Additional Investigation of Two Alternatives for Lone Pine Dam

An Addendum to the Show Low Creek Reservoir System Evaluation

1.

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Prepared for:

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1.0 Introduction

The Show Low Creek Reservoir System Evaluation (SLCRSE), November 5, 2002, concluded with several alternatives to remove Lone Pine Dam from the Arizona Department of Water Resources "unsafe, significant hazard" classification as well as alternatives for creating a larger permanent pool at Schoens reservoir. Following the submittal of the SLCRSE, A Value Engineering Report (VER), prepared concurrently with the SLCRSE, was submitted to Navajo County outlining the value of the SLCRSE alternatives as well as the value of many other alternatives. Navajo County, in conjunction with the Silver Creek Watershed Advisory Committee, has chosen two alternatives to be investigated in additional detail per a letter sent to Charles Schlinger of the Sustainable Water Resources Alliance (SWRA) dated December 2, 2002, by Tom Heib from the Navajo County Public Works Department. The two alternatives are 1) Build an approximately 400 foot bridge 200-300 feet south of Lone Pine Dam and leave the dam in place, and 2) Reroute Lone Pine Dam road around the southerly end of Lone Pine Reservoir, approximately 500 feet north of the Show Low Creek and Linden Draw confluence, and cross Show Low Creek with fill and a culvert to pass the 10 year storm event flood without overtopping the roadway. The dam would remain in place as is.

2.0 Purpose

This report, as an addendum to the SLCRSE, presents results of our investigation of these two alternatives and provides a recommendation.

3.0 Alternative 1 - Build Bridge

This alternative involves constructing an approximately 400 foot long bridge to span Show Low Creek approximately 200 to 300 feet south of Lone Pine Dam. The author walked the proposed bridge site and a photograph is presented in Figure 5 in Appendix B. Figure 1 in Appendix B shows the plan view for both the bridge and culvert crossing alternatives. Figure 2 in Appendix B is a plan view of the proposed bridge location using the topography created by the NAU survey. The proposed roadway realignment will allow for higher design speeds as the existing tight curves would no longer be used. The bridge-deck elevation should also remain close to that of Lone Pine Dam's crest so that the possibility of inundation is removed. The excavation for the spillway will still be required to pass the 0.5 PMF event per the SLCRSE. The embankment for the bridge approaches would come from the spillway excavation need to bring the spillway to ADWR standards. The pavement cross section used for cut and fill quantity calculations is a 26' wide, 3 inches of asphalt concrete on 5 inches of aggregate base course with 4 foot shoulders. Each side of the roadway will have a 2 foot ditch with 4:1 side slopes when roadway is within excavation, and 4:1 side slope when the edge of roadway requires embankment. The bridge itself will be 30 feet wide: two 12-foot lanes of traffic, two concrete barriers that are 2 feet wide, and a 4' walkway. Figure 3 in Appendix B is a profile of the bridge crossing.

3.1 Alternative 1 - Cost Estimate

In order to provide the best construction cost for this level of planning, construction costs were derived from documented project costs of similar projects as well as knowledge from local contractors who are familiar with project area, local construction costs and suppliers. The Arizona department of Transportation (ADOT) keeps records on their construction costs annually. Rick Schilke from the ADOT Flagstaff construction office provided the ADOT 1998 construction cost index as well as the tabulation of bids for the recently completed I-40/I-17 interchange; this project is comprehensive and includes helpful bridge costs. Chen-Woei Pong from the Structures section at ADOT's Phoenix office provided detailed construction cost estimates for 3 bridges completed on the Bee Line Highway from Payson to Phoenix. Doyle Hancock from Show Low Construction was also very helpful in providing construction costs from his experience in roadway and bridge construction. Bridge costs were developed assuming post-tensioned concrete girders and Type 4 girders. Although there were a few discrepancies between these resources, overall, they were surprisingly consistent. For the few discrepancies that did appear, the most conservative unit price was used. Costs estimates provided do not include costs associated with property or environmental issues.

The estimated project cost for this alternative is the following:

12,000 SF of bridge* $90/SF=	$1,080,000
Spillway excavation – 26,500 CY *$8/CY =	$ 212,000
Roadway Clear and Grub $4500/Acre*4 acres =	$ 18,000
2440 feet of 3" A.C. on 5" A.B.C roadway	
1137 tons of A.C * $65/ton =	$ 74,000
976 CY of A.B.C. * $50/CY =	$ 49,000
Roadway Embankment $5/CY *36,000 CY =	$ 180,000
Mobilization 10% =	$ 161,000
Subtotal =	$1,774,000
Final Engineering/Planning/Design 15% =	$ 266,000
Contingency 10% =	$ 177,000
Total -	**$2,217,000**

4.0 Alternative 2 – Culvert Crossing

This alternative involves rerouting Lone Pine Dam road away from the top of Lone Pine Dam and to a new Show Low Creek crossing approximately 1.5 miles south of Lone Pine Dam. The dam will remain in place and therefore the frequency of inundation of this new crossing should be and has been analyzed. The constraints on this alternative are the following: Minimize costs by minimizing fill in Show Low Creek, but still allowing the 10 year storm event flood to pass through a selected culvert without overtopping the roadway.

Per the letter sent to Charles Schlinger of the Sustainable Water Resources Alliance (SWRA) dated December 2, 2002, by Tom Heib from the Navajo County Public Works Department, the suggested realignment of Lone Pine Dam road would be as follows: "from the northeast quarter of section 22 along a ridgeline to the east; to a new box culvert located approximately 500 feet north of the Linden Draw confluence; from here, almost due east and up the slope towards the center of section 24 where the alignment turns to the northeast to tie into the existing road somewhere in section 13." Figure 1 in Appendix B shows the plan view for both the bridge and culvert crossing alternatives. Figure 6 in Appendix B shows a photograph of the proposed culvert crossing location.

Other possible culvert locations were examined when the author visited Lone Pine Reservoir in February, 2003. There appears to be a possible crossing 500 feet south of Linden Draw and Show Low Creek confluence, however, this location requires additional roadway and forest disturbance, as well as additional costs for crossing Linden Draw. Other possible locations exist even further south, but these locations fail to maintain the direct access that Lone Pine Dam road provides for Navajo County. Another location is right through the middle of the widest section of Lone Pine Reservoir. This location has much potential to become costly due to the enormous amount of fill that would be required, unless the roadway is close to the bottom of the reservoir. However, this would likely result in sedimentation difficulties as this location appears to have a layer of unconsolidated sediment of unknown thickness. A low flow channel currently winds its way through the sediment, however, as floods occur, this channel will likely change its location unless the channel is heavily reinforced for erosion control both upstream and downstream from the roadway crossing. This type of channel stabilization will likely bring the construction costs for this culvert location above those for the location identified by Navajo County. Furthermore, the low profile necessary to make this culvert crossing economical will also result in unacceptable inundation times as floodwater takes much time to exit through Lone Pine Dam's 24" primary spillway pipe.

The ground surface was digitized from 7.5' USGS quads and then transformed into a digital terrain model in AutoCAD. The contour interval is 20 feet, and the roadway profile was created where the top of road matches the top of ground where possible. There is large uncertainty in embankment/excavation calculations, which could push the cost of this alternative higher. Therefore the costs associated with excavation and embankment should be considered a minimum. The vertical datum of the NAU survey relates to the USGS 7.5 minute topographic quadrangle as 1000'=5971'.

The design speed is 35 mph with a rate of vertical curvature of 50 as recommended by A Policy on Geometric Design, American Association of State Highway and Transportation Officials

(AASHTO). Rural standards in other Arizona counties vary, however most use 8% grade as a maximum for rural highway design, with allowances for steeper grades in unusual circumstances. The low design speed detracts from the desirability of the culvert crossing when compared to the bridge option. However, the low design speed will benefit safety for drivers as this crossing has flood inundation potential. Also, higher design speeds actually increase both excavation as well as embankment. Nevertheless, an 8% grade to the west and a 10% grade to the east were necessary to prevent prohibitive excavation, and as such, 33 feet of embankment still results at the lowest point.

The pavement cross section, ditch and fill slope geometry are the same as that stated in Alternative 1. Figure 4 in Appendix B shows a closer plan and profile of the culvert crossing itself. The figure shows grading limits of excavation and embankment. The road elevations shown in this profile were used to model the road as a broad crested weir for the flood routing calculations. A 10 foot by 10 foot concrete box culvert was used in the flood routing calculations, however, an equivalent corrugated metal pipe approximately 11 feet 6 inches in diameter is cheaper and is used in the construction cost estimate.

Although Lone Pine Dam has been analyzed by previous reports, the culvert crossing can affect the flood control performance of Lone Pine Reservoir. The culvert crossing has the possibility of creating two reservoirs, one north of the crossing (north pond), and one south of the crossing (south pond) that interact with one another, and may even qualify as a new dam if the flood routing calculations show ponding behind the culvert crossing that meets ADWR criteria for a dam. The 100-year storm is used to assess if culvert crossings with these conditions qualify as an ADWR jurisdictional dam. Currently, Lone Pine Dam is classified as a “significant” hazard dam. Under this classification, Lone Pine Dam, along with its reservoir and spillways, must adequately pass the 0.5 PMF event. If this alternative is implemented, reclassifying Lone Pine Dam to “low” hazard because the road no longer crosses its crest is a possibility. If the reclassification is successful, only the 0.25 PMF event needs to be analyzed.

The north pond contour areas were calculated and subtracted from the area-elevation curve for Lone Pine reservoir as presented in the Dames and Moore report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981, hereafter referred to as “Dames and Moore” report. The highest reservoir pool elevation, 5978 feet, used in area-elevation calculations was linearly extrapolated from both the north and south pond elevation-area graphs. The NAU survey of Lone Pine Dam, conducted prior to and used for the SLCRSE, was also used to help construct the Lone Pine Reservoir’s elevation-area relationship.

The two reservoirs were analyzed as two interconnected ponds, which require analysis beyond typical storage routing. Storage routing requires that a rating table be created for the pond outlet structures so that the ponds outflow for any given ponded water elevation can be determined. An interconnected pond is a pond whose ponded water surface elevations affect the performance of an upstream pond, and therefore the upstream pond’s outlet structure rating table is no longer sufficient to model the pond’s performance. Rather, a rating “surface”, or a family of rating tables, is needed to model all of the possible tail water conditions that can be created by the downstream pond. Three rating curves from this surface have been included in Appendix C. As each new pond is interconnected, a new dimension is added to the outlet structure performance rating.

The PMF, 0.5 PMF, 0.25 PMF, 100-year and 10-year storm events were simulated. The hydrographs were created using the 24-hour PMF hydrograph, as well as the 100 year and 10 year storm event peaks presented in the Dames and Moore report. The 24-hour PMF was simply scaled down to match the peak storm runoff for each event. Although there is some error involved in this approach because of the time to peak assumptions, the hydrographs are sufficient in presenting a qualitative interpretation of the interconnected reservoirs' performance.

Haestad Methods' PondPack program was used for the flood event routing simulation as it can compute multi-dimensional performance ratings. This program does have some limitations. The program's computational algorithm searches for a final solution when the nested iterations converge within limits specified by the user. Large ponds like Lone Pine Reservoir may not have their simulations converge to a solution because of the maximum number of iterations allowed by the program. Evidence for non-convergence can be seen in Figure 7 in Appendix B as an oscillation in the computed hydrographs. Although the PMF, 0.5 PMF and 0.25 PMF flood events showed oscillations in their computed hydrographs, the results still resemble the expected results close enough to serve useful in interpreting the performance of the interconnected reservoirs.

Convergence problems occurred during the rating surface creation and during the flood routing, most notably during high flows over the roadway. However, these errors are not large enough to significantly affect the expected response of the two reservoirs acting as one reservoir at high ponded water elevations. The flows calculated by the rating surface are so much larger than what is leaving the interconnected reservoirs through Lone Pine Dam's spillways, that the two ponds essentially act as one pond when the ponded water surface elevations on either side of the culvert crossing match. This expected response is clearly shown in the interconnected pond summaries, Figures 7-11 in Appendix B. The routing calculations are included in Appendix C.

According to the Arizona Administrative Code, Title 12, Chapter 15 (AAC12-15), a transportation structure such as a highway, road or railroad fill that exists solely for transportation purposes, and is not intended for impounding water on an intermittent basis or permanent basis, is exempt from ADWR jurisdiction. Therefore, it is unlikely that the new culvert crossing would become a new ADWR jurisdictional dam. However, Alternative 2 as it is proposed in this report would require lower design speeds. Due to the high volume of embankment at the culvert crossing, the roadway will be overtopped during the 100-year event or during less frequent events. The 10-year ponded water depth is well below the roadway elevation.

4.1 Alternative 2 – Cost Estimate

Please refer to the section 3.1 Alternative 1 – Cost Estimate for a discussion on costs. Lee Brody and Max Baldwin from Contech Construction Products, Inc., provided timely and very helpful CMP material costs as well as installation costs used for this alternative. Below, the excavation and embankment outside the culvert crossing (between stations 32+00 and 52+00) have been isolated from the rest of the roadway embankment and excavation. The quantities calculated for these areas have larger uncertainty because only the culvert crossing area was site-inspected by the author. Gabions might serve as a simple erosion control on the north slope of the roadway embankment during flooding events that overtop the roadway, but the erosion control needed during these events has not been quantified.

The estimated project cost for this alternative is the following:

Spillway excavation – 26,500 CY *$8/CY =	$ 212,000
Roadway Clear and Grub $4500/Acre*21 acres =	$ 95,000
15,000 feet of 3” A.C. on 5” A.B.C roadway	
6990 tons of A.C * $65/ton =	$ 454,000
6000 CY of A.B.C. * $50/CY =	$ 300,000
Roadway Excavation $8/CY *94,500 CY =	$ 756,000
(Outside Culvert Crossing Sta. 32+00 to 52+00)	
Roadway Embankment $5/CY * 17,300 CY =	$ 87,000
(Outside Culvert Crossing Sta. 32+00 to 52+00)	
[The following two items have larger uncertainty]	
Roadway Excavation $8/CY *40,500 CY =	$ 324,000
(Culvert Crossing Sta. 32+00 to 52+00)	
Roadway Embankment $5/CY * 73,700 CY =	$ 369,000
(Culvert Crossing Sta. 32+00 to 52+00)	
11’-6” dia. 8 Ga. CMP $630/LF *300 LF =	$ 189,000
Mobilization 10% =	$ 279,000
Subtotal =	$3,065,000
Final Engineering/Planning/Design 15% =	$ 460,000
Contingency 10% =	$ 307,000
Total -	**$3,832,000**

5.0 Conclusions and Recommendations

Table 1 below shows the project cost and the author's opinion of the alternative's probability for successful implementation based on technical feasibility. Alternative 1 – Build Bridge, is recommended for implementation.

Both alternatives will involve some right-of-way and environmental difficulties, and costs associated with these issues are not included, however, Alternative 1 has simpler concerns. Both projects utilize familiar design construction methods that create a high probability for successful implementation and achievement of their objectives.

Alternative 1 is less expensive, and also allows for higher design speeds, fewer short radius turns, and unimpeded traffic flow even during infrequent flooding events. Although larger uncertainties surround some of the project costs associated with Alternative 2, these uncertainties are not large enough to compete economically with Alternative 1.

While a detailed hydraulic analysis was performed for Alternative 2, a new hydrologic study of Show Low Creek is recommended to utilize the additional data collected since the last hydrologic study was performed as well as account for changes in the watershed, computer software, and hydrologic computing methods.

Table 1 – Cost and Probability of Success Summary Alternatives 1 and 2

Item Name	Project Cost	Opinion of Probability of Success
Alternative 1 – Build Bridge	**$ 2,217,000**	**High**
Alternative 2 – Culvert Crossing and Re-route Lone Pine Dam Road	**$3,832,000**	**High**

Appendix A: References

The references of the Show Low Creek Reservoir System Evaluation, dated November 5, 2002, are included herein, and the following are additional references.

1. Plan and Profile of 1-17/1-40 Interchange and Tabulation of Bids (60% Complete), Arizona Department of Transportation, December, 1998.

2. A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials, 2001.

3. Construction Cost Estimates for 3 Bee Line Highway Bridges supplied by the Arizona Department of Transportation Structures Group.

4. Construction Cost Estimates supplied by Show Low Construction, Show Low , AZ.

5. Construction Cost Estimates supplied by Contech Construction Products, Inc.

6. Autodesk Land Development Desktop Civil Design Software, Version 3.0.

Appendix B: Figures

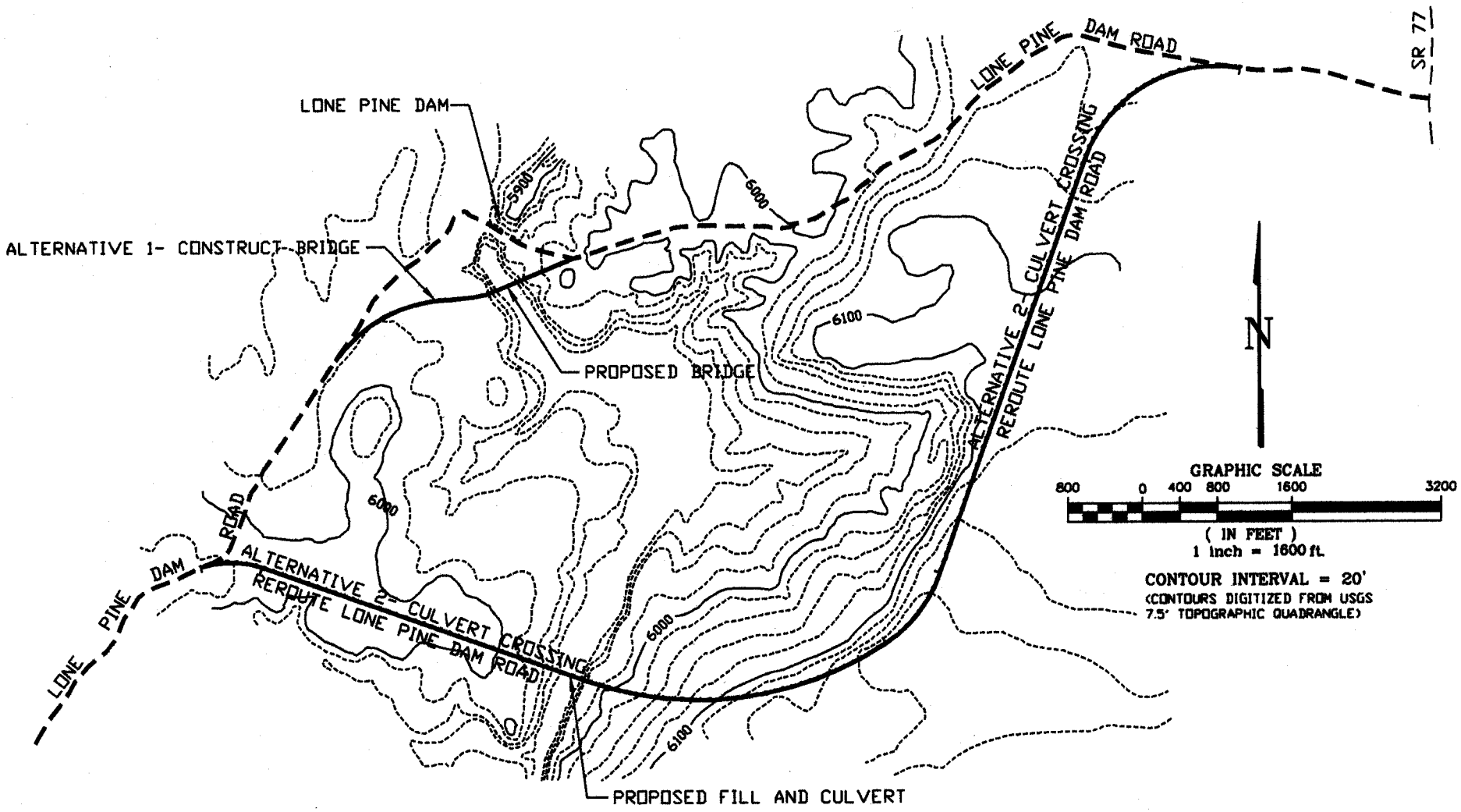
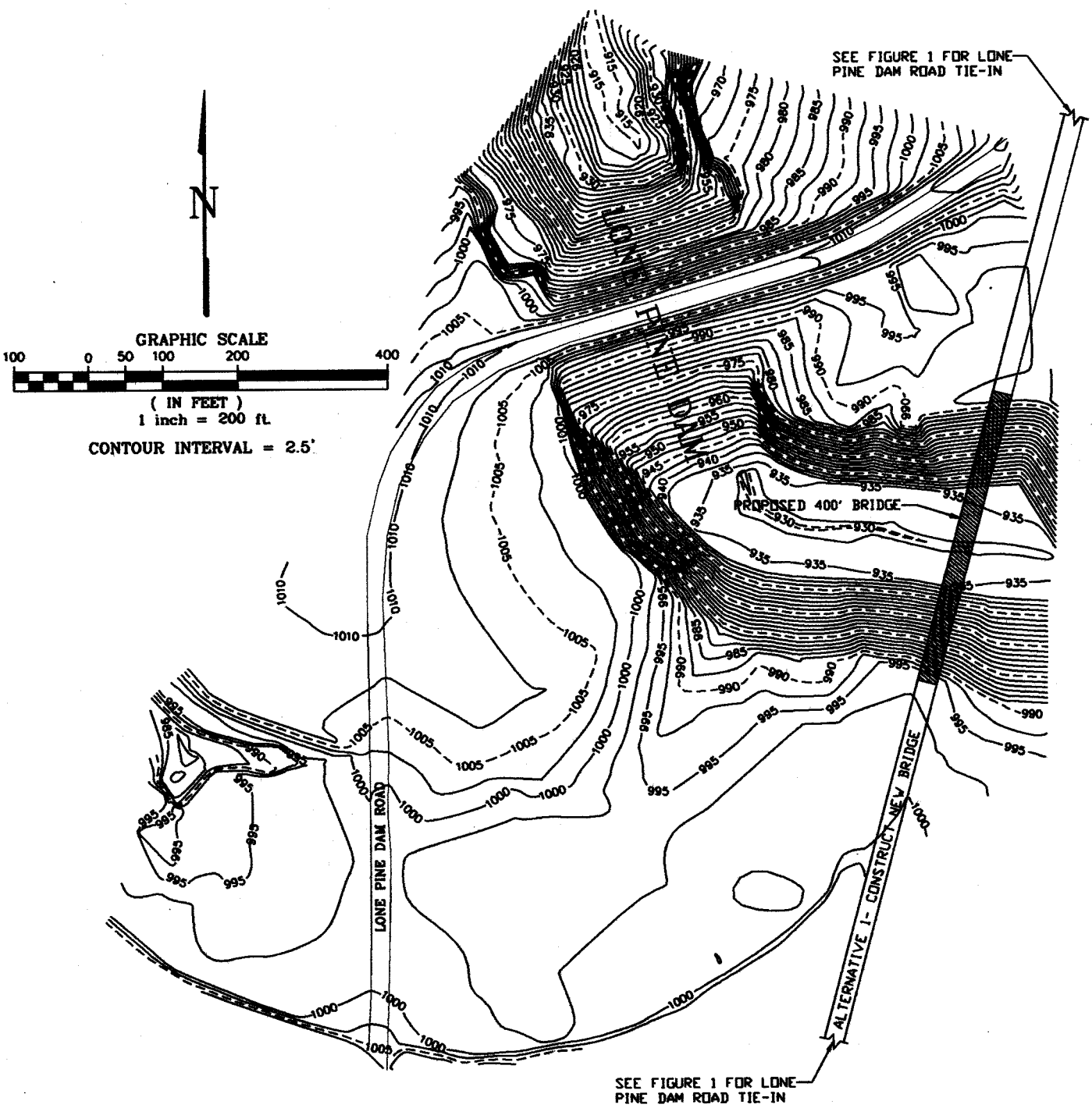
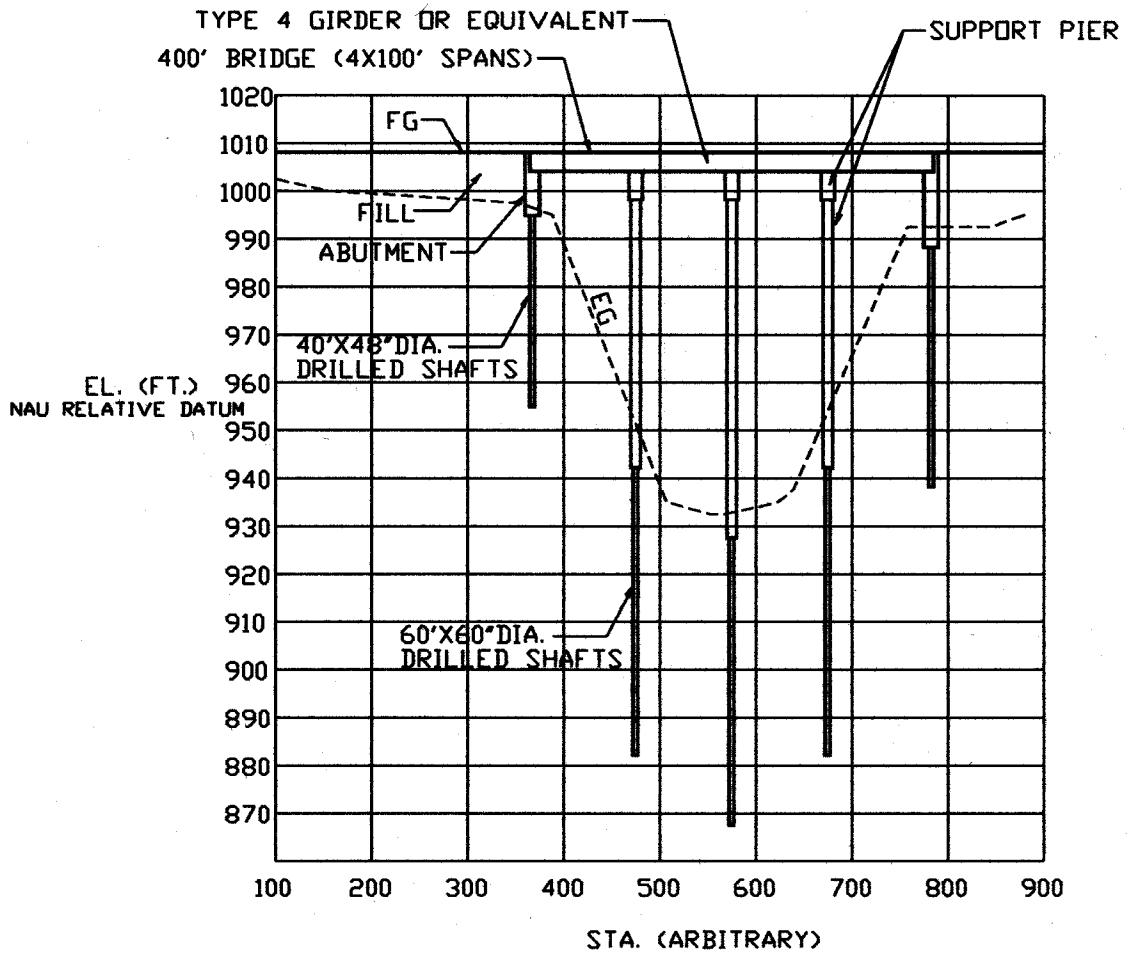


FIGURE 1 - PLAN VIEW FOR ALTERNATIVES 1 AND 2



- CONTOURS FROM NAU SURVEY
- NAU VERTICAL DATUM: 1000'=5971' FROM USGS 7.5' TOPO QUAD

FIGURE 2 - PLAN VIEW OF ALTERNATIVE 1 (PROPOSED 400' BRIDGE)



- HORIZONTAL SCALE:1"=200', VERTICAL SCALE:1"=20'
- NAU VERTICAL DATUM: 1000'=5971' FROM USGS 7.5' TOPO QUAD

FIGURE 3 - PROFILE OF PROPOSED BRIDGE

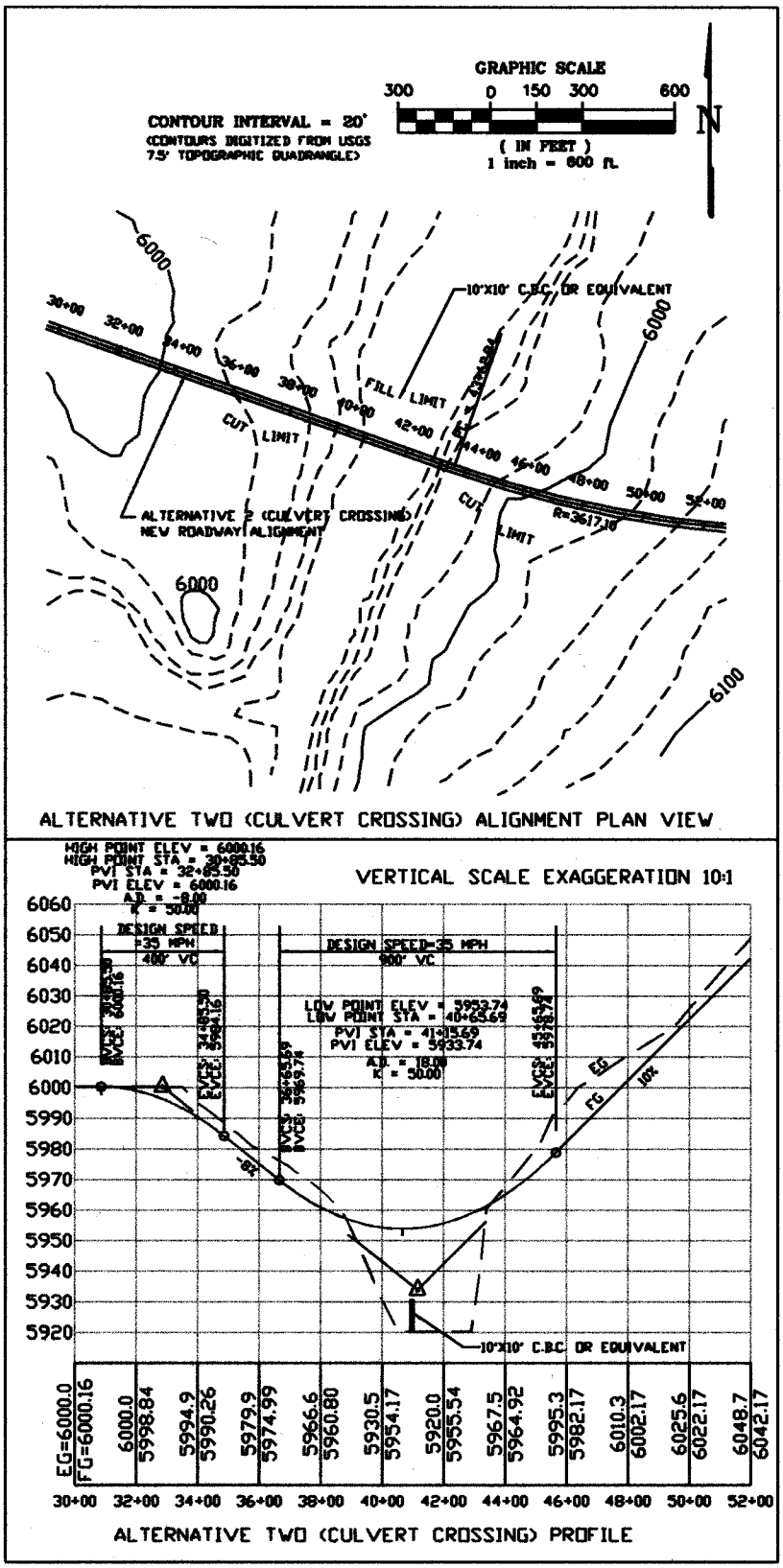


FIGURE 4 - ALTERNATIVE 2 (CULVERT CROSSING) PLAN AND PROFILE

Figure 5 – Photograph of proposed bridge location. Photo looks southward from northeast corner of Lone Pine Dam. Proposed bridge crossing will be approximately 200 to 300 feet south from this location. Photo taken February, 2003.

Figure 6 – Photograph of proposed culvert crossing. Photo looks northward from the Show Low Creek and Linden Draw confluence. Proposed culvert crossing will be approximately 500 feet north from this location. Photo taken February, 2003.

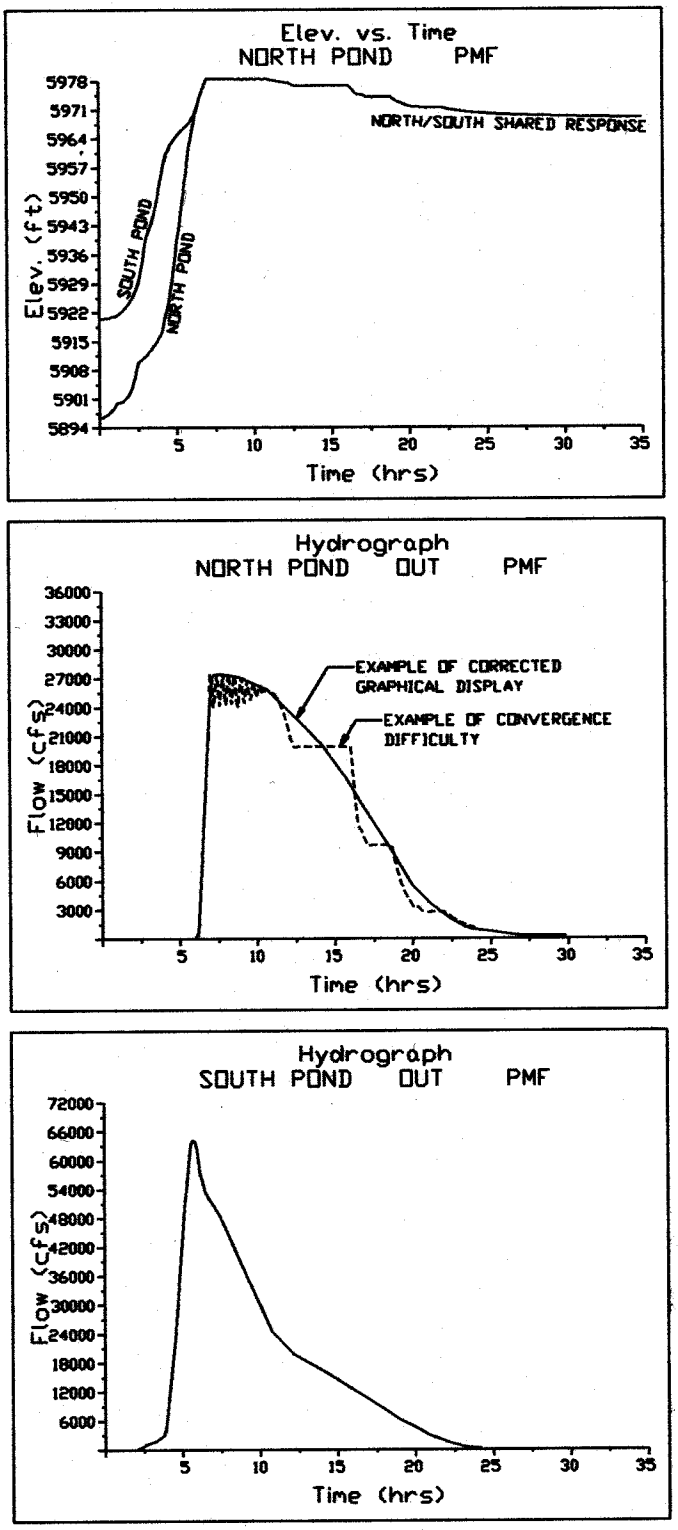


FIGURE 7 - ALTERNATIVE TWO (CULVERT CROSSING) NORTH POND AND SOUTH POND INTERACTION SUMMARY FOR THE PMF EVENT.

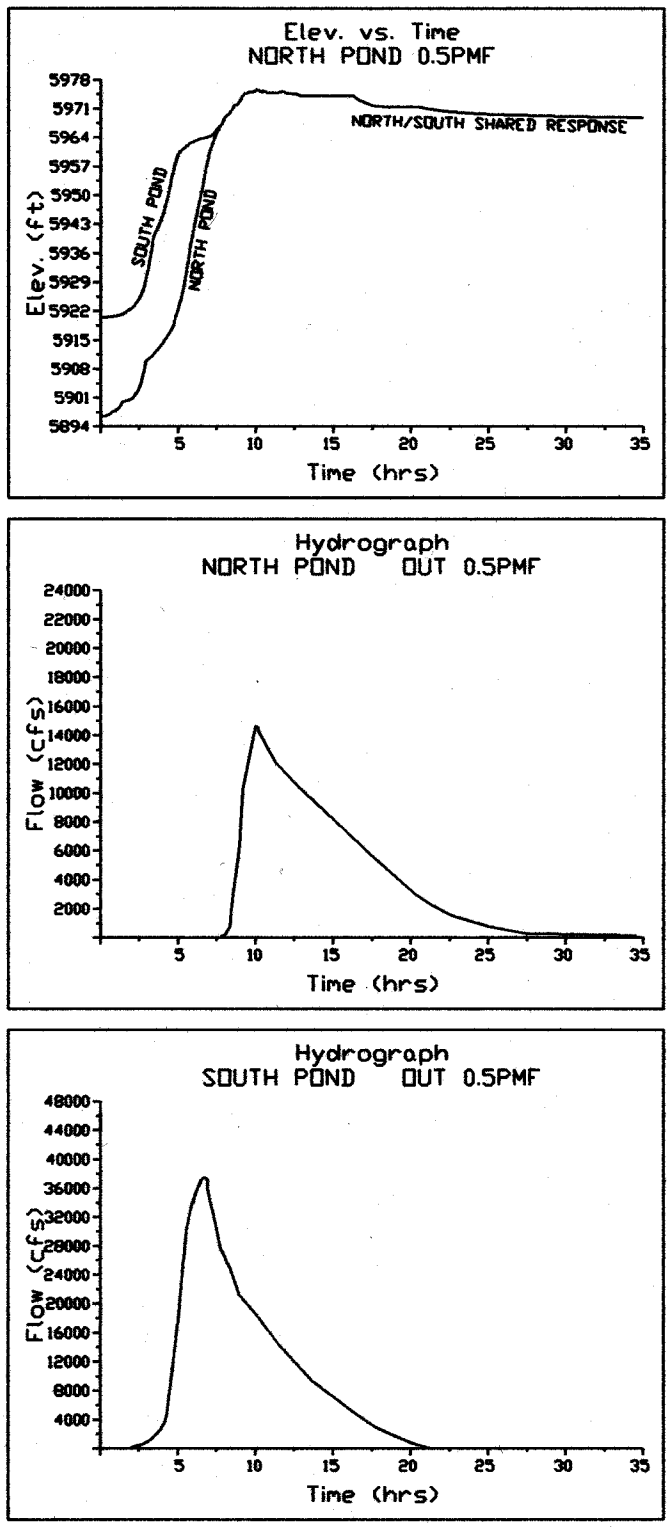


FIGURE 8 - ALTERNATIVE TWO (CULVERT CROSSING) NORTH POND AND SOUTH POND INTERACTION SUMMARY FOR THE 0.5 PMF EVENT.

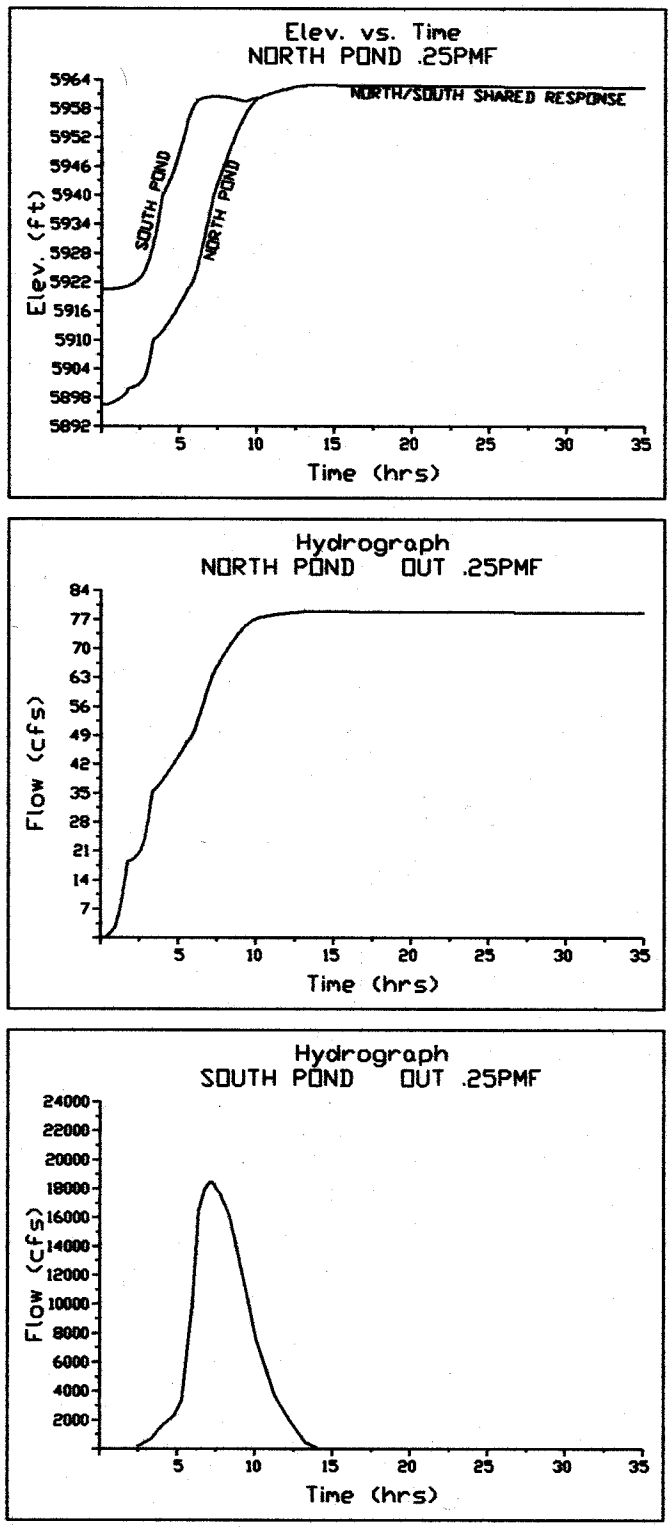


FIGURE 9 - ALTERNATIVE TWO (CULVERT CROSSING) NORTH POND AND SOUTH POND INTERACTION SUMMARY FOR THE 0.25 PMF EVENT.

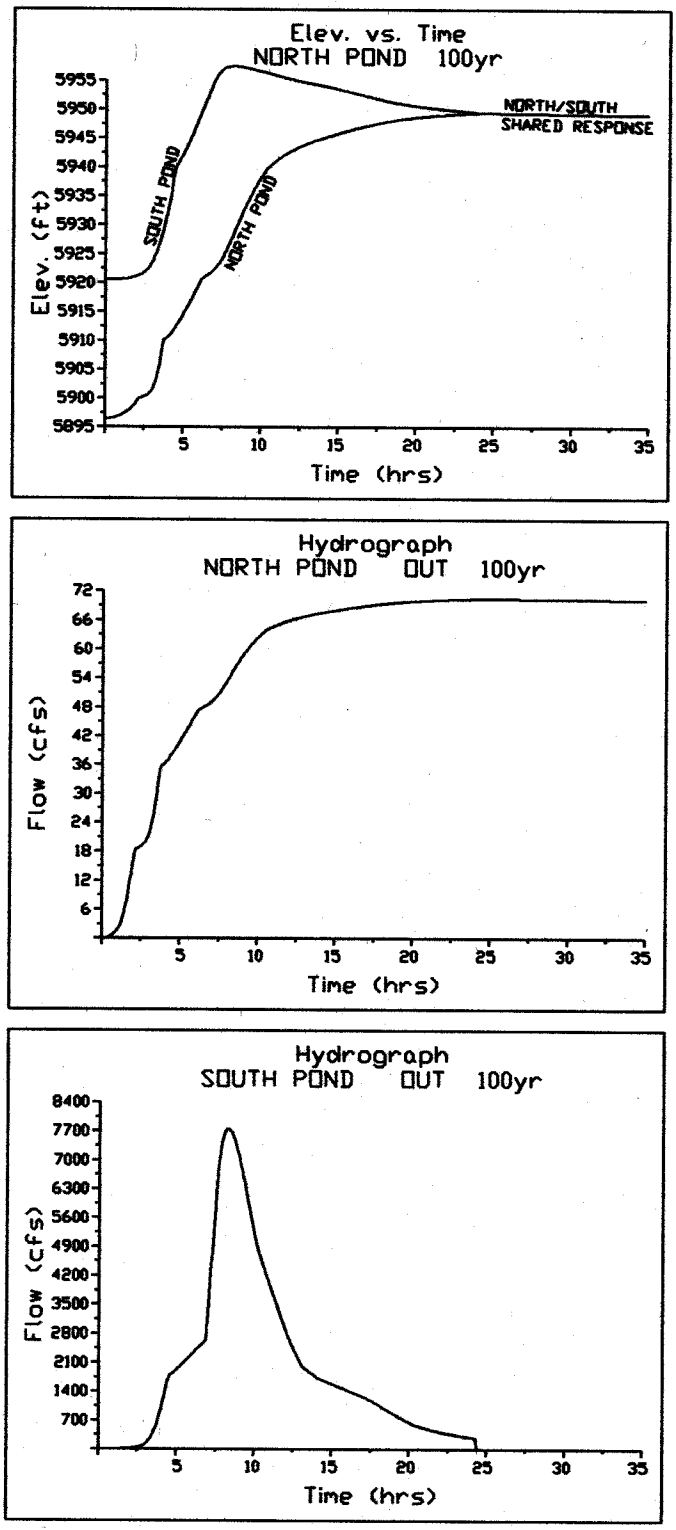


FIGURE 10 - ALTERNATIVE TWO (CULVERT CROSSING) NORTH POND AND SOUTH POND INTERACTION SUMMARY FOR THE 100 YEAR EVENT.

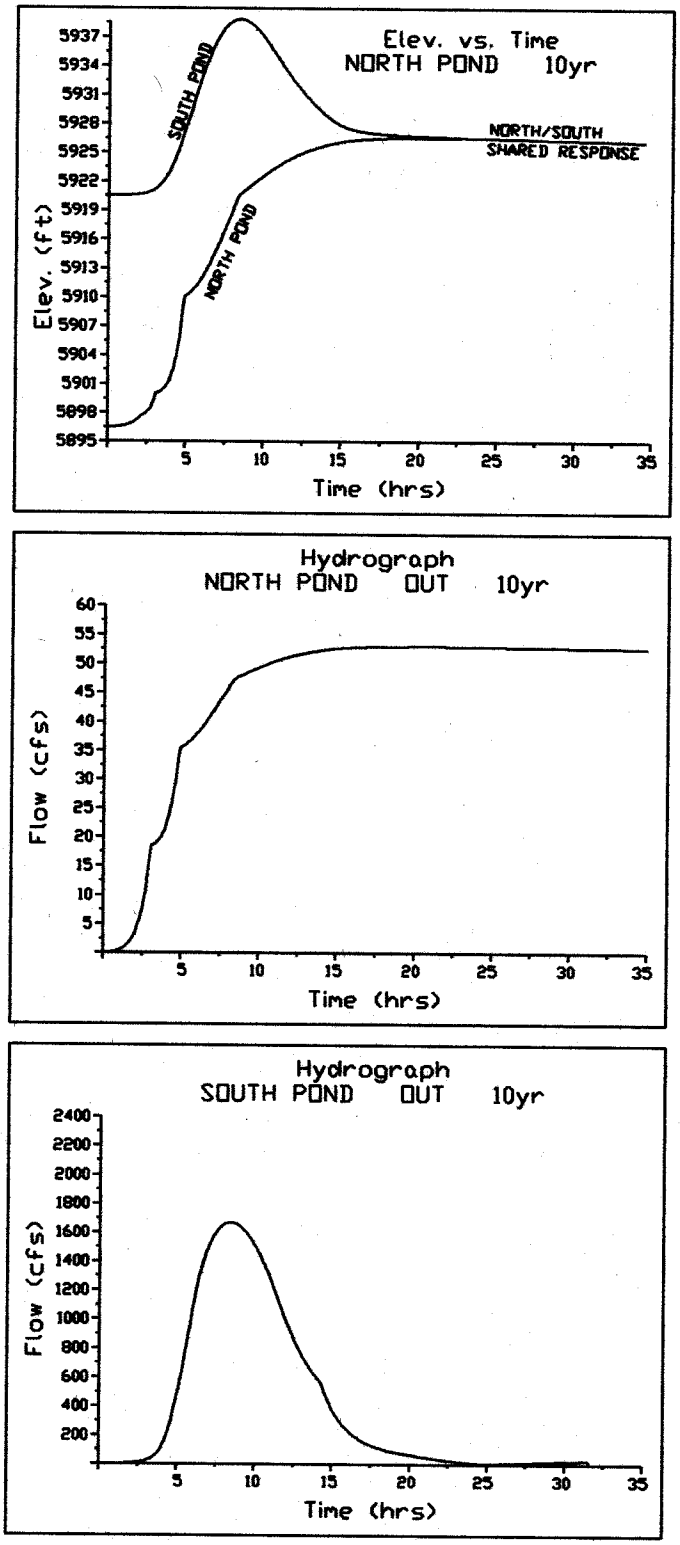


FIGURE 11 - ALTERNATIVE TWO (CULVERT CROSSING) NORTH POND AND SOUTH POND INTERACTION SUMMARY FOR THE 10 YEAR EVENT.

Appendix C: Hydrograph Routing Calculations for Alternative 2

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   ------------------------------
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   Output Time Step  =    .1000 hrs
   ICPM Ending Time  =  35.0000 hrs
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MASTER NETWORK SUMMARY
(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*LONE PINE OUT	JCT	PMF	22227.750		7.0000	27460.87		
*LONE PINE OUT	JCT	0.5PMF	8613.335		10.0000	14672.65		
*LONE PINE OUT	JCT	.25PMF	197.737		13.2000	78.93		
*LONE PINE OUT	JCT	100yr	172.198		24.3000	70.45		
*LONE PINE OUT	JCT	10yr	131.300		20.5000	53.04		
NORTH POND	POND	PMF	30046.450		5.7000	64250.23		
NORTH POND	POND	0.5PMF	16337.400		6.8000	37597.13		
NORTH POND	POND	.25PMF	6315.553		7.1000	18437.18		
NORTH POND	POND	100yr	3958.263		8.3000	7760.68		
NORTH POND	POND	10yr	1065.516		8.4000	1669.19		
NORTH POND	OUT POND	PMF	22227.750		7.0000	27460.87	5978.50	10093.990
NORTH POND	OUT POND	0.5PMF	8613.335		10.0000	14672.65	5975.59	9378.827
NORTH POND	OUT POND	.25PMF	197.737		13.2000	78.93	5962.87	6254.095
NORTH POND	OUT POND	100yr	172.198		24.3000	70.45	5949.41	3847.033
NORTH POND	OUT POND	10yr	131.300		20.5000	53.04	5926.57	979.123
SCALED HYD.	HYG	PMF	40094.710		6.5000	80000.00		
SCALED HYD.	HYG	0.5PMF	20047.360		6.5000	40000.00		
SCALED HYD.	HYG	.25PMF	10023.680		6.5000	20000.00		
SCALED HYD.	HYG	100yr	5276.465		6.5000	10528.00		
SCALED HYD.	HYG	10yr	1178.784		6.5000	2352.00		
SOUTH POND	POND	PMF	40094.700		6.5000	80000.00		
SOUTH POND	POND	0.5PMF	20047.350		6.5000	40000.00		
SOUTH POND	POND	.25PMF	10023.680		6.5000	20000.00		
SOUTH POND	POND	100yr	5276.467		6.5000	10528.00		
SOUTH POND	POND	10yr	1178.785		6.5000	2352.00		
SOUTH POND	OUT POND	PMF	30046.450		5.7000	64250.23	5978.50	6565.491
SOUTH POND	OUT POND	0.5PMF	16337.400		6.8000	37597.13	5975.59	5903.142
SOUTH POND	OUT POND	.25PMF	6315.553		7.1000	18437.18	5962.87	3009.155
SOUTH POND	OUT POND	100yr	3958.263		8.3000	7760.68	5957.45	2106.867
SOUTH POND	OUT POND	10yr	1065.516		8.4000	1669.19	5938.83	371.128

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Note: These hydrograph ordinates were scaled from the 24-hour PMF hydrograph to match the flood event peaks. Both the flood event peaks and the PMF hydrograph were taken from the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981.

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   .0000 |         .00        4.41        9.79       29.40       49.10
  2.5000 |      107.78      294.00      588.00      882.00     1470.00
  5.0000 |     1764.00     2116.80     2293.20     2352.00     2293.20
  7.5000 |     2058.00     1861.99     1636.58     1401.38     1176.00
 10.0000 |      950.59      793.80      666.38      548.78      441.00
 12.5000 |      382.20      323.40      284.18      244.99      215.59
 15.0000 |      176.40      166.58      147.00      117.60      107.78
 17.5000 |       97.99       78.38       73.50       63.68       58.80
 20.0000 |       48.98       39.19       34.28       29.40       19.58
 22.5000 |       14.70        9.79        4.41         .00
```

Note: These hydrograph ordinates were scaled from the 24-hour PMF hydrograph to match the flood event peaks. Both the flood event peaks and the PMF hydrograph were taken from the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981.

```
Type.... Read HYG
Name.... SCALED HYD.                                        Event: 100yr
File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
Storm... Tag: 100yr


           HYG file = S:\GROUPS\SWRA\JJ\LPINE4.HYG
           HYG ID   = 100 year
           HYG Tag  = 100yr
           ----------------------------------
           Peak Discharge =     10528.00 cfs
           Time to Peak   =       6.5000 hrs
           HYG Volume     =     5276.465 ac-ft
           ----------------------------------

                        HYDROGRAPH ORDINATES (cfs)
   Time  |              Output Time increment = .5000 hrs
   hrs   |    Time on left represents time for first value in each row.
---------|------------------------------------------------------------
   .0000 |         .00       19.74       43.82      131.60      219.77
  2.5000 |      482.45     1316.00     2632.00     3948.00     6580.00
  5.0000 |     7896.00     9475.20    10264.80    10528.00    10264.80
  7.5000 |     9212.00     8334.62     7325.65     6272.85     5264.00
 10.0000 |     4255.02     3553.20     2982.85     2456.45     1974.00
 12.5000 |     1710.80     1447.60     1272.05     1096.62      965.02
 15.0000 |      789.60      745.65      658.00      526.40      482.45
 17.5000 |      438.62      350.85      329.00      285.05      263.20
 20.0000 |      219.25      175.42      153.45      131.60       87.65
 22.5000 |       65.80       43.82       19.74         .00
```

Note: These hydrograph ordinates were scaled from the 24-hour PMF hydrograph to match the flood event peaks. Both the flood event peaks and the PMF hydrograph were taken from the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981.

```
Type.... Read HYG
Name.... SCALED HYD.                                    Event: .25PMF yr
File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
Storm... Tag: .25PMF


           HYG file = S:\GROUPS\SWRA\JJ\LPINE4.HYG
           HYG ID   = 0.25 PMF
           HYG Tag  = .25PMF
           ----------------------------------
           Peak Discharge =     20000.00 cfs
           Time to Peak   =       6.5000 hrs
           HYG Volume     =    10023.680 ac-ft
           ----------------------------------

                       HYDROGRAPH ORDINATES (cfs)
   Time  |             Output Time increment = .5000 hrs
   hrs   |    Time on left represents time for first value in each row.
---------|------------------------------------------------------------
   .0000 |         .00       37.50       83.25      250.00      417.50
  2.5000 |      916.50     2500.00     5000.00     7500.00    12500.00
  5.0000 |    15000.00    18000.00    19500.00    20000.00    19500.00
  7.5000 |    17500.00    15833.25    13916.50    11916.50    10000.00
 10.0000 |     8083.25     6750.00     5666.50     4666.50     3750.00
 12.5000 |     3250.00     2750.00     2416.50     2083.25     1833.25
 15.0000 |     1500.00     1416.50     1250.00     1000.00      916.50
 17.5000 |      833.25      666.50      625.00      541.50      500.00
 20.0000 |      416.50      333.25      291.50      250.00      166.50
 22.5000 |      125.00       83.25       37.50         .00
```

Note: These hydrograph ordinates were scaled from the 24-hour PMF hydrograph to match the flood event peaks. Both the flood event peaks and the PMF hydrograph were taken from the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981.

```
Type.... Read HYG
Name.... SCALED HYD.                                    Event: 0.5PMF yr
File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
Storm... Tag: 0.5PMF


           HYG file = S:\GROUPS\SWRA\JJ\LPINE4.HYG
           HYG ID   = 0.5 PMF
           HYG Tag  = 0.5PMF
           ----------------------------------
           Peak Discharge =     40000.00 cfs
           Time to Peak   =       6.5000 hrs
           HYG Volume     =    20047.360 ac-ft
           ----------------------------------

                        HYDROGRAPH ORDINATES (cfs)
   Time  |              Output Time increment = .5000 hrs
   hrs   |    Time on left represents time for first value in each row.
---------|------------------------------------------------------------
   .0000 |         .00       75.00      166.50      500.00      835.00
  2.5000 |     1833.00     5000.00    10000.00    15000.00    25000.00
  5.0000 |    30000.00    36000.00    39000.00    40000.00    39000.00
  7.5000 |    35000.00    31666.50    27833.00    23833.00    20000.00
 10.0000 |    16166.50    13500.00    11333.00     9333.00     7500.00
 12.5000 |     6500.00     5500.00     4833.00     4166.50     3666.50
 15.0000 |     3000.00     2833.00     2500.00     2000.00     1833.00
 17.5000 |     1666.50     1333.00     1250.00     1083.00     1000.00
 20.0000 |      833.00      666.50      583.00      500.00      333.00
 22.5000 |      250.00      166.50       75.00         .00
```

Note: These hydrograph ordinates were scaled from the 24-hour PMF hydrograph to match the flood event peaks. Both the flood event peaks and the PMF hydrograph were taken from the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam, July, 1981.

Type.... Vol: Elev-Area
Name.... NORTH POND***

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
5896.50	-----	.0010	.0000	.000	.000
5900.00	-----	.1000	.1110	.130	.130
5910.00	-----	5.0000	5.8071	19.357	19.487
5920.50	-----	75.0000	99.3649	347.777	367.264
5940.00	-----	129.0000	302.3616	1965.350	2332.614
5960.00	-----	195.0000	482.6033	3217.355	5549.969
**5978.50	-----	300.0000	736.8677	4544.018	10093.990

Type.... Vol: Elev-Area
Name.... SOUTH POND

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
5920.50	-----	3.0000	.0000	.000	.000
5940.00	-----	46.0000	60.7473	394.858	394.858
5960.00	-----	162.0000	294.3250	1962.167	2357.024
**5978.50	-----	300.0000	682.4541	4208.467	6565.491

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

** Linearly Extrapolated

*** The North Pond areas were taken from digitized contours from a USGS 7.5' quad. These areas were then subtracted from the Elevation-Area curve shown in the Dames and Moore Report, Final Report Reconnaissance-Level Flood Control Study for Lone Pine Dam.

```
Type.... Outlet Input Data
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


                  REQUESTED POND WS ELEVATIONS:

                    Min. Elev.=   5920.50 ft
                    Increment =      2.00 ft
                    Max. Elev.=   5978.50 ft


           ******************************************
                          OUTLET CONNECTIVITY
           ******************************************

            ---> Forward Flow Only (UpStream to DnStream)
           <---  Reverse Flow Only (DnStream to UpStream)
           <---> Forward and Reverse Both Allowed

    Structure         No.        Outfall    E1, ft     E2, ft
-----------------    ----        -------  ---------  ---------
Weir-XY Points              --->    TW    5954.000   5978.500
Culvert-Box                 --->    TW    5920.500   5978.500
TW SETUP, DS Channel
```

```
Type.... Outlet Input Data
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


              OUTLET STRUCTURE INPUT DATA



              Structure ID      =
              Structure Type    = Weir-XY Points
              ------------------------------------
              # of Openings     =         1
              WEIR X-Y GROUND POINTS

                  X, ft     Elev, ft
               ---------   ---------
                3550.00     5978.50
                3650.00     5971.00
                3750.00     5964.00
                3850.00     5958.00
                3950.00     5955.00
                4050.00     5954.00
                4150.00     5954.00
                4250.00     5957.00
                4350.00     5962.00
                4450.00     5974.00
                4500.00     5978.50

              Lowest Elev.      =   5954.00 ft

              Weir Coeff.       =  3.000000

              Weir TW effects     (Use adjustment equation)
```

```
Type.... Outlet Input Data
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

             OUTLET STRUCTURE INPUT DATA



             Structure ID      =
             Structure Type    = Culvert-Box
             -----------------------------------
             No. Barrels       =         1
             Barrel Height     =     10.00 ft
             Barrel Width      =     10.00 ft
             Upstream Invert   =   5920.50 ft
             Dnstream Invert   =   5918.50 ft
             Horiz. Length     =    300.00 ft
             Barrel Length     =    300.01 ft
             Barrel Slope      =    .00667 ft/ft

             OUTLET CONTROL DATA...
             Mannings n        =     .0130
             Ke                =     .5000  (forward entrance loss)
             Kb                =   .001452  (per ft of full flow)
             Kr                =     .5000  (reverse entrance loss)
             HW Convergence    =      .001  +/- ft

             INLET CONTROL DATA...
             Equation form     =         2
             Inlet Control K   =     .5150
             Inlet Control M   =     .6670
             Inlet Control c   =    .03750
             Inlet Control Y   =     .7900
             T1 ratio (HW/D)   =     1.188
             T2 ratio (HW/D)   =     1.387
             Slope Factor      =     -.500

 Use unsubmerged inlet control Form 2 equ. below T1 elev.
 Use   submerged inlet control Form 2 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =   5932.38 ft  --->  Flow =   1106.80 cfs
 At T2 Elev =   5934.37 ft  --->  Flow =   1264.91 cfs
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)
```

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
5920.50	.00	5896.50	.000	E < Y min=5954.00
5922.50	.00	5896.50	.000	E < Y min=5954.00
5923.50	.00	5896.50	.000	E < Y min=5954.00
5924.50	.00	5896.50	.000	E < Y min=5954.00
5926.50	.00	5896.50	.000	E < Y min=5954.00
5928.50	.00	5896.50	.000	E < Y min=5954.00
5929.50	.00	5896.50	.000	E < Y min=5954.00
5930.50	.00	5896.50	.000	E < Y min=5954.00
5932.50	.00	5896.50	.000	E < Y min=5954.00
5934.50	.00	5896.50	.000	E < Y min=5954.00
5935.50	.00	5896.50	.000	E < Y min=5954.00
5936.50	.00	5896.50	.000	E < Y min=5954.00
5938.50	.00	5896.50	.000	E < Y min=5954.00
5940.50	.00	5896.50	.000	E < Y min=5954.00
5941.50	.00	5896.50	.000	E < Y min=5954.00
5942.50	.00	5896.50	.000	E < Y min=5954.00
5944.50	.00	5896.50	.000	E < Y min=5954.00
5946.50	.00	5896.50	.000	E < Y min=5954.00
5947.50	.00	5896.50	.000	E < Y min=5954.00
5948.50	.00	5896.50	.000	E < Y min=5954.00
5950.50	.00	5896.50	.000	E < Y min=5954.00
5952.50	.00	5896.50	.000	E < Y min=5954.00
5953.50	.00	5896.50	.000	E < Y min=5954.00
5954.00	.00	5896.50	.000	E = Y min=5954.00
5954.50	131.07	5896.50	.000	Max.H=.50; Max.Htw=-57.50;; W(ft)=166.67
5956.50	2481.20	5896.50	.000	Max.H=2.50; Max.Htw=-57.50;; W(ft)=333.33
5958.50	7732.74	5896.50	.000	Max.H=4.50; Max.Htw=-57.50;; W(ft)=438.33
5959.50	11440.89	5896.50	.000	Max.H=5.50; Max.Htw=-57.50;; W(ft)=475.00
5960.50	15795.58	5896.50	.000	Max.H=6.50; Max.Htw=-57.50;; W(ft)=511.67
5962.50	26507.63	5896.50	.000	Max.H=8.50; Max.Htw=-57.50;; W(ft)=579.17
5964.50	39990.72	5896.50	.000	Max.H=10.50; Max.Htw=-57.50;; W(ft)=627.98
5965.50	47748.39	5896.50	.000	Max.H=11.50; Max.Htw=-57.50;; W(ft)=650.60
5966.50	56115.80	5896.50	.000	Max.H=12.50; Max.Htw=-57.50;; W(ft)=673.21
5968.50	74676.54	5896.50	.000	Max.H=14.50; Max.Htw=-57.50;; W(ft)=718.45
5970.50	95673.53	5896.50	.000	Max.H=16.50; Max.Htw=-57.50;; W(ft)=763.69
5971.50	107157.70	5896.50	.000	Max.H=17.50; Max.Htw=-57.50;; W(ft)=785.83
5972.50	119321.50	5896.50	.000	Max.H=18.50; Max.Htw=-57.50;; W(ft)=807.50
5974.50	145597.00	5896.50	.000	Max.H=20.50; Max.Htw=-57.50;; W(ft)=852.22
5976.50	174667.00	5896.50	.000	Max.H=22.50; Max.Htw=-57.50;; W(ft)=901.11
5977.50	190176.20	5896.50	.000	Max.H=23.50; Max.Htw=-57.50;; W(ft)=925.56
5978.50	206346.20	5896.50	.000	Max.H=24.50; Max.Htw=-57.50;; W(ft)=950.00

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Culvert-Box)
               ---------------------------------------
               Mannings open channel maximum capacity: 2082.53 cfs
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water             Notes
 ----------------  --------------  -------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5920.50       .00   5896.50   .000                  Upstream HW & DNstream TW < Inv.El
5922.50     69.25   5896.50   .000     CRIT.DEPTH CONTROL  Vh= .571ft  Dcr= 1.142ft   CRIT.DEPTH
5923.50    127.39   5896.50   .000     CRIT.DEPTH CONTROL  Vh= .857ft  Dcr= 1.715ft   CRIT.DEPTH
5924.50    195.98   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 1.143ft  Dcr= 2.286ft   CRIT.DEPTH
5926.50    360.01   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 1.714ft  Dcr= 3.428ft   CRIT.DEPTH
5928.50    554.39   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 2.286ft  Dcr= 4.571ft   CRIT.DEPTH
5929.50    661.50   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 2.571ft  Dcr= 5.143ft   CRIT.DEPTH
5930.50    774.87   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 2.857ft  Dcr= 5.714ft   CRIT.DEPTH
5932.50   1018.45   5896.50   .000     CRIT.DEPTH CONTROL  Vh= 3.428ft  Dcr= 6.857ft   CRIT.DEPTH
5934.50   1278.88   5896.50   .000     INLET CONTROL...  Submerged:  HW =14.00
5935.50   1379.20   5896.50   .000     INLET CONTROL...  Submerged:  HW =15.00
5936.50   1472.66   5896.50   .000     INLET CONTROL...  Submerged:  HW =16.00
5938.50   1643.75   5896.50   .000     INLET CONTROL...  Submerged:  HW =18.00
5940.50   1798.82   5896.50   .000     INLET CONTROL...  Submerged:  HW =20.00
5941.50   1871.49   5896.50   .000     INLET CONTROL...  Submerged:  HW =21.00
5942.50   1941.30   5896.50   .000     INLET CONTROL...  Submerged:  HW =22.00
5944.50   2074.24   5896.50   .000     INLET CONTROL...  Submerged:  HW =24.00
5946.50   2198.98   5896.50   .000     INLET CONTROL...  Submerged:  HW =26.00
5947.50   2258.87   5896.50   .000     INLET CONTROL...  Submerged:  HW =27.00
5948.50   2317.05   5896.50   .000     INLET CONTROL...  Submerged:  HW =28.00
5950.50   2429.39   5896.50   .000     INLET CONTROL...  Submerged:  HW =30.00
5952.50   2536.87   5896.50   .000     INLET CONTROL...  Submerged:  HW =32.00
5953.50   2588.84   5896.50   .000     INLET CONTROL...  Submerged:  HW =33.00
5954.00   2614.50   5896.50   .000     INLET CONTROL...  Submerged:  HW =33.50
5954.50   2639.87   5896.50   .000     INLET CONTROL...  Submerged:  HW =34.00
5956.50   2739.05   5896.50   .000     INLET CONTROL...  Submerged:  HW =36.00
5958.50   2834.70   5896.50   .000     INLET CONTROL...  Submerged:  HW =38.00
5959.50   2881.34   5896.50   .000     INLET CONTROL...  Submerged:  HW =39.00
5960.50   2927.30   5896.50   .000     INLET CONTROL...  Submerged:  HW =40.00
5962.50   3016.95   5896.50   .000     INLET CONTROL...  Submerged:  HW =42.00
5964.50   3104.12   5896.50   .000     INLET CONTROL...  Submerged:  HW =44.00
5965.50   3146.74   5896.50   .000     INLET CONTROL...  Submerged:  HW =45.00
5966.50   3188.90   5896.50   .000     INLET CONTROL...  Submerged:  HW =46.00
5968.50   3271.39   5896.50   .000     INLET CONTROL...  Submerged:  HW =48.00
5970.50   3351.98   5896.50   .000     INLET CONTROL...  Submerged:  HW =50.00
5971.50   3391.46   5896.50   .000     INLET CONTROL...  Submerged:  HW =51.00
5972.50   3430.56   5896.50   .000     INLET CONTROL...  Submerged:  HW =52.00
5974.50   3507.42   5896.50   .000     INLET CONTROL...  Submerged:  HW =54.00
5976.50   3582.67   5896.50   .000     INLET CONTROL...  Submerged:  HW =56.00
5977.50   3619.67   5896.50   .000     INLET CONTROL...  Submerged:  HW =57.00
5978.50   3656.39   5896.50   .000     INLET CONTROL...  Submerged:  HW =58.00
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water              Notes
 ----------------  ---------------  -------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5920.50       .00   REVERSE: Flow is closed off
5922.50       .00   REVERSE: Flow is closed off
5923.50       .00   REVERSE: Flow is closed off
5924.50       .00   REVERSE: Flow is closed off
5926.50       .00   5926.50   .000             E < Y min=5954.00
5928.50       .00   5926.50   .000             E < Y min=5954.00
5929.50       .00   5926.50   .000             E < Y min=5954.00
5930.50       .00   5926.50   .000             E < Y min=5954.00
5932.50       .00   5926.50   .000             E < Y min=5954.00
5934.50       .00   5926.50   .000             E < Y min=5954.00
5935.50       .00   5926.50   .000             E < Y min=5954.00
5936.50       .00   5926.50   .000             E < Y min=5954.00
5938.50       .00   5926.50   .000             E < Y min=5954.00
5940.50       .00   5926.50   .000             E < Y min=5954.00
5941.50       .00   5926.50   .000             E < Y min=5954.00
5942.50       .00   5926.50   .000             E < Y min=5954.00
5944.50       .00   5926.50   .000             E < Y min=5954.00
5946.50       .00   5926.50   .000             E < Y min=5954.00
5947.50       .00   5926.50   .000             E < Y min=5954.00
5948.50       .00   5926.50   .000             E < Y min=5954.00
5950.50       .00   5926.50   .000             E < Y min=5954.00
5952.50       .00   5926.50   .000             E < Y min=5954.00
5953.50       .00   5926.50   .000             E < Y min=5954.00
5954.00       .00   5926.50   .000             E = Y min=5954.00
5954.50    131.07   5926.50   .000             Max.H=.50; Max.Htw=-27.50;; W(ft)=166.67
5956.50   2481.20   5926.50   .000             Max.H=2.50; Max.Htw=-27.50;; W(ft)=333.33
5958.50   7732.74   5926.50   .000             Max.H=4.50; Max.Htw=-27.50;; W(ft)=438.33
5959.50  11440.89   5926.50   .000             Max.H=5.50; Max.Htw=-27.50;; W(ft)=475.00
5960.50  15795.58   5926.50   .000             Max.H=6.50; Max.Htw=-27.50;; W(ft)=511.67
5962.50  26507.63   5926.50   .000             Max.H=8.50; Max.Htw=-27.50;; W(ft)=579.17
5964.50  39990.72   5926.50   .000             Max.H=10.50; Max.Htw=-27.50;; W(ft)=627.98
5965.50  47748.39   5926.50   .000             Max.H=11.50; Max.Htw=-27.50;; W(ft)=650.60
5966.50  56115.80   5926.50   .000             Max.H=12.50; Max.Htw=-27.50;; W(ft)=673.21
5968.50  74676.54   5926.50   .000             Max.H=14.50; Max.Htw=-27.50;; W(ft)=718.45
5970.50  95673.53   5926.50   .000             Max.H=16.50; Max.Htw=-27.50;; W(ft)=763.69
5971.50 107157.70   5926.50   .000             Max.H=17.50; Max.Htw=-27.50;; W(ft)=785.83
5972.50 119321.50   5926.50   .000             Max.H=18.50; Max.Htw=-27.50;; W(ft)=807.50
5974.50 145597.00   5926.50   .000             Max.H=20.50; Max.Htw=-27.50;; W(ft)=852.22
5976.50 174667.00   5926.50   .000             Max.H=22.50; Max.Htw=-27.50;; W(ft)=901.11
5977.50 190176.20   5926.50   .000             Max.H=23.50; Max.Htw=-27.50;; W(ft)=925.56
5978.50 206346.20   5926.50   .000             Max.H=24.50; Max.Htw=-27.50;; W(ft)=950.00
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

              RATING TABLE FOR ONE OUTLET TYPE

              Structure ID  =   (Culvert-Box)
              ---------------------------------------
              Mannings open channel maximum capacity: 2082.53 cfs
              Upstream  ID  =    (Pond Water Surface)
              DNstream  ID  = TW (Pond Outfall)
```

WS Elev, Device Q		Tail Water		Notes			
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages			
5920.50	.00	REVERSE: Flow is closed off					
5922.50	.00	REVERSE: Flow is closed off					
5923.50	.00	REVERSE: Flow is closed off					
5924.50	.00	REVERSE: Flow is closed off					
5926.50	.00	5926.50	.000	HW = TW elev			
5928.50	568.73	5926.50	.000	BACKWATER CONTROL..	Vh= 1.620ft	hwDi= 5.570ft	Lbw= 300.0ft
5929.50	661.50	5926.50	.000	CRIT.DEPTH CONTROL	Vh= 2.571ft	Dcr= 5.143ft	H.JUMP IN PIPE
5930.50	774.87	5926.50	.000	CRIT.DEPTH CONTROL	Vh= 2.857ft	Dcr= 5.714ft	H.JUMP IN PIPE
5932.50	1018.45	5926.50	.000	CRIT.DEPTH CONTROL	Vh= 3.428ft	Dcr= 6.857ft	H.JUMP IN PIPE
5934.50	1278.88	5926.50	.000	INLET CONTROL...	Submerged:	HW =14.00	
5935.50	1379.20	5926.50	.000	INLET CONTROL...	Submerged:	HW =15.00	
5936.50	1472.66	5926.50	.000	INLET CONTROL...	Submerged:	HW =16.00	
5938.50	1643.75	5926.50	.000	INLET CONTROL...	Submerged:	HW =18.00	
5940.50	1798.82	5926.50	.000	INLET CONTROL...	Submerged:	HW =20.00	
5941.50	1871.49	5926.50	.000	INLET CONTROL...	Submerged:	HW =21.00	
5942.50	1941.30	5926.50	.000	INLET CONTROL...	Submerged:	HW =22.00	
5944.50	2074.24	5926.50	.000	INLET CONTROL...	Submerged:	HW =24.00	
5946.50	2198.98	5926.50	.000	INLET CONTROL...	Submerged:	HW =26.00	
5947.50	2258.87	5926.50	.000	INLET CONTROL...	Submerged:	HW =27.00	
5948.50	2317.05	5926.50	.000	INLET CONTROL...	Submerged:	HW =28.00	
5950.50	2429.39	5926.50	.000	INLET CONTROL...	Submerged:	HW =30.00	
5952.50	2536.87	5926.50	.000	INLET CONTROL...	Submerged:	HW =32.00	
5953.50	2588.84	5926.50	.000	INLET CONTROL...	Submerged:	HW =33.00	
5954.00	2614.50	5926.50	.000	INLET CONTROL...	Submerged:	HW =33.50	
5954.50	2639.87	5926.50	.000	INLET CONTROL...	Submerged:	HW =34.00	
5956.50	2739.05	5926.50	.000	INLET CONTROL...	Submerged:	HW =36.00	
5958.50	2834.70	5926.50	.000	INLET CONTROL...	Submerged:	HW =38.00	
5959.50	2881.34	5926.50	.000	INLET CONTROL...	Submerged:	HW =39.00	
5960.50	2927.30	5926.50	.000	INLET CONTROL...	Submerged:	HW =40.00	
5962.50	3016.95	5926.50	.000	INLET CONTROL...	Submerged:	HW =42.00	
5964.50	3104.12	5926.50	.000	INLET CONTROL...	Submerged:	HW =44.00	
5965.50	3146.74	5926.50	.000	INLET CONTROL...	Submerged:	HW =45.00	
5966.50	3188.90	5926.50	.000	INLET CONTROL...	Submerged:	HW =46.00	
5968.50	3271.39	5926.50	.000	INLET CONTROL...	Submerged:	HW =48.00	
5970.50	3351.98	5926.50	.000	INLET CONTROL...	Submerged:	HW =50.00	
5971.50	3391.46	5926.50	.000	INLET CONTROL...	Submerged:	HW =51.00	
5972.50	3430.56	5926.50	.000	INLET CONTROL...	Submerged:	HW =52.00	
5974.50	3507.42	5926.50	.000	INLET CONTROL...	Submerged:	HW =54.00	
5976.50	3582.67	5926.50	.000	INLET CONTROL...	Submerged:	HW =56.00	
5977.50	3619.67	5926.50	.000	INLET CONTROL...	Submerged:	HW =57.00	
5978.50	3656.39	5926.50	.000	INLET CONTROL...	Submerged:	HW =58.00	

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water              Notes
 ----------------  ---------------  -------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5920.50       .00   REVERSE: Flow is closed off
5922.50       .00   REVERSE: Flow is closed off
5923.50       .00   REVERSE: Flow is closed off
5924.50       .00   REVERSE: Flow is closed off
5926.50       .00   REVERSE: Flow is closed off
5928.50       .00   REVERSE: Flow is closed off
5929.50       .00   REVERSE: Flow is closed off
5930.50       .00   REVERSE: Flow is closed off
5932.50       .00   REVERSE: Flow is closed off
5934.50       .00   REVERSE: Flow is closed off
5935.50       .00   REVERSE: Flow is closed off
5936.50       .00   REVERSE: Flow is closed off
5938.50       .00   REVERSE: Flow is closed off
5940.50       .00   REVERSE: Flow is closed off
5941.50       .00   5941.50   .000            E < Y min=5954.00
5942.50       .00   5941.50   .000            E < Y min=5954.00
5944.50       .00   5941.50   .000            E < Y min=5954.00
5946.50       .00   5941.50   .000            E < Y min=5954.00
5947.50       .00   5941.50   .000            E < Y min=5954.00
5948.50       .00   5941.50   .000            E < Y min=5954.00
5950.50       .00   5941.50   .000            E < Y min=5954.00
5952.50       .00   5941.50   .000            E < Y min=5954.00
5953.50       .00   5941.50   .000            E < Y min=5954.00
5954.00       .00   5941.50   .000            E = Y min=5954.00
5954.50    131.07   5941.50   .000            Max.H=.50; Max.Htw=-12.50;; W(ft)=166.67
5956.50   2481.20   5941.50   .000            Max.H=2.50; Max.Htw=-12.50;; W(ft)=333.33
5958.50   7732.74   5941.50   .000            Max.H=4.50; Max.Htw=-12.50;; W(ft)=438.33
5959.50  11440.89   5941.50   .000            Max.H=5.50; Max.Htw=-12.50;; W(ft)=475.00
5960.50  15795.58   5941.50   .000            Max.H=6.50; Max.Htw=-12.50;; W(ft)=511.67
5962.50  26507.63   5941.50   .000            Max.H=8.50; Max.Htw=-12.50;; W(ft)=579.17
5964.50  39990.72   5941.50   .000            Max.H=10.50; Max.Htw=-12.50;; W(ft)=627.98
5965.50  47748.39   5941.50   .000            Max.H=11.50; Max.Htw=-12.50;; W(ft)=650.60
5966.50  56115.80   5941.50   .000            Max.H=12.50; Max.Htw=-12.50;; W(ft)=673.21
5968.50  74676.54   5941.50   .000            Max.H=14.50; Max.Htw=-12.50;; W(ft)=718.45
5970.50  95673.53   5941.50   .000            Max.H=16.50; Max.Htw=-12.50;; W(ft)=763.69
5971.50 107157.70   5941.50   .000            Max.H=17.50; Max.Htw=-12.50;; W(ft)=785.83
5972.50 119321.50   5941.50   .000            Max.H=18.50; Max.Htw=-12.50;; W(ft)=807.50
5974.50 145597.00   5941.50   .000            Max.H=20.50; Max.Htw=-12.50;; W(ft)=852.22
5976.50 174667.00   5941.50   .000            Max.H=22.50; Max.Htw=-12.50;; W(ft)=901.11
5977.50 190176.20   5941.50   .000            Max.H=23.50; Max.Htw=-12.50;; W(ft)=925.56
5978.50 206346.20   5941.50   .000            Max.H=24.50; Max.Htw=-12.50;; W(ft)=950.00
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Culvert-Box)
               ---------------------------------------
               Mannings open channel maximum capacity: 2082.53 cfs
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water             Notes
 ----------------  --------------  --------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  --------------------------
5920.50       .00   REVERSE: Flow is closed off
5922.50       .00   REVERSE: Flow is closed off
5923.50       .00   REVERSE: Flow is closed off
5924.50       .00   REVERSE: Flow is closed off
5926.50       .00   REVERSE: Flow is closed off
5928.50       .00   REVERSE: Flow is closed off
5929.50       .00   REVERSE: Flow is closed off
5930.50       .00   REVERSE: Flow is closed off
5932.50       .00   REVERSE: Flow is closed off
5934.50       .00   REVERSE: Flow is closed off
5935.50       .00   REVERSE: Flow is closed off
5936.50       .00   REVERSE: Flow is closed off
5938.50       .00   REVERSE: Flow is closed off
5940.50       .00   REVERSE: Flow is closed off
5941.50       .00   5941.50   .000                    HW = TW elev
5942.50    576.32   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=.516ft  HL=.999ft
5944.50    998.63   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=1.550ft  HL=3.000ft
5946.50   1289.27   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=2.583ft  HL=5.000ft
5947.50   1412.35   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=3.100ft  HL=6.000ft
5948.50   1525.65   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=3.617ft  HL=7.001ft
5950.50   1729.81   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=4.650ft  HL=9.000ft
5952.50   1912.25   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=5.683ft  HL=10.999ft
5953.50   1997.41   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=6.200ft  HL=12.000ft
5954.00   2038.59   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=6.458ft  HL=12.500ft
5954.50   2078.99   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=6.717ft  HL=13.001ft
5956.50   2233.17   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=7.750ft  HL=15.000ft
5958.50   2377.42   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=8.784ft  HL=17.001ft
5959.50   2446.25   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=9.300ft  HL=17.999ft
5960.50   2513.33   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=9.817ft  HL=19.000ft
5962.50   2642.22   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=10.849ft  HL=20.999ft
5964.50   2765.27   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=11.883ft  HL=23.000ft
5965.50   2824.75   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=12.400ft  HL=24.000ft
5966.50   2882.93   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=12.916ft  HL=24.999ft
5968.50   2996.04   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=13.950ft  HL=26.999ft
5970.50   3105.04   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=14.983ft  HL=28.999ft
5971.50   3158.17   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=15.500ft  HL=30.000ft
5972.50   3210.39   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=16.017ft  HL=31.001ft
5974.50   3312.29   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=17.050ft  HL=33.000ft
5976.50   3411.23   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=18.084ft  HL=35.001ft
5977.50   3459.61   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=18.600ft  HL=36.001ft
5978.50   3507.31   5941.50   .000        FULL FLOW...Lfull=300.01ft  Vh=19.117ft  HL=37.000ft
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)

WS Elev,Device Q    Tail Water             Notes
---------------  --------------  -------------------------
WS Elev.    Q      TW Elev Converge
  ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5920.50       .00   REVERSE: Flow is closed off
5922.50       .00   REVERSE: Flow is closed off
5923.50       .00   REVERSE: Flow is closed off
5924.50       .00   REVERSE: Flow is closed off
5926.50       .00   REVERSE: Flow is closed off
5928.50       .00   REVERSE: Flow is closed off
5929.50       .00   REVERSE: Flow is closed off
5930.50       .00   REVERSE: Flow is closed off
5932.50       .00   REVERSE: Flow is closed off
5934.50       .00   REVERSE: Flow is closed off
5935.50       .00   REVERSE: Flow is closed off
5936.50       .00   REVERSE: Flow is closed off
5938.50       .00   REVERSE: Flow is closed off
5940.50       .00   REVERSE: Flow is closed off
5941.50       .00   REVERSE: Flow is closed off
5942.50       .00   REVERSE: Flow is closed off
5944.50       .00   REVERSE: Flow is closed off
5946.50       .00   REVERSE: Flow is closed off
5947.50       .00   REVERSE: Flow is closed off
5948.50       .00   REVERSE: Flow is closed off
5950.50       .00   REVERSE: Flow is closed off
5952.50       .00   REVERSE: Flow is closed off
5953.50       .00   REVERSE: Flow is closed off
5954.00       .00   REVERSE: Flow is closed off
5954.50       .00   REVERSE: Flow is closed off
5956.50       .00   REVERSE: Flow is closed off
5958.50       .00   REVERSE: Flow is closed off
5959.50       .00   REVERSE: Flow is closed off
5960.50       .00   REVERSE: Flow is closed off
5962.50       .00   5962.50   .000             Max.H=8.50; Max.Htw=8.50;; W(ft)=579.17
5964.50  26203.88   5962.50   .000             Max.H=10.50; Max.Htw=8.50;; W(ft)=627.98
5965.50  34824.42   5962.50   .000             Max.H=11.50; Max.Htw=8.50;; W(ft)=650.60
5966.50  43734.45   5962.50   .000             Max.H=12.50; Max.Htw=8.50;; W(ft)=673.21
5968.50  62946.04   5962.50   .000             Max.H=14.50; Max.Htw=8.50;; W(ft)=718.45
5970.50  84320.09   5962.50   .000             Max.H=16.50; Max.Htw=8.50;; W(ft)=763.69
5971.50  95938.61   5962.50   .000             Max.H=17.50; Max.Htw=8.50;; W(ft)=785.83
5972.50 108213.00   5962.50   .000             Max.H=18.50; Max.Htw=8.50;; W(ft)=807.50
5974.50 134659.50   5962.50   .000             Max.H=20.50; Max.Htw=8.50;; W(ft)=852.22
5976.50 163855.00   5962.50   .000             Max.H=22.50; Max.Htw=8.50;; W(ft)=901.11
5977.50 179415.00   5962.50   .000             Max.H=23.50; Max.Htw=8.50;; W(ft)=925.56
5978.50 195629.80   5962.50   .000             Max.H=24.50; Max.Htw=8.50;; W(ft)=950.00
```

```
Type.... Individual Outlet Curves
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Culvert-Box)
               ---------------------------------------
               Mannings open channel maximum capacity: 2082.53 cfs
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water             Notes
 ----------------  --------------  --------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  --------------------------
5920.50       .00   REVERSE: Flow is closed off
5922.50       .00   REVERSE: Flow is closed off
5923.50       .00   REVERSE: Flow is closed off
5924.50       .00   REVERSE: Flow is closed off
5926.50       .00   REVERSE: Flow is closed off
5928.50       .00   REVERSE: Flow is closed off
5929.50       .00   REVERSE: Flow is closed off
5930.50       .00   REVERSE: Flow is closed off
5932.50       .00   REVERSE: Flow is closed off
5934.50       .00   REVERSE: Flow is closed off
5935.50       .00   REVERSE: Flow is closed off
5936.50       .00   REVERSE: Flow is closed off
5938.50       .00   REVERSE: Flow is closed off
5940.50       .00   REVERSE: Flow is closed off
5941.50       .00   REVERSE: Flow is closed off
5942.50       .00   REVERSE: Flow is closed off
5944.50       .00   REVERSE: Flow is closed off
5946.50       .00   REVERSE: Flow is closed off
5947.50       .00   REVERSE: Flow is closed off
5948.50       .00   REVERSE: Flow is closed off
5950.50       .00   REVERSE: Flow is closed off
5952.50       .00   REVERSE: Flow is closed off
5953.50       .00   REVERSE: Flow is closed off
5954.00       .00   REVERSE: Flow is closed off
5954.50       .00   REVERSE: Flow is closed off
5956.50       .00   REVERSE: Flow is closed off
5958.50       .00   REVERSE: Flow is closed off
5959.50       .00   REVERSE: Flow is closed off
5960.50       .00   REVERSE: Flow is closed off
5962.50       .00   5962.50   .000                  HW = TW elev
5964.50    815.44   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=1.033ft  HL=2.000ft
5965.50    998.72   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=1.550ft  HL=3.000ft
5966.50   1153.21   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=2.067ft  HL=4.000ft
5968.50   1412.46   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=3.100ft  HL=6.001ft
5970.50   1630.98   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=4.134ft  HL=8.001ft
5971.50   1729.68   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=4.649ft  HL=8.999ft
5972.50   1823.32   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=5.166ft  HL=10.000ft
5974.50   1997.33   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=6.200ft  HL=11.999ft
5976.50   2157.39   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=7.233ft  HL=13.999ft
5977.50   2233.13   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=7.750ft  HL=15.000ft
5978.50   2306.44   5962.50   .000    FULL FLOW...Lfull=300.01ft  Vh=8.267ft  HL=16.001ft
```

Type.... Composite Rating Curve
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .000 (+/- ft)

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5920.50	.00	5896.50	.000	None contributing
5922.50	69.25	5896.50	.000	
5923.50	127.39	5896.50	.000	
5924.50	195.98	5896.50	.000	
5926.50	360.01	5896.50	.000	
5928.50	554.39	5896.50	.000	
5929.50	661.50	5896.50	.000	
5930.50	774.87	5896.50	.000	
5932.50	1018.45	5896.50	.000	
5934.50	1278.88	5896.50	.000	
5935.50	1379.20	5896.50	.000	
5936.50	1472.66	5896.50	.000	
5938.50	1643.75	5896.50	.000	
5940.50	1798.82	5896.50	.000	
5941.50	1871.49	5896.50	.000	
5942.50	1941.30	5896.50	.000	
5944.50	2074.24	5896.50	.000	
5946.50	2198.98	5896.50	.000	
5947.50	2258.87	5896.50	.000	
5948.50	2317.05	5896.50	.000	
5950.50	2429.39	5896.50	.000	
5952.50	2536.87	5896.50	.000	
5953.50	2588.84	5896.50	.000	
5954.00	2614.50	5896.50	.000	
5954.50	2770.93	5896.50	.000	
5956.50	5220.24	5896.50	.000	
5958.50	10567.44	5896.50	.000	
5959.50	14322.22	5896.50	.000	
5960.50	18722.88	5896.50	.000	
5962.50	29524.58	5896.50	.000	
5964.50	43094.84	5896.50	.000	
5965.50	50895.14	5896.50	.000	
5966.50	59304.70	5896.50	.000	
5968.50	77947.93	5896.50	.000	
5970.50	99025.51	5896.50	.000	
5971.50	110549.20	5896.50	.000	
5972.50	122752.00	5896.50	.000	
5974.50	149104.40	5896.50	.000	
5976.50	178249.60	5896.50	.000	
5977.50	193795.80	5896.50	.000	
5978.50	210002.50	5896.50	.000	

Type.... Composite Rating Curve
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .000 (+/- ft)

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5920.50	.00	5926.50	.000	
5922.50	.00	5926.50	.000	
5923.50	.00	5926.50	.000	
5924.50	.00	5926.50	.000	
5926.50	.00	5926.50	.000	
5928.50	568.73	5926.50	.000	
5929.50	661.50	5926.50	.000	
5930.50	774.87	5926.50	.000	
5932.50	1018.45	5926.50	.000	
5934.50	1278.88	5926.50	.000	
5935.50	1379.20	5926.50	.000	
5936.50	1472.66	5926.50	.000	
5938.50	1643.75	5926.50	.000	
5940.50	1798.82	5926.50	.000	
5941.50	1871.49	5926.50	.000	
5942.50	1941.30	5926.50	.000	
5944.50	2074.24	5926.50	.000	
5946.50	2198.98	5926.50	.000	
5947.50	2258.87	5926.50	.000	
5948.50	2317.05	5926.50	.000	
5950.50	2429.39	5926.50	.000	
5952.50	2536.87	5926.50	.000	
5953.50	2588.84	5926.50	.000	
5954.00	2614.50	5926.50	.000	
5954.50	2770.93	5926.50	.000	
5956.50	5220.24	5926.50	.000	
5958.50	10567.44	5926.50	.000	
5959.50	14322.22	5926.50	.000	
5960.50	18722.88	5926.50	.000	
5962.50	29524.58	5926.50	.000	
5964.50	43094.84	5926.50	.000	
5965.50	50895.14	5926.50	.000	
5966.50	59304.70	5926.50	.000	
5968.50	77947.93	5926.50	.000	
5970.50	99025.51	5926.50	.000	
5971.50	110549.20	5926.50	.000	
5972.50	122752.00	5926.50	.000	
5974.50	149104.40	5926.50	.000	
5976.50	178249.60	5926.50	.000	
5977.50	193795.80	5926.50	.000	
5978.50	210002.50	5926.50	.000	

Type.... Composite Rating Curve
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .000 (+/- ft)

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5920.50	.00	5941.50	.000	
5922.50	.00	5941.50	.000	
5923.50	.00	5941.50	.000	
5924.50	.00	5941.50	.000	
5926.50	.00	5941.50	.000	
5928.50	.00	5941.50	.000	
5929.50	.00	5941.50	.000	
5930.50	.00	5941.50	.000	
5932.50	.00	5941.50	.000	
5934.50	.00	5941.50	.000	
5935.50	.00	5941.50	.000	
5936.50	.00	5941.50	.000	
5938.50	.00	5941.50	.000	
5940.50	.00	5941.50	.000	
5941.50	.00	5941.50	.000	
5942.50	576.32	5941.50	.000	
5944.50	998.63	5941.50	.000	
5946.50	1289.27	5941.50	.000	
5947.50	1412.35	5941.50	.000	
5948.50	1525.65	5941.50	.000	
5950.50	1729.81	5941.50	.000	
5952.50	1912.25	5941.50	.000	
5953.50	1997.41	5941.50	.000	
5954.00	2038.59	5941.50	.000	
5954.50	2210.06	5941.50	.000	
5956.50	4714.36	5941.50	.000	
5958.50	10110.16	5941.50	.000	
5959.50	13887.14	5941.50	.000	
5960.50	18308.91	5941.50	.000	
5962.50	29149.86	5941.50	.000	
5964.50	42755.99	5941.50	.000	
5965.50	50573.14	5941.50	.000	
5966.50	58998.73	5941.50	.000	
5968.50	77672.59	5941.50	.000	
5970.50	98778.57	5941.50	.000	
5971.50	110315.90	5941.50	.000	
5972.50	122531.90	5941.50	.000	
5974.50	148909.30	5941.50	.000	
5976.50	178078.20	5941.50	.000	
5977.50	193635.80	5941.50	.000	
5978.50	209853.50	5941.50	.000	

Type.... Composite Rating Curve
Name.... CULVERT CROSSING

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

CUMULATIVE HGL CONVERGENCE ERROR .000 (+/- ft)

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5920.50	.00	5962.50	.000	
5922.50	.00	5962.50	.000	
5923.50	.00	5962.50	.000	
5924.50	.00	5962.50	.000	
5926.50	.00	5962.50	.000	
5928.50	.00	5962.50	.000	
5929.50	.00	5962.50	.000	
5930.50	.00	5962.50	.000	
5932.50	.00	5962.50	.000	
5934.50	.00	5962.50	.000	
5935.50	.00	5962.50	.000	
5936.50	.00	5962.50	.000	
5938.50	.00	5962.50	.000	
5940.50	.00	5962.50	.000	
5941.50	.00	5962.50	.000	
5942.50	.00	5962.50	.000	
5944.50	.00	5962.50	.000	
5946.50	.00	5962.50	.000	
5947.50	.00	5962.50	.000	
5948.50	.00	5962.50	.000	
5950.50	.00	5962.50	.000	
5952.50	.00	5962.50	.000	
5953.50	.00	5962.50	.000	
5954.00	.00	5962.50	.000	
5954.50	.00	5962.50	.000	
5956.50	.00	5962.50	.000	
5958.50	.00	5962.50	.000	
5959.50	.00	5962.50	.000	
5960.50	.00	5962.50	.000	
5962.50	.00	5962.50	.000	
5964.50	27019.32	5962.50	.000	
5965.50	35823.14	5962.50	.000	
5966.50	44887.66	5962.50	.000	
5968.50	64358.50	5962.50	.000	
5970.50	85951.06	5962.50	.000	
5971.50	97668.29	5962.50	.000	
5972.50	110036.30	5962.50	.000	
5974.50	136656.80	5962.50	.000	
5976.50	166012.40	5962.50	.000	
5977.50	181648.20	5962.50	.000	
5978.50	197936.20	5962.50	.000	

```
Type.... Outlet Input Data
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


                  REQUESTED POND WS ELEVATIONS:

                    Min. Elev.=   5896.50 ft
                    Increment =      1.00 ft
                    Max. Elev.=   5978.50 ft


           ******************************************
                          OUTLET CONNECTIVITY
           ******************************************

            ---> Forward Flow Only (UpStream to DnStream)
           <---  Reverse Flow Only (DnStream to UpStream)
           <---> Forward and Reverse Both Allowed

     Structure         No.        Outfall    E1, ft     E2, ft
  -----------------   ----        -------  ---------  ---------
  Culvert-Circular            --->    TW    5896.500   5978.500
  Weir-XY Points              --->    TW    5968.630   5978.500
  TW SETUP, DS Channel
```

```
Type.... Outlet Input Data
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


              OUTLET STRUCTURE INPUT DATA



              Structure ID      =
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.0000 ft
              Upstream Invert   =   5896.50 ft
              Dnstream Invert   =   5894.67 ft
              Horiz. Length     =    423.00 ft
              Barrel Length     =    423.00 ft
              Barrel Slope      =    .00433 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .012411  (per ft of full flow)
              Kr                =     .5000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =         1
              Inlet Control K   =     .0098
              Inlet Control M   =    2.0000
              Inlet Control c   =    .03980
              Inlet Control Y   =     .6700
              T1 ratio (HW/D)   =     1.158
              T2 ratio (HW/D)   =     1.305
              Slope Factor      =     -.500

 Use unsubmerged inlet control Form 1 equ. below T1 elev.
 Use   submerged inlet control Form 1 equ. above T2 elev.

 In transition zone between unsubmerged and submerged inlet control,
 interpolate between flows at T1 & T2...
 At T1 Elev =   5898.82 ft  --->  Flow =     15.55 cfs
 At T2 Elev =   5899.11 ft  --->  Flow =     17.77 cfs
```

```
Type.... Outlet Input Data
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

              OUTLET STRUCTURE INPUT DATA



              Structure ID      =
              Structure Type    = Weir-XY Points
              ------------------------------------
              # of Openings     =         1
              WEIR X-Y GROUND POINTS

                  X, ft     Elev, ft
               ---------   ---------
                    .00     5978.50
                  51.00     5969.80
                 106.00     5969.32
                 140.00     5968.65
                 170.00     5968.92
                 203.00     5968.63
                 266.00     5969.25
                 281.00     5969.13
                 325.00     5971.00
                 367.00     5973.50
                 399.00     5976.00
                 420.00     5978.50

              Lowest Elev.      =   5968.63 ft

              Weir Coeff.       =  3.000000

              Weir TW effects     (Use adjustment equation)



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    30
              Min. TW tolerance =    .01 ft
              Max. TW tolerance =    .01 ft
              Min. HW tolerance =    .01 ft
              Max. HW tolerance =    .01 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

```
Type.... Individual Outlet Curves
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

              RATING TABLE FOR ONE OUTLET TYPE

              Structure ID  =   (Culvert-Circular)
              ---------------------------------------
              Mannings open channel maximum capacity: 16.01 cfs
              Upstream  ID  =    (Pond Water Surface)
              DNstream  ID  = TW (Pond Outfall)
```

WS Elev, ft	Device Q, cfs	Tail Water TW Elev, ft	Converge +/-ft	Notes / Computation Messages
5896.50	.00	Free Outfall		Upstream HW & DNstream TW < Inv.El
5897.50	3.43	Free Outfall		CRIT.DEPTH CONTROL Vh= .235ft Dcr= .647ft H.JUMP IN PIPE
5898.50	11.91	Free Outfall		BACKWATER CONTROL.. Vh= .430ft hwDi= 1.354ft Lbw= 423.0ft
5899.50	17.39	Free Outfall		FULL FLOW...Lfull=181.45ft Vh=.476ft HL=1.786ft
5900.50	19.57	Free Outfall		FULL FLOW...Lfull=346.94ft Vh=.603ft HL=3.502ft
5901.50	21.69	Free Outfall		FULL FLOW...Lfull=387.62ft Vh=.741ft HL=4.677ft
5902.50	23.68	Free Outfall		FULL FLOW...Lfull=403.62ft Vh=.883ft HL=5.746ft
5903.50	25.53	Free Outfall		FULL FLOW...Lfull=411.46ft Vh=1.026ft HL=6.780ft
5904.50	27.28	Free Outfall		FULL FLOW...Lfull=415.27ft Vh=1.172ft HL=7.795ft
5905.50	28.93	Free Outfall		FULL FLOW...Lfull=417.72ft Vh=1.318ft HL=8.808ft
5906.50	30.49	Free Outfall		FULL FLOW...Lfull=419.46ft Vh=1.464ft HL=9.815ft
5907.50	31.98	Free Outfall		FULL FLOW...Lfull=420.48ft Vh=1.610ft HL=10.819ft
5908.50	33.41	Free Outfall		FULL FLOW...Lfull=420.95ft Vh=1.758ft HL=11.821ft
5909.50	34.78	Free Outfall		FULL FLOW...Lfull=421.78ft Vh=1.904ft HL=12.824ft
5910.50	36.10	Free Outfall		FULL FLOW...Lfull=421.90ft Vh=2.052ft HL=13.825ft
5911.50	37.39	Free Outfall		FULL FLOW...Lfull=421.92ft Vh=2.201ft HL=14.828ft
5912.50	38.62	Free Outfall		FULL FLOW...Lfull=422.18ft Vh=2.348ft HL=15.827ft
5913.50	39.81	Free Outfall		FULL FLOW...Lfull=422.34ft Vh=2.496ft HL=16.826ft
5914.50	40.98	Free Outfall		FULL FLOW...Lfull=422.50ft Vh=2.644ft HL=17.828ft
5915.50	42.11	Free Outfall		FULL FLOW...Lfull=422.56ft Vh=2.792ft HL=18.829ft
5916.50	43.21	Free Outfall		FULL FLOW...Lfull=422.60ft Vh=2.940ft HL=19.829ft
5917.50	44.28	Free Outfall		FULL FLOW...Lfull=422.74ft Vh=3.087ft HL=20.830ft
5918.50	45.33	Free Outfall		FULL FLOW...Lfull=422.77ft Vh=3.236ft HL=21.830ft
5919.50	46.36	Free Outfall		FULL FLOW...Lfull=422.78ft Vh=3.384ft HL=22.829ft
5920.50	47.36	Free Outfall		FULL FLOW...Lfull=422.80ft Vh=3.531ft HL=23.828ft
5921.50	48.34	Free Outfall		FULL FLOW...Lfull=422.82ft Vh=3.680ft HL=24.830ft
5922.50	49.30	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=3.827ft HL=25.830ft
5923.50	50.25	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=3.975ft HL=26.829ft
5924.50	51.17	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.124ft HL=27.829ft
5925.50	52.09	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.272ft HL=28.831ft
5926.50	52.98	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.420ft HL=29.830ft
5927.50	53.86	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.568ft HL=30.830ft
5928.50	54.73	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.716ft HL=31.830ft
5929.50	55.58	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=4.864ft HL=32.829ft
5930.50	56.42	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.013ft HL=33.830ft
5931.50	57.25	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.161ft HL=34.829ft
5932.50	58.07	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.309ft HL=35.829ft
5933.50	58.87	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.457ft HL=36.831ft
5934.50	59.67	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.605ft HL=37.830ft
5935.50	60.45	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.754ft HL=38.830ft
5936.50	61.22	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=5.902ft HL=39.831ft
5937.50	61.99	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.050ft HL=40.829ft
5938.50	62.74	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.198ft HL=41.830ft
5939.50	63.49	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.346ft HL=42.830ft
5940.50	64.22	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.495ft HL=43.830ft
5941.50	64.95	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.643ft HL=44.831ft
5942.50	65.67	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.791ft HL=45.829ft
5943.50	66.38	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=6.939ft HL=46.830ft
5944.50	67.09	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=7.087ft HL=47.830ft
5945.50	67.79	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=7.235ft HL=48.830ft
5946.50	68.48	Free Outfall		FULL FLOW...Lfull=422.92ft Vh=7.384ft HL=49.830ft

```
Type.... Individual Outlet Curves
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Culvert-Circular)
               ---------------------------------------
               Mannings open channel maximum capacity: 16.01 cfs
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water             Notes
 ----------------  --------------  -------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5947.50     69.16   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=7.532ft  HL=50.831ft
5948.50     69.84   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=7.680ft  HL=51.829ft
5949.50     70.51   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=7.828ft  HL=52.829ft
5950.50     71.17   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=7.976ft  HL=53.830ft
5951.50     71.83   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.125ft  HL=54.831ft
5952.50     72.48   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.273ft  HL=55.831ft
5953.50     73.13   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.421ft  HL=56.831ft
5954.50     73.77   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.569ft  HL=57.830ft
5955.50     74.40   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.717ft  HL=58.829ft
5956.50     75.04   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=8.865ft  HL=59.831ft
5957.50     75.66   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.014ft  HL=60.831ft
5958.50     76.28   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.162ft  HL=61.831ft
5959.50     76.89   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.310ft  HL=62.829ft
5960.50     77.50   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.458ft  HL=63.830ft
5961.50     78.11   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.606ft  HL=64.830ft
5962.50     78.71   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.754ft  HL=65.830ft
5963.50     79.30   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=9.902ft  HL=66.830ft
5964.50     79.89   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.051ft  HL=67.830ft
5965.50     80.48   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.199ft  HL=68.830ft
5966.50     81.06   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.347ft  HL=69.830ft
5967.50     81.64   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.495ft  HL=70.830ft
5968.50     82.22   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.643ft  HL=71.830ft
5968.63     82.29   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.662ft  HL=71.959ft
5969.50     82.79   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.791ft  HL=72.830ft
5970.50     83.35   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=10.940ft  HL=73.830ft
5971.50     83.92   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.088ft  HL=74.831ft
5972.50     84.47   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.236ft  HL=75.829ft
5973.50     85.03   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.384ft  HL=76.829ft
5974.50     85.58   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.532ft  HL=77.830ft
5975.50     86.13   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.681ft  HL=78.831ft
5976.50     86.67   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.829ft  HL=79.830ft
5977.50     87.21   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=11.977ft  HL=80.830ft
5978.50     87.75   Free Outfall    FULL FLOW...Lfull=422.92ft  Vh=12.125ft  HL=81.830ft
```

```
Type.... Individual Outlet Curves
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)
```

WS Elev, ft	Device Q, cfs	Tail Water TW Elev, ft	Converge +/-ft	Notes Computation Messages
5896.50	.00	Free Outfall		E < Y min=5968.63
5897.50	.00	Free Outfall		E < Y min=5968.63
5898.50	.00	Free Outfall		E < Y min=5968.63
5899.50	.00	Free Outfall		E < Y min=5968.63
5900.50	.00	Free Outfall		E < Y min=5968.63
5901.50	.00	Free Outfall		E < Y min=5968.63
5902.50	.00	Free Outfall		E < Y min=5968.63
5903.50	.00	Free Outfall		E < Y min=5968.63
5904.50	.00	Free Outfall		E < Y min=5968.63
5905.50	.00	Free Outfall		E < Y min=5968.63
5906.50	.00	Free Outfall		E < Y min=5968.63
5907.50	.00	Free Outfall		E < Y min=5968.63
5908.50	.00	Free Outfall		E < Y min=5968.63
5909.50	.00	Free Outfall		E < Y min=5968.63
5910.50	.00	Free Outfall		E < Y min=5968.63
5911.50	.00	Free Outfall		E < Y min=5968.63
5912.50	.00	Free Outfall		E < Y min=5968.63
5913.50	.00	Free Outfall		E < Y min=5968.63
5914.50	.00	Free Outfall		E < Y min=5968.63
5915.50	.00	Free Outfall		E < Y min=5968.63
5916.50	.00	Free Outfall		E < Y min=5968.63
5917.50	.00	Free Outfall		E < Y min=5968.63
5918.50	.00	Free Outfall		E < Y min=5968.63
5919.50	.00	Free Outfall		E < Y min=5968.63
5920.50	.00	Free Outfall		E < Y min=5968.63
5921.50	.00	Free Outfall		E < Y min=5968.63
5922.50	.00	Free Outfall		E < Y min=5968.63
5923.50	.00	Free Outfall		E < Y min=5968.63
5924.50	.00	Free Outfall		E < Y min=5968.63
5925.50	.00	Free Outfall		E < Y min=5968.63
5926.50	.00	Free Outfall		E < Y min=5968.63
5927.50	.00	Free Outfall		E < Y min=5968.63
5928.50	.00	Free Outfall		E < Y min=5968.63
5929.50	.00	Free Outfall		E < Y min=5968.63
5930.50	.00	Free Outfall		E < Y min=5968.63
5931.50	.00	Free Outfall		E < Y min=5968.63
5932.50	.00	Free Outfall		E < Y min=5968.63
5933.50	.00	Free Outfall		E < Y min=5968.63
5934.50	.00	Free Outfall		E < Y min=5968.63
5935.50	.00	Free Outfall		E < Y min=5968.63
5936.50	.00	Free Outfall		E < Y min=5968.63
5937.50	.00	Free Outfall		E < Y min=5968.63
5938.50	.00	Free Outfall		E < Y min=5968.63
5939.50	.00	Free Outfall		E < Y min=5968.63
5940.50	.00	Free Outfall		E < Y min=5968.63
5941.50	.00	Free Outfall		E < Y min=5968.63
5942.50	.00	Free Outfall		E < Y min=5968.63
5943.50	.00	Free Outfall		E < Y min=5968.63
5944.50	.00	Free Outfall		E < Y min=5968.63
5945.50	.00	Free Outfall		E < Y min=5968.63
5946.50	.00	Free Outfall		E < Y min=5968.63

```
Type.... Individual Outlet Curves
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW


               RATING TABLE FOR ONE OUTLET TYPE

               Structure ID  =   (Weir-XY Points)
               ---------------------------------------
               Upstream  ID  =    (Pond Water Surface)
               DNstream  ID  = TW (Pond Outfall)


 WS Elev,Device Q    Tail Water              Notes
 ----------------  ---------------  -------------------------
 WS Elev.    Q      TW Elev Converge
   ft       cfs        ft    +/-ft   Computation Messages
--------  -------  --------  -----  -------------------------
5947.50       .00   Free Outfall             E < Y min=5968.63
5948.50       .00   Free Outfall             E < Y min=5968.63
5949.50       .00   Free Outfall             E < Y min=5968.63
5950.50       .00   Free Outfall             E < Y min=5968.63
5951.50       .00   Free Outfall             E < Y min=5968.63
5952.50       .00   Free Outfall             E < Y min=5968.63
5953.50       .00   Free Outfall             E < Y min=5968.63
5954.50       .00   Free Outfall             E < Y min=5968.63
5955.50       .00   Free Outfall             E < Y min=5968.63
5956.50       .00   Free Outfall             E < Y min=5968.63
5957.50       .00   Free Outfall             E < Y min=5968.63
5958.50       .00   Free Outfall             E < Y min=5968.63
5959.50       .00   Free Outfall             E < Y min=5968.63
5960.50       .00   Free Outfall             E < Y min=5968.63
5961.50       .00   Free Outfall             E < Y min=5968.63
5962.50       .00   Free Outfall             E < Y min=5968.63
5963.50       .00   Free Outfall             E < Y min=5968.63
5964.50       .00   Free Outfall             E < Y min=5968.63
5965.50       .00   Free Outfall             E < Y min=5968.63
5966.50       .00   Free Outfall             E < Y min=5968.63
5967.50       .00   Free Outfall             E < Y min=5968.63
5968.50       .00   Free Outfall             E < Y min=5968.63
5968.63       .00   Free Outfall             E = Y min=5968.63
5969.50    243.97   Free Outfall             Max.H=.87; Max.Htw=free out;; W(ft)=204.35
5970.50   1260.26   Free Outfall             Max.H=1.87; Max.Htw=free out;; W(ft)=266.34
5971.50   2886.47   Free Outfall             Max.H=2.87; Max.Htw=free out;; W(ft)=292.37
5972.50   5026.06   Free Outfall             Max.H=3.87; Max.Htw=free out;; W(ft)=315.03
5973.50   7630.75   Free Outfall             Max.H=4.87; Max.Htw=free out;; W(ft)=337.69
5974.50  10716.71   Free Outfall             Max.H=5.87; Max.Htw=free out;; W(ft)=356.35
5975.50  14236.57   Free Outfall             Max.H=6.87; Max.Htw=free out;; W(ft)=375.01
5976.50  18195.66   Free Outfall             Max.H=7.87; Max.Htw=free out;; W(ft)=391.48
5977.50  22581.83   Free Outfall             Max.H=8.87; Max.Htw=free out;; W(ft)=405.74
5978.50  27373.11   Free Outfall             Max.H=9.87; Max.Htw=free out;; W(ft)=420.00
```

Type.... Composite Rating Curve
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5896.50	.00	Free Outfall		None contributing
5897.50	3.43	Free Outfall		
5898.50	11.91	Free Outfall		
5899.50	17.39	Free Outfall		
5900.50	19.57	Free Outfall		
5901.50	21.69	Free Outfall		
5902.50	23.68	Free Outfall		
5903.50	25.53	Free Outfall		
5904.50	27.28	Free Outfall		
5905.50	28.93	Free Outfall		
5906.50	30.49	Free Outfall		
5907.50	31.98	Free Outfall		
5908.50	33.41	Free Outfall		
5909.50	34.78	Free Outfall		
5910.50	36.10	Free Outfall		
5911.50	37.39	Free Outfall		
5912.50	38.62	Free Outfall		
5913.50	39.81	Free Outfall		
5914.50	40.98	Free Outfall		
5915.50	42.11	Free Outfall		
5916.50	43.21	Free Outfall		
5917.50	44.28	Free Outfall		
5918.50	45.33	Free Outfall		
5919.50	46.36	Free Outfall		
5920.50	47.36	Free Outfall		
5921.50	48.34	Free Outfall		
5922.50	49.30	Free Outfall		
5923.50	50.25	Free Outfall		
5924.50	51.17	Free Outfall		
5925.50	52.09	Free Outfall		
5926.50	52.98	Free Outfall		
5927.50	53.86	Free Outfall		
5928.50	54.73	Free Outfall		
5929.50	55.58	Free Outfall		
5930.50	56.42	Free Outfall		
5931.50	57.25	Free Outfall		
5932.50	58.07	Free Outfall		
5933.50	58.87	Free Outfall		

Type.... Composite Rating Curve
Name.... SPILLWAY/PIPE

File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
5934.50	59.67	Free Outfall		
5935.50	60.45	Free Outfall		
5936.50	61.22	Free Outfall		
5937.50	61.99	Free Outfall		
5938.50	62.74	Free Outfall		
5939.50	63.49	Free Outfall		
5940.50	64.22	Free Outfall		
5941.50	64.95	Free Outfall		
5942.50	65.67	Free Outfall		
5943.50	66.38	Free Outfall		
5944.50	67.09	Free Outfall		
5945.50	67.79	Free Outfall		
5946.50	68.48	Free Outfall		
5947.50	69.16	Free Outfall		
5948.50	69.84	Free Outfall		
5949.50	70.51	Free Outfall		
5950.50	71.17	Free Outfall		
5951.50	71.83	Free Outfall		
5952.50	72.48	Free Outfall		
5953.50	73.13	Free Outfall		
5954.50	73.77	Free Outfall		
5955.50	74.40	Free Outfall		
5956.50	75.04	Free Outfall		
5957.50	75.66	Free Outfall		
5958.50	76.28	Free Outfall		
5959.50	76.89	Free Outfall		
5960.50	77.50	Free Outfall		
5961.50	78.11	Free Outfall		
5962.50	78.71	Free Outfall		
5963.50	79.30	Free Outfall		
5964.50	79.89	Free Outfall		
5965.50	80.48	Free Outfall		
5966.50	81.06	Free Outfall		
5967.50	81.64	Free Outfall		
5968.50	82.22	Free Outfall		
5968.63	82.29	Free Outfall		
5969.50	326.75	Free Outfall		
5970.50	1343.62	Free Outfall		
5971.50	2970.39	Free Outfall		
5972.50	5110.54	Free Outfall		
5973.50	7715.78	Free Outfall		
5974.50	10802.29	Free Outfall		
5975.50	14322.70	Free Outfall		
5976.50	18282.34	Free Outfall		
5977.50	22669.05	Free Outfall		
5978.50	27460.87	Free Outfall		

```
  Type.... ICPM Node Routing Summary
  Name.... NORTH POND         Tag: PMF                        Event: PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... PMF   Tag: PMF


                          ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = NORTH POND    IN PMF
   Outflow HYG file = NORTH POND   OUT PMF

   Pond Node   Data = NORTH POND
   Pond Volume Data = NORTH POND
   Pond Outlet Data = SPILLWAY/PIPE

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5896.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                         Tp, hrs    Elev, ft    Vol, ac-ft
                         ---------  ---------   ----------
                           7.0000     5978.50     10093.990


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   5.7000    64250.23         .0000         .00
   Pond Outflow....   7.0000    27460.87         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....   30046.450   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse       22227.750   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....   30046.450
 - Total Vol OUT...   22227.750
 - Ending Pond Vol.    7741.623  <-- (At 35.0000 hrs  Elev.= 5968.92 ft)
                    ------------
   Difference......      77.081 ac-ft  (.257% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... NORTH POND         Tag: 10yr                        Event: 10yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 10yr   Tag: 10yr


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = NORTH POND    IN 10yr
   Outflow HYG file = NORTH POND   OUT 10yr

   Pond Node   Data = NORTH POND
   Pond Volume Data = NORTH POND
   Pond Outlet Data = SPILLWAY/PIPE

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5896.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                         Tp, hrs    Elev, ft    Vol, ac-ft
                         ---------  ---------   ----------
                         20.5000     5926.57       979.123


                    FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                    Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                   ---------   ---------     ---------   ---------
   Pond Inflow.....   8.4000     1669.19        .0000         .00
   Pond Outflow....  20.5000       53.04        .0000         .00


                      TOTAL VOLUME IN           TOTAL VOLUME OUT
                    Vol, ac-ft  Direction     Vol, ac-ft  Direction
                   ------------  -------     ------------  -------
   Pond Inflow.....    1065.516   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse        131.300   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....    1065.516
 - Total Vol OUT...     131.300
 - Ending Pond Vol.     933.700  <-- (At 35.0000 hrs  Elev.= 5926.12 ft)
                   ------------
   Difference......        .517 ac-ft  (.049% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... NORTH POND         Tag: 100yr                      Event: 100yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 100yr   Tag: 100yr


                          ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = NORTH POND    IN 100yr
   Outflow HYG file = NORTH POND   OUT 100yr

   Pond Node   Data = NORTH POND
   Pond Volume Data = NORTH POND
   Pond Outlet Data = SPILLWAY/PIPE

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5896.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                          24.4000     5949.41      3847.033


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   8.3000     7760.68         .0000         .00
   Pond Outflow....  24.3000       70.45         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....    3958.263   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse        172.198   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....    3958.263
 - Total Vol OUT...     172.198
 - Ending Pond Vol.    3788.750  <-- (At 35.0000 hrs  Elev.= 5949.05 ft)
                    ------------
   Difference......      -2.684 ac-ft  (.068% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... NORTH POND         Tag: .25PMF                Event: .25PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... .25PMF   Tag: .25PMF


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = NORTH POND    IN .25PMF
   Outflow HYG file = NORTH POND   OUT .25PMF

   Pond Node   Data = NORTH POND
   Pond Volume Data = NORTH POND
   Pond Outlet Data = SPILLWAY/PIPE

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5896.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                          13.2000     5962.87      6254.095


                    FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                    Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                   ---------   ---------     ---------   ---------
   Pond Inflow.....   7.1000    18437.18         .0000         .00
   Pond Outflow....  13.2000       78.93         .0000         .00


                      TOTAL VOLUME IN           TOTAL VOLUME OUT
                    Vol, ac-ft  Direction     Vol, ac-ft  Direction
                   ------------  -------     ------------  -------
   Pond Inflow.....    6315.553   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse        197.737   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....    6315.553
 - Total Vol OUT...     197.737
 - Ending Pond Vol.    6128.166  <-- (At 35.0000 hrs  Elev.= 5962.35 ft)
                    ------------
   Difference......     -10.349 ac-ft  (.164% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... NORTH POND         Tag: 0.5PMF                Event: 0.5PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 0.5PMF   Tag: 0.5PMF


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = NORTH POND    IN 0.5PMF
   Outflow HYG file = NORTH POND   OUT 0.5PMF

   Pond Node   Data = NORTH POND
   Pond Volume Data = NORTH POND
   Pond Outlet Data = SPILLWAY/PIPE

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5896.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                          10.0000     5975.59      9378.827


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   6.8000    37597.13         .0000         .00
   Pond Outflow....  10.0000    14672.65         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....   16337.400   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse        8613.335   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....   16337.400
 - Total Vol OUT...    8613.335
 - Ending Pond Vol.    7721.594  <-- (At 35.0000 hrs  Elev.= 5968.84 ft)
                    ------------
   Difference......       2.476 ac-ft  (.015% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... SOUTH POND         Tag: PMF                      Event: PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... PMF   Tag: PMF


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = SOUTH POND    IN PMF
   Outflow HYG file = SOUTH POND   OUT PMF

   Pond Node   Data = SOUTH POND
   Pond Volume Data = SOUTH POND
   Pond Outlet Data = CULVERT CROSSING

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5920.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                            7.0000     5978.50      6565.491


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   6.5000    80000.00         .0000         .00
   Pond Outflow....   5.7000    64250.23         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....   40094.700   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse       30046.450   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....   40094.700
 - Total Vol OUT...   30046.450
 - Ending Pond Vol.    4388.059  <-- (At 35.0000 hrs  Elev.= 5968.93 ft)
                    ------------
   Difference......    5660.197 ac-ft  (14.117% of Inflow Volume)

   WARNING: Mass balance for routing volumes vary by more than .5%
```

```
  Type.... ICPM Node Routing Summary
  Name.... SOUTH POND         Tag: 10yr                        Event: 10yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 10yr   Tag: 10yr


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = SOUTH POND    IN 10yr
   Outflow HYG file = SOUTH POND   OUT 10yr

   Pond Node   Data = SOUTH POND
   Pond Volume Data = SOUTH POND
   Pond Outlet Data = CULVERT CROSSING

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5920.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                            8.4000     5938.83       371.128


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   6.5000     2352.00         .0000         .00
   Pond Outflow....   8.4000     1669.19         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....    1178.785   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse       1065.516   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....    1178.785
 - Total Vol OUT...    1065.516
 - Ending Pond Vol.     113.891  <-- (At 35.0000 hrs  Elev.= 5926.13 ft)
                    ------------
   Difference......       -.623 ac-ft  (.053% of Inflow Volume)
```

```
  Type.... ICPM Node Routing Summary
  Name.... SOUTH POND         Tag: 100yr                    Event: 100yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 100yr   Tag: 100yr


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = SOUTH POND    IN 100yr
   Outflow HYG file = SOUTH POND   OUT 100yr

   Pond Node   Data = SOUTH POND
   Pond Volume Data = SOUTH POND
   Pond Outlet Data = CULVERT CROSSING

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5920.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                         Tp, hrs    Elev, ft    Vol, ac-ft
                         ---------  ---------   ----------
                           8.3000     5957.45      2106.867


                    FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                    Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                   ---------   ---------     ---------   ---------
  Pond Inflow.....   6.5000    10528.00         .0000         .00
  Pond Outflow....   8.3000     7760.68         .0000         .00


                      TOTAL VOLUME IN           TOTAL VOLUME OUT
                    Vol, ac-ft  Direction     Vol, ac-ft  Direction
                   ------------  -------     ------------  -------
  Pond Inflow.....    5276.467   Forward           .000   Reverse
  Pond Outflow....        .000   Reverse        3958.263   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
+ Initial Vol.....        .000
+ Total Vol IN....    5276.467
- Total Vol OUT...    3958.263
- Ending Pond Vol.    1283.246  <-- (At 35.0000 hrs  Elev.= 5949.06 ft)
                   ------------
   Difference......      34.958 ac-ft  (.663% of Inflow Volume)

   WARNING: Mass balance for routing volumes vary by more than .5%
```

```
  Type.... ICPM Node Routing Summary
  Name.... SOUTH POND         Tag: .25PMF                Event: .25PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... .25PMF   Tag: .25PMF


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = SOUTH POND    IN .25PMF
   Outflow HYG file = SOUTH POND   OUT .25PMF

   Pond Node   Data = SOUTH POND
   Pond Volume Data = SOUTH POND
   Pond Outlet Data = CULVERT CROSSING

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5920.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                          13.3000     5962.87      3009.155


                    FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                    Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                   ---------   ---------     ---------   ---------
   Pond Inflow.....   6.5000    20000.00         .0000         .00
   Pond Outflow....   7.1000    18437.18         .0000         .00


                     TOTAL VOLUME IN           TOTAL VOLUME OUT
                    Vol, ac-ft  Direction     Vol, ac-ft  Direction
                   ------------  -------     ------------  -------
   Pond Inflow.....   10023.680   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse        6315.553   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....   10023.680
 - Total Vol OUT...    6315.553
 - Ending Pond Vol.    2893.080  <-- (At 35.0000 hrs  Elev.= 5962.36 ft)
                    ------------
   Difference......     815.044 ac-ft  (8.131% of Inflow Volume)

   WARNING: Mass balance for routing volumes vary by more than .5%
```

```
  Type.... ICPM Node Routing Summary
  Name.... SOUTH POND         Tag: 0.5PMF                Event: 0.5PMF yr
  File.... S:\GROUPS\SWRA\JJ\LONE PINE 4-ADD.PPW
  Storm... 0.5PMF   Tag: 0.5PMF


                         ICPM POND ROUTING SUMMARY

   HYG Dir          = S:\GROUPS\SWRA\JJ\
   Inflow  HYG file = SOUTH POND    IN 0.5PMF
   Outflow HYG file = SOUTH POND   OUT 0.5PMF

   Pond Node   Data = SOUTH POND
   Pond Volume Data = SOUTH POND
   Pond Outlet Data = CULVERT CROSSING

   No Infiltration

   INITIAL CONDITIONS                    CALCULATION TOLERANCES
   ----------------------------------    ------------------------------
   Starting WS Elev =  5920.50 ft        Target Convergence=     .010 cfs +/-
   Starting Volume  =     .000 ac-ft     Max. Iterations   =       35 loops
   Starting Outflow =      .00 cfs       ICPM   Time Step  =    .1000 hrs
                                         Output Time Step  =    .1000 hrs
   ----------------------------------    ICPM Ending Time  =  35.0000 hrs
                                         ------------------------------

                              MAXIMUM STORAGE
                          Tp, hrs    Elev, ft    Vol, ac-ft
                          ---------  ---------   ----------
                          10.1000     5975.59      5903.142


                     FORWARD FLOW PEAKS        REVERSE FLOW PEAKS
                     Tp, hrs     Qp, cfs       Tp, hrs     Qp, cfs
                    ---------   ---------     ---------   ---------
   Pond Inflow.....   6.5000    40000.00         .0000         .00
   Pond Outflow....   6.8000    37597.13         .0000         .00


                       TOTAL VOLUME IN           TOTAL VOLUME OUT
                     Vol, ac-ft  Direction     Vol, ac-ft  Direction
                    ------------  -------     ------------  -------
   Pond Inflow.....   20047.350   Forward           .000   Reverse
   Pond Outflow....        .000   Reverse       16337.400   Forward


   MASS BALANCE (ac-ft)
   ----------------------------
 + Initial Vol.....        .000
 + Total Vol IN....   20047.350
 - Total Vol OUT...   16337.400
 - Ending Pond Vol.    4369.397  <-- (At 35.0000 hrs  Elev.= 5968.85 ft)
                    ------------
   Difference......    -659.450 ac-ft  (3.289% of Inflow Volume)

   WARNING: Mass balance for routing volumes vary by more than .5%
```