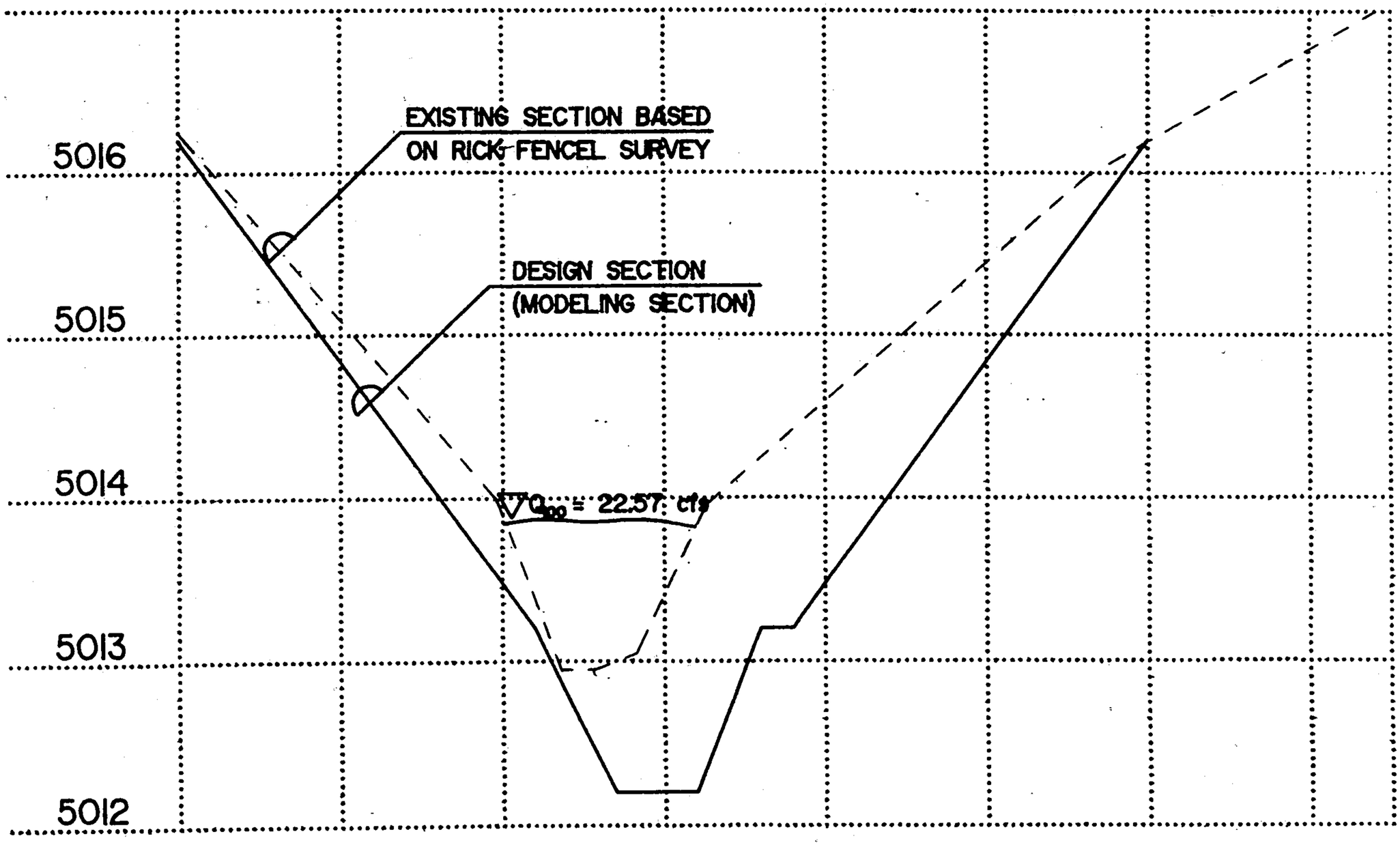
Given Constant Data;

| | |
|---|---|
| Bottom Width..... | 2.00 |
| Z-Left..... | 2.00 |
| Z-Right..... | 2.00 |
| Mannings 'n'..... | 0.013 |
| Channel Slope..... | 0.0050 |
| Channel Discharge.. | 22.57 |

| Bottom Width ft | Z-Left (H:V) | Z-Right (H:V) | Mannings 'n' | Channel Slope ft/ft | COMPUTED Channel Depth ft | COMPUTED Channel Discharge cfs | COMPUTED Velocity fps |
|---|---|---|---|---|---|---|---|
| 2.00 | 2.00 | 2.00 | 0.013 | 0.0050 | 0.98 | 22.57 | 5.80 |

Open Channel Flow Module, Version 3.42 (c)

Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708




PHASE I CHANNEL

SCALE : 1" = 5' HORIZ.
1" = 1' VERT.

# PHASE 1
## SIDE CHANNEL

DWG. NO. 2 | DATE: 4-93

*EASTERLING & ASSOCIATES, INC.*
*CONSULTING ENGINEERS*
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Albuquerque, New Mexico 87114
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Project Name SAD 223 - CABEZON ANALYSIS
Project No. 3302.2 Date 4-12-93
Subject PHASE II SIDE CHANNEL
By DSH Sheet 1 of 1

PHASE II SIDE CHANNEL @ BASE LINE STA 6+44 CHANNEL ℄ STA 48+56

DATA

MAIN CHANNEL

STA. ~ 48+56
$Q_{100}$ = 554.37 CFS
CHANNEL INV. = 5003.42
$D_{AVG}$ (HEC-2) = 3.04 FT.
WSEL = 5006.46

SIDE CHANNEL

SECTION - SEE SKETCH TITLED PHASE II SIDE CHANNEL
$Q_{100}$ = 42.78 CFS
L = 490 LF
S = 0.005 FT/FT
n = 0.013 CONCRETE
n = 0.027 GRASS

ANALYSIS

BASED ON THE NORMAL DEPTH CALCULATIONS ON THE FOLLOWING PAGES THE EXISTING CHANNEL SECTION HAS THE CAPACITY TO CARRY THE INTENDED DISCHARGE WITH APPROXIMATELY 1 FT OF FREEBOARD. HOWEVER THE EXISTING SECTION IS NOT IN ACCORDANCE WITH THE ORIGINAL DESIGN SECTION.

# Trapezoidal Channel Analysis & Design

## Open Channel - Uniform flow

Worksheet Name: S-CHNLII

Description: CABEZON ANALYSIS-PHASE II SIDE CHANNEL

Solve For Depth

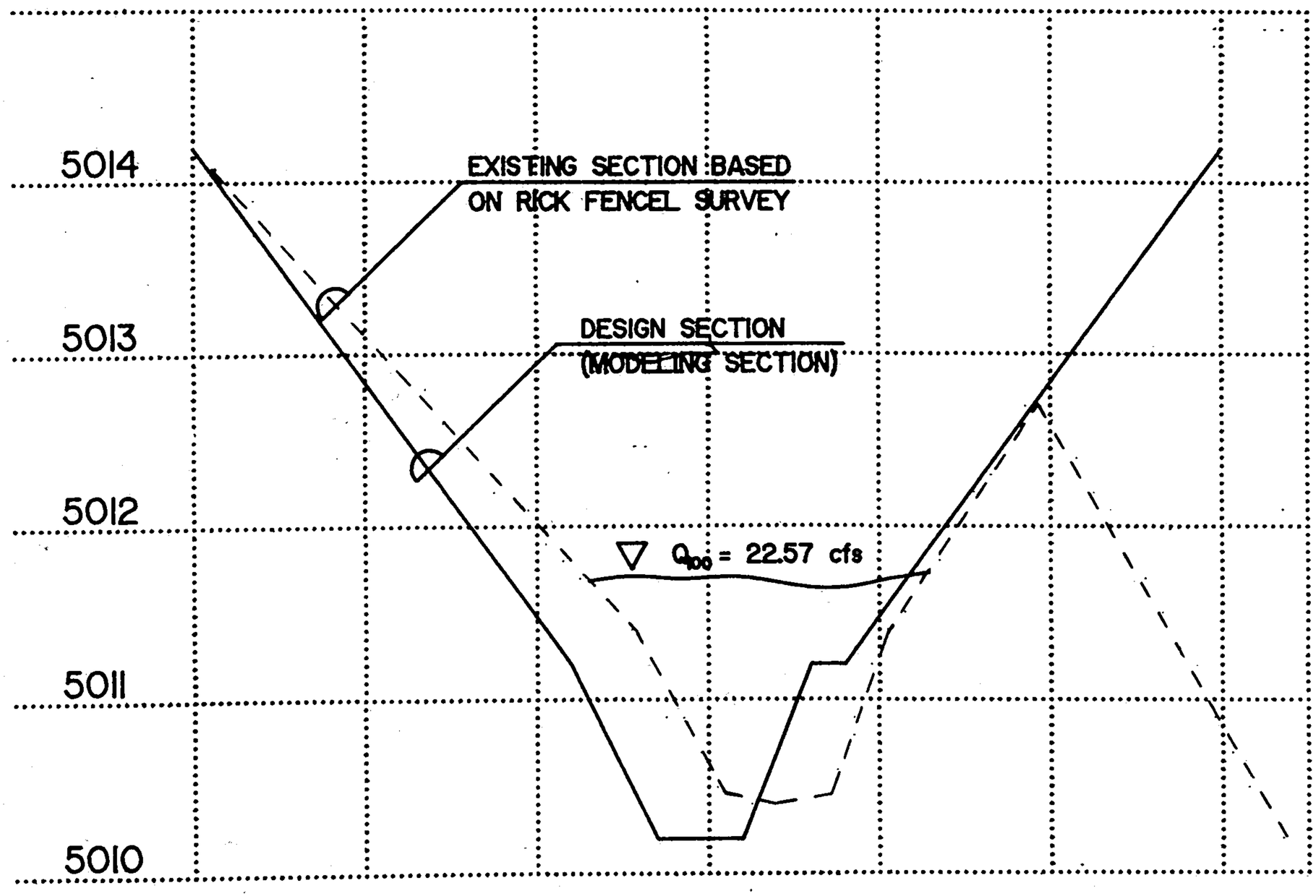
Given Constant Data;

| | |
|---|---|
| Bottom Width..... | 2.00 |
| Z-Left..... | 2.00 |
| Z-Right..... | 2.00 |
| Mannings 'n'..... | 0.013 |
| Channel Slope..... | 0.0050 |
| Channel Discharge.. | 42.78 |

| Bottom Width ft | Z-Left (H:V) | Z-Right (H:V) | Mannings 'n' | Channel Slope ft/ft | COMPUTED Channel Depth ft | COMPUTED Channel Discharge cfs | COMPUTED Velocity fps |
|---|---|---|---|---|---|---|---|
| 2.00 | 2.00 | 2.00 | 0.013 | 0.0050 | 1.33 | 42.78 | 6.86 |

Open Channel Flow Module, Version 3.42 (c)

Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708




PHASE II CHANNEL

SCALE : 1" = 5' HORIZ.
1" = 1' VERT.

| PHASE II SIDE CHANNEL | | EASTERLING & ASSOCIATES, INC. CONSULTING ENGINEERS 10131 Coors Rd., NW, Suite H-7/8 ALBUQUERQUE, NEW MEXICO 87114 (505) 898-8021 FAX (505) 898-8501 |
|---|---|---|
| DWG. NO. 2 | DATE: 4-93 | |

# APPENDIX D

## Cost Estimates

# CABEZON CAPACITY ANALYSIS
## ESTIMATE OF COST
## RAISED EARTH BERM
## (2 FEET OF FREEBOARD)

| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | Clearing & grubbing. | AC | 3.5 | $ 600.00 | $ 2,100.00 |
| 2 | Borrow, hauling & compaction of suitable fill. | CY | 3,200 | 6.00 | 19,200.00 |
| 3 | Remove & replace trees. | LS | 1 | 5,000.00 | 5,000.00 |
| 4 | Adjust sprinkler heads. | LS | 1 | 5,000.00 | 5,000.00 |
| 5 | Remove & replace existing chain link fence. | SF | 5,415 | 3.00 | 16,245.00 |
| 6 | Remove & replace existing woven wire fence. | SF | 9,880 | 1.50 | 14,820.00 |
| 7 | Seeding | AC | 3.5 | 1,500.00 | 5,250.00 |
| | | | | Subtotal | $67,615.00 |
| | | | | 15% Contingencies | 10,142.25 |
| | | | | Total | $77,757.25 |

# CABEZON CAPACITY ANALYSIS
## ESTIMATE OF COST
## RAISED EARTH BERM
## (3 FEET OF FREEBOARD)

| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | Clearing & grubbing. | AC | 4.5 | $ 600.00 | $ 2,700.00 |
| 2 | Borrow, hauling & compaction of suitable fill. | CY | 10,150 | 6.00 | 60,900.00 |
| 3 | Remove & replace trees. | LS | 1 | 5,000.00 | 5,000.00 |
| 4 | Adjust sprinkler heads. | LS | 1 | 5,000.00 | 5,000.00 |
| 5 | Remove & replace existing chain link fence. | SF | 5,415 | 3.00 | 16,245.00 |
| 6 | Remove & replace existing woven wire fence. | SF | 9,880 | 1.50 | 14,820.00 |
| 7 | Seeding | AC | 4.5 | 1,500.00 | 6,750.00 |
| | | | | Subtotal | $111,415.00 |
| | | | | 15% Contingencies | 16,712.25 |
| | | | | Total | $128,127.25 |

# CABEZON CAPACITY ANALYSIS
## ESTIMATE OF COST
## CMU WALLS
## (3 FEET OF FREEBOARD)

| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | CMU wall core filled. | SF | 15,252 | $ 8.00 | $122,016.00 |
| 2 | Concrete footing. | CY | 380 | 230.00 | 87,400.00 |
| | | | | Subtotal | $209,416.00 |
| | | | | 15% Contingencies | 31,412.40 |
| | | | | Total | $240,828.40 |

# CABEZON CAPACITY ANALYSIS
## ESTIMATE OF COST
## RAISED EARTH BERM/CMU WALL
## (3 FEET OF FREEBOARD)

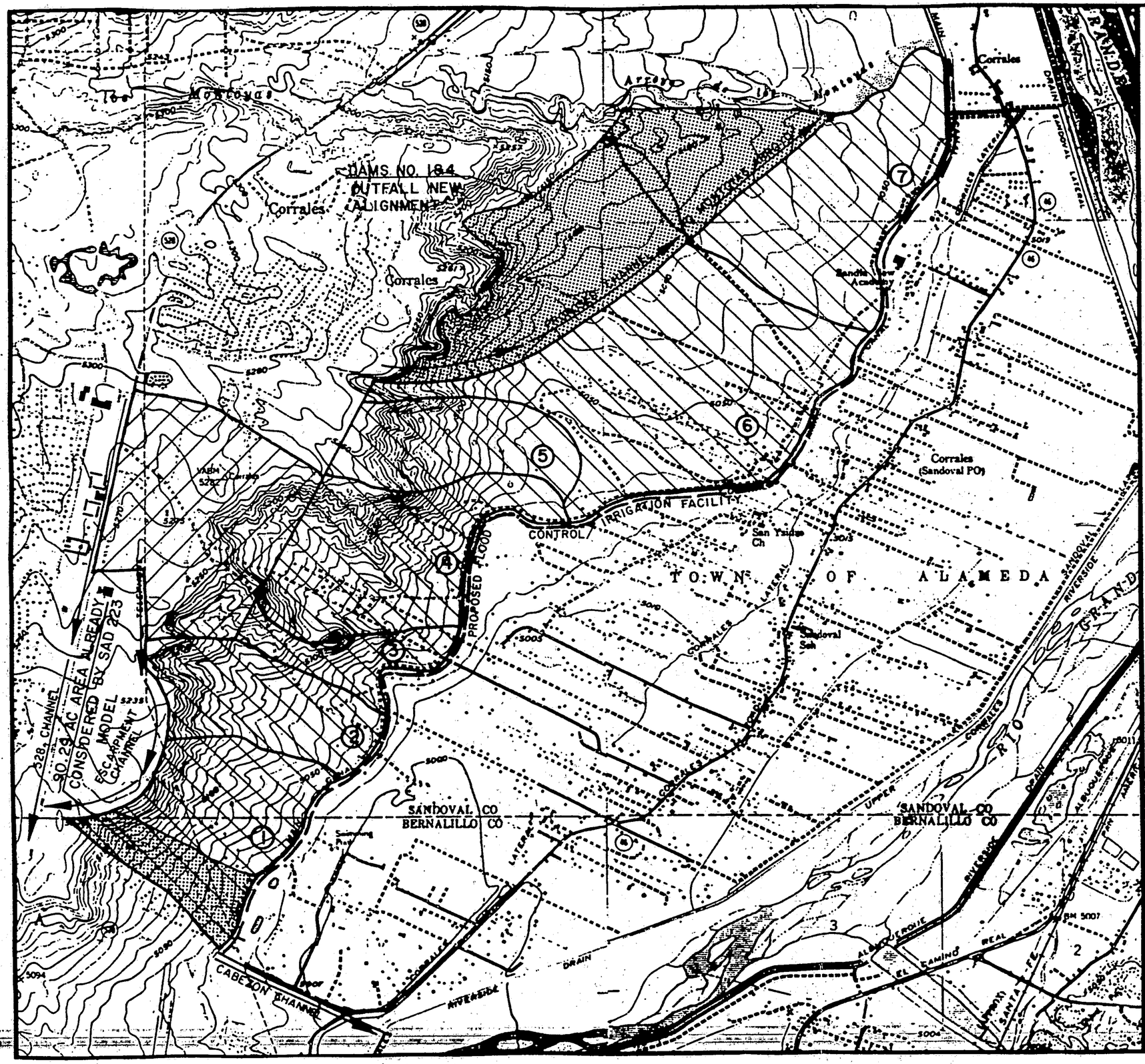
| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | Clearing & grubbing. | AC | 4.5 | $ 600.00 | $ 2,700.00 |
| 2 | Borrow, hauling & compaction of suitable fill. | CY | 10,150 | 6.00 | 60,900.00 |
| 3 | Remove & replace trees. | LS | 1 | 5,000.00 | 5,000.00 |
| 4 | Adjust sprinkler heads. | LS | 1 | 5,000.00 | 5,000.00 |
| 5 | Remove & replace existing chain link fence. | SF | 5,415 | 3.00 | 16,245.00 |
| 6 | Remove & replace existing woven wire fence. | SF | 9,880 | 1.50 | 14,820.00 |
| 7 | Seeding. | AC | 4.5 | 1,500.00 | 6,750.00 |
| 8 | CMU wall core filled. | SF | 1,935 | 8.00 | 15,480.00 |
| 9 | CMU wall footing. | CY | 50 | 230.00 | 11,500.00 |
| | | | | Subtotal | $138,395.00 |
| | | | | 15% Contingencies | 20,759.25 |
| | | | | Total | $159,154.25 |

# CABEZON CAPACITY ANALYSIS
## ESTIMATE OF COST
## SKYVIEW ACRES POND EXPANSION

| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 1 | Land acquisition - Lots 19 & 20 0.5 ac. each. | SF | 44,000 | $1.45 | $63,800.00 |
| 2 | Unclassified excavation. | CY | ~2,350 | 3.00 | 7,050.00 |
| | | | | Subtotal | $70,850.00 |
| | | | | 15% Contingencies | 10,627.50 |
| | | | | Total | $81,477.50 |

# CABEZON CAPACITY ANALYSIS
## CONCRETE TRAPEZOIDAL CHANNEL
## ESTIMATE OF COST
## CMU SPLASH BLOCKS/RAISED EARTH BERM
## (2 FEET/3 FEET OF FREEBOARD)

| BID ITEM | ITEM DESCRIPTION | UNIT | ESTIMATED QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| **2 FT. FREEBOARD** | | | | | |
| | **CMU SPLASH BLOCKS** | | | | |
| 1 | CMU core filled wall. | SF | 110 | $ 8.00 | $ 880.00 |
| 2 | Drill & dowel rebar. | LS | 1 | 500.00 | 500.00 |
| | | | | Subtotal | $1,380.00 |
| | | | | 15% Contingencies | 207.00 |
| | | | | Total | $1,587.00 |
| | **RAISED EARTH BERM** | | | | |
| 1 | Borrow, hauling & compaction of suitable fill. | CY | 100 | 6.00 | $ 600.00 |
| 2 | Base course maintenance road. | SY | 388 | 3.50 | 1,358.00 |
| | | | | Subtotal | $1,958.00 |
| | | | | 15% Contingencies | 293.70 |
| | | | | Total | $2,251.70 |
| **3 FT. OF FREEBOARD** | | | | | |
| | **CMU SPLASH BLOCKS** | | | | |
| 1 | CMU core filled wall. | SF | 660 | $ 8.00 | $ 5,280.00 |
| 2 | Drill & dowel rebar. | LS | 1 | 1,500.00 | 1,500.00 |
| | | | | Subtotal | $6,780.00 |
| | | | | 15% Contingencies | 1,017.00 |
| | | | | Total | $7,797.00 |
| | **RAISED EARTH BERM** | | | | |
| 1 | Borrow, hauling & compaction of suitable fill. | CY | 650 | $6.00 | $ 3,900.00 |
| 2 | Base course maintenance road. | SY | 1,140 | 3.50 | 3,990.00 |
| | | | | Subtotal | $7,890.00 |
| | | | | 15% Contingencies | 1,183.50 |
| | | | | Total | $9,073.50 |




# LEGEND

DRAINAGE AREA BOUNDARY

④ ANALYSIS POINT

AREA 1, WITHIN THE CORRALES VILLAGE LIMITS

AREA 2, WITHIN RIO RANCHO CITY LIMITS - URBAN CENTER POND DRAINAGE AREA

DRAINAGE CHANNEL

PROPOSED FLOOD CONTROL / IRRIGATION FACILITY

AREA ADDED TO THE DRAINAGE BASINS

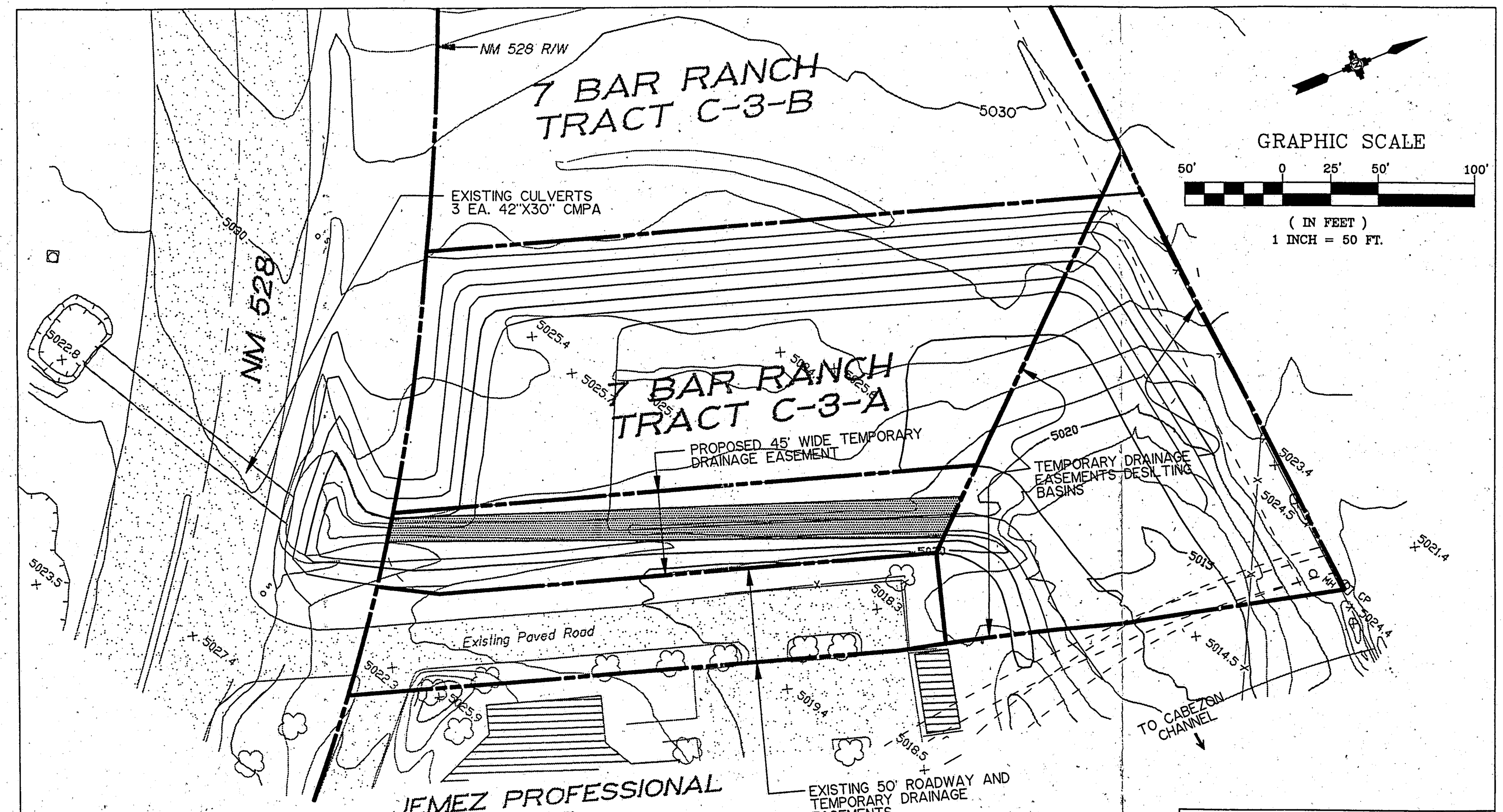
AREA TO BE REMOVED FROM DRAINAGE AREA

SCALE: 1" = 2000'

N

## FIGURE 1

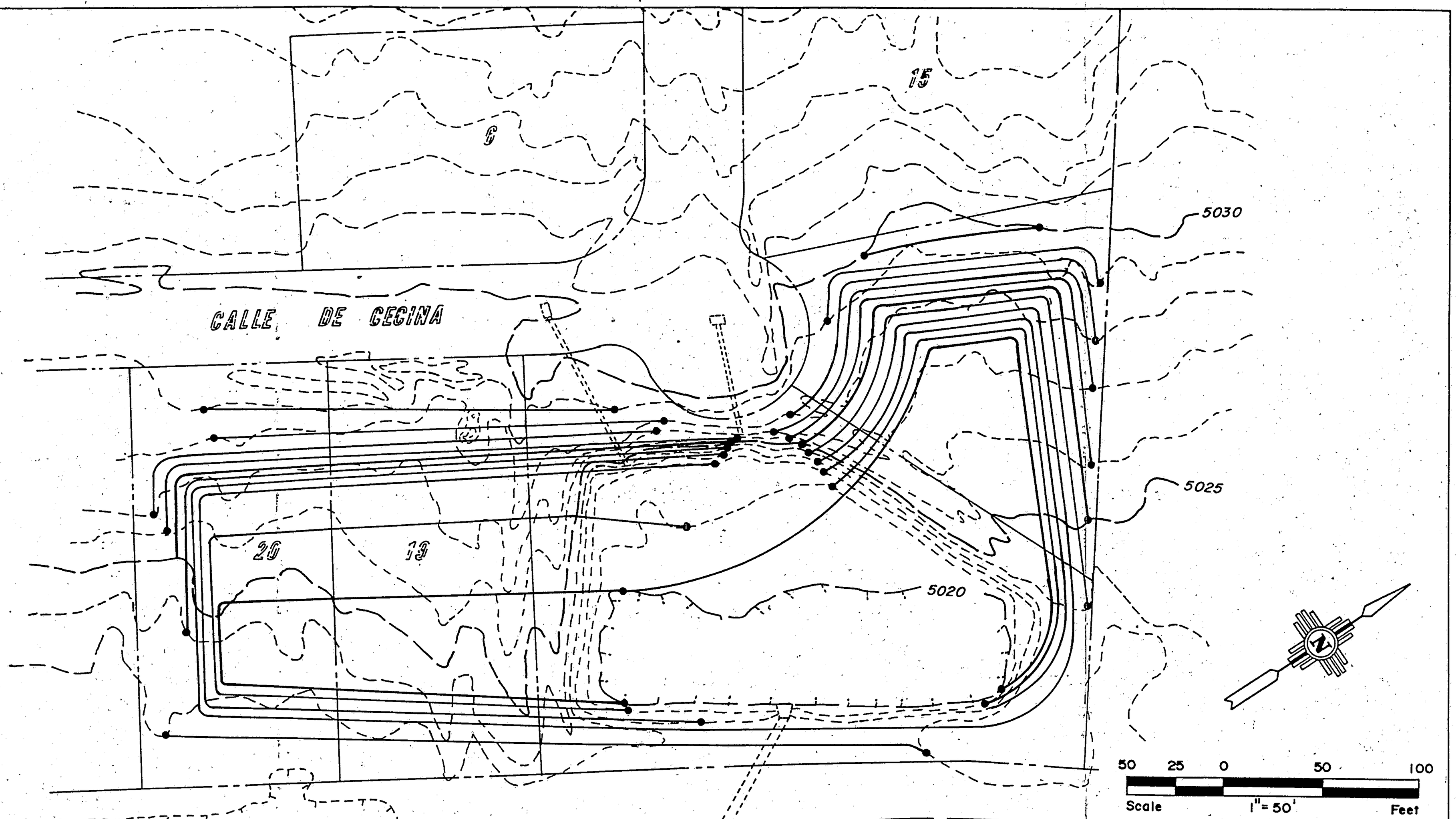
DRAINAGE AREA MAP
CORRALES HIGH DITCH
COMBINED FLOOD CONTROL / IRRIGATION FACILITY




*EASTERLING & ASSOCIATES INC.*

**Figure No. 2**
**Conceptual Cabezon Pond**
**Expansion**

DWG. NO. 2 | DATE: 4-93




EASTERLING & ASSOCIATES INC.

FIGURE NO. 3

CONCEPTUAL SKYVIEW POND EXPANSION

DWG. NO. 3 | DATE. 4-93

# APPENDIX E

## Cabezon Channel Box Culvert

## Model Study

By: Dr. Richard Haggen
University of New Mexico
Hydraulics Laboratory

THE UNIVERSITY OF NEW MEXICO
CIVIL ENGINEERING

Tuesday, July 20, 1993

JUL 21 1993
LBS ✓
VSF ✓
CME ✓
RPB ✓
DSH ✓

FILE 3302.2

Mr. Cliff Anderson, PE
Drainage Engineer
AMAFCA
2600 Prospect NE
Albuquerque, NM 87107

Dear Cliff:

Enclosed are three copies of my report *Cabezon Crossing Transition.* The existing structure functions well as designed by Easterling & Assoc. An increase in design flow from 385 to 502 cfs is acceptable from the point of view of crossing capacity.

The new discharge appears to require some channel wall or berm extension which I understand is now incorporated in Easterling's restudy. I have suggested a modification for streamline improvement which I also understand has been incorporated by Easterling.

Please let me know if further information is needed. Easterling & Assoc. assumed an active role in the experimentation phase and has reviewed a draft of this report. We are now investigating the Piedras Marcadas confluence for BHI.

Yours truly,

Richard J. Heggen

cc: Easterling & Assoc.

Richard J. Heggen, Civil Engineering, University of New Mexico, Albuquerque, NM 87131-1351
(505) 277-5737, 277-2722, FAX (505) 277-1988, e-mail rheggen@bootes.unm.edu

University of New Mexico

Department of Civil Engineering

# Cabezon Crossing Transition

Richard J. Heggen

July 19, 1993

A Report Prepared for the Albuquerque Metropolitan Arroyo Flood Control Authority

# Cabezon Crossing Transition

Richard J. Heggen
Department of Civil Engineering
University of New Mexico

July 19, 1993

## Introduction

Easterling & Assoc. (EA) designed the Cabezon Channel in Albuquerque's Northwest quadrant in 1985. Innovative design combined objectives of flood protection, irrigation, aesthetics and recreation. The structure transmits the historical Corrales High Ditch irrigation flow in a 10-ft. trapezoidal channel inset into a 50-ft trapezoidal flood conveyance channel. Design flood discharge at the Corrales Rd. crossing is 385 cfs.

At the Corrales Rd. crossing, the irrigation channel moves to the right of the flood control channel. *(In this report, right and left designations are in relation to the convention of downstream perspective, not the arbitrary orientation of a figure. Fig. 1 indicates the respective sides.)* A 42-in RCP siphons the irrigation flow under the highway to the Corrales Acequia. Overflow from the irrigation channel spills over a side weir adjustable by stoplogs into the flood conveyance channel. Flood flow drops into three 8x4 CBC's under the highway and is then conveyed in a 10-ft. trapezoidal channel to the Rio Grande.

Two 30-in RCP storm sewers enter the CBC's under the highway. The Corrales Acequia siphons below the CBC outlet.

Fig. 1 shows the layout of the transition into the CBC's. As flow converges at the downstream end, the bed drops 3.11 ft. to generate necessary specific energy to enter the CBC's.

In flood conditions, flow is substantially two-dimensional. While the irrigation channel is narrower than the flood conveyance portion, the irrigation channel is deeper and thus has a higher velocity. The irrigation-channel portion of the flood flow abruptly diverts over the side weir and creates a clockwise arc in the main flow. Were no countermeasures taken, the left CBC would receive more inflow than the right CBC. The streamlines of Fig. 1 illustrates this flow pattern.

EA designed the irrigation channel to flow near critical conditions for aesthetic purposes. Upstream meanders simulate a natural stream. EA used HEC-2 to design the cross-sections below the crossing structure. The drops and two-dimensionally precluded reliable HEC-2 modeling of the transition itself, so this portion of the design was by less-sophisticated, conservative, conventional methods. The structure has worked well to date.

Observation under irrigation flow conditions indicates that leakage through and flow over the stoplogs sweeps far to the left of the main channel, outflowing in large part through the leftmost CBC. The right CBC accumulates debris. To

rectify this imbalance, AMAFCA placed a concrete bumper barrier diagonally above the CBC entrances to divert flow to the right. This minor modification works.

The Middle Rio Grande Conservancy District operates the irrigation system. That agency controls the 42-in gate and may alter the stoplog level to assure irrigation delivery. For conservative flood control design, the 42-in gate is assumed to be closed or blocked with debris and the stoplogs are assumed to be at full height.

## The Problem

A proposed modification to the upstream master drainage plan increases the design discharge to 502 cfs. EA submitted updated HEC-2 analyses to AMAFCA, again up- and downstream, but not through, the crossing. This report does not address the adequacy of these reaches.

In the capacity of on-call services to AMAFCA, Richard Heggen, PE, reviewed the EA submission and undertook HEC-2 analysis through the transition. The EA HEC-2 is sound and indicates that some additional freeboard may be necessary, depending on AMAFCA's requirement requiring energy grade line.

The transition HEC-2 shows no choke, but this finding is inconclusive. An imprecise energy balance down the steep inclines, the major swirl caused by the irrigation spill and probable wave action invalidate HEC-2's basis. Were HEC-2, with its simplified assumptions, to indicate a choke at the CBC entrance, an actual choke would be expected. The increased discharge would not be allowable. HEC-2's lack of a choke, however, is marginal evidence, at best, that the structure is hydraulically adequate. Heggen suggested that the structure be physically modeled as part of UNM's ongoing AMAFCA laboratory project.

## Problem Statement

AMAFCA authorized UNM to model the Cabezon crossing transition to:

1) Determine the hydraulic profile,

2) Evaluate design modification as indicated, and

3) Determine the ultimate capacity of the structure.

## The Models

The study employed the UNM Civil Engineering/AMAFCA Open Channel Test Facility. The 50 ft. articulated table served as a platform for a three-dimensional channel model constructed of wood and sheet metal. The model extended from approximately 100 ft. above the transition to CBC's. *(Unless otherwise noted, all dimensions are for the prototype, not the model.)*

Discharge measurement was by a pressure differential Annubar Flow Sensor, model GCR25 in the main pump piping.

Geometric similitude was 1:12. The inertial-gravity force ratio was the same for both model and prototype, making Froude numbers equal.

## Experiments

The experimental procedure was less formal than that usually practiced in the UNM Civil Engineering/AMAFCA Open Channel Laboratory. UNM constructed the as-built model and in conjunction with the EA design team experimented with modifications in a trial-and-error manner. Intermediate performances were photographed or videotaped, but there is no full record of each test. The experiment reported here represents modifications deemed by EA to best satisfy the project objectives. The modifications are:

1) Remove existing bumper barrier

2) Construct a 0.75x0.75x9.25 ft. irrigation flow deflector, location shown in Fig. 2

3) Construct a 2.5x0.75x8.75 ft. deflector wall, location shown in Fig. 2. Were discharge to be further increased, the deflector wall could be heightened an additional 0.5 ft. and extended up the left sidewall.

Depths were measured from channel bed and velocities were measured by a 625 Pygmy current meter..

## Results

Fig. 3 shows selected flow depths and velocities for 502 cfs. The existing structure conveys the proposed 502 cfs. Flow at the CBC entrance concentrates on the left side. The deflector wall redistributes the discharge evenly among the three CBC's.

The existing bumper barrier has minimal effect at design discharge. The barrier may be replaced with the irrigation flow deflector. While this modification is not necessary for conveyance, it cleans up the design and removes a potential for debris accumulation in the sloped CBC entrance.

Discharge was increased to 840 cfs, at which point flow spilled over the right bank above the inlet to the irrigation channel siphon. Velocities against the deflector wall were roughly 69 percent greater than at 502 cfs.

## Discussion

Experimentation verifies EA's original design. The existing structure conveys the proposed increase in discharge as anticipated by EA. The proposed modifications are constructable and distribute the flow evenly to the CBC's.

This study does not propose the 840 cfs limit for flood control planning. Such increase simply indicates that the structure retains some excess capacity above that proposed by EA. Use the higher velocity against the deflector wall for structural design to allow for future modification.

This study does not deal with freeboard. Berm or sidewall extension may be desirable where natural grade slopes away from the structure, but the necessity for this and the height requirement is left to EA and AMAFCA.

## Conclusions

1) The structures functions in close accord with EA's prediction.

2) Add a deflector wall on the flood conveyance channel's left side.

3) Remove the bumper barrier and add an irrigation flow deflector below the stoplog gate.

4) The transition has a conveyance capacity of 840 cfs.

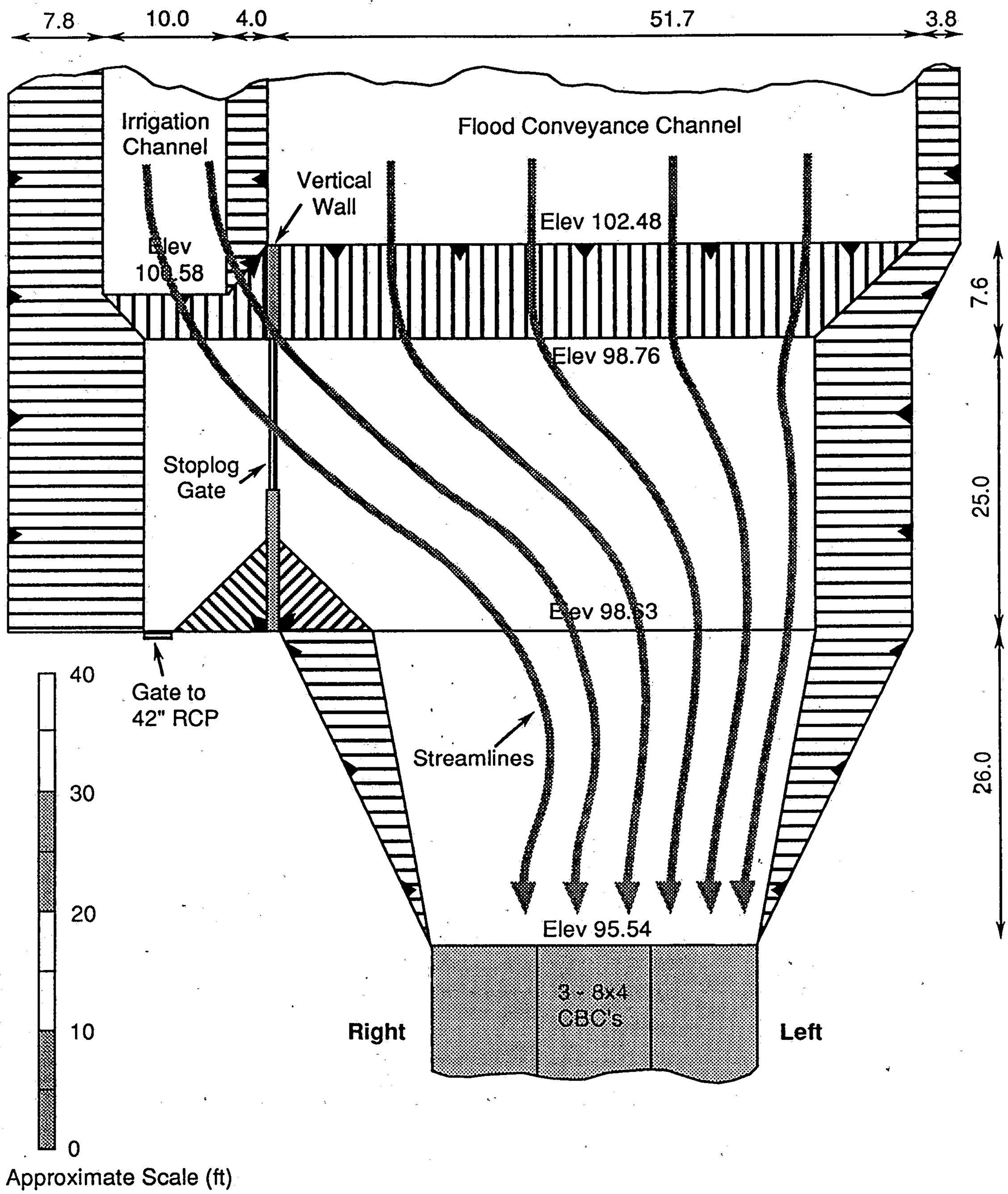



Figure 1. Plan View

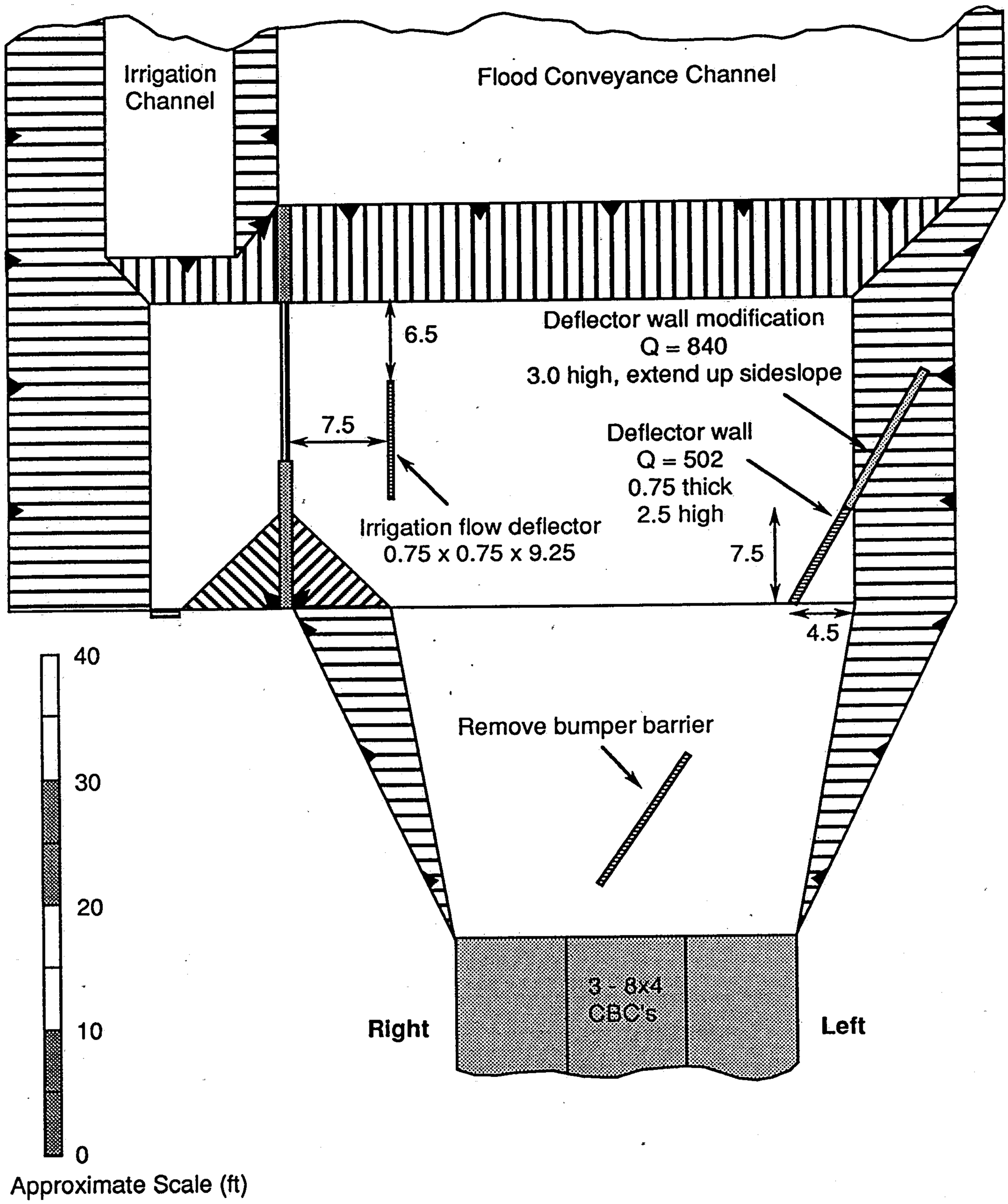



Figure 2. Proposed Modifications

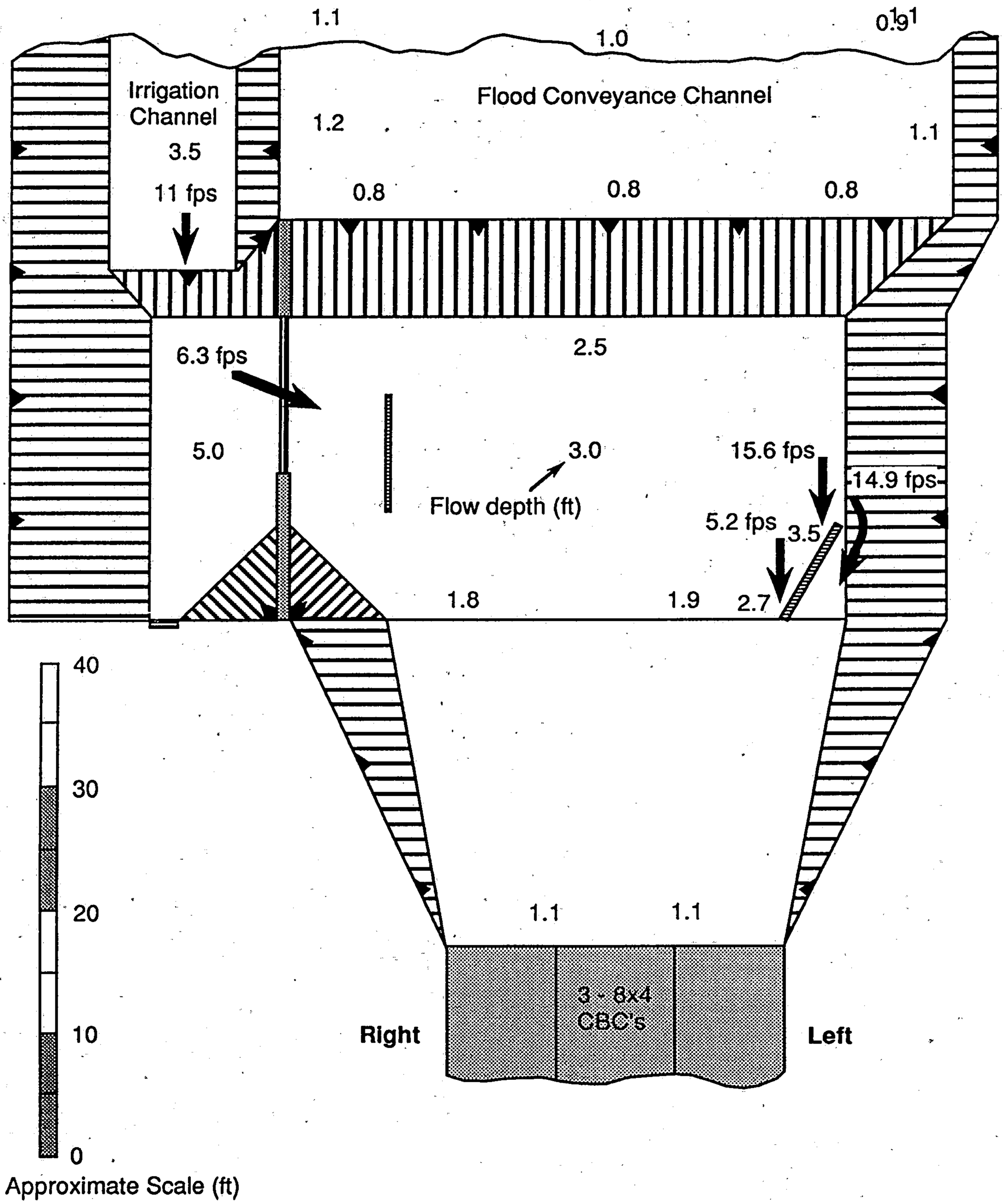



Figure 3. Depths and Velocities

## Appendix

**Notes:**

1. Multiply model distances by 12 to get prototype distances.
2. Multiply model velocities by 3.46 to get prototype velocities.
3. Multiply model discharges by 1.11 in gpm to get prototype discharges in cfs.

The Model Study report was not available at the time this report was issued. The report will be incorporated by Addendum as soon as it becomes available.