# RITTENHOUSE
# FLOOD RETARDING STRUCTURE

23984-002-0000

April 2002

## SPILLWAY INUNDATION STUDY

### FCD NO. 98-33

Submitted to

**Flood Control District of Maricopa County**
2801 West Durango Street
Phoenix, Arizona 85009
(602) 506-1501


Submitted by
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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# SECTION 1.0 INTRODUCTION

## 1.1 PURPOSE OF STUDY

The purpose of this study is to determine and delineate the inundation limits of the 1/3, 2/3, and full spillway discharges from the emergency spillways of the Rittenhouse Flood Retarding Structures (FRS); and, to determine the approximate travel time from the spillways to the downstream limit of study for each of the flow scenarios.

## 1.2 STUDY AREA

The Rittenhouse FRS is located in Pinal County, Arizona south of US 60 and the City of Apache Junction (see Exhibit 1, Location Map). The emergency spillway for the Rittenhouse FRS is located at the southeastern end of the structure in Section 13 of Township 2 South (T2S), Range 8 East (R8E).

Immediately below, and running perpendicular to, the Rittenhouse emergency spillway is a channel collecting the principal spillway outlet flow. This channel turns 90° and forward to the west. The study begins at the upstream bank of the principal spillway outlet collection channel.

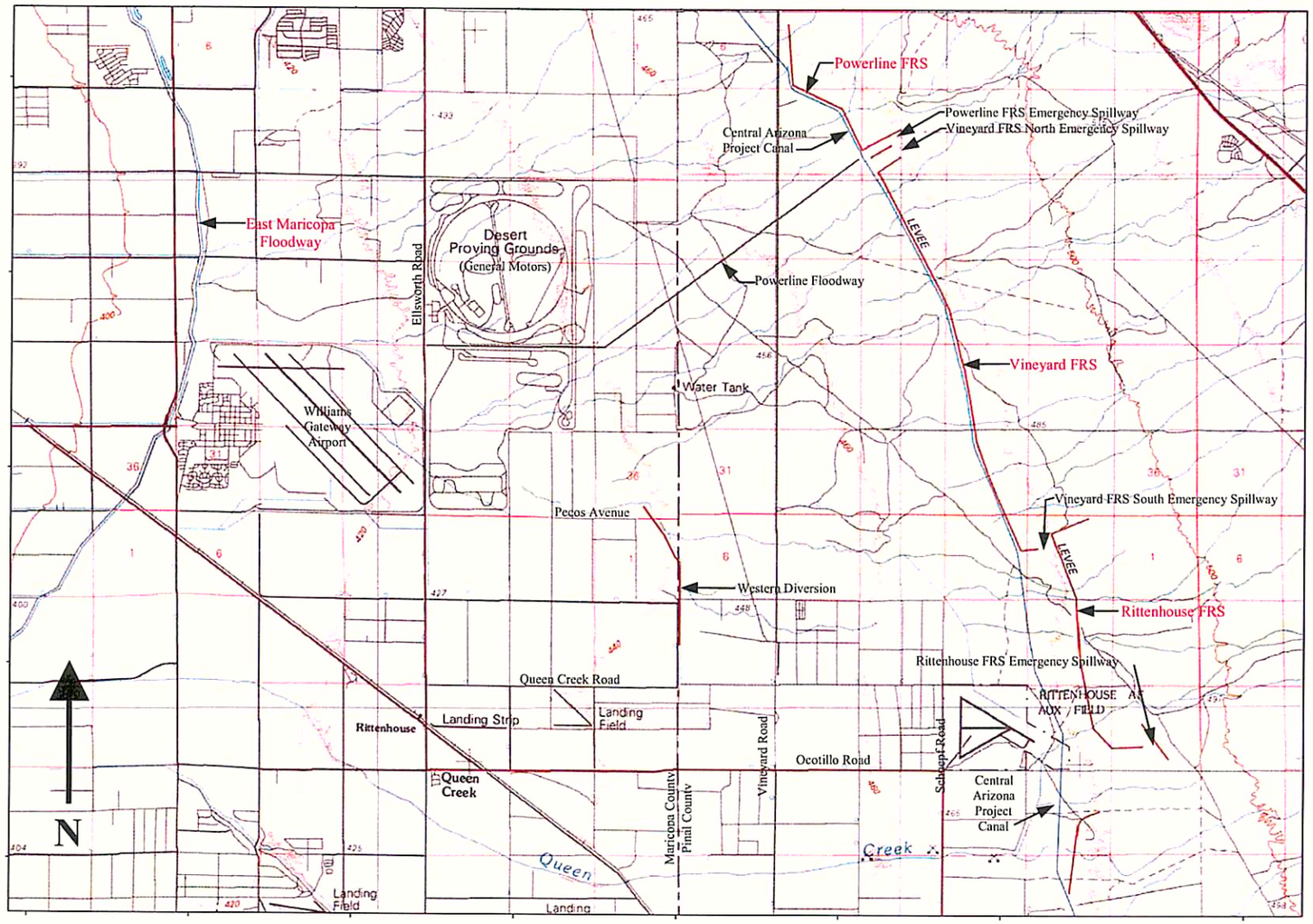
The study limit is from the emergency spillway of the Rittenhouse FRS to the Southern Pacific Rail Road (SPRR) Bridge, a distance of approximately 7.3 miles for the Rittenhouse flow.

Flows from the Rittenhouse spillway proceed in a typically southwesterly direction, to the Queen Creek culvert through Center Arizona Project Canal (CAP). The Flow ponds behind the eastern embankment of the CAP because of limitation of the culvert capacity, and then overtops the CAP westerly entering the Queen Creek Channel. A portion of the flow on the right overbank upstream of SPRR Bridge flows along the railroad to the northwest to the Rittenhouse Channel.

## 1.3 SURVEY AND MAPPING

As directed by the FCD, this study utilized survey and mapping from several sources. The first was new survey and mapping developed specifically for this contract (FCD 98-33) and included the area generally described as an approximate 1.5 mile wide strip from the Rittenhouse FRS spillway to the Maricopa and Pinal County line. M & B Aerial Mapping, LLC performed this new mapping (References 1) for this study under a subcontract with Michael Baker Jr., Inc. The new mapping utilized aerial data gathered on a flight date of July 9, 2000 for the Rittenhouse FRS. The elevation datum system for this map is North American Vertical Datum of 1988 (1988 NAVD).

Huitt-Zollars, Inc. performed the Queen Creek main channel portion of the new mapping for this study (Reference 2). The area covered an approximate 600 feet wide strip from the CAP to the County line.




**Location Map**
(N.T.S.)

**Exhibit 1**

AZTEC Engineering provided field and ground control survey for the contract.

Topographic mapping prepared under FCD #86-23, the Queen Creek Area Drainage Master Study ADMS (Reference 3), was used for the area west of the Maricopa and Pinal County line. This mapping was not available from the District in digital form. It was supplied to Baker as paper maps of scale 1" = 200' and as raster image files (.tif format) scanned by the District at a 1" = 200' scale. The elevation datum system for this raster image map is National Geodetic Vertical Datum of 1929 (1929 NGVD). Conversion factor 1929 NGVD to 1988 NAVD is +1.98 feet.

# SECTION 2.0 HYDRAULICS

## 2.1 METHODOLOGY

### *2.1.1 Modeling*

All hydraulic analyses were performed by step backwater calculations using the USACE's HEC-RAS, version 2.2 (Reference 4). This version can perform only one-dimensional flow calculations.

Separate HEC-RAS models were developed in the upstream right overbank area and the downstream main channel area for each of the three flow scenarios in case to specify different effective flow limits for the three discharges.

Two groups of HEC-RAS model were developed based on different mapping systems. The existing mapping (Reference 3) was made in October 1986, which was approximately 14 years ago. The elevations at the overbank area on this mapping were approximately two feet lower than that on the digital mapping (Reference 1 and 2), however, the channel bed elevation was approximately 2 feet higher than that on the digital mapping (Reference 1 and 2). Although there are differences in mapping systems, the floodplain boundaries were tied in at the joint cross section. Upstream of the county boundary, models were developed based on digital mapping data. The upstream HEC-RAS model was started at the county boundary and terminated at the upstream emergency spillway. Downstream of the county boundary, models were developed based on existing mapping (Reference 3) by manual interpolation of the topographic data. The downstream HEC-RAS model was started at immediately upstream of the SPRR Bridge and terminated at the county boundary. Part of the model of Queen Creek/Sanokai Wash Hydraulic Master Plan - Queen Creek HEC-RAS (0.21 miles downstream of SPRR Bridge) (Huitt-Zollars, Inc.) were used to provide starting water surface elevations.

Right and Left overbank area models were developed due to overbank flow at downstream of Vineyard Road and downstream of CAP.

A HEC-RAS model was also developed for the split flow flooding area at the upstream SPRR Bridge along the railroad to northwest. This model was developed based on existing mapping (Reference 3) by manual interpolation of the topographic data. The upstream of flooding area obtained from this model will tie in with downstream model flooding area.

### *2.1.2 Discharges*

Discharges for the three flow scenarios were determined and provided by the FCDMC. The discharges given are:

| Location | Full Flow (cfs) | 2/3 Flow (cfs) | 1/3 Flow (cfs) |
|---|---|---|---|
| **Below Rittenhouse FRS** | 14,000 | 9,333 | 4667 |

Discharges utilized for the three flow scenarios determined for the different models are:

| Location | Full Flow (cfs) | 2/3 Flow (cfs) | 1/3 Flow (cfs) |
|---|---|---|---|
| **Below Rittenhouse FRS** | 14,000 | 9,333 | 4667 |
| **Upstream Left overbank below CAP** | 1430 | 780 | 230 |
| **Upstream Main channel below Vineyard Rd.** | 10900 | 9200 | 4667 |
| **Downstream Main channel at County Boundary** | 10900 | 9200 | 4667 |
| **Downstream Main channel below X/S 12.827** | 13490 | 9200 | 4667 |
| **Upstream Right overbank below Vineyard Road** | 6550 | 3340 | 600 |
| **Downstream Right overbank below Maricopa County Boundary** | 6550 | 3340 | 600 |
| **Railroad model** | 2980 | 300 | 130 |

The discharges are based on the assumption that there is no flow obtained or lost through the CAP. The discharges at upstream left and right overbank areas were determined by HEC-RAS model flow distribution information. The areas covered by each model are shown in Exhibit 2.

### *2.1.3 Flow Regime*

A mixed flow regime was assumed to account for both supercritical and subcritical flow conditions for upstream models.

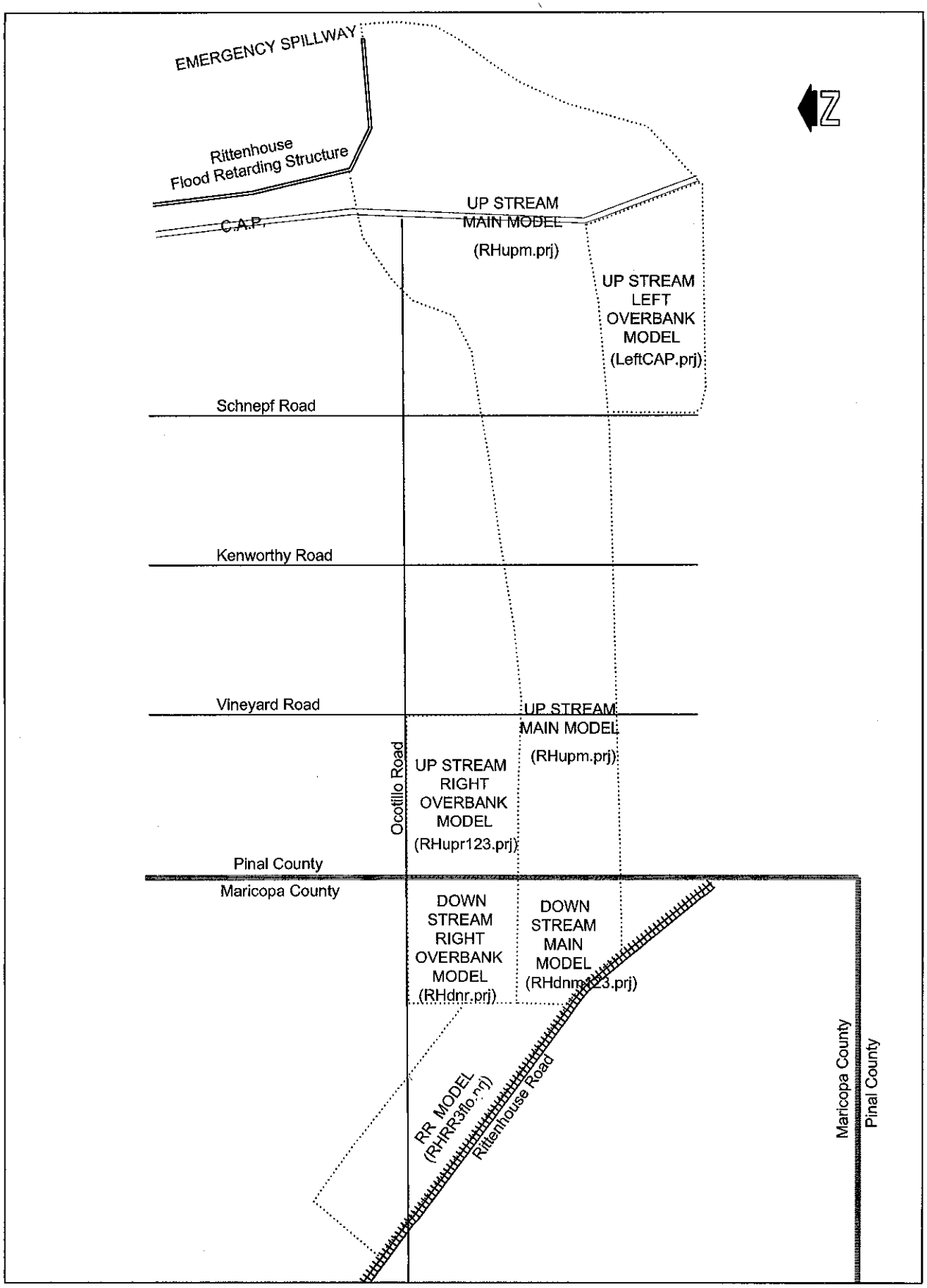

EMERGENCY SPILLWAY
Rittenhouse
Flood Retarding Structure
C.A.P.
UP STREAM
MAIN MODEL
(RHupm.prj)
UP STREAM
LEFT
OVERBANK
MODEL
(LeftCAP.prj)
Schnepf Road
Kenworthy Road
Vineyard Road
UP STREAM
MAIN MODEL
(RHupm.prj)
Ocotillo Road
UP STREAM
RIGHT
OVERBANK
MODEL
(RHupr123.prj)
Pinal County
Maricopa County
DOWN
STREAM
RIGHT
OVERBANK
MODEL
(RHdnr.prj)
DOWN
STREAM
MAIN
MODEL
(RHdnm123.prj)
RR MODEL
(RHRR3flo.prj)
Rittenhouse Road
Maricopa County
Pinal County

EXHIBIT 2

### *2.1.4 Starting Water Surface Elevation*

The normal depth or slope-area method was used as the downstream boundary condition for the downstream models. Downstream staring water surface elevations, 1446.75, 1444.86 and 1440.85 for the full, 2/3 and 1/3 spillway flows, respectively were obtained through the existing HEC-RAS model (0.21 miles reach) for the main channel models. This results were shown in Appendix C. A slope of 0.034 ft/ft was used as the downstream boundary condition for the right overbank models for all 3 discharges.

Through the county boundary (cross section 13.351), the calculated water surface elevations from downstream models were used as upstream model boundary conditions. The conversion factor 1.98 was used to obtain the upstream water surface elevations. For the main channel models, downstream water surface elevations of 1455.86, 1455.43 and 1454.18 were used for full, 2/3 and 1/3 flow discharge scenarios respectively. For the right overbank models, downstream water surface elevations 1480.70, 1481.39 and 1481.76 were used for full, 2/3 and 1/3 flow discharge scenarios respectively.

For the upstream left overbank models, water surface elevations in the main models were used as starting water surface elevations.

### *2.1.5 Cross Section Layout*

For the new digital mapping developed for this study, cross sections for HEC-RAS were developed from a digital terrain model (DTM) using BOSS International's RiverCAD, version 3.5, software (Reference 5). Cross sections in areas of existing mapping provided by the FCDMC were developed by manual interpolation of the topographic data. Spacing of cross sections was approximately every 1000 ft except where topographical features warranted a deviation from this spacing and in the shallow flooding area.

Cross sections were oriented perpendicular to flow and stationed left to right looking downstream with the baseline being the 10,000-station.

The most upstream cross section was set at an arbitrary River Mile stationing of 20.000. Downstream cross section station IDs were then assigned based on the river mile distance, decreasing downstream, along the hydraulic baseline from this station 20.000.

### *2.1.6 Channel Stationing*

Flows out of the emergency spillway and over the CAP have not occurred historically. Therefore, there is no existing channel downstream of the Rittenhouse FRS formed from these flows. Channel stations have been estimated based on topographic features and engineering judgement.

Channel stations downstream of the Rittenhouse FRS were developed as follows:

- Channel stations upstream of the CAP were developed based on the width of the emergency spillway.

- As flows overtopping the CAP will encounter low resistance (nearly bare ground), the center lower portion of the topwidth of the cross sections, therefore, have been designated as channel. The widths are from 1200 to 2300 feet adjacent to the CAP.
- Downstream of the CAP, flows fall into the Queen Creek channel. Therefore, the existing channel was used to designate the channel stations.

Channel stations remained the same for all three flow scenarios.

### *2.1.7 Hydraulic Baseline*

The hydraulic baseline is located within the channel stations and follows the same path described in section *2.1.6 Channel Stationing.*

### *2.1.8 Manning's 'n' Values*

Manning's 'n' value calculations are presented in Appendix C of this report.

The area from the Rittenhouse FRS to approximately 1500 feet downstream of the CAP consists of natural desert vegetation. The 'n' values for the channel portion are 0.040 to 0.045, and for the overbank area are 0.050 to 0.060.

The area from the SPRR Bridge to approximately 1500 feet downstream of the CAP consists of natural channel and agricultural land. The 'n' values for the channel portion is 0.035 and for the overbank area is 0.050.

For the area with bare ground, road and irrigation canal, the 'n' values used are 0.030 to 0.035.

The same 'n' values were used for all three flow scenarios.

### *2.1.9 Expansion Ratios*

Expansion ratios were determined for the full flow scenario based on the methodology presented in the HEC-RAS Hydraulic Reference Manual, version 2.0 (Reference 6).

Expansion ratios were assumed to be 2:1 in this study for all flow scenarios.

### *2.1.10 Contraction Ratios*

Contraction ratios were assumed to be 1:1 in all cases for all flow scenarios.

### *2.1.11 Contraction/Expansion Coefficients*

Contraction/Expansion (c/e) coefficients of 0.1 and 0.3, respectively, were used for most of the modeling. The c/e coefficients of 0.3/0.5 were used where a bridge is located until flows had fully expanded.

### *2.1.12 Calibration*

Flow has never occurred over the Rittenhouse FRS emergency spillways. Therefore, there are no high water marks or flood records to calibrate against so calibration is not possible.

## 2.2 SPECIAL PROBLEMS

### *2.2.1 Queen Creek Culvert through the CAP*

Queen Creek crosses through both embankments of the CAP as a pipe culvert (see Photo 2.2.1.a and b).

The capacity of the culvert at the CAP was analyzed using HY8 (Reference 7). Tailwater elevations were calculated using a 48 feet width channel with an "n" value of 0.05 and a slope of 0.09 ft/ft. A rating curve was generated for obtaining the culvert discharge capacity. The HEC-RAS computed water surface elevations at cross section 18.012 were used as upstream water surface elevations.

**Photo 2.2.1.a.** Looking upstream (east) over the CAP Culverts (Photo date June 4, 2001)

The computed culvert capacities for the 3 flow scenarios based on the rating curve generated in the HY8 were:

| Flow Scenario | Pipe Culvert Capacity (cfs) | Culvert Capacity vs. Total Flow (%) |
|---|---|---|
| Full Flow (14,000 cfs) | 1600 | 11.4 |
| 2 Thirds Flow (9,333 cfs) | 1560 | 16.7 |
| 1 Third Flow (4667 cfs) | 1510 | 32.4 |

The culvert at the CAP was not included in the HEC-RAS modeling. The culvert discharge has been deducted from the total discharge at cross sections 17.907 and 17.882 during the HEC-RAS modeling.

**Photo 2.2.1.b.** Outlet of the culvert through the CAP. (Photo date March 23, 2000)

### 2.2.2 *Flows over the CAP*

Cross sections 17.907 and 17.882 respectively reflect the east and west CAP top of embankment elevations.

Flows may occur to the north and the south between the eastern CAP embankment and the Rittenhouse FRS structure but there is no flow loss from the north and the south.

Flows overtopping the eastern CAP embankment will likely continue down the CAP canal until the capacity of the CAP is reached. No attempt was made to estimate the magnitude of these flows or the capacity of the CAP.

For the purposes of this study, it was assumed that the entire spillway discharges for all three flow scenarios would overtop the CAP. Additionally, it was assumed that there would be no erosion or breach of the CAP embankments. Cross sections were taken along the east and west top of banks.

Flows overtopping the western CAP embankment at the south of irrigation canal (south of station 9750) will likely continue down to the west. The water surface elevations at the south overbank area, downstream of the CAP, were analyzed separately from the main channel. Flows return to the Queen Creek channel upstream of Schnepf Road (cross section 16.563).

Flows overtopping the western CAP embankment at the north overbank area (north of station 12100), will likely continue to the west until reaching an earthen diversion structure 1000 feet downstream of the CAP. Then, flow turns south, back to the main channel. In the case of CAP failure at the overbank area, the

area downstream of the earthen diversion structure is subject to flooding since the flow can overtop the structure.

**Photo 2.2.2.a.** Looking north on the western CAP embankment. (Photo date June 3, 2001)

**Photo 2.2.2.b.** Looking south on the western CAP embankment. (Photo date June 3, 2001)

### *2.2.3 Gravel Pits along Queen Creek*

There are several gravel pits adjacent to and within the Queen Creek channel between Vineyard Road and the CAP. Some of the pits are 30 to 40 feet deep. The pits adjacent to the main channel were blocked in the HEC-RAS models. The

pits connected with the main channel were also blocked from the bottom to the effective flow depths. The pits are included in the flooding area.

### *2.2.4 Bridge at Schnepf Road*

There is no survey data for the Bridge at Schnepf Road. The bridge information used in HEC-RAS modeling is obtained from the existing HEC-RAS model, Queen Creek/Sanokai Wash Hydraulic Master Plan - Queen Creek HEC-RAS, generated by Huitt-Zollars, Inc. provided by FCDMC. From the model the bridge cross section is large enough to pass the full flow discharge.

**Photo 2.2.4** Looking downstream (west) at Schnepf Road Bridge (on east side of the bridge). (Photo date in May 14, 2001)

### *2.2.5 Culvert at Vineyard Road*

Queen Creek crosses under Vineyard Road in five 8' X 5' CBCs. The capacity of the culvert was analyzed using HY8 (Reference 7). Tailwater elevation 1479.25 feet, obtained from backwater analysis for full channel folw, was used in the analysis. A rating curve was generated for obtaining the culvert discharge capacity. The HEC-RAS computed water surface elevations at cross section 14.512 were used as upstream water surface elevations.

The computed culvert capacities for the 3 flow scenarios based on the rating curve generated in the HY8 were:

| Flow Scenario | Pipe Culvert Capacity (cfs) | Culvert Capacity vs. Total Flow (%) |
|---|---|---|
| Full Flow (14,000 cfs) | 2150 | 15.4 |
| 2 Thirds Flow (9,333 cfs) | 2073 | 22.2 |
| 1 Third Flow (4667 cfs) | 1937 | 41.5 |

The culvert at the CAP was not included in the HEC-RAS modeling. The culvert discharges were deducted from total flow at cross section 14.489 for the HEC-RAS modeling.

**Photo 2.2.5.a.** Looking upstream (east) at Queen Creek Culvert at Vineyard Road (on west side of the culvert). (Photo date in May 14, 2001)

**Photo 2.2.5.b.** Looking upstream (east) at Vineyard Road. (Photo date in May 14, 2001)

### *2.2.6 Flows over the Vineyard Road*

Because of the limited capacity of the culvert under the Vineyard Road, flows overtop Vineyard Road and travel to the right overbank area downstream of Vineyard Road. The estimated discharges for the full, 2/3 and 1/3 flow scenarios are 6550, 3340 and 600 cfs respectively.

It appears that flows will not return to the main channel until downstream of the county boundary at cross section 13.212 because of higher road and land elevations between the overbank area and main channel.

Separate modeling was done for the right overbank area to give reasonable flooding boundaries on both the upstream and downstream sides of the county boundary.

HEC-RAS 3.0.1 version (Reference 8) was used for the analysis in order to model the quantity of flow returning to the main channel. The printout results were show in the Appendix C.

The discharges in the main channel were estimated assuming that there was no road and culvert at the Vineyard Road (cross section 14.489). This gives a worse condition for the downstream main channel, in case the road washes out due to flooding. The estimated discharges are 10900, 9200 and 4667 cfs for the full, 2/3 and 1/3 flow scenarios respectively.

### *2.2.7 Blocked Obstructions*

There are several irrigation ponds and lower areas (north of station 14000) that are not connected with the flooding area. These areas were blocked in the HEC-RAS modeling. Blocked obstructions were also used in the HEC-RAS modeling at the

limits of the flooding to prevent HEC-RAS from showing ineffective flow areas in non-flow areas.

### 2.2.8 *SPRR Bridge Capacity*

The SPRR Bridge can pass the 2/3 and 1/3 flow discharges, but not the full flow discharge. A split flow model was done for the full flow scenario. The model indicates that 2470 cfs will overtop the right overbank area upstream of the SPRR Bridge. This flow will continue to the northwest along the railroad.

**Photo 2.2.8.a. SPRR Bridge looking downstream** (Photo date May 14, 2001)

**Photo 2.2.8.b. SPRR Bridge upstream right overbank area** (Photo date May 14, 2001)

# SECTION 3.0 FINAL RESULTS

## 3.1 OVERTOPPING OF CAP

Based on the effective flow limits, the flooding will be contained within the mapping generated under this study for that area west, or downstream, of the CAP. Cross sections 17.907 and 17.882, located along the CAP's top of east and west banks, respectively, show the flows to be uncontained at the limit of the new mapping on the north side but contained with the additional topographic data from the McClain Harbers mapping (Reference 9). It was assumed for this study that flows are contained within the mapping area.

If spillway flows seek out a low point in the CAP banks and cross the CAP at that location and/or cause a breach in the CAP embankment, flooding could be concentrated in an area other than that identified under this study. Flow depths would depend on the particular topographic and land use conditions of that area and, therefore, could be greater or less than those computed in the models presented in this study. Identification of such potential locations was beyond the scope of this study.

There is the potential for flooding to occur at the north and the south overbank areas on the plan sheets if the CAP canal banks fail north and/or south of the limits of the mapping prepared under this study. These two areas have been noted as area subject flooding due to CAP failure.

## 3.2 FLOW DOWNSTREAM OF THE CAP TO SCHNEPF ROAD

The left bank flooding boundaries were delineated based on the left overbank models. The right bank flooding boundaries were delineated based on the upstream main models but were adjusted in the cross sections containing gravel pits. For full and 2/3 flow scenarios, the gravel pits were included in the flooding area. The map shows that only limited flow can split into the pit upstream of cross section 17.319. When the pit is full, the water will flow out from downstream edge and continue to the west. Therefore, the right bank flood boundaries were adjusted based on estimated flow boundaries. In this area, notes have been added to the plan sheets indicating that the delineation has been "adjusted by hand" at individual cross sections. For the 1/3 flow scenario, the boundary was delineated based on the upstream main model results.

## 3.3 FLOW FROM VINEYARD ROAD TO COUNTY BOUNDARY

The right bank flooding boundaries were delineated based on the upstream right overbank models. It was assumed for this study that the right bank will be in place during the flooding, therefore, overbank flow could not return to the main channel until it reached cross section 13.307 at the downstream end of the county boundary. This assumption gives the worst scenario for right overbank area modeling.

The inundation area is a relative shallow flooding area on the right overbank and the average depths in the area are less than 1.5, 1.0 and 0.5 feet for the full, 2/3 and 1/3 flow scenarios respectively.

The left bank flooding boundaries were delineated based on the upstream main models. To give the worst scenario, the discharges used in the three flow scenarios have been estimated under the condition that the road and the culvert at Vineyard Road cross section have been washed out. This is likely since the design frequency for the road and the culvert is lower than the frequency of the given discharges.

## 3.4 FLOWS AT THE COUNTY BOUNDARY

Downstream models were used to delineate the inundation area downstream of the county boundary. The inundation limits tie in with the upstream limits at the county boundary (cross section 13.351). The downstream models gave the wider flooding boundaries for all three flow scenarios. Therefore, their results were used for the delineations in this cross section.

## 3.5 FLOWS DOWNSTREAM OF THE COUNTY BOUNDARY

The right bank flooding boundaries were delineated based on the downstream, right overbank models. From cross section 13.307, the ground elevation between the right overbank area and the main channel becomes lower. Therefore, flows begin to split back to the main channel. The right overbank discharges at cross section 12.827 were 510, 300, and 130 cfs for the full, 2/3 and 1/3 flow scenarios respectively. The remaining flow will travel northwest along the SPRR.

The left bank flooding boundaries were delineated based on the downstream main models. The 1/3 and 2/3 flows can pass through the SPRR Bridge to the downstream channel. The split flow happened at the right bank immediately upstream of the bridge for the full flow. The result shows that approximately 11020 cfs discharge can pass through the SPRR Bridge. Therefore 2980 cfs of discharge will flow northwest along the SPRR in the full flow scenario.

## 3.6 FLOWS ALONG THE SPRR

A HEC-RAS model was generated to estimate the inundation limits along the SPRR from the Queen Creek right bank to the Rittenhouse Channel at the intersection of Ellsworth Road and Queen Creek Road. The study method for this area is approximate and the cross section data and Manning's "n" values were generated accordingly.

Modeling results show that small amounts of flow may overtop the railroad 2400 feet downstream of the SPRR Bridge for the full flow scenario. The estimated spill discharge is 130 cfs. There are no overtopping flows for the 1/3 and 2/3 flow scenarios. The flow over the railroad would be a shallow sheet flow which the depth would be expected to be less than 0.5 feet, and it would flow directly back to the Queen Creek channel.

There is a three-pipe culvert crossing the railroad upstream of Ocotillo Road. Field photos show that the pipes have been buried half way. This culvert was not considered during the modeling because the culvert was not well maintained.

The limit of the study is along the SPRR. It is assumed that all flows remain on the north of the railroad. Flows crossing railroad to the south is not analyzed.

Several flooding areas are delineated based on the analysis results. The inundation depths and flow velocities are shown on the plan sheets for the full, 2/3 and 1/3 flow scenarios.

**Photo 3.6.a. SPRR Culvert Inlet (upstream)** **(Photo date July, 2001)**

**Photo 3.6.b. SPRR Culvert Outlet (downstream)** **(Photo date July, 2001)**

## 3.7 INUNDATION LIMITS

Due to the nature of the topography of this area causing shallow flooding across the cross sections, there are some cross sections within the modeling which show flows within a natural swale whereas the section immediately downstream may not show flows within that same swale. For all three flow scenarios, the inundation limits have been reviewed for consistency of upstream inundation limits and topography. In areas where it appears that flows would continue over the natural topography, the inundation limits have been expanded to include these areas even though the HEC-RAS model may not show these as inundated areas. In these areas, notes have been added to the plan sheets indicating that the delineation has been "adjusted by hand" at individual cross sections.

## 3.8 TRAVEL TIMES

Travel time is the time it takes flows to travel from the spillway to the specified cross section. In this study, two travel times have been computed and are shown in the *Hydraulic Data* table on the plan sheets.

The first, channel travel time, is the time it takes flows to travel in the channel. This time best represents flows in the main washes and serves as an indicator of when the Queen Creek main channel below the Rittenhouse FRS will experience peak flooding.

The second, average channel time, is the time with consideration of the entire cross section. Since flows are primarily in the overbank for this study, this time best represents overbank travel time and when homes, businesses, etc. in the lower limits of the study may experience peak flooding.

# APPENDIX A: REFERENCES

## A.1 Data Collection Summary

With the exception of the new mapping generated under this study, the FCDMC provided the data used in this inundation study.

Data obtained from the District follows:

*FLOOD CONTROL DISTRICT OF MARICOPA COUNTY*

- McLain Harbers Co., Inc., Topographic Mapping prepared for the Flood Control District of Maricopa County (FCD 93-51), Rittenhouse FRS, Index and Sheets 1 through 11 of 11, June 30, 1995.
- Wood & Associates, Inc., Aerial Photographs for Queen Creek Area Drainage Master Study prepared for the Flood Control District of Maricopa County (FCD 86-23), September 26, 1986.
- Wood & Associates, Inc., Topographic Mapping for Queen Creek Area Drainage Master Study prepared for the Flood Control District of Maricopa County (FCD 86-23), November 22, 1986.

## A.2 Referenced Documents

1. M & B Aerial Mapping, LLC, Digital Files for Topographic Mapping of Area Downstream of Rittenhouse FRS, Scale 1:2,400, Contour Interval 2 feet, Flight Date July 9, 2000.
2. Huitt Zollars, Inc. Queen Creek & Sanokai Wash Project Survey Report, July 23, 2000.
3. Topographic Mapping for Queen Creek Area Drainage Master Study, Scale 1:2,400, Contour Interval 2 feet, Flight Dates October 19 and November 22, 1986.
4. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-RAS: River Analysis System, Version 2.2, Davis, California, September 1998.
5. BOSS International, Inc., Computer Program RiverCAD, Version 3.5, Madison, Wisconsin, August 1998.
6. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-RAS, River Analysis System, Hydraulic Reference Manual, Version 2.0, Davis California, April 1997.
7. FHWA Culvert Analysis, HY8, Version 6.0.
8. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-RAS: River Analysis System, Version 3.0.1, Davis, California, March 2001.

9. McLain Harbers Co., Inc., Topographic Mapping prepared for the Flood Control District of Maricopa County (FCD 93-51), Rittenhouse FRS, Sheet 7 of 11, June 30, 1995.

# MICHAEL BAKER JR., INC.

## PHONE CALL REPORT

PROJECT/LOCATION: SIS East Side Structures –Task B

S.O. NO.: 23984-002-0000
DATE: November 30, 2000
CONTRACT NO.:

| | | | |
|---|---|---|---|
| From: | Felicia Terry | To: | Tim Murphy |
| Repres.: | Baker | Repres.: | FCD |
| Phone No.: | | Phone No.: | 602-506-4605 |

Subject: **Status of Review**

Talked to Tim about Baker's latest submittal (Portion of B1). He said that he has not had time to review it yet, But that Russ Cruff reviewed it and had no comments. Russ said the n-values looked fine. I told him we would then continue with the delineation using those n-values.

I told Tim that because we had 3 different mapping sources, that some of the mapping was not matching exactly. We have our mapping that was prepared by M&B and then we have some areas that are strip digital mapping that we received from the District and then there is the Topo from the Queen Creek ADMS mapping that was scanned. The problem areas are where the strip digital mapping is tying into the Queen Creek (scanned) mapping. M&B tied into the digital and those areas match but then the strip digital areas are then matched to the scanned sheets and in some areas they do not line up. Tim said he understood and that that was ok. He has seen that problem before. We are to document it in the TDN. Tim said we could show the different areas of mapping by using a key on the cover sheet. It would be the entire mapping area on the cover sheet with mile streets or some kind of references (GM, Williams Gateway) and to differentiate the areas of different mapping by using various kinds of shading. This would only need to be shown on the cover sheet and not on the mapping portion. He also said that this diagram could be put in the TDN to help show the problem areas that are being discussed.

Tim reiterated that the Queen Creek Wash mapping by Kenney Aerial still has not been approved. They did make a submittal but the FCD did not approve it. He will be giving Baker a time extension after the first of the year due to this.

PREPARED BY FTerry TITLE Assistant Eng. Manager PAGE 1 OF 1

Baker

# Meeting Minutes

**Project:** Task B –FCD 98-33 B3
Rittenhouse FRS

**Date:** May 14, 2001

**Date of Meeting:** May 10, 2001
**Time of Meeting:** 2:00 p.m.

**Subject:** **Status of Task B**

**By:** Felicia Terry, P.E.
1313 E. Osborn Rd, Suite 150
Phoenix, AZ 85014
Tel (602) 279.1234 Fax (602) 279.1411
Email: fterry@mbakercorp.com

**Location:** Flood Control District Office

***Attendees:***

| Name | Agency/Company | Phone | Facsimile |
|---|---|---|---|
| Tim Murphy | Flood Control District of Maricopa County | 602.506.1501 | 602.506.4601 |
| Felicia Terry | Michael Baker Jr., Inc. | 602.279.1234 | 602.279.1411 |
| Albert Romano | Michael Baker Jr., Inc. | 602.279.1234 | 602.279.1411 |
| Eric Neal | Michael Baker Jr., Inc. | 602.279.1234 | 602.279.1411 |
| Wei Cui | Michael Baker Jr., Inc. | 602.279.1234 | 602.279.1411 |

1. **Introducing New Project Manager**

Felicia Terry introduced Eric Neal, who will be the New Project Manager for the Spillway and Gavilan projects. Albert Romano will be assisting and, a technical resource.

2. **CAP**

In the vicinity of Rittenhouse Spillway, the CAP is approximately 10-feet higher than existing ground. Water will pond behind the CAP then flow to the South towards Queen Creek wash and existing culverts that flow over the CAP. Baker has performed weir flow calculations to determine the width of flow over the CAP. Tim agreed with performing the weir flow calculations. Preliminary delineation shows that the full flow is almost confined in Queen Creek Wash.

Tim recommended that the area directly below the CAP from Rittenhouse Spillway contain a note stating that "the area may be subject to flooding if the CAP fails, but no depths or velocities were determined". A polygon would be needed to show the area. Tim stressed that polygon lines need to be 'snapped' to make sure that it closes so that GIS will pick it up.

**3. Railroad**

Baker is responsible for the modeling to the railroad. Baker requested the current Queen Creek Wash model that would contain the survey of the Railroad Bridge and the bridge over Schnepf Road. Tim would talk to Dave Degerness about getting the HEC-RAS model or the survey and discharges. If the railroad opening cannot pass the entire 14000 cfs, Baker will need to model the flow that drains to the north along the railroad to the EMF. Tim will research and locate the existing model for the area adjacent to the railroad, and Baker can use the model to determine the flooding limits along the railroad.

**4. GIS**

If there are any GIS questions, call Mark Brewer. Do not spend a lot of time trying to figure it out, because Mark can usually answer the question quickly. There is a training course that Mark offers that will help consultants on their submittal. Baker has had 3 people attend the class, and Baker can have others attend. Tim suggested calling Mark to set something up. Perhaps Guihua, Wei and Eric could attend.

**5. Sheet Layout**

Tim wanted to review the sheet layout before they were actually cut. He would like to have a minimal number of sheets and may be able to help with the layout.

**6. Flooding Limits**

The District's Dam Safety Group would like to have the flooding limits electronically. They do not want the topo, or structures, etc.; just the flooding limits (which should be geo-referenced). This will help them to define the property within the flooding limits. Baker will get this information to Tim.

**10. Meeting Adjourned at 3:30 p.m.**

Baker

**Michael Baker Jr., Inc.**
*A Unit of Michael Baker Corporation*

1313 E. Osborn Road, Suite 150
Phoenix, Arizona 85014

(602) 279-1234
FAX (602) 279-1411

# MEETING MINUTES

Date: June 28, 2000

Location: Flood Control District Office

Project: Spillway Inundation Study Task B- FCD 98-33

Topic: Project Progress Meeting

Attendees:

**Flood Control District of Maricopa County**
Tim Murphy

**Michael Baker Jr., Inc.**
Felicia Terry

## Item 1

Discussed the mapping issue for Task B. Baker is planning on submitting the mapping for Task B in ground coordinates. Mapping for Task A was submitted and basically accepted (minor comments still pending) with ground coordinates. Therefore Task B will be handled the same way. AZTEC will deliver the grid and the ground coordinates with the survey report.

Baker will write a letter to Tim Murphy concerning this issue.

## Item 2

Baker showed Tim a problem that they are seeing with the scanned sheets from the Queen Creek ADMS. Using the grid ticks on the maps the topography sheets are matched to the adjacent sheets. There is a slight overlap between the sheets, and the contours do not match up. After trying several times to match the sheets, Baker concluded the mismatch, which is only off by approximately 11 feet (out of a 1"=200' scale), is due to the scanning process. The scanning machine used for this study was not a flat bed scanner, but had a roller instead. This process probably stretched the sheets, which caused a slight mismatch.

Tim compared the original mylars, which did match up correctly, so it is probably the scanner. This problem will be documented in the report.

## Item 3

The final Apache Junction Study will be delivered after the July 4 holiday.

CC: Tim Murphy
Cathy Regester
Felicia Terry

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

1313 E. Osborn Road, Suite 150
Phoenix, Arizona 85014

(602) 279-1234
FAX (602) 279-1411

# MEETING MINUTES

Date: May 3, 2000

Location: Michael Baker Jr., Inc.'s office

Project: Spillway Inundation Study Task B- FCD 98-33

Topic: Project Progress Meeting

Attendees: **Flood Control District of Maricopa County**
Tim Murphy

**Michael Baker Jr., Inc.**
Cathy Regester Felicia Terry

## Item 1

The primary discussion of this meeting concerned the flooding that was shown to occur beyond the aerial mapping limits. This area is north of the mapping. Baker had put together maps showing the flooding using the 25,000-cfs with effective flow limits and one without. Baker also provided summary output data from the HEC-RAS models.

In both models flooding is beyond the mapping limits. When effective flow limits are not used the depth of flooding averages around 1 foot and a large amount of water spreads to the north. Water flows down between the dam and the CAP and then spills over the CAP.

The 25,000-cfs discharge needs to be investigated. That amount of water is the capacity of the spillway but not the designed discharge. The designed Q is closer to 15,000-cfs and the 25,000-cfs is not likely to ever occur.

It seems more reasonable to use: a) the design Q, b) effective limits; and, c) blocked obstructions. This would direct the water to flow in its natural path with a depth that would be significant to map. Ineffective flow that is beyond the aerial mapping could be depicted on Quad maps. Flows would be captured by the existing wash and taken to and around the GM Proving Grounds. Flow arrows could be used to show the flow path. Calculations could be made based on the wash capacity and information from the East Mesa ADMP which was prepared by Dibble and Associates. This would eliminate the need for additional mapping and should present a more realistic picture of what will occur during the flood event.

A suggestion made by Tim was to widen the channel. Currently the channel is just the width of the Powerline Floodway, which is approximately 30 feet. This will be widened to the width of the spillway opening to see what effect it would have.

The District may need to look at placing a berm on the north side of the Powerline FRS spillway between the CAP and the dam. This would prevent water from flowing to the north and eventually overtopping the CAP in the vicinity of Weekes Wash.

## Item 2

Discussed the Check surveys for B1. Most of the aerial mapping is well within mapping tolerances. Showed Tim the areas that appeared to be out of tolerances. These areas have already been shown and discussed with M&B Aerial. M&B looked at the aerial photos again and are confident that the mapping is within tolerance. Therefore, Baker accepts the mapping.

## Item 3

Discussed the status of the aerial mapping for Queen Creek (B3). Tim has received the mapping from Huitt-Zollars. He has not had a chance to look at it but will be sending us a copy. Baker requested a cost estimate from M&B to map the whole area instead of tying into Huitt-Zollars mapping. Baker has not received the cost estimate to date.

## ACTIONS

Tim to investigate the 25,000 cfs.
Tim to forward a copy of the Queen Creek Mapping to Baker.
Baker to widen the channel width in the HEC-RAS model.
Baker to get mapping estimate from M&B Aerial.

CC: Tim Murphy
Cathy Regester
Felicia Terry

Baker

**Michael Baker Jr., Inc.**
*A Unit of Michael Baker Corporation*

1313 E. Osborn Road, Suite 150
Phoenix, Arizona 85014

(602) 279-1234
FAX (602) 279-1411

# MEETING MINUTES

Date: March 14, 2000

Location: Michael Baker Jr., Inc.'s office

Project: Task A – Apache Junction FRS Inundation Study and Task B- FCD 98-33

Topic: Project Progress Meeting

Attendees: **Flood Control District of Maricopa County**
Tim Murphy

**Michael Baker Jr., Inc.**
Cathy Regester Felicia Terry

## TASK A

The majority of the meeting was spent reviewing the comments from FCD and discussing Baker's response. Most of the comments were minor and will be easily resolved. The most significant comment was to make sure the start and end stations reported in the HEC-RAS model matched what was plotted on the map. In some instances Baker delineated based on the Topo and the amount of flow rather than start and end stations. Baker had used effective flow limits to restrict the flow in the cross sections. Tim instructed Baker to use blocked obstructions in the HEC-RAS model to allow the start and end stations in the HEC-RAS to match the delineation on the map. For those sections where the mapping start and end stations were not appropriate, Baker was told to note them on the plans and state "adjusted by hand". Baker agrees to make the changes to the plans and model.

## TASK B

Discussed the progress of the Huitt Zollars mapping. It has not been checked yet. The FCD does not want Baker to start on mapping Task B3.

We have received the mapping for B1 and have shown it to Tim. Some of the control points used on the McLain Harbors project were not used. Will check with AZTEC on this. AZTEC is preparing a survey report, which will discuss what and why they used the control points.

Check surveys have been submitted, but have not been checked. One of the cross sections is along the top of the structure.

The discharge to use at this point is the 25,000-cfs. It is a combination of Powerline and Vineyard spillway discharges.

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

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Phoenix, Arizona 85014

(602) 279-1234
FAX (602) 279-1411

# MEETING MINUTES

Date: January 14, 2000

Location: Michael Baker Jr., Inc.'s office

Project: Task B – Powerline, Vineyard, Rittenhouse FRS Inundation Study - FCD 98-33

Topic: Kick-Off meeting

Attendees: **Flood Control District of Maricopa County**
Tim Murphy
Dave Degenerres
Joe Tram

**Michael Baker Jr., Inc.**
Cathy Regester Felicia Terry

Baker was given an update on the mapping for Queen Creek that is being prepared by Huitt-Zollars with Kenney Aerial as their subconsultant. They have discovered a bust in the topography. The new mapping is not able to tie in to the existing Queen Creek mapping. There is a discrepancy between the contours. Baker said that they would not be needing this mapping until the end of February or beginning of March. FCD will keep Baker apprised of the status of the mapping. Baker will let their subconsultant, M&B Aerial know of the situation and they can contact Kenney Aerial directly as it gets closer to the time when this mapping is needed.

Baker was given permission to manually-cut the cross sections on the existing mapping that was provided by FCD.

FCD gave Baker a list of documents that the District has in their library. Baker will review and research the documents from FCD.

It was discussed how the CAP was going to be modeled for the study. Currently the canal was to be assumed flowing full and the flow from the spillway would just continue to flow over it. FCD mentioned that this assumption needs to be stated in a Problem Section or an Assumption Section of the report. Just make sure somewhere it is documented in the report.

M&B AERIAL MAPPING, LLC
One W. Deer Valley Road #206 Phoenix, AZ 85027
(623) 580-9883 FAX (623) 580-5181
MBAERIAL@USWEST.NET

file no.[illegible]

April 26, 2000

Faticia Terry
Baker Engineering
1313 E. Osborn Rd #150
Phoenix, AZ. 85014

RE: Comments on cross-sections

Dear Felicia

After re-setting the models in question to review the ground shots provided by the surveyor. We now found that most of the ground shots agree with the mapping as shown by the cross-section comparison produced by Baker Engineering. A few area's on the cross-section comparison plots do not agree with standards. Those are the area's that we re-set and found that the ground shots in question do not agree with our setup. These shots are close to one's that read within mapping standards, the discrepancy 1.2' to 2.3'. Our ground readability from the flying hieght is from .2' to .4' therefore we feel the [illegible] points are in error.

If you have any questions, please call.

Sincerely,

Robert J. Moon

Robert J. Moon/Owner-Operator
M&B Aerial Mapping, LLC

Letter of Transmittal

AZTEC ENGINEERING

# Letter of Transmittal

To: Felicia Terry
Michael Baker Jr., Inc.
1313 East Osborn Road, Suite 150
Phoenix, Arizona, 85014

Date/Time: February 28, 2001
Subject: Survey Report

Project: Rittenhouse F.R.S.
Project Number: Aztec Job No. 9918

From: Al Reece

Method of Delivery: U.S. Mail x Courier To Be Picked Up Hand Carry

We Are Sending You: x Attached ___ Under Separate Cover

___ Shop Drawings ___ Prints ___ Plans ___ Specifications ___ Submittal
___ Change Order ___ Reports ___ Letter ___ Review Comments ___ Other

| Quantity | Doc Date | Doc No. | Description |
|---|---|---|---|
| 1 | | | Survey Report |
| 1 | | | Floppy diskette with electronic files |
| | | | |
| | | | |

The above transmitted as follows:

___ For Approval ___ Approved as Submitted ___ Resubmit Copies for Approval
___ For your use ___ Approved as noted ___ Submit ___ copies for distribution
___ As requested ___ Returned for Corrections ___ Return for ___ corrected prints
___ Other x For review and comment ___ Please sign and return one copy

Remarks

AZTEC ENGINEERING

Bridge Design

Civil Engineering

Construction Administration

Drainage

Graphic Design

Roadway Design

Survey

Traffic Engineering

Urban Freeway Design

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Web Site:
www.aztecengcom

# SURVEY REPORT for the RITTENHOUSE F.R.S. SPILLWAY DELINEATION

This report will detail the results of a survey conducted by AZTEC Engineering during the month of August 2000 to establish horizontal and vertical control for aerial mapping on the above project (FCD 98-33). The horizontal coordinates are NAD 83(1992) State Plane Coordinates and elevations are NAVD 88. Reference was made to a survey report prepared by Huitt-Zollars, Inc. for the Queen Creek/Sanokai Wash HMP and East Maricopa Floodway Capacity Mitigation Study (FCD 98-26). The intent of this survey is to be on the same horizontal and vertical datum as the Huitt-Zollars survey.

A static GPS network was established incorporating control from the Huitt-Zollars survey and from the MCFCD GIS database. NGS control point G-68 appears in both sources and has the highest order of accuracy (B order horizontal and 1st order vertical). The horizontal and vertical basis of this survey is point G-68. The table below shows record and measured coordinates and elevations for the control points used in the control network. Coordinates shown are grid coordinates in international feet.

| POINT I.D. | XNAD83 | YNAD83 | NAVD88 | DESCRIPTION |
|---|---|---|---|---|
| | | | | |
| G-68 (RECORD) | 794086.092 | 815117.146 | 1426.92 | NGS Brass Cap in concrete monument |
| G-68 (MEASURED) | 794086.092 | 815117.146 | 1426.92 | NGS Brass Cap in concrete monument |
| | | | | |
| KLEIN 2 (RECORD) | 827921.190 | 820571.100 | 1603.42 | ADOT Brass Cap atop Rittenhouse Dike |
| KLEIN 2 (MEASURED) | 827921.129 | 820571.302 | 1603.13 | ADOT Brass Cap atop Rittenhouse Dike |
| | | | | |
| 1104 (RECORD) | 825741.380 | 818440.360 | 1579.49 | "X" cut on CAP Bridge @ Ocotillo Rd. |
| 1104 (MEASURED) | 825741.390 | 818440.564 | 1579.11 | "X" cut on CAP Bridge @ Ocotillo Rd. |
| | | | | |
| 80439 (RECORD) | 0.000 | 0.000 | 0.00 | 1/2" Rebar 700' NE of Mtn. Rd. & Williams Field |
| 80439 (MEASURED) | 799884.146 | 839250.944 | 1444.08 | 1/2" Rebar 700' NE of Mtn. Rd. & Williams Field |

AZTEC ENGINEERING

Bridge Design

Civil Engineering

Construction Administration

Drainage

Graphic Design

Roadway Design

Survey

Traffic Engineering

Urban Freeway Design

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Fax: 602-454-0403

E-mail:
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Web Site:
www.aztecengcom

The network points described in the previous paragraph were then used to control RTK GPS observations on the aerial panel points for the project. The Arizona Central Zone transverse mercator projection and Geoid 99 were used for the RTK survey. A ground adjustment factor of 1.000152742 was multiplied by the grid coordinates to get ground coordinates. During the survey, four aerial targets from the Huitt-Zollars survey were recovered and tied to this survey. The table below shows record and measured ground coordinates for the recovered Huitt-Zollars points.

| POINT I.D. | XNAD83 | YNAD83 | NAVD88 |
|---|---|---|---|
| | | | |
| PNL 1 (REC) | 808175.215 | 811337.319 | 1484.45 |
| PNL 1 (MEAS) | 808175.171 | 811337.330 | 1484.69 |
| | | | |
| PNL 2 (REC) | 808160.715 | 812263.405 | 1481.66 |
| PNL 2 (MEAS) | 808160.600 | 812263.366 | 1481.86 |
| | | | |
| PNL 9 (REC) | 818734.331 | 812648.280 | 1534.00 |
| PNL 9 (MEAS) | 818734.279 | 812648.219 | 1534.82 |
| | | | |
| PNL 10 (REC) | 818730.108 | 813917.726 | 1532.31 |
| PNL 10 (MEAS) | 818730.000 | 813917.704 | 1533.11 |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 1-28-01
ARIZONA, U.S.A.

Alan D. Reece

CTRI
AREA B-3 (GRID RDINATES)

| CTLTYP_LID | CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | XNAD83 | YNAD83 | NGVD29 | NAVD88 | CTLMNT_LID | PNTNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7 | 13 | 0.000 | 0.000 | 802025.303 | 818228.416 | 0.000 | 1456.050 | 17 | 1 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 802045.580 | 814296.478 | 0.000 | 1459.180 | 31 | 2 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 802102.489 | 810378.675 | 0.000 | 1460.700 | 3 | 3 | SET 1/2" REBAR |
| 6 | 7 | 13 | 0.000 | 0.000 | 804062.320 | 816463.814 | 0.000 | 1462.730 | 31 | 4 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 804458.747 | 812231.065 | 0.000 | 1466.170 | 17 | 5 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 806929.702 | 812226.759 | 0.000 | 1476.230 | 17 | 6 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 807283.957 | 816320.435 | 0.000 | 1481.180 | 31 | 7 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 809389.445 | 818318.443 | 0.000 | 1489.170 | 17 | 8 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 809455.516 | 814406.870 | 0.000 | 1488.050 | 31 | 9 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 809379.216 | 810444.365 | 0.000 | 1490.600 | 31 | 10 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 811732.607 | 816338.790 | 0.000 | 1494.170 | 31 | 11 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 811717.322 | 812468.158 | 0.000 | 1500.690 | 31 | 12 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 814301.142 | 812583.019 | 0.000 | 1506.200 | 31 | 13 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 814168.111 | 816355.651 | 0.000 | 1505.020 | 31 | 14 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 816599.830 | 818375.775 | 0.000 | 1518.590 | 17 | 15 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 816621.133 | 814498.531 | 0.000 | 1521.650 | 31 | 16 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 816651.808 | 810414.403 | 0.000 | 1523.220 | 31 | 17 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 819021.834 | 816369.216 | 0.000 | 1532.490 | 31 | 18 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 819029.839 | 812479.134 | 0.000 | 1532.590 | 31 | 19 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 821477.960 | 812409.177 | 0.000 | 1541.300 | 31 | 20 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 821214.708 | 816352.215 | 0.000 | 1542.970 | 31 | 21 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 823829.895 | 818485.388 | 0.000 | 1558.780 | 3 | 22 | SET 1/2" REBAR |
| 6 | 7 | 13 | 0.000 | 0.000 | 823864.813 | 814334.844 | 0.000 | 1557.520 | 31 | 23 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 823908.478 | 810410.135 | 0.000 | 1557.420 | 31 | 24 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 825800.437 | 816941.125 | 0.000 | 1573.510 | 31 | 25 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 826547.612 | 813206.764 | 0.000 | 1586.150 | 31 | 26 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 829095.818 | 814417.293 | 0.000 | 1583.800 | 31 | 27 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 828607.085 | 817734.561 | 0.000 | 1583.850 | 31 | 28 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 830527.242 | 819030.424 | 0.000 | 1595.590 | 31 | 29 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 831726.954 | 815758.875 | 0.000 | 1603.740 | 31 | 30 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 834123.859 | 814698.779 | 0.000 | 1615.830 | 31 | 31 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 833663.644 | 818431.392 | 0.000 | 1617.060 | 31 | 32 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 831298.113 | 821181.402 | 0.000 | 1604.930 | 31 | 33 | SET 60D NAIL |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 2-28-01
ARIZONA, U.S.A.

CTRL_GRO[illegible]XLS
AREA B-3 (GROUND [illegible]ORDINATES)

| CTLTYP_LID | CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | X-GROUND | Y-GROUND | NGVD29 | NAVD88 | CTLMNT_LID | PNTNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 7 | 13 | 0.000 | 0.000 | 802147.806 | 818353.394 | 0.000 | 1456.050 | 17 | 1 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 802168.086 | 814420.856 | 0.000 | 1459.180 | 31 | 2 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 802225.004 | 810502.454 | 0.000 | 1460.700 | 3 | 3 | SET 1/2" REBAR |
| 6 | 7 | 13 | 0.000 | 0.000 | 804185.134 | 816588.522 | 0.000 | 1462.730 | 31 | 4 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 804581.622 | 812355.126 | 0.000 | 1466.170 | 17 | 5 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 807052.954 | 812350.820 | 0.000 | 1476.230 | 17 | 6 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 807407.264 | 816445.121 | 0.000 | 1481.180 | 31 | 7 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 809513.072 | 818443.435 | 0.000 | 1489.170 | 17 | 8 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 809579.153 | 814531.264 | 0.000 | 1488.050 | 31 | 9 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 809502.842 | 810568.154 | 0.000 | 1490.600 | 31 | 10 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 811856.593 | 816463.479 | 0.000 | 1494.170 | 31 | 11 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 811841.305 | 812592.256 | 0.000 | 1500.690 | 31 | 12 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 814425.520 | 812707.135 | 0.000 | 1506.200 | 31 | 13 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 814292.468 | 816480.342 | 0.000 | 1505.020 | 31 | 14 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 816724.559 | 818500.776 | 0.000 | 1518.590 | 17 | 15 | SET PK & SHINER |
| 6 | 7 | 13 | 0.000 | 0.000 | 816745.866 | 814622.939 | 0.000 | 1521.650 | 31 | 16 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 816776.545 | 810583.187 | 0.000 | 1523.220 | 31 | 17 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 819146.933 | 816493.909 | 0.000 | 1532.490 | 31 | 18 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 819154.939 | 812603.233 | 0.000 | 1532.590 | 31 | 19 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 821603.434 | 812533.266 | 0.000 | 1541.300 | 31 | 20 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 821340.142 | 816476.906 | 0.000 | 1542.970 | 31 | 21 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 823955.728 | 818610.405 | 0.000 | 1558.780 | 3 | 22 | SET 1/2" REBAR |
| 6 | 7 | 13 | 0.000 | 0.000 | 823990.651 | 814459.227 | 0.000 | 1557.520 | 31 | 23 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 824034.323 | 810533.919 | 0.000 | 1557.420 | 31 | 24 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 825926.572 | 817065.906 | 0.000 | 1573.510 | 31 | 25 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 826673.860 | 813330.975 | 0.000 | 1586.150 | 31 | 26 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 829222.456 | 814541.688 | 0.000 | 1583.800 | 31 | 27 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 828733.648 | 817859.463 | 0.000 | 1583.850 | 31 | 28 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 830654.098 | 819155.525 | 0.000 | 1595.590 | 31 | 29 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 831853.994 | 815883.475 | 0.000 | 1603.740 | 31 | 30 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 834251.265 | 814823.218 | 0.000 | 1615.830 | 31 | 31 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 833790.980 | 818556.401 | 0.000 | 1617.060 | 31 | 32 | SET 60D NAIL |
| 6 | 7 | 13 | 0.000 | 0.000 | 831425.088 | 821306.831 | 0.000 | 1604.930 | 31 | 33 | SET 60D NAIL |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 2-28-01
ARIZONA, U.S.A.

CORNE[illegible]S
AREA B-3 (GRID [illegible]DINATES)

| CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | XNAD83 | YNAD83 | NGVD29 | NAVD88 | CTLMNT_LID | CNRNAME | TWNSHP | RNG | SCTN | AGENCY | PNTNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 13 | 0.000 | 0.000 | 818602.703 | 815751.022 | 0.000 | 1532.812 | 11 | QCOR W | T02S | R08E | 22 | N/A | 2001 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| 7 | 13 | 0.000 | 0.000 | 818624.441 | 810467.403 | 0.000 | 1533.676 | 11 | QCOR W | T02S | R08E | 27 | N/A | 2002 | FND BC/HH @ SCHNEPF RD WITH PUNCHMARK |
| 7 | 13 | 0.000 | 0.000 | 821227.997 | 818408.864 | 0.000 | 1544.562 | 1 | QCOR N | T02S | R08E | 22 | N/A | 2003 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPF ON OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 823874.525 | 815783.625 | 0.000 | 1560.177 | 1 | QCOR W | T02S | R08E | 23 | N/A | 2004 | FND 2" OD PIPE 1/2MI S OF OCOTILLO ON BARKLEY RD |
| 7 | 13 | 0.000 | 0.000 | 815952.697 | 818369.783 | 0.000 | 1514.364 | 11 | QCOR N | T02S | R08E | 21 | N/A | 2005 | FND BC/HH @ OCOTILLO & COYOTE |
| 7 | 13 | 0.000 | 0.000 | 813325.655 | 815708.200 | 0.000 | 1507.206 | 1 | QCOR W | T02S | R08E | 21 | N/A | 2006 | FND 3" OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 813335.965 | 813067.721 | 0.000 | 1511.049 | 1 | SCOR SW | T02S | R08E | 21 | N/A | 2007 | FND 1"OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 808032.025 | 818308.396 | 0.000 | 1482.908 | 11 | SCOR NW | T02S | R08E | 20 | N/A | 2008 | FND BC/HH @ OCOTILLO & VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 810675.642 | 818328.652 | 0.000 | 1494.063 | 11 | QCOR N | T02S | R08E | 20 | N/A | 2009 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 808051.430 | 813025.655 | 0.000 | 1481.306 | 7 | SCOR SW | T02S | R08E | 20 | GLO | 2011 | FND GLO BC @ VINEYARD RD & CHANDLER HIEGHTS |
| 7 | 13 | 0.000 | 0.000 | 805390.036 | 818300.895 | 0.000 | 1470.563 | 11 | QCOR N | T02S | R08E | 19 | N/A | 2012 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| 7 | 13 | 0.000 | 0.000 | 802073.617 | 813007.232 | 0.000 | 1456.108 | 1 | SCOR SW | T02S | R08E | 19 | N/A | 2013 | FND 2" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802074.620 | 812900.794 | 0.000 | 1458.033 | 1 | SCOR NE | T02S | R07E | 25 | N/A | 2014 | FND 1.5" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802048.720 | 815649.247 | 0.000 | 1452.928 | 3 | QCOR W | T02S | R08E | 19 | N/A | 2015 | FND 1/2 REBAR |
| 7 | 13 | 0.000 | 0.000 | 823893.274 | 810501.845 | 0.000 | 1558.081 | 3 | QCOR W | T02S | R08E | 26 | N/A | 2016 | FND REBAR WITH PLASTIC CAP "ALLEN LS16097" |
| 7 | 13 | 0.000 | 0.000 | 829148.802 | 818473.074 | 0.000 | 1585.733 | 7 | SCOR NE | T02S | R08E | 23 | GLO | 2017 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 813315.203 | 818348.598 | 0.000 | 1503.312 | 11 | SCOR NE | T02S | R08E | 20 | N/A | 2018 | FND BC/HH @ KENWORTHY & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 818590.550 | 818393.030 | 0.000 | 1529.497 | 7 | SCOR NE | T02S | R08E | 21 | GLO | 2019 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 808071.982 | 807741.048 | 0.000 | 1484.099 | 7 | SCOR SE | T02S | R08E | 30 | PINAL | 2020 | FND PINAL COUNTY BC FLUSH W/PVMT |
| 7 | 13 | 0.000 | 0.000 | 802024.479 | 818291.332 | 0.000 | 1457.171 | 11 | SCOR NW | T02S | R08E | 19 | MCDOT | 2021 | FND MCDOT BC/HH |
| 7 | 13 | 0.000 | 0.000 | 823865.412 | 818424.762 | 0.000 | 1558.881 | 7 | SCOR NE | T02S | R08E | 22 | GLO | 2022 | FND GLO BC @ SIERRA VISTA DR & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 829170.724 | 813188.543 | 0.000 | 1585.708 | 7 | SCOR NE | T02S | R08E | 26 | GLO | 2023 | FND GLO BC |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 2-28-01
ARIZONA, U.S.A.

CORNERS_[illegible]D.XLS
AREA B-3 (GROU[illegible]RDINATES)

| CTLTYP_LID | CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | XNAD83 | YNAD83 | NGVD29 | NAVD88 | CTLMNT_LID | CNRNAME | TWNSHP | RNG | SCTN | AGENCY | PNTNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | 7 | 13 | 0.000 | 0.000 | 818727.738 | 815875.622 | 0.000 | 1532.812 | 11 | OCOR W | T02S | R08E | 22 | N/A | 2001 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 818749.479 | 810591.196 | 0.000 | 1533.676 | 11 | OCOR W | T02S | R08E | 27 | N/A | 2002 | FND BC/HH @ SCHNEPF RD WITH PUNCHMARK |
| 28 | 7 | 13 | 0.000 | 0.000 | 821353.433 | 818533.869 | 0.000 | 1544.562 | 1 | OCOR N | T02S | R08E | 22 | N/A | 2003 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPF ON OCOTILLO RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 824000.365 | 815908.230 | 0.000 | 1560.177 | 1 | OCOR W | T02S | R08E | 23 | N/A | 2004 | FND 2" OD PIPE 1/2MI S OF OCOTILLO ON BARKLEY RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 816077.327 | 818494.783 | 0.000 | 1514.364 | 11 | OCOR N | T02S | R08E | 21 | N/A | 2005 | FND BC/HH @ OCOTILLO & COYOTE |
| 28 | 7 | 13 | 0.000 | 0.000 | 813449.884 | 815832.793 | 0.000 | 1507.206 | 1 | OCOR W | T02S | R08E | 21 | N/A | 2006 | FND 3" OD PIPE |
| 28 | 7 | 13 | 0.000 | 0.000 | 813460.195 | 813191.910 | 0.000 | 1511.049 | 1 | SCOR SW | T02S | R08E | 21 | N/A | 2007 | FND 1"OD PIPE |
| 28 | 7 | 13 | 0.000 | 0.000 | 808155.446 | 818433.386 | 0.000 | 1482.908 | 11 | SCOR NW | T02S | R08E | 20 | N/A | 2008 | FND BC/HH @ OCOTILLO & VINEYARD RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 810799.466 | 818453.646 | 0.000 | 1494.063 | 11 | OCOR N | T02S | R08E | 20 | N/A | 2009 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 808174.853 | 813149.838 | 0.000 | 1481.306 | 7 | SCOR SW | T02S | R08E | 20 | GLO | 2011 | FND GLO BC @ VINEYARD RD & CHANDLER HIEGHTS |
| 28 | 7 | 13 | 0.000 | 0.000 | 805513.053 | 818425.884 | 0.000 | 1470.563 | 11 | OCOR N | T02S | R08E | 19 | N/A | 2012 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| 28 | 7 | 13 | 0.000 | 0.000 | 802196.128 | 813131.412 | 0.000 | 1456.108 | 1 | SCOR SW | T02S | R08E | 19 | N/A | 2013 | FND 2" OD PIPE WITH WASHER LS21765 |
| 28 | 7 | 13 | 0.000 | 0.000 | 802197.130 | 813024.958 | 0.000 | 1458.033 | 1 | SCOR NE | T02S | R07E | 25 | N/A | 2014 | FND 1.5" OD PIPE WITH WASHER LS21765 |
| 28 | 7 | 13 | 0.000 | 0.000 | 802171.226 | 815773.831 | 0.000 | 1452.928 | 3 | OCOR W | T02S | R08E | 19 | N/A | 2015 | FND 1/2 REBAR |
| 28 | 7 | 13 | 0.000 | 0.000 | 824019.117 | 810625.642 | 0.000 | 1558.081 | 3 | OCOR W | T02S | R08E | 26 | N/A | 2016 | FND REBAR WITH PLASTIC CAP "ALLEN LS16097" |
| 28 | 7 | 13 | 0.000 | 0.000 | 829275.448 | 818598.089 | 0.000 | 1585.733 | 7 | SCOR NE | T02S | R08E | 23 | GLO | 2017 | FND GLO BC |
| 28 | 7 | 13 | 0.000 | 0.000 | 813439.430 | 818473.594 | 0.000 | 1503.312 | 11 | SCOR NE | T02S | R08E | 20 | N/A | 2018 | FND BC/HH @ KENWORTHY & OCOTILLO RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 818715.583 | 818518.033 | 0.000 | 1529.497 | 7 | SCOR NE | T02S | R08E | 21 | GLO | 2019 | FND GLO BC |
| 28 | 7 | 13 | 0.000 | 0.000 | 808195.409 | 807864.424 | 0.000 | 1484.099 | 7 | SCOR SE | T02S | R08E | 30 | PINAL | 2020 | FND PINAL COUNTY BC FLUSH W/PVMT |
| 28 | 7 | 13 | 0.000 | 0.000 | 802146.981 | 818416.320 | 0.000 | 1457.171 | 11 | SCOR NW | T02S | R08E | 19 | MCDOT | 2021 | FND MCDOT BC/HH |
| 28 | 7 | 13 | 0.000 | 0.000 | 823991.251 | 818549.790 | 0.000 | 1558.881 | 7 | SCOR NE | T02S | R08E | 22 | GLO | 2022 | FND GLO BC @ SIERRA VISTA DR & OCOTILLO RD |
| 28 | 7 | 13 | 0.000 | 0.000 | 829297.373 | 813312.751 | 0.000 | 1585.708 | 7 | SCOR NE | T02S | R08E | 26 | GLO | 2023 | FND GLO BC |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 2-26-21
ARIZONA, U.S.A.

FPCTLF[illegible]LS
AREA B-3 (GRID [illegible]RDINATES)

| CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | XNAD83 | YNAD83 | NGVD29 | NAVD88 | CTLMNT_LID | RMNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 13 | 0.000 | 0.000 | 818602.703 | 815751.022 | 0.000 | 1532.812 | 11 | ERM2001 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| 7 | 13 | 0.000 | 0.000 | 818624.441 | 810467.403 | 0.000 | 1533.676 | 11 | ERM2002 | FND BC/HH @ SCHNEPE RD WITH PUNCHMARK |
| 7 | 13 | 0.000 | 0.000 | 821227.997 | 818408.864 | 0.000 | 1544.562 | 1 | ERM2003 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPE ON OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 823874.525 | 815783.625 | 0.000 | 1560.177 | 1 | ERM2004 | FND 2" OD PIPE 1/2MI S OF OCOTILLO ON BARKLEY RD |
| 7 | 13 | 0.000 | 0.000 | 815952.697 | 818369.783 | 0.000 | 1514.364 | 11 | ERM2005 | FND BC/HH @ OCOTILLO & COYOTE |
| 7 | 13 | 0.000 | 0.000 | 813325.655 | 815708.200 | 0.000 | 1507.206 | 1 | ERM2006 | FND 3" OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 813335.965 | 813067.721 | 0.000 | 1511.049 | 1 | ERM2007 | FND 1"OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 808032.025 | 818308.396 | 0.000 | 1482.908 | 11 | ERM2008 | FND BC/HH @ OCOTILLO & VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 810675.642 | 818328.652 | 0.000 | 1494.063 | 11 | ERM2009 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 808051.430 | 813025.655 | 0.000 | 1481.306 | 7 | ERM2011 | FND GLO BC @ VINEYARD RD & CHANDLER HIEGHTS |
| 7 | 13 | 0.000 | 0.000 | 805390.036 | 818300.895 | 0.000 | 1470.563 | 11 | ERM2012 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| 7 | 13 | 0.000 | 0.000 | 802073.617 | 813007.232 | 0.000 | 1456.108 | 1 | ERM2013 | FND 2" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802074.620 | 812900.794 | 0.000 | 1458.033 | 1 | ERM2014 | FND 1.5" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802048.720 | 815649.247 | 0.000 | 1452.928 | 3 | ERM2015 | FND 1/2 REBAR |
| 7 | 13 | 0.000 | 0.000 | 823893.274 | 810501.845 | 0.000 | 1558.081 | 3 | ERM2016 | FND REBAR WITH PLASTIC CAP "ALLEN LS16097" |
| 7 | 13 | 0.000 | 0.000 | 829148.802 | 818473.074 | 0.000 | 1585.733 | 7 | ERM2017 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 813315.203 | 818348.598 | 0.000 | 1503.312 | 11 | ERM2018 | FND BC/HH @ KENWORTHY & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 818590.550 | 818393.030 | 0.000 | 1529.497 | 7 | ERM2019 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 808071.982 | 807741.048 | 0.000 | 1484.099 | 7 | ERM2020 | FND PINAL COUNTY BC FLUSH W/PVMT |
| 7 | 13 | 0.000 | 0.000 | 802024.479 | 818291.332 | 0.000 | 1457.171 | 11 | ERM2021 | FND MCDOT BC/HH |
| 7 | 13 | 0.000 | 0.000 | 823865.412 | 818424.782 | 0.000 | 1558.881 | 7 | ERM2022 | FND GLO BC @ SIERRA VISTA DR & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 829170.724 | 813188.543 | 0.000 | 1585.708 | 7 | ERM2023 | FND GLO BC |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 2-28-01
ARIZONA, U.S.A.

Alan D. Reece

FPCTLFCD_G[illegible]ND.XLS
AREA B-3 (GROUND COORDINATES)

| CTLHOR_LID | CTLVER_LID | XNAD27 | YNAD27 | XNAD83 | YNAD83 | NGVD29 | NAVD88 | CTLMNT_LID | RMNUM | DESC |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 13 | 0.000 | 0.000 | 818727.738 | 815875.622 | 0.000 | 1532.812 | 11 | ERM2001 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| 7 | 13 | 0.000 | 0.000 | 818749.479 | 810591.196 | 0.000 | 1533.676 | 11 | ERM2002 | FND BC/HH @ SCHNEPE RD WITH PUNCHMARK |
| 7 | 13 | 0.000 | 0.000 | 821353.433 | 818533.869 | 0.000 | 1544.562 | 1 | ERM2003 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPE ON OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 824000.365 | 815908.230 | 0.000 | 1560.177 | 1 | ERM2004 | FND 2" OD PIPE 1/2MI S OF OCOTILLO ON BARKLEY RD |
| 7 | 13 | 0.000 | 0.000 | 816077.327 | 818494.783 | 0.000 | 1514.364 | 11 | ERM2005 | FND BC/HH @ OCOTILLO & COYOTE |
| 7 | 13 | 0.000 | 0.000 | 813449.884 | 815832.793 | 0.000 | 1507.206 | 1 | ERM2006 | FND 3" OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 813460.195 | 813191.910 | 0.000 | 1511.049 | 1 | ERM2007 | FND 1"OD PIPE |
| 7 | 13 | 0.000 | 0.000 | 808155.446 | 818433.386 | 0.000 | 1482.908 | 11 | ERM2008 | FND BC/HH @ OCOTILLO & VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 810799.466 | 818453.646 | 0.000 | 1494.063 | 11 | ERM2009 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD RD |
| 7 | 13 | 0.000 | 0.000 | 808174.853 | 813149.838 | 0.000 | 1481.306 | 7 | ERM2011 | FND GLO BC @ VINEYARD RD & CHANDLER HIEGHTS |
| 7 | 13 | 0.000 | 0.000 | 805513.053 | 818425.884 | 0.000 | 1470.563 | 11 | ERM2012 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| 7 | 13 | 0.000 | 0.000 | 802196.128 | 813131.412 | 0.000 | 1456.108 | 1 | ERM2013 | FND 2" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802197.130 | 813024.958 | 0.000 | 1458.033 | 1 | ERM2014 | FND 1.5" OD PIPE WITH WASHER LS21765 |
| 7 | 13 | 0.000 | 0.000 | 802171.226 | 815773.831 | 0.000 | 1452.928 | 3 | ERM2015 | FND 1/2 REBAR |
| 7 | 13 | 0.000 | 0.000 | 824019.117 | 810625.642 | 0.000 | 1558.081 | 3 | ERM2016 | FND REBAR WITH PLASTIC CAP "ALLEN LS16097" |
| 7 | 13 | 0.000 | 0.000 | 829275.448 | 818598.089 | 0.000 | 1585.733 | 7 | ERM2017 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 813439.430 | 818473.594 | 0.000 | 1503.312 | 11 | ERM2018 | FND BC/HH @ KENWORTHY & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 818715.583 | 818518.033 | 0.000 | 1529.497 | 7 | ERM2019 | FND GLO BC |
| 7 | 13 | 0.000 | 0.000 | 808195.409 | 807864.424 | 0.000 | 1484.099 | 7 | ERM2020 | FND PINAL COUNTY BC FLUSH W/PVMT |
| 7 | 13 | 0.000 | 0.000 | 802146.981 | 818416.320 | 0.000 | 1457.171 | 11 | ERM2021 | FND MCDOT BC/HH |
| 7 | 13 | 0.000 | 0.000 | 823991.251 | 818549.790 | 0.000 | 1558.881 | 7 | ERM2022 | FND GLO BC @ SIERRA VISTA DR & OCOTILLO RD |
| 7 | 13 | 0.000 | 0.000 | 829297.373 | 813312.751 | 0.000 | 1585.708 | 7 | ERM2023 | FND GLO BC |

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
25396
ALAN D.
REECE
Date Signed 7-28-01
ARIZONA, U.S.A.

6-20-00

9918

APACHE JUNCTION
FLOOD CONTROL STUDY

PHASE 3B

PANEL LAYOUT

R. DESAUTELS
D. BOETEGER

PARTLY CLDY
90°F

EB# 168A

9918

FB#168A

RAD
DLB

46

20
6-19-00
SUNNY 93°

GPS CONTROL FILE @ BASE : 9918C
STAKEOUT FILE : 9918
STORE FILE : 9918-061900

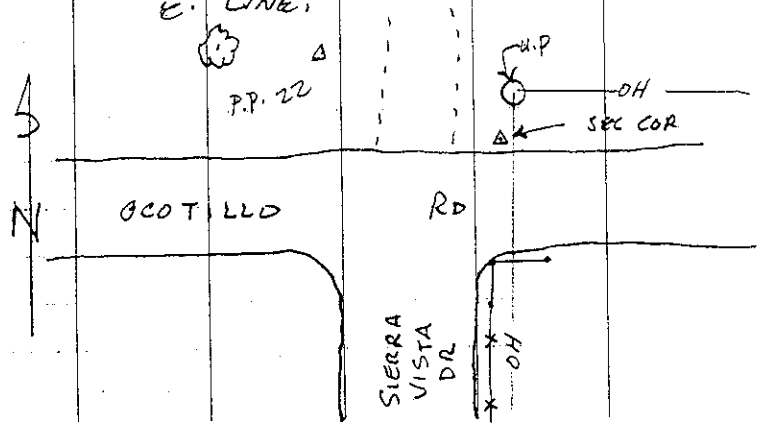
BASE@ 100

HI 1.248 m
4. = 4.074
USER ENTERED N 810617.473
E 818685.073
HT 1533.752
LAT 33-13-39.9355N
LONG 111-31-42.7242W
EHT 1437.112

FND - 1/2" REBAR @ 1/2 MILE N. OF COMBS Rd
& APPROX 60' E. OF Schnepf (TOMAHAWK) Rd
ALSO SEE pg 43 OF FB 168A (THIS).

| RTK | STAKEOUT | PANELS |
|---|---|---|
| 3 | Panel | |
| 1 | Panel | |
| 8 | Panel | |
| 15 | Panel | |
| 22 | Panel | |

NE22 FND - BC FLUSH W/GROUND
2½" DIAM DISK
@ "T" IN gravel Rd, 6' S.W. of
A UTILITY POLE WITH N & S THEN
E. LINE.




SET - 1/2" REBAR

SET - P.K & SHINER @ "T" IN PAVED Rd
OCOTILLO Rd & MW

SET P.K & SHINER ON OCOTILLO

SET - P.K & SHINER ON OCOTILLO

SET - 1/2" REBAR Approx 75' N.W. of
Below Sec Cor. & Approx 25' E. of
A LONE 4" diam Mesquite Tree.

U.S. General Land Office
T25 R8E
S15 S14
S22 S23
1914
Grimms

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 23 | | PANEL | | | | SET - 60 d NULL | |
| 24 | | PANEL | | | | SET - 60 d NULL | |
| 17 | | PANEL | | | | SET 600 NULL | |

CONT. PANEL LAYOUT
GPS STKOUT FILE:
STORE FILE: 99180626

RAD
DIB

6/26/00

BASE @ 100
HI 1.348m (4.422 FT)

SEE pg 46

CKE 101 (0.03 N / 0.01 E)

| | | | |
|---|---|---|---|
| 20 | PANEL | SET | 60d NAIL |
| 13 | PANEL | SET | 60d NAIL |
| 18 | PANEL | SET | 60d NAIL |
| 19 | PANEL | SET | 60d NAIL |

CONT. PANEL LAYOUT

R.A.D.
D.B.

6-28-00

(50)

BASE @ 100

HI 1.367m 4.484 FT

CKP 101 (0.00 E / 0.00 S)

| | | |
|---|---|---|
| 6 | PANEL | SET - P.K. & SHINER |
| 5 | PANEL | SET - P.K. & SHINER |
| 2 | PANEL | SET 60 d NAIL |
| 9 | PANEL | SET - 60 d NAIL |
| 7 | PANEL | SET - 60d NAIL |
| 4 | PANEL | SET - 60d NAIL |

(51)

R.A.D.
D 1 B

6/29/00

CONT. LAYOUT
GPS STORE FILE 991806-29

BASE C 100
HI 1.271m 4.169FT

CKC101

| | | | |
|---|---|---|---|
| 16 | PANEL | | SET - 60 D NAIL |
| 14 | PANEL | | SET - 60 D NAIL |
| 12 | PANEL | | SET - 60 D NAIL |
| 10 | PANEL | | SET 60d NAIL |
| 11 | PANEL | | SET - 60d NAIL |

CONT. PANEL LAYOUT
GPS STORE FILE: 991806-30

R.A.D.
DIR

6/30/

BASE @ 100
HI 1.314 ?

| | | |
|---|---|---|
| 31 | PANEL | SET - 60d NAIL |
| 32 | PANEL | SET - 60d NAIL |
| 33 | PANEL | SET - 60d NAIL |
| 29 | PANEL | SET - 60d NAIL |
| 28 | PANEL | SET - 60d NAIL |

CONT. PANEL LAYOUT
GPS FILE: 991807-05
BASE : 99180
BASE@ 100
HI 4.176

OKE 101

536 1/4 CORNER

EAST 1/4 COR

FND - 2 1/2" DIAM BC ON 1" DIAM IRON PIPE, RISING 1.55' ABOVE GROUND. 30' E. OF A NORTH/SOUTH 4 WIRE FENCE LINE.

U.S. GENERAL LAND OFFICE SURVEY
1/4
536
531

30 Panel Set - 60 d NAIL

27 Panel Set 60 d NAIL

| | | | |
|---|---|---|---|
| NE26 | | SECTION CORNER | FND - 2 1/2" DIAM BC ON 2" DIAM. IRON PIPE, RISING 1/2' ABOVE GROUND. |
| 25 | | PANEL | SET - 60 d NAIL |
| 24 | | PANEL | SET - 60 d NAIL |

U.S. GENERAL LAND OFFICE 1914 ADAMS

| | |
|---|---|
| T2S | R8E |
| S23 | S24 |
| S26 | S25 |

CONT. PANEL LAYOUT
GPS STAGE FILE : 991807-06
BASE : 9918C07-06

| | | | | | |
|---|---|---|---|---|---|
| BASE C | 100 | 1.295<br>HI 4.248 | | | |
| CKE 101 | | | | | |
| 21 | | PANEL | | | SET 60d NAIL IN Cleared Field 200' W OF CALC POSITION. |
| CENTER 22 | | | SECTION COR | | FND 2" (O.D) PIPE ON FIELD SERVICE Rd, 0.7' BELOW GROUND. FLAGGED W/ 4' LATH. ASSUMING CENTER OF SECTION 22 |
| 15 | | PAINT | PANEL | | Picked up previously |
| 8 | | " | | | " |
| 7 | | " | | | " |
| 1 | | " | | | " |

7/4/00

| | | |
|---|---|---|
| 10 | LAY PAPER FOR PANEL | |
| 3 | " " | |
| SE 30 | SEC CORNER | FND - BC (COPPER) FLUSH @ COMBS & VINEYARDS<br>PINAL Co. HWY DEPT. |
| 12 | LAY PAPER FOR PANEL | |
| 14 | | |
| NE 20 | SECTION CORNER | FND - BC/H.H @ KENWORTHY Rd<br>& @ COTILLO |

PINAL COUNTY
T2S R8E
S30 S29
S31 S32
2000
HWY DEPT

168A

| | | | | | | |
|---|---|---|---|---|---|---|
| NE21 | | SECTION CORNER | | | | FND - U.S.G.S. BC @ SCHNEPH & OCITILLO, 0-6' BELOW GRAVEL SURFACE. |

U.S. GENERAL LAND OFFICE 1914

| | |
|---|---|
| S14 | S15 |
| S21 | S22 |

Huitt-Zollar Comparisons

7-25-00
GPM
9 KLH

Base @ G68 HI: 1.199m = 3.93'
Time: 8:47 GDOP 4.1 7/7

Base File: 9918b3so

Rover ck to 101
sk # stor #
100
101

Rover File 5/pstake 9918b3so
store 99180725

| | | | | |
|---|---|---|---|---|
| Hz 2 | 1102 | PP | Huitt-Zollar Panel Pt | |
| Hz 3 | 1103 | PP | Huitt-Zollar Panel Pt | shot at coords |
| | | | No Pt FND | |
| PP5 | 1105 | PP | AZTEC Panel Pt. | |
| PP6 | 1106 | PP | AZTEC Panel Pt. | |

Base @ 100 HI: 1.286m = 4.22'
Time: 12:08P GDOP 2.6 8/8

| | | | | |
|---|---|---|---|---|
| 101 | 1101 | CK | Aztec CPT | |
| Hz 10 | 1110 | PP | Huitt-Zoller Panel Pt. | missing 124.15 in x 125.10 right |
| Hz 9 | 1109 | PP | " " | cut .77 |
| Hz 5 | 1104 | MPT | No pt FND | Shot @ coords. |
| Hz 1 | 1111 | PP | Huitt-Zollar Panel Pt | missing 123.9 in x 123.45 right |
| Hz 2 | 1112 | PP | " " | Cut .25 |

169

02/05/2001

9918

FLOOD CONTROL

PHASE B3
SECTION CORNER
RECOVERY
&
CROSS SECTIONS

R. DESAUTELS
J. BRADLEY

SUNNY 73°

FB# 168

BASE FILE . 991883
ROVER FILE . 9918-020501

BASE C 100
HT 4.350'
USER ENTERED N 810617.473
E 818685.072
OHT 1533.752
LAT 33-13-39.93443 N
LONG 111-32-42.74211 W
EHT 1437.12

CKC 161
OUT 0.02
LT 0.03
FILL 0.02

2001 1/4 COR E. 1/4 21

FND- BC/H.H C SOUTHWEST RD & SCHNEDF RD. NO MARKINGS OTHER THEN PUNCH MARK.

21 22

| | | | | | |
|---|---|---|---|---|---|
| 2002 | | 1/4 COR | | E 1/4 28 | FND - BC/HH @ MID SECTION LINE ℄ SCHNEDF Rd, NO MARKING EXCEPT PUNCH. 28 \| 27 |
| 2003 | | 1/4 COR | | N 1/4 22 | FND - 3/4" O.D. PIPE, 0.4' BELOW SURFACE OF GRAVEL Rd. 1/2 MILE E. OF SCHNEFP Rd ON OCOTILLO, 15 / 22 |
| 2004 | | 1/4 COR | | E 1/4 22 | FND - 2" O.D. PIPE, RISING 1/2' ABOVE NATURAL GROUND @ E. EDGE OF GRAVEL Rd, UNDER 5 WIRE FENCE 1/2 MILE S. OF OCOTILLO RD ON BARKLEY Rd. 22 \| 23 |

| | | | | | |
|---|---|---|---|---|---|
| 2005 | | 1/4 COR | | N 1/4 21 | FND - BC (H.H. @ OCITILLO & COYOTE, NO MARKINGS EXCEPT PUNCH<br>16<br>21 |
| 2006 | | 1/4 COR | | | FND - 3" O.D. PIPE ON W. SIDE OF SMALL DIRT MOUND, E. SIDE OF DIRT ROAD. 1/2 MILE SOUTH OF OCITILLO, ON<br>20 \| 21 |
| 2007 | | COR. | | S.W COR SEC 21 | FND - 1" O.D PIPE W/ 1/2" DIAM ROD STUCK IN CENTER. PIPE RISES 1/2" & ROD RISES 12" ABOVE THAT. POINT IS ADJACENT TO THE W. OF A FENCE CORNER OF A 4 WIRE FENCE LINE GOING E & S. POINT IS 4' HIGHER THEN EXISTING GRAVEL ROAD, ON THE W. SIDE. POINT IS 1 MILE SOUTH OF OCITILLO<br>20 \| 21<br>29 \| 28 |

| | | | | |
|---|---|---|---|---|
| 2008 | COR. | N.E COR Sec 19 | FND - BC/H.H. @ OCOTILLO & VINEYARD. No MARKINGS EXCEPT PUNCH. | 18 \| 17 / 19 \| 20 |
| 2009 | 1/4 COR | N 1/4 20 | FND - BC/H.H @ 1/2 MILE E. OF VINEYARD ON OCOTILLO. No MARKINGS EXCEPT PUNCH MARK. | 17 / 20 |
| 2010 | STREET MON. | | FND - BC FLUSH @ VINEYARD & MARILYN. | |
| 2011 | COR. | S.E COR Sec 19 | FND - 2" DIAM G.L.O. BC., 0.15' BELOW PAVEMENT SURFACE. @ VINEYARD & CHANDLER HEIGHTS RD. MONUMENT IN POOR CONDITION. | |

GENERAL LAND OFFICE SURVEY

| | |
|---|---|
| 19 | 20 |
| 30 | 29 |

RAD
JJR RT

02/00/0

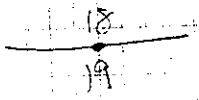
CONT. PHASE B3 MON. TIES

BASE FILE 9918 B3
ROVER FILE 9918-020001

BASE @ 100
HI 4.190

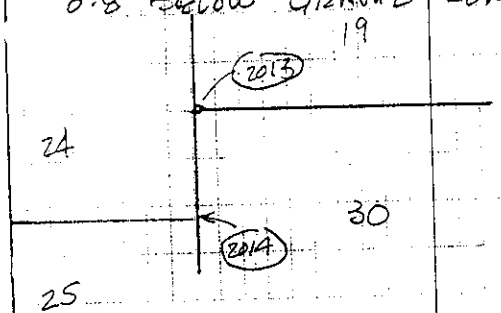
CKC 101 ✓

2012 1/4 COR N. 1/4 SEC 19 FND - BC/H.H @ OCOTILLO & KENNEDY DR.




2013 S.W. COR SEC 19 (PINAL CO.) FND - 2" O.D. PIPE W/WASHER LS # 21745, PIPE IS 0.8' BELOW SURFACE OF GRAVEL RD.

2014 SW COR SEC 24 (MARICOPA CO.) FND - 1 1/2" O.D. PIPE, W/WASHER LS 21745 0.8' BELOW GRAVEL ROAD SURFACE



02-06-01

| | | | | | |
|---|---|---|---|---|---|
| 2015 | | 1/4 COR | ? | W. 1/4 Sec 19 ? | END - 1/2" REBAR, 1' BELOW SURFACE OF GRAVEL RD. REBAR HAS SMALL AMOUNT OF WIRE WRAPED AROUND TOP, NO WASHER. LOCATED 1/2 MILE N. OF POINT 2013. |

24 MARICOPA | 19 PINAL Co.

CROSS SECTIONS PHASE 33

RAD
JJB

02/07/00

(66

BASE FILE : 9918B3
ROVER FILE : 9918-020701

BASE @ 100
HI 4.390

CKC 101 ✓

2016 1/4 COR ? E. 1/4 SEC 27?

FND — REBAR W/ YELLOW CAP "ALLEN LS 16097" BURIED 0.7' BELOW SURFACE OF DIRT ROAD ON E. SIDE OF LARGE SPRING DITCH. 1 MILE E. OF SCHNEPE RD. & 1/2 MILE N. OF COMPAS RD.

27 | 26

CROSS SECTIONS

XS 1 3001 — 3076
2 3077 — 3128
3 3130 — 3179
4 3180 - 3209 & 3242-3279
5 3236 - 3319
6 3320 - 3401

BASE FILE : 9918 B3
ROVER FILE : 9918-020901

BASE @ 100
HI 4.360

| | | | |
|---|---|---|---|
| 1104 | | out | 0.20 |
| | | LT | 0.01 |
| | | FIL | 0.30 |
| 9001 | | | |
| 1110 | ✓ | out | 0.18 |
| | | LT | 0.02 |
| | | FILL | 0.02 |
| 1169 | ✓ | OUT | 0.14 |
| | | LT | 0.02 |
| | | FILL | 0.10 |

NAV COORS.
GRID.

9001 E 827921.190
N 820571.11
1603.420

1104 E 825741.38
N 818440.360
1579.49

1109 N 812524.105
E 818609.244
1534.82

1110 N 813793.396
E 818604.966
1533.11

JD 16 [illegible]
RT 9300

RAD
JJB

02/12/01

BASE FILE : 9918133
ROUTER : 9918-021201

BASE @ 100
HI 4.30

CK @ 101 ✓

CK 9001

OUT 0.19
RT 0.06
FILL 0.30

FND - ADOT HWY DIV. RC
FLUSH IN CONC ON TOP, W.
EDGE OF RITTENHOUSE LEVEE

HIGHWAY
ADOT
KLIENZ
DIV.
P&M CS
1975

CONT CROSS SECTIONS

3130 - 3237

02/12/

* USED LINE BETWEEN PANEL
# 33 - # 30

GRID COOR.

# 33 N 821181.4024
E 831298.1133
1604.93

# 30 N 815758.8744
E 831726.9544
1603.74

BASE FILE : 991883
ROVER FILE : 9918-021301

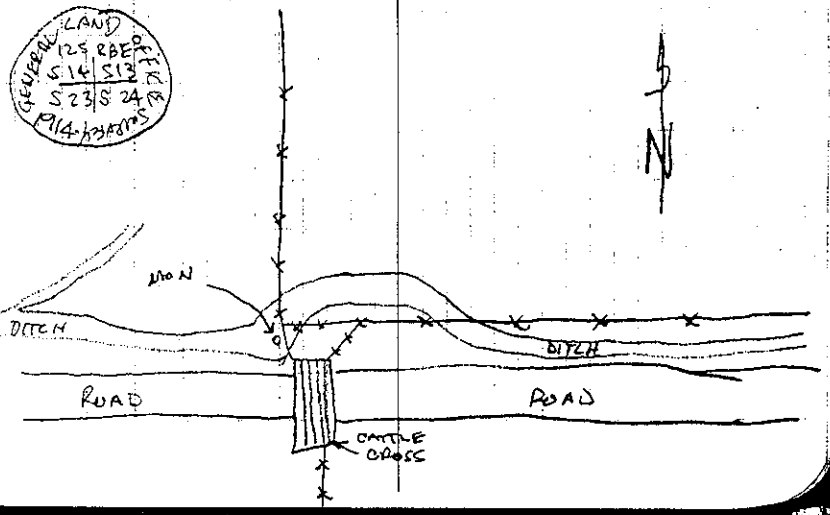
BASE : 100
HI 4.285

CKC 101 ✓

2017 SEC COR

XS 3238 — 3280
79

FND - G.L.O BC ON 2" DIAM PIPE RISING 0.4' ABOVE BOTTOM OF DITCH. POINT IS HARD TO SPOT BUT LIES APPROX. 13' N.W. OF N.W. COR OF CATTLE CROSSING. 2' W OF DELAPIDATED WIRE FENCE LINE.



02/14/01

BASE FILE : 99243
ROVER FILE : 9918-021401

BOMSE @ 100
HI 3.934

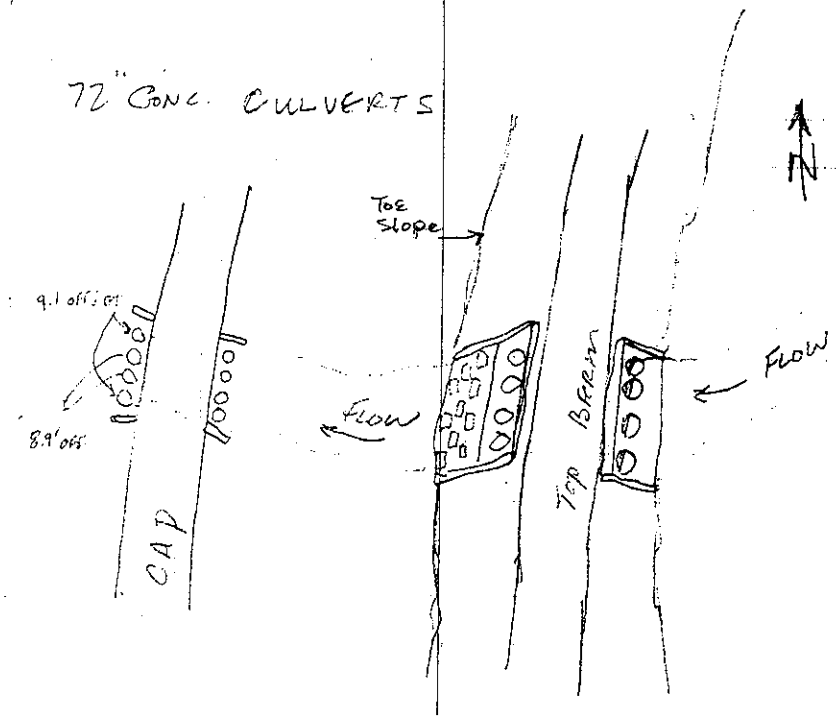
CK@ 101 ✓

CONT. X SECTION
~~3180 - 3218~~
4180 → 4227

SHOOT INV. OF PIPES ON BERM 72" CONC. CULVERTS
HR = 14.76 (6.562 + 8.2')
* AREA IS SOUTH OF N 1/4 SEC 26.

SHOOT INV. ON CAP OVERSHOOT PIPES
HR = 15.36 (6.562 + 8.8)
ALSO 72" PIPE

Delete? 3227, 3226 SHOT W/ REFLECTOR AGAINST HEAD WALL QUESTIONABLE.



RAD
JJB

72

02/15/01

BASE FILE : 9918
ROVER FILE 9918 - 021501

BASE @ 100
HI 4.10

CKC

CONT. FROM YESTERDAY @ C.A.V
OVERSHOT PIPES.

72" DIAM.

~~3228~~ - ~~3235~~
4228 4235

3232 HR = 15.66 ; 3235
3233 HR = 15.46 ; 3234

XS ~~3236~~ - ~~3299~~
4236 4299

(ON KENNWORTHY)

RAO
JJR

02/16/01

BASE : 991883
ROVER : 9918 - 021601

BASE : 100
NI 4.00

CKC 101

CONT CROSS SECTION ON KENWORTH

~~3300~~ - ~~3319~~
4300 4319

X.S. ~~3320~~ - 3401
4320 4401

# Fax Transmittal

AZTEC ENGINEERING

| | | | |
|---|---|---|---|
| To: | Cathy Regester | From: | Al Reece |
| Company: | Michael Baker Jr., Inc. | Date/Time: | February 27, 2001 |
| Fax: | 602-279-1411 | Phone: | 602-29-1234 |
| Subject: | Area B-3 | Project: | Rittenhouse FRS |
| Pages: | ~~2~~ 3 including this one | Project Number: | Aztec Job No. 9918 |

Remarks:

Attached are the field notes for the pipes that are included in cross-section file.

PLEASE DELETE POINT # 4227 FROM FILE.

If you do not receive all of the pages, please call (602) 454-0402 as soon as possible.

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Copy To:

File Name and Path: F:\9918\Com\022701f1adr.doc

3747 East Grove Street • Phoenix, Arizona 85040 • 602/454-0402 • FAX 602/454-0403

rev 2/00

02/14/01

BASE FILE : 9918-3
ROVER FILE : 9918-021401

BASE @ 100
HI 3.934

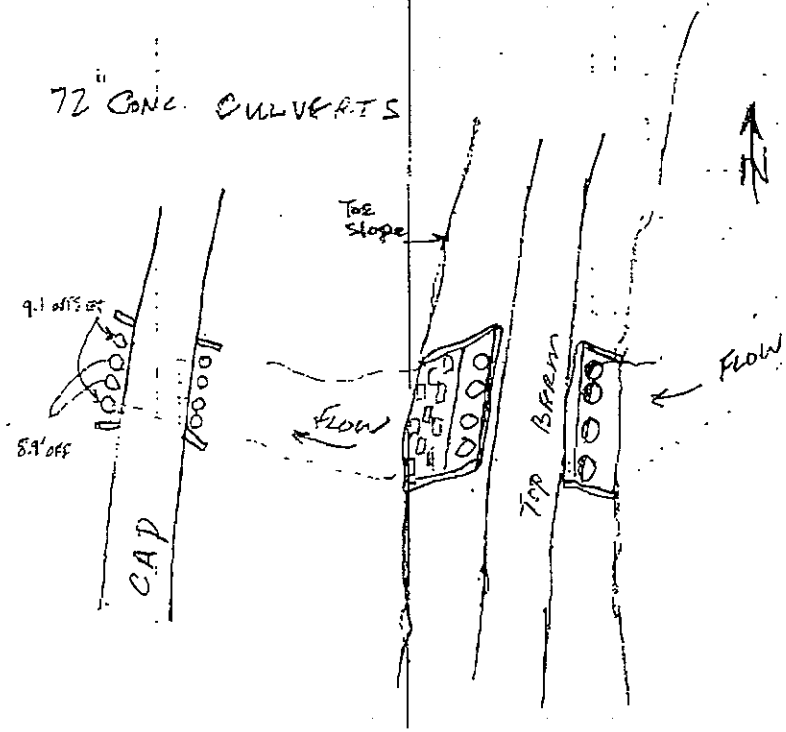
CK@ 101 ✓

CONT. X SECTION
~~3180 - 3216~~
4180 → 4227

SHOOT INV. OF PIPES ON BERM 72" CONC. CULVERTS
HR = 14.76 (6.562 + 8.2')
* AREA IS SOUTH OF N. 1/4 SEC 26.

SHOOT INV. ON CAP OVERSHOOT PIPES
HR = 15.36 (6.562 + 8.8)
ALSO 72" PIPE

Delete? 3227, 3226 SHOT W/ REC[illegible]
AGAINST HEAD WALL, [illegible] QUAL.



RAD
JJB

(72

02/15/01

BASE FILE 9918
ROVER FILE 9918 - 021501

BASE @ 100
HI 4.10

CXC

CONT: FROM YESTERDAY @ C.A.D
OVERSHOOT TRES.

~~3228~~ - ~~3235~~
4228 4235

3232 HR = 15.66 @ 3235
3233 HR = 15.46 @ 3234

XS ~~3236~~ - ~~3299~~
4236 4299

72' 21 AM.

(ON KENNWORTHY)

HUITT-ZOLLARS

Huitt-Zollars, Inc. / 4742 N. 24th Street / Suite 100 / Phoenix, Arizona 85016 / 602-952-9123 / Fax 602-952-9124

July 27, 1999

Mr. Tim Phillips
Project Manager
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009-6399

Reference: Queen Creek/Sanokai Wash HMP and East Maricopa Floodway Capacity Mitigation Study – Contract FCD 98-26

Subject: Submittal of Project Survey Report

Dear Mr. Phillips:

Enclosed herein is the Project Survey Report, submitted in accordance with Subtask 4.5.6 - Project Survey Report Annex of the contract scope of work.

Please do not hesitate to contact us if there are any questions or comments.

Very truly yours,

HUITT-ZOLLARS, INC.

Fred K. Duren, Jr., P.E., P.G.
Project Manager

Registered Professional Engineer (Civil)
CERTIFICATE NO.
12250
FRED K.
DUREN, JR.
Date Signed 7/27/99
ARIZONA, U.S.A.

HUITT-ZOLLARS

Huitt-Zollars, Inc. / 4742 N. 24th Street / Suite 100 / Phoenix, Arizona 85016 / 602-952-9123 / Fax 602-952-9124

**Queen Creek & Sanokai Wash**
**Project Survey Report**

To: Fred Duren (Project Manager)
From: Steve Long (Survey Manager)

Fred:

The attached information pertains to the work the field crew performed on the area around Queen Creek Wash from the Maricopa and Pinal County line to the Central Arizona Project alignment. The length of the wash and the corresponding aerial mapping control covered an area four and one-half miles in length and approximately 600 feet wide.

The attachments contain 1.) The map prepared for Kenny Aerial showing the panel locations along with the final coordinate values and elevations for each point. 2.) A hard copy of the download information from the data collector showing the metric values of each panel point and each GPS control point used for this project. The measured latitude and longitude for each GPS point is also shown. 3.) The GPS data sheets as provided by the National Geodetic Survey along with the relevant conversion data.

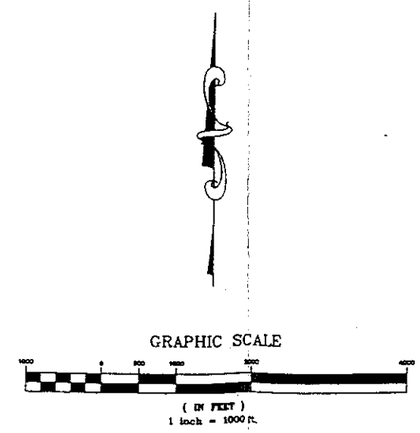
The work performed on this phase of the project was done by GPS methods, and not conventional methods, therefore there are no field books to go with this report. The GPS data sheets provided not only the information needed to complete this phase of the project, but also provided the related information requested in Subtask 4.5.6- Project Survey Report Annex of the contract Scope of Work.

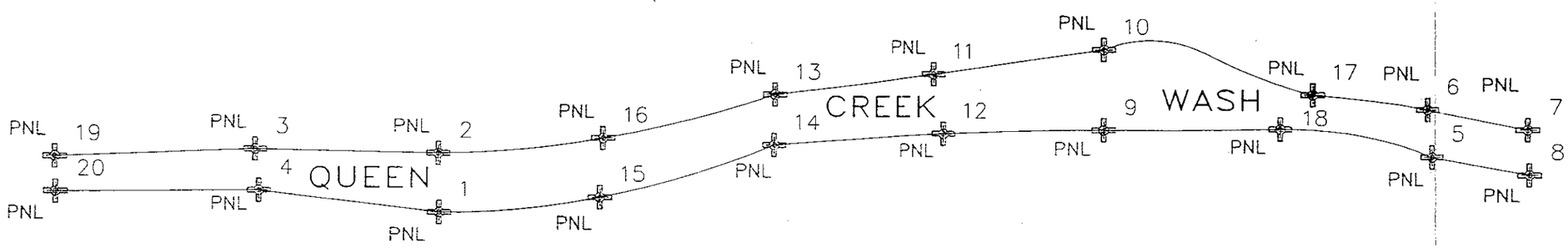
Prepared 7/23/1999
Steven R. Long, R.L.S.
Survey Manager

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
22768
STEVEN R.
LONG
Date Signed 7-23-99
ARIZONA, U.S.A.

# AERIAL MAPPING CONTROL DIAGRAM
# &
# FINAL COORDINATE DATA

| CONTROL TABLE | | | |
|---|---|---|---|
| 1, | 811337.3187, | 808175.215, | 1484.445538 |
| 2, | 812263.405, | 808160.7148, | 1481.660105 |
| 3, | 812312.5562, | 805317.6297, | 1468.366142 |
| 4, | 811667.4577, | 805379.2467, | 1470.406824 |
| 5, | 812245.8662, | 823952.5261, | 1555.643045 |
| 6, | 812992.5485, | 823876.2415, | 1551.377953 |
| 7, | 812662.4489, | 825462.1136, | 1564.10105 |
| 8, | 811949.3216, | 825491.6194, | 1564.822835 |
| 9, | 812648.2801, | 818734.3309, | 1533.999344 |
| 10, | 813917.7259, | 818730.1078, | 1532.309711 |
| 11, | 813537.9763, | 816023.2181, | 1517.982283 |
| 12, | 812599.9164, | 816186.8848, | 1520.902231 |
| 13, | 813199.9129, | 813477.4323, | 1508.536745 |
| 14, | 812402.9801, | 813464.4874, | 1502.634514 |
| 15, | 811570.5925, | 810738.7201, | 1491.75853 |
| 16, | 812496.8101, | 810785.1478, | 1489.593176 |
| 17, | 813222.4983, | 822050.6215, | 1543.881234 |
| 18, | 812677.2477, | 821539.1228, | 1544.498031 |
| 19, | 812189.3944, | 802163.0403, | 1457.480315 |
| 20, | 811637.6894, | 802176.8843, | 1459.629265 |




REVISIONS

DESIGNED BY: PHIL
DRAWN BY: PHIL
CHECKED BY:

HUITT-ZOLLARS
Huitt-Zollars, Inc.
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Engineering
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CONTROL SHEET
QUEEN CREEK DRAINAGE STUDY
PART OF THE SOUTH HALF OF
TOWNSHIP 2 SOUTH, RANGE 8 EAST, G&S.R.B&M.
MARICOPA COUNTY, ARIZONA

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
22768
STEVEN R. LONG
ARIZONA, U.S.A.

DATE:
DEC. 14, 1998

H-Z JOB NO.:
05-0949-01

SHEET
1
OF
1

FILE:
G:\PROJ\05094901\

Project QUEEN CREEK
Client
Task RESULTS OF GPS TRANSFORMATION

HUITT ZOLLARS INCORPORATED

Job No. 05-0749-01
By DGF Date 12-3-98
Chkd Date
Sheet of

| | dX | dY | dHgt |
|---|---|---|---|
| ✓ D517 | — | — | 0.003 |
| ✓ 668 | -0.010 | -0.046 | -0.001 |
| ✓ KLEIN 2 | -0.026 | 0.008 | — |
| ✓ P 364 | — | — | -0.030 |
| ✓ PECOS | -0.006 | 0.011 | — |
| ✓ Q 282 | 0.042 | 0.028 | 0.006 |
| ✓ Q 364 | — | — | 0.022 |

2-D HELMERT PARAMETERS & RMS

| | | |
|---|---|---|
| SHIFT dX: | 248659.8970 | 0.0189 m |
| SHIFT dY: | 248156.4005 | 0.0189 m |
| ROTATION: | -735.905365 | 0.6905 " |
| SCALE: | -95.051582 | 3.3480 ppm |
| ORIGIN XØ: | 0.8235 m | |
| ORIGIN YØ: | -0.6582 m | |

HEIGHT TRANSFORMATION & RMS

| | | |
|---|---|---|
| SLOPE dH/dX: | $-3.078295 \times 10^{-5}$ | $6.706 \times 10^{-5}$ |
| SLOPE dH/dY: | $-5.216416 \times 10^{-5}$ | $7.726 \times 10^{-5}$ |
| SHIFT dHØ: | 61.2038 | 0.0121 m |
| ORIGIN XØ: | -2726.9680 m | |
| ORIGIN YØ: | -3678.3595 m | |

Project QUEEN CREEK (MCFCD)
Client
Task GRID TO GROUND CONVERSION

HUITT ZOLLARS INCORPORATED

Job No. 05-0949-01
By DGF Date 12-10-98
Chkd Date
Sheet of

GRID TO GROUND CONVERSION [NAD 83]

REDUCTION TO ELLIPSOID: $S = D \times [R/(R+N+H)]$

S = DISTANCE ON ELLIPSOID
D = HOZ. DISTANCE ON SURFACE
R = MEAN RADIUS OF CURV. OF ELL. = 6,370,000 m
H = ELEV. (AMSL)
N = GEOID HT.

$$\frac{6,370,000}{6,370,000 + [-29.46] + 460.919} = 0.999932272$$

AVERAGE "EASTING" OF JOB: 248250.4137 m

$E' = (213,360 - 248,250.4137) = -34,890.4137$ m

REDUCTION TO GRID $0.9999 + [(E')^2 \times 1.23244 * 10^{-14}]$

K = GRID SCALE FACTOR $= 0.9999 + [(-34890.4137)^2 * 1.23244 * 10^{-14}]$
$= 0.9999 + 0.000015003$
$= 0.999915003$

COMBINED FACTORS = (REDUCTION TO ELLIPSOID) X (REDUCTION TO GRID)
$= (0.999932272) * (0.999915003) = 0.999847281$

Project QUEEN CREEK (MCFCO)
Client
Task AVGS. FOR GRID/GRND COM.

HUITT ZOLLARS INCORPORATED

Job No. 05-0949-01
By DGF Date 12-10-98
Chkd Date
Sheet of

AVG ELEV, JOB SITE: 460.919m [BY AVG. NAVD 88 EL. FOR ALL PANEL POINTS ON JOB]

AVG. GEOID HT: KLEIN 2 -29.38m H
PEZOS -29.36m H
D 517 -29.47m V
Q 282 -29.44m H V
P 364 -29.50m V
~~H 681 -29.46m~~
~~W 364 -29.43m~~
G 68 -29.54m H V
Q 364 -29.52m V

AVG = -29.46

# The NGS Data Sheet

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 5.70
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = NOVEMBER 30, 1998
 DU0676 ***********************************************************************
 DU0676  DESIGNATION -  P 364
 DU0676  PID         -  DU0676
 DU0676  STATE/COUNTY-  AZ/MARICOPA
 DU0676  USGS QUAD   -  SACATON NE (1975)
 DU0676
 DU0676                          *CURRENT SURVEY CONTROL
 DU0676  ______________________________________________________________________
 DU0676* NAD 83(1986)-  33 13 08.     (N)    111 34 57.     (W)     SCALED
 DU0676* NAVD 88     -      444.060  (meters)    1456.89   (feet)  ADJUSTED
 DU0676  ______________________________________________________________________
 DU0676  GEOID HEIGHT-        -29.50  (meters)                     GEOID96
 DU0676  DYNAMIC HT  -        443.523 (meters)    1455.12   (feet)  COMP
 DU0676  MODELED GRAV-     979,415.3  (mgal)                       NAVD 88
 DU0676
 DU0676  VERT ORDER  -  FIRST     CLASS II
 DU0676
 DU0676.The horizontal coordinates were scaled from a topographic map and have
 DU0676.an estimated accuracy of +/- 6 seconds.
 DU0676
 DU0676.The orthometric height was determined by differential leveling
 DU0676.and adjusted by the National Geodetic Survey in November 1993.
 DU0676
 DU0676.The geoid height was determined by GEOID96.
 DU0676
 DU0676.The dynamic height is computed by dividing the NAVD 88
 DU0676.geopotential number by the normal gravity value computed on the
 DU0676.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 DU0676.degrees latitude (G = 980.6199 gals.).
 DU0676
 DU0676.The modeled gravity was interpolated from observed gravity values.
 DU0676
 DU0676;                    North         East     Units  Estimated Accuracy
 DU0676;SPC AZ C     -   246,080.      244,510.      MT  (+/- 180 meters Scaled)
 DU0676
 DU0676                          SUPERSEDED SURVEY CONTROL
 DU0676
 DU0676  NGVD 29     -      444.248  (m)         1457.50   (f) ADJ UNCH    1 2
 DU0676
 DU0676.Superseded values are not recommended for survey control.
 DU0676.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 DU0676.See file format.dat to determine how the superseded data were derived.
 DU0676
 DU0676_MARKER: DB = BENCH MARK DISK
 DU0676_SETTING: 46 = COPPER-CLAD STEEL ROD W/O SLEEVE (10 FT.+)
 DU0676_STAMPING: P 364 1967
 DU0676_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 DU0676_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 DU0676+SATELLITE: SATELLITE OBSERVATIONS - January 11, 1992
 DU0676
 DU0676  HISTORY     - Date     Condition        Recov. By
 DU0676  HISTORY     - 1967     MONUMENTED       CGS
 DU0676  HISTORY     - 19920111 GOOD             NGS
 DU0676
 DU0676                          STATION DESCRIPTION
 DU0676
 DU0676'DESCRIBED BY COAST AND GEODETIC SURVEY 1967
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DU0676'4.2 MI SE FROM QUEEN CREEK.
DU0676'ABOUT 0.4 MILE SOUTH ALONG ELLSWORTH AVENUE FROM THE QUEEN CREEK
DU0676'SCHOOL AT QUEEN CREEK, THENCE 3.8 MILES SOUTHEAST ALONG THE SOUTHERN
DU0676'PACIFIC RAILROAD, IN S 25, T 2 S, R 7 E, 0.1 MILE SOUTHEAST OF A
DU0676'LOADING DOCK, 27 FEET SOUTHWEST OF THE SOUTHWEST RAIL OF THE TRACK, 2
DU0676'FEET NORTHEAST OF MILEPOST 942, 103 FEET NORTHEAST OF THE CENTER LINE
DU0676'OF A ROAD WHICH PARALLELS THE TRACKS, 102 FEET NORTH OF THE CENTER
DU0676'LINE OF A ROAD WHICH LEADS EAST, 1.3 FEET SOUTHWEST OF A METAL WITNESS
DU0676'POST, ABOUT 5 FEET BELOW THE LEVEL OF THE TRACKS, AND ON THE TOP OF A
DU0676'5/8-INCH COPPER COATED ROD THAT IS DRIVEN TO A DEPTH OF 25 FEET AND IS
DU0676'ENCASED IN A 5-INCH IRON PIPE PROJECTING 2 INCHES.
DU0676
DU0676                          STATION RECOVERY (1992)
DU0676
DU0676'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU0676'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU0676'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU0676'THENCE 4.8 KM (3.00 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
DU0676'RAILROAD, 31.4 M (103.0 FT) NORTHEAST OF THE CENTERLINE OF
DU0676'RITTENHOUSE ROAD, 29.4 M (96.5 FT) NORTH OF THE CENTER OF RIGGS ROAD,
DU0676'7.6 M (24.9 FT) SOUTHWEST OF THE NEAR RAIL, 1.1 M (3.6 FT) NORTHEAST
DU0676'OF MILEPOST 942, 1.0 M (3.3 FT) BELOW THE LEVEL OF RITTENHOUSE ROAD,
DU0676'AND 0.4 M (1.3 FT) SOUTHWEST OF A WITNESS POST.  NOTE--THE DISK IS
DU0676'ENCASED IN A 5-INCH METAL PIPE AND IS FLUSH WITH THE GROUND SURFACE.
1        National Geodetic Survey,   Retrieval Date = NOVEMBER 30, 1998
DU0678 ***********************************************************************
DU0678  DESIGNATION -  Q 364
DU0678  PID         -  DU0678
DU0678  STATE/COUNTY-  AZ/MARICOPA
DU0678  USGS QUAD   -  SACATON NE (1975)
DU0678
DU0678                          *CURRENT SURVEY CONTROL
DU0678  ___________________________________________________________________
DU0678* NAD 83(1986)-  33 13 52.     (N)    111 35 39.     (W)     SCALED
DU0678* NAVD 88     -       440.618  (meters)    1445.59   (feet)  ADJUSTED
DU0678  ___________________________________________________________________
DU0678  GEOID HEIGHT-         -29.52  (meters)                     GEOID96
DU0678  DYNAMIC HT  -         440.084 (meters)    1443.84   (feet)  COMP
DU0678  MODELED GRAV-     979,413.0   (mgal)                       NAVD 88
DU0678
DU0678  VERT ORDER  -  FIRST     CLASS II
DU0678
DU0678.The horizontal coordinates were scaled from a topographic map and have
DU0678.an estimated accuracy of +/- 6 seconds.
DU0678
DU0678.The orthometric height was determined by differential leveling
DU0678.and adjusted by the National Geodetic Survey in November 1993.
DU0678
DU0678.The geoid height was determined by GEOID96.
DU0678
DU0678.The dynamic height is computed by dividing the NAVD 88
DU0678.geopotential number by the normal gravity value computed on the
DU0678.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DU0678.degrees latitude (G = 980.6199 gals.).
DU0678
DU0678.The modeled gravity was interpolated from observed gravity values.
DU0678
DU0678;                    North         East     Units  Estimated Accuracy
DU0678;SPC AZ C     -   247,430.      243,420.      MT  (+/- 180 meters Scaled)
DU0678
DU0678                          SUPERSEDED SURVEY CONTROL
DU0678
DU0678  NGVD 29     -       440.712  (m)         1445.90   (f) ADJ UNCH    1 2
DU0678
```

```
DU0678.Superseded values are not recommended for survey control.
DU0678.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU0678.See file format.dat to determine how the superseded data were derived.
DU0678
DU0678_MARKER: DB = BENCH MARK DISK
DU0678_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU0678_STAMPING: Q 364 1967
DU0678_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DU0678+STABILITY: SURFACE MOTION
DU0678_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DU0678+SATELLITE: SATELLITE OBSERVATIONS - January 11, 1992
DU0678
DU0678  HISTORY     - Date     Condition        Recov. By
DU0678  HISTORY     - 1967     MONUMENTED       CGS
DU0678  HISTORY     - 19920111 GOOD             NGS
DU0678
DU0678                          STATION DESCRIPTION
DU0678
DU0678'DESCRIBED BY COAST AND GEODETIC SURVEY 1967
DU0678'3.2 MI SE FROM QUEEN CREEK.
DU0678'ABOUT 0.4 MILE SOUTH ALONG ELLSWORTH AVENUE FROM THE QUEEN CREEK
DU0678'SCHOOL AT QUEEN CREEK, THENCE 2.8 MILES SOUTHEAST ALONG THE SOUTHERN
DU0678'PACIFIC RAILROAD, IN S 24, T 2 S, R 7 E, 3 1/2 FEET SOUTHEAST OF THE
DU0678'1ST POLE NORTHWEST OF MILEPOST 941, 29 FEET SOUTHWEST OF THE SOUTHWEST
DU0678'RAIL OF THE TRACKS, 159 FEET NORTHWEST OF THE CENTER OF A CROSSING OF
DU0678'THE RAILROAD AND A ROAD, 1.8 FEET NORTHWEST OF A METAL WITNESS POST,
DU0678'ABOUT 5 FEET BELOW THE LEVEL OF THE TRACKS, AND SET IN THE TOP OF A
DU0678'CONCRETE POST PROJECTING 4 INCHES.
DU0678
DU0678                          STATION RECOVERY (1992)
DU0678
DU0678'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU0678'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU0678'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU0678'THENCE 3.1 KM (1.90 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
DU0678'RAILROAD, 30.8 M (101.0 FT) NORTHEAST OF AND LEVEL WITH THE
DU0678'CENTERLINE OF RITTENHOUSE ROAD, 8.9 M (29.2 FT) SOUTHWEST OF THE NEAR
DU0678'RAIL, 1.2 M (3.9 FT) SOUTHEAST OF UTILITY POLE NUMBER 28F (FIRST POLE
DU0678'NORTHWEST OF MILEPOST 941), 0.4 NORTHWEST OF A WITNESS POST, AND THE
DU0678'MONUMENT IS FLUSH WITH THE GROUND SURFACE.
1        National Geodetic Survey,   Retrieval Date = NOVEMBER 30, 1998
DU1573 ***********************************************************************
DU1573  CBN          -  This is a Cooperative Base Network Control Station.
DU1573  DESIGNATION  -  G 68
DU1573  PID          -  DU1573
DU1573  STATE/COUNTY-   AZ/MARICOPA
DU1573  USGS QUAD    -  SACATON NE (1975)
DU1573
DU1573                          *CURRENT SURVEY CONTROL
DU1573
DU1573* NAD 83(1992)-  33 14 25.26695(N)    111 36 32.16722(W)     ADJUSTED
DU1573* NAVD 88      -       434.925  (meters)    1426.92   (feet) ADJUSTED
DU1573
DU1573  X            -  -1,966,650.990 (meters)                     COMP
DU1573  Y            -  -4,964,931.069 (meters)                     COMP
DU1573  Z            -   3,476,506.443 (meters)                     COMP
DU1573  LAPLACE CORR-            1.68  (seconds)                    DEFLEC96
DU1573  ELLIP HEIGHT-          405.36  (meters)                     GPS OBS
DU1573  GEOID HEIGHT-          -29.54  (meters)                     GEOID96
DU1573  DYNAMIC HT   -         434.399 (meters)    1425.19   (feet) COMP
DU1573  MODELED GRAV-      979,415.5   (mgal)                       NAVD 88
DU1573
DU1573  HORZ ORDER   -  B
DU1573  VERT ORDER   -  FIRST     CLASS II
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DU1573  ELLP ORDER  -  SECOND    CLASS I
DU1573
DU1573.The horizontal coordinates were established by GPS observations
DU1573.and adjusted by the National Geodetic Survey in September 1992.
DU1573
DU1573.The orthometric height was determined by differential leveling
DU1573.and adjusted by the National Geodetic Survey in November 1993.
DU1573
DU1573.The X, Y, and Z were computed from the position and the ellipsoidal ht.
DU1573
DU1573.The Laplace correction was computed from DEFLEC96 derived deflections.
DU1573
DU1573.The ellipsoidal height was determined by GPS observations
DU1573.and is referenced to NAD 83.
DU1573
DU1573.The geoid height was determined by GEOID96.
DU1573
DU1573.The dynamic height is computed by dividing the NAVD 88
DU1573.geopotential number by the normal gravity value computed on the
DU1573.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DU1573.degrees latitude (G = 980.6199 gals.).
DU1573
DU1573.The modeled gravity was interpolated from observed gravity values.
DU1573
DU1573;                      North          East     Units  Scale       Converg.
DU1573;SPC AZ C     -   248,447.706   242,037.441   MT  0.99991014 +0 10 07.3
DU1573;UTM  12      - 3,678,098.146   443,270.103   MT  0.99963968 -0 20 01.7
DU1573
DU1573                            SUPERSEDED SURVEY CONTROL
DU1573
DU1573  NAD 83(1986)-  33 14 25.25819(N)    111 36 32.16924(W) AD(       ) 1
DU1573  NAD 83(1986)-  33 14 25.25819(N)    111 36 32.16924(W) AD(       ) B
DU1573  NGVD 29     -       435.104  (m)         1427.50   (f) ADJ UNCH    1 2
DU1573
DU1573.Superseded values are not recommended for survey control.
DU1573.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU1573.See file format.dat to determine how the superseded data were derived.
DU1573
DU1573_MARKER: DB = BENCH MARK DISK
DU1573_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU1573_STAMPING: G 68 1934
DU1573_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DU1573+STABILITY: SURFACE MOTION
DU1573_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DU1573+SATELLITE: SATELLITE OBSERVATIONS - December 17, 1995
DU1573
DU1573  HISTORY     - Date     Condition        Recov. By
DU1573  HISTORY     - UNK      MONUMENTED
DU1573  HISTORY     - 19840406 GOOD
DU1573  HISTORY     - 19920110 GOOD             NGS
DU1573  HISTORY     - 19920204 GOOD             NGS
DU1573  HISTORY     - 19951217 GOOD             CHANCE
DU1573
DU1573                            STATION DESCRIPTION
DU1573
DU1573'DESCRIBED 1984
DU1573'RECOVERED IN GOOD CONDITION.
DU1573
DU1573                            STATION RECOVERY (1992)
DU1573
DU1573'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU1573'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU1573'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU1573'THENCE 1.5 KM (0.95 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
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DU1573'RAILROAD, 33.0 M (108.3 FT) NORTHEAST OF THE CENTERLINE OF
DU1573'RITTENHOUSE ROAD, 9.1 M (29.9 FT) SOUTHWEST OF THE NEAR RIAL, 5.6 M
DU1573'(18.4 FT) NORTHWEST OF MILEPOST 940, 0.5 M (1.6 FT) ABOVE THE LEVEL
DU1573'OF THE ROAD, 0.4 M (1.3 FT) SOUTHEAST OF A WITNESS POST, AND THE
DU1573'MONUMENT IS FLUSH WITH THE GROUND SURFACE.
DU1573
DU1573                          STATION RECOVERY (1992)
DU1573
DU1573'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU1573'THE STATION IS LOCATED ABOUT 2.5 KM (1.6 MI) EAST-SOUTHEAST OF QUEEN
DU1573'CREEK, ALONG THE SOUTHERN PACIFIC RAILROAD TRACK, BETWEEN THE TRACK
DU1573'AND A PAVED ROAD, UNDER A LARGE CREOSOTE BUSH.  OWNERSHIP--SOUTHERN
DU1573'PACIFIC RAILROAD.
DU1573'TO REACH THE STATION FROM THE QUEEN CREEK POST OFFICE, GO NORTH ON
DU1573'ELLSWORTH ROAD FOR 0.16 KM (0.10 MI) TO A PAVED CROSSROAD.  TURN
DU1573'RIGHT, EAST, ON OCOTILLO ROAD FOR 1.08 KM (0.67 MI) TO A SLANTED
DU1573'PAVED CROSSROAD AT RAILROAD TRACK.  BEAR RIGHT, SOUTHEAST, ON
DU1573'RITTENHOUSE ROAD FOR 0.98 KM (0.61 MI) TO A SQUARE CONCRETE
DU1573'IRRIGATION UNIT ON THE RIGHT.  CONTINUE AHEAD ON RITTENHOUSE ROAD FOR
DU1573'0.59 KM (0.37 MI) TO THE STATION ON THE LEFT.
DU1573'THE STATION IS SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST FLUSH
DU1573'WITH THE GROUND.  LOCATED 33.1 M (108.6 FT) NORTHEAST OF AND LEVEL
DU1573'WITH THE ROAD CENTER, 23.1 M (75.8 FT) EAST-NORTHEAST OF A UTILITY
DU1573'POLE ALONG THE ROAD, 8.9 M (29.2 FT) SOUTHWEST OF THE SOUTHWEST RAIL
DU1573'OF THE TRACK, 5.7 M (18.7 FT) NORTHWEST OF A UTILITY POLE WITH MILE
DU1573'MARKER 940 AND 0.5 M (1.6 FT) SOUTHEAST OF A METAL WITNESS POST.
DU1573
DU1573                          STATION RECOVERY (1995)
DU1573
DU1573'RECOVERY NOTE BY JE CHANCE AND ASSOCIATES 1995 (MFY)
DU1573'RECOVERED IN GOOD CONDITION.  A NEW AND COMPLETE DESCRIPTION FOLLOWS
DU1573'THE STATION IS LOCATED APPROXIMATELY 2.5 KM (1.55 MI) EAST-SOUTHEAST
DU1573'OF QUEEN CREEK ALONG THE SOUTHERN PACIFIC RAILROAD TRACK BETWEN THE
DU1573'TRACK AND RITTENHOUSE ROAD.  OWNERSHIP -- SOUTHERN PACIFIC RAILROAD TO
DU1573'REACH THE STATION FROM THE JUNCTION OF ELLSWORTH ROAD AND OCOTILLO
DU1573'ROAD, GO EAST ON OCOTILLO ROAD FOR 1.08 KM (0.65 MI) TO A PAVED ROAD
DU1573'AT THE RAILROAD TRACK, RITTENHOUSE ROAD.  BEAR RIGHT AND PROCEED
DU1573'SOUTHEAST ON RITTENHOUSE ROAD FOR 0.98 KM (0.60 MI) TO A SQUARE
DU1573'CONCRETE IRRIGATION UNIT ON THE RIGHT.  CONTINUE SOUTHEAST ON
DU1573'RITTENHOUSE ROAD FOR 0.59 KM (0.35 MI) TO THE STATION ON THE LEFT THE
DU1573'STATION IS A BENCH MARK DISK SET INTO THE TOP OF A 30-CM SQUARE
DU1573'CONCRETE POST FLUSH WITH THE GROUND.  THE STATION IS LOCATED 33.0 M
DU1573'(108.3 FT) NORTHEAST OF THE RITTENHOUSE ROAD CENTERLINE, 23.1 M (75.8
DU1573'FT) EAST-NORTHEAST OF A UTILITY POLE ALONG RITTENHOUSE ROAD, 8.9 M
DU1573'(29.2 FT) SOUTHWEST OF THE SOUTHWEST RAIL OF THE RAILROAD TRACK, 5.7 M
DU1573'(18.7 FT) NORTHWEST OF A UTILITY POLE LOCATED NEAR MILE MARKER 940,
DU1573'0.5 M (1.6 FT) SOUTHEAST OF A METAL WITNESS POST, AND LEVEL WITH THE
DU1573'RITTENHOUSE ROAD CENTERLINE
1        National Geodetic Survey,   Retrieval Date = NOVEMBER 30, 1998
DU1572 ***********************************************************************
DU1572  DESIGNATION -  R 364
DU1572  PID         -  DU1572
DU1572  STATE/COUNTY-  AZ/MARICOPA
DU1572  USGS QUAD   -  SACATON NE (1975)
DU1572
DU1572                        *CURRENT SURVEY CONTROL
DU1572
DU1572* NAD 83(1986)-  33 14 47.     (N)    111 37 07.     (W)     SCALED
DU1572* NAVD 88     -      430.957  (meters)    1413.90   (feet)  ADJUSTED
DU1572
DU1572  GEOID HEIGHT-        -29.56  (meters)                     GEOID96
DU1572  DYNAMIC HT  -        430.436 (meters)    1412.19   (feet)  COMP
DU1572  MODELED GRAV-     979,417.1  (mgal)                       NAVD 88
DU1572
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DU1572  VERT ORDER  -  FIRST     CLASS II
DU1572
DU1572.The horizontal coordinates were scaled from a topographic map and have
DU1572.an estimated accuracy of +/- 6 seconds.
DU1572
DU1572.The orthometric height was determined by differential leveling
DU1572.and adjusted by the National Geodetic Survey in November 1993.
DU1572
DU1572.The geoid height was determined by GEOID96.
DU1572
DU1572.The dynamic height is computed by dividing the NAVD 88
DU1572.geopotential number by the normal gravity value computed on the
DU1572.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DU1572.degrees latitude (G = 980.6199 gals.).
DU1572
DU1572.The modeled gravity was interpolated from observed gravity values.
DU1572
DU1572;                      North         East    Units  Estimated Accuracy
DU1572;SPC AZ C     -    249,120,      241,130.      MT  (+/- 180 meters Scaled)
DU1572
DU1572                            SUPERSEDED SURVEY CONTROL
DU1572
DU1572  NGVD 29     -        431.147  (m)          1414.52   (f) ADJ UNCH    1 2
DU1572
DU1572.Superseded values are not recommended for survey control.
DU1572.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU1572.See file format.dat to determine how the superseded data were derived.
DU1572
DU1572_MARKER: DB = BENCH MARK DISK
DU1572_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU1572_STAMPING: R 364 1967
DU1572_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DU1572+STABILITY: SURFACE MOTION
DU1572_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DU1572+SATELLITE: SATELLITE OBSERVATIONS - January 10, 1992
DU1572
DU1572  HISTORY     - Date     Condition        Recov. By
DU1572  HISTORY     - UNK      MONUMENTED
DU1572  HISTORY     - 19920110 GOOD             NGS
DU1572
DU1572                            STATION DESCRIPTION
DU1572
DU1572'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
DU1572'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU1572'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU1572'THENCE 0.2 KM (0.10 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
DU1572'RAILROAD, 31.3 M (102.7 FT) NORTHEAST OF AND LEVEL WITH THE CENTER OF
DU1572'RITTENHOUSE ROAD, 26.2 M (86.0 FT) SOUTHEAST OF A UTILITY POLE, 9.1 M
DU1572'(29.9 FT) SOUTHWEST OF THE NEAR RAIL, 0.4 M (1.3 FT) NORTHWEST OF A
DU1572'WITNESS POST, AND THE MONUMENT IS FLUSH WITH THE GROUND SURFACE.
Elapsed Time = 00:00:12
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[redacted]

FOUND

DU2084 **********
DU2084 DESIGNATION - KLEINZ ← "KLEIN 2"
DU2084 PID - DU2084 SPACE TWO
DU2084 STATE/COUNTY- AZ/PINAL
DU2084 USGS QUAD - SUPERSTITION MTS SW (1982)
DU2084
DU2084 *CURRENT SURVEY CONTROL
DU2084 _____
DU2084* NAD 83(1992)- 33 15 18.06552(N) 111 29 53.51988(W) ADJUSTED
DU2084* NAVD 88 - 488.7 (meters) 1603. (feet) VERTCON
DU2084 _____
DU2084 LAPLACE CORR- 2.92 (seconds) DEFLEC96
DU2084 GEOID HEIGHT- -29.38 (meters) GEOID96
DU2084
DU2084 [redacted]
DU2084
DU2084.The horizontal coordinates were established by classical geodetic methods
DU2084.and adjusted by the National Geodetic Survey in August 1993.
DU2084
DU2084.The NAVD 88 height was computed by applying the VERTCON shift value to
DU2084.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
DU2084
DU2084.The Laplace correction was computed from DEFLEC96 derived deflections.
DU2084
DU2084.The geoid height was determined by GEOID96.
DU2084
DU2084; North East Units Scale Converg.
DU2084;SPC AZ C - 250,110.029 252,350.407 MT 0.99991874 +0 13 46.1
DU2084;UTM 12 - 3,679,669.502 453,594.347 MT 0.99962655 -0 16 23.5
DU2084
DU2084: Primary Azimuth Mark Grid Az
DU2084:SPC AZ C - PECOS 336 54 01.4
DU2084:UTM 12 - PECOS 337 24 11.0
DU2084
DU2084|----------|
DU2084| PID Reference Object Distance Geod. Az |
DU2084| dddmmss.s |
DU2084| KLEINZ RM 1 13.688 METERS 14409 |
DU2084| KLEINZ RM 2 13.798 METERS 33140 |
DU2084| DU2090 PECOS APPROX. 3.8 KM 3370747.5 |
DU2084|----------|
DU2084
DU2084 SUPERSEDED SURVEY CONTROL
DU2084
DU2084 NAD 83(1986)- 33 15 18.06099(N) 111 29 53.52262(W) ADJUSTED
DU2084 NAD 27 - 33 15 17.86774(N) 111 29 51.05587(W) ADJUSTED
DU2084 NGVD 29 - 488.2 (meters) 1602. (feet) VERT ANG
DU2084
DU2084.Superseded values are not recommended for survey control.
DU2084.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU2084.See file format.dat to determine how the superseded data were derived.
DU2084
DU2084_MARKER: DD = SURVEY DISK
DU2084_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU2084
DU2084 HISTORY - Date Condition Recov. By
DU2084 HISTORY - 1975 MONUMENTED AZDT

DU2084
DU2084 STATION DESCRIPTION
DU2084
DU2084'DESCRIBED BY ARIZONA DEPARTMENT OF TRANSPORTATION 1975 (TT)
DU2084'THE STATION IS LOCATED ABOUT 11.5 MILES EAST SOUTHEAST OF APACHE
DU2084'JUNCTION AND 16.3 MILES WEST NORTHWEST OF FLORENCE ON TOP OF A
DU2084'FLOOD CONTROL DIKE.
DU2084'
DU2084'THE STATION IS AN ADOT HWY. DIVISION DISK STAMPED KLEINZ 1975
DU2084'AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT. THE STATION
DU2084'IS ON THE SOUTHWEST CORNER OF DIKE AND MARKED WITH A WITNESS POST
DU2084'AND SIGN 2.7 FEET TO THE WEST.
DU2084'
DU2084'REFERENCE MARK 1 IS A ADOT HWY. DIVISION DISK STAMPED RM1-KLEINZ
DU2084'1975 AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT ON TOP
DU2084'OF DIKE.
DU2084'
DU2084'REFERENCE MARK 2 IS A ADOT HWY. DIVISION DISK STAMPED RM 2
DU2084'KLEINZ 1975 AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT
DU2084'ON TOP OF DIKE.
DU2084'
DU2084'TO REACH THE STATION FROM APACHE JUNCTION, GO WEST ON
DU2084'U.S. HIGHWAY 60 FOR 0.85 MILE TO IRONWOOD ST., GO LEFT (SOUTH)
DU2084'FOR 1.5 MILES TO SOUTHERN AVENUE AND HIGH SCHOOL ON THE
DU2084'LEFT. CONTINUE SOUTH FOR 3.45 MILES TO A CONCRETE LINED
DU2084'WATERSHED DITCH, GO LEFT THROUGH GATE ON THE NORTH SIDE OF DITCH
DU2084'AND FOLLOW DITCH NORTH EASTERLY FOR 1.2 MILES TO ANOTHER GATE,
DU2084'PASS THROUGH GATE AND GO 200 FEET THEN MAKE A SHARP RIGHT
DU2084'TURN ACROSS DITCH. FOLLOW TRAIL SOUTHEAST FOR 0.3 MILE TO
DU2084'BASE OF DIKE, GO LEFT FOR 0.4 MILE TO NORTHEAST END OF DIKE.
DU2084'AT THIS POINT, MAKE HARD RIGHT TURN AND FOLLOW ROAD ON TOP OF
DU2084'DIKE FOR 0.35 MILE TO BEND IN DIKE TO THE SOUTHEAST, CONTINUE
DU2084'SOUTHEAST FOR 1.14 MILES TO A GATE IN FENCELINE ACROSS THE DIKE.
DU2084'GO THROUGH GATE AND CONTINUE FOR 0.76 MILE TO STATION WARNER,
DU2084'CONTINUE ON DIKE ROAD FOR 1.35 MILES TO A GATE.
DU2084'PASS THROUGH GATE AND GO 1.59 MILES TO THE STATION PECOS ON
DU2084'THE RIGHT ON THE SOUTHWEST CORNER OF DIKE, CONTINUE ON
DU2084'DIKE ROAD 0.26 MILE TO END OF DIKE. MAKE A HARD RIGHT TURN AND
DU2084'GO 100 FEET ON TRACK ROAD THEN TURN LEFT ACROSS A DITCH AND
DU2084'FOLLOW TRAIL 0.26 MILE TO BASE OF DIKE, TURN RIGHT AND FOLLOW
DU2084'TRAIL 0.55 MILE ALONG BASE OF DIKE TO A GATE AND RAMP. PASS
DU2084'THROUGH GATE AND MAKE HARD LEFT UP RAMP TO TOP OF DIKE,
DU2084'TURN RIGHT ON DIKE ROAD AND GO 1.0 MILE TO GATE, PASS THROUGH
DU2084'GATE AND GO 0.64 MILE TO STATION ON THE RIGHT AT SOUTHWEST
DU2084'CORNER OF DIKE.
DU2084'
DU2084'HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.

Found [redacted]

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DU2090 ************************************************************************
DU2090 DESIGNATION - PECOS
DU2090 PID         - DU2090
DU2090 STATE/COUNTY- AZ/PINAL
DU2090 USGS QUAD   - DESERT WELL (1982)
DU2090
DU2090                  *CURRENT SURVEY CONTROL
DU2090 ________________________________________________________________________
DU2090* NAD 83(1992)- 33 17 10.50526(N)   111 30 49.99103(W)   ADJUSTED
DU2090* NAVD 88    -     482.1  (meters)   1582.   (feet)  VERTCON
DU2090 ________________________________________________________________________
DU2090 LAPLACE CORR-        3.26  (seconds)            DEFLEC96
DU2090 GEOID HEIGHT-      -29.36  (meters)             GEOID96
DU2090
DU2090 [redacted]
DU2090
DU2090.The horizontal coordinates were established by classical geodetic methods
DU2090.and adjusted by the National Geodetic Survey in August 1993.
DU2090
DU2090.The NAVD 88 height was computed by applying the VERTCON shift value to
DU2090.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
DU2090
DU2090.The Laplace correction was computed from DEFLEC96 derived deflections.
DU2090
DU2090.The geoid height was determined by GEOID96.
DU2090
DU2090;              North        East    Units  Scale     Converg.
DU2090;SPC AZ C    -  253,568.031  250,875.464  MT  0.99991735 +0 13 15.8
DU2090;UTM  12     - 3,683,139.307  452,150.232  MT  0.99962823 -0 16 55.3
DU2090
DU2090:            Primary Azimuth Mark                Grid Az
DU2090:SPC AZ C    - GOLDMINE MT                        223 38 53.2
DU2090:UTM  12     - GOLDMINE MT                        224 09 04.3
DU2090
DU2090|-----------------------------------------------------------|
DU2090| PID    Reference Object                Distance     Geod. Az |
DU2090|                                        dddmmss.s |
DU2090|      PECOS RM 1                       13.683 METERS 09739     |
DU2090| DU2124 GOLDMINE MT                        APPROX.15.5 KM 2235209.0 |
DU2090|      PECOS RM 2                       13.839 METERS 29521     |
DU2090|-----------------------------------------------------------|
DU2090
DU2090                  SUPERSEDED SURVEY CONTROL
DU2090
DU2090  NAD 83(1986)- 33 17 10.50068(N)   111 30 49.99399(W)   ADJUSTED
DU2090  NAD 27     - 33 17 10.31125(N)   111 30 47.52422(W)   ADJUSTED
DU2090  NGVD 29    -     481.6  (meters)   1580.   (feet)  VERT ANG
DU2090
DU2090.Superseded values are not recommended for survey control.
DU2090.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU2090.See file format.dat to determine how the superseded data were derived.
DU2090
DU2090_MARKER: DD = SURVEY DISK
DU2090_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU2090
DU2090  HISTORY    - Date    Condition      Recov. By
DU2090  HISTORY    - 1975    MONUMENTED     AZDT
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DU2090
DU2090 STATION DESCRIPTION
DU2090
DU2090'DESCRIBED BY ARIZONA DEPARTMENT OF TRANSPORTATION 1975 (TT)
DU2090'THE STATION IS ABOUT 9 MILES EAST SOUTHEAST OF APACHE JUNCTION AND
DU2090'18.9 MILES WEST NORTHWEST OF FLORENCE ON A FLOOD CONTROL DIKE.
DU2090'
DU2090'THE STATION IS AN ADOT HIGHWAY DIVISION DISK STAMPED PECOS 1975
DU2090'AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT ON THE SOUTHWEST
DU2090'CORNER OF DIKE. THE STATION IS MARKED BY A WITNESS POST AND SIGN
DU2090'2.7 FEET TO THE SOUTH.
DU2090'
DU2090'REFERENCE MARK 1 IS AN ADOT HIGHWAY DIVISION DISK STAMPED RM 1
DU2090'PECOS 1975 AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT ON
DU2090'TOP OF DIKE.
DU2090'
DU2090'REFERENCE MARK 2 IS A ADOT HIGHWAY DIVISION DISK STAMPED RM 2
DU2090'PECOS 1975 AND IS SET IN A 10 INCH DIAMETER CONCRETE MONUMENT ON
DU2090'THE TOP OF DIKE.
DU2090'
DU2090'TO REACH THE STATION FROM APACHE JUNCTION, GO WEST ON U.S. HIGHWAY
DU2090'60 FOR 0.85 MILE TO IRONWOOD ST., GO LEFT (SOUTH) FOR 1.5 MILES
DU2090'TO SOUTHERN AVENUE AND HIGH SCHOOL ON THE LEFT. CONTINUE SOUTH
DU2090'FOR 3.45 MILES TO A CONCRETE LINED WATERSHED DITCH, GO LEFT
DU2090'THROUGH GATE ON THE NORTH SIDE OF DITCH AND FOLLOW DITCH NORTH
DU2090'EASTERLY FOR 1.2 MILES TO ANOTHER GATE, PASS THROUGH GATE AND
DU2090'GO 200 FEET THEN MAKE A SHARP RIGHT TURN ACROSS DITCH. FOLLOW
DU2090'TRAIL SOUTHEAST FOR 0.3 MILE TO BASE OF DIKE, GO LEFT FOR 0.4
DU2090'MILE TO NORTHEAST END OF DIKE. AT THIS POINT, MAKE HARD RIGHT
DU2090'TURN AND FOLLOW ROAD ON TOP OF DIKE FOR 0.35 MILE TO BEND IN
DU2090'DIKE TO THE SOUTHEAST, CONTINUE SOUTHEAST FOR 1.14 MILES TO A
DU2090'GATE IN FENCELINE ACROSS THE DIKE. GO THROUGH GATE AND
DU2090'CONTINUE FOR 0.76 MILE TO STATION WARNER, CONTINUE ON DIKE ROAD
DU2090'FOR 1.35 MILES TO A GATE, PASS THROUGH GATE AND GO 1.59
DU2090'MILES TO THE STATION ON THE RIGHT ON THE SOUTHWEST CORNER OF
DU2090'DIKE. A CAR CAN BE DRIVEN TO THE STATION IN DRY WEATHER.
DU2090'
DU2090'HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.

DU2295 **********
DU2295 DESIGNATION - D 517
DU2295 PID - DU2295
DU2295 STATE/COUNTY- AZ/PINAL
DU2295 USGS QUAD - SACATON NE (1975)
DU2295
DU2295 *CURRENT SURVEY CONTROL
DU2295 _____
DU2295* NAD 83(1986)- 33 12 28. (N) 111 34 22. (W) SCALED
DU2295* NAVD 88 - 448.605 (meters) 1471.80 (feet) ADJUSTED
DU2295 _____
DU2295 GEOID HEIGHT- -29.47 (meters) GEOID96
DU2295 DYNAMIC HT - 448.064 (meters) 1470.02 (feet) COMP
DU2295 MODELED GRAV- 979,417.4 (mgal) NAVD 88
DU2295
DU2295 VERT ORDER - FIRST CLASS II
DU2295
DU2295.The horizontal coordinates were scaled from a topographic map and have an estimated accuracy of +/- 6 seconds.
DU2295 The orthometric height was determined by differential leveling and adjusted by the National Geodetic Survey in November 1993. The geoid height was determined by GEOID96. The dynamic height is computed by dividing the NAVD 88 geopotential number by the normal gravity value computed on the Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45 degrees latitude (G = 980.6199 gals.). The modeled gravity was interpolated from observed gravity values.
DU2295
DU2295; North East Units Estimated Accuracy
DU2295;SPC AZ C - 244,850. 245,420. MT (+/- 180 meters Scaled)
DU2295
DU2295_MARKER: I = METAL ROD
DU2295_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+).
DU2295_STAMPING: D 517 1992
DU2295_PROJECTION: FLUSH
DU2295_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DU2295_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DU2295+SATELLITE: SATELLITE OBSERVATIONS - 1992
DU2295_ROD/PIPE-DEPTH: 7.4 meters
DU2295_SLEEVE-DEPTH : 0.9 meters
DU2295
DU2295 HISTORY - Date Condition Recov. By
DU2295 HISTORY - 1992 MONUMENTED NGS
DU2295
DU2295 STATION DESCRIPTION
DU2295'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
DU2295'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU2295'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU2295'THENCE 6.5 KM (4.05 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
DU2295'RAILROAD, 31.1 M (102.0 FT) SOUTHWEST OF THE NEAR RAIL, 22.3 M (73.2
DU2295'FT) NORTHWEST OF THE EAST CORNER OF A STOCK PEN, 5.5 M (18.0 FT)
DU2295'SOUTHWEST OF AND LEVEL WITH THE CENTER OF A GRAVELED ROAD, 2.2 M (7.2
DU2295'FT) SOUTHEAST OF A UTILITY POLE, AND 0.4 M (1.3 FT) NORTHWEST OF A
DU2295'WITNESS POST. NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH
DU2295'LOGO CAP.

FOUND

DU0672 **********
DU0672 CBN - This is a Cooperative Base Network Control Station.
DU0672 DESIGNATION - Q 282
DU0672 PID - DU0672
DU0672 STATE/COUNTY- AZ/PINAL
DU0672 USGS QUAD - SACATON NE (1975)
DU0672
DU0672 *CURRENT SURVEY CONTROL
DU0672 _____
DU0672* NAD 83(1992)- 33 11 12.19321(N) 111 33 07.36766(W) ADJUSTED
DU0672* NAVD 88 - 454.444 (meters) 1490.95 (feet) ADJUSTED
DU0672 _____
DU0672 X - -1,962,923.361 (meters) COMP
DU0672 Y - -4,969,927.181 (meters) COMP
DU0672 Z - 3,471,540.425 (meters) COMP
DU0672 LAPLACE CORR- 0.82 (seconds) DEFLEC96
DU0672 ELLIP HEIGHT- 425.02 (meters) GPS OBS
DU0672 GEOID HEIGHT- -29.44 (meters) GEOID96
DU0672 DYNAMIC HT - 453.896 (meters) 1489.16 (feet) COMP
DU0672 MODELED GRAV- 979,418.3 (mgal) NAVD 88
DU0672
DU0672 HORZ ORDER - FIRST
DU0672 VERT ORDER - FIRST CLASS II
DU0672 ELLP ORDER - SECOND CLASS I
DU0672
DU0672.The horizontal coordinates were established by GPS observations
DU0672.and adjusted by the National Geodetic Survey in September 1992.
DU0672
DU0672.The orthometric height was determined by differential leveling
DU0672.and adjusted by the National Geodetic Survey in November 1993.
DU0672
DU0672.The X, Y, and Z were computed from the position and the ellipsoidal ht.
DU0672
DU0672.The Laplace correction was computed from DEFLEC96 derived deflections.
DU0672
DU0672.The ellipsoidal height was determined by GPS observations
DU0672.and is referenced to NAD 83.
DU0672
DU0672.The geoid height was determined by GEOID96.
DU0672
DU0672.The dynamic height is computed by dividing the NAVD 88
DU0672.geopotential number by the normal gravity value computed on the
DU0672.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DU0672.degrees latitude (G = 980.6199 gals.).
DU0672
DU0672.The modeled gravity was interpolated from observed gravity values.
DU0672
DU0672; North East Units Scale Converg.
DU0672;SPC AZ C - 242,517.116 247,359.657 MT 0.99991425 +0 11 58.5
DU0672;UTM 12 - 3,672,122.792 448,538.686 MT 0.99963265 -0 18 07.8
DU0672
DU0672 SUPERSEDED SURVEY CONTROL
DU0672
DU0672 NAD 83(1986)- 33 11 12.18511(N) 111 33 07.36986(W) ADJUSTED
DU0672 NGVD 29 - 454.372 (meters) 1490.72 (feet) ADJ UNCH
DU0672
DU0672.Superseded values are not recommended for survey control.

DU0672.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DU0672.See file format.dat to determine how the superseded data were derived.
DU0672
DU0672_MARKER: DB = BENCH MARK DISK
DU0672_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT (ROUND)
DU0672_STAMPING: Q 282 1948
DU0672_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DU0672+STABILITY: SURFACE MOTION
DU0672_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DU0672+SATELLITE: SATELLITE OBSERVATIONS - February 04, 1992
DU0672
DU0672 HISTORY - Date Condition Recov. By
DU0672 HISTORY - 1948 MONUMENTED CGS
DU0672 HISTORY - 1967 GOOD NGS
DU0672 HISTORY - 19840404 GOOD
DU0672 HISTORY - 19920110 GOOD NGS
DU0672 HISTORY - 19920204 GOOD NGS
DU0672
DU0672 STATION DESCRIPTION
DU0672
DU0672'DESCRIBED BY NATIONAL GEODETIC SURVEY 1967
DU0672'4.8 MI NW FROM MAGMA.
DU0672'ABOUT 4.8 MILES NORTHWEST ALONG THE SOUTHERN PACIFIC RAILROAD FROM THE
DU0672'STATION SIGN AT MAGMA, IN S 8, T 3 S, R 8 E, 28 1/2 FEET SOUTHWEST OF
DU0672'THE SOUTHWEST RAIL OF THE TRACKS, 37 FEET NORTHWEST OF MILEPOST 945,
DU0672'30 FEET NORTHEAST OF THE CENTER LINE OF A TRAIL ROAD WHICH PARALLELS
DU0672'THE TRACKS, 1.1 FEET SOUTHEAST OF A METAL WITNESS POST, ABOUT 4 FEET
DU0672'BELOW THE LEVEL OF THE TRACKS, AND SET IN THE TOP OF A CONCRETE POST
DU0672'PROJECTING 6 INCHES.
DU0672
DU0672 STATION RECOVERY (1984)
DU0672
DU0672'RECOVERED 1984
DU0672'RECOVERED IN GOOD CONDITION.
DU0672
DU0672 STATION RECOVERY (1992)
DU0672
DU0672'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU0672'0.2 KM (0.10 MI) NORTHERLY ALONG ELLSWORTH ROAD FROM THE POST OFFICE
DU0672'IN QUEEN CREEK, THENCE 1.2 KM (0.75 MI) EASTERLY ALONG OCOTILLO ROAD,
DU0672'THENCE 9.6 KM (5.95 MI) SOUTHEASTERLY ALONG THE SOUTHERN PACIFIC
DU0672'RAILROAD, 14.5 M (47.6 FT) NORTHEAST OF AND LEVEL WITH THE CENTER OF
DU0672'A DIRT ROAD, 11.0 M (36.1 FT) NORTHWEST OF MILEPOST 945, 8.8 M (28.9
DU0672'FT) SOUTHWEST OF THE NEAR RAIL, 8.6 M (28.2 FT) NORTH OF A UTILITY
DU0672'POLE WITH A METER ATTACHED, 0.4 M (1.3 FT) SOUTHEAST OF A WITNESS
DU0672'POST, AND THE MONUMENT PROJECTS 0.1 M (0.3 FT) ABOVE THE GROUND
DU0672'SURFACE.
DU0672
DU0672 STATION RECOVERY (1992)
DU0672
DU0672'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
DU0672'THE STATION IS LOCATED ABOUT 8 KM (5.0 MI) NOTHEAST OF MAGMA, 7 KM
DU0672'(4.3 MI) SOUTHEAST OF QUEEN CREEK, ALONG THE SOUTHERN PACIFIC
DU0672'RAILROAD TRACK, AT MILE 945, 2.5 KM (1.6 MI) SOUTHEAST OF A TRACK
DU0672'SIDING AT STOCK PENS, BETWEEN THE TRACK AND A DIRT ROAD.
DU0672'OWNERSHIP--SOUTHERN PACIFIC RAILROAD.
DU0672'TO REACH THE STATION FROM THE QUEEN CREEK POST OFFICE, GO NORTH ON

DU0672'ELLSWORTH ROAD FOR 0.16 KM (0.10 MI) TO A PAVED CROSSROAD. TURN
DU0672'RIGHT, EAST, ON OCOTILLO ROAD FOR 1.08 KM (0.67 MI) TO A SLANTED
DU0672'PAVED CROSSROAD AT TRACKS. BEAR RIGHT, SOUTHEAST, ON RITTENHOUSE ROAD
DU0672'FOR 4.86 KM (3.02 MI) TO END OF PAVEMENT AT RIGGS ROAD. CONTINUE
DU0672'AHEAD FOR 2.64 KM (1.64 MI) TO AN OVERHEAD ELECTRIC WIRE AND THE
DU0672'STATION ON THE LEFT.
DU0672'THE STATION IS SET IN THE TOP OF A 25-CM SQUARE CONCRETE POST
DU0672'PROJECTING 10-CM. LOCATED 14.8 M (48.6 FT) NORTHEAST OF AND SLIGHTLY
DU0672'HIGHER THAN THE ROAD CENTER, 11.2 M (36.7 FT) NORTHWEST OF A UTILITY
DU0672'POLE WITH MILE MARKER 945, 8.9 M (29.2 FT) NORTH OF A UTILITY POLE
DU0672'WITH METER AND PIPELINE WEATHER UNIT 53-16, 8.9 M (29.2 FT) SOUTHWEST
DU0672'OF THE SOUTHWEST RAIL OF THE TRACK AND 0.4 M (1.3 FT) SOUTHEAST OF A
DU0672'METAL WITNESS POST.

# GPS DATA COLLECTION HARD COPY INFORMATION

0949-01a

```
000001,247257.848,246294.186,452.459,MEAS,
000002,247540.076,246289.767,451.610,MEAS,
000003,247555.055,245423.327,447.558,MEAS,
000005,247534.731,251102.376,476.099,MEAS,
000006,247762.285,251079.128,474.799,MEAS,
000007,247661.686,251562.428,478.677,MEAS,
000008,247444.358,251571.420,478.897,MEAS,
000009,247657.368,249512.113,467.563,MEAS,
000010,248044.236,249510.826,467.048,MEAS,
000011,247928.506,248685.892,462.681,MEAS,
000012,247642.629,248735.770,463.571,MEAS,
000013,247825.480,247910.055,459.802,MEAS,
000014,247582.612,247906.110,458.003,MEAS,
000015,247328.939,247075.423,454.688,MEAS,
000016,247611.207,247089.572,454.028,MEAS,
000017,247832.363,250522.764,470.575,MEAS,
000018,247666.196,250366.883,470.763,MEAS,
000019,247517.521,244461.955,444.240,MEAS,
000020,247349.387,244466.174,444.895,MEAS,
000021,247534.718,251102.361,474.156,MEAS,
00004,247358.459,245442.105,448.180,MEAS,
D 517,0.000,0.000,448.605,FIX,
G 68,248447.706,242037.441,434.925,FIX,
KLEIN 2,250110.029,252350.407,0.000,FIX,
P 364,0.000,0.000,444.060,FIX,
PECOS,253568.031,250875.464,0.000,FIX,
Q 282,242517.116,247359.657,454.444,FIX,
Q 364,0.000,0.000,440.618,FIX,
```

474.160
472.860
476.738
476.958

NOTE:
ELEV.'s FOR 5-8
WHER SHOT W/ BAD
ROD HT AND NEEDED
TO BE ADJUSTED
-1.939 m,

```
D 517,33.122915623,-111.342197978,387.41431,MEAS,
G 68,33.142517145,-111.363194830,373.67337,MEAS,
KLEIN 2,33.151797285,-111.295329984,427.60534,MEAS,
P 364,33.131218431,-111.350204637,382.88918,MEAS,
PECOS,33.171041300,-111.304977283,420.93330,MEAS,
Q 282,33.111209504,-111.330714979,393.27812,MEAS,
Q 364,33.135574208,-111.354489957,379.37807,MEAS,
START,33.135112259,-111.304130321,415.45950,MEAS,
base,33.135270179,-111.303691673,418.18561,FIX,
```

# GPS DATA CONVERSION DATA
# &
# GPS DATA SHEETS

QUEEN CREEK (MCFCD)- COORDINATES FOR AERIAL CONTROL POINTS

| POINT | GRID N (M) | GRID E (M) | ELEV (M) | GRND N (M) | GRND E (M) | GRND N (IF) | GRND E (IF) | ELEV (IF) |
|---|---|---|---|---|---|---|---|---|
| 1 | 247257.848 | 246294.186 | 452.459 | 247295.6147 | 246331.8055 | 811337.3187 | 808175.215 | 1484.446 |
| 2 | 247540.076 | 246289.767 | 451.61 | 247577.8858 | 246327.3859 | 812263.405 | 808160.7148 | 1481.66 |
| 3 | 247555.055 | 245423.327 | 447.558 | 247592.8671 | 245460.8135 | 812312.5562 | 805317.6297 | 1468.366 |
| 4 | 247358.459 | 245442.105 | 448.18 | 247396.2411 | 245479.5944 | 811667.4577 | 805379.2467 | 1470.407 |
| 5 | 247534.731 | 251102.376 | 474.16 | 247572.54 | 251140.73 | 812245.8662 | 823952.5261 | 1555.643 |
| 6 | 247762.285 | 251079.128 | 472.86 | 247800.1288 | 251117.4784 | 812992.5485 | 823876.2415 | 1551.378 |
| 7 | 247661.686 | 251562.428 | 476.738 | 247699.5144 | 251600.8522 | 812662.4489 | 825462.1136 | 1564.101 |
| 8 | 247444.358 | 251571.42 | 476.958 | 247482.1532 | 251609.8456 | 811949.3216 | 825491.6194 | 1564.823 |
| 9 | 247657.368 | 249512.113 | 467.563 | 247695.1958 | 249550.2241 | 812648.2801 | 818734.3309 | 1533.999 |
| 10 | 248044.236 | 249510.826 | 467.048 | 248082.1229 | 249548.9369 | 813917.7259 | 818730.1078 | 1532.31 |
| 11 | 247928.506 | 248685.892 | 462.681 | 247966.3752 | 248723.8769 | 813537.9763 | 816023.2181 | 1517.982 |
| 12 | 247642.629 | 248735.77 | 463.571 | 247680.4545 | 248773.7625 | 812599.9164 | 816186.8848 | 1520.902 |
| 13 | 247825.48 | 247910.055 | 459.802 | 247863.3334 | 247947.9214 | 813199.9129 | 813477.4323 | 1508.537 |
| 14 | 247582.612 | 247906.11 | 458.003 | 247620.4283 | 247943.9758 | 812402.9801 | 813464.4874 | 1502.635 |
| 15 | 247328.939 | 247075.423 | 454.688 | 247366.7166 | 247113.1619 | 811570.5925 | 810738.7201 | 1491.759 |
| 16 | 247611.207 | 247089.572 | 454.028 | 247649.0277 | 247127.313 | 812496.8101 | 810785.1478 | 1489.593 |
| 17 | 247832.363 | 250522.764 | 470.575 | 247870.2175 | 250561.0294 | 813222.4983 | 822050.6215 | 1543.881 |
| 18 | 247666.196 | 250366.883 | 470.763 | 247704.0251 | 250405.1246 | 812677.2477 | 821539.1228 | 1544.498 |
| 19 | 247517.521 | 244461.955 | 444.24 | 247555.3274 | 244499.2947 | 812189.3944 | 802163.0403 | 1457.48 |
| 20 | 247349.387 | 244466.174 | 444.895 | 247387.1677 | 244503.5143 | 811637.6894 | 802176.8843 | 1459.629 |
| AVG: | 247605.0471 | 248250.4137 | 460.919 | | | | | |

**NOTES:**

All Horizontal Coordinates are based on NAD83(1992).
All Elevations are based on NAVD88.
Average Grid to Ground Scale factor for the job site is 0.999847281
International Feet used per Arizona state statute.

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

## SCOPE OF WORK

## DELINEATION OF SPILLWAY FLOWS FOR FOUR EAST SIDE FLOOD RETARDING STRUCTURES

## CONTRACT FCD 98-33

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
# SCOPE OF WORK
# DELINEATION OF SPILLWAY FLOWS FOR FOUR EAST SIDE FLOOD RETARDING STRUCTURES
# FCD 98-33

## GENERAL

The study is to delineate the inundation limits of the 1/3, 2/3, and full spillway discharge values for the Apache Junction, Powerline, Vineyard, and Rittenhouse Flood Retarding Structures (FRS). The combined delineation project consists of approximately 30 linear miles of emergency spillway delineations as depicted on exhibits 1 & 2. The consultant will determine the inundation limits using the U.S. Army Corps of Engineers HEC-RAS computer model. The consultant must use sound engineering judgement in the development of the inundation limits. The results of the HEC-RAS model must be analyzed carefully and refinements made to the input parameters in order to obtain the most realistic results.

**All work must be completed within 690 days from Notice to Proceed, which includes a minimum of 120 days for District reviews.**

## TASK A – APACHE JUNCTION FLOOD RETARDING STRUCTURE

### TASK A1 - COORDINATION

The consultant will submit a project schedule showing coordination meetings and completion dates for each of the tasks in the scope during the proposal stage. The consultant shall update and resubmit this project schedule whenever changes in the schedule occur.

The consultant shall submit a quarterly estimation of the projected billing within 14 days of Notice To Proceed. Thereafter, this estimation will be updated and submitted to the District's Project Manager at least 10 days prior to the end of each quarter.

The consultant will obtain any necessary Rights of Entry. The consultant will furnish the District with a list of all property owners notified and a sample Right of Entry letter.

The consultant shall meet with officials from ADOT, the Cities of Apache Junction and Mesa and other agencies in the study areas. The purpose of this meeting is to notify them about the study and obtain information on current or planned public works projects in the study area.

### TASK A2 - DATA COLLECTION

The consultant will obtain Arizona Department of Transportation (ADOT) and Central Arizona Project (CAP) drainage calculations for hydraulic structures in the area as available. The District will provide the consultant with a copy of the Southeast Mesa ADMS and the East County ADMS. The consultant may utilize structural and hydraulic design data contained in the ADOT, CAP, and ADMS' for hydraulic modeling of structures within the study area.

The District will supply the 3 discharge values to be modeled. The consultant will conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values, photographic documentation of floodplain characteristics, determination of channel bank stations, observation of possible overflow and split flow areas. The results of the field reconnaissance will be included in the Final Report. However, a draft version of the field reconnaissance results will be submitted to the District prior to beginning the hydraulic modeling. The field reconnaissance section of the Final Report will present the determination of channel and overbank "n" values along with color photographs (or color photocopies) of these areas. Photo locations, structures and "n" values will be displayed on reduced (usually 11" x 17") scale exhibit.

The topographic mapping prepared for the Apache Junction FRS will be developed using a Digital Terrain Model (DTM). The DTM will be developed and a copy delivered to the District following the guidelines stated in the District's Data Delivery Specifications: The Hydrologic Information System, Revision 3.1, June 1, 1998. Topographic mapping will be provided at a scale of 1:2400 (1" = 200') with a contour interval of two (2) feet. Mapping will tie-in to the existing topographic mapping for the Signal Butte Flood Retarding Structure Spillway Inundation Study. The topographic mapping must meet the quality control called for in FEMA-37, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995.

All mapping will be provided using the National Geodetic Vertical Datum of 1929 (NGVD 29). As-built mapping of the FRS is available based on the North American Vertical Datum of 1988 (NAVD 88). The consultant will include an Elevation Reference Mark (ERM) in its mapping common to the as-built mapping of the FRS so that the 2 datums may be tied together.

## TASK A3 - HYDRAULIC ANALYSIS

The hydraulic analysis will be preformed using the U.S. Army Corps of Engineers HEC-RAS, Version 2.2, River Analysis System computer model.

The initial location and alignment of cross sections and channel centerline will be submitted for the District's review and approval prior to the initial digitizing of the cross section data and should closely parallel the existing flood insurance study. The usual spacing of cross sections will be approximately every 500 feet, unless geographic or structural constraints dictate closer spacing. The use of a different cross section spacing will require the approval of the District's Project Manager. Cross sections will extend the full width of the inundated area. The orientation of the cross sections may need to be altered after running the HEC-RAS model to ensure that cross sections are perpendicular to flow. Also, to ensure good hydraulic modeling of the spillway discharges, additional cross sections may need to be added, or the existing cross sections may need to be moved. Interpolated cross sections will not be used in the HEC-RAS model. Cross section stationing will be from left to right looking downstream with the thalweg at station 10,000.

Manning's n values are to be determined using the methodology in the USGS report, Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, April 1991. In urbanized areas, the consultant may develop 'n' values to represent various densities of development. The use of high 'n' values to limit flows through areas of dense development and low conveyance is encouraged. The developed 'n' values may be applied to all flow scenarios.

Prior to the completion of the final hydraulic models all of the input data must be reviewed to ensure that it agrees with HEC-RAS model results. This includes: the location of the channel centerline, reach lengths, Manning's n values, ineffective flow limits, discharge values, etc.

The HEC-RAS models will be developed using a mixed flow regime. The HEC-RAS model will be started at the CAP canal based on the estimated discharge spillage high water elevation over the canal bank along the flow lines.

For braided channels, each branch should be modeled with its highest anticipated discharge value. This might require more then one HEC-RAS model to delineate the inundation limits in these areas. A rating curve must be determined and the discharge contained within the channel. The percentage of discharge in each overbank and the main channel must be closely assessed within the split flow area, as well as upstream and downstream of it.

The consultant is to setup the HEC-RAS models so that the cross sections are broken into as many segments as practical for determining the maximum depth and velocity along the cross section. The consultant will need to calculate the time it takes for flows to travel from the spillway to each cross section.

Cross sections shall be plotted showing, computed water surface profiles, ineffective flow areas, "n" values, encroachments, channel stationing, and other pertinent information. The consultant is to make refinements to the HEC-RAS model based on review of the model by the District and other interested Agencies. Adjustments to the input parameters for obtaining the most realistic results are considered normal to the scope of work.

## TASK A4 - FINAL PRODUCTS

Develop an inundation limit exhibit using the supplied topographic data on 24" x 36" size sheets. The use of any larger size sheets will require approval from the District's Project Manager, and the maximum size allowed is 33" x 46". This exhibit will use the District's standard border, title block, and legend format. Shown on this exhibit will be the inundation limits for the three discharges, cross section locations, thalweg location, supplied topographic data, consultant developed topographic data or revisions, major and appropriate minor road names, and elevation reference marks. This exhibit will be plotted at the same scale as the originally supplied topographic data. The use of a different scale will require approval of the District's Project Manager. A table must be included on this exhibit showing the computed water surface elevation of each cross section for each discharge modeled, and other pertinent information such as maximum depth, velocity, and travel time from the spillway to each cross section. In the case of split or braided flow the maximum inundation limit should be shown and the maximum water surface elevation for each portion of the cross section listed. At the end of the study one complete set of inundation limit exhibits will be submitted on non-erasable mylar (3 mil or thicker), and will be sealed by the engineer. No sticky backs or other types of tape products shall be applied to the mylars.

An overall Final Report for the study will be developed. This report will include, a narrative description of the purpose of this study, what steps were undertaken to complete this study, any assumptions made, minutes of meetings with officials from ADOT and the Cities of Apache Junction and Mesa and other agencies, the field reconnaissance results, and a reduced size (11" x 17") copy of the inundation limit exhibit. Included as appendixes to this report should be printouts of the HEC-RAS models, plot of the cross sections, supporting calculations for any other hydraulic analysis done, and a copy of any supplemental survey work performed.

The electronic drawings developed for this study will be submitted in a CADD format that is suitable for translation into the District's Hydrologic Information System (HIS). The drawings will be prepared in conformance with the CADD Data Delivery Specifications portions (primarily Chapter 3 and Appendix C) of the District's HIS Data Delivery Specifications, Revision 3.1, for the following layers:

1. NDXPRJ (CP - 40)
2. PRJ (CP - 60)
3. DQ.TBL (CP - 410)
4. PRJDAT.TBL (CP - 430)
5. SPILLWAY BASELINE ROUTE SYSTEM (CP - 588)
6. SPILLWAY CROSS SECTION (CP - 590)
6. SPILLWAY ZONE (CP - 591)
8. HEC-RAS OUTPUT (CP - 599)

All topographic data developed for this study by the consultant will be prepared in conformance with the CADD Data Delivery Specifications portions of the District's HIS Data Delivery Specifications. Revision 3.1, for the following layers:

1. CARTOGRAPHIC FEATURES (CP - 110)
2. CORNERS (CP - 210)
3. MISCELLANEOUS CONTROL SURVEY POINTS (CP - 215)
4. STRUCTURE (CP - 360)
5. BRIDGE (CP - 608)
6. CANAL SYSTEM (CP - 610)
7. CULVERT (CP - 612)
8. FCD PROJECT FACILITY (CP - 620)
9. STREET DETAIL (CP - 660)
10. ELEVATION (LAND) (CP - 710)
11. RIVER SYSTEM (CP - 960)

The consultant is to only fill out those layers for which data is developed during the course of this study. If the consultant has data that doesn't fall into one of the above layers, the consultant shall contact the District in order to determine what to do with that data. The consultant must follow the applicable CADD specifications when developing their CADD files. The CADD files submitted by the consultant will be subject to a rigorous quality control (QC) check by District staff.

### TASK A5 - DELIVERABLES

1. One set of the inundation limit exhibits (full size) on mylar sealed by the engineer.
2. 4 copies of the Final Report sealed by the engineer, inundation limit exhibits, and copies of the final HEC-RAS models on diskette.
3. All of the CADD data called for in the Final Products Section.
4. The Digital Terrain Model for the mapping developed for this study.
5. Two (2) sets of 9" X 9" contact prints.

## TASK B – Rittenhouse, Vineyard and Powerline Flood Retarding Structures

***No work is to begin on this Task until authorized in writing by the District's Project Manager.***

### TASK B1 - COORDINATION

After receiving authorization to proceed with this task, the consultant will update the project schedule showing coordination meetings and completion dates for each of the tasks in the scope. The consultant shall update and resubmit this project schedule whenever changes in the schedule occur.

The consultant shall submit an updated quarterly estimation of the projected billing within 14 days of Notice to Proceed on this task. Thereafter, this estimation will be updated and submitted to the District's Project Manager at least 10 days prior to the end of each quarter.

The consultant will obtain any necessary Rights of Entry. The consultant will furnish the District with a list of all property owners notified and a sample Right of Entry letter.

The consultant shall meet with officials from Central Arizona Project, the Cities of Mesa, Gilbert and Queen Creek and other agencies in the study area. The purpose of this meeting is to notify them about the study and obtain information on current or planned public works projects in the study area.

## TASK B2 - DATA COLLECTION

The primary source for the topographic mapping data is the Queen Creek Drainage Master Study (DMS). This mapping was originally developed using aerial photogrammetry methods. The horizontal scale is 1" = 200' and the contour interval is two-feet. This mapping will need to be augmented by new data outside the County boundary. The supplemental topographic data and survey work will be at the same scale, and on the same horizontal and vertical datum as the supplied mapping.

The consultant will obtain CAP drainage calculations for hydraulic structures in the area as available. The District will provide the consultant with a copy of the Queen Creek DMS. The consultant may utilize structural and hydraulic design data contained in the CAP and DMS for hydraulic modeling of structures within the study area.

The District will supply the discharge values to be modeled. The consultant will conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values, photographic documentation of floodplain characteristics, determination of channel bank stations, observation of possible overflow and split flow areas. The results of the field reconnaissance will be included in the Final Report. However, a draft version of the field reconnaissance results will be submitted to the District prior to beginning the hydraulic modeling. The field reconnaissance section of the Final Report will present the determination of channel and overbank "n" values along with color photographs (or color photocopies) of these areas. Photo locations, structures and "n" values will be displayed on reduced (usually 11" x 17") scale exhibit

The topographic mapping prepared for the Powerline, Vineyard, and Rittenhouse FRS's will be developed using a Digital Terrain Model (DTM). The DTM will be developed and a copy delivered to the District following the guidelines stated in the District's Data Delivery Specifications: The Hydrologic Information System, Revision 3.1, June 1, 1998. Topographic mapping will be provided at a scale of 1:2400 (1" = 200') with a contour interval of two (2) feet. Mapping will tie-in to the existing mapping for the Queen Creek Area Drainage Master Study (ADMS), and the Queen Creek Hydraulic Master Plan. The topographic mapping must meet the quality control called for in FEMA-37, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995.

All mapping will be provided using the National Geodetic Vertical Datum of 1929 (NGVD 29). As-built mapping of the FRS is available based on the North American Vertical Datum of 1988 (NAVD 88). The consultant will include an Elevation Reference Mark (ERM) in its mapping common to the as-built mapping of the FRS so that the 2 datums may be tied together.

## TASK B3 - HYDRAULIC ANALYSIS

The hydraulic analysis will be preformed using the U.S. Army Corps of Engineers HEC-RAS, Version 2.2, River Analysis System computer model.

The initial location and alignment of cross sections and channel centerline will be submitted for the District's review and approval prior to the initial digitizing of the cross section data and should closely parallel the existing flood insurance study. The usual spacing of cross sections will be approximately every 500 feet, unless

geographic or structural constraints dictate closer spacing. The use of a different cross section spacing will require the approval of the District's Project Manager. Cross sections will extend the full width of the inundated area. The orientation of the cross sections may need to be altered after running the HEC-RAS model to ensure that cross sections are perpendicular to flow. Also, to ensure good hydraulic modeling of the spillway discharges, additional cross sections may need to be added, or the existing cross sections may need to be moved. Interpolated cross sections will not be used in the HEC-RAS model. Cross section stationing will be from left to right looking downstream with the thalweg at station 10,000.

Manning's n values are to be determined using the methodology in the USGS report, Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, April 1991. In urbanized areas, the consultant may develop 'n' values to represent various densities of development. The use of high 'n' values to limit flows through areas of dense development and low conveyance is encouraged. The developed 'n' values may be applied to all flow scenarios.

Prior to the completion of the final hydraulic models all of the input data must be reviewed to ensure that it agrees with HEC-RAS model results. This includes: the location of the channel centerline, reach lengths, Manning's n values, ineffective flow limits, discharge values, etc.

The HEC-RAS models will be developed using a mixed flow regime. The HEC-RAS model should be started far enough downstream to eliminate the affects of the starting conditions on the downstream limit of the study area: and reflect a minimized hazard from spillway flows.

For the north Powerline FRS spillway, three (3) HEC-RAS models will be prepared using the one-third, two-third, and full spillway discharges as supplied by the District.

For the Vineyard FRS, five (5) HEC-RAS models will be prepared for the combination spillway flows from the south Powerline FRS spillway and the Vineyard FRS spillway as determined by the District. The District will provide the consultant with the five (5) spillway flows to be modeled.

For the Rittenhouse FRS, HEC-RAS models will be developed using the one-third, two-third, and full spillway discharges as supplied by the District. Depending on whether failure and non-failure scenarios are needed for the existing diversion dike immediately downstream of the spillway, a minimum of three (3) and as many as six (6) HEC-RAS models may need to be prepared.

For the area downstream of the Powerline and Vineyard FRS' where flows from the two structures combine, the District will supply the discharges to be used in the modeling.

The CAP will be modeled assuming a spillage overtop of the higher of the 2 canal banks along the spillway flowage lines. The CAP will be assumed full at the time of overtopping and, therefore, no reduction in spillway discharge will be made at the CAP.

Several diversion dikes are present in the watershed. Where diversion dikes are encountered in the flow path and are not overtopped, dikes will be analyzed based on the worst case scenarios, failed vs. not failed. Where dikes are overtopped, they will be analyzed assuming failure of the dike.

For the north Powerline FRS spillway, flows are assumed to be traveling in a southwesterly direction. If mapping, modeling, or surveying prepared under this study refutes this assumption and flows are determined to be moving northwesterly, additional mapping will be required under a separate contract or a Change Order to this contract.

For braided channels, each branch should be modeled with its highest anticipated discharge value. This might require more than one HEC-RAS model to delineate the inundation limits in these areas. A rating curve must be determined and the discharge contained within the channel. The percentage of discharge in each overbank and the main channel must be closely assessed within the split flow area, as well as upstream and downstream of it.

The consultant is to setup the HEC-RAS models so that the cross sections are broken into as many segments as practical for determining the maximum depth and velocity along the cross section. The consultant will need to calculate the time it takes for flows to travel from the spillway to each cross section.

Cross sections shall be plotted showing, computed water surface profiles, ineffective flow areas, "n" values, encroachments, channel stationing, and other pertinent information. The consultant is to make refinements to the HEC-RAS model based on review of the model by the District and other interested Agencies. Adjustments to the input parameters for obtaining the most realistic results are considered normal to the scope of work.

## TASK B4 - FINAL PRODUCTS

Develop an inundation limit exhibit using the supplied topographic data on 24" x 36" size sheets. The use of any larger size sheets will require approval from the District's Project Manager, and the maximum size allowed is 33" x 46". This exhibit will use the District's standard border, title block, and legend format. Shown on this exhibit will be the inundation limits for the three discharges, cross section locations, thalweg location, supplied topographic data, consultant developed topographic data or revisions, major and appropriate minor road names, and elevation reference marks. This exhibit will be plotted at the same scale as the originally supplied topographic data. The use of a different scale will require approval of the District's Project Manager. A table must be included on this exhibit showing the computed water surface elevation of each cross section for each discharge modeled, and other pertinent information such as maximum depth, velocity, and travel time from the spillway to each cross section. In the case of split or braided flow the maximum inundation limit should be shown and the maximum water surface elevation for each portion of the cross section listed. At the end of the study one complete set of inundation limit exhibits will be submitted on non-erasable mylar (3 mil or thicker), and will be sealed by the engineer. No sticky backs or other types of tape products shall be applied to the mylars.

An overall Final Report for the study will be developed. This report will include, a narrative description of the purpose of this study, what steps were undertaken to complete this study, any assumptions made, minutes of meetings with officials from Central Arizona Project, the Cities, and agencies, reconnaissance results, and a reduced size (11" x 17") copy of the inundation limit exhibit. Included as appendixes to this report should be printouts of the HEC-RAS models, plot of the cross sections, supporting calculations for any other hydraulic analysis done, and a copy of any supplemental survey work performed.

The electronic drawings developed for this study will be submitted in a CADD format that is suitable for translation into the District's Hydrologic Information System (HIS). The drawings will be prepared in conformance with the CADD Data Delivery Specifications portions (primarily Chapter 3 and Appendix C) of the District's HIS Data Delivery Specifications, Revision 3.1, for the following layers:

1. NDXPRJ (CP - 40)
2. PRJ (CP - 60)
3. DQ.TBL (CP - 410)
4. PRJDAT.TBL (CP - 430)
5. SPILLWAY BASELINE ROUTE SYSTEM (CP - 588)
6. SPILLWAY CROSS SECTION (CP - 590)
7. SPILLWAY ZONE (CP - 591)
8. HEC-RAS OUTPUT (CP - 599)

All topographic data developed for this study by the consultant will be prepared in conformance with the CADD Data Delivery Specifications portions of the District's HIS Data Delivery Specifications, Revision 3.1, for the following layers:

1. CARTOGRAPHIC FEATURES (CP - 110)
2. CORNERS (CP - 210)
3. MISCELLANEOUS CONTROL SURVEY POINTS (CP - 215)

4. STRUCTURE (CP - 360)
5. BRIDGE (CP - 608)
6. CANAL SYSTEM (CP - 610)
7. CULVERT (CP - 612)
8. FCD PROJECT FACILITY (CP - 620)
9. STREET DETAIL (CP - 660)
10. ELEVATION (LAND) (CP - 710)
11. RIVER SYSTEM (CP - 960)

The consultant is to only fill out those layers for which data is developed during the course of this study. If the consultant has data that doesn't fall into one of the above layers, the consultant shall contact the District in order to determine what to do with that data. The consultant must follow the applicable CADD specifications when developing their CADD files. The CADD files submitted by the consultant will be subject to a rigorous quality control (QC) check by District staff.

**TASK B5 - DELIVERABLES**

1. One set of the inundation limit exhibits (full size) on mylar sealed by the engineer.

2. 4 copies of the Final Report sealed by the engineer, inundation limit exhibits, and copies of the HEC-RAS models on diskette.

3. All of the CADD data called for in the Final Products Section.

4. Digital Terrain Models for the new topographic mapping developed for this study

5. Two (2) sets of 9" X 9" contact prints.

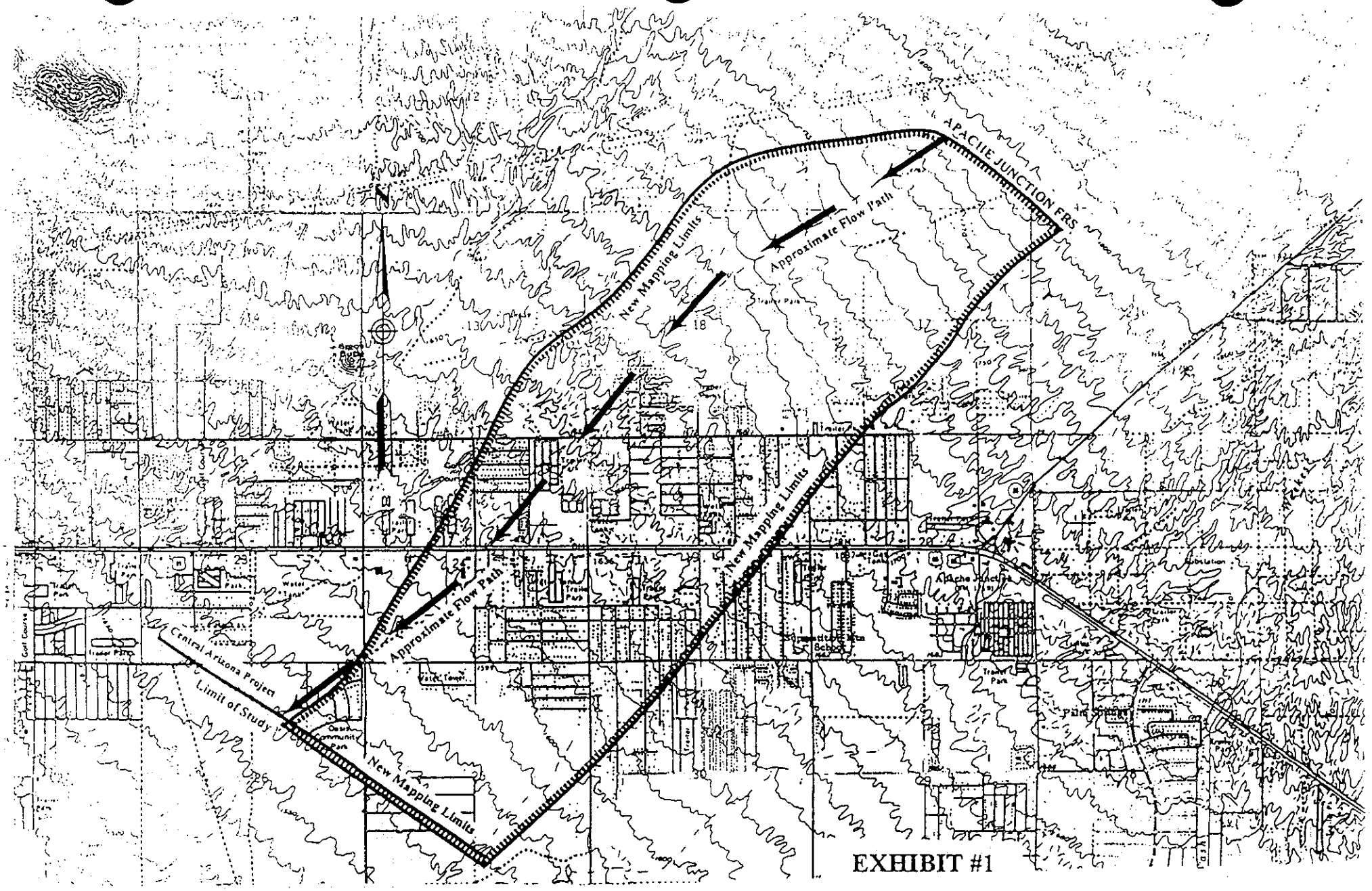
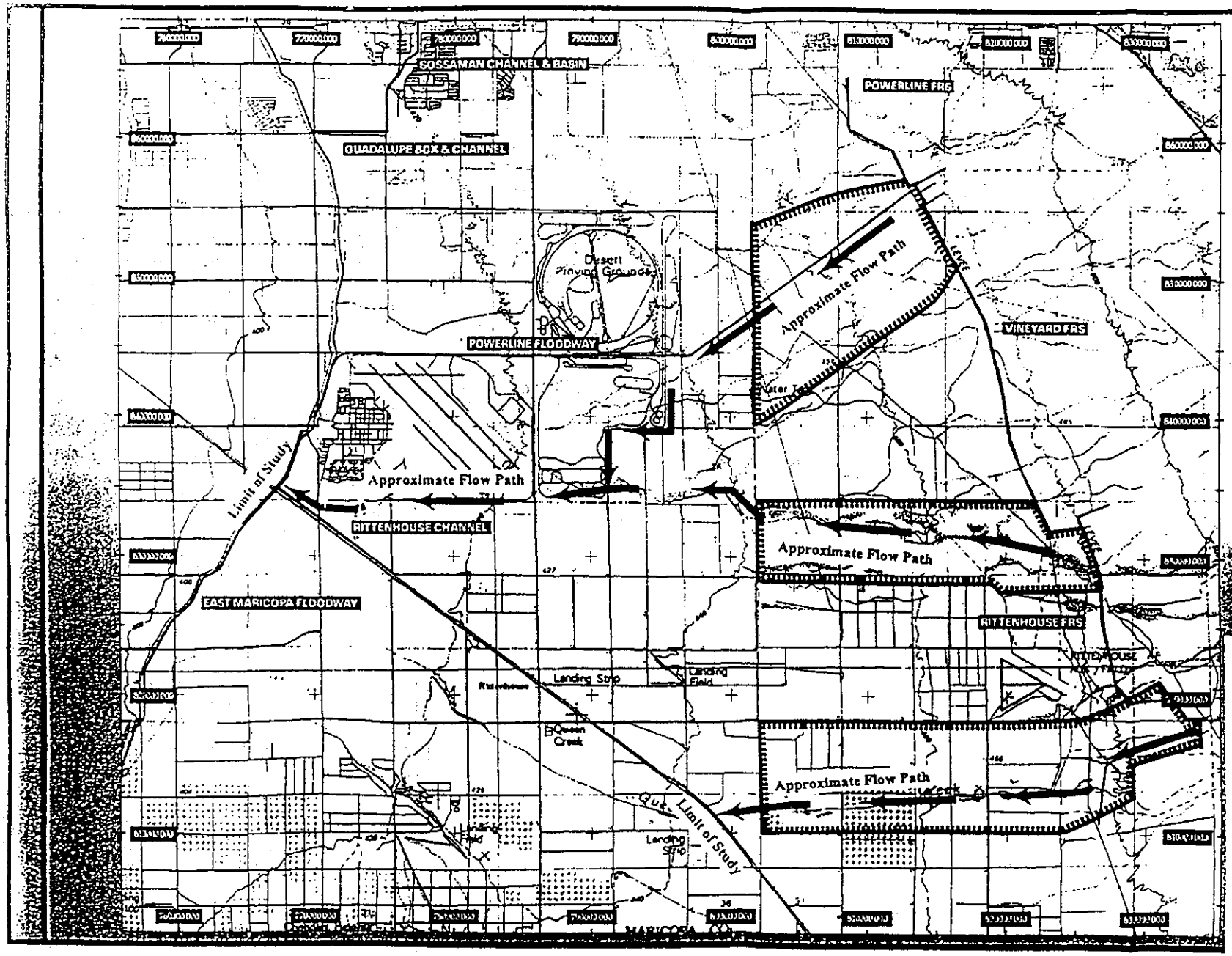

APACHE JUNCTION FRS
Approximate Flow Path
New Mapping Limits
Approximate Flow Path
New Mapping Limits
Central Arizona Project
Limit of Study
New Mapping Limits
Apache Junction
Palm Springs

EXHIBIT #1

# EXHIBIT #2




New Mapping Limits

# MANNING'S 'n' VALUE DETERMINATIONS

## I. INTRODUCTION

A field reconnaissance investigation was conducted on May 14, 2001. The purpose of the trip was to gather data, including photographic documentation, for the estimation of Manning's 'n' values for the areas in the anticipated flow path downstream of the emergency spillway of Rittenhouse Flood Retarding Structures.

A second field reconnaissance investigation was conducted on June 3, 2001. The purpose of this trip was to obtain additional photographic documentation; verify existing land use conditions; and, gather data, including photographic documentation, for the estimation of Manning's 'n' values for the areas downstream of the CAP Culvert.

## II. METHODOLOGY

Manning's 'n' values were assigned based on field observation using the methodology described in ***Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona***, a manual prepared by the U.S. Geological Survey for the FCDMC. A base 'n' value ($n_b$) was assigned according to the bed material. In accordance with the manual, adjustments to the $n_b$ were then made to account for factors affecting the roughness characteristics such as degree of irregularity, effects of obstructions, and vegetation. Typical photographs and calculations for the 'n' values for the areas are included in this section.

The inundation area was basically divided into 3 land use conditions: natural desert, natural channel, and agricultural land. Land use assignments are based on existing conditions.

*Natural Desert:* This land use includes the area immediately downstream of the Rittenhouse FRS emergency spillway to approximately 1500 feet downstream of the CAP. The area consists of natural desert vegetation, predominantly brushy shrubs with a few scattered trees. Bed material is a sandy silt. The vegetation is dense immediately upstream of the CAP. The 'n' values for the channel portion are 0.040 to 0.045 and for the overbank area are 0.050 to 0.060.

*Natural Channel:* This land use includes the area downstream of the CAP to the SPRR Bridge, in both Maricopa County and Pinal County. The area consists of a few natural desert vegetation and scattered trees. Bed materials are sand and gravel. The 'n' value was determined to be 0.035 for the natural channel areas.

*Agricultural Land:* This land use applies to the large crop fields and citrus groves which are present in between Kenworthy Road and Vineyard Road. Field crops generally grown in this part of Maricopa County include small grain, corn/sorghum, and alfalfa. There are some scattered homes over the study area. Due to the spacing and small number of structures and the width of the floodplain, these were assumed to be only a minor obstruction to flow in the 'n' value calculations. The 'n' value was determined to be 0.050 for agricultural land.

## III. PHOTOGRAPHS AND 'n' VALUE ASSIGNMENTS

Along with the calculations for the 'n' value assignments, photographs are provided for typical areas representing the natural desert, channel and agricultural land use conditions. Other 'n' values used in the study are:

| Channel Material | 'n' Value |
|---|---|
| Top of CAP and Road (bare ground) | 0.030-0.035 |
| Earthen Spillway (with vegetation) | 0.040-0.055 |

## IV. COMPARASION OF 'n' VALUE WITH EXISTING MODEL

There is an existing HEC-RAS model for Queen Creek/Sanokai Wash Hydraulic Master Plan project, (Huitt-Zollars, Inc. October, 2000). The "n" values (from SPRR Bridge to the CAP) used in existing model were 0.032 for the channel and 0.040 for the overbank area. The "n" values for the same reach in this study are 0.035 for the channel and 0.050 for the overbank area. The values used in this study are close to the field conditions.

**LOCATION:** **Rittenhouse FRS**

**CROSS SECTION DESCRIPTION:** **Nature Desert** (Photographs 1).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.010$ | **n = 0.040** |
| Left Overbank | $n_b = 0$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = N/A** |
| Right Overbank | $n_b = 0$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = N/A** |

**Photo 1.** Looking upstream (northeast) at Rittenhouse FRS. Natural desert in spillway areas. (Photo date May 14, 2001)

**LOCATION: Upstream of CAP;**

**CROSS SECTION DESCRIPTION: Nature Desert** (Photographs 2-3).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.015$ | **n = 0.045** |
| Left Overbank | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.030$ | **n = 0.060** |
| Right Overbank | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.030$ | **n = 0.060** |

**Photo 2.** Looking downstream (west) at upstream of CAP. Natural desert in spillway areas. (Photo date May 14, 2001)

**Photo 3.** Looking south at upstream of CAP. Natural desert in spillway areas. (Photo date May 14, 2001)

**LOCATION:** **On top of the CAP**

**CROSS SECTION DESCRIPTION:** **Bare ground** (Photographs 4).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = 0.030** |
| Left Overbank | $n_b = 0.035$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = 0.035** |
| Right Overbank | $n_b = 0.035$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = 0.035** |

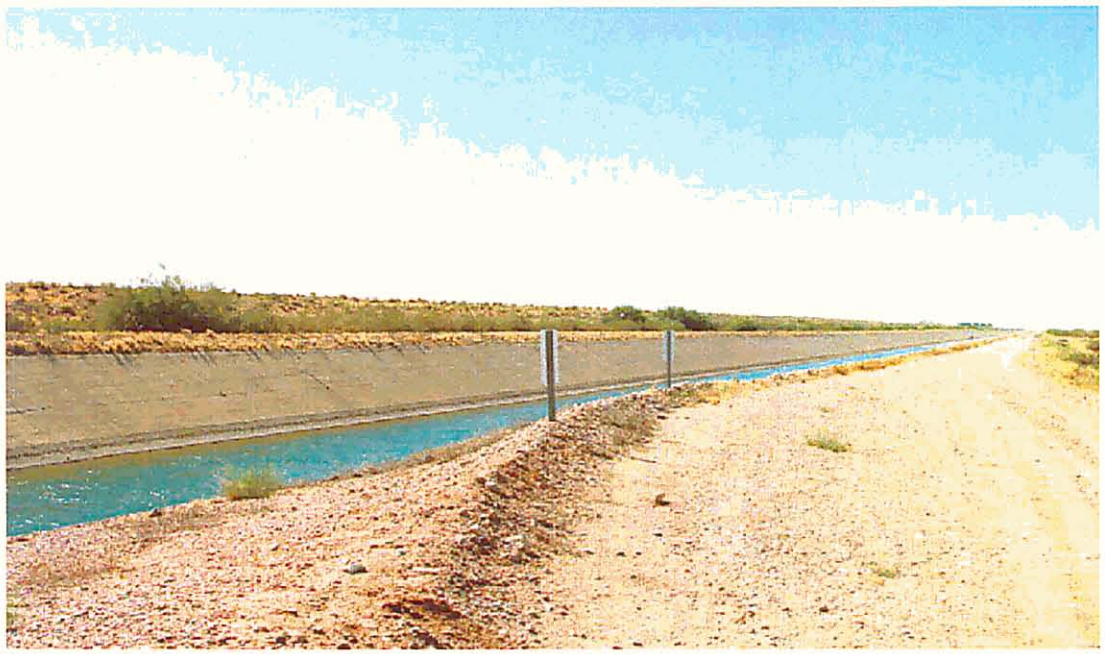


**Photo 4.** On the top of the CAP. (Photo date May 14, 2001)

**LOCATION:** **Downstream of the CAP**

**CROSS SECTION DESCRIPTION:** **Natural Channel and Desert** (Photographs 5-6).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0.030$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.015$ | **n = 0.045** |
| Left Overbank | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.025$ | **n = 0.050** |
| Right Overbank | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.025$ | **n = 0.050** |

**Photo 5.** Looking downstream (west) across CAP at the channel location. (Photo date June 3, 2001)

**Photo 6.** Looking downstream (west) across CAP at right overbank area. (Photo date June 3, 2001)

**LOCATION:** **Downstream of the CAP**

**CROSS SECTION DESCRIPTION:** **Natural Desert** (Photographs 7).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = N/A** |
| Left Overbank | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.015$ | **n = 0.040** |
| Right Overbank | $n_b = 0$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0$ | **n = N/A** |

**Photo 7.** Looking downstream (west) across CAP at left overbank area. (Photo date June 3, 2001)

**LOCATION:** **Downstream of the CAP from Schnepf Road to the SPRR Bridge**

**CROSS SECTION DESCRIPTION:** **Natural Channel and agricultural land** (Photographs 8-13).

| Portion of Cross section | Components | | | | Weighted and Composite Values |
|---|---|---|---|---|---|
| Channel | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.010$ | **n = 0.035** |
| Left Overbank | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.025$ | **n = 0.050** |
| Right Overbank | $n_b = 0.025$ | $n_1 = 0$ | $n_2 = 0$ | $n_3 = 0.025$ | **n = 0.050** |

**Photo 8.** Looking downstream (west) at Schnepf Road Bridge (Photo date May 14, 2001)

**Photo 9.** Looking upstream at Vineyard Road. Natural channel. (Photo date May 14, 2001)

**Photo 10.** Looking downstream (west) at County Boundary. Natural channel. (Photo date June 3, 2001)

**Photo 11.** Looking upstream at the SPRR Bridge. Natural channel (Photo date May 14, 2001)

**Photo 12.** Looking north on right overbank area at County Boundary. Agricultural land. (Photo date June 3, 2001)

**Photo 13.** Looking north on left overbank area upstream of County Boundary. Agricultural land. (Photo date May 14, 2001)

**Photo 14.** Looking west on left overbank area downstream of Schnepf Road. Natural desert. (Photo date May 14, 2001)

| | | | |
|---|---|---|---|
| **Project:** Spillway Inundation Studies – Rittenhouse FRS | | | |
| **Subject:** Expansion Ratio Calculations | | | |
| **Filename:** D:/fcdspill/taskB/Rittenhouse/Engfiles/Report/RHExpCalcs.doc | | | |
| **Computed By:** WC | **Date:** 9/10/01 | **Checked By:** | **Date:** |

# Expansion Ratio Calculations

Location: cross section 16.545 to 16.542

Using Equation B-2:

Cross Section 1 = Cross Section 16.542

Cross Section 2 = Cross Section 16.545

$$ER = 0.421 + 0.485\ (Fc^2/F_c^1) + 1.80 \times 10^{-5}\ (Q)$$

$$= 0.421 + 0.485\ (0.79/0.77) + 1.80 \times 10^{-5}\ (14{,}000)$$

$$= 1.17$$

Check Range in Table B.2:

$b/B = 210/284 = 0.74$ Use: $b/B = 0.5$

$n_{ob}/n_c = 0.035/0.035 = 1.00$ Use: $n_{ob}/n_c = 1$

$s = 0.0051$ ft/ft = 26.9 ft/mi Use: 10 ft/mi

Then, ER = 1.3 – 2.0

Use: **ER = 2.0**

| | | | |
|---|---|---|---|
| **Project:** Spillway Inundation Studies – Rittenhouse FRS | | | |
| **Subject:** Expansion Ratio Calculations | | | |
| **Filename:** D:/fcdspill/taskB/Rittenhouse/Engfiles/Report/RHExpCalcs.doc | | | |
| **Computed By:** WC | **Date:** 9/10/01 | **Checked By:** | **Date:** |

# Expansion Ratio Calculations

Location: cross section 15.523 to 15.495

Using Equation B-2:

Cross Section 1 = Cross Section 15.495

Cross Section 2 = Cross Section 15.523

$$ER = 0.421 + 0.485\ (Fc^2/F_c^1) + 1.80 \times 10^{-5}\ (Q)$$

$$= 0.421 + 0.485\ (0.99/0.52) + 1.80 \times 10^{-5}\ (14{,}000)$$

$$= 1.60$$

Check Range in Table B.2:

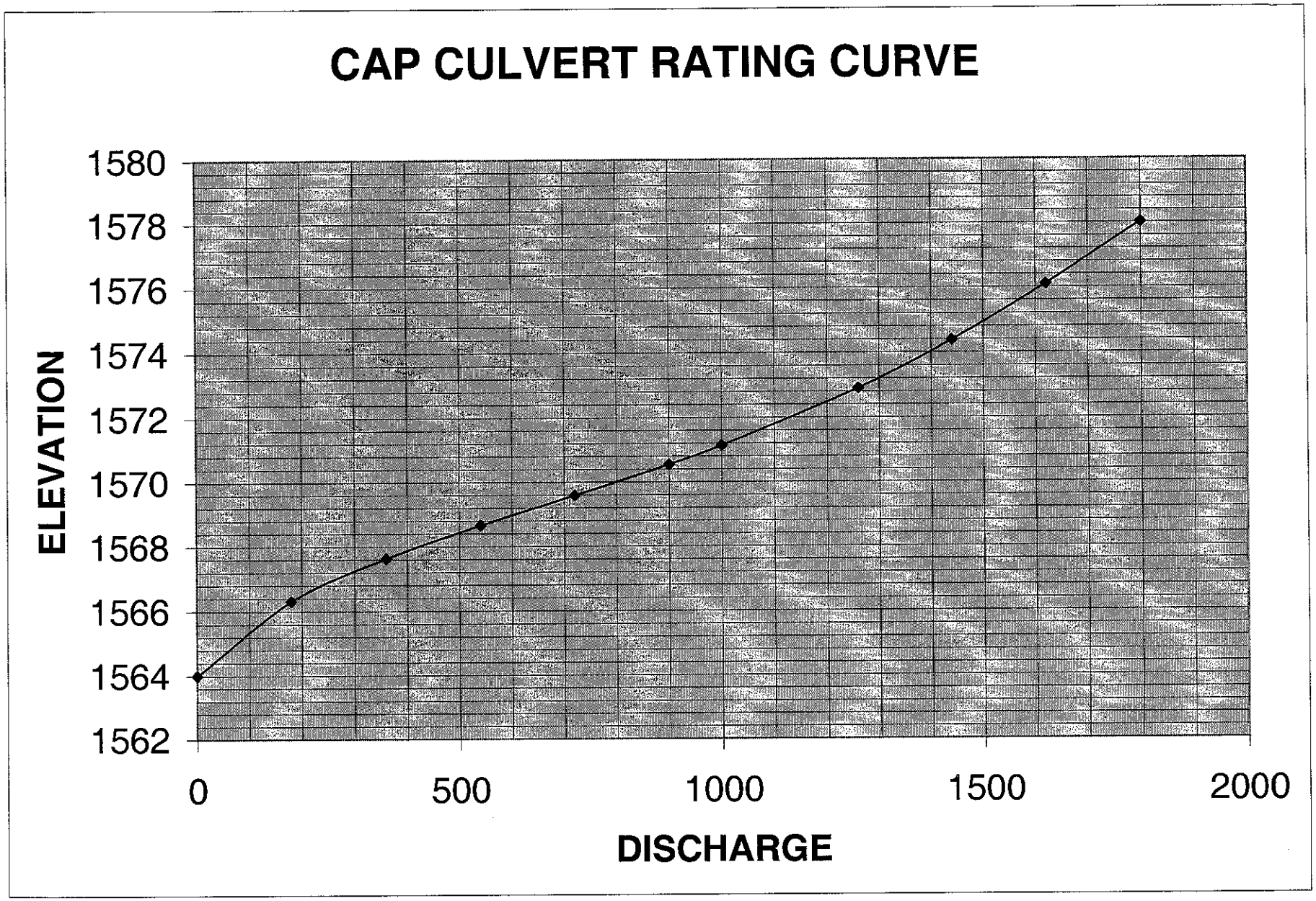
$b/B = 290/490 = 0.59$ Use: $b/B = 0.5$

$n_{ob}/n_c = 0.035/0.035 = 1.00$ Use: $n_{ob}/n_c = 1$

$s = 0.0029$ ft/ft = 15.3 ft/mi Use: 10 ft/mi

Then, ER = 1.3 – 2.0

Use: **ER = 2.0**


CAP CULVERT RATING CURVE
ELEVATION
1580
1578
1576
1574
1572
1570
1568
1566
1564
1562
0
500
1000
1500
2000
DISCHARGE

# Culvert calculation for the CAP Culvert

CURRENT DATE: 08-28-2001 FILE DATE: 08-28-2001
CURRENT TIME: 10:44:30 FILE NAME: CULCAP1

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

| CULV NO. | SITE DATA: INLET ELEV. (ft) | OUTLET ELEV. (ft) | CULVERT LENGTH (ft) | CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL | SPAN (ft) | RISE (ft) | MANNING n | INLET TYPE |
|---|---|---|---|---|---|---|---|---|
| 1 | 1564.00 | 1562.00 | 192.01 | 1 RCP | 6.00 | 6.00 | .014 | CONVENTIONAL |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |

SUMMARY OF CULVERT FLOWS (cfs) FILE: CULCAP1 DATE: 08-28-2001

| ELEV (ft) | TOTAL | 1 | 2 | 3 | 4 | 5 | 6 | ROADWAY | ITR |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1566.31 | 45.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1567.62 | 90.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1568.65 | 135.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1569.58 | 180.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1570.55 | 225.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1571.13 | 250.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1572.90 | 315.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1574.38 | 360.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1576.09 | 405.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1578.02 | 450.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | OVERTOPPING | |

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: CULCAP1 DATE: 08-28-2001

| HEAD ELEV (ft) | HEAD ERROR (ft) | TOTAL FLOW (cfs) | FLOW ERROR (cfs) | % FLOW ERROR |
|---|---|---|---|---|
| 0.00 | 0.000 | 0.00 | 0.00 | 0.00 |
| 1566.31 | 0.000 | 45.00 | 0.00 | 0.00 |
| 1567.62 | 0.000 | 90.00 | 0.00 | 0.00 |
| 1568.65 | 0.000 | 135.00 | 0.00 | 0.00 |
| 1569.58 | 0.000 | 180.00 | 0.00 | 0.00 |
| 1570.55 | 0.000 | 225.00 | 0.00 | 0.00 |
| 1571.13 | 0.000 | 250.00 | 0.00 | 0.00 |
| 1572.90 | 0.000 | 315.00 | 0.00 | 0.00 |
| 1574.38 | 0.000 | 360.00 | 0.00 | 0.00 |
| 1576.09 | 0.000 | 405.00 | 0.00 | 0.00 |
| 1578.02 | 0.000 | 450.00 | 0.00 | 0.00 |

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 08-27-2001 FILE DATE: 08-27-2001
CURRENT TIME: 12:43:04 FILE NAME: CULCAP1

PERFORMANCE CURVE FOR CULVERT 1 - 1( 6.00 (ft) BY 6.00 (ft)) RCP

| DIS-CHARGE FLOW (cfs) | HEAD-WATER ELEV. (ft) | INLET CONTROL DEPTH (ft) | OUTLET CONTROL DEPTH (ft) | FLOW TYPE <F4> | NORMAL DEPTH (ft) | CRIT. DEPTH (ft) | OUTLET DEPTH (ft) | TW DEPTH (ft) | OUTLET VEL. (fps) | TW VEL. (fps) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1564.00 | 0.00 | -2.00 | 0-NF | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 45.00 | 1566.31 | 2.31 | 1.97 | 1-S2n | 1.34 | 1.77 | 1.27 | 0.54 | 10.21 | 5.06 |
| 90.00 | 1567.62 | 3.62 | 2.60 | 1-S2n | 1.92 | 2.54 | 1.96 | 0.79 | 11.22 | 6.23 |
| 135.00 | 1568.65 | 4.65 | 3.33 | 1-S2n | 2.40 | 3.14 | 2.46 | 0.97 | 12.39 | 7.00 |
| 180.00 | 1569.58 | 5.58 | 4.17 | 1-S2n | 2.81 | 3.65 | 2.89 | 1.13 | 13.32 | 7.59 |
| 225.00 | 1570.54 | 6.54 | 5.15 | 1-S2n | 3.21 | 4.10 | 3.32 | 1.26 | 14.03 | 8.07 |
| 250.00 | 1571.13 | 7.13 | 5.75 | 1-S2n | 3.43 | 4.32 | 3.54 | 1.33 | 14.41 | 8.30 |
| 315.00 | 1572.90 | 8.90 | 7.53 | 5-S2n | 4.01 | 4.83 | 4.11 | 1.49 | 15.26 | 8.85 |
| 360.00 | 1574.38 | 10.38 | 8.92 | 5-S2n | 4.45 | 5.09 | 4.54 | 1.59 | 15.73 | 9.17 |
| 405.00 | 1576.09 | 12.09 | 10.48 | 5-S2n | 5.01 | 5.34 | 5.05 | 1.68 | 15.99 | 9.47 |
| 450.00 | 1578.02 | 14.02 | 11.69 | 2-M2c | 6.00 | 5.60 | 5.60 | 1.77 | 16.49 | 9.74 |

El. inlet face invert 1564.00 ft El. outlet invert 1562.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

```
***** SITE DATA ***** CULVERT INVERT **************
      INLET STATION                          0.00 ft
      INLET ELEVATION                     1564.00 ft
      OUTLET STATION                       192.00 ft
      OUTLET ELEVATION                    1562.00 ft
      NUMBER OF BARRELS                      1
      SLOPE (V/H)                            0.0104
      CULVERT LENGTH ALONG SLOPE           192.01 ft

***** CULVERT DATA SUMMARY ************************
      BARREL SHAPE          CIRCULAR
      BARREL DIAMETER         6.00 ft
      BARREL MATERIAL       CONCRETE
      BARREL MANNING'S n    0.014
      INLET TYPE            CONVENTIONAL
      INLET EDGE AND WALL   SQUARE EDGE WITH HEADWALL
      INLET DEPRESSION      NONE
```

CURRENT DATE: 08-27-2001
CURRENT TIME: 12:43:04

FILE DATE: 08-27-2001
FILE NAME: CULCAP1

## TAILWATER

******* REGULAR CHANNEL CROSS SECTION **********

| | |
|---|---|
| BOTTOM WIDTH | 12.00 ft |
| SIDE SLOPE H/V (X:1) | 8.0 |
| CHANNEL SLOPE V/H (ft/ft) | 0.090 |
| MANNING'S n (.01-0.1) | 0.050 |
| CHANNEL INVERT ELEVATION | 1562.00 ft |
| CULVERT NO.1 OUTLET INVERT ELEVATION | 1562.00 ft |

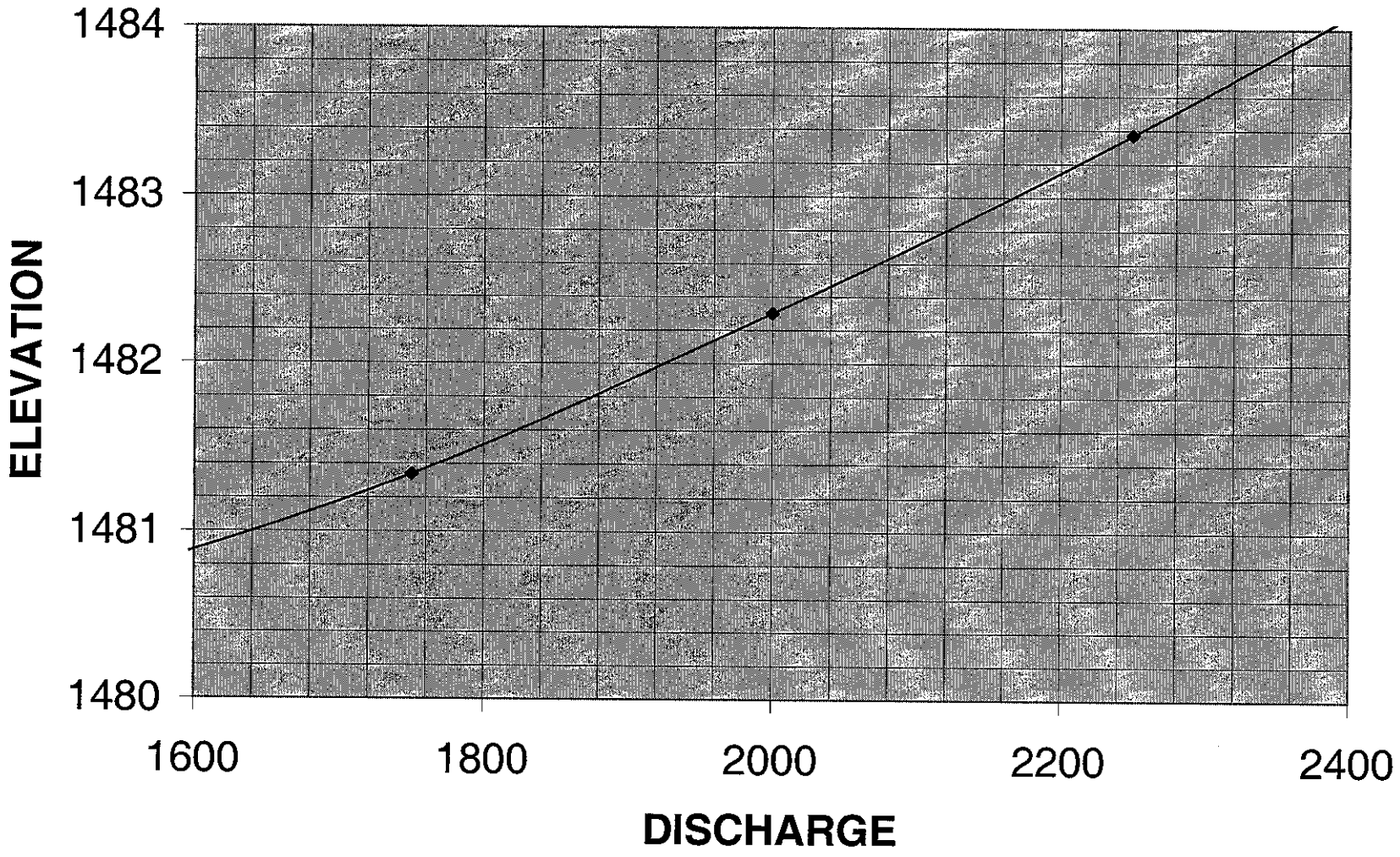
******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

| FLOW (cfs) | W.S.E. (ft) | FROUDE NUMBER | DEPTH (ft) | VEL. (f/s) | SHEAR (psf) |
|---|---|---|---|---|---|
| 0.00 | 1562.00 | 0.000 | 0.00 | 0.00 | 0.00 |
| 45.00 | 1562.54 | 1.210 | 0.54 | 5.06 | 3.05 |
| 90.00 | 1562.79 | 1.236 | 0.79 | 6.23 | 4.43 |
| 135.00 | 1562.97 | 1.250 | 0.97 | 7.00 | 5.47 |
| 180.00 | 1563.13 | 1.259 | 1.13 | 7.59 | 6.34 |
| 225.00 | 1563.26 | 1.266 | 1.26 | 8.07 | 7.09 |
| 250.00 | 1563.33 | 1.269 | 1.33 | 8.30 | 7.47 |
| 315.00 | 1563.49 | 1.278 | 1.49 | 8.85 | 8.36 |
| 360.00 | 1563.59 | 1.283 | 1.59 | 9.17 | 8.92 |
| 405.00 | 1563.68 | 1.287 | 1.68 | 9.47 | 9.44 |
| 450.00 | 1563.77 | 1.290 | 1.77 | 9.74 | 9.93 |

## ROADWAY OVERTOPPING DATA

| | |
|---|---|
| ROADWAY SURFACE | PAVED |
| EMBANKMENT TOP WIDTH | 88.00 ft |
| CREST LENGTH | 50.00 ft |
| OVERTOPPING CREST ELEVATION | 963.79 ft |

# VINEYARD ROAD CULVERT RATING CURVE



# Culvert calculation for Vineyard Road Culvert

CURRENT DATE: 08-28-2001 FILE DATE: 08-28-2001
CURRENT TIME: 10:15:54 FILE NAME: CULVINE2

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.0

| CULV NO. | SITE DATA: INLET ELEV. (ft) | OUTLET ELEV. (ft) | CULVERT LENGTH (ft) | CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL | SPAN (ft) | RISE (ft) | MANNING n | INLET TYPE |
|---|---|---|---|---|---|---|---|---|
| 1 | 1474.40 | 1474.00 | 40.00 | 1 RCB | 8.00 | 5.00 | .014 | CONVENTIONAL |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |

SUMMARY OF CULVERT FLOWS (cfs) FILE: CULVINE2 DATE: 08-28-2001

| ELEV (ft) | TOTAL | 1 | 2 | 3 | 4 | 5 | 6 | ROADWAY | ITR |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1479.29 | 50.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1479.41 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1479.60 | 150.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1479.88 | 200.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1480.24 | 250.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1480.67 | 300.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1481.34 | 350.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1482.30 | 400.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1483.37 | 450.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 1484.57 | 500.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0 |
| 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | OVERTOPPING | |

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: CULVINE2 DATE: 08-28-2001

| HEAD ELEV (ft) | HEAD ERROR (ft) | TOTAL FLOW (cfs) | FLOW ERROR (cfs) | % FLOW ERROR |
|---|---|---|---|---|
| 0.00 | 0.000 | 0.00 | 0.00 | 0.00 |
| 1479.29 | 0.000 | 50.00 | 0.00 | 0.00 |
| 1479.41 | 0.000 | 100.00 | 0.00 | 0.00 |
| 1479.60 | 0.000 | 150.00 | 0.00 | 0.00 |
| 1479.88 | 0.000 | 200.00 | 0.00 | 0.00 |
| 1480.24 | 0.000 | 250.00 | 0.00 | 0.00 |
| 1480.67 | 0.000 | 300.00 | 0.00 | 0.00 |
| 1481.34 | 0.000 | 350.00 | 0.00 | 0.00 |
| 1482.30 | 0.000 | 400.00 | 0.00 | 0.00 |
| 1483.37 | 0.000 | 450.00 | 0.00 | 0.00 |
| 1484.57 | 0.000 | 500.00 | 0.00 | 0.00 |

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 08-28-2001 FILE DATE: 08-28-2001
CURRENT TIME: 10:15:54 FILE NAME: CULVINE2

PERFORMANCE CURVE FOR CULVERT 1 - 1( 8.00 (ft) BY 5.00 (ft)) RCB

| DIS-CHARGE FLOW (cfs) | HEAD-WATER ELEV. (ft) | INLET CONTROL DEPTH (ft) | OUTLET CONTROL DEPTH (ft) | FLOW TYPE <F4> | NORMAL DEPTH (ft) | CRIT. DEPTH (ft) | OUTLET DEPTH (ft) | TW DEPTH (ft) | OUTLET VEL. (fps) | TW VEL. (fps) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1479.25 | 0.00 | 4.85 | 0-NF | 0.00 | 0.00 | 0.00 | 5.25 | 0.00 | 0.00 |
| 50.00 | 1479.29 | 1.82 | 4.89 | 1-S1f | 0.76 | 1.07 | 5.00 | 5.25 | 1.25 | 0.00 |
| 100.00 | 1479.41 | 2.87 | 5.01 | 4-FFt | 1.22 | 1.70 | 5.00 | 5.25 | 2.50 | 0.00 |
| 150.00 | 1479.61 | 3.74 | 5.21 | 4-FFt | 1.60 | 2.22 | 5.00 | 5.25 | 3.75 | 0.00 |
| 200.00 | 1479.88 | 4.52 | 5.48 | 4-FFt | 1.96 | 2.69 | 5.00 | 5.25 | 5.00 | 0.00 |
| 250.00 | 1480.24 | 5.29 | 5.84 | 4-FFt | 2.28 | 3.13 | 5.00 | 5.25 | 6.25 | 0.00 |
| 300.00 | 1480.67 | 6.08 | 6.27 | 4-FFt | 2.60 | 3.53 | 5.00 | 5.25 | 7.50 | 0.00 |
| 350.00 | 1481.34 | 6.94 | 6.79 | 4-FFt | 2.90 | 3.91 | 2.90 | 5.25 | 15.06 | 0.00 |
| 400.00 | 1482.30 | 7.90 | 7.38 | 4-FFt | 3.20 | 4.28 | 3.20 | 5.25 | 15.62 | 0.00 |
| 450.00 | 1483.37 | 8.97 | 8.05 | 4-FFt | 3.49 | 4.62 | 3.49 | 5.25 | 16.11 | 0.00 |
| 500.00 | 1484.57 | 10.17 | 8.80 | 4-FFt | 3.77 | 4.96 | 3.77 | 5.25 | 16.56 | 0.00 |

El. inlet face invert 1474.40 ft El. outlet invert 1474.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

```
***** SITE DATA ***** CULVERT INVERT **************
      INLET STATION                          0.00 ft
      INLET ELEVATION                     1474.40 ft
      OUTLET STATION                        40.00 ft
      OUTLET ELEVATION                    1474.00 ft
      NUMBER OF BARRELS                      1
      SLOPE (V/H)                            0.0100
      CULVERT LENGTH ALONG SLOPE            40.00 ft

***** CULVERT DATA SUMMARY ************************
      BARREL SHAPE          BOX
      BARREL SPAN             8.00 ft
      BARREL RISE             5.00 ft
      BARREL MATERIAL       CONCRETE
      BARREL MANNING'S n    0.014
      INLET TYPE            CONVENTIONAL
      INLET EDGE AND WALL   SQUARE EDGE  (90-45 DEG.)
      INLET DEPRESSION      NONE
```

CURRENT DATE: 08-28-2001
CURRENT TIME: 10:15:54

FILE DATE: 08-28-2001
FILE NAME: CULVINE2

## TAILWATER

CONSTANT WATER SURFACE ELEVATION
1479.25

## ROADWAY OVERTOPPING DATA

| | |
|---|---|
| ROADWAY SURFACE | PAVED |
| EMBANKMENT TOP WIDTH | 25.00 ft |
| CREST LENGTH | 50.00 ft |
| OVERTOPPING CREST ELEVATION | 1483.00 ft |

HEC-RAS Plan: LM 14000 cfs River: Queen Creek Reach: SPRR-Boundary

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR-Boundary | 13.350 | 10900.00 | 1449.40 | 1453.88 | 1453.88 | 1454.93 | 0.007302 | 8.66 | 1659.54 | 2103.06 | 0.79 |
| SPRR-Boundary | 13.307 | 10900.00 | 1447.50 | 1453.26 | 1451.37 | 1453.55 | 0.002200 | 5.27 | 2776.11 | 2498.97 | 0.45 |
| SPRR-Boundary | 13.212 | 10900.00 | 1446.10 | 1452.11 | 1449.49 | 1452.42 | 0.002079 | 4.99 | 2872.66 | 3332.07 | 0.43 |
| SPRR-Boundary | 13.118 | 10900.00 | 1444.10 | 1450.90 | 1449.40 | 1451.30 | 0.002500 | 6.51 | 3112.14 | 2647.83 | 0.49 |
| SPRR-Boundary | 13.023 | 12050.00 | 1442.50 | 1448.85 | 1448.85 | 1449.68 | 0.003977 | 8.15 | 2636.93 | 2752.58 | 0.62 |
| SPRR-Boundary | 12.929 | 13030.00 | 1441.00 | 1448.32 | 1446.72 | 1448.54 | 0.001022 | 4.45 | 4696.86 | 2658.62 | 0.32 |
| SPRR-Boundary | 12.827 | 13095.00 | 1438.80 | 1447.51 | 1443.94 | 1447.90 | 0.001051 | 5.41 | 3664.09 | 1889.19 | 0.34 |
| SPRR-Boundary | 12.788 | 12248.00 | 1437.50 | 1447.42 | 1443.74 | 1447.64 | 0.000677 | 4.44 | 4279.10 | 1418.43 | 0.28 |
| SPRR-Boundary | 12.743 | 11475.00 | 1436.70 | 1447.11 | | 1447.44 | 0.000884 | 5.14 | 3199.48 | 754.79 | 0.32 |
| SPRR-Boundary | 12.729 | 11018.00 | 1436.80 | 1446.75 | 1441.78 | 1447.31 | 0.000685 | 5.97 | 1845.69 | 200.91 | 0.35 |
| SPRR-Boundary | 12.725 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.721 | 11018.00 | 1436.80 | 1445.69 | 1441.78 | 1446.40 | 0.001000 | 6.74 | 1634.99 | 197.63 | 0.41 |
| SPRR-Boundary | 12.704 | 11018.00 | 1436.80 | 1444.20 | 1442.71 | 1445.94 | 0.003637 | 10.58 | 1041.82 | 151.60 | 0.71 |
| SPRR-Boundary | 12.700 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.689 | 11018.00 | 1436.80 | 1443.93 | 1442.71 | 1445.81 | 0.004124 | 11.01 | 1000.77 | 150.81 | 0.75 |
| SPRR-Boundary | 12.662 | 11018.00 | 1436.00 | 1444.10 | | 1444.92 | 0.001765 | 7.41 | 1654.15 | 385.00 | 0.50 |
| SPRR-Boundary | 12.624 | 11018.00 | 1435.20 | 1443.42 | | 1444.45 | 0.002425 | 8.16 | 1411.92 | 340.00 | 0.58 |
| SPRR-Boundary | 12.586 | 11018.00 | 1434.30 | 1442.24 | | 1443.76 | 0.004334 | 9.91 | 1128.53 | 242.90 | 0.72 |
| SPRR-Boundary | 12.549 | 11018.00 | 1434.00 | 1441.92 | | 1442.88 | 0.003009 | 7.87 | 1413.58 | 258.95 | 0.56 |
| SPRR-Boundary | 12.511 | 11018.00 | 1433.00 | 1441.39 | 1438.82 | 1442.32 | 0.002504 | 7.88 | 1531.94 | 333.49 | 0.52 |

HEC-RAS Plan: LM 9333 cfs River: Queen Creek Reach: SPRR-Boundary

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR-Boundary | 13.350 | 9200.00 | 1449.40 | 1453.45 | 1453.45 | 1454.56 | 0.008601 | 8.69 | 1254.73 | 806.09 | 0.85 |
| SPRR-Boundary | 13.307 | 9200.00 | 1447.50 | 1452.89 | 1451.11 | 1453.14 | 0.002166 | 4.95 | 2482.69 | 1091.96 | 0.44 |
| SPRR-Boundary | 13.212 | 9200.00 | 1446.10 | 1451.78 | 1449.17 | 1452.06 | 0.001958 | 4.65 | 2437.84 | 2751.72 | 0.41 |
| SPRR-Boundary | 13.118 | 9200.00 | 1444.10 | 1450.68 | 1449.11 | 1451.04 | 0.002224 | 5.98 | 2766.75 | 2558.47 | 0.46 |
| SPRR-Boundary | 13.023 | 9200.00 | 1442.50 | 1447.94 | 1447.23 | 1449.20 | 0.006291 | 9.15 | 1185.28 | 1336.76 | 0.76 |
| SPRR-Boundary | 12.929 | 9200.00 | 1441.00 | 1447.03 | 1445.19 | 1447.37 | 0.001851 | 5.08 | 2661.03 | 1515.64 | 0.42 |
| SPRR-Boundary | 12.827 | 9200.00 | 1438.80 | 1445.99 | 1443.01 | 1446.44 | 0.001435 | 5.47 | 1737.97 | 299.88 | 0.38 |
| SPRR-Boundary | 12.788 | 9200.00 | 1437.50 | 1445.76 | 1442.90 | 1446.12 | 0.001268 | 5.21 | 2445.31 | 1278.33 | 0.36 |
| SPRR-Boundary | 12.743 | 9200.00 | 1436.70 | 1444.90 | | 1445.66 | 0.002518 | 7.05 | 1386.81 | 638.08 | 0.51 |
| SPRR-Boundary | 12.729 | 9200.00 | 1436.80 | 1444.86 | 1441.22 | 1445.47 | 0.000969 | 6.25 | 1472.05 | 195.05 | 0.40 |
| SPRR-Boundary | 12.725 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.721 | 9200.00 | 1436.80 | 1444.81 | 1441.22 | 1445.43 | 0.000991 | 6.29 | 1461.70 | 194.88 | 0.41 |
| SPRR-Boundary | 12.704 | 9200.00 | 1436.80 | 1443.53 | 1442.06 | 1445.01 | 0.003485 | 9.77 | 941.20 | 149.65 | 0.69 |
| SPRR-Boundary | 12.700 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.689 | 9200.00 | 1436.80 | 1443.32 | 1442.05 | 1444.91 | 0.003887 | 10.12 | 909.06 | 149.03 | 0.72 |
| SPRR-Boundary | 12.662 | 9200.00 | 1436.00 | 1443.35 | | 1444.13 | 0.001920 | 7.15 | 1366.30 | 385.00 | 0.51 |
| SPRR-Boundary | 12.624 | 9200.00 | 1435.20 | 1442.72 | | 1443.65 | 0.002542 | 7.75 | 1196.24 | 245.88 | 0.58 |
| SPRR-Boundary | 12.586 | 9200.00 | 1434.30 | 1441.66 | | 1442.97 | 0.004169 | 9.20 | 1002.89 | 193.71 | 0.70 |
| SPRR-Boundary | 12.549 | 9200.00 | 1434.00 | 1441.29 | | 1442.12 | 0.002999 | 7.32 | 1258.24 | 235.05 | 0.54 |
| SPRR-Boundary | 12.511 | 9200.00 | 1433.00 | 1440.73 | 1438.21 | 1441.57 | 0.002503 | 7.42 | 1314.61 | 325.67 | 0.51 |

HEC-RAS Plan: LM 4667 cfs River: Queen Creek Reach: SPRR-Boundary

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR-Boundary | 13.350 | 4667.00 | 1449.40 | 1452.20 | 1452.08 | 1453.07 | 0.011909 | 7.50 | 625.63 | 340.78 | 0.92 |
| SPRR-Boundary | 13.307 | 4667.00 | 1447.50 | 1451.40 | 1450.29 | 1451.60 | 0.003061 | 4.41 | 1443.79 | 670.98 | 0.48 |
| SPRR-Boundary | 13.212 | 4667.00 | 1446.10 | 1450.25 | 1448.21 | 1450.41 | 0.001705 | 3.53 | 1439.06 | 863.08 | 0.37 |
| SPRR-Boundary | 13.118 | 4667.00 | 1444.10 | 1448.92 | 1448.13 | 1449.29 | 0.003171 | 5.64 | 1124.16 | 517.97 | 0.52 |
| SPRR-Boundary | 13.023 | 4667.00 | 1442.50 | 1446.87 | 1445.81 | 1447.48 | 0.004111 | 6.27 | 750.74 | 218.55 | 0.59 |
| SPRR-Boundary | 12.929 | 4667.00 | 1441.00 | 1444.94 | 1443.97 | 1445.40 | 0.004127 | 5.43 | 858.93 | 305.17 | 0.57 |
| SPRR-Boundary | 12.827 | 4667.00 | 1438.80 | 1443.71 | 1441.72 | 1444.00 | 0.001675 | 4.40 | 1078.35 | 277.55 | 0.39 |
| SPRR-Boundary | 12.788 | 4667.00 | 1437.50 | 1443.13 | 1441.37 | 1443.57 | 0.002475 | 5.31 | 879.29 | 220.02 | 0.47 |
| SPRR-Boundary | 12.743 | 4667.00 | 1436.70 | 1442.22 | | 1442.85 | 0.003597 | 6.35 | 735.23 | 186.12 | 0.56 |
| SPRR-Boundary | 12.729 | 4667.00 | 1436.80 | 1442.23 | 1439.63 | 1442.59 | 0.000942 | 4.82 | 968.38 | 186.86 | 0.37 |
| SPRR-Boundary | 12.725 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.721 | 4667.00 | 1436.80 | 1442.20 | 1439.63 | 1442.56 | 0.000959 | 4.85 | 962.86 | 186.77 | 0.38 |
| SPRR-Boundary | 12.704 | 4667.00 | 1436.80 | 1441.43 | 1440.17 | 1442.28 | 0.003136 | 7.36 | 633.81 | 143.53 | 0.62 |
| SPRR-Boundary | 12.700 | Bridge | | | | | | | | | |
| SPRR-Boundary | 12.689 | 4667.00 | 1436.80 | 1441.33 | 1440.17 | 1442.22 | 0.003373 | 7.53 | 619.49 | 143.24 | 0.64 |
| SPRR-Boundary | 12.662 | 4667.00 | 1436.00 | 1441.13 | | 1441.66 | 0.002235 | 5.80 | 805.37 | 207.22 | 0.52 |
| SPRR-Boundary | 12.624 | 4667.00 | 1435.20 | 1440.48 | | 1441.12 | 0.002837 | 6.41 | 727.63 | 191.26 | 0.58 |
| SPRR-Boundary | 12.586 | 4667.00 | 1434.30 | 1439.55 | | 1440.41 | 0.004310 | 7.42 | 629.29 | 165.18 | 0.67 |
| SPRR-Boundary | 12.549 | 4667.00 | 1434.00 | 1438.95 | | 1439.54 | 0.003570 | 6.16 | 758.04 | 199.87 | 0.56 |
| SPRR-Boundary | 12.511 | 4667.00 | 1433.00 | 1438.41 | 1436.46 | 1438.93 | 0.002501 | 5.82 | 801.26 | 175.22 | 0.48 |

HEC-RAS Plan: LR 14000 cfs River: Queen Creek Reach: SPRR- R overbank Profile: full flow

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR- R overbank | 13.350 | 6550.00 | 1453.00 | 1455.61 | 1454.40 | 1455.72 | 0.002706 | 2.65 | 2493.73 | 1147.03 | 0.31 |
| SPRR- R overbank | 13.307 | 6550.00 | 1452.60 | 1454.92 | 1453.88 | 1455.04 | 0.003400 | 2.78 | 2385.83 | 1327.34 | 0.34 |
| SPRR- R overbank | 13.306 | Lat. Weir | | | | | | | | | |
| SPRR- R overbank | 13.212 | 5514.83 | 1451.30 | 1453.60 | 1452.53 | 1453.68 | 0.002545 | 2.37 | 2383.44 | 1272.00 | 0.30 |
| SPRR- R overbank | 13.118 | 3489.06 | 1449.50 | 1451.23 | 1450.94 | 1451.44 | 0.013874 | 3.73 | 962.04 | 980.54 | 0.63 |
| SPRR- R overbank | 13.023 | 1949.42 | 1447.50 | 1449.79 | 1448.36 | 1449.81 | 0.000712 | 1.17 | 1672.43 | 938.20 | 0.15 |
| SPRR- R overbank | 12.929 | 970.80 | 1448.20 | 1449.12 | 1448.70 | 1449.15 | 0.004796 | 1.41 | 689.70 | 1218.61 | 0.33 |
| SPRR- R overbank | 12.827 | 507.59 | 1446.00 | 1446.93 | 1446.62 | 1446.94 | 0.003403 | 1.09 | 571.07 | 1897.60 | 0.27 |

HEC-RAS Plan: LR 9333 cfs River: Queen Creek Reach: SPRR- R overbank Profile: two third flow

| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR- R overbank | 13.350 | 3340.00 | 1453.00 | 1454.92 | 1454.02 | 1454.98 | 0.002438 | 1.97 | 1706.39 | 1122.48 | 0.28 |
| SPRR- R overbank | 13.307 | 3340.00 | 1452.60 | 1454.27 | 1453.48 | 1454.34 | 0.003285 | 2.11 | 1593.04 | 1239.93 | 0.32 |
| SPRR- R overbank | 13.306 | Lat. Weir | | | | | | | | | |
| SPRR- R overbank | 13.212 | 3056.63 | 1451.30 | 1453.14 | 1452.23 | 1453.18 | 0.001935 | 1.73 | 1802.69 | 1251.93 | 0.25 |
| SPRR- R overbank | 13.118 | 2072.99 | 1449.50 | 1450.74 | 1450.70 | 1451.00 | 0.036574 | 4.09 | 508.94 | 862.92 | 0.92 |
| SPRR- R overbank | 13.023 | 1314.44 | 1447.50 | 1449.53 | 1448.22 | 1449.54 | 0.000528 | 0.92 | 1427.15 | 910.33 | 0.13 |
| SPRR- R overbank | 12.929 | 669.29 | 1448.20 | 1449.00 | 1448.61 | 1449.02 | 0.004773 | 1.23 | 545.38 | 1179.48 | 0.32 |
| SPRR- R overbank | 12.827 | 300.05 | 1446.00 | 1446.80 | 1446.48 | 1446.81 | 0.003405 | 0.98 | 345.26 | 1147.85 | 0.26 |

HEC-RAS Plan: LR 4667cfs River: Queen Creek Reach: SPRR- R overbank Profile: one third flow

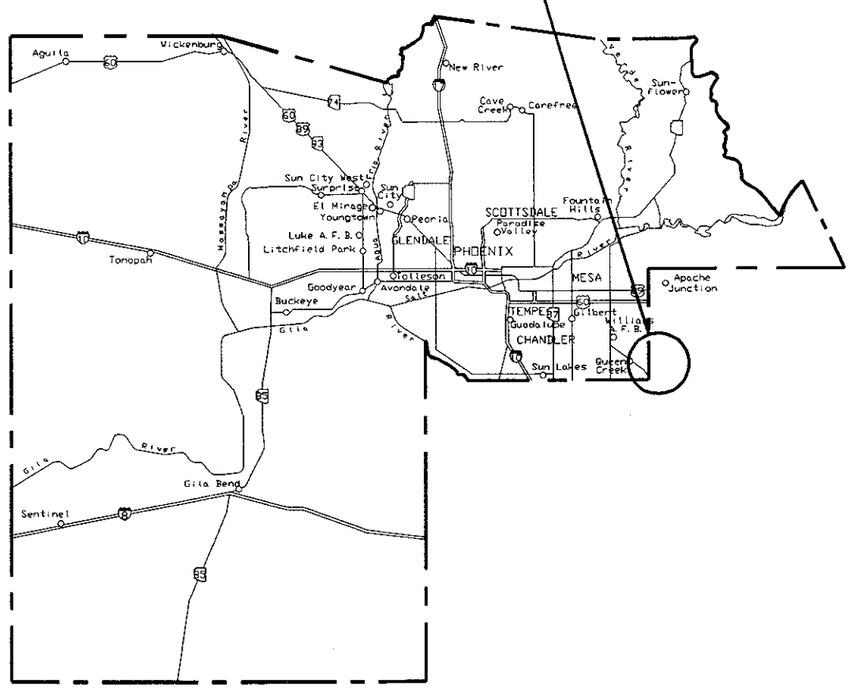
| Reach | River Sta | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| SPRR- R overbank | 13.350 | 600.00 | 1453.00 | 1453.94 | 1453.46 | 1453.95 | 0.002097 | 0.96 | 623.29 | 1047.61 | 0.22 |
| SPRR- R overbank | 13.307 | 600.00 | 1452.60 | 1453.27 | 1452.98 | 1453.29 | 0.004438 | 1.23 | 487.22 | 993.13 | 0.31 |
| SPRR- R overbank | 13.306 | Lat. Weir | | | | | | | | | |
| SPRR- R overbank | 13.212 | 600.00 | 1451.30 | 1452.27 | 1451.76 | 1452.28 | 0.001306 | 0.82 | 741.88 | 1178.79 | 0.18 |
| SPRR- R overbank | 13.118 | 509.93 | 1449.50 | 1450.26 | 1450.26 | 1450.42 | 0.053711 | 3.13 | 163.05 | 532.49 | 1.00 |
| SPRR- R overbank | 13.023 | 413.24 | 1447.50 | 1448.98 | 1447.96 | 1448.98 | 0.000190 | 0.44 | 941.09 | 848.43 | 0.07 |
| SPRR- R overbank | 12.929 | 295.22 | 1448.20 | 1448.71 | 1448.46 | 1448.73 | 0.004468 | 1.07 | 274.96 | 691.48 | 0.30 |
| SPRR- R overbank | 12.827 | 129.23 | 1446.00 | 1446.60 | 1446.34 | 1446.61 | 0.003401 | 0.81 | 165.85 | 665.59 | 0.25 |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

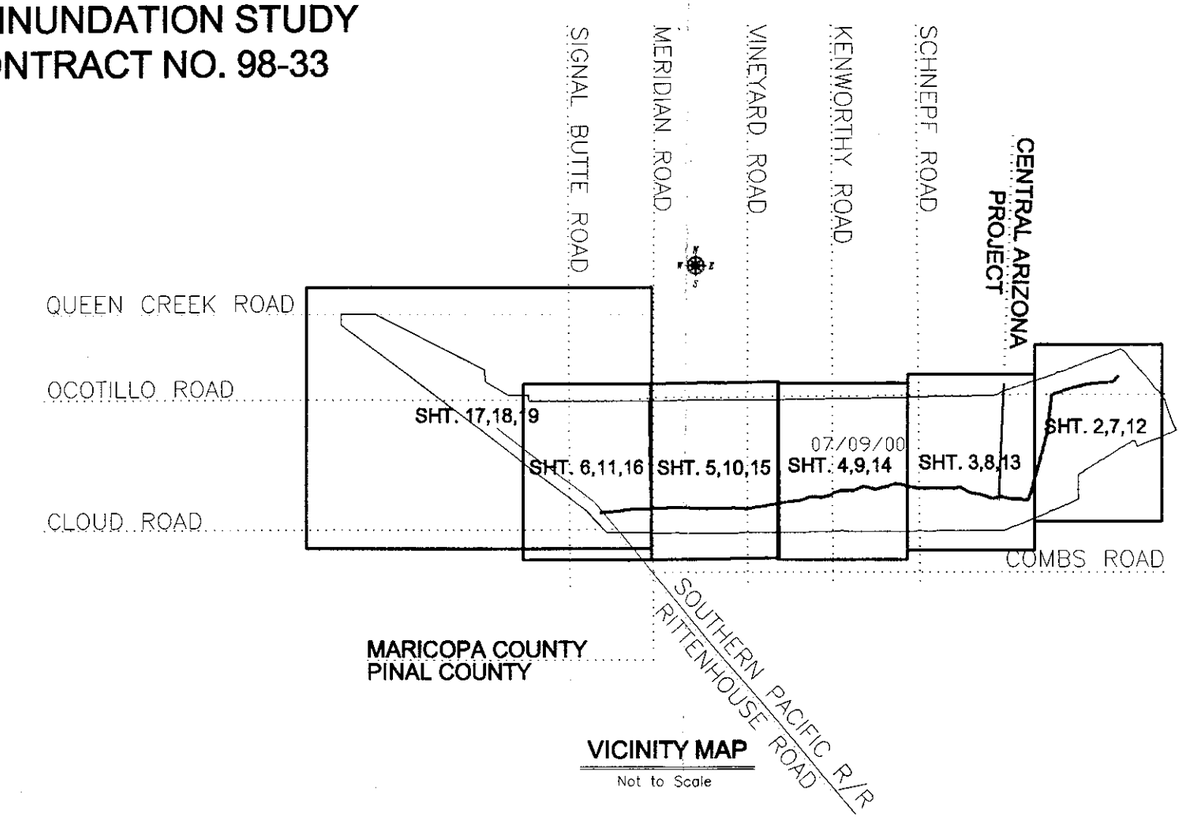
## RITTENHOUSE
## FLOOD RETARDING STRUCTURE
## SPILLWAY INUNDATION STUDY
## F.C.D. CONTRACT NO. 98-33

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

PROJECT LOCATION




MARICOPA COUNTY
Not to Scale




VICINITY MAP
Not to Scale

MICHAEL S. ELLEGOOD, P.E.
CHIEF ENGINEER AND GENERAL MANAGER

SHEET INDEX


| | |
|---|---|
| 1 | COVER |
| 2-6, 17 | FULL SPILLWAY FLOW |
| 7-11, 18 | 2/3 SPILLWAY FLOW |
| 12-16, 19 | 1/3 SPILLWAY FLOW |


**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY**

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY

F.C.D. CONTRACT NO. 98-33

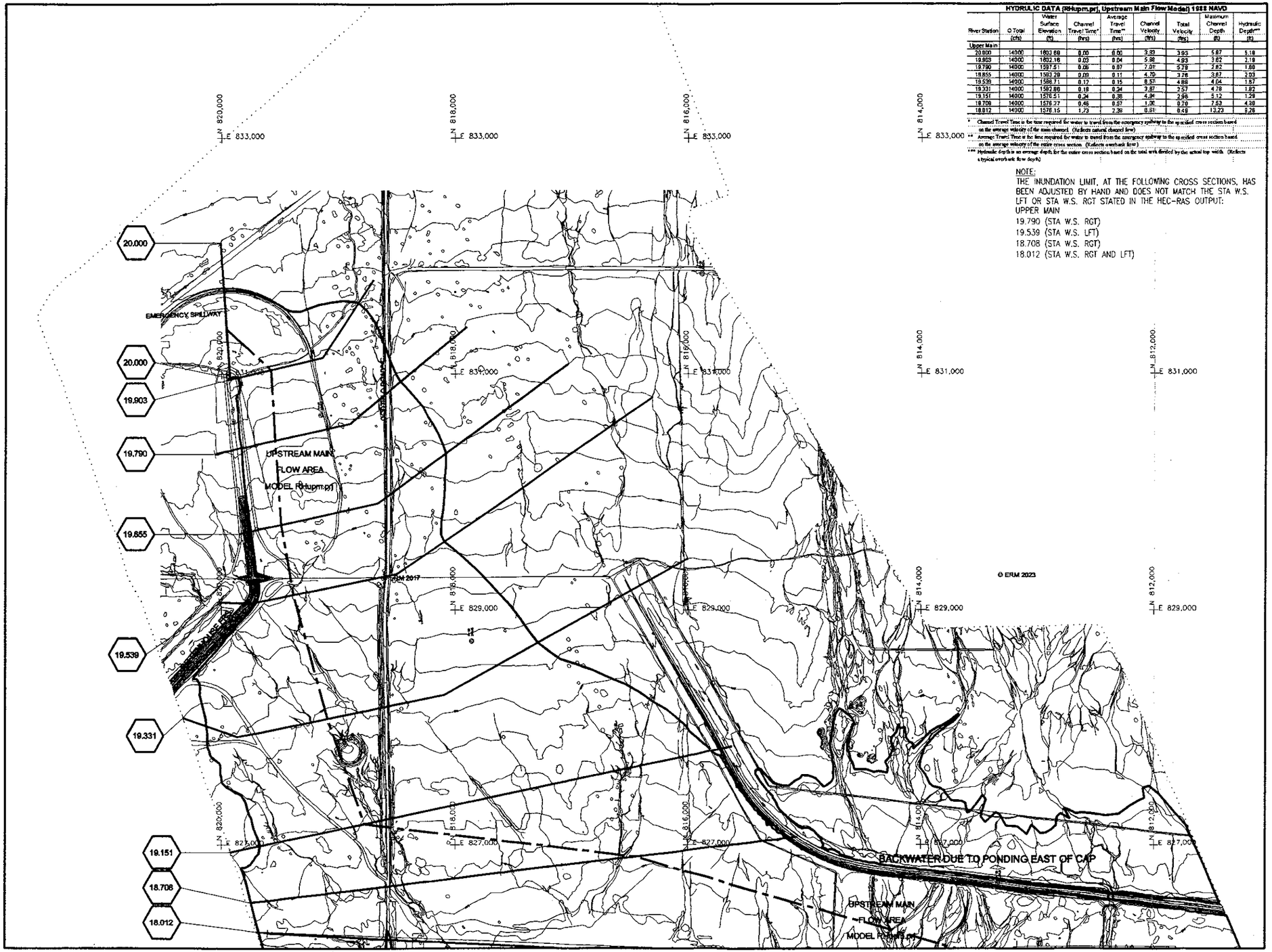
Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 1 OF 19

\\Folders from VN\rdsgun\jobs\Rittenhouse\Guidelines\Map_FCD\Cover\Sheet.dwg, 04/29/2002 09:20:47 AM




**HYDRULIC DATA [R4upm.prj], Upstream Main Flow Model] 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Main: | | | | | | | | |
| 20.000 | 14000 | 1603.69 | 0.00 | 0.00 | 3.93 | 3.93 | 5.87 | 5.18 |
| 19.903 | 14000 | 1602.16 | 0.03 | 0.04 | 5.98 | 4.93 | 3.62 | 2.19 |
| 19.790 | 14000 | 1597.51 | 0.06 | 0.07 | 7.01 | 5.79 | 2.82 | 1.69 |
| 19.855 | 14000 | 1593.28 | 0.09 | 0.11 | 4.70 | 3.76 | 3.87 | 2.03 |
| 19.539 | 14000 | 1586.71 | 0.12 | 0.15 | 8.57 | 4.88 | 4.04 | 1.87 |
| 19.331 | 14000 | 1582.86 | 0.18 | 0.24 | 3.87 | 2.57 | 4.78 | 1.82 |
| 19.151 | 14000 | 1576.51 | 0.24 | 0.38 | 4.94 | 2.96 | 5.12 | 1.29 |
| 18.708 | 14000 | 1576.27 | 0.46 | 0.67 | 1.06 | 0.70 | 7.53 | 4.98 |
| 18.012 | 14000 | 1576.15 | 1.73 | 2.39 | 0.81 | 0.49 | 13.23 | 9.26 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross sections based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross sections based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross sections based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:
UPPER MAIN
19.790 (STA W.S. RGT)
19.539 (STA W.S. LFT)
19.708 (STA W.S. RGT)
18.012 (STA W.S. RGT AND LFT)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (H13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147)
- ELEVATION REFERENCE MARK — ERM XXX
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

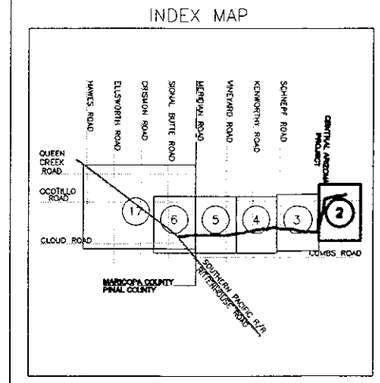
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2017 | 1585.733 | FND GLO BRASS CAP |
| ERM2023 | 1585.708 | FND GLO BRASS CAP |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
FULL SPILLWAY FLOW

F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

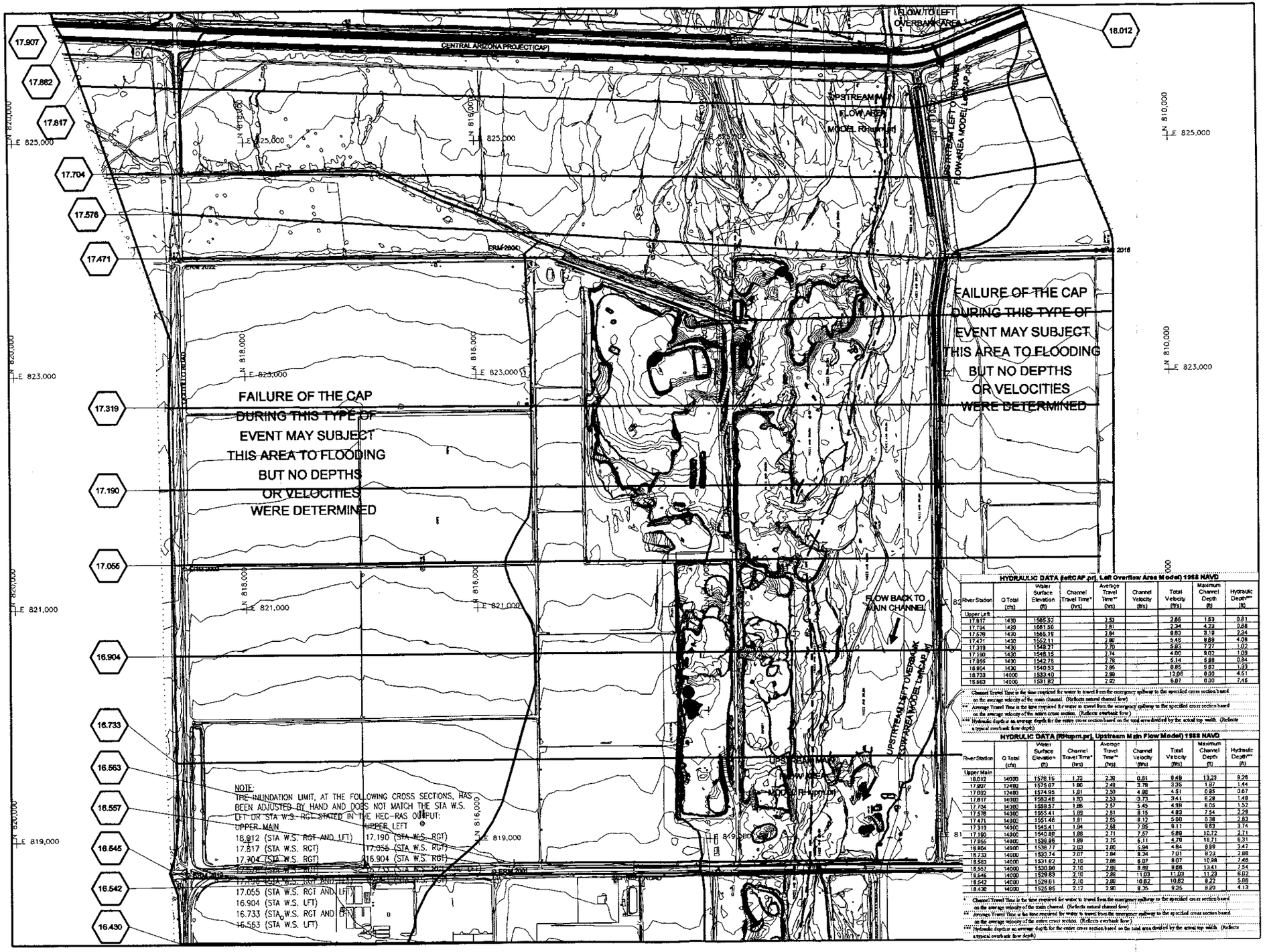
| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 2 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040




NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:

| UPPER MAIN | UPPER LEFT |
|---|---|
| 18.012 (STA W.S. RGT AND LFT) | 17.190 (STA W.S. RGT) |
| 17.817 (STA W.S. RGT) | 17.055 (STA W.S. RGT) |
| 17.704 (STA W.S. RGT) | 16.904 (STA W.S. RGT) |
| [illegible] (STA W.S. RGT) | 16.733 (STA W.S. RGT) |
| 17.576 (STA W.S. RGT AND LFT) | |
| 17.055 (STA W.S. RGT AND LFT) | |
| 16.904 (STA W.S. LFT) | |
| 16.733 (STA W.S. RGT AND LFT) | |
| 16.563 (STA W.S. LFT) | |

**HYDRAULIC DATA (fcfCAP.prj, Left Overflow Area Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Left | | | | | | | | |
| 17.817 | 1430 | 1565.53 | | 1.53 | | 2.86 | 1.53 | 0.81 |
| 17.704 | 1430 | 1561.50 | | 2.81 | | 2.34 | 4.23 | 0.88 |
| 17.576 | 1430 | 1555.19 | | 2.84 | | 9.83 | 3.19 | 2.24 |
| 17.471 | 1430 | 1552.11 | | 2.88 | | 5.46 | 8.89 | 4.06 |
| 17.319 | 1430 | 1549.27 | | 2.70 | | 5.95 | 7.07 | 1.07 |
| 17.190 | 1430 | 1548.15 | | 3.74 | | 4.00 | 9.02 | 1.09 |
| 17.055 | 1430 | 1542.78 | | 2.78 | | 5.14 | 5.89 | 0.84 |
| 16.904 | 1430 | 1540.53 | | 2.96 | | 9.85 | 5.82 | 1.03 |
| 16.733 | 14000 | 1533.40 | | 2.99 | | 12.06 | 8.00 | 4.61 |
| 15.563 | 14000 | 1531.82 | | 2.92 | | 6.07 | 6.00 | 7.46 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic Depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRULIC DATA (RHmpm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Main | | | | | | | | |
| 18.012 | 14000 | 1578.19 | 1.72 | 3.38 | 0.81 | 8.49 | 13.23 | 9.26 |
| 17.907 | 12400 | 1575.67 | 1.90 | 2.49 | 3.79 | 3.35 | 1.97 | 1.44 |
| 17.882 | 12400 | 1574.95 | 1.91 | 2.50 | 4.98 | 4.51 | 0.95 | 0.67 |
| 17.817 | 14000 | 1563.46 | 1.93 | 2.53 | 3.73 | 3.41 | 6.28 | 1.48 |
| 17.704 | 14000 | 1559.57 | 1.86 | 2.57 | 5.45 | 4.99 | 6.05 | 1.57 |
| 17.576 | 14000 | 1555.41 | 1.88 | 2.81 | 8.15 | 4.83 | 7.54 | 2.28 |
| 17.471 | 14000 | 1551.46 | 1.81 | 2.85 | 8.12 | 5.00 | 6.38 | 2.83 |
| 17.319 | 14000 | 1545.41 | 1.94 | 2.88 | 7.95 | 6.11 | 9.63 | 3.74 |
| 17.190 | 14000 | 1540.88 | 1.88 | 2.71 | 7.57 | 6.88 | 10.72 | 2.71 |
| 17.055 | 14000 | 1536.95 | 1.89 | 2.75 | 6.11 | 4.78 | 18.71 | 8.31 |
| 16.904 | 14000 | 1538.77 | 2.03 | 2.80 | 5.94 | 4.84 | 8.88 | 3.42 |
| 16.733 | 14000 | 1532.74 | 2.07 | 2.84 | 8.24 | 7.01 | 9.73 | 2.88 |
| 16.563 | 14000 | 1531.82 | 2.10 | 2.86 | 6.07 | 6.07 | 10.98 | 7.46 |
| 16.557 | 14000 | 1530.98 | 2.10 | 2.88 | 8.88 | 8.68 | 13.41 | 7.54 |
| 16.545 | 14000 | 1529.83 | 2.10 | 2.88 | 11.03 | 11.03 | 11.23 | 6.02 |
| 16.542 | 14000 | 1529.61 | 2.10 | 2.88 | 10.82 | 10.82 | 9.72 | 5.06 |
| 16.430 | 14000 | 1526.86 | 2.12 | 2.90 | 8.35 | 8.35 | 8.20 | 4.13 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic Depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (W12.0, W13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY (County Boundary)
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

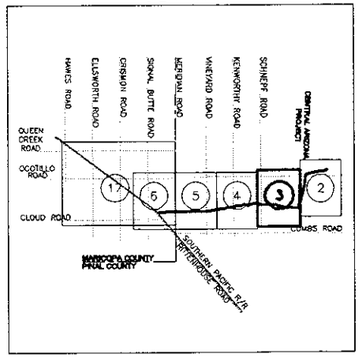
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2001 | 1532.812 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| ERM2003 | 1544.562 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPE ON OCTILLO RD |
| ERM2004 | 1560.177 | FND 2" OD PIPE 1/2MI S OF OCTILLO ON BARKLEY |
| ERM2016 | 1558.081 | FND REBAR WITH PLASTIC CAP ALLEN LS16097 |
| ERM2019 | 1529.497 | FND CLO BC |
| ERM2022 | 1558.881 | FND CLO BC @ SIERRA VISTA DR & OCOTILLO RD |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
FULL SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 3 OF 19

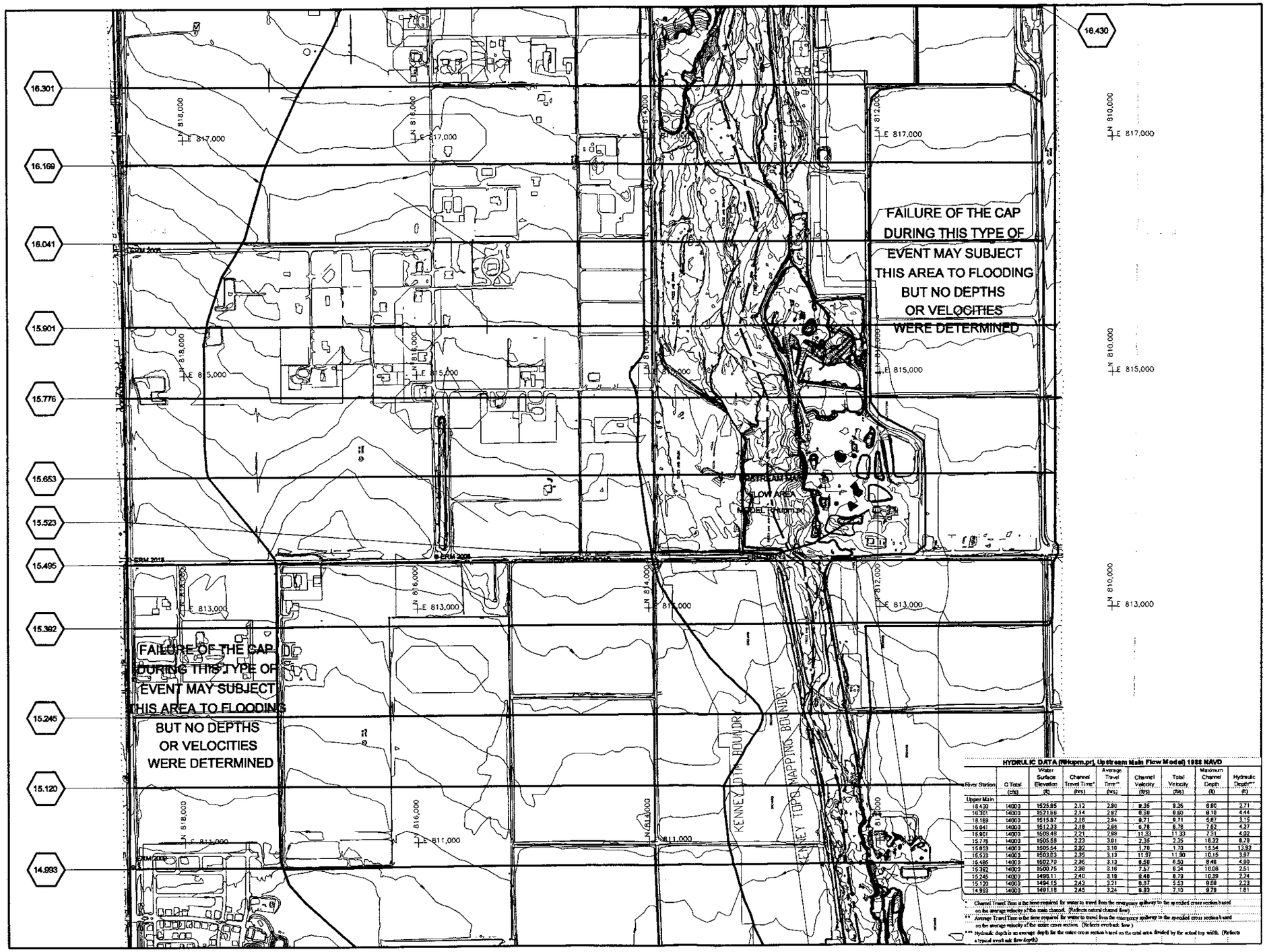
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC,
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH HMP AND
EAST MARICOPA FLOODWAY CAPCITY MITIGATION STUDY (FCD98-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040

Folders from V:\Fcdspill\Tess\Rittenhouse\Cloud Road, Jim\Dat January, 09/24/2002 04:06:10 PM




**HYDRULIC DATA (Wkpm.pr, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Main | | | | | | | | |
| 16.430 | 14000 | 1525.85 | 2.12 | 2.80 | 9.35 | 9.35 | 8.80 | 2.71 |
| 16.301 | 14000 | 1521.69 | 2.14 | 2.97 | 8.58 | 8.60 | 9.10 | 4.44 |
| 16.169 | 14000 | 1515.87 | 2.16 | 2.94 | 9.71 | 9.71 | 5.87 | 3.15 |
| 16.041 | 14000 | 1512.23 | 2.18 | 2.86 | 8.78 | 8.78 | 7.62 | 4.27 |
| 15.901 | 14000 | 1509.49 | 2.21 | 2.88 | 11.33 | 11.33 | 7.21 | 4.02 |
| 15.776 | 14000 | 1505.58 | 2.23 | 3.01 | 2.35 | 2.35 | 16.22 | 8.79 |
| 15.653 | 14000 | 1505.54 | 2.32 | 3.10 | 1.70 | 1.70 | 15.54 | 12.93 |
| 15.523 | 14000 | 1503.03 | 2.35 | 3.13 | 11.97 | 11.90 | 10.15 | 3.87 |
| 15.495 | 14000 | 1502.70 | 2.36 | 3.13 | 8.50 | 8.50 | 8.48 | 4.80 |
| 15.392 | 14000 | 1500.76 | 2.38 | 3.16 | 7.67 | 8.24 | 10.08 | 2.51 |
| 15.245 | 14000 | 1498.11 | 2.40 | 3.19 | 8.48 | 8.79 | 10.39 | 2.24 |
| 15.120 | 14000 | 1494.15 | 2.43 | 3.21 | 9.87 | 5.53 | 9.08 | 2.23 |
| 14.993 | 14000 | 1491.18 | 2.45 | 3.24 | 9.93 | 7.10 | 9.79 | 1.81 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (MILE 0.0, MILE 1.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY (County Boundary)
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

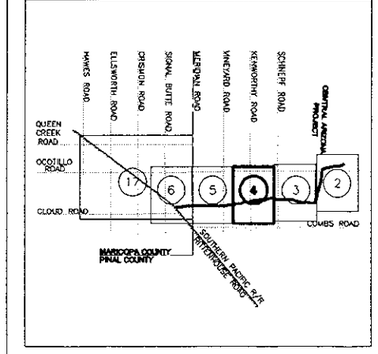
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2005 | 1514.364 | FND BC/HH @ OCOTILLO RD & COYOTE RD |
| ERM2006 | 1507.206 | FND 3" OD PIPE |
| ERM2007 | 1511.049 | FND 1" OD PIPE |
| ERM2009 | 1494.063 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD RD |
| ERM2018 | 1503.312 | FND BC/HH @ KENWORTHY & OCTILLO RD |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10.000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
FULL SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 4 OF 19

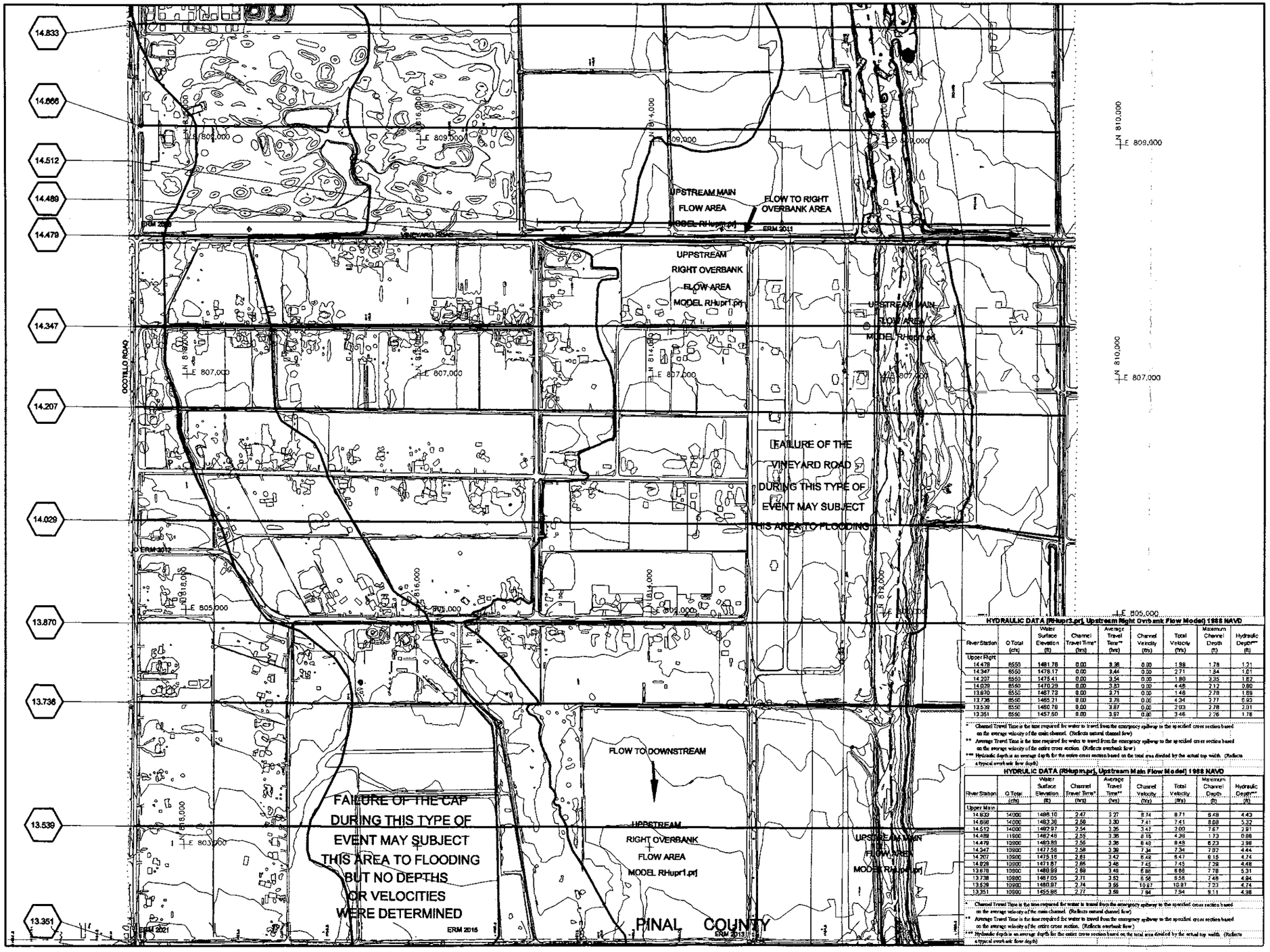
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&S AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANDAN WASH HMP AND
EAST MARICOPA FLOODWAY CAPCITY MITIGATION STUDY (FC098-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040

Plotted: Friday, 04/26/02 04:06:30 PM




**HYDRAULIC DATA (RHupr3.prj, Upstream Right Overbank Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Right | | | | | | | | |
| 14.479 | 8550 | 1481.78 | 0.00 | 3.36 | 0.00 | 1.98 | 1.78 | 1.21 |
| 14.347 | 8550 | 1478.17 | 0.00 | 3.44 | 0.00 | 2.71 | 1.84 | 1.01 |
| 14.207 | 8550 | 1475.41 | 0.00 | 3.54 | 0.00 | 1.80 | 3.35 | 1.82 |
| 14.029 | 8550 | 1470.29 | 0.00 | 3.83 | 0.00 | 4.48 | 2.12 | 0.80 |
| 13.870 | 8550 | 1467.73 | 0.00 | 3.71 | 0.00 | 1.46 | 2.78 | 1.89 |
| 13.736 | 8550 | 1465.21 | 0.00 | 3.76 | 0.00 | 4.34 | 3.77 | 0.93 |
| 13.539 | 8550 | 1460.76 | 0.00 | 3.87 | 0.00 | 2.03 | 2.78 | 2.01 |
| 13.351 | 8550 | 1457.50 | 0.00 | 3.97 | 0.00 | 3.46 | 2.76 | 1.78 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRAULIC DATA (RHupm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper Main | | | | | | | | |
| 14.833 | 14000 | 1488.10 | 2.47 | 3.27 | 8.74 | 8.71 | 8.49 | 4.43 |
| 14.666 | 14000 | 1483.36 | 2.50 | 3.30 | 7.41 | 7.41 | 8.08 | 5.32 |
| 14.512 | 14000 | 1487.97 | 2.54 | 3.35 | 3.47 | 2.00 | 1.67 | 2.81 |
| 14.489 | 11900 | 1482.48 | 2.55 | 3.36 | 8.15 | 4.38 | 1.73 | 0.88 |
| 14.479 | 10900 | 1480.85 | 2.55 | 3.36 | 8.40 | 8.48 | 6.23 | 3.98 |
| 14.347 | 10900 | 1477.58 | 2.58 | 3.39 | 7.34 | 7.34 | 7.07 | 4.44 |
| 14.207 | 10900 | 1475.15 | 2.61 | 3.42 | 8.48 | 8.47 | 8.15 | 4.74 |
| 14.029 | 10900 | 1471.87 | 2.65 | 3.46 | 7.45 | 7.45 | 7.28 | 4.48 |
| 13.870 | 10900 | 1468.99 | 2.69 | 3.49 | 8.88 | 8.88 | 7.78 | 5.31 |
| 13.736 | 10900 | 1467.05 | 2.71 | 3.52 | 8.58 | 8.58 | 7.49 | 4.94 |
| 13.539 | 10900 | 1463.97 | 2.74 | 3.55 | 10.97 | 10.97 | 7.23 | 4.74 |
| 13.351 | 10900 | 1455.98 | 2.77 | 3.58 | 7.94 | 7.94 | 9.11 | 4.98 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M12.0, M13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK — ERM XXX
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

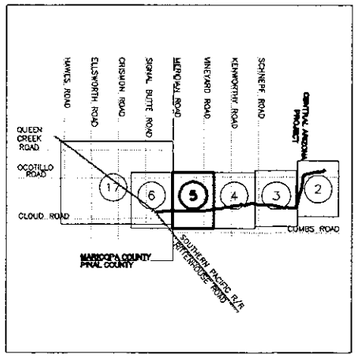
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2008 | 1482.908 | FND BC/HH OCOTILLO RD & VINEYARD RD |
| ERM2011 | 1481.306 | FND CLO BC @ VINEYARD RD & CHANDLER HEIGHTS |
| ERM2012 | 1470.583 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| ERM2013 | 1456.108 | FND 2" OD PIPE WITH WASHER LS21765 |
| ERM2015 | 1452.928 | FND 1/2 REBAR |
| ERM2021 | 1457.171 | FND MCDOT BC/HH |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'

SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
FULL SPILLWAY FLOW

F.C.D. CONTRACT NO. 98-33

Baker
Michael Baker Jr., Inc.

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

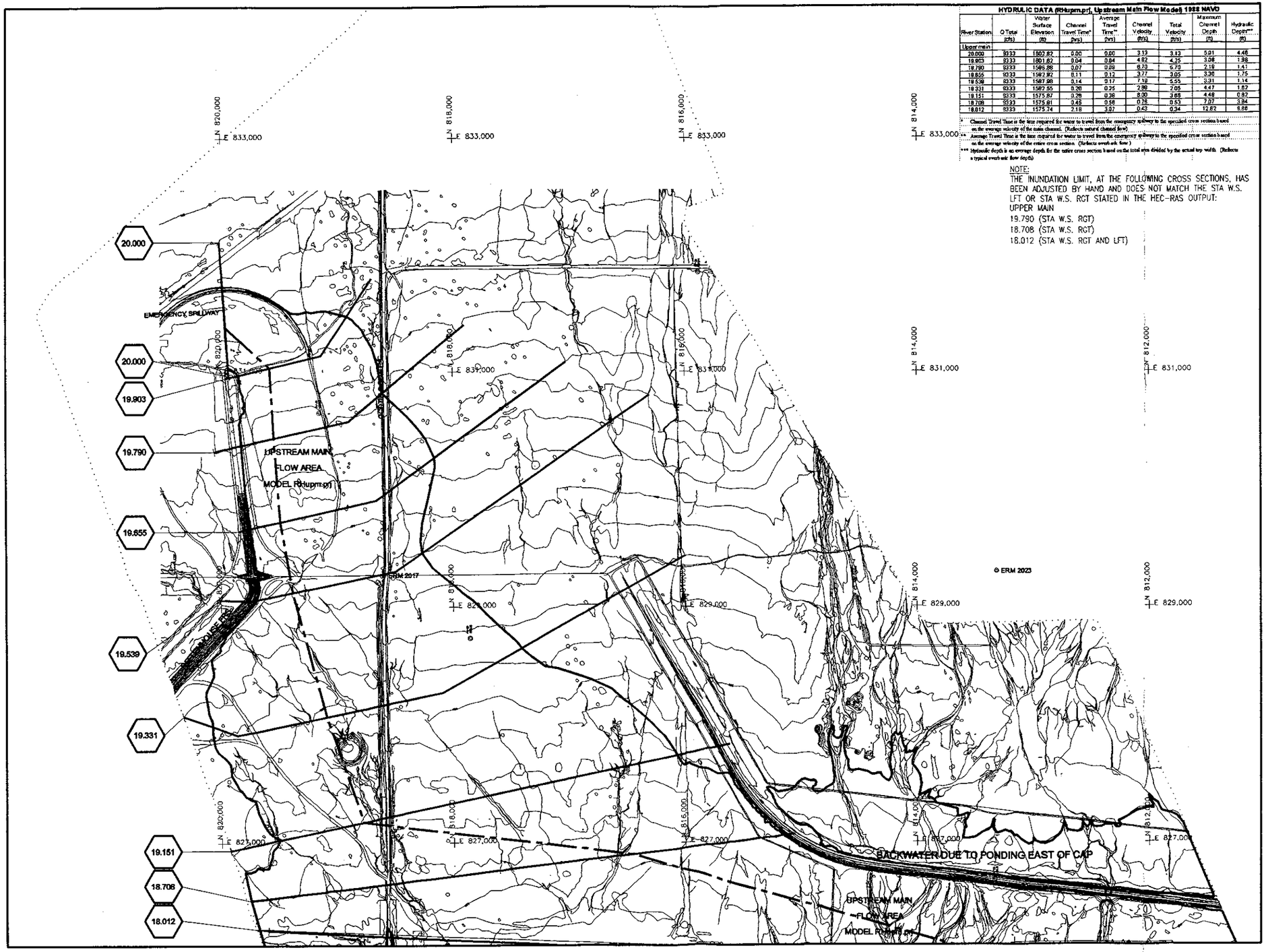
SHEET 5 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #208, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH HMP AND
EAST MARICOPA FLOODWAY CAPACITY MITIGATION STUDY (FC098-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING.
3747 East Grove Street, Phoenix, AZ 85040




**HYDRULIC DATA (R4upm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 20.000 | 9333 | 1602.82 | 0.00 | 0.00 | 3.13 | 3.13 | 5.01 | 4.46 |
| 19.903 | 9333 | 1601.82 | 0.04 | 0.04 | 4.82 | 4.25 | 3.08 | 1.98 |
| 19.790 | 9333 | 1596.86 | 0.07 | 0.09 | 6.70 | 5.70 | 2.19 | 1.41 |
| 19.655 | 9333 | 1592.92 | 0.11 | 0.12 | 3.77 | 3.05 | 3.30 | 1.75 |
| 19.539 | 9333 | 1587.98 | 0.14 | 0.17 | 7.10 | 5.55 | 3.31 | 1.14 |
| 19.331 | 9333 | 1582.55 | 0.20 | 0.25 | 2.88 | 2.05 | 4.47 | 1.82 |
| 19.151 | 9333 | 1575.87 | 0.28 | 0.38 | 5.00 | 3.65 | 4.46 | 0.82 |
| 18.708 | 9333 | 1575.61 | 0.45 | 0.58 | 0.78 | 0.53 | 7.07 | 3.84 |
| 18.012 | 9333 | 1575.74 | 2.18 | 3.07 | 0.43 | 0.34 | 12.82 | 9.88 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:
UPPER MAIN
19.790 (STA W.S. RGT)
18.708 (STA W.S. RGT)
18.012 (STA W.S. RGT AND LFT)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M12.0, M13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY (County Boundary)
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

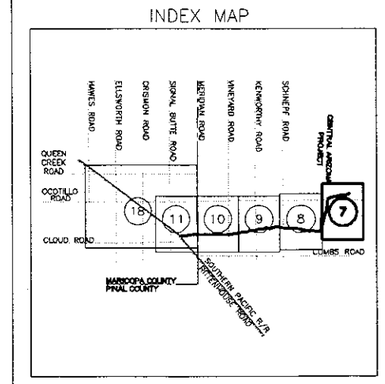
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2017 | 1585.733 | FND GLO BRASS CAP |
| ERM2023 | 1585.708 | FND GLO BRASS CAP |

## NOTES

1– THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
2/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

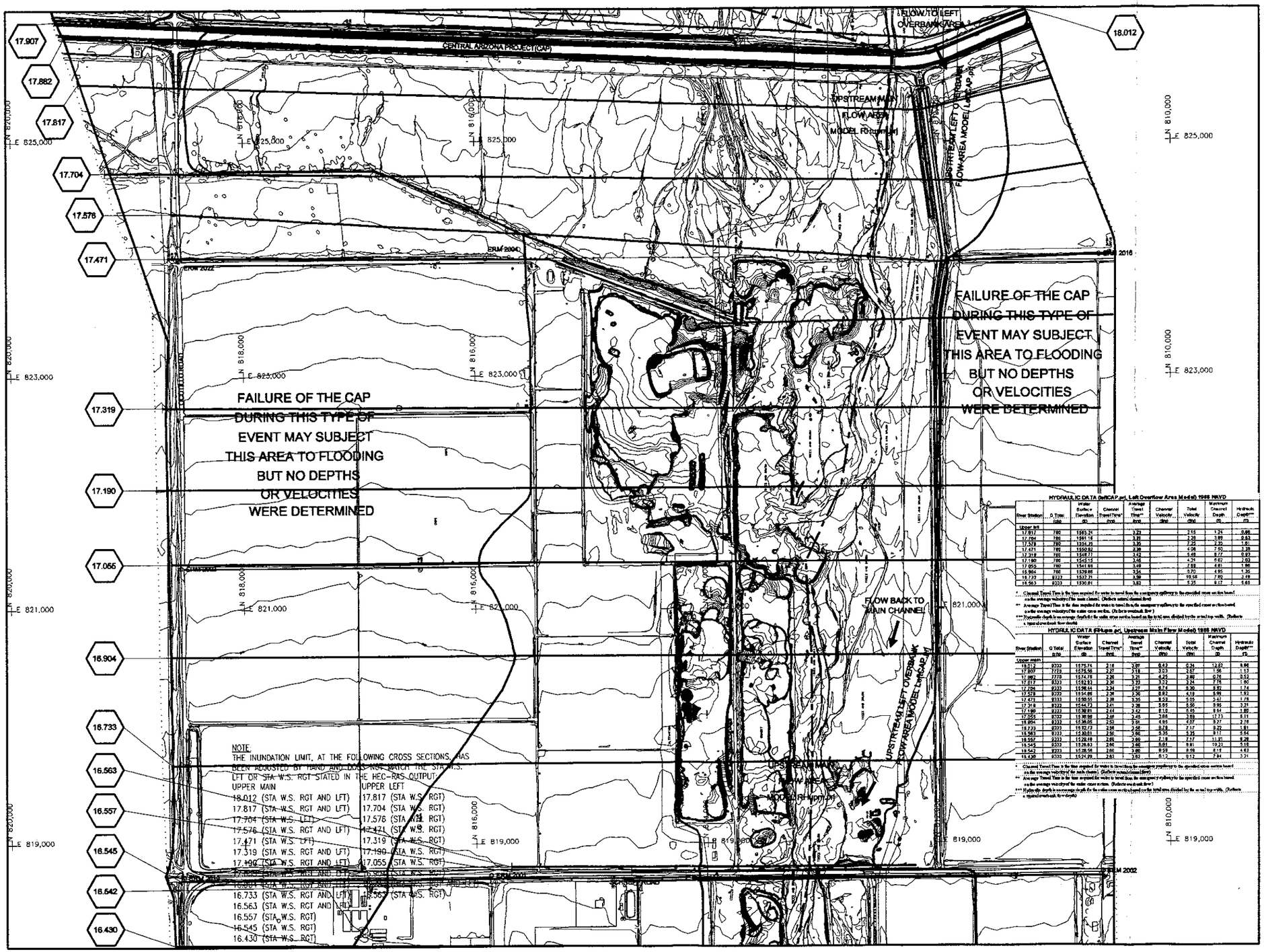
| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 7 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
MASS AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040




NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:

| UPPER MAIN | UPPER LEFT |
|---|---|
| 18.012 (STA W.S. RGT AND LFT) | 17.817 (STA W.S. RGT) |
| 17.817 (STA W.S. RGT AND LFT) | 17.704 (STA W.S. RGT) |
| 17.704 (STA W.S. LFT) | 17.576 (STA W.S. RGT) |
| 17.576 (STA W.S. RGT AND LFT) | 17.471 (STA W.S. RGT) |
| 17.471 (STA W.S. LFT) | 17.319 (STA W.S. RGT) |
| 17.319 (STA W.S. RGT AND LFT) | 17.190 (STA W.S. RGT) |
| 17.190 (STA W.S. RGT AND LFT) | 17.055 (STA W.S. RGT) |
| 17.055 (STA W.S. RGT AND LFT) | 16.904 (STA W.S. RGT) |
| 16.904 (STA W.S. RGT AND LFT) | 16.563 (STA W.S. RGT) |
| 16.733 (STA W.S. RGT AND LFT) | |
| 16.563 (STA W.S. RGT AND LFT) | |
| 16.557 (STA W.S. RGT) | |
| 16.545 (STA W.S. RGT) | |
| 16.430 (STA W.S. RGT) | |

HYDRAULIC DATA (UPCAP pr), Left Overflow Area Model) 1988 NAVD

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (min) | Average Travel Time** (min) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper left | | | | | | | | |
| 17.817 | 780 | 1565.24 | | 3.23 | | 2.15 | 1.24 | 0.96 |
| 17.704 | 780 | 1561.16 | | 3.23 | | 2.25 | 3.89 | 0.63 |
| 17.576 | 780 | 1554.25 | | 3.35 | | 2.32 | 2.32 | 1.01 |
| 17.471 | 780 | 1550.82 | | 3.38 | | 4.09 | 7.50 | 3.39 |
| 17.319 | 780 | 1548.77 | | 3.42 | | 5.48 | 8.77 | 0.93 |
| 17.190 | 780 | 1545.15 | | 3.46 | | 4.21 | 6.02 | 2.03 |
| 17.055 | 780 | 1541.93 | | 3.49 | | 2.92 | 4.81 | 1.96 |
| 16.904 | 780 | 1539.86 | | 3.54 | | 3.70 | 4.95 | 1.35 |
| 16.733 | 8333 | 1537.31 | | 3.58 | | 10.58 | 7.90 | 2.49 |
| 16.563 | 8333 | 1530.01 | | 3.62 | | 5.35 | 9.17 | 5.65 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Subcritical normal channel flow)
** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Subcritical overbank flow)
*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the overall top width. (Subcritical normal channel flow depth)

HYDRAULIC DATA (PFaqua pr), Upstream Main Flow Model) 1988 NAVD

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (min) | Average Travel Time** (min) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 18.012 | 8333 | 1575.74 | 2.18 | 3.87 | 6.43 | 6.34 | 12.02 | 8.66 |
| 17.907 | 7773 | 1575.56 | 2.20 | 3.88 | 5.93 | 3.67 | 1.96 | 1.13 |
| 17.882 | 7773 | 1574.78 | 2.26 | 3.91 | 4.25 | 2.88 | 0.76 | 0.52 |
| 17.817 | 8333 | 1573.51 | 2.36 | 3.93 | 3.02 | 3.24 | 2.15 | 1.60 |
| 17.704 | 8333 | 1570.44 | 2.34 | 3.97 | 5.74 | 8.30 | 8.97 | 1.74 |
| 17.576 | 8333 | 1564.88 | 2.36 | 3.96 | 8.82 | 4.18 | 5.98 | 1.82 |
| 17.471 | 8333 | 1560.55 | 2.39 | 3.95 | 8.53 | 5.05 | 5.47 | 1.78 |
| 17.319 | 8333 | 1554.73 | 2.41 | 3.98 | 9.65 | 6.50 | 9.95 | 3.21 |
| 17.190 | 8333 | 1550.81 | 2.44 | 3.97 | 8.10 | 5.15 | 8.04 | 1.86 |
| 17.055 | 8333 | 1546.98 | 2.48 | 3.45 | 3.86 | 3.83 | 17.73 | 6.11 |
| 16.904 | 8333 | 1545.05 | 2.50 | 3.91 | 4.95 | 4.07 | 9.27 | 2.28 |
| 16.733 | 8333 | 1539.73 | 2.56 | 3.98 | 8.28 | 7.17 | 9.22 | 1.81 |
| 16.563 | 8333 | 1530.01 | 2.66 | 3.96 | 5.35 | 5.35 | 8.17 | 5.64 |
| 16.557 | 8333 | 1529.48 | 2.66 | 3.90 | 7.18 | 7.17 | 11.21 | 6.26 |
| 16.545 | 8333 | 1528.83 | 2.66 | 3.90 | 8.01 | 9.91 | 19.23 | 5.16 |
| 16.542 | 8333 | 1528.56 | 2.66 | 3.90 | 8.59 | 8.59 | 8.13 | 4.83 |
| 16.430 | 8333 | 1524.89 | 2.63 | 3.92 | 8.12 | 8.12 | 7.84 | 3.31 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Subcritical normal channel flow)
** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Subcritical overbank flow)
*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the overall top width. (Subcritical normal channel flow depth)

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

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AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANDOKAI WASH HMP AND
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GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M12.0, M13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK — ERM XXX
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

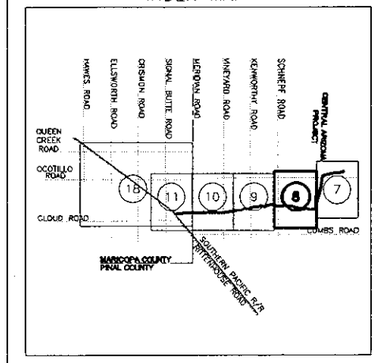
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2001 | 1532.812 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| ERM2002 | 1533.676 | FND BC/HH @ SCHNEPE ON OCTILLO RD |
| ERM2003 | 1544.562 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPE ON OCTILLO RD |
| ERM2004 | 1560.177 | FND 2" OD PIPE 1/2M S OF OCTILLO ON BARKLEY |
| ERM2016 | 1558.081 | FND REBAR WITH PLASTIC CAP ALLEN LS16097 |
| ERM2019 | 1529.497 | FND GLO BC |
| ERM2022 | 1558.881 | FND GLO BC @ SIERRA VISTA DR & OCTILLO RD |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
2/3 SPILLWAY FLOW
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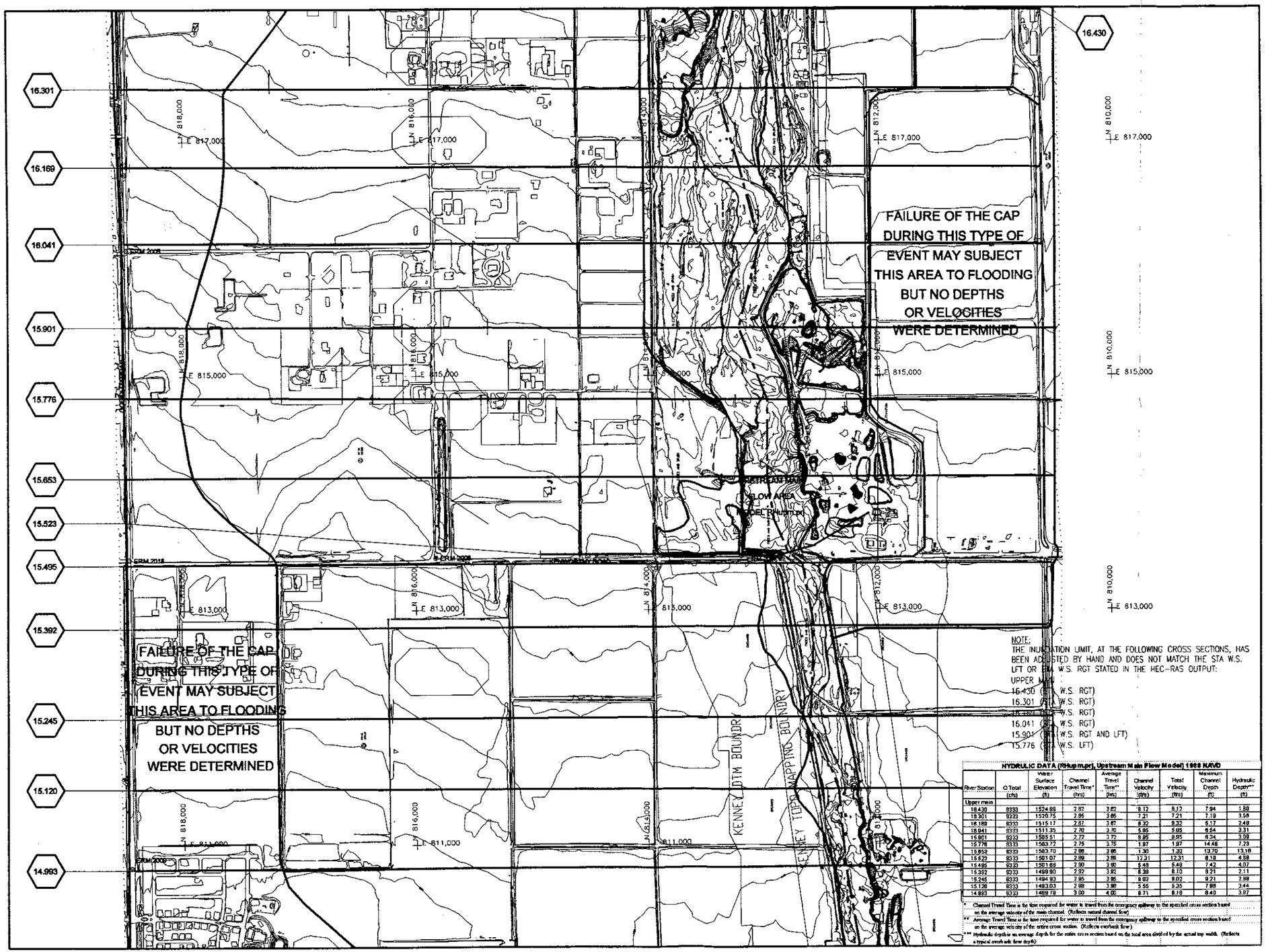
SHEET 8 OF 19

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UPPER MAIN
16.430 (STA W.S. RGT)
16.301 (STA W.S. RGT)
16.169 (STA W.S. RGT)
16.041 (STA W.S. RGT)
15.901 (STA W.S. RGT AND LFT)
15.776 (STA W.S. LFT)

**HYDRULIC DATA (RHupmpr), Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 16.430 | 8333 | 1524.99 | 2.87 | 3.67 | 6.12 | 8.17 | 7.94 | 1.80 |
| 16.301 | 8333 | 1520.75 | 2.85 | 3.65 | 7.21 | 7.21 | 7.19 | 3.58 |
| 16.169 | 8333 | 1515.17 | 2.87 | 3.67 | 8.32 | 8.32 | 5.17 | 2.48 |
| 16.041 | 8333 | 1511.35 | 2.70 | 3.70 | 5.65 | 5.65 | 6.54 | 3.31 |
| 15.901 | 8333 | 1505.51 | 2.72 | 3.72 | 9.95 | 9.95 | 6.34 | 3.09 |
| 15.776 | 8333 | 1503.72 | 2.75 | 3.75 | 1.97 | 1.97 | 14.48 | 7.23 |
| 15.653 | 8333 | 1503.70 | 2.95 | 3.95 | 1.30 | 1.30 | 13.70 | 13.19 |
| 15.523 | 8333 | 1501.07 | 2.89 | 3.89 | 12.31 | 12.31 | 8.18 | 4.58 |
| 15.495 | 8333 | 1501.65 | 2.90 | 3.90 | 5.49 | 5.49 | 7.42 | 4.07 |
| 15.392 | 8333 | 1499.80 | 2.92 | 3.92 | 8.38 | 8.10 | 9.21 | 2.11 |
| 15.245 | 8333 | 1494.93 | 2.95 | 3.95 | 8.02 | 8.02 | 9.21 | 2.98 |
| 15.120 | 8333 | 1493.03 | 2.98 | 3.98 | 5.55 | 5.35 | 7.98 | 3.44 |
| 14.993 | 8333 | 1489.78 | 3.00 | 4.00 | 8.71 | 8.18 | 8.40 | 3.87 |

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## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M12.0, M13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
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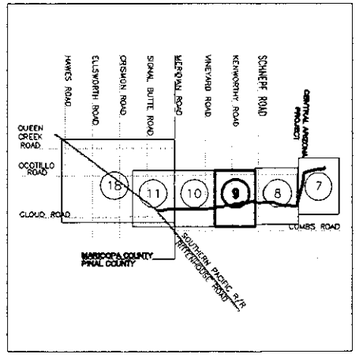
| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2005 | 1514.364 | FND BC/HH @ OCOTILLO & COYOTE |
| ERM2006 | 1507.206 | FND 3" OD PIPE |
| ERM2007 | 1511.049 | FND 1" OD PIPE |
| ERM2009 | 1494.063 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD |
| ERM2018 | 1503.312 | FND BC/HH @ KENWORTHY & OCTILLO RD |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
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2/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

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SHEET 9 OF 19

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AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
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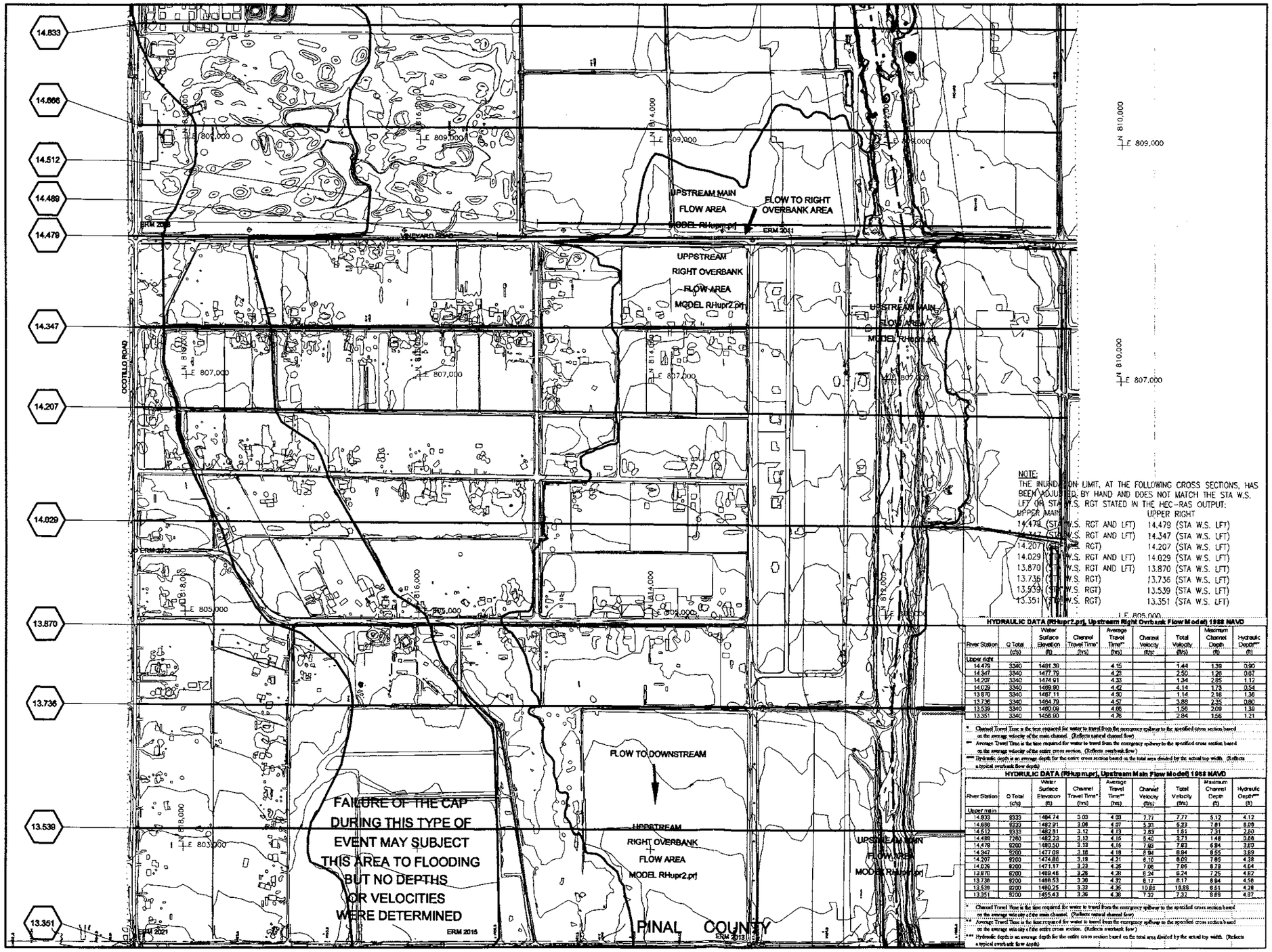


NOTE:
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| UPPER MAIN | UPPER RIGHT |
|---|---|
| 14.479 (STA W.S. RGT AND LFT) | 14.479 (STA W.S. LFT) |
| 14.347 (STA W.S. RGT AND LFT) | 14.347 (STA W.S. LFT) |
| 14.207 (STA W.S. RGT) | 14.207 (STA W.S. LFT) |
| 14.029 (STA W.S. RGT AND LFT) | 14.029 (STA W.S. LFT) |
| 13.870 (STA W.S. RGT AND LFT) | 13.870 (STA W.S. LFT) |
| 13.736 (STA W.S. RGT) | 13.736 (STA W.S. LFT) |
| 13.539 (STA W.S. RGT) | 13.539 (STA W.S. LFT) |
| 13.351 (STA W.S. RGT) | 13.351 (STA W.S. LFT) |

**HYDRAULIC DATA (RHupr2.prj, Upstream Right Overbank Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper right | | | | | | | | |
| 14.479 | 3340 | 1481.39 | | 4.15 | | 1.44 | 1.39 | 0.90 |
| 14.347 | 3340 | 1477.79 | | 4.28 | | 2.50 | 1.20 | 0.81 |
| 14.207 | 3340 | 1474.91 | | 4.33 | | 1.34 | 2.85 | 1.12 |
| 14.029 | 3340 | 1469.90 | | 4.42 | | 4.14 | 1.73 | 0.54 |
| 13.870 | 3340 | 1467.11 | | 4.50 | | 1.14 | 2.16 | 1.36 |
| 13.736 | 3340 | 1464.79 | | 4.57 | | 3.88 | 2.35 | 0.90 |
| 13.539 | 3340 | 1460.09 | | 4.66 | | 1.56 | 2.09 | 1.39 |
| 13.351 | 3340 | 1456.90 | | 4.76 | | 2.84 | 1.56 | 1.21 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)
** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)
*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRULIC DATA (RHupr.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 14.833 | 9333 | 1484.74 | 3.03 | 4.03 | 7.77 | 7.77 | 5.12 | 4.12 |
| 14.666 | 9333 | 1482.91 | 3.08 | 4.07 | 5.31 | 5.23 | 7.81 | 6.08 |
| 14.612 | 9333 | 1482.81 | 3.12 | 4.13 | 2.63 | 1.51 | 7.31 | 2.80 |
| 14.489 | 7260 | 1482.23 | 3.13 | 4.15 | 5.40 | 2.71 | 1.48 | 0.68 |
| 14.479 | 9200 | 1483.50 | 3.13 | 4.15 | 7.50 | 7.83 | 6.94 | 3.60 |
| 14.347 | 9200 | 1477.09 | 3.16 | 4.18 | 8.94 | 8.94 | 8.55 | 3.89 |
| 14.207 | 9200 | 1474.88 | 3.19 | 4.21 | 6.10 | 6.09 | 7.85 | 4.38 |
| 14.029 | 9200 | 1471.17 | 3.23 | 4.25 | 7.06 | 7.06 | 6.78 | 4.04 |
| 13.870 | 9200 | 1469.46 | 3.26 | 4.28 | 6.24 | 6.24 | 7.25 | 4.82 |
| 13.736 | 9200 | 1466.53 | 3.30 | 4.32 | 6.17 | 6.17 | 8.94 | 4.58 |
| 13.539 | 9200 | 1460.25 | 3.33 | 4.36 | 10.88 | 10.98 | 6.51 | 4.28 |
| 13.351 | 9200 | 1455.43 | 3.36 | 4.38 | 7.32 | 7.32 | 8.89 | 4.87 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)
** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)
*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (W126, W133)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK — ERM XXX
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

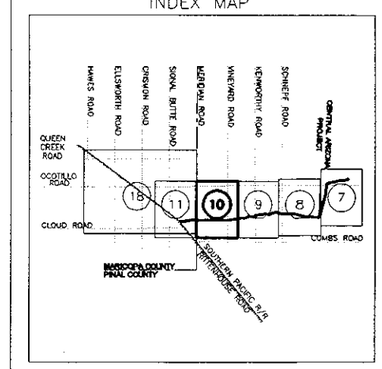
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2008 | 1482.908 | FND BC/HH OCOTILLO & VINEYARD RD |
| ERM2011 | 1481.306 | FND GLO BC @ VINEYARD RD & CHANDLER HEIGHTS |
| ERM2012 | 1470.563 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| ERM2013 | 1456.108 | FND 2" OD PIPE WITH WASHER LS21765 |
| ERM2015 | 1452.928 | FND 1/2 REBAR |
| ERM2021 | 1457.171 | FND MCDOT BC/HH |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
2/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

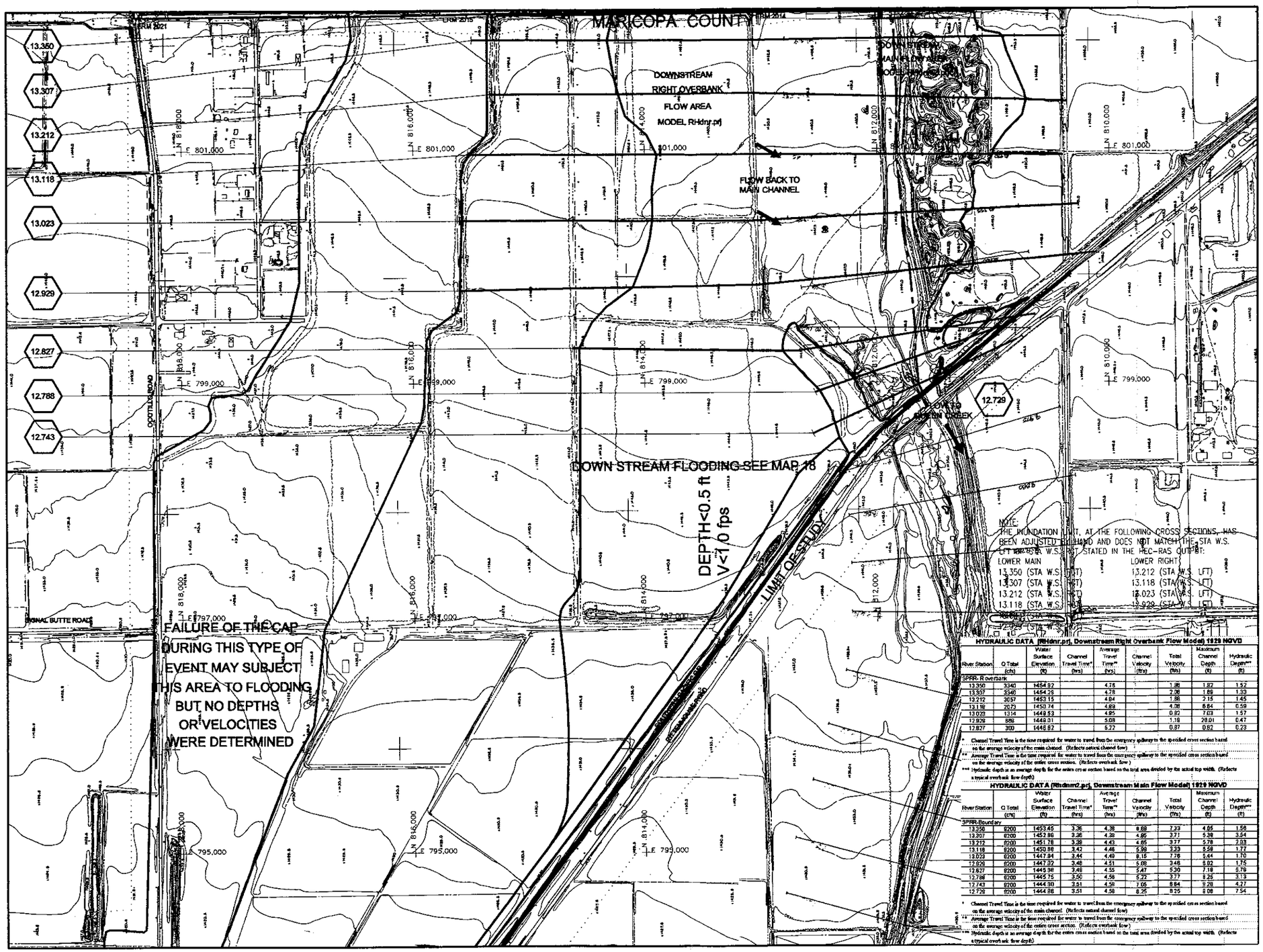
SHEET 10 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&R AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH MAP AND
EAST MARICOPA FLOODWAY CAPACITY MITIGATION STUDY (FCD96-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040




NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT AND STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:

| LOWER MAIN | LOWER RIGHT |
|---|---|
| 13.350 (STA W.S. RGT) | 13.212 (STA W.S. LFT) |
| 13.307 (STA W.S. RGT) | 13.118 (STA W.S. LFT) |
| 13.212 (STA W.S. RGT) | 13.023 (STA W.S. LFT) |
| 13.118 (STA W.S. RGT) | 12.929 (STA W.S. LFT) |
| 12.929 (STA W.S. RGT) | |
| 12.827 (STA W.S. RGT) | |

**HYDRAULIC DATA (RHdnr.prj, Downstream Right Overbank Flow Model) 1929 NGVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| SPRR-R Overbank | | | | | | | | |
| 13.350 | 3340 | 1454.92 | | 4.78 | | 1.98 | 1.92 | 1.52 |
| 13.307 | 3340 | 1454.28 | | 4.78 | | 2.08 | 1.89 | 1.33 |
| 13.212 | 3057 | 1453.15 | | 4.94 | | 1.88 | 2.15 | 1.45 |
| 13.118 | 2673 | 1450.74 | | 4.89 | | 4.08 | 6.64 | 0.59 |
| 13.023 | 1314 | 1449.53 | | 4.95 | | 0.92 | 7.03 | 1.57 |
| 12.929 | 888 | 1449.01 | | 5.08 | | 1.18 | 28.01 | 0.47 |
| 12.827 | 300 | 1446.82 | | 5.72 | | 0.87 | 0.92 | 0.23 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow )

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRAULIC DATA (RHdnrm2.prj, Downstream Main Flow Model) 1929 NGVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | | | | | | | | |
| 13.350 | 6200 | 1453.46 | 3.36 | 4.38 | 8.69 | 7.29 | 4.95 | 1.56 |
| 13.307 | 6200 | 1452.86 | 3.36 | 4.39 | 4.85 | 3.71 | 5.39 | 3.94 |
| 13.212 | 6200 | 1451.78 | 3.39 | 4.43 | 4.85 | 3.77 | 5.78 | 2.03 |
| 13.118 | 6200 | 1450.88 | 3.42 | 4.46 | 5.99 | 3.33 | 8.58 | 1.77 |
| 13.023 | 6200 | 1447.84 | 3.44 | 4.49 | 8.15 | 7.78 | 5.44 | 1.70 |
| 12.929 | 6200 | 1447.02 | 3.48 | 4.51 | 5.08 | 3.46 | 8.02 | 1.75 |
| 12.827 | 6200 | 1445.98 | 3.48 | 4.55 | 5.47 | 5.30 | 7.18 | 5.76 |
| 12.788 | 6200 | 1445.75 | 3.50 | 4.56 | 5.72 | 3.77 | 8.25 | 3.13 |
| 12.743 | 6200 | 1444.90 | 3.51 | 4.58 | 7.05 | 8.64 | 9.28 | 4.27 |
| 12.729 | 6200 | 1444.88 | 3.51 | 4.58 | 8.25 | 8.25 | 8.08 | 7.54 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

INUNDATION AREA BOUNDARY

HYDRAULIC BASE LINE WITH RIVER MILE (M27.0, M13.0)

INUNDATION AREA DUE TO CAP FAILURE

CROSS SECTION (2.147 — 2.147)

ELEVATION REFERENCE MARK — ERM XXX

COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary

PANEL POINT

MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

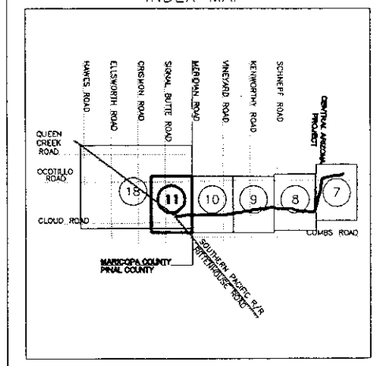
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2014 | 1458.033 | FND 1.5" OD PIPE WITH WASHER LS21755 |
| ERM2015 | 1452.928 | FND 1/2 REBAR |
| ERM2021 | 1457.171 | FND MCDOT BC/HH |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000
2- WEST SIDE AERIAL MAPPING PROVIDED BY:
FCDMC TO BAKER AS A RASTER IMAGE
SEE QUEEN CREEK ADMS TOPOGRAPHIC MAPS. FCD 86-23

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

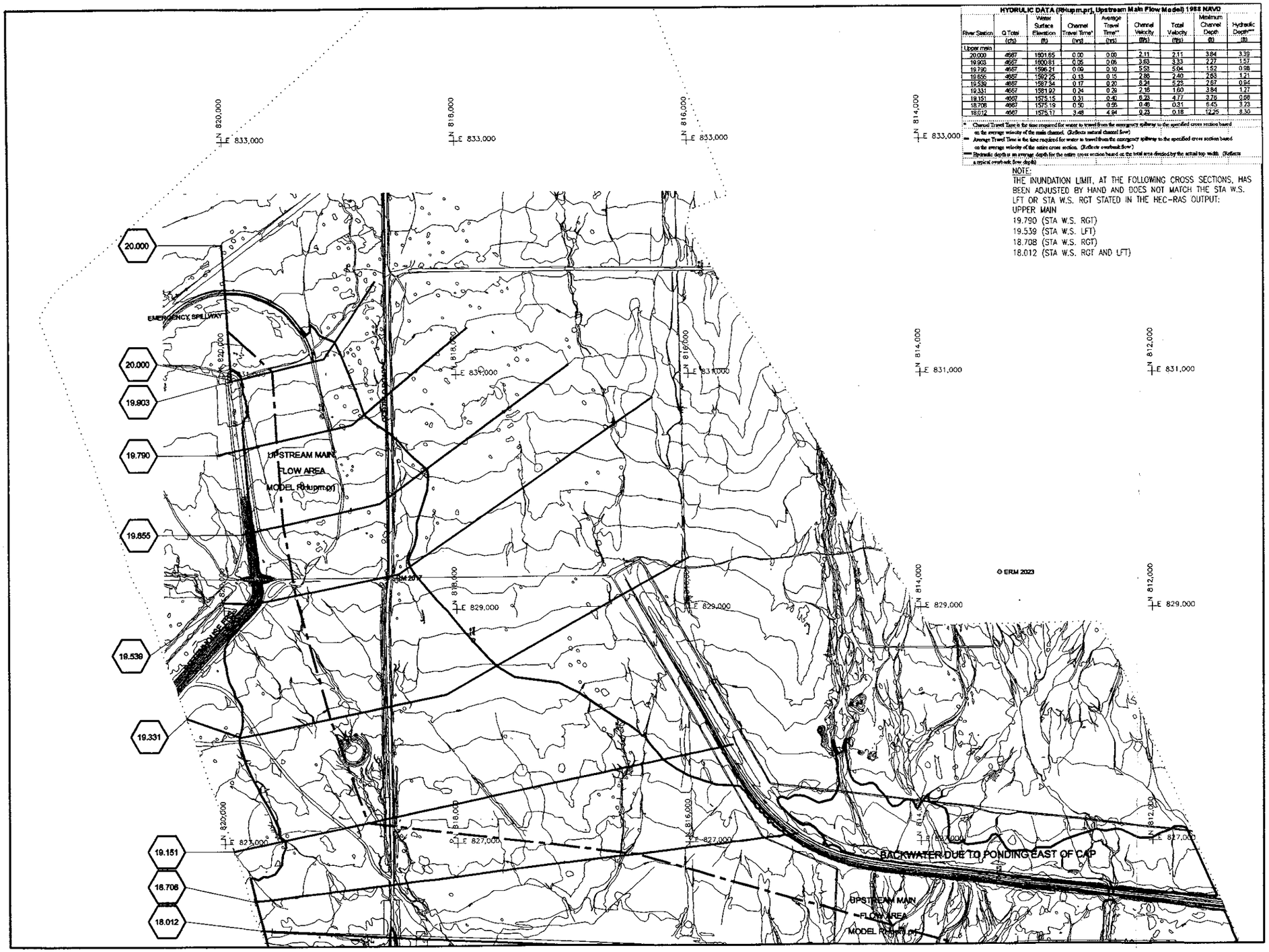
RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
2/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 11 OF 19




**HYDRULIC DATA (R1upm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Minimum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 20.000 | 4667 | 1601.65 | 0.00 | 0.00 | 2.11 | 2.11 | 3.84 | 3.39 |
| 19.903 | 4667 | 1600.81 | 0.05 | 0.06 | 3.63 | 3.33 | 2.27 | 1.57 |
| 19.790 | 4667 | 1596.21 | 0.09 | 0.10 | 5.53 | 5.04 | 1.52 | 0.98 |
| 19.855 | 4667 | 1592.25 | 0.13 | 0.15 | 2.88 | 2.40 | 2.63 | 1.21 |
| 19.539 | 4667 | 1587.34 | 0.17 | 0.20 | 8.24 | 5.23 | 2.87 | 0.94 |
| 19.331 | 4667 | 1581.92 | 0.24 | 0.29 | 2.16 | 1.60 | 3.84 | 1.27 |
| 19.151 | 4667 | 1575.15 | 0.31 | 0.40 | 6.23 | 4.77 | 3.78 | 0.88 |
| 18.708 | 4667 | 1575.19 | 0.50 | 0.95 | 0.46 | 0.31 | 6.45 | 3.23 |
| 18.012 | 4667 | 1575.17 | 3.48 | 4.94 | 0.23 | 0.18 | 12.25 | 8.30 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:
UPPER MAIN
19.790 (STA W.S. RGT)
19.539 (STA W.S. LFT)
18.708 (STA W.S. RGT)
18.012 (STA W.S. RGT AND LFT)

## LEGEND

INUNDATION AREA BOUNDARY
HYDRAULIC BASE LINE WITH RIVER MILE — M12.0 M13.0
INUNDATION AREA DUE TO CAP FAILURE
CROSS SECTION — 2.147 2.147
ELEVATION REFERENCE MARK — ERM XXX
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY — County Boundary
PANEL POINT
MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

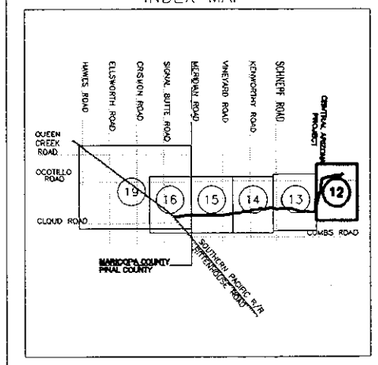
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988 CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2017 | 1585.733 | FND GLO BRASS CAP |
| ERM2023 | 1585.708 | FND GLO BRASS CAP |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

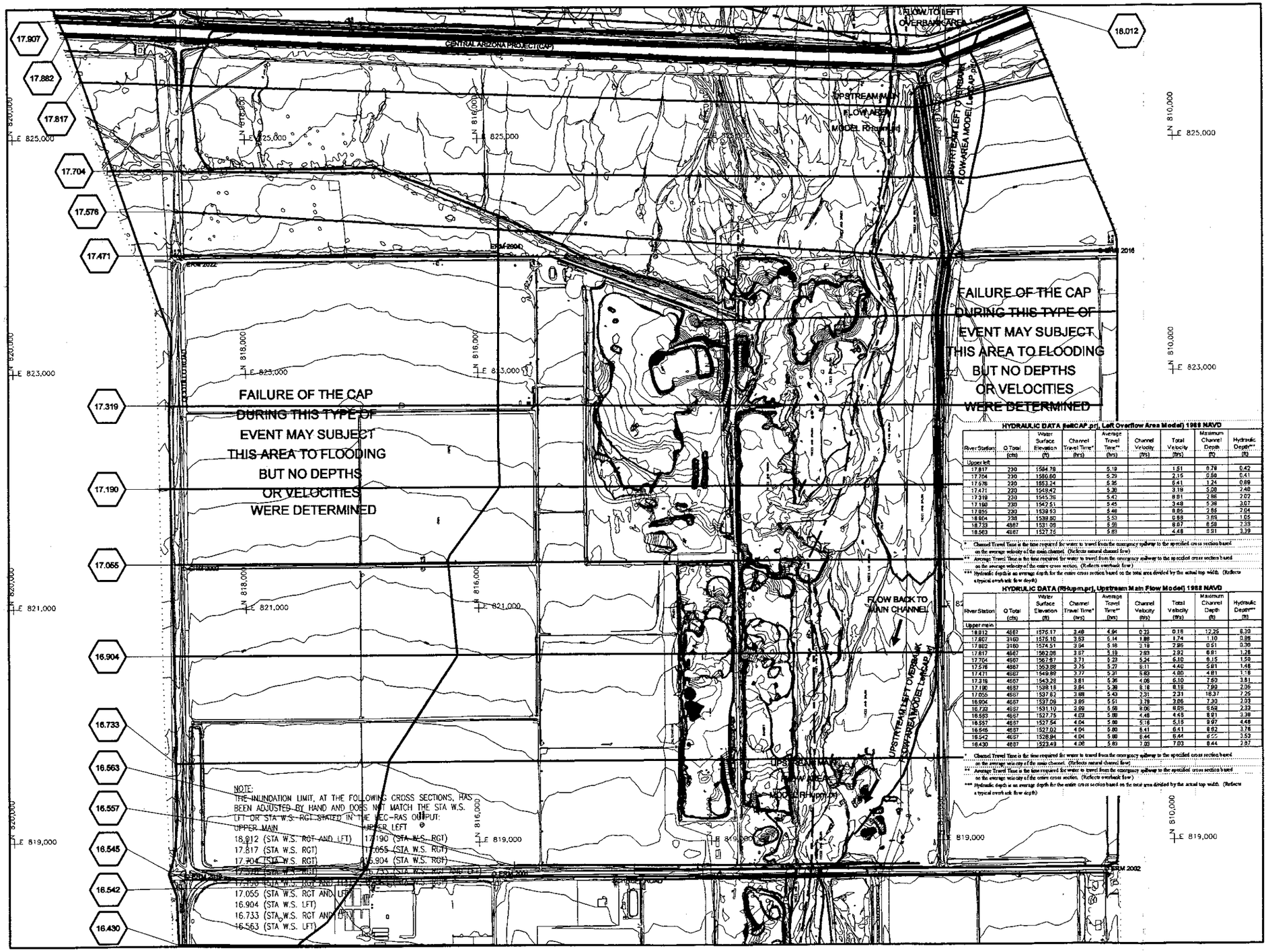
SHEET 12 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040

\Folders from V\Vcospill\fcs\Rittenhouse\Cad\way_3\R1\Sht1-3.dwg, 04/24/2002 04:12:30 PM




NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR STA W.S. RGT STATED IN THE HEC-RAS OUTPUT:

| UPPER MAIN | UPPER LEFT |
|---|---|
| 18.012 (STA W.S. RGT AND LFT) | 17.190 (STA W.S. RGT) |
| 17.817 (STA W.S. RGT) | 17.055 (STA W.S. RGT) |
| 17.704 (STA W.S. RGT) | 16.904 (STA W.S. RGT) |
| 17.576 (STA W.S. RGT) | 16.733 (STA W.S. RGT AND LFT) |
| 17.190 (STA W.S. RGT AND LFT) | |
| 17.055 (STA W.S. RGT AND LFT) | |
| 16.904 (STA W.S. LFT) | |
| 16.733 (STA W.S. RGT AND LFT) | |
| 16.563 (STA W.S. LFT) | |

**HYDRAULIC DATA (leftCAP.prj, Left Overflow Area Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper left | | | | | | | | |
| 17.817 | 230 | 1584.78 | | 5.19 | | 1.61 | 0.78 | 0.42 |
| 17.704 | 230 | 1580.60 | | 5.29 | | 2.15 | 0.58 | 0.41 |
| 17.576 | 230 | 1553.24 | | 5.35 | | 5.41 | 1.24 | 0.89 |
| 17.471 | 230 | 1549.42 | | 5.38 | | 3.19 | 5.08 | 2.48 |
| 17.319 | 230 | 1545.36 | | 5.43 | | 8.81 | 2.86 | 2.02 |
| 17.190 | 230 | 1542.51 | | 5.45 | | 3.48 | 5.38 | 3.07 |
| 17.055 | 230 | 1539.53 | | 5.48 | | 8.85 | 2.86 | 2.04 |
| 16.904 | 230 | 1539.80 | | 5.53 | | 0.58 | 3.85 | 1.05 |
| 16.733 | 4667 | 1531.09 | | 5.56 | | 8.07 | 6.58 | 2.33 |
| 16.563 | 4667 | 1527.76 | | 5.63 | | 4.48 | 8.91 | 3.39 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRAULIC DATA (RHupm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 18.012 | 4667 | 1576.17 | 3.48 | 4.94 | 0.23 | 0.18 | 12.26 | 8.30 |
| 17.807 | 3160 | 1576.10 | 3.53 | 5.14 | 1.88 | 1.74 | 1.10 | 0.86 |
| 17.802 | 3160 | 1574.51 | 3.54 | 5.16 | 3.19 | 2.95 | 0.51 | 0.30 |
| 17.817 | 4667 | 1562.06 | 3.67 | 5.19 | 2.93 | 2.92 | 6.81 | 1.28 |
| 17.704 | 4667 | 1557.87 | 3.71 | 5.23 | 5.24 | 5.10 | 6.15 | 1.50 |
| 17.576 | 4667 | 1553.88 | 3.75 | 5.27 | 6.11 | 4.40 | 5.61 | 1.48 |
| 17.471 | 4667 | 1549.80 | 3.77 | 5.31 | 5.62 | 4.80 | 4.81 | 1.16 |
| 17.319 | 4667 | 1543.28 | 3.81 | 5.36 | 4.06 | 6.10 | 7.60 | 3.81 |
| 17.190 | 4667 | 1538.18 | 3.84 | 5.39 | 8.18 | 8.13 | 7.93 | 2.06 |
| 17.055 | 4667 | 1537.62 | 3.88 | 5.43 | 2.31 | 2.31 | 18.37 | 7.25 |
| 16.904 | 4667 | 1537.09 | 3.95 | 5.51 | 3.78 | 3.86 | 7.30 | 2.03 |
| 16.733 | 4667 | 1531.10 | 3.99 | 5.56 | 8.06 | 8.05 | 6.58 | 2.33 |
| 16.563 | 4667 | 1527.75 | 4.03 | 5.60 | 4.48 | 4.48 | 8.91 | 3.39 |
| 16.557 | 4667 | 1527.54 | 4.04 | 5.60 | 5.16 | 5.15 | 9.97 | 4.48 |
| 16.545 | 4667 | 1527.02 | 4.04 | 5.60 | 6.41 | 6.41 | 8.62 | 3.76 |
| 16.542 | 4667 | 1528.94 | 4.04 | 5.60 | 6.44 | 6.44 | 8.55 | 3.53 |
| 16.430 | 4667 | 1523.49 | 4.06 | 5.63 | 7.03 | 7.03 | 8.44 | 2.87 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M12.0, M13.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY (County Boundary)
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

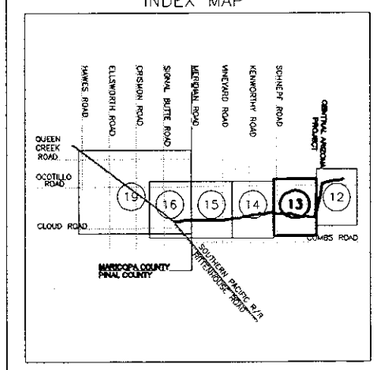
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988 CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft.

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2001 | 1532.812 | FND BC/HH @ SOUTHWOOD RD & SCHNEPE RD |
| ERM2002 | 1533.676 | FND BC/HH @ SCHNEPE ON OCTILLO RD |
| ERM2003 | 1544.562 | FND 3/4" OD PIPE 0.4FT BELOW ROAD 1/2M E OF SCHNEPE ON OCTILLO RD |
| ERM2004 | 1560.177 | FND 2" OD PIPE 1/2M S OF OCTILLO ON BARKLEY |
| ERM2016 | 1558.081 | FND REBAR WITH PLASTIC CAP ALLEN LS16097 |
| ERM2019 | 1529.497 | FND GLO BC |
| ERM2022 | 1558.881 | FND GLO BC @ SIERRA VISTA DR & OCTILLO RD |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KORI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

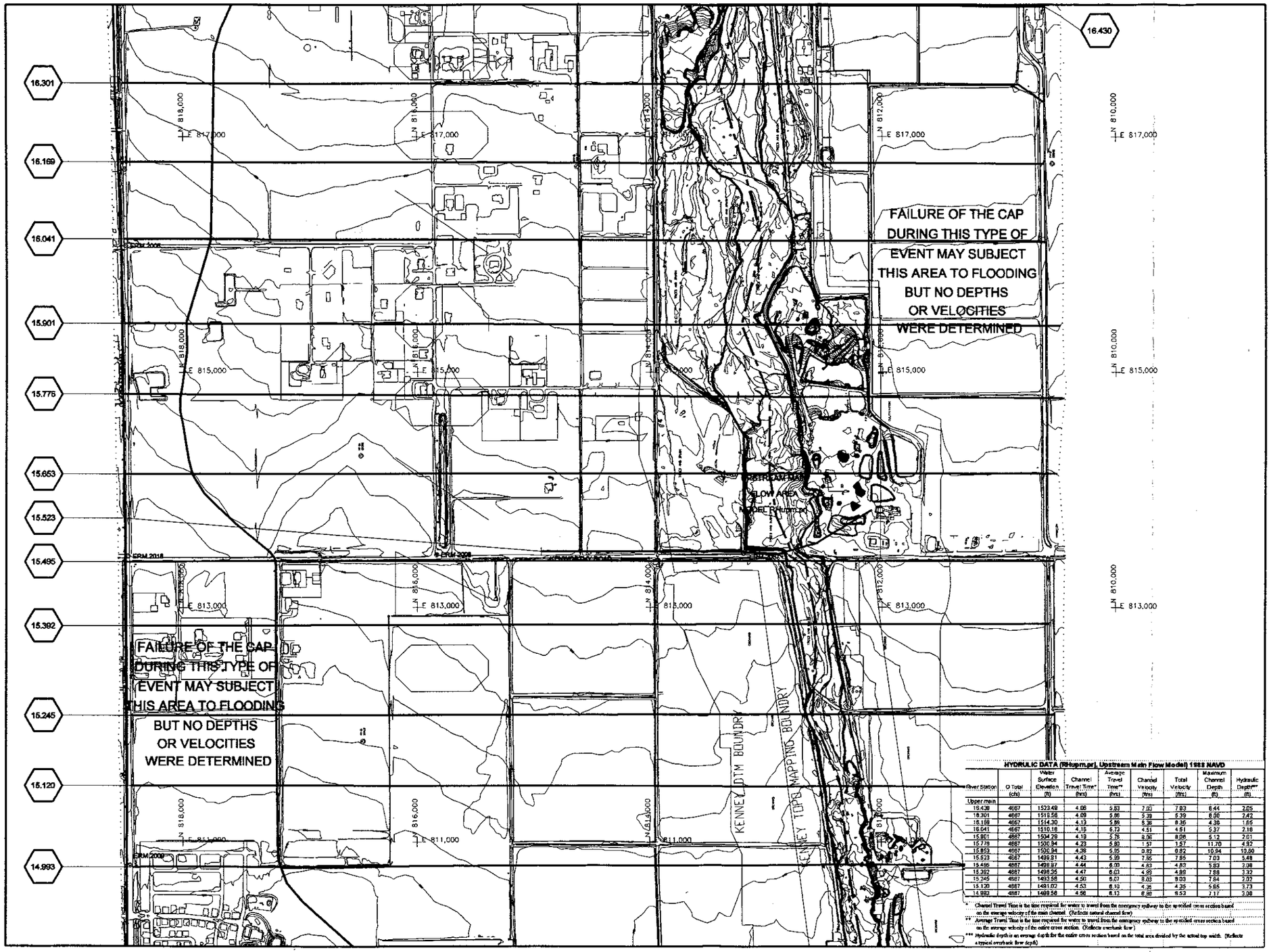
SHEET 13 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH HMP AND
EAST MARICOPA FLOODWAY CAPACITY MITIGATION STUDY (FCD98-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040




**HYDRULIC DATA (RHupm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 19.430 | 4667 | 1523.49 | 4.06 | 5.83 | 7.00 | 7.83 | 6.44 | 2.05 |
| 18.301 | 4667 | 1519.56 | 4.09 | 5.86 | 5.39 | 5.39 | 8.00 | 2.42 |
| 18.169 | 4667 | 1514.30 | 4.13 | 5.89 | 6.36 | 8.36 | 4.30 | 1.65 |
| 16.041 | 4667 | 1510.16 | 4.16 | 5.73 | 4.51 | 4.51 | 5.37 | 2.16 |
| 15.901 | 4667 | 1504.29 | 4.19 | 5.76 | 8.90 | 8.06 | 5.12 | 2.01 |
| 15.776 | 4667 | 1500.94 | 4.23 | 5.80 | 1.57 | 1.57 | 11.70 | 4.92 |
| 15.653 | 4667 | 1500.94 | 4.28 | 5.85 | 0.82 | 0.82 | 10.94 | 10.60 |
| 15.523 | 4667 | 1499.31 | 4.43 | 5.99 | 7.85 | 7.85 | 7.03 | 5.48 |
| 15.495 | 4667 | 1498.97 | 4.44 | 6.00 | 4.63 | 4.63 | 5.82 | 3.08 |
| 15.392 | 4667 | 1498.35 | 4.47 | 6.03 | 4.89 | 4.89 | 7.88 | 3.32 |
| 15.245 | 4667 | 1493.58 | 4.50 | 6.07 | 8.03 | 8.03 | 7.84 | 2.02 |
| 15.120 | 4667 | 1491.02 | 4.53 | 6.10 | 4.35 | 4.35 | 5.65 | 3.73 |
| 14.993 | 4667 | 1489.56 | 4.56 | 6.13 | 6.80 | 6.53 | 7.17 | 3.00 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

## LEGEND

- INUNDATION AREA BOUNDARY
- HYDRAULIC BASE LINE WITH RIVER MILE (M17.0, M18.0)
- INUNDATION AREA DUE TO CAP FAILURE
- CROSS SECTION (2.147 — 2.147)
- ELEVATION REFERENCE MARK (ERM XXX)
- COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY (County Boundary)
- PANEL POINT
- MAPPING BOUNDARY

## ELEVATION REFERENCE MARKS

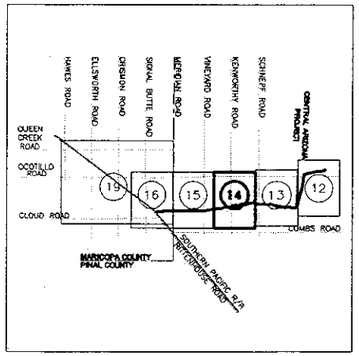
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= −1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2005 | 1514.364 | FND BC/HH @ OCOTILLO & COYOTE |
| ERM2006 | 1507.206 | FND 3" OD PIPE |
| ERM2007 | 1511.049 | FND 1" OD PIPE |
| ERM2009 | 1494.063 | FND BC/HH ON OCOTILLO 1/2MI E OF VINEYARD |
| ERM2018 | 1503.312 | FND BC/HH @ KENWORTHY & OCTILLO RD |

## NOTES

1– THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

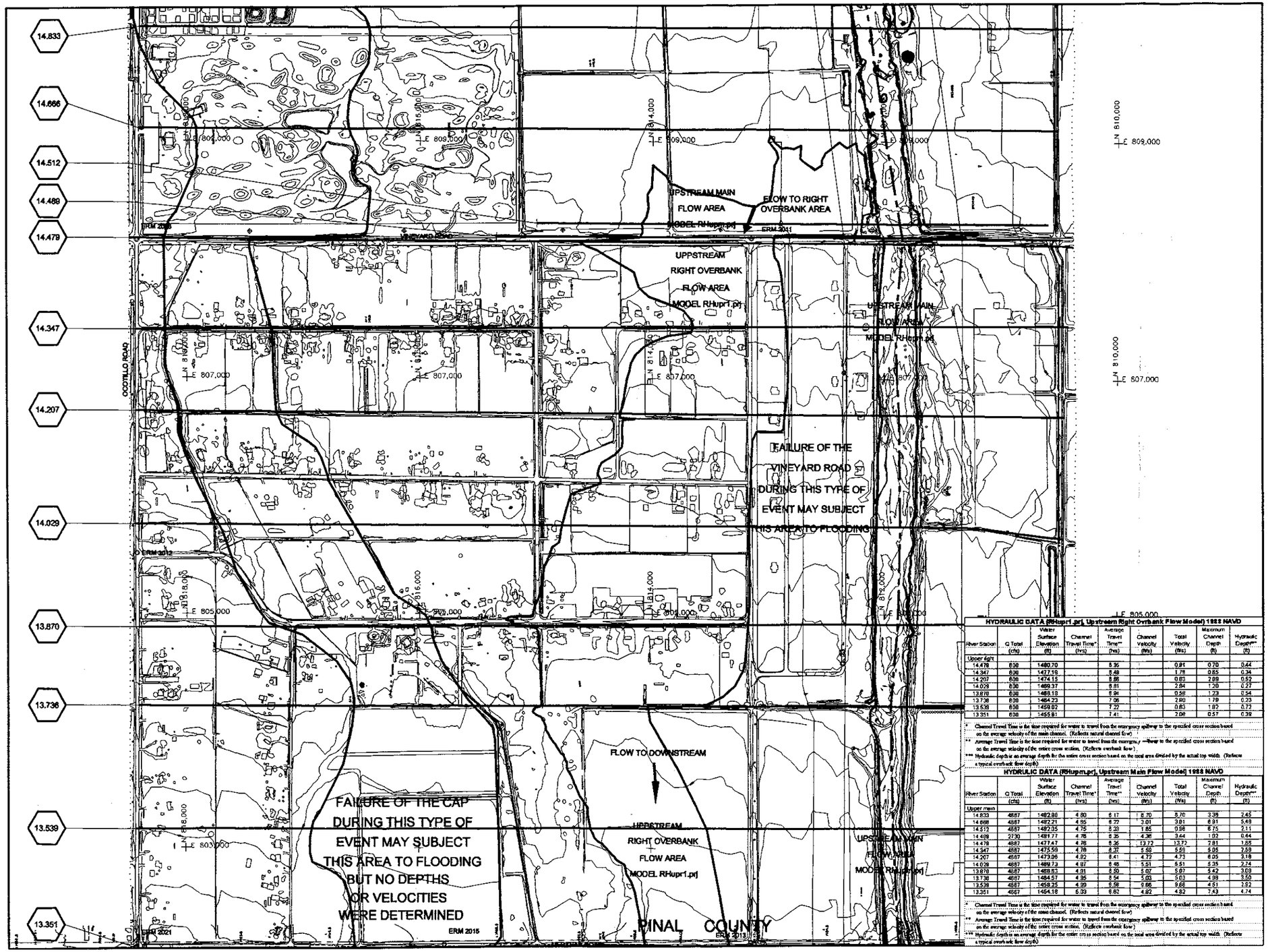
SHEET 14 OF 19

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH HMP AND
EAST MARICOPA FLOODWAY CAPCITY MITIGATION STUDY (FCD98-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040




## LEGEND

| | |
|---|---|
| INUNDATION AREA BOUNDARY | |
| HYDRAULIC BASE LINE WITH RIVER MILE | M12.0 — M13.0 |
| INUNDATION AREA DUE TO CAP FAILURE | |
| CROSS SECTION | 2.147 — 2.147 |
| ELEVATION REFERENCE MARK | ERM XXX |
| COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY | County Boundary |
| PANEL POINT | |
| MAPPING BOUNDARY | |

## ELEVATION REFERENCE MARKS

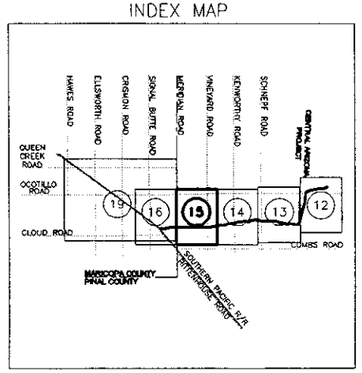
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2008 | 1482.908 | FND BC/HH OCOTILLO & VINEYARD RD |
| ERM2011 | 1481.306 | FND GLO BC @ VINEYARD RD & CHANDLER HEIGHTS |
| ERM2012 | 1470.563 | FND BC/HH @ OCOTILLO & KENNEDY DR |
| ERM2013 | 1456.108 | FND 2" OD PIPE WITH WASHER LS21765 |
| ERM2015 | 1452.928 | FND 1/2 REBAR |
| ERM2021 | 1457.171 | FND MCDOT BC/HH |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000

## INDEX MAP




400' 0' 400' 800'

SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

**HYDRAULIC DATA (RHupr1.prj, Upstream Right Overbank Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper right | | | | | | | | |
| 14.478 | 800 | 1480.70 | | 8.36 | | 0.91 | 0.70 | 0.44 |
| 14.347 | 800 | 1477.16 | | 5.48 | | 1.78 | 0.85 | 0.34 |
| 14.207 | 800 | 1474.15 | | 8.86 | | 0.83 | 2.09 | 0.52 |
| 14.029 | 800 | 1469.37 | | 9.81 | | 0.84 | 1.20 | 0.27 |
| 13.870 | 800 | 1466.18 | | 8.94 | | 0.98 | 1.73 | 0.54 |
| 13.736 | 800 | 1464.23 | | 7.06 | | 2.80 | 1.78 | 0.23 |
| 13.539 | 800 | 1459.02 | | 7.22 | | 0.83 | 1.82 | 0.73 |
| 13.351 | 800 | 1455.81 | | 7.41 | | 2.08 | 0.57 | 0.39 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRAULIC DATA (RHupm.prj, Upstream Main Flow Model) 1988 NAVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (ft/s) | Total Velocity (ft/s) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| Upper main | | | | | | | | |
| 14.833 | 4667 | 1482.98 | 4.80 | 6.17 | 8.70 | 5.70 | 3.39 | 2.45 |
| 14.666 | 4667 | 1482.21 | 4.95 | 6.72 | 3.01 | 3.81 | 6.91 | 5.48 |
| 14.512 | 4667 | 1482.05 | 4.75 | 8.23 | 1.85 | 0.98 | 6.75 | 2.11 |
| 14.489 | 2730 | 1481.77 | 4.78 | 9.35 | 4.36 | 3.44 | 1.02 | 0.44 |
| 14.478 | 4667 | 1477.47 | 4.78 | 9.26 | 13.72 | 13.72 | 7.81 | 1.55 |
| 14.347 | 4667 | 1475.59 | 4.78 | 8.27 | 5.58 | 5.58 | 5.05 | 2.59 |
| 14.207 | 4667 | 1473.06 | 4.82 | 9.41 | 4.73 | 4.73 | 6.05 | 3.18 |
| 14.029 | 4667 | 1469.73 | 4.87 | 9.48 | 5.51 | 5.51 | 5.35 | 2.74 |
| 13.870 | 4667 | 1466.53 | 4.91 | 8.50 | 5.07 | 5.07 | 5.42 | 3.08 |
| 13.736 | 4667 | 1464.57 | 4.95 | 8.54 | 5.03 | 5.03 | 4.98 | 3.50 |
| 13.539 | 4667 | 1459.25 | 4.99 | 8.58 | 9.66 | 9.66 | 4.51 | 2.92 |
| 13.351 | 4667 | 1454.18 | 5.03 | 8.62 | 4.82 | 4.82 | 7.43 | 4.74 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

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*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 28148 KOFI AWUMAH DATE SIGNED ARIZONA, U.S.A.

**Baker**

Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 15 OF 19

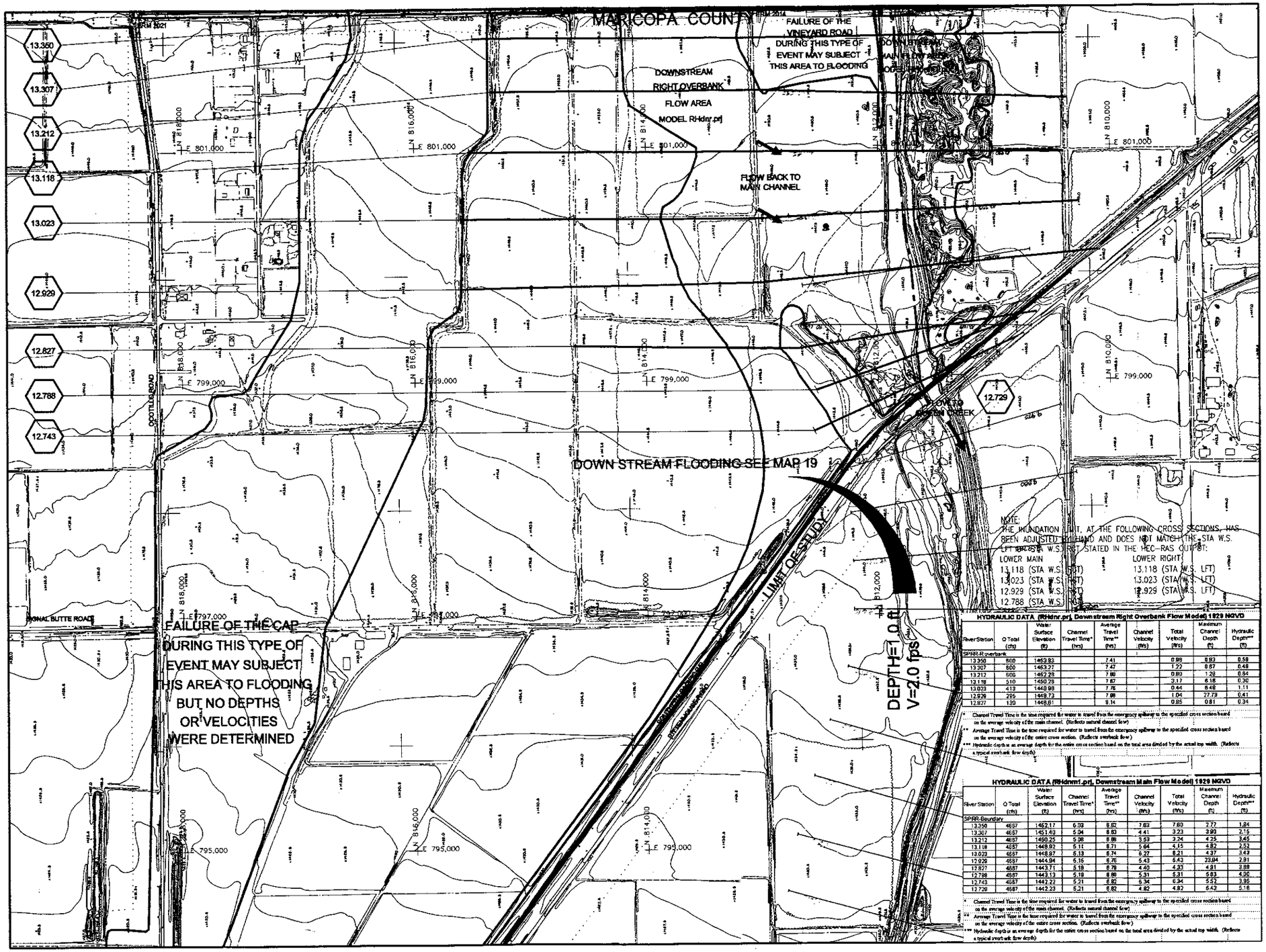
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1" = 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS. THE HORIZONTAL DATUM WAS NAD 83.

AERIAL MAPPING PROVIDED BY:
M&B AERIAL MAPPING, LLC.
ONE WEST DEER VALLEY ROAD #206, PHOENIX, AZ 85027

AERIAL MAPPING FOR QUEEN CREEK CHANNEL PROVIDED BY FCDMC TO BAKER
SEE QUEEN CREEK/SANOKAI WASH HMP AND
EAST MARICOPA FLOODWAY CAPACITY MITIGATION STUDY (FC098-26)

GROUND CONTROL SURVEY DATA
PROVIDED BY: AZTEC ENGINEERING,
3747 East Grove Street, Phoenix, AZ 85040

\\Folders from V\Fcdspill\Jobs\Rittenhouse\Cloud\dwg_310\3211 Friday, 04/19/2002 04:31:20 PM




NOTE:
THE INUNDATION LIMIT, AT THE FOLLOWING CROSS SECTIONS, HAS BEEN ADJUSTED BY HAND AND DOES NOT MATCH THE STA W.S. LFT OR RGT W.S. RGT STATED IN THE HEC-RAS OUTPUT:

| LOWER MAIN | LOWER RIGHT |
|---|---|
| 13.118 (STA W.S. RGT) | 13.118 (STA W.S. LFT) |
| 13.023 (STA W.S. RGT) | 13.023 (STA W.S. LFT) |
| 12.929 (STA W.S. RGT) | 12.929 (STA W.S. LFT) |
| 12.788 (STA W.S. RGT) | |

**HYDRAULIC DATA (RHdnr.prj, Downstream Right Overbank Flow Model) 1929 NGVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| SPRR-R overbank | | | | | | | | |
| 13.350 | 600 | 1453.93 | | 7.41 | | 0.98 | 8.93 | 0.58 |
| 13.307 | 600 | 1453.27 | | 7.47 | | 1.22 | 8.87 | 0.48 |
| 13.212 | 600 | 1452.28 | | 7.80 | | 0.80 | 1.26 | 0.54 |
| 13.118 | 510 | 1450.79 | | 7.87 | | 3.17 | 6.18 | 0.30 |
| 13.023 | 413 | 1449.98 | | 7.78 | | 0.44 | 8.48 | 1.11 |
| 12.929 | 295 | 1449.73 | | 7.08 | | 1.04 | 27.79 | 0.41 |
| 12.877 | 130 | 1448.81 | | 6.14 | | 0.85 | 0.81 | 0.34 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

** Average Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the entire cross section. (Reflects overbank flow)

*** Hydraulic depth is an average depth for the entire cross section based on the total area divided by the actual top width. (Reflects a typical overbank flow depth)

**HYDRAULIC DATA (RHdnm1.prj, Downstream Main Flow Model) 1929 NGVD**

| River Station | Q Total (cfs) | Water Surface Elevation (ft) | Channel Travel Time* (hrs) | Average Travel Time** (hrs) | Channel Velocity (fps) | Total Velocity (fps) | Maximum Channel Depth (ft) | Hydraulic Depth*** (ft) |
|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | | | | | | | | |
| 13.350 | 4687 | 1452.17 | 5.03 | 8.82 | 7.83 | 7.80 | 3.72 | 1.84 |
| 13.307 | 4687 | 1451.40 | 5.04 | 8.93 | 4.41 | 3.23 | 3.90 | 2.15 |
| 13.212 | 4687 | 1450.25 | 5.08 | 8.88 | 3.53 | 3.24 | 4.25 | 3.45 |
| 13.118 | 4687 | 1449.92 | 5.11 | 8.71 | 5.64 | 4.15 | 4.82 | 2.52 |
| 13.023 | 4687 | 1448.97 | 5.13 | 8.74 | 6.27 | 6.21 | 4.37 | 3.42 |
| 12.929 | 4687 | 1444.84 | 5.16 | 8.78 | 5.43 | 5.43 | 23.94 | 2.91 |
| 12.827 | 4687 | 1443.71 | 5.18 | 8.79 | 4.40 | 4.33 | 4.91 | 3.88 |
| 12.788 | 4687 | 1443.13 | 5.19 | 8.80 | 5.31 | 5.31 | 5.83 | 4.00 |
| 12.743 | 4687 | 1442.22 | 5.21 | 8.82 | 6.34 | 6.34 | 5.52 | 3.95 |
| 12.729 | 4687 | 1442.23 | 5.21 | 8.82 | 4.82 | 4.82 | 6.43 | 5.16 |

* Channel Travel Time is the time required for water to travel from the emergency spillway to the specified cross section based on the average velocity of the main channel. (Reflects natural channel flow)

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## LEGEND

| | |
|---|---|
| INUNDATION AREA BOUNDARY | |
| HYDRAULIC BASE LINE WITH RIVER MILE | M17.0 — M13.0 |
| INUNDATION AREA DUE TO CAP FAILURE | |
| CROSS SECTION | 2.147 — 2.147 |
| ELEVATION REFERENCE MARK | ERM XXX |
| COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY | County Boundary |
| PANEL POINT | |
| MAPPING BOUNDARY | |

## ELEVATION REFERENCE MARKS

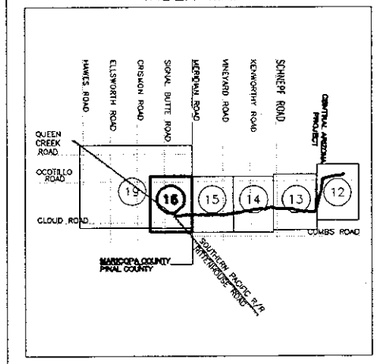
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929 NGVD= -1.98 ft

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|
| ERM2014 | 1458.033 | FND 1.5" OD PIPE WITH WASHER LS21765 |
| ERM2015 | 1452.928 | FND 1/2 REBAR |
| ERM2021 | 1457.171 | FND MCDOT BC/HH |

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000
2- WEST SIDE AERIAL MAPPING PROVIDED BY:
FCDMC TO BAKER AS A RASTER IMAGE
SEE QUEEN CREEK ADMS TOPOGRAPHIC MAPS, FCD 86-23

## INDEX MAP




400' 0' 400' 800'
SCALE: 1" = 400 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

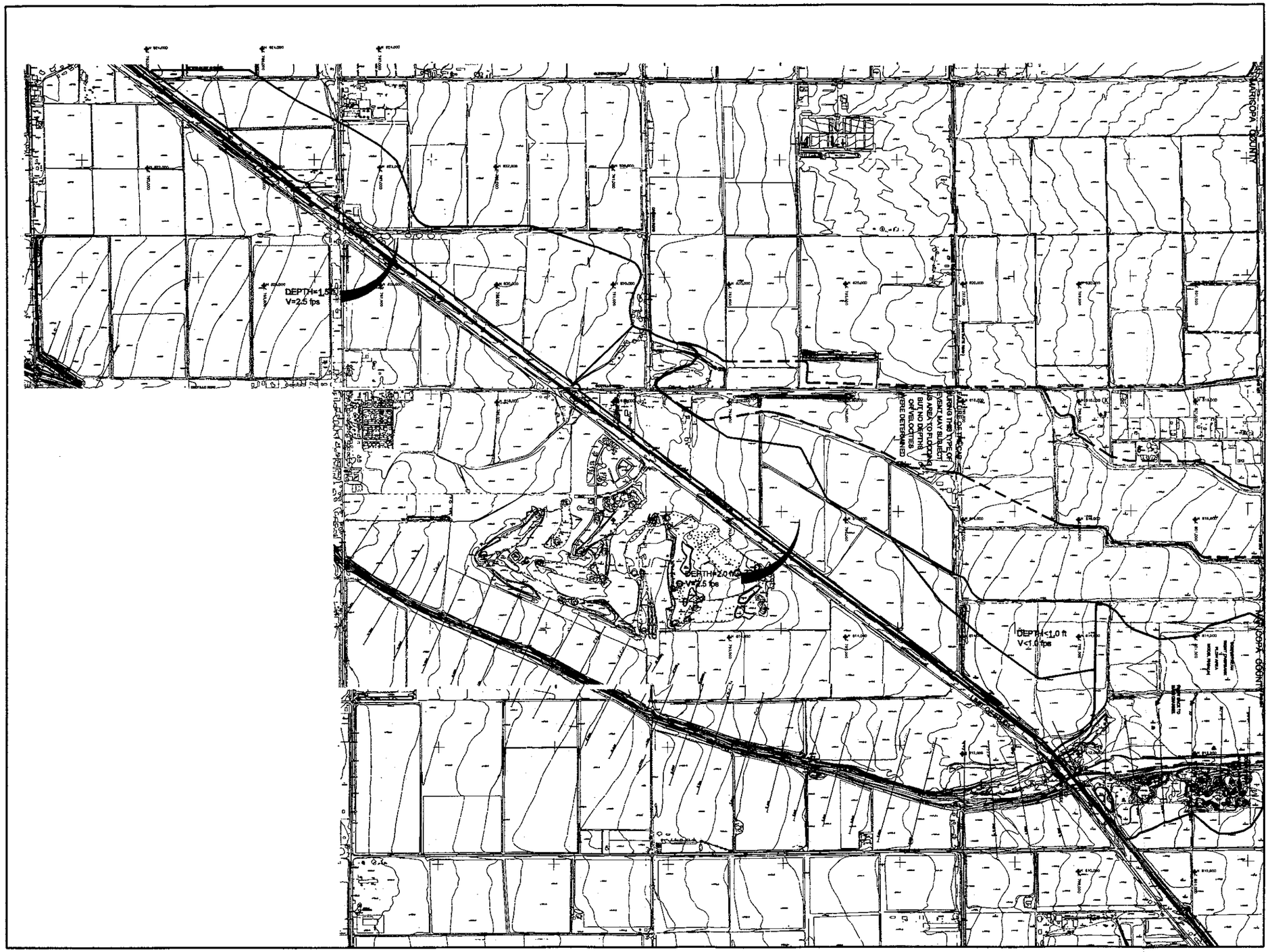
RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 16 OF 19




## LEGEND

| | |
|---|---|
| INUNDATION AREA BOUNDARY | |
| HYDRAULIC BASE LINE WITH RIVER MILE | M12.0 — M13.0 |
| INUNDATION AREA DUE TO CAP FAILURE | |
| CROSS SECTION | 2.147 — 2.147 |
| ELEVATION REFERENCE MARK | ERM XXX |
| COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY | County Boundary |
| PANEL POINT | |
| MAPPING BOUNDARY | |

## ELEVATION REFERENCE MARKS

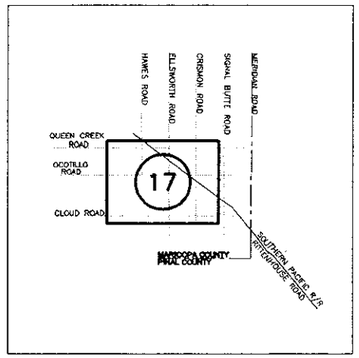
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 FT

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000
2- WEST SIDE AERIAL MAPPING PROVIDED BY:
FCDMC TO BAKER AS A RASTER IMAGE
SEE QUEEN CREEK ADMS TOPOGRAPHIC MAPS, FCD 86-23

## INDEX MAP




800' 0' 800' 1600'
SCALE: 1" = 800 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

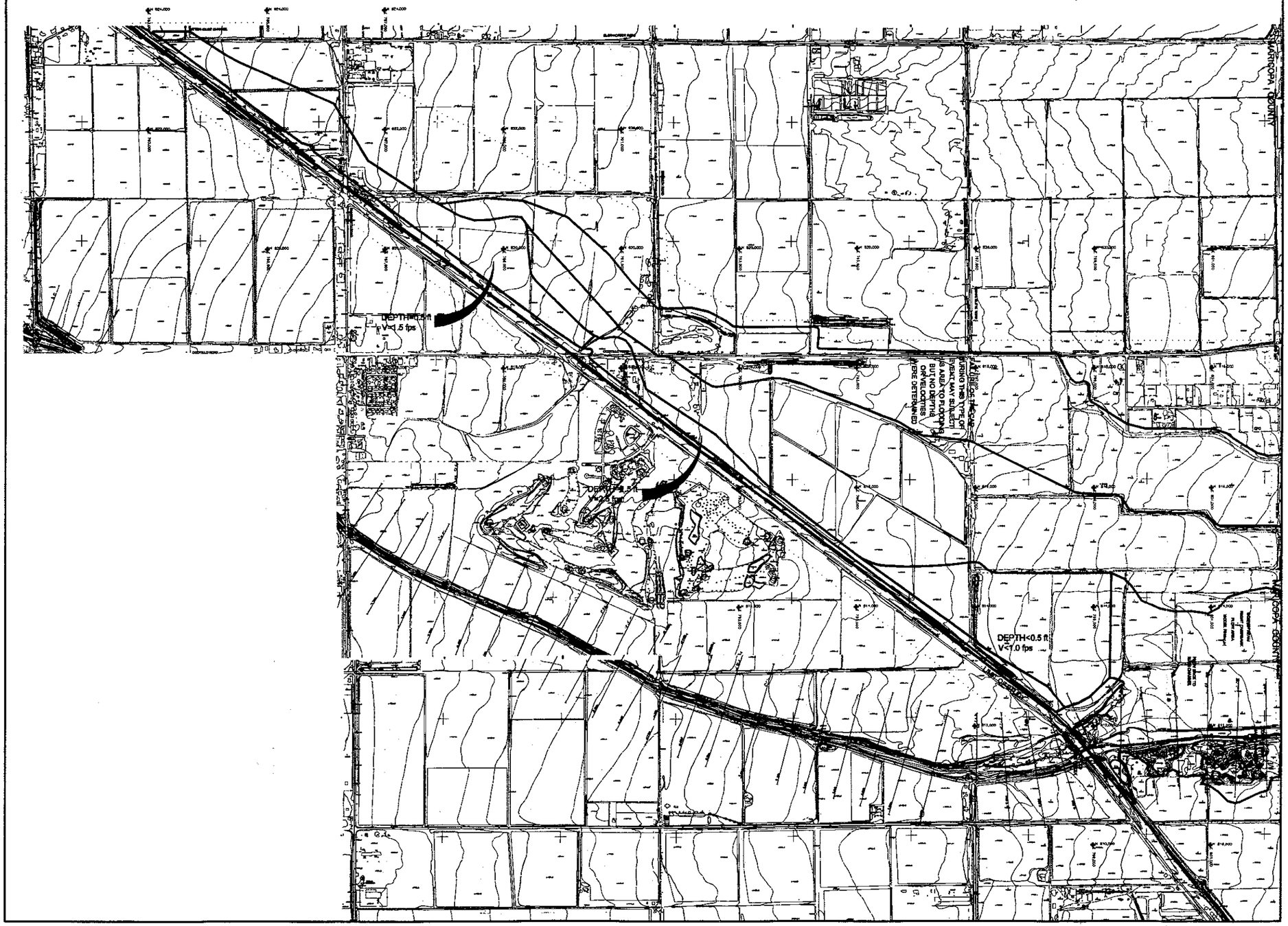
RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
FULL SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ..... ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK | K.A. | 04/02 |

SHEET 17 OF 19




## LEGEND

| | |
|---|---|
| INUNDATION AREA BOUNDARY | |
| HYDRAULIC BASE LINE WITH RIVER MILE | 0.0 M-M 0.1 |
| INUNDATION AREA DUE TO CAP FAILURE | |
| CROSS SECTION | 2.147 — 2.147 |
| ELEVATION REFERENCE MARK | ERM XXX |
| COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY | County Boundary |
| PANEL POINT | |
| MAPPING BOUNDARY | |

## ELEVATION REFERENCE MARKS

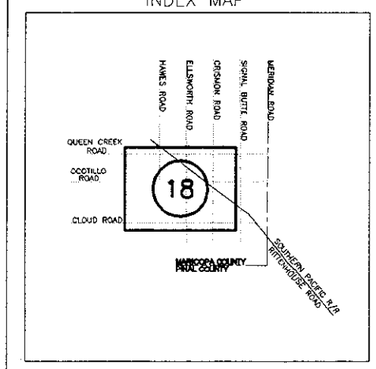
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 FT

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000
2- WEST SIDE AERIAL MAPPING PROVIDED BY:
FCDMC TO BAKER AS A RASTER IMAGE
SEE QUEEN CREEK ADMS TOPOGRAPHIC MAPS, FCD 86-23

## INDEX MAP




800' 0' 800' 1600'
SCALE: 1" = 800 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|
| 2 | | | |
| 1 | | | |

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

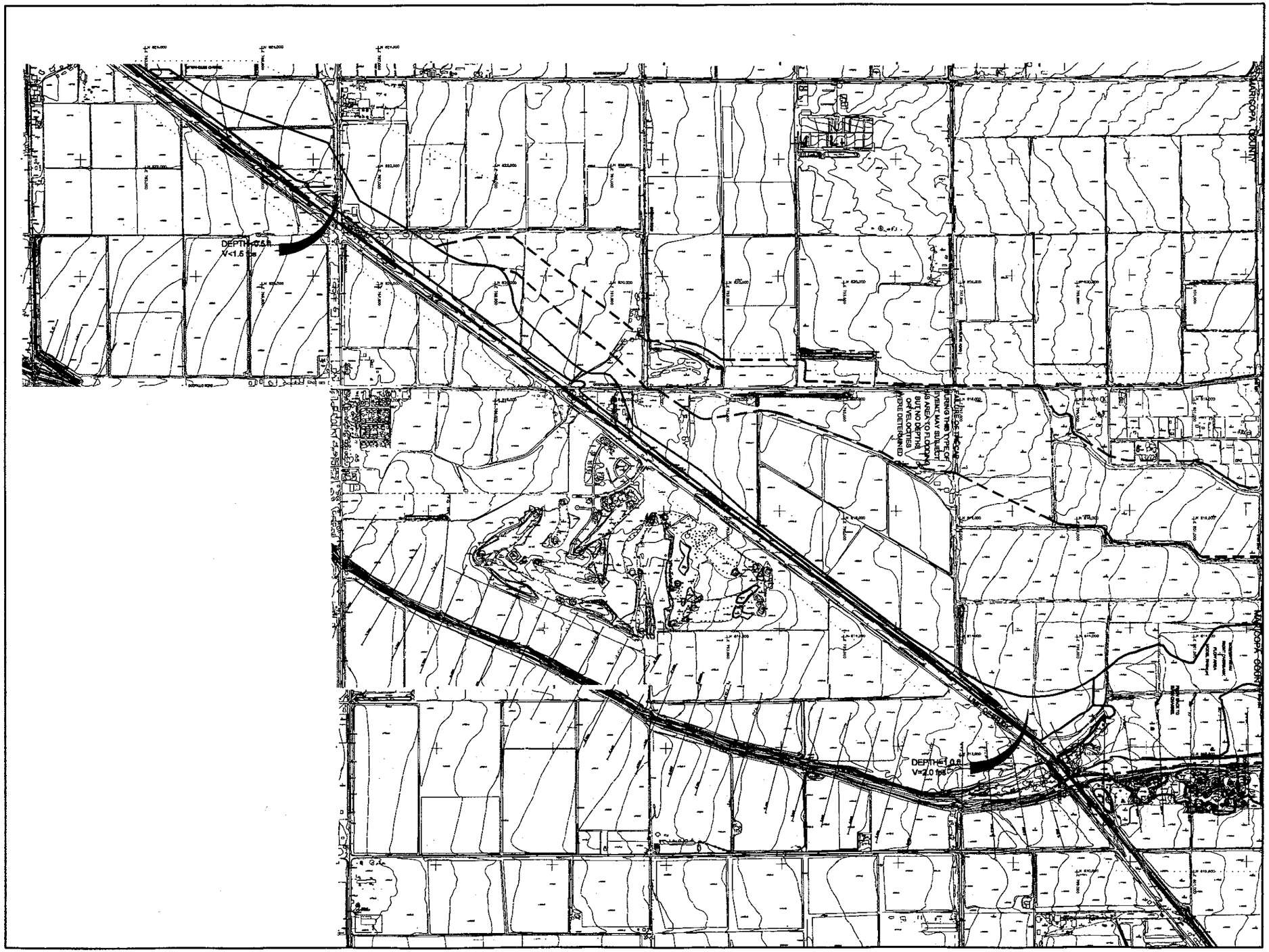
RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
2/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 18 OF 19




## LEGEND

| | |
|---|---|
| INUNDATION AREA BOUNDARY | |
| HYDRAULIC BASE LINE WITH RIVER MILE | —H12.0 — —H13.0 |
| INUNDATION AREA DUE TO CAP FAILURE | |
| CROSS SECTION | (2.147) — (2.147) |
| ELEVATION REFERENCE MARK | ERM XXX |
| COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY | County Boundary |
| PANEL POINT | △ |
| MAPPING BOUNDARY | |

## ELEVATION REFERENCE MARKS

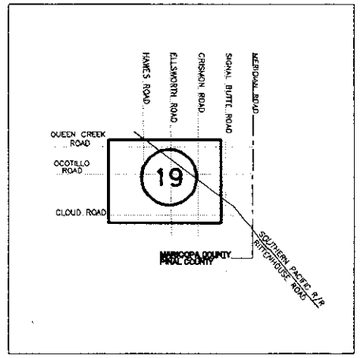
NOTE: ELEVATIONS ARE BASED ON NATIONAL AMERICAN VERTICAL DATUM OF 1988
CONVERSION FACTOR 1988 NAVD TO 1929
NGVD= -1.98 FT

| I.D. NUMBER | ELEV. (FT) | DESCRIPTION/LOCATION |
|---|---|---|

## NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000
2- WEST SIDE AERIAL MAPPING PROVIDED BY:
FCDMC TO BAKER AS A RASTER IMAGE
SEE QUEEN CREEK ADMS TOPOGRAPHIC MAPS, FCD 86-23

## INDEX MAP




800' 0' 800' 1600'
SCALE: 1" = 800 FEET
CONTOUR INTERVAL = 2 FEET

| NO. | REVISION | BY | DATE |
|---|---|---|---|

# FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RITTENHOUSE
FLOOD RETARDING STRUCTURE
SPILLWAY INUNDATION STUDY
1/3 SPILLWAY FLOW
F.C.D. CONTRACT NO. 98-33

Registered Professional Engineer (Civil) CERTIFICATE NO. 28148 KOFI AWUMAH Date Signed ARIZONA, U.S.A.

**Baker**
Michael Baker Jr., Inc.

| | BY | DATE |
|---|---|---|
| DESIGN | W.C. | 04/02 |
| DESIGN CHK. | K.A. | 04/02 |
| PLANS | H.D.T. | 04/02 |
| PLANS CHK. | K.A. | 04/02 |

SHEET 19 OF 19

## D.1 UPSTREAM MAIN HEC-RAS MODEL, RHUPM.PRJ (FOR THREE FLOWS)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rittenhouse FRS_upper three flow
Project File : RHupm.prj
Run Date and Time: 03/20/2002 9:30:44 AM

Project in English units

Project Description:
Spillway Inundation Study for Rittenhouse FRS - Three Spillway Flow Scenario

Rittenhouse FRS Emergency Spillway to Queen Creek upstream of Maricopa County boundary.

Model Vertical Datum: 1988 NAVD
Starting Water Surface Elevations, 1455.86, 1455.43 and 1454.18, were obtained through downstream main channel HEC-RAS modeling results and plus 1.98 feet.

FCD 98-33

Michael Baker Jr., Inc. 03/2002

PLAN DATA

Plan Title: Three flow Upper main model
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupm.P01

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupm.G01

Flow Title : ThreeFlow Profiles (Mixed Flow Regime)
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupm.F01

Plan Description:
Three flow scenario for upstream main channel

This model are adequate for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 49 | Mulitple Openings | = | 0 |
| | Culverts | = 0 | Inline Weirs | = | 0 |
| | Bridges | = 1 | | | |

Computational Information

| | |
|---|---|
| Water surface calculation tolerance | = 0.01 |
| Critical depth calculaton tolerance | = 0.01 |
| Maximum number of interations | = 20 |
| Maximum difference tolerance | = 0.3 |
| Flow tolerance factor | = 0.001 |

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: ThreeFlow Profiles (Mixed Flow Regime)
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupm.F01

Flow Data (cfs)

| River | Reach | RS | 1/3 flow | 2/3 flow | full flow |
|---|---|---|---|---|---|
| Queen Creek | Upper main | 20.000 | 4667 | 9333 | 14000 |
| Queen Creek | Upper main | 17.907 | 3160 | 7770 | 12400 |
| Queen Creek | Upper main | 17.882 | 3160 | 7770 | 12400 |
| Queen Creek | Upper main | 17.817 | 4667 | 9333 | 14000 |
| Queen Creek | Upper main | 14.512 | 4667 | 9333 | 14000 |
| Queen Creek | Upper main | 14.489 | 2730 | 7260 | 11900 |
| Queen Creek | Upper main | 14.479 | 4667 | 9200 | 10900 |
| Queen Creek | Upper main | 14.347 | 4667 | 9200 | 10900 |
| Queen Creek | Upper main | 13.351 | 4667 | 9200 | 10900 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | Upper main | 1/3 flow | Critical | Known WS = 1454.18 |
| Queen Creek | Upper main | 2/3 flow | Critical | Known WS = 1455.43 |
| Queen Creek | Upper main | full flow | Critical | Known WS = 1455.86 |

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupm.G01

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 20.000

INPUT
Description:
Station Elevation Data num= 38

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9259.42 | 1608 | 9383.56 | 1607.67 | 9403.7 | 1607.22 | 9429.87 | 1607.71 | 9475.38 | 1607.25 |
| 9566.2 | 1606 | 9616.34 | 1606 | 9639.41 | 1606.1 | 9640.06 | 1606 | 9649.65 | 1606 |
| 9651.29 | 1606.16 | 9654.96 | 1606 | 9669.61 | 1605.41 | 9674.47 | 1604 | 9681.36 | 1602 |
| 9688.49 | 1600 | 9693.34 | 1598.64 | 9718.1 | 1598 | 9726.8 | 1597.81 | 9748.43 | 1597.89 |
| 9763.22 | 1597.83 | 9794.81 | 1597.81 | 9818.72 | 1598 | 9832.8 | 1598.11 | 9843.52 | 1598 |
| 10108.64 | 1598 | 10159.17 | 1598.44 | 10168.08 | 1598.24 | 10216.19 | 1598.57 | 10227.37 | 1598.52 |
| 10246.51 | 1598.65 | 10291.72 | 1598.11 | 10314.48 | 1600 | 10337.88 | 1602 | 10361.56 | 1604 |
| 10361.82 | 1604.02 | 10362.71 | 1604 | 10412.8 | 1603.63 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9259.42 | .05 | 9669.61 | .04 | 10361.56 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9669.61 | 10361.56 | 1200 | 512.6 | 200 | .1 | .3 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1601.72 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | 0.040 | |
| W.S. Elev (ft) | 1601.65 | Reach Len. (ft) | 1200.00 | 512.60 | 200.00 |
| Crit W.S. (ft) | 1599.33 | Flow Area (sq ft) | | 2210.61 | |
| E.G. Slope (ft/ft) | 0.000634 | Area (sq ft) | | 2210.61 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |

| | | | | | |
|---|---|---|---|---|---|
| Top Width (ft) | 651.15 | Top Width (ft) | | 651.15 | |
| Vel Total (ft/s) | 2.11 | Avg. Vel. (ft/s) | | 2.11 | |
| Max Chl Dpth (ft) | 3.84 | Hydr. Depth (ft) | | 3.39 | |
| Conv. Total (cfs) | 185385.7 | Conv. (cfs) | | 185385.7 | |
| Length Wtd. (ft) | 540.25 | Wetted Per. (ft) | | 651.73 | |
| Min Ch El (ft) | 1597.81 | Shear (lb/sq ft) | | 0.13 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.28 | |
| Frctn Loss (ft) | 0.71 | Cum Volume (acre-ft) | 808.42 | 1575.99 | 2531.28 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 252.99 | 393.22 | 545.13 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1602.97 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.15 | Wt. n-Val. | | 0.040 | |
| W.S. Elev (ft) | 1602.82 | Reach Len. (ft) | 1200.00 | 512.60 | 200.00 |
| Crit W.S. (ft) | 1600.05 | Flow Area (sq ft) | | 2984.65 | |
| E.G. Slope (ft/ft) | 0.000966 | Area (sq ft) | | 2984.65 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 669.06 | Top Width (ft) | | 669.06 | |
| Vel Total (ft/s) | 3.13 | Avg. Vel. (ft/s) | | 3.13 | |
| Max Chl Dpth (ft) | 5.01 | Hydr. Depth (ft) | | 4.46 | |
| Conv. Total (cfs) | 300216.0 | Conv. (cfs) | | 300216.0 | |
| Length Wtd. (ft) | 554.73 | Wetted Per. (ft) | | 669.86 | |
| Min Ch El (ft) | 1597.81 | Shear (lb/sq ft) | | 0.27 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.84 | |
| Frctn Loss (ft) | 1.00 | Cum Volume (acre-ft) | 997.21 | 1987.35 | 2883.06 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 339.69 | 417.05 | 607.89 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1603.92 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.24 | Wt. n-Val. | | 0.040 | 0.050 |
| W.S. Elev (ft) | 1603.68 | Reach Len. (ft) | 1200.00 | 512.60 | 200.00 |
| Crit W.S. (ft) | 1600.64 | Flow Area (sq ft) | | 3565.18 | 0.17 |
| E.G. Slope (ft/ft) | 0.001234 | Area (sq ft) | | 3565.18 | 0.17 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13999.98 | 0.01 |
| Top Width (ft) | 688.94 | Top Width (ft) | | 682.20 | 6.74 |
| Vel Total (ft/s) | 3.93 | Avg. Vel. (ft/s) | | 3.93 | 0.09 |
| Max Chl Dpth (ft) | 5.87 | Hydr. Depth (ft) | | 5.23 | 0.02 |
| Conv. Total (cfs) | 398468.2 | Conv. (cfs) | | 398467.7 | 0.4 |
| Length Wtd. (ft) | 561.68 | Wetted Per. (ft) | | 683.15 | 6.79 |
| Min Ch El (ft) | 1597.81 | Shear (lb/sq ft) | | 0.40 | 0.00 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.58 | 0.00 |
| Frctn Loss (ft) | 1.27 | Cum Volume (acre-ft) | 1177.09 | 2276.14 | 3215.39 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 381.95 | 429.65 | 712.28 |

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9669.61 | 9808.00 | 942.91 | 440.12 | 125.81 | 20.20 | 3.51 | 2.14 |
| 9808.00 | 9946.39 | 1108.85 | 503.93 | 138.39 | 23.76 | 3.64 | 2.20 |
| 9946.39 | 10084.78 | 1112.19 | 504.84 | 138.39 | 23.83 | 3.65 | 2.20 |
| 10084.78 | 10223.17 | 977.92 | 467.34 | 138.40 | 20.95 | 3.38 | 2.09 |
| 10223.17 | RB 10361.56 | 525.13 | 294.37 | 110.74 | 11.25 | 2.66 | 1.78 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9669.61 | 9808.00 | 1852.27 | 589.56 | 130.06 | 19.85 | 4.55 | 3.14 |
| 9808.00 | 9946.39 | 2178.66 | 666.21 | 138.39 | 23.34 | 4.81 | 3.27 |
| 9946.39 | 10084.78 | 2183.64 | 667.12 | 138.39 | 23.40 | 4.82 | 3.27 |
| 10084.78 | 10223.17 | 1982.87 | 629.62 | 138.40 | 21.25 | 4.55 | 3.15 |
| 10223.17 | RB 10361.56 | 1135.57 | 432.14 | 124.63 | 12.17 | 3.47 | 2.63 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9669.61 | 9808.00 | 2754.87 | 702.08 | 133.14 | 19.68 | 5.30 | 3.92 |
| 9808.00 | 9946.39 | 3234.58 | 785.12 | 138.39 | 23.10 | 5.67 | 4.12 |
| 9946.39 | 10084.78 | 3240.86 | 786.03 | 138.39 | 23.15 | 5.68 | 4.12 |
| 10084.78 | 10223.17 | 2987.21 | 748.53 | 138.40 | 21.34 | 5.41 | 3.99 |
| 10223.17 | RB 10361.56 | 1782.47 | 543.42 | 134.84 | 12.73 | 4.04 | 3.28 |
| 10361.56 | 10402.55 | | | | | | |
| 10402.55 | 10407.68 | 0.00 | 0.01 | 1.62 | 0.00 | 0.01 | 0.03 |
| 10407.68 | 10412.80 | 0.01 | 0.16 | 5.17 | 0.00 | 0.03 | 0.09 |

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 19.903

INPUT
Description:
Station Elevation Data num= 24

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8750 | 1603.23 | 9021.59 | 1602 | 9216.29 | 1601.41 | 9242.62 | 1601.84 | 9277.59 | 1601.14 |
| 9313.87 | 1601.32 | 9333.12 | 1601.3 | 9350.28 | 1601.09 | 9452.5 | 1600 | 9540 | 1599.79 |
| 9612.38 | 1599.79 | 9617.71 | 1598.97 | 9639.65 | 1599.98 | 9655.1 | 1599.65 | 9672.03 | 1598.54 |
| 10220.65 | 1599.16 | 10257.18 | 1599.43 | 10262.39 | 1600 | 10281.31 | 1602 | 10297.26 | 1603.66 |
| 10313.08 | 1603.71 | 10334.79 | 1603.28 | 10371.14 | 1602 | 10389.97 | 1600.17 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8750 | .05 | 9639.65 | .041 | 10281.31 | .05 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9639.65 10281.31 760 598.31 600 .1 .3
Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10313.08 | 10389.97 | 1603.71 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10300 | 10389.97 | 1602.5 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1601.00 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.19 | Wt. n-Val. | 0.050 | 0.040 | |
| W.S. Elev (ft) | 1600.81 | Reach Len. (ft) | 760.00 | 598.31 | 600.00 |
| Crit W.S. (ft) | 1600.14 | Flow Area (sq ft) | 220.74 | 1181.87 | |
| E.G. Slope (ft/ft) | 0.004134 | Area (sq ft) | 220.74 | 1181.87 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 375.39 | 4291.60 | |
| Top Width (ft) | 893.19 | Top Width (ft) | 262.82 | 630.37 | |
| Vel Total (ft/s) | 3.33 | Avg. Vel. (ft/s) | 1.70 | 3.63 | |
| Max Chl Dpth (ft) | 2.27 | Hydr. Depth (ft) | 0.84 | 1.87 | |

| | | | | | |
|---|---|---|---|---|---|
| Conv. Total (cfs) | 72585.6 | Conv. (cfs) | 5838.5 | 66747.1 | |
| Length Wtd. (ft) | 608.93 | Wetted Per. (ft) | 262.91 | 630.49 | |
| Min Ch El (ft) | 1598.54 | Shear (lb/sq ft) | 0.22 | 0.48 | |
| Alpha | 1.12 | Stream Power (lb/ft s) | 0.37 | 1.76 | |
| Frctn Loss (ft) | 4.31 | Cum Volume (acre-ft) | 805.38 | 1556.03 | 2531.28 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 249.37 | 385.68 | 545.13 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1601.95 | Element | | | |
| Vel Head (ft) | 0.33 | Wt. n-Val. | 0.050 | 0.040 | |
| W.S. Elev (ft) | 1601.62 | Reach Len. (ft) | 760.00 | 598.31 | 600.00 |
| Crit W.S. (ft) | 1600.77 | Flow Area (sq ft) | 496.13 | 1700.36 | |
| E.G. Slope (ft/ft) | 0.004551 | Area (sq ft) | 496.13 | 1700.36 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 1143.92 | 8189.08 | |
| Top Width (ft) | 1108.23 | Top Width (ft) | 470.13 | 638.11 | |
| Vel Total (ft/s) | 4.25 | Avg. Vel. (ft/s) | 2.31 | 4.82 | |
| Max Chl Dpth (ft) | 3.08 | Hydr. Depth (ft) | 1.06 | 2.66 | |
| Conv. Total (cfs) | 138342.8 | Conv. (cfs) | 16956.4 | 121386.5 | |
| Length Wtd. (ft) | 618.90 | Wetted Per. (ft) | 470.23 | 638.26 | |
| Min Ch El (ft) | 1598.54 | Shear (lb/sq ft) | 0.30 | 0.76 | |
| Alpha | 1.16 | Stream Power (lb/ft s) | 0.69 | 3.65 | |
| Frctn Loss (ft) | 4.42 | Cum Volume (acre-ft) | 990.38 | 1959.78 | 2883.06 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 333.21 | 409.36 | 607.89 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1602.63 | Element | | | |
| Vel Head (ft) | 0.47 | Wt. n-Val. | 0.050 | 0.040 | 0.050 |
| W.S. Elev (ft) | 1602.16 | Reach Len. (ft) | 760.00 | 598.31 | 600.00 |
| Crit W.S. (ft) | 1601.27 | Flow Area (sq ft) | 801.12 | 2040.42 | 0.12 |
| E.G. Slope (ft/ft) | 0.005363 | Area (sq ft) | 801.12 | 2040.42 | 0.12 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 1999.13 | 12000.83 | 0.05 |
| Top Width (ft) | 1295.53 | Top Width (ft) | 652.37 | 641.66 | 1.49 |
| Vel Total (ft/s) | 4.93 | Avg. Vel. (ft/s) | 2.50 | 5.88 | 0.39 |
| Max Chl Dpth (ft) | 3.62 | Hydr. Depth (ft) | 1.23 | 3.18 | 0.08 |
| Conv. Total (cfs) | 191176.4 | Conv. (cfs) | 27299.0 | 163876.8 | 0.6 |
| Length Wtd. (ft) | 626.12 | Wetted Per. (ft) | 652.48 | 641.84 | 1.50 |
| Min Ch El (ft) | 1598.54 | Shear (lb/sq ft) | 0.41 | 1.06 | 0.03 |
| Alpha | 1.26 | Stream Power (lb/ft s) | 1.03 | 6.26 | 0.01 |
| Frctn Loss (ft) | 4.45 | Cum Volume (acre-ft) | 1166.06 | 2243.16 | 3215.39 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 372.97 | 421.86 | 712.26 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9372.75 | 9461.72 | 40.07 | 38.07 | 84.90 | 0.86 | 0.45 | 1.05 |
| 9461.72 | 9550.69 | 142.67 | 83.11 | 88.97 | 3.06 | 0.93 | 1.72 |
| 9550.69 | 9639.65 | 192.65 | 99.56 | 89.05 | 4.13 | 1.12 | 1.94 |
| LB 9639.65 | 9767.98 | 966.78 | 256.61 | 128.37 | 20.72 | 2.00 | 3.77 |
| 9767.98 | 9896.31 | 1037.55 | 267.69 | 128.33 | 22.23 | 2.09 | 3.88 |
| 9896.31 | 10024.65 | 920.13 | 249.08 | 128.33 | 19.72 | 1.94 | 3.69 |
| 10024.65 | 10152.98 | 808.39 | 230.46 | 128.33 | 17.32 | 1.80 | 3.51 |
| 10152.98 | RB 10281.31 | 558.77 | 178.03 | 117.12 | 11.97 | 1.52 | 3.14 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9105.86 | 9194.83 | 1.15 | 3.68 | 49.28 | 0.01 | 0.07 | 0.31 |
| 9194.83 | 9283.79 | 8.92 | 14.08 | 65.00 | 0.10 | 0.22 | 0.63 |
| 9283.79 | 9372.75 | 40.45 | 39.53 | 88.97 | 0.43 | 0.44 | 1.02 |
| 9372.75 | 9461.72 | 225.13 | 110.71 | 88.97 | 2.41 | 1.24 | 2.03 |
| 9461.72 | 9550.69 | 398.04 | 155.84 | 88.97 | 4.26 | 1.75 | 2.55 |
| 9550.69 | 9639.65 | 470.21 | 172.29 | 89.05 | 5.04 | 1.94 | 2.73 |
| LB 9639.65 | 9767.98 | 1798.63 | 361.53 | 128.37 | 19.27 | 2.82 | 4.98 |
| 9767.98 | 9896.31 | 1891.81 | 372.60 | 128.33 | 20.27 | 2.90 | 5.08 |
| 9896.31 | 10024.65 | 1736.95 | 353.99 | 128.33 | 18.61 | 2.76 | 4.91 |
| 10024.65 | 10152.98 | 1587.39 | 335.38 | 128.33 | 17.01 | 2.61 | 4.73 |
| 10152.98 | RB 10281.31 | 1174.33 | 276.87 | 124.90 | 12.58 | 2.22 | 4.24 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8927.93 | 9016.90 | 0.57 | 1.99 | 29.62 | 0.00 | 0.07 | 0.29 |
| 9016.90 | 9105.86 | 17.96 | 24.54 | 88.97 | 0.13 | 0.28 | 0.73 |
| 9105.86 | 9194.83 | 55.97 | 48.53 | 88.97 | 0.40 | 0.55 | 1.15 |
| 9194.83 | 9283.79 | 76.92 | 58.74 | 88.98 | 0.55 | 0.66 | 1.31 |
| 9283.79 | 9372.75 | 147.40 | 86.77 | 88.97 | 1.05 | 0.98 | 1.70 |
| 9372.75 | 9461.72 | 400.05 | 157.95 | 88.97 | 2.86 | 1.78 | 2.53 |
| 9461.72 | 9550.69 | 608.18 | 203.08 | 88.97 | 4.34 | 2.28 | 2.99 |
| 9550.69 | 9639.65 | 692.05 | 219.53 | 89.05 | 4.94 | 2.47 | 3.15 |
| LB 9639.65 | 9767.98 | 2605.12 | 429.67 | 128.37 | 18.61 | 3.35 | 6.06 |
| 9767.98 | 9896.31 | 2718.58 | 440.75 | 128.33 | 19.42 | 3.43 | 6.17 |
| 9896.31 | 10024.65 | 2529.95 | 422.14 | 128.33 | 18.07 | 3.29 | 5.99 |
| 10024.65 | 10152.98 | 2346.74 | 403.52 | 128.33 | 16.76 | 3.14 | 5.82 |
| 10152.98 | RB 10281.31 | 1800.45 | 344.35 | 128.47 | 12.86 | 2.68 | 5.23 |
| 10281.31 | 10292.18 | 0.05 | 0.12 | 1.50 | 0.00 | 0.08 | 0.39 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 19.790

INPUT
Description:
Station Elevation Data num= 52

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8040 | 1599.49 | 8078 | 1599.94 | 8090.24 | 1600 | 8110.46 | 1600 | 8115.27 | 1600 |
| 8117.42 | 1600 | 8123.36 | 1599.95 | 8135.4 | 1599.72 | 8201.3 | 1599.9 | 8237.57 | 1599.67 |
| 8536.07 | 1598 | 8574.22 | 1598 | 8662.31 | 1598.03 | 8665.17 | 1598 | 8848.27 | 1597.21 |
| 8864.59 | 1597.78 | 8876.51 | 1596 | 8880.49 | 1595.4 | 8885.84 | 1596 | 8899.86 | 1597.6 |
| 8934.8 | 1597.37 | 8940.28 | 1596 | 8946.24 | 1594.44 | 8954.58 | 1596 | 8961.01 | 1597.13 |
| 8963.38 | 1597.11 | 9002.67 | 1596.73 | 9011 | 1596.44 | 9035.35 | 1596.74 | 9268.61 | 1596 |
| 9330 | 1595.73 | 9517.36 | 1595.84 | 9525.16 | 1594.74 | 9536.77 | 1596 | 9538.58 | 1596.18 |
| 9541.74 | 1596 | 9550.65 | 1595.67 | 9557.7 | 1594.88 | 9782.94 | 1594.69 | 10149.39 | 1595.13 |
| 10153.55 | 1596 | 10182.32 | 1596.12 | 10250.38 | 1596.22 | 10269.31 | 1596.14 | 10304.26 | 1596.35 |
| 10356.41 | 1596.61 | 10365.92 | 1596.28 | 10383.34 | 1596.15 | 10440.57 | 1596.01 | 10511.63 | 1596.1 |
| 10513.01 | 1596 | 10525.12 | 1595.11 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8040 | .05 | 9538.58 | .041 | 10153.55 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9538.58 | 10153.55 | 730 | 710.4 | 700 | .1 | .3 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|

8851 8959 1597.210145.2210525.12 1598

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1596.66 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.45 | Wt. n-Val. | 0.050 | 0.040 | |
| W.S. Elev (ft) | 1596.21 | Reach Len. (ft) | 730.00 | 710.40 | 700.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 124.08 | 801.66 | |
| E.G. Slope (ft/ft) | 0.015311 | Area (sq ft) | 124.08 | 801.66 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 235.06 | 4431.94 | |
| Top Width (ft) | 942.02 | Top Width (ft) | 335.38 | 606.64 | |
| Vel Total (ft/s) | 5.04 | Avg. Vel. (ft/s) | 1.89 | 5.53 | |
| Max Chl Dpth (ft) | 1.52 | Hydr. Depth (ft) | 0.37 | 1.32 | |
| Conv. Total (cfs) | 37716.6 | Conv. (cfs) | 1899.7 | 35817.0 | |
| Length Wtd. (ft) | 713.41 | Wetted Per. (ft) | 335.54 | 607.78 | |
| Min Ch El (ft) | 1594.69 | Shear (lb/sq ft) | 0.35 | 1.26 | |
| Alpha | 1.15 | Stream Power (lb/ft s) | 0.67 | 6.97 | |
| Frctn Loss (ft) | 4.19 | Cum Volume (acre-ft) | 802.37 | 1542.41 | 2531.28 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 244.15 | 377.18 | 545.13 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1597.50 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.62 | Wt. n-Val. | 0.050 | 0.040 | |
| W.S. Elev (ft) | 1596.88 | Reach Len. (ft) | 730.00 | 710.40 | 700.00 |
| Crit W.S. (ft) | 1596.81 | Flow Area (sq ft) | 428.45 | 1209.54 | |
| E.G. Slope (ft/ft) | 0.013019 | Area (sq ft) | 428.45 | 1209.54 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 1227.54 | 8105.46 | |
| Top Width (ft) | 1158.64 | Top Width (ft) | 552.00 | 606.64 | |
| Vel Total (ft/s) | 5.70 | Avg. Vel. (ft/s) | 2.87 | 6.70 | |
| Max Chl Dpth (ft) | 2.19 | Hydr. Depth (ft) | 0.78 | 1.99 | |
| Conv. Total (cfs) | 81795.7 | Conv. (cfs) | 10758.3 | 71037.3 | |
| Length Wtd. (ft) | 714.69 | Wetted Per. (ft) | 552.27 | 608.45 | |
| Min Ch El (ft) | 1594.69 | Shear (lb/sq ft) | 0.63 | 1.62 | |
| Alpha | 1.23 | Stream Power (lb/ft s) | 1.81 | 10.83 | |
| Frctn Loss (ft) | 4.27 | Cum Volume (acre-ft) | 982.31 | 1939.80 | 2883.06 |
| C & E Loss (ft) | 0.13 | Cum SA (acres) | 324.29 | 400.81 | 607.89 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1598.16 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.65 | Wt. n-Val. | 0.050 | 0.040 | |
| W.S. Elev (ft) | 1597.51 | Reach Len. (ft) | 730.00 | 710.40 | 700.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 823.64 | 1594.62 | |
| E.G. Slope (ft/ft) | 0.009879 | Area (sq ft) | 823.64 | 1594.62 | |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 2815.86 | 11184.14 | |
| Top Width (ft) | 1344.48 | Top Width (ft) | 737.84 | 606.64 | |
| Vel Total (ft/s) | 5.79 | Avg. Vel. (ft/s) | 3.42 | 7.01 | |
| Max Chl Dpth (ft) | 2.82 | Hydr. Depth (ft) | 1.12 | 2.63 | |
| Conv. Total (cfs) | 140853.9 | Conv. (cfs) | 28330.4 | 112523.5 | |
| Length Wtd. (ft) | 715.62 | Wetted Per. (ft) | 738.53 | 609.09 | |
| Min Ch El (ft) | 1594.69 | Shear (lb/sq ft) | 0.69 | 1.61 | |
| Alpha | 1.24 | Stream Power (lb/ft s) | 2.35 | 11.32 | |
| Frctn Loss (ft) | 4.49 | Cum Volume (acre-ft) | 1151.89 | 2218.19 | 3215.39 |
| C & E Loss (ft) | 0.11 | Cum SA (acres) | 360.84 | 413.29 | 712.25 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9089.01 | 9238.86 | 1.03 | 2.02 | 35.67 | 0.02 | 0.06 | 0.51 |
| 9238.86 | 9388.72 | 91.13 | 52.83 | 149.86 | 1.95 | 0.35 | 1.72 |
| 9388.72 | 9538.58 | 142.92 | 69.23 | 150.01 | 3.06 | 0.46 | 2.06 |
| LB 9538.58 | 9661.57 | 806.81 | 152.71 | 123.05 | 17.29 | 1.24 | 5.28 |
| 9661.57 | 9784.57 | 1065.76 | 180.44 | 122.99 | 22.84 | 1.47 | 5.91 |
| 9784.57 | 9907.56 | 1035.34 | 177.33 | 122.99 | 22.18 | 1.44 | 5.84 |
| 9907.56 | 10030.56 | 864.68 | 159.16 | 122.99 | 18.53 | 1.29 | 5.43 |
| 10030.56 | RB 10153.55 | 659.33 | 132.02 | 115.75 | 14.13 | 1.15 | 4.99 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8939.15 | 9089.01 | 25.37 | 22.78 | 102.54 | 0.27 | 0.22 | 1.11 |
| 9089.01 | 9238.86 | 166.90 | 82.09 | 149.86 | 1.79 | 0.55 | 2.03 |
| 9238.86 | 9388.72 | 474.13 | 153.59 | 149.86 | 5.08 | 1.02 | 3.09 |
| 9388.72 | 9538.58 | 561.13 | 169.99 | 150.01 | 6.01 | 1.13 | 3.30 |
| LB 9538.58 | 9661.57 | 1534.23 | 235.41 | 123.05 | 16.44 | 1.91 | 6.52 |
| 9661.57 | 9784.57 | 1847.62 | 263.13 | 122.99 | 19.80 | 2.14 | 7.02 |
| 9784.57 | 9907.56 | 1811.39 | 260.02 | 122.99 | 19.41 | 2.11 | 6.97 |
| 9907.56 | 10030.56 | 1605.43 | 241.86 | 122.99 | 17.20 | 1.97 | 6.64 |
| 10030.56 | RB 10153.55 | 1306.79 | 209.12 | 116.42 | 14.00 | 1.82 | 6.25 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8639.43 | 8789.29 | 0.07 | 0.29 | 11.63 | 0.00 | 0.03 | 0.23 |
| 8789.29 | 8939.15 | 21.99 | 24.23 | 126.84 | 0.16 | 0.19 | 0.91 |
| 8939.15 | 9089.01 | 237.29 | 108.07 | 150.32 | 1.69 | 0.72 | 2.20 |
| 9089.01 | 9238.86 | 542.24 | 177.22 | 149.86 | 3.87 | 1.18 | 3.06 |
| 9238.86 | 9388.72 | 953.92 | 248.71 | 149.86 | 6.81 | 1.66 | 3.84 |
| 9388.72 | 9538.58 | 1060.36 | 265.12 | 150.01 | 7.57 | 1.77 | 4.00 |
| LB 9538.58 | 9661.57 | 2155.89 | 313.48 | 123.05 | 15.40 | 2.55 | 6.88 |
| 9661.57 | 9784.57 | 2483.72 | 341.21 | 122.99 | 17.74 | 2.77 | 7.28 |
| 9784.57 | 9907.56 | 2446.12 | 338.10 | 122.99 | 17.47 | 2.75 | 7.23 |
| 9907.56 | 10030.56 | 2231.02 | 319.93 | 122.99 | 15.94 | 2.60 | 6.97 |
| 10030.56 | RB 10153.55 | 1867.39 | 281.90 | 117.05 | 13.34 | 2.46 | 6.62 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 19.655

INPUT
Description:
Station Elevation Data  num=  63

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7140 | 1598 | 7140.55 | 1598 | 7417.47 | 1596 | 7791.21 | 1594.4 | 8019.03 | 1594.71 |
| 8040.96 | 1594.49 | 8284.64 | 1594 | 8698.23 | 1592 | 8702.04 | 1591.96 | 8704.23 | 1592 |
| 8710.9 | 1592.12 | 8771.02 | 1592 | 8900.18 | 1591.48 | 8919.57 | 1591.27 | 8928.96 | 1591.52 |
| 8966.33 | 1591.91 | 8968.98 | 1592 | 8981.85 | 1592.39 | 8984.88 | 1592 | 8998.52 | 1590.16 |
| 9013.71 | 1591.97 | 9046.54 | 1591.7 | 9056.09 | 1590 | 9058.22 | 1589.62 | 9060.48 | 1590 |
| 9072.29 | 1592 | 9074.96 | 1592.45 | 9076.4 | 1592 | 9079.39 | 1591.12 | 9131.84 | 1591.23 |

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    9140 1591.04 9150.15 1591.04 9160.73 1590.81 9401.46 1591.19 9423.99 1591.59
 9436.16 1591.12 9475.55 1591.05 9488.12 1591.32  9507.5 1591.11 10019.5 1590.58
 10164.8    159010199.25 1589.81 10218.7 1589.8610233.44    159010237.87 1590.02
10255.03 1590.4310258.82    159210263.64    159410268.46    159610273.28    1598
 10278.1    1600 10282.9    160210284.08 1602.4910296.48 1602.6210298.41    1602
 10304.6    160010310.79    159810316.98    159610323.24    159410329.66    1592
10334.87 1590.3810343.14  1590.610363.22 1590.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    7140     .05  9507.5     .0410258.82     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9507.510258.82              730   610.8     610             .1       .3
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    7140  7719.5    159310263.6410363.22    1594
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1592.36 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | 0.050 | 0.040 | 0.050 |
| W.S. Elev (ft) | 1592.25 | Reach Len. (ft) | 730.00 | 610.80 | 610.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 725.91 | 1215.72 | 0.08 |
| E.G. Slope (ft/ft) | 0.003120 | Area (sq ft) | 725.91 | 1215.72 | 0.08 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1191.31 | 3475.66 | 0.03 |
| Top Width (ft) | 1605.70 | Top Width (ft) | 853.78 | 751.32 | 0.61 |
| Vel Total (ft/s) | 2.40 | Avg. Vel. (ft/s) | 1.64 | 2.86 | 0.40 |
| Max Chl Dpth (ft) | 2.63 | Hydr. Depth (ft) | 0.85 | 1.62 | 0.13 |
| Conv. Total (cfs) | 83557.6 | Conv. (cfs) | 21329.1 | 62228.0 | 0.5 |
| Length Wtd. (ft) | 645.35 | Wetted Per. (ft) | 854.63 | 751.64 | 0.66 |
| Min Ch El (ft) | 1589.81 | Shear (lb/sq ft) | 0.17 | 0.32 | 0.02 |
| Alpha | 1.17 | Stream Power (lb/ft s) | 0.27 | 0.90 | 0.01 |
| Frctn Loss (ft) | 4.49 | Cum Volume (acre-ft) | 795.25 | 1525.96 | 2531.28 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 234.19 | 366.11 | 545.12 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1593.09 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.17 | Wt. n-Val. | 0.050 | 0.040 | 0.050 |
| W.S. Elev (ft) | 1592.92 | Reach Len. (ft) | 730.00 | 610.80 | 610.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1344.93 | 1716.21 | 1.01 |
| E.G. Slope (ft/ft) | 0.003434 | Area (sq ft) | 1344.93 | 1716.21 | 1.01 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 2853.96 | 6478.04 | 1.00 |
| Top Width (ft) | 1752.53 | Top Width (ft) | 999.00 | 751.32 | 2.21 |
| Vel Total (ft/s) | 3.05 | Avg. Vel. (ft/s) | 2.12 | 3.77 | 0.98 |
| Max Chl Dpth (ft) | 3.30 | Hydr. Depth (ft) | 1.35 | 2.28 | 0.46 |
| Conv. Total (cfs) | 159265.4 | Conv. (cfs) | 48702.2 | 110546.2 | 17.0 |
| Length Wtd. (ft) | 654.00 | Wetted Per. (ft) | 999.91 | 751.64 | 2.39 |
| Min Ch El (ft) | 1589.81 | Shear (lb/sq ft) | 0.29 | 0.49 | 0.09 |
| Alpha | 1.21 | Stream Power (lb/ft s) | 0.61 | 1.85 | 0.09 |
| Frctn Loss (ft) | 4.50 | Cum Volume (acre-ft) | 967.45 | 1915.94 | 2883.05 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 311.30 | 389.74 | 607.87 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1593.55 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.27 | Wt. n-Val. | 0.050 | 0.040 | 0.050 |
| W.S. Elev (ft) | 1593.29 | Reach Len. (ft) | 730.00 | 610.80 | 610.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1726.08 | 1992.36 | 1.99 |
| E.G. Slope (ft/ft) | 0.004357 | Area (sq ft) | 1726.08 | 1992.36 | 1.99 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 4640.22 | 9357.03 | 2.76 |
| Top Width (ft) | 1829.43 | Top Width (ft) | 1075.01 | 751.32 | 3.10 |

| | | | | | |
|---|---|---|---|---|---|
| Vel Total (ft/s) | 3.76 | Avg. Vel. (ft/s) | 2.69 | 4.70 | 1.39 |
| Max Chl Dpth (ft) | 3.67 | Hydr. Depth (ft) | 1.61 | 2.65 | 0.64 |
| Conv. Total (cfs) | 212094.8 | Conv. (cfs) | 70297.5 | 141755.5 | 41.7 |
| Length Wtd. (ft) | 660.27 | Wetted Per. (ft) | 1075.92 | 751.64 | 3.35 |
| Min Ch El (ft) | 1589.81 | Shear (lb/sq ft) | 0.44 | 0.72 | 0.16 |
| Alpha | 1.21 | Stream Power (lb/ft s) | 1.17 | 3.39 | 0.22 |
| Frctn Loss (ft) | 4.37 | Cum Volume (acre-ft) | 1130.52 | 2188.94 | 3215.38 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 345.65 | 402.22 | 712.23 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8560.50 | 8797.25 | 15.72 | 28.92 | 151.00 | 0.34 | 0.19 | 0.54 |
| 8797.25 | 9034.00 | 176.98 | 146.62 | 231.36 | 3.79 | 0.63 | 1.21 |
| 9034.00 | 9270.75 | 540.13 | 288.42 | 235.51 | 11.57 | 1.23 | 1.87 |
| 9270.75 | 9507.50 | 458.49 | 261.96 | 236.77 | 9.82 | 1.11 | 1.75 |
| LB 9507.50 | 9657.76 | 423.37 | 183.19 | 150.26 | 9.07 | 1.22 | 2.31 |
| 9657.76 | 9808.03 | 517.20 | 206.57 | 150.26 | 11.08 | 1.37 | 2.50 |
| 9808.03 | 9958.29 | 618.39 | 229.94 | 150.26 | 13.25 | 1.53 | 2.69 |
| 9958.29 | 10108.56 | 783.56 | 265.04 | 150.27 | 16.79 | 1.76 | 2.96 |
| 10108.56 | RB 10258.82 | 1133.15 | 330.98 | 150.58 | 24.28 | 2.20 | 3.42 |
| 10258.82 | 10269.26 | 0.03 | 0.08 | 0.66 | 0.00 | 0.13 | 0.40 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8323.75 | 8560.50 | 2.62 | 6.54 | 52.00 | 0.03 | 0.13 | 0.40 |
| 8560.50 | 8797.25 | 215.04 | 168.85 | 236.75 | 2.30 | 0.71 | 1.27 |
| 8797.25 | 9034.00 | 572.35 | 303.93 | 237.02 | 6.13 | 1.28 | 1.88 |
| 9034.00 | 9270.75 | 1083.27 | 445.94 | 237.37 | 11.61 | 1.88 | 2.43 |
| 9270.75 | 9507.50 | 980.69 | 419.67 | 236.77 | 10.51 | 1.77 | 2.34 |
| LB 9507.50 | 9657.76 | 929.66 | 283.29 | 150.26 | 9.96 | 1.89 | 3.28 |
| 9657.76 | 9808.03 | 1061.02 | 306.66 | 150.26 | 11.37 | 2.04 | 3.46 |
| 9808.03 | 9958.29 | 1199.21 | 330.04 | 150.26 | 12.85 | 2.20 | 3.63 |
| 9958.29 | 10108.56 | 1419.19 | 365.14 | 150.27 | 15.21 | 2.43 | 3.89 |
| 10108.56 | RB 10258.82 | 1868.96 | 431.08 | 150.58 | 20.03 | 2.87 | 4.34 |
| 10258.82 | 10269.26 | 1.00 | 1.01 | 2.39 | 0.01 | 0.46 | 0.98 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8323.75 | 8560.50 | 32.50 | 39.62 | 128.01 | 0.23 | 0.31 | 0.82 |
| 8560.50 | 8797.25 | 483.00 | 255.86 | 236.75 | 3.45 | 1.08 | 1.89 |
| 8797.25 | 9034.00 | 978.31 | 390.95 | 237.02 | 6.99 | 1.65 | 2.50 |
| 9034.00 | 9270.75 | 1638.10 | 532.96 | 237.37 | 11.70 | 2.25 | 3.07 |
| 9270.75 | 9507.50 | 1508.31 | 506.69 | 236.77 | 10.77 | 2.14 | 2.98 |
| LB 9507.50 | 9657.76 | 1413.55 | 338.52 | 150.26 | 10.10 | 2.25 | 4.18 |
| 9657.76 | 9808.03 | 1579.98 | 361.90 | 150.26 | 11.29 | 2.41 | 4.37 |
| 9808.03 | 9958.29 | 1753.72 | 385.27 | 150.26 | 12.53 | 2.56 | 4.55 |
| 9958.29 | 10108.56 | 2027.97 | 420.37 | 150.27 | 14.49 | 2.80 | 4.82 |
| 10108.56 | RB 10258.82 | 2581.81 | 486.31 | 150.58 | 18.44 | 3.24 | 5.31 |
| 10258.82 | 10269.26 | 2.76 | 1.99 | 3.35 | 0.02 | 0.64 | 1.39 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 19.539

INPUT
Description:
Station Elevation Data num= 72

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 6440 | 1595.53 | 6451.24 | 1595.93 | 6781.47 | 1594 | 6805.23 | 1594 | 6823.17 | 1594.11 |
| 6824.36 | 1594 | 6839.28 | 1593.08 | 6848.78 | 1593.12 | 6856.84 | 1594 | 6859.96 | 1594.3 |
| 6886.9 | 1594 | 7265.12 | 1592 | 7566.72 | 1591.15 | 7606.81 | 1591.29 | 7638.34 | 1591.76 |
| 7670.51 | 1591.79 | 7723.59 | 1590.68 | 7786.56 | 1590.18 | 7788.45 | 1590 | 7792.71 | 1589.54 |
| 7796.32 | 1590 | 7800.71 | 1590.58 | 8226.81 | 1590 | 8804.66 | 1588 | 9008.59 | 1587.31 |
| 9015.54 | 1587.56 | 9070 | 1587.6 | 9112.85 | 1587.63 | 9125.07 | 1587.68 | 9157.38 | 1588 |
| 9159.86 | 1588.11 | 9184.55 | 1588 | 9200.22 | 1586 | 9204.3 | 1585.48 | 9206.98 | 1586 |
| 9214.71 | 1587.74 | 9865.55 | 1586 | 9875.55 | 1585.9 | 9889.61 | 1585.78 | 9892.97 | 1586 |
| 9900.9 | 1586.54 | 9954.78 | 1586 | 10001.62 | 1585.45 | 10006.87 | 1584.67 | 10015.28 | 1585.68 |
| 10062.52 | 1586 | 10226.41 | 1586.31 | 10288.36 | 1586.37 | 10309.46 | 1587.11 | 10312.33 | 1588 |
| 10318.73 | 1590 | 10325.14 | 1592 | 10331.72 | 1594 | 10338.39 | 1596 | 10345.06 | 1598 |
| 10351.68 | 1600 | 10358.3 | 1602 | 10361.4 | 1602.94 | 10378.79 | 1602.76 | 10382.02 | 1602 |
| 10390.5 | 1600 | 10398.98 | 1598 | 10407.47 | 1596 | 10416.1 | 1594 | 10424.8 | 1592 |
| 10433.73 | 1590 | 10434.71 | 1589.81 | 0579.59 | 1588.61 | 0591.83 | 1589.03 | 10603.45 | 1588.45 |
| 10618.73 | 1588 | 10633.28 | 1587.57 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 6440 | .05 | 9900.9 | .045 | 10312.33 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9900.9 | 10312.33 | 1200 | 1100.5 | 1140 | .1 | .3 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 6440 | 9212 | 1587.42 | 10318.73 | 10633.28 | 1590 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1587.83 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.49 | Wt. n-Val. | 0.050 | 0.045 | |
| W.S. Elev (ft) | 1587.34 | Reach Len. (ft) | 1200.00 | 1100.50 | 1140.00 |
| Crit W.S. (ft) | 1587.34 | Flow Area (sq ft) | 386.68 | 505.07 | |
| E.G. Slope (ft/ft) | 0.027015 | Area (sq ft) | 386.68 | 505.07 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1514.40 | 3152.60 | |
| Top Width (ft) | 948.52 | Top Width (ft) | 539.21 | 409.32 | |
| Vel Total (ft/s) | 5.23 | Avg. Vel. (ft/s) | 3.92 | 6.24 | |
| Max Chl Dpth (ft) | 2.67 | Hydr. Depth (ft) | 0.72 | 1.23 | |
| Conv. Total (cfs) | 28394.7 | Conv. (cfs) | 9213.8 | 19180.9 | |
| Length Wtd. (ft) | 1135.73 | Wetted Per. (ft) | 539.47 | 409.49 | |
| Min Ch El (ft) | 1584.67 | Shear (lb/sq ft) | 1.21 | 2.08 | |
| Alpha | 1.14 | Stream Power (lb/ft s) | 4.73 | 12.98 | |
| Frctn Loss (ft) | 5.24 | Cum Volume (acre-ft) | 785.92 | 1513.89 | 2531.28 |
| C & E Loss (ft) | 0.13 | Cum SA (acres) | 222.51 | 357.97 | 545.12 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1588.55 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.57 | Wt. n-Val. | 0.050 | 0.045 | |
| W.S. Elev (ft) | 1587.98 | Reach Len. (ft) | 1200.00 | 1100.50 | 1140.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 918.23 | 763.98 | |
| E.G. Slope (ft/ft) | 0.020253 | Area (sq ft) | 918.23 | 763.98 | |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 9333.00 | Flow (cfs) | 3910.89 | 5422.11 | |
| Top Width (ft) | 1470.50 | Top Width (ft) | 1059.15 | 411.35 | |
| Vel Total (ft/s) | 5.55 | Avg. Vel. (ft/s) | 4.26 | 7.10 | |
| Max Chl Dpth (ft) | 3.31 | Hydr. Depth (ft) | 0.87 | 1.86 | |
| Conv. Total (cfs) | 65580.5 | Conv. (cfs) | 27480.8 | 38099.7 | |
| Length Wtd. (ft) | 1142.38 | Wetted Per. (ft) | 1059.58 | 411.62 | |
| Min Ch El (ft) | 1584.67 | Shear (lb/sq ft) | 1.10 | 2.35 | |
| Alpha | 1.20 | Stream Power (lb/ft s) | 4.67 | 16.66 | |
| Frctn Loss (ft) | 5.77 | Cum Volume (acre-ft) | 948.49 | 1898.55 | 2883.04 |
| C & E Loss (ft) | 0.15 | Cum SA (acres) | 294.05 | 381.59 | 607.85 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1589.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.45 | Wt. n-Val. | 0.050 | 0.045 | 0.050 |
| W.S. Elev (ft) | 1588.71 | Reach Len. (ft) | 1200.00 | 1100.50 | 1140.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1798.40 | 1067.58 | 0.81 |
| E.G. Slope (ft/ft) | 0.011112 | Area (sq ft) | 1798.40 | 1067.58 | 0.81 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 6984.81 | 7013.94 | 1.24 |
| Top Width (ft) | 1716.07 | Top Width (ft) | 1302.35 | 411.43 | 2.28 |
| Vel Total (ft/s) | 4.88 | Avg. Vel. (ft/s) | 3.88 | 6.57 | 1.53 |
| Max Chl Dpth (ft) | 4.04 | Hydr. Depth (ft) | 1.38 | 2.59 | 0.36 |
| Conv. Total (cfs) | 132808.5 | Conv. (cfs) | 66260.2 | 66536.5 | 11.8 |
| Length Wtd. (ft) | 1147.14 | Wetted Per. (ft) | 1302.79 | 411.70 | 2.39 |
| Min Ch El (ft) | 1584.67 | Shear (lb/sq ft) | 0.96 | 1.80 | 0.24 |
| Alpha | 1.22 | Stream Power (lb/ft s) | 3.72 | 11.82 | 0.36 |
| Frctn Loss (ft) | 6.08 | Cum Volume (acre-ft) | 1100.99 | 2167.49 | 3215.36 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 325.73 | 394.06 | 712.19 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9208.72 | 9554.81 | 85.93 | 49.47 | 193.35 | 1.84 | 0.26 | 1.74 |
| 9554.81 | 9900.90 | 1428.53 | 337.23 | 346.12 | 30.61 | 0.97 | 4.24 |
| LB 9900.90 | 9983.19 | 611.83 | 100.82 | 82.29 | 13.11 | 1.23 | 6.07 |
| 9983.19 | 10065.47 | 1033.89 | 138.20 | 82.41 | 22.15 | 1.68 | 7.48 |
| 10065.47 | 10147.76 | 641.92 | 103.77 | 82.29 | 13.75 | 1.26 | 6.19 |
| 10147.76 | 10230.04 | 515.44 | 90.96 | 82.29 | 11.04 | 1.11 | 5.67 |
| 10230.04 | RB 10312.33 | 349.46 | 71.32 | 80.22 | 7.49 | 0.89 | 4.90 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8516.54 | 8862.63 | 3.28 | 4.35 | 50.72 | 0.04 | 0.09 | 0.75 |
| 8862.63 | 9208.72 | 244.30 | 120.30 | 316.29 | 2.62 | 0.38 | 2.03 |
| 9208.72 | 9554.81 | 716.80 | 238.00 | 346.45 | 7.68 | 0.69 | 3.01 |
| 9554.81 | 9900.90 | 2946.62 | 555.60 | 346.12 | 31.57 | 1.61 | 5.30 |
| LB 9900.90 | 9983.19 | 1071.87 | 152.74 | 82.29 | 11.48 | 1.86 | 7.02 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9983.19 | 10065.47 | 1542.33 | 190.12 | 82.41 | 16.53 | 2.31 | 8.11 |
| 10065.47 | 10147.76 | 1106.56 | 155.69 | 82.29 | 11.86 | 1.89 | 7.11 |
| 10147.76 | 10230.04 | 959.11 | 142.89 | 82.29 | 10.28 | 1.74 | 6.71 |
| 10230.04 | RB 10312.33 | 742.15 | 122.55 | 82.35 | 7.95 | 1.49 | 6.06 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8516.54 | 8862.63 | 198.15 | 120.56 | 264.08 | 1.42 | 0.46 | 1.64 |
| 8862.63 | 9208.72 | 1089.27 | 373.49 | 346.14 | 7.78 | 1.08 | 2.92 |
| 9208.72 | 9554.81 | 1731.32 | 493.38 | 346.45 | 12.37 | 1.43 | 3.51 |
| 9554.81 | 9900.90 | 3966.15 | 810.99 | 346.12 | 28.33 | 2.34 | 4.89 |
| LB 9900.90 | 9983.19 | 1394.60 | 213.46 | 82.29 | 9.96 | 2.59 | 6.53 |
| 9983.19 | 10065.47 | 1823.18 | 250.84 | 82.41 | 13.02 | 3.05 | 7.27 |
| 10065.47 | 10147.76 | 1426.84 | 216.41 | 82.29 | 10.19 | 2.63 | 6.59 |
| 10147.76 | 10230.04 | 1288.96 | 203.61 | 82.29 | 9.21 | 2.47 | 6.33 |
| 10230.04 | RB 10312.33 | 1080.28 | 183.26 | 82.43 | 7.72 | 2.23 | 5.89 |
| 10312.33 | 10344.42 | 1.24 | 0.81 | 2.39 | 0.01 | 0.36 | 1.53 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 19.331

INPUT
Description:
Station Elevation Data num= 77

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 6570 | 1586 | 6596.36 | 1585.47 | 6604.39 | 1584.17 | 6613.56 | 1585.83 | 6634.19 | 1585.32 |
| 6645.11 | 1586 | 6723.49 | 1585.93 | 6735.34 | 1585.85 | 6934.43 | 1585.27 | 6944.9 | 1585.08 |
| 7115.03 | 1584.56 | 7122.19 | 1585.7 | 7132.34 | 1586 | 7136.42 | 1586.17 | 7138.55 | 1586.83 |
| 7141.05 | 1586 | 7145.8 | 1584.46 | 7180.12 | 1584.51 | 7197.39 | 1584.54 | 7218.83 | 1584.69 |
| 7229.12 | 1584.26 | 7243.09 | 1584 | 7311.28 | 1584 | 7338.8 | 1584.17 | 7340.6 | 1584 |
| 7346.56 | 1583.46 | 7352.22 | 1584 | 7353.91 | 1584.14 | 7427.37 | 1584 | 7510.49 | 1584 |
| 7537.2 | 1584 | 8446.72 | 1582 | 8960 | 1580.6 | 9282.94 | 1580.52 | 9289.48 | 1580 |
| 9292.06 | 1579.81 | 9295.45 | 1580 | 9301.55 | 1580.33 | 9434.73 | 1580.24 | 9442.48 | 1581.15 |
| 9451.74 | 1580 | 9457.52 | 1579.28 | 9461.73 | 1580 | 9468.67 | 1580.99 | 9494.21 | 1580.73 |
| 9498.99 | 1580 | 9510.49 | 1578.08 | 9523.42 | 1580 | 9525.6 | 1580.32 | 9531.59 | 1582 |
| 9537.51 | 1583.65 | 9544.79 | 1582 | 9550.93 | 1580.6 | 9638.64 | 1580.53 | 9661.41 | 1580.22 |
| 9710.02 | 158 | 10125.01 | 158 | 10131.77 | 1580.09 | 10132.5 | 158 | 10141.61 | 1578.94 |
| 10149.09 | 1579.92 | 10153.35 | 158 | 10165.98 | 1580.24 | 10176.85 | 1580.38 | 10190.56 | 1580 |
| 10216.2 | 1579.44 | 10227.56 | 158 | 10230.91 | 1580.28 | 10258.39 | 1580.36 | 10287.66 | 1580.34 |
| 10619.82 | 1581.47 | 10652.79 | 1581.41 | 10755.56 | 1581.8 | 10772.95 | 1581.86 | 10825 | 1582 |
| 10910 | 1582 | 11260 | 1584 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 6570 | .055 | 9638.64 | .045 | 10287.66 | .055 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9638.64 | 10287.66 | 1780 | 948.8 | 1000 | .1 | .3 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1581.97 | Element | | | |
| Vel Head (ft) | 0.05 | Wt. n-Val. | 0.055 | 0.045 | 0.055 |
| W.S. Elev (ft) | 1581.92 | Reach Len. (ft) | 1780.00 | 948.80 | 1000.00 |
| Crit W.S. (ft) | 1581.01 | Flow Area (sq ft) | 1303.78 | 1226.37 | 389.03 |
| E.G. Slope (ft/ft) | 0.001833 | Area (sq ft) | 1303.78 | 1226.37 | 389.03 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1640.96 | 2649.68 | 376.36 |
| Top Width (ft) | 2307.50 | Top Width (ft) | 1149.82 | 649.02 | 508.66 |
| Vel Total (ft/s) | 1.60 | Avg. Vel. (ft/s) | 1.26 | 2.16 | 0.97 |
| Max Chl Dpth (ft) | 3.84 | Hydr. Depth (ft) | 1.13 | 1.89 | 0.76 |
| Conv. Total (cfs) | 108997.1 | Conv. (cfs) | 38324.3 | 61882.9 | 8789.9 |

| | | | | | |
|---|---|---|---|---|---|
| Length Wtd. (ft) | 1318.29 | Wetted Per. (ft) | 1150.92 | 649.20 | 508.66 |
| Min Ch El (ft) | 1578.94 | Shear (lb/sq ft) | 0.13 | 0.22 | 0.09 |
| Alpha | 1.28 | Stream Power (lb/ft s) | 0.16 | 0.47 | 0.08 |
| Frctn Loss (ft) | 6.38 | Cum Volume (acre-ft) | 762.64 | 1492.02 | 2526.19 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 199.25 | 344.60 | 538.46 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m): between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1582.64 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.09 | Wt. n-Val. | 0.055 | 0.045 | 0.055 |
| W.S. Elev (ft) | 1582.55 | Reach Len. (ft) | 1780.00 | 948.80 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 2113.71 | 1634.23 | 799.05 |
| E.G. Slope (ft/ft) | 0.002240 | Area (sq ft) | 2113.71 | 1634.23 | 799.05 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 3510.03 | 4726.51 | 1096.46 |
| Top Width (ft) | 2801.66 | Top Width (ft) | 1433.83 | 649.02 | 718.81 |
| Vel Total (ft/s) | 2.05 | Avg. Vel. (ft/s) | 1.66 | 2.89 | 1.37 |
| Max Chl Dpth (ft) | 4.47 | Hydr. Depth (ft) | 1.47 | 2.52 | 1.11 |
| Conv. Total (cfs) | 197182.8 | Conv. (cfs) | 74158.2 | 99859.2 | 23165.4 |
| Length Wtd. (ft) | 1353.30 | Wetted Per. (ft) | 1435.08 | 649.20 | 718.82 |
| Min Ch El (ft) | 1578.94 | Shear (lb/sq ft) | 0.21 | 0.35 | 0.16 |
| Alpha | 1.30 | Stream Power (lb/ft s) | 0.34 | 1.02 | 0.21 |
| Frctn Loss (ft) | 6.44 | Cum Volume (acre-ft) | 906.72 | 1868.26 | 2872.59 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 259.71 | 368.19 | 598.45 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1582.99 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.13 | Wt. n-Val. | 0.055 | 0.045 | 0.055 |
| W.S. Elev (ft) | 1582.86 | Reach Len. (ft) | 1780.00 | 948.80 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 2579.56 | 1835.07 | 1029.86 |
| E.G. Slope (ft/ft) | 0.003089 | Area (sq ft) | 2579.56 | 1835.07 | 1029.86 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 5394.85 | 6732.77 | 1872.38 |
| Top Width (ft) | 2999.01 | Top Width (ft) | 1577.03 | 649.02 | 772.97 |
| Vel Total (ft/s) | 2.57 | Avg. Vel. (ft/s) | 2.09 | 3.67 | 1.82 |
| Max Chl Dpth (ft) | 4.78 | Hydr. Depth (ft) | 1.64 | 2.83 | 1.33 |
| Conv. Total (cfs) | 251895.7 | Conv. (cfs) | 97067.1 | 121139.6 | 33689.0 |
| Length Wtd. (ft) | 1378.56 | Wetted Per. (ft) | 1578.35 | 649.20 | 772.97 |
| Min Ch El (ft) | 1578.94 | Shear (lb/sq ft) | 0.32 | 0.55 | 0.26 |
| Alpha | 1.30 | Stream Power (lb/ft s) | 0.66 | 2.00 | 0.47 |
| Frctn Loss (ft) | 6.30 | Cum Volume (acre-ft) | 1040.69 | 2130.82 | 3201.87 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 286.07 | 380.67 | 702.05 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8411.18 | 8718.05 | 40.82 | 80.56 | 243.04 | 0.87 | 0.33 | 0.51 |
| 8718.05 | 9024.91 | 360.20 | 326.63 | 306.87 | 7.72 | 1.06 | 1.10 |
| 9024.91 | 9331.78 | 582.47 | 435.83 | 306.91 | 12.48 | 1.42 | 1.34 |
| 9331.78 | 9638.64 | 657.48 | 460.77 | 294.10 | 14.09 | 1.57 | 1.43 |
| LB 9638.64 | 9768.44 | 495.61 | 235.71 | 129.81 | 10.62 | 1.82 | 2.10 |
| 9768.44 | 9898.25 | 545.23 | 249.60 | 129.80 | 11.68 | 1.92 | 2.18 |
| 9898.25 | 10028.05 | 545.23 | 249.59 | 129.80 | 11.68 | 1.92 | 2.18 |
| 10028.05 | 10157.86 | 577.00 | 258.33 | 129.94 | 12.36 | 1.99 | 2.23 |
| 10157.86 | RB 10287.66 | 486.59 | 233.15 | 129.84 | 10.43 | 1.80 | 2.09 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10287.66 | 10384.89 | 169.69 | 137.83 | 97.23 | 3.64 | 1.42 | 1.23 |
| 10384.89 | 10482.13 | 108.97 | 105.66 | 97.23 | 2.33 | 1.09 | 1.03 |
| 10482.13 | 10579.36 | 59.51 | 73.50 | 97.23 | 1.28 | 0.76 | 0.81 |
| 10579.36 | 10676.60 | 29.42 | 48.16 | 97.23 | 0.63 | 0.50 | 0.61 |
| 10676.60 | 10773.83 | 8.71 | 23.20 | 97.24 | 0.19 | 0.24 | 0.38 |
| 10773.83 | 10871.06 | 0.06 | 0.68 | 22.49 | 0.00 | 0.03 | 0.09 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8104.32 | 8411.18 | 22.07 | 50.90 | 215.16 | 0.24 | 0.24 | 0.43 |
| 8411.18 | 8718.05 | 277.86 | 268.18 | 306.87 | 2.98 | 0.87 | 1.04 |
| 8718.05 | 9024.91 | 836.32 | 519.47 | 306.87 | 8.96 | 1.69 | 1.61 |
| 9024.91 | 9331.78 | 1149.31 | 628.67 | 306.91 | 12.31 | 2.05 | 1.83 |
| 9331.78 | 9638.64 | 1224.51 | 646.50 | 299.28 | 13.12 | 2.17 | 1.89 |
| LB 9638.64 | 9768.44 | 899.37 | 317.28 | 129.81 | 9.64 | 2.44 | 2.83 |
| 9768.44 | 9898.25 | 965.94 | 331.17 | 129.80 | 10.35 | 2.55 | 2.92 |
| 9898.25 | 10028.05 | 965.94 | 331.16 | 129.80 | 10.35 | 2.55 | 2.92 |
| 10028.05 | 10157.86 | 1008.08 | 339.90 | 129.94 | 10.80 | 2.62 | 2.97 |
| 10157.86 | RB 10287.66 | 887.16 | 314.72 | 129.84 | 9.51 | 2.42 | 2.82 |
| 10287.66 | 10384.89 | 355.67 | 198.93 | 97.23 | 3.81 | 2.05 | 1.79 |
| 10384.89 | 10482.13 | 265.08 | 166.76 | 97.23 | 2.84 | 1.72 | 1.59 |
| 10482.13 | 10579.36 | 185.49 | 134.61 | 97.23 | 1.99 | 1.38 | 1.38 |
| 10579.36 | 10676.60 | 131.02 | 109.26 | 97.23 | 1.40 | 1.12 | 1.20 |
| 10676.60 | 10773.83 | 85.04 | 84.30 | 97.24 | 0.91 | 0.87 | 1.01 |
| 10773.83 | 10871.06 | 44.46 | 57.13 | 97.23 | 0.48 | 0.59 | 0.78 |
| 10871.06 | 10968.30 | 28.65 | 43.89 | 97.23 | 0.31 | 0.45 | 0.65 |
| 10968.30 | 11065.53 | 1.05 | 4.16 | 38.18 | 0.01 | 0.11 | 0.25 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 7797.46 | 8104.32 | 0.50 | 2.64 | 49.02 | 0.00 | 0.05 | 0.19 |
| 8104.32 | 8411.18 | 105.14 | 136.61 | 306.86 | 0.75 | 0.45 | 0.77 |
| 8411.18 | 8718.05 | 536.28 | 363.14 | 306.87 | 3.83 | 1.18 | 1.48 |
| 8718.05 | 9024.91 | 1288.41 | 614.43 | 306.87 | 9.20 | 2.00 | 2.10 |
| 9024.91 | 9331.78 | 1692.08 | 723.63 | 306.91 | 12.09 | 2.36 | 2.34 |
| 9331.78 | 9638.64 | 1772.48 | 739.12 | 301.83 | 12.66 | 2.46 | 2.40 |
| LB 9638.64 | 9768.44 | 1288.30 | 357.45 | 129.81 | 9.20 | 2.75 | 3.60 |
| 9768.44 | 9898.25 | 1372.82 | 371.33 | 129.80 | 9.81 | 2.86 | 3.70 |
| 9898.25 | 10028.05 | 1372.81 | 371.33 | 129.80 | 9.81 | 2.86 | 3.70 |
| 10028.05 | 10157.86 | 1426.07 | 380.07 | 129.94 | 10.19 | 2.93 | 3.75 |
| 10157.86 | RB 10287.66 | 1272.74 | 354.89 | 129.84 | 9.09 | 2.73 | 3.59 |
| 10287.66 | 10384.89 | 537.66 | 229.02 | 97.23 | 3.84 | 2.36 | 2.35 |
| 10384.89 | 10482.13 | 417.78 | 196.85 | 97.23 | 2.98 | 2.02 | 2.12 |
| 10482.13 | 10579.36 | 310.34 | 164.69 | 97.23 | 2.22 | 1.69 | 1.88 |
| 10579.36 | 10676.60 | 234.91 | 139.35 | 97.23 | 1.68 | 1.43 | 1.69 |
| 10676.60 | 10773.83 | 169.06 | 114.39 | 97.24 | 1.21 | 1.18 | 1.48 |
| 10773.83 | 10871.06 | 107.57 | 87.21 | 97.23 | 0.77 | 0.90 | 1.23 |
| 10871.06 | 10968.30 | 81.77 | 73.98 | 97.23 | 0.58 | 0.76 | 1.11 |
| 10968.30 | 11065.53 | 13.29 | 24.36 | 92.33 | 0.09 | 0.26 | 0.55 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek

REACH: Upper main RS: 19.151

INPUT
Description:
Station Elevation Data num= 119

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 6772.09 | 1580.39 | 6798.01 | 1580.41 | 6817.21 | 1580 | 6825.21 | 1581.64 | 6838.66 | 1581.18 |
| 6840.97 | 1582 | 6846.06 | 1584 | 6849.25 | 1585.26 | 6865.61 | 1586 | 6865.87 | 1586.03 |
| 6867.91 | 1586.62 | 6869.53 | 1586 | 6874.77 | 1584 | 6880.01 | 1582 | 6885.25 | 1580 |
| 6890.49 | 1578 | 6892.55 | 1577.2 | 6896.99 | 1578 | 6897.03 | 1578.01 | 6897.06 | 1578 |
| 6901.77 | 1576.73 | 6952.39 | 1576.76 | 6963.59 | 1576.48 | 7067.04 | 1576.53 | 7083.25 | 1577.32 |
| 7107.21 | 1577.19 | 7126.5 | 1576.53 | 7157.77 | 1576.13 | 7165.68 | 1576.79 | 7186.38 | 1576.58 |
| 7198.61 | 1576 | 7199.81 | 1575.94 | 7203.21 | 1576 | 7216.11 | 1576.25 | 7225.32 | 1576 |
| 7236.85 | 1575.69 | 7570.31 | 1574.48 | 7574.19 | 1574 | 7579.35 | 1573.32 | 7586.13 | 1574 |
| 7590.55 | 1574.44 | 7649.11 | 1574.46 | 7656.36 | 1574 | 7664.74 | 1573.2 | 7672.13 | 1574 |
| 7677.88 | 1574.63 | 7690.94 | 1574 | 7697.43 | 1572 | 7699.38 | 1571.39 | 7702.75 | 1572 |
| 7714.13 | 1574 | 7716.46 | 1574.38 | 7750.05 | 1574.6 | 7753.22 | 1574 | 7759.1 | 1572.92 |
| 7771.14 | 1574 | 7774.16 | 1574.22 | 7802.92 | 1574.61 | 7805.86 | 1574 | 7817.29 | 1573.53 |
| 7825.61 | 1574 | 7834.22 | 1574.54 | 7907.14 | 1575.54 | 7928.75 | 1575.45 | 8128.56 | 1576 |
| 8140.61 | 1576.12 | 8193.79 | 1577.12 | 8219.63 | 1577.29 | 8237.31 | 1577.15 | 8342.07 | 1576 |
| 8897.06 | 1575.44 | 8909.58 | 1574.57 | 8919.65 | 1575.2 | 9035.4 | 1575.79 | 9084.38 | 1575.33 |
| 9240.42 | 1575.16 | 9623.53 | 1574.67 | 9656.15 | 1575.2 | 9733.47 | 1574.86 | 9738.33 | 1576 |
| 9743.3 | 1577.29 | 9748.91 | 1576 | 9755.07 | 1574.08 | 9757.65 | 1574 | 9761.34 | 1573.84 |
| 9768.43 | 1572.06 | 9779.3 | 1574 | 9781.24 | 1574.35 | 9800.93 | 1574.06 | 9801.43 | 1574 |
| 9810.23 | 1572.94 | 9837.85 | 1573.13 | 9840.52 | 1574 | 9846.68 | 1576 | 9850.09 | 1577.1 |
| 9854.02 | 1576 | 9860.72 | 1574.19 | 9868.94 | 1574 | 9893.93 | 1573.47 | 9902.82 | 1572.95 |
| 9917.61 | 1573.75 | 10032.13 | 1574 | 10092.62 | 1574.34 | 10095.37 | 1574 | 10097.18 | 1573.78 |
| 10100.6 | 1574 | 10108.21 | 1574.43 | 10185.23 | 1574.95 | 10211.39 | 1575.41 | 10217.51 | 1575.81 |
| 10707.49 | 1575.41 | 10718.25 | 1574.24 | 10733.48 | 1575.57 | 10750.46 | 1576 | 10910.4 | 1576.5 |
| 10933.75 | 1576.73 | 10984.46 | 1577.52 | 11074.57 | 1578 | 11170.97 | 1578.6 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 6772.09 | .06 | 9850.09 | .045 | 10217.51 | .06 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9850.09 | 10217.51 | 450 | 2338.9 | 900 | .1 | .3 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.56 | Element | | | |
| Vel Head (ft) | 0.41 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.15 | Reach Len. (ft) | 450.00 | 2338.90 | 900.00 |
| Crit W.S. (ft) | 1575.15 | Flow Area (sq ft) | 622.11 | 346.97 | 8.50 |
| E.G. Slope (ft/ft) | 0.034547 | Area (sq ft) | 622.11 | 346.97 | 8.50 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 2483.41 | 2160.56 | 23.03 |
| Top Width (ft) | 1429.22 | Top Width (ft) | 1071.21 | 339.28 | 18.73 |
| Vel Total (ft/s) | 4.77 | Avg. Vel. (ft/s) | 3.99 | 6.23 | 2.71 |
| Max Chl Dpth (ft) | 3.76 | Hydr. Depth (ft) | 0.58 | 1.02 | 0.45 |
| Conv. Total (cfs) | 25109.3 | Conv. (cfs) | 13361.2 | 11624.2 | 123.9 |
| Length Wtd. (ft) | 1417.57 | Wetted Per. (ft) | 1073.52 | 339.51 | 18.82 |
| Min Ch El (ft) | 1572.95 | Shear (lb/sq ft) | 1.25 | 2.20 | 0.97 |
| Alpha | 1.16 | Stream Power (lb/ft s) | 4.99 | 13.73 | 2.64 |
| Frctn Loss (ft) | 0.13 | Cum Volume (acre-ft) | 723.29 | 1474.88 | 2521.63 |
| C & E Loss (ft) | 0.12 | Cum SA (acres) | 153.87 | 333.84 | 532.41 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1576.17 | Element | | | |
| Vel Head (ft) | 0.30 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.87 | Reach Len. (ft) | 450.00 | 2338.90 | 900.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 1790.49 | 603.49 | 155.02 |
| E.G. Slope (ft/ft) | 0.016807 | Area (sq ft) | 1790.49 | 603.49 | 155.02 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 5489.89 | 3623.23 | 219.89 |
| Top Width (ft) | 3105.66 | Top Width (ft) | 2214.84 | 363.01 | 527.81 |

| | | | | | |
|---|---|---|---|---|---|
| Vel Total (ft/s) | 3.66 | Avg. Vel. (ft/s) | 3.07 | 6.00 | 1.42 |
| Max Chl Dpth (ft) | 4.48 | Hydr. Depth (ft) | 0.81 | 1.66 | 0.29 |
| Conv. Total (cfs) | 71991.2 | Conv. (cfs) | 42346.9 | 27948.2 | 1696.1 |
| Length Wtd. (ft) | 1327.26 | Wetted Per. (ft) | 2217.48 | 363.35 | 527.94 |
| Min Ch El (ft) | 1572.95 | Shear (lb/sq ft) | 0.85 | 1.74 | 0.31 |
| Alpha | 1.46 | Stream Power (lb/ft s) | 2.60 | 10.46 | 0.44 |
| Frctn Loss (ft) | 0.27 | Cum Volume (acre-ft) | 826.96 | 1843.89 | 2861.64 |
| C & E Loss (ft) | 0.09 | Cum SA (acres) | 185.17 | 357.17 | 584.14 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1576.69 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.19 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1576.51 | Reach Len. (ft) | 450.00 | 2338.90 | 900.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 3351.43 | 835.81 | 535.92 |
| E.G. Slope (ft/ft) | 0.007436 | Area (sq ft) | 3351.43 | 835.81 | 535.92 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 8907.35 | 4129.14 | 963.51 |
| Top Width (ft) | 3671.05 | Top Width (ft) | 2612.06 | 365.30 | 693.68 |
| Vel Total (ft/s) | 2.96 | Avg. Vel. (ft/s) | 2.66 | 4.94 | 1.80 |
| Max Chl Dpth (ft) | 5.12 | Hydr. Depth (ft) | 1.28 | 2.29 | 0.77 |
| Conv. Total (cfs) | 162350.0 | Conv. (cfs) | 103293.5 | 47883.3 | 11173.3 |
| Length Wtd. (ft) | 1235.75 | Wetted Per. (ft) | 2615.01 | 365.73 | 693.81 |
| Min Ch El (ft) | 1572.95 | Shear (lb/sq ft) | 0.59 | 1.06 | 0.36 |
| Alpha | 1.36 | Stream Power (lb/ft s) | 1.58 | 5.24 | 0.64 |
| Frctn Loss (ft) | 0.36 | Cum Volume (acre-ft) | 919.51 | 2101.74 | 3183.90 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 200.48 | 369.62 | 685.21 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 7079.89 | 7387.69 | 0.00 | 0.00 | 1.30 | 0.00 | 0.00 | 0.09 |
| 7387.69 | 7695.49 | 653.55 | 182.71 | 308.29 | 14.00 | 0.59 | 3.58 |
| 7695.49 | 8003.29 | 904.48 | 180.54 | 183.78 | 19.38 | 0.99 | 5.01 |
| 8003.29 | 8618.89 | | | | | | |
| 8618.89 | 8926.69 | 11.20 | 5.06 | 17.58 | 0.24 | 0.29 | 2.21 |
| 8926.69 | 9234.49 | | | | | | |
| 9234.49 | 9542.29 | 90.27 | 54.51 | 291.94 | 1.93 | 0.19 | 1.66 |
| 9542.29 | 9850.09 | 823.95 | 199.30 | 270.63 | 17.65 | 0.74 | 4.13 |
| LB 9850.09 | 9923.57 | 713.30 | 97.74 | 66.57 | 15.28 | 1.47 | 7.30 |
| 9923.57 | 9997.06 | 646.16 | 95.83 | 73.48 | 13.85 | 1.30 | 6.74 |
| 9997.06 | 10070.54 | 493.36 | 81.51 | 73.49 | 10.57 | 1.11 | 6.05 |
| 10070.54 | 10144.03 | 271.02 | 56.91 | 73.54 | 5.81 | 0.77 | 4.76 |
| 10144.03 | RB 10217.51 | 36.68 | 14.97 | 52.43 | 0.79 | 0.29 | 2.45 |
| 10217.51 | 10694.24 | | | | | | |
| 10694.24 | 10789.59 | 23.03 | 8.50 | 18.82 | 0.49 | 0.45 | 2.71 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 7079.89 | 7387.69 | 119.16 | 69.02 | 157.53 | 1.28 | 0.44 | 1.73 |
| 7387.69 | 7695.49 | 1454.41 | 405.10 | 308.29 | 15.58 | 1.32 | 3.59 |
| 7695.49 | 8003.29 | 1191.70 | 359.59 | 308.57 | 12.77 | 1.17 | 3.31 |
| 8003.29 | 8311.09 | 5.66 | 8.37 | 78.00 | 0.06 | 0.11 | 0.68 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8311.09 | 8618.89 | 5.85 | 11.03 | 147.87 | 0.06 | 0.07 | 0.53 |
| 8618.89 | 8926.69 | 155.54 | 105.88 | 307.85 | 1.67 | 0.34 | 1.47 |
| 8926.69 | 9234.49 | 269.68 | 147.30 | 307.80 | 2.89 | 0.48 | 1.83 |
| 9234.49 | 9542.29 | 771.50 | 276.75 | 307.80 | 8.27 | 0.90 | 2.79 |
| 9542.29 | 9850.09 | 1516.41 | 407.44 | 293.76 | 16.25 | 1.39 | 3.72 |
| LB 9850.09 | 9923.57 | 992.01 | 146.69 | 69.34 | 10.63 | 2.12 | 6.76 |
| 9923.57 | 9997.06 | 978.75 | 148.92 | 73.48 | 10.49 | 2.03 | 6.57 |
| 9997.06 | 10070.54 | 826.95 | 134.60 | 73.49 | 8.86 | 1.83 | 6.14 |
| 10070.54 | 10144.03 | 590.52 | 110.01 | 73.54 | 6.33 | 1.50 | 5.37 |
| 10144.03 | RB 10217.51 | 234.98 | 63.27 | 73.50 | 2.52 | 0.86 | 3.71 |
| 10217.51 | 10312.86 | 5.57 | 9.42 | 95.35 | 0.06 | 0.10 | 0.59 |
| 10312.86 | 10408.20 | 14.68 | 16.84 | 95.35 | 0.16 | 0.18 | 0.87 |
| 10408.20 | 10503.55 | 26.98 | 24.26 | 95.35 | 0.29 | 0.25 | 1.11 |
| 10503.55 | 10598.89 | 42.10 | 31.68 | 95.35 | 0.45 | 0.33 | 1.33 |
| 10598.89 | 10694.24 | 59.79 | 39.10 | 95.35 | 0.64 | 0.41 | 1.53 |
| 10694.24 | 10789.59 | 70.76 | 33.74 | 51.21 | 0.76 | 0.66 | 2.10 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 6772.09 | 7079.89 | 0.10 | 0.82 | 58.64 | 0.00 | 0.01 | 0.12 |
| 7079.89 | 7387.69 | 344.10 | 192.38 | 233.89 | 2.46 | 0.82 | 1.79 |
| 7387.69 | 7695.49 | 1913.33 | 601.46 | 308.29 | 13.67 | 1.95 | 3.18 |
| 7695.49 | 8003.29 | 1677.16 | 555.95 | 308.57 | 11.98 | 1.81 | 3.02 |
| 8003.29 | 8311.09 | 131.71 | 95.89 | 173.23 | 0.94 | 0.55 | 1.37 |
| 8311.09 | 8618.89 | 279.89 | 189.69 | 307.80 | 2.00 | 0.62 | 1.48 |
| 8618.89 | 8926.69 | 608.28 | 302.24 | 307.85 | 4.34 | 0.98 | 2.01 |
| 8926.69 | 9234.49 | 753.53 | 343.65 | 307.80 | 5.38 | 1.12 | 2.19 |
| 9234.49 | 9542.29 | 1283.80 | 473.10 | 307.80 | 9.17 | 1.54 | 2.71 |
| 9542.29 | 9850.09 | 1915.47 | 596.24 | 301.13 | 13.68 | 1.99 | 3.21 |
| LB 9850.09 | 9923.57 | 1027.68 | 191.49 | 71.72 | 7.34 | 2.68 | 5.37 |
| 9923.57 | 9997.06 | 1049.46 | 195.80 | 73.48 | 7.50 | 2.66 | 5.36 |
| 9997.06 | 10070.54 | 924.66 | 181.48 | 73.49 | 6.60 | 2.47 | 5.10 |
| 10070.54 | 10144.03 | 725.05 | 156.89 | 73.54 | 5.18 | 2.13 | 4.62 |
| 10144.03 | RB 10217.51 | 402.28 | 110.15 | 73.50 | 2.87 | 1.50 | 3.65 |
| 10217.51 | 10312.86 | 113.17 | 70.24 | 95.35 | 0.81 | 0.74 | 1.61 |
| 10312.86 | 10408.20 | 133.79 | 77.66 | 95.35 | 0.96 | 0.81 | 1.72 |
| 10408.20 | 10503.55 | 155.76 | 85.08 | 95.35 | 1.11 | 0.89 | 1.83 |
| 10503.55 | 10598.89 | 179.07 | 92.51 | 95.35 | 1.28 | 0.97 | 1.94 |
| 10598.89 | 10694.24 | 203.65 | 99.93 | 95.35 | 1.45 | 1.05 | 2.04 |
| 10694.24 | 10789.59 | 160.72 | 86.74 | 95.47 | 1.15 | 0.91 | 1.85 |
| 10789.59 | 10884.93 | 17.03 | 22.54 | 95.35 | 0.12 | 0.24 | 0.76 |
| 10884.93 | 10980.28 | 0.31 | 1.22 | 26.26 | 0.00 | 0.05 | 0.25 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 18.708

INPUT
Description:
Station Elevation Data num= 96

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8589.15 | 1580.57 | 8594.22 | 1582 | 8601.2 | 1584 | 8606.72 | 1585.67 | 8616.58 | 1586 |
| 8632.46 | 1586.72 | 8634.37 | 1587.54 | 8640.4 | 1586 | 8647.9 | 1584 | 8655.42 | 1582 |
| 8662.98 | 1580 | 8670.23 | 1578 | 8674.57 | 1576.73 | 8680.11 | 1577.66 | 8686.09 | 1576 |
| 8692.75 | 1574.07 | 8788.35 | 1574 | 8854.22 | 1574 | 8864.42 | 1574 | 8874.17 | 1573.73 |
| 8889.82 | 1573.51 | 9000.15 | 1572.86 | 9114.52 | 1572.85 | 9128.19 | 1573.26 | 9171.96 | 1572.68 |
| 9180.15 | 1572.11 | 9264.38 | 1572.29 | 9344.45 | 1572 | 9568.58 | 1571.3 | 9579.26 | 1570.84 |
| 9587.9 | 1571.35 | 10096.89 | 1570.26 | 10098.58 | 1570 | 10108.04 | 1568.82 | 10119.03 | 1570 |
| 10119.28 | 1570.03 | 10122.2 | 1570 | 10131.31 | 1569.81 | 10136.38 | 1568.74 | 10146.33 | 1570 |
| 10146.58 | 1570.03 | 10238.44 | 1570 | 10371.94 | 1570 | 10562.84 | 1571.11 | 10586.29 | 1571.71 |
| 10618.97 | 1572 | 10624.98 | 1572.06 | 10634.79 | 1572 | 10657.66 | 1571.82 | 11049.02 | 1571.43 |
| 11060.65 | 1571.09 | 11068.05 | 1571.56 | 11149.03 | 1571.52 | 11162.47 | 1571.41 | 11171.33 | 1571.6 |
| 11739.72 | 1571.27 | 11863.8 | 1571.74 | 11985.55 | 1571.25 | 11994.21 | 1570 | 11998.35 | 1569.31 |
| 12002.93 | 1570 | 12010.18 | 1571.06 | 12072.33 | 1571.22 | 12076.45 | 1570 | 12078.3 | 1569.45 |
| 12081.5 | 1570 | 12088.46 | 1571.6 | 12100.79 | 1571.75 | 12108.11 | 1570.25 | 12118.87 | 1571.69 |

```
12140.62  1571.9 12152.2 1571.4912157.26    157212160.14 1572.2912195.84 1572.08
12245.96    157212259.08 1571.9112261.25    157212292.19 1573.2512325.01  1573.3
 12385.4 1572.5912532.76 1572.6312544.24 1572.2512559.84 1572.6712619.61 1572.41
12656.21 1572.8512662.95  1572.212912.24    157413156.57 1574.3413166.77    1574
13169.58 1573.8813179.12    157413195.19 1574.3313253.79 1575.1113316.64 1574.63
13317.64 1578.63

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8589.15     .06  9587.9    .04510586.29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9587.910586.29             4800  3678.3    3800             .1        .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
13317.6413317.64 1578.63
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.20 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.19 | Reach Len. (ft) | 4800.00 | 3678.30 | 3800.00 |
| Crit W.S. (ft) | 1571.39 | Flow Area (sq ft) | 2250.25 | 4658.21 | 8021.66 |
| E.G. Slope (ft/ft) | 0.000025 | Area (sq ft) | 2250.25 | 4658.21 | 8021.66 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 510.28 | 2133.12 | 2023.60 |
| Top Width (ft) | 4627.91 | Top Width (ft) | 899.03 | 998.39 | 2730.49 |
| Vel Total (ft/s) | 0.31 | Avg. Vel. (ft/s) | 0.23 | 0.46 | 0.25 |
| Max Chl Dpth (ft) | 6.45 | Hydr. Depth (ft) | 2.50 | 4.67 | 2.94 |
| Conv. Total (cfs) | 939430.8 | Conv. (cfs) | 102716.3 | 429379.7 | 407334.8 |
| Length Wtd. (ft) | 3920.27 | Wetted Per. (ft) | 899.25 | 998.75 | 2732.12 |
| Min Ch El (ft) | 1568.74 | Shear (lb/sq ft) | 0.00 | 0.01 | 0.00 |
| Alpha | 1.32 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.02 | Cum Volume (acre-ft) | 708.45 | 1340.51 | 2438.67 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 143.69 | 297.93 | 504.01 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.81 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.81 | Reach Len. (ft) | 4800.00 | 3678.30 | 3800.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 2801.26 | 5269.40 | 9693.27 |
| E.G. Slope (ft/ft) | 0.000057 | Area (sq ft) | 2801.26 | 5269.40 | 9693.27 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 1117.87 | 3990.25 | 4224.88 |
| Top Width (ft) | 4630.17 | Top Width (ft) | 901.14 | 998.39 | 2730.64 |
| Vel Total (ft/s) | 0.53 | Avg. Vel. (ft/s) | 0.40 | 0.76 | 0.44 |
| Max Chl Dpth (ft) | 7.07 | Hydr. Depth (ft) | 3.11 | 5.28 | 3.55 |
| Conv. Total (cfs) | 1233391.3 | Conv. (cfs) | 147731.1 | 527326.1 | 558334.1 |
| Length Wtd. (ft) | 3929.35 | Wetted Per. (ft) | 901.45 | 998.75 | 2732.75 |
| Min Ch El (ft) | 1568.74 | Shear (lb/sq ft) | 0.01 | 0.02 | 0.01 |
| Alpha | 1.27 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.01 |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 803.24 | 1686.22 | 2759.90 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 169.07 | 320.62 | 550.47 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1576.28 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1576.27 | Reach Len. (ft) | 4800.00 | 3678.30 | 3800.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 3219.43 | 5732.28 | 10959.29 |
| E.G. Slope (ft/ft) | 0.000090 | Area (sq ft) | 3219.43 | 5732.28 | 10959.29 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 1762.53 | 5748.13 | 6489.34 |
| Top Width (ft) | 4631.93 | Top Width (ft) | 902.78 | 998.39 | 2730.76 |
| Vel Total (ft/s) | 0.70 | Avg. Vel. (ft/s) | 0.55 | 1.00 | 0.59 |
| Max Chl Dpth (ft) | 7.53 | Hydr. Depth (ft) | 3.57 | 5.74 | 4.01 |
| Conv. Total (cfs) | 1477828.9 | Conv. (cfs) | 186051.4 | 606767.8 | 685009.7 |
| Length Wtd. (ft) | 3934.90 | Wetted Per. (ft) | 903.16 | 998.75 | 2733.23 |
| Min Ch El (ft) | 1568.74 | Shear (lb/sq ft) | 0.02 | 0.03 | 0.02 |
| Alpha | 1.24 | Stream Power (lb/ft s) | 0.01 | 0.03 | 0.01 |

| | | | | | |
|---|---|---|---|---|---|
| Frctn Loss (ft) | 0.12 | Cum Volume (acre-ft) | 885.57 | 1925.40 | 3065.14 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 182.32 | 333.01 | 649.84 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8589.15 | 8689.03 | 0.00 | 0.00 | 0.16 | 0.00 | 0.02 | 0.01 |
| 8689.03 | 8788.90 | 14.21 | 113.65 | 100.03 | 0.30 | 1.14 | 0.13 |
| 8788.90 | 8888.78 | 16.89 | 126.02 | 99.88 | 0.36 | 1.26 | 0.13 |
| 8888.78 | 8988.65 | 35.56 | 196.96 | 99.88 | 0.76 | 1.97 | 0.18 |
| 8988.65 | 9088.53 | 47.08 | 233.07 | 99.88 | 1.01 | 2.33 | 0.20 |
| 9088.53 | 9188.40 | 47.99 | 235.79 | 99.90 | 1.03 | 2.36 | 0.20 |
| 9188.40 | 9288.28 | 70.61 | 297.25 | 99.88 | 1.51 | 2.98 | 0.24 |
| 9288.28 | 9388.15 | 78.30 | 316.28 | 99.88 | 1.68 | 3.17 | 0.25 |
| 9388.15 | 9488.03 | 91.92 | 348.22 | 99.88 | 1.97 | 3.49 | 0.26 |
| 9488.03 | 9587.90 | 107.72 | 383.01 | 99.90 | 2.31 | 3.83 | 0.28 |
| LB 9587.90 | 9787.58 | 336.65 | 810.28 | 199.68 | 7.21 | 4.06 | 0.42 |
| 9787.58 | 9987.26 | 397.83 | 895.66 | 199.68 | 8.52 | 4.49 | 0.44 |
| 9987.26 | 10186.93 | 491.42 | 1017.43 | 200.03 | 10.53 | 5.10 | 0.48 |
| 10186.93 | 10386.61 | 507.12 | 1036.08 | 199.68 | 10.87 | 5.19 | 0.49 |
| 10386.61 | RB 10586.29 | 400.11 | 898.76 | 199.69 | 8.57 | 4.50 | 0.45 |
| 10586.29 | 10859.42 | 243.22 | 935.35 | 273.14 | 5.21 | 3.42 | 0.26 |
| 10859.42 | 11132.56 | 274.40 | 1005.58 | 273.15 | 5.88 | 3.68 | 0.27 |
| 11132.56 | 11405.70 | 272.58 | 1001.54 | 273.14 | 5.84 | 3.67 | 0.27 |
| 11405.70 | 11678.83 | 290.48 | 1040.49 | 273.13 | 6.22 | 3.81 | 0.28 |
| 11678.83 | 11951.96 | 279.07 | 1015.77 | 273.14 | 5.98 | 3.72 | 0.27 |
| 11951.96 | 12225.10 | 289.67 | 1040.38 | 274.19 | 6.21 | 3.81 | 0.28 |
| 12225.10 | 12498.23 | 145.14 | 686.21 | 273.17 | 3.11 | 2.51 | 0.21 |
| 12498.23 | 12771.37 | 155.64 | 715.61 | 273.18 | 3.33 | 2.62 | 0.22 |
| 12771.37 | 13044.50 | 55.54 | 385.62 | 273.14 | 1.19 | 1.41 | 0.14 |
| 13044.50 | 13317.64 | 17.86 | 195.12 | 272.73 | 0.38 | 0.72 | 0.09 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8589.15 | 8689.03 | 0.06 | 0.74 | 2.36 | 0.00 | 0.33 | 0.08 |
| 8689.03 | 8788.90 | 45.37 | 174.79 | 100.03 | 0.49 | 1.75 | 0.26 |
| 8788.90 | 8888.78 | 50.90 | 187.16 | 99.88 | 0.55 | 1.87 | 0.27 |
| 8888.78 | 8988.65 | 86.97 | 258.10 | 99.88 | 0.93 | 2.58 | 0.34 |
| 8988.65 | 9088.53 | 108.17 | 294.21 | 99.88 | 1.16 | 2.95 | 0.37 |
| 9088.53 | 9188.40 | 109.82 | 296.93 | 99.90 | 1.18 | 2.97 | 0.37 |
| 9188.40 | 9288.28 | 150.30 | 358.39 | 99.88 | 1.61 | 3.59 | 0.42 |
| 9288.28 | 9388.15 | 163.83 | 377.42 | 99.88 | 1.76 | 3.78 | 0.43 |
| 9388.15 | 9488.03 | 187.58 | 409.36 | 99.88 | 2.01 | 4.10 | 0.46 |
| 9488.03 | 9587.90 | 214.87 | 444.15 | 99.90 | 2.30 | 4.45 | 0.48 |
| LB 9587.90 | 9787.58 | 648.72 | 932.52 | 199.68 | 6.95 | 4.67 | 0.70 |
| 9787.58 | 9987.26 | 750.70 | 1017.90 | 199.68 | 8.04 | 5.10 | 0.74 |
| 9987.26 | 10186.93 | 905.21 | 1139.67 | 200.03 | 9.70 | 5.71 | 0.79 |
| 10186.93 | 10386.61 | 931.13 | 1158.32 | 199.68 | 9.98 | 5.80 | 0.80 |
| 10386.61 | RB 10586.29 | 754.49 | 1021.00 | 199.69 | 8.08 | 5.11 | 0.74 |
| 10586.29 | 10859.42 | 498.51 | 1102.56 | 273.14 | 5.34 | 4.04 | 0.45 |
| 10859.42 | 11132.56 | 552.53 | 1172.79 | 273.15 | 5.92 | 4.29 | 0.47 |
| 11132.56 | 11405.70 | 549.38 | 1168.74 | 273.14 | 5.89 | 4.28 | 0.47 |
| 11405.70 | 11678.83 | 580.24 | 1207.70 | 273.13 | 6.22 | 4.42 | 0.48 |
| 11678.83 | 11951.96 | 560.58 | 1182.98 | 273.14 | 6.01 | 4.33 | 0.47 |
| 11951.96 | 12225.10 | 578.66 | 1207.59 | 274.19 | 6.20 | 4.42 | 0.48 |
| 12225.10 | 12498.23 | 325.27 | 853.42 | 273.17 | 3.49 | 3.12 | 0.38 |
| 12498.23 | 12771.37 | 344.15 | 882.82 | 273.18 | 3.69 | 3.23 | 0.39 |
| 12771.37 | 13044.50 | 157.76 | 552.83 | 273.14 | 1.69 | 2.02 | 0.29 |
| 13044.50 | 13317.64 | 77.80 | 361.85 | 273.37 | 0.83 | 1.33 | 0.22 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8589.15 | 8689.03 | 0.32 | 2.17 | 4.07 | 0.00 | 0.56 | 0.15 |
| 8689.03 | 8788.90 | 84.88 | 221.09 | 100.03 | 0.61 | 2.21 | 0.38 |
| 8788.90 | 8888.78 | 93.04 | 233.47 | 99.88 | 0.66 | 2.34 | 0.40 |
| 8888.78 | 8988.65 | 144.79 | 304.41 | 99.88 | 1.03 | 3.05 | 0.48 |
| 8988.65 | 9088.53 | 174.53 | 340.52 | 99.88 | 1.25 | 3.41 | 0.51 |
| 9088.53 | 9188.40 | 176.82 | 343.24 | 99.90 | 1.26 | 3.44 | 0.52 |
| 9188.40 | 9288.28 | 232.73 | 404.69 | 99.88 | 1.66 | 4.05 | 0.58 |
| 9288.28 | 9388.15 | 251.25 | 423.72 | 99.88 | 1.79 | 4.24 | 0.59 |
| 9388.15 | 9488.03 | 283.60 | 455.66 | 99.88 | 2.03 | 4.56 | 0.62 |
| 9488.03 | 9587.90 | 320.56 | 490.46 | 99.90 | 2.29 | 4.91 | 0.65 |
| LB 9587.90 | 9787.58 | 951.45 | 1025.09 | 199.68 | 6.80 | 5.13 | 0.93 |
| 9787.58 | 9987.26 | 1087.17 | 1110.48 | 199.68 | 7.77 | 5.56 | 0.98 |
| 9987.26 | 10186.93 | 1291.51 | 1232.25 | 200.03 | 9.23 | 6.17 | 1.05 |
| 10186.93 | 10386.61 | 1325.82 | 1250.90 | 199.68 | 9.47 | 6.26 | 1.06 |
| 10386.61 | RB 10586.29 | 1092.18 | 1113.57 | 199.69 | 7.80 | 5.58 | 0.98 |
| 10586.29 | 10859.42 | 756.16 | 1229.19 | 273.14 | 5.40 | 4.50 | 0.62 |
| 10859.42 | 11132.56 | 829.50 | 1299.42 | 273.15 | 5.92 | 4.76 | 0.64 |
| 11132.56 | 11405.70 | 825.23 | 1295.38 | 273.14 | 5.89 | 4.74 | 0.64 |
| 11405.70 | 11678.83 | 867.01 | 1334.33 | 273.13 | 6.19 | 4.89 | 0.65 |
| 11678.83 | 11951.96 | 840.41 | 1309.61 | 273.14 | 6.00 | 4.79 | 0.64 |
| 11951.96 | 12225.10 | 864.65 | 1334.22 | 274.19 | 6.18 | 4.88 | 0.65 |
| 12225.10 | 12498.23 | 518.36 | 980.05 | 273.17 | 3.70 | 3.59 | 0.53 |
| 12498.23 | 12771.37 | 544.51 | 1009.45 | 273.18 | 3.89 | 3.70 | 0.54 |
| 12771.37 | 13044.50 | 281.53 | 679.46 | 273.14 | 2.01 | 2.49 | 0.41 |
| 13044.50 | 13317.64 | 161.98 | 488.18 | 273.85 | 1.16 | 1.79 | 0.33 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 18.012

INPUT
Description:
Station Elevation Data num= 137

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8314.82 | 1578.91 | 8394.82 | 1568.91 | 8395.82 | 1568.91 | 8580.93 | 1568 | 8759.78 | 1568 |
| 8870.8 | 1568 | 8905.23 | 1568 | 8958.45 | 1568 | 9012.22 | 1567.75 | 9050.84 | 1567.84 |
| 9116.22 | 1566.9 | 9207.41 | 1566.75 | 9252.07 | 1566 | 9297.6 | 1565.64 | 9303.88 | 1566 |
| 9329.8 | 1567.06 | 9351.73 | 1566.72 | 9373.89 | 1566.08 | 9412.12 | 1567.57 | 9455.93 | 1566.92 |
| 9460.71 | 1566 | 9469.23 | 1564.75 | 9475.12 | 1564 | 9480.87 | 1563.24 | 9516.75 | 1562.92 |
| 9521.76 | 1564 | 9530.83 | 1566 | 9531.93 | 1566.24 | 9698.57 | 1566 | 9787.74 | 1566 |
| 9835.47 | 1567.4 | 9885.34 | 1566.76 | 9907.53 | 1566 | 10002.7 | 1565.82 | 10020 | 1566 |
| 10037.04 | 1566.16 | 10061.9 | 156 | 10093.63 | 1565.71 | 10175.73 | 1565.81 | 10208.28 | 1564.44 |
| 10238.71 | 1565.51 | 10260.21 | 1565.44 | 10293.44 | 156 | 10303.36 | 156 | 10336.02 | 1566 |
| 10385.23 | 156 | 10460.99 | 1566.05 | 10465.06 | 1566 | 10568.6 | 1565.02 | 10657.4 | 1564.79 |
| 10669.32 | 156 | 10685.17 | 1567.46 | 10712.17 | 1567.75 | 10759.28 | 1567.43 | 10788.23 | 1568 |
| 10853.31 | 1568.47 | 10868.27 | 156 | 10899.67 | 1566.75 | 10906.24 | 156 | 10933.97 | 1564.09 |
| 10955.37 | 156 | 10975.53 | 1567.91 | 10979.57 | 156 | 10997.61 | 156 | 11034.35 | 1568 |
| 11078.56 | 156 | 11141.81 | 1567.51 | 11160.84 | 156 | 11178.44 | 156 | 11228.49 | 1567.11 |
| 11242.69 | 156 | 11247.87 | 1565.59 | 11298.03 | 1565.31 | 11311.62 | 1565.43 | 11314.33 | 1566 |
| 11323.87 | 156 | 11324.97 | 1568.23 | 11429.64 | 1568.28 | 11476.21 | 1568 | 11744.4 | 1566.45 |
| 11771.34 | 1566.75 | 12091.28 | 1566.22 | 12093.06 | 156 | 12098.42 | 1565.37 | 12104.39 | 1566 |
| 12106.79 | 1566.05 | 12252.85 | 1567.37 | 12266.5 | 156 | 12267.66 | 1565.89 | 12268.7 | 1566 |
| 12284.39 | 1567.8 | 12363.77 | 156 | 12383.41 | 1568.24 | 12396.82 | 1568.86 | 12444.96 | 1569.09 |
| 12469.89 | 1569.37 | 12487.72 | 1569.79 | 12496.21 | 1570 | 12505.2 | 1570.18 | 12508.29 | 1570 |
| 12520.41 | 1569.35 | 12782.1 | 156 | 13545.32 | 156 | 14035.16 | 1566 | 14788.5 | 1568 |
| 15178.56 | 1569.03 | 15183.06 | 156 | 15188.43 | 1566.77 | 15196.63 | 156 | 15203.86 | 1568.76 |
| 15399.32 | 157 | 15403.09 | 157 | 15422.29 | 1570 | 15423.7 | 1570.02 | 15423.93 | 1570 |
| 15429.45 | 1569.68 | 15494.07 | 1569.64 | 15548.22 | 157 | 15623.57 | 157 | 15638.77 | 1574 |
| 15653.86 | 157 | 15667.18 | 1577.77 | 15686.64 | 157 | 15689.12 | 1578.03 | 15689.21 | 1578 |
| 15695.31 | 157 | 15701.79 | 157 | 15709.74 | 157 | 15918.37 | 1570.64 | 15983.76 | 1570.84 |
| 16001.65 | 1570.86 | 16062.61 | 1570.81 | 16173.96 | 1571.78 | 16184.06 | 1572 | 16194.6 | 1572.22 |
| 16716.15 | 1573.72 | 16717.15 | 1578.72 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8314.82 | .06 | 9455.93 | .04 | 10685.17 | .06 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9455.93 | 10685.17 | 1300 | 551.3 | 400 | .3 | .5 |

Ineffective Flow num= 1

```
   Sta L    Sta R     Elev
   1140016717.15     1580
Blocked Obstructions      num=        2
   Sta L    Sta R     Elev    Sta L    Sta R     Elev
 8314.82 8314.82 1578.9116717.1516717.15 1578.72
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.17 | Reach Len. (ft) | 1300.00 | 551.30 | 400.00 |
| Crit W.S. (ft) | 1566.35 | Flow Area (sq ft) | 8207.87 | 11567.14 | 5579.21 |
| E.G. Slope (ft/ft) | 0.000002 | Area (sq ft) | 8207.87 | 11567.14 | 41186.30 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1192.77 | 2633.41 | 840.82 |
| Top Width (ft) | 8321.36 | Top Width (ft) | 1111.22 | 1229.24 | 5980.91 |
| Vel Total (ft/s) | 0.18 | Avg. Vel. (ft/s) | 0.15 | 0.23 | 0.15 |
| Max Chl Dpth (ft) | 12.25 | Hydr. Depth (ft) | 7.39 | 9.41 | 7.80 |
| Conv. Total (cfs) | 3015671.3 | Conv. (cfs) | 770730.3 | 1701629.0 | 543311.9 |
| Length Wtd. (ft) | 678.40 | Wetted Per. (ft) | 1111.70 | 1230.10 | 715.52 |
| Min Ch El (ft) | 1562.92 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.14 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.00 | Cum Volume (acre-ft) | 132.25 | 655.46 | 292.32 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 32.94 | 203.87 | 124.03 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.75 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1575.74 | Reach Len. (ft) | 1300.00 | 551.30 | 400.00 |
| Crit W.S. (ft) | 1566.77 | Flow Area (sq ft) | 8842.91 | 12268.19 | 5986.89 |
| E.G. Slope (ft/ft) | 0.000008 | Area (sq ft) | 8842.91 | 12268.19 | 44599.07 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 2418.52 | 5216.24 | 1698.24 |
| Top Width (ft) | 8332.19 | Top Width (ft) | 1115.78 | 1229.24 | 5987.17 |
| Vel Total (ft/s) | 0.34 | Avg. Vel. (ft/s) | 0.27 | 0.43 | 0.28 |
| Max Chl Dpth (ft) | 12.82 | Hydr. Depth (ft) | 7.93 | 9.98 | 8.38 |
| Conv. Total (cfs) | 3358300.3 | Conv. (cfs) | 870259.5 | 1876963.3 | 611077.5 |
| Length Wtd. (ft) | 689.09 | Wetted Per. (ft) | 1116.30 | 1230.10 | 715.52 |
| Min Ch El (ft) | 1562.92 | Shear (lb/sq ft) | 0.00 | 0.00 | 0.00 |
| Alpha | 1.14 | Stream Power (lb/ft s) | 0.00 | 0.00 | 0.00 |
| Frctn Loss (ft) | 0.02 | Cum Volume (acre-ft) | 161.69 | 945.76 | 391.77 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 57.95 | 226.57 | 170.22 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1576.16 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | 0.060 | 0.045 | 0.060 |
| W.S. Elev (ft) | 1576.15 | Reach Len. (ft) | 1300.00 | 551.30 | 400.00 |
| Crit W.S. (ft) | 1567.19 | Flow Area (sq ft) | 9302.18 | 12773.42 | 6280.69 |
| E.G. Slope (ft/ft) | 0.000015 | Area (sq ft) | 9302.18 | 12773.42 | 47060.79 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 3660.39 | 7775.95 | 2563.66 |
| Top Width (ft) | 8339.96 | Top Width (ft) | 1119.07 | 1229.24 | 5991.65 |
| Vel Total (ft/s) | 0.49 | Avg. Vel. (ft/s) | 0.39 | 0.61 | 0.41 |
| Max Chl Dpth (ft) | 13.23 | Hydr. Depth (ft) | 8.31 | 10.39 | 8.79 |
| Conv. Total (cfs) | 3614441.8 | Conv. (cfs) | 945018.1 | 2007552.5 | 661871.1 |
| Length Wtd. (ft) | 703.86 | Wetted Per. (ft) | 1119.61 | 1230.10 | 715.52 |
| Min Ch El (ft) | 1562.92 | Shear (lb/sq ft) | 0.01 | 0.01 | 0.01 |
| Alpha | 1.14 | Stream Power (lb/ft s) | 0.00 | 0.01 | 0.00 |
| Frctn Loss (ft) | 0.03 | Cum Volume (acre-ft) | 195.67 | 1144.07 | 534.43 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 70.93 | 238.96 | 269.38 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8314.82 | 8428.93 | 38.01 | 373.26 | 84.61 | 0.81 | 4.43 | 0.10 |
| 8428.93 | 8543.04 | 103.03 | 765.29 | 114.11 | 2.21 | 6.71 | 0.13 |
| 8543.04 | 8657.15 | 114.43 | 815.03 | 114.11 | 2.45 | 7.14 | 0.14 |
| 8657.15 | 8771.26 | 115.26 | 818.55 | 114.11 | 2.47 | 7.17 | 0.14 |
| 8771.26 | 8885.38 | 115.26 | 818.56 | 114.11 | 2.47 | 7.17 | 0.14 |
| 8885.38 | 8999.49 | 116.18 | 822.47 | 114.11 | 2.49 | 7.21 | 0.14 |
| 8999.49 | 9113.60 | 127.00 | 867.63 | 114.12 | 2.72 | 7.60 | 0.15 |
| 9113.60 | 9227.71 | 149.64 | 957.37 | 114.11 | 3.21 | 8.39 | 0.16 |
| 9227.71 | 9341.82 | 167.84 | 1025.76 | 114.15 | 3.60 | 8.99 | 0.16 |
| 9341.82 | 9455.93 | 146.12 | 943.94 | 114.16 | 3.13 | 8.27 | 0.15 |
| LB 9455.93 | 9701.78 | 554.20 | 2388.06 | 246.48 | 11.87 | 9.71 | 0.23 |
| 9701.78 | 9947.63 | 469.97 | 2161.07 | 245.89 | 10.07 | 8.79 | 0.22 |
| 9947.63 | 10193.47 | 519.67 | 2295.34 | 245.87 | 11.13 | 9.34 | 0.23 |
| 10193.47 | 10439.32 | 530.83 | 2324.85 | 245.88 | 11.37 | 9.46 | 0.23 |
| 10439.32 | RB 10685.17 | 558.74 | 2397.82 | 245.98 | 11.97 | 9.75 | 0.23 |
| 10685.17 | 11288.37 | 712.63 | 4719.81 | 603.60 | 15.27 | 7.82 | 0.15 |
| 11288.37 | 11891.57 | 128.19 | 859.40 | 111.92 | 2.75 | 7.70 | 0.15 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8314.82 | 8428.93 | 81.05 | 422.59 | 89.21 | 0.87 | 4.76 | 0.19 |
| 8428.93 | 8543.04 | 212.03 | 830.37 | 114.11 | 2.27 | 7.28 | 0.26 |
| 8543.04 | 8657.15 | 233.61 | 880.11 | 114.11 | 2.50 | 7.71 | 0.27 |
| 8657.15 | 8771.26 | 235.17 | 883.63 | 114.11 | 2.52 | 7.74 | 0.27 |
| 8771.26 | 8885.38 | 235.18 | 883.64 | 114.11 | 2.52 | 7.74 | 0.27 |
| 8885.38 | 8999.49 | 236.91 | 887.55 | 114.11 | 2.54 | 7.78 | 0.27 |
| 8999.49 | 9113.60 | 257.33 | 932.71 | 114.12 | 2.76 | 8.17 | 0.28 |
| 9113.60 | 9227.71 | 299.92 | 1022.45 | 114.11 | 3.21 | 8.96 | 0.29 |
| 9227.71 | 9341.82 | 334.02 | 1090.83 | 114.15 | 3.58 | 9.56 | 0.31 |
| 9341.82 | 9455.93 | 293.31 | 1009.02 | 114.16 | 3.14 | 8.84 | 0.29 |
| LB 9455.93 | 9701.78 | 1094.58 | 2528.27 | 246.48 | 11.73 | 10.28 | 0.43 |
| 9701.78 | 9947.63 | 937.26 | 2301.28 | 245.89 | 10.04 | 9.36 | 0.41 |
| 9947.63 | 10193.47 | 1030.21 | 2435.55 | 245.87 | 11.04 | 9.91 | 0.42 |
| 10193.47 | 10439.32 | 1051.05 | 2465.06 | 245.88 | 11.26 | 10.03 | 0.43 |
| 10439.32 | RB 10685.17 | 1103.13 | 2538.03 | 245.98 | 11.82 | 10.32 | 0.43 |
| 10685.17 | 11288.37 | 1438.91 | 5063.82 | 603.60 | 15.42 | 8.39 | 0.28 |
| 11288.37 | 11891.57 | 259.33 | 923.07 | 111.92 | 2.78 | 8.27 | 0.28 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8314.82 | 8428.93 | 126.89 | 459.76 | 92.52 | 0.91 | 4.99 | 0.28 |
| 8428.93 | 8543.04 | 323.87 | 877.27 | 114.11 | 2.31 | 7.69 | 0.37 |
| 8543.04 | 8657.15 | 355.05 | 927.01 | 114.11 | 2.54 | 8.12 | 0.38 |
| 8657.15 | 8771.26 | 357.31 | 930.53 | 114.11 | 2.55 | 8.15 | 0.38 |
| 8771.26 | 8885.38 | 357.31 | 930.54 | 114.11 | 2.55 | 8.15 | 0.38 |
| 8885.38 | 8999.49 | 359.82 | 934.45 | 114.11 | 2.57 | 8.19 | 0.39 |
| 8999.49 | 9113.60 | 389.25 | 979.61 | 114.12 | 2.78 | 8.58 | 0.40 |
| 9113.60 | 9227.71 | 450.49 | 1069.35 | 114.11 | 3.22 | 9.37 | 0.42 |
| 9227.71 | 9341.82 | 499.41 | 1137.73 | 114.15 | 3.57 | 9.97 | 0.44 |
| 9341.82 | 9455.93 | 440.99 | 1055.92 | 114.16 | 3.15 | 9.25 | 0.42 |
| LB 9455.93 | 9701.78 | 1628.62 | 2629.32 | 246.48 | 11.63 | 10.69 | 0.62 |
| 9701.78 | 9947.63 | 1403.37 | 2402.33 | 245.89 | 10.02 | 9.77 | 0.58 |
| 9947.63 | 10193.47 | 1536.59 | 2536.59 | 245.87 | 10.98 | 10.32 | 0.61 |
| 10193.47 | 10439.32 | 1566.43 | 2566.11 | 245.88 | 11.19 | 10.44 | 0.61 |
| 10439.32 | RB 10685.17 | 1640.94 | 2639.08 | 245.98 | 11.72 | 10.73 | 0.62 |
| 10685.17 | 11288.37 | 2171.79 | 5311.74 | 603.60 | 15.51 | 8.81 | 0.41 |
| 11288.37 | 11891.57 | 391.87 | 968.95 | 111.92 | 2.80 | 8.68 | 0.40 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.907

INPUT
Description:
Station Elevation Data num= 24

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8772.79 | 1577.7 | 8773.79 | 1575.47 | 9372.79 | 1575 | 9682.79 | 1574 | 9829.87 | 1574.78 |
| 9992.79 | 1574.27 | 10400.12 | 1574 | 10832.79 | 1574 | 11322.79 | 1574 | 11352.79 | 1576 |
| 11392.79 | 1576.41 | 3122.79 | 1576.41 | 5272.79 | 1576.22 | 16042.79 | 1576 | 16102.79 | 1578 |
| 16155.41 | 1578 | 16166.33 | 1579.31 | 6197.79 | 1579.37 | 16205.19 | 1578 | 16282.79 | 1578 |
| 16332.79 | 1576 | 16372.79 | 1575.91 | 6472.79 | 1576 | 17232.79 | 1577.8 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8772.79 | .035 | 9829.87 | .031 | 1352.79 | .035 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9829.87 | 11352.79 | 150 | 134.8 | 200 | .3 | .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8772.79 | 8773.79 | 1575.47 | 11367.79 | 17232.79 | 1576 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8772.79 | 8772.79 | 1577.7 | 11392.79 | 17232.79 | 1576.4 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.15 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.05 | Wt. n-Val. | 0.035 | 0.030 | |
| W.S. Elev (ft) | 1575.10 | Reach Len. (ft) | 150.00 | 134.80 | 200.00 |
| Crit W.S. (ft) | 1574.58 | Flow Area (sq ft) | 298.57 | 1515.33 | |
| E.G. Slope (ft/ft) | 0.001439 | Area (sq ft) | 298.57 | 1515.33 | |
| Q Total (cfs) | 3160.00 | Flow (cfs) | 305.87 | 2854.13 | |
| Top Width (ft) | 2097.86 | Top Width (ft) | 588.39 | 1509.47 | |
| Vel Total (ft/s) | 1.74 | Avg. Vel. (ft/s) | 1.02 | 1.88 | |
| Max Chl Dpth (ft) | 1.10 | Hydr. Depth (ft) | 0.51 | 1.00 | |
| Conv. Total (cfs) | 83312.2 | Conv. (cfs) | 8064.2 | 75248.0 | |
| Length Wtd. (ft) | 137.48 | Wetted Per. (ft) | 588.40 | 1509.50 | |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.05 | 0.09 | |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.05 | 0.17 | |
| Frctn Loss (ft) | 0.47 | Cum Volume (acre-ft) | 5.32 | 572.67 | 103.22 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 7.58 | 186.54 | 96.57 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.69 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.13 | Wt. n-Val. | 0.035 | 0.030 | |
| W.S. Elev (ft) | 1575.56 | Reach Len. (ft) | 150.00 | 134.80 | 200.00 |
| Crit W.S. (ft) | 1574.99 | Flow Area (sq ft) | 699.68 | 2212.87 | |
| E.G. Slope (ft/ft) | 0.002256 | Area (sq ft) | 699.68 | 2212.87 | |
| Q Total (cfs) | 7770.00 | Flow (cfs) | 1072.21 | 6697.79 | |
| Top Width (ft) | 2572.50 | Top Width (ft) | 1056.12 | 1516.38 | |
| Vel Total (ft/s) | 2.67 | Avg. Vel. (ft/s) | 1.53 | 3.03 | |
| Max Chl Dpth (ft) | 1.56 | Hydr. Depth (ft) | 0.66 | 1.46 | |
| Conv. Total (cfs) | 163584.5 | Conv. (cfs) | 22573.7 | 141010.8 | |
| Length Wtd. (ft) | 139.74 | Wetted Per. (ft) | 1056.19 | 1516.43 | |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.09 | 0.21 | |
| Alpha | 1.16 | Stream Power (lb/ft s) | 0.14 | 0.62 | |
| Frctn Loss (ft) | 0.64 | Cum Volume (acre-ft) | 19.29 | 854.12 | 187.00 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 25.54 | 209.20 | 142.73 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1576.07 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.20 | Wt. n-Val. | 0.035 | 0.030 | |
| W.S. Elev (ft) | 1575.87 | Reach Len. (ft) | 150.00 | 134.80 | 200.00 |
| Crit W.S. (ft) | 1575.31 | Flow Area (sq ft) | 1024.84 | 2680.42 | |
| E.G. Slope (ft/ft) | 0.002753 | Area (sq ft) | 1024.84 | 2680.42 | |
| Q Total (cfs) | 12400.00 | Flow (cfs) | 2237.05 | 10162.95 | |
| Top Width (ft) | 2577.26 | Top Width (ft) | 1056.26 | 1521.00 | |
| Vel Total (ft/s) | 3.35 | Avg. Vel. (ft/s) | 2.18 | 3.79 | |
| Max Chl Dpth (ft) | 1.87 | Hydr. Depth (ft) | 0.97 | 1.76 | |
| Conv. Total (cfs) | 236328.4 | Conv. (cfs) | 42635.4 | 193693.0 | |
| Length Wtd. (ft) | 140.80 | Wetted Per. (ft) | 1056.52 | 1521.06 | |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.17 | 0.30 | |
| Alpha | 1.13 | Stream Power (lb/ft s) | 0.36 | 1.15 | |
| Frctn Loss (ft) | 0.74 | Cum Volume (acre-ft) | 41.57 | 1046.28 | 318.35 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 38.46 | 221.55 | 241.87 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9195.62 | 9301.33 | 0.15 | 1.41 | 59.85 | 0.00 | 0.02 | 0.11 |
| 9301.33 | 9407.04 | 3.04 | 10.78 | 105.71 | 0.10 | 0.10 | 0.28 |
| 9407.04 | 9512.75 | 27.74 | 40.59 | 105.71 | 0.88 | 0.38 | 0.68 |
| 9512.75 | 9618.45 | 80.00 | 76.64 | 105.71 | 2.53 | 0.72 | 1.04 |
| 9618.45 | 9724.16 | 136.04 | 105.39 | 105.71 | 4.31 | 1.00 | 1.29 |
| 9724.16 | 9829.87 | 58.90 | 63.78 | 105.71 | 1.86 | 0.60 | 0.92 |
| LB 9829.87 | 10134.45 | 325.83 | 218.82 | 304.58 | 10.31 | 0.72 | 1.49 |
| 10134.45 | 10439.04 | 590.30 | 312.57 | 304.58 | 18.68 | 1.03 | 1.89 |
| 10439.04 | 10743.62 | 665.77 | 335.96 | 304.58 | 21.07 | 1.10 | 1.98 |
| 10743.62 | 11048.21 | 665.77 | 335.96 | 304.58 | 21.07 | 1.10 | 1.98 |
| 11048.21 | RB 11352.79 | 606.46 | 312.00 | 291.17 | 19.19 | 1.07 | 1.94 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8772.79 | 8878.50 | 6.11 | 14.16 | 104.81 | 0.08 | 0.14 | 0.43 |
| 8878.50 | 8984.21 | 13.66 | 23.01 | 105.71 | 0.18 | 0.22 | 0.59 |
| 8984.21 | 9089.91 | 23.39 | 31.78 | 105.71 | 0.30 | 0.30 | 0.74 |
| 9089.91 | 9195.62 | 35.11 | 40.55 | 105.71 | 0.45 | 0.38 | 0.87 |
| 9195.62 | 9301.33 | 48.66 | 49.32 | 105.71 | 0.63 | 0.47 | 0.99 |
| 9301.33 | 9407.04 | 66.56 | 59.52 | 105.71 | 0.86 | 0.56 | 1.12 |
| 9407.04 | 9512.75 | 130.95 | 89.33 | 105.71 | 1.69 | 0.85 | 1.47 |
| 9512.75 | 9618.45 | 230.39 | 125.37 | 105.71 | 2.97 | 1.19 | 1.84 |
| 9618.45 | 9724.16 | 325.01 | 154.12 | 105.71 | 4.18 | 1.46 | 2.11 |
| 9724.16 | 9829.87 | 192.37 | 112.51 | 105.71 | 2.48 | 1.06 | 1.71 |
| LB 9829.87 | 10134.45 | 938.40 | 359.26 | 304.58 | 12.08 | 1.18 | 2.61 |
| 10134.45 | 10439.04 | 1381.04 | 453.00 | 304.58 | 17.77 | 1.49 | 3.05 |
| 10439.04 | 10743.62 | 1501.97 | 476.40 | 304.58 | 19.33 | 1.56 | 3.15 |
| 10743.62 | 11048.21 | 1501.97 | 476.40 | 304.58 | 19.33 | 1.56 | 3.15 |
| 11048.21 | RB 11352.79 | 1374.42 | 447.82 | 298.10 | 17.69 | 1.50 | 3.07 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8772.79 | 8878.50 | 54.18 | 46.43 | 105.15 | 0.44 | 0.44 | 1.17 |
| 8878.50 | 8984.21 | 72.81 | 55.56 | 105.71 | 0.59 | 0.53 | 1.31 |
| 8984.21 | 9089.91 | 92.96 | 64.33 | 105.71 | 0.75 | 0.61 | 1.45 |
| 9089.91 | 9195.62 | 115.02 | 73.09 | 105.71 | 0.93 | 0.69 | 1.57 |
| 9195.62 | 9301.33 | 138.92 | 81.86 | 105.71 | 1.12 | 0.77 | 1.70 |
| 9301.33 | 9407.04 | 168.95 | 92.06 | 105.71 | 1.36 | 0.87 | 1.84 |
| 9407.04 | 9512.75 | 269.65 | 121.87 | 105.71 | 2.17 | 1.15 | 2.21 |
| 9512.75 | 9618.45 | 415.29 | 157.92 | 105.71 | 3.35 | 1.49 | 2.63 |
| 9618.45 | 9724.16 | 548.80 | 186.67 | 105.71 | 4.43 | 1.77 | 2.94 |
| 9724.16 | 9829.87 | 360.47 | 145.06 | 105.71 | 2.91 | 1.37 | 2.49 |
| LB 9829.87 | 10134.45 | 1528.47 | 453.03 | 304.58 | 12.33 | 1.49 | 3.37 |
| 10134.45 | 10439.04 | 2091.18 | 546.77 | 304.58 | 16.86 | 1.80 | 3.82 |
| 10439.04 | 10743.62 | 2242.44 | 570.17 | 304.58 | 18.08 | 1.87 | 3.93 |
| 10743.62 | 11048.21 | 2242.44 | 570.17 | 304.58 | 18.08 | 1.87 | 3.93 |
| 11048.21 | RB 11352.79 | 2058.42 | 540.29 | 302.73 | 16.60 | 1.79 | 3.81 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.882

INPUT
Description:
Station Elevation Data num= 22

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8740.72 | 1577 | 8741.72 | 1575 | 9440 | 1574.41 | 9440.72 | 1574.4 | 9780.72 | 1574.1 |
| 10270.72 | 157410890.72 | | 157412160.72 | | 1574.513690.72 | | 157414090.72 | | 1574.35 |
| 14340.72 | 157414540.72 | | 1574.514780.72 | | 157415640.72 | | 157415960.72 | | 1574 |
| 16020.72 | 157616080.72 | | 157816280.72 | | 157816340.72 | | 157616400.72 | | 1574 |
| 17129.58 | 157417130.58 | | 1577 | | | | | | |

Manning's n Values num= 4

| Sta | n Val | Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|---|---|
| 8740.72 | .035 | 9440 | .035 | 9440.72 | .031 | 2160.72 | .035 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9780.72 | 12160.72 | 400 | 341.8 | 500 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8740.72 | 8740.72 | 1575 | 12900 | 17130.58 | 1576 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 16300 | 17130.58 | 1575 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1574.66 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.15 | Wt. n-Val. | 0.030 | 0.030 | 0.035 |
| W.S. Elev (ft) | 1574.51 | Reach Len. (ft) | 400.00 | 341.80 | 500.00 |
| Crit W.S. (ft) | 1574.51 | Flow Area (sq ft) | 95.01 | 875.03 | 97.69 |
| E.G. Slope (ft/ft) | 0.015782 | Area (sq ft) | 95.01 | 875.03 | 1340.81 |
| Q Total (cfs) | 3160.00 | Flow (cfs) | 230.55 | 2794.28 | 135.17 |
| Top Width (ft) | 6655.98 | Top Width (ft) | 460.64 | 2380.00 | 3815.34 |
| Vel Total (ft/s) | 2.96 | Avg. Vel. (ft/s) | 2.43 | 3.19 | 1.38 |
| Max Chl Dpth (ft) | 0.51 | Hydr. Depth (ft) | 0.21 | 0.37 | 0.13 |
| Conv. Total (cfs) | 25154.0 | Conv. (cfs) | 1835.2 | 22242.8 | 1076.0 |
| Length Wtd. (ft) | 361.54 | Wetted Per. (ft) | 460.64 | 2380.00 | 739.28 |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.20 | 0.36 | 0.13 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.49 | 1.16 | 0.18 |
| Frctn Loss (ft) | 2.95 | Cum Volume (acre-ft) | 4.64 | 568.97 | 100.14 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 5.77 | 180.52 | 87.81 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.01 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.25 | Wt. n-Val. | 0.031 | 0.030 | 0.035 |
| W.S. Elev (ft) | 1574.76 | Reach Len. (ft) | 400.00 | 341.80 | 500.00 |
| Crit W.S. (ft) | 1574.76 | Flow Area (sq ft) | 247.44 | 1470.90 | 282.78 |
| E.G. Slope (ft/ft) | 0.013995 | Area (sq ft) | 247.44 | 1470.90 | 2296.98 |
| Q Total (cfs) | 7770.00 | Flow (cfs) | 768.25 | 6253.37 | 748.38 |
| Top Width (ft) | 6959.82 | Top Width (ft) | 756.97 | 2380.00 | 3822.85 |
| Vel Total (ft/s) | 3.88 | Avg. Vel. (ft/s) | 3.10 | 4.25 | 2.65 |
| Max Chl Dpth (ft) | 0.76 | Hydr. Depth (ft) | 0.33 | 0.62 | 0.38 |
| Conv. Total (cfs) | 65680.0 | Conv. (cfs) | 6494.0 | 52859.9 | 6326.1 |
| Length Wtd. (ft) | 363.28 | Wetted Per. (ft) | 756.97 | 2380.00 | 739.28 |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.29 | 0.54 | 0.33 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 0.89 | 2.30 | 0.88 |
| Frctn Loss (ft) | 2.63 | Cum Volume (acre-ft) | 17.66 | 848.42 | 181.73 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 22.41 | 203.17 | 133.96 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1575.29 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.34 | Wt. n-Val. | 0.031 | 0.030 | 0.035 |
| W.S. Elev (ft) | 1574.95 | Reach Len. (ft) | 400.00 | 341.80 | 500.00 |
| Crit W.S. (ft) | 1574.95 | Flow Area (sq ft) | 410.17 | 1917.15 | 421.40 |
| E.G. Slope (ft/ft) | 0.013470 | Area (sq ft) | 410.17 | 1917.15 | 3014.29 |
| Q Total (cfs) | 12400.00 | Flow (cfs) | 1431.65 | 9540.95 | 1427.40 |
| Top Width (ft) | 7187.37 | Top Width (ft) | 978.90 | 2380.00 | 3828.48 |
| Vel Total (ft/s) | 4.51 | Avg. Vel. (ft/s) | 3.49 | 4.98 | 3.39 |
| Max Chl Dpth (ft) | 0.95 | Hydr. Depth (ft) | 0.42 | 0.81 | 0.57 |
| Conv. Total (cfs) | 106842.7 | Conv. (cfs) | 12335.6 | 82208.1 | 12299.0 |
| Length Wtd. (ft) | 366.33 | Wetted Per. (ft) | 978.90 | 2380.00 | 739.28 |
| Min Ch El (ft) | 1574.00 | Shear (lb/sq ft) | 0.35 | 0.68 | 0.48 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 1.23 | 3.37 | 1.62 |
| Frctn Loss (ft) | 2.52 | Cum Volume (acre-ft) | 39.10 | 1039.17 | 311.43 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 34.96 | 215.52 | 233.08 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9260.72 | 9364.72 | 0.30 | 0.84 | 44.64 | 0.01 | 0.02 | 0.36 |
| 9364.72 | 9468.72 | 9.60 | 8.77 | 104.00 | 0.30 | 0.08 | 1.09 |
| 9468.72 | 9572.72 | 35.73 | 18.92 | 104.00 | 1.13 | 0.18 | 1.89 |
| 9572.72 | 9676.72 | 70.59 | 28.46 | 104.00 | 2.23 | 0.27 | 2.48 |
| 9676.72 | 9780.72 | 114.31 | 38.01 | 104.00 | 3.62 | 0.37 | 3.01 |
| LB 9780.72 | 10256.72 | 738.63 | 218.94 | 476.00 | 23.37 | 0.46 | 3.37 |
| 10256.72 | 10732.72 | 881.12 | 243.38 | 476.00 | 27.88 | 0.51 | 3.62 |
| 10732.72 | 11208.72 | 764.38 | 223.49 | 476.00 | 24.19 | 0.47 | 3.42 |
| 11208.72 | 11684.72 | 347.19 | 139.19 | 476.00 | 10.99 | 0.29 | 2.49 |
| 11684.72 | RB 12160.72 | 63.02 | 50.00 | 476.00 | 1.99 | 0.11 | 1.26 |
| 12160.72 | 12657.71 | 45.63 | 45.99 | 496.99 | 1.44 | 0.09 | 0.99 |
| 12657.71 | 13154.69 | 89.50 | 51.69 | 242.29 | 2.83 | 0.21 | 1.73 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8948.72 | 9052.72 | 0.09 | 0.36 | 28.97 | 0.00 | 0.01 | 0.26 |
| 9052.72 | 9156.72 | 5.75 | 7.12 | 104.00 | 0.07 | 0.07 | 0.81 |
| 9156.72 | 9260.72 | 22.78 | 16.25 | 104.00 | 0.29 | 0.16 | 1.40 |
| 9260.72 | 9364.72 | 47.93 | 25.39 | 104.00 | 0.62 | 0.24 | 1.89 |
| 9364.72 | 9468.72 | 85.70 | 34.81 | 104.00 | 1.10 | 0.33 | 2.46 |
| 9468.72 | 9572.72 | 144.89 | 44.95 | 104.00 | 1.86 | 0.43 | 3.22 |
| 9572.72 | 9676.72 | 199.72 | 54.50 | 104.00 | 2.57 | 0.52 | 3.66 |
| 9676.72 | 9780.72 | 261.37 | 64.05 | 104.00 | 3.36 | 0.62 | 4.08 |
| LB 9780.72 | 10256.72 | 1525.27 | 338.12 | 476.00 | 19.63 | 0.71 | 4.51 |
| 10256.72 | 10732.72 | 1713.43 | 362.56 | 476.00 | 22.05 | 0.76 | 4.73 |
| 10732.72 | 11208.72 | 1559.62 | 342.66 | 476.00 | 20.07 | 0.72 | 4.55 |
| 11208.72 | 11684.72 | 974.16 | 258.37 | 476.00 | 12.54 | 0.54 | 3.77 |
| 11684.72 | RB 12160.72 | 480.98 | 169.17 | 476.00 | 6.19 | 0.36 | 2.84 |
| 12160.72 | 12657.71 | 414.32 | 170.41 | 496.99 | 5.33 | 0.34 | 2.43 |
| 12657.71 | 13154.69 | 334.01 | 112.35 | 242.29 | 4.30 | 0.46 | 2.97 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8740.72 | 8844.72 | 0.25 | 0.78 | 42.90 | 0.00 | 0.02 | 0.32 |
| 8844.72 | 8948.72 | 7.27 | 8.34 | 104.00 | 0.06 | 0.08 | 0.87 |
| 8948.72 | 9052.72 | 24.94 | 17.48 | 104.00 | 0.20 | 0.17 | 1.43 |
| 9052.72 | 9156.72 | 50.26 | 26.62 | 104.00 | 0.41 | 0.26 | 1.89 |
| 9156.72 | 9260.72 | 82.19 | 35.75 | 104.00 | 0.66 | 0.34 | 2.30 |
| 9260.72 | 9364.72 | 120.12 | 44.89 | 104.00 | 0.97 | 0.43 | 2.68 |
| 9364.72 | 9468.72 | 173.54 | 54.31 | 104.00 | 1.40 | 0.52 | 3.20 |
| 9468.72 | 9572.72 | 256.08 | 64.45 | 104.00 | 2.07 | 0.62 | 3.97 |
| 9572.72 | 9676.72 | 322.37 | 74.00 | 104.00 | 2.60 | 0.71 | 4.36 |
| 9676.72 | 9780.72 | 394.62 | 83.55 | 104.00 | 3.18 | 0.80 | 4.72 |
| LB 9780.72 | 10256.72 | 2241.73 | 427.37 | 476.00 | 18.08 | 0.90 | 5.25 |
| 10256.72 | 10732.72 | 2459.47 | 451.81 | 476.00 | 19.83 | 0.95 | 5.44 |
| 10732.72 | 11208.72 | 2281.64 | 431.91 | 476.00 | 18.40 | 0.91 | 5.28 |
| 11208.72 | 11684.72 | 1588.85 | 347.62 | 476.00 | 12.81 | 0.73 | 4.57 |
| 11684.72 | RB 12160.72 | 969.33 | 258.42 | 476.00 | 7.82 | 0.54 | 3.75 |
| 12160.72 | 12657.71 | 846.44 | 263.60 | 496.99 | 6.83 | 0.53 | 3.21 |
| 12657.71 | 13154.69 | 580.90 | 157.78 | 242.29 | 4.68 | 0.65 | 3.68 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 17.817

INPUT
Description:
Station Elevation Data  num= 224

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8560.4 | 1565.91 | 8877.94 | 1565.59 | 9421.79 | 1564 | 9449.71 | 1564 | 9545.02 | 1565.14 |
| 9581.46 | 1566 | 9600.69 | 1567.06 | 9603.85 | 1566 | 9609.54 | 1564.15 | 9628.02 | 1564.53 |
| 9632.03 | 1565.44 | 9634.71 | 1564 | 9638.38 | 1562 | 9642.04 | 1560 | 9645.45 | 1558 |
| 9648.37 | 1556.17 | 9663.43 | 1557.32 | 9665.45 | 1556 | 9669.09 | 1554 | 9671.52 | 1552.73 |
| 9672.29 | 1552 | 9672.56 | 1551.8 | 9695.34 | 1551.8 | 9695.65 | 1552 | 9696.89 | 1552.83 |
| 9701.53 | 1553.11 | 9702.79 | 1554 | 9705.62 | 1556 | 9708.45 | 1558 | 9711.28 | 1560 |
| 9714.24 | 1562 | 9717.29 | 1563.91 | 9721.47 | 1563.55 | 9722.16 | 1564 | 9725.2 | 1566 |
| 9728.24 | 1568 | 9731.29 | 1570 | 9734.33 | 1572 | 9736.78 | 1573.61 | 9740.94 | 1572.64 |
| 9753.43 | 1572.16 | 9757.16 | 1572 | 9760.39 | 1571.71 | 9763.72 | 1570 | 9767.6 | 1568 |
| 9771.42 | 1566 | 9775.17 | 1564 | 9778.92 | 1562 | 9780.42 | 1561.2 | 9809.46 | 1561.1 |
| 9822.06 | 1562 | 9839.52 | 1562.43 | 9843.19 | 1562 | 9860.25 | 1560 | 9864.11 | 1559.46 |
| 9868.76 | 1560 | 9888.57 | 1561.88 | 9936.59 | 1561.94 | 9941.93 | 1560 | 9946.34 | 1558.73 |
| 9964.27 | 1558 | 9976.41 | 1557.45 | 9984.05 | 1556 | 9988.07 | 1555.23 | 10021.18 | 1555.17 |
| 10022.42 | 1556 | 10025.38 | 1558 | 10028.29 | 1560 | 10031.2 | 1562 | 10031.55 | 1562.24 |
| 10106.99 | 1562.62 | 10130.31 | 1562 | 10149.92 | 1561.53 | 10205.58 | 1561.95 | 10228.34 | 1562 |
| 10273.54 | 1562.54 | 10280.98 | 1562 | 10298.25 | 1560.84 | 10341.5 | 1561.47 | 10345.84 | 1562 |
| 10352.11 | 1562.97 | 10362.93 | 1562.97 | 10398.59 | 1562.37 | 10415.37 | 1563.43 | 10435.53 | 1563.34 |
| 10438.68 | 1562 | 10443.41 | 1560 | 10446.27 | 1559.08 | 10463.11 | 1559.29 | 10469.41 | 1560 |
| 10477.25 | 1560.87 | 10532.62 | 1561.07 | 10586.9 | 1560.67 | 10605.43 | 1560.96 | 10655.77 | 1560.61 |
| 10675.96 | 1561.38 | 10684.81 | 1560 | 10692.48 | 1558.8 | 10729.47 | 1559.5 | 10732.9 | 1560 |
| 10741.21 | 1561.3 | 10815.96 | 1562 | 10860.48 | 1562.7 | 10870.06 | 1562 | 10875 | 1561.65 |
| 10880.77 | 1562 | 10884.14 | 1562.21 | 10910.86 | 1562.47 | 10934.47 | 1562 | 10945.88 | 1561.78 |
| 10959.12 | 1560.98 | 10998.56 | 1561.48 | 11184.83 | 1561.8 | 11190.57 | 1561.76 | 11221.73 | 1561.59 |
| 11232.31 | 1560.7 | 11246.15 | 1560.62 | 11279.59 | 1560.64 | 11285.05 | 1562 | 11293.03 | 1564 |
| 11294.94 | 1564.48 | 11333.41 | 1564.18 | 11335.82 | 1564 | 11360.27 | 1562 | 11360.39 | 1561.99 |
| 11367.3 | 1560 | 11380.96 | 1558.93 | 11397.78 | 1559.15 | 11402.46 | 1560 | 11411.49 | 1561.71 |
| 11413.63 | 1562 | 11428.22 | 1564 | 11443.02 | 1566 | 11449.81 | 1566.9 | 11453.1 | 1566 |
| 11459.77 | 1564 | 11463.88 | 1562.77 | 11476.69 | 1562.63 | 11480.6 | 1562 | 11494.03 | 1560.02 |
| 11509.68 | 1560.2 | 11528.33 | 1560.46 | 11536.6 | 1562 | 11547.14 | 1564 | 11552.8 | 1565.09 |

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11624.18 1565.49 11668.2  1565.711678.56 1565.1711702.58 1565.5811935.18 1564.67
11951.85    156411966.32 1563.4211974.04    156411984.54  1564.812055.91 1564.79
 12106.5 1565.1412263.14 1565.7612352.56 1564.6112364.52    156412374.51  1563.5
12396.05 1563.4312431.05 1563.4812481.32 1563.2212497.01 1562.4812516.75 1562.82
12629.91 1563.0212775.33 1562.9212805.81 1563.5812824.97    156412908.96 1565.76
13051.84 1565.08 13296.4 1564.8813304.01 1564.5113313.13 1565.0813501.86  1564.4
13506.82    156413512.63 1563.5213521.45    156413527.93 1564.3813554.19    1564
13560.16  1563.9 13643.3    156413763.38    156414205.25 1563.2614342.59 1563.05
14349.38 1562.0814357.57 1562.7314481.71 1563.2514489.21 1562.6914503.87 1563.17
14514.45 1562.5214525.37 1563.0615092.58    156415362.39 1565.4315386.83    1564
15397.27  1563.215408.54    156415417.86 1564.8915459.81  1564.315514.43  1565.2
 15742.8 1565.4415761.42 1565.49 15807.2  1565.9 15844.9 1565.3116095.56 1565.58
16097.29    156616105.52    156816113.91    157016120.97 1571.7916144.93 1571.65
16150.94    157016158.14    156816164.63  1566.216215.85 1566.1516232.03 1566.07
16326.01 1566.2616334.26 1566.2916564.73 1567.4316599.29    156816638.95    1568
16657.69    156816683.36 1568.4416767.39 1568.5416989.13 1569.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  8560.4     .05 9936.59    .04511285.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9936.5911285.05              650   597.3     660             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  8560.4 9728.24    1568

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1562.21   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.14   Wt. n-Val.                 0.050      0.045      0.050
  W.S. Elev (ft)            1562.08   Reach Len. (ft)           650.00     597.30     660.00
  Crit W.S. (ft)            1561.14   Flow Area (sq ft)         103.44    1292.90     202.37
  E.G. Slope (ft/ft)       0.005768   Area (sq ft)              103.44    1292.90     202.37
  Q Total (cfs)             4667.00   Flow (cfs)                189.87    3790.48     686.65
  Top Width (ft)            1271.17   Top Width (ft)            140.51    1018.57     112.08
  Vel Total (ft/s)             2.92   Avg. Vel. (ft/s)            1.84       2.93       3.39
  Max Chl Dpth (ft)            6.91   Hydr. Depth (ft)            0.74       1.27       1.81
  Conv. Total (cfs)         61451.4   Conv. (cfs)               2500.1    49910.0     9041.2
  Length Wtd. (ft)           603.78   Wetted Per. (ft)          141.04    1022.84     112.99
  Min Ch El (ft)            1555.17   Shear (lb/sq ft)            0.26       0.46       0.64
  Alpha                        1.03   Stream Power (lb/ft s)      0.48       1.33       2.19
  Frctn Loss (ft)              4.10   Cum Volume (acre-ft)        3.73     560.47      91.28
  C & E Loss (ft)              0.03   Cum SA (acres)              3.01     167.19      65.27


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1563.09   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.16   Wt. n-Val.                 0.050      0.045      0.050
  W.S. Elev (ft)            1562.93   Reach Len. (ft)           650.00     597.30     660.00
  Crit W.S. (ft)            1561.97   Flow Area (sq ft)         235.10    2306.19     339.42
  E.G. Slope (ft/ft)       0.004748   Area (sq ft)              235.10    2306.19     339.42
  Q Total (cfs)             9333.00   Flow (cfs)                621.73    7648.68    1062.59
  Top Width (ft)            1805.34   Top Width (ft)            159.41    1305.72     340.21
  Vel Total (ft/s)             3.24   Avg. Vel. (ft/s)            2.64       3.32       3.13
  Max Chl Dpth (ft)            7.76   Hydr. Depth (ft)            1.47       1.77       1.00
  Conv. Total (cfs)        135450.9   Conv. (cfs)               9023.3   111006.1   15421.5
  Length Wtd. (ft)           604.38   Wetted Per. (ft)          160.18    1310.37     341.60
  Min Ch El (ft)            1555.17   Shear (lb/sq ft)            0.44       0.52       0.29
  Alpha                        1.01   Stream Power (lb/ft s)      1.15       1.73       0.92
  Frctn Loss (ft)              3.93   Cum Volume (acre-ft)       15.45     833.61     166.60
  C & E Loss (ft)              0.05   Cum SA (acres)             18.21     188.71     110.06


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #full flow
```

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1563.65 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.19 | Wt. n-Val. | 0.050 | 0.045 | 0.050 |
| W.S. Elev (ft) | 1563.46 | Reach Len. (ft) | 650.00 | 597.30 | 660.00 |
| Crit W.S. (ft) | 1562.42 | Flow Area (sq ft) | 320.36 | 3013.24 | 771.55 |
| E.G. Slope (ft/ft) | 0.004382 | Area (sq ft) | 320.36 | 3013.24 | 771.55 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 995.74 | 11231.31 | 1772.95 |
| Top Width (ft) | 2765.15 | Top Width (ft) | 160.41 | 1348.46 | 1256.28 |
| Vel Total (ft/s) | 3.41 | Avg. Vel. (ft/s) | 3.11 | 3.73 | 2.30 |
| Max Chl Dpth (ft) | 8.29 | Hydr. Depth (ft) | 2.00 | 2.23 | 0.61 |
| Conv. Total (cfs) | 211491.9 | Conv. (cfs) | 15042.2 | 169666.4 | 26783.2 |
| Length Wtd. (ft) | 608.26 | Wetted Per. (ft) | 161.31 | 1353.21 | 1257.99 |
| Min Ch El (ft) | 1555.17 | Shear (lb/sq ft) | 0.54 | 0.61 | 0.17 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 1.69 | 2.27 | 0.39 |
| Frctn Loss (ft) | 3.64 | Cum Volume (acre-ft) | 35.75 | 1019.82 | 289.70 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 29.73 | 200.89 | 203.90 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9661.35 | 9798.97 | 35.88 | 17.60 | 20.42 | 0.77 | 0.87 | 2.04 |
| 9798.97 | 9936.59 | 153.99 | 85.84 | 120.63 | 3.30 | 0.71 | 1.79 |
| LB 9936.59 | 10206.28 | 2021.25 | 492.23 | 176.52 | 43.31 | 2.83 | 4.11 |
| 10206.28 | 10475.97 | 310.69 | 142.99 | 133.22 | 6.66 | 1.08 | 2.17 |
| 10475.97 | 10745.67 | 1091.86 | 403.24 | 270.06 | 23.40 | 1.50 | 2.71 |
| 10745.67 | 11015.36 | 112.62 | 86.38 | 173.14 | 2.41 | 0.50 | 1.30 |
| 11015.36 | RB 11285.05 | 254.06 | 168.08 | 269.90 | 5.44 | 0.62 | 1.51 |
| 11285.05 | 11855.46 | 686.65 | 202.37 | 112.99 | 14.71 | 1.81 | 3.39 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9661.35 | 9798.97 | 98.95 | 35.43 | 22.22 | 1.06 | 1.63 | 2.79 |
| 9798.97 | 9936.59 | 522.79 | 199.67 | 137.96 | 5.60 | 1.45 | 2.62 |
| LB 9936.59 | 10206.28 | 2741.80 | 689.15 | 272.65 | 29.38 | 2.56 | 3.98 |
| 10206.28 | 10475.97 | 764.78 | 298.21 | 227.97 | 8.19 | 1.31 | 2.56 |
| 10475.97 | 10745.67 | 2390.23 | 632.27 | 270.06 | 25.61 | 2.34 | 3.78 |
| 10745.67 | 11015.36 | 650.41 | 289.45 | 269.79 | 6.97 | 1.07 | 2.25 |
| 11015.36 | RB 11285.05 | 1101.46 | 397.11 | 269.90 | 11.80 | 1.47 | 2.77 |
| 11285.05 | 11855.46 | 1046.90 | 312.85 | 154.54 | 11.22 | 2.04 | 3.35 |
| 11855.46 | 12425.87 | | | | | | |
| 12425.87 | 12996.27 | 5.17 | 10.88 | 100.48 | 0.06 | 0.11 | 0.47 |
| 12996.27 | 14137.09 | | | | | | |
| 14137.09 | 14707.50 | 10.52 | 15.69 | 86.58 | 0.11 | 0.18 | 0.67 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9661.35 | 9798.97 | 149.02 | 47.31 | 23.35 | 1.06 | 2.08 | 3.15 |
| 9798.97 | 9936.59 | 846.72 | 273.05 | 137.96 | 6.05 | 1.98 | 3.10 |
| LB 9936.59 | 10206.28 | 3673.59 | 832.95 | 272.65 | 26.24 | 3.09 | 4.41 |
| 10206.28 | 10475.97 | 1226.19 | 430.05 | 270.81 | 8.76 | 1.59 | 2.85 |
| 10475.97 | 10745.67 | 3285.88 | 776.07 | 270.06 | 23.47 | 2.88 | 4.23 |
| 10745.67 | 11015.36 | 1244.54 | 433.25 | 269.79 | 8.89 | 1.61 | 2.87 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11015.36 | RB 11285.05 | 1801.10 | 540.91 | 269.90 | 12.87 | 2.01 | 3.33 |
| 11285.05 | 11855.46 | 1380.34 | 399.15 | 171.92 | 9.86 | 2.34 | 3.46 |
| 11855.46 | 12425.87 | 0.06 | 0.49 | 32.09 | 0.00 | 0.02 | 0.12 |
| 12425.87 | 12996.27 | 201.97 | 170.34 | 365.46 | 1.44 | 0.47 | 1.19 |
| 12996.27 | 13566.68 | | | | | | |
| 13566.68 | 14137.09 | 0.54 | 2.22 | 51.46 | 0.00 | 0.04 | 0.24 |
| 14137.09 | 14707.50 | 188.81 | 195.51 | 570.57 | 1.35 | 0.34 | 0.97 |
| 14707.50 | 15277.91 | 0.78 | 2.93 | 59.42 | 0.01 | 0.05 | 0.27 |
| 15277.91 | 15848.31 | 0.47 | 0.92 | 7.08 | 0.00 | 0.13 | 0.51 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.704

INPUT
Description:
Station Elevation Data num= 230

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8290 | 1562 | 9250 | 1560.8 | 9425.72 | 1560 | 9448.76 | 1560 | 9495.62 | 1560.8 |
| 9510.04 | 1561.27 | 9534.47 | 1560.65 | 9535.91 | 1560 | 9540.31 | 1558 | 9544.95 | 1556 |
| 9548.68 | 1554.4 | 9563.07 | 1554.98 | 9565 | 1554 | 9568.75 | 1552 | 9569.34 | 1551.68 |
| 9570.48 | 1551.82 | 9593.58 | 1551.82 | 9593.87 | 1552 | 9594.96 | 1552.67 | 9598.2 | 1552 |
| 9598.67 | 1551.9 | 9598.8 | 1552 | 9601.25 | 1554 | 9603.69 | 1556 | 9606.14 | 1558 |
| 9608.63 | 1560 | 9610.11 | 1561.06 | 9616.07 | 1561.38 | 9617.14 | 1562 | 9620.45 | 1564 |
| 9623.76 | 1566 | 9627.07 | 1568 | 9630.38 | 1570 | 9633.69 | 1572 | 9635.64 | 1573.18 |
| 9639.46 | 1572.27 | 9651.73 | 1572.13 | 9652.61 | 1572 | 9657.84 | 1571.2 | 9659.81 | 1570 |
| 9663.24 | 1568 | 9666.87 | 1566 | 9670.5 | 1564 | 9674.13 | 1562 | 9676.9 | 1560.47 |
| 9715.97 | 1560 | 9780.71 | 1559.1 | 9788.34 | 1558 | 9797.29 | 1556.86 | 9804.71 | 1558 |
| 9809.59 | 1558.78 | 9825.43 | 1558.07 | 9825.92 | 1558 | 9841.2 | 1556.26 | 9849.52 | 1557.36 |
| 9860.91 | 1558 | 9876.9 | 1558.89 | 9894.21 | 1559.22 | 9946.66 | 1558 | 9957.49 | 1556.52 |
| 9958.55 | 1556 | 9962.66 | 1554 | 9965.01 | 1552.99 | 9973.76 | 1552.8 | 9979.43 | 1552.05 |
| 9992 | 1552.7 | 9996.56 | 1552 | 10000 | 1551.52 | 10007.65 | 1552 | 10018.58 | 1552.68 |
| 10036.83 | 1552.82 | 10038.85 | 1554 | 10042.29 | 1556 | 10045.72 | 1558 | 10055.59 | 1558.77 |
| 10176.29 | 1559.48 | 10271.23 | 1559.31 | 10280.45 | 1558 | 10284.8 | 1557.37 | 10290.11 | 1558 |
| 10303.02 | 1559.46 | 10451.34 | 1559.13 | 10453.92 | 1558 | 10458.59 | 1556 | 10459.72 | 1555.61 |
| 10477.71 | 1556 | 10486.3 | 1556.16 | 10541.27 | 1557.06 | 10588.53 | 1556.26 | 10614.09 | 1557.11 |
| 10661.52 | 1557.04 | 10680.8 | 1556.34 | 10719.83 | 1556.46 | 10725.48 | 1556 | 10738.81 | 1554.92 |
| 10748.09 | 1556 | 10763.74 | 1557.76 | 10793.57 | 1557.48 | 10814.28 | 1557.32 | 10824.07 | 1556 |
| 10824.19 | 1555.99 | 10824.82 | 1556 | 10845.02 | 1556.51 | 10882.15 | 1556.65 | 10892.05 | 1557.64 |
| 10901.84 | 1558 | 10902.91 | 1558.03 | 10912.06 | 1560 | 10913.44 | 1560.24 | 10936.26 | 1559.8 |
| 10953.87 | 1558.77 | 10981.89 | 1559.85 | 11003.16 | 1559.98 | 11003.82 | 1560 | 11032.43 | 1560.82 |
| 11103.11 | 1562 | 11111.59 | 1562 | 11124.02 | 1562 | 11139.33 | 1562 | 11189.4 | 1561.84 |
| 11203.66 | 1560 | 11219 | 1558 | 11228.89 | 1556.71 | 11239.28 | 1556.11 | 11251.46 | 1558 |
| 11264.05 | 1559.85 | 11265.34 | 1560 | 11284.63 | 1562 | 11294.17 | 1563 | 11311.92 | 1562 |
| 11313.74 | 1561.91 | 11334.16 | 1561.38 | 11383.68 | 1561.47 | 11395.05 | 1560 | 11421.11 | 1559.39 |
| 11442.01 | 1558.04 | 11477.75 | 1558.96 | 11496.32 | 1558.74 | 11503.48 | 1558 | 11505.21 | 1557.86 |
| 11535.33 | 1557.83 | 11549.04 | 1557.19 | 11558.07 | 1558 | 11575.07 | 1559.26 | 11608.81 | 1560 |
| 11618.95 | 1560.29 | 11621.53 | 1560 | 11631.28 | 1558.91 | 1643.24 | 1559.86 | 11662.39 | 1559.56 |
| 11686.62 | 1558.98 | 11702.5 | 1558 | 11707.45 | 1557.71 | 1719.68 | 1557.83 | 11722.4 | 1558 |
| 11787.91 | 1560 | 11815.64 | 1560.51 | 11826.93 | 1560.01 | 11850.46 | 1561.42 | 12061.5 | 1561.06 |
| 12075.58 | 1560.21 | 2086.11 | 1560.04 | 12087.16 | 1560 | 12096.43 | 1559.17 | 12106.92 | 1560 |
| 12111.1 | 1560.33 | 12148.32 | 1560.69 | 12400.74 | 1562 | 12434.36 | 1562.36 | 12446.61 | 1562 |
| 12450.16 | 1561.87 | 12488.99 | 1561 | 12500.79 | 1560 | 12503.75 | 1559.76 | 12511.82 | 1559.65 |
| 12582.78 | 1559.31 | 2607.61 | 1559.77 | 12617.71 | 1559.56 | 12698.96 | 1559.48 | 12722.17 | 1560 |
| 12733.04 | 1560.45 | 13311.46 | 1560.91 | 3443.95 | 1560.84 | 13450.5 | 1560.54 | 13468.26 | 1560.55 |
| 13473.11 | 1560 | 13479.26 | 1559.31 | 13485.67 | 1560 | 13492.97 | 1560.72 | 13508.06 | 1561.15 |
| 13516.4 | 1560.58 | 13947.47 | 1560.44 | 13955.32 | 1560 | 13956.89 | 1559.91 | 3959.12 | 1560 |
| 13969.91 | 1560.49 | 14139.85 | 1560.42 | 14155.98 | 1560 | 14199.74 | 1559.01 | 14230.13 | 1559.7 |
| 14255.82 | 1559.87 | 14282.06 | 1558.01 | 14327.02 | 1559.45 | 14346.03 | 1560 | 14358.44 | 1560 |
| 14444.63 | 1560 | 14471.67 | 1560 | 14555.79 | 1560 | 15737.97 | 1562 | 15756.37 | 1562 |
| 15817.42 | 1562 | 15855.04 | 1562 | 15915.43 | 1562 | 16015.51 | 1562.21 | 6026.24 | 1562 |
| 16049.6 | 1561.81 | 6072.03 | 1562 | 16091.41 | 1562 | 16093.41 | 1564.11 | 6102.23 | 1564 |
| 16117.88 | 1563.81 | 16139.74 | 1563.39 | 16145.11 | 1563.46 | 16157.23 | 1563.23 | 16184 | 1563.72 |
| 16373.29 | 1563.73 | 16432.18 | 1562 | 16584.53 | 1562 | 16705.73 | 1562.16 | 16731.01 | 1562.22 |

Manning's n Values num= 6

| Sta | n Val | Sta | n Val | Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|---|---|---|---|
| 8290 | .04 | 9510.04 | .03 | 9894.21 | .03 | 10055.59 | .05 | 10459.72 | .035 |
| 10902.91 | .05 | | | | | | | | |

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9894.2110913.44              680     676     500             .1       .3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8290 9620.45    156416091.9416731.01 1562.36
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1558.08 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.42 | Wt. n-Val. | 0.030 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1557.67 | Reach Len. (ft) | 680.00 | 676.00 | 500.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 21.29 | 865.47 | 28.14 |
| E.G. Slope (ft/ft) | 0.008091 | Area (sq ft) | 21.29 | 865.47 | 28.14 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 65.86 | 4537.56 | 63.58 |
| Top Width (ft) | 608.65 | Top Width (ft) | 37.67 | 527.73 | 43.25 |
| Vel Total (ft/s) | 5.10 | Avg. Vel. (ft/s) | 3.09 | 5.24 | 2.26 |
| Max Chl Dpth (ft) | 6.15 | Hydr. Depth (ft) | 0.57 | 1.64 | 0.65 |
| Conv. Total (cfs) | 51883.5 | Conv. (cfs) | 732.2 | 50444.5 | 706.8 |
| Length Wtd. (ft) | 658.55 | Wetted Per. (ft) | 37.95 | 530.96 | 43.48 |
| Min Ch El (ft) | 1551.52 | Shear (lb/sq ft) | 0.28 | 0.82 | 0.33 |
| Alpha | 1.03 | Stream Power (lb/ft s) | 0.88 | 4.32 | 0.74 |
| Frctn Loss (ft) | 3.91 | Cum Volume (acre-ft) | 2.80 | 545.67 | 89.54 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 1.68 | 156.59 | 64.10 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1559.11 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.67 | Wt. n-Val. | 0.030 | 0.036 | 0.050 |
| W.S. Elev (ft) | 1558.44 | Reach Len. (ft) | 680.00 | 676.00 | 500.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 63.45 | 1300.52 | 117.37 |
| E.G. Slope (ft/ft) | 0.009273 | Area (sq ft) | 63.45 | 1300.52 | 117.37 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 272.95 | 8766.62 | 293.43 |
| Top Width (ft) | 852.01 | Top Width (ft) | 73.77 | 592.10 | 186.13 |
| Vel Total (ft/s) | 6.30 | Avg. Vel. (ft/s) | 4.30 | 6.74 | 2.50 |
| Max Chl Dpth (ft) | 6.92 | Hydr. Depth (ft) | 0.86 | 2.20 | 0.63 |
| Conv. Total (cfs) | 96921.8 | Conv. (cfs) | 2834.6 | 91040.1 | 3047.2 |
| Length Wtd. (ft) | 641.19 | Wetted Per. (ft) | 74.21 | 595.78 | 186.61 |
| Min Ch El (ft) | 1551.52 | Shear (lb/sq ft) | 0.49 | 1.26 | 0.36 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 2.13 | 8.52 | 0.91 |
| Frctn Loss (ft) | 3.70 | Cum Volume (acre-ft) | 13.22 | 808.88 | 163.14 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 16.47 | 175.70 | 106.08 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT  Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1559.99 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.42 | Wt. n-Val. | 0.030 | 0.041 | 0.050 |
| W.S. Elev (ft) | 1559.57 | Reach Len. (ft) | 680.00 | 676.00 | 500.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 183.88 | 2122.77 | 503.72 |
| E.G. Slope (ft/ft) | 0.008660 | Area (sq ft) | 183.88 | 2122.77 | 503.72 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 980.63 | 11560.41 | 1458.96 |
| Top Width (ft) | 1843.24 | Top Width (ft) | 147.21 | 1015.85 | 680.19 |
| Vel Total (ft/s) | 4.98 | Avg. Vel. (ft/s) | 5.33 | 5.45 | 2.90 |
| Max Chl Dpth (ft) | 8.05 | Hydr. Depth (ft) | 1.25 | 2.09 | 0.74 |
| Conv. Total (cfs) | 150440.7 | Conv. (cfs) | 10537.6 | 124225.5 | 15677.7 |
| Length Wtd. (ft) | 628.72 | Wetted Per. (ft) | 147.75 | 1019.93 | 681.19 |
| Min Ch El (ft) | 1551.52 | Shear (lb/sq ft) | 0.67 | 1.13 | 0.40 |
| Alpha | 1.10 | Stream Power (lb/ft s) | 3.59 | 6.13 | 1.16 |
| Frctn Loss (ft) | 3.91 | Cum Volume (acre-ft) | 31.98 | 984.61 | 280.04 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 27.43 | 184.68 | 189.23 |

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9733.79 | 9894.21 | 65.86 | 21.29 | 37.95 | 1.41 | 0.57 | 3.09 |
| LB 9894.21 | 10098.06 | 3216.28 | 422.81 | 98.41 | 68.92 | 4.40 | 7.61 |
| 10098.06 | 10301.90 | 0.38 | 0.67 | 4.57 | 0.01 | 0.15 | 0.56 |
| 10301.90 | 10505.75 | 298.19 | 78.62 | 51.46 | 6.39 | 1.54 | 3.79 |
| 10505.75 | 10709.59 | 513.34 | 188.15 | 203.89 | 11.00 | 0.92 | 2.73 |
| 10709.59 | RB 10913.44 | 509.38 | 175.22 | 172.63 | 10.91 | 1.02 | 2.91 |
| 10913.44 | 11495.20 | 59.80 | 24.46 | 27.95 | 1.28 | 0.88 | 2.45 |
| 11495.20 | 12076.95 | 3.78 | 3.69 | 15.53 | 0.08 | 0.24 | 1.02 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9733.79 | 9894.21 | 272.95 | 63.45 | 74.21 | 2.92 | 0.86 | 4.30 |
| LB 9894.21 | 10098.06 | 4601.19 | 504.31 | 126.08 | 49.30 | 4.08 | 9.12 |
| 10098.06 | 10301.90 | 14.56 | 8.82 | 16.77 | 0.16 | 0.53 | 1.65 |
| 10301.90 | 10505.75 | 730.47 | 118.80 | 53.41 | 7.83 | 2.25 | 6.15 |
| 10505.75 | 10709.59 | 1780.99 | 345.84 | 203.89 | 19.08 | 1.70 | 5.15 |
| 10709.59 | RB 10913.44 | 1639.42 | 322.74 | 195.64 | 17.57 | 1.65 | 5.08 |
| 10913.44 | 11495.20 | 162.18 | 54.50 | 60.83 | 1.74 | 0.90 | 2.98 |
| 11495.20 | 12076.95 | 126.46 | 58.69 | 106.30 | 1.35 | 0.55 | 2.15 |
| 12076.95 | 13822.22 | | | | | | |
| 13822.22 | 14403.98 | 4.79 | 4.18 | 19.48 | 0.05 | 0.21 | 1.15 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9733.79 | 9894.21 | 980.63 | 183.88 | 147.75 | 7.00 | 1.25 | 5.33 |
| LB 9894.21 | 10098.06 | 4584.53 | 701.38 | 206.37 | 32.75 | 3.44 | 6.54 |
| 10098.06 | 10301.90 | 76.84 | 78.67 | 204.10 | 0.55 | 0.39 | 0.98 |
| 10301.90 | 10505.75 | 1033.24 | 220.48 | 204.57 | 7.38 | 1.08 | 4.69 |
| 10505.75 | 10709.59 | 3033.30 | 576.07 | 203.89 | 21.67 | 2.83 | 5.27 |
| 10709.59 | RB 10913.44 | 2832.50 | 546.18 | 201.00 | 20.23 | 2.72 | 5.19 |
| 10913.44 | 11495.20 | 580.18 | 186.11 | 171.82 | 4.14 | 1.09 | 3.12 |
| 11495.20 | 12076.95 | 714.24 | 232.92 | 220.42 | 5.10 | 1.06 | 3.07 |
| 12076.95 | 12658.71 | 7.97 | 12.29 | 119.58 | 0.06 | 0.10 | 0.65 |
| 12658.71 | 13240.47 | 1.43 | 2.94 | 44.21 | 0.01 | 0.07 | 0.49 |
| 13240.47 | 13822.22 | 0.46 | 0.61 | 4.74 | 0.00 | 0.13 | 0.75 |
| 13822.22 | 14403.98 | 154.68 | 68.85 | 120.44 | 1.10 | 0.57 | 2.25 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.576

INPUT
Description:
Station Elevation Data num= 170

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|

```
 7949.55 1558.07 8249.89 1558.71 8318.31 1559.52 9197.79    1558 9202.82    1556
  9255.6    1556 9267.65 1557.49 9300.95 1556.61 9311.01    1556  9313.2 1555.87
 9317.97    1554 9322.69  1552.5 9336.82    1554 9338.33 1554.07  9338.6    1554
 9344.72 1552.96 9348.42 1553.24 9349.06    1552  9350.1    1550 9351.13    1548
 9352.17    1546 9353.49    1544 9353.57 1543.92 9370.26 1543.92 9370.35    1544
 9372.61    1546 9374.66    1548 9376.29    1550 9377.92 1551.99 9377.94    1552
 9383.31    1554 9387.59    1556 9391.18 1557.75 9392.52 1557.14 9409.38    1557
 9415.51    1556 9416.46    1556 9423.24  1556.7 9452.78 1557.01 9515.44 1556.72
 9575.64    1556 9606.18    1556 9612.32 1556.49 9636.65    1556 9727.81    1556
 9789.71    1556 9951.33 1554.86 9952.82    1554 9956.27    1552 9957.36 1551.35
 9964.55 1550.38 9972.02    1552 9979.15 1553.53 9989.05  1553.2 9993.62    1552
10000.73 1550.0510005.99    155010050.28 1549.24 10071.2    154810073.35 1547.87
10073.71    154810079.64    155010083.23 1551.2110095.85 1550.7610100.27    1550
10100.69 1549.9410101.54    155010120.03 1551.2510135.89 1550.5210144.65 1550.95
10146.79    155210150.86    155410154.68 1555.9310158.23    155610168.15    1556
10265.76 1555.4510272.63    155410275.46 1553.41 10440.3    155410513.38 1554.48
10544.08 1554.0110565.42 1554.8710608.51    155410623.82 1553.6710643.42    1554
10660.18 1554.35 10705.7 1554.1110707.14    155410726.76 1552.5110745.27 1553.63
10761.96 1552.5710794.96 1553.9310815.19 1552.4910888.89 1552.4511062.08 1552.34
11078.27 1553.4411109.65  1553.811110.73    155411121.72    155611123.09 1556.25
11124.22    155611133.17    155411136.17 1553.3311204.06 1552.7511213.66    1554
11220.68 1554.9111230.95    155611232.42 1556.16 11233.4    155611246.31 1554.13
11283.08 1555.8311313.37    155611417.29 1557.5311431.37 1556.7311443.09 1557.57
11528.37 1557.1711549.56 1556.22 11555.5    155611590.61 1555.7811592.76    1556
11614.07    155811625.52 1558.8511836.92 1558.3411838.88    1558 11850.2 1556.22
11863.63 1557.96 11868.5    155811886.62  1558.2 11891.9    155811901.53 1557.83
12098.06  1557.712110.96    155812469.79 1558.6812597.72  1558.212600.16    1558
12618.44 1556.5212641.78 1557.4412749.86  1557.812759.79    155812765.22 1558.13
12804.09 1558.1512830.84    1558 12915.9  1557.512962.13 1556.5112993.41 1557.09
13016.45    155613018.64 1555.9213023.06    155613066.27 1557.1413103.51 1557.75
13105.17    155813221.36 1559.38 13607.9 1558.5713650.62 1558.3614186.05    1558
 14601.8    155814694.59    155814833.57    1558 15200.9 1558.9515250.63 1559.09
15280.99    156015657.07    156015772.48    1560 15951.1 1561.5115953.85    1562
15957.76 1562.62 15981.1  1562.115987.73    156216023.72    1562 16025.7 1562.08

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7949.55     .05 9951.33    .03510168.15     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.3310168.15              560   553.2    1000             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7949.55 9453.88 1557.7611444.82 16025.7 1557.62
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 7949.55    9564    1556

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1554.16   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.48   Wt. n-Val.                            0.035      0.050
  W.S. Elev (ft)            1553.68   Reach Len. (ft)            560.00    553.20    1000.00
  Crit W.S. (ft)            1553.26   Flow Area (sq ft)                    622.26     438.57
  E.G. Slope (ft/ft)       0.004554   Area (sq ft)                         622.26     438.57
  Q Total (cfs)             4667.00   Flow (cfs)                          3803.72     863.28
  Top Width (ft)             728.70   Top Width (ft)                       196.83     531.87
  Vel Total (ft/s)             4.40   Avg. Vel. (ft/s)                       6.11       1.97
  Max Chl Dpth (ft)            5.81   Hydr. Depth (ft)                       3.16       0.82
  Conv. Total (cfs)         69157.8   Conv. (cfs)                         56365.3    12792.5
  Length Wtd. (ft)           672.73   Wetted Per. (ft)                     199.66     532.22
  Min Ch El (ft)            1547.87   Shear (lb/sq ft)                       0.89       0.23
  Alpha                        1.61   Stream Power (lb/ft s)                 5.42       0.46
  Frctn Loss (ft)              3.78   Cum Volume (acre-ft)         2.63    534.13      86.86
  C & E Loss (ft)              0.00   Cum SA (acres)               1.39    150.97      60.80


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1555.37   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.51   Wt. n-Val.                            0.035      0.050
  W.S. Elev (ft)            1554.86   Reach Len. (ft)            560.00    553.20    1000.00
```

| | | | | | |
|---|---|---|---|---|---|
| Crit W.S. (ft) | 1554.43 | Flow Area (sq ft) | | 857.18 | 1373.87 |
| E.G. Slope (ft/ft) | 0.003931 | Area (sq ft) | | 857.18 | 1373.87 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 5928.51 | 3404.49 |
| Top Width (ft) | 1159.05 | Top Width (ft) | | 201.23 | 957.82 |
| Vel Total (ft/s) | 4.18 | Avg. Vel. (ft/s) | | 6.92 | 2.48 |
| Max Chl Dpth (ft) | 6.99 | Hydr. Depth (ft) | | 4.26 | 1.43 |
| Conv. Total (cfs) | 148858.0 | Conv. (cfs) | | 94557.6 | 54300.4 |
| Length Wtd. (ft) | 744.67 | Wetted Per. (ft) | | 204.66 | 958.73 |
| Min Ch El (ft) | 1547.87 | Shear (lb/sq ft) | | 1.03 | 0.35 |
| Alpha | 1.86 | Stream Power (lb/ft s) | | 7.11 | 0.87 |
| Frctn Loss (ft) | 4.13 | Cum Volume (acre-ft) | 12.72 | 792.14 | 154.58 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 15.89 | 169.54 | 99.51 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1556.06 | Element | | | |
| Vel Head (ft) | 0.65 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1555.41 | Reach Len. (ft) | 560.00 | 553.20 | 1000.00 |
| Crit W.S. (ft) | 1555.06 | Flow Area (sq ft) | 21.39 | 968.24 | 1909.45 |
| E.G. Slope (ft/ft) | 0.004683 | Area (sq ft) | 21.39 | 968.24 | 1909.45 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 18.38 | 7896.12 | 6085.50 |
| Top Width (ft) | 1267.74 | Top Width (ft) | 77.88 | 202.32 | 987.54 |
| Vel Total (ft/s) | 4.83 | Avg. Vel. (ft/s) | 0.86 | 8.16 | 3.19 |
| Max Chl Dpth (ft) | 7.54 | Hydr. Depth (ft) | 0.27 | 4.79 | 1.93 |
| Conv. Total (cfs) | 204583.1 | Conv. (cfs) | 268.6 | 115386.6 | 88928.0 |
| Length Wtd. (ft) | 781.69 | Wetted Per. (ft) | 77.88 | 205.88 | 988.71 |
| Min Ch El (ft) | 1547.87 | Shear (lb/sq ft) | 0.08 | 1.37 | 0.56 |
| Alpha | 1.80 | Stream Power (lb/ft s) | 0.07 | 11.21 | 1.80 |
| Frctn Loss (ft) | 4.01 | Cum Volume (acre-ft) | 30.38 | 960.62 | 266.19 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 25.68 | 175.23 | 179.66 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9951.33 | 9994.69 | 200.39 | 59.94 | 42.55 | 4.29 | 1.45 | 3.34 |
| 9994.69 | 10038.06 | 1043.71 | 162.91 | 43.59 | 22.36 | 3.76 | 6.41 |
| 10038.06 | 10081.42 | 1549.13 | 206.97 | 43.86 | 33.19 | 4.77 | 7.48 |
| 10081.42 | 10124.79 | 687.65 | 126.83 | 43.59 | 14.73 | 2.92 | 5.42 |
| 10124.79 | RB 10168.15 | 322.84 | 65.60 | 26.08 | 6.92 | 2.58 | 4.92 |
| 10168.15 | 10753.91 | 28.97 | 33.30 | 119.89 | 0.62 | 0.28 | 0.87 |
| 10753.91 | 11339.66 | 834.31 | 405.28 | 412.33 | 17.88 | 0.98 | 2.06 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9951.33 | 9994.69 | 507.26 | 109.92 | 44.91 | 5.44 | 2.53 | 4.61 |
| 9994.69 | 10038.06 | 1571.91 | 214.10 | 43.59 | 16.84 | 4.94 | 7.34 |
| 10038.06 | 10081.42 | 2138.60 | 258.15 | 43.86 | 22.91 | 5.95 | 8.28 |
| 10081.42 | 10124.79 | 1155.70 | 178.01 | 43.59 | 12.38 | 4.11 | 6.49 |
| 10124.79 | RB 10168.15 | 555.04 | 97.00 | 28.71 | 5.95 | 3.49 | 5.72 |
| 10168.15 | 10753.91 | 739.14 | 441.05 | 484.82 | 7.92 | 0.91 | 1.68 |
| 10753.91 | 11339.66 | 2665.35 | 932.82 | 473.91 | 28.56 | 1.97 | 2.86 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9751.15 | 9951.33 | 18.38 | 21.39 | 77.88 | 0.13 | 0.27 | 0.86 |
| LB 9951.33 | 9994.69 | 774.64 | 133.78 | 44.91 | 5.53 | 3.09 | 5.79 |
| 9994.69 | 10038.06 | 2063.39 | 237.96 | 43.59 | 14.74 | 5.49 | 8.67 |
| 10038.06 | 10081.42 | 2727.62 | 282.02 | 43.86 | 19.48 | 6.50 | 9.67 |
| 10081.42 | 10124.79 | 1568.79 | 201.88 | 43.59 | 11.21 | 4.66 | 7.77 |
| 10124.79 | RB 10168.15 | 761.67 | 112.59 | 29.93 | 5.44 | 3.90 | 6.76 |
| 10168.15 | 10753.91 | 1774.65 | 708.91 | 488.32 | 12.68 | 1.45 | 2.50 |
| 10753.91 | 11339.66 | 4310.85 | 1200.55 | 500.39 | 30.79 | 2.40 | 3.59 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.471

INPUT
Description:
Station Elevation Data num= 199

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8029.49 | 1554.73 | 8145.6 | 1554.75 | 8151.42 | 1555.33 | 8158.37 | 1554.66 | 8171.08 | 1555.08 |
| 9279.64 | 1555.13 | 9297.47 | 1555.18 | 9379.3 | 1554 | 9458.2 | 1553.99 | 9458.3 | 1554 |
| 9475.48 | 1555.38 | 9477.41 | 1556 | 9483.28 | 1558 | 9485.32 | 1558.69 | 9501.45 | 1559.2 |
| 9503.95 | 1559.31 | 9506.62 | 1558 | 9510.72 | 1556 | 9514.83 | 1554 | 9518.93 | 1552 |
| 9523.03 | 1550 | 9527.14 | 1548 | 9528.3 | 1547.44 | 9530.81 | 1548 | 9533.3 | 1548.57 |
| 9546.42 | 1549.4 | 9549.99 | 1548 | 9551.9 | 1547.24 | 9553.57 | 1546 | 9556.29 | 1544 |
| 9557.08 | 1543.42 | 9564.83 | 1543.96 | 9564.9 | 1544 | 9567.85 | 1546 | 9570.78 | 1548 |
| 9570.88 | 1548.07 | 9575.49 | 1550 | 9580.32 | 1552 | 9584.09 | 1553.53 | 9597 | 1553.33 |
| 9604.51 | 1552 | 9605.92 | 1551.77 | 9606.98 | 1552 | 9611.1 | 1552.94 | 9679.31 | 1553.97 |
| 9679.59 | 1554 | 9687.12 | 1554.83 | 9743.9 | 1554.68 | 9759.9 | 1554 | 9784.81 | 1552.94 |
| 9802.68 | 1554 | 9804.28 | 1554.08 | 9847.72 | 1554.05 | 9850.48 | 1554 | 9898.9 | 1553.07 |
| 9905.31 | 1552 | 9909.45 | 1550 | 9913.6 | 1548 | 9916.95 | 1546 | 9917.15 | 1545.86 |
| 9924.12 | 1545.08 | 9936.35 | 1546 | 9950.95 | 1547.1 | 9985.12 | 1547.68 | 9995.26 | 1546.08 |
| 10030.08 | 154 | 710035.42 | 1548 | 10040.4 | 1548.96 | 10064.74 | 1548.55 | 10068.43 | 1548 |
| 10071.52 | 1547.43 | 10072.49 | 154 | 810075.89 | 155 | 010079.32 | 1552 | 10080.5 | 1552.62 |
| 10129.8 | 1552.15 | 10157.39 | 155 | 410171.29 | 155 | 410183.05 | 1553.27 | 10189.96 | 1552 |
| 10204.01 | 155 | 010219.28 | 154 | 810232.74 | 154 | 610235.25 | 1545.62 | 10238.18 | 1544 |
| 10241.81 | 154 | 210245.44 | 154 | 010249.07 | 153 | 810252.69 | 153 | 610256.32 | 1534 |
| 10260.06 | 153 | 210264.07 | 153 | 010268.03 | 152 | 810271.65 | 152 | 610275.28 | 1524 |
| 10277.77 | 1522.63 | 10287.13 | 152 | 210298.09 | 1521.51 | 10303.93 | 152 | 010310.78 | 1518 |
| 10311.55 | 1517.73 | 10336.1 | 151 | 810339.62 | 1518.05 | 10347.96 | 152 | 010349.71 | 1520 |
| 10356.53 | 152 | 010366.82 | 152 | 010380.93 | 1519.43 | 10412.74 | 1520 | 10525.8 | 1521.69 |
| 10531.42 | 152 | 210622.07 | 1523.21 | 10642.1 | 152 | 210729.58 | 152 | 010749.98 | 1519.53 |
| 10754 | 152 | 010766.48 | 152 | 210777.35 | 152 | 410781.13 | 152 | 610784.91 | 1528 |
| 10788.69 | 153 | 010792.58 | 153 | 210798.37 | 153 | 410801.94 | 1535.02 | 10803.04 | 1536 |
| 10805.1 | 1538 | 10807 | 154 | 010808.55 | 1541.62 | 10814.11 | 154 | 210832.55 | 1543.07 |
| 10840.56 | 154 | 410850.52 | 1545.18 | 10872.8 | 154 | 610949.74 | 154 | 810977.73 | 1548.51 |
| 11050.36 | 155 | 011096.85 | 155 | 211145.56 | 155 | 411182.37 | 1555.32 | 11184.17 | 1556 |
| 11189.46 | 1558 | 11199.3 | 156 | 011203.56 | 1560.79 | 11217.07 | 1560.44 | 11217.9 | 1560 |
| 11221.66 | 155 | 811224.61 | 155 | 611227.05 | 155 | 411229.51 | 155 | 211232.13 | 1550 |
| 11235.3 | 154 | 811237.33 | 1546.77 | 11238.78 | 154 | 611246.22 | 1544.17 | 11264.32 | 1544.63 |
| 11266.86 | 154 | 611270.56 | 154 | 811274.26 | 155 | 011277.96 | 155 | 211281.05 | 1553.74 |
| 11287.37 | 155 | 411295.42 | 155 | 411337.22 | 1553.71 | 11376.72 | 155 | 411430.79 | 1554.68 |
| 11444.34 | 1554.64 | 11501.21 | 1554.81 | 11972.88 | 155 | 612287.32 | 1556.06 | 12431.19 | 1556.48 |
| 12597.54 | 1556.47 | 12603.79 | 1556.95 | 12633.86 | 1557.14 | 12732.07 | 1556.97 | 12988.58 | 1557.46 |
| 13083.65 | 155 | 813569.24 | 1559.78 | 14256.64 | 155 | 814928.48 | 155 | 615149.12 | 1556 |
| 15245.7 | 155 | 615257.56 | 155 | 615685.13 | 155 | 615705.94 | 155 | 615710.75 | 1556 |
| 15968.44 | 1555.68 | 16062.85 | 1554.58 | 16080.45 | 1554.47 | 16155.78 | 155 | 616160.59 | 1558 |
| 16162.05 | 1558.61 | 16180.09 | 1558.51 | 16183.33 | 155 | 816199.02 | 1556.03 | 16215.07 | 1558 |
| 16220.72 | 1558.77 | 16235.13 | 1558.99 | 16260.25 | 1559.19 | 16275.35 | 1559.33 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8029.49 | .05 | 9898.9 | .03 | 10171.29 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9898.9 | 10171.29 | 780 | 803.3 | 800 | .1 | .3 |

Ineffective Flow num= 2

```
  Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8029.49 9687.12 1554.8311130.5616275.35    1554
Blocked Obstructions      num=       3
  Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 9279.64 9687.12 1554.8310186.2911096.85    154911203.5616275.35    1554
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1550.38 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.50 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1549.89 | Reach Len. (ft) | 780.00 | 803.30 | 800.00 |
| Crit W.S. (ft) | 1549.89 | Flow Area (sq ft) | | 443.99 | 721.42 |
| E.G. Slope (ft/ft) | 0.007105 | Area (sq ft) | | 443.99 | 721.42 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 3034.17 | 1632.83 |
| Top Width (ft) | 1005.89 | Top Width (ft) | | 166.01 | 839.88 |
| Vel Total (ft/s) | 4.00 | Avg. Vel. (ft/s) | | 6.83 | 2.26 |
| Max Chl Dpth (ft) | 4.81 | Hydr. Depth (ft) | | 2.67 | 0.86 |
| Conv. Total (cfs) | 55368.4 | Conv. (cfs) | | 35996.8 | 19371.6 |
| Length Wtd. (ft) | 801.50 | Wetted Per. (ft) | | 168.24 | 839.95 |
| Min Ch El (ft) | 1545.08 | Shear (lb/sq ft) | | 1.17 | 0.38 |
| Alpha | 2.01 | Stream Power (lb/ft s) | | 8.00 | 0.86 |
| Frctn Loss (ft) | 3.93 | Cum Volume (acre-ft) | 2.63 | 527.36 | 73.54 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 1.39 | 148.66 | 45.05 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1551.22 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.67 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1550.55 | Reach Len. (ft) | 780.00 | 803.30 | 800.00 |
| Crit W.S. (ft) | 1550.47 | Flow Area (sq ft) | | 555.66 | 1290.70 |
| E.G. Slope (ft/ft) | 0.008390 | Area (sq ft) | | 555.66 | 1290.70 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 4738.78 | 4594.22 |
| Top Width (ft) | 1031.62 | Top Width (ft) | | 168.53 | 863.08 |
| Vel Total (ft/s) | 5.05 | Avg. Vel. (ft/s) | | 8.53 | 3.56 |
| Max Chl Dpth (ft) | 5.47 | Hydr. Depth (ft) | | 3.30 | 1.50 |
| Conv. Total (cfs) | 101889.5 | Conv. (cfs) | | 51733.8 | 50155.7 |
| Length Wtd. (ft) | 801.47 | Wetted Per. (ft) | | 171.10 | 863.21 |
| Min Ch El (ft) | 1545.08 | Shear (lb/sq ft) | | 1.70 | 0.78 |
| Alpha | 1.69 | Stream Power (lb/ft s) | | 14.51 | 2.79 |
| Frctn Loss (ft) | 5.79 | Cum Volume (acre-ft) | 12.72 | 783.16 | 123.99 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 15.89 | 167.19 | 78.61 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1552.03 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.56 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1551.46 | Reach Len. (ft) | 780.00 | 803.30 | 800.00 |
| Crit W.S. (ft) | 1550.94 | Flow Area (sq ft) | | 710.52 | 2088.23 |
| E.G. Slope (ft/ft) | 0.005648 | Area (sq ft) | | 710.52 | 2088.23 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 5769.65 | 8230.35 |
| Top Width (ft) | 1062.59 | Top Width (ft) | | 171.98 | 890.62 |
| Vel Total (ft/s) | 5.00 | Avg. Vel. (ft/s) | | 8.12 | 3.94 |
| Max Chl Dpth (ft) | 6.38 | Hydr. Depth (ft) | | 4.13 | 2.34 |
| Conv. Total (cfs) | 186281.9 | Conv. (cfs) | | 76770.1 | 109511.8 |
| Length Wtd. (ft) | 801.46 | Wetted Per. (ft) | | 175.00 | 890.83 |
| Min Ch El (ft) | 1545.08 | Shear (lb/sq ft) | | 1.43 | 0.83 |
| Alpha | 1.45 | Stream Power (lb/ft s) | | 11.63 | 3.26 |
| Frctn Loss (ft) | 5.54 | Cum Volume (acre-ft) | 30.24 | 949.97 | 220.31 |

| | | | | | |
|---|---|---|---|---|---|
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 25.18 | 172.85 | 158.10 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9898.90 | 9953.38 | 1209.97 | 153.47 | 44.84 | 25.93 | 3.51 | 7.88 |
| 9953.38 | 10007.86 | 1076.93 | 154.86 | 54.61 | 23.08 | 2.84 | 6.95 |
| 10007.86 | 10062.33 | 652.76 | 114.73 | 54.67 | 13.99 | 2.11 | 5.69 |
| 10062.33 | 10116.81 | 94.50 | 20.94 | 14.12 | 2.02 | 1.57 | 4.51 |
| 10116.81 | 10171.29 | | | | | | |
| 10171.29 | 10781.70 | 1166.84 | 507.63 | 576.87 | 25.00 | 0.88 | 2.30 |
| 10781.70 | 11392.10 | 466.00 | 213.78 | 263.08 | 9.98 | 0.81 | 2.18 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9898.90 | 9953.38 | 1743.47 | 183.10 | 46.37 | 18.68 | 4.06 | 9.52 |
| 9953.38 | 10007.86 | 1680.74 | 191.23 | 54.61 | 18.01 | 3.51 | 8.79 |
| 10007.86 | 10062.33 | 1134.18 | 151.10 | 54.67 | 12.15 | 2.77 | 7.51 |
| 10062.33 | 10116.81 | 180.37 | 30.24 | 15.45 | 1.93 | 2.08 | 5.96 |
| 10116.81 | 10171.29 | | | | | | |
| 10171.29 | 10781.70 | 3240.06 | 894.32 | 581.67 | 34.72 | 1.54 | 3.62 |
| 10781.70 | 11392.10 | 1354.17 | 396.38 | 281.54 | 14.51 | 1.41 | 3.42 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9898.90 | 9953.38 | 1969.95 | 224.95 | 48.46 | 14.07 | 4.79 | 8.76 |
| 9953.38 | 10007.86 | 2037.44 | 240.78 | 54.61 | 14.55 | 4.42 | 8.46 |
| 10007.86 | 10062.33 | 1502.40 | 200.65 | 54.67 | 10.73 | 3.68 | 7.49 |
| 10062.33 | 10116.81 | 259.86 | 44.14 | 17.25 | 1.86 | 2.75 | 5.89 |
| 10116.81 | 10171.29 | | | | | | |
| 10171.29 | 10781.70 | 5742.12 | 1426.19 | 588.13 | 41.02 | 2.43 | 4.03 |
| 10781.70 | 11392.10 | 2488.25 | 662.04 | 302.70 | 17.77 | 2.19 | 3.76 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.319

INPUT
Description:
Station Elevation Data num= 237

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7871.49 | 1551 | 7878.03 | 1552 | 7878.05 | 1552 | 7878.08 | 1552 | 7885.94 | 1551.22 |
| 7897.8 | 1551.39 | 8224.56 | 1552 | 8675.63 | 1552 | 8880.78 | 1550.37 | 8893.71 | 1550.48 |
| 9176.78 | 1552 | 9205.32 | 1553.68 | 9213.6 | 1554 | 9222.84 | 1554.3 | 9226.79 | 1554.07 |

```
 9227.06    1554 9234.89    1552 9242.83    1550 9251.16    1548 9253.81 1547.36
 9258.02    1548 9259.94 1548.36 9274.28 1549.68 9276.42    1548 9278.15 1546.69
 9279.01    1546  9281.5    1544  9283.2  1542.5 9283.57 1542.69 9290.61 1542.87
 9290.71  1542.5 9292.26    1544 9294.89    1546 9296.85 1547.48 9298.38    1548
 9300.79 1548.81 9316.48 1548.52 9319.25    1548 9325.07 1546.79 9328.95    1548
 9329.79 1548.26 9490.04  1549.2 9502.89 1549.97 9505.95    1550 9538.81 1550.43
 9545.95    1550 9558.43 1549.32 9570.94    1550 9590.13  1550.8 9638.11 1551.52
 9745.04 1550.06 9745.82    1550 9770.09    1548  9770.8 1547.94 9771.22    1548
 9785.51    1550 9790.26 1550.25 9790.61    1550 9793.33    1548 9796.04    1546
 9798.64    1544 9799.18 1543.58 9830.87 1542.19  9857.7    1544 9858.57 1544.09
 9872.59    1544 9881.04 1543.92 9904.64    1544 9927.09 1544.19 9930.25    1544
 9954.31 1542.73 9957.67    1542 9959.96 1541.45 9975.18 1541.62 9979.74    1540
 9985.55 1538.0210003.91 1539.7310013.18    154010043.52 1541.02 10045.3    1542
10049.82    154410050.07    154410083.79 1543.4310084.71    154410087.96    1546
10090.95    154810093.01  1549.410129.79    155010233.15    155010271.37    1548
10352.87    154610360.58    154610489.48 1547.4510498.02    154610503.56  1545.2
10506.24    154410510.69    154210515.15    1540 10519.6    153810524.28    1536
10529.83 1535.7810531.89    1536 10538.8    153610560.21    153610568.13 1537.33
10598.63 1537.4710603.49    153810609.67    154010613.51    154210617.36    1544
   10697    154610709.31 1547.2610809.75    154810832.35    154810844.01  1546.9
10848.27    154810852.11 1548.9410854.34    1548 10857.8 1546.4710862.65    1546
10907.86    154410911.13 1543.7310922.45    154410960.34    154610972.69 1547.92
10972.98    154810988.95 1549.2211006.74 1549.2511030.07 1549.9311032.48    1548
11033.98 1546.7811073.65 1547.6811074.26    154811078.05    155011081.84    1552
11084.12 1553.5111087.03    155211090.89    155011094.76    154811098.62    1546
11102.45    154411102.86 1543.7711106.07    1542 11109.7    154011113.32    1538
11116.95    153611120.58    153411121.11 1533.7111187.22    153411307.81    1534
11372.06 1532.2211378.76 1532.4811380.06    153211385.45    153011394.76    1528
11405.64    152611420.39    1524 11433.4    152211445.74    152011454.65 1518.22
11466.36    151811702.32    151611887.93    1514 11978.4    151212025.22    1510
12091.05    150812177.12    1506 12195.3 1505.2312195.82    150612197.17    1508
12198.48    151012199.66    151212200.83    151412202.01    151612203.19    1518
12204.36    152012205.57    152212206.82    152412208.07    152612209.32    1528
12210.57    153012211.82    153212213.08    153412214.33    153612215.32    1538
12216.25    154012216.76  1541.112221.41 1540.2812247.19 1541.2112248.29    1542
12250.99    154412253.26    154612258.62    154812268.55 1548.6312270.03    1548
12276.17    154612276.31 1545.9512277.09    154612282.86 1546.1912301.63 1546.11
   12314 1546.1812318.68    154812324.02    155012329.02 1551.8612342.29 1551.77
12347.07    1550 12347.1 1549.9912733.44 1549.9612733.58    155012738.27 1551.28
12741.55 1551.2212746.11 1551.7412760.69 1551.7612771.26 1551.4112780.61 1551.39
 13882.1    155013930.97    155013987.25  1550.2 14048.5 1550.0514112.03    1550
14138.21    155014234.47    155014465.93    155015760.38    155215768.51 1552.11
15772.75 1552.44 15802.1 1552.2215804.14    155215823.76    155015833.64 1549.07
15843.82    155015861.14 1551.5715876.32    155215884.97 1552.2515894.09 1552.19
15915.12    155215953.34 1551.66

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7871.49     .05 9790.26    .03510129.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9790.2610129.79              710     683     710              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7871.49 9638.11 1551.52   1080015953.34    1548
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7871.49 9771.49    1550   1100015871.49    1547

CROSS SECTION OUTPUT     Profile #1/3 flow

  E.G. Elev (ft)            1543.71   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.43   Wt. n-Val.                            0.035      0.050
  W.S. Elev (ft)            1543.28   Reach Len. (ft)            710.00     683.00     710.00
  Crit W.S. (ft)            1541.25   Flow Area (sq ft)                     296.22     618.42
  E.G. Slope (ft/ft)       0.003593   Area (sq ft)                          296.22     618.42
  Q Total (cfs)             4667.00   Flow (cfs)                           1203.66    3463.34
  Top Width (ft)             253.52   Top Width (ft)                        145.38     108.14
  Vel Total (ft/s)             5.10   Avg. Vel. (ft/s)                        4.06       5.60
  Max Chl Dpth (ft)            7.50   Hydr. Depth (ft)                        2.04       5.72
  Conv. Total (cfs)         77854.5   Conv. (cfs)                         20079.4    57775.1
  Length Wtd. (ft)           693.02   Wetted Per. (ft)                      146.83     110.95
  Min Ch El (ft)            1538.02   Shear (lb/sq ft)                        0.45       1.25
  Alpha                        1.06   Stream Power (lb/ft s)                  1.84       7.00
  Frctn Loss (ft)              4.45   Cum Volume (acre-ft)         2.63     520.53      61.24
  C & E Loss (ft)              0.06   Cum SA (acres)               1.39     145.79      36.35
```

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1545.43 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.70 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1544.73 | Reach Len. (ft) | 710.00 | 683.00 | 710.00 |
| Crit W.S. (ft) | 1543.09 | Flow Area (sq ft) | | 632.46 | 789.93 |
| E.G. Slope (ft/ft) | 0.006289 | Area (sq ft) | | 632.46 | 813.74 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 3575.66 | 5757.34 |
| Top Width (ft) | 475.18 | Top Width (ft) | | 288.21 | 186.96 |
| Vel Total (ft/s) | 6.56 | Avg. Vel. (ft/s) | | 5.65 | 7.29 |
| Max Chl Dpth (ft) | 8.95 | Hydr. Depth (ft) | | 2.19 | 5.57 |
| Conv. Total (cfs) | 117691.1 | Conv. (cfs) | | 45089.9 | 72601.2 |
| Length Wtd. (ft) | 692.61 | Wetted Per. (ft) | | 290.64 | 145.24 |
| Min Ch El (ft) | 1538.02 | Shear (lb/sq ft) | | 0.85 | 2.14 |
| Alpha | 1.05 | Stream Power (lb/ft s) | | 4.83 | 15.56 |
| Frctn Loss (ft) | 4.67 | Cum Volume (acre-ft) | 12.72 | 772.21 | 104.67 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 15.89 | 162.98 | 68.97 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1546.44 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.02 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1545.41 | Reach Len. (ft) | 710.00 | 683.00 | 710.00 |
| Crit W.S. (ft) | 1544.82 | Flow Area (sq ft) | | 829.46 | 896.47 |
| E.G. Slope (ft/ft) | 0.008755 | Area (sq ft) | | 829.46 | 960.59 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 6592.75 | 7407.25 |
| Top Width (ft) | 535.12 | Top Width (ft) | | 290.21 | 244.91 |
| Vel Total (ft/s) | 8.11 | Avg. Vel. (ft/s) | | 7.95 | 8.26 |
| Max Chl Dpth (ft) | 9.63 | Hydr. Depth (ft) | | 2.86 | 5.22 |
| Conv. Total (cfs) | 149626.2 | Conv. (cfs) | | 70460.6 | 79165.7 |
| Length Wtd. (ft) | 693.20 | Wetted Per. (ft) | | 293.06 | 175.01 |
| Min Ch El (ft) | 1538.02 | Shear (lb/sq ft) | | 1.55 | 2.80 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 12.30 | 23.13 |
| Frctn Loss (ft) | 4.73 | Cum Volume (acre-ft) | 30.24 | 935.77 | 192.31 |
| C & E Loss (ft) | 0.09 | Cum SA (acres) | 25.18 | 168.59 | 147.67 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9790.26 | 9858.17 | 33.50 | 22.40 | 41.11 | 0.72 | 0.55 | 1.50 |
| 9858.17 | 9926.07 | | | | | | |
| 9926.07 | 9993.98 | 432.52 | 113.21 | 50.91 | 9.27 | 2.26 | 3.82 |
| 9993.98 | 10061.88 | 737.64 | 160.62 | 54.80 | 15.81 | 2.96 | 4.59 |
| 10061.88 | 10129.79 | | | | | | |
| 10129.79 | 10712.14 | 3463.34 | 618.42 | 110.95 | 74.21 | 5.72 | 5.60 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9790.26 | 9858.17 | 429.92 | 103.68 | 60.97 | 4.61 | 1.71 | 4.15 |
| 9858.17 | 9926.07 | 112.52 | 48.43 | 67.91 | 1.21 | 0.71 | 2.32 |
| 9926.07 | 9993.98 | 1220.05 | 203.39 | 68.73 | 13.07 | 3.00 | 6.00 |
| 9993.98 | 10061.88 | 1734.97 | 251.11 | 68.65 | 18.59 | 3.70 | 6.91 |
| 10061.88 | RB 10129.79 | 78.22 | 25.85 | 24.39 | 0.84 | 1.08 | 3.03 |
| 10129.79 | 10712.14 | 5757.33 | 789.93 | 145.24 | 61.69 | 5.57 | 7.29 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9790.26 | 9858.17 | 929.75 | 145.18 | 62.08 | 6.64 | 2.37 | 6.40 |
| 9858.17 | 9926.07 | 429.58 | 94.69 | 67.91 | 3.07 | 1.39 | 4.54 |
| 9926.07 | 9993.98 | 2144.22 | 249.64 | 68.73 | 15.32 | 3.68 | 8.59 |
| 9993.98 | 10061.88 | 2872.36 | 297.36 | 68.65 | 20.52 | 4.38 | 9.66 |
| 10061.88 | RB 10129.79 | 216.85 | 42.59 | 25.69 | 1.55 | 1.70 | 5.09 |
| 10129.79 | 10712.14 | 7407.24 | 896.47 | 175.01 | 52.91 | 5.22 | 8.26 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 17.190

INPUT
Description:
Station Elevation Data  num=  300

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7653.45 | 1548 | 7761.75 | 1547.79 | 7762.55 | 1548 | 7767.33 | 1549.12 | 7775.28 | 1548.58 |
| 7788.9 | 1548.63 | 8246.52 | 1548 | 8729.5 | 1547.7 | 8758.1 | 1546.68 | 8780.13 | 1546.65 |
| 8790.75 | 1546.71 | 9097.59 | 1546.78 | 9117.51 | 1546.56 | 9136.95 | 1546.86 | 9138.57 | 1546 |
| 9141.99 | 1544 | 9143.95 | 1542.85 | 9148.35 | 1543.55 | 9153.92 | 1544 | 9161.44 | 1544.54 |
| 9162.43 | 1544 | 9166.2 | 1542 | 9167.98 | 1541.05 | 9169.25 | 1540 | 9171.45 | 1538 |
| 9172.26 | 1537.13 | 9177.83 | 1538 | 9180.4 | 1537.14 | 9181.05 | 1540 | 9185.39 | 1542 |
| 9186.25 | 1542.32 | 9190.57 | 1544 | 9193.76 | 1545.31 | 9209.19 | 1545.5 | 9216.01 | 1544 |
| 9218.86 | 1543.3 | 9220.69 | 1544 | 9222.85 | 1544.81 | 9304.99 | 1546 | 9356.34 | 1546 |
| 9446.22 | 1545.68 | 9449.91 | 1546 | 9451.6 | 1546.33 | 9452.81 | 1546 | 9455.69 | 1545.55 |
| 9463.88 | 1546 | 9483.77 | 1547.1 | 9556.72 | 1546.93 | 9643.2 | 1547.06 | 9701.66 | 1547.47 |
| 9709.7 | 1546 | 9714.06 | 1545.19 | 9716 | 1544 | 9718.44 | 1542.23 | 9730.66 | 1542.11 |
| 9736.24 | 1544 | 9738.59 | 1544.94 | 9751.19 | 1546 | 9764.58 | 1547.13 | 9783.61 | 1548 |
| 9794.85 | 1548.24 | 9802.85 | 1548.26 | 9806.34 | 1548.29 | 9806.66 | 1548 | 9808.89 | 1546 |
| 9811.11 | 1544 | 9813.34 | 1542 | 9815.53 | 1540.03 | 9815.89 | 1540 | 9830.24 | 1539.2 |
| 9842.2 | 1540 | 9844.95 | 1540.2 | 9862.13 | 1540 | 9903.92 | 1539.99 | 9907.8 | 1538 |
| 9910.97 | 1536.77 | 9951.9 | 1536 | 9968.91 | 1534.37 | 9976 | 1536 | 9976.95 | 1536.19 |
| 9999.96 | 1536.78 | 10042.4 | 1536.89 | 10092.39 | 1536.64 | 10095.73 | 1536 | 10101.64 | 1534.63 |
| 10115.37 | 1534.02 | 10115.45 | 1534 | 10121.62 | 1532 | 10127.62 | 1530.17 | 10129.03 | 1532 |
| 10130.51 | 1534 | 10131.99 | 1536 | 10132.04 | 1536.07 | 10161.29 | 1537.57 | 10173.64 | 1536 |
| 10182.04 | 1535 | 10183.45 | 1536 | 10186.13 | 1538 | 10188.7 | 1540 | 10191.24 | 1542 |
| 10193.54 | 1543.82 | 10269.79 | 1543.77 | 10283.6 | 1542.72 | 10331.89 | 1543.47 | 10333.05 | 1544 |
| 10337.45 | 1546 | 10342.08 | 1548 | 10345.11 | 1548.79 | 10347.44 | 1548 | 10354.37 | 1546 |
| 10361.29 | 1544 | 10361.49 | 1543.94 | 10364.27 | 1544 | 10402.49 | 1544.15 | 10402.76 | 1544 |
| 10406.42 | 1542 | 10410.08 | 1540 | 10410.95 | 1539.52 | 10412.73 | 1538 | 10415.06 | 1536 |
| 10417.4 | 1534 | 10419.73 | 1532 | 10422.05 | 1530 | 10424.22 | 1528 | 10426.39 | 1526 |
| 10428.56 | 1524 | 10429.67 | 1522.97 | 10443.29 | 1523.2 | 10483.32 | 1524 | 10510.54 | 1524 |
| 10557.94 | 1522.22 | 10558.69 | 1522 | 10565.63 | 1520 | 10569.36 | 1518.92 | 10617.25 | 1520 |
| 10664.12 | 1521.37 | 10885.21 | 1521.78 | 10885.64 | 1522 | 10889.63 | 1524 | 10893.62 | 1526 |
| 10897.74 | 1528 | 10901.87 | 1530 | 10905.99 | 1532 | 10906.68 | 1532.33 | 10907.36 | 1534 |
| 10908.3 | 1536 | 10909.37 | 1537.93 | 10909.45 | 1538 | 10911.52 | 1540 | 10913.6 | 1542 |
| 10915.67 | 1544 | 10917.75 | 1546 | 10918.49 | 1546.97 | 10919.58 | 1548 | 10920.57 | 1549.12 |
| 10922.54 | 1548 | 10925.37 | 1546.42 | 10928.86 | 1546.57 | 10950.21 | 1546.25 | 10961.12 | 1546.16 |
| 10961.32 | 1546 | 10963.85 | 1544 | 10966.56 | 1542 | 10969.28 | 1540 | 10971.99 | 1538 |
| 10975.23 | 1536 | 10978.88 | 1534 | 10982.62 | 1532.09 | 10984.61 | 1532 | 11066.37 | 1532 |
| 11173.49 | 1533.68 | 11174.09 | 1534 | 11177.92 | 1536 | 11181.74 | 1538 | 11185.56 | 1540 |
| 11189.39 | 1542 | 11193.4 | 1544 | 11197.91 | 1546 | 11202.49 | 1548 | 11203.79 | 1548.5 |
| 11204.87 | 1548 | 11209.13 | 1546 | 11213.34 | 1544 | 11217.55 | 1542 | 11221.76 | 1540 |

```
11226.34    153811230.35    153611233.48 1534.1911258.98  1534.211261.72    1536
11264.85    153811268.75    154011272.65    154211276.55    154411280.45    1546
 11284.3    154811286.43 1549.1111292.18    154811296.55    1546 11300.8    1544
11304.81    154211308.83    154011312.84    153811316.85    153611318.81 1535.02
11550.51    153611617.81 1536.2711624.18    153811631.54    154011638.86    1542
11640.99 1542.7111642.78    154211647.77    154011652.77    153811662.97    1536
11667.19 1535.56 11679.6    153411691.01    153411695.22    153411725.65 1532.24
11726.39    1532 11732.6    153011738.82    152811745.03    152611746.59  1525.5
11773.62 1524.3511776.26    152611781.95    152811786.93    152811790.59    1526
11794.77 1524.1811818.93 1524.8611822.19    152611828.43    152811836.53    1530
11852.53    1530 11888.3    153011892.14    153211895.97    153411899.68    1536
 11903.2    153811906.95    154011910.91    154211914.56 1543.7911925.41    1544
11982.34 1544.53 12007.3 1544.5212014.88    154412014.93    154412042.85 1543.45
12044.32    154412049.64    154612050.79 1546.4412051.87    1546 12057.4    1544
12062.56 1542.1412093.67 1542.5612104.09 1543.0412122.11 1543.4312147.67 1543.67
12159.62 1543.09 12179.4 1543.0512214.76  1543.412215.81    1544 12219.3    1546
12222.77    154812224.07 1548.7912236.77 1548.8212238.27    154812241.87 1546.03
12399.51    154612493.78    154612624.07 1546.3312627.22  1547.412631.37 1547.49
 12636.2 1547.4812649.06 1547.8912669.75 1547.1713839.42    1546 14165.7    1546
14170.37 1546.1214176.43    154614178.69 1545.9614240.87    154615652.91 1547.18
15657.75    154815658.44 1548.1415687.15 1548.3315690.17    154815708.02    1546
15715.46 1545.1115726.57    1546 15746.7 1547.4815766.49    154815767.02 1548.01
15767.49    1548 15776.3 1547.8415805.27    154815897.67 1548.1415911.47 1547.89

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
 7653.45     .05 9806.34    .03510345.11     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9806.3410345.11              700   708.5     720             .1       .3
Blocked Obstructions      num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9138    9700    1546   10350   10915    1539   10915   13000    1545

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1539.20   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.04   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1538.16   Reach Len. (ft)             700.00    708.50     720.00
  Crit W.S. (ft)            1538.16   Flow Area (sq ft)                     570.72
  E.G. Slope (ft/ft)       0.014658   Area (sq ft)                          570.72
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             278.84   Top Width (ft)                        278.84
  Vel Total (ft/s)             8.18   Avg. Vel. (ft/s)                        8.18
  Max Chl Dpth (ft)            7.99   Hydr. Depth (ft)                        2.05
  Conv. Total (cfs)         38548.1   Conv. (cfs)                         38548.1
  Length Wtd. (ft)           708.50   Wetted Per. (ft)                      284.42
  Min Ch El (ft)            1530.17   Shear (lb/sq ft)                        1.84
  Alpha                        1.00   Stream Power (lb/ft s)                 15.02
  Frctn Loss (ft)              0.51   Cum Volume (acre-ft)          2.63    513.73      56.20
  C & E Loss (ft)              0.29   Cum SA (acres)                1.39    142.47      35.46


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1540.74   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.93   Wt. n-Val.                            0.035      0.050
  W.S. Elev (ft)            1539.81   Reach Len. (ft)             700.00    708.50     720.00
  Crit W.S. (ft)            1539.81   Flow Area (sq ft)                    1042.38     405.58
  E.G. Slope (ft/ft)       0.007251   Area (sq ft)                         1042.38     405.58
  Q Total (cfs)             9333.00   Flow (cfs)                           8442.06     890.94
  Top Width (ft)             805.20   Top Width (ft)                        304.30     500.90
  Vel Total (ft/s)             6.45   Avg. Vel. (ft/s)                        8.10       2.20
  Max Chl Dpth (ft)            9.64   Hydr. Depth (ft)                        3.43       0.81
```

| | | | | | |
|---|---|---|---|---|---|
| Conv. Total (cfs) | 109601.2 | Conv. (cfs) | | 99138.5 | 10462.7 |
| Length Wtd. (ft) | 709.09 | Wetted Per. (ft) | | 310.88 | 501.50 |
| Min Ch El (ft) | 1530.17 | Shear (lb/sq ft) | | 1.52 | 0.37 |
| Alpha | 1.44 | Stream Power (lb/ft s) | | 12.29 | 0.80 |
| Frctn Loss (ft) | 0.90 | Cum Volume (acre-ft) | 12.72 | 759.08 | 94.73 |
| C & E Loss (ft) | 0.21 | Cum SA (acres) | 15.89 | 158.33 | 63.36 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1541.62 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.73 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1540.89 | Reach Len. (ft) | 700.00 | 708.50 | 720.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 1431.57 | 947.40 |
| E.G. Slope (ft/ft) | 0.005470 | Area (sq ft) | | 1431.57 | 947.40 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 10833.74 | 3166.26 |
| Top Width (ft) | 879.25 | Top Width (ft) | | 375.26 | 503.99 |
| Vel Total (ft/s) | 5.88 | Avg. Vel. (ft/s) | | 7.57 | 3.34 |
| Max Chl Dpth (ft) | 10.72 | Hydr. Depth (ft) | | 3.81 | 1.88 |
| Conv. Total (cfs) | 189292.2 | Conv. (cfs) | | 146481.6 | 42810.6 |
| Length Wtd. (ft) | 709.91 | Wetted Per. (ft) | | 382.60 | 505.30 |
| Min Ch El (ft) | 1530.17 | Shear (lb/sq ft) | | 1.28 | 0.64 |
| Alpha | 1.35 | Stream Power (lb/ft s) | | 9.67 | 2.14 |
| Frctn Loss (ft) | 1.16 | Cum Volume (acre-ft) | 30.24 | 918.04 | 176.76 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 25.18 | 163.37 | 141.57 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9806.34 | 9914.09 | 35.03 | 6.90 | 6.87 | 0.75 | 1.05 | 5.08 |
| 9914.09 | 10021.85 | 1651.87 | 209.77 | 108.05 | 35.39 | 1.95 | 7.87 |
| 10021.85 | 10129.60 | 2331.34 | 259.66 | 109.87 | 49.95 | 2.41 | 8.98 |
| 10129.60 | 10237.36 | 648.76 | 94.39 | 59.63 | 13.90 | 1.66 | 6.87 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9806.34 | 9914.09 | 84.13 | 26.63 | 30.64 | 0.90 | 0.89 | 3.16 |
| 9914.09 | 10021.85 | 3155.23 | 387.94 | 108.05 | 33.81 | 3.60 | 8.13 |
| 10021.85 | 10129.60 | 3817.53 | 437.84 | 109.87 | 40.90 | 4.06 | 8.72 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10129.60 | 10237.36 | 1385.16 | 189.95 | 62.32 | 14.84 | 3.23 | 7.29 |
| 10237.36 | 10345.11 | | | | | | |
| 10345.11 | 10901.75 | 875.42 | 398.15 | 491.59 | 9.38 | 0.81 | 2.20 |
| 10901.75 | 11458.38 | 15.52 | 7.43 | 9.91 | 0.17 | 0.78 | 2.09 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9806.34 | 9914.09 | 379.83 | 119.22 | 100.62 | 2.71 | 1.20 | 3.19 |
| 9914.09 | 10021.85 | 4005.50 | 504.14 | 108.05 | 28.61 | 4.68 | 7.95 |
| 10021.85 | 10129.60 | 4635.98 | 554.04 | 109.87 | 33.11 | 5.14 | 8.37 |
| 10129.60 | 10237.36 | 1812.43 | 254.16 | 64.06 | 12.95 | 4.22 | 7.13 |
| 10237.36 | 10345.11 | | | | | | |
| 10345.11 | 10901.75 | 3111.02 | 929.04 | 493.84 | 22.22 | 1.88 | 3.35 |
| 10901.75 | 11458.38 | 55.25 | 18.36 | 11.46 | 0.39 | 1.72 | 3.01 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 17.055

INPUT
Description:
Station Elevation Data num= 202

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7454.12 | 1545.16 | 7458.31 | 1545.88 | 7470.4 | 1544.49 | 7481.52 | 1544.69 | 8427.17 | 1544.54 |
| 8428.57 | 1544 | 8431.45 | 1542.85 | 8436.51 | 1543.89 | 8457.42 | 1543.88 | 8460.54 | 1544 |
| 8471.42 | 1544.34 | 8573.66 | 1544 | 8810.45 | 1542.01 | 8825.47 | 1542.91 | 8828.55 | 1542 |
| 8830.28 | 1541.38 | 8834.45 | 1542 | 8836.84 | 1542.4 | 8853.43 | 1543.62 | 8856.68 | 1542 |
| 8859 | 1540.73 | 8859.91 | 1540 | 8861.99 | 1538 | 8863.08 | 1536.88 | 8870.81 | 1536.9 |
| 8872.3 | 1538 | 8875.08 | 1540 | 8876.95 | 1541.41 | 8878.37 | 1542 | 8881.9 | 1543.02 |
| 8898.07 | 1542.67 | 8900.53 | 1542 | 8906.77 | 1540.75 | 8913.14 | 1542 | 8913.81 | 1542.14 |
| 9146.15 | 1542.5 | 9150.94 | 1544 | 9151.69 | 1544.23 | 9172.47 | 1544 | 9260.32 | 1543.5 |
| 9284.39 | 1542.41 | 9285.22 | 1542 | 9289.54 | 1540 | 9289.81 | 1539.88 | 9293.22 | 1540 |
| 9306.88 | 1540.45 | 9311.59 | 1542 | 9312.19 | 1542.2 | 9343.02 | 1543.24 | 9515.19 | 1543.63 |
| 9532.63 | 1544 | 9534.19 | 1544.09 | 9558.55 | 1544.29 | 9560.75 | 1544 | 9570.21 | 1542.7 |
| 9584.99 | 1543.34 | 9709.49 | 1543.11 | 9714.69 | 1542 | 9717.95 | 1541.3 | 9727.05 | 1540 |
| 9732.14 | 1539.15 | 9758.68 | 1539.11 | 9781.62 | 1539.56 | 9793.57 | 1538 | 9800.53 | 1537.21 |
| 9820.88 | 1536 | 9821.15 | 1535.98 | 9825.58 | 1534 | 9830.11 | 1532 | 9834.64 | 1530 |
| 9838.41 | 1528.34 | 9838.96 | 1528 | 9842.2 | 1526 | 9845.57 | 1524 | 9849 | 1522 |
| 9850.3 | 1521.25 | 10020.15 | 1522 | 10038.75 | 1522.12 | 10039.09 | 1522 | 10044.21 | 1520.28 |
| 10051.37 | 1521.95 | 10051.97 | 1522 | 10060.73 | 1522.42 | 10065.46 | 1522 | 10071.99 | 1526 |
| 10076.12 | 1527.19 | 10101.23 | 1526.02 | 10101.36 | 1526 | 10117.15 | 1524 | 10130.46 | 1522.03 |
| 10130.84 | 1522 | 10139.05 | 1522 | 10154.9 | 1522 | 10180.67 | 1521.8 | 10215.38 | 1521.65 |
| 10226.91 | 1521.16 | 10231.62 | 1520 | 10237.08 | 1518.33 | 10241.4 | 1518 | 10326.59 | 1516 |
| 10391.7 | 1516 | 10439.7 | 1516 | 10455.92 | 1515.74 | 10457.14 | 1516 | 10465.83 | 1518 |
| 10473.51 | 1520 | 10479.89 | 1522 | 10486.27 | 1524 | 10493.89 | 1526 | 10499.78 | 1528 |
| 10503.97 | 1530 | 10506.55 | 1532 | 10508.35 | 1533.39 | 10508.94 | 1534 | 10510.74 | 1536 |
| 10512.56 | 1538 | 10514.38 | 1540 | 10515.09 | 1540.78 | 10518.8 | 1542 | 10522.29 | 1543.26 |
| 10526.32 | 1542 | 10528.72 | 1540.81 | 0535.95 | 1541.51 | 10538.58 | 1540 | 10542.07 | 1538 |
| 10545.06 | 1536.26 | 10567.22 | 1538 | 10569.62 | 1540 | 10572.46 | 1542 | 10575.69 | 1544 |
| 10577.68 | 1545.29 | 10582.45 | 1544 | 10585.84 | 1542.95 | 10587.49 | 1543.02 | 10589.86 | 1544 |
| 10594.85 | 1546 | 10596.3 | 1546.58 | 10598.3 | 1546 | 10604.19 | 1544 | 10604.54 | 1543.83 |
| 10631.07 | 1543.61 | 0638.07 | 1544 | 10641.74 | 1544.06 | 10646.58 | 1546 | 10647.46 | 1546 |
| 10651.83 | 1544 | 10653.78 | 1543.11 | 10794.98 | 1542 | 10926.56 | 1542 | 11136.6 | 1542.99 |

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11142.01    154411250.12    154411255.61    154411411.52    1544   11483 1542.61
 11580.6    154211808.99    154011846.37 1539.6811851.15    154011875.14    1542
11892.72    154411903.56    154611905.36 1546.9511910.41    154611912.24 1545.64
11924.25 1545.6111928.36    1544 11929.5 1543.5812299.25    154412315.27 1544.12
12318.77 1544.7312322.76 1544.8412326.36  1545.512338.36    154612344.17  1546.2
12344.99    154612351.56    154412351.88  1543.912352.13    154412356.23 1545.82
12359.67    154612381.33 1546.4212387.13    154612397.22 1545.2113286.35    1544
13863.22  1543.213869.63 1543.1515295.61 1543.2315326.28    154415345.14 1544.77
15383.78 1544.9915390.52    1544 15404.6    1542 15407.2 1541.6415409.79    1542
 15424.3    154415428.09 1544.5215436.03 1545.7415461.53    154615461.62    1546
15461.69    154615470.72 1545.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7454.12     .05 9800.53    .03510076.12     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9800.5310076.12              820   796.7     850              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7454.12 9709.49 1543.1110522.2915470.72 1543.26
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8425    9340    1542 9854.1210076.12    153010076.12   10200    1538
   10200   13000    1541
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1537.71 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.08 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1537.62 | Reach Len. (ft) | 820.00 | 796.70 | 850.00 |
| Crit W.S. (ft) | 1531.85 | Flow Area (sq ft) | 0.76 | 2023.88 | |
| E.G. Slope (ft/ft) | 0.000227 | Area (sq ft) | 0.76 | 2023.88 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 0.12 | 4666.88 | |
| Top Width (ft) | 279.24 | Top Width (ft) | 3.65 | 275.59 | |
| Vel Total (ft/s) | 2.31 | Avg. Vel. (ft/s) | 0.16 | 2.31 | |
| Max Chl Dpth (ft) | 16.37 | Hydr. Depth (ft) | 0.21 | 7.34 | |
| Conv. Total (cfs) | 309852.7 | Conv. (cfs) | 7.8 | 309844.8 | |
| Length Wtd. (ft) | 812.54 | Wetted Per. (ft) | 3.67 | 295.55 | |
| Min Ch El (ft) | 1521.25 | Shear (lb/sq ft) | 0.00 | 0.10 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.00 | 0.22 | |
| Frctn Loss (ft) | 0.46 | Cum Volume (acre-ft) | 2.63 | 492.63 | 56.20 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 1.36 | 137.96 | 35.46 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1539.20 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.23 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1538.98 | Reach Len. (ft) | 820.00 | 796.70 | 850.00 |
| Crit W.S. (ft) | 1533.18 | Flow Area (sq ft) | 13.18 | 2396.19 | 120.79 |
| E.G. Slope (ft/ft) | 0.000508 | Area (sq ft) | 13.18 | 2396.19 | 120.79 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 8.27 | 9245.59 | 79.15 |
| Top Width (ft) | 413.90 | Top Width (ft) | 14.43 | 275.59 | 123.88 |
| Vel Total (ft/s) | 3.69 | Avg. Vel. (ft/s) | 0.63 | 3.86 | 0.66 |
| Max Chl Dpth (ft) | 17.73 | Hydr. Depth (ft) | 0.91 | 8.69 | 0.98 |
| Conv. Total (cfs) | 414085.7 | Conv. (cfs) | 366.8 | 410207.3 | 3511.6 |
| Length Wtd. (ft) | 812.84 | Wetted Per. (ft) | 14.54 | 295.93 | 124.85 |
| Min Ch El (ft) | 1521.25 | Shear (lb/sq ft) | 0.03 | 0.26 | 0.03 |
| Alpha | 1.08 | Stream Power (lb/ft s) | 0.02 | 0.99 | 0.02 |
| Frctn Loss (ft) | 0.87 | Cum Volume (acre-ft) | 12.62 | 731.11 | 90.38 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 15.78 | 153.62 | 58.20 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1540.36 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.40 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1539.96 | Reach Len. (ft) | 820.00 | 796.70 | 850.00 |
| Crit W.S. (ft) | 1534.25 | Flow Area (sq ft) | 69.16 | 2668.89 | 243.37 |

| | | | | | |
|---|---|---|---|---|---|
| E.G. Slope (ft/ft) | 0.000771 | Area (sq ft) | 69.16 | 2668.89 | 243.37 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 54.81 | 13633.41 | 311.78 |
| Top Width (ft) | 472.74 | Top Width (ft) | 73.27 | 275.59 | 123.88 |
| Vel Total (ft/s) | 4.70 | Avg. Vel. (ft/s) | 0.79 | 5.11 | 1.28 |
| Max Chl Dpth (ft) | 18.71 | Hydr. Depth (ft) | 0.94 | 9.68 | 1.96 |
| Conv. Total (cfs) | 504129.2 | Conv. (cfs) | 1973.8 | 490928.5 | 11226.9 |
| Length Wtd. (ft) | 813.10 | Wetted Per. (ft) | 73.49 | 295.93 | 125.84 |
| Min Ch El (ft) | 1521.25 | Shear (lb/sq ft) | 0.05 | 0.43 | 0.09 |
| Alpha | 1.15 | Stream Power (lb/ft s) | 0.04 | 2.22 | 0.12 |
| Frctn Loss (ft) | 1.19 | Cum Volume (acre-ft) | 29.69 | 884.69 | 166.92 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 24.59 | 158.08 | 136.38 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9565.89 | 9800.53 | 0.12 | 0.76 | 3.67 | 0.00 | 0.21 | 0.16 |
| LB 9800.53 | 9855.65 | 640.35 | 342.97 | 67.46 | 13.72 | 6.22 | 1.87 |
| 9855.65 | 9910.77 | 1027.90 | 420.23 | 55.12 | 22.02 | 7.62 | 2.45 |
| 9910.77 | 9965.88 | 1027.88 | 420.22 | 55.12 | 22.02 | 7.62 | 2.45 |
| 9965.88 | 10021.00 | 1027.90 | 420.23 | 55.12 | 22.02 | 7.62 | 2.45 |
| 10021.00 | RB 10076.12 | 942.85 | 420.23 | 62.74 | 20.20 | 7.62 | 2.24 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9565.89 | 9800.53 | 8.27 | 13.18 | 14.54 | 0.09 | 0.91 | 0.63 |
| LB 9800.53 | 9855.65 | 1331.72 | 417.43 | 67.46 | 14.27 | 7.57 | 3.19 |
| 9855.65 | 9910.77 | 2022.15 | 494.69 | 55.12 | 21.67 | 8.98 | 4.09 |
| 9910.77 | 9965.88 | 2022.11 | 494.68 | 55.12 | 21.67 | 8.98 | 4.09 |
| 9965.88 | 10021.00 | 2022.15 | 494.69 | 55.12 | 21.67 | 8.98 | 4.09 |
| 10021.00 | RB 10076.12 | 1847.45 | 494.69 | 63.12 | 19.79 | 8.98 | 3.73 |
| 10076.12 | 10615.58 | 79.15 | 120.79 | 124.85 | 0.85 | 0.98 | 0.66 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9565.89 | 9800.53 | 54.81 | 69.16 | 73.49 | 0.39 | 0.94 | 0.79 |
| LB 9800.53 | 9855.65 | 2015.30 | 471.97 | 67.46 | 14.40 | 8.56 | 4.27 |
| 9855.65 | 9910.77 | 2968.66 | 549.23 | 55.12 | 21.20 | 9.96 | 5.41 |
| 9910.77 | 9965.88 | 2968.60 | 549.22 | 55.12 | 21.20 | 9.96 | 5.41 |
| 9965.88 | 10021.00 | 2968.66 | 549.23 | 55.12 | 21.20 | 9.96 | 5.41 |
| 10021.00 | RB 10076.12 | 2712.19 | 549.23 | 63.12 | 19.37 | 9.96 | 4.94 |
| 10076.12 | 10615.58 | 311.78 | 243.37 | 125.84 | 2.23 | 1.96 | 1.28 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.904

INPUT
Description:
Station Elevation Data num= 262

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7496.59 | 1541.52 | 7500.28 | 1542 | 7500.5 | 1542.02 | 7501.14 | 1542 | 7511.57 | 1541.44 |
| 7526.56 | 1541.34 | 8472.26 | 1541.61 | 8475.81 | 1540 | 8476.13 | 1539.87 | 8476.68 | 1540 |

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 8481.47 1541.17 8503.34    1540 8508.56 1539.71 8515.28    1540 8525.61 1540.43
 8569.31    1540 8761.28    1540  8811.4    1540 8837.59 1539.58 8855.25 1539.27
 8860.61 1539.45 8871.75 1538.89 8878.58 1539.59 8890.24    1540 8890.31 1540.01
 8893.63 1540.64 8908.12    1540  8926.4 1539.24 8927.17    1540 8927.58    1540
 8941.56 1538.68 8945.83    1538 8950.63 1537.14 8953.52    1538 8955.34 1538.35
 9154.99    1538 9229.73    1538 9322.04 1539.52 9348.01 1538.62 9373.66    1540
 9377.67 1540.22 9386.23    1540    9570 1538.32 9594.85 1539.67 9643.56 1538.66
 9645.33    1538 9647.98 1536.95 9669.39    1536 9670.03 1535.97 9670.07    1536
 9673.21    1538 9674.51 1538.83  9688.8 1539.46 9691.35    1538 9694.89    1536
 9696.81 1534.91 9729.61    1536 9736.28 1536.27 9742.82    1536 9760.44 1535.39
 9761.57    1536 9765.28    1538 9769.18    1540 9773.97    1542 9775.35 1542.58
 9777.25    1542 9784.17    1540 9790.94    1538 9792.01  1537.6 9837.66 1537.89
    9838    1538 9844.57    1540 9851.93    1540 9856.55    1538 9858.02 1537.36
 9860.92    1536 9889.65 1535.06 9891.66    1534 9895.44    1532 9899.32    1530
 9899.75 1529.78 9915.25    1530 9935.74 1530.49 9938.08    1532 9941.18    1534
 9944.27    1536    9946 1536.9210018.03 1536.3110018.97    153610023.29    1534
10024.41 1533.2710032.75 1532.88 10035.2    153410040.27    153610041.56 1536.48
 10126.8 1537.2710140.97    153610152.26 1534.9910165.94 1535.0810167.02    1534
10169.01    1532   10171    153010173.06    152810175.11    152610177.17    1524
10179.23    152210180.04 1521.2210198.96 1521.4910201.08    152010203.94    1518
10206.79    151610209.64    151410212.49    151210215.34    151010217.19 1508.73
10296.33    1510 10316.5    151210334.92 1513.7410341.46    1514 10346.5    1514
10417.35    151210431.25  1510.710431.97    151010433.99    150810435.99    1506
   10438    150410438.04 1503.9610438.42    150410444.24 1504.4510447.73 1505.37
10459.75 1504.7110469.61    150410474.39 1503.6110477.29    1504 10480.6 1504.47
10482.44    150610484.88    150810486.94 1509.6610490.39    151010506.87    1512
10519.75    151410533.59    151610554.37    1518 10569.5    152010583.03    1522
10601.06    152410614.26    152610619.66  1526.810621.61    152810624.86    1530
 10628.1    153210631.35    1534 10634.6    153610637.85    153810641.09    1540
10644.05 1541.8210649.42 1540.2710666.05  1540.810680.82 1540.0310680.84    1540
10682.07    153810683.29    153610684.51    153410685.74    153210686.96    1530
10688.19    152810689.41    152610690.64    152410691.86    152210693.09    1520
10694.31    151810695.54    151610696.76    151410697.98    151210699.21    1510
10700.43    150810701.66    150610702.88    150410704.11    150210705.33    1500
10706.56    149810707.78    149610709.01    149410710.26    149210727.04 1491.99
10727.05    149210731.56    149410736.34    149610741.13    149810745.91    1500
10745.94 1500.0110770.68 1500.5610936.68    150011027.46    149811030.03 1497.63
11031.26    149811035.98 1499.4411084.57    1500 11088.3 1500.06 11111.5 1500.03
11114.59    150211117.72    150411125.04    1506 11130.7 1507.3311131.56    1508
11134.13    1510 11136.7    151211139.26    1514 11141.1  1515.111141.23    1516
11141.46    151811141.66    152011141.85    152211142.04    152411142.23    1526
11142.42    152811142.62    153011142.81    1532   11143    153411143.19    1536
11143.23 1536.3811156.51    153811158.05  1538.211162.73    1540 11167.5    1542
   11170 1543.0411172.36    154211177.71    154011180.51 1538.9511207.85    1538
11209.75    153812331.97 1539.3612347.37    154012348.69 1540.0512362.68 1540.44
12367.93 1540.4112371.55 1540.4712384.93 1540.7212390.79 1540.2912391.69    1540
12398.53    153812398.59 1537.9912398.62    153812403.91    154012404.05 1540.05
12859.11    154013888.69 1538.8713907.08 1538.8313913.28 1538.8813928.86  1538.9
15129.98    154015367.74 1540.2515394.45 1540.9715423.78  1540.815430.66    1540
15447.93    153815448.78  1537.9 15449.6    1538 15466.6    154015480.66 1541.65
15510.18 1541.3715521.19 1541.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7496.59     .05 9851.93    .035 10126.8     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9851.93 10126.8              960   907.5     910             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7496.59 9775.35 1542.5810634.3115521.19    1542
Blocked Obstructions     num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7496.59    9775    154010152.15 10634.6    153510666.05   15480    1540

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1537.24   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.16   Wt. n-Val.                            0.035      0.050
  W.S. Elev (ft)            1537.08   Reach Len. (ft)            960.00     907.50     910.00
  Crit W.S. (ft)            1536.40   Flow Area (sq ft)                     499.04    1026.38
  E.G. Slope (ft/ft)       0.003220   Area (sq ft)                          499.04    1027.66
  Q Total (cfs)             4667.00   Flow (cfs)                           1892.77    2774.23
  Top Width (ft)             755.20   Top Width (ft)                        247.76     507.44
  Vel Total (ft/s)             3.06   Avg. Vel. (ft/s)                        3.79       2.70
  Max Chl Dpth (ft)            7.30   Hydr. Depth (ft)                        2.01       2.03
```

| | | | | | |
|---|---|---|---|---|---|
| Conv. Total (cfs) | 82250.0 | Conv. (cfs) | | 33357.6 | 48892.3 |
| Length Wtd. (ft) | 908.24 | Wetted Per. (ft) | | 252.60 | 505.76 |
| Min Ch El (ft) | 1529.78 | Shear (lb/sq ft) | | 0.40 | 0.41 |
| Alpha | 1.09 | Stream Power (lb/ft s) | | 1.51 | 1.10 |
| Frctn Loss (ft) | 5.05 | Cum Volume (acre-ft) | 2.62 | 469.56 | 46.17 |
| C & E Loss (ft) | 0.09 | Cum SA (acres) | 1.32 | 133.17 | 30.51 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1538.33 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.28 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1538.05 | Reach Len. (ft) | 960.00 | 907.50 | 910.00 |
| Crit W.S. (ft) | 1536.89 | Flow Area (sq ft) | 14.43 | 759.21 | 1520.18 |
| E.G. Slope (ft/ft) | 0.003516 | Area (sq ft) | 14.43 | 759.21 | 1524.23 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 11.49 | 3757.49 | 5564.03 |
| Top Width (ft) | 828.93 | Top Width (ft) | 47.42 | 270.38 | 511.14 |
| Vel Total (ft/s) | 4.07 | Avg. Vel. (ft/s) | 0.80 | 4.95 | 3.66 |
| Max Chl Dpth (ft) | 8.27 | Hydr. Depth (ft) | 0.30 | 2.81 | 3.00 |
| Conv. Total (cfs) | 157389.6 | Conv. (cfs) | 193.7 | 63365.4 | 93830.5 |
| Length Wtd. (ft) | 908.36 | Wetted Per. (ft) | 47.53 | 275.43 | 507.88 |
| Min Ch El (ft) | 1529.78 | Shear (lb/sq ft) | 0.07 | 0.61 | 0.66 |
| Alpha | 1.08 | Stream Power (lb/ft s) | 0.05 | 2.99 | 2.40 |
| Frctn Loss (ft) | 4.39 | Cum Volume (acre-ft) | 12.36 | 702.26 | 74.33 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 15.19 | 148.63 | 52.00 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1539.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.40 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1538.77 | Reach Len. (ft) | 960.00 | 907.50 | 910.00 |
| Crit W.S. (ft) | 1537.31 | Flow Area (sq ft) | 50.31 | 954.53 | 1885.70 |
| E.G. Slope (ft/ft) | 0.003763 | Area (sq ft) | 50.31 | 954.53 | 1892.78 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 89.10 | 5668.13 | 8242.77 |
| Top Width (ft) | 836.57 | Top Width (ft) | 52.22 | 272.04 | 512.30 |
| Vel Total (ft/s) | 4.84 | Avg. Vel. (ft/s) | 1.77 | 5.94 | 4.37 |
| Max Chl Dpth (ft) | 8.99 | Hydr. Depth (ft) | 0.96 | 3.51 | 3.72 |
| Conv. Total (cfs) | 228223.4 | Conv. (cfs) | 1452.5 | 92400.0 | 134370.9 |
| Length Wtd. (ft) | 908.62 | Wetted Per. (ft) | 52.54 | 277.24 | 507.88 |
| Min Ch El (ft) | 1529.78 | Shear (lb/sq ft) | 0.22 | 0.81 | 0.87 |
| Alpha | 1.09 | Stream Power (lb/ft s) | 0.40 | 4.80 | 3.81 |
| Frctn Loss (ft) | 4.24 | Cum Volume (acre-ft) | 28.56 | 851.56 | 146.08 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 23.41 | 153.07 | 130.17 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9851.93 | 9906.90 | 538.98 | 144.89 | 49.84 | 11.55 | 3.00 | 3.72 |
| 9906.90 | 9961.88 | 1121.99 | 237.08 | 56.84 | 24.04 | 4.31 | 4.73 |
| 9961.88 | 10016.85 | 34.62 | 29.02 | 54.98 | 0.74 | 0.53 | 1.19 |
| 10016.85 | 10071.83 | 194.21 | 82.52 | 56.40 | 4.16 | 1.50 | 2.35 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10071.83 | RB 10126.80 | 2.98 | 5.53 | 34.55 | 0.06 | 0.16 | 0.54 |
| 10126.80 | 10666.24 | 2774.23 | 1026.38 | 505.76 | 59.44 | 2.03 | 2.70 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9616.40 | 9851.93 | 11.49 | 14.43 | 47.53 | 0.12 | 0.30 | 0.80 |
| LB 9851.93 | 9906.90 | 998.51 | 192.94 | 52.24 | 10.70 | 3.82 | 5.18 |
| 9906.90 | 9961.88 | 1867.93 | 290.60 | 56.84 | 20.01 | 5.29 | 6.43 |
| 9961.88 | 10016.85 | 234.36 | 82.53 | 54.98 | 2.51 | 1.50 | 2.84 |
| 10016.85 | 10071.83 | 529.84 | 136.03 | 56.40 | 5.68 | 2.47 | 3.90 |
| 10071.83 | RB 10126.80 | 126.86 | 57.11 | 54.98 | 1.36 | 1.04 | 2.22 |
| 10126.80 | 10666.24 | 5564.02 | 1520.18 | 507.88 | 59.62 | 3.00 | 3.66 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9616.40 | 9851.93 | 89.10 | 50.31 | 52.54 | 0.64 | 0.96 | 1.77 |
| LB 9851.93 | 9906.90 | 1428.97 | 229.90 | 54.05 | 10.21 | 4.41 | 6.22 |
| 9906.90 | 9961.88 | 2526.55 | 330.19 | 56.84 | 18.05 | 6.01 | 7.65 |
| 9961.88 | 10016.85 | 492.30 | 122.12 | 54.98 | 3.52 | 2.22 | 4.03 |
| 10016.85 | 10071.83 | 886.68 | 175.62 | 56.40 | 6.33 | 3.19 | 5.05 |
| 10071.83 | RB 10126.80 | 333.63 | 96.70 | 54.98 | 2.38 | 1.76 | 3.45 |
| 10126.80 | 10666.24 | 8242.76 | 1885.70 | 507.88 | 58.88 | 3.72 | 4.37 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.733

INPUT
Description:
Station Elevation Data num= 242

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7488.9 | 1536.81 | 7498.67 | 1536.72 | 7509.26 | 1536.59 | 8400.36 | 1538 | 8426.17 | 1538 |
| 8850.07 | 1537.58 | 8863.4 | 1536.98 | 8867.18 | 1537.49 | 8876.27 | 1536 | 8877.8 | 1535.74 |
| 8879.68 | 1536 | 8886.14 | 1536.93 | 8895.33 | 1537.21 | 8898.33 | 1538 | 8899.42 | 1538.28 |
| 8925.79 | 1538.29 | 8927.04 | 1538 | 8930.95 | 1537.1 | 8939.38 | 1536.37 | 8944.1 | 1536 |
| 8949.1 | 1535.64 | 8952.96 | 1536 | 8958.37 | 1536.6 | 8973.35 | 1536 | 8975.9 | 1535.89 |
| 8978.8 | 1536 | 9001.15 | 1536.85 | 9048.14 | 1536 | 9173.51 | 1534 | 9263.01 | 1534 |
| 9498.18 | 1534.77 | 9499.01 | 1534 | 9501.12 | 1532 | 9503.27 | 1530 | 9505.42 | 1528 |
| 9507.53 | 1526 | 9509.17 | 1524.07 | 9509.58 | 1524 | 9547.34 | 1522 | 9553.43 | 1521.73 |
| 9562.78 | 1520 | 9599.4 | 1520 | 9611.38 | 1520 | 9617.9 | 1519.03 | 9619.45 | 1520 |
| 9622.68 | 1522 | 9626.5 | 1524 | 9630.61 | 1526 | 9635.24 | 1528 | 9640.09 | 1530 |
| 9648.2 | 1532 | 9652.22 | 1534 | 9657.12 | 1535.09 | 9801.14 | 1534.98 | 9807.54 | 1536 |
| 9835.3 | 1536 | 9839.68 | 1534.92 | 9917.35 | 1534.95 | 9918.82 | 1534 | 9921.92 | 1532 |
| 9924.74 | 1530 | 9925.88 | 1528.99 | 9955.22 | 1528.94 | 9959.58 | 1528 | 9966.53 | 1526.48 |
| 9987.52 | 1527.16 | 9999.99 | 152 | 610004.68 | 1525.55 | 10013.59 | 1524.58 | 10022.95 | 1524.51 |
| 10026.22 | 152 | 610030.67 | 152 | 810034.49 | 1529.76 | 10059.67 | 1528.93 | 10067.01 | 1530 |
| 10069.6 | 1530.38 | 10073.24 | 1530.37 | 10095.54 | 153 | 010111.04 | 1529.41 | 0120.14 | 1529.59 |
| 10123.44 | 153 | 010148.62 | 1531.05 | 10169.99 | 1530.47 | 10173.9 | 153 | 210178.71 | 1534 |

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10183.44    153610184.78 1536.5610185.88    153610189.89    153410194.03    1532
10195.99 1531.0510197.27 1530.7510197.72    153010198.91    152810200.11    1526
 10201.3    1524 10202.5    152210203.69    152010204.89    151810206.08    1516
10207.28    151410208.47    151210209.71    151010211.12    150810212.53    1506
 10212.9 1505.4710225.64    150610270.35 1507.0210274.32    150810282.81    1510
10292.42    151210307.46    151210317.58    151010323.23    150810327.57 1506.46
10585.89  1507.910586.43    150810597.14    151010603.65 1511.1810605.36    1512
10609.43    151410610.22  1514.410611.19    151610612.34    151810613.44    1520
10614.55    152210615.65    152410616.76    152610617.86    152810618.97    1530
10620.07    1532 10620.4 1532.5910624.81    153410631.06    153610632.09 1536.33
10635.79    153610645.11  1535.210669.58    153610669.76 1536.0110669.84    1536
   10685 1534.6510687.78    153610693.84    153810725.48    153810728.34 1536.14
10728.45    153610730.05    153410731.65    153210733.25    153010734.85    1528
10736.44    152610737.97    1524 10739.5    152210741.04    152010742.57    1518
 10744.1    151610745.89    151410747.61    151210749.33    151010749.39 1509.93
10754.31    1510 10759.6 1510.2910768.77    151010788.96 1509.1210790.52    1510
10794.49    151210795.96 1512.5410796.95    151210800.61    151010804.33    1508
10808.91    150610814.06    150410818.58    150210819.24 1501.7110849.54    1502
10927.62    150411086.83    150411116.74    150411125.78 1504.0811131.25    1506
11136.74    150811141.78    151011146.75    151211147.12 1512.0911148.29    1514
11149.49    151611150.66    151811151.83    152011152.99    152211154.16    1524
11155.33    152611156.49    152811157.66    153011158.82    153211159.99    1534
11160.32 1534.57 11162.6    153611165.78    153811168.33    154011170.88    1542
11171.47 1542.47 11172.6    154211177.42    154011181.36    153811185.14    1536
11187.15 1534.9412367.56 1535.8312370.63    153612374.84 1536.27 12389.1  1536.4
12395.83    1536 12397.1 1535.9313903.48 1534.0913911.05 1534.0313912.17    1534
13917.45 1533.9213935.46    153415245.98 1534.5715272.41 1534.4515275.96  1535.3
15284.01 1535.3415295.85 1534.0615295.98    153415300.19    153215304.52    1530
15309.05 1527.95 15375.7 1528.1415379.99    1530 15384.6    153215387.08 1533.08
15397.06    153415397.45 1534.0415403.45    153615403.69 1536.0715408.33    1536
 15427.6 1535.7315448.34    153415454.86 1533.4615459.26    1534 15475.6    1536
 15482.2 1536.8115515.44  1537.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  7488.9     .05 9839.68    .03510184.78     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9839.6810184.78              950   895.9     950             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7488.9  9835.3    1536   1062715515.44    1536
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9000    9835    1535   10190   10627    1532   10627   15470    1535

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1532.10   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.01   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1531.10   Reach Len. (ft)            950.00     895.90     950.00
  Crit W.S. (ft)            1530.95   Flow Area (sq ft)                     579.05
  E.G. Slope (ft/ft)       0.011821   Area (sq ft)                          579.05
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             248.39   Top Width (ft)                        248.39
  Vel Total (ft/s)             8.06   Avg. Vel. (ft/s)                        8.06
  Max Chl Dpth (ft)            6.59   Hydr. Depth (ft)                        2.33
  Conv. Total (cfs)         42924.4   Conv. (cfs)                          42924.4
  Length Wtd. (ft)           895.90   Wetted Per. (ft)                      250.98
  Min Ch El (ft)            1524.51   Shear (lb/sq ft)                        1.70
  Alpha                        1.00   Stream Power (lb/ft s)                 13.72
  Frctn Loss (ft)              3.83   Cum Volume (acre-ft)         2.62     458.33      35.44
  C & E Loss (ft)              0.21   Cum SA (acres)               1.32     128.00      25.21


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1533.85   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.12   Wt. n-Val.                            0.035      0.050
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| | | | | | |
|---|---|---|---|---|---|
| W.S. Elev (ft) | 1532.73 | Reach Len. (ft) | 950.00 | 895.90 | 950.00 |
| Crit W.S. (ft) | 1532.73 | Flow Area (sq ft) | | 990.26 | 311.52 |
| E.G. Slope (ft/ft) | 0.007137 | Area (sq ft) | | 990.26 | 311.52 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 8700.98 | 632.02 |
| Top Width (ft) | 683.18 | Top Width (ft) | | 254.87 | 428.32 |
| Vel Total (ft/s) | 7.17 | Avg. Vel. (ft/s) | | 8.79 | 2.03 |
| Max Chl Dpth (ft) | 8.22 | Hydr. Depth (ft) | | 3.89 | 0.73 |
| Conv. Total (cfs) | 110471.1 | Conv. (cfs) | | 102990.1 | 7481.0 |
| Length Wtd. (ft) | 897.73 | Wetted Per. (ft) | | 258.27 | 428.85 |
| Min Ch El (ft) | 1524.51 | Shear (lb/sq ft) | | 1.71 | 0.32 |
| Alpha | 1.41 | Stream Power (lb/ft s) | | 15.01 | 0.66 |
| Frctn Loss (ft) | 2.64 | Cum Volume (acre-ft) | 12.20 | 684.04 | 55.16 |
| C & E Loss (ft) | 0.20 | Cum SA (acres) | 14.67 | 143.15 | 42.19 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1534.86 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.12 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1533.74 | Reach Len. (ft) | 950.00 | 895.90 | 950.00 |
| Crit W.S. (ft) | 1533.47 | Flow Area (sq ft) | | 1249.31 | 746.14 |
| E.G. Slope (ft/ft) | 0.005932 | Area (sq ft) | | 1249.31 | 746.14 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 11550.87 | 2449.13 |
| Top Width (ft) | 692.41 | Top Width (ft) | | 258.85 | 433.56 |
| Vel Total (ft/s) | 7.02 | Avg. Vel. (ft/s) | | 9.25 | 3.28 |
| Max Chl Dpth (ft) | 9.23 | Hydr. Depth (ft) | | 4.83 | 1.72 |
| Conv. Total (cfs) | 181771.6 | Conv. (cfs) | | 149972.9 | 31798.7 |
| Length Wtd. (ft) | 900.63 | Wetted Per. (ft) | | 262.75 | 434.48 |
| Min Ch El (ft) | 1524.51 | Shear (lb/sq ft) | | 1.76 | 0.64 |
| Alpha | 1.47 | Stream Power (lb/ft s) | | 16.28 | 2.09 |
| Frctn Loss (ft) | 2.31 | Cum Volume (acre-ft) | 28.01 | 828.60 | 118.51 |
| C & E Loss (ft) | 0.17 | Cum SA (acres) | 22.83 | 147.54 | 120.29 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 1142.30 | 153.03 | 55.53 | 24.48 | 2.81 | 7.46 |
| 9977.72 | 10046.74 | 3014.50 | 301.04 | 70.30 | 64.59 | 4.36 | 10.01 |
| 10046.74 | 10115.76 | 421.63 | 91.87 | 69.15 | 9.03 | 1.33 | 4.59 |
| 10115.76 | RB 10184.78 | 88.57 | 33.11 | 56.00 | 1.90 | 0.59 | 2.67 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 2106.41 | 244.05 | 58.44 | 22.57 | 4.29 | 8.63 |
| 9977.72 | 10046.74 | 4490.13 | 413.83 | 70.30 | 48.11 | 6.00 | 10.85 |
| 10046.74 | 10115.76 | 1404.09 | 204.66 | 69.15 | 15.04 | 2.97 | 6.86 |
| 10115.76 | RB 10184.78 | 700.35 | 127.72 | 60.38 | 7.50 | 2.13 | 5.48 |
| 10184.78 | 10717.85 | 632.02 | 311.52 | 428.85 | 6.77 | 0.73 | 2.03 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 2752.63 | 302.26 | 60.30 | 19.66 | 5.17 | 9.11 |
| 9977.72 | 10046.74 | 5435.60 | 483.44 | 70.30 | 38.83 | 7.00 | 11.24 |
| 10046.74 | 10115.76 | 2136.75 | 274.27 | 69.15 | 15.26 | 3.97 | 7.79 |
| 10115.76 | RB 10184.78 | 1225.90 | 189.35 | 63.01 | 8.76 | 3.04 | 6.47 |
| 10184.78 | 10717.85 | 2449.13 | 746.14 | 434.48 | 17.49 | 1.72 | 3.28 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.563

INPUT
Description:
Station Elevation Data num= 79

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9071.1 | 1534.25 | 9166.33 | 1534 | 9188.48 | 1534 | 9290.35 | 1534 | 9415.18 | 1532.15 |
| 9416.1 | 1532 | 9426.51 | 1530 | 9427.58 | 1529.7 | 9430.73 | 1530 | 9474.96 | 1530 |
| 9475.36 | 1529.99 | 9475.43 | 1530 | 9485.04 | 1532 | 9513.01 | 1533.6 | 9530.26 | 1534 |
| 9541.61 | 1534.21 | 9547.05 | 1534 | 9579.81 | 1534 | 9581.79 | 1534.1 | 9770.77 | 1535.38 |
| 9773.4 | 1534 | 9777.19 | 1532 | 9780.99 | 1530 | 9784.93 | 1528 | 9789.78 | 1526.25 |
| 9860.53 | 1527.47 | 9899.89 | 1527.04 | 9918.17 | 1526.77 | 9931.75 | 1526.65 | 9936.69 | 1526 |
| 9940.69 | 1525.27 | 9945.67 | 1526 | 9947.46 | 1526.09 | 9949.29 | 1526 | 9983.86 | 1524.7 |
| 9989.49 | 1524 | 9997.43 | 152210001.19 | | 1520.8410013.48 | | 152210053.13 | | 1522 |
| 10109.15 | 1521.0210111.32 | | 152210115.82 | | 1524 | 10120.4 | 152610122.78 | | 1527.04 |
| 10134.86 | 1526 | 10142.8 | 1525.2410165.99 | | 152610174.86 | | 1526.310181.69 | | 1528 |
| 10182.93 | 1528.2710212.59 | | 1528.1110250.83 | | 152810255.04 | | 1527.310300.54 | | 1528 |
| 10481.77 | 153010507.33 | | 1530.6510510.45 | | 153210517.97 | | 153210521.58 | | 1530.69 |
| 10603.12 | 1531.8810604.31 | | 153210615.53 | | 1533.2910639.91 | | 1532.9510647.23 | | 1532 |
| 10871.7 | 153010952.71 | | 153011147.77 | | 153211147.78 | | 153211157.15 | | 1532.35 |
| 11160.9 | 153211166.84 | | 1531.2611175.72 | | 1531.4112289.33 | | 153212301.59 | | 1532.48 |
| 12309.43 | 1532.5212333.31 | | 1533.1 | 12393 | 1532.7212571.81 | | 1532.58 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9071.1 | .05 | 9780.99 | .03510481.77 | | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9780.9910481.77 | | 40 | 32.8 | 40 | .3 | .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9071.1 | 9870.77 | 1535 | 10180 | 12571.81 | 1533.29 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1528.06 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.31 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1527.75 | Reach Len. (ft) | 40.00 | 32.80 | 40.00 |
| Crit W.S. (ft) | 1525.49 | Flow Area (sq ft) | | 1046.19 | |
| E.G. Slope (ft/ft) | 0.002195 | Area (sq ft) | | 1122.74 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 426.88 | Top Width (ft) | | 426.88 | |
| Vel Total (ft/s) | 4.46 | Avg. Vel. (ft/s) | | 4.46 | |
| Max Chl Dpth (ft) | 6.91 | Hydr. Depth (ft) | | 3.38 | |
| Conv. Total (cfs) | 99614.2 | Conv. (cfs) | | 99614.2 | |
| Length Wtd. (ft) | 32.80 | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.46 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.05 | |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 2.62 | 440.83 | 35.44 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 1.32 | 121.06 | 25.21 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1530.45 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1530.01 | Reach Len. (ft) | 40.00 | 32.80 | 40.00 |
| Crit W.S. (ft) | 1527.42 | Flow Area (sq ft) | | 1744.60 | |
| E.G. Slope (ft/ft) | 0.001596 | Area (sq ft) | 0.96 | 2445.90 | 0.55 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 832.46 | Top Width (ft) | 49.00 | 700.78 | 82.68 |
| Vel Total (ft/s) | 5.35 | Avg. Vel. (ft/s) | | 5.35 | |
| Max Chl Dpth (ft) | 9.17 | Hydr. Depth (ft) | | 5.64 | |
| Conv. Total (cfs) | 233595.7 | Conv. (cfs) | | 233595.7 | |
| Length Wtd. (ft) | 32.80 | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.56 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.99 | |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 12.19 | 648.70 | 51.76 |
| C & E Loss (ft) | 0.11 | Cum SA (acres) | 14.14 | 133.33 | 36.62 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1532.39 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.57 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1531.82 | Reach Len. (ft) | 40.00 | 32.80 | 40.00 |
| Crit W.S. (ft) | 1528.34 | Flow Area (sq ft) | | 2303.95 | |
| E.G. Slope (ft/ft) | 0.001421 | Area (sq ft) | 109.08 | 3713.50 | 738.32 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 2120.44 | Top Width (ft) | 70.54 | 700.78 | 1349.12 |
| Vel Total (ft/s) | 6.08 | Avg. Vel. (ft/s) | | 6.08 | |
| Max Chl Dpth (ft) | 10.98 | Hydr. Depth (ft) | | 7.45 | |
| Conv. Total (cfs) | 371329.9 | Conv. (cfs) | | 371329.9 | |
| Length Wtd. (ft) | 32.80 | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.66 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 3.99 | |
| Frctn Loss (ft) | 0.06 | Cum Volume (acre-ft) | 26.82 | 777.57 | 102.33 |
| C & E Loss (ft) | 0.18 | Cum SA (acres) | 22.06 | 137.67 | 100.85 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 49.21 | 34.35 | 50.38 | 1.05 | 0.68 | 1.43 |
| 9921.15 | 10061.30 | 2599.13 | 560.10 | 140.87 | 55.69 | 4.00 | 4.64 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10061.30 | 10201.46 | 2018.67 | 451.74 | 120.23 | 43.25 | 3.81 | 4.47 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 502.79 | 148.13 | 50.38 | 5.39 | 2.94 | 3.39 |
| 9921.15 | 10061.30 | 4905.11 | 876.64 | 140.87 | 52.56 | 6.25 | 5.60 |
| 10061.30 | 10201.46 | 3925.10 | 719.82 | 120.23 | 42.06 | 6.06 | 5.45 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 1066.65 | 239.25 | 50.38 | 7.62 | 4.75 | 4.46 |
| 9921.15 | 10061.30 | 7146.97 | 1130.16 | 140.87 | 51.05 | 8.06 | 6.32 |
| 10061.30 | 10201.46 | 5786.38 | 934.53 | 120.23 | 41.33 | 7.87 | 6.19 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 16.557

INPUT
Description:
Station Elevation Data  num= 69

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9047.5 | 1533.08 | 9106.59 | 1532.94 | 9115.83 | 1532.91 | 9345.57 | 1532.38 | 9374.99 | 1532 |
| 9432.63 | 1532 | 9470.28 | 1532 | 9484.66 | 1531.83 | 9556.41 | 1531.68 | 9556.79 | 1531.68 |
| 9629.07 | 1530 | 9795.47 | 1530 | 9802.32 | 1532 | 9807.09 | 1533.76 | 9818.78 | 1533.96 |
| 9826.26 | 1532 | 9849.04 | 1530 | 9911.02 | 1535.362 | 9916.36 | 1533.358 | 9926.06 | 1529.547 |
| 9931.55 | 1523.656 | 9936.85 | 1522.768 | 9940.95 | 1522.608 | 9945.67 | 1525.33 | 9947.92 | 1525.515 |
| 9960.39 | 1525.03 | 9973.51 | 521.308 | 9988.04 | 1520.578 | 9994.56 | 1520.803 | 10010.04 | 1518.898 |
| 10022.61 | 1517.566 | 10030 | 1519.789 | 10039.13 | 1519.221 | 0059.31 | 1524.961 | 10071.35 | 1525.899 |
| 10076.13 | 1526.772 | 10088.31 | 1525.05 | 10096.58 | 1525.426 | 10102.36 | 1525.298 | 10112.29 | 1526.083 |
| 10129.82 | 1526.719 | 10132.21 | 1528.994 | 10140.19 | 1532.542 | 10143.87 | 1533.969 | 10148.66 | 1535.438 |
| 10187.6 | 1530 | 10212.86 | 1532 | 10217.91 | 1532 | 10219.28 | 1534.54 | 10229.16 | 1534 |
| 10235.13 | 1533.68 | 10250.95 | 1532 | 10337.27 | 1530 | 10367.43 | 1532 | 10377.79 | 1532 |
| 10387.83 | 1533.85 | 10390.25 | 1532 | 10416.31 | 1532 | 10422.47 | 1533.46 | 10431.98 | 1532 |
| 10503.91 | 1532 | 10534.7 | 1532 | 10546.79 | 1532 | 10601.69 | 1533.99 | 10664.61 | 1532.93 |
| 10796.8 | 1532 | 11475.18 | 1530.95 | 11519.68 | 1531.02 | 11536.91 | 1530.98 | | |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9047.5 | .05 | 9926.06 | .035 | 10132.21 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9926.06 | 10132.21 | | 61.8 | 61.8 | 61.8 | .3 | .5 |

Ineffective Flow  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9047.5 | 9900 | 1534 | 10150 | 11536.91 | 1534 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1527.95 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.41 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1527.54 | Reach Len. (ft) | 18.00 | 18.00 | 18.00 |
| Crit W.S. (ft) | 1524.68 | Flow Area (sq ft) | | 903.87 | |
| E.G. Slope (ft/ft) | 0.002083 | Area (sq ft) | | 903.87 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 202.75 | Top Width (ft) | | 202.75 | |
| Vel Total (ft/s) | 5.16 | Avg. Vel. (ft/s) | | 5.16 | |
| Max Chl Dpth (ft) | 9.97 | Hydr. Depth (ft) | | 4.46 | |
| Conv. Total (cfs) | 102266.2 | Conv. (cfs) | | 102266.2 | |
| Length Wtd. (ft) | 18.00 | Wetted Per. (ft) | | 207.76 | |

| | | | | | |
|---|---|---|---|---|---|
| Min Ch El (ft) | 1517.57 | Shear (lb/sq ft) | | 0.57 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.92 | |
| Frctn Loss (ft) | 0.04 | Cum Volume (acre-ft) | 2.62 | 440.07 | 35.44 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 1.32 | 120.82 | 25.21 |

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1530.28 | Element | | | |
| Vel Head (ft) | 0.80 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1529.48 | Reach Len. (ft) | 18.00 | 18.00 | 18.00 |
| Crit W.S. (ft) | 1527.10 | Flow Area (sq ft) | | 1300.53 | 0.26 |
| E.G. Slope (ft/ft) | 0.002552 | Area (sq ft) | | 1300.53 | 0.26 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9332.85 | 0.15 |
| Top Width (ft) | 207.18 | Top Width (ft) | | 206.09 | 1.09 |
| Vel Total (ft/s) | 7.17 | Avg. Vel. (ft/s) | | 7.18 | 0.55 |
| Max Chl Dpth (ft) | 11.91 | Hydr. Depth (ft) | | 6.31 | 0.24 |
| Conv. Total (cfs) | 184731.8 | Conv. (cfs) | | 184728.9 | 2.9 |
| Length Wtd. (ft) | 18.00 | Wetted Per. (ft) | | 212.51 | 1.19 |
| Min Ch El (ft) | 1517.57 | Shear (lb/sq ft) | | 0.98 | 0.04 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 7.00 | 0.02 |
| Frctn Loss (ft) | 0.06 | Cum Volume (acre-ft) | 12.19 | 647.29 | 51.75 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 14.11 | 132.99 | 36.58 |

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1532.14 | Element | | | |
| Vel Head (ft) | 1.18 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1530.97 | Reach Len. (ft) | 18.00 | 18.00 | 18.00 |
| Crit W.S. (ft) | 1528.37 | Flow Area (sq ft) | 2.57 | 1607.74 | 4.39 |
| E.G. Slope (ft/ft) | 0.002830 | Area (sq ft) | 196.45 | 1607.74 | 65.86 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 3.09 | 13990.43 | 6.48 |
| Top Width (ft) | 568.78 | Top Width (ft) | 237.28 | 206.15 | 125.35 |
| Vel Total (ft/s) | 8.67 | Avg. Vel. (ft/s) | 1.20 | 8.70 | 1.48 |
| Max Chl Dpth (ft) | 13.40 | Hydr. Depth (ft) | 0.71 | 7.80 | 0.99 |
| Conv. Total (cfs) | 263146.7 | Conv. (cfs) | 58.1 | 262966.8 | 121.8 |
| Length Wtd. (ft) | 18.00 | Wetted Per. (ft) | 3.89 | 212.61 | 4.86 |
| Min Ch El (ft) | 1517.57 | Shear (lb/sq ft) | 0.12 | 1.34 | 0.16 |
| Alpha | 1.01 | Stream Power (lb/ft s) | 0.14 | 11.63 | 0.24 |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 26.68 | 775.56 | 101.96 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 21.92 | 137.33 | 100.18 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9926.06 | 9967.29 | 411.78 | 123.85 | 42.15 | 8.82 | 3.15 | 3.32 |
| 9967.29 | 10008.52 | 1616.16 | 279.86 | 41.60 | 34.63 | 6.79 | 5.77 |
| 10008.52 | 10049.75 | 2231.31 | 341.16 | 42.08 | 47.81 | 8.27 | 6.54 |
| 10049.75 | 10090.98 | 266.64 | 95.15 | 41.85 | 5.71 | 2.31 | 2.80 |
| 10090.98 | RB 10132.21 | 141.11 | 63.84 | 40.08 | 3.02 | 1.61 | 2.21 |

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9926.06 | 9967.29 | 1071.58 | 201.91 | 44.80 | 11.48 | 4.90 | 5.31 |
| 9967.29 | 10008.52 | 2948.43 | 359.79 | 41.60 | 31.59 | 8.73 | 8.19 |
| 10008.52 | 10049.75 | 3803.51 | 421.09 | 42.08 | 40.75 | 10.21 | 9.03 |
| 10049.75 | 10090.98 | 884.19 | 175.08 | 41.85 | 9.47 | 4.25 | 5.05 |
| 10090.98 | RB 10132.21 | 625.14 | 142.66 | 42.19 | 6.70 | 3.46 | 4.38 |
| 10132.21 | 10272.68 | 0.15 | 0.26 | 1.19 | 0.00 | 0.24 | 0.55 |

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9838.20 | 9926.06 | 3.09 | 2.57 | 3.89 | 0.02 | 0.71 | 1.20 |
| LB 9926.06 | 9967.29 | 1811.41 | 263.35 | 44.89 | 12.94 | 6.39 | 6.88 |
| 9967.29 | 10008.52 | 4168.75 | 421.23 | 41.60 | 29.78 | 10.22 | 9.90 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10008.52 | 10049.75 | 5188.77 | 482.53 | 42.08 | 37.06 | 11.70 | 10.75 |
| 10049.75 | 10090.98 | 1586.94 | 236.52 | 41.85 | 11.34 | 5.74 | 6.71 |
| 10090.98 | RB 10132.21 | 1234.56 | 204.11 | 42.19 | 8.82 | 4.95 | 6.05 |
| 10132.21 | 10272.68 | 6.48 | 4.39 | 4.86 | 0.05 | 0.99 | 1.48 |

Warning: Divided flow computed for this cross-section.

```
BRIDGE                    RIVER: Queen Creek
REACH: Upper main            RS: 16.548

INPUT
Description: Schnepf Road Bridge
Distance from Upstream XS =       18
Deck/Roadway Width        =       33
Weir Coefficient          =      2.6
Bridge Deck/Roadway Skew  =        0
Upstream  Deck/Roadway Coordinates
    num=        9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    8000  1534.5    1530    9913  1536.7    1526    9914  1536.7  1534.5
   10134  1536.7  1534.5   10135  1536.7    152510634.86    1534    1525
10799.66    1532    152511201.49    1532    152512995.22 1533.36    1525

Upstream Bridge Cross Section Data
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  9047.5 1533.08 9106.59 1532.94 9115.83 1532.91 9345.57 1532.38 9374.99    1532
 9432.63    1532 9470.28    1532 9484.66 1531.83 9556.41 1531.68 9556.79 1531.68
 9629.07    1530 9795.47    1530 9802.32    1532 9807.09 1533.76 9818.78 1533.96
 9826.26    1532 9849.04    1530 9911.021535.362 9916.361533.358 9926.061529.547
 9931.551523.656 9936.851522.768 9940.951522.608 9945.67 1525.33 9947.921525.515
 9960.39 1525.03  9973.51521.308 9988.041520.578 9994.561520.80310010.041518.898
 10022.61517.566   100301519.78910039.131519.22210059.311524.96110071.351525.899
10076.131526.77210088.31 1525.0510096.581525.42610102.361525.29810112.291526.083
10129.821526.71910132.211528.99410140.191532.54210143.871533.96910148.661535.438
 10187.6    153010212.86    153210217.91    153410219.28 1534.5410229.16    1534
10235.13 1533.6810250.95    153210337.27    153010367.43    153010377.79    1532
10387.83 1533.8510390.25    153410416.31    153410422.47 1533.4610431.98    1532
10503.91    1532 10534.7    153210546.79    153210601.69 1533.9910664.61 1532.93
 10796.8    153211475.18 1530.9511519.68 1531.0211536.91 1530.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  9047.5     .05 9926.06    .03510132.21     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9926.0610132.21              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  9047.5    9900    1534   1015011536.91    1534

Downstream  Deck/Roadway Coordinates
    num=        9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    8000  1534.5    1530    9913  1536.7    1526    9914  1536.7  1534.5
   10134  1536.7  1534.5   10135  1536.7    152510634.86    1534    1525
10799.66    1532    152511201.49    1532    152512995.22 1533.36    1525

Downstream Bridge Cross Section Data
Station Elevation Data    num=     154
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 7439.82 1534.12 7467.89    1534 7469.23 1533.68 7482.05 1533.71  7483.8    1534
 7554.64    1534 7630.76 1533.12 7658.92 1533.16 7678.57 1533.64 7705.04 1533.37
  7718.2    1534 7783.78 1534.09  7841.1 1534.02 7854.75    1534 8038.73    1534
 8043.85 1534.02 8224.86 1534.57 8233.58 1534.32 8560.02 1534.48 8574.45 1534.38
 8854.54 1534.47 8948.79 1534.49 9095.87    1534 9184.37    1534 9219.37    1534
 9233.76    1534 9358.99 1534.82 9408.09    1534 9457.72 1532.54 9494.42 1532.75
 9552.23    1532 9556.76 1530.82 9628.84    1530 9664.96    1530 9705.31    1530
 9767.04    1530 9808.79    1532 9815.68 1533.67 9829.96 1533.88 9836.74    1532
 9875.32    1530 9891.74 1529.32 9897.79 1528.88 9901.951535.179 9907.471534.898
 9911.251532.521 9922.051528.884 9925.491525.025  9942.21521.946 9956.121521.467
 9973.951520.569 9982.62  1518.4 9986.991518.793 9993.381518.74910017.551523.233
   100301524.15810045.461523.60710061.311524.20110070.551525.78210093.091526.327
10110.071527.26710127.751526.57110131.191529.95510138.161533.09910145.771535.359
10158.26 1528.8910193.04    153010199.09 1530.2910206.35    1532 10211.1    1534
```

```
10212.43 1534.5610225.44    153410227.08 1533.9510232.22    153210238.77 1530.25
10269.39    153010344.31    152810345.85 1527.9610397.49    152810410.01    1530
10414.28    153210417.29  1533.410427.85  1533.210429.96    153210433.46    1530
10440.94    152810443.61 1527.3310476.69 1527.8610477.84    152810491.51    1530
10499.71    153210509.19 1532.8510523.63  1532.610527.75    153210537.76    1530
10540.97 1529.3610572.02 1529.9110573.98    153010601.68    153210608.24 1532.78
10625.76  1532.510645.39    153210665.55 1531.8210668.92    153210725.02    1532
10744.58 1531.3810776.03 1530.9810805.06 1530.3710831.35 1530.4810835.23    1530
10836.19 1529.8910843.52 1528.0810913.27    152810929.01    152811121.96 1529.99
11122.63    153011412.23 1530.5111456.48 1531.7111479.52 1531.6811521.96 1531.28
11523.71    153211525.44 1532.7811534.88  1533.211540.93    153211547.29  1531.1
11680.74 1531.3811703.79 1531.6512612.65    153212648.91    153212679.22    1532
12692.95 1532.4112749.82 1532.3812755.95    153212763.03 1531.5713546.61    1530
13770.89 1529.4413778.84    153013799.21    153213799.41 1532.0213804.36    1532
 13808.8    1532 13812.5    153213824.45 1531.9413833.99    153013839.42 1529.31
14974.01    152815157.48 1526.9915178.95    152815188.22 1528.5515224.67    1530
15243.46 1530.7815317.93    153015348.76 1529.61   15410  1529.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7439.82     .05 9922.05    .03510131.19     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9922.0510131.19              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7439.82    9911    1532 10131.3   15410    1531
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7439.82 9808.79    1531   10818   15410    1531

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  1536.5
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  5

Pier Data
Pier Station     Upstream=  9947.9    Downstream=  9942.2
Upstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535
Downstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535

Pier Data
Pier Station     Upstream= 9988.04    Downstream= 9982.62
Upstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535
Downstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535

Pier Data
Pier Station     Upstream=   10030    Downstream=   10030
Upstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535
Downstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535

Pier Data
Pier Station     Upstream=10071.35    Downstream= 10070.6
Upstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535
Downstream     num=       2
    Width   Elev    Width   Elev
       1    1517       1    1535
```

```
Pier Data
Pier Station      Upstream=10112.29    Downstream= 10110.1
Upstream     num=        2
    Width   Elev     Width   Elev
       1    1517       1    1535
Downstream     num=        2
    Width   Elev     Width   Elev
       1    1517       1    1535

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Yarnell                  KVal =    1.25
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT     Profile #1/3 flow
Opening : Bridge #1
```

| | | | Inside BR US | Inside BR DS |
|---|---|---|---|---|
| E.G. US. (ft) | 1527.95 | Element | | |
| W.S. US. (ft) | 1527.54 | E.G. Elev (ft) | 1527.90 | 1527.71 |
| Q Total (cfs) | 4667.00 | W.S. Elev (ft) | 1527.45 | 1527.06 |
| Q Bridge (cfs) | 4667.00 | Crit W.S. (ft) | 1524.69 | 1525.40 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 9.88 | 8.61 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 5.39 | 6.50 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 865.63 | 718.19 |
| Weir Submerg | | Froude # Chl | 0.45 | 0.59 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 3452.32 | 2878.02 |
| Min Top Rd (ft) | 1536.50 | Hydr Depth (ft) | 4.38 | 3.75 |
| Min El Prs (ft) | 1534.50 | W.P. Total (ft) | 241.37 | 229.43 |
| Delta EG (ft) | 0.30 | Conv. Total (cfs) | 86103.8 | 65247.3 |
| Delta WS (ft) | 0.53 | Top Width (ft) | 197.57 | 191.37 |
| BR Open Area (sq ft) | 2277.68 | Frctn Loss (ft) | 0.13 | 0.05 |
| BR Open Vel (ft/s) | 6.50 | C & E Loss (ft) | 0.06 | 0.01 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.66 | 1.00 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 3.55 | 6.50 |

```
Warning: The Yarnell method gave an invalid answer.  The upstream energy was less than the
         downstream energy.  The program defaulted to the next valid (user selected) method.  If the
         Yarnell method was the only one selected, the program will default to an energy based
         solution.

BRIDGE OUTPUT     Profile #2/3 flow
Opening : Bridge #1
```

| | | | Inside BR US | Inside BR DS |
|---|---|---|---|---|
| E.G. US. (ft) | 1530.28 | Element | | |
| W.S. US. (ft) | 1529.48 | E.G. Elev (ft) | 1530.20 | 1529.92 |
| Q Total (cfs) | 9333.00 | W.S. Elev (ft) | 1529.31 | 1528.67 |
| Q Bridge (cfs) | 9333.00 | Crit W.S. (ft) | 1527.14 | 1527.54 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 11.75 | 10.23 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 7.54 | 8.95 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 1237.75 | 1042.65 |
| Weir Submerg | | Froude # Chl | 0.54 | 0.70 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 6817.63 | 5953.21 |
| Min Top Rd (ft) | 1536.50 | Hydr Depth (ft) | 6.14 | 5.15 |
| Min El Prs (ft) | 1534.50 | W.P. Total (ft) | 265.61 | 257.90 |
| Delta EG (ft) | 0.44 | Conv. Total (cfs) | 146874.8 | 112337.9 |
| Delta WS (ft) | 0.85 | Top Width (ft) | 201.65 | 202.65 |
| BR Open Area (sq ft) | 2277.68 | Frctn Loss (ft) | 0.17 | 0.06 |
| BR Open Vel (ft/s) | 8.95 | C & E Loss (ft) | 0.11 | 0.02 |
| Coef of Q | | Shear Total (lb/sq ft) | 1.17 | 1.74 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 8.86 | 15.59 |

Warning: The Yarnell method gave an invalid answer. The upstream energy was less than the downstream energy. The program defaulted to the next valid (user selected) method. If the Yarnell method was the only one selected, the program will default to an energy based solution.

BRIDGE OUTPUT Profile #full flow
Opening : Bridge #1

| | | | | |
|---|---|---|---|---|
| E.G. US. (ft) | 1532.14 | Element | Inside BR US | Inside BR DS |
| W.S. US. (ft) | 1530.97 | E.G. Elev (ft) | 1532.04 | 1531.62 |
| Q Total (cfs) | 14000.00 | W.S. Elev (ft) | 1530.72 | 1529.63 |
| Q Bridge (cfs) | 14000.00 | Crit W.S. (ft) | 1528.44 | 1528.77 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 13.16 | 11.19 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 9.18 | 11.31 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 1525.65 | 1238.32 |
| Weir Submerg | | Froude # Chl | 0.61 | 0.81 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 10576.33 | 9369.49 |
| Min Top Rd (ft) | 1536.50 | Hydr Depth (ft) | 7.39 | 6.01 |
| Min El Prs (ft) | 1534.50 | W.P. Total (ft) | 285.65 | 271.47 |
| Delta EG (ft) | 0.64 | Conv. Total (cfs) | 200045.4 | 145286.1 |
| Delta WS (ft) | 1.39 | Top Width (ft) | 206.33 | 206.03 |
| BR Open Area (sq ft) | 2277.68 | Frctn Loss (ft) | 0.22 | 0.08 |
| BR Open Vel (ft/s) | 11.31 | C & E Loss (ft) | 0.20 | 0.03 |
| Coef of Q | | Shear Total (lb/sq ft) | 1.63 | 2.64 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 14.99 | 29.90 |

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.545

INPUT
Description: downstream of Schnepf Road bridge from hmp model
Station Elevation Data num= 154

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7439.82 | 1534.12 | 7467.89 | 1534 | 7469.23 | 1533.68 | 7482.05 | 1533.71 | 7483.8 | 1534 |
| 7554.64 | 1534 | 7630.76 | 1533.12 | 7658.92 | 1533.16 | 7678.57 | 1533.64 | 7705.04 | 1533.37 |
| 7718.2 | 1534 | 7783.78 | 1534.09 | 7841.1 | 1534.02 | 7854.75 | 1534 | 8038.73 | 1534 |
| 8043.85 | 1534.02 | 8224.86 | 1534.57 | 8233.58 | 1534.32 | 8560.02 | 1534.48 | 8574.45 | 1534.38 |
| 8854.54 | 1534.47 | 8948.79 | 1534.49 | 9095.87 | 1534 | 9184.37 | 1534 | 9219.37 | 1534 |
| 9233.76 | 1534 | 9358.99 | 1534.82 | 9408.09 | 1534 | 9457.72 | 1532.54 | 9494.42 | 1532.75 |
| 9552.23 | 1532 | 9556.76 | 1530.82 | 9628.84 | 1530 | 9664.96 | 1530 | 9705.31 | 1530 |
| 9767.04 | 1530 | 9808.79 | 1532 | 9815.68 | 1533.67 | 9829.96 | 1533.88 | 9836.74 | 1532 |
| 9875.32 | 1530 | 9891.74 | 1529.32 | 9897.79 | 1528.88 | 9901.95 | 1535.179 | 9907.47 | 1534.898 |
| 9911.25 | 1532.521 | 9922.05 | 1528.884 | 9925.49 | 1525.025 | 9942.2 | 1521.946 | 9956.12 | 1521.467 |
| 9973.95 | 1520.569 | 9982.62 | 1518.4 | 9986.99 | 1518.793 | 9993.38 | 1518.74 | 9910017.55 | 1523.233 |
| 100301 | 524.15 | 810045.46 | 1523.6 | 710061.31 | 1524.2 | 0110070.55 | 1525.78 | 210093.09 | 1526.327 |
| 10110.07 | 1527.26 | 710127.75 | 1526.57 | 110131.19 | 1529.95 | 510138.16 | 1533.09 | 910145.77 | 1535.359 |
| 10158.26 | 1528.89 | 10193.04 | 153 | 010199.09 | 1530.29 | 10206.35 | 1532 | 10211.1 | 1534 |
| 10212.43 | 1534.56 | 10225.44 | 153 | 410227.08 | 1533.95 | 10232.22 | 153 | 210238.77 | 1530.25 |
| 10269.39 | 153 | 010344.31 | 152 | 810345.85 | 1527.96 | 10397.49 | 152 | 810410.01 | 1530 |
| 10414.28 | 153 | 210417.29 | 1533.4 | 10427.85 | 1533.2 | 10429.96 | 153 | 210433.46 | 1530 |
| 10440.94 | 152 | 810443.61 | 1527.33 | 10476.69 | 1527.86 | 10477.84 | 152 | 810491.51 | 1530 |
| 10499.71 | 153 | 210509.19 | 1532.85 | 10523.63 | 1532.6 | 10527.75 | 153 | 210537.76 | 1530 |
| 10540.97 | 1529.36 | 10572.02 | 1529.91 | 10573.98 | 153 | 010601.68 | 153 | 210608.24 | 1532.78 |
| 10625.76 | 1532.5 | 10645.39 | 153 | 210665.55 | 1531.82 | 10668.92 | 153 | 210725.02 | 1532 |
| 10744.58 | 1531.38 | 10776.03 | 1530.98 | 10805.06 | 1530.37 | 10831.35 | 1530.48 | 10835.23 | 1530 |
| 10836.19 | 1529.89 | 10843.52 | 1528.08 | 10913.27 | 152 | 810929.01 | 152 | 811121.96 | 1529.99 |
| 11122.63 | 153 | 011412.23 | 1530.51 | 11456.48 | 1531.71 | 11479.52 | 1531.68 | 11521.96 | 1531.28 |
| 11523.71 | 153 | 211525.44 | 1532.78 | 11534.88 | 1533.2 | 11540.93 | 153 | 211547.29 | 1531.1 |
| 11680.74 | 1531.38 | 11703.79 | 1531.65 | 12612.65 | 153 | 212648.91 | 153 | 212679.22 | 1532 |
| 12692.95 | 1532.41 | 12749.82 | 1532.38 | 12755.95 | 153 | 212763.03 | 1531.57 | 13546.61 | 1530 |
| 13770.89 | 1529.44 | 13778.84 | 153 | 013799.21 | 153 | 213799.41 | 1532.02 | 13804.36 | 1532 |
| 13808.8 | 1532 | 13812.5 | 153 | 213824.45 | 1531.94 | 13833.99 | 153 | 013839.42 | 1529.31 |
| 14974.01 | 152 | 815157.48 | 1526.99 | 15178.95 | 152 | 815188.22 | 1528.55 | 15224.67 | 1530 |
| 15243.46 | 1530.78 | 15317.93 | 153 | 015348.76 | 1529.61 | 15410 | 1529.8 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 7439.82 | .05 | 9922.05 | .035 | 10131.19 | .05 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
      9922.0510131.19                20    15.8      20              .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7439.82    9911    1532 10131.3   15410    1531
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7439.82 9808.79    1531   10818   15410    1531
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1527.65 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.64 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1527.02 | Reach Len. (ft) | 20.00 | 15.80 | 20.00 |
| Crit W.S. (ft) | 1525.36 | Flow Area (sq ft) | | 728.28 | |
| E.G. Slope (ft/ft) | 0.003955 | Area (sq ft) | | 728.28 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 193.55 | Top Width (ft) | | 193.55 | |
| Vel Total (ft/s) | 6.41 | Avg. Vel. (ft/s) | | 6.41 | |
| Max Chl Dpth (ft) | 8.62 | Hydr. Depth (ft) | | 3.76 | |
| Conv. Total (cfs) | 74210.4 | Conv. (cfs) | | 74210.4 | |
| Length Wtd. (ft) | 15.80 | Wetted Per. (ft) | | 195.86 | |
| Min Ch El (ft) | 1518.40 | Shear (lb/sq ft) | | 0.92 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.88 | |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 2.62 | 438.92 | 35.44 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 1.32 | 120.54 | 25.21 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1529.83 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.21 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1528.63 | Reach Len. (ft) | 20.00 | 15.80 | 20.00 |
| Crit W.S. (ft) | 1527.48 | Flow Area (sq ft) | | 1059.31 | |
| E.G. Slope (ft/ft) | 0.005018 | Area (sq ft) | | 1059.31 | 82.81 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 331.79 | Top Width (ft) | | 207.56 | 124.22 |
| Vel Total (ft/s) | 8.81 | Avg. Vel. (ft/s) | | 8.81 | |
| Max Chl Dpth (ft) | 10.23 | Hydr. Depth (ft) | | 5.10 | |
| Conv. Total (cfs) | 131747.4 | Conv. (cfs) | | 131747.4 | |
| Length Wtd. (ft) | 15.80 | Wetted Per. (ft) | | 211.27 | |
| Min Ch El (ft) | 1518.40 | Shear (lb/sq ft) | | 1.57 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 13.84 | |
| Frctn Loss (ft) | 0.08 | Cum Volume (acre-ft) | 12.19 | 645.64 | 51.74 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 14.11 | 132.70 | 36.56 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1531.51 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.92 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1529.58 | Reach Len. (ft) | 20.00 | 15.80 | 20.00 |
| Crit W.S. (ft) | 1528.71 | Flow Area (sq ft) | 0.72 | 1257.66 | |
| E.G. Slope (ft/ft) | 0.006440 | Area (sq ft) | 4.62 | 1257.66 | 235.22 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 0.82 | 13999.18 | |
| Top Width (ft) | 436.19 | Top Width (ft) | 14.89 | 208.76 | 212.54 |
| Vel Total (ft/s) | 11.13 | Avg. Vel. (ft/s) | 1.14 | 11.13 | |
| Max Chl Dpth (ft) | 11.18 | Hydr. Depth (ft) | 0.35 | 6.02 | |
| Conv. Total (cfs) | 174455.4 | Conv. (cfs) | 10.3 | 174445.1 | |
| Length Wtd. (ft) | 15.80 | Wetted Per. (ft) | 2.18 | 212.97 | |
| Min Ch El (ft) | 1518.40 | Shear (lb/sq ft) | 0.13 | 2.37 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.15 | 26.43 | |
| Frctn Loss (ft) | 0.10 | Cum Volume (acre-ft) | 26.64 | 773.56 | 101.91 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 21.87 | 137.04 | 100.12 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9922.05 | 9963.88 | 1053.87 | 179.21 | 41.35 | 22.58 | 4.46 | 5.88 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9963.88 | 10005.71 | 2516.21 | 304.94 | 42.34 | 53.92 | 7.29 | 8.25 |
| 10005.71 | 10047.53 | 814.15 | 154.57 | 42.08 | 17.44 | 3.70 | 5.27 |
| 10047.53 | 10089.36 | 271.78 | 79.95 | 41.98 | 5.82 | 1.91 | 3.40 |
| 10089.36 | RB 10131.19 | 10.98 | 9.62 | 28.11 | 0.24 | 0.34 | 1.14 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9922.05 | 9963.88 | 2080.77 | 245.16 | 43.52 | 22.29 | 5.89 | 8.49 |
| 9963.88 | 10005.71 | 4254.08 | 372.42 | 42.34 | 45.58 | 8.90 | 11.42 |
| 10005.71 | 10047.53 | 1804.21 | 222.05 | 42.08 | 19.33 | 5.31 | 8.13 |
| 10047.53 | 10089.36 | 913.15 | 147.43 | 41.98 | 9.78 | 3.52 | 6.19 |
| 10089.36 | RB 10131.19 | 280.79 | 72.23 | 41.36 | 3.01 | 1.78 | 3.89 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9673.83 | 9922.05 | 0.82 | 0.72 | 2.18 | 0.01 | 0.35 | 1.14 |
| LB 9922.05 | 9963.88 | 3103.23 | 284.98 | 43.86 | 22.17 | 6.81 | 10.89 |
| 9963.88 | 10005.71 | 5879.04 | 412.26 | 42.34 | 41.99 | 9.86 | 14.26 |
| 10005.71 | 10047.53 | 2771.23 | 261.89 | 42.08 | 19.79 | 6.26 | 10.58 |
| 10047.53 | 10089.36 | 1587.14 | 187.28 | 41.98 | 11.34 | 4.48 | 8.47 |
| 10089.36 | RB 10131.19 | 658.53 | 111.25 | 42.72 | 4.70 | 2.68 | 5.92 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 16.542

INPUT
Description:
Station Elevation Data  num=  74

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8410.2 | 1533.89 | 8548.96 | 1533.83 | 8554.37 | 1533.72 | 8558.44 | 1534 | 8558.84 | 1534.12 |
| 8567.76 | 1534 | 8571.34 | 1533.95 | 8789.49 | 1534 | 8851.1 | 1534.41 | 8857.98 | 1534.52 |
| 8894.89 | 1534 | 9411.71 | 1532.63 | 9455.81 | 1532.92 | 9481.99 | 1532.67 | 9484.34 | 1533.35 |
| 9589.93 | 1533.33 | 9789.14 | 1533.28 | 9843.46 | 1533.11 | 9863.59 | 1532 | 9892.68 | 1530 |
| 9905.49 | 1528.85 | 9913.65 | 1528 | 9927.23 | 1526.37 | 9927.77 | 1526 | 9930.93 | 1524 |
| 9934.56 | 1522 | 9939.89 | 1520.58 | 9990.59 | 1520.39 | 9997.36 | 152210004.12 | | 1523.54 |
| 10042.93 | 1522.6710052.09 | | 152410059.73 | | 1525.110109.54 | | 152610125.52 | | 1526.85 |
| 10152.62 | 152810166.79 | | 153010201.66 | | 1530.83 | 10205 | 153210210.32 | | 1534 |
| 10210.99 | 1534.26 | 10218 | 153410221.94 | | 1533.8410227.83 | | 153210256.39 | | 1532 |
| 10275.96 | 153210280.25 | | 153210329.33 | | 153210406.03 | | 153210408.59 | | 1533.23 |
| 10424.37 | 1532.8710425.96 | | 153210429.78 | | 1530 10531.2 | | 1529.22 10594.5 | | 1530 |
| 10617.92 | 1530.0910635.59 | | 1530.3210657.46 | | 153110738.84 | | 1530.8410764.84 | | 1530.71 |
| 10800.07 | 1530.0310823.87 | | 153010900.38 | | 153011224.51 | | 1531.3711268.63 | | 1531.47 |
| 11312.91 | 1531.4711416.51 | | 1531.4911435.25 | | 1531.5111456.39 | | 1531.6711469.59 | | 1531.56 |
| 11472.3 | 1531.7211478.36 | | 1531.411506.75 | | 1531.4711596.15 | | 1531.58 | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8410.2 | .05 | 9892.68 | .03510201.66 | | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9892.6810201.66 | | 610 | 590.5 | 610 | .1 | .3 |

Ineffective Flow  num=  2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8410.2 | 9914 | 1532 | 1013911596.15 | | 1532 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1527.58 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.64 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1526.94 | Reach Len. (ft) | 610.00 | 590.50 | 610.00 |
| Crit W.S. (ft) | 1525.60 | Flow Area (sq ft) | | 724.13 | |
| E.G. Slope (ft/ft) | 0.004343 | Area (sq ft) | | 724.13 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |

| | | | | | |
|---|---|---|---|---|---|
| Top Width (ft) | 205.13 | Top Width (ft) | | 205.13 | |
| Vel Total (ft/s) | 6.44 | Avg. Vel. (ft/s) | | 6.44 | |
| Max Chl Dpth (ft) | 6.55 | Hydr. Depth (ft) | | 3.53 | |
| Conv. Total (cfs) | 70813.8 | Conv. (cfs) | | 70813.8 | |
| Length Wtd. (ft) | 590.50 | Wetted Per. (ft) | | 207.13 | |
| Min Ch El (ft) | 1520.39 | Shear (lb/sq ft) | | 0.95 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 6.11 | |
| Frctn Loss (ft) | 3.31 | Cum Volume (acre-ft) | 2.62 | 438.66 | 35.44 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 1.32 | 120.47 | 25.21 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1529.73 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.15 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1528.58 | Reach Len. (ft) | 610.00 | 590.50 | 610.00 |
| Crit W.S. (ft) | 1527.46 | Flow Area (sq ft) | | 1085.86 | |
| E.G. Slope (ft/ft) | 0.005088 | Area (sq ft) | | 1100.67 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 248.62 | Top Width (ft) | | 248.62 | |
| Vel Total (ft/s) | 8.59 | Avg. Vel. (ft/s) | | 8.59 | |
| Max Chl Dpth (ft) | 8.19 | Hydr. Depth (ft) | | 4.83 | |
| Conv. Total (cfs) | 130848.1 | Conv. (cfs) | | 130848.1 | |
| Length Wtd. (ft) | 590.50 | Wetted Per. (ft) | | 227.08 | |
| Min Ch El (ft) | 1520.39 | Shear (lb/sq ft) | | 1.52 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 13.05 | |
| Frctn Loss (ft) | 3.67 | Cum Volume (acre-ft) | 12.19 | 645.25 | 51.73 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 14.11 | 132.62 | 36.53 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1531.34 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.79 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1529.55 | Reach Len. (ft) | 610.00 | 590.50 | 610.00 |
| Crit W.S. (ft) | 1528.68 | Flow Area (sq ft) | | 1304.77 | |
| E.G. Slope (ft/ft) | 0.006207 | Area (sq ft) | | 1350.83 | 11.57 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 335.84 | Top Width (ft) | | 265.93 | 69.91 |
| Vel Total (ft/s) | 10.73 | Avg. Vel. (ft/s) | | 10.73 | |
| Max Chl Dpth (ft) | 9.16 | Hydr. Depth (ft) | | 5.80 | |
| Conv. Total (cfs) | 177703.7 | Conv. (cfs) | | 177703.7 | |
| Length Wtd. (ft) | 590.66 | Wetted Per. (ft) | | 227.08 | |
| Min Ch El (ft) | 1520.39 | Shear (lb/sq ft) | | 2.23 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 23.89 | |
| Frctn Loss (ft) | 3.95 | Cum Volume (acre-ft) | 26.64 | 773.09 | 101.86 |
| C & E Loss (ft) | 0.15 | Cum SA (acres) | 21.86 | 136.96 | 100.06 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9892.68 | 9954.48 | 951.01 | 145.44 | 33.41 | 20.38 | 4.55 | 6.54 |
| 9954.48 | 10016.27 | 2641.08 | 344.10 | 62.16 | 56.59 | 5.57 | 7.68 |
| 10016.27 | 10078.07 | 964.42 | 187.79 | 61.98 | 20.66 | 3.04 | 5.14 |
| 10078.07 | 10139.86 | 110.49 | 46.81 | 49.58 | 2.37 | 0.94 | 2.36 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LB 9892.68 | 9954.48 | 1692.68 | 207.46 | 41.97 | 18.14 | 5.13 | 8.16 |
| 9954.48 | 10016.27 | 4654.02 | 445.39 | 62.16 | 49.87 | 7.21 | 10.45 |
| 10016.27 | 10078.07 | 2268.84 | 289.08 | 61.98 | 24.31 | 4.68 | 7.85 |
| 10078.07 | 10139.86 | 717.46 | 143.93 | 60.97 | 7.69 | 2.36 | 4.98 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9892.68 | 9954.48 | 2554.75 | 246.84 | 41.97 | 18.25 | 6.10 | 10.35 |
| 9954.48 | 10016.27 | 6493.14 | 505.51 | 62.16 | 46.38 | 8.18 | 12.84 |
| 10016.27 | 10078.07 | 3511.91 | 349.20 | 61.98 | 25.09 | 5.65 | 10.06 |
| 10078.07 | 10139.86 | 1440.21 | 203.21 | 60.97 | 10.29 | 3.34 | 7.09 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.430

INPUT
Description:
Station Elevation Data num= 194

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7364.61 | 1528 | 7370.62 | 1528 | 7374.12 | 1528 | 7383.05 | 1528.61 | 7509.3 | 1529.14 |
| 7545.29 | 1528.59 | 7550 | 1529.65 | 7579.32 | 1530 | 7586.32 | 1530.09 | 7586.86 | 1530 |
| 7589.69 | 1529.55 | 7608 | 1528.92 | 8447.3 | 1529.84 | 8447.96 | 1530 | 8450.2 | 1530.56 |
| 8454.44 | 1530.52 | 8456.61 | 1531.08 | 8471.03 | 1531.1 | 9217.32 | 1530 | 9283.53 | 1530 |
| 9312.96 | 1530.37 | 9316.78 | 1530.78 | 9320.72 | 1530 | 9323.91 | 1529.32 | 9333.96 | 1528.75 |
| 9360.5 | 1528.55 | 9370.31 | 1529.45 | 9374.19 | 1529.52 | 9379.45 | 1530 | 9381.17 | 1530.17 |
| 9385.83 | 1530 | 9388.61 | 1529.79 | 9399.3 | 1528 | 9403.79 | 1527.26 | 9478.97 | 1527.43 |
| 9484.79 | 1526.79 | 9488.49 | 1526 | 9497.89 | 1524 | 9501.48 | 1523.27 | 9517.9 | 1523.15 |
| 9520.15 | 1524 | 9525.45 | 1526 | 9529.62 | 1527.5 | 9563.62 | 1527.23 | 9568.69 | 1526 |
| 9576.97 | 1524 | 9584.24 | 1522 | 9585.05 | 1521.75 | 9586.29 | 1522 | 9596.35 | 1524 |
| 9600.63 | 1524.84 | 9606.96 | 1524.25 | 9614.29 | 1526 | 9614.89 | 1526.14 | 9626.62 | 1526.65 |
| 9645.82 | 1526.26 | 9669.33 | 1527.37 | 9675.98 | 1526.47 | 9679.65 | 1528 | 9684.43 | 1530 |
| 9688.31 | 1531.66 | 9704.17 | 1531.46 | 9708.61 | 1530 | 9709.35 | 1529.75 | 9716.44 | 1529.85 |
| 9722.18 | 1528 | 9728.39 | 1526 | 9734.08 | 1524.21 | 9777.41 | 1524 | 9831.25 | 1523.67 |
| 9840.51 | 1522.07 | 9846.31 | 1522 | 9860.03 | 1521.81 | 9863.2 | 1522 | 9876.21 | 1523.04 |
| 9895.66 | 1523.32 | 9905.04 | 1522 | 9909.37 | 1521.4 | 9910.92 | 1522 | 9913.61 | 1523.07 |
| 9933.62 | 1523.66 | 9938.75 | 1522 | 9943.57 | 1520.37 | 9954.83 | 1520.39 | 10008.22 | 1520.26 |
| 10014.34 | 1520 | 10058.81 | 1518 | 10074.4 | 1517.05 | 10077.15 | 1518 | 10080.91 | 1519.32 |
| 10081.96 | 1520 | 10085.06 | 1522 | 10088.16 | 1524 | 10091.14 | 1526 | 10094.09 | 1528 |
| 10096.17 | 1529.42 | 10103.83 | 1528 | 10107.69 | 1527.38 | 10115 | 1526 | 10124.78 | 1524 |
| 10125.75 | 1523.8 | 10130.3 | 1522 | 10135.33 | 1520 | 10135.64 | 1519.79 | 10135.96 | 1519.74 |
| 10140.07 | 1518 | 10144.81 | 1516 | 10149.55 | 1514 | 10160.38 | 1512 | 10161.12 | 1511.88 |
| 10161.61 | 1512 | 10161.62 | 1512 | 10173.2 | 1510 | 10176.43 | 1508 | 10178.82 | 1506.52 |
| 10227.41 | 1508 | 10227.84 | 1508 | 10237.97 | 1508 | 10262.5 | 1507.54 | 10263.88 | 1508 |
| 10269.87 | 1510 | 10271.86 | 1510.7 | 10274 | 1510 | 10280.18 | 1508 | 10282.65 | 1507.19 |
| 10320.47 | 1508 | 10370.69 | 1510 | 10396.07 | 1512 | 10398.08 | 1512.22 | 10402.49 | 1514 |
| 10407.24 | 1516 | 10411.74 | 1518 | 10413.15 | 1518.63 | 10416.47 | 1518 | 10425.91 | 1516.42 |
| 10432.02 | 1518 | 10437.62 | 1520 | 10442.45 | 1522 | 10447.29 | 1524 | 10448.81 | 1524.63 |
| 10470.88 | 1524.24 | 10474.93 | 1526 | 10481.65 | 1526 | 10482.7 | 1525.84 | 10490.47 | 1526 |
| 10715.57 | 1527.17 | 10732.47 | 1527.21 | 10739.85 | 1527.16 | 10749.13 | 1526.33 | 11354.12 | 1527.62 |
| 11366.97 | 1527.34 | 11371.69 | 1528 | 11376.77 | 1528.53 | 11382.94 | 1528.12 | 11384.58 | 1528 |
| 11386.85 | 1527.84 | 11975.8 | 1526 | 12199.72 | 1526 | 12247.85 | 1526.41 | 12251.82 | 1526.8 |
| 12265.88 | 1526.65 | 12269.55 | 1526.12 | 12283.91 | 1526 | 12493.54 | 1526 | 12502.6 | 1526.29 |
| 12536.34 | 1528 | 12545.56 | 1528.47 | 12593.92 | 1528.54 | 12626.2 | 1528.64 | 12645.73 | 1528.78 |
| 12655.87 | 1529.11 | 12660.97 | 1528.31 | 12997.32 | 1528.34 | 13000.63 | 1528.97 | 13008.49 | 1528.44 |
| 13056.22 | 1528 | 14048.92 | 1526 | 15210 | 1528 | 15248.15 | 1523.49 | 15252.19 | 1524 |
| 15268.69 | 1525.97 | 15271.12 | 1526 | 15293.19 | 1526.29 | 15294.77 | 1526 | 15305.9 | 1524 |
| 15316.24 | 1522 | 15316.57 | 1521.93 | 15316.83 | 1522 | 15324.6 | 1524 | 15332.1 | 1526 |
| 15334.47 | 1526.73 | 15348.82 | 1527.32 | 15355.39 | 1526 | 15363.14 | 1524.44 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 7364.61 | .05 | 9688.31 | .035 | 10096.17 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9688.31 | 10096.17 | 650 | 684.1 | 700 | .1 | .3 |

Blocked Obstructions num= 3

| Sta L | Sta R | Elev | Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|---|---|---|
| 9420 | 9688 | 1526 | 10110 | 10490 | 1525.5 | 11715 | 15363.14 | 1527 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1524.26 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.77 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1523.49 | Reach Len. (ft) | 650.00 | 684.10 | 700.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 663.78 | |
| E.G. Slope (ft/ft) | 0.007527 | Area (sq ft) | | 663.78 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 248.86 | Top Width (ft) | | 248.86 | |
| Vel Total (ft/s) | 7.03 | Avg. Vel. (ft/s) | | 7.03 | |
| Max Chl Dpth (ft) | 6.44 | Hydr. Depth (ft) | | 2.67 | |
| Conv. Total (cfs) | 53792.9 | Conv. (cfs) | | 53792.9 | |
| Length Wtd. (ft) | 684.10 | Wetted Per. (ft) | | 251.69 | |
| Min Ch El (ft) | 1517.05 | Shear (lb/sq ft) | | 1.24 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 8.71 | |
| Frctn Loss (ft) | 4.15 | Cum Volume (acre-ft) | 2.62 | 429.25 | 35.44 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 1.32 | 117.39 | 25.21 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1526.01 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1524.99 | Reach Len. (ft) | 650.00 | 684.10 | 700.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 1149.11 | |
| E.G. Slope (ft/ft) | 0.007830 | Area (sq ft) | | 1149.11 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 358.02 | Top Width (ft) | | 358.02 | |
| Vel Total (ft/s) | 8.12 | Avg. Vel. (ft/s) | | 8.12 | |
| Max Chl Dpth (ft) | 7.94 | Hydr. Depth (ft) | | 3.21 | |
| Conv. Total (cfs) | 105476.1 | Conv. (cfs) | | 105476.1 | |
| Length Wtd. (ft) | 684.10 | Wetted Per. (ft) | | 361.46 | |
| Min Ch El (ft) | 1517.05 | Shear (lb/sq ft) | | 1.55 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 12.62 | |
| Frctn Loss (ft) | 4.39 | Cum Volume (acre-ft) | 12.19 | 630.00 | 51.73 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 14.11 | 128.50 | 36.53 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1527.24 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.30 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1525.94 | Reach Len. (ft) | 650.00 | 684.10 | 700.00 |
| Crit W.S. (ft) | 1525.56 | Flow Area (sq ft) | | 1494.02 | 159.43 |
| E.G. Slope (ft/ft) | 0.007230 | Area (sq ft) | | 1494.02 | 159.43 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13766.41 | 233.59 |
| Top Width (ft) | 727.79 | Top Width (ft) | | 362.49 | 365.30 |
| Vel Total (ft/s) | 8.47 | Avg. Vel. (ft/s) | | 9.21 | 1.47 |
| Max Chl Dpth (ft) | 8.89 | Hydr. Depth (ft) | | 4.12 | 0.44 |
| Conv. Total (cfs) | 164644.4 | Conv. (cfs) | | 161897.3 | 2747.1 |
| Length Wtd. (ft) | 684.23 | Wetted Per. (ft) | | 366.37 | 365.44 |
| Min Ch El (ft) | 1517.05 | Shear (lb/sq ft) | | 1.84 | 0.20 |
| Alpha | 1.17 | Stream Power (lb/ft s) | | 16.96 | 0.29 |
| Frctn Loss (ft) | 4.39 | Cum Volume (acre-ft) | 26.64 | 753.81 | 100.66 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 21.86 | 132.70 | 97.01 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9769.88 | 9851.45 | 75.16 | 22.15 | 19.29 | 1.61 | 1.16 | 3.39 |
| 9851.45 | 9933.03 | 164.17 | 61.57 | 76.97 | 3.52 | 0.81 | 2.67 |
| 9933.03 | 10014.60 | 1533.69 | 240.14 | 80.97 | 32.86 | 2.98 | 6.39 |
| 10014.60 | RB 10096.17 | 2893.98 | 339.91 | 74.46 | 62.01 | 4.67 | 8.51 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9688.31 | 9769.88 | 89.67 | 31.89 | 38.39 | 0.96 | 0.83 | 2.81 |
| 9769.88 | 9851.45 | 504.38 | 121.60 | 81.71 | 5.40 | 1.49 | 4.15 |
| 9851.45 | 9933.03 | 995.37 | 183.18 | 82.08 | 10.67 | 2.25 | 5.43 |
| 9933.03 | 10014.60 | 3096.93 | 361.99 | 82.11 | 33.18 | 4.44 | 8.56 |
| 10014.60 | RB 10096.17 | 4646.65 | 450.45 | 77.17 | 49.79 | 6.00 | 10.32 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9688.31 | 9769.88 | 323.06 | 69.99 | 41.58 | 2.31 | 1.69 | 4.62 |
| 9769.88 | 9851.45 | 1181.98 | 199.70 | 81.71 | 8.44 | 2.45 | 5.92 |
| 9851.45 | 9933.03 | 1844.28 | 261.27 | 82.08 | 13.17 | 3.20 | 7.06 |
| 9933.03 | 10014.60 | 4396.80 | 440.09 | 82.11 | 31.41 | 5.40 | 9.99 |
| 10014.60 | RB 10096.17 | 6020.29 | 522.97 | 78.89 | 43.00 | 6.84 | 11.51 |
| 10096.17 | 10622.87 | 233.59 | 159.43 | 365.44 | 1.67 | 0.44 | 1.47 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.301

INPUT
Description:
Station Elevation Data num= 165

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7166.1 | 1525.73 | 7179.36 | 1526 | 7209.12 | 1526.22 | 7210.49 | 1526 | 7215.26 | 1525.44 |
| 7266.52 | 1524.71 | 7288.83 | 1525.13 | 7348.34 | 1525.61 | 7428.37 | 1525.79 | 7447.28 | 1526 |
| 8263.59 | 1527.49 | 8278.08 | 1527.56 | 8282.81 | 1527.58 | 8284.59 | 1528 | 8286.71 | 1528.61 |
| 8588.3 | 1528.99 | 8727.15 | 1528 | 8730.1 | 1527.81 | 9159.32 | 1526.5 | 9180.76 | 1526.5 |
| 9212.84 | 1526 | 9333.83 | 1524.12 | 9342.24 | 1524 | 9345 | 1523.51 | 9363.13 | 1522 |
| 9371.95 | 1521.09 | 9382.42 | 1520.89 | 9392.89 | 1520.54 | 9403.63 | 1522 | 9426.64 | 1524 |
| 9456.69 | 1525.06 | 9460.84 | 1526 | 9467.95 | 1527.4 | 9479 | 1527.35 | 9487.19 | 1526.12 |
| 9487.47 | 1526 | 9492.88 | 1524 | 9495.24 | 1523.28 | 9502.74 | 1522 | 9509.59 | 1520.89 |
| 9555.6 | 1521.23 | 9574.64 | 1520 | 9577.34 | 1519.82 | 9582.8 | 1520 | 9607.31 | 1520.03 |
| 9607.59 | 1520 | 9625.54 | 1519.36 | 9627 | 1518 | 9629.21 | 1516 | 9629.89 | 1515.53 |
| 9642.42 | 1515.97 | 9642.46 | 1516 | 9647.69 | 1518 | 9648.25 | 1518.17 | 9658.64 | 1518.59 |
| 9662.82 | 1520 | 9666.59 | 1521.13 | 9779.72 | 1520 | 9788.09 | 1519.71 | 9790.48 | 1520 |
| 9801.48 | 1521.32 | 9851.22 | 1521.89 | 9853.62 | 1520 | 9856.48 | 1518 | 9859.33 | 1516 |
| 9862.19 | 1514 | 9862.6 | 1513.71 | 9881.89 | 1513.56 | 9885.13 | 1514 | 9905.71 | 1515.48 |
| 9909.56 | 1516 | 9916.85 | 1516.7 | 10001.28 | 1516 | 10012.54 | 1518 | 10013.39 | 1518.14 |
| 10019.03 | 1518 | 10067.26 | 1516.6 | 10079.41 | 1518 | 10083.16 | 1518.4 | 10101.92 | 1518 |
| 10102.85 | 1517.98 | 10103 | 1518 | 10107.93 | 1518.7 | 10209.73 | 1518.5 | 10213.61 | 1520 |
| 10219.14 | 1522 | 10225 | 1524 | 10225.22 | 1524.08 | 10225.4 | 1524 | 10230.13 | 1522 |
| 10236.31 | 1520 | 10241.7 | 1518 | 10248.69 | 1516 | 10250.62 | 1515.5 | 10252.39 | 1514 |
| 10254.69 | 1512 | 10256.99 | 1510 | 10259.28 | 1508 | 10261.53 | 1506 | 10263.61 | 1504 |
| 10265.7 | 1502 | 10267.17 | 1500.5 | 10346.37 | 1500 | 10466.43 | 1498 | 10479.83 | 1497.94 |
| 10479.94 | 1498 | 10483.43 | 1500 | 10486.83 | 1502 | 10490.24 | 1504 | 10492.95 | 1505.59 |
| 10493.09 | 1506 | 10493.78 | 1508 | 10494.57 | 1510 | 10495.36 | 1512 | 10496.09 | 1514 |
| 10496.82 | 1516 | 10497.54 | 1518 | 10498.27 | 1520 | 10498.99 | 1522 | 10499.31 | 1522.87 |
| 10501.16 | 1522 | 10505.63 | 1520.3 | 10529.14 | 1520.3 | 10533.65 | 1522 | 10538.73 | 1523.91 |
| 10547.59 | 1523.3 | 10565.57 | 1524 | 10565.68 | 1524 | 10572.86 | 1524.4 | 10577.21 | 1524 |
| 10582.19 | 1523.5 | 11164.49 | 1524 | 11197.69 | 1524.2 | 11205.48 | 1524.7 | 11207.48 | 1524.9 |
| 11213.28 | 1524.8 | 11222.83 | 1524 | 11478.12 | 1523.9 | 11546.53 | 1523.69 | 12423.5 | 1524 |
| 12473.35 | 1524.1 | 12489.17 | 1524.1 | 12492.93 | 1525.4 | 12496.67 | 1524.7 | 12610.33 | 1524.94 |

```
12614.54 1525.6212635.72 1525.6412639.53 1525.2412822.64 1525.1212826.18 1525.91
12830.58 1525.0313711.24    1524 13849.5 1523.5313850.71    152413852.06 1524.56
13854.24    152413856.23 1523.6914406.33    152215056.87 1520.5115068.56    1520
 15073.3 1519.7315075.26    152015092.69    152215094.58  1522.215118.74 1522.16

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  7166.1     .05 9851.22    .03510225.22     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9851.2210225.22               710   694.9     710              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7166.1  9851.6    152210225.2215118.74 1524.08
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7166.1 9467.95 1527.0410236.31   10566    152112826.1815118.74 1525.91

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)           1520.01   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.45   Wt. n-Val.                          0.035
  W.S. Elev (ft)           1519.56   Reach Len. (ft)           710.00    694.90     710.00
  Crit W.S. (ft)           1518.86   Flow Area (sq ft)                   866.63
  E.G. Slope (ft/ft)      0.005001   Area (sq ft)               85.89    866.63
  Q Total (cfs)            4667.00   Flow (cfs)                         4667.00
  Top Width (ft)            399.82   Top Width (ft)             41.63    358.19
  Vel Total (ft/s)            5.39   Avg. Vel. (ft/s)                      5.39
  Max Chl Dpth (ft)           6.00   Hydr. Depth (ft)                      2.42
  Conv. Total (cfs)        65994.8   Conv. (cfs)                        65994.8
  Length Wtd. (ft)          694.90   Wetted Per. (ft)                    360.75
  Min Ch El (ft)           1513.56   Shear (lb/sq ft)                      0.75
  Alpha                       1.00   Stream Power (lb/ft s)                4.04
  Frctn Loss (ft)             5.06   Cum Volume (acre-ft)        1.98    417.24      35.44
  C & E Loss (ft)             0.02   Cum SA (acres)              1.01    112.63      25.21


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)           1521.55   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.81   Wt. n-Val.                          0.035
  W.S. Elev (ft)           1520.75   Reach Len. (ft)           710.00    694.90     710.00
  Crit W.S. (ft)           1519.89   Flow Area (sq ft)                  1294.10
  E.G. Slope (ft/ft)      0.005361   Area (sq ft)              218.44   1294.10       0.86
  Q Total (cfs)            9333.00   Flow (cfs)                         9333.00
  Top Width (ft)            559.30   Top Width (ft)            193.99    363.00       2.31
  Vel Total (ft/s)            7.21   Avg. Vel. (ft/s)                      7.21
  Max Chl Dpth (ft)           7.19   Hydr. Depth (ft)                      3.56
  Conv. Total (cfs)       127472.4   Conv. (cfs)                       127472.4
  Length Wtd. (ft)          694.90   Wetted Per. (ft)                    366.17
  Min Ch El (ft)           1513.56   Shear (lb/sq ft)                      1.18
  Alpha                       1.00   Stream Power (lb/ft s)                8.53
  Frctn Loss (ft)             5.29   Cum Volume (acre-ft)       10.56    610.81      51.72
  C & E Loss (ft)             0.03   Cum SA (acres)             12.67    122.84      36.52


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #full flow

  E.G. Elev (ft)           1522.81   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.15   Wt. n-Val.                          0.035
  W.S. Elev (ft)           1521.66   Reach Len. (ft)           710.00    694.90     710.00
  Crit W.S. (ft)           1520.75   Flow Area (sq ft)                  1627.90
  E.G. Slope (ft/ft)      0.005696   Area (sq ft)              467.25   1627.91     197.08
  Q Total (cfs)           14000.00   Flow (cfs)                        14000.00
```

| | | | | | |
|---|---|---|---|---|---|
| Top Width (ft) | 991.56 | Top Width (ft) | 326.48 | 366.69 | 298.39 |
| Vel Total (ft/s) | 8.60 | Avg. Vel. (ft/s) | | 8.60 | |
| Max Chl Dpth (ft) | 8.10 | Hydr. Depth (ft) | | 4.44 | |
| Conv. Total (cfs) | 185493.7 | Conv. (cfs) | | 185493.7 | |
| Length Wtd. (ft) | 694.90 | Wetted Per. (ft) | | 370.23 | |
| Min Ch El (ft) | 1513.56 | Shear (lb/sq ft) | | 1.56 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 13.45 | |
| Frctn Loss (ft) | 5.45 | Cum Volume (acre-ft) | 23.15 | 729.29 | 97.79 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 19.43 | 126.97 | 91.68 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9851.22 | 9926.02 | 2208.68 | 320.55 | 73.78 | 47.33 | 4.47 | 6.89 |
| 9926.02 | 10000.82 | 1356.33 | 240.57 | 74.80 | 29.06 | 3.22 | 5.64 |
| 10000.82 | 10075.62 | 745.22 | 168.18 | 75.06 | 15.97 | 2.25 | 4.43 |
| 10075.62 | 10150.42 | 216.08 | 79.95 | 74.91 | 4.63 | 1.07 | 2.70 |
| 10150.42 | RB 10225.22 | 140.70 | 57.38 | 62.20 | 3.01 | 0.93 | 2.45 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9851.22 | 9926.02 | 3617.30 | 406.59 | 75.75 | 38.76 | 5.54 | 8.90 |
| 9926.02 | 10000.82 | 2566.10 | 329.24 | 74.80 | 27.49 | 4.40 | 7.79 |
| 10000.82 | 10075.62 | 1692.69 | 256.85 | 75.06 | 18.14 | 3.43 | 6.59 |
| 10075.62 | 10150.42 | 840.48 | 168.62 | 74.91 | 9.01 | 2.25 | 4.98 |
| 10150.42 | RB 10225.22 | 616.43 | 132.80 | 65.65 | 6.60 | 2.04 | 4.64 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9851.22 | 9926.02 | 4880.07 | 474.23 | 77.11 | 34.86 | 6.37 | 10.29 |
| 9926.02 | 10000.82 | 3713.65 | 397.67 | 74.80 | 26.53 | 5.32 | 9.34 |
| 10000.82 | 10075.62 | 2650.85 | 325.29 | 75.06 | 18.93 | 4.35 | 8.15 |
| 10075.62 | 10150.42 | 1566.49 | 237.06 | 74.91 | 11.19 | 3.17 | 6.61 |
| 10150.42 | RB 10225.22 | 1188.95 | 193.66 | 68.34 | 8.49 | 2.86 | 6.14 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.169

INPUT
Description:
Station Elevation Data num= 142

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7408.92 | 1523.92 | 7422.47 | 1524 | 7439.35 | 1524.1 | 7439.91 | 1524 | 7444.37 | 1523.13 |

```
 7458.84 1522.62 7484.66  1523.3 8857.17    1524 8890.61 1524.29  8894.2 1524.55
 8898.84 1524.89  8901.8 1525.08 8914.22    1525 8924.93 1524.77  9243.8    1524
 9278.06 1523.58 9306.44 1523.58 9312.99    1524  9324.3    1524 9364.62 1522.89
 9395.85 1522.13 9407.66    1522 9419.55    1522 9448.91    1522 9476.76    1522
 9477.48    1522 9491.11 1521.65  9498.4    1520 9507.25    1518 9512.98 1516.36
 9535.98  1516.1 9560.94    1516 9561.93 1515.95 9562.16    1516 9562.98  1516.2
 9570.17 1516.28 9574.65    1518 9578.55    1520 9582.74 1520.67 9602.98  1520.8
 9606.25    1522 9612.18    1524 9615.11 1524.72 9628.73 1524.76 9630.49    1524
 9635.13    1522 9639.59    1520  9643.9 1518.04  9644.7    1518  9677.1 1517.32
 9736.16    1518 9789.87    1518 9835.19 1516.19 9835.41    1516 9837.66    1514
 9839.99    1512 9840.15 1511.87 9842.47    1512 9856.59 1512.79 9859.14    1514
 9861.36 1515.13 9865.52 1515.26 9867.78    1514 9869.64 1513.14 9932.57 1513.56
 9941.34 1512.81 9949.55 1513.31 9967.92 1513.19    9988 1512.6610000.37 1513.45
10103.68    151410116.61 1514.1310117.03    151410123.78 1512.2310143.12    1512
10178.21    151210197.41 1512.5210200.51    151210205.21 1511.1310241.92 1510.57
10257.42    1510 10273.2    151010277.94  1510.510282.78    151210289.26    1514
10293.38    151610296.51 1517.5410320.07    1518 10345.3    151810387.39    1516
10421.87 1514.5110469.19    151610472.21 1516.0810515.88    151810528.57 1518.58
10668.48 1518.8710672.87    151810681.37    151610682.27 1515.7910698.03    1516
10727.16 1516.2710731.86    151810737.05    152010737.64 1520.2310746.48    1520
10748.78 1519.8710750.96    152010764.37  1520.710769.55 1520.4710775.52 1521.47
 10779.9 1520.1910791.55    152010801.03    152011141.84 1520.9511150.85 1521.44
11254.41    152211278.43 1522.0511278.69    152211285.12 1520.6711291.82 1520.63
11296.64 1521.5411385.83 1521.1711391.63    152211394.16 1522.2911398.39    1522
11403.45 1521.6611404.99 1521.63 11410.1 1521.9911416.99 1521.2912448.75    1520
12635.95    152012651.74 1520.1712671.39 1520.6414051.67 1520.7214072.11 1520.81
14363.27    152015063.79    151815254.22 1517.26 15268.5 1516.7315281.69    1518
15287.92 1518.6115313.34 1518.78

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7408.92     .05 9789.87    .03510296.51     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9789.8710296.51               700   676.2     700              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7408.92 9628.73 1524.7610307.2415313.34 1517.75
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7408.92 9789.87    151811008.9215313.34    1518

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1514.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.63   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1514.30   Reach Len. (ft)             700.00     676.20     700.00
  Crit W.S. (ft)            1514.15   Flow Area (sq ft)                      734.11
  E.G. Slope (ft/ft)       0.011597   Area (sq ft)                           734.11
  Q Total (cfs)             4667.00   Flow (cfs)                            4667.00
  Top Width (ft)             445.06   Top Width (ft)                         445.06
  Vel Total (ft/s)             6.36   Avg. Vel. (ft/s)                         6.36
  Max Chl Dpth (ft)            4.30   Hydr. Depth (ft)                         1.65
  Conv. Total (cfs)         43337.5   Conv. (cfs)                           43337.5
  Length Wtd. (ft)           676.20   Wetted Per. (ft)                       447.71
  Min Ch El (ft)            1510.00   Shear (lb/sq ft)                         1.19
  Alpha                        1.00   Stream Power (lb/ft s)                   7.55
  Frctn Loss (ft)              4.34   Cum Volume (acre-ft)          1.28     404.47      35.44
  C & E Loss (ft)              0.09   Cum SA (acres)                0.67     106.22      25.21


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1516.24   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.08   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1515.17   Reach Len. (ft)             700.00     676.20     700.00
  Crit W.S. (ft)            1515.04   Flow Area (sq ft)                     1121.48
  E.G. Slope (ft/ft)       0.011567   Area (sq ft)                          1121.48      11.87
  Q Total (cfs)             9333.00   Flow (cfs)                            9333.00
  Top Width (ft)             488.29   Top Width (ft)                         452.19      36.10
```

| | | | | | |
|---|---|---|---|---|---|
| Vel Total (ft/s) | 8.32 | Avg. Vel. (ft/s) | | 8.32 | |
| Max Chl Dpth (ft) | 5.17 | Hydr. Depth (ft) | | 2.48 | |
| Conv. Total (cfs) | 86777.3 | Conv. (cfs) | | 86777.3 | |
| Length Wtd. (ft) | 676.20 | Wetted Per. (ft) | | 455.79 | |
| Min Ch El (ft) | 1510.00 | Shear (lb/sq ft) | | 1.78 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 14.79 | |
| Frctn Loss (ft) | 4.20 | Cum Volume (acre-ft) | 8.78 | 591.55 | 51.61 |
| C & E Loss (ft) | 0.16 | Cum SA (acres) | 11.09 | 116.34 | 36.20 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1517.33 | Element | | | |
| Vel Head (ft) | 1.46 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1515.87 | Reach Len. (ft) | 700.00 | 676.20 | 700.00 |
| Crit W.S. (ft) | 1515.79 | Flow Area (sq ft) | | 1442.10 | |
| E.G. Slope (ft/ft) | 0.011449 | Area (sq ft) | | 1442.10 | 51.04 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 538.60 | Top Width (ft) | | 457.56 | 81.04 |
| Vel Total (ft/s) | 9.71 | Avg. Vel. (ft/s) | | 9.71 | |
| Max Chl Dpth (ft) | 5.87 | Hydr. Depth (ft) | | 3.15 | |
| Conv. Total (cfs) | 130840.0 | Conv. (cfs) | | 130840.0 | |
| Length Wtd. (ft) | 676.20 | Wetted Per. (ft) | | 461.60 | |
| Min Ch El (ft) | 1510.00 | Shear (lb/sq ft) | | 2.23 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 21.68 | |
| Frctn Loss (ft) | 4.07 | Cum Volume (acre-ft) | 19.34 | 704.80 | 95.77 |
| C & E Loss (ft) | 0.23 | Cum SA (acres) | 16.77 | 120.40 | 88.59 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9789.87 | 9891.20 | 292.69 | 63.27 | 47.92 | 6.27 | 1.36 | 4.63 |
| 9891.20 | 9992.53 | 448.11 | 110.25 | 101.39 | 9.60 | 1.09 | 4.06 |
| 9992.53 | 10093.85 | 186.46 | 65.14 | 101.34 | 4.00 | 0.64 | 2.86 |
| 10093.85 | 10195.18 | 945.92 | 172.74 | 101.58 | 20.27 | 1.70 | 5.48 |
| 10195.18 | RB 10296.51 | 2793.82 | 322.71 | 95.47 | 59.86 | 3.41 | 8.66 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9789.87 | 9891.20 | 693.01 | 105.21 | 54.02 | 7.43 | 2.03 | 6.59 |
| 9891.20 | 9992.53 | 1304.85 | 197.85 | 101.39 | 13.98 | 1.95 | 6.60 |
| 9992.53 | 10093.85 | 847.94 | 152.73 | 101.34 | 9.09 | 1.51 | 5.55 |
| 10093.85 | 10195.18 | 2059.15 | 260.34 | 101.58 | 22.06 | 2.57 | 7.91 |
| 10195.18 | RB 10296.51 | 4428.04 | 405.35 | 97.45 | 47.44 | 4.20 | 10.92 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9789.87 | 9891.20 | 1139.07 | 143.89 | 58.23 | 8.14 | 2.59 | 7.92 |
| 9891.20 | 9992.53 | 2233.53 | 269.06 | 101.39 | 15.95 | 2.66 | 8.30 |
| 9992.53 | 10093.85 | 1645.42 | 223.94 | 101.34 | 11.75 | 2.21 | 7.35 |
| 10093.85 | 10195.18 | 3159.44 | 331.55 | 101.58 | 22.57 | 3.27 | 9.53 |
| 10195.18 | RB 10296.51 | 5822.55 | 473.66 | 99.05 | 41.59 | 4.84 | 12.29 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 16.041

INPUT
Description:
Station Elevation Data num= 183

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7572.41 | 1521.8 | 7597.69 | 1521.7 | 7604.32 | 1520.34 | 7607.2 | 1520 | 7628.08 | 1520 |
| 8405.24 | 1521.21 | 9057.16 | 1522 | 9057.35 | 1522 | 9061.05 | 1522.03 | 9064.54 | 1522.11 |
| 9068.03 | 1522 | 9080.59 | 1521.53 | 9084.86 | 1521.76 | 9090.23 | 1521.13 | 9093.16 | 1520.79 |
| 9421.05 | 1520 | 9535.11 | 1520 | 9560.77 | 1520.76 | 9580.36 | 1520.8 | 9583.85 | 1522 |
| 9588.65 | 1523.99 | 9592.75 | 1522 | 9597.45 | 1520 | 9602.3 | 1518 | 9607.11 | 1516 |
| 9608.33 | 1515.46 | 9647.18 | 1514 | 9667.22 | 1513.49 | 9689.79 | 1512.96 | 9693.31 | 1514 |
| 9699.31 | 1516 | 9701.39 | 1516.89 | 9717.11 | 1516.8 | 9719.97 | 1518 | 9724.74 | 1520 |
| 9729.6 | 1521.95 | 9730.5 | 1522 | 9739.41 | 1522.52 | 9740.02 | 1522 | 9742.35 | 1520 |
| 9744.68 | 1518 | 9747.01 | 1516 | 9749.34 | 1514 | 9751.66 | 1512 | 9753.99 | 1510 |
| 9756.32 | 1508 | 9757.34 | 1507.1 | 9775.23 | 1508 | 9779.15 | 1508.08 | 9790.21 | 1508.82 |
| 9924.75 | 1509.17 | 9929.26 | 1508 | 9931.47 | 1507.28 | 9957.87 | 1508 | 9965.81 | 1508.6 |
| 10000 | 1508.85 | 10002.96 | 1508 | 10005.62 | 1507.28 | 10022.51 | 1506 | 10052.79 | 1504.81 |
| 10086.86 | 1505.26 | 10089.27 | 1506 | 10094.96 | 1508 | 10097.88 | 1509.07 | 10193.2 | 1508 |
| 10196.63 | 1507.71 | 10210.12 | 1508 | 10231.09 | 1509.51 | 10231.85 | 1510 | 10234.85 | 1512 |
| 10238.48 | 1514 | 10240.99 | 1515.22 | 10246.04 | 1516 | 10259.3 | 1518 | 10269.2 | 1518 |
| 10281.68 | 1517.07 | 10285.71 | 1516 | 10293.1 | 1514 | 10294.73 | 1513.55 | 10297.17 | 1513.82 |
| 10298.38 | 1514 | 10311.96 | 1516 | 10317.76 | 1516.78 | 10380.85 | 1517.57 | 10384.05 | 1516 |
| 10387.92 | 1514 | 10388.12 | 1513.91 | 10463.66 | 1513.74 | 10484.31 | 1513.51 | 10492.33 | 1512 |
| 10493.35 | 1511.81 | 10496.82 | 1512 | 10510.21 | 1512.18 | 10523.56 | 1513.67 | 10524.47 | 1514 |
| 10530.29 | 1516 | 10536.25 | 1517.17 | 10547.3 | 1516.79 | 10562.73 | 1516.37 | 10585.57 | 1518 |
| 10614.4 | 1518 | 10621.87 | 1517.83 | 10630.83 | 1516 | 10643.64 | 1514.02 | 10647.61 | 1514 |
| 10664.23 | 1513.59 | 10665.89 | 1514 | 10674 | 1516 | 10681.5 | 1517.87 | 10790.99 | 1516.36 |
| 10792.72 | 1516 | 10801.12 | 1514.23 | 10830.69 | 1514 | 10833.33 | 1513.81 | 10836.69 | 1514 |
| 10850.34 | 1514.94 | 10852.97 | 1514 | 10858.62 | 1512 | 10858.66 | 1511.99 | 10858.92 | 1512 |
| 10888.45 | 1512.75 | 10891.55 | 1514 | 10896.5 | 1516 | 10900.73 | 1517.87 | 10910.44 | 1517.9 |
| 10918.67 | 1518 | 10925.06 | 1518.13 | 10926.63 | 1518 | 10934.47 | 1517.68 | 10938.17 | 1518 |
| 10938.75 | 1518.11 | 10938.97 | 1518 | 10940.27 | 1517.49 | 11551.48 | 1517.58 | 11555.55 | 1517.89 |
| 11559.02 | 1518 | 11564.8 | 1518.28 | 11568.88 | 1518.97 | 11574.78 | 1518.96 | 11581.18 | 1518.08 |
| 11602.73 | 1518 | 12141.39 | 1516.39 | 12454.88 | 1516 | 12471.4 | 1515.82 | 12472.36 | 1516 |
| 12476.7 | 1516.74 | 12482.13 | 1516.03 | 12649.19 | 1516.39 | 12653.9 | 1516.51 | 12658.09 | 1516 |
| 12659.11 | 1515.87 | 12793.17 | 1515.17 | 12796.19 | 1516 | 12796.28 | 1516.02 | 12813.94 | 1516.2 |
| 12835.57 | 1516.51 | 12991.02 | 1516.84 | 12997.91 | 1517.25 | 13003.96 | 1516.85 | 13326.65 | 1518 |
| 13381.71 | 1518 | 13384.03 | 1518 | 13706.63 | 1518 | 13730.87 | 1518.97 | 13788.23 | 1519.13 |
| 13984.27 | 1518.63 | 14076.55 | 1518.85 | 14119.11 | 1518.7 | 14209.56 | 1518.73 | 14216.92 | 1519.89 |
| 14231.22 | 1519.59 | 14250.86 | 1518.07 | 14254.81 | 1518 | 14267 | 1518 | 14270.81 | 1518 |
| 14297.35 | 1518 | 14337.97 | 1518 | 14697.06 | 1516 | 15403.84 | 1514 | 15428.86 | 1514 |
| 15436.11 | 1514.1 | 15448.87 | 1514.8 | 15473.87 | 1514.71 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 7572.41 | .05 | 9739.41 | .035 | 10259.3 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9739.41 | 10259.3 | 750 | 739.3 | 750 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 7572.41 | 9739.41 | 1522.52 | 10259.31 | 5473.87 | 1518 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1510.49 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.32 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1510.18 | Reach Len. (ft) | 750.00 | 739.30 | 750.00 |
| Crit W.S. (ft) | 1509.43 | Flow Area (sq ft) | | 1034.40 | |
| E.G. Slope (ft/ft) | 0.004069 | Area (sq ft) | | 1034.40 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 478.33 | Top Width (ft) | | 478.33 | |
| Vel Total (ft/s) | 4.51 | Avg. Vel. (ft/s) | | 4.51 | |
| Max Chl Dpth (ft) | 5.37 | Hydr. Depth (ft) | | 2.16 | |
| Conv. Total (cfs) | 73163.1 | Conv. (cfs) | | 73163.1 | |
| Length Wtd. (ft) | 739.30 | Wetted Per. (ft) | | 481.03 | |
| Min Ch El (ft) | 1504.81 | Shear (lb/sq ft) | | 0.55 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.46 | |
| Frctn Loss (ft) | 5.13 | Cum Volume (acre-ft) | 1.28 | 390.74 | 35.44 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 0.67 | 99.05 | 25.21 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1511.88 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.53 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1511.35 | Reach Len. (ft) | 750.00 | 739.30 | 750.00 |
| Crit W.S. (ft) | 1510.29 | Flow Area (sq ft) | | 1595.72 | |
| E.G. Slope (ft/ft) | 0.003878 | Area (sq ft) | | 1595.72 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 481.45 | Top Width (ft) | | 481.45 | |
| Vel Total (ft/s) | 5.85 | Avg. Vel. (ft/s) | | 5.85 | |
| Max Chl Dpth (ft) | 6.54 | Hydr. Depth (ft) | | 3.31 | |
| Conv. Total (cfs) | 149875.4 | Conv. (cfs) | | 149875.4 | |
| Length Wtd. (ft) | 739.30 | Wetted Per. (ft) | | 484.94 | |
| Min Ch El (ft) | 1504.81 | Shear (lb/sq ft) | | 0.80 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 4.66 | |
| Frctn Loss (ft) | 4.73 | Cum Volume (acre-ft) | 8.78 | 570.46 | 51.52 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 11.09 | 109.09 | 35.91 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1513.04 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.71 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1512.33 | Reach Len. (ft) | 750.00 | 739.30 | 750.00 |
| Crit W.S. (ft) | 1510.99 | Flow Area (sq ft) | | 2069.77 | |
| E.G. Slope (ft/ft) | 0.003700 | Area (sq ft) | | 2069.77 | 7.85 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 519.29 | Top Width (ft) | | 484.17 | 35.12 |
| Vel Total (ft/s) | 6.76 | Avg. Vel. (ft/s) | | 6.76 | |
| Max Chl Dpth (ft) | 7.52 | Hydr. Depth (ft) | | 4.27 | |
| Conv. Total (cfs) | 230146.5 | Conv. (cfs) | | 230146.5 | |
| Length Wtd. (ft) | 739.30 | Wetted Per. (ft) | | 488.30 | |
| Min Ch El (ft) | 1504.81 | Shear (lb/sq ft) | | 0.98 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 6.62 | |
| Frctn Loss (ft) | 4.44 | Cum Volume (acre-ft) | 19.34 | 677.55 | 95.30 |
| C & E Loss (ft) | 0.13 | Cum SA (acres) | 16.77 | 113.09 | 87.65 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.41 | 9843.39 | 531.93 | 148.38 | 90.80 | 11.40 | 1.66 | 3.58 |
| 9843.39 | 9947.37 | 471.74 | 145.91 | 104.25 | 10.11 | 1.40 | 3.23 |
| 9947.37 | 10051.34 | 1544.85 | 297.34 | 104.29 | 33.10 | 2.86 | 5.20 |
| 10051.34 | 10155.32 | 1554.34 | 298.82 | 104.63 | 33.30 | 2.87 | 5.20 |
| 10155.32 | RB 10259.30 | 564.15 | 143.95 | 77.07 | 12.09 | 1.87 | 3.92 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.41 | 9843.39 | 1288.36 | 253.98 | 92.59 | 13.80 | 2.79 | 5.07 |
| 9843.39 | 9947.37 | 1298.14 | 267.53 | 104.25 | 13.91 | 2.57 | 4.85 |
| 9947.37 | 10051.34 | 2740.82 | 418.96 | 104.29 | 29.37 | 4.03 | 6.54 |
| 10051.34 | 10155.32 | 2751.06 | 420.44 | 104.63 | 29.48 | 4.04 | 6.54 |
| 10155.32 | RB 10259.30 | 1254.63 | 234.80 | 79.18 | 13.44 | 2.99 | 5.34 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.41 | 9843.39 | 2078.86 | 343.87 | 94.10 | 14.85 | 3.73 | 6.05 |
| 9843.39 | 9947.37 | 2190.11 | 369.63 | 104.25 | 15.64 | 3.55 | 5.93 |
| 9947.37 | 10051.34 | 3880.50 | 521.06 | 104.29 | 27.72 | 5.01 | 7.45 |
| 10051.34 | 10155.32 | 3890.52 | 522.54 | 104.63 | 27.79 | 5.03 | 7.45 |
| 10155.32 | RB 10259.30 | 1960.02 | 312.67 | 81.03 | 14.00 | 3.90 | 6.27 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.901

INPUT
Description:
Station Elevation Data num= 302

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7261.3 | 1516 | 7371.14 | 1516.01 | 7379.38 | 1516.36 | 7384.68 | 1517.58 | 7412.5 | 1517.82 |
| 7417.46 | 1516.56 | 7431.39 | 1516 | 7433.87 | 1515.9 | 7438.36 | 1516 | 7463.34 | 1516.57 |
| 8867.03 | 1516.42 | 8874.71 | 1516.97 | 8881.89 | 1516.63 | 8898.65 | 1516.74 | 8905.95 | 1516 |
| 8906.12 | 1515.98 | 8906.36 | 1516 | 8911.8 | 1516.43 | 8915.67 | 1518 | 8920.62 | 1520 |
| 8925.53 | 1522 | 8928.33 | 1523.15 | 8930.38 | 1522 | 8933.96 | 1520 | 8937.53 | 1518 |
| 8941.11 | 1516 | 8943.98 | 1514.38 | 8949.73 | 1514 | 9011.17 | 1512 | 9088.82 | 1512 |
| 9106.23 | 1512 | 9127.38 | 1511.53 | 9129.2 | 1512 | 9142.78 | 1512 | 9147.56 | 1512 |
| 9153.86 | 1512 | 9157.76 | 1510 | 9158.56 | 1509.59 | 9185.74 | 1508 | 9197.21 | 1507.44 |

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 9198.69    1508 9203.96    1510 9210.47    1512  9210.9 1512.13 9213.24    1512
 9228.19    1510 9230.54 1509.55  9231.5    1508 9232.73    1506 9234.05    1504
 9235.39    1502 9236.74    1500 9238.08    1498 9239.43    1496 9240.77    1494
 9242.11    1492 9243.46    1490  9244.8    1488 9246.13    1486 9247.44    1484
 9248.76    1482 9249.98 1480.13 9267.31    1480 9316.64    1480 9324.69 1480.51
 9327.17    1482 9330.51    1484 9333.96    1486 9334.35 1486.22 9334.63    1488
 9334.94    1490 9335.25    1492 9335.66    1494 9336.11    1496 9336.57    1498
 9337.03    1500 9337.49    1502 9337.95    1504 9338.41    1506 9338.87    1508
 9339.33    1510 9339.79    1512 9340.19 1513.75 9340.96    1514 9347.14    1516
 9353.33    1518 9359.82    1520 9366.05    1522  9372.5    1524 9379.03    1526
 9387.96    1528 9389.66 1528.19  9389.8    1528 9391.18    1526 9393.17    1524
 9395.45    1522 9399.49    1522 9400.36 1522.32 9401.98    1522 9404.96    1520
 9408.08    1518 9412.41    1516 9416.93    1514 9421.45    1512 9424.38 1510.71
 9424.49    1510  9424.8    1508  9425.1    1506 9425.41    1504  9425.7    1502
    9426    1500  9426.3    1498  9426.6    1496 9427.04    1494 9428.07    1492
 9430.01    1490 9431.96    1488 9433.92    1486 9435.87    1484 9437.83    1482
 9439.79    1480 9441.75    1478 9443.27 1476.35 9495.88    1476 9600.97 1475.55
 9611.07 1475.54 9613.19 1475.89 9628.69    1474 9629.32    1474 9634.63  1474.7
 9667.03 1475.45 9668.45    1476 9673.49    1478 9679.72    1480 9686.45    1482
 9690.75    1484 9692.35    1486 9693.88    1488  9694.7    1490 9695.22    1492
 9695.73    1494 9696.24    1496 9696.75    1498 9697.26    1500 9698.17    1502
 9699.45    1504 9702.83    1506  9706.3    1508 9712.25 1509.27 9750.02 1509.12
 9752.22    1510 9756.33    1512 9759.95 1513.54 9769.03 1513.49  9774.2    1514
 9776.31  1514.2 9776.76    1514 9781.35    1512 9785.94    1510 9790.69    1508
 9791.68 1507.61 9792.54    1508 9797.17    1510 9798.53 1510.54 9803.42 1510.54
 9805.52    1510 9821.72    1508 9826.34    1506 9828.33 1505.14 9839.66 1504.97
 9843.26    1504 9848.16 1502.06 9854.24    1502 9891.39 1501.74 9893.26    1502
 9898.61 1502.82 9920.67 1503.67 9946.15    1504  9949.2 1504.12 9949.51    1504
 9954.61 1502.18 9979.53 1502.3210086.26 1502.7710089.12 1502.3610089.79    1502
10093.82    150010095.59 1499.1710119.95 1499.6210123.14    150010123.66 1500.06
10126.28    150210129.21    150410132.15    150610135.09    150810138.03    1510
10140.96    151210141.17 1512.1410245.15    151410258.44    151410282.24    1514
10310.71 1514.0310310.87    151410319.13 1512.0810328.35    151210354.88 1511.05
10355.64  1510.910380.53 1510.5410381.54    151010384.46 1508.55 10392.8  1509.4
10407.62 1509.3110418.68    1510 10511.4 1510.6410516.11    151010516.23 1509.97
10520.01    151010522.89    151010526.22 1509.8510526.81    151010534.93    1512
10541.55 1513.4410638.71    151210638.74    151210650.86    151010657.83  1509.1
10698.26 1509.6510699.58    1510 10707.2    151210715.03    151410717.15 1514.54
10729.67 1514.1810744.75 1514.4410752.36 1514.3710756.41 1514.9510758.73    1514
10758.99 1513.8910835.81    1514 11374.5  1515.311384.93 1515.1311387.65 1515.46
11392.14 1515.8211398.29 1514.6911672.93    151412288.16 1513.0112295.93 1513.32
12608.88 1512.8912628.96  1513.512649.02 1513.43 12664.2 1512.7712803.04    1512
12897.66 1511.1912900.68    151212903.26 1512.7312906.73    151212911.68 1510.93
13146.58 1511.1313154.11    151213154.18 1512.0113159.62 1512.5813177.99 1512.69
13191.02 1512.1513404.61 1512.3413426.07    151413428.14  1514.213433.47    1514
13454.05  1513.213660.51 1513.3213682.36 1513.9113687.41    151413698.67 1514.19
13702.59    1514 13711.7 1513.3413949.17 1513.5113951.84    151413957.96 1515.48
14359.07    1514   14451  1513.214457.04    151214464.68    151014469.63 1508.68
14474.47    150814479.24 1507.4814528.16 1507.7414560.76 1507.5314564.92    1508
14574.74    151014584.34    151214585.04 1512.15   14718    151214877.58    1510
14927.98    151015054.26    151015178.25    151015223.51 1510.5415226.37    1510
15243.24    151015246.05 1510.4815249.61    151015253.73 1509.3815257.48    1510
15263.75 1511.1115288.87 1511.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  7261.3     .05 9776.31    .03510141.17     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9776.3110141.17              670   657.5     670              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7261.3 9776.31  1514.210282.2415288.87    1514
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7261.3 9776.31  1512.511392.1415288.87    1510

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1505.30   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.01   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1504.29   Reach Len. (ft)            670.00     657.50     670.00
  Crit W.S. (ft)            1504.29   Flow Area (sq ft)                     578.73
  E.G. Slope (ft/ft)       0.014390   Area (sq ft)                          578.73
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             287.44   Top Width (ft)                        287.44
```

| | | | | | |
|---|---|---|---|---|---|
| Vel Total (ft/s) | 8.06 | Avg. Vel. (ft/s) | | 8.06 | |
| Max Chl Dpth (ft) | 5.12 | Hydr. Depth (ft) | | 2.01 | |
| Conv. Total (cfs) | 38905.4 | Conv. (cfs) | | 38905.4 | |
| Length Wtd. (ft) | 657.50 | Wetted Per. (ft) | | 290.44 | |
| Min Ch El (ft) | 1499.17 | Shear (lb/sq ft) | | 1.79 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 14.44 | |
| Frctn Loss (ft) | 0.35 | Cum Volume (acre-ft) | 1.28 | 377.05 | 35.44 |
| C & E Loss (ft) | 0.29 | Cum SA (acres) | 0.67 | 92.55 | 25.21 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1507.05 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.54 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1505.51 | Reach Len. (ft) | 670.00 | 657.50 | 670.00 |
| Crit W.S. (ft) | 1505.51 | Flow Area (sq ft) | | 938.31 | |
| E.G. Slope (ft/ft) | 0.012402 | Area (sq ft) | | 938.31 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 303.95 | Top Width (ft) | | 303.95 | |
| Vel Total (ft/s) | 9.95 | Avg. Vel. (ft/s) | | 9.95 | |
| Max Chl Dpth (ft) | 6.34 | Hydr. Depth (ft) | | 3.09 | |
| Conv. Total (cfs) | 83806.0 | Conv. (cfs) | | 83806.0 | |
| Length Wtd. (ft) | 657.50 | Wetted Per. (ft) | | 307.50 | |
| Min Ch El (ft) | 1499.17 | Shear (lb/sq ft) | | 2.36 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 23.50 | |
| Frctn Loss (ft) | 0.33 | Cum Volume (acre-ft) | 8.78 | 548.95 | 51.52 |
| C & E Loss (ft) | 0.44 | Cum SA (acres) | 11.09 | 102.43 | 35.91 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1508.47 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.99 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1506.48 | Reach Len. (ft) | 670.00 | 657.50 | 670.00 |
| Crit W.S. (ft) | 1506.48 | Flow Area (sq ft) | | 1235.66 | |
| E.G. Slope (ft/ft) | 0.011350 | Area (sq ft) | | 1235.66 | |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 307.63 | Top Width (ft) | | 307.63 | |
| Vel Total (ft/s) | 11.33 | Avg. Vel. (ft/s) | | 11.33 | |
| Max Chl Dpth (ft) | 7.31 | Hydr. Depth (ft) | | 4.02 | |
| Conv. Total (cfs) | 131409.3 | Conv. (cfs) | | 131409.3 | |
| Length Wtd. (ft) | 657.50 | Wetted Per. (ft) | | 311.67 | |
| Min Ch El (ft) | 1499.17 | Shear (lb/sq ft) | | 2.81 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 31.83 | |
| Frctn Loss (ft) | 0.36 | Cum Volume (acre-ft) | 19.34 | 649.50 | 95.23 |
| C & E Loss (ft) | 0.57 | Cum SA (acres) | 16.77 | 106.37 | 87.35 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9776.31 | 9849.28 | 47.11 | 8.82 | 7.50 | 1.01 | 1.24 | 5.34 |
| 9849.28 | 9922.25 | 1029.76 | 139.61 | 73.07 | 22.06 | 1.91 | 7.38 |
| 9922.25 | 9995.23 | 575.78 | 98.63 | 73.31 | 12.34 | 1.35 | 5.84 |
| 9995.23 | 10068.20 | 886.89 | 127.57 | 72.97 | 19.00 | 1.75 | 6.95 |
| 10068.20 | RB 10141.17 | 2127.46 | 204.10 | 63.59 | 45.59 | 3.32 | 10.42 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9776.31 | 9849.28 | 122.52 | 25.01 | 22.38 | 1.31 | 1.15 | 4.90 |
| 9849.28 | 9922.25 | 2226.05 | 228.70 | 73.07 | 23.85 | 3.13 | 9.73 |
| 9922.25 | 9995.23 | 1598.24 | 187.72 | 73.31 | 17.12 | 2.57 | 8.51 |
| 9995.23 | 10068.20 | 2036.06 | 216.67 | 72.97 | 21.82 | 2.97 | 9.40 |
| 10068.20 | RB 10141.17 | 3350.13 | 280.20 | 65.76 | 35.90 | 4.43 | 11.96 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9776.31 | 9849.28 | 321.25 | 47.31 | 24.83 | 2.29 | 1.97 | 6.79 |
| 9849.28 | 9922.25 | 3392.24 | 299.66 | 73.07 | 24.23 | 4.11 | 11.32 |
| 9922.25 | 9995.23 | 2648.96 | 258.68 | 73.31 | 18.92 | 3.54 | 10.24 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9995.23 | 10068.20 | 3171.04 | 287.63 | 72.97 | 22.65 | 3.94 | 11.02 |
| 10068.20 | RB 10141.17 | 4466.52 | 342.38 | 67.49 | 31.90 | 5.30 | 13.05 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.776

INPUT
Description:
Station Elevation Data num= 234

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7482.3 | 1514.29 | 7491.77 | 1514 | 7547.97 | 1513.62 | 7593.94 | 1514 | 7616.17 | 1514.61 |
| 7621.11 | 1515.97 | 7645.79 | 1515.99 | 7652.08 | 1514.43 | 7659.37 | 1514 | 7671.45 | 1513.28 |
| 7700.96 | 1513.39 | 8484.69 | 1514 | 8879.07 | 1514 | 9053.53 | 1512.95 | 9109.66 | 1514 |
| 9112.4 | 1514.39 | 9118.71 | 1514.49 | 9136.36 | 1514.1 | 9142.06 | 1516 | 9146.22 | 1517.61 |
| 9147.92 | 1516 | 9150.02 | 1514 | 9152.12 | 1512 | 9154.22 | 1510 | 9156.32 | 1508 |
| 9158.42 | 1506 | 9160.43 | 1504.08 | 9179.54 | 1504.35 | 9182.13 | 1506 | 9185.25 | 1508 |
| 9188.32 | 1510 | 9190.55 | 1511.45 | 9190.87 | 1510 | 9191.3 | 1508 | 9191.63 | 1506 |
| 9191.96 | 1504 | 9192.29 | 1502 | 9192.62 | 1500 | 9192.71 | 1499.44 | 9314.03 | 1499.44 |
| 9314.93 | 1500 | 9317.05 | 1501.02 | 9333.79 | 1501.45 | 9337.09 | 1500.3 | 9495.51 | 1500 |
| 9708.54 | 1499.25 | 9709.92 | 1500 | 9713.58 | 1502 | 9717.16 | 1504 | 9720.27 | 1505.75 |
| 9748.35 | 1505.92 | 9753.68 | 1504.34 | 9772.21 | 1504.42 | 9772.86 | 1504.62 | 9781.13 | 1504.54 |
| 9786.47 | 1506 | 9795.02 | 1507.57 | 9797.22 | 1506 | 9800.45 | 1504 | 9803.68 | 1502 |
| 9806.76 | 1500 | 9809.64 | 1498 | 9812.52 | 1496 | 9815.4 | 1494 | 9818.28 | 1492 |
| 9821.16 | 1490 | 9821.98 | 1489.44 | 9951.11 | 1490 | 9960.05 | 1490 | 9969.87 | 1490 |
| 9993.19 | 149 | 10035.45 | 1489.24 | 10037.05 | 149 | 10042.36 | 149 | 210046.84 | 1494 |
| 10050.38 | 149 | 610054.57 | 149 | 810058.43 | 1499.84 | 10105.79 | 1498.55 | 10117.4 | 1499.75 |
| 10137.57 | 150 | 010204.44 | 1500.58 | 10221.05 | 1500.1 | 10235.56 | 1500.47 | 10262.87 | 1500.67 |
| 10266.03 | 150 | 010270.35 | 1499.1 | 10275.85 | 1500 | 10278.5 | 1500.43 | 10363.76 | 1500 |
| 10373.26 | 1499.89 | 10406.75 | 1498.89 | 10409.22 | 150 | 010413.68 | 150 | 210418.19 | 1504 |
| 10421.36 | 1505.4 | 10426.25 | 150 | 410434.12 | 150 | 210435.63 | 1501.64 | 10457.69 | 1502 |
| 10461.69 | 1502.13 | 10466.86 | 150 | 410481.06 | 150 | 610491.17 | 150 | 810499.58 | 1510 |
| 10501.01 | 1510.34 | 10506.51 | 151 | 210513.14 | 151 | 410520.69 | 151 | 610527.59 | 1518 |
| 10531.93 | 1519.4 | 10536.21 | 1518 | 10547.7 | 151 | 610553.91 | 151 | 410560.02 | 1512 |
| 10564.83 | 1510.43 | 10582.87 | 151 | 010605.38 | 1509.29 | 10675.95 | 1508 | 10688.9 | 1507.82 |
| 10786.7 | 1507.04 | 10795.34 | 150 | 810799.54 | 1508.44 | 10831.32 | 150 | 810934.52 | 1507.43 |
| 10937.69 | 150 | 810948.77 | 151 | 010954.36 | 1511.01 | 10968.47 | 1511.27 | 10984.07 | 1511.5 |
| 10987.26 | 151 | 210991.25 | 1512.63 | 10994.45 | 151 | 210999.52 | 151 | 111491.05 | 1510.8 |
| 11497.34 | 1511.98 | 11501.84 | 1511.48 | 11610.45 | 1510.8 | 11622.15 | 1511.55 | 11623.91 | 1512 |
| 11626.6 | 1512.33 | 11631.88 | 1512.31 | 11634.41 | 151 | 211639.83 | 1511.16 | 11814.28 | 1510.49 |
| 11818.57 | 1511.1 | 11823.85 | 151 | 011827.23 | 1509.3 | 11869.99 | 1509.87 | 11906.21 | 1510 |
| 11908.09 | 1510.02 | 11918.75 | 1511.14 | 11930.36 | 1511.07 | 11944.83 | 1511.24 | 11946.03 | 1510.63 |
| 12053.92 | 1510.48 | 12060.14 | 1510.88 | 12079.59 | 1510.95 | 12084.07 | 151 | 012086.47 | 1509.46 |
| 12138.05 | 1509.95 | 12138.43 | 151 | 012146.13 | 1510.98 | 12154.11 | 151 | 012160.64 | 1509.12 |
| 12241.33 | 1509.26 | 12248.87 | 151 | 012250.41 | 1510.2 | 12278.63 | 1510.83 | 12327.72 | 1510.55 |
| 12386.51 | 1510.41 | 12406.06 | 151 | 012415.05 | 1509.81 | 12418.85 | 1509.05 | 12464.63 | 1509.3 |
| 12469.43 | 151 | 012471.95 | 1510.4 | 12473.53 | 151 | 012475.45 | 1509.66 | 12593.3 | 1510 |
| 12631.84 | 151 | 012743.42 | 1509.51 | 12759.84 | 1509.4 | 12797.89 | 151 | 012864.25 | 1510 |
| 12864.57 | 151 | 012887.63 | 1509.91 | 12899.44 | 1508.8 | 12942.68 | 1508.88 | 13004.21 | 1508.51 |
| 13039.52 | 1508.5 | 13047.68 | 1509.26 | 13067.26 | 150 | 913116.44 | 1508.69 | 13136.39 | 1508.94 |
| 13143.65 | 1508.16 | 13393.5 | 1508.16 | 13400.31 | 1509.08 | 13405.24 | 150 | 813405.33 | 1507.98 |
| 13426.9 | 150 | 813438.06 | 150 | 813544.99 | 150 | 813658.09 | 1508.76 | 13662.08 | 1510 |
| 13665.93 | 1511.25 | 13669.77 | 1510.36 | 13924.06 | 1510.62 | 13929 | 1511.59 | 14187.87 | 1511.32 |
| 14191.38 | 151 | 214192.56 | 1512.2 | 14286.63 | 151 | 214918.12 | 151 | 015240.85 | 1508 |
| 15297.39 | 1507.7 | 15304.91 | 150 | 615313.58 | 150 | 415315.28 | 1503.6 | 15402.88 | 1503.01 |
| 15406.39 | 150 | 415413.49 | 150 | 615417.67 | 1507.18 | 15425.91 | 1506.56 | 15450.39 | 1507.24 |
| 15489.01 | 1507.52 | 15498.17 | 150 | 815500.57 | 1508.13 | 15516.11 | 150 | 815524.43 | 1507.94 |
| 15538.4 | 150 | 615542.92 | 1505.33 | 15547.57 | 150 | 615560.87 | 1507.9 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|

```
 7482.3     .05 9795.02    .03510491.17     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9795.0210491.17              670   651.3     670            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7482.3 9795.02 1507.5710531.9315560.87  1519.4
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7482.3 9717.16    150610531.9315560.87    1510

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)          1500.98   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.04   Wt. n-Val.                           0.035
  W.S. Elev (ft)          1500.94   Reach Len. (ft)          670.00     651.30     670.00
  Crit W.S. (ft)          1492.17   Flow Area (sq ft)                  2979.97
  E.G. Slope (ft/ft)     0.000165   Area (sq ft)                       2979.97
  Q Total (cfs)           4667.00   Flow (cfs)                         4667.00
  Top Width (ft)           606.02   Top Width (ft)                      606.02
  Vel Total (ft/s)           1.57   Avg. Vel. (ft/s)                      1.57
  Max Chl Dpth (ft)         11.70   Hydr. Depth (ft)                      4.92
  Conv. Total (cfs)      363138.8   Conv. (cfs)                      363138.8
  Length Wtd. (ft)         651.30   Wetted Per. (ft)                    612.79
  Min Ch El (ft)          1489.24   Shear (lb/sq ft)                      0.05
  Alpha                      1.00   Stream Power (lb/ft s)                0.08
  Frctn Loss (ft)            0.02   Cum Volume (acre-ft)        1.28     350.19      35.44
  C & E Loss (ft)            0.01   Cum SA (acres)              0.67      85.81      25.21

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)          1503.77   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.06   Wt. n-Val.                           0.035
  W.S. Elev (ft)          1503.71   Reach Len. (ft)          670.00     651.30     670.00
  Crit W.S. (ft)          1493.59   Flow Area (sq ft)                  4734.58
  E.G. Slope (ft/ft)     0.000157   Area (sq ft)                       4734.58
  Q Total (cfs)           9333.00   Flow (cfs)                         9333.00
  Top Width (ft)           655.33   Top Width (ft)                      655.33
  Vel Total (ft/s)           1.97   Avg. Vel. (ft/s)                      1.97
  Max Chl Dpth (ft)         14.47   Hydr. Depth (ft)                      7.22
  Conv. Total (cfs)      744623.1   Conv. (cfs)                      744623.1
  Length Wtd. (ft)         651.30   Wetted Per. (ft)                    664.03
  Min Ch El (ft)          1489.24   Shear (lb/sq ft)                      0.07
  Alpha                      1.00   Stream Power (lb/ft s)                0.14
  Frctn Loss (ft)            0.04   Cum Volume (acre-ft)        8.78     506.14      51.52
  C & E Loss (ft)            0.01   Cum SA (acres)             11.09      95.19      35.91

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT    Profile #full flow

  E.G. Elev (ft)          1505.65   Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.09   Wt. n-Val.                           0.035
  W.S. Elev (ft)          1505.56   Reach Len. (ft)          670.00     651.30     670.00
  Crit W.S. (ft)          1494.74   Flow Area (sq ft)                  5969.30
  E.G. Slope (ft/ft)     0.000172   Area (sq ft)              37.37    5969.30
  Q Total (cfs)          14000.00   Flow (cfs)                        14000.00
  Top Width (ft)           718.14   Top Width (ft)            38.10     680.04
  Vel Total (ft/s)           2.35   Avg. Vel. (ft/s)                      2.35
  Max Chl Dpth (ft)         16.32   Hydr. Depth (ft)                      8.78
  Conv. Total (cfs)     1067974.9   Conv. (cfs)                     1067974.9
  Length Wtd. (ft)         651.30   Wetted Per. (ft)                    690.01
  Min Ch El (ft)          1489.24   Shear (lb/sq ft)                      0.09
  Alpha                      1.00   Stream Power (lb/ft s)                0.22
  Frctn Loss (ft)            0.05   Cum Volume (acre-ft)       19.05     595.12      95.23
  C & E Loss (ft)            0.01   Cum SA (acres)             16.47      98.91      87.35
```

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9795.02 | 9934.25 | 2413.14 | 1359.60 | 132.53 | 51.71 | 10.54 | 1.77 |
| 9934.25 | 10073.48 | 2130.87 | 1295.67 | 141.60 | 45.66 | 9.31 | 1.64 |
| 10073.48 | 10212.71 | 61.31 | 153.13 | 139.31 | 1.31 | 1.10 | 0.40 |
| 10212.71 | 10351.94 | 27.44 | 94.58 | 139.51 | 0.59 | 0.68 | 0.29 |
| 10351.94 | RB 10491.17 | 34.23 | 76.98 | 59.84 | 0.73 | 1.30 | 0.44 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9795.02 | 9934.25 | 4097.97 | 1722.97 | 137.72 | 43.91 | 12.92 | 2.38 |
| 9934.25 | 10073.48 | 3862.93 | 1681.53 | 141.60 | 41.39 | 12.08 | 2.30 |
| 10073.48 | 10212.71 | 586.26 | 538.99 | 139.31 | 6.28 | 3.87 | 1.09 |
| 10212.71 | 10351.94 | 483.54 | 480.44 | 139.51 | 5.18 | 3.45 | 1.01 |
| 10351.94 | RB 10491.17 | 302.28 | 310.66 | 105.89 | 3.24 | 2.98 | 0.97 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9795.02 | 9934.25 | 5587.15 | 1972.32 | 141.24 | 39.91 | 14.47 | 2.83 |
| 9934.25 | 10073.48 | 5421.57 | 1939.02 | 141.60 | 38.73 | 13.93 | 2.80 |
| 10073.48 | 10212.71 | 1244.02 | 796.48 | 139.31 | 8.89 | 5.72 | 1.56 |
| 10212.71 | 10351.94 | 1094.31 | 737.92 | 139.51 | 7.82 | 5.30 | 1.48 |
| 10351.94 | RB 10491.17 | 652.94 | 523.57 | 128.36 | 4.66 | 4.15 | 1.25 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.653

INPUT
Description:
Station Elevation Data num= 215

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7527.16 | 1510 | 7602.74 | 1509.8 | 7604.58 | 1510 | 7612.08 | 1510.86 | 7618.13 | 1511.84 |
| 7625.31 | 1512 | 7640 | 1512.37 | 7641.02 | 1512 | 7646.24 | 1510.21 | 7657.36 | 1510.27 |
| 7679.37 | 1510 | 7944.66 | 1510 | 8480.96 | 1510 | 8504.49 | 1509.69 | 8600.48 | 1510 |
| 8668.88 | 1511.03 | 8675.49 | 1511.22 | 8693.36 | 1510.89 | 8702.7 | 1511.18 | 8704.88 | 1512 |
| 8710.17 | 1514 | 8711.04 | 1514.35 | 8739.72 | 1514.93 | 8741.15 | 1514 | 8745.14 | 1512 |
| 8749.75 | 1510 | 8752.6 | 1508.77 | 8899.18 | 1508.77 | 8901.61 | 1510 | 8905.57 | 1512 |
| 8909.53 | 1514 | 8913.49 | 1516 | 8917.45 | 1518 | 8917.79 | 1518.17 | 8946.28 | 1518.81 |
| 8947.94 | 1518 | 8952.06 | 1516 | 8956.17 | 1514 | 8960.29 | 1512 | 8964.44 | 1510 |
| 8966.87 | 1508.9 | 8971.38 | 1508 | 8975.06 | 1507.27 | 8997.23 | 1507.34 | 8998.4 | 1508 |
| 9001.96 | 1510 | 9005.51 | 1512 | 9009.06 | 1514 | 9013.01 | 1516 | 9016.16 | 1516.89 |
| 9017.43 | 1516 | 9028.51 | 1516 | 9038.8 | 1518 | 9056.11 | 1518.55 | 9057.15 | 1518 |
| 9060.92 | 1516 | 9064.68 | 1514 | 9068.45 | 1512 | 9072.22 | 1510 | 9075.75 | 1508 |
| 9077.67 | 1506.84 | 9111.84 | 1507.51 | 9112.75 | 1508 | 9116.48 | 1510 | 9120.22 | 1512 |
| 9123.97 | 1514 | 9127.72 | 1516 | 9131.26 | 1517.89 | 9136.16 | 1518 | 9177.04 | 1518.85 |
| 9216.58 | 1519.09 | 9218.56 | 1518 | 9222.19 | 1516 | 9225.82 | 1514 | 9229.45 | 1512 |
| 9233.06 | 1510 | 9236.07 | 1508.32 | 9270.23 | 1508 | 9438.24 | 1508 | 9493.02 | 1508.73 |

```
 9495.12    1510 9499.07    1512 9503.63    1514 9516.97    1514 9521.94    1512
 9526.92    1510 9531.89    1508 9541.51 1506.74 9576.95    1506 9583.95    1506
 9640.06    1506 9648.54 1505.98 9648.56    1506 9651.34    1508 9654.11    1510
 9656.89    1512 9659.63    1514 9660.95 1515.03 9662.53    1514  9665.6    1512
 9668.67    1510 9671.74    1508 9674.82    1506  9677.9    1504 9680.98    1502
 9684.06    1500 9687.14    1498 9690.22    1496 9693.29    1494 9696.37    1492
 9699.45    1490 9701.65 1488.57 9717.48  1488.5 9727.64    1488 9764.85    1486
   10000 1485.4910019.59    148410042.63    148210055.06 1480.3910190.21    1481
10191.77    148210194.88    148410197.99    1486 10201.1    148810204.17    1490
10207.18    149210210.19    1494 10213.2    149610216.21    149810219.23    1500
10222.24    150210225.06 1503.8810228.17    150410270.32 1505.6610271.39    1506
10277.74    150810281.14 1508.9310313.86    150810326.15    150810358.83    1510
10376.86    151010384.55 1508.6310399.03    150810403.35    150810429.33    1508
10439.21    1506 10439.7  1505.910555.58 1505.0110746.84 1504.2910812.19 1504.64
10814.96    150610818.53 1507.7110880.44  1506.8 10886.5 1506.0510942.61 1506.14
10948.43 1506.8710953.46    150610953.71 1505.9510954.03    150610959.61 1506.83
10968.15  1506.710980.98 1507.3510983.58    150810989.11 1509.4510998.84  1508.3
11384.05 1508.1311392.86 1508.5311396.64 1508.5911453.99    150811610.31 1507.86
11611.66    1508 11620.3 1508.9311623.87 1509.0311629.53 1509.4811636.12 1508.32
11815.29    150812699.74 1506.5912732.36 1507.46 12746.7 1507.3912769.02 1507.59
12772.71    150612777.53    150412782.35    150212783.33 1501.5912800.61  1500.5
12818.13 1500.5212822.74    150212828.96    150412835.18    150612841.36    1508
12843.96 1508.8512857.86 1508.4712863.39    150812868.45 1507.6312888.93 1506.93
12901.88 1506.16 13050.4    150613545.99    150413717.19    150414052.86    1506
14377.18    1508 14391.9 1508.1314396.49 1508.4714402.15    1508 14405.6 1507.72
14946.63    1506 15415.7 1504.7215449.84 1505.3715468.78 1504.5715476.42 1504.71
15482.97 1504.5115495.67 1504.9315519.15 1504.6615526.76    150415538.63 1502.93

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7527.16     .05 9660.95    .03510281.14     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9660.9510281.14              600   684.9     770              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7527.16 9660.95 1515.0310376.8615538.63    1510
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7527.16   11000    1490   1100115538.63  1508.3

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1500.95   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.01   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1500.94   Reach Len. (ft)             600.00     684.90     770.00
  Crit W.S. (ft)            1491.38   Flow Area (sq ft)                     5702.74
  E.G. Slope (ft/ft)       0.000016   Area (sq ft)                          5702.74
  Q Total (cfs)             4667.00   Flow (cfs)                            4667.00
  Top Width (ft)             538.03   Top Width (ft)                         538.03
  Vel Total (ft/s)             0.82   Avg. Vel. (ft/s)                         0.82
  Max Chl Dpth (ft)           10.94   Hydr. Depth (ft)                        10.60
  Conv. Total (cfs)       1158859.8   Conv. (cfs)                         1158859.8
  Length Wtd. (ft)           684.90   Wetted Per. (ft)                       544.57
  Min Ch El (ft)            1490.00   Shear (lb/sq ft)                         0.01
  Alpha                        1.00   Stream Power (lb/ft s)                   0.01
  Frctn Loss (ft)              0.04   Cum Volume (acre-ft)          1.28     285.28      35.44
  C & E Loss (ft)              0.09   Cum SA (acres)                0.67      77.26      25.21


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1503.73   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.03   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1503.70   Reach Len. (ft)             600.00     684.90     770.00
  Crit W.S. (ft)            1492.19   Flow Area (sq ft)                     7200.48
  E.G. Slope (ft/ft)       0.000031   Area (sq ft)                          7200.48
  Q Total (cfs)             9333.00   Flow (cfs)                            9333.00
  Top Width (ft)             546.43   Top Width (ft)                         546.43
  Vel Total (ft/s)             1.30   Avg. Vel. (ft/s)                         1.30
  Max Chl Dpth (ft)           13.70   Hydr. Depth (ft)                        13.18
```

| | | | | | |
|---|---|---|---|---|---|
| Conv. Total (cfs) | 1688615.6 | Conv. (cfs) | | 1688615.6 | |
| Length Wtd. (ft) | 684.90 | Wetted Per. (ft) | | 554.62 | |
| Min Ch El (ft) | 1490.00 | Shear (lb/sq ft) | | 0.02 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.03 | |
| Frctn Loss (ft) | 0.08 | Cum Volume (acre-ft) | 8.78 | 416.91 | 51.52 |
| C & E Loss (ft) | 0.23 | Cum SA (acres) | 11.09 | 86.20 | 35.91 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1505.58 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.04 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1505.54 | Reach Len. (ft) | 600.00 | 684.90 | 770.00 |
| Crit W.S. (ft) | 1492.86 | Flow Area (sq ft) | | 8242.98 | |
| E.G. Slope (ft/ft) | 0.000049 | Area (sq ft) | | 8242.98 | 259.03 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 918.93 | Top Width (ft) | | 591.70 | 327.23 |
| Vel Total (ft/s) | 1.70 | Avg. Vel. (ft/s) | | 1.70 | |
| Max Chl Dpth (ft) | 15.54 | Hydr. Depth (ft) | | 13.93 | |
| Conv. Total (cfs) | 2006223.3 | Conv. (cfs) | | 2006223.3 | |
| Length Wtd. (ft) | 684.89 | Wetted Per. (ft) | | 600.53 | |
| Min Ch El (ft) | 1490.00 | Shear (lb/sq ft) | | 0.04 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.07 | |
| Frctn Loss (ft) | 0.12 | Cum Volume (acre-ft) | 18.77 | 488.87 | 93.24 |
| C & E Loss (ft) | 0.22 | Cum SA (acres) | 16.18 | 89.41 | 84.83 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9660.95 | 9784.99 | 798.79 | 1027.68 | 105.61 | 17.12 | 10.04 | 0.78 |
| 9784.99 | 9909.03 | 1140.08 | 1356.73 | 124.04 | 24.43 | 10.94 | 0.84 |
| 9909.03 | 10033.06 | 1140.07 | 1356.72 | 124.04 | 24.43 | 10.94 | 0.84 |
| 10033.06 | 10157.10 | 1140.08 | 1356.73 | 124.04 | 24.43 | 10.94 | 0.84 |
| 10157.10 | RB 10281.14 | 447.96 | 604.88 | 66.84 | 9.60 | 9.52 | 0.74 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9660.95 | 9784.99 | 1603.31 | 1316.33 | 110.69 | 17.18 | 12.35 | 1.22 |
| 9784.99 | 9909.03 | 2274.58 | 1699.35 | 124.04 | 24.37 | 13.70 | 1.34 |
| 9909.03 | 10033.06 | 2274.57 | 1699.33 | 124.04 | 24.37 | 13.70 | 1.34 |
| 10033.06 | 10157.10 | 2274.58 | 1699.35 | 124.04 | 24.37 | 13.70 | 1.34 |
| 10157.10 | RB 10281.14 | 905.96 | 786.13 | 71.82 | 9.71 | 11.61 | 1.15 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9660.95 | 9784.99 | 2459.12 | 1514.93 | 114.06 | 17.57 | 13.84 | 1.62 |
| 9784.99 | 9909.03 | 3473.62 | 1927.34 | 124.04 | 24.81 | 15.54 | 1.80 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9909.03 | 10033.06 | 3473.59 | 1927.33 | 124.04 | 24.81 | 15.54 | 1.80 |
| 10033.06 | 10157.10 | 3473.62 | 1927.34 | 124.04 | 24.81 | 15.54 | 1.80 |
| 10157.10 | RB 10281.14 | 1120.05 | 946.04 | 114.35 | 8.00 | 8.59 | 1.18 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.523

INPUT
Description:
Station Elevation Data num= 40

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9220.07 | 1508 | 9616.54 | 1508 | 9620.99 | 1506 | 9624.59 | 1504.37 | 9644.73 | 1504 |
| 9767.15 | 1502.67 | 9769.91 | 1504 | 9774.07 | 1506 | 9779.22 | 1506.67 | 9782.73 | 1506 |
| 9795.17 | 1504 | 9801.76 | 1502.52 | 9864.61 | 1502 | 9889.88 | 1501.52 | 9903.35 | 1500.45 |
| 9941.87 | 1500.95 | 9944.03 | 1500 | 9948.59 | 1498 | 9948.91 | 1497.88 | 9964.34 | 1497.6 |
| 9967.56 | 1496 | 9971.44 | 1494 | 9973.94 | 1492.88 | 10044.32 | 1493.04 | 10045.77 | 1494 |
| 10048.8 | 1496 | 10052.25 | 1498 | 10055.8 | 1500 | 10057.76 | 1501.08 | 10059.94 | 1502 |
| 10064.68 | 1504 | 10069.38 | 1506 | 10082.78 | 1507 | 10402.48 | 1508 | 10550 | 1508 |
| 10720 | 1510 | 10860 | 1508 | 11150 | 1506 | 11300 | 1506.84 | 12090 | 1506 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9220.07 | .05 | 9801.76 | .035 | 10059.94 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9801.76 | 10059.94 | 220 | 147.4 | 95 | .1 | .3 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1500.82 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.91 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1499.91 | Reach Len. (ft) | 220.00 | 147.40 | 95.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 610.21 | |
| E.G. Slope (ft/ft) | 0.003501 | Area (sq ft) | | 610.21 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 111.41 | Top Width (ft) | | 111.41 | |
| Vel Total (ft/s) | 7.65 | Avg. Vel. (ft/s) | | 7.65 | |
| Max Chl Dpth (ft) | 7.03 | Hydr. Depth (ft) | | 5.48 | |
| Conv. Total (cfs) | 78874.6 | Conv. (cfs) | | 78874.6 | |
| Length Wtd. (ft) | 147.40 | Wetted Per. (ft) | | 114.86 | |
| Min Ch El (ft) | 1492.88 | Shear (lb/sq ft) | | 1.16 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 8.88 | |
| Frctn Loss (ft) | 0.45 | Cum Volume (acre-ft) | 1.28 | 235.65 | 35.44 |
| C & E Loss (ft) | 0.17 | Cum SA (acres) | 0.67 | 72.15 | 25.21 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1503.42 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 2.34 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1501.08 | Reach Len. (ft) | 220.00 | 147.40 | 95.00 |
| Crit W.S. (ft) | 1501.08 | Flow Area (sq ft) | | 760.80 | |
| E.G. Slope (ft/ft) | 0.011001 | Area (sq ft) | | 760.80 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 162.38 | Top Width (ft) | | 162.38 | |
| Vel Total (ft/s) | 12.27 | Avg. Vel. (ft/s) | | 12.27 | |
| Max Chl Dpth (ft) | 8.20 | Hydr. Depth (ft) | | 4.69 | |
| Conv. Total (cfs) | 88980.9 | Conv. (cfs) | | 88980.9 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 166.39 | |
| Min Ch El (ft) | 1492.88 | Shear (lb/sq ft) | | 3.14 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 38.53 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 8.78 | 354.33 | 51.52 |
| C & E Loss (ft) | | Cum SA (acres) | 11.09 | 80.63 | 35.91 |

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1505.25 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 2.22 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1503.03 | Reach Len. (ft) | 220.00 | 147.40 | 95.00 |
| Crit W.S. (ft) | 1503.03 | Flow Area (sq ft) | 6.52 | 1169.08 | 1.25 |
| E.G. Slope (ft/ft) | 0.010839 | Area (sq ft) | 6.52 | 1169.08 | 1.25 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 6.50 | 13991.16 | 2.34 |
| Top Width (ft) | 296.33 | Top Width (ft) | 35.72 | 258.18 | 2.43 |
| Vel Total (ft/s) | 11.90 | Avg. Vel. (ft/s) | 1.00 | 11.97 | 1.88 |
| Max Chl Dpth (ft) | 10.15 | Hydr. Depth (ft) | 0.18 | 4.53 | 0.51 |
| Conv. Total (cfs) | 134475.5 | Conv. (cfs) | 62.5 | 134390.6 | 22.5 |
| Length Wtd. (ft) | 147.41 | Wetted Per. (ft) | 35.86 | 262.39 | 2.64 |
| Min Ch El (ft) | 1492.88 | Shear (lb/sq ft) | 0.12 | 3.01 | 0.32 |
| Alpha | 1.01 | Stream Power (lb/ft s) | 0.12 | 36.08 | 0.60 |
| Frctn Loss (ft) | 0.70 | Cum Volume (acre-ft) | 18.72 | 414.88 | 90.94 |
| C & E Loss (ft) | 0.48 | Cum SA (acres) | 15.94 | 82.72 | 81.92 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9905.03 | 9956.67 | 71.14 | 21.10 | 12.86 | 1.52 | 1.70 | 3.37 |
| 9956.67 | 10008.30 | 2352.14 | 302.73 | 52.74 | 50.40 | 5.86 | 7.77 |
| 10008.30 | RB 10059.94 | 2243.73 | 286.38 | 49.27 | 48.08 | 6.05 | 7.83 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9853.40 | 9905.03 | 6.64 | 3.57 | 9.67 | 0.07 | 0.37 | 1.86 |
| 9905.03 | 9956.67 | 181.07 | 50.91 | 52.28 | 1.94 | 0.99 | 3.56 |
| 9956.67 | 10008.30 | 4759.52 | 363.23 | 52.74 | 51.00 | 7.03 | 13.10 |
| 10008.30 | RB 10059.94 | 4385.77 | 343.08 | 51.69 | 46.99 | 6.94 | 12.78 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9685.42 | 9743.59 | 0.17 | 0.46 | 9.17 | 0.00 | 0.05 | 0.38 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9743.59 | 9801.76 | 6.33 | 6.06 | 26.69 | 0.05 | 0.23 | 1.04 |
| LB 9801.76 | 9853.40 | 99.23 | 37.14 | 51.64 | 0.71 | 0.72 | 2.67 |
| 9853.40 | 9905.03 | 318.31 | 74.77 | 51.68 | 2.27 | 1.45 | 4.26 |
| 9905.03 | 9956.67 | 1021.90 | 151.23 | 52.28 | 7.30 | 2.93 | 6.76 |
| 9956.67 | 10008.30 | 6571.36 | 463.55 | 52.74 | 46.94 | 8.98 | 14.18 |
| 10008.30 | RB 10059.94 | 5980.36 | 442.40 | 54.05 | 42.72 | 8.57 | 13.52 |
| 10059.94 | 10262.95 | 2.34 | 1.25 | 2.64 | 0.02 | 0.51 | 1.88 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.495

INPUT
Description:
Station Elevation Data num= 121

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7852.88 | 1506.9 | 7858.49 | 1506.95 | 7871.09 | 1506.31 | 7886.5 | 1506.5 | 7897.3 | 1507.5 |
| 7912.26 | 1507.02 | 7916.46 | 1506.89 | 7927.57 | 1506.87 | 7954.31 | 1506 | 7956 | 1505.91 |
| 8374.04 | 1506 | 8679.75 | 1506 | 8736.06 | 1506 | 8858.37 | 1506 | 9122.63 | 1506 |
| 9316.11 | 1506 | 9499.59 | 1504.34 | 9541.64 | 1504 | 9546.25 | 1503.32 | 9555.73 | 1503.29 |
| 9559.8 | 1504 | 9733.13 | 1504.82 | 9739.09 | 1504.98 | 9743.97 | 1504 | 9753.12 | 1502.2 |
| 9760.07 | 1502 | 9826.01 | 1500 | 9906.59 | 1498 | 9906.93 | 1497.97 | 9924.55 | 1496 |
| 9951.51 | 1495.05 | 9975.06 | 1494.24 | 10036.63 | 1494.81 | 10050.55 | 1495.31 | 10056.33 | 1496 |
| 10072.44 | 1498 | 10075.7 | 1498.41 | 10078.35 | 1498 | 10084.03 | 1496.38 | 10132.71 | 1498 |
| 10160.93 | 1500 | 10184.6 | 1500 | 10189.29 | 1500 | 10213.94 | 1501.53 | 10222.81 | 1502 |
| 10243.28 | 1503.29 | 10252.68 | 1504 | 10265.24 | 1505.34 | 10274.41 | 1504 | 10284.33 | 1502 |
| 10309.47 | 1501.16 | 10323.78 | 1502 | 10324.63 | 1502.06 | 10414.19 | 1502.58 | 10446.08 | 1502.96 |
| 10463.28 | 1502.38 | 10483.59 | 1502.36 | 10499.07 | 1502.72 | 10508.69 | 1502.47 | 10525.39 | 1502.09 |
| 10538.23 | 1502.47 | 10565.21 | 1503.12 | 10585.55 | 1502 | 10628.86 | 1502 | 10920.36 | 1504 |
| 10963.19 | 1504 | 11214.83 | 1504 | 11225.64 | 1504.36 | 11243.59 | 1504.97 | 11327.98 | 1505.2 |
| 11342.97 | 1504 | 11347.47 | 1503.56 | 11583.35 | 1504 | 11598.17 | 1504 | 12493.94 | 1502.88 |
| 12512.25 | 1503.52 | 12530.49 | 1503.74 | 12551.22 | 1504 | 12553.2 | 1504.06 | 12581.85 | 1504.9 |
| 12630.94 | 1505.39 | 12645.65 | 1506 | 12659.5 | 1507.28 | 12664.85 | 1507.59 | 12684.35 | 1507.37 |
| 12778.03 | 1507.24 | 12850.71 | 1507.59 | 12867.51 | 1507.24 | 12909.95 | 1506.59 | 12930.81 | 1506 |
| 12934.01 | 1505.86 | 12943.41 | 1505.28 | 12951.65 | 1505.56 | 13057.24 | 1504 | 14152.99 | 1504 |
| 14155.86 | 1504 | 14155.99 | 1503.97 | 14167.92 | 1503.72 | 14494.98 | 1503.65 | 14499.28 | 1504 |
| 14504.98 | 1504.6 | 14532.9 | 1504.78 | 14542.03 | 1504.05 | 14542.49 | 1504 | 14555.4 | 1502.88 |
| 14643.19 | 1502.92 | 14820.71 | 1502.74 | 14925.88 | 1502.69 | 14982.35 | 1504 | 14982.68 | 1504.08 |
| 15116.77 | 1504 | 15372.94 | 1503.56 | 15381.87 | 1503.83 | 15402.6 | 1503.53 | 15406.36 | 1503.67 |
| 15734.19 | 1503.31 | 15778.67 | 1503.25 | 15792.82 | 1503.08 | 15816.42 | 1503.07 | 15834.7 | 1502 |
| 15840.13 | 1501.31 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 7852.88 | .05 | 9739.09 | .03 | 10265.24 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9739.09 | 10265.24 | 560 | 547.5 | 560 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 7852.88 | 9739.09 | 1504.98 | 10190 | 15840.13 | 1504 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 7852.88 | 9724.09 | 1504.98 | 13000 | 15840.13 | 1504 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1500.20 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.33 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1499.87 | Reach Len. (ft) | 560.00 | 547.50 | 560.00 |
| Crit W.S. (ft) | 1498.20 | Flow Area (sq ft) | | 1008.26 | |
| E.G. Slope (ft/ft) | 0.002664 | Area (sq ft) | | 1008.26 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |

| | | | | | |
|---|---|---|---|---|---|
| Top Width (ft) | 327.65 | Top Width (ft) | | 327.65 | |
| Vel Total (ft/s) | 4.63 | Avg. Vel. (ft/s) | | 4.63 | |
| Max Chl Dpth (ft) | 5.63 | Hydr. Depth (ft) | | 3.08 | |
| Conv. Total (cfs) | 90428.3 | Conv. (cfs) | | 90428.3 | |
| Length Wtd. (ft) | 547.50 | Wetted Per. (ft) | | 328.37 | |
| Min Ch El (ft) | 1494.24 | Shear (lb/sq ft) | | 0.51 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.36 | |
| Frctn Loss (ft) | 1.47 | Cum Volume (acre-ft) | 1.28 | 232.92 | 35.44 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.67 | 71.41 | 25.21 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1502.14 | Element | | | |
| Vel Head (ft) | 0.46 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1501.68 | Reach Len. (ft) | 560.00 | 547.50 | 560.00 |
| Crit W.S. (ft) | 1499.66 | Flow Area (sq ft) | | 1711.46 | |
| E.G. Slope (ft/ft) | 0.002537 | Area (sq ft) | | 1733.11 | 6.40 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 470.79 | Top Width (ft) | | 446.27 | 24.53 |
| Vel Total (ft/s) | 5.45 | Avg. Vel. (ft/s) | | 5.45 | |
| Max Chl Dpth (ft) | 7.44 | Hydr. Depth (ft) | | 4.08 | |
| Conv. Total (cfs) | 185309.9 | Conv. (cfs) | | 185309.9 | |
| Length Wtd. (ft) | 547.50 | Wetted Per. (ft) | | 420.21 | |
| Min Ch El (ft) | 1494.24 | Shear (lb/sq ft) | | 0.64 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 3.52 | |
| Frctn Loss (ft) | 1.58 | Cum Volume (acre-ft) | 8.78 | 350.11 | 51.51 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 11.09 | 79.60 | 35.89 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1503.43 | Element | | | |
| Vel Head (ft) | 0.63 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1502.80 | Reach Len. (ft) | 560.00 | 547.50 | 560.00 |
| Crit W.S. (ft) | 1500.74 | Flow Area (sq ft) | | 2195.73 | |
| E.G. Slope (ft/ft) | 0.002651 | Area (sq ft) | | 2258.13 | 217.06 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 912.95 | Top Width (ft) | | 485.42 | 427.54 |
| Vel Total (ft/s) | 6.38 | Avg. Vel. (ft/s) | | 6.38 | |
| Max Chl Dpth (ft) | 8.56 | Hydr. Depth (ft) | | 4.99 | |
| Conv. Total (cfs) | 271914.8 | Conv. (cfs) | | 271914.8 | |
| Length Wtd. (ft) | 547.72 | Wetted Per. (ft) | | 440.74 | |
| Min Ch El (ft) | 1494.24 | Shear (lb/sq ft) | | 0.82 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.26 | |
| Frctn Loss (ft) | 1.73 | Cum Volume (acre-ft) | 18.71 | 409.08 | 90.70 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 15.85 | 81.47 | 81.45 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.09 | 9844.32 | 1.18 | 2.07 | 12.93 | 0.03 | 0.16 | 0.57 |
| 9844.32 | 9949.55 | 732.93 | 227.19 | 105.38 | 15.70 | 2.16 | 3.23 |
| 9949.55 | 10054.78 | 3169.88 | 546.80 | 105.29 | 67.92 | 5.20 | 5.80 |
| 10054.78 | 10160.01 | 763.01 | 232.20 | 104.78 | 16.35 | 2.23 | 3.29 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta | Right Sta | Flow | Area | W.P. | % Conv. | Hydr D. | Velocity |
|---|---|---|---|---|---|---|---|

| (ft) | (ft) | (cfs) | (sq ft) | (ft) | | (ft) | (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.09 | 9844.32 | 163.68 | 81.61 | 73.80 | 1.75 | 1.11 | 2.01 |
| 9844.32 | 9949.55 | 1966.51 | 418.26 | 105.38 | 21.07 | 3.97 | 4.70 |
| 9949.55 | 10054.78 | 5067.86 | 737.87 | 105.29 | 54.30 | 7.01 | 6.87 |
| 10054.78 | 10160.01 | 2001.07 | 423.25 | 105.74 | 21.44 | 4.02 | 4.73 |
| 10160.01 | RB 10265.24 | 133.89 | 50.47 | 29.99 | 1.43 | 1.68 | 2.65 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9739.09 | 9844.32 | 545.85 | 179.81 | 94.34 | 3.90 | 1.91 | 3.04 |
| 9844.32 | 9949.55 | 3128.49 | 535.78 | 105.38 | 22.35 | 5.09 | 5.84 |
| 9949.55 | 10054.78 | 6826.58 | 855.40 | 105.29 | 48.76 | 8.13 | 7.98 |
| 10054.78 | 10160.01 | 3169.77 | 540.77 | 105.74 | 22.64 | 5.14 | 5.86 |
| 10160.01 | RB 10265.24 | 329.31 | 83.96 | 29.99 | 2.35 | 2.80 | 3.92 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.392

INPUT
Description:
Station Elevation Data num= 105

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7994.99 | 1504.58 | 8007.75 | 1504.42 | 8012.01 | 1504 | 8012.35 | 1503.97 | 8015.86 | 1504 |
| 8026.2 | 1504.08 | 8834.79 | 1504 | 9462.1 | 1502 | 9656.14 | 1500 | 9819.8 | 1499.02 |
| 9823.45 | 1500 | 9830.85 | 1502 | 9837.54 | 1503.81 | 9852.09 | 1502.97 | 9854.18 | 1502 |
| 9856.12 | 1501.13 | 9858.34 | 1500 | 9862.45 | 1498 | 9865.55 | 1496.49 | 9901.63 | 1496.11 |
| 9901.84 | 1496 | 9905.61 | 1494 | 9909.68 | 1492 | 9912.35 | 1490.82 | 9933.44 | 1490.69 |
| 9944.35 | 1492 | 9951.92 | 1492.95 | 9991.62 | 1493.61 | 10000 | 1492.09 | 10019.48 | 1492.4 |
| 10023.3 | 1494 | 10026.89 | 1495.52 | 10043.14 | 1495.13 | 10045.86 | 1496 | 10049.1 | 1496.94 |
| 10053.66 | 1496.13 | 10068.34 | 1497.6 | 10121.3 | 1497.63 | 10130.29 | 1498 | 10151.64 | 1498.86 |
| 10154.9 | 1498 | 10157.04 | 1497.43 | 10161.38 | 1498 | 10164.53 | 1498.56 | 10186.6 | 1499.05 |
| 10192.55 | 1499.59 | 10193.71 | 1500 | 10199.35 | 1502 | 10204.99 | 1504 | 10207.39 | 1504.88 |
| 10223.54 | 1504 | 10229.95 | 1503.56 | 10235.03 | 1502 | 10241.48 | 1500 | 10242.16 | 1499.79 |
| 10689.68 | 1500 | 11372.47 | 1501.21 | 11385.52 | 1501.36 | 11388.35 | 1502 | 11388.84 | 1502.11 |
| 11394.33 | 1502 | 11395.96 | 1501.97 | 11402.63 | 1501.02 | 12610.67 | 1500 | 12614 | 1499.97 |
| 12618.51 | 1500 | 12631.8 | 1500.12 | 12640.23 | 1501.38 | 12643.92 | 1501.41 | 12649.68 | 1500.34 |
| 12697.67 | 1500 | 13644.59 | 1498.21 | 13651.54 | 1498.64 | 13661.44 | 1498.59 | 13668.92 | 1499.2 |
| 13672.44 | 1499.63 | 13676.7 | 1499.55 | 13682.56 | 1499.46 | 13939.32 | 1498 | 14254.99 | 1497.52 |
| 14572.84 | 1497.69 | 14575.5 | 1498 | 14592.69 | 1500 | 14606.16 | 1501.59 | 14622.86 | 1501.93 |
| 14842.99 | 1501.72 | 14847.27 | 1502 | 14850.04 | 1502.18 | 14851.23 | 1502 | 14855.46 | 1501.32 |
| 14865.66 | 1501.18 | 14868.77 | 1502 | 14871.5 | 1502.59 | 14903.5 | 1502 | 14909.58 | 1501.28 |
| 15069.81 | 1501.14 | 15075.1 | 1501.64 | 15080.97 | 1500.99 | 15454.77 | 1500.98 | 15478.27 | 1501.32 |
| 15496.06 | 1501.45 | 15509.38 | 1501 | 15843.21 | 1501.11 | 15861.67 | 1501.16 | 15873.62 | 1500.07 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 7994.99 | .05 | 9837.54 | .035 | 10207.39 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9837.54 | 10207.39 | 810 | 775.4 | 810 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10550 | 15873.62 | 1501 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 7994.99 | 9840 | 1502.5 | 11374 | 15873.62 | 1501 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1498.72 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.37 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1498.35 | Reach Len. (ft) | 810.00 | 775.40 | 810.00 |
| Crit W.S. (ft) | 1496.03 | Flow Area (sq ft) | | 953.50 | |
| E.G. Slope (ft/ft) | 0.002721 | Area (sq ft) | | 953.50 | |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 287.00 | Top Width (ft) | | 287.00 | |
| Vel Total (ft/s) | 4.89 | Avg. Vel. (ft/s) | | 4.89 | |
| Max Chl Dpth (ft) | 7.66 | Hydr. Depth (ft) | | 3.32 | |
| Conv. Total (cfs) | 89466.5 | Conv. (cfs) | | 89466.5 | |
| Length Wtd. (ft) | 775.40 | Wetted Per. (ft) | | 290.20 | |
| Min Ch El (ft) | 1490.69 | Shear (lb/sq ft) | | 0.56 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.73 | |
| Frctn Loss (ft) | 4.10 | Cum Volume (acre-ft) | 1.28 | 220.59 | 35.44 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 0.67 | 67.55 | 25.21 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1500.55 | Element | | | |
| Vel Head (ft) | 0.64 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1499.91 | Reach Len. (ft) | 810.00 | 775.40 | 810.00 |
| Crit W.S. (ft) | 1498.21 | Flow Area (sq ft) | | 1453.32 | 15.78 |
| E.G. Slope (ft/ft) | 0.003278 | Area (sq ft) | | 1453.32 | 15.78 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9328.85 | 4.15 |
| Top Width (ft) | 594.48 | Top Width (ft) | | 334.94 | 259.54 |
| Vel Total (ft/s) | 6.35 | Avg. Vel. (ft/s) | | 6.42 | 0.26 |
| Max Chl Dpth (ft) | 9.22 | Hydr. Depth (ft) | | 4.34 | 0.06 |
| Conv. Total (cfs) | 163002.3 | Conv. (cfs) | | 162929.9 | 72.5 |
| Length Wtd. (ft) | 775.41 | Wetted Per. (ft) | | 338.68 | 259.56 |
| Min Ch El (ft) | 1490.69 | Shear (lb/sq ft) | | 0.88 | 0.01 |
| Alpha | 1.02 | Stream Power (lb/ft s) | | 5.64 | 0.00 |
| Frctn Loss (ft) | 4.29 | Cum Volume (acre-ft) | 8.78 | 330.08 | 51.37 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 11.09 | 74.69 | 34.06 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1501.67 | Element | | | |
| Vel Head (ft) | 0.90 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1500.77 | Reach Len. (ft) | 810.00 | 775.40 | 810.00 |
| Crit W.S. (ft) | 1499.32 | Flow Area (sq ft) | | 1743.18 | 281.53 |
| E.G. Slope (ft/ft) | 0.003820 | Area (sq ft) | | 1743.18 | 561.95 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13516.26 | 483.74 |
| Top Width (ft) | 1225.24 | Top Width (ft) | | 339.06 | 886.18 |
| Vel Total (ft/s) | 6.91 | Avg. Vel. (ft/s) | | 7.75 | 1.72 |
| Max Chl Dpth (ft) | 10.08 | Hydr. Depth (ft) | | 5.14 | 0.91 |
| Conv. Total (cfs) | 226519.3 | Conv. (cfs) | | 218692.5 | 7826.8 |
| Length Wtd. (ft) | 776.23 | Wetted Per. (ft) | | 343.16 | 311.16 |
| Min Ch El (ft) | 1490.69 | Shear (lb/sq ft) | | 1.21 | 0.22 |
| Alpha | 1.22 | Stream Power (lb/ft s) | | 9.39 | 0.37 |
| Frctn Loss (ft) | 4.15 | Cum Volume (acre-ft) | 18.71 | 383.93 | 85.69 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 15.85 | 76.29 | 73.01 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LB 9837.54 | 9911.51 | 402.10 | 124.72 | 51.37 | 8.62 | 2.51 | 3.22 |
| 9911.51 | 9985.48 | 2761.15 | 459.05 | 74.19 | 59.16 | 6.21 | 6.01 |
| 9985.48 | 10059.45 | 1417.43 | 309.21 | 75.12 | 30.37 | 4.18 | 4.58 |
| 10059.45 | 10133.42 | 81.01 | 55.20 | 74.02 | 1.74 | 0.75 | 1.47 |
| 10133.42 | RB 10207.39 | 5.31 | 5.30 | 15.50 | 0.11 | 0.35 | 1.00 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9837.54 | 9911.51 | 1026.55 | 205.00 | 54.94 | 11.00 | 3.87 | 5.01 |
| 9911.51 | 9985.48 | 4682.11 | 574.62 | 74.19 | 50.17 | 7.77 | 8.15 |
| 9985.48 | 10059.45 | 2806.52 | 424.78 | 75.12 | 30.07 | 5.74 | 6.61 |
| 10059.45 | 10133.42 | 620.60 | 170.77 | 74.02 | 6.65 | 2.31 | 3.63 |
| 10133.42 | RB 10207.39 | 193.07 | 78.14 | 60.41 | 2.07 | 1.30 | 2.47 |
| 10207.39 | 10774.01 | 4.15 | 15.78 | 259.56 | 0.04 | 0.06 | 0.26 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9837.54 | 9911.51 | 1584.05 | 251.31 | 56.84 | 11.31 | 4.60 | 6.30 |
| 9911.51 | 9985.48 | 6270.07 | 638.24 | 74.19 | 44.79 | 8.63 | 9.82 |
| 9985.48 | 10059.45 | 3981.20 | 488.41 | 75.12 | 28.44 | 6.60 | 8.15 |
| 10059.45 | 10133.42 | 1182.64 | 234.39 | 74.02 | 8.45 | 3.17 | 5.05 |
| 10133.42 | RB 10207.39 | 498.31 | 130.82 | 62.99 | 3.56 | 2.09 | 3.81 |
| 10207.39 | 10774.01 | 483.74 | 281.53 | 311.16 | 3.46 | 0.91 | 1.72 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.245

INPUT
Description:
Station Elevation Data num= 99

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7910.99 | 1501.37 | 7919.03 | 1501.27 | 7929.89 | 1500.58 | 7952.7 | 1500.7 | 7959.47 | 1501.5 |
| 7970.12 | 1501.57 | 7973.47 | 1500.98 | 7989.37 | 1501.09 | 8002.63 | 1500.87 | 9172.02 | 1500 |
| 9436.16 | 1498 | 9507.79 | 1496 | 9508.97 | 1495.78 | 9511.59 | 1496 | 9646.05 | 1496.52 |
| 9658.26 | 1498 | 9666.26 | 1498.73 | 9684.28 | 1499.35 | 9688.41 | 1498 | 9694.26 | 1496 |
| 9699.95 | 1494.3 | 9706.52 | 1494.78 | 9728.7 | 1494 | 9732.74 | 1493.88 | 9741.24 | 1492.81 |
| 9756.26 | 1492 | 9771.32 | 1491.43 | 9778.17 | 1492 | 9784.19 | 1492.53 | 9791.5 | 1493.76 |
| 9885.27 | 1492.73 | 9891.01 | 1494 | 9893.51 | 1494.56 | 9901.01 | 1494.07 | 9901.26 | 1494 |
| 9906.91 | 1492.53 | 9925.54 | 1493.45 | 9930.14 | 1492 | 9930.57 | 1491.85 | 9984.41 | 1490.96 |
| 10005.77 | 1491.24 | 10010.51 | 1490 | 10018.61 | 1488 | 10018.98 | 1487.91 | 10048.01 | 1486 |
| 10051.32 | 1485.72 | 10051.49 | 1486 | 10052.88 | 1488 | 10054.26 | 1490 | 10055.65 | 1492 |
| 10057.03 | 1494 | 10058.42 | 1496 | 10059.51 | 1497.57 | 10069.1 | 1496 | 10073 | 1495.39 |
| 10389.35 | 1496 | 10895.77 | 1498 | 11021.04 | 1498 | 11340.56 | 1497.65 | 11352.95 | 1497.82 |
| 11354.01 | 1498 | 11356.86 | 1498.49 | 11362.64 | 1498.38 | 11368.78 | 1498 | 11372.58 | 1497.73 |
| 12574.18 | 1497.49 | 12597.59 | 1497.37 | 12603.89 | 1498 | 12605.8 | 1498.37 | 12609.64 | 1498.58 |
| 12614.14 | 1498 | 12615.64 | 1497.78 | 13369.85 | 1496 | 13605.82 | 1495.39 | 13611.75 | 1496 |
| 13613.7 | 1496.21 | 13616.5 | 1496 | 13624.48 | 1495.42 | 13634.01 | 1495.82 | 13634.87 | 1496 |

```
 13638.4 1496.6313642.68 1496.3413646.89    149613648.84 1495.9114551.69 1494.57
14560.44    149614565.93 1496.9714574.57    149814577.69 1498.3514586.51 1498.29
 14597.6 1498.6415186.54    149815716.75    149815798.67 1498.5115823.52 1499.26
15830.99    149815834.47 1497.4715841.75    149815851.96 1498.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7910.99     .05 9666.26    .03510059.51     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9666.2610059.51              660   659.6     660             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7910.99 9684.28 1499.3510710.9915851.96 1497.57
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7910.99 9684.28    149710710.9915851.96    1497

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1494.56   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.00   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1493.56   Reach Len. (ft)            660.00     659.60     660.00
  Crit W.S. (ft)            1493.56   Flow Area (sq ft)                     581.38
  E.G. Slope (ft/ft)       0.014379   Area (sq ft)                          581.38
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             288.29   Top Width (ft)                        288.29
  Vel Total (ft/s)             8.03   Avg. Vel. (ft/s)                        8.03
  Max Chl Dpth (ft)            7.84   Hydr. Depth (ft)                        2.02
  Conv. Total (cfs)        38919.6    Conv. (cfs)                          38919.6
  Length Wtd. (ft)           659.60   Wetted Per. (ft)                      293.62
  Min Ch El (ft)            1485.72   Shear (lb/sq ft)                        1.78
  Alpha                        1.00   Stream Power (lb/ft s)                 14.27
  Frctn Loss (ft)              2.64   Cum Volume (acre-ft)         1.28     206.93      35.44
  C & E Loss (ft)              0.21   Cum SA (acres)               0.67      62.43      25.21


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1496.20   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.26   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1494.93   Reach Len. (ft)            660.00     659.60     660.00
  Crit W.S. (ft)            1494.80   Flow Area (sq ft)                    1035.12
  E.G. Slope (ft/ft)       0.011287   Area (sq ft)                         1035.12
  Q Total (cfs)             9333.00   Flow (cfs)                           9333.00
  Top Width (ft)             359.85   Top Width (ft)                        359.85
  Vel Total (ft/s)             9.02   Avg. Vel. (ft/s)                        9.02
  Max Chl Dpth (ft)            9.21   Hydr. Depth (ft)                        2.88
  Conv. Total (cfs)        87847.1    Conv. (cfs)                          87847.1
  Length Wtd. (ft)           659.60   Wetted Per. (ft)                      366.25
  Min Ch El (ft)            1485.72   Shear (lb/sq ft)                        1.99
  Alpha                        1.00   Stream Power (lb/ft s)                 17.96
  Frctn Loss (ft)              2.45   Cum Volume (acre-ft)         8.78     307.93      51.22
  C & E Loss (ft)              0.23   Cum SA (acres)              11.09      68.51      31.65


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1497.48 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.37 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1496.11 | Reach Len. (ft) | 660.00 | 659.60 | 660.00 |
| Crit W.S. (ft) | 1495.80 | Flow Area (sq ft) | | 1460.21 | 133.40 |
| E.G. Slope (ft/ft) | 0.008010 | Area (sq ft) | | 1460.21 | 133.40 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13812.78 | 187.22 |
| Top Width (ft) | 712.53 | Top Width (ft) | | 364.55 | 347.98 |
| Vel Total (ft/s) | 8.79 | Avg. Vel. (ft/s) | | 9.46 | 1.40 |
| Max Chl Dpth (ft) | 10.39 | Hydr. Depth (ft) | | 4.01 | 0.38 |
| Conv. Total (cfs) | 156427.5 | Conv. (cfs) | | 154335.5 | 2091.9 |
| Length Wtd. (ft) | 659.61 | Wetted Per. (ft) | | 371.73 | 348.04 |
| Min Ch El (ft) | 1485.72 | Shear (lb/sq ft) | | 1.96 | 0.19 |
| Alpha | 1.14 | Stream Power (lb/ft s) | | 18.58 | 0.27 |
| Frctn Loss (ft) | 2.44 | Cum Volume (acre-ft) | 18.71 | 355.42 | 79.23 |
| C & E Loss (ft) | 0.21 | Cum SA (acres) | 15.85 | 70.02 | 61.53 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9666.26 | 9744.91 | 13.94 | 5.36 | 9.69 | 0.30 | 0.56 | 2.60 |
| 9744.91 | 9823.56 | 277.62 | 66.75 | 59.56 | 5.95 | 1.12 | 4.16 |
| 9823.56 | 9902.21 | 76.32 | 31.96 | 65.56 | 1.64 | 0.49 | 2.39 |
| 9902.21 | 9980.86 | 651.25 | 124.22 | 78.32 | 13.95 | 1.59 | 5.24 |
| 9980.86 | RB 10059.51 | 3647.88 | 353.08 | 80.48 | 78.16 | 4.65 | 10.33 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9666.26 | 9744.91 | 143.16 | 40.98 | 47.28 | 1.53 | 0.87 | 3.49 |
| 9744.91 | 9823.56 | 1120.00 | 172.73 | 78.83 | 12.00 | 2.20 | 6.48 |
| 9823.56 | 9902.21 | 710.91 | 131.56 | 78.91 | 7.62 | 1.67 | 5.40 |
| 9902.21 | 9980.86 | 1827.86 | 232.04 | 79.08 | 19.58 | 2.95 | 7.88 |
| 9980.86 | RB 10059.51 | 5531.07 | 457.81 | 82.15 | 59.26 | 5.96 | 12.08 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9666.26 | 9744.91 | 532.28 | 98.53 | 51.33 | 3.80 | 1.93 | 5.40 |
| 9744.91 | 9823.56 | 2080.52 | 265.03 | 78.83 | 14.86 | 3.37 | 7.85 |
| 9823.56 | 9902.21 | 1569.13 | 223.86 | 78.91 | 11.21 | 2.85 | 7.01 |
| 9902.21 | 9980.86 | 2906.79 | 324.34 | 79.08 | 20.76 | 4.12 | 8.96 |
| 9980.86 | RB 10059.51 | 6724.05 | 548.45 | 83.58 | 48.03 | 7.06 | 12.26 |
| 10059.51 | 10638.75 | 187.22 | 133.40 | 348.04 | 1.34 | 0.38 | 1.40 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 15.120

INPUT
Description:
Station Elevation Data num= 107

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8150.39 | 1498.46 | 8158.18 | 1498.31 | 8161.26 | 1498 | 8166.53 | 1497.49 | 8192.67 | 1497.73 |
| 8194.06 | 1498 | 8200.14 | 1499.23 | 8209.44 | 1499.19 | 8215.34 | 1498 | 8216 | 1497.88 |
| 8228.66 | 1497.48 | 8522.16 | 1498 | 8966 | 1498 | 9286.28 | 1498 | 9591.56 | 1498 |
| 9731.65 | 1496 | 9753.68 | 1495.54 | 9772.03 | 1496 | 9784 | 1496.53 | 9794.4 | 1497.19 |
| 9802.34 | 1497.54 | 9808.36 | 1497.95 | 9818.41 | 1496 | 9828.75 | 1494 | 9840.3 | 1492 |
| 9844.37 | 1491.3 | 9846.97 | 1492 | 9847.46 | 1492.21 | 9847.87 | 1492 | 9851.77 | 1490 |
| 9855.17 | 1488.51 | 9866.23 | 1489.82 | 9870.41 | 1488 | 9874.05 | 1486 | 9874.06 | 1485.99 |
| 9889.54 | 1485.87 | 9890.35 | 1486 | 9900.09 | 1487.53 | 9932.68 | 1487.1 | 9934.99 | 1488 |
| 9937.85 | 1489.18 | 9941.62 | 1488 | 9949.35 | 1486 | 9950.48 | 1485.71 | 9968.24 | 1485.07 |
| 9974.69 | 1486 | 9979.22 | 1486.67 | 10097.67 | 1487.33 | 10099.79 | 1488 | 10102.89 | 1489.01 |
| 10130.24 | 1488.64 | 10133.99 | 1490 | 10139.52 | 1492 | 10145.27 | 1494 | 10151.07 | 1496 |
| 10156.88 | 1498 | 10158.13 | 1498.43 | 10171.77 | 1498.45 | 10172.94 | 1498 | 10178.18 | 1496 |
| 10183.25 | 1494 | 10187.5 | 1492.29 | 10206.77 | 1492.37 | 10647.16 | 1494 | 10665.14 | 1494 |
| 10678.55 | 1494 | 10781.83 | 1494 | 10837.64 | 1494 | 11581.22 | 1494.71 | 11595.68 | 1494.75 |
| 11598.83 | 1495.63 | 11604.69 | 1495.74 | 11612.39 | 1495.36 | 12502.34 | 1496 | 12765 | 1496 |
| 12811.58 | 1495.66 | 12833.15 | 1495.05 | 12845.31 | 1495.97 | 12846.71 | 1496 | 12849.64 | 1496.06 |
| 12850.15 | 1496 | 12856.28 | 1495.31 | 13445.15 | 1494 | 13846.72 | 1493.09 | 13854.82 | 1493.46 |
| 13875.01 | 1493.75 | 13877.7 | 1494 | 13879.03 | 1494.12 | 13880.51 | 1494 | 13883.78 | 1493.74 |
| 13888.79 | 1493.19 | 14290.62 | 1492 | 14788.68 | 1491.79 | 14789.65 | 1492 | 14798.24 | 1494 |
| 14799.73 | 1494.38 | 14813.79 | 1496 | 14818.21 | 1496.53 | 14826.83 | 1496.51 | 15886.43 | 1496 |
| 15999.59 | 1496 | 16050.65 | 1496.59 | 16062.03 | 1496.74 | 16069.53 | 1496 | 16077.7 | 1495.07 |
| 16091.12 | 1496 | 16093.58 | 1496.17 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8150.39 | .05 | 9808.36 | .035 | 10158.13 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9808.36 | 10158.13 | 680 | 667.8 | 680 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 12150.39 | 16093.58 | 1496 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 12150.39 | 16093.58 | 1496 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1491.31 | Element | | | |
| Vel Head (ft) | 0.29 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1491.02 | Reach Len. (ft) | 680.00 | 667.80 | 680.00 |
| Crit W.S. (ft) | 1489.22 | Flow Area (sq ft) | | 1071.85 | |
| E.G. Slope (ft/ft) | 0.001844 | Area (sq ft) | | 1071.85 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 287.02 | Top Width (ft) | | 287.02 | |
| Vel Total (ft/s) | 4.35 | Avg. Vel. (ft/s) | | 4.35 | |
| Max Chl Dpth (ft) | 5.95 | Hydr. Depth (ft) | | 3.73 | |
| Conv. Total (cfs) | 108689.6 | Conv. (cfs) | | 108689.6 | |
| Length Wtd. (ft) | 668.12 | Wetted Per. (ft) | | 290.37 | |
| Min Ch El (ft) | 1485.07 | Shear (lb/sq ft) | | 0.42 | |

| | | | | | |
|---|---|---|---|---|---|
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.85 | |
| Frctn Loss (ft) | 2.00 | Cum Volume (acre-ft) | 1.28 | 194.41 | 35.44 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 0.67 | 58.07 | 25.21 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1493.51 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.48 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1493.03 | Reach Len. (ft) | 680.00 | 667.80 | 680.00 |
| Crit W.S. (ft) | 1490.47 | Flow Area (sq ft) | | 1671.58 | 73.21 |
| E.G. Slope (ft/ft) | 0.001829 | Area (sq ft) | | 1671.58 | 73.21 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9285.35 | 47.65 |
| Top Width (ft) | 507.84 | Top Width (ft) | | 308.14 | 199.70 |
| Vel Total (ft/s) | 5.35 | Avg. Vel. (ft/s) | | 5.55 | 0.65 |
| Max Chl Dpth (ft) | 7.96 | Hydr. Depth (ft) | | 5.42 | 0.37 |
| Conv. Total (cfs) | 218212.2 | Conv. (cfs) | | 217098.1 | 1114.0 |
| Length Wtd. (ft) | 668.24 | Wetted Per. (ft) | | 312.41 | 199.85 |
| Min Ch El (ft) | 1485.07 | Shear (lb/sq ft) | | 0.61 | 0.04 |
| Alpha | 1.07 | Stream Power (lb/ft s) | | 3.39 | 0.03 |
| Frctn Loss (ft) | 2.23 | Cum Volume (acre-ft) | 8.78 | 287.44 | 50.67 |
| C & E Loss (ft) | 0.09 | Cum SA (acres) | 11.09 | 63.45 | 30.13 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1494.82 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.67 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1494.15 | Reach Len. (ft) | 680.00 | 667.80 | 680.00 |
| Crit W.S. (ft) | 1491.48 | Flow Area (sq ft) | | 2022.81 | 507.30 |
| E.G. Slope (ft/ft) | 0.002132 | Area (sq ft) | | 2022.81 | 507.30 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13492.71 | 507.29 |
| Top Width (ft) | 1132.99 | Top Width (ft) | | 317.76 | 815.23 |
| Vel Total (ft/s) | 5.53 | Avg. Vel. (ft/s) | | 6.67 | 1.00 |
| Max Chl Dpth (ft) | 9.08 | Hydr. Depth (ft) | | 6.37 | 0.62 |
| Conv. Total (cfs) | 303175.4 | Conv. (cfs) | | 292189.8 | 10985.6 |
| Length Wtd. (ft) | 668.93 | Wetted Per. (ft) | | 322.31 | 815.59 |
| Min Ch El (ft) | 1485.07 | Shear (lb/sq ft) | | 0.84 | 0.08 |
| Alpha | 1.40 | Stream Power (lb/ft s) | | 5.57 | 0.08 |
| Frctn Loss (ft) | 2.23 | Cum Volume (acre-ft) | 18.71 | 329.05 | 74.37 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 15.85 | 64.86 | 52.72 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9808.36 | 9878.31 | 230.15 | 72.42 | 30.06 | 4.93 | 2.54 | 3.18 |
| 9878.31 | 9948.27 | 1188.56 | 273.35 | 70.89 | 25.47 | 3.91 | 4.35 |
| 9948.27 | 10018.22 | 1662.42 | 332.92 | 70.15 | 35.62 | 4.76 | 4.99 |
| 10018.22 | 10088.18 | 1213.11 | 275.26 | 69.96 | 25.99 | 3.93 | 4.41 |
| 10088.18 | RB 10158.13 | 372.77 | 117.90 | 49.31 | 7.99 | 2.42 | 3.16 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9808.36 | 9878.31 | 553.77 | 145.91 | 46.07 | 5.93 | 3.32 | 3.80 |
| 9878.31 | 9948.27 | 2365.09 | 414.23 | 70.89 | 25.34 | 5.92 | 5.71 |
| 9948.27 | 10018.22 | 2979.34 | 473.80 | 70.15 | 31.92 | 6.77 | 6.29 |
| 10018.22 | 10088.18 | 2404.46 | 416.14 | 69.96 | 25.76 | 5.95 | 5.78 |
| 10088.18 | RB 10158.13 | 982.69 | 221.49 | 55.34 | 10.53 | 4.08 | 4.44 |
| 10158.13 | 10751.67 | 47.65 | 73.21 | 199.85 | 0.51 | 0.37 | 0.65 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9808.36 | 9878.31 | 917.93 | 198.88 | 52.56 | 6.56 | 3.95 | 4.62 |
| 9878.31 | 9948.27 | 3411.12 | 492.74 | 70.89 | 24.37 | 7.04 | 6.92 |
| 9948.27 | 10018.22 | 4154.54 | 552.30 | 70.15 | 29.68 | 7.90 | 7.52 |
| 10018.22 | 10088.18 | 3463.68 | 494.64 | 69.96 | 24.74 | 7.07 | 7.00 |
| 10088.18 | RB 10158.13 | 1545.43 | 284.25 | 58.76 | 11.04 | 4.94 | 5.44 |
| 10158.13 | 10751.67 | 500.78 | 481.84 | 569.18 | 3.58 | 0.85 | 1.04 |
| 10751.67 | 11345.22 | 6.51 | 25.46 | 246.42 | 0.05 | 0.10 | 0.26 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.993

INPUT
Description:
Station Elevation Data num= 140

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8112.38 | 1495.04 | 8150.6 | 1495.4 | 8197.48 | 1496 | 8209.23 | 1496.25 | 8213.73 | 1496.24 |
| 8220.73 | 1496 | 8245.39 | 1496 | 8256.73 | 1496.75 | 8265.98 | 1496.67 | 8268.93 | 1496 |
| 8271.39 | 1495.56 | 8504.82 | 1495.28 | 9023.34 | 1494 | 9269.04 | 1494 | 9341.2 | 1494 |
| 9381.14 | 1494 | 9444.76 | 1494 | 9459.21 | 1493.66 | 9612.52 | 1493.4 | 9707.09 | 1494 |
| 9753.03 | 1494.94 | 9754.82 | 1496 | 9759.72 | 1498 | 9764.6 | 1500 | 9766.39 | 1500.73 |
| 9780.01 | 1502 | 9805.05 | 1502 | 9807.66 | 1502 | 9808.48 | 1502 | 9813.56 | 1500 |
| 9816.2 | 1498 | 9818.62 | 1496 | 9821.05 | 1494 | 9823.48 | 1492 | 9825.91 | 1490 |
| 9828.33 | 1488 | 9830.12 | 1486.52 | 9861.47 | 1486.44 | 9864.15 | 1488 | 9868.18 | 1490 |
| 9872.2 | 1492 | 9876.23 | 1494 | 9877.73 | 1494.74 | 9879.26 | 1494 | 9883.3 | 1492 |
| 9887.3 | 1490 | 9890.93 | 1488 | 9894.55 | 1486 | 9894.59 | 1485.98 | 9939.97 | 1486 |
| 9953.58 | 1488 | 9976.98 | 1488 | 9984.03 | 1486 | 9985.92 | 1486 | 9988.82 | 1486.27 |
| 9991.2 | 1486 | 9996.96 | 1484 | 9999.84 | 1482.91 | 10009.68 | 1484 | 10014.95 | 1485.59 |
| 10021.53 | 1484 | 10021.63 | 1483.97 | 10045.43 | 1484 | 10054.93 | 1484 | 10071.4 | 1482 |
| 10075.68 | 1481.39 | 10076.95 | 1482 | 10081.07 | 1484 | 10085.22 | 1486 | 10089.27 | 1488 |
| 10090.9 | 1488.84 | 10101.91 | 1489.61 | 10103.08 | 1490 | 10109.03 | 1492 | 10114.96 | 1494 |
| 10120.66 | 1495.93 | 10136.48 | 1495.56 | 10146.53 | 1494 | 10153.42 | 1493.11 | 10158.69 | 1492 |
| 10162.59 | 1491.19 | 10188.99 | 1490 | 10364.9 | 1490 | 11250 | 1491.71 | 11632.43 | 1491.07 |
| 11647.63 | 1491.51 | 11648.96 | 1492 | 11651.91 | 1492.74 | 11659.18 | 1492.64 | 11664.21 | 1492 |
| 11667.59 | 1491.57 | 12853.25 | 1492 | 12877.96 | 1492.41 | 12890.09 | 1492.94 | 12896.96 | 1492.36 |
| 12902.2 | 1493.14 | 12906.92 | 1493.14 | 12915.25 | 1492.44 | 13208.09 | 1492 | 13963.21 | 1490.87 |
| 14248.93 | 1490 | 14845.59 | 1490 | 14869.33 | 1491.76 | 14874.78 | 1492 | 14927.56 | 1492 |
| 14978.83 | 1492 | 15055.24 | 1492 | 15062.03 | 1491.25 | 15150.81 | 1490.51 | 15162.28 | 1490.27 |

```
15193.85 1490.3915210.03  1490.515275.29    149115284.08 1491.1315318.54 1491.64
 15350.2 1491.4815364.73 1491.1115390.96 1491.1115407.77 1491.4815530.57    1492
15549.28 1492.2815563.09    149215567.45 1491.8715580.15    149215591.95 1492.11
   15608 1493.0815757.88 1492.83 15768.7 1492.5715792.88 1492.7215805.26  1493.4
15960.88 1492.8215969.63 1492.3215995.77 1492.1116015.11 1492.9816029.97 1492.82
16090.91 1493.5616105.54    149416111.19  1494.216132.56    149416139.47 1493.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8112.38     .05 9877.73    .03510114.96     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9877.7310114.96              870   849.5     870              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8112.38 9820.38    1494   1125016139.47  1491.7
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8112.38 9820.38    1494   1125016139.47  1491.7

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)           1489.27   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.71   Wt. n-Val.                0.050      0.035
  W.S. Elev (ft)           1488.56   Reach Len. (ft)          870.00     849.50     870.00
  Crit W.S. (ft)           1487.77   Flow Area (sq ft)         71.79     643.18
  E.G. Slope (ft/ft)      0.005696   Area (sq ft)              71.79     643.18
  Q Total (cfs)            4667.00   Flow (cfs)               242.15    4424.85
  Top Width (ft)            238.10   Top Width (ft)            37.64     200.46
  Vel Total (ft/s)            6.53   Avg. Vel. (ft/s)           3.37       6.88
  Max Chl Dpth (ft)           7.17   Hydr. Depth (ft)           1.91       3.21
  Conv. Total (cfs)        61838.4   Conv. (cfs)              3208.5    58629.9
  Length Wtd. (ft)          850.03   Wetted Per. (ft)          38.93     204.43
  Min Ch El (ft)           1481.39   Shear (lb/sq ft)           0.66       1.12
  Alpha                       1.07   Stream Power (lb/ft s)     2.21       7.70
  Frctn Loss (ft)             5.59   Cum Volume (acre-ft)       0.72     181.26      35.44
  C & E Loss (ft)             0.00   Cum SA (acres)             0.38      54.33      25.21


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)           1491.18   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.39   Wt. n-Val.                0.050      0.035
  W.S. Elev (ft)           1489.79   Reach Len. (ft)          870.00     849.50     870.00
  Crit W.S. (ft)           1489.29   Flow Area (sq ft)        120.20     896.31
  E.G. Slope (ft/ft)      0.008001   Area (sq ft)             120.20     896.31
  Q Total (cfs)            9333.00   Flow (cfs)               628.23    8704.77
  Top Width (ft)            256.33   Top Width (ft)            41.58     214.75
  Vel Total (ft/s)            9.18   Avg. Vel. (ft/s)           5.23       9.71
  Max Chl Dpth (ft)           8.40   Hydr. Depth (ft)           2.89       4.17
  Conv. Total (cfs)       104340.8   Conv. (cfs)              7023.5    97317.3
  Length Wtd. (ft)          850.19   Wetted Per. (ft)          43.60     219.15
  Min Ch El (ft)           1481.39   Shear (lb/sq ft)           1.38       2.04
  Alpha                       1.07   Stream Power (lb/ft s)     7.20      19.84
  Frctn Loss (ft)             5.37   Cum Volume (acre-ft)       7.84     267.76      50.10
  C & E Loss (ft)             0.14   Cum SA (acres)            10.76      59.44      28.57


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #full flow

  E.G. Elev (ft)           1492.52   Element                  Left OB    Channel   Right OB
  Vel Head (ft)               1.34   Wt. n-Val.                0.050      0.035      0.050
  W.S. Elev (ft)           1491.18   Reach Len. (ft)          870.00     849.50     870.00
  Crit W.S. (ft)           1491.18   Flow Area (sq ft)        181.48    1201.36     589.04
  E.G. Slope (ft/ft)      0.005915   Area (sq ft)             181.48    1201.36     589.04
  Q Total (cfs)           14000.00   Flow (cfs)               993.82   11925.31    1080.87
  Top Width (ft)           1086.58   Top Width (ft)            46.09     221.67     818.82
  Vel Total (ft/s)            7.10   Avg. Vel. (ft/s)           5.48       9.93       1.83
```

| | | | | | |
|---|---|---|---|---|---|
| Max Chl Dpth (ft) | 9.79 | Hydr. Depth (ft) | 3.94 | 5.42 | 0.72 |
| Conv. Total (cfs) | 182034.9 | Conv. (cfs) | 12922.1 | 155058.8 | 14054.0 |
| Length Wtd. (ft) | 851.02 | Wetted Per. (ft) | 48.93 | 226.64 | 818.85 |
| Min Ch El (ft) | 1481.39 | Shear (lb/sq ft) | 1.37 | 1.96 | 0.27 |
| Alpha | 1.71 | Stream Power (lb/ft s) | 7.50 | 19.43 | 0.49 |
| Frctn Loss (ft) | 4.39 | Cum Volume (acre-ft) | 17.29 | 304.34 | 65.82 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 15.49 | 60.72 | 39.97 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9701.20 | 9877.73 | 242.15 | 71.79 | 38.93 | 5.19 | 1.91 | 3.37 |
| LB 9877.73 | 9925.18 | 443.72 | 84.89 | 35.94 | 9.51 | 2.41 | 5.23 |
| 9925.18 | 9972.62 | 266.88 | 70.01 | 47.59 | 5.72 | 1.48 | 3.81 |
| 9972.62 | 10020.07 | 987.15 | 154.93 | 48.73 | 21.15 | 3.27 | 6.37 |
| 10020.07 | 10067.51 | 1885.49 | 226.27 | 47.58 | 40.40 | 4.77 | 8.33 |
| 10067.51 | RB 10114.96 | 841.61 | 107.08 | 24.58 | 18.03 | 4.69 | 7.86 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9701.20 | 9877.73 | 628.23 | 120.20 | 43.60 | 6.73 | 2.89 | 5.23 |
| LB 9877.73 | 9925.18 | 1056.77 | 129.35 | 38.47 | 11.32 | 3.45 | 8.17 |
| 9925.18 | 9972.62 | 901.04 | 127.99 | 47.59 | 9.65 | 2.70 | 7.04 |
| 9972.62 | 10020.07 | 2071.27 | 212.91 | 48.73 | 22.19 | 4.49 | 9.73 |
| 10020.07 | 10067.51 | 3406.40 | 284.25 | 47.58 | 36.50 | 5.99 | 11.98 |
| 10067.51 | RB 10114.96 | 1269.29 | 141.81 | 36.78 | 13.60 | 4.06 | 8.95 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9701.20 | 9877.73 | 993.82 | 181.48 | 48.93 | 7.10 | 3.94 | 5.48 |
| LB 9877.73 | 9925.18 | 1570.47 | 183.66 | 41.56 | 11.22 | 4.56 | 8.55 |
| 9925.18 | 9972.62 | 1576.27 | 194.33 | 47.59 | 11.26 | 4.10 | 8.11 |
| 9972.62 | 10020.07 | 2839.23 | 279.24 | 48.73 | 20.28 | 5.89 | 10.17 |
| 10020.07 | 10067.51 | 4214.68 | 350.58 | 47.58 | 30.10 | 7.39 | 12.02 |
| 10067.51 | RB 10114.96 | 1724.63 | 193.55 | 41.17 | 12.32 | 4.95 | 8.91 |
| 10114.96 | 10717.41 | 1025.97 | 522.06 | 554.72 | 7.33 | 0.94 | 1.97 |
| 10717.41 | 11319.86 | 54.94 | 67.00 | 264.12 | 0.39 | 0.25 | 0.82 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.833

INPUT
Description:
Station Elevation Data num= 138

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8255.53 | 1492 | 8345.83 | 1492.91 | 8353.2 | 1492.86 | 8386.79 | 1492.84 | 8394.13 | 1493.55 |
| 8406.55 | 1493.22 | 8411.4 | 1492.39 | 8425.29 | 1492.09 | 8772.94 | 1492 | 8891.98 | 1490.74 |
| 8979.57 | 1490.54 | 8983.5 | 1490.76 | 8985.63 | 1490 | 8986.46 | 1489.68 | 9055.03 | 1488 |
| 9328.08 | 1488 | 9379.01 | 1488 | 9572.06 | 1487.6 | 9582.4 | 1487.78 | 9596.76 | 1486.45 |
| 9610.6 | 1486 | 9657.57 | 1484.69 | 9658.06 | 1484 | 9659.46 | 1482 | 9660.86 | 1480 |
| 9662.26 | 1478 | 9663.67 | 1476 | 9665.07 | 1474 | 9666.47 | 1472 | 9667.87 | 1470 |
| 9669.28 | 1468 | 9670.68 | 1466 | 9672.08 | 1464 | 9673.49 | 1462 | 9674.89 | 1460 |
| 9675.2 | 1459.56 | 9691.21 | 1460 | 9693.84 | 1460.08 | 9725.48 | 1460.68 | 9767.39 | 1460.75 |
| 9768.22 | 1462 | 9769.55 | 1464 | 9770.88 | 1466 | 9772.21 | 1468 | 9773.55 | 1470 |
| 9774.88 | 1472 | 9776.21 | 1474 | 9777.54 | 1476 | 9778.87 | 1478 | 9780.2 | 1480 |
| 9781.13 | 1482 | 9782.04 | 1484 | 9782.95 | 1486 | 9783.87 | 1488 | 9784.1 | 1488.5 |
| 9785.63 | 1488 | 9788.54 | 1486.94 | 9816.05 | 1487.92 | 9816.75 | 1488 | 9828.49 | 1489.22 |
| 9832.25 | 1488 | 9837.71 | 1486 | 9839.21 | 1485.45 | 9842.37 | 1484 | 9846.39 | 1482 |
| 9849.34 | 1480.51 | 9857.96 | 1480 | 9867 | 1479.63 | 9873 | 1480 | 9881.38 | 1480.47 |
| 9902.09 | 1482 | 9912.64 | 1482.53 | 9931.26 | 1482 | 9967.06 | 1480.5 | 9981.41 | 1480.05 |
| 10069.86 | 1480.07 | 10073.71 | 1480 | 10095.76 | 1479.62 | 10123.31 | 1479.89 | 10123.52 | 1480 |
| 10127.21 | 1482 | 10130.9 | 1484 | 10134.42 | 1486 | 10137.89 | 1488 | 10139.6 | 1488.99 |
| 10141.23 | 1488 | 10144.79 | 1486 | 10145.34 | 1485.69 | 10155.3 | 1486 | 10316.03 | 1486.29 |
| 10319.35 | 1488 | 10320.3 | 1488.49 | 10321.8 | 1488 | 10326.74 | 1486.41 | 10245.56 | 1488 |
| 11749.7 | 1488.31 | 11763.08 | 1488.51 | 11767.46 | 1489.48 | 11775.06 | 1489.19 | 11782.88 | 1488.54 |
| 12008.7 | 1490 | 12997.34 | 1491.35 | 13007.35 | 1491.23 | 13013.81 | 1490.74 | 13017.13 | 1492 |
| 13017.19 | 1492.02 | 13017.56 | 1492 | 13022.28 | 1491.74 | 13024.94 | 1490.91 | 13664.79 | 1490 |
| 14181.86 | 1489.31 | 14196.98 | 1488 | 14208.02 | 1487.04 | 14314.16 | 1486 | 15003.44 | 1485.34 |
| 15017.81 | 1486 | 15030.8 | 1486.46 | 15045.34 | 1486 | 15137.99 | 1486 | 15165.58 | 1486.12 |
| 15171.13 | 1486 | 15349.13 | 1486 | 15352.17 | 1486 | 15364.56 | 1486 | 15413.66 | 1486.68 |
| 15823.7 | 1488 | 16070.57 | 1488.89 | 16110.94 | 1489.12 | 16182.71 | 1489.74 | 16206.28 | 1489.95 |
| 16207.56 | 1490 | 16220.1 | 1490.66 | 16226.86 | 1490 | 16238.47 | 1488.79 | 16254.97 | 1488.3 |
| 16266.34 | 1488.26 | 16276.7 | 1490 | 16278 | 1490.25 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8255.53 | .05 | 9828.49 | .035 | 10139.6 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9828.49 | 10139.6 | 890 | 877.6 | 890 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 8255.53 | 9828.49 | 1489.22 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8255.53 | 9784 | 1484 | 12255.53 | 16278 | 1488.99 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1483.68 | Element | | | |
| Vel Head (ft) | 0.70 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1482.98 | Reach Len. (ft) | 890.00 | 877.60 | 890.00 |
| Crit W.S. (ft) | 1482.55 | Flow Area (sq ft) | | 696.12 | |
| E.G. Slope (ft/ft) | 0.007622 | Area (sq ft) | | 696.12 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 284.61 | Top Width (ft) | | 284.61 | |
| Vel Total (ft/s) | 6.70 | Avg. Vel. (ft/s) | | 6.70 | |
| Max Chl Dpth (ft) | 3.36 | Hydr. Depth (ft) | | 2.45 | |
| Conv. Total (cfs) | 53457.0 | Conv. (cfs) | | 53457.0 | |
| Length Wtd. (ft) | 877.60 | Wetted Per. (ft) | | 286.15 | |
| Min Ch El (ft) | 1479.62 | Shear (lb/sq ft) | | 1.16 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 7.76 | |
| Frctn Loss (ft) | 1.16 | Cum Volume (acre-ft) | 0.00 | 168.20 | 35.44 |
| C & E Loss (ft) | 0.17 | Cum SA (acres) | 0.00 | 49.60 | 25.21 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1485.67 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.94 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1484.74 | Reach Len. (ft) | 890.00 | 877.60 | 890.00 |
| Crit W.S. (ft) | 1483.76 | Flow Area (sq ft) | | 1200.76 | |
| E.G. Slope (ft/ft) | 0.005130 | Area (sq ft) | 91.58 | 1200.76 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 417.88 | Top Width (ft) | 126.45 | 291.43 | |
| Vel Total (ft/s) | 7.77 | Avg. Vel. (ft/s) | | 7.77 | |
| Max Chl Dpth (ft) | 5.12 | Hydr. Depth (ft) | | 4.12 | |
| Conv. Total (cfs) | 130306.7 | Conv. (cfs) | | 130306.7 | |
| Length Wtd. (ft) | 877.60 | Wetted Per. (ft) | | 293.82 | |
| Min Ch El (ft) | 1479.62 | Shear (lb/sq ft) | | 1.31 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 10.17 | |
| Frctn Loss (ft) | 2.17 | Cum Volume (acre-ft) | 5.72 | 247.31 | 50.10 |
| C & E Loss (ft) | 0.15 | Cum SA (acres) | 9.08 | 54.51 | 28.57 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1487.29 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.19 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1486.10 | Reach Len. (ft) | 890.00 | 877.60 | 890.00 |
| Crit W.S. (ft) | 1484.78 | Flow Area (sq ft) | | 1602.01 | 5.44 |
| E.G. Slope (ft/ft) | 0.004542 | Area (sq ft) | 297.79 | 1602.01 | 5.44 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13997.94 | 2.06 |
| Top Width (ft) | 538.57 | Top Width (ft) | 175.46 | 297.16 | 65.96 |
| Vel Total (ft/s) | 8.71 | Avg. Vel. (ft/s) | | 8.74 | 0.38 |
| Max Chl Dpth (ft) | 6.48 | Hydr. Depth (ft) | | 5.39 | 0.08 |
| Conv. Total (cfs) | 207738.5 | Conv. (cfs) | | 207707.8 | 30.6 |
| Length Wtd. (ft) | 877.60 | Wetted Per. (ft) | | 300.18 | 66.07 |
| Min Ch El (ft) | 1479.62 | Shear (lb/sq ft) | | 1.51 | 0.02 |
| Alpha | 1.01 | Stream Power (lb/ft s) | | 13.22 | 0.01 |
| Frctn Loss (ft) | 2.95 | Cum Volume (acre-ft) | 12.50 | 277.00 | 59.88 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 13.27 | 55.66 | 31.13 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9828.49 | 9890.71 | 796.50 | 120.52 | 46.96 | 17.07 | 2.60 | 6.61 |
| 9890.71 | 9952.93 | 254.75 | 68.10 | 62.29 | 5.46 | 1.09 | 3.74 |
| 9952.93 | 10015.16 | 1155.47 | 168.64 | 62.24 | 24.76 | 2.71 | 6.85 |
| 10015.16 | 10077.38 | 1313.93 | 182.14 | 62.22 | 28.15 | 2.93 | 7.21 |
| 10077.38 | RB 10139.60 | 1146.35 | 156.72 | 52.44 | 24.56 | 3.03 | 7.31 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9828.49 | 9890.71 | 1548.78 | 204.78 | 51.00 | 16.59 | 4.10 | 7.56 |
| 9890.71 | 9952.93 | 1064.31 | 177.12 | 62.29 | 11.40 | 2.85 | 6.01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9952.93 | 10015.16 | 2252.86 | 277.67 | 62.24 | 24.14 | 4.46 | 8.11 |
| 10015.16 | 10077.38 | 2438.79 | 291.16 | 62.22 | 26.13 | 4.68 | 8.38 |
| 10077.38 | RB 10139.60 | 2028.26 | 250.02 | 56.06 | 21.73 | 4.56 | 8.11 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9828.49 | 9890.71 | 2292.31 | 275.04 | 54.60 | 16.37 | 5.16 | 8.33 |
| 9890.71 | 9952.93 | 1936.09 | 261.98 | 62.29 | 13.83 | 4.21 | 7.39 |
| 9952.93 | 10015.16 | 3328.76 | 362.53 | 62.24 | 23.78 | 5.83 | 9.18 |
| 10015.16 | 10077.38 | 3538.53 | 376.03 | 62.22 | 25.28 | 6.04 | 9.41 |
| 10077.38 | RB 10139.60 | 2902.25 | 326.42 | 58.82 | 20.73 | 5.71 | 8.89 |
| 10139.60 | 10753.44 | 2.06 | 5.44 | 66.07 | 0.01 | 0.08 | 0.38 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.666

INPUT
Description:
Station Elevation Data num= 138

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8508.51 | 1489.69 | 8510.49 | 1490 | 8519.07 | 1491.31 | 8529.2 | 1491.62 | 8534 | 1490 |
| 8534.23 | 1489.92 | 8544.35 | 1489.96 | 9399.93 | 1488 | 9585.97 | 1486 | 9755.31 | 1484.84 |
| 9786.63 | 1484.32 | 9798.35 | 1486 | 9804.86 | 1486.93 | 9813.46 | 1486 | 9814.88 | 1485.85 |
| 9817.71 | 1486 | 9824.6 | 1486.6 | 9825.85 | 1486 | 9830 | 1484 | 9834.15 | 1482 |
| 9835.24 | 1481.37 | 9836.89 | 1482 | 9840.15 | 1483.16 | 9841.93 | 1482 | 9845.19 | 1480 |
| 9848.52 | 1478 | 9851.84 | 1476 | 9853 | 1475.3 | 9903.56 | 1475.5 | 9953.22 | 1476 |
| 10111.32 | 1478 | 10111.53 | 1478.01 | 10116.01 | 1480 | 10120.52 | 1482 | 10125.02 | 1484 |
| 10129.2 | 1486 | 10134.45 | 1487.66 | 10139.88 | 1486 | 10144 | 1484.58 | 10204.64 | 1484 |
| 10249.89 | 1483.41 | 10279.78 | 1483.35 | 11218.96 | 1484 | 11847.6 | 1484.16 | 11863.7 | 1484.45 |
| 11876.59 | 1484 | 12058.27 | 1484 | 13119.39 | 1484.94 | 13128.41 | 1485.21 | 13134.33 | 1484.85 |
| 13136.4 | 1486 | 13139.97 | 1488 | 13140.7 | 1488.41 | 13145.76 | 1488.71 | 13148.45 | 1488 |
| 13150.77 | 1487.45 | 13329.36 | 1487.49 | 13333.14 | 1488 | 13369.96 | 1488 | 13370.68 | 1487.89 |
| 13582.99 | 1487.34 | 13585.59 | 1486 | 13590.68 | 1484.85 | 13596.89 | 1486 | 13600.77 | 1486.67 |
| 13615.67 | 1487.81 | 13625.96 | 1487.43 | 13937.93 | 1487.28 | 13944.66 | 1488 | 13949.67 | 1488.59 |
| 13980.44 | 1490 | 14019.62 | 1492 | 14026.72 | 1492.27 | 14040.38 | 1492 | 14068.51 | 1490 |
| 14081.46 | 1488.76 | 14091.55 | 1488 | 14096.64 | 1487.71 | 14120.56 | 1486.98 | 14178.85 | 1486.38 |
| 14199.11 | 1486 | 14211.96 | 1486 | 14223.14 | 1486.76 | 14264.92 | 1486.94 | 14274.72 | 1486 |
| 14283.49 | 1484.31 | 14284.85 | 1484 | 14455.23 | 1482 | 14604.24 | 1482 | 14641.16 | 1482 |
| 14764.81 | 1480.76 | 14768.34 | 1480 | 14777.67 | 1478 | 14785.43 | 1476.23 | 14902.79 | 1476.23 |
| 14915.64 | 1478 | 14928.14 | 1479.31 | 14949.23 | 1480 | 14990.34 | 1482 | 14998.72 | 1484 |
| 15000.12 | 1484.41 | 15072.52 | 1485.15 | 15076.53 | 1484 | 15083.66 | 1482 | 15106.18 | 1480 |
| 15132.64 | 1480 | 15139.85 | 1480.18 | 15177.37 | 1481.43 | 15235.84 | 1481.88 | 15312.22 | 1481.13 |
| 15474.57 | 1481.26 | 15503.17 | 1481.68 | 15611.44 | 1482 | 15679.62 | 1482 | 15692.95 | 1482 |
| 15740.8 | 1482 | 15845.34 | 1482 | 15957.87 | 1484 | 15968.86 | 1484.26 | 15982.41 | 1485.56 |
| 16006.41 | 1486 | 16010.13 | 1486.13 | 16015.48 | 1487.31 | 16049.94 | 1487.71 | 16057.98 | 1486.28 |
| 16073.93 | 1486 | 16076.55 | 1486 | 16213.53 | 1486 | 16231.12 | 1485.68 | 16233.02 | 1486 |
| 16238.74 | 1486.96 | 16364.78 | 1487.19 | 16380.07 | 1486.04 | 16382.57 | 1486 | 16391.52 | 1485.63 |
| 16394.97 | 1486 | 16408.8 | 1486.24 | 16412.38 | 1487.12 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8508.51 | .05 | 9804.86 | .03 | 10134.45 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9804.86 | 10134.45 | 850 | 815.8 | 850 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 13108.51 | 16412.38 | 1487.66 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 13200 | 16412.38 | 1486 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.35 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.14 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1482.21 | Reach Len. (ft) | 850.00 | 815.80 | 850.00 |
| Crit W.S. (ft) | 1478.58 | Flow Area (sq ft) | | 1551.16 | |
| E.G. Slope (ft/ft) | 0.000528 | Area (sq ft) | | 1551.16 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 283.16 | Top Width (ft) | | 283.16 | |
| Vel Total (ft/s) | 3.01 | Avg. Vel. (ft/s) | | 3.01 | |
| Max Chl Dpth (ft) | 6.91 | Hydr. Depth (ft) | | 5.48 | |
| Conv. Total (cfs) | 203110.5 | Conv. (cfs) | | 203110.5 | |
| Length Wtd. (ft) | 821.76 | Wetted Per. (ft) | | 286.37 | |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | | 0.18 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.54 | |
| Frctn Loss (ft) | 0.24 | Cum Volume (acre-ft) | 0.00 | 145.57 | 35.44 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 0.00 | 43.89 | 25.21 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1483.35 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1482.91 | Reach Len. (ft) | 850.00 | 815.80 | 850.00 |
| Crit W.S. (ft) | 1479.83 | Flow Area (sq ft) | | 1751.34 | |
| E.G. Slope (ft/ft) | 0.001453 | Area (sq ft) | | 1751.34 | |
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 289.23 | Top Width (ft) | | 289.23 | |
| Vel Total (ft/s) | 5.33 | Avg. Vel. (ft/s) | | 5.33 | |
| Max Chl Dpth (ft) | 7.61 | Hydr. Depth (ft) | | 6.06 | |
| Conv. Total (cfs) | 244846.3 | Conv. (cfs) | | 244846.3 | |
| Length Wtd. (ft) | 823.03 | Wetted Per. (ft) | | 293.07 | |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | | 0.54 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.89 | |
| Frctn Loss (ft) | 0.56 | Cum Volume (acre-ft) | 4.79 | 217.57 | 50.10 |
| C & E Loss (ft) | 0.11 | Cum SA (acres) | 7.79 | 48.66 | 28.57 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1484.24 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.85 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1483.38 | Reach Len. (ft) | 850.00 | 815.80 | 850.00 |
| Crit W.S. (ft) | 1480.89 | Flow Area (sq ft) | | 1888.48 | 1.02 |
| E.G. Slope (ft/ft) | 0.002583 | Area (sq ft) | | 1888.48 | 1.02 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 13999.90 | 0.10 |
| Top Width (ft) | 355.19 | Top Width (ft) | | 292.35 | 62.84 |
| Vel Total (ft/s) | 7.41 | Avg. Vel. (ft/s) | | 7.41 | 0.10 |
| Max Chl Dpth (ft) | 8.08 | Hydr. Depth (ft) | | 6.46 | 0.02 |
| Conv. Total (cfs) | 275475.6 | Conv. (cfs) | | 275473.7 | 1.9 |
| Length Wtd. (ft) | 823.67 | Wetted Per. (ft) | | 296.52 | 62.84 |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | | 1.03 | 0.00 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 7.61 | 0.00 |
| Frctn Loss (ft) | 0.93 | Cum Volume (acre-ft) | 9.46 | 241.84 | 59.81 |
| C & E Loss (ft) | 0.22 | Cum SA (acres) | 11.48 | 49.73 | 29.81 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9804.86 | 9870.78 | 435.64 | 163.40 | 35.25 | 9.33 | 4.96 | 2.67 |
| 9870.78 | 9936.70 | 1490.30 | 439.02 | 65.92 | 31.93 | 6.66 | 3.39 |
| 9936.70 | 10002.61 | 1251.77 | 395.40 | 65.92 | 26.82 | 6.00 | 3.17 |
| 10002.61 | 10068.53 | 977.07 | 340.79 | 65.92 | 20.94 | 5.17 | 2.87 |
| 10068.53 | RB 10134.45 | 512.22 | 212.55 | 53.36 | 10.98 | 4.05 | 2.41 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9804.86 | 9870.78 | 835.20 | 188.01 | 40.23 | 8.95 | 5.02 | 4.44 |
| 9870.78 | 9936.70 | 2916.81 | 485.12 | 65.92 | 31.25 | 7.36 | 6.01 |
| 9936.70 | 10002.61 | 2492.92 | 441.51 | 65.92 | 26.71 | 6.70 | 5.65 |
| 10002.61 | 10068.53 | 2000.44 | 386.89 | 65.92 | 21.43 | 5.87 | 5.17 |
| 10068.53 | RB 10134.45 | 1087.64 | 249.80 | 55.08 | 11.65 | 4.62 | 4.35 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9804.86 | 9870.78 | 1252.02 | 206.26 | 42.51 | 8.94 | 5.22 | 6.07 |
| 9870.78 | 9936.70 | 4311.14 | 516.18 | 65.92 | 30.79 | 7.83 | 8.35 |
| 9936.70 | 10002.61 | 3721.19 | 472.57 | 65.92 | 26.58 | 7.17 | 7.87 |
| 10002.61 | 10068.53 | 3032.38 | 417.95 | 65.92 | 21.66 | 6.34 | 7.26 |
| 10068.53 | RB 10134.45 | 1683.16 | 275.51 | 56.24 | 12.02 | 5.00 | 6.11 |
| 10134.45 | 10762.24 | 0.10 | 1.02 | 62.84 | 0.00 | 0.02 | 0.10 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.512

INPUT
Description: upstream Vineyard Road
Station Elevation Data num= 59

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8726.53 | 1486.33 | 8969.32 | 1486 | 9737.9 | 1484 | 9770.14 | 1483.69 | 9772.3 | 1484 |
| 9784.43 | 1486 | 9786.35 | 1486.39 | 9793.95 | 1486 | 9811.1 | 1484.8 | 9813.83 | 1484 |
| 9820.66 | 1482 | 9822.96 | 1481.33 | 9832.09 | 1480 | 9837.87 | 1479.38 | 9840.1 | 1480 |
| 9856.49 | 1481.73 | 9868.77 | 1480 | 9879.83 | 1478 | 9889.87 | 1476 | 9890.49 | 1475.85 |
| 9915.83 | 1475.73 | 9930.79 | 1476 | 9975.71 | 1477.13 | 9999.74 | 147610043.93 | | 1475.3 |
| 10068.98 | 147610106.21 | | 1477.2110144.36 | | 1476.3210180.69 | | 1477.6410181.58 | | 1478 |
| 10186.56 | 148010191.55 | | 148210196.79 | | 148410197.47 | | 1484.2610206.55 | | 1485.1 |
| 10266.74 | 1484.1610268.45 | | 148410281.93 | | 1482.3610283.58 | | 148210291.11 | | 1480 |
| 10292.46 | 1479.5410320.25 | | 1479.3910321.24 | | 148010324.71 | | 148210327.99 | | 1483.83 |
| 10330.62 | 148210332.97 | | 1480.3410364.47 | | 1480.55 10378.2 | | 1481.1810384.02 | | 1481.55 |
| 10388.73 | 1480.3111011.63 | | 148011038.99 | | 148011958.32 | | 1480.9611970.89 | | 1480.82 |
| 12214.35 | 148212412.88 | | 148412758.46 | | 148413126.53 | | 1483.76 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8726.53 | .05 | 9820.66 | .03 | 10191.55 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9820.66 | 10191.55 | 140 | 120.4 | 150 | .1 | .3 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.08 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1482.05 | Reach Len. (ft) | 140.00 | 120.40 | 150.00 |
| Crit W.S. (ft) | 1478.31 | Flow Area (sq ft) | 0.00 | 1841.36 | 3025.19 |
| E.G. Slope (ft/ft) | 0.000180 | Area (sq ft) | 0.00 | 1841.36 | 3025.19 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 0.00 | 3039.80 | 1627.19 |
| Top Width (ft) | 2301.87 | Top Width (ft) | 0.18 | 370.89 | 1930.79 |
| Vel Total (ft/s) | 0.96 | Avg. Vel. (ft/s) | 0.03 | 1.65 | 0.54 |
| Max Chl Dpth (ft) | 6.75 | Hydr. Depth (ft) | 0.03 | 4.96 | 1.57 |
| Conv. Total (cfs) | 348121.9 | Conv. (cfs) | 0.0 | 226745.8 | 121376.1 |
| Length Wtd. (ft) | 129.27 | Wetted Per. (ft) | 0.19 | 372.76 | 1932.60 |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | 0.00 | 0.06 | 0.02 |
| Alpha | 2.04 | Stream Power (lb/ft s) | 0.00 | 0.09 | 0.01 |
| Frctn Loss (ft) | 0.05 | Cum Volume (acre-ft) | 0.00 | 113.80 | 5.92 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 0.00 | 37.76 | 6.38 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.68 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1482.61 | Reach Len. (ft) | 140.00 | 120.40 | 150.00 |
| Crit W.S. (ft) | 1479.46 | Flow Area (sq ft) | 0.63 | 2047.18 | 4113.65 |
| E.G. Slope (ft/ft) | 0.000396 | Area (sq ft) | 0.63 | 2047.18 | 4113.65 |
| Q Total (cfs) | 9333.00 | Flow (cfs) | 0.17 | 5386.49 | 3946.35 |
| Top Width (ft) | 2365.54 | Top Width (ft) | 2.08 | 370.89 | 1992.57 |
| Vel Total (ft/s) | 1.51 | Avg. Vel. (ft/s) | 0.26 | 2.63 | 0.96 |
| Max Chl Dpth (ft) | 7.31 | Hydr. Depth (ft) | 0.30 | 5.52 | 2.06 |
| Conv. Total (cfs) | 468758.9 | Conv. (cfs) | 8.3 | 270541.6 | 198209.0 |
| Length Wtd. (ft) | 133.37 | Wetted Per. (ft) | 2.17 | 372.76 | 1994.86 |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | 0.01 | 0.14 | 0.05 |
| Alpha | 1.91 | Stream Power (lb/ft s) | 0.00 | 0.36 | 0.05 |
| Frctn Loss (ft) | 0.13 | Cum Volume (acre-ft) | 4.78 | 182.00 | 9.96 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 7.77 | 42.48 | 9.13 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1483.08 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1482.97 | Reach Len. (ft) | 140.00 | 120.40 | 150.00 |
| Crit W.S. (ft) | 1481.14 | Flow Area (sq ft) | 1.59 | 2179.75 | 4833.08 |
| E.G. Slope (ft/ft) | 0.000634 | Area (sq ft) | 1.59 | 2179.75 | 4833.08 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | 0.71 | 7560.76 | 6438.52 |
| Top Width (ft) | 2407.27 | Top Width (ft) | 3.30 | 370.89 | 2033.08 |
| Vel Total (ft/s) | 2.00 | Avg. Vel. (ft/s) | 0.45 | 3.47 | 1.33 |
| Max Chl Dpth (ft) | 7.67 | Hydr. Depth (ft) | 0.48 | 5.88 | 2.38 |
| Conv. Total (cfs) | 556176.0 | Conv. (cfs) | 28.4 | 300365.4 | 255782.2 |
| Length Wtd. (ft) | 135.32 | Wetted Per. (ft) | 3.44 | 372.76 | 2035.66 |
| Min Ch El (ft) | 1475.30 | Shear (lb/sq ft) | 0.02 | 0.23 | 0.09 |
| Alpha | 1.84 | Stream Power (lb/ft s) | 0.01 | 0.80 | 0.13 |
| Frctn Loss (ft) | 0.20 | Cum Volume (acre-ft) | 9.45 | 203.74 | 12.65 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 11.45 | 43.51 | 9.37 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9711.25 | 9820.66 | 0.00 | 0.00 | 0.19 | 0.00 | 0.03 | 0.03 |
| LB 9820.66 | 9894.84 | 179.15 | 181.95 | 75.09 | 3.84 | 2.45 | 0.98 |
| 9894.84 | 9969.02 | 778.98 | 437.34 | 74.19 | 16.69 | 5.90 | 1.78 |
| 9969.02 | 10043.19 | 797.07 | 443.46 | 74.21 | 17.08 | 5.98 | 1.80 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10043.19 | 10117.37 | 739.01 | 423.78 | 74.21 | 15.83 | 5.71 | 1.74 |
| 10117.37 | RB 10191.55 | 545.58 | 354.83 | 75.05 | 11.69 | 4.78 | 1.54 |
| 10191.55 | 10485.05 | 184.26 | 337.66 | 197.93 | 3.95 | 1.72 | 0.55 |
| 10485.05 | 10778.55 | 316.99 | 547.39 | 293.50 | 6.79 | 1.87 | 0.58 |
| 10778.55 | 11072.04 | 357.94 | 588.78 | 293.50 | 7.67 | 2.01 | 0.61 |
| 11072.04 | 11365.54 | 317.36 | 547.77 | 293.50 | 6.80 | 1.87 | 0.58 |
| 11365.54 | 11659.04 | 235.35 | 457.82 | 293.50 | 5.04 | 1.56 | 0.51 |
| 11659.04 | 11952.54 | 163.44 | 367.86 | 293.50 | 3.50 | 1.25 | 0.44 |
| 11952.54 | 12246.04 | 51.86 | 177.93 | 267.18 | 1.11 | 0.67 | 0.29 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9711.25 | 9820.66 | 0.17 | 0.63 | 2.17 | 0.00 | 0.30 | 0.26 |
| LB 9820.66 | 9894.84 | 376.74 | 223.11 | 75.09 | 4.04 | 3.01 | 1.69 |
| 9894.84 | 9969.02 | 1354.66 | 478.51 | 74.19 | 14.51 | 6.45 | 2.83 |
| 9969.02 | 10043.19 | 1383.39 | 484.63 | 74.21 | 14.82 | 6.53 | 2.85 |
| 10043.19 | 10117.37 | 1291.05 | 464.94 | 74.21 | 13.83 | 6.27 | 2.78 |
| 10117.37 | RB 10191.55 | 980.63 | 396.00 | 75.05 | 10.51 | 5.34 | 2.48 |
| 10191.55 | 10485.05 | 431.39 | 448.22 | 205.09 | 4.62 | 2.21 | 0.96 |
| 10485.05 | 10778.55 | 731.68 | 710.26 | 293.50 | 7.84 | 2.42 | 1.03 |
| 10778.55 | 11072.04 | 804.12 | 751.65 | 293.50 | 8.62 | 2.56 | 1.07 |
| 11072.04 | 11365.54 | 732.33 | 710.64 | 293.50 | 7.85 | 2.42 | 1.03 |
| 11365.54 | 11659.04 | 584.46 | 620.69 | 293.50 | 6.26 | 2.11 | 0.94 |
| 11659.04 | 11952.54 | 450.21 | 530.73 | 293.50 | 4.82 | 1.81 | 0.85 |
| 11952.54 | 12246.04 | 211.52 | 337.32 | 293.50 | 2.27 | 1.15 | 0.63 |
| 12246.04 | 12539.53 | 0.66 | 4.17 | 28.77 | 0.01 | 0.14 | 0.16 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9711.25 | 9820.66 | 0.71 | 1.59 | 3.44 | 0.01 | 0.48 | 0.45 |
| LB 9820.66 | 9894.84 | 576.61 | 249.62 | 75.09 | 4.12 | 3.37 | 2.31 |
| 9894.84 | 9969.02 | 1881.15 | 505.02 | 74.19 | 13.44 | 6.81 | 3.72 |
| 9969.02 | 10043.19 | 1918.93 | 511.14 | 74.21 | 13.71 | 6.89 | 3.75 |
| 10043.19 | 10117.37 | 1797.40 | 491.46 | 74.21 | 12.84 | 6.63 | 3.66 |
| 10117.37 | RB 10191.55 | 1386.66 | 422.51 | 75.05 | 9.90 | 5.70 | 3.28 |
| 10191.55 | 10485.05 | 690.48 | 521.61 | 210.41 | 4.93 | 2.51 | 1.32 |
| 10485.05 | 10778.55 | 1164.04 | 815.16 | 293.50 | 8.31 | 2.78 | 1.43 |
| 10778.55 | 11072.04 | 1264.22 | 856.56 | 293.50 | 9.03 | 2.92 | 1.48 |
| 11072.04 | 11365.54 | 1164.94 | 815.54 | 293.50 | 8.32 | 2.78 | 1.43 |
| 11365.54 | 11659.04 | 958.78 | 725.59 | 293.50 | 6.85 | 2.47 | 1.32 |
| 11659.04 | 11952.54 | 768.96 | 635.63 | 293.50 | 5.49 | 2.17 | 1.21 |
| 11952.54 | 12246.04 | 420.04 | 442.22 | 293.50 | 3.00 | 1.51 | 0.95 |
| 12246.04 | 12539.53 | 7.08 | 20.79 | 64.25 | 0.05 | 0.32 | 0.34 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.489

INPUT
Description: Vineyard Road
Station Elevation Data num= 15

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8620.64 | 1486.71 | 8955.38 | 1486 | 9357.19 | 1484 | 9704.69 | 1482 | 9795.46 | 1480 |
| 10000 | 147810 | 146.97 | 147810 | 220.44 | 148010 | 317.67 | 148210 | 608.19 | 1482 |
| 10982.01 | 1481.92 | 11180.64 | 1481.45 | 12040.64 | 1481.61 | 12580.64 | 148213 | 130.64 | 1484 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|

8620.64 .035 9704.69 .03510220.44 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9704.6910220.44 55 52.7 55 .1 .3
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
8620.6410317.67 1480.7513120.6413130.64 1484

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.01 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.24 | Wt. n-Val. | | 0.035 | 0.035 |
| W.S. Elev (ft) | 1481.77 | Reach Len. (ft) | 55.00 | 52.70 | 55.00 |
| Crit W.S. (ft) | 1481.77 | Flow Area (sq ft) | | 490.09 | 303.86 |
| E.G. Slope (ft/ft) | 0.011005 | Area (sq ft) | | 490.09 | 303.86 |
| Q Total (cfs) | 2730.00 | Flow (cfs) | | 2139.06 | 590.94 |
| Top Width (ft) | 1801.68 | Top Width (ft) | | 505.16 | 1296.52 |
| Vel Total (ft/s) | 3.44 | Avg. Vel. (ft/s) | | 4.36 | 1.94 |
| Max Chl Dpth (ft) | 1.02 | Hydr. Depth (ft) | | 0.97 | 0.23 |
| Conv. Total (cfs) | 26023.8 | Conv. (cfs) | | 20390.7 | 5633.2 |
| Length Wtd. (ft) | 52.88 | Wetted Per. (ft) | | 505.17 | 1296.53 |
| Min Ch El (ft) | 1480.75 | Shear (lb/sq ft) | | 0.67 | 0.16 |
| Alpha | 1.33 | Stream Power (lb/ft s) | | 2.91 | 0.31 |
| Frctn Loss (ft) | 0.37 | Cum Volume (acre-ft) | | 110.58 | 0.19 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | | 36.55 | 0.82 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.53 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.30 | Wt. n-Val. | 0.035 | 0.035 | 0.035 |
| W.S. Elev (ft) | 1482.23 | Reach Len. (ft) | 55.00 | 52.70 | 55.00 |
| Crit W.S. (ft) | 1482.23 | Flow Area (sq ft) | 4.64 | 728.41 | 1223.34 |
| E.G. Slope (ft/ft) | 0.010196 | Area (sq ft) | 4.64 | 728.41 | 1223.34 |
| Q Total (cfs) | 7260.00 | Flow (cfs) | 4.72 | 3930.74 | 3324.54 |
| Top Width (ft) | 2979.65 | Top Width (ft) | 40.15 | 515.75 | 2423.75 |
| Vel Total (ft/s) | 3.71 | Avg. Vel. (ft/s) | 1.02 | 5.40 | 2.72 |
| Max Chl Dpth (ft) | 1.48 | Hydr. Depth (ft) | 0.12 | 1.41 | 0.50 |
| Conv. Total (cfs) | 71897.7 | Conv. (cfs) | 46.7 | 38927.1 | 32923.8 |
| Length Wtd. (ft) | 53.17 | Wetted Per. (ft) | 40.15 | 515.76 | 2423.76 |
| Min Ch El (ft) | 1480.75 | Shear (lb/sq ft) | 0.07 | 0.90 | 0.32 |
| Alpha | 1.39 | Stream Power (lb/ft s) | 0.07 | 4.85 | 0.87 |
| Frctn Loss (ft) | 0.41 | Cum Volume (acre-ft) | 4.77 | 178.17 | 0.77 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 7.70 | 41.25 | 1.53 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.85 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.37 | Wt. n-Val. | 0.035 | 0.035 | 0.035 |
| W.S. Elev (ft) | 1482.48 | Reach Len. (ft) | 55.00 | 52.70 | 55.00 |
| Crit W.S. (ft) | 1482.48 | Flow Area (sq ft) | 20.15 | 857.60 | 1839.08 |
| E.G. Slope (ft/ft) | 0.010674 | Area (sq ft) | 20.15 | 857.60 | 1839.08 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 11900.00 | Flow (cfs) | 34.20 | 5279.45 | 6586.35 |
| Top Width (ft) | 3092.05 | Top Width (ft) | 83.67 | 515.75 | 2492.63 |
| Vel Total (ft/s) | 4.38 | Avg. Vel. (ft/s) | 1.70 | 6.16 | 3.58 |
| Max Chl Dpth (ft) | 1.73 | Hydr. Depth (ft) | 0.24 | 1.66 | 0.74 |
| Conv. Total (cfs) | 115183.8 | Conv. (cfs) | 331.0 | 51101.5 | 63751.3 |
| Length Wtd. (ft) | 53.37 | Wetted Per. (ft) | 83.67 | 515.76 | 2492.65 |
| Min Ch El (ft) | 1480.75 | Shear (lb/sq ft) | 0.16 | 1.11 | 0.49 |
| Alpha | 1.25 | Stream Power (lb/ft s) | 0.27 | 6.82 | 1.76 |
| Frctn Loss (ft) | 0.44 | Cum Volume (acre-ft) | 9.41 | 199.55 | 1.16 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 11.31 | 42.29 | 1.57 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9704.69 | 9807.84 | 261.22 | 70.64 | 92.57 | 9.57 | 0.76 | 3.70 |
| 9807.84 | 9910.99 | 469.45 | 104.86 | 103.15 | 17.20 | 1.02 | 4.48 |
| 9910.99 | 10014.14 | 469.46 | 104.86 | 103.15 | 17.20 | 1.02 | 4.48 |
| 10014.14 | 10117.29 | 469.45 | 104.86 | 103.15 | 17.20 | 1.02 | 4.48 |
| 10117.29 | RB 10220.44 | 469.46 | 104.86 | 103.15 | 17.20 | 1.02 | 4.48 |
| 10220.44 | 10511.46 | 213.49 | 62.19 | 85.89 | 7.82 | 0.72 | 3.43 |
| 10511.46 | 10802.48 | | | | | | |
| 10802.48 | 11093.50 | 1.59 | 2.58 | 46.66 | 0.06 | 0.06 | 0.62 |
| 11093.50 | 11384.52 | 141.91 | 79.30 | 291.02 | 5.20 | 0.27 | 1.79 |
| 11384.52 | 11675.54 | 124.29 | 73.23 | 291.02 | 4.55 | 0.25 | 1.70 |
| 11675.54 | 11966.56 | 83.00 | 57.48 | 291.02 | 3.04 | 0.20 | 1.44 |
| 11966.56 | 12257.58 | 26.69 | 29.09 | 290.92 | 0.98 | 0.10 | 0.92 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9596.29 | 9704.69 | 4.72 | 4.64 | 40.15 | 0.06 | 0.12 | 1.02 |
| LB 9704.69 | 9807.84 | 545.01 | 117.32 | 103.16 | 7.51 | 1.14 | 4.65 |
| 9807.84 | 9910.99 | 846.43 | 152.77 | 103.15 | 11.66 | 1.48 | 5.54 |
| 9910.99 | 10014.14 | 846.43 | 152.77 | 103.15 | 11.66 | 1.48 | 5.54 |
| 10014.14 | 10117.29 | 846.43 | 152.77 | 103.15 | 11.66 | 1.48 | 5.54 |
| 10117.29 | RB 10220.44 | 846.43 | 152.77 | 103.15 | 11.66 | 1.48 | 5.54 |
| 10220.44 | 10511.46 | 388.15 | 150.81 | 291.03 | 5.35 | 0.52 | 2.57 |
| 10511.46 | 10802.48 | 111.33 | 71.28 | 291.02 | 1.53 | 0.24 | 1.56 |
| 10802.48 | 11093.50 | 201.56 | 101.78 | 291.02 | 2.78 | 0.35 | 1.98 |
| 11093.50 | 11384.52 | 698.12 | 214.47 | 291.02 | 9.62 | 0.74 | 3.26 |
| 11384.52 | 11675.54 | 665.53 | 208.41 | 291.02 | 9.17 | 0.72 | 3.19 |
| 11675.54 | 11966.56 | 583.80 | 192.65 | 291.02 | 8.04 | 0.66 | 3.03 |
| 11966.56 | 12257.58 | 447.58 | 164.26 | 291.02 | 6.16 | 0.56 | 2.72 |
| 12257.58 | 12548.60 | 210.85 | 104.57 | 291.02 | 2.90 | 0.36 | 2.02 |
| 12548.60 | 12839.62 | 17.64 | 15.12 | 95.59 | 0.24 | 0.16 | 1.17 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9596.29 | 9704.69 | 34.20 | 20.15 | 83.67 | 0.29 | 0.24 | 1.70 |
| LB 9704.69 | 9807.84 | 778.16 | 143.15 | 103.16 | 6.54 | 1.39 | 5.44 |
| 9807.84 | 9910.99 | 1125.32 | 178.61 | 103.15 | 9.46 | 1.73 | 6.30 |
| 9910.99 | 10014.14 | 1125.33 | 178.61 | 103.15 | 9.46 | 1.73 | 6.30 |
| 10014.14 | 10117.29 | 1125.32 | 178.61 | 103.15 | 9.46 | 1.73 | 6.30 |
| 10117.29 | RB 10220.44 | 1125.33 | 178.61 | 103.15 | 9.46 | 1.73 | 6.30 |
| 10220.44 | 10511.46 | 788.74 | 223.70 | 291.03 | 6.63 | 0.77 | 3.53 |
| 10511.46 | 10802.48 | 379.31 | 144.18 | 291.02 | 3.19 | 0.50 | 2.63 |
| 10802.48 | 11093.50 | 522.25 | 174.67 | 291.02 | 4.39 | 0.60 | 2.99 |
| 11093.50 | 11384.52 | 1197.37 | 287.37 | 291.02 | 10.06 | 0.99 | 4.17 |
| 11384.52 | 11675.54 | 1155.55 | 281.30 | 291.02 | 9.71 | 0.97 | 4.11 |
| 11675.54 | 11966.56 | 1049.71 | 265.55 | 291.02 | 8.82 | 0.91 | 3.95 |
| 11966.56 | 12257.58 | 869.41 | 237.16 | 291.02 | 7.31 | 0.81 | 3.67 |
| 12257.58 | 12548.60 | 536.23 | 177.46 | 291.02 | 4.51 | 0.61 | 3.02 |
| 12548.60 | 12839.62 | 87.78 | 47.69 | 164.47 | 0.74 | 0.29 | 1.84 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.479

INPUT
Description: Vineyard Road downstream
Station Elevation Data num= 89

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8543.14 | 1484.37 | 8652.76 | 1484.37 | 8665.5 | 1486 | 8673.28 | 1486.35 | 8680.99 | 1486.6 |
| 8690.08 | 1486.57 | 8690.3 | 1486 | 8691.05 | 1485.99 | 8705.1 | 1486 | 8716.31 | 1486.18 |
| 8722.77 | 1486.95 | 8730.49 | 1486.79 | 8745.17 | 1486.42 | 8749.97 | 1486.31 | 8763.1 | 1486 |
| 8907.62 | 1485.18 | 8915.33 | 1485.4 | 8920.83 | 1484.48 | 8925.26 | 1485.7 | 8964.59 | 1484.85 |
| 8984.76 | 1484 | 9000.02 | 1484 | 9013.59 | 1484 | 9034.61 | 1484 | 9436.48 | 1484 |
| 9440.92 | 1482 | 9713.03 | 1482 | 9731.02 | 1484 | 9738.36 | 1484 | 9738.84 | 1484 |
| 9774.13 | 1484 | 9852.83 | 1483.51 | 9875.25 | 1483.91 | 9881.51 | 1483.22 | 9889.9 | 1482 |
| 9892.13 | 1480.31 | 9905.06 | 1480 | 9913.59 | 1478.44 | 9955.57 | 1478 | 9958.89 | 1476.17 |
| 9976.93 | 1476 | 10000 | 1475.21 | 10036.5 | 1474.66 | 10056.96 | 1475.17 | 10074.47 | 1474.88 |
| 10090.1 | 1476 | 10125.04 | 1476.86 | 10152.11 | 1477.13 | 10174.48 | 1478 | 10187.08 | 1478.74 |
| 10190.48 | 1479.45 | 10213.21 | 1480 | 10214.91 | 1482 | 10227.79 | 1482 | 10238.02 | 1482 |
| 10246.4 | 1482 | 10251.67 | 1482 | 10255.94 | 1482 | 10274.07 | 1482 | 10315.25 | 1482 |
| 10471.27 | 1481.41 | 10507.05 | 1480.45 | 11013.15 | 1480.94 | 11276.34 | 1480.29 | 11325.2 | 1480.47 |
| 11560.04 | 1480.86 | 12134.9 | 1480 | 12580.36 | 1480 | 12761.72 | 1480.27 | 12805.02 | 1480.84 |
| 13006.37 | 1481.03 | 13137.88 | 1482 | 13183.28 | 1483.63 | 13798.18 | 1483.37 | 13863.82 | 1483.92 |
| 14034.44 | 1484 | 14098.6 | 1484 | 14136.53 | 1484 | 14224.63 | 1484 | 14478.76 | 1484 |
| 14952.6 | 1484 | 15158.25 | 1482 | 15645.54 | 1480 | 15869.87 | 1478 | 16206.67 | 1478 |
| 16291.35 | 1480 | 16438.57 | 1480.88 | 16527.31 | 1482 | 16648.48 | 1482.54 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8543.14 | .05 | 9852.83 | .03 | 10238.02 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9852.83 | 10238.02 | 700 | 695.7 | 700 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8543.14 | 9852.83 | 1483.91 | 10238.02 | 16648.48 | 1482 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10239 | 16648.48 | 1482 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1480.40 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 2.92 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1477.47 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1478.45 | Flow Area (sq ft) | | 340.14 | |
| E.G. Slope (ft/ft) | 0.053113 | Area (sq ft) | | 340.14 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 204.40 | Top Width (ft) | | 204.40 | |
| Vel Total (ft/s) | 13.72 | Avg. Vel. (ft/s) | | 13.72 | |
| Max Chl Dpth (ft) | 2.81 | Hydr. Depth (ft) | | 1.66 | |
| Conv. Total (cfs) | 20250.5 | Conv. (cfs) | | 20250.5 | |
| Length Wtd. (ft) | 695.70 | Wetted Per. (ft) | | 204.82 | |
| Min Ch El (ft) | 1474.66 | Shear (lb/sq ft) | | 5.51 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 75.56 | |
| Frctn Loss (ft) | 1.35 | Cum Volume (acre-ft) | | 110.07 | |
| C & E Loss (ft) | 0.27 | Cum SA (acres) | | 36.12 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1481.48 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.98 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1480.50 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1479.73 | Flow Area (sq ft) | | 1159.69 | |
| E.G. Slope (ft/ft) | 0.006348 | Area (sq ft) | | 1159.69 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 321.76 | Top Width (ft) | | 321.76 | |
| Vel Total (ft/s) | 7.93 | Avg. Vel. (ft/s) | | 7.93 | |
| Max Chl Dpth (ft) | 5.84 | Hydr. Depth (ft) | | 3.60 | |
| Conv. Total (cfs) | 115473.1 | Conv. (cfs) | | 115473.1 | |
| Length Wtd. (ft) | 695.70 | Wetted Per. (ft) | | 322.87 | |
| Min Ch El (ft) | 1474.66 | Shear (lb/sq ft) | | 1.42 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 11.29 | |
| Frctn Loss (ft) | 3.58 | Cum Volume (acre-ft) | 4.77 | 177.02 | |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 7.68 | 40.74 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1482.01 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.12 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1480.89 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1480.16 | Flow Area (sq ft) | | 1284.95 | |
| E.G. Slope (ft/ft) | 0.006360 | Area (sq ft) | | 1284.95 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 322.60 | Top Width (ft) | | 322.60 | |
| Vel Total (ft/s) | 8.48 | Avg. Vel. (ft/s) | | 8.48 | |
| Max Chl Dpth (ft) | 6.23 | Hydr. Depth (ft) | | 3.98 | |
| Conv. Total (cfs) | 136675.1 | Conv. (cfs) | | 136675.1 | |
| Length Wtd. (ft) | 695.70 | Wetted Per. (ft) | | 324.02 | |
| Min Ch El (ft) | 1474.66 | Shear (lb/sq ft) | | 1.57 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 13.36 | |
| Frctn Loss (ft) | 3.52 | Cum Volume (acre-ft) | 9.40 | 198.25 | |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 11.26 | 41.78 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9929.87 | 10006.91 | 1068.30 | 85.65 | 50.73 | 22.89 | 1.70 | 12.47 |
| 10006.91 | 10083.94 | 3135.52 | 193.18 | 77.07 | 67.18 | 2.51 | 16.23 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10083.94 | 10160.98 | 463.18 | 61.30 | 77.01 | 9.92 | 0.80 | 7.56 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9852.83 | 9929.87 | 186.81 | 50.35 | 38.20 | 2.03 | 1.33 | 3.71 |
| 9929.87 | 10006.91 | 2302.94 | 301.65 | 77.53 | 25.03 | 3.92 | 7.63 |
| 10006.91 | 10083.94 | 4116.83 | 426.44 | 77.07 | 44.75 | 5.54 | 9.65 |
| 10083.94 | 10160.98 | 2222.20 | 294.57 | 77.07 | 24.15 | 3.82 | 7.54 |
| 10160.98 | RB 10238.02 | 371.23 | 86.67 | 53.00 | 4.04 | 1.65 | 4.28 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9852.83 | 9929.87 | 288.91 | 65.22 | 38.84 | 2.65 | 1.69 | 4.43 |
| 9929.87 | 10006.91 | 2739.76 | 331.61 | 77.53 | 25.14 | 4.30 | 8.26 |
| 10006.91 | 10083.94 | 4683.86 | 456.40 | 77.07 | 42.97 | 5.92 | 10.26 |
| 10083.94 | 10160.98 | 2653.28 | 324.52 | 77.07 | 24.34 | 4.21 | 8.18 |
| 10160.98 | RB 10238.02 | 534.20 | 107.20 | 53.51 | 4.90 | 2.02 | 4.98 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.347

INPUT
Description:
Station Elevation Data num= 97

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8512.04 | 1483.05 | 8551.76 | 1483.54 | 8557.37 | 1483.53 | 8567.11 | 1483.5 | 8570.97 | 1482.13 |
| 8574.61 | 1482 | 8583.42 | 1481.83 | 8584.15 | 1482 | 8588.5 | 1483.04 | 8594.86 | 1483.28 |
| 8600.43 | 1482.25 | 8625.77 | 1482.52 | 8669.36 | 1482 | 8908.25 | 1480.15 | 9016.41 | 1480 |
| 9278.78 | 1478 | 9468.43 | 1477.47 | 9674.72 | 1478 | 9679.77 | 1478.06 | 9680.24 | 1478 |
| 9694.98 | 1476 | 9696.35 | 1475.8 | 9702.04 | 1474 | 9702.97 | 1473.73 | 9746.14 | 1473.42 |
| 9765.48 | 1474 | 9774 | 1474.31 | 9779.08 | 1476 | 9784.47 | 1478 | 9789.03 | 1479.69 |
| 9796.69 | 1480 | 9797.83 | 1480.08 | 9798.42 | 1480 | 9811.58 | 1478.95 | 9814.08 | 1478 |
| 9819.66 | 1476 | 9823.73 | 1474.56 | 9835.81 | 1474 | 9839.16 | 1473.8 | 9858.46 | 1473.32 |
| 9878.57 | 1472 | 9891.22 | 1471.16 | 9899.1 | 1472 | 9904.13 | 1472.53 | 9914.23 | 1472.7 |
| 9928.27 | 1472.87 | 9942.13 | 1473.13 | 9956.9 | 1472 | 9973.6 | 1470.73 | 9984.1 | 1470.54 |
| 10000 | 1471.03 | 10004.53 | 1472 | 10012 | 1473.81 | 10060.05 | 1474 | 10064.1 | 1474.15 |
| 10068.07 | 1474 | 10085.58 | 1473.35 | 10091.13 | 1473.41 | 10100.37 | 1474 | 10105.81 | 1474.24 |
| 10108.97 | 1474 | 10130.58 | 1473.53 | 10135.37 | 1474 | 10143.52 | 1474.88 | 10146.24 | 1476 |
| 10151.1 | 1478 | 10156.98 | 1480 | 10158.78 | 1480.57 | 10167.05 | 1481.03 | 10172.79 | 1481.14 |
| 10175.56 | 1480 | 10180.41 | 1478 | 10183.17 | 1476.87 | 10411.15 | 1477.18 | 10442.96 | 1477.51 |
| 10916.18 | 1477.29 | 10946.66 | 1477 | 11232.94 | 1476.53 | 11263.26 | 1476.53 | 11266.43 | 1476.56 |
| 12386.92 | 1477.62 | 12517.9 | 1478 | 13033.98 | 1479.5 | 13037.58 | 1480 | 13041.07 | 1480.48 |
| 13045.61 | 1480.62 | 13050.34 | 1480 | 13059.04 | 1478.88 | 13075.76 | 1479.61 | 13465.85 | 1480 |
| 15070.01 | 1480 | 15355.22 | 1478 | 15512.09 | 1476 | 16266.33 | 1476 | 16300.25 | 1478 |
| 16342.91 | 1480 | 16529.76 | 1480.57 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8512.04 | .05 | 9797.83 | .035 | 10172.79 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9797.83 | 10172.79 | 800 | 740.2 | 800 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8512.04 | 9790 | 1478 | 10172.8 | 16529.76 | 1478 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8512.04 | 9790 | 1477.2 | 10178 | 16529.76 | 1478 |

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1476.08 | Element | | | |
| Vel Head (ft) | 0.48 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1475.59 | Reach Len. (ft) | 800.00 | 740.20 | 800.00 |
| Crit W.S. (ft) | 1474.87 | Flow Area (sq ft) | | 835.59 | |
| E.G. Slope (ft/ft) | 0.004923 | Area (sq ft) | | 835.59 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 324.44 | Top Width (ft) | | 324.44 | |
| Vel Total (ft/s) | 5.59 | Avg. Vel. (ft/s) | | 5.59 | |
| Max Chl Dpth (ft) | 5.05 | Hydr. Depth (ft) | | 2.58 | |
| Conv. Total (cfs) | 66512.7 | Conv. (cfs) | | 66512.7 | |
| Length Wtd. (ft) | 740.20 | Wetted Per. (ft) | | 325.48 | |
| Min Ch El (ft) | 1470.54 | Shear (lb/sq ft) | | 0.79 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 4.41 | |
| Frctn Loss (ft) | 2.63 | Cum Volume (acre-ft) | | 100.68 | |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | | 31.90 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1477.83 | Element | | | |
| Vel Head (ft) | 0.75 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1477.09 | Reach Len. (ft) | 800.00 | 740.20 | 800.00 |
| Crit W.S. (ft) | 1475.94 | Flow Area (sq ft) | | 1326.07 | |
| E.G. Slope (ft/ft) | 0.004245 | Area (sq ft) | | 1326.07 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 332.25 | Top Width (ft) | | 332.25 | |
| Vel Total (ft/s) | 6.94 | Avg. Vel. (ft/s) | | 6.94 | |
| Max Chl Dpth (ft) | 6.55 | Hydr. Depth (ft) | | 3.99 | |
| Conv. Total (cfs) | 141203.1 | Conv. (cfs) | | 141203.1 | |
| Length Wtd. (ft) | 740.21 | Wetted Per. (ft) | | 333.84 | |
| Min Ch El (ft) | 1470.54 | Shear (lb/sq ft) | | 1.05 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 7.30 | |
| Frctn Loss (ft) | 2.54 | Cum Volume (acre-ft) | 4.77 | 157.17 | |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 7.68 | 35.52 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1478.40 | Element | | | |
| Vel Head (ft) | 0.84 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1477.56 | Reach Len. (ft) | 800.00 | 740.20 | 800.00 |
| Crit W.S. (ft) | 1476.29 | Flow Area (sq ft) | | 1485.25 | |
| E.G. Slope (ft/ft) | 0.004127 | Area (sq ft) | 38.87 | 1485.25 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 504.34 | Top Width (ft) | 169.59 | 334.74 | |
| Vel Total (ft/s) | 7.34 | Avg. Vel. (ft/s) | | 7.34 | |
| Max Chl Dpth (ft) | 7.02 | Hydr. Depth (ft) | | 4.44 | |
| Conv. Total (cfs) | 169664.7 | Conv. (cfs) | | 169664.7 | |
| Length Wtd. (ft) | 740.22 | Wetted Per. (ft) | | 336.51 | |
| Min Ch El (ft) | 1470.54 | Shear (lb/sq ft) | | 1.14 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 8.35 | |
| Frctn Loss (ft) | 2.54 | Cum Volume (acre-ft) | 9.09 | 176.13 | |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 9.89 | 36.53 | |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9797.83 | 9872.82 | 442.74 | 101.65 | 52.24 | 9.49 | 1.95 | 4.36 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9872.82 | 9947.81 | 1447.83 | 239.32 | 75.13 | 31.02 | 3.19 | 6.05 |
| 9947.81 | 10022.81 | 1945.42 | 286.13 | 75.39 | 41.68 | 3.82 | 6.80 |
| 10022.81 | 10097.80 | 546.20 | 133.27 | 75.02 | 11.70 | 1.78 | 4.10 |
| 10097.80 | RB 10172.79 | 284.81 | 75.22 | 47.69 | 6.10 | 1.59 | 3.79 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9797.83 | 9872.82 | 1067.22 | 182.48 | 56.68 | 11.60 | 3.25 | 5.85 |
| 9872.82 | 9947.81 | 2635.70 | 351.34 | 75.13 | 28.65 | 4.69 | 7.50 |
| 9947.81 | 10022.81 | 3238.97 | 398.15 | 75.39 | 35.21 | 5.31 | 8.13 |
| 10022.81 | 10097.80 | 1449.44 | 245.29 | 75.02 | 15.75 | 3.27 | 5.91 |
| 10097.80 | RB 10172.79 | 808.67 | 148.81 | 51.61 | 8.79 | 2.91 | 5.43 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9797.83 | 9872.82 | 1310.00 | 209.62 | 58.10 | 12.02 | 3.64 | 6.25 |
| 9872.82 | 9947.81 | 3068.41 | 387.13 | 75.13 | 28.15 | 5.16 | 7.93 |
| 9947.81 | 10022.81 | 3702.64 | 433.95 | 75.39 | 33.97 | 5.79 | 8.53 |
| 10022.81 | 10097.80 | 1801.32 | 281.08 | 75.02 | 16.53 | 3.75 | 6.41 |
| 10097.80 | RB 10172.79 | 1017.63 | 173.47 | 52.87 | 9.34 | 3.32 | 5.87 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.207

INPUT
Description: 14.204
Station Elevation Data num= 190

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8575.62 | 1479.23 | 8585.14 | 1479.41 | 8590.82 | 1479.68 | 8600.52 | 1479.52 | 8605.42 | 1478.87 |
| 8617.93 | 1478.7 | 8622.54 | 1479.13 | 8627.12 | 1479.01 | 8631.42 | 1478 | 8631.92 | 1477.87 |
| 8641.44 | 1477.49 | 8651.08 | 1476.71 | 8701.2 | 1476 | 9339.89 | 1475.32 | 9346.67 | 1475.7 |
| 9454.44 | 1474 | 9505.63 | 1473.26 | 9527.1 | 1472 | 9528.62 | 1471.92 | 9601.51 | 1470.79 |
| 9660.96 | 1471.62 | 9664.24 | 1472 | 9690.78 | 1474 | 9694.16 | 1474.24 | 9696.74 | 1474 |
| 9706.49 | 1473.1 | 9756.95 | 1473.21 | 9771.94 | 1473.24 | 9792.39 | 1473.82 | 9792.91 | 1474 |
| 9798.59 | 1476 | 9804.27 | 1478 | 9809.95 | 1480 | 9816.06 | 1482 | 9816.23 | 1482.13 |
| 9816.61 | 1482 | 9822.29 | 1480 | 9826.18 | 1478.72 | 9827.9 | 1478 | 9833.04 | 1476 |
| 9838.18 | 1474 | 9840.2 | 1473.21 | 9846.05 | 1472 | 9856.1 | 1470.41 | 9867.62 | 1470 |
| 9877.31 | 1469.66 | 9907 | 1468.43 | 9934.14 | 1470 | 9940.09 | 1470.31 | 9960.85 | 1471.24 |
| 9984.91 | 1470.17 | 10000 | 1470.68 | 10019.4 | 1470 | 10038.15 | 1469.26 | 10051.99 | 1469.04 |
| 10068.16 | 1468.79 | 10073.75 | 1468 | 10078.18 | 1467.42 | 10083.26 | 1467.01 | 10099.29 | 1468 |
| 10107.77 | 1468.63 | 10116.69 | 1470 | 10130.71 | 1472 | 10137.26 | 1472.82 | 10150.98 | 1472.91 |
| 10167.27 | 1474 | 10168.28 | 1474.17 | 10185.52 | 1475.2 | 10188.42 | 1476 | 10194.18 | 1478 |
| 10195.6 | 1478.5 | 10203.73 | 1479.11 | 10208.24 | 1478.64 | 10209.58 | 1478 | 10213.7 | 1476 |
| 10217.74 | 1474 | 10218.85 | 1473.45 | 10227.19 | 1474 | 10231.3 | 1474 | 10245.51 | 1473.85 |
| 10299.63 | 1474 | 10357.02 | 1474 | 10448.61 | 1473.69 | 10468.09 | 1474 | 10480.61 | 1474.23 |
| 10487.54 | 1474 | 10937.55 | 1474 | 10951.31 | 1474.5 | 10982.8 | 1474.49 | 10986.97 | 1474 |
| 10991.97 | 1473.34 | 11020.86 | 1473.12 | 11033.4 | 1474 | 11112.13 | 1474 | 11120.62 | 1473.4 |
| 11266.2 | 1473.51 | 11296.64 | 1472.88 | 11309.84 | 1472.06 | 11319.13 | 1473.93 | 11742.89 | 1473.08 |
| 11747.52 | 1474 | 11749.8 | 1474.49 | 11754.46 | 1474 | 11961.23 | 1473.77 | 11962.33 | 1474 |
| 11965.68 | 1474.74 | 11979.12 | 1474 | 12006.57 | 1473.48 | 12396.17 | 1474 | 12415.67 | 1474.51 |
| 12437.01 | 1474.67 | 12448.35 | 1474.78 | 12456.68 | 1476 | 12571.72 | 1477.19 | 12679.44 | 1476.89 |
| 12877.07 | 1478 | 12917.95 | 1478 | 12944.71 | 1477.73 | 12960.56 | 1477.47 | 13043.31 | 1477.31 |
| 13106.94 | 1477.13 | 13136.32 | 1477.06 | 13152.15 | 1476.28 | 13564.73 | 1477.23 | 13606.3 | 1477.67 |
| 13618.73 | 1477.57 | 14256.33 | 1476.97 | 14265.27 | 1478 | 14270.68 | 1478.38 | 14380.6 | 1478 |
| 14392.54 | 1477.62 | 14396.17 | 1478 | 14406.21 | 1478.98 | 14420.5 | 1478 | 14420.91 | 1477.97 |
| 14446.89 | 1477.86 | 14448.94 | 1478 | 14459.76 | 1479 | 14646.15 | 1478 | 14662.1 | 1478 |
| 14696.47 | 1478.37 | 14699.17 | 1478 | 14704.76 | 1477.03 | 14959.1 | 1477.31 | 14965.97 | 1476 |
| 14966.31 | 1475.95 | 14967.62 | 1476 | 14993 | 1476.59 | 15132.14 | 1476.94 | 15139.93 | 1476 |

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15140.94 1475.8915200.49    147615206.77    147615224.55    147615228.76 1476.05
15308.63    147615342.86    147415350.65  1473.815362.46    147415363.77    1474
15420.17    147415559.15 1474.0415559.26    147415564.28    1472 15564.3 1471.99
15565.35    147215638.93    1472 15788.3 1471.7515795.31 1470.8315800.85 1471.81
15846.23    147215896.01    147216115.81    147216164.78    147416183.52 1475.22
16194.11 1475.9416195.68    147616325.23 1477.8516345.62 1477.7116378.58    1478
16439.44    147816461.44 1477.5716470.92 1477.5916472.43    147816475.25 1478.75
16480.11 1478.3516489.64    147816516.23 1477.0216537.77 1477.3616563.67 1477.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8575.62     .05 9816.06    .03510203.73     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9816.0610203.73              950   941.5     980             .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62    9790    147610203.7316563.67    1478
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62 9816.61    1474   1020416563.67    1476

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1473.41   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.35   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1473.06   Reach Len. (ft)            950.00     941.50     980.00
  Crit W.S. (ft)            1471.64   Flow Area (sq ft)                     987.01
  E.G. Slope (ft/ft)       0.002685   Area (sq ft)                          987.01
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             312.32   Top Width (ft)                        312.32
  Vel Total (ft/s)             4.73   Avg. Vel. (ft/s)                        4.73
  Max Chl Dpth (ft)            6.05   Hydr. Depth (ft)                        3.16
  Conv. Total (cfs)         90070.1   Conv. (cfs)                          90070.1
  Length Wtd. (ft)           941.50   Wetted Per. (ft)                      313.20
  Min Ch El (ft)            1467.01   Shear (lb/sq ft)                        0.53
  Alpha                        1.00   Stream Power (lb/ft s)                  2.50
  Frctn Loss (ft)              3.19   Cum Volume (acre-ft)                   85.20
  C & E Loss (ft)              0.01   Cum SA (acres)                         26.49

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1475.24   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.58   Wt. n-Val.                  0.050      0.035
  W.S. Elev (ft)            1474.66   Reach Len. (ft)            950.00     941.50     980.00
  Crit W.S. (ft)            1472.85   Flow Area (sq ft)            2.54    1508.89
  E.G. Slope (ft/ft)       0.002840   Area (sq ft)               237.49    1508.89
  Q Total (cfs)             9200.00   Flow (cfs)                   2.60    9197.40
  Top Width (ft)             722.27   Top Width (ft)             382.25     340.02
  Vel Total (ft/s)             6.09   Avg. Vel. (ft/s)             1.02       6.10
  Max Chl Dpth (ft)            7.65   Hydr. Depth (ft)             0.53       4.44
  Conv. Total (cfs)        172624.8   Conv. (cfs)                  48.8   172575.9
  Length Wtd. (ft)           941.50   Wetted Per. (ft)             4.90     341.24
  Min Ch El (ft)            1467.01   Shear (lb/sq ft)             0.09       0.78
  Alpha                        1.00   Stream Power (lb/ft s)       0.09       4.78
  Frctn Loss (ft)              3.27   Cum Volume (acre-ft)         2.59     133.09
  C & E Loss (ft)              0.02   Cum SA (acres)               4.17      29.81

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #full flow

  E.G. Elev (ft)            1475.81   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.65   Wt. n-Val.                  0.050      0.035
  W.S. Elev (ft)            1475.16   Reach Len. (ft)            950.00     941.50     980.00
  Crit W.S. (ft)            1473.27   Flow Area (sq ft)            5.26    1679.30
  E.G. Slope (ft/ft)       0.002894   Area (sq ft)               434.51    1679.30
  Q Total (cfs)            10900.00   Flow (cfs)                   7.38   10892.62
  Top Width (ft)             764.55   Top Width (ft)             414.99     349.56
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| | | | | |
|---|---|---|---|---|
| Vel Total (ft/s) | 6.47 | Avg. Vel. (ft/s) | 1.40 | 6.49 |
| Max Chl Dpth (ft) | 8.15 | Hydr. Depth (ft) | 0.85 | 4.80 |
| Conv. Total (cfs) | 202606.4 | Conv. (cfs) | 137.2 | 202469.2 |
| Length Wtd. (ft) | 941.50 | Wetted Per. (ft) | 6.39 | 350.89 |
| Min Ch El (ft) | 1467.01 | Shear (lb/sq ft) | 0.15 | 0.86 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.21 | 5.61 |
| Frctn Loss (ft) | 3.26 | Cum Volume (acre-ft) | 4.74 | 149.24 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 4.53 | 30.72 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9816.06 | 9893.59 | 597.55 | 146.47 | 52.94 | 12.80 | 2.78 | 4.08 |
| 9893.59 | 9971.13 | 1117.77 | 248.57 | 77.63 | 23.95 | 3.21 | 4.50 |
| 9971.13 | 10048.66 | 1006.57 | 233.37 | 77.58 | 21.57 | 3.01 | 4.31 |
| 10048.66 | 10126.20 | 1927.85 | 345.22 | 77.90 | 41.31 | 4.45 | 5.58 |
| 10126.20 | RB 10203.73 | 17.27 | 13.37 | 27.15 | 0.37 | 0.49 | 1.29 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9692.02 | 9816.06 | 2.60 | 2.54 | 4.90 | 0.03 | 0.53 | 1.02 |
| LB 9816.06 | 9893.59 | 1278.59 | 234.53 | 57.66 | 13.90 | 4.11 | 5.45 |
| 9893.59 | 9971.13 | 2268.44 | 372.61 | 77.63 | 24.66 | 4.81 | 6.09 |
| 9971.13 | 10048.66 | 2117.12 | 357.40 | 77.58 | 23.01 | 4.61 | 5.92 |
| 10048.66 | 10126.20 | 3323.84 | 469.25 | 77.90 | 36.13 | 6.05 | 7.08 |
| 10126.20 | RB 10203.73 | 209.42 | 75.09 | 50.46 | 2.28 | 1.49 | 2.79 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9692.02 | 9816.06 | 7.38 | 5.26 | 6.39 | 0.07 | 0.85 | 1.40 |
| LB 9816.06 | 9893.59 | 1536.40 | 263.07 | 59.02 | 14.10 | 4.51 | 5.84 |
| 9893.59 | 9971.13 | 2691.53 | 410.93 | 77.63 | 24.69 | 5.30 | 6.55 |
| 9971.13 | 10048.66 | 2528.61 | 395.73 | 77.58 | 23.20 | 5.10 | 6.39 |
| 10048.66 | 10126.20 | 3818.34 | 507.57 | 77.90 | 35.03 | 6.55 | 7.52 |
| 10126.20 | RB 10203.73 | 317.74 | 102.00 | 58.75 | 2.92 | 1.74 | 3.12 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 14.029

INPUT
Description:
Station Elevation Data num= 160

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8587.49 | 1475.2 | 8590.54 | 1475.88 | 8594.14 | 1474 | 8595.58 | 1473.23 | 8604.14 | 1473.56 |
| 8604.95 | 1474 | 8606.26 | 1474.75 | 8617.28 | 1474.16 | 8624.98 | 1475.67 | 8631.8 | 1475.62 |
| 8638.61 | 1474.85 | 8677.79 | 1474.84 | 8696.31 | 1474 | 8911.08 | 1474 | 8931.28 | 1474 |
| 9303.05 | 1474 | 9373.89 | 1474 | 9424.57 | 1473.35 | 9454.99 | 1473.38 | 9777.75 | 1472.45 |
| 9824.93 | 1474 | 9833.94 | 1475.35 | 9841.01 | 1476 | 9845.46 | 1476.37 | 9848.92 | 1476 |
| 9865.32 | 1474 | 9877.19 | 1472 | 9888.19 | 1470.15 | 9889.55 | 1470 | 9906.47 | 1468 |
| 9909.46 | 1467.55 | 9912.91 | 1466 | 9915.73 | 1464.38 | 9934.58 | 1464.92 | 9959.9 | 1466 |
| 9963.85 | 1466 | 9964.53 | 1465.99 | 9972.43 | 1466 | 9983.75 | 1466.11 | 10000.01 | 1467.25 |
| 10015.56 | 1466.66 | 10070.52 | 1467.51 | 10079.68 | 1466.85 | 10094.95 | 1467.03 | 10099.68 | 1468 |

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 10101.8 1468.4510135.63    146810158.56 1467.6910166.69 1466.6110195.18 1467.65
10196.09    146810201.28    147010206.76    147210210.82 1473.8310213.26    1474
10221.65 1474.5910224.14    147410232.49    147210239.17 1470.2310245.73 1470.18
10260.45 1470.9610464.67 1470.8310496.85 1471.1210573.64    147010587.14    1470
10680.59    147010695.38    1470 10838.6 1470.4810931.58 1470.3910955.35 1470.18
10963.02 1470.9210994.52    147111001.21 1470.76 11260.8    147011273.76 1469.95
11307.03 1469.18 11317.2 1468.1711328.64    1470 11329.8 1470.1811430.38    1470
   12832 1468.8212837.99    1470 12838.5 1470.1112839.27    147012846.01 1469.03
13049.39    147013049.54    147013049.63    147013056.96 1469.6713068.09 1469.59
13069.66    147013077.39    147213079.96 1472.6713084.69 1472.9113091.84    1472
13098.12 1471.2513108.55    147213113.79  1472.313144.06 1472.1913145.37    1472
 13156.3 1470.54 13166.5    147213171.66 1472.7413234.41    147214678.19 1471.89
14693.72    147014701.91 1469.1214785.21  1468.414791.44 1468.4214820.48    1468
14912.62    146814915.94 1468.0114921.99 1469.0614928.62 1468.7814937.26 1468.55
14945.44 1469.0214954.66 1468.61 14962.5 1468.7314971.48    146814980.36 1467.87
14981.55    146814983.24 1468.1815000.34 1468.0215000.44 1468.0115016.13 1468.36
15024.55 1468.3715045.38    146815054.34 1467.9215055.37    146815058.64 1468.25
15063.39    146815065.88 1467.8515085.27    146815096.71 1468.11 15102.2 1469.22
15106.71 1468.5515484.42 1468.6415490.43 1469.5715500.08 1468.4315506.45 1469.46
15513.31 1468.8715771.54 1469.6715775.29    147015799.23    147215806.92 1472.66
15896.17 1473.9315901.38 1473.9915904.17 1473.6915912.86 1473.5115926.88 1473.62
16430.09    147216462.96    147216474.74    1472 16506.1    147216516.58 1472.09
16517.17    147216525.47  1470.916542.87    147216547.52 1472.5516573.13  1472.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8587.49     .05 9845.46    .03510221.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9845.4610221.65              840   838.6     840             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
10221.6516573.13    1472
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
   1022216573.13    1472

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1470.20   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.47   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1469.73   Reach Len. (ft)            840.00     838.60     840.00
  Crit W.S. (ft)            1468.87   Flow Area (sq ft)                     846.58
  E.G. Slope (ft/ft)       0.004424   Area (sq ft)                          846.58
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             308.74   Top Width (ft)                        308.74
  Vel Total (ft/s)             5.51   Avg. Vel. (ft/s)                        5.51
  Max Chl Dpth (ft)            5.35   Hydr. Depth (ft)                        2.74
  Conv. Total (cfs)         70162.9   Conv. (cfs)                          70162.9
  Length Wtd. (ft)           838.60   Wetted Per. (ft)                      310.38
  Min Ch El (ft)            1464.38   Shear (lb/sq ft)                        0.75
  Alpha                        1.00   Stream Power (lb/ft s)                  4.15
  Frctn Loss (ft)              3.15   Cum Volume (acre-ft)                   65.38
  C & E Loss (ft)              0.02   Cum SA (acres)                         19.78


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1471.95   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.77   Wt. n-Val.                              0.035
  W.S. Elev (ft)            1471.17   Reach Len. (ft)            840.00     838.60     840.00
  Crit W.S. (ft)            1470.02   Flow Area (sq ft)                    1302.37
  E.G. Slope (ft/ft)       0.004339   Area (sq ft)                         1302.37
  Q Total (cfs)             9200.00   Flow (cfs)                           9200.00
  Top Width (ft)             322.38   Top Width (ft)                        322.38
  Vel Total (ft/s)             7.06   Avg. Vel. (ft/s)                        7.06
  Max Chl Dpth (ft)            6.79   Hydr. Depth (ft)                        4.04
  Conv. Total (cfs)        139671.5   Conv. (cfs)                         139671.5
  Length Wtd. (ft)           838.60   Wetted Per. (ft)                      324.39
  Min Ch El (ft)            1464.38   Shear (lb/sq ft)                        1.09
  Alpha                        1.00   Stream Power (lb/ft s)                  7.68
  Frctn Loss (ft)              2.83   Cum Volume (acre-ft)                  102.71
  C & E Loss (ft)              0.05   Cum SA (acres)                         22.65
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1472.53 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.86 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1471.67 | Reach Len. (ft) | 840.00 | 838.60 | 840.00 |
| Crit W.S. (ft) | 1470.39 | Flow Area (sq ft) | | 1462.29 | |
| E.G. Slope (ft/ft) | 0.004215 | Area (sq ft) | | 1462.29 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 326.66 | Top Width (ft) | | 326.66 | |
| Vel Total (ft/s) | 7.45 | Avg. Vel. (ft/s) | | 7.45 | |
| Max Chl Dpth (ft) | 7.29 | Hydr. Depth (ft) | | 4.48 | |
| Conv. Total (cfs) | 167892.9 | Conv. (cfs) | | 167892.9 | |
| Length Wtd. (ft) | 838.60 | Wetted Per. (ft) | | 328.80 | |
| Min Ch El (ft) | 1464.38 | Shear (lb/sq ft) | | 1.17 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 8.72 | |
| Frctn Loss (ft) | 2.80 | Cum Volume (acre-ft) | | 115.29 | |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | | 23.41 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9845.46 | 9920.70 | 316.54 | 67.73 | 29.77 | 6.78 | 2.35 | 4.67 |
| 9920.70 | 9995.94 | 2093.08 | 304.93 | 75.30 | 44.85 | 4.05 | 6.86 |
| 9995.94 | 10071.17 | 1044.78 | 200.94 | 75.27 | 22.39 | 2.67 | 5.20 |
| 10071.17 | 10146.41 | 630.65 | 148.54 | 75.41 | 13.51 | 1.97 | 4.25 |
| 10146.41 | RB 10221.65 | 581.96 | 124.44 | 54.65 | 12.47 | 2.30 | 4.68 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9845.46 | 9920.70 | 655.86 | 116.95 | 39.60 | 7.13 | 3.03 | 5.61 |
| 9920.70 | 9995.94 | 3505.91 | 413.47 | 75.30 | 38.11 | 5.50 | 8.48 |
| 9995.94 | 10071.17 | 2163.90 | 309.48 | 75.27 | 23.52 | 4.11 | 6.99 |
| 10071.17 | 10146.41 | 1586.45 | 257.09 | 75.41 | 17.24 | 3.42 | 6.17 |
| 10146.41 | RB 10221.65 | 1287.88 | 205.39 | 58.82 | 14.00 | 3.54 | 6.27 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9845.46 | 9920.70 | 800.67 | 136.69 | 42.57 | 7.35 | 3.29 | 5.86 |
| 9920.70 | 9995.94 | 3996.42 | 450.54 | 75.30 | 36.66 | 5.99 | 8.87 |
| 9995.94 | 10071.17 | 2581.37 | 346.56 | 75.27 | 23.68 | 4.61 | 7.45 |
| 10071.17 | 10146.41 | 1961.79 | 294.16 | 75.41 | 18.00 | 3.91 | 6.67 |
| 10146.41 | RB 10221.65 | 1559.74 | 234.34 | 60.25 | 14.31 | 3.94 | 6.66 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 13.870

INPUT
Description:
Station Elevation Data num= 163

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|

```
  8558.7 1471.68 8571.76 1471.44 8573.67    1472 8575.99 1472.61 8577.28    1472
 8579.01 1471.07 8590.26 1471.45 8591.83    1472 8595.02 1473.23 8606.55    1472
 8608.85 1471.71 8617.39 1471.08 8631.88 1471.09 8634.45 1470.71 8636.59    1470
 8642.64    1468 8644.85 1467.24 8680.57 1467.86 8680.97    1468  8686.6    1470
 8692.31 1471.94 8718.13  1471.8 8767.21 1470.76 9486.09    1470 9768.58  1468.6
 9825.53 1469.58 9827.26    1470 9835.39    1472 9839.75 1473.17 9848.47 1473.43
 9859.98    1472 9876.08    1470 9881.01 1469.49 9884.99    1468 9890.34    1466
 9896.01    1464 9899.55 1462.75 9917.23    1462 9920.88 1461.84 9922.47    1462
 9942.02 1463.81 9949.74    1464 9959.11  1464.2   10000 1464.6210036.97 1464.72
10096.33    146410099.58 1463.9710115.36 1462.6510133.75 1462.6310147.15 1462.45
 10152.8    146210162.52 1461.2110181.69 1461.2510182.54    146210184.83    1464
10187.11    1466 10189.4    146810191.59 1469.9110192.64    147010201.97 1470.91
10205.61    1470 10213.5    146810219.96    146610223.51  1464.910260.97    1465
10263.88    146610265.28 1466.55   10447    146810448.27 1468.07 10448.6    1468
10448.81    146810457.14    146810480.49  1467.810647.25    1466 10827.4    1466
10932.69 1466.5710943.05    146810943.08    146810943.92    146810974.32 1467.73
10984.41 1467.1711233.43 1467.1911246.66 1467.1111287.76 1466.1511291.85    1466
11404.84    146611408.29 1466.3511423.02    146611429.86 1465.8211601.27 1465.32
11625.55 1465.7711650.35 1465.9611922.62 1465.5811940.87 1465.3411998.55  1465.8
12015.79 1465.59 12363.6 1465.7812378.11 1465.6212393.99 1465.1812488.67 1465.31
 12505.6 1465.4512526.61    146612528.18 1466.0412529.44    146612734.61 1464.95
12744.02 1465.6712760.48 1465.1612950.28 1465.6212967.34 1465.1213041.26    1466
13042.99 1466.5313051.85 1466.44 13063.8    146613158.56    146613160.11 1466.29
13172.36 1466.3613177.63    146613183.18    146613214.17    146613218.17    1466
13476.33 1467.5813498.82 1467.3613590.82 1467.9313609.49 1467.89 13702.3 1467.54
13739.61    146813746.41 1468.8913761.69    146813791.53 1467.8713836.35 1467.39
13980.61 1467.4513998.32 1467.1114138.38 1466.3414159.75 1466.3414215.55    1466
14223.11    146614232.82    146614507.56 1465.5214528.76 1465.27 15023.3    1466
15097.31    146615121.32    146615188.78    146615195.21 1465.5915228.09 1465.53
15249.57    146615260.92    146615266.46    146615272.58 1466.2215297.52    1466
   15357    146615480.84    146815675.12 1469.4615705.14 1468.9115865.23 1468.89
15869.18 1469.1315873.32 1469.23 15880.2 1468.5615930.01    146816488.32 1467.91
 16505.4 1467.1916523.86    146816526.19 1468.23

Manning's n Values         num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
  8558.7     .05 9848.47    .03510201.97     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9848.4710201.97              720  706.24     720             .1       .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.7 9848.47 1473.4310202.9716526.19    1470
Blocked Obstructions     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.7    9800    1470   1020216526.19    1470

CROSS SECTION OUTPUT    Profile #1/3 flow

  E.G. Elev (ft)            1467.03   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.40   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1466.63   Reach Len. (ft)            720.00     706.24     720.00
  Crit W.S. (ft)            1465.49   Flow Area (sq ft)                     920.49
  E.G. Slope (ft/ft)       0.003229   Area (sq ft)                          920.49
  Q Total (cfs)             4667.00   Flow (cfs)                           4667.00
  Top Width (ft)             299.19   Top Width (ft)                        299.19
  Vel Total (ft/s)             5.07   Avg. Vel. (ft/s)                        5.07
  Max Chl Dpth (ft)            5.42   Hydr. Depth (ft)                        3.08
  Conv. Total (cfs)         82132.6   Conv. (cfs)                         82132.6
  Length Wtd. (ft)           706.24   Wetted Per. (ft)                      302.11
  Min Ch El (ft)            1461.21   Shear (lb/sq ft)                        0.61
  Alpha                        1.00   Stream Power (lb/ft s)                  3.11
  Frctn Loss (ft)              2.06   Cum Volume (acre-ft)                   48.37
  C & E Loss (ft)              0.00   Cum SA (acres)                         13.92


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #2/3 flow

  E.G. Elev (ft)            1469.07   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.60   Wt. n-Val.                            0.035
  W.S. Elev (ft)            1468.46   Reach Len. (ft)            720.00     706.24     720.00
  Crit W.S. (ft)            1466.63   Flow Area (sq ft)                    1474.69
  E.G. Slope (ft/ft)       0.002700   Area (sq ft)                         1474.69
```

| | | | |
|---|---|---|---|
| Q Total (cfs) | 9200.00 | Flow (cfs) | 9200.00 |
| Top Width (ft) | 306.18 | Top Width (ft) | 306.18 |
| Vel Total (ft/s) | 6.24 | Avg. Vel. (ft/s) | 6.24 |
| Max Chl Dpth (ft) | 7.25 | Hydr. Depth (ft) | 4.82 |
| Conv. Total (cfs) | 177040.2 | Conv. (cfs) | 177040.2 |
| Length Wtd. (ft) | 706.24 | Wetted Per. (ft) | 310.12 |
| Min Ch El (ft) | 1461.21 | Shear (lb/sq ft) | 0.80 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 5.00 |
| Frctn Loss (ft) | 1.94 | Cum Volume (acre-ft) | 75.97 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 16.60 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1469.68 | Element | | | |
| Vel Head (ft) | 0.69 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1468.99 | Reach Len. (ft) | 720.00 | 706.24 | 720.00 |
| Crit W.S. (ft) | 1467.00 | Flow Area (sq ft) | | 1636.57 | |
| E.G. Slope (ft/ft) | 0.002705 | Area (sq ft) | | 1636.57 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 308.19 | Top Width (ft) | | 308.19 | |
| Vel Total (ft/s) | 6.66 | Avg. Vel. (ft/s) | | 6.66 | |
| Max Chl Dpth (ft) | 7.78 | Hydr. Depth (ft) | | 5.31 | |
| Conv. Total (cfs) | 209564.3 | Conv. (cfs) | | 209564.3 | |
| Length Wtd. (ft) | 706.24 | Wetted Per. (ft) | | 312.43 | |
| Min Ch El (ft) | 1461.21 | Shear (lb/sq ft) | | 0.88 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.89 | |
| Frctn Loss (ft) | 1.96 | Cum Volume (acre-ft) | | 85.46 | |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 17.30 | |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9848.47 | 9919.17 | 553.95 | 105.67 | 31.21 | 11.87 | 3.46 | 5.24 |
| 9919.17 | 9989.87 | 954.58 | 203.26 | 70.80 | 20.45 | 2.87 | 4.70 |
| 9989.87 | 10060.57 | 525.50 | 141.99 | 70.70 | 11.26 | 2.01 | 3.70 |
| 10060.57 | 10131.27 | 1015.76 | 210.93 | 70.76 | 21.76 | 2.98 | 4.82 |
| 10131.27 | RB 10201.97 | 1617.22 | 258.64 | 58.64 | 34.65 | 4.57 | 6.25 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9848.47 | 9919.17 | 995.40 | 166.04 | 36.44 | 10.82 | 4.69 | 6.00 |
| 9919.17 | 9989.87 | 2035.96 | 332.71 | 70.80 | 22.13 | 4.71 | 6.12 |
| 9989.87 | 10060.57 | 1451.62 | 271.44 | 70.70 | 15.78 | 3.84 | 5.35 |
| 10060.57 | 10131.27 | 2115.60 | 340.38 | 70.76 | 23.00 | 4.81 | 6.22 |
| 10131.27 | RB 10201.97 | 2601.42 | 364.13 | 61.42 | 28.28 | 6.21 | 7.14 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9848.47 | 9919.17 | 1165.19 | 185.07 | 37.94 | 10.69 | 5.03 | 6.30 |
| 9919.17 | 9989.87 | 2438.62 | 369.96 | 70.80 | 22.37 | 5.23 | 6.59 |
| 9989.87 | 10060.57 | 1805.07 | 308.70 | 70.70 | 16.56 | 4.37 | 5.85 |
| 10060.57 | 10131.27 | 2524.43 | 377.63 | 70.76 | 23.16 | 5.34 | 6.68 |
| 10131.27 | RB 10201.97 | 2966.68 | 395.20 | 62.23 | 27.22 | 6.67 | 7.51 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 13.736

INPUT
Description:
Station Elevation Data num= 128

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8481.19 | 1469.83 | 8503.13 | 1470 | 8543.72 | 1470 | 9145.76 | 1470 | 9778.58 | 1470.56 |
| 9784.88 | 1470 | 9798.95 | 1470 | 9813.84 | 1470.8 | 9821.38 | 1470 | 9837.65 | 1468 |
| 9853.57 | 1466 | 9869.5 | 1464 | 9885.43 | 1462 | 9901.21 | 1460 | 9904.44 | 1459.59 |
| 9925.69 | 1460 | 9928.96 | 1460.1 | 10000 | 1460.58 | 10040.53 | 1461.15 | 10091.19 | 1460.73 |
| 10104.56 | 1462 | 10125.6 | 1464 | 10138.13 | 1465.83 | 10154 | 1466 | 10158.4 | 1466.11 |
| 10158.71 | 1466 | 10170.29 | 1466 | 10192.75 | 1468 | 10223.65 | 1469.85 | 10224.07 | 1469.85 |
| 10359.17 | 1469.15 | 10373.72 | 1468 | 10375.61 | 1467.87 | 10376.44 | 1468 | 10635.06 | 1468 |
| 10655.14 | 1468 | 10718.74 | 1468 | 10727.79 | 1468 | 10824.62 | 1469.17 | 10901.49 | 1468.07 |
| 10904.2 | 1468 | 10919.56 | 1466.33 | 11048.21 | 1466 | 11104.62 | 1465.86 | 11111.04 | 1466 |
| 11113.09 | 1466.02 | 11143.12 | 1466.39 | 11181.28 | 1466 | 11185.02 | 1465.48 | 11214.14 | 1464.63 |
| 11253.53 | 1466 | 11364.16 | 1466 | 11452.87 | 1465 | 11731.55 | 1464.61 | 11859.4 | 1464.58 |
| 11896.31 | 1464.54 | 12247.25 | 1464 | 12305.81 | 1464 | 12707.28 | 1464 | 12894.94 | 1463.91 |
| 12963.59 | 1464 | 12994.98 | 1464.29 | 12997.71 | 1464 | 13009.41 | 1462.44 | 13015.37 | 1464 |
| 13020.53 | 1465.17 | 13162.61 | 1466 | 13247 | 1466 | 13249.48 | 1466 | 13453.56 | 1466 |
| 13485.66 | 1465.2 | 13530.12 | 1465.79 | 13544.84 | 1464 | 13566.9 | 1462.23 | 13595.7 | 1462.18 |
| 13637.87 | 1462 | 13672.28 | 1462 | 13695.45 | 1462.59 | 13723.4 | 1462.46 | 13768.28 | 1462.13 |
| 13788.13 | 1462 | 13821.72 | 1462 | 13823.08 | 1462 | 13833.06 | 1462 | 13908.56 | 1462 |
| 14302.5 | 1461.5 | 14308.88 | 1461.95 | 14486.63 | 1462 | 14527.71 | 1462.45 | 14540.54 | 1462.09 |
| 14575.78 | 1463.89 | 14578.36 | 1464 | 14974.42 | 1466 | 15122.02 | 1466.61 | 15129.88 | 1467.67 |
| 15134.8 | 1467.77 | 15143.5 | 1466.13 | 15155.83 | 1466.51 | 15178.8 | 1466.24 | 15183.59 | 1466 |
| 15190.08 | 1465.66 | 15192.42 | 1466 | 15196.83 | 1466.78 | 15552.58 | 1466 | 15742.53 | 1465.86 |
| 15748.5 | 1466 | 15767.13 | 1466.41 | 15783.35 | 1466 | 15785.89 | 1465.92 | 15806.62 | 1465.65 |
| 15811.06 | 1466 | 15812.83 | 1466.16 | 15816.19 | 1466.12 | 15832.18 | 1466.31 | 15839.03 | 1466 |
| 15873.69 | 1465.8 | 15900.28 | 1466 | 15902.37 | 1466.02 | 15924.22 | 1466 | 16100.16 | 1465.3 |
| 16122.37 | 1465.33 | 16160.5 | 1465.23 | 16176.98 | 1465.16 | 16194.33 | 1465.11 | 16424 | 1465.4 |
| 16431.35 | 1465.85 | 16447.86 | 1464.39 | 16469.93 | 1465.22 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8481.19 | .05 | 9813.84 | .03 | 10223.65 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9813.84 | 10223.65 | 1080 | 1040.5 | 1050 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10223.65 | 16469.93 | 1468 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10852 | 16469.93 | 1468 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1464.97 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.39 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1464.57 | Reach Len. (ft) | 1080.00 | 1040.50 | 1050.00 |
| Crit W.S. (ft) | 1463.04 | Flow Area (sq ft) | | 926.98 | |
| E.G. Slope (ft/ft) | 0.002650 | Area (sq ft) | | 926.98 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 264.60 | Top Width (ft) | | 264.60 | |
| Vel Total (ft/s) | 5.03 | Avg. Vel. (ft/s) | | 5.03 | |
| Max Chl Dpth (ft) | 4.98 | Hydr. Depth (ft) | | 3.50 | |
| Conv. Total (cfs) | 90659.2 | Conv. (cfs) | | 90659.2 | |
| Length Wtd. (ft) | 1040.50 | Wetted Per. (ft) | | 265.13 | |
| Min Ch El (ft) | 1459.59 | Shear (lb/sq ft) | | 0.58 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.91 | |
| Frctn Loss (ft) | 5.16 | Cum Volume (acre-ft) | | 33.40 | |
| C & E Loss (ft) | 0.11 | Cum SA (acres) | | 9.35 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1467.12 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.59 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1466.53 | Reach Len. (ft) | 1080.00 | 1040.50 | 1050.00 |
| Crit W.S. (ft) | 1464.40 | Flow Area (sq ft) | | 1490.99 | |
| E.G. Slope (ft/ft) | 0.002802 | Area (sq ft) | | 1490.99 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 326.90 | Top Width (ft) | | 326.90 | |
| Vel Total (ft/s) | 6.17 | Avg. Vel. (ft/s) | | 6.17 | |
| Max Chl Dpth (ft) | 6.94 | Hydr. Depth (ft) | | 4.56 | |
| Conv. Total (cfs) | 173813.9 | Conv. (cfs) | | 173813.9 | |
| Length Wtd. (ft) | 1040.50 | Wetted Per. (ft) | | 327.68 | |
| Min Ch El (ft) | 1459.59 | Shear (lb/sq ft) | | 0.80 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 4.91 | |
| Frctn Loss (ft) | 4.91 | Cum Volume (acre-ft) | | 51.93 | |
| C & E Loss (ft) | 0.12 | Cum SA (acres) | | 11.47 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1467.71 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.67 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1467.05 | Reach Len. (ft) | 1080.00 | 1040.50 | 1050.00 |
| Crit W.S. (ft) | 1464.83 | Flow Area (sq ft) | | 1662.46 | |
| E.G. Slope (ft/ft) | 0.002847 | Area (sq ft) | | 1662.46 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 336.81 | Top Width (ft) | | 336.81 | |
| Vel Total (ft/s) | 6.56 | Avg. Vel. (ft/s) | | 6.56 | |
| Max Chl Dpth (ft) | 7.46 | Hydr. Depth (ft) | | 4.94 | |
| Conv. Total (cfs) | 204269.3 | Conv. (cfs) | | 204269.3 | |
| Length Wtd. (ft) | 1040.50 | Wetted Per. (ft) | | 337.65 | |
| Min Ch El (ft) | 1459.59 | Shear (lb/sq ft) | | 0.88 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.74 | |
| Frctn Loss (ft) | 4.75 | Cum Volume (acre-ft) | | 58.72 | |
| C & E Loss (ft) | 0.12 | Cum SA (acres) | | 12.07 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9813.84 | 9895.80 | 195.99 | 59.91 | 31.12 | 4.20 | 1.94 | 3.27 |
| 9895.80 | 9977.76 | 2087.28 | 364.99 | 82.04 | 44.72 | 4.45 | 5.72 |
| 9977.76 | 10059.73 | 1574.50 | 308.08 | 81.97 | 33.74 | 3.76 | 5.11 |
| 10059.73 | 10141.69 | 809.23 | 194.01 | 70.00 | 17.34 | 2.78 | 4.17 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9813.84 | 9895.80 | 564.18 | 135.54 | 46.82 | 6.13 | 2.92 | 4.16 |
| 9895.80 | 9977.76 | 3711.99 | 525.32 | 82.04 | 40.35 | 6.41 | 7.07 |
| 9977.76 | 10059.73 | 3068.09 | 468.42 | 81.97 | 33.35 | 5.72 | 6.55 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10059.73 | 10141.69 | 1833.40 | 344.40 | 82.25 | 19.93 | 4.20 | 5.32 |
| 10141.69 | RB 10223.65 | 22.34 | 17.30 | 34.60 | 0.24 | 0.50 | 1.29 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9813.84 | 9895.80 | 715.93 | 160.61 | 50.97 | 6.57 | 3.18 | 4.46 |
| 9895.80 | 9977.76 | 4274.87 | 567.67 | 82.04 | 39.22 | 6.93 | 7.53 |
| 9977.76 | 10059.73 | 3586.86 | 510.77 | 81.97 | 32.91 | 6.23 | 7.02 |
| 10059.73 | 10141.69 | 2251.12 | 386.75 | 82.25 | 20.65 | 4.72 | 5.82 |
| 10141.69 | RB 10223.65 | 71.22 | 36.66 | 40.43 | 0.65 | 0.91 | 1.94 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper main RS: 13.539

INPUT
Description:
Station Elevation Data num= 88

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8582.12 | 1465.1 | 8632.38 | 1465.71 | 9205.41 | 1465.27 | 9572.19 | 1465.27 | 9838.78 | 1464.88 |
| 9853.96 | 1464 | 9884.33 | 1462 | 9913.39 | 1460 | 9941.91 | 1458 | 9970.43 | 1456 |
| 9996.96 | 1454.1410044.91 | 1455.6410075.25 | 1454.37 | 10087 | 145410095.34 | 1453.74 | | | |
| 10095.83 | 145410099.56 | 145610103.29 | 145810107.08 | 146010110.25 | 1461.75 | | | | |
| 10111.31 | 146210116.88 | 1463.35 10127.3 | 1463.4510134.02 | 146210135.91 | 1461.56 | | | | |
| 10148.94 | 1460.5910158.23 | 1460.7410333.22 | 146010477.28 | 146010517.48 | 1460 | | | | |
| 10732.29 | 1460 10926.8 | 146011097.79 | 146011165.21 | 1461.26 11170.3 | 1460.93 | | | | |
| 11187.66 | 146011190.31 | 1459.8411207.48 | 1459.3711225.98 | 1459.8512068.22 | 1458 | | | | |
| 12486.32 | 145812662.53 | 1459.412665.49 | 146012674.29 | 1461.81 12688.4 | 1460.96 | | | | |
| 12710.71 | 1460 12719.8 | 1459.612758.01 | 146012869.74 | 146212894.35 | 1462.65 | | | | |
| 13042.11 | 146413075.37 | 1464.5113091.44 | 1464 13113.7 | 1463.1913167.97 | 1462.89 | | | | |
| 13200 | 146213206.91 | 1463.56 13211.7 | 146213213.66 | 1461.3613225.95 | 1461.95 | | | | |
| 13226.83 | 146213236.08 | 1462.4913241.02 | 1462.2313246.36 | 1462.1513246.89 | 1462 | | | | |
| 13253.78 | 1460.0513260.76 | 146013338.66 | 146013368.39 | 1460.513370.94 | 1460 | | | | |
| 13380.11 | 1458.3313390.45 | 145813399.21 | 1457.7114603.73 | 1456.6514617.99 | 1456.85 | | | | |
| 15016.3 | 145815096.52 | 146015104.47 | 1460.2415185.18 | 1461.1715202.82 | 1460.92 | | | | |
| 15830.72 | 1460.7315833.76 | 1461.6215838.17 | 1461.37 15842.8 | 1460.916450.11 | 1460.26 | | | | |
| 16450.33 | 1460.2616493.42 | 1461.0516518.44 | 1461.13 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8582.12 | .05 | 9838.78 | .03 | 10116.88 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9838.78 | 10116.88 | 1000 | 993.9 | 1000 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10116.88 | 16518.44 | 1463 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10117 | 16518.44 | 1462 |

CROSS SECTION OUTPUT Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1459.70 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.45 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1458.25 | Reach Len. (ft) | 1000.00 | 993.90 | 1000.00 |
| Crit W.S. (ft) | 1458.25 | Flow Area (sq ft) | | 483.09 | |
| E.G. Slope (ft/ft) | 0.012536 | Area (sq ft) | | 483.09 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |

| | | | |
|---|---|---|---|
| Top Width (ft) | 165.40 | Top Width (ft) | 165.40 |
| Vel Total (ft/s) | 9.66 | Avg. Vel. (ft/s) | 9.66 |
| Max Chl Dpth (ft) | 4.51 | Hydr. Depth (ft) | 2.92 |
| Conv. Total (cfs) | 41682.6 | Conv. (cfs) | 41682.6 |
| Length Wtd. (ft) | 993.90 | Wetted Per. (ft) | 166.73 |
| Min Ch El (ft) | 1453.74 | Shear (lb/sq ft) | 2.27 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 21.91 |
| Frctn Loss (ft) | 3.51 | Cum Volume (acre-ft) | 16.56 |
| C & E Loss (ft) | 0.33 | Cum SA (acres) | 4.22 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1462.08 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.83 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1460.25 | Reach Len. (ft) | 1000.00 | 993.90 | 1000.00 |
| Crit W.S. (ft) | 1459.98 | Flow Area (sq ft) | | 847.09 | |
| E.G. Slope (ft/ft) | 0.009533 | Area (sq ft) | | 847.09 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 197.83 | Top Width (ft) | | 197.83 | |
| Vel Total (ft/s) | 10.86 | Avg. Vel. (ft/s) | | 10.86 | |
| Max Chl Dpth (ft) | 6.51 | Hydr. Depth (ft) | | 4.28 | |
| Conv. Total (cfs) | 94227.6 | Conv. (cfs) | | 94227.6 | |
| Length Wtd. (ft) | 993.90 | Wetted Per. (ft) | | 199.73 | |
| Min Ch El (ft) | 1453.74 | Shear (lb/sq ft) | | 2.52 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 27.41 | |
| Frctn Loss (ft) | 5.52 | Cum Volume (acre-ft) | | 24.01 | |
| C & E Loss (ft) | 0.30 | Cum SA (acres) | | 5.20 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1462.84 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.87 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1460.97 | Reach Len. (ft) | 1000.00 | 993.90 | 1000.00 |
| Crit W.S. (ft) | 1460.54 | Flow Area (sq ft) | | 993.78 | |
| E.G. Slope (ft/ft) | 0.008492 | Area (sq ft) | | 993.78 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 209.59 | Top Width (ft) | | 209.59 | |
| Vel Total (ft/s) | 10.97 | Avg. Vel. (ft/s) | | 10.97 | |
| Max Chl Dpth (ft) | 7.23 | Hydr. Depth (ft) | | 4.74 | |
| Conv. Total (cfs) | 118282.1 | Conv. (cfs) | | 118282.1 | |
| Length Wtd. (ft) | 993.90 | Wetted Per. (ft) | | 211.71 | |
| Min Ch El (ft) | 1453.74 | Shear (lb/sq ft) | | 2.49 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 27.30 | |
| Frctn Loss (ft) | 5.74 | Cum Volume (acre-ft) | | 26.99 | |
| C & E Loss (ft) | 0.27 | Cum SA (acres) | | 5.55 | |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9894.40 | 9950.02 | 11.95 | 4.76 | 11.68 | 0.26 | 0.41 | 2.51 |
| 9950.02 | 10005.64 | 1325.86 | 150.10 | 55.74 | 28.41 | 2.70 | 8.83 |
| 10005.64 | 10061.26 | 1710.98 | 174.81 | 55.65 | 36.66 | 3.14 | 9.79 |
| 10061.26 | RB 10116.88 | 1618.21 | 153.41 | 43.66 | 34.67 | 3.61 | 10.55 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9894.40 | 9950.02 | 276.35 | 56.79 | 40.41 | 3.00 | 1.41 | 4.87 |
| 9950.02 | 10005.64 | 2844.14 | 261.59 | 55.74 | 30.91 | 4.70 | 10.87 |
| 10005.64 | 10061.26 | 3309.24 | 286.30 | 55.65 | 35.97 | 5.15 | 11.56 |
| 10061.26 | RB 10116.88 | 2770.28 | 242.41 | 47.93 | 30.11 | 5.24 | 11.43 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9894.40 | 9950.02 | 475.82 | 89.58 | 50.90 | 4.37 | 1.76 | 5.31 |
| 9950.02 | 10005.64 | 3387.84 | 301.64 | 55.74 | 31.08 | 5.42 | 11.23 |
| 10005.64 | 10061.26 | 3866.86 | 326.35 | 55.65 | 35.48 | 5.87 | 11.85 |
| 10061.26 | RB 10116.88 | 3169.49 | 276.21 | 49.42 | 29.08 | 5.80 | 11.48 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper main  RS: 13.351

INPUT
Description:
Station Elevation Data  num=  82

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8565.62 | 1461 | 8819.25 | 1460 | 9792.1 | 1459.62 | 9800.19 | 1458 | 9808.23 | 1456.4 |
| 9823.11 | 1456 | 9903.55 | 1454 | 9951.28 | 1452.17 | 9952.07 | 1452.26 | 9953.52 | 1452 |
| 9964.87 | 1450 | 9974.53 | 1448 | 9977.77 | 1447.17 | 10021.99 | 1446.75 | 10074.33 | 1447.39 |
| 10083.44 | 1447.86 | 10083.8 | 1448 | 10088.78 | 1450 | 10094.1 | 1452 | 10100.11 | 1454 |
| 10103.79 | 1455.23 | 10105.52 | 1456 | 10110 | 1458 | 10114.27 | 1460 | 10117.72 | 1461.61 |
| 10120.9 | 1460 | 10125.19 | 1458 | 10126.18 | 1457.54 | 10197.35 | 1457.14 | 10247.37 | 1457.59 |
| 10337.82 | 1457.41 | 11127.31 | 1458 | 11141.06 | 1458.15 | 11152.59 | 1458 | 11164.73 | 1457.84 |
| 11167.42 | 1458 | 11231.27 | 1458 | 11368.33 | 1458 | 11396.54 | 1456 | 11446.84 | 1456 |
| 11495.62 | 1455.45 | 11595.62 | 1455.53 | 11695.62 | 1455.37 | 11795.62 | 1455.34 | 11895.62 | 1455.58 |
| 11995.62 | 1455.47 | 12095.62 | 1455.6 | 12214.56 | 1458 | 12363.74 | 1458 | 12740.45 | 1460 |
| 12743.83 | 1460.08 | 12750.17 | 1460 | 12778.31 | 1460 | 12778.34 | 1460 | 12796.04 | 1459.8 |
| 12838.75 | 1459.53 | 12972.48 | 1458.94 | 12973.4 | 1458.94 | 13185.11 | 1458.03 | 13186.21 | 1458 |

```
13286.73    145613348.99 1455.14 13458.7 1454.1913468.18    145413561.98 1453.81
14627.57    145414720.48    145614855.64    145815012.24    145815061.71    1458
15062.81    145815070.78 1457.9515077.09    145815134.73    145815471.76 1457.38
15550.97 1456.9716237.47    145616310.61 1455.9616348.77 1455.9416497.94    1456
16502.69 1456.1216550.67 1457.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8565.62     .05  9792.1    .03510117.72     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9792.110117.72             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8565.62 8819.25    146010117.7216550.67    1460
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
   1011016550.67    1458
```

CROSS SECTION OUTPUT  Profile #1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1454.54 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.36 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1454.18 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1450.88 | Flow Area (sq ft) | | 968.18 | |
| E.G. Slope (ft/ft) | 0.001638 | Area (sq ft) | | 968.18 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 204.34 | Top Width (ft) | | 204.34 | |
| Vel Total (ft/s) | 4.82 | Avg. Vel. (ft/s) | | 4.82 | |
| Max Chl Dpth (ft) | 7.43 | Hydr. Depth (ft) | | 4.74 | |
| Conv. Total (cfs) | 115314.4 | Conv. (cfs) | | 115314.4 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 206.04 | |
| Min Ch El (ft) | 1446.75 | Shear (lb/sq ft) | | 0.48 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.32 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

Note:  Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1456.26 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.83 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1455.43 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1453.08 | Flow Area (sq ft) | | 1257.35 | |
| E.G. Slope (ft/ft) | 0.003635 | Area (sq ft) | | 1257.35 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 258.21 | Top Width (ft) | | 258.21 | |
| Vel Total (ft/s) | 7.32 | Avg. Vel. (ft/s) | | 7.32 | |
| Max Chl Dpth (ft) | 8.68 | Hydr. Depth (ft) | | 4.87 | |
| Conv. Total (cfs) | 152600.2 | Conv. (cfs) | | 152600.2 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 260.13 | |
| Min Ch El (ft) | 1446.75 | Shear (lb/sq ft) | | 1.10 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 8.03 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

CROSS SECTION OUTPUT  Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1456.84 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.98 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1455.86 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1453.75 | Flow Area (sq ft) | | 1372.28 | |
| E.G. Slope (ft/ft) | 0.004174 | Area (sq ft) | | 1372.28 | |
| Q Total (cfs) | 10900.00 | Flow (cfs) | | 10900.00 | |
| Top Width (ft) | 276.46 | Top Width (ft) | | 276.46 | |
| Vel Total (ft/s) | 7.94 | Avg. Vel. (ft/s) | | 7.94 | |
| Max Chl Dpth (ft) | 9.11 | Hydr. Depth (ft) | | 4.96 | |
| Conv. Total (cfs) | 168705.6 | Conv. (cfs) | | 168705.6 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 278.49 | |
| Min Ch El (ft) | 1446.75 | Shear (lb/sq ft) | | 1.28 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 10.20 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

FLOW DISTRIBUTION OUTPUT  Profile #1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9857.22 | 9922.35 | 9.11 | 10.81 | 26.06 | 0.20 | 0.42 | 0.84 |
| 9922.35 | 9987.47 | 761.28 | 222.59 | 65.66 | 16.31 | 3.42 | 3.42 |
| 9987.47 | 10052.60 | 2683.51 | 472.49 | 65.13 | 57.50 | 7.26 | 5.68 |
| 10052.60 | RB 10117.72 | 1213.10 | 262.29 | 49.20 | 25.99 | 5.46 | 4.63 |

Note:  Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT  Profile #2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9792.10 | 9857.22 | 0.89 | 1.56 | 11.19 | 0.01 | 0.14 | 0.57 |
| 9857.22 | 9922.35 | 168.61 | 73.22 | 65.15 | 1.83 | 1.12 | 2.30 |
| 9922.35 | 9987.47 | 1798.88 | 303.99 | 65.66 | 19.55 | 4.67 | 5.92 |
| 9987.47 | 10052.60 | 4916.09 | 553.89 | 65.13 | 53.44 | 8.51 | 8.88 |
| 10052.60 | RB 10117.72 | 2315.53 | 324.68 | 53.00 | 25.17 | 6.29 | 7.13 |

FLOW DISTRIBUTION OUTPUT  Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9792.10 | 9857.22 | 11.40 | 10.08 | 28.49 | 0.10 | 0.35 | 1.13 |
| 9857.22 | 9922.35 | 306.85 | 101.22 | 65.15 | 2.82 | 1.55 | 3.03 |
| 9922.35 | 9987.47 | 2210.20 | 331.99 | 65.66 | 20.28 | 5.10 | 6.66 |
| 9987.47 | 10052.60 | 5661.99 | 581.89 | 65.13 | 51.94 | 8.94 | 9.73 |
| 10052.60 | RB 10117.72 | 2709.57 | 347.09 | 54.06 | 24.86 | 6.60 | 7.81 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 | n4 | n5 | n6 |
|---|---|---|---|---|---|---|---|
| Upper main | 20.000 | .05 | .04 | .05 | | | |
| Upper main | 19.903 | .05 | .04 | .05 | | | |
| Upper main | 19.790 | .05 | .04 | .05 | | | |
| Upper main | 19.655 | .05 | .04 | .05 | | | |
| Upper main | 19.539 | .05 | .045 | .05 | | | |
| Upper main | 19.331 | .055 | .045 | .055 | | | |
| Upper main | 19.151 | .06 | .045 | .06 | | | |
| Upper main | 18.708 | .06 | .045 | .06 | | | |
| Upper main | 18.012 | .06 | .045 | .06 | | | |
| Upper main | 17.907 | .035 | .03 | .035 | | | |
| Upper main | 17.882 | .035 | .035 | .03 | .035 | | |
| Upper main | 17.817 | .05 | .045 | .05 | | | |
| Upper main | 17.704 | .04 | .03 | .035 | .05 | .035 | .05 |
| Upper main | 17.576 | .05 | .035 | .05 | | | |
| Upper main | 17.471 | .05 | .035 | .05 | | | |
| Upper main | 17.319 | .05 | .035 | .05 | | | |
| Upper main | 17.190 | .05 | .035 | .05 | | | |
| Upper main | 17.055 | .05 | .035 | .05 | | | |
| Upper main | 16.904 | .05 | .035 | .05 | | | |
| Upper main | 16.733 | .05 | .035 | .05 | | | |
| Upper main | 16.563 | .05 | .035 | .05 | | | |
| Upper main | 16.557 | .05 | .035 | .05 | | | |
| Upper main | 16.548 | Bridge | | | | | |
| Upper main | 16.545 | .05 | .035 | .05 | | | |
| Upper main | 16.542 | .05 | .035 | .05 | | | |
| Upper main | 16.430 | .05 | .035 | .05 | | | |
| Upper main | 16.301 | .05 | .035 | .05 | | | |
| Upper main | 16.169 | .05 | .035 | .05 | | | |
| Upper main | 16.041 | .05 | .035 | .05 | | | |
| Upper main | 15.901 | .05 | .035 | .05 | | | |
| Upper main | 15.776 | .05 | .035 | .05 | | | |
| Upper main | 15.653 | .05 | .035 | .05 | | | |

| | | | | |
|---|---|---|---|---|
| Upper main | 15.523 | .05 | .035 | .05 |
| Upper main | 15.495 | .05 | .035 | .05 |
| Upper main | 15.392 | .05 | .035 | .05 |
| Upper main | 15.245 | .05 | .035 | .05 |
| Upper main | 15.120 | .05 | .035 | .05 |
| Upper main | 14.993 | .05 | .035 | .05 |
| Upper main | 14.833 | .05 | .035 | .05 |
| Upper main | 14.666 | .05 | .035 | .05 |
| Upper main | 14.512 | .05 | .035 | .05 |
| Upper main | 14.489 | .035 | .035 | .035 |
| Upper main | 14.479 | .05 | .035 | .05 |
| Upper main | 14.347 | .05 | .035 | .05 |
| Upper main | 14.207 | .05 | .035 | .05 |
| Upper main | 14.029 | .05 | .035 | .05 |
| Upper main | 13.870 | .05 | .035 | .05 |
| Upper main | 13.736 | .05 | .035 | .05 |
| Upper main | 13.539 | .05 | .035 | .05 |
| Upper main | 13.351 | .05 | .035 | .05 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Upper main | 20.000 | 1200 | 512.6 | 200 |
| Upper main | 19.903 | 760 | 598.31 | 600 |
| Upper main | 19.790 | 730 | 710.4 | 700 |
| Upper main | 19.655 | 730 | 610.8 | 610 |
| Upper main | 19.539 | 1200 | 1100.5 | 1140 |
| Upper main | 19.331 | 1780 | 948.8 | 1000 |
| Upper main | 19.151 | 450 | 2338.9 | 900 |
| Upper main | 18.708 | 4800 | 3678.3 | 3800 |
| Upper main | 18.012 | 1300 | 551.3 | 400 |
| Upper main | 17.907 | 150 | 134.8 | 200 |
| Upper main | 17.882 | 400 | 341.8 | 500 |
| Upper main | 17.817 | 650 | 597.3 | 660 |
| Upper main | 17.704 | 680 | 676 | 500 |
| Upper main | 17.576 | 560 | 553.2 | 1000 |
| Upper main | 17.471 | 780 | 803.3 | 800 |
| Upper main | 17.319 | 710 | 683 | 710 |
| Upper main | 17.190 | 700 | 708.5 | 720 |
| Upper main | 17.055 | 820 | 796.7 | 850 |
| Upper main | 16.904 | 960 | 907.5 | 910 |
| Upper main | 16.733 | 950 | 895.9 | 950 |
| Upper main | 16.563 | 40 | 32.8 | 40 |
| Upper main | 16.557 | 61.8 | 61.8 | 61.8 |
| Upper main | 16.548 | Bridge | | |
| Upper main | 16.545 | 20 | 15.8 | 20 |
| Upper main | 16.542 | 610 | 590.5 | 610 |
| Upper main | 16.430 | 650 | 684.1 | 700 |
| Upper main | 16.301 | 710 | 694.9 | 710 |
| Upper main | 16.169 | 700 | 676.2 | 700 |
| Upper main | 16.041 | 750 | 739.3 | 750 |
| Upper main | 15.901 | 670 | 657.5 | 670 |
| Upper main | 15.776 | 670 | 651.3 | 670 |
| Upper main | 15.653 | 600 | 684.9 | 770 |
| Upper main | 15.523 | 220 | 147.4 | 95 |
| Upper main | 15.495 | 560 | 547.5 | 560 |
| Upper main | 15.392 | 810 | 775.4 | 810 |
| Upper main | 15.245 | 660 | 659.6 | 660 |
| Upper main | 15.120 | 680 | 667.8 | 680 |
| Upper main | 14.993 | 870 | 849.5 | 870 |
| Upper main | 14.833 | 890 | 877.6 | 890 |
| Upper main | 14.666 | 850 | 815.8 | 850 |
| Upper main | 14.512 | 140 | 120.4 | 150 |
| Upper main | 14.489 | 55 | 52.7 | 55 |
| Upper main | 14.479 | 700 | 695.7 | 700 |
| Upper main | 14.347 | 800 | 740.2 | 800 |
| Upper main | 14.207 | 950 | 941.5 | 980 |
| Upper main | 14.029 | 840 | 838.6 | 840 |
| Upper main | 13.870 | 720 | 706.24 | 720 |
| Upper main | 13.736 | 1080 | 1040.5 | 1050 |

| | | | | |
|---|---|---|---|---|
| Upper main | 13.539 | 1000 | 993.9 | 1000 |
| Upper main | 13.351 | | | |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| Upper main | 20.000 | .1 | .3 |
| Upper main | 19.903 | .1 | .3 |
| Upper main | 19.790 | .1 | .3 |
| Upper main | 19.655 | .1 | .3 |
| Upper main | 19.539 | .1 | .3 |
| Upper main | 19.331 | .1 | .3 |
| Upper main | 19.151 | .1 | .3 |
| Upper main | 18.708 | .1 | .3 |
| Upper main | 18.012 | .3 | .5 |
| Upper main | 17.907 | .3 | .5 |
| Upper main | 17.882 | .1 | .3 |
| Upper main | 17.817 | .1 | .3 |
| Upper main | 17.704 | .1 | .3 |
| Upper main | 17.576 | .1 | .3 |
| Upper main | 17.471 | .1 | .3 |
| Upper main | 17.319 | .1 | .3 |
| Upper main | 17.190 | .1 | .3 |
| Upper main | 17.055 | .1 | .3 |
| Upper main | 16.904 | .1 | .3 |
| Upper main | 16.733 | .1 | .3 |
| Upper main | 16.563 | .3 | .5 |
| Upper main | 16.557 | .3 | .5 |
| Upper main | 16.548 | Bridge | |
| Upper main | 16.545 | .3 | .5 |
| Upper main | 16.542 | .1 | .3 |
| Upper main | 16.430 | .1 | .3 |
| Upper main | 16.301 | .1 | .3 |
| Upper main | 16.169 | .1 | .3 |
| Upper main | 16.041 | .1 | .3 |
| Upper main | 15.901 | .1 | .3 |
| Upper main | 15.776 | .1 | .3 |
| Upper main | 15.653 | .1 | .3 |
| Upper main | 15.523 | .1 | .3 |
| Upper main | 15.495 | .1 | .3 |
| Upper main | 15.392 | .1 | .3 |
| Upper main | 15.245 | .1 | .3 |
| Upper main | 15.120 | .1 | .3 |
| Upper main | 14.993 | .1 | .3 |
| Upper main | 14.833 | .1 | .3 |
| Upper main | 14.666 | .1 | .3 |
| Upper main | 14.512 | .1 | .3 |
| Upper main | 14.489 | .1 | .3 |
| Upper main | 14.479 | .1 | .3 |
| Upper main | 14.347 | .1 | .3 |
| Upper main | 14.207 | .1 | .3 |
| Upper main | 14.029 | .1 | .3 |
| Upper main | 13.870 | .1 | .3 |
| Upper main | 13.736 | .1 | .3 |
| Upper main | 13.539 | .1 | .3 |
| Upper main | 13.351 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 20.000 | 4667.00 | 1597.81 | 1601.65 | 1599.33 | 1601.72 | 0.000634 | 2.11 | 2210.61 | 651.15 | 0.20 |
| Upper main | 20.000 | 9333.00 | 1597.81 | 1602.82 | 1600.05 | 1602.97 | 0.000966 | 3.13 | 2984.65 | 669.06 | 0.26 |
| Upper main | 20.000 | 14000.00 | 1597.81 | 1603.68 | 1600.64 | 1603.92 | 0.001234 | 3.93 | 3565.35 | 688.94 | 0.30 |
| Upper main | 19.903 | 4667.00 | 1598.54 | 1600.81 | 1600.14 | 1601.00 | 0.004134 | 3.63 | 1402.61 | 893.19 | 0.47 |
| Upper main | 19.903 | 9333.00 | 1598.54 | 1601.62 | 1600.77 | 1601.95 | 0.004551 | 4.82 | 2196.49 | 1108.23 | 0.52 |
| Upper main | 19.903 | 14000.00 | 1598.54 | 1602.16 | 1601.27 | 1602.63 | 0.005363 | 5.88 | 2841.66 | 1295.53 | 0.58 |
| Upper main | 19.790 | 4667.00 | 1594.69 | 1596.21 | | 1596.66 | 0.015311 | 5.53 | 925.74 | 942.02 | 0.85 |
| Upper main | 19.790 | 9333.00 | 1594.69 | 1596.88 | 1596.81 | 1597.50 | 0.013019 | 6.70 | 1637.99 | 1158.64 | 0.84 |
| Upper main | 19.790 | 14000.00 | 1594.69 | 1597.51 | | 1598.16 | 0.009879 | 7.01 | 2418.25 | 1344.48 | 0.76 |
| Upper main | 19.655 | 4667.00 | 1589.81 | 1592.25 | | 1592.36 | 0.003120 | 2.86 | 1941.71 | 1605.70 | 0.40 |
| Upper main | 19.655 | 9333.00 | 1589.81 | 1592.92 | | 1593.09 | 0.003434 | 3.77 | 3062.15 | 1752.53 | 0.44 |
| Upper main | 19.655 | 14000.00 | 1589.81 | 1593.29 | | 1593.55 | 0.004357 | 4.70 | 3720.43 | 1829.43 | 0.51 |
| Upper main | 19.539 | 4667.00 | 1584.67 | 1587.34 | 1587.34 | 1587.83 | 0.027015 | 6.24 | 891.75 | 948.52 | 0.99 |
| Upper main | 19.539 | 9333.00 | 1584.67 | 1587.98 | | 1588.55 | 0.020253 | 7.10 | 1682.21 | 1470.50 | 0.92 |
| Upper main | 19.539 | 14000.00 | 1584.67 | 1588.71 | | 1589.17 | 0.011112 | 6.57 | 2866.79 | 1716.07 | 0.72 |
| Upper main | 19.331 | 4667.00 | 1578.94 | 1581.92 | 1581.01 | 1581.97 | 0.001833 | 2.16 | 2919.19 | 2307.50 | 0.28 |
| Upper main | 19.331 | 9333.00 | 1578.94 | 1582.55 | | 1582.64 | 0.002240 | 2.89 | 4546.99 | 2801.66 | 0.32 |
| Upper main | 19.331 | 14000.00 | 1578.94 | 1582.86 | | 1582.99 | 0.003089 | 3.67 | 5444.49 | 2999.01 | 0.38 |
| Upper main | 19.151 | 4667.00 | 1572.95 | 1575.15 | 1575.15 | 1575.56 | 0.034547 | 6.23 | 977.57 | 1429.22 | 1.09 |
| Upper main | 19.151 | 9333.00 | 1572.95 | 1575.87 | | 1576.17 | 0.016807 | 6.00 | 2549.00 | 3105.66 | 0.82 |
| Upper main | 19.151 | 14000.00 | 1572.95 | 1576.51 | | 1576.69 | 0.007436 | 4.94 | 4723.16 | 3671.05 | 0.58 |
| Upper main | 18.708 | 4667.00 | 1568.74 | 1575.19 | 1571.39 | 1575.20 | 0.000025 | 0.46 | 14930.12 | 4627.91 | 0.04 |
| Upper main | 18.708 | 9333.00 | 1568.74 | 1575.81 | | 1575.81 | 0.000057 | 0.76 | 17763.94 | 4630.17 | 0.06 |
| Upper main | 18.708 | 14000.00 | 1568.74 | 1576.27 | | 1576.28 | 0.000090 | 1.00 | 19911.00 | 4631.93 | 0.07 |
| Upper main | 18.012 | 4667.00 | 1562.92 | 1575.17 | 1566.35 | 1575.17 | 0.000002 | 0.23 | 25354.22 | 8321.36 | 0.01 |
| Upper main | 18.012 | 9333.00 | 1562.92 | 1575.74 | 1566.77 | 1575.75 | 0.000008 | 0.43 | 27097.99 | 8332.19 | 0.02 |
| Upper main | 18.012 | 14000.00 | 1562.92 | 1576.15 | 1567.19 | 1576.16 | 0.000015 | 0.61 | 28356.30 | 8339.96 | 0.03 |
| Upper main | 17.907 | 3160.00 | 1574.00 | 1575.10 | 1574.58 | 1575.15 | 0.001439 | 1.88 | 1813.90 | 2097.86 | 0.33 |
| Upper main | 17.907 | 7770.00 | 1574.00 | 1575.56 | 1574.99 | 1575.69 | 0.002256 | 3.03 | 2912.56 | 2572.50 | 0.44 |
| Upper main | 17.907 | 12400.00 | 1574.00 | 1575.87 | 1575.31 | 1576.07 | 0.002753 | 3.79 | 3705.26 | 2577.26 | 0.50 |
| Upper main | 17.882 | 3160.00 | 1574.00 | 1574.51 | 1574.51 | 1574.66 | 0.015782 | 3.19 | 1067.73 | 6655.98 | 0.93 |
| Upper main | 17.882 | 7770.00 | 1574.00 | 1574.76 | 1574.76 | 1575.01 | 0.013995 | 4.25 | 2001.11 | 6959.82 | 0.95 |
| Upper main | 17.882 | 12400.00 | 1574.00 | 1574.95 | 1574.95 | 1575.29 | 0.013470 | 4.98 | 2748.72 | 7187.37 | 0.98 |
| Upper main | 17.817 | 4667.00 | 1555.17 | 1562.08 | 1561.14 | 1562.21 | 0.005768 | 2.93 | 1598.72 | 1271.17 | 0.46 |
| Upper main | 17.817 | 9333.00 | 1555.17 | 1562.93 | 1561.97 | 1563.09 | 0.004748 | 3.32 | 2880.71 | 1805.34 | 0.44 |
| Upper main | 17.817 | 14000.00 | 1555.17 | 1563.46 | 1562.42 | 1563.65 | 0.004382 | 3.73 | 4105.15 | 2765.15 | 0.44 |
| Upper main | 17.704 | 4667.00 | 1551.52 | 1557.67 | | 1558.08 | 0.008091 | 5.24 | 914.90 | 608.65 | 0.72 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 17.704 | 9333.00 | 1551.52 | 1558.44 | | 1559.11 | 0.009273 | 6.74 | 1481.34 | 852.01 | 0.80 |
| Upper main | 17.704 | 14000.00 | 1551.52 | 1559.57 | | 1559.99 | 0.008660 | 5.45 | 2810.37 | 1843.24 | 0.66 |
| Upper main | 17.576 | 4667.00 | 1547.87 | 1553.68 | 1553.26 | 1554.16 | 0.004554 | 6.11 | 1060.83 | 728.70 | 0.61 |
| Upper main | 17.576 | 9333.00 | 1547.87 | 1554.86 | 1554.43 | 1555.37 | 0.003931 | 6.92 | 2231.05 | 1159.05 | 0.59 |
| Upper main | 17.576 | 14000.00 | 1547.87 | 1555.41 | 1555.06 | 1556.06 | 0.004683 | 8.16 | 2899.08 | 1267.74 | 0.66 |
| Upper main | 17.471 | 4667.00 | 1545.08 | 1549.89 | 1549.89 | 1550.38 | 0.007105 | 6.83 | 1165.41 | 1005.89 | 0.74 |
| Upper main | 17.471 | 9333.00 | 1545.08 | 1550.55 | 1550.47 | 1551.22 | 0.008390 | 8.53 | 1846.36 | 1031.62 | 0.83 |
| Upper main | 17.471 | 14000.00 | 1545.08 | 1551.46 | 1550.94 | 1552.03 | 0.005648 | 8.12 | 2798.75 | 1062.59 | 0.70 |
| Upper main | 17.319 | 4667.00 | 1538.02 | 1543.28 | 1541.25 | 1543.71 | 0.003593 | 4.06 | 914.64 | 253.52 | 0.50 |
| Upper main | 17.319 | 9333.00 | 1538.02 | 1544.73 | 1543.09 | 1545.43 | 0.006289 | 5.65 | 1422.39 | 475.18 | 0.67 |
| Upper main | 17.319 | 14000.00 | 1538.02 | 1545.41 | 1544.82 | 1546.44 | 0.008755 | 7.95 | 1725.93 | 535.12 | 0.83 |
| Upper main | 17.190 | 4667.00 | 1530.17 | 1538.16 | 1538.16 | 1539.20 | 0.014658 | 8.18 | 570.72 | 278.84 | 1.01 |
| Upper main | 17.190 | 9333.00 | 1530.17 | 1539.81 | 1539.81 | 1540.74 | 0.007251 | 8.10 | 1447.96 | 805.20 | 0.77 |
| Upper main | 17.190 | 14000.00 | 1530.17 | 1540.89 | | 1541.62 | 0.005470 | 7.57 | 2378.97 | 879.25 | 0.68 |
| Upper main | 17.055 | 4667.00 | 1521.25 | 1537.62 | 1531.85 | 1537.71 | 0.000227 | 2.31 | 2024.64 | 279.24 | 0.15 |
| Upper main | 17.055 | 9333.00 | 1521.25 | 1538.98 | 1533.18 | 1539.20 | 0.000508 | 3.86 | 2530.16 | 413.90 | 0.23 |
| Upper main | 17.055 | 14000.00 | 1521.25 | 1539.96 | 1534.25 | 1540.36 | 0.000771 | 5.11 | 2981.42 | 472.74 | 0.29 |
| Upper main | 16.904 | 4667.00 | 1529.78 | 1537.08 | 1536.40 | 1537.24 | 0.003220 | 3.79 | 1525.42 | 755.20 | 0.47 |
| Upper main | 16.904 | 9333.00 | 1529.78 | 1538.05 | 1536.89 | 1538.33 | 0.003516 | 4.95 | 2293.81 | 828.93 | 0.52 |
| Upper main | 16.904 | 14000.00 | 1529.78 | 1538.77 | 1537.31 | 1539.17 | 0.003763 | 5.94 | 2890.54 | 836.57 | 0.56 |
| Upper main | 16.733 | 4667.00 | 1524.51 | 1531.10 | 1530.95 | 1532.10 | 0.011821 | 8.06 | 579.05 | 248.39 | 0.93 |
| Upper main | 16.733 | 9333.00 | 1524.51 | 1532.73 | 1532.73 | 1533.85 | 0.007137 | 8.79 | 1301.78 | 683.18 | 0.79 |
| Upper main | 16.733 | 14000.00 | 1524.51 | 1533.74 | 1533.47 | 1534.86 | 0.005932 | 9.25 | 1995.45 | 692.41 | 0.74 |
| Upper main | 16.563 | 4667.00 | 1520.84 | 1527.75 | 1525.49 | 1528.06 | 0.002195 | 4.46 | 1046.19 | 426.88 | 0.43 |
| Upper main | 16.563 | 9333.00 | 1520.84 | 1530.01 | 1527.42 | 1530.45 | 0.001596 | 5.35 | 1744.60 | 832.46 | 0.40 |
| Upper main | 16.563 | 14000.00 | 1520.84 | 1531.82 | 1528.34 | 1532.39 | 0.001421 | 6.08 | 2303.95 | 2120.44 | 0.39 |
| Upper main | 16.557 | 4667.00 | 1517.57 | 1527.54 | 1524.68 | 1527.95 | 0.002083 | 5.16 | 903.87 | 202.75 | 0.43 |
| Upper main | 16.557 | 9333.00 | 1517.57 | 1529.48 | 1527.10 | 1530.28 | 0.002552 | 7.18 | 1300.79 | 207.18 | 0.50 |
| Upper main | 16.557 | 14000.00 | 1517.57 | 1530.97 | 1528.37 | 1532.14 | 0.002830 | 8.70 | 1614.70 | 568.78 | 0.55 |
| Upper main | 16.548 | Bridge | | | | | | | | | |
| Upper main | 16.545 | 4667.00 | 1518.40 | 1527.02 | 1525.36 | 1527.65 | 0.003955 | 6.41 | 728.28 | 193.55 | 0.58 |
| Upper main | 16.545 | 9333.00 | 1518.40 | 1528.63 | 1527.48 | 1529.83 | 0.005018 | 8.81 | 1059.31 | 331.79 | 0.69 |
| Upper main | 16.545 | 14000.00 | 1518.40 | 1529.58 | 1528.71 | 1531.51 | 0.006440 | 11.13 | 1258.39 | 436.19 | 0.80 |
| Upper main | 16.542 | 4667.00 | 1520.39 | 1526.94 | 1525.60 | 1527.58 | 0.004343 | 6.44 | 724.13 | 205.13 | 0.60 |
| Upper main | 16.542 | 9333.00 | 1520.39 | 1528.58 | 1527.46 | 1529.73 | 0.005088 | 8.59 | 1085.86 | 248.62 | 0.69 |
| Upper main | 16.542 | 14000.00 | 1520.39 | 1529.55 | 1528.68 | 1531.34 | 0.006207 | 10.73 | 1304.77 | 335.84 | 0.79 |
| Upper main | 16.430 | 4667.00 | 1517.05 | 1523.49 | | 1524.26 | 0.007527 | 7.03 | 663.78 | 248.86 | 0.76 |
| Upper main | 16.430 | 9333.00 | 1517.05 | 1524.99 | | 1526.01 | 0.007830 | 8.12 | 1149.11 | 358.02 | 0.80 |
| Upper main | 16.430 | 14000.00 | 1517.05 | 1525.94 | 1525.56 | 1527.24 | 0.007230 | 9.21 | 1653.45 | 727.79 | 0.80 |
| Upper main | 16.301 | 4667.00 | 1513.56 | 1519.56 | 1518.86 | 1520.01 | 0.005001 | 5.39 | 866.63 | 399.82 | 0.61 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 16.301 | 9333.00 | 1513.56 | 1520.75 | 1519.89 | 1521.55 | 0.005361 | 7.21 | 1294.10 | 559.30 | 0.67 |
| Upper main | 16.301 | 14000.00 | 1513.56 | 1521.66 | 1520.75 | 1522.81 | 0.005696 | 8.60 | 1627.90 | 991.56 | 0.72 |
| Upper main | 16.169 | 4667.00 | 1510.00 | 1514.30 | 1514.15 | 1514.93 | 0.011597 | 6.36 | 734.11 | 445.06 | 0.87 |
| Upper main | 16.169 | 9333.00 | 1510.00 | 1515.17 | 1515.04 | 1516.24 | 0.011567 | 8.32 | 1121.48 | 488.29 | 0.93 |
| Upper main | 16.169 | 14000.00 | 1510.00 | 1515.87 | 1515.79 | 1517.33 | 0.011449 | 9.71 | 1442.10 | 538.60 | 0.96 |
| Upper main | 16.041 | 4667.00 | 1504.81 | 1510.18 | 1509.43 | 1510.49 | 0.004069 | 4.51 | 1034.40 | 478.33 | 0.54 |
| Upper main | 16.041 | 9333.00 | 1504.81 | 1511.35 | 1510.29 | 1511.88 | 0.003878 | 5.85 | 1595.72 | 481.45 | 0.57 |
| Upper main | 16.041 | 14000.00 | 1504.81 | 1512.33 | 1510.99 | 1513.04 | 0.003700 | 6.76 | 2069.77 | 519.29 | 0.58 |
| Upper main | 15.901 | 4667.00 | 1499.17 | 1504.29 | 1504.29 | 1505.30 | 0.014390 | 8.06 | 578.73 | 287.44 | 1.00 |
| Upper main | 15.901 | 9333.00 | 1499.17 | 1505.51 | 1505.51 | 1507.05 | 0.012402 | 9.95 | 938.31 | 303.95 | 1.00 |
| Upper main | 15.901 | 14000.00 | 1499.17 | 1506.48 | 1506.48 | 1508.47 | 0.011350 | 11.33 | 1235.66 | 307.63 | 1.00 |
| Upper main | 15.776 | 4667.00 | 1489.24 | 1500.94 | 1492.17 | 1500.98 | 0.000165 | 1.57 | 2979.97 | 606.02 | 0.12 |
| Upper main | 15.776 | 9333.00 | 1489.24 | 1503.71 | 1493.59 | 1503.77 | 0.000157 | 1.97 | 4734.58 | 655.33 | 0.13 |
| Upper main | 15.776 | 14000.00 | 1489.24 | 1505.56 | 1494.74 | 1505.65 | 0.000172 | 2.35 | 5969.30 | 718.14 | 0.14 |
| Upper main | 15.653 | 4667.00 | 1490.00 | 1500.94 | 1491.38 | 1500.95 | 0.000016 | 0.82 | 5702.74 | 538.03 | 0.04 |
| Upper main | 15.653 | 9333.00 | 1490.00 | 1503.70 | 1492.19 | 1503.73 | 0.000031 | 1.30 | 7200.48 | 546.43 | 0.06 |
| Upper main | 15.653 | 14000.00 | 1490.00 | 1505.54 | 1492.86 | 1505.58 | 0.000049 | 1.70 | 8242.98 | 918.93 | 0.08 |
| Upper main | 15.523 | 4667.00 | 1492.88 | 1499.91 | | 1500.82 | 0.003501 | 7.65 | 610.21 | 111.41 | 0.58 |
| Upper main | 15.523 | 9333.00 | 1492.88 | 1501.08 | 1501.08 | 1503.42 | 0.011001 | 12.27 | 760.80 | 162.38 | 1.00 |
| Upper main | 15.523 | 14000.00 | 1492.88 | 1503.03 | 1503.03 | 1505.25 | 0.010839 | 11.97 | 1176.85 | 296.33 | 0.99 |
| Upper main | 15.495 | 4667.00 | 1494.24 | 1499.87 | 1498.20 | 1500.20 | 0.002664 | 4.63 | 1008.26 | 327.65 | 0.47 |
| Upper main | 15.495 | 9333.00 | 1494.24 | 1501.68 | 1499.66 | 1502.14 | 0.002537 | 5.45 | 1711.46 | 470.79 | 0.48 |
| Upper main | 15.495 | 14000.00 | 1494.24 | 1502.80 | 1500.74 | 1503.43 | 0.002651 | 6.38 | 2195.73 | 912.95 | 0.50 |
| Upper main | 15.392 | 4667.00 | 1490.69 | 1498.35 | 1496.03 | 1498.72 | 0.002721 | 4.89 | 953.50 | 287.00 | 0.47 |
| Upper main | 15.392 | 9333.00 | 1490.69 | 1499.91 | 1498.21 | 1500.55 | 0.003278 | 6.42 | 1469.10 | 594.48 | 0.54 |
| Upper main | 15.392 | 14000.00 | 1490.69 | 1500.77 | 1499.32 | 1501.67 | 0.003820 | 7.75 | 2024.71 | 1225.24 | 0.60 |
| Upper main | 15.245 | 4667.00 | 1485.72 | 1493.56 | 1493.56 | 1494.56 | 0.014379 | 8.03 | 581.38 | 288.29 | 1.00 |
| Upper main | 15.245 | 9333.00 | 1485.72 | 1494.93 | 1494.80 | 1496.20 | 0.011287 | 9.02 | 1035.12 | 359.85 | 0.94 |
| Upper main | 15.245 | 14000.00 | 1485.72 | 1496.11 | 1495.80 | 1497.48 | 0.008010 | 9.46 | 1593.62 | 712.53 | 0.83 |
| Upper main | 15.120 | 4667.00 | 1485.07 | 1491.02 | 1489.22 | 1491.31 | 0.001844 | 4.35 | 1071.85 | 287.02 | 0.40 |
| Upper main | 15.120 | 9333.00 | 1485.07 | 1493.03 | 1490.47 | 1493.51 | 0.001829 | 5.55 | 1744.79 | 507.84 | 0.42 |
| Upper main | 15.120 | 14000.00 | 1485.07 | 1494.15 | 1491.48 | 1494.82 | 0.002132 | 6.67 | 2530.11 | 1132.99 | 0.47 |
| Upper main | 14.993 | 4667.00 | 1481.39 | 1488.56 | 1487.77 | 1489.27 | 0.005696 | 6.88 | 714.97 | 238.10 | 0.68 |
| Upper main | 14.993 | 9333.00 | 1481.39 | 1489.79 | 1489.29 | 1491.18 | 0.008001 | 9.71 | 1016.51 | 256.33 | 0.84 |
| Upper main | 14.993 | 14000.00 | 1481.39 | 1491.18 | 1491.18 | 1492.52 | 0.005915 | 9.93 | 1971.89 | 1086.58 | 0.75 |
| Upper main | 14.833 | 4667.00 | 1479.62 | 1482.98 | 1482.55 | 1483.68 | 0.007622 | 6.70 | 696.12 | 284.61 | 0.76 |
| Upper main | 14.833 | 9333.00 | 1479.62 | 1484.74 | 1483.76 | 1485.67 | 0.005130 | 7.77 | 1200.76 | 417.88 | 0.67 |
| Upper main | 14.833 | 14000.00 | 1479.62 | 1486.10 | 1484.78 | 1487.29 | 0.004542 | 8.74 | 1607.46 | 538.57 | 0.66 |
| Upper main | 14.666 | 4667.00 | 1475.30 | 1482.21 | 1478.58 | 1482.35 | 0.000528 | 3.01 | 1551.16 | 283.16 | 0.23 |
| Upper main | 14.666 | 9333.00 | 1475.30 | 1482.91 | 1479.83 | 1483.35 | 0.001453 | 5.33 | 1751.34 | 289.23 | 0.38 |
| Upper main | 14.666 | 14000.00 | 1475.30 | 1483.38 | 1480.89 | 1484.24 | 0.002583 | 7.41 | 1889.50 | 355.19 | 0.51 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 14.512 | 4667.00 | 1475.30 | 1482.05 | 1478.31 | 1482.08 | 0.000180 | 1.65 | 4866.56 | 2301.87 | 0.13 |
| Upper main | 14.512 | 9333.00 | 1475.30 | 1482.61 | 1479.46 | 1482.68 | 0.000396 | 2.63 | 6161.47 | 2365.54 | 0.20 |
| Upper main | 14.512 | 14000.00 | 1475.30 | 1482.97 | 1481.14 | 1483.08 | 0.000634 | 3.47 | 7014.43 | 2407.27 | 0.25 |
| Upper main | 14.489 | 2730.00 | 1480.75 | 1481.77 | 1481.77 | 1482.01 | 0.011005 | 4.36 | 793.95 | 1801.68 | 0.78 |
| Upper main | 14.489 | 7260.00 | 1480.75 | 1482.23 | 1482.23 | 1482.53 | 0.010196 | 5.40 | 1956.38 | 2979.65 | 0.80 |
| Upper main | 14.489 | 11900.00 | 1480.75 | 1482.48 | 1482.48 | 1482.85 | 0.010674 | 6.16 | 2716.83 | 3092.05 | 0.84 |
| Upper main | 14.479 | 4667.00 | 1474.66 | 1477.47 | 1478.45 | 1480.40 | 0.053113 | 13.72 | 340.14 | 204.40 | 1.87 |
| Upper main | 14.479 | 9200.00 | 1474.66 | 1480.50 | 1479.73 | 1481.48 | 0.006348 | 7.93 | 1159.69 | 321.76 | 0.74 |
| Upper main | 14.479 | 10900.00 | 1474.66 | 1480.89 | 1480.16 | 1482.01 | 0.006360 | 8.48 | 1284.95 | 322.60 | 0.75 |
| Upper main | 14.347 | 4667.00 | 1470.54 | 1475.59 | 1474.87 | 1476.08 | 0.004923 | 5.59 | 835.59 | 324.44 | 0.61 |
| Upper main | 14.347 | 9200.00 | 1470.54 | 1477.09 | 1475.94 | 1477.83 | 0.004245 | 6.94 | 1326.07 | 332.25 | 0.61 |
| Upper main | 14.347 | 10900.00 | 1470.54 | 1477.56 | 1476.29 | 1478.40 | 0.004127 | 7.34 | 1485.25 | 504.34 | 0.61 |
| Upper main | 14.207 | 4667.00 | 1467.01 | 1473.06 | 1471.64 | 1473.41 | 0.002685 | 4.73 | 987.01 | 312.32 | 0.47 |
| Upper main | 14.207 | 9200.00 | 1467.01 | 1474.66 | 1472.85 | 1475.24 | 0.002840 | 6.10 | 1511.43 | 722.27 | 0.51 |
| Upper main | 14.207 | 10900.00 | 1467.01 | 1475.16 | 1473.27 | 1475.81 | 0.002894 | 6.49 | 1684.56 | 764.55 | 0.52 |
| Upper main | 14.029 | 4667.00 | 1464.38 | 1469.73 | 1468.87 | 1470.20 | 0.004424 | 5.51 | 846.58 | 308.74 | 0.59 |
| Upper main | 14.029 | 9200.00 | 1464.38 | 1471.17 | 1470.02 | 1471.95 | 0.004339 | 7.06 | 1302.37 | 322.38 | 0.62 |
| Upper main | 14.029 | 10900.00 | 1464.38 | 1471.67 | 1470.39 | 1472.53 | 0.004215 | 7.45 | 1462.29 | 326.66 | 0.62 |
| Upper main | 13.870 | 4667.00 | 1461.21 | 1466.63 | 1465.49 | 1467.03 | 0.003229 | 5.07 | 920.49 | 299.19 | 0.51 |
| Upper main | 13.870 | 9200.00 | 1461.21 | 1468.46 | 1466.63 | 1469.07 | 0.002700 | 6.24 | 1474.69 | 306.18 | 0.50 |
| Upper main | 13.870 | 10900.00 | 1461.21 | 1468.99 | 1467.00 | 1469.68 | 0.002705 | 6.66 | 1636.57 | 308.19 | 0.51 |
| Upper main | 13.736 | 4667.00 | 1459.59 | 1464.57 | 1463.04 | 1464.97 | 0.002650 | 5.03 | 926.98 | 264.60 | 0.47 |
| Upper main | 13.736 | 9200.00 | 1459.59 | 1466.53 | 1464.40 | 1467.12 | 0.002802 | 6.17 | 1490.99 | 326.90 | 0.51 |
| Upper main | 13.736 | 10900.00 | 1459.59 | 1467.05 | 1464.83 | 1467.71 | 0.002847 | 6.56 | 1662.46 | 336.81 | 0.52 |
| Upper main | 13.539 | 4667.00 | 1453.74 | 1458.25 | 1458.25 | 1459.70 | 0.012536 | 9.66 | 483.09 | 165.40 | 1.00 |
| Upper main | 13.539 | 9200.00 | 1453.74 | 1460.25 | 1459.98 | 1462.08 | 0.009533 | 10.86 | 847.09 | 197.83 | 0.92 |
| Upper main | 13.539 | 10900.00 | 1453.74 | 1460.97 | 1460.54 | 1462.84 | 0.008492 | 10.97 | 993.78 | 209.59 | 0.89 |
| Upper main | 13.351 | 4667.00 | 1446.75 | 1454.18 | 1450.88 | 1454.54 | 0.001638 | 4.82 | 968.18 | 204.34 | 0.39 |
| Upper main | 13.351 | 9200.00 | 1446.75 | 1455.43 | 1453.08 | 1456.26 | 0.003635 | 7.32 | 1257.35 | 258.21 | 0.58 |
| Upper main | 13.351 | 10900.00 | 1446.75 | 1455.86 | 1453.75 | 1456.84 | 0.004174 | 7.94 | 1372.28 | 276.46 | 0.63 |

Profile Output Table - Standard Table 2

| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 20.000 | 1601.72 | 1601.65 | 0.07 | 0.71 | 0.01 | | 4667.00 | | 651.15 |
| Upper main | 20.000 | 1602.97 | 1602.82 | 0.15 | 1.00 | 0.02 | | 9333.00 | | 669.06 |
| Upper main | 20.000 | 1603.92 | 1603.68 | 0.24 | 1.27 | 0.02 | | 13999.98 | 0.01 | 688.94 |
| Upper main | 19.903 | 1601.00 | 1600.81 | 0.19 | 4.31 | 0.03 | 375.39 | 4291.60 | | 893.19 |
| Upper main | 19.903 | 1601.95 | 1601.62 | 0.33 | 4.42 | 0.03 | 1143.92 | 8189.08 | | 1108.23 |
| Upper main | 19.903 | 1602.63 | 1602.16 | 0.47 | 4.45 | 0.02 | 1999.13 | 12000.83 | 0.05 | 1295.53 |

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|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 19.790 | 1596.66 | 1596.21 | 0.45 | 4.19 | 0.10 | 235.06 | 4431.94 | | 942.02 |
| Upper main | 19.790 | 1597.50 | 1596.88 | 0.62 | 4.27 | 0.13 | 1227.54 | 8105.46 | | 1158.64 |
| Upper main | 19.790 | 1598.16 | 1597.51 | 0.65 | 4.49 | 0.11 | 2815.86 | 11184.14 | | 1344.48 |
| Upper main | 19.655 | 1592.36 | 1592.25 | 0.11 | 4.49 | 0.04 | 1191.31 | 3475.66 | 0.03 | 1605.70 |
| Upper main | 19.655 | 1593.09 | 1592.92 | 0.17 | 4.50 | 0.04 | 2853.96 | 6478.04 | 1.00 | 1752.53 |
| Upper main | 19.655 | 1593.55 | 1593.29 | 0.27 | 4.37 | 0.02 | 4640.22 | 9357.03 | 2.76 | 1829.43 |
| Upper main | 19.539 | 1587.83 | 1587.34 | 0.49 | 5.24 | 0.13 | 1514.40 | 3152.60 | | 948.52 |
| Upper main | 19.539 | 1588.55 | 1587.98 | 0.57 | 5.77 | 0.15 | 3910.89 | 5422.11 | | 1470.50 |
| Upper main | 19.539 | 1589.17 | 1588.71 | 0.45 | 6.08 | 0.10 | 6984.81 | 7013.94 | 1.24 | 1716.07 |
| Upper main | 19.331 | 1581.97 | 1581.92 | 0.05 | 6.38 | 0.04 | 1640.96 | 2649.68 | 376.36 | 2307.50 |
| Upper main | 19.331 | 1582.64 | 1582.55 | 0.09 | 6.44 | 0.02 | 3510.03 | 4726.51 | 1096.46 | 2801.66 |
| Upper main | 19.331 | 1582.99 | 1582.86 | 0.13 | 6.30 | 0.01 | 5394.85 | 6732.77 | 1872.38 | 2999.01 |
| Upper main | 19.151 | 1575.56 | 1575.15 | 0.41 | 0.13 | 0.12 | 2483.41 | 2160.56 | 23.03 | 1429.22 |
| Upper main | 19.151 | 1576.17 | 1575.87 | 0.30 | 0.27 | 0.09 | 5489.89 | 3623.23 | 219.89 | 3105.66 |
| Upper main | 19.151 | 1576.69 | 1576.51 | 0.19 | 0.36 | 0.05 | 8907.35 | 4129.14 | 963.51 | 3671.05 |
| Upper main | 18.708 | 1575.20 | 1575.19 | 0.00 | 0.02 | 0.00 | 510.28 | 2133.12 | 2023.60 | 4627.91 |
| Upper main | 18.708 | 1575.81 | 1575.81 | 0.01 | 0.07 | 0.00 | 1117.87 | 3990.25 | 4224.88 | 4630.17 |
| Upper main | 18.708 | 1576.28 | 1576.27 | 0.01 | 0.12 | 0.00 | 1762.53 | 5748.13 | 6489.34 | 4631.93 |
| Upper main | 18.012 | 1575.17 | 1575.17 | 0.00 | 0.00 | 0.02 | 1192.77 | 2633.41 | 840.82 | 8321.36 |
| Upper main | 18.012 | 1575.75 | 1575.74 | 0.00 | 0.02 | 0.04 | 2418.52 | 5216.24 | 1698.24 | 8332.19 |
| Upper main | 18.012 | 1576.16 | 1576.15 | 0.00 | 0.03 | 0.06 | 3660.39 | 7775.95 | 2563.66 | 8339.96 |
| Upper main | 17.907 | 1575.15 | 1575.10 | 0.05 | 0.47 | 0.03 | 305.87 | 2854.13 | | 2097.86 |
| Upper main | 17.907 | 1575.69 | 1575.56 | 0.13 | 0.64 | 0.04 | 1072.21 | 6697.79 | | 2572.50 |
| Upper main | 17.907 | 1576.07 | 1575.87 | 0.20 | 0.74 | 0.04 | 2237.05 | 10162.95 | | 2577.26 |
| Upper main | 17.882 | 1574.66 | 1574.51 | 0.15 | 2.95 | 0.00 | 230.55 | 2794.28 | 135.17 | 6655.98 |
| Upper main | 17.882 | 1575.01 | 1574.76 | 0.25 | 2.63 | 0.03 | 768.25 | 6253.37 | 748.38 | 6959.82 |
| Upper main | 17.882 | 1575.29 | 1574.95 | 0.34 | 2.52 | 0.04 | 1431.65 | 9540.95 | 1427.40 | 7187.37 |
| Upper main | 17.817 | 1562.21 | 1562.08 | 0.14 | 4.10 | 0.03 | 189.87 | 3790.48 | 686.65 | 1271.17 |
| Upper main | 17.817 | 1563.09 | 1562.93 | 0.16 | 3.93 | 0.05 | 621.73 | 7648.68 | 1062.59 | 1805.34 |
| Upper main | 17.817 | 1563.65 | 1563.46 | 0.19 | 3.64 | 0.02 | 995.74 | 11231.31 | 1772.95 | 2765.15 |
| Upper main | 17.704 | 1558.08 | 1557.67 | 0.42 | 3.91 | 0.01 | 65.86 | 4537.56 | 63.58 | 608.65 |
| Upper main | 17.704 | 1559.11 | 1558.44 | 0.67 | 3.70 | 0.05 | 272.95 | 8766.62 | 293.43 | 852.01 |
| Upper main | 17.704 | 1559.99 | 1559.57 | 0.42 | 3.91 | 0.02 | 980.63 | 11560.41 | 1458.96 | 1843.24 |
| Upper main | 17.576 | 1554.16 | 1553.68 | 0.48 | 3.78 | 0.00 | | 3803.72 | 863.28 | 728.70 |
| Upper main | 17.576 | 1555.37 | 1554.86 | 0.51 | 4.13 | 0.02 | | 5928.51 | 3404.49 | 1159.05 |
| Upper main | 17.576 | 1556.06 | 1555.41 | 0.65 | 4.01 | 0.03 | 18.38 | 7896.12 | 6085.50 | 1267.74 |
| Upper main | 17.471 | 1550.38 | 1549.89 | 0.50 | 3.93 | 0.02 | | 3034.17 | 1632.83 | 1005.89 |
| Upper main | 17.471 | 1551.22 | 1550.55 | 0.67 | 5.79 | 0.00 | | 4738.78 | 4594.22 | 1031.62 |
| Upper main | 17.471 | 1552.03 | 1551.46 | 0.56 | 5.54 | 0.05 | | 5769.65 | 8230.35 | 1062.59 |
| Upper main | 17.319 | 1543.71 | 1543.28 | 0.43 | 4.45 | 0.06 | | 1203.66 | 3463.34 | 253.52 |

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|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 17.319 | 1545.43 | 1544.73 | 0.70 | 4.67 | 0.02 | | 3575.66 | 5757.34 | 475.18 |
| Upper main | 17.319 | 1546.44 | 1545.41 | 1.02 | 4.73 | 0.09 | | 6592.75 | 7407.25 | 535.12 |
| Upper main | 17.190 | 1539.20 | 1538.16 | 1.04 | 0.51 | 0.29 | | 4667.00 | | 278.84 |
| Upper main | 17.190 | 1540.74 | 1539.81 | 0.93 | 0.90 | 0.21 | | 8442.06 | 890.94 | 805.20 |
| Upper main | 17.190 | 1541.62 | 1540.89 | 0.73 | 1.16 | 0.10 | | 10833.74 | 3166.26 | 879.25 |
| Upper main | 17.055 | 1537.71 | 1537.62 | 0.08 | 0.46 | 0.01 | 0.12 | 4666.88 | | 279.24 |
| Upper main | 17.055 | 1539.20 | 1538.98 | 0.23 | 0.87 | 0.00 | 8.27 | 9245.59 | 79.15 | 413.90 |
| Upper main | 17.055 | 1540.36 | 1539.96 | 0.40 | 1.19 | 0.00 | 54.81 | 13633.41 | 311.78 | 472.74 |
| Upper main | 16.904 | 1537.24 | 1537.08 | 0.16 | 5.05 | 0.09 | | 1892.77 | 2774.23 | 755.20 |
| Upper main | 16.904 | 1538.33 | 1538.05 | 0.28 | 4.39 | 0.08 | 11.49 | 3757.49 | 5564.03 | 828.93 |
| Upper main | 16.904 | 1539.17 | 1538.77 | 0.40 | 4.24 | 0.07 | 89.10 | 5668.13 | 8242.77 | 836.57 |
| Upper main | 16.733 | 1532.10 | 1531.10 | 1.01 | 3.83 | 0.21 | | 4667.00 | | 248.39 |
| Upper main | 16.733 | 1533.85 | 1532.73 | 1.12 | 2.64 | 0.20 | | 8700.98 | 632.02 | 683.18 |
| Upper main | 16.733 | 1534.86 | 1533.74 | 1.12 | 2.31 | 0.17 | | 11550.87 | 2449.13 | 692.41 |
| Upper main | 16.563 | 1528.06 | 1527.75 | 0.31 | 0.07 | 0.03 | | 4667.00 | | 426.88 |
| Upper main | 16.563 | 1530.45 | 1530.01 | 0.44 | 0.07 | 0.11 | | 9333.00 | | 832.46 |
| Upper main | 16.563 | 1532.39 | 1531.82 | 0.57 | 0.06 | 0.18 | | 14000.00 | | 2120.44 |
| Upper main | 16.557 | 1527.95 | 1527.54 | 0.41 | 0.04 | 0.01 | | 4667.00 | | 202.75 |
| Upper main | 16.557 | 1530.28 | 1529.48 | 0.80 | 0.06 | 0.03 | | 9332.85 | 0.15 | 207.18 |
| Upper main | 16.557 | 1532.14 | 1530.97 | 1.18 | 0.07 | 0.04 | 3.09 | 13990.43 | 6.48 | 568.78 |
| Upper main | 16.548 | Bridge | | | | | | | | |
| Upper main | 16.545 | 1527.65 | 1527.02 | 0.64 | 0.07 | 0.00 | | 4667.00 | | 193.55 |
| Upper main | 16.545 | 1529.83 | 1528.63 | 1.21 | 0.08 | 0.03 | | 9333.00 | | 331.79 |
| Upper main | 16.545 | 1531.51 | 1529.58 | 1.92 | 0.10 | 0.07 | 0.82 | 13999.18 | | 436.19 |
| Upper main | 16.542 | 1527.58 | 1526.94 | 0.64 | 3.31 | 0.01 | | 4667.00 | | 205.13 |
| Upper main | 16.542 | 1529.73 | 1528.58 | 1.15 | 3.67 | 0.04 | | 9333.00 | | 248.62 |
| Upper main | 16.542 | 1531.34 | 1529.55 | 1.79 | 3.95 | 0.15 | | 14000.00 | | 335.84 |
| Upper main | 16.430 | 1524.26 | 1523.49 | 0.77 | 4.15 | 0.10 | | 4667.00 | | 248.86 |
| Upper main | 16.430 | 1526.01 | 1524.99 | 1.02 | 4.39 | 0.06 | | 9333.00 | | 358.02 |
| Upper main | 16.430 | 1527.24 | 1525.94 | 1.30 | 4.39 | 0.05 | | 13766.41 | 233.59 | 727.79 |
| Upper main | 16.301 | 1520.01 | 1519.56 | 0.45 | 5.06 | 0.02 | | 4667.00 | | 399.82 |
| Upper main | 16.301 | 1521.55 | 1520.75 | 0.81 | 5.29 | 0.03 | | 9333.00 | | 559.30 |
| Upper main | 16.301 | 1522.81 | 1521.66 | 1.15 | 5.45 | 0.03 | | 14000.00 | | 991.56 |
| Upper main | 16.169 | 1514.93 | 1514.30 | 0.63 | 4.34 | 0.09 | | 4667.00 | | 445.06 |
| Upper main | 16.169 | 1516.24 | 1515.17 | 1.08 | 4.20 | 0.16 | | 9333.00 | | 488.29 |
| Upper main | 16.169 | 1517.33 | 1515.87 | 1.46 | 4.07 | 0.23 | | 14000.00 | | 538.60 |
| Upper main | 16.041 | 1510.49 | 1510.18 | 0.32 | 5.13 | 0.07 | | 4667.00 | | 478.33 |
| Upper main | 16.041 | 1511.88 | 1511.35 | 0.53 | 4.73 | 0.10 | | 9333.00 | | 481.45 |
| Upper main | 16.041 | 1513.04 | 1512.33 | 0.71 | 4.44 | 0.13 | | 14000.00 | | 519.29 |
| Upper main | 15.901 | 1505.30 | 1504.29 | 1.01 | 0.35 | 0.29 | | 4667.00 | | 287.44 |

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|---|---|---|---|---|---|---|---|---|---|---|
| Upper main | 15.901 | 1507.05 | 1505.51 | 1.54 | 0.33 | 0.44 | | 9333.00 | | 303.95 |
| Upper main | 15.901 | 1508.47 | 1506.48 | 1.99 | 0.36 | 0.57 | | 14000.00 | | 307.63 |
| Upper main | 15.776 | 1500.98 | 1500.94 | 0.04 | 0.02 | 0.01 | | 4667.00 | | 606.02 |
| Upper main | 15.776 | 1503.77 | 1503.71 | 0.06 | 0.04 | 0.01 | | 9333.00 | | 655.33 |
| Upper main | 15.776 | 1505.65 | 1505.56 | 0.09 | 0.05 | 0.01 | | 14000.00 | | 718.14 |
| Upper main | 15.653 | 1500.95 | 1500.94 | 0.01 | 0.04 | 0.09 | | 4667.00 | | 538.03 |
| Upper main | 15.653 | 1503.73 | 1503.70 | 0.03 | 0.08 | 0.23 | | 9333.00 | | 546.43 |
| Upper main | 15.653 | 1505.58 | 1505.54 | 0.04 | 0.12 | 0.22 | | 14000.00 | | 918.93 |
| Upper main | 15.523 | 1500.82 | 1499.91 | 0.91 | 0.45 | 0.17 | | 4667.00 | | 111.41 |
| Upper main | 15.523 | 1503.42 | 1501.08 | 2.34 | | | | 9333.00 | | 162.38 |
| Upper main | 15.523 | 1505.25 | 1503.03 | 2.22 | 0.70 | 0.48 | 6.50 | 13991.16 | 2.34 | 296.33 |
| Upper main | 15.495 | 1500.20 | 1499.87 | 0.33 | 1.47 | 0.00 | | 4667.00 | | 327.65 |
| Upper main | 15.495 | 1502.14 | 1501.68 | 0.46 | 1.58 | 0.02 | | 9333.00 | | 470.79 |
| Upper main | 15.495 | 1503.43 | 1502.80 | 0.63 | 1.73 | 0.03 | | 14000.00 | | 912.95 |
| Upper main | 15.392 | 1498.72 | 1498.35 | 0.37 | 4.10 | 0.06 | | 4667.00 | | 287.00 |
| Upper main | 15.392 | 1500.55 | 1499.91 | 0.64 | 4.29 | 0.06 | | 9328.85 | 4.15 | 594.48 |
| Upper main | 15.392 | 1501.67 | 1500.77 | 0.90 | 4.15 | 0.05 | | 13516.26 | 483.74 | 1225.24 |
| Upper main | 15.245 | 1494.56 | 1493.56 | 1.00 | 2.64 | 0.21 | | 4667.00 | | 288.29 |
| Upper main | 15.245 | 1496.20 | 1494.93 | 1.26 | 2.45 | 0.23 | | 9333.00 | | 359.85 |
| Upper main | 15.245 | 1497.48 | 1496.11 | 1.37 | 2.44 | 0.21 | | 13812.78 | 187.22 | 712.53 |
| Upper main | 15.120 | 1491.31 | 1491.02 | 0.29 | 2.00 | 0.04 | | 4667.00 | | 287.02 |
| Upper main | 15.120 | 1493.51 | 1493.03 | 0.48 | 2.23 | 0.09 | | 9285.35 | 47.65 | 507.84 |
| Upper main | 15.120 | 1494.82 | 1494.15 | 0.67 | 2.23 | 0.07 | | 13492.71 | 507.29 | 1132.99 |
| Upper main | 14.993 | 1489.27 | 1488.56 | 0.71 | 5.59 | 0.00 | 242.15 | 4424.85 | | 238.10 |
| Upper main | 14.993 | 1491.18 | 1489.79 | 1.39 | 5.37 | 0.14 | 628.23 | 8704.77 | | 256.33 |
| Upper main | 14.993 | 1492.52 | 1491.18 | 1.34 | 4.39 | 0.05 | 993.82 | 11925.31 | 1080.87 | 1086.58 |
| Upper main | 14.833 | 1483.68 | 1482.98 | 0.70 | 1.16 | 0.17 | | 4667.00 | | 284.61 |
| Upper main | 14.833 | 1485.67 | 1484.74 | 0.94 | 2.17 | 0.15 | | 9333.00 | | 417.88 |
| Upper main | 14.833 | 1487.29 | 1486.10 | 1.19 | 2.95 | 0.10 | | 13997.94 | 2.06 | 538.57 |
| Upper main | 14.666 | 1482.35 | 1482.21 | 0.14 | 0.24 | 0.03 | | 4667.00 | | 283.16 |
| Upper main | 14.666 | 1483.35 | 1482.91 | 0.44 | 0.56 | 0.11 | | 9333.00 | | 289.23 |
| Upper main | 14.666 | 1484.24 | 1483.38 | 0.85 | 0.93 | 0.22 | | 13999.90 | 0.10 | 355.19 |
| Upper main | 14.512 | 1482.08 | 1482.05 | 0.03 | 0.05 | 0.02 | 0.00 | 3039.80 | 1627.19 | 2301.87 |
| Upper main | 14.512 | 1482.68 | 1482.61 | 0.07 | 0.13 | 0.02 | 0.17 | 5386.49 | 3946.35 | 2365.54 |
| Upper main | 14.512 | 1483.08 | 1482.97 | 0.11 | 0.20 | 0.03 | 0.71 | 7560.76 | 6438.52 | 2407.27 |
| Upper main | 14.489 | 1482.01 | 1481.77 | 0.24 | 0.37 | 0.03 | | 2139.06 | 590.94 | 1801.68 |
| Upper main | 14.489 | 1482.53 | 1482.23 | 0.30 | 0.41 | 0.07 | 4.72 | 3930.74 | 3324.54 | 2979.65 |
| Upper main | 14.489 | 1482.85 | 1482.48 | 0.37 | 0.44 | 0.07 | 34.20 | 5279.45 | 6586.35 | 3092.05 |
| Upper main | 14.479 | 1480.40 | 1477.47 | 2.92 | 1.35 | 0.27 | | 4667.00 | | 204.40 |
| Upper main | 14.479 | 1481.48 | 1480.50 | 0.98 | 3.58 | 0.07 | | 9200.00 | | 321.76 |
| Upper main | 14.479 | 1482.01 | 1480.89 | 1.12 | 3.52 | 0.08 | | 10900.00 | | 322.60 |

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|---|---|---|---|---|---|---|---|---|---|
| Upper main | 14.347 | 1476.08 | 1475.59 | 0.48 | 2.63 | 0.04 | | 4667.00 | 324.44 |
| Upper main | 14.347 | 1477.83 | 1477.09 | 0.75 | 2.54 | 0.05 | | 9200.00 | 332.25 |
| Upper main | 14.347 | 1478.40 | 1477.56 | 0.84 | 2.54 | 0.05 | | 10900.00 | 504.34 |
| Upper main | 14.207 | 1473.41 | 1473.06 | 0.35 | 3.19 | 0.01 | | 4667.00 | 312.32 |
| Upper main | 14.207 | 1475.24 | 1474.66 | 0.58 | 3.27 | 0.02 | 2.60 | 9197.40 | 722.27 |
| Upper main | 14.207 | 1475.81 | 1475.16 | 0.65 | 3.26 | 0.02 | 7.38 | 10892.62 | 764.55 |
| Upper main | 14.029 | 1470.20 | 1469.73 | 0.47 | 3.15 | 0.02 | | 4667.00 | 308.74 |
| Upper main | 14.029 | 1471.95 | 1471.17 | 0.77 | 2.83 | 0.05 | | 9200.00 | 322.38 |
| Upper main | 14.029 | 1472.53 | 1471.67 | 0.86 | 2.80 | 0.05 | | 10900.00 | 326.66 |
| Upper main | 13.870 | 1467.03 | 1466.63 | 0.40 | 2.06 | 0.00 | | 4667.00 | 299.19 |
| Upper main | 13.870 | 1469.07 | 1468.46 | 0.60 | 1.94 | 0.00 | | 9200.00 | 306.18 |
| Upper main | 13.870 | 1469.68 | 1468.99 | 0.69 | 1.96 | 0.01 | | 10900.00 | 308.19 |
| Upper main | 13.736 | 1464.97 | 1464.57 | 0.39 | 5.16 | 0.11 | | 4667.00 | 264.60 |
| Upper main | 13.736 | 1467.12 | 1466.53 | 0.59 | 4.91 | 0.12 | | 9200.00 | 326.90 |
| Upper main | 13.736 | 1467.71 | 1467.05 | 0.67 | 4.75 | 0.12 | | 10900.00 | 336.81 |
| Upper main | 13.539 | 1459.70 | 1458.25 | 1.45 | 3.51 | 0.33 | | 4667.00 | 165.40 |
| Upper main | 13.539 | 1462.08 | 1460.25 | 1.83 | 5.52 | 0.30 | | 9200.00 | 197.83 |
| Upper main | 13.539 | 1462.84 | 1460.97 | 1.87 | 5.74 | 0.27 | | 10900.00 | 209.59 |
| Upper main | 13.351 | 1454.54 | 1454.18 | 0.36 | | | | 4667.00 | 204.34 |
| Upper main | 13.351 | 1456.26 | 1455.43 | 0.83 | | | | 9200.00 | 258.21 |
| Upper main | 13.351 | 1456.84 | 1455.86 | 0.98 | | | | 10900.00 | 276.46 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| Upper main | 20.000 | 4667.00 | 1601.65 | 5.03 | 6.62 | 2.11 | 2.11 | 3.84 | 3.39 |
| Upper main | 20.000 | 9333.00 | 1602.82 | 3.36 | 4.38 | 3.13 | 3.13 | 5.01 | 4.46 |
| Upper main | 20.000 | 14000.00 | 1603.68 | 2.77 | 3.58 | 3.93 | 3.93 | 5.87 | 5.18 |
| Upper main | 19.903 | 4667.00 | 1600.81 | 4.98 | 6.56 | 3.63 | 3.33 | 2.27 | 1.57 |
| Upper main | 19.903 | 9333.00 | 1601.62 | 3.32 | 4.34 | 4.82 | 4.25 | 3.08 | 1.98 |
| Upper main | 19.903 | 14000.00 | 1602.16 | 2.74 | 3.54 | 5.88 | 4.93 | 3.62 | 2.19 |
| Upper main | 19.790 | 4667.00 | 1596.21 | 4.94 | 6.52 | 5.53 | 5.04 | 1.52 | 0.98 |
| Upper main | 19.790 | 9333.00 | 1596.88 | 3.29 | 4.30 | 6.70 | 5.70 | 2.19 | 1.41 |
| Upper main | 19.790 | 14000.00 | 1597.51 | 2.71 | 3.51 | 7.01 | 5.79 | 2.82 | 1.80 |
| Upper main | 19.655 | 4667.00 | 1592.25 | 4.90 | 6.47 | 2.86 | 2.40 | 2.63 | 1.21 |
| Upper main | 19.655 | 9333.00 | 1592.92 | 3.25 | 4.26 | 3.77 | 3.05 | 3.30 | 1.75 |
| Upper main | 19.655 | 14000.00 | 1593.29 | 2.68 | 3.47 | 4.70 | 3.76 | 3.67 | 2.03 |
| Upper main | 19.539 | 4667.00 | 1587.34 | 4.86 | 6.42 | 6.24 | 5.23 | 2.67 | 0.94 |
| Upper main | 19.539 | 9333.00 | 1587.98 | 3.22 | 4.21 | 7.10 | 5.55 | 3.31 | 1.14 |
| Upper main | 19.539 | 14000.00 | 1588.71 | 2.65 | 3.42 | 6.57 | 4.88 | 4.04 | 1.67 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper main | 19.331 | 4667.00 | 1581.92 | 4.79 | 6.33 | 2.16 | 1.60 | 3.84 | 1.27 |
| Upper main | 19.331 | 9333.00 | 1582.55 | 3.16 | 4.13 | 2.89 | 2.05 | 4.47 | 1.62 |
| Upper main | 19.331 | 14000.00 | 1582.86 | 2.59 | 3.34 | 3.67 | 2.57 | 4.78 | 1.82 |
| Upper main | 19.151 | 4667.00 | 1575.15 | 4.72 | 6.22 | 6.23 | 4.77 | 3.76 | 0.68 |
| Upper main | 19.151 | 9333.00 | 1575.87 | 3.10 | 4.00 | 6.00 | 3.66 | 4.48 | 0.82 |
| Upper main | 19.151 | 14000.00 | 1576.51 | 2.53 | 3.20 | 4.94 | 2.96 | 5.12 | 1.29 |
| Upper main | 18.708 | 4667.00 | 1575.19 | 4.53 | 6.06 | 0.46 | 0.31 | 6.45 | 3.23 |
| Upper main | 18.708 | 9333.00 | 1575.81 | 2.91 | 3.82 | 0.76 | 0.53 | 7.07 | 3.84 |
| Upper main | 18.708 | 14000.00 | 1576.27 | 2.31 | 3.01 | 1.00 | 0.70 | 7.53 | 4.30 |
| Upper main | 18.012 | 4667.00 | 1575.17 | 1.55 | 1.68 | 0.23 | 0.18 | 12.25 | 8.30 |
| Upper main | 18.012 | 9333.00 | 1575.74 | 1.18 | 1.31 | 0.43 | 0.34 | 12.82 | 8.86 |
| Upper main | 18.012 | 14000.00 | 1576.15 | 1.04 | 1.19 | 0.61 | 0.49 | 13.23 | 9.26 |
| Upper main | 17.907 | 3160.00 | 1575.10 | 1.40 | 1.48 | 1.88 | 1.74 | 1.10 | 0.86 |
| Upper main | 17.907 | 7770.00 | 1575.56 | 1.09 | 1.19 | 3.03 | 2.67 | 1.56 | 1.13 |
| Upper main | 17.907 | 12400.00 | 1575.87 | 0.97 | 1.09 | 3.79 | 3.35 | 1.87 | 1.44 |
| Upper main | 17.882 | 3160.00 | 1574.51 | 1.39 | 1.46 | 3.19 | 2.96 | 0.51 | 0.30 |
| Upper main | 17.882 | 7770.00 | 1574.76 | 1.08 | 1.17 | 4.25 | 3.88 | 0.76 | 0.52 |
| Upper main | 17.882 | 12400.00 | 1574.95 | 0.96 | 1.08 | 4.98 | 4.51 | 0.95 | 0.67 |
| Upper main | 17.817 | 4667.00 | 1562.08 | 1.36 | 1.43 | 2.93 | 2.92 | 6.91 | 1.26 |
| Upper main | 17.817 | 9333.00 | 1562.93 | 1.06 | 1.15 | 3.32 | 3.24 | 7.76 | 1.60 |
| Upper main | 17.817 | 14000.00 | 1563.46 | 0.94 | 1.05 | 3.73 | 3.41 | 8.29 | 1.48 |
| Upper main | 17.704 | 4667.00 | 1557.67 | 1.32 | 1.39 | 5.24 | 5.10 | 6.15 | 1.50 |
| Upper main | 17.704 | 9333.00 | 1558.44 | 1.02 | 1.11 | 6.74 | 6.30 | 6.92 | 1.74 |
| Upper main | 17.704 | 14000.00 | 1559.57 | 0.91 | 1.01 | 5.45 | 4.98 | 8.05 | 1.52 |
| Upper main | 17.576 | 4667.00 | 1553.68 | 1.28 | 1.35 | 6.11 | 4.40 | 5.81 | 1.46 |
| Upper main | 17.576 | 9333.00 | 1554.86 | 1.00 | 1.08 | 6.92 | 4.18 | 6.99 | 1.92 |
| Upper main | 17.576 | 14000.00 | 1555.41 | 0.88 | 0.97 | 8.16 | 4.83 | 7.54 | 2.29 |
| Upper main | 17.471 | 4667.00 | 1549.89 | 1.26 | 1.31 | 6.83 | 4.00 | 4.81 | 1.16 |
| Upper main | 17.471 | 9333.00 | 1550.55 | 0.98 | 1.03 | 8.53 | 5.05 | 5.47 | 1.79 |
| Upper main | 17.471 | 14000.00 | 1551.46 | 0.86 | 0.93 | 8.12 | 5.00 | 6.38 | 2.63 |
| Upper main | 17.319 | 4667.00 | 1543.28 | 1.22 | 1.26 | 4.06 | 5.10 | 7.50 | 3.61 |
| Upper main | 17.319 | 9333.00 | 1544.73 | 0.95 | 0.99 | 5.65 | 6.56 | 8.95 | 3.31 |
| Upper main | 17.319 | 14000.00 | 1545.41 | 0.83 | 0.90 | 7.95 | 8.11 | 9.63 | 3.74 |
| Upper main | 17.190 | 4667.00 | 1538.16 | 1.19 | 1.23 | 8.18 | 8.18 | 7.99 | 2.05 |
| Upper main | 17.190 | 9333.00 | 1539.81 | 0.92 | 0.96 | 8.10 | 6.45 | 9.64 | 1.80 |
| Upper main | 17.190 | 14000.00 | 1540.89 | 0.81 | 0.87 | 7.57 | 5.88 | 10.72 | 2.71 |
| Upper main | 17.055 | 4667.00 | 1537.62 | 1.15 | 1.19 | 2.31 | 2.31 | 16.37 | 7.25 |
| Upper main | 17.055 | 9333.00 | 1538.98 | 0.88 | 0.92 | 3.86 | 3.69 | 17.73 | 6.11 |
| Upper main | 17.055 | 14000.00 | 1539.96 | 0.78 | 0.83 | 5.11 | 4.70 | 18.71 | 6.31 |
| Upper main | 16.904 | 4667.00 | 1537.08 | 1.08 | 1.11 | 3.79 | 3.06 | 7.30 | 2.03 |

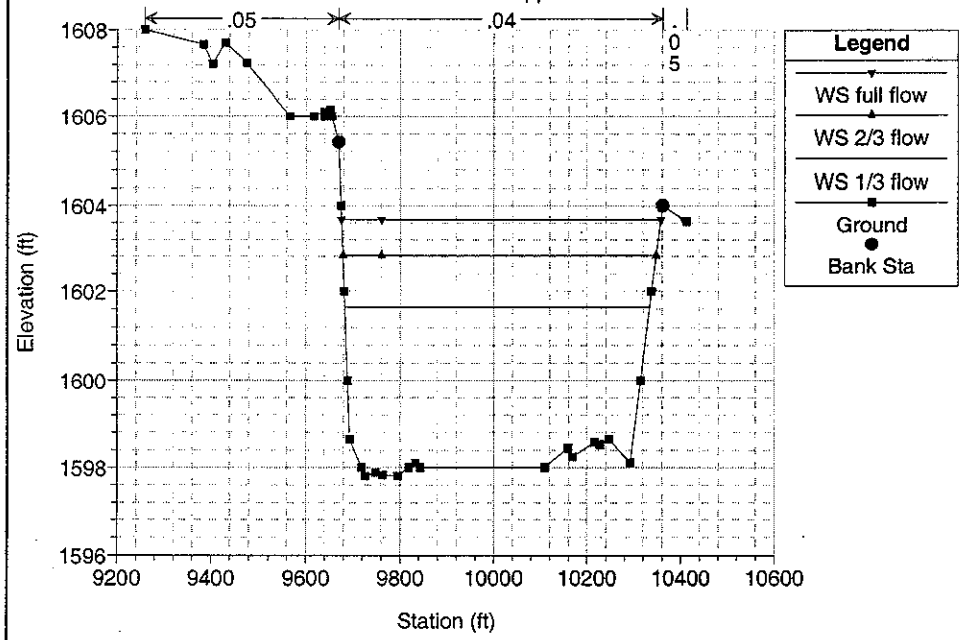
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper main | 16.904 | 9333.00 | 1538.05 | 0.83 | 0.87 | 4.95 | 4.07 | 8.27 | 2.78 |
| Upper main | 16.904 | 14000.00 | 1538.77 | 0.74 | 0.78 | 5.94 | 4.84 | 8.99 | 3.48 |
| Upper main | 16.733 | 4667.00 | 1531.10 | 1.04 | 1.06 | 8.06 | 8.06 | 6.59 | 2.33 |
| Upper main | 16.733 | 9333.00 | 1532.73 | 0.80 | 0.82 | 8.79 | 7.17 | 8.22 | 1.91 |
| Upper main | 16.733 | 14000.00 | 1533.74 | 0.70 | 0.74 | 9.25 | 7.02 | 9.23 | 2.88 |
| Upper main | 16.563 | 4667.00 | 1527.75 | 1.00 | 1.02 | 4.46 | 4.46 | 6.91 | 3.38 |
| Upper main | 16.563 | 9333.00 | 1530.01 | 0.76 | 0.78 | 5.35 | 5.35 | 9.17 | 5.64 |
| Upper main | 16.563 | 14000.00 | 1531.82 | 0.67 | 0.70 | 6.08 | 6.08 | 10.98 | 7.45 |
| Upper main | 16.557 | 4667.00 | 1527.54 | 0.99 | 1.02 | 5.16 | 5.16 | 9.97 | 4.46 |
| Upper main | 16.557 | 9333.00 | 1529.48 | 0.76 | 0.78 | 7.18 | 7.17 | 11.91 | 6.28 |
| Upper main | 16.557 | 14000.00 | 1530.97 | 0.67 | 0.70 | 8.70 | 8.67 | 13.40 | 7.54 |
| Upper main | 16.548 | Bridge | | | | | | | |
| Upper main | 16.545 | 4667.00 | 1527.02 | 0.99 | 1.02 | 6.41 | 6.41 | 8.62 | 3.76 |
| Upper main | 16.545 | 9333.00 | 1528.63 | 0.76 | 0.78 | 8.81 | 8.81 | 10.23 | 5.10 |
| Upper main | 16.545 | 14000.00 | 1529.58 | 0.67 | 0.70 | 11.13 | 11.13 | 11.18 | 5.97 |
| Upper main | 16.542 | 4667.00 | 1526.94 | 0.99 | 1.02 | 6.44 | 6.44 | 6.55 | 3.53 |
| Upper main | 16.542 | 9333.00 | 1528.58 | 0.76 | 0.78 | 8.59 | 8.59 | 8.19 | 4.83 |
| Upper main | 16.542 | 14000.00 | 1529.55 | 0.67 | 0.70 | 10.73 | 10.73 | 9.16 | 5.80 |
| Upper main | 16.430 | 4667.00 | 1523.49 | 0.97 | 0.99 | 7.03 | 7.03 | 6.44 | 2.67 |
| Upper main | 16.430 | 9333.00 | 1524.99 | 0.74 | 0.76 | 8.12 | 8.12 | 7.94 | 3.21 |
| Upper main | 16.430 | 14000.00 | 1525.94 | 0.65 | 0.68 | 9.21 | 8.47 | 8.89 | 2.27 |
| Upper main | 16.301 | 4667.00 | 1519.56 | 0.94 | 0.96 | 5.39 | 5.39 | 6.00 | 2.42 |
| Upper main | 16.301 | 9333.00 | 1520.75 | 0.71 | 0.73 | 7.21 | 7.21 | 7.19 | 3.56 |
| Upper main | 16.301 | 14000.00 | 1521.66 | 0.63 | 0.66 | 8.60 | 8.60 | 8.10 | 4.44 |
| Upper main | 16.169 | 4667.00 | 1514.30 | 0.90 | 0.93 | 6.36 | 6.36 | 4.30 | 1.65 |
| Upper main | 16.169 | 9333.00 | 1515.17 | 0.69 | 0.71 | 8.32 | 8.32 | 5.17 | 2.48 |
| Upper main | 16.169 | 14000.00 | 1515.87 | 0.61 | 0.64 | 9.71 | 9.71 | 5.87 | 3.15 |
| Upper main | 16.041 | 4667.00 | 1510.18 | 0.87 | 0.89 | 4.51 | 4.51 | 5.37 | 2.16 |
| Upper main | 16.041 | 9333.00 | 1511.35 | 0.66 | 0.68 | 5.85 | 5.85 | 6.54 | 3.31 |
| Upper main | 16.041 | 14000.00 | 1512.33 | 0.59 | 0.62 | 6.76 | 6.76 | 7.52 | 4.27 |
| Upper main | 15.901 | 4667.00 | 1504.29 | 0.84 | 0.86 | 8.06 | 8.06 | 5.12 | 2.01 |
| Upper main | 15.901 | 9333.00 | 1505.51 | 0.64 | 0.66 | 9.95 | 9.95 | 6.34 | 3.09 |
| Upper main | 15.901 | 14000.00 | 1506.48 | 0.56 | 0.59 | 11.33 | 11.33 | 7.31 | 4.02 |
| Upper main | 15.776 | 4667.00 | 1500.94 | 0.80 | 0.82 | 1.57 | 1.57 | 11.70 | 4.92 |
| Upper main | 15.776 | 9333.00 | 1503.71 | 0.61 | 0.63 | 1.97 | 1.97 | 14.47 | 7.22 |
| Upper main | 15.776 | 14000.00 | 1505.56 | 0.54 | 0.57 | 2.35 | 2.35 | 16.32 | 8.78 |
| Upper main | 15.653 | 4667.00 | 1500.94 | 0.65 | 0.67 | 0.82 | 0.82 | 10.94 | 10.60 |
| Upper main | 15.653 | 9333.00 | 1503.70 | 0.50 | 0.51 | 1.30 | 1.30 | 13.70 | 13.18 |
| Upper main | 15.653 | 14000.00 | 1505.54 | 0.45 | 0.48 | 1.70 | 1.70 | 15.54 | 13.93 |
| Upper main | 15.523 | 4667.00 | 1499.91 | 0.60 | 0.63 | 7.65 | 7.65 | 7.03 | 5.48 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper main | 15.523 | 9333.00 | 1501.08 | 0.47 | 0.49 | 12.27 | 12.27 | 8.20 | 4.69 |
| Upper main | 15.523 | 14000.00 | 1503.03 | 0.42 | 0.45 | 11.97 | 11.90 | 10.15 | 3.97 |
| Upper main | 15.495 | 4667.00 | 1499.87 | 0.59 | 0.62 | 4.63 | 4.63 | 5.63 | 3.08 |
| Upper main | 15.495 | 9333.00 | 1501.68 | 0.46 | 0.48 | 5.45 | 5.45 | 7.44 | 4.08 |
| Upper main | 15.495 | 14000.00 | 1502.80 | 0.41 | 0.44 | 6.38 | 6.38 | 8.56 | 4.99 |
| Upper main | 15.392 | 4667.00 | 1498.35 | 0.56 | 0.59 | 4.89 | 4.89 | 7.66 | 3.32 |
| Upper main | 15.392 | 9333.00 | 1499.91 | 0.44 | 0.46 | 6.42 | 6.35 | 9.22 | 2.47 |
| Upper main | 15.392 | 14000.00 | 1500.77 | 0.39 | 0.42 | 7.75 | 6.91 | 10.08 | 3.11 |
| Upper main | 15.245 | 4667.00 | 1493.56 | 0.53 | 0.55 | 8.03 | 8.03 | 7.84 | 2.02 |
| Upper main | 15.245 | 9333.00 | 1494.93 | 0.41 | 0.43 | 9.02 | 9.02 | 9.21 | 2.88 |
| Upper main | 15.245 | 14000.00 | 1496.11 | 0.37 | 0.39 | 9.46 | 8.79 | 10.39 | 2.24 |
| Upper main | 15.120 | 4667.00 | 1491.02 | 0.50 | 0.52 | 4.35 | 4.35 | 5.95 | 3.73 |
| Upper main | 15.120 | 9333.00 | 1493.03 | 0.38 | 0.40 | 5.55 | 5.35 | 7.96 | 3.44 |
| Upper main | 15.120 | 14000.00 | 1494.15 | 0.34 | 0.37 | 6.67 | 5.53 | 9.08 | 2.23 |
| Upper main | 14.993 | 4667.00 | 1488.56 | 0.47 | 0.49 | 6.88 | 6.53 | 7.17 | 3.00 |
| Upper main | 14.993 | 9333.00 | 1489.79 | 0.36 | 0.38 | 9.71 | 9.18 | 8.40 | 3.97 |
| Upper main | 14.993 | 14000.00 | 1491.18 | 0.32 | 0.34 | 9.93 | 7.10 | 9.79 | 1.81 |
| Upper main | 14.833 | 4667.00 | 1482.98 | 0.43 | 0.45 | 6.70 | 6.70 | 3.36 | 2.45 |
| Upper main | 14.833 | 9333.00 | 1484.74 | 0.33 | 0.35 | 7.77 | 7.77 | 5.12 | 4.12 |
| Upper main | 14.833 | 14000.00 | 1486.10 | 0.30 | 0.31 | 8.74 | 8.71 | 6.48 | 4.43 |
| Upper main | 14.666 | 4667.00 | 1482.21 | 0.38 | 0.40 | 3.01 | 3.01 | 6.91 | 5.48 |
| Upper main | 14.666 | 9333.00 | 1482.91 | 0.30 | 0.31 | 5.33 | 5.33 | 7.61 | 6.06 |
| Upper main | 14.666 | 14000.00 | 1483.38 | 0.27 | 0.28 | 7.41 | 7.41 | 8.08 | 5.32 |
| Upper main | 14.512 | 4667.00 | 1482.05 | 0.28 | 0.29 | 1.65 | 0.96 | 6.75 | 2.11 |
| Upper main | 14.512 | 9333.00 | 1482.61 | 0.24 | 0.25 | 2.63 | 1.51 | 7.31 | 2.60 |
| Upper main | 14.512 | 14000.00 | 1482.97 | 0.23 | 0.23 | 3.47 | 2.00 | 7.67 | 2.91 |
| Upper main | 14.489 | 2730.00 | 1481.77 | 0.27 | 0.27 | 4.36 | 3.44 | 1.02 | 0.44 |
| Upper main | 14.489 | 7260.00 | 1482.23 | 0.23 | 0.23 | 5.40 | 3.71 | 1.48 | 0.66 |
| Upper main | 14.489 | 11900.00 | 1482.48 | 0.22 | 0.22 | 6.16 | 4.38 | 1.73 | 0.88 |
| Upper main | 14.479 | 4667.00 | 1477.47 | 0.27 | 0.27 | 13.72 | 13.72 | 2.81 | 1.66 |
| Upper main | 14.479 | 9200.00 | 1480.50 | 0.23 | 0.23 | 7.93 | 7.93 | 5.84 | 3.60 |
| Upper main | 14.479 | 10900.00 | 1480.89 | 0.22 | 0.22 | 8.48 | 8.48 | 6.23 | 3.98 |
| Upper main | 14.347 | 4667.00 | 1475.59 | 0.25 | 0.25 | 5.59 | 5.59 | 5.05 | 2.58 |
| Upper main | 14.347 | 9200.00 | 1477.09 | 0.20 | 0.20 | 6.94 | 6.94 | 6.55 | 3.99 |
| Upper main | 14.347 | 10900.00 | 1477.56 | 0.19 | 0.19 | 7.34 | 7.34 | 7.02 | 4.44 |
| Upper main | 14.207 | 4667.00 | 1473.06 | 0.21 | 0.21 | 4.73 | 4.73 | 6.05 | 3.16 |
| Upper main | 14.207 | 9200.00 | 1474.66 | 0.17 | 0.17 | 6.10 | 6.09 | 7.65 | 4.38 |
| Upper main | 14.207 | 10900.00 | 1475.16 | 0.16 | 0.16 | 6.49 | 6.47 | 8.15 | 4.74 |
| Upper main | 14.029 | 4667.00 | 1469.73 | 0.16 | 0.16 | 5.51 | 5.51 | 5.35 | 2.74 |
| Upper main | 14.029 | 9200.00 | 1471.17 | 0.13 | 0.13 | 7.06 | 7.06 | 6.79 | 4.04 |
| Upper main | 14.029 | 10900.00 | 1471.67 | 0.12 | 0.12 | 7.45 | 7.45 | 7.29 | 4.48 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper main | 13.870 | 4667.00 | 1466.63 | 0.12 | 0.12 | 5.07 | 5.07 | 5.42 | 3.08 |
| Upper main | 13.870 | 9200.00 | 1468.46 | 0.10 | 0.10 | 6.24 | 6.24 | 7.25 | 4.82 |
| Upper main | 13.870 | 10900.00 | 1468.99 | 0.09 | 0.09 | 6.66 | 6.66 | 7.78 | 5.31 |
| Upper main | 13.736 | 4667.00 | 1464.57 | 0.08 | 0.08 | 5.03 | 5.03 | 4.98 | 3.50 |
| Upper main | 13.736 | 9200.00 | 1466.53 | 0.06 | 0.06 | 6.17 | 6.17 | 6.94 | 4.56 |
| Upper main | 13.736 | 10900.00 | 1467.05 | 0.06 | 0.06 | 6.56 | 6.56 | 7.46 | 4.94 |
| Upper main | 13.539 | 4667.00 | 1458.25 | 0.04 | 0.04 | 9.66 | 9.66 | 4.51 | 2.92 |
| Upper main | 13.539 | 9200.00 | 1460.25 | 0.03 | 0.03 | 10.86 | 10.86 | 6.51 | 4.28 |
| Upper main | 13.539 | 10900.00 | 1460.97 | 0.03 | 0.03 | 10.97 | 10.97 | 7.23 | 4.74 |
| Upper main | 13.351 | 4667.00 | 1454.18 | 0.00 | 0.00 | 4.82 | 4.82 | 7.43 | 4.74 |
| Upper main | 13.351 | 9200.00 | 1455.43 | 0.00 | 0.00 | 7.32 | 7.32 | 8.68 | 4.87 |
| Upper main | 13.351 | 10900.00 | 1455.86 | 0.00 | 0.00 | 7.94 | 7.94 | 9.11 | 4.96 |

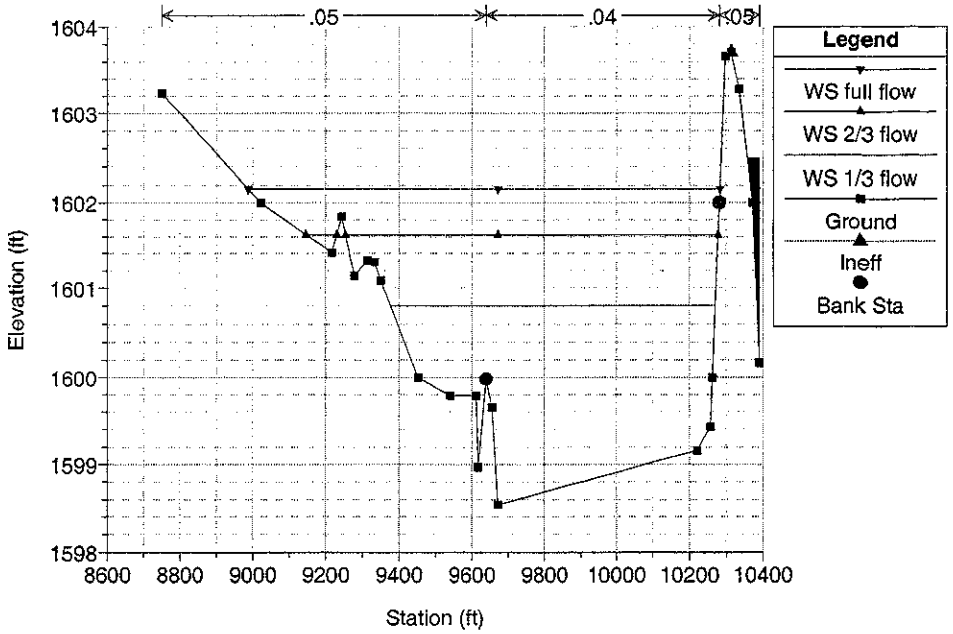
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 20.000



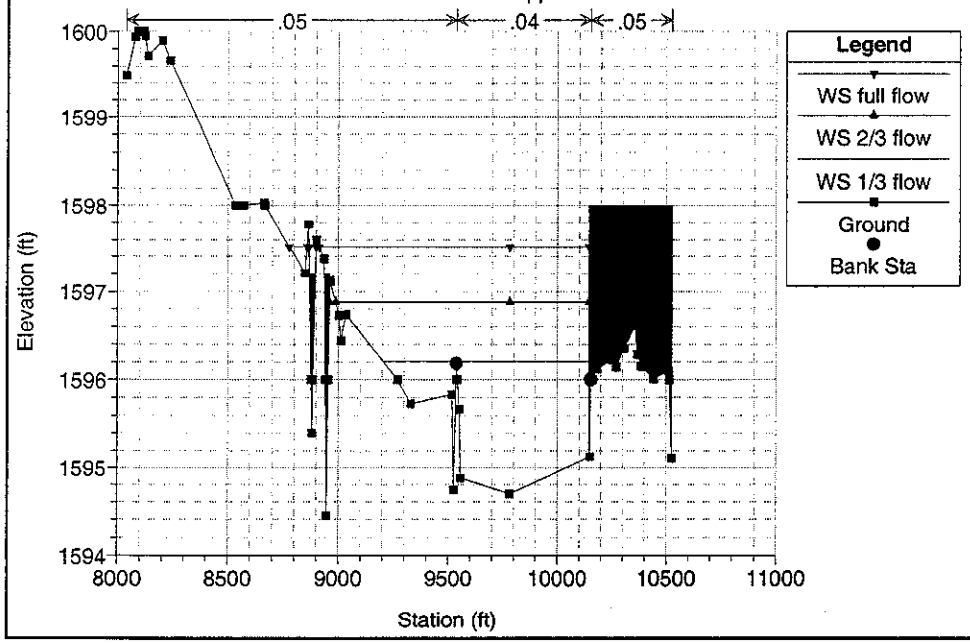

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.903



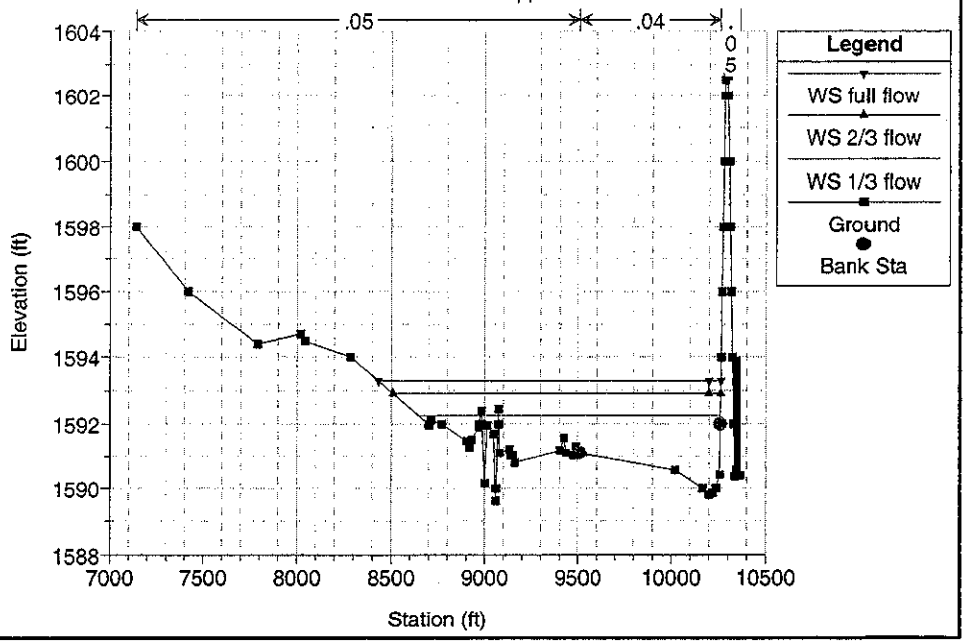

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.790



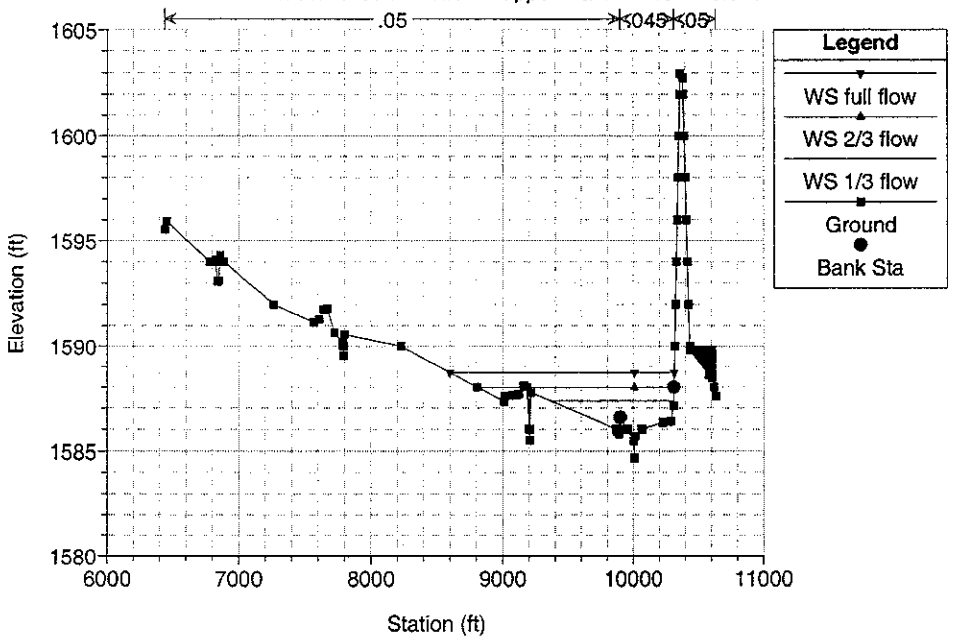

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.655



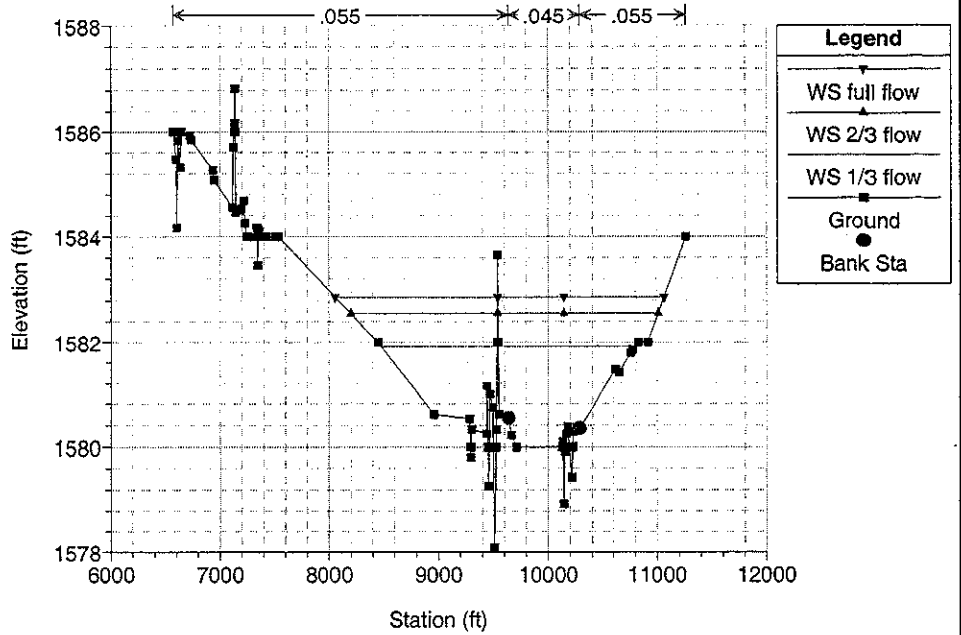
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.539



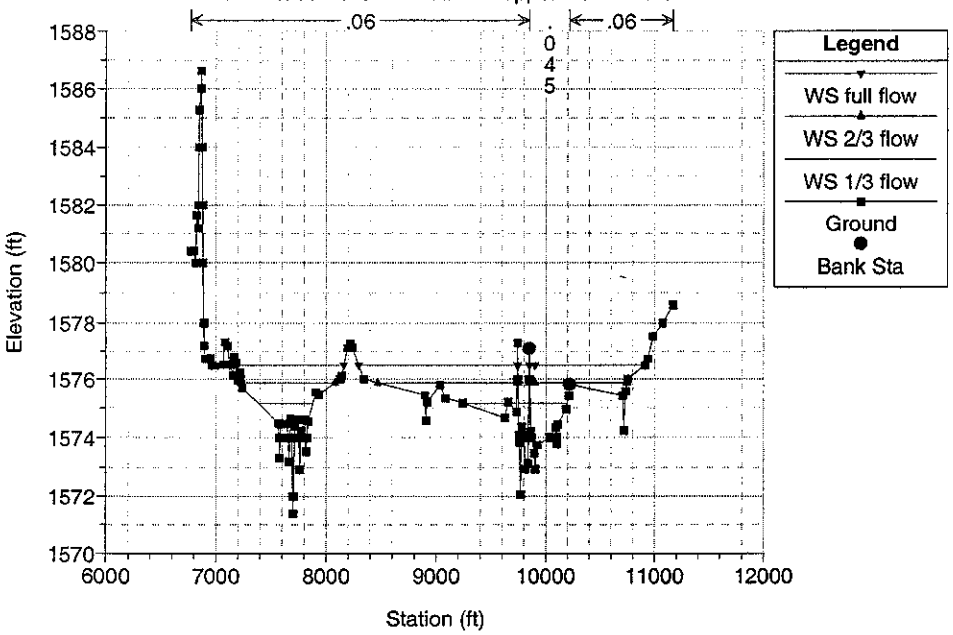

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.331



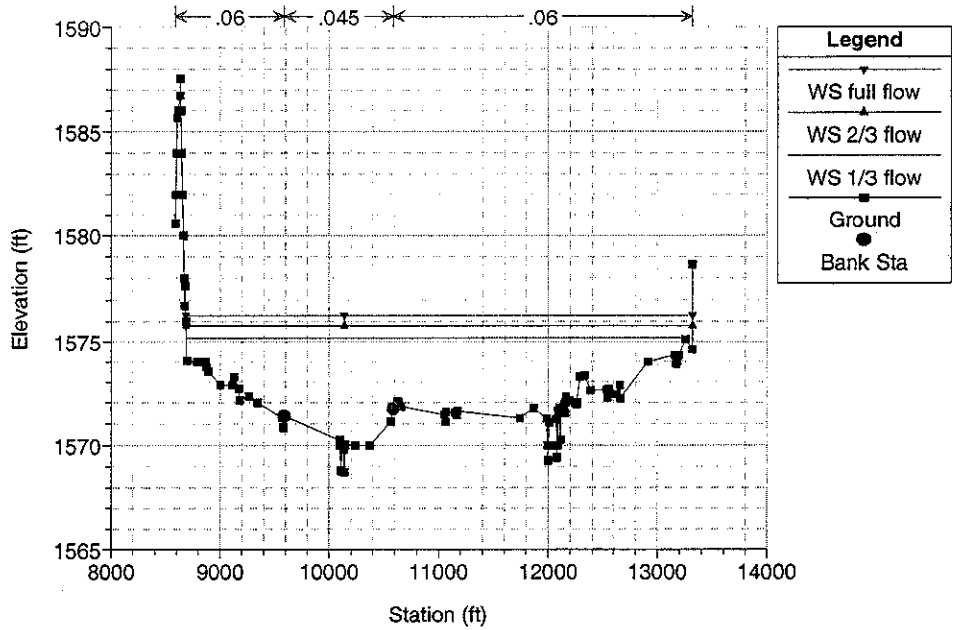

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 19.151



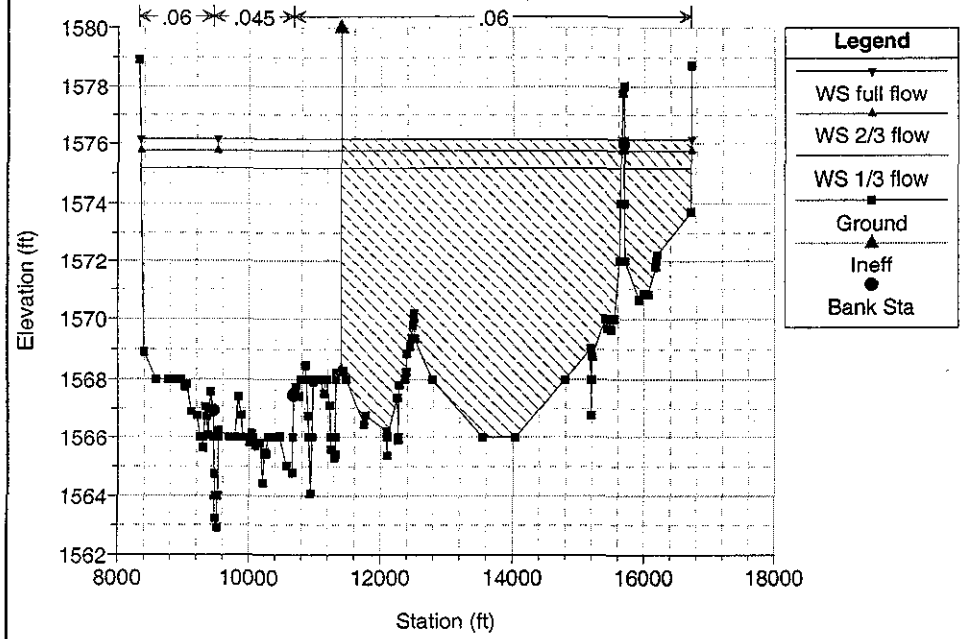

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 18.708



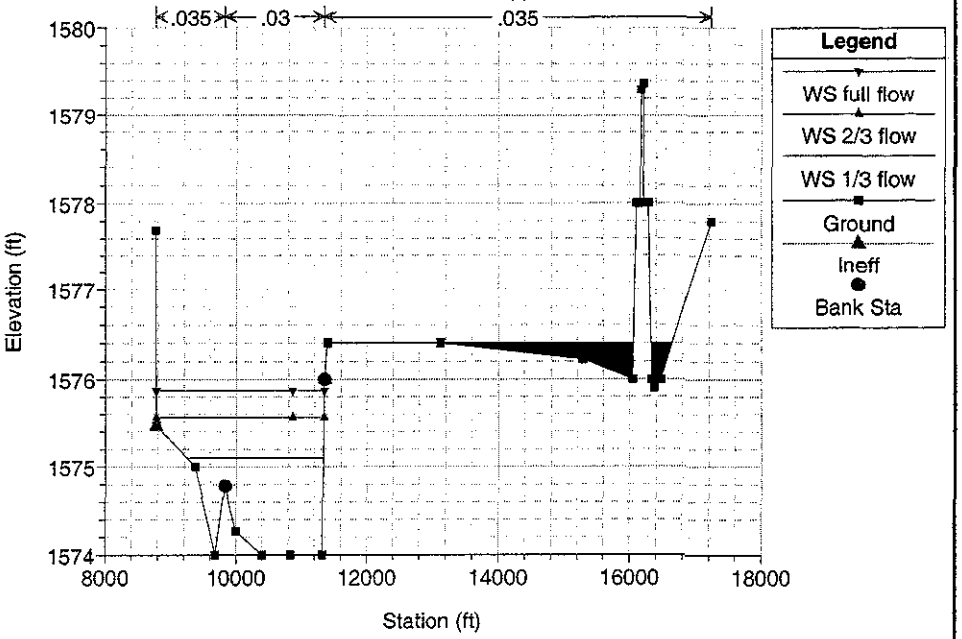
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 18.012



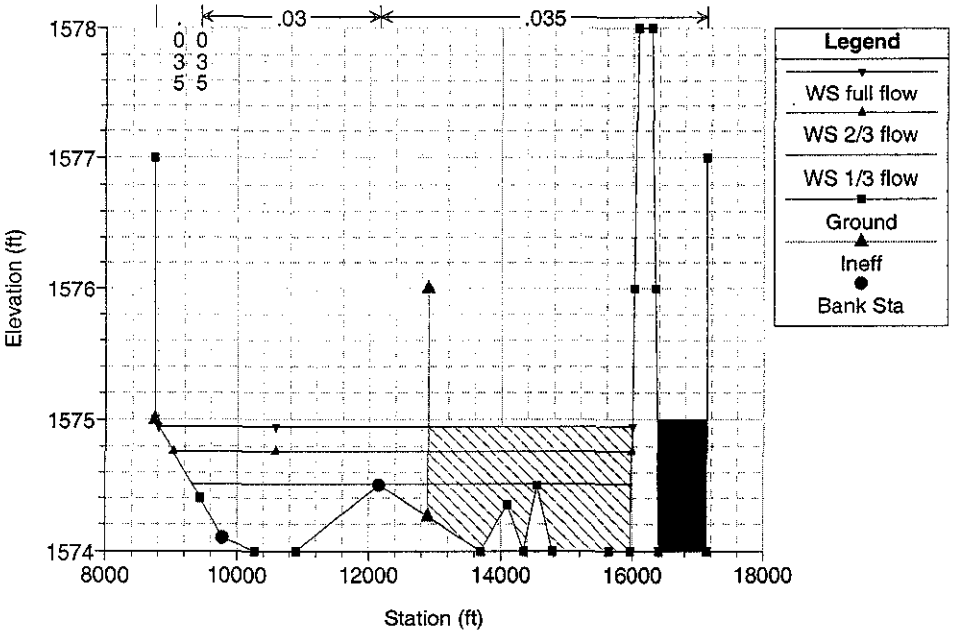

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.907



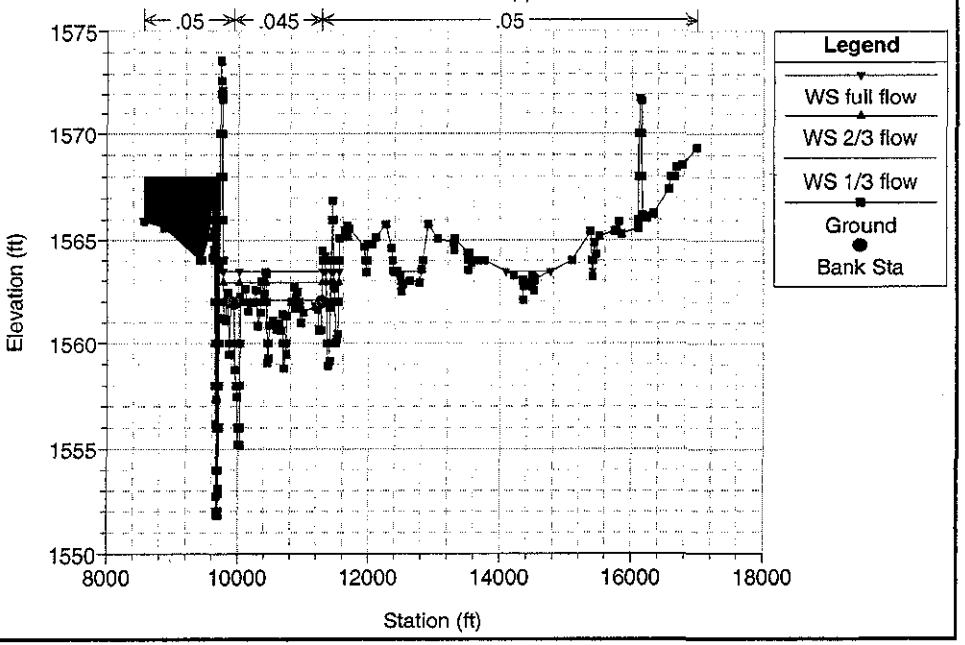

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.882



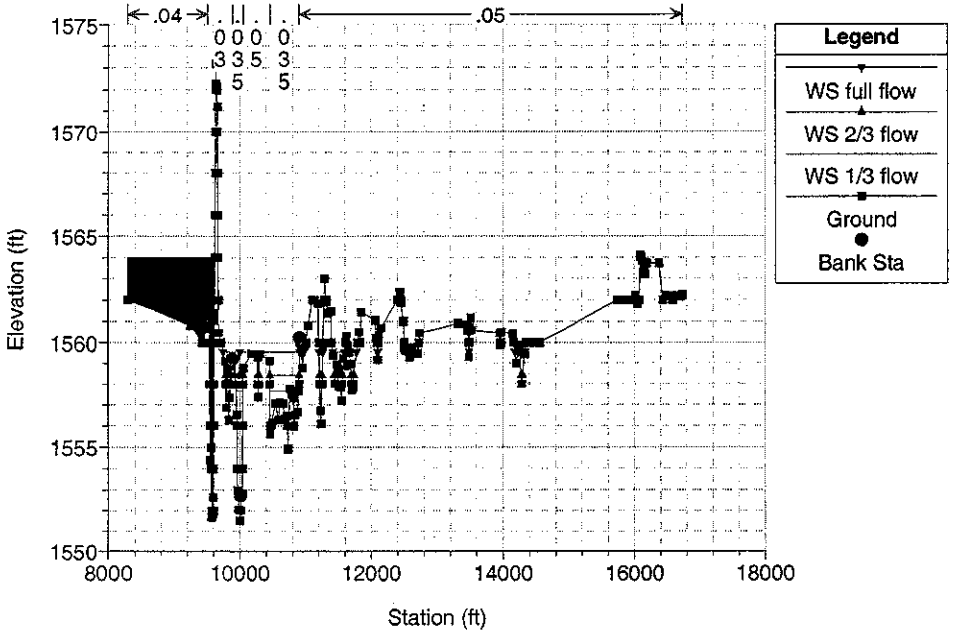

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.817



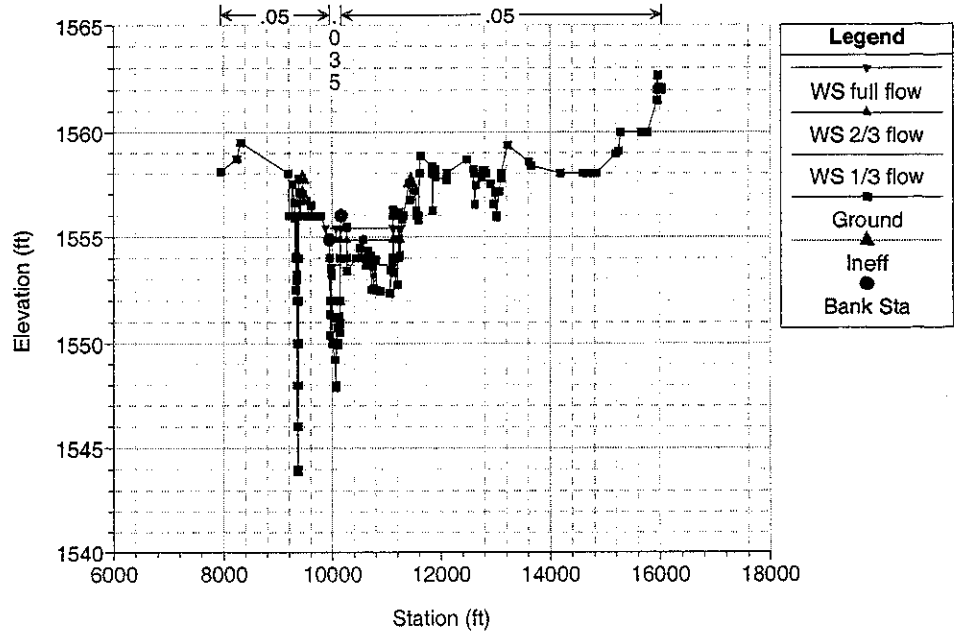
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.704



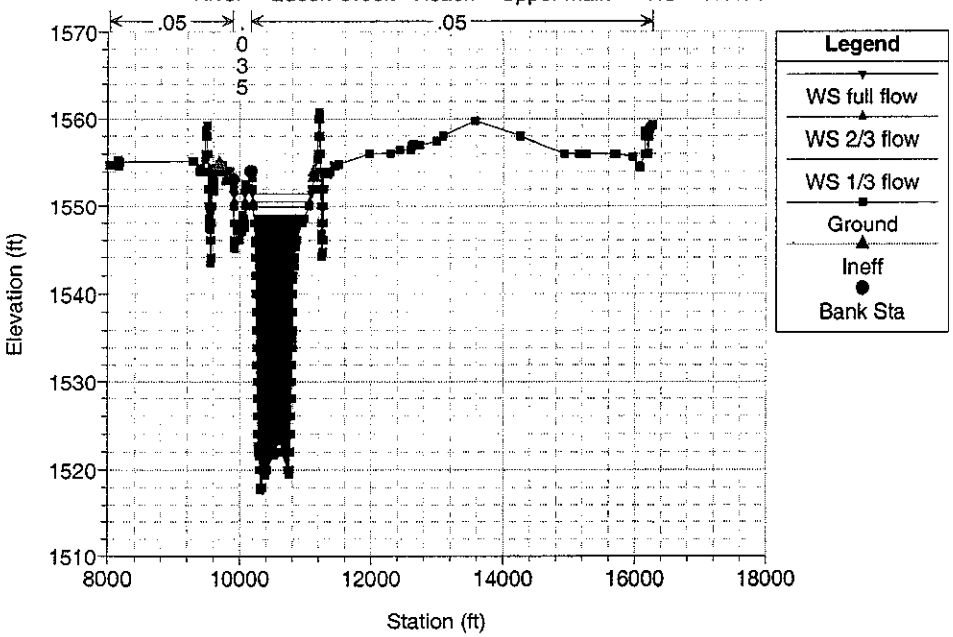

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.576



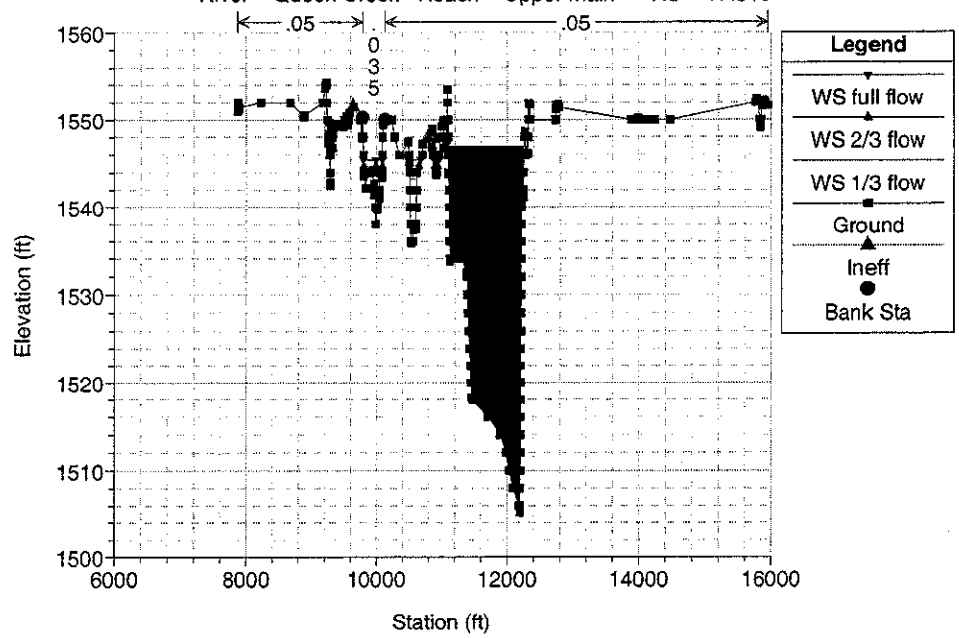

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

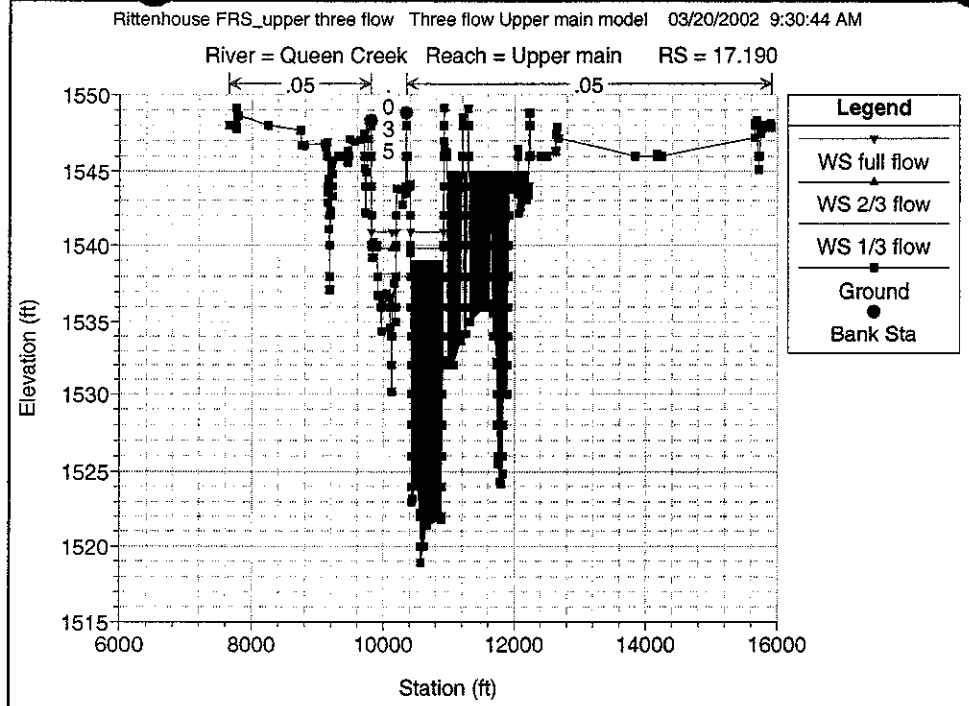
River = Queen Creek Reach = Upper main RS = 17.471

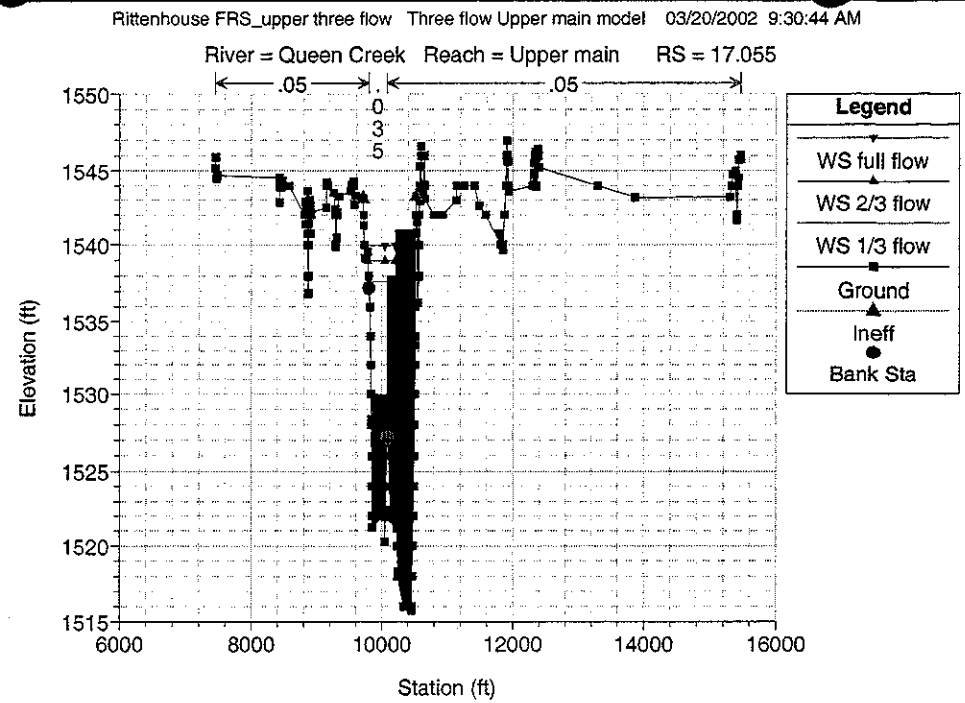



Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 17.319




Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM
River = Queen Creek Reach = Upper main RS = 17.190
.05
.05
Legend
WS full flow
WS 2/3 flow
WS 1/3 flow
Ground
Bank Sta
Elevation (ft)
Station (ft)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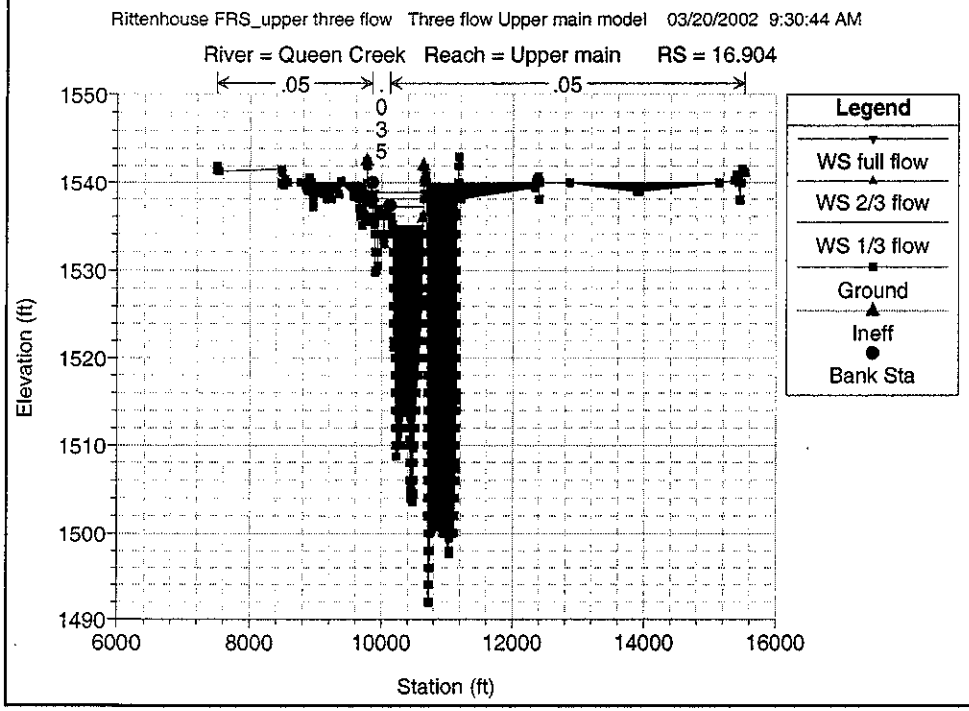
River = Queen Creek Reach = Upper main RS = 17.055
.05
.05
Legend
WS full flow
WS 2/3 flow
WS 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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River = Queen Creek Reach = Upper main RS = 16.904
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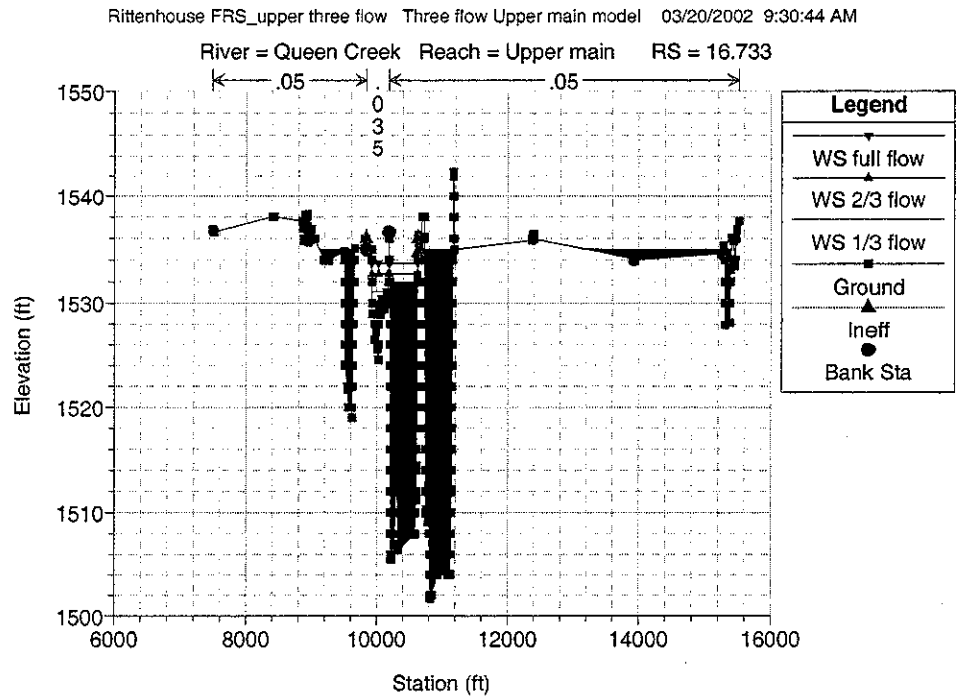
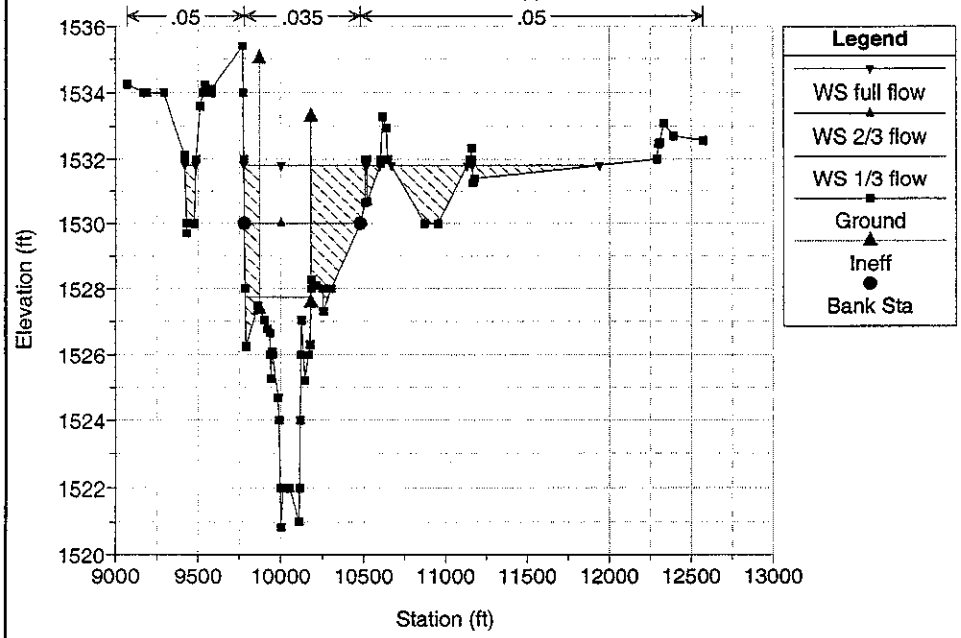
.05
Legend
WS full flow
WS 2/3 flow
WS 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM
River = Queen Creek Reach = Upper main RS = 16.733
.05
.05
Legend
WS full flow
WS 2/3 flow
WS 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

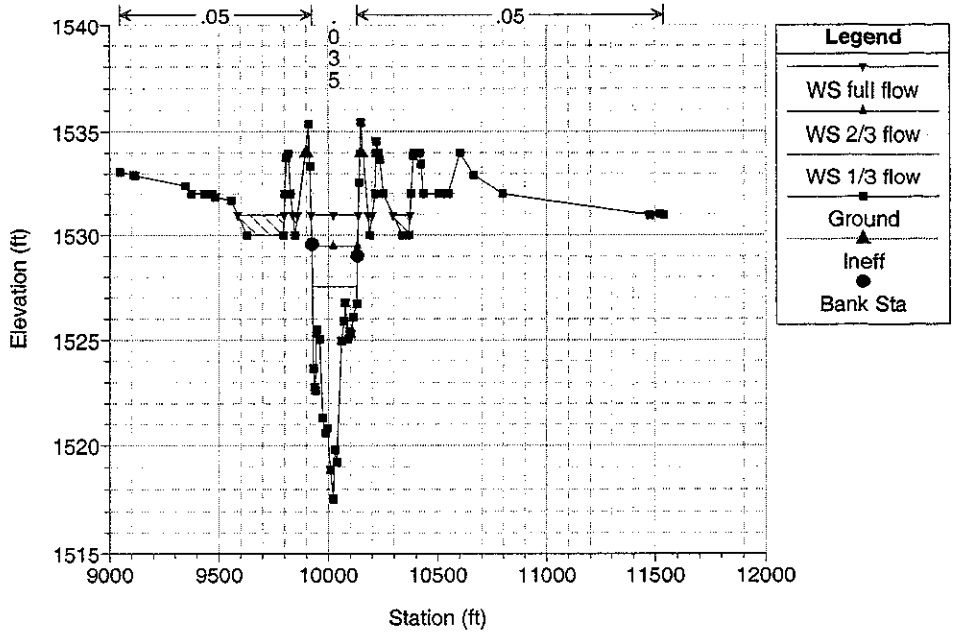
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.563



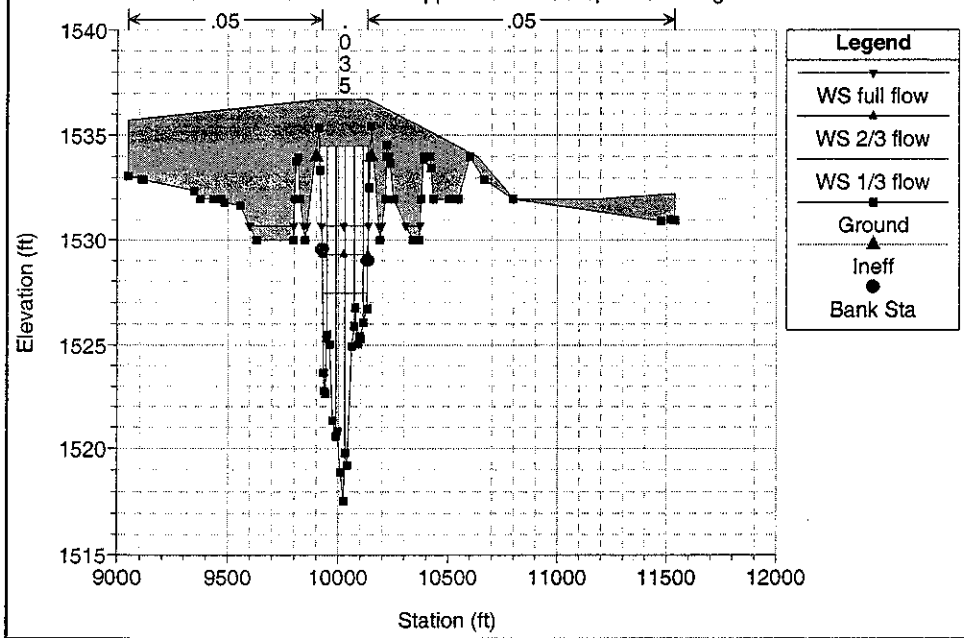

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.557



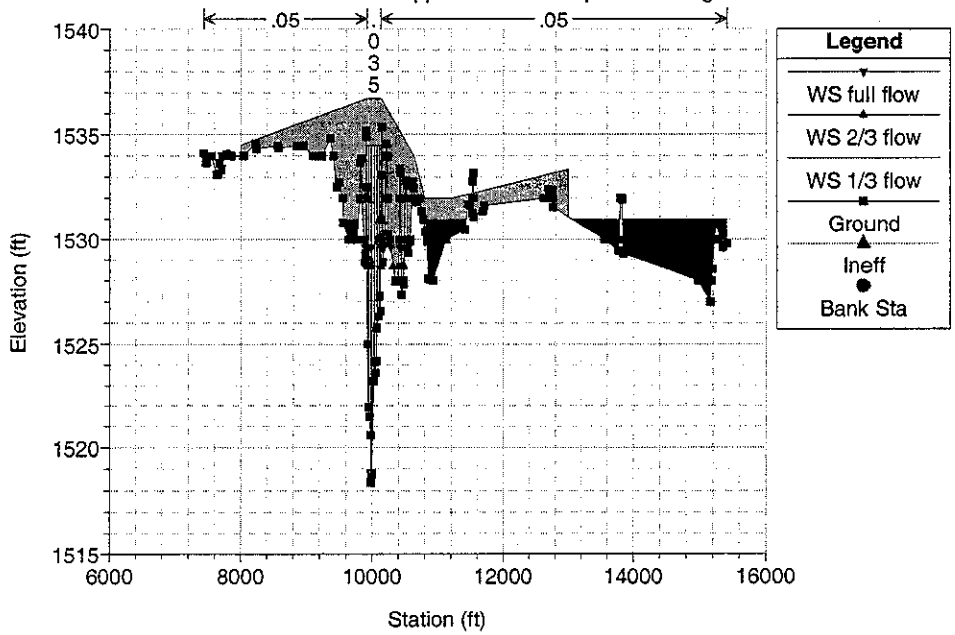

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main Schnepf Road Bridge RS = 16.548



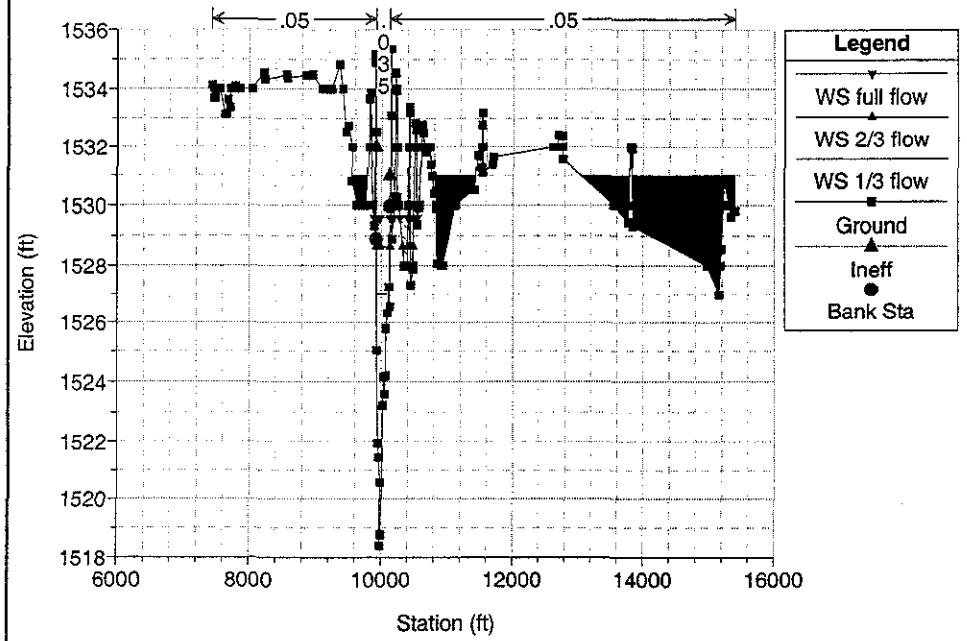

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main Schnepf Road Bridge RS = 16.548



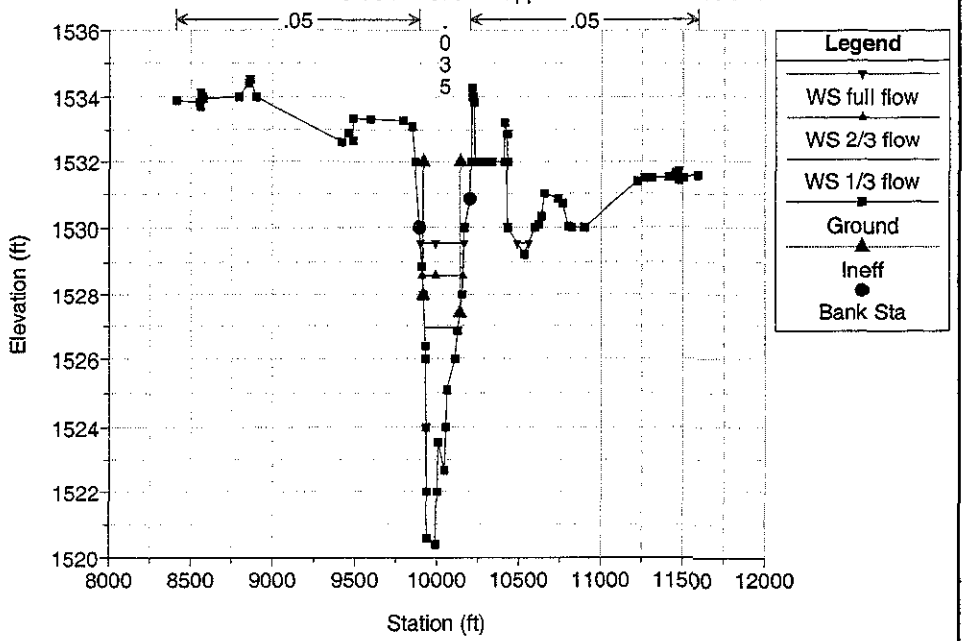
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main downstream of Schnepf Road bridge from h RS = 16.545



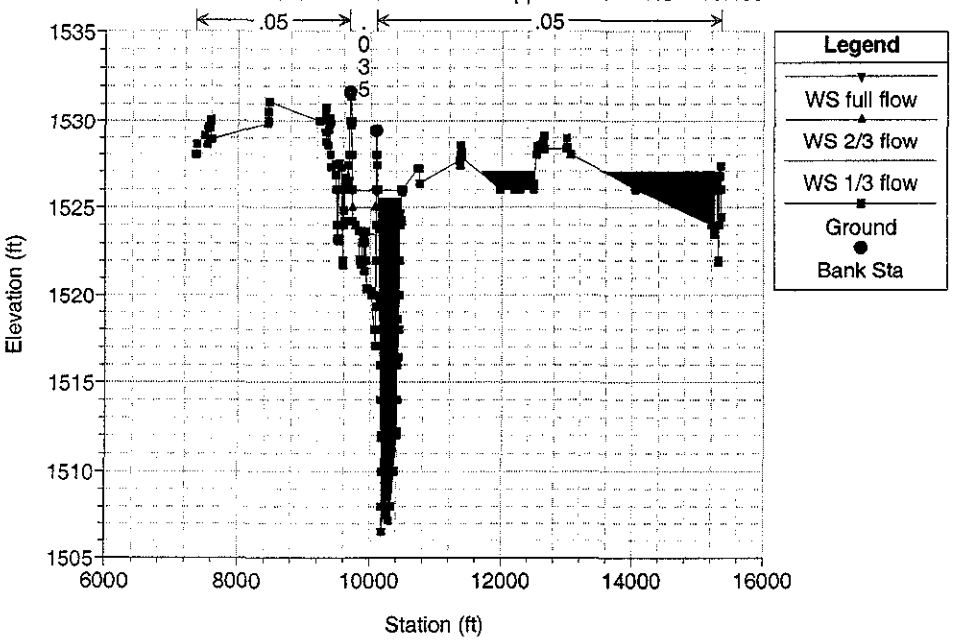

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.542




Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.430

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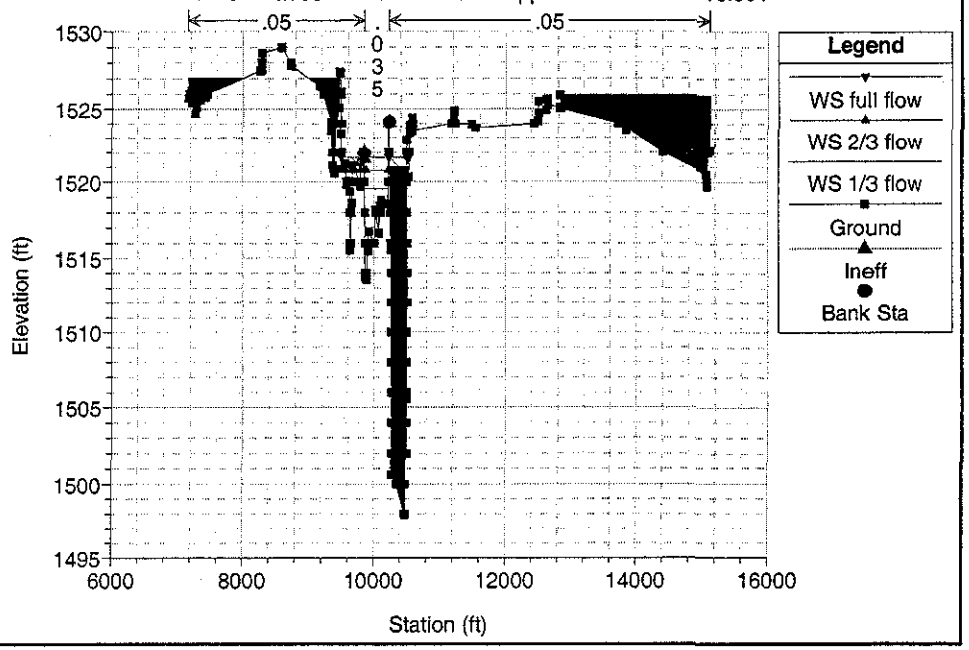
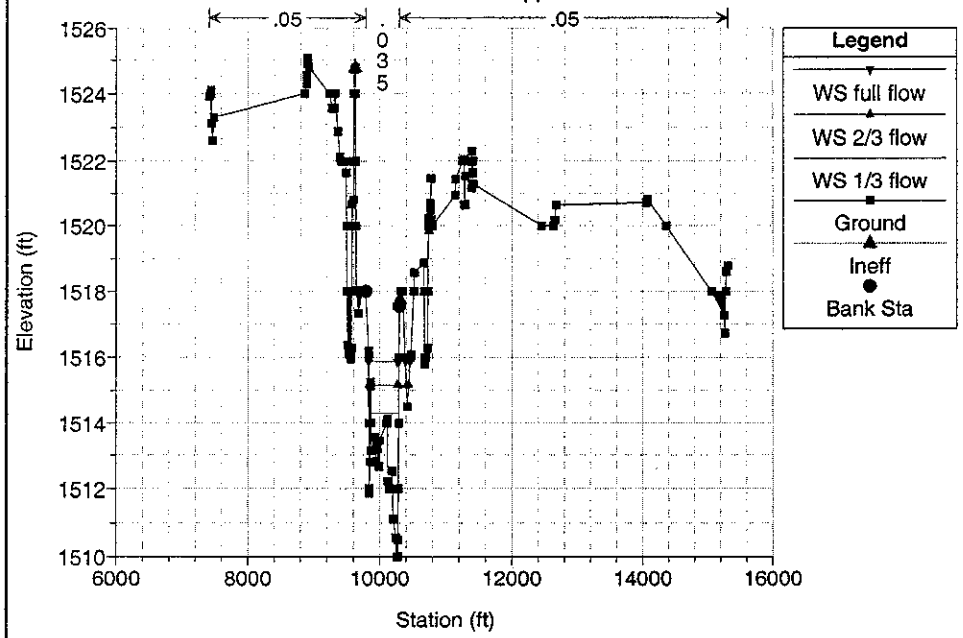


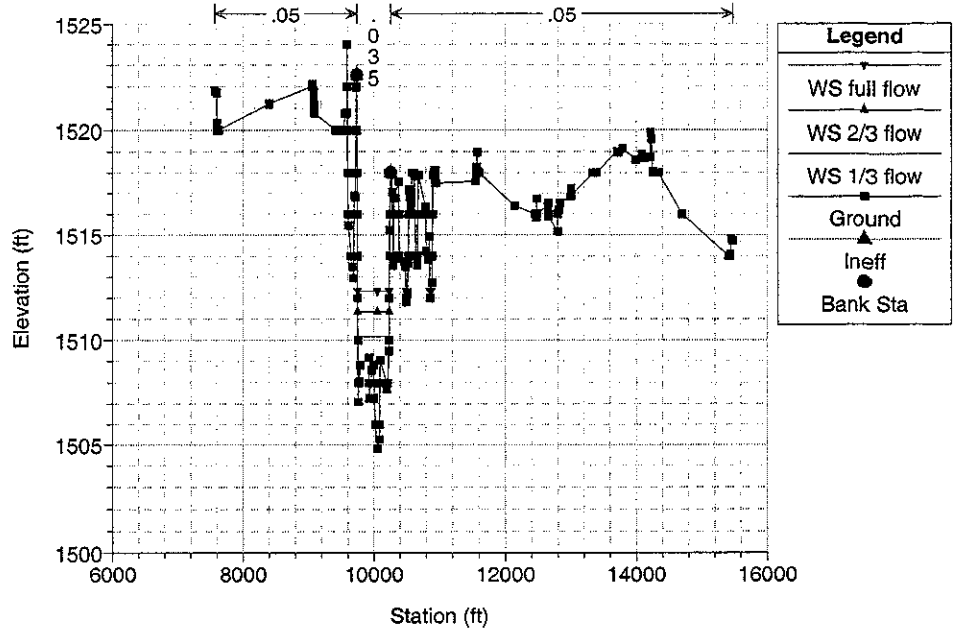
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.169



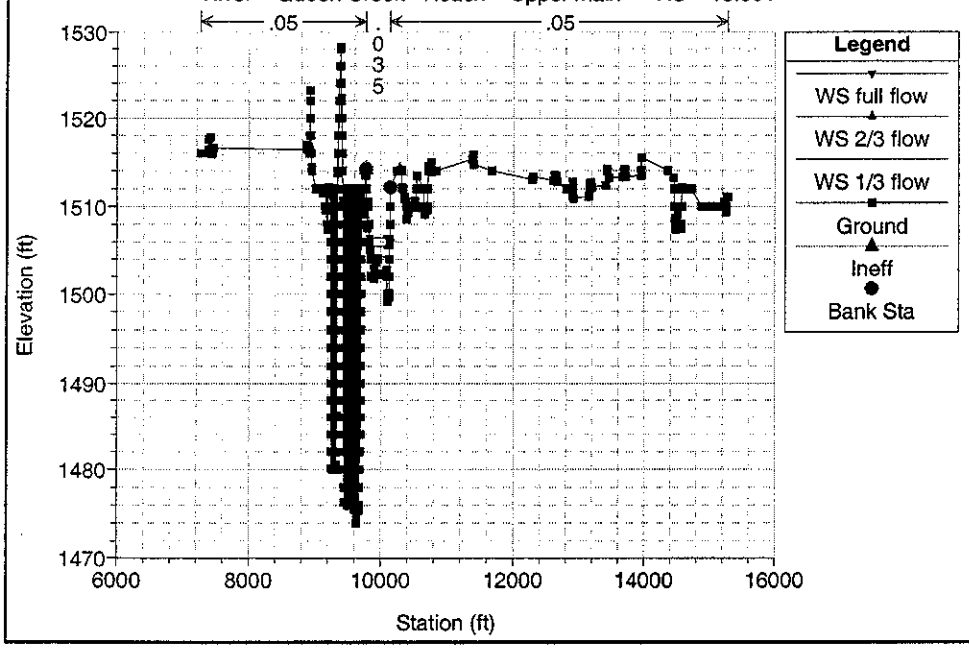

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 16.041



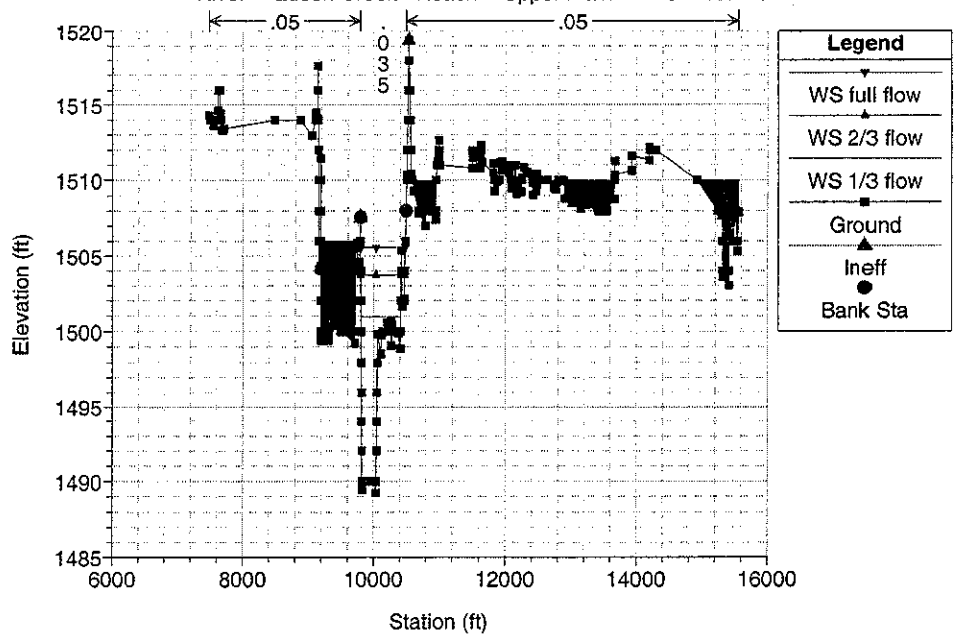

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 15.901



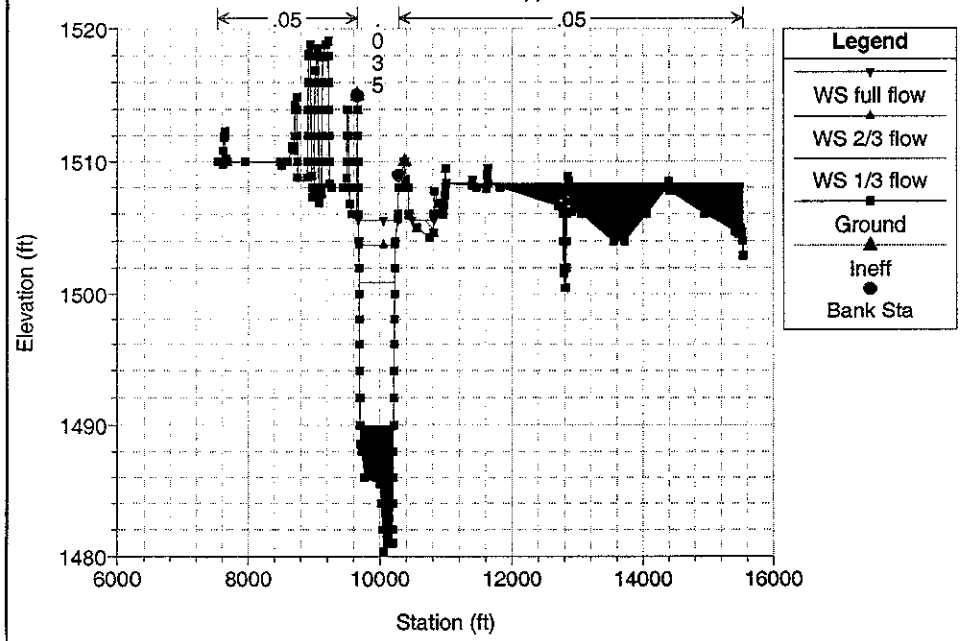

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 15.776



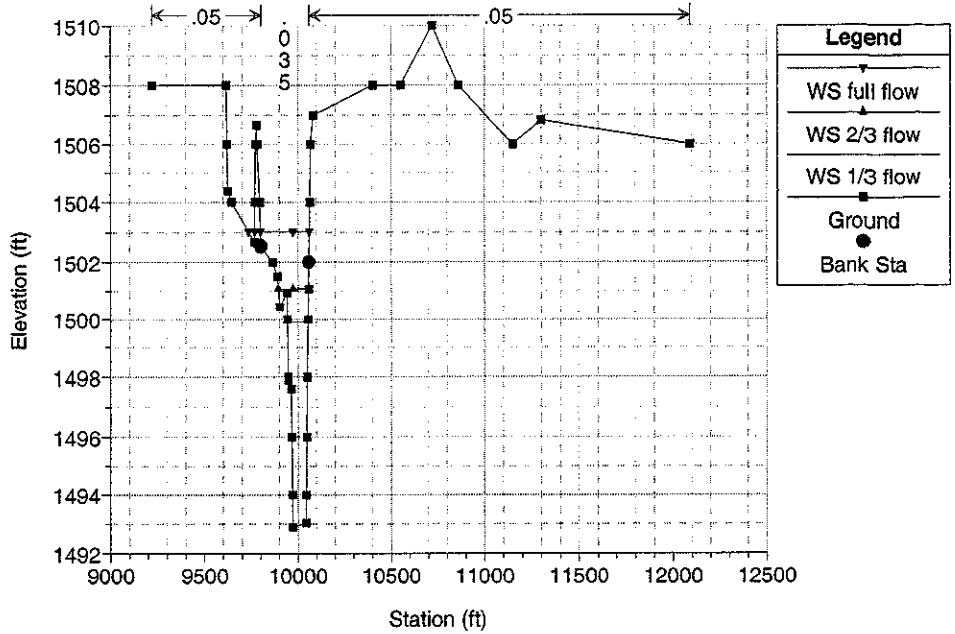
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 15.653




Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 15.523

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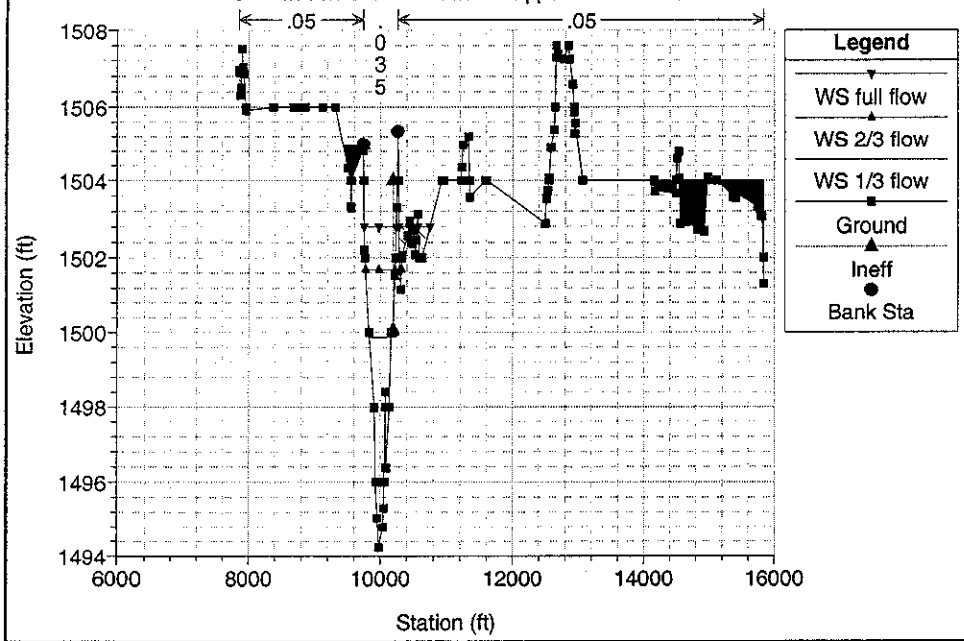


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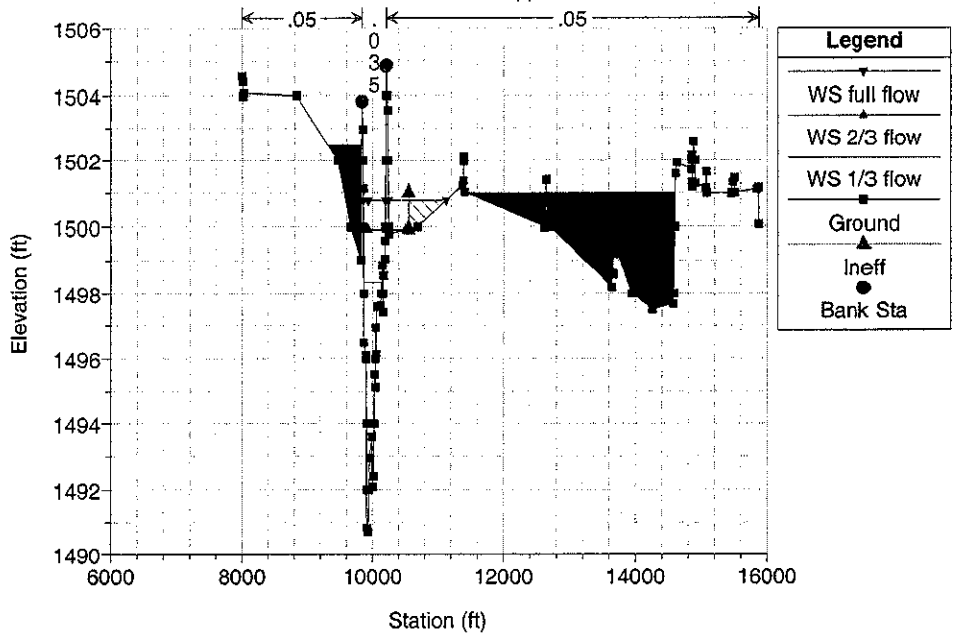

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

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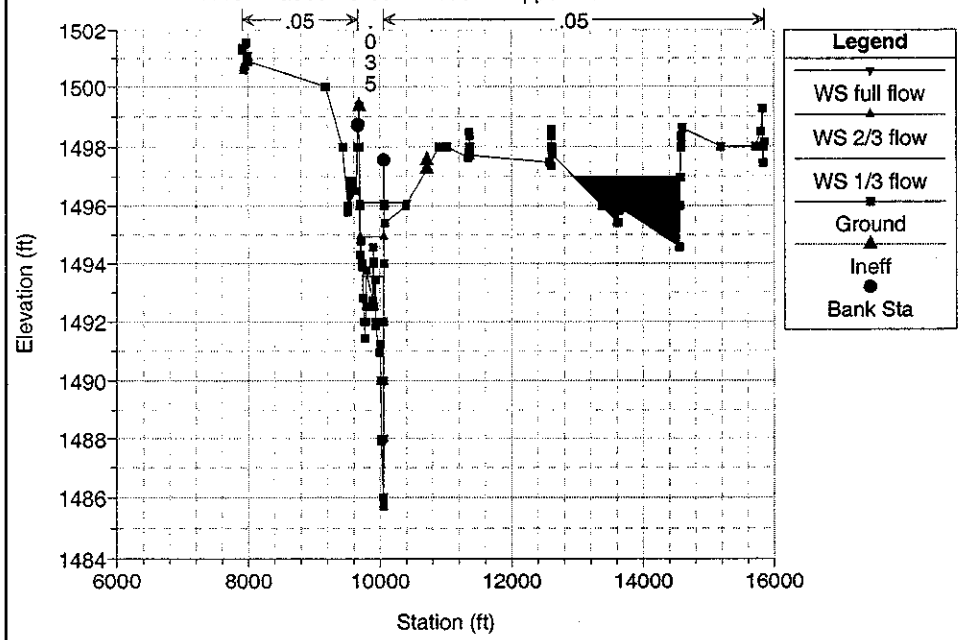
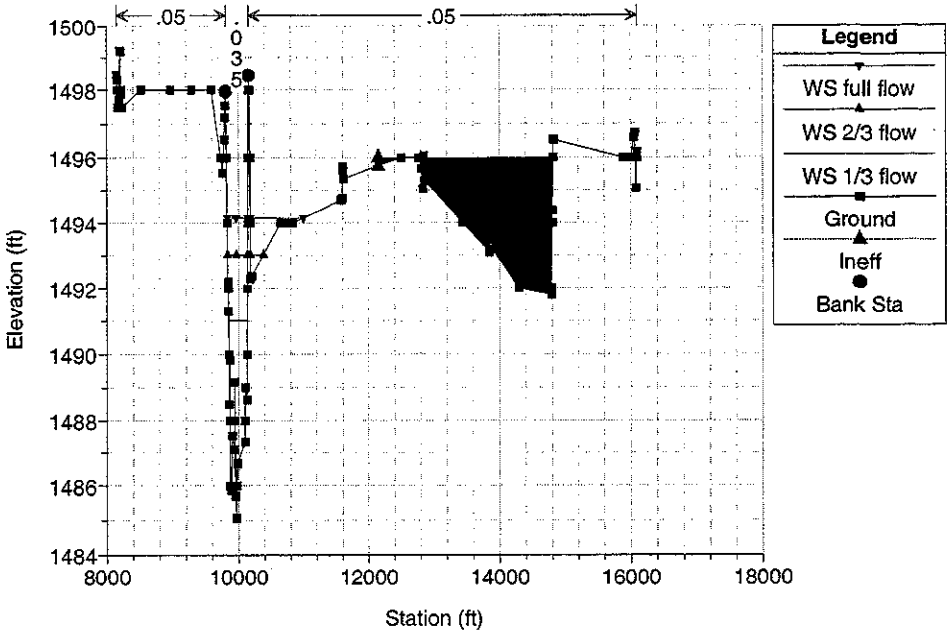


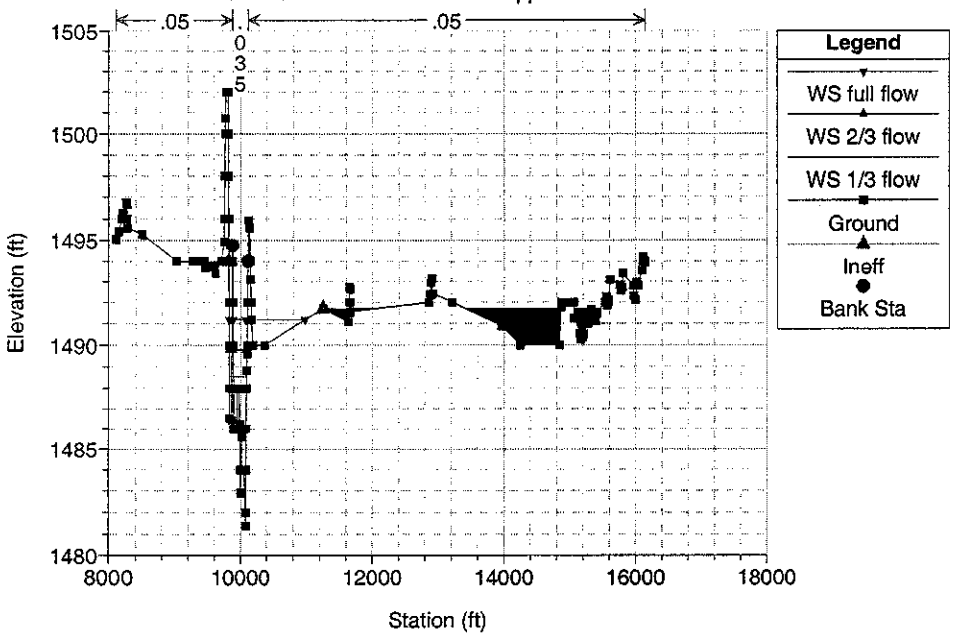

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 15.120



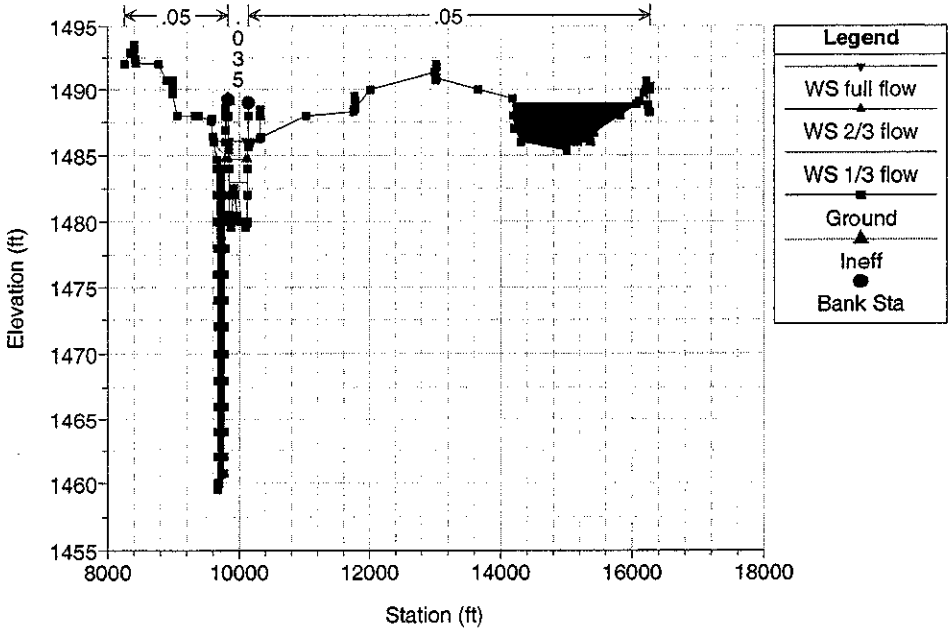

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 14.993



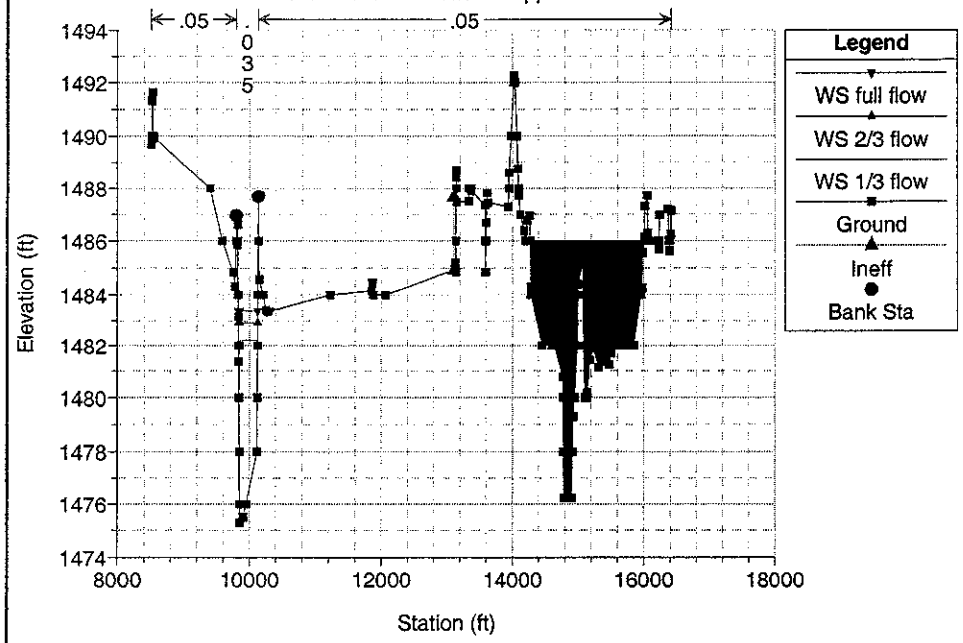

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 14.833



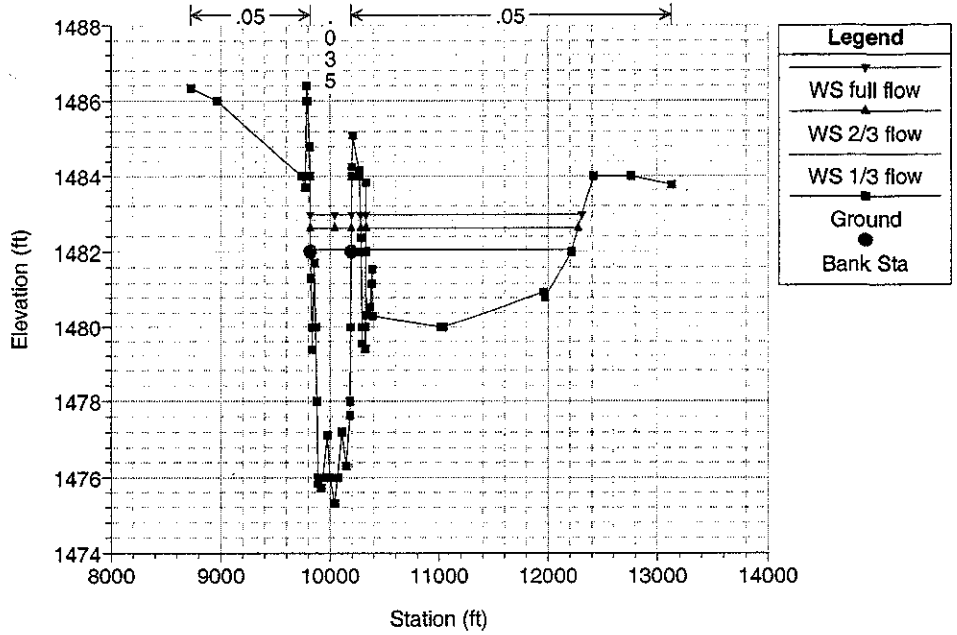
Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main RS = 14.666



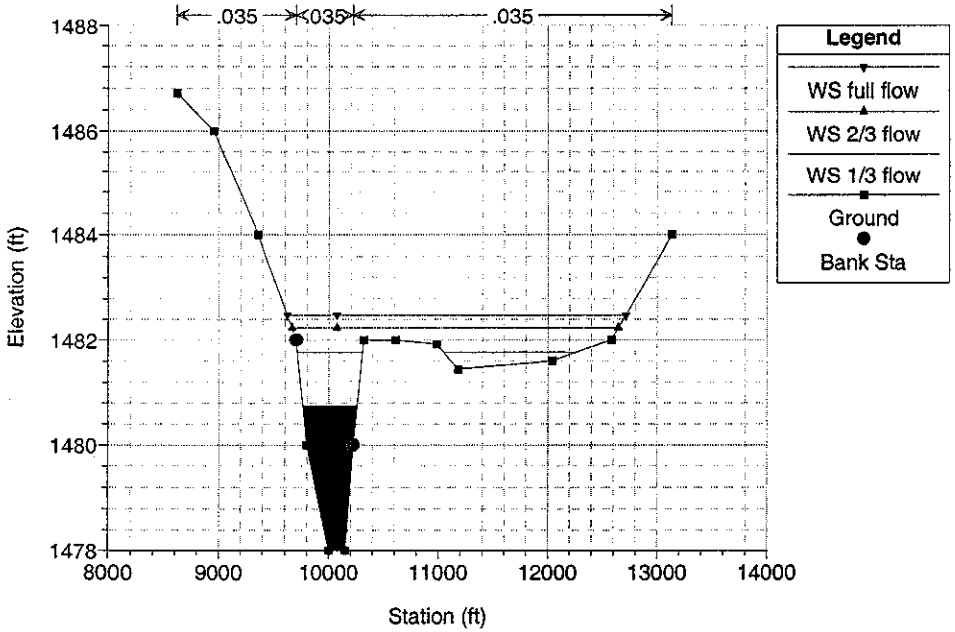

Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main upstream Vineyard Road RS = 14.512




Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

River = Queen Creek Reach = Upper main Vineyard Road RS = 14.489

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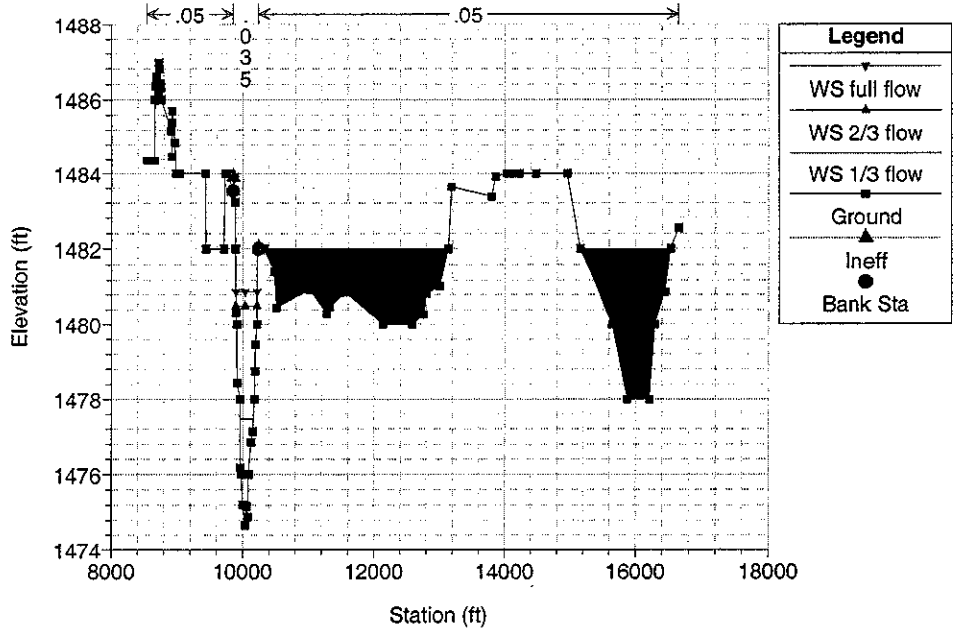
River = Queen Creek Reach = Upper main Vineyard Road downstream RS = 14.479



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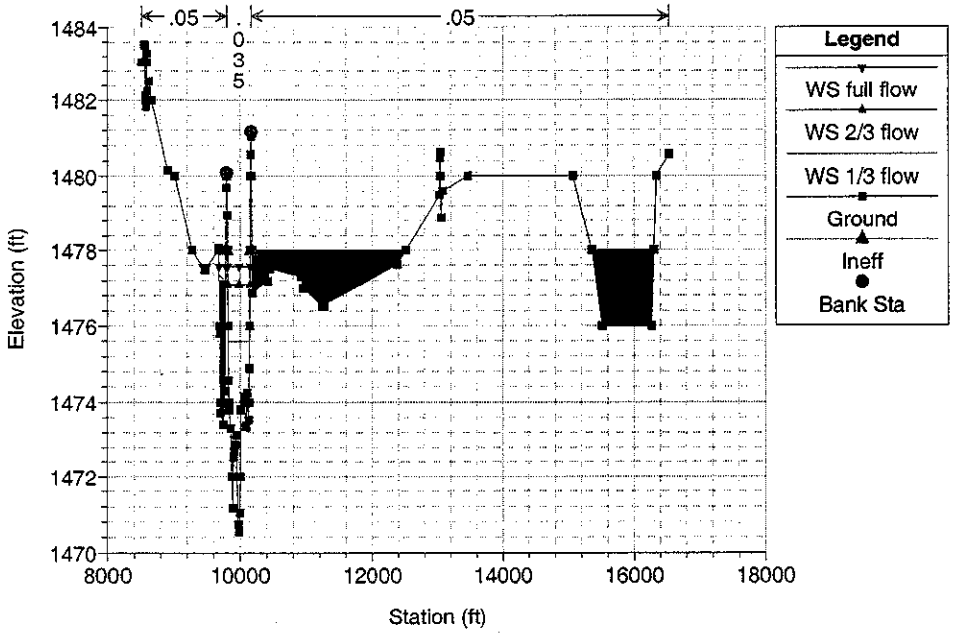


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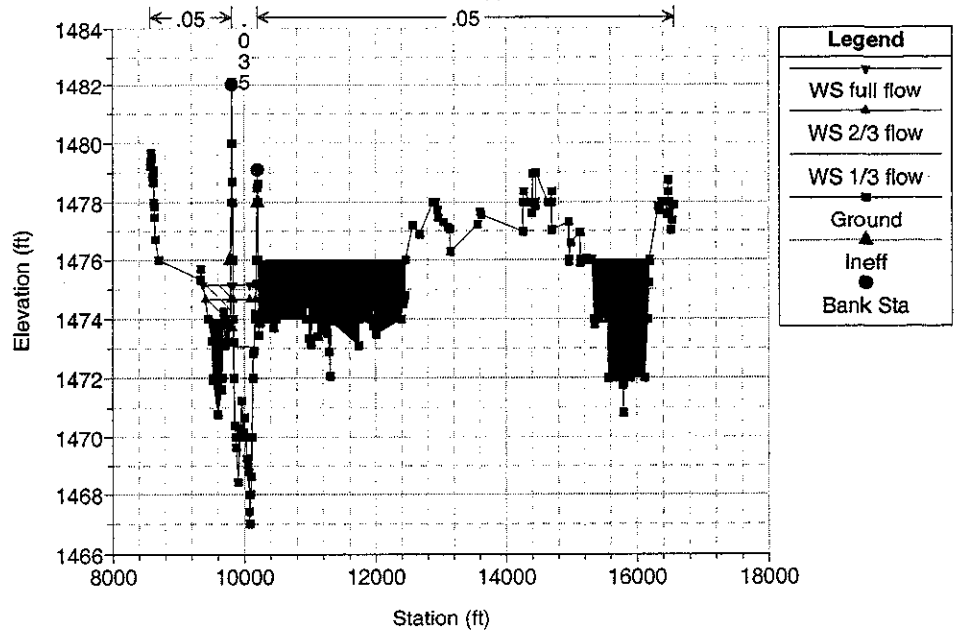


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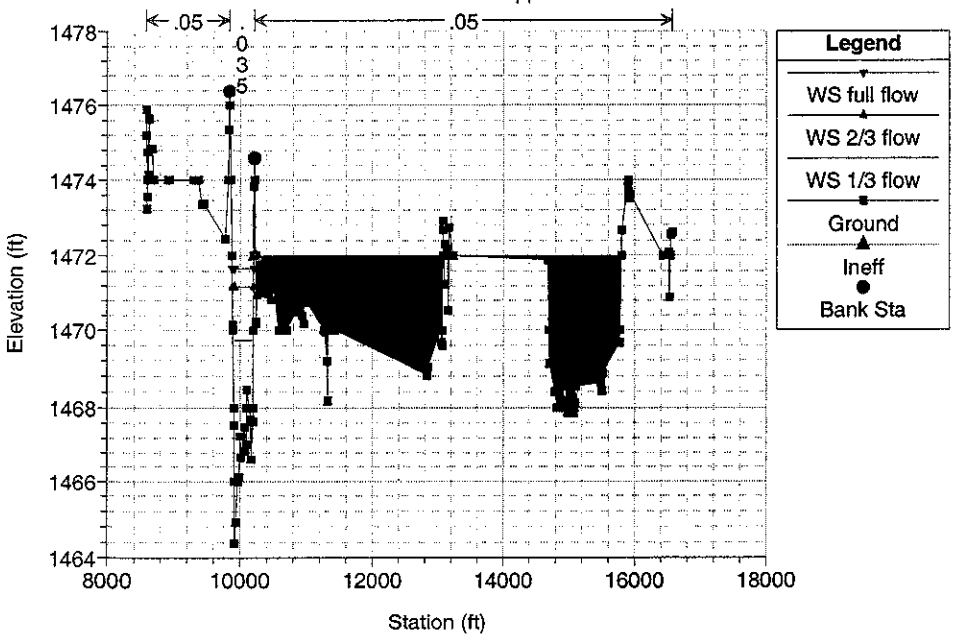


Rittenhouse FRS_upper three flow Three flow Upper main model 03/20/2002 9:30:44 AM

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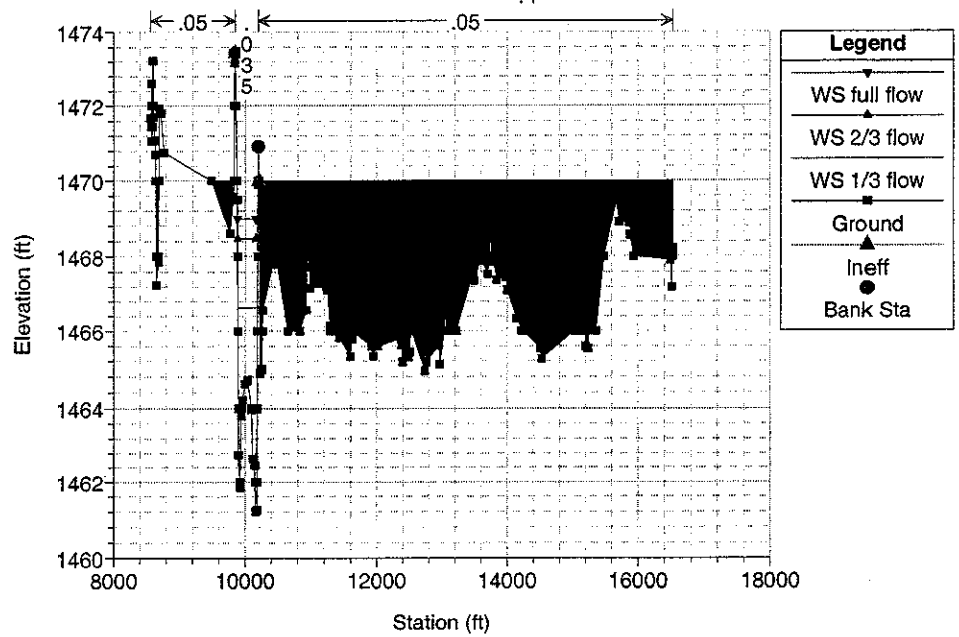

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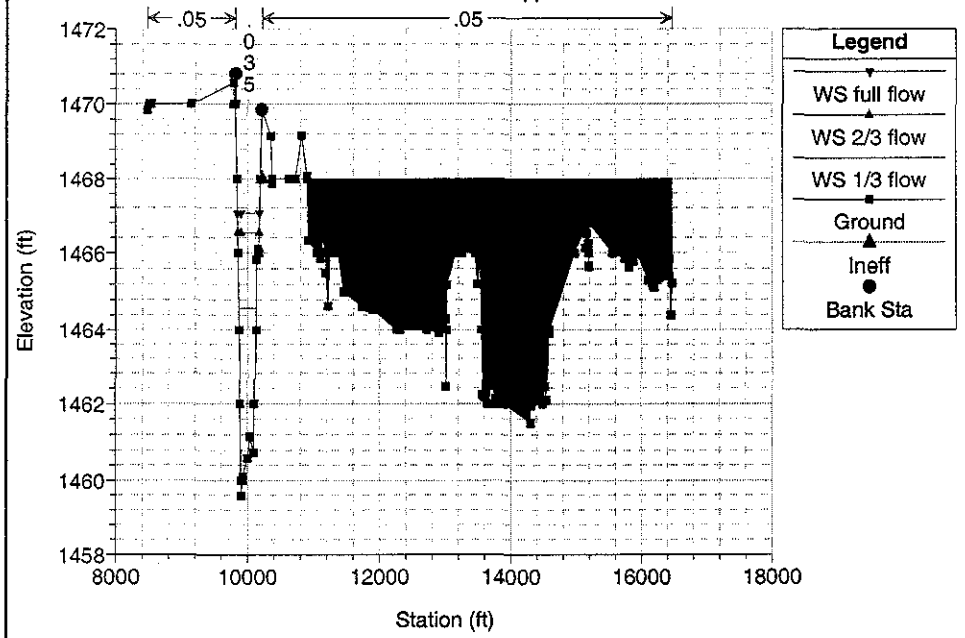


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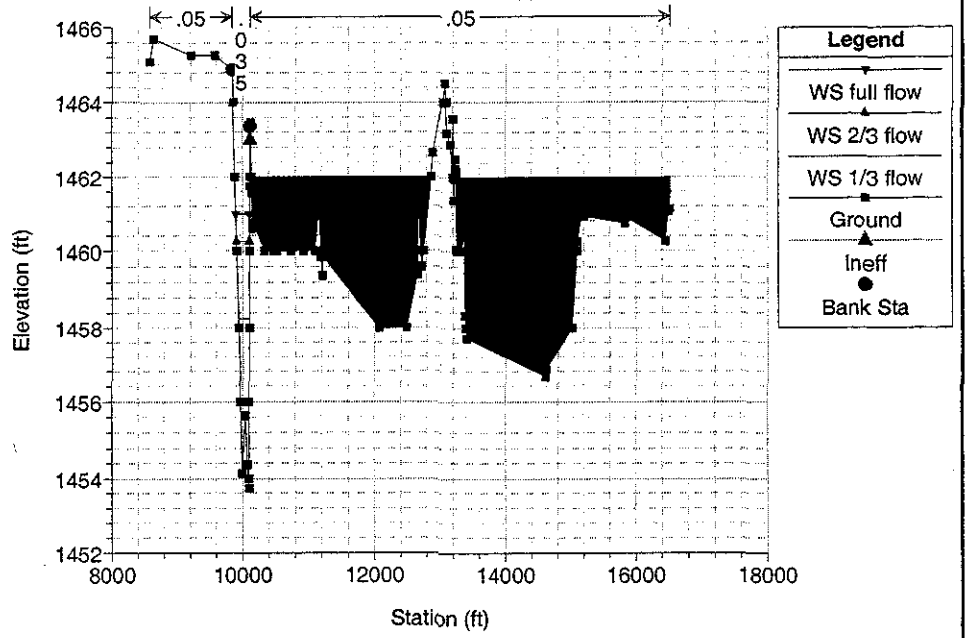


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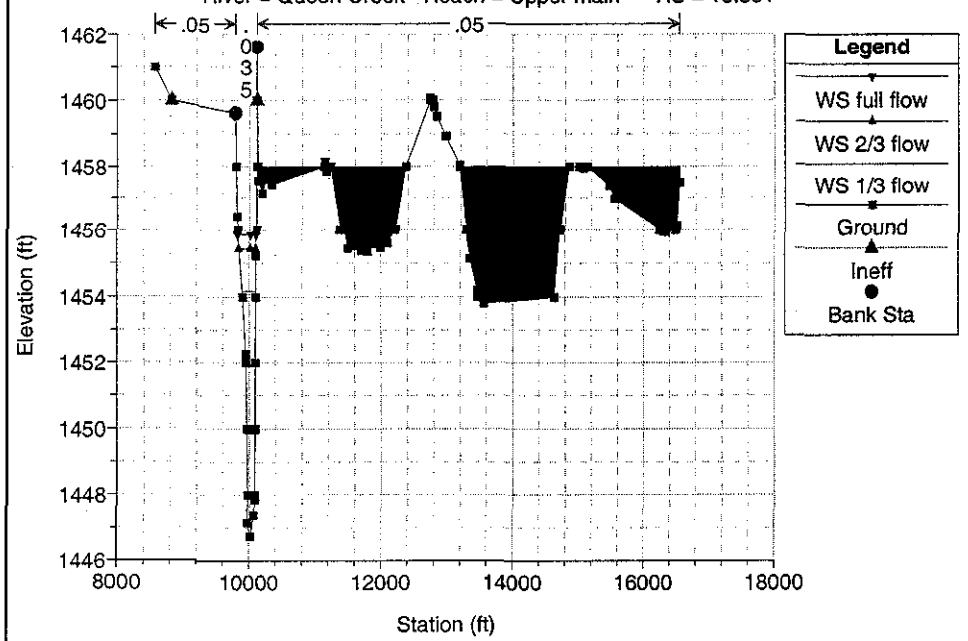

## D.2 UPSTREAM LEFT OVERBANK HEC-RAS MODEL, LEFTCAP.PRJ (FOR THREE FLOWS)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Rittenhouse FRS_Left CAP Floodplain
Project File : LeftCAP.prj
Run Date and Time: 03/20/2002 1:05:16 PM

Project in English units

Project Description:
Spillway Inundation Study for Rittenhouse FRS - Three Spillway Flow Scenario

Left Bank Over top flow condition. Left bank from CAP to Schnepf Road

Model Vertical Datum: 1988 NAVD
Starting Water Surface Elevations were obtained through upstream main channel HEC-RAS modeling results.

FCD 98-33

Michael Baker Jr., Inc. 03/2002

PLAN DATA

Plan Title: Left Overbank Three Spillway Flows
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\LeftCAP.P01

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\LeftCAP.G01

Flow Title : Three Flow Profiles (Mixed Flow Regime)
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\LeftCAP.F01

Plan Description:
Three flow scenario for upstream left overbank area

This model are adequate
for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections = | 10 | Mulitple Openings = | 0 |
| | Culverts = | 0 | Inline Weirs = | 0 |
| | Bridges = | 0 | | |

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01

Maximum number of interations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Three Flow Profiles (Mixed Flow Regime)
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\LeftCAP.F01

Flow Data (cfs)

| River | Reach | RS | PF 1/3 flow | PF 2/3 flow | PF full flow |
|---|---|---|---|---|---|
| Queen Creek | Upper left | 17.817 | 230 | 780 | 1430 |
| Queen Creek | Upper left | 17.055 | 230 | 780 | 1430 |
| Queen Creek | Upper left | 16.904 | 230 | 780 | 1430 |
| Queen Creek | Upper left | 16.733 | 4667 | 9333 | 14000 |
| Queen Creek | Upper left | 16.563 | 4667 | 9333 | 14000 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | Upper left | PF 1/3 flow | Critical | Known WS = 1527.75 |
| Queen Creek | Upper left | PF 2/3 flow | Critical | Known WS = 1530.01 |
| Queen Creek | Upper left | PF full flow | Critical | Known WS = 1531.82 |

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\LeftCAP.G01

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 17.817

INPUT
Description:
Station Elevation Data num= 224

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8560.4 | 1565.91 | 8877.94 | 1565.59 | 9421.79 | 1564 | 9449.71 | 1564 | 9545.02 | 1565.14 |
| 9581.46 | 1566 | 9600.69 | 1567.06 | 9603.85 | 1566 | 9609.54 | 1564.15 | 9628.02 | 1564.53 |
| 9632.03 | 1565.44 | 9634.71 | 1564 | 9638.38 | 1562 | 9642.04 | 1560 | 9645.45 | 1558 |
| 9648.37 | 1556.17 | 9663.43 | 1557.32 | 9665.45 | 1556 | 9669.09 | 1554 | 9671.52 | 1552.73 |
| 9672.29 | 1552 | 9672.56 | 1551.8 | 9695.34 | 1551.8 | 9695.65 | 1552 | 9696.89 | 1552.83 |
| 9701.53 | 1553.11 | 9702.79 | 1554 | 9705.62 | 1556 | 9708.45 | 1558 | 9711.28 | 1560 |
| 9714.24 | 1562 | 9717.29 | 1563.91 | 9721.47 | 1563.55 | 9722.16 | 1564 | 9725.2 | 1566 |
| 9728.24 | 1568 | 9731.29 | 1570 | 9734.33 | 1572 | 9736.78 | 1573.61 | 9740.94 | 1572.64 |
| 9753.43 | 1572.16 | 9757.16 | 1572 | 9760.39 | 1571.71 | 9763.72 | 1570 | 9767.6 | 1568 |
| 9771.42 | 1566 | 9775.17 | 1564 | 9778.92 | 1562 | 9780.42 | 1561.2 | 9809.46 | 1561.1 |
| 9822.06 | 1562 | 9839.52 | 1562.43 | 9843.19 | 1562 | 9860.25 | 1560 | 9864.11 | 1559.46 |
| 9868.76 | 1560 | 9888.57 | 1561.88 | 9936.59 | 1561.94 | 9941.93 | 1560 | 9946.34 | 1558.73 |
| 9964.27 | 1558 | 9976.41 | 1557.45 | 9984.05 | 1556 | 9988.07 | 1555.23 | 10021.18 | 1555.17 |
| 10022.42 | 1556 | 10025.38 | 1558 | 10028.29 | 1560 | 10031.2 | 1562 | 10031.55 | 1562.24 |
| 10106.99 | 1562.6 | 10130.31 | 1562 | 10149.92 | 1561.53 | 10205.58 | 1561.95 | 10228.34 | 1562 |
| 10273.54 | 1562.54 | 10280.98 | 1562 | 10298.25 | 1560.84 | 10341.5 | 1561.47 | 10345.84 | 1562 |
| 10352.11 | 1562.97 | 10362.93 | 1562.97 | 10398.59 | 1562.37 | 10415.37 | 1563.43 | 10435.53 | 1563.34 |
| 10438.68 | 1562 | 10443.41 | 1560 | 10446.27 | 1559.08 | 10463.11 | 1559.29 | 10469.41 | 1560 |
| 10477.25 | 1560.87 | 10532.62 | 1561.07 | 10586.9 | 1560.67 | 10605.43 | 1560.96 | 10655.77 | 1560.61 |
| 10675.96 | 1561.38 | 10684.81 | 1560 | 10692.48 | 1558.8 | 10729.47 | 1559.5 | 10732.9 | 1560 |
| 10741.21 | 1561.3 | 10815.96 | 1562 | 10860.48 | 1562.7 | 10870.06 | 1562 | 10875 | 1561.65 |
| 10880.77 | 1562 | 10884.14 | 1562.21 | 10910.86 | 1562.47 | 10934.47 | 1562 | 10945.88 | 1561.78 |
| 10959.12 | 1560.98 | 10998.56 | 1561.48 | 11184.83 | 1561.8 | 11190.57 | 1561.76 | 11221.73 | 1561.59 |
| 11232.31 | 1560.7 | 11246.15 | 1560.62 | 11279.59 | 1560.64 | 11285.05 | 1562 | 11293.03 | 1564 |
| 11294.94 | 1564.48 | 11333.41 | 1564.18 | 11335.82 | 1564 | 11360.27 | 1562 | 11360.39 | 1561.99 |

```
 11367.3    156011380.96 1558.9311397.78 1559.1511402.46    156011411.49 1561.71
11413.63    156211428.22    156411443.02    156611449.81  1566.9 11453.1    1566
11459.77    156411463.88 1562.7711476.69 1562.63 11480.6    156211494.03 1560.02
11509.68  1560.211528.33 1560.46 11536.6    156211547.14    1564 11552.8 1565.09
11624.18 1565.49 11668.2  1565.711678.56 1565.1711702.58 1565.5811935.18 1564.67
11951.85    156411966.32 1563.4211974.04    156411984.54  1564.812055.91 1564.79
 12106.5 1565.1412263.14 1565.7612352.56 1564.6112364.52    156412374.51  1563.5
12396.05 1563.4312431.05 1563.4812481.32 1563.2212497.01 1562.4812516.75 1562.82
12629.91 1563.0212775.33 1562.9212805.81 1563.5812824.97    156412908.96 1565.76
13051.84 1565.08 13296.4 1564.8813304.01 1564.5113313.13 1565.0813501.86  1564.4
13506.82    156413512.63 1563.5213521.45    156413527.93 1564.3813554.19    1564
13560.16  1563.9 13643.3    156413763.38    156414205.25 1563.2614342.59 1563.05
14349.38 1562.0814357.57 1562.7314481.71 1563.2514489.21 1562.6914503.87 1563.17
14514.45 1562.5214525.37 1563.0615092.58    156415362.39 1565.4315386.83    1564
15397.27  1563.215408.54    156415417.86 1564.8915459.81  1564.315514.43  1565.2
 15742.8 1565.4415761.42 1565.49 15807.2  1565.9 15844.9 1565.3116095.56 1565.58
16097.29    156616105.52    156816113.91    157016120.97 1571.7916144.93 1571.65
16150.94    157016158.14    156816164.63  1566.216215.85 1566.1516232.03 1566.07
16326.01 1566.2616334.26 1566.2916564.73 1567.4316599.29    156816638.95    1568
16657.69    156816683.36 1568.4416767.39 1568.5416989.13 1569.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  8560.4     .04 9936.59    .04511285.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9936.5911285.05              680   597.3     660             .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 9600.6916989.13 1567.06

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1564.82   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.04   Wt. n-Val.                0.040
  W.S. Elev (ft)            1564.78   Reach Len. (ft)          680.00     597.30     660.00
  Crit W.S. (ft)            1564.53   Flow Area (sq ft)        152.11
  E.G. Slope (ft/ft)       0.005244   Area (sq ft)             152.11
  Q Total (cfs)              230.00   Flow (cfs)               230.00
  Top Width (ft)             360.93   Top Width (ft)           360.93
  Vel Total (ft/s)             1.51   Avg. Vel. (ft/s)           1.51
  Max Chl Dpth (ft)            0.78   Hydr. Depth (ft)           0.42
  Conv. Total (cfs)          3176.2   Conv. (cfs)              3176.2
  Length Wtd. (ft)           680.00   Wetted Per. (ft)         360.94
  Min Ch El (ft)            1567.06   Shear (lb/sq ft)           0.14
  Alpha                        1.00   Stream Power (lb/ft s)     0.21
  Frctn Loss (ft)              4.15   Cum Volume (acre-ft)      14.13      26.71      15.48
  C & E Loss (ft)              0.00   Cum SA (acres)            16.64      14.85      31.23

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)            1565.32   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.07   Wt. n-Val.                0.040
  W.S. Elev (ft)            1565.25   Reach Len. (ft)          680.00     597.30     660.00
  Crit W.S. (ft)            1564.90   Flow Area (sq ft)        365.36
  E.G. Slope (ft/ft)       0.005756   Area (sq ft)             365.36
  Q Total (cfs)              780.00   Flow (cfs)               780.00
  Top Width (ft)             554.19   Top Width (ft)           554.19
  Vel Total (ft/s)             2.13   Avg. Vel. (ft/s)           2.13
  Max Chl Dpth (ft)            1.25   Hydr. Depth (ft)           0.66
  Conv. Total (cfs)         10281.0   Conv. (cfs)             10281.0
  Length Wtd. (ft)           680.00   Wetted Per. (ft)         554.20
  Min Ch El (ft)            1567.06   Shear (lb/sq ft)           0.24
  Alpha                        1.00   Stream Power (lb/ft s)     0.51
  Frctn Loss (ft)              4.07   Cum Volume (acre-ft)      47.29      84.83     220.37
  C & E Loss (ft)              0.00   Cum SA (acres)            45.24      53.63     231.55

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF full flow
```

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1565.64 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | 0.040 | | |
| W.S. Elev (ft) | 1565.53 | Reach Len. (ft) | 680.00 | 597.30 | 660.00 |
| Crit W.S. (ft) | 1565.16 | Flow Area (sq ft) | 537.81 | | |
| E.G. Slope (ft/ft) | 0.006774 | Area (sq ft) | 537.81 | | |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 663.10 | Top Width (ft) | 663.10 | | |
| Vel Total (ft/s) | 2.66 | Avg. Vel. (ft/s) | 2.66 | | |
| Max Chl Dpth (ft) | 1.53 | Hydr. Depth (ft) | 0.81 | | |
| Conv. Total (cfs) | 17374.9 | Conv. (cfs) | 17374.9 | | |
| Length Wtd. (ft) | 680.00 | Wetted Per. (ft) | 663.12 | | |
| Min Ch El (ft) | 1567.06 | Shear (lb/sq ft) | 0.34 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.91 | | |
| Frctn Loss (ft) | 4.05 | Cum Volume (acre-ft) | 79.27 | 131.52 | 405.62 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 62.47 | 53.88 | 303.43 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9110.88 | 9248.50 | 8.49 | 13.00 | 94.31 | 3.69 | 0.14 | 0.65 |
| 9248.50 | 9386.11 | 98.01 | 65.63 | 137.62 | 42.61 | 0.48 | 1.49 |
| 9386.11 | 9523.73 | 123.51 | 73.48 | 129.01 | 53.70 | 0.57 | 1.68 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8973.26 | 9110.88 | 14.63 | 19.51 | 115.52 | 1.88 | 0.17 | 0.75 |
| 9110.88 | 9248.50 | 120.56 | 74.17 | 137.62 | 15.46 | 0.54 | 1.63 |
| 9248.50 | 9386.11 | 305.38 | 129.54 | 137.62 | 39.15 | 0.94 | 2.36 |
| 9386.11 | 9523.73 | 335.01 | 136.94 | 137.62 | 42.95 | 1.00 | 2.45 |
| 9523.73 | 9661.35 | 4.42 | 5.22 | 25.81 | 0.57 | 0.20 | 0.85 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8835.64 | 8973.26 | 4.95 | 8.18 | 74.82 | 0.35 | 0.11 | 0.60 |
| 8973.26 | 9110.88 | 85.63 | 57.79 | 137.62 | 5.99 | 0.42 | 1.48 |
| 9110.88 | 9248.50 | 262.45 | 113.16 | 137.62 | 18.35 | 0.82 | 2.32 |
| 9248.50 | 9386.11 | 509.75 | 168.53 | 137.62 | 35.65 | 1.22 | 3.02 |
| 9386.11 | 9523.73 | 547.60 | 175.93 | 137.62 | 38.29 | 1.28 | 3.11 |
| 9523.73 | 9661.35 | 19.61 | 14.23 | 37.82 | 1.37 | 0.38 | 1.38 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 17.704

INPUT
Description:
Station Elevation Data num= 230

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8290 | 1562 | 9250 | 1560.8 | 9425.72 | 1560 | 9448.76 | 1560 | 9495.62 | 1560.8 |
| 9510.04 | 1561.27 | 9534.47 | 1560.65 | 9535.91 | 1560 | 9540.31 | 1558 | 9544.95 | 1556 |
| 9548.68 | 1554.4 | 9563.07 | 1554.98 | 9565 | 1554 | 9568.75 | 1552 | 9569.34 | 1551.68 |
| 9570.48 | 1551.82 | 9593.58 | 1551.82 | 9593.87 | 1552 | 9594.96 | 1552.67 | 9598.2 | 1552 |
| 9598.67 | 1551.9 | 9598.8 | 1552 | 9601.25 | 1554 | 9603.69 | 1556 | 9606.14 | 1558 |
| 9608.63 | 1560 | 9610.11 | 1561.06 | 9616.07 | 1561.38 | 9617.14 | 1562 | 9620.45 | 1564 |
| 9623.76 | 1566 | 9627.07 | 1568 | 9630.38 | 1570 | 9633.69 | 1572 | 9635.64 | 1573.18 |

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 9639.46 1572.27 9651.73 1572.13 9652.61    1572 9657.84  1571.2 9659.81    1570
 9663.24    1568 9666.87    1566  9670.5    1564 9674.13    1562  9676.9 1560.47
 9715.97    1560 9780.71  1559.1 9788.34    1558 9797.29 1556.86 9804.71    1558
 9809.59 1558.78 9825.43 1558.07 9825.92    1558  9841.2 1556.26 9849.52 1557.36
 9860.91    1558  9876.9 1558.89 9894.21 1559.22 9946.66    1558 9957.49 1556.52
 9958.55    1556 9962.66    1554 9965.01 1552.99 9973.76  1552.8 9979.43 1552.05
    9992  1552.7 9996.56    1552   10000 1551.5210007.65    155210018.58 1552.68
10036.83 1552.8210038.85    155410042.29    155610045.72    155810055.59 1558.77
10176.29 1559.4810271.23 1559.3110280.45    1558 10284.8 1557.3710290.11    1558
10303.02 1559.4610451.34 1559.1310453.92    155810458.59    155610459.72 1555.61
10477.71    1556 10486.3 1556.1610541.27 1557.0610588.53 1556.2610614.09 1557.11
10661.52 1557.04 10680.8 1556.3410719.83 1556.4610725.48    155610738.81 1554.92
10748.09    155610763.74 1557.7610793.57 1557.4810814.28 1557.3210824.07    1556
10824.19 1555.9910824.82    155610845.02 1556.5110882.15 1556.6510892.05 1557.64
10901.84    155810902.91 1558.0310912.06    156010913.44 1560.2410936.26  1559.8
10953.87 1558.7710981.89 1559.8511003.16 1559.9811003.82    156011032.43 1560.82
11103.11    156211111.59    156211124.02    156211139.33    1562 11189.4 1561.84
11203.66    1560   11219    155811228.89 1556.7111239.28  1556.111251.46    1558
11264.05 1559.8511265.34    156011284.63    156211294.17    156311311.92    1562
11313.74 1561.9111334.16 1561.3811383.68 1561.4711395.05    156011421.11 1559.39
11442.01 1558.0411477.75 1558.9611496.32 1558.7411503.48    155811505.21 1557.86
11535.33 1557.8311549.04 1557.1911558.07    155811575.07 1559.2611608.81    1560
11618.95 1560.2911621.53    156011631.28  1558.911643.24 1559.8611662.39 1559.56
11686.62 1558.98 11702.5    155811707.45  1557.711719.68 1557.83 11722.4    1558
11787.91    156011815.64 1560.5111826.93 1560.0111850.46 1561.42 12061.5 1561.06
12075.58  1560.212086.11 1560.0412087.16    156012096.43 1559.1712106.92    1560
 12111.1 1560.3312148.32 1560.6912400.74    156212434.36 1562.3612446.61    1562
12450.16 1561.8712488.99    156112500.79    156012503.75 1559.7612511.82 1559.65
12582.78  1559.312607.61 1559.7712617.71 1559.5612698.96 1559.4812722.17    1560
12733.04 1560.4513311.46  1560.913443.95 1560.84 13450.5 1560.5413468.26 1560.55
13473.11    156013479.26 1559.3113485.67    156013492.97 1560.7213508.06 1561.15
 13516.4 1560.5813947.47 1560.4413955.32    156013956.89  1559.913959.12    1560
13969.91 1560.4914139.85 1560.4214155.98    156014199.74 1559.0114230.13  1559.7
14255.82 1559.8714282.06 1558.0114327.02 1559.4514346.03    156014358.44    1560
14444.63    156014471.67    156014555.79    156015737.97    156215756.37    1562
15817.42    156215855.04    156215915.43    156216015.51  1562.216026.24    1562
 16049.6  1561.816072.03    156216091.41    156416093.41  1564.116102.23    1564
16117.88 1563.8116139.74 1563.3916145.11 1563.4616157.23 1563.23   16184 1563.72
16373.29 1563.7316432.18    156216584.53    156216705.73 1562.1616731.01 1562.22

Manning's n Values         num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
    8290     .04 9510.04     .03 9894.21    .03510055.59     .0510459.72    .035
10902.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9894.2110913.44              720     676     500              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    961716731.01    1562
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8290    9660    1560    966116731.01    1561

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1560.67  Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.07  Wt. n-Val.                0.034
  W.S. Elev (ft)            1560.60  Reach Len. (ft)          720.00     676.00     500.00
  Crit W.S. (ft)            1560.45  Flow Area (sq ft)        106.89
  E.G. Slope (ft/ft)       0.007558  Area (sq ft)             106.89
  Q Total (cfs)             230.00   Flow (cfs)               230.00
  Top Width (ft)            263.47   Top Width (ft)           263.47
  Vel Total (ft/s)            2.15   Avg. Vel. (ft/s)           2.15
  Max Chl Dpth (ft)           0.60   Hydr. Depth (ft)           0.41
  Conv. Total (cfs)         2645.7   Conv. (cfs)              2645.7
  Length Wtd. (ft)          720.00   Wetted Per. (ft)         263.79
  Min Ch El (ft)            1561.00  Shear (lb/sq ft)           0.19
  Alpha                       1.00   Stream Power (lb/ft s)     0.41
  Frctn Loss (ft)             6.93   Cum Volume (acre-ft)      12.11      26.71      15.48
  C & E Loss (ft)             0.04   Cum SA (acres)            11.77      14.85      31.23


Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
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Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1561.24 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.08 | Wt. n-Val. | 0.036 | | |
| W.S. Elev (ft) | 1561.16 | Reach Len. (ft) | 720.00 | 676.00 | 500.00 |
| Crit W.S. (ft) | 1560.88 | Flow Area (sq ft) | 341.98 | | |
| E.G. Slope (ft/ft) | 0.006237 | Area (sq ft) | 377.12 | 163.98 | 572.62 |
| Q Total (cfs) | 780.00 | Flow (cfs) | 780.00 | | |
| Top Width (ft) | 5559.00 | Top Width (ft) | 861.58 | 1019.23 | 3678.19 |
| Vel Total (ft/s) | 2.28 | Avg. Vel. (ft/s) | 2.28 | | |
| Max Chl Dpth (ft) | 1.16 | Hydr. Depth (ft) | 0.53 | | |
| Conv. Total (cfs) | 9876.4 | Conv. (cfs) | 9876.4 | | |
| Length Wtd. (ft) | 720.00 | Wetted Per. (ft) | 643.53 | | |
| Min Ch El (ft) | 1561.00 | Shear (lb/sq ft) | 0.21 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.47 | | |
| Frctn Loss (ft) | 6.00 | Cum Volume (acre-ft) | 41.49 | 83.71 | 216.04 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 34.18 | 46.65 | 203.68 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1561.59 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.09 | Wt. n-Val. | 0.036 | | |
| W.S. Elev (ft) | 1561.50 | Reach Len. (ft) | 720.00 | 676.00 | 500.00 |
| Crit W.S. (ft) | 1561.16 | Flow Area (sq ft) | 610.86 | | |
| E.G. Slope (ft/ft) | 0.005267 | Area (sq ft) | 720.62 | 511.48 | 1916.88 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 6365.97 | Top Width (ft) | 1146.91 | 1019.23 | 4199.84 |
| Vel Total (ft/s) | 2.34 | Avg. Vel. (ft/s) | 2.34 | | |
| Max Chl Dpth (ft) | 1.50 | Hydr. Depth (ft) | 0.66 | | |
| Conv. Total (cfs) | 19704.9 | Conv. (cfs) | 19704.9 | | |
| Length Wtd. (ft) | 720.00 | Wetted Per. (ft) | 928.27 | | |
| Min Ch El (ft) | 1561.00 | Shear (lb/sq ft) | 0.22 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.51 | | |
| Frctn Loss (ft) | 5.13 | Cum Volume (acre-ft) | 69.45 | 128.02 | 391.10 |
| C & E Loss (ft) | 0.11 | Cum SA (acres) | 48.34 | 46.90 | 271.62 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9252.53 | 9412.95 | 41.93 | 31.66 | 117.93 | 18.23 | 0.27 | 1.32 |
| 9412.95 | 9573.37 | 125.06 | 54.00 | 109.58 | 54.37 | 0.49 | 2.32 |
| 9573.37 | 9733.79 | 63.01 | 21.23 | 36.28 | 27.40 | 0.59 | 2.97 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT  Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8931.68 | 9092.11 | 5.16 | 10.69 | 130.79 | 0.66 | 0.08 | 0.48 |
| 9092.11 | 9252.53 | 44.62 | 42.32 | 160.42 | 5.72 | 0.26 | 1.05 |
| 9252.53 | 9412.95 | 247.57 | 118.32 | 160.42 | 31.74 | 0.74 | 2.09 |
| 9412.95 | 9573.37 | 331.96 | 128.69 | 152.93 | 42.56 | 0.84 | 2.58 |
| 9573.37 | 9733.79 | 150.69 | 41.96 | 38.96 | 19.32 | 1.09 | 3.59 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT  Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8610.84 | 8771.26 | 1.38 | 4.28 | 82.71 | 0.10 | 0.05 | 0.32 |
| 8771.26 | 8931.68 | 26.40 | 32.67 | 160.42 | 1.85 | 0.20 | 0.81 |
| 8931.68 | 9092.11 | 82.72 | 64.84 | 160.42 | 5.78 | 0.40 | 1.28 |
| 9092.11 | 9252.53 | 161.90 | 97.01 | 160.42 | 11.32 | 0.60 | 1.67 |
| 9252.53 | 9412.95 | 424.61 | 173.01 | 160.42 | 29.69 | 1.08 | 2.45 |
| 9412.95 | 9573.37 | 525.59 | 182.96 | 160.58 | 36.75 | 1.14 | 2.87 |
| 9573.37 | 9733.79 | 207.40 | 56.09 | 43.29 | 14.50 | 1.31 | 3.70 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper left  RS: 17.576

INPUT
Description:
Station Elevation Data  num= 170

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7949.55 | 1558.07 | 8249.89 | 1558.71 | 8318.31 | 1559.52 | 9197.79 | 1558 | 9202.82 | 1556 |
| 9255.6 | 1556 | 9267.65 | 1557.49 | 9300.95 | 1556.61 | 9311.01 | 1556 | 9313.2 | 1555.87 |
| 9317.97 | 1554 | 9322.69 | 1552.5 | 9336.82 | 1554 | 9338.33 | 1554.07 | 9338.6 | 1554 |
| 9344.72 | 1552.96 | 9348.42 | 1553.24 | 9349.06 | 1552 | 9350.1 | 1550 | 9351.13 | 1548 |
| 9352.17 | 1546 | 9353.49 | 1544 | 9353.57 | 1543.92 | 9370.26 | 1543.92 | 9370.35 | 1544 |
| 9372.61 | 1546 | 9374.66 | 1548 | 9376.29 | 1550 | 9377.92 | 1551.99 | 9377.94 | 1552 |
| 9383.31 | 1554 | 9387.59 | 1556 | 9391.18 | 1557.75 | 9392.52 | 1557.14 | 9409.38 | 1557 |
| 9415.51 | 1556 | 9416.46 | 1556 | 9423.24 | 1556.7 | 9452.78 | 1557.01 | 9515.44 | 1556.72 |
| 9575.64 | 1556 | 9606.18 | 1556 | 9612.32 | 1556.49 | 9636.65 | 1556 | 9727.81 | 1556 |
| 9789.71 | 1556 | 9951.33 | 1554.86 | 9952.82 | 1554 | 9956.27 | 1552 | 9957.36 | 1551.35 |
| 9964.55 | 1550.38 | 9972.02 | 1552 | 9979.15 | 1553.53 | 9989.05 | 1553.2 | 9993.62 | 1552 |
| 10000.73 | 1550.05 | 10005.99 | 1550 | 10050.28 | 1549.24 | 10071.2 | 1548 | 10073.35 | 1547.87 |
| 10073.71 | 1548 | 10079.64 | 1550 | 10083.23 | 1551.21 | 10095.85 | 1550.76 | 10100.27 | 1550 |
| 10100.69 | 1549.94 | 10101.54 | 1550 | 10120.03 | 1551.25 | 10135.89 | 1550.52 | 10144.65 | 1550.95 |
| 10146.79 | 1552 | 10150.86 | 1554 | 10154.68 | 1555.93 | 10158.23 | 1556 | 10168.15 | 1556 |
| 10265.76 | 1555.45 | 10272.63 | 1554 | 10275.46 | 1553.41 | 10440.3 | 1554 | 10513.38 | 1554.48 |
| 10544.08 | 1554.01 | 10565.42 | 1554.87 | 10608.51 | 1554 | 10623.82 | 1553.67 | 10643.42 | 1554 |
| 10660.18 | 1554.35 | 10705.7 | 1554.11 | 10707.14 | 1554 | 10726.76 | 1552.51 | 10745.27 | 1553.63 |
| 10761.96 | 1552.57 | 10794.96 | 1553.93 | 10815.19 | 1552.49 | 10888.89 | 1552.45 | 11062.08 | 1552.34 |
| 11078.27 | 1553.44 | 11109.65 | 1553.8 | 11110.73 | 1554 | 11121.72 | 1556 | 11123.09 | 1556.25 |
| 11124.22 | 1556 | 11133.17 | 1554 | 11136.17 | 1553.33 | 11204.06 | 1552.75 | 11213.66 | 1554 |
| 11220.68 | 1554.91 | 11230.95 | 1556 | 11232.42 | 1556.16 | 11233.4 | 1556 | 11246.31 | 1554.13 |
| 11283.08 | 1555.83 | 11313.37 | 1556 | 11417.29 | 1557.53 | 11431.37 | 1556.73 | 11443.09 | 1557.57 |
| 11528.37 | 1557.17 | 11549.56 | 1556.22 | 11555.5 | 1556 | 11590.61 | 1555.78 | 11592.76 | 1556 |
| 11614.07 | 1558 | 11625.52 | 1558.85 | 11836.92 | 1558.34 | 11838.88 | 1558 | 11850.2 | 1556.22 |
| 11863.63 | 1557.96 | 11868.5 | 1558 | 11886.62 | 1558.2 | 11891.9 | 1558 | 11901.53 | 1557.83 |
| 12098.06 | 1557.7 | 12110.96 | 1558 | 12469.79 | 1558.68 | 12597.72 | 1558.2 | 12600.16 | 1558 |

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12618.44 1556.5212641.78 1557.4412749.86  1557.812759.79    155812765.22 1558.13
12804.09 1558.1512830.84    1558 12915.9  1557.512962.13 1556.5112993.41 1557.09
13016.45    155613018.64 1555.9213023.06    155613066.27 1557.1413103.51 1557.75
13105.17    155813221.36 1559.38 13607.9 1558.5713650.62 1558.3614186.05    1558
 14601.8    155814694.59    155814833.57    1558 15200.9 1558.9515250.63 1559.09
15280.99    156015657.07    156015772.48    1560 15951.1 1561.5115953.85    1562
15957.76 1562.62 15981.1  1562.115987.73    156216023.72    1562 16025.7 1562.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7949.55     .04 9267.65     .03 9391.18     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.3310168.15              500   553.2    1000             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
 9718.25 16025.7    1560
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7949.55 9388.25    1552 9391.13 16025.7 1557.75

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1553.70   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.45   Wt. n-Val.                0.030
  W.S. Elev (ft)            1553.24   Reach Len. (ft)          500.00     553.20    1000.00
  Crit W.S. (ft)            1553.24   Flow Area (sq ft)         42.53
  E.G. Slope (ft/ft)       0.012994   Area (sq ft)              42.53
  Q Total (cfs)              230.00   Flow (cfs)               230.00
  Top Width (ft)              47.52   Top Width (ft)            47.52
  Vel Total (ft/s)             5.41   Avg. Vel. (ft/s)           5.41
  Max Chl Dpth (ft)            1.24   Hydr. Depth (ft)           0.89
  Conv. Total (cfs)          2017.7   Conv. (cfs)              2017.7
  Length Wtd. (ft)           500.00   Wetted Per. (ft)          48.69
  Min Ch El (ft)            1557.75   Shear (lb/sq ft)           0.71
  Alpha                        1.00   Stream Power (lb/ft s)     3.83
  Frctn Loss (ft)              1.38   Cum Volume (acre-ft)      10.88      26.71      15.48
  C & E Loss (ft)              0.09   Cum SA (acres)             9.20      14.85      31.23

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)            1555.16   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.82   Wt. n-Val.                0.030
  W.S. Elev (ft)            1554.35   Reach Len. (ft)          500.00     553.20    1000.00
  Crit W.S. (ft)            1554.35   Flow Area (sq ft)        107.63
  E.G. Slope (ft/ft)       0.011756   Area (sq ft)             107.63
  Q Total (cfs)              780.00   Flow (cfs)               780.00
  Top Width (ft)              66.97   Top Width (ft)            66.97
  Vel Total (ft/s)             7.25   Avg. Vel. (ft/s)           7.25
  Max Chl Dpth (ft)            2.35   Hydr. Depth (ft)           1.61
  Conv. Total (cfs)          7193.9   Conv. (cfs)              7193.9
  Length Wtd. (ft)           500.00   Wetted Per. (ft)          68.65
  Min Ch El (ft)            1557.75   Shear (lb/sq ft)           1.15
  Alpha                        1.00   Stream Power (lb/ft s)     8.34
  Frctn Loss (ft)              1.61   Cum Volume (acre-ft)      37.49      82.44     212.75
  C & E Loss (ft)              0.17   Cum SA (acres)            26.51      38.74     182.57

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
```

additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1556.35 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.16 | Wt. n-Val. | 0.030 | | |
| W.S. Elev (ft) | 1555.19 | Reach Len. (ft) | 500.00 | 553.20 | 1000.00 |
| Crit W.S. (ft) | 1555.19 | Flow Area (sq ft) | 165.63 | | |
| E.G. Slope (ft/ft) | 0.010181 | Area (sq ft) | 165.63 | | |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 70.92 | Top Width (ft) | 70.92 | | |
| Vel Total (ft/s) | 8.63 | Avg. Vel. (ft/s) | 8.63 | | |
| Max Chl Dpth (ft) | 3.19 | Hydr. Depth (ft) | 2.34 | | |
| Conv. Total (cfs) | 14172.6 | Conv. (cfs) | 14172.6 | | |
| Length Wtd. (ft) | 500.00 | Wetted Per. (ft) | 72.94 | | |
| Min Ch El (ft) | 1557.75 | Shear (lb/sq ft) | 1.44 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 12.46 | | |
| Frctn Loss (ft) | 1.91 | Cum Volume (acre-ft) | 62.13 | 124.05 | 380.10 |
| C & E Loss (ft) | 0.21 | Cum SA (acres) | 38.28 | 38.99 | 247.51 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9150.62 | 9350.80 | 18.79 | 6.76 | 17.99 | 8.17 | 0.40 | 2.78 |
| 9350.80 | 9550.97 | 211.21 | 35.76 | 30.70 | 91.83 | 1.17 | 5.91 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9150.62 | 9350.80 | 189.76 | 36.52 | 34.96 | 24.33 | 1.08 | 5.20 |
| 9350.80 | 9550.97 | 590.24 | 71.10 | 33.70 | 75.67 | 2.14 | 8.30 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9150.62 | 9350.80 | 466.90 | 65.79 | 37.26 | 32.65 | 1.83 | 7.10 |
| 9350.80 | 9550.97 | 963.10 | 99.84 | 35.68 | 67.35 | 2.85 | 9.65 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 17.471

INPUT
Description:
Station Elevation Data num= 199

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8029.49 | 1554.73 | 8145.6 | 1554.75 | 8151.42 | 1555.33 | 8158.37 | 1554.66 | 8171.08 | 1555.08 |
| 9279.64 | 1555.13 | 9297.47 | 1555.18 | 9379.3 | 1554 | 9458.2 | 1553.99 | 9458.3 | 1554 |
| 9475.48 | 1555.38 | 9477.41 | 1556 | 9483.28 | 1558 | 9485.32 | 1558.69 | 9501.45 | 1559.2 |
| 9503.95 | 1559.31 | 9506.62 | 1558 | 9510.72 | 1556 | 9514.83 | 1554 | 9518.93 | 1552 |
| 9523.03 | 1550 | 9527.14 | 1548 | 9528.3 | 1547.44 | 9530.81 | 1548 | 9533.3 | 1548.57 |
| 9546.42 | 1549.4 | 9549.99 | 1548 | 9551.9 | 1547.24 | 9553.57 | 1546 | 9556.29 | 1544 |
| 9557.08 | 1543.42 | 9564.83 | 1543.96 | 9564.9 | 1544 | 9567.85 | 1546 | 9570.78 | 1548 |
| 9570.88 | 1548.07 | 9575.49 | 1550 | 9580.32 | 1552 | 9584.09 | 1553.53 | 9597 | 1553.33 |
| 9604.51 | 1552 | 9605.92 | 1551.77 | 9606.98 | 1552 | 9611.1 | 1552.94 | 9679.31 | 1553.97 |
| 9679.59 | 1554 | 9687.12 | 1554.83 | 9743.9 | 1554.68 | 9759.9 | 1554 | 9784.81 | 1552.94 |
| 9802.68 | 1554 | 9804.28 | 1554.08 | 9847.72 | 1554.05 | 9850.48 | 1554 | 9898.9 | 1553.07 |
| 9905.31 | 1552 | 9909.45 | 1550 | 9913.6 | 1548 | 9916.95 | 1546 | 9917.15 | 1545.86 |
| 9924.12 | 1545.08 | 9936.35 | 1546 | 9950.95 | 1547.1 | 9985.12 | 1547.68 | 9995.26 | 1546.08 |
| 10030.08 | 1547 | 10035.42 | 1548 | 10040.4 | 1548.96 | 10064.74 | 1548.55 | 10068.43 | 1548 |
| 10071.52 | 1547.43 | 10072.49 | 1548 | 10075.89 | 1550 | 10079.32 | 1552 | 10080.5 | 1552.62 |
| 10129.8 | 1552.15 | 10157.39 | 1554 | 10171.29 | 1554 | 10183.05 | 1553.27 | 10189.96 | 1552 |
| 10204.01 | 1550 | 10219.28 | 1548 | 10232.74 | 1546 | 10235.25 | 1545.62 | 10238.18 | 1544 |
| 10241.81 | 1542 | 10245.44 | 1540 | 10249.07 | 1538 | 10252.69 | 1536 | 10256.32 | 1534 |
| 10260.06 | 1532 | 10264.07 | 1530 | 10268.03 | 1528 | 10271.65 | 1526 | 10275.28 | 1524 |
| 10277.77 | 1522.63 | 10287.13 | 1522 | 10298.09 | 1521.51 | 10303.93 | 1520 | 10310.78 | 1518 |
| 10311.55 | 1517.73 | 10336.1 | 1518 | 10339.62 | 1518.05 | 10347.96 | 1520 | 10349.71 | 1520 |
| 10356.53 | 1520 | 10366.82 | 1520 | 10380.93 | 1519.43 | 10412.74 | 1520 | 10525.8 | 1521.69 |
| 10531.42 | 1522 | 10622.07 | 1523.21 | 10642.1 | 1522 | 10729.58 | 1520 | 10749.98 | 1519.53 |
| 10754 | 1520 | 10766.48 | 1522 | 10777.35 | 1524 | 10781.13 | 1526 | 10784.91 | 1528 |
| 10788.69 | 1530 | 10792.58 | 1532 | 10798.37 | 1534 | 10801.94 | 1535.02 | 10803.04 | 1536 |
| 10805.1 | 1538 | 10807 | 1540 | 10808.55 | 1541.62 | 10814.11 | 1542 | 10832.55 | 1543.07 |
| 10840.56 | 1544 | 10850.52 | 1545.18 | 10872.8 | 1546 | 10949.74 | 1548 | 10977.73 | 1548.51 |
| 11050.36 | 1550 | 11096.85 | 1552 | 11145.56 | 1554 | 11182.37 | 1555.32 | 11184.17 | 1556 |
| 11189.46 | 1558 | 11199.3 | 1560 | 11203.56 | 1560.79 | 11217.07 | 1560.44 | 11217.9 | 1560 |
| 11221.66 | 1558 | 11224.61 | 1556 | 11227.05 | 1554 | 11229.51 | 1552 | 11232.13 | 1550 |
| 11235.3 | 1548 | 11237.33 | 1546.77 | 11238.78 | 1546 | 11246.22 | 1544.17 | 11264.32 | 1544.63 |

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11266.86    154611270.56    154811274.26    155011277.96    155211281.05 1553.74
11287.37    155411295.42    155411337.22  1553.711376.72    155411430.79 1554.68
11444.34 1554.6411501.21 1554.8111972.88    155612287.32 1556.0612431.19 1556.48
12597.54 1556.4712603.79 1556.9512633.86 1557.1412732.07 1556.9712988.58 1557.46
13083.65    155813569.24 1559.7814256.64    155814928.48    155615149.12    1556
 15245.7    155615257.56    155615685.13    155615705.94    155615710.75    1556
15968.44 1555.6816062.85 1554.5816080.45 1554.4716155.78    155616160.59    1558
16162.05 1558.6116180.09 1558.5116183.33    155816199.02 1556.0316215.07    1558
16220.72 1558.7716235.13 1558.9916260.25 1559.1916275.35 1559.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8029.49     .04 9506.62     .03 9584.09     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9898.910171.29              770   803.3     780              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
 9606.5216275.35    1559
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
 9606.5216275.35    1550

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1548.57   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.16   Wt. n-Val.                 0.030
  W.S. Elev (ft)            1548.42   Reach Len. (ft)           770.00     803.30     780.00
  Crit W.S. (ft)            1546.23   Flow Area (sq ft)          72.20
  E.G. Slope (ft/ft)       0.001170   Area (sq ft)               72.20
  Q Total (cfs)             230.00    Flow (cfs)                230.00
  Top Width (ft)             29.12    Top Width (ft)             29.12
  Vel Total (ft/s)            3.19    Avg. Vel. (ft/s)            3.19
  Max Chl Dpth (ft)           5.00    Hydr. Depth (ft)            2.48
  Conv. Total (cfs)          6724.7   Conv. (cfs)               6724.7
  Length Wtd. (ft)          770.00    Wetted Per. (ft)           32.28
  Min Ch El (ft)            1550.00   Shear (lb/sq ft)            0.16
  Alpha                        1.00   Stream Power (lb/ft s)      0.52
  Frctn Loss (ft)              2.13   Cum Volume (acre-ft)       10.22      26.71      15.48
  C & E Loss (ft)              0.08   Cum SA (acres)              8.76      14.85      31.23

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)            1551.18   Element                   Left OB    Channel   Right OB
  Vel Head (ft)                0.26   Wt. n-Val.                 0.030
  W.S. Elev (ft)            1550.92   Reach Len. (ft)           770.00     803.30     780.00
  Crit W.S. (ft)            1548.97   Flow Area (sq ft)         191.10
  E.G. Slope (ft/ft)       0.001483   Area (sq ft)              191.10     154.65     831.14
  Q Total (cfs)             780.00    Flow (cfs)                780.00
  Top Width (ft)            1145.71   Top Width (ft)             56.57     169.92     919.22
  Vel Total (ft/s)             4.08   Avg. Vel. (ft/s)            4.08
  Max Chl Dpth (ft)            7.50   Hydr. Depth (ft)            3.38
  Conv. Total (cfs)         20256.7   Conv. (cfs)               20256.7
  Length Wtd. (ft)          770.00    Wetted Per. (ft)           61.04
  Min Ch El (ft)            1550.00   Shear (lb/sq ft)            0.29
  Alpha                        1.00   Stream Power (lb/ft s)      1.18
  Frctn Loss (ft)              1.93   Cum Volume (acre-ft)       35.77      81.45     203.21
  C & E Loss (ft)              0.02   Cum SA (acres)             25.80      37.66     172.02

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF full flow
```

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1552.57 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.46 | Wt. n-Val. | 0.030 | | |
| W.S. Elev (ft) | 1552.11 | Reach Len. (ft) | 770.00 | 803.30 | 780.00 |
| Crit W.S. (ft) | 1550.17 | Flow Area (sq ft) | 261.95 | | |
| E.G. Slope (ft/ft) | 0.001979 | Area (sq ft) | 262.05 | 359.19 | 1946.63 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 1199.14 | Top Width (ft) | 65.42 | 174.86 | 958.86 |
| Vel Total (ft/s) | 5.46 | Avg. Vel. (ft/s) | 5.46 | | |
| Max Chl Dpth (ft) | 8.69 | Hydr. Depth (ft) | 4.06 | | |
| Conv. Total (cfs) | 32146.7 | Conv. (cfs) | 32146.7 | | |
| Length Wtd. (ft) | 770.00 | Wetted Per. (ft) | 69.52 | | |
| Min Ch El (ft) | 1550.00 | Shear (lb/sq ft) | 0.47 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 2.54 | | |
| Frctn Loss (ft) | 2.77 | Cum Volume (acre-ft) | 59.67 | 121.77 | 357.75 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 37.49 | 37.88 | 236.51 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9525.02 | 9711.96 | 230.00 | 72.20 | 32.28 | 100.00 | 2.48 | 3.19 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9338.08 | 9525.02 | 6.10 | 3.66 | 4.31 | 0.78 | 0.94 | 1.67 |
| 9525.02 | 9711.96 | 773.90 | 187.44 | 56.73 | 99.22 | 3.56 | 4.13 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9338.08 | 9525.02 | 25.78 | 9.71 | 7.02 | 1.80 | 1.54 | 2.66 |
| 9525.02 | 9711.96 | 1404.22 | 252.25 | 62.50 | 98.20 | 4.34 | 5.57 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 17.319

INPUT
Description:
Station Elevation Data num= 237

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7871.49 | 1551 | 7878.03 | 1552 | 7878.05 | 1552 | 7878.08 | 1552 | 7885.94 | 1551.22 |
| 7897.8 | 1551.39 | 8224.56 | 1552 | 8675.63 | 1552 | 8880.78 | 1550.37 | 8893.71 | 1550.48 |

```
 9176.78    1552 9205.32 1553.68  9213.6    1554 9222.84  1554.3 9226.79 1554.07
 9227.06    1554 9234.89    1552 9242.83    1550 9251.16    1548 9253.81 1547.36
 9258.02    1548 9259.94 1548.36 9274.28 1549.68 9276.42    1548 9278.15 1546.69
 9279.01    1546  9281.5    1544  9283.2  1542.5 9283.57 1542.69 9290.61 1542.87
 9290.71  1542.5 9292.26    1544 9294.89    1546 9296.85 1547.48 9298.38    1548
 9300.79 1548.81 9316.48 1548.52 9319.25    1548 9325.07 1546.79 9328.95    1548
 9329.79 1548.26 9490.04  1549.2 9502.89 1549.97 9505.95    1550 9538.81 1550.43
 9545.95    1550 9558.43 1549.32 9570.94    1550 9590.13  1550.8 9638.11 1551.52
 9745.04 1550.06 9745.82    1550 9770.09    1548  9770.8 1547.94 9771.22    1548
 9785.51    1550 9790.26 1550.25 9790.61    1550 9793.33    1548 9796.04    1546
 9798.64    1544 9799.18 1543.58 9830.87 1542.19  9857.7    1544 9858.57 1544.09
 9872.59    1544 9881.04 1543.92 9904.64    1544 9927.09 1544.19 9930.25    1544
 9954.31 1542.73 9957.67    1542 9959.96 1541.45 9975.18 1541.62 9979.74    1540
 9985.55 1538.0210003.91 1539.7310013.18    154010043.52 1541.02 10045.3    1542
10049.82    154410050.07    154410083.79 1543.4310084.71    154410087.96    1546
10090.95    154810093.01  1549.410129.79    155010233.15    155010271.37    1548
10352.87    154610360.58    154610489.48 1547.4510498.02    154610503.56  1545.2
10506.24    154410510.69    154210515.15    1540 10519.6    153810524.28    1536
10529.83 1535.7810531.89    1536 10538.8    153610560.21    153610568.13 1537.33
10598.63 1537.4710603.49    153810609.67    154010613.51    154210617.36    1544
   10697    154610709.31 1547.2610809.75    154810832.35    154810844.01  1546.9
10848.27    154810852.11 1548.9410854.34    1548 10857.8 1546.4710862.65    1546
10907.86    154410911.13 1543.7310922.45    154410960.34    154610972.69 1547.92
10972.98    154810988.95 1549.2211006.74 1549.2511030.07 1549.9311032.48    1548
11033.98 1546.7811073.65 1547.6811074.26    154811078.05    155011081.84    1552
11084.12 1553.5111087.03    155211090.89    155011094.76    154811098.62    1546
11102.45    154411102.86 1543.7711106.07    1542 11109.7    154011113.32    1538
11116.95    153611120.58    153411121.11 1533.7111187.22    153411307.81    1534
11372.06 1532.2211378.76 1532.4811380.06    153211385.45    153011394.76    1528
11405.64    152611420.39    1524 11433.4    152211445.74    152011454.65 1518.22
11466.36    151811702.32    151611887.93    1514 11978.4    151212025.22    1510
12091.05    150812177.12    1506 12195.3 1505.2312195.82    150612197.17    1508
12198.48    151012199.66    151212200.83    151412202.01    151612203.19    1518
12204.36    152012205.57    152212206.82    152412208.07    152612209.32    1528
12210.57    153012211.82    153212213.08    153412214.33    153612215.32    1538
12216.25    154012216.76  1541.112221.41 1540.2812247.19 1541.2112248.29    1542
12250.99    154412253.26    154612258.62    154812268.55 1548.6312270.03    1548
12276.17    154612276.31 1545.9512277.09    154612282.86 1546.1912301.63 1546.11
   12314 1546.1812318.68    154812324.02    155012329.02 1551.8612342.29 1551.77
12347.07    1550 12347.1 1549.9912733.44 1549.9612733.58    155012738.27 1551.28
12741.55 1551.2212746.11 1551.7412760.69 1551.7612771.26 1551.4112780.61 1551.39
 13882.1    155013930.97    155013987.25  1550.2 14048.5 1550.0514112.03    1550
14138.21    155014234.47    155014465.93    155015760.38    155215768.51 1552.11
15772.75 1552.44 15802.1 1552.2215804.14    155215823.76    155015833.64 1549.07
15843.82    155015861.14 1551.5715876.32    155215884.97 1552.2515894.09 1552.19
15915.12    155215953.34 1551.66

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
 7871.49     .04 9226.79     .03 9300.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9790.2610129.79              675     683     710              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev
 9597.6315953.34    1556
Blocked Obstructions     num=        1
   Sta L   Sta R    Elev
    970015953.34    1547

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1546.36   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                1.00   Wt. n-Val.                  0.030
  W.S. Elev (ft)            1545.36   Reach Len. (ft)            675.00     683.00     710.00
  Crit W.S. (ft)            1545.36   Flow Area (sq ft)           28.72
  E.G. Slope (ft/ft)       0.012679   Area (sq ft)                28.72
  Q Total (cfs)              230.00   Flow (cfs)                 230.00
  Top Width (ft)              14.25   Top Width (ft)              14.25
  Vel Total (ft/s)             8.01   Avg. Vel. (ft/s)             8.01
  Max Chl Dpth (ft)            2.86   Hydr. Depth (ft)             2.02
  Conv. Total (cfs)          2042.6   Conv. (cfs)                2042.6
  Length Wtd. (ft)           675.00   Wetted Per. (ft)            16.69
  Min Ch El (ft)            1547.00   Shear (lb/sq ft)             1.36
  Alpha                        1.00   Stream Power (lb/ft s)      10.91
  Frctn Loss (ft)              2.20   Cum Volume (acre-ft)         9.33      26.71      15.48
```

| | | | | | |
|---|---|---|---|---|---|
| C & E Loss (ft) | 0.24 | Cum SA (acres) | 8.37 | 14.85 | 31.23 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1549.23 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.46 | Wt. n-Val. | 0.031 | | |
| W.S. Elev (ft) | 1548.77 | Reach Len. (ft) | 675.00 | 683.00 | 710.00 |
| Crit W.S. (ft) | 1548.77 | Flow Area (sq ft) | 142.82 | | |
| E.G. Slope (ft/ft) | 0.005122 | Area (sq ft) | 149.37 | 524.74 | 3316.44 |
| Q Total (cfs) | 780.00 | Flow (cfs) | 780.00 | | |
| Top Width (ft) | 2466.68 | Top Width (ft) | 170.15 | 299.79 | 1996.75 |
| Vel Total (ft/s) | 5.46 | Avg. Vel. (ft/s) | 5.46 | | |
| Max Chl Dpth (ft) | 6.27 | Hydr. Depth (ft) | 0.93 | | |
| Conv. Total (cfs) | 10898.8 | Conv. (cfs) | 10898.8 | | |
| Length Wtd. (ft) | 675.00 | Wetted Per. (ft) | 159.47 | | |
| Min Ch El (ft) | 1547.00 | Shear (lb/sq ft) | 0.29 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 1.56 | | |
| Frctn Loss (ft) | 2.21 | Cum Volume (acre-ft) | 32.76 | 75.19 | 166.08 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 23.80 | 33.33 | 145.91 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1549.80 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.53 | Wt. n-Val. | 0.033 | | |
| W.S. Elev (ft) | 1549.27 | Reach Len. (ft) | 675.00 | 683.00 | 710.00 |
| Crit W.S. (ft) | 1549.27 | Flow Area (sq ft) | 245.44 | | |
| E.G. Slope (ft/ft) | 0.008437 | Area (sq ft) | 262.46 | 676.54 | 4331.67 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 2607.41 | Top Width (ft) | 265.99 | 301.22 | 2040.20 |
| Vel Total (ft/s) | 5.83 | Avg. Vel. (ft/s) | 5.83 | | |
| Max Chl Dpth (ft) | 6.77 | Hydr. Depth (ft) | 1.02 | | |
| Conv. Total (cfs) | 15568.5 | Conv. (cfs) | 15568.5 | | |
| Length Wtd. (ft) | 675.00 | Wetted Per. (ft) | 245.85 | | |
| Min Ch El (ft) | 1547.00 | Shear (lb/sq ft) | 0.53 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 3.06 | | |
| Frctn Loss (ft) | 3.20 | Cum Volume (acre-ft) | 55.03 | 112.22 | 301.54 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 34.57 | 33.49 | 209.66 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT  Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9214.63 | 9406.51 | 230.00 | 28.72 | 16.69 | 100.00 | 2.02 | 8.01 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT  Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9214.63 | 9406.51 | 779.94 | 142.56 | 150.07 | 99.99 | 0.98 | 5.47 |
| 9406.51 | 9598.38 | 0.06 | 0.26 | 9.40 | 0.01 | 0.03 | 0.22 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

FLOW DISTRIBUTION OUTPUT  Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9214.63 | 9406.51 | 1392.87 | 219.06 | 161.13 | 97.40 | 1.41 | 6.36 |
| 9406.51 | 9598.38 | 37.13 | 26.38 | 84.71 | 2.60 | 0.31 | 1.41 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper left  RS: 17.190

INPUT
Description:
Station Elevation Data  num=  301

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7653.45 | 1548 | 7761.75 | 1547.79 | 7762.55 | 1548 | 7767.33 | 1549.12 | 7775.28 | 1548.58 |
| 7788.9 | 1548.63 | 8246.52 | 1548 | 8729.5 | 1547.7 | 8758.1 | 1546.68 | 8780.13 | 1546.65 |
| 8790.75 | 1546.71 | 9097.59 | 1546.78 | 9117.51 | 1546.56 | 9136.95 | 1546.86 | 9138.57 | 1546 |
| 9141.99 | 1544 | 9143.95 | 1542.85 | 9148.35 | 1543.55 | 9153.92 | 1544 | 9161.44 | 1544.54 |
| 9162.43 | 1544 | 9166.2 | 1542 | 9167.98 | 1541.05 | 9169.25 | 1540 | 9171.45 | 1538 |
| 9172.26 | 1537.13 | 9177.83 | 1538 | 9180.4 | 1537.14 | 9181.05 | 1540 | 9185.39 | 1542 |
| 9186.25 | 1542.32 | 9190.57 | 1544 | 9193.76 | 1545.31 | 9204.99 | 1545.448 | 9209.19 | 1545.5 |
| 9216.01 | 1544 | 9218.86 | 1543.3 | 9220.69 | 1544 | 9222.85 | 1544.81 | 9304.99 | 1546 |
| 9356.34 | 1546 | 9446.22 | 1545.68 | 9449.91 | 1546 | 9451.6 | 1546.33 | 9452.81 | 1546 |
| 9455.69 | 1545.55 | 9463.88 | 1546 | 9483.77 | 1547.1 | 9556.72 | 1546.93 | 9643.2 | 1547.06 |
| 9701.66 | 1547.47 | 9709.7 | 1546 | 9714.06 | 1545.19 | 9716 | 1544 | 9718.44 | 1542.23 |

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 9730.66 1542.11 9736.24    1544 9738.59 1544.94 9751.19    1546 9764.58 1547.13
 9783.61    1548 9794.85 1548.24 9802.85 1548.26 9806.34 1548.29 9806.66    1548
 9808.89    1546 9811.11    1544 9813.34    1542 9815.53 1540.03 9815.89    1540
 9830.24  1539.2  9842.2    1540 9844.95  1540.2 9862.13    1540 9903.92 1539.99
  9907.8    1538 9910.97 1536.77  9951.9    1536 9968.91 1534.37    9976    1536
 9976.95 1536.19 9999.96 1536.78 10042.4 1536.8910092.39 1536.6410095.73    1536
10101.64 1534.6310115.37 1534.0210115.45    153410121.62    153210127.62 1530.17
10129.03    153210130.51    153410131.99    153610132.04 1536.0710161.29 1537.57
10173.64    153610182.04    153510183.45    153610186.13    1538 10188.7    1540
10191.24    154210193.54 1543.8210269.79 1543.77 10283.6 1542.7210331.89 1543.47
10333.05    154410337.45    154610342.08    154810345.11 1548.7910347.44    1548
10354.37    154610361.29    154410361.49 1543.9410364.27    154410402.49 1544.15
10402.76    154410406.42    154210410.08    154010410.95 1539.5210412.73    1538
10415.06    1536 10417.4    153410419.73    153210422.05    153010424.22    1528
10426.39    152610428.56    152410429.67 1522.9710443.29  1523.210483.32    1524
10510.54    152410557.94 1522.2210558.69    152210565.63    152010569.36 1518.92
10617.25    152010664.12 1521.3710885.21 1521.7810885.64    152210889.63    1524
10893.62    152610897.74    152810901.87    153010905.99    153210906.68 1532.33
10907.36    1534 10908.3    153610909.37 1537.9310909.45    153810911.52    1540
 10913.6    154210915.67    154410917.75    154610918.49 1546.9710919.58    1548
10920.57 1549.1210922.54    154810925.37 1546.4210928.86 1546.5710950.21 1546.25
10961.12 1546.1610961.32    154610963.85    154410966.56    154210969.28    1540
10971.99    153810975.23    153610978.88    153410982.62 1532.0910984.61    1532
11066.37    153211173.49 1533.6811174.09    153411177.92    153611181.74    1538
11185.56    154011189.39    1542 11193.4    154411197.91    154611202.49    1548
11203.79  1548.511204.87    154811209.13    154611213.34    154411217.55    1542
11221.76    154011226.34    153811230.35    153611233.48 1534.1911258.98  1534.2
11261.72    153611264.85    153811268.75    154011272.65    154211276.55    1544
11280.45    1546 11284.3    154811286.43 1549.1111292.18    154811296.55    1546
 11300.8    154411304.81    154211308.83    154011312.84    153811316.85    1536
11318.81 1535.0211550.51    153611617.81 1536.2711624.18    153811631.54    1540
11638.86    154211640.99 1542.7111642.78    154211647.77    154011652.77    1538
11662.97    153611667.19 1535.56 11679.6    153411691.01    153411695.22    1534
11725.65 1532.2411726.39    1532 11732.6    153011738.82    152811745.03    1526
11746.59  1525.511773.62 1524.3511776.26    152611781.95    152811786.93    1528
11790.59    152611794.77 1524.1811818.93 1524.8611822.19    152611828.43    1528
11836.53    153011852.53    1530 11888.3    153011892.14    153211895.97    1534
11899.68    1536 11903.2    153811906.95    154011910.91    154211914.56 1543.79
11925.41    154411982.34 1544.53 12007.3 1544.5212014.88    154412014.93    1544
12042.85 1543.4512044.32    154412049.64    154612050.79 1546.4412051.87    1546
 12057.4    154412062.56 1542.1412093.67 1542.5612104.09 1543.0412122.11 1543.43
12147.67 1543.6712159.62 1543.09 12179.4 1543.0512214.76  1543.412215.81    1544
 12219.3    154612222.77    154812224.07 1548.7912236.77 1548.8212238.27    1548
12241.87 1546.0312399.51    154612493.78    154612624.07 1546.3312627.22  1547.4
12631.37 1547.49 12636.2 1547.4812649.06 1547.8912669.75 1547.1713839.42    1546
 14165.7    154614170.37 1546.1214176.43    154614178.69 1545.9614240.87    1546
15652.91 1547.1815657.75    154815658.44 1548.1415687.15 1548.3315690.17    1548
15708.02    154615715.46 1545.1115726.57    1546 15746.7 1547.4815766.49    1548
15767.02 1548.0115767.49    1548 15776.3 1547.8415805.27    154815897.67 1548.14
15911.47 1547.89

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
 7653.45     .04 9136.95     .03 9209.19     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9806.3410345.11               650   708.5     720              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
    960015911.47  1547.5
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    968515911.47    1544

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1542.70   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.19   Wt. n-Val.                0.030
  W.S. Elev (ft)            1542.51   Reach Len. (ft)          650.00     708.50     720.00
  Crit W.S. (ft)            1540.22   Flow Area (sq ft)         66.05
  E.G. Slope (ft/ft)       0.001458   Area (sq ft)              66.05
  Q Total (cfs)             230.00    Flow (cfs)               230.00
  Top Width (ft)             21.52    Top Width (ft)            21.52
  Vel Total (ft/s)            3.48    Avg. Vel. (ft/s)           3.48
  Max Chl Dpth (ft)           5.38    Hydr. Depth (ft)           3.07
  Conv. Total (cfs)         6022.5    Conv. (cfs)              6022.5
```

| | | | | | |
|---|---|---|---|---|---|
| Length Wtd. (ft) | 650.00 | Wetted Per. (ft) | 26.44 | | |
| Min Ch El (ft) | 1544.00 | Shear (lb/sq ft) | 0.23 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.79 | | |
| Frctn Loss (ft) | 2.09 | Cum Volume (acre-ft) | 8.59 | 26.71 | 15.48 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 8.10 | 14.85 | 31.23 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1545.44 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.29 | Wt. n-Val. | 0.030 | | |
| W.S. Elev (ft) | 1545.15 | Reach Len. (ft) | 650.00 | 708.50 | 720.00 |
| Crit W.S. (ft) | 1543.05 | Flow Area (sq ft) | 181.09 | | |
| E.G. Slope (ft/ft) | 0.002273 | Area (sq ft) | 207.41 | 604.36 | 1999.07 |
| Q Total (cfs) | 780.00 | Flow (cfs) | 780.00 | | |
| Top Width (ft) | 2416.57 | Top Width (ft) | 116.18 | 525.76 | 1774.64 |
| Vel Total (ft/s) | 4.31 | Avg. Vel. (ft/s) | 4.31 | | |
| Max Chl Dpth (ft) | 8.02 | Hydr. Depth (ft) | 2.03 | | |
| Conv. Total (cfs) | 16362.1 | Conv. (cfs) | 16362.1 | | |
| Length Wtd. (ft) | 650.00 | Wetted Per. (ft) | 96.31 | | |
| Min Ch El (ft) | 1544.00 | Shear (lb/sq ft) | 0.27 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 1.15 | | |
| Frctn Loss (ft) | 2.77 | Cum Volume (acre-ft) | 30.00 | 66.34 | 122.76 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 21.58 | 26.86 | 115.18 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1546.40 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.25 | Wt. n-Val. | 0.032 | | |
| W.S. Elev (ft) | 1546.15 | Reach Len. (ft) | 650.00 | 708.50 | 720.00 |
| Crit W.S. (ft) | 1545.08 | Flow Area (sq ft) | 357.42 | | |
| E.G. Slope (ft/ft) | 0.003030 | Area (sq ft) | 418.93 | 1127.96 | 3903.54 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 3749.55 | Top Width (ft) | 370.65 | 529.06 | 2849.84 |
| Vel Total (ft/s) | 4.00 | Avg. Vel. (ft/s) | 4.00 | | |
| Max Chl Dpth (ft) | 9.02 | Hydr. Depth (ft) | 1.09 | | |
| Conv. Total (cfs) | 25976.7 | Conv. (cfs) | 25976.7 | | |
| Length Wtd. (ft) | 650.00 | Wetted Per. (ft) | 334.20 | | |
| Min Ch El (ft) | 1544.00 | Shear (lb/sq ft) | 0.20 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.81 | | |
| Frctn Loss (ft) | 3.21 | Cum Volume (acre-ft) | 49.76 | 98.07 | 234.43 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 29.63 | 26.98 | 169.80 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9160.47 | 9375.76 | 230.00 | 66.05 | 26.44 | 100.00 | 3.07 | 3.48 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8945.18 | 9160.47 | 68.00 | 26.82 | 21.17 | 8.72 | 1.31 | 2.54 |
| 9160.47 | 9375.76 | 712.00 | 154.27 | 75.14 | 91.28 | 2.25 | 4.62 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8945.18 | 9160.47 | 207.88 | 47.97 | 23.16 | 14.54 | 2.16 | 4.33 |
| 9160.47 | 9375.76 | 1199.48 | 279.89 | 221.79 | 83.88 | 1.30 | 4.29 |
| 9375.76 | 9591.05 | 22.64 | 29.56 | 89.25 | 1.58 | 0.33 | 0.77 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 17.055

INPUT
Description:
Station Elevation Data num= 202

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7454.12 | 1545.16 | 7458.31 | 1545.88 | 7470.4 | 1544.49 | 7481.52 | 1544.69 | 8427.17 | 1544.54 |
| 8428.57 | 1544 | 8431.45 | 1542.85 | 8436.51 | 1543.89 | 8457.42 | 1543.88 | 8460.54 | 1544 |
| 8471.42 | 1544.34 | 8573.66 | 1544 | 8810.45 | 1542.01 | 8825.47 | 1542.91 | 8828.55 | 1542 |
| 8830.28 | 1541.38 | 8834.45 | 1542 | 8836.84 | 1542.4 | 8853.43 | 1543.62 | 8856.68 | 1542 |
| 8859 | 1540.73 | 8859.91 | 1540 | 8861.99 | 1538 | 8863.08 | 1536.88 | 8870.81 | 1536.9 |
| 8872.3 | 1538 | 8875.08 | 1540 | 8876.95 | 1541.41 | 8878.37 | 1542 | 8881.9 | 1543.02 |
| 8898.07 | 1542.67 | 8900.53 | 1542 | 8906.77 | 1540.75 | 8913.14 | 1542 | 8913.81 | 1542.14 |
| 9146.15 | 1542.5 | 9150.94 | 1544 | 9151.69 | 1544.23 | 9172.47 | 1544 | 9260.32 | 1543.5 |
| 9284.39 | 1542.41 | 9285.22 | 1542 | 9289.54 | 1540 | 9289.81 | 1539.88 | 9293.22 | 1540 |
| 9306.88 | 1540.45 | 9311.59 | 1542 | 9312.19 | 1542.2 | 9343.02 | 1543.24 | 9515.19 | 1543.63 |
| 9532.63 | 1544 | 9534.19 | 1544.09 | 9558.55 | 1544.29 | 9560.75 | 1544 | 9570.21 | 1542.7 |
| 9584.99 | 1543.34 | 9709.49 | 1543.11 | 9714.69 | 1542 | 9717.95 | 1541.3 | 9727.05 | 1540 |
| 9732.14 | 1539.15 | 9758.68 | 1539.11 | 9781.62 | 1539.56 | 9793.57 | 1538 | 9800.53 | 1537.21 |
| 9820.88 | 1536 | 9821.15 | 1535.98 | 9825.58 | 1534 | 9830.11 | 1532 | 9834.64 | 1530 |
| 9838.41 | 1528.34 | 9838.96 | 1528 | 9842.2 | 1526 | 9845.57 | 1524 | 9849 | 1522 |
| 9850.3 | 1521.25 | 10020.15 | 1522 | 10038.75 | 1522.12 | 10039.09 | 1522 | 10044.21 | 1520.28 |
| 10051.37 | 1521.95 | 10051.97 | 1522 | 10060.73 | 1522.42 | 10065.46 | 1524 | 10071.99 | 1526 |
| 10076.12 | 1527.19 | 10101.23 | 1526.02 | 10101.36 | 1526 | 10117.15 | 1524 | 10130.46 | 1522.03 |
| 10130.84 | 1522 | 10139.05 | 1522 | 10154.9 | 1522 | 10180.67 | 1521.8 | 10215.38 | 1521.65 |
| 10226.91 | 1521.16 | 10231.62 | 1520 | 10237.08 | 1518.33 | 10241.4 | 1518 | 10326.59 | 1516 |
| 10391.7 | 1516 | 10439.7 | 1516 | 10455.92 | 1515.74 | 10457.14 | 1516 | 10465.83 | 1518 |
| 10473.51 | 1520 | 10479.89 | 1522 | 10486.27 | 1524 | 10493.89 | 1526 | 10499.78 | 1528 |
| 10503.97 | 1530 | 10506.55 | 1532 | 10508.35 | 1533.39 | 10508.94 | 1534 | 10510.74 | 1536 |
| 10512.56 | 1538 | 10514.38 | 1540 | 10515.09 | 1540.78 | 10518.8 | 1542 | 10522.29 | 1543.26 |
| 10526.32 | 1542 | 10528.72 | 1540.8 | 10535.95 | 1541.51 | 10538.58 | 1540 | 10542.07 | 1538 |
| 10545.06 | 1536.26 | 10567.22 | 1538 | 10569.62 | 1540 | 10572.46 | 1542 | 10575.69 | 1544 |
| 10577.68 | 1545.29 | 10582.45 | 1544 | 10585.84 | 1542.95 | 10587.49 | 1543.02 | 10589.86 | 1544 |
| 10594.85 | 1546 | 10596.3 | 1546.58 | 10598.3 | 1546 | 10604.19 | 1544 | 10604.54 | 1543.83 |
| 10631.07 | 1543.6 | 10638.07 | 1544 | 10641.74 | 1544.06 | 10646.58 | 1546 | 10647.46 | 1546 |
| 10651.83 | 1544 | 10653.78 | 1543.11 | 10794.98 | 1542 | 10926.56 | 1542 | 11136.6 | 1542.99 |
| 11142.01 | 1544 | 11250.12 | 1544 | 11255.61 | 1544 | 11411.52 | 1544 | 11483 | 1542.61 |
| 11580.6 | 1542 | 11808.99 | 1540 | 11846.37 | 1539.68 | 11851.15 | 1540 | 11875.14 | 1542 |
| 11892.72 | 1544 | 11903.56 | 1546 | 11905.36 | 1546.95 | 11910.41 | 1546 | 11912.24 | 1545.64 |
| 11924.25 | 1545.61 | 11928.36 | 1544 | 11929.5 | 1543.58 | 12299.25 | 1544 | 12315.27 | 1544.12 |

```
12318.77 1544.7312322.76 1544.8412326.36  1545.512338.36    154612344.17  1546.2
12344.99    154612351.56    154412351.88  1543.912352.13    154412356.23 1545.82
12359.67    154612381.33 1546.4212387.13    154612397.22 1545.2113286.35    1544
13863.22  1543.213869.63 1543.1515295.61 1543.2315326.28    154415345.14 1544.77
15383.78 1544.9915390.52    1544 15404.6    1542 15407.2 1541.6415409.79    1542
 15424.3    154415428.09 1544.5215436.03 1545.7415461.53    154615461.62    1546
15461.69    154615470.72 1545.77

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
 7454.12     .04 8853.43     .04 8856.68     .03  8881.9     .03 8898.07     .04
 9151.69     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9800.5310076.12               800   796.7     850             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7454.12 8471.42 1544.34 9558.5515470.72 1544.29
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7454.12 8853.43 1543.62    971015470.72    1540

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1540.53   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                1.01   Wt. n-Val.                0.030
  W.S. Elev (ft)            1539.53   Reach Len. (ft)          800.00     796.70     850.00
  Crit W.S. (ft)            1539.53   Flow Area (sq ft)         28.58
  E.G. Slope (ft/ft)       0.012145   Area (sq ft)              28.58
  Q Total (cfs)              230.00   Flow (cfs)               230.00
  Top Width (ft)              14.02   Top Width (ft)            14.02
  Vel Total (ft/s)             8.05   Avg. Vel. (ft/s)           8.05
  Max Chl Dpth (ft)            2.65   Hydr. Depth (ft)           2.04
  Conv. Total (cfs)          2087.0   Conv. (cfs)              2087.0
  Length Wtd. (ft)           800.00   Wetted Per. (ft)          15.96
  Min Ch El (ft)            1540.00   Shear (lb/sq ft)           1.36
  Alpha                        1.00   Stream Power (lb/ft s)    10.93
  Frctn Loss (ft)              0.55   Cum Volume (acre-ft)       7.89      26.71      15.48
  C & E Loss (ft)              0.30   Cum SA (acres)             7.83      14.85      31.23

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)            1542.61   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.92   Wt. n-Val.                0.033
  W.S. Elev (ft)            1541.69   Reach Len. (ft)          800.00     796.70     850.00
  Crit W.S. (ft)            1541.69   Flow Area (sq ft)        101.41
  E.G. Slope (ft/ft)       0.010739   Area (sq ft)             235.36     465.60    1055.51
  Q Total (cfs)              780.00   Flow (cfs)               780.00
  Top Width (ft)            1157.47   Top Width (ft)           139.00     275.59     742.88
  Vel Total (ft/s)             7.69   Avg. Vel. (ft/s)           7.69
  Max Chl Dpth (ft)            4.81   Hydr. Depth (ft)           1.86
  Conv. Total (cfs)          7526.7   Conv. (cfs)              7526.7
  Length Wtd. (ft)           800.00   Wetted Per. (ft)          58.71
  Min Ch El (ft)            1540.00   Shear (lb/sq ft)           1.16
  Alpha                        1.00   Stream Power (lb/ft s)     8.91
  Frctn Loss (ft)              0.77   Cum Volume (acre-ft)      26.69      57.64      97.51
  C & E Loss (ft)              0.27   Cum SA (acres)            19.68      20.34      94.37

Warning: The energy equation could not be balanced within the specified number of iterations.  The
```

program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1543.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.41 | Wt. n-Val. | 0.035 | | |
| W.S. Elev (ft) | 1542.76 | Reach Len. (ft) | 800.00 | 796.70 | 850.00 |
| Crit W.S. (ft) | 1542.76 | Flow Area (sq ft) | 278.01 | | |
| E.G. Slope (ft/ft) | 0.009473 | Area (sq ft) | 505.08 | 760.73 | 2144.95 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 2004.74 | Top Width (ft) | 422.32 | 275.59 | 1306.83 |
| Vel Total (ft/s) | 5.14 | Avg. Vel. (ft/s) | 5.14 | | |
| Max Chl Dpth (ft) | 5.88 | Hydr. Depth (ft) | 0.84 | | |
| Conv. Total (cfs) | 14692.2 | Conv. (cfs) | 14692.2 | | |
| Length Wtd. (ft) | 800.00 | Wetted Per. (ft) | 336.08 | | |
| Min Ch El (ft) | 1540.00 | Shear (lb/sq ft) | 0.49 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 2.52 | | |
| Frctn Loss (ft) | 0.70 | Cum Volume (acre-ft) | 42.86 | 82.71 | 184.44 |
| C & E Loss (ft) | 0.12 | Cum SA (acres) | 23.72 | 20.43 | 135.45 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8627.33 | 8861.97 | 4.07 | 1.17 | 2.17 | 1.77 | 0.75 | 3.47 |
| 8861.97 | 9096.61 | 225.93 | 27.40 | 13.79 | 98.23 | 2.20 | 8.24 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8627.33 | 8861.97 | 42.97 | 7.55 | 6.02 | 5.51 | 1.60 | 5.69 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8861.97 | 9096.61 | 628.16 | 62.00 | 27.33 | 80.53 | 2.47 | 10.13 |
| 9096.61 | 9331.25 | 108.86 | 31.86 | 25.36 | 13.96 | 1.29 | 3.42 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8627.33 | 8861.97 | 105.04 | 13.70 | 8.37 | 7.35 | 2.01 | 7.67 |
| 8861.97 | 9096.61 | 1064.66 | 182.68 | 224.28 | 74.45 | 0.82 | 5.83 |
| 9096.61 | 9331.25 | 260.30 | 81.63 | 103.43 | 18.20 | 0.80 | 3.19 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 16.904

INPUT
Description:
Station Elevation Data num= 263

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7496.59 | 1541.52 | 7500.28 | 1542 | 7500.5 | 1542.02 | 7501.14 | 1542 | 7511.57 | 1541.44 |
| 7526.56 | 1541.34 | 8472.26 | 1541.61 | 8475.81 | 1540 | 8476.13 | 1539.87 | 8476.68 | 1540 |
| 8481.47 | 1541.17 | 8503.34 | 1540 | 8508.56 | 1539.71 | 8515.28 | 1540 | 8525.61 | 1540.43 |
| 8569.31 | 1540 | 8761.28 | 1540 | 8811.4 | 1540 | 8837.59 | 1539.58 | 8855.25 | 1539.27 |
| 8860.61 | 1539.45 | 8871.75 | 1538.89 | 8878.58 | 1539.59 | 8890.24 | 1540 | 8890.31 | 1540.01 |
| 8893.63 | 1540.64 | 8908.12 | 1540 | 8926.4 | 1539.24 | 8927.17 | 1540 | 8927.58 | 1540 |
| 8941.56 | 1538.68 | 8945.83 | 1538 | 8950.63 | 1537.14 | 8953.52 | 1538 | 8955.34 | 1538.35 |
| 9046.31 | 1539.5 | 9154.99 | 1538 | 9229.73 | 1538 | 9322.04 | 1539.52 | 9348.01 | 1538.62 |
| 9373.66 | 1540 | 9377.67 | 1540.22 | 9386.23 | 1540 | 9570 | 1538.32 | 9594.85 | 1539.67 |
| 9643.56 | 1538.66 | 9645.33 | 1538 | 9647.98 | 1536.95 | 9669.39 | 1536 | 9670.03 | 1535.97 |
| 9670.07 | 1536 | 9673.21 | 1538 | 9674.51 | 1538.83 | 9688.8 | 1539.46 | 9691.35 | 1538 |
| 9694.89 | 1536 | 9696.81 | 1534.91 | 9729.61 | 1536 | 9736.28 | 1536.27 | 9742.82 | 1536 |
| 9760.44 | 1535.39 | 9761.57 | 1536 | 9765.28 | 1538 | 9769.18 | 1540 | 9773.97 | 1542 |
| 9775.35 | 1542.58 | 9777.25 | 1542 | 9784.17 | 1540 | 9790.94 | 1538 | 9792.01 | 1537.6 |
| 9837.66 | 1537.89 | 9838 | 1538 | 9844.57 | 1540 | 9851.93 | 1540 | 9856.55 | 1538 |
| 9858.02 | 1537.36 | 9860.92 | 1536 | 9889.65 | 1535.06 | 9891.66 | 1534 | 9895.44 | 1532 |
| 9899.32 | 1530 | 9899.75 | 1529.78 | 9915.25 | 1530 | 9935.74 | 1530.49 | 9938.08 | 1532 |
| 9941.18 | 1534 | 9944.27 | 1536 | 9946 | 1536.92 | 10018.03 | 1536.31 | 10018.97 | 1536 |
| 10023.29 | 1534 | 10024.41 | 1533.27 | 10032.75 | 1532.88 | 10035.2 | 1534 | 10040.27 | 1536 |
| 10041.56 | 1536.48 | 10126.8 | 1537.27 | 10140.97 | 1536 | 10152.26 | 1534.99 | 10165.94 | 1535.08 |
| 10167.02 | 1534 | 10169.01 | 1532 | 10171 | 1530 | 10173.06 | 1528 | 10175.11 | 1526 |
| 10177.17 | 1524 | 10179.23 | 1522 | 10180.04 | 1521.22 | 10198.96 | 1521.49 | 10201.08 | 1520 |
| 10203.94 | 1518 | 10206.79 | 1516 | 10209.64 | 1514 | 10212.49 | 1512 | 10215.34 | 1510 |
| 10217.19 | 1508.73 | 10296.33 | 1510 | 10316.5 | 1512 | 10334.92 | 1513.74 | 10341.46 | 1514 |
| 10346.5 | 1514 | 10417.35 | 1512 | 10431.25 | 1510.71 | 10431.97 | 1510 | 10433.99 | 1508 |
| 10435.99 | 1506 | 10438 | 1504 | 10438.04 | 1503.96 | 10438.42 | 1504 | 10444.24 | 1504.45 |

```
10447.73 1505.3710459.75 1504.7110469.61    150410474.39 1503.6110477.29    1504
 10480.6 1504.4710482.44    150610484.88    150810486.94 1509.6610490.39    1510
10506.87    151210519.75    151410533.59    151610554.37    1518 10569.5    1520
10583.03    152210601.06    152410614.26    152610619.66  1526.810621.61    1528
10624.86    1530 10628.1    153210631.35    1534 10634.6    153610637.85    1538
10641.09    154010644.05 1541.8210649.42 1540.2710666.05  1540.810680.82 1540.03
10680.84    154010682.07    153810683.29    153610684.51    153410685.74    1532
10686.96    153010688.19    152810689.41    152610690.64    152410691.86    1522
10693.09    152010694.31    151810695.54    151610696.76    151410697.98    1512
10699.21    151010700.43    150810701.66    150610702.88    150410704.11    1502
10705.33    150010706.56    149810707.78    149610709.01    149410710.26    1492
10727.04 1491.9910727.05    149210731.56    149410736.34    149610741.13    1498
10745.91    150010745.94 1500.0110770.68 1500.5610936.68    150011027.46    1498
11030.03 1497.6311031.26    149811035.98 1499.4411084.57    1500 11088.3 1500.06
 11111.5 1500.0311114.59    150211117.72    150411125.04    1506 11130.7 1507.33
11131.56    150811134.13    1510 11136.7    151211139.26    1514 11141.1  1515.1
11141.23    151611141.46    151811141.66    152011141.85    152211142.04    1524
11142.23    152611142.42    152811142.62    153011142.81    1532   11143    1534
11143.19    153611143.23 1536.3811156.51    153811158.05  1538.211162.73    1540
 11167.5    1542   11170 1543.0411172.36    154211177.71    154011180.51 1538.95
11207.85    153811209.75    153812331.97 1539.3612347.37    154012348.69 1540.05
12362.68 1540.4412367.93 1540.4112371.55 1540.4712384.93 1540.7212390.79 1540.29
12391.69    154012398.53    153812398.59 1537.9912398.62    153812403.91    1540
12404.05 1540.0512859.11    154013888.69 1538.8713907.08 1538.8313913.28 1538.88
13928.86  1538.915129.98    154015367.74 1540.2515394.45 1540.9715423.78  1540.8
15430.66    154015447.93    153815448.78  1537.9 15449.6    1538 15466.6    1540
15480.66 1541.6515510.18 1541.3715521.19 1541.15

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 7496.59    .035 8927.58    .035 9046.31     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9851.93 10126.8               960   907.5     940             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7496.59 8786.31  1540.5 9773.9715521.19    1542
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 7496.59 8893.63 1540.64    976215521.19    1538

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)            1538.61   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.01   Wt. n-Val.                0.050
  W.S. Elev (ft)            1538.60   Reach Len. (ft)          960.00     907.50     940.00
  Crit W.S. (ft)            1536.38   Flow Area (sq ft)        347.96
  E.G. Slope (ft/ft)       0.000221   Area (sq ft)             377.42     162.73     753.65
  Q Total (cfs)             230.00    Flow (cfs)               230.00
  Top Width (ft)           2172.86    Top Width (ft)           381.34     271.64    1519.88
  Vel Total (ft/s)             0.66   Avg. Vel. (ft/s)           0.66
  Max Chl Dpth (ft)            3.69   Hydr. Depth (ft)           1.05
  Conv. Total (cfs)        15484.6    Conv. (cfs)              15484.6
  Length Wtd. (ft)          909.97    Wetted Per. (ft)         334.82
  Min Ch El (ft)           1538.00    Shear (lb/sq ft)           0.01
  Alpha                        1.00   Stream Power (lb/ft s)     0.01
  Frctn Loss (ft)              6.40   Cum Volume (acre-ft)       4.16      25.23       8.13
  C & E Loss (ft)              0.10   Cum SA (acres)             4.20      12.36      16.40


Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)            1539.87   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.01   Wt. n-Val.                0.048
  W.S. Elev (ft)            1539.86   Reach Len. (ft)          960.00     907.50     940.00
  Crit W.S. (ft)            1537.19   Flow Area (sq ft)       1114.71
  E.G. Slope (ft/ft)       0.000332   Area (sq ft)            1213.75     506.56    4244.28
  Q Total (cfs)             780.00    Flow (cfs)               780.00
```

| | | | | | |
|---|---|---|---|---|---|
| Top Width (ft) | 5354.83 | Top Width (ft) | 884.30 | 274.55 | 4195.99 |
| Vel Total (ft/s) | 0.70 | Avg. Vel. (ft/s) | 0.70 | | |
| Max Chl Dpth (ft) | 4.95 | Hydr. Depth (ft) | 1.35 | | |
| Conv. Total (cfs) | 42785.4 | Conv. (cfs) | 42785.4 | | |
| Length Wtd. (ft) | 911.55 | Wetted Per. (ft) | 830.44 | | |
| Min Ch El (ft) | 1538.00 | Shear (lb/sq ft) | 0.03 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.02 | | |
| Frctn Loss (ft) | 5.65 | Cum Volume (acre-ft) | 13.39 | 48.75 | 45.80 |
| C & E Loss (ft) | 0.17 | Cum SA (acres) | 10.28 | 15.31 | 46.18 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1540.54 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | 0.048 | | |
| W.S. Elev (ft) | 1540.53 | Reach Len. (ft) | 960.00 | 907.50 | 940.00 |
| Crit W.S. (ft) | 1538.19 | Flow Area (sq ft) | 1689.26 | | |
| E.G. Slope (ft/ft) | 0.000302 | Area (sq ft) | 1833.01 | 690.37 | 7563.31 |
| Q Total (cfs) | 1430.00 | Flow (cfs) | 1430.00 | | |
| Top Width (ft) | 6469.53 | Top Width (ft) | 943.88 | 274.87 | 5250.78 |
| Vel Total (ft/s) | 0.85 | Avg. Vel. (ft/s) | 0.85 | | |
| Max Chl Dpth (ft) | 5.62 | Hydr. Depth (ft) | 1.93 | | |
| Conv. Total (cfs) | 82230.2 | Conv. (cfs) | 82230.2 | | |
| Length Wtd. (ft) | 912.37 | Wetted Per. (ft) | 880.13 | | |
| Min Ch El (ft) | 1538.00 | Shear (lb/sq ft) | 0.04 | | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.03 | | |
| Frctn Loss (ft) | 4.66 | Cum Volume (acre-ft) | 21.39 | 69.44 | 89.72 |
| C & E Loss (ft) | 0.22 | Cum SA (acres) | 11.17 | 15.40 | 71.47 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8909.79 | 9145.33 | 5.37 | 20.23 | 67.25 | 2.33 | 0.30 | 0.27 |
| 9145.33 | 9380.86 | 17.23 | 61.00 | 120.88 | 7.49 | 0.50 | 0.28 |
| 9380.86 | 9616.40 | 0.61 | 5.03 | 35.87 | 0.26 | 0.14 | 0.12 |
| 9616.40 | 9851.93 | 206.80 | 261.70 | 110.82 | 89.91 | 2.46 | 0.79 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8909.79 | 9145.33 | 133.60 | 227.64 | 232.42 | 17.13 | 0.98 | 0.59 |
| 9145.33 | 9380.86 | 168.51 | 292.60 | 225.79 | 21.60 | 1.30 | 0.58 |
| 9380.86 | 9616.40 | 63.71 | 160.03 | 214.86 | 8.17 | 0.75 | 0.40 |
| 9616.40 | 9851.93 | 414.18 | 434.44 | 157.38 | 53.10 | 2.85 | 0.95 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8674.26 | 8909.79 | 1.28 | 4.10 | 13.65 | 0.09 | 0.30 | 0.31 |
| 8909.79 | 9145.33 | 320.24 | 384.94 | 236.23 | 22.39 | 1.63 | 0.83 |
| 9145.33 | 9380.86 | 334.39 | 447.93 | 235.61 | 23.38 | 1.90 | 0.75 |
| 9380.86 | 9616.40 | 186.33 | 315.36 | 235.58 | 13.03 | 1.34 | 0.59 |
| 9616.40 | 9851.93 | 587.76 | 536.94 | 159.06 | 41.10 | 3.49 | 1.09 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 16.733

INPUT
Description:
Station Elevation Data num= 242

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 7488.9 | 1536.81 | 7498.67 | 1536.72 | 7509.26 | 1536.59 | 8400.36 | 1538 | 8426.17 | 1538 |
| 8850.07 | 1537.58 | 8863.4 | 1536.98 | 8867.18 | 1537.49 | 8876.27 | 1536 | 8877.8 | 1535.74 |
| 8879.68 | 1536 | 8886.14 | 1536.93 | 8895.33 | 1537.21 | 8898.33 | 1538 | 8899.42 | 1538.28 |
| 8925.79 | 1538.29 | 8927.04 | 1538 | 8930.95 | 1537.1 | 8939.38 | 1536.37 | 8944.1 | 1536 |
| 8949.1 | 1535.64 | 8952.96 | 1536 | 8958.37 | 1536.6 | 8973.35 | 1536 | 8975.9 | 1535.89 |
| 8978.8 | 1536 | 9001.15 | 1536.85 | 9048.14 | 1536 | 9173.51 | 1534 | 9263.01 | 1534 |
| 9498.18 | 1534.77 | 9499.01 | 1534 | 9501.12 | 1532 | 9503.27 | 1530 | 9505.42 | 1528 |
| 9507.53 | 1526 | 9509.17 | 1524.07 | 9509.58 | 1524 | 9547.34 | 1522 | 9553.43 | 1521.73 |
| 9562.78 | 1520 | 9599.4 | 1520 | 9611.38 | 1520 | 9617.9 | 1519.03 | 9619.45 | 1520 |
| 9622.68 | 1522 | 9626.5 | 1524 | 9630.61 | 1526 | 9635.24 | 1528 | 9640.09 | 1530 |
| 9648.2 | 1532 | 9652.22 | 1534 | 9657.12 | 1535.09 | 9801.14 | 1534.98 | 9807.54 | 1536 |
| 9835.3 | 1536 | 9839.68 | 1534.92 | 9917.35 | 1534.95 | 9918.82 | 1534 | 9921.92 | 1532 |
| 9924.74 | 1530 | 9925.88 | 1528.99 | 9955.22 | 1528.94 | 9959.58 | 1528 | 9966.53 | 1526.48 |
| 9987.52 | 1527.16 | 9999.99 | 152 | 10004.68 | 1525.55 | 10013.59 | 1524.58 | 10022.95 | 1524.51 |
| 10026.22 | 152 | 10030.67 | 152 | 10034.49 | 1529.76 | 10059.67 | 1528.93 | 10067.01 | 1530 |
| 10069.6 | 1530.38 | 10073.24 | 1530.37 | 10095.54 | 153 | 10111.04 | 1529.41 | 10120.14 | 1529.59 |
| 10123.44 | 153 | 10148.62 | 1531.05 | 10169.99 | 1530.47 | 10173.9 | 153 | 10178.71 | 1534 |
| 10183.44 | 153 | 10184.78 | 1536.56 | 10185.88 | 153 | 10189.89 | 153 | 10194.03 | 1532 |
| 10195.99 | 1531.05 | 10197.27 | 1530.75 | 10197.72 | 153 | 10198.91 | 152 | 10200.11 | 1526 |
| 10201.3 | 1524 | 10202.5 | 152 | 10203.69 | 152 | 10204.89 | 151 | 10206.08 | 1516 |
| 10207.28 | 151 | 10208.47 | 151 | 10209.71 | 151 | 10211.12 | 150 | 10212.53 | 1506 |
| 10212.9 | 1505.47 | 10225.64 | 150 | 10270.35 | 1507.02 | 10274.32 | 150 | 10282.81 | 1510 |
| 10292.42 | 151 | 10307.46 | 151 | 10317.58 | 151 | 10323.23 | 150 | 10327.57 | 1506.46 |
| 10585.89 | 1507.91 | 10586.43 | 150 | 10597.14 | 151 | 10603.65 | 1511.18 | 10605.36 | 1512 |
| 10609.43 | 151 | 10610.22 | 1514.41 | 10611.19 | 151 | 10612.34 | 151 | 10613.44 | 1520 |
| 10614.55 | 152 | 10615.65 | 152 | 10616.76 | 152 | 10617.86 | 152 | 10618.97 | 1530 |
| 10620.07 | 1532 | 10620.4 | 1532.59 | 10624.81 | 153 | 10631.06 | 153 | 10632.09 | 1536.33 |
| 10635.79 | 153 | 10645.11 | 1535.21 | 10669.58 | 153 | 10669.76 | 1536.01 | 10669.84 | 1536 |
| 10685 | 1534.65 | 10687.78 | 153 | 10693.84 | 153 | 10725.48 | 153 | 10728.34 | 1536.14 |
| 10728.45 | 153 | 10730.05 | 153 | 10731.65 | 153 | 10733.25 | 153 | 10734.85 | 1528 |
| 10736.44 | 152 | 10737.97 | 1524 | 10739.5 | 152 | 10741.04 | 152 | 10742.57 | 1518 |
| 10744.1 | 151 | 10745.89 | 151 | 10747.61 | 151 | 10749.33 | 151 | 10749.39 | 1509.93 |
| 10754.31 | 1510 | 10759.6 | 1510.29 | 10768.77 | 151 | 10788.96 | 1509.12 | 10790.52 | 1510 |
| 10794.49 | 151 | 10795.96 | 1512.54 | 10796.95 | 151 | 10800.61 | 151 | 10804.33 | 1508 |
| 10808.91 | 150 | 10814.06 | 150 | 10818.58 | 150 | 10819.24 | 1501.71 | 10849.54 | 1502 |
| 10927.62 | 150 | 11086.83 | 150 | 11116.74 | 150 | 11125.78 | 1504.08 | 11131.25 | 1506 |
| 11136.74 | 150 | 11141.78 | 151 | 11146.75 | 151 | 11147.12 | 1512.09 | 11148.29 | 1514 |
| 11149.49 | 151 | 11150.66 | 151 | 11151.83 | 152 | 11152.99 | 152 | 11154.16 | 1524 |
| 11155.33 | 152 | 11156.49 | 152 | 11157.66 | 153 | 11158.82 | 153 | 11159.99 | 1534 |
| 11160.32 | 1534.57 | 11162.6 | 153 | 11165.78 | 153 | 11168.33 | 154 | 11170.88 | 1542 |
| 11171.47 | 1542.47 | 11172.6 | 154 | 11177.42 | 154 | 11181.36 | 153 | 11185.14 | 1536 |
| 11187.15 | 1534.94 | 12367.56 | 1535.83 | 12370.63 | 153 | 12374.84 | 1536.27 | 12389.1 | 1536.4 |
| 12395.83 | 1536 | 12397.1 | 1535.93 | 13903.48 | 1534.09 | 13911.05 | 1534.03 | 13912.17 | 1534 |
| 13917.45 | 1533.92 | 13935.46 | 153 | 15245.98 | 1534.57 | 15272.41 | 1534.45 | 15275.96 | 1535.3 |

```
15284.01 1535.3415295.85 1534.0615295.98    153415300.19    153215304.52    1530
15309.05 1527.95 15375.7 1528.1415379.99    1530 15384.6    153215387.08 1533.08
15397.06    153415397.45 1534.0415403.45    153615403.69 1536.0715408.33    1536
 15427.6 1535.7315448.34    153415454.86 1533.4615459.26    1534 15475.6    1536
 15482.2 1536.8115515.44  1537.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  7488.9     .05 9839.68    .03510184.78     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9839.6810184.78              950   895.9    950             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7488.9  9835.3    1536 10188.915515.44 1536.85
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  7488.9  9835.3    1536 10188.915515.44    1535

CROSS SECTION OUTPUT    Profile #PF 1/3 flow

  E.G. Elev (ft)          1532.10  Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.01  Wt. n-Val.                           0.035
  W.S. Elev (ft)          1531.09  Reach Len. (ft)          950.00     895.90     950.00
  Crit W.S. (ft)          1530.95  Flow Area (sq ft)                   578.63
  E.G. Slope (ft/ft)     0.011850  Area (sq ft)                        578.63
  Q Total (cfs)           4667.00  Flow (cfs)                         4667.00
  Top Width (ft)           248.39  Top Width (ft)                      248.39
  Vel Total (ft/s)           8.07  Avg. Vel. (ft/s)                      8.07
  Max Chl Dpth (ft)          6.58  Hydr. Depth (ft)                      2.33
  Conv. Total (cfs)       42872.9  Conv. (cfs)                        42872.9
  Length Wtd. (ft)         895.90  Wetted Per. (ft)                    250.97
  Min Ch El (ft)          1524.51  Shear (lb/sq ft)                      1.71
  Alpha                      1.00  Stream Power (lb/ft s)               13.76
  Frctn Loss (ft)            3.83  Cum Volume (acre-ft)                 17.50
  C & E Loss (ft)            0.21  Cum SA (acres)                        6.95


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT    Profile #PF 2/3 flow

  E.G. Elev (ft)          1534.04  Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.73  Wt. n-Val.                           0.035
  W.S. Elev (ft)          1532.31  Reach Len. (ft)          950.00     895.90     950.00
  Crit W.S. (ft)          1532.31  Flow Area (sq ft)                   883.77
  E.G. Slope (ft/ft)     0.011884  Area (sq ft)                        883.77
  Q Total (cfs)           9333.00  Flow (cfs)                         9333.00
  Top Width (ft)           253.21  Top Width (ft)                      253.21
  Vel Total (ft/s)          10.56  Avg. Vel. (ft/s)                     10.56
  Max Chl Dpth (ft)          7.80  Hydr. Depth (ft)                      3.49
  Conv. Total (cfs)       85613.9  Conv. (cfs)                        85613.9
  Length Wtd. (ft)         895.90  Wetted Per. (ft)                    256.40
  Min Ch El (ft)          1524.51  Shear (lb/sq ft)                      2.56
  Alpha                      1.00  Stream Power (lb/ft s)               27.01
  Frctn Loss (ft)            3.06  Cum Volume (acre-ft)       0.01      34.26       0.01
  C & E Loss (ft)            0.39  Cum SA (acres)             0.53       9.81       0.91


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed
         and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1535.65 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 2.26 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1533.40 | Reach Len. (ft) | 950.00 | 895.90 | 950.00 |
| Crit W.S. (ft) | 1533.38 | Flow Area (sq ft) | | 1160.79 | |
| E.G. Slope (ft/ft) | 0.011047 | Area (sq ft) | | 1160.79 | |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 257.50 | Top Width (ft) | | 257.50 | |
| Vel Total (ft/s) | 12.06 | Avg. Vel. (ft/s) | | 12.06 | |
| Max Chl Dpth (ft) | 8.89 | Hydr. Depth (ft) | | 4.51 | |
| Conv. Total (cfs) | 133198.5 | Conv. (cfs) | | 133198.5 | |
| Length Wtd. (ft) | 895.90 | Wetted Per. (ft) | | 261.23 | |
| Min Ch El (ft) | 1524.51 | Shear (lb/sq ft) | | 3.06 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 36.96 | |
| Frctn Loss (ft) | 2.76 | Cum Volume (acre-ft) | 1.19 | 50.16 | 8.12 |
| C & E Loss (ft) | 0.51 | Cum SA (acres) | 0.77 | 9.85 | 14.82 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 1142.27 | 152.94 | 55.52 | 24.48 | 2.81 | 7.47 |
| 9977.72 | 10046.74 | 3015.38 | 300.92 | 70.30 | 64.61 | 4.36 | 10.02 |
| 10046.74 | 10115.76 | 421.12 | 91.75 | 69.15 | 9.02 | 1.33 | 4.59 |
| 10115.76 | RB 10184.78 | 88.24 | 33.02 | 56.00 | 1.89 | 0.59 | 2.67 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 2274.28 | 220.32 | 57.66 | 24.37 | 3.91 | 10.32 |
| 9977.72 | 10046.74 | 5049.79 | 384.90 | 70.30 | 54.11 | 5.58 | 13.12 |
| 10046.74 | 10115.76 | 1382.13 | 175.73 | 69.15 | 14.81 | 2.55 | 7.87 |
| 10115.76 | RB 10184.78 | 626.80 | 102.82 | 59.29 | 6.72 | 1.75 | 6.10 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta | Right Sta | Flow | Area | W.P. | % Conv. | Hydr D. | Velocity |
|---|---|---|---|---|---|---|---|

| (ft) | (ft) | (cfs) | (sq ft) | (ft) | | (ft) | (ft/s) |
|---|---|---|---|---|---|---|---|
| 9908.70 | 9977.72 | 3353.58 | 282.29 | 59.66 | 23.95 | 4.87 | 11.88 |
| 9977.72 | 10046.74 | 6777.83 | 459.77 | 70.30 | 48.41 | 6.66 | 14.74 |
| 10046.74 | 10115.76 | 2492.36 | 250.60 | 69.15 | 17.80 | 3.63 | 9.95 |
| 10115.76 | RB 10184.78 | 1376.23 | 168.12 | 62.12 | 9.83 | 2.73 | 8.19 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper left RS: 16.563

INPUT
Description:
Station Elevation Data num= 79

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9071.1 | 1534.25 | 9166.33 | 1534 | 9188.48 | 1534 | 9290.35 | 1534 | 9415.18 | 1532.15 |
| 9416.1 | 1532 | 9426.51 | 1530 | 9427.58 | 1529.7 | 9430.73 | 1530 | 9474.96 | 1530 |
| 9475.36 | 1529.99 | 9475.43 | 1530 | 9485.04 | 1532 | 9513.01 | 1533.6 | 9530.26 | 1534 |
| 9541.61 | 1534.21 | 9547.05 | 1534 | 9579.81 | 1534 | 9581.79 | 1534.1 | 9770.77 | 1535.38 |
| 9773.4 | 1534 | 9777.19 | 1532 | 9780.99 | 1530 | 9784.93 | 1528 | 9789.78 | 1526.25 |
| 9860.53 | 1527.47 | 9899.89 | 1527.04 | 9918.17 | 1526.77 | 9931.75 | 1526.65 | 9936.69 | 1526 |
| 9940.69 | 1525.27 | 9945.67 | 1526 | 9947.46 | 1526.09 | 9949.29 | 1526 | 9983.86 | 1524.7 |
| 9989.49 | 1524 | 9997.43 | 152210001.19 | | 1520.8410013.48 | | 152210053.13 | | 1522 |
| 10109.15 | 1521.0210111.32 | | 152210115.82 | | 1524 | 10120.4 | 152610122.78 | | 1527.04 |
| 10134.86 | 1526 | 10142.8 | 1525.2410165.99 | | 152610174.86 | | 1526.310181.69 | | 1528 |
| 10182.93 | 1528.2710212.59 | | 1528.1110250.83 | | 152810255.04 | | 1527.310300.54 | | 1528 |
| 10481.77 | 153010507.33 | | 1530.6510510.45 | | 153210517.97 | | 153210521.58 | | 1530.69 |
| 10603.12 | 1531.8810604.31 | | 153210615.53 | | 1533.2910639.91 | | 1532.9510647.23 | | 1532 |
| 10871.7 | 153010952.71 | | 153011147.77 | | 153211147.78 | | 153211157.15 | | 1532.35 |
| 11160.9 | 153211166.84 | | 1531.2611175.72 | | 1531.4112289.33 | | 153212301.59 | | 1532.48 |
| 12309.43 | 1532.5212333.31 | | 1533.1 | 12393 | 1532.7212571.81 | | 1532.58 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9071.1 | .05 | 9780.99 | .03510481.77 | | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9780.9910481.77 | | 40 | 32.8 | 40 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9071.1 | 9870.77 | 1535 | 1018012571.81 | | 1533.29 |

CROSS SECTION OUTPUT Profile #PF 1/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1528.06 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.31 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1527.75 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1525.49 | Flow Area (sq ft) | | 1046.75 | |
| E.G. Slope (ft/ft) | 0.002191 | Area (sq ft) | | 1123.53 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 427.02 | Top Width (ft) | | 427.02 | |
| Vel Total (ft/s) | 4.46 | Avg. Vel. (ft/s) | | 4.46 | |
| Max Chl Dpth (ft) | 6.91 | Hydr. Depth (ft) | | 3.39 | |
| Conv. Total (cfs) | 99704.1 | Conv. (cfs) | | 99704.1 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.46 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.05 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2/3 flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1530.45 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1530.01 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1527.42 | Flow Area (sq ft) | | 1745.62 | |
| E.G. Slope (ft/ft) | 0.001593 | Area (sq ft) | 1.13 | 2448.21 | 0.82 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 9333.00 | Flow (cfs) | | 9333.00 | |
| Top Width (ft) | 833.32 | Top Width (ft) | 49.04 | 700.78 | 83.50 |
| Vel Total (ft/s) | 5.35 | Avg. Vel. (ft/s) | | 5.35 | |
| Max Chl Dpth (ft) | 9.17 | Hydr. Depth (ft) | | 5.65 | |
| Conv. Total (cfs) | 233823.3 | Conv. (cfs) | | 233823.3 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.56 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.98 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1532.39 | Element | | | |
| Vel Head (ft) | 0.57 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1531.82 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1528.35 | Flow Area (sq ft) | | 2305.30 | |
| E.G. Slope (ft/ft) | 0.001419 | Area (sq ft) | 109.39 | 3716.58 | 744.27 |
| Q Total (cfs) | 14000.00 | Flow (cfs) | | 14000.00 | |
| Top Width (ft) | 2130.07 | Top Width (ft) | 70.60 | 700.78 | 1358.69 |
| Vel Total (ft/s) | 6.07 | Avg. Vel. (ft/s) | | 6.07 | |
| Max Chl Dpth (ft) | 10.98 | Hydr. Depth (ft) | | 7.45 | |
| Conv. Total (cfs) | 371694.9 | Conv. (cfs) | | 371694.9 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 311.48 | |
| Min Ch El (ft) | 1520.84 | Shear (lb/sq ft) | | 0.66 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 3.98 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 1/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 49.39 | 34.44 | 50.38 | 1.06 | 0.68 | 1.43 |
| 9921.15 | 10061.30 | 2598.98 | 560.35 | 140.87 | 55.69 | 4.00 | 4.64 |
| 10061.30 | 10201.46 | 2018.63 | 451.95 | 120.23 | 43.25 | 3.81 | 4.47 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 2/3 flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 503.26 | 148.30 | 50.38 | 5.39 | 2.94 | 3.39 |
| 9921.15 | 10061.30 | 4904.79 | 877.10 | 140.87 | 52.55 | 6.26 | 5.59 |
| 10061.30 | 10201.46 | 3924.95 | 720.21 | 120.23 | 42.05 | 6.07 | 5.45 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9780.99 | 9921.15 | 1067.26 | 239.48 | 50.38 | 7.62 | 4.75 | 4.46 |
| 9921.15 | 10061.30 | 7146.56 | 1130.78 | 140.87 | 51.05 | 8.07 | 6.32 |
| 10061.30 | 10201.46 | 5786.17 | 935.05 | 120.23 | 41.33 | 7.88 | 6.19 |

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 | n4 | n5 | n6 |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Upper left | 17.817 | .04 | .045 | .05 | | | |
| Upper left | 17.704 | .04 | .03 | .035 | .05 | .035 | .05 |
| Upper left | 17.576 | .04 | .03 | .05 | | | |
| Upper left | 17.471 | .04 | .03 | .05 | | | |
| Upper left | 17.319 | .04 | .03 | .05 | | | |
| Upper left | 17.190 | .04 | .03 | .05 | | | |
| Upper left | 17.055 | .04 | .04 | .03 | .03 | .04 | .05 |
| Upper left | 16.904 | .035 | .035 | .05 | | | |
| Upper left | 16.733 | .05 | .035 | .05 | | | |
| Upper left | 16.563 | .05 | .035 | .05 | | | |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Upper left | 17.817 | 680 | 597.3 | 660 |
| Upper left | 17.704 | 720 | 676 | 500 |
| Upper left | 17.576 | 500 | 553.2 | 1000 |
| Upper left | 17.471 | 770 | 803.3 | 780 |
| Upper left | 17.319 | 675 | 683 | 710 |
| Upper left | 17.190 | 650 | 708.5 | 720 |
| Upper left | 17.055 | 800 | 796.7 | 850 |
| Upper left | 16.904 | 960 | 907.5 | 940 |
| Upper left | 16.733 | 950 | 895.9 | 950 |
| Upper left | 16.563 | 40 | 32.8 | 40 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| Upper left | 17.817 | .1 | .3 |
| Upper left | 17.704 | .1 | .3 |
| Upper left | 17.576 | .1 | .3 |
| Upper left | 17.471 | .1 | .3 |
| Upper left | 17.319 | .1 | .3 |
| Upper left | 17.190 | .1 | .3 |
| Upper left | 17.055 | .1 | .3 |
| Upper left | 16.904 | .1 | .3 |
| Upper left | 16.733 | .1 | .3 |
| Upper left | 16.563 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper left | 17.817 | 230.00 | 1567.06 | 1564.78 | 1564.53 | 1564.82 | 0.005244 | | 152.11 | 360.93 | 0.00 |
| Upper left | 17.817 | 780.00 | 1567.06 | 1565.25 | 1564.90 | 1565.32 | 0.005756 | | 365.36 | 554.19 | 0.00 |
| Upper left | 17.817 | 1430.00 | 1567.06 | 1565.53 | 1565.16 | 1565.64 | 0.006774 | | 537.81 | 663.10 | 0.00 |
| Upper left | 17.704 | 230.00 | 1561.00 | 1560.60 | 1560.45 | 1560.67 | 0.007558 | | 106.89 | 263.47 | 0.00 |
| Upper left | 17.704 | 780.00 | 1561.00 | 1561.16 | 1560.88 | 1561.24 | 0.006237 | | 341.98 | 5559.00 | 0.00 |
| Upper left | 17.704 | 1430.00 | 1561.00 | 1561.50 | 1561.16 | 1561.59 | 0.005267 | | 610.86 | 6365.97 | 0.00 |
| Upper left | 17.576 | 230.00 | 1557.75 | 1553.24 | 1553.24 | 1553.70 | 0.012994 | | 42.53 | 47.52 | 0.00 |
| Upper left | 17.576 | 780.00 | 1557.75 | 1554.35 | 1554.35 | 1555.16 | 0.011756 | | 107.63 | 66.97 | 0.00 |
| Upper left | 17.576 | 1430.00 | 1557.75 | 1555.19 | 1555.19 | 1556.35 | 0.010181 | | 165.63 | 70.92 | 0.00 |
| Upper left | 17.471 | 230.00 | 1550.00 | 1548.42 | 1546.23 | 1548.57 | 0.001170 | | 72.20 | 29.12 | 0.00 |
| Upper left | 17.471 | 780.00 | 1550.00 | 1550.92 | 1548.97 | 1551.18 | 0.001483 | | 191.10 | 1145.71 | 0.00 |
| Upper left | 17.471 | 1430.00 | 1550.00 | 1552.11 | 1550.17 | 1552.57 | 0.001979 | | 261.95 | 1199.14 | 0.00 |
| Upper left | 17.319 | 230.00 | 1547.00 | 1545.36 | 1545.36 | 1546.36 | 0.012679 | | 28.72 | 14.25 | 0.00 |
| Upper left | 17.319 | 780.00 | 1547.00 | 1548.77 | 1548.77 | 1549.23 | 0.005122 | | 142.82 | 2466.68 | 0.00 |
| Upper left | 17.319 | 1430.00 | 1547.00 | 1549.27 | 1549.27 | 1549.80 | 0.008437 | | 245.44 | 2607.41 | 0.00 |
| Upper left | 17.190 | 230.00 | 1544.00 | 1542.51 | 1540.22 | 1542.70 | 0.001458 | | 66.05 | 21.52 | 0.00 |
| Upper left | 17.190 | 780.00 | 1544.00 | 1545.15 | 1543.05 | 1545.44 | 0.002273 | | 181.09 | 2416.57 | 0.00 |
| Upper left | 17.190 | 1430.00 | 1544.00 | 1546.15 | 1545.08 | 1546.40 | 0.003030 | | 357.42 | 3749.55 | 0.00 |
| Upper left | 17.055 | 230.00 | 1540.00 | 1539.53 | 1539.53 | 1540.53 | 0.012145 | | 28.58 | 14.02 | 0.00 |
| Upper left | 17.055 | 780.00 | 1540.00 | 1541.69 | 1541.69 | 1542.61 | 0.010739 | | 101.41 | 1157.47 | 0.00 |
| Upper left | 17.055 | 1430.00 | 1540.00 | 1542.76 | 1542.76 | 1543.17 | 0.009473 | | 278.01 | 2004.74 | 0.00 |
| Upper left | 16.904 | 230.00 | 1538.00 | 1538.60 | 1536.38 | 1538.61 | 0.000221 | | 347.96 | 2172.86 | 0.00 |
| Upper left | 16.904 | 780.00 | 1538.00 | 1539.86 | 1537.19 | 1539.87 | 0.000332 | | 1114.71 | 5354.83 | 0.00 |
| Upper left | 16.904 | 1430.00 | 1538.00 | 1540.53 | 1538.19 | 1540.54 | 0.000302 | | 1689.26 | 6469.53 | 0.00 |
| Upper left | 16.733 | 4667.00 | 1524.51 | 1531.09 | 1530.95 | 1532.10 | 0.011850 | 8.07 | 578.63 | 248.39 | 0.93 |
| Upper left | 16.733 | 9333.00 | 1524.51 | 1532.31 | 1532.31 | 1534.04 | 0.011884 | 10.56 | 883.77 | 253.21 | 1.00 |
| Upper left | 16.733 | 14000.00 | 1524.51 | 1533.40 | 1533.38 | 1535.65 | 0.011047 | 12.06 | 1160.79 | 257.50 | 1.00 |
| Upper left | 16.563 | 4667.00 | 1520.84 | 1527.75 | 1525.49 | 1528.06 | 0.002191 | 4.46 | 1046.75 | 427.02 | 0.43 |
| Upper left | 16.563 | 9333.00 | 1520.84 | 1530.01 | 1527.42 | 1530.45 | 0.001593 | 5.35 | 1745.62 | 833.32 | 0.40 |
| Upper left | 16.563 | 14000.00 | 1520.84 | 1531.82 | 1528.35 | 1532.39 | 0.001419 | 6.07 | 2305.30 | 2130.07 | 0.39 |

Profile Output Table - Standard Table 2

| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| Upper left | 17.817 | 1564.82 | 1564.78 | 0.04 | 4.15 | 0.00 | 230.00 | | | 360.93 |
| Upper left | 17.817 | 1565.32 | 1565.25 | 0.07 | 4.07 | 0.00 | 780.00 | | | 554.19 |
| Upper left | 17.817 | 1565.64 | 1565.53 | 0.11 | 4.05 | 0.01 | 1430.00 | | | 663.10 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper left | 17.704 | 1560.67 | 1560.60 | 0.07 | 6.93 | 0.04 | 230.00 | | 263.47 |
| Upper left | 17.704 | 1561.24 | 1561.16 | 0.08 | 6.00 | 0.07 | 780.00 | | 5559.00 |
| Upper left | 17.704 | 1561.59 | 1561.50 | 0.09 | 5.13 | 0.11 | 1430.00 | | 6365.97 |
| Upper left | 17.576 | 1553.70 | 1553.24 | 0.45 | 1.38 | 0.09 | 230.00 | | 47.52 |
| Upper left | 17.576 | 1555.16 | 1554.35 | 0.82 | 1.61 | 0.17 | 780.00 | | 66.97 |
| Upper left | 17.576 | 1556.35 | 1555.19 | 1.16 | 1.91 | 0.21 | 1430.00 | | 70.92 |
| Upper left | 17.471 | 1548.57 | 1548.42 | 0.16 | 2.13 | 0.08 | 230.00 | | 29.12 |
| Upper left | 17.471 | 1551.18 | 1550.92 | 0.26 | 1.93 | 0.02 | 780.00 | | 1145.71 |
| Upper left | 17.471 | 1552.57 | 1552.11 | 0.46 | 2.77 | 0.01 | 1430.00 | | 1199.14 |
| Upper left | 17.319 | 1546.36 | 1545.36 | 1.00 | 2.20 | 0.24 | 230.00 | | 14.25 |
| Upper left | 17.319 | 1549.23 | 1548.77 | 0.46 | 2.21 | 0.05 | 780.00 | | 2466.68 |
| Upper left | 17.319 | 1549.80 | 1549.27 | 0.53 | 3.20 | 0.08 | 1430.00 | | 2607.41 |
| Upper left | 17.190 | 1542.70 | 1542.51 | 0.19 | 2.09 | 0.08 | 230.00 | | 21.52 |
| Upper left | 17.190 | 1545.44 | 1545.15 | 0.29 | 2.77 | 0.06 | 780.00 | | 2416.57 |
| Upper left | 17.190 | 1546.40 | 1546.15 | 0.25 | 3.21 | 0.02 | 1430.00 | | 3749.55 |
| Upper left | 17.055 | 1540.53 | 1539.53 | 1.01 | 0.55 | 0.30 | 230.00 | | 14.02 |
| Upper left | 17.055 | 1542.61 | 1541.69 | 0.92 | 0.77 | 0.27 | 780.00 | | 1157.47 |
| Upper left | 17.055 | 1543.17 | 1542.76 | 0.41 | 0.70 | 0.12 | 1430.00 | | 2004.74 |
| Upper left | 16.904 | 1538.61 | 1538.60 | 0.01 | 6.40 | 0.10 | 230.00 | | 2172.86 |
| Upper left | 16.904 | 1539.87 | 1539.86 | 0.01 | 5.65 | 0.17 | 780.00 | | 5354.83 |
| Upper left | 16.904 | 1540.54 | 1540.53 | 0.01 | 4.66 | 0.22 | 1430.00 | | 6469.53 |
| Upper left | 16.733 | 1532.10 | 1531.09 | 1.01 | 3.83 | 0.21 | | 4667.00 | 248.39 |
| Upper left | 16.733 | 1534.04 | 1532.31 | 1.73 | 3.06 | 0.39 | | 9333.00 | 253.21 |
| Upper left | 16.733 | 1535.65 | 1533.40 | 2.26 | 2.76 | 0.51 | | 14000.00 | 257.50 |
| Upper left | 16.563 | 1528.06 | 1527.75 | 0.31 | | | | 4667.00 | 427.02 |
| Upper left | 16.563 | 1530.45 | 1530.01 | 0.44 | | | | 9333.00 | 833.32 |
| Upper left | 16.563 | 1532.39 | 1531.82 | 0.57 | | | | 14000.00 | 2130.07 |

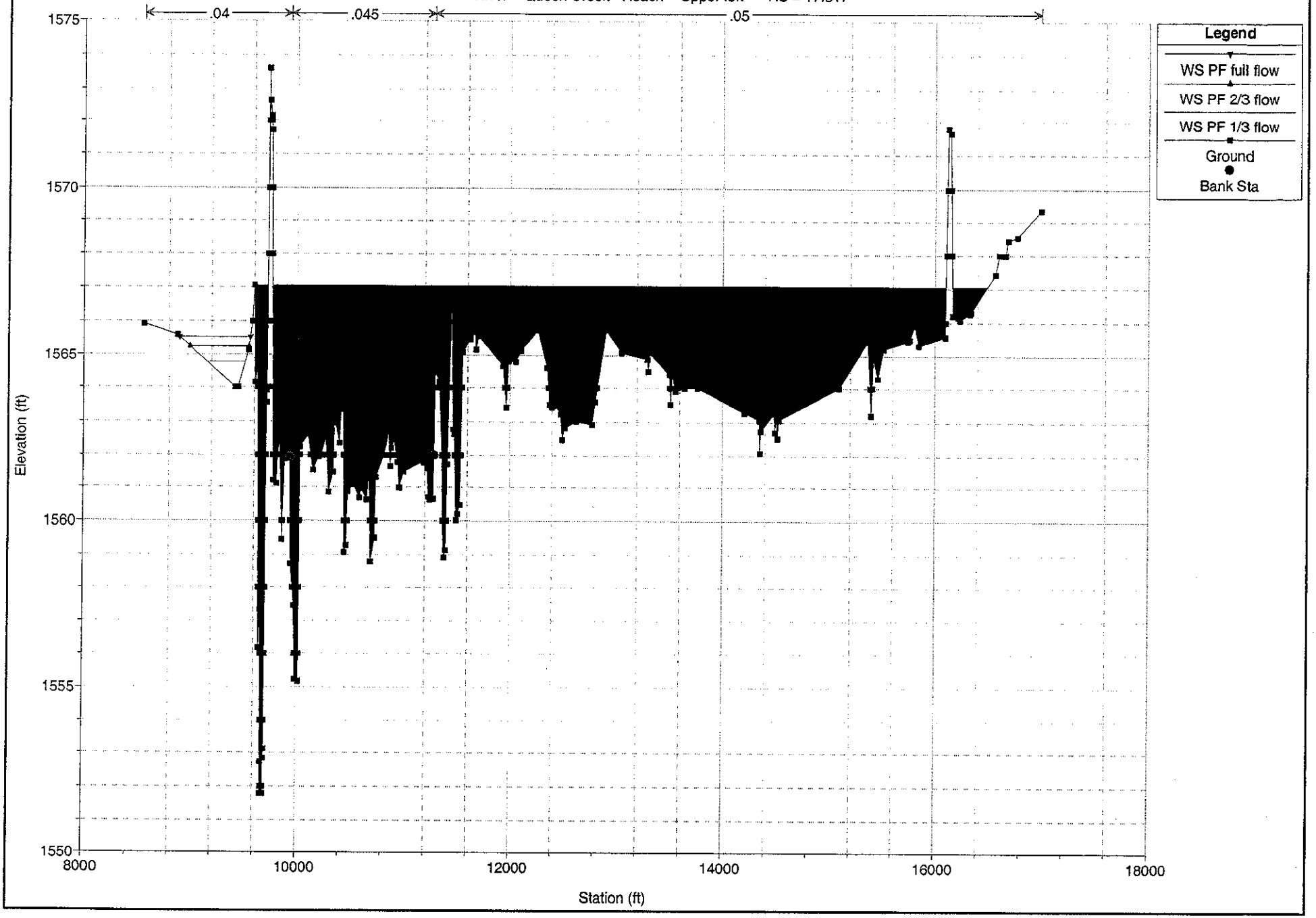
Profile Output Table - Hydratable

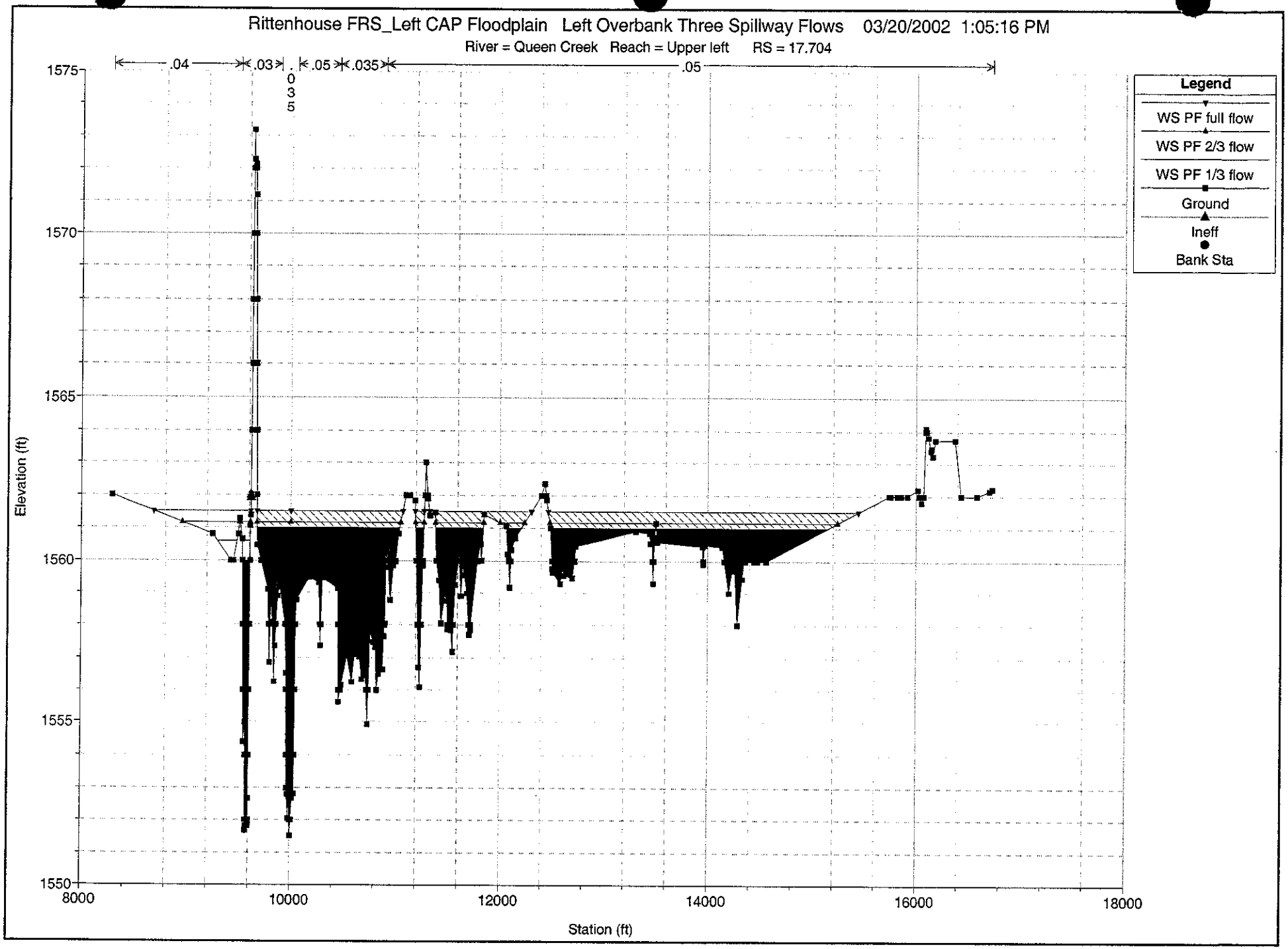
| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| Upper left | 17.817 | 230.00 | 1564.78 | 0.10 | 0.44 | | 1.51 | 0.78 | 0.42 |
| Upper left | 17.817 | 780.00 | 1565.25 | 0.08 | 0.39 | | 2.13 | 1.25 | 0.66 |
| Upper left | 17.817 | 1430.00 | 1565.53 | 0.07 | 0.39 | | 2.66 | 1.53 | 0.81 |
| Upper left | 17.704 | 230.00 | 1560.60 | 0.10 | 0.34 | | 2.15 | 0.60 | 0.41 |
| Upper left | 17.704 | 780.00 | 1561.16 | 0.08 | 0.31 | | 2.28 | 1.16 | 0.53 |
| Upper left | 17.704 | 1430.00 | 1561.50 | 0.07 | 0.31 | | 2.34 | 1.50 | 0.66 |
| Upper left | 17.576 | 230.00 | 1553.24 | 0.10 | 0.28 | | 5.41 | 1.24 | 0.89 |
| Upper left | 17.576 | 780.00 | 1554.35 | 0.08 | 0.27 | | 7.25 | 2.35 | 1.61 |
| Upper left | 17.576 | 1430.00 | 1555.19 | 0.07 | 0.28 | | 8.63 | 3.19 | 2.34 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Upper left | 17.471 | 230.00 | 1548.42 | 0.10 | 0.25 | | 3.19 | 5.00 | 2.48 |
| Upper left | 17.471 | 780.00 | 1550.92 | 0.08 | 0.24 | | 4.08 | 7.50 | 3.38 |
| Upper left | 17.471 | 1430.00 | 1552.11 | 0.07 | 0.26 | | 5.46 | 8.69 | 4.06 |
| Upper left | 17.319 | 230.00 | 1545.36 | 0.10 | 0.21 | | 8.01 | 2.86 | 2.02 |
| Upper left | 17.319 | 780.00 | 1548.77 | 0.08 | 0.20 | | 5.46 | 6.27 | 0.93 |
| Upper left | 17.319 | 1430.00 | 1549.27 | 0.07 | 0.22 | | 5.83 | 6.77 | 1.02 |
| Upper left | 17.190 | 230.00 | 1542.51 | 0.10 | 0.18 | | 3.48 | 5.38 | 3.07 |
| Upper left | 17.190 | 780.00 | 1545.15 | 0.08 | 0.16 | | 4.31 | 8.02 | 2.03 |
| Upper left | 17.190 | 1430.00 | 1546.15 | 0.07 | 0.18 | | 4.00 | 9.02 | 1.09 |
| Upper left | 17.055 | 230.00 | 1539.53 | 0.10 | 0.15 | | 8.05 | 2.65 | 2.04 |
| Upper left | 17.055 | 780.00 | 1541.69 | 0.08 | 0.13 | | 7.69 | 4.81 | 1.86 |
| Upper left | 17.055 | 1430.00 | 1542.76 | 0.07 | 0.14 | | 5.14 | 5.88 | 0.84 |
| Upper left | 16.904 | 230.00 | 1538.60 | 0.10 | 0.10 | | 0.66 | 3.69 | 1.05 |
| Upper left | 16.904 | 780.00 | 1539.86 | 0.08 | 0.08 | | 0.70 | 4.95 | 1.35 |
| Upper left | 16.904 | 1430.00 | 1540.53 | 0.07 | 0.07 | | 0.85 | 5.62 | 1.93 |
| Upper left | 16.733 | 4667.00 | 1531.09 | 0.04 | 0.04 | 8.07 | 8.07 | 6.58 | 2.33 |
| Upper left | 16.733 | 9333.00 | 1532.31 | 0.03 | 0.03 | 10.56 | 10.56 | 7.80 | 3.49 |
| Upper left | 16.733 | 14000.00 | 1533.40 | 0.03 | 0.03 | 12.06 | 12.06 | 8.89 | 4.51 |
| Upper left | 16.563 | 4667.00 | 1527.75 | 0.00 | 0.00 | 4.46 | 4.46 | 6.91 | 3.39 |
| Upper left | 16.563 | 9333.00 | 1530.01 | 0.00 | 0.00 | 5.35 | 5.35 | 9.17 | 5.65 |
| Upper left | 16.563 | 14000.00 | 1531.82 | 0.00 | 0.00 | 6.07 | 6.07 | 10.98 | 7.45 |

Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM

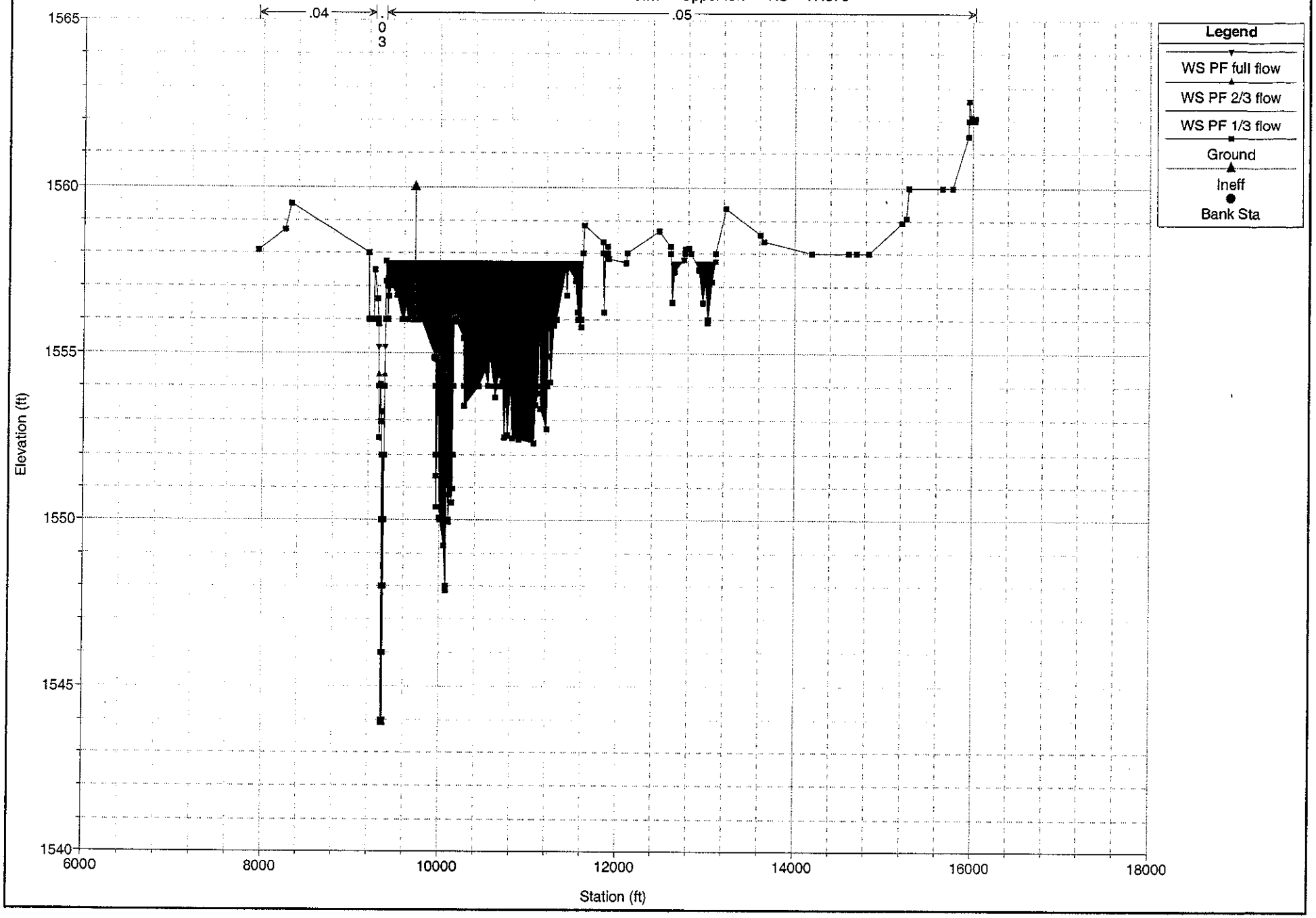
River = Queen Creek Reach = Upper left RS = 17.817




Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM
River = Queen Creek Reach = Upper left RS = 17.704
.04
.03
.035
.05
.035
.05
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1575
1570
1565
1560
1555
1550
8000
10000
12000
14000
16000
18000
Station (ft)

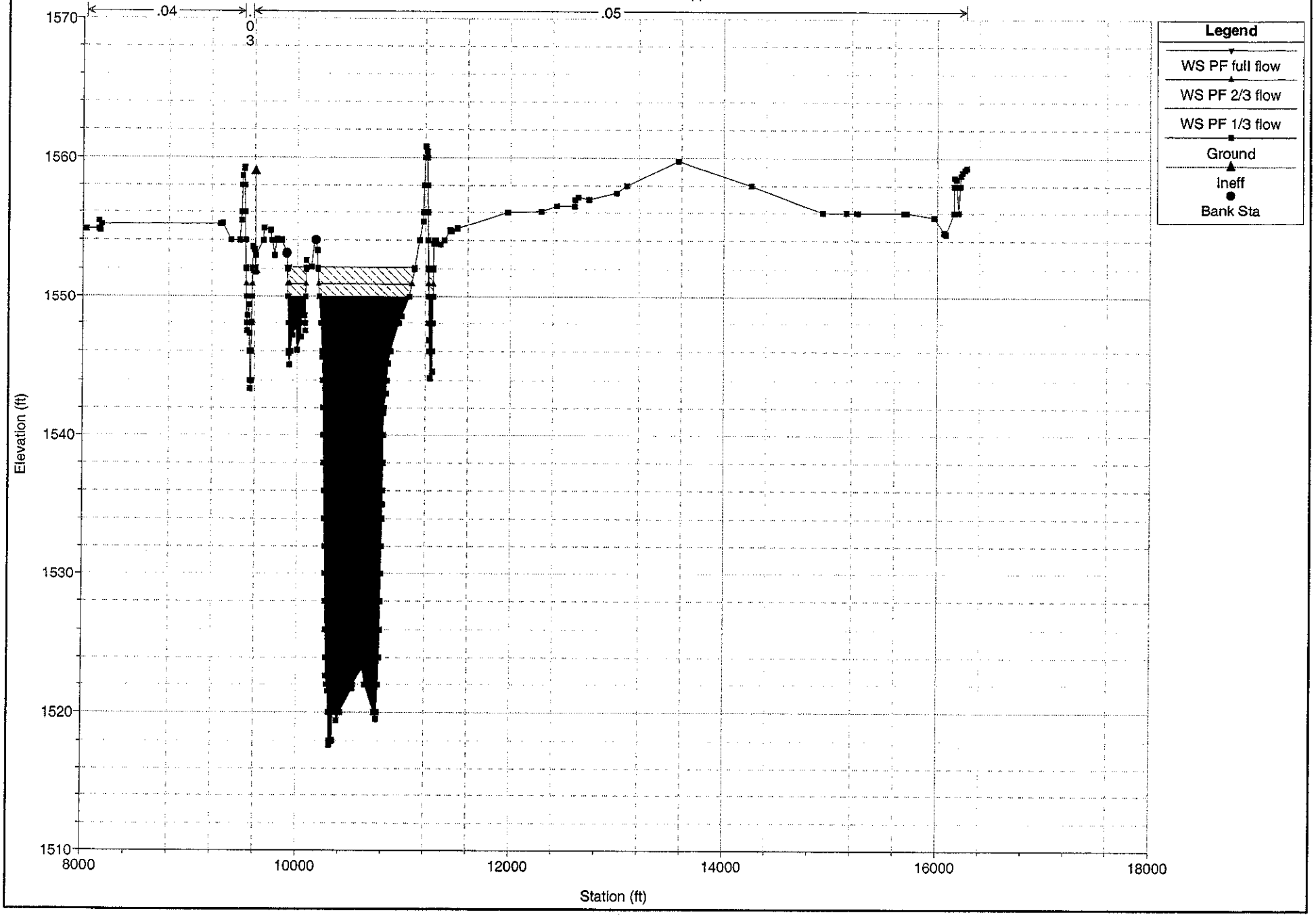
Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM

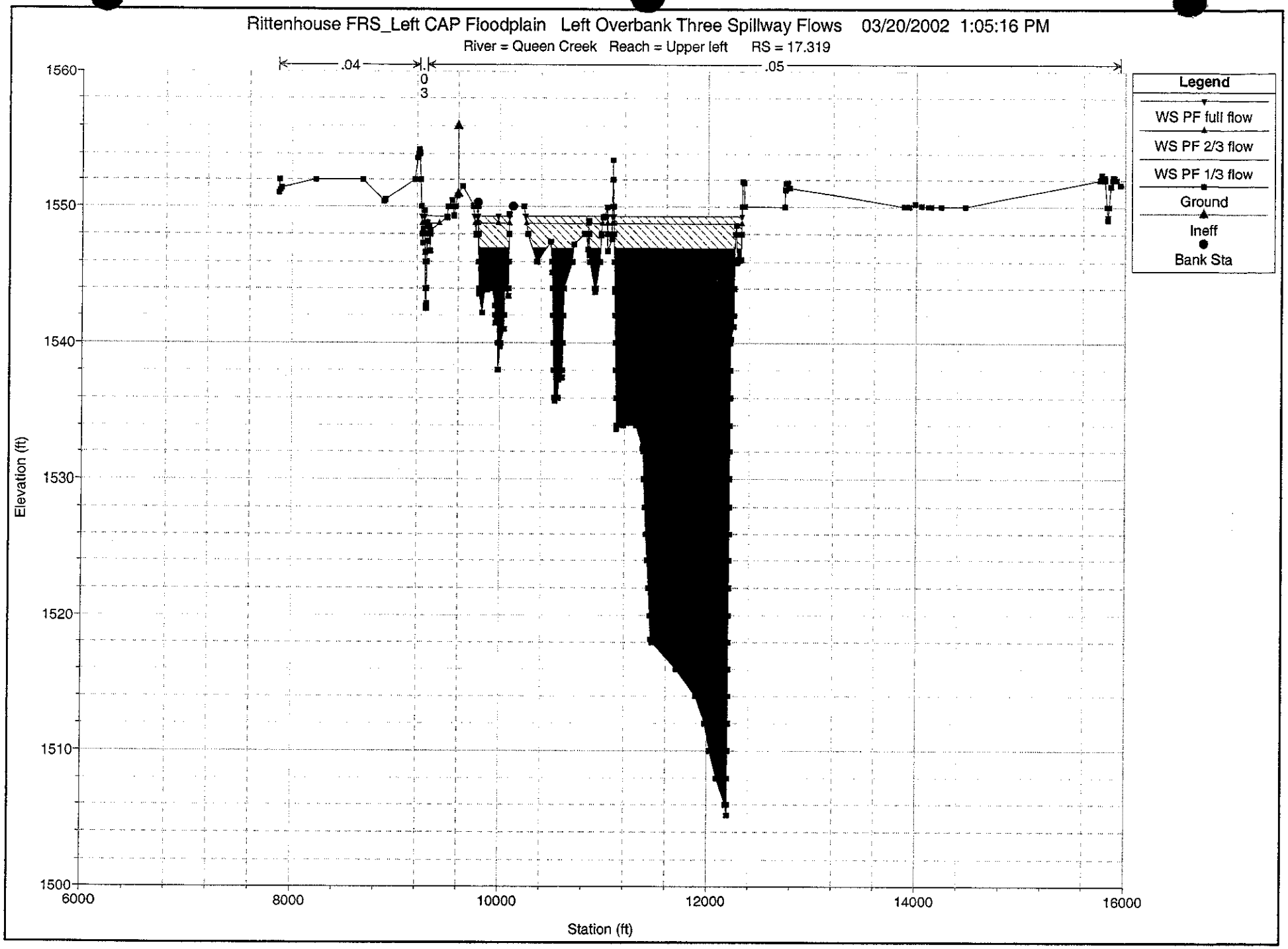
River = Queen Creek Reach = Upper left RS = 17.576



Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM

River = Queen Creek Reach = Upper left RS = 17.471

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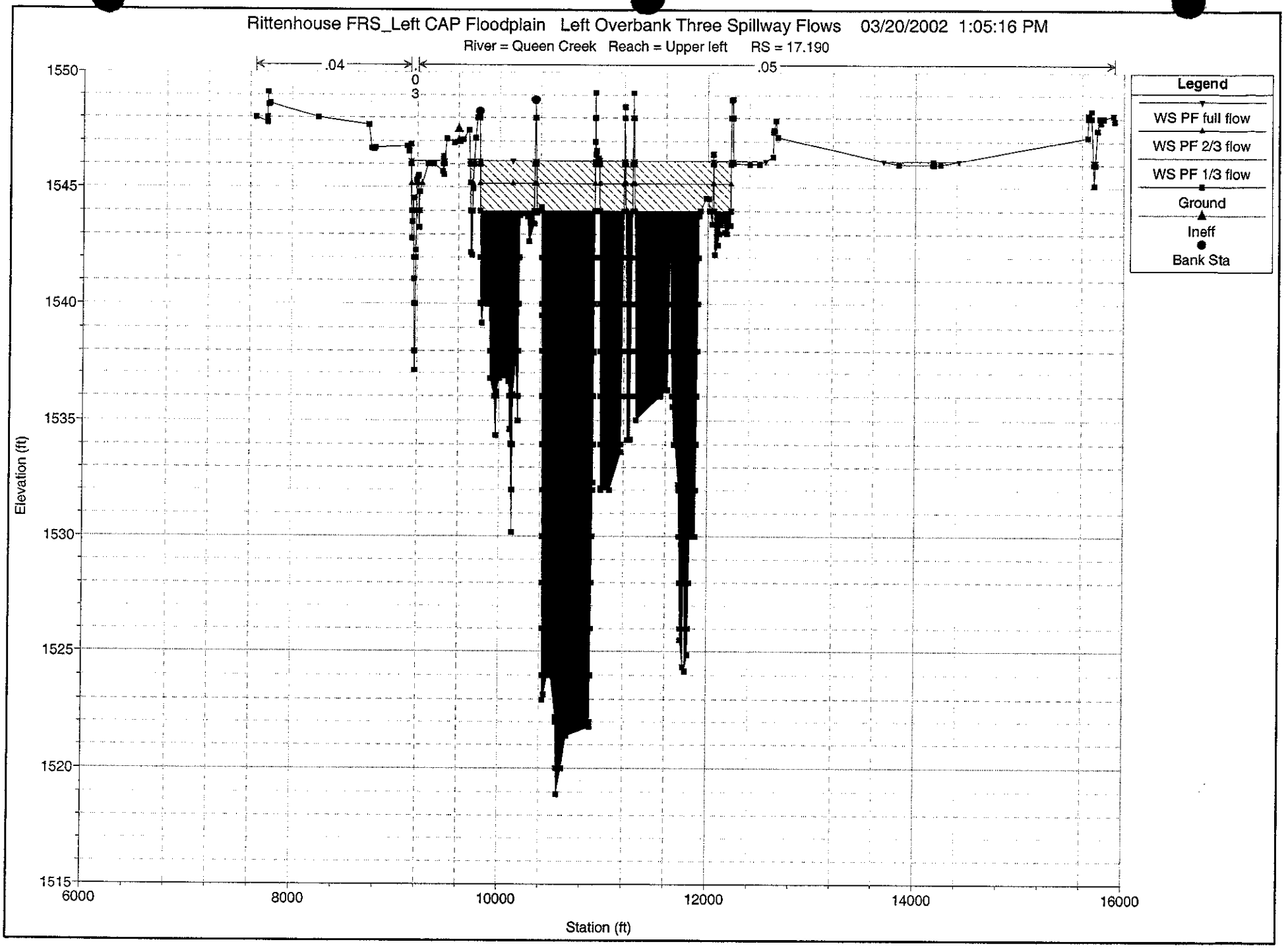
River = Queen Creek Reach = Upper left RS = 17.319
.04
.05
0
3
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1560
1550
1540
1530
1520
1510
1500
6000
8000
10000
12000
14000
16000
Station (ft)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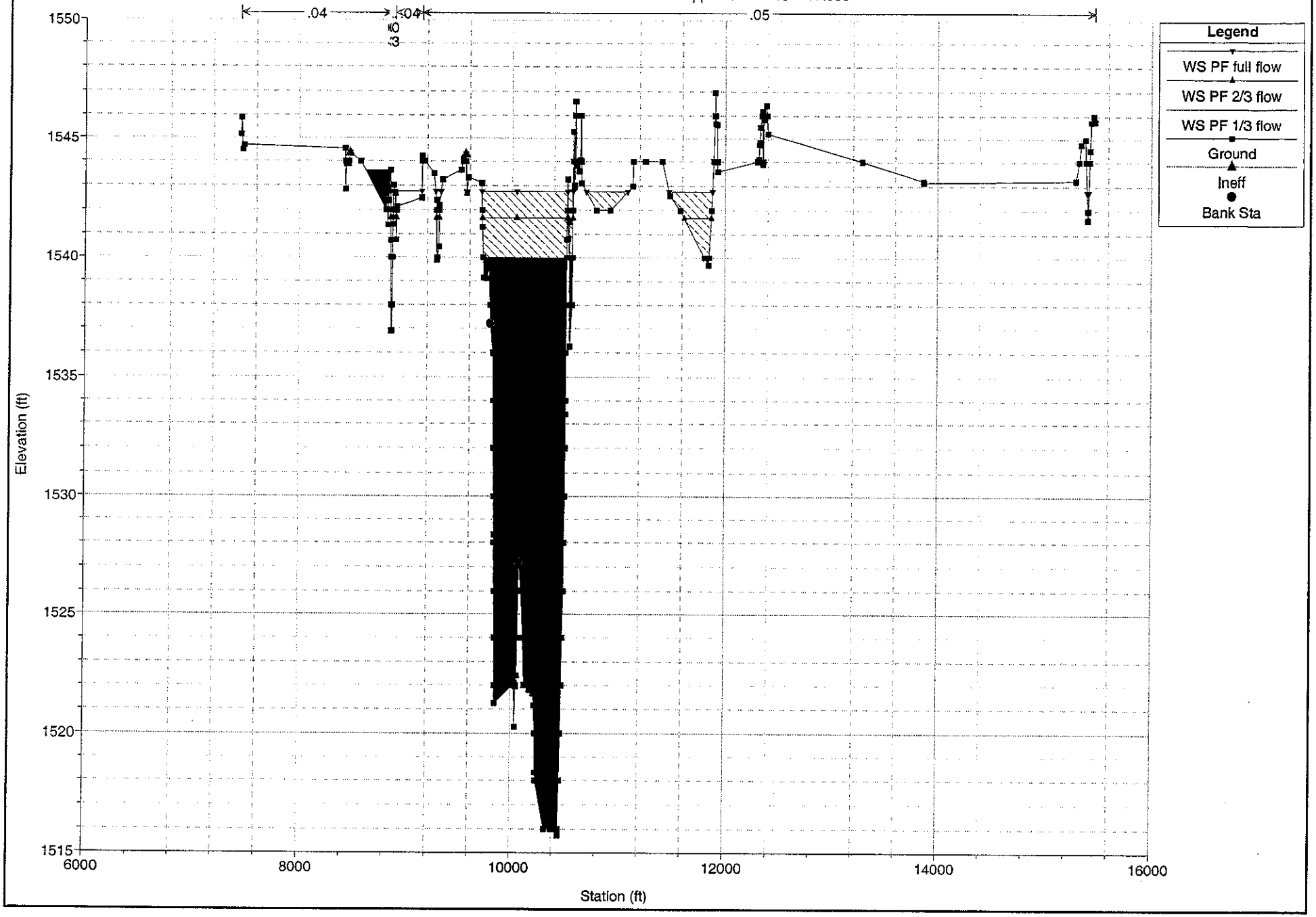
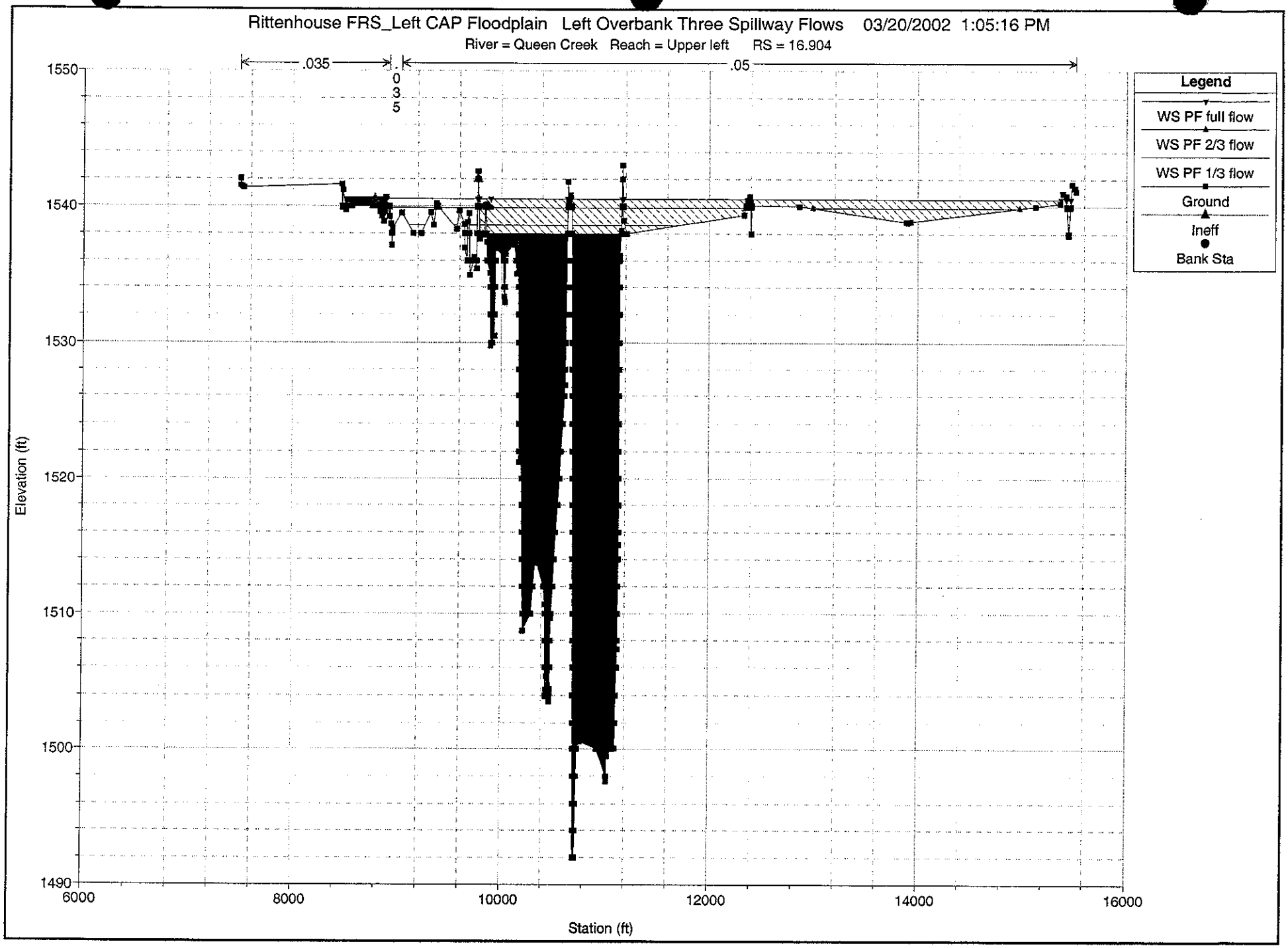
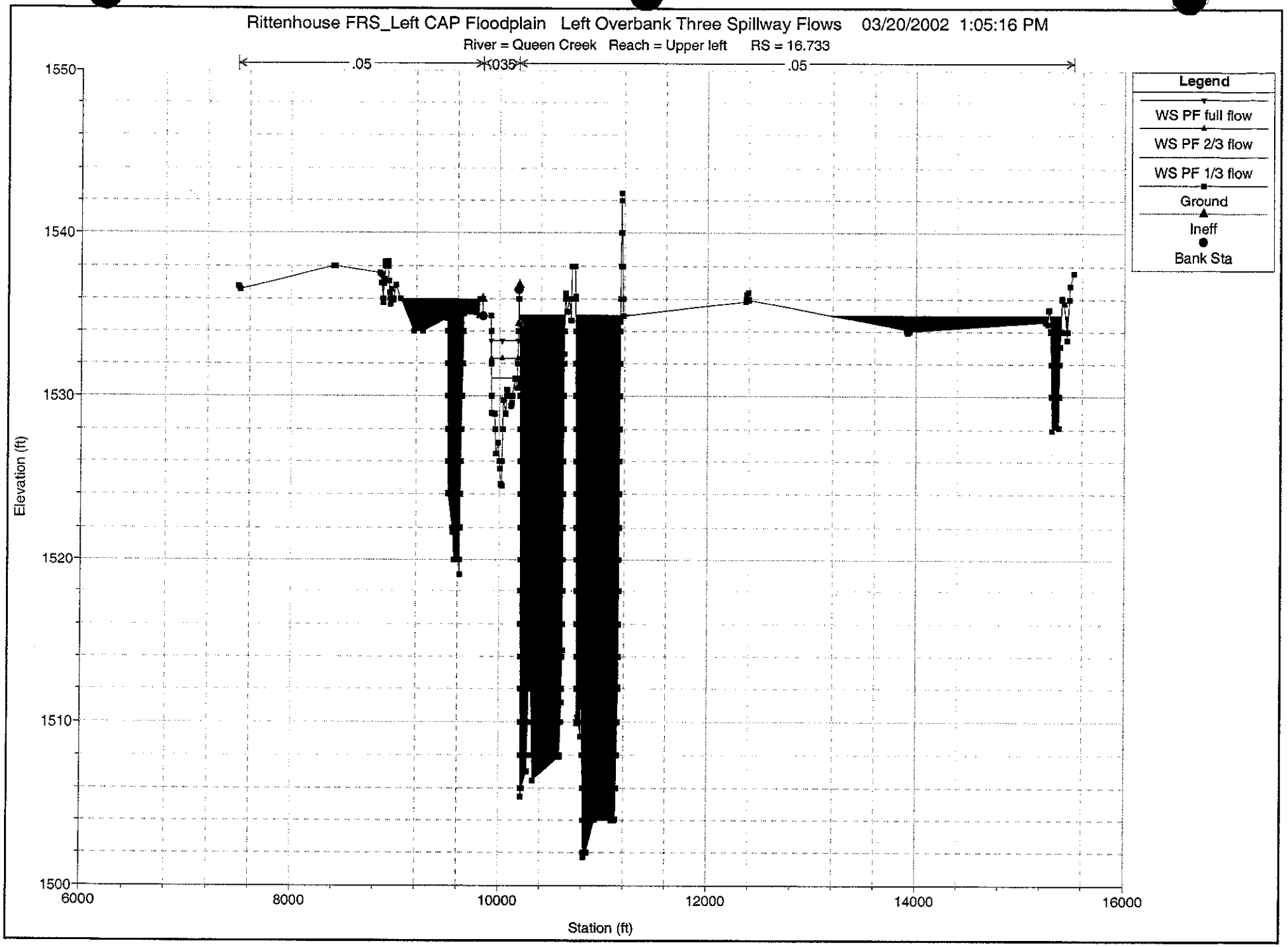
River = Queen Creek Reach = Upper left RS = 17.190
.04
.05
0
3
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1550
1545
1540
1535
1530
1525
1520
1515
6000
8000
10000
12000
14000
16000
Station (ft)

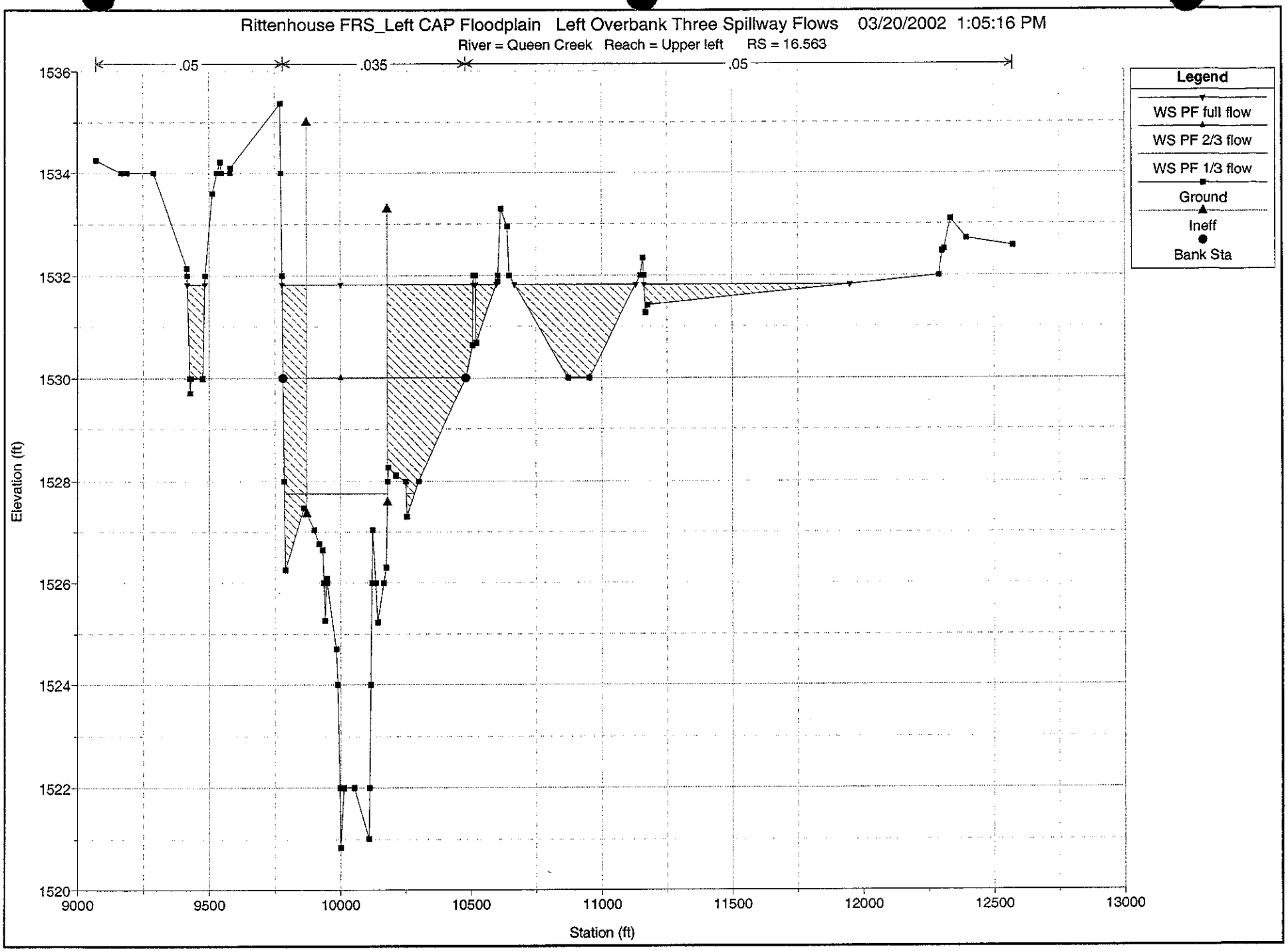
Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM

River = Queen Creek Reach = Upper left RS = 17.055




Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM
River = Queen Creek Reach = Upper left RS = 16.904
.035
.035
.05
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1550
1540
1530
1520
1510
1500
1490
6000
8000
10000
12000
14000
16000
Station (ft)


Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM
River = Queen Creek Reach = Upper left RS = 16.733
.05
.035
.05
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1550
1540
1530
1520
1510
1500
6000
8000
10000
12000
14000
16000
Station (ft)


Rittenhouse FRS_Left CAP Floodplain Left Overbank Three Spillway Flows 03/20/2002 1:05:16 PM
River = Queen Creek Reach = Upper left RS = 16.563
.05
.035
.05
Legend
WS PF full flow
WS PF 2/3 flow
WS PF 1/3 flow
Ground
Ineff
Bank Sta
Elevation (ft)
1536
1534
1532
1530
1528
1526
1524
1522
1520
9000
9500
10000
10500
11000
11500
12000
12500
13000
Station (ft)

## D.3 UPSTREAM RIGHT OVERBANK HEC-RAS MODEL, RHUPR3.PRJ (FOR FULL FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Rittenhouse FRS Upper Right full
Project File : RHupr3.prj
Run Date and Time: 03/20/2002 1:41:46 PM

Project in English units

Project Description:
Spillway Inundation Study for Rittenhouse FRS - Full Spillway Flow Scenario

Upstream right bank overbank flow area from Vineyard Road to Maricopa County boundary

Model Vertical Datum: 1988 NAVD
Starting Water Surface Elevation, 1457.60, was obtained through downstream right over bank HEC-RAS modeling result and plus 1.98 feet .

FCD 98-33
Michael Baker Jr., Inc. 03/2002

PLAN DATA

Plan Title: Full flow Upper right overbank
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr3.P01

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr3.G01

Flow Title : Full Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr3.F01

Plan Description:
Full flow Scenario right overbank area

This model are adequate for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections = | 8 | Mulitple Openings = | 0 |
| | Culverts = | 0 | Inline Weirs = | 0 |
| | Bridges = | 0 | | |

Computational Information

| | |
|---|---|
| Water surface calculation tolerance = | 0.01 |
| Critical depth calculaton tolerance = | 0.01 |
| Maximum number of interations = | 20 |
| Maximum difference tolerance = | 0.3 |
| Flow tolerance factor = | 0.001 |

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Full Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr3.F01

Flow Data (cfs)

| River | Reach | RS | Full flow |
|---|---|---|---|
| Queen Creek | Upper right | 14.479 | 6550 |
| Queen Creek | Upper right | 14.347 | 6550 |
| Queen Creek | Upper right | 13.351 | 6550 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | Upper right | Full flow | Critical | Known WS = 1457.6 |

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr3.G01

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 14.479

INPUT
Description: Vineyard Road downstream
Station Elevation Data num= 89

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8543.14 | 1484.37 | 8652.76 | 1484.37 | 8665.5 | 1486 | 8673.28 | 1486.35 | 8680.99 | 1486.6 |
| 8690.08 | 1486.57 | 8690.3 | 1486 | 8691.05 | 1485.99 | 8705.1 | 1486 | 8716.31 | 1486.18 |
| 8722.77 | 1486.95 | 8730.49 | 1486.79 | 8745.17 | 1486.42 | 8749.97 | 1486.31 | 8763.1 | 1486 |
| 8907.62 | 1485.18 | 8915.33 | 1485.4 | 8920.83 | 1484.48 | 8925.26 | 1485.7 | 8964.59 | 1484.85 |
| 8984.76 | 1484 | 9000.02 | 1484 | 9013.59 | 1484 | 9034.61 | 1484 | 9436.48 | 1484 |
| 9440.92 | 1482 | 9713.03 | 1482 | 9731.02 | 1484 | 9738.36 | 1484 | 9738.84 | 1484 |
| 9774.13 | 1484 | 9852.83 | 1483.51 | 9875.25 | 1483.91 | 9881.51 | 1483.22 | 9889.9 | 1482 |
| 9892.13 | 1480.31 | 9905.06 | 1480 | 9913.59 | 1478.44 | 9955.57 | 1478 | 9958.89 | 1476.17 |
| 9976.93 | 1476 | 10000 | 1475.21 | 10036.5 | 1474.66 | 10056.96 | 1475.17 | 10074.47 | 1474.88 |
| 10090.1 | 1476 | 10125.04 | 1476.86 | 10152.11 | 1477.13 | 10174.48 | 1478 | 10187.08 | 1478.74 |
| 10190.48 | 1479.45 | 10213.21 | 1480 | 10214.91 | 1482 | 10227.79 | 1482 | 10238.02 | 1482 |
| 10246.4 | 1482 | 10251.67 | 1482 | 10255.94 | 1482 | 10274.07 | 1482 | 10315.25 | 1482 |
| 10471.27 | 1481.41 | 10507.05 | 1480.45 | 11013.15 | 1480.94 | 11276.34 | 1480.29 | 11325.2 | 1480.47 |
| 11560.04 | 1480.86 | 12134.9 | 1480 | 12580.36 | 1480 | 12761.72 | 1480.27 | 12805.02 | 1480.84 |
| 13006.37 | 1481.03 | 13137.88 | 1482 | 13183.28 | 1483.63 | 13798.18 | 1483.37 | 13863.82 | 1483.92 |
| 14034.44 | 1484 | 14098.6 | 1484 | 14136.53 | 1484 | 14224.63 | 1484 | 14478.76 | 1484 |
| 14952.6 | 1484 | 15158.25 | 1482 | 15645.54 | 1480 | 15869.87 | 1478 | 16206.67 | 1478 |
| 16291.35 | 1480 | 16438.57 | 1480.88 | 16527.31 | 1482 | 16648.48 | 1482.54 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8543.14 | .05 | 9852.83 | .035 | 10238.02 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9852.83 | 10238.02 | 700 | 695.7 | 700 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8543.14 | 10238.02 | 1482 | 13863.82 | 16648.48 | 1483.92 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8543.14 | 10214 | 1483.91 | 13243.14 | 16648.48 | 1484 |

CROSS SECTION OUTPUT  Profile #Full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1481.82 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1481.76 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1481.06 | Flow Area (sq ft) | | | 3311.91 |
| E.G. Slope (ft/ft) | 0.003418 | Area (sq ft) | | 0.29 | 3311.91 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | | | 6550.00 |
| Top Width (ft) | 2727.82 | Top Width (ft) | | 0.71 | 2727.11 |
| Vel Total (ft/s) | 1.98 | Avg. Vel. (ft/s) | | | 1.98 |
| Max Chl Dpth (ft) | 1.76 | Hydr. Depth (ft) | | | 1.21 |
| Conv. Total (cfs) | 112034.3 | Conv. (cfs) | | | 112034.3 |
| Length Wtd. (ft) | 700.00 | Wetted Per. (ft) | | | 2727.14 |
| Min Ch El (ft) | 1480.93 | Shear (lb/sq ft) | | | 0.26 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.51 |
| Frctn Loss (ft) | 3.53 | Cum Volume (acre-ft) | | 0.04 | 383.05 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 0.13 | 285.15 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10238.02 | 10879.07 | 744.58 | 466.86 | 500.69 | 11.37 | 0.93 | 1.59 |
| 10879.07 | 11520.11 | 1264.41 | 708.12 | 641.05 | 19.30 | 1.10 | 1.79 |
| 11520.11 | 12161.16 | 1710.33 | 848.83 | 641.05 | 26.11 | 1.32 | 2.01 |
| 12161.16 | 12802.20 | 2566.31 | 1082.83 | 641.05 | 39.18 | 1.69 | 2.37 |
| 12802.20 | 13443.25 | 264.36 | 205.25 | 303.31 | 4.04 | 0.68 | 1.29 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 14.347

INPUT
Description:
Station Elevation Data  num=  97

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8512.04 | 1483.05 | 8551.76 | 1483.54 | 8557.37 | 1483.53 | 8567.11 | 1483.5 | 8570.97 | 1482.13 |
| 8574.61 | 1482 | 8583.42 | 1481.83 | 8584.15 | 1482 | 8588.5 | 1483.04 | 8594.86 | 1483.28 |
| 8600.43 | 1482.25 | 8625.77 | 1482.52 | 8669.36 | 1482 | 8908.25 | 1480.15 | 9016.41 | 1480 |
| 9278.78 | 1478 | 9468.43 | 1477.47 | 9674.72 | 1478 | 9679.77 | 1478.06 | 9680.24 | 1478 |
| 9694.98 | 1476 | 9696.35 | 1475.8 | 9702.04 | 1474 | 9702.97 | 1473.73 | 9746.14 | 1473.42 |
| 9765.48 | 1474 | 9774 | 1474.31 | 9779.08 | 1476 | 9784.47 | 1478 | 9789.03 | 1479.69 |
| 9796.69 | 1480 | 9797.83 | 1480.08 | 9798.42 | 1480 | 9811.58 | 1478.95 | 9814.08 | 1478 |
| 9819.66 | 1476 | 9823.73 | 1474.56 | 9835.81 | 1474 | 9839.16 | 1473.8 | 9858.46 | 1473.32 |
| 9878.57 | 1472 | 9891.22 | 1471.16 | 9899.1 | 1472 | 9904.13 | 1472.53 | 9914.23 | 1472.7 |
| 9928.27 | 1472.87 | 9942.13 | 1473.13 | 9956.9 | 1472 | 9973.6 | 1470.73 | 9984.1 | 1470.54 |
| 10000 | 1471.03 | 10045.53 | 1472 | 10012 | 1473.81 | 10060.05 | 1474 | 10064.1 | 1474.15 |
| 10068.07 | 1474 | 10085.58 | 1473.35 | 10091.13 | 1473.41 | 0100.37 | 1474 | 10105.81 | 1474.24 |
| 10108.97 | 1474 | 10130.58 | 1473.53 | 10135.37 | 1474 | 10143.52 | 1474.88 | 10146.24 | 1476 |
| 10151.1 | 1478 | 10156.98 | 1480 | 10158.78 | 1480.57 | 10167.05 | 1481.03 | 10172.79 | 1481.14 |
| 10175.56 | 1480 | 10180.41 | 1478 | 10183.17 | 1476.87 | 10411.15 | 1477.18 | 10442.96 | 1477.51 |
| 10916.18 | 1477.29 | 10946.66 | 1477 | 11232.94 | 1476.53 | 11263.26 | 1476.53 | 11266.43 | 1476.56 |
| 12386.92 | 1477.62 | 12517.9 | 1478 | 13033.98 | 1479.5 | 13037.58 | 1480 | 13041.07 | 1480.48 |
| 13045.61 | 1480.62 | 13050.34 | 1480 | 13059.04 | 1478.88 | 13075.76 | 1479.61 | 13465.85 | 1480 |
| 15070.01 | 1480 | 15355.22 | 1478 | 15512.09 | 1476 | 16266.33 | 1476 | 16300.25 | 1478 |
| 16342.91 | 1480 | 16529.76 | 1480.57 | | | | | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8512.04 | .05 | 9797.83 | .03 | 10172.79 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9797.83 | 10172.79 | 800 | 740.2 | 800 | .1 | .3 |

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8512.0410442.96    147813041.0716529.76 1480.48
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8512.04   10172    147913912.0416529.76 1478.89
```

CROSS SECTION OUTPUT  Profile #Full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1478.29 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1478.17 | Reach Len. (ft) | 800.00 | 740.20 | 800.00 |
| Crit W.S. (ft) | 1477.83 | Flow Area (sq ft) | | | 2414.90 |
| E.G. Slope (ft/ft) | 0.008253 | Area (sq ft) | | | 2414.90 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | | | 6550.00 |
| Top Width (ft) | 2397.93 | Top Width (ft) | | | 2397.93 |
| Vel Total (ft/s) | 2.71 | Avg. Vel. (ft/s) | | | 2.71 |
| Max Chl Dpth (ft) | 1.64 | Hydr. Depth (ft) | | | 1.01 |
| Conv. Total (cfs) | 72100.1 | Conv. (cfs) | | | 72100.1 |
| Length Wtd. (ft) | 800.00 | Wetted Per. (ft) | | | 2398.19 |
| Min Ch El (ft) | 1479.00 | Shear (lb/sq ft) | | | 0.52 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 1.41 |
| Frctn Loss (ft) | 2.81 | Cum Volume (acre-ft) | | 0.04 | 337.04 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 0.12 | 243.97 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10172.79 | 10808.49 | 1354.30 | 564.43 | 628.76 | 20.68 | 0.90 | 2.40 |
| 10808.49 | 11444.18 | 2683.35 | 854.46 | 635.70 | 40.97 | 1.34 | 3.14 |
| 11444.18 | 12079.88 | 2055.78 | 728.23 | 635.70 | 31.39 | 1.15 | 2.82 |
| 12079.88 | 12715.58 | 456.56 | 267.79 | 498.04 | 6.97 | 0.54 | 1.70 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 14.207

INPUT
Description: 14.204
Station Elevation Data  num=  190

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8575.62 | 1479.23 | 8585.14 | 1479.41 | 8590.82 | 1479.68 | 8600.52 | 1479.52 | 8605.42 | 1478.87 |
| 8617.93 | 1478.7 | 8622.54 | 1479.13 | 8627.12 | 1479.01 | 8631.42 | 1478 | 8631.92 | 1477.87 |
| 8641.44 | 1477.49 | 8651.08 | 1476.71 | 8701.2 | 1476 | 9339.89 | 1475.32 | 9346.67 | 1475.7 |
| 9454.44 | 1474 | 9505.63 | 1473.26 | 9527.1 | 1472 | 9528.62 | 1471.92 | 9601.51 | 1470.79 |
| 9660.96 | 1471.62 | 9664.24 | 1472 | 9690.78 | 1474 | 9694.16 | 1474.24 | 9696.74 | 1474 |
| 9706.49 | 1473.1 | 9756.95 | 1473.21 | 9771.94 | 1473.24 | 9792.39 | 1473.82 | 9792.91 | 1474 |
| 9798.59 | 1476 | 9804.27 | 1478 | 9809.95 | 1480 | 9816.06 | 1482 | 9816.23 | 1482.13 |
| 9816.61 | 1482 | 9822.29 | 1480 | 9826.18 | 1478.72 | 9827.9 | 1478 | 9833.04 | 1476 |
| 9838.18 | 1474 | 9840.2 | 1473.21 | 9846.05 | 1472 | 9856.1 | 1470.41 | 9867.62 | 1470 |
| 9877.31 | 1469.66 | 9907 | 1468.43 | 9934.14 | 1470 | 9940.09 | 1470.31 | 9960.85 | 1471.24 |
| 9984.91 | 1470.17 | 10000 | 1470.68 | 10019.4 | 1470 | 10038.15 | 1469.26 | 10051.99 | 1469.04 |
| 10068.16 | 1468.79 | 10073.75 | 1468 | 10078.18 | 1467.42 | 10083.26 | 1467.01 | 10099.29 | 1468 |
| 10107.77 | 1468.63 | 10116.69 | 1470 | 10130.71 | 1472 | 10137.26 | 1472.82 | 10150.98 | 1472.91 |

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10167.27    147410168.28 1474.1710185.52  1475.210188.42    147610194.18    1478
 10195.6  1478.510203.73 1479.1110208.24 1478.6410209.58    1478 10213.7    1476
10217.74    147410218.85 1473.4510227.19    1474 10231.3    147410245.51 1473.85
10299.63    147410357.02    147410448.61 1473.6910468.09    147410480.61 1474.23
10487.54    147410937.55    147410951.31  1474.5 10982.8 1474.4910986.97    1474
10991.97 1473.3411020.86 1473.12 11033.4    147411112.13    147411120.62  1473.4
 11266.2 1473.5111296.64 1472.8811309.84 1472.0611319.13 1473.9311742.89 1473.08
11747.52    1474 11749.8 1474.4911754.46    147411961.23 1473.7711962.33    1474
11965.68 1474.7411979.12    147412006.57 1473.4812396.17    147412415.67 1474.51
12437.01 1474.6712448.35 1474.7812456.68    147612571.72 1477.1912679.44 1476.89
12877.07    147812917.95    147812944.71 1477.7312960.56 1477.4713043.31 1477.31
13106.94 1477.1313136.32 1477.0613152.15 1476.2813564.73 1477.23 13606.3 1477.67
13618.73 1477.5714256.33 1476.9714265.27    147814270.68 1478.38 14380.6    1478
14392.54 1477.6214396.17    147814406.21 1478.98 14420.5    147814420.91 1477.97
14446.89 1477.8614448.94    147814459.76    147914646.15    1478 14662.1    1478
14696.47 1478.3714699.17    147814704.76 1477.03 14959.1  1477.314965.97    1476
14966.31 1475.9514967.62    1476   14993 1476.5915132.14 1476.9415139.93    1476
15140.94 1475.8915200.49    147615206.77    147615224.55    147615228.76 1476.05
15308.63    147615342.86    147415350.65  1473.815362.46    147415363.77    1474
15420.17    147415559.15 1474.0415559.26    147415564.28    1472 15564.3 1471.99
15565.35    147215638.93    1472 15788.3 1471.7515795.31 1470.8315800.85 1471.81
15846.23    147215896.01    147216115.81    147216164.78    147416183.52 1475.22
16194.11 1475.9416195.68    147616325.23 1477.8516345.62 1477.7116378.58    1478
16439.44    147816461.44 1477.5716470.92 1477.5916472.43    147816475.25 1478.75
16480.11 1478.3516489.64    147816516.23 1477.0216537.77 1477.3616563.67 1477.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8575.62     .05 9816.06    .03510203.73     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9816.0610203.73              950   941.5     980             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.6210203.73    147612877.0716563.67    1478
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62   10180    147612877.0716563.67    1476

CROSS SECTION OUTPUT    Profile #Full flow

  E.G. Elev (ft)          1475.46   Element                    Left OB    Channel   Right OB
  Vel Head (ft)              0.05   Wt. n-Val.                                         0.050
  W.S. Elev (ft)          1475.41   Reach Len. (ft)            950.00     941.50     980.00
  Crit W.S. (ft)          1474.41   Flow Area (sq ft)                               3636.14
  E.G. Slope (ft/ft)     0.001925   Area (sq ft)                  2.17              3636.14
  Q Total (cfs)           6550.00   Flow (cfs)                                      6550.00
  Top Width (ft)          2244.09   Top Width (ft)                6.30              2237.79
  Vel Total (ft/s)           1.80   Avg. Vel. (ft/s)                                   1.80
  Max Chl Dpth (ft)          3.35   Hydr. Depth (ft)                                   1.62
  Conv. Total (cfs)      149299.3   Conv. (cfs)                                     149299.3
  Length Wtd. (ft)        980.00   Wetted Per. (ft)                                2238.99
  Min Ch El (ft)          1474.87   Shear (lb/sq ft)                                   0.20
  Alpha                      1.00   Stream Power (lb/ft s)                             0.35
  Frctn Loss (ft)            4.84   Cum Volume (acre-ft)          0.02              281.47
  C & E Loss (ft)            0.03   Cum SA (acres)                0.07              201.41


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Full flow

  Left Sta     Right Sta       Flow      Area      W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)    (ft)                (ft)     (ft/s)
  10203.73     10839.72      1500.54    904.25    625.33     22.91      1.45      1.66
  10839.72     11475.72      1994.61   1080.17    636.35     30.45      1.70      1.85
  11475.72     12111.71      2201.74   1146.09    636.29     33.61      1.80      1.92
  12111.71     12747.71       853.12    505.61    341.02     13.02      1.48      1.69


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
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        than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
        section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 14.029

INPUT
Description:
Station Elevation Data    num=     160
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8587.49  1475.2 8590.54 1475.88 8594.14    1474 8595.58 1473.23 8604.14 1473.56
 8604.95    1474 8606.26 1474.75 8617.28 1474.16 8624.98 1475.67  8631.8 1475.62
 8638.61 1474.85 8677.79 1474.84 8696.31    1474 8911.08    1474 8931.28    1474
 9303.05    1474 9373.89    1474 9424.57 1473.35 9454.99 1473.38 9777.75 1472.45
 9824.93    1474 9833.94 1475.35 9841.01    1476 9845.46 1476.37 9848.92    1476
 9865.32    1474 9877.19    1472 9888.19 1470.15 9889.55    1470 9906.47    1468
 9909.46 1467.55 9912.91    1466 9915.73 1464.38 9934.58 1464.92  9959.9    1466
 9963.85    1466 9964.53 1465.99 9972.43    1466 9983.75 1466.1110000.01 1467.25
10015.56 1466.6610070.52  1467.510079.68 1466.8510094.95 1467.0310099.68    1468
 10101.8 1468.4510135.63    146810158.56 1467.6910166.69 1466.6110195.18 1467.65
10196.09    146810201.28    147010206.76    147210210.82 1473.8310213.26    1474
10221.65 1474.5910224.14    147410232.49    147210239.17 1470.2310245.73 1470.18
10260.45 1470.9610464.67 1470.8310496.85 1471.1210573.64    147010587.14    1470
10680.59    147010695.38    1470 10838.6 1470.4810931.58 1470.3910955.35 1470.18
10963.02 1470.9210994.52    147111001.21 1470.76 11260.8    147011273.76 1469.95
11307.03 1469.18 11317.2 1468.1711328.64    1470 11329.8 1470.1811430.38    1470
   12832 1468.8212837.99    1470 12838.5 1470.1112839.27    147012846.01 1469.03
13049.39    147013049.54    147013049.63    147013056.96 1469.6713068.09 1469.59
13069.66    147013077.39    147213079.96 1472.6713084.69 1472.9113091.84    1472
13098.12 1471.2513108.55    147213113.79  1472.313144.06 1472.1913145.37    1472
 13156.3 1470.54 13166.5    147213171.66 1472.7413234.41    147214678.19 1471.89
14693.72    147014701.91 1469.1214785.21  1468.414791.44 1468.4214820.48    1468
14912.62    146814915.94 1468.0114921.99 1469.0614928.62 1468.7814937.26 1468.55
14945.44 1469.0214954.66 1468.61 14962.5 1468.7314971.48    146814980.36 1467.87
14981.55    146814983.24 1468.1815000.34 1468.0215000.44 1468.0115016.13 1468.36
15024.55 1468.3715045.38    146815054.34 1467.9215055.37    146815058.64 1468.25
15063.39    146815065.88 1467.8515085.27    146815096.71 1468.11 15102.2 1469.22
15106.71 1468.5515484.42 1468.6415490.43 1469.5715500.08 1468.4315506.45 1469.46
15513.31 1468.8715771.54 1469.6715775.29    147015799.23    147215806.92 1472.66
15896.17 1473.9315901.38 1473.9915904.17 1473.6915912.86 1473.5115926.88 1473.62
16430.09    147216462.96    147216474.74    1472 16506.1    147216516.58 1472.09
16517.17    147216525.47  1470.916542.87    147216547.52 1472.5516573.13  1472.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8587.49     .05 9845.46    .03510221.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9845.4610221.65              840   838.6     840              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8587.4910963.02 1471.9212987.4916573.13    1472
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8587.49   10900    147113079.9616573.13 1472.67

CROSS SECTION OUTPUT    Profile #Full flow

  E.G. Elev (ft)            1470.60   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.31   Wt. n-Val.                                      0.050
  W.S. Elev (ft)            1470.29   Reach Len. (ft)           840.00     838.60    840.00
  Crit W.S. (ft)            1470.22   Flow Area (sq ft)                               1467.31
  E.G. Slope (ft/ft)       0.030203   Area (sq ft)                                    1506.80
  Q Total (cfs)             6550.00   Flow (cfs)                                      6550.00
  Top Width (ft)            1922.47   Top Width (ft)                                  1922.47
  Vel Total (ft/s)             4.46   Avg. Vel. (ft/s)                                   4.46
  Max Chl Dpth (ft)            2.12   Hydr. Depth (ft)                                   0.80
  Conv. Total (cfs)         37689.2   Conv. (cfs)                                     37689.2
  Length Wtd. (ft)           840.00   Wetted Per. (ft)                                1826.06
  Min Ch El (ft)            1471.00   Shear (lb/sq ft)                                   1.52
  Alpha                        1.00   Stream Power (lb/ft s)                             6.76
  Frctn Loss (ft)              2.75   Cum Volume (acre-ft)                             223.62
  C & E Loss (ft)              0.08   Cum SA (acres)                                   154.61
```

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #Full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10856.80 | 11491.95 | 260.23 | 112.46 | 330.31 | 3.97 | 0.34 | 2.31 |
| 11491.95 | 12127.09 | 1318.41 | 386.73 | 635.15 | 20.13 | 0.61 | 3.41 |
| 12127.09 | 12762.24 | 3769.53 | 726.36 | 635.15 | 57.55 | 1.14 | 5.19 |
| 12762.24 | 13397.39 | 1201.83 | 241.75 | 225.45 | 18.35 | 1.07 | 4.97 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.870

INPUT
Description:
Station Elevation Data num= 163

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8558.7 | 1471.68 | 8571.76 | 1471.44 | 8573.67 | 1472 | 8575.99 | 1472.61 | 8577.28 | 1472 |
| 8579.01 | 1471.07 | 8590.26 | 1471.45 | 8591.83 | 1472 | 8595.02 | 1473.23 | 8606.55 | 1472 |
| 8608.85 | 1471.71 | 8617.39 | 1471.08 | 8631.88 | 1471.09 | 8634.45 | 1470.71 | 8636.59 | 1470 |
| 8642.64 | 1468 | 8644.85 | 1467.24 | 8680.57 | 1467.86 | 8680.97 | 1468 | 8686.6 | 1470 |
| 8692.31 | 1471.94 | 8718.13 | 1471.8 | 8767.21 | 1470.76 | 9486.09 | 1470 | 9768.58 | 1468.6 |
| 9825.53 | 1469.58 | 9827.26 | 1470 | 9835.39 | 1472 | 9839.75 | 1473.17 | 9848.47 | 1473.43 |
| 9859.98 | 1472 | 9876.08 | 1470 | 9881.01 | 1469.49 | 9884.99 | 1468 | 9890.34 | 1466 |
| 9896.01 | 1464 | 9899.55 | 1462.75 | 9917.23 | 1462 | 9920.88 | 1461.84 | 9922.47 | 1462 |
| 9942.02 | 1463.81 | 9949.74 | 1464 | 9959.11 | 1464.2 | 10000 | 1464.6 | 10036.97 | 1464.72 |
| 10096.33 | 1464 | 10099.58 | 1463.97 | 10115.36 | 1462.65 | 10133.75 | 1462.63 | 10147.15 | 1462.45 |
| 10152.8 | 1462 | 10162.52 | 1461.21 | 10181.69 | 1461.25 | 10182.54 | 1462 | 10184.83 | 1464 |
| 10187.11 | 1466 | 10189.4 | 1468 | 10191.59 | 1469.91 | 10192.64 | 1470 | 10201.97 | 1470.91 |
| 10205.61 | 1470 | 10213.5 | 1468 | 10219.96 | 1466 | 10223.51 | 1464.91 | 10260.97 | 1465 |
| 10263.88 | 1466 | 10265.28 | 1466.55 | 10447 | 1468 | 10448.27 | 1468.07 | 10448.6 | 1468 |
| 10448.81 | 1468 | 10457.14 | 1468 | 10480.49 | 1467.81 | 10647.25 | 1466 | 10827.4 | 1466 |
| 10932.69 | 1466.57 | 10943.05 | 1468 | 10943.08 | 1468 | 10943.92 | 1468 | 10974.32 | 1467.73 |
| 10984.41 | 1467.17 | 11233.43 | 1467.19 | 11246.66 | 1467.11 | 11287.76 | 1466.15 | 11291.85 | 1466 |
| 11404.84 | 1466 | 11408.29 | 1466.35 | 11423.02 | 1466 | 11429.86 | 1465.82 | 11601.27 | 1465.32 |
| 11625.55 | 1465.77 | 11650.35 | 1465.96 | 11922.62 | 1465.58 | 11940.87 | 1465.34 | 11998.55 | 1465.8 |
| 12015.79 | 1465.59 | 12363.6 | 1465.78 | 12378.11 | 1465.62 | 12393.99 | 1465.18 | 12488.67 | 1465.31 |
| 12505.6 | 1465.45 | 12526.61 | 1466 | 12528.18 | 1466.04 | 12529.44 | 1466 | 12734.61 | 1464.95 |
| 12744.02 | 1465.67 | 12760.48 | 1465.16 | 12950.28 | 1465.62 | 12967.34 | 1465.12 | 13041.26 | 1466 |
| 13042.99 | 1466.53 | 13051.85 | 1466.44 | 13063.8 | 1466 | 13158.56 | 1466 | 13160.11 | 1466.29 |
| 13172.36 | 1466.36 | 13177.63 | 1466 | 13183.18 | 1466 | 13214.17 | 1466 | 13218.17 | 1466 |
| 13476.33 | 1467.58 | 13498.82 | 1467.36 | 13590.82 | 1467.93 | 13609.49 | 1467.89 | 13702.3 | 1467.54 |
| 13739.61 | 1468 | 13746.41 | 1468.89 | 13761.69 | 1468 | 13791.53 | 1467.87 | 13836.35 | 1467.39 |
| 13980.61 | 1467.45 | 13998.32 | 1467.11 | 14138.38 | 1466.34 | 14159.75 | 1466.34 | 14215.55 | 1466 |
| 14223.11 | 1466 | 14232.82 | 1466 | 14507.56 | 1465.52 | 14528.76 | 1465.27 | 15023.3 | 1466 |
| 15097.31 | 1466 | 15121.32 | 1466 | 15188.78 | 1466 | 15195.21 | 1465.59 | 15228.09 | 1465.53 |
| 15249.57 | 1466 | 15260.92 | 1466 | 15266.46 | 1466 | 15272.58 | 1466.22 | 15297.52 | 1466 |
| 15357 | 1466 | 15480.84 | 1468 | 15675.12 | 1469.46 | 15705.14 | 1468.91 | 15865.23 | 1468.89 |
| 15869.18 | 1469.13 | 15873.32 | 1469.23 | 15880.2 | 1468.56 | 15930.01 | 1468 | 16488.32 | 1467.91 |
| 16505.4 | 1467.19 | 16523.86 | 1468 | 16526.19 | 1468.23 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8558.7 | .05 | 9848.47 | .035 | 10201.97 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9848.47 | 10201.97 | 720 | 706.24 | 720 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8558.7 | 10943.92 | 1468 | 13746.41 | 16526.19 | 1468.89 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8558.7 | 10943 | 1470 | 13746.41 | 16526.19 | 1470.89 |

CROSS SECTION OUTPUT  Profile #Full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1467.77 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1467.73 | Reach Len. (ft) | 720.00 | 706.24 | 720.00 |
| Crit W.S. (ft) | 1466.35 | Flow Area (sq ft) | | | 4478.33 |
| E.G. Slope (ft/ft) | 0.001170 | Area (sq ft) | | | 4478.33 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | | | 6550.00 |
| Top Width (ft) | 2652.56 | Top Width (ft) | | | 2652.56 |
| Vel Total (ft/s) | 1.46 | Avg. Vel. (ft/s) | | | 1.46 |
| Max Chl Dpth (ft) | 2.78 | Hydr. Depth (ft) | | | 1.69 |
| Conv. Total (cfs) | 191519.8 | Conv. (cfs) | | | 191519.8 |
| Length Wtd. (ft) | 720.00 | Wetted Per. (ft) | | | 2652.83 |
| Min Ch El (ft) | 1470.00 | Shear (lb/sq ft) | | | 0.12 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.18 |
| Frctn Loss (ft) | 2.24 | Cum Volume (acre-ft) | | | 165.91 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | | | 110.50 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10834.39 | 11466.81 | 499.43 | 510.24 | 493.01 | 7.62 | 1.04 | 0.98 |
| 11466.81 | 12099.24 | 2039.06 | 1311.03 | 632.43 | 31.13 | 2.07 | 1.56 |
| 12099.24 | 12731.66 | 2221.37 | 1380.16 | 632.44 | 33.91 | 2.18 | 1.61 |
| 12731.66 | 13364.08 | 1752.48 | 1197.27 | 632.60 | 26.76 | 1.89 | 1.46 |
| 13364.08 | 13996.50 | 37.66 | 79.62 | 262.34 | 0.57 | 0.30 | 0.47 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 13.736

INPUT
Description:
Station Elevation Data  num=  128

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8481.19 | 1469.83 | 8503.13 | 1470 | 8543.72 | 1470 | 9145.76 | 1470 | 9778.58 | 1470.56 |
| 9784.88 | 1470 | 9798.95 | 1470 | 9813.84 | 1470.8 | 9821.38 | 1470 | 9837.65 | 1468 |
| 9853.57 | 1466 | 9869.5 | 1464 | 9885.43 | 1462 | 9901.21 | 1460 | 9904.44 | 1459.59 |
| 9925.69 | 1460 | 9928.96 | 1460.1 | 10000 | 1460.58 | 10040.53 | 1461.15 | 10091.19 | 1460.73 |
| 10104.56 | 1462 | 10125.6 | 1464 | 10138.13 | 1465.83 | 10154 | 1466 | 10158.4 | 1466.11 |
| 10158.71 | 1466 | 10170.29 | 1466 | 10192.75 | 1468 | 10223.65 | 1469.85 | 10224.07 | 1469.85 |
| 10359.17 | 1469.15 | 10373.72 | 1468 | 10375.61 | 1467.87 | 10376.44 | 1468 | 10635.06 | 1468 |
| 10655.14 | 1468 | 10718.74 | 1468 | 10727.79 | 1468 | 10824.62 | 1469.17 | 10901.49 | 1468.07 |
| 10904.2 | 1468 | 10919.56 | 1466.33 | 11048.21 | 1466 | 11104.62 | 1465.86 | 11111.04 | 1466 |
| 11113.09 | 1466.02 | 11143.12 | 1466.39 | 11181.28 | 1466 | 11185.02 | 1465.48 | 11214.14 | 1464.63 |
| 11253.53 | 1466 | 11364.16 | 1466 | 11452.87 | 1465 | 11731.55 | 1464.61 | 11859.4 | 1464.58 |
| 11896.31 | 1464.54 | 12247.25 | 1464 | 12305.81 | 1464 | 12707.28 | 1464 | 12894.94 | 1463.91 |
| 12963.59 | 1464 | 12994.98 | 1464.29 | 12997.71 | 1464 | 13009.41 | 1462.44 | 13015.37 | 1464 |
| 13020.53 | 1465.17 | 13162.61 | 1466 | 13247 | 1466 | 13249.48 | 1466 | 13453.56 | 1466 |
| 13485.66 | 1465.2 | 13530.12 | 1465.79 | 13544.84 | 1464 | 13566.9 | 1462.23 | 13595.7 | 1462.18 |
| 13637.87 | 1462 | 13672.28 | 1462 | 13695.45 | 1462.59 | 13723.4 | 1462.46 | 13768.28 | 1462.13 |
| 13788.13 | 1462 | 13821.72 | 1462 | 13823.08 | 1462 | 13833.06 | 1462 | 13908.56 | 1462 |
| 14302.5 | 1461.5 | 14308.88 | 1461.95 | 14486.63 | 1462 | 14527.71 | 1462.45 | 14540.54 | 1462.09 |
| 14575.78 | 1463.89 | 14578.36 | 1464 | 14974.42 | 1466 | 15122.02 | 1466.61 | 15129.88 | 1467.67 |
| 15134.8 | 1467.77 | 15143.5 | 1466.13 | 15155.83 | 1466.51 | 15178.8 | 1466.24 | 15183.59 | 1466 |
| 15190.08 | 1465.66 | 15192.42 | 1466 | 15196.83 | 1466.78 | 15552.58 | 1466 | 15742.53 | 1465.86 |
| 15748.5 | 1466 | 15767.13 | 1466.41 | 15783.35 | 1466 | 15785.89 | 1465.92 | 15806.62 | 1465.65 |
| 15811.06 | 1466 | 15812.83 | 1466.16 | 15816.19 | 1466.12 | 15832.18 | 1466.31 | 15839.03 | 1466 |
| 15873.69 | 1465.8 | 15900.28 | 1466 | 15902.37 | 1466.02 | 15924.22 | 1466 | 16100.16 | 1465.3 |
| 16122.37 | 1465.33 | 16160.5 | 1465.23 | 16176.98 | 1465.16 | 16194.33 | 1465.11 | 16424 | 1465.4 |
| 16431.35 | 1465.85 | 16447.86 | 1464.39 | 16469.93 | 1465.22 | | | | |

```
Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
 8481.19     .05 9813.84    .03510223.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9813.8410223.65             1080  1040.5    1050            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.1911143.12 1466.39   1330016469.93 1467.77
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.19   11143    146613162.6116469.93    1466

CROSS SECTION OUTPUT    Profile #Full flow

  E.G. Elev (ft)            1465.50   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.29   Wt. n-Val.                                         0.050
  W.S. Elev (ft)            1465.21   Reach Len. (ft)            1080.00    1040.50   1050.00
  Crit W.S. (ft)            1465.07   Flow Area (sq ft)                                 1510.21
  E.G. Slope (ft/ft)       0.023271   Area (sq ft)                                      1510.21
  Q Total (cfs)             6550.00   Flow (cfs)                                        6550.00
  Top Width (ft)            1629.51   Top Width (ft)                                    1629.51
  Vel Total (ft/s)             4.34   Avg. Vel. (ft/s)                                     4.34
  Max Chl Dpth (ft)            2.77   Hydr. Depth (ft)                                     0.93
  Conv. Total (cfs)         42937.1   Conv. (cfs)                                       42937.1
  Length Wtd. (ft)          1050.00   Wetted Per. (ft)                                  1629.98
  Min Ch El (ft)            1466.00   Shear (lb/sq ft)                                     1.35
  Alpha                        1.00   Stream Power (lb/ft s)                               5.84
  Frctn Loss (ft)              4.59   Cum Volume (acre-ft)                               116.42
  C & E Loss (ft)              0.07   Cum SA (acres)                                      75.11


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Full flow

  Left Sta     Right Sta       Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  10848.28     11472.91        26.91      17.00     75.15       0.41      0.23       1.58
  11472.91     12097.53      1145.94     376.65    624.63      17.50      0.60       3.04
  12097.53     12722.16      3518.06     738.28    624.63      53.71      1.18       4.77
  12722.16     13346.79      1859.09     378.28    305.57      28.38      1.24       4.91


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 13.539

INPUT
Description:
Station Elevation Data    num=      88
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8582.12  1465.1 8632.38 1465.71 9205.41 1465.27 9572.19 1465.27 9838.78 1464.88
 9853.96    1464 9884.33    1462 9913.39    1460 9941.91    1458 9970.43    1456
 9996.96 1454.1410044.91 1455.6410075.25 1454.37   10087    145410095.34 1453.74
10095.83    145410099.56    145610103.29    145810107.08    146010110.25 1461.75
10111.31    146210116.88 1463.35 10127.3 1463.4510134.02    146210135.91 1461.56
10148.94 1460.5910158.23 1460.7410333.22    146010477.28    146010517.48    1460
10732.29    1460 10926.8    146011097.79    146011165.21 1461.26 11170.3 1460.93
11187.66    146011190.31 1459.8411207.48 1459.3711225.98 1459.8512068.22    1458
12486.32    145812662.53  1459.412665.49    146012674.29 1461.81 12688.4 1460.96
12710.71    1460 12719.8  1459.612758.01    146012869.74    146212894.35 1462.65
13042.11    146413075.37 1464.5113091.44    1464 13113.7 1463.1913167.97 1462.89
   13200    146213206.91 1463.56 13211.7    146213213.66 1461.3613225.95 1461.95
13226.83    146213236.08 1462.4913241.02 1462.2313246.36 1462.1513246.89    1462
13253.78 1460.0513260.76    146013338.66    146013368.39  1460.513370.94    1460
13380.11 1458.3313390.45    145813399.21 1457.7114603.73 1456.6514617.99 1456.85
```

```
 15016.3    145815096.52    146015104.47 1460.2415185.18 1461.1715202.82 1460.92
15830.72 1460.7315833.76 1461.6215838.17 1461.37 15842.8  1460.916450.11 1460.26
16450.33 1460.2616493.42 1461.0516518.44 1461.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8582.12     .05 9838.78    .03510116.88     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9838.7810116.88             1000   993.9    1000            .1        .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8582.1211165.21 1461.26 13042.116518.44    1464
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8582.12   11165    146213075.3716518.44 1464.51

CROSS SECTION OUTPUT    Profile #Full flow

  E.G. Elev (ft)            1460.85   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.06   Wt. n-Val.                                          0.050
  W.S. Elev (ft)            1460.78   Reach Len. (ft)          1000.00     993.90    1000.00
  Crit W.S. (ft)            1459.42   Flow Area (sq ft)                              3219.84
  E.G. Slope (ft/ft)       0.001780   Area (sq ft)                                   3219.84
  Q Total (cfs)             6550.00   Flow (cfs)                                     6550.00
  Top Width (ft)            1605.42   Top Width (ft)                                 1605.42
  Vel Total (ft/s)             2.03   Avg. Vel. (ft/s)                                  2.03
  Max Chl Dpth (ft)            2.78   Hydr. Depth (ft)                                  2.01
  Conv. Total (cfs)        155262.2   Conv. (cfs)                                   155262.2
  Length Wtd. (ft)          1000.00   Wetted Per. (ft)                               1605.65
  Min Ch El (ft)            1462.00   Shear (lb/sq ft)                                  0.22
  Alpha                        1.00   Stream Power (lb/ft s)                            0.45
  Frctn Loss (ft)              3.05   Cum Volume (acre-ft)                             59.41
  C & E Loss (ft)              0.01   Cum SA (acres)                                   36.12


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Full flow

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)             (cfs)    (sq ft)      (ft)                 (ft)     (ft/s)
  10757.04     11397.19        308.78     241.73    224.17       4.71       1.08       1.28
  11397.19     12037.35       2492.44    1287.66    640.16      38.05       2.01       1.94
  12037.35     12677.50       3684.55    1619.77    632.09      56.25       2.56       2.27
  12677.50     13317.66         64.23      70.67    109.22       0.98       0.65       0.91


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 13.351

INPUT
Description:
Station Elevation Data    num=      82
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
 8565.62     1461 8819.25     1460  9792.1 1459.62 9800.19     1458 9808.23   1456.4
 9823.11     1456 9903.55     1454 9951.28 1452.17 9952.07 1452.26 9953.52     1452
 9964.87     1450 9974.53     1448 9977.77 1447.1710021.99 1446.7510074.33 1447.39
10083.44 1447.86 10083.8     144810088.78     1450 10094.1     145210100.11     1454
10103.79 1455.2310105.52     1456   10110     145810114.27     146010117.72 1461.61
 10120.9    146010125.19     145810126.18 1457.5410197.35 1457.1410247.37 1457.59
10337.82 1457.4111127.31     145811141.06 1458.1511152.59     145811164.73 1457.84
11167.42    145811231.27     145811368.33     145611396.54     145611446.84     1456
11495.62 1455.4511595.62 1455.5311695.62 1455.3711795.62 1455.3411895.62 1455.58
11995.62 1455.4712095.62  1455.612214.56     145612363.74     145812740.45     1460
12743.83 1460.0812750.17     146012778.31     146012778.34     146012796.04   1459.8
```

```
12838.75 1459.5312972.48 1458.94 12973.4 1458.9413185.11 1458.0313186.21    1458
13286.73    145613348.99 1455.14 13458.7 1454.1913468.18    145413561.98 1453.81
14627.57    145414720.48    145614855.64    145815012.24    145815061.71    1458
15062.81    145815070.78 1457.9515077.09    145815134.73    145815471.76 1457.38
15550.97 1456.9716237.47    145616310.61 1455.9616348.77 1455.9416497.94    1456
16502.69 1456.1216550.67 1457.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8565.62     .05  9792.1     .0510117.72     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9792.110117.72             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8565.6211141.06 1458.15 12740.416550.67    1458
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8565.62 10120.9    146012743.8316550.67 1460.08

CROSS SECTION OUTPUT    Profile #Full flow

  E.G. Elev (ft)            1457.79   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.19   Wt. n-Val.                                          0.050
  W.S. Elev (ft)            1457.60   Reach Len. (ft)
  Crit W.S. (ft)            1456.80   Flow Area (sq ft)                                1892.85
  E.G. Slope (ft/ft)       0.006379   Area (sq ft)                                     1956.29
  Q Total (cfs)             6550.00   Flow (cfs)                                       6550.00
  Top Width (ft)            1541.17   Top Width (ft)                                   1541.17
  Vel Total (ft/s)             3.46   Avg. Vel. (ft/s)                                    3.46
  Max Chl Dpth (ft)            2.26   Hydr. Depth (ft)                                    1.76
  Conv. Total (cfs)         82012.7   Conv. (cfs)                                      82012.7
  Length Wtd. (ft)                    Wetted Per. (ft)                                 1075.25
  Min Ch El (ft)            1460.00   Shear (lb/sq ft)                                    0.70
  Alpha                        1.00   Stream Power (lb/ft s)                              2.43
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT    Profile #Full flow

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                 (ft)     (ft/s)
  10761.01     11404.31       333.74     145.28    145.64       5.10       1.00       2.30
  11404.31     12047.60      5031.85    1340.48    643.30      76.82       2.08       3.75
  12047.60     12690.90      1184.40     407.09    286.31      18.08       1.42       2.91


Warning: Divided flow computed for this cross-section.


SUMMARY OF MANNING'S N VALUES

River:Queen Creek

      Reach          River Sta.       n1        n2        n3

 Upper right          14.479           .05      .035       .05
 Upper right          14.347           .05      .035       .05
 Upper right          14.207           .05      .035       .05
 Upper right          14.029           .05      .035       .05
 Upper right          13.870           .05      .035       .05
 Upper right          13.736           .05      .035       .05
 Upper right          13.539           .05      .035       .05
 Upper right          13.351           .05       .05       .05


SUMMARY OF REACH LENGTHS

River: Queen Creek
```

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Upper right | 14.479 | 700 | 695.7 | 700 |
| Upper right | 14.347 | 800 | 740.2 | 800 |
| Upper right | 14.207 | 950 | 941.5 | 980 |
| Upper right | 14.029 | 840 | 838.6 | 840 |
| Upper right | 13.870 | 720 | 706.24 | 720 |
| Upper right | 13.736 | 1080 | 1040.5 | 1050 |
| Upper right | 13.539 | 1000 | 993.9 | 1000 |
| Upper right | 13.351 | | | |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| Upper right | 14.479 | .1 | .3 |
| Upper right | 14.347 | .1 | .3 |
| Upper right | 14.207 | .1 | .3 |
| Upper right | 14.029 | .1 | .3 |
| Upper right | 13.870 | .1 | .3 |
| Upper right | 13.736 | .1 | .3 |
| Upper right | 13.539 | .1 | .3 |
| Upper right | 13.351 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 6550.00 | 1480.93 | 1481.76 | 1481.06 | 1481.82 | 0.003418 | | 3311.91 | 2727.82 | 0.00 |
| Upper right | 14.347 | 6550.00 | 1479.00 | 1478.17 | 1477.83 | 1478.29 | 0.008253 | | 2414.90 | 2397.93 | 0.00 |
| Upper right | 14.207 | 6550.00 | 1474.87 | 1475.41 | 1474.41 | 1475.46 | 0.001925 | | 3636.14 | 2244.09 | 0.00 |
| Upper right | 14.029 | 6550.00 | 1471.00 | 1470.29 | 1470.22 | 1470.60 | 0.030203 | | 1467.31 | 1922.47 | 0.00 |
| Upper right | 13.870 | 6550.00 | 1470.00 | 1467.73 | 1466.35 | 1467.77 | 0.001170 | | 4478.33 | 2652.56 | 0.00 |
| Upper right | 13.736 | 6550.00 | 1466.00 | 1465.21 | 1465.07 | 1465.50 | 0.023271 | | 1510.21 | 1629.51 | 0.00 |
| Upper right | 13.539 | 6550.00 | 1462.00 | 1460.78 | 1459.42 | 1460.85 | 0.001780 | | 3219.84 | 1605.42 | 0.00 |
| Upper right | 13.351 | 6550.00 | 1460.00 | 1457.60 | 1456.80 | 1457.79 | 0.006379 | | 1892.85 | 1541.17 | 0.00 |

Profile Output Table - Standard Table 2

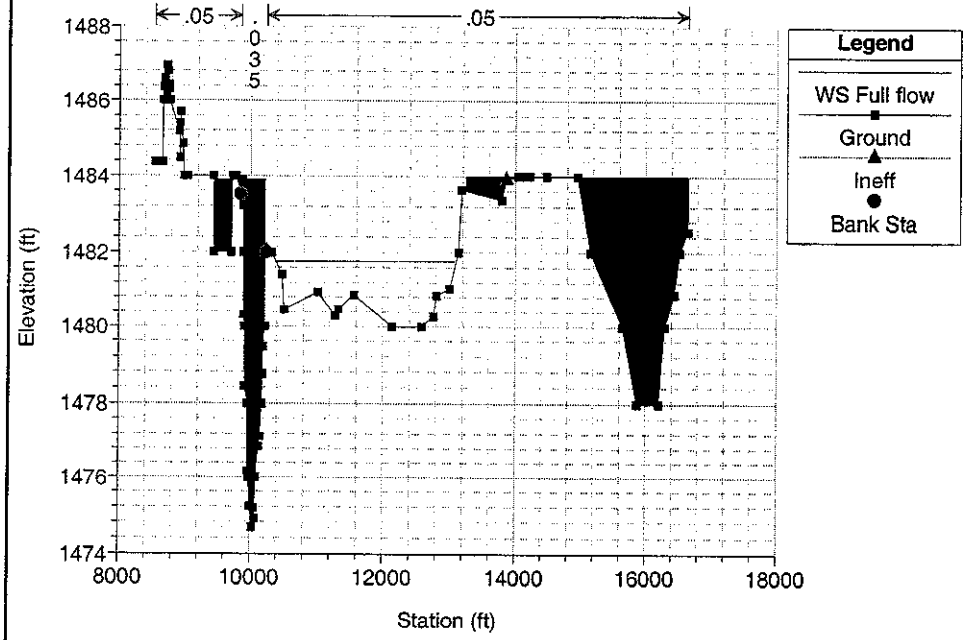
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 1481.82 | 1481.76 | 0.06 | 3.53 | 0.01 | | | 6550.00 | 2727.82 |
| Upper right | 14.347 | 1478.29 | 1478.17 | 0.11 | 2.81 | 0.02 | | | 6550.00 | 2397.93 |
| Upper right | 14.207 | 1475.46 | 1475.41 | 0.05 | 4.84 | 0.03 | | | 6550.00 | 2244.09 |
| Upper right | 14.029 | 1470.60 | 1470.29 | 0.31 | 2.75 | 0.08 | | | 6550.00 | 1922.47 |
| Upper right | 13.870 | 1467.77 | 1467.73 | 0.03 | 2.24 | 0.03 | | | 6550.00 | 2652.56 |
| Upper right | 13.736 | 1465.50 | 1465.21 | 0.29 | 4.59 | 0.07 | | | 6550.00 | 1629.51 |
| Upper right | 13.539 | 1460.85 | 1460.78 | 0.06 | 3.05 | 0.01 | | | 6550.00 | 1605.42 |
| Upper right | 13.351 | 1457.79 | 1457.60 | 0.19 | | | | | 6550.00 | 1541.17 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 6550.00 | 1481.76 | 0.00 | 0.61 | | 1.98 | 1.76 | 1.21 |
| Upper right | 14.347 | 6550.00 | 1478.17 | 0.00 | 0.53 | | 2.71 | 1.64 | 1.01 |
| Upper right | 14.207 | 6550.00 | 1475.41 | 0.00 | 0.43 | | 1.80 | 3.35 | 1.62 |
| Upper right | 14.029 | 6550.00 | 1470.29 | 0.00 | 0.34 | | 4.46 | 2.12 | 0.80 |
| Upper right | 13.870 | 6550.00 | 1467.73 | 0.00 | 0.26 | | 1.46 | 2.78 | 1.69 |
| Upper right | 13.736 | 6550.00 | 1465.21 | 0.00 | 0.19 | | 4.34 | 2.77 | 0.93 |
| Upper right | 13.539 | 6550.00 | 1460.78 | 0.00 | 0.10 | | 2.03 | 2.78 | 2.01 |
| Upper right | 13.351 | 6550.00 | 1457.60 | 0.00 | 0.00 | | 3.46 | 2.26 | 1.76 |

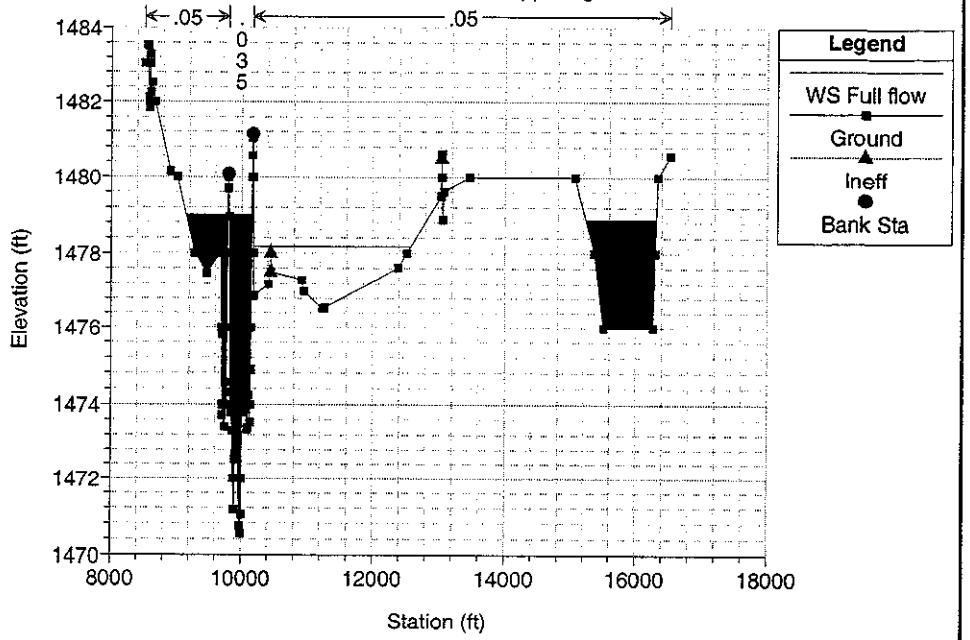
Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right Vineyard Road downstream RS = 14.479



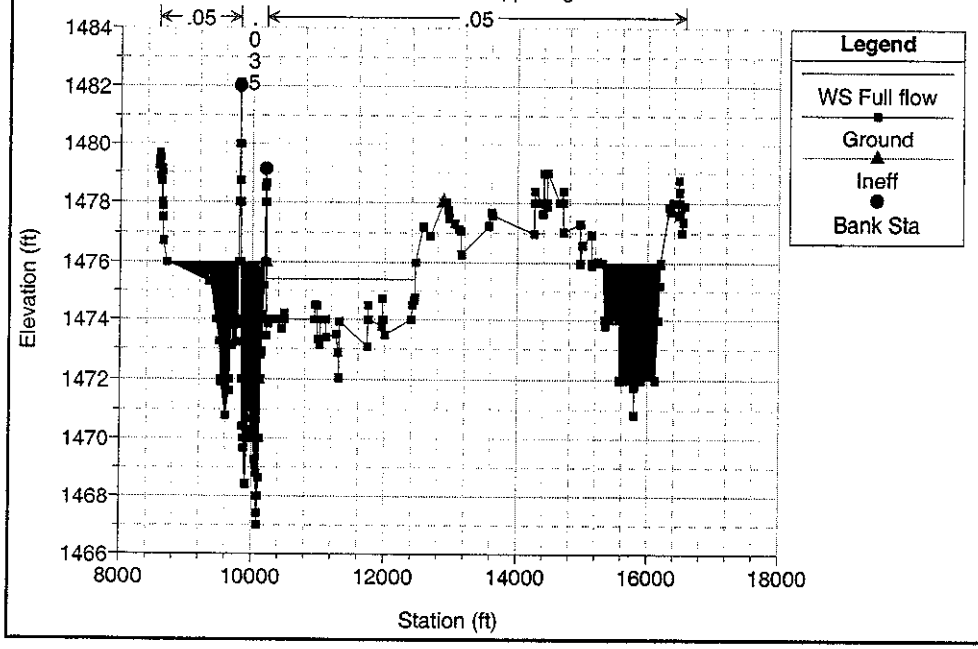

Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 14.347



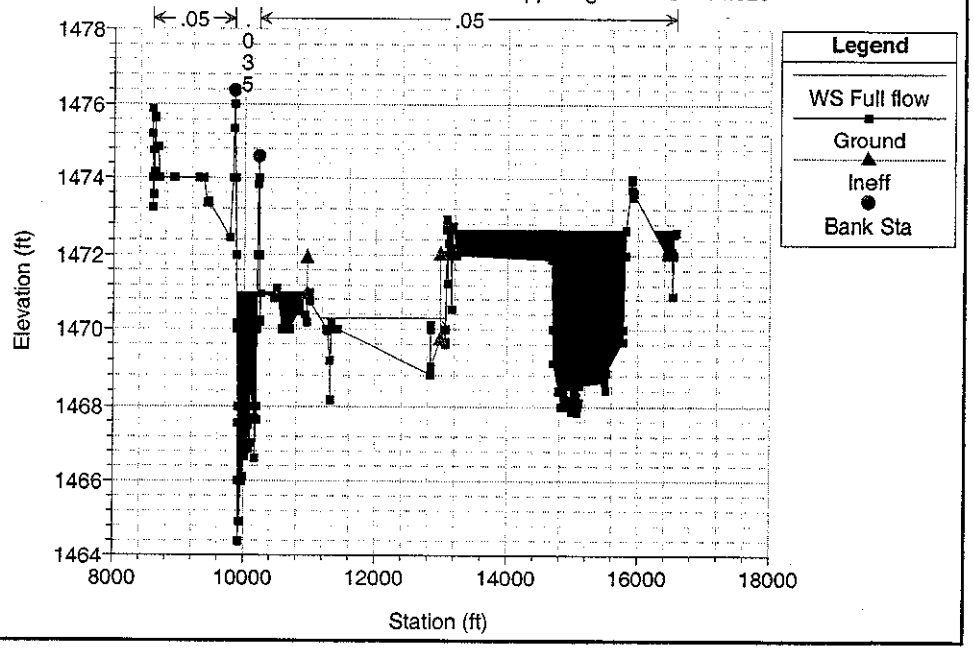

Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right 14.204 RS = 14.207



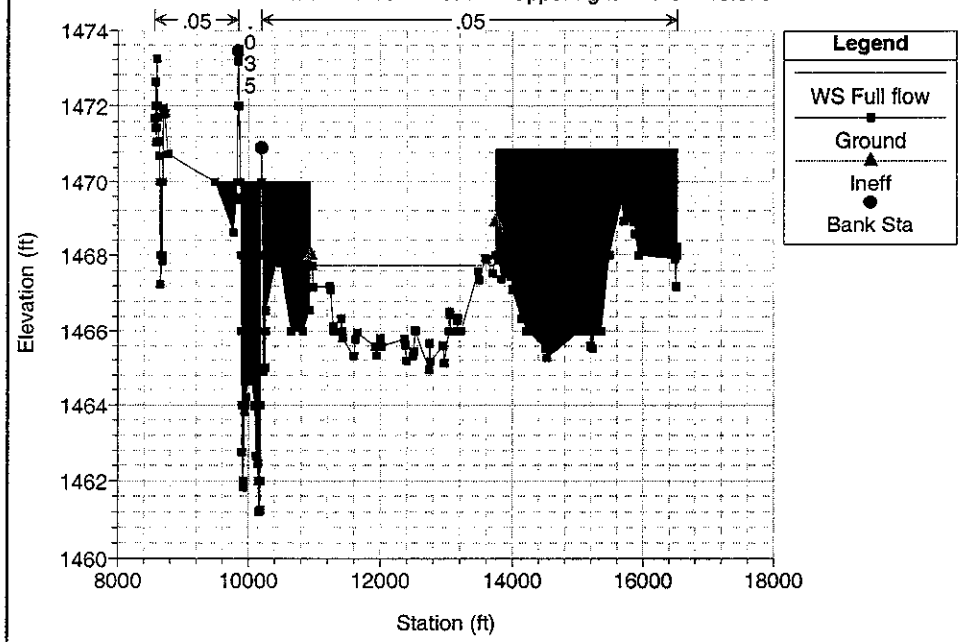

Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 14.029



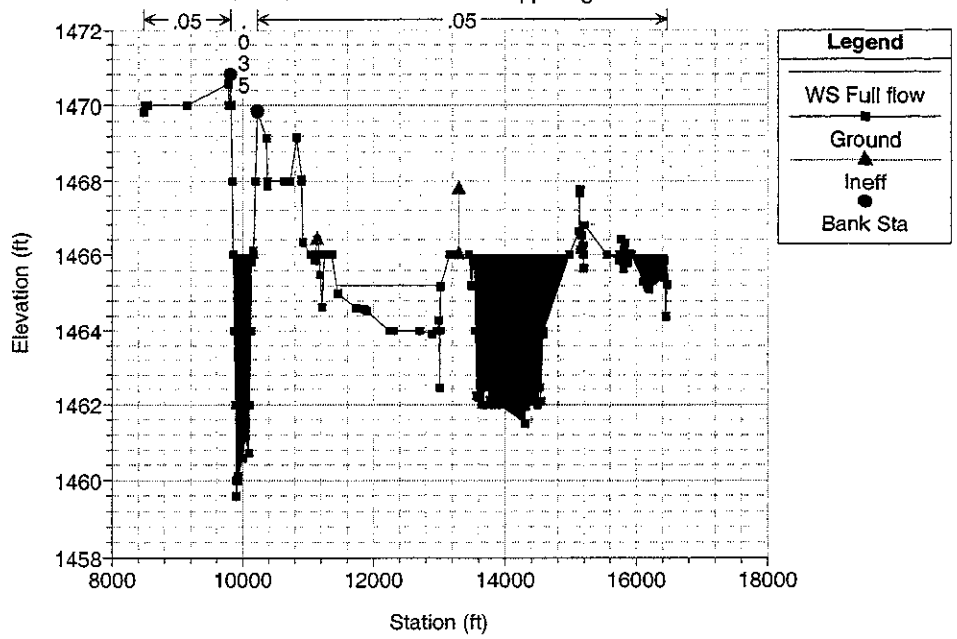
Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 13.870



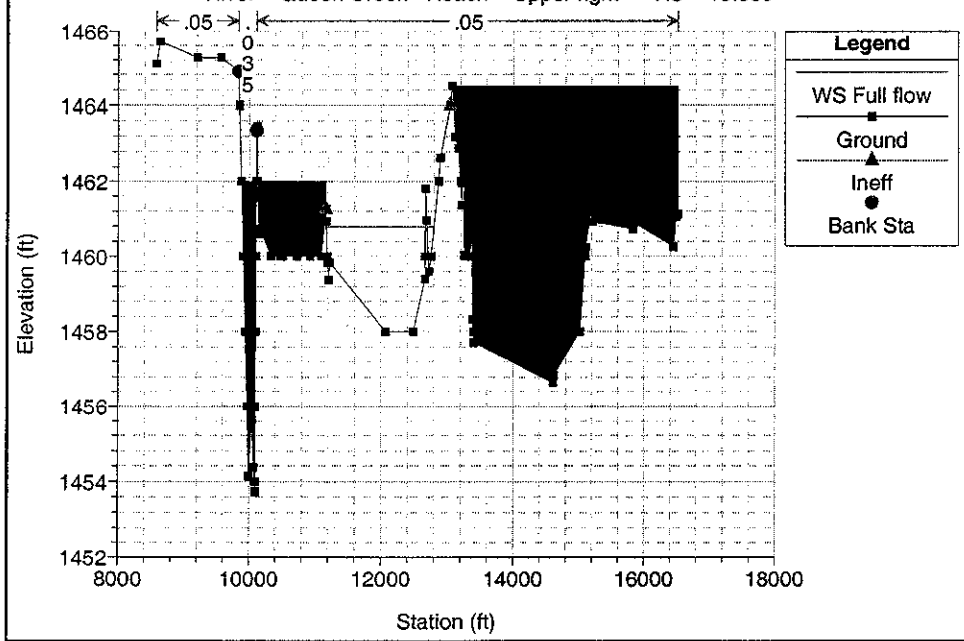

Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 13.736



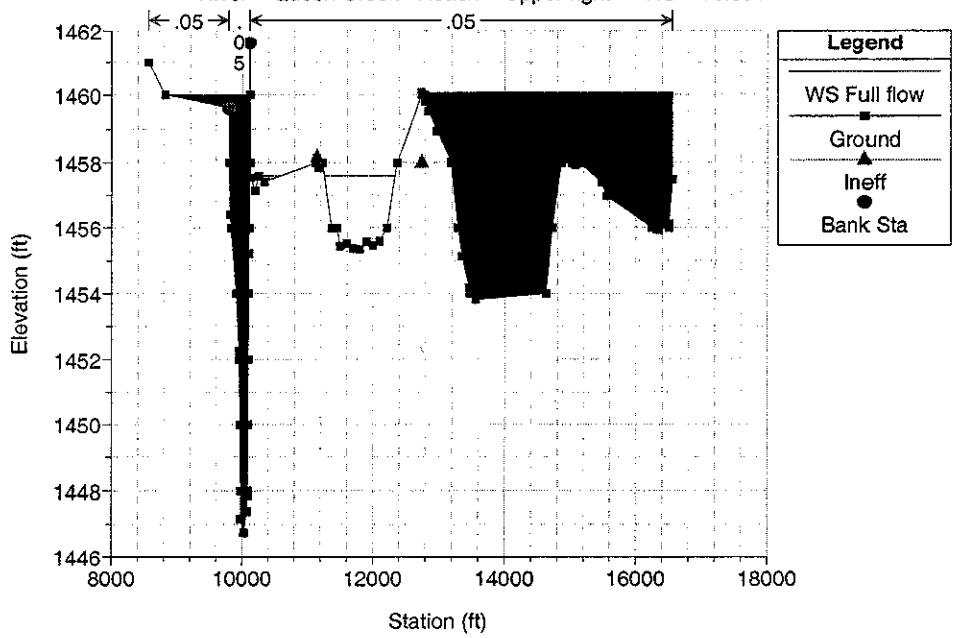

Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 13.539




Rittenhouse FRS Upper Right full Full flow Upper right overbank 03/20/2002 1:41:46 PM

River = Queen Creek Reach = Upper right RS = 13.351



## D.4 UPSTREAM RIGHT OVERBANK HEC-RAS MODEL, RHUPR2.PRJ (FOR TWO THRID FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rittenhouse FRS Upper Right two third
Project File : RHupr2.prj
Run Date and Time: 03/20/2002 4:52:38 PM

Project in English units

Project Description:
Spillway Inundation Study for Rittenhouse FRS - Two third Spillway Flow Scenario

Upstream right overbank flow area from Vineyard Road to Maricopa County boundary

Model Vertical Datum: 1988 NAVD
Starting Water Surface
Elevation, 1456.90, was obtained through
downstream right over bank HEC-RAS
modeling result and plus 1.98 feet .

FCD 98-33
Michael Baker Jr., Inc.
03/2002

**********
This model are adequate for conceptual purposes but not for design purposes.
Therefore this model should not be used directly for the design and construction
of channel improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: Two third flow Upper right overbank
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr2.P01

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr2.G01

Flow Title : Two third Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr2.F01

Plan Description:
Two thrid flow scenario downstream right over bank area

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections = | 8 | Mulitple Openings = | 0 |
| | Culverts = | 0 | Inline Weirs = | 0 |

```
            Bridges          =    0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  20
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow
```

FLOW DATA

Flow Title: Two third Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr2.F01

Flow Data (cfs)

| River | Reach | RS | Two third flow |
|---|---|---|---|
| Queen Creek | Upper right | 14.479 | 3340 |
| Queen Creek | Upper right | 14.347 | 3340 |
| Queen Creek | Upper right | 13.351 | 3340 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | Upper right | Two third flow | Critical | Known WS = 1456.9 |

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr2.G01

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 14.479

INPUT
Description: Vineyard Road downstream
Station Elevation Data  num=  89

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8543.14 | 1484.37 | 8652.76 | 1484.37 | 8665.5 | 1486 | 8673.28 | 1486.35 | 8680.99 | 1486.6 |
| 8690.08 | 1486.57 | 8690.3 | 1486 | 8691.05 | 1485.99 | 8705.1 | 1486 | 8716.31 | 1486.18 |
| 8722.77 | 1486.95 | 8730.49 | 1486.79 | 8745.17 | 1486.42 | 8749.97 | 1486.31 | 8763.1 | 1486 |
| 8907.62 | 1485.18 | 8915.33 | 1485.4 | 8920.83 | 1484.48 | 8925.26 | 1485.7 | 8964.59 | 1484.85 |
| 8984.76 | 1484 | 9000.02 | 1484 | 9013.59 | 1484 | 9034.61 | 1484 | 9436.48 | 1484 |
| 9440.92 | 1482 | 9713.03 | 1482 | 9731.02 | 1484 | 9738.36 | 1484 | 9738.84 | 1484 |
| 9774.13 | 1484 | 9852.83 | 1483.51 | 9875.25 | 1483.91 | 9881.51 | 1483.22 | 9889.9 | 1482 |
| 9892.13 | 1480.31 | 9905.06 | 1480 | 9913.59 | 1478.44 | 9955.57 | 1478 | 9958.89 | 1476.17 |
| 9976.93 | 1476 | 10000 | 1475.21 | 10036.5 | 1474.66 | 10056.96 | 1475.17 | 10074.47 | 1474.88 |
| 10090.1 | 1476 | 10125.04 | 1476.86 | 10152.11 | 1477.13 | 10174.48 | 1478 | 10187.08 | 1478.74 |
| 10190.48 | 1479.45 | 10213.21 | 1480 | 10214.91 | 1482 | 10227.79 | 1482 | 10238.02 | 1482 |
| 10246.4 | 1482 | 10251.67 | 1482 | 10255.94 | 1482 | 10274.07 | 1482 | 10315.25 | 1482 |
| 10471.27 | 1481.41 | 10507.05 | 1480.45 | 11013.15 | 1480.94 | 11276.34 | 1480.29 | 11325.2 | 1480.47 |
| 11560.04 | 1480.86 | 12134.9 | 1480 | 12580.36 | 1480 | 12761.72 | 1480.27 | 12805.02 | 1480.84 |
| 13006.37 | 1481.03 | 13137.88 | 1482 | 13183.28 | 1483.63 | 13798.18 | 1483.37 | 13863.82 | 1483.92 |
| 14034.44 | 1484 | 14098.6 | 1484 | 14136.53 | 1484 | 14224.63 | 1484 | 14478.76 | 1484 |
| 14952.6 | 1484 | 15158.25 | 1482 | 15645.54 | 1480 | 15869.87 | 1478 | 16206.67 | 1478 |
| 16291.35 | 1480 | 16438.57 | 1480.88 | 16527.31 | 1482 | 16648.48 | 1482.54 | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8543.14 | .05 | 9852.83 | .035 | 10238.02 | .05 |

Bank Sta: Left  Right  Lengths: Left Channel  Right  Coeff Contr.  Expan.

```
      9852.8310238.02              700   695.7     700              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8543.1410238.02    148213863.8216648.48 1483.92
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8543.14   10214 1483.9113243.1416648.48    1484
```

CROSS SECTION OUTPUT  Profile #Two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1481.42 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1481.39 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1480.81 | Flow Area (sq ft) | | | 2320.77 |
| E.G. Slope (ft/ft) | 0.002705 | Area (sq ft) | | 0.09 | 2320.77 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 2583.13 | Top Width (ft) | | 0.39 | 2582.74 |
| Vel Total (ft/s) | 1.44 | Avg. Vel. (ft/s) | | | 1.44 |
| Max Chl Dpth (ft) | 1.39 | Hydr. Depth (ft) | | | 0.90 |
| Conv. Total (cfs) | 64222.9 | Conv. (cfs) | | | 64222.9 |
| Length Wtd. (ft) | 700.00 | Wetted Per. (ft) | | | 2582.76 |
| Min Ch El (ft) | 1480.93 | Shear (lb/sq ft) | | | 0.15 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.22 |
| Frctn Loss (ft) | 3.52 | Cum Volume (acre-ft) | | 0.00 | 246.80 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 0.01 | 252.55 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #Two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10238.02 | 10879.07 | 355.14 | 298.19 | 406.97 | 10.63 | 0.73 | 1.19 |
| 10879.07 | 11520.11 | 557.21 | 468.59 | 641.05 | 16.68 | 0.73 | 1.19 |
| 11520.11 | 12161.16 | 863.15 | 609.30 | 641.05 | 25.84 | 0.95 | 1.42 |
| 12161.16 | 12802.20 | 1483.66 | 843.30 | 641.05 | 44.42 | 1.32 | 1.76 |
| 12802.20 | 13443.25 | 80.83 | 101.39 | 252.64 | 2.42 | 0.40 | 0.80 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 14.347

INPUT
Description:
Station Elevation Data  num=  97

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8512.04 | 1483.05 | 8551.76 | 1483.54 | 8557.37 | 1483.53 | 8567.11 | 1483.5 | 8570.97 | 1482.13 |
| 8574.61 | 1482 | 8583.42 | 1481.83 | 8584.15 | 1482 | 8588.5 | 1483.04 | 8594.86 | 1483.28 |
| 8600.43 | 1482.25 | 8625.77 | 1482.52 | 8669.36 | 1482 | 8908.25 | 1480.15 | 9016.41 | 1480 |
| 9278.78 | 1478 | 9468.43 | 1477.47 | 9674.72 | 1478 | 9679.77 | 1478.06 | 9680.24 | 1478 |
| 9694.98 | 1476 | 9696.35 | 1475.8 | 9702.04 | 1474 | 9702.97 | 1473.73 | 9746.14 | 1473.42 |
| 9765.48 | 1474 | 9774 | 1474.31 | 9779.08 | 1476 | 9784.47 | 1478 | 9789.03 | 1479.69 |
| 9796.69 | 1480 | 9797.83 | 1480.08 | 9798.42 | 1480 | 9811.58 | 1478.95 | 9814.08 | 1478 |
| 9819.66 | 1476 | 9823.73 | 1474.56 | 9835.81 | 1474 | 9839.16 | 1473.8 | 9858.46 | 1473.32 |
| 9878.57 | 1472 | 9891.22 | 1471.16 | 9899.1 | 1472 | 9904.13 | 1472.53 | 9914.23 | 1472.7 |
| 9928.27 | 1472.87 | 9942.13 | 1473.13 | 9956.9 | 1472 | 9973.6 | 1470.73 | 9984.1 | 1470.54 |
| 10000 | 1471.0310004.53 | | 1472 | 10012 | 1473.8110060.05 | | 1474 | 10064.1 | 1474.15 |
| 10068.07 | 147410085.58 | | 1473.3510091.13 | | 1473.410100.37 | | 147410105.81 | | 1474.24 |
| 10108.97 | 147410130.58 | | 1473.5310135.37 | | 147410143.52 | | 1474.8810146.24 | | 1476 |
| 10151.1 | 147810156.98 | | 148010158.78 | | 1480.5710167.05 | | 1481.0310172.79 | | 1481.14 |
| 10175.56 | 148010180.41 | | 147810183.17 | | 1476.8710411.15 | | 1477.1810442.96 | | 1477.51 |
| 10916.18 | 1477.2910946.66 | | 147711232.94 | | 1476.5311263.26 | | 1476.5311266.43 | | 1476.56 |
| 12386.92 | 1477.62 12517.9 | | 147813033.98 | | 1479.513037.58 | | 148013041.07 | | 1480.48 |
| 13045.61 | 1480.6213050.34 | | 148013059.04 | | 1478.8813075.76 | | 1479.6113465.85 | | 1480 |
| 15070.01 | 148015355.22 | | 147815512.09 | | 147616266.33 | | 147616300.25 | | 1478 |

16342.91 148016529.76 1480.57

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8512.04 | .05 | 9797.83 | .03 | 10172.79 | .05 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

| Left | Right | Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9797.83 | 10172.79 | 800 | 740.2 | 800 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8512.04 | 10442.96 | 1478 | 13041.07 | 16529.76 | 1480.48 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8512.04 | 10172 | 1479 | 13912.04 | 16529.76 | 1478.89 |

CROSS SECTION OUTPUT Profile #Two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1477.89 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.10 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1477.79 | Reach Len. (ft) | 800.00 | 740.20 | 800.00 |
| Crit W.S. (ft) | 1477.55 | Flow Area (sq ft) | | | 1336.98 |
| E.G. Slope (ft/ft) | 0.012121 | Area (sq ft) | | | 1527.60 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 2265.96 | Top Width (ft) | | | 2265.96 |
| Vel Total (ft/s) | 2.50 | Avg. Vel. (ft/s) | | | 2.50 |
| Max Chl Dpth (ft) | 1.26 | Hydr. Depth (ft) | | | 0.67 |
| Conv. Total (cfs) | 30337.6 | Conv. (cfs) | | | 30337.6 |
| Length Wtd. (ft) | 800.00 | Wetted Per. (ft) | | | 2003.92 |
| Min Ch El (ft) | 1479.00 | Shear (lb/sq ft) | | | 0.50 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 1.26 |
| Frctn Loss (ft) | 2.94 | Cum Volume (acre-ft) | | 0.00 | 215.88 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 0.01 | 213.59 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #Two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10172.79 | 10808.49 | 207.18 | 134.84 | 365.53 | 6.20 | 0.37 | 1.54 |
| 10808.49 | 11444.18 | 1785.22 | 612.58 | 635.70 | 53.45 | 0.96 | 2.91 |
| 11444.18 | 12079.88 | 1215.27 | 486.36 | 635.70 | 36.39 | 0.77 | 2.50 |
| 12079.88 | 12715.58 | 132.33 | 103.21 | 367.00 | 3.96 | 0.28 | 1.28 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 14.207

INPUT
Description: 14.204
Station Elevation Data num= 190

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8575.62 | 1479.23 | 8585.14 | 1479.41 | 8590.82 | 1479.68 | 8600.52 | 1479.52 | 8605.42 | 1478.87 |
| 8617.93 | 1478.7 | 8622.54 | 1479.13 | 8627.12 | 1479.01 | 8631.42 | 1478 | 8631.92 | 1477.87 |
| 8641.44 | 1477.49 | 8651.08 | 1476.71 | 8701.2 | 1476 | 9339.89 | 1475.32 | 9346.67 | 1475.7 |
| 9454.44 | 1474 | 9505.63 | 1473.26 | 9527.1 | 1472 | 9528.62 | 1471.92 | 9601.51 | 1470.79 |
| 9660.96 | 1471.62 | 9664.24 | 1472 | 9690.78 | 1474 | 9694.16 | 1474.24 | 9696.74 | 1474 |

```
 9706.49  1473.1 9756.95 1473.21 9771.94 1473.24 9792.39 1473.82 9792.91    1474
 9798.59    1476 9804.27    1478 9809.95    1480 9816.06    1482 9816.23 1482.13
 9816.61    1482 9822.29    1480 9826.18 1478.72  9827.9    1478 9833.04    1476
 9838.18    1474  9840.2 1473.21 9846.05    1472  9856.1 1470.41 9867.62    1470
 9877.31 1469.66    9907 1468.43 9934.14    1470 9940.09 1470.31 9960.85 1471.24
 9984.91 1470.17   10000 1470.68 10019.4    147010038.15 1469.2610051.99 1469.04
10068.16 1468.7910073.75    146810078.18 1467.4210083.26 1467.0110099.29    1468
10107.77 1468.6310116.69    147010130.71    147210137.26 1472.8210150.98 1472.91
10167.27    147410168.28 1474.1710185.52  1475.210188.42    147610194.18    1478
 10195.6  1478.510203.73 1479.1110208.24 1478.6410209.58    1478 10213.7    1476
10217.74    147410218.85 1473.4510227.19    1474 10231.3    147410245.51 1473.85
10299.63    147410357.02    147410448.61 1473.6910468.09    147410480.61 1474.23
10487.54    147410937.55    147410951.31  1474.5 10982.8 1474.4910986.97    1474
10991.97 1473.3411020.86 1473.12 11033.4    147411112.13    147411120.62  1473.4
 11266.2 1473.5111296.64 1472.8811309.84 1472.0611319.13 1473.9311742.89 1473.08
11747.52    1474 11749.8 1474.4911754.46    147411961.23 1473.7711962.33    1474
11965.68 1474.7411979.12    147412006.57 1473.4812396.17    147412415.67 1474.51
12437.01 1474.6712448.35 1474.7812456.68    147612571.72 1477.1912679.44 1476.89
12877.07    147812917.95    147812944.71 1477.7312960.56 1477.4713043.31 1477.31
13106.94 1477.1313136.32 1477.0613152.15 1476.2813564.73 1477.23 13606.3 1477.67
13618.73 1477.5714256.33 1476.9714265.27    147814270.68 1478.38 14380.6    1478
14392.54 1477.6214396.17    147814406.21 1478.98 14420.5    147814420.91 1477.97
14446.89 1477.8614448.94    147814459.76    147914646.15    1478 14662.1    1478
14696.47 1478.3714699.17    147814704.76 1477.03 14959.1  1477.314965.97    1476
14966.31 1475.9514967.62    1476   14993 1476.5915132.14 1476.9415139.93    1476
15140.94 1475.8915200.49    147615206.77    147615224.55    147615228.76 1476.05
15308.63    147615342.86    147415350.65  1473.815362.46    147415363.77    1474
15420.17    147415559.15 1474.0415559.26    147415564.28    1472 15564.3 1471.99
15565.35    147215638.93    1472 15788.3 1471.7515795.31 1470.8315800.85 1471.81
15846.23    147215896.01    147216115.81    147216164.78    147416183.52 1475.22
16194.11 1475.9416195.68    147616325.23 1477.8516345.62 1477.7116378.58    1478
16439.44    147816461.44 1477.5716470.92 1477.5916472.43    147816475.25 1478.75
16480.11 1478.3516489.64    147816516.23 1477.0216537.77 1477.3616563.67 1477.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8575.62     .05 9816.06    .03510203.73     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9816.0610203.73              950   941.5     980             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.6210203.73    147612877.0716563.67    1478
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62   10180    147612877.0716563.67    1476

CROSS SECTION OUTPUT    Profile #Two third flow

  E.G. Elev (ft)            1474.93   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.03   Wt. n-Val.                                         0.050
  W.S. Elev (ft)            1474.91   Reach Len. (ft)            950.00     941.50    980.00
  Crit W.S. (ft)            1474.17   Flow Area (sq ft)                               2499.53
  E.G. Slope (ft/ft)       0.001741   Area (sq ft)                            0.01    2499.53
  Q Total (cfs)             3340.00   Flow (cfs)                              3340.00
  Top Width (ft)            2233.89   Top Width (ft)                          0.59    2233.30
  Vel Total (ft/s)             1.34   Avg. Vel. (ft/s)                                   1.34
  Max Chl Dpth (ft)            2.85   Hydr. Depth (ft)                                   1.12
  Conv. Total (cfs)         80049.5   Conv. (cfs)                             80049.5
  Length Wtd. (ft)           980.00   Wetted Per. (ft)                        2234.33
  Min Ch El (ft)            1474.87   Shear (lb/sq ft)                                   0.12
  Alpha                        1.00   Stream Power (lb/ft s)                             0.16
  Frctn Loss (ft)              4.74   Cum Volume (acre-ft)                    0.00     178.89
  C & E Loss (ft)              0.02   Cum SA (acres)                          0.01     172.28


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Two third flow

  Left Sta     Right Sta       Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)            (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10203.73 | 10839.72 | 691.69 | 586.83 | 624.18 | 20.71 | 0.94 | 1.18 |
| 10839.72 | 11475.72 | 1043.39 | 756.81 | 636.35 | 31.24 | 1.19 | 1.38 |
| 11475.72 | 12111.71 | 1199.31 | 822.74 | 636.29 | 35.91 | 1.29 | 1.46 |
| 12111.71 | 12747.71 | 405.61 | 333.14 | 337.51 | 12.14 | 0.99 | 1.22 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 14.029

INPUT
Description:
Station Elevation Data num= 160

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8587.49 | 1475.2 | 8590.54 | 1475.88 | 8594.14 | 1474 | 8595.58 | 1473.23 | 8604.14 | 1473.56 |
| 8604.95 | 1474 | 8606.26 | 1474.75 | 8617.28 | 1474.16 | 8624.98 | 1475.67 | 8631.8 | 1475.62 |
| 8638.61 | 1474.85 | 8677.79 | 1474.84 | 8696.31 | 1474 | 8911.08 | 1474 | 8931.28 | 1474 |
| 9303.05 | 1474 | 9373.89 | 1474 | 9424.57 | 1473.35 | 9454.99 | 1473.38 | 9777.75 | 1472.45 |
| 9824.93 | 1474 | 9833.94 | 1475.35 | 9841.01 | 1476 | 9845.46 | 1476.37 | 9848.92 | 1476 |
| 9865.32 | 1474 | 9877.19 | 1472 | 9888.19 | 1470.15 | 9889.55 | 1470 | 9906.47 | 1468 |
| 9909.46 | 1467.55 | 9912.91 | 1466 | 9915.73 | 1464.38 | 9934.58 | 1464.92 | 9959.9 | 1466 |
| 9963.85 | 1466 | 9964.53 | 1465.99 | 9972.43 | 1466 | 9983.75 | 1466.11 | 10000.01 | 1467.25 |
| 10015.56 | 1466.66 | 10070.52 | 1467.51 | 10079.68 | 1466.85 | 10094.95 | 1467.03 | 10099.68 | 1468 |
| 10101.8 | 1468.45 | 10135.63 | 1468 | 10158.56 | 1467.69 | 10166.69 | 1466.61 | 10195.18 | 1467.65 |
| 10196.09 | 1468 | 10201.28 | 1470 | 10206.76 | 1472 | 10210.82 | 1473.83 | 10213.26 | 1474 |
| 10221.65 | 1474.59 | 10224.14 | 1474 | 10232.49 | 1472 | 10239.17 | 1470.23 | 10245.73 | 1470.18 |
| 10260.45 | 1470.96 | 10464.67 | 1470.83 | 10496.85 | 1471.12 | 10573.64 | 1470 | 10587.14 | 1470 |
| 10680.59 | 1470 | 10695.38 | 1470 | 10838.6 | 1470.48 | 10931.58 | 1470.39 | 10955.35 | 1470.18 |
| 10963.02 | 1470.92 | 10994.52 | 1471 | 11001.21 | 1470.76 | 11260.8 | 1470 | 11273.76 | 1469.95 |
| 11307.03 | 1469.18 | 11317.2 | 1468.17 | 11328.64 | 1470 | 11329.8 | 1470.18 | 11430.38 | 1470 |
| 12832 | 1468.82 | 12837.99 | 1470 | 12838.5 | 1470.11 | 12839.27 | 1470 | 12846.01 | 1469.03 |
| 13049.39 | 1470 | 13049.54 | 1470 | 13049.63 | 1470 | 13056.96 | 1469.67 | 13068.09 | 1469.59 |
| 13069.66 | 1470 | 13077.39 | 1472 | 13079.96 | 1472.67 | 13084.69 | 1472.91 | 13091.84 | 1472 |
| 13098.12 | 1471.25 | 13108.55 | 1472 | 13113.79 | 1472.31 | 13144.06 | 1472.19 | 13145.37 | 1472 |
| 13156.3 | 1470.54 | 13166.5 | 1472 | 13171.66 | 1472.74 | 13234.41 | 1472 | 14678.19 | 1471.89 |
| 14693.72 | 1470 | 14701.91 | 1469.12 | 14785.21 | 1468.41 | 14791.44 | 1468.42 | 14820.48 | 1468 |
| 14912.62 | 1468 | 14915.94 | 1468.01 | 14921.99 | 1469.06 | 14928.62 | 1468.78 | 14937.26 | 1468.55 |
| 14945.44 | 1469.02 | 14954.66 | 1468.61 | 14962.5 | 1468.73 | 14971.48 | 1468 | 14980.36 | 1467.87 |
| 14981.55 | 1468 | 14983.24 | 1468.18 | 15000.34 | 1468.02 | 15000.44 | 1468.01 | 15016.13 | 1468.36 |
| 15024.55 | 1468.37 | 15045.38 | 1468 | 15054.34 | 1467.92 | 15055.37 | 1468 | 15058.64 | 1468.25 |
| 15063.39 | 1468 | 15065.88 | 1467.85 | 15085.27 | 1468 | 15096.71 | 1468.11 | 15102.2 | 1469.22 |
| 15106.71 | 1468.55 | 15484.42 | 1468.64 | 15490.43 | 1469.57 | 15500.08 | 1468.43 | 15506.45 | 1469.46 |
| 15513.31 | 1468.87 | 15771.54 | 1469.67 | 15775.29 | 1470 | 15799.23 | 1472 | 15806.92 | 1472.66 |
| 15896.17 | 1473.93 | 15901.38 | 1473.99 | 15904.17 | 1473.69 | 15912.86 | 1473.51 | 15926.88 | 1473.62 |
| 16430.09 | 1472 | 16462.96 | 1472 | 16474.74 | 1472 | 16506.1 | 1472 | 16516.58 | 1472.09 |
| 16517.17 | 1472 | 16525.47 | 1470.91 | 16542.87 | 1472 | 16547.52 | 1472.55 | 16573.13 | 1472.6 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8587.49 | .05 | 9845.46 | .035 | 10221.65 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9845.46 | 10221.65 | 840 | 838.6 | 840 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8587.49 | 10963.02 | 1471.92 | 12987.49 | 16573.13 | 1472 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8587.49 | 10900 | 1471 | 13079.96 | 16573.13 | 1472.67 |

CROSS SECTION OUTPUT Profile #Two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1470.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.27 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1469.90 | Reach Len. (ft) | 840.00 | 838.60 | 840.00 |
| Crit W.S. (ft) | 1469.90 | Flow Area (sq ft) | | | 805.85 |
| E.G. Slope (ft/ft) | 0.043996 | Area (sq ft) | | | 813.58 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 1545.44 | Top Width (ft) | | | 1545.44 |
| Vel Total (ft/s) | 4.14 | Avg. Vel. (ft/s) | | | 4.14 |
| Max Chl Dpth (ft) | 1.73 | Hydr. Depth (ft) | | | 0.54 |

| | | | |
|---|---|---|---|
| Conv. Total (cfs) | 15923.5 | Conv. (cfs) | 15923.5 |
| Length Wtd. (ft) | 840.00 | Wetted Per. (ft) | 1487.58 |
| Min Ch El (ft) | 1471.00 | Shear (lb/sq ft) | 1.49 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 6.17 |
| Frctn Loss (ft) | 2.48 | Cum Volume (acre-ft) | 141.63 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 129.77 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #Two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10856.80 | 11491.95 | 136.09 | 32.98 | 52.26 | 4.07 | 0.63 | 4.13 |
| 11491.95 | 12127.09 | 306.31 | 140.26 | 577.24 | 9.17 | 0.24 | 2.18 |
| 12127.09 | 12762.24 | 2221.90 | 478.49 | 635.15 | 66.52 | 0.75 | 4.64 |
| 12762.24 | 13397.39 | 675.70 | 154.10 | 222.93 | 20.23 | 0.69 | 4.38 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.870

INPUT
Description:
Station Elevation Data num= 163

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8558.7 | 1471.68 | 8571.76 | 1471.44 | 8573.67 | 1472 | 8575.99 | 1472.61 | 8577.28 | 1472 |
| 8579.01 | 1471.07 | 8590.26 | 1471.45 | 8591.83 | 1472 | 8595.02 | 1473.23 | 8606.55 | 1472 |
| 8608.85 | 1471.71 | 8617.39 | 1471.08 | 8631.88 | 1471.09 | 8634.45 | 1470.71 | 8636.59 | 1470 |
| 8642.64 | 1468 | 8644.85 | 1467.24 | 8680.57 | 1467.86 | 8680.97 | 1468 | 8686.6 | 1470 |
| 8692.31 | 1471.94 | 8718.13 | 1471.8 | 8767.21 | 1470.76 | 9486.09 | 1470 | 9768.58 | 1468.6 |
| 9825.53 | 1469.58 | 9827.26 | 1470 | 9835.39 | 1472 | 9839.75 | 1473.17 | 9848.47 | 1473.43 |
| 9859.98 | 1472 | 9876.08 | 1470 | 9881.01 | 1469.49 | 9884.99 | 1468 | 9890.34 | 1466 |
| 9896.01 | 1464 | 9899.55 | 1462.75 | 9917.23 | 1462 | 9920.88 | 1461.84 | 9922.47 | 1462 |
| 9942.02 | 1463.81 | 9949.74 | 1464 | 9959.11 | 1464.2 | 10000 | 1464.6 | 10036.97 | 1464.72 |
| 10096.33 | 1464 | 10099.58 | 1463.9 | 10115.36 | 1462.65 | 10133.75 | 1462.63 | 10147.15 | 1462.45 |
| 10152.8 | 1462 | 10162.52 | 1461.21 | 10181.69 | 1461.25 | 10182.54 | 1462 | 10184.83 | 1464 |
| 10187.11 | 1466 | 10189.4 | 1468 | 10191.59 | 1469.91 | 10192.64 | 1470 | 10201.97 | 1470.91 |
| 10205.61 | 1470 | 10213.5 | 1468 | 10219.96 | 1466 | 10223.51 | 1464.91 | 10260.97 | 1465 |
| 10263.88 | 1466 | 10265.28 | 1466.55 | 10447 | 1468 | 10448.27 | 1468.07 | 10448.6 | 1468 |
| 10448.81 | 1468 | 10457.14 | 1468 | 10480.49 | 1467.8 | 10647.25 | 1466 | 10827.4 | 1466 |
| 10932.69 | 1466.57 | 10943.05 | 1468 | 10943.08 | 1468 | 10943.92 | 1468 | 10974.32 | 1467.73 |
| 10984.41 | 1467.17 | 11233.43 | 1467.19 | 11246.66 | 1467.11 | 11287.76 | 1466.15 | 11291.85 | 1466 |
| 11404.84 | 1466 | 11408.29 | 1466.35 | 11423.02 | 1466 | 11429.86 | 1465.82 | 11601.27 | 1465.32 |
| 11625.55 | 1465.77 | 11650.35 | 1465.96 | 11922.62 | 1465.58 | 11940.87 | 1465.34 | 11998.55 | 1465.8 |
| 12015.79 | 1465.59 | 12363.6 | 1465.78 | 12378.11 | 1465.62 | 12393.99 | 1465.18 | 12488.67 | 1465.31 |
| 12505.6 | 1465.45 | 12526.61 | 1466 | 12528.18 | 1466.04 | 12529.44 | 1466 | 12734.61 | 1464.95 |
| 12744.02 | 1465.67 | 12760.48 | 1465.16 | 12950.28 | 1465.62 | 12967.34 | 1465.12 | 13041.26 | 1466 |
| 13042.99 | 1466.53 | 13051.85 | 1466.44 | 13063.8 | 1466 | 13158.56 | 1466 | 13160.11 | 1466.29 |

```
13172.36 1466.3613177.63    146613183.18    146613214.17    146613218.17    1466
13476.33 1467.5813498.82 1467.3613590.82 1467.9313609.49 1467.89 13702.3 1467.54
13739.61    146813746.41 1468.8913761.69    146813791.53 1467.8713836.35 1467.39
13980.61 1467.4513998.32 1467.1114138.38 1466.3414159.75 1466.3414215.55    1466
14223.11    146614232.82    146614507.56 1465.5214528.76 1465.27 15023.3    1466
15097.31    146615121.32    146615188.78    146615195.21 1465.5915228.09 1465.53
15249.57    146615260.92    146615266.46    146615272.58 1466.2215297.52    1466
   15357    146615480.84    146815675.12 1469.4615705.14 1468.9115865.23 1468.89
15869.18 1469.1315873.32 1469.23 15880.2 1468.5615930.01    146816488.32 1467.91
 16505.4 1467.1916523.86    146816526.19 1468.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  8558.7     .05 9848.47    .03510201.97     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9848.4710201.97              720  706.24     720             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.710943.92    146813746.4116526.19 1468.89
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.7   10943    147013746.4116526.19 1470.89

CROSS SECTION OUTPUT    Profile #Two third flow

  E.G. Elev (ft)            1467.13   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.02   Wt. n-Val.                                         0.050
  W.S. Elev (ft)            1467.11   Reach Len. (ft)            720.00     706.24     720.00
  Crit W.S. (ft)            1466.10   Flow Area (sq ft)                                 2932.91
  E.G. Slope (ft/ft)       0.000973   Area (sq ft)                                      2932.91
  Q Total (cfs)             3340.00   Flow (cfs)                                        3340.00
  Top Width (ft)            2152.96   Top Width (ft)                                    2152.96
  Vel Total (ft/s)             1.14   Avg. Vel. (ft/s)                                     1.14
  Max Chl Dpth (ft)            2.16   Hydr. Depth (ft)                                     1.36
  Conv. Total (cfs)        107102.7   Conv. (cfs)                                      107102.7
  Length Wtd. (ft)           720.00   Wetted Per. (ft)                                  2153.20
  Min Ch El (ft)            1470.00   Shear (lb/sq ft)                                     0.08
  Alpha                        1.00   Stream Power (lb/ft s)                               0.09
  Frctn Loss (ft)              2.08   Cum Volume (acre-ft)                               105.50
  C & E Loss (ft)              0.02   Cum SA (acres)                                      94.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Two third flow

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)             (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  10834.39     11466.81        206.80     224.30     220.23      6.19      1.02       0.92
  11466.81     12099.24       1068.90     916.46     632.43     32.00      1.45       1.17
  12099.24     12731.66       1206.62     985.59     632.44     36.13      1.56       1.22
  12731.66     13364.08        856.89     802.70     632.60     25.66      1.27       1.07
  13364.08     13996.50          0.80       3.86      35.50      0.02      0.11       0.21

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 13.736

INPUT
Description:
Station Elevation Data    num=     128
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8481.19 1469.83 8503.13    1470 8543.72    1470 9145.76    1470 9778.58 1470.56
 9784.88    1470 9798.95    1470 9813.84  1470.8 9821.38    1470 9837.65    1468
 9853.57    1466  9869.5    1464 9885.43    1462 9901.21    1460 9904.44 1459.59
 9925.69    1460 9928.96  1460.1   10000 1460.5810040.53 1461.1510091.19 1460.73
10104.56    1462 10125.6    146410138.13 1465.83   10154    1466 10158.4 1466.11
```

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10158.71    146610170.29    146610192.75    146810223.65 1469.8510224.07 1469.85
10359.17 1469.1510373.72    146810375.61 1467.8710376.44    146810635.06    1468
10655.14    146810718.74    146810727.79    146810824.62 1469.1710901.49 1468.07
 10904.2    146810919.56 1466.3311048.21    146611104.62 1465.8611111.04    1466
11113.09 1466.0211143.12 1466.3911181.28    146611185.02 1465.4811214.14 1464.63
11253.53    146611364.16    146611452.87    146511731.55 1464.61 11859.4 1464.58
11896.31 1464.5412247.25    146412305.81    146412707.28    146412894.94 1463.91
12963.59    146412994.98 1464.2912997.71    146413009.41 1462.4413015.37    1464
13020.53 1465.1713162.61    1466   13247    146613249.48    146613453.56    1466
13485.66  1465.213530.12 1465.7913544.84    1464 13566.9 1462.23 13595.7 1462.18
13637.87    146213672.28    146213695.45 1462.59 13723.4 1462.4613768.28 1462.13
13788.13    146213821.72    146213823.08    146213833.06    146213908.56    1462
 14302.5  1461.514308.88 1461.9514486.63    146214527.71 1462.4514540.54 1462.09
14575.78 1463.8914578.36    146414974.42    146615122.02 1466.6115129.88 1467.67
 15134.8 1467.77 15143.5 1466.1315155.83 1466.51 15178.8 1466.2415183.59    1466
15190.08 1465.6615192.42    146615196.83 1466.7815552.58    146615742.53 1465.86
 15748.5    146615767.13 1466.4115783.35    146615785.89 1465.9215806.62 1465.65
15811.06    146615812.83 1466.1615816.19 1466.1215832.18 1466.3115839.03    1466
15873.69  1465.815900.28    146615902.37 1466.0215924.22    146616100.16  1465.3
16122.37 1465.33 16160.5 1465.2316176.98 1465.1616194.33 1465.11   16424  1465.4
16431.35 1465.8516447.86 1464.3916469.93 1465.22

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8481.19     .05 9813.84    .03510223.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9813.8410223.65             1080  1040.5    1050             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.1911143.12 1466.39   1330016469.93 1467.77
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.19   11143    146613162.6116469.93    1466

CROSS SECTION OUTPUT    Profile #Two third flow

  E.G. Elev (ft)            1465.03   Element                  Left OB    Channel   Right OB
  Vel Head (ft)                0.23   Wt. n-Val.                                      0.050
  W.S. Elev (ft)            1464.79   Reach Len. (ft)          1080.00    1040.50   1050.00
  Crit W.S. (ft)            1464.73   Flow Area (sq ft)                               860.55
  E.G. Slope (ft/ft)       0.033293   Area (sq ft)                                    860.55
  Q Total (cfs)             3340.00   Flow (cfs)                                     3340.00
  Top Width (ft)            1428.05   Top Width (ft)                                 1428.05
  Vel Total (ft/s)             3.88   Avg. Vel. (ft/s)                                  3.88
  Max Chl Dpth (ft)            2.35   Hydr. Depth (ft)                                  0.60
  Conv. Total (cfs)         18305.0   Conv. (cfs)                                   18305.0
  Length Wtd. (ft)          1050.00   Wetted Per. (ft)                               1428.46
  Min Ch El (ft)            1466.00   Shear (lb/sq ft)                                  1.25
  Alpha                        1.00   Stream Power (lb/ft s)                            4.86
  Frctn Loss (ft)              4.84   Cum Volume (acre-ft)                             74.15
  C & E Loss (ft)              0.06   Cum SA (acres)                                   64.51


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #Two third flow

  Left Sta     Right Sta        Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)         (ft)             (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  10848.28     11472.91          0.77       0.83     10.25       0.02       0.08       0.92
  11472.91     12097.53        253.65     127.75    496.47       7.59       0.26       1.99
  12097.53     12722.16       1962.05     477.89    624.63      58.74       0.77       4.11
  12722.16     13346.79       1123.53     254.08    297.11      33.64       0.86       4.42


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
```

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.539

INPUT
Description:
Station Elevation Data num= 88

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8582.12 | 1465.1 | 8632.38 | 1465.71 | 9205.41 | 1465.27 | 9572.19 | 1465.27 | 9838.78 | 1464.88 |
| 9853.96 | 1464 | 9884.33 | 1462 | 9913.39 | 1460 | 9941.91 | 1458 | 9970.43 | 1456 |
| 9996.96 | 1454.14 | 10044.91 | 1455.64 | 10075.25 | 1454.37 | 10087 | 1454 | 10095.34 | 1453.74 |
| 10095.83 | 1454 | 10099.56 | 1456 | 10103.29 | 1458 | 10107.08 | 1460 | 10110.25 | 1461.75 |
| 10111.31 | 1462 | 10116.88 | 1463.35 | 10127.3 | 1463.45 | 10134.02 | 1462 | 10135.91 | 1461.56 |
| 10148.94 | 1460.59 | 10158.23 | 1460.74 | 10333.22 | 1460 | 10477.28 | 1460 | 10517.48 | 1460 |
| 10732.29 | 1460 | 10926.8 | 1460 | 11097.79 | 1460 | 11165.21 | 1461.26 | 11170.3 | 1460.93 |
| 11187.66 | 1460 | 11190.31 | 1459.84 | 11207.48 | 1459.37 | 11225.98 | 1459.85 | 12068.22 | 1458 |
| 12486.32 | 1458 | 12662.53 | 1459.4 | 12665.49 | 1460 | 12674.29 | 1461.81 | 12688.4 | 1460.96 |
| 12710.71 | 1460 | 12719.8 | 1459.6 | 12758.01 | 1460 | 12869.74 | 1462 | 12894.35 | 1462.65 |
| 13042.11 | 1464 | 13075.37 | 1464.51 | 13091.44 | 1464 | 13113.7 | 1463.19 | 13167.97 | 1462.89 |
| 13200 | 1462 | 13206.91 | 1463.56 | 13211.7 | 1462 | 13213.66 | 1461.36 | 13225.95 | 1461.95 |
| 13226.83 | 1462 | 13236.08 | 1462.49 | 13241.02 | 1462.23 | 13246.36 | 1462.15 | 13246.89 | 1462 |
| 13253.78 | 1460.05 | 13260.76 | 1460 | 13338.66 | 1460 | 13368.39 | 1460.5 | 13370.94 | 1460 |
| 13380.11 | 1458.33 | 13390.45 | 1458 | 13399.21 | 1457.71 | 14603.73 | 1456.65 | 14617.99 | 1456.85 |
| 15016.3 | 1458 | 15096.52 | 1460 | 15104.47 | 1460.24 | 15185.18 | 1461.17 | 15202.82 | 1460.92 |
| 15830.72 | 1460.73 | 15833.76 | 1461.62 | 15838.17 | 1461.37 | 15842.8 | 1460.9 | 16450.11 | 1460.26 |
| 16450.33 | 1460.26 | 16493.42 | 1461.05 | 16518.44 | 1461.13 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8582.12 | .05 | 9838.78 | .035 | 10116.88 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9838.78 | 10116.88 | 1000 | 993.9 | 1000 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8582.12 | 11165.21 | 1461.26 | 13042.11 | 16518.44 | 1464 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8582.12 | 11165 | 1462 | 13075.37 | 16518.44 | 1464.51 |

CROSS SECTION OUTPUT Profile #Two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1460.13 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.04 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1460.09 | Reach Len. (ft) | 1000.00 | 993.90 | 1000.00 |
| Crit W.S. (ft) | 1458.99 | Flow Area (sq ft) | | | 2137.18 |
| E.G. Slope (ft/ft) | 0.001725 | Area (sq ft) | | | 2137.18 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 1534.65 | Top Width (ft) | | | 1534.65 |
| Vel Total (ft/s) | 1.56 | Avg. Vel. (ft/s) | | | 1.56 |
| Max Chl Dpth (ft) | 2.09 | Hydr. Depth (ft) | | | 1.39 |
| Conv. Total (cfs) | 80415.1 | Conv. (cfs) | | | 80415.1 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | | 1534.76 |
| Min Ch El (ft) | 1462.00 | Shear (lb/sq ft) | | | 0.15 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.23 |
| Frctn Loss (ft) | 3.10 | Cum Volume (acre-ft) | | | 38.02 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | | 28.81 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #Two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10757.04 | 11397.19 | 60.73 | 91.61 | 211.28 | 1.82 | 0.43 | 0.66 |
| 11397.19 | 12037.35 | 1179.55 | 846.22 | 640.16 | 35.32 | 1.32 | 1.39 |
| 12037.35 | 12677.50 | 2093.03 | 1185.15 | 628.67 | 62.67 | 1.89 | 1.77 |
| 12677.50 | 13317.66 | 6.68 | 14.19 | 54.65 | 0.20 | 0.26 | 0.47 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.351

INPUT
Description:
Station Elevation Data num= 82

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8565.62 | 1461 | 8819.25 | 1460 | 9792.1 | 1459.62 | 9800.19 | 1458 | 9808.23 | 1456.4 |
| 9823.11 | 1456 | 9903.55 | 1454 | 9951.28 | 1452.17 | 9952.07 | 1452.26 | 9953.52 | 1452 |
| 9964.87 | 1450 | 9974.53 | 1448 | 9977.77 | 1447.171 | 10021.99 | 1446.751 | 10074.33 | 1447.39 |
| 10083.44 | 1447.86 | 10083.8 | 144 | 810088.78 | 1450 | 10094.1 | 145 | 210100.11 | 1454 |
| 10103.79 | 1455.231 | 0105.52 | 1456 | 10110 | 145 | 810114.27 | 146 | 010117.72 | 1461.61 |
| 10120.9 | 146 | 010125.19 | 145 | 810126.18 | 1457.541 | 0197.35 | 1457.141 | 0247.37 | 1457.59 |
| 10337.82 | 1457.411 | 1127.31 | 145 | 811141.06 | 1458.151 | 1152.59 | 145 | 811164.73 | 1457.84 |
| 11167.42 | 145 | 811231.27 | 145 | 811368.33 | 145 | 611396.54 | 145 | 611446.84 | 1456 |
| 11495.62 | 1455.451 | 1595.62 | 1455.531 | 1695.62 | 1455.371 | 1795.62 | 1455.341 | 1895.62 | 1455.58 |
| 11995.62 | 1455.471 | 2095.62 | 1455.61 | 2214.56 | 145 | 612363.74 | 145 | 812740.45 | 1460 |
| 12743.83 | 1460.081 | 2750.17 | 146 | 012778.31 | 146 | 012778.34 | 146 | 012796.04 | 1459.8 |
| 12838.75 | 1459.531 | 2972.48 | 1458.94 | 12973.4 | 1458.941 | 3185.11 | 1458.031 | 3186.21 | 1458 |
| 13286.73 | 145 | 613348.99 | 1455.14 | 13458.7 | 1454.191 | 3468.18 | 145 | 413561.98 | 1453.81 |
| 14627.57 | 145 | 414720.48 | 145 | 614855.64 | 145 | 815012.24 | 145 | 815061.71 | 1458 |
| 15062.81 | 145 | 815070.78 | 1457.951 | 5077.09 | 145 | 815134.73 | 145 | 815471.76 | 1457.38 |
| 15550.97 | 1456.971 | 6237.47 | 145 | 616310.61 | 1455.961 | 6348.77 | 1455.941 | 6497.94 | 1456 |
| 16502.69 | 1456.121 | 6550.67 | 1457.49 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8565.62 | .05 | 9792.1 | .035 | 10117.72 | .05 |

| Bank Sta: Left | Right | Coeff Contr. | Expan. |
|---|---|---|---|
| 9792.1 | 10117.72 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8565.62 | 11141.06 | 1458.15 | 12740.41 | 6550.67 | 1458 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8565.62 | 10117 | 1460 | 12743.83 | 16550.67 | 1460.08 |

CROSS SECTION OUTPUT Profile #Two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1457.03 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.13 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1456.90 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1456.37 | Flow Area (sq ft) | | | 1175.31 |
| E.G. Slope (ft/ft) | 0.007128 | Area (sq ft) | | | 1175.31 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 975.04 | Top Width (ft) | | | 975.04 |
| Vel Total (ft/s) | 2.84 | Avg. Vel. (ft/s) | | | 2.84 |
| Max Chl Dpth (ft) | 1.56 | Hydr. Depth (ft) | | | 1.21 |
| Conv. Total (cfs) | 39560.3 | Conv. (cfs) | | | 39560.3 |
| Length Wtd. (ft) | | Wetted Per. (ft) | | | 975.06 |
| Min Ch El (ft) | 1460.00 | Shear (lb/sq ft) | | | 0.54 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 1.52 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

FLOW DISTRIBUTION OUTPUT Profile #Two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10761.01 | 11404.31 | 106.27 | 60.14 | 97.66 | 3.18 | 0.62 | 1.77 |
| 11404.31 | 12047.60 | 2698.86 | 890.20 | 643.30 | 80.80 | 1.38 | 3.03 |
| 12047.60 | 12690.90 | 534.87 | 224.97 | 234.09 | 16.01 | 0.96 | 2.38 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| Upper right | 14.479 | .05 | .035 | .05 |
| Upper right | 14.347 | .05 | .035 | .05 |
| Upper right | 14.207 | .05 | .035 | .05 |
| Upper right | 14.029 | .05 | .035 | .05 |
| Upper right | 13.870 | .05 | .035 | .05 |
| Upper right | 13.736 | .05 | .035 | .05 |
| Upper right | 13.539 | .05 | .035 | .05 |
| Upper right | 13.351 | .05 | .035 | .05 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Upper right | 14.479 | 700 | 695.7 | 700 |
| Upper right | 14.347 | 800 | 740.2 | 800 |
| Upper right | 14.207 | 950 | 941.5 | 980 |
| Upper right | 14.029 | 840 | 838.6 | 840 |
| Upper right | 13.870 | 720 | 706.24 | 720 |
| Upper right | 13.736 | 1080 | 1040.5 | 1050 |
| Upper right | 13.539 | 1000 | 993.9 | 1000 |
| Upper right | 13.351 | | | |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| Upper right | 14.479 | .1 | .3 |
| Upper right | 14.347 | .1 | .3 |
| Upper right | 14.207 | .1 | .3 |
| Upper right | 14.029 | .1 | .3 |
| Upper right | 13.870 | .1 | .3 |
| Upper right | 13.736 | .1 | .3 |
| Upper right | 13.539 | .1 | .3 |
| Upper right | 13.351 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 3340.00 | 1480.93 | 1481.39 | 1480.81 | 1481.42 | 0.002705 | | 2320.77 | 2583.13 | 0.00 |
| Upper right | 14.347 | 3340.00 | 1479.00 | 1477.79 | 1477.55 | 1477.89 | 0.012121 | | 1336.98 | 2265.96 | 0.00 |
| Upper right | 14.207 | 3340.00 | 1474.87 | 1474.91 | 1474.17 | 1474.93 | 0.001741 | | 2499.53 | 2233.89 | 0.00 |
| Upper right | 14.029 | 3340.00 | 1471.00 | 1469.90 | 1469.90 | 1470.17 | 0.043996 | | 805.85 | 1545.44 | 0.00 |
| Upper right | 13.870 | 3340.00 | 1470.00 | 1467.11 | 1466.10 | 1467.13 | 0.000973 | | 2932.91 | 2152.96 | 0.00 |
| Upper right | 13.736 | 3340.00 | 1466.00 | 1464.79 | 1464.73 | 1465.03 | 0.033293 | | 860.55 | 1428.05 | 0.00 |
| Upper right | 13.539 | 3340.00 | 1462.00 | 1460.09 | 1458.99 | 1460.13 | 0.001725 | | 2137.18 | 1534.65 | 0.00 |
| Upper right | 13.351 | 3340.00 | 1460.00 | 1456.90 | 1456.37 | 1457.03 | 0.007128 | | 1175.31 | 975.04 | 0.00 |

Profile Output Table - Standard Table 2

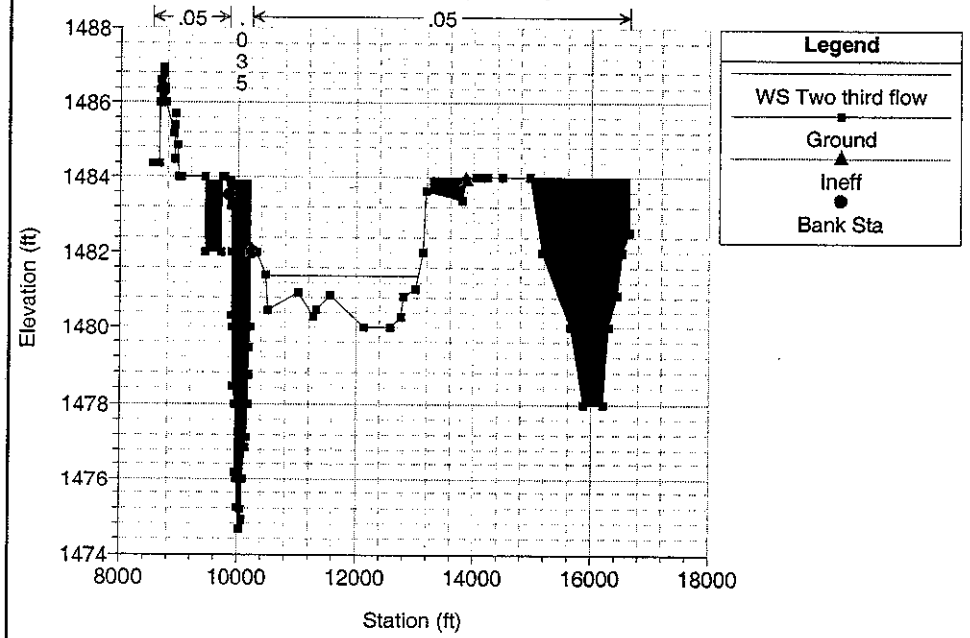
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 1481.42 | 1481.39 | 0.03 | 3.52 | 0.01 | | | 3340.00 | 2583.13 |
| Upper right | 14.347 | 1477.89 | 1477.79 | 0.10 | 2.94 | 0.02 | | | 3340.00 | 2265.96 |
| Upper right | 14.207 | 1474.93 | 1474.91 | 0.03 | 4.74 | 0.02 | | | 3340.00 | 2233.89 |
| Upper right | 14.029 | 1470.17 | 1469.90 | 0.27 | 2.48 | 0.07 | | | 3340.00 | 1545.44 |
| Upper right | 13.870 | 1467.13 | 1467.11 | 0.02 | 2.08 | 0.02 | | | 3340.00 | 2152.96 |
| Upper right | 13.736 | 1465.03 | 1464.79 | 0.23 | 4.84 | 0.06 | | | 3340.00 | 1428.05 |
| Upper right | 13.539 | 1460.13 | 1460.09 | 0.04 | 3.10 | 0.01 | | | 3340.00 | 1534.65 |
| Upper right | 13.351 | 1457.03 | 1456.90 | 0.13 | | | | | 3340.00 | 975.04 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 3340.00 | 1481.39 | 0.00 | 0.72 | | 1.44 | 1.39 | 0.90 |
| Upper right | 14.347 | 3340.00 | 1477.79 | 0.00 | 0.62 | | 2.50 | 1.26 | 0.67 |
| Upper right | 14.207 | 3340.00 | 1474.91 | 0.00 | 0.50 | | 1.34 | 2.85 | 1.12 |
| Upper right | 14.029 | 3340.00 | 1469.90 | 0.00 | 0.40 | | 4.14 | 1.73 | 0.54 |
| Upper right | 13.870 | 3340.00 | 1467.11 | 0.00 | 0.31 | | 1.14 | 2.16 | 1.36 |
| Upper right | 13.736 | 3340.00 | 1464.79 | 0.00 | 0.23 | | 3.88 | 2.35 | 0.60 |
| Upper right | 13.539 | 3340.00 | 1460.09 | 0.00 | 0.13 | | 1.56 | 2.09 | 1.39 |
| Upper right | 13.351 | 3340.00 | 1456.90 | 0.00 | 0.00 | | 2.84 | 1.56 | 1.21 |

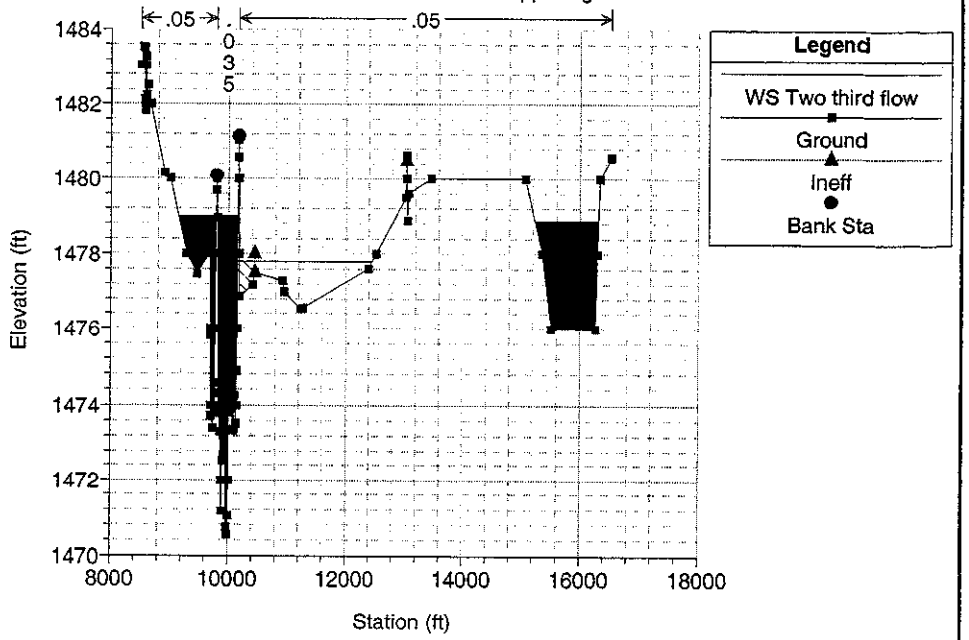
Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right Vineyard Road downstream RS = 14.479



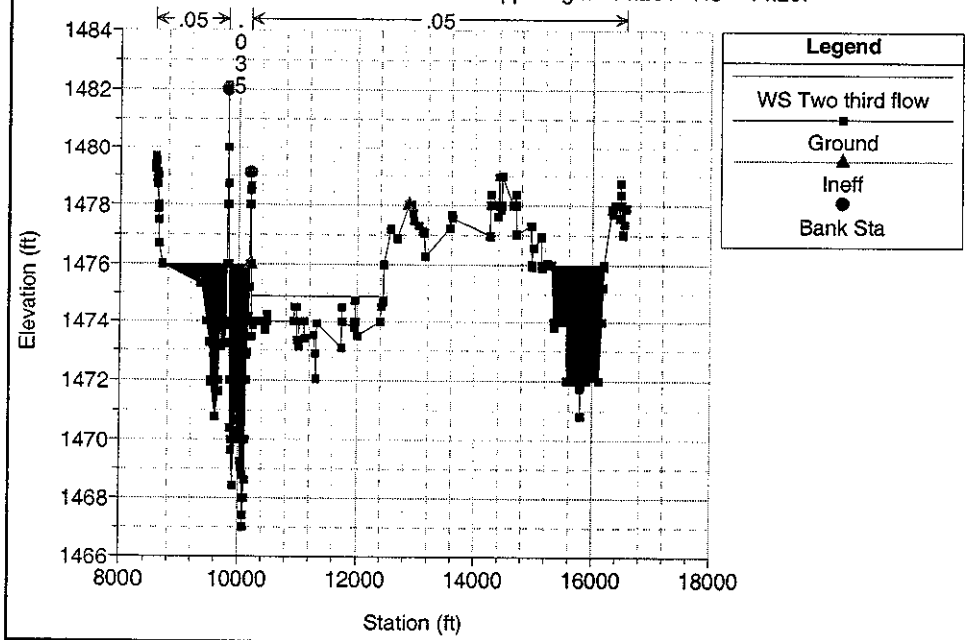

Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 14.347



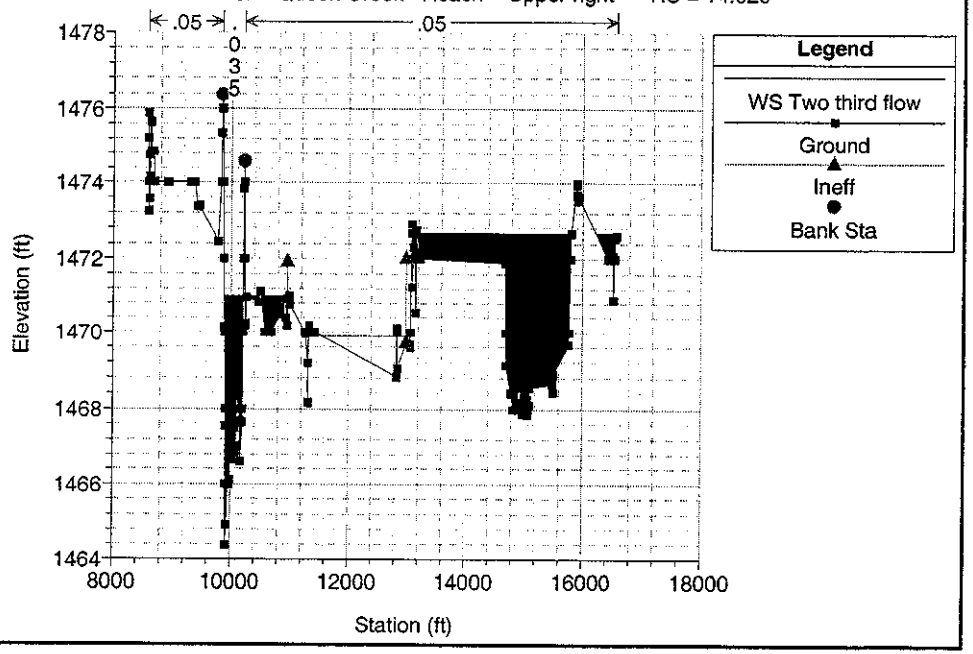

Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right 14.204 RS = 14.207



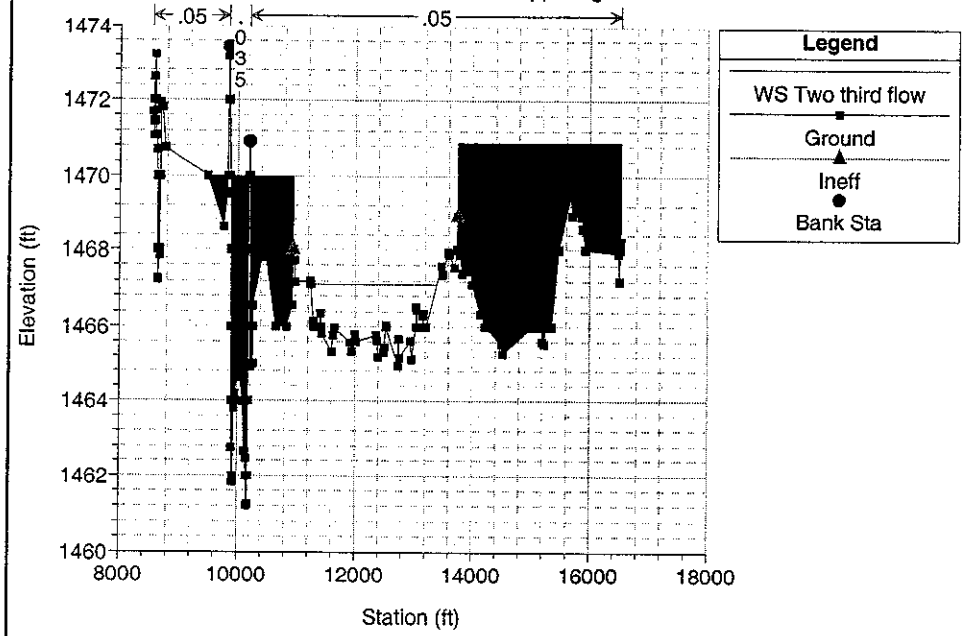

Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 14.029



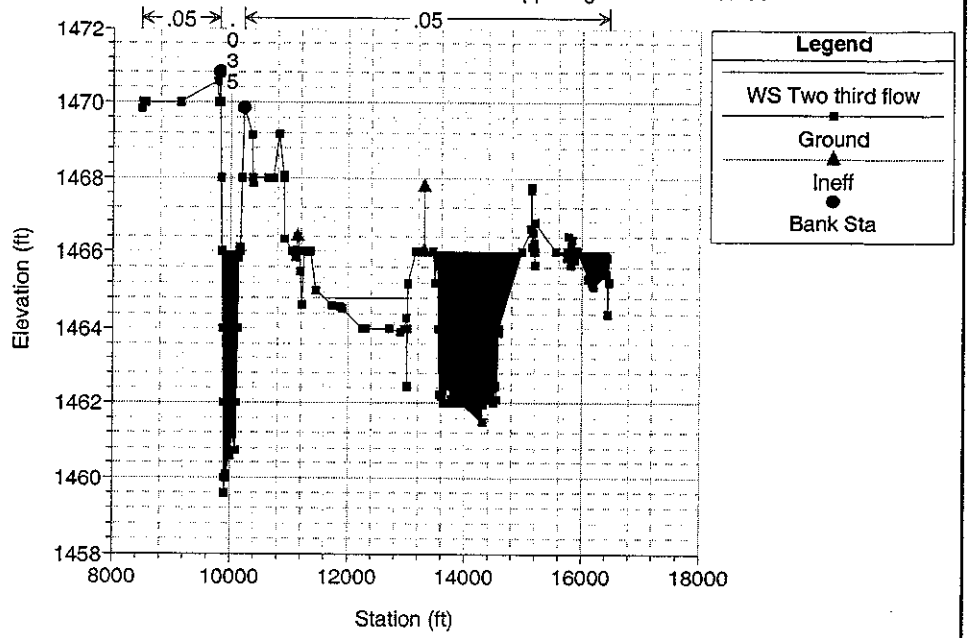
Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 13.870



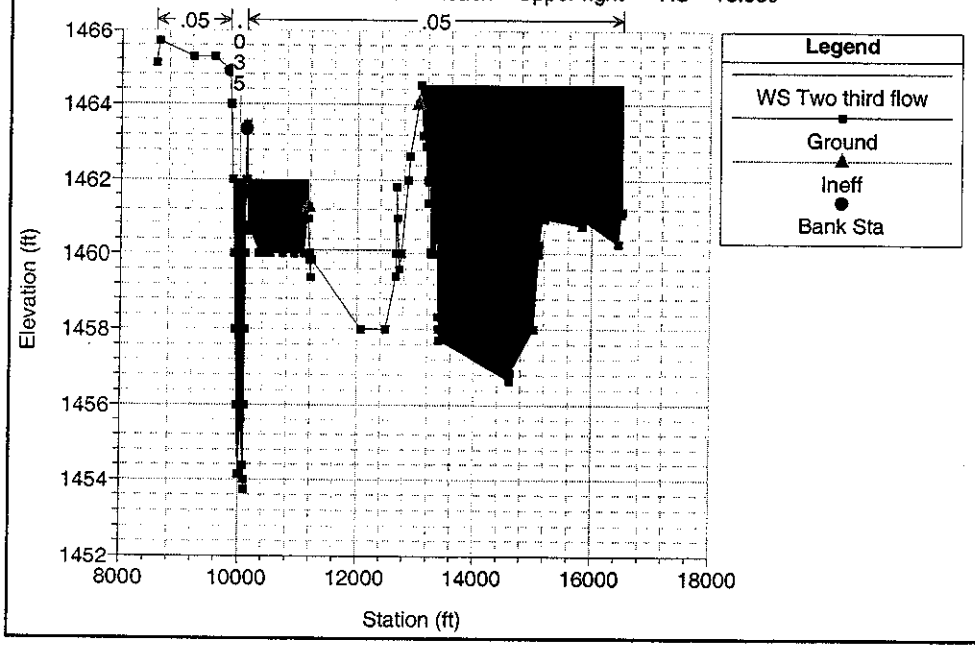

Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 13.736



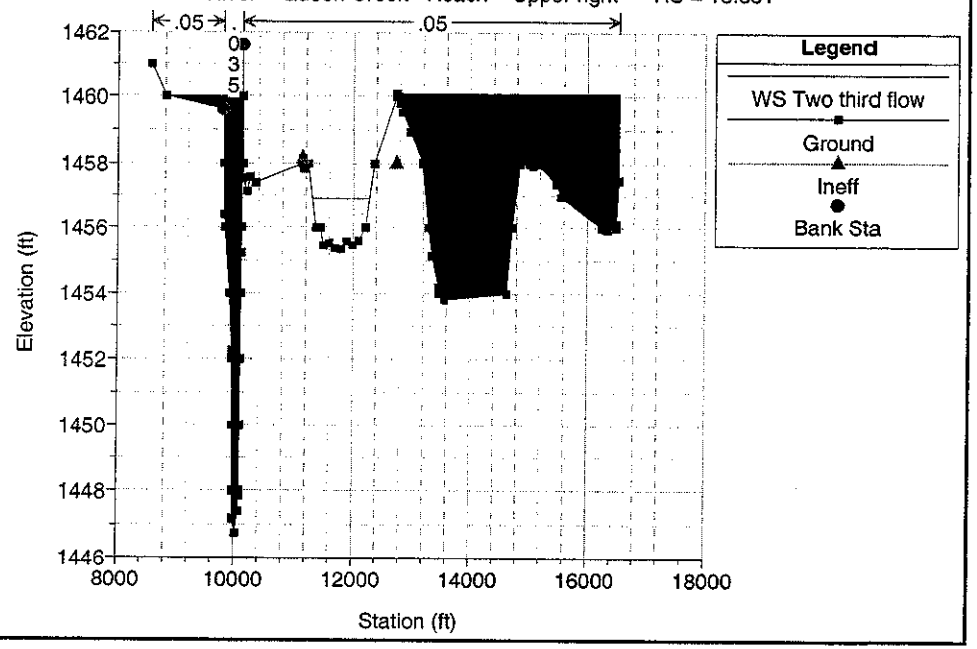

Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 13.539




Rittenhouse FRS Upper Right two third Two third flow Upper right overbank 03/20/2002 3:35:06 PM

River = Queen Creek Reach = Upper right RS = 13.351



## D.5 UPSTREAM RIGHT OVERBANK HEC-RAS MODEL, RHUPR1.PRJ (FOR ONE THRID FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rittenhouse FRS Upper Right one third
Project File : RHupr1.prj
Run Date and Time: 03/20/2002 3:58:58 PM

Project in English units

Project Description:
Spillway Inundation Study for Rittenhouse FRS - One third Spillway Flow Scenario

Upstream right overbank flow area from Vineyard Road to Maricopa County boundary

Model Vertical Datum: 1988 NAVD
Starting Water Surface Elevation, 1455.91.90, was obtained through downstream right over bank HEC-RAS modeling result and plus 1.98 feet .

FCD 98-33

Michael Baker Jr., Inc. 03/2002

**********
This model are adequate for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: One third flow upper right overband
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr1.P01

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr1.G01

Flow Title : One third Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr1.F01

Plan Description:

Two thrid flow scenario downstream right over bank area

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 8 | Mulitple Openings | = | 0 |
| | Culverts | = 0 | Inline Weirs | = | 0 |
| | Bridges | = 0 | | | |

```
Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  40
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow
```

FLOW DATA

Flow Title: One third Flow Profiles
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr1.F01

Flow Data (cfs)

| River | Reach | RS | One third flow |
|---|---|---|---|
| Queen Creek | Upper right | 14.479 | 600 |
| Queen Creek | Upper right | 14.347 | 600 |
| Queen Creek | Upper right | 13.351 | 600 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | Upper right | One third flow | Critical | Known WS = 1455.91 |

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHupr1.G01

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 14.479

INPUT
Description: Vineyard Road downstream
Station Elevation Data num= 89

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8543.14 | 1484.37 | 8652.76 | 1484.37 | 8665.5 | 1486 | 8673.28 | 1486.35 | 8680.99 | 1486.6 |
| 8690.08 | 1486.57 | 8690.3 | 1486 | 8691.05 | 1485.99 | 8705.1 | 1486 | 8716.31 | 1486.18 |
| 8722.77 | 1486.95 | 8730.49 | 1486.79 | 8745.17 | 1486.42 | 8749.97 | 1486.31 | 8763.1 | 1486 |
| 8907.62 | 1485.18 | 8915.33 | 1485.4 | 8920.83 | 1484.48 | 8925.26 | 1485.7 | 8964.59 | 1484.85 |
| 8984.76 | 1484 | 9000.02 | 1484 | 9013.59 | 1484 | 9034.61 | 1484 | 9436.48 | 1484 |
| 9440.92 | 1482 | 9713.03 | 1482 | 9731.02 | 1484 | 9738.36 | 1484 | 9738.84 | 1484 |
| 9774.13 | 1484 | 9852.83 | 1483.51 | 9875.25 | 1483.91 | 9881.51 | 1483.22 | 9889.9 | 1482 |
| 9892.13 | 1480.31 | 9905.06 | 1480 | 9913.59 | 1478.44 | 9955.57 | 1478 | 9958.89 | 1476.17 |
| 9976.93 | 1476 | 10000 | 1475.21 | 10036.5 | 1474.66 | 10056.96 | 1475.17 | 10074.47 | 1474.88 |
| 10090.1 | 1476 | 10125.04 | 1476.86 | 10152.11 | 1477.13 | 10174.48 | 1478 | 10187.08 | 1478.74 |
| 10190.48 | 1479.45 | 10213.21 | 1480 | 10214.91 | 1482 | 10227.79 | 1482 | 10238.02 | 1482 |
| 10246.4 | 1482 | 10251.67 | 1482 | 10255.94 | 1482 | 10274.07 | 1482 | 10315.25 | 1482 |
| 10471.27 | 1481.41 | 10507.05 | 1480.45 | 11013.15 | 1480.94 | 11276.34 | 1480.29 | 11325.2 | 1480.47 |
| 11560.04 | 1480.86 | 12134.9 | 1480 | 12580.36 | 1480 | 12761.72 | 1480.27 | 12805.02 | 1480.84 |
| 13006.37 | 1481.03 | 13137.88 | 1482 | 13183.28 | 1483.63 | 13798.18 | 1483.37 | 13863.82 | 1483.92 |
| 14034.44 | 1484 | 14098.6 | 1484 | 14136.53 | 1484 | 14224.63 | 1484 | 14478.76 | 1484 |
| 14952.6 | 1484 | 15158.25 | 1484 | 15645.54 | 1480 | 15869.87 | 1478 | 16206.67 | 1478 |
| 16291.35 | 1480 | 16438.57 | 1480.88 | 16527.31 | 1482 | 16648.48 | 1482.54 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8543.14 | .05 | 9852.83 | .035 | 10238.02 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9852.83 | 10238.02 | 700 | 695.7 | 700 | .1 | .3 |

Ineffective Flow num= 2

```
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8543.1410238.02    148213863.8216648.48 1483.92
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8543.14   10988 1483.9113243.1416648.48    1484
```

CROSS SECTION OUTPUT  Profile #One third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1480.72 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1480.70 | Reach Len. (ft) | 700.00 | 695.70 | 700.00 |
| Crit W.S. (ft) | 1480.32 | Flow Area (sq ft) | | | 656.40 |
| E.G. Slope (ft/ft) | 0.002500 | Area (sq ft) | | | 656.40 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 1487.55 | Top Width (ft) | | | 1487.55 |
| Vel Total (ft/s) | 0.91 | Avg. Vel. (ft/s) | | | 0.91 |
| Max Chl Dpth (ft) | 0.70 | Hydr. Depth (ft) | | | 0.44 |
| Conv. Total (cfs) | 12001.0 | Conv. (cfs) | | | 12001.0 |
| Length Wtd. (ft) | 700.00 | Wetted Per. (ft) | | | 1487.55 |
| Min Ch El (ft) | 1483.91 | Shear (lb/sq ft) | | | 0.07 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.06 |
| Frctn Loss (ft) | 3.49 | Cum Volume (acre-ft) | | | 73.26 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | | 158.31 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #One third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10879.07 | 11520.11 | 31.49 | 66.97 | 357.27 | 5.25 | 0.19 | 0.47 |
| 11520.11 | 12161.16 | 136.33 | 184.06 | 496.75 | 22.72 | 0.37 | 0.74 |
| 12161.16 | 12802.20 | 432.18 | 405.37 | 633.52 | 72.03 | 0.64 | 1.07 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 14.347

INPUT
Description:
Station Elevation Data  num=  97

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8512.04 | 1483.05 | 8551.76 | 1483.54 | 8557.37 | 1483.53 | 8567.11 | 1483.5 | 8570.97 | 1482.13 |
| 8574.61 | 1482 | 8583.42 | 1481.83 | 8584.15 | 1482 | 8588.5 | 1483.04 | 8594.86 | 1483.28 |
| 8600.43 | 1482.25 | 8625.77 | 1482.52 | 8669.36 | 1482 | 8908.25 | 1480.15 | 9016.41 | 1480 |
| 9278.78 | 1478 | 9468.43 | 1477.47 | 9674.72 | 1478 | 9679.77 | 1478.06 | 9680.24 | 1478 |
| 9694.98 | 1476 | 9696.35 | 1475.8 | 9702.04 | 1474 | 9702.97 | 1473.73 | 9746.14 | 1473.42 |
| 9765.48 | 1474 | 9774 | 1474.31 | 9779.08 | 1476 | 9784.47 | 1478 | 9789.03 | 1479.69 |
| 9796.69 | 1480 | 9797.83 | 1480.08 | 9798.42 | 1480 | 9811.58 | 1478.95 | 9814.08 | 1478 |
| 9819.66 | 1476 | 9823.73 | 1474.56 | 9835.81 | 1474 | 9839.16 | 1473.8 | 9858.46 | 1473.32 |
| 9878.57 | 1472 | 9891.22 | 1471.16 | 9899.1 | 1472 | 9904.13 | 1472.53 | 9914.23 | 1472.7 |
| 9928.27 | 1472.87 | 9942.13 | 1473.13 | 9956.9 | 1472 | 9973.6 | 1470.73 | 9984.1 | 1470.54 |
| 10000 | 1471.03 | 10004.53 | 1472 | 10012 | 1473.81 | 10060.05 | 1474 | 10064.1 | 1474.15 |
| 10068.07 | 147410 | 085.58 | 1473.35 | 10091.13 | 1473.41 | 0100.37 | 147410 | 105.81 | 1474.24 |
| 10108.97 | 147410 | 130.58 | 1473.53 | 10135.37 | 147410 | 143.52 | 1474.88 | 10146.24 | 1476 |
| 10151.1 | 147810 | 156.98 | 148010 | 158.78 | 1480.57 | 10167.05 | 1481.03 | 10172.79 | 1481.14 |
| 10175.56 | 148010 | 180.41 | 147810 | 183.17 | 1476.87 | 10411.15 | 1477.18 | 10442.96 | 1477.51 |
| 10916.18 | 1477.29 | 10946.66 | 147711 | 232.94 | 1476.53 | 11263.26 | 1476.53 | 11266.43 | 1476.56 |
| 12386.92 | 1477.62 | 12517.9 | 147813 | 033.98 | 1479.51 | 3037.58 | 148013 | 041.07 | 1480.48 |
| 13045.61 | 1480.62 | 13050.34 | 148013 | 059.04 | 1478.88 | 13075.76 | 1479.61 | 13465.85 | 1480 |
| 15070.01 | 148015 | 355.22 | 147815 | 512.09 | 147616 | 266.33 | 147616 | 300.25 | 1478 |
| 16342.91 | 148016 | 529.76 | 1480.57 | | | | | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|

```
 8512.04     .05 9797.83    .03510172.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9797.8310172.79              800   740.2     800              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8512.0410442.96    147813041.0716529.76 1480.48
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8512.04   10413    147913912.0416529.76 1478.89

CROSS SECTION OUTPUT    Profile #One third flow

  E.G. Elev (ft)            1477.22   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.05   Wt. n-Val.                                        0.050
  W.S. Elev (ft)            1477.18   Reach Len. (ft)            800.00     740.20    800.00
  Crit W.S. (ft)            1477.03   Flow Area (sq ft)                               340.46
  E.G. Slope (ft/ft)       0.014562   Area (sq ft)                                    340.46
  Q Total (cfs)              600.00   Flow (cfs)                                      600.00
  Top Width (ft)             988.29   Top Width (ft)                                  988.29
  Vel Total (ft/s)             1.76   Avg. Vel. (ft/s)                                  1.76
  Max Chl Dpth (ft)            0.65   Hydr. Depth (ft)                                  0.34
  Conv. Total (cfs)          4972.1   Conv. (cfs)                                     4972.1
  Length Wtd. (ft)           800.00   Wetted Per. (ft)                                988.29
  Min Ch El (ft)            1479.00   Shear (lb/sq ft)                                  0.31
  Alpha                        1.00   Stream Power (lb/ft s)                            0.55
  Frctn Loss (ft)              3.05   Cum Volume (acre-ft)                             65.25
  C & E Loss (ft)              0.01   Cum SA (acres)                                  138.42


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #One third flow

  Left Sta    Right Sta      Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)        (ft)           (cfs)    (sq ft)      (ft)                 (ft)     (ft/s)
  10808.49    11444.18      468.92     234.93     515.92     78.15      0.46       2.00
  11444.18    12079.88      131.08     105.55     472.37     21.85      0.22       1.24


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 14.207

INPUT
Description: 14.204
Station Elevation Data    num=     190
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8575.62 1479.23 8585.14 1479.41 8590.82 1479.68 8600.52 1479.52 8605.42 1478.87
 8617.93  1478.7 8622.54 1479.13 8627.12 1479.01 8631.42    1478 8631.92 1477.87
 8641.44 1477.49 8651.08 1476.71  8701.2    1476 9339.89 1475.32 9346.67  1475.7
 9454.44    1474 9505.63 1473.26  9527.1    1472 9528.62 1471.92 9601.51 1470.79
 9660.96 1471.62 9664.24    1472 9690.78    1474 9694.16 1474.24 9696.74    1474
 9706.49  1473.1 9756.95 1473.21 9771.94 1473.24 9792.39 1473.82 9792.91    1474
 9798.59    1476 9804.27    1478 9809.95    1480 9816.06    1482 9816.23 1482.13
 9816.61    1482 9822.29    1480 9826.18 1478.72  9827.9    1478 9833.04    1476
 9838.18    1474  9840.2 1473.21 9846.05    1472  9856.1 1470.41 9867.62    1470
 9877.31 1469.66    9907 1468.43 9934.14    1470 9940.09 1470.31 9960.85 1471.24
 9984.91 1470.17   10000 1470.68 10019.4    147010038.15 1469.2610051.99 1469.04
10068.16 1468.7910073.75    146810078.18 1467.4210083.26 1467.0110099.29    1468
10107.77 1468.6310116.69    147010130.71    147210137.26 1472.8210150.98 1472.91
10167.27    147410168.28 1474.1710185.52  1475.210188.42    147610194.18    1478
 10195.6  1478.510203.73 1479.1110208.24 1478.6410209.58    1478 10213.7    1476
10217.74    147410218.85 1473.4510227.19    1474 10231.3    147410245.51 1473.85
10299.63    147410357.02    147410448.61 1473.6910468.09    147410480.61 1474.23
10487.54    147410937.55    147410951.31  1474.5 10982.8 1474.4910986.97    1474
10991.97 1473.3411020.86 1473.12 11033.4    147411112.13    147411120.62  1473.4
 11266.2 1473.5111296.64 1472.8811309.84 1472.0611319.13 1473.9311742.89 1473.08
11747.52    1474 11749.8 1474.4911754.46    147411961.23 1473.7711962.33    1474
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11965.68 1474.7411979.12    147412006.57 1473.4812396.17    147412415.67 1474.51
12437.01 1474.6712448.35 1474.7812456.68    147612571.72 1477.1912679.44 1476.89
12877.07    147812917.95    147812944.71 1477.7312960.56 1477.4713043.31 1477.31
13106.94 1477.1313136.32 1477.0613152.15 1476.2813564.73 1477.23 13606.3 1477.67
13618.73 1477.5714256.33 1476.9714265.27    147814270.68 1478.38 14380.6    1478
14392.54 1477.6214396.17    147814406.21 1478.98 14420.5    147814420.91 1477.97
14446.89 1477.8614448.94    147814459.76    147914646.15    1478 14662.1    1478
14696.47 1478.3714699.17    147814704.76 1477.03 14959.1  1477.314965.97    1476
14966.31 1475.9514967.62    1476   14993 1476.5915132.14 1476.9415139.93    1476
15140.94 1475.8915200.49    147615206.77    147615224.55    147615228.76 1476.05
15308.63    147615342.86    147415350.65  1473.815362.46    147415363.77    1474
15420.17    147415559.15 1474.0415559.26    147415564.28    1472 15564.3 1471.99
15565.35    147215638.93    1472 15788.3 1471.7515795.31 1470.8315800.85 1471.81
15846.23    147215896.01    147216115.81    147216164.78    147416183.52 1475.22
16194.11 1475.9416195.68    147616325.23 1477.8516345.62 1477.7116378.58    1478
16439.44    147816461.44 1477.5716470.92 1477.5916472.43    147816475.25 1478.75
16480.11 1478.3516489.64    147816516.23 1477.0216537.77 1477.3616563.67 1477.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8575.62     .05 9816.06    .03510203.73     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9816.0610203.73              950   941.5     980             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62   10950  1474.512877.0716563.67    1478
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8575.62   10950  1474.412877.0716563.67    1476

CROSS SECTION OUTPUT    Profile #One third flow

  E.G. Elev (ft)            1474.16   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.01   Wt. n-Val.                                        0.050
  W.S. Elev (ft)            1474.15   Reach Len. (ft)            950.00     941.50     980.00
  Crit W.S. (ft)            1473.68   Flow Area (sq ft)                                 721.77
  E.G. Slope (ft/ft)       0.001722   Area (sq ft)                                      721.77
  Q Total (cfs)              600.00   Flow (cfs)                                        600.00
  Top Width (ft)            1398.22   Top Width (ft)                                   1398.22
  Vel Total (ft/s)             0.83   Avg. Vel. (ft/s)                                    0.83
  Max Chl Dpth (ft)            2.09   Hydr. Depth (ft)                                    0.52
  Conv. Total (cfs)         14459.3   Conv. (cfs)                                      14459.3
  Length Wtd. (ft)           980.00   Wetted Per. (ft)                                 1398.71
  Min Ch El (ft)            1474.40   Shear (lb/sq ft)                                    0.06
  Alpha                        1.00   Stream Power (lb/ft s)                              0.05
  Frctn Loss (ft)              4.65   Cum Volume (acre-ft)                               55.49
  C & E Loss (ft)              0.01   Cum SA (acres)                                    116.50


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT    Profile #One third flow

  Left Sta    Right Sta       Flow       Area       W.P.     % Conv.    Hydr D.   Velocity
  (ft)        (ft)            (cfs)    (sq ft)      (ft)                (ft)      (ft/s)
  10839.72    11475.72      238.07     275.50     490.37      39.68      0.56       0.86
  11475.72    12111.71      301.82     348.45     618.05      50.30      0.56       0.87
  12111.71    12747.71       60.11      97.81     290.29      10.02      0.34       0.61


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 14.029

INPUT
Description:
```

Station Elevation Data num= 160

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8587.49 | 1475.2 | 8590.54 | 1475.88 | 8594.14 | 1474 | 8595.58 | 1473.23 | 8604.14 | 1473.56 |
| 8604.95 | 1474 | 8606.26 | 1474.75 | 8617.28 | 1474.16 | 8624.98 | 1475.67 | 8631.8 | 1475.62 |
| 8638.61 | 1474.85 | 8677.79 | 1474.84 | 8696.31 | 1474 | 8911.08 | 1474 | 8931.28 | 1474 |
| 9303.05 | 1474 | 9373.89 | 1474 | 9424.57 | 1473.35 | 9454.99 | 1473.38 | 9777.75 | 1472.45 |
| 9824.93 | 1474 | 9833.94 | 1475.35 | 9841.01 | 1476 | 9845.46 | 1476.37 | 9848.92 | 1476 |
| 9865.32 | 1474 | 9877.19 | 1472 | 9888.19 | 1470.15 | 9889.55 | 1470 | 9906.47 | 1468 |
| 9909.46 | 1467.55 | 9912.91 | 1466 | 9915.73 | 1464.38 | 9934.58 | 1464.92 | 9959.9 | 1466 |
| 9963.85 | 1466 | 9964.53 | 1465.99 | 9972.43 | 1466 | 9983.75 | 1466.1 | 110000.01 | 1467.25 |
| 10015.56 | 1466.6 | 10070.52 | 1467.5 | 10079.68 | 1466.85 | 10094.95 | 1467.03 | 10099.68 | 1468 |
| 10101.8 | 1468.45 | 10135.63 | 146810 | 158.56 | 1467.69 | 10166.69 | 1466.61 | 10195.18 | 1467.65 |
| 10196.09 | 146810 | 201.28 | 147010 | 206.76 | 147210 | 210.82 | 1473.83 | 10213.26 | 1474 |
| 10221.65 | 1474.59 | 10224.14 | 147410 | 232.49 | 147210 | 239.17 | 1470.23 | 10245.73 | 1470.18 |
| 10260.45 | 1470.96 | 10464.67 | 1470.83 | 10496.85 | 1471.12 | 10573.64 | 147010 | 587.14 | 1470 |
| 10680.59 | 147010 | 695.38 | 1470 | 10838.6 | 1470.48 | 10931.58 | 1470.39 | 10955.35 | 1470.18 |
| 10963.02 | 1470.92 | 10994.52 | 147111 | 001.21 | 1470.76 | 11260.8 | 147011 | 273.76 | 1469.95 |
| 11307.03 | 1469.18 | 11317.2 | 1468.17 | 11328.64 | 1470 | 11329.8 | 1470.18 | 11430.38 | 1470 |
| 12832 | 1468.82 | 12837.99 | 1470 | 12838.5 | 1470.11 | 12839.27 | 147012 | 846.01 | 1469.03 |
| 13049.39 | 147013 | 049.54 | 147013 | 049.63 | 147013 | 056.96 | 1469.67 | 13068.09 | 1469.59 |
| 13069.66 | 147013 | 077.39 | 147213 | 079.96 | 1472.67 | 13084.69 | 1472.91 | 13091.84 | 1472 |
| 13098.12 | 1471.25 | 13108.55 | 147213 | 113.79 | 1472.31 | 13144.06 | 1472.19 | 13145.37 | 1472 |
| 13156.3 | 1470.54 | 13166.5 | 147213 | 171.66 | 1472.74 | 13234.41 | 147214 | 678.19 | 1471.89 |
| 14693.72 | 147014 | 701.91 | 1469.12 | 14785.21 | 1468.41 | 14791.44 | 1468.42 | 14820.48 | 1468 |
| 14912.62 | 146814 | 915.94 | 1468.01 | 14921.99 | 1469.06 | 14928.62 | 1468.78 | 14937.26 | 1468.55 |
| 14945.44 | 1469.02 | 14954.66 | 1468.61 | 14962.5 | 1468.73 | 14971.48 | 146814 | 980.36 | 1467.87 |
| 14981.55 | 146814 | 983.24 | 1468.18 | 15000.34 | 1468.02 | 15000.44 | 1468.01 | 15016.13 | 1468.36 |
| 15024.55 | 1468.37 | 15045.38 | 146815 | 054.34 | 1467.92 | 15055.37 | 146815 | 058.64 | 1468.25 |
| 15063.39 | 146815 | 065.88 | 1467.85 | 15085.27 | 146815 | 096.71 | 1468.11 | 15102.2 | 1469.22 |
| 15106.71 | 1468.55 | 15484.42 | 1468.64 | 15490.43 | 1469.57 | 15500.08 | 1468.43 | 15506.45 | 1469.46 |
| 15513.31 | 1468.87 | 15771.54 | 1469.67 | 15775.29 | 147015 | 799.23 | 147215 | 806.92 | 1472.66 |
| 15896.17 | 1473.93 | 15901.38 | 1473.99 | 15904.17 | 1473.69 | 15912.86 | 1473.51 | 15926.88 | 1473.62 |
| 16430.09 | 147216 | 462.96 | 147216 | 474.74 | 1472 | 16506.1 | 147216 | 516.58 | 1472.09 |
| 16517.17 | 147216 | 525.47 | 1470.91 | 6542.87 | 147216 | 547.52 | 1472.55 | 16573.13 | 1472.6 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8587.49 | .05 | 9845.46 | .03 | 10221.65 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9845.46 | 10221.65 | 840 | 838.6 | 840 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8587.49 | 10963.02 | 1471.92 | 12987.49 | 16573.13 | 1472 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8587.49 | 10900 | 1471 | 13079.96 | 16573.13 | 1472.67 |

CROSS SECTION OUTPUT Profile #One third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1469.50 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.13 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1469.37 | Reach Len. (ft) | 840.00 | 838.60 | 840.00 |
| Crit W.S. (ft) | 1469.37 | Flow Area (sq ft) | | | 204.39 |
| E.G. Slope (ft/ft) | 0.053665 | Area (sq ft) | | | 204.39 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 753.86 | Top Width (ft) | | | 753.86 |
| Vel Total (ft/s) | 2.94 | Avg. Vel. (ft/s) | | | 2.94 |
| Max Chl Dpth (ft) | 1.20 | Hydr. Depth (ft) | | | 0.27 |
| Conv. Total (cfs) | 2590.0 | Conv. (cfs) | | | 2590.0 |
| Length Wtd. (ft) | 840.00 | Wetted Per. (ft) | | | 754.09 |
| Min Ch El (ft) | 1471.00 | Shear (lb/sq ft) | | | 0.91 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 2.67 |
| Frctn Loss (ft) | 2.14 | Cum Volume (acre-ft) | | | 45.07 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | | | 92.30 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates

that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #One third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10856.80 | 11491.95 | 49.51 | 12.32 | 25.97 | 8.25 | 0.48 | 4.02 |
| 11491.95 | 12127.09 | | | | | | |
| 12127.09 | 12762.24 | 369.27 | 142.65 | 582.12 | 61.55 | 0.25 | 2.59 |
| 12762.24 | 13397.39 | 181.21 | 49.43 | 146.00 | 30.20 | 0.34 | 3.67 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.870

INPUT
Description:
Station Elevation Data num= 163

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8558.7 | 1471.68 | 8571.76 | 1471.44 | 8573.67 | 1472 | 8575.99 | 1472.61 | 8577.28 | 1472 |
| 8579.01 | 1471.07 | 8590.26 | 1471.45 | 8591.83 | 1472 | 8595.02 | 1473.23 | 8606.55 | 1472 |
| 8608.85 | 1471.71 | 8617.39 | 1471.08 | 8631.88 | 1471.09 | 8634.45 | 1470.71 | 8636.59 | 1470 |
| 8642.64 | 1468 | 8644.85 | 1467.24 | 8680.57 | 1467.86 | 8680.97 | 1468 | 8686.6 | 1470 |
| 8692.31 | 1471.94 | 8718.13 | 1471.8 | 8767.21 | 1470.76 | 9486.09 | 1470 | 9768.58 | 1468.6 |
| 9825.53 | 1469.58 | 9827.26 | 1470 | 9835.39 | 1472 | 9839.75 | 1473.17 | 9848.47 | 1473.43 |
| 9859.98 | 1472 | 9876.08 | 1470 | 9881.01 | 1469.49 | 9884.99 | 1468 | 9890.34 | 1466 |
| 9896.01 | 1464 | 9899.55 | 1462.75 | 9917.23 | 1462 | 9920.88 | 1461.84 | 9922.47 | 1462 |
| 9942.02 | 1463.81 | 9949.74 | 1464 | 9959.11 | 1464.2 | 10000 | 1464.6 | 10036.97 | 1464.72 |
| 10096.33 | 1464 | 10099.58 | 1463.9 | 10115.36 | 1462.65 | 10133.75 | 1462.63 | 10147.15 | 1462.45 |
| 10152.8 | 1462 | 10162.52 | 1461.21 | 10181.69 | 1461.25 | 10182.54 | 1462 | 10184.83 | 1464 |
| 10187.11 | 1466 | 10189.4 | 1468 | 10191.59 | 1469.91 | 10192.64 | 1470 | 10201.97 | 1470.91 |
| 10205.61 | 1470 | 10213.5 | 1468 | 10219.96 | 1466 | 10223.51 | 1464.91 | 10260.97 | 1465 |
| 10263.88 | 1466 | 10265.28 | 1466.55 | 10447 | 1468 | 10448.27 | 1468.07 | 10448.6 | 1468 |
| 10448.81 | 1468 | 10457.14 | 1468 | 10480.49 | 1467.81 | 10647.25 | 1466 | 10827.4 | 1466 |
| 10932.69 | 1466.57 | 10943.05 | 1468 | 10943.08 | 1468 | 10943.92 | 1468 | 10974.32 | 1467.73 |
| 10984.41 | 1467.17 | 11233.43 | 1467.19 | 11246.66 | 1467.11 | 11287.76 | 1466.15 | 11291.85 | 1466 |
| 11404.84 | 1466 | 11408.29 | 1466.35 | 11423.02 | 1466 | 11429.86 | 1465.82 | 11601.27 | 1465.32 |
| 11625.55 | 1465.77 | 11650.35 | 1465.96 | 11922.62 | 1465.58 | 11940.87 | 1465.34 | 11998.55 | 1465.8 |
| 12015.79 | 1465.59 | 12363.6 | 1465.78 | 12378.11 | 1465.62 | 12393.99 | 1465.18 | 12488.67 | 1465.31 |
| 12505.6 | 1465.45 | 12526.61 | 1466 | 12528.18 | 1466.04 | 12529.44 | 1466 | 12734.61 | 1464.95 |
| 12744.02 | 1465.67 | 12760.48 | 1465.16 | 12950.28 | 1465.62 | 12967.34 | 1465.12 | 13041.26 | 1466 |
| 13042.99 | 1466.53 | 13051.85 | 1466.44 | 13063.8 | 1466 | 13158.56 | 1466 | 13160.11 | 1466.29 |
| 13172.36 | 1466.36 | 13177.63 | 1466 | 13183.18 | 1466 | 13214.17 | 1466 | 13218.17 | 1466 |
| 13476.33 | 1467.58 | 13498.82 | 1467.36 | 13590.82 | 1467.93 | 13609.49 | 1467.89 | 13702.3 | 1467.54 |
| 13739.61 | 1468 | 13746.41 | 1468.89 | 13761.69 | 1468 | 13791.53 | 1467.87 | 13836.35 | 1467.39 |
| 13980.61 | 1467.45 | 13998.32 | 1467.11 | 14138.38 | 1466.34 | 14159.75 | 1466.34 | 14215.55 | 1466 |
| 14223.11 | 1466 | 14232.82 | 1466 | 14507.56 | 1465.52 | 14528.76 | 1465.27 | 15023.3 | 1466 |
| 15097.31 | 1466 | 15121.32 | 1466 | 15188.78 | 1466 | 15195.21 | 1465.59 | 15228.09 | 1465.53 |
| 15249.57 | 1466 | 15260.92 | 1466 | 15266.46 | 1466 | 15272.58 | 1466.22 | 15297.52 | 1466 |
| 15357 | 1466 | 15480.84 | 1468 | 15675.12 | 1469.46 | 15705.14 | 1468.91 | 15865.23 | 1468.89 |
| 15869.18 | 1469.13 | 15873.32 | 1469.23 | 15880.2 | 1468.56 | 15930.01 | 1468 | 16488.32 | 1467.91 |
| 16505.4 | 1467.19 | 16523.86 | 1468 | 16526.19 | 1468.23 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8558.7 | .05 | 9848.47 | .035 | 10201.97 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9848.47 | 10201.97 | 720 | 706.24 | 720 | .1 | .3 |

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.710943.92    146813746.4116526.19 1468.89
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  8558.7   10943    147013746.4116526.19 1470.89
```

CROSS SECTION OUTPUT  Profile #One third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1466.19 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1466.18 | Reach Len. (ft) | 720.00 | 706.24 | 720.00 |
| Crit W.S. (ft) | 1465.66 | Flow Area (sq ft) | | | 1028.24 |
| E.G. Slope (ft/ft) | 0.000802 | Area (sq ft) | | | 1028.24 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 1920.10 | Top Width (ft) | | | 1920.10 |
| Vel Total (ft/s) | 0.58 | Avg. Vel. (ft/s) | | | 0.58 |
| Max Chl Dpth (ft) | 1.23 | Hydr. Depth (ft) | | | 0.54 |
| Conv. Total (cfs) | 21191.2 | Conv. (cfs) | | | 21191.2 |
| Length Wtd. (ft) | 720.00 | Wetted Per. (ft) | | | 1920.24 |
| Min Ch El (ft) | 1470.00 | Shear (lb/sq ft) | | | 0.03 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.02 |
| Frctn Loss (ft) | 1.82 | Cum Volume (acre-ft) | | | 33.19 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | | 66.51 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #One third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10834.39 | 11466.81 | 12.36 | 38.97 | 171.63 | 2.06 | 0.23 | 0.32 |
| 11466.81 | 12099.24 | 181.20 | 328.89 | 632.43 | 30.20 | 0.52 | 0.55 |
| 12099.24 | 12731.66 | 249.02 | 398.02 | 632.44 | 41.50 | 0.63 | 0.63 |
| 12731.66 | 13364.08 | 157.42 | 262.35 | 483.74 | 26.24 | 0.54 | 0.60 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: Upper right  RS: 13.736

INPUT
Description:
Station Elevation Data  num=  128

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 8481.19 1469.83 8503.13    1470 8543.72    1470 9145.76    1470 9778.58 1470.56
 9784.88    1470 9798.95    1470 9813.84  1470.8 9821.38    1470 9837.65    1468
 9853.57    1466  9869.5    1464 9885.43    1462 9901.21    1460 9904.44 1459.59
 9925.69    1460 9928.96  1460.1   10000 1460.5810040.53 1461.1510091.19 1460.73
10104.56    1462 10125.6    146410138.13 1465.83   10154    1466 10158.4 1466.11
10158.71    146610170.29    146610192.75    146810223.65 1469.8510224.07 1469.85
10359.17 1469.1510373.72    146810375.61 1467.8710376.44    146810635.06    1468
10655.14    146810718.74    146810727.79    146810824.62 1469.1710901.49 1468.07
 10904.2    146810919.56 1466.3311048.21    146611104.62 1465.8611111.04    1466
11113.09 1466.0211143.12 1466.3911181.28    146611185.02 1465.4811214.14 1464.63
11253.53    146611364.16    146611452.87    146511731.55 1464.61 11859.4 1464.58
11896.31 1464.5412247.25    146412305.81    146412707.28    146412894.94 1463.91
12963.59    146412994.98 1464.2912997.71    146413009.41 1462.4413015.37    1464
13020.53 1465.1713162.61    1466   13247    146613249.48    146613453.56    1466
13485.66  1465.213530.12 1465.7913544.84    1464 13566.9 1462.23 13595.7 1462.18
13637.87    146213672.28    146213695.45 1462.59 13723.4 1462.4613768.28 1462.13
13788.13    146213821.72    146213823.08    146213833.06    146213908.56    1462
 14302.5  1461.514308.88 1461.9514486.63    146214527.71 1462.4514540.54 1462.09
14575.78 1463.8914578.36    146414974.42    146615122.02 1466.6115129.88 1467.67
 15134.8 1467.77 15143.5 1466.1315155.83 1466.51 15178.8 1466.2415183.59    1466
15190.08 1465.6615192.42    146615196.83 1466.7815552.58    146615742.53 1465.86
```

```
 15748.5    146615767.13 1466.4115783.35    146615785.89 1465.9215806.62 1465.65
15811.06    146615812.83 1466.1615816.19 1466.1215832.18 1466.3115839.03    1466
15873.69  1465.815900.28    146615902.37 1466.0215924.22    146616100.16  1465.3
16122.37 1465.33 16160.5 1465.2316176.98 1465.1616194.33 1465.11   16424  1465.4
16431.35 1465.8516447.86 1464.3916469.93 1465.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 8481.19     .05 9813.84    .03510223.65     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9813.8410223.65             1080  1040.5    1050             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.1911143.12 1466.39   1330016469.93 1467.77
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
 8481.19   11143    146613162.6116469.93    1466

CROSS SECTION OUTPUT    Profile #One third flow

  E.G. Elev (ft)            1464.35   Element                    Left OB    Channel   Right OB
  Vel Head (ft)                0.12   Wt. n-Val.                                          0.050
  W.S. Elev (ft)            1464.23   Reach Len. (ft)            1080.00    1040.50   1050.00
  Crit W.S. (ft)            1464.23   Flow Area (sq ft)                                  214.08
  E.G. Slope (ft/ft)       0.052837   Area (sq ft)                                       214.08
  Q Total (cfs)             600.00    Flow (cfs)                                         600.00
  Top Width (ft)            911.14    Top Width (ft)                                     911.14
  Vel Total (ft/s)            2.80    Avg. Vel. (ft/s)                                     2.80
  Max Chl Dpth (ft)           1.79    Hydr. Depth (ft)                                     0.23
  Conv. Total (cfs)         2610.3    Conv. (cfs)                                        2610.3
  Length Wtd. (ft)         1050.00    Wetted Per. (ft)                                   911.49
  Min Ch El (ft)           1466.00    Shear (lb/sq ft)                                     0.77
  Alpha                       1.00    Stream Power (lb/ft s)                               2.17
  Frctn Loss (ft)             3.83    Cum Volume (acre-ft)                                22.92
  C & E Loss (ft)             0.03    Cum SA (acres)                                      43.11


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

FLOW DISTRIBUTION OUTPUT    Profile #One third flow

  Left Sta    Right Sta      Flow       Area       W.P.    % Conv.    Hydr D.   Velocity
  (ft)        (ft)           (cfs)    (sq ft)      (ft)                (ft)     (ft/s)
  12097.53    12722.16      294.81     126.15     624.05     49.14      0.20      2.34
  12722.16    13346.79      305.19      87.92     287.44     50.86      0.31      3.47


Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         water surface was used.

CROSS SECTION          RIVER: Queen Creek
REACH: Upper right        RS: 13.539
```

INPUT
Description:
Station Elevation Data num= 88

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8582.12 | 1465.1 | 8632.38 | 1465.71 | 9205.41 | 1465.27 | 9572.19 | 1465.27 | 9838.78 | 1464.88 |
| 9853.96 | 1464 | 9884.33 | 1462 | 9913.39 | 1460 | 9941.91 | 1458 | 9970.43 | 1456 |
| 9996.96 | 1454.14 | 10044.91 | 1455.64 | 10075.25 | 1454.37 | 10087 | 1454 | 10095.34 | 1453.74 |
| 10095.83 | 1454 | 10099.56 | 1456 | 10103.29 | 1458 | 10107.08 | 1460 | 10110.25 | 1461.75 |
| 10111.31 | 1462 | 10116.88 | 1463.35 | 10127.3 | 1463.45 | 10134.02 | 1462 | 10135.91 | 1461.56 |
| 10148.94 | 1460.59 | 10158.23 | 1460.74 | 10333.22 | 1460 | 10477.28 | 1460 | 10517.48 | 1460 |
| 10732.29 | 1460 | 10926.8 | 1460 | 11097.79 | 1460 | 11165.21 | 1461.26 | 11170.3 | 1460.93 |
| 11187.66 | 1460 | 11190.31 | 1459.84 | 11207.48 | 1459.37 | 11225.98 | 1459.85 | 12068.22 | 1458 |
| 12486.32 | 1458 | 12662.53 | 1459.4 | 12665.49 | 1460 | 12674.29 | 1461.81 | 12688.4 | 1460.96 |
| 12710.71 | 1460 | 12719.8 | 1459.6 | 12758.01 | 1460 | 12869.74 | 1462 | 12894.35 | 1462.65 |
| 13042.11 | 1464 | 13075.37 | 1464.51 | 13091.44 | 1464 | 13113.7 | 1463.19 | 13167.97 | 1462.89 |
| 13200 | 1462 | 13206.91 | 1463.56 | 13211.7 | 1462 | 13213.66 | 1461.36 | 13225.95 | 1461.95 |
| 13226.83 | 1462 | 13236.08 | 1462.49 | 13241.02 | 1462.23 | 13246.36 | 1462.15 | 13246.89 | 1462 |
| 13253.78 | 1460.05 | 13260.76 | 1460 | 13338.66 | 1460 | 13368.39 | 1460.5 | 13370.94 | 1460 |
| 13380.11 | 1458.33 | 13390.45 | 1458 | 13399.21 | 1457.71 | 14603.73 | 1456.65 | 14617.99 | 1456.85 |
| 15016.3 | 1458 | 15096.52 | 1460 | 15104.47 | 1460.24 | 15185.18 | 1461.17 | 15202.82 | 1460.92 |
| 15830.72 | 1460.73 | 15833.76 | 1461.62 | 15838.17 | 1461.37 | 15842.8 | 1460.9 | 16450.11 | 1460.26 |
| 16450.33 | 1460.26 | 16493.42 | 1461.05 | 16518.44 | 1461.13 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8582.12 | .05 | 9838.78 | .035 | 10116.88 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9838.78 | 10116.88 | 1000 | 993.9 | 1000 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8582.12 | 11165.21 | 1461.26 | 13042.11 | 16518.44 | 1464 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8582.12 | 11165 | 1462 | 13075.37 | 16518.44 | 1464.51 |

CROSS SECTION OUTPUT Profile #One third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1459.03 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1459.02 | Reach Len. (ft) | 1000.00 | 993.90 | 1000.00 |
| Crit W.S. (ft) | 1458.36 | Flow Area (sq ft) | | | 723.86 |
| E.G. Slope (ft/ft) | 0.001210 | Area (sq ft) | | | 723.86 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 1008.03 | Top Width (ft) | | | 1008.03 |
| Vel Total (ft/s) | 0.83 | Avg. Vel. (ft/s) | | | 0.83 |
| Max Chl Dpth (ft) | 1.02 | Hydr. Depth (ft) | | | 0.72 |
| Conv. Total (cfs) | 17250.3 | Conv. (cfs) | | | 17250.3 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | | 1008.04 |
| Min Ch El (ft) | 1462.00 | Shear (lb/sq ft) | | | 0.05 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.04 |
| Frctn Loss (ft) | 3.04 | Cum Volume (acre-ft) | | | 11.62 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | | 19.98 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #One third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11397.19 | 12037.35 | 122.33 | 204.27 | 431.29 | 20.39 | 0.47 | 0.60 |
| 12037.35 | 12677.50 | 477.67 | 519.57 | 576.74 | 79.61 | 0.90 | 0.92 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: Upper right RS: 13.351

INPUT
Description:
Station Elevation Data num= 82

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8565.62 | 1461 | 8819.25 | 1460 | 9792.1 | 1459.62 | 9800.19 | 1458 | 9808.23 | 1456.4 |
| 9823.11 | 1456 | 9903.55 | 1454 | 9951.28 | 1452.17 | 9952.07 | 1452.26 | 9953.52 | 1452 |
| 9964.87 | 1450 | 9974.53 | 1448 | 9977.77 | 1447.17 | 10021.99 | 1446.75 | 10074.33 | 1447.39 |
| 10083.44 | 1447.86 | 10083.8 | 1448 | 10088.78 | 1450 | 10094.1 | 1452 | 10100.11 | 1454 |
| 10103.79 | 1455.23 | 10105.52 | 1456 | 10110 | 1458 | 10114.27 | 1460 | 10117.72 | 1461.61 |
| 10120.9 | 1460 | 10125.19 | 1458 | 10126.18 | 1457.54 | 10197.35 | 1457.14 | 10247.37 | 1457.59 |
| 10337.82 | 1457.41 | 11127.31 | 1458 | 11141.06 | 1458.15 | 11152.59 | 1458 | 11164.73 | 1457.84 |
| 11167.42 | 1458 | 11231.27 | 1458 | 11368.33 | 1456 | 11396.54 | 1456 | 11446.84 | 1456 |
| 11495.62 | 1455.45 | 11595.62 | 1455.53 | 11695.62 | 1455.37 | 11795.62 | 1455.34 | 11895.62 | 1455.58 |
| 11995.62 | 1455.47 | 12095.62 | 1455.6 | 12214.56 | 1456 | 12363.74 | 1458 | 12740.45 | 1460 |
| 12743.83 | 1460.08 | 12750.17 | 1460 | 12778.31 | 1460 | 12778.34 | 1460 | 12796.04 | 1459.8 |
| 12838.75 | 1459.53 | 12972.48 | 1458.94 | 12973.4 | 1458.94 | 13185.11 | 1458.03 | 13186.21 | 1458 |
| 13286.73 | 1456 | 13348.99 | 1455.14 | 13458.7 | 1454.19 | 13468.18 | 1454 | 13561.98 | 1453.81 |
| 14627.57 | 1454 | 14720.48 | 1456 | 14855.64 | 1458 | 15012.24 | 1458 | 15061.71 | 1458 |
| 15062.81 | 1458 | 15070.78 | 1457.95 | 15077.09 | 1458 | 15134.73 | 1458 | 15471.76 | 1457.38 |
| 15550.97 | 1456.97 | 16237.47 | 1456 | 16310.61 | 1455.96 | 16348.77 | 1455.94 | 16497.94 | 1456 |
| 16502.69 | 1456.12 | 16550.67 | 1457.49 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8565.62 | .05 | 9792.1 | .035 | 10117.72 | .05 |

Bank Sta: Left Right Coeff Contr. Expan.
9792.1 10117.72 .1 .3

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8565.62 | 11141.06 | 1458.15 | 12740.41 | 6550.67 | 1458 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8565.62 | 10117 | 1460 | 12743.83 | 16550.67 | 1460.08 |

CROSS SECTION OUTPUT Profile #One third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1455.98 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1455.91 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1455.78 | Flow Area (sq ft) | | | 288.21 |
| E.G. Slope (ft/ft) | 0.017035 | Area (sq ft) | | | 288.21 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 732.99 | Top Width (ft) | | | 732.99 |
| Vel Total (ft/s) | 2.08 | Avg. Vel. (ft/s) | | | 2.08 |
| Max Chl Dpth (ft) | 0.57 | Hydr. Depth (ft) | | | 0.39 |
| Conv. Total (cfs) | 4597.0 | Conv. (cfs) | | | 4597.0 |
| Length Wtd. (ft) | | Wetted Per. (ft) | | | 732.99 |
| Min Ch El (ft) | 1460.00 | Shear (lb/sq ft) | | | 0.42 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.87 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

FLOW DISTRIBUTION OUTPUT Profile #One third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11404.31 | 12047.60 | 557.93 | 257.53 | 592.79 | 92.99 | 0.43 | 2.17 |
| 12047.60 | 12690.90 | 42.07 | 30.68 | 140.21 | 7.01 | 0.22 | 1.37 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| Upper right | 14.479 | .05 | .035 | .05 |
| Upper right | 14.347 | .05 | .035 | .05 |
| Upper right | 14.207 | .05 | .035 | .05 |
| Upper right | 14.029 | .05 | .035 | .05 |
| Upper right | 13.870 | .05 | .035 | .05 |

| | | | | |
|---|---|---|---|---|
| Upper right | 13.736 | .05 | .035 | .05 |
| Upper right | 13.539 | .05 | .035 | .05 |
| Upper right | 13.351 | .05 | .035 | .05 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Upper right | 14.479 | 700 | 695.7 | 700 |
| Upper right | 14.347 | 800 | 740.2 | 800 |
| Upper right | 14.207 | 950 | 941.5 | 980 |
| Upper right | 14.029 | 840 | 838.6 | 840 |
| Upper right | 13.870 | 720 | 706.24 | 720 |
| Upper right | 13.736 | 1080 | 1040.5 | 1050 |
| Upper right | 13.539 | 1000 | 993.9 | 1000 |
| Upper right | 13.351 | | | |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| Upper right | 14.479 | .1 | .3 |
| Upper right | 14.347 | .1 | .3 |
| Upper right | 14.207 | .1 | .3 |
| Upper right | 14.029 | .1 | .3 |
| Upper right | 13.870 | .1 | .3 |
| Upper right | 13.736 | .1 | .3 |
| Upper right | 13.539 | .1 | .3 |
| Upper right | 13.351 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 600.00 | 1483.91 | 1480.70 | 1480.32 | 1480.72 | 0.002500 | | 656.40 | 1487.55 | 0.00 |
| Upper right | 14.347 | 600.00 | 1479.00 | 1477.18 | 1477.03 | 1477.22 | 0.014562 | | 340.46 | 988.29 | 0.00 |
| Upper right | 14.207 | 600.00 | 1474.40 | 1474.15 | 1473.68 | 1474.16 | 0.001722 | | 721.77 | 1398.22 | 0.00 |
| Upper right | 14.029 | 600.00 | 1471.00 | 1469.37 | 1469.37 | 1469.50 | 0.053665 | | 204.39 | 753.86 | 0.00 |
| Upper right | 13.870 | 600.00 | 1470.00 | 1466.18 | 1465.66 | 1466.19 | 0.000802 | | 1028.24 | 1920.10 | 0.00 |
| Upper right | 13.736 | 600.00 | 1466.00 | 1464.23 | 1464.23 | 1464.35 | 0.052837 | | 214.08 | 911.14 | 0.00 |
| Upper right | 13.539 | 600.00 | 1462.00 | 1459.02 | 1458.36 | 1459.03 | 0.001210 | | 723.86 | 1008.03 | 0.00 |
| Upper right | 13.351 | 600.00 | 1460.00 | 1455.91 | 1455.78 | 1455.98 | 0.017035 | | 288.21 | 732.99 | 0.00 |

Profile Output Table - Standard Table 2

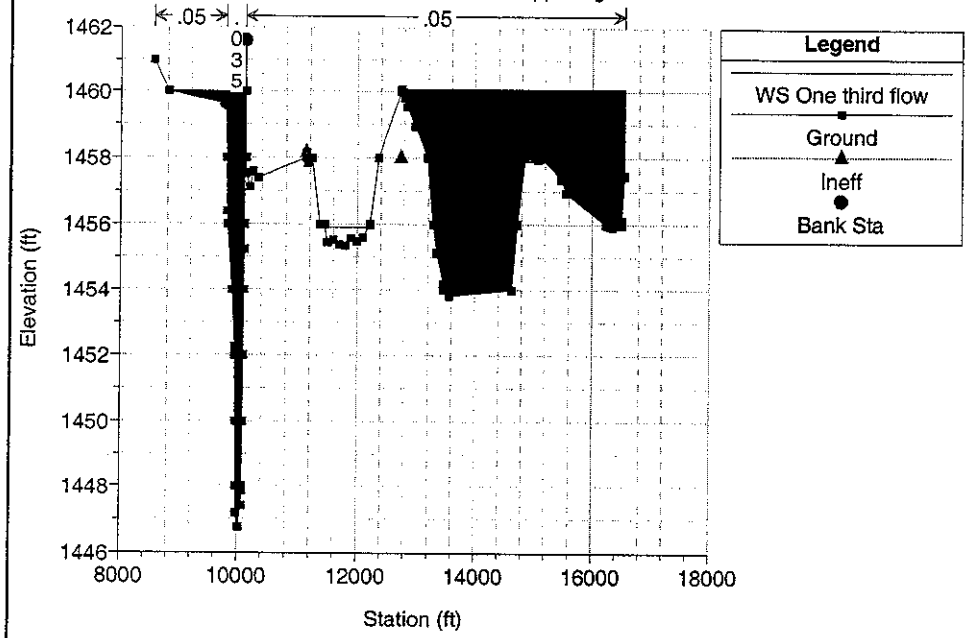
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 1480.72 | 1480.70 | 0.01 | 3.49 | 0.00 | | | 600.00 | 1487.55 |
| Upper right | 14.347 | 1477.22 | 1477.18 | 0.05 | 3.05 | 0.01 | | | 600.00 | 988.29 |
| Upper right | 14.207 | 1474.16 | 1474.15 | 0.01 | 4.65 | 0.01 | | | 600.00 | 1398.22 |
| Upper right | 14.029 | 1469.50 | 1469.37 | 0.13 | 2.14 | 0.04 | | | 600.00 | 753.86 |
| Upper right | 13.870 | 1466.19 | 1466.18 | 0.01 | 1.82 | 0.01 | | | 600.00 | 1920.10 |
| Upper right | 13.736 | 1464.35 | 1464.23 | 0.12 | 3.83 | 0.03 | | | 600.00 | 911.14 |
| Upper right | 13.539 | 1459.03 | 1459.02 | 0.01 | 3.04 | 0.01 | | | 600.00 | 1008.03 |
| Upper right | 13.351 | 1455.98 | 1455.91 | 0.07 | | | | | 600.00 | 732.99 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| Upper right | 14.479 | 600.00 | 1480.70 | 0.00 | 1.06 | | 0.91 | 0.70 | 0.44 |
| Upper right | 14.347 | 600.00 | 1477.18 | 0.00 | 0.92 | | 1.76 | 0.65 | 0.34 |
| Upper right | 14.207 | 600.00 | 1474.15 | 0.00 | 0.75 | | 0.83 | 2.09 | 0.52 |
| Upper right | 14.029 | 600.00 | 1469.37 | 0.00 | 0.60 | | 2.94 | 1.20 | 0.27 |
| Upper right | 13.870 | 600.00 | 1466.18 | 0.00 | 0.47 | | 0.58 | 1.23 | 0.54 |
| Upper right | 13.736 | 600.00 | 1464.23 | 0.00 | 0.35 | | 2.80 | 1.79 | 0.23 |
| Upper right | 13.539 | 600.00 | 1459.02 | 0.00 | 0.19 | | 0.83 | 1.02 | 0.72 |
| Upper right | 13.351 | 600.00 | 1455.91 | 0.00 | 0.00 | | 2.08 | 0.57 | 0.39 |

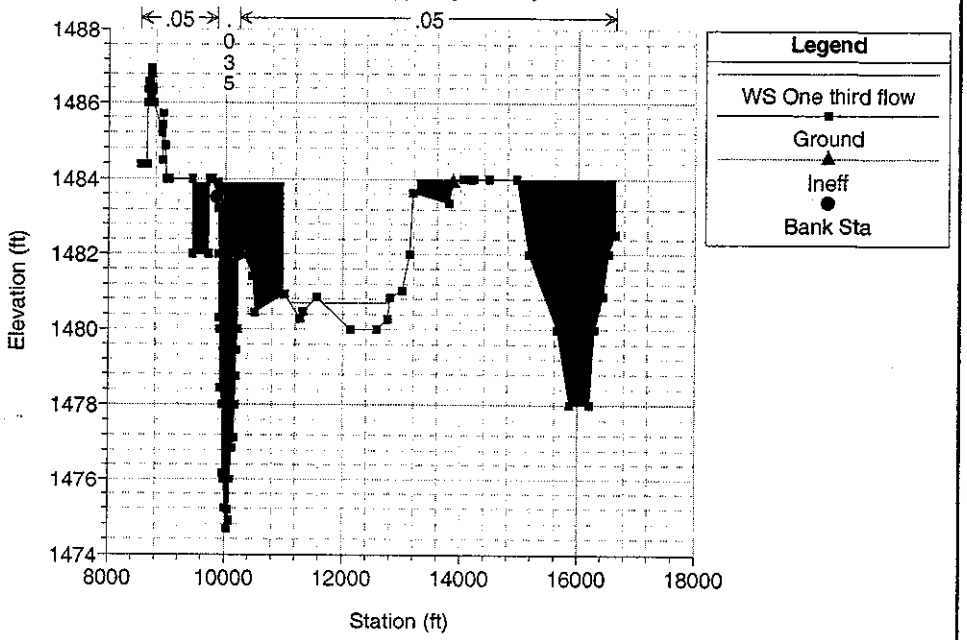
Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 13.351



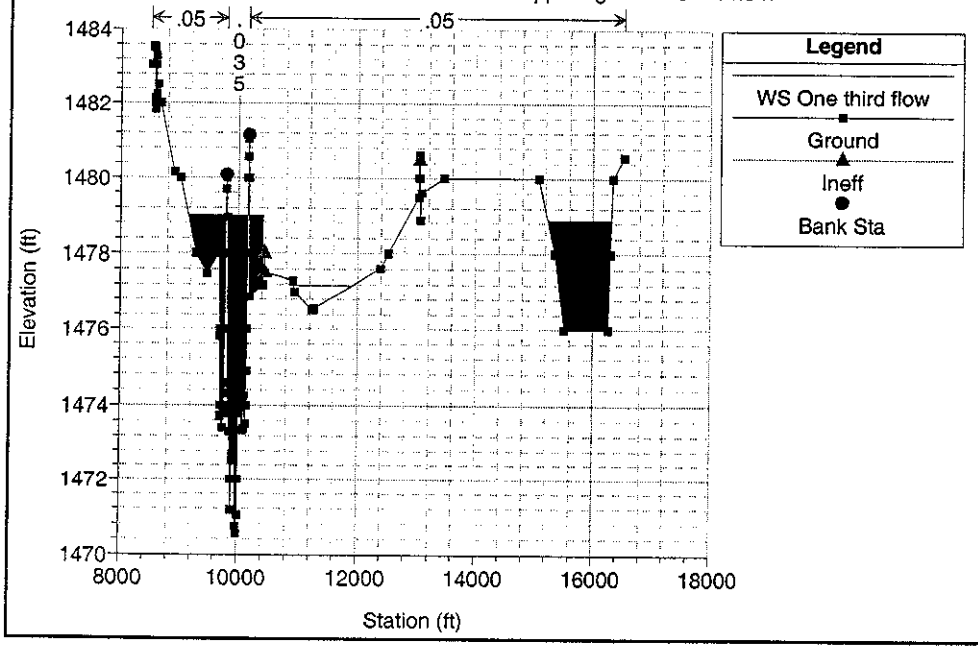

Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right Vineyard Road downstream RS = 14.479



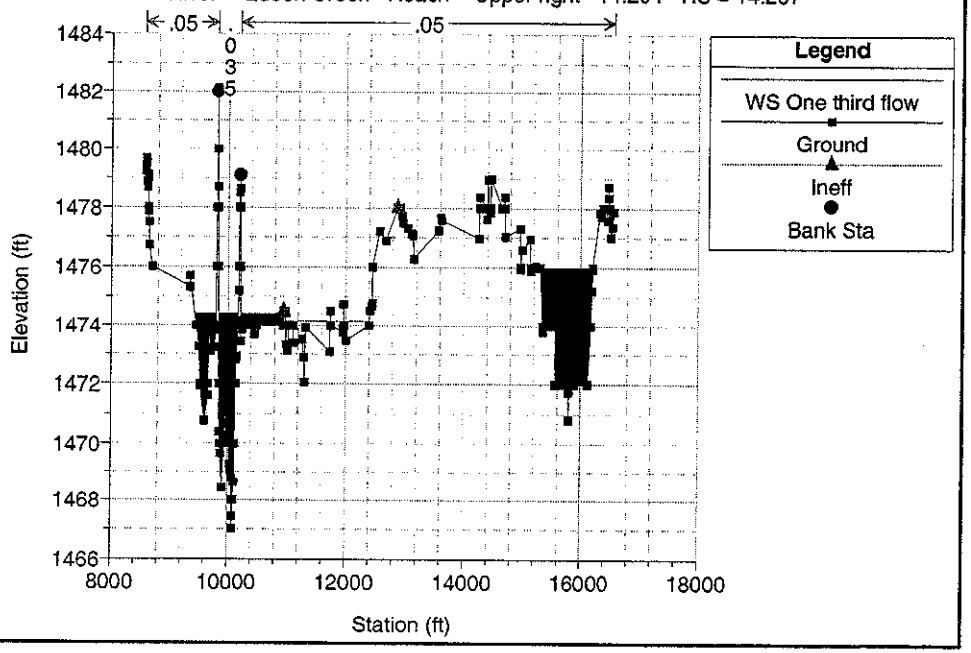

Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 14.347



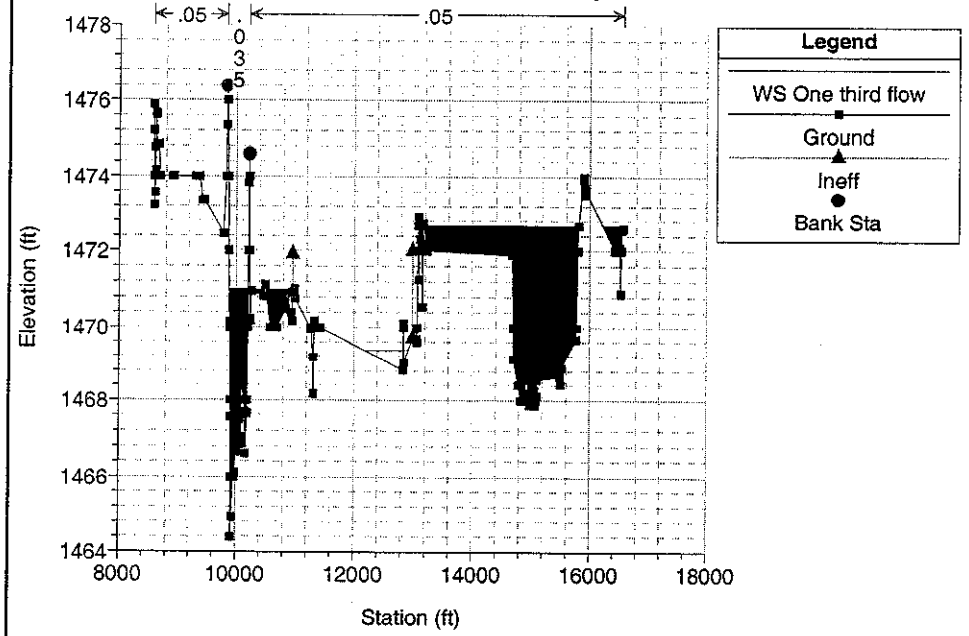

Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right 14.204 RS = 14.207



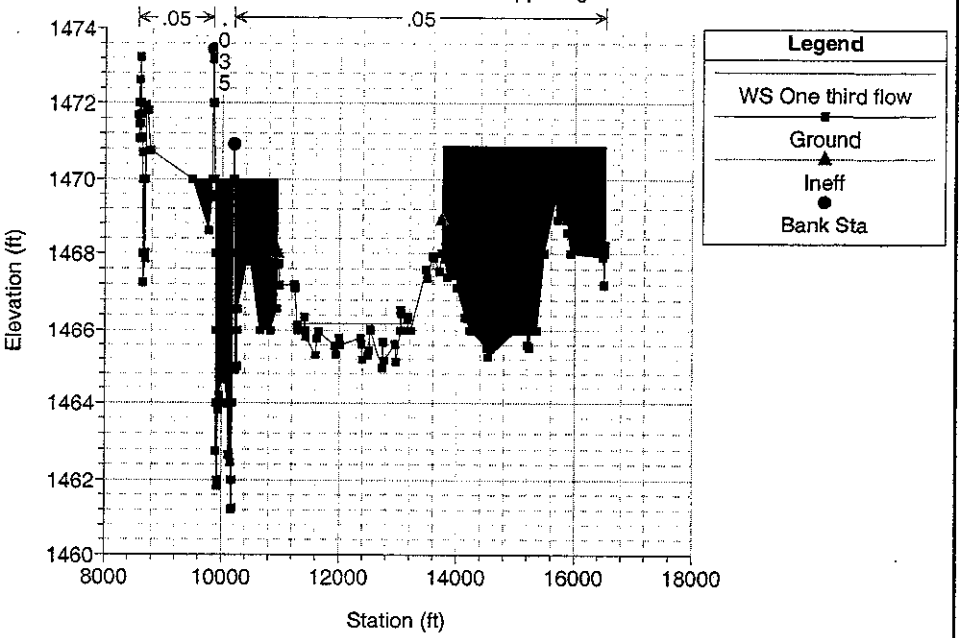
Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 14.029



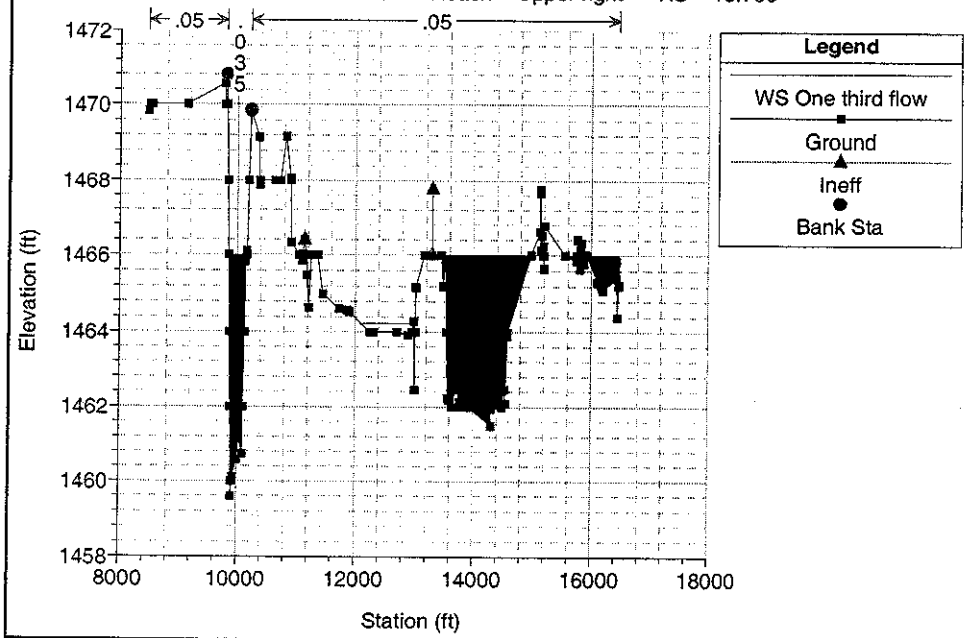

Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 13.870



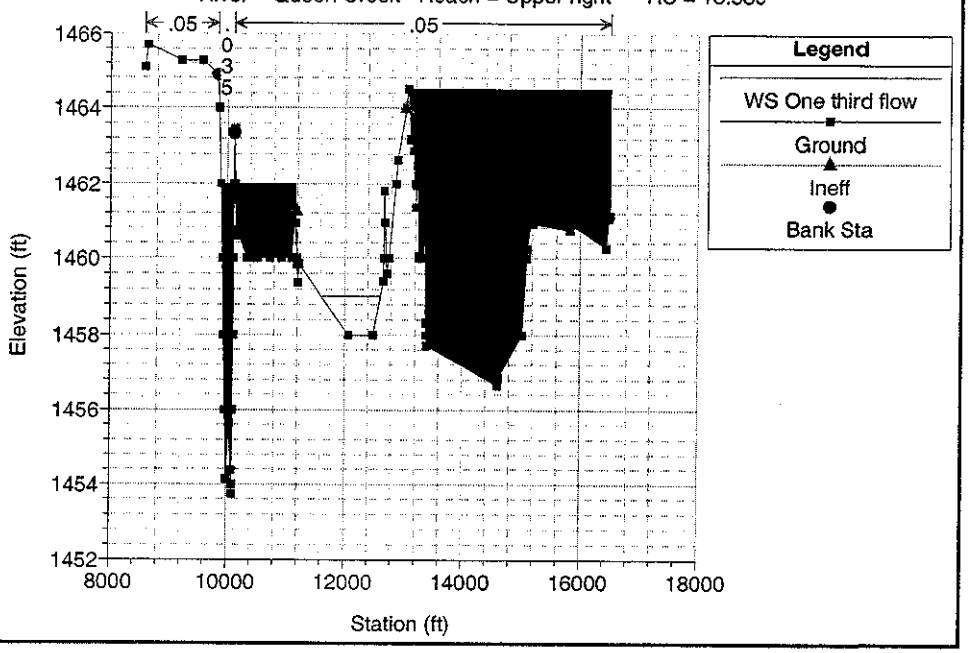

Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 13.736




Rittenhouse FRS Upper Right one third One third flow upper right overband 03/20/2002 3:58:58 PM

River = Queen Creek Reach = Upper right RS = 13.539



## D.6 DOWNSTREAM MAIN HEC-RAS MODEL, RHDNM3.PRJ (FOR FULL FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: SPRR Bridge Main Channel (full flow)
Project File : RHdnm3.prj
Run Date and Time: 03/20/2002 2:05:42 PM

Project in English units

Project Description:
Spillway Inundation Study Rittenhouse FRS Full flow scenario

Main Channel
from Maricopa County boundary to SPRR Bridge

Model Vertical Datum: 1929 NGVD
Cross section data obtained based on the Topo map SECTION 25 T.2S., R.7E.
for QUEEN CREEK AREA DRAINAGE MASTER STUDY ( FCDMC October 19, 1986.)

Starting Water Surface Elevation, 1446.75, was obtained by running
exist HEC-RAS model, see Queen Creek/Sanokai Wash Hydraulic Master Plan -
Queen Creek HEC-RAS for Preferred Alternative (Huitt-Zollars, Inc.).

FCD 98-33
Michael Baker Jr., Inc. 03/2002

**********

The data and assumptions used to develop
this model are adequate for conceptual purposes but not for design purposes.
Therefore this model should not be used directly for the design and
construction of channel improvements without more detailed study and
information.

**********

PLAN DATA

Plan Title: Full flow SPRR main channel
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm3.p02

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm3.g04

Flow Title : Full flow 14000 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm3.f02

Plan Description:
Full flow Scenario downstream main channel area

This model are adequate for
conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 10 | Mulitple Openings | = | 0 |
| | Culverts | = 0 | Inline Weirs | = | 0 |
| | Bridges | = 0 | | | |

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 40
Maximum difference tolerance = 0.2
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Full flow 14000 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm3.f02

Flow Data (cfs)

| River | Reach | RS | Full flow main |
|---|---|---|---|
| Queen Creek | SPRR-Boundary | 13.350 | 10900 |
| Queen Creek | SPRR-Boundary | 13.307 | 10900 |
| Queen Creek | SPRR-Boundary | 13.212 | 10900 |
| Queen Creek | SPRR-Boundary | 13.118 | 10900 |
| Queen Creek | SPRR-Boundary | 13.023 | 12050 |
| Queen Creek | SPRR-Boundary | 12.929 | 13030 |
| Queen Creek | SPRR-Boundary | 12.827 | 13095 |
| Queen Creek | SPRR-Boundary | 12.788 | 12248 |
| Queen Creek | SPRR-Boundary | 12.743 | 11475 |
| Queen Creek | SPRR-Boundary | 12.729 | 11018 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | SPRR-Boundary | Full flow main | Critical | Known WS = 1446.75 |

GEOMETRY DATA

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm3.g04

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.350

INPUT
Description: new cross section #8
Station Elevation Data num= 27

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9025 | 1456 | 9480 | 1454 | 9870 | 1452 | 9950 | 1450 | 10000 | 1449.4 |
| 10150 | 1450 | 10171 | 1452 | 10176 | 1454 | 10190 | 1454.4 | 10205 | 1454 |
| 10300 | 1453 | 10690 | 1454 | 11050 | 1454 | 11250 | 1454 | 11275 | 1456.41 |
| 11300 | 1454 | 11450 | 1453.3 | 11930 | 1453 | 12390 | 1454 | 12440 | 1456 |
| 12815 | 1457.4 | 13250 | 1456 | 13365 | 1454 | 13445 | 1454 | 13485 | 1456 |
| 13540 | 1452 | 14000 | 1452 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9025 | .05 | 9870 | .035 | 10190 | .05 |

```
Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
          9870   10190              240  225.45    220              .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    9025    9400    1458   11275   14000 1456.41
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
   13000   14000    1456
```

CROSS SECTION OUTPUT  Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1454.93 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.05 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1453.88 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1453.88 | Flow Area (sq ft) | 345.28 | 1131.86 | 188.58 |
| E.G. Slope (ft/ft) | 0.007254 | Area (sq ft) | 345.28 | 1131.86 | 754.97 |
| Q Total (cfs) | 10900.00 | Flow (cfs) | 839.15 | 9784.35 | 276.50 |
| Top Width (ft) | 2110.68 | Top Width (ft) | 366.96 | 305.71 | 1438.01 |
| Vel Total (ft/s) | 6.54 | Avg. Vel. (ft/s) | 2.43 | 8.64 | 1.47 |
| Max Chl Dpth (ft) | 4.48 | Hydr. Depth (ft) | 0.94 | 3.70 | 0.44 |
| Conv. Total (cfs) | 127980.7 | Conv. (cfs) | 9852.7 | 114881.5 | 3246.5 |
| Length Wtd. (ft) | 230.06 | Wetted Per. (ft) | 366.96 | 306.19 | 427.70 |
| Min Ch El (ft) | 1449.40 | Shear (lb/sq ft) | 0.43 | 1.67 | 0.20 |
| Alpha | 1.58 | Stream Power (lb/ft s) | 1.04 | 14.47 | 0.29 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | 112.08 | 103.25 | 145.80 |
| C & E Loss (ft) | | Cum SA (acres) | 47.17 | 17.85 | 139.10 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9447.50 | 9532.00 | 0.81 | 2.15 | 28.96 | 0.01 | 0.07 | 0.38 |
| 9532.00 | 9616.50 | 33.79 | 30.86 | 84.50 | 0.31 | 0.37 | 1.10 |
| 9616.50 | 9701.00 | 124.47 | 67.47 | 84.50 | 1.14 | 0.80 | 1.84 |
| 9701.00 | 9785.50 | 256.37 | 104.09 | 84.50 | 2.35 | 1.23 | 2.46 |
| 9785.50 | 9870.00 | 423.70 | 140.71 | 84.50 | 3.89 | 1.67 | 3.01 |
| LB 9870.00 | 9934.00 | 1177.66 | 171.64 | 64.02 | 10.80 | 2.68 | 6.86 |
| 9934.00 | 9998.00 | 2339.13 | 259.06 | 64.01 | 21.46 | 4.05 | 9.03 |
| 9998.00 | 10062.00 | 2649.00 | 279.12 | 64.00 | 24.30 | 4.36 | 9.49 |
| 10062.00 | 10126.00 | 2395.42 | 262.77 | 64.00 | 21.98 | 4.11 | 9.12 |
| 10126.00 | RB 10190.00 | 1223.13 | 159.26 | 50.16 | 11.22 | 3.20 | 7.68 |
| 10190.00 | 10571.00 | 273.23 | 181.77 | 354.78 | 2.51 | 0.51 | 1.50 |
| 10571.00 | 10952.00 | 3.30 | 6.82 | 72.92 | 0.03 | 0.09 | 0.48 |

Warning: Divided flow computed for this cross-section.

```
CROSS SECTION          RIVER: Queen Creek
REACH: SPRR-Boundary      RS: 13.307

INPUT
Description: new cross section #7
Station Elevation Data     num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    8550  1455.5    8610    1454    9423    1452    9600    1450    9700    1450
    9710    1440    9780    1440    9890    1450    9947    1450    9970    1448
    9985  1447.5   10004    1448   10142    1450   10156    1454   10169    1455
   10180    1454   10550    1453   11190    1454   11200  1454.3   11240    1454
   11260    1454   11440  1452.6   11880  1452.7   12325    1453   12410    1454
   12430  1455.5   12440    1454   12580  1455.3   12800    1456   12820    1457
   12840    1456   12950  1454.8   13480  1455.8   13500    1452   13780    1450

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    8550     .05    9947    .035   10156     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
          9947   10156              550   498.6    460              .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8550    9450    1460   11200   13780  1454.3
Blocked Obstructions     num=       2
```

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 9880 | 1448 | 13400 | 13780 | 1454 |

CROSS SECTION OUTPUT  Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.55 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.28 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1453.26 | Reach Len. (ft) | 550.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1451.40 | Flow Area (sq ft) | 1849.65 | 892.03 | 34.43 |
| E.G. Slope (ft/ft) | 0.002200 | Area (sq ft) | 2211.07 | 892.03 | 517.28 |
| Q Total (cfs) | 10900.00 | Flow (cfs) | 6183.79 | 4703.86 | 12.35 |
| Top Width (ft) | 2498.97 | Top Width (ft) | 1036.64 | 206.41 | 1255.92 |
| Vel Total (ft/s) | 3.93 | Avg. Vel. (ft/s) | 3.34 | 5.27 | 0.36 |
| Max Chl Dpth (ft) | 5.76 | Hydr. Depth (ft) | 3.72 | 4.32 | 0.13 |
| Conv. Total (cfs) | 232399.1 | Conv. (cfs) | 131844.8 | 100291.0 | 263.3 |
| Length Wtd. (ft) | 525.04 | Wetted Per. (ft) | 497.93 | 206.99 | 263.72 |
| Min Ch El (ft) | 1447.50 | Shear (lb/sq ft) | 0.51 | 0.59 | 0.02 |
| Alpha | 1.19 | Stream Power (lb/ft s) | 1.71 | 3.12 | 0.01 |
| Frctn Loss (ft) | 1.12 | Cum Volume (acre-ft) | 105.04 | 98.02 | 142.59 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 43.31 | 16.52 | 132.30 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9388.20 | 9527.90 | 333.14 | 156.29 | 77.91 | 3.06 | 2.01 | 2.13 |
| 9527.90 | 9667.60 | 1201.37 | 426.20 | 139.70 | 11.02 | 3.05 | 2.82 |
| 9667.60 | 9807.30 | 2531.80 | 668.18 | 140.53 | 23.23 | 4.78 | 3.79 |
| 9807.30 | 9947.00 | 2117.48 | 598.98 | 139.79 | 19.43 | 4.29 | 3.54 |
| LB 9947.00 | 9988.80 | 1129.47 | 202.37 | 41.90 | 10.36 | 4.84 | 5.58 |
| 9988.80 | 10030.60 | 1278.65 | 217.83 | 41.81 | 11.73 | 5.21 | 5.87 |
| 10030.60 | 10072.40 | 1028.44 | 191.14 | 41.81 | 9.44 | 4.57 | 5.38 |
| 10072.40 | 10114.20 | 811.53 | 165.82 | 41.80 | 7.45 | 3.97 | 4.89 |
| 10114.20 | RB 10156.00 | 455.78 | 114.87 | 39.67 | 4.18 | 2.93 | 3.97 |
| 10156.00 | 10518.40 | 1.54 | 5.71 | 65.01 | 0.01 | 0.09 | 0.27 |
| 10518.40 | 10880.80 | 10.81 | 28.72 | 198.71 | 0.10 | 0.14 | 0.38 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 13.212

INPUT
Description: new cross section #6
Station Elevation Data  num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8530 | 1454.5 | 8580 | 1454 | 8840 | 1452 | 9200 | 1450 | 9210 | 1440 |
| 9570 | 1440 | 9630 | 1460 | 9700 | 1440 | 9850 | 1440 | 9885 | 1450 |
| 9895 | 1452 | 9920 | 1450 | 9930 | 1448 | 9981 | 1446.1 | 10095 | 1448 |
| 10126 | 1452 | 10160 | 1452 | 10250 | 1451 | 10770 | 1451.5 | 11040 | 1452 |
| 11150 | 1452.4 | 11230 | 1452 | 11240 | 1452 | 11475 | 1451.3 | 11920 | 1451.55 |
| 12340 | 1452 | 12430 | 1453.65 | 12590 | 1453.5 | 12930 | 1452.9 | 13280 | 1453.2 |
| 13420 | 1454 | 13460 | 1454.5 | 13485 | 1454 | 13495 | 1452 | 13520 | 1450 |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8530 | .05 | 9895 | .035 | 10126 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9895 | 10126 | 470 | 496.1 | 525 | .1 | .3 |

Ineffective Flow  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9630 | 1460 | 11150 | 13520 | 1453.5 |

Blocked Obstructions  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9900 | 1446 | 13400 | 13520 | 1453 |

CROSS SECTION OUTPUT  Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1452.42 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.31 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1452.11 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1449.49 | Flow Area (sq ft) | 1307.38 | 959.44 | 605.84 |
| E.G. Slope (ft/ft) | 0.002079 | Area (sq ft) | 4127.39 | 959.44 | 1163.44 |
| Q Total (cfs) | 10900.00 | Flow (cfs) | 5499.24 | 4790.28 | 610.49 |
| Top Width (ft) | 3332.07 | Top Width (ft) | 1018.18 | 231.00 | 2082.89 |
| Vel Total (ft/s) | 3.79 | Avg. Vel. (ft/s) | 4.21 | 4.99 | 1.01 |
| Max Chl Dpth (ft) | 6.11 | Hydr. Depth (ft) | 5.51 | 4.15 | 0.64 |
| Conv. Total (cfs) | 239082.8 | Conv. (cfs) | 120621.4 | 105070.9 | 13390.5 |
| Length Wtd. (ft) | 488.25 | Wetted Per. (ft) | 239.00 | 231.59 | 944.59 |
| Min Ch El (ft) | 1446.10 | Shear (lb/sq ft) | 0.71 | 0.54 | 0.08 |
| Alpha | 1.38 | Stream Power (lb/ft s) | 2.99 | 2.68 | 0.08 |
| Frctn Loss (ft) | 1.11 | Cum Volume (acre-ft) | 65.02 | 87.42 | 133.72 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 30.33 | 14.02 | 114.67 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9622.00 | 9758.50 | 2303.52 | 551.20 | 101.75 | 21.13 | 5.46 | 4.18 |
| 9758.50 | 9895.00 | 3195.74 | 756.18 | 137.26 | 29.32 | 5.54 | 4.23 |
| LB 9895.00 | 9941.20 | 342.43 | 107.28 | 46.49 | 3.14 | 2.32 | 3.19 |
| 9941.20 | 9987.40 | 1387.99 | 247.87 | 46.23 | 12.73 | 5.37 | 5.60 |
| 9987.40 | 10033.60 | 1455.62 | 255.00 | 46.21 | 13.35 | 5.52 | 5.71 |
| 10033.60 | 10079.80 | 1133.19 | 219.43 | 46.21 | 10.40 | 4.75 | 5.16 |
| 10079.80 | RB 10126.00 | 471.03 | 129.86 | 46.46 | 4.32 | 2.81 | 3.63 |
| 10126.00 | 10465.40 | 305.12 | 275.83 | 339.41 | 2.80 | 0.81 | 1.11 |
| 10465.40 | 10804.80 | 260.59 | 250.92 | 339.40 | 2.39 | 0.74 | 1.04 |
| 10804.80 | 11144.20 | 44.76 | 79.08 | 265.78 | 0.41 | 0.30 | 0.57 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 13.118

INPUT
Description: new cross section #5
Station Elevation Data  num= 29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8590 | 1452 | 9160 | 1452 | 9230 | 1440 | 9530 | 1440 | 9540 | 1450 |
| 9835 | 1452 | 9860 | 1455 | 9920 | 1452 | 9935 | 1446 | 9978 | 1444.1 |
| 10080 | 1446 | 10090 | 1450 | 10100 | 1452 | 10110 | 1452 | 10120 | 1452 |
| 10140 | 1450 | 10650 | 1449.8 | 11200 | 1449.9 | 11270 | 1449.5 | 11400 | 1450 |
| 11500 | 1450 | 12030 | 1450.6 | 12365 | 1452 | 12420 | 1452.6 | 12560 | 1452 |
| 12910 | 1451.6 | 13430 | 1451.7 | 13580 | 1452 | 13660 | 1452.2 | | |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8590 | .05 | 9920 | .035 | 10090 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9920 | 10090 | | 470 | 504 | 560 | .1 | .3 |

Ineffective Flow  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8590 | 9250 | 1452 | 11140 | 13660 | 1452 |

Blocked Obstructions  num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 8590 | 9530 | 1447 |

CROSS SECTION OUTPUT  Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1451.30 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.40 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1450.90 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |

| | | | | | |
|---|---|---|---|---|---|
| Crit W.S. (ft) | 1449.40 | Flow Area (sq ft) | 1174.66 | 906.84 | 1030.63 |
| E.G. Slope (ft/ft) | 0.002500 | Area (sq ft) | 1456.06 | 906.84 | 1740.79 |
| Q Total (cfs) | 10900.00 | Flow (cfs) | 3449.75 | 5900.20 | 1550.04 |
| Top Width (ft) | 2647.83 | Top Width (ft) | 505.94 | 167.24 | 1974.64 |
| Vel Total (ft/s) | 3.50 | Avg. Vel. (ft/s) | 2.94 | 6.51 | 1.50 |
| Max Chl Dpth (ft) | 6.80 | Hydr. Depth (ft) | 2.78 | 5.42 | 1.02 |
| Conv. Total (cfs) | 217980.5 | Conv. (cfs) | 68988.8 | 117993.5 | 30998.1 |
| Length Wtd. (ft) | 502.92 | Wetted Per. (ft) | 422.82 | 169.02 | 1013.60 |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | 0.43 | 0.84 | 0.16 |
| Alpha | 2.12 | Stream Power (lb/ft s) | 1.27 | 5.45 | 0.24 |
| Frctn Loss (ft) | 1.58 | Cum Volume (acre-ft) | 34.90 | 76.79 | 116.22 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 22.11 | 11.75 | 90.22 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9122.00 | 9255.00 | 61.13 | 19.49 | 5.00 | 0.56 | 3.90 | 3.14 |
| 9255.00 | 9388.00 | 1626.02 | 518.36 | 133.00 | 14.92 | 3.90 | 3.14 |
| 9388.00 | 9521.00 | 1626.02 | 518.36 | 133.00 | 14.92 | 3.90 | 3.14 |
| 9521.00 | 9654.00 | 136.36 | 117.31 | 133.44 | 1.25 | 0.88 | 1.16 |
| 9654.00 | 9787.00 | 0.23 | 1.15 | 18.38 | 0.00 | 0.06 | 0.20 |
| 9787.00 | 9920.00 | | | | | | |
| LB 9920.00 | 9954.00 | 696.18 | 131.01 | 32.21 | 6.39 | 4.19 | 5.31 |
| 9954.00 | 9988.00 | 1561.69 | 217.46 | 34.03 | 14.33 | 6.40 | 7.18 |
| 9988.00 | 10022.00 | 1521.27 | 214.01 | 34.01 | 13.96 | 6.29 | 7.11 |
| 10022.00 | 10056.00 | 1274.81 | 192.48 | 34.01 | 11.70 | 5.66 | 6.62 |
| 10056.00 | RB 10090.00 | 846.23 | 151.88 | 34.77 | 7.76 | 4.47 | 5.57 |
| 10090.00 | 10447.00 | 426.24 | 300.04 | 320.60 | 3.91 | 0.94 | 1.42 |
| 10447.00 | 10804.00 | 592.19 | 381.55 | 357.00 | 5.43 | 1.07 | 1.55 |
| 10804.00 | 11161.00 | 531.64 | 349.06 | 336.00 | 4.88 | 1.04 | 1.52 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.023

INPUT
Description: new cross section #4
Station Elevation Data num= 26

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8460 | 1451 | 8610 | 1450 | 9382 | 1448 | 9683 | 1446 | 9870 | 1446 |
| 9874 | 1450 | 9894 | 1450.5 | 9910 | 1444 | 9980 | 1442.5 | 10110 | 1444 |
| 10134 | 1450 | 10143 | 1450.5 | 10150 | 1450 | 10510 | 1448 | 11180 | 1448 |
| 11240 | 1449.1 | 11275 | 1448 | 11800 | 1447.5 | 11990 | 1448 | 12200 | 1450 |
| 12380 | 1450.5 | 12475 | 1450.9 | 12820 | 1450 | 13420 | 1449.8 | 13775 | 1450 |
| 13800 | 1450.8 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8460 | .05 | 9910 | .035 | 10134 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10134 | 420 | 494.4 | 590 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8460 | 9400 | 1448 | 11240 | 13800 | 1449.1 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 8460 | 9870 | 1447.5 |

CROSS SECTION OUTPUT Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.68 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.82 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1448.85 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1448.85 | Flow Area (sq ft) | 812.35 | 1167.71 | 656.86 |
| E.G. Slope (ft/ft) | 0.003977 | Area (sq ft) | 812.35 | 1167.71 | 1495.31 |

| | | | | | |
|---|---|---|---|---|---|
| Q Total (cfs) | 12050.00 | Flow (cfs) | 1517.50 | 9511.84 | 1020.66 |
| Top Width (ft) | 2752.58 | Top Width (ft) | 831.38 | 219.41 | 1701.79 |
| Vel Total (ft/s) | 4.57 | Avg. Vel. (ft/s) | 1.87 | 8.15 | 1.55 |
| Max Chl Dpth (ft) | 6.35 | Hydr. Depth (ft) | 0.98 | 5.32 | 0.75 |
| Conv. Total (cfs) | 191079.5 | Conv. (cfs) | 24063.4 | 150831.3 | 16184.9 |
| Length Wtd. (ft) | 507.50 | Wetted Per. (ft) | 832.72 | 220.03 | 870.09 |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | 0.24 | 1.32 | 0.19 |
| Alpha | 2.54 | Stream Power (lb/ft s) | 0.45 | 10.73 | 0.29 |
| Frctn Loss (ft) | 0.89 | Cum Volume (acre-ft) | 22.66 | 64.79 | 95.41 |
| C & E Loss (ft) | 0.18 | Cum SA (acres) | 14.90 | 9.51 | 66.59 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9040.00 | 9185.00 | 11.70 | 22.66 | 132.27 | 0.10 | 0.17 | 0.52 |
| 9185.00 | 9330.00 | 84.38 | 76.92 | 145.00 | 0.70 | 0.53 | 1.10 |
| 9330.00 | 9475.00 | 250.82 | 147.87 | 145.00 | 2.08 | 1.02 | 1.70 |
| 9475.00 | 9620.00 | 401.80 | 196.19 | 145.00 | 3.33 | 1.35 | 2.05 |
| 9620.00 | 9765.00 | 401.80 | 196.19 | 145.00 | 3.33 | 1.35 | 2.05 |
| 9765.00 | 9910.00 | 367.00 | 172.52 | 120.45 | 3.05 | 1.45 | 2.13 |
| LB 9910.00 | 9954.80 | 1925.25 | 238.92 | 44.81 | 15.98 | 5.33 | 8.06 |
| 9954.80 | 9999.60 | 2442.73 | 275.59 | 44.81 | 20.27 | 6.15 | 8.86 |
| 9999.60 | 10044.40 | 2258.35 | 262.91 | 44.80 | 18.74 | 5.87 | 8.59 |
| 10044.40 | 10089.20 | 1936.60 | 239.75 | 44.80 | 16.07 | 5.35 | 8.08 |
| 10089.20 | RB 10134.00 | 948.93 | 150.54 | 40.81 | 7.87 | 3.74 | 6.30 |
| 10134.00 | 10500.60 | 57.26 | 57.71 | 144.15 | 0.48 | 0.40 | 0.99 |
| 10500.60 | 10867.20 | 513.04 | 312.47 | 366.60 | 4.26 | 0.85 | 1.64 |
| 10867.20 | 11233.80 | 450.36 | 286.67 | 359.34 | 3.74 | 0.80 | 1.57 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.929

INPUT
Description: cut cross section #3, center station 10000
Station Elevation Data num= 28

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8330 | 1454 | 8600 | 1450 | 9000 | 1448 | 9430 | 1448 | 9450 | 1446 |
| 9465 | 1444 | 9480 | 1442 | 9550 | 1440 | 9750 | 1421 | 9860 | 1446 |
| 9886 | 1442 | 9930 | 1441 | 10085 | 1442 | 10156 | 1444 | 10190 | 1446 |
| 10825 | 1446 | 11200 | 1446 | 11250 | 1448 | 11280 | 1448.25 | 11700 | 1448.2 |
| 12070 | 1448.9 | 12395 | 1448.8 | 12525 | 1449.2 | 12630 | 1449.25 | 13260 | 1448.6 |
| 13600 | 1448 | 13850 | 1448 | 13855 | 1448.1 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8330 | .05 | 9860 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9860 | 10190 | 500 | 537.8 | 840 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 11280 | 13855 | 1448.5 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 9710 | 1450 | 9710 | 9860 | 1446.5 |

CROSS SECTION OUTPUT Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1448.54 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.22 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1448.32 | Reach Len. (ft) | 500.00 | 537.80 | 840.00 |
| Crit W.S. (ft) | 1446.72 | Flow Area (sq ft) | 316.14 | 1961.05 | 2418.18 |
| E.G. Slope (ft/ft) | 0.001023 | Area (sq ft) | 316.14 | 1961.05 | 2574.92 |
| Q Total (cfs) | 13030.00 | Flow (cfs) | 401.18 | 8719.51 | 3909.32 |
| Top Width (ft) | 2657.51 | Top Width (ft) | 314.58 | 330.00 | 2012.94 |
| Vel Total (ft/s) | 2.78 | Avg. Vel. (ft/s) | 1.27 | 4.45 | 1.62 |
| Max Chl Dpth (ft) | 7.32 | Hydr. Depth (ft) | 1.00 | 5.94 | 2.22 |
| Conv. Total (cfs) | 407432.8 | Conv. (cfs) | 12544.4 | 272648.8 | 122239.7 |
| Length Wtd. (ft) | 601.84 | Wetted Per. (ft) | 316.72 | 330.91 | 1090.04 |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | 0.06 | 0.38 | 0.14 |
| Alpha | 1.83 | Stream Power (lb/ft s) | 0.08 | 1.68 | 0.23 |
| Frctn Loss (ft) | 0.62 | Cum Volume (acre-ft) | 17.22 | 47.03 | 67.85 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 9.37 | 6.39 | 41.43 |

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

FLOW DISTRIBUTION OUTPUT Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 8789.00 | 8942.00 | 0.01 | 0.11 | 6.58 | 0.00 | 0.02 | 0.06 |
| 8942.00 | 9095.00 | 16.17 | 40.99 | 153.00 | 0.12 | 0.27 | 0.39 |
| 9095.00 | 9248.00 | 0.69 | 1.61 | 5.32 | 0.01 | 0.32 | 0.43 |
| 9248.00 | 9707.00 | | | | | | |
| 9707.00 | 9860.00 | 384.31 | 273.43 | 151.82 | 2.95 | 1.82 | 1.41 |
| LB 9860.00 | 9926.00 | 1638.86 | 383.49 | 66.82 | 12.58 | 5.81 | 4.27 |
| 9926.00 | 9992.00 | 2325.13 | 470.73 | 66.00 | 17.84 | 7.13 | 4.94 |
| 9992.00 | 10058.00 | 2100.27 | 442.86 | 66.00 | 16.12 | 6.71 | 4.74 |
| 10058.00 | 10124.00 | 1759.31 | 398.24 | 66.02 | 13.50 | 6.03 | 4.42 |
| 10124.00 | RB 10190.00 | 895.92 | 265.73 | 66.07 | 6.88 | 4.03 | 3.37 |
| 10190.00 | 10556.50 | 1415.56 | 851.33 | 366.50 | 10.86 | 2.32 | 1.66 |
| 10556.50 | 10923.00 | 1415.56 | 851.33 | 366.50 | 10.86 | 2.32 | 1.66 |
| 10923.00 | 11289.50 | 1078.20 | 715.52 | 357.04 | 8.27 | 2.00 | 1.51 |

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.827

INPUT
Description: cut from map section 25 (QC area drainage master study)
Station Elevation Data num= 14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9100 | 1450.6 | 9280 | 1446 | 9792 | 1446 | 9892 | 1446 | 9900 | 1444 |
| 9930 | 1440 | 9971 | 1438.8 | 10160 | 1440 | 10162 | 1440.375 | 10192 | 1446 |
| 10320 | 1446 | 10670 | 1440 | 10840 | 1446 | 11110 | 1447 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9100 | .05 | 9900 | .035 | 10162 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9900 | 10162 | 150 | 206.7 | 470 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 9100 | 9750 | 1448 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10300 | 11110 | 1446 |

CROSS SECTION OUTPUT Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.90 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.39 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1447.51 | Reach Len. (ft) | 150.00 | 206.70 | 470.00 |
| Crit W.S. (ft) | 1443.94 | Flow Area (sq ft) | 234.61 | 2045.43 | 1381.56 |
| E.G. Slope (ft/ft) | 0.001053 | Area (sq ft) | 989.31 | 2045.43 | 1381.56 |
| Q Total (cfs) | 13095.00 | Flow (cfs) | 304.49 | 11079.36 | 1711.15 |
| Top Width (ft) | 1889.12 | Top Width (ft) | 679.12 | 262.00 | 948.00 |
| Vel Total (ft/s) | 3.58 | Avg. Vel. (ft/s) | 1.30 | 5.42 | 1.24 |
| Max Chl Dpth (ft) | 8.71 | Hydr. Depth (ft) | 1.56 | 7.81 | 1.46 |
| Conv. Total (cfs) | 403587.2 | Conv. (cfs) | 9384.4 | 341465.4 | 52737.4 |
| Length Wtd. (ft) | 248.45 | Wetted Per. (ft) | 150.25 | 262.32 | 949.04 |
| Min Ch El (ft) | 1438.80 | Shear (lb/sq ft) | 0.10 | 0.51 | 0.10 |
| Alpha | 1.96 | Stream Power (lb/ft s) | 0.13 | 2.78 | 0.12 |
| Frctn Loss (ft) | 0.21 | Cum Volume (acre-ft) | 9.73 | 22.30 | 29.70 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 3.67 | 2.74 | 12.88 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

FLOW DISTRIBUTION OUTPUT Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9740.00 | 9820.00 | 134.19 | 105.75 | 70.00 | 1.02 | 1.51 | 1.27 |
| 9820.00 | 9900.00 | 170.30 | 128.86 | 80.25 | 1.30 | 1.61 | 1.32 |
| LB 9900.00 | 9952.40 | 1622.89 | 340.91 | 52.68 | 12.39 | 6.51 | 4.76 |
| 9952.40 | 10004.80 | 2564.99 | 447.75 | 52.41 | 19.59 | 8.54 | 5.73 |
| 10004.80 | 10057.20 | 2458.56 | 436.48 | 52.40 | 18.77 | 8.33 | 5.63 |
| 10057.20 | 10109.60 | 2297.05 | 419.04 | 52.40 | 17.54 | 8.00 | 5.48 |
| 10109.60 | RB 10162.00 | 2135.87 | 401.25 | 52.44 | 16.31 | 7.66 | 5.32 |
| 10162.00 | 10256.80 | 375.60 | 227.59 | 95.32 | 2.87 | 2.40 | 1.65 |
| 10256.80 | 10351.60 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10351.60 | 10446.40 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10446.40 | 10541.20 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10541.20 | 10636.00 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10636.00 | 10730.80 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10730.80 | 10825.60 | 174.20 | 143.22 | 94.80 | 1.33 | 1.51 | 1.22 |
| 10825.60 | 10920.40 | 150.62 | 131.25 | 94.80 | 1.15 | 1.38 | 1.15 |
| 10920.40 | 11015.20 | 93.11 | 98.35 | 94.80 | 0.71 | 1.04 | 0.95 |
| 11015.20 | 11110.00 | 46.60 | 65.06 | 95.31 | 0.36 | 0.69 | 0.72 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.788

INPUT
Description: updated cross section
Station Elevation Data num= 14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9150 | 1451 | 9200 | 1450 | 9320 | 1444 | 9880 | 1444 | 9911 | 1440 |
| 10000 | 1438 | 10020 | 1437.5 | 10050 | 1438 | 10095 | 1440 | 10110 | 1444 |
| 10380 | 1444 | 10550 | 1444 | 10565 | 1446 | 10670 | 1446.5 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9150 | .05 | 9880 | .035 | 10110 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9880 | 10110 | 190 | 238.7 | 290 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 9150 | 9660 | 1449 |

CROSS SECTION OUTPUT Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.64 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.22 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1447.42 | Reach Len. (ft) | 190.00 | 238.70 | 290.00 |
| Crit W.S. (ft) | 1443.73 | Flow Area (sq ft) | 752.36 | 1861.05 | 1663.84 |
| E.G. Slope (ft/ft) | 0.000678 | Area (sq ft) | 2032.04 | 1861.05 | 1663.84 |
| Q Total (cfs) | 12248.00 | Flow (cfs) | 1321.23 | 8269.71 | 2657.07 |
| Top Width (ft) | 1418.40 | Top Width (ft) | 628.40 | 230.00 | 560.00 |
| Vel Total (ft/s) | 2.86 | Avg. Vel. (ft/s) | 1.76 | 4.44 | 1.60 |
| Max Chl Dpth (ft) | 9.92 | Hydr. Depth (ft) | 3.42 | 8.09 | 2.97 |
| Conv. Total (cfs) | 470475.1 | Conv. (cfs) | 50751.5 | 317659.3 | 102064.3 |
| Length Wtd. (ft) | 246.80 | Wetted Per. (ft) | 220.00 | 230.86 | 561.05 |
| Min Ch El (ft) | 1437.50 | Shear (lb/sq ft) | 0.14 | 0.34 | 0.13 |
| Alpha | 1.73 | Stream Power (lb/ft s) | 0.25 | 1.52 | 0.20 |
| Frctn Loss (ft) | 0.19 | Cum Volume (acre-ft) | 4.53 | 13.03 | 13.27 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 1.42 | 1.57 | 4.75 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

FLOW DISTRIBUTION OUTPUT Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9588.00 | 9661.00 | 6.01 | 3.42 | 1.00 | 0.05 | 3.42 | 1.76 |
| 9661.00 | 9734.00 | 438.41 | 249.65 | 73.00 | 3.58 | 3.42 | 1.76 |
| 9734.00 | 9807.00 | 438.41 | 249.65 | 73.00 | 3.58 | 3.42 | 1.76 |
| 9807.00 | 9880.00 | 438.41 | 249.65 | 73.00 | 3.58 | 3.42 | 1.76 |
| LB 9880.00 | 9926.00 | 1024.24 | 281.84 | 46.26 | 8.36 | 6.13 | 3.63 |
| 9926.00 | 9972.00 | 1695.86 | 380.59 | 46.01 | 13.85 | 8.27 | 4.46 |
| 9972.00 | 10018.00 | 2066.77 | 428.55 | 46.01 | 16.87 | 9.32 | 4.82 |
| 10018.00 | 10064.00 | 2138.25 | 437.41 | 46.02 | 17.46 | 9.51 | 4.89 |
| 10064.00 | RB 10110.00 | 1344.56 | 332.67 | 46.55 | 10.98 | 7.23 | 4.04 |
| 10110.00 | 10166.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10166.00 | 10222.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10222.00 | 10278.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10278.00 | 10334.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10334.00 | 10390.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10390.00 | 10446.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10446.00 | 10502.00 | 319.34 | 191.51 | 56.00 | 2.61 | 3.42 | 1.67 |
| 10502.00 | 10558.00 | 307.32 | 187.24 | 56.07 | 2.51 | 3.34 | 1.64 |
| 10558.00 | 10614.00 | 69.99 | 77.06 | 56.06 | 0.57 | 1.38 | 0.91 |
| 10614.00 | 10670.00 | 44.36 | 58.98 | 56.92 | 0.36 | 1.05 | 0.75 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.743

INPUT
Description: {XS 1198} modified cross section
Station Elevation Data num= 12

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9777 | 1450 | 9822 | 1450 | 9854 | 1443 | 9895 | 1438 | 10000 | 1436.7 |
| 10020 | 1438 | 10044 | 1442 | 10067 | 1444 | 10260 | 1440 | 10445 | 1440 |
| 10492 | 1446 | 10590 | 1446.2 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9777 | .05 | 9854 | .035 | 10067 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9854 | 10067 | 30 | 75.6 | 190 | .3 | .5 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10067 | 10590 | 1444 |

CROSS SECTION OUTPUT Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.44 | Element | Left OB | Channel | Right OB |

| | | | | | |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.33 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1447.11 | Reach Len. (ft) | 30.00 | 75.60 | 190.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 38.56 | 1755.58 | 1403.59 |
| E.G. Slope (ft/ft) | 0.000885 | Area (sq ft) | 38.56 | 1755.58 | 1403.59 |
| Q Total (cfs) | 11475.00 | Flow (cfs) | 54.23 | 9027.07 | 2393.70 |
| Top Width (ft) | 754.78 | Top Width (ft) | 18.78 | 213.00 | 523.00 |
| Vel Total (ft/s) | 3.59 | Avg. Vel. (ft/s) | 1.41 | 5.14 | 1.71 |
| Max Chl Dpth (ft) | 10.41 | Hydr. Depth (ft) | 2.05 | 8.24 | 2.68 |
| Conv. Total (cfs) | 385657.1 | Conv. (cfs) | 1822.6 | 303385.8 | 80448.6 |
| Length Wtd. (ft) | 87.70 | Wetted Per. (ft) | 19.22 | 213.77 | 524.03 |
| Min Ch El (ft) | 1436.70 | Shear (lb/sq ft) | 0.11 | 0.45 | 0.15 |
| Alpha | 1.66 | Stream Power (lb/ft s) | 0.16 | 2.33 | 0.25 |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 0.01 | 3.12 | 3.06 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 0.01 | 0.36 | 1.14 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

FLOW DISTRIBUTION OUTPUT  Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9830.90 | 9838.60 | 0.48 | 1.25 | 3.45 | 0.00 | 0.37 | 0.39 |
| 9838.60 | 9846.30 | 12.35 | 12.17 | 7.88 | 0.11 | 1.58 | 1.02 |
| 9846.30 | 9854.00 | 41.40 | 25.14 | 7.88 | 0.36 | 3.26 | 1.65 |
| LB 9854.00 | 9896.60 | 1238.23 | 285.48 | 42.90 | 10.79 | 6.70 | 4.34 |
| 9896.60 | 9939.20 | 2183.06 | 400.05 | 42.60 | 19.02 | 9.39 | 5.46 |
| 9939.20 | 9981.80 | 2391.17 | 422.51 | 42.60 | 20.84 | 9.92 | 5.66 |
| 9981.80 | 10024.40 | 2372.87 | 420.97 | 42.70 | 20.68 | 9.88 | 5.64 |
| 10024.40 | RB 10067.00 | 841.74 | 226.58 | 42.96 | 7.34 | 5.32 | 3.72 |
| 10067.00 | 10119.30 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10119.30 | 10171.60 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10171.60 | 10223.90 | 289.52 | 162.51 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10223.90 | 10276.20 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10276.20 | 10328.50 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10328.50 | 10380.80 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10380.80 | 10433.10 | 289.52 | 162.50 | 52.30 | 2.52 | 3.11 | 1.78 |
| 10433.10 | 10485.40 | 273.85 | 157.26 | 52.37 | 2.39 | 3.01 | 1.74 |
| 10485.40 | 10537.70 | 52.79 | 58.55 | 52.35 | 0.46 | 1.12 | 0.90 |
| 10537.70 | 10590.00 | 40.45 | 50.24 | 53.21 | 0.35 | 0.96 | 0.81 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 12.729

INPUT
Description: Section upstream of SPRR Bridge
Station Elevation Data  num=  7

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9800 | 1450.3 | 9883 | 1450 | 9910 | 1436.8 | 10000 | 1436.8 | 10080 | 1436.8 |
| 10094 | 1450 | 10212 | 1450.3 | | | | | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9800 | .04 | 9883 | .028 | 10094 | .04 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9883 | 10094 | 40 | 40 | 40 | .3 | .5 |

Ineffective Flow  num=  2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9800 | 9883 | 1450 | 10094 | 10212 | 1450 |

CROSS SECTION OUTPUT  Profile #Full flow main

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.30 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.55 | Wt. n-Val. | | 0.028 | |
| W.S. Elev (ft) | 1446.75 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1441.78 | Flow Area (sq ft) | | 1845.25 | |
| E.G. Slope (ft/ft) | 0.000686 | Area (sq ft) | | 1845.25 | |
| Q Total (cfs) | 11018.00 | Flow (cfs) | | 11018.00 | |
| Top Width (ft) | 200.91 | Top Width (ft) | | 200.91 | |
| Vel Total (ft/s) | 5.97 | Avg. Vel. (ft/s) | | 5.97 | |
| Max Chl Dpth (ft) | 9.95 | Hydr. Depth (ft) | | 9.18 | |
| Conv. Total (cfs) | 420784.2 | Conv. (cfs) | | 420784.2 | |

| | | | |
|---|---|---|---|
| Length Wtd. (ft) | | Wetted Per. (ft) | 207.16 |
| Min Ch El (ft) | 1436.80 | Shear (lb/sq ft) | 0.38 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 2.28 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | |
| C & E Loss (ft) | | Cum SA (acres) | |

FLOW DISTRIBUTION OUTPUT  Profile #Full flow main

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9883.00 | 9925.20 | 1227.30 | 252.49 | 37.85 | 11.14 | 7.10 | 4.86 |
| 9925.20 | 9967.40 | 2664.56 | 419.89 | 42.20 | 24.18 | 9.95 | 6.35 |
| 9967.40 | 10009.60 | 2664.50 | 419.88 | 42.20 | 24.18 | 9.95 | 6.35 |
| 10009.60 | 10051.80 | 2664.56 | 419.89 | 42.20 | 24.18 | 9.95 | 6.35 |
| 10051.80 | RB 10094.00 | 1797.09 | 333.09 | 42.70 | 16.31 | 8.60 | 5.40 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | .05 | .035 | .05 |
| SPRR-Boundary | 13.307 | .05 | .035 | .05 |
| SPRR-Boundary | 13.212 | .05 | .035 | .05 |
| SPRR-Boundary | 13.118 | .05 | .035 | .05 |
| SPRR-Boundary | 13.023 | .05 | .035 | .05 |
| SPRR-Boundary | 12.929 | .05 | .035 | .05 |
| SPRR-Boundary | 12.827 | .05 | .035 | .05 |
| SPRR-Boundary | 12.788 | .05 | .035 | .05 |
| SPRR-Boundary | 12.743 | .05 | .035 | .05 |
| SPRR-Boundary | 12.729 | .04 | .028 | .04 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 240 | 225.45 | 220 |
| SPRR-Boundary | 13.307 | 550 | 498.6 | 460 |
| SPRR-Boundary | 13.212 | 470 | 496.1 | 525 |
| SPRR-Boundary | 13.118 | 470 | 504 | 560 |
| SPRR-Boundary | 13.023 | 420 | 494.4 | 590 |
| SPRR-Boundary | 12.929 | 500 | 537.8 | 840 |
| SPRR-Boundary | 12.827 | 150 | 206.7 | 470 |
| SPRR-Boundary | 12.788 | 190 | 238.7 | 290 |
| SPRR-Boundary | 12.743 | 30 | 75.6 | 190 |
| SPRR-Boundary | 12.729 | 40 | 40 | 40 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| SPRR-Boundary | 13.350 | .1 | .3 |
| SPRR-Boundary | 13.307 | .1 | .3 |
| SPRR-Boundary | 13.212 | .1 | .3 |
| SPRR-Boundary | 13.118 | .1 | .3 |
| SPRR-Boundary | 13.023 | .1 | .3 |
| SPRR-Boundary | 12.929 | .1 | .3 |
| SPRR-Boundary | 12.827 | .1 | .3 |
| SPRR-Boundary | 12.788 | .1 | .3 |
| SPRR-Boundary | 12.743 | .3 | .5 |
| SPRR-Boundary | 12.729 | .3 | .5 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 10900.00 | 1449.40 | 1453.88 | 1453.88 | 1454.93 | 0.007254 | 8.64 | 1665.71 | 2110.68 | 0.79 |
| SPRR-Boundary | 13.307 | 10900.00 | 1447.50 | 1453.26 | 1451.40 | 1453.55 | 0.002200 | 5.27 | 2776.11 | 2498.97 | 0.45 |
| SPRR-Boundary | 13.212 | 10900.00 | 1446.10 | 1452.11 | 1449.49 | 1452.42 | 0.002079 | 4.99 | 2872.66 | 3332.07 | 0.43 |
| SPRR-Boundary | 13.118 | 10900.00 | 1444.10 | 1450.90 | 1449.40 | 1451.30 | 0.002500 | 6.51 | 3112.14 | 2647.83 | 0.49 |
| SPRR-Boundary | 13.023 | 12050.00 | 1442.50 | 1448.85 | 1448.85 | 1449.68 | 0.003977 | 8.15 | 2636.93 | 2752.58 | 0.62 |
| SPRR-Boundary | 12.929 | 13030.00 | 1441.00 | 1448.32 | 1446.72 | 1448.54 | 0.001023 | 4.45 | 4695.38 | 2657.51 | 0.32 |
| SPRR-Boundary | 12.827 | 13095.00 | 1438.80 | 1447.51 | 1443.94 | 1447.90 | 0.001053 | 5.42 | 3661.60 | 1889.12 | 0.34 |
| SPRR-Boundary | 12.788 | 12248.00 | 1437.50 | 1447.42 | 1443.73 | 1447.64 | 0.000678 | 4.44 | 4277.25 | 1418.40 | 0.28 |
| SPRR-Boundary | 12.743 | 11475.00 | 1436.70 | 1447.11 | | 1447.44 | 0.000885 | 5.14 | 3197.73 | 754.78 | 0.32 |
| SPRR-Boundary | 12.729 | 11018.00 | 1436.80 | 1446.75 | 1441.78 | 1447.30 | 0.000686 | 5.97 | 1845.25 | 200.91 | 0.35 |

Profile Output Table - Standard Table 2

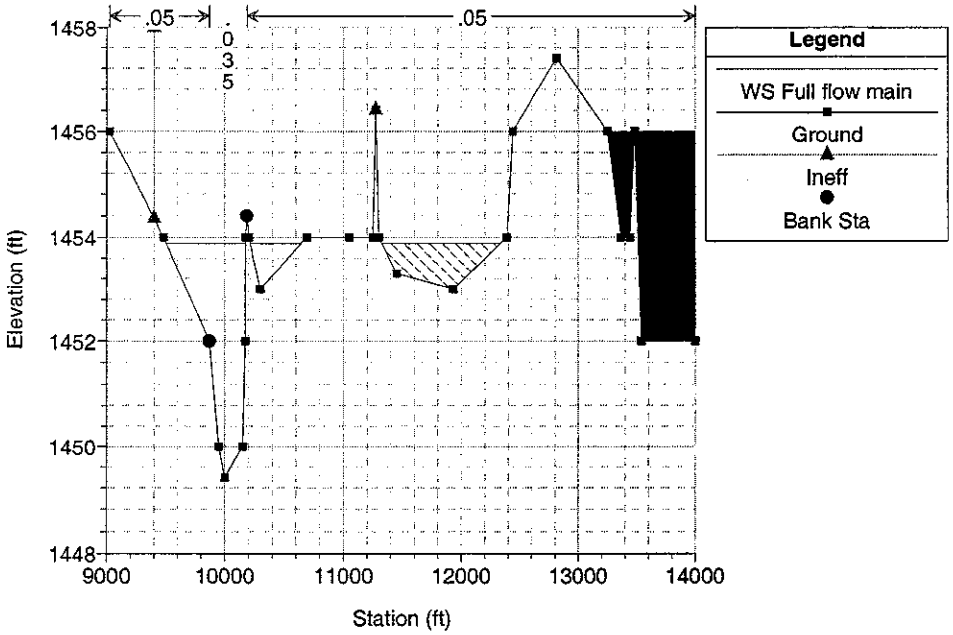
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 1454.93 | 1453.88 | 1.05 | | | 839.15 | 9784.35 | 276.50 | 2110.68 |
| SPRR-Boundary | 13.307 | 1453.55 | 1453.26 | 0.28 | 1.12 | 0.00 | 6183.79 | 4703.86 | 12.35 | 2498.97 |
| SPRR-Boundary | 13.212 | 1452.42 | 1452.11 | 0.31 | 1.11 | 0.01 | 5499.24 | 4790.28 | 610.49 | 3332.07 |
| SPRR-Boundary | 13.118 | 1451.30 | 1450.90 | 0.40 | 1.58 | 0.04 | 3449.75 | 5900.20 | 1550.04 | 2647.83 |
| SPRR-Boundary | 13.023 | 1449.68 | 1448.85 | 0.82 | 0.89 | 0.18 | 1517.50 | 9511.84 | 1020.66 | 2752.58 |
| SPRR-Boundary | 12.929 | 1448.54 | 1448.32 | 0.22 | 0.62 | 0.02 | 401.18 | 8719.51 | 3909.32 | 2657.51 |
| SPRR-Boundary | 12.827 | 1447.90 | 1447.51 | 0.39 | 0.21 | 0.05 | 304.49 | 11079.36 | 1711.15 | 1889.12 |
| SPRR-Boundary | 12.788 | 1447.64 | 1447.42 | 0.22 | 0.19 | 0.01 | 1321.23 | 8269.71 | 2657.07 | 1418.40 |
| SPRR-Boundary | 12.743 | 1447.44 | 1447.11 | 0.33 | 0.07 | 0.07 | 54.23 | 9027.07 | 2393.70 | 754.78 |
| SPRR-Boundary | 12.729 | 1447.30 | 1446.75 | 0.55 | | | | 11018.00 | | 200.91 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 10900.00 | 1453.88 | 0.16 | 0.26 | 8.64 | 6.54 | 4.48 | 1.51 |
| SPRR-Boundary | 13.307 | 10900.00 | 1453.26 | 0.15 | 0.25 | 5.27 | 3.93 | 5.76 | 2.87 |
| SPRR-Boundary | 13.212 | 10900.00 | 1452.11 | 0.12 | 0.21 | 4.99 | 3.79 | 6.11 | 2.03 |
| SPRR-Boundary | 13.118 | 10900.00 | 1450.90 | 0.10 | 0.17 | 6.51 | 3.50 | 6.80 | 1.94 |
| SPRR-Boundary | 13.023 | 12050.00 | 1448.85 | 0.08 | 0.14 | 8.15 | 4.57 | 6.35 | 1.37 |
| SPRR-Boundary | 12.929 | 13030.00 | 1448.32 | 0.06 | 0.10 | 4.45 | 2.78 | 7.32 | 2.71 |
| SPRR-Boundary | 12.827 | 13095.00 | 1447.51 | 0.03 | 0.05 | 5.42 | 3.58 | 8.71 | 2.69 |
| SPRR-Boundary | 12.788 | 12248.00 | 1447.42 | 0.02 | 0.03 | 4.44 | 2.86 | 9.92 | 4.23 |
| SPRR-Boundary | 12.743 | 11475.00 | 1447.11 | 0.00 | 0.01 | 5.14 | 3.59 | 10.41 | 4.24 |
| SPRR-Boundary | 12.729 | 11018.00 | 1446.75 | 0.00 | 0.00 | 5.97 | 5.97 | 9.95 | 9.18 |

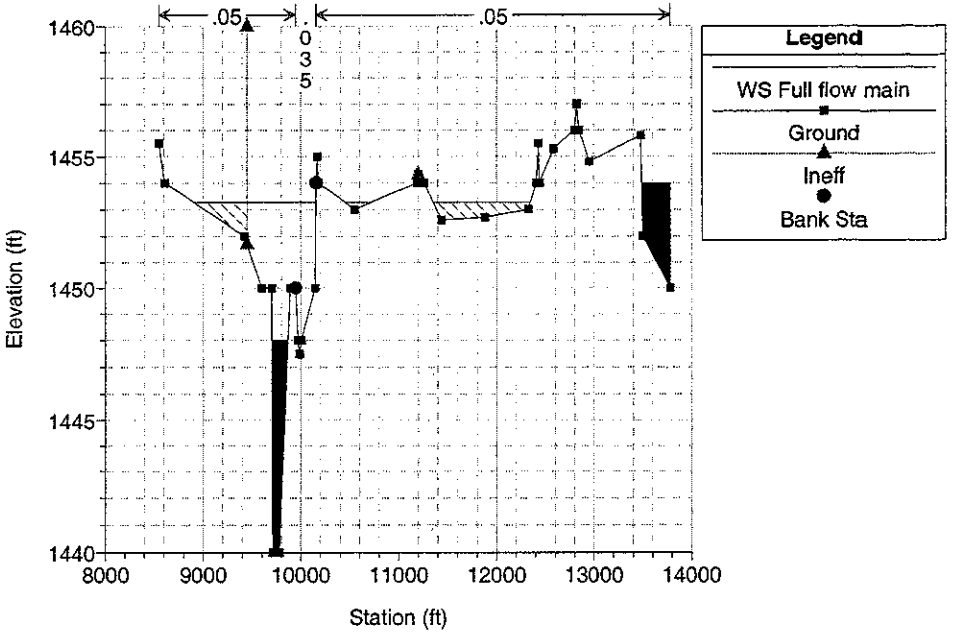
SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #8 RS = 13.350



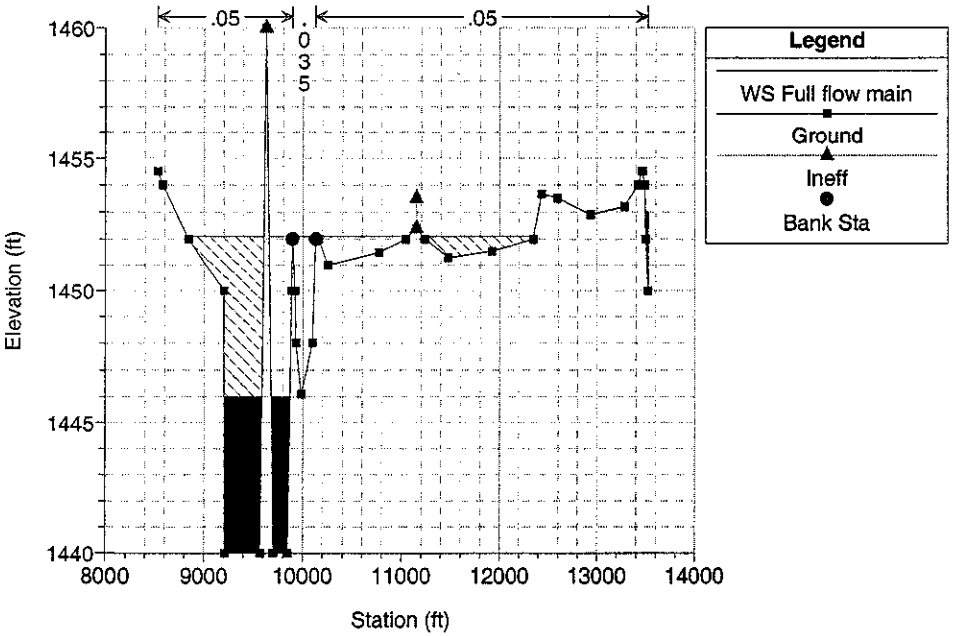

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #7 RS = 13.307



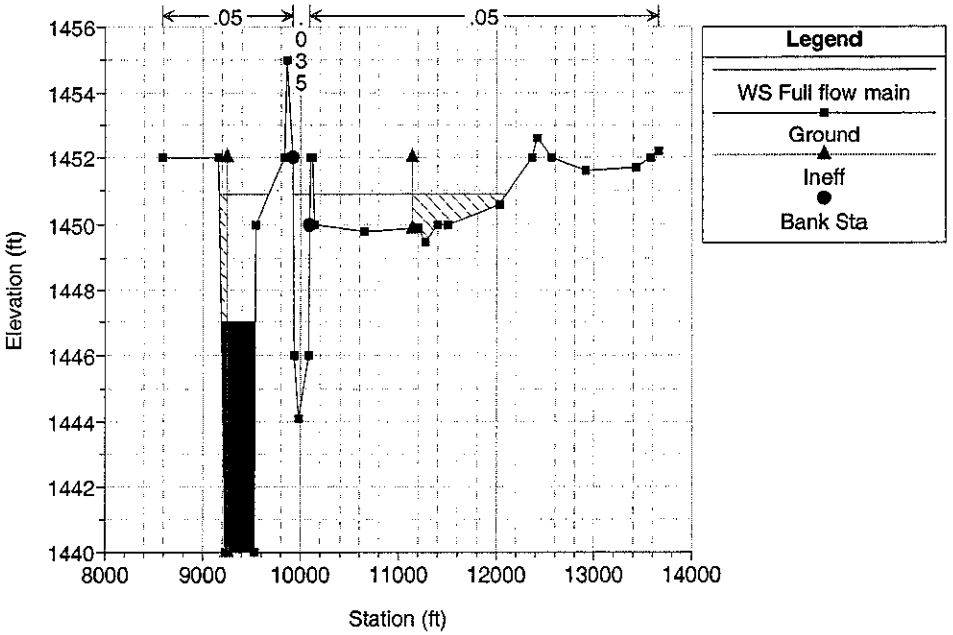

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #6 RS = 13.212



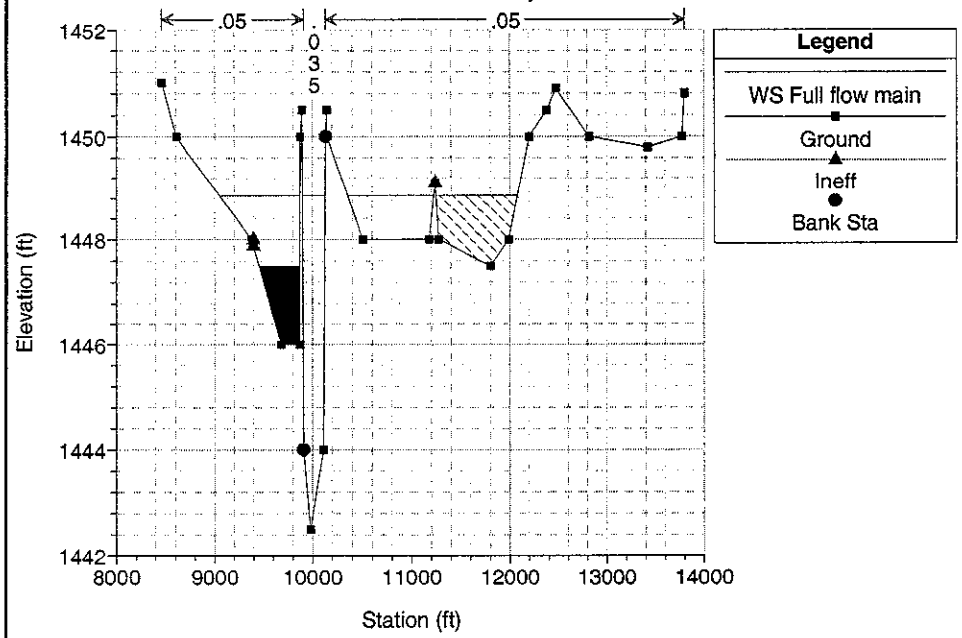

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #5 RS = 13.118



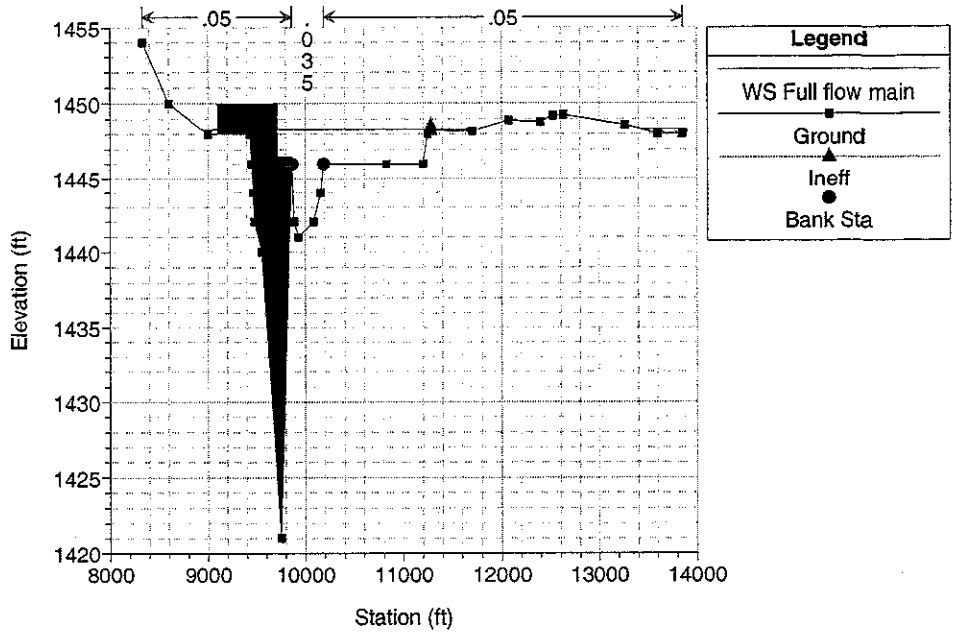
SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #4 RS = 13.023



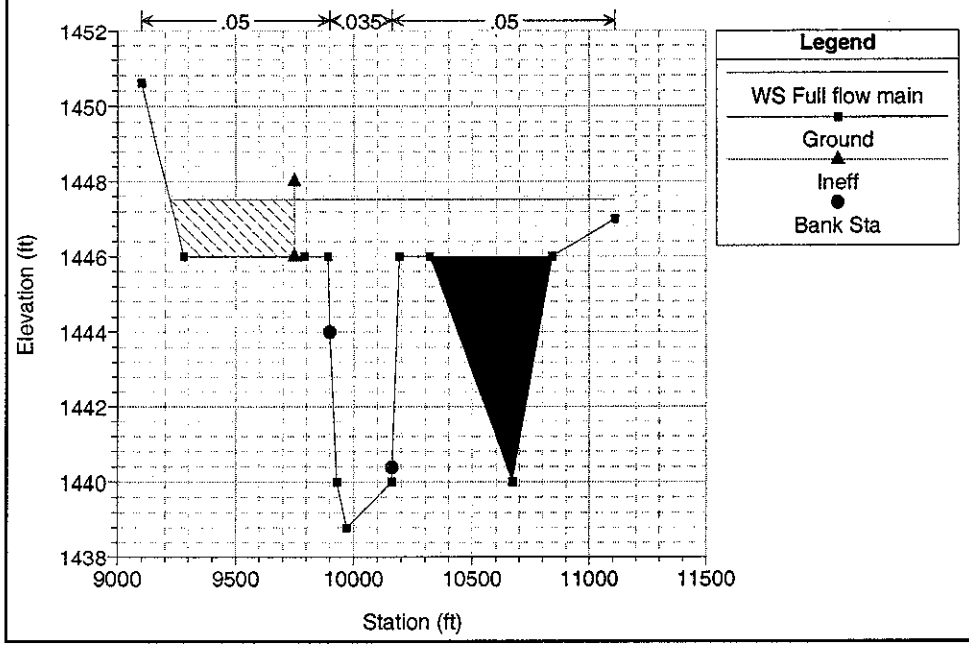

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary cut cross section #3, center station 100 RS = 12.929



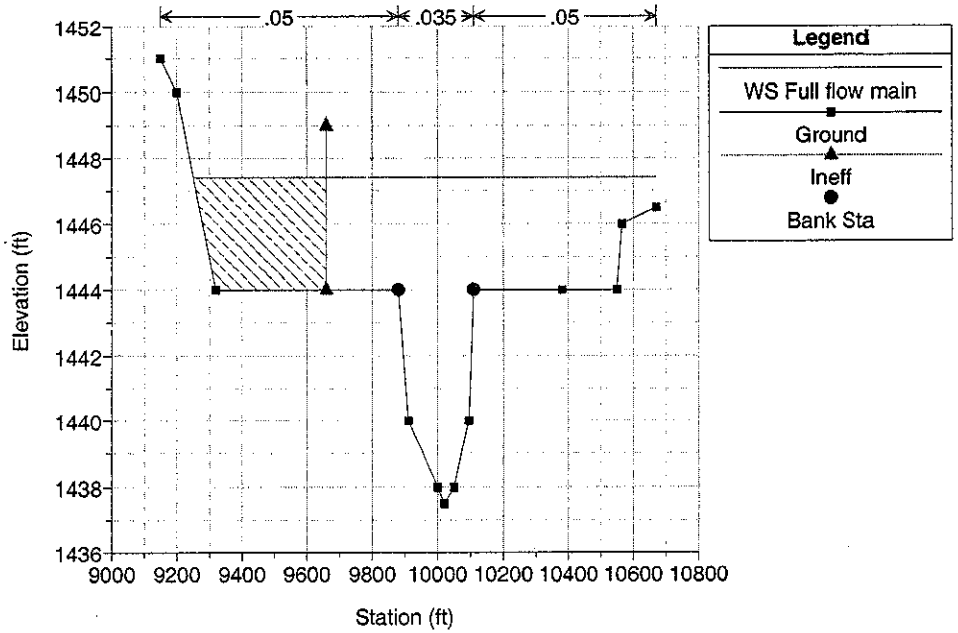

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary cut from map section 25 (QC area drainag RS = 12.827



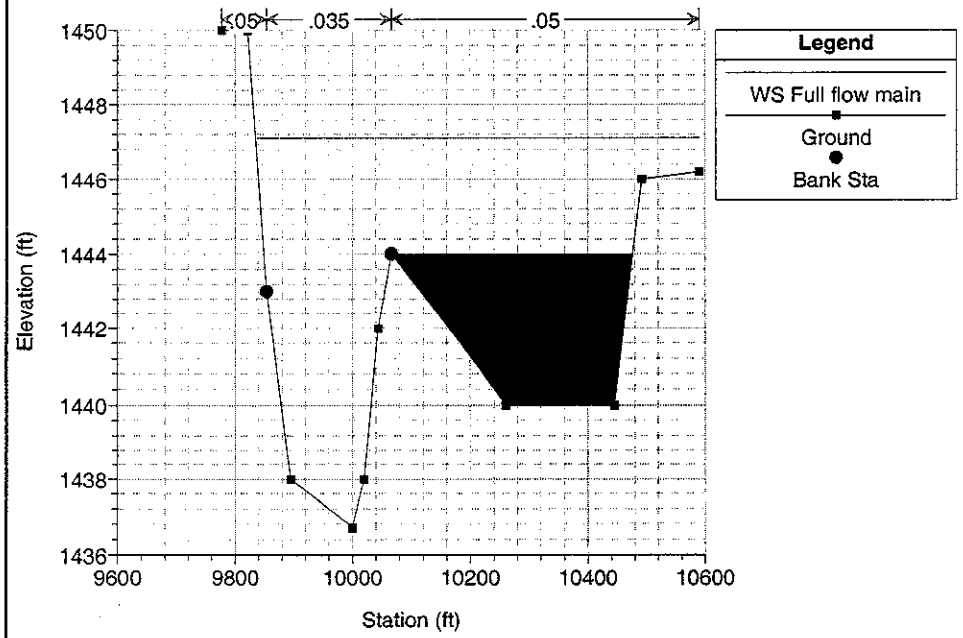

SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary updated cross section RS = 12.788



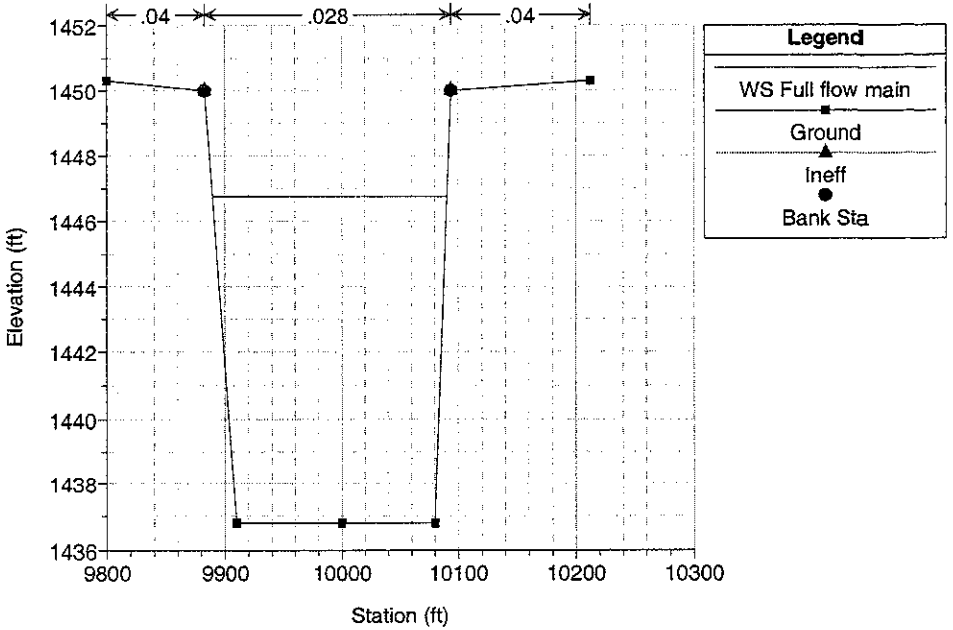
SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary {XS 1198} modified cross section RS = 12.743




SPRR Bridge Main Channel (full flow) Full flow SPRR main channel 03/20/2002 2:05:42 PM

River = Queen Creek Reach = SPRR-Boundary Section upstream of SPRR Bridge RS = 12.729



## D.7 DOWNSTREAM MAIN HEC-RAS MODEL, RHDNM2.PRJ (FOR TWO THRID FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: SPRR Bridge Main Channel (twothird flow)
Project File : RHdnm2.prj
Run Date and Time: 03/20/2002 4:22:26 PM

Project in English units

Project Description:
Spillway Inundation Study Rittenhouse FRS _ Two third flow scenario
Main Channel from Maricopa County boundary to SPRR Bridge

Model Vertical Datum: 1929 NGVD
Cross section data obtained based on the Topo map SECTION 25 T.2S., R.7E.
for QUEEN CREEK AREA DRAINAGE MASTER STUDY ( FCDMC October 19, 1986.)

Starting Water Surface Elevation, 1444.86, was obtained by running
exist HEC-RAS model, see Queen Creek/Sanokai Wash Hydraulic Master Plan -
Queen Creek HEC-RAS for Preferred Alternative (Huitt-Zollars, Inc.).

FCD 98-33
Michael Baker Jr., Inc. 03/2002

**********

The data and assumptions used
to develop this model are adequate for conceptual purposes but not for design
purposes. Therefore this model should not be used directly for the design
and construction of channel improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: Two third flow SPRR main channel
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm2.p02

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm2.g04

Flow Title : Two third flow 9333 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm2.f02

Plan Description:

Two thrid flow Scenario, downstream main channel area

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 10 | Mulitple Openings | = | 0 |
| | Culverts | = 0 | Inline Weirs | = | 0 |
| | Bridges | = 0 | | | |

Computational Information

| | | |
|---|---|---|
| Water surface calculation tolerance | = | 0.01 |
| Critical depth calculaton tolerance | = | 0.01 |
| Maximum number of interations | = | 35 |
| Maximum difference tolerance | = | 0.2 |
| Flow tolerance factor | = | 0.001 |

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Two third flow 9333 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm2.f02

Flow Data (cfs)

| River | Reach | RS | two third flow |
|---|---|---|---|
| Queen Creek | SPRR-Boundary | 13.350 | 9200 |
| Queen Creek | SPRR-Boundary | 13.307 | 9200 |
| Queen Creek | SPRR-Boundary | 13.212 | 9200 |
| Queen Creek | SPRR-Boundary | 13.118 | 9200 |
| Queen Creek | SPRR-Boundary | 13.023 | 9200 |
| Queen Creek | SPRR-Boundary | 12.929 | 9200 |
| Queen Creek | SPRR-Boundary | 12.827 | 9200 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | SPRR-Boundary | two third flow | Critical | Known WS = 1444.86 |

GEOMETRY DATA

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm2.g04

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.350

INPUT
Description: new cross section #8
Station Elevation Data num= 27

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9025 | 1456 | 9480 | 1454 | 9870 | 1452 | 9950 | 1450 | 10000 | 1449.4 |
| 10150 | 1450 | 10171 | 1452 | 10176 | 1454 | 10190 | 1454.4 | 10205 | 1454 |
| 10300 | 1453 | 10690 | 1454 | 11050 | 1454 | 11250 | 1454 | 11275 | 1456.41 |
| 11300 | 1454 | 11450 | 1453.3 | 11930 | 1453 | 12390 | 1454 | 12440 | 1456 |
| 12815 | 1457.4 | 13250 | 1456 | 13365 | 1454 | 13445 | 1454 | 13485 | 1456 |
| 13540 | 1452 | 14000 | 1452 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9025 | .05 | 9870 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9870 | 10190 | 240 | 225.45 | 220 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9025 | 9400 | 1458 | 11275 | 14000 | 1456.41 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 11298 | 14000 | 1454 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1454.56 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.11 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1453.45 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1453.43 | Flow Area (sq ft) | 205.19 | 1000.28 | 49.26 |
| E.G. Slope (ft/ft) | 0.008601 | Area (sq ft) | 205.19 | 1000.28 | 49.26 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 456.54 | 8693.19 | 50.27 |
| Top Width (ft) | 806.09 | Top Width (ft) | 282.88 | 304.63 | 218.58 |
| Vel Total (ft/s) | 7.33 | Avg. Vel. (ft/s) | 2.22 | 8.69 | 1.02 |
| Max Chl Dpth (ft) | 4.05 | Hydr. Depth (ft) | 0.73 | 3.28 | 0.23 |
| Conv. Total (cfs) | 99200.0 | Conv. (cfs) | 4922.7 | 93735.3 | 542.0 |
| Length Wtd. (ft) | 229.87 | Wetted Per. (ft) | 282.89 | 305.03 | 218.58 |
| Min Ch El (ft) | 1449.40 | Shear (lb/sq ft) | 0.39 | 1.76 | 0.12 |
| Alpha | 1.33 | Stream Power (lb/ft s) | 0.87 | 15.30 | 0.12 |
| Frctn Loss (ft) | 0.88 | Cum Volume (acre-ft) | 85.01 | 86.25 | 75.21 |
| C & E Loss (ft) | 0.26 | Cum SA (acres) | 37.02 | 17.73 | 81.98 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations,. when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9532.00 | 9616.50 | 0.93 | 2.21 | 29.38 | 0.01 | 0.08 | 0.42 |
| 9616.50 | 9701.00 | 37.34 | 31.04 | 84.50 | 0.41 | 0.37 | 1.20 |
| 9701.00 | 9785.50 | 136.84 | 67.66 | 84.50 | 1.49 | 0.80 | 2.02 |
| 9785.50 | 9870.00 | 281.41 | 104.27 | 84.50 | 3.06 | 1.23 | 2.70 |
| LB 9870.00 | 9934.00 | 953.69 | 144.04 | 64.02 | 10.37 | 2.25 | 6.62 |
| 9934.00 | 9998.00 | 2102.74 | 231.47 | 64.01 | 22.86 | 3.62 | 9.08 |
| 9998.00 | 10062.00 | 2415.40 | 251.53 | 64.00 | 26.25 | 3.93 | 9.60 |
| 10062.00 | 10126.00 | 2159.39 | 235.18 | 64.00 | 23.47 | 3.67 | 9.18 |
| 10126.00 | RB 10190.00 | 1061.99 | 138.06 | 49.00 | 11.54 | 2.84 | 7.69 |
| 10190.00 | 10571.00 | 50.27 | 49.26 | 218.58 | 0.55 | 0.23 | 1.02 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.307

INPUT
Description: new cross section #7

Station Elevation Data num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8550 | 1455.5 | 8610 | 1454 | 9423 | 1452 | 9600 | 1450 | 9700 | 1450 |
| 9710 | 1440 | 9780 | 1440 | 9890 | 1450 | 9947 | 1450 | 9970 | 1448 |
| 9985 | 1447.5 | 10004 | 1448 | 10142 | 1450 | 10156 | 1454 | 10169 | 1455 |
| 10180 | 1454 | 10550 | 1453 | 11190 | 1454 | 11200 | 1454.3 | 11240 | 1454 |
| 11260 | 1454 | 11440 | 1452.6 | 11880 | 1452.7 | 12325 | 1453 | 12410 | 1454 |
| 12430 | 1455.5 | 12440 | 1454 | 12580 | 1455.3 | 12800 | 1456 | 12820 | 1457 |
| 12840 | 1456 | 12950 | 1454.8 | 13480 | 1455.8 | 13500 | 1452 | 13780 | 1450 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8550 | .05 | 9947 | .035 | 10156 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9947 | 10156 | 550 | 498.6 | 460 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 9450 | 1460 | 11200 | 13780 | 1454.3 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 9880 | 1448 | 11240 | 13780 | 1454 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.14 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.25 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1452.89 | Reach Len. (ft) | 550.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1451.13 | Flow Area (sq ft) | 1666.49 | 816.20 | |
| E.G. Slope (ft/ft) | 0.002166 | Area (sq ft) | 1856.64 | 816.20 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 5157.28 | 4042.72 | |
| Top Width (ft) | 1091.96 | Top Width (ft) | 886.83 | 205.12 | |
| Vel Total (ft/s) | 3.71 | Avg. Vel. (ft/s) | 3.09 | 4.95 | |
| Max Chl Dpth (ft) | 5.39 | Hydr. Depth (ft) | 3.35 | 3.98 | |
| Conv. Total (cfs) | 197675.1 | Conv. (cfs) | 110811.5 | 86863.6 | |
| Length Wtd. (ft) | 526.03 | Wetted Per. (ft) | 497.93 | 205.65 | |
| Min Ch El (ft) | 1447.50 | Shear (lb/sq ft) | 0.45 | 0.54 | |
| Alpha | 1.18 | Stream Power (lb/ft s) | 1.40 | 2.66 | |
| Frctn Loss (ft) | 1.08 | Cum Volume (acre-ft) | 79.33 | 81.55 | 75.09 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 33.79 | 16.41 | 81.42 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9388.20 | 9527.90 | 233.56 | 127.58 | 77.91 | 2.54 | 1.64 | 1.83 |
| 9527.90 | 9667.60 | 953.18 | 374.72 | 139.70 | 10.36 | 2.68 | 2.54 |
| 9667.60 | 9807.30 | 2178.08 | 616.69 | 140.53 | 23.67 | 4.41 | 3.53 |
| 9807.30 | 9947.00 | 1792.45 | 547.49 | 139.79 | 19.48 | 3.92 | 3.27 |
| LB 9947.00 | 9988.80 | 980.95 | 186.97 | 41.90 | 10.66 | 4.47 | 5.25 |
| 9988.80 | 10030.60 | 1121.34 | 202.42 | 41.81 | 12.19 | 4.84 | 5.54 |
| 10030.60 | 10072.40 | 886.00 | 175.74 | 41.81 | 9.63 | 4.20 | 5.04 |
| 10072.40 | 10114.20 | 683.60 | 150.41 | 41.80 | 7.43 | 3.60 | 4.54 |
| 10114.20 | RB 10156.00 | 370.83 | 100.66 | 38.33 | 4.03 | 2.65 | 3.68 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.212

INPUT
Description: new cross section #6
Station Elevation Data num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8530 | 1454.5 | 8580 | 1454 | 8840 | 1452 | 9200 | 1450 | 9210 | 1440 |
| 9570 | 1440 | 9630 | 1460 | 9700 | 1440 | 9850 | 1440 | 9885 | 1450 |
| 9895 | 1452 | 9920 | 1450 | 9930 | 1448 | 9981 | 1446.1 | 10095 | 1448 |
| 10126 | 1452 | 10160 | 1452 | 10250 | 1451 | 10770 | 1451.5 | 11040 | 1452 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 11150 | 1452.4 | 11230 | 1452 | 11240 | 1452 | 11475 | 1451.3 | 11920 | 1451.55 |
| 12340 | 1452 | 12430 | 1453.65 | 12590 | 1453.5 | 12930 | 1452.9 | 13280 | 1453.2 |
| 13420 | 1454 | 13460 | 1454.5 | 13485 | 1454 | 13495 | 1452 | 13520 | 1450 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8530 | .05 | 9895 | .035 | 10126 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9895 | 10126 | 470 | 496.1 | 525 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9630 | 1460 | 11150 | 13520 | 1453.5 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9900 | 1446 | 13400 | 13520 | 1453 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1452.06 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.28 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1451.78 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1449.17 | Flow Area (sq ft) | 1229.30 | 883.65 | 324.89 |
| E.G. Slope (ft/ft) | 0.001958 | Area (sq ft) | 3799.94 | 883.65 | 547.02 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 4847.75 | 4105.92 | 246.32 |
| Top Width (ft) | 2751.72 | Top Width (ft) | 961.06 | 226.57 | 1564.09 |
| Vel Total (ft/s) | 3.77 | Avg. Vel. (ft/s) | 3.94 | 4.65 | 0.76 |
| Max Chl Dpth (ft) | 5.78 | Hydr. Depth (ft) | 5.23 | 3.90 | 0.44 |
| Conv. Total (cfs) | 207932.8 | Conv. (cfs) | 109566.0 | 92799.6 | 5567.2 |
| Length Wtd. (ft) | 486.89 | Wetted Per. (ft) | 236.68 | 227.13 | 742.04 |
| Min Ch El (ft) | 1446.10 | Shear (lb/sq ft) | 0.63 | 0.48 | 0.05 |
| Alpha | 1.25 | Stream Power (lb/ft s) | 2.50 | 2.21 | 0.04 |
| Frctn Loss (ft) | 1.01 | Cum Volume (acre-ft) | 43.62 | 71.82 | 72.20 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 22.13 | 13.94 | 73.17 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9622.00 | 9758.50 | 2032.20 | 518.07 | 100.54 | 22.09 | 5.19 | 3.92 |
| 9758.50 | 9895.00 | 2815.58 | 711.23 | 136.14 | 30.60 | 5.25 | 3.96 |
| LB 9895.00 | 9941.20 | 269.02 | 92.32 | 43.74 | 2.92 | 2.12 | 2.91 |
| 9941.20 | 9987.40 | 1209.70 | 232.62 | 46.23 | 13.15 | 5.03 | 5.20 |
| 9987.40 | 10033.60 | 1272.53 | 239.74 | 46.21 | 13.83 | 5.19 | 5.31 |
| 10033.60 | 10079.80 | 973.68 | 204.17 | 46.21 | 10.58 | 4.42 | 4.77 |
| 10079.80 | RB 10126.00 | 380.98 | 114.79 | 44.75 | 4.14 | 2.58 | 3.32 |
| 10126.00 | 10465.40 | 150.29 | 173.37 | 285.70 | 1.63 | 0.61 | 0.87 |
| 10465.40 | 10804.80 | 92.55 | 138.85 | 339.40 | 1.01 | 0.41 | 0.67 |
| 10804.80 | 11144.20 | 3.48 | 12.66 | 116.94 | 0.04 | 0.11 | 0.27 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.118

INPUT
Description: new cross section #5
Station Elevation Data num= 29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8590 | 1452 | 9160 | 1452 | 9230 | 1440 | 9530 | 1440 | 9540 | 1450 |
| 9835 | 1452 | 9860 | 1455 | 9920 | 1452 | 9935 | 1446 | 9978 | 1444.1 |
| 10080 | 1446 | 10090 | 1450 | 10100 | 1452 | 10110 | 1452 | 10120 | 1452 |
| 10140 | 1450 | 10650 | 1449.8 | 11200 | 1449.9 | 11270 | 1449.5 | 11400 | 1450 |
| 11500 | 1450 | 12030 | 1450.6 | 12365 | 1452 | 12420 | 1452.6 | 12560 | 1452 |
| 12910 | 1451.6 | 13430 | 1451.7 | 13580 | 1452 | 13660 | 1452.2 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|

```
    8590     .05    9920    .035   10090     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9920   10090              470     504     560            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    8590    9250    1452   11140   13660    1452
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
    8590    9530    1447
```

CROSS SECTION OUTPUT  Profile #two third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1451.04 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.36 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1450.68 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |
| Crit W.S. (ft) | 1449.11 | Flow Area (sq ft) | 1086.08 | 870.44 | 810.04 |
| E.G. Slope (ft/ft) | 0.002224 | Area (sq ft) | 1349.40 | 870.44 | 1316.33 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 3009.76 | 5209.68 | 980.56 |
| Top Width (ft) | 2558.42 | Top Width (ft) | 472.51 | 166.70 | 1919.21 |
| Vel Total (ft/s) | 3.33 | Avg. Vel. (ft/s) | 2.77 | 5.99 | 1.21 |
| Max Chl Dpth (ft) | 6.58 | Hydr. Depth (ft) | 2.78 | 5.22 | 0.80 |
| Conv. Total (cfs) | 195068.7 | Conv. (cfs) | 63816.3 | 110461.4 | 20791.0 |
| Length Wtd. (ft) | 500.85 | Wetted Per. (ft) | 390.66 | 168.43 | 1010.29 |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | 0.39 | 0.72 | 0.11 |
| Alpha | 2.08 | Stream Power (lb/ft s) | 1.07 | 4.30 | 0.13 |
| Frctn Loss (ft) | 1.75 | Cum Volume (acre-ft) | 15.84 | 61.83 | 60.97 |
| C & E Loss (ft) | 0.09 | Cum SA (acres) | 14.39 | 11.70 | 52.17 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9122.00 | 9255.00 | 53.88 | 18.40 | 5.00 | 0.59 | 3.68 | 2.93 |
| 9255.00 | 9388.00 | 1433.09 | 489.37 | 133.00 | 15.58 | 3.68 | 2.93 |
| 9388.00 | 9521.00 | 1433.09 | 489.37 | 133.00 | 15.58 | 3.68 | 2.93 |
| 9521.00 | 9654.00 | 89.70 | 88.96 | 119.66 | 0.97 | 0.75 | 1.01 |
| 9654.00 | 9920.00 | | | | | | |
| LB 9920.00 | 9954.00 | 608.31 | 124.26 | 31.62 | 6.61 | 4.05 | 4.90 |
| 9954.00 | 9988.00 | 1389.53 | 210.05 | 34.03 | 15.10 | 6.18 | 6.62 |
| 9988.00 | 10022.00 | 1352.29 | 206.60 | 34.01 | 14.70 | 6.08 | 6.55 |
| 10022.00 | 10056.00 | 1125.63 | 185.07 | 34.01 | 12.24 | 5.44 | 6.08 |
| 10056.00 | RB 10090.00 | 733.91 | 144.47 | 34.77 | 7.98 | 4.25 | 5.08 |
| 10090.00 | 10447.00 | 260.69 | 230.53 | 317.29 | 2.83 | 0.73 | 1.13 |
| 10447.00 | 10804.00 | 381.55 | 303.71 | 357.00 | 4.15 | 0.85 | 1.26 |
| 10804.00 | 11161.00 | 338.34 | 275.81 | 336.00 | 3.68 | 0.82 | 1.23 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 13.023

INPUT
Description: new cross section #4
Station Elevation Data  num=  26

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8460 | 1451 | 8610 | 1450 | 9382 | 1448 | 9683 | 1446 | 9870 | 1446 |
| 9874 | 1450 | 9894 | 1450.5 | 9910 | 1444 | 9980 | 1442.5 | 10110 | 1444 |
| 10134 | 1450 | 10143 | 1450.5 | 10150 | 1450 | 10510 | 1448 | 11180 | 1448 |
| 11240 | 1449.1 | 11275 | 1448 | 11800 | 1447.5 | 11990 | 1448 | 12200 | 1450 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12380 | 1450.5 | 12475 | 1450.9 | 12820 | 1450 | 13420 | 1449.8 | 13775 | 1450 |
| 13800 | 1450.8 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8460 | .05 | 9910 | .035 | 10134 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10134 | 420 | 494.4 | 590 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8460 | 9400 | 1448 | 11240 | 13800 | 1449.1 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 8460 | 9870 | 1447.5 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.20 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 1.26 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1447.94 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1447.23 | Flow Area (sq ft) | 216.14 | 969.48 | |
| E.G. Slope (ft/ft) | 0.006288 | Area (sq ft) | 216.43 | 969.48 | 139.70 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 327.07 | 8872.93 | |
| Top Width (ft) | 1337.54 | Top Width (ft) | 489.68 | 215.77 | 632.08 |
| Vel Total (ft/s) | 7.76 | Avg. Vel. (ft/s) | 1.51 | 9.15 | |
| Max Chl Dpth (ft) | 5.44 | Hydr. Depth (ft) | 0.45 | 4.49 | |
| Conv. Total (cfs) | 116021.9 | Conv. (cfs) | 4124.7 | 111897.2 | |
| Length Wtd. (ft) | 499.83 | Wetted Per. (ft) | 481.31 | 216.28 | |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | 0.18 | 1.76 | |
| Alpha | 1.34 | Stream Power (lb/ft s) | 0.27 | 16.10 | |
| Frctn Loss (ft) | 1.56 | Cum Volume (acre-ft) | 7.39 | 51.19 | 51.61 |
| C & E Loss (ft) | 0.27 | Cum SA (acres) | 9.20 | 9.49 | 35.77 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9330.00 | 9475.00 | 25.08 | 22.26 | 75.00 | 0.27 | 0.30 | 1.13 |
| 9475.00 | 9620.00 | 94.17 | 64.09 | 145.00 | 1.02 | 0.44 | 1.47 |
| 9620.00 | 9765.00 | 94.17 | 64.09 | 145.00 | 1.02 | 0.44 | 1.47 |
| 9765.00 | 9910.00 | 113.66 | 65.69 | 116.31 | 1.24 | 0.57 | 1.73 |
| LB 9910.00 | 9954.80 | 1772.22 | 198.10 | 44.81 | 19.26 | 4.42 | 8.95 |
| 9954.80 | 9999.60 | 2352.24 | 234.78 | 44.81 | 25.57 | 5.24 | 10.02 |
| 9999.60 | 10044.40 | 2144.37 | 222.10 | 44.80 | 23.31 | 4.96 | 9.66 |
| 10044.40 | 10089.20 | 1784.78 | 198.93 | 44.80 | 19.40 | 4.44 | 8.97 |
| 10089.20 | RB 10134.00 | 819.31 | 115.57 | 37.05 | 8.91 | 3.16 | 7.09 |

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.929

INPUT
Description: cut cross section #3, center station 10000
Station Elevation Data num= 28

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8330 | 1454 | 8600 | 1450 | 9000 | 1448 | 9430 | 1448 | 9450 | 1446 |
| 9465 | 1444 | 9480 | 1442 | 9550 | 1440 | 9750 | 1421 | 9860 | 1446 |
| 9886 | 1442 | 9930 | 1441 | 10085 | 1442 | 10156 | 1444 | 10190 | 1446 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10825 | 1446 | 11200 | 1446 | 11250 | 1448 | 11280 | 1448.25 | 11700 | 1448.2 |
| 12070 | 1448.9 | 12395 | 1448.8 | 12525 | 1449.2 | 12630 | 1449.25 | 13260 | 1448.6 |
| 13600 | 1448 | 13850 | 1448 | 13855 | 1448.1 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8330 | .05 | 9860 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9860 | 10190 | 500 | 537.8 | 840 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8330 | 9710 | 1450 | 11280 | 13855 | 1448.5 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 9710 | 1446.5 | 9710 | 9860 | 1446.5 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.37 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.34 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1447.02 | Reach Len. (ft) | 500.00 | 537.80 | 840.00 |
| Crit W.S. (ft) | 1445.19 | Flow Area (sq ft) | 78.66 | 1532.56 | 1047.78 |
| E.G. Slope (ft/ft) | 0.001854 | Area (sq ft) | 219.01 | 1532.56 | 1047.78 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 65.45 | 7783.44 | 1351.11 |
| Top Width (ft) | 1785.85 | Top Width (ft) | 420.24 | 330.00 | 1035.61 |
| Vel Total (ft/s) | 3.46 | Avg. Vel. (ft/s) | 0.83 | 5.08 | 1.29 |
| Max Chl Dpth (ft) | 6.02 | Hydr. Depth (ft) | 0.52 | 4.64 | 1.01 |
| Conv. Total (cfs) | 213681.4 | Conv. (cfs) | 1520.2 | 180780.0 | 31381.2 |
| Length Wtd. (ft) | 562.90 | Wetted Per. (ft) | 150.00 | 330.91 | 1035.63 |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | 0.06 | 0.54 | 0.12 |
| Alpha | 1.84 | Stream Power (lb/ft s) | 0.05 | 2.72 | 0.15 |
| Frctn Loss (ft) | 0.91 | Cum Volume (acre-ft) | 5.29 | 36.99 | 43.57 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 4.82 | 6.39 | 24.48 |

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9707.00 | 9860.00 | 65.45 | 78.66 | 150.00 | 0.71 | 0.52 | 0.83 |
| LB 9860.00 | 9926.00 | 1430.72 | 297.79 | 66.82 | 15.55 | 4.51 | 4.80 |
| 9926.00 | 9992.00 | 2213.45 | 385.03 | 66.00 | 24.06 | 5.83 | 5.75 |
| 9992.00 | 10058.00 | 1952.94 | 357.16 | 66.00 | 21.23 | 5.41 | 5.47 |
| 10058.00 | 10124.00 | 1563.26 | 312.54 | 66.02 | 16.99 | 4.74 | 5.00 |
| 10124.00 | RB 10190.00 | 623.06 | 180.03 | 66.07 | 6.77 | 2.73 | 3.46 |
| 10190.00 | 10556.50 | 488.08 | 375.45 | 366.50 | 5.31 | 1.02 | 1.30 |
| 10556.50 | 10923.00 | 488.08 | 375.45 | 366.50 | 5.31 | 1.02 | 1.30 |
| 10923.00 | 11289.50 | 374.96 | 296.88 | 302.63 | 4.08 | 0.98 | 1.26 |

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.827

INPUT
Description: cut from map section 25 (QC area drainage master study)
Station Elevation Data num= 14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9100 | 1450.6 | 9280 | 1446 | 9792 | 1446 | 9892 | 1446 | 9900 | 1444 |
| 9930 | 1440 | 9971 | 1438.8 | 10160 | 1440 | 10162 | 1440.375 | 10192 | 1446 |
| 10320 | 1446 | 10670 | 1440 | 10840 | 1446 | 11110 | 1447 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9100 | .05 | 9900 | .035 | 10162 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9900 | 10162 | 150 | 206.7 | 470 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 9750 | 1448 | 10300 | 11110 | 1446 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.44 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.46 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |

| | | | | | |
|---|---|---|---|---|---|
| W.S. Elev (ft) | 1445.98 | Reach Len. (ft) | 150.00 | 206.70 | 470.00 |
| Crit W.S. (ft) | 1443.01 | Flow Area (sq ft) | 7.88 | 1645.49 | 83.90 |
| E.G. Slope (ft/ft) | 0.001436 | Area (sq ft) | 7.88 | 1645.49 | 1635.72 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 8.65 | 9005.56 | 185.79 |
| Top Width (ft) | 818.49 | Top Width (ft) | 7.94 | 262.00 | 548.55 |
| Vel Total (ft/s) | 5.30 | Avg. Vel. (ft/s) | 1.10 | 5.47 | 2.21 |
| Max Chl Dpth (ft) | 7.18 | Hydr. Depth (ft) | 0.99 | 6.28 | 2.80 |
| Conv. Total (cfs) | 242740.2 | Conv. (cfs) | 228.1 | 237610.0 | 4902.1 |
| Length Wtd. (ft) | 220.27 | Wetted Per. (ft) | 8.18 | 262.32 | 30.44 |
| Min Ch El (ft) | 1438.80 | Shear (lb/sq ft) | 0.09 | 0.56 | 0.25 |
| Alpha | 1.05 | Stream Power (lb/ft s) | 0.09 | 3.08 | 0.55 |
| Frctn Loss (ft) | 0.30 | Cum Volume (acre-ft) | 3.99 | 17.37 | 17.70 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | 2.36 | 2.74 | 9.21 |

Warning: Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main channel velocity head was the closest to the previously computed cross section.
Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT  Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9820.00 | 9900.00 | 8.65 | 7.88 | 8.18 | 0.09 | 0.99 | 1.10 |
| LB 9900.00 | 9952.40 | 1210.81 | 260.92 | 52.68 | 13.16 | 4.98 | 4.64 |
| 9952.40 | 10004.80 | 2152.66 | 367.76 | 52.41 | 23.40 | 7.02 | 5.85 |
| 10004.80 | 10057.20 | 2044.07 | 356.49 | 52.40 | 22.22 | 6.80 | 5.73 |
| 10057.20 | 10109.60 | 1880.16 | 339.05 | 52.40 | 20.44 | 6.47 | 5.55 |
| 10109.60 | RB 10162.00 | 1717.85 | 321.26 | 52.44 | 18.67 | 6.13 | 5.35 |
| 10162.00 | 10256.80 | 185.79 | 83.90 | 30.44 | 2.02 | 2.80 | 2.21 |

Warning: Multiple water surfaces were found that could balance the energy equation. The program selected the water surface whose main channel velocity head was the closest to the previously computed cross section.
Warning: Divided flow computed for this cross-section.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 12.788

INPUT
Description: updated cross section
Station Elevation Data  num=  14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9150 | 1451 | 9200 | 1450 | 9320 | 1444 | 9880 | 1444 | 9911 | 1440 |
| 10000 | 1438 | 10020 | 1437.5 | 10050 | 1438 | 10095 | 1440 | 10110 | 1444 |
| 10380 | 1444 | 10550 | 1444 | 10565 | 1446 | 10670 | 1446.5 | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9150 | .05 | 9880 | .035 | 10110 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9880 | 10110 | 190 | 238.7 | 290 | .1 | .3 |

Ineffective Flow  num=  2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9150 | 9660 | 1449 | 10440 | 10670 | 1447 |

CROSS SECTION OUTPUT  Profile #two third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.11 | Element | | | |
| Vel Head (ft) | 0.36 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1445.75 | Reach Len. (ft) | 190.00 | 238.70 | 290.00 |
| Crit W.S. (ft) | 1442.91 | Flow Area (sq ft) | 385.97 | 1478.01 | 578.95 |
| E.G. Slope (ft/ft) | 0.001271 | Area (sq ft) | 1013.24 | 1478.01 | 783.48 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 594.82 | 7712.94 | 892.23 |
| Top Width (ft) | 1278.25 | Top Width (ft) | 595.09 | 230.00 | 453.16 |
| Vel Total (ft/s) | 3.77 | Avg. Vel. (ft/s) | 1.54 | 5.22 | 1.54 |
| Max Chl Dpth (ft) | 8.25 | Hydr. Depth (ft) | 1.75 | 6.43 | 1.75 |
| Conv. Total (cfs) | 258063.7 | Conv. (cfs) | 16685.0 | 216351.1 | 25027.5 |
| Length Wtd. (ft) | 239.94 | Wetted Per. (ft) | 220.00 | 230.86 | 330.00 |
| Min Ch El (ft) | 1437.50 | Shear (lb/sq ft) | 0.14 | 0.51 | 0.14 |
| Alpha | 1.64 | Stream Power (lb/ft s) | 0.21 | 2.65 | 0.21 |
| Frctn Loss (ft) | 0.42 | Cum Volume (acre-ft) | 2.23 | 9.96 | 4.65 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 1.32 | 1.57 | 3.80 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9588.00 | 9661.00 | 2.70 | 1.75 | 1.00 | 0.03 | 1.75 | 1.54 |
| 9661.00 | 9734.00 | 197.37 | 128.07 | 73.00 | 2.15 | 1.75 | 1.54 |
| 9734.00 | 9807.00 | 197.37 | 128.07 | 73.00 | 2.15 | 1.75 | 1.54 |
| 9807.00 | 9880.00 | 197.37 | 128.07 | 73.00 | 2.15 | 1.75 | 1.54 |
| LB 9880.00 | 9926.00 | 819.92 | 205.23 | 46.26 | 8.91 | 4.46 | 4.00 |
| 9926.00 | 9972.00 | 1583.73 | 303.98 | 46.01 | 17.21 | 6.61 | 5.21 |
| 9972.00 | 10018.00 | 2021.69 | 351.94 | 46.01 | 21.97 | 7.65 | 5.74 |
| 10018.00 | 10064.00 | 2107.00 | 360.80 | 46.02 | 22.90 | 7.84 | 5.84 |
| 10064.00 | RB 10110.00 | 1180.60 | 256.06 | 46.55 | 12.83 | 5.57 | 4.61 |
| 10110.00 | 10166.00 | 151.41 | 98.25 | 56.00 | 1.65 | 1.75 | 1.54 |
| 10166.00 | 10222.00 | 151.41 | 98.25 | 56.00 | 1.65 | 1.75 | 1.54 |
| 10222.00 | 10278.00 | 151.41 | 98.25 | 56.00 | 1.65 | 1.75 | 1.54 |
| 10278.00 | 10334.00 | 151.41 | 98.25 | 56.00 | 1.65 | 1.75 | 1.54 |
| 10334.00 | 10390.00 | 151.41 | 98.25 | 56.00 | 1.65 | 1.75 | 1.54 |
| 10390.00 | 10446.00 | 135.19 | 87.72 | 50.00 | 1.47 | 1.75 | 1.54 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.743

INPUT
Description: (XS 1198) modified cross section
Station Elevation Data num= 12

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9777 | 1450 | 9822 | 1450 | 9854 | 1443 | 9895 | 1438 | 10000 | 1436.7 |
| 10020 | 1438 | 10044 | 1442 | 10067 | 1444 | 10260 | 1440 | 10445 | 1440 |
| 10492 | 1446 | 10590 | 1446.2 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9777 | .05 | 9854 | .035 | 10067 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9854 | 10067 | 30 | 75.6 | 190 | .3 | .5 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10170 | 10590 | |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10067 | 10590 | 1444 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1445.66 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.76 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1444.90 | Reach Len. (ft) | 30.00 | 75.60 | 190.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 8.22 | 1284.65 | 92.31 |
| E.G. Slope (ft/ft) | 0.002526 | Area (sq ft) | 8.22 | 1284.65 | 370.01 |
| Q Total (cfs) | 9200.00 | Flow (cfs) | 11.66 | 9060.17 | 128.17 |
| Top Width (ft) | 638.02 | Top Width (ft) | 8.67 | 213.00 | 416.35 |
| Vel Total (ft/s) | 6.64 | Avg. Vel. (ft/s) | 1.42 | 7.05 | 1.39 |
| Max Chl Dpth (ft) | 8.20 | Hydr. Depth (ft) | 0.95 | 6.03 | 0.90 |
| Conv. Total (cfs) | 183057.5 | Conv. (cfs) | 232.1 | 180275.2 | 2550.2 |
| Length Wtd. (ft) | 76.37 | Wetted Per. (ft) | 8.87 | 213.77 | 103.00 |
| Min Ch El (ft) | 1436.70 | Shear (lb/sq ft) | 0.15 | 0.95 | 0.14 |
| Alpha | 1.11 | Stream Power (lb/ft s) | 0.21 | 6.68 | 0.20 |
| Frctn Loss (ft) | 0.11 | Cum Volume (acre-ft) | 0.00 | 2.39 | 0.81 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 0.00 | 0.35 | 0.91 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9838.60 | 9846.30 | 0.03 | 0.10 | 0.99 | 0.00 | 0.11 | 0.31 |
| 9846.30 | 9854.00 | 11.63 | 8.12 | 7.88 | 0.13 | 1.05 | 1.43 |
| LB 9854.00 | 9896.60 | 1046.42 | 191.29 | 42.90 | 11.37 | 4.49 | 5.47 |
| 9896.60 | 9939.20 | 2298.49 | 305.86 | 42.60 | 24.98 | 7.18 | 7.51 |
| 9939.20 | 9981.80 | 2586.71 | 328.32 | 42.60 | 28.12 | 7.71 | 7.88 |
| 9981.80 | 10024.40 | 2562.39 | 326.78 | 42.70 | 27.85 | 7.67 | 7.84 |
| 10024.40 | RB 10067.00 | 566.17 | 132.39 | 42.96 | 6.15 | 3.11 | 4.28 |
| 10067.00 | 10119.30 | 65.08 | 46.87 | 52.30 | 0.71 | 0.90 | 1.39 |
| 10119.30 | 10171.60 | 63.09 | 45.44 | 50.70 | 0.69 | 0.90 | 1.39 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.729

INPUT
Description: Section upstream of SPRR Bridge
Station Elevation Data num= 7

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9800 | 1450.3 | 9883 | 1450 | 9910 | 1436.8 | 10000 | 1436.8 | 10080 | 1436.8 |
| 10094 | 1450 | 10212 | 1450.3 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9800 | .04 | 9883 | .028 | 10094 | .04 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9883 | 10094 | 40 | 40 | 40 | .3 | .5 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9800 | 9883 | 1450 | 10094 | 10212 | 1450 |

CROSS SECTION OUTPUT Profile #two third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1445.47 | Element | | | |
| Vel Head (ft) | 0.61 | Wt. n-Val. | | 0.028 | |
| W.S. Elev (ft) | 1444.86 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1441.22 | Flow Area (sq ft) | | 1471.08 | |
| E.G. Slope (ft/ft) | 0.000972 | Area (sq ft) | | 1471.08 | |
| Q Total (cfs) | 9200.00 | Flow (cfs) | | 9200.00 | |
| Top Width (ft) | 195.04 | Top Width (ft) | | 195.04 | |
| Vel Total (ft/s) | 6.25 | Avg. Vel. (ft/s) | | 6.25 | |
| Max Chl Dpth (ft) | 8.06 | Hydr. Depth (ft) | | 7.54 | |
| Conv. Total (cfs) | 295164.9 | Conv. (cfs) | | 295164.9 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 200.10 | |
| Min Ch El (ft) | 1436.80 | Shear (lb/sq ft) | | 0.45 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 2.79 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9883.00 | 9925.20 | 979.73 | 188.95 | 33.55 | 10.65 | 5.96 | 5.19 |
| 9925.20 | 9967.40 | 2239.71 | 340.13 | 42.20 | 24.34 | 8.06 | 6.58 |
| 9967.40 | 10009.60 | 2239.66 | 340.12 | 42.20 | 24.34 | 8.06 | 6.58 |
| 10009.60 | 10051.80 | 2239.71 | 340.13 | 42.20 | 24.34 | 8.06 | 6.58 |
| 10051.80 | RB 10094.00 | 1501.20 | 261.74 | 39.95 | 16.32 | 7.12 | 5.74 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | .05 | .035 | .05 |

| | | | | |
|---|---|---|---|---|
| SPRR-Boundary | 13.307 | .05 | .035 | .05 |
| SPRR-Boundary | 13.212 | .05 | .035 | .05 |
| SPRR-Boundary | 13.118 | .05 | .035 | .05 |
| SPRR-Boundary | 13.023 | .05 | .035 | .05 |
| SPRR-Boundary | 12.929 | .05 | .035 | .05 |
| SPRR-Boundary | 12.827 | .05 | .035 | .05 |
| SPRR-Boundary | 12.788 | .05 | .035 | .05 |
| SPRR-Boundary | 12.743 | .05 | .035 | .05 |
| SPRR-Boundary | 12.729 | .04 | .028 | .04 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 240 | 225.45 | 220 |
| SPRR-Boundary | 13.307 | 550 | 498.6 | 460 |
| SPRR-Boundary | 13.212 | 470 | 496.1 | 525 |
| SPRR-Boundary | 13.118 | 470 | 504 | 560 |
| SPRR-Boundary | 13.023 | 420 | 494.4 | 590 |
| SPRR-Boundary | 12.929 | 500 | 537.8 | 840 |
| SPRR-Boundary | 12.827 | 150 | 206.7 | 470 |
| SPRR-Boundary | 12.788 | 190 | 238.7 | 290 |
| SPRR-Boundary | 12.743 | 30 | 75.6 | 190 |
| SPRR-Boundary | 12.729 | 40 | 40 | 40 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| SPRR-Boundary | 13.350 | .1 | .3 |
| SPRR-Boundary | 13.307 | .1 | .3 |
| SPRR-Boundary | 13.212 | .1 | .3 |
| SPRR-Boundary | 13.118 | .1 | .3 |
| SPRR-Boundary | 13.023 | .1 | .3 |
| SPRR-Boundary | 12.929 | .1 | .3 |
| SPRR-Boundary | 12.827 | .1 | .3 |
| SPRR-Boundary | 12.788 | .1 | .3 |
| SPRR-Boundary | 12.743 | .3 | .5 |
| SPRR-Boundary | 12.729 | .3 | .5 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 9200.00 | 1449.40 | 1453.45 | 1453.43 | 1454.56 | 0.008601 | 8.69 | 1254.73 | 806.09 | 0.85 |
| SPRR-Boundary | 13.307 | 9200.00 | 1447.50 | 1452.89 | 1451.13 | 1453.14 | 0.002166 | 4.95 | 2482.69 | 1091.96 | 0.44 |
| SPRR-Boundary | 13.212 | 9200.00 | 1446.10 | 1451.78 | 1449.17 | 1452.06 | 0.001958 | 4.65 | 2437.84 | 2751.72 | 0.41 |
| SPRR-Boundary | 13.118 | 9200.00 | 1444.10 | 1450.68 | 1449.11 | 1451.04 | 0.002224 | 5.99 | 2766.56 | 2558.42 | 0.46 |
| SPRR-Boundary | 13.023 | 9200.00 | 1442.50 | 1447.94 | 1447.23 | 1449.20 | 0.006288 | 9.15 | 1185.62 | 1337.54 | 0.76 |
| SPRR-Boundary | 12.929 | 9200.00 | 1441.00 | 1447.02 | 1445.19 | 1447.37 | 0.001854 | 5.08 | 2658.99 | 1785.85 | 0.42 |
| SPRR-Boundary | 12.827 | 9200.00 | 1438.80 | 1445.98 | 1443.01 | 1446.44 | 0.001436 | 5.47 | 1737.27 | 818.49 | 0.38 |
| SPRR-Boundary | 12.788 | 9200.00 | 1437.50 | 1445.75 | 1442.91 | 1446.11 | 0.001271 | 5.22 | 2442.93 | 1278.25 | 0.36 |
| SPRR-Boundary | 12.743 | 9200.00 | 1436.70 | 1444.90 | | 1445.66 | 0.002526 | 7.05 | 1385.18 | 638.02 | 0.51 |
| SPRR-Boundary | 12.729 | 9200.00 | 1436.80 | 1444.86 | 1441.22 | 1445.47 | 0.000972 | 6.25 | 1471.08 | 195.04 | 0.40 |

Profile Output Table - Standard Table 2

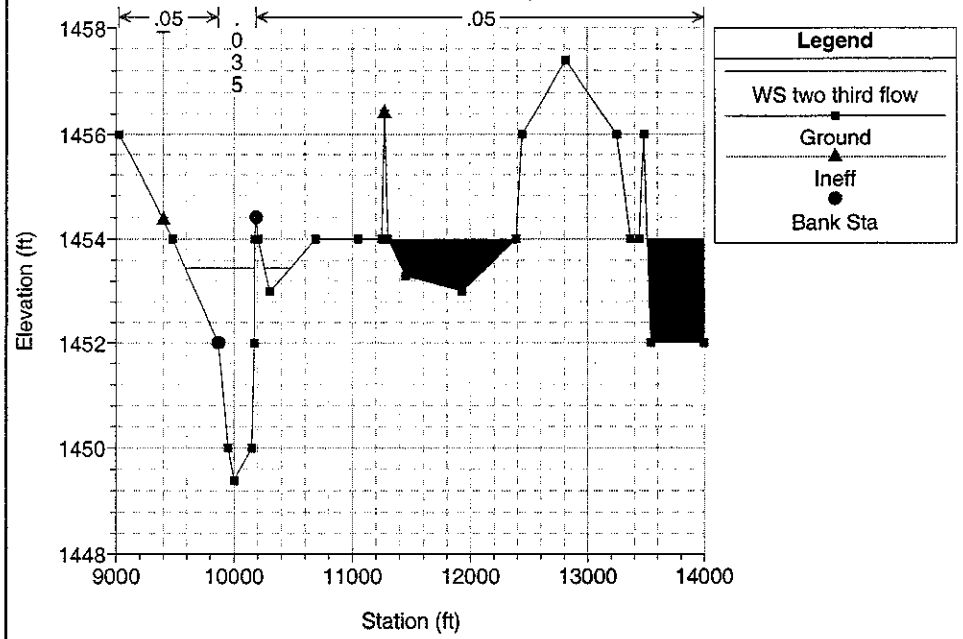
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 1454.56 | 1453.45 | 1.11 | 0.88 | 0.26 | 456.54 | 8693.19 | 50.27 | 806.09 |
| SPRR-Boundary | 13.307 | 1453.14 | 1452.89 | 0.25 | 1.08 | 0.00 | 5157.28 | 4042.72 | | 1091.96 |
| SPRR-Boundary | 13.212 | 1452.06 | 1451.78 | 0.28 | 1.01 | 0.01 | 4847.75 | 4105.92 | 246.32 | 2751.72 |
| SPRR-Boundary | 13.118 | 1451.04 | 1450.68 | 0.36 | 1.75 | 0.09 | 3009.76 | 5209.68 | 980.56 | 2558.42 |
| SPRR-Boundary | 13.023 | 1449.20 | 1447.94 | 1.26 | 1.56 | 0.27 | 327.07 | 8872.93 | | 1337.54 |
| SPRR-Boundary | 12.929 | 1447.37 | 1447.02 | 0.34 | 0.91 | 0.01 | 65.45 | 7783.44 | 1351.11 | 1785.85 |
| SPRR-Boundary | 12.827 | 1446.44 | 1445.98 | 0.46 | 0.30 | 0.03 | 8.65 | 9005.56 | 185.79 | 818.49 |
| SPRR-Boundary | 12.788 | 1446.11 | 1445.75 | 0.36 | 0.42 | 0.04 | 594.82 | 7712.94 | 892.23 | 1278.25 |
| SPRR-Boundary | 12.743 | 1445.66 | 1444.90 | 0.76 | 0.11 | 0.08 | 11.66 | 9060.17 | 128.17 | 638.02 |
| SPRR-Boundary | 12.729 | 1445.47 | 1444.86 | 0.61 | | | | 9200.00 | | 195.04 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 9200.00 | 1453.45 | 0.15 | 0.20 | 8.69 | 7.33 | 4.05 | 1.56 |
| SPRR-Boundary | 13.307 | 9200.00 | 1452.89 | 0.15 | 0.19 | 4.95 | 3.71 | 5.39 | 3.54 |
| SPRR-Boundary | 13.212 | 9200.00 | 1451.78 | 0.12 | 0.15 | 4.65 | 3.77 | 5.78 | 2.03 |
| SPRR-Boundary | 13.118 | 9200.00 | 1450.68 | 0.09 | 0.12 | 5.99 | 3.33 | 6.58 | 1.77 |
| SPRR-Boundary | 13.023 | 9200.00 | 1447.94 | 0.07 | 0.09 | 9.15 | 7.76 | 5.44 | 1.70 |
| SPRR-Boundary | 12.929 | 9200.00 | 1447.02 | 0.05 | 0.07 | 5.08 | 3.46 | 6.02 | 1.75 |
| SPRR-Boundary | 12.827 | 9200.00 | 1445.98 | 0.02 | 0.03 | 5.47 | 5.30 | 7.18 | 5.79 |
| SPRR-Boundary | 12.788 | 9200.00 | 1445.75 | 0.01 | 0.02 | 5.22 | 3.77 | 8.25 | 3.13 |
| SPRR-Boundary | 12.743 | 9200.00 | 1444.90 | 0.00 | 0.00 | 7.05 | 6.64 | 8.20 | 4.27 |
| SPRR-Boundary | 12.729 | 9200.00 | 1444.86 | 0.00 | 0.00 | 6.25 | 6.25 | 8.06 | 7.54 |

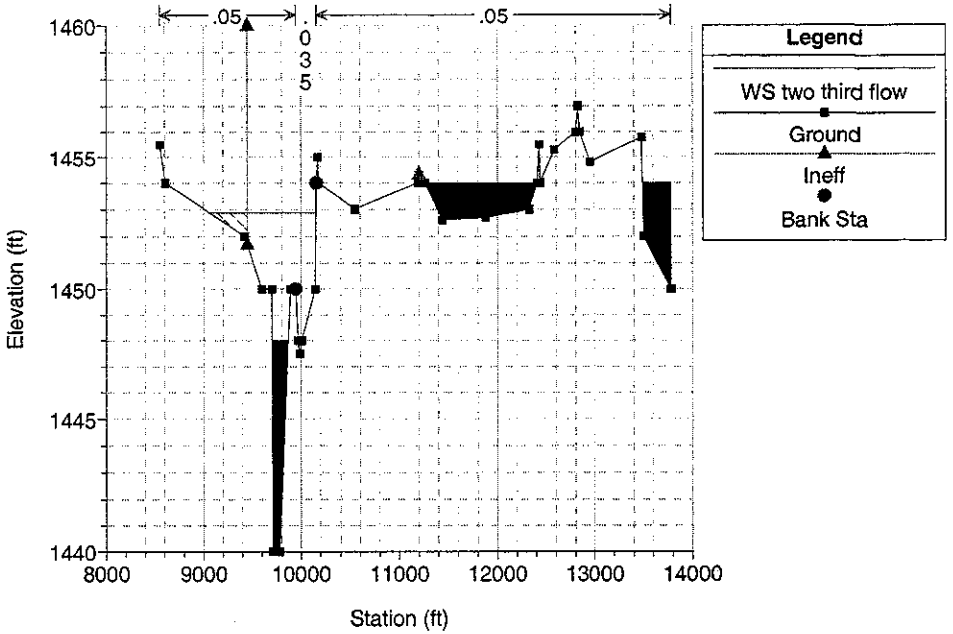
SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #8 RS = 13.350



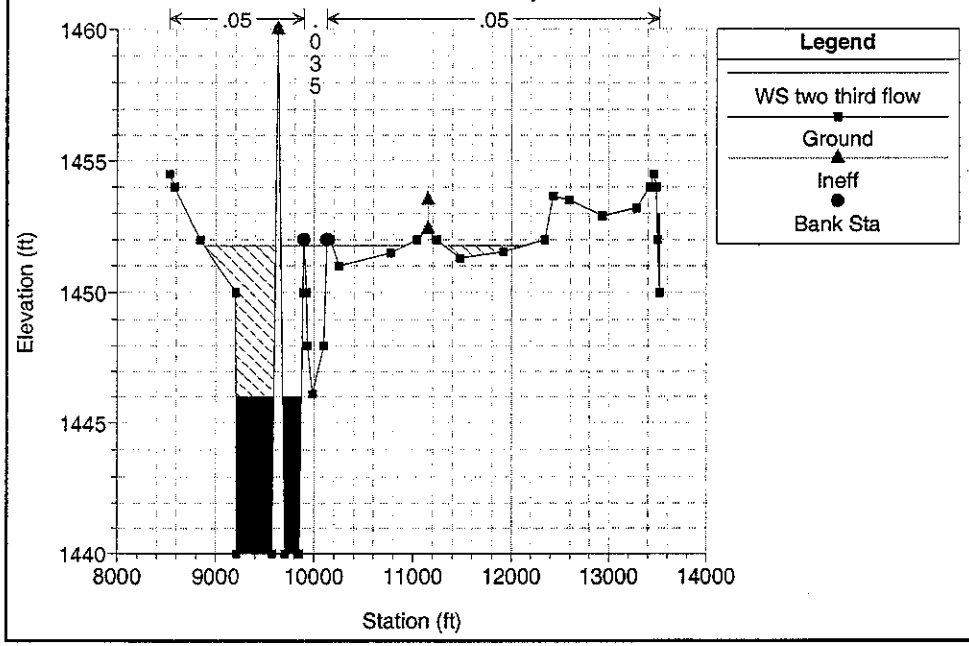

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #7 RS = 13.307



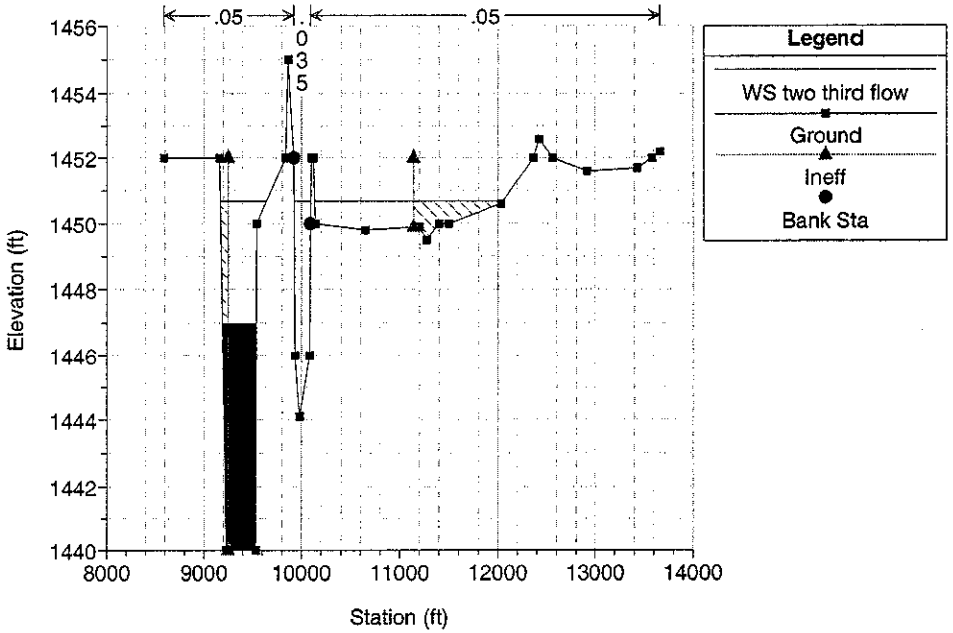

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #6 RS = 13.212



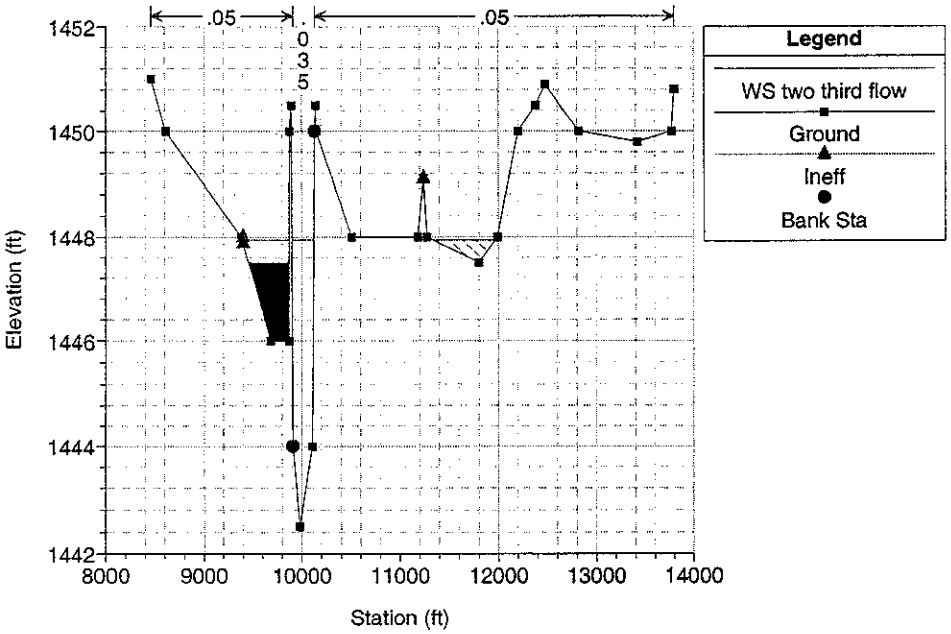

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #5 RS = 13.118



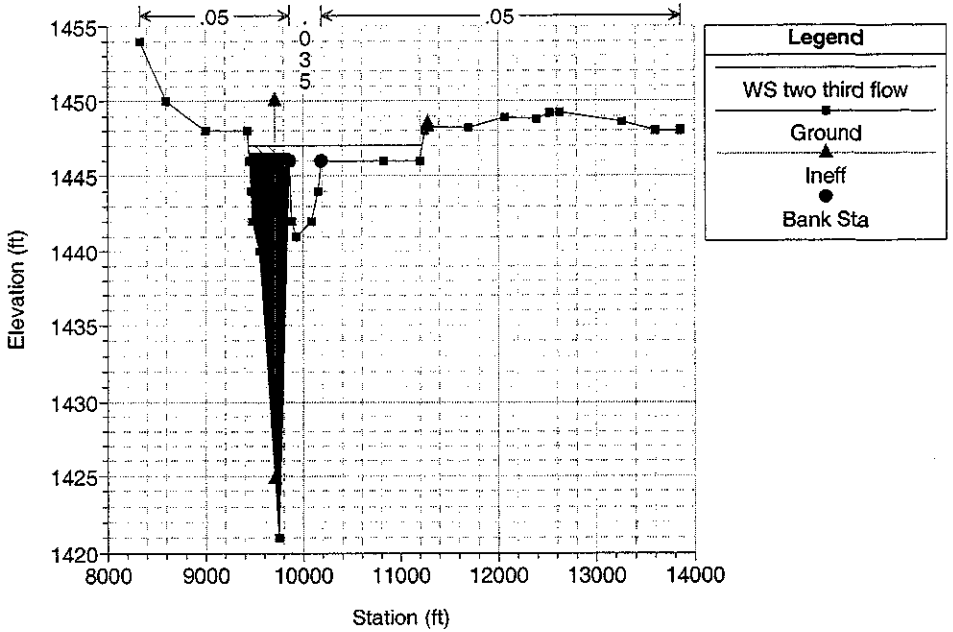
SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #4 RS = 13.023



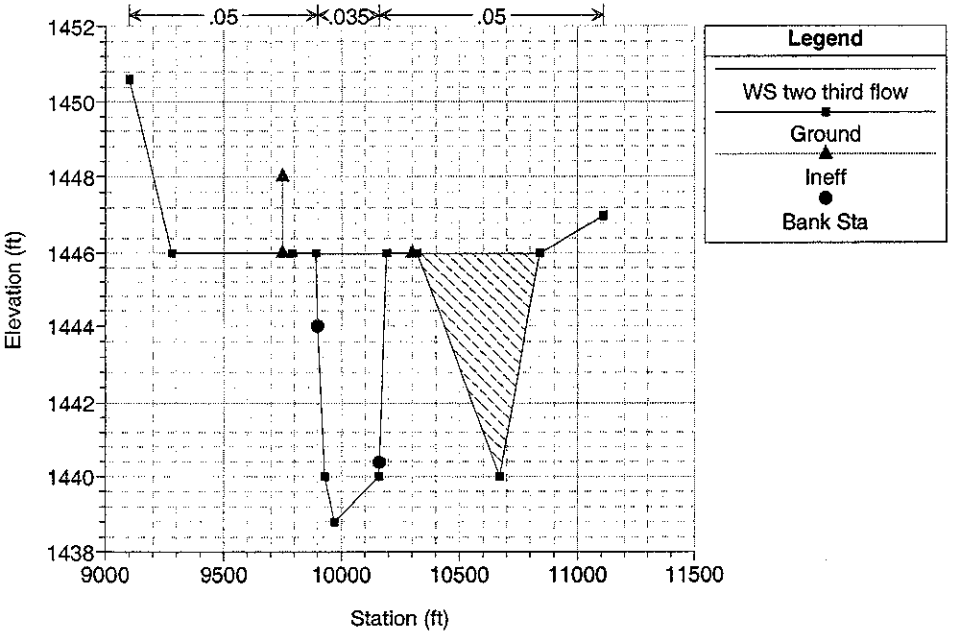

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary cut cross section #3, center station 100 RS = 12.929



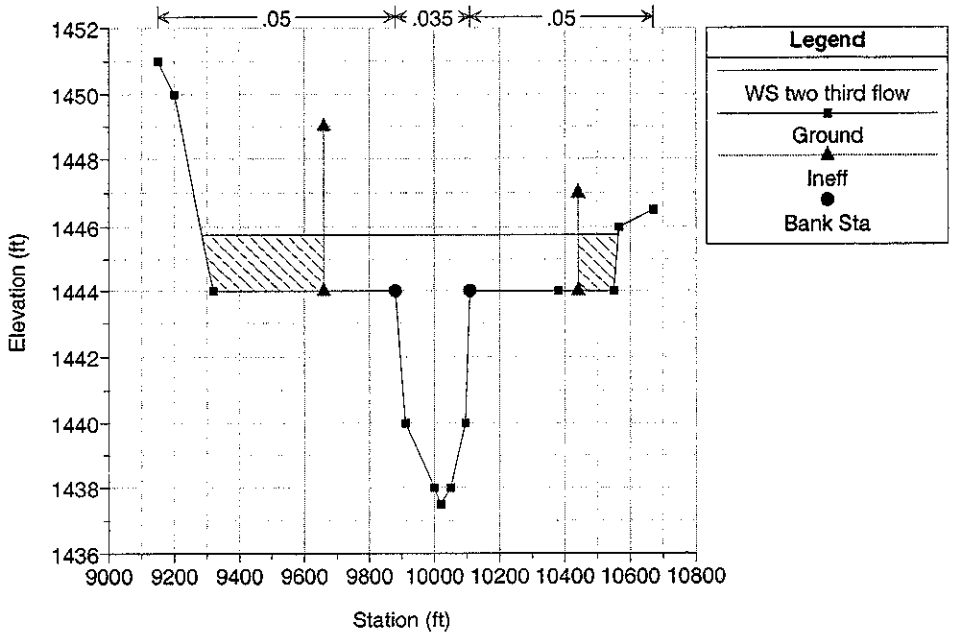

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary cut from map section 25 (QC area drainag RS = 12.827



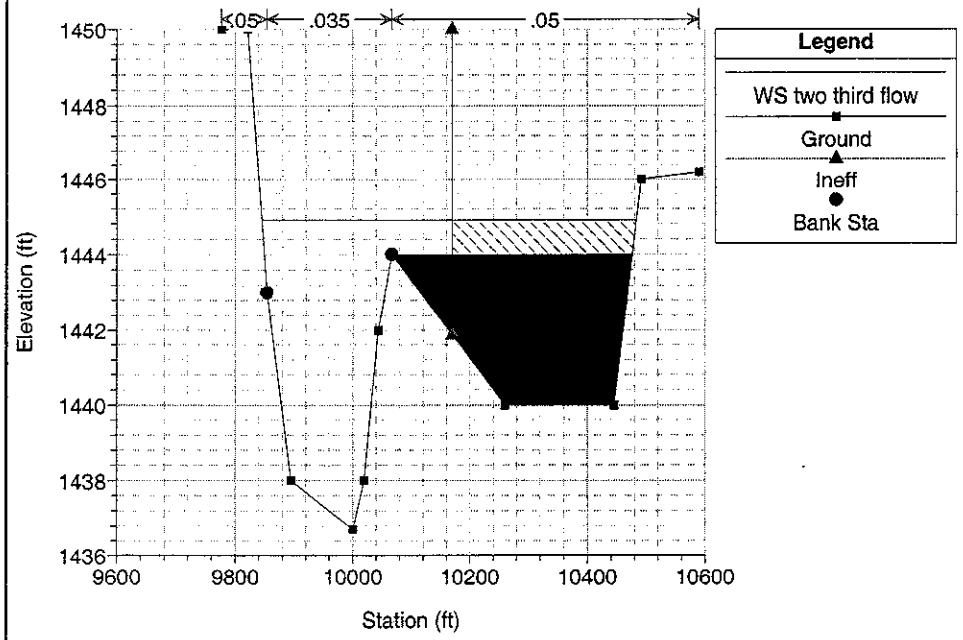

SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary updated cross section RS = 12.788



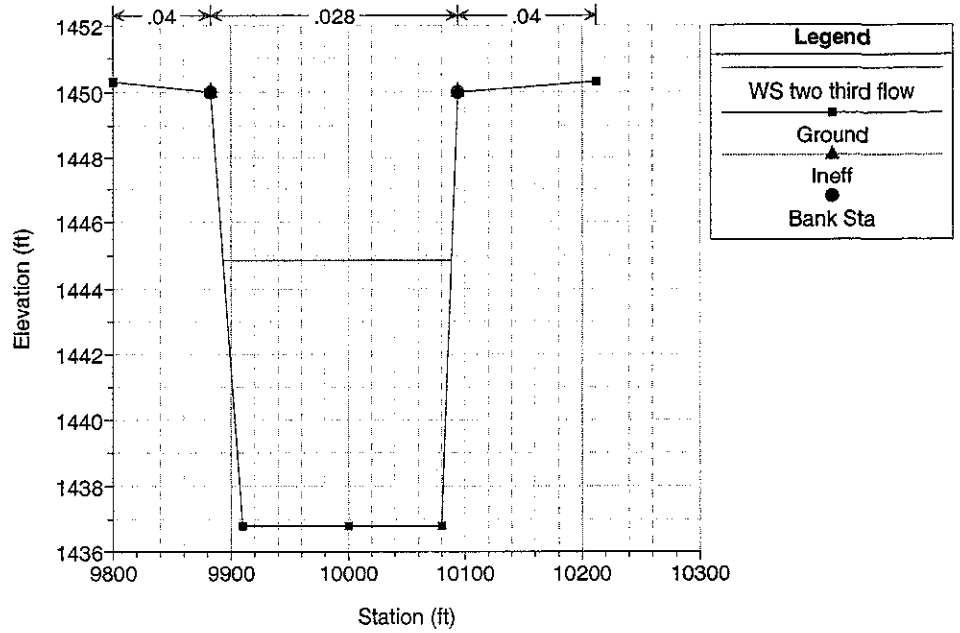
SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary {XS 1198} modified cross section RS = 12.743




SPRR Bridge Main Channel (twothird flow) Two third flow SPRR main channel 03/20/2002 4:22:26 PM

River = Queen Creek Reach = SPRR-Boundary Section upstream of SPRR Bridge RS = 12.729



## D.8 DOWNESTREAM MAIN HEC-RAS MODEL, RHDNM1.PRJ (FOR ONE THRID FLOW)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X      X  XXXXXX    XXXX        XXXX       XX      XXXX
X      X  X        X    X       X   X     X  X    X
X      X  X        X            X   X    X    X   X
XXXXXXX  XXXX      X       XXX  XXXX     XXXXXX    XXXX
X      X  X        X            X  X     X    X        X
X      X  X        X    X       X   X    X    X        X
X      X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: SPRR Bridge Main Channel (onethird flow)
Project File : RHdnm1.prj
Run Date and Time: 03/20/2002 4:30:24 PM

Project in English units

Project Description:
Spillway Inundation Study Rittenhouse FRS _ One third flow scenario

Main Channel from SPRR Bridge to Maricopa County boundary.

Model Vertical Datum: 1929 NGVD
Cross section data obtained based on the Topo map SECTION 25 T.2S., R.7E.
for QUEEN CREEK AREA DRAINAGE MASTER STUDY ( FCDMC October 19, 1986.)

Starting Water Surface Elevation, 1442.23, was obtained by running
exist HEC-RAS model, see Queen Creek/Sanokai Wash Hydraulic Master Plan -
Queen Creek HEC-RAS for Preferred Alternative (Huitt-Zollars, Inc.).

FCD 98-33
Michael Baker Jr., Inc. 03/2002

**********
The data and assumptions used to develop this model are adequate for
conceptual purposes but not for design purposes. Therefore this model
should not be used directly for the design and construction of channel
improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: one third flow SPRR main channel
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm1.p02

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm1.g04

Flow Title : One third flow 4667 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm1.f02

Plan Description:

One thrid flow Scenario, downstream main channel area

Plan Summary Information:

| | | | | | |
|---|---|---|---|---|---|
| Number of: | Cross Sections | = 10 | Mulitple Openings | = | 0 |
| | Culverts | = 0 | Inline Weirs | = | 0 |
| | Bridges | = 0 | | | |

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 35
Maximum difference tolerance = 0.2
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: One third flow 4667 cfs
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm1.f02

Flow Data (cfs)

| River | Reach | RS | one third flow main |
|---|---|---|---|
| Queen Creek | SPRR-Boundary | 13.350 | 4667 |
| Queen Creek | SPRR-Boundary | 13.307 | 4667 |
| Queen Creek | SPRR-Boundary | 13.212 | 4667 |
| Queen Creek | SPRR-Boundary | 13.118 | 4667 |
| Queen Creek | SPRR-Boundary | 13.023 | 4667 |
| Queen Creek | SPRR-Boundary | 12.929 | 4667 |
| Queen Creek | SPRR-Boundary | 12.827 | 4667 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | SPRR-Boundary | one third flow main | Critical | Known WS = 1442.23 |

GEOMETRY DATA

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnm1.g04

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.350

INPUT
Description: new cross section #8
Station Elevation Data num= 29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8320 | 1458 | 8500 | 1456.5 | 9025 | 1456 | 9480 | 1454 | 9870 | 1452 |
| 9950 | 1450 | 10000 | 1449.4 | 10150 | 1450 | 10171 | 1452 | 10176 | 1454 |
| 10190 | 1454.4 | 10205 | 1454 | 10300 | 1453 | 10690 | 1454 | 11050 | 1454 |
| 11250 | 1454 | 11275 | 1456.41 | 11300 | 1454 | 11450 | 1453.3 | 11930 | 1453 |
| 12390 | 1454 | 12440 | 1456 | 12815 | 1457.4 | 13250 | 1456 | 13365 | 1454 |
| 13445 | 1454 | 13485 | 1456 | 13540 | 1452 | 14000 | 1452 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8320 | .05 | 9870 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9870 | 10190 | 240 | 225.45 | 220 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8320 | 9400 | 1458 | 11275 | 14000 | 1456.41 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 13000 | 14000 | 1456 |

CROSS SECTION OUTPUT  Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.07 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.90 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1452.17 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1452.08 | Flow Area (sq ft) | 2.75 | 611.55 | |
| E.G. Slope (ft/ft) | 0.012579 | Area (sq ft) | 2.75 | 611.55 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1.75 | 4665.25 | |
| Top Width (ft) | 334.15 | Top Width (ft) | 32.73 | 301.42 | |
| Vel Total (ft/s) | 7.60 | Avg. Vel. (ft/s) | 0.64 | 7.63 | |
| Max Chl Dpth (ft) | 2.77 | Hydr. Depth (ft) | 0.08 | 2.03 | |
| Conv. Total (cfs) | 41611.8 | Conv. (cfs) | 15.6 | 41596.2 | |
| Length Wtd. (ft) | 229.20 | Wetted Per. (ft) | 32.73 | 301.58 | |
| Min Ch El (ft) | 1449.40 | Shear (lb/sq ft) | 0.07 | 1.59 | |
| Alpha | 1.01 | Stream Power (lb/ft s) | 0.04 | 12.15 | |
| Frctn Loss (ft) | 1.26 | Cum Volume (acre-ft) | 94.98 | 54.56 | 12.42 |
| C & E Loss (ft) | 0.21 | Cum SA (acres) | 23.57 | 16.72 | 6.80 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9715.00 | 9870.00 | 1.75 | 2.75 | 32.73 | 0.04 | 0.08 | 0.64 |
| LB 9870.00 | 9934.00 | 273.81 | 61.94 | 64.02 | 5.87 | 0.97 | 4.42 |
| 9934.00 | 9998.00 | 1187.45 | 149.36 | 64.01 | 25.44 | 2.33 | 7.95 |
| 9998.00 | 10062.00 | 1465.14 | 169.43 | 64.00 | 31.39 | 2.65 | 8.65 |
| 10062.00 | 10126.00 | 1237.12 | 153.07 | 64.00 | 26.51 | 2.39 | 8.08 |
| 10126.00 | RB 10190.00 | 501.72 | 77.74 | 45.55 | 10.75 | 1.71 | 6.45 |

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 13.307

INPUT
Description: new cross section #7
Station Elevation Data  num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8550 | 1455.5 | 8610 | 1454 | 9423 | 1452 | 9600 | 1450 | 9700 | 1450 |
| 9710 | 1440 | 9780 | 1440 | 9890 | 1450 | 9947 | 1450 | 9970 | 1448 |
| 9985 | 1447.5 | 10004 | 1448 | 10142 | 1450 | 10156 | 1454 | 10169 | 1455 |
| 10180 | 1454 | 10550 | 1453 | 11190 | 1454 | 11200 | 1454.3 | 11240 | 1454 |
| 11260 | 1454 | 11440 | 1452.6 | 11880 | 1452.7 | 12325 | 1453 | 12410 | 1454 |
| 12430 | 1455.5 | 12440 | 1454 | 12580 | 1455.3 | 12800 | 1456 | 12820 | 1457 |
| 12840 | 1456 | 12950 | 1454.8 | 13480 | 1455.8 | 13500 | 1452 | 13780 | 1450 |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8550 | .05 | 9947 | .035 | 10156 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9947 | 10156 | 550 | 498.6 | 460 | .1 | .3 |

Ineffective Flow  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 9450 | 1460 | 11200 | 13780 | 1454.3 |

Blocked Obstructions  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 9880 | 1448 | 13400 | 13780 | 1454 |

CROSS SECTION OUTPUT  Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1451.60 | Element | Left OB | Channel | Right OB |

| | | | | | |
|---|---|---|---|---|---|
| Vel Head (ft) | 0.20 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1451.40 | Reach Len. (ft) | 550.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1450.29 | Flow Area (sq ft) | 929.46 | 514.33 | |
| E.G. Slope (ft/ft) | 0.003061 | Area (sq ft) | 929.46 | 514.33 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 2400.99 | 2266.01 | |
| Top Width (ft) | 670.98 | Top Width (ft) | 471.08 | 199.91 | |
| Vel Total (ft/s) | 3.23 | Avg. Vel. (ft/s) | 2.58 | 4.41 | |
| Max Chl Dpth (ft) | 3.90 | Hydr. Depth (ft) | 1.97 | 2.57 | |
| Conv. Total (cfs) | 84352.0 | Conv. (cfs) | 43395.8 | 40956.1 | |
| Length Wtd. (ft) | 526.63 | Wetted Per. (ft) | 472.00 | 200.22 | |
| Min Ch El (ft) | 1447.50 | Shear (lb/sq ft) | 0.38 | 0.49 | |
| Alpha | 1.23 | Stream Power (lb/ft s) | 0.97 | 2.16 | |
| Frctn Loss (ft) | 1.18 | Cum Volume (acre-ft) | 92.41 | 51.64 | 12.42 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 22.19 | 15.43 | 6.80 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9388.20 | 9527.90 | 9.88 | 15.26 | 51.98 | 0.21 | 0.29 | 0.65 |
| 9527.90 | 9667.60 | 274.23 | 166.49 | 139.70 | 5.88 | 1.19 | 1.65 |
| 9667.60 | 9807.30 | 1219.06 | 408.46 | 140.53 | 26.12 | 2.92 | 2.98 |
| 9807.30 | 9947.00 | 897.82 | 339.26 | 139.79 | 19.24 | 2.43 | 2.65 |
| LB 9947.00 | 9988.80 | 585.01 | 124.66 | 41.90 | 12.54 | 2.98 | 4.69 |
| 9988.80 | 10030.60 | 711.80 | 140.12 | 41.81 | 15.25 | 3.35 | 5.08 |
| 10030.60 | 10072.40 | 500.55 | 113.43 | 41.81 | 10.73 | 2.71 | 4.41 |
| 10072.40 | 10114.20 | 328.53 | 88.11 | 41.80 | 7.04 | 2.11 | 3.73 |
| 10114.20 | RB 10156.00 | 140.12 | 48.02 | 32.91 | 3.00 | 1.47 | 2.92 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.212

INPUT
Description: new cross section #6
Station Elevation Data num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8530 | 1454.5 | 8580 | 1454 | 8840 | 1452 | 9200 | 1450 | 9210 | 1440 |
| 9570 | 1440 | 9630 | 1460 | 9700 | 1440 | 9850 | 1440 | 9885 | 1450 |
| 9895 | 1452 | 9920 | 1450 | 9930 | 1448 | 9981 | 1446.1 | 10095 | 1448 |
| 10126 | 1452 | 10160 | 1452 | 10250 | 1451 | 10770 | 1451.5 | 11040 | 1452 |
| 11150 | 1452.4 | 11230 | 1452 | 11240 | 1452 | 11475 | 1451.3 | 11920 | 1451.55 |
| 12340 | 1452 | 12430 | 1453.65 | 12590 | 1453.5 | 12930 | 1452.9 | 13280 | 1453.2 |
| 13420 | 1454 | 13460 | 1454.5 | 13485 | 1454 | 13495 | 1452 | 13520 | 1450 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8530 | .05 | 9895 | .035 | 10126 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9895 | 10126 | 470 | 496.1 | 525 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9630 | 1460 | 11150 | 13520 | 1453.5 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 9900 | 1446 | 13400 | 13520 | 1453 |

CROSS SECTION OUTPUT Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1450.41 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.17 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1450.25 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1448.21 | Flow Area (sq ft) | 878.89 | 560.18 | |
| E.G. Slope (ft/ft) | 0.001705 | Area (sq ft) | 2551.84 | 560.18 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 2688.75 | 1978.25 | |
| Top Width (ft) | 863.08 | Top Width (ft) | 667.55 | 195.53 | |
| Vel Total (ft/s) | 3.24 | Avg. Vel. (ft/s) | 3.06 | 3.53 | |
| Max Chl Dpth (ft) | 4.25 | Hydr. Depth (ft) | 3.96 | 2.86 | |

| | | | | | |
|---|---|---|---|---|---|
| Conv. Total (cfs) | 113019.7 | Conv. (cfs) | 65112.8 | 47906.9 | |
| Length Wtd. (ft) | 484.70 | Wetted Per. (ft) | 223.29 | 195.93 | |
| Min Ch El (ft) | 1446.10 | Shear (lb/sq ft) | 0.42 | 0.30 | |
| Alpha | 1.02 | Stream Power (lb/ft s) | 1.28 | 1.07 | |
| Frctn Loss (ft) | 1.10 | Cum Volume (acre-ft) | 70.43 | 45.49 | 12.42 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 15.00 | 13.16 | 6.80 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9622.00 | 9758.50 | 1120.79 | 369.32 | 94.96 | 24.02 | 3.91 | 3.03 |
| 9758.50 | 9895.00 | 1567.97 | 509.56 | 128.33 | 33.60 | 3.99 | 3.08 |
| LB 9895.00 | 9941.20 | 94.44 | 40.39 | 24.52 | 2.02 | 1.66 | 2.34 |
| 9941.20 | 9987.40 | 625.38 | 161.80 | 46.23 | 13.40 | 3.50 | 3.87 |
| 9987.40 | 10033.60 | 672.20 | 168.93 | 46.21 | 14.40 | 3.66 | 3.98 |
| 10033.60 | 10079.80 | 453.26 | 133.36 | 46.21 | 9.71 | 2.89 | 3.40 |
| 10079.80 | RB 10126.00 | 132.95 | 55.69 | 32.77 | 2.85 | 1.71 | 2.39 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.118

INPUT
Description: new cross section #5
Station Elevation Data num= 29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8590 | 1452 | 9160 | 1452 | 9230 | 1440 | 9530 | 1440 | 9540 | 1450 |
| 9835 | 1452 | 9860 | 1455 | 9920 | 1452 | 9935 | 1446 | 9978 | 1444.1 |
| 10080 | 1446 | 10090 | 1450 | 10100 | 1452 | 10110 | 1452 | 10120 | 1452 |
| 10140 | 1450 | 10650 | 1449.8 | 11200 | 1449.9 | 11270 | 1449.5 | 11400 | 1450 |
| 11500 | 1450 | 12030 | 1450.6 | 12365 | 1452 | 12420 | 1452.6 | 12560 | 1452 |
| 12910 | 1451.6 | 13430 | 1451.7 | 13580 | 1452 | 13660 | 1452.2 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8590 | .05 | 9920 | .035 | 10090 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9920 | 10090 | 470 | 504 | 560 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8590 | 9250 | 1452 | 11140 | 13660 | 1452 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 8590 | 9530 | 1447 |

CROSS SECTION OUTPUT Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.29 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.38 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1448.92 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |
| Crit W.S. (ft) | 1448.13 | Flow Area (sq ft) | 542.32 | 581.68 | |
| E.G. Slope (ft/ft) | 0.003173 | Area (sq ft) | 669.52 | 581.68 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 1388.61 | 3278.39 | |
| Top Width (ft) | 517.96 | Top Width (ft) | 358.39 | 159.57 | |
| Vel Total (ft/s) | 4.15 | Avg. Vel. (ft/s) | 2.56 | 5.64 | |
| Max Chl Dpth (ft) | 4.82 | Hydr. Depth (ft) | 1.89 | 3.65 | |
| Conv. Total (cfs) | 82856.8 | Conv. (cfs) | 24653.1 | 58203.7 | |
| Length Wtd. (ft) | 498.85 | Wetted Per. (ft) | 286.66 | 160.76 | |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | 0.37 | 0.72 | |
| Alpha | 1.41 | Stream Power (lb/ft s) | 0.96 | 4.04 | |
| Frctn Loss (ft) | 1.79 | Cum Volume (acre-ft) | 53.05 | 38.99 | 12.42 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 9.46 | 11.14 | 6.80 |

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9122.00 | 9255.00 | 24.68 | 9.58 | 5.00 | 0.53 | 1.92 | 2.58 |
| 9255.00 | 9388.00 | 656.51 | 254.70 | 133.00 | 14.07 | 1.92 | 2.58 |
| 9388.00 | 9521.00 | 656.51 | 254.70 | 133.00 | 14.07 | 1.92 | 2.58 |
| 9521.00 | 9654.00 | 50.92 | 23.35 | 15.66 | 1.09 | 1.52 | 2.18 |
| 9654.00 | 9920.00 | | | | | | |
| LB 9920.00 | 9954.00 | 339.91 | 73.98 | 26.87 | 7.28 | 2.81 | 4.59 |
| 9954.00 | 9988.00 | 943.71 | 150.06 | 34.03 | 20.22 | 4.41 | 6.29 |
| 9988.00 | 10022.00 | 908.24 | 146.61 | 34.01 | 19.46 | 4.31 | 6.19 |
| 10022.00 | 10056.00 | 696.97 | 125.08 | 34.01 | 14.93 | 3.68 | 5.57 |
| 10056.00 | RB 10090.00 | 389.56 | 85.95 | 31.85 | 8.35 | 2.75 | 4.53 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 13.023

INPUT
Description: new cross section #4
Station Elevation Data num= 26

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8460 | 1451 | 8610 | 1450 | 9382 | 1448 | 9683 | 1446 | 9870 | 1446 |
| 9874 | 1450 | 9894 | 1450.5 | 9910 | 1444 | 9980 | 1442.5 | 10110 | 1444 |
| 10134 | 1450 | 10143 | 1450.5 | 10150 | 1450 | 10510 | 1448 | 11180 | 1448 |
| 11240 | 1449.1 | 11275 | 1448 | 11800 | 1447.5 | 11990 | 1448 | 12200 | 1450 |
| 12380 | 1450.5 | 12475 | 1450.9 | 12820 | 1450 | 13420 | 1449.8 | 13775 | 1450 |
| 13800 | 1450.8 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8460 | .05 | 9910 | .035 | 10134 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10134 | 420 | 494.4 | 590 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8460 | 9870 | 1447.5 | 11240 | 13800 | 1449.1 |

CROSS SECTION OUTPUT Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.48 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.61 | Wt. n-Val. | 0.050 | 0.035 | |
| W.S. Elev (ft) | 1446.87 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1445.81 | Flow Area (sq ft) | 10.54 | 741.07 | |
| E.G. Slope (ft/ft) | 0.004102 | Area (sq ft) | 231.08 | 741.07 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | 23.72 | 4643.28 | |
| Top Width (ft) | 537.79 | Top Width (ft) | 326.30 | 211.49 | |
| Vel Total (ft/s) | 6.21 | Avg. Vel. (ft/s) | 2.25 | 6.27 | |
| Max Chl Dpth (ft) | 4.37 | Hydr. Depth (ft) | 1.33 | 3.50 | |
| Conv. Total (cfs) | 72865.7 | Conv. (cfs) | 370.4 | 72495.3 | |
| Length Wtd. (ft) | 494.21 | Wetted Per. (ft) | 8.87 | 211.87 | |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | 0.30 | 0.90 | |
| Alpha | 1.01 | Stream Power (lb/ft s) | 0.69 | 5.61 | |
| Frctn Loss (ft) | 2.03 | Cum Volume (acre-ft) | 48.20 | 31.34 | 12.42 |
| C & E Loss (ft) | 0.04 | Cum SA (acres) | 5.77 | 8.99 | 6.80 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 9765.00 | 9910.00 | 23.72 | 10.54 | 8.87 | 0.51 | 1.33 | 2.25 |
| LB 9910.00 | 9954.80 | 901.62 | 150.20 | 44.81 | 19.32 | 3.35 | 6.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9954.80 | 9999.60 | 1297.70 | 186.88 | 44.81 | 27.81 | 4.17 | 6.94 |
| 9999.60 | 10044.40 | 1154.29 | 174.19 | 44.80 | 24.73 | 3.89 | 6.63 |
| 10044.40 | 10089.20 | 910.02 | 151.03 | 44.80 | 19.50 | 3.37 | 6.03 |
| 10089.20 | RB 10134.00 | 379.65 | 78.76 | 32.65 | 8.13 | 2.44 | 4.82 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.929

INPUT
Description: cut cross section #3, center station 10000
Station Elevation Data num= 28

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8330 | 1454 | 8600 | 1450 | 9000 | 1448 | 9430 | 1448 | 9450 | 1446 |
| 9465 | 1444 | 9480 | 1442 | 9550 | 1440 | 9750 | 1421 | 9860 | 1446 |
| 9886 | 1442 | 9930 | 1441 | 10085 | 1442 | 10156 | 1444 | 10190 | 1446 |
| 10825 | 1446 | 11200 | 1446 | 11250 | 1448 | 11280 | 1448.25 | 11700 | 1448.2 |
| 12070 | 1448.9 | 12395 | 1448.8 | 12525 | 1449.2 | 12630 | 1449.25 | 13260 | 1448.6 |
| 13600 | 1448 | 13850 | 1448 | 13855 | 1448.1 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8330 | .05 | 9860 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9860 | 10190 | 500 | 537.8 | 840 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8330 | 9860 | 1446.5 | 11280 | 13855 | 1448.5 |

CROSS SECTION OUTPUT Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1445.40 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.46 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1444.94 | Reach Len. (ft) | 500.00 | 537.80 | 840.00 |
| Crit W.S. (ft) | 1443.97 | Flow Area (sq ft) | | 858.96 | |
| E.G. Slope (ft/ft) | 0.004127 | Area (sq ft) | 4458.47 | 858.96 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 702.60 | Top Width (ft) | 397.43 | 305.17 | |
| Vel Total (ft/s) | 5.43 | Avg. Vel. (ft/s) | | 5.43 | |
| Max Chl Dpth (ft) | 23.94 | Hydr. Depth (ft) | | 2.81 | |
| Conv. Total (cfs) | 72651.2 | Conv. (cfs) | | 72651.2 | |
| Length Wtd. (ft) | 539.42 | Wetted Per. (ft) | | 305.47 | |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | | 0.72 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 3.94 | |
| Frctn Loss (ft) | 1.35 | Cum Volume (acre-ft) | 25.59 | 22.26 | 12.42 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 2.28 | 6.06 | 6.80 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9860.00 | 9926.00 | 836.69 | 164.08 | 59.37 | 17.93 | 2.77 | 5.10 |
| 9926.00 | 9992.00 | 1548.74 | 247.69 | 66.00 | 33.18 | 3.75 | 6.25 |
| 9992.00 | 10058.00 | 1269.34 | 219.82 | 66.00 | 27.20 | 3.33 | 5.77 |
| 10058.00 | 10124.00 | 869.55 | 175.20 | 66.02 | 18.63 | 2.65 | 4.96 |
| 10124.00 | RB 10190.00 | 142.68 | 52.18 | 48.08 | 3.06 | 1.09 | 2.73 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.827

INPUT
Description: cut from map section 25 (QC area drainage master study)
Station Elevation Data num= 21

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9100 | 1450.6 | 9280 | 1446 | 9792 | 1446 | 9892 | 1446 | 9900 | 1444 |
| 9930 | 1440 | 9971 | 1438.8 | 10160 | 1440 | 10162 | 1440.375 | 10192 | 1446 |
| 10320 | 1446 | 10670 | 1440 | 10840 | 1446 | 11110 | 1447.1 | 11240 | 1446.3 |
| 11400 | 1446 | 11750 | 1446.9 | 12020 | 1446.8 | 12400 | 1446.8 | 12880 | 1446.5 |
| 12940 | 1447 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9100 | .05 | 9900 | .035 | 10162 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9900 | 10162 | 150 | 206.7 | 470 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 9750 | 1448 | 10300 | 12940 | 1446 |

CROSS SECTION OUTPUT Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1444.00 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.30 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1443.71 | Reach Len. (ft) | 150.00 | 206.70 | 470.00 |
| Crit W.S. (ft) | 1441.72 | Flow Area (sq ft) | | 1048.93 | 29.59 |
| E.G. Slope (ft/ft) | 0.001675 | Area (sq ft) | | 1048.93 | 624.77 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4617.02 | 49.98 |
| Top Width (ft) | 598.75 | Top Width (ft) | | 259.79 | 338.96 |
| Vel Total (ft/s) | 4.33 | Avg. Vel. (ft/s) | | 4.40 | 1.69 |
| Max Chl Dpth (ft) | 4.91 | Hydr. Depth (ft) | | 4.04 | 1.67 |
| Conv. Total (cfs) | 114048.8 | Conv. (cfs) | | 112827.4 | 1221.4 |
| Length Wtd. (ft) | 208.11 | Wetted Per. (ft) | | 260.10 | 18.08 |
| Min Ch El (ft) | 1438.80 | Shear (lb/sq ft) | | 0.42 | 0.17 |
| Alpha | 1.03 | Stream Power (lb/ft s) | | 1.86 | 0.29 |
| Frctn Loss (ft) | 0.42 | Cum Volume (acre-ft) | | 10.48 | 6.40 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 2.58 | 3.53 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9900.00 | 9952.40 | 483.44 | 141.87 | 50.45 | 10.36 | 2.83 | 3.41 |
| 9952.40 | 10004.80 | 1198.74 | 248.38 | 52.41 | 25.69 | 4.74 | 4.83 |
| 10004.80 | 10057.20 | 1109.59 | 237.12 | 52.40 | 23.78 | 4.53 | 4.68 |
| 10057.20 | 10109.60 | 976.96 | 219.68 | 52.40 | 20.93 | 4.19 | 4.45 |
| 10109.60 | RB 10162.00 | 848.29 | 201.89 | 52.44 | 18.18 | 3.85 | 4.20 |
| 10162.00 | 10439.80 | 49.98 | 29.59 | 18.08 | 1.07 | 1.67 | 1.69 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR-Boundary RS: 12.788

INPUT
Description: updated cross section
Station Elevation Data num= 14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9150 | 1451 | 9200 | 1450 | 9320 | 1444 | 9880 | 1444 | 9911 | 1440 |
| 10000 | 1438 | 10020 | 1437.5 | 10050 | 1438 | 10095 | 1440 | 10110 | 1444 |
| 10380 | 1444 | 10550 | 1444 | 10565 | 1446 | 10670 | 1446.5 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9150 | .05 | 9880 | .035 | 10110 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9880 | 10110 | 190 | 238.7 | 290 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 9150 | 9660 | 1449 |

CROSS SECTION OUTPUT  Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1443.57 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.44 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1443.13 | Reach Len. (ft) | 190.00 | 238.70 | 290.00 |
| Crit W.S. (ft) | 1441.37 | Flow Area (sq ft) | | 879.53 | |
| E.G. Slope (ft/ft) | 0.002473 | Area (sq ft) | | 879.53 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 220.04 | Top Width (ft) | | 220.04 | |
| Vel Total (ft/s) | 5.31 | Avg. Vel. (ft/s) | | 5.31 | |
| Max Chl Dpth (ft) | 5.63 | Hydr. Depth (ft) | | 4.00 | |
| Conv. Total (cfs) | 93852.4 | Conv. (cfs) | | 93852.4 | |
| Length Wtd. (ft) | 238.70 | Wetted Per. (ft) | | 220.73 | |
| Min Ch El (ft) | 1437.50 | Shear (lb/sq ft) | | 0.62 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 3.26 | |
| Frctn Loss (ft) | 0.71 | Cum Volume (acre-ft) | | 5.90 | 3.03 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 1.44 | 1.71 |

FLOW DISTRIBUTION OUTPUT  Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9880.00 | 9926.00 | 301.22 | 87.58 | 39.49 | 6.45 | 2.23 | 3.44 |
| 9926.00 | 9972.00 | 932.64 | 183.42 | 46.01 | 19.98 | 3.99 | 5.08 |
| 9972.00 | 10018.00 | 1373.54 | 231.38 | 46.01 | 29.43 | 5.03 | 5.94 |
| 10018.00 | 10064.00 | 1462.13 | 240.24 | 46.02 | 31.33 | 5.22 | 6.09 |
| 10064.00 | RB 10110.00 | 597.47 | 136.91 | 43.19 | 12.80 | 3.20 | 4.36 |

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 12.743

INPUT
Description: (XS 1198) modified cross section
Station Elevation Data  num= 12

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9777 | 1450 | 9822 | 1450 | 9854 | 1443 | 9895 | 1438 | 10000 | 1436.7 |
| 10020 | 1438 | 10044 | 1442 | 10067 | 1444 | 10260 | 1440 | 10445 | 1440 |
| 10492 | 1446 | 10590 | 1446.2 | | | | | | |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9777 | .05 | 9854 | .035 | 10067 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9854 | 10067 | 30 | 75.6 | 190 | .3 | .5 |

Ineffective Flow  num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 10067 | 10590 | 1444 |

CROSS SECTION OUTPUT  Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1442.85 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.62 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1442.22 | Reach Len. (ft) | 30.00 | 75.60 | 190.00 |
| Crit W.S. (ft) | 1440.74 | Flow Area (sq ft) | | 735.73 | |
| E.G. Slope (ft/ft) | 0.003590 | Area (sq ft) | | 735.73 | 549.57 |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 495.80 | Top Width (ft) | | 186.18 | 309.63 |
| Vel Total (ft/s) | 6.34 | Avg. Vel. (ft/s) | | 6.34 | |
| Max Chl Dpth (ft) | 5.52 | Hydr. Depth (ft) | | 3.95 | |
| Conv. Total (cfs) | 77893.7 | Conv. (cfs) | | 77893.7 | |
| Length Wtd. (ft) | 75.60 | Wetted Per. (ft) | | 186.82 | |
| Min Ch El (ft) | 1436.70 | Shear (lb/sq ft) | | 0.88 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.60 | |
| Frctn Loss (ft) | 0.12 | Cum Volume (acre-ft) | | 1.48 | 1.20 |
| C & E Loss (ft) | 0.13 | Cum SA (acres) | | 0.32 | 0.68 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT  Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9854.00 | 9896.60 | 320.63 | 79.86 | 36.48 | 6.87 | 2.20 | 4.01 |
| 9896.60 | 9939.20 | 1246.81 | 191.94 | 42.60 | 26.72 | 4.51 | 6.50 |
| 9939.20 | 9981.80 | 1499.42 | 214.41 | 42.60 | 32.13 | 5.03 | 6.99 |
| 9981.80 | 10024.40 | 1479.09 | 212.86 | 42.70 | 31.69 | 5.00 | 6.95 |
| 10024.40 | RB 10067.00 | 121.06 | 36.65 | 22.43 | 2.59 | 1.65 | 3.30 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR-Boundary  RS: 12.729

INPUT
Description: Section upstream of SPRR Bridge
Station Elevation Data  num= 7

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9800 | 1450.3 | 9883 | 1450 | 9910 | 1436.8 | 10000 | 1436.8 | 10080 | 1436.8 |
| 10094 | 1450 | 10212 | 1450.3 | | | | | | |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9800 | .04 | 9883 | .028 | 10094 | .04 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9883 | 10094 | 40 | 40 | 40 | .3 | .5 |

Ineffective Flow  num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9800 | 9883 | 1450 | 10094 | 10212 | 1450 |

CROSS SECTION OUTPUT  Profile #one third flow m

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1442.59 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.36 | Wt. n-Val. | | 0.028 | |
| W.S. Elev (ft) | 1442.23 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1439.63 | Flow Area (sq ft) | | 968.88 | |
| E.G. Slope (ft/ft) | 0.000940 | Area (sq ft) | | 968.88 | |
| Q Total (cfs) | 4667.00 | Flow (cfs) | | 4667.00 | |
| Top Width (ft) | 186.87 | Top Width (ft) | | 186.87 | |
| Vel Total (ft/s) | 4.82 | Avg. Vel. (ft/s) | | 4.82 | |
| Max Chl Dpth (ft) | 5.43 | Hydr. Depth (ft) | | 5.18 | |
| Conv. Total (cfs) | 152181.1 | Conv. (cfs) | | 152181.1 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 190.28 | |
| Min Ch El (ft) | 1436.80 | Shear (lb/sq ft) | | 0.30 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.44 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

FLOW DISTRIBUTION OUTPUT  Profile #one third flow m

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| LB 9883.00 | 9925.20 | 466.35 | 112.69 | 27.56 | 9.99 | 4.28 | 4.14 |
| 9925.20 | 9967.40 | 1145.75 | 229.14 | 42.20 | 24.55 | 5.43 | 5.00 |
| 9967.40 | 10009.60 | 1145.72 | 229.14 | 42.20 | 24.55 | 5.43 | 5.00 |
| 10009.60 | 10051.80 | 1145.75 | 229.14 | 42.20 | 24.55 | 5.43 | 5.00 |
| 10051.80 | RB 10094.00 | 763.44 | 168.76 | 36.12 | 16.36 | 4.97 | 4.52 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | .05 | .035 | .05 |
| SPRR-Boundary | 13.307 | .05 | .035 | .05 |

| | | | | |
|---|---|---|---|---|
| SPRR-Boundary | 13.212 | .05 | .035 | .05 |
| SPRR-Boundary | 13.118 | .05 | .035 | .05 |
| SPRR-Boundary | 13.023 | .05 | .035 | .05 |
| SPRR-Boundary | 12.929 | .05 | .035 | .05 |
| SPRR-Boundary | 12.827 | .05 | .035 | .05 |
| SPRR-Boundary | 12.788 | .05 | .035 | .05 |
| SPRR-Boundary | 12.743 | .05 | .035 | .05 |
| SPRR-Boundary | 12.729 | .04 | .028 | .04 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 240 | 225.45 | 220 |
| SPRR-Boundary | 13.307 | 550 | 498.6 | 460 |
| SPRR-Boundary | 13.212 | 470 | 496.1 | 525 |
| SPRR-Boundary | 13.118 | 470 | 504 | 560 |
| SPRR-Boundary | 13.023 | 420 | 494.4 | 590 |
| SPRR-Boundary | 12.929 | 500 | 537.8 | 840 |
| SPRR-Boundary | 12.827 | 150 | 206.7 | 470 |
| SPRR-Boundary | 12.788 | 190 | 238.7 | 290 |
| SPRR-Boundary | 12.743 | 30 | 75.6 | 190 |
| SPRR-Boundary | 12.729 | 40 | 40 | 40 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| SPRR-Boundary | 13.350 | .1 | .3 |
| SPRR-Boundary | 13.307 | .1 | .3 |
| SPRR-Boundary | 13.212 | .1 | .3 |
| SPRR-Boundary | 13.118 | .1 | .3 |
| SPRR-Boundary | 13.023 | .1 | .3 |
| SPRR-Boundary | 12.929 | .1 | .3 |
| SPRR-Boundary | 12.827 | .1 | .3 |
| SPRR-Boundary | 12.788 | .1 | .3 |
| SPRR-Boundary | 12.743 | .3 | .5 |
| SPRR-Boundary | 12.729 | .3 | .5 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 4667.00 | 1449.40 | 1452.17 | 1452.08 | 1453.07 | 0.012579 | 7.63 | 614.30 | 334.15 | 0.94 |
| SPRR-Boundary | 13.307 | 4667.00 | 1447.50 | 1451.40 | 1450.29 | 1451.60 | 0.003061 | 4.41 | 1443.79 | 670.98 | 0.48 |
| SPRR-Boundary | 13.212 | 4667.00 | 1446.10 | 1450.25 | 1448.21 | 1450.41 | 0.001705 | 3.53 | 1439.06 | 863.08 | 0.37 |
| SPRR-Boundary | 13.118 | 4667.00 | 1444.10 | 1448.92 | 1448.13 | 1449.29 | 0.003173 | 5.64 | 1124.00 | 517.96 | 0.52 |
| SPRR-Boundary | 13.023 | 4667.00 | 1442.50 | 1446.87 | 1445.81 | 1447.48 | 0.004102 | 6.27 | 751.61 | 537.79 | 0.59 |
| SPRR-Boundary | 12.929 | 4667.00 | 1441.00 | 1444.94 | 1443.97 | 1445.40 | 0.004127 | 5.43 | 858.96 | 702.60 | 0.57 |
| SPRR-Boundary | 12.827 | 4667.00 | 1438.80 | 1443.71 | 1441.72 | 1444.00 | 0.001675 | 4.40 | 1078.52 | 598.75 | 0.39 |
| SPRR-Boundary | 12.788 | 4667.00 | 1437.50 | 1443.13 | 1441.37 | 1443.57 | 0.002473 | 5.31 | 879.53 | 220.04 | 0.47 |
| SPRR-Boundary | 12.743 | 4667.00 | 1436.70 | 1442.22 | 1440.74 | 1442.85 | 0.003590 | 6.34 | 735.73 | 495.80 | 0.56 |
| SPRR-Boundary | 12.729 | 4667.00 | 1436.80 | 1442.23 | 1439.63 | 1442.59 | 0.000940 | 4.82 | 968.88 | 186.87 | 0.37 |

Profile Output Table - Standard Table 2

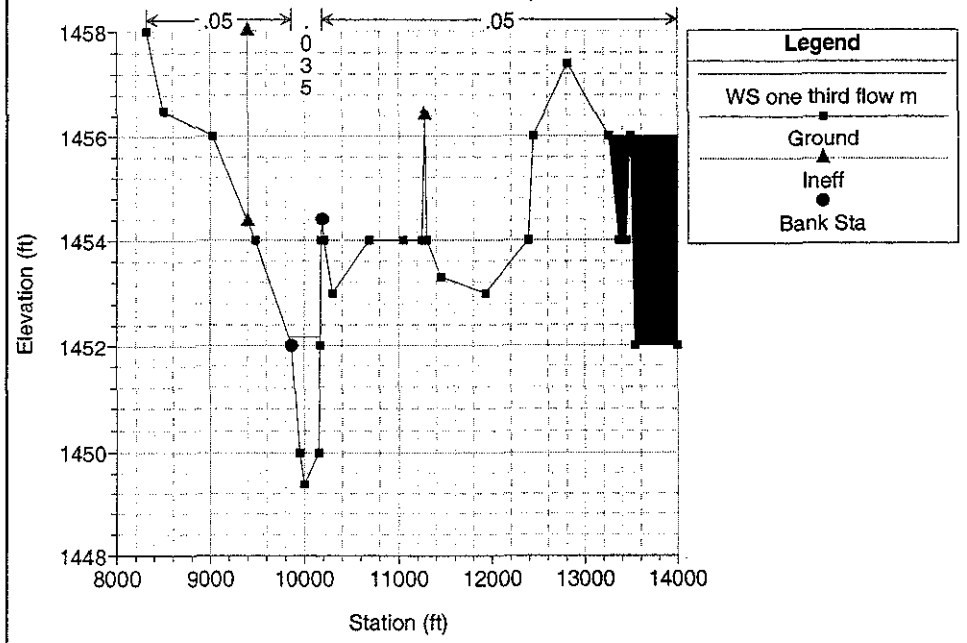
| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 1453.07 | 1452.17 | 0.90 | 1.26 | 0.21 | 1.75 | 4665.25 | | 334.15 |
| SPRR-Boundary | 13.307 | 1451.60 | 1451.40 | 0.20 | 1.18 | 0.01 | 2400.99 | 2266.01 | | 670.98 |
| SPRR-Boundary | 13.212 | 1450.41 | 1450.25 | 0.17 | 1.10 | 0.02 | 2688.75 | 1978.25 | | 863.08 |
| SPRR-Boundary | 13.118 | 1449.29 | 1448.92 | 0.38 | 1.79 | 0.02 | 1388.61 | 3278.39 | | 517.96 |
| SPRR-Boundary | 13.023 | 1447.48 | 1446.87 | 0.61 | 2.03 | 0.04 | 23.72 | 4643.28 | | 537.79 |
| SPRR-Boundary | 12.929 | 1445.40 | 1444.94 | 0.46 | 1.35 | 0.05 | | 4667.00 | | 702.60 |
| SPRR-Boundary | 12.827 | 1444.00 | 1443.71 | 0.30 | 0.42 | 0.01 | | 4617.02 | 49.98 | 598.75 |
| SPRR-Boundary | 12.788 | 1443.57 | 1443.13 | 0.44 | 0.71 | 0.02 | | 4667.00 | | 220.04 |
| SPRR-Boundary | 12.743 | 1442.85 | 1442.22 | 0.62 | 0.12 | 0.13 | | 4667.00 | | 495.80 |
| SPRR-Boundary | 12.729 | 1442.59 | 1442.23 | 0.36 | | | | 4667.00 | | 186.87 |

Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| SPRR-Boundary | 13.350 | 4667.00 | 1452.17 | 0.18 | 0.20 | 7.63 | 7.60 | 2.77 | 1.84 |
| SPRR-Boundary | 13.307 | 4667.00 | 1451.40 | 0.17 | 0.19 | 4.41 | 3.23 | 3.90 | 2.15 |
| SPRR-Boundary | 13.212 | 4667.00 | 1450.25 | 0.13 | 0.14 | 3.53 | 3.24 | 4.25 | 3.45 |
| SPRR-Boundary | 13.118 | 4667.00 | 1448.92 | 0.10 | 0.11 | 5.64 | 4.15 | 4.82 | 2.52 |
| SPRR-Boundary | 13.023 | 4667.00 | 1446.87 | 0.08 | 0.08 | 6.27 | 6.21 | 4.37 | 3.43 |
| SPRR-Boundary | 12.929 | 4667.00 | 1444.94 | 0.06 | 0.06 | 5.43 | 5.43 | 23.94 | 2.81 |
| SPRR-Boundary | 12.827 | 4667.00 | 1443.71 | 0.03 | 0.03 | 4.40 | 4.33 | 4.91 | 3.89 |
| SPRR-Boundary | 12.788 | 4667.00 | 1443.13 | 0.02 | 0.02 | 5.31 | 5.31 | 5.63 | 4.00 |
| SPRR-Boundary | 12.743 | 4667.00 | 1442.22 | 0.00 | 0.00 | 6.34 | 6.34 | 5.52 | 3.95 |
| SPRR-Boundary | 12.729 | 4667.00 | 1442.23 | 0.00 | 0.00 | 4.82 | 4.82 | 5.43 | 5.18 |

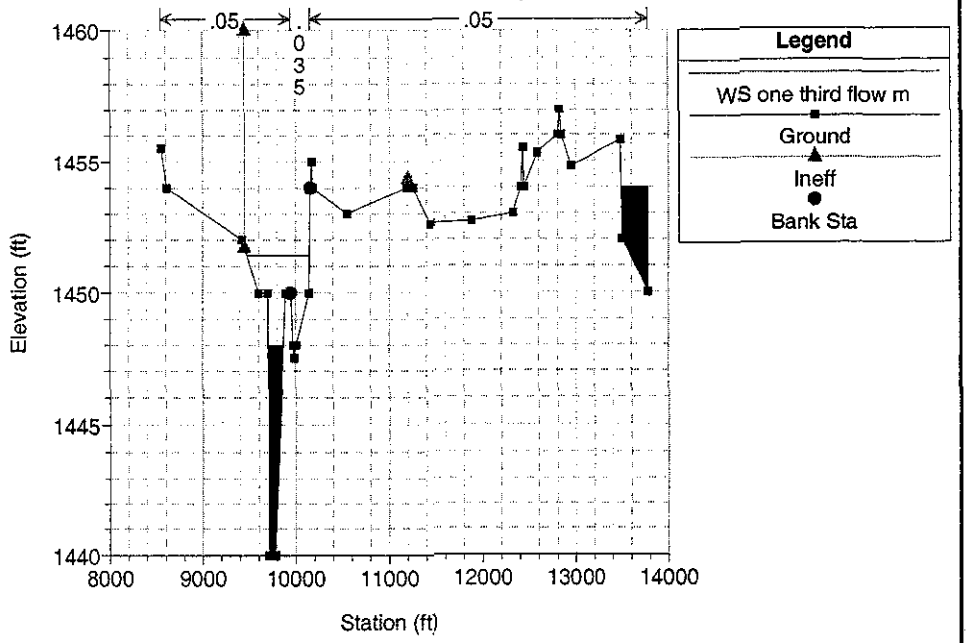
SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #8 RS = 13.350



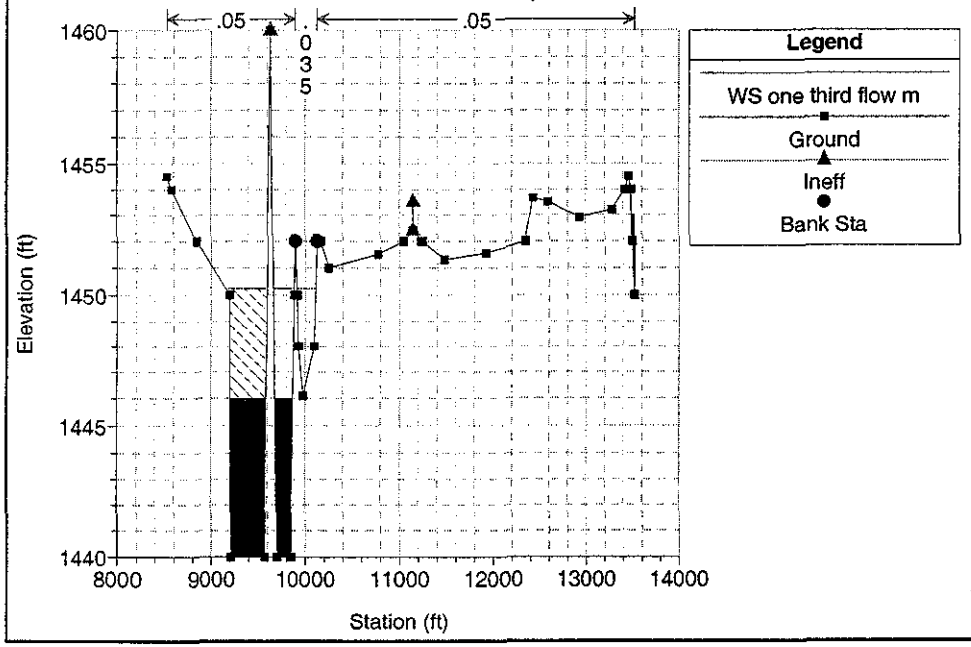

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #7 RS = 13.307



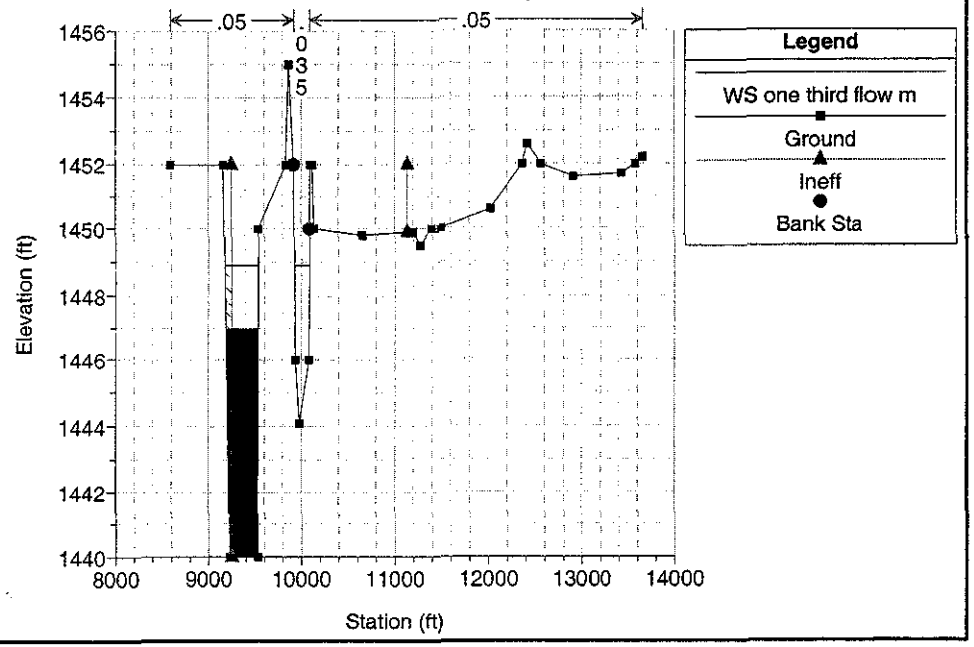

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #6 RS = 13.212



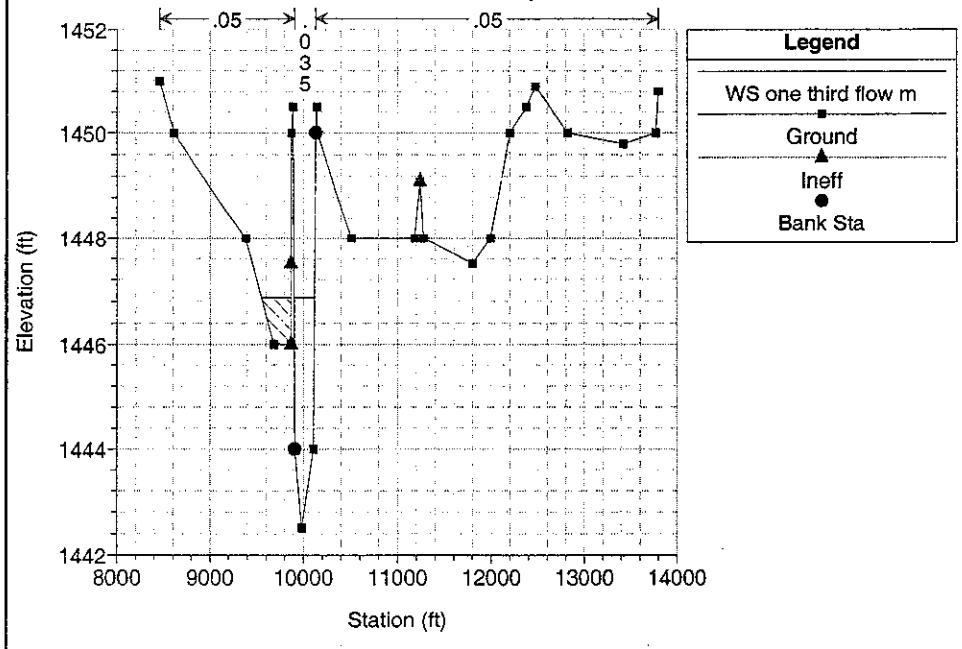

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #5 RS = 13.118



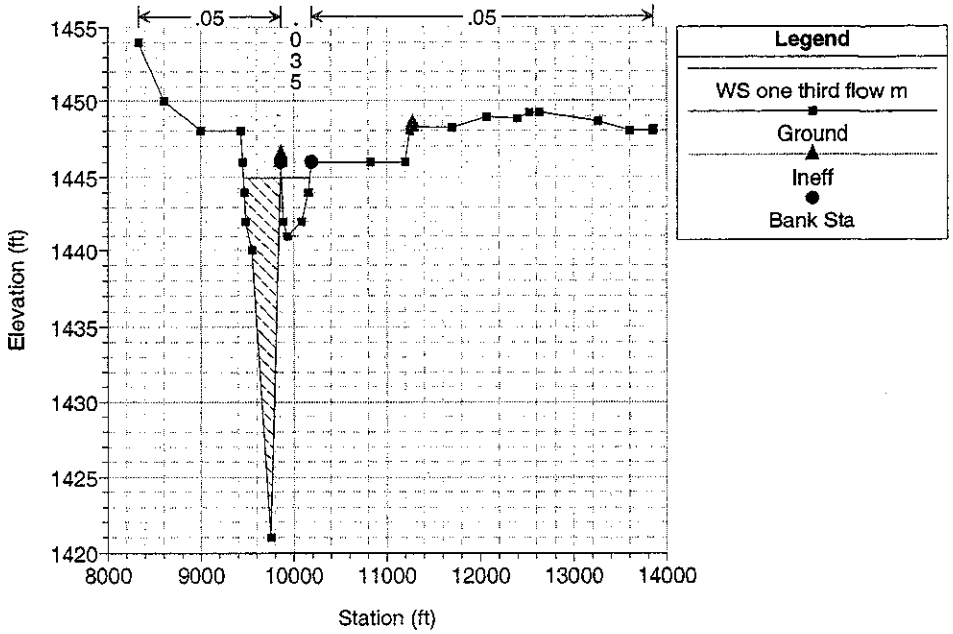
SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary new cross section #4 RS = 13.023



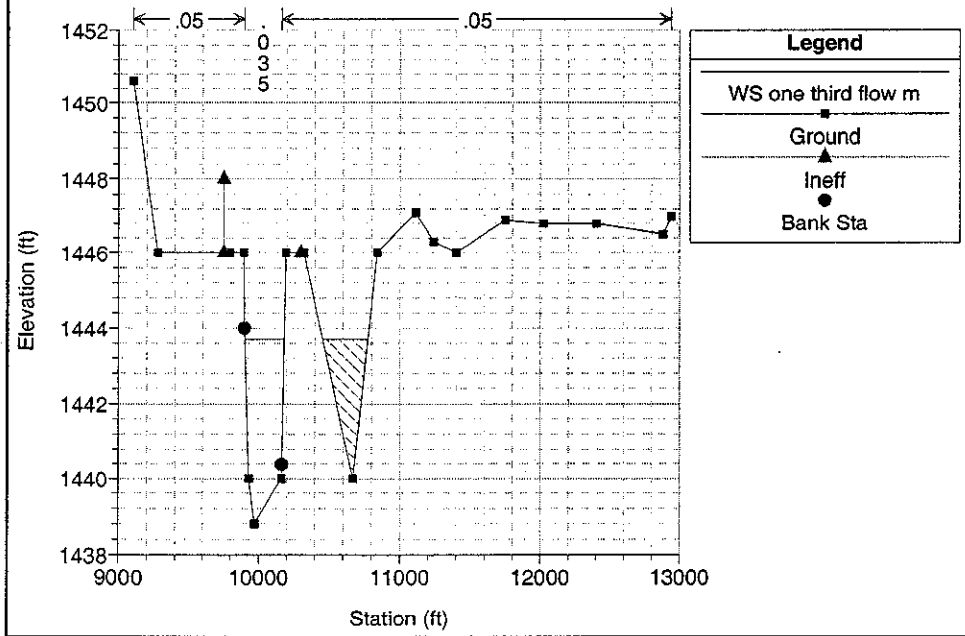

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary cut cross section #3, center station 100 RS = 12.929



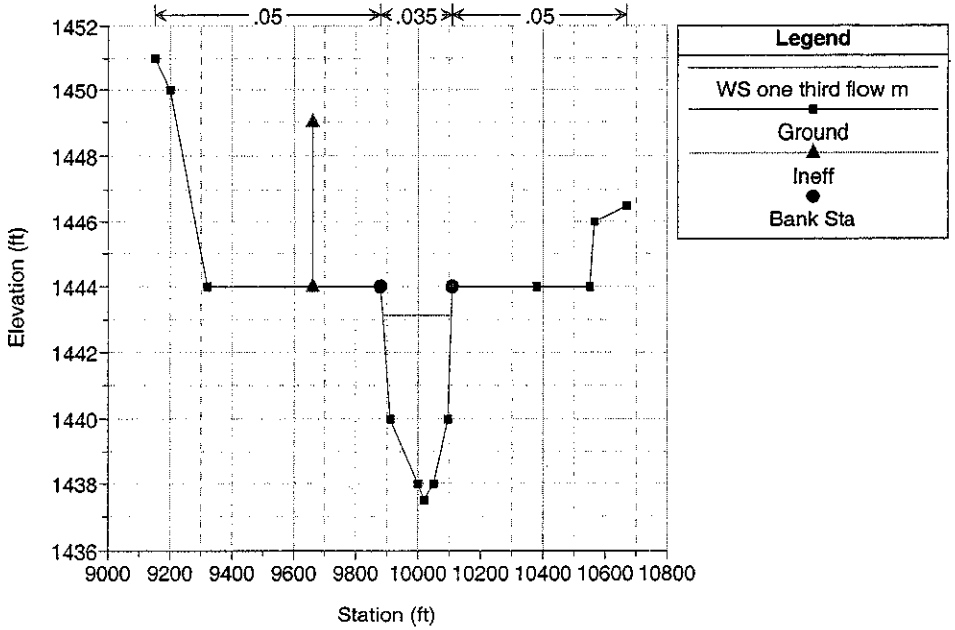

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary cut from map section 25 (QC area drainag RS = 12.827



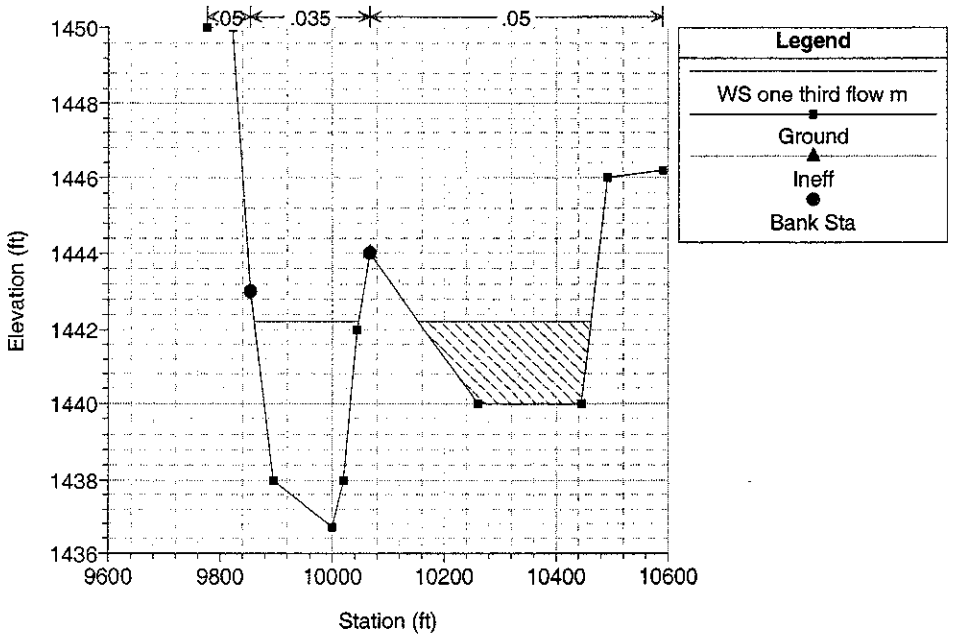

SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary updated cross section RS = 12.788



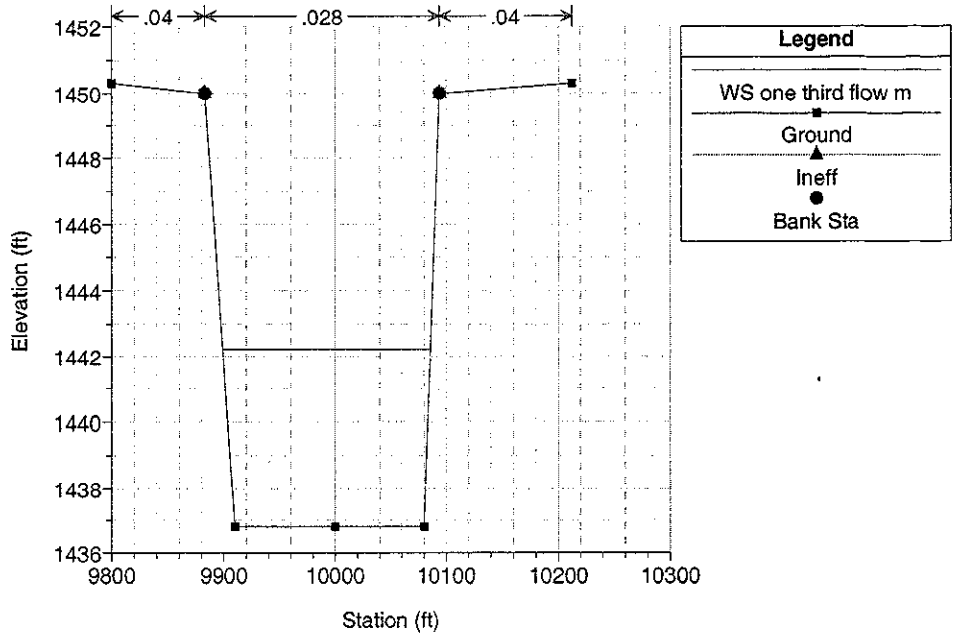
SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary {XS 1198} modified cross section RS = 12.743




SPRR Bridge Main Channel (onethird flow) one third flow SPRR main channel 03/20/2002 4:30:24 PM

River = Queen Creek Reach = SPRR-Boundary Section upstream of SPRR Bridge RS = 12.729



## D.9 DOWNSTREAM RIGHT OVERBANK HEC-RAS MODEL, RHDNR.PRJ (FOR THREE FLOWS)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X      X  XXXXXX    XXXX        XXXX       XX      XXXX
X      X  X        X    X      X   X     X  X    X
X      X  X        X           X   X    X    X   X
XXXXXXX  XXXX      X       XXX XXXX     XXXXXX    XXXX
X      X  X        X           X  X     X    X        X
X      X  X        X    X      X   X    X    X        X
X      X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: SPRR Bridge Overbank (three flows)
Project File : RHdnr.prj
Run Date and Time: 03/20/2002 2:34:18 PM

Project in English units

Project Description:
Spillway Inundation Study Rittenhouse FRS _ Three Flow Scenario

Right side overbank area from 500 feet upstream of SPRR Bridge to Maricopa County boundary.

Model Vertical Datum: 1929 NGVD
Cross section data obtained based on the Topo map SECTION 25 T.2S., R.7E. for QUEEN CREEK AREA DRAINAGE MASTER STUDY ( FCDMC October 19, 1986.)

Starting Water Surface Elevations
were obtained by slope area method. A slope of 0.034 ft/ft was used as the downstream boundary condition.

FCD 98-33
Michael Baker Jr., Inc. 03/2002

**********

The data and assumptions used to develop this model are adequate for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: Three flows SPRR right side overbank
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnr.p02

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnr.g04

Flow Title : Three flows
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnr.f02

Plan Description:
Three flow Scenario downstream right over bank area

```
Plan Summary Information:
Number of:  Cross Sections =    7    Mulitple Openings =    0
            Culverts       =    0    Inline Weirs      =    0
            Bridges        =    0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  40
    Maximum difference tolerance        =  0.2
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow
```

FLOW DATA

Flow Title: Three flows
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnr.f02

Flow Data (cfs)

| River | Reach | RS | one third flow | two third flow | full flow |
|---|---|---|---|---|---|
| Queen Creek | SPRR- R overbank | 13.350 | 600 | 3340 | 6550 |
| Queen Creek | SPRR- R overbank | 13.212 | 600 | 3057 | 5515 |
| Queen Creek | SPRR- R overbank | 13.118 | 510 | 2073 | 3489 |
| Queen Creek | SPRR- R overbank | 13.023 | 413 | 1314 | 1949 |
| Queen Creek | SPRR- R overbank | 12.929 | 295 | 669 | 971 |
| Queen Creek | SPRR- R overbank | 12.827 | 130 | 300 | 510 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Queen Creek | SPRR- R overbank | one third flow | Critical | Normal S = .0034 |
| Queen Creek | SPRR- R overbank | two third flow | Critical | Normal S = .0034 |
| Queen Creek | SPRR- R overbank | full flow | Critical | Normal S = .0034 |

GEOMETRY DATA

Geometry Title: QC base geometry
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHdnr.g04

CROSS SECTION  RIVER: Queen Creek
REACH: SPRR- R overbank  RS: 13.350

INPUT
Description: new cross section #8
Station Elevation Data  num=  29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8320 | 1458 | 8500 | 1456.5 | 9025 | 1456 | 9480 | 1454 | 9870 | 1452 |
| 9950 | 1450 | 10000 | 1449.4 | 10150 | 1450 | 10171 | 1452 | 10176 | 1454 |
| 10190 | 1454.4 | 10205 | 1454 | 10300 | 1453 | 10690 | 1454 | 11050 | 1454 |
| 11250 | 1454 | 11275 | 1456.41 | 11300 | 1454 | 11450 | 1453.3 | 11930 | 1453 |
| 12390 | 1454 | 12440 | 1456 | 12815 | 1457.4 | 13250 | 1456 | 13365 | 1454 |
| 13445 | 1454 | 13485 | 1456 | 13540 | 1452 | 14000 | 1452 | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8320 | .05 | 9870 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9870 | 10190 | 240 | 225.45 | 220 | .1 | .3 |

Ineffective Flow  num=  2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 8320 | 11275 | 1456.41 | 12815 | 14000 | 1457.4 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8320 | 11300 | 1454 | 12814 | 14000 | 1457.4 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.94 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1453.93 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1453.46 | Flow Area (sq ft) | | | 614.62 |
| E.G. Slope (ft/ft) | 0.002181 | Area (sq ft) | | | 614.62 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 1042.01 | Top Width (ft) | | | 1042.01 |
| Vel Total (ft/s) | 0.98 | Avg. Vel. (ft/s) | | | 0.98 |
| Max Chl Dpth (ft) | 0.93 | Hydr. Depth (ft) | | | 0.59 |
| Conv. Total (cfs) | 12846.6 | Conv. (cfs) | | | 12846.6 |
| Length Wtd. (ft) | 220.00 | Wetted Per. (ft) | | | 1042.02 |
| Min Ch El (ft) | 1454.00 | Shear (lb/sq ft) | | | 0.08 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.08 |
| Frctn Loss (ft) | 0.65 | Cum Volume (acre-ft) | 89.59 | 47.71 | 94.41 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 24.02 | 8.33 | 104.10 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1454.98 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1454.92 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1454.03 | Flow Area (sq ft) | | | 1705.56 |
| E.G. Slope (ft/ft) | 0.002486 | Area (sq ft) | 453.64 | 290.83 | 2679.59 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 3110.73 | Top Width (ft) | 598.75 | 320.00 | 2191.98 |
| Vel Total (ft/s) | 1.96 | Avg. Vel. (ft/s) | | | 1.96 |
| Max Chl Dpth (ft) | 1.92 | Hydr. Depth (ft) | | | 1.52 |
| Conv. Total (cfs) | 66989.7 | Conv. (cfs) | | | 66989.7 |
| Length Wtd. (ft) | 220.00 | Wetted Per. (ft) | | | 1122.52 |
| Min Ch El (ft) | 1454.00 | Shear (lb/sq ft) | | | 0.24 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.46 |
| Frctn Loss (ft) | 0.62 | Cum Volume (acre-ft) | 101.84 | 51.89 | 163.53 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 29.27 | 9.20 | 129.75 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1455.72 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1455.62 | Reach Len. (ft) | 240.00 | 225.45 | 220.00 |
| Crit W.S. (ft) | 1454.40 | Flow Area (sq ft) | | | 2500.74 |
| E.G. Slope (ft/ft) | 0.002749 | Area (sq ft) | 929.03 | 515.05 | 4226.70 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | | | 6550.00 |
| Top Width (ft) | 3302.19 | Top Width (ft) | 758.16 | 320.00 | 2224.03 |
| Vel Total (ft/s) | 2.62 | Avg. Vel. (ft/s) | | | 2.62 |
| Max Chl Dpth (ft) | 2.62 | Hydr. Depth (ft) | | | 2.18 |
| Conv. Total (cfs) | 124931.6 | Conv. (cfs) | | | 124931.6 |
| Length Wtd. (ft) | 220.00 | Wetted Per. (ft) | | | 1147.36 |
| Min Ch El (ft) | 1454.00 | Shear (lb/sq ft) | | | 0.37 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.98 |
| Frctn Loss (ft) | 0.67 | Cum Volume (acre-ft) | 118.82 | 56.02 | 216.12 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 55.57 | 13.60 | 143.80 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10952.00 | 11333.00 | 0.11 | 0.73 | 17.75 | 0.02 | 0.04 | 0.15 |
| 11333.00 | 11714.00 | 210.70 | 229.41 | 381.00 | 35.12 | 0.60 | 0.92 |
| 11714.00 | 12095.00 | 347.47 | 309.72 | 381.00 | 57.91 | 0.81 | 1.12 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12095.00 | 12476.00 | 41.72 | 74.77 | 262.26 | 6.95 | 0.29 | 0.56 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10952.00 | 11333.00 | 49.43 | 37.19 | 42.56 | 1.48 | 0.87 | 1.33 |
| 11333.00 | 11714.00 | 1201.36 | 606.13 | 381.00 | 35.97 | 1.59 | 1.98 |
| 11714.00 | 12095.00 | 1478.19 | 686.44 | 381.00 | 44.26 | 1.80 | 2.15 |
| 12095.00 | 12476.00 | 611.03 | 375.82 | 317.96 | 18.29 | 1.18 | 1.63 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10952.00 | 11333.00 | 133.50 | 69.53 | 49.87 | 2.04 | 1.40 | 1.92 |
| 11333.00 | 11714.00 | 2334.84 | 873.09 | 381.00 | 35.65 | 2.29 | 2.67 |
| 11714.00 | 12095.00 | 2703.63 | 953.40 | 381.00 | 41.28 | 2.50 | 2.84 |
| 12095.00 | 12476.00 | 1378.03 | 604.73 | 335.49 | 21.04 | 1.80 | 2.28 |

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 13.307

INPUT
Description: new cross section #7
Station Elevation Data num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8550 | 1455.5 | 8610 | 1454 | 9423 | 1452 | 9600 | 1450 | 9700 | 1450 |
| 9710 | 1440 | 9780 | 1440 | 9890 | 1450 | 9947 | 1450 | 9970 | 1448 |
| 9985 | 1447.5 | 10004 | 1448 | 10142 | 1450 | 10156 | 1454 | 10169 | 1455 |
| 10180 | 1454 | 10550 | 1453 | 11190 | 1454 | 11200 | 1454.3 | 11240 | 1454 |
| 11260 | 1454 | 11440 | 1452.6 | 11880 | 1452.7 | 12325 | 1453 | 12410 | 1454 |
| 12430 | 1455.5 | 12440 | 1454 | 12580 | 1455.3 | 12800 | 1456 | 12820 | 1457 |
| 12840 | 1456 | 12950 | 1454.8 | 13480 | 1455.8 | 13500 | 1452 | 13780 | 1450 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8550 | .05 | 9947 | .035 | 10156 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9947 | 10156 | 447 | 498.6 | 460 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 11200 | 1455.3 | 12430 | 13780 | 1455.5 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8550 | 11200 | 1454.3 | 12814 | 13780 | 1457 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.29 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1453.27 | Reach Len. (ft) | 447.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1452.98 | Flow Area (sq ft) | | | 490.37 |
| E.G. Slope (ft/ft) | 0.004348 | Area (sq ft) | | | 490.37 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 993.81 | Top Width (ft) | | | 993.81 |
| Vel Total (ft/s) | 1.22 | Avg. Vel. (ft/s) | | | 1.22 |
| Max Chl Dpth (ft) | 0.67 | Hydr. Depth (ft) | | | 0.49 |
| Conv. Total (cfs) | 9099.7 | Conv. (cfs) | | | 9099.7 |
| Length Wtd. (ft) | 460.00 | Wetted Per. (ft) | | | 993.82 |
| Min Ch El (ft) | 1454.30 | Shear (lb/sq ft) | | | 0.13 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.16 |
| Frctn Loss (ft) | 1.00 | Cum Volume (acre-ft) | 89.59 | 47.71 | 91.62 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 24.02 | 8.33 | 98.95 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1454.35 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1454.29 | Reach Len. (ft) | 447.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1453.48 | Flow Area (sq ft) | | | 1618.02 |
| E.G. Slope (ft/ft) | 0.003283 | Area (sq ft) | | | 1622.78 |
| Q Total (cfs) | 3340.00 | Flow (cfs) | | | 3340.00 |
| Top Width (ft) | 1245.32 | Top Width (ft) | | | 1245.32 |
| Vel Total (ft/s) | 2.06 | Avg. Vel. (ft/s) | | | 2.06 |
| Max Chl Dpth (ft) | 1.69 | Hydr. Depth (ft) | | | 1.33 |
| Conv. Total (cfs) | 58288.1 | Conv. (cfs) | | | 58288.1 |
| Length Wtd. (ft) | 460.00 | Wetted Per. (ft) | | | 1212.34 |
| Min Ch El (ft) | 1454.30 | Shear (lb/sq ft) | | | 0.27 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.56 |
| Frctn Loss (ft) | 1.16 | Cum Volume (acre-ft) | 100.59 | 51.14 | 152.67 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 27.62 | 8.37 | 121.07 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1455.06 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.11 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1454.94 | Reach Len. (ft) | 447.00 | 498.60 | 460.00 |
| Crit W.S. (ft) | 1453.88 | Flow Area (sq ft) | | | 2416.27 |
| E.G. Slope (ft/ft) | 0.003355 | Area (sq ft) | 876.78 | 134.55 | 3133.49 |
| Q Total (cfs) | 6550.00 | Flow (cfs) | | | 6550.00 |
| Top Width (ft) | 3956.92 | Top Width (ft) | 1374.75 | 209.00 | 2373.17 |
| Vel Total (ft/s) | 2.71 | Avg. Vel. (ft/s) | | | 2.71 |
| Max Chl Dpth (ft) | 2.34 | Hydr. Depth (ft) | | | 1.98 |
| Conv. Total (cfs) | 113084.9 | Conv. (cfs) | | | 113084.9 |
| Length Wtd. (ft) | 460.00 | Wetted Per. (ft) | | | 1222.63 |
| Min Ch El (ft) | 1454.30 | Shear (lb/sq ft) | | | 0.41 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 1.12 |
| Frctn Loss (ft) | 1.36 | Cum Volume (acre-ft) | 113.85 | 54.34 | 197.54 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 49.70 | 12.23 | 132.19 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11243.20 | 11605.60 | 173.34 | 136.37 | 251.58 | 28.89 | 0.54 | 1.27 |
| 11605.60 | 11968.00 | 283.64 | 212.05 | 362.40 | 47.27 | 0.59 | 1.34 |
| 11968.00 | 12330.40 | 142.27 | 140.17 | 362.40 | 23.71 | 0.39 | 1.01 |
| 12330.40 | 12692.80 | 0.75 | 1.79 | 17.44 | 0.12 | 0.10 | 0.42 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10880.80 | 11243.20 | 3.08 | 6.47 | 41.67 | 0.09 | 0.16 | 0.48 |
| 11243.20 | 11605.60 | 886.63 | 459.31 | 362.40 | 26.55 | 1.27 | 1.93 |
| 11605.60 | 11968.00 | 1314.28 | 581.67 | 362.40 | 39.35 | 1.61 | 2.26 |
| 11968.00 | 12330.40 | 1054.87 | 509.78 | 362.40 | 31.58 | 1.41 | 2.07 |
| 12330.40 | 12692.80 | 81.13 | 60.80 | 83.46 | 2.43 | 0.73 | 1.33 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10880.80 | 11243.20 | 50.95 | 34.77 | 43.20 | 0.78 | 0.80 | 1.47 |
| 11243.20 | 11605.60 | 1824.14 | 696.78 | 362.40 | 27.85 | 1.92 | 2.62 |
| 11605.60 | 11968.00 | 2388.69 | 819.14 | 362.40 | 36.47 | 2.26 | 2.92 |
| 11968.00 | 12330.40 | 2049.62 | 747.25 | 362.40 | 31.29 | 2.06 | 2.74 |
| 12330.40 | 12692.80 | 236.61 | 118.34 | 92.23 | 3.61 | 1.28 | 2.00 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 13.212

INPUT
Description: new cross section #6
Station Elevation Data num= 35

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8530 | 1454.5 | 8580 | 1454 | 8840 | 1452 | 9200 | 1450 | 9210 | 1440 |
| 9570 | 1440 | 9630 | 1460 | 9700 | 1440 | 9850 | 1440 | 9885 | 1450 |
| 9895 | 1452 | 9920 | 1450 | 9930 | 1448 | 9981 | 1446.1 | 10095 | 1448 |
| 10126 | 1452 | 10160 | 1452 | 10250 | 1451 | 10770 | 1451.5 | 11040 | 1452 |
| 11150 | 1452.4 | 11230 | 1452 | 11240 | 1452 | 11475 | 1451.3 | 11920 | 1451.55 |
| 12340 | 1452 | 12430 | 1453.65 | 12590 | 1453.5 | 12930 | 1452.9 | 13280 | 1453.2 |
| 13420 | 1454 | 13460 | 1454.5 | 13485 | 1454 | 13495 | 1452 | 13520 | 1450 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8530 | .05 | 9895 | .035 | 10126 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9895 | 10126 | 470 | 496.1 | 525 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 11150 | 1453.65 | 12430 | 13520 | 1453.65 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8530 | 10126 | 1453.5 | 12422 | 13520 | 1453.66 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1452.29 | Element | | | |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1452.28 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1451.76 | Flow Area (sq ft) | | | 752.68 |
| E.G. Slope (ft/ft) | 0.001312 | Area (sq ft) | | | 1521.30 |
| Q Total (cfs) | 600.00 | Flow (cfs) | | | 600.00 |
| Top Width (ft) | 2171.96 | Top Width (ft) | | | 2171.96 |
| Vel Total (ft/s) | 0.80 | Avg. Vel. (ft/s) | | | 0.80 |
| Max Chl Dpth (ft) | 1.28 | Hydr. Depth (ft) | | | 0.64 |
| Conv. Total (cfs) | 16564.4 | Conv. (cfs) | | | 16564.4 |
| Length Wtd. (ft) | 525.00 | Wetted Per. (ft) | | | 1181.13 |
| Min Ch El (ft) | 1452.00 | Shear (lb/sq ft) | | | 0.05 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.04 |
| Frctn Loss (ft) | 1.86 | Cum Volume (acre-ft) | 89.59 | 47.71 | 81.00 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 24.02 | 8.33 | 82.24 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.19 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.04 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1453.15 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1452.23 | Flow Area (sq ft) | | | 1815.53 |
| E.G. Slope (ft/ft) | 0.001957 | Area (sq ft) | | | 3469.03 |
| Q Total (cfs) | 3057.00 | Flow (cfs) | | | 3057.00 |
| Top Width (ft) | 2276.48 | Top Width (ft) | | | 2276.48 |
| Vel Total (ft/s) | 1.68 | Avg. Vel. (ft/s) | | | 1.68 |
| Max Chl Dpth (ft) | 2.15 | Hydr. Depth (ft) | | | 1.45 |
| Conv. Total (cfs) | 69105.5 | Conv. (cfs) | | | 69105.5 |
| Length Wtd. (ft) | 525.00 | Wetted Per. (ft) | | | 1252.50 |
| Min Ch El (ft) | 1452.00 | Shear (lb/sq ft) | | | 0.18 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.30 |
| Frctn Loss (ft) | 2.17 | Cum Volume (acre-ft) | 100.59 | 51.14 | 125.78 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 27.62 | 8.37 | 102.48 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1453.69 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.08 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1453.61 | Reach Len. (ft) | 470.00 | 496.10 | 525.00 |
| Crit W.S. (ft) | 1452.52 | Flow Area (sq ft) | | | 2399.59 |
| E.G. Slope (ft/ft) | 0.002566 | Area (sq ft) | 130.53 | 24.81 | 4526.09 |
| Q Total (cfs) | 5515.00 | Flow (cfs) | | | 5515.00 |
| Top Width (ft) | 3749.41 | Top Width (ft) | 1222.41 | 231.00 | 2296.00 |
| Vel Total (ft/s) | 2.30 | Avg. Vel. (ft/s) | | | 2.30 |
| Max Chl Dpth (ft) | 2.61 | Hydr. Depth (ft) | | | 1.89 |
| Conv. Total (cfs) | 108868.4 | Conv. (cfs) | | | 108868.4 |
| Length Wtd. (ft) | 525.00 | Wetted Per. (ft) | | | 1272.12 |
| Min Ch El (ft) | 1452.00 | Shear (lb/sq ft) | | | 0.30 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.69 |
| Frctn Loss (ft) | 2.23 | Cum Volume (acre-ft) | 108.68 | 53.43 | 157.10 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 36.37 | 9.71 | 107.53 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11144.20 | 11483.60 | 113.99 | 166.91 | 309.48 | 19.00 | 0.54 | 0.68 |
| 11483.60 | 11823.00 | 282.26 | 298.38 | 339.40 | 47.04 | 0.88 | 0.95 |
| 11823.00 | 12162.40 | 168.20 | 218.72 | 339.40 | 28.03 | 0.64 | 0.77 |
| 12162.40 | 12501.80 | 35.55 | 68.65 | 192.84 | 5.92 | 0.36 | 0.52 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11144.20 | 11483.60 | 723.43 | 454.38 | 333.60 | 23.66 | 1.36 | 1.59 |
| 11483.60 | 11823.00 | 1112.55 | 592.33 | 339.40 | 36.39 | 1.75 | 1.88 |
| 11823.00 | 12162.40 | 874.52 | 512.67 | 339.40 | 28.61 | 1.51 | 1.71 |
| 12162.40 | 12501.80 | 346.49 | 256.13 | 240.09 | 11.33 | 1.07 | 1.35 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11144.20 | 11483.60 | 1352.12 | 608.48 | 333.60 | 24.52 | 1.82 | 2.22 |
| 11483.60 | 11823.00 | 1890.28 | 749.11 | 339.40 | 34.28 | 2.21 | 2.52 |
| 11823.00 | 12162.40 | 1567.26 | 669.44 | 339.40 | 28.42 | 1.97 | 2.34 |
| 12162.40 | 12501.80 | 705.34 | 372.55 | 259.72 | 12.79 | 1.44 | 1.89 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 13.118

INPUT
Description: new cross section #5
Station Elevation Data num= 29

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8590 | 1452 | 9160 | 1452 | 9230 | 1440 | 9530 | 1440 | 9540 | 1450 |
| 9835 | 1452 | 9860 | 1455 | 9920 | 1452 | 9935 | 1446 | 9978 | 1444.1 |
| 10080 | 1446 | 10090 | 1450 | 10100 | 1452 | 10110 | 1452 | 10120 | 1452 |
| 10140 | 1450 | 10650 | 1449.8 | 11200 | 1449.9 | 11270 | 1449.5 | 11400 | 1450 |
| 11500 | 1450 | 12030 | 1450.6 | 12365 | 1452 | 12420 | 1452.6 | 12560 | 1452 |
| 12910 | 1451.6 | 13430 | 1451.7 | 13580 | 1452 | 13660 | 1452.2 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8590 | .05 | 9920 | .035 | 10090 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9920 | 10090 | 470 | 504 | 560 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8590 | 11200 | 1452.9 | 12420 | 13660 | 1452.6 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8590 | 9530 | 1447 | 12412 | 13660 | 1452.5 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1450.42 | Element | | | |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1450.26 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |
| Crit W.S. (ft) | 1450.26 | Flow Area (sq ft) | | | 161.04 |
| E.G. Slope (ft/ft) | 0.055474 | Area (sq ft) | 1164.45 | 800.64 | 569.97 |
| Q Total (cfs) | 510.00 | Flow (cfs) | | | 510.00 |
| Top Width (ft) | 2166.79 | Top Width (ft) | 408.11 | 165.65 | 1593.04 |
| Vel Total (ft/s) | 3.17 | Avg. Vel. (ft/s) | | | 3.17 |
| Max Chl Dpth (ft) | 6.16 | Hydr. Depth (ft) | | | 0.30 |
| Conv. Total (cfs) | 2165.3 | Conv. (cfs) | | | 2165.3 |
| Length Wtd. (ft) | 560.00 | Wetted Per. (ft) | | | 529.15 |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | | | 1.05 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 3.34 |
| Frctn Loss (ft) | 0.45 | Cum Volume (acre-ft) | 83.31 | 43.15 | 68.39 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 21.82 | 7.39 | 59.55 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,

water surface was used.

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1451.00 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.26 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1450.74 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |
| Crit W.S. (ft) | 1450.70 | Flow Area (sq ft) | | | 510.62 |
| E.G. Slope (ft/ft) | 0.037592 | Area (sq ft) | 1378.06 | 880.45 | 1432.06 |
| Q Total (cfs) | 2073.00 | Flow (cfs) | | | 2073.00 |
| Top Width (ft) | 2583.05 | Top Width (ft) | 481.72 | 166.85 | 1934.48 |
| Vel Total (ft/s) | 4.06 | Avg. Vel. (ft/s) | | | 4.06 |
| Max Chl Dpth (ft) | 6.64 | Hydr. Depth (ft) | | | 0.59 |
| Conv. Total (cfs) | 10691.8 | Conv. (cfs) | | | 10691.8 |
| Length Wtd. (ft) | 560.00 | Wetted Per. (ft) | | | 863.39 |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | | | 1.39 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 5.63 |
| Frctn Loss (ft) | 1.37 | Cum Volume (acre-ft) | 93.16 | 46.12 | 96.25 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 25.02 | 7.42 | 77.10 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1451.45 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.20 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1451.25 | Reach Len. (ft) | 470.00 | 504.00 | 560.00 |
| Crit W.S. (ft) | 1450.95 | Flow Area (sq ft) | | | 983.52 |
| E.G. Slope (ft/ft) | 0.014293 | Area (sq ft) | 1644.51 | 966.12 | 2454.76 |
| Q Total (cfs) | 3489.00 | Flow (cfs) | | | 3489.00 |
| Top Width (ft) | 2792.81 | Top Width (ft) | 560.15 | 168.13 | 2064.54 |
| Vel Total (ft/s) | 3.55 | Avg. Vel. (ft/s) | | | 3.55 |
| Max Chl Dpth (ft) | 7.15 | Hydr. Depth (ft) | | | 1.00 |
| Conv. Total (cfs) | 29184.0 | Conv. (cfs) | | | 29184.0 |
| Length Wtd. (ft) | 560.00 | Wetted Per. (ft) | | | 985.78 |
| Min Ch El (ft) | 1444.10 | Shear (lb/sq ft) | | | 0.89 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 3.16 |
| Frctn Loss (ft) | 1.58 | Cum Volume (acre-ft) | 99.10 | 47.78 | 115.03 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 26.75 | 7.44 | 81.26 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11161.00 | 11518.00 | 472.44 | 135.80 | 318.00 | 92.64 | 0.43 | 3.48 |
| 11518.00 | 11875.00 | 37.56 | 25.23 | 211.15 | 7.36 | 0.12 | 1.49 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11161.00 | 11518.00 | 1393.86 | 288.48 | 318.00 | 67.24 | 0.91 | 4.83 |
| 11518.00 | 11875.00 | 613.07 | 184.58 | 357.00 | 29.57 | 0.52 | 3.32 |
| 11875.00 | 12232.00 | 66.07 | 37.55 | 188.39 | 3.19 | 0.20 | 1.76 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11161.00 | 11518.00 | 1888.81 | 451.13 | 318.00 | 54.14 | 1.42 | 4.19 |
| 11518.00 | 11875.00 | 1240.67 | 367.18 | 357.00 | 35.56 | 1.03 | 3.38 |
| 11875.00 | 12232.00 | 359.51 | 165.20 | 310.77 | 10.30 | 0.53 | 2.18 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 13.023

INPUT
Description: new cross section #4
Station Elevation Data num= 26

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8460 | 1451 | 8610 | 1450 | 9382 | 1448 | 9683 | 1446 | 9870 | 1446 |
| 9874 | 1450 | 9894 | 1450.5 | 9910 | 1444 | 9980 | 1442.5 | 10110 | 1444 |
| 10134 | 1450 | 10143 | 1450.5 | 10150 | 1450 | 10510 | 1448 | 11180 | 1448 |
| 11240 | 1449.1 | 11275 | 1448 | 11800 | 1447.5 | 11990 | 1448 | 12200 | 1450 |
| 12380 | 1450.5 | 12475 | 1450.9 | 12820 | 1450 | 13420 | 1449.8 | 13775 | 1450 |
| 13800 | 1450.8 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8460 | .05 | 9910 | .35 | 10134 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10134 | 420 | 494.4 | 590 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8460 | 11240 | 1451 | 12475 | 13800 | 1450.9 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8460 | 9870 | 1447.5 | 12474 | 13800 | 1450.8 |

CROSS SECTION OUTPUT Profile #one third flow

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1448.98 | | | | |
| Vel Head (ft) | 0.00 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1448.98 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1447.96 | Flow Area (sq ft) | | | 946.69 |
| E.G. Slope (ft/ft) | 0.000186 | Area (sq ft) | 922.66 | 1196.00 | 1717.55 |
| Q Total (cfs) | 413.00 | Flow (cfs) | | | 413.00 |
| Top Width (ft) | 2851.15 | Top Width (ft) | 881.61 | 219.93 | 1749.61 |
| Vel Total (ft/s) | 0.44 | Avg. Vel. (ft/s) | | | 0.44 |
| Max Chl Dpth (ft) | 6.48 | Hydr. Depth (ft) | | | 1.11 |
| Conv. Total (cfs) | 30244.4 | Conv. (cfs) | | | 30244.4 |
| Length Wtd. (ft) | 590.00 | Wetted Per. (ft) | | | 849.35 |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | | | 0.01 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.01 |
| Frctn Loss (ft) | 0.24 | Cum Volume (acre-ft) | 72.05 | 31.60 | 53.69 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 14.86 | 5.16 | 38.06 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #two third flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.55 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1449.53 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1448.22 | Flow Area (sq ft) | | | 1432.70 |
| E.G. Slope (ft/ft) | 0.000521 | Area (sq ft) | 1467.93 | 1317.85 | 2730.38 |
| Q Total (cfs) | 1314.00 | Flow (cfs) | | | 1314.00 |
| Top Width (ft) | 3235.70 | Top Width (ft) | 1096.64 | 222.13 | 1916.93 |
| Vel Total (ft/s) | 0.92 | Avg. Vel. (ft/s) | | | 0.92 |
| Max Chl Dpth (ft) | 7.03 | Hydr. Depth (ft) | | | 1.57 |
| Conv. Total (cfs) | 57580.3 | Conv. (cfs) | | | 57580.3 |
| Length Wtd. (ft) | 590.00 | Wetted Per. (ft) | | | 911.00 |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | | | 0.05 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.05 |
| Frctn Loss (ft) | 0.51 | Cum Volume (acre-ft) | 77.80 | 33.41 | 69.49 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 16.51 | 5.17 | 52.34 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.82 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1449.80 | Reach Len. (ft) | 420.00 | 494.40 | 590.00 |
| Crit W.S. (ft) | 1448.36 | Flow Area (sq ft) | | | 1675.06 |
| E.G. Slope (ft/ft) | 0.000708 | Area (sq ft) | 1768.74 | 1376.20 | 3242.57 |
| Q Total (cfs) | 1949.00 | Flow (cfs) | | | 1949.00 |
| Top Width (ft) | 3413.67 | Top Width (ft) | 1198.87 | 223.18 | 1991.62 |
| Vel Total (ft/s) | 1.16 | Avg. Vel. (ft/s) | | | 1.16 |
| Max Chl Dpth (ft) | 7.30 | Hydr. Depth (ft) | | | 1.78 |
| Conv. Total (cfs) | 73245.6 | Conv. (cfs) | | | 73245.6 |
| Length Wtd. (ft) | 590.00 | Wetted Per. (ft) | | | 938.52 |
| Min Ch El (ft) | 1442.50 | Shear (lb/sq ft) | | | 0.08 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.09 |
| Frctn Loss (ft) | 0.65 | Cum Volume (acre-ft) | 80.69 | 34.23 | 78.41 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 17.27 | 5.18 | 55.18 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11233.80 | 11600.40 | 159.99 | 385.24 | 356.66 | 38.74 | 1.08 | 0.42 |
| 11600.40 | 11967.00 | 232.61 | 487.57 | 366.60 | 56.32 | 1.33 | 0.48 |
| 11967.00 | 12333.60 | 20.41 | 73.89 | 126.09 | 4.94 | 0.59 | 0.28 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11233.80 | 11600.40 | 528.67 | 583.70 | 360.42 | 40.23 | 1.62 | 0.91 |
| 11600.40 | 11967.00 | 690.24 | 689.66 | 366.60 | 52.53 | 1.88 | 1.00 |
| 11967.00 | 12333.60 | 95.09 | 159.35 | 183.98 | 7.24 | 0.87 | 0.60 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 11233.80 | 11600.40 | 789.76 | 678.16 | 360.42 | 40.52 | 1.88 | 1.16 |
| 11600.40 | 11967.00 | 998.06 | 785.74 | 366.60 | 51.21 | 2.14 | 1.27 |
| 11967.00 | 12333.60 | 161.19 | 211.17 | 211.50 | 8.27 | 1.00 | 0.76 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 12.929

INPUT
Description: cut cross section #3, center station 10000
Station Elevation Data num= 28

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 8330 | 1454 | 8600 | 1450 | 9000 | 1448 | 9430 | 1448 | 9450 | 1446 |
| 9465 | 1444 | 9480 | 1442 | 9550 | 1440 | 9750 | 1421 | 9860 | 1446 |
| 9886 | 1442 | 9930 | 1441 | 10085 | 1442 | 10156 | 1444 | 10190 | 1446 |
| 10825 | 1446 | 11200 | 1446 | 11250 | 1448 | 11280 | 1448.25 | 11700 | 1448.2 |
| 12070 | 1448.9 | 12395 | 1448.8 | 12525 | 1449.2 | 12630 | 1449.25 | 13260 | 1448.6 |
| 13600 | 1448 | 13850 | 1448 | 13855 | 1448.1 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 8330 | .05 | 9860 | .035 | 10190 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9860 | 10190 | 500 | 537.8 | 550 | .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 8330 | 11280 | 1450 | 12525 | 13855 | 1450 |

Blocked Obstructions num= 1

| Sta L | Sta R | Elev |
|---|---|---|
| 12618 | 13855 | 1449.26 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1448.74 | Element | | | |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1448.73 | Reach Len. (ft) | 500.00 | 537.80 | 550.00 |
| Crit W.S. (ft) | 1448.46 | Flow Area (sq ft) | | | 283.18 |
| E.G. Slope (ft/ft) | 0.004089 | Area (sq ft) | 6401.53 | 2093.90 | 3140.19 |
| Q Total (cfs) | 295.00 | Flow (cfs) | | | 295.00 |
| Top Width (ft) | 3122.83 | Top Width (ft) | 1005.09 | 330.00 | 1787.74 |
| Vel Total (ft/s) | 1.04 | Avg. Vel. (ft/s) | | | 1.04 |
| Max Chl Dpth (ft) | 27.73 | Hydr. Depth (ft) | | | 0.41 |
| Conv. Total (cfs) | 4613.3 | Conv. (cfs) | | | 4613.3 |
| Length Wtd. (ft) | 550.00 | Wetted Per. (ft) | | | 697.74 |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | | | 0.10 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.11 |
| Frctn Loss (ft) | 2.12 | Cum Volume (acre-ft) | 36.74 | 12.93 | 20.79 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 5.77 | 2.04 | 14.11 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #two third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.03 | Element | | | |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1449.01 | Reach Len. (ft) | 500.00 | 537.80 | 550.00 |
| Crit W.S. (ft) | 1448.61 | Flow Area (sq ft) | | | 561.25 |
| E.G. Slope (ft/ft) | 0.004352 | Area (sq ft) | 6697.57 | 2188.41 | 3730.40 |
| Q Total (cfs) | 669.00 | Flow (cfs) | | | 669.00 |
| Top Width (ft) | 3666.22 | Top Width (ft) | 1062.37 | 330.00 | 2273.85 |
| Vel Total (ft/s) | 1.19 | Avg. Vel. (ft/s) | | | 1.19 |
| Max Chl Dpth (ft) | 28.01 | Hydr. Depth (ft) | | | 0.47 |
| Conv. Total (cfs) | 10141.0 | Conv. (cfs) | | | 10141.0 |
| Length Wtd. (ft) | 550.00 | Wetted Per. (ft) | | | 1183.85 |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | | | 0.13 |

| | | | | | |
|---|---|---|---|---|---|
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.15 |
| Frctn Loss (ft) | 2.20 | Cum Volume (acre-ft) | 38.44 | 13.51 | 25.74 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 6.10 | 2.04 | 23.96 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #full flow

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1449.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1449.14 | Reach Len. (ft) | 500.00 | 537.80 | 550.00 |
| Crit W.S. (ft) | 1448.71 | Flow Area (sq ft) | | | 713.41 |
| E.G. Slope (ft/ft) | 0.004313 | Area (sq ft) | 6833.38 | 2230.10 | 4020.28 |
| Q Total (cfs) | 971.00 | Flow (cfs) | | | 971.00 |
| Top Width (ft) | 3732.56 | Top Width (ft) | 1087.64 | 330.00 | 2314.92 |
| Vel Total (ft/s) | 1.36 | Avg. Vel. (ft/s) | | | 1.36 |
| Max Chl Dpth (ft) | 28.14 | Hydr. Depth (ft) | | | 0.58 |
| Conv. Total (cfs) | 14786.1 | Conv. (cfs) | | | 14786.1 |
| Length Wtd. (ft) | 550.00 | Wetted Per. (ft) | | | 1224.92 |
| Min Ch El (ft) | 1441.00 | Shear (lb/sq ft) | | | 0.16 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.21 |
| Frctn Loss (ft) | 2.18 | Cum Volume (acre-ft) | 39.22 | 13.77 | 29.22 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 6.24 | 2.04 | 26.02 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10923.00 | 11289.50 | 5.07 | 4.52 | 9.50 | 1.72 | 0.48 | 1.12 |
| 11289.50 | 11656.00 | 211.13 | 182.67 | 366.50 | 71.57 | 0.50 | 1.16 |
| 11656.00 | 12022.50 | 78.80 | 95.99 | 321.74 | 26.71 | 0.30 | 0.82 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10923.00 | 11289.50 | 10.04 | 7.24 | 9.50 | 1.50 | 0.76 | 1.39 |
| 11289.50 | 11656.00 | 406.63 | 287.63 | 366.50 | 60.78 | 0.78 | 1.41 |
| 11656.00 | 12022.50 | 220.16 | 199.04 | 366.50 | 32.91 | 0.54 | 1.11 |
| 12022.50 | 12389.00 | 28.82 | 58.77 | 366.50 | 4.31 | 0.16 | 0.49 |
| 12389.00 | 12755.50 | 3.35 | 8.56 | 74.85 | 0.50 | 0.11 | 0.39 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10923.00 | 11289.50 | 13.49 | 8.44 | 9.50 | 1.39 | 0.89 | 1.60 |
| 11289.50 | 11656.00 | 542.63 | 333.93 | 366.50 | 55.88 | 0.91 | 1.62 |
| 11656.00 | 12022.50 | 324.62 | 245.35 | 366.50 | 33.43 | 0.67 | 1.32 |
| 12022.50 | 12389.00 | 78.99 | 105.07 | 366.50 | 8.13 | 0.29 | 0.75 |
| 12389.00 | 12755.50 | 11.26 | 20.61 | 115.92 | 1.16 | 0.18 | 0.55 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Queen Creek
REACH: SPRR- R overbank RS: 12.827

INPUT
Description: cut from map section 25 (QC area drainage master study)
Station Elevation Data num= 21

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9100 | 1450.6 | 9280 | 1446 | 9792 | 1446 | 9892 | 1446 | 9900 | 1444 |
| 9930 | 1440 | 9971 | 1438.8 | 10160 | 1440 | 10162 | 1440.375 | 10192 | 1446 |
| 10320 | 1446 | 10670 | 1440 | 10840 | 1446 | 11110 | 1447.1 | 11240 | 1446.3 |
| 11400 | 1446 | 11750 | 1446.9 | 12020 | 1446.8 | 12400 | 1446.8 | 12880 | 1446.5 |
| 12940 | 1447 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9100 | .05 | 9900 | .035 | 10162 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9900 | 10162 | | 0 | 0 | 0 .1 | .3 |

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 11010 | 1447.5 | 12940 | 12940 | 1448 |

Blocked Obstructions num= 2

| Sta L | Sta R | Elev | Sta L | Sta R | Elev |
|---|---|---|---|---|---|
| 9100 | 11110 | 1447.1 | 11750 | 12940 | 1446.62 |

CROSS SECTION OUTPUT Profile #one third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.62 | Element | | | |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1446.61 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1446.34 | Flow Area (sq ft) | | | 153.26 |
| E.G. Slope (ft/ft) | 0.003395 | Area (sq ft) | | | 153.26 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | | 130.00 |
| Top Width (ft) | 446.97 | Top Width (ft) | | | 446.97 |
| Vel Total (ft/s) | 0.85 | Avg. Vel. (ft/s) | | | 0.85 |
| Max Chl Dpth (ft) | 0.61 | Hydr. Depth (ft) | | | 0.34 |
| Conv. Total (cfs) | 2231.2 | Conv. (cfs) | | | 2231.2 |
| Length Wtd. (ft) | | Wetted Per. (ft) | | | 446.98 |
| Min Ch El (ft) | 1447.10 | Shear (lb/sq ft) | | | 0.07 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.06 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

CROSS SECTION OUTPUT Profile #two third flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.83 | Element | | | |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1446.82 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1446.48 | Flow Area (sq ft) | | | 346.07 |
| E.G. Slope (ft/ft) | 0.003406 | Area (sq ft) | | | 346.07 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | | 300.00 |
| Top Width (ft) | 1521.66 | Top Width (ft) | | | 1521.66 |
| Vel Total (ft/s) | 0.87 | Avg. Vel. (ft/s) | | | 0.87 |
| Max Chl Dpth (ft) | 0.82 | Hydr. Depth (ft) | | | 0.23 |
| Conv. Total (cfs) | 5140.3 | Conv. (cfs) | | | 5140.3 |
| Length Wtd. (ft) | | Wetted Per. (ft) | | | 1521.66 |
| Min Ch El (ft) | 1447.10 | Shear (lb/sq ft) | | | 0.05 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | | 0.04 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #full flow

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.98 | Element | | | |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | | 0.050 |
| W.S. Elev (ft) | 1446.97 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1446.65 | Flow Area (sq ft) | | | 608.10 |

| | | | |
|---|---|---|---|
| E.G. Slope (ft/ft) | 0.003401 | Area (sq ft) | 608.10 |
| Q Total (cfs) | 510.00 | Flow (cfs) | 510.00 |
| Top Width (ft) | 1806.37 | Top Width (ft) | 1806.37 |
| Vel Total (ft/s) | 0.84 | Avg. Vel. (ft/s) | 0.84 |
| Max Chl Dpth (ft) | 0.97 | Hydr. Depth (ft) | 0.34 |
| Conv. Total (cfs) | 8745.3 | Conv. (cfs) | 8745.3 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 1806.38 |
| Min Ch El (ft) | 1447.10 | Shear (lb/sq ft) | 0.07 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.06 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | |
| C & E Loss (ft) | | Cum SA (acres) | |

FLOW DISTRIBUTION OUTPUT Profile #one third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10995.40 | 11273.20 | 11.21 | 19.04 | 83.39 | 8.62 | 0.23 | 0.59 |
| 11273.20 | 11551.00 | 115.36 | 124.76 | 277.80 | 88.74 | 0.45 | 0.92 |
| 11551.00 | 11828.80 | 3.43 | 9.46 | 85.78 | 2.64 | 0.11 | 0.36 |

FLOW DISTRIBUTION OUTPUT Profile #two third flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10995.40 | 11273.20 | 30.43 | 40.47 | 117.99 | 10.14 | 0.34 | 0.75 |
| 11273.20 | 11551.00 | 214.30 | 183.90 | 277.80 | 71.43 | 0.66 | 1.17 |
| 11551.00 | 11828.80 | 20.23 | 36.54 | 168.57 | 6.74 | 0.22 | 0.55 |
| 11828.80 | 12106.60 | 0.26 | 2.52 | 145.28 | 0.09 | 0.02 | 0.10 |
| 12106.60 | 12384.40 | 0.72 | 6.04 | 277.80 | 0.24 | 0.02 | 0.12 |
| 12384.40 | 12662.20 | 9.04 | 27.53 | 277.80 | 3.01 | 0.10 | 0.33 |
| 12662.20 | 12940.00 | 25.02 | 49.09 | 256.41 | 8.34 | 0.19 | 0.51 |

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #full flow

| Left Sta (ft) | Right Sta (ft) | Flow (cfs) | Area (sq ft) | W.P. (ft) | % Conv. | Hydr D. (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|---|
| 10995.40 | 11273.20 | 48.41 | 60.30 | 142.71 | 9.49 | 0.42 | 0.80 |
| 11273.20 | 11551.00 | 281.15 | 226.15 | 277.80 | 55.13 | 0.81 | 1.24 |
| 11551.00 | 11828.80 | 42.30 | 72.58 | 277.80 | 8.29 | 0.26 | 0.58 |
| 11828.80 | 12106.60 | 16.67 | 41.52 | 277.80 | 3.27 | 0.15 | 0.40 |
| 12106.60 | 12384.40 | 21.45 | 48.29 | 277.80 | 4.21 | 0.17 | 0.44 |
| 12384.40 | 12662.20 | 39.61 | 69.78 | 277.80 | 7.77 | 0.25 | 0.57 |
| 12662.20 | 12940.00 | 60.41 | 89.48 | 274.67 | 11.84 | 0.33 | 0.68 |

SUMMARY OF MANNING'S N VALUES

River:Queen Creek

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| SPRR- R overbank | 13.350 | .05 | .035 | .05 |
| SPRR- R overbank | 13.307 | .05 | .035 | .05 |
| SPRR- R overbank | 13.212 | .05 | .035 | .05 |
| SPRR- R overbank | 13.118 | .05 | .035 | .05 |
| SPRR- R overbank | 13.023 | .05 | .35 | .05 |
| SPRR- R overbank | 12.929 | .05 | .035 | .05 |
| SPRR- R overbank | 12.827 | .05 | .035 | .05 |

SUMMARY OF REACH LENGTHS

River: Queen Creek

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| SPRR- R overbank | 13.350 | 240 | 225.45 | 220 |

| | | | | |
|---|---|---|---|---|
| SPRR- R overbank | 13.307 | 447 | 498.6 | 460 |
| SPRR- R overbank | 13.212 | 470 | 496.1 | 525 |
| SPRR- R overbank | 13.118 | 470 | 504 | 560 |
| SPRR- R overbank | 13.023 | 420 | 494.4 | 590 |
| SPRR- R overbank | 12.929 | 500 | 537.8 | 550 |
| SPRR- R overbank | 12.827 | 0 | 0 | 0 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Queen Creek

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|
| SPRR- R overbank | 13.350 | .1 | .3 |
| SPRR- R overbank | 13.307 | .1 | .3 |
| SPRR- R overbank | 13.212 | .1 | .3 |
| SPRR- R overbank | 13.118 | .1 | .3 |
| SPRR- R overbank | 13.023 | .1 | .3 |
| SPRR- R overbank | 12.929 | .1 | .3 |
| SPRR- R overbank | 12.827 | .1 | .3 |

Profile Output Table - Standard Table 1

| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPRR- R overbank | 13.350 | 600.00 | 1454.00 | 1453.93 | 1453.46 | 1453.94 | 0.002181 | | 614.62 | 1042.01 | 0.00 |
| SPRR- R overbank | 13.350 | 3340.00 | 1454.00 | 1454.92 | 1454.03 | 1454.98 | 0.002486 | | 1705.56 | 3110.73 | 0.00 |
| SPRR- R overbank | 13.350 | 6550.00 | 1454.00 | 1455.62 | 1454.40 | 1455.72 | 0.002749 | | 2500.74 | 3302.19 | 0.00 |
| SPRR- R overbank | 13.307 | 600.00 | 1454.30 | 1453.27 | 1452.98 | 1453.29 | 0.004348 | | 490.37 | 993.81 | 0.00 |
| SPRR- R overbank | 13.307 | 3340.00 | 1454.30 | 1454.29 | 1453.48 | 1454.35 | 0.003283 | | 1618.02 | 1245.32 | 0.00 |
| SPRR- R overbank | 13.307 | 6550.00 | 1454.30 | 1454.94 | 1453.88 | 1455.06 | 0.003355 | | 2416.27 | 3956.92 | 0.00 |
| SPRR- R overbank | 13.212 | 600.00 | 1452.00 | 1452.28 | 1451.76 | 1452.29 | 0.001312 | | 752.68 | 2171.96 | 0.00 |
| SPRR- R overbank | 13.212 | 3057.00 | 1452.00 | 1453.15 | 1452.23 | 1453.19 | 0.001957 | | 1815.53 | 2276.48 | 0.00 |
| SPRR- R overbank | 13.212 | 5515.00 | 1452.00 | 1453.61 | 1452.52 | 1453.69 | 0.002566 | | 2399.59 | 3749.41 | 0.00 |
| SPRR- R overbank | 13.118 | 510.00 | 1444.10 | 1450.26 | 1450.26 | 1450.42 | 0.055474 | | 161.04 | 2166.79 | 0.00 |
| SPRR- R overbank | 13.118 | 2073.00 | 1444.10 | 1450.74 | 1450.70 | 1451.00 | 0.037592 | | 510.62 | 2583.05 | 0.00 |
| SPRR- R overbank | 13.118 | 3489.00 | 1444.10 | 1451.25 | 1450.95 | 1451.45 | 0.014293 | | 983.52 | 2792.81 | 0.00 |
| SPRR- R overbank | 13.023 | 413.00 | 1442.50 | 1448.98 | 1447.96 | 1448.98 | 0.000186 | | 946.69 | 2851.15 | 0.00 |
| SPRR- R overbank | 13.023 | 1314.00 | 1442.50 | 1449.53 | 1448.22 | 1449.55 | 0.000521 | | 1432.70 | 3235.70 | 0.00 |
| SPRR- R overbank | 13.023 | 1949.00 | 1442.50 | 1449.80 | 1448.36 | 1449.82 | 0.000708 | | 1675.06 | 3413.67 | 0.00 |
| SPRR- R overbank | 12.929 | 295.00 | 1441.00 | 1448.73 | 1448.46 | 1448.74 | 0.004089 | | 283.18 | 3122.83 | 0.00 |
| SPRR- R overbank | 12.929 | 669.00 | 1441.00 | 1449.01 | 1448.61 | 1449.03 | 0.004352 | | 561.25 | 3666.22 | 0.00 |
| SPRR- R overbank | 12.929 | 971.00 | 1441.00 | 1449.14 | 1448.71 | 1449.17 | 0.004313 | | 713.41 | 3732.56 | 0.00 |
| SPRR- R overbank | 12.827 | 130.00 | 1447.10 | 1446.61 | 1446.34 | 1446.62 | 0.003395 | | 153.26 | 446.97 | 0.00 |
| SPRR- R overbank | 12.827 | 300.00 | 1447.10 | 1446.82 | 1446.48 | 1446.83 | 0.003406 | | 346.07 | 1521.66 | 0.00 |
| SPRR- R overbank | 12.827 | 510.00 | 1447.10 | 1446.97 | 1446.65 | 1446.98 | 0.003401 | | 608.10 | 1806.37 | 0.00 |

Profile Output Table - Standard Table 2

| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| SPRR- R overbank | 13.350 | 1453.94 | 1453.93 | 0.01 | 0.65 | 0.00 | | | 600.00 | 1042.01 |
| SPRR- R overbank | 13.350 | 1454.98 | 1454.92 | 0.06 | 0.62 | 0.00 | | | 3340.00 | 3110.73 |
| SPRR- R overbank | 13.350 | 1455.72 | 1455.62 | 0.11 | 0.67 | 0.00 | | | 6550.00 | 3302.19 |
| SPRR- R overbank | 13.307 | 1453.29 | 1453.27 | 0.02 | 1.00 | 0.00 | | | 600.00 | 993.81 |
| SPRR- R overbank | 13.307 | 1454.35 | 1454.29 | 0.07 | 1.16 | 0.01 | | | 3340.00 | 1245.32 |
| SPRR- R overbank | 13.307 | 1455.06 | 1454.94 | 0.11 | 1.36 | 0.01 | | | 6550.00 | 3956.92 |
| SPRR- R overbank | 13.212 | 1452.29 | 1452.28 | 0.01 | 1.86 | 0.01 | | | 600.00 | 2171.96 |
| SPRR- R overbank | 13.212 | 1453.19 | 1453.15 | 0.04 | 2.17 | 0.02 | | | 3057.00 | 2276.48 |
| SPRR- R overbank | 13.212 | 1453.69 | 1453.61 | 0.08 | 2.23 | 0.01 | | | 5515.00 | 3749.41 |
| SPRR- R overbank | 13.118 | 1450.42 | 1450.26 | 0.16 | 0.45 | 0.05 | | | 510.00 | 2166.79 |
| SPRR- R overbank | 13.118 | 1451.00 | 1450.74 | 0.26 | 1.37 | 0.07 | | | 2073.00 | 2583.05 |
| SPRR- R overbank | 13.118 | 1451.45 | 1451.25 | 0.20 | 1.58 | 0.05 | | | 3489.00 | 2792.81 |
| SPRR- R overbank | 13.023 | 1448.98 | 1448.98 | 0.00 | 0.24 | 0.00 | | | 413.00 | 2851.15 |
| SPRR- R overbank | 13.023 | 1449.55 | 1449.53 | 0.01 | 0.51 | 0.00 | | | 1314.00 | 3235.70 |
| SPRR- R overbank | 13.023 | 1449.82 | 1449.80 | 0.02 | 0.65 | 0.00 | | | 1949.00 | 3413.67 |
| SPRR- R overbank | 12.929 | 1448.74 | 1448.73 | 0.02 | 2.12 | 0.00 | | | 295.00 | 3122.83 |
| SPRR- R overbank | 12.929 | 1449.03 | 1449.01 | 0.02 | 2.20 | 0.00 | | | 669.00 | 3666.22 |
| SPRR- R overbank | 12.929 | 1449.17 | 1449.14 | 0.03 | 2.18 | 0.01 | | | 971.00 | 3732.56 |
| SPRR- R overbank | 12.827 | 1446.62 | 1446.61 | 0.01 | | | | | 130.00 | 446.97 |
| SPRR- R overbank | 12.827 | 1446.83 | 1446.82 | 0.01 | | | | | 300.00 | 1521.66 |
| SPRR- R overbank | 12.827 | 1446.98 | 1446.97 | 0.01 | | | | | 510.00 | 1806.37 |

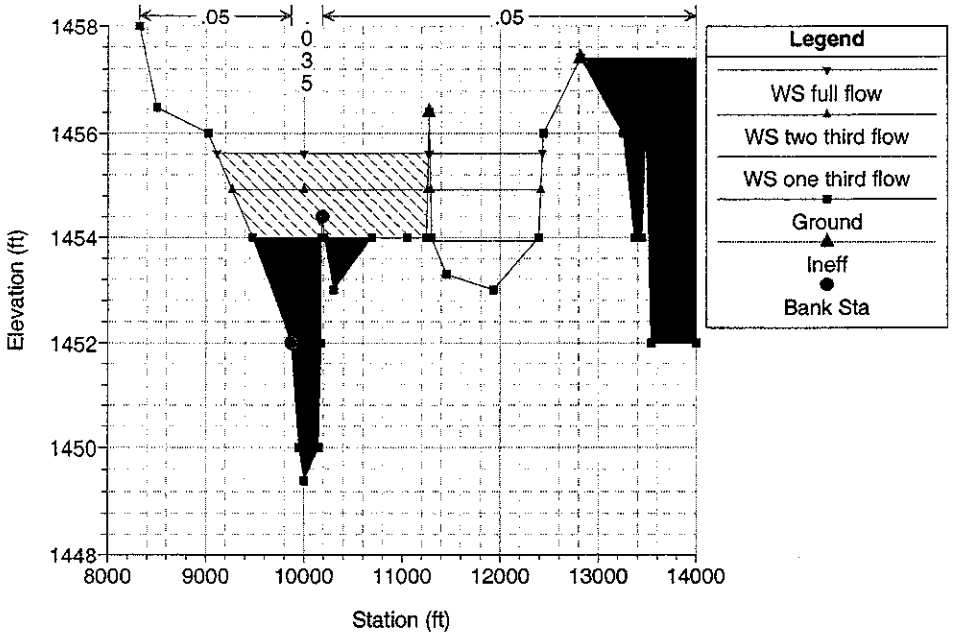
Profile Output Table - Hydratable

| Reach | River Sta | Q Total (cfs) | W.S. Elev (ft) | Trvl Tme Chl (hrs) | Trvl Tme Avg (hrs) | Vel Chnl (ft/s) | Vel Total (ft/s) | Max Chl Dpth (ft) | Hydr Depth (ft) |
|---|---|---|---|---|---|---|---|---|---|
| SPRR- R overbank | 13.350 | 600.00 | 1453.93 | 0.00 | 0.73 | | 0.98 | 0.93 | 0.59 |
| SPRR- R overbank | 13.350 | 3340.00 | 1454.92 | 0.00 | 0.52 | | 1.96 | 1.92 | 1.52 |
| SPRR- R overbank | 13.350 | 6550.00 | 1455.62 | 0.00 | 0.46 | | 2.62 | 2.62 | 2.18 |
| SPRR- R overbank | 13.307 | 600.00 | 1453.27 | 0.00 | 0.67 | | 1.22 | 0.67 | 0.49 |
| SPRR- R overbank | 13.307 | 3340.00 | 1454.29 | 0.00 | 0.49 | | 2.06 | 1.69 | 1.33 |
| SPRR- R overbank | 13.307 | 6550.00 | 1454.94 | 0.00 | 0.44 | | 2.71 | 2.34 | 1.98 |
| SPRR- R overbank | 13.212 | 600.00 | 1452.28 | 0.00 | 0.54 | | 0.80 | 1.28 | 0.64 |
| SPRR- R overbank | 13.212 | 3057.00 | 1453.15 | 0.00 | 0.42 | | 1.68 | 2.15 | 1.45 |
| SPRR- R overbank | 13.212 | 5515.00 | 1453.61 | 0.00 | 0.38 | | 2.30 | 2.61 | 1.89 |
| SPRR- R overbank | 13.118 | 510.00 | 1450.26 | 0.00 | 0.47 | | 3.17 | 6.16 | 0.30 |
| SPRR- R overbank | 13.118 | 2073.00 | 1450.74 | 0.00 | 0.37 | | 4.06 | 6.64 | 0.59 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPRR- R overbank | 13.118 | 3489.00 | 1451.25 | 0.00 | 0.33 | 3.55 | 7.15 | 1.00 |
| SPRR- R overbank | 13.023 | 413.00 | 1448.98 | 0.00 | 0.38 | 0.44 | 6.48 | 1.11 |
| SPRR- R overbank | 13.023 | 1314.00 | 1449.53 | 0.00 | 0.30 | 0.92 | 7.03 | 1.57 |
| SPRR- R overbank | 13.023 | 1949.00 | 1449.80 | 0.00 | 0.27 | 1.16 | 7.30 | 1.78 |
| SPRR- R overbank | 12.929 | 295.00 | 1448.73 | 0.00 | 0.16 | 1.04 | 27.73 | 0.41 |
| SPRR- R overbank | 12.929 | 669.00 | 1449.01 | 0.00 | 0.15 | 1.19 | 28.01 | 0.47 |
| SPRR- R overbank | 12.929 | 971.00 | 1449.14 | 0.00 | 0.14 | 1.36 | 28.14 | 0.58 |
| SPRR- R overbank | 12.827 | 130.00 | 1446.61 | 0.00 | 0.00 | 0.85 | 0.61 | 0.34 |
| SPRR- R overbank | 12.827 | 300.00 | 1446.82 | 0.00 | 0.00 | 0.87 | 0.82 | 0.23 |
| SPRR- R overbank | 12.827 | 510.00 | 1446.97 | 0.00 | 0.00 | 0.84 | 0.97 | 0.34 |

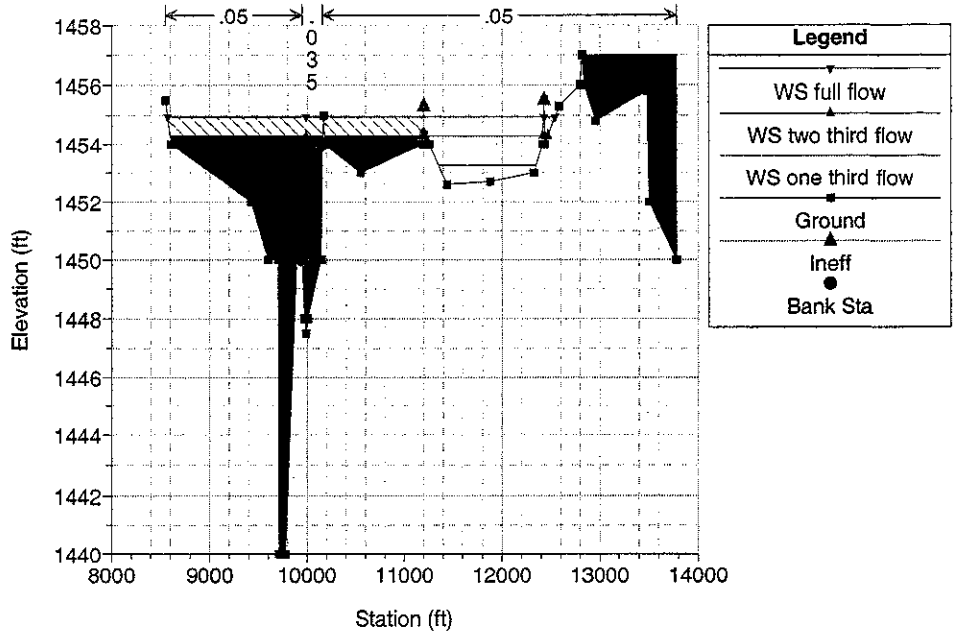
SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank new cross section #8 RS = 13.350



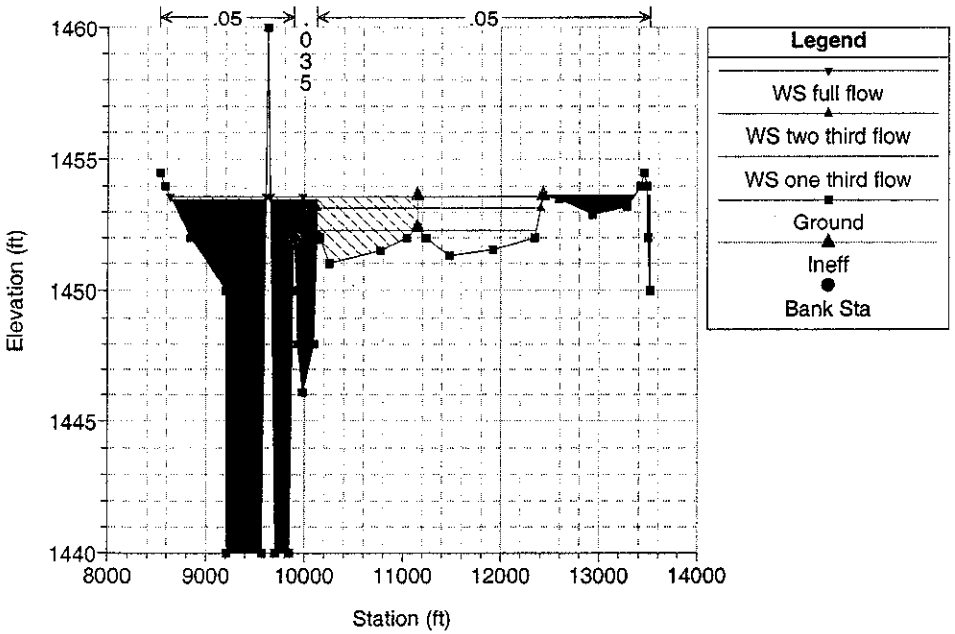

SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank new cross section #7 RS = 13.307



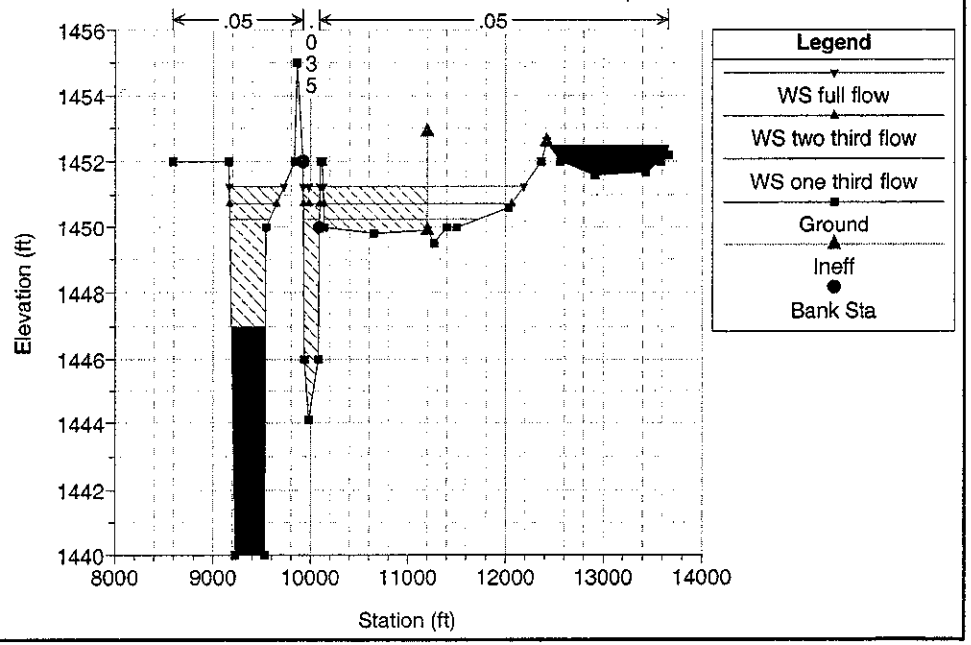

SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank new cross section #6 RS = 13.212



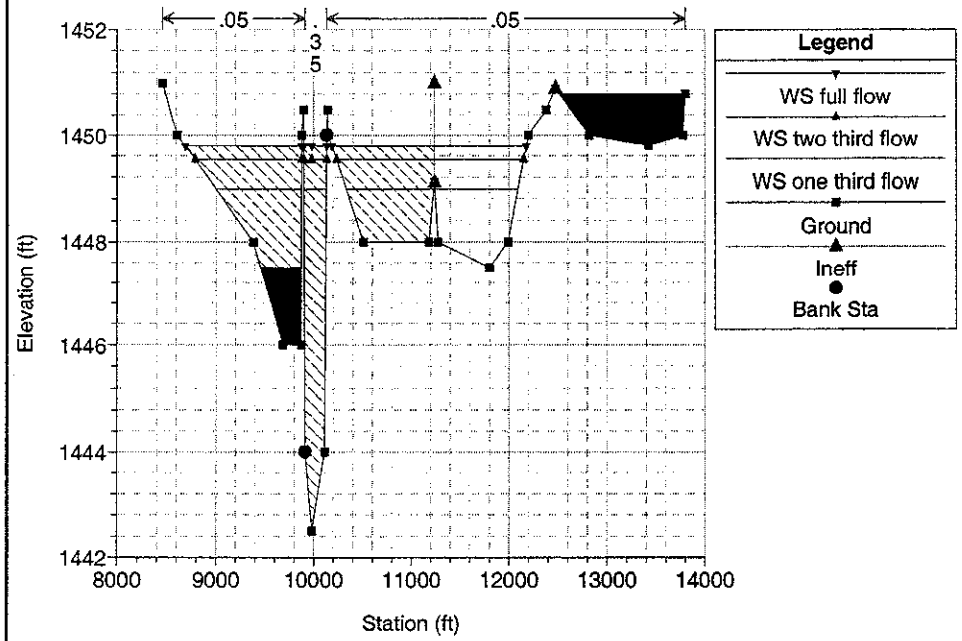

SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank new cross section #5 RS = 13.118



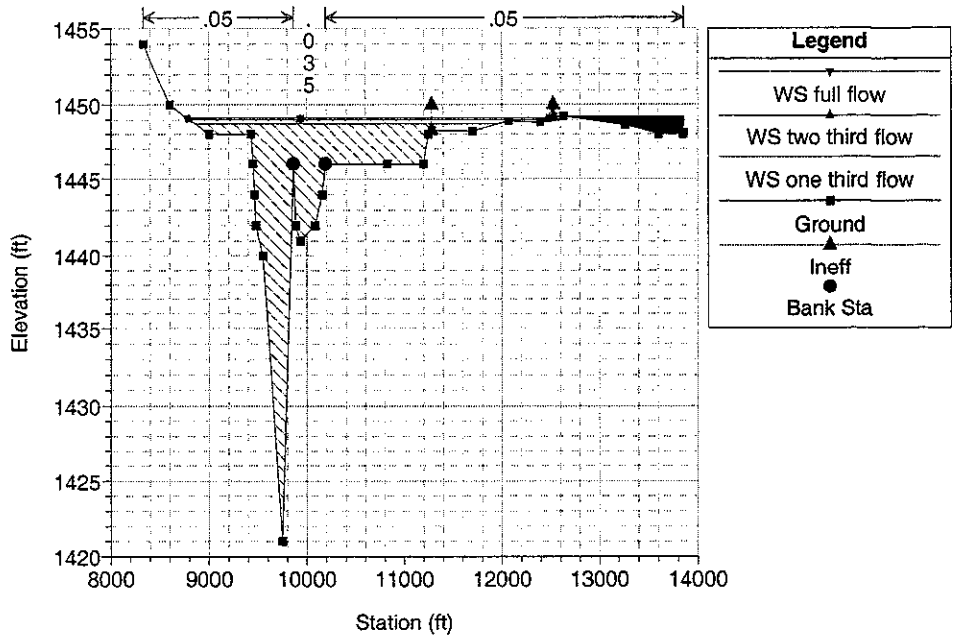
SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank new cross section #4 RS = 13.023



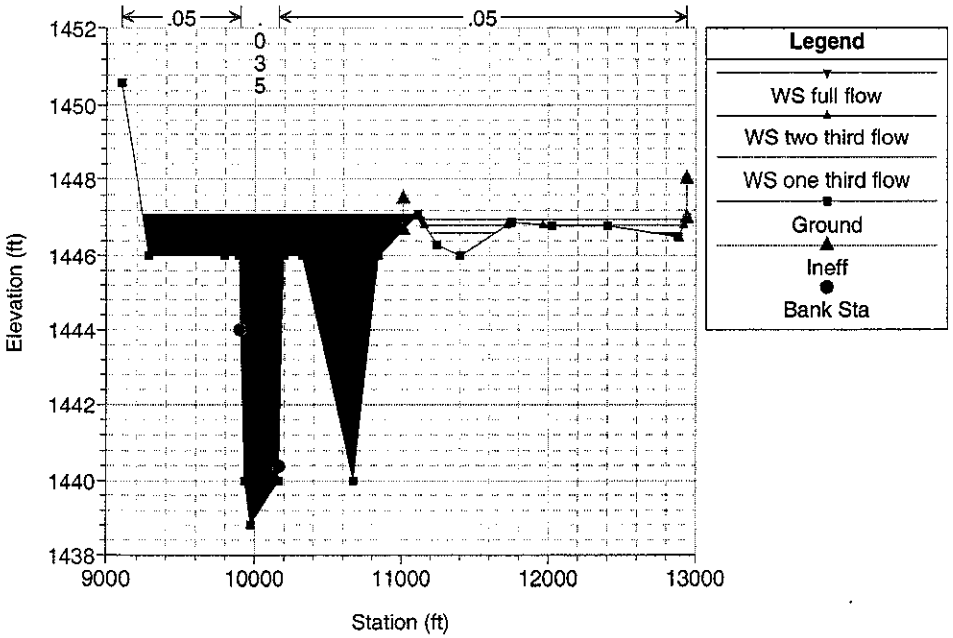

SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank cut cross section #3, center station 100 RS = 12.929




SPRR Bridge Overbank (three flows) Three flows SPRR right side overbank 03/20/2002 2:34:18 PM

River = Queen Creek Reach = SPRR- R overbank cut from map section 25 (QC area drainag RS = 12.827



## D.10 HEC-RAS MODEL FOR THE AREA ALONG RAILROAD, RHRR3FLO.PRJ (FOR THREE FLOWS)

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Rittenhouse Railroad - three flow
Project File : RHRR3flo.prj
Run Date and Time: 03/20/2002 3:01:26 PM

Project in English units

Project Description:
Spillway Inundation Study Rittenhouse FRS _
Three Flow Scenario

Split flow along east side of railroad.

Model
Vertical Datum: 1929 NGVD
Cross section data obtained based on the Topo map SECTION 25 T.2S., R.7E.
for QUEEN CREEK AREA DRAINAGE MASTER STUDY ( FCDMC October 19, 1986.)

Starting Water Surface Elevations were obtained by slope area method.
A slope of 0.004 ft/ft was used as the downstream boundary condition.

FCD 98-33

Michael Baker Jr., Inc. 03/2002

**********

The data and assumptions used to develop this model are adequate for conceptual purposes but not for design purposes. Therefore this model should not be used directly for the design and construction of channel improvements without more detailed study and information.

**********

PLAN DATA

Plan Title: Plan 02
Plan File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHRR3flo.p02

Geometry Title: Railroad
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHRR3flo.g01

Flow Title : Flow 02
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHRR3flo.f02

Plan Description:
Three flwo scenario, along east side of railroad

Plan Summary Information:
Number of: Cross Sections = 17 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0

```
            Bridges        =     0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  20
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Mixed Flow
```

FLOW DATA

Flow Title: Flow 02
Flow File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHRR3flo.f02

Flow Data (cfs)

| River | Reach | RS | PF 1 | PF 2 | PF 3 |
|---|---|---|---|---|---|
| Railroad | East | 9.90530 | 130 | 300 | 2980 |

Boundary Conditions

| River | Reach | Profile | Upstream | Downstream |
|---|---|---|---|---|
| Railroad | East | PF 1 | Normal S = .004 | Normal S = .004 |

GEOMETRY DATA

Geometry Title: Railroad
Geometry File : m:\Folders from V\Fcdspill\TaskB\Rittenhouse\Submittal\Jan0902\HEC-RAS\RHRR3flo.g01

CROSS SECTION RIVER: Railroad
REACH: East RS: 9.90530

INPUT
Description:
Station Elevation Data num= 10

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1448.5 | 9910 | 1448.2 | 9940 | 1446 | 10000 | 1446 | 10020 | 1446 |
| 10120 | 1446.5 | 10250 | 1446 | 10520 | 1446 | 10730 | 1446.5 | 11320 | 1447.5 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 10120 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10120 | 1000 | 1000 | 1000 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.29 | Element | | | |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1446.28 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1446.16 | Flow Area (sq ft) | | 30.29 | 100.64 |
| E.G. Slope (ft/ft) | 0.006994 | Area (sq ft) | | 30.29 | 100.64 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 38.92 | 91.08 |
| Top Width (ft) | 597.08 | Top Width (ft) | | 139.07 | 458.01 |
| Vel Total (ft/s) | 0.99 | Avg. Vel. (ft/s) | | 1.29 | 0.90 |
| Max Chl Dpth (ft) | 0.28 | Hydr. Depth (ft) | | 0.22 | 0.22 |
| Conv. Total (cfs) | 1554.5 | Conv. (cfs) | | 465.4 | 1089.1 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 139.08 | 458.01 |
| Min Ch El (ft) | 1446.00 | Shear (lb/sq ft) | | 0.10 | 0.10 |
| Alpha | 1.08 | Stream Power (lb/ft s) | | 0.12 | 0.09 |
| Frctn Loss (ft) | 5.14 | Cum Volume (acre-ft) | | 44.13 | 18.21 |

| | | | | |
|---|---|---|---|---|
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 111.50 | 51.61 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1446.48 | Element | | | |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1446.45 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1446.26 | Flow Area (sq ft) | | 57.67 | 190.46 |
| E.G. Slope (ft/ft) | 0.006013 | Area (sq ft) | | 57.67 | 190.46 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 90.16 | 209.84 |
| Top Width (ft) | 752.31 | Top Width (ft) | | 176.18 | 576.13 |
| Vel Total (ft/s) | 1.21 | Avg. Vel. (ft/s) | | 1.56 | 1.10 |
| Max Chl Dpth (ft) | 0.45 | Hydr. Depth (ft) | | 0.33 | 0.33 |
| Conv. Total (cfs) | 3868.9 | Conv. (cfs) | | 1162.7 | 2706.2 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 176.20 | 576.13 |
| Min Ch El (ft) | 1446.00 | Shear (lb/sq ft) | | 0.12 | 0.12 |
| Alpha | 1.08 | Stream Power (lb/ft s) | | 0.19 | 0.14 |
| Frctn Loss (ft) | 4.69 | Cum Volume (acre-ft) | | 73.26 | 31.76 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 130.46 | 85.10 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1447.60 | Element | | | |
| Vel Head (ft) | 0.09 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1447.52 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1446.93 | Flow Area (sq ft) | | 264.04 | 1147.12 |
| E.G. Slope (ft/ft) | 0.004100 | Area (sq ft) | | 264.04 | 1147.12 |
| Q Total (cfs) | 2980.00 | Flow (cfs) | | 861.65 | 2118.35 |
| Top Width (ft) | 1400.71 | Top Width (ft) | | 200.71 | 1200.00 |
| Vel Total (ft/s) | 2.11 | Avg. Vel. (ft/s) | | 3.26 | 1.85 |
| Max Chl Dpth (ft) | 1.52 | Hydr. Depth (ft) | | 1.32 | 0.96 |
| Conv. Total (cfs) | 46537.1 | Conv. (cfs) | | 13456.0 | 33081.1 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 200.76 | 1200.02 |
| Min Ch El (ft) | 1446.00 | Shear (lb/sq ft) | | 0.34 | 0.24 |
| Alpha | 1.23 | Stream Power (lb/ft s) | | 1.10 | 0.45 |
| Frctn Loss (ft) | 3.24 | Cum Volume (acre-ft) | 0.07 | 271.78 | 215.28 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 0.25 | 208.01 | 275.43 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

LATERAL WEIR RIVER: Railroad
REACH: East RS: 9.810605

INPUT
Description: Lateral Weir
Lateral weir position = Left overbank
Distance from Upstream XS = 0
Deck/Roadway Width = 20
Weir Coefficient = 3
Weir Flow Reference = Energy Grade
Weir Embankment Coordinates num = 7

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1448.5 | 1000 | 1445.3 | 2000 | 1440.5 | 3170 | 1438.8 | 4490 | 1432.7 |
| 6390 | 1426 | 7740 | 1421.5 | | | | | | |

Weir crest shape = Broad Crested

LATERAL WEIR/SPILLWAY OUTPUT Profile #PF 1

| | | | |
|---|---|---|---|
| E.G. US. (ft) | 1446.29 | Weir Max Depth (ft) | |
| W.S. US. (ft) | 1446.28 | Weir Avg Depth (ft) | |
| E.G. DS (ft) | 1418.60 | Weir Submerg | 0.00 |

| | | | |
|---|---|---|---|
| W.S. DS (ft) | 1418.56 | Min El Weir Flow (ft) | 1421.50 |
| Q US (cfs) | 130.00 | Wr Top Wdth (ft) | |
| Q Leaving Total (cfs) | 0.00 | Total Gate Flow (cfs) | |
| Q DS (cfs) | 130.00 | Gate Group Q (cfs) | |
| Perc Q Leaving | 0.00 | Gate Open Ht (ft) | |
| Q Weir (cfs) | 0.00 | Gate #Open | |
| Wr Flw Area (sq ft) | | Gate Area (sq ft) | |
| Weir Sta US (ft) | | Gate Submerg | |
| Weir Sta DS (ft) | | Gate Invert (ft) | |

LATERAL WEIR/SPILLWAY OUTPUT Profile #PF 2

| | | | |
|---|---|---|---|
| E.G. US. (ft) | 1446.48 | Weir Max Depth (ft) | |
| W.S. US. (ft) | 1446.45 | Weir Avg Depth (ft) | |
| E.G. DS (ft) | 1419.07 | Weir Submerg | 0.00 |
| W.S. DS (ft) | 1419.01 | Min El Weir Flow (ft) | 1421.50 |
| Q US (cfs) | 300.00 | Wr Top Wdth (ft) | |
| Q Leaving Total (cfs) | 0.00 | Total Gate Flow (cfs) | |
| Q DS (cfs) | 300.00 | Gate Group Q (cfs) | |
| Perc Q Leaving | 0.00 | Gate Open Ht (ft) | |
| Q Weir (cfs) | 0.00 | Gate #Open | |
| Wr Flw Area (sq ft) | | Gate Area (sq ft) | |
| Weir Sta US (ft) | | Gate Submerg | |
| Weir Sta DS (ft) | | Gate Invert (ft) | |

LATERAL WEIR/SPILLWAY OUTPUT Profile #PF 3

| | | | |
|---|---|---|---|
| E.G. US. (ft) | 1447.60 | Weir Max Depth (ft) | 0.51 |
| W.S. US. (ft) | 1447.52 | Weir Avg Depth (ft) | 0.25 |
| E.G. DS (ft) | 1420.78 | Weir Submerg | 0.00 |
| W.S. DS (ft) | 1420.63 | Min El Weir Flow (ft) | 1421.50 |
| Q US (cfs) | 2980.00 | Wr Top Wdth (ft) | 541.72 |
| Q Leaving Total (cfs) | 235.49 | Total Gate Flow (cfs) | |
| Q DS (cfs) | 2748.94 | Gate Group Q (cfs) | |
| Perc Q Leaving | 7.75 | Gate Open Ht (ft) | |
| Q Weir (cfs) | 235.49 | Gate #Open | |
| Wr Flw Area (sq ft) | 137.64 | Gate Area (sq ft) | |
| Weir Sta US (ft) | 1651.25 | Gate Submerg | |
| Weir Sta DS (ft) | 2192.97 | Gate Invert (ft) | |

CROSS SECTION RIVER: Railroad
REACH: East RS: 9.71591

INPUT
Description:
Station Elevation Data num= 11

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9930 | 1445.3 | 9940 | 1445 | 10000 | 1439.5 | 10090 | 1442 | 10700 | 1444 |
| 11550 | 1445.5 | 12140 | 1446 | 12500 | 1447 | 12505 | 1447.5 | 12510 | 1447.3 |
| 12660 | 1447.7 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9930 | .05 | 9940 | .035 | 10090 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9940 | 10090 | 1000 | 1000 | 1000 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1441.15 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.08 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1441.07 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 57.54 | |
| E.G. Slope (ft/ft) | 0.003930 | Area (sq ft) | | 57.54 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 73.47 | Top Width (ft) | | 73.47 | |
| Vel Total (ft/s) | 2.26 | Avg. Vel. (ft/s) | | 2.26 | |
| Max Chl Dpth (ft) | 1.57 | Hydr. Depth (ft) | | 0.78 | |
| Conv. Total (cfs) | 2073.8 | Conv. (cfs) | | 2073.8 | |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 73.57 | |
| Min Ch El (ft) | 1439.50 | Shear (lb/sq ft) | | 0.19 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.43 | |

| | | | | |
|---|---|---|---|---|
| Frctn Loss (ft) | 3.38 | Cum Volume (acre-ft) | 43.12 | 17.06 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 109.06 | 46.35 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1441.78 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.12 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1441.66 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 109.58 | |
| E.G. Slope (ft/ft) | 0.003756 | Area (sq ft) | | 109.58 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 101.39 | Top Width (ft) | | 101.39 | |
| Vel Total (ft/s) | 2.74 | Avg. Vel. (ft/s) | | 2.74 | |
| Max Chl Dpth (ft) | 2.16 | Hydr. Depth (ft) | | 1.08 | |
| Conv. Total (cfs) | 4895.3 | Conv. (cfs) | | 4895.3 | |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 101.52 | |
| Min Ch El (ft) | 1439.50 | Shear (lb/sq ft) | | 0.25 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.69 | |
| Frctn Loss (ft) | 3.35 | Cum Volume (acre-ft) | | 71.34 | 29.57 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 127.27 | 78.49 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1444.35 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.22 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1444.14 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 421.80 | 697.35 |
| E.G. Slope (ft/ft) | 0.002626 | Area (sq ft) | | 421.80 | 697.35 |
| Q Total (cfs) | 2980.00 | Flow (cfs) | | 1906.78 | 1073.22 |
| Top Width (ft) | 826.93 | Top Width (ft) | | 140.56 | 686.37 |
| Vel Total (ft/s) | 2.66 | Avg. Vel. (ft/s) | | 4.52 | 1.54 |
| Max Chl Dpth (ft) | 4.63 | Hydr. Depth (ft) | | 3.00 | 1.02 |
| Conv. Total (cfs) | 58156.8 | Conv. (cfs) | | 37212.2 | 20944.7 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 140.81 | 686.37 |
| Min Ch El (ft) | 1439.50 | Shear (lb/sq ft) | | 0.49 | 0.17 |
| Alpha | 1.96 | Stream Power (lb/ft s) | | 2.22 | 0.26 |
| Frctn Loss (ft) | 3.33 | Cum Volume (acre-ft) | 0.07 | 263.91 | 194.11 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 0.25 | 204.10 | 253.78 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 9.52649

INPUT
Description:
Station Elevation Data num= 11

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9880 | 1440.5 | 9890 | 1440.2 | 10000 | 1436 | 10070 | 1440 | 10150 | 1439.6 |
| 10300 | 1440 | 11410 | 1442 | 11600 | 1442 | 11605 | 1442.5 | 11610 | 1442.5 |
| 12380 | 1442.5 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9880 | .05 | 9890 | .035 | 10070 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9890 | 10070 | 1170 | 1170 | 1170 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1437.77 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1437.70 | Reach Len. (ft) | 1170.00 | 1170.00 | 1170.00 |
| Crit W.S. (ft) | 1437.17 | Flow Area (sq ft) | | 63.08 | |
| E.G. Slope (ft/ft) | 0.002933 | Area (sq ft) | | 63.08 | |

| | | | | |
|---|---|---|---|---|
| Q Total (cfs) | 130.00 | Flow (cfs) | 130.00 | |
| Top Width (ft) | 74.24 | Top Width (ft) | 74.24 | |
| Vel Total (ft/s) | 2.06 | Avg. Vel. (ft/s) | 2.06 | |
| Max Chl Dpth (ft) | 1.70 | Hydr. Depth (ft) | 0.85 | |
| Conv. Total (cfs) | 2400.4 | Conv. (cfs) | 2400.4 | |
| Length Wtd. (ft) | 1170.00 | Wetted Per. (ft) | 74.32 | |
| Min Ch El (ft) | 1436.00 | Shear (lb/sq ft) | 0.16 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.32 | |
| Frctn Loss (ft) | 4.50 | Cum Volume (acre-ft) | 41.74 | 17.06 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 107.37 | 46.35 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1438.42 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.10 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1438.32 | Reach Len. (ft) | 1170.00 | 1170.00 | 1170.00 |
| Crit W.S. (ft) | 1437.63 | Flow Area (sq ft) | | 117.06 | |
| E.G. Slope (ft/ft) | 0.003003 | Area (sq ft) | | 117.06 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 101.14 | Top Width (ft) | | 101.14 | |
| Vel Total (ft/s) | 2.56 | Avg. Vel. (ft/s) | | 2.56 | |
| Max Chl Dpth (ft) | 2.31 | Hydr. Depth (ft) | | 1.16 | |
| Conv. Total (cfs) | 5474.3 | Conv. (cfs) | | 5474.3 | |
| Length Wtd. (ft) | 1170.00 | Wetted Per. (ft) | | 101.25 | |
| Min Ch El (ft) | 1436.00 | Shear (lb/sq ft) | | 0.22 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.56 | |
| Frctn Loss (ft) | 4.24 | Cum Volume (acre-ft) | | 68.74 | 29.57 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 124.95 | 78.49 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1441.01 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.38 | Wt. n-Val. | 0.050 | 0.035 | 0.050 |
| W.S. Elev (ft) | 1440.63 | Reach Len. (ft) | 1170.00 | 1170.00 | 1170.00 |
| Crit W.S. (ft) | 1440.24 | Flow Area (sq ft) | 2.80 | 462.36 | 300.90 |
| E.G. Slope (ft/ft) | 0.004417 | Area (sq ft) | 2.80 | 462.36 | 300.90 |
| Q Total (cfs) | 2831.42 | Flow (cfs) | 2.34 | 2445.14 | 383.94 |
| Top Width (ft) | 769.52 | Top Width (ft) | 10.00 | 180.00 | 579.52 |
| Vel Total (ft/s) | 3.70 | Avg. Vel. (ft/s) | 0.84 | 5.29 | 1.28 |
| Max Chl Dpth (ft) | 4.63 | Hydr. Depth (ft) | 0.28 | 2.57 | 0.52 |
| Conv. Total (cfs) | 42602.4 | Conv. (cfs) | 35.3 | 36790.3 | 5776.9 |
| Length Wtd. (ft) | 1170.00 | Wetted Per. (ft) | 10.13 | 180.19 | 579.52 |
| Min Ch El (ft) | 1436.00 | Shear (lb/sq ft) | 0.08 | 0.71 | 0.14 |
| Alpha | 1.78 | Stream Power (lb/ft s) | 0.06 | 3.74 | 0.18 |
| Frctn Loss (ft) | 4.71 | Cum Volume (acre-ft) | 0.04 | 253.76 | 182.65 |
| C & E Loss (ft) | 0.08 | Cum SA (acres) | 0.13 | 200.42 | 239.25 |

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 9.30492

INPUT
Description:
Station Elevation Data num= 9

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9950 | 1438.8 | 9960 | 1438.5 | 10000 | 1431 | 10040 | 1434 | 10120 | 1434.5 |
| 10850 | 1436 | 11330 | 1438 | 11450 | 1438 | 12160 | 1437.8 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9950 | .05 | 9960 | .035 | 10850 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9960 | 10850 | 1320 | 1320 | 1320 | .1 | .3 |

CROSS SECTION OUTPUT  Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1433.25 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1433.10 | Reach Len. (ft) | 1320.00 | 1320.00 | 1320.00 |
| Crit W.S. (ft) | 1432.64 | Flow Area (sq ft) | | 41.07 | |
| E.G. Slope (ft/ft) | 0.005266 | Area (sq ft) | | 41.07 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 39.16 | Top Width (ft) | | 39.16 | |
| Vel Total (ft/s) | 3.17 | Avg. Vel. (ft/s) | | 3.17 | |
| Max Chl Dpth (ft) | 2.10 | Hydr. Depth (ft) | | 1.05 | |
| Conv. Total (cfs) | 1791.5 | Conv. (cfs) | | 1791.5 | |
| Length Wtd. (ft) | 1320.00 | Wetted Per. (ft) | | 39.43 | |
| Min Ch El (ft) | 1431.00 | Shear (lb/sq ft) | | 0.34 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.08 | |
| Frctn Loss (ft) | 4.23 | Cum Volume (acre-ft) | | 40.34 | 17.06 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 105.85 | 46.35 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1434.17 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.21 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1433.96 | Reach Len. (ft) | 1320.00 | 1320.00 | 1320.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 81.86 | |
| E.G. Slope (ft/ft) | 0.004456 | Area (sq ft) | | 81.86 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 55.28 | Top Width (ft) | | 55.28 | |
| Vel Total (ft/s) | 3.66 | Avg. Vel. (ft/s) | | 3.66 | |
| Max Chl Dpth (ft) | 2.96 | Hydr. Depth (ft) | | 1.48 | |
| Conv. Total (cfs) | 4494.1 | Conv. (cfs) | | 4494.1 | |
| Length Wtd. (ft) | 1320.00 | Wetted Per. (ft) | | 55.67 | |
| Min Ch El (ft) | 1431.00 | Shear (lb/sq ft) | | 0.41 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.50 | |
| Frctn Loss (ft) | 4.21 | Cum Volume (acre-ft) | | 66.07 | 29.57 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 122.85 | 78.49 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1436.23 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.12 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1436.11 | Reach Len. (ft) | 1320.00 | 1320.00 | 1320.00 |
| Crit W.S. (ft) | 1435.50 | Flow Area (sq ft) | | 987.84 | 1.37 |
| E.G. Slope (ft/ft) | 0.003670 | Area (sq ft) | | 987.84 | 1.37 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2748.59 | 0.35 |
| Top Width (ft) | 902.87 | Top Width (ft) | | 877.24 | 25.63 |
| Vel Total (ft/s) | 2.78 | Avg. Vel. (ft/s) | | 2.78 | 0.26 |
| Max Chl Dpth (ft) | 5.11 | Hydr. Depth (ft) | | 1.13 | 0.05 |
| Conv. Total (cfs) | 45378.6 | Conv. (cfs) | | 45372.8 | 5.8 |
| Length Wtd. (ft) | 1320.00 | Wetted Per. (ft) | | 877.83 | 25.63 |
| Min Ch El (ft) | 1431.00 | Shear (lb/sq ft) | | 0.26 | 0.01 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.72 | 0.00 |
| Frctn Loss (ft) | 4.11 | Cum Volume (acre-ft) | | 234.28 | 178.59 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 186.22 | 231.12 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Railroad
REACH: East  RS: 9.05493

INPUT
Description:
Station Elevation Data  num=  8

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9940 | 1432.7 | 9950 | 1432.4 | 10000 | 1426.3 | 10030 | 1430 | 10400 | 1430.5 |
| 10840 | 1432 | 11190 | 1432 | 11195 | 1433 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9940 | .05 | 9950 | .035 | 10030 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9950 | 10030 | 1900 | 1900 | 1900 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1429.00 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.09 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1428.91 | Reach Len. (ft) | 1900.00 | 1900.00 | 1900.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 55.50 | |
| E.G. Slope (ft/ft) | 0.002156 | Area (sq ft) | | 55.50 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 42.54 | Top Width (ft) | | 42.54 | |
| Vel Total (ft/s) | 2.34 | Avg. Vel. (ft/s) | | 2.34 | |
| Max Chl Dpth (ft) | 2.61 | Hydr. Depth (ft) | | 1.30 | |
| Conv. Total (cfs) | 2799.5 | Conv. (cfs) | | 2799.5 | |
| Length Wtd. (ft) | 1900.00 | Wetted Per. (ft) | | 42.86 | |
| Min Ch El (ft) | 1426.30 | Shear (lb/sq ft) | | 0.17 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.41 | |
| Frctn Loss (ft) | 6.76 | Cum Volume (acre-ft) | | 38.88 | 17.06 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 104.61 | 46.35 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1429.94 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.14 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1429.80 | Reach Len. (ft) | 1900.00 | 1900.00 | 1900.00 |
| Crit W.S. (ft) | 1428.72 | Flow Area (sq ft) | | 99.94 | |
| E.G. Slope (ft/ft) | 0.002393 | Area (sq ft) | | 99.94 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 57.09 | Top Width (ft) | | 57.09 | |
| Vel Total (ft/s) | 3.00 | Avg. Vel. (ft/s) | | 3.00 | |
| Max Chl Dpth (ft) | 3.50 | Hydr. Depth (ft) | | 1.75 | |
| Conv. Total (cfs) | 6132.2 | Conv. (cfs) | | 6132.2 | |
| Length Wtd. (ft) | 1900.00 | Wetted Per. (ft) | | 57.51 | |
| Min Ch El (ft) | 1426.30 | Shear (lb/sq ft) | | 0.26 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.78 | |
| Frctn Loss (ft) | 6.95 | Cum Volume (acre-ft) | | 63.32 | 29.57 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 121.15 | 78.49 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1432.12 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.17 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1431.94 | Reach Len. (ft) | 1900.00 | 1900.00 | 1900.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 244.21 | 930.93 |
| E.G. Slope (ft/ft) | 0.002669 | Area (sq ft) | | 244.21 | 930.93 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 1158.20 | 1590.75 |
| Top Width (ft) | 869.20 | Top Width (ft) | | 76.25 | 792.96 |
| Vel Total (ft/s) | 2.34 | Avg. Vel. (ft/s) | | 4.74 | 1.71 |
| Max Chl Dpth (ft) | 5.64 | Hydr. Depth (ft) | | 3.20 | 1.17 |
| Conv. Total (cfs) | 53204.8 | Conv. (cfs) | | 22416.5 | 30788.4 |
| Length Wtd. (ft) | 1900.00 | Wetted Per. (ft) | | 76.82 | 792.96 |
| Min Ch El (ft) | 1426.30 | Shear (lb/sq ft) | | 0.53 | 0.20 |
| Alpha | 2.04 | Stream Power (lb/ft s) | | 2.51 | 0.33 |
| Frctn Loss (ft) | 6.27 | Cum Volume (acre-ft) | | 215.62 | 164.46 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | | 171.77 | 218.72 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 8.69508

INPUT
Description:
Station Elevation Data num= 5

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9940 | 1426 | 9950 | 1425.7 | 10000 | 1420.3 | 10070 | 1424.5 | 11640 | 1425.6 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9940 | .05 | 9950 | .035 | 10070 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9950 | 10070 | 1350 | 1350 | 1350 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1422.22 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1422.06 | Reach Len. (ft) | 1350.00 | 1350.00 | 1350.00 |
| Crit W.S. (ft) | 1421.74 | Flow Area (sq ft) | | 40.07 | |
| E.G. Slope (ft/ft) | 0.006964 | Area (sq ft) | | 40.07 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 45.58 | Top Width (ft) | | 45.58 | |
| Vel Total (ft/s) | 3.24 | Avg. Vel. (ft/s) | | 3.24 | |
| Max Chl Dpth (ft) | 1.76 | Hydr. Depth (ft) | | 0.88 | |
| Conv. Total (cfs) | 1557.8 | Conv. (cfs) | | 1557.8 | |
| Length Wtd. (ft) | 1350.00 | Wetted Per. (ft) | | 45.73 | |
| Min Ch El (ft) | 1420.30 | Shear (lb/sq ft) | | 0.38 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.24 | |
| Frctn Loss (ft) | 3.58 | Cum Volume (acre-ft) | | 36.79 | 17.06 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | | 102.69 | 46.35 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1422.98 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.23 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1422.75 | Reach Len. (ft) | 1350.00 | 1350.00 | 1350.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 78.04 | |
| E.G. Slope (ft/ft) | 0.006270 | Area (sq ft) | | 78.04 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 63.61 | Top Width (ft) | | 63.61 | |
| Vel Total (ft/s) | 3.84 | Avg. Vel. (ft/s) | | 3.84 | |
| Max Chl Dpth (ft) | 2.45 | Hydr. Depth (ft) | | 1.23 | |
| Conv. Total (cfs) | 3788.7 | Conv. (cfs) | | 3788.7 | |
| Length Wtd. (ft) | 1350.00 | Wetted Per. (ft) | | 63.82 | |
| Min Ch El (ft) | 1420.30 | Shear (lb/sq ft) | | 0.48 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.84 | |
| Frctn Loss (ft) | 3.86 | Cum Volume (acre-ft) | | 59.44 | 29.57 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | | 118.51 | 78.49 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1425.83 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.34 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1425.50 | Reach Len. (ft) | 1350.00 | 1350.00 | 1350.00 |
| Crit W.S. (ft) | 1425.45 | Flow Area (sq ft) | | 341.53 | 705.83 |
| E.G. Slope (ft/ft) | 0.004178 | Area (sq ft) | | 341.53 | 705.83 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 1897.99 | 850.96 |

| | | | | |
|---|---|---|---|---|
| Top Width (ft) | 1537.56 | Top Width (ft) | 118.10 | 1419.46 |
| Vel Total (ft/s) | 2.62 | Avg. Vel. (ft/s) | 5.56 | 1.21 |
| Max Chl Dpth (ft) | 5.19 | Hydr. Depth (ft) | 2.89 | 0.50 |
| Conv. Total (cfs) | 42530.8 | Conv. (cfs) | 29365.1 | 13165.8 |
| Length Wtd. (ft) | 1350.00 | Wetted Per. (ft) | 118.50 | 1419.46 |
| Min Ch El (ft) | 1420.30 | Shear (lb/sq ft) | 0.75 | 0.13 |
| Alpha | 3.16 | Stream Power (lb/ft s) | 4.18 | 0.16 |
| Frctn Loss (ft) | 5.00 | Cum Volume (acre-ft) | 202.84 | 128.77 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | 167.53 | 170.47 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 8.43940

INPUT
Description:
Station Elevation Data num= 6

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9960 | 1421.5 | 9970 | 1421.2 | 10000 | 1416.3 | 10030 | 1418 | 10600 | 1420 |
| 11430 | 1421.8 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9960 | .05 | 9970 | .035 | 10030 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9970 | 10030 | 1575 | 1575 | 1575 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1418.60 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.05 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1418.56 | Reach Len. (ft) | 1575.00 | 1575.00 | 1575.00 |
| Crit W.S. (ft) | 1417.79 | Flow Area (sq ft) | | 57.72 | 43.92 |
| E.G. Slope (ft/ft) | 0.001387 | Area (sq ft) | | 57.72 | 43.92 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 109.31 | 20.69 |
| Top Width (ft) | 202.03 | Top Width (ft) | | 43.81 | 158.22 |
| Vel Total (ft/s) | 1.28 | Avg. Vel. (ft/s) | | 1.89 | 0.47 |
| Max Chl Dpth (ft) | 2.26 | Hydr. Depth (ft) | | 1.32 | 0.28 |
| Conv. Total (cfs) | 3490.5 | Conv. (cfs) | | 2935.1 | 555.4 |
| Length Wtd. (ft) | 1575.00 | Wetted Per. (ft) | | 44.04 | 158.23 |
| Min Ch El (ft) | 1416.30 | Shear (lb/sq ft) | | 0.11 | 0.02 |
| Alpha | 1.87 | Stream Power (lb/ft s) | | 0.21 | 0.01 |
| Frctn Loss (ft) | 5.84 | Cum Volume (acre-ft) | | 35.28 | 16.38 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 101.30 | 43.90 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1419.07 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1419.01 | Reach Len. (ft) | 1575.00 | 1575.00 | 1575.00 |
| Crit W.S. (ft) | 1418.47 | Flow Area (sq ft) | | 78.33 | 145.68 |
| E.G. Slope (ft/ft) | 0.001630 | Area (sq ft) | | 78.33 | 145.68 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 189.08 | 110.92 |
| Top Width (ft) | 334.76 | Top Width (ft) | | 46.60 | 288.17 |
| Vel Total (ft/s) | 1.34 | Avg. Vel. (ft/s) | | 2.41 | 0.76 |
| Max Chl Dpth (ft) | 2.71 | Hydr. Depth (ft) | | 1.68 | 0.51 |
| Conv. Total (cfs) | 7431.2 | Conv. (cfs) | | 4683.7 | 2747.6 |
| Length Wtd. (ft) | 1575.00 | Wetted Per. (ft) | | 46.87 | 288.17 |
| Min Ch El (ft) | 1416.30 | Shear (lb/sq ft) | | 0.17 | 0.05 |
| Alpha | 2.17 | Stream Power (lb/ft s) | | 0.41 | 0.04 |
| Frctn Loss (ft) | 6.00 | Cum Volume (acre-ft) | | 57.01 | 27.31 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 116.81 | 74.03 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1420.78 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.15 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1420.63 | Reach Len. (ft) | 1575.00 | 1575.00 | 1575.00 |
| Crit W.S. (ft) | 1419.96 | Flow Area (sq ft) | | 161.81 | 1020.82 |
| E.G. Slope (ft/ft) | 0.003310 | Area (sq ft) | | 161.81 | 1020.82 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 793.18 | 1955.76 |
| Top Width (ft) | 917.12 | Top Width (ft) | | 56.51 | 860.61 |
| Vel Total (ft/s) | 2.32 | Avg. Vel. (ft/s) | | 4.90 | 1.92 |
| Max Chl Dpth (ft) | 4.33 | Hydr. Depth (ft) | | 2.86 | 1.19 |
| Conv. Total (cfs) | 47780.6 | Conv. (cfs) | | 13786.7 | 33994.0 |
| Length Wtd. (ft) | 1575.00 | Wetted Per. (ft) | | 56.91 | 860.61 |
| Min Ch El (ft) | 1416.30 | Shear (lb/sq ft) | | 0.59 | 0.25 |
| Alpha | 1.77 | Stream Power (lb/ft s) | | 2.88 | 0.47 |
| Frctn Loss (ft) | 6.00 | Cum Volume (acre-ft) | | 195.04 | 102.01 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 164.83 | 135.14 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 8.17921

INPUT
Description:
Station Elevation Data num= 6

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9960 | 1416.8 | 9970 | 1416.5 | 10000 | 1414 | 10060 | 1412 | 10460 | 1414 |
| 10810 | 1415.1 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9960 | .05 | 9970 | .035 | 10460 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9970 | 10460 | 1185 | 593 | 1 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1412.75 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1412.60 | Reach Len. (ft) | 1185.00 | 593.00 | 1.00 |
| Crit W.S. (ft) | 1412.60 | Flow Area (sq ft) | | 41.11 | |
| E.G. Slope (ft/ft) | 0.027757 | Area (sq ft) | | 41.11 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 137.52 | Top Width (ft) | | 137.52 | |
| Vel Total (ft/s) | 3.16 | Avg. Vel. (ft/s) | | 3.16 | |
| Max Chl Dpth (ft) | 0.60 | Hydr. Depth (ft) | | 0.30 | |
| Conv. Total (cfs) | 780.3 | Conv. (cfs) | | 780.3 | |
| Length Wtd. (ft) | 593.00 | Wetted Per. (ft) | | 137.53 | |
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | | 0.52 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.64 | |
| Frctn Loss (ft) | 0.03 | Cum Volume (acre-ft) | | 33.49 | 15.58 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | | 98.02 | 41.04 |

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1413.06 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1412.90 | Reach Len. (ft) | 1185.00 | 593.00 | 1.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 92.25 | |

| | | | | |
|---|---|---|---|---|
| E.G. Slope (ft/ft) | 0.017129 | Area (sq ft) | 92.25 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | 300.00 | |
| Top Width (ft) | 206.00 | Top Width (ft) | 206.00 | |
| Vel Total (ft/s) | 3.25 | Avg. Vel. (ft/s) | 3.25 | |
| Max Chl Dpth (ft) | 0.90 | Hydr. Depth (ft) | 0.45 | |
| Conv. Total (cfs) | 2292.2 | Conv. (cfs) | 2292.2 | |
| Length Wtd. (ft) | 593.00 | Wetted Per. (ft) | 206.01 | |
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | 0.48 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 1.56 | |
| Frctn Loss (ft) | 0.07 | Cum Volume (acre-ft) | 53.93 | 24.68 |
| C & E Loss (ft) | 0.05 | Cum SA (acres) | 112.24 | 68.82 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1414.78 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.22 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1414.56 | Reach Len. (ft) | 1185.00 | 593.00 | 1.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 718.77 | 49.62 |
| E.G. Slope (ft/ft) | 0.004426 | Area (sq ft) | | 718.77 | 49.62 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2707.03 | 41.91 |
| Top Width (ft) | 644.40 | Top Width (ft) | | 466.70 | 177.70 |
| Vel Total (ft/s) | 3.58 | Avg. Vel. (ft/s) | | 3.77 | 0.84 |
| Max Chl Dpth (ft) | 2.56 | Hydr. Depth (ft) | | 1.54 | 0.28 |
| Conv. Total (cfs) | 41322.2 | Conv. (cfs) | | 40692.2 | 630.0 |
| Length Wtd. (ft) | 588.49 | Wetted Per. (ft) | | 466.76 | 177.70 |
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | | 0.43 | 0.08 |
| Alpha | 1.09 | Stream Power (lb/ft s) | | 1.60 | 0.07 |
| Frctn Loss (ft) | 0.47 | Cum Volume (acre-ft) | | 179.12 | 82.66 |
| C & E Loss (ft) | 0.06 | Cum SA (acres) | | 155.37 | 116.37 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 8.02900

INPUT
Description:
Station Elevation Data num= 5

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9930 | 1414.5 | 9940 | 1414.5 | 9970 | 1414.5 | 10530 | 1410.3 | 11330 | 1415.1 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9930 | .05 | 9930 | .035 | 11330 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9930 | 11330 | 1 | 593 | 1186 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1412.59 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1412.59 | Reach Len. (ft) | 1.00 | 593.00 | 1186.00 |
| Crit W.S. (ft) | 1410.84 | Flow Area (sq ft) | | 787.32 | |
| E.G. Slope (ft/ft) | 0.000013 | Area (sq ft) | | 787.32 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 687.31 | Top Width (ft) | | 687.31 | |
| Vel Total (ft/s) | 0.17 | Avg. Vel. (ft/s) | | 0.17 | |
| Max Chl Dpth (ft) | 2.29 | Hydr. Depth (ft) | | 1.15 | |
| Conv. Total (cfs) | 36593.7 | Conv. (cfs) | | 36593.7 | |
| Length Wtd. (ft) | 593.00 | Wetted Per. (ft) | | 687.33 | |
| Min Ch El (ft) | 1410.30 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.03 | Cum Volume (acre-ft) | | 27.85 | 15.58 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 92.41 | 41.04 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1412.93 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.00 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1412.93 | Reach Len. (ft) | 1.00 | 593.00 | 1186.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 1037.84 | |
| E.G. Slope (ft/ft) | 0.000032 | Area (sq ft) | | 1037.84 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 789.12 | Top Width (ft) | | 789.12 | |
| Vel Total (ft/s) | 0.29 | Avg. Vel. (ft/s) | | 0.29 | |
| Max Chl Dpth (ft) | 2.63 | Hydr. Depth (ft) | | 1.32 | |
| Conv. Total (cfs) | 52890.4 | Conv. (cfs) | | 52890.4 | |
| Length Wtd. (ft) | 594.80 | Wetted Per. (ft) | | 789.14 | |
| Min Ch El (ft) | 1410.30 | Shear (lb/sq ft) | | 0.00 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.00 | |
| Frctn Loss (ft) | 0.06 | Cum Volume (acre-ft) | | 46.24 | 24.68 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 105.47 | 68.82 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1414.25 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1414.23 | Reach Len. (ft) | 1.00 | 593.00 | 1186.00 |
| Crit W.S. (ft) | 1412.13 | Flow Area (sq ft) | | 2310.36 | |
| E.G. Slope (ft/ft) | 0.000320 | Area (sq ft) | | 2310.36 | |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2748.94 | |
| Top Width (ft) | 1177.39 | Top Width (ft) | | 1177.39 | |
| Vel Total (ft/s) | 1.19 | Avg. Vel. (ft/s) | | 1.19 | |
| Max Chl Dpth (ft) | 3.92 | Hydr. Depth (ft) | | 1.96 | |
| Conv. Total (cfs) | 153735.5 | Conv. (cfs) | | 153735.5 | |
| Length Wtd. (ft) | 738.66 | Wetted Per. (ft) | | 1177.41 | |
| Min Ch El (ft) | 1410.30 | Shear (lb/sq ft) | | 0.04 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.05 | |
| Frctn Loss (ft) | 0.56 | Cum Volume (acre-ft) | | 158.50 | 82.66 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 144.18 | 116.37 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION  RIVER: Railroad
REACH: East  RS: 7.87879

INPUT
Description:
Station Elevation Data  num= 11

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1414.5 | 9910 | 1414.2 | 9940 | 1412 | 10000 | 1412 | 10100 | 1412 |
| 10380 | 1413.5 | 10840 | 1413 | 11350 | 1412.8 | 11900 | 1412.8 | 12250 | 1414 |
| 12350 | 1414.5 | | | | | | | | |

Manning's n Values  num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 10380 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10380 | 1265 | 1265 | 1265 | .1 | .3 |

CROSS SECTION OUTPUT  Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1412.56 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1412.54 | Reach Len. (ft) | 1265.00 | 1265.00 | 1265.00 |
| Crit W.S. (ft) | 1412.26 | Flow Area (sq ft) | | 115.22 | |
| E.G. Slope (ft/ft) | 0.002175 | Area (sq ft) | | 115.22 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 267.88 | Top Width (ft) | | 267.88 | |
| Vel Total (ft/s) | 1.13 | Avg. Vel. (ft/s) | | 1.13 | |
| Max Chl Dpth (ft) | 0.54 | Hydr. Depth (ft) | | 0.43 | |
| Conv. Total (cfs) | 2787.2 | Conv. (cfs) | | 2787.2 | |
| Length Wtd. (ft) | 1265.00 | Wetted Per. (ft) | | 267.90 | |

| | | | | |
|---|---|---|---|---|
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | 0.06 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.07 | |
| Frctn Loss (ft) | 3.87 | Cum Volume (acre-ft) | 21.71 | 15.58 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 85.91 | 41.04 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1412.86 | Element | | | |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1412.83 | Reach Len. (ft) | 1265.00 | 1265.00 | 1265.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 200.43 | 15.11 |
| E.G. Slope (ft/ft) | 0.002344 | Area (sq ft) | | 200.43 | 15.11 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 298.18 | 1.82 |
| Top Width (ft) | 948.62 | Top Width (ft) | | 325.41 | 623.21 |
| Vel Total (ft/s) | 1.39 | Avg. Vel. (ft/s) | | 1.49 | 0.12 |
| Max Chl Dpth (ft) | 0.83 | Hydr. Depth (ft) | | 0.62 | 0.02 |
| Conv. Total (cfs) | 6197.0 | Conv. (cfs) | | 6159.4 | 37.6 |
| Length Wtd. (ft) | 1265.00 | Wetted Per. (ft) | | 325.44 | 623.21 |
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | | 0.09 | 0.00 |
| Alpha | 1.14 | Stream Power (lb/ft s) | | 0.13 | 0.00 |
| Frctn Loss (ft) | 3.98 | Cum Volume (acre-ft) | | 37.81 | 24.48 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 97.88 | 60.33 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1413.68 | Element | | | |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1413.61 | Reach Len. (ft) | 1265.00 | 1265.00 | 1265.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 515.45 | 1066.45 |
| E.G. Slope (ft/ft) | 0.003530 | Area (sq ft) | | 515.45 | 1066.45 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 1398.53 | 1350.41 |
| Top Width (ft) | 2217.79 | Top Width (ft) | | 461.94 | 1755.85 |
| Vel Total (ft/s) | 1.74 | Avg. Vel. (ft/s) | | 2.71 | 1.27 |
| Max Chl Dpth (ft) | 1.61 | Hydr. Depth (ft) | | 1.12 | 0.61 |
| Conv. Total (cfs) | 46270.1 | Conv. (cfs) | | 23540.0 | 22730.1 |
| Length Wtd. (ft) | 1265.00 | Wetted Per. (ft) | | 462.00 | 1755.85 |
| Min Ch El (ft) | 1412.00 | Shear (lb/sq ft) | | 0.25 | 0.13 |
| Alpha | 1.50 | Stream Power (lb/ft s) | | 0.67 | 0.17 |
| Frctn Loss (ft) | 4.37 | Cum Volume (acre-ft) | | 139.27 | 68.14 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 133.02 | 92.46 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 7.67665

INPUT
Description:
Station Elevation Data num= 13

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1411 | 9910 | 1410.7 | 9940 | 1408.3 | 10000 | 1408.3 | 10100 | 1408.3 |
| 10400 | 1408.7 | 10420 | 1409 | 10440 | 1408.7 | 10800 | 1408 | 11000 | 1408 |
| 11900 | 1409 | 12300 | 1409.8 | 12320 | 1410.8 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 10420 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10420 | 830 | 830 | 830 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 888 | F | | |

CROSS SECTION OUTPUT  Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1408.69 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1408.67 | Reach Len. (ft) | 830.00 | 830.00 | 830.00 |
| Crit W.S. (ft) | 1408.53 | Flow Area (sq ft) | | 112.59 | |
| E.G. Slope (ft/ft) | 0.004611 | Area (sq ft) | | 112.59 | 454.58 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 1595.69 | Top Width (ft) | | 444.24 | 1151.46 |
| Vel Total (ft/s) | 1.15 | Avg. Vel. (ft/s) | | 1.15 | |
| Max Chl Dpth (ft) | 0.67 | Hydr. Depth (ft) | | 0.25 | |
| Conv. Total (cfs) | 1914.4 | Conv. (cfs) | | 1914.4 | |
| Length Wtd. (ft) | 830.00 | Wetted Per. (ft) | | 444.25 | |
| Min Ch El (ft) | 1408.30 | Shear (lb/sq ft) | | 0.07 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.08 | |
| Frctn Loss (ft) | 2.96 | Cum Volume (acre-ft) | | 18.40 | 8.98 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 75.57 | 24.32 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT  Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1408.88 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.04 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1408.85 | Reach Len. (ft) | 830.00 | 830.00 | 830.00 |
| Crit W.S. (ft) | 1408.67 | Flow Area (sq ft) | | 193.53 | |
| E.G. Slope (ft/ft) | 0.004433 | Area (sq ft) | | 193.53 | 669.99 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 1807.26 | Top Width (ft) | | 476.53 | 1330.73 |
| Vel Total (ft/s) | 1.55 | Avg. Vel. (ft/s) | | 1.55 | |
| Max Chl Dpth (ft) | 0.85 | Hydr. Depth (ft) | | 0.41 | |
| Conv. Total (cfs) | 4505.6 | Conv. (cfs) | | 4505.6 | |
| Length Wtd. (ft) | 830.00 | Wetted Per. (ft) | | 476.55 | |
| Min Ch El (ft) | 1408.30 | Shear (lb/sq ft) | | 0.11 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.17 | |
| Frctn Loss (ft) | 2.93 | Cum Volume (acre-ft) | | 32.09 | 14.53 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 86.24 | 31.96 |

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT  Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1409.30 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.05 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1409.26 | Reach Len. (ft) | 830.00 | 830.00 | 830.00 |
| Crit W.S. (ft) | 1409.01 | Flow Area (sq ft) | | 394.00 | 1283.62 |
| E.G. Slope (ft/ft) | 0.003385 | Area (sq ft) | | 394.00 | 1283.62 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 839.28 | 1909.66 |
| Top Width (ft) | 2100.37 | Top Width (ft) | | 491.96 | 1608.41 |
| Vel Total (ft/s) | 1.64 | Avg. Vel. (ft/s) | | 2.13 | 1.49 |
| Max Chl Dpth (ft) | 1.26 | Hydr. Depth (ft) | | 0.80 | 0.80 |
| Conv. Total (cfs) | 47245.6 | Conv. (cfs) | | 14424.5 | 32821.0 |
| Length Wtd. (ft) | 830.00 | Wetted Per. (ft) | | 492.00 | 1608.41 |
| Min Ch El (ft) | 1408.30 | Shear (lb/sq ft) | | 0.17 | 0.17 |
| Alpha | 1.09 | Stream Power (lb/ft s) | | 0.36 | 0.25 |
| Frctn Loss (ft) | 2.79 | Cum Volume (acre-ft) | | 126.06 | 34.02 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 119.17 | 43.61 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION RIVER: Railroad
REACH: East RS: 7.51945

INPUT
Description:
Station Elevation Data num= 12

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1408.5 | 9910 | 1408.2 | 9940 | 1404.5 | 10000 | 1406 | 10150 | 1405.2 |
| 10450 | 1405.8 | 10900 | 1405 | 11150 | 1405.7 | 11500 | 1406 | 11600 | 1406.3 |
| 11730 | 1406 | 11740 | 1408 | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 10450 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10450 | 866 | 866 | 866 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 888 | F | | |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1405.73 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1405.71 | Reach Len. (ft) | 866.00 | 866.00 | 866.00 |
| Crit W.S. (ft) | 1405.48 | Flow Area (sq ft) | | 126.27 | |
| E.G. Slope (ft/ft) | 0.002845 | Area (sq ft) | | 126.27 | 234.49 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 1079.73 | Top Width (ft) | | 411.76 | 667.97 |
| Vel Total (ft/s) | 1.03 | Avg. Vel. (ft/s) | | 1.03 | |
| Max Chl Dpth (ft) | 1.21 | Hydr. Depth (ft) | | 0.31 | |
| Conv. Total (cfs) | 2437.4 | Conv. (cfs) | | 2437.4 | |
| Length Wtd. (ft) | 866.00 | Wetted Per. (ft) | | 411.85 | |
| Min Ch El (ft) | 1404.50 | Shear (lb/sq ft) | | 0.05 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.06 | |
| Frctn Loss (ft) | 4.13 | Cum Volume (acre-ft) | | 16.13 | 2.42 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 67.41 | 6.98 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1405.95 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1405.93 | Reach Len. (ft) | 866.00 | 866.00 | 866.00 |
| Crit W.S. (ft) | 1405.65 | Flow Area (sq ft) | | 225.47 | 0.25 |
| E.G. Slope (ft/ft) | 0.002873 | Area (sq ft) | | 225.47 | 409.23 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 299.90 | 0.10 |
| Top Width (ft) | 1466.56 | Top Width (ft) | | 504.42 | 962.14 |
| Vel Total (ft/s) | 1.33 | Avg. Vel. (ft/s) | | 1.33 | 0.40 |
| Max Chl Dpth (ft) | 1.42 | Hydr. Depth (ft) | | 0.45 | 0.13 |
| Conv. Total (cfs) | 5597.0 | Conv. (cfs) | | 5595.1 | 1.9 |
| Length Wtd. (ft) | 866.00 | Wetted Per. (ft) | | 504.53 | 2.00 |
| Min Ch El (ft) | 1404.50 | Shear (lb/sq ft) | | 0.08 | 0.02 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.11 | 0.01 |
| Frctn Loss (ft) | 4.20 | Cum Volume (acre-ft) | | 28.10 | 4.25 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 76.89 | 10.12 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the

cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1406.52 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1406.46 | Reach Len. (ft) | 866.00 | 866.00 | 866.00 |
| Crit W.S. (ft) | 1406.01 | Flow Area (sq ft) | | 504.45 | 1038.06 |
| E.G. Slope (ft/ft) | 0.003332 | Area (sq ft) | | 504.45 | 1038.06 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 1202.21 | 1546.73 |
| Top Width (ft) | 1808.17 | Top Width (ft) | | 525.88 | 1282.29 |
| Vel Total (ft/s) | 1.78 | Avg. Vel. (ft/s) | | 2.38 | 1.49 |
| Max Chl Dpth (ft) | 1.96 | Hydr. Depth (ft) | | 0.96 | 0.81 |
| Conv. Total (cfs) | 47622.0 | Conv. (cfs) | | 20826.8 | 26795.2 |
| Length Wtd. (ft) | 866.00 | Wetted Per. (ft) | | 526.02 | 1282.34 |
| Min Ch El (ft) | 1404.50 | Shear (lb/sq ft) | | 0.20 | 0.17 |
| Alpha | 1.18 | Stream Power (lb/ft s) | | 0.48 | 0.25 |
| Frctn Loss (ft) | 3.65 | Cum Volume (acre-ft) | | 117.50 | 11.90 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 109.47 | 16.07 |

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION RIVER: Railroad
REACH: East RS: 7.35535

INPUT
Description:
Station Elevation Data num= 11

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1404 | 9910 | 1403.7 | 9940 | 1401.5 | 10000 | 1401.3 | 10250 | 1401.3 |
| 10600 | 1402 | 10850 | 1403.1 | 11100 | 1402.5 | 11120 | 1403 | 11150 | 1404 |
| 11700 | 1404 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 10850 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 10850 | 811 | 811 | 811 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1401.59 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1401.56 | Reach Len. (ft) | 811.00 | 811.00 | 811.00 |
| Crit W.S. (ft) | 1401.48 | Flow Area (sq ft) | | 89.87 | |
| E.G. Slope (ft/ft) | 0.009620 | Area (sq ft) | | 89.87 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 438.89 | Top Width (ft) | | 438.89 | |
| Vel Total (ft/s) | 1.45 | Avg. Vel. (ft/s) | | 1.45 | |
| Max Chl Dpth (ft) | 0.26 | Hydr. Depth (ft) | | 0.20 | |
| Conv. Total (cfs) | 1325.4 | Conv. (cfs) | | 1325.4 | |
| Length Wtd. (ft) | 811.00 | Wetted Per. (ft) | | 438.89 | |
| Min Ch El (ft) | 1401.30 | Shear (lb/sq ft) | | 0.12 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.18 | |
| Frctn Loss (ft) | 3.04 | Cum Volume (acre-ft) | | 13.98 | 0.09 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 58.96 | 0.34 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1401.75 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1401.70 | Reach Len. (ft) | 811.00 | 811.00 | 811.00 |

| | | | | |
|---|---|---|---|---|
| Crit W.S. (ft) | 1401.60 | Flow Area (sq ft) | 156.66 | |
| E.G. Slope (ft/ft) | 0.009845 | Area (sq ft) | 156.66 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | 300.00 | |
| Top Width (ft) | 511.12 | Top Width (ft) | 511.12 | |
| Vel Total (ft/s) | 1.91 | Avg. Vel. (ft/s) | 1.91 | |
| Max Chl Dpth (ft) | 0.40 | Hydr. Depth (ft) | 0.31 | |
| Conv. Total (cfs) | 3023.6 | Conv. (cfs) | 3023.6 | |
| Length Wtd. (ft) | 811.00 | Wetted Per. (ft) | 511.13 | |
| Min Ch El (ft) | 1401.30 | Shear (lb/sq ft) | 0.19 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.36 | |
| Frctn Loss (ft) | 2.99 | Cum Volume (acre-ft) | 24.30 | 0.18 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | 66.80 | 0.55 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1402.85 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.16 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1402.69 | Reach Len. (ft) | 811.00 | 811.00 | 811.00 |
| Crit W.S. (ft) | 1402.32 | Flow Area (sq ft) | | 856.05 | 8.60 |
| E.G. Slope (ft/ft) | 0.005510 | Area (sq ft) | | 856.05 | 8.60 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2744.94 | 4.01 |
| Top Width (ft) | 922.67 | Top Width (ft) | | 834.04 | 88.64 |
| Vel Total (ft/s) | 3.18 | Avg. Vel. (ft/s) | | 3.21 | 0.47 |
| Max Chl Dpth (ft) | 1.39 | Hydr. Depth (ft) | | 1.03 | 0.10 |
| Conv. Total (cfs) | 37032.6 | Conv. (cfs) | | 36978.7 | 54.0 |
| Length Wtd. (ft) | 811.00 | Wetted Per. (ft) | | 834.08 | 88.64 |
| Min Ch El (ft) | 1401.30 | Shear (lb/sq ft) | | 0.35 | 0.03 |
| Alpha | 1.02 | Stream Power (lb/ft s) | | 1.13 | 0.02 |
| Frctn Loss (ft) | 2.72 | Cum Volume (acre-ft) | | 103.98 | 1.50 |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 95.95 | 2.45 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 7.20174

INPUT
Description:
Station Elevation Data num= 9

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9950 | 1402 | 9960 | 1401.7 | 10000 | 1397.8 | 10030 | 1398 | 10500 | 1398.5 |
| 10510 | 1399 | 10530 | 1398 | 10550 | 1400 | 11800 | 1401 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9950 | .05 | 9960 | .035 | 10500 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9960 | 10500 | 1000 | 1000 | 1000 | .1 | .3 |

Ineffective Flow num= 1

| Sta L | Sta R | Elev | Permanent |
|---|---|---|---|
| 888 | F | | |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1398.54 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1398.53 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1398.30 | Flow Area (sq ft) | | 153.00 | 0.01 |
| E.G. Slope (ft/ft) | 0.001982 | Area (sq ft) | | 153.00 | 4.21 |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | 0.00 |
| Top Width (ft) | 523.96 | Top Width (ft) | | 507.48 | 16.48 |
| Vel Total (ft/s) | 0.85 | Avg. Vel. (ft/s) | | 0.85 | 0.08 |
| Max Chl Dpth (ft) | 0.73 | Hydr. Depth (ft) | | 0.30 | 0.01 |
| Conv. Total (cfs) | 2920.4 | Conv. (cfs) | | 2920.4 | 0.0 |

| | | | | |
|---|---|---|---|---|
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | 507.52 | 0.59 |
| Min Ch El (ft) | 1397.80 | Shear (lb/sq ft) | 0.04 | 0.00 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.03 | 0.00 |
| Frctn Loss (ft) | 3.51 | Cum Volume (acre-ft) | 11.72 | 0.05 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 50.15 | 0.19 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1398.75 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1398.73 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1398.43 | Flow Area (sq ft) | | 255.55 | 0.53 |
| E.G. Slope (ft/ft) | 0.001917 | Area (sq ft) | | 255.55 | 8.55 |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 299.84 | 0.16 |
| Top Width (ft) | 536.11 | Top Width (ft) | | 509.55 | 26.56 |
| Vel Total (ft/s) | 1.17 | Avg. Vel. (ft/s) | | 1.17 | 0.31 |
| Max Chl Dpth (ft) | 0.93 | Hydr. Depth (ft) | | 0.50 | 0.12 |
| Conv. Total (cfs) | 6851.7 | Conv. (cfs) | | 6847.9 | 3.8 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 509.60 | 4.63 |
| Min Ch El (ft) | 1397.80 | Shear (lb/sq ft) | | 0.06 | 0.01 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.07 | 0.00 |
| Frctn Loss (ft) | 3.54 | Cum Volume (acre-ft) | | 20.46 | 0.10 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 57.29 | 0.30 |

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1400.13 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.13 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1400.00 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1399.19 | Flow Area (sq ft) | | 908.98 | 62.37 |
| E.G. Slope (ft/ft) | 0.002250 | Area (sq ft) | | 908.98 | 62.37 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2647.21 | 101.73 |
| Top Width (ft) | 572.51 | Top Width (ft) | | 522.54 | 49.97 |
| Vel Total (ft/s) | 2.83 | Avg. Vel. (ft/s) | | 2.91 | 1.63 |
| Max Chl Dpth (ft) | 2.20 | Hydr. Depth (ft) | | 1.74 | 1.25 |
| Conv. Total (cfs) | 57954.9 | Conv. (cfs) | | 55810.1 | 2144.8 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 522.65 | 50.11 |
| Min Ch El (ft) | 1397.80 | Shear (lb/sq ft) | | 0.24 | 0.17 |
| Alpha | 1.03 | Stream Power (lb/ft s) | | 0.71 | 0.29 |
| Frctn Loss (ft) | 3.93 | Cum Volume (acre-ft) | | 87.55 | 0.83 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 83.32 | 1.15 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION RIVER: Railroad
REACH: East RS: 7.01233

INPUT
Description:
Station Elevation Data num= 6

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9940 | 1399.5 | 9950 | 1399.2 | 10000 | 1396 | 10210 | 1394.5 | 11090 | 1396 |
| 11940 | 1398 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 9940 | .05 | 9950 | .035 | 11090 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9950 | 11090 | 1000 | 1000 | 1000 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1395.03 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1394.99 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | 1394.88 | Flow Area (sq ft) | | 88.02 | |
| E.G. Slope (ft/ft) | 0.007848 | Area (sq ft) | | 88.02 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 357.66 | Top Width (ft) | | 357.66 | |
| Vel Total (ft/s) | 1.48 | Avg. Vel. (ft/s) | | 1.48 | |
| Max Chl Dpth (ft) | 0.49 | Hydr. Depth (ft) | | 0.25 | |
| Conv. Total (cfs) | 1467.4 | Conv. (cfs) | | 1467.4 | |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 357.66 | |
| Min Ch El (ft) | 1394.50 | Shear (lb/sq ft) | | 0.12 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.18 | |
| Frctn Loss (ft) | 3.50 | Cum Volume (acre-ft) | | 8.95 | |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 40.22 | |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1395.22 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.06 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1395.16 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 159.05 | |
| E.G. Slope (ft/ft) | 0.008628 | Area (sq ft) | | 159.05 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 480.78 | Top Width (ft) | | 480.78 | |
| Vel Total (ft/s) | 1.89 | Avg. Vel. (ft/s) | | 1.89 | |
| Max Chl Dpth (ft) | 0.66 | Hydr. Depth (ft) | | 0.33 | |
| Conv. Total (cfs) | 3229.8 | Conv. (cfs) | | 3229.8 | |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 480.78 | |
| Min Ch El (ft) | 1394.50 | Shear (lb/sq ft) | | 0.18 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.34 | |
| Frctn Loss (ft) | 3.54 | Cum Volume (acre-ft) | | 15.70 | |
| C & E Loss (ft) | 0.01 | Cum SA (acres) | | 45.93 | |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1396.19 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.17 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1396.02 | Reach Len. (ft) | 1000.00 | 1000.00 | 1000.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 835.86 | 0.06 |
| E.G. Slope (ft/ft) | 0.008552 | Area (sq ft) | | 835.86 | 0.06 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2748.94 | 0.01 |
| Top Width (ft) | 1097.42 | Top Width (ft) | | 1090.26 | 7.16 |
| Vel Total (ft/s) | 3.29 | Avg. Vel. (ft/s) | | 3.29 | 0.11 |
| Max Chl Dpth (ft) | 1.52 | Hydr. Depth (ft) | | 0.77 | 0.01 |
| Conv. Total (cfs) | 29725.6 | Conv. (cfs) | | 29725.6 | 0.1 |
| Length Wtd. (ft) | 1000.00 | Wetted Per. (ft) | | 1090.27 | 7.16 |
| Min Ch El (ft) | 1394.50 | Shear (lb/sq ft) | | 0.41 | 0.00 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.35 | 0.00 |
| Frctn Loss (ft) | 3.52 | Cum Volume (acre-ft) | | 67.52 | 0.12 |
| C & E Loss (ft) | 0.03 | Cum SA (acres) | | 64.81 | 0.50 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 6.82293

INPUT
Description:
Station Elevation Data num= 10

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1395 | 9910 | 1395 | 9940 | 1395 | 9960 | 1394.7 | 9965 | 1392 |
| 10000 | 1391 | 10150 | 1391.2 | 10950 | 1391.5 | 11050 | 1392 | 11100 | 1394 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 11050 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 11050 | 1580 | 1580 | 1580 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1391.52 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1391.52 | Reach Len. (ft) | 1580.00 | 1580.00 | 1580.00 |
| Crit W.S. (ft) | 1391.35 | Flow Area (sq ft) | | 198.71 | |
| E.G. Slope (ft/ft) | 0.001969 | Area (sq ft) | | 198.71 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 970.97 | Top Width (ft) | | 970.97 | |
| Vel Total (ft/s) | 0.65 | Avg. Vel. (ft/s) | | 0.65 | |
| Max Chl Dpth (ft) | 0.51 | Hydr. Depth (ft) | | 0.20 | |
| Conv. Total (cfs) | 2929.8 | Conv. (cfs) | | 2929.8 | |
| Length Wtd. (ft) | 1580.00 | Wetted Per. (ft) | | 970.98 | |
| Min Ch El (ft) | 1391.00 | Shear (lb/sq ft) | | 0.03 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.02 | |
| Frctn Loss (ft) | 4.30 | Cum Volume (acre-ft) | | 5.66 | |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 24.97 | |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1391.67 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.01 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1391.65 | Reach Len. (ft) | 1580.00 | 1580.00 | 1580.00 |
| Crit W.S. (ft) | 1391.44 | Flow Area (sq ft) | | 335.50 | |
| E.G. Slope (ft/ft) | 0.001912 | Area (sq ft) | | 335.50 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 1003.53 | Top Width (ft) | | 1003.53 | |
| Vel Total (ft/s) | 0.89 | Avg. Vel. (ft/s) | | 0.89 | |
| Max Chl Dpth (ft) | 0.65 | Hydr. Depth (ft) | | 0.33 | |
| Conv. Total (cfs) | 6861.0 | Conv. (cfs) | | 6861.0 | |
| Length Wtd. (ft) | 1580.00 | Wetted Per. (ft) | | 1003.54 | |
| Min Ch El (ft) | 1391.00 | Shear (lb/sq ft) | | 0.04 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.04 | |
| Frctn Loss (ft) | 4.23 | Cum Volume (acre-ft) | | 10.03 | |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | | 28.89 | |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 3

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1392.63 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.07 | Wt. n-Val. | | 0.035 | 0.050 |
| W.S. Elev (ft) | 1392.56 | Reach Len. (ft) | 1580.00 | 1580.00 | 1580.00 |
| Crit W.S. (ft) | 1391.94 | Flow Area (sq ft) | | 1308.53 | 3.96 |
| E.G. Slope (ft/ft) | 0.001907 | Area (sq ft) | | 1308.53 | 3.96 |
| Q Total (cfs) | 2748.94 | Flow (cfs) | | 2746.74 | 2.21 |
| Top Width (ft) | 1100.11 | Top Width (ft) | | 1086.04 | 14.07 |
| Vel Total (ft/s) | 2.09 | Avg. Vel. (ft/s) | | 2.10 | 0.56 |

| | | | | |
|---|---|---|---|---|
| Max Chl Dpth (ft) | 1.56 | Hydr. Depth (ft) | 1.20 | 0.28 |
| Conv. Total (cfs) | 62946.8 | Conv. (cfs) | 62896.2 | 50.5 |
| Length Wtd. (ft) | 1580.00 | Wetted Per. (ft) | 1086.20 | 14.08 |
| Min Ch El (ft) | 1391.00 | Shear (lb/sq ft) | 0.14 | 0.03 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.30 | 0.02 |
| Frctn Loss (ft) | 4.22 | Cum Volume (acre-ft) | 42.91 | 0.07 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 39.83 | 0.26 |

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Railroad
REACH: East RS: 6.52371

INPUT
Description:
Station Elevation Data num= 6

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 9900 | 1390.8 | 9910 | 1390.5 | 9930 | 1390.5 | 9950 | 1386 | 10000 | 1386.8 |
| 11050 | 1388 | | | | | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 9900 | .05 | 9910 | .035 | 11050 | .05 |

| Bank Sta: Left | Right | Lengths: Left | Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|---|
| 9910 | 11050 | 0 | 0 | 0 | .1 | .3 |

CROSS SECTION OUTPUT Profile #PF 1

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1387.22 | Element | | | |
| Vel Head (ft) | 0.02 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1387.20 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1387.00 | Flow Area (sq ft) | | 113.31 | |
| E.G. Slope (ft/ft) | 0.004000 | Area (sq ft) | | 113.31 | |
| Q Total (cfs) | 130.00 | Flow (cfs) | | 130.00 | |
| Top Width (ft) | 405.58 | Top Width (ft) | | 405.58 | |
| Vel Total (ft/s) | 1.15 | Avg. Vel. (ft/s) | | 1.15 | |
| Max Chl Dpth (ft) | 1.20 | Hydr. Depth (ft) | | 0.28 | |
| Conv. Total (cfs) | 2055.5 | Conv. (cfs) | | 2055.5 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 405.72 | |
| Min Ch El (ft) | 1386.00 | Shear (lb/sq ft) | | 0.07 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.08 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

CROSS SECTION OUTPUT Profile #PF 2

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1387.44 | Element | | | |
| Vel Head (ft) | 0.03 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1387.41 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1387.17 | Flow Area (sq ft) | | 217.28 | |
| E.G. Slope (ft/ft) | 0.004003 | Area (sq ft) | | 217.28 | |
| Q Total (cfs) | 300.00 | Flow (cfs) | | 300.00 | |
| Top Width (ft) | 589.38 | Top Width (ft) | | 589.38 | |
| Vel Total (ft/s) | 1.38 | Avg. Vel. (ft/s) | | 1.38 | |
| Max Chl Dpth (ft) | 1.41 | Hydr. Depth (ft) | | 0.37 | |
| Conv. Total (cfs) | 4741.8 | Conv. (cfs) | | 4741.8 | |
| Length Wtd. (ft) | | Wetted Per. (ft) | | 589.55 | |
| Min Ch El (ft) | 1386.00 | Shear (lb/sq ft) | | 0.09 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 0.13 | |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | | | |
| C & E Loss (ft) | | Cum SA (acres) | | | |

CROSS SECTION OUTPUT Profile #PF 3

| | | | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 1388.41 | Element | | | |
| Vel Head (ft) | 0.10 | Wt. n-Val. | | 0.035 | |
| W.S. Elev (ft) | 1388.31 | Reach Len. (ft) | | | |
| Crit W.S. (ft) | 1387.90 | Flow Area (sq ft) | | 1057.34 | |
| E.G. Slope (ft/ft) | 0.004005 | Area (sq ft) | | 1057.34 | |

| | | | |
|---|---|---|---|
| Q Total (cfs) | 2748.94 | Flow (cfs) | 2748.94 |
| Top Width (ft) | 1110.25 | Top Width (ft) | 1110.25 |
| Vel Total (ft/s) | 2.60 | Avg. Vel. (ft/s) | 2.60 |
| Max Chl Dpth (ft) | 2.31 | Hydr. Depth (ft) | 0.95 |
| Conv. Total (cfs) | 43436.8 | Conv. (cfs) | 43436.8 |
| Length Wtd. (ft) | | Wetted Per. (ft) | 1110.81 |
| Min Ch El (ft) | 1386.00 | Shear (lb/sq ft) | 0.24 |
| Alpha | 1.00 | Stream Power (lb/ft s) | 0.62 |
| Frctn Loss (ft) | | Cum Volume (acre-ft) | |
| C & E Loss (ft) | | Cum SA (acres) | |

SUMMARY OF MANNING'S N VALUES

River:Railroad

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| East | 9.90530 | .05 | .035 | .05 |
| East | 9.810605 | Lat. Weir | | |
| East | 9.71591 | .05 | .035 | .05 |
| East | 9.52649 | .05 | .035 | .05 |
| East | 9.30492 | .05 | .035 | .05 |
| East | 9.05493 | .05 | .035 | .05 |
| East | 8.69508 | .05 | .035 | .05 |
| East | 8.43940 | .05 | .035 | .05 |
| East | 8.17921 | .05 | .035 | .05 |
| East | 8.02900 | .05 | .035 | .05 |
| East | 7.87879 | .05 | .035 | .05 |
| East | 7.67665 | .05 | .035 | .05 |
| East | 7.51945 | .05 | .035 | .05 |
| East | 7.35535 | .05 | .035 | .05 |
| East | 7.20174 | .05 | .035 | .05 |
| East | 7.01233 | .05 | .035 | .05 |
| East | 6.82293 | .05 | .035 | .05 |
| East | 6.52371 | .05 | .035 | .05 |

SUMMARY OF REACH LENGTHS

River: Railroad

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| East | 9.90530 | 1000 | 1000 | 1000 |
| East | 9.810605 | Lat. Weir | | |
| East | 9.71591 | 1000 | 1000 | 1000 |
| East | 9.52649 | 1170 | 1170 | 1170 |
| East | 9.30492 | 1320 | 1320 | 1320 |
| East | 9.05493 | 1900 | 1900 | 1900 |
| East | 8.69508 | 1350 | 1350 | 1350 |
| East | 8.43940 | 1575 | 1575 | 1575 |
| East | 8.17921 | 1185 | 593 | 1 |
| East | 8.02900 | 1 | 593 | 1186 |
| East | 7.87879 | 1265 | 1265 | 1265 |
| East | 7.67665 | 830 | 830 | 830 |
| East | 7.51945 | 866 | 866 | 866 |
| East | 7.35535 | 811 | 811 | 811 |
| East | 7.20174 | 1000 | 1000 | 1000 |
| East | 7.01233 | 1000 | 1000 | 1000 |
| East | 6.82293 | 1580 | 1580 | 1580 |
| East | 6.52371 | 0 | 0 | 0 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Railroad

| Reach | River Sta. | Contr. | Expan. |
|---|---|---|---|

| | | | |
|---|---|---|---|
| East | 9.90530 | .1 | .3 |
| East | 9.810605 Lat. Weir | | |
| East | 9.71591 | .1 | .3 |
| East | 9.52649 | .1 | .3 |
| East | 9.30492 | .1 | .3 |
| East | 9.05493 | .1 | .3 |
| East | 8.69508 | .1 | .3 |
| East | 8.43940 | .1 | .3 |
| East | 8.17921 | .1 | .3 |
| East | 8.02900 | .1 | .3 |
| East | 7.87879 | .1 | .3 |
| East | 7.67665 | .1 | .3 |
| East | 7.51945 | .1 | .3 |
| East | 7.35535 | .1 | .3 |
| East | 7.20174 | .1 | .3 |
| East | 7.01233 | .1 | .3 |
| East | 6.82293 | .1 | .3 |
| East | 6.52371 | .1 | .3 |

Profile Output Table - Standard Table 1

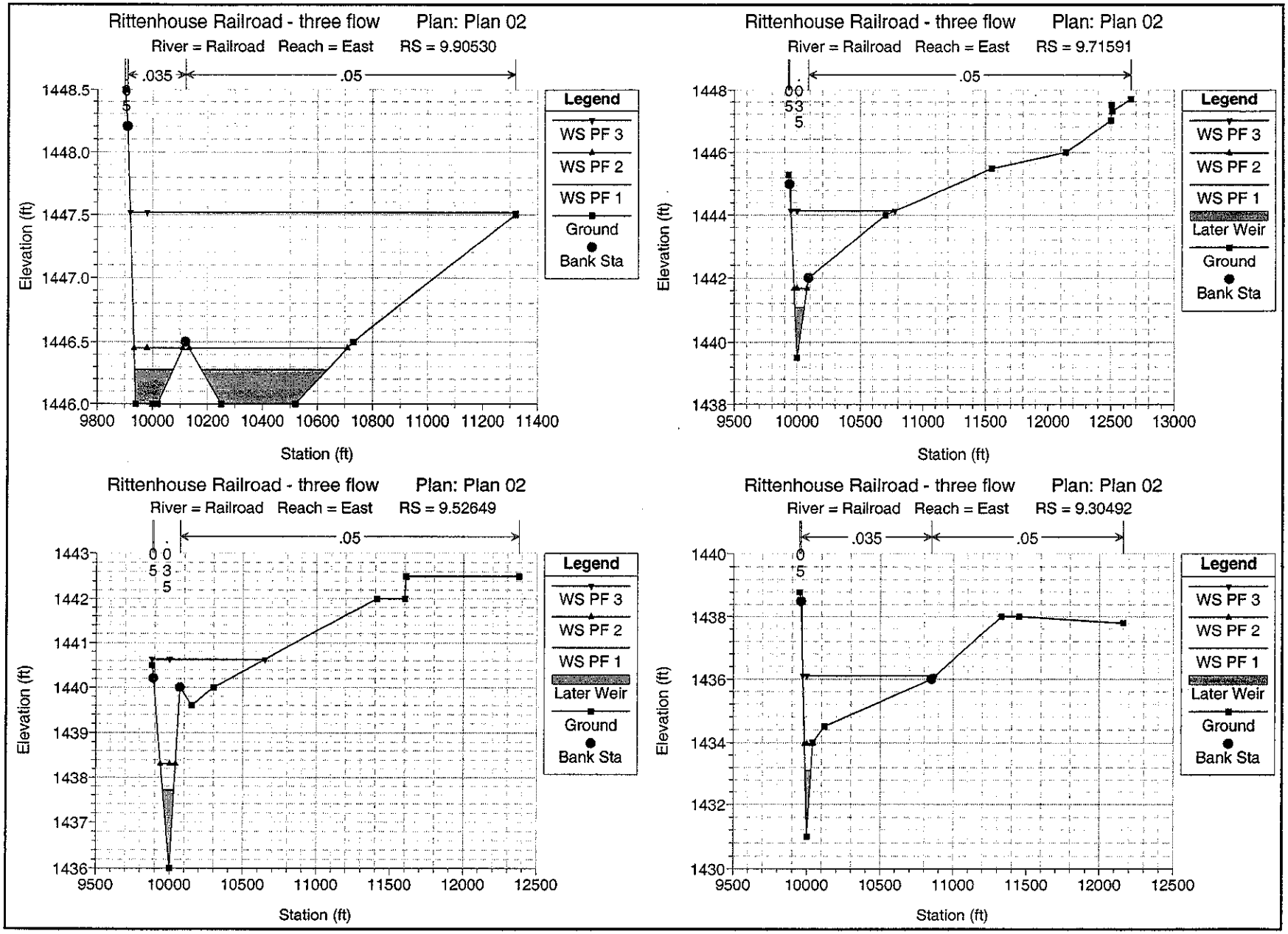
| Reach | River Sta | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 9.90530 | 130.00 | 1446.00 | 1446.28 | 1446.16 | 1446.29 | 0.006994 | 1.29 | 130.93 | 597.08 | 0.49 |
| East | 9.90530 | 300.00 | 1446.00 | 1446.45 | 1446.26 | 1446.48 | 0.006013 | 1.56 | 248.13 | 752.31 | 0.48 |
| East | 9.90530 | 2980.00 | 1446.00 | 1447.52 | 1446.93 | 1447.60 | 0.004100 | 3.26 | 1411.16 | 1400.71 | 0.50 |
| East | 9.810605 | Lat. Weir | | | | | | | | | |
| East | 9.71591 | 130.00 | 1439.50 | 1441.07 | | 1441.15 | 0.003930 | 2.26 | 57.54 | 73.47 | 0.45 |
| East | 9.71591 | 300.00 | 1439.50 | 1441.66 | | 1441.78 | 0.003756 | 2.74 | 109.58 | 101.39 | 0.46 |
| East | 9.71591 | 2980.00 | 1439.50 | 1444.14 | | 1444.35 | 0.002626 | 4.52 | 1119.15 | 826.93 | 0.46 |
| East | 9.52649 | 130.00 | 1436.00 | 1437.70 | 1437.17 | 1437.77 | 0.002933 | 2.06 | 63.08 | 74.24 | 0.39 |
| East | 9.52649 | 300.00 | 1436.00 | 1438.32 | 1437.63 | 1438.42 | 0.003003 | 2.56 | 117.06 | 101.14 | 0.42 |
| East | 9.52649 | 2831.42 | 1436.00 | 1440.63 | 1440.24 | 1441.01 | 0.004417 | 5.29 | 766.06 | 769.52 | 0.58 |
| East | 9.30492 | 130.00 | 1431.00 | 1433.10 | 1432.64 | 1433.25 | 0.005266 | 3.17 | 41.07 | 39.16 | 0.54 |
| East | 9.30492 | 300.00 | 1431.00 | 1433.96 | | 1434.17 | 0.004456 | 3.66 | 81.86 | 55.28 | 0.53 |
| East | 9.30492 | 2748.94 | 1431.00 | 1436.11 | 1435.50 | 1436.23 | 0.003670 | 2.78 | 989.20 | 902.87 | 0.46 |
| East | 9.05493 | 130.00 | 1426.30 | 1428.91 | | 1429.00 | 0.002156 | 2.34 | 55.50 | 42.54 | 0.36 |
| East | 9.05493 | 300.00 | 1426.30 | 1429.80 | 1428.72 | 1429.94 | 0.002393 | 3.00 | 99.94 | 57.09 | 0.40 |
| East | 9.05493 | 2748.94 | 1426.30 | 1431.94 | | 1432.12 | 0.002669 | 4.74 | 1175.14 | 869.20 | 0.47 |
| East | 8.69508 | 130.00 | 1420.30 | 1422.06 | 1421.74 | 1422.22 | 0.006964 | 3.24 | 40.07 | 45.58 | 0.61 |
| East | 8.69508 | 300.00 | 1420.30 | 1422.75 | | 1422.98 | 0.006270 | 3.84 | 78.04 | 63.61 | 0.61 |
| East | 8.69508 | 2748.94 | 1420.30 | 1425.50 | 1425.45 | 1425.83 | 0.004178 | 5.56 | 1047.37 | 1537.56 | 0.58 |
| East | 8.43940 | 130.00 | 1416.30 | 1418.56 | 1417.79 | 1418.60 | 0.001387 | 1.89 | 101.64 | 202.03 | 0.29 |
| East | 8.43940 | 300.00 | 1416.30 | 1419.01 | 1418.47 | 1419.07 | 0.001630 | 2.41 | 224.02 | 334.76 | 0.33 |
| East | 8.43940 | 2748.94 | 1416.30 | 1420.63 | 1419.96 | 1420.78 | 0.003310 | 4.90 | 1182.63 | 917.12 | 0.51 |
| East | 8.17921 | 130.00 | 1412.00 | 1412.60 | 1412.60 | 1412.75 | 0.027757 | 3.16 | 41.11 | 137.52 | 1.02 |
| East | 8.17921 | 300.00 | 1412.00 | 1412.90 | | 1413.06 | 0.017129 | 3.25 | 92.25 | 206.00 | 0.86 |
| East | 8.17921 | 2748.94 | 1412.00 | 1414.56 | | 1414.78 | 0.004426 | 3.77 | 768.39 | 644.40 | 0.53 |
| East | 8.02900 | 130.00 | 1410.30 | 1412.59 | 1410.84 | 1412.59 | 0.000013 | 0.17 | 787.32 | 687.31 | 0.03 |
| East | 8.02900 | 300.00 | 1410.30 | 1412.93 | | 1412.93 | 0.000032 | 0.29 | 1037.84 | 789.12 | 0.04 |
| East | 8.02900 | 2748.94 | 1410.30 | 1414.23 | 1412.13 | 1414.25 | 0.000320 | 1.19 | 2310.36 | 1177.39 | 0.15 |
| East | 7.87879 | 130.00 | 1412.00 | 1412.54 | 1412.26 | 1412.56 | 0.002175 | 1.13 | 115.22 | 267.88 | 0.30 |
| East | 7.87879 | 300.00 | 1412.00 | 1412.83 | | 1412.86 | 0.002344 | 1.49 | 215.54 | 948.62 | 0.33 |
| East | 7.87879 | 2748.94 | 1412.00 | 1413.61 | | 1413.68 | 0.003530 | 2.71 | 1581.90 | 2217.79 | 0.45 |
| East | 7.67665 | 130.00 | 1408.30 | 1408.67 | 1408.53 | 1408.69 | 0.004611 | 1.15 | 112.59 | 1595.69 | 0.40 |
| East | 7.67665 | 300.00 | 1408.30 | 1408.85 | 1408.67 | 1408.88 | 0.004433 | 1.55 | 193.53 | 1807.26 | 0.43 |
| East | 7.67665 | 2748.94 | 1408.30 | 1409.26 | 1409.01 | 1409.30 | 0.003385 | 2.13 | 1677.61 | 2100.37 | 0.42 |
| East | 7.51945 | 130.00 | 1404.50 | 1405.71 | 1405.48 | 1405.73 | 0.002845 | 1.03 | 126.27 | 1079.73 | 0.33 |
| East | 7.51945 | 300.00 | 1404.50 | 1405.93 | 1405.65 | 1405.95 | 0.002873 | 1.33 | 225.72 | 1466.56 | 0.35 |
| East | 7.51945 | 2748.94 | 1404.50 | 1406.46 | 1406.01 | 1406.52 | 0.003332 | 2.38 | 1542.51 | 1808.17 | 0.43 |

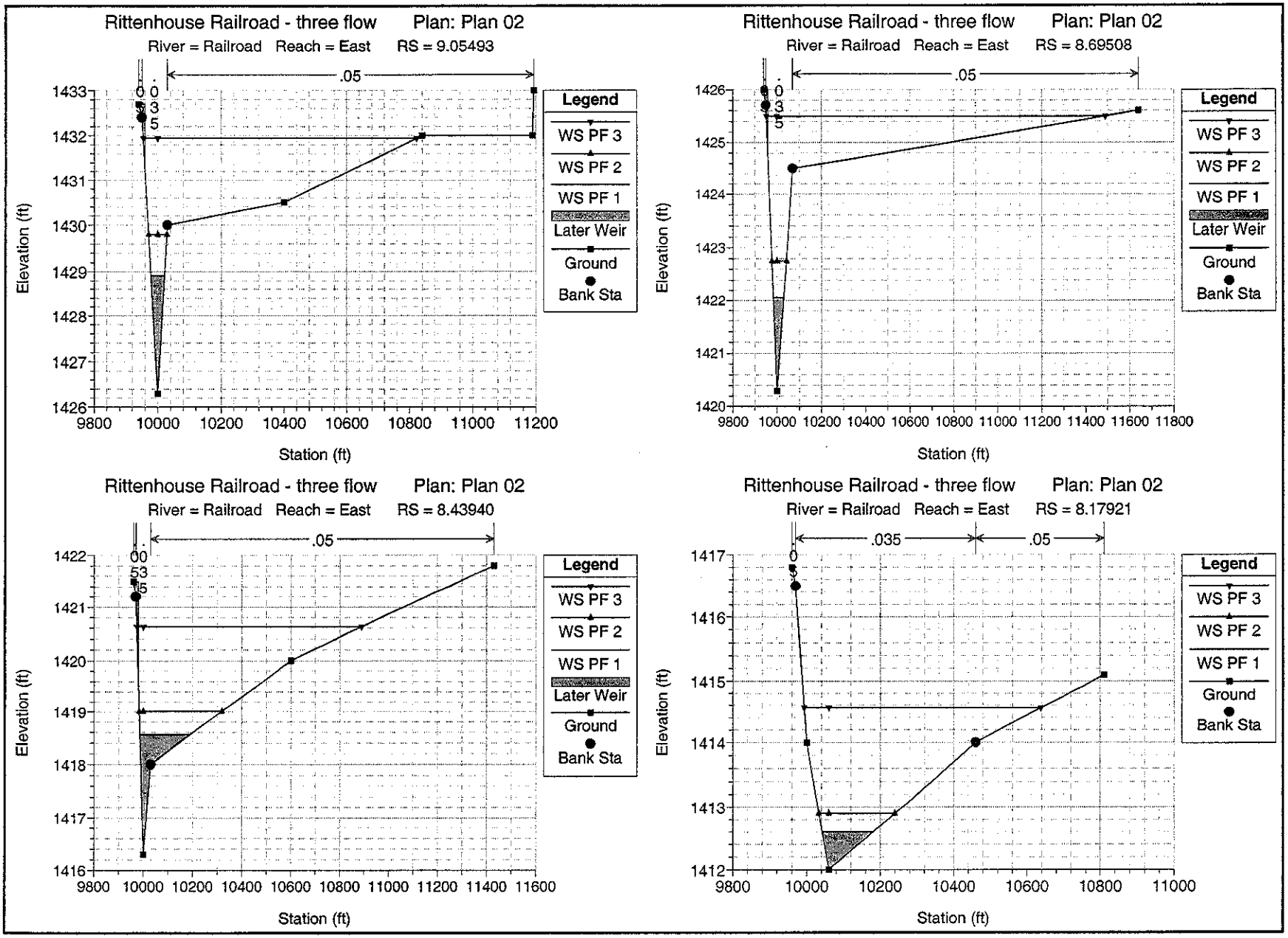
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 7.35535 | 130.00 | 1401.30 | 1401.56 | 1401.48 | 1401.59 | 0.009620 | 1.45 | 89.87 | 438.89 | 0.56 |
| East | 7.35535 | 300.00 | 1401.30 | 1401.70 | 1401.60 | 1401.75 | 0.009845 | 1.91 | 156.66 | 511.12 | 0.61 |
| East | 7.35535 | 2748.94 | 1401.30 | 1402.69 | 1402.32 | 1402.85 | 0.005510 | 3.21 | 864.65 | 922.67 | 0.56 |
| East | 7.20174 | 130.00 | 1397.80 | 1398.53 | 1398.30 | 1398.54 | 0.001982 | 0.85 | 153.01 | 523.96 | 0.27 |
| East | 7.20174 | 300.00 | 1397.80 | 1398.73 | 1398.43 | 1398.75 | 0.001917 | 1.17 | 256.08 | 536.11 | 0.29 |
| East | 7.20174 | 2748.94 | 1397.80 | 1400.00 | 1399.19 | 1400.13 | 0.002250 | 2.91 | 971.35 | 572.51 | 0.39 |
| East | 7.01233 | 130.00 | 1394.50 | 1394.99 | 1394.88 | 1395.03 | 0.007848 | 1.48 | 88.02 | 357.66 | 0.52 |
| East | 7.01233 | 300.00 | 1394.50 | 1395.16 | | 1395.22 | 0.008628 | 1.89 | 159.05 | 480.78 | 0.58 |
| East | 7.01233 | 2748.94 | 1394.50 | 1396.02 | | 1396.19 | 0.008552 | 3.29 | 835.92 | 1097.42 | 0.66 |
| East | 6.82293 | 130.00 | 1391.00 | 1391.52 | 1391.35 | 1391.52 | 0.001969 | 0.65 | 198.71 | 970.97 | 0.25 |
| East | 6.82293 | 300.00 | 1391.00 | 1391.65 | 1391.44 | 1391.67 | 0.001912 | 0.89 | 335.50 | 1003.53 | 0.27 |
| East | 6.82293 | 2748.94 | 1391.00 | 1392.56 | 1391.94 | 1392.63 | 0.001907 | 2.10 | 1312.49 | 1100.11 | 0.34 |
| East | 6.52371 | 130.00 | 1386.00 | 1387.20 | 1387.00 | 1387.22 | 0.004000 | 1.15 | 113.31 | 405.58 | 0.38 |
| East | 6.52371 | 300.00 | 1386.00 | 1387.41 | 1387.17 | 1387.44 | 0.004003 | 1.38 | 217.28 | 589.38 | 0.40 |
| East | 6.52371 | 2748.94 | 1386.00 | 1388.31 | 1387.90 | 1388.41 | 0.004005 | 2.60 | 1057.34 | 1110.25 | 0.47 |

Profile Output Table - Standard Table 2

| Reach | River Sta | E.G. Elev (ft) | W.S. Elev (ft) | Vel Head (ft) | Frctn Loss (ft) | C & E Loss (ft) | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | Top Width (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| East | 9.90530 | 1446.29 | 1446.28 | 0.02 | 5.14 | 0.01 | | 38.92 | 91.08 | 597.08 |
| East | 9.90530 | 1446.48 | 1446.45 | 0.02 | 4.69 | 0.01 | | 90.16 | 209.84 | 752.31 |
| East | 9.90530 | 1447.60 | 1447.52 | 0.09 | 3.24 | 0.01 | | 861.65 | 2118.35 | 1400.71 |
| East | 9.810605 | Lat. Weir | | | | | | | | |
| East | 9.71591 | 1441.15 | 1441.07 | 0.08 | 3.38 | 0.00 | | 130.00 | | 73.47 |
| East | 9.71591 | 1441.78 | 1441.66 | 0.12 | 3.35 | 0.00 | | 300.00 | | 101.39 |
| East | 9.71591 | 1444.35 | 1444.14 | 0.22 | 3.33 | 0.02 | | 1906.78 | 1073.22 | 826.93 |
| East | 9.52649 | 1437.77 | 1437.70 | 0.07 | 4.50 | 0.01 | | 130.00 | | 74.24 |
| East | 9.52649 | 1438.42 | 1438.32 | 0.10 | 4.24 | 0.01 | | 300.00 | | 101.14 |
| East | 9.52649 | 1441.01 | 1440.63 | 0.38 | 4.71 | 0.08 | 2.34 | 2445.14 | 383.94 | 769.52 |
| East | 9.30492 | 1433.25 | 1433.10 | 0.16 | 4.23 | 0.02 | | 130.00 | | 39.16 |
| East | 9.30492 | 1434.17 | 1433.96 | 0.21 | 4.21 | 0.02 | | 300.00 | | 55.28 |
| East | 9.30492 | 1436.23 | 1436.11 | 0.12 | 4.11 | 0.01 | | 2748.59 | 0.35 | 902.87 |
| East | 9.05493 | 1429.00 | 1428.91 | 0.09 | 6.76 | 0.01 | | 130.00 | | 42.54 |
| East | 9.05493 | 1429.94 | 1429.80 | 0.14 | 6.95 | 0.01 | | 300.00 | | 57.09 |
| East | 9.05493 | 1432.12 | 1431.94 | 0.17 | 6.27 | 0.02 | | 1158.20 | 1590.75 | 869.20 |
| East | 8.69508 | 1422.22 | 1422.06 | 0.16 | 3.58 | 0.03 | | 130.00 | | 45.58 |
| East | 8.69508 | 1422.98 | 1422.75 | 0.23 | 3.86 | 0.05 | | 300.00 | | 63.61 |
| East | 8.69508 | 1425.83 | 1425.50 | 0.34 | 5.00 | 0.06 | | 1897.99 | 850.96 | 1537.56 |
| East | 8.43940 | 1418.60 | 1418.56 | 0.05 | 5.84 | 0.01 | | 109.31 | 20.69 | 202.03 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| East | 8.43940 | 1419.07 | 1419.01 | 0.06 | 6.00 | 0.01 | 189.08 | 110.92 | 334.76 |
| East | 8.43940 | 1420.78 | 1420.63 | 0.15 | 6.00 | 0.01 | 793.18 | 1955.76 | 917.12 |
| East | 8.17921 | 1412.75 | 1412.60 | 0.16 | 0.03 | 0.05 | 130.00 | | 137.52 |
| East | 8.17921 | 1413.06 | 1412.90 | 0.16 | 0.07 | 0.05 | 300.00 | | 206.00 |
| East | 8.17921 | 1414.78 | 1414.56 | 0.22 | 0.47 | 0.06 | 2707.03 | 41.91 | 644.40 |
| East | 8.02900 | 1412.59 | 1412.59 | 0.00 | 0.03 | 0.00 | 130.00 | | 687.31 |
| East | 8.02900 | 1412.93 | 1412.93 | 0.00 | 0.06 | 0.00 | 300.00 | | 789.12 |
| East | 8.02900 | 1414.25 | 1414.23 | 0.02 | 0.56 | 0.00 | 2748.94 | | 1177.39 |
| East | 7.87879 | 1412.56 | 1412.54 | 0.02 | 3.87 | 0.00 | 130.00 | | 267.88 |
| East | 7.87879 | 1412.86 | 1412.83 | 0.03 | 3.98 | 0.00 | 298.18 | 1.82 | 948.62 |
| East | 7.87879 | 1413.68 | 1413.61 | 0.07 | 4.37 | 0.01 | 1398.53 | 1350.41 | 2217.79 |
| East | 7.67665 | 1408.69 | 1408.67 | 0.02 | 2.96 | 0.00 | 130.00 | | 1595.69 |
| East | 7.67665 | 1408.88 | 1408.85 | 0.04 | 2.93 | 0.00 | 300.00 | | 1807.26 |
| East | 7.67665 | 1409.30 | 1409.26 | 0.05 | 2.79 | 0.00 | 839.28 | 1909.66 | 2100.37 |
| East | 7.51945 | 1405.73 | 1405.71 | 0.02 | 4.13 | 0.00 | 130.00 | | 1079.73 |
| East | 7.51945 | 1405.95 | 1405.93 | 0.03 | 4.20 | 0.00 | 299.90 | 0.10 | 1466.56 |
| East | 7.51945 | 1406.52 | 1406.46 | 0.06 | 3.65 | 0.01 | 1202.21 | 1546.73 | 1808.17 |
| East | 7.35535 | 1401.59 | 1401.56 | 0.03 | 3.04 | 0.01 | 130.00 | | 438.89 |
| East | 7.35535 | 1401.75 | 1401.70 | 0.06 | 2.99 | 0.01 | 300.00 | | 511.12 |
| East | 7.35535 | 1402.85 | 1402.69 | 0.16 | 2.72 | 0.01 | 2744.94 | 4.01 | 922.67 |
| East | 7.20174 | 1398.54 | 1398.53 | 0.01 | 3.51 | 0.00 | 130.00 | 0.00 | 523.96 |
| East | 7.20174 | 1398.75 | 1398.73 | 0.02 | 3.54 | 0.00 | 299.84 | 0.16 | 536.11 |
| East | 7.20174 | 1400.13 | 1400.00 | 0.13 | 3.93 | 0.00 | 2647.21 | 101.73 | 572.51 |
| East | 7.01233 | 1395.03 | 1394.99 | 0.03 | 3.50 | 0.01 | 130.00 | | 357.66 |
| East | 7.01233 | 1395.22 | 1395.16 | 0.06 | 3.54 | 0.01 | 300.00 | | 480.78 |
| East | 7.01233 | 1396.19 | 1396.02 | 0.17 | 3.52 | 0.03 | 2748.94 | 0.01 | 1097.42 |
| East | 6.82293 | 1391.52 | 1391.52 | 0.01 | 4.30 | 0.00 | 130.00 | | 970.97 |
| East | 6.82293 | 1391.67 | 1391.65 | 0.01 | 4.23 | 0.00 | 300.00 | | 1003.53 |
| East | 6.82293 | 1392.63 | 1392.56 | 0.07 | 4.22 | 0.00 | 2746.74 | 2.21 | 1100.11 |
| East | 6.52371 | 1387.22 | 1387.20 | 0.02 | | | 130.00 | | 405.58 |
| East | 6.52371 | 1387.44 | 1387.41 | 0.03 | | | 300.00 | | 589.38 |
| East | 6.52371 | 1388.41 | 1388.31 | 0.10 | | | 2748.94 | | 1110.25 |


Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 9.90530
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 9.71591
.05
Later Weir
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 9.52649
.05
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 9.30492
.035
.05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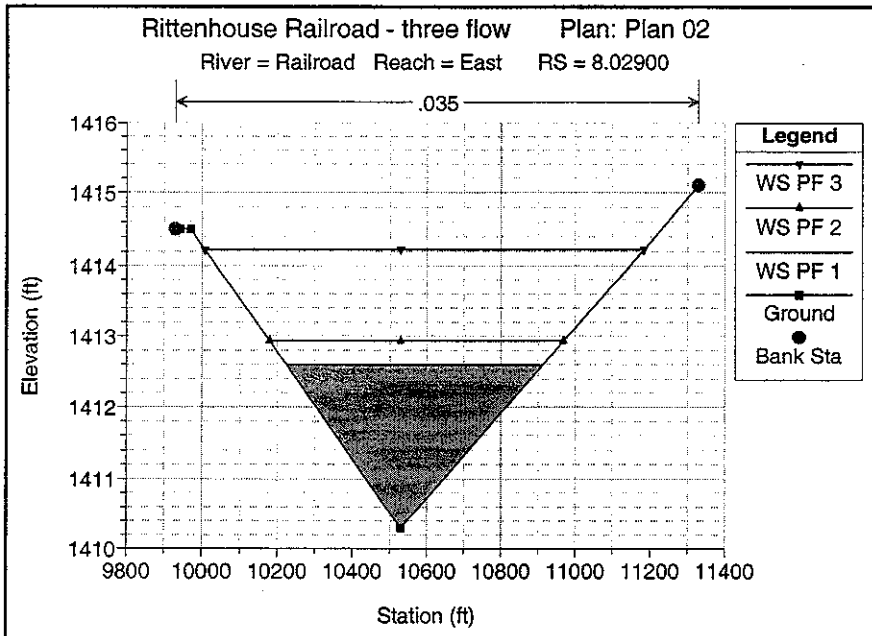
River = Railroad Reach = East RS = 9.05493
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Later Weir
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 8.69508
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Later Weir
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 8.43940
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Later Weir
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 8.17921
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta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River = Railroad Reach = East RS = 8.02900
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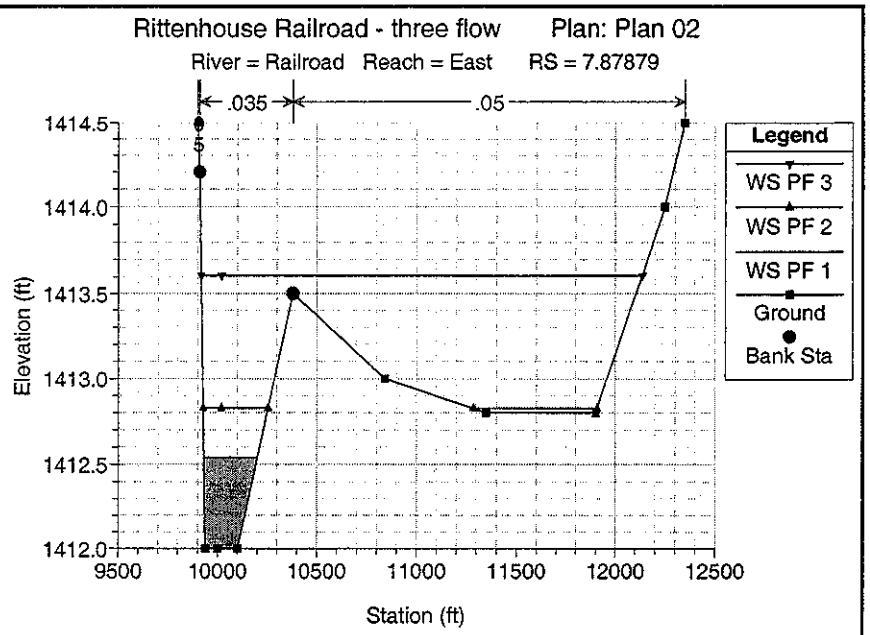
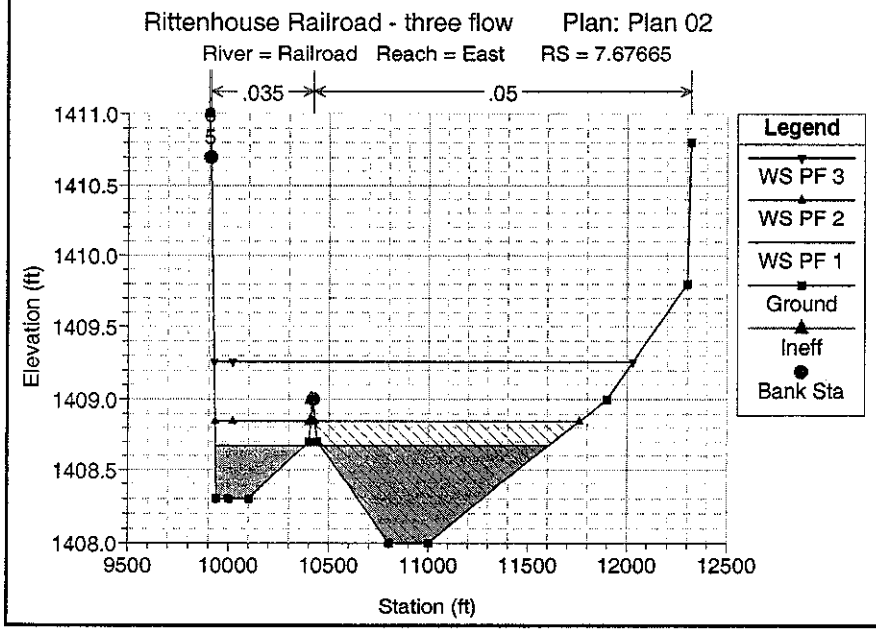
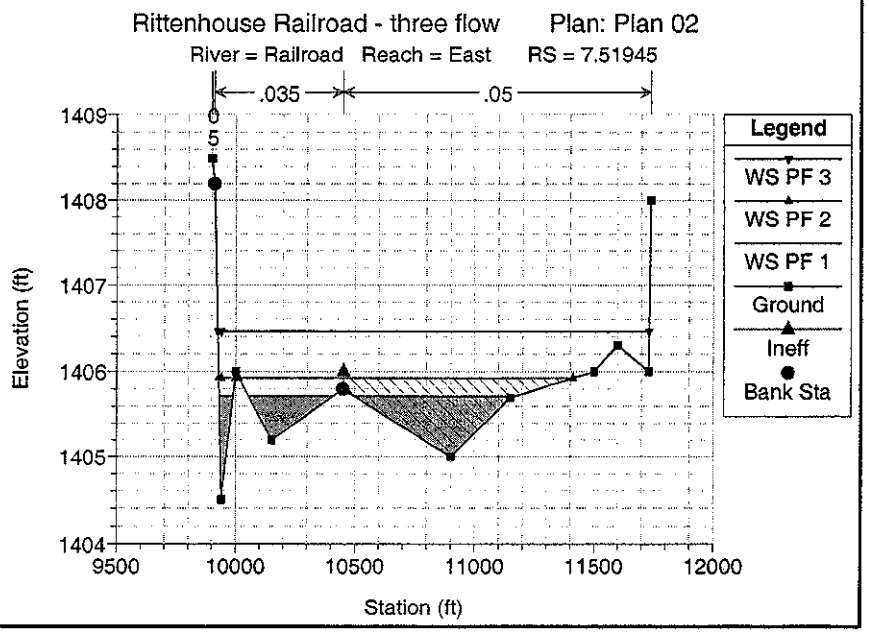
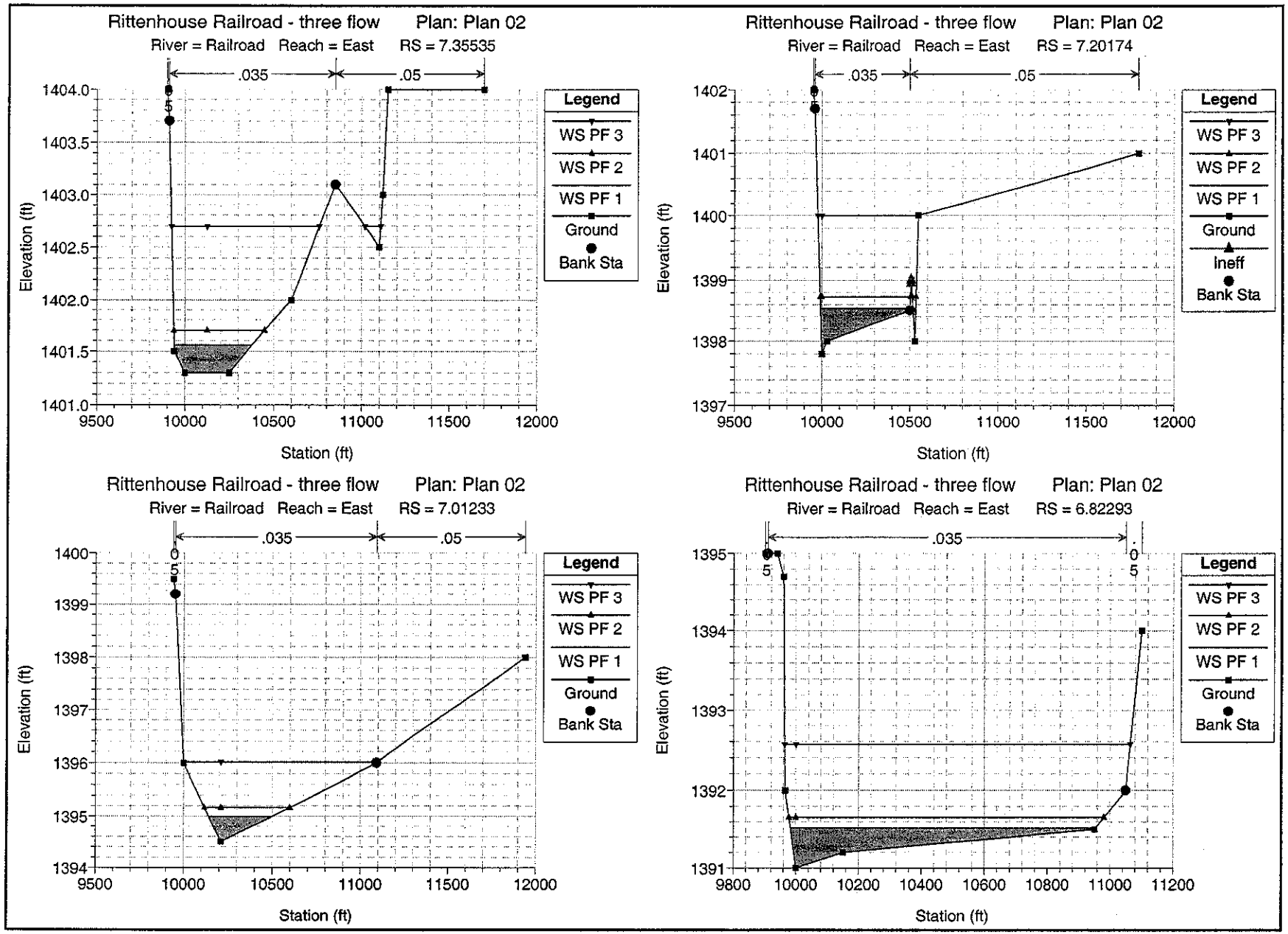
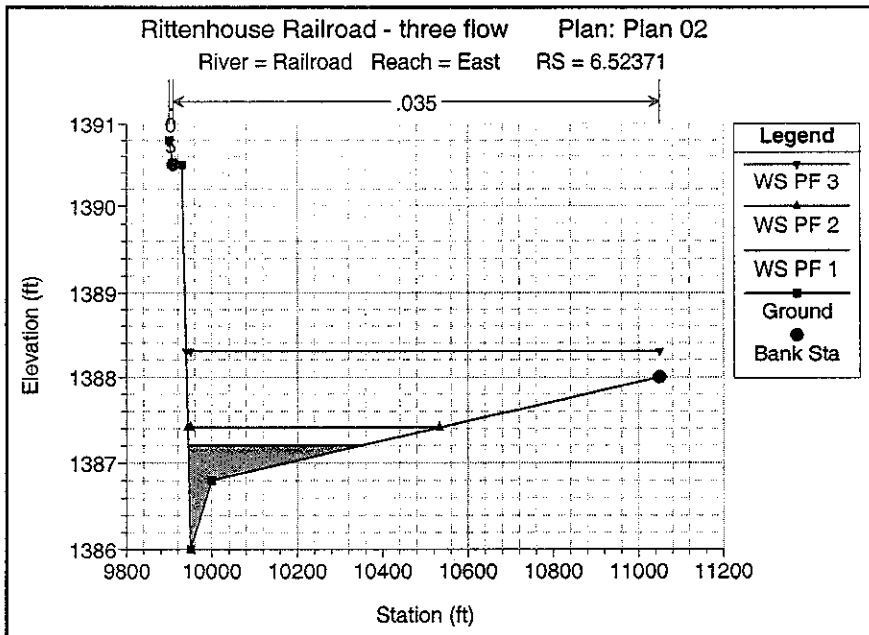
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta


Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.87879
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta


Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.67665
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta


Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.51945
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta


Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.35535
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.20174
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Ineff
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 7.01233
.035
.05
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta
Rittenhouse Railroad - three flow Plan: Plan 02
River = Railroad Reach = East RS = 6.82293
.035
Elevation (ft)
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta


Rittenhouse Railroad - three flow
Plan: Plan 02
River = Railroad
Reach = East
RS = 6.52371
.035
Elevation (ft)
1391
1390
1389
1388
1387
1386
9800
10000
10200
10400
10600
10800
11000
11200
Station (ft)
Legend
WS PF 3
WS PF 2
WS PF 1
Ground
Bank Sta