TECHNICAL MEMORANDUM

CH2M HILL

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REMARKS

PREPARED FOR: Howard Hargis/City of Tempe

PREPARED BY: Steve Walker/PHX

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DATE: September 19, 1994

SUBJECT: Draft Technical Memorandum of Dam Hydraulics for Rio Salado

PROJECT: SWW36963.01

This memorandum presents hydraulic data regarding the dams for the Rio Salado Town Lake project. The information was obtained using HEC-2 modeling and manual calculations.

The objectives of the hydraulic study are to:

- Evaluate the hydraulic impacts of the project on the Salt River using a HEC-2 model
- Estimate the hydraulic performance of the dams for various operational modes
- Estimate the lengths of the stilling basins for various operational modes

Criteria and assumptions:

- Design discharge will be the 100-year storm (Q = 215,000 cfs) per Flood Control District of Maricopa County (FCDMC). Current information prepared by the U.S. Bureau of Reclamation (March 30, 1994) states that the design discharges following completion of Salt River dam improvements will likely be significantly less than 215,000 cfs. However, this evaluation is based on the previous, more conservative estimate.

MEMORANDUM CH2M HILL

10/18/94

TO: Richard G. Perreault/FCDMC

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File

FROM: Henry Allen/CH2M HILL

DATE: October 17, 1994

SUBJECT: Draft Technical Memorandum of Rio Salado Dam Hydraulics

PROJECT: SWW36963.01.01

Attached are several documents for your review that were prepared for the Rio Salado Town Lake project.

The Draft Technical Memorandum (TM, Ref.1, attached) has been revised. The HEC-2 model used in the revision was created by combining two models (RSSRP1.hc2 and RSSRP2.hc2) that were made in support of the revised FEMA floodplain delineations. RSSRP1.hc2 covered the reach from the beginning of the ADOT channelization up to the railroad bridge; RSSRP2.hc2 from Grade Control Structure #4 up to McClintock Drive. RSSRP2.hc2 was the run used in the CRSS LOMR.

The following table addresses your comments. The responses are brief summaries of the information in the Preliminary Design Report and appendixes submitted for your review.

If you have any further questions, please feel free to contact me.

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phx/36963.01/fcdltr1.doc

Comment Number	Response
	Hydraulics
1	**Impacts to Structures:** *Construction:* The construction of the dams will have little effect since they are not located near any existing structures. *Operation:* There are two dam operation scenarios that will have an effect on the channel hydraulics: maximum design flow with the dam inflated and maximum design flow with the dam deflated. In the first case, the design discharge is around 31,000 cfs and the lake would be full. The main effects of the lake would be to: 1) Dissipate the flow jet from the Indian Bend Wash Drop Structure as it enters the lake 2) Pond up the flows from the Salt River behind the upstream dam, and 3) Reduce the velocity of the flow in the reach between the dams. None of these impacts would be detrimental. In the second case, the design discharge is 215,000 cfs (Q100). With the dams deflated, the only difference in the channel between the existing and proposed conditions would be the addition of the dam piers, foundations, and energy dissipater aprons as well as the sediment accumulation upstream of the downstream dam. Figure 3 in the TM compares the water surface elevations, flow velocities and flow depths between the existing and proposed (design) conditions. As can be seen in this figure, the greatest changes in the hydraulic parameters occur within the limits of the concrete dam structures. So, the channel in these locations will not be adversely affected. In the vicinity of the existing structures (see Figure 2 in the TM for locations) which are from HEC-2 cross-section 15.6 and on upstream, there is very little change in the hydraulic parameters so that the stability of these structures in the proposed conditions will not be less than it is in the existing conditions. Also, the stability of Grade Control Structure #4 (cross-section 2) will not be diminished because it will be in the backwater of the dam.

2	**Local Scour at Dams:** Calculations of local scour depths at the dams can be found in the attached document *Scour Downstream of the Energy Dissipater Aprons.* Scour depths for the 100-year flood are 13 feet at the downstream dam and 5 feet at the upstream dam. These depths were estimated using the existing channel material. To reduce the scour depths, rip rap will be placed in the scour areas downstream of the aprons. **Sediment on the dam:** Due to the construction of main-stem dams on the Salt and Verde Rivers, in-stream mining, urbanization, and landscaping of the Indian Bend Wash, the sediment supplied by the Salt River to the project site is limited (Ref. 2, attached). With so little sediment being transported, the reach tends to be degradational. No problem is anticipated at the structures from sediment deposition. Long-term monitoring of the deposited sediments will be part of the ongoing lake maintenance program. **Stilling Basins:** Calculations for the design of the stilling basins can be found in the TM.
3	**Dam Stability:** The stability of the dam is addressed in detail, including supporting computations, in the Geotechnical Report, which is scheduled to be completed by early November.
4	**Sediment Regime:** With the dams deflated, which occurs for flows with a recurrence interval of 5 years or more, the flow hydraulics for the proposed conditions are similar to existing conditions (see Figure 3 in the TM). Therefore, apart from sediments being trapped by the downstream dam's foundation, the dams will not affect the existing sediment regime. When the dams are full or partially deflated, they will act as sediment traps for the bed material load during frequent flows. In the short term, as a result of in-channel grading activities that have disturbed or removed

	part of the armor layer, sediment deposition rates will be relatively high. However, the sediment transport capacities of the low flows (less than 5-year) are small due to the relatively low depths and velocities which characterize these events. Initial monitoring of the sediment deposited at the dams may be required and the removal of accumulated material may be necessary. The actual rate of sediment deposition depends on the flow rates, duration types of in-channel activities, and other factors. Therefore, a definitive volume estimate is not possible. Once an equilibrium armored condition is re-established in the upstream "supply" reach, the volume of sediment deposited will decrease. At the east dam, the bedload will drop out but the finer, suspended or wash load sediments will pass over the east dam. A portion of this passing material will remain suspended and flow over the west dam. The trap efficiency of a reservoir, and the percentage of the suspended sediment load captured, are typically calculated as functions of the storage volume of the reservoir compared to the volume of water passing through it. Based on these relationships, the trap efficiency of the Town Lake is estimated to be very small, indicating that most of the suspended sediment will pass through the lake. As with the upstream dam, monitoring of long-term sediment deposition is recommended.
5	**Lake Effects and Dam Operation:** For the effects of the lake on flow hydraulics, see the response to Comment #1. The time required to lower the dams is about 30 minutes (ref. 3, attached) The time required to evacuate the lake, i.e. until the lake is 99% drained, is about 4 hours (Ref. 4, attached) The lowering of the dams, in a normal operating mode, will be automatic. Deflation will begin once the lake level raises (due to inflows of storm discharges) to predetermined water surface elevations. *Fail-safe system:* Design of the dam-operation control system has not been finalized but redundancy will be built into the system to ensure

	electrical power for dam inflation and pressure relief for dam deflation. Fail-safe components, similar to those described in References 5, 6, and 7 (attached) are being considered.
	Hydrology
6	**Model Differences:** As mentioned above, the run used in the revised Technical Memorandum was the same run used in the CRSS LOMR. This should eliminate some of the discrepancies. Concerning the differences in levee elevations between the CRSS model and the As-Builts, please compare the discrepancies with the CRSS LOMR run in the revised TM.
7	**Sedimentation Effects on Hydraulics:** Sedimentation at the dams was included in the run used in the TM.

References

1. *Draft Technical Memorandum of Dam Hydraulics for Rio Salado*, CH2M HILL, September 19, 1994

2. Memorandum from George Cotton/Carter & Burgess to Steve Walker/CH2M HILL, Sept. 22,1994, re: Salt River Sedimentation

3. Meeting minutes from meeting with Bridgestone, August 17, 1994

4. *Sudden Gate Opening Analysis, Town Lake, Tempe Rio Salado Project*, Carter & Burgess, August 19, 1994

5. *Introducing the Bridgestone Rubber Dam*, Bridgestone Corporation, August 1989

6. *Technical Standard of Rubberized Fabric Inflatable Weirs (Second Edition)*, Land Development Technical Research Center, August 1983

7. *Inflatable Rubber Dams: Sumigate*, Rodney Hunt Company, 1991

8. *Sumigate Inflatable Rubber Dams, 20 Questions*, Rodney Hunt Company, 1992

9. *Scour Downstream of the Energy Dissipater Aprons*, CH2M HILL, Sept 1994

FLOOD CONTROL DISTRICT
of
Maricopa County

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Nov. 15, 1994

Mr. Steve R. Walker, P.E.
Senior Water Resources Engineer
CH2MHill
P.O. Box 28440
Tempe, Arizona 85285-8440

SUBJECT: DRAFT TECHNICAL MEMORANDUM OF RIO SALADO DAM HYDRAULICS (SWW36963.01.01)

Dear Steve:

Reference is made to the Draft Technical Memorandum (TM) dated September 19, 1994; the October 17, 1994 memorandum from Henry Allen (CH2MHill) addressing our August 9, 1994 comments and the technical reports and rubber dam information that was provided with the October 17th transmittal.

District planning and technical staff have reviewed the referenced information and provide the following comments for your use and action:

1. The newly submitted HEC-2 model is the CRSS LOMR model with the proposed rubber dams included in it. The new model does not include or account for sediment accumulation upstream of the east dam. Why?

2. "N" values on the benched overbank areas have been reduced from 0.045 in the previous submittal to 0.025 in the new submittal. While 0.025 may be appropriate for bike, pedestrian, and equestrian trails, as stated on page 10 of the TM, it is not appropriate for the landscaped areas (see HEC-2 section #12 as an example). We request that documentation be provided as to how the "N" values were assigned using the District's "Estimated Manning's Roughness Coefficients for Stream, Channels, and Floodplains in Maricopa County, Arizona," and justify any coefficients that are lower than those that would result from using the District's procedures.

3. In the June 28, 1994 TM, a table was included that compares CWSEL to the top of the levee and the calculated freeboard. We request that a similar table be provided that compares the elevations and calculated freeboard for the CRSS model to the elevations at the same locations using the 1994 CH2MHill Topography.

4. The energy dissipater slabs should be analyzed for hydrostatic uplift and sliding. Please provide these analyses and calculations verifying that adequate factors of safety are included.

5. Calculations for the design of the loose riprap apron were not provided. We request that the design for riprap size and thickness and supporting calculations be provided.

6. When available, please provide the design/hydraulic calculations for the interceptor storm drains and pumps that will replace storm drains that presently outfall into the channel.

7. Sheets 22 through 28 (inclusive) of the project plans were not provided. If they are available, please provide three sets.

8. Construction of the reinforced concrete slurry walls could impact the structural stability of the existing CSA slope protection. Please provide detailed plans, construction procedures, and stability calculations if and when they are available. Is this information included in the geotechnical report that is scheduled to be available in November, 1994?

9. Page 4-1, Table 4-1: The SPF for this reach of the Salt River is 289,000 cfs, not 250,000 cfs. This and all other references to the SPF should reflect a flow rate of 289,000 cfs.

10. Page 4-3: The District has operations and maintenance responsibility for the flood control features constructed at part of the Salt River Channelization. The City of Tempe is the floodplain manager for this reach of the Salt River; therefore, the City is the regulating authority. The "bullet" statements in this section are correct.

11. Page 4-5, Figures 4-4 and 4-5: Please verify the water surface and top of levee elevations as depicted in the two figures.

12. Page 9-8, "Filling": The District has operations and maintenance responsibilities for the Indian Bend Wash (IBW) Outlet; therefore, we should be included in the discussions for using the wash to fill the lake.

13. On the key map of sheet 10 of 26 of the Landscape Plan, Section 2 is shown to be on the south bank. On sheet 19 of 26, Section 2 is labelled as being on the north shore. Which is correct?

14. Page 14-1: Alterations of the gabions for the landscape plantings must be designed and constructed to insure the structural integrity of the levees. The impacts of root growth and irrigation on the levees must also be completely evaluated and accommodated.

15. Page 18-2: Inspection of the CSA after "significant flow" events will be necessary; therefore,

close coordination with the District will be required before the re-filling of the lake can commence.

16. On sheet 17 of the plans: What is the percent slope of the energy dissipater slab?

17. On some of the sheets of the construction plans, the bridge on Rural Road is labelled "Rural Road Bridge" and on others it is "Scottsdale Road Bridge." Which title is correct?

18. Landscaping Plans, sheet 8 of 16: The note refers to a trail connection across the IBW drop structure. During previous discussions on the trail system, I thought we had agreed that the trail connection crossing the IBW would be upstream of the Red Mountain Freeway and not across the drop structure. Please confirm.

If you have any questions, please feel free to contact me.

Sincerely,

Richard G. Perreault
Chief, Planning Branch

cc: Howard Hargis, City of Tempe

- Three feet of freeboard is to be maintained at the design discharge per criteria established by FCDMC.

- The configurations of the dams are described in Table 1 and shown in Figure 1. There is a concrete apron downstream of the downstream dam and both upstream and downstream of the upstream dam. The Manning's "n" for the aprons and the dam structures was 0.025.

Table 1
Dam Configurations

Cross-Section Geometry

Dam Location	Bed Elev., ft	Dam Foundation Elev., ft	Dam Height, H, ft	Lake Water Surface and Dam Crest Elev., ft.	Channel Width at Top of Dam, ft.	No. of Bays
Downstream	1128.9	1132.0	16	1148	907	4
Upstream	1140.4	1142.0	6	1148	966	4

Piers

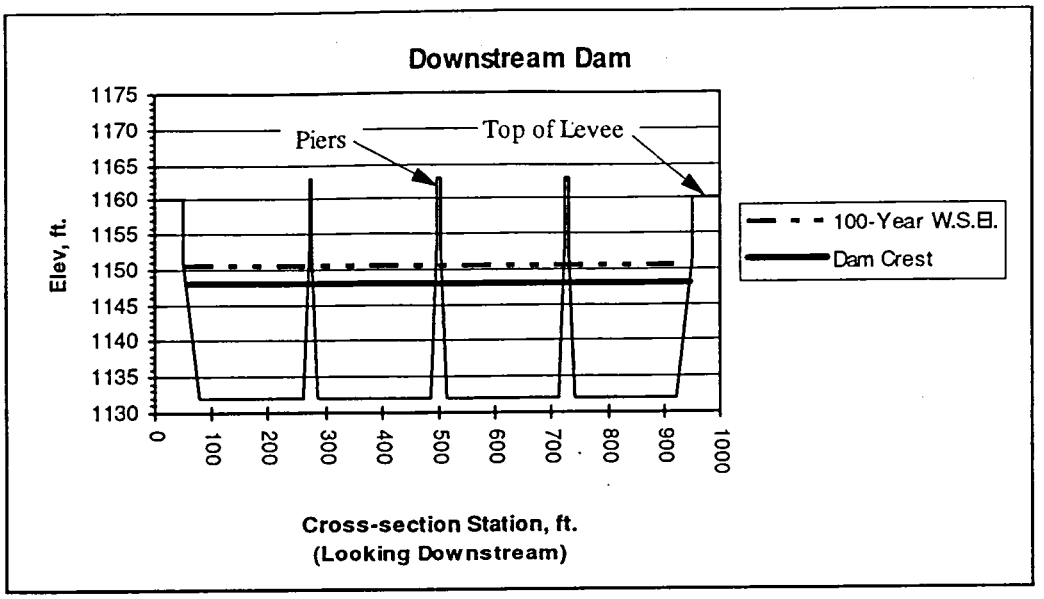
Dam Location	No. of Piers	Pier Height, ft.	Top-of-Pier Elev., ft.	Top-of-Pier Width, ft.	Side Slopes	Base Width, ft.
Downstream	3	21	1153	6	½:1	27
Upstream	3	12	1154	6	½:1	18

*For modeling, 10 feet was added to the pier height to accommodate architectural details that may be added.

- Overbanks will be developed which will increase the channel roughness. Overbank development was assumed to be represented by the concept design prepared for this study. The Manning's "n" for the landscaped portions of the overbank was assumed to be 0.045. Bike, pedestrian and equestrian trails were modeled as 0.025

- As requested by FCDMC, the area upstream of the downstream dam's sill was assumed to be ineffective to model sediment deposition up to the elevation of the sill.

- For rating curves, it is assumed that the top of the dam remains horizontal as it deflates.



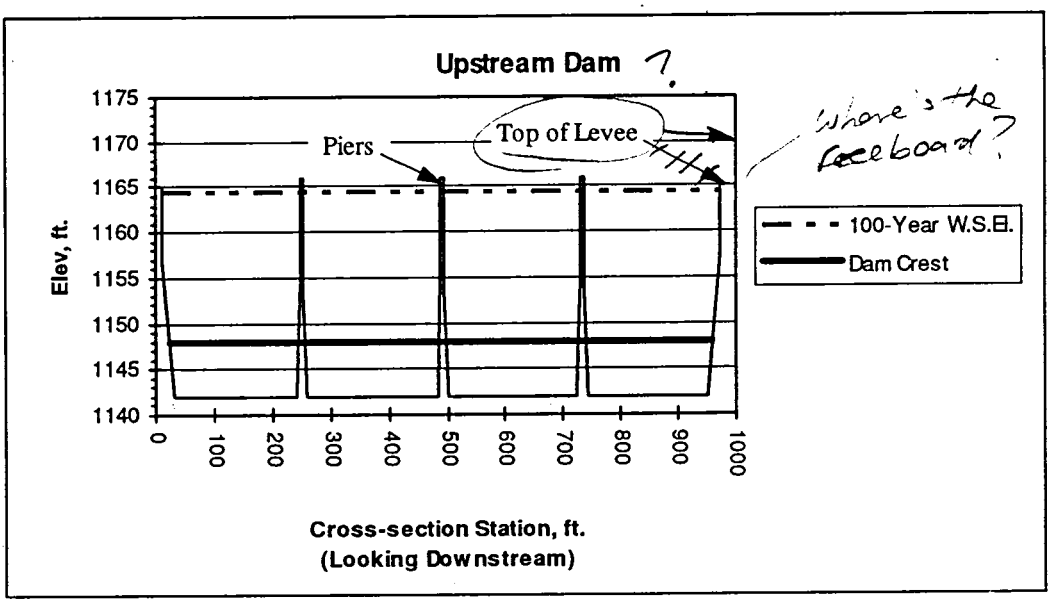


Figure 1: Dam Sections

Procedures:

A) ***HEC-2 model***

The hydraulic impacts of the project were estimated by combining two HEC-2 models (RSSRP1.hc2 and RSSRP2.hc2) originally created in support of revised Federal Emergency Management Agency (FEMA) floodplain delineation. RSSRP1.hc2 covered the reach from the beginning of the ADOT channelization up to the Railroad bridge, RSSRP2.hc2 form Grade Control Structure #4 up to McClintock Drive. The filename of the combined run was RS-FEMA.hc2.

File Modifications: RS-FEMA.hc2 was copied, called RS-PROP.hc2 and then RS-PROP.hc2 was modified as follows:

- Discharge modeled was Q_{100} which was 210,000 cfs downstream of the Railroad bridge and 215,000 cfs upstream of the bridge.

- The dams were modeled using the Normal Bridge routine because they will not be subject to weir or pressure flow effects. The upstream dam is about 3,150 feet upstream (east) of Rural Road. The dam's foundation will be about 1½ feet above the channel bed as shown on the channel design plans for this reach of the Salt River channelization project. The downstream dam is about 222 feet downstream of Grade Control Structure No. 4 (2,380 feet west of Mill Avenue). The dam's foundation acts as a grade control structure. The invert of the structure is about 3 feet above the design channel invert .

- Overbank development, between the downstream and upstream dams, was modeled by adding left and right encroachment stations and elevations. Elevations were taken from the most current landscape architect concept plans. Manning's "n" values, as mentioned above, were entered for this area using NH cards.

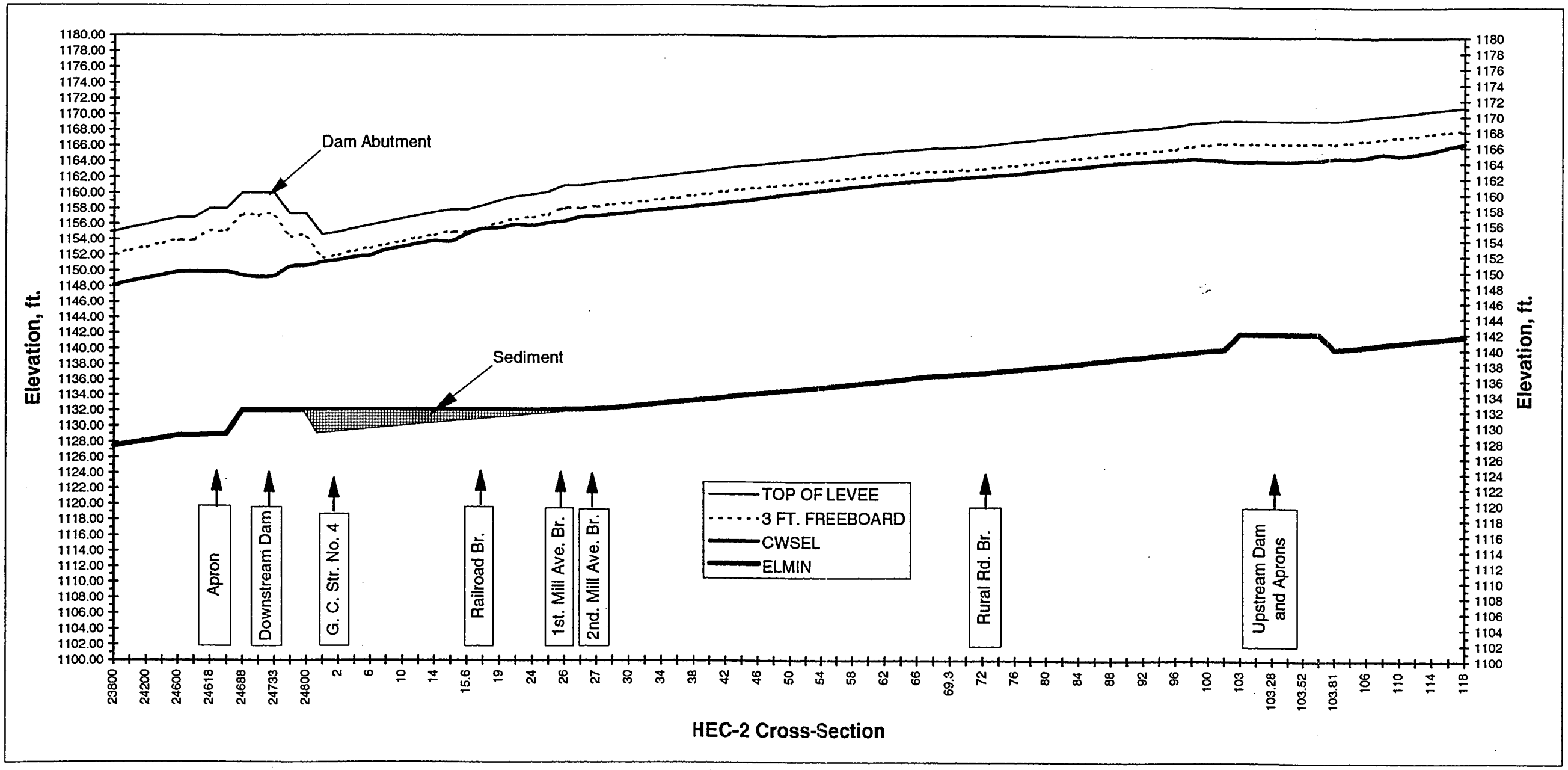
- Sediment was included by setting a sediment elevation using the X3 card (X3.2)

Results:

The water surface profile for the 100-year discharge is shown in Figure 2. The line titled "TOP OF LEVEE" is a plot of the elevation of the lower of the left or right bank levees. The "3 FT. FREEBOARD" (based on FCDMC design criteria) line is 3 feet below the Top of Levee. "CWSEL" is the water surface line and "ELMIN" is the bottom of the channel bed. The resultant water surface complies with the freeboard limit. The minimum freeboard of 3.03 occurs just upstream of the Railroad bridge.

At the downstream dam, the reduction in cross-section area due to the piers causes the water surface elevation to drop by about ½ foot. At the upstream dam, the piers are significantly smaller, and have almost no effect on the water surface.

Figure 3 shows several plots comparing various hydraulic parameters between the Existing (FEMA) and Design (or proposed) conditions. The maximum increase in CWSEL is 1.02 feet and occurs at section 8 but this increase quickly diminishes upstream. The maximum increase in the channel velocity of about 3.5 ft./s. occurs within the dam structure itself and not in the alluvial channel bed.



3P1B50F.XLS

Figure 2
100-Year Water Surface Profile

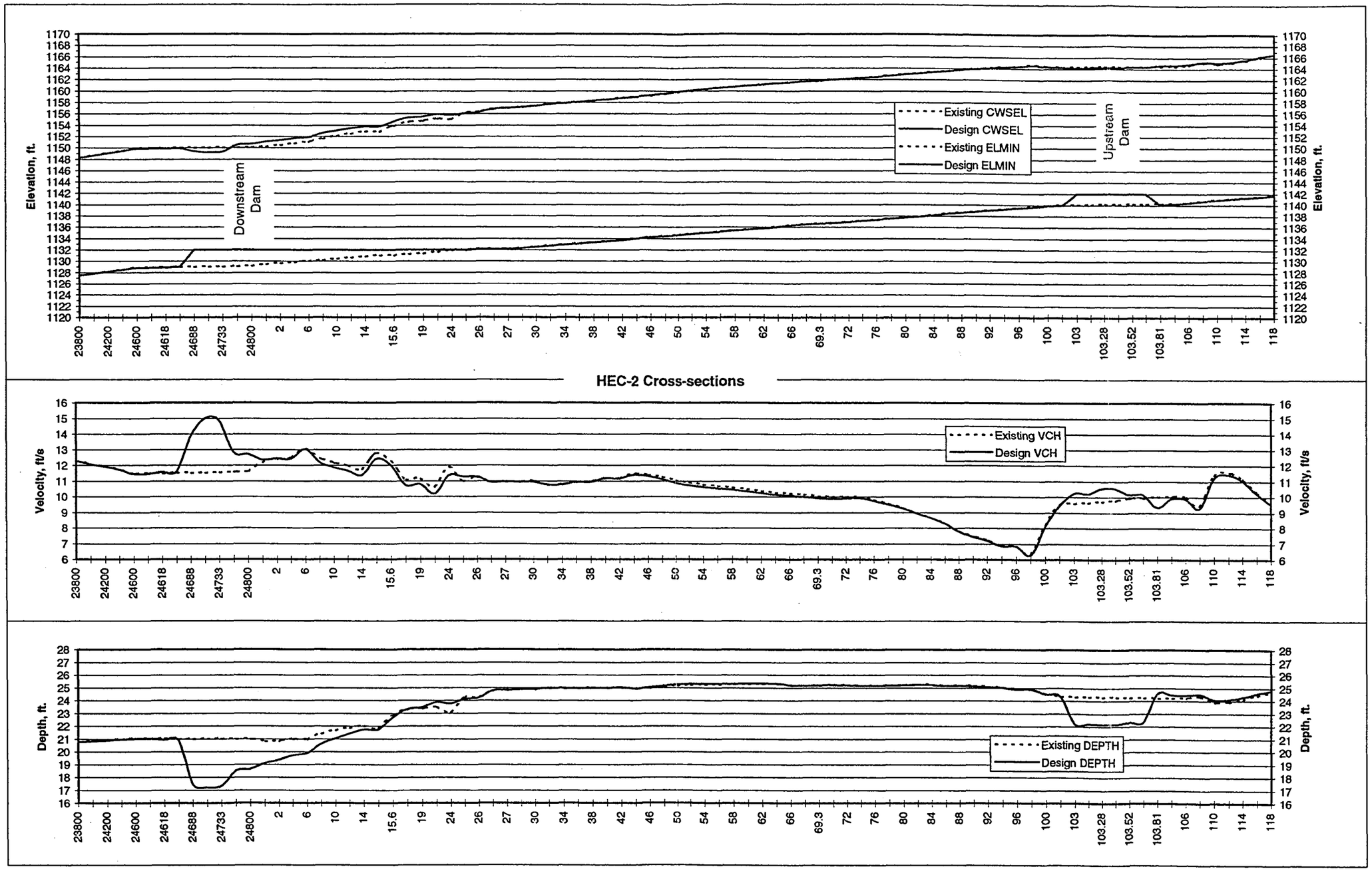


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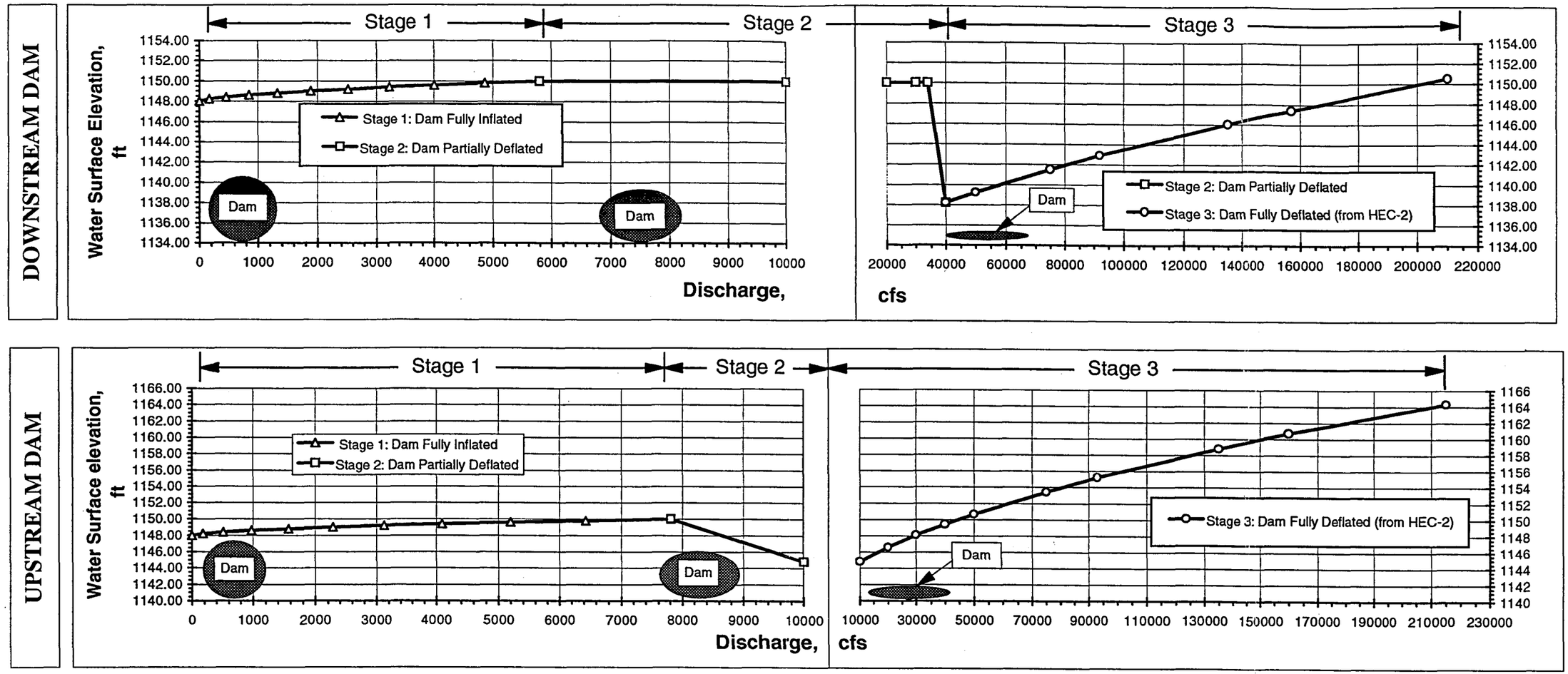
Figure 3
Existing vs. Design



DAMOPFIG.XLS

Figure 4
Composite Rating Curves

B) Discharge Rating Curve

Rating curves for the dams were developed using a discharge relationship found in the Bridgestone technical notebook, *Questions and Answers about the Bridgestone Rubber Dam*, August 1989 (see appendix). The equation resembles that of a broad-crested weir. The discharge coefficient is a function of the ratio of depth of flow over the dam to dam height, and increases as the ratio increases.

The dam operation is designed to prevent the lake level from exceeding elevation 1150 during most storm flows. The crests of the dams are at elevation 1148. When storm flows cause the lake level to exceed 1150, the downstream dam will partially deflate to maintain elevation 1150. Details of the proposed operation plan are included in the appendix. If the lake elevation of 1150 cannot be maintained without lowering the downstream dam below 1145, the dam will instead be completely deflated. The upstream dam will only be operated in a fully deflated or inflated position, and will automatically deflate if the lake elevation exceeds 1150. Discharges for these operational levels are shown in Table 2.

C) Stilling Basin Length Rating Curve

Stilling basins are used to mitigate the potential scour caused by water flowing over drop structures. In addition, the basins can diffuse floodwaves formed by rapid deflation of rubber dams.

Rating curves used to estimate the length of the stilling basins downstream of the dams were developed using equations found in *Open Channel Hydraulics* by V.T. Chow, 1959 and *Drainage Design Manual for Maricopa County*, Vol. 2: Hydraulics (see Appendix). The ratings included safety factors suggested by the FCDMC.

The length of a stilling basin is a function of the overfall height and unit discharge. The equations assume that the nappe is aerated. Basin lengths for the operational levels mentioned in Section B are shown in Table 2.

Recommended design lengths:

- Downstream dam, 95 feet
- Upstream dam, 35 feet

Table 2 Overflow Discharges and Stilling Basin Lengths								
Location	**Dam Inflation**	**Lake Level, ft.**	**Crest Elev., ft.**	**Flow Depth Over Dam, ft.**	**Dam Height, ft.**	**Dam Overflow Length (cross-section length minus piers*), ft.**	**Discharge, cfs**	**Stilling Basin Length, ft.**
Downstream	Fully Inflated	1150	1148	2	16	890	5,800	39
	Partially Deflated	1150	1145	5	13	890	31,200	93
Upstream	Fully Inflated	1150	1148	2	6	930	7,800	35
*Abutments not subtracted because their slopes are flatter and may add some conveyance.								

D) Composite Discharge Rating Curve for the Downstream Dam

In Figure 4 are composite rating curves for the downstream and upstream dams showing discharges at three different stages of operation. In the first stage, the dams are fully inflated and the depth of storm flow increases from 0 feet (elevation 1148) to 2 feet (elevation 1150). In the second stage, the dams are deflating to maintain a maximum water surface elevation of 1150. In the third stage, the dams are completely deflated, and as the discharges continue to increase, the water surface elevation will eventually rise above elevation 1150.

RIO SALADO

Technical Memorandum

Appendix

Contents

HEC-2 output for RS-PROP.OUT

Disk containing HEC-2 file RS-PROP.*

Discharge rating curve information:
- Supporting documentation
- Downstream dam discharge rating curves
- Upstream dam discharge rating curves

Rio Salado Town Lake Dam Design and Operation Criteria, CH2M Hill, 1994

Stilling Basin rating curve information:
- Derivation of equation
- Supporting documentation
- Downstream dam stilling basin rating curves
- Upstream dam stilling basin rating curves

Plot of discharges vs. recurrence intervals

HEC2 S/N: 1916530021 HMVersion: 6.50 Data File: RS-PROP.hc2

```
*********************************************
*  HEC-2 WATER SURFACE PROFILES             *
*                                           *
*  Version   4.6.2;  May 1991               *
*                                           *
*  RUN DATE    16SEP94    TIME   14:31:34   *
*********************************************
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
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============================
H A E S T A D   M E T H O D S
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS RUN EXECUTED 16SEP94 14:31:34

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

 Version   4.6.2;  May 1991
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RIO SALADO - TOWN LAKE FINAL RUN

PROPOSED DEVELOPMENT OF SALT RIVER FOR TOWN LAKE

Downstream dam: at section 24700
3 piers w/0.5H:1V side slopes, 6 ft. topwidth, 16' high
includes concrete apron

Upstream dam: at section 103.00
3 piers w/0.5H:1V side slopes, 6 ft. topwidth, 6' high
includes concrete apron

Sediment deposition at elev. 1132 upstream of downstream dam

Overbank Development:
Placed on top of CSA
Manning's n: walkways = 0.025
landscaped slopes = 0.045
Elevations from landscape plans

Notes:
- this run was created by combining the CRSS runs: RSSRP1.hc2 and RSSRP2.hc2
  The seam is at GC #4
- see note at Priest Ave. Br.
- starting WSEL's on RC card at first cross-section
- these cross-section were set up with the left and right banks defined
  by looking upstream

```
T1   RIO SALADO TOWN LAKE for TEMPE, AZ
T2   CH2M HILL    Walker/Allen   Sept. 1994
T3      RS-PROP.HC2

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
                4                                                         205000    1119.15

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
      1                 -1                                                -6.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        39        66        43         1         8        42        26         5
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  150

NC    0.050     0.050     0.035       0.1       0.3

QT        4     90000    155000    205000    250000

 Begin ADOT Channelization

              ***** Begin ADOT Channelization *****

X1    10035        12   10020.0   11105.0       0.0       0.0       0.0       0.0      1000         0
RC        4     90000   1112.21    155000   1116.42    205000   1119.15    250000   1120.10
GR    125.0     10000.     125.0     10010.    122.00    10020.    105.00    10056.    104.00    10340.
GR   100.00     10356.     97.20     10540.    100.00    10750.    105.00    10770.    105.00    11050.
GR    125.0     11105.     125.0     11150.

X1    10200        11   10025.0   11100.0     165.0     165.0     165.0       0.0      1000         0
GR   122.00     10000.    123.00     10025.    105.00    10065.    104.00    10355.    100.00    10365.
GR    98.10     10548.    100.00     10758.    105.00    10775.    105.00    11060.    123.00    11100.
GR   123.00     11150.

X1    10400        11   10035.0   11103.0     200.0     200.0     200.0       0.0      1000         0
GR   122.00     10000.    122.00     10035.    105.00    10070.    105.00    10353.    100.00    10385.
GR    98.10     10548.    100.00     10758.    105.00    10775.    105.00    11060.    123.00    11103.
GR   123.00     11140.

X1    10600        11   10025.0   11100.0     200.0     200.0     200.0       0.0      1000         0
GR   123.00     10000.    123.00     10025.    105.00    10068.    105.00    10362.    100.00    10392.
GR    98.50     10544.    100.00     10760.    105.00    10775.    106.00    11050.    124.00    11100.
GR   124.00     11130.

X1    10800        11   10030.0   11100.0     200.0     200.0     200.0       0.0      1000         0
GR   123.00     10000.    123.00     10030.    105.00    10067.    106.00    10380.    100.00    10400.
GR    99.00     10540.    101.00     10780.    106.00    10800.    107.00    11060.    124.00    11100.
GR   124.00     11145.

X1    11000        11   10022.0   11095.0     200.0     200.0     200.0       0.0      1000         0
GR   123.00     10000.    123.00     10022.    105.00    10065.    106.00    10392.    101.00    10418.
GR    99.50     10538.    101.00     10810.    106.00    10830.    107.00    11060.    124.00    11095.
GR   125.00     11195.
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X1	11200	12	10030.0	11100.0	200.0	200.0	200.0	0.0	1000	0
GR	123.00	10000.	123.00	10030.	106.00	10064.	106.00	10413.	100.00	10425.
GR	100.00	10538.	100.00	10815.	103.00	10821.	106.00	10875.	107.00	11055.
GR	126.00	11100.	126.00	11160.						
X1	11400	11	10030.0	11113.0	200.0	200.0	200.0	0.0	1000	0
GR	124.00	10000.	124.00	10030.	107.00	10064.	103.40	10405.	100.40	10411.
GR	100.40	10810.	103.40	10816.	108.00	10925.	108.00	11060.	126.00	11113.
GR	128.00	11195.								
X1	11600	12	10030.0	11122.0	200.0	200.0	200.0	0.0	1000	0
GR	124.00	10000.	124.00	10030.	108.00	10065.	103.90	10399.	100.90	10405.
GR	100.90	10805.	103.90	10811.	103.90	11060.	116.50	11080.	116.50	11089.
GR	127.50	11122.	127.50	11133.						
X1	11800	12	10035.0	11130.0	200.0	200.0	200.0	0.0	1000	0
GR	125.50	10000.	125.00	10035.	110.00	10075.	104.40	10386.	101.40	10392.
GR	101.40	10792.	104.40	10798.	104.40	11071.	116.90	11089.	116.90	11097.
GR	127.90	11130.	127.90	11141.						
X1	12000	12	10035.0	11130.0	200.0	200.0	200.0	0.0	1000	0
GR	127.60	10000.	127.00	10035.	110.00	10070.	104.80	10364.	101.80	10370.
GR	101.80	10770.	104.80	10776.	104.80	11070.	117.40	11089.	117.40	11097.
GR	128.40	11130.	128.40	11140.						
X1	12100	12	10035.0	11125.0	100.0	100.0	100.0	0.0	1000	0
GR	127.80	10000.	127.00	10035.	110.50	10070.	105.10	10347.	102.10	10353.
GR	102.10	10753.	105.10	10759.	105.10	11065.	117.60	11084.	117.60	11092.
GR	128.60	11125.	128.60	11136.						
X1	12200	12	10032.0	11123.0	100.0	100.0	100.0	0.0	1000	0
GR	128.00	10000.	126.00	10032.	110.00	10082.	105.30	10334.	102.30	10340.
GR	102.30	10740.	105.30	10746.	105.30	11063.	117.80	11082.	117.80	11090.
GR	128.80	11123.	128.80	11134.						
X1	12400	12	10047.0	11109.0	200.0	200.0	200.0	0.0	1000	0
GR	129.30	10000.	129.00	10047.	111.00	10085.	105.80	10308.	102.80	10314.
GR	102.80	10714.	105.80	10720.	105.80	11049.	118.20	11068.	118.20	11076.
GR	129.20	11109.	129.20	11119.						

X1	12600	14	10033.0	11097.0	200.0	200.0	200.0	0.0	1000	0
GR	130.00	10000.	130.00	10033.	118.60	10078.	118.60	10086.	106.20	10105.
GR	106.20	10281.	103.20	10287.	103.20	10687.	106.20	10693.	106.20	11038.
GR	118.60	11056.	118.60	11064.	129.60	11097.	129.60	11108.		
X1	12800	14	10055.0	11130.0	200.0	200.0	200.0	0.0	1000	0
GR	130.40	10000.	131.00	10055.	119.10	10108.	119.10	10116.	106.70	10135.
GR	106.70	10284.	103.70	10290.	103.70	10690.	106.70	10696.	106.70	11071.
GR	119.10	11089.	119.10	11097.	130.00	11130.	130.00	11141.		
X1	13000	14	10059.0	11115.0	200.0	200.0	200.0	0.0	1000	0
GR	132.00	10000.	131.00	10059.	119.40	10087.	119.40	10095.	107.20	10113.
GR	107.20	10244.	104.20	10250.	104.20	10650.	107.20	10656.	107.20	11055.
GR	119.50	11074.	119.50	11082.	130.50	11115.	130.50	11126.		
X1	13200	14	10040.0	11092.0	200.0	200.0	200.0	0.0	1000	0
GR	131.00	10000.	130.00	10040.	119.90	10064.	119.90	10072.	107.70	10090.
GR	107.70	10194.	104.70	10200.	104.70	10600.	107.70	10606.	107.70	11032.
GR	119.90	11051.	119.90	11059.	130.90	11092.	130.90	11102.		
X1	13400	14	10040.0	11092.0	200.0	200.0	200.0	0.0	1000	0
GR	131.00	10000.	130.00	10040.	120.30	10064.	120.30	10072.	108.10	10090.
GR	108.10	10172.	105.10	10178.	105.10	10578.	108.10	10584.	108.10	11032.
GR	120.30	11051.	120.30	11059.	131.30	11092.	131.30	11102.		
X1	13600	14	10042.0	11087.0	200.0	200.0	200.0	0.0	1000	0
GR	132.00	10000.	130.00	10042.	120.80	10067.	120.80	10075.	108.60	10093.
GR	108.60	10144.	105.60	10150.	105.60	10550.	108.60	10556.	108.60	11027.
GR	120.80	11046.	120.80	11054.	131.80	11087.	131.80	11097.		
X1	13800	14	10035.0	11081.0	200.0	200.0	200.0	0.0	1000	0
GR	132.50	10000.	130.00	10035.	121.20	10055.	121.20	10063.	109.10	10081.
GR	109.10	10114.	106.10	10120.	106.10	10520.	109.10	10526.	109.10	11022.
GR	121.20	11040.	121.20	11048.	132.20	11081.	132.20	11092.		
X1	14000	14	10033.0	11085.0	200.0	200.0	200.0	0.0	1000	0
GR	132.00	10000.	130.00	10033.	121.60	10049.	121.60	10057.	109.50	10075.
GR	109.50	10096.	106.50	10102.	106.50	10502.	109.50	10508.	109.50	11026.
GR	121.60	11044.	121.60	11052.	132.60	11085.	132.60	11096.		

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X1    14200        14    10011.0    11093.0      200.0      200.0      200.0        0.0       1000          0
GR   133.00     10000.     133.00     10011.     122.00     10044.     122.00     10052.     110.00     10070.
GR   110.00     10091.     107.00     10097.     107.00     10497.     110.00     10503.     110.00     11034.
GR   122.00     11052.     122.00     11060.     133.00     11093.     133.00     11104.

NC     0.0        0.0        0.0        0.3        0.5

  Grade Control Str. No. 2

              ***** Grade Control Str. No. 2 *****

X1    14400        13    10027.0    11093.0      200.0      200.0      200.0        0.0       1000          0
GR   133.50     10000.     133.50     10027.     133.50     10035.     110.50     10070.     110.50     10086.
GR   107.50     10092.     107.50     10492.     110.50     10498.     110.50     11034.     122.50     11052.
GR   122.50     11060.     133.50     11093.     133.50     11104.

NC   0.050      0.050      0.035        0.3        0.5

  SR 153 Bridge (D/S limit)

              ***** SR 153 Bridge (D/S limit) *****

X1    14665        10    10036.0    11068.0      265.0      265.0      265.0        0.0       1000          0
X3        0       0.0        0.0    10036.0      147.0    11068.0      147.0        0.0        0.0
GR   134.10     10000.     134.10     10036.     111.20     10070.     111.20     10092.     108.20     10098.
GR   108.20     10498.     111.20     10504.     111.20     11034.     134.10     11068.     134.10     11103.

  SR 153 Bridge (U/S limit)

              ***** SR 153 Bridge (U/S limit) *****

X1    14785        12    10011.0    11068.0      120.0      120.0      120.0        0.0       1000          0
GR   134.30     10000.     134.30     10011.     123.30     10044.     123.30     10052.     111.40     10070.
GR   111.40     10092.     108.40     10098.     108.40     10498.     111.40     10504.     111.40     11034.
GR   134.30     11068.     134.30     11103.

NC     0.0        0.0        0.0        0.1        0.3

X1    15000        14    10011.0    11091.0      215.0      215.0      215.0        0.0       1000          0
GR   134.70     10000.     134.70     10011.     123.70     10044.     123.70     10052.     111.90     10070.
GR   111.90     10091.     108.90     10097.     108.90     10497.     111.90     10503.     111.90     11033.
GR   123.70     11050.     123.70     11058.     134.70     11091.     134.70     11102.
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NC    0.050     0.050     0.035       0.1       0.3

X1    15200        14   10011.0   11091.0     200.0     200.0     200.0       0.0      1000         0
GR   135.20    10000.    135.20     10011.    124.20    10044.    124.20    10052.    112.40     10070.
GR   112.40    10091.    109.40     10097.    109.40    10497.    112.40    10503.    112.40     11033.
GR   124.20    11050.    124.20     11058.    135.20    11091.    135.20    11102.

X1    15400        12   10035.0   11091.0     200.0     200.0     200.0       0.0      1000         0
GR   135.60    10000.    135.60     10035.    112.80    10069.    112.80    10091.    109.80     10097.
GR   109.80    10497.    112.80     10503.    112.80    11033.    124.60    11051.    124.60     11059.
GR   135.60    11091.    135.60     11102.

NC    0.050     0.050     0.035       0.3       0.5

QT        4     92000    157000     210000    250000

  SR 143 Bridge (D/S limit)

              *****  SR 143 Bridge (D/S limit)  *****

X1    15586        12   10035.0   11091.0     186.0     186.0     186.0       0.0      1000         0
X3        0       0.0       0.0   10035.0     145.4   11091.0     145.4       0.0       0.0
GR   136.00    10000.    136.00     10035.    113.30    10069.    113.30    10091.    110.30     10097.
GR   110.30    10497.    113.30     10503.    113.30    11033.    125.00    11051.    125.00     11059.
GR   136.00    11091.    136.00     11102.

SB     1.05      1.56       2.6      200.0     963.0      48.0   26680.0       1.5   1110.50    1110.30

  SR 143 Bridge (U/S limit)

              *****  SR 143 Bridge (U/S limit)  *****

X1    15710        12   10011.0   11066.0     124.0     124.0     124.0       0.0      1000         0
X2      0.0       0.0         1    1137.0    1145.4       0.0         0      2.00       0.0
GR   136.10    10000.    136.20     10011.    125.20    10044.    125.20    10052.    113.60     10070.
GR   113.60    10091.    110.60     10097.    110.60    10497.    113.60    10503.    113.60     11032.
GR   136.20    11066.    136.20     11102.

NC      0.0       0.0       0.0       0.1       0.3

X1    16000        16   10011.0   11084.0     290.0     290.0     290.0       0.0      1000         0
GR   136.90    10000.    136.90     10011.    125.90    10044.    125.90    10052.    114.30     10078.
GR   114.30    10089.    111.30     10095.    111.30    10495.    114.30    10501.    114.30     11032.
GR   125.90    11050.    125.90     11058.    122.90    11062.    122.90    11063.    136.90     11084.
GR   136.90    11098.
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NC    0.035     0.035     0.035      0.1       0.3

X1    16200        15   10020.0   11096.0     200.0     200.0     200.0       0.0      1000         0
GR   137.30     10000.    137.30    10012.    137.30    10020.    114.70    10081.    114.70    10109.
GR   111.70     10115.    111.70    10515.    114.70    10521.    114.70    11043.    126.30    11061.
GR   126.30     11069.    123.30    11073.    123.30    11074.    137.30    11096.    137.30    11109.

X1    16400        16   10011.0   11083.0     200.0     200.0     200.0       0.0      1000         0
GR   137.70     10000.    137.70    10011.    126.70    10044.    126.70    10052.    115.20    10069.
GR   115.20     10102.    112.20    10108.    112.20    10508.    115.20    10514.    115.20    11031.
GR   126.70     11049.    126.70    11057.    123.70    11061.    123.70    11062.    138.30    11083.
GR   138.30     11098.

X1    16600        16   10011.0   11085.0     200.0     200.0     200.0       0.0      1000         0
GR   138.10     10000.    138.10    10011.    127.10    10043.    127.10    10051.    115.70    10069.
GR   115.70     10124.    112.70    10130.    112.70    10530.    115.70    10536.    115.70    11033.
GR   127.10     11050.    127.10    11058.    124.10    11063.    124.10    11064.    138.70    11085.
GR   138.70     11099.

X1    16800        16   10010.0   11087.0     200.0     200.0     200.0       0.0      1000         0
GR   138.60     10000.    138.60    10010.    127.60    10043.    127.60    10051.    116.20    10069.
GR   116.20     10157.    113.20    10163.    113.20    10563.    116.20    10569.    116.20    11035.
GR   127.60     11052.    127.60    11060.    124.60    11065.    124.60    11066.    139.20    11087.
GR   139.20     11101.

X1    17000        16   10011.0   11089.0     200.0     200.0     200.0       0.0      1000         0
GR   139.00     10000.    139.00    10011.    128.00    10044.    128.00    10052.    116.60    10069.
GR   116.60     10205.    113.60    10211.    113.60    10611.    116.60    10617.    116.60    11037.
GR   128.00     11054.    128.00    11062.    125.00    11067.    125.00    11068.    139.60    11089.
GR   139.60     11103.

X1    17200        16   10011.0   11089.0     200.0     200.0     200.0       0.0      1000         0
GR   139.40     10000.    139.40    10011.    128.40    10044.    128.40    10052.    117.10    10069.
GR   117.10     10263.    114.10    10269.    114.10    10669.    117.10    10675.    117.10    11037.
GR   128.40     11054.    128.40    11062.    125.40    11067.    125.40    11068.    140.00    11089.
GR   140.00     11103.

X1    17400        12   10010.0   11088.0     200.0     200.0     200.0       0.0      1000         0
GR   139.80     10000.    139.80    10010.    128.80    10043.    128.80    10051.    117.60    10068.
GR   117.60     10322.    114.60    10328.    114.60    10728.    117.60    10734.    117.60    11036.
GR   140.40     11088.    140.40    11102.
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X1   17600      12  10011.0  11070.0     200.0     200.0     200.0       0.0      1000         0
GR  140.30   10000.   140.30   10011.    129.30   10044.    129.30   10052.    118.00   10069.
GR  118.00   10382.   115.00   10388.    115.00   10788.    118.00   10794.    118.00   11035.
GR  140.90   11070.   140.90   11084.

X1   17800      12  10011.0  11067.0     200.0     200.0     200.0       0.0      1000         0
GR  140.70   10000.   140.70   10011.    129.70   10044.    129.70   10052.    118.50   10068.
GR  118.50   10431.   115.50   10437.    115.50   10837.    118.50   10843.    118.50   11033.
GR  141.30   11067.   141.30   11081.

X1   18000      12  10011.0  11065.0     200.0     200.0     200.0       0.0      1000         0
GR  141.00   10000.   141.00   10011.    130.10   10044.    130.10   10052.    119.00   10069.
GR  119.00   10485.   116.00   10491.    116.00   10891.    119.00   10897.    119.00   11031.
GR  141.70   11065.   141.70   11079.

X1   18200      12  10011.0  11061.0     200.0     200.0     200.0       0.0      1000         0
GR  141.50   10000.   141.50   10011.    130.50   10044.    130.50   10052.    119.50   10069.
GR  119.50   10528.   116.50   10534.    116.50   10934.    119.50   10940.    119.50   11027.
GR  142.10   11061.   142.10   11075.

X1   18400      10  10015.0  11080.0     200.0     200.0     200.0       0.0      1000         0
GR  142.00   10000.   142.00   10015.    119.90   10077.    119.90   10567.    116.90   10573.
GR  116.90   10973.   119.90   10979.    119.90   11032.    142.60   11080.    142.60   11090.

X1   18600      10  10018.0  11050.0     200.0     200.0     200.0       0.0      1000         0
GR  142.40   10000.   142.40   10018.    120.40   10067.    120.40   10576.    117.40   10582.
GR  117.40   10982.   120.40   10988.    120.40   11016.    143.00   11050.    143.00   11063.

X1   18800      12  10011.0  11046.0     200.0     200.0     200.0       0.0      1000         0
GR  142.80   10000.   142.80   10011.    131.80   10044.    131.80   10052.    120.90   10069.
GR  120.90   10587.   117.90   10593.    117.90   10993.    120.90   10999.    120.90   11012.
GR  143.40   11046.   143.40   11060.

X1   19000      12  10011.0  11039.0     200.0     200.0     200.0       0.0      1000         0
GR  143.20   10000.   143.20   10011.    132.20   10044.    132.20   10052.    121.30   10069.
GR  121.30   10586.   118.30   10592.    118.30   10992.    121.30   10998.    121.30   11005.
GR  143.80   11039.   143.80   11053.

X1   19200      12  10011.0  11031.0     200.0     200.0     200.0       0.0      1000         0
GR  143.70   10000.   143.70   10011.    132.70   10044.    132.70   10052.    121.80   10068.
GR  121.80   10574.   118.80   10580.    118.80   10980.    121.80   10986.    121.80   10998.
GR  144.30   11031.   144.30   11045.
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X1    19400        12   10011.0   11023.0     200.0     200.0     200.0       0.0      1000         0
GR   144.10     10000.    144.10    10011.    133.10    10044.    133.10    10052.    122.30     10068.
GR   122.30     10555.    119.30    10561.    119.30    10961.    122.30    10967.    122.30     10989.
GR   144.70     11023.    144.70    11037.

X1    19600        12   10011.0   11014.0     200.0     200.0     200.0       0.0      1000         0
GR   144.50     10000.    144.50    10011.    133.50    10044.    133.50    10052.    122.80     10068.
GR   122.80     10516.    119.80    10522.    119.80    10922.    122.80    10928.    122.80     10980.
GR   145.10     11014.    145.10    11028.

X1    19800        12   10011.0   11005.0     200.0     200.0     200.0       0.0      1000         0
GR   145.00     10000.    145.00    10011.    134.00    10044.    134.00    10052.    123.20     10068.
GR   123.20     10480.    120.20    10486.    120.20    10886.    123.20    10892.    123.20     10972.
GR   145.60     11005.    145.60    11019.

X1    20000        12   10010.0   10994.0     200.0     200.0     200.0       0.0      1000         0
GR   145.60     10000.    145.60    10010.    134.60    10043.    134.60    10051.    123.70     10068.
GR   123.70     10435.    120.70    10441.    120.70    10841.    123.70    10847.    123.70     10961.
GR   145.60     10994.    145.60    11008.

X1    20200        12   10011.0   10987.0     200.0     200.0     200.0       0.0      1000         0
GR   146.10     10000.    146.10    10011.    135.10    10044.    135.10    10052.    124.20     10068.
GR   124.20     10382.    121.20    10388.    121.20    10788.    124.20    10794.    124.20     10951.
GR   146.10     10987.    146.10    11000.

X1    20400        10   10020.0   10987.0     200.0     200.0     200.0       0.0      1000         0
GR   146.60     10000.    146.60    10020.    124.60    10066.    124.60    10325.    121.60     10331.
GR   121.60     10731.    124.60    10737.    124.60    10938.    146.60    10987.    146.60     11000.

X1    20600        12   10010.0   10965.0     200.0     200.0     200.0       0.0      1000         0
GR   147.10     10000.    147.10    10010.    136.10    10043.    136.10    10051.    125.10     10068.
GR   125.10     10276.    122.10    10282.    122.10    10682.    125.10    10688.    125.10     10932.
GR   147.10     10965.    147.10    10979.

X1    20782        14   10012.0   10988.0     178.0     178.0     178.0       0.0      1000         0
GR   147.67     10000.    147.67    10012.    136.66    10045.    136.66    10053.    125.56     10069.
GR   125.56     10230.    122.50    10236.    122.50    10636.    125.56    10642.    125.56     10931.
GR   136.66     10947.    136.66    10955.    147.67    10988.    147.67    10999.
```

Grade Control Str. No. 3

```
                 *****  Grade Control Str. No. 3  *****

X1    20800        14    10012.0    10988.0       18.0       18.0       18.0        0.0       1000          0
GR   147.70     10000.     147.70     10012.     136.69     10045.     136.69     10053.     125.59    10069.
GR   125.59     10230.     122.53     10236.     122.53     10636.     125.59     10642.     125.59    10931.
GR   136.69     10947.     136.69     10955.     147.70     10988.     147.70     10999.

X1    21000        10    10032.0    10964.0      200.0      200.0      200.0        0.0       1000          0
GR   148.20     10000.     148.20     10032.     125.94     10069.     125.94     10190.     122.86    10196.
GR   122.86     10596.     125.94     10602.     125.94     10931.     148.20     10964.     148.20    10999.

NC    0.050      0.050      0.035        0.3        0.5

  Priest Bridge (D/S)

                 *****  Priest Bridge (D/S)  *****

X1    21050        10    10032.0    10964.0       50.0       50.0       50.0        0.0       1000          0
X3       10       0.0        0.0        0.0        0.0        0.0        0.0      157.0      157.0
GR    148.3   10000.0      148.3    10032.0      126.2    10069.0      126.2    10190.0      123.2   10196.0
GR    123.2   10596.0      126.2    10602.0      126.2    10931.0      148.3    10964.0      148.8   10999.0

SB     1.05       1.56        2.6     1000.0      861.8       42.0    24080.0        1.5     1123.4    1123.2

  Priest Bridge (U/S)

                 *****  Priest Bridge (U/S)  *****

X1    21150        10    10032.0    10964.0      100.0      100.0      100.0        0.0       1000          0
X2      0.0       0.0          1     1150.0     1157.0        0.0          0        2.0        0.0
X3       10       0.0        0.0        0.0        0.0        0.0        0.0      157.0      157.0
GR    148.5   10000.0      148.5    10032.0      126.4    10069.0      126.4    10190.0      123.4   10196.0
GR    123.4   10596.0      126.4    10602.0      126.4    10931.0      148.5    10964.0      148.5   10999.0
```

Note: the following change in contraction/expansion coefficients was not in the original file, RSSRP1.hc2, provided to CH2M HILL. When the coefficients are left here as 0.3/0.5, then the CWSEL at GC #4 in RSSRP1 does not match the starting water surface elevation in the file RSSPR2 which begins at GC #4. To make the two runs compatible and since between Priest Ave. and GC #4 there are not any drastic changes in the cross-section, the coefficients were reduced to 0.1/0.3 as shown below. A result of this, though, is that the CWSEL's in this run from Priest to GC #4 will not match those in RSSRP1.

```
NC                                  .1        .3

X1   21200       10   10035.0   10965.0      50.0      50.0      50.0       0.0      1000         0
GR  148.90    10000.    148.90    10035.    126.20   10069.    126.20    10160.    123.19    10166.
GR  123.19    10566.    126.20    10572.    126.20   10931.    148.90    10965.    148.90    11000.

X1   21400       14   10011.0   10991.0     200.0     200.0     200.0       0.0      1000         0
GR  149.60    10000.    149.60    10011.    137.86   10045.    137.86    10053.    126.56    10070.
GR  126.56    10133.    123.52    10139.    123.52   10539.    126.56    10545.    126.56    10932.
GR  137.86    10949.    137.86    10957.    149.60   10991.    149.60    11002.

X1   21600       10   10013.0   11006.0     200.0     200.0     200.0       0.0      1000         0
GR  150.00    10000.    150.00    10013.    126.91   10078.    126.91    10119.    123.85    10125.
GR  123.85    10525.    126.91    10531.    126.91   10940.    150.50    11006.    150.50    11017.

X1   21800       14   10011.0   10991.0     200.0     200.0     200.0       0.0      1000         0
GR  150.50    10000.    150.50    10011.    138.47   10045.    138.47    10053.    127.17    10070.
GR  127.17    10101.    124.18    10107.    124.18   10507.    127.17    10513.    127.17    10932.
GR  138.47    10949.    138.47    10957.    150.50   10991.    150.50    11002.

X1   22000       14   10011.0   10991.0     200.0     200.0     200.0       0.0      1000         0
GR  151.00    10000.    151.00    10011.    138.82   10045.    138.82    10053.    127.52    10070.
GR  127.52    10104.    124.51    10110.    124.51   10510.    127.52    10516.    127.52    10932.
GR  138.82    10949.    138.82    10957.    151.00   10991.    151.00    11002.

X1   22200       14   10010.0   10990.0     200.0     200.0     200.0       0.0      1000         0
GR  151.40    10000.    151.40    10010.    139.08   10044.    139.08    10052.    127.88    10069.
GR  127.88    10123.    124.84    10129.    124.84   10529.    127.88    10535.    127.88    10931.
GR  139.08    10948.    139.08    10956.    151.40   10990.    151.40    11000.

X1   22400       14   10010.0   10990.0     200.0     200.0     200.0       0.0      1000         0
GR  151.90    10000.    151.90    10010.    139.44   10044.    139.44    10052.    128.24    10069.
GR  128.24    10160.    125.18    10166.    125.18   10566.    128.24    10572.    128.24    10931.
GR  139.44    10948.    139.44    10956.    151.90   10990.    151.90    11000.

X1   22600       14   10010.0   10990.0     200.0     200.0     200.0       0.0      1000         0
GR  152.30    10000.    152.30    10010.    139.69   10044.    139.69    10052.    128.49    10069.
GR  128.49    10205.    125.51    10211.    125.51   10611.    128.49    10617.    128.49    10931.
GR  139.69    10948.    139.69    10956.    152.30   10990.    152.30    11000.
```

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X1   22800      14  10010.0  10990.0    200.0    200.0    200.0      0.0     1000        0
GR  152.80   10000.   152.80  10010.   140.05  10044.   140.05  10052.   128.85  10069.
GR  128.85   10260.   125.84  10266.   125.84  10666.   128.85  10672.   128.85  10931.
GR  140.05   10948.   140.05  10956.   152.80  10990.   152.80  11000.

X1   23000      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  153.20   10000.   153.20  10011.   140.30  10045.   140.30  10053.   129.20  10069.
GR  129.20   10325.   126.70  10331.   126.70  10731.   129.20  10737.   129.20  10931.
GR  140.30   10947.   140.30  10955.   153.20  10989.   153.20  11000.

X1   23200      14  10010.0  10990.0    200.0    200.0    200.0      0.0     1000        0
GR  153.70   10000.   153.70  10010.   140.66  10044.   140.66  10052.   129.46  10069.
GR  129.46   10390.   126.50  10396.   126.50  10796.   129.46  10802.   129.46  10931.
GR  140.66   10948.   140.66  10956.   153.70  10990.   153.70  11000.

X1   23400      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  154.10   10000.   154.10  10011.   140.92  10045.   140.92  10053.   129.82  10069.
GR  129.82   10440.   126.83  10446.   126.83  10846.   129.82  10852.   129.82  10931.
GR  140.92   10947.   140.92  10955.   154.10  10989.   154.10  11000.

X1   23600      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  154.60   10000.   154.60  10011.   141.27  10045.   141.27  10053.   130.17  10069.
GR  130.17   10480.   127.16  10486.   127.16  10886.   130.17  10892.   130.17  10931.
GR  141.27   10947.   141.27  10955.   154.60  10989.   154.60  11000.

X1   23800      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  155.00   10000.   155.00  10011.   141.53  10045.   141.53  10053.   130.53  10069.
GR  130.53   10500.   127.46  10506.   127.46  10906.   130.53  10912.   130.53  10931.
GR  141.53   10947.   141.53  10955.   155.00  10989.   155.00  11000.

X1   24000      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  155.50   10000.   155.50  10011.   141.88  10045.   141.88  10053.   130.40  10069.
GR  130.40   10510.   127.82  10516.   127.82  10916.   130.40  10922.   130.40  10931.
GR  141.88   10947.   141.88  10955.   155.50  10989.   155.50  11000.

X1   24200      14  10011.0  10989.0    200.0    200.0    200.0      0.0     1000        0
GR  155.90   10000.   155.90  10011.   142.14  10045.   142.14  10053.   130.40  10069.
GR  130.40   10507.   128.15  10513.   128.15  10913.   130.40  10919.   130.40  10931.
GR  142.14   10947.   142.14  10955.   155.90  10989.   155.90  11000.
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1C/T4-PRINT

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X1    24400        10    10014.0    10981.0      200.0      200.0      200.0        0.0       1000          0
GR   156.40     10000.     156.40      10014.    130.40      10066.    130.40     10487.     128.48     10493.
GR   128.48     10893.     130.40      10899.    130.40      10928.    156.40     10981.     156.40     10994.

X1    24600        10    10010.0    11004.0      200.0      200.0      200.0        0.0       1000          0
GR   156.80     10000.     156.80      10010.    130.40      10076.    130.40     10465.     128.81     10471.
GR   128.81     10871.     130.40      10877.    130.40      10938.    156.80     11004.     156.80     11019.

X1    24617                                        17         17         17                   0.03

NC                          .025         .3        .5

  DOWNSTREAM DAM
  d.s. edge of apron

X1    24618         8     10050       10951         1          1          1
GR     1158     10000      1158       10050      1151      10050     1128.9      10083     1128.9      10918
GR     1151     10951      1158       10951      1158      11000

X1    24687                                        69         69         69                   0.1

  d.s. edge of foundation

X1    24688         8     10050       10951         1          1          1
GR     1160     10000      1160       10050      1151      10050      1132    10078.5      1132     10922.5
GR     1151     10951      1160       10951      1160      11000

X1    24700        26     10050       10951        12         12         12
GR     1160     10000      1160       10050      1151      10050      1132    10078.5      1132       10261
GR     1153   10271.5      1163     10271.5      1163    10277.5      1153    10277.5      1132       10288
GR     1132     10487      1153     10497.5      1163    10497.5      1163    10503.5      1153     10503.5
GR     1132     10514      1132       10713      1153    10723.5      1163    10723.5      1163     10729.5
GR     1153   10729.5      1132       10740      1132    10922.5      1151      10951      1160       10951
GR     1160     11000

X1    24733                                        33         33         33

NH        5      .045     10045        .025     10053       .035      10947       .025     10955        .045
NH    11000

X1    24744        14    10053.0    10947.0        11         11         11                999.91          0
X3              1132                 10053      1150      10947       1150
GR   157.30     10000.     157.30      10011.    143.11      10045.    143.11     10053.     130.40     10069.
GR   130.40     10410.     129.14      10416.    129.14      10816.    130.40     10822.     130.40     10931.
GR   143.11     10947.     143.11      10955.    157.30      10989.    157.30     11000.
```

```
NC                                        .1        .3

NH        5      .045     10045      .025     10053      .035     10947      .025     10955      .045
NH    11000

X1    24800                                     56        56        56                  .09
X3             1132                   10053     1150     10947      1150

  Here is the seam between the two FEMA runs RSSRP1.hc2 and RSSRP2.hc2.

  Grade Control Str. No. 4

NH        5      .045     557.5      .025     581.5      .035      1500      .025      1517      .045
NH     1563

               *****  Grade Control Str. No. 4  *****

X1      0.0       12     581.5   1500.00     155.0     155.0     155.0       0.0       0.0         0
X3             1132               581.5      1150   1500.00      1150
GR   1154.7    505.00   1154.60    520.00   1142.10    557.50   1141.86     581.5   1132.40    609.88
GR   1129.4   1022.00   1132.40    1454.7   1147.50   1500.00   1147.65   1515.00   1147.50   1517.00
GR   1157.7   1548.00   1157.85   1563.00

NH        5      .045     574.5      .025     598.5      .035      1500      .025      1568      .045
NH     1609

X1      2.0       13    598.50   1500.00     120.0     200.0     160.0       0.0       0.0         0
X3             1132               598.50      1150   1500.00      1150
GR   1154.9    522.00   1154.91    573.00   1142.40    574.50   1142.40    598.50   1132.53    626.94
GR   1129.6   1082.00   1132.61   1454.55   1147.83   1500.00   1147.83   1515.00   1145.83   1521.00
GR   1145.8   1568.00   1155.04   1594.00   1155.04   1609.00

NH        5      .045     587.5      .025     611.5      .035      1500      .025      1611      .045
NH     1654

X1      4.0       13    611.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
X3             1132               611.50      1150   1500.00      1150
GR   1155.4    535.00   1155.41    550.00   1142.90    587.50   1142.90    611.50   1132.74    640.63
GR   1129.8   1141.00   1132.82   1454.34   1148.17   1500.00   1148.32   1515.00   1146.17   1521.00
GR   1146.1   1611.00   1155.44   1639.00   1155.44   1654.00

NH        5      .045     597.5      .025     621.5      .035      1460      .025      1660      .045
NH     1701
```

```
X1      6.0        13    621.50   1460.00     200.0     200.0     200.0       0.0       0.0         0
X3              1132            621.50      1150   1460.00      1150
GR   1155.9    545.00   1155.91    560.00   1143.40    597.50   1143.40    621.50   1132.96    651.29
GR   1130.0   1190.00   1133.03   1413.59   1148.50   1460.00   1148.50   1515.00   1146.50   1521.00
GR   1146.5   1660.00   1155.83   1686.00   1155.83   1701.00

NH        5      .045     605.5      .025     629.5      .035      1500      .025   1701.83      .045
NH     1745

X1      8.0        13    629.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
X3              1132            629.50      1150   1500.00     1150.4
GR   1156.4    553.00   1156.41    568.00   1143.90    605.50   1143.66    629.50   1133.50    659.98
GR   1130.2   1225.00   1133.50   1454.01   1148.83   1500.00   1148.83   1515.00   1146.83   1521.00
GR   1147.7   1701.83   1156.22   1730.00   1156.22   1745.00

NH        5      .045     603.5      .025     627.5      .035      1500      .025      1748      .045
NH     1792

X1     10.0        13    627.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
X3              1132            627.50      1150   1500.00     1150.8
GR   1156.9    551.00   1156.91    566.00   1144.40    603.50   1144.40    627.50   1133.38    658.64
GR   1130.4   1247.00   1133.45   1453.86   1149.17   1500.00   1149.17   1515.00   1147.17   1521.00
GR   1148.3   1748.00   1156.63   1777.00   1156.63   1792.00

NH        5      .045     599.5      .025     623.5      .035      1500      .025      1796      .045
NH     1837

X1     12.0        13    623.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
X3              1132            623.50      1150   1500.00     1151.2
GR   1157.4    547.00   1157.41    562.00   1144.90    599.50   1144.90    623.50   1133.60    655.15
GR   1130.6   1255.00   1133.66   1453.65   1149.50   1500.00   1149.50   1515.00   1147.50   1521.00
GR   1148.8   1796.00   1157.04   1822.00   1157.04   1837.00

NH        5      .045     587.55     .025     611.43      .035      1500      .025   1830.74      .045
NH   1874.6

X1     14.0        13    611.43   1500.00     115.0     200.0     158.0       0.0       0.0         0
X3              1132            611.43      1150   1500.00     1151.6
GR   1157.6    535.31   1157.69    550.24   1145.19    587.55   1145.19    611.43   1133.72    643.13
GR   1130.8   1243.75   1133.86   1452.09   1149.83   1500.00   1149.83   1507.43   1147.83   1513.40
GR   1149.4   1830.74   1157.47   1859.66   1157.47    1874.6

NC                                     0.3       0.5

NH        5      .045     575.61     .025     599.49      .035      1420      .025   1886.52      .045
NH   1926.3
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X1      15.4        13     599.49   1420.00      85.0     160.0     122.0       0.0       0.0         0
X3             1132              599.49       1150   1420.00      1152
GR    1157.9    523.37    1157.90    538.30   1145.40    575.61   1145.40    599.49   1133.81    630.71
GR    1131.0    1233.8    1134.03   1371.79   1150.10   1420.00   1150.10   1515.00   1148.10   1521.00
GR    1149.9   1886.52    1157.79   1911.32   1157.79    1926.3

QT         4     93000     160000    215000    250000

SB      1.48      1.56       2.67    1388.0     816.0      72.0   29800.0      10.7   1131.58   1131.55

  SPRR bridge U/S

NH         5      .045     574.61      .025    598.49      .035      1420      .025   1886.52      .045
NH    1926.3

                 *****  SPRR bridge U/S  *****

X1      15.6        13     598.49   1420.00      15.0      20.0      18.0       0.0       0.0         0
X2       0.0       0.0          1    1161.0    1165.0       0.0         0       2.0       0.0
X3             1132              598.49       1150   1420.00      1152
GR    1158.9    522.38    1157.94    537.30   1145.44    574.61   1145.44    598.49   1133.83    629.75
GR    1131.0   1232.81    1134.05   1371.76   1150.13   1420.00   1150.13   1515.00   1148.13   1521.00
GR    1149.9   1886.52    1157.79   1911.40   1157.79    1926.3

NC                                      0.1       0.3

NH         5      .045     578.34      .025    602.29      .035      1500      .025      1790      .045
NH      2050

X1      17.3        13     602.29   1500.00     155.0     150.0     152.0       0.0       0.0         0
X3             1132              602.29       1150   1500.00      1152
GR    1158.3    525.95    1158.33    540.92   1145.83    578.34   1145.83    602.29   1133.99    634.21
GR    1131.2   1229.54    1134.21   1450.17   1150.38   1500.00   1150.38   1515.00   1148.57   1521.00
GR    1150.0   1790.00    1160.04   1880.00   1160.04   2050.00

  Old Ash Bridge alignment

NH         5      .045     578.42      .025     602.9      .035      1500      .025    1698.3      .045
NH    1741.3

                 *****  Old Ash Bridge alignment  *****

X1      19.0        13     602.90   1500.00     180.0     165.0     172.0       0.0       0.0         0
X3             1132              602.90       1150   1500.00      1152
GR    1158.9    526.47    1158.99    541.46   1146.49    578.42   1146.49    602.90   1134.19    636.64
GR    1131.3   1218.78    1134.38   1450.88   1150.66   1500.00   1150.66   1515.00   1148.66   1521.00
GR    1149.5   1698.30    1160.47   1726.27   1160.47    1741.3
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NH        5       .045     534.27       .025     557.48       .035      1500       .025   1658.02       .045
NH   1702.6

X1     21.5         13     557.48    1500.00       90.0      275.0     182.0        0.0       0.0          0
X3               1132               557.48       1150    1500.00      1152
GR   1159.4     483.50    1159.48     498.01    1146.98     534.27   1146.98     557.48   1134.28     590.08
GR   1131.6    1142.03    1134.67    1450.65    1151.12    1500.00   1151.12    1515.00   1149.12    1521.00
GR   1149.8    1658.02    1160.79    1688.10    1160.79    1702.60

NH        5       .045      453.8       .025     522.05       .035      1371       .025   1511.75       .045
NH     1556

X1     24.0         13     522.05    1371.00       50.0      230.0     140.0        0.0       0.0          0
X3               1132               522.05       1150    1371.00      1152
GR   1159.7     405.82    1159.76     419.53    1147.26     453.80   1147.26     522.05   1134.34     551.50
GR   1131.9    1031.91    1134.91    1327.70    1151.50    1371.00   1151.50    1386.00   1149.50    1392.00
GR   1150.1    1511.75    1160.90    1541.00    1160.90    1556.00
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Mill Avenue bridge

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NH        5       .045     450.15       .025       530       .035      1370       .025   1501.65       .045
NH     1545

                 *****  Mill Avenue bridge  *****

X1     24.6         13     530.00       1370      60.0       60.0      60.0        0.0       0.0          0
RC        7    40000.0    1141.84    93000.0    1147.51   135000.0   1151.04   160000.0   1152.84   215000.0
RC   1156.1   250000.0    1158.80   296000.0    1162.00
X2      0.0        0.0          0        0.0       0.0        0.0         0        0.0       0.0
X3               1132               530.00       1150       1370      1152
GR   1160.0     402.16    1160.09     415.87    1147.59     450.15   1147.59     530.00   1134.40     560.00
GR   1131.9    1021.85    1134.97    1327.65    1151.62    1370.00   1151.62    1385.00   1149.62    1391.00
GR   1150.1    1501.65    1161.06    1530.00    1161.06    1545.00

NC   0.035      0.035

NH        5       .045     492.66       .025     587.86       .035      1428       .025      1550       .045
NH   1594.6

X1     26.0         13     587.86    1428.00      230.0      140.0     185.0        0.0       0.0          0
X3               1132               587.86       1150    1428.00      1152
GR   1160.9     442.68    1160.90     456.96    1148.40     492.66   1148.40     587.86   1134.65     620.48
GR   1132.1    1024.35    1135.12    1382.59    1151.88    1428.00   1151.88    1442.28   1149.88    1447.99
GR   1150.3    1550.00    1161.16    1580.32    1161.16    1594.60
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SB      1.11       1.56       2.67     1040.0      760.0       85.0    30000.0        5.2    1132.12    1132.22

  Second Mill Avenue bridge

NH         5       .045     492.66       .025     587.86       .035       1428       .025       1550       .045
NH    1594.6

                 *****  Second Mill Avenue bridge  *****

X1     26.45         13     587.86    1428.00       45.0       45.0       45.0        0.0        0.0          0
X2       0.0        0.0          1    1172.51    1176.14        0.0          0        2.0        0.0
X3                                     587.86       1150    1428.00       1152
GR    1160.9     442.68    1160.90     456.96    1148.40     492.66    1148.40     587.86    1134.65     620.48
GR    1132.1    1024.35    1135.12    1382.59    1151.88    1428.00    1151.88    1442.28    1149.88    1447.99
GR    1150.3    1550.00    1161.22    1580.32    1161.22    1594.60

NH         5       .045     549.19       .025     648.59       .035       1491       .025    1601.21       .045
NH      1646

X1      27.0         13     648.59    1491.00      255.0       55.0      155.0        0.0        0.0          0
X3                                     648.59       1150    1491.00       1153
GR    1161.2     497.00    1161.22     511.91    1148.72     549.19    1148.72     648.59    1134.97     683.18
GR    1132.2    1034.75    1135.22    1443.40    1152.08    1491.00    1152.08    1505.91    1150.08    1511.87
GR    1150.5    1601.21    1161.29    1631.00    1161.29    1646.00

NH         5       .045      554.5       .025      654.5       .035       1500       .025       1598       .045
NH      1643

X1      28.0         13     654.50    1500.00      220.0      100.0      160.0        0.0        0.0          0
X3                                     654.50       1150    1500.00       1154
GR    1161.4     502.00    1161.44     517.00    1148.94     554.50    1148.94     654.50    1135.20     689.57
GR    1132.3     999.00    1135.33    1451.97    1152.27    1500.00    1152.27    1515.00    1150.27    1521.00
GR    1150.6    1598.00    1161.57    1628.00    1161.57    1643.00

NH         5       .045      557.5       .025      657.5       .035       1500       .025       1580       .045
NH      1625

X1      30.0         13     657.50     1500.0      200.0      200.0      200.0        0.0        0.0          0
X3                                     657.50       1150     1500.0       1153
GR    1161.6     505.00    1161.65     520.00    1149.15     557.50    1149.15     657.50    1135.42     692.39
GR    1132.5     952.00    1135.54    1451.64    1152.65    1500.00    1152.65    1515.00    1150.65    1521.00
GR    1150.9    1580.00    1161.84    1610.00    1161.84    1625.00

NH         5       .045      566.5       .025     658.06       .035       1500       .025       1580       .045
NH    1634.6
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X1     32.0        11    658.06    1500.0     200.0     200.0     200.0       0.0       0.0         0
X3                          658.06      1150    1500.0      1152
GR   1161.8    514.00   1161.86    529.00   1149.37    566.50   1149.37    658.06   1135.63    692.98
GR   1132.7    920.00   1135.75   1462.92   1148.11   1500.00   1148.91   1580.00   1162.11   1619.60
GR   1162.1   1634.60

NH        5      .045     581.5      .025    656.17      .035      1500      .025      1580      .045
NH   1634.6

X1     34.0        11    656.17   1500.00     200.0     200.0     200.0       0.0       0.0         0
X3                          656.17      1150   1500.00      1152
GR   1162.0    529.00   1162.07    544.00   1149.57    581.50   1149.57    656.17   1135.85    691.45
GR   1132.9    902.00   1135.96   1466.01   1148.32   1500.00   1149.12   1580.00   1162.32   1619.60
GR   1162.3   1634.60

NH        5      .045     609.5      .025    658.78      .035      1500      .025      1580      .045
NH   1634.6

X1     36.0        11    658.78   1500.00     230.0     200.0     215.0       0.0       0.0         0
X3                          658.78      1150   1500.00      1152
GR   1162.3    557.00   1162.31    572.00   1149.81    609.50   1149.81    658.78   1136.09    699.94
GR   1133.1    894.00   1136.17   1462.89   1148.54   1500.00   1149.34   1580.00   1162.53   1619.57
GR   1162.5    1634.6

NH        5      .045    619.27      .025    661.39      .035      1500      .025      1580      .045
NH   1634.6

X1     38.0        11    661.39   1500.00     260.0     200.0     230.0       0.0       0.0         0
X3                          661.39      1150   1500.00      1152
GR   1162.5    568.00   1162.58    583.00   1150.49    619.27   1150.08    661.39   1136.37    697.57
GR   1133.3    892.00   1136.37   1462.86   1148.75   1500.00   1149.55   1580.00   1162.74   1619.57
GR   1162.7    1634.6

NH        5      .045    647.78      .025    671.78      .035      1500      .025      1580      .045
NH   1654.6

X1     40.0        11    671.78   1500.00     260.0     200.0     230.0       0.0       0.0         0
X3                          671.78      1151   1500.00      1152
GR   1162.8    596.00   1162.85    611.00   1150.59    647.78   1150.35    671.78   1136.65    712.88
GR   1133.5    895.00   1136.58   1462.86   1148.96   1500.00   1149.76   1580.00   1162.95   1639.57
GR   1162.9    1654.6

NH        5      .045    649.78      .025    673.78      .035      1500      .025      1580      .045
NH   1636.8
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X1     42.0        11     673.78    1500.00      260.0      200.0      230.0        0.0        0.0          0
X3                           673.78     1151.3    1500.00       1152
GR   1163.1    598.00    1163.12     613.00    1150.86     649.78    1150.62     673.78    1136.93     714.85
GR   1133.7    900.00    1136.79    1462.83    1149.18    1500.00    1149.24    1580.00    1163.16    1621.76
GR   1163.1    1636.8

NH        5      .045     666.78       .025     690.78       .035       1500       .025       1580       .045
NH   1634.5

X1     44.0        11     690.78    1500.00      260.0      200.0      230.0        0.0        0.0          0
X3                           690.78     1151.6    1500.00     1151.6
GR   1163.3    615.00    1163.39     630.00    1151.13     666.78    1150.89     690.78    1137.20     731.85
GR   1134.0    908.00    1137.00    1462.83    1149.39    1500.00    1150.19    1580.00    1163.37    1619.54
GR   1163.3    1634.5

NH        5      .045     665.78       .025     689.78       .035       1500       .025       1580       .045
NH   1634.5

X1     46.0        11     689.78    1500.00      260.0      200.0      230.0        0.0        0.0          0
X3                           689.78       1152    1500.00     1151.2
GR   1163.6    614.00    1163.66     629.00    1151.40     665.78    1151.16     689.78    1137.48     730.82
GR   1134.2    919.00    1137.21    1462.83    1149.60    1500.00    1150.40    1580.00    1163.58    1619.54
GR   1163.5    1634.5

NH        5      .045     658.78       .025     682.78       .035       1500       .025       1580       .045
NH   1634.5

X1     48.0        11     682.78    1500.00      260.0      200.0      230.0        0.0        0.0          0
X3                           682.78       1152    1500.00     1150.8
GR   1163.9    607.00    1163.93     622.00    1151.67     658.78    1151.43     682.78    1137.76     723.79
GR   1134.4    931.00    1137.42    1462.80    1149.82    1500.00    1150.62    1580.00    1163.79    1619.51
GR   1163.7    1634.5

NH        5      .045     646.78       .025     670.78       .035       1500       .025       1580       .045
NH   1634.5

X1     50.0        11     670.78    1500.00      210.0      200.0      205.0        0.0        0.0          0
X3                           670.78     1151.8    1500.00     1150.4
GR   1164.1    595.00    1164.15     610.00    1151.89     646.78    1151.65     670.78    1137.99     711.76
GR   1134.6    951.00    1137.63    1462.80    1150.03    1500.00    1150.83    1580.00    1164.00    1619.51
GR   1164.0    1634.5

NH        5      .045     637.78       .025     661.78       .035       1500       .025       1580       .045
NH   1634.5
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X1     52.0        11     661.78    1500.00       175.0      200.0      188.0       0.0       0.0         0
X3                                   661.78      1151.6    1500.00     1150.0
GR   1164.3    586.00    1164.33     601.00     1152.07     637.78    1151.83     661.78   1138.17    702.76
GR   1134.8    981.00    1137.84    1462.80     1150.24    1500.00    1151.04    1580.00   1164.21   1619.51
GR   1164.2    1634.5

NH        5      .045     630.78       .025      654.78       .035       1500       .025      1580      .045
NH   1634.5

X1     54.0        11     654.78    1500.00       160.0      200.0      180.0       0.0       0.0         0
X3                                   654.78      1151.4    1500.00      1150
GR   1164.5    579.00    1164.50     594.00     1152.24     630.78    1152.00     654.78   1138.34    695.76
GR   1135.0   1020.00    1138.05    1467.87     1150.46    1500.00    1151.26    1580.00   1164.42   1619.48
GR   1164.4    1634.5

NH        5      .045     621.78       .025      645.78       .035       1500       .025      1580      .045
NH   1634.5

X1     56.0        11     645.78    1500.00       160.0      200.0      180.0       0.0       0.0         0
X3                                   645.78      1151.2    1500.00      1150
GR   1164.6    570.00    1164.67     585.00     1152.41     621.78    1152.17     645.78   1138.52    686.73
GR   1135.2   1065.00    1138.26    1462.77     1150.67    1500.00    1151.47    1580.00   1164.63   1619.48
GR   1164.6    1634.5

NH        5      .045     614.78       .025      638.78       .035       1500       .025      1580      .045
NH   1634.5

X1     58.0        11     638.78    1500.00       165.0      200.0      182.0       0.0       0.0         0
X3                                   638.78      1151.0    1500.00     1150.3
GR   1164.8    563.00    1164.84     578.00     1152.58     614.78    1152.34     638.78   1138.69    679.73
GR   1135.4   1121.00    1138.47    1462.77     1150.88    1500.00    1151.68    1580.00   1164.84   1619.48
GR   1164.8    1634.5

NH        5      .045     605.78       .025      629.78       .035       1500       .025      1580      .045
NH   1634.5

X1     60.0        11     629.78    1500.00       170.0      200.0      185.0       0.0       0.0         0
X3                                   629.78      1151.0    1500.00     1150.6
GR   1165.0    554.00    1165.01     569.00     1152.75     605.78    1152.51     629.78   1138.87    670.70
GR   1135.6   1180.00    1138.68    1462.77     1151.09    1500.00    1151.89    1580.00   1165.05   1619.48
GR   1165.0    1634.5

NH        5      .045     596.78       .025      620.78       .035       1500       .025      1580      .045
NH   1634.5
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X1     62.0        11     620.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                           620.78    1151.5   1500.00      1151
GR   1165.1    545.00    1165.18    560.00   1152.92     596.78   1152.68    620.78   1139.04    661.70
GR   1135.8   1230.00    1138.89   1462.74   1151.31   1500.00   1152.11   1580.00   1165.26   1619.45
GR   1165.2    1634.5

NH       5      .045     588.78      .025    612.78      .035      1500      .025      1580      .045
NH   1634.5

X1     64.0        11     612.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                           612.78      1152   1500.00    1151.3
GR   1165.3    537.00    1165.34    552.00   1153.08     588.78   1152.84    612.78   1139.22    647.88
GR   1136.0   1270.00    1139.09   1462.71   1151.52   1500.00   1152.32   1580.00   1165.47   1619.45
GR   1165.4    1634.5

NH       5      .045     580.78      .025    604.78      .035      1500      .025      1580      .045
NH   1633.9

X1     66.0        11     604.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                           604.78    1152.5   1500.00    1151.6
GR   1165.5    529.00    1165.51    544.00   1153.25     580.78   1153.01    604.78   1139.39    645.64
GR   1136.3   1300.00    1139.30   1462.71   1151.73   1500.00   1152.53   1580.00   1165.51   1618.94
GR   1165.5    1633.9

NH       5      .045     573.78      .025    597.78      .035      1500      .025      1580      .045
NH   1634.4

X1     68.0        11     597.78   1500.00     170.0     200.0     185.0       0.0       0.0         0
X3                           597.78      1153   1500.00      1152
GR   1165.6    522.00    1165.69    537.00   1153.43     573.78   1153.19    597.78   1139.57    638.64
GR   1136.5   1318.00    1139.51   1462.68   1151.95   1500.00   1152.75   1580.00   1165.89   1619.42
GR   1165.8    1634.4

NH       5      .045     566.78      .025    590.78      .035      1500      .025      1580      .045
NH   1634.4

X1     69.3        11     590.78   1500.00      85.0     130.0     108.0       0.0       0.0         0
X3       10                 590.78    1153.2   1500.00      1152                                   0.0
GR   1165.7    515.00    1165.78    530.00   1153.52     566.78   1153.28    590.78   1139.66    631.64
GR   1136.6   1322.00    1139.65   1462.68   1152.09   1500.00   1152.89   1580.00   1166.03   1619.42
GR   1166.0    1634.4

SB     1.05      1.56       2.63       0.0     831.0      54.0   34820.0       5.0   1136.75   1136.65
  Rural Road bridge

NH       5      .045     565.78      .025    589.78      .035      1500      .025      1580      .045
NH   1634.4
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***** Rural Road bridge *****

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X1     70.3       21     589.78   1500.00      85.0     100.0      92.0       0.0       0.0         0
X2      0.0      0.0          1   1172.28   1176.98       0.0         0       2.0       0.0
X3                                589.78    1153.4   1500.00      1152
BT      -12   514.00   1176.98   1165.86    524.00   1177.02   1169.35    645.00   1178.49   1170.82
BT            766.00   1179.49   1171.79    887.00   1179.95   1172.28   1008.00   1179.95   1172.28
BT           1129.00   1179.46   1171.79   1250.00   1178.49   1170.82   1371.00   1177.02   1169.35
BT           1492.00   1175.07   1167.40   1612.00   1172.65   1164.98   1619.42   1172.50   1166.13
GR    1165.8   514.00   1165.78    524.00   1165.86    529.00   1153.60    565.78   1153.36    589.78
GR    1139.7   630.61   1139.69    645.00   1139.17    766.00   1138.64    887.00   1138.12   1008.00
GR    1137.6  1129.00   1137.07   1250.00   1136.75   1325.00   1137.76   1371.00   1139.75   1462.68
GR    1149.5  1492.00   1152.19   1500.00   1152.99   1580.00   1163.66   1612.00   1166.13   1619.42
GR    1166.1   1634.4

NH         5     .045    557.78      .025    581.78      .035      1500      .025      1549      .045
NH    1604.4

X1      72.0       11     581.78   1500.00     150.0     170.0     160.0       0.0       0.0         0
X3                                581.78    1153.6   1500.00      1152
GR    1166.0   506.00   1166.03    521.00   1153.77    557.78   1153.53    581.78   1139.91    622.64
GR    1136.9  1321.00   1139.93   1462.68   1152.37   1500.00   1152.86   1549.00   1166.31   1589.35
GR    1166.3   1604.4

NH         5     .045    547.78      .025    571.78      .035      1500      .025      1524      .045
NH    1580.1

X1      74.0       11     571.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                571.78    1153.8   1500.00    1152.5
GR    1166.2   496.00   1166.26    511.00   1154.00    547.78   1153.76    571.78   1140.12    612.70
GR    1137.1  1315.00   1140.14   1462.65   1152.59   1500.00   1152.83   1524.00   1166.52   1565.07
GR    1166.5   1580.1

NH         5     .045    532.78      .025    556.78      .035      1500      .025      1524      .045
NH    1580.1

X1      76.0       11     556.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                556.78      1154   1500.00      1153
GR    1166.4   481.00   1166.49    496.00   1154.23    532.78   1153.99    556.78   1140.33    597.76
GR    1137.3  1279.00   1140.35   1462.65   1152.80   1500.00   1153.04   1524.00   1166.73   1565.07
GR    1166.7   1580.1

NH         5     .045    508.75      .025    532.75      .035      1500      .025      1524      .045
NH    1580.1

X1      78.0       11     532.75   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                532.75    1154.2   1500.00    1153.5
GR    1166.7   457.00   1166.71    472.00   1154.46    508.75   1154.22    532.75   1140.54    573.79
GR    1137.5  1241.00   1140.56   1462.65   1153.01   1500.00   1153.25   1524.00   1166.94   1565.07
GR    1166.9   1580.1
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NH        5      .045    482.78      .025    506.78      .035      1500      .025      1524      .045
NH   1580.0

X1     80.0        11    506.78   1500.00     165.0     200.0     182.0       0.0       0.0         0
X3                                 506.78    1154.4   1500.00      1154
GR   1166.9    431.00   1166.95    446.00   1154.69    482.78   1154.45    506.78   1140.76    547.85
GR   1137.7   1194.00   1140.77   1462.62   1153.23   1500.00   1153.47   1524.00   1167.15   1565.04
GR   1167.1    1580.0

NH        5      .045    447.78      .025    471.78      .035      1500      .025      1524      .045
NH   1580.0

X1     82.0        11    471.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                 471.78    1154.6   1500.00    1154.5
GR   1167.1    396.00   1167.18    411.00   1154.92    447.78   1154.68    471.78   1140.97    512.91
GR   1137.9   1136.00   1140.98   1462.62   1153.44   1500.00   1153.68   1524.00   1167.36   1565.04
GR   1167.3    1580.0

NH        5      .045    411.78      .025    435.78      .035      1500      .025      1524      .045
NH   1580.0

X1     84.0        11    435.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                 435.78    1154.8   1500.00      1155
GR   1167.4    360.00   1167.41    375.00   1155.15    411.78   1154.91    435.78   1141.19    476.94
GR   1138.1   1088.00   1141.19   1462.62   1153.65   1500.00   1153.89   1524.00   1167.57   1565.04
GR   1167.5    1580.0

NH        5      .045    364.78      .025    388.78      .035      1500      .025      1524      .045
NH   1580.0

X1     86.0        11    388.78   1500.00     165.0     200.0     182.0       0.0       0.0         0
X3                                 388.78      1155   1500.00    1154.5
GR   1167.6    313.00   1167.64    328.00   1155.38    364.78   1155.14    388.78   1141.39    430.03
GR   1138.4   1040.00   1141.40   1462.59   1153.87   1500.00   1154.11   1524.00   1167.78   1565.01
GR   1167.7    1580.0

NH        5      .045    298.78      .025    322.78      .035      1500      .025      1524      .045
NH   1580.0

X1     88.0        11    322.78   1500.00     160.0     200.0     180.0       0.0       0.0         0
X3                                 322.78      1155   1500.00      1154
GR   1167.8    247.00   1167.87    262.00   1155.61    298.78   1155.37    322.78   1141.60    364.09
GR   1138.6   1008.00   1141.60   1462.56   1154.08   1500.00   1154.32   1524.00   1167.99   1565.01
GR   1167.9    1580.0
```

```
NH        5      .045       241      .025    265.78      .035      1500      .025      1524      .045
NH   1576.0

X1     90.0        12    265.78   1500.00     155.0     200.0     178.0       0.0       0.0         0
X3                         265.78      1155   1500.00      1154
GR   1168.0    190.00   1168.07    205.00   1155.81    241.00   1155.57    265.78   1149.50    284.00
GR   1141.8    307.09   1138.81    980.00   1141.81   1462.56   1154.29   1500.00   1154.53   1524.00
GR   1168.2   1561.01   1168.20    1576.0

NH        5      .045     191.78      .025    215.78      .035      1500      .025      1524      .045
NH   1577.0

X1     92.0        11    215.78   1500.00     155.0     200.0     178.0       0.0       0.0         0
X3                         215.78      1155   1500.00      1154
GR   1168.2    140.00   1168.24    155.00   1155.98    191.78   1157.74    215.78   1142.01    262.97
GR   1139.0    960.00   1142.02   1459.53   1155.51   1500.00   1155.75   1524.00   1168.41   1561.98
GR   1168.4    1577.0

NH        5      .045     144.75      .025    168.75      .035      1500      .025      1524      .045
NH   1576.1

X1     94.0        12    168.75   1500.00     155.0     200.0     178.0       0.0       0.0         0
X3                         168.75      1155   1500.00      1154
GR   1168.4     93.00   1168.41    108.00   1156.16    144.75   1155.92    168.75   1142.21    185.88
GR   1141.9    282.00   1139.23    948.00   1142.23   1471.62   1154.72   1500.00   1154.96   1524.00
GR   1168.6   1561.05   1168.62    1576.1

NH        5      .045      84.75      .025       150      .035      1500      .025      1524      .045
NH   1580.0

X1     96.0        12    150.00   1500.00     225.0     200.0     212.0       0.0       0.0         0
X3                         150.00      1155   1500.00     1154.5
GR   1168.6     33.00   1168.66     48.00   1156.41     84.75   1156.17    150.00   1142.51    190.98
GR   1142.1    319.00   1139.44    939.00   1142.44   1462.53   1154.93   1500.00   1155.17   1524.00
GR   1168.8   1564.98   1168.83    1580.0

NH        3      .035      1500      .025      1524      .045    1580.0

X1     98.0         9     20.00   1500.00     290.0     200.0     245.0       0.0       0.0         0
X3                                         1500.00      1155
GR   1156.4     20.00   1142.89     60.80   1141.79    353.00   1139.65    920.00   1142.65   1462.50
GR   1155.1   1500.00   1155.39   1524.00   1169.04   1564.95   1169.04    1580.0
```

```
NH        3      .035      1500      .025      1524      .045    1580.0

X1    100.0         7    350.00   1500.00     310.0     200.0     255.0       0.0       0.0         0
X3                                                    1500.00    1155.5
GR   1142.5    350.00   1139.86    885.00   1142.86   1462.50   1155.36   1500.00   1155.60   1524.00
GR   1169.2   1564.95   1169.25    1580.0
```

Section 102 was used as the downstream edge of the apron. This is the first cross-section upstream of the confluence with the Indian Bend Wash and is very close to the location of the apron which is also right next to the confluence.

```
NH        5      .045    460.41      .025    484.41      .035      1500      .025      1524      .045
NH   1580.0

X1    102.0        11    484.41   1500.00     370.0     200.0     285.0       0.0       0.0         0
X3                                 484.41      1155   1500.00      1156
GR   1169.4    407.91   1169.42    422.91   1156.92    460.41   1156.68    484.41   1143.15    525.00
GR   1140.0    853.00   1143.07   1462.50   1155.57   1500.00   1155.81   1524.00   1169.46   1564.95
GR   1169.4    1580.0
```

UPSTREAM DAM
d.s.edge of apron

```
NC     .045      .045      .025        .3        .5

X1   103.00        12       510      1474         1         1         1
GR   1169.4    407.91   1169.42    422.91      1165       500      1165       510      1157       510
GR     1142     532.5     1142    1451.5      1157      1474      1165      1474      1165      1484
GR   1169.5   1564.95    1169.4   1579.95
```

d.s. edge of piers

```
X1   103.22                                     22        22        22

X1   103.28        30       510      1474         6         6         6
GR   1169.4    407.91   1169.42    422.91      1165       500      1165       510      1157       510
GR     1142     532.5     1142     741.5      1154     747.5      1166     747.5      1166     753.5
GR     1154     753.5     1142     759.5      1142       983      1154       989      1166       989
GR     1166       995     1154       995      1142      1001      1142    1224.5      1154    1230.5
GR     1166    1230.5     1166    1236.5      1154    1236.5      1142    1242.5      1142    1451.5
GR     1157      1474     1165      1474      1165      1484    1169.5    1564.9    1169.4    1579.9
```

```
X1   103.46                                  18        18        18

X1   103.52        12       510      1474     6         6         6
GR   1169.4    407.91   1169.42    422.91  1165       500      1165       510      1157       510
GR     1142     532.5     1142    1451.5  1157      1474      1165      1474      1165      1484
GR   1169.5   1564.95    1169.4   1579.95

  u.s. edge of apron

X1   103.80                                  28        28        28

NC     .035      .035      .035        .1    .3

X1   103.81        11   484.41   1500.00     1         1         1                .07
GR   1169.4    407.91   1169.42    422.91 1156.92    460.41   1156.68    484.41   1143.15    525.00
GR   1140.0    853.00   1143.07   1462.50 1155.57   1500.00   1155.81   1524.00   1169.46   1564.95
GR   1169.4   1579.95

X1    104.0        11   535.50   1500.00    178       118       148
GR   1169.6    459.00   1169.62    474.00 1157.12    511.50   1156.88    535.50   1143.15    576.69
GR   1140.2    828.00   1143.28   1462.47 1155.79   1500.00   1156.03   1524.00   1169.67   1564.92
GR   1169.6   1579.92

X1    106.0        11   531.50   1500.00   250.0     200.0     225.0       0.0       0.0         0
GR   1169.8    455.00   1169.87    470.00 1157.37    507.50   1157.13    531.50   1143.40    572.69
GR   1140.4    810.00   1143.49   1462.47 1156.00   1500.00   1156.14   1514.40   1169.88   1555.62
GR   1169.8   1570.62

X1    108.0        10   473.50   1500.00   250.0     200.0     225.0       0.0       0.0         0
GR   1170.1    397.00   1170.12    412.00 1157.62    449.50   1157.38    473.50   1143.65    514.69
GR   1140.7    795.00   1143.70   1462.02 1156.36   1500.00   1170.09   1541.19   1170.09   1556.19

X1    110.0         9   590.50   1500.00   255.0     200.0     228.0       0.0       0.0         0
GR   1170.3    514.00   1170.37    529.00 1157.87    566.50   1157.63    590.50   1143.91    631.66
GR   1140.9    790.00   1143.91   1420.83 1170.30   1500.00   1170.30   1515.00

X1    112.0         9   606.50   1500.00   225.0     200.0     212.0       0.0       0.0         0
GR   1170.6    530.00   1170.60    545.00 1158.10    582.50   1157.86    606.50   1144.13    647.69
GR   1141.1    790.00   1144.12   1420.83 1170.51   1500.00   1170.51   1515.00
```

```
X1    114.0        9    584.50   1500.00     200.0     200.0     200.0       0.0       0.0         0
GR   1170.8   508.00   1170.80    523.00   1158.30    560.50   1158.06    584.50   1144.33    625.69
GR   1141.3   800.00   1144.32   1420.77   1170.73   1500.00   1170.73   1515.00

X1    116.0        9    529.50   1500.00     205.0     200.0     202.0       0.0       0.0         0
GR   1171.0   453.00   1171.00    468.00   1158.50    505.50   1158.26    529.50   1144.54    570.66
GR   1141.5   820.00   1144.53   1420.77   1170.94   1500.00   1170.94   1515.00

X1    118.0        9    474.50   1500.00     210.0     200.0     205.0       0.0       0.0         0
GR   1171.2   398.00   1171.21    413.00   1158.71    450.50   1158.47    474.50   1144.75    515.66
GR   1141.7   854.00   1144.74   1420.77   1171.15   1500.00   1171.15   1515.00

X1    119.8        9    446.50   1500.00     180.0     200.0     190.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.3   370.00   1171.39    385.00   1158.89    422.50   1158.65    446.50   1144.95    487.60
GR   1141.9   525.00   1144.95   1420.74   1171.37   1500.00   1171.37   1515.00

X1   120.42        9    446.22   1485.00      57.0      42.0      50.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.4   370.00   1171.45    385.00   1158.95    422.50   1158.71    446.22   1144.98    487.69
GR   1142.0   926.50   1145.00   1405.77   1171.41   1485.00   1171.41   1500.00
  Grade Control Str. No. 5

              ***** Grade Control Str. No. 5 *****
X1    120.5        9    443.50   1485.00       8.0       8.0       8.0       0.0       0.0         0
GR   1171.4   367.00   1171.46    382.00   1158.96    419.50   1158.72    443.50   1150.00    469.66
GR   1147.0   926.50   1150.00   1420.74   1171.42   1485.00   1171.42   1500.00

X1    122.0        9    441.50   1460.00     155.0     150.0     152.0       0.0       0.0         0
GR   1171.6   365.00   1171.61    380.00   1159.11    417.50   1158.87    441.50   1150.16    467.63
GR   1147.1   941.00   1150.15   1395.71   1171.58   1460.00   1171.58   1475.00

X1   122.65        9    441.50   1460.00      65.0      65.0      65.0       0.0       0.0         0
X3       10      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
GR   1171.6   365.00   1171.68    380.00   1159.18    417.50   1158.94    441.50   1150.22    490.27
GR   1147.2   952.00   1150.22   1395.71   1171.65   1460.00   1171.65   1475.00

SB    1.05     1.56      2.63       0.0     798.0      66.0   24246.0       6.3   1147.31   1147.22
  McClintock Drive Bridge
```

***** McClintock Drive Bridge *****

X1	123.55	20	441.5	1460.00	90.0	90.0	90.0	0.0	0.0	0
X2	0.0	0.0	1	1180.61	1181.8	0.0	0	2.0	0.0	
X3	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BT	-11	316.00	1181.80	1174.13	436.00	1184.23	1176.56	554.00	1185.93	1178.26
BT		672.00	1187.37	1179.70	790.00	1188.15	1180.48	908.00	1188.28	1180.61
BT		1026.00	1188.15	1180.48	1144.00	1187.37	1179.70	1262.00	1185.93	1178.26
BT		1380.00	1184.23	1176.56	1500.00	1181.80	1174.13			
GR	1174.1	316.00	1171.77	371.00	1171.77	386.00	1159.27	423.50	1159.10	436.00
GR	1159.0	441.50	1150.31	500.09	1149.97	554.00	1149.22	672.00	1148.48	790.00
GR	1147.7	908.00	1147.31	975.00	1147.64	1026.00	1148.42	1144.00	1149.19	1262.00
GR	1149.9	1380.00	1150.31	1433.31	1171.75	1460.00	1171.75	1475.00	1174.13	1500.00
X1	124.0	9	436.50	1465.00	45.0	45.0	45.0	0.0	0.0	0
GR	1171.8	360.00	1171.81	375.00	1159.31	412.50	1159.07	436.50	1150.36	464.22
GR	1147.3	983.00	1150.35	1400.68	1171.79	1465.00	1171.79	1480.00		
X1	126.0	10	415.00	1500.00	200.0	200.0	200.0	0.0	0.0	0
X3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	1170.0	240.00	1168.00	272.00	1166.00	317.00	1164.00	348.00	1162.00	388.00
GR	1159.2	415.00	1150.56	441.13	1147.55	985.00	1150.55	1435.62	1172.01	1500.00
X1	128.0	8	402.00	1500.00	200.0	200.0	200.0	0.0	0.0	0
X3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	1172.0	242.00	1166.00	280.00	1164.00	377.00	1159.47	402.00	1150.76	428.13
GR	1147.7	1017.00	1150.75	1359.75	1170.00	1500.00				

1C/L4PRINT

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

*PROF 1


CCHV=    0.100 CEHV=    0.300
*SECNO 10035.000
              *****  Begin ADOT Channelization  *****

 10035.000     21.95   1119.15       0.00    1119.15    1121.33       2.18       0.00       0.00    1122.00
  205000.0       0.0  205000.0        0.0        0.0    17314.0        0.0        0.0        0.0    1125.00
      0.00      0.00     11.84       0.00      0.000      0.035      0.000      0.000    1097.20   10026.04
  0.001899        0.        0.         0.          0          0          0       0.00    1062.88   11088.91


*SECNO 10200.000
 10200.000     21.39   1119.49       0.00       0.00    1121.64       2.14       0.31       0.00    1123.00
  205000.0       0.0  205000.0        0.0        0.0    17444.9        0.0       65.8        4.0    1123.00
      0.00      0.00     11.75       0.00      0.000      0.035      0.000      0.000    1098.10   10032.79
  0.001846      165.      165.       165.          2          0          0       0.00    1059.42   11092.21


*SECNO 10400.000
 10400.000     21.79   1119.89       0.00       0.00    1122.01       2.11       0.36       0.00    1122.00
  205000.0       0.0  205000.0        0.0        0.0    17581.1        0.0      146.2        8.9    1123.00
      0.01      0.00     11.66       0.00      0.000      0.035      0.000      0.000    1098.10   10039.33
  0.001791      200.      200.       200.          2          0          0       0.00    1056.25   11095.58


*SECNO 10600.000
 10600.000     21.77   1120.27       0.00       0.00    1122.36       2.10       0.36       0.00    1123.00
  205000.0       0.0  205000.0        0.0        0.0    17635.4        0.0      227.1       13.7    1124.00
      0.01      0.00     11.62       0.00      0.000      0.035      0.000      0.000    1098.50   10031.55
  0.001775      200.      200.       200.          0          0          0       0.00    1058.06   11089.61


*SECNO 10800.000
 10800.000     21.60   1120.60       0.00       0.00    1122.74       2.14       0.36       0.01    1123.00
  205000.0       0.0  205000.0        0.0        0.0    17447.0        0.0      307.6       18.6    1124.00
      0.02      0.00     11.75       0.00      0.000      0.035      0.000      0.000    1099.00   10034.94
  0.001840      200.      200.       200.          2          0          0       0.00    1057.04   11091.99


*SECNO 11000.000
 11000.000     21.57   1121.07       0.00       0.00    1123.10       2.03       0.35       0.01    1123.00
  205000.0       0.0  205000.0        0.0        0.0    17927.3        0.0      388.8       23.5    1124.00
      0.02      0.00     11.44       0.00      0.000      0.035      0.000      0.000    1099.50   10026.60
  0.001692      200.      200.       200.          2          0          0       0.00    1062.37   11088.97
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 11200.000
 11200.000     21.47   1121.47       0.00       0.00    1123.44       1.97       0.33       0.01    1123.00
  205000.0       0.0  205000.0        0.0        0.0    18212.4        0.0      471.8       28.3    1126.00
      0.03      0.00     11.26       0.00      0.000      0.035      0.000      0.000    1100.00   10033.06
  0.001595      200.      200.       200.          2          0          0       0.00    1056.21   11089.27

*SECNO 11400.000
 11400.000     21.48   1121.88       0.00       0.00    1123.76       1.88       0.31       0.01    1124.00
  205000.0       0.0  205000.0        0.0        0.0    18637.0        0.0      556.4       33.2    1126.00
      0.03      0.00     11.00       0.00      0.000      0.035      0.000      0.000    1100.40   10034.25
  0.001494      200.      200.       200.          2          0          0       0.00    1066.61   11100.86

*SECNO 11600.000
 11600.000     21.42   1122.32       0.00       0.00    1124.05       1.73       0.28       0.02    1124.00
  205000.0       0.0  205000.0        0.0        0.0    19433.4        0.0      643.8       38.1    1127.50
      0.04      0.00     10.55       0.00      0.000      0.035      0.000      0.000    1100.90   10033.67
  0.001312      200.      200.       200.          2          0          0       0.00    1072.80   11106.47

*SECNO 11800.000
 11800.000     21.13   1122.53       0.00       0.00    1124.35       1.82       0.27       0.03    1125.00
  205000.0       0.0  205000.0        0.0        0.0    18920.2        0.0      731.8       43.0    1127.90
      0.04      0.00     10.83       0.00      0.000      0.035      0.000      0.000    1101.40   10041.59
  0.001433      200.      200.       200.          2          0          0       0.00    1072.30   11113.89

*SECNO 12000.000
 12000.000     21.02   1122.82       0.00       0.00    1124.64       1.82       0.29       0.00    1127.00
  205000.0       0.0  205000.0        0.0        0.0    18943.8        0.0      818.8       47.9    1128.40
      0.05      0.00     10.82       0.00      0.000      0.035      0.000      0.000    1101.80   10043.62
  0.001423      200.      200.       200.          1          0          0       0.00    1069.61   11113.23

*SECNO 12100.000
 12100.000     20.83   1122.93       0.00       0.00    1124.80       1.87       0.15       0.02    1127.00
  205000.0       0.0  205000.0        0.0        0.0    18678.9        0.0      861.9       50.4    1128.60
      0.05      0.00     10.97       0.00      0.000      0.035      0.000      0.000    1102.10   10043.64
  0.001481      100.      100.       100.          2          0          0       0.00    1064.35   11107.99
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 12200.000
 12200.000     20.77    1123.07       0.00       0.00    1124.95       1.88       0.15       0.00    1126.00
  205000.0       0.0   205000.0        0.0        0.0    18632.2        0.0      904.8       52.8    1128.80
      0.05      0.00      11.00       0.00      0.000      0.035      0.000      0.000    1102.30   10041.14
  0.001493      100.       100.       100.          0          0          0       0.00    1064.68   11105.82

*SECNO 12400.000
 12400.000     20.48    1123.28       0.00       0.00    1125.31       2.03       0.31       0.04    1129.00
  205000.0       0.0   205000.0        0.0        0.0    17941.1        0.0      988.7       57.6    1129.20
      0.06      0.00      11.43       0.00      0.000      0.035      0.000      0.000    1102.80   10059.08
  0.001626      200.       200.       200.          2          0          0       0.00    1032.16   11091.24

*SECNO 12600.000
 12600.000     20.43    1123.63       0.00       0.00    1125.63       2.00       0.32       0.00    1130.00
  205000.0       0.0   205000.0        0.0        0.0    18063.1        0.0     1071.4       62.4    1129.60
      0.06      0.00      11.35       0.00      0.000      0.035      0.000      0.000    1103.20   10058.15
  0.001571      200.       200.       200.          2          0          0       0.00    1020.94   11079.09

*SECNO 12800.000
 12800.000     20.22    1123.92       0.00       0.00    1125.96       2.03       0.32       0.01    1131.00
  205000.0       0.0   205000.0        0.0        0.0    17912.4        0.0     1154.0       67.1    1130.00
      0.07      0.00      11.44       0.00      0.000      0.035      0.000      0.000    1103.70   10086.51
  0.001624      200.       200.       200.          2          0          0       0.00    1025.09   11111.61

*SECNO 13000.000
 13000.000     20.04    1124.24       0.00       0.00    1126.29       2.06       0.33       0.01    1131.00
  205000.0       0.0   205000.0        0.0        0.0    17816.3        0.0     1236.0       71.8    1130.50
      0.07      0.00      11.51       0.00      0.000      0.035      0.000      0.000    1104.20   10075.31
  0.001645      200.       200.       200.          0          0          0       0.00    1020.92   11096.23

*SECNO 13200.000
 13200.000     19.84    1124.54       0.00       0.00    1126.64       2.10       0.34       0.01    1130.00
  205000.0       0.0   205000.0        0.0        0.0    17607.9        0.0     1317.3       76.4    1130.90
      0.08      0.00      11.64       0.00      0.000      0.035      0.000      0.000    1104.70   10052.98
  0.001708      200.       200.       200.          2          0          0       0.00    1019.93   11072.91
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 13400.000
 13400.000     19.77    1124.87       0.00       0.00    1126.99       2.12       0.34       0.00    1130.00
  205000.0       0.0   205000.0       0.0        0.0    17542.7        0.0     1398.0       81.1    1131.30
      0.08      0.00      11.69       0.00      0.000      0.035      0.000      0.000    1105.10   10052.69
  0.001729      200.       200.       200.          0          0          0       0.00    1020.03   11072.72

*SECNO 13600.000
 13600.000     19.57    1125.17       0.00       0.00    1127.37       2.21       0.36       0.03    1130.00
  205000.0       0.0   205000.0       0.0        0.0    17201.8        0.0     1477.8       85.8    1131.80
      0.09      0.00      11.92       0.00      0.000      0.035      0.000      0.000    1105.60   10055.14
  0.001827      200.       200.       200.          2          0          0       0.00    1011.96   11067.10

*SECNO 13800.000
 13800.000     19.43    1125.53       0.00       0.00    1127.74       2.22       0.37       0.00    1130.00
  205000.0       0.0   205000.0       0.0        0.0    17162.1        0.0     1556.7       90.4    1132.20
      0.09      0.00      11.94       0.00      0.000      0.035      0.000      0.000    1106.10   10045.18
  0.001850      200.       200.       200.          0          0          0       0.00    1015.79   11060.96

*SECNO 14000.000
 14000.000     19.44    1125.94       0.00       0.00    1128.11       2.17       0.37       0.00    1130.00
  205000.0       0.0   205000.0       0.0        0.0    17345.3        0.0     1635.9       95.1    1132.60
      0.10      0.00      11.82       0.00      0.000      0.035      0.000      0.000    1106.50   10040.73
  0.001806      200.       200.       200.          2          0          0       0.00    1024.30   11065.03

*SECNO 14200.000
 14200.000     19.34    1126.34       0.00       0.00    1128.48       2.14       0.36       0.00    1133.00
  205000.0       0.0   205000.0       0.0        0.0    17464.5        0.0     1715.8       99.9    1133.00
      0.10      0.00      11.74       0.00      0.000      0.035      0.000      0.000    1107.00   10030.99
  0.001805      200.       200.       200.          2          0          0       0.00    1042.02   11073.01

CCHV=    0.300 CEHV=    0.500
*SECNO 14400.000
              *****  Grade Control Str. No. 2  *****

 14400.000     19.18    1126.68       0.00       0.00    1128.87       2.19       0.36       0.03    1133.50
  205000.0       0.0   205000.0       0.0        0.0    17252.4        0.0     1795.5      104.6    1133.50
      0.11      0.00      11.88       0.00      0.000      0.035      0.000      0.000    1107.50   10045.39
  0.001846      200.       200.       200.          2          0          0       0.00    1027.14   11072.52
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

CCHV=    0.300 CEHV=    0.500
*SECNO 14665.000

3470 ENCROACHMENT STATIONS=    10036.0   11068.0  TYPE=      1  TARGET=     1032.000
 ELENCL=     147.00  ELENCR=     147.00
              *****  SR 153 Bridge (D/S limit)  *****

 14665.000     18.93   1127.13      0.00       0.00   1129.40      2.27       0.50       0.04   1134.10
  205000.0       0.0  205000.0       0.0        0.0   16956.1       0.0     1899.6      110.8   1134.10
      0.11      0.00     12.09      0.00      0.000     0.035     0.000      0.000    1108.20  10046.34
  0.001917      265.      265.      265.          2         0         0       0.00    1011.32  11057.66

*SECNO 14785.000
              *****  SR 153 Bridge (U/S limit)  *****

 14785.000     19.01   1127.41      0.00       0.00   1129.64      2.24       0.23       0.01   1134.30
  205000.0       0.0  205000.0       0.0        0.0   17077.3       0.0     1946.4      113.6   1134.30
      0.11      0.00     12.00      0.00      0.000     0.035     0.000      0.000    1108.40  10031.68
  0.001907      120.      120.      120.          2         0         0       0.00    1026.08  11057.76

CCHV=    0.100 CEHV=    0.300
*SECNO 15000.000
 15000.000     18.91   1127.81      0.00       0.00   1130.06      2.25       0.42       0.01   1134.70
  205000.0       0.0  205000.0       0.0        0.0   17013.3       0.0     2030.6      118.7   1134.70
      0.12      0.00     12.05      0.00      0.000     0.035     0.000      0.000    1108.90  10031.65
  0.001961      215.      215.      215.          0         0         0       0.00    1038.70  11070.35

CCHV=    0.100 CEHV=    0.300
*SECNO 15200.000
 15200.000     18.78   1128.18      0.00       0.00   1130.47      2.29       0.40       0.01   1135.20
  205000.0       0.0  205000.0       0.0        0.0   16881.2       0.0     2108.4      123.5   1135.20
      0.12      0.00     12.14      0.00      0.000     0.035     0.000      0.000    1109.40  10032.03
  0.002010      200.      200.      200.          1         0         0       0.00    1037.94  11069.97

*SECNO 15400.000
 15400.000     18.78   1128.58      0.00       0.00   1130.87      2.30       0.40       0.00   1135.60
  205000.0       0.0  205000.0       0.0        0.0   16847.3       0.0     2185.8      128.2   1135.60
      0.13      0.00     12.17      0.00      0.000     0.035     0.000      0.000    1109.80  10045.47
  0.001992      200.      200.      200.          0         0         0       0.00    1025.11  11070.58
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

CCHV=    0.300 CEHV=    0.500
*SECNO 15586.000

3470 ENCROACHMENT STATIONS=    10035.0   11091.0  TYPE=      1  TARGET=     1056.000
 ELENCL=    145.40  ELENCR=    145.40
             *****  SR 143 Bridge (D/S limit)  *****

 15586.000     18.58   1128.88      0.00      0.00   1131.35      2.47      0.39      0.09   1136.00
  210000.0       0.0  210000.0       0.0       0.0   16643.4       0.0    2257.3     132.6   1136.00
      0.13      0.00     12.62      0.00     0.000     0.035     0.000     0.000   1110.30  10045.67
  0.002175      186.      186.      186.         2         0         0      0.00   1024.61  11070.28


SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.56      2.60     200.00    963.00     48.00  26680.00      1.50   1110.50   1110.30

*SECNO 15710.000
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1128.69 BRIDGE VELOCITY=      12.18     CALCULATED CHANNEL AREA=     17141.

 EGPRS      EGLWC      H3       QWEIR      QLOW      BAREA   TRAPEZOID      ELLC      ELTRD     WEIRLN
                                                              AREA
      0.00   1131.76      0.45        0.   210000.    26680.    25301.     1137.00   1145.40        0.


             *****  SR 143 Bridge (U/S limit)  *****

 15710.000     18.73   1129.33      0.00      0.00   1131.76      2.44      0.41      0.00   1136.20
  210000.0       0.0  210000.0       0.0       0.0   16768.7       0.0    2304.9     135.5   1136.20
      0.14      0.00     12.52      0.00     0.000     0.035     0.000     0.000   1110.60  10031.63
  0.002120      124.      124.      124.         0         0         0      0.00   1024.03  11055.66


CCHV=    0.100 CEHV=    0.300
*SECNO 16000.000
 16000.000     18.64   1129.94      0.00      0.00   1132.39      2.45      0.62      0.00   1136.90
  210000.0       0.0  210000.0       0.0       0.0   16735.0       0.0    2416.4     142.4   1136.90
      0.14      0.00     12.55      0.00     0.000     0.035     0.000     0.000   1111.30  10031.86
  0.002185      290.      290.      290.         0         0         0      0.00   1041.71  11073.57
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

CCHV=    0.100 CEHV=    0.300
*SECNO 16200.000
 16200.000     18.75   1130.45       0.00       0.00   1132.82       2.37       0.43       0.01   1137.30
  210000.0       0.0  210000.0        0.0        0.0   16985.2        0.0     2493.8      147.2   1137.30
      0.15      0.00     12.36       0.00      0.000     0.035      0.000      0.000    1111.70  10038.49
  0.002092      200.      200.       200.          2         0          0       0.00    1046.74  11085.23

*SECNO 16400.000
 16400.000     18.63   1130.83       0.00       0.00   1133.27       2.44       0.43       0.02   1137.70
  210000.0       0.0  210000.0        0.0        0.0   16757.7        0.0     2571.3      152.0   1138.30
      0.15      0.00     12.53       0.00      0.000     0.035      0.000      0.000    1112.20  10031.61
  0.002176      200.      200.       200.          2         0          0       0.00    1040.65  11072.26

*SECNO 16600.000
 16600.000     18.56   1131.26       0.00       0.00   1133.71       2.45       0.44       0.00   1138.10
  210000.0       0.0  210000.0        0.0        0.0   16723.4        0.0     2648.1      156.8   1138.70
      0.16      0.00     12.56       0.00      0.000     0.035      0.000      0.000    1112.70  10030.91
  0.002197      200.      200.       200.          0         0          0       0.00    1043.39  11074.29

*SECNO 16800.000
 16800.000     18.50   1131.70       0.00       0.00   1134.15       2.46       0.44       0.00   1138.60
  210000.0       0.0  210000.0        0.0        0.0   16693.4        0.0     2724.8      161.6   1139.20
      0.16      0.00     12.58       0.00      0.000     0.035      0.000      0.000    1113.20  10030.71
  0.002216      200.      200.       200.          0         0          0       0.00    1045.50  11076.21

*SECNO 17000.000
 17000.000     18.56   1132.16       0.00       0.00   1134.59       2.43       0.44       0.00   1139.00
  210000.0       0.0  210000.0        0.0        0.0   16784.7        0.0     2801.7      166.4   1139.60
      0.16      0.00     12.51       0.00      0.000     0.035      0.000      0.000    1113.60  10031.51
  0.002180      200.      200.       200.          2         0          0       0.00    1046.80  11078.30

*SECNO 17200.000
 17200.000     18.49   1132.59       0.00       0.00   1135.04       2.45       0.44       0.01   1139.40
  210000.0       0.0  210000.0        0.0        0.0   16721.0        0.0     2878.6      171.2   1140.00
      0.17      0.00     12.56       0.00      0.000     0.035      0.000      0.000    1114.10  10031.41
  0.002208      200.      200.       200.          1         0          0       0.00    1046.95  11078.35
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SECNO / Q / TIME / SLOPE	DEPTH / QLOB / VLOB / XLOBL	CWSEL / QCH / VCH / XLCH	CRIWS / QROB / VROB / XLOBR	WSELK / ALOB / XNL / ITRIAL	EG / ACH / XNCH / IDC	HV / AROB / XNR / ICONT	HL / VOL / WTN / CORAR	OLOSS / TWA / ELMIN / TOPWID	L-BANK ELEV / R-BANK ELEV / SSTA / ENDST
*SECNO 17400.000									
17400.000	18.42	1133.02	0.00	0.00	1135.49	2.47	0.44	0.01	1139.80
210000.0	0.0	210000.0	0.0	0.0	16646.7	0.0	2955.2	176.0	1140.40
0.17	0.00	12.62	0.00	0.000	0.035	0.000	0.000	1114.60	10030.33
0.002215	200.	200.	200.	1	0	0	0.00	1040.85	11071.18
*SECNO 17600.000									
17600.000	18.44	1133.44	0.00	0.00	1135.94	2.50	0.44	0.01	1140.30
210000.0	0.0	210000.0	0.0	0.0	16539.2	0.0	3031.4	180.7	1140.90
0.18	0.00	12.70	0.00	0.000	0.035	0.000	0.000	1115.00	10031.58
0.002228	200.	200.	200.	2	0	0	0.00	1027.01	11058.60
*SECNO 17800.000									
17800.000	18.37	1133.87	0.00	0.00	1136.40	2.53	0.45	0.01	1140.70
210000.0	0.0	210000.0	0.0	0.0	16448.3	0.0	3107.1	185.4	1141.30
0.18	0.00	12.77	0.00	0.000	0.035	0.000	0.000	1115.50	10031.47
0.002262	200.	200.	200.	1	0	0	0.00	1024.46	11055.93
*SECNO 18000.000									
18000.000	18.30	1134.30	0.00	0.00	1136.87	2.56	0.46	0.01	1141.00
210000.0	0.0	210000.0	0.0	0.0	16349.0	0.0	3182.4	190.1	1141.70
0.19	0.00	12.84	0.00	0.000	0.035	0.000	0.000	1116.00	10031.25
0.002302	200.	200.	200.	1	0	0	0.00	1022.68	11053.93
*SECNO 18200.000									
18200.000	18.24	1134.74	0.00	0.00	1137.34	2.60	0.46	0.01	1141.50
210000.0	0.0	210000.0	0.0	0.0	16230.8	0.0	3257.2	194.8	1142.10
0.19	0.00	12.94	0.00	0.000	0.035	0.000	0.000	1116.50	10031.25
0.002346	200.	200.	200.	1	0	0	0.00	1018.70	11049.94
*SECNO 18400.000									
18400.000	18.39	1135.29	0.00	0.00	1137.81	2.51	0.46	0.01	1142.00
210000.0	0.0	210000.0	0.0	0.0	16503.1	0.0	3332.4	199.5	1142.60
0.19	0.00	12.72	0.00	0.000	0.035	0.000	0.000	1116.90	10033.81
0.002247	200.	200.	200.	2	0	0	0.00	1030.74	11064.55

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 18600.000									
18600.000	18.28	1135.68	0.00	0.00	1138.30	2.63	0.46	0.03	1142.40
210000.0	0.0	210000.0	0.0	0.0	16149.8	0.0	3407.3	204.2	1143.00
0.20	0.00	13.00	0.00	0.000	0.035	0.000	0.000	1117.40	10032.98
0.002344	200.	200.	200.	2	0	0	0.00	1006.00	11038.98
*SECNO 18800.000									
18800.000	18.21	1136.11	0.00	0.00	1138.80	2.69	0.48	0.02	1142.80
210000.0	0.0	210000.0	0.0	0.0	15964.1	0.0	3481.0	208.8	1143.40
0.20	0.00	13.15	0.00	0.000	0.035	0.000	0.000	1117.90	10031.07
0.002432	200.	200.	200.	2	0	0	0.00	1003.91	11034.98
*SECNO 19000.000									
19000.000	18.29	1136.59	0.00	0.00	1139.29	2.70	0.49	0.00	1143.20
210000.0	0.0	210000.0	0.0	0.0	15935.1	0.0	3554.3	213.4	1143.80
0.21	0.00	13.18	0.00	0.000	0.035	0.000	0.000	1118.30	10030.84
0.002425	200.	200.	200.	0	0	0	0.00	997.26	11028.10
*SECNO 19200.000									
19200.000	18.24	1137.04	0.00	0.00	1139.79	2.75	0.49	0.02	1143.70
210000.0	0.0	210000.0	0.0	0.0	15784.1	0.0	3627.1	218.0	1144.30
0.21	0.00	13.30	0.00	0.000	0.035	0.000	0.000	1118.80	10030.97
0.002478	200.	200.	200.	2	0	0	0.00	989.39	11020.36
*SECNO 19400.000									
19400.000	18.20	1137.50	0.00	0.00	1140.31	2.81	0.50	0.02	1144.10
210000.0	0.0	210000.0	0.0	0.0	15616.7	0.0	3699.2	222.5	1144.70
0.22	0.00	13.45	0.00	0.000	0.035	0.000	0.000	1119.30	10030.79
0.002540	200.	200.	200.	2	0	0	0.00	981.29	11012.08
*SECNO 19600.000									
19600.000	18.18	1137.98	0.00	0.00	1140.84	2.87	0.51	0.02	1144.50
210000.0	0.0	210000.0	0.0	0.0	15457.4	0.0	3770.5	227.0	1145.10
0.22	0.00	13.59	0.00	0.000	0.035	0.000	0.000	1119.80	10030.57
0.002597	200.	200.	200.	2	0	0	0.00	972.57	11003.14

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 19800.000									
19800.000	18.29	1138.49	0.00	0.00	1141.36	2.87	0.52	0.00	1145.00
210000.0	0.0	210000.0	0.0	0.0	15436.7	0.0	3841.4	231.4	1145.60
0.22	0.00	13.60	0.00	0.000	0.035	0.000	0.000	1120.20	10030.53
0.002579	200.	200.	200.	0	0	0	0.00	964.00	10994.53
*SECNO 20000.000									
20000.000	18.26	1138.96	0.00	0.00	1141.91	2.94	0.52	0.02	1145.60
210000.0	0.0	210000.0	0.0	0.0	15253.2	0.0	3911.9	235.8	1145.60
0.23	0.00	13.77	0.00	0.000	0.035	0.000	0.000	1120.70	10029.91
0.002647	200.	200.	200.	2	0	0	0.00	954.09	10984.00
*SECNO 20200.000									
20200.000	18.26	1139.46	0.00	0.00	1142.46	3.00	0.53	0.02	1146.10
210000.0	0.0	210000.0	0.0	0.0	15100.1	0.0	3981.6	240.2	1146.10
0.23	0.00	13.91	0.00	0.000	0.035	0.000	0.000	1121.20	10030.93
0.002703	200.	200.	200.	2	0	0	0.00	945.14	10976.08
*SECNO 20400.000									
20400.000	18.42	1140.02	0.00	0.00	1142.99	2.97	0.53	0.00	1146.60
210000.0	0.0	210000.0	0.0	0.0	15180.0	0.0	4051.1	244.5	1146.60
0.24	0.00	13.83	0.00	0.000	0.035	0.000	0.000	1121.60	10033.75
0.002626	200.	200.	200.	2	0	0	0.00	938.60	10972.35
*SECNO 20600.000									
20600.000	18.39	1140.49	0.00	0.00	1143.56	3.08	0.54	0.03	1147.10
210000.0	0.0	210000.0	0.0	0.0	14920.7	0.0	4120.2	248.8	1147.10
0.24	0.00	14.07	0.00	0.000	0.035	0.000	0.000	1122.10	10029.84
0.002736	200.	200.	200.	2	0	0	0.00	925.24	10955.08
*SECNO 20782.000									
20782.000	18.51	1141.01	0.00	0.00	1144.05	3.04	0.49	0.00	1147.67
210000.0	0.0	210000.0	0.0	0.0	15002.0	0.0	4181.3	252.6	1147.67
0.24	0.00	14.00	0.00	0.000	0.035	0.000	0.000	1122.50	10031.97
0.002727	178.	178.	178.	2	0	0	0.00	936.07	10968.03

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

*SECNO 20800.000
              *****  Grade Control Str. No. 3  *****

 20800.000     18.54   1141.07       0.00       0.00   1144.10       3.04       0.05       0.00   1147.70
  210000.0       0.0  210000.0        0.0        0.0   15019.8        0.0     4187.5      253.0   1147.70
      0.24      0.00     13.98       0.00      0.000     0.035      0.000      0.000    1122.53  10031.91
  0.002717       18.       18.        18.          0         0          0       0.00     936.18  10968.09

*SECNO 21000.000
 21000.000     18.81   1141.67       0.00       0.00   1144.63       2.97       0.52       0.01   1148.20
  210000.0       0.0  210000.0        0.0        0.0   15194.5        0.0     4256.9      257.2   1148.20
      0.25      0.00     13.82       0.00      0.000     0.035      0.000      0.000    1122.86  10042.86
  0.002527      200.      200.       200.          2         0          0       0.00     911.45  10954.31

CCHV=    0.300 CEHV=    0.500
*SECNO 21050.000
              *****  Priest Bridge (D/S)  *****

 21050.000     18.56   1141.76       0.00       0.00   1144.80       3.04       0.13       0.04   1148.30
  210000.0       0.0  210000.0        0.0        0.0   15012.5        0.0     4274.2      258.3   1148.30
      0.25      0.00     13.99       0.00      0.000     0.035      0.000      0.000    1123.20  10042.95
  0.002629       50.       50.        50.          2         0          0       0.00     911.28  10954.23


SPECIAL BRIDGE

SB  XK        XKOR       COFQ      RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.05      1.56       2.60    1000.00    861.80      42.00   24080.00      1.50    1123.40    1123.20

*SECNO 21150.000
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1141.48 BRIDGE VELOCITY=      13.64     CALCULATED CHANNEL AREA=     15311.

 EGPRS      EGLWG       H3       QWEIR      QLOW       BAREA    TRAPEZOID      ELLC       ELTRD      WEIRLN
                                                                  AREA
      0.00   1145.27     0.63        0.   210000.     24080.    22868.     1150.00    1157.00         0.


              *****  Priest Bridge (U/S)  *****

 21150.000     18.99   1142.39       0.00       0.00   1145.27       2.89       0.48       0.00   1148.50
  210000.0       0.0  210000.0        0.0        0.0   15404.3        0.0     4309.1      260.3   1148.50
      0.25      0.00     13.63       0.00      0.000     0.035      0.000      0.000    1123.40  10042.23
  0.002418      100.      100.       100.          0         0          0       0.00     912.64  10954.87
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

CCHV=    0.100 CEHV=    0.300
*SECNO 21200.000
 21200.000     19.48   1142.67       0.00       0.00   1145.40       2.73       0.12       0.02   1148.90
  210000.0       0.0  210000.0        0.0        0.0   15826.0        0.0     4327.1      261.4   1148.90
      0.25      0.00      13.27       0.00      0.000     0.035      0.000      0.000    1123.19  10044.33
  0.002208       50.        50.        50.          2         0          0       0.00     911.34  10955.67

*SECNO 21400.000
 21400.000     19.70   1143.22       0.00       0.00   1145.85       2.63       0.44       0.01   1149.60
  210000.0       0.0  210000.0        0.0        0.0   16141.5        0.0     4400.4      265.7   1149.60
      0.26      0.00      13.01       0.00      0.000     0.035      0.000      0.000    1123.52  10029.47
  0.002159      200.       200.      200.          2         0          0       0.00     943.06  10972.53

*SECNO 21600.000
 21600.000     19.95   1143.80       0.00       0.00   1146.28       2.49       0.42       0.01   1150.00
  210000.0       0.0  210000.0        0.0        0.0   16598.1        0.0     4475.6      270.0   1150.50
      0.26      0.00      12.65       0.00      0.000     0.035      0.000      0.000    1123.85  10030.47
  0.001997      200.       200.      200.          2         0          0       0.00     956.78  10987.24

*SECNO 21800.000
 21800.000     19.98   1144.16       0.00       0.00   1146.70       2.54       0.40       0.02   1150.50
  210000.0       0.0  210000.0        0.0        0.0   16430.3        0.0     4551.4      274.4   1150.50
      0.27      0.00      12.78       0.00      0.000     0.035      0.000      0.000    1124.18  10028.91
  0.002038      200.       200.      200.          2         0          0       0.00     944.18  10973.09

*SECNO 22000.000
 22000.000     20.09   1144.60       0.00       0.00   1147.11       2.51       0.40       0.00   1151.00
  210000.0       0.0  210000.0        0.0        0.0   16515.8        0.0     4627.1      278.7   1151.00
      0.27      0.00      12.72       0.00      0.000     0.035      0.000      0.000    1124.51  10028.88
  0.002004      200.       200.      200.          2         0          0       0.00     944.25  10973.12

*SECNO 22200.000
 22200.000     20.18   1145.02       0.00       0.00   1147.51       2.49       0.40       0.00   1151.40
  210000.0       0.0  210000.0        0.0        0.0   16581.5        0.0     4703.0      283.0   1151.40
      0.27      0.00      12.66       0.00      0.000     0.035      0.000      0.000    1124.84  10027.64
  0.001979      200.       200.      200.          1         0          0       0.00     944.71  10972.36
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 22400.000
 22400.000     20.25    1145.43       0.00       0.00    1147.90       2.47       0.39       0.00    1151.90
  210000.0       0.0   210000.0       0.0        0.0    16638.9       0.0     4779.3      287.4    1151.90
      0.28      0.00      12.62       0.00      0.000      0.035     0.000      0.000    1125.18   10027.68
  0.001956      200.       200.       200.          1          0         0       0.00     944.64   10972.32

*SECNO 22600.000
 22600.000     20.35    1145.86       0.00       0.00    1148.29       2.43       0.39       0.00    1152.30
  210000.0       0.0   210000.0       0.0        0.0    16785.7       0.0     4856.0      291.7    1152.30
      0.28      0.00      12.51       0.00      0.000      0.035     0.000      0.000    1125.51   10027.36
  0.001901      200.       200.       200.          2          0         0       0.00     945.28   10972.64

*SECNO 22800.000
 22800.000     20.41    1146.25       0.00       0.00    1148.67       2.42       0.38       0.00    1152.80
  210000.0       0.0   210000.0       0.0        0.0    16820.9       0.0     4933.2      296.1    1152.80
      0.29      0.00      12.48       0.00      0.000      0.035     0.000      0.000    1125.84   10027.47
  0.001888      200.       200.       200.          0          0         0       0.00     945.05   10972.53

*SECNO 23000.000
 23000.000     19.89    1146.59       0.00       0.00    1149.08       2.49       0.39       0.02    1153.20
  210000.0       0.0   210000.0       0.0        0.0    16588.6       0.0     5009.9      300.4    1153.20
      0.29      0.00      12.66       0.00      0.000      0.035     0.000      0.000    1126.70   10028.42
  0.001971      200.       200.       200.          2          0         0       0.00     943.15   10971.58

*SECNO 23200.000
 23200.000     20.61    1147.11       0.00       0.00    1149.47       2.36       0.38       0.01    1153.70
  210000.0       0.0   210000.0       0.0        0.0    17036.7       0.0     5087.1      304.7    1153.70
      0.30      0.00      12.33       0.00      0.000      0.035     0.000      0.000    1126.50   10027.18
  0.001811      200.       200.       200.          2          0         0       0.00     945.63   10972.82

*SECNO 23400.000
 23400.000     20.64    1147.47       0.00       0.00    1149.83       2.36       0.36       0.00    1154.10
  210000.0       0.0   210000.0       0.0        0.0    17041.0       0.0     5165.3      309.1    1154.10
      0.30      0.00      12.32       0.00      0.000      0.035     0.000      0.000    1126.83   10028.08
  0.001806      200.       200.       200.          1          0         0       0.00     943.85   10971.92
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1C/14PRINT

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

*SECNO 23600.000
 23600.000     20.68    1147.84       0.00       0.00    1150.19       2.36       0.36       0.00    1154.60
  210000.0       0.0   210000.0       0.0        0.0    17050.6       0.0     5243.6      313.4    1154.60
      0.31      0.00      12.32       0.00      0.000      0.035     0.000      0.000    1127.16   10028.26
  0.001801      200.       200.       200.          0          0         0       0.00     943.48   10971.74

*SECNO 23800.000
 23800.000     20.74    1148.20       0.00       0.00    1150.55       2.35       0.36       0.00    1155.00
  210000.0       0.0   210000.0       0.0        0.0    17082.9       0.0     5321.9      317.7    1155.00
      0.31      0.00      12.29       0.00      0.000      0.035     0.000      0.000    1127.46   10028.17
  0.001790      200.       200.       200.          0          0         0       0.00     943.65   10971.83

*SECNO 24000.000
 24000.000     20.82    1148.64       0.00       0.00    1150.91       2.26       0.35       0.01    1155.50
  210000.0       0.0   210000.0       0.0        0.0    17396.9       0.0     5401.1      322.1    1155.50
      0.31      0.00      12.07       0.00      0.000      0.035     0.000      0.000    1127.82   10028.11
  0.001686      200.       200.       200.          2          0         0       0.00     943.77   10971.89

*SECNO 24200.000
 24200.000     20.89    1149.04       0.00       0.00    1151.24       2.21       0.33       0.01    1155.90
  210000.0       0.0   210000.0       0.0        0.0    17613.7       0.0     5481.5      326.4    1155.90
      0.32      0.00      11.92       0.00      0.000      0.035     0.000      0.000    1128.15   10027.96
  0.001619      200.       200.       200.          2          0         0       0.00     944.08   10972.04

*SECNO 24400.000
 24400.000     20.95    1149.43       0.00       0.00    1151.56       2.13       0.31       0.01    1156.40
  210000.0       0.0   210000.0       0.0        0.0    17913.9       0.0     5563.0      330.7    1156.40
      0.32      0.00      11.72       0.00      0.000      0.035     0.000      0.000    1128.48   10027.94
  0.001515      200.       200.       200.          2          0         0       0.00     938.85   10966.79

*SECNO 24600.000
 24600.000     21.02    1149.83       0.00       0.00    1151.87       2.04       0.30       0.01    1156.80
  210000.0       0.0   210000.0       0.0        0.0    18340.2       0.0     5646.3      335.1    1156.80
      0.33      0.00      11.45       0.00      0.000      0.035     0.000      0.000    1128.81   10027.42
  0.001438      200.       200.       200.          2          0         0       0.00     959.16   10986.58
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 24617.000
 24617.000     21.02    1149.86       0.00       0.00    1151.89       2.04       0.02       0.00    1156.83
  210000.0       0.0   210000.0       0.0        0.0    18335.5        0.0     5653.4      335.5    1156.83
      0.33      0.00      11.45       0.00      0.000      0.035      0.000      0.000    1128.84   10027.43
  0.001439       17.        17.        17.          0          0          0       0.00     959.14   10986.57

CCHV=    0.300 CEHV=    0.500
*SECNO 24618.000

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.43

 24618.000     20.93    1149.83       0.00       0.00    1151.92       2.08       0.00       0.02    1158.00
  210000.0       0.0   210000.0       0.0        0.0    18134.7        0.0     5653.8      335.5    1158.00
      0.33      0.00      11.58       0.00      0.000      0.025      0.000      0.000    1128.90   10051.74
  0.000703        1.         1.         1.          2          0          0       0.00     897.52   10949.26

*SECNO 24687.000
 24687.000     20.88    1149.88       0.00       0.00    1151.97       2.09       0.05       0.01    1158.10
  210000.0       0.0   210000.0       0.0        0.0    18083.1        0.0     5682.5      336.9    1158.10
      0.33      0.00      11.61       0.00      0.000      0.025      0.000      0.000    1129.00   10051.83
  0.000709       69.        69.        69.          2          0          0       0.00     897.35   10949.17

*SECNO 24688.000

3301 HV CHANGED MORE THAN HVINS

 24688.000     17.44    1149.44       0.00       0.00    1152.41       2.97       0.00       0.44    1160.00
  210000.0       0.0   210000.0       0.0        0.0    15175.8        0.0     5682.9      336.9    1160.00
      0.33      0.00      13.84       0.00      0.000      0.025      0.000      0.000    1132.00   10052.34
  0.001266        1.         1.         1.          2          0          0       0.00     896.32   10948.66

*SECNO 24700.000

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS

 24700.000     17.20    1149.20       0.00       0.00    1152.69       3.49       0.02       0.26    1160.00
  210000.0       0.0   210000.0       0.0        0.0    14010.6        0.0     5686.9      337.2    1160.00
      0.33      0.00      14.99       0.00      0.000      0.025      0.000      0.000    1132.00   10052.70
  0.001734       12.        12.        12.          2          0          0       0.00     866.20   10948.30
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 24733.000

3265 DIVIDED FLOW

 24733.000     17.32   1149.32       0.00       0.00   1152.76       3.43       0.06       0.02    1160.00
  210000.0       0.0  210000.0       0.0        0.0   14119.4        0.0     5697.6      337.8    1160.00
      0.33      0.00     14.87       0.00      0.000     0.025      0.000      0.000    1132.00   10052.51
  0.001693       33.       33.        33.          2         0          0       0.00     866.95   10948.49

1490 NH CARD USED
*SECNO 24744.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=    10053.0   10947.0  TYPE=      1  TARGET=      894.000
 ELENCL=   1150.00  ELENCR=   1150.00
 24744.000     18.49   1150.49       0.00       0.00   1153.04       2.55       0.02       0.26    1143.02
  210000.0       6.7  209986.6        6.7        4.5   16377.6        4.5     5701.4      338.0    1150.00
      0.33      1.49     12.82       1.49      0.026     0.035      0.026      0.000    1132.00   10042.69
  0.001929       11.       11.        11.          3         0          0       0.00     914.63   10957.31

CCHV=    0.100 CEHV=    0.300
1490 NH CARD USED
*SECNO 24800.000

3470 ENCROACHMENT STATIONS=    10053.0   10947.0  TYPE=      1  TARGET=      894.000
 ELENCL=   1150.00  ELENCR=   1150.00
 24800.000     18.64   1150.64       0.00       0.00   1153.16       2.51       0.11       0.00    1143.11
  210000.0      10.6  209978.9       10.5        6.1   16512.7        6.1     5722.6      339.2    1150.00
      0.33      1.72     12.72       1.72      0.026     0.035      0.026      0.000    1132.00   10042.00
  0.001877       56.       56.        56.          2         0          0       0.00     916.00   10958.00

1490 NH CARD USED
*SECNO 0.000

3470 ENCROACHMENT STATIONS=      581.5    1500.0  TYPE=      1  TARGET=      918.500
 ELENCL=   1150.00  ELENCR=   1150.00
             *****  Grade Control Str. No. 4  *****
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  SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
  Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
  TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
  SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

    0.000      19.08    1151.08       0.00       0.00    1153.45       2.36       0.28       0.01    1141.86
  210000.0      72.6   209876.9       50.5       30.8    17001.5       20.8     5782.3      342.6    1150.00
     0.34      2.35      12.34       2.42      0.026      0.035      0.026      0.000    1132.00     548.65
 0.001742      155.       155.       155.          2          0          0       0.00     972.72    1521.37

1490 NH CARD USED
*SECNO 2.000

3470 ENCROACHMENT STATIONS=      598.5    1500.0  TYPE=      1  TARGET=      901.500
 ELENCL=   1150.00  ELENCR=   1150.00
    2.000      19.34    1151.34       0.00       0.00    1153.74       2.40       0.28       0.01    1142.40
  210000.0      97.4   209622.1      280.4       32.5    16863.3       95.9     5844.9      346.2    1150.00
     0.34      3.00      12.43       2.92      0.025      0.035      0.025      0.000    1132.00     574.09
 0.001742      120.       160.       200.          2          0          0       0.00    1000.84    1574.93

1490 NH CARD USED
*SECNO 4.000

3470 ENCROACHMENT STATIONS=      611.5    1500.0  TYPE=      1  TARGET=      888.500
 ELENCL=   1150.00  ELENCR=   1150.00
    4.000      19.70    1151.70       0.00       0.00    1154.08       2.38       0.34       0.00    1142.90
  210000.0     154.0   209180.7      665.3       50.7    16860.8      195.6     5923.1      350.9    1150.00
     0.34      3.04      12.41       3.40      0.027      0.035      0.025      0.000    1132.00     575.75
 0.001702      200.       200.       200.          1          0          0       0.00    1043.98    1619.73

1490 NH CARD USED
*SECNO 6.000

3470 ENCROACHMENT STATIONS=      621.5    1460.0  TYPE=      1  TARGET=      838.500
 ELENCL=   1150.00  ELENCR=   1150.00
    6.000      19.89    1151.89       0.00       0.00    1154.51       2.62       0.36       0.07    1143.40
  210000.0     193.8   208309.4     1496.8       56.7    15963.1      385.8     6000.1      355.8    1150.00
     0.35      3.42      13.05       3.88      0.027      0.035      0.025      0.000    1132.00     585.51
 0.001875      200.       200.       200.          2          0          0       0.00    1082.91    1668.42

1490 NH CARD USED
*SECNO 8.000

3470 ENCROACHMENT STATIONS=      629.5    1500.0  TYPE=      1  TARGET=      870.500
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 ELENCL=   1150.00  ELENCR=   1150.40
    8.000      20.60   1152.60      0.00       0.00   1154.89       2.29       0.34       0.03   1143.66
  210000.0     309.7  207897.8    1792.6       82.3   17041.3      456.2     6078.1      360.9   1150.40
     0.35      3.76      12.20      3.93      0.027     0.035      0.025      0.000    1132.00    590.28
 0.001578      200.       200.      200.          2         0          0       0.00    1122.21   1712.49

1490 NH CARD USED
*SECNO 10.000

3470 ENCROACHMENT STATIONS=      627.5    1500.0  TYPE=      1  TARGET=      872.500
 ELENCL=   1150.00  ELENCR=   1150.80
   10.000      21.04   1153.04      0.00       0.00   1155.21       2.17       0.30       0.01   1144.40
  210000.0     387.7  207445.1    2167.2       97.8   17449.9      566.8     6160.0      366.1   1150.80
     0.36      3.96      11.89      3.82      0.027     0.035      0.025      0.000    1132.00    587.03
 0.001457      200.       200.      200.          2         0          0       0.00    1172.09   1759.12

1490 NH CARD USED
*SECNO 12.000

3470 ENCROACHMENT STATIONS=      623.5    1500.0  TYPE=      1  TARGET=      876.500
 ELENCL=   1150.00  ELENCR=   1151.20
   12.000      21.41   1153.41      0.00       0.00   1155.50       2.09       0.28       0.01   1144.90
  210000.0     460.5  207073.2    2466.3      111.3   17747.0      665.1     6244.2      371.6   1151.20
     0.36      4.14      11.67      3.71      0.027     0.035      0.025      0.000    1132.00    582.24
 0.001381      200.       200.      200.          2         0          0       0.00    1223.60   1805.84

1490 NH CARD USED
*SECNO 14.000

3470 ENCROACHMENT STATIONS=      611.4    1500.0  TYPE=      1  TARGET=      888.570
 ELENCL=   1150.00  ELENCR=   1151.60
   14.000      21.73   1153.73      0.00       0.00   1155.72       1.99       0.21       0.01   1145.19
  210000.0     519.6  206962.0    2518.4      123.0   18182.6      717.2     6312.8      376.4   1151.60
     0.37      4.22      11.38      3.51      0.027     0.035      0.025      0.000    1132.00    569.43
 0.001296      115.       158.      200.          2         0          0       0.00    1271.83   1841.26

CCHV=    0.300 CEHV=    0.500
1490 NH CARD USED
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 15.400

3470 ENCROACHMENT STATIONS=      599.5    1420.0  TYPE=      1  TARGET=      820.510
 ELENCL=   1150.00  ELENCR=   1152.00
    15.400     21.72   1153.72      0.00       0.00   1156.08       2.36       0.17       0.19   1145.40
  210000.0     564.7  206719.0    2716.3      121.6   16654.9      809.6     6364.6      380.4   1152.00
      0.37      4.64     12.41      3.36      0.027     0.035      0.025      0.000    1132.00    558.03
  0.001560       85.      122.      160.          2         0          0       0.00    1335.86   1893.89


SPECIAL BRIDGE

SB  XK        XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.48      1.56       2.67    1388.00    816.00      72.00   29800.00      10.70    1131.58    1131.55

1490 NH CARD USED
*SECNO 15.600
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1153.48 BRIDGE VELOCITY=      10.02     CALCULATED CHANNEL AREA=     21428.

 EGPRS      EGLWC      H3         QWEIR      QLOW       BAREA    TRAPEZOID      ELLC       ELTRD      WEIRLN
                                                                    AREA
      0.00   1156.83      0.93        0.   215000.    29800.    31150.     1161.00    1165.00         0.


3470 ENCROACHMENT STATIONS=      598.5    1420.0  TYPE=      1  TARGET=      821.510
 ELENCL=   1150.00  ELENCR=   1152.00
              *****  SPRR bridge U/S  *****

    15.600     22.65   1154.65      0.00       0.00   1156.83       2.18       0.75       0.00   1145.44
  215000.0     789.4  208966.6    5244.0      162.0   17432.0     1253.0     6372.2      381.0   1152.00
      0.37      4.87     11.99      4.19      0.028     0.035      0.025      0.000    1132.00    552.74
  0.001371       15.       18.       20.          0         0          0       0.00    1345.18   1897.92


CCHV=    0.100 CEHV=    0.300
1490 NH CARD USED
*SECNO 17.300

3470 ENCROACHMENT STATIONS=      602.3    1500.0  TYPE=      1  TARGET=      897.710
 ELENCL=   1150.00  ELENCR=   1152.00
    17.300     23.30   1155.30      0.00       0.00   1157.05       1.75       0.18       0.04   1145.83
  215000.0     875.8  209920.3    4203.9      190.1   19551.9     1018.8     6441.3      385.5   1152.00
      0.37      4.61     10.74      4.13      0.028     0.035      0.025      0.000    1132.00    554.52
  0.001061      155.      152.      150.          2         0          0       0.00    1272.45   1826.97
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 19.000

3470 ENCROACHMENT STATIONS=      602.9    1500.0  TYPE=      1  TARGET=      897.100
 ELENCL=   1150.00  ELENCR=   1152.00
              *****  Old Ash Bridge alignment  *****

    19.000     23.47   1155.47      0.00       0.00   1157.25      1.78       0.18       0.01   1146.49
  215000.0     934.5  210974.9    3090.6      195.2   19557.0     707.2     6522.5      390.3   1152.00
      0.38      4.79     10.79      4.37      0.028     0.035     0.025      0.000    1132.00    555.95
  0.001070      180.      172.      165.          2         0         0       0.00    1153.80   1709.75

1490 NH CARD USED
*SECNO 21.500

3470 ENCROACHMENT STATIONS=      557.5    1500.0  TYPE=      1  TARGET=      942.520
 ELENCL=   1150.00  ELENCR=   1152.00
    21.500     23.86   1155.86      0.00       0.00   1157.45      1.58       0.18       0.02   1146.98
  215000.0     938.0  211288.2    2773.7      201.9   20780.9     636.4     6611.5      395.4   1152.00
      0.38      4.65     10.17      4.36      0.028     0.035     0.025      0.000    1132.00    511.84
  0.000935       90.      182.      275.          2         0         0       0.00    1159.41   1671.25

1490 NH CARD USED
*SECNO 24.000

3470 ENCROACHMENT STATIONS=      522.0    1371.0  TYPE=      1  TARGET=      848.950
 ELENCL=   1150.00  ELENCR=   1152.00
    24.000     23.75   1155.75      0.00       0.00   1157.71      1.96       0.15       0.11   1147.26
  215000.0    2710.0  209643.6    2646.4      450.1   18459.2     550.2     6678.0      399.2   1152.00
      0.39      6.02     11.36      4.81      0.026     0.035     0.025      0.000    1132.00    433.63
  0.001190       50.      140.      230.          2         0         0       0.00    1090.43   1524.06

1490 NH CARD USED
*SECNO 24.600

3470 ENCROACHMENT STATIONS=      530.0    1370.0  TYPE=      1  TARGET=      840.000
 ELENCL=   1150.00  ELENCR=   1152.00
              *****  Mill Avenue bridge  *****

    24.600     24.10   1156.10      0.00       0.00   1158.03      1.93       0.07       0.00   1147.59
  215000.0    3423.2  208743.2    2833.6      550.3   18524.4     566.1     6704.9      400.7   1152.00
      0.39      6.22     11.27      5.01      0.026     0.035     0.025      0.000    1132.00    429.43
  0.001150       60.       60.       60.          0         0         0       0.00    1085.05   1514.48
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


1490 NH CARD USED
*SECNO 26.000

3470 ENCROACHMENT STATIONS=      587.9    1428.0  TYPE=      1  TARGET=      840.140
 ELENCL=   1150.00  ELENCR=   1152.00
    26.000     24.22   1156.32      0.00      0.00   1158.24      1.92      0.21      0.00   1148.40
  215000.0    4299.0  207828.0    2873.0     666.7   18464.3     557.5    6788.5     405.3   1152.00
      0.39      6.45     11.26      5.15     0.026     0.035     0.025     0.000   1132.10    471.97
  0.001152      230.      185.      140.         0         0         0      0.00   1092.32   1564.29


SPECIAL BRIDGE

SB  XK        XKOR      COFQ     RDLEN     BWC       BWP      BAREA     SS        ELCHU     ELCHD
     1.11      1.56      2.67   1040.00    760.00     85.00  30000.00      5.20   1132.12   1132.22

1490 NH CARD USED
*SECNO 26.450
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1155.83 BRIDGE VELOCITY=      11.39     CALCULATED CHANNEL AREA=     18926.

 EGPRS      EGLWC       H3       QWEIR      QLOW      BAREA   TRAPEZOID      ELLC      ELTRD     WEIRLN
                                                               AREA
      0.00   1158.67     0.54        0.   215000.    30000.    35746.     1172.51   1176.14        0.


3470 ENCROACHMENT STATIONS=      587.9    1428.0  TYPE=      1  TARGET=      840.140
 ELENCL=   1150.00  ELENCR=   1152.00
              *****  Second Mill Avenue bridge  *****

    26.450     24.76   1156.86      0.00      0.00   1158.67      1.81      0.43      0.00   1148.40
  215000.0    4733.7  206907.8    3358.4     730.7   18925.0     632.4    6809.2     406.5   1152.00
      0.39      6.48     10.93      5.31     0.026     0.035     0.025     0.000   1132.10    470.18
  0.001052       45.       45.       45.         0         0         0      0.00   1095.82   1566.00


1490 NH CARD USED
*SECNO 27.000

3470 ENCROACHMENT STATIONS=      648.6    1491.0  TYPE=      1  TARGET=      842.410
 ELENCL=   1150.00  ELENCR=   1153.00
    27.000     24.82   1157.02      0.00      0.00   1158.84      1.82      0.16      0.00   1148.72
  215000.0    5164.1  207610.0    2225.9     780.6   18932.5     473.0    6881.6     410.3   1153.00
      0.40      6.62     10.97      4.71     0.026     0.035     0.025     0.000   1132.20    525.84
  0.001062      255.      155.       55.         1         0         0      0.00   1089.84   1615.68
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

1490 NH CARD USED
*SECNO 28.000

3470 ENCROACHMENT STATIONS=      654.5    1500.0  TYPE=      1  TARGET=      845.500
 ELENCL=   1150.00  ELENCR=   1154.00
    28.000     24.89   1157.19      0.00      0.00   1159.01      1.82      0.17      0.00   1148.94
  215000.0    5390.1  208270.9    1339.0     803.5   19012.9     332.6    6956.2     414.3   1154.00
      0.40      6.71     10.95      4.03     0.026     0.035     0.025     0.000   1132.30    530.94
  0.001061      220.      160.      100.         0         0         0      0.00   1079.70   1610.63

1490 NH CARD USED
*SECNO 30.000

3470 ENCROACHMENT STATIONS=      657.5    1500.0  TYPE=      1  TARGET=      842.500
 ELENCL=   1150.00  ELENCR=   1153.00
    30.000     24.91   1157.41      0.00      0.00   1159.23      1.82      0.21      0.00   1149.15
  215000.0    5656.9  207455.9    1887.2     828.3   18938.7     385.0    7048.8     419.2   1153.00
      0.41      6.83     10.95      4.90     0.026     0.035     0.026     0.000   1132.50    533.68
  0.001059      200.      200.      200.         0         0         0      0.00   1061.26   1594.94

1490 NH CARD USED
*SECNO 32.000

3470 ENCROACHMENT STATIONS=      658.1    1500.0  TYPE=      1  TARGET=      841.940
 ELENCL=   1150.00  ELENCR=   1152.00
    32.000     24.98   1157.68      0.00      0.00   1159.44      1.76      0.21      0.01   1149.37
  215000.0    5404.3  206732.1    2863.6     796.5   19187.2     517.7    7142.1     424.1   1152.00
      0.41      6.79     10.77      5.53     0.026     0.035     0.026     0.000   1132.70    542.21
  0.001010      200.      200.      200.         2         0         0      0.00   1060.04   1602.25

1490 NH CARD USED
*SECNO 34.000

3470 ENCROACHMENT STATIONS=      656.2    1500.0  TYPE=      1  TARGET=      843.830
 ELENCL=   1150.00  ELENCR=   1152.00
    34.000     24.98   1157.88      0.00      0.00   1159.64      1.76      0.20      0.00   1149.57
  215000.0    4647.7  207314.8    3037.5     685.6   19251.7     537.5    7236.2     428.9   1152.00
      0.42      6.78     10.77      5.65     0.026     0.035     0.026     0.000   1132.90    556.99
  0.001007      200.      200.      200.         0         0         0      0.00   1045.60   1602.59
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 36.000

3470 ENCROACHMENT STATIONS=      658.8    1500.0  TYPE=      1  TARGET=      841.220
 ELENCL=   1150.00  ELENCR=   1152.00
    36.000      24.96   1158.06      0.00       0.00   1159.88      1.81       0.22       0.02   1149.81
  215000.0     3324.9  208428.9    3246.2      496.4   19087.7     554.2     7336.4      434.0   1152.00
      0.42       6.70     10.92      5.86      0.027     0.035     0.026      0.000    1133.10    584.94
  0.001042       230.      215.      200.          2         0         0       0.00    1017.85   1602.79

1490 NH CARD USED
*SECNO 38.000

3470 ENCROACHMENT STATIONS=      661.4    1500.0  TYPE=      1  TARGET=      838.610
 ELENCL=   1150.00  ELENCR=   1152.00
    38.000      25.00   1158.30      0.00       0.00   1160.12      1.82       0.24       0.00   1150.08
  215000.0     2826.0  208714.1    3460.0      429.0   19086.8     577.0     7442.5      439.3   1152.00
      0.43       6.59     10.93      6.00      0.027     0.035     0.026      0.000    1133.30    595.84
  0.001041       260.      230.      200.          0         0         0       0.00    1007.37   1603.21

1490 NH CARD USED
*SECNO 40.000

3470 ENCROACHMENT STATIONS=      671.8    1500.0  TYPE=      1  TARGET=      828.220
 ELENCL=   1151.00  ELENCR=   1152.00
    40.000      24.99   1158.49      0.00       0.00   1160.39      1.90       0.24       0.02   1150.35
  215000.0     1570.6  209617.0    3812.4      266.7   18778.1     633.4     7547.4      444.6   1152.00
      0.44       5.89     11.16      6.02      0.028     0.035     0.026      0.000    1133.50    624.54
  0.001090       260.      230.      200.          2         0         0       0.00     990.75   1615.29

1490 NH CARD USED
*SECNO 42.000

3470 ENCROACHMENT STATIONS=      673.8    1500.0  TYPE=      1  TARGET=      826.220
 ELENCL=   1151.30  ELENCR=   1152.00
    42.000      25.04   1158.74      0.00       0.00   1160.64      1.90       0.25       0.00   1150.62
  215000.0     1550.0  209480.6    3969.4      264.3   18754.5     623.4     7650.9      449.7   1152.00
      0.44       5.86     11.17      6.37      0.028     0.035     0.026      0.000    1133.70    626.65
  0.001089       260.      230.      200.          0         0         0       0.00     978.54   1605.19
```

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

1490 NH CARD USED
*SECNO 44.000

3470 ENCROACHMENT STATIONS=      690.8    1500.0  TYPE=      1  TARGET=      809.220
 ELENCL=   1151.60  ELENCR=   1151.60
    44.000     24.94   1158.94       0.00       0.00   1160.92       1.98       0.26       0.02   1150.89
  215000.0    1549.0  208772.7     4678.3      260.1   18311.1      677.4     7753.3      454.8   1151.60
      0.45      5.96      11.40       6.91      0.028      0.035      0.026      0.000    1134.00    643.89
  0.001139      260.      230.       200.          2          0          0       0.00     960.76   1604.65

1490 NH CARD USED
*SECNO 46.000

3470 ENCROACHMENT STATIONS=      689.8    1500.0  TYPE=      1  TARGET=      810.220
 ELENCL=   1152.00  ELENCR=   1151.20
    46.000     25.03   1159.23       0.00       0.00   1161.18       1.95       0.26       0.00   1151.16
  215000.0    1495.6  208112.2     5392.2      256.0   18396.5      745.5     7855.0      459.9   1151.20
      0.45      5.84      11.31       7.23      0.028      0.035      0.026      0.000    1134.20    642.97
  0.001115      260.      230.       200.          2          0          0       0.00     962.68   1605.65

1490 NH CARD USED
*SECNO 48.000

3470 ENCROACHMENT STATIONS=      682.8    1500.0  TYPE=      1  TARGET=      817.220
 ELENCL=   1152.00  ELENCR=   1150.80
    48.000     25.16   1159.56       0.00       0.00   1161.44       1.88       0.25       0.01   1151.43
  215000.0    1580.0  207311.5     6108.5      269.4   18646.4      817.2     7958.0      464.9   1150.80
      0.46      5.87      11.12       7.48      0.028      0.035      0.026      0.000    1134.40    635.48
  0.001068      260.      230.       200.          2          0          0       0.00     971.15   1606.63

1490 NH CARD USED
*SECNO 50.000

3470 ENCROACHMENT STATIONS=      670.8    1500.0  TYPE=      1  TARGET=      829.220
 ELENCL=   1151.80  ELENCR=   1150.40
    50.000     25.26   1159.86       0.00       0.00   1161.66       1.80       0.21       0.01   1151.65
  215000.0    1702.9  206784.8     6512.3      287.5   19001.2      861.7     8051.8      469.5   1150.40
      0.46      5.92      10.88       7.56      0.028      0.035      0.026      0.000    1134.60    622.88
  0.001017      210.      205.       200.          2          0          0       0.00     984.21   1607.08
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 52.000

3470 ENCROACHMENT STATIONS=      661.8    1500.0  TYPE=      1  TARGET=      838.220
 ELENCL=   1151.60  ELENCR=   1150.00
    52.000      25.30   1160.10      0.00       0.00   1161.85      1.75       0.19       0.00   1151.83
  215000.0     1723.4  206619.8    6656.9      292.3  19243.1    879.8     8139.5      473.8   1150.24
      0.47       5.90     10.74      7.57      0.028    0.035    0.026      0.000    1134.80    613.69
  0.000987       175.      188.      200.          2        0        0       0.00     993.48   1607.18

1490 NH CARD USED
*SECNO 54.000

3470 ENCROACHMENT STATIONS=      654.8    1500.0  TYPE=      1  TARGET=      845.220
 ELENCL=   1151.40  ELENCR=   1150.00
    54.000      25.32   1160.32      0.00       0.00   1162.03      1.72       0.18       0.00   1152.00
  215000.0     1719.7  206709.8    6570.5      294.5  19458.0    879.4     8224.5      477.9   1150.46
      0.47       5.84     10.62      7.47      0.028    0.035    0.026      0.000    1135.00    606.56
  0.000963       160.      180.      200.          2        0        0       0.00    1000.61   1607.16

1490 NH CARD USED
*SECNO 56.000

3470 ENCROACHMENT STATIONS=      645.8    1500.0  TYPE=      1  TARGET=      854.220
 ELENCL=   1151.20  ELENCR=   1150.00
    56.000      25.32   1160.52      0.00       0.00   1162.21      1.69       0.17       0.00   1152.17
  215000.0     1719.5  206767.3    6513.3      296.1  19631.1    878.8     8310.4      482.1   1150.67
      0.48       5.81     10.53      7.41      0.028    0.035    0.026      0.000    1135.20    597.45
  0.000948       160.      180.      200.          2        0        0       0.00    1009.69   1607.15

1490 NH CARD USED
*SECNO 58.000

3470 ENCROACHMENT STATIONS=      638.8    1500.0  TYPE=      1  TARGET=      861.220
 ELENCL=   1151.00  ELENCR=   1150.30
    58.000      25.32   1160.72      0.00       0.00   1162.38      1.66       0.17       0.00   1152.34
  215000.0     1717.1  206833.5    6449.4      297.6  19796.2    877.8     8398.0      486.4   1150.88
      0.48       5.77     10.45      7.35      0.028    0.035    0.026      0.000    1135.40    590.36
  0.000933       165.      182.      200.          2        0        0       0.00    1016.76   1607.12
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 60.000

3470 ENCROACHMENT STATIONS=      629.8    1500.0  TYPE=      1  TARGET=      870.220
 ELENCL=   1151.00  ELENCR=   1150.60
    60.000     25.33   1160.93      0.00      0.00   1162.55      1.63      0.17      0.00   1152.51
  215000.0    1712.8  206910.0    6377.3     299.5   20015.1     877.7    8487.7     490.7   1151.09
      0.49      5.72     10.34      7.27     0.028     0.035     0.026     0.000   1135.60    581.24
  0.000912      170.      185.      200.         2         0         0      0.00   1025.87   1607.12

1490 NH CARD USED
*SECNO 62.000

3470 ENCROACHMENT STATIONS=      620.8    1500.0  TYPE=      1  TARGET=      879.220
 ELENCL=   1151.50  ELENCR=   1151.00
    62.000     25.33   1161.13      0.00      0.00   1162.72      1.59      0.16      0.00   1152.68
  215000.0    1705.5  207008.4    6286.0     300.9   20230.3     875.4    8576.0     495.0   1151.31
      0.49      5.67     10.23      7.18     0.028     0.035     0.026     0.000   1135.80    572.16
  0.000893      160.      180.      200.         2         0         0      0.00   1034.90   1607.05

1490 NH CARD USED
*SECNO 64.000

3470 ENCROACHMENT STATIONS=      612.8    1500.0  TYPE=      1  TARGET=      887.220
 ELENCL=   1152.00  ELENCR=   1151.30
    64.000     25.33   1161.33      0.00      0.00   1162.88      1.56      0.16      0.00   1152.84
  215000.0    1697.7  207110.6    6191.7     302.8   20471.5     874.2    8665.2     499.3   1151.52
      0.50      5.61     10.12      7.08     0.028     0.035     0.026     0.000   1136.00    564.04
  0.000870      160.      180.      200.         2         0         0      0.00   1042.98   1607.02

1490 NH CARD USED
*SECNO 66.000

3470 ENCROACHMENT STATIONS=      604.8    1500.0  TYPE=      1  TARGET=      895.220
 ELENCL=   1152.50  ELENCR=   1151.60
    66.000     25.19   1161.49      0.00      0.00   1163.04      1.55      0.16      0.00   1153.01
  215000.0    1693.7  207171.7    6134.6     302.2   20542.4     868.6    8755.0     503.7   1151.73
      0.50      5.60     10.09      7.06     0.028     0.035     0.026     0.000   1136.30    556.08
  0.000871      160.      180.      200.         0         0         0      0.00   1050.79   1606.86
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K/T4PRINT

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


1490 NH CARD USED
*SECNO 68.000

3470 ENCROACHMENT STATIONS=      597.8    1500.0  TYPE=      1  TARGET=      902.220
 ELENCL=   1153.00  ELENCR=   1152.00
    68.000      25.18   1161.68      0.00       0.00   1163.20      1.53       0.16       0.00   1153.19
  215000.0     1686.0  207281.0    6033.1      302.9  20707.7     863.8     8847.8      508.2   1152.00
      0.51       5.57     10.01      6.98      0.028    0.035     0.026      0.000    1136.50    549.03
  0.000857       170.      185.      200.          2        0         0       0.00    1057.75   1606.79


1490 NH CARD USED
*SECNO 69.300

3470 ENCROACHMENT STATIONS=      590.8    1500.0  TYPE=      1  TARGET=      909.220
 ELENCL=   1153.20  ELENCR=   1152.00
    69.300      25.20   1161.80      0.00       0.00   1163.30      1.50       0.09       0.00   1153.28
  215000.0     1681.4  207337.7    5980.9      304.4  20891.3     863.8     8902.5      510.9   1152.09
      0.51       5.52      9.92      6.92      0.028    0.035     0.026      0.000    1136.60    541.94
  0.000842        85.      108.      130.          2        0         0       0.00    1064.78   1606.73


SPECIAL BRIDGE

SB  XK         XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.05       1.56       2.63       0.00    831.00      54.00   34820.00       5.00    1136.75    1136.65

1490 NH CARD USED
*SECNO 70.300
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1161.67 BRIDGE VELOCITY=       9.55     CALCULATED CHANNEL AREA=     22472.

 EGPRS      EGLWC      H3         QWEIR      QLOW       BAREA    TRAPEZOID      ELLC       ELTRD      WEIRLN
                                                                   AREA
      0.00   1163.47       0.19        0.   215000.    34820.     33919.     1172.28    1176.98         0.


3470 ENCROACHMENT STATIONS=      589.8    1500.0  TYPE=      1  TARGET=      910.220
 ELENCL=   1153.40  ELENCR=   1152.00
              *****  Rural Road bridge  *****

    70.300      25.24   1161.99      0.00       0.00   1163.47      1.49       0.17       0.00   1153.36
  215000.0     1703.4  207259.5    6037.1      309.1  20977.9     873.0     8949.3      513.1   1152.19
      0.51       5.51      9.88      6.92      0.028    0.035     0.026      0.000    1136.75    540.62
  0.000831        85.       92.      100.          0        0         0       0.00    1066.35   1606.98
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 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

1490 NH CARD USED
*SECNO 72.000

3470 ENCROACHMENT STATIONS=      581.8    1500.0  TYPE=      1  TARGET=      918.220
 ELENCL=   1153.60  ELENCR=   1152.00
   72.000     25.21   1162.11      0.00      0.00   1163.61      1.50      0.13      0.00   1153.53
 215000.0    1690.7  209390.2    3919.1     307.0   21144.4     594.3    9030.6     517.0   1152.37
     0.52      5.51      9.90      6.59     0.028     0.035     0.027     0.000   1136.90    532.73
 0.000835      150.      160.      170.         0         0         0      0.00   1044.04   1576.78

1490 NH CARD USED
*SECNO 74.000

3470 ENCROACHMENT STATIONS=      571.8    1500.0  TYPE=      1  TARGET=      928.220
 ELENCL=   1153.80  ELENCR=   1152.50
   74.000     25.16   1162.26      0.00      0.00   1163.76      1.51      0.15      0.00   1153.76
 215000.0    1665.9  211211.8    2122.3     302.9   21319.7     362.6    9121.7     521.3   1152.59
     0.52      5.50      9.91      5.85     0.028     0.035     0.028     0.000   1137.10    523.00
 0.000839      160.      180.      200.         0         0         0      0.00   1029.29   1552.29

1490 NH CARD USED
*SECNO 76.000

3470 ENCROACHMENT STATIONS=      556.8    1500.0  TYPE=      1  TARGET=      943.220
 ELENCL=   1154.00  ELENCR=   1153.00
   76.000     25.15   1162.45      0.00      0.00   1163.91      1.46      0.15      0.00   1153.99
 215000.0    1632.1  211314.5    2053.4     301.6   21663.0     359.3    9213.3     525.6   1153.00
     0.53      5.41      9.75      5.71     0.028     0.035     0.028     0.000   1137.30    508.11
 0.000814      160.      180.      200.         2         0         0      0.00   1044.13   1552.24

1490 NH CARD USED
*SECNO 78.000

3470 ENCROACHMENT STATIONS=      532.8    1500.0  TYPE=      1  TARGET=      967.250
 ELENCL=   1154.20  ELENCR=   1153.50
   78.000     25.18   1162.68      0.00      0.00   1164.06      1.39      0.14      0.01   1154.22
 215000.0    1588.2  211502.9    1908.9     301.3   22246.4     348.9    9306.7     529.9   1153.50
     0.53      5.27      9.51      5.47     0.028     0.035     0.028     0.000   1137.50    484.10
 0.000771      160.      180.      200.         2         0         0      0.00   1067.94   1552.04
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


1490 NH CARD USED
*SECNO 80.000

3470 ENCROACHMENT STATIONS=      506.8    1500.0  TYPE=      1  TARGET=      993.220
 ELENCL=   1154.40  ELENCR=   1154.00
    80.000      25.19   1162.89      0.00       0.00   1164.21       1.32       0.14       0.01   1154.45
  215000.0     1540.7  211699.3    1760.0      300.6   22865.0      336.7     9403.7      534.5   1154.00
      0.54       5.13       9.26      5.23      0.028     0.035      0.028      0.000    1137.70    458.18
  0.000731       165.       182.      200.          2         0          0       0.00    1093.57   1551.75


1490 NH CARD USED
*SECNO 82.000

3470 ENCROACHMENT STATIONS=      471.8    1500.0  TYPE=      1  TARGET=     1028.220
 ELENCL=   1154.60  ELENCR=   1154.50
    82.000      25.22   1163.12      0.00       0.00   1164.34       1.23       0.13       0.01   1154.68
  215000.0     1483.9  211907.8    1608.4      300.4   23712.1      325.2     9502.5      539.1   1154.50
      0.55       4.94       8.94      4.95      0.028     0.035      0.028      0.000    1137.90    423.19
  0.000679       160.       180.      200.          2         0          0       0.00    1128.31   1551.50


1490 NH CARD USED
*SECNO 84.000

3470 ENCROACHMENT STATIONS=      435.8    1500.0  TYPE=      1  TARGET=     1064.220
 ELENCL=   1154.80  ELENCR=   1155.00
    84.000      25.22   1163.32      0.00       0.00   1164.47       1.15       0.12       0.01   1154.91
  215000.0     1426.0  212110.0    1463.9      299.2   24562.3      312.8     9604.8      543.8   1155.00
      0.55       4.77       8.64      4.68      0.028     0.035      0.028      0.000    1138.10    387.26
  0.000634       160.       180.      200.          2         0          0       0.00    1163.91   1551.17


1490 NH CARD USED
*SECNO 86.000

3470 ENCROACHMENT STATIONS=      388.8    1500.0  TYPE=      1  TARGET=     1111.220
 ELENCL=   1155.00  ELENCR=   1154.50
    86.000      25.14   1163.54      0.00       0.00   1164.59       1.05       0.11       0.01   1155.14
  215000.0     1360.9  212025.0    1614.2      298.5   25635.8      343.0     9712.3      548.8   1154.50
      0.56       4.56       8.27      4.71      0.028     0.035      0.028      0.000    1138.40    340.31
  0.000581       165.       182.      200.          2         0          0       0.00    1211.61   1551.91
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 88.000

3470 ENCROACHMENT STATIONS=      322.8    1500.0  TYPE=      1  TARGET=     1177.220
 ELENCL=   1155.00  ELENCR=   1154.00
    88.000     25.17   1163.77      0.00      0.00   1164.70      0.93      0.10      0.01   1155.37
  215000.0    1278.5  212056.0    1665.5     298.4   27224.7     363.5    9824.3     553.9   1154.08
      0.56      4.28      7.79      4.58     0.028     0.035     0.028     0.000   1138.60    274.31
  0.000513      160.      180.      200.         2         0         0      0.00   1278.03   1552.34

1490 NH CARD USED
*SECNO 90.000

3470 ENCROACHMENT STATIONS=      265.8    1500.0  TYPE=      1  TARGET=     1234.220
 ELENCL=   1155.00  ELENCR=   1154.00
    90.000     25.13   1163.94      0.00      0.00   1164.80      0.85      0.09      0.01   1155.57
  215000.0    1244.4  212202.3    1553.3     301.7   28537.6     348.8    9940.9     559.2   1154.29
      0.57      4.12      7.44      4.45     0.028     0.035     0.028     0.000   1138.81    217.11
  0.000468      155.      178.      200.         2         0         0      0.00   1332.37   1549.49

1490 NH CARD USED
*SECNO 92.000

3470 ENCROACHMENT STATIONS=      215.8    1500.0  TYPE=      1  TARGET=     1284.220
 ELENCL=   1155.00  ELENCR=   1154.00
    92.000     25.08   1164.08      0.00      0.00   1164.88      0.80      0.08      0.00   1157.74
  215000.0     977.6  212787.3    1235.1     271.7   29496.0     306.9   10062.0     564.8   1155.51
      0.58      3.60      7.21      4.03     0.028     0.035     0.028     0.000   1139.00    167.48
  0.000444      155.      178.      200.         2         0         0      0.00   1381.51   1548.99

1490 NH CARD USED
*SECNO 94.000

3470 ENCROACHMENT STATIONS=      168.8    1500.0  TYPE=      1  TARGET=     1331.250
 ELENCL=   1155.00  ELENCR=   1154.00
    94.000     25.01   1164.24      0.00      0.00   1164.96      0.73      0.07      0.01   1155.92
  215000.0    1106.9  212496.1    1397.0     294.5   30912.4     342.4   10187.9     570.5   1154.72
      0.58      3.76      6.87      4.08     0.028     0.035     0.028     0.000   1139.23    120.52
  0.000399      155.      178.      200.         2         0         0      0.00   1428.67   1549.20
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

1490 NH CARD USED
*SECNO 96.000

3470 ENCROACHMENT STATIONS=      150.0    1500.0  TYPE=      1  TARGET=     1350.000
 ELENCL=   1155.00  ELENCR=   1154.50
    96.000     24.89   1164.33      0.00       0.00   1165.05      0.72       0.08       0.00   1156.17
  215000.0    2653.6  210955.0    1391.4      618.3   30866.6    348.6    10342.2      577.6   1154.93
      0.59      4.29      6.83      3.99      0.026     0.035    0.028      0.000    1139.44     61.00
  0.000401      225.      212.      200.          0         0        0       0.00    1490.52   1551.53

1490 NH CARD USED
*SECNO 98.000

3470 ENCROACHMENT STATIONS=        0.0    1500.0  TYPE=      1  TARGET=     1499.999
    98.000     24.89   1164.54      0.00       0.00   1165.15      0.62       0.09       0.01   1206.40
  215000.0       0.0  213705.3    1294.7        0.0   33870.0    348.4    10527.9      586.1   1155.10
      0.60      0.00      6.31      3.72      0.000     0.035    0.028      0.000    1139.65     20.00
  0.000346      290.      245.      200.          2         0        0       0.00    1531.44   1551.44

1490 NH CARD USED
*SECNO 100.000

3470 ENCROACHMENT STATIONS=        0.0    1500.0  TYPE=      1  TARGET=     1499.999
   100.000     24.51   1164.37      0.00       0.00   1165.39      1.02       0.11       0.12   1192.50
  215000.0       0.0  213448.8    1551.2        0.0   26261.8    327.2    10705.5      594.0   1155.50
      0.61      0.00      8.13      4.74      0.000     0.035    0.028      0.000    1139.86    350.00
  0.000596      310.      255.      200.          2         0        0       0.00    1200.39   1550.39

1490 NH CARD USED
*SECNO 102.000

3470 ENCROACHMENT STATIONS=      484.4    1500.0  TYPE=      1  TARGET=     1015.590
 ELENCL=   1155.00  ELENCR=   1156.00
   102.000     24.32   1164.32      0.00       0.00   1165.69      1.37       0.20       0.10   1156.68
  215000.0    1339.1  212039.8    1621.0      262.5   22493.5    304.9    10867.5      601.6   1156.00
      0.62      5.10      9.43      5.32      0.028     0.035    0.028      0.000    1140.00    438.21
  0.000797      370.      285.      200.          2         0        0       0.00    1111.09   1549.31
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

CCHV=    0.300 CEHV=    0.500
*SECNO 103.000
   103.000     22.19    1164.19       0.00       0.00    1165.81       1.62       0.00       0.13    1165.00
  215000.0       0.0  215000.0        0.0        0.0    21056.4        0.0    10868.0      601.6    1165.00
      0.62      0.00      10.21       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
  0.000499        1.         1.         1.          2          0          0       0.00     964.00    1474.00

*SECNO 103.220
   103.220     22.21    1164.21       0.00       0.00    1165.82       1.62       0.01       0.00    1165.00
  215000.0       0.0  215000.0        0.0        0.0    21070.2        0.0    10878.7      602.1    1165.00
      0.62      0.00      10.20       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
  0.000498       22.        22.        22.          0          0          0       0.00     964.00    1474.00

*SECNO 103.280

3265 DIVIDED FLOW

   103.280     22.16    1164.16       0.00       0.00    1165.88       1.72       0.00       0.05    1165.00
  215000.0       0.0  215000.0        0.0        0.0    20406.4        0.0    10881.5      602.2    1165.00
      0.62      0.00      10.54       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
  0.000620        6.         6.         6.          2          0          0       0.00     946.00    1474.00

*SECNO 103.460

3265 DIVIDED FLOW

   103.460     22.17    1164.17       0.00       0.00    1165.89       1.72       0.01       0.00    1165.00
  215000.0       0.0  215000.0        0.0        0.0    20416.0        0.0    10890.0      602.6    1165.00
      0.62      0.00      10.53       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
  0.000619       18.        18.        18.          0          0          0       0.00     946.00    1474.00

*SECNO 103.520
   103.520     22.33    1164.33       0.00       0.00    1165.93       1.60       0.00       0.04    1165.00
  215000.0       0.0  215000.0        0.0        0.0    21192.7        0.0    10892.8      602.7    1165.00
      0.62      0.00      10.15       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
  0.000489        6.         6.         6.          2          0          0       0.00     964.00    1474.00
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 103.800
  103.800      22.35    1164.35       0.00       0.00    1165.95       1.60       0.01       0.00    1165.00
 215000.0       0.0   215000.0        0.0        0.0    21207.4        0.0    10906.5      603.3    1165.00
     0.62      0.00      10.14       0.00      0.000      0.025      0.000      0.000    1142.00     510.00
 0.000487       28.        28.        28.          0          0          0       0.00     964.00    1474.00

CCHV=    0.100 CEHV=    0.300
*SECNO 103.810
  103.810      24.56    1164.63       0.00       0.00    1165.97       1.34       0.00       0.03    1156.75
 215000.0     1104.5   212469.8     1425.6      273.8    22738.5      327.7    10907.0      603.4    1155.64
     0.62      4.03       9.34       4.35      0.035      0.035      0.035      0.000    1140.07     437.49
 0.000772        1.         1.         1.          2          0          0       0.00    1112.76    1550.25

*SECNO 104.000
  104.000      24.44    1164.64       0.00       0.00    1166.14       1.51       0.12       0.05    1156.88
 215000.0     1139.4   212391.4     1469.2      268.0    21467.0      320.6    10984.0      607.1    1155.79
     0.63      4.25       9.89       4.58      0.035      0.035      0.035      0.000    1140.20     488.95
 0.000872       178.       148.       118.          2          0          0       0.00    1060.87    1549.82

*SECNO 106.000
  106.000      24.43    1164.83       0.00       0.00    1166.34       1.50       0.20       0.00    1157.13
 215000.0     1122.1   212841.7     1036.3      265.3    21537.1      239.3    11097.9      612.5    1156.00
     0.63      4.23       9.88       4.33      0.035      0.035      0.035      0.000    1140.40     485.13
 0.000871       250.       225.       200.          1          0          0       0.00    1055.34    1540.46

*SECNO 108.000
  108.000      24.51    1165.21       0.00       0.00    1166.54       1.33       0.18       0.02    1157.38
 215000.0     1084.0   213557.9     358.1      271.3    22982.5      117.4    11215.3      618.1    1156.36
     0.64      4.00       9.29       3.05      0.035      0.035      0.035      0.000    1140.70     426.74
 0.000763       250.       225.       200.          2          0          0       0.00    1099.79    1526.54

*SECNO 110.000

3301 HV CHANGED MORE THAN HVINS

  110.000      24.09    1164.99       0.00       0.00    1166.94       1.94       0.21       0.18    1157.63
 215000.0     1202.7   213797.3        0.0      250.1    19080.1        0.0    11327.1      623.5    1170.30
     0.65      4.81      11.21       0.00      0.035      0.035      0.000      0.000    1140.90     545.12
 0.001186       255.       228.       200.          2          0          0       0.00     938.96    1484.09
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  SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
  Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
  TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
  SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 112.000
  112.000     24.10    1165.20       0.00       0.00    1167.21       2.02       0.26       0.02    1157.86
 215000.0    1219.3   213780.8        0.0      249.0    18717.6        0.0    11420.4      628.0    1170.51
     0.65      4.90      11.42       0.00      0.035      0.035      0.000      0.000    1141.10     561.19
 0.001234      225.       212.       200.          0          0          0       0.00     922.88    1484.07

*SECNO 114.000
  114.000     24.28    1165.58       0.00       0.00    1167.46       1.88       0.24       0.01    1158.06
 215000.0    1226.6   213773.4        0.0      257.3    19377.1        0.0    11509.0      632.3    1170.73
     0.66      4.77      11.03       0.00      0.035      0.035      0.000      0.000    1141.30     538.65
 0.001137      200.       200.       200.          2          0          0       0.00     945.91    1484.56

*SECNO 116.000
  116.000     24.59    1166.09       0.00       0.00    1167.70       1.62       0.21       0.03    1158.26
 215000.0    1212.8   213787.2        0.0      271.3    20913.7        0.0    11603.7      636.8    1170.94
     0.66      4.47      10.22       0.00      0.035      0.035      0.000      0.000    1141.50     482.74
 0.000955      205.       202.       200.          2          0          0       0.00    1002.70    1485.44

*SECNO 118.000
  118.000     24.79    1166.49       0.00       0.00    1167.90       1.41       0.18       0.02    1158.47
 215000.0    1179.3   213820.7        0.0      280.5    22385.4        0.0    11706.9      641.7    1171.15
     0.67      4.20       9.55       0.00      0.035      0.035      0.000      0.000    1141.70     427.15
 0.000821      210.       205.       200.          2          0          0       0.00    1058.88    1486.03

*SECNO 119.800

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1158.65 ELREA=      1171.37

  119.800     24.83    1166.73       0.00       0.00    1168.06       1.33       0.15       0.01    1158.65
 215000.0    1158.8   213841.2        0.0      283.5    23077.1        0.0    11807.2      646.3    1171.37
     0.67      4.09       9.27       0.00      0.035      0.035      0.000      0.000    1141.90     398.97
 0.000769      180.       190.       200.          2          0          0       0.00    1087.13    1486.09

*SECNO 120.420

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1158.71 ELREA=      1171.41

  120.420     24.74    1166.74       0.00       0.00    1168.12       1.38       0.04       0.01    1158.71
 215000.0    1156.6   213843.4        0.0      278.7    22667.4        0.0    11833.8      647.6    1171.41
     0.68      4.15       9.43       0.00      0.035      0.035      0.000      0.000    1142.00     399.13
 0.000801       57.        50.        42.          2          0          0       0.00    1071.86    1470.99
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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 120.500

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  0.65

             *****  Grade Control Str. No. 5  *****

  120.500     19.09   1166.09       0.00       0.00   1168.41       2.32       0.01       0.28   1158.72
 215000.0    1531.9  213468.0        0.0      250.5   17430.3        0.0    11837.6      647.8   1171.42
     0.68      6.12      12.25       0.00      0.035     0.035      0.000      0.000    1147.00    398.09
 0.001914        8.         8.         8.          2         0          0       0.00    1070.93   1469.03

*SECNO 122.000
  122.000     19.23   1166.33       0.00       0.00   1168.73       2.40       0.29       0.02   1158.87
 215000.0    1587.4  213412.6        0.0      254.4   17130.7        0.0    11898.8      651.5   1171.58
     0.68      6.24      12.46       0.00      0.035     0.035      0.000      0.000    1147.10    395.84
 0.001967      155.       152.       150.          2         0          0       0.00    1048.41   1444.25

*SECNO 122.650

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA=      1158.94 ELREA=      1171.65

  122.650     19.24   1166.44       0.00       0.00   1168.86       2.42       0.13       0.01   1158.94
 215000.0    1621.8  213378.2        0.0      256.6   17036.0        0.0    11924.6      653.0   1171.65
     0.68      6.32      12.53       0.00      0.035     0.035      0.000      0.000    1147.20    395.69
 0.002002       65.        65.        65.          1         0          0       0.00    1048.71   1444.40


SPECIAL BRIDGE

SB  XK        XKOR       COFQ      RDLEN      BWC        BWP       BAREA      SS         ELCHU      ELCHD
     1.05      1.56       2.63       0.00     798.00     66.00   24246.00      6.30    1147.31    1147.22

*SECNO 123.550
CLASS A LOW FLOW

3420 BRIDGE W.S.=    1165.91 BRIDGE VELOCITY=      13.57     CALCULATED CHANNEL AREA=     15797.
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
0.00	1169.26	0.63	0.	215000.	24246.	31362.	1180.61	1181.80	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 1159.00 ELREA= 1171.75

***** McClintock Drive Bridge *****

123.550	19.76	1167.07	0.00	0.00	1169.26	2.19	0.39	0.00	1159.00
215000.0	1380.6	213619.4	0.0	233.9	17950.5	0.0	11961.3	655.2	1171.75
0.68	5.90	11.90	0.00	0.035	0.035	0.000	0.000	1147.31	400.10
0.001714	90.	90.	90.	0	0	0	0.00	1054.07	1454.17

*SECNO 124.000

124.000	19.85	1167.15	0.00	0.00	1169.34	2.18	0.08	0.00	1159.07
215000.0	1729.1	213270.9	0.0	283.4	17929.1	0.0	11980.1	656.3	1171.79
0.68	6.10	11.90	0.00	0.035	0.035	0.000	0.000	1147.30	388.97
0.001714	45.	45.	45.	0	0	0	0.00	1062.12	1451.09

*SECNO 126.000

126.000	20.29	1167.84	0.00	0.00	1169.68	1.83	0.31	0.04	1159.20
215000.0	2373.0	212627.0	0.0	516.1	19477.4	0.0	12067.8	661.5	1172.01
0.69	4.60	10.92	0.00	0.035	0.035	0.000	0.000	1147.55	275.46
0.001392	200.	200.	200.	2	0	0	0.00	1212.05	1487.51

*SECNO 128.000

128.000	20.36	1168.06	0.00	0.00	1170.00	1.94	0.29	0.03	1159.47
215000.0	1959.7	213040.3	0.0	468.6	18976.0	0.0	12158.3	667.1	1170.00
0.69	4.18	11.23	0.00	0.035	0.035	0.000	0.000	1147.70	266.94
0.001543	200.	200.	200.	2	0	0	0.00	1218.94	1485.88

THIS RUN EXECUTED 16SEP94 14:31:42

****
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

RS-PROP.HC2

SUMMARY PRINTOUT

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
10035.000	0.00	0.00	205000.00	1119.15	21.95	1097.20	11.84	18.99
10200.000	165.00	165.00	205000.00	1119.49	21.39	1098.10	11.75	18.46
10400.000	200.00	365.00	205000.00	1119.89	21.79	1098.10	11.66	17.91
10600.000	200.00	565.00	205000.00	1120.27	21.77	1098.50	11.62	17.75
10800.000	200.00	765.00	205000.00	1120.60	21.60	1099.00	11.75	18.40
11000.000	200.00	965.00	205000.00	1121.07	21.57	1099.50	11.44	16.92
11200.000	200.00	1165.00	205000.00	1121.47	21.47	1100.00	11.26	15.95
11400.000	200.00	1365.00	205000.00	1121.88	21.48	1100.40	11.00	14.94
11600.000	200.00	1565.00	205000.00	1122.32	21.42	1100.90	10.55	13.12
11800.000	200.00	1765.00	205000.00	1122.53	21.13	1101.40	10.83	14.33
12000.000	200.00	1965.00	205000.00	1122.82	21.02	1101.80	10.82	14.23
12100.000	100.00	2065.00	205000.00	1122.93	20.83	1102.10	10.97	14.81
12200.000	100.00	2165.00	205000.00	1123.07	20.77	1102.30	11.00	14.93
12400.000	200.00	2365.00	205000.00	1123.28	20.48	1102.80	11.43	16.26
12600.000	200.00	2565.00	205000.00	1123.63	20.43	1103.20	11.35	15.71
12800.000	200.00	2765.00	205000.00	1123.92	20.22	1103.70	11.44	16.24
13000.000	200.00	2965.00	205000.00	1124.24	20.04	1104.20	11.51	16.45

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
13200.000	200.00	3165.00	205000.00	1124.54	19.84	1104.70	11.64	17.08
13400.000	200.00	3365.00	205000.00	1124.87	19.77	1105.10	11.69	17.29
13600.000	200.00	3565.00	205000.00	1125.17	19.57	1105.60	11.92	18.27
13800.000	200.00	3765.00	205000.00	1125.53	19.43	1106.10	11.94	18.50
14000.000	200.00	3965.00	205000.00	1125.94	19.44	1106.50	11.82	18.06
14200.000	200.00	4165.00	205000.00	1126.34	19.34	1107.00	11.74	18.05
14400.000	200.00	4365.00	205000.00	1126.68	19.18	1107.50	11.88	18.46
14665.000	265.00	4630.00	205000.00	1127.13	18.93	1108.20	12.09	19.17
14785.000	120.00	4750.00	205000.00	1127.41	19.01	1108.40	12.00	19.07
15000.000	215.00	4965.00	205000.00	1127.81	18.91	1108.90	12.05	19.61
15200.000	200.00	5165.00	205000.00	1128.18	18.78	1109.40	12.14	20.10
15400.000	200.00	5365.00	205000.00	1128.58	18.78	1109.80	12.17	19.92
15586.000	186.00	5551.00	210000.00	1128.88	18.58	1110.30	12.62	21.75
15710.000	124.00	5675.00	210000.00	1129.33	18.73	1110.60	12.52	21.20
16000.000	290.00	5965.00	210000.00	1129.94	18.64	1111.30	12.55	21.85
16200.000	200.00	6165.00	210000.00	1130.45	18.75	1111.70	12.36	20.92
16400.000	200.00	6365.00	210000.00	1130.83	18.63	1112.20	12.53	21.76
16600.000	200.00	6565.00	210000.00	1131.26	18.56	1112.70	12.56	21.97
16800.000	200.00	6765.00	210000.00	1131.70	18.50	1113.20	12.58	22.16
17000.000	200.00	6965.00	210000.00	1132.16	18.56	1113.60	12.51	21.80
17200.000	200.00	7165.00	210000.00	1132.59	18.49	1114.10	12.56	22.08
17400.000	200.00	7365.00	210000.00	1133.02	18.42	1114.60	12.62	22.15
17600.000	200.00	7565.00	210000.00	1133.44	18.44	1115.00	12.70	22.28
17800.000	200.00	7765.00	210000.00	1133.87	18.37	1115.50	12.77	22.62
18000.000	200.00	7965.00	210000.00	1134.30	18.30	1116.00	12.84	23.02
18200.000	200.00	8165.00	210000.00	1134.74	18.24	1116.50	12.94	23.46

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
18400.000	200.00	8365.00	210000.00	1135.29	18.39	1116.90	12.72	22.47
18600.000	200.00	8565.00	210000.00	1135.68	18.28	1117.40	13.00	23.44
18800.000	200.00	8765.00	210000.00	1136.11	18.21	1117.90	13.15	24.32
19000.000	200.00	8965.00	210000.00	1136.59	18.29	1118.30	13.18	24.25
19200.000	200.00	9165.00	210000.00	1137.04	18.24	1118.80	13.30	24.78
19400.000	200.00	9365.00	210000.00	1137.50	18.20	1119.30	13.45	25.40
19600.000	200.00	9565.00	210000.00	1137.98	18.18	1119.80	13.59	25.97
19800.000	200.00	9765.00	210000.00	1138.49	18.29	1120.20	13.60	25.79
20000.000	200.00	9965.00	210000.00	1138.96	18.26	1120.70	13.77	26.47
20200.000	200.00	10165.00	210000.00	1139.46	18.26	1121.20	13.91	27.03
20400.000	200.00	10365.00	210000.00	1140.02	18.42	1121.60	13.83	26.26
20600.000	200.00	10565.00	210000.00	1140.49	18.39	1122.10	14.07	27.36
20782.000	178.00	10743.00	210000.00	1141.01	18.51	1122.50	14.00	27.27
20800.000	18.00	10761.00	210000.00	1141.07	18.54	1122.53	13.98	27.17
21000.000	200.00	10961.00	210000.00	1141.67	18.81	1122.86	13.82	25.27
21050.000	50.00	11011.00	210000.00	1141.76	18.56	1123.20	13.99	26.29
21150.000	100.00	11111.00	210000.00	1142.39	18.99	1123.40	13.63	24.18
21200.000	50.00	11161.00	210000.00	1142.67	19.48	1123.19	13.27	22.08
21400.000	200.00	11361.00	210000.00	1143.22	19.70	1123.52	13.01	21.59
21600.000	200.00	11561.00	210000.00	1143.80	19.95	1123.85	12.65	19.97
21800.000	200.00	11761.00	210000.00	1144.16	19.98	1124.18	12.78	20.38
22000.000	200.00	11961.00	210000.00	1144.60	20.09	1124.51	12.72	20.04
22200.000	200.00	12161.00	210000.00	1145.02	20.18	1124.84	12.66	19.79
22400.000	200.00	12361.00	210000.00	1145.43	20.25	1125.18	12.62	19.56
22600.000	200.00	12561.00	210000.00	1145.86	20.35	1125.51	12.51	19.01
22800.000	200.00	12761.00	210000.00	1146.25	20.41	1125.84	12.48	18.88

	SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
	23000.000	200.00	12961.00	210000.00	1146.59	19.89	1126.70	12.66	19.71
	23200.000	200.00	13161.00	210000.00	1147.11	20.61	1126.50	12.33	18.11
	23400.000	200.00	13361.00	210000.00	1147.47	20.64	1126.83	12.32	18.06
	23600.000	200.00	13561.00	210000.00	1147.84	20.68	1127.16	12.32	18.01
	23800.000	200.00	13761.00	210000.00	1148.20	20.74	1127.46	12.29	17.90
	24000.000	200.00	13961.00	210000.00	1148.64	20.82	1127.82	12.07	16.86
	24200.000	200.00	14161.00	210000.00	1149.04	20.89	1128.15	11.92	16.19
	24400.000	200.00	14361.00	210000.00	1149.43	20.95	1128.48	11.72	15.15
	24600.000	200.00	14561.00	210000.00	1149.83	21.02	1128.81	11.45	14.38
	24617.000	17.00	14578.00	210000.00	1149.86	21.02	1128.84	11.45	14.39
*	24618.000	1.00	14579.00	210000.00	1149.83	20.93	1128.90	11.58	7.03
	24687.000	69.00	14648.00	210000.00	1149.88	20.88	1129.00	11.61	7.09
	24688.000	1.00	14649.00	210000.00	1149.44	17.44	1132.00	13.84	12.66
	24700.000	12.00	14661.00	210000.00	1149.20	17.20	1132.00	14.99	17.34
	24733.000	33.00	14694.00	210000.00	1149.32	17.32	1132.00	14.87	16.93
	24744.000	11.00	14705.00	210000.00	1150.49	18.49	1132.00	12.82	19.29
	24800.000	56.00	14761.00	210000.00	1150.64	18.64	1132.00	12.72	18.77
	0.000	155.00	14916.00	210000.00	1151.08	19.08	1132.00	12.34	17.42
	2.000	160.00	15076.00	210000.00	1151.34	19.34	1132.00	12.43	17.42
	4.000	200.00	15276.00	210000.00	1151.70	19.70	1132.00	12.41	17.02
	6.000	200.00	15476.00	210000.00	1151.89	19.89	1132.00	13.05	18.75
	8.000	200.00	15676.00	210000.00	1152.60	20.60	1132.00	12.20	15.78
	10.000	200.00	15876.00	210000.00	1153.04	21.04	1132.00	11.89	14.57
	12.000	200.00	16076.00	210000.00	1153.41	21.41	1132.00	11.67	13.81
	14.000	158.00	16234.00	210000.00	1153.73	21.73	1132.00	11.38	12.96
	15.400	122.00	16356.00	210000.00	1153.72	21.72	1132.00	12.41	15.60

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
15.600	18.00	16374.00	215000.00	1154.65	22.65	1132.00	11.99	13.71
17.300	152.00	16526.00	215000.00	1155.30	23.30	1132.00	10.74	10.61
19.000	172.00	16698.00	215000.00	1155.47	23.47	1132.00	10.79	10.70
21.500	182.00	16880.00	215000.00	1155.86	23.86	1132.00	10.17	9.35
24.000	140.00	17020.00	215000.00	1155.75	23.75	1132.00	11.36	11.90
24.600	60.00	17080.00	215000.00	1156.10	24.10	1132.00	11.27	11.50
26.000	185.00	17265.00	215000.00	1156.32	24.22	1132.10	11.26	11.52
26.450	45.00	17310.00	215000.00	1156.86	24.76	1132.10	10.93	10.52
27.000	155.00	17465.00	215000.00	1157.02	24.82	1132.20	10.97	10.62
28.000	160.00	17625.00	215000.00	1157.19	24.89	1132.30	10.95	10.61
30.000	200.00	17825.00	215000.00	1157.41	24.91	1132.50	10.95	10.59
32.000	200.00	18025.00	215000.00	1157.68	24.98	1132.70	10.77	10.10
34.000	200.00	18225.00	215000.00	1157.88	24.98	1132.90	10.77	10.07
36.000	215.00	18440.00	215000.00	1158.06	24.96	1133.10	10.92	10.42
38.000	230.00	18670.00	215000.00	1158.30	25.00	1133.30	10.93	10.41
40.000	230.00	18900.00	215000.00	1158.49	24.99	1133.50	11.16	10.90
42.000	230.00	19130.00	215000.00	1158.74	25.04	1133.70	11.17	10.89
44.000	230.00	19360.00	215000.00	1158.94	24.94	1134.00	11.40	11.39
46.000	230.00	19590.00	215000.00	1159.23	25.03	1134.20	11.31	11.15
48.000	230.00	19820.00	215000.00	1159.56	25.16	1134.40	11.12	10.68
50.000	205.00	20025.00	215000.00	1159.86	25.26	1134.60	10.88	10.17
52.000	188.00	20213.00	215000.00	1160.10	25.30	1134.80	10.74	9.87
54.000	180.00	20393.00	215000.00	1160.32	25.32	1135.00	10.62	9.63
56.000	180.00	20573.00	215000.00	1160.52	25.32	1135.20	10.53	9.48
58.000	182.00	20755.00	215000.00	1160.72	25.32	1135.40	10.45	9.33
60.000	185.00	20940.00	215000.00	1160.93	25.33	1135.60	10.34	9.12

SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
62.000	180.00	21120.00	215000.00	1161.13	25.33	1135.80	10.23	8.93
64.000	180.00	21300.00	215000.00	1161.33	25.33	1136.00	10.12	8.70
66.000	180.00	21480.00	215000.00	1161.49	25.19	1136.30	10.09	8.71
68.000	185.00	21665.00	215000.00	1161.68	25.18	1136.50	10.01	8.57
69.300	108.00	21773.00	215000.00	1161.80	25.20	1136.60	9.92	8.42
70.300	92.00	21865.00	215000.00	1161.99	25.24	1136.75	9.88	8.31
72.000	160.00	22025.00	215000.00	1162.11	25.21	1136.90	9.90	8.35
74.000	180.00	22205.00	215000.00	1162.26	25.16	1137.10	9.91	8.39
76.000	180.00	22385.00	215000.00	1162.45	25.15	1137.30	9.75	8.14
78.000	180.00	22565.00	215000.00	1162.68	25.18	1137.50	9.51	7.71
80.000	182.00	22747.00	215000.00	1162.89	25.19	1137.70	9.26	7.31
82.000	180.00	22927.00	215000.00	1163.12	25.22	1137.90	8.94	6.79
84.000	180.00	23107.00	215000.00	1163.32	25.22	1138.10	8.64	6.34
86.000	182.00	23289.00	215000.00	1163.54	25.14	1138.40	8.27	5.81
88.000	180.00	23469.00	215000.00	1163.77	25.17	1138.60	7.79	5.13
90.000	178.00	23647.00	215000.00	1163.94	25.13	1138.81	7.44	4.68
92.000	178.00	23825.00	215000.00	1164.08	25.08	1139.00	7.21	4.44
94.000	178.00	24003.00	215000.00	1164.24	25.01	1139.23	6.87	3.99
96.000	212.00	24215.00	215000.00	1164.33	24.89	1139.44	6.83	4.01
98.000	245.00	24460.00	215000.00	1164.54	24.89	1139.65	6.31	3.46
100.000	255.00	24715.00	215000.00	1164.37	24.51	1139.86	8.13	5.96
102.000	285.00	25000.00	215000.00	1164.32	24.32	1140.00	9.43	7.97
103.000	1.00	25001.00	215000.00	1164.19	22.19	1142.00	10.21	4.99
103.220	22.00	25023.00	215000.00	1164.21	22.21	1142.00	10.20	4.98
103.280	6.00	25029.00	215000.00	1164.16	22.16	1142.00	10.54	6.20
103.460	18.00	25047.00	215000.00	1164.17	22.17	1142.00	10.53	6.19

	SECNO	XLCH	CUMDS	Q	CWSEL	DEPTH	ELMIN	VCH	10*KS
	103.520	6.00	25053.00	215000.00	1164.33	22.33	1142.00	10.15	4.89
	103.800	28.00	25081.00	215000.00	1164.35	22.35	1142.00	10.14	4.87
	103.810	1.00	25082.00	215000.00	1164.63	24.56	1140.07	9.34	7.72
	104.000	148.00	25230.00	215000.00	1164.64	24.44	1140.20	9.89	8.72
	106.000	225.00	25455.00	215000.00	1164.83	24.43	1140.40	9.88	8.71
	108.000	225.00	25680.00	215000.00	1165.21	24.51	1140.70	9.29	7.63
	110.000	228.00	25908.00	215000.00	1164.99	24.09	1140.90	11.21	11.86
	112.000	212.00	26120.00	215000.00	1165.20	24.10	1141.10	11.42	12.34
	114.000	200.00	26320.00	215000.00	1165.58	24.28	1141.30	11.03	11.37
	116.000	202.00	26522.00	215000.00	1166.09	24.59	1141.50	10.22	9.55
	118.000	205.00	26727.00	215000.00	1166.49	24.79	1141.70	9.55	8.21
	119.800	190.00	26917.00	215000.00	1166.73	24.83	1141.90	9.27	7.69
	120.420	50.00	26967.00	215000.00	1166.74	24.74	1142.00	9.43	8.01
*	120.500	8.00	26975.00	215000.00	1166.09	19.09	1147.00	12.25	19.14
	122.000	152.00	27127.00	215000.00	1166.33	19.23	1147.10	12.46	19.67
	122.650	65.00	27192.00	215000.00	1166.44	19.24	1147.20	12.53	20.02
	123.550	90.00	27282.00	215000.00	1167.07	19.76	1147.31	11.90	17.14
	124.000	45.00	27327.00	215000.00	1167.15	19.85	1147.30	11.90	17.14
	126.000	200.00	27527.00	215000.00	1167.84	20.29	1147.55	10.92	13.92
	128.000	200.00	27727.00	215000.00	1168.06	20.36	1147.70	11.23	15.43

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SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
10035.000	0.00	0.00	0.00	1097.20	205000.00	1119.15	0.00	1121.33	18.99	11.84	17314.04	47041.63
10200.000	165.00	0.00	0.00	1098.10	205000.00	1119.49	0.00	1121.64	18.46	11.75	17444.88	47711.19
10400.000	200.00	0.00	0.00	1098.10	205000.00	1119.89	0.00	1122.01	17.91	11.66	17581.06	48435.23
10600.000	200.00	0.00	0.00	1098.50	205000.00	1120.27	0.00	1122.36	17.75	11.62	17635.36	48652.58
10800.000	200.00	0.00	0.00	1099.00	205000.00	1120.60	0.00	1122.74	18.40	11.75	17446.96	47787.39
11000.000	200.00	0.00	0.00	1099.50	205000.00	1121.07	0.00	1123.10	16.92	11.44	17927.33	49843.67
11200.000	200.00	0.00	0.00	1100.00	205000.00	1121.47	0.00	1123.44	15.95	11.26	18212.39	51529.78
11400.000	200.00	0.00	0.00	1100.40	205000.00	1121.88	0.00	1123.76	14.94	11.00	18636.96	53043.06
11600.000	200.00	0.00	0.00	1100.90	205000.00	1122.32	0.00	1124.05	13.12	10.55	19433.36	56593.99
11800.000	200.00	0.00	0.00	1101.40	205000.00	1122.53	0.00	1124.35	14.33	10.83	18920.19	54160.89
12000.000	200.00	0.00	0.00	1101.80	205000.00	1122.82	0.00	1124.64	14.23	10.82	18943.78	54346.35
12100.000	100.00	0.00	0.00	1102.10	205000.00	1122.93	0.00	1124.80	14.81	10.97	18678.87	53266.39
12200.000	100.00	0.00	0.00	1102.30	205000.00	1123.07	0.00	1124.95	14.93	11.00	18632.23	53059.09
12400.000	200.00	0.00	0.00	1102.80	205000.00	1123.28	0.00	1125.31	16.26	11.43	17941.12	50831.39
12600.000	200.00	0.00	0.00	1103.20	205000.00	1123.63	0.00	1125.63	15.71	11.35	18063.12	51726.26
12800.000	200.00	0.00	0.00	1103.70	205000.00	1123.92	0.00	1125.96	16.24	11.44	17912.41	50876.70
13000.000	200.00	0.00	0.00	1104.20	205000.00	1124.24	0.00	1126.29	16.45	11.51	17816.27	50549.89
13200.000	200.00	0.00	0.00	1104.70	205000.00	1124.54	0.00	1126.64	17.08	11.64	17607.87	49603.33
13400.000	200.00	0.00	0.00	1105.10	205000.00	1124.87	0.00	1126.99	17.29	11.69	17542.67	49296.23
13600.000	200.00	0.00	0.00	1105.60	205000.00	1125.17	0.00	1127.37	18.27	11.92	17201.78	47965.30
13800.000	200.00	0.00	0.00	1106.10	205000.00	1125.53	0.00	1127.74	18.50	11.94	17162.15	47656.91
14000.000	200.00	0.00	0.00	1106.50	205000.00	1125.94	0.00	1128.11	18.06	11.82	17345.30	48235.90
14200.000	200.00	0.00	0.00	1107.00	205000.00	1126.34	0.00	1128.48	18.05	11.74	17464.47	48255.09
14400.000	200.00	0.00	0.00	1107.50	205000.00	1126.68	0.00	1128.87	18.46	11.88	17252.39	47718.95

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
14665.000	265.00	0.00	0.00	1108.20	205000.00	1127.13	0.00	1129.40	19.17	12.09	16956.15	46820.70
14785.000	120.00	0.00	0.00	1108.40	205000.00	1127.41	0.00	1129.64	19.07	12.00	17077.34	46947.11
15000.000	215.00	0.00	0.00	1108.90	205000.00	1127.81	0.00	1130.06	19.61	12.05	17013.26	46296.07
15200.000	200.00	0.00	0.00	1109.40	205000.00	1128.18	0.00	1130.47	20.10	12.14	16881.19	45722.00
15400.000	200.00	0.00	0.00	1109.80	205000.00	1128.58	0.00	1130.87	19.92	12.17	16847.34	45931.11
15586.000	186.00	0.00	0.00	1110.30	210000.00	1128.88	0.00	1131.35	21.75	12.62	16643.43	45027.13
15710.000	124.00	1145.40	1137.00	1110.60	210000.00	1129.33	0.00	1131.76	21.20	12.52	16768.73	45610.55
16000.000	290.00	0.00	0.00	1111.30	210000.00	1129.94	0.00	1132.39	21.85	12.55	16735.04	44923.11
16200.000	200.00	0.00	0.00	1111.70	210000.00	1130.45	0.00	1132.82	20.92	12.36	16985.21	45912.25
16400.000	200.00	0.00	0.00	1112.20	210000.00	1130.83	0.00	1133.27	21.76	12.53	16757.74	45023.44
16600.000	200.00	0.00	0.00	1112.70	210000.00	1131.26	0.00	1133.71	21.97	12.56	16723.37	44798.88
16800.000	200.00	0.00	0.00	1113.20	210000.00	1131.70	0.00	1134.15	22.16	12.58	16693.36	44606.77
17000.000	200.00	0.00	0.00	1113.60	210000.00	1132.16	0.00	1134.59	21.80	12.51	16784.70	44972.02
17200.000	200.00	0.00	0.00	1114.10	210000.00	1132.59	0.00	1135.04	22.08	12.56	16720.98	44686.38
17400.000	200.00	0.00	0.00	1114.60	210000.00	1133.02	0.00	1135.49	22.15	12.62	16646.72	44621.04
17600.000	200.00	0.00	0.00	1115.00	210000.00	1133.44	0.00	1135.94	22.28	12.70	16539.17	44493.38
17800.000	200.00	0.00	0.00	1115.50	210000.00	1133.87	0.00	1136.40	22.62	12.77	16448.33	44153.70
18000.000	200.00	0.00	0.00	1116.00	210000.00	1134.30	0.00	1136.87	23.02	12.84	16349.00	43767.79
18200.000	200.00	0.00	0.00	1116.50	210000.00	1134.74	0.00	1137.34	23.46	12.94	16230.77	43355.22
18400.000	200.00	0.00	0.00	1116.90	210000.00	1135.29	0.00	1137.81	22.47	12.72	16503.15	44298.94
18600.000	200.00	0.00	0.00	1117.40	210000.00	1135.68	0.00	1138.30	23.44	13.00	16149.84	43371.72
18800.000	200.00	0.00	0.00	1117.90	210000.00	1136.11	0.00	1138.80	24.32	13.15	15964.05	42585.39
19000.000	200.00	0.00	0.00	1118.30	210000.00	1136.59	0.00	1139.29	24.25	13.18	15935.11	42642.48
19200.000	200.00	0.00	0.00	1118.80	210000.00	1137.04	0.00	1139.79	24.78	13.30	15784.15	42184.29
19400.000	200.00	0.00	0.00	1119.30	210000.00	1137.50	0.00	1140.31	25.40	13.45	15616.65	41671.58
19600.000	200.00	0.00	0.00	1119.80	210000.00	1137.98	0.00	1140.84	25.97	13.59	15457.42	41209.75

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
19800.000	200.00	0.00	0.00	1120.20	210000.00	1138.49	0.00	1141.36	25.79	13.60	15436.69	41352.24
20000.000	200.00	0.00	0.00	1120.70	210000.00	1138.96	0.00	1141.91	26.47	13.77	15253.25	40820.09
20200.000	200.00	0.00	0.00	1121.20	210000.00	1139.46	0.00	1142.46	27.03	13.91	15100.07	40393.95
20400.000	200.00	0.00	0.00	1121.60	210000.00	1140.02	0.00	1142.99	26.26	13.83	15179.95	40982.48
20600.000	200.00	0.00	0.00	1122.10	210000.00	1140.49	0.00	1143.56	27.36	14.07	14920.70	40149.63
20782.000	178.00	0.00	0.00	1122.50	210000.00	1141.01	0.00	1144.05	27.27	14.00	15001.98	40210.82
20800.000	18.00	0.00	0.00	1122.53	210000.00	1141.07	0.00	1144.10	27.17	13.98	15019.76	40286.84
21000.000	200.00	0.00	0.00	1122.86	210000.00	1141.67	0.00	1144.63	25.27	13.82	15194.53	41777.93
21050.000	50.00	0.00	0.00	1123.20	210000.00	1141.76	0.00	1144.80	26.29	13.99	15012.54	40959.05
21150.000	100.00	1157.00	1150.00	1123.40	210000.00	1142.39	0.00	1145.27	24.18	13.63	15404.29	42706.17
21200.000	50.00	0.00	0.00	1123.19	210000.00	1142.67	0.00	1145.40	22.08	13.27	15826.03	44691.22
21400.000	200.00	0.00	0.00	1123.52	210000.00	1143.22	0.00	1145.85	21.59	13.01	16141.51	45198.77
21600.000	200.00	0.00	0.00	1123.85	210000.00	1143.80	0.00	1146.28	19.97	12.65	16598.09	46990.68
21800.000	200.00	0.00	0.00	1124.18	210000.00	1144.16	0.00	1146.70	20.38	12.78	16430.29	46514.70
22000.000	200.00	0.00	0.00	1124.51	210000.00	1144.60	0.00	1147.11	20.04	12.72	16515.77	46914.17
22200.000	200.00	0.00	0.00	1124.84	210000.00	1145.02	0.00	1147.51	19.79	12.66	16581.50	47210.70
22400.000	200.00	0.00	0.00	1125.18	210000.00	1145.43	0.00	1147.90	19.56	12.62	16638.88	47483.84
22600.000	200.00	0.00	0.00	1125.51	210000.00	1145.86	0.00	1148.29	19.01	12.51	16785.74	48162.19
22800.000	200.00	0.00	0.00	1125.84	210000.00	1146.25	0.00	1148.67	18.88	12.48	16820.91	48336.20
23000.000	200.00	0.00	0.00	1126.70	210000.00	1146.59	0.00	1149.08	19.71	12.66	16588.64	47296.00
23200.000	200.00	0.00	0.00	1126.50	210000.00	1147.11	0.00	1149.47	18.11	12.33	17036.74	49351.04
23400.000	200.00	0.00	0.00	1126.83	210000.00	1147.47	0.00	1149.83	18.06	12.32	17041.01	49421.91
23600.000	200.00	0.00	0.00	1127.16	210000.00	1147.84	0.00	1150.19	18.01	12.32	17050.60	49479.39
23800.000	200.00	0.00	0.00	1127.46	210000.00	1148.20	0.00	1150.55	17.90	12.29	17082.91	49629.75
24000.000	200.00	0.00	0.00	1127.82	210000.00	1148.64	0.00	1150.91	16.86	12.07	17396.88	51147.92
24200.000	200.00	0.00	0.00	1128.15	210000.00	1149.04	0.00	1151.24	16.19	11.92	17613.73	52198.89

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	24400.000	200.00	0.00	0.00	1128.48	210000.00	1149.43	0.00	1151.56	15.15	11.72	17913.87	53950.39
	24600.000	200.00	0.00	0.00	1128.81	210000.00	1149.83	0.00	1151.87	14.38	11.45	18340.16	55381.26
	24617.000	17.00	0.00	0.00	1128.84	210000.00	1149.86	0.00	1151.89	14.39	11.45	18335.47	55358.69
*	24618.000	1.00	0.00	0.00	1128.90	210000.00	1149.83	0.00	1151.92	7.03	11.58	18134.67	79225.72
	24687.000	69.00	0.00	0.00	1129.00	210000.00	1149.88	0.00	1151.97	7.09	11.61	18083.07	78862.32
	24688.000	1.00	0.00	0.00	1132.00	210000.00	1149.44	0.00	1152.41	12.66	13.84	15175.75	59020.53
	24700.000	12.00	0.00	0.00	1132.00	210000.00	1149.20	0.00	1152.69	17.34	14.99	14010.64	50428.47
	24733.000	33.00	0.00	0.00	1132.00	210000.00	1149.32	0.00	1152.76	16.93	14.87	14119.38	51035.66
	24744.000	11.00	0.00	0.00	1132.00	210000.00	1150.49	0.00	1153.04	19.29	12.82	16386.59	47808.02
	24800.000	56.00	0.00	0.00	1132.00	210000.00	1150.64	0.00	1153.16	18.77	12.72	16524.96	48469.91
	0.000	155.00	0.00	0.00	1132.00	210000.00	1151.08	0.00	1153.45	17.42	12.34	17053.16	50307.82
	2.000	160.00	0.00	0.00	1132.00	210000.00	1151.34	0.00	1153.74	17.42	12.43	16991.73	50313.03
	4.000	200.00	0.00	0.00	1132.00	210000.00	1151.70	0.00	1154.08	17.02	12.41	17107.12	50903.38
	6.000	200.00	0.00	0.00	1132.00	210000.00	1151.89	0.00	1154.51	18.75	13.05	16405.49	48495.49
	8.000	200.00	0.00	0.00	1132.00	210000.00	1152.60	0.00	1154.89	15.78	12.20	17579.77	52859.99
	10.000	200.00	0.00	0.00	1132.00	210000.00	1153.04	0.00	1155.21	14.57	11.89	18114.47	55007.57
	12.000	200.00	0.00	0.00	1132.00	210000.00	1153.41	0.00	1155.50	13.81	11.67	18523.34	56500.89
	14.000	158.00	0.00	0.00	1132.00	210000.00	1153.73	0.00	1155.72	12.96	11.38	19022.80	58328.40
	15.400	122.00	0.00	0.00	1132.00	210000.00	1153.72	0.00	1156.08	15.60	12.41	17586.07	53172.58
	15.600	18.00	1165.00	1161.00	1132.00	215000.00	1154.65	0.00	1156.83	13.71	11.99	18846.92	58060.16
	17.300	152.00	0.00	0.00	1132.00	215000.00	1155.30	0.00	1157.05	10.61	10.74	20760.81	66004.19
	19.000	172.00	0.00	0.00	1132.00	215000.00	1155.47	0.00	1157.25	10.70	10.79	20459.46	65740.37
	21.500	182.00	0.00	0.00	1132.00	215000.00	1155.86	0.00	1157.45	9.35	10.17	21619.21	70304.41
	24.000	140.00	0.00	0.00	1132.00	215000.00	1155.75	0.00	1157.71	11.90	11.36	19459.56	62313.25
	24.600	60.00	0.00	0.00	1132.00	215000.00	1156.10	0.00	1158.03	11.50	11.27	19640.76	63392.30
	26.000	185.00	0.00	0.00	1132.10	215000.00	1156.32	0.00	1158.24	11.52	11.26	19688.40	63341.00

1C74PRINT

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
26.450	45.00	1176.14	1172.51	1132.10	215000.00	1156.86	0.00	1158.67	10.52	10.93	20288.10	66290.33
27.000	155.00	0.00	0.00	1132.20	215000.00	1157.02	0.00	1158.84	10.62	10.97	20186.15	65963.16
28.000	160.00	0.00	0.00	1132.30	215000.00	1157.19	0.00	1159.01	10.61	10.95	20148.93	66019.42
30.000	200.00	0.00	0.00	1132.50	215000.00	1157.41	0.00	1159.23	10.59	10.95	20151.91	66072.02
32.000	200.00	0.00	0.00	1132.70	215000.00	1157.68	0.00	1159.44	10.10	10.77	20501.39	67651.09
34.000	200.00	0.00	0.00	1132.90	215000.00	1157.88	0.00	1159.64	10.07	10.77	20474.85	67742.51
36.000	215.00	0.00	0.00	1133.10	215000.00	1158.06	0.00	1159.88	10.42	10.92	20138.33	66600.98
38.000	230.00	0.00	0.00	1133.30	215000.00	1158.30	0.00	1160.12	10.41	10.93	20092.90	66637.38
40.000	230.00	0.00	0.00	1133.50	215000.00	1158.49	0.00	1160.39	10.90	11.16	19678.15	65130.63
42.000	230.00	0.00	0.00	1133.70	215000.00	1158.74	0.00	1160.64	10.89	11.17	19642.14	65152.13
44.000	230.00	0.00	0.00	1134.00	215000.00	1158.94	0.00	1160.92	11.39	11.40	19248.55	63718.48
46.000	230.00	0.00	0.00	1134.20	215000.00	1159.23	0.00	1161.18	11.15	11.31	19398.13	64398.11
48.000	230.00	0.00	0.00	1134.40	215000.00	1159.56	0.00	1161.44	10.68	11.12	19732.91	65774.32
50.000	205.00	0.00	0.00	1134.60	215000.00	1159.86	0.00	1161.66	10.17	10.88	20150.42	67425.70
52.000	188.00	0.00	0.00	1134.80	215000.00	1160.10	0.00	1161.85	9.87	10.74	20415.18	68446.08
54.000	180.00	0.00	0.00	1135.00	215000.00	1160.32	0.00	1162.03	9.63	10.62	20631.82	69294.57
56.000	180.00	0.00	0.00	1135.20	215000.00	1160.52	0.00	1162.21	9.48	10.53	20806.03	69830.27
58.000	182.00	0.00	0.00	1135.40	215000.00	1160.72	0.00	1162.38	9.33	10.45	20971.58	70406.36
60.000	185.00	0.00	0.00	1135.60	215000.00	1160.93	0.00	1162.55	9.12	10.34	21192.34	71190.00
62.000	180.00	0.00	0.00	1135.80	215000.00	1161.13	0.00	1162.72	8.93	10.23	21406.59	71942.46
64.000	180.00	0.00	0.00	1136.00	215000.00	1161.33	0.00	1162.88	8.70	10.12	21648.46	72883.68
66.000	180.00	0.00	0.00	1136.30	215000.00	1161.49	0.00	1163.04	8.71	10.09	21713.29	72866.67
68.000	185.00	0.00	0.00	1136.50	215000.00	1161.68	0.00	1163.20	8.57	10.01	21874.43	73424.00
69.300	108.00	0.00	0.00	1136.60	215000.00	1161.80	0.00	1163.30	8.42	9.92	22059.50	74113.65
70.300	92.00	1176.98	1172.28	1136.75	215000.00	1161.99	0.00	1163.47	8.31	9.88	22159.93	74598.87
72.000	160.00	0.00	0.00	1136.90	215000.00	1162.11	0.00	1163.61	8.35	9.90	22045.71	74387.18

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
74.000	180.00	0.00	0.00	1137.10	215000.00	1162.26	0.00	1163.76	8.39	9.91	21985.24	74231.77
76.000	180.00	0.00	0.00	1137.30	215000.00	1162.45	0.00	1163.91	8.14	9.75	22323.91	75380.44
78.000	180.00	0.00	0.00	1137.50	215000.00	1162.68	0.00	1164.06	7.71	9.51	22896.65	77405.44
80.000	182.00	0.00	0.00	1137.70	215000.00	1162.89	0.00	1164.21	7.31	9.26	23502.29	79525.07
82.000	180.00	0.00	0.00	1137.90	215000.00	1163.12	0.00	1164.34	6.79	8.94	24337.75	82480.66
84.000	180.00	0.00	0.00	1138.10	215000.00	1163.32	0.00	1164.47	6.34	8.64	25174.40	85397.16
86.000	182.00	0.00	0.00	1138.40	215000.00	1163.54	0.00	1164.59	5.81	8.27	26277.41	89190.63
88.000	180.00	0.00	0.00	1138.60	215000.00	1163.77	0.00	1164.70	5.13	7.79	27886.54	94907.27
90.000	178.00	0.00	0.00	1138.81	215000.00	1163.94	0.00	1164.80	4.68	7.44	29188.09	99414.66
92.000	178.00	0.00	0.00	1139.00	215000.00	1164.08	0.00	1164.88	4.44	7.21	30074.53	101999.26
94.000	178.00	0.00	0.00	1139.23	215000.00	1164.24	0.00	1164.96	3.99	6.87	31549.34	107691.84
96.000	212.00	0.00	0.00	1139.44	215000.00	1164.33	0.00	1165.05	4.01	6.83	31833.52	107380.45
98.000	245.00	0.00	0.00	1139.65	215000.00	1164.54	0.00	1165.15	3.46	6.31	34218.39	115564.48
100.000	255.00	0.00	0.00	1139.86	215000.00	1164.37	0.00	1165.39	5.96	8.13	26589.08	88081.02
102.000	285.00	0.00	0.00	1140.00	215000.00	1164.32	0.00	1165.69	7.97	9.43	23060.93	76143.92
103.000	1.00	0.00	0.00	1142.00	215000.00	1164.19	0.00	1165.81	4.99	10.21	21056.43	96253.22
103.220	22.00	0.00	0.00	1142.00	215000.00	1164.21	0.00	1165.82	4.98	10.20	21070.19	96356.25
103.280	6.00	0.00	0.00	1142.00	215000.00	1164.16	0.00	1165.88	6.20	10.54	20406.43	86332.14
103.460	18.00	0.00	0.00	1142.00	215000.00	1164.17	0.00	1165.89	6.19	10.53	20416.01	86395.39
103.520	6.00	0.00	0.00	1142.00	215000.00	1164.33	0.00	1165.93	4.89	10.15	21192.70	97275.09
103.800	28.00	0.00	0.00	1142.00	215000.00	1164.35	0.00	1165.95	4.87	10.14	21207.41	97385.66
103.810	1.00	0.00	0.00	1140.07	215000.00	1164.63	0.00	1165.97	7.72	9.34	23339.94	77395.94
104.000	148.00	0.00	0.00	1140.20	215000.00	1164.64	0.00	1166.14	8.72	9.89	22055.55	72794.21
106.000	225.00	0.00	0.00	1140.40	215000.00	1164.83	0.00	1166.34	8.71	9.88	22041.68	72835.65
108.000	225.00	0.00	0.00	1140.70	215000.00	1165.21	0.00	1166.54	7.63	9.29	23371.13	77826.93
110.000	228.00	0.00	0.00	1140.90	215000.00	1164.99	0.00	1166.94	11.86	11.21	19330.17	62441.44

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	112.000	212.00	0.00	0.00	1141.10	215000.00	1165.20	0.00	1167.21	12.34	11.42	18966.61	61210.11
	114.000	200.00	0.00	0.00	1141.30	215000.00	1165.58	0.00	1167.46	11.37	11.03	19634.35	63769.61
	116.000	202.00	0.00	0.00	1141.50	215000.00	1166.09	0.00	1167.70	9.55	10.22	21185.03	69579.45
	118.000	205.00	0.00	0.00	1141.70	215000.00	1166.49	0.00	1167.90	8.21	9.55	22665.91	75051.05
	119.800	190.00	0.00	0.00	1141.90	215000.00	1166.73	0.00	1168.06	7.69	9.27	23360.54	77523.38
	120.420	50.00	0.00	0.00	1142.00	215000.00	1166.74	0.00	1168.12	8.01	9.43	22946.11	75968.73
*	120.500	8.00	0.00	0.00	1147.00	215000.00	1166.09	0.00	1168.41	19.14	12.25	17680.79	49147.37
	122.000	152.00	0.00	0.00	1147.10	215000.00	1166.33	0.00	1168.73	19.67	12.46	17385.01	48476.97
	122.650	65.00	0.00	0.00	1147.20	215000.00	1166.44	0.00	1168.86	20.02	12.53	17292.64	48054.58
	123.550	90.00	1181.80	1180.61	1147.31	215000.00	1167.07	0.00	1169.26	17.14	11.90	18184.36	51927.90
	124.000	45.00	0.00	0.00	1147.30	215000.00	1167.15	0.00	1169.34	17.14	11.90	18212.46	51928.54
	126.000	200.00	0.00	0.00	1147.55	215000.00	1167.84	0.00	1169.68	13.92	10.92	19993.47	57627.21
	128.000	200.00	0.00	0.00	1147.70	215000.00	1168.06	0.00	1170.00	15.43	11.23	19444.61	54738.11

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SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
10035.000	205000.00	1119.15	0.00	0.00	0.00	1062.88	0.00
10200.000	205000.00	1119.49	0.00	0.34	0.00	1059.42	165.00
10400.000	205000.00	1119.89	0.00	0.40	0.00	1056.25	200.00
10600.000	205000.00	1120.27	0.00	0.37	0.00	1058.06	200.00
10800.000	205000.00	1120.60	0.00	0.33	0.00	1057.04	200.00
11000.000	205000.00	1121.07	0.00	0.48	0.00	1062.37	200.00
11200.000	205000.00	1121.47	0.00	0.40	0.00	1056.21	200.00
11400.000	205000.00	1121.88	0.00	0.41	0.00	1066.61	200.00
11600.000	205000.00	1122.32	0.00	0.45	0.00	1072.80	200.00
11800.000	205000.00	1122.53	0.00	0.21	0.00	1072.30	200.00
12000.000	205000.00	1122.82	0.00	0.29	0.00	1069.61	200.00
12100.000	205000.00	1122.93	0.00	0.11	0.00	1064.35	100.00
12200.000	205000.00	1123.07	0.00	0.14	0.00	1064.68	100.00
12400.000	205000.00	1123.28	0.00	0.21	0.00	1032.16	200.00
12600.000	205000.00	1123.63	0.00	0.35	0.00	1020.94	200.00
12800.000	205000.00	1123.92	0.00	0.30	0.00	1025.09	200.00
13000.000	205000.00	1124.24	0.00	0.31	0.00	1020.92	200.00
13200.000	205000.00	1124.54	0.00	0.30	0.00	1019.93	200.00
13400.000	205000.00	1124.87	0.00	0.33	0.00	1020.03	200.00
13600.000	205000.00	1125.17	0.00	0.30	0.00	1011.96	200.00
13800.000	205000.00	1125.53	0.00	0.36	0.00	1015.79	200.00
14000.000	205000.00	1125.94	0.00	0.42	0.00	1024.30	200.00
14200.000	205000.00	1126.34	0.00	0.39	0.00	1042.02	200.00
14400.000	205000.00	1126.68	0.00	0.34	0.00	1027.14	200.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
14665.000	205000.00	1127.13	0.00	0.46	0.00	1011.32	265.00
14785.000	205000.00	1127.41	0.00	0.27	0.00	1026.08	120.00
15000.000	205000.00	1127.81	0.00	0.40	0.00	1038.70	215.00
15200.000	205000.00	1128.18	0.00	0.37	0.00	1037.94	200.00
15400.000	205000.00	1128.58	0.00	0.39	0.00	1025.11	200.00
15586.000	210000.00	1128.88	0.00	0.30	0.00	1024.61	186.00
15710.000	210000.00	1129.33	0.00	0.45	0.00	1024.03	124.00
16000.000	210000.00	1129.94	0.00	0.62	0.00	1041.71	290.00
16200.000	210000.00	1130.45	0.00	0.51	0.00	1046.74	200.00
16400.000	210000.00	1130.83	0.00	0.38	0.00	1040.65	200.00
16600.000	210000.00	1131.26	0.00	0.43	0.00	1043.39	200.00
16800.000	210000.00	1131.70	0.00	0.44	0.00	1045.50	200.00
17000.000	210000.00	1132.16	0.00	0.47	0.00	1046.80	200.00
17200.000	210000.00	1132.59	0.00	0.43	0.00	1046.95	200.00
17400.000	210000.00	1133.02	0.00	0.43	0.00	1040.85	200.00
17600.000	210000.00	1133.44	0.00	0.42	0.00	1027.01	200.00
17800.000	210000.00	1133.87	0.00	0.43	0.00	1024.46	200.00
18000.000	210000.00	1134.30	0.00	0.43	0.00	1022.68	200.00
18200.000	210000.00	1134.74	0.00	0.44	0.00	1018.70	200.00
18400.000	210000.00	1135.29	0.00	0.55	0.00	1030.74	200.00
18600.000	210000.00	1135.68	0.00	0.38	0.00	1006.00	200.00
18800.000	210000.00	1136.11	0.00	0.43	0.00	1003.91	200.00
19000.000	210000.00	1136.59	0.00	0.48	0.00	997.26	200.00
19200.000	210000.00	1137.04	0.00	0.45	0.00	989.39	200.00
19400.000	210000.00	1137.50	0.00	0.46	0.00	981.29	200.00
19600.000	210000.00	1137.98	0.00	0.47	0.00	972.57	200.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
19800.000	210000.00	1138.49	0.00	0.51	0.00	964.00	200.00
20000.000	210000.00	1138.96	0.00	0.47	0.00	954.09	200.00
20200.000	210000.00	1139.46	0.00	0.49	0.00	945.14	200.00
20400.000	210000.00	1140.02	0.00	0.57	0.00	938.60	200.00
20600.000	210000.00	1140.49	0.00	0.46	0.00	925.24	200.00
20782.000	210000.00	1141.01	0.00	0.52	0.00	936.07	178.00
20800.000	210000.00	1141.07	0.00	0.06	0.00	936.18	18.00
21000.000	210000.00	1141.67	0.00	0.60	0.00	911.45	200.00
21050.000	210000.00	1141.76	0.00	0.09	0.00	911.28	50.00
21150.000	210000.00	1142.39	0.00	0.63	0.00	912.64	100.00
21200.000	210000.00	1142.67	0.00	0.28	0.00	911.34	50.00
21400.000	210000.00	1143.22	0.00	0.55	0.00	943.06	200.00
21600.000	210000.00	1143.80	0.00	0.57	0.00	956.78	200.00
21800.000	210000.00	1144.16	0.00	0.37	0.00	944.18	200.00
22000.000	210000.00	1144.60	0.00	0.43	0.00	944.25	200.00
22200.000	210000.00	1145.02	0.00	0.42	0.00	944.71	200.00
22400.000	210000.00	1145.43	0.00	0.41	0.00	944.64	200.00
22600.000	210000.00	1145.86	0.00	0.43	0.00	945.28	200.00
22800.000	210000.00	1146.25	0.00	0.39	0.00	945.05	200.00
23000.000	210000.00	1146.59	0.00	0.34	0.00	943.15	200.00
23200.000	210000.00	1147.11	0.00	0.52	0.00	945.63	200.00
23400.000	210000.00	1147.47	0.00	0.36	0.00	943.85	200.00
23600.000	210000.00	1147.84	0.00	0.36	0.00	943.48	200.00
23800.000	210000.00	1148.20	0.00	0.37	0.00	943.65	200.00
24000.000	210000.00	1148.64	0.00	0.44	0.00	943.77	200.00
24200.000	210000.00	1149.04	0.00	0.39	0.00	944.08	200.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	24400.000	210000.00	1149.43	0.00	0.39	0.00	938.85	200.00
	24600.000	210000.00	1149.83	0.00	0.40	0.00	959.16	200.00
	24617.000	210000.00	1149.86	0.00	0.02	0.00	959.14	17.00
*	24618.000	210000.00	1149.83	0.00	-0.02	0.00	897.52	1.00
	24687.000	210000.00	1149.88	0.00	0.04	0.00	897.35	69.00
	24688.000	210000.00	1149.44	0.00	-0.44	0.00	896.32	1.00
	24700.000	210000.00	1149.20	0.00	-0.24	0.00	866.20	12.00
	24733.000	210000.00	1149.32	0.00	0.13	0.00	866.95	33.00
	24744.000	210000.00	1150.49	0.00	1.17	0.00	914.63	11.00
	24800.000	210000.00	1150.64	0.00	0.15	0.00	916.00	56.00
	0.000	210000.00	1151.08	0.00	0.44	0.00	972.72	155.00
	2.000	210000.00	1151.34	0.00	0.26	0.00	1000.84	160.00
	4.000	210000.00	1151.70	0.00	0.36	0.00	1043.98	200.00
	6.000	210000.00	1151.89	0.00	0.19	0.00	1082.91	200.00
	8.000	210000.00	1152.60	0.00	0.71	0.00	1122.21	200.00
	10.000	210000.00	1153.04	0.00	0.43	0.00	1172.09	200.00
	12.000	210000.00	1153.41	0.00	0.38	0.00	1223.60	200.00
	14.000	210000.00	1153.73	0.00	0.32	0.00	1271.83	158.00
	15.400	210000.00	1153.72	0.00	-0.01	0.00	1335.86	122.00
	15.600	215000.00	1154.65	0.00	0.93	0.00	1345.18	18.00
	17.300	215000.00	1155.30	0.00	0.65	0.00	1272.45	152.00
	19.000	215000.00	1155.47	0.00	0.17	0.00	1153.80	172.00
	21.500	215000.00	1155.86	0.00	0.40	0.00	1159.41	182.00
	24.000	215000.00	1155.75	0.00	-0.12	0.00	1090.43	140.00
	24.600	215000.00	1156.10	0.00	0.35	0.00	1085.05	60.00
	26.000	215000.00	1156.32	0.00	0.22	0.00	1092.32	185.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
26.450	215000.00	1156.86	0.00	0.54	0.00	1095.82	45.00
27.000	215000.00	1157.02	0.00	0.15	0.00	1089.84	155.00
28.000	215000.00	1157.19	0.00	0.17	0.00	1079.70	160.00
30.000	215000.00	1157.41	0.00	0.22	0.00	1061.26	200.00
32.000	215000.00	1157.68	0.00	0.28	0.00	1060.04	200.00
34.000	215000.00	1157.88	0.00	0.20	0.00	1045.60	200.00
36.000	215000.00	1158.06	0.00	0.18	0.00	1017.85	215.00
38.000	215000.00	1158.30	0.00	0.23	0.00	1007.37	230.00
40.000	215000.00	1158.49	0.00	0.19	0.00	990.75	230.00
42.000	215000.00	1158.74	0.00	0.25	0.00	978.54	230.00
44.000	215000.00	1158.94	0.00	0.20	0.00	960.76	230.00
46.000	215000.00	1159.23	0.00	0.29	0.00	962.68	230.00
48.000	215000.00	1159.56	0.00	0.33	0.00	971.15	230.00
50.000	215000.00	1159.86	0.00	0.30	0.00	984.21	205.00
52.000	215000.00	1160.10	0.00	0.24	0.00	993.48	188.00
54.000	215000.00	1160.32	0.00	0.22	0.00	1000.61	180.00
56.000	215000.00	1160.52	0.00	0.20	0.00	1009.69	180.00
58.000	215000.00	1160.72	0.00	0.20	0.00	1016.76	182.00
60.000	215000.00	1160.93	0.00	0.21	0.00	1025.87	185.00
62.000	215000.00	1161.13	0.00	0.20	0.00	1034.90	180.00
64.000	215000.00	1161.33	0.00	0.20	0.00	1042.98	180.00
66.000	215000.00	1161.49	0.00	0.17	0.00	1050.79	180.00
68.000	215000.00	1161.68	0.00	0.19	0.00	1057.75	185.00
69.300	215000.00	1161.80	0.00	0.12	0.00	1064.78	108.00
70.300	215000.00	1161.99	0.00	0.19	0.00	1066.35	92.00
72.000	215000.00	1162.11	0.00	0.12	0.00	1044.04	160.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
74.000	215000.00	1162.26	0.00	0.15	0.00	1029.29	180.00
76.000	215000.00	1162.45	0.00	0.20	0.00	1044.13	180.00
78.000	215000.00	1162.68	0.00	0.22	0.00	1067.94	180.00
80.000	215000.00	1162.89	0.00	0.21	0.00	1093.57	182.00
82.000	215000.00	1163.12	0.00	0.22	0.00	1128.31	180.00
84.000	215000.00	1163.32	0.00	0.21	0.00	1163.91	180.00
86.000	215000.00	1163.54	0.00	0.21	0.00	1211.61	182.00
88.000	215000.00	1163.77	0.00	0.23	0.00	1278.03	180.00
90.000	215000.00	1163.94	0.00	0.18	0.00	1332.37	178.00
92.000	215000.00	1164.08	0.00	0.14	0.00	1381.51	178.00
94.000	215000.00	1164.24	0.00	0.16	0.00	1428.67	178.00
96.000	215000.00	1164.33	0.00	0.10	0.00	1490.52	212.00
98.000	215000.00	1164.54	0.00	0.20	0.00	1531.44	245.00
100.000	215000.00	1164.37	0.00	-0.17	0.00	1200.39	255.00
102.000	215000.00	1164.32	0.00	-0.05	0.00	1111.09	285.00
103.000	215000.00	1164.19	0.00	-0.13	0.00	964.00	1.00
103.220	215000.00	1164.21	0.00	0.01	0.00	964.00	22.00
103.280	215000.00	1164.16	0.00	-0.05	0.00	946.00	6.00
103.460	215000.00	1164.17	0.00	0.01	0.00	946.00	18.00
103.520	215000.00	1164.33	0.00	0.16	0.00	964.00	6.00
103.800	215000.00	1164.35	0.00	0.02	0.00	964.00	28.00
103.810	215000.00	1164.63	0.00	0.28	0.00	1112.76	1.00
104.000	215000.00	1164.64	0.00	0.01	0.00	1060.87	148.00
106.000	215000.00	1164.83	0.00	0.20	0.00	1055.34	225.00
108.000	215000.00	1165.21	0.00	0.37	0.00	1099.79	225.00
110.000	215000.00	1164.99	0.00	-0.21	0.00	938.96	228.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	112.000	215000.00	1165.20	0.00	0.20	0.00	922.88	212.00
	114.000	215000.00	1165.58	0.00	0.39	0.00	945.91	200.00
	116.000	215000.00	1166.09	0.00	0.50	0.00	1002.70	202.00
	118.000	215000.00	1166.49	0.00	0.41	0.00	1058.88	205.00
	119.800	215000.00	1166.73	0.00	0.24	0.00	1087.13	190.00
	120.420	215000.00	1166.74	0.00	0.01	0.00	1071.86	50.00
*	120.500	215000.00	1166.09	0.00	-0.65	0.00	1070.93	8.00
	122.000	215000.00	1166.33	0.00	0.24	0.00	1048.41	152.00
	122.650	215000.00	1166.44	0.00	0.11	0.00	1048.71	65.00
	123.550	215000.00	1167.07	0.00	0.63	0.00	1054.07	90.00
	124.000	215000.00	1167.15	0.00	0.08	0.00	1062.12	45.00
	126.000	215000.00	1167.84	0.00	0.69	0.00	1212.05	200.00
	128.000	215000.00	1168.06	0.00	0.22	0.00	1218.94	200.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 24618.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 120.500 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

Hydrodynamics

QUESTIONS & ANSWERS

about the

BRIDGESTONE RUBBER DAM

August 1989

BRIDGESTONE CORPORATION
1-10-1 Kyobashi
Chuo-ku, Tokyo 104

3 HYDRODYNAMICS

3.1 Maximum Overflow

What is the maximum overflow recommended for a Rubber Dam?

The maximum overflow of a Bridgestone Rubber Dam is 1.4 times dam height. Therefore the crest on a 2.0 meter (6.6') high dam should not exceed 0.8 meters (2.6'). Such a high crest without significant oscillation is possible with the Rubber Dam because of its employment of a fin (see 3.7 Lessening of Oscillation). For Ogee crested weirs the maximum overflow depends on the particular shape of the weir crest, but a maximum overflow of 1.3 times the Rubber Dam height is normally advised. If demanded, design modifications can make it possible to increase the permitted overflow. Such special cases should be referred to Bridgestone for study and comment.

3.2 Watercourse Gradient

What information on the watercourse gradient is needed for the design of a Rubber Dam installation?

Bridgestone requires no information on watercourse gradient for the design of a standard Rubber Dam. Employment of the optional SCUL waterhead level control system is an exception to this. The design of this system requires data on water build-up over time behind the Rubber Dam so that it can maintain a constant head of water (see 5.7 SCUL).

3.3 Rubber Dam Air Pressure Settings

At what inner air pressure settings do Rubber Dams operate?

As can be seen in the condensed table below, the design inner air pressure of a Rubber Dam depends on its height. Note that inner pressure for a given dam height is the same as water pressure at the same depth of water.

Table 3.3 Rubber Dam Design Inner Air Pressure Settings

Dam Height	Design Pressure	Dam Height	Design Pressure
0.5 meter	0.05 (kg/cm^2)	2 feet	0.87 (lb/in^2)
1.0	0.10	5	2.17
2.0	0.20	8	3.47
3.0	0.30	10	4.33
4.0	0.40	13	5.63
5.0	0.50	17	7.37

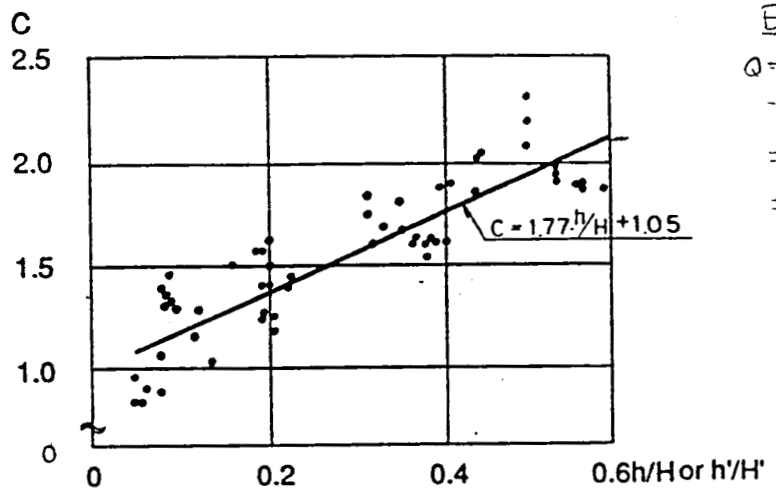
3.4 Discharge Coefficient

What is the discharge coefficient of the Rubber Dam?

The discharge coefficient for a Bridgestone Rubber Dam is provided in the formula and graph below:

Metric:	English:
$Q = C \times B \times h^{3/2}$	$Q' = 1.81 \times C \times B' \times h'^{3/2}$
where: Q = Discharge volume (m^3/sec)	Q' = Discharge volume ($feet^3$/sec)
C = Discharge coefficient	C = Discharge coefficient
B = Width of Rubber Dam (m)	B' = Width of Rubber Dam (feet)
h = Overflow water depth (crest) (m)	h' = Overflow water depth (crest) (feet)

Graph 3.4 Discharge Coefficient In Case of No Downstream Water Level Against Rubber Dam Body



English

$Q = 1.81 C B h^{1.5}$

$= 1.81 (1.77 \frac{h}{H} + 1.05) B h^{1.5}$

$= (3.2 \frac{h}{H} + 1.9) B h^{1.5}$

$= \frac{3.2B}{H} h^{2.5} + 1.9 B h^{1.5}$ ✓

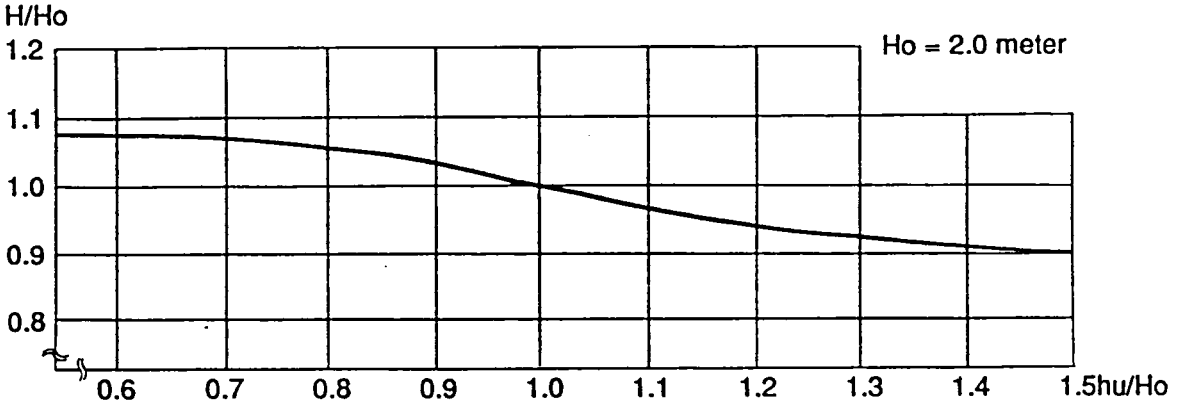
where: H = Actual height of Rubber Dam (meter)
H' = 〃 (feet)

3.5 Water Overflow and Dam Pressure/Height Relationship

The air pressure inside an inflatable dam must vary with the height of the headwater (weight of water) bearing on it. How does this effect the inner pressure and height of an inflatable dam body?

The weight of water bearing on an air-filled inflatable dam has little effect on its height. Graph 3.5A on the following page shows the relationship between the height of a Rubber Dam and a head of water, with 1.0 on the x-y axis representing water height equal to designed dam height.

Graph 3.5A Rubber Dam Height/Waterhead Height Relationship

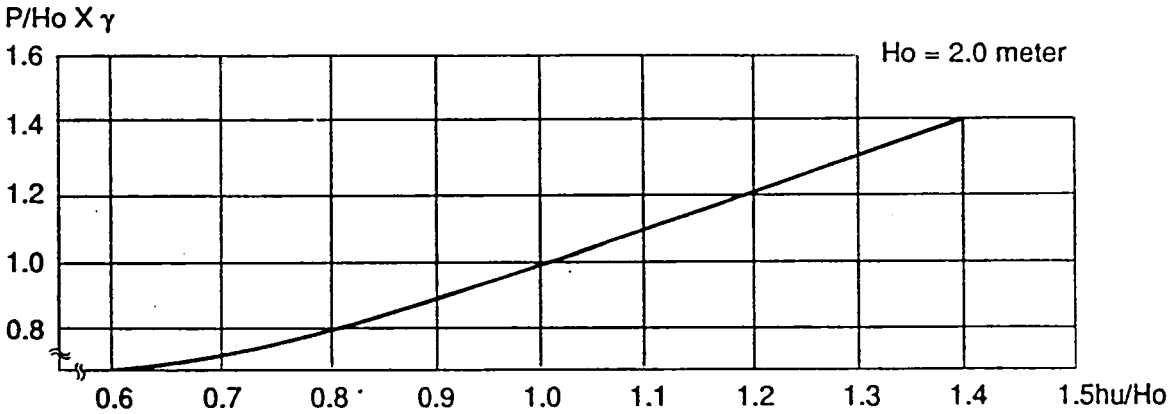


where: H = Actual height of Rubber Dam
Ho = Design height of Rubber Dam
hu = Upstream water depth

Example: 2m (6.6') high dam with an upstream water depth of 1.3 times design height (2.6m or 8.5') will have an actual height of about 1.86m (6.1') (Waterhead at 1.3 times Rubber Dam design height on x axis equals 0.93 times design height on y axis; 0.93 X 2.0m (6.6') equals 1.86m (6.1').

Graph 3.5B below shows the increase in the internal pressure of a Rubber Dam as the head of water acting against it increases. 1.0 on the x-y axis indicates inner pressure of a Rubber Dam at the designed operating height of the dam.

Graph 3.5B Rubber Dam Inner Pressure/Waterhead Height Relationship



where: P = Inner pressure of Rubber Dam
hu = Upstream water depth
Ho = 2.0 meter
γ = Specific weight of water (1 gram/cm^3)

3.6 V-Notch Effect

What is the V-notch effect in Rubber Dams?

A Rubber Dam body does not deflate evenly, that is, the crest of a dam does not remain straight and parallel with the foundation as it lowers. Discharging water rushing over a deflating dam increases the pressure acting on it, which tends to push it down in a particular place, creating a depression shaped like a "V" notch as the dam deflates to around 70% of its normal operating height. The V notch has the effect of increasing water discharge over a deflating dam and concentrating its downstream flow at the V notch position. While the V notch normally starts at the center of the dam body it often moves to either side during deflation. The occurrence of a V notch moving to the side of a dam is a function of the side slope angle. Dams with gradual side slopes keep the V notch in the center position while sharp side slopes tend to result in a V notch which shifts to the side. The V notch effect is not a practical concern as it does not result in detrimental stress to the Rubber Dam and the increase in waterflow to a particular area of the downstream riverbed is of short duration.

3.7 Lessening of Oscillation

Does oscillation effect inflatable dams, what is its effect, and how does Bridgestone deal with it?

Bridgestone's employment of a fin on the downstream side of the Rubber Dam crest minimizes oscillation of the dam body. A drawing of this fin is in *Introducing the Bridgestone Rubber Dam*, section 5.43 Fin Structure. (Also see paper *Rubber Dam: Causes of Oscillation of Rubber Dams and Countermeasures* presented by Bridgestone at the International Association for Hydraulic Research, 21st Congress, August 1985, Melbourne, Australia, available on request.)

3.8 Test Models

How does Bridgestone scale down Rubber Dam models used for testing?

Bridgestone Rubber Dam models used in tank tests are scaled down in accordance with Froude's Law.

RIO SALADO: Rubber Dam Rating Curve DOWNSTREAM DAM

Note: Equation in English units
Equations from Bridgestone Rubber Dam Technical Information

$Q = 1.81*C*B*h^{3/2}$

where: Q = discharge, cfs
C = 1.77*h/H+1.05
h = overfall height (depth of flow over dam), ft.
H = dam height, ft.
B = length of dam

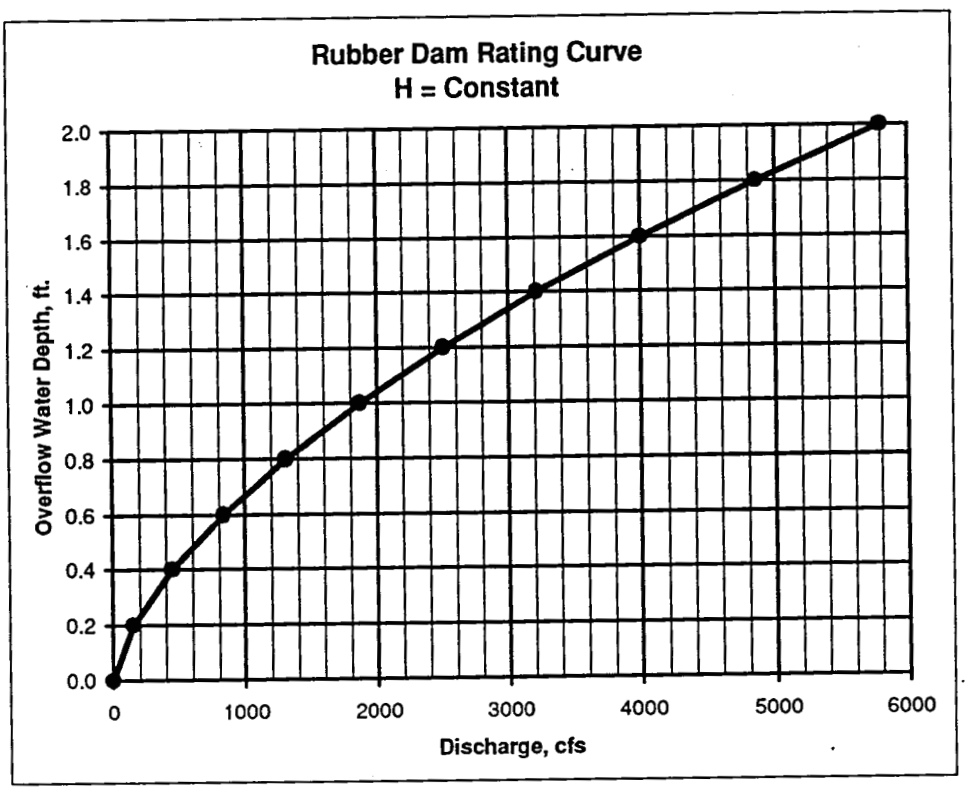
Input:	
Length of rubber dam, B, ft.=	890
Dam Inflated, Depth of flow over dam increasing	
Max. height of flow over dam, h, ft.=	2
Min. height of flow over dam, h, ft.=	0
Height of rubber dam, H, ft.=	16
Dam Deflating	
Height of flow over deflating dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	16
Min. height of rubber dam, H, ft.=	12
Dam Deflating, W.S.El. is constant	
Max. depth of flow over fully inflated dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	16
Min. height of rubber dam, H, ft.=	13
(Max. h + H = 18 ft.)	

Dam Inflated, Depth of flow over dam increasing

Calculations:

H is constant at 16 ft.

h, ft.	C	Q, cfs
0.0	1.05	0
0.2	1.07	154
0.4	1.09	446
0.6	1.12	836
0.8	1.14	1312
1.0	1.16	1870
1.2	1.18	2505
1.4	1.20	3215
1.6	1.23	4000
1.8	1.25	4859
2.0	1.27	5792

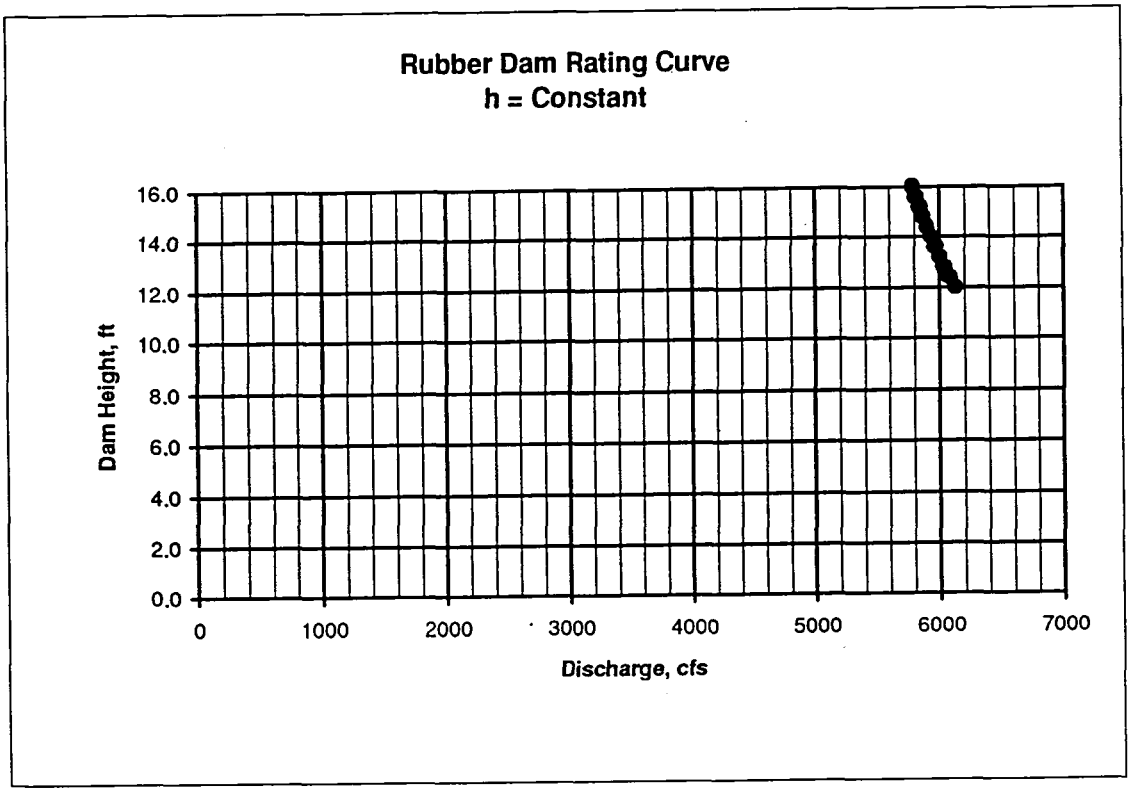


Dam Deflating

Calculations:

h is constant at 2 ft.

H, ft.	C	Q, cfs
16.0	1.27	5792
15.6	1.28	5818
15.2	1.28	5845
14.8	1.29	5874
14.4	1.30	5904
14.0	1.30	5936
13.6	1.31	5970
13.2	1.32	6006
12.8	1.33	6044
12.4	1.34	6085
12.0	1.35	6128

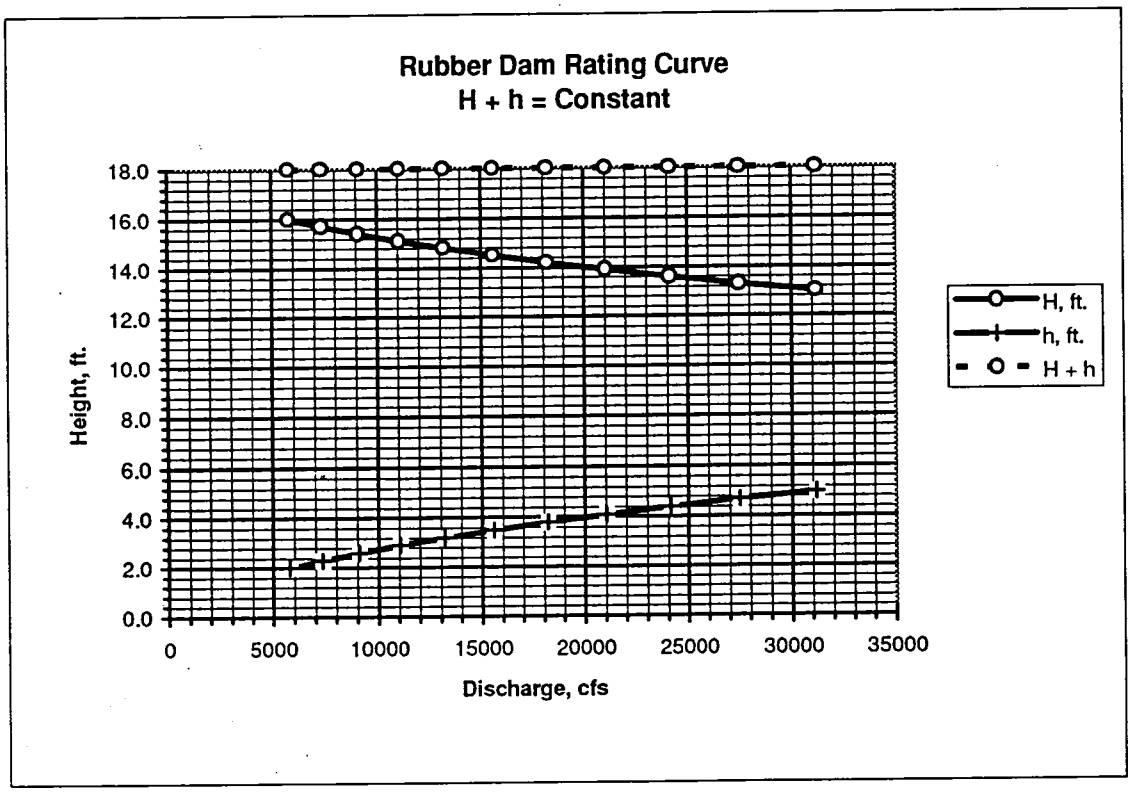


Dam Deflating, W.S.El. is constant

Calculations:

H + h is constant at 18 ft.

H, ft.	h, ft.	H + h	C	Q, cfs	Vel., ft/s
16.0	2.0	18.0	1.27	5792	3
15.7	2.3	18.0	1.31	7357	4
15.4	2.6	18.0	1.35	9109	4
15.1	2.9	18.0	1.39	11058	4
14.8	3.2	18.0	1.43	13211	5
14.5	3.5	18.0	1.48	15582	5
14.2	3.8	18.0	1.52	18182	5
13.9	4.1	18.0	1.57	21024	6
13.6	4.4	18.0	1.62	24125	6
13.3	4.7	18.0	1.68	27502	7
13.0	5.0	18.0	1.73	31172	7



RIO SALADO: Rubber Dam Rating Curve UPSTREAM DAM

Note: Equation in English units
Equations from Bridgestone Rubber Dam Technical Information

$Q = 1.81*C*B*h^{3/2}$

where: Q = discharge, cfs
C = 1.77*h/H+1.05
h = overfall height (depth of flow over dam), ft.
H = dam height, ft.
B = length of dam

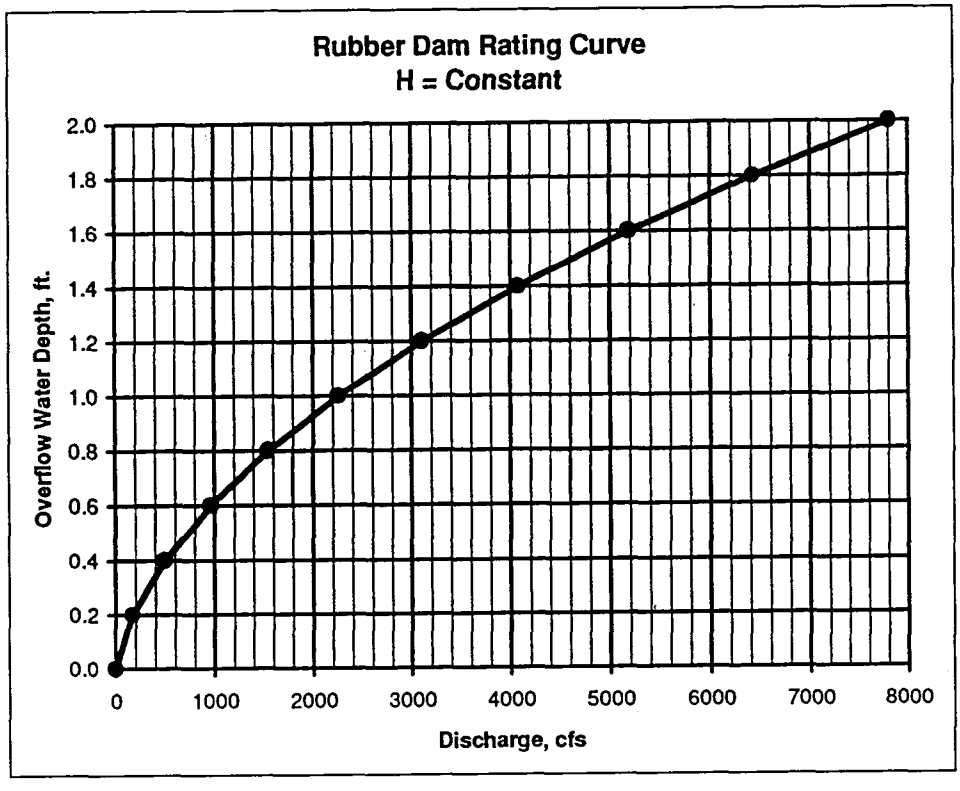
Input:	
Length of rubber dam, B, ft.=	930
Dam Inflated, Depth of flow over dam increasing	
Max. height of flow over dam, h, ft.=	2
Min. height of flow over dam, h, ft.=	0
Height of rubber dam, H, ft.=	6
Dam Deflating	
Height of flow over deflating dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	6
Min. height of rubber dam, H, ft.=	4
Dam Deflating, W.S.El. is constant	
Max. depth of flow over fully inflated dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	6
Min. height of rubber dam, H, ft.=	4
(Max. h + H = 8 ft.)	

Dam Inflated, Depth of flow over dam increasing

Calculations:

H is constant at 6 ft.

h, ft.	C	Q, cfs
0.0	1.05	0
0.2	1.11	167
0.4	1.17	497
0.6	1.23	960
0.8	1.29	1549
1.0	1.35	2264
1.2	1.40	3107
1.4	1.46	4079
1.6	1.52	5185
1.8	1.58	6427
2.0	1.64	7808

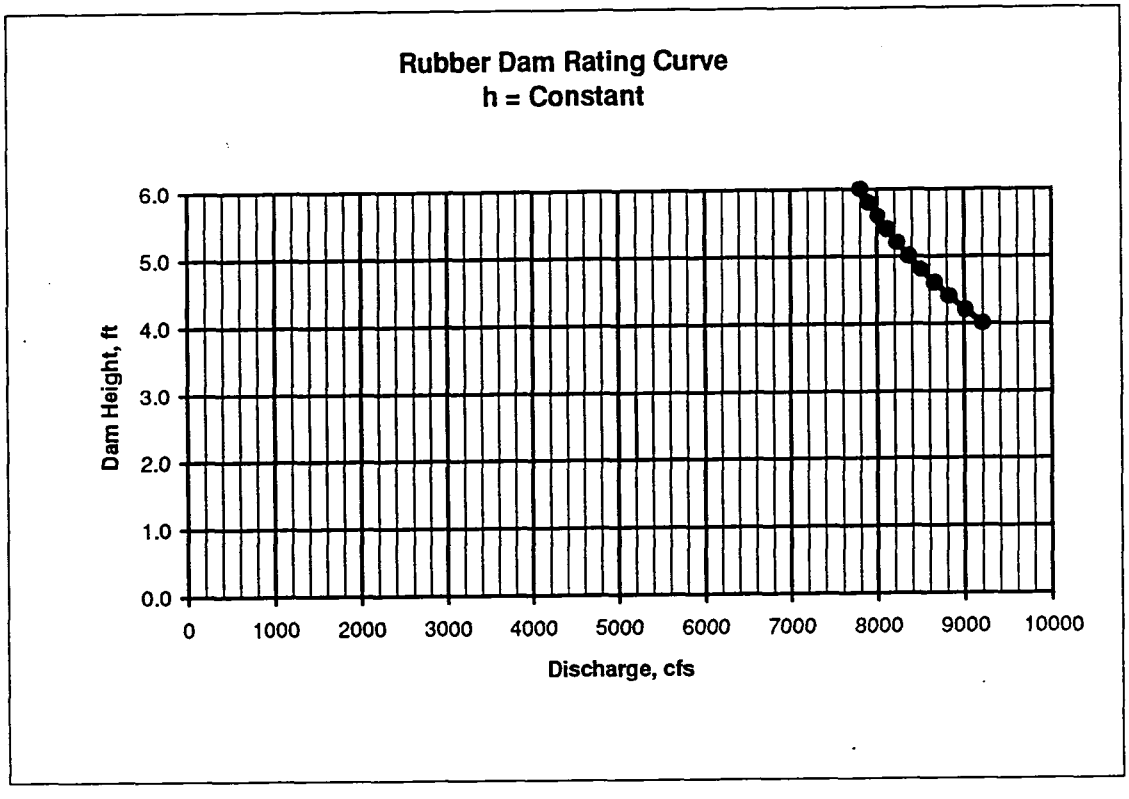


Dam Deflating

Calculations:

h is constant at 2 ft.

H, ft.	C	Q, cfs
6.0	1.64	7808
5.8	1.66	7905
5.6	1.68	8009
5.4	1.71	8120
5.2	1.73	8240
5.0	1.76	8370
4.8	1.79	8510
4.6	1.82	8663
4.4	1.85	8830
4.2	1.89	9012
4.0	1.94	9213

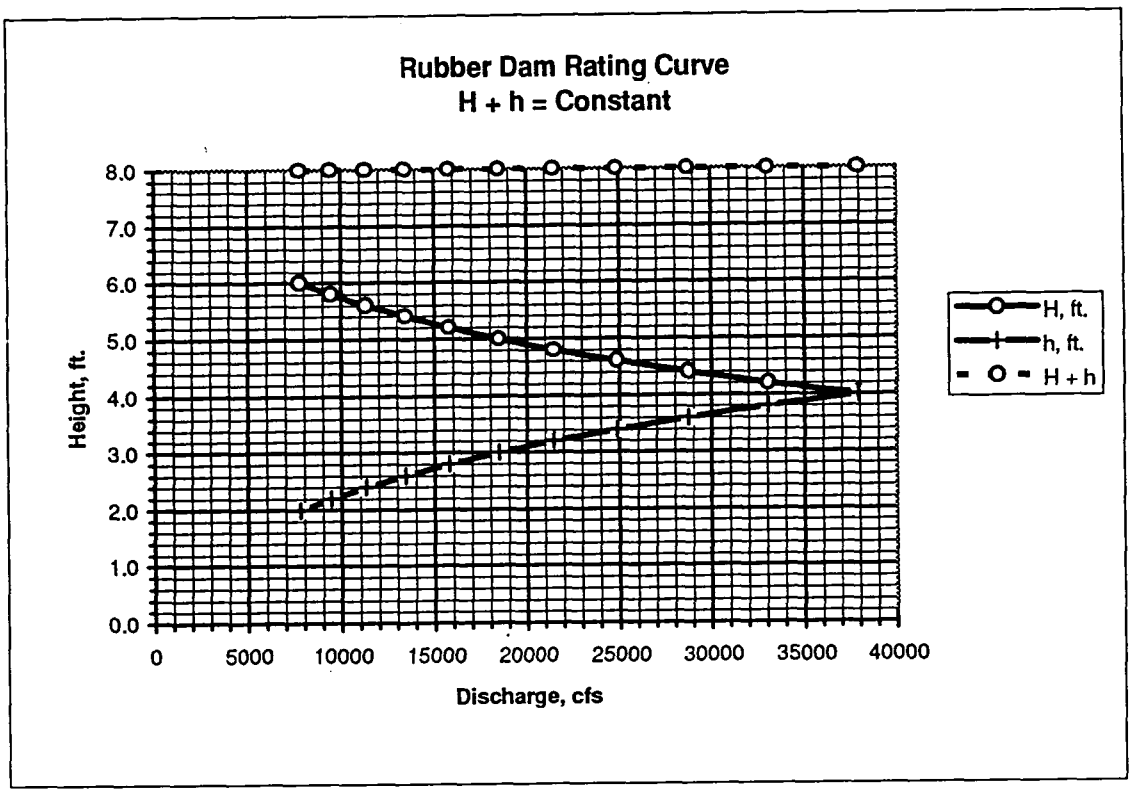


Dam Deflating, W.S.El. is constant

Calculations:

H + h is constant at 8 ft.

H, ft.	h, ft.	H + h	C	Q, cfs	Vel., ft/s
6.0	2.0	8.0	1.64	7808	4
5.8	2.2	8.0	1.72	9455	5
5.6	2.4	8.0	1.81	11319	5
5.4	2.6	8.0	1.90	13424	6
5.2	2.8	8.0	2.00	15798	6
5.0	3.0	8.0	2.11	18473	7
4.8	3.2	8.0	2.23	21488	7
4.6	3.4	8.0	2.36	24887	8
4.4	3.6	8.0	2.50	28724	9
4.2	3.8	8.0	2.65	33061	9
4.0	4.0	8.0	2.82	37975	10



MEMORANDUM

CH2M HILL

TO: Howard Hargis/City of Tempe

COPIES: Dave Allard/PHX
Peter Binney/DEN
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Chuck Pedri/PHX
Bob Morrison, Sr./RDD
Chuck Pedri/PHX
Rich Randall/PHX
Larry Roth/SFO
Ted Way/SAC
Tom Wolf/PHX

FROM: Steve Walker/PHX

DATE: June 27, 1994

SUBJECT: Rio Salado Town Lake Dam Design and Operation Criteria

PROJECT: SWW36963.01.01

This memo summarizes the assumed design and operational criteria for the Rio Salado impoundment structures, based on the results of our preliminary design analysis performed to date. The attached spreadsheet summarizes basic size and location information for both the upstream and downstream dams. The stations are based on the CRSS HEC 2 Run for the Rio Salado channelization dated 1991.

Dam Operations

The dams must operate through a range of flow scenarios, minimizing the loss of stored water, as well as minimizing impacts to the lakeside development and upstream and downstream structures. This section will describe the assumed operating scenarios for a range of flow events.

Normal reservoir will be 1147.75 feet, plus or minus 0.25 feet. Freeboard between normal pool and crest of dam is 0.25 feet. The suppliers state they can control the crest height to at least plus or minus 3 inches (0.25 feet). The dam operator could adjust the dam pressure on each segment to more precisely set the dam elevation. Normal freeboard at the edges of the lake is 2 feet with minimum wall height of 1150.0.

Initial Filling of the Lake

Water for filling the lake will either be conveyed via the Salt River or the Indian Bend Wash. If the Indian Bend Wash is the sole source, and the water begins to approach the bottom of the sill of the downstream dam (el. 1132), the dam should be completely inflated to begin impounding water. As the water level rises and begins approaching the sill elevation of the upstream dam (el. 1142), the upstream dam should be completely inflated, thus forming the lake. The water would continue to rise until it reaches the design water surface of 1147.75 ±. This is the simplest scenario.

If the Salt River is the sole source, the scenario will be the same as above except that inflating the upstream dam would result in water ponding behind the structure until it spills over into the lake. It would be desirable to limit the discharge head to a maximum of 2 feet over the dam (el. 1150) or 8,000 cfs for dam stability. As the water level rises, and begins approaching the normal design surface of 1147.75, the inflow should be shut off. Of course, there would now be a pool of water impounded upstream of the upstream dam (which may or not be desirable). The life-span of this pool depends upon whether the inflows (stormwater and nuisance flows) exceed the outflows of evaporation, seepage, and/or pumping. No pumping is currently included in the design.

Make-up Water

Make-up water is controlled by the reservoir level. If water drops below 1147.50, make-up water from some source will be required. This may be automatic, with manual override, or completely manual because the available sources may vary daily in volume and water quality. When the reservoir increases to 1148.0, excess water will spill over the crest. Wastage of water over the crest should be avoided.

Stormwater Flows

Inflows to the lake other than water supply will be from one or more of these three sources:

- Salt River
- Indian Bend Wash
- Storm Drains

Salt River Discharges

The normal operating static water level for the lake will be 1147.75. When there is inflow down the Salt River that exceeds the infiltration rate of the river, water initially will pond behind the upstream dam (unless that space is already filled with water) before rising to the crest of the dam (el. 1148.0) and spilling over. A minimum 2 feet of freeboard will be provided for shoreline treatments and lakeside developments. The normal operating range for the lake, during most flow conditions, will be between elevations 1147.75 and 1150.

At elevation 1150, the spill capacity of the fully inflated upstream dam is 7,800 cfs. The downstream dam spill capacity is 6,250 cfs, therefore, during Salt River discharges between 0 and 6,250 cfs, both dams will remain inflated. If the inflows reach about 6,200 cfs, the lake level will rise to 1150, which is the maximum desirable water surface elevation. If the water surface continues to rise, the controls on the downstream dam would be set to automatically maintain a constant pool elevation of 1150 plus or minus 0.25 feet by deflating one or more of the dam segments. The V-notch will form when the downstream dam is deflated to 10 to 35 percent (varies depending upon the supplier) of the full height. As flow rates exceed 6250 cfs, dam sections will be sequentially lowered 3 feet to an elevation of 1145, beginning with the center sections and proceeding to the two outer sections. When all dams have been lowered to 1145, the maximum flow rate at a water surface elevation 1150 is about 36,000 cfs. (This is approximately a 5-year flood event on the Salt River and greater than a 100-year event on the IBW.) When fully deflated, the flow rate at water surface elevation 1150 is approximately 190,000 cfs. The upstream dams will remain fully inflated until the flow rate reaches 36,000 cfs.

If the flows continue to increase to greater than 36,000 cfs (el.> 1150.0), then the operation mode should be changed to manual and a signal would be given to:

- First completely deflate each of the dam segments of the upstream dam since this dam is most sensitive to instability because of the high head/dam height ratio (2/6).

- Second completely deflate each of the dam segments of the downstream dam. With the dams fully deflated, the channel now has the capacity to convey the 100-year storm event of 215,000 cfs and have 3 feet of freeboard available below the levee.

As flow rates decrease, re-inflation will begin when the flow rate elevation at the upstream dam has been reduced to 2,000 cfs. The downstream dam segments will be

inflated first. Once they have fully inflated, the operation would correspond to the filling of the lake.

Indian Bend Wash Discharges

Except for during the most extreme storms, the anticipated discharges from Indian Bend Wash will not require active management of the dams. For discharges that exceed 6,200 cfs, the operating scenario will be the same as that for Salt River flows, except that the upstream dam will not be lowered. Only the downstream dam will be controlled. For the anticipated 100-year discharge on Indian Bend Wash, the downstream dams would be lowered to a minimum elevation of 1,145 feet.

Flows down Indian Bend Wash will enter the lake and flow both upstream and downstream. The upstream flows will spill over the upstream dam until the space behind the dam is filled (water will back up as far as the grade control structure at McClintock Road) and then all flows will be in the downstream direction. If the inflow exceeds the seepage and evaporation losses in the lake, the excess water will spill over the downstream dam crest. The upstream dam will have a dual connection system which will allow it to accommodate flows in both directions, up to at least 2 feet over the dam crest (el. 1150). However, the dam should not be deflated when the flow is in the upstream direction, since the tube will not stow properly in a flattened position. The operator will need to wait until the flow reverses to the downstream direction with a minimum velocity of 2 to 3 fps.

Stilling Basin length equation
- incorporating ratting equation from Bridgestone Tech. Info.

Length of Splashpad, L = Length of overfall drop + Length of Hydraulic jump
$= L_d + L_j$ (L_d = length of drop, L_j = length of jump)
- assumes jump begins right after nappe hits.

where $L_d = 4.3\, Y_f\, D_n^{0.27}$, $D_n = \dfrac{q^2}{g\, Y_f^3}$

$L_j = (1.6^*)(6)(Y_2)$ *1.6 = FCDMC safety factor
$= 9.6\, Y_2$
$Y_2 = 1.66\, Y_f\, D_n^{0.27}$

$\therefore L_j = (9.6)[1.66\, Y_f\, D_n^{0.27}]$
$= 16\, Y_f\, D_n^{0.27}$

$$\therefore L = L_d + L_j = 4.3\, Y_f\, D_n^{0.27} + 16\, Y_f\, D_n^{0.27}$$
$$= 20.3\, Y_f\, D_n^{0.27}$$
$$= 20.3\, Y_f \left(\frac{q^2}{g\, Y_f^3}\right)^{0.27}$$
$$= \frac{20.3}{g^{0.27}}\, Y_f^{1} \left(\frac{q^{0.54}}{Y_f^{0.81}}\right)$$
$$= 8\, Y_f^{0.19}\, q^{0.54}$$

$q = 1.81\, C B h^{1.5}$, $B = 1$
$= 1.81\, C h^{1.5}$, $C = 1.77\, h/H + 1.05$
$= 1.81[1.77\, h/H + 1.05]\, h^{1.5}$
$= (3.2\, h/H + 1.9)\, h^{1.5}$
$= \dfrac{3.2}{H}\, h^{2.5} + 1.9\, h^{1.5}$

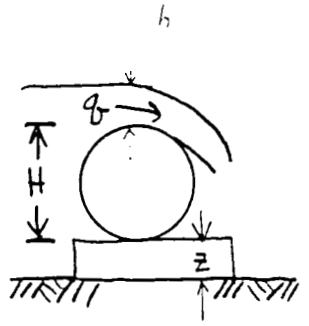
← from Bridgestone Tech. Info.

height of rubber dam → H

$$\therefore L = 8\, Y_f^{0.19} \left(\frac{3.2}{H} h^{2.5} + 1.9\, h^{1.5}\right)^{0.54}$$

Since downstream dam is on a pedestal of height, z,

$$\therefore L = 8(H + z)^{0.19} \left(\frac{3.2}{H} h^{2.5} + 1.9\, h^{1.5}\right)^{0.54}$$



OPEN-CHANNEL HYDRAULICS

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New York Toronto London

1959

15-15. The Straight Drop Spillway. The aerated free-falling nappe in a straight drop spillway (Fig. 15-18) will reverse its curvature and turn smoothly into supercritical flow on the apron. Consequently, a hydraulic jump may be formed downstream. Based on his own experimental data

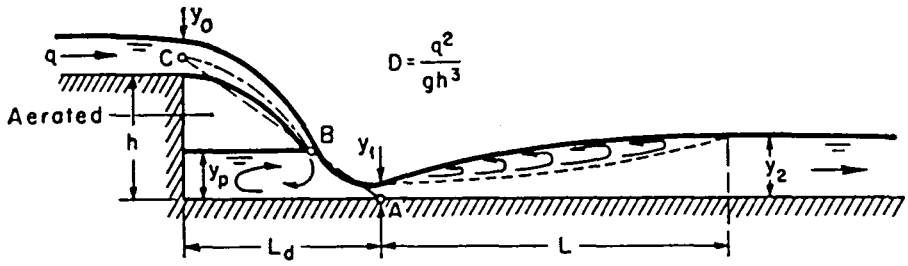

FIG. 15-18. Flow geometry of a straight drop spillway.

and those of Moore [40] and Bakhmeteff and Feodoroff [65], Rand [66] found that the flow geometry at straight drop spillways can be described by functions of the *drop number*, which is defined as

$$\mathrm{D} = \frac{q^2}{gh^3} \tag{15-9}$$

where q is the discharge per unit width of the crest of overfall, g is the acceleration of gravity, and h is the height of the drop. The functions are

$$\frac{L_d}{h} = 4.30\mathrm{D}^{0.27} \tag{15-10}$$

$$\frac{y_p}{h} = 1.00\mathrm{D}^{0.22} \tag{15-11}$$

$$\frac{y_1}{h} = 0.54\mathrm{D}^{0.425} \tag{15-12}$$

$$\frac{y_2}{h} = 1.66\mathrm{D}^{0.27} \tag{15-13}$$

where L_d is the drop length, that is, the distance from the drop wall to the position of the depth y_1; y_p is the pool depth under the nappe; y_1 is the depth at the toe of the nappe or the beginning of the hydraulic jump; and y_2 is the tailwater depth sequent to y_1. The position of the depth y_1 can be approximately determined by the straight line ABC which joins the point A on the apron at the position of y_1, the point B on the axis of the nappe at the height of pool depth, and the point C on the axis of the nappe at the crest of the fall. The fact that these three points lie on a straight line was also verified by experiment.

For a given height h and discharge q per unit width of the fall crest, the sequent depth y_2 and the drop length L_d can be computed by Eqs. (15-10) and (15-13). On the one hand, if the tailwater depth is less than

y_2, the hydraulic jump will recede downstream. On the other hand, if the tailwater depth is greater than y_2, the jump will be submerged. As the tailwater level rises, the spillway crest may be finally submerged. The spillway will still be effective if the submergence does not reach the control depth on the spillway crest. The upper surface of the submerged nappe may be assumed as a straight line tangent to the upper surface of the free nappe at the point where the nappe plunges into the tailwater. The upper surface of the free nappe may be represented by the general equation given in Art. 14-1.

In the above discussion it is assumed that the length of the spillway crest is the same as the width of the approach channel. If the crest length is less than the width of the approach channel, the contraction at the ends of the spillway notch will be so great that the ends of the nappe may land beyond the stilling-basin sidewalls and the concentration of high velocities at the center of the outlet may cause additional scour in the downstream channel. It is, therefore, important to design the approach end properly by shaping the approach channel to reduce the effect of end contractions.

The straight drop spillway is commonly installed in small drainage structures by the U.S. Soil Conservation Service. The simplest form of such a structure, known as the *box inlet drop spillway*, is simply a rectangular box open at the top and at the downstream end [67–69]. Storm runoff is directed to the box by dikes and headwalls, enters over the upstream end and two sides, and leaves through the open downstream end leading to a channel outlet. A generalized design has also been developed by the Service as a result of tests and analyses at the St. Anthony Falls Hydraulic Laboratory [70,71].

By placing a gridiron or grate on top of the straight drop spillway, the overfalling jet can be separated into a number of long thin sheets of water which fall nearly vertically into the channel below. Thus the energy in the jet can be dissipated without resort to the use of hydraulic jump, and hence wave action can be reduced if $\mathbf{F}_1 = 2.5$ to 4.5. This scheme has been adopted by the U.S. Bureau of Reclamation [34,35] for developing a so-called *drop energy dissipator* as a substitute design for USBR basin IV (Art. 15-14). In this design, the grate may be composed of a series of beams, such as steel rails, channel irons, or timbers, which form slots parallel to the direction of flow. The width of the slots is equal to two-thirds the width of the beams. If the rails are tilted downward at an angle of 3° or more, the grate is self-cleaning. On the other hand, if the grate is tilted upward, it can check the upstream water level but may pose a cleaning problem. The length of the grate slots can be computed by

$$L_G = \frac{4.1Q}{WN\sqrt{2gy_1}} \tag{15-14}$$

where Q is the total discharge in cfs, W is the width of a space in ft, N is the number of spaces, g is the gravitational acceleration, and y_1 is the depth of flow in the canal upstream.

15-16. Jump in Sloping Channels. In the analysis of hydraulic jumps in sloping channels or channels having appreciable slope, it is essential to consider the weight of water in the jump; in horizontal channels the effect of this weight is negligible. Thus, the momentum formulas for jumps on horizontal floor cannot be applied straightforwardly to jumps on sloping floor. As will be shown in this article, however, the momentum principle can be used to derive an equation analogous to Eq. (3-21), which will contain an empirical function that has to be determined experimentally.

Early studies on hydraulic jumps in sloping channels were made by Riegal and Beebe [9] and by Ellms [72,73]. Later investigations were made by Bakhmeteff and Matzke [74] and also by Yarnell[1] and Kindsvater [75].

Hydraulic jump in sloping channels may occur in various forms, as shown in Fig. 15-19. Case 1 is a typical form, but it is not common in practical problems. Cases 2 to 4, known as *drowned-out jumps*, are common forms and usually appear simply as jets of water plunging into a downstream pool below the steep slope. For practical purposes, it is believed that the solutions for the typical form of case 1 and for the drowned-out jumps are mutually applicable. Case 5 shows the jump on an adverse slope. This is a rare type of jump, and no adequate experimental data are available at the present moment.

For the analysis of the jump of case 1, a rectangular channel of unit width is assumed. Considering all effective forces parallel to the channel bottom, the momentum equation may be written

$$\frac{Qw}{g}(\beta_2 V_2 - \beta_1 V_1) = P_1 - P_2 + W \sin\theta - F_f \qquad (3\text{-}14)$$

where $Q = V_1 d_1$, $V_2 = V_1 d_1/d_2$, $P_1 = 0.5wd_1^2 \cos\theta$, $P_2 = 0.5wd_2^2 \cos\theta$, F_f is negligible, and β_1 and β_2 may be taken as unity. If the surface profile of the jump is a straight line, the weight of water in the jump can be computed. The discrepancy between the straight-line and actual profiles and the effect of slope may be corrected by a factor K. Thus,

$$W = \tfrac{1}{2}KwL(d_1 + d_2) \qquad (15\text{-}15)$$

Substituting Eq. (15-15) in Eq. (3-14), letting $\mathbf{F}_1 = V_1/\sqrt{gd_1}$, and

[1] The work started in 1936 by David L. Yarnell at the Iowa Institute of Hydraulic Research, Iowa City, Iowa, was interrupted by his death in 1937. The Yarnell data were lent to the Tennessee Valley Authority in 1939 for an extensive investigation by Kindsvater.

Drainage Design Manual for Maricopa County, Arizona

Volume II
Hydraulics

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ing the walls. Additional rows of baffles may be buried below grade to allow for downstream channel degradation.

4. The baffle chute side wall height (measured normal to the floor slope) should be 2.4 times the critical depth based on peak discharge (or $3H_b$). The wall height will contain the main flow and most of the splash. The design of the area behind the wall should consider that some splash may occur, but extensive protection measures are not required.

5. Determine upstream transition and apron side wall height as required by backwater analysis. Lower basin wing walls are generally constructed normal to the chute side walls at the chute outlet to prevent eddy current erosion at the drop toe. These transition walls are of a height equal to the channel normal depth plus 1 foot, and length sufficient to inhibit eddy current erosion.

6. All concrete walls and footer dimensions are determined by conventional structural methods. Cutoff walls and underdrain requirements are determined by seepage analysis (see Section 6.3.2.4).

7. The most troublesome aspect of the design is the determination of the hydraulic impact forces on the baffles to allow the structural engineer to size adequate reinforcing steel. Figure 6.9(d) may be used as a guideline. The structural engineer should apply a conservative safety factor, as this curve is based on relatively sparse information.

Construction Considerations: There are numerous steps necessary in the construction of a baffle chute, but they are usually easily controlled by a contractor. For quality control and inspection, there are consistent, measurable, and repeatable standards to apply.

Potential areas of concern include foundation problems, riprap quality control and placement, and finish work with regard to architectural and landscape treatments. Formwork, form ties, and seal coatings can leave a poor appearance, if not handled properly. Poor concrete vibration can result in surface defects (honeycombing) or more serious conditions, such as exposed rebar.

In summary, baffle chute drop structures are the most successful as far as hydraulic performance is concerned and are straight forward to construct. Steel, formwork, concrete placement and finish, and backfill require periodic inspection.

6.3.4.2 Vertical Hard Basin Drops: The vertical hard basin is a generalized category which can include a wide variety of structure design modifications and adaptations. A variety of components can be used for both the hard basin and the wall, various contraction effects can be implemented to reduce approach velocities, and different trickle channel options can be selected.

The maximum vertical drop height from crest to basin for a vertical hard basin drop is limited to 3 feet for safety considerations.

The hydraulic phenomenon provided by this type of drop is a jet of water which overflows the crest wall into the basin below. The jet hits the hard basin and is redirected horizontally. With sufficient tailwater, a hydraulic jump is initiated. Otherwise, the flow continues horizontally in a supercritical mode until the specific force of the tailwater is sufficient to force the jump. Energy is dissipated in the turbulence through the hydraulic jump; therefore, the basin is sized to contain the supercritical flow and the erosive turbulent zone.

Generally, a rough basin is advantageous since increased roughness will result in a shorter, more economical basin. Figure 6.10 shows a vertical drop with a grouted boulder basin (concrete may also be used), and illustrates several important design considerations.

General Hydraulic Design Procedure:

1. The design approach uses the unit discharge in the main channel and the trickle channel to determine the separate water surface profiles and jump locations in these zones. The basin is sized to adequately contain the hydraulic jump and associated turbulent flows.

2. The rock lined approach length ends abruptly at a structural retaining crestwall which has a nearly rectangular cross-section and trickle channel section. (Refer to Section 6.3.2.2.)

3. Crest wall and footer dimensions are determined by conventional structural methods. Underdrain requirements are determined from seepage analysis.

4. *Open Channel Hydraulics* (Chow 1959), makes a brief presentation for the "Straight Drop Spillway," which applies here. Separate analysis would need to be undertaken for the trickle channel area and the main channel area as discussed in Section 6.3.2.3. Add subscript *t* for the trickle channel area and subscript *m* for the main channel area in the following equations.

   Refer to Figure 6.11 to identify the following parameters. L_b is the design basin length which includes L_d and the distance to the jump, D_j, which is measured from the downstream end of L_d. The jump length, L_j, is approximated as six times the sequent depth, Y_2. As a safety factor, to assure a sufficient length for L_b, 0.6 L_j is added in the design of L_b, such that

$$L_b \geq L_d + D_j + 9.6Y_2 \tag{6.5}$$

   When a hydraulic jump occurs immediately where the nappe hits the basin floor, the following variables are defined:

$$L_d / Y_f = 4.3\, D_n^{\ 0.27} \tag{6.6a}$$

   where

$$D_n = q_c^2/(gY_f^3) \tag{6.6b}$$

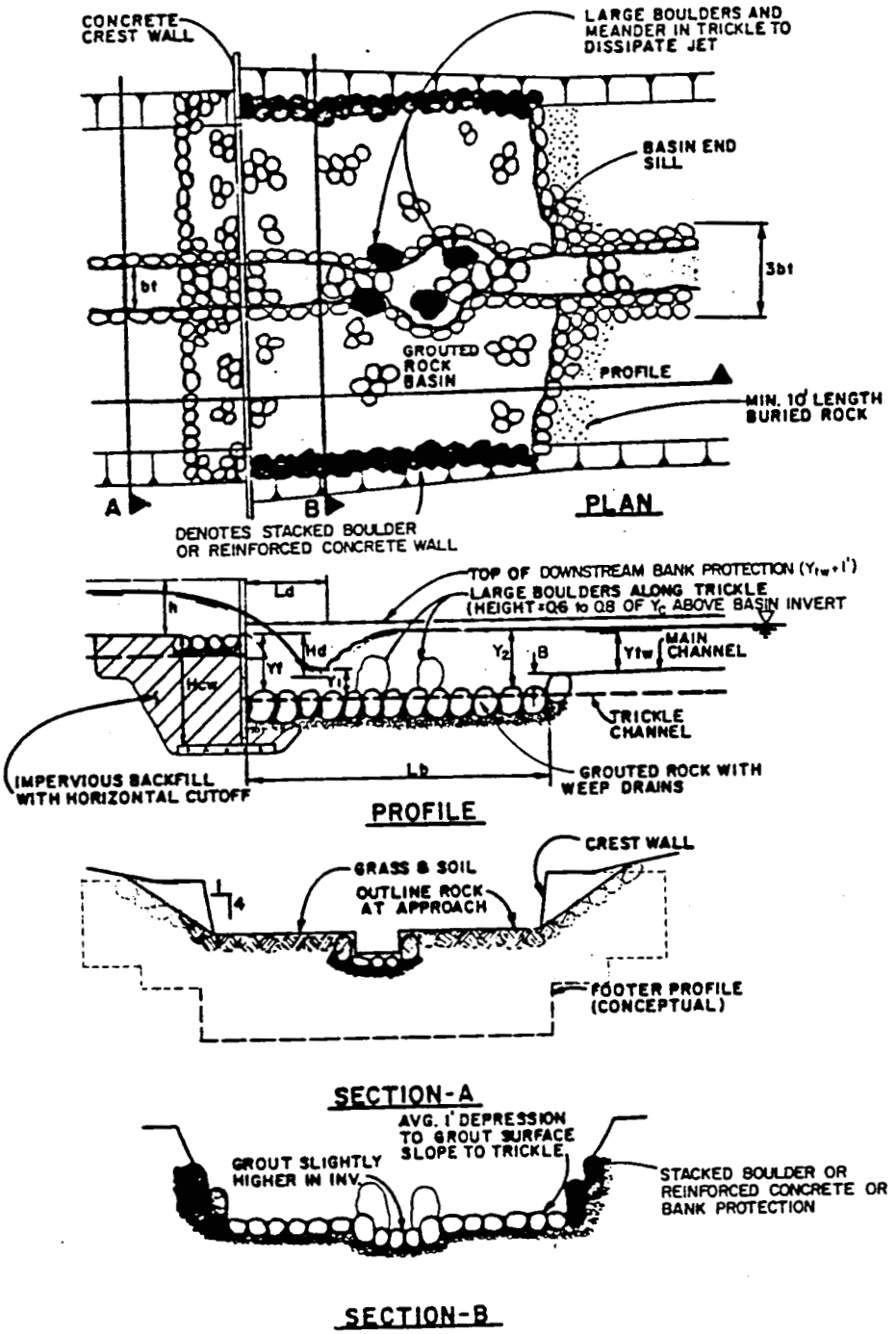


Figure 6.10
Vertical Hard Basin Drop
(McLaughlin Water Engineers, Ltd. 1986)

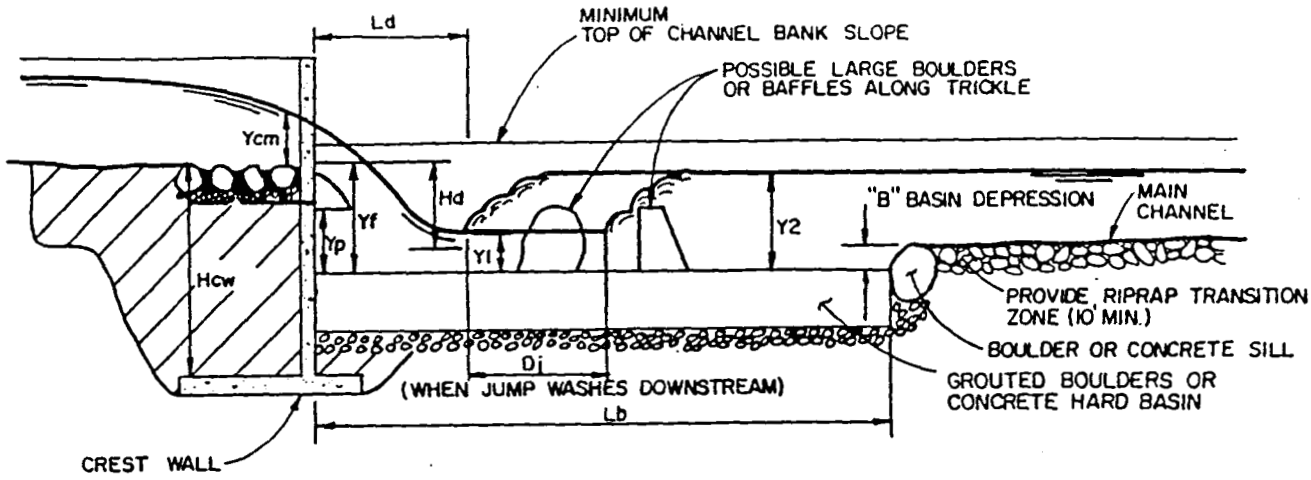


Figure 6.11
Vertical Drop Hydraulic System
(McLaughlin Water Engineers, Ltd. 1986)

$$Y_p / Y_f = 1.0\, D_n^{\;0.22} \tag{6.7}$$

$$Y_1 / Y_f = 0.54\, D_n^{\;0.425} \tag{6.8}$$

$$Y_2 / Y_f = 1.66\, D_n^{\;0.27} \tag{6.9}$$

5. In the case where the tailwater does not provide a depth equivalent to or greater than Y_2, the jet will wash downstream as supercritical flow until its specific force is sufficiently reduced to allow the jump to occur. Determination of the distance to the hydraulic jump, D_j, requires a separate water surface profile analysis for the main and low flow zones. Any change in tailwater affects the stability of the jump in both locations.

6. Caution is advised regarding the higher unit flow condition in the low flow zone. Large boulders and meanders in the trickle zone of the basin are shown to help dissipate the jet, and rock is extended downstream along the low flow channel. This results in three possible basin length design conditions:

   a. At the main channel zone:

$$L_{bm} = L_{dm} + D_{jm} + 0.60\,(6Y_2)_m \tag{6.10}$$

   b. At the trickle zone, standard design:

$$L_{bt} = L_{dt} + D_{jt} + 0.60\,(6Y_2)_t \tag{6.11}$$

c. When large boulders or baffles are used to confine the jump to the impingement area of the low flow zone, the low flow basin length may be reduced:

$$L_{bt} = L_{dt} + 0.60\,(6Y_2)_t \tag{6.12}$$

7. The basin floor elevation is depressed at depth B, variable with drop height and practical for trickle flow drainage. Note that the basin depth adds to the effective tailwater depth. The basin is constructed of concrete or grouted rock. Either material must be evaluated for the hydraulic forces and seepage uplift.

8. There is a sill at the basin end to bring the invert elevation to that of the downstream channel and side walls extending from the crestwall to the sill. The sill is important in causing the hydraulic jump to form in the basin. Buried riprap should be used downstream of the sill to minimize any local scour caused by the lift over the sill.

9. Water surface profile analyses have proven that base widths of the rectangular crest which are less than that of the channel will result in high unit discharges and velocities, thereby requiring unreasonable extensions of both the basin length and upstream rock protection. Roughness in the basin area can reduce the basin length required to contain the hydraulic jump. This is the primary advantage of the use of grouted rock in the drop basin.

Construction Considerations: Foundation and seepage concerns are very critical with regard to the vertical wall, as poor control can result in sudden failure. The use of caissons or pile can mitigate this effect. Put in comparative terms with the baffle chute, seepage problems can result in displacement of the vertical wall with no warning, where the box-like structure of the baffle chute may evidence some movement or cracking, but not total failure, and thus allow time for repairs.

The quality control concerns and measures for reinforced concrete are described under baffle chutes. The foundation concerns for the wall are critical as described above. The subsoil conditions for the basin are also important so that the basin concrete or grouted riprap is stable against uplift pressures.

A grouted boulder stilling basin provides roughness, which is useful in shortening the basin length. As the name implies, the basin should be constructed of individual boulders placed on a prepared subgrade. Boulders should be a minimum dimension that exceeds the grout layer thickness, so that the contractor and the inspector can see and have grout placed directly to the subgrade and completely filling the voids. Graded riprap should not be used for grouting, as the smaller rock prevents the voids from being completely filled with grout. The result is a direct piping route for water beneath the grout, and a structural slab with insufficient mass. The completed combination of boulders and grout should have an overall weight sufficient to offset uplift forces. A minimum dimension of 18 inches is recommended for boulders, and 12 inches for the grout layer. By maintaining the finished surface of the grout below the top of the boulder, both appearance and roughness characteristics are enhanced. Seepage relief for the basin slab should be provided.

RIO SALADO: Stilling Basin Rating Curve for Rubber Dams
DOWNSTREAM DAM

Note: Equation in English units
Stilling Basin length equation derived from equations found in
- *Open Channel Hydraulics* by V.T. Chow, 1959 and
- *Drainage Design Manual for Maricopa County*, Vol. 2: Hydraulics

Discharge and coefficient equations from Bridgestone Rubber Dam Technical Information

Length of Stilling Basin, L = 8*(Y^0.19)*(q^0.54)

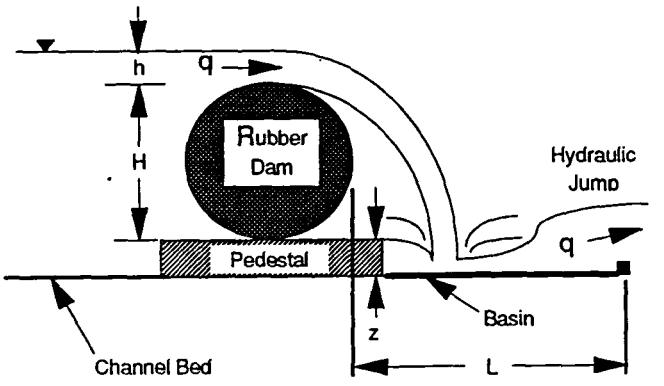
where: L = length, ft. (includes factor of safety recommended by FCDMC)
Y = distance from top of dam to Stilling Basin floor, ft
q = unit discharge over dam, cfs/ft

Unit discharge over dam, $q = 1.81*C*B*h^{3/2}$

where: C = 1.77*h/H+1.05
h = overfall depth, ft.
H = dam height, ft.
B = length of dam = 1 ft.

Total discharge, Q, cfs = q * total dam length

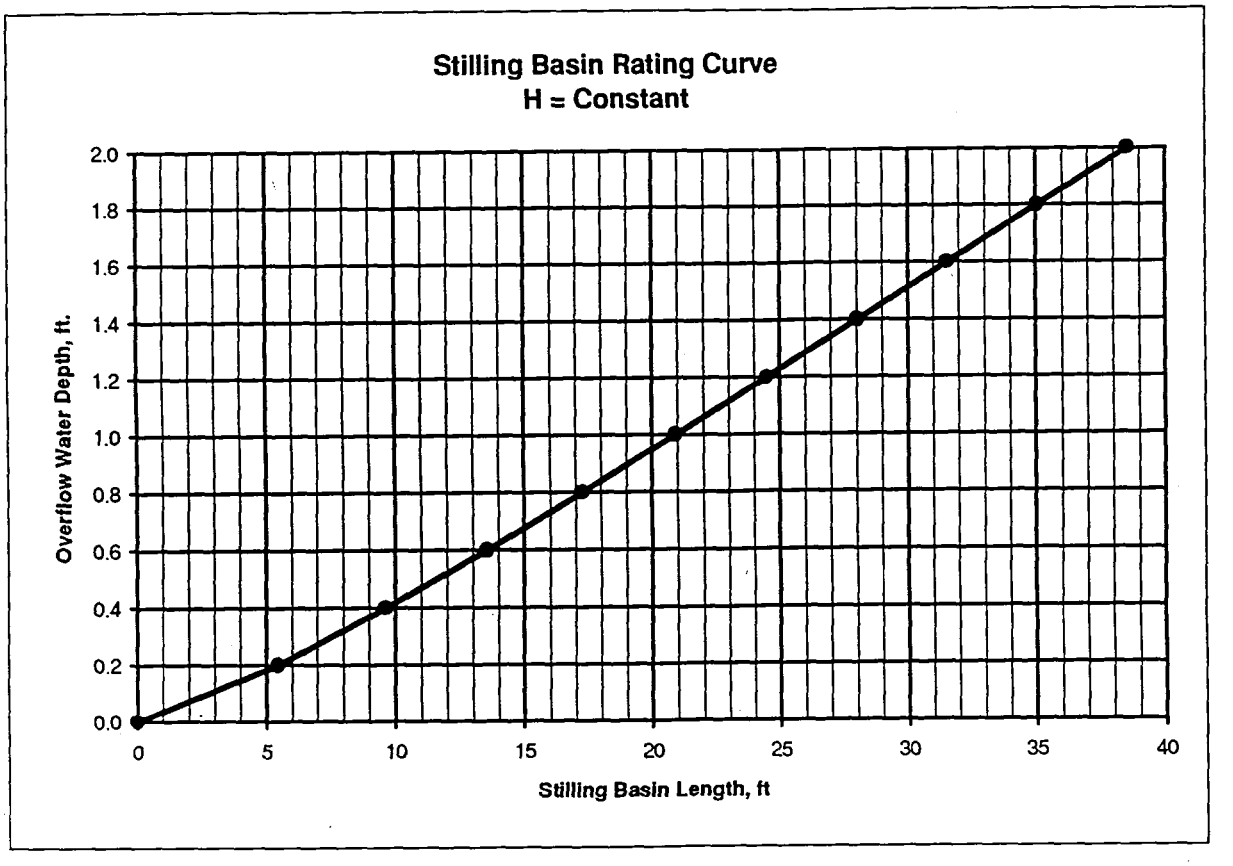
Input:	
Total Dam Length, ft. =	890
Max. depth of flow over fully inflated dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	16
Min. height of rubber dam, H, ft.=	13
Pedestal height, z =	3.1
Calculated:	
Max. h + H =	18
Max. depth of water at dam, h + H + z =	21.1



Calculations:

H is constant at 16 ft.

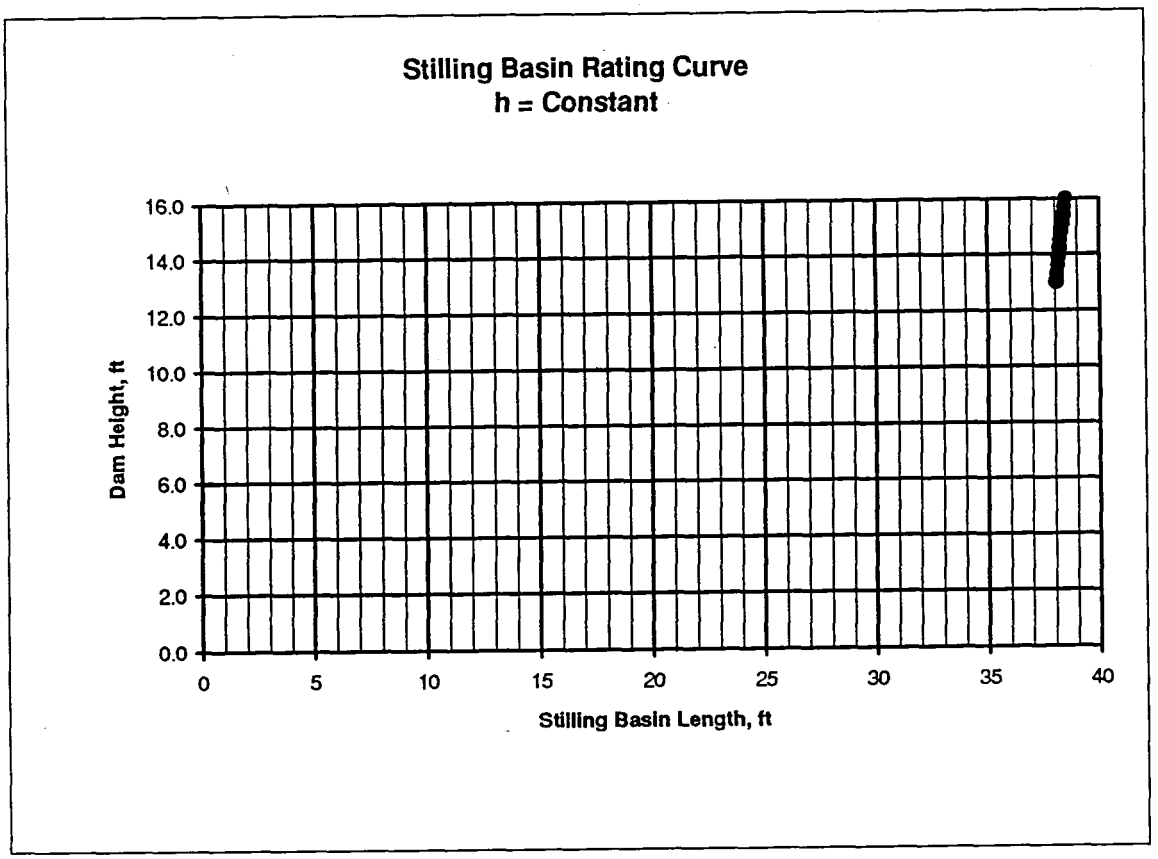
h, ft.	C	q, cfs	Q, cfs	Y = H + z	L, ft.
0.0	1.05	0.0	0	19.1	0
0.2	1.07	0.2	154	19.1	5
0.4	1.09	0.5	446	19.1	10
0.6	1.12	0.9	836	19.1	14
0.8	1.14	1.5	1312	19.1	17
1.0	1.16	2.1	1870	19.1	21
1.2	1.18	2.8	2505	19.1	24
1.4	1.20	3.6	3215	19.1	28
1.6	1.23	4.5	4000	19.1	32
1.8	1.25	5.5	4859	19.1	35
2.0	1.27	6.5	5792	19.1	39



Calculations:

h is constant at 2 ft.

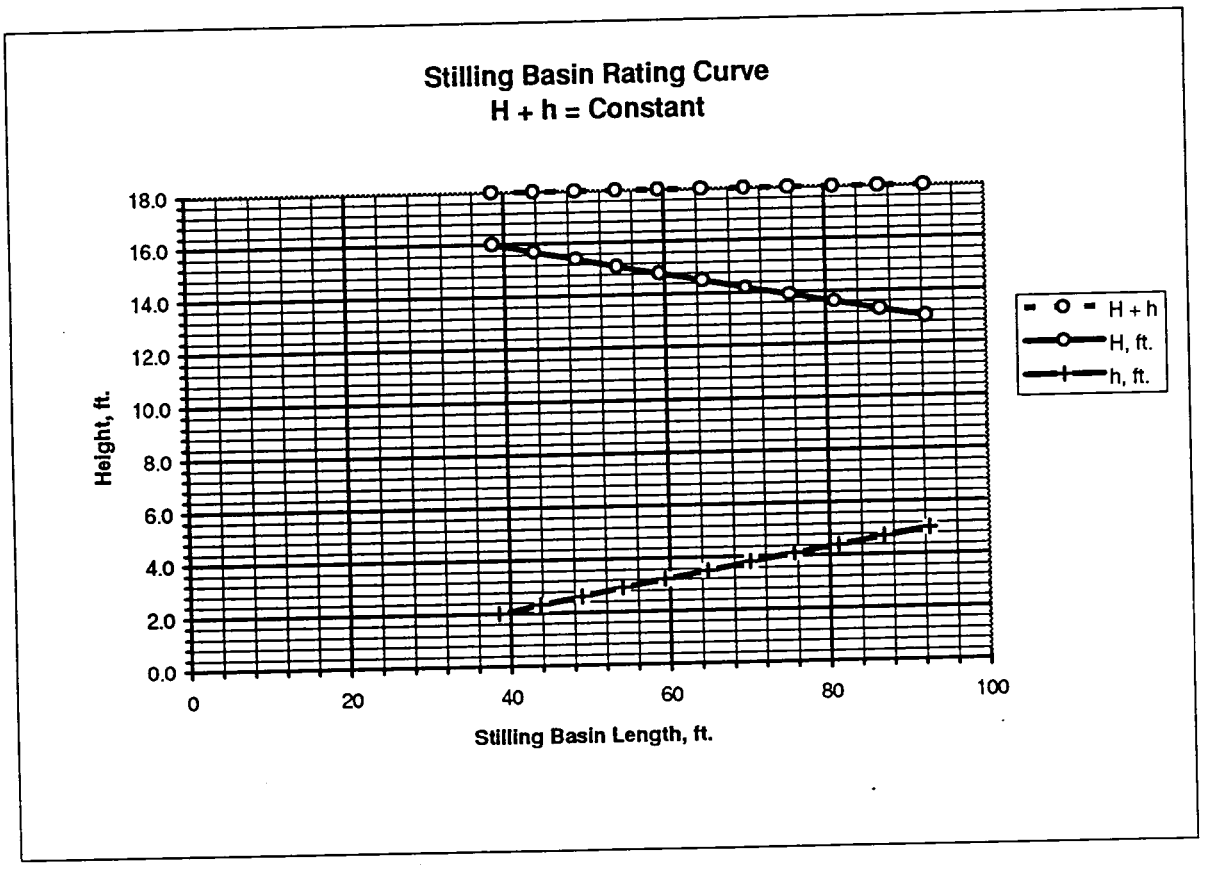
H, ft.	C	q, cfs	Q, cfs	Y = H + z	L, ft.
13.0	1.32	6.8	6025	16.1	38
13.3	1.32	6.7	5997	16.4	38
13.6	1.31	6.7	5970	16.7	38
13.9	1.30	6.7	5945	17.0	38
14.2	1.30	6.7	5920	17.3	38
14.5	1.29	6.6	5896	17.6	38
14.8	1.29	6.6	5874	17.9	38
15.1	1.28	6.6	5852	18.2	38
15.4	1.28	6.6	5831	18.5	38
15.7	1.28	6.5	5811	18.8	38
16.0	1.27	6.5	5792	19.1	39



Calculations:

H + h is constant at 18 ft.

H, ft.	h, ft.	H + h	C	q, cfs	Q, cfs	Y = H + z	L, ft.	Vel., ft/s
13.0	5.0	18.0	1.73	35	31172	16.1	93	7
13.3	4.7	18.0	1.68	31	27502	16.4	87	7
13.6	4.4	18.0	1.62	27	24125	16.7	81	6
13.9	4.1	18.0	1.57	24	21024	17.0	76	6
14.2	3.8	18.0	1.52	20	18182	17.3	70	5
14.5	3.5	18.0	1.48	18	15582	17.6	65	5
14.8	3.2	18.0	1.43	15	13211	17.9	59	5
15.1	2.9	18.0	1.39	12	11058	18.2	54	4
15.4	2.6	18.0	1.35	10	9109	18.5	49	4
15.7	2.3	18.0	1.31	8	7357	18.8	44	4
16.0	2.0	18.0	1.27	7	5792	19.1	39	3



RIO SALADO: Stilling Basin Rating Curve for Rubber Dams
UPSTREAM DAM

Note: Equation in English units
Stilling Basin length equation derived from equations found in
- *Open Channel Hydraulics* by V.T. Chow, 1959 and
- *Drainage Design Manual for Maricopa County*, Vol. 2: Hydraulics

Discharge and coefficient equations from Bridgestone Rubber Dam Technical Information

Length of Stilling Basin, L = 8*(Y^0.19)*(q^0.54)

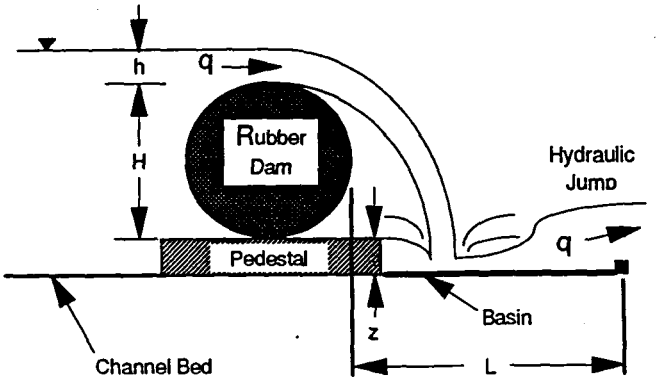
where: L = length, ft. (includes factor of safety recommended by FCDMC)
Y = distance from top of dam to Stilling Basin floor, ft
q = unit discharge over dam, cfs/ft

Unit discharge over dam, $q = 1.81*C*B*h^{3/2}$

where: C = 1.77*h/H+1.05
h = overfall depth, ft.
H = dam height, ft.
B = length of dam = 1 ft.

Total discharge, Q, cfs = q * total dam length

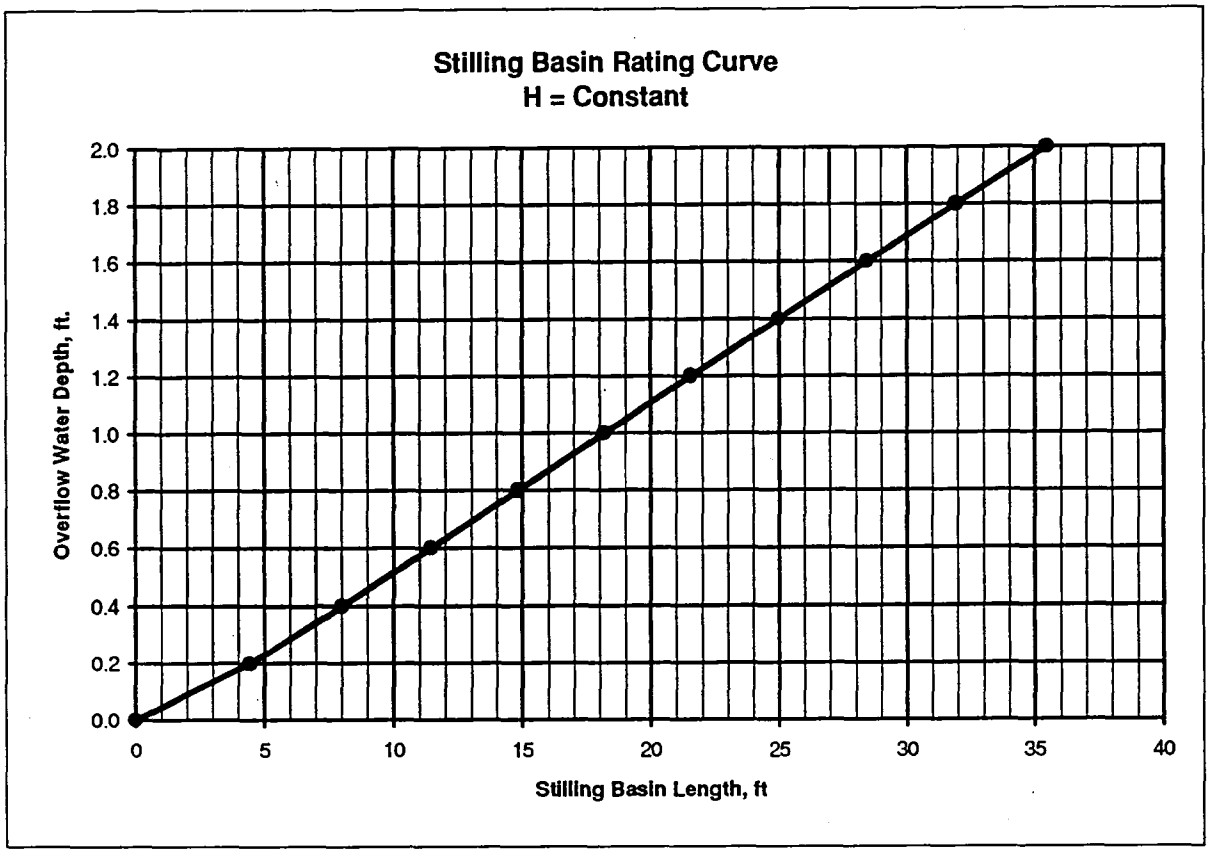
Input:	
Total Dam Length, ft. =	930
Max. depth of flow over fully inflated dam, h, ft.=	2
Max. height of rubber dam, H, ft.=	6
Min. height of rubber dam, H, ft.=	4
Pedestal height, z =	0
Calculated:	
Max. h + H =	8
Max. depth of water at dam, h + H + z =	8



Calculations:

H is constant at 6 ft.

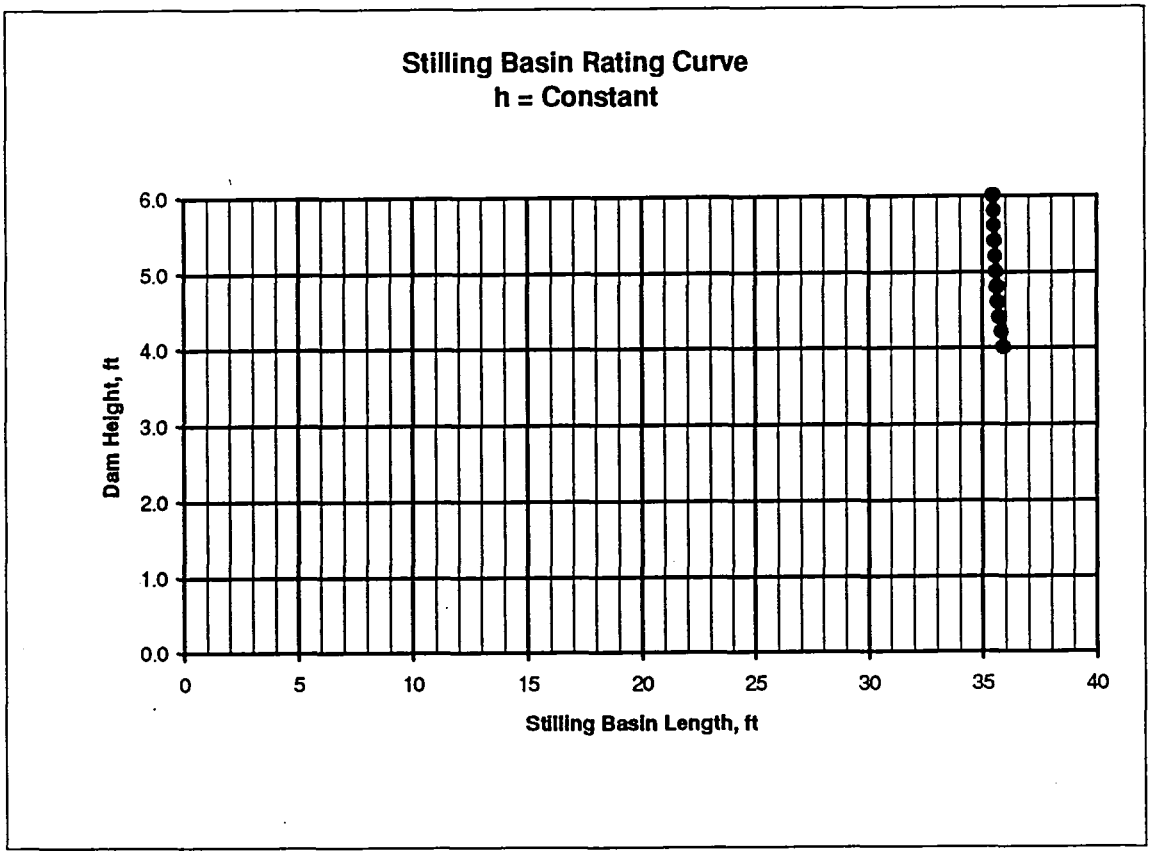
h, ft.	C	q, cfs	Q, cfs	Y = H + z	L, ft.
0.0	1.05	0.0	0	6	0
0.2	1.11	0.2	167	6	4
0.4	1.17	0.5	497	6	8
0.6	1.23	1.0	960	6	11
0.8	1.29	1.7	1549	6	15
1.0	1.35	2.4	2264	6	18
1.2	1.40	3.3	3107	6	22
1.4	1.46	4.4	4079	6	25
1.6	1.52	5.6	5185	6	28
1.8	1.58	6.9	6427	6	32
2.0	1.64	8.4	7808	6	35



Calculations:

h is constant at 2 ft.

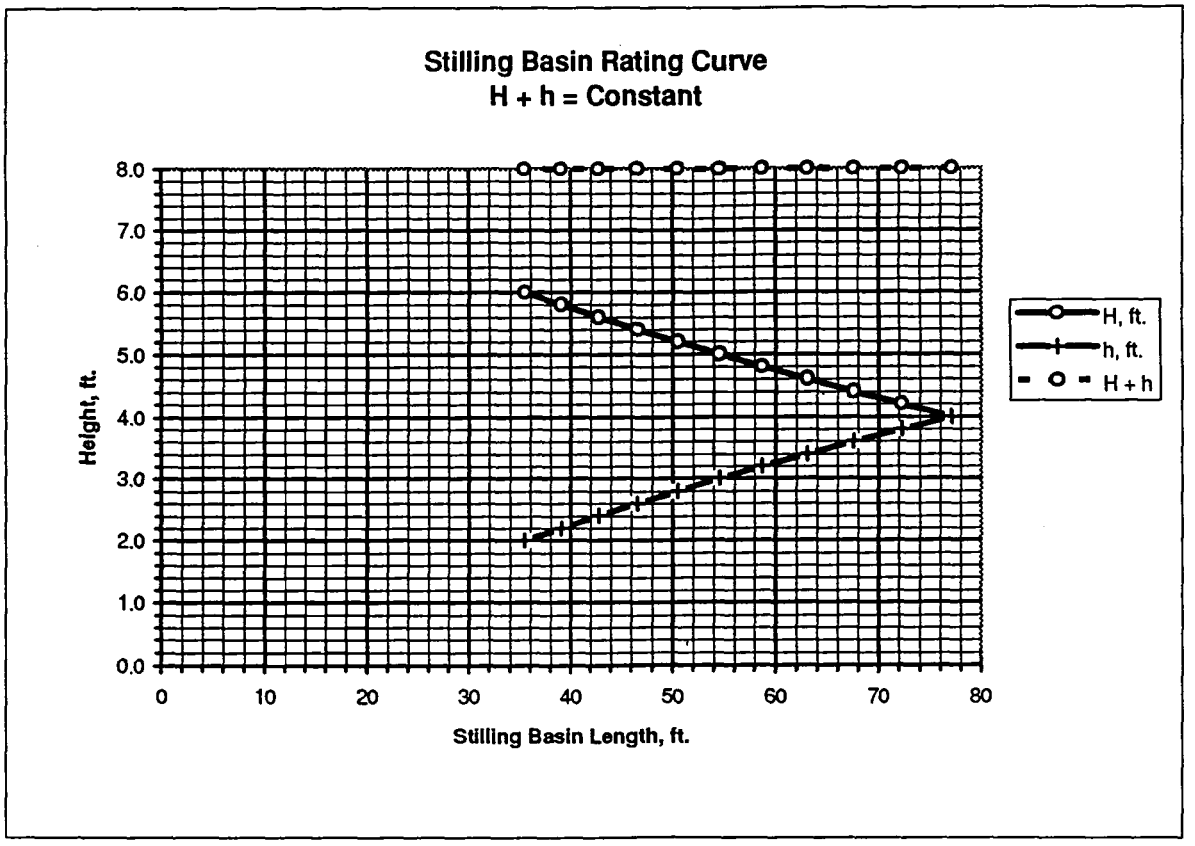
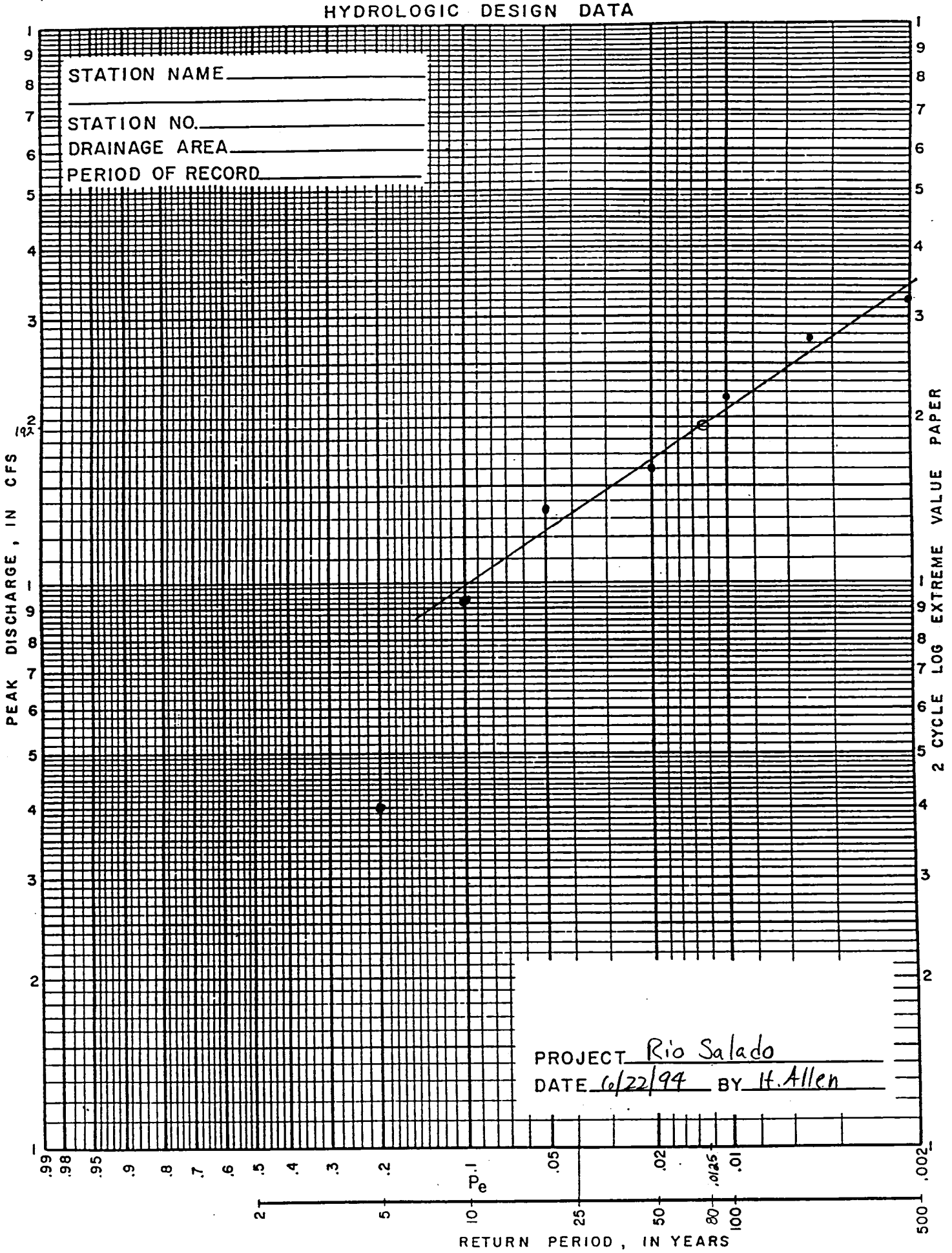
H, ft.	C	q, cfs	Q, cfs	Y = H + z	L, ft.
4.0	1.94	9.9	9213	4.0	36
4.2	1.89	9.7	9012	4.2	36
4.4	1.85	9.5	8830	4.4	36
4.6	1.82	9.3	8663	4.6	36
4.8	1.79	9.2	8510	4.8	36
5.0	1.76	9.0	8370	5.0	36
5.2	1.73	8.9	8240	5.2	36
5.4	1.71	8.7	8120	5.4	36
5.6	1.68	8.6	8009	5.6	35
5.8	1.66	8.5	7905	5.8	35
6.0	1.64	8.4	7808	6.0	35



Calculations:

H + h is constant at 8 ft.

H, ft.	h, ft.	H + h	C	q, cfs	Q, cfs	Y = H + z	L, ft.	Vel., ft/s
4.0	4.0	8.0	2.82	41	37975	4.0	77	10
4.2	3.8	8.0	2.65	36	33061	4.2	72	9
4.4	3.6	8.0	2.50	31	28724	4.4	68	9
4.6	3.4	8.0	2.36	27	24887	4.6	63	8
4.8	3.2	8.0	2.23	23	21488	4.8	59	7
5.0	3.0	8.0	2.11	20	18473	5.0	55	7
5.2	2.8	8.0	2.00	17	15798	5.2	51	6
5.4	2.6	8.0	1.90	14	13424	5.4	47	6
5.6	2.4	8.0	1.81	12	11319	5.6	43	5
5.8	2.2	8.0	1.72	10	9455	5.8	39	5
6.0	2.0	8.0	1.64	8	7808	6.0	35	4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