

FINAL REPORT

**HYDROLOGIC AND HYDRAULIC
ANALYSIS OF THE SIPPO CREEK
RESERVOIR DAM WATERSHED
ODNR FILE NO. 0614-012**

CITY OF MASSILLON, OHIO



Prepared for the
City of Massillon
Stark County, Ohio

October 2011

URS

1375 Euclid Avenue
Cleveland, Ohio 44115
216-622-2400
Project No. 13814498

TABLE OF CONTENTS

Section 1	Introduction.....	1-1
1.1	Existing Site Conditions and Dam History	1-1
1.1.1	Site Setting	1-3
1.2	Project Objectives	1-3
1.3	Design Constraint Identification	1-4
Section 2	Hydrology/Hydraulics	2-1
2.1	Hydrology	2-1
2.2	Hydrologic ModEls.....	2-1
2.2.1	Previously Developed HEC-1 Models.....	2-1
2.2.2	HydroCAD Analysis.....	2-2
2.2.2.1	Drainage Area	2-2
2.2.2.2	Curve Number.....	2-3
2.2.2.3	Storage	2-4
2.2.2.4	Initial Abstraction	2-5
2.2.2.5	Lag Time.....	2-5
2.2.2.6	Impermeability	2-6
2.2.2.7	Survey	2-6
2.2.2.8	Probable Maximum Precipitation	2-7
2.2.2.9	Rainfall Distribution	2-7
2.2.2.10	Probable Maximum Flood.....	2-8
2.2.2.11	Critical Flood.....	2-9
2.3	Hydraulics	2-9
2.3.1	HEC-RAS Model Development and Methodology	2-10
2.3.2	Expansion/Contraction Coefficients	2-11
2.3.3	Weirs and Weir Coefficients.....	2-11
2.3.4	Manning’s n Roughness Coefficients	2-12
2.3.5	Ineffective Flow Areas.....	2-12
2.3.6	Obstructions	2-13
2.3.7	Bridges/Culverts	2-13
2.3.8	Existing Primary Spillway	2-13
2.3.9	North Sippo Park.....	2-14
2.3.10	Lincoln Way Culvert.....	2-15
2.3.11	Sippo Pressure Conduit.....	2-15
2.4	Dam Failure Analysis	2-16
2.4.1	Methodology	2-16
2.4.2	Breach Parameters and Assumptions.....	2-18
2.4.3	Breach Modeling and Analysis.....	2-20
2.4.4	Results.....	2-21
2.5	Dam Hazard Category.....	2-23
2.5.1	Dam Failure Analysis	2-23
2.5.2	Hazard Classification	2-23

TABLE OF CONTENTS

Section 3	Summary	3-1
	3.1 Summary of Analyses	3-1
	3.1.1 Hydrologic Analysis	3-1
	3.1.2 Hydraulic Analysis.....	3-1
	3.1.3 Dam Failure Analysis	3-2
	3.1.4 Dam Hazard Category.....	3-2
Section 4	Recommendations	4-1
Section 5	Conclusions	5-1
Section 6	Limitations	6-1
Section 7	References	7-1

TABLE OF CONTENTS

List of Figures

Figure 1 – General Location and Watershed Boundary Map

Figure 2 – HEC-RAS Cross Section Location Map

Figure 3 – Site Features Map (South)

Figure 4 – Site Features Map (North)

List of Tables

Table 1 – HydroCAD vs. HEC-RAS Output Comparison Table

Table 2 – HydroCAD Flood Discharge vs. Headwater and Tailwater Comparison Table

Table 3 – HydroCAD Dam Failure Analysis Output Table

List of Charts

Chart 1 – Water Surface Elevation vs. Discharge Comparison Chart

List of Appendices

Appendix 1 – HydroCAD Output

Appendix 2 – HEC-RAS Output

Appendix 3 – Dam Failure Parameter Spreadsheets and HydroCAD Dam Failure Analysis

Appendix 4 – Information sheets (Lincoln Way Culvert, Sippo Pressure Conduit)

Appendix 5 – FEMA FIS information

The following report describes the results of URS Corporation's (URS's) hydrologic and hydraulic analyses of the contributing watershed for Sippo Creek Reservoir located in the City of Massillon, Stark County, Ohio. URS performed the work as authorized by the City of Massillon (City) in April, 2011. These analyses were performed to determine the Probable Maximum Flood (PMF) inflow into Sippo Creek Reservoir and to assist in the investigation of potential improvements. In addition, a failure analysis of the dam was performed to determine the appropriate hazard category for the dam. The Sippo Creek Reservoir watershed consists of rural and subdivided areas draining a portion of Stark County as shown on Figure 1. The 14.8 square mile (9,459 acres) watershed of Sippo Creek Reservoir consists mostly of residential lots, with some wooded grassland, and wooded areas. A PMF discharge of 31,970 cubic feet per second (cfs) into Sippo Creek Reservoir was determined using HydroCAD's TR-20 model.

The information derived from our site visit and analyses are assembled in this report, including: descriptions of the general physiographic and geologic setting of the area and the results of the hydrologic and hydraulic analyses.

1.1 EXISTING SITE CONDITIONS AND DAM HISTORY

Sippo Creek Reservoir (Reservoir) is located in the City of Massillon, in west central Stark County, Ohio, east of the Tuscarawas River and State Route 21 and west of Interstate 77, as shown on Figure 1. Sippo Creek Reservoir Dam (Dam) is an earthen dam approximately 19 feet high and 265 feet long, and was built between 1875 and 1896 by the Massillon Water Works Supply Company to supply water to the City. The Massillon Water Works Supply Company is defunct and no longer supplies water to the City, who now owns the dam and the surrounding park. The old pumping house is still intact and exists on the right abutment of the Dam (looking downstream). There is no current or planned access across the dam, as there is a small pedestrian bridge just downstream of the dam. The Ohio Department of Natural Resources (ODNR), which regulates dams in the State of Ohio, has assigned the Dam ODNR File No. 0614-012.

Sippo Creek Reservoir Dam is currently classified as a Class I High Hazard Dam by ODNR because its failure would cause flooding to a residential neighborhood (approximately 3,300 feet downstream of it) with a possible loss of human life. A Class I dam is required by ODNR to safely store or discharge the Probable Maximum Flood (PMF) or a Critical Flood without overtopping. The analyses in this report are based on the PMF. Determining the magnitude of a Critical Flood may be available for Sippo Creek Reservoir Dam, but determining its magnitude is outside of the scope of this study.

In February 2002, MS Consultants (MSC) submitted a hydrology report to the City to support design plans for a roller compacted concrete (RCC) overlay to prevent overtopping failure of the

Dam. The design plans and the hydrologic report were not approved by ODNR. URS reviewed the MS Consultants hydrologic report and the associated analyses and a subsequent analysis performed by ODNR.

Both the MS Consultants report and the ODNR analysis show that in its present condition, Sippo Creek Reservoir Dam will overtop and possibly fail during to floods considerably smaller than the PMF.

The Reservoir is at the lower end of the drainage area of Sippo Creek, which is a tributary of the Tuscarawas River. The Reservoir is used for recreational purposes and has a surface area of approximately 7.0 acre in size at normal pool (1001.64 ft.) and impounds 82.2 acre-feet at the crest of the dam (1004.2 ft.). The dam has a 50 foot wide stone block spillway overflow weir which serves as the principal spillway. The weir discharges onto a series of small stone steps, which subsequently discharge onto a stone pad, which acts as an energy dissipater. A lake drain pipe emerges from the stone steps and lies on the floor of the stone pad. The channel then returns to normal width about 150 feet downstream of the Dam, where a small pedestrian bridge crosses the channel. There is currently no emergency spillway.

There are two major controls for the hydraulics of the Sippo Creek downstream of the dam. The main hydraulic control is the large road embankment for Lincoln Way (SR 142) approximately 1,500 feet downstream of the Dam which acts as a constriction point during very large flows (Figure 2). The maximum capacity of the Lincoln Way culvert, prior to overtopping the road embankment, is approximately 3,500 cubic feet per second. For comparison, the 500-year flood, as determined by the Federal Emergency Management Agency (FEMA), is 2,650 cfs. The top of the Lincoln Way embankment (el. 1008± ft.) is about 4 feet higher than the crest of the Sippo Reservoir Dam. Failure of the Lincoln Way embankment during a large flood would cause considerable flood damage downstream. A failure analysis of the Lincoln Way embankment is outside of the scope of this report.

The other major hydraulic control downstream of the Dam is a large storm sewer called the Sippo Pressure Conduit (SPC) located approximately 3,800 feet downstream of the Dam. The SPC is a large, drop structure and storm drain that acts as a siphon to transport the majority of flows, smaller than the 100-year flow, below the City and into the Tuscarawas River. Flows that are not much larger than the 100-year flood will exceed the capacity of the SPC and affect most residences along Tremont Avenue SE and flood portions of the City to the west of 3rd Street SE. The majority of the flow, in very large flows, will travel above the SPC and flood many of the residences on Tremont and most buildings to the west of its intersection with 3rd Street SE. The location of the Lincoln Way embankment and the SPC is shown on Figure 2.

The current owner of the Dam is the City of Massillon, who plans to construct dam modifications to increase the discharge/storage capacity, in excess of the primary spillway's capacity, in order to comply with ODNR dam safety regulations. This hydrologic and hydraulic analysis will support an alternatives study which is currently being performed by URS for the City.

In April 2011 the City authorized URS Corporation to proceed with the development of hydrology and hydraulics to determine the design flood in conjunction with the preparation of final design plans and specifications for the dam modifications to bring the Dam into compliance with the ODNR regulations. This hydrology and hydraulics study presents the results of the analysis of the design flood and the hazard classification for the Dam. If approved, this report will form the basis of design to facilitate development of final design plans, drawings and technical specifications. All other pertinent engineering analyses, site investigations, references, standards and backup calculations will be included in the Basis of Design Report. This document was prepared for submittal to ODNR as the initial step in the permitting process for modifying the Dam.

1.1.1 Site Setting

The dam site consists of the Reservoir, the abandoned pump house, a recreational park, and surrounding residences with large areas of open space and some mature trees. Surface topography of the site vicinity consists of gently rolling hills with ground surface elevations varying between approximately 985 and 1085 feet (NAVD 88).

The site is situated in the west central part of Stark County, and is within the watershed of the Tuscarawas River. The site is in the glaciated part of Ohio, in the Akron-Canton Interlobate Plateau, which is a part of the Appalachian Plateaus. This physiographic region is characterized as a hummocky area between two converging glacial lobes dominated by kames, kame terraces, eskers, kettles, kettle lakes and bogs/fens. This region contains deranged drainage with many natural and man-made lakes.

There is currently no subsurface information available specifically for the site. A subsurface exploration program will be initiated in support of the final Dam improvements. Bedrock is not anticipated to be encountered within 30 feet of the ground surface.

1.2 PROJECT OBJECTIVES

The objectives of this study are to determine the design flood discharge for design dam modifications that will safely pass the design flood and satisfy ODNR regulations; and to provide backup calculations to support the analysis. In addition, the requirements of Stark County, the

City Engineer, and the Stark Soil and Water Conservation District need to be satisfied. The intent is to determine the design flood to facilitate the design of an economically feasible dam improvement plan that satisfies all parties; and to determine the dam's appropriate hazard classification.

1.3 DESIGN CONSTRAINT IDENTIFICATION

To construct Dam improvements, acceptable to ODNR, several issues are required to be resolved. The following is a summary of the design considerations, constraints, and issues that will need to be considered based on the current configuration of the Dam.

- The selected solution to passing or storing the design flood requires a system to direct the floodwater over the Dam and into the downstream channel, in a controlled manner, to protect the Dam from overtopping failure; and to protect the outlet channel from erosion.
- The existing normal pool elevation is surveyed at an elevation of 1001.64 ft. (NAVD 88). The proposed lake water surface elevation may be lowered, but is preferred by the City to remain at its current level.
- The existing lake water surface elevation during the design flood will not increase due to the dam modifications.
- Any change to the existing lake outlet structure will need to be designed to enable floodwater to flow out of the lake and over the stone steps and onto the stone pad in a controlled manner.
- Overtopping protection will be necessary on the upstream and downstream face of the dam due to the large flows anticipated to flow over the dam crest.
- The flow out of the Dam must have its energy dissipated prior to discharging to the outlet channel downstream of the dam to prevent erosion damage.
- The pedestrian bridge immediately downstream of the Dam must be protected from erosion damage during large flows out of the Dam.
- A drainage easement will not be needed for the modifications, as the property is currently wholly owned by the City.
- The Stark County Engineer requires that the flooding conditions downstream of the dam not be worsened due to the dam modifications.

- The Stark County Engineer requires that the storage of the lake be consistent with current conditions.

These considerations and other issues will be incorporated into the final design to pass the design flood by storage, discharge, or a combination of both without threatening the Dam with an uncontrolled overtopping. Phase I and Phase II Property Assessment

2.1 HYDROLOGY

The following sections describe the determination of the design discharge that will be used as the basis for any design modifications.

2.2 HYDROLOGIC MODELS

2.2.1 Previously Developed HEC-1 Models

HEC-1 is a watershed runoff model originally developed by the US Army Corps of Engineers Hydrologic Engineering Center to determine peak discharges due to rainfall events. The HEC-1 model takes into consideration many watershed parameters to determine the runoff hydrographs. Complex basins can be analyzed based on their characteristics and spatial relationships to other basins. HEC-1 uses hydrology techniques and methodology developed by the US Department of Agriculture, Soil Conservation Service (SCS) (since renamed the Natural Resource Conservation Service (NRCS)).

Two HEC-1 models have been previously developed for the Sippo Creek Reservoir watershed. The initial model was developed in January 1998 by MSC in support of their hydrologic and hydraulic study as the basis for the design plans submitted to ODNR at that time. The MSC hydrologic and hydraulic study and subsequent design were not approved by ODNR. MSC used a 72-hour PMP value of 34.50 inches to determine a design flood discharge of 12,485 cfs. MSC determined that the dam was not capable of storing and/or discharging this design flood without overtopping.

The second HEC-1 model was developed by ODNR in support of their ODNR Dam Safety Investigation (May 2001) to determine the capability of the dam to store and/or discharge the design flood without overtopping. The ODNR HEC-1 was based on the MSC HEC-1 model with several modifications to the geometry and a different rainfall distribution. ODNR used a 6-hour PMP to determine a design flood discharge of 42,442 cfs. ODNR determined that the dam was not capable of storing and/or discharging this design flood without overtopping. ODNR also used a 24-hour PMP to compare with the 6-hour PMP. The 24-hour PMP resulted in a flood discharge of 20,180 cfs. Since the 6-hour PMP results in a 100 percent larger flood, it is more appropriate to use the more conservative flood as the design flood. The current accepted PMF discharge for the Dam is 42,442 cfs.

2.2.2 HydroCAD Analysis

A subsequent hydrologic model was developed by URS using HydroCAD (See Appendix A) to determine the actual existing condition design discharge for the Dam, the correct hazard classification, and if a possible Critical Flood exists for the Dam. URS used a combination of the parameters used in the HEC-1 models for Sippo Creek Reservoir from ODNR and MS Consultants to refine the outflow calculations for Sippo Creek Reservoir Dam. URS revised the outflow rating curve for the upstream lakes and the Dam based on field measurements, corrected and added storage to the model based on available topography, and incorporated the downstream tailwater conditions for the Dam to the model. Based upon these revisions, URS determined that the peak discharge of the 6-hour PMF at the dam is 31,970 cfs, the 6-hour 50 percent PMF is 11,457 cfs, the 6-hour 40 percent PMF is 8,226 cfs, and the 6-hour 25 percent PMF is 3,881 cfs.

The HydroCAD modeling system was used due to its ease of use when modeling multiple storm events and its ability to give similar results to HEC-1. Like HEC-1, it is based largely on hydrology methodology and equations developed by the SCS. HydroCAD uses the SCS TR-20 unit hydrograph and routing method, combined with other hydrology and hydraulics calculations to determine stormwater runoff from rainfall events. Similar to HEC-1, for a given rainfall event, these techniques are used to generate hydrographs throughout a watershed.

The model used the broad-crested weir equation to determine the ability of the Dam's existing stone block weir spillway and the earthen dam crest to pass flows at various headwater and tailwater elevations. Furthermore, the flows out of the Dam were checked against a rating curve developed using the Bentley's "FlowMaster" program. A combined rating curve for the existing stone block weir and the dam crest was developed to check against the HydroCAD results.

Flows through the Lincoln Way culvert and over the road were checked against a rating curve developed using Bentley's "CulvertMaster" program.

The 6-hour PMP incremental rainfall distribution described in the NRCS TR-60 Manual was used in the URS Sippo Creek Reservoir HydroCAD for storms larger than the 500-year flood. The SCS Type II distribution was used for the 100-year and 500-year floods.

2.2.2.1 Drainage Area

The drainage area for Sippo Creek Reservoir was determined by MSC to be 14.8 square miles (9,459 acres) and confirmed by ODNR and URS. The Sippo Creek Reservoir watershed consists of rural and subdivided areas draining a portion of Stark County as shown on Figure 1. The watershed of Sippo Creek Reservoir consists mostly of residential lots, with some wooded grassland, and wooded areas. The URS total drainage area was determined in AutoCAD using

USGS quadrangles of the watershed. The total drainage area determined by URS was divided into 11 sub-basins that were used in the subsequent HydroCAD model. MSC subdivided the drainage area into 5 sub-basins. The ODNR Sippo Creek Reservoir Dam HEC-1 further subdivided the drainage area into 11 sub-basins. URS used the same 11 sub-basins as used by ODNR.

Upstream of Sippo Creek Reservoir there are several large lakes and other storage areas that were included in the URS HydroCAD model. The series of man-made lakes to the northeast of the Dam is a private development built in the 1920's and is used for recreational purposes. These lakes include Cable, O'Springs and Slagle/Eric. The largest of the lakes is Lake Cable and has a surface area of 150 acres.

Sippo Lake is a large (107 acres) man-made lake to south and east of the Reservoir. MSC and ODNR also modeled these lakes using HEC-1 to determine their effect on the design storm. Downstream of the Sippo Lake is a large wetland area behind Genoa Road that was part of an old abandoned lake bed. URS added this storage area to the model which was not included in either the MSC or ODNR HEC-1 models. In smaller storms, these storage areas significantly attenuate flood peaks. During larger storms these areas do not attenuate the peak discharge as much, as the majority of their storage is filled to capacity, and inflow equals outflow, with little additional storage.

In addition, downstream of the Dam, is the North Sippo Park, which also acts as a storage area, due to the large road embankment for Lincoln Way. It was determined that the embankment attenuates large floods, but does little to attenuate floods as large as the PMF. This embankment was added to the URS HydroCAD model to determine its effect on the design flood and lesser floods. The North Sippo Park has sufficient capacity to store/discharge floods larger than the 500-year flood without overtopping the Lincoln Way embankment. The MSC and ODNR HEC-1 models did not include the storage area of the park to determine tailwater conditions at the Dam. The channel downstream of the Lincoln Way culvert was also added to the model to determine if the culvert was inlet or outlet controlled throughout a particular flood.

2.2.2.2 Curve Number

MSC performed a detailed curve number analysis for their hydrologic study of the basin in support of their design improvements for the Dam. MSC determined SCS curve numbers for the individual sub-basins of the Lake's watershed, which takes many watershed and ODNR characteristics (such as slope, cover type and soils) into consideration. The SCS curve number for each basin was determined from the US Department of Agriculture "Soil Survey of Stark County". The soil survey showed the boundaries between the curve numbers values for

residential, wooded, meadow and agricultural crop areas. MSC determined the curve numbers averaged 75, which was used for their 5 sub-basins.

The ODNR reviewed the MSC curve numbers and made revisions to them, in their HEC-1 analysis. ODNR determined that the curve numbers ranging from 80, for subdivisions, to 67 used for woodlands/grasslands. The average curve number of the 11 sub-basins used by ODNR, was 72 for the entire watershed. URS also reviewed the ODNR curve numbers, and an aerial photo (dated 2007), and a field survey was conducted to verify the aerial photo. URS determined that the ODNR curve numbers were appropriate for the sub-basins, and did not modify their curve numbers. The average SCS curve number in the URS HydroCAD model is 72 for the entire basin. The average SCS curve number of 72 used for the entire basin in the ODNR HEC-1 appears to be reasonable and conservative.

2.2.2.3 Storage

The storage for the watershed was calculated by the HydroCAD model from the SCS Storage equation. The basin storage is derived from the SCS Storage equation that is dependent on the SCS curve number. The variable SCS curve numbers were used for all the sub-basins storage calculations to remain conservative.

There appears to be more storage in the watershed than is being accounted for in the HydroCAD model for smaller storms, hence the large discharges for the Type II distribution. There are several sub-basins that will have more storage than calculated using the simplified SCS Storage equation. In several sub-basins there are culverts, road embankments, small ponds and unconnected low-lying areas that were not included in the modeling. These and other low-lying areas store more water in the sub-basins than is accounted for in the modeling and generally decrease the run-off from the watershed. The net effect on the peak discharge will be to decrease it. These storage areas will tend to decrease floods peaks smaller than the 100-year event, but would not significantly decrease discharges due to larger rainfall events.

An average storage depth of 3.89 inches was estimated using the SCS Storage equation and a basin average SCS curve number of 72. This rainfall amount is stored in the basin and not applied as direct runoff.

The storage volume for the lakes (Slagle, O'Springs, Cable, Sippo Lake, and Sippo Reservoir) used in the ODNR and MSC HEC-1 models were calculated with AutoCAD and slightly modified where appropriate. The modified storage volumes were based on the Stark County Engineer's topography and input into the URS HydroCAD model. In addition, the area downstream of Sippo Lake and upstream of Genoa Road was input into the URS HydroCAD model to determine its effect on the outflow hydrograph. The rating curves for flows out of Lake

Slagle and Sippo Lake were slightly modified based on the Stark County Engineer's topography and observations and measurements taken during the site visit to the lakes.

The storage area downstream of Sippo Creek Reservoir, the culvert under Lincoln Way, and the channel downstream of Lincoln Way were also added to the URS HydroCAD model to determine the tailwater conditions affecting the outflow from Sippo Creek Reservoir during various floods.

2.2.2.4 Initial Abstraction

The initial abstraction is the amount of water that is initially stored in the basin prior to initiation of runoff. The initial abstraction for the entire watershed was calculated from the SCS Initial Abstraction equation using the storage calculated from the SCS curve numbers. The initial abstraction for a sub-basin is calculated using the SCS Initial Abstraction equation that states that the initial abstraction for a basin is 20 percent of the storage.

The average initial abstraction for the watershed was approximated to be 0.78 inches based on an average SCS curve number of 72 and a storage depth of 3.89 inches. Each basin had its individual storage and initial abstraction calculated for input into HydroCAD. The average initial abstraction number is based on the entire watershed having an SCS curve number of approximately 72. The actual initial abstraction for the watershed is probably larger than that estimated by the SCS equation, which was used to remain conservative.

2.2.2.5 Lag Time

Lag time by definition is the time differential between the centroid of the rainfall excess to the centroid of the discharge. It can be interpreted as the time it takes water to flow from the center of the basin to the outlet point of the basin or the time to peak at the outlet of the basin. In essence, the longer the rainfall lags in the basin, the lower the peak discharge and conversely, the quicker it leaves the basin the higher the peak discharge.

The MSC HEC-1 used varying lag times ranging from of 1.78 hours for smaller basins, to as much as 16.4 hours for the majority of the watershed. Although these lag times might be reasonable for a larger basin with a 72-hour rainfall, they are outside of the practical range of lag times for a basin of this size and rainfall of the required duration. The lag times determined by MSC appear to be overestimated for the sub-basin size and length to width ratios.

The lag time for each sub-basin was determined by ODNR, and confirmed by URS, using the SCS TR-55 time of concentration and using the SCS lag time equation ($LT=0.6Tc$). The various lag times for the sub-basins ranged from 2.26 hours, to as little as 0.44 hours, using variable SCS

curve numbers for each sub-basin. The average lag time for the sub-basins is about 1.2 hours, which is a reasonable estimate for the basin configuration. Almost one-half of the watershed has a lag time longer than 1.5 hours. URS determined that the ODNR lag times used were reasonable and used them in the URS HydroCAD modeling. Since the peaks of the hydrographs generated by the varying lag times are not coincident, the sub-basin hydrographs are not additive. Therefore, due to the difference in lag times for the various sub-basins, it is apparent that the peak flows of the individual sub-basin hydrographs do not coincide, which reduces the peak flow at the Dam.

2.2.2.6 Impermeability

The United States Geological Service (USGS) 7.5 Minute Quadrangles for Massillon and West Canton, Ohio with a scale of 1:24,000 and a 10' contour interval were input into AutoCAD and used to check the MSC and ODNR drainage areas, stream lengths, and slopes. In addition, the areas upstream of the Dam identified as lakes and ponds and other impervious areas such as roads, buildings and parking lots were used to estimate the percentage of connected impervious area.

In both the ODNR HEC-1 and the MSC Sippo Creek Reservoir HEC-1, only some of the impermeability of the basin was accounted for. The impermeability of a watershed greatly affects how much water is absorbed by the basin and offsets some of the storage and initial abstraction of the basin depending how much impermeable surface area there is and if it is connected. The SCS curve number takes larger amounts of the impermeable area of the watershed into account (tract houses, commercial real estate, etc.) but not the smaller percentages that can become significant.

In addition, the large number of lakes, ponds, and low-lying areas that contribute to the direct runoff from the basin will also add some storage volume during smaller floods. The percentage of impermeable area of the various sub-basins was determined by taking the surface area of the connected lakes and ponds as shown on the USGS quadrangle. It was presumed that all of the small lakes and ponds were connected, at capacity and had little storage. The percentage of connected impermeable area calculated for the sub-basins was used in the HydroCAD model.

2.2.2.7 Survey

A survey of the spillway and the downstream channel was performed in August 2011 by the City of Massillon and the information was incorporated into the URS basemap and models. There are currently no other available surveys of the dam and surrounding area. Ground surveys will be performed to support the hydrologic and hydraulic analyses for the final design. The future

survey will include the topography of the Dam and Sippo Creek, surface drainage features, utility boxes, the upstream and downstream slopes and downstream foot bridge. In addition, the finished floor elevations of the low-lying houses on Tremont Avenue SE will be determined. The vertical datum for the survey is the National Geodetic Vertical Datum of 1988 (NAVD 88) and the horizontal control is the Ohio State Plane Coordinate System NAD 1983 (NAD 83), North Zone, U.S. Foot.

2.2.2.8 Probable Maximum Precipitation

The Probable Maximum Flood that would flow into Sippo Creek Reservoir would be a direct result of the Probable Maximum Precipitation falling on the watershed during a given time period. The PMP is the largest expected storm event based on historical rainfall and predicted meteorological data. The PMP as described by the National Oceanic and Atmospheric Administration (NOAA) is “Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographical location at a certain time of the year.”

PMP rainfall totals were determined by charts available in NOAA’s HMR-51 (1978) All Season Probable Maximum Precipitation for 6 and 24-Hour Duration, 10 Square Mile Area and are 26.15 inches and 32.00 inches, respectively. The 6-hour PMP chart for Ohio is also shown on the ODNR Division of Water Fact Sheet 95-37 “Dam Safety-Probable Maximum Flood”.

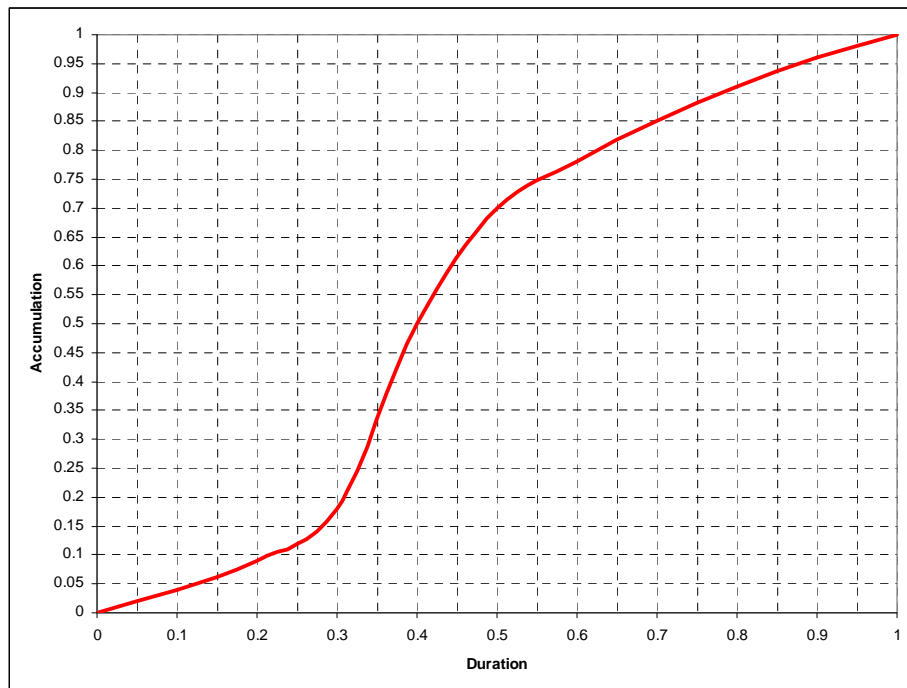
2.2.2.9 Rainfall Distribution

Rainfall for storms larger than the 500-year flood was distributed in the HydroCAD model according to the Natural Resources Conservation Service (NRCS) Technical Release 60 (TR-60, dated 2005). The NRCS utilizes a standard Emergency Spillway and Freeboard (ESFB) design hydrograph rainfall distribution as shown in graph below. This distribution curve was applied to the PMP, and fractions thereof, for the Sippo Creek Reservoir watershed over both a 6-hour and 24-hour period to determine the worst case scenario peak inflow into the lake.

The SCS Type II rainfall distribution was applied to the 24-hour/100-year rainfall depth determined from the Midwest Climate Center’s (MCC) Rainfall Frequency Atlas of the Midwest (Huff and Angel, 1992). The discharge from the MCC depth was compared to the FEMA estimated discharge. A rainfall depth was estimated to give a respective discharge based on the FEMA Flood Insurance Study (FIS). Since the FEMA estimated discharge of 1,980 cfs is higher than the MCC determined discharge of 1,763 cfs, the FEMA values were used. There are no MCC values estimated for the 500-year flood.

The Soil Conservation Service (SCS) Type II distribution was also used to estimate the 500-year flood rainfall depth to result in the FEMA 500-year discharge of 2,650 cfs.

The 6-hour PMF estimated inflow discharge of 31,970 cfs is considerably higher than the estimated 24-hr PMF inflow of 23,172 cfs. Therefore, the peak discharge of the Probable Maximum Flood into the Sippo Creek Reservoir is determined to be 31,970 cfs and is considered the PMF design discharge.



ESFB Dimensionless Design Storm Distribution Graph

2.2.2.10 Probable Maximum Flood

The design discharge for a Class I dam by ODNR rule is the Probable Maximum Flood (PMF) or the Critical Flood. The PMF is the expected discharge that is caused by the Probable Maximum Precipitation (PMP). The PMF is the flood that is a result of the PMP on a watershed basin. The PMP for the watershed that was used in the modeling to determine the design discharge is 26.15 inches in a 6-hour period. The URS determined PMF, using this rainfall value on the Sippo Creek Reservoir watershed, is 31,970 cfs.

In its present condition, Sippo Creek Reservoir Dam will overtop and possibly fail due to floods considerably smaller than the estimated Critical Flood.

2.2.2.11 Critical Flood

A Class I dam is required by ODNR to safely store and/or discharge the Probable Maximum Flood (PMF) or a Critical Flood without overtopping. If approved by ODNR, this Critical Flood can be used as the design flood for the future modifications planned for the Dam.

The critical flood is the flood discharge at which no further damages downstream would occur whether or not the dam fails. Preliminary results from the URS dam breach parameter analysis show that a Critical Flood probably exists for the Dam. The smallest Critical Flood for a Class I dam is 40 percent of the PMF and the smallest Critical Flood for a Class II dam is 20 percent of the PMF. Determination of the acceptable critical discharge requires approval by ODNR. A Critical Flood for Sippo Creek Reservoir Dam may be approved by ODNR once the analysis is performed.

The URS dam failure analysis estimates that that a Critical Flood exists for the Sippo Creek Reservoir Dam due to the submergence of the Dam and the overtopping of the Lincoln Way embankment as shown on Chart 1.

A Critical Flood inflow discharge as low as 4,500 cubic feet per second (cfs) is estimated by URS, which is approximately 30 percent of the PMF discharge. The 20 percent PMF is determined to be 2,672 cfs, which approximates the FEMA 500-year flood discharge of 2,650 cfs.

2.3 HYDRAULICS

The Hydrologic Engineering Center's River Analysis System (HEC-RAS) v4.1.0 was used to model the hydraulics of the Sippo Creek Reservoir Dam, the Lincoln Way culvert, the Sippo Pressure Conduit and the downstream channel to just past the SPC. The limits of the HEC-RAS model extend from just upstream of Hankins Street, to just downstream of the intersection of Tremont Avenue SE and 2nd Street SE as shown on Figure 2. The area downstream of the Sippo Pressure Conduit, was modeled to determine how larger discharges might flood the area when the conduit capacity is exceeded. The HEC-GeoRAS extension of ESRI's ArcMap was used to develop a HEC-RAS model to determine how the Lincoln Way embankment and culvert affect flooding during storms ranging from the 100-year flood, up to and including the Probable Maximum Flood. HEC-RAS output was compared with the HydroCAD output to ensure that it gave reliable results and supported the conclusions. Table 1 shows the results of the comparison. The following is a description of the HEC-RAS modeling effort.

2.3.1 HEC-RAS Model Development and Methodology

A site basemap was developed in AutoCAD Civil-3D 2011 using a topographic map with two-foot contour intervals that was obtained from the Stark County Engineer. The topography along the crest of the dam and the spillway were adjusted slightly based on the August 2011 survey performed by the City. The basemap was augmented with hydrology, buildings and culverts based on existing as-built plans, GIS information, the 2011 survey, aerial photographs and a site visit. The topographic basemap and a color aerial photograph were used with the GIS program ArcMap 9.3 to determine the geometry of the channel and floodplain; and to develop cross sections for input into the HEC-RAS model. A HEC-RAS cross section location map is shown on Figure 2. Site features maps are shown on Figures 3 and 4 of the areas south and north of Lincoln Way, respectively. ArcMap was also used to determine hydraulic parameters such as slope, distance between cross sections, channel limits, and top of bank elevations. In addition, a site visit and extensive review of field photographs was used to verify the model data input.

There are three main parts of the HEC-RAS modeling effort. The upstream portion of the Sippo Creek HEC-RAS model runs from Hankins Road NE to the Sippo Creek Reservoir Dam. The middle portion of the model extends downstream from the Dam to the Lincoln Way embankment and culvert and incorporated the North Sippo Park. The lower portion of the model extends downstream from Lincoln Way, past the Sippo Pressure Conduit, to just beyond the intersection of Tremont Avenue SE and 2nd Avenue SE, in the City of Massillon.

The critical structures on Tremont Avenue SE, downstream of the Lincoln Way embankment, were added to the model to determine actual depths of flooding in the area. There are some critical structures downstream of the Sippo Creek Pressure Conduit. Critical structures are defined as habitable structures where a possible loss of life can be expected during large floods or a possible dam/embankment failure. The low-lying houses on Tremont Avenue SW, downstream of South Sippo Park, are subject to flooding depths as much as 3 feet during the 100-year flood, and to depths in excess of 15 feet during the Probable Maximum Flood. Depths in excess of three feet are considered dangerous as cars, and other large floating objects, can be mobilized and carried in the flood. In addition, due to the hydraulics of the Sippo Creek Pressure Conduit, floating objects close to the inlet to the conduit are subject to being drawn into the pressure pipe.

The HEC-RAS model was run in steady state mode over a range of flows to determine the water surface elevations, velocities and flow regimes; and to determine the limits of flooding through the studied reach.

AutoCAD Civil-3D 2011 was used in conjunction with the topographic basemap to determine the limits of flooding as a result of the various floods.

2.3.2 Expansion/Contraction Coefficients

The expansion and contraction coefficients significantly affect the head losses at a culvert or bridge, as water is forced through an opening smaller than the upstream and downstream channel. The expansion and contraction coefficients for the culvert under Lincoln Way and the Sippo Pressure Conduit were set at 0.5 and 0.3, respectively to remain conservative. In addition, the expansion and contraction coefficients were also increased, in the same manner, for the roads that cross the creek, upstream of the Dam. The expansion and contraction coefficients for all other sections were set at 0.3 and 0.1, respectively.

2.3.3 Weirs and Weir Coefficients

There are three separate weirs included in the HEC-RAS model, which were input as broad crested weirs, but with different weir coefficients. The three weirs modeled are the Dam, the Lincoln Way roadway, and the flow above the Sippo Pressure Conduit.

The Dam was modeled in HEC-RAS as an in-line structure with an average weir coefficient of 2.71, due to the large depth of flow over the Dam during extreme flood events, and the existence of the concrete spillway. HEC-RAS does not have the capability of modeling an inline structure with multiple weirs. The entire weir in the HEC-RAS model was modeled with an average breadth (length in flow direction) of 14.9 feet. In comparison, the primary spillway was modeled separately in the HydroCAD model, and a weir coefficient was assigned a value of 3.32 which is the upper limit for an inefficient broad crested weir. The top of the earthen dam, in the HydroCAD model, was assigned a value of 2.63, which is the lower limit of a broad crested weir under the expected flow conditions. The average of the weir coefficients in both models is approximately 2.71. Although the average weir coefficient is variable and dependent on the depth of flow over the weir, and the breadth of the weir, it is probably close to the value assigned during larger flows. This average weir coefficient assigned for the Dam is a practical lower limit, to minimize the flow over the dam, and to remain conservative.

The actual weir coefficient for the primary concrete spillway of the Dam is probably higher than 3.3, at the depths of flooding analyzed, while the actual weir coefficient for the weir flow over the dam would probably approach 2.8 at the depths analyzed. In addition, in the model calculations, since the weir is submerged during large floods, the actual weir coefficient is minimized by the submergence factor.

The weir coefficient for Lincoln Way roadway was determined to be 2.63, with a broad crested weir breadth of 60 feet. The roadway is overlaid with asphalt, but has curbs and guardrails which limit the actual flow over the roadway. The weir coefficient may be slightly higher than that used in the model, but the value was used to remain conservative. The actual weir coefficient is

dependent on depths of flow over the roadway. In the HEC-RAS and HydroCAD models, the roadway weir coefficient was assigned the lower limit of the expected values.

The weir coefficient for the flow above the Sippo Pressure Conduit was input into the HEC-RAS model to determine flows above the culvert. A broad crested weir coefficient of 2.63 was used to approximate flows in this area. This average weir coefficient assigned for the Sippo Creek Pressure Conduit is the practical lower limit, to minimize the flow over the pipe, and to remain conservative.

All weir coefficients were estimated from the HydroCAD technical reference guide, which is reprinted from “Practical Hydraulics” by Andrew Simon (1981).

2.3.4 Manning’s n Roughness Coefficients

The existing Manning’s roughness coefficients were developed from information derived from site visits, aerial photographs and site photographs. Manning’s roughness coefficients were also estimated from those used in the FEMA Flood Insurance Study for Stark County, Incorporated Areas. In addition, the United States Geological Survey (USGS) (1984) Water Supply Paper 2339 “Guide for Selecting Manning’s Roughness Coefficients for Natural Channels and Floodplains” was used as a reference.

Manning’s roughness coefficients for the channel ranged from 0.022 to 0.035, with an average of 0.03 for the majority of the creek. The areas that had a rough weedy channel were assigned a value of 0.035 and the lake bottom was assigned a value of 0.022 to remain conservative. The overbanks were given an average value of 0.045. Roads in the floodplain were assigned a value of 0.020 and large trees and higher/thicker vegetation areas were assigned a value of 0.10.

2.3.5 Ineffective Flow Areas

Ineffective flow areas are areas that are not used in the conveyance calculations in HEC-RAS, but are used to calculate storage between cross sections. The most significant areas that are considered ineffective in the HEC-RAS model are the areas just outside of the opening of the modeled culverts. It is recommended by the Hydrologic Engineering Center that these areas be designated ineffective to ensure that head losses through the culvert are calculated correctly.

A small area upstream of 17th Street NE was also included as ineffective as it is protected by a small levee along the creek during smaller floods. This area does not affect the flooding conditions downstream of the Dam.

2.3.6 Obstructions

Obstructions such as existing buildings and structures were added to the HEC-RAS model, where appropriate, to ensure that blocked areas that can't convey flood water were not included in the conveyance calculations. The abandoned pump house building on the right embankment of the Dam was included, as it blocks flow out of the Reservoir during large floods. In addition, the houses and large out-buildings (detached garages/ storage sheds, etc.) on Tremont Avenue SE were included to determine the depths of flooding at these structures during various flood events. These buildings also block flow in the floodplain and take up storage area.

In addition, the upstream buildings and out-buildings were included in the HEC-RAS modeling to determine how the backwater from the dam affects these structures. Several of the houses and commercial buildings upstream of the dam are subject to flooding during the 100-year flood. Several of these structures between the Reservoir and Hankins Road are severely affected during flood events larger than the 500-year flood.

2.3.7 Bridges/Culverts

The HEC-RAS modeling includes two main culverts to determine flooding depths downstream of the dam. The culvert under Lincoln Way and the Sippo Creek Pressure Conduit were included as they affect the hydraulics of the creek. The minor culverts and bridges upstream and downstream of the dam were not included in the HEC-RAS modeling as they are too small to affect the hydraulics during larger floods. The ones upstream do not affect the hydraulics of the downstream area and the bridges downstream would be submerged during large floods. It should be noted that the culvert under Genoa Road and its associated storage area were added to the HydroCAD model as this area affects the peak flow for various storm events in the watershed.

2.3.8 Existing Primary Spillway

The existing primary spillway of the Dam consists of a concrete block weir that is 50 feet in length and a surveyed elevation of 1001.64 ft. (NAVD 88). The weir outlets onto a set of concrete blocks, which act as an energy dissipater, with a concrete slab below that to further dissipate the energy of flow. Downstream of the primary spillway is a 50 foot wide manmade channel with little or no erosion protection. Further downstream of the spillway pad is a small pedestrian bridge, with 45 degree wingwalls, and concrete abutments. The channel returns to a natural 20 foot wide meandering channel downstream of the footbridge as shown on Figure 4.

The top of the Dam is earthen with a concrete block cutoff wall that is exposed near the primary spillway. The top of the cutoff wall on the left abutment is surveyed to be at an elevation of 1004.2 ft. and the embankment has a playground downstream of it. The top of the cut-off wall on

the right abutment has a surveyed elevation of 1005.0 ft. and terminates at an abandoned water supply building. During large floods, water may flow around the abandoned water supply building.

The primary spillway is not capable of passing large floods without overtopping the crest of the dam. There is evidence that the Dam has overtopped during large floods and eroded the embankment on both sides of the primary spillway down to the concrete block cutoff wall. The primary spillway can pass approximately 600 cfs without overtopping the left embankment and 900 cfs without overtopping the right embankment. By comparison, FEMA determined that the 100-year flood on the Sippo Creek is approximately 1,980 cfs.

2.3.9 North Sippo Park

The wide valley below the Sippo Creek Reservoir Dam is part of the North Sippo Park, which is maintained as part of the Massillon Park System. The park in general is surrounded by high hills and consists of the floodplain terrace of the Sippo Creek. The valley between the Dam and Lincoln Way is subject to extreme flooding. The 100-year flood would have a channel depth of approximately 12 feet. Larger floods could fill the entire valley and overtop the Lincoln Way embankment, with depths over 30 feet in the North Sippo Park.

In addition, since the North Sippo Park has a large storage area, large floods downstream of Lincoln Way are attenuated. Since the park acts as a defacto dry detention basin, it is an integral part of flood prevention during very large floods. It should be noted that the storage area of North Sippo Park is larger than the storage of the entire Sippo Creek Reservoir. In fact, flooding in the park during very large floods would back water into the Sippo Creek Reservoir, creating one large lake that would submerge the Dam.

The North Sippo Park was not analyzed by MSC or ODNR in their respective HEC-1 models. Since the tailwater elevations below the Dam controls the actual discharge out of the Dam during large floods, the analysis of the park area is integral to understanding the flooding condition downstream of the Dam.

The storage area of the park was estimated from the URS topographic basemap and calculated in the HydroCAD model for irregular prismatic shapes. The volumes calculated were checked against the total volume calculated in AutoCAD Civil 3-D. The total volume of the park between the Dam and the Lincoln Way embankment (el. 1108) is approximately 197 acre-feet and has a surface area of approximately 13.5 acres. By comparison, the Sippo Creek Reservoir has a total volume of approximately 143 acre-feet and a surface area of 21.5 acres at the same elevation (1008 ft.). The difference in volume attenuates large floods and minimizes any dam break

flooding in the North Sippo Park. Table 3 shows that peak discharges downstream of the North Sippo Park slightly increases due to dam failures during larger floods.

2.3.10 Lincoln Way Culvert

The Lincoln Way culvert (Stark County Bridge No. PE-8-49) is a 14 foot wide by 10 foot tall, 121'-10" long, semi-circular concrete box. The inlet to the culvert has wingwalls and a headwall to minimize head losses into the structure. The top of the Lincoln Way embankment is approximately 29'-9" above the culvert flowline. The top of the roadway is estimated to be at an elevation of 1008.0 ft., which was used in both the HEC-RAS and HydroCAD models. The maximum flow through the culvert is approximately 3,500 cfs, which is larger than the estimated 500-year flood discharge. Larger flows would overtop the embankment, possibly causing its failure. A failure of this embankment would cause severe flooding downstream. Damage from a failure of this embankment could possibly have a large economic impact and a possible loss of life. The information sheet from the Stark County Engineer is included in Appendix 4.

In the HEC-RAS and HydroCAD models the box culvert was modeled as an equivalent area box culvert with a width of 14.0' and a height of 8'-2" (area = 114.33 sf). The length is 121.83' with a slope of 0.1 percent. A Manning's roughness coefficient of 0.015 was assigned to the culvert, since only half of the culvert is concrete, and the other half is brick.

2.3.11 Sippo Pressure Conduit

The Sippo Pressure Conduit (SPC) is a 13.25 foot wide by 10 foot tall reinforced concrete box culvert siphon that starts approximately 850 feet east of the intersection of Tremont Avenue SE and 3rd Street SE as shown on Figures 2 and 3. The inlet to the SPC is a drop structure which is approximately 8.5 feet below the invert of the creek, as it enters the siphon. The invert of the inlet to the SPC is at elevation 935.38 ft. The flow enters the SPC by way of a steeply sloped concrete drop structure that allows large flows to be conveyed underground along Tremont Avenue SE and into the Tuscarawas River. Flows in the pipe are under pressure the entire length of the culvert. Backwater gates along the pipe prevent surcharges into the areas along the pipe. The pipe is capable of handling the majority of flow during the 100-year flood, but cannot pass larger floods. Any flows in excess of the 100-year flow are conveyed along Tremont Road SE above the pipe and cause flooding to Downtown Massillon.

The SPC was modeled in HEC-RAS as a long 9.5' tall by 13.25' wide concrete culvert to match the actual open area of the culvert, since the corners are mitered and the invert is an inverted crown. The culvert was assigned a Manning's roughness coefficient of 0.012 and a slope of 0.5

percent. The SPC was not added to the HydroCAD model since only discharges downstream of the Lincoln Way culvert were required to determine actual depths of flooding.

The plan and profile design sheets from the United States Army Corps of Engineers are included in Appendix 4.

2.4 DAM FAILURE ANALYSIS

The parameters for the hydraulic calculations used in the hydraulic analysis were taken from various sources. The following is a synopsis of the determined parameters used for input into the HydroCAD dam failure models. The existing conditions HydroCAD model was developed to determine various floods inflow and outflow discharges for the Reservoir and the resulting downstream flood conditions. Subsequent HydroCAD models were developed by URS to determine approximate outflow conditions should the dam fail during different flooding scenarios. This analysis is the basis for reclassifying the dam from its current hazard classification.

2.4.1 Methodology

A dam failure analysis spreadsheet using industry standard dam failure equations and estimated parameters was developed to estimate the outflow dam failure discharge, the average width of breach, and the timing of the breach during different dam failure scenarios. The dam failure spreadsheets are included in Appendix 3. The dam failure equations used in the analysis spreadsheet are described in detail in Section 2.4.2 below. The determined peak inflow discharge from the URS existing conditions HydroCAD model was used as the starting baseflow condition for the dam failure analysis. This flow was added to the outflow discharge from the Reservoir estimated from the spreadsheet. In this manner, the peak flow from the dam failure is added to the baseflow to give reasonable estimates of the total outflow discharge and the storage area inundated downstream. There were seven dam failure scenarios run for the analysis. The runs were for the “Sunny Day” condition {where the dam fails with minimal flow and no overtopping}, the 100-year and 500-year floods (where slight overtopping occurs), and the 0.22 PMF, the 0.24 PMF, the 0.25 PMF, the 0.5 PMF, and the full PMF (where significant overtopping occurs). The URS existing conditions HydroCAD model was modified to develop a series of dam failure HydroCAD models.

The dam failure HydroCAD model was developed using the known peak inflow during each event from the existing conditions HydroCAD model. The input parameters were the increase in flow due to the dam failure estimated from the dam failure parameter spreadsheet, and the peak headwater and tailwater condition for the selected scenario from the existing conditions

HydroCAD model. In this way, the total outflow from the dam is modeled as a combination of the peak flow without the failure and the increase in flow due to the failure, and the maximum water surface elevation during flood conditions upstream and downstream of the dam, at the time the dam fails.

The outflow discharge estimates from the dam failure analysis spreadsheet were input into the dam failure HydroCAD models. The peak discharge of each modeled flood was added to the additional discharge from the corresponding dam failure. The two discharges were assumed to be concurrent to assure that the maximum downstream discharge was calculated. The outflow from the dam failure was modeled as a broad crested rectangular weir with a head at the full height of the dam. The width of the breach was adjusted to give the expected dam failure discharge at the peak of the flood event.

Each breach scenario was initiated using the maximum elevation in the lake, corresponding to the flood scenario water surface elevation determined in the existing conditions HydroCAD model. The model assumed the breach failure was initiated at the start of the modeling and was an instantaneous dam failure. The breach model calculates the displacement of storage, but not the movement of the actual dam failure wave. The topographic basemap and HEC-RAS were used to determine the actual depths of flooding downstream of the dam due to each failure. The dam breach analysis in this manner is more conservative than a progressive failure due to the timing of the lake volume release and the changing downstream conditions.

The starting water surface elevation of the Reservoir and the downstream areas of North Sippo Park matched the peak discharge elevations from the existing conditions HydroCAD model for each scenario. In this manner, the model was started with the most conservative initial conditions for each failure scenario. The resultant maximum peak flow out of the Reservoir occurs with the maximum volume in the Reservoir and the least storage available in the North Sippo Park during the dam failure. The upstream and downstream storage areas were those used in the existing conditions HydroCAD model; as was the geometry of Lincoln Way culvert and the downstream channel.

The actual inflow hydrograph for the watershed was not used due to the difficulty with matching the peak of the flood with the timing of the dam failure in HydroCAD. However, the dam failure HydroCAD model starting with the peak condition during the flood gives reliable answers in determining the changes in storage as the Reservoir drains and fills the North Sippo Park; while estimating the attenuation of the peak discharge in the downstream channel due to the Lincoln Way embankment culvert. Therefore, the total outflow from the dam failure is added to the peak flow of the flood while the storage is maximized upstream and minimized downstream, to keep

conservative. In actuality, the dam could fail much earlier than the peak of any given storm event.

A full dam break analysis using an unsteady-state HEC-RAS model would be necessary to perform a Critical Flood Analysis, which is outside the scope of this study. However, expected peak dam failure flows were input into the existing conditions steady-state HEC-RAS model to assist in determining estimated flood depths and velocities expected during each failure scenario.

Water elevations in the Reservoir and the North Sippo Park were set to their peak elevations for each scenario from the results of the existing conditions HydroCAD model. The “Sunny Day” failure scenario modeled a piping failure mechanism since the Dam is not overtopped. For all other scenarios, overtopping was used as the breach mechanism for the modeling, as it is the more likely, and conservative, cause of failure for the Dam.

2.4.2 Breach Parameters and Assumptions

Common practice for breach parameters have been compiled by Bill Irwin in Workshop on Issues, Resolutions, and Research Needs Related to Dam Failure Analysis and were followed in this analysis. The breach parameters and assumptions for the embankment failure analysis were taken from the Bureau of Reclamation (BOR) “Guidelines for Estimating Dam Breach Parameters”, the journal of Hydraulic Engineering “Breach Characteristics of Dam Failures”, and others. The two major input parameters for breach modeling are average breach width and breach development time. Earth embankment dams historically have been found to have average breach widths of 1 to 5 times the hydraulic height of the dam and breach development times between 6 and 60 minutes. Average breach width and breach development times were calculated for each failure scenario based on equations derived by MacDonald & Langridge-Monopolis reported in Washington State Dept of Ecology’s Dam Safety Guidelines Technical Note 1 as well as equations derived by Von Thun & Gillette as seen in Prediction of Embankment Dam Breach Parameters and are included in Appendix 3. The calculated values that correlated best with widely accepted common practice values were reviewed to estimate actual peak discharges due to a dam failure for each scenario. URS used the more conservative values for the failure peak discharge, average breach width, and breach development time. Breach side slopes were set at 1H:1V since cohesive fill dikes typically fail at slopes this steep or steeper, and the hydraulic embankment height was taken as the difference between the reservoir starting water surface elevation and the tailwater surface elevation at the base of the embankment at the peak of the flood scenario.

Table A below shows the parameters URS used for the modeling efforts.

Dam Breach Input Parameters

Scenario	Dam Breach Input Parameters*							
	Height of Water (ft)	Crest Width (ft)	Storage Volume (ac-ft)	Upstream Slope (Z ₁ :1)	Downstream Slope (Z ₂ :1)	Breach Sideslope	Surface Area of Reservoir (ac)	Failure Mode
Sunny Day**	15	15.0	61.0	3.0	2.5	1.0	7.1	Piping
100-yr	13.61	15.0	104.1	3.0	2.5	1.0	18.4	Overtopping
500-yr	9.35	15.0	83.9	3.0	2.5	1.0	18.5	Overtopping
0.22 PMF	5.56	15.0	66.7	3.0	2.5	1.0	19.4	Overtopping
0.24 PMF	1.97	15.0	35.8	3.0	2.5	1.0	20.8	Overtopping
0.25 PMF	0.93	15.0	20.1	3.0	2.5	1.0	22.6	Overtopping
0.50 PMF	1.2	15.0	48.9	3.0	2.5	1.0	47.4	Overtopping
PMF***	2.14	15.0	149.3	3.0	2.5	1.0	72.9	Overtopping

*Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 – Washington

**Sunny Day dam failure with water surface elevation in the lake at 1001.64 at time of breach.

*** 24-hour PMF using TR-60 Distribution

The table below shows the average breach width expected, the time of breach development, downstream slope used and the estimated breach discharge increase. As shown, the increase in discharge due to the breach is diminished, up to the 0.25 PMF, as the difference in headwater to tailwater depth is reduced. After the 0.30 PMF, the difference in head starts to increase, up to the full PMF, due to overtopping of the Lincoln Way embankment.

Dam Breach Output

Scenario	Dam Breach Results			Estimated Outflow Q increase (cfs)
	Average Breach Width (ft.)	Breach Development Time (hr)	Downstream Channel Slope (ft/ft)	
Sunny Day**	57.5	0.55	0.004	3,500
100-yr	54.1	0.52	0.004	4,400
500-yr	43.4	0.44	0.004	2,820
0.22 PMF	33.9	0.36	0.004	1,820
0.24 PMF	24.9	0.29	0.004	412
0.25 PMF	22.3	0.27	0.004	115
0.50 PMF	23.0	0.27	0.004	303
PMF***	25.4	0.29	0.004	1,350

2.4.3 Breach Modeling and Analysis

Modeling efforts began by assigning known variables, and outputs from the dam failure analysis spreadsheet and the existing conditions HydroCAD model into dam failure HydroCAD models to simulate each scenario as accurately as possible. Peak discharges, which were taken from the existing conditions HydroCAD model, were used for input into the dam failure HydroCAD model for each breach event that would occur at the Dam. The additional breach discharge, taken from the dam failure spreadsheet, was added to the peak discharge to ensure the correct total discharge was modeled. Embankment failures were modeled using an unsteady state analysis of the flood discharge out of the Reservoir into the downstream area.

Individual HydroCAD models were set up to accurately model the behavior of each breach scenario. The models generated the total outflow hydrograph of the Reservoir breach, to determine the depth of water downstream and to determine if the Lincoln Way embankment would be overtopped. The outflow discharge from the Reservoir was compared to the discharge

downstream of the Lincoln Way embankment to determine the increase in flooding at the critical structures as shown on Table 3. The depth of flooding at the critical structures was determined using the existing conditions HEC-RAS, based on the increased flow due to failure of the Dam.

During the Sunny Day scenario, the water surface elevation was set at the Dam's normal pool elevation of 1001.64 ft., and a tailwater depth of 1 foot. For the 100-year flood scenario, the water surface elevation was set at an elevation of 1006.27 ft., which is the maximum water surface in the Reservoir during the 100-year flood. This elevation is about 2 feet higher than the lowest elevation on the crest of the dam. Overtopping at this depth would be expected to cause considerable overtopping damage and possible failure of the dam. During successively larger floods, the water surface elevations in the Reservoir and the downstream area were set according to headwater and tailwater elevations shown on Table 2. Modeling the Reservoir failures in this manner gives the most conservative output.

2.4.4 Results

The results of the dam break analyses show that the Dam is subject to backwater/tailwater conditions, due to the Lincoln Way embankment, that submerge the Dam during large floods. Impacts from a failure of the Dam are reduced due to these tailwater conditions. The difference in elevation between the downstream water surface elevation of the Dam and the headwater over the Dam decrease as the inflow discharge increases, as shown on Table 2. Due to this condition, should the Dam fail during large floods, the expected increase in flooding downstream of the Dam, is minimized as shown on Table 3.

In addition, due to the large storage area between Lincoln Way and the Dam, in North Sippo Park, increased discharges caused by the Dam failing, during smaller floods, are minimized. In addition, the Lincoln Way meters the flow to the downstream area, minimizing flooding during floods smaller than the 0.3 percent PMF.

As shown on Table 3, the "Sunny Day" and the 100-year failure scenarios are the only floods that dramatically increase the flooding discharge downstream of Lincoln Way, without overtopping the embankment. Floods larger than the 0.25 percent PMF would overtop the Lincoln Way Embankment and discharges downstream are no longer attenuated by the culvert.

The "Sunny Day" failure scenario starts with a minimum discharge, and the Dam failure increases the discharge to 3,500 cfs, which is attenuated to 2,211 cfs by the Lincoln Way culvert. During the 100-year failure the inflow discharge peaks at 1,980 cfs and increases to 6,380 cfs due to the dam failure, and is attenuated to 3,737 cfs by the Lincoln Way culvert. During larger failure scenarios, the increase in discharge due to the failure decreases, even while the inflow discharge increases. During the 0.25 percent PMF failure, the inflow discharge peaks at 3,881 cfs

and increases only to 3,996 cfs, due to a dam failure, since the difference in elevation between the headwater over the dam and the tailwater is less than a foot. The total discharge is attenuated to 3,400 cfs by the Lincoln Way culvert. Floods much larger than the 30 percent PMF would overtop, and probably fail the Lincoln Way Embankment. Failure of the embankment would cause worse flooding conditions, than a Sippo Creek Reservoir Dam failure. Failure of the Sippo Creek Dam, during floods larger than the 50 percent PMF, would not cause any additional damage downstream, as long as the Lincoln Way embankment hadn't already failed. If the Lincoln Way embankment is overtopped, and fails, during floods larger than the 30 percent, failure of the Sippo Creek Reservoir Dam would not make matters worse.

The table below illustrates the results for the Sippo Creek Reservoir Dam Break Analysis. As shown, except for the "Sunny Day" scenario, the additional discharge from a dam failure decreases, while the total discharge at the habitable structures downstream of the Lincoln Way Embankment only slightly increase. The depth of flooding also only slightly increases for floods up to the 0.25 PMF. The floods at the habitable structures downstream of the Lincoln Way embankment are attenuated by the storage area of North Sippo Park and the metering of the flow by the Lincoln Way culvert.

URS Dam Breach Analysis Results

Scenario	Sippo Creek Reservoir Dam Breach Analysis Results			
	Total Maximum Dam Breach Outflow (cfs)	Total Discharge Outflow downstream of Lincoln Way (cfs)	Approximate Lowest Floor Elevation of Critical Structures on Tremont Avenue SW* (ft)	Water Surface Elevation at Critical Section (ft)
Sunny Day	3,500	1,289	962.0	963.96
100-yr	6,320	2,643	962.0	965.23
500-yr	5,470	2,924	962.0	965.43
0.22 PMF	4,965	3,116	962.0	965.57
0.24 PMF	4,051	3,640	962.0	965.92
0.25 PMF	4,000	3,400	962.0	965.77
0.50 PMF	11,760	11,760	962.0	970.18
PMF	24,522	24,229	962.0	975.46

*HEC-RAS cross section 2823.359

There are multiple low-lying habitable structures, in the 100-year floodplain of Sippo Creek on Tremont Avenue SE that would be subject to some flooding during any Dam failure. These structures should be evacuated during any event that overtops the Dam.

2.5 DAM HAZARD CATEGORY

The following is a summation of the results of the Dam failure analysis as it pertains to the hazard category of the Dam. The total discharge from the dam is a function of the peak flow at the dam, and the resultant increase due to a dam failure. Using the dam failure discharge spreadsheet and the HydroCAD dam failure modeling, it can be shown that failure of the Dam would not be expected to cause a loss of life downstream due to the presence of the Lincoln Way embankment and culvert, and the large storage area of North Sippo Park.

2.5.1 Dam Failure Analysis

A dam failure analysis was performed to determine the increased flows downstream as a result of a failure during various flood events. The dam failure analysis determined that as the peak discharge out of the dam increased, the total discharge at the critical structures only slightly increased as shown on Table 3. As the discharge increased into the Reservoir, the tailwater, created by the Lincoln Way embankment and culvert, submerged the Dam. Because of this occurrence, the difference in headwater of the Reservoir to tailwater in North Sippo Park decreased, which lowered the additional discharge caused by failure of the Dam.

The total flow capacity of the existing primary spillway, without overtopping the left embankment is approximately 600 cfs. The storage capacity of North Sippo Park, downstream of the Dam at this discharge is larger than the volume of the lake during this flood. Therefore, any failure of the Dam during this condition would not threaten the integrity of the Lincoln Way embankment and would only slightly increase flooding to the downstream residences.

During larger floods, prior to the Lincoln Way embankment overtopping, the total volume of the park between the Dam and the Lincoln Way embankment (el. 1108 ft.) is approximately 197 acre-feet and has a surface area of approximately 13.5 acres. By comparison, the Sippo Creek Reservoir has a total volume of approximately 143 acre-feet and a surface area of 21.5 acres at the same elevation (el. 1008 ft.). The difference in volume attenuates large floods and minimizes any dam break flooding in the North Sippo Park. Table 3 shows that flooding downstream of the North Sippo Park only increases slightly due to dam failures during larger floods.

2.5.2 Hazard Classification

The Sippo Creek Reservoir Dam is considered a High Hazard Class I Dam due to the expected loss of life from a failure of the embankment. It was expected that due to the extreme depths of flooding over the Dam, it would fail and cause a large flood wave to travel downstream. As shown by the modeling, the tailwater caused by the Lincoln Way embankment and culvert, and the large storage area of the North Sippo Park, would minimize increases in flooding

downstream of the Dam due to its failure. In addition, floods larger than the 0.25 PMF would overtop the Lincoln Way embankment. During the 0.25 PMF, the difference between the tailwater and the headwater over the Dam is only about 1 foot and the increase in flooding due to a failure of the Dam, would be nominal. Any dam failure during floods greater than the 0.25 PMF would not be likely to cause additional damage downstream. In the existing conditions, failure of the Lincoln Way embankment would be worse than the Sippo Creek Reservoir failing during the same flood. In essence, the Lincoln Way embankment minimizes flooding downstream for floods up to the 0.25 PMF, while larger floods would be likely to overtop the embankment, whether the Sippo Reservoir Dam failed, or not.

Due to this condition, it appears that the Sippo Reservoir Dam should be more appropriately classified as a Hazard Class II Dam, whose failure would cause damage to state and interstate highways, and cause floodwater damage to homes, businesses, industrial structures, with no loss of life expected.

3.1 SUMMARY OF ANALYSES

The following is a summary of the URS hydrologic and hydraulic analyses.

3.1.1 Hydrologic Analysis

The drainage area for the Reservoir is 14.8 square miles with an average SCS curve number of 72. There are several large lakes upstream of the Reservoir that store some floodwater and attenuate flooding downstream during smaller storms. However, these lakes and other storage areas do little to attenuate flooding downstream during extreme flooding events.

The results of the URS HydroCAD hydrologic model show that the peak discharge into the Reservoir for the 6-hour PMF is 31,970 cfs and for the 24-hour PMF discharge is 23,172 cfs. The 100-year and the 500-year floods determined by FEMA for the area are 1,950 cfs and 2640 cfs respectively. The twenty-five percent (0.25) PMF discharge is 3,881 cfs and the 50-percent (0.5) PMF discharge into the Reservoir is 11,457 cfs.

It does not appear that the Reservoir can store or pass the 100-percent PMF design flood without severely overtopping. The Sippo Reservoir Dam will overtop during the 100-year flood by approximately 2 feet over the left embankment. However, discharges up to the 0.25 PMF, downstream of the Lincoln Way embankment, are attenuated by the storage in North Sippo Park and metered by the Lincoln Way culvert. Once the Lincoln Way embankment is overtopped during floods larger than the 0.25 PMF, the discharges downstream of the embankment are not attenuated and the structures downstream will be affected by the entire discharge out of the Reservoir.

It appears that a Critical Flood of approximately 4,100 cfs (0.26 PMF) exists for the Dam, as at this discharge the Lincoln Way embankment would be overtopped by over 0.5 feet and possibly fail, whether the Sippo Reservoir Dam failed or not.

Drawings of the any proposed improvements to the Dam will be developed in a Feasibility Report, once the design discharge has been approved by ODNR.

3.1.2 Hydraulic Analysis

There are approximately 40 low-lying habitable structures along Tremont Avenue SE, east of 3rd Street SE, below the Dam and the Lincoln Way embankment. These structures are subject to minor flooding during large floods and to dangerous flooding levels during extreme storms. Although the Sippo Pressure Conduit offers some protection to these structures during floods

smaller than the 100-year flood, it does not offer them much protection from larger floods. It appears that the maximum discharge for the Lincoln Way culvert is approximately 3,300 cfs. The maximum discharge of the Sippo Pressure Conduit is approximately 1,300 cfs flowing full and 1,800 cfs under pressure.

The low-lying structures on Tremont Avenue Se will be expected to flood to depths ranging from 3 feet during the 100-year flood up to 16 feet deep during the full PMF. Several of these structures are built along the creek and would also be subject to erosion damage and possible damage from floating objects.

It should be further noted that during large floods, the Lincoln Way embankment backs water over the Sippo Creek Reservoir submerging the Dam. This is due to the embankment being almost 4 feet higher (el. 1008.0 ft.) than the top of the Dam (el. 1004.2 ft.). Once the embankment backs water into the reservoir, failure of the Dam is less likely to cause damage due to increased discharges downstream.

3.1.3 Dam Failure Analysis

Sippo Creek Reservoir Dam is subject to overtopping during large floods. However, due to the large storage area below the dam, portions of smaller floods are stored in North Sippo Park should the dam fail. In addition, the presence of the Lincoln Way embankment, and culvert, backs up water, which submerges the Dam during large floods. Although large floods would cause flooding to occur downstream prior to any dam failure, the failure of the Dam does not exacerbate the downstream flooding, as in other similar dams of its size and storage capacity.

3.1.4 Dam Hazard Category

The Sippo Creek Reservoir Dam is considered a High Hazard Class I Dam due to the expected loss of life from a failure of the embankment. As shown by the modeling, the tailwater caused by the Lincoln Way embankment and culvert, and the large storage area of the North Sippo Park, would minimize increases in flooding downstream of the Dam due to its failure.

Any failure of the Dam during floods greater than the 0.25 PMF would not be likely to cause additional damage downstream. In the existing conditions, failure of the Lincoln Way embankment would be worse than the Sippo Creek Reservoir Dam failing during the same flood.

The Lincoln Way embankment minimizes flooding downstream for floods up to the 0.25 PMF, while larger floods would be likely to overtop the embankment, whether the Sippo Reservoir Dam failed, or not. Since a failure of the Sippo Creek Reservoir Dam would not cause a probable loss of life, it would be more appropriate to classify it as a Class II High Hazard Dam, whose

failure would cause damage to state and interstate highways, and cause floodwater damage to homes, businesses, industrial structures, with no loss of life expected.

This section provides the recommendation by URS for the appropriate hazard category of the Dam and the required design flood.

Currently, the Dam is considered in Hazard Category I, where a loss of life would be expected should the dam fail. However, based on our hydrologic and hydraulic analyses, and our current understanding of the project, due to the submergence of the dam during large floods, a failure of the dam is not likely to cause a loss of life downstream. It is recommended that the current Hazard Classification be revised to a Hazard Category II, where only flooding of structures, and/or damage to major roads would occur due to failure of the dam.

URS determined that the peak inflow discharge of the PMF at the Dam is 31,970 cfs. A storm using 50 percent of the PMP rainfall depth yields a discharge of 11,457 cfs. It is recommended that since failure of the Dam would not result in a probable loss of life, that the design flood be 11,457 cfs. All calculations and subsequent improvement designs, permits, and the annual fee should be based on the Dam being able to store or pass the 50 percent PMF discharge without uncontrolled overtopping.

In conclusion, URS believes that the appropriate hazard category for the Dam is Hazard Class II and not Class I as it currently categorized. The Dam should have a design flood no greater than the 50 percent PMF. Any proposed improvements should be designed to pass the 50 percent PMF design flood. The current design flood was determined to be 31,970 cfs, and the 50-percent design flood has been determined to be 11,457 cfs.

The conclusions and analyses presented in this report are based on the best available information, and are based on our current understanding of the existing site conditions and the scope of the project, and the existing conditions found by URS at the site and information provided in other reports for the area. This detailed hydrologic and hydraulic analysis includes development of the design flood, hazard category determination and additional engineering as required so that the project can proceed to the design phase.

In the event that changes are made to the site or upstream conditions, the conclusions and recommendations presented herein should not be considered valid, unless URS has reviewed the changes, and incorporated their impact in the analyses provided.

The conclusions and recommendations presented in this report are based on our analysis of the information collected for this project. The recommendations presented in this report should not be used for other projects or purposes. Conclusions or recommendations made from these data by others are their responsibility.

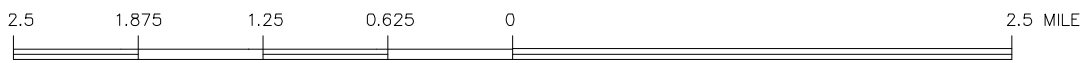
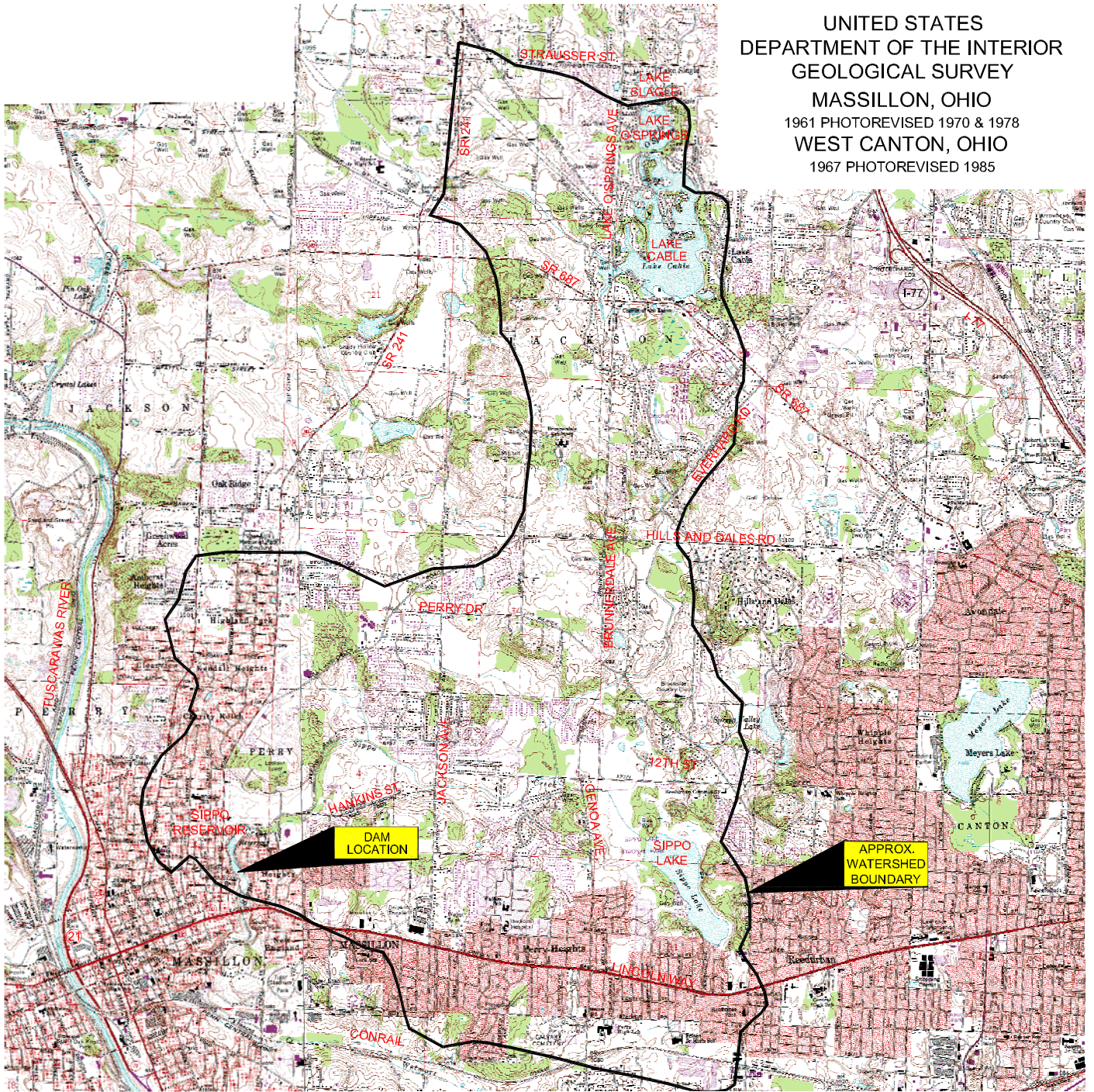
Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

- Andrew Simon (1981) “Practical Hydraulics”
- AutoCAD v2011/Civil 3-D Design, (2011) Hydrology Package.
- Bentley, (2009) “FlowMaster v8i” Hydrology Package.
- Bentley, (2011) “CulvertMaster v3.3” Hydrology Package.
- Bureau of Reclamation (BOR), “*Guidelines for Estimating Dam Breach Parameters*”
- Federal Emergency Management Agency (FEMA) Flood Insurance Study, Dated July 5, 1982.
- Federal Highway Administration (FHWA), FHA-NHI-01-020 HDS No. 5 (2001) “*Hydraulic Design of Highway Culverts*”.
- Froehlich, David C. *Peak Outflow from Breached Embankment Dam*. ASCE Journal of Water Resources Planning and Management, vol. 121 no. 1, p. 90-97, 1995.
- Huff and Angel, NOAA, MCC, NWS, (1992) Bulletin No. 71, “*Rainfall Frequency Atlas of the Midwest*”.
- HydroCAD Software Solutions LLC (2010) “HydroCAD v9.1.0” Storm Water Modeling System and HydroCAD Technical Reference Guide
- Irwin, Bill. Natural Resources Conservation Service (October 1993) “*Workshop on Issues, Resolutions, and Research Needs Related to Dam Failure Analysis*”
- Journal of Hydraulic Engineering, “*Breaching Characteristics of Dam Failures*”
- Moore, J. N. and Riley, R. C. “*Comparison of Temporal Rainfall Distributions for Near Probable Maximum Precipitation Storm Events for Dam Design.*” National Water Management Center, NRCS, Little Rock, Arkansas.
- MS Consultants HEC-1 Analysis, Sippo Creek Reservoir Dam, Dated: January 1998.
- National Oceanic and Atmospheric Administration (1978) HMR-51 “*All Season Probable Maximum Precipitation for 6 and 24-Hour Duration, 10-Square Mile Area*” (ODNR Chart Number 2).
- Natural Resource Conservation Service (2005): “*Earth Dams and Reservoirs*”. Technical Release No. 60, US Department of Agriculture, Washington, DC.
- ODNR Dam Safety Inspection Report, Sippo Creek Reservoir Dam, File Number 0614-012 Massillon, Stark County, Ohio, Dated: May 25, 2010.
- ODNR HEC-1 Analysis, Sippo Creek Reservoir Dam, Dated: May 2001.

- Roberson, John, Cassidy, John, and Chaudhry, Hanif (1995), *“Hydraulic Engineering”*, John Wiley and Sons, Inc.
- Stark County Engineer, (2002) Summit County Topography with 2-foot contours.
- Stark County Engineer, Lincoln Way Culvert (Bridge No. PE-8-49) Information Card
- USCOE/HEC (2010) “HEC-RAS v4.1.0” River Analysis System Hydrology Package.
- USCOE (1941) *“Design Plans for Sippo Pressure Conduit”*.
- USGS (1984) Water Supply Paper 2339 *“Guide for Selecting Manning’s Roughness Coefficients for Natural Channels and Floodplains”*.
- Washington State Department of Ecology. *“Dam Break Inundation Analysis and Downstream Hazard Classification”*. Dam Safety Guidelines: Technical Note 1. July 1992.

Figures

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY
 MASSILLON, OHIO
 1961 PHOTOREVISED 1970 & 1978
 WEST CANTON, OHIO
 1967 PHOTOREVISED 1985



CONTOUR INTERVAL 10 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

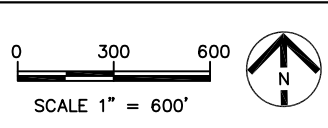
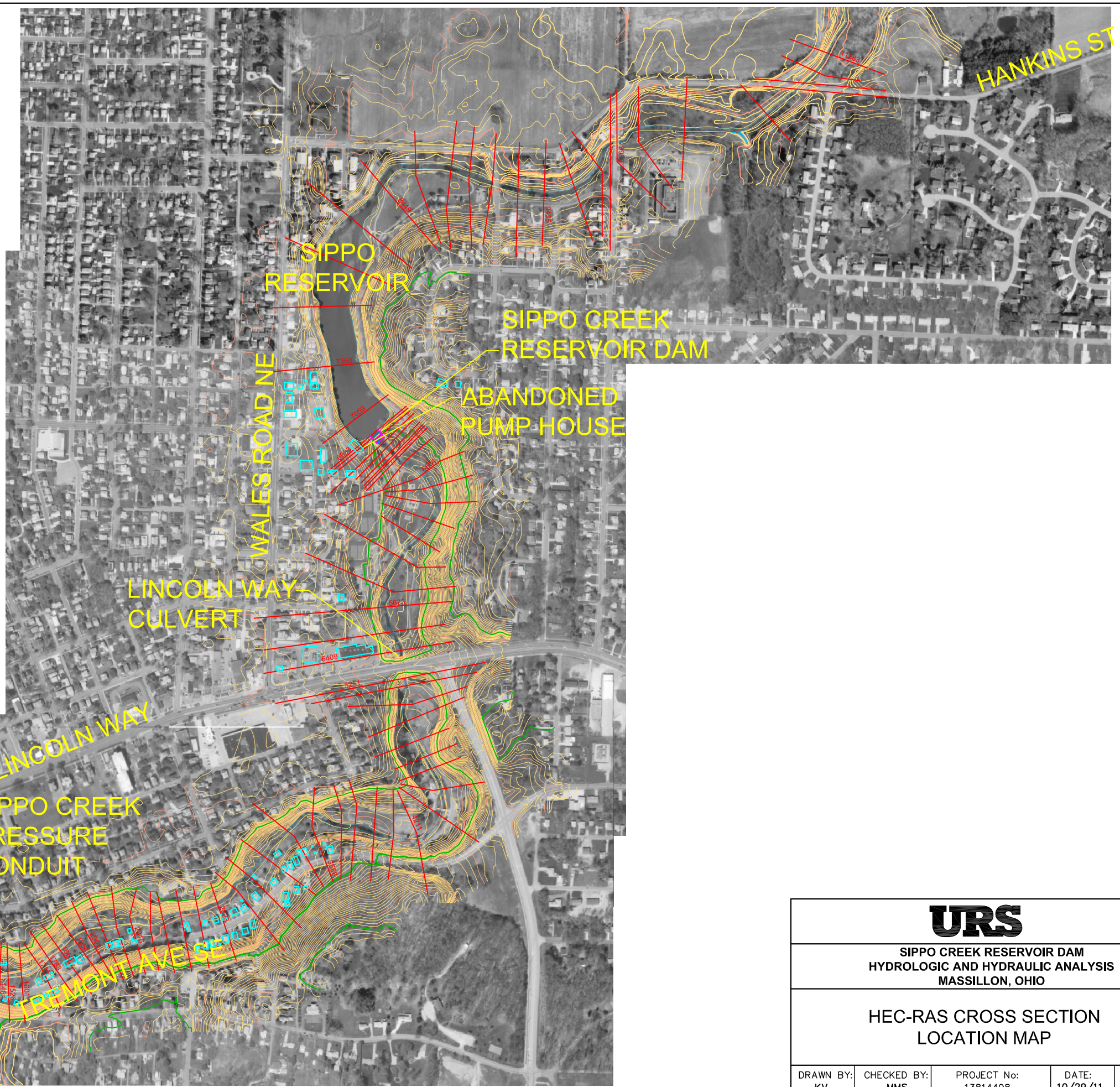


GENERAL LOCATION AND WATERSHED BOUNDARY MAP
 SIPPO CREEK RESERVOIR DAM (ODNR #0614-012) - CITY OF MASSILLON, STARK COUNTY, OHIO

DRAWN BY: MMS	CHECKED BY: MTD	PROJECT NUMBER: 13814498	DATE: 6/27/2011	FIGURE NO: 1
---------------	-----------------	--------------------------	-----------------	--------------

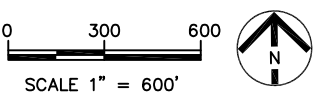
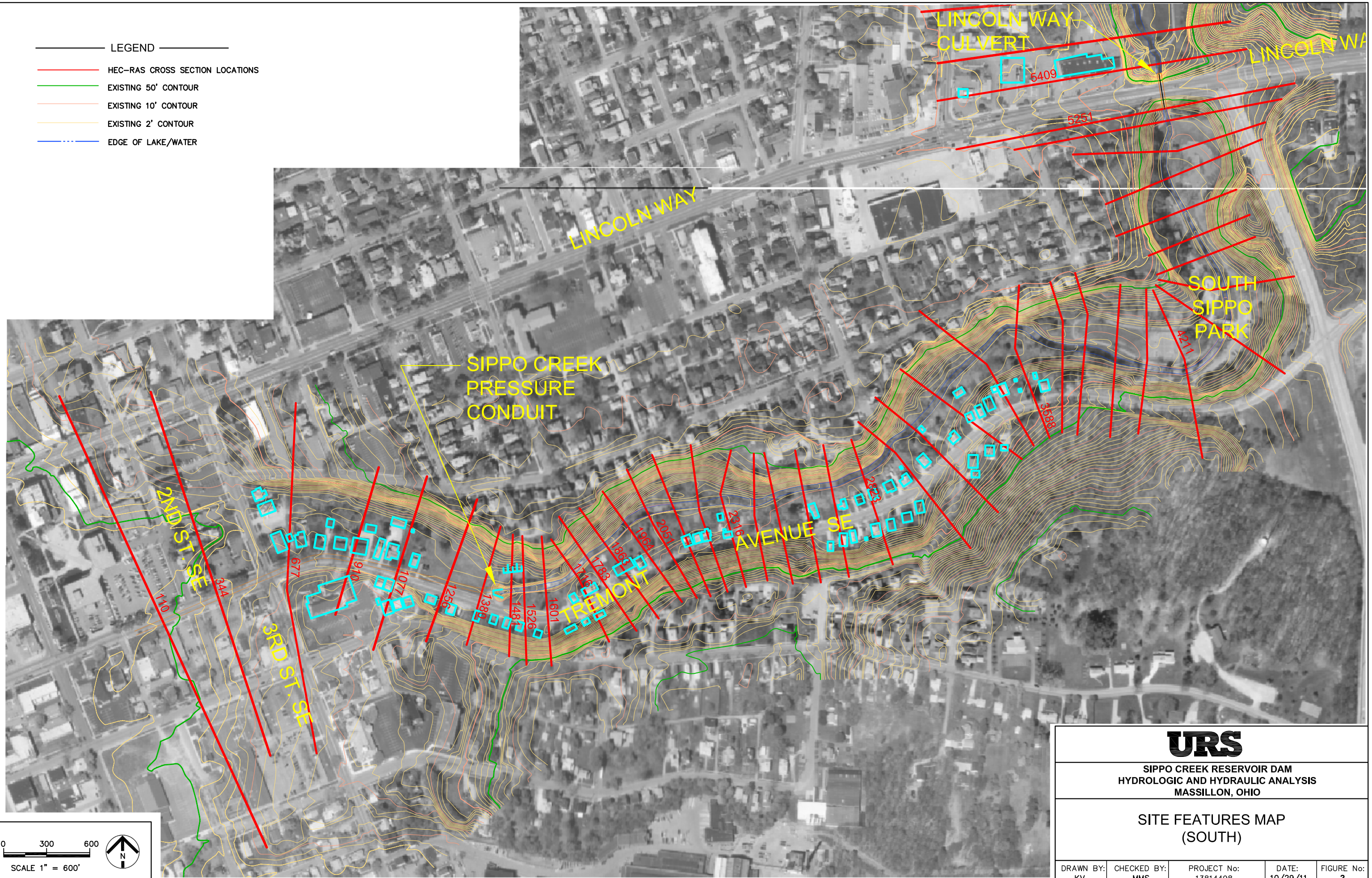


- LEGEND
- HEC-RAS CROSS SECTION LOCATIONS
 - EXISTING 50' CONTOUR
 - EXISTING 10' CONTOUR
 - EXISTING 2' CONTOUR
 - EDGE OF LAKE/WATER



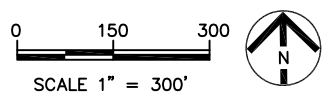
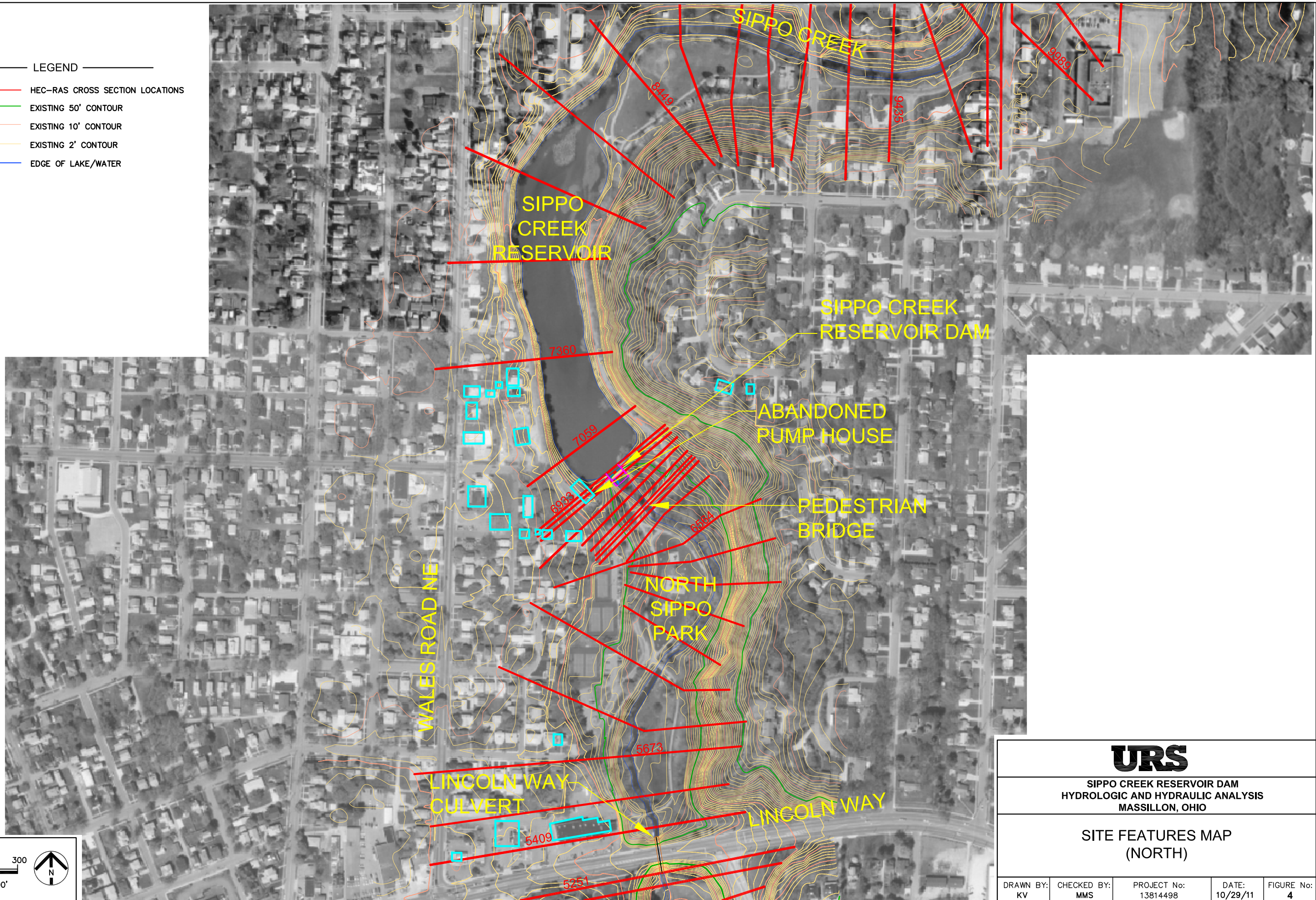
URS				
SIPPO CREEK RESERVOIR DAM HYDROLOGIC AND HYDRAULIC ANALYSIS MASSILLON, OHIO				
HEC-RAS CROSS SECTION LOCATION MAP				
DRAWN BY: KV	CHECKED BY: MMS	PROJECT No: 13814498	DATE: 10/29/11	FIGURE No: 2

- LEGEND
- HEC-RAS CROSS SECTION LOCATIONS
 - EXISTING 50' CONTOUR
 - EXISTING 10' CONTOUR
 - EXISTING 2' CONTOUR
 - EDGE OF LAKE/WATER



URS				
SIPPO CREEK RESERVOIR DAM HYDROLOGIC AND HYDRAULIC ANALYSIS MASSILLON, OHIO				
SITE FEATURES MAP (SOUTH)				
DRAWN BY: KV	CHECKED BY: MMS	PROJECT No: 13814498	DATE: 10/29/11	FIGURE No: 3

- LEGEND
- HEC-RAS CROSS SECTION LOCATIONS
 - EXISTING 50' CONTOUR
 - EXISTING 10' CONTOUR
 - EXISTING 2' CONTOUR
 - EDGE OF LAKE/WATER



URS

SIPPO CREEK RESERVOIR DAM
HYDROLOGIC AND HYDRAULIC ANALYSIS
MASSILLON, OHIO

SITE FEATURES MAP
(NORTH)

DRAWN BY: KV	CHECKED BY: MMS	PROJECT No: 13814498	DATE: 10/29/11	FIGURE No: 4
-----------------	--------------------	-------------------------	-------------------	-----------------

Tables

TABLE 1

Sippo Creek Flood WSE HydroCAD vs. HEC-RAS Comparison Matrix											
		HEC-RAS					HydroCAD				
	Return Period	100-yr	500-year	Overtopping test	0.5% PMF	PMF	100-yr	500-year	Overtopping test	0.5% PMF	PMF
XS Location	Discharge	1,980 cfs	2,650 cfs	4,188 cfs	11,457 cfs	31,970 cfs	1,982 cfs	2,650 cfs	4,188 cfs	11,457 cfs	31,970 cfs
Sippo Creek Reservoir Dam	HEC-RAS River XS Station 6933.617	1006.71	1007.61	1010.26	1015.29	1020.48	1006.27	1006.86	1009.11	1012.56	1017.39
Lincoln Way (SR 172)	HEC-RAS River XS Station 5409.418	996.13	1006.52	1008.72	1013.89	1018.24	992.66	997.51	1008.54	1011.38	1014.62
	Elevation Difference (ft)	10.58	1.09	1.54	1.40	2.24	13.61	9.35	0.57	1.18	2.77

Notes:

1. FEMA 100-yr flood discharge = 1,980 cfs
2. FEMA 500-yr flood discharge = 2,650 cfs
3. PMF and 50% PMF discharges taken from URS existing conditions HydroCAD model
4. Top of Sippo Creek Reservoir Dam at elevation 1004.2 and spillway at elevation 1001.64 determined from survey (NAVD88)
5. Top of Lincoln Way roadway estimated at elevation 1008.0 (from Summit Co. Engineer topo - NAVD88)
6. Overtopping test discharge estimated to have minimum of 0.5 feet overtopping over Lincoln Way embankment
7. All discharges are those entering Sippo Creek Reservoir Dam

TABLE 2

Flood Discharge vs. Headwater/Tailwater Comparison Table

Return Period	Flood Discharge (cfs)	Duration (hr) / Rainfall Depth (in)	Distribution	Sippo Reservoir Dam		
				Headwater (ft)	Tailwater (ft)	Δ (ft)
Q100	1,980	24 / 5.22	Type II	1006.27	992.66	13.61
Q500	2,650	24 / 6.08	Type II	1006.86	997.51	9.35
0.2 PMF	2,672	6 / 5.24	TR-60	1006.87	997.40	9.47
0.21 PMF	2,906	6 / 5.5	TR-60	1007.05	999.48	7.57
0.22 PMF	3,143	6 / 5.76	TR-60	1007.21	1001.65	5.56
0.23 PMF	3,396	6 / 6.04	TR-60	1007.39	1003.81	3.58
0.24 PMF	3,640	6 / 6.29	TR-60	1007.72	1005.75	1.97
0.25 PMF	3,881	6 / 6.54	TR-60	1008.28	1007.35	0.93
0.4 PMF	8,226	6 / 10.48	TR-60	1011.43	1010.54	0.89
0.5 PMF	11,457	6 / 13.08	TR-60	1012.56	1011.38	1.18
PMF	23,172	24 / 32.00	TR-60	1015.62	1013.48	2.14
PMF	31,970	6 / 26.15	TR-60	1017.40	1014.63	2.77

Notes:

1. FEMA 100-yr flood discharge = 1,980 cfs
2. FEMA 500-yr flood discharge = 2,650 cfs
3. PMF and percentages of PMF discharges taken from URS existing conditions HydroCAD model
4. Top of Sippo Creek Reservoir Dam at elevation 1004.2 and spillway at elevation 1001.64 determined from survey (NAVD88)
5. Top of Lincoln Way roadway estimated at elevation 1008.0 (from Summit Co. Engineer topo - NAVD88)

TABLE 3

Dam Failure Flood Discharge Analysis Table

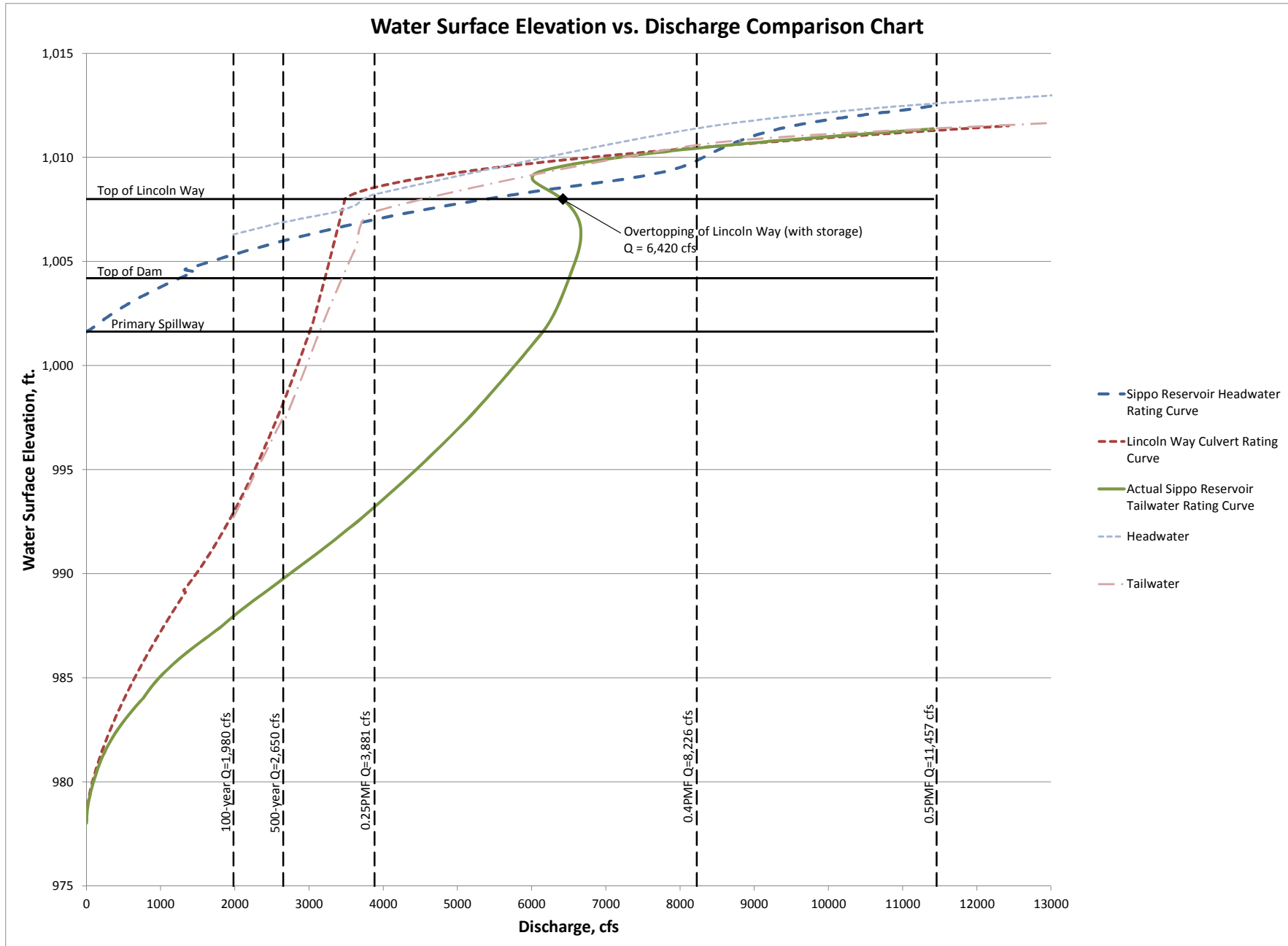
Return Period	Sippo Reservoir Dam				Lincoln Way Embankment					
	Flood Discharge Inflow (cfs)	Dam Failure Additional Discharge (cfs)	Total Flood Discharge Outflow From Dam Failure (cfs)	Starting Reservoir WSE (ft)	Starting North Sippo Park WSE (ft)	Ending North Sippo Park WSE (ft)	Δ (ft) Water Surface Elevation Due to Dam Failure	Discharge Downstream of Embankment (cfs)	Δ (cfs) Dam Failure Attenuation Due to Culvert	Actual Increase in Flow Downstream at Critical Houses Due to Dam Failure
Sunny Day	0	3,500	3,500	1001.64	980	988.87	8.87	1,289	2,211	1,289
Q100	1,980	4,400	6,380	1006.27	992.66	999.04	6.38	2,643	3,737	663
Q500	2,650	2,820	5,470	1006.86	997.51	1002.48	4.97	2,924	2,546	274
0.22 PMF	3,143	1,820	4,963	1007.21	1001.65	1005.40	3.75	3,116	1,847	-27
0.24 PMF	3,640	412	4,052	1007.72	1005.75	1007.28	1.53	3,350	702	-290
0.25 PMF	3,881	115	3,996	1008.28	1007.35	1008.23	0.88	3,400	596	-481
0.5 PMF	11,457	303	11,760	1012.56	1011.38	1011.45	0.07	11,760	0	303
PMF	23,172	1,350	24,522	1015.62	1013.48	1013.65	0.17	24,522	0	1,350

Notes:

1. FEMA 100-yr flood discharge = 1,980 cfs
2. FEMA 500-yr flood discharge = 2,650 cfs
3. PMF and percentages of PMF discharges taken from URS existing conditions HydroCAD model
4. Top of Sippo Creek Reservoir Dam at elevation 1004.2 and spillway at elevation 1001.64 determined from survey (NAVD88)
5. Top of Lincoln Way roadway estimated at elevation 1008.0 (from Summit Co. Engineer topo - NAVD88)

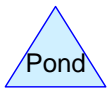
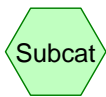
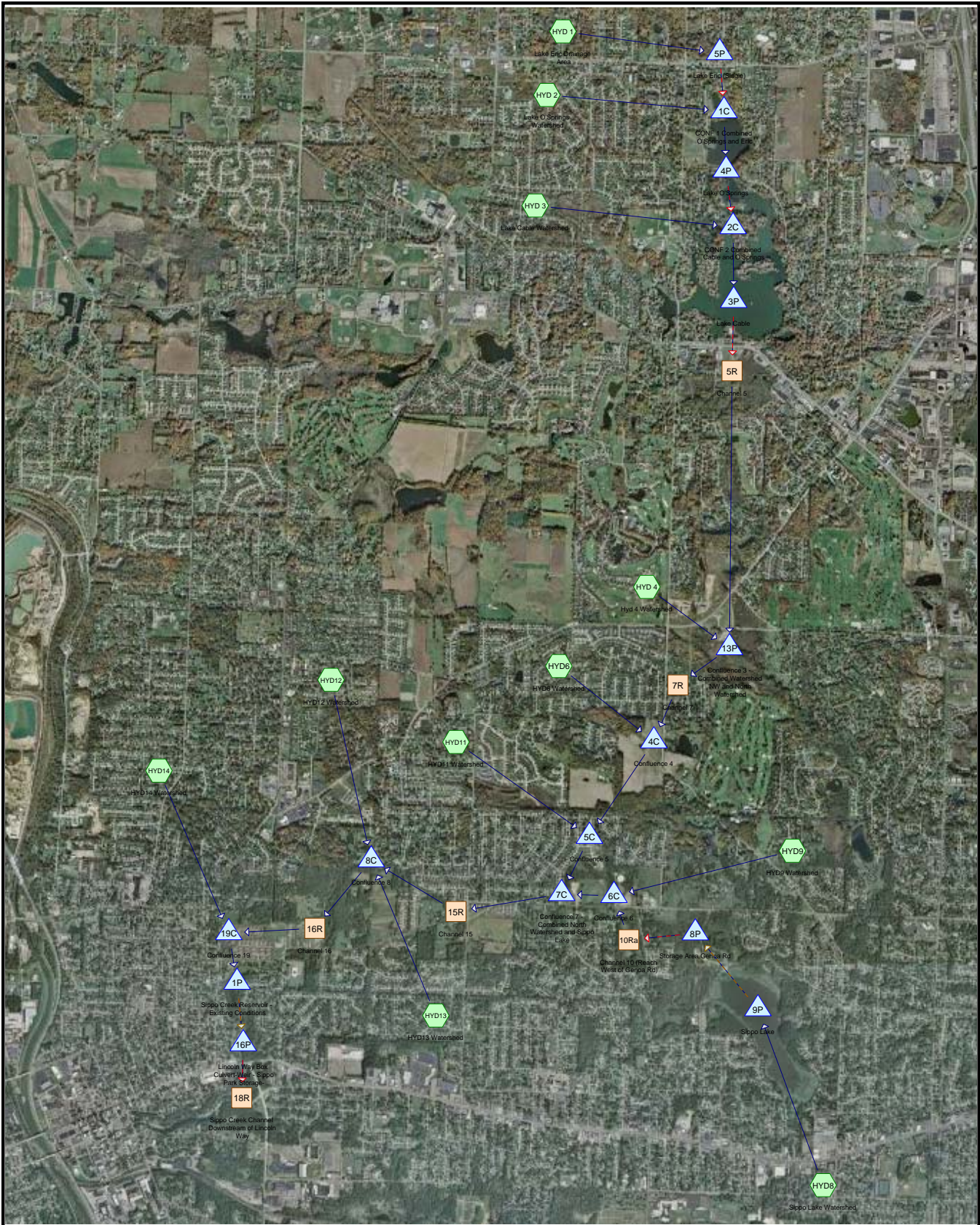
Charts

CHART 1



Appendices

Appendix 1
HydroCAD Output



Drainage Diagram for Existing Conditions Sippo Reservoir-URS-Final
 Prepared by URS Corporation, Printed 10/21/2011
 HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-Final

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/21/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1,427.200	67	(HYD11, HYD9)
1,075.200	68	1 acre lots, 20% imp, HSG B (HYD 4)
1,068.800	69	Pasture/grassland/range, Fair, HSG B (HYD6)
1,401.600	70	1/2 acre lots, 25% imp, HSG B (HYD 3)
838.400	74	>75% Grass cover, Good, HSG C (HYD 1, HYD12)
2,969.600	75	1/4 acre lots, 38% imp, HSG B (HYD 2, HYD13, HYD8)
678.400	80	1/2 acre lots, 25% imp, HSG C (HYD14)
9,459.200	72	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-Final

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/21/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
6,515.200	HSG B	HYD 2, HYD 3, HYD 4, HYD13, HYD6, HYD8
1,516.800	HSG C	HYD 1, HYD12, HYD14
0.000	HSG D	
1,427.200	Other	HYD11, HYD9
9,459.200		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-Final

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/21/2011

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	3P	1,088.00	1,076.00	450.0	0.0267	0.012	36.0	0.0	0.0
2	8P	1,018.00	1,017.00	60.0	0.0167	0.025	48.0	0.0	0.0
3	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric	Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=22.36" Tc=44.0 min CN=74 Runoff=1,201.03 cfs 214.656 af
SubcatchmentHYD 2: Lake O'Springs	Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=22.54" Tc=65.0 min CN=75 Runoff=2,527.02 cfs 504.797 af
SubcatchmentHYD 3: Lake Cable	Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=21.63" Tc=226.0 min CN=70 Runoff=6,713.23 cfs 2,526.163 af
SubcatchmentHYD 4: Hyd 4	Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=21.24" Tc=128.0 min CN=68 Runoff=7,108.10 cfs 1,903.393 af
SubcatchmentHYD11: HYD11 Watershed	Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=21.05" Tc=129.0 min CN=67 Runoff=5,048.23 cfs 1,358.154 af
SubcatchmentHYD12: HYD12 Watershed	Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=22.36" Tc=110.0 min CN=74 Runoff=5,426.14 cfs 1,347.565 af
SubcatchmentHYD13: HYD13	Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=22.54" Tc=72.0 min CN=75 Runoff=6,690.59 cfs 1,382.182 af
SubcatchmentHYD14: HYD14	Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=23.37" Tc=78.0 min CN=80 Runoff=6,163.49 cfs 1,321.298 af
SubcatchmentHYD6: HYD6 Watershed	Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=21.44" Tc=155.0 min CN=69 Runoff=6,371.96 cfs 1,909.350 af
SubcatchmentHYD8: Sippo Lake	Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=22.54" Tc=156.0 min CN=75 Runoff=12,291.40 cfs 3,689.826 af
SubcatchmentHYD9: HYD9 Watershed	Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=21.05" Tc=151.0 min CN=67 Runoff=3,883.92 cfs 1,144.890 af
Reach 5R: Channel 5	Avg. Flow Depth=8.80' Max Vel=9.96 fps Inflow=6,815.05 cfs 3,323.095 af L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=6,665.91 cfs 3,316.193 af
Reach 7R: Channel 7	Avg. Flow Depth=19.37' Max Vel=4.19 fps Inflow=9,680.66 cfs 5,219.296 af L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=9,512.17 cfs 5,207.816 af
Reach 10Ra: Channel 10 (Reach	Avg. Flow Depth=9.70' Max Vel=3.28 fps Inflow=8,241.98 cfs 3,417.777 af L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=8,238.61 cfs 3,416.977 af
Reach 15R: Channel 15	Avg. Flow Depth=21.03' Max Vel=4.13 fps Inflow=26,875.65 cfs 13,036.329 af L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=25,726.43 cfs 12,993.444 af
Reach 16R: Channel 16	Avg. Flow Depth=24.88' Max Vel=5.15 fps Inflow=30,666.22 cfs 15,722.689 af L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=29,994.14 cfs 15,677.921 af

Reach 18R: Sippo Creek Avg. Flow Depth=15.82' Max Vel=15.14 fps Inflow=31,762.22 cfs 16,983.052 af
 L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=31,762.34 cfs 16,982.927 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=3,664.37 cfs 719.332 af
 Primary=3,664.37 cfs 719.332 af

Pond 1P: Sippo Creek Peak Elev=1,017.39' Storage=617.831 af Inflow=31,969.77 cfs 16,998.692 af
 37.698 af Secondary=20,860.32 cfs 10,293.374 af Tertiary=4,808.93 cfs 1,903.735 af Outflow=31,764.74 cfs 16,984.808 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=7,733.17 cfs 3,244.892 af
 Primary=7,733.17 cfs 3,244.892 af

Pond 3P: Lake Cable Peak Elev=1,101.10' Storage=2,975.885 af Inflow=7,733.17 cfs 3,244.891 af
 Primary=1,137.10 cfs 1,445.120 af Secondary=5,677.95 cfs 1,878.118 af Outflow=6,815.05 cfs 3,323.238 af

Pond 4C: Confluence 4 Inflow=13,887.05 cfs 7,117.016 af
 Primary=13,887.05 cfs 7,117.016 af

Pond 4P: Lake O'Springs Peak Elev=1,109.71' Storage=135.596 af Inflow=3,664.37 cfs 719.332 af
 Primary=3,158.66 cfs 666.641 af Secondary=428.38 cfs 52.088 af Outflow=3,587.04 cfs 718.729 af

Pond 5C: Confluence 5 Inflow=18,421.74 cfs 8,475.020 af
 Primary=18,421.74 cfs 8,475.020 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,121.10' Storage=32.369 af Inflow=1,201.03 cfs 214.656 af
 Primary=711.29 cfs 146.788 af Secondary=487.85 cfs 67.747 af Outflow=1,199.15 cfs 214.535 af

Pond 6C: Confluence 6 Inflow=10,750.17 cfs 4,561.781 af
 Primary=10,750.17 cfs 4,561.781 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Inflow=26,875.65 cfs 13,036.565 af
 Primary=26,875.65 cfs 13,036.565 af

Pond 8C: Confluence 8 Inflow=30,666.22 cfs 15,722.940 af
 Primary=30,666.22 cfs 15,722.940 af

Pond 8P: Storage Area Genoa Peak Elev=1,029.90' Storage=1,292.779 af Inflow=12,104.92 cfs 3,596.882 af
 Primary=130.35 cfs 292.476 af Secondary=8,142.61 cfs 3,125.388 af Outflow=8,241.98 cfs 3,417.863 af

Pond 9P: Sippo Lake Peak Elev=1,031.37' Storage=668.631 af Inflow=12,291.40 cfs 3,689.826 af
 23 cfs 2,921.396 af Secondary=291.63 cfs 77.072 af Tertiary=2,744.05 cfs 598.415 af Outflow=12,104.92 cfs 3,596.882 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=9,680.66 cfs 5,219.441 af
 Primary=9,680.66 cfs 5,219.441 af

Pond 16P: Lincoln Way Box Peak Elev=1,014.62' Storage=299.154 af Inflow=31,764.74 cfs 16,984.540 af
 Primary=3,400.33 cfs 4,540.004 af Secondary=28,633.45 cfs 12,443.317 af Outflow=31,762.22 cfs 16,983.321 af

Pond 19C: Confluence 19 Inflow=31,969.77 cfs 16,998.956 af
 Primary=31,969.77 cfs 16,998.956 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 17,302.274 af Average Runoff Depth = 21.95"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 1,201.03 cfs @ 3.18 hrs, Volume= 214.656 af, Depth=22.36"

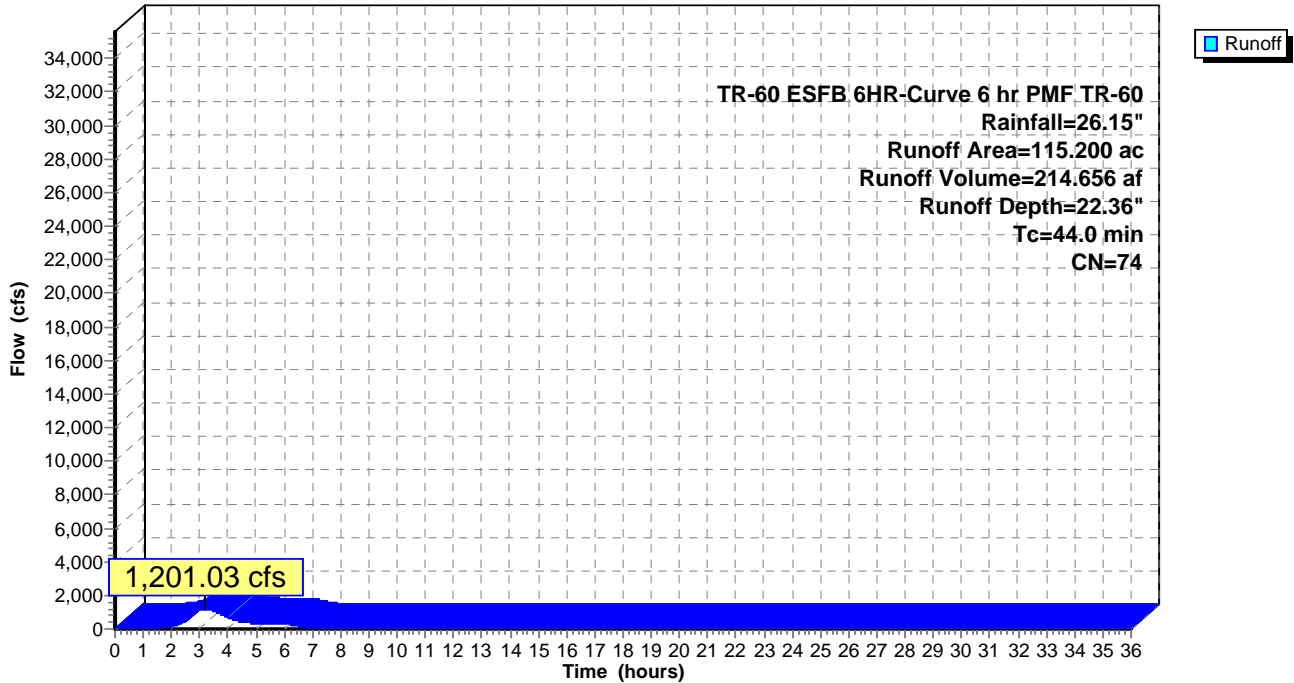
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 2,527.02 cfs @ 3.47 hrs, Volume= 504.797 af, Depth=22.54"

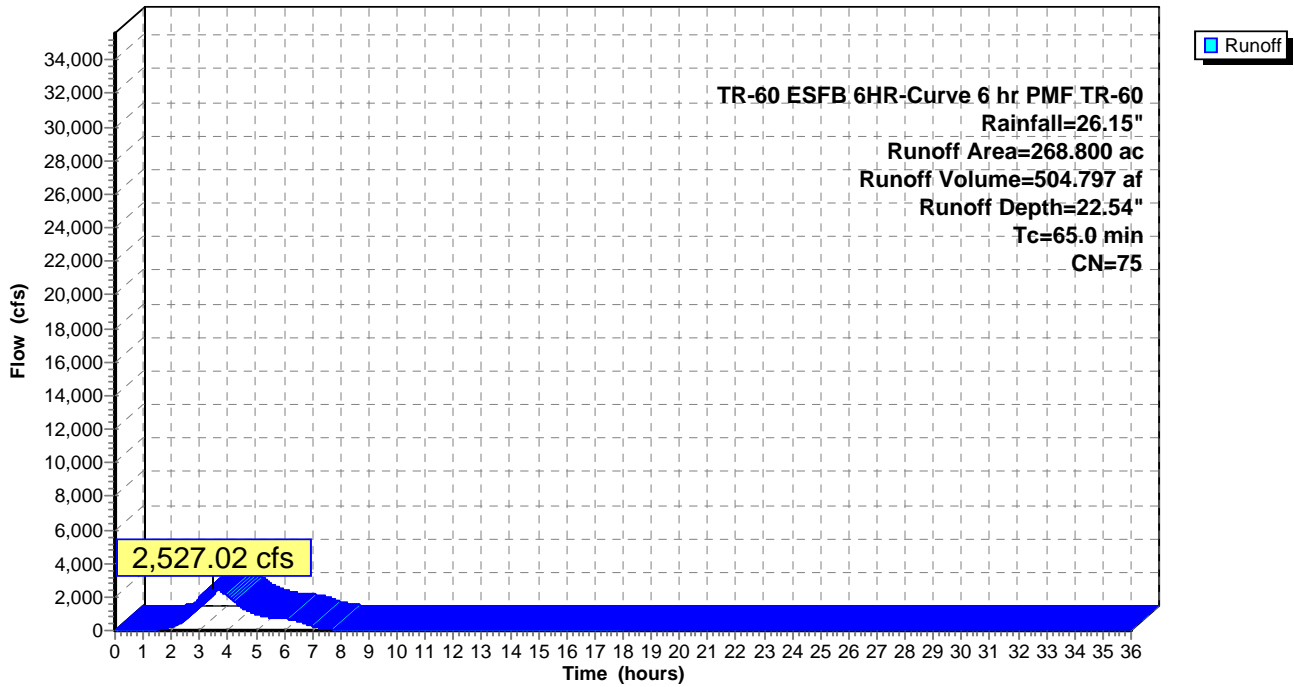
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 6,713.23 cfs @ 5.78 hrs, Volume= 2,526.163 af, Depth=21.63"

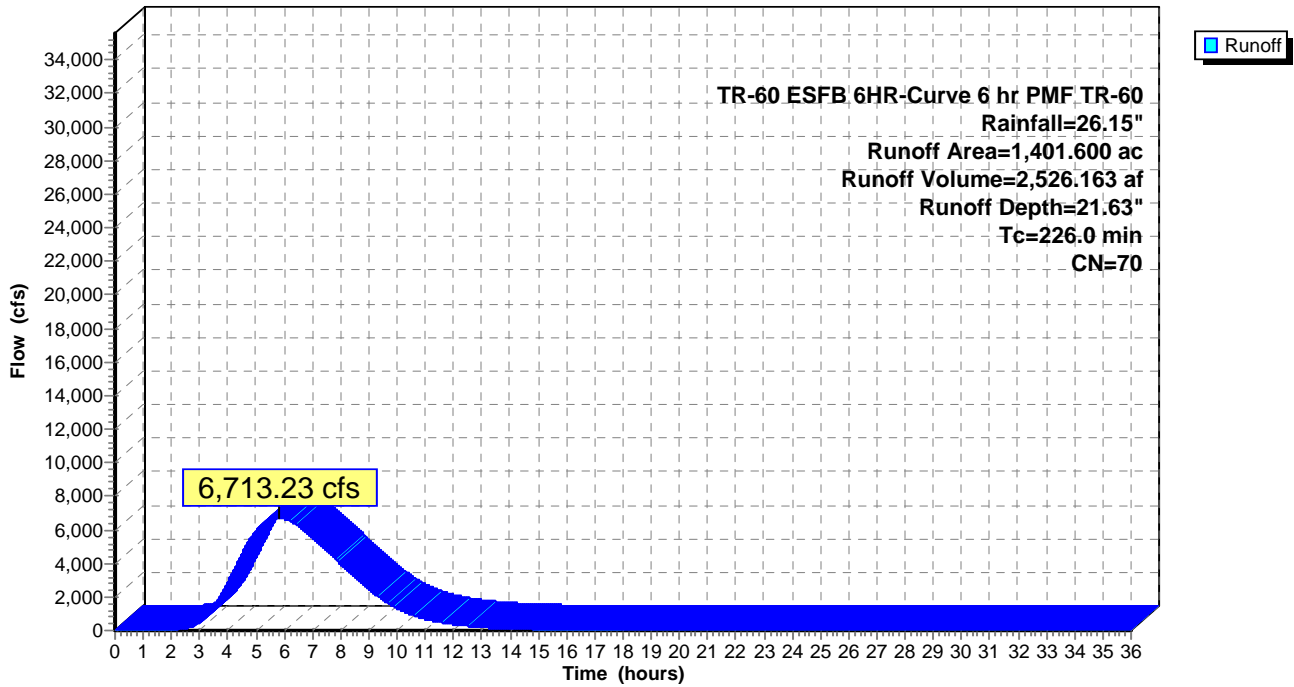
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 7,108.10 cfs @ 4.41 hrs, Volume= 1,903.393 af, Depth=21.24"

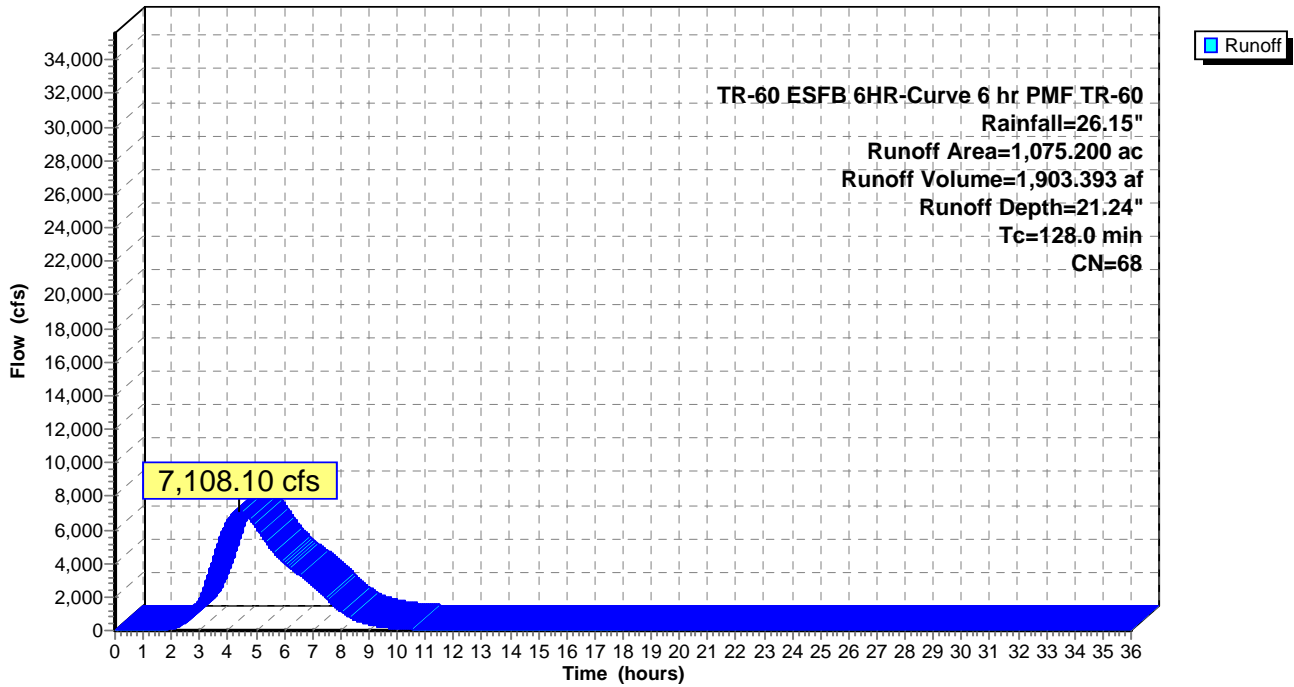
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 5,048.23 cfs @ 4.44 hrs, Volume= 1,358.154 af, Depth=21.05"

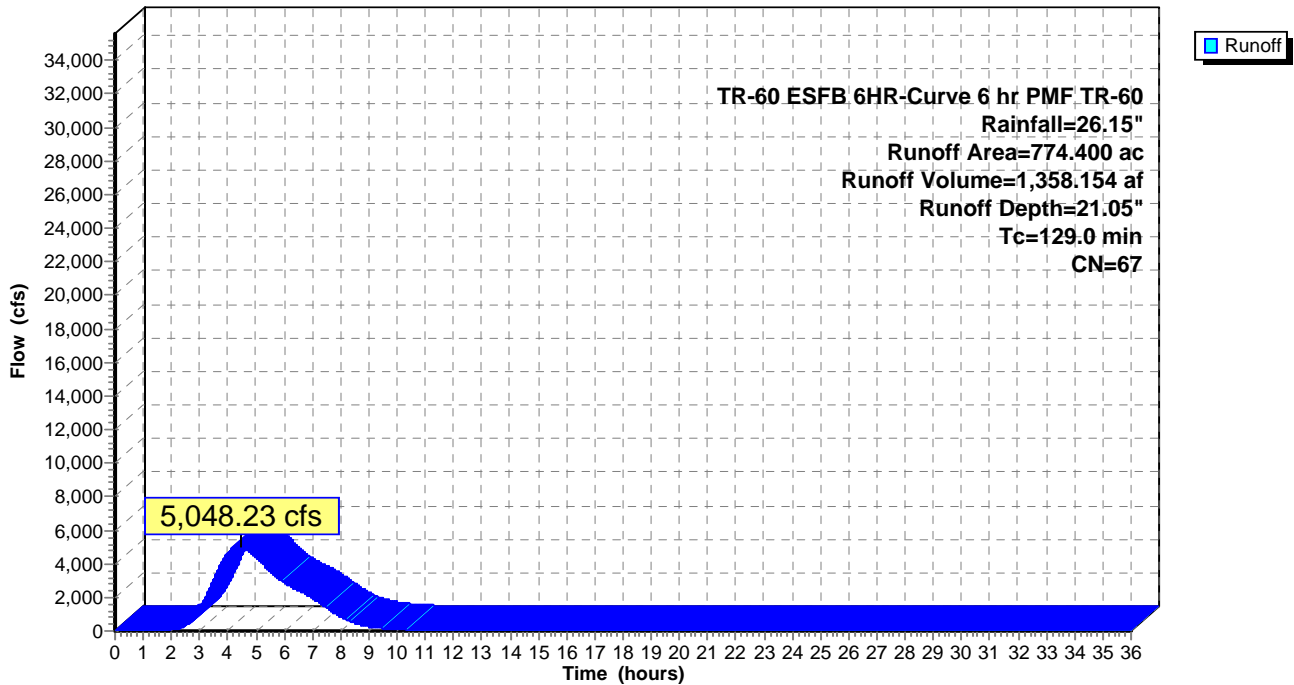
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 5,426.14 cfs @ 4.04 hrs, Volume= 1,347.565 af, Depth=22.36"

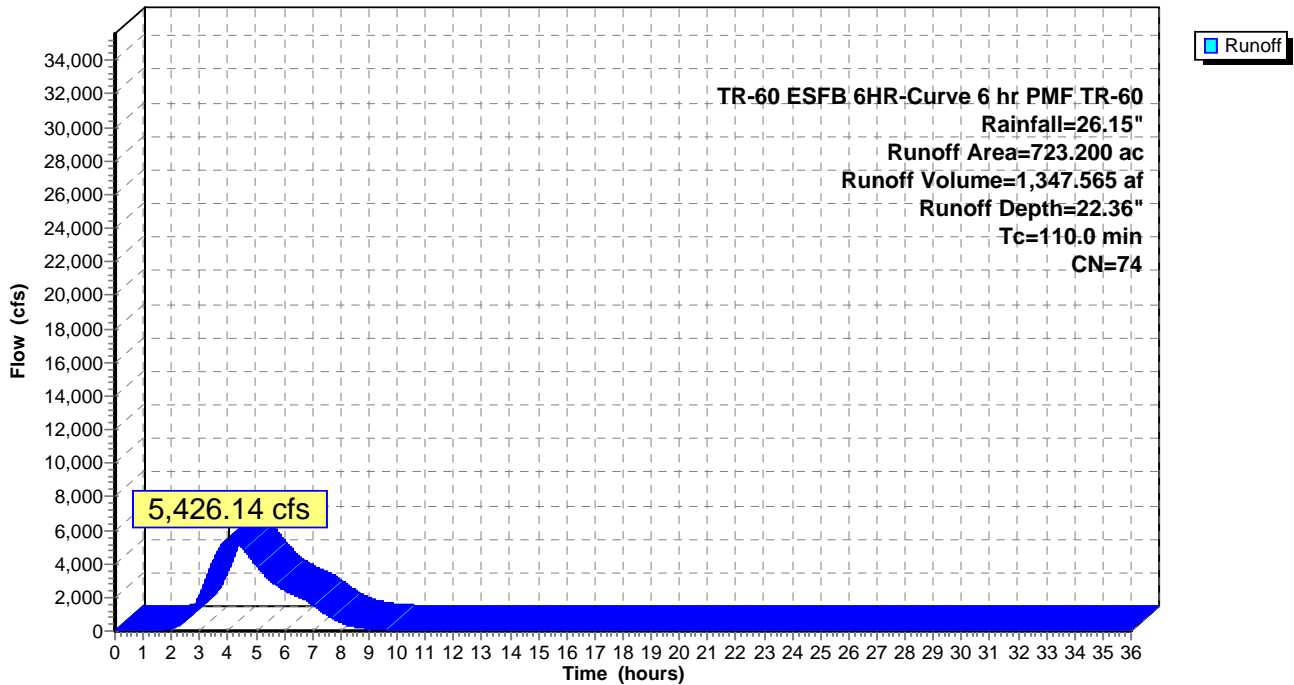
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 6,690.59 cfs @ 3.60 hrs, Volume= 1,382.182 af, Depth=22.54"

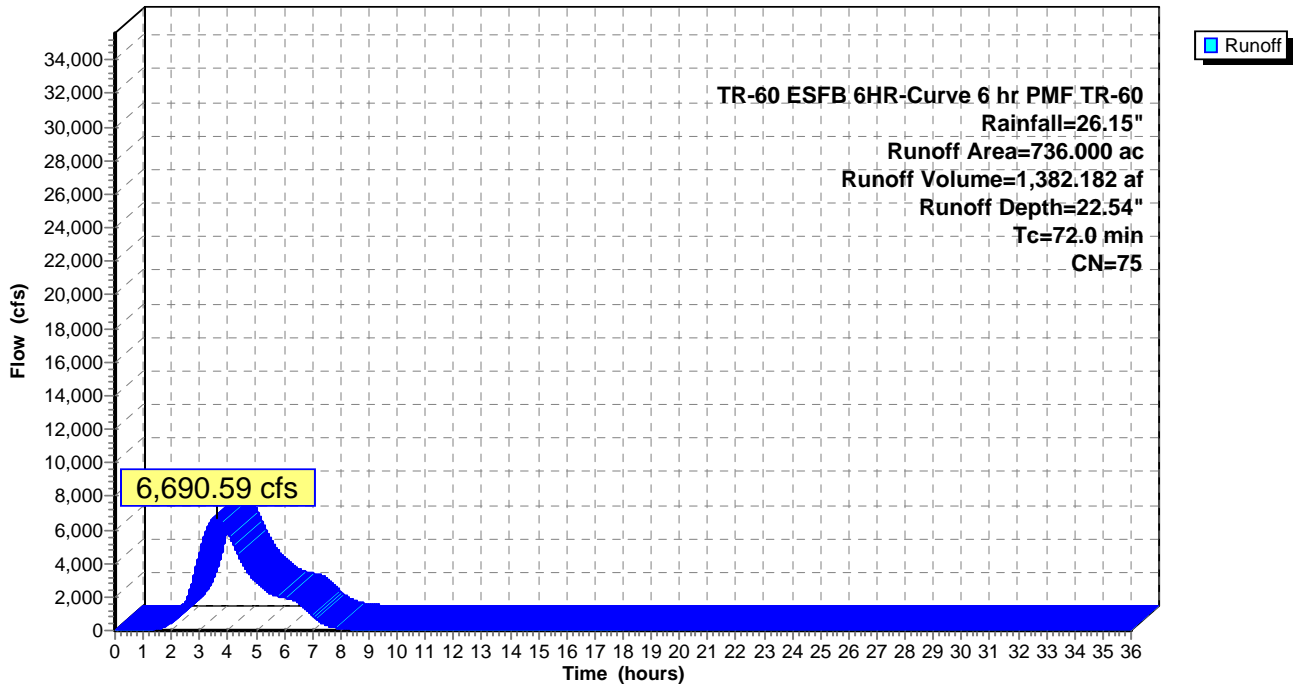
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 6,163.49 cfs @ 3.64 hrs, Volume= 1,321.298 af, Depth=23.37"

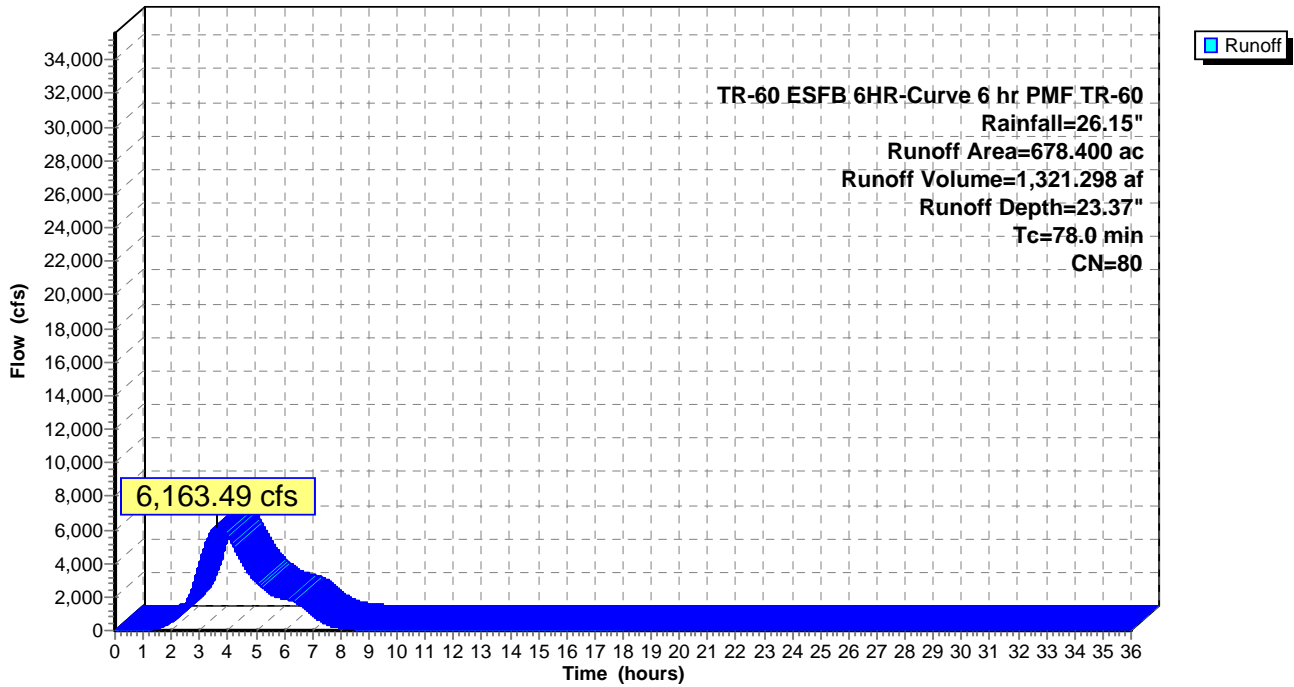
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 6,371.96 cfs @ 4.66 hrs, Volume= 1,909.350 af, Depth=21.44"

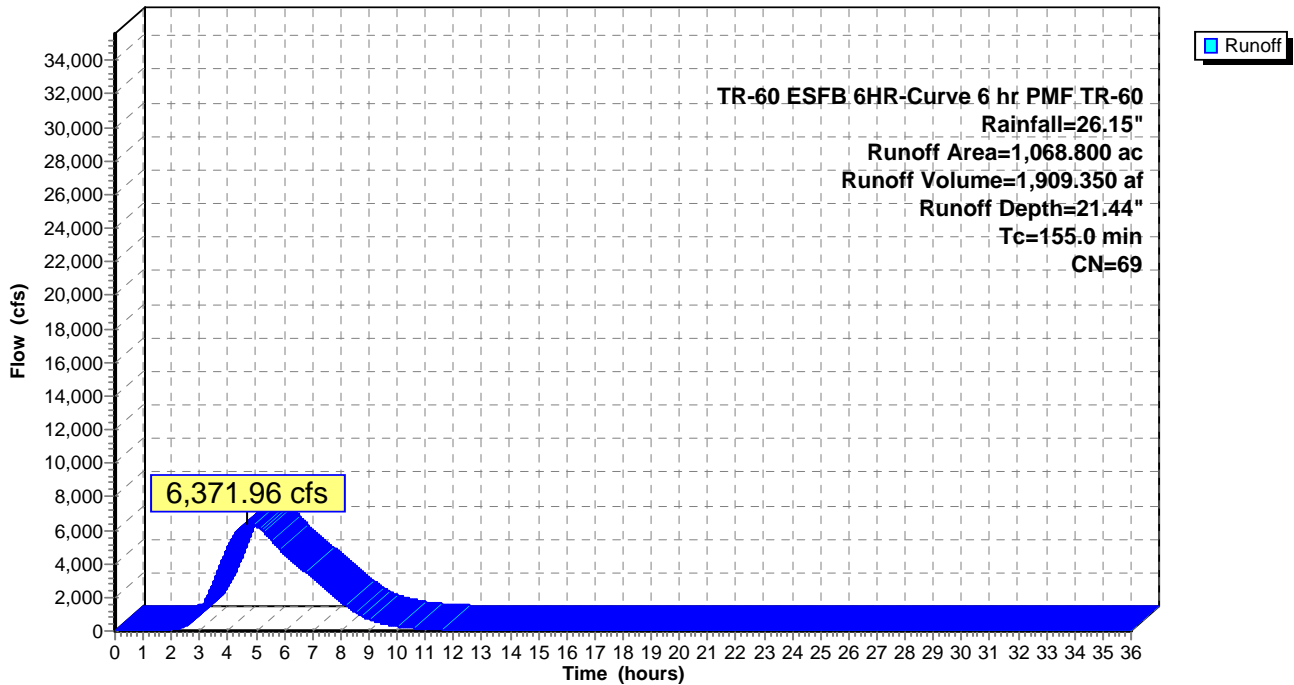
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 12,291.40 cfs @ 4.68 hrs, Volume= 3,689.826 af, Depth=22.54"

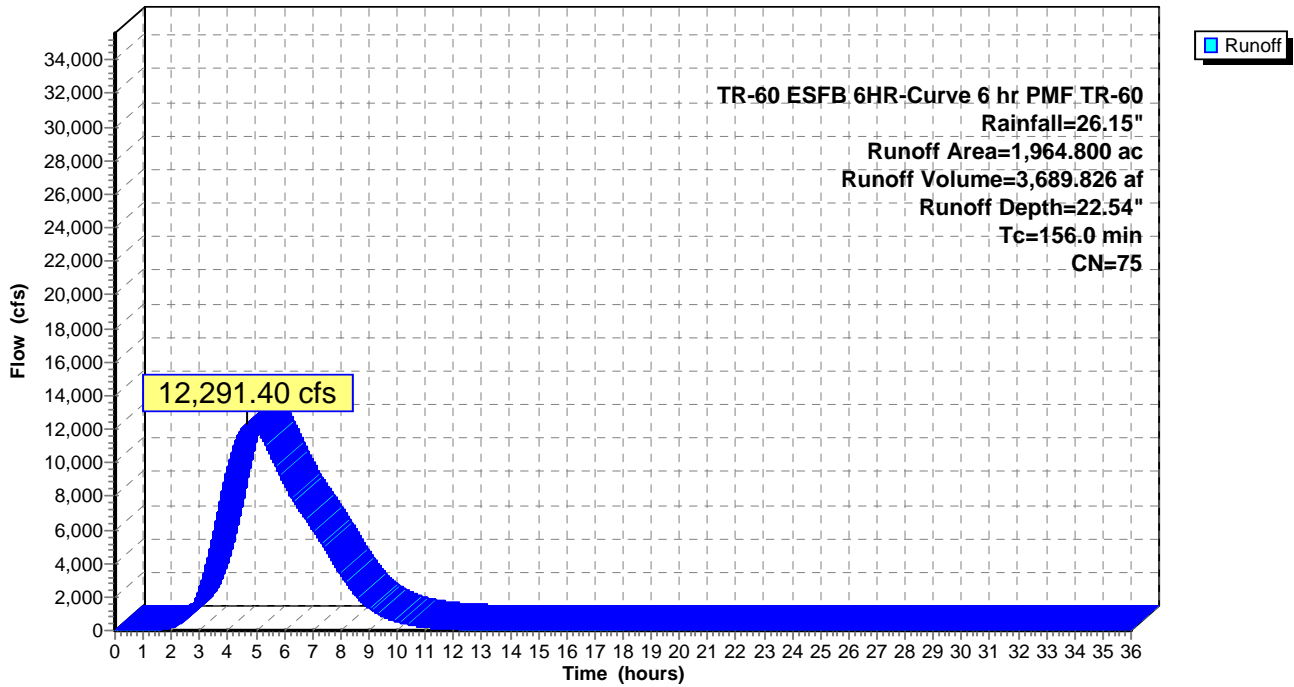
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 3,883.92 cfs @ 4.70 hrs, Volume= 1,144.890 af, Depth=21.05"

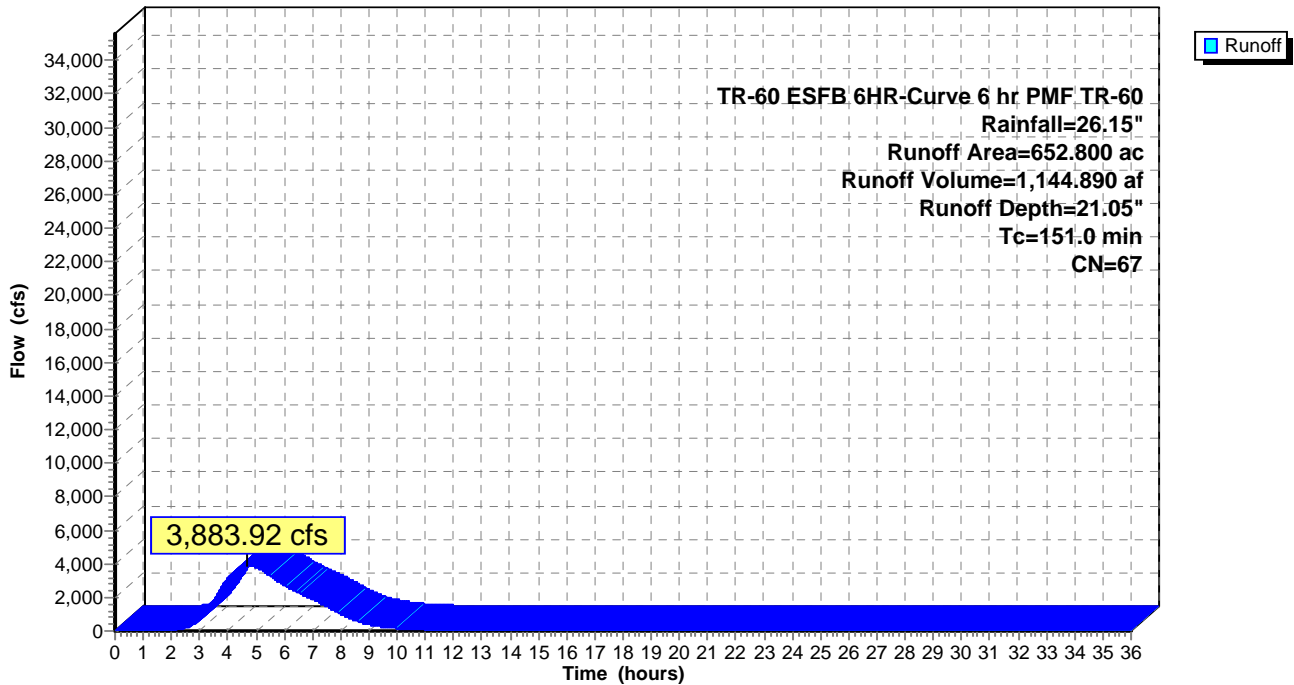
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6 hr PMF TR-60 Rainfall=26.15"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



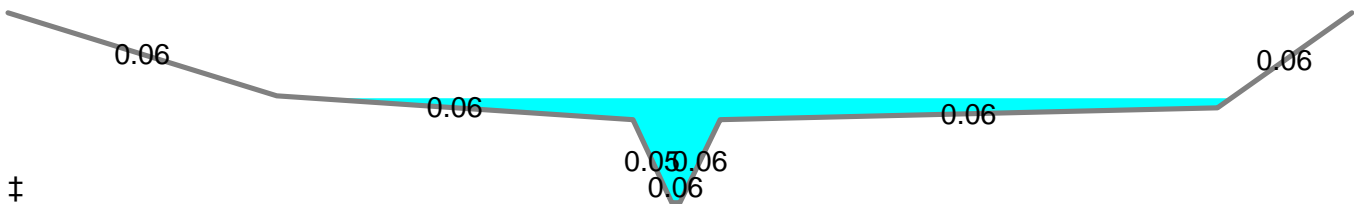
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 22.33" for 6 hr PMF TR-60 event
 Inflow = 6,815.05 cfs @ 6.63 hrs, Volume= 3,323.095 af
 Outflow = 6,665.91 cfs @ 6.97 hrs, Volume= 3,316.193 af, Atten= 2%, Lag= 20.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.96 fps, Min. Travel Time= 14.7 min
 Avg. Velocity = 6.06 fps, Avg. Travel Time= 24.2 min

Peak Storage= 9,397,422 cf @ 6.97 hrs
 Average Depth at Peak Storage= 8.80'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

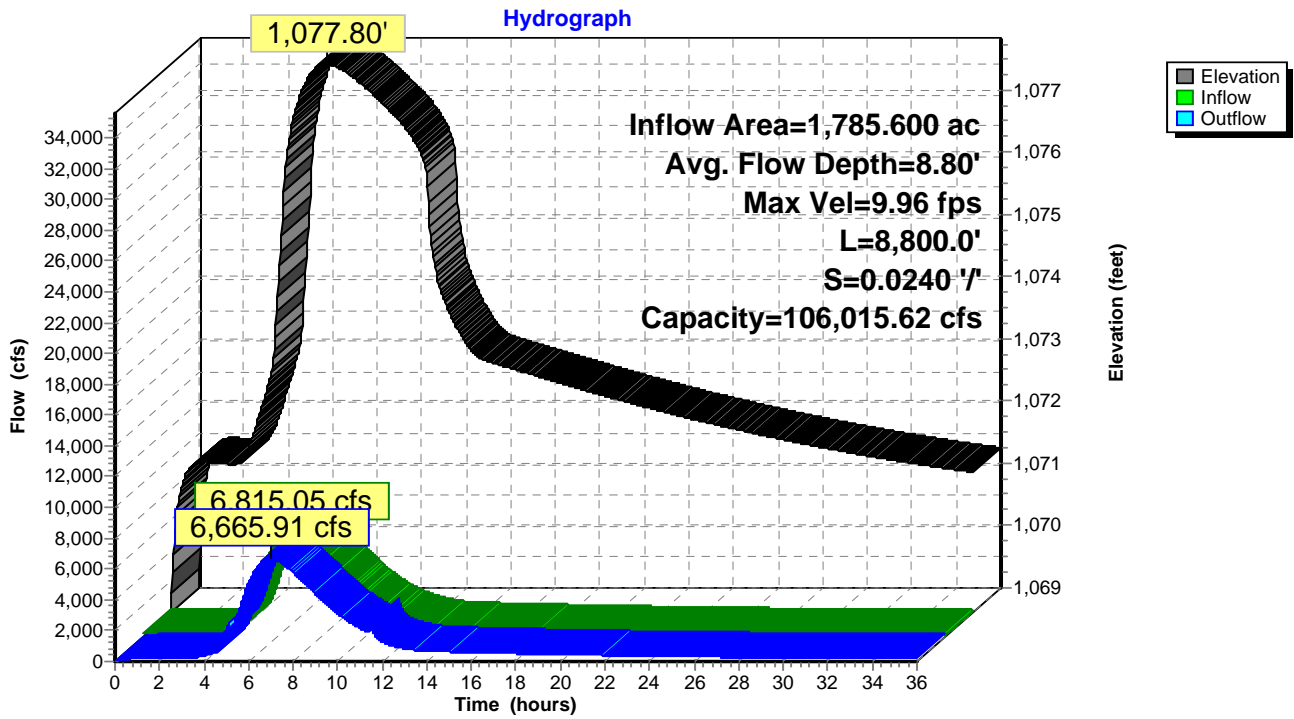
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



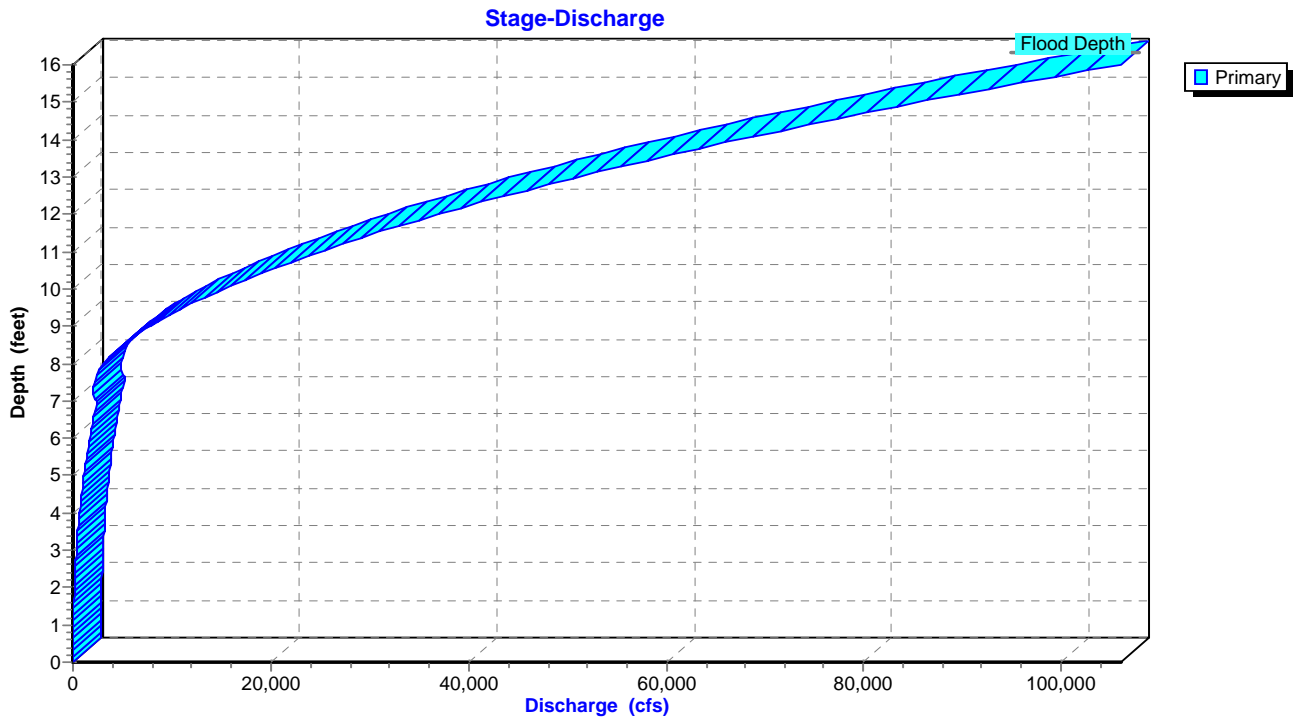
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

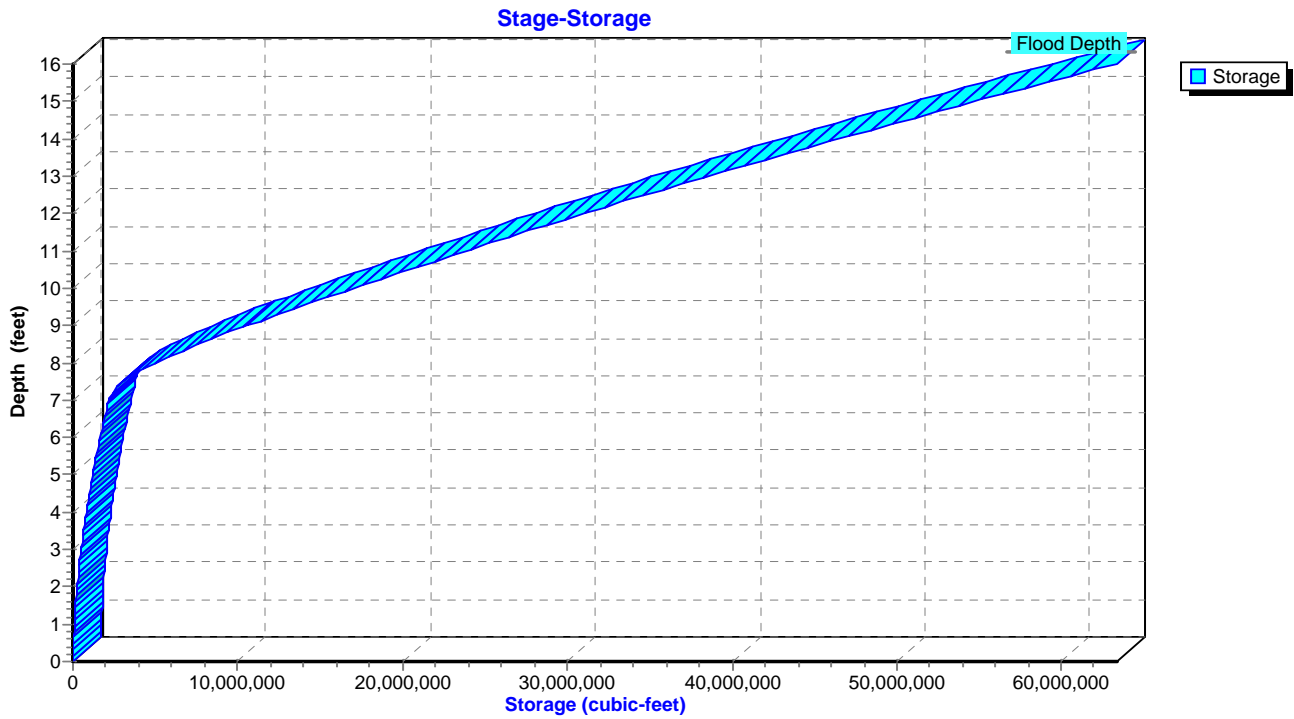
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



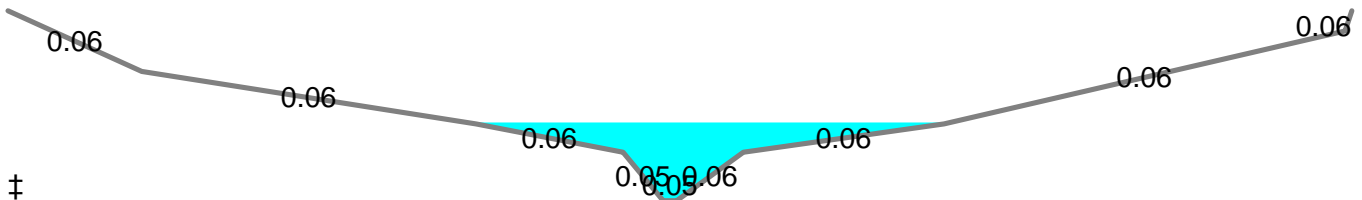
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 21.89" for 6 hr PMF TR-60 event
 Inflow = 9,680.66 cfs @ 6.63 hrs, Volume= 5,219.296 af
 Outflow = 9,512.17 cfs @ 6.91 hrs, Volume= 5,207.816 af, Atten= 2%, Lag= 17.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.19 fps, Min. Travel Time= 23.5 min
 Avg. Velocity = 2.85 fps, Avg. Travel Time= 34.6 min

Peak Storage= 13,400,691 cf @ 6.91 hrs
 Average Depth at Peak Storage= 19.37'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

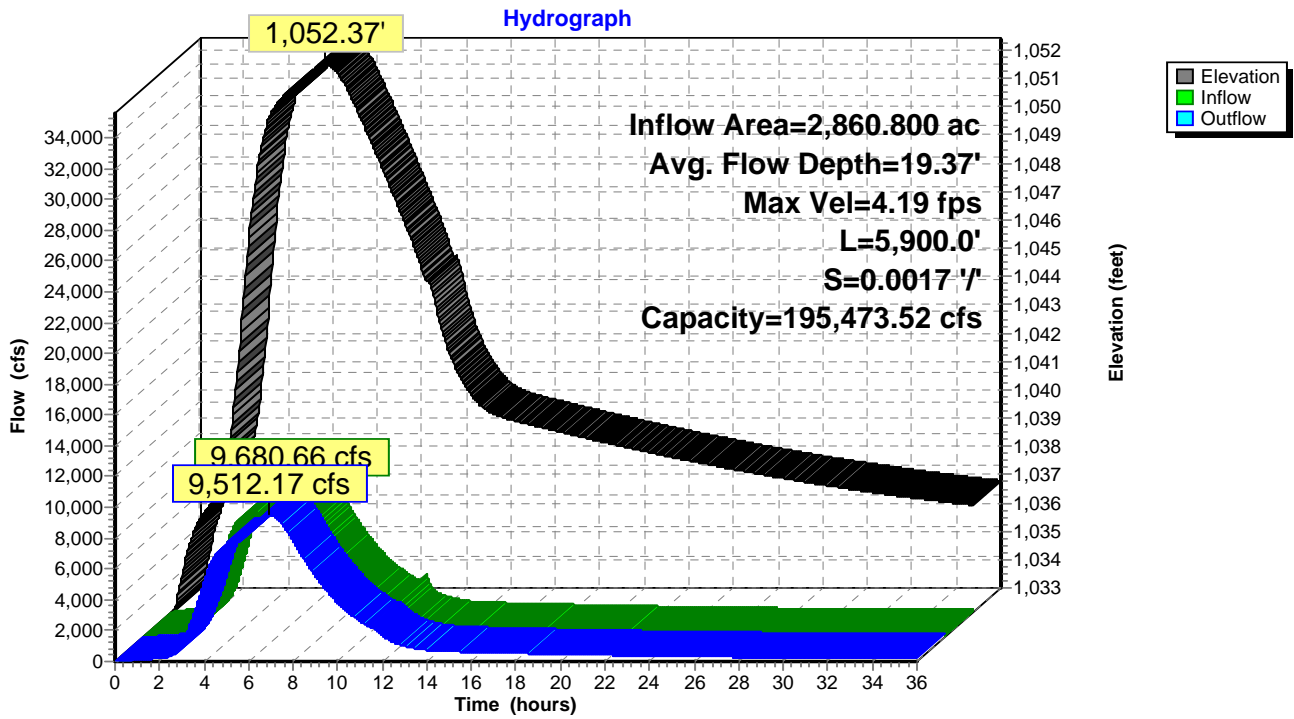
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



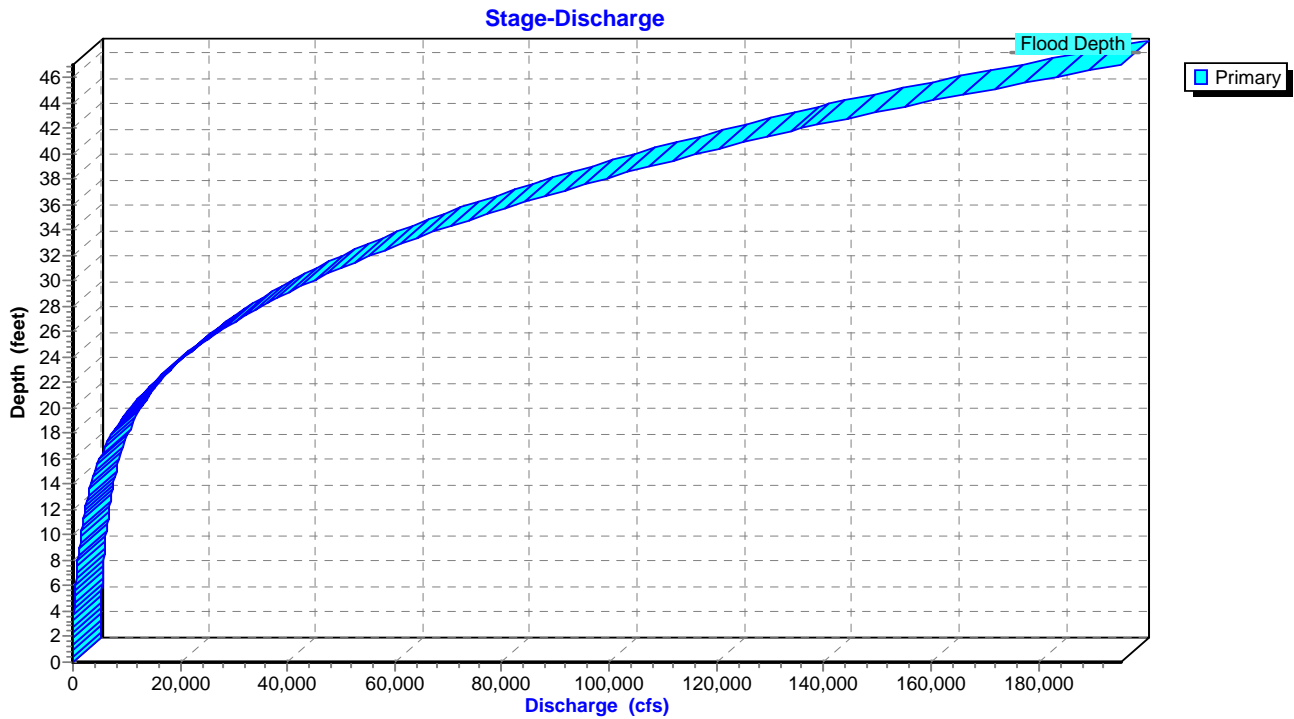
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

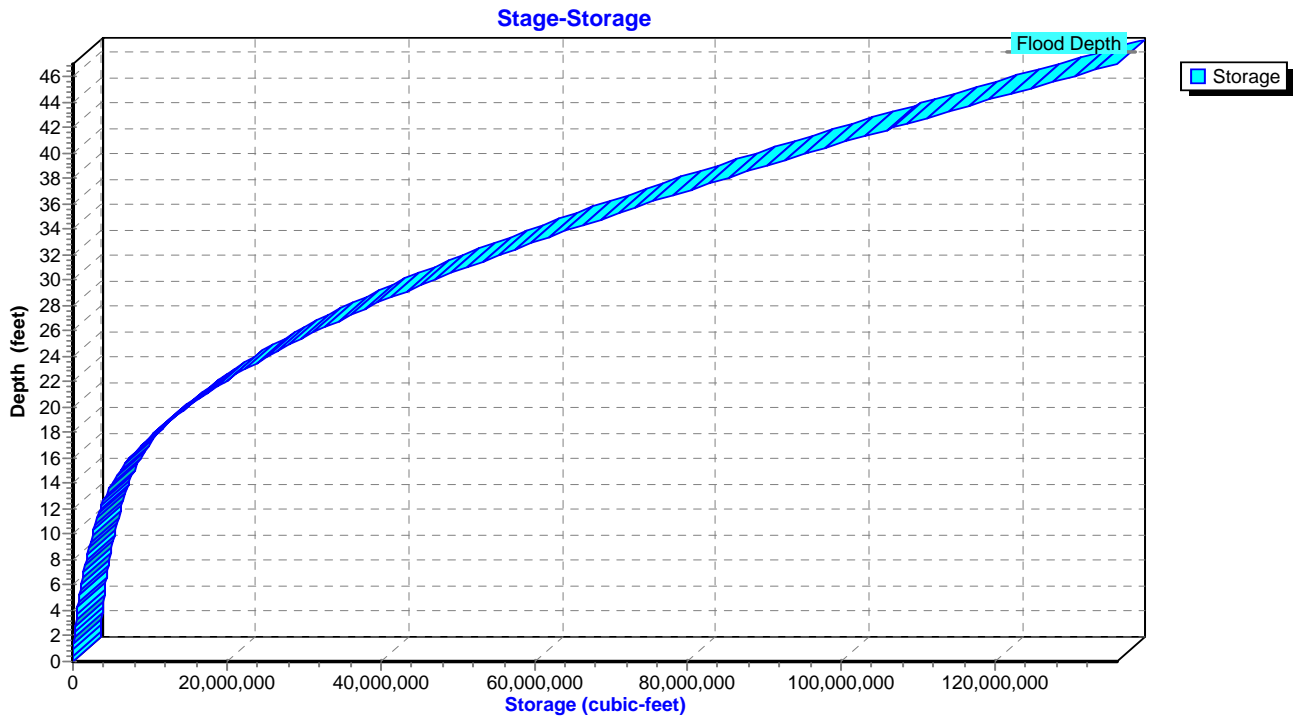
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



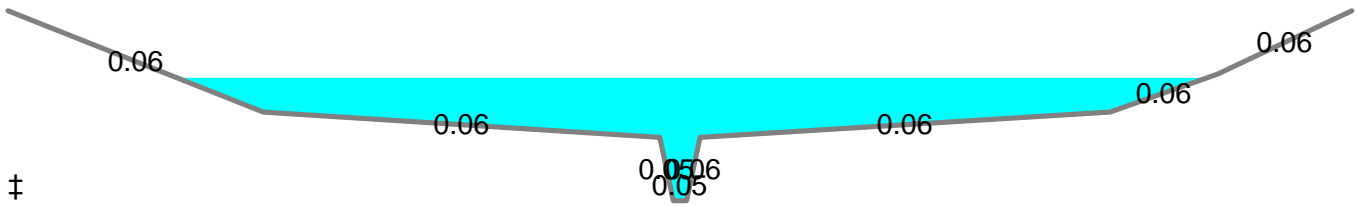
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 20.87" for 6 hr PMF TR-60 event
 Inflow = 8,241.98 cfs @ 6.31 hrs, Volume= 3,417.777 af
 Outflow = 8,238.61 cfs @ 6.37 hrs, Volume= 3,416.977 af, Atten= 0%, Lag= 3.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.28 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 2.50 fps, Avg. Travel Time= 6.0 min

Peak Storage= 2,380,441 cf @ 6.37 hrs
 Average Depth at Peak Storage= 9.70'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

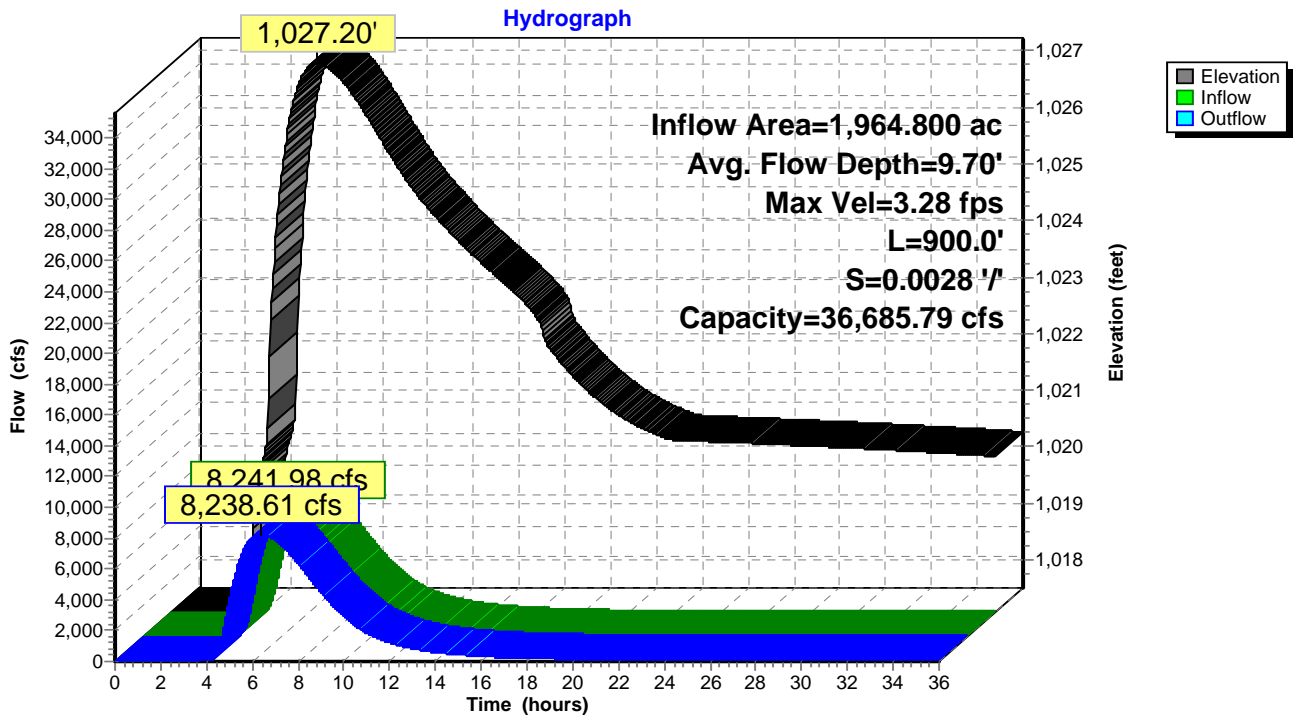
Custom cross-section, Length= 900.0' Slope= 0.0028 '/ (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



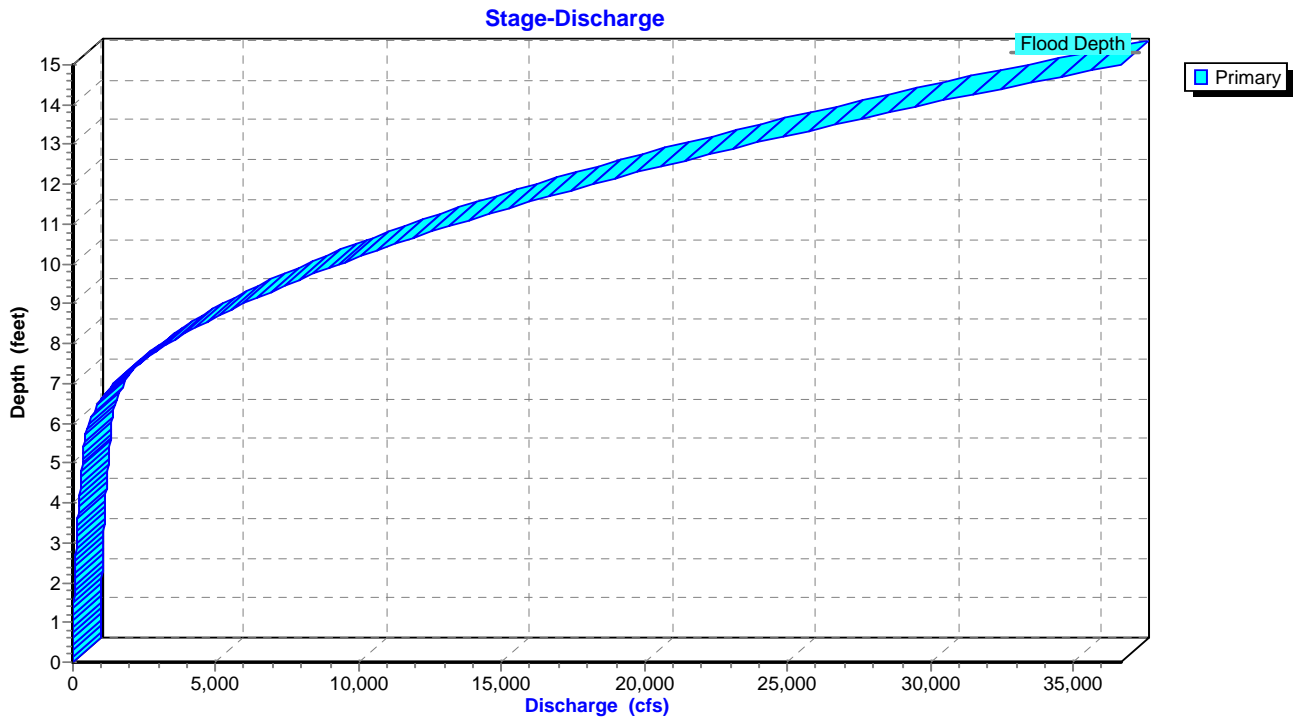
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

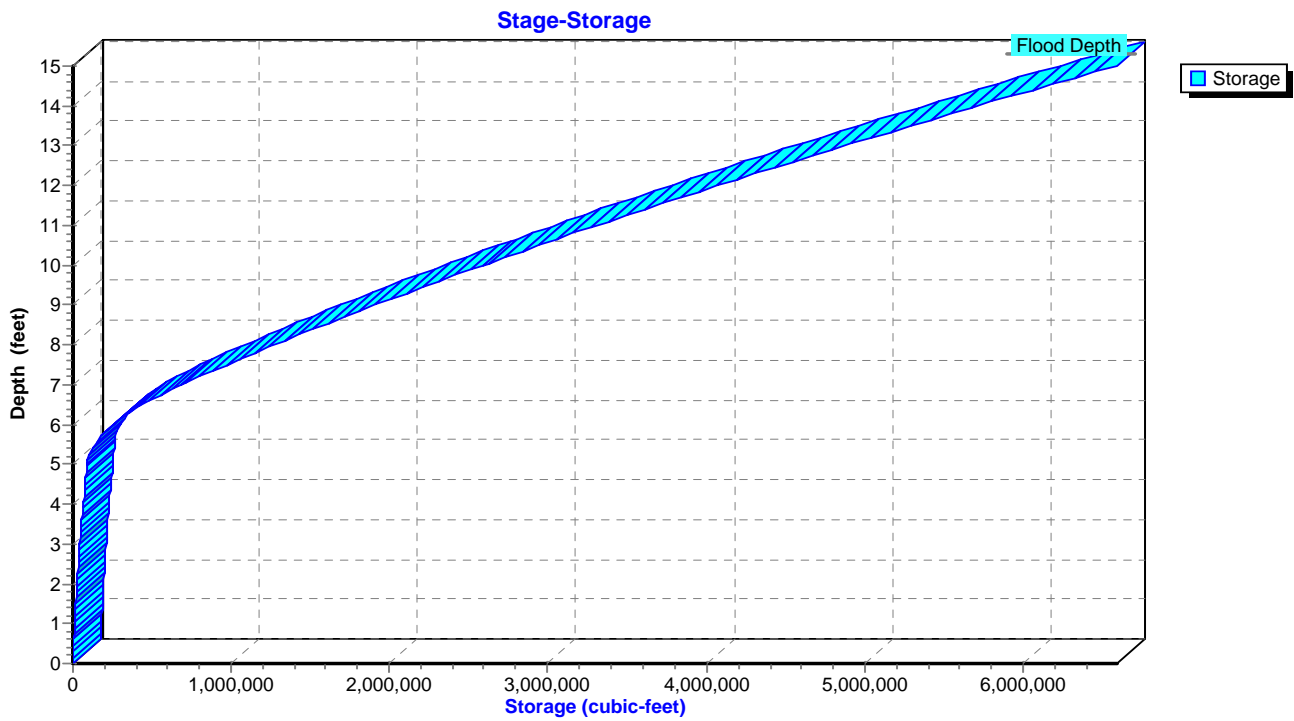
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



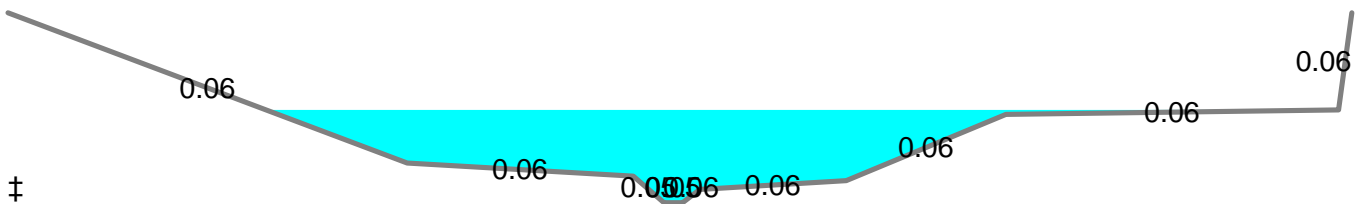
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 21.37" for 6 hr PMF TR-60 event
 Inflow = 26,875.65 cfs @ 5.38 hrs, Volume= 13,036.329 af
 Outflow = 25,726.43 cfs @ 5.65 hrs, Volume= 12,993.444 af, Atten= 4%, Lag= 16.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 4.13 fps, Min. Travel Time= 35.5 min
 Avg. Velocity = 2.01 fps, Avg. Travel Time= 72.9 min

Peak Storage= 60,963,087 cf @ 6.91 hrs
 Average Depth at Peak Storage= 21.03'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

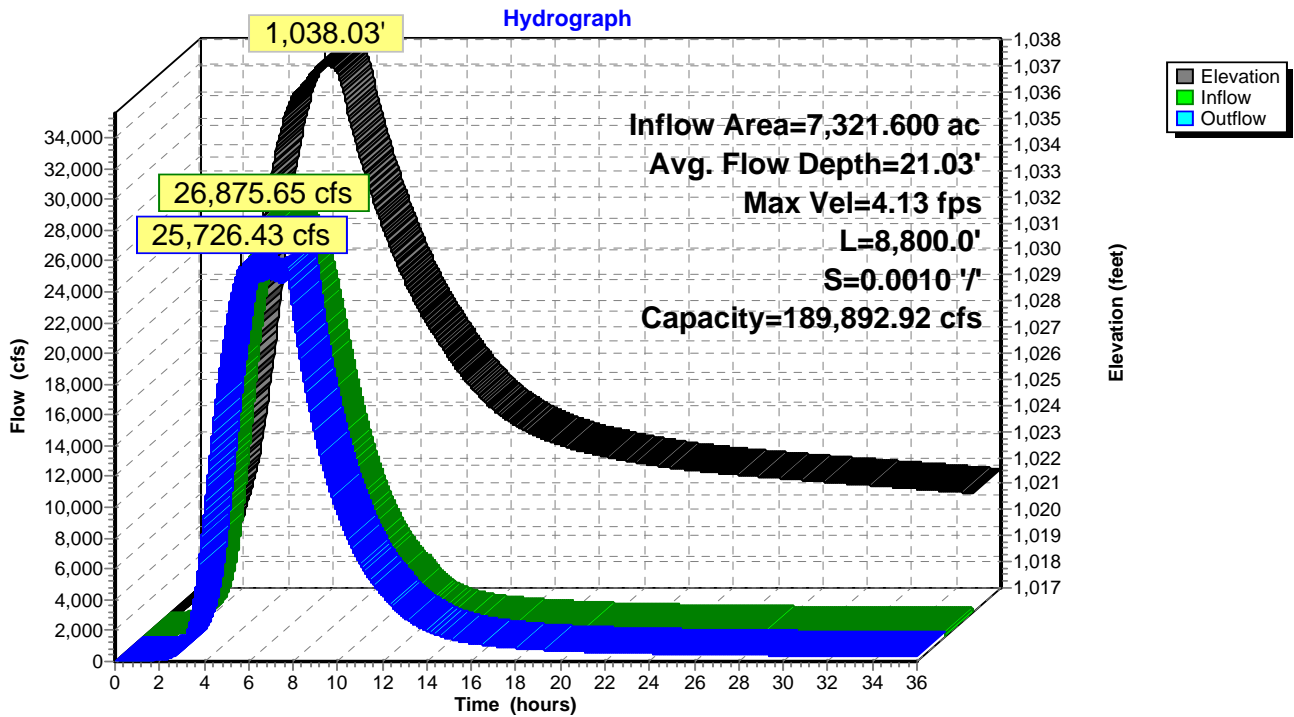
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



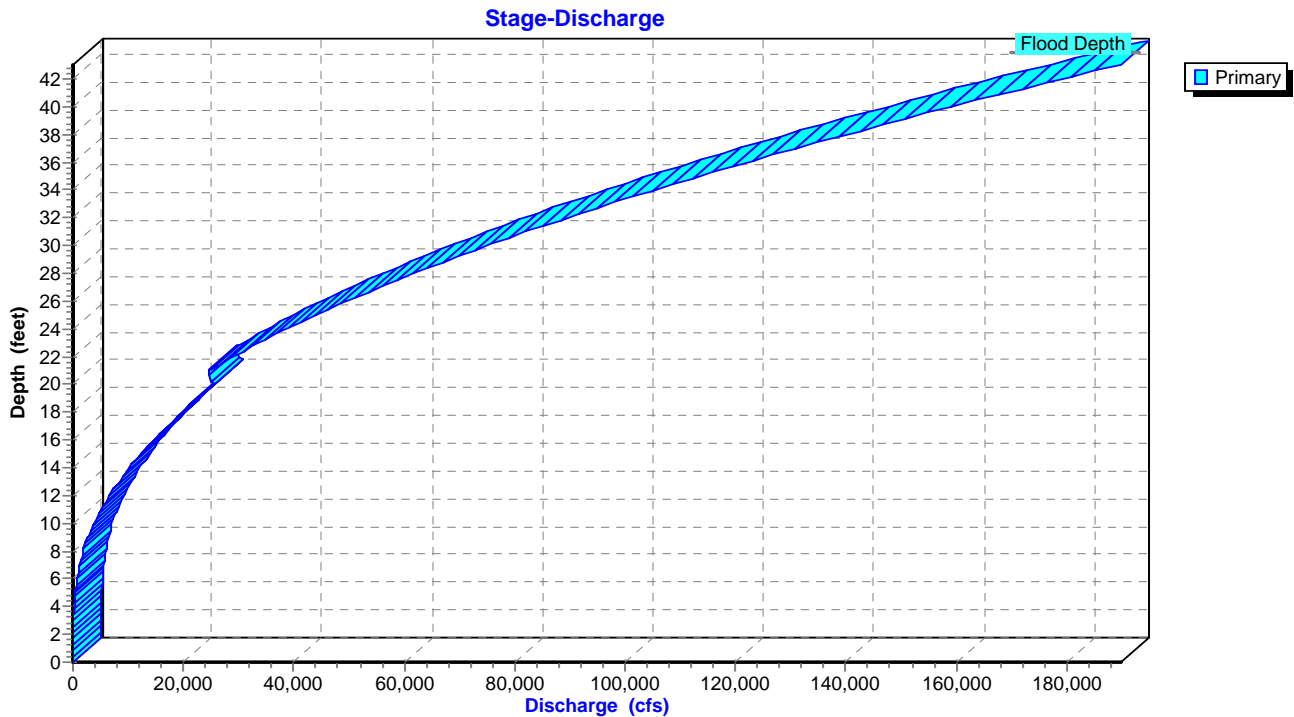
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

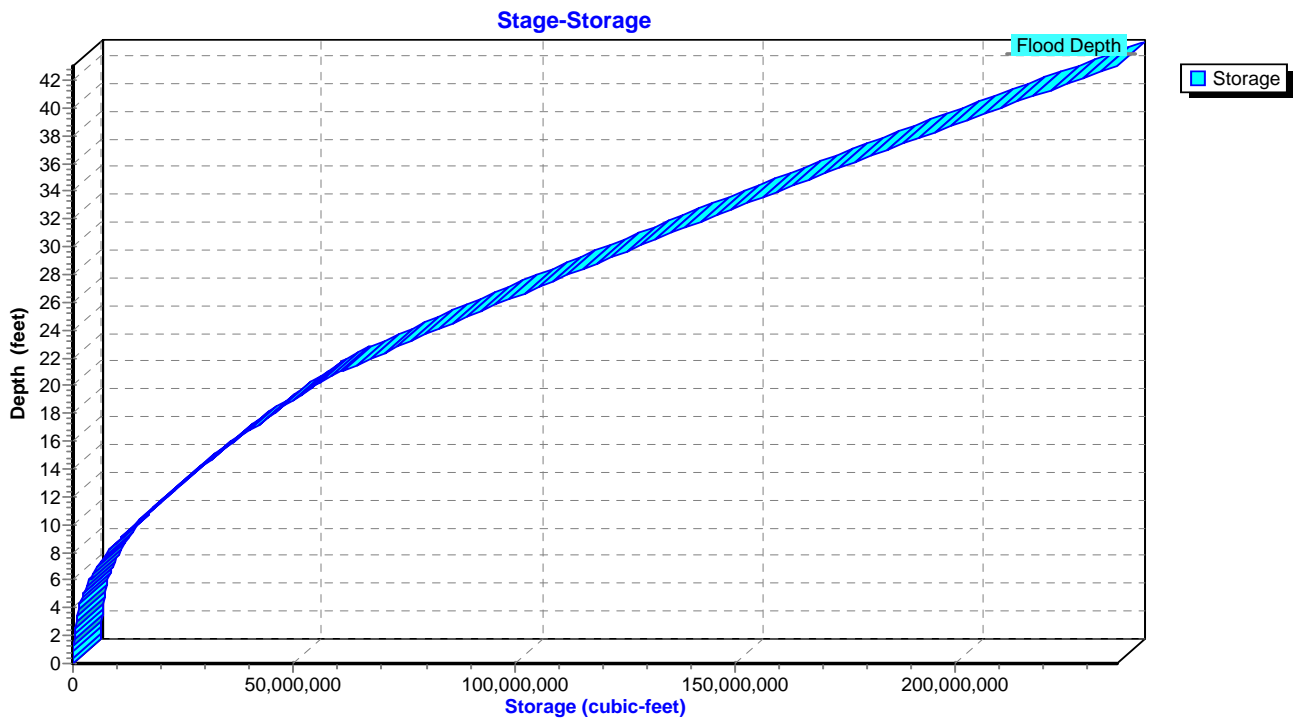
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



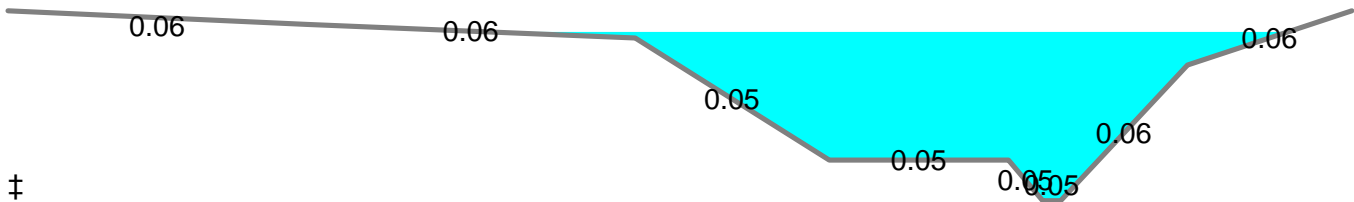
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 21.49" for 6 hr PMF TR-60 event
 Inflow = 30,666.22 cfs @ 5.66 hrs, Volume= 15,722.689 af
 Outflow = 29,994.14 cfs @ 5.80 hrs, Volume= 15,677.921 af, Atten= 2%, Lag= 8.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.15 fps, Min. Travel Time= 24.3 min
 Avg. Velocity = 2.28 fps, Avg. Travel Time= 54.7 min

Peak Storage= 43,668,232 cf @ 5.80 hrs
 Average Depth at Peak Storage= 24.88'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

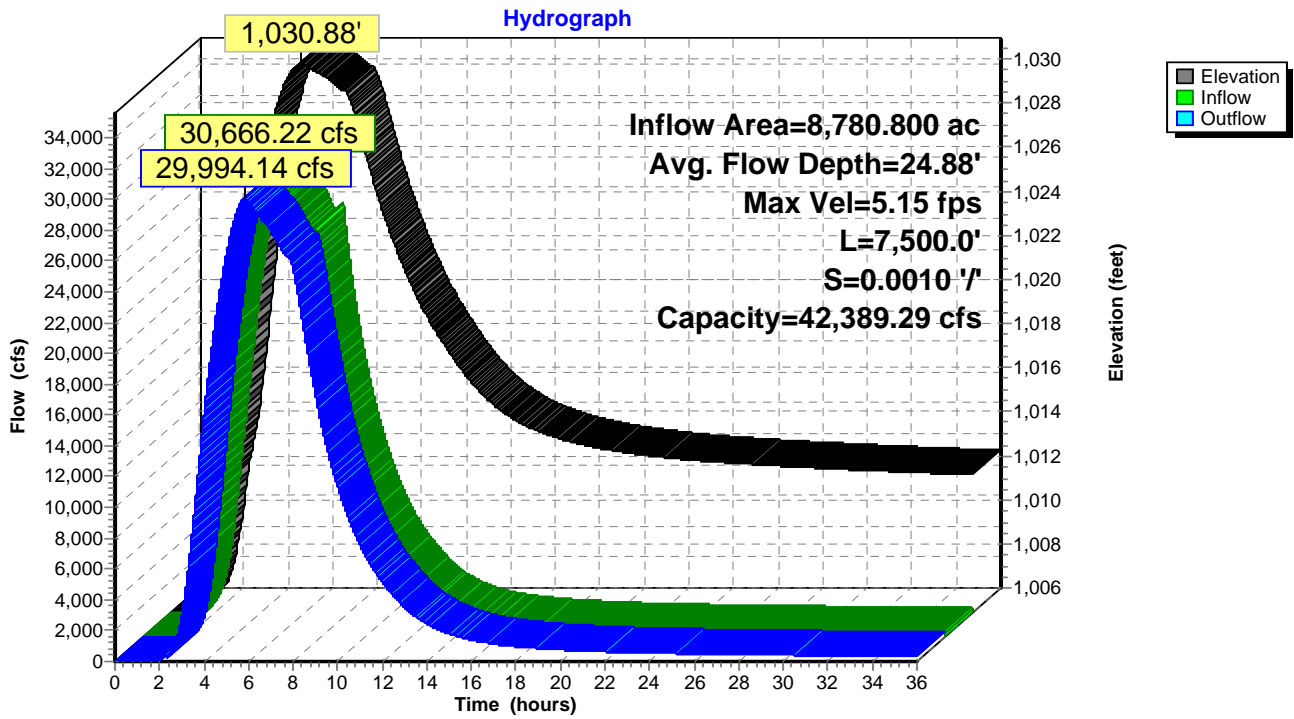
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



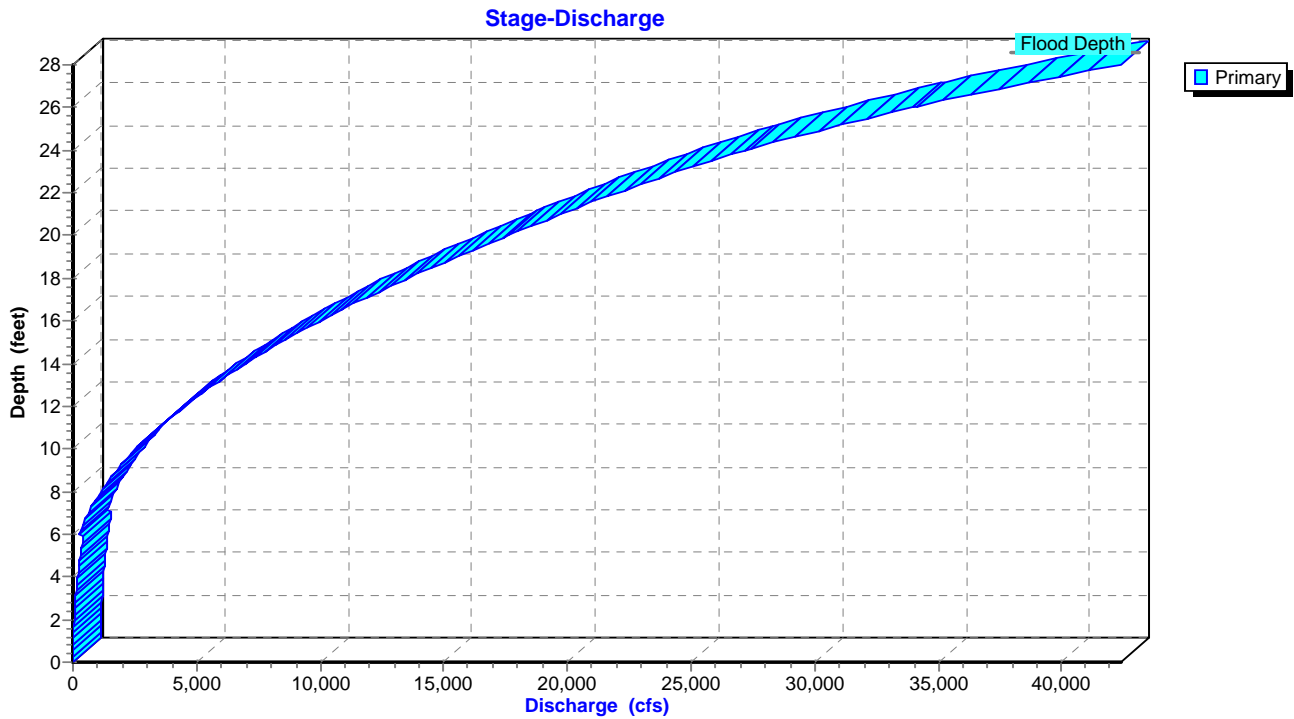
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

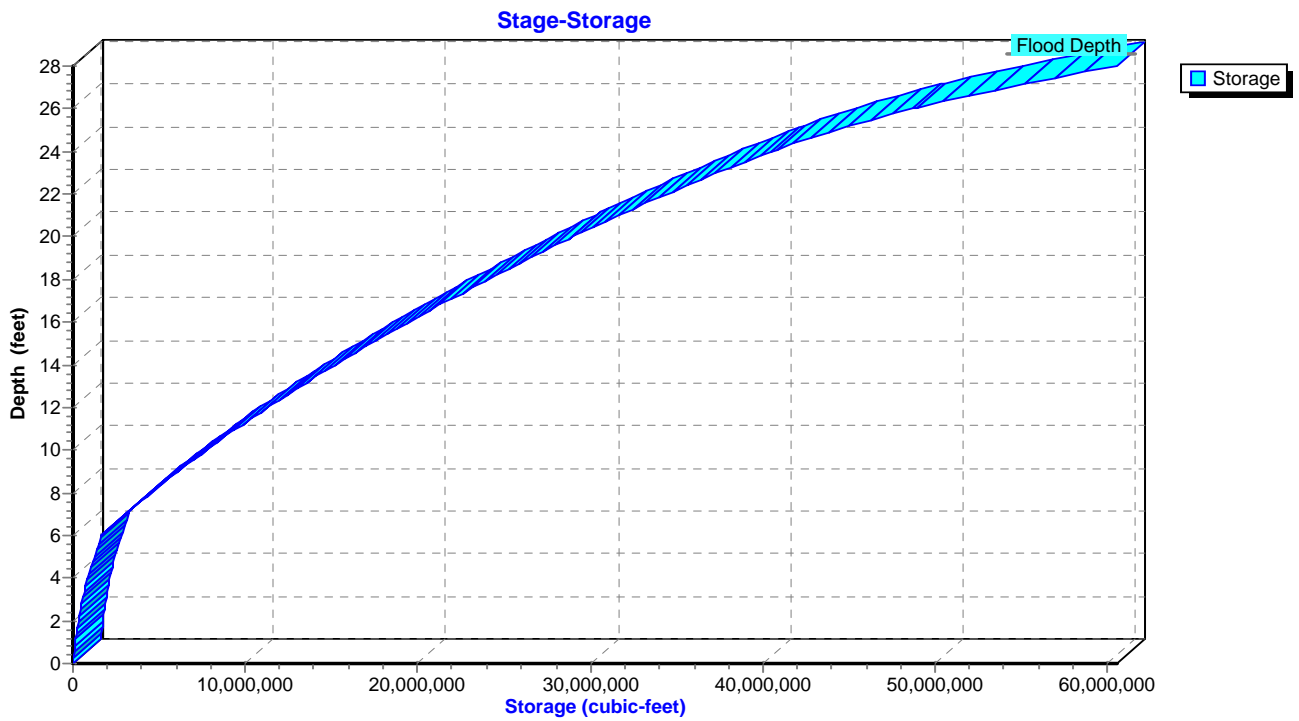
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



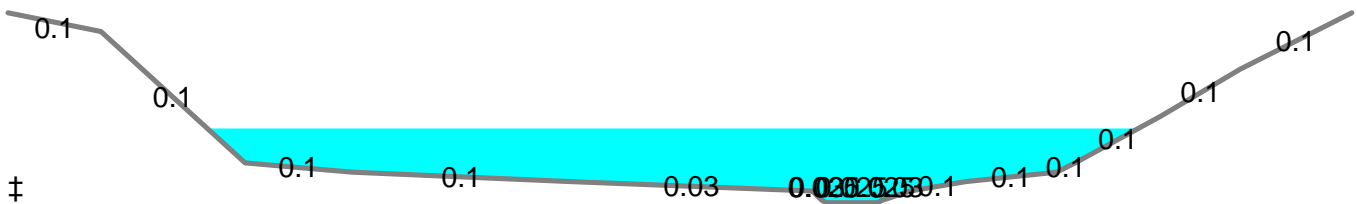
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 21.54" for 6 hr PMF TR-60 event
 Inflow = 31,762.22 cfs @ 5.97 hrs, Volume= 16,983.052 af
 Outflow = 31,762.34 cfs @ 5.98 hrs, Volume= 16,982.927 af, Atten= 0%, Lag= 0.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 15.14 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 10.00 fps, Avg. Travel Time= 0.8 min

Peak Storage= 944,202 cf @ 5.98 hrs
 Average Depth at Peak Storage= 15.82'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

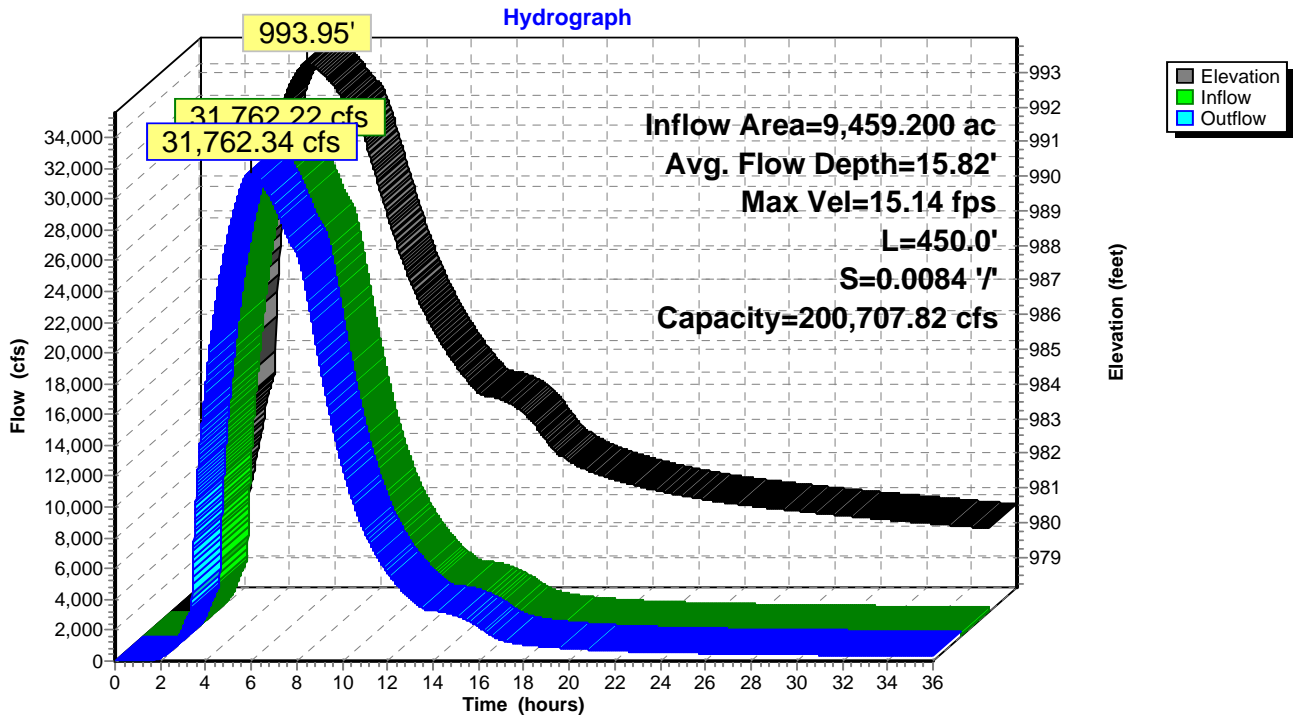
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



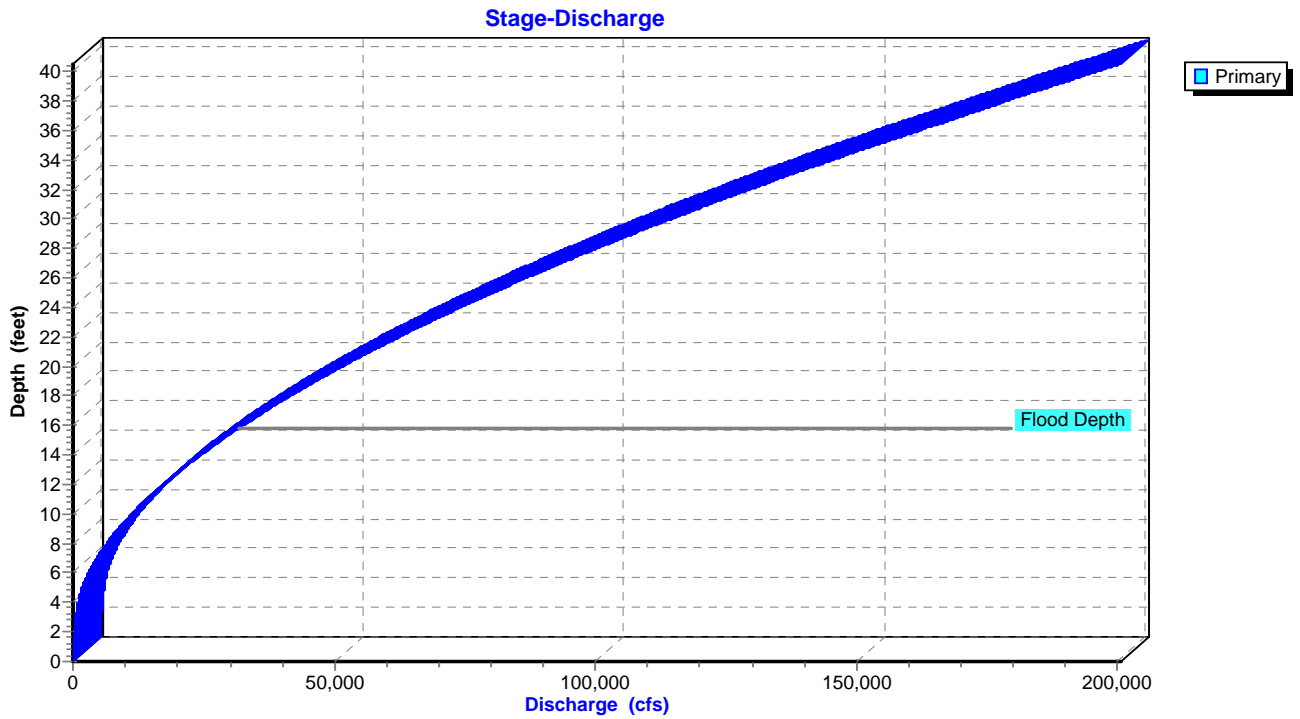
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

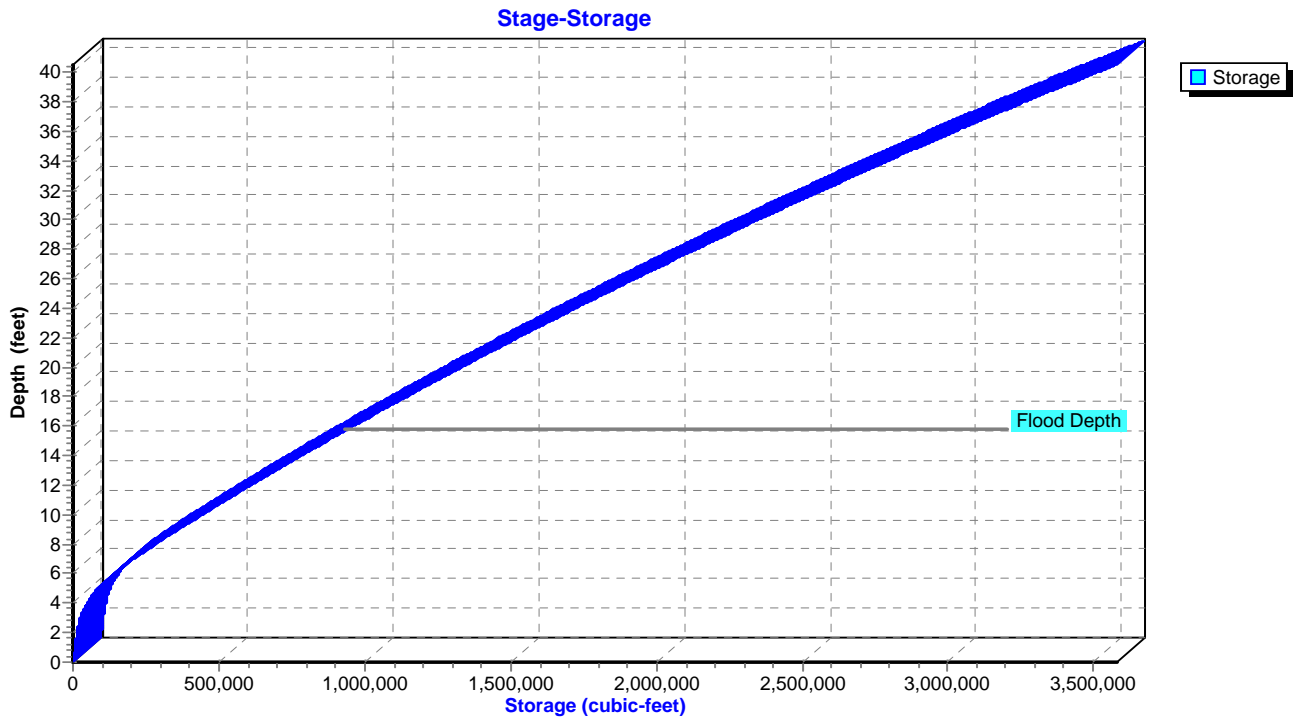
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

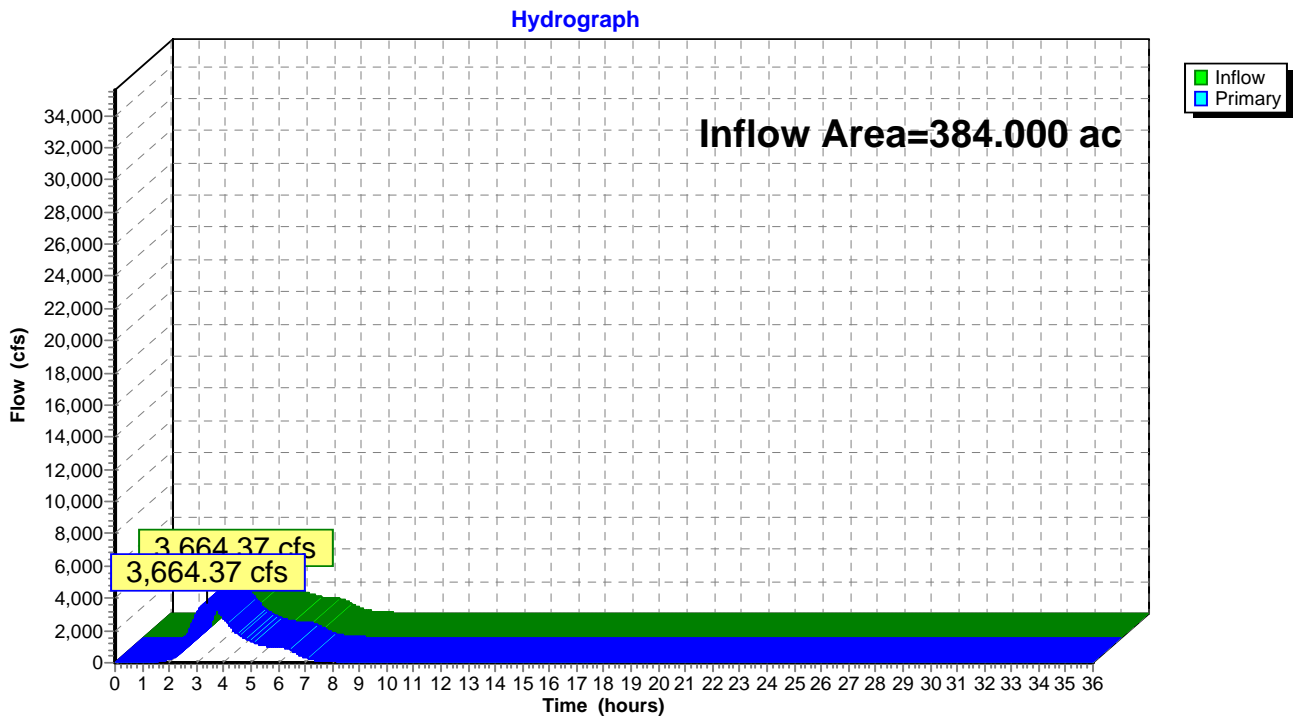


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth = 22.48" for 6 hr PMF TR-60 event
Inflow = 3,664.37 cfs @ 3.39 hrs, Volume= 719.332 af
Primary = 3,664.37 cfs @ 3.40 hrs, Volume= 719.332 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 21.56" for 6 hr PMF TR-60 event
 Inflow = 31,969.77 cfs @ 5.78 hrs, Volume= 16,998.692 af
 Outflow = 31,764.74 cfs @ 5.94 hrs, Volume= 16,984.808 af, Atten= 1%, Lag= 10.1 min
 Primary = 6,095.56 cfs @ 5.94 hrs, Volume= 4,787.698 af
 Secondary = 20,860.32 cfs @ 5.94 hrs, Volume= 10,293.374 af
 Tertiary = 4,808.93 cfs @ 5.95 hrs, Volume= 1,903.735 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,017.39' @ 5.96 hrs Surf.Area= 77.686 ac Storage= 617.831 af (556.869 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 21.5 min calculated for 16,919.146 af (100% of inflow)
 Center-of-Mass det. time= 13.2 min (496.5 - 483.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

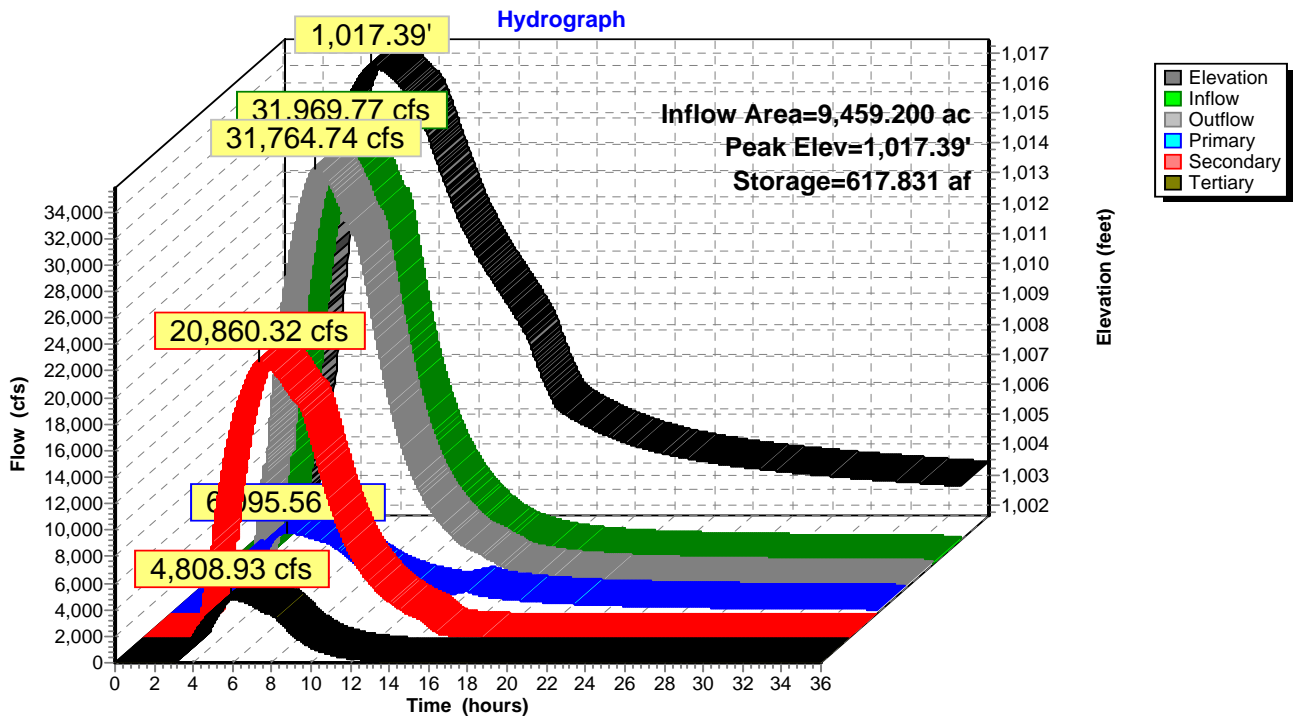
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

Primary OutFlow Max=6,095.16 cfs @ 5.94 hrs HW=1,017.39' TW=1,014.62' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 6,095.16 cfs @ 7.74 fps)

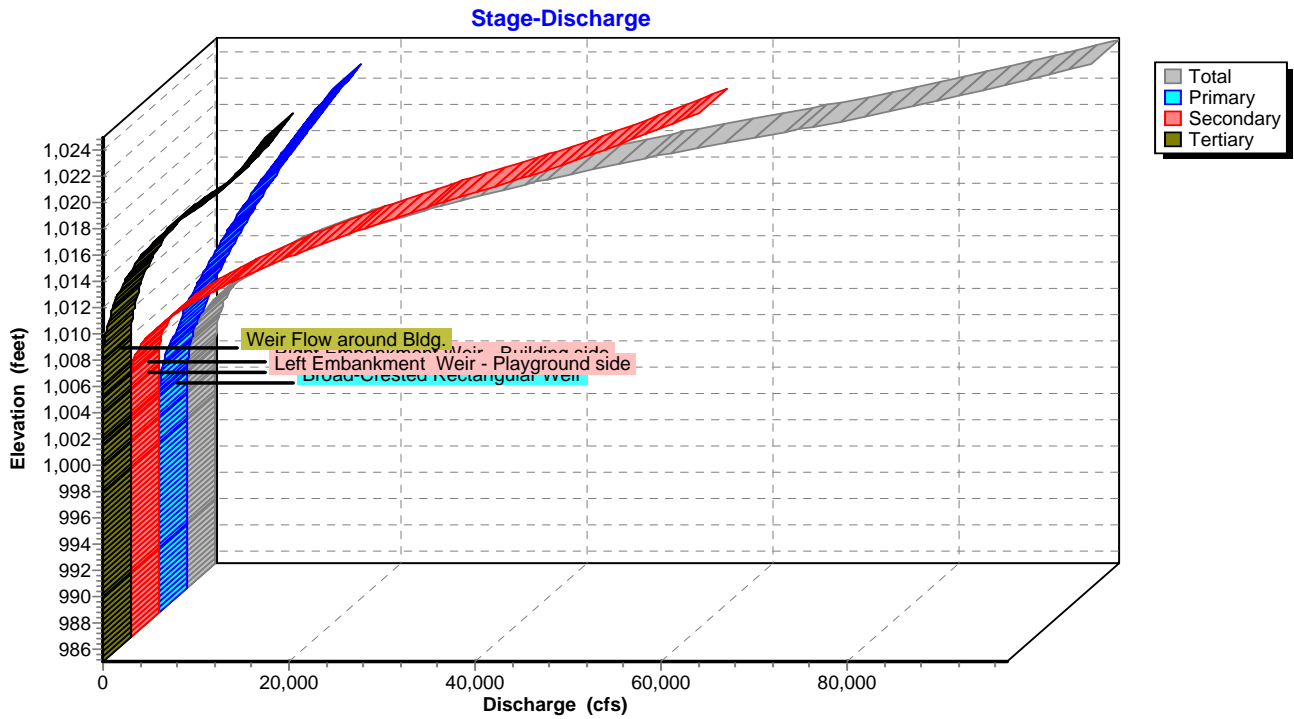
Secondary OutFlow Max=20,858.91 cfs @ 5.94 hrs HW=1,017.39' TW=1,014.62' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 6,611.74 cfs @ 7.51 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 14,247.17 cfs @ 7.40 fps)

Tertiary OutFlow Max=4,808.74 cfs @ 5.95 hrs HW=1,017.39' TW=1,014.62' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Weir Controls 4,808.74 cfs @ 3.38 fps)

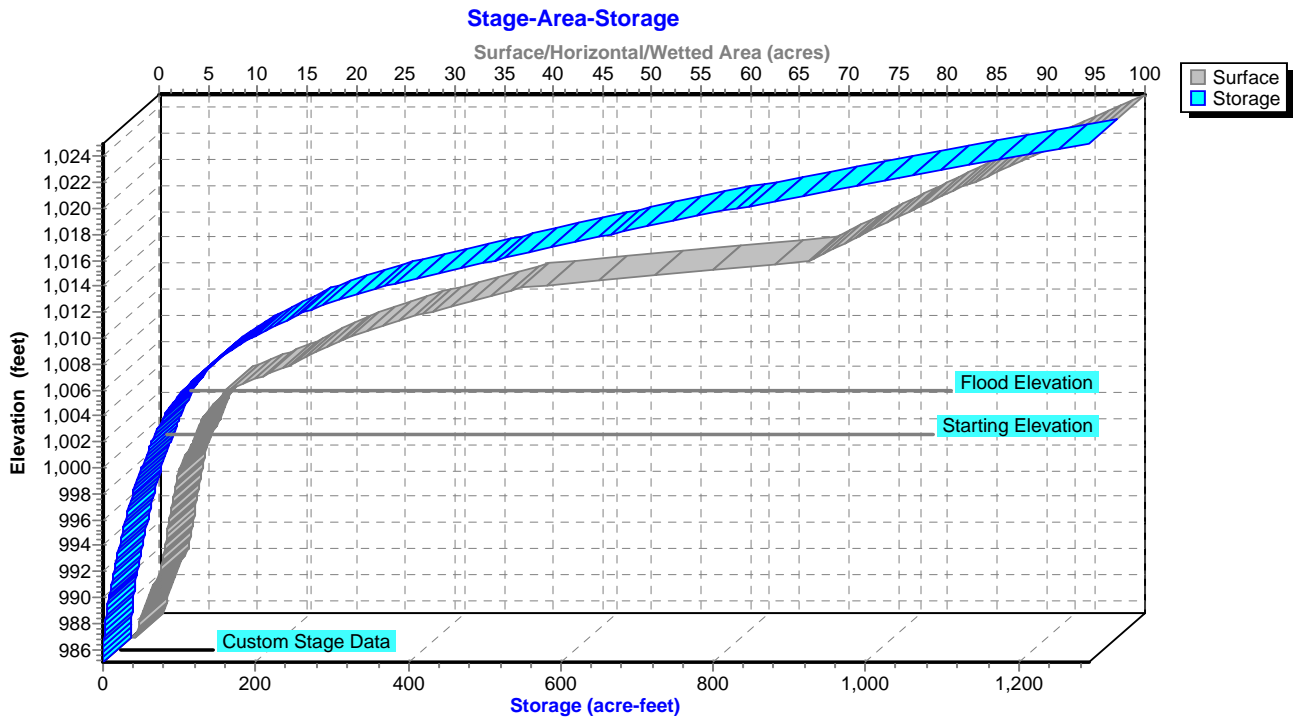
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

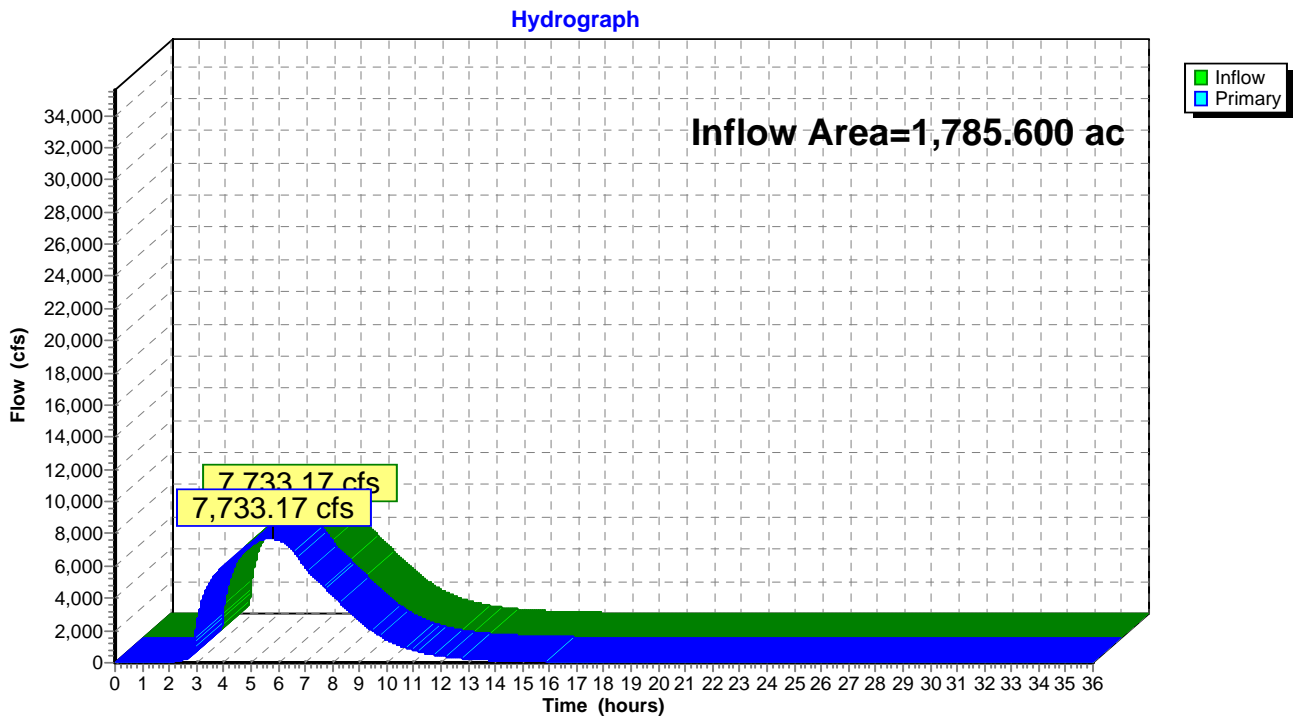


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 21.81" for 6 hr PMF TR-60 event
Inflow = 7,733.17 cfs @ 5.77 hrs, Volume= 3,244.892 af
Primary = 7,733.17 cfs @ 5.78 hrs, Volume= 3,244.892 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 21.81" for 6 hr PMF TR-60 event
 Inflow = 7,733.17 cfs @ 5.78 hrs, Volume= 3,244.891 af
 Outflow = 6,815.05 cfs @ 6.63 hrs, Volume= 3,323.238 af, Atten= 12%, Lag= 51.1 min
 Primary = 1,137.10 cfs @ 6.63 hrs, Volume= 1,445.120 af
 Secondary = 5,677.95 cfs @ 6.63 hrs, Volume= 1,878.118 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,101.10' @ 6.63 hrs Surf.Area= 349.138 ac Storage= 2,975.885 af (1,061.885 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= 688.5 min calculated for 1,408.847 af (43% of inflow)
 Center-of-Mass det. time= 249.1 min (633.6 - 384.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

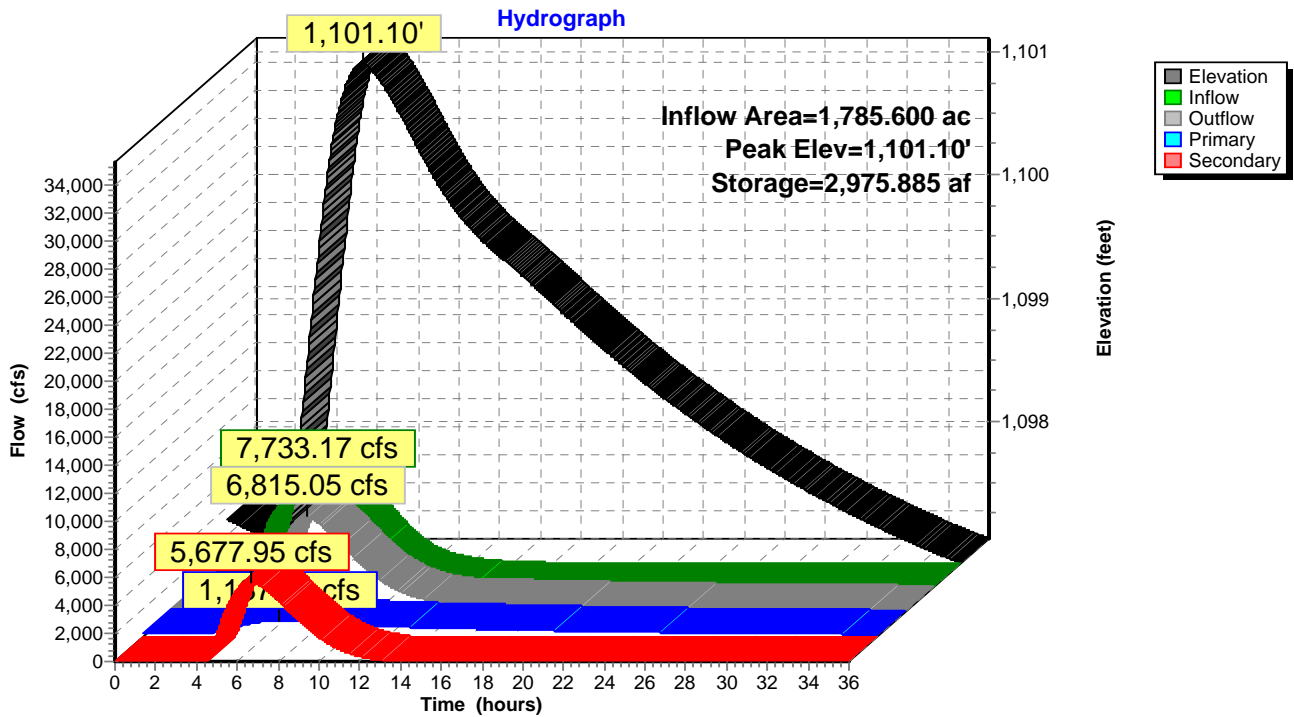
Primary OutFlow Max=1,137.10 cfs @ 6.63 hrs HW=1,101.10' TW=1,077.77' (Dynamic Tailwater)

- ↑ 1=Culvert-RCP (Barrel Controls 135.33 cfs @ 19.14 fps)
- ↑ 2=Custom Weir/Orifice (Weir Controls 1,001.77 cfs @ 7.10 fps)

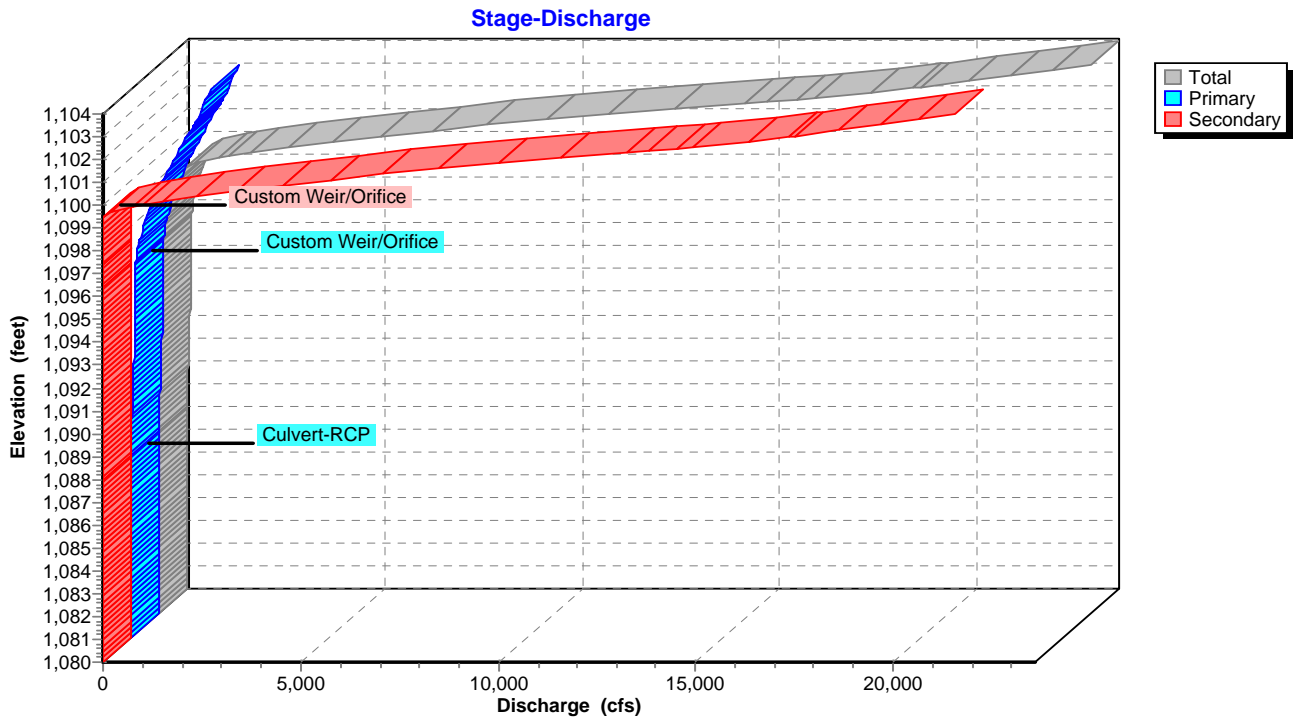
Secondary OutFlow Max=5,677.91 cfs @ 6.63 hrs HW=1,101.10' TW=1,077.77' (Dynamic Tailwater)

- ↑ 3=Custom Weir/Orifice (Weir Controls 5,677.91 cfs @ 3.54 fps)

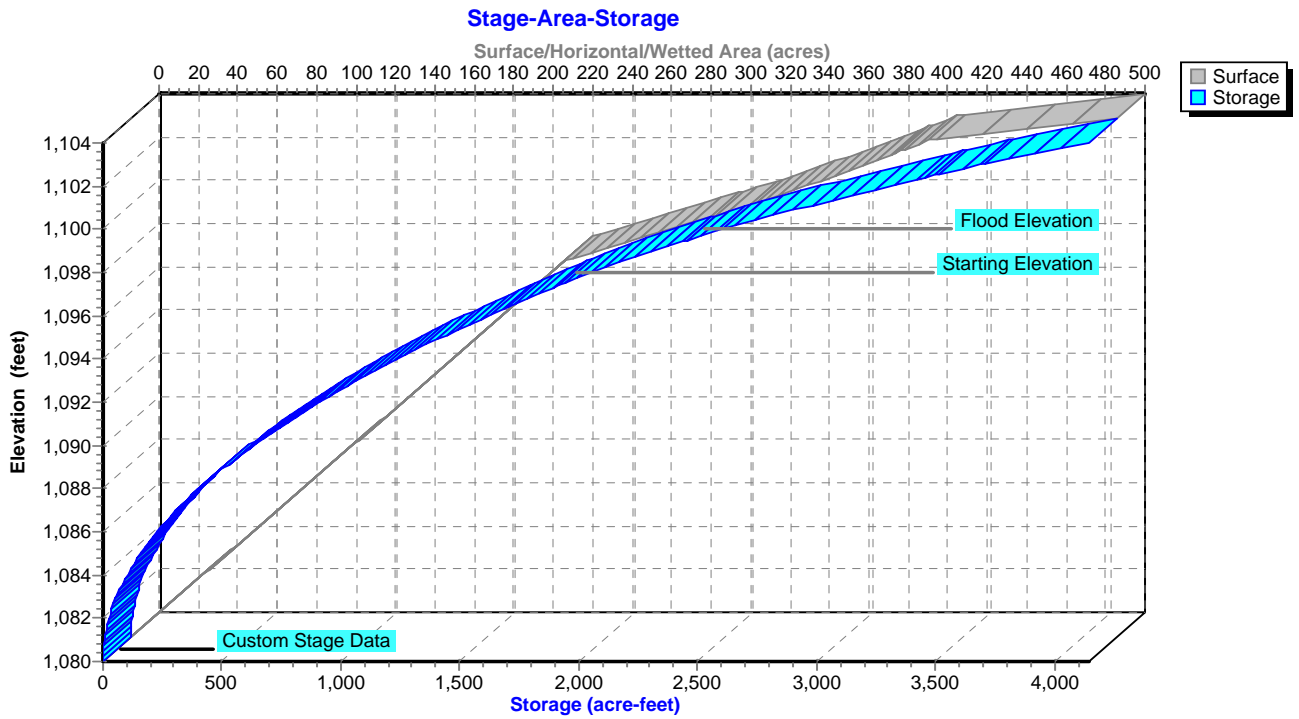
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable



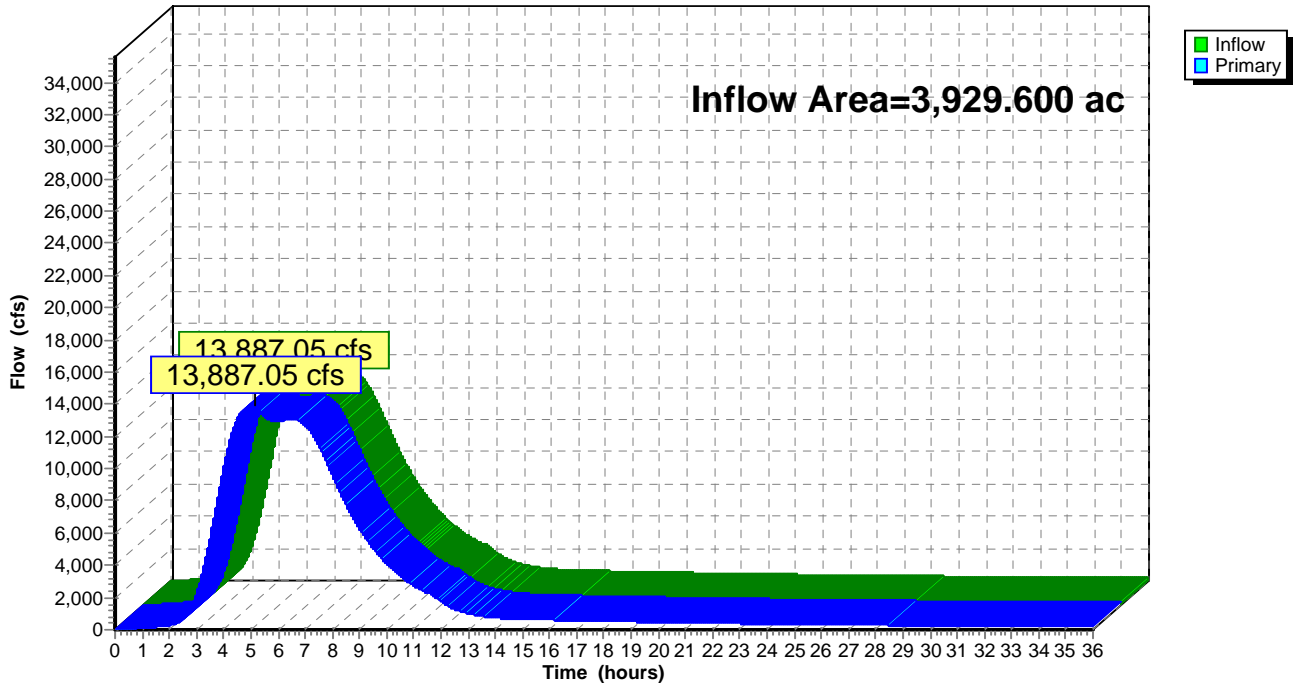
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 21.73" for 6 hr PMF TR-60 event
Inflow = 13,887.05 cfs @ 5.13 hrs, Volume= 7,117.016 af
Primary = 13,887.05 cfs @ 5.14 hrs, Volume= 7,117.016 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth = 22.48" for 6 hr PMF TR-60 event
 Inflow = 3,664.37 cfs @ 3.40 hrs, Volume= 719.332 af
 Outflow = 3,587.04 cfs @ 3.56 hrs, Volume= 718.729 af, Atten= 2%, Lag= 9.4 min
 Primary = 3,158.66 cfs @ 3.56 hrs, Volume= 666.641 af
 Secondary = 428.38 cfs @ 3.56 hrs, Volume= 52.088 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,109.71' @ 3.56 hrs Surf.Area= 37.794 ac Storage= 135.596 af (111.296 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 83.8 min calculated for 694.237 af (97% of inflow)
 Center-of-Mass det. time= 68.1 min (323.5 - 255.4)

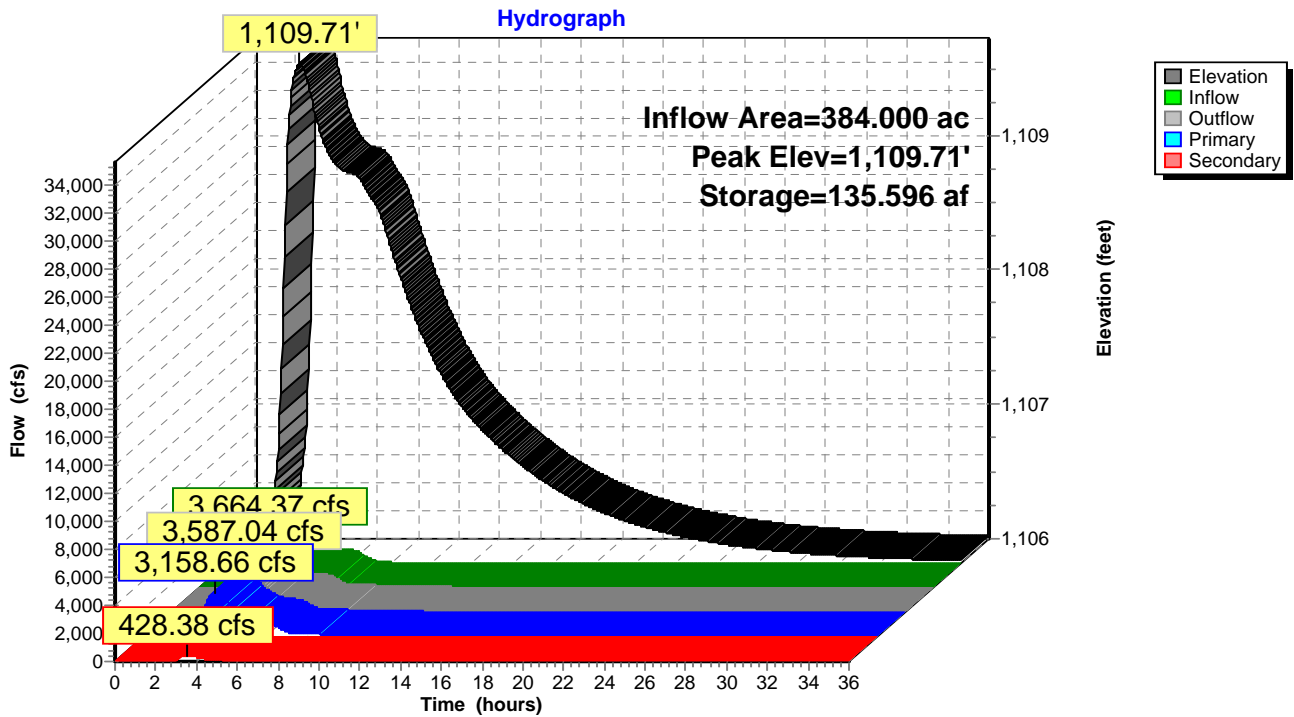
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

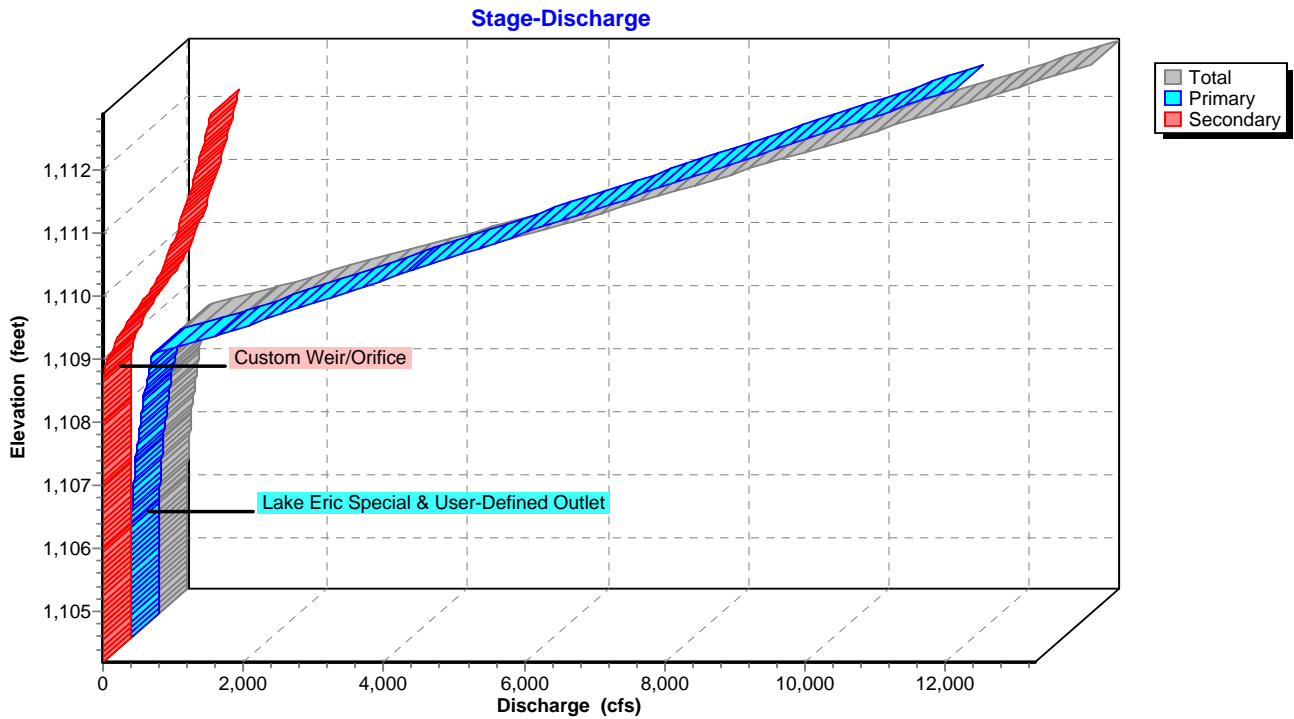
Primary OutFlow Max=3,158.65 cfs @ 3.56 hrs HW=1,109.71' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 3,158.65 cfs)

Secondary OutFlow Max=428.38 cfs @ 3.56 hrs HW=1,109.71' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 428.38 cfs @ 2.82 fps)

Pond 4P: Lake O'Springs

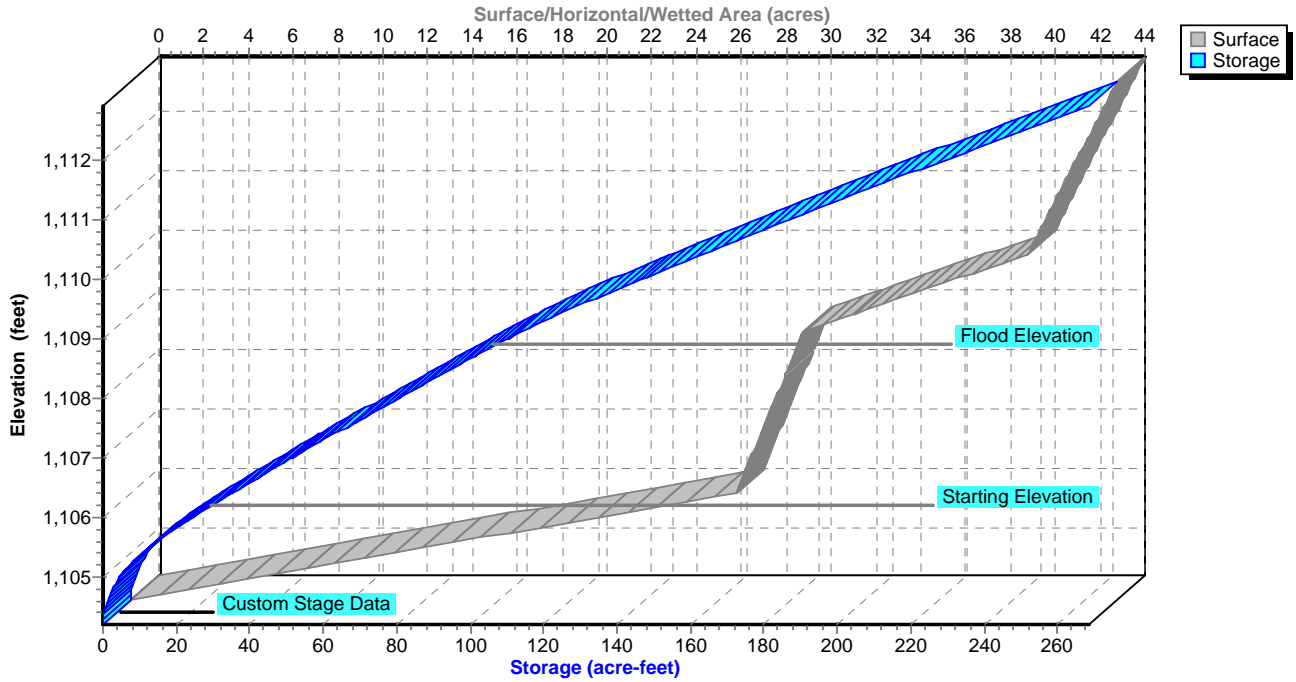


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



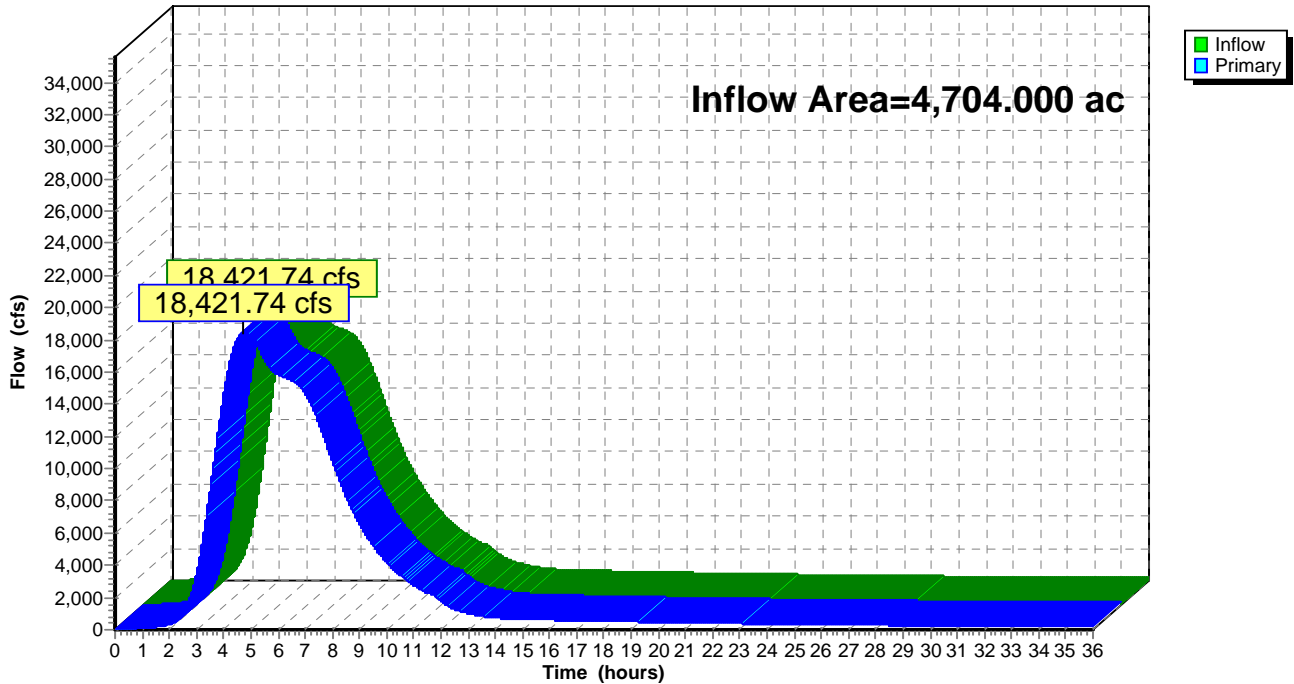
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 21.62" for 6 hr PMF TR-60 event
Inflow = 18,421.74 cfs @ 4.73 hrs, Volume= 8,475.020 af
Primary = 18,421.74 cfs @ 4.74 hrs, Volume= 8,475.020 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 22.36" for 6 hr PMF TR-60 event
 Inflow = 1,201.03 cfs @ 3.18 hrs, Volume= 214.656 af
 Outflow = 1,199.15 cfs @ 3.20 hrs, Volume= 214.535 af, Atten= 0%, Lag= 1.3 min
 Primary = 711.29 cfs @ 3.20 hrs, Volume= 146.788 af
 Secondary = 487.85 cfs @ 3.20 hrs, Volume= 67.747 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,121.10' @ 3.20 hrs Surf.Area= 4.631 ac Storage= 32.369 af (18.679 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 55.0 min calculated for 200.845 af (94% of inflow)
 Center-of-Mass det. time= 36.7 min (267.2 - 230.6)

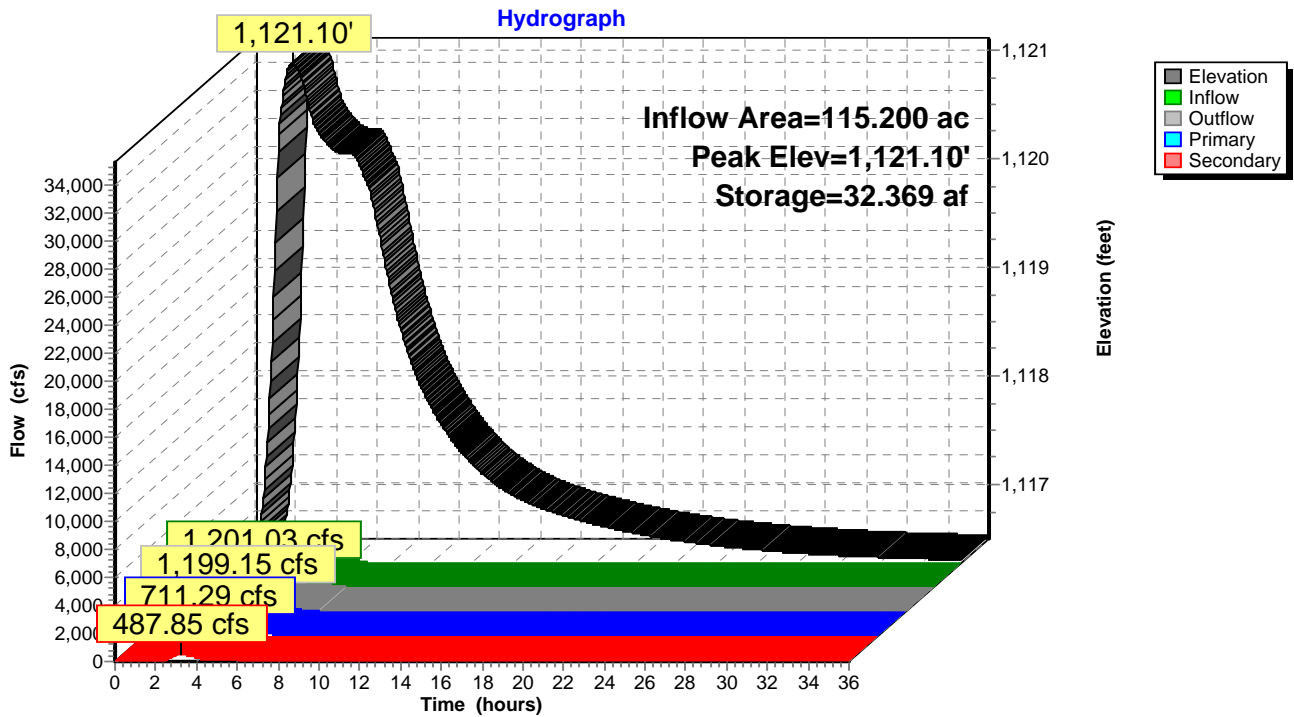
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

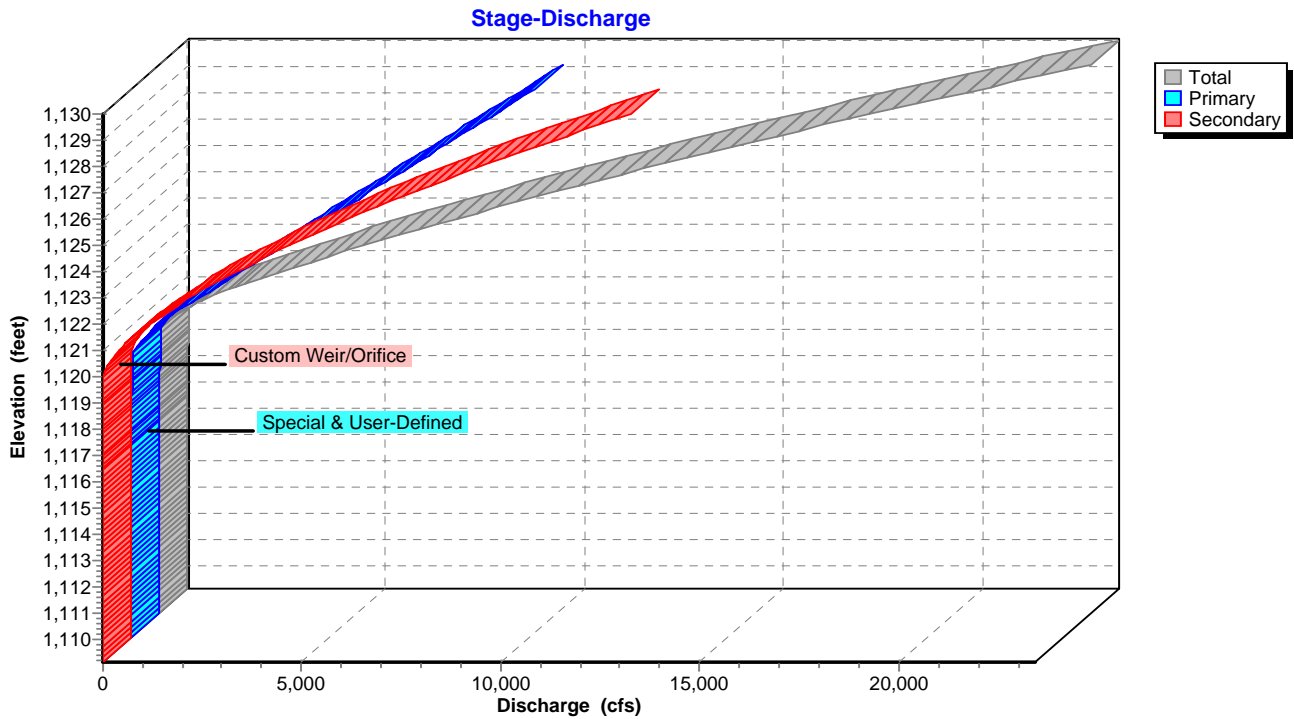
Primary OutFlow Max=711.28 cfs @ 3.20 hrs HW=1,121.10' TW=0.00' (Dynamic Tailwater)
 ↑1=Special & User-Defined (Custom Controls 711.28 cfs)

Secondary OutFlow Max=487.84 cfs @ 3.20 hrs HW=1,121.10' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 487.84 cfs @ 2.94 fps)

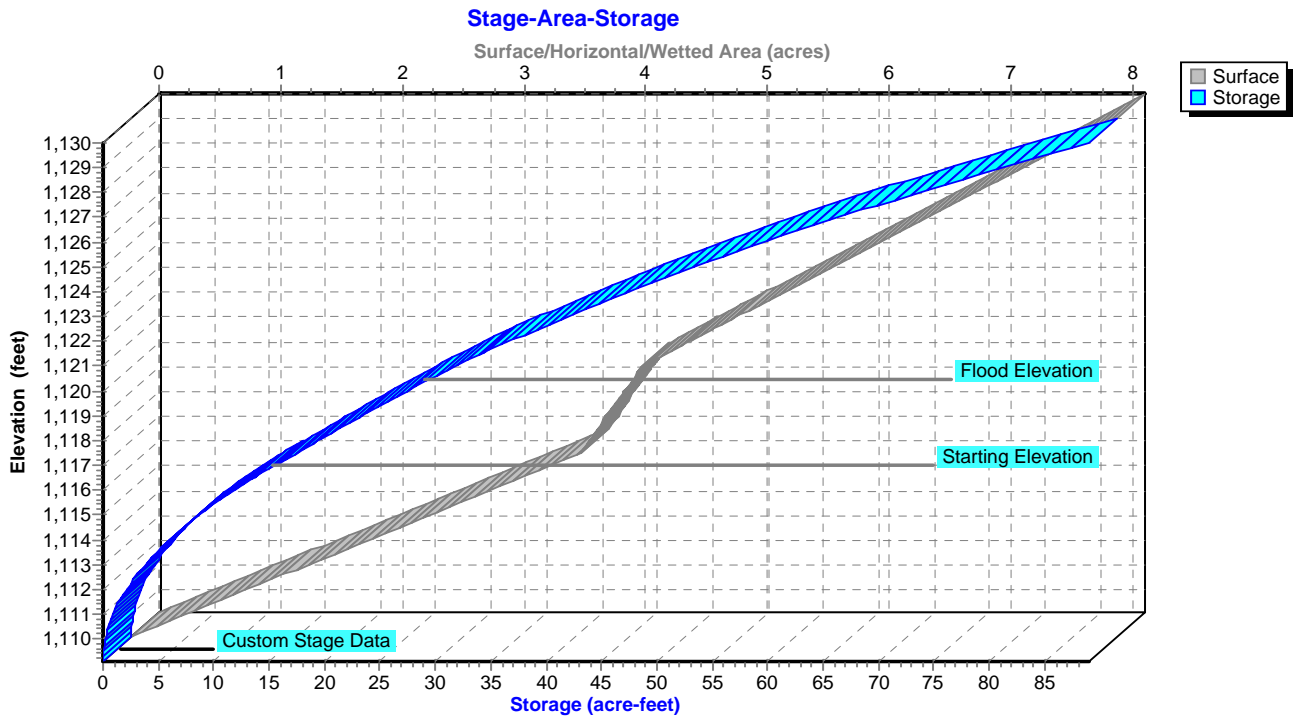
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



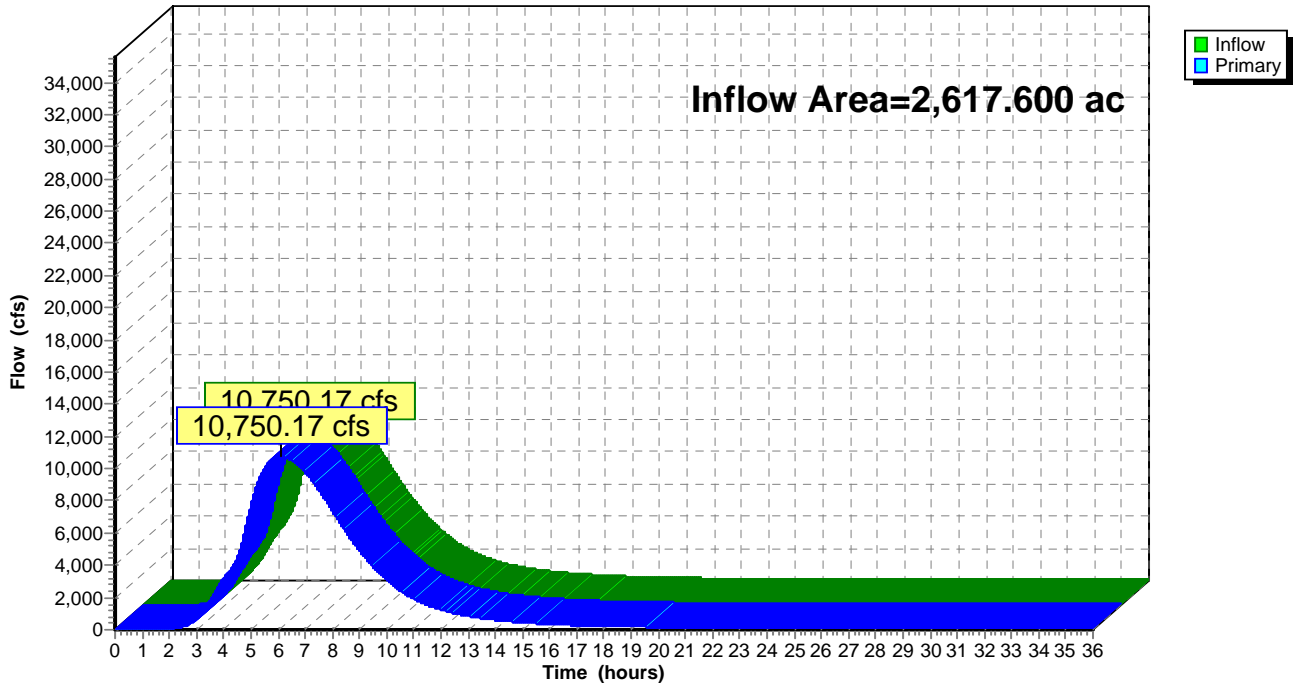
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 20.91" for 6 hr PMF TR-60 event
Inflow = 10,750.17 cfs @ 6.08 hrs, Volume= 4,561.781 af
Primary = 10,750.17 cfs @ 6.09 hrs, Volume= 4,561.781 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

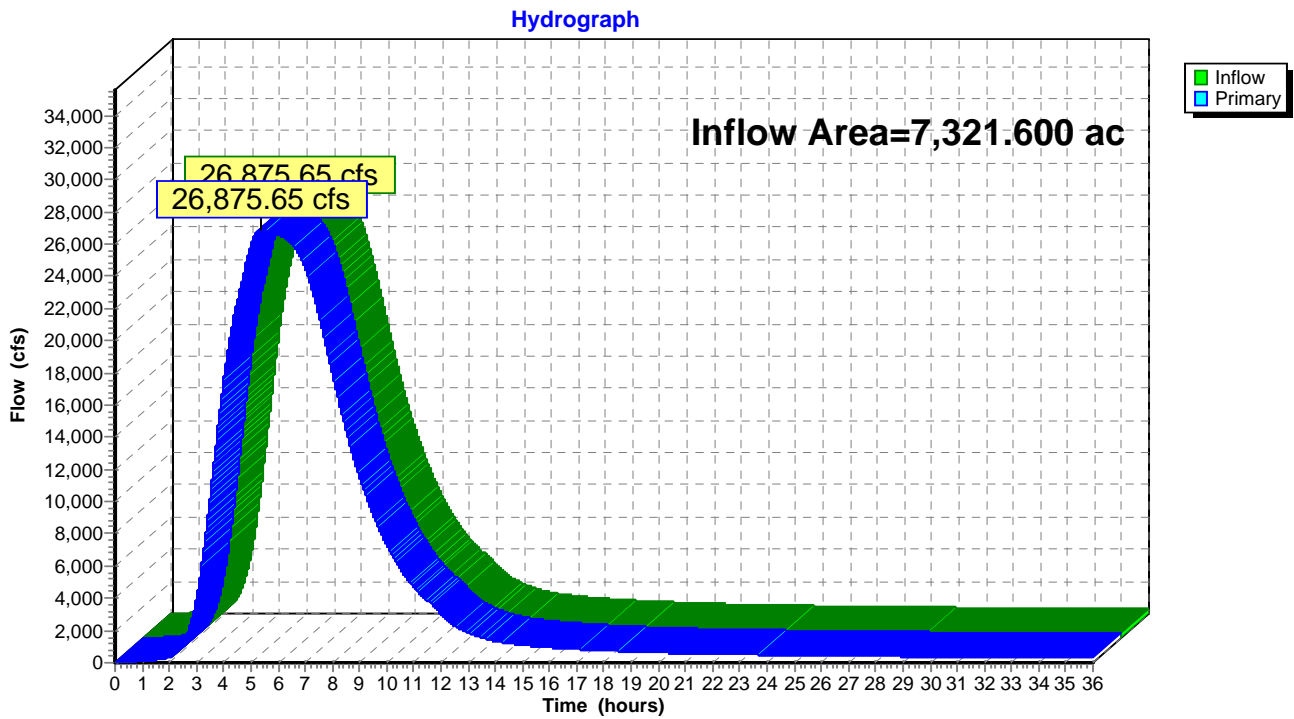


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 21.37" for 6 hr PMF TR-60 event
Inflow = 26,875.65 cfs @ 5.37 hrs, Volume= 13,036.565 af
Primary = 26,875.65 cfs @ 5.38 hrs, Volume= 13,036.565 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



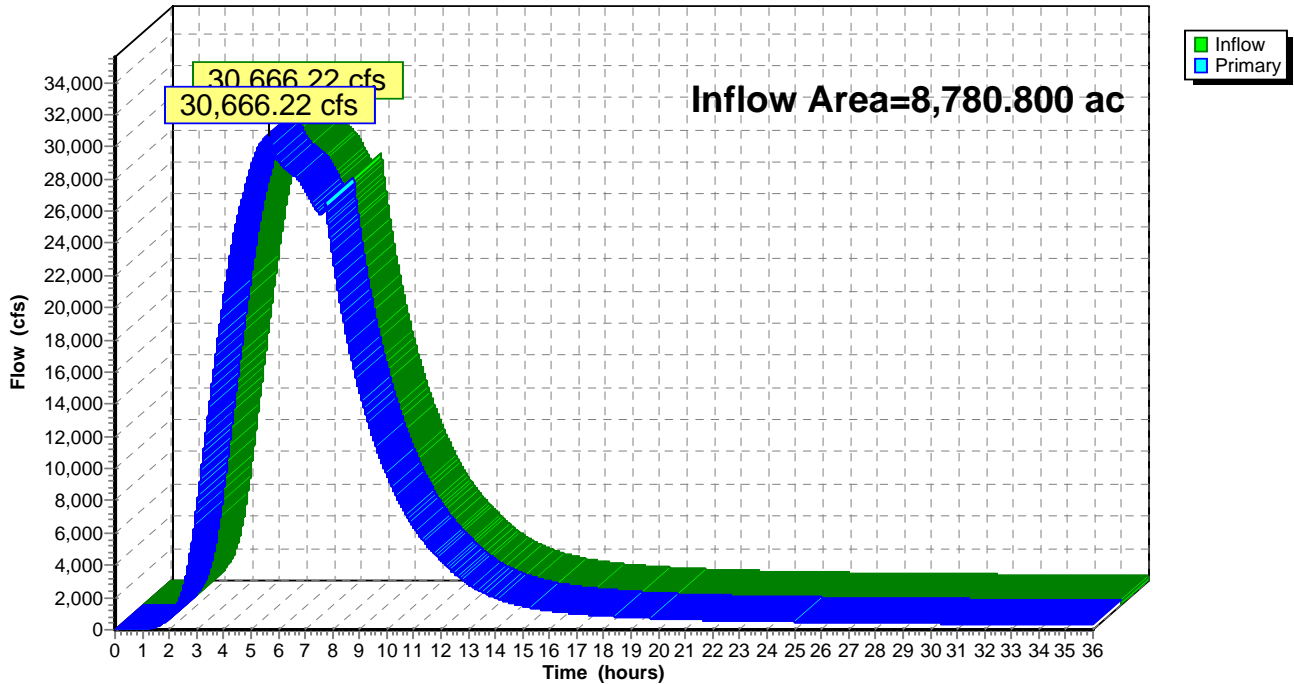
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 21.49" for 6 hr PMF TR-60 event
Inflow = 30,666.22 cfs @ 5.65 hrs, Volume= 15,722.940 af
Primary = 30,666.22 cfs @ 5.66 hrs, Volume= 15,722.940 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 21.97" for 6 hr PMF TR-60 event
 Inflow = 12,104.92 cfs @ 4.89 hrs, Volume= 3,596.882 af
 Outflow = 8,241.98 cfs @ 6.31 hrs, Volume= 3,417.863 af, Atten= 32%, Lag= 85.4 min
 Primary = 130.35 cfs @ 4.23 hrs, Volume= 292.476 af
 Secondary = 8,142.61 cfs @ 6.31 hrs, Volume= 3,125.388 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,029.90' @ 6.32 hrs Surf.Area= 252.799 ac Storage= 1,292.779 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 183.3 min calculated for 3,417.863 af (95% of inflow)
 Center-of-Mass det. time= 166.0 min (537.4 - 371.4)

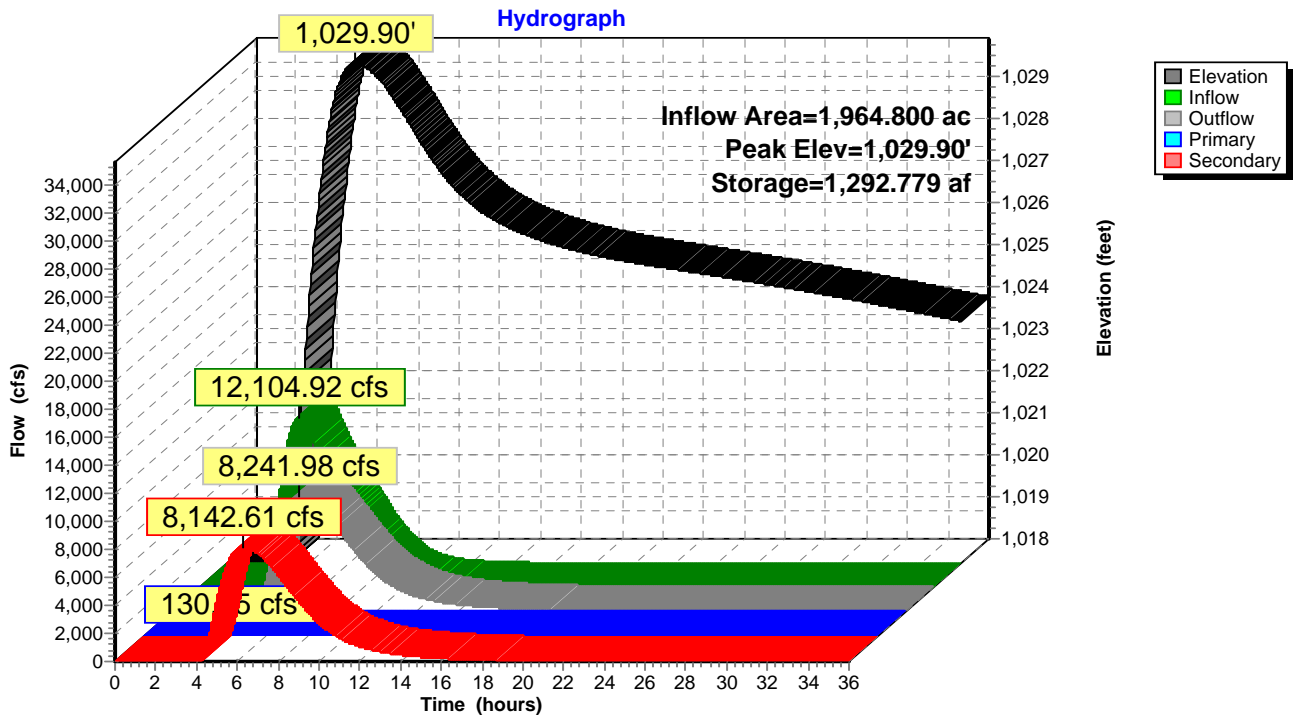
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

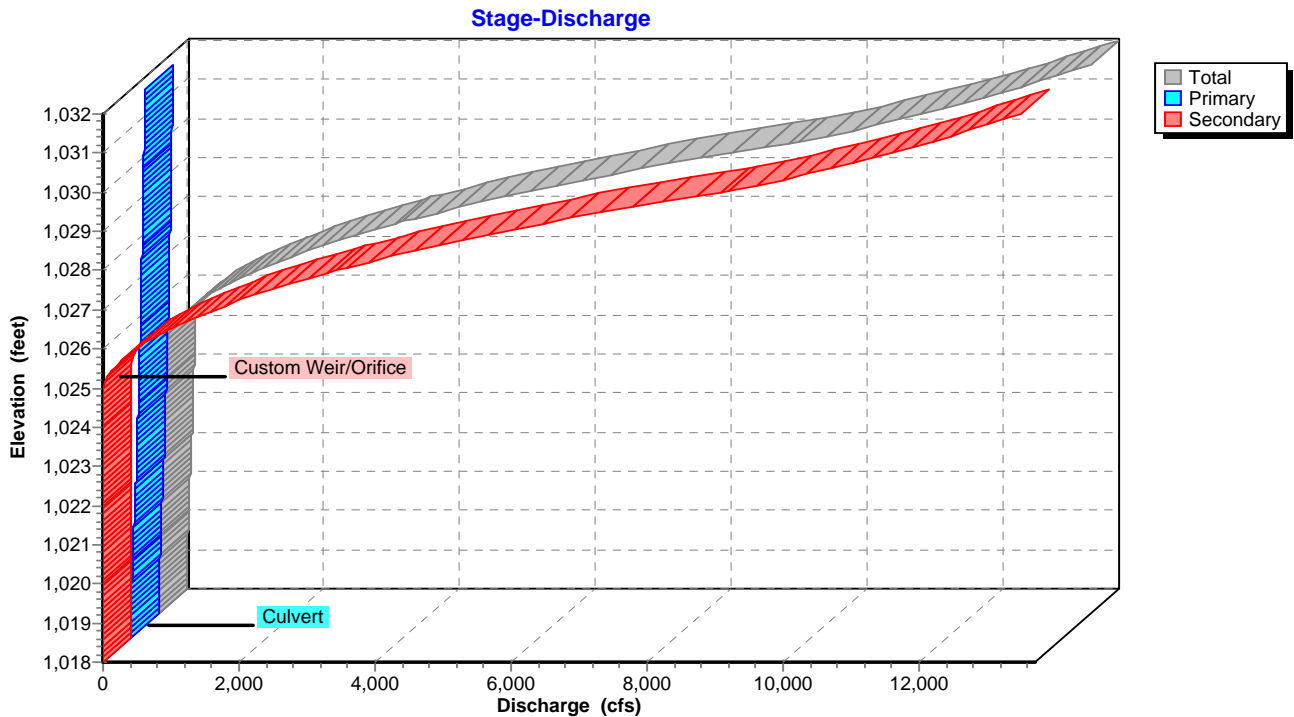
Primary OutFlow Max=128.96 cfs @ 4.23 hrs HW=1,025.34' TW=1,020.80' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 128.96 cfs @ 10.26 fps)

Secondary OutFlow Max=8,142.27 cfs @ 6.31 hrs HW=1,029.90' TW=1,027.20' (Dynamic Tailwater)
 ↑**2=Custom Weir/Orifice** (Weir Controls 8,142.27 cfs @ 6.08 fps)

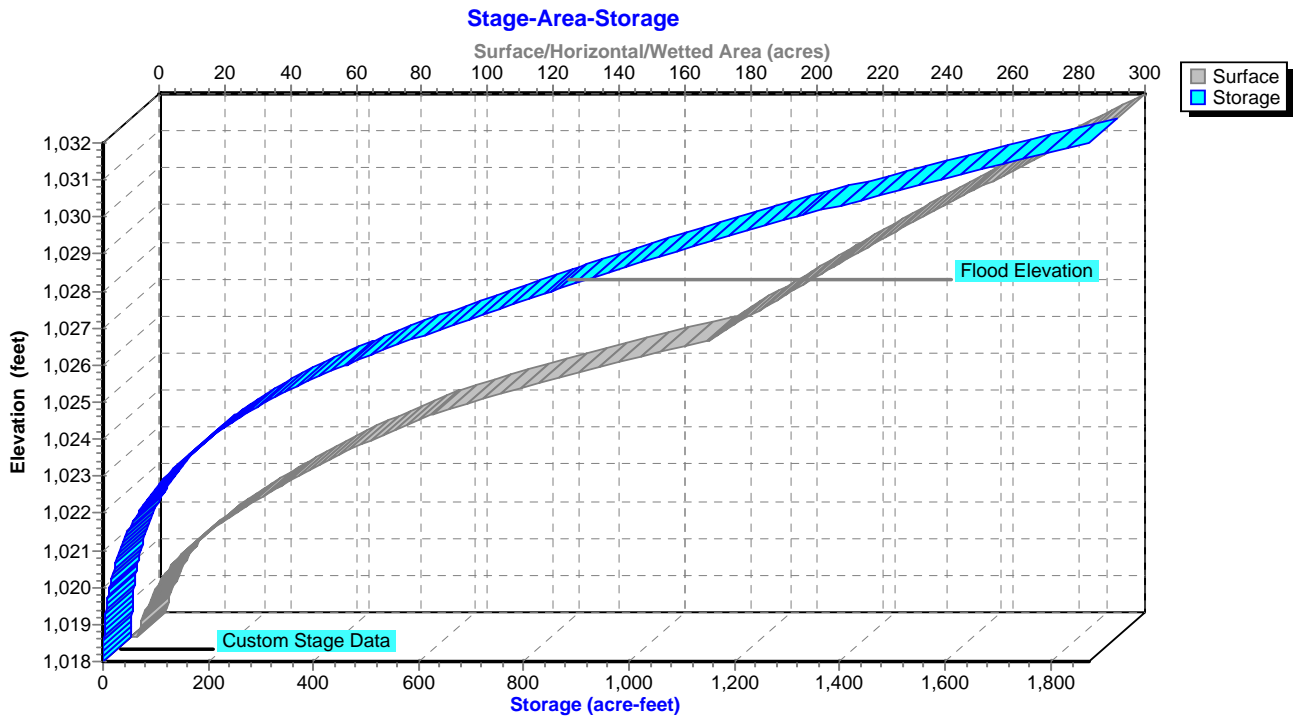
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 22.54" for 6 hr PMF TR-60 event
 Inflow = 12,291.40 cfs @ 4.68 hrs, Volume= 3,689.826 af
 Outflow = 12,104.92 cfs @ 4.89 hrs, Volume= 3,596.882 af, Atten= 2%, Lag= 12.3 min
 Primary = 9,076.23 cfs @ 4.88 hrs, Volume= 2,921.396 af
 Secondary = 291.63 cfs @ 4.97 hrs, Volume= 77.072 af
 Tertiary = 2,744.05 cfs @ 4.97 hrs, Volume= 598.415 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,031.37' @ 4.97 hrs Surf.Area= 112.172 ac Storage= 668.631 af (448.631 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 65.8 min calculated for 3,376.882 af (92% of inflow)
 Center-of-Mass det. time= 37.5 min (371.4 - 333.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

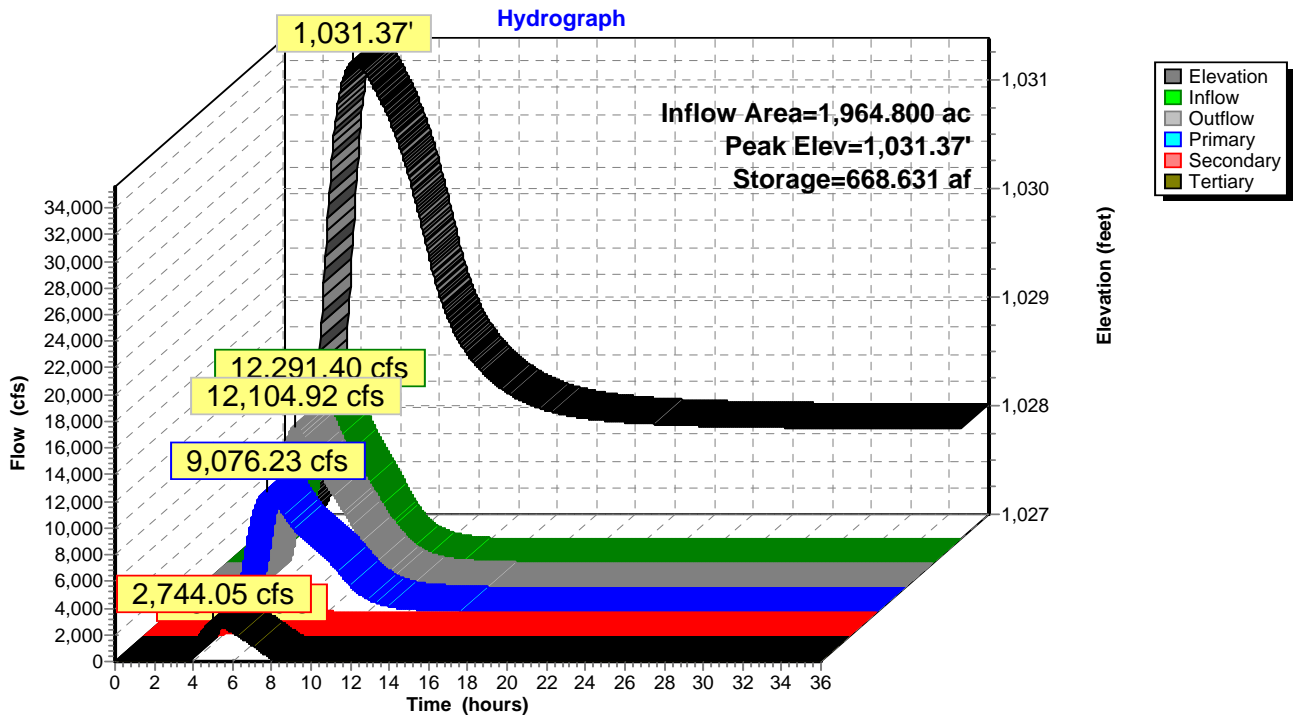
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9,072.64 cfs @ 4.88 hrs HW=1,031.36' TW=1,028.07' (Dynamic Tailwater)
 ↑
 1=Broad-Crested Rectangular Weir (Weir Controls 4,864.02 cfs @ 4.82 fps)
 2=Broad-Crested Rectangular Weir (Weir Controls 4,208.62 cfs @ 4.45 fps)

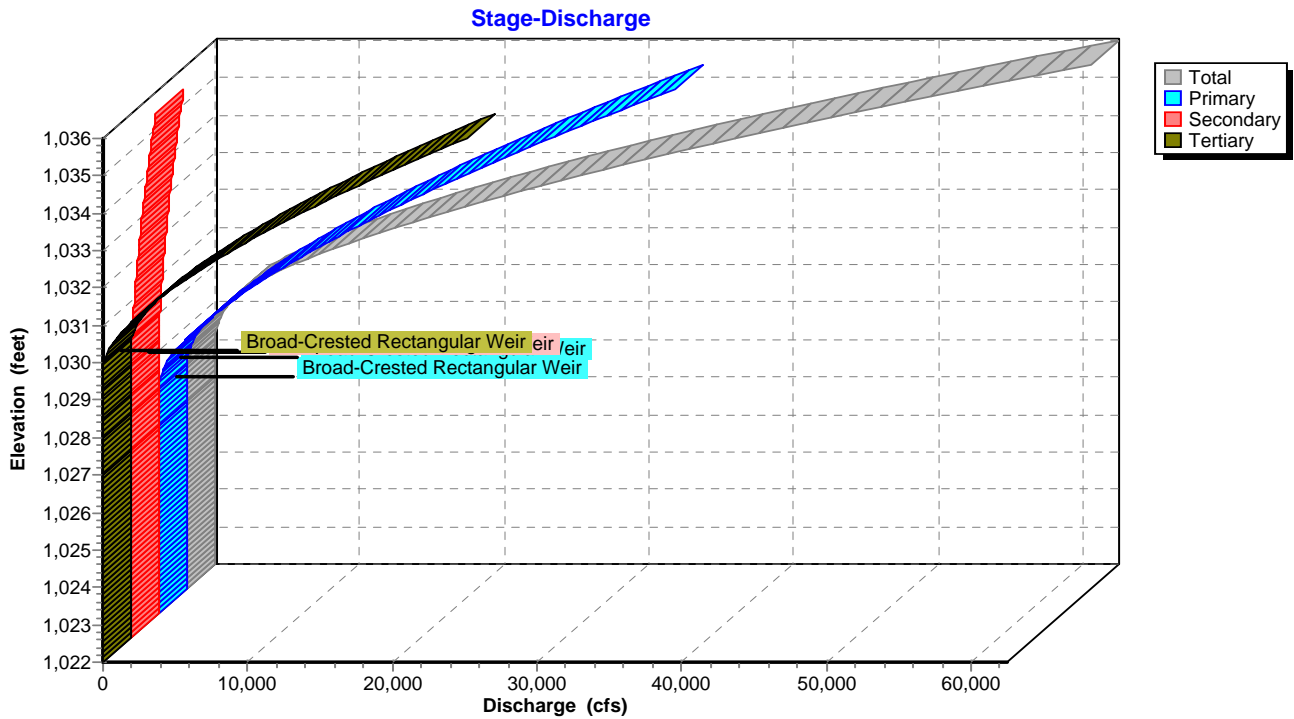
Secondary OutFlow Max=291.63 cfs @ 4.97 hrs HW=1,031.37' TW=1,028.35' (Dynamic Tailwater)
 ↑
 3=Sharp-Crested Rectangular Weir (Weir Controls 291.63 cfs @ 4.70 fps)

Tertiary OutFlow Max=2,744.04 cfs @ 4.97 hrs HW=1,031.37' TW=1,028.35' (Dynamic Tailwater)
 ↑
 4=Broad-Crested Rectangular Weir (Weir Controls 2,744.04 cfs @ 3.09 fps)

Pond 9P: Sippo Lake

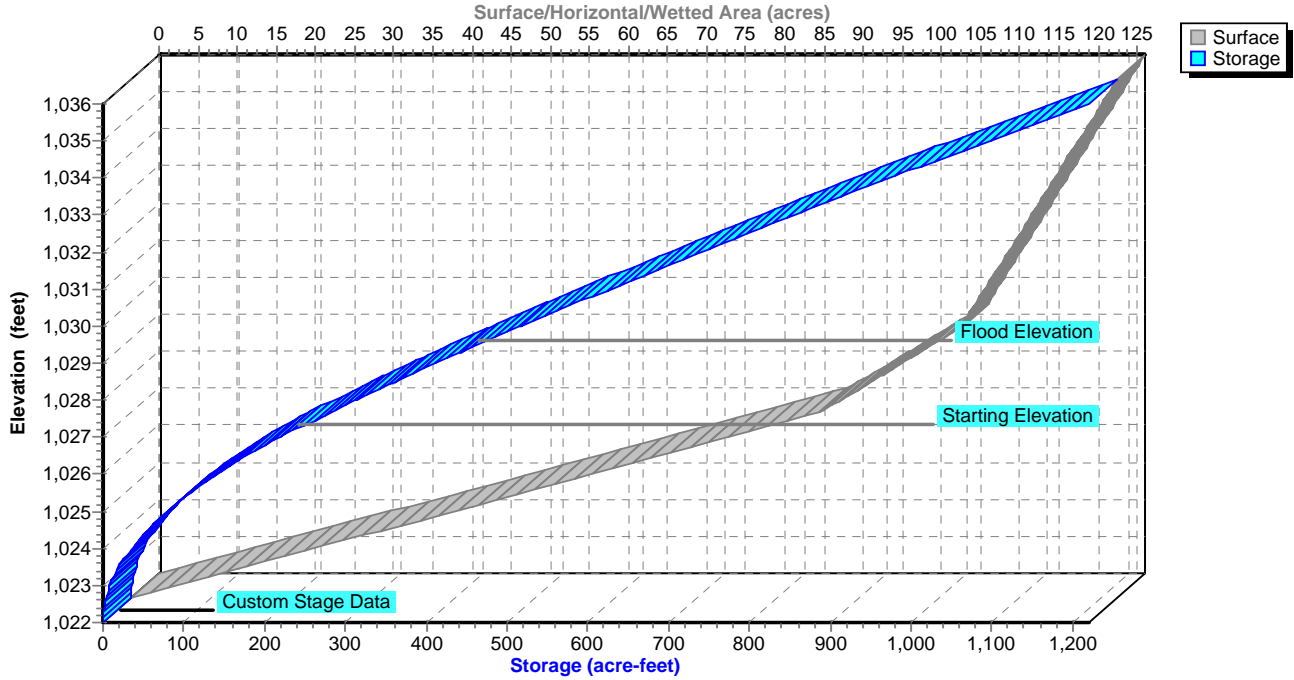


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

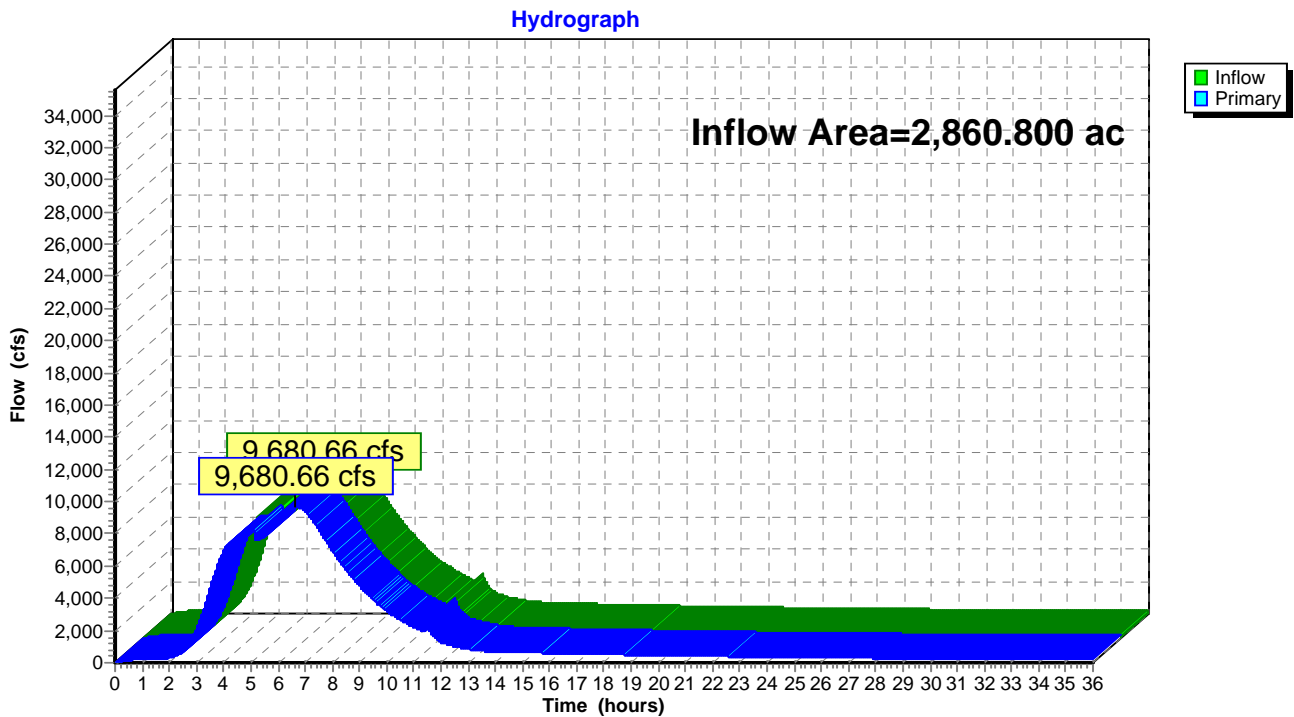


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 21.89" for 6 hr PMF TR-60 event
Inflow = 9,680.66 cfs @ 6.62 hrs, Volume= 5,219.441 af
Primary = 9,680.66 cfs @ 6.63 hrs, Volume= 5,219.441 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 21.55" for 6 hr PMF TR-60 event
 Inflow = 31,764.74 cfs @ 5.94 hrs, Volume= 16,984.540 af
 Outflow = 31,762.22 cfs @ 5.97 hrs, Volume= 16,983.321 af, Atten= 0%, Lag= 1.6 min
 Primary = 3,400.33 cfs @ 3.39 hrs, Volume= 4,540.004 af
 Secondary = 28,633.45 cfs @ 5.97 hrs, Volume= 12,443.317 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,014.62' @ 5.97 hrs Surf.Area= 18.467 ac Storage= 299.154 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 11.3 min calculated for 16,978.605 af (100% of inflow)
 Center-of-Mass det. time= 11.2 min (507.6 - 496.4)

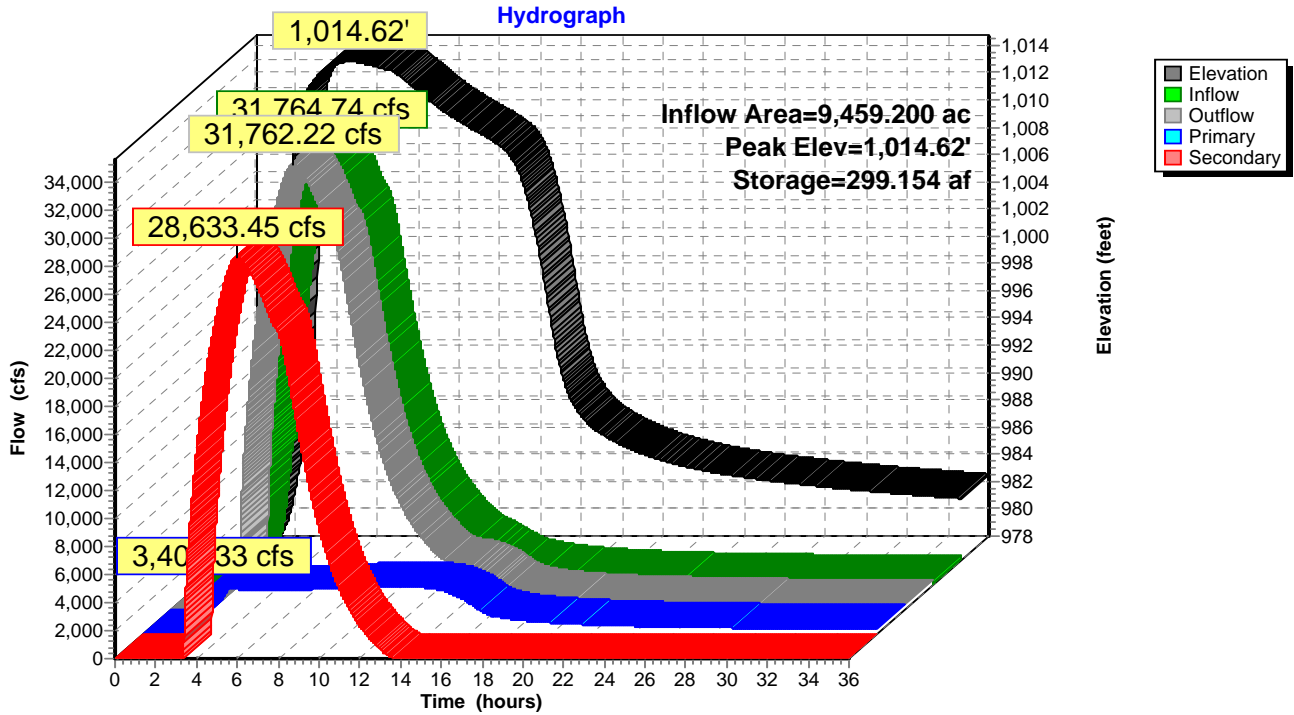
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

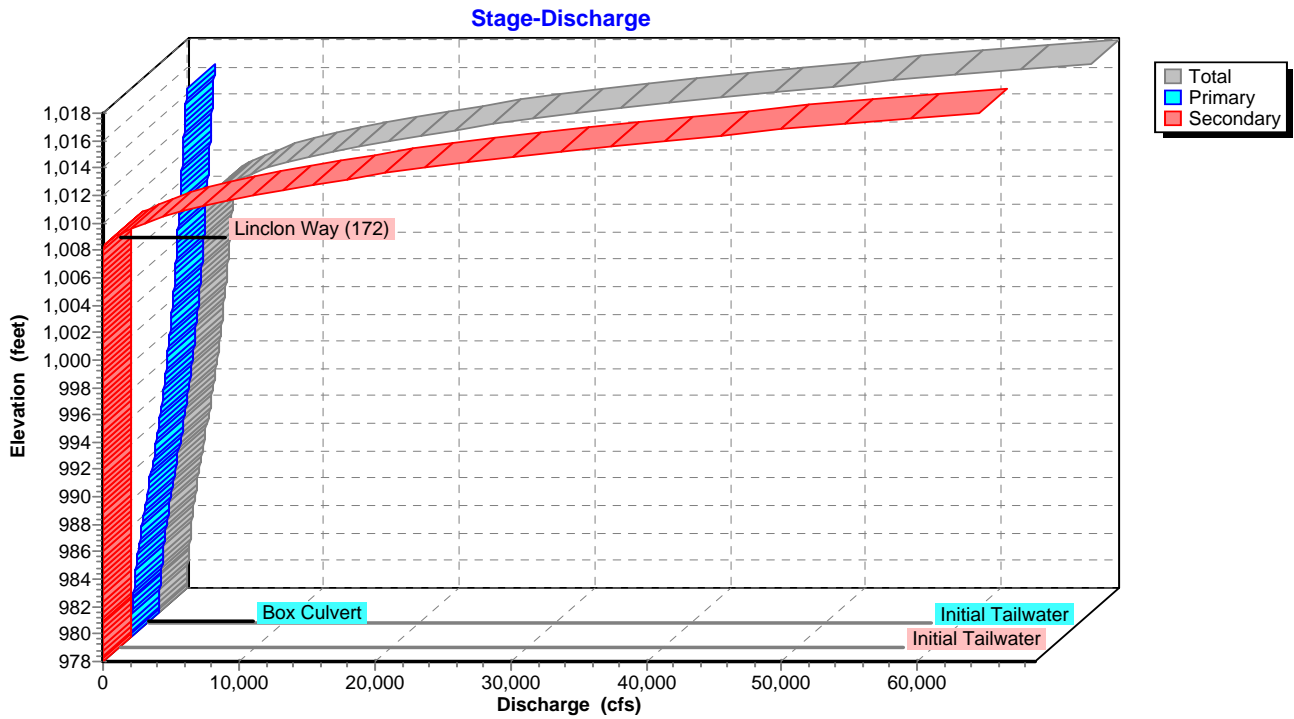
Primary OutFlow Max=3,383.15 cfs @ 3.39 hrs HW=1,009.45' TW=985.19' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,383.15 cfs @ 29.59 fps)

Secondary OutFlow Max=28,633.37 cfs @ 5.97 hrs HW=1,014.62' TW=993.95' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 28,633.37 cfs @ 7.62 fps)

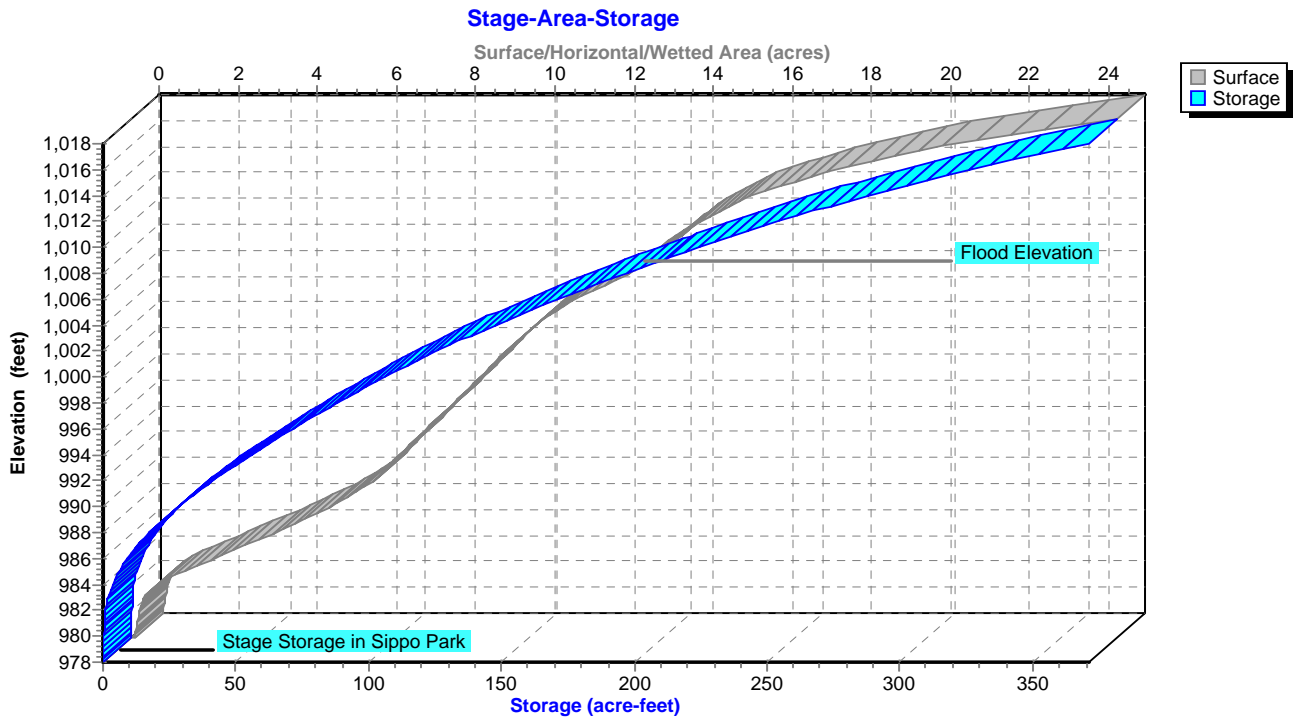
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



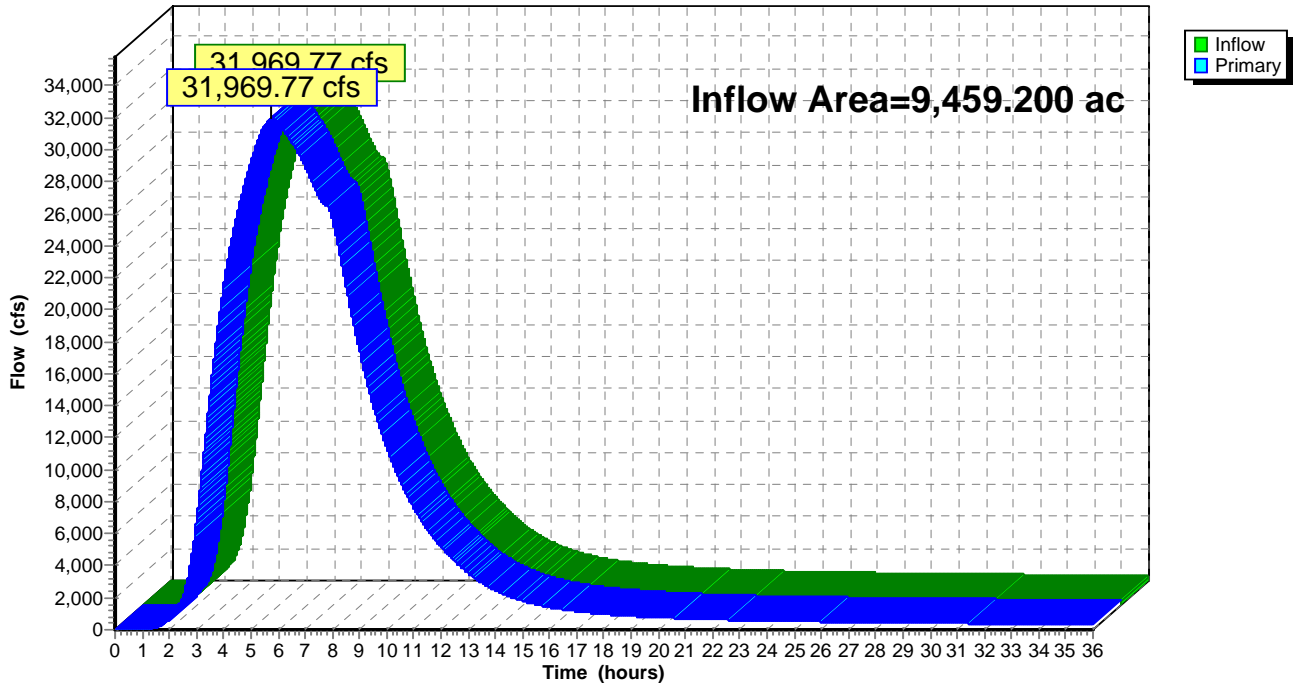
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 21.56" for 6 hr PMF TR-60 event
Inflow = 31,969.77 cfs @ 5.77 hrs, Volume= 16,998.956 af
Primary = 31,969.77 cfs @ 5.78 hrs, Volume= 16,998.956 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=0.68"
 Tc=44.0 min CN=74 Runoff=32.83 cfs 6.498 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=0.72"
 Tc=65.0 min CN=75 Runoff=72.93 cfs 16.167 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=0.51"
 Tc=226.0 min CN=70 Runoff=159.11 cfs 60.010 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=0.44"
 Tc=128.0 min CN=68 Runoff=128.56 cfs 39.553 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=0.41"
 Tc=129.0 min CN=67 Runoff=84.91 cfs 26.294 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=0.68"
 Tc=110.0 min CN=74 Runoff=146.23 cfs 40.794 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=0.72"
 Tc=72.0 min CN=75 Runoff=192.06 cfs 44.266 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=0.97"
 Tc=78.0 min CN=80 Runoff=240.95 cfs 54.996 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=0.48"
 Tc=155.0 min CN=69 Runoff=129.39 cfs 42.474 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=0.72"
 Tc=156.0 min CN=75 Runoff=365.52 cfs 118.170 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=0.41"
 Tc=151.0 min CN=67 Runoff=67.94 cfs 22.165 af

Reach 5R: Channel 5 Avg. Flow Depth=2.41' Max Vel=5.24 fps Inflow=221.72 cfs 428.033 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=203.77 cfs 422.922 af

Reach 7R: Channel 7 Avg. Flow Depth=4.79' Max Vel=2.38 fps Inflow=304.03 cfs 462.283 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=295.97 cfs 453.998 af

Reach 10Ra: Channel 10 (Reach West Avg. Flow Depth=1.13' Max Vel=1.51 fps Inflow=20.96 cfs 23.790 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=20.96 cfs 23.727 af

Reach 15R: Channel 15 Avg. Flow Depth=5.35' Max Vel=1.53 fps Inflow=575.67 cfs 568.267 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=502.02 cfs 551.504 af

Reach 16R: Channel 16 Avg. Flow Depth=6.98' Max Vel=2.08 fps Inflow=671.10 cfs 636.364 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=597.79 cfs 622.575 af

Existing Conditions Sippo Reservoir- TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 67

Reach 18R: Sippo Creek Channel Avg. Flow Depth=3.39' Max Vel=9.09 fps Inflow=647.45 cfs 669.947 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=647.44 cfs 669.847 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=77.31 cfs 22.597 af
Primary=77.31 cfs 22.597 af

Pond 1P: Sippo Creek Reservoir - Peak Elev=1,004.37' Storage=84.063 af Inflow=663.19 cfs 677.371 af
Primary=649.85 cfs 670.270 af Secondary=2.43 cfs 0.219 af Tertiary=0.00 cfs 0.000 af Outflow=652.28 cfs 670.490 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=186.56 cfs 82.400 af
Primary=186.56 cfs 82.400 af

Pond 3P: Lake Cable Peak Elev=1,097.40' Storage=1,914.000 af Inflow=186.56 cfs 82.399 af
Primary=221.72 cfs 428.129 af Secondary=0.00 cfs 0.000 af Outflow=221.72 cfs 428.129 af

Pond 4C: Confluence 4 Inflow=424.80 cfs 496.375 af
Primary=424.80 cfs 496.375 af

Pond 4P: Lake O'Springs Peak Elev=1,106.46' Storage=36.820 af Inflow=77.31 cfs 22.597 af
Primary=27.56 cfs 22.390 af Secondary=0.00 cfs 0.000 af Outflow=27.56 cfs 22.390 af

Pond 5C: Confluence 5 Inflow=507.84 cfs 522.573 af
Primary=507.84 cfs 522.573 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,117.60' Storage=17.832 af Inflow=32.83 cfs 6.498 af
Primary=11.37 cfs 6.431 af Secondary=0.00 cfs 0.000 af Outflow=11.37 cfs 6.431 af

Pond 6C: Confluence 6 Inflow=67.94 cfs 45.891 af
Primary=67.94 cfs 45.891 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=575.67 cfs 568.365 af
Primary=575.67 cfs 568.365 af

Pond 8C: Confluence 8 Inflow=671.10 cfs 636.464 af
Primary=671.10 cfs 636.464 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,019.90' Storage=11.686 af Inflow=55.00 cfs 25.501 af
Primary=20.96 cfs 23.792 af Secondary=0.00 cfs 0.000 af Outflow=20.96 cfs 23.792 af

Pond 9P: Sippo Lake Peak Elev=1,028.17' Storage=328.051 af Inflow=365.52 cfs 118.170 af
Primary=55.00 cfs 25.501 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=55.00 cfs 25.501 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=304.03 cfs 462.379 af
Primary=304.03 cfs 462.379 af

Pond 16P: Lincoln Way Box Peak Elev=984.99' Storage=5.949 af Inflow=652.28 cfs 670.389 af
Primary=647.45 cfs 670.047 af Secondary=0.00 cfs 0.000 af Outflow=647.45 cfs 670.047 af

Pond 19C: Confluence 19 Inflow=663.19 cfs 677.471 af
Primary=663.19 cfs 677.471 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 471.386 af Average Runoff Depth = 0.60"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 32.83 cfs @ 3.58 hrs, Volume= 6.498 af, Depth= 0.68"

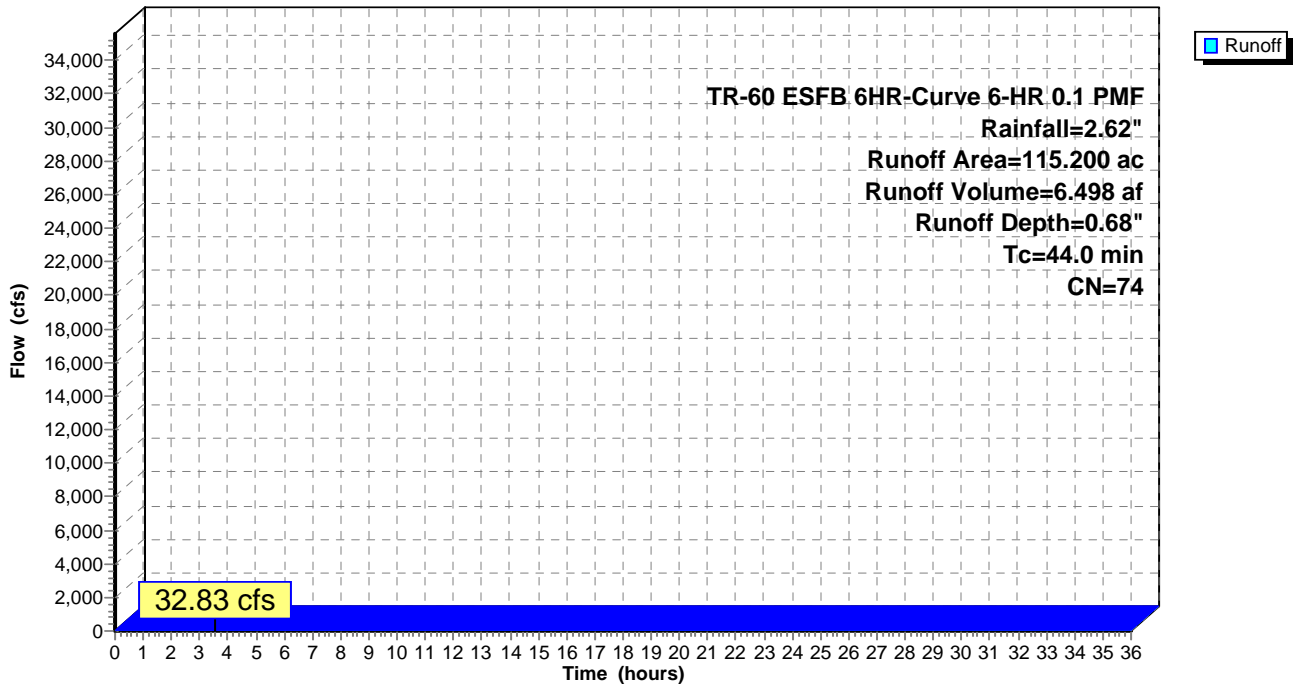
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 72.93 cfs @ 3.90 hrs, Volume= 16.167 af, Depth= 0.72"

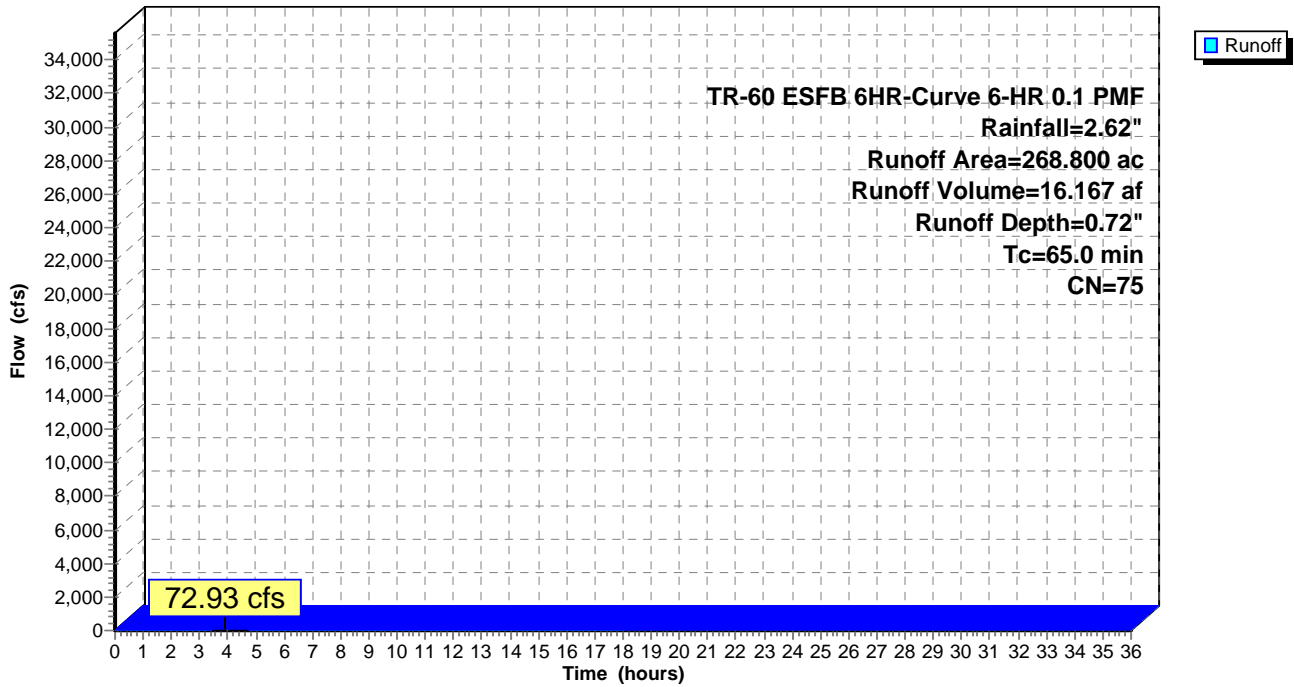
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 159.11 cfs @ 6.78 hrs, Volume= 60.010 af, Depth= 0.51"

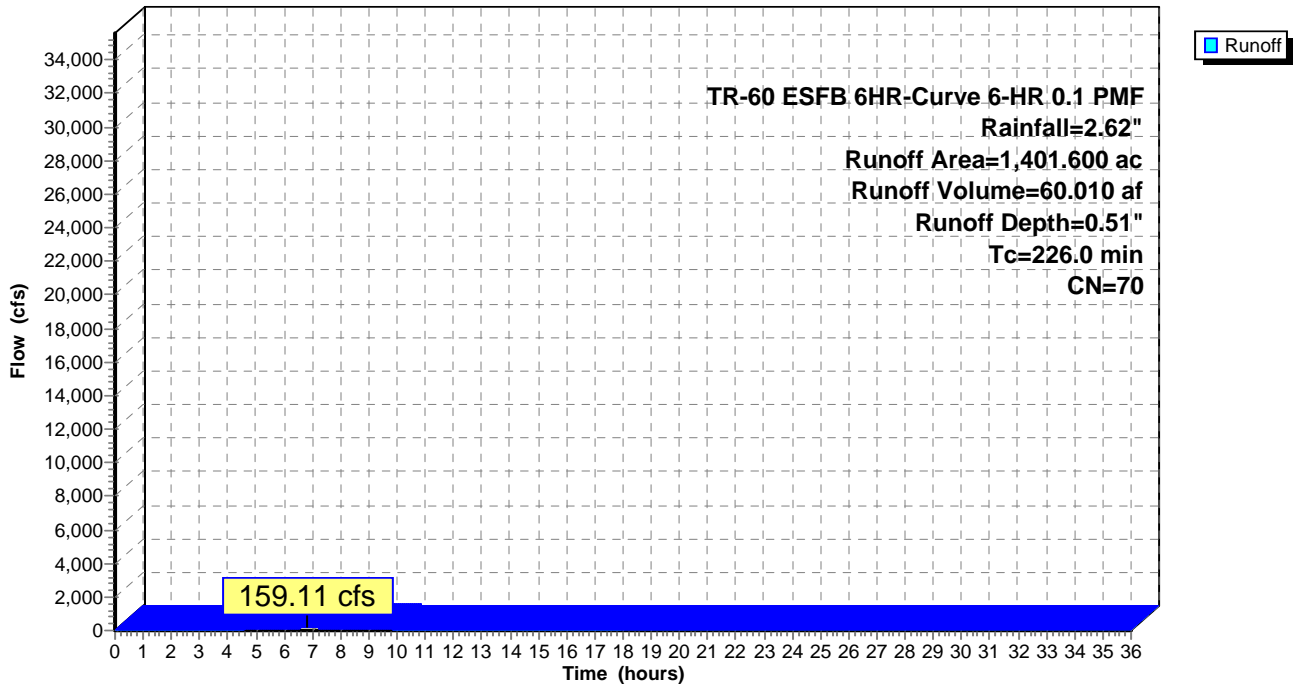
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 128.56 cfs @ 5.26 hrs, Volume= 39.553 af, Depth= 0.44"

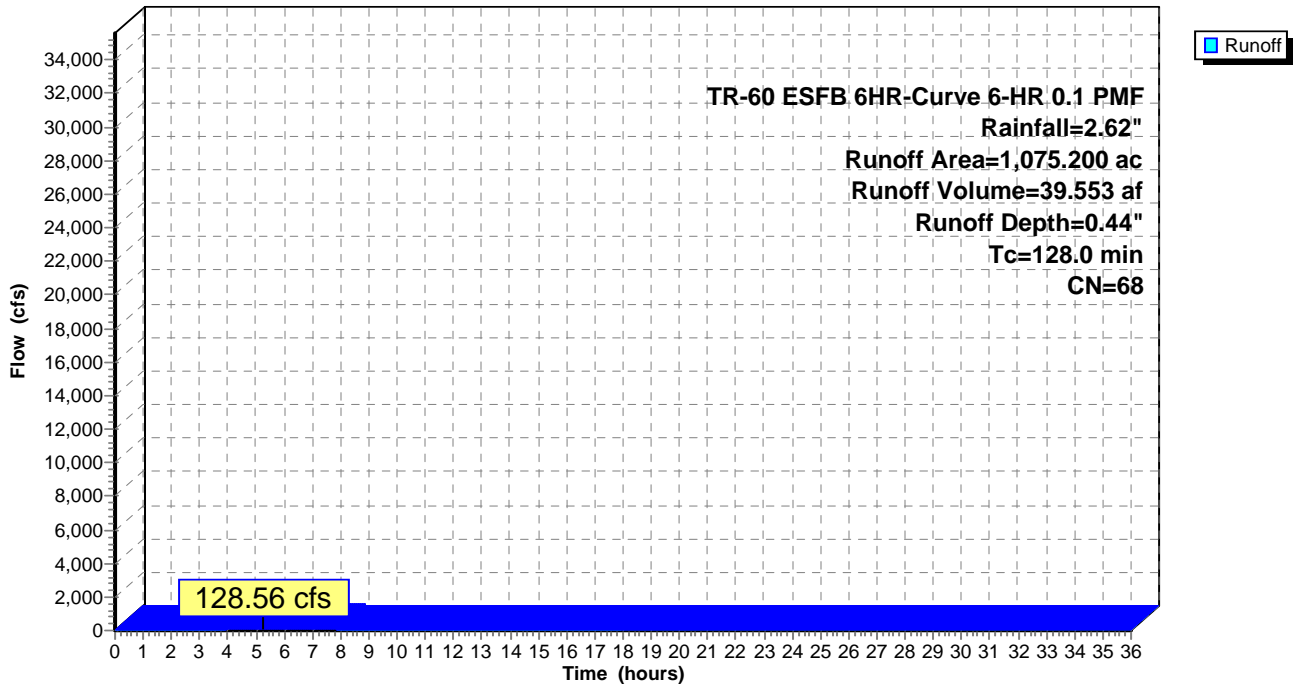
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 84.91 cfs @ 5.30 hrs, Volume= 26.294 af, Depth= 0.41"

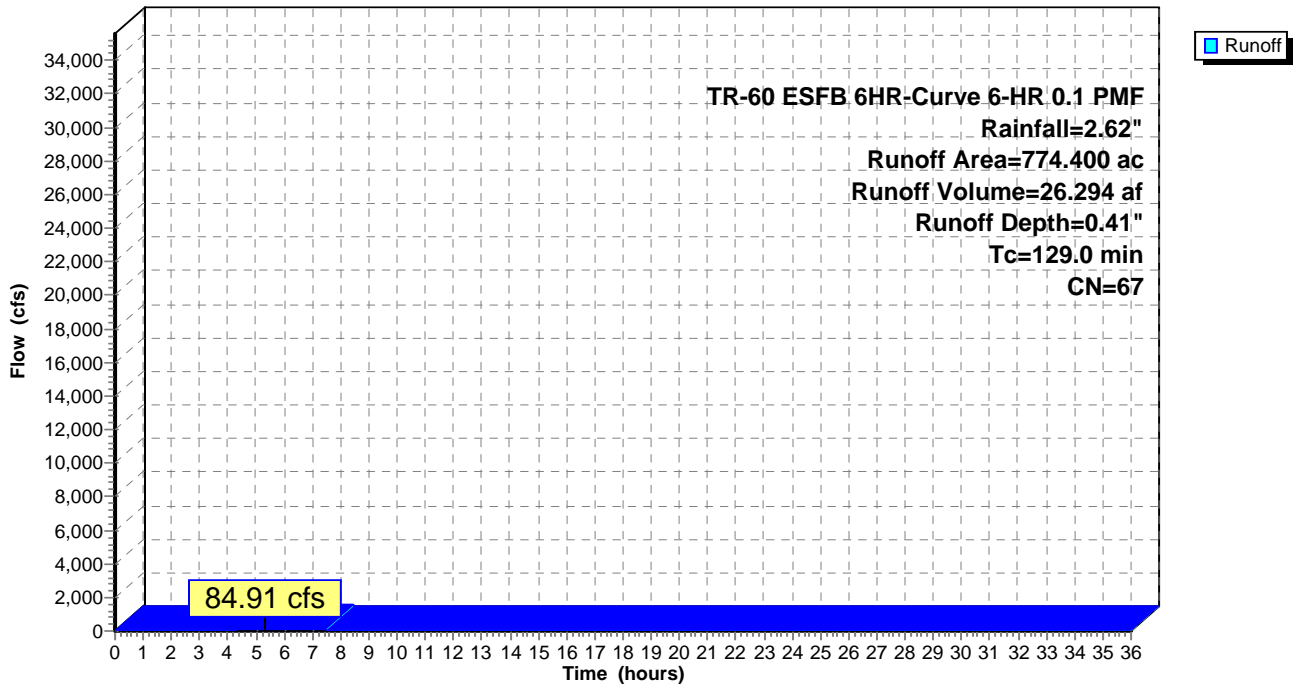
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 146.23 cfs @ 4.64 hrs, Volume= 40.794 af, Depth= 0.68"

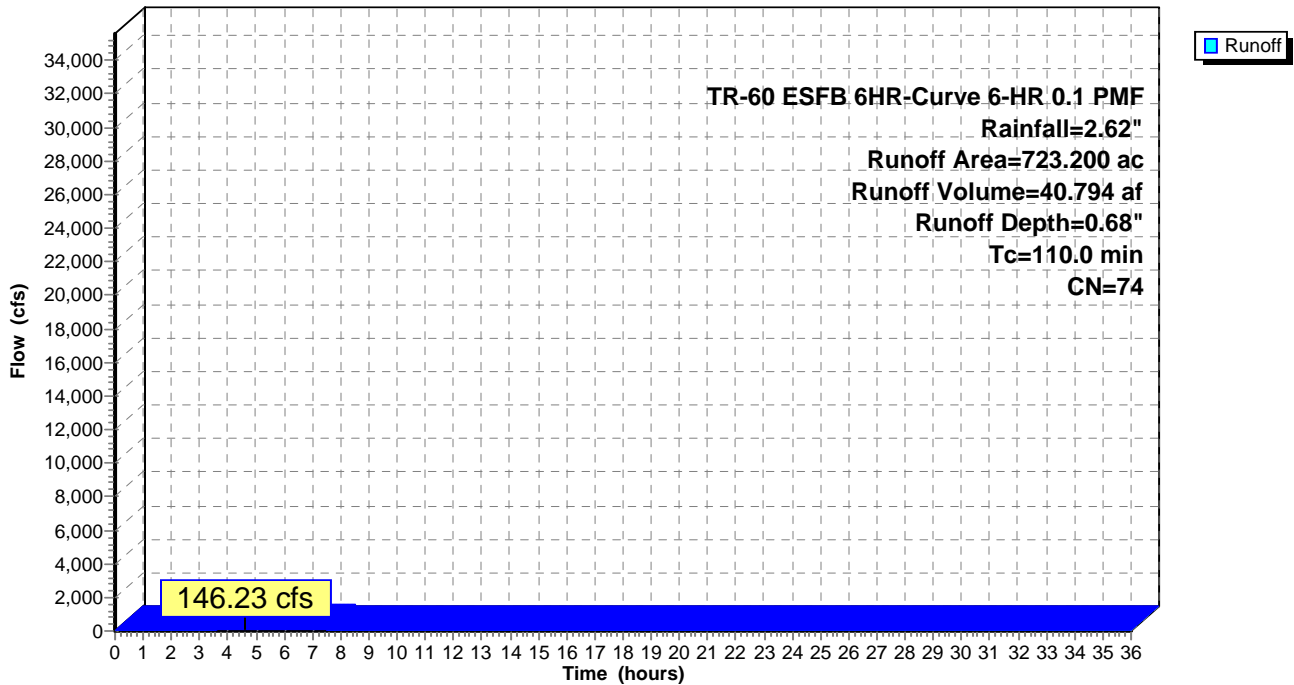
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 192.06 cfs @ 4.00 hrs, Volume= 44.266 af, Depth= 0.72"

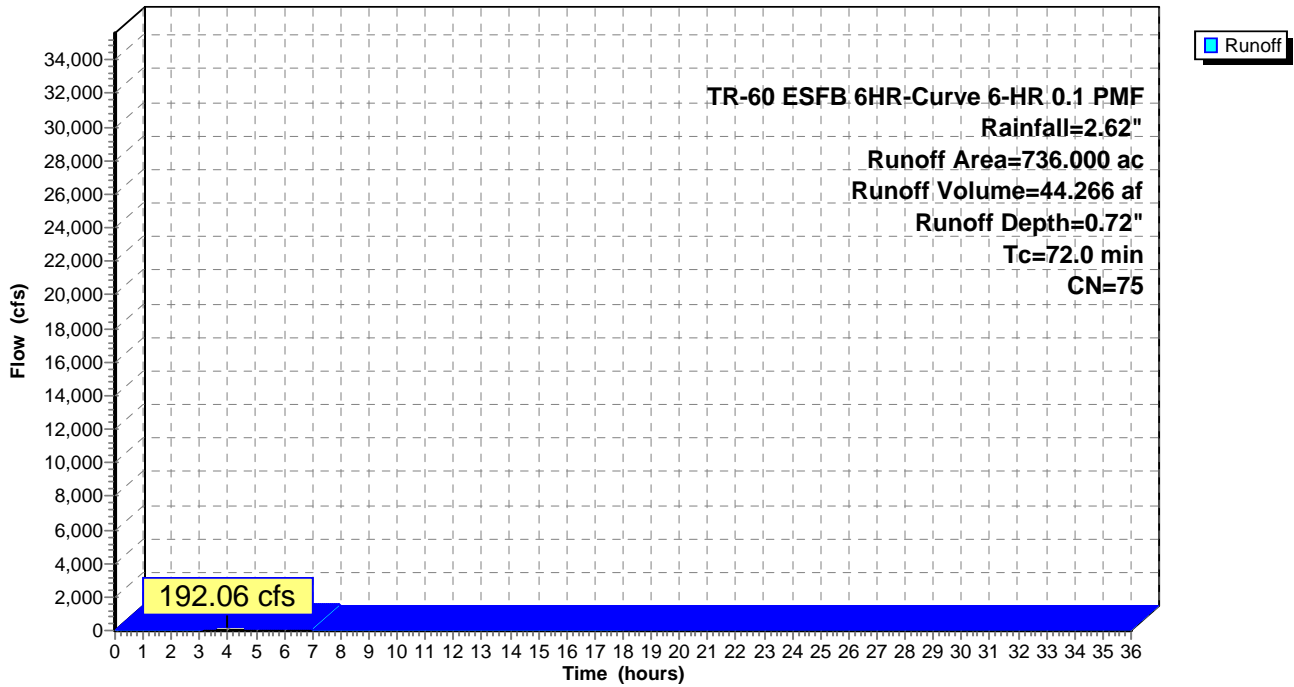
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 240.95 cfs @ 3.98 hrs, Volume= 54.996 af, Depth= 0.97"

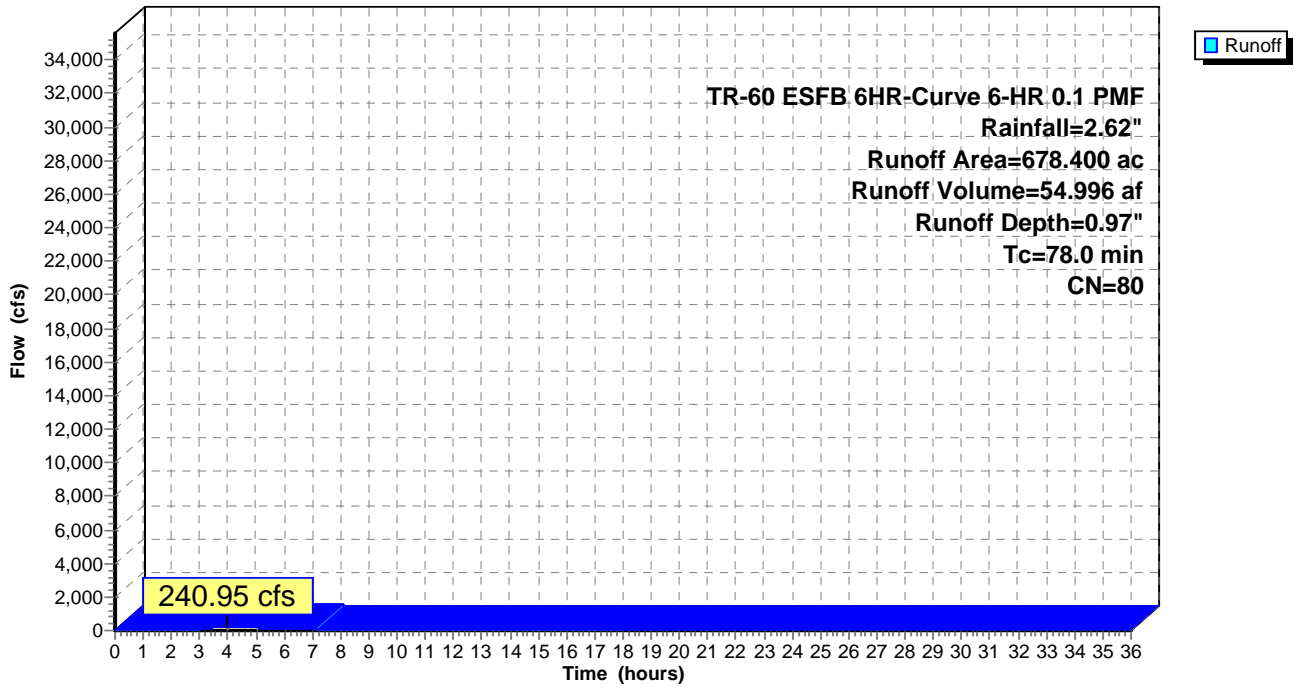
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 129.39 cfs @ 5.68 hrs, Volume= 42.474 af, Depth= 0.48"

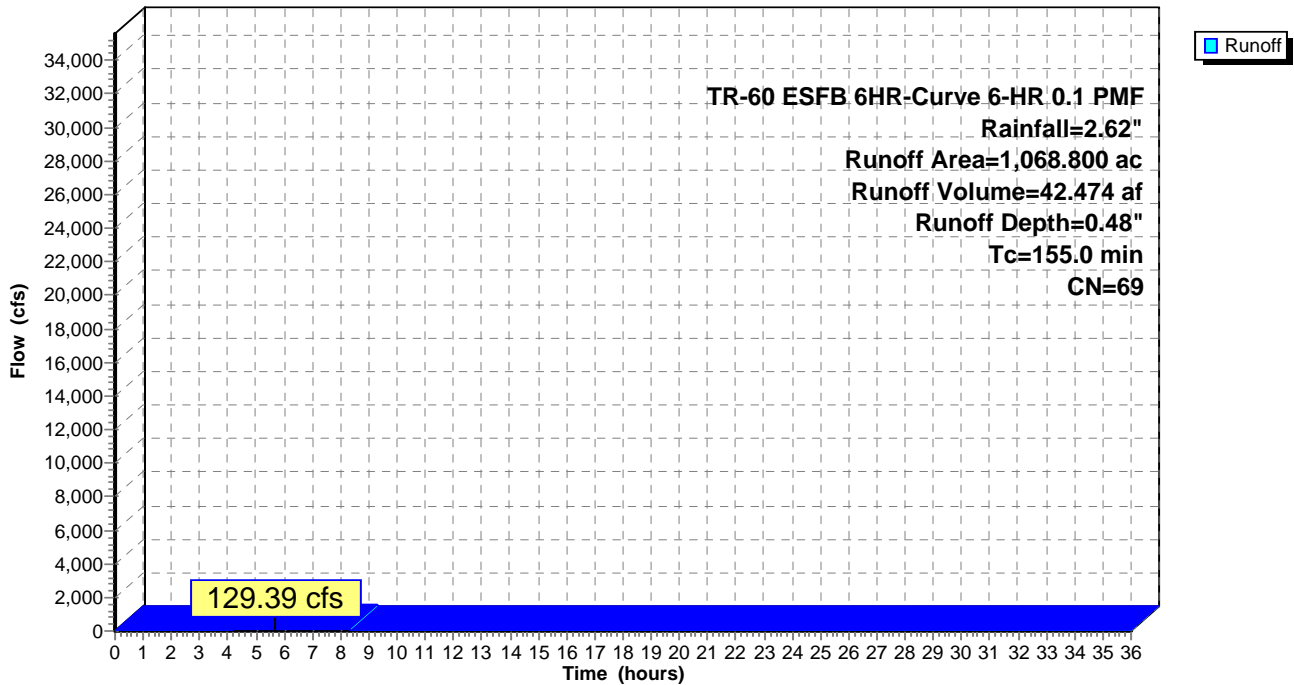
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 365.52 cfs @ 5.37 hrs, Volume= 118.170 af, Depth= 0.72"

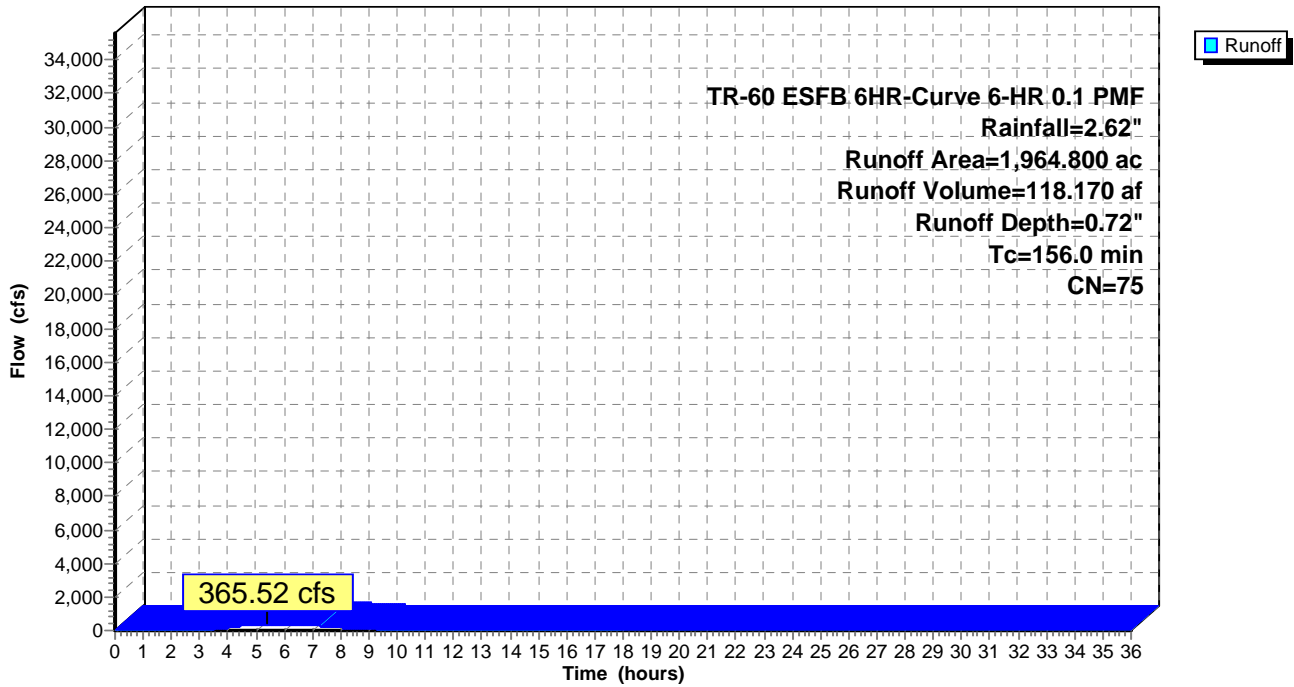
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 67.94 cfs @ 5.87 hrs, Volume= 22.165 af, Depth= 0.41"

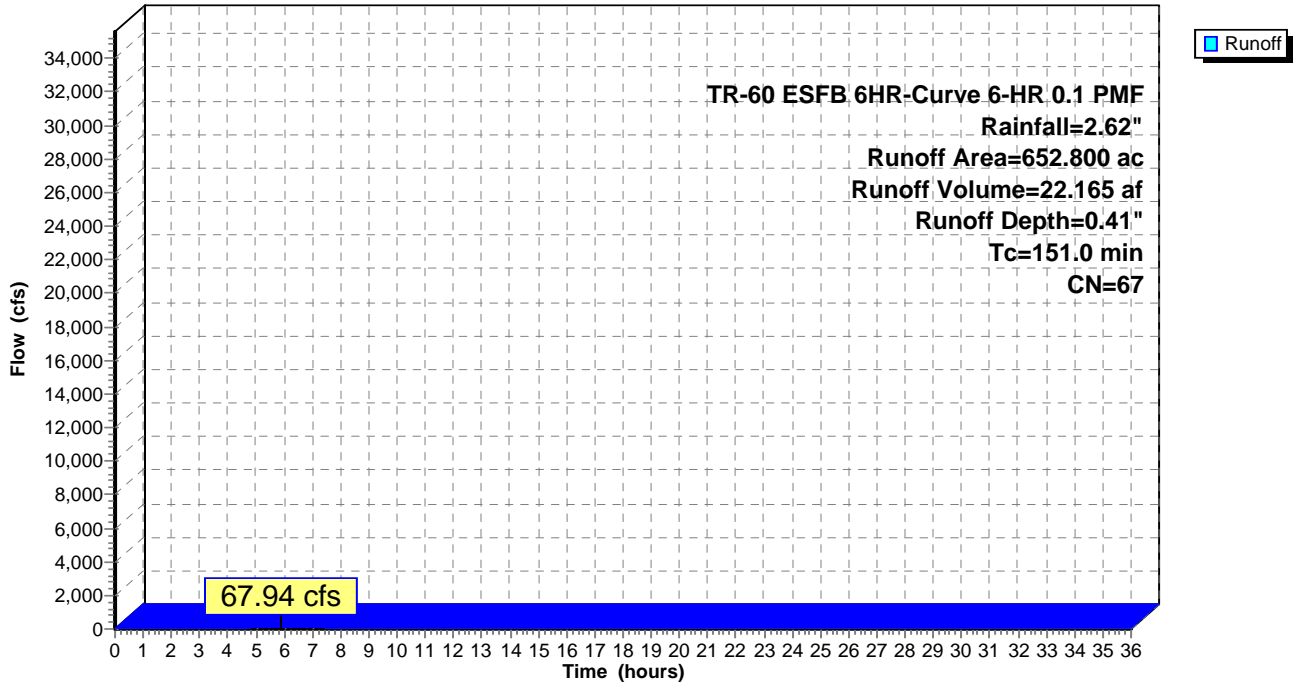
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.1 PMF Rainfall=2.62"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



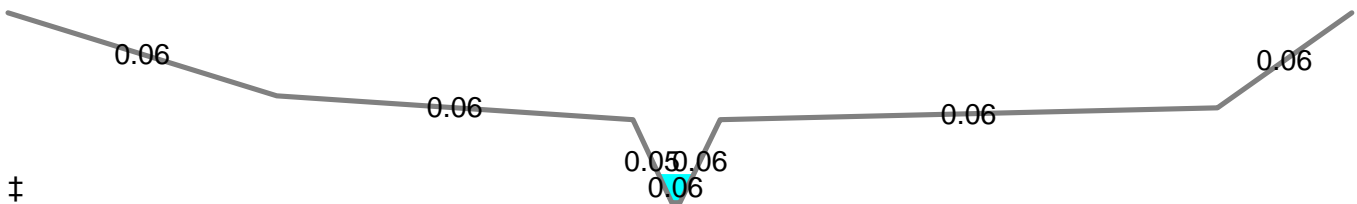
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.88" for 6-HR 0.1 PMF event
 Inflow = 221.72 cfs @ 0.00 hrs, Volume= 428.033 af
 Outflow = 203.77 cfs @ 1.54 hrs, Volume= 422.922 af, Atten= 8%, Lag= 92.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.24 fps, Min. Travel Time= 28.0 min
 Avg. Velocity = 4.74 fps, Avg. Travel Time= 30.9 min

Peak Storage= 342,459 cf @ 1.54 hrs
 Average Depth at Peak Storage= 2.41'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

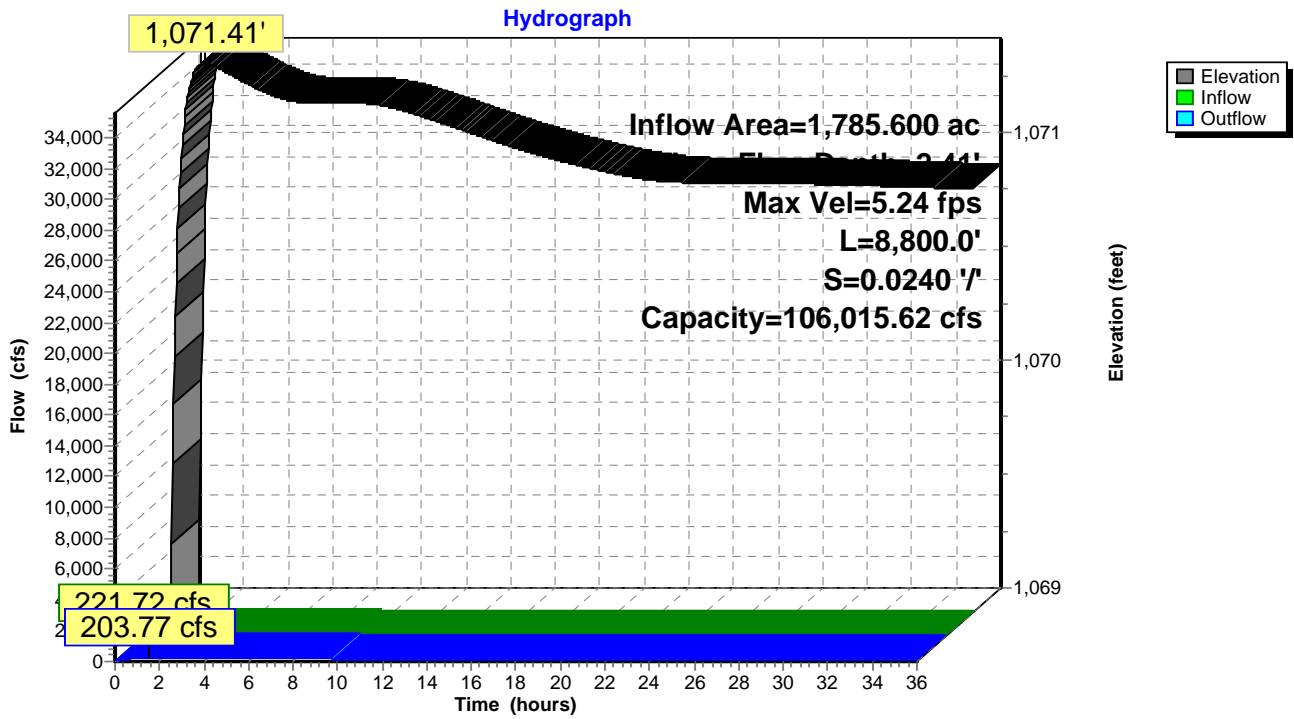
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



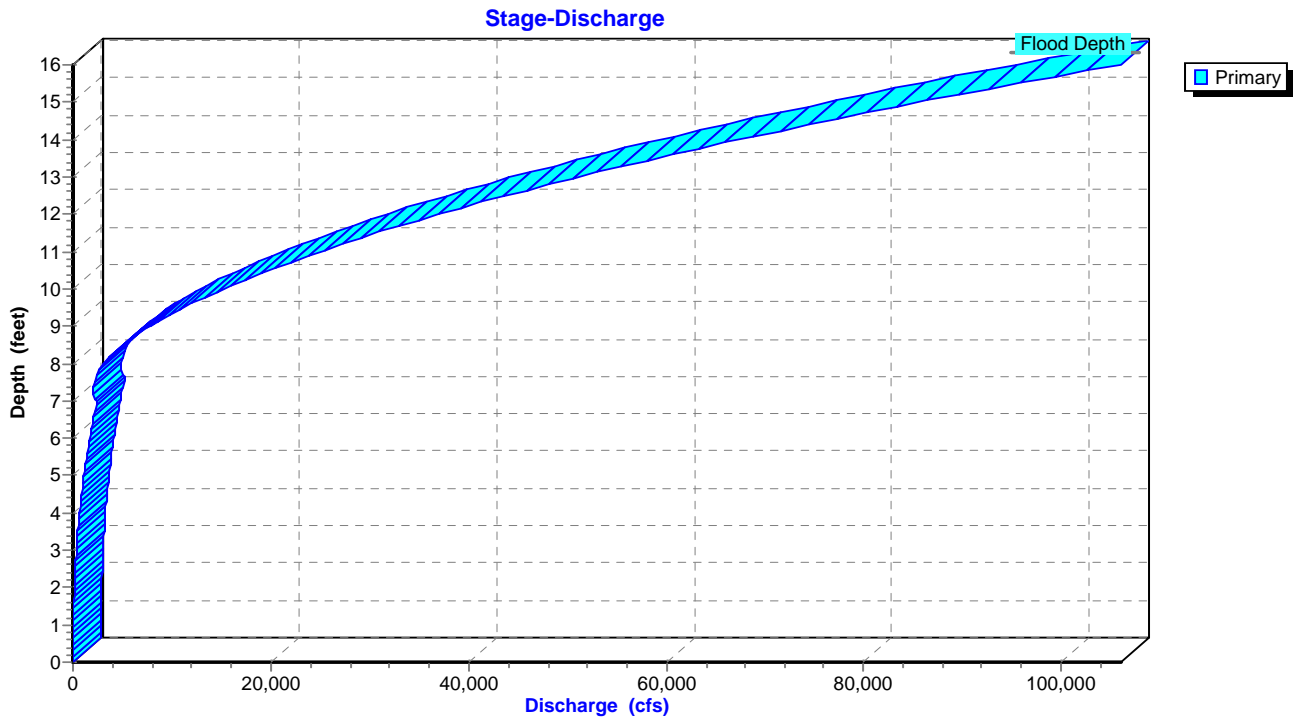
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

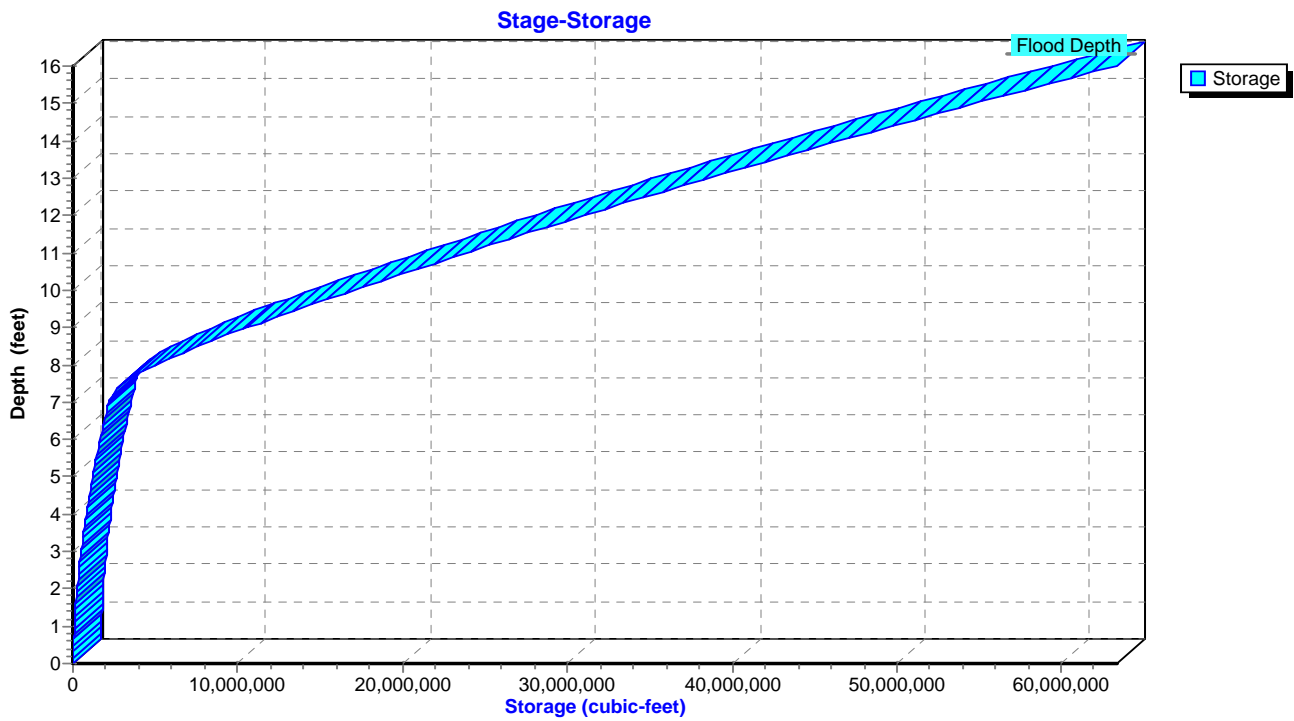
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



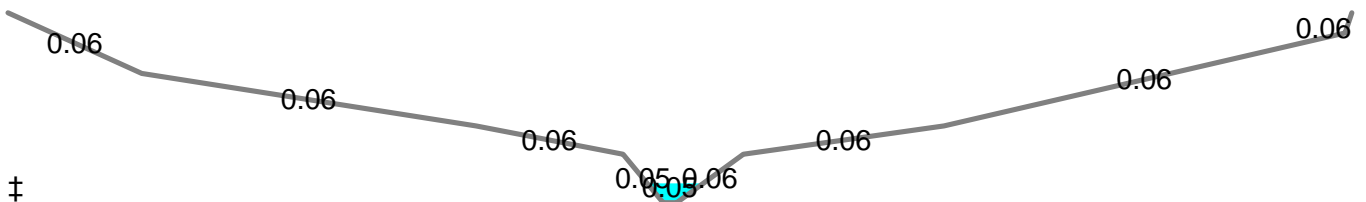
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 1.94" for 6-HR 0.1 PMF event
 Inflow = 304.03 cfs @ 5.14 hrs, Volume= 462.283 af
 Outflow = 295.97 cfs @ 5.90 hrs, Volume= 453.998 af, Atten= 3%, Lag= 45.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.38 fps, Min. Travel Time= 41.4 min
 Avg. Velocity = 1.99 fps, Avg. Travel Time= 49.4 min

Peak Storage= 735,173 cf @ 5.90 hrs
 Average Depth at Peak Storage= 4.79'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

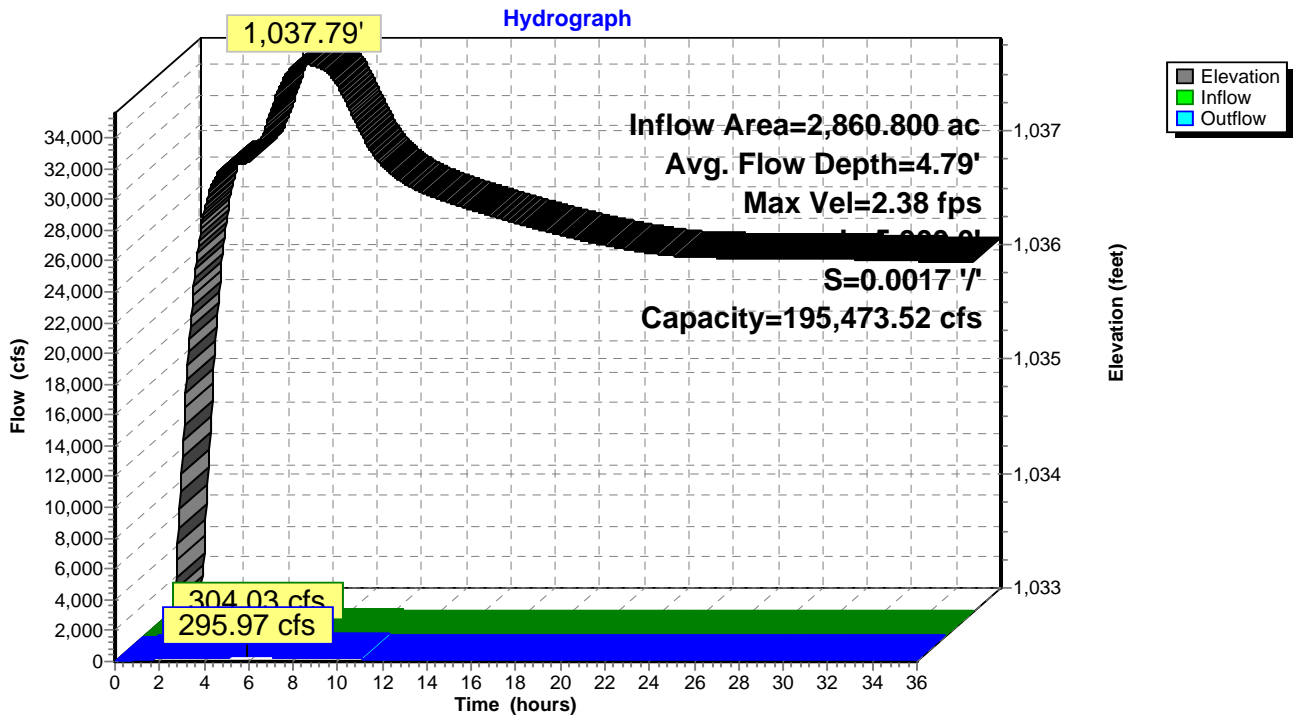
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



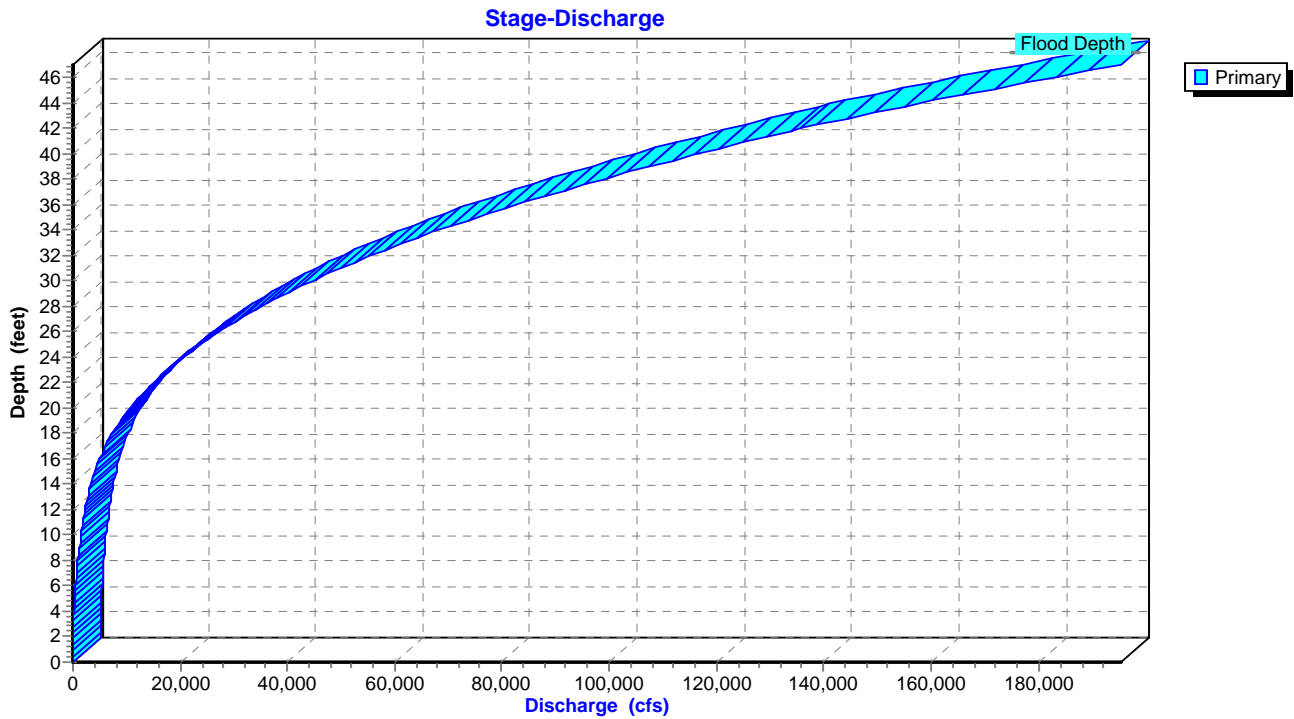
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

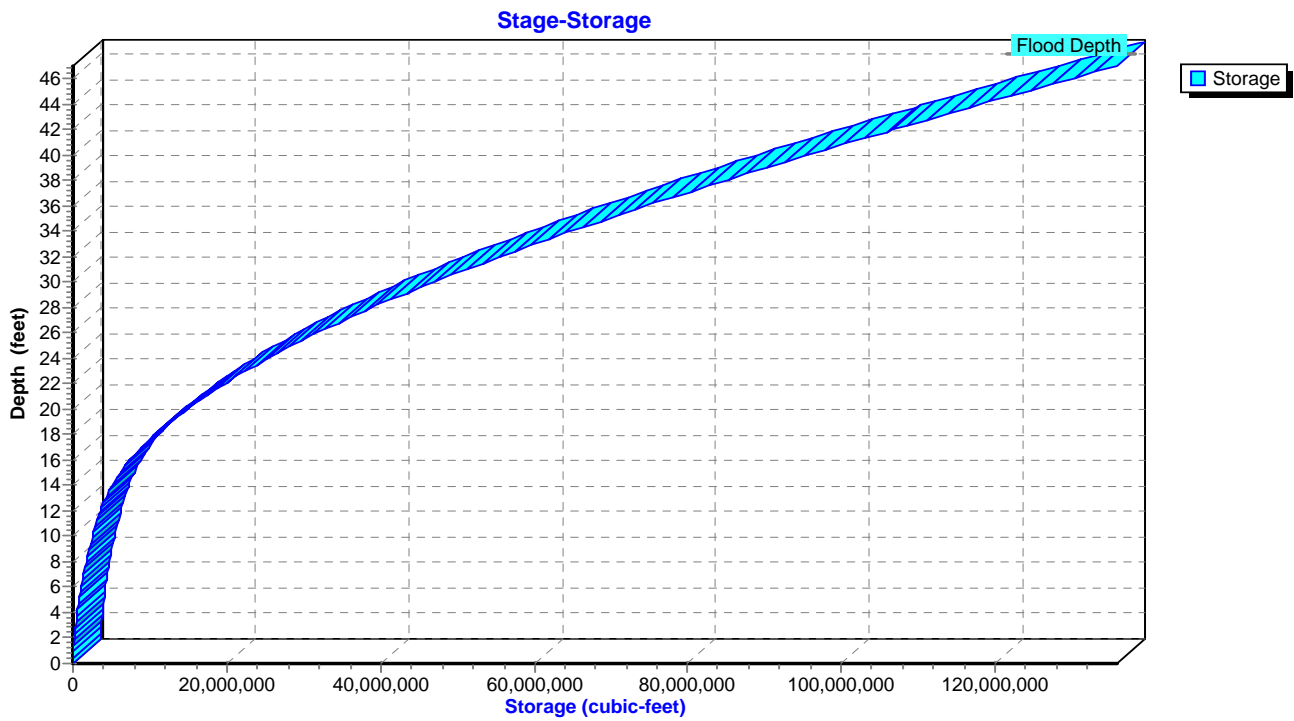
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



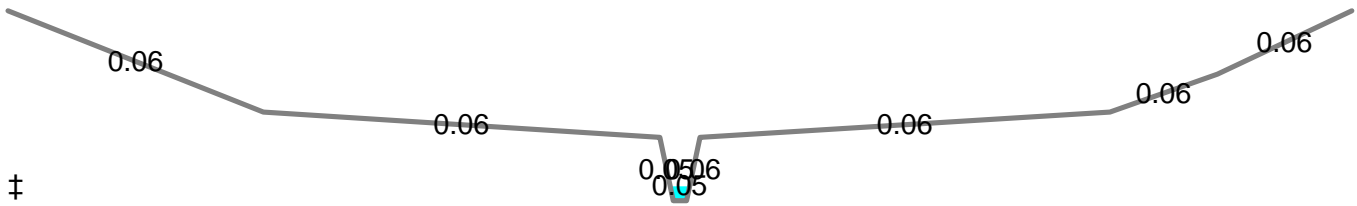
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 0.15" for 6-HR 0.1 PMF event
 Inflow = 20.96 cfs @ 13.13 hrs, Volume= 23.790 af
 Outflow = 20.96 cfs @ 13.24 hrs, Volume= 23.727 af, Atten= 0%, Lag= 6.9 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 1.51 fps, Min. Travel Time= 10.0 min
 Avg. Velocity = 1.10 fps, Avg. Travel Time= 13.7 min

Peak Storage= 12,538 cf @ 13.24 hrs
 Average Depth at Peak Storage= 1.13'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

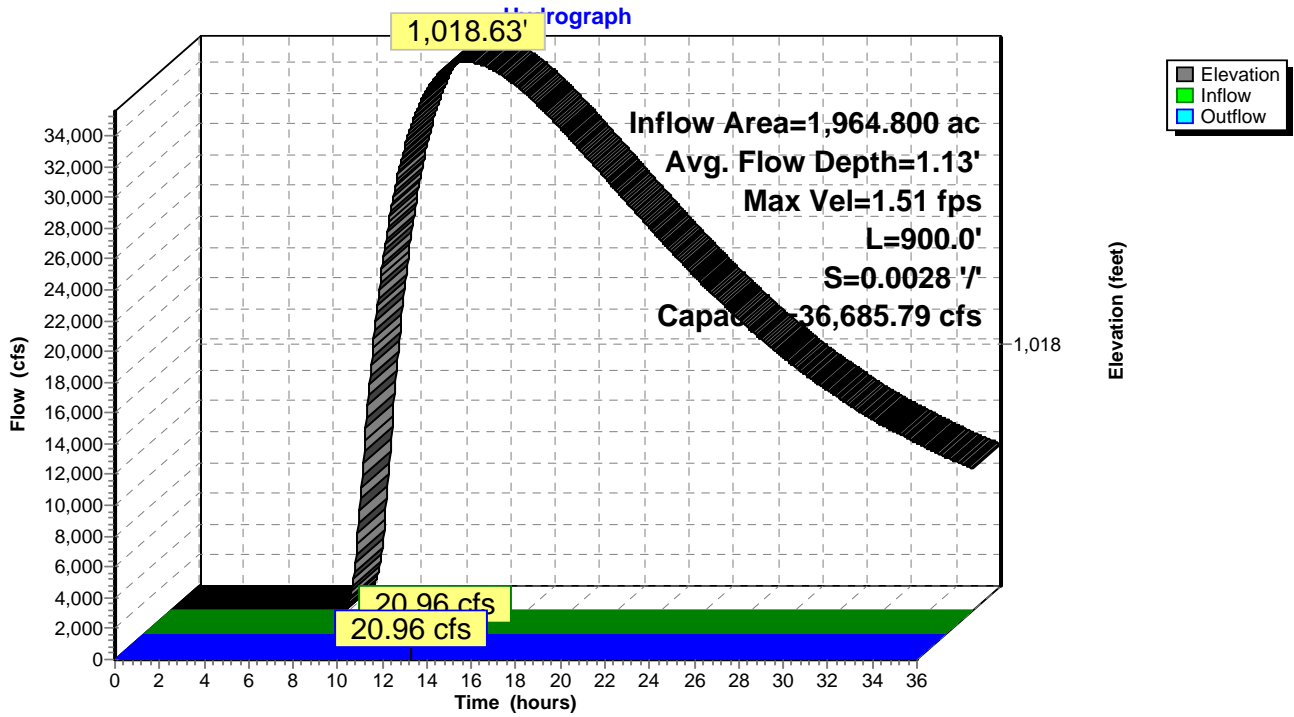
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



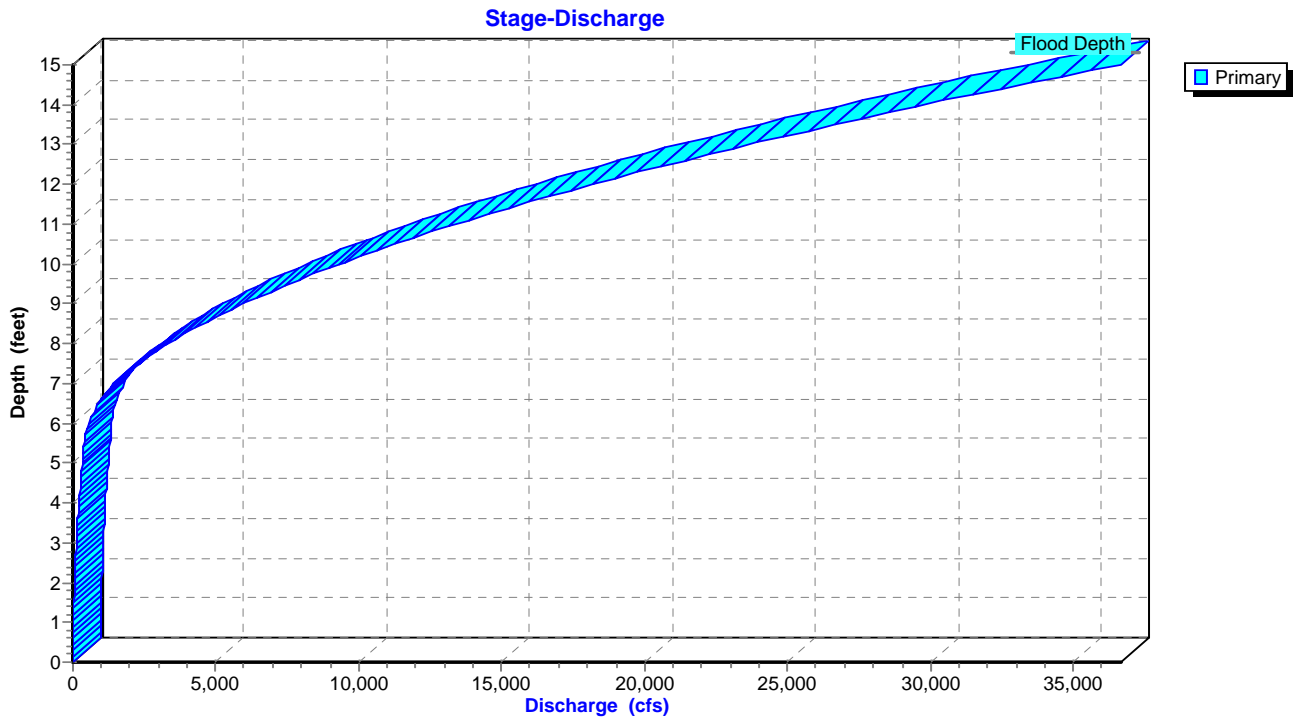
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

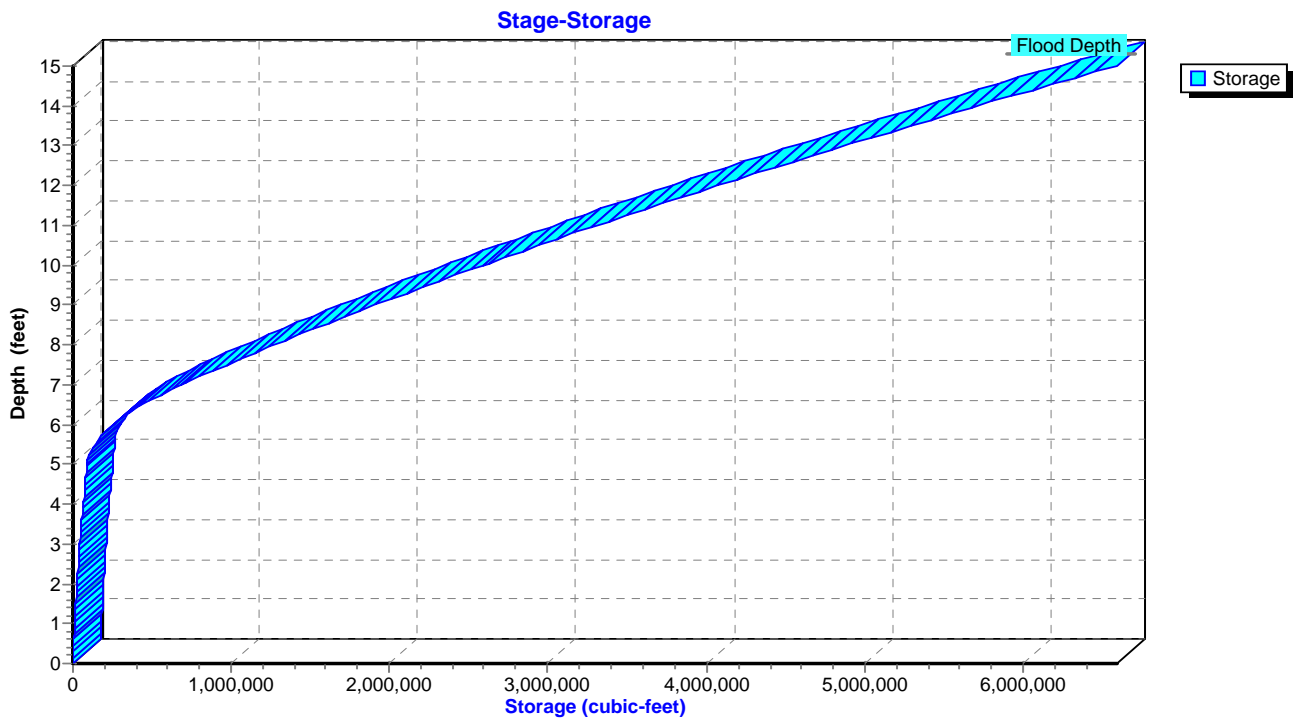
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



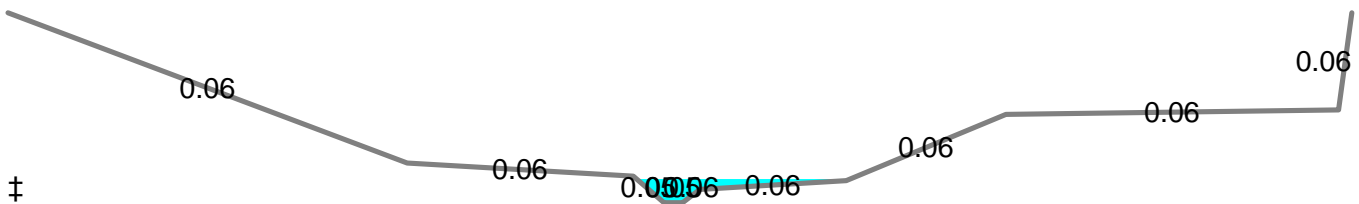
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 0.93" for 6-HR 0.1 PMF event
 Inflow = 575.67 cfs @ 5.72 hrs, Volume= 568.267 af
 Outflow = 502.02 cfs @ 7.29 hrs, Volume= 551.504 af, Atten= 13%, Lag= 94.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 1.53 fps, Min. Travel Time= 96.0 min
 Avg. Velocity = 1.40 fps, Avg. Travel Time= 104.6 min

Peak Storage= 2,894,665 cf @ 7.29 hrs
 Average Depth at Peak Storage= 5.35'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

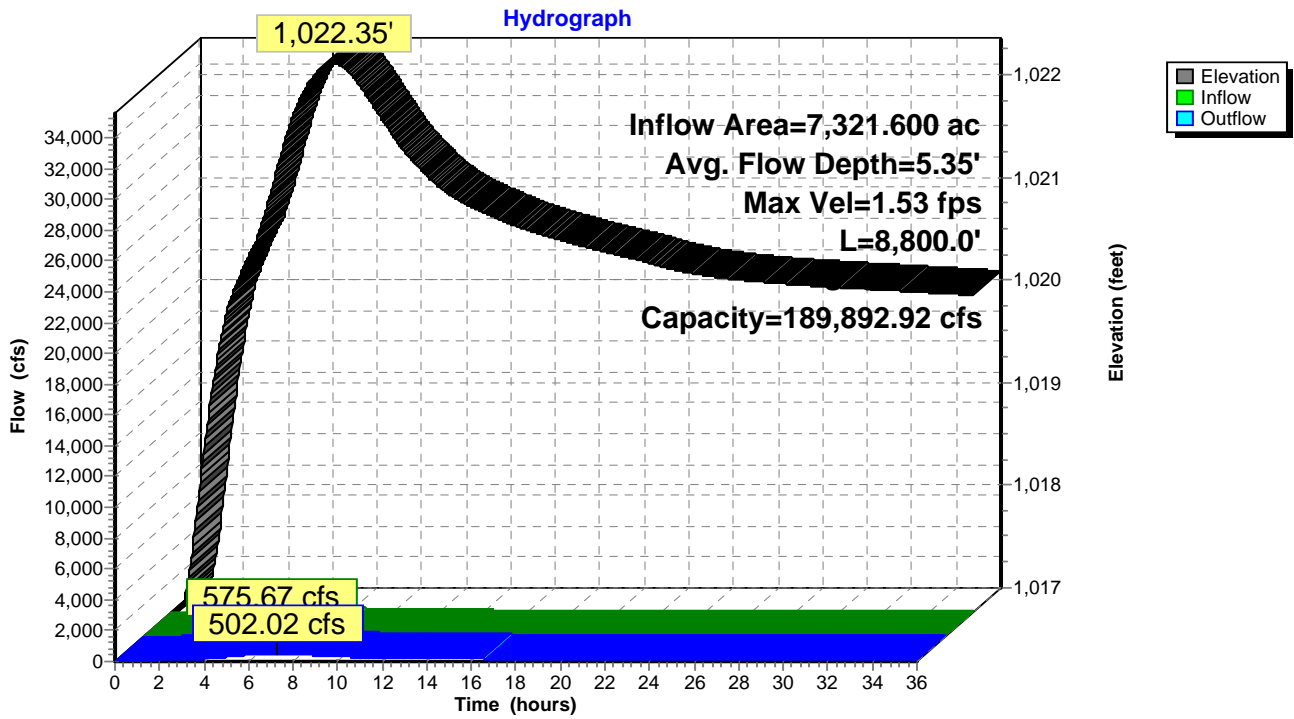
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



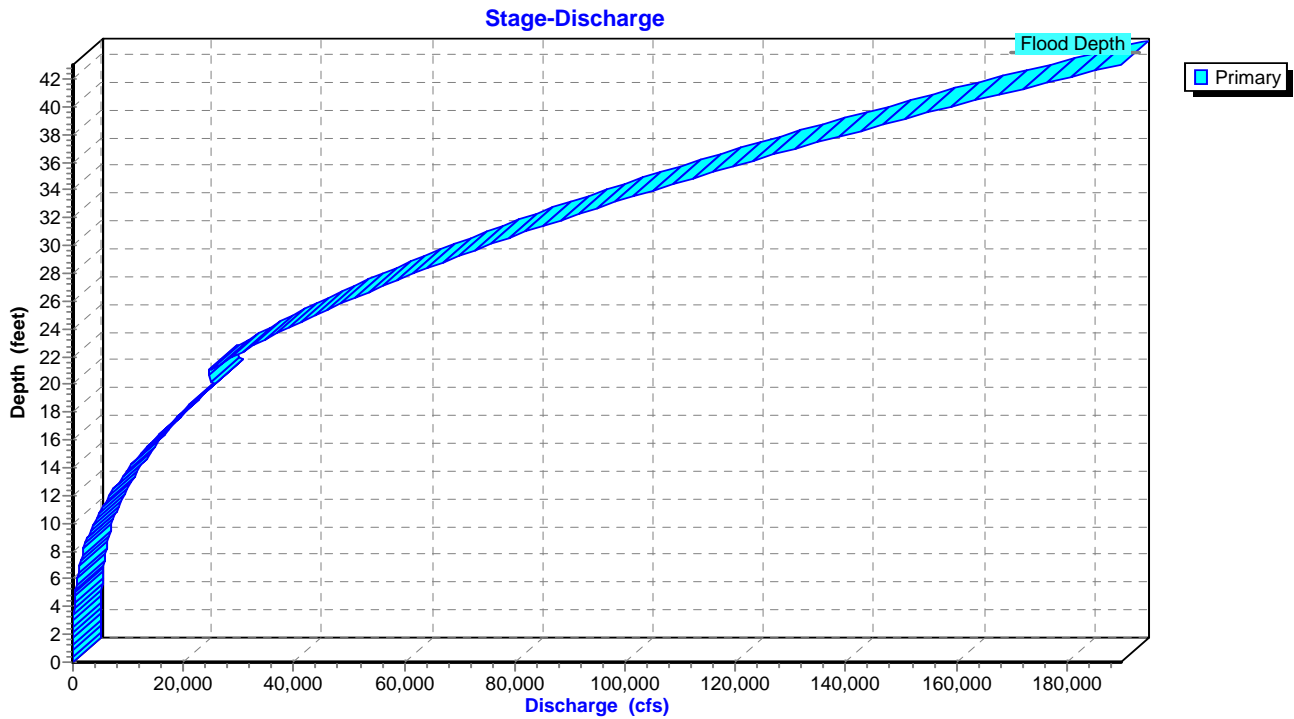
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

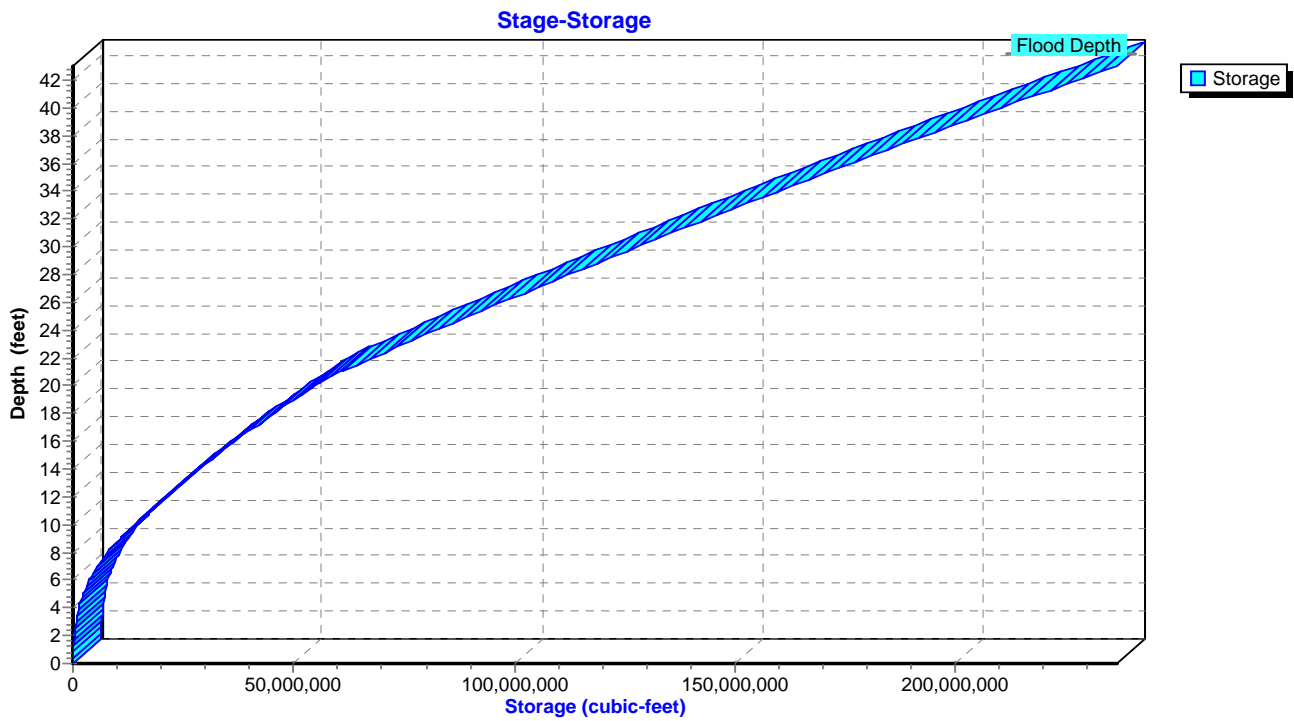
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



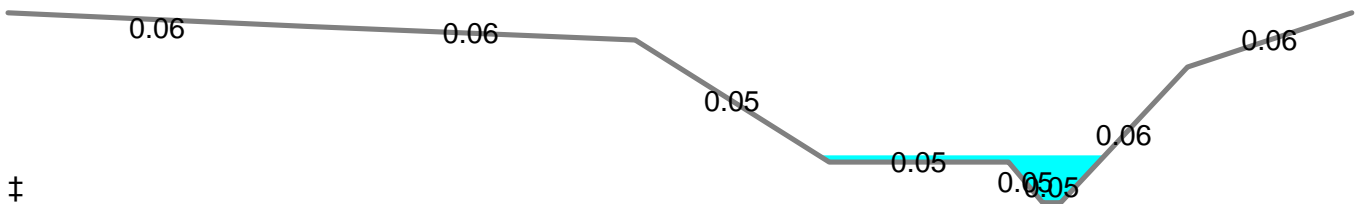
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 0.87" for 6-HR 0.1 PMF event
 Inflow = 671.10 cfs @ 6.49 hrs, Volume= 636.364 af
 Outflow = 597.79 cfs @ 7.29 hrs, Volume= 622.575 af, Atten= 11%, Lag= 48.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.08 fps, Min. Travel Time= 60.0 min
 Avg. Velocity = 1.46 fps, Avg. Travel Time= 85.6 min

Peak Storage= 2,997,748 cf @ 7.29 hrs
 Average Depth at Peak Storage= 6.98'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

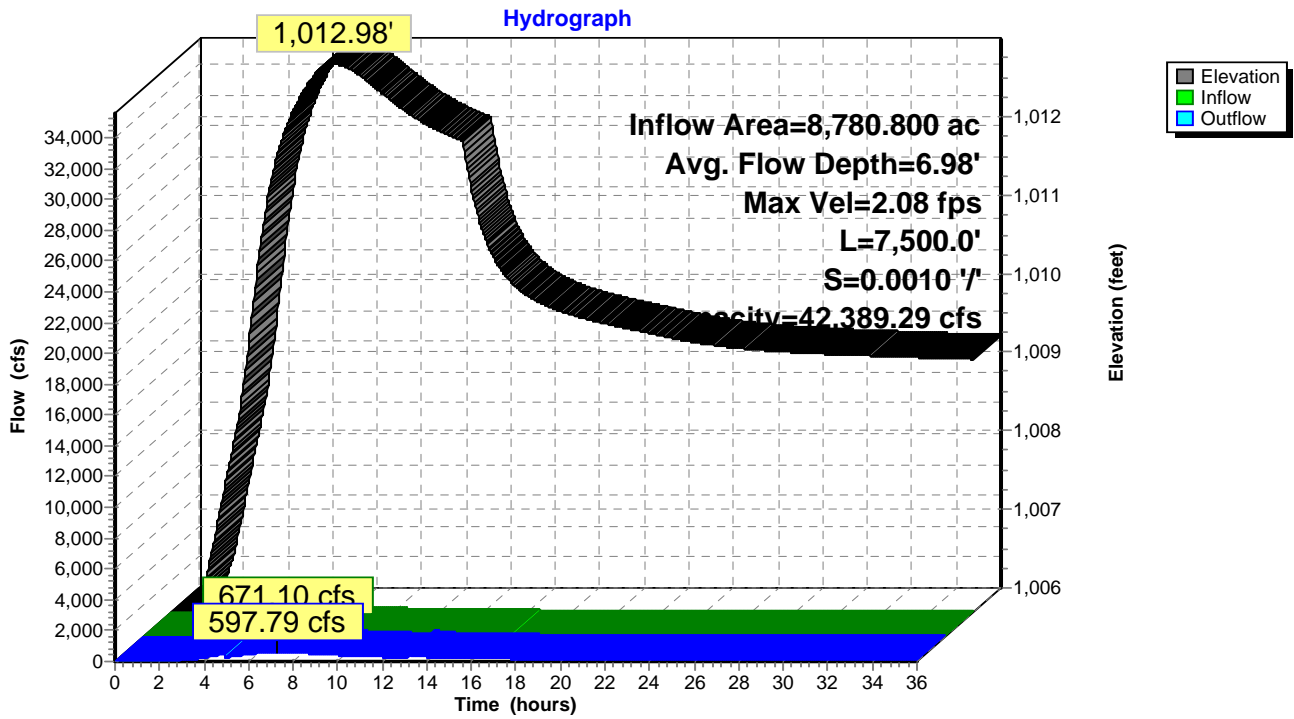
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



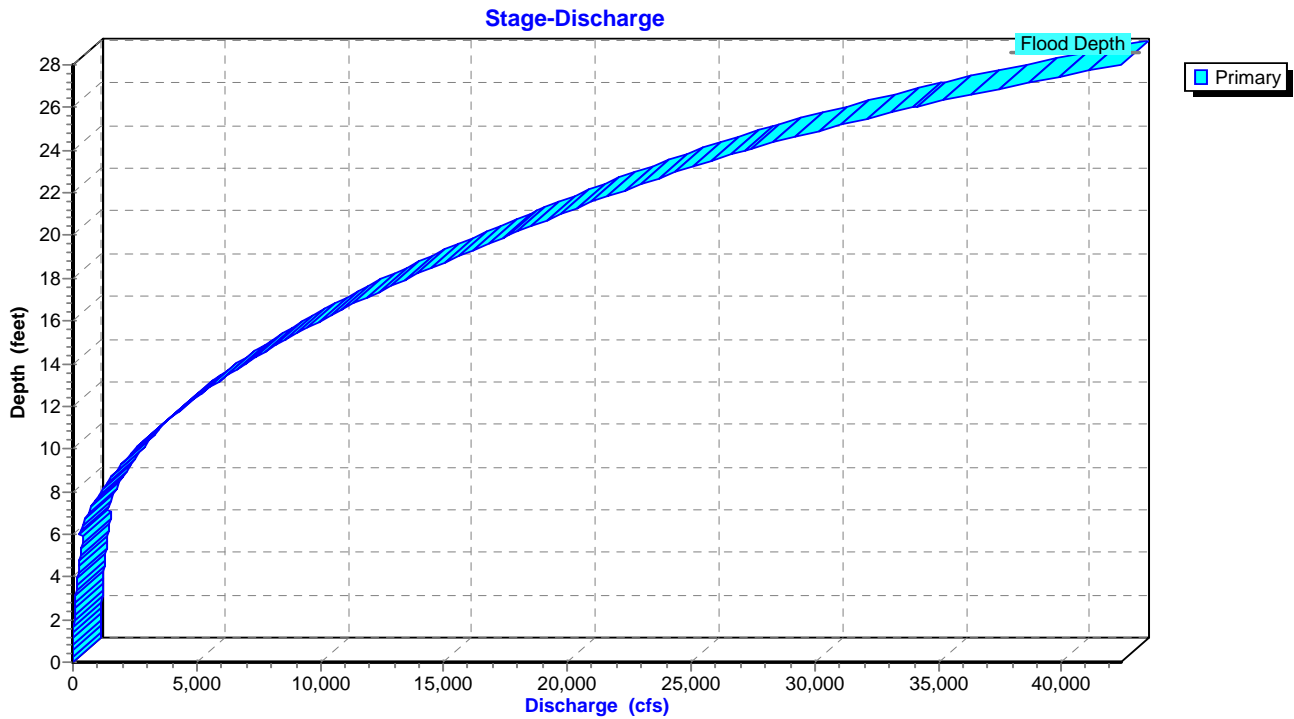
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

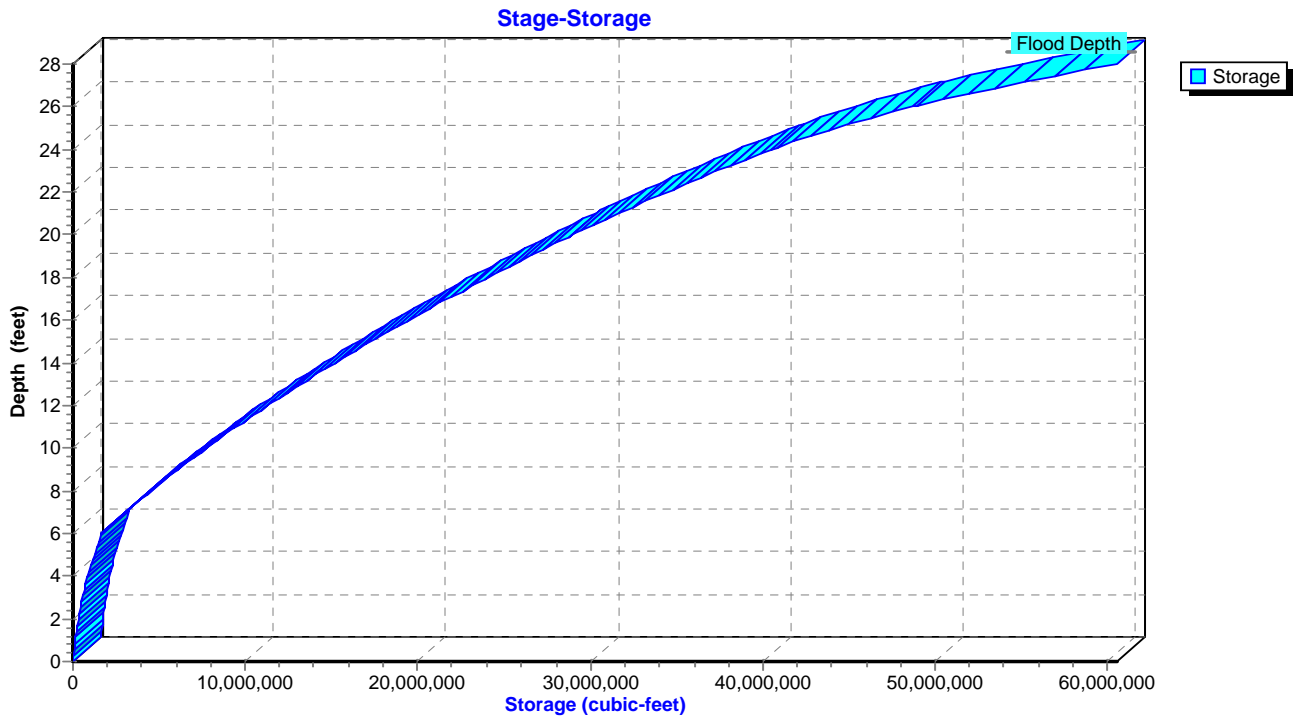
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



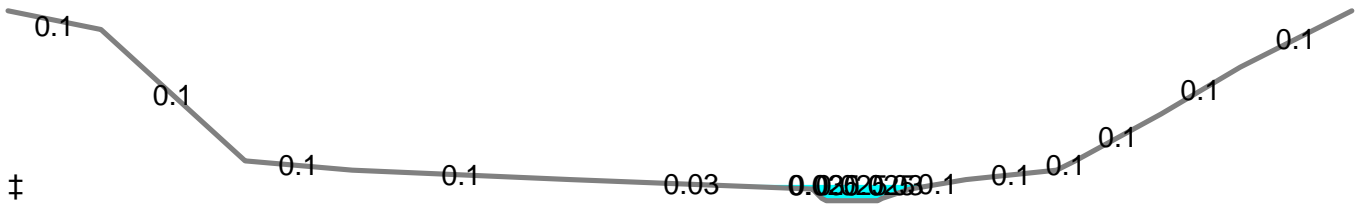
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 0.85" for 6-HR 0.1 PMF event
 Inflow = 647.45 cfs @ 7.32 hrs, Volume= 669.947 af
 Outflow = 647.44 cfs @ 7.33 hrs, Volume= 669.847 af, Atten= 0%, Lag= 0.9 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.09 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 7.20 fps, Avg. Travel Time= 1.0 min

Peak Storage= 32,212 cf @ 7.33 hrs
 Average Depth at Peak Storage= 3.39'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

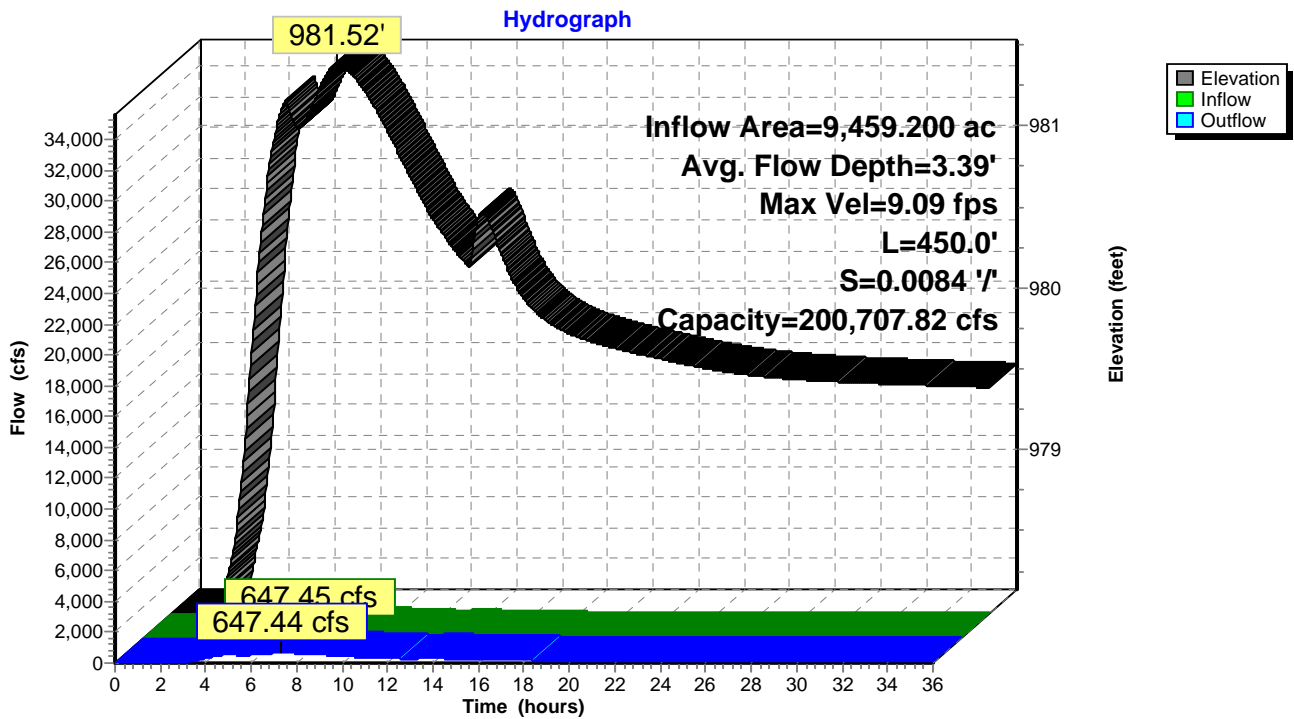
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



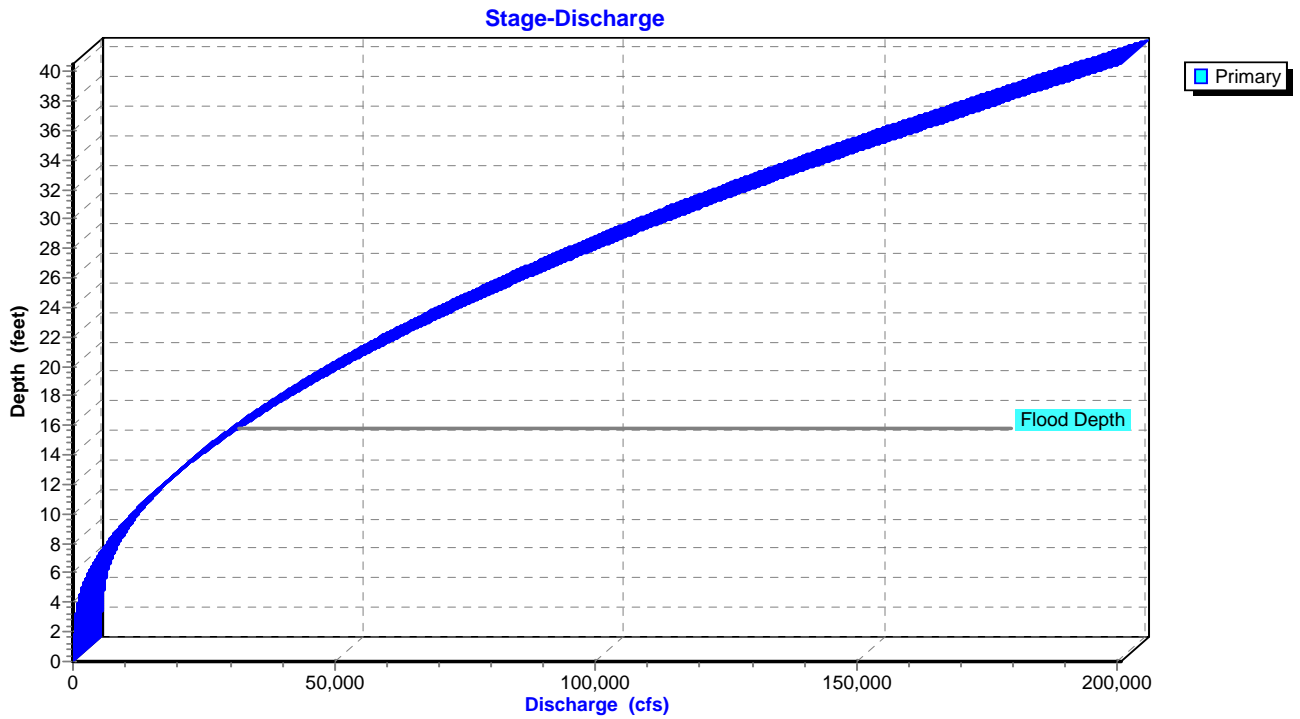
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

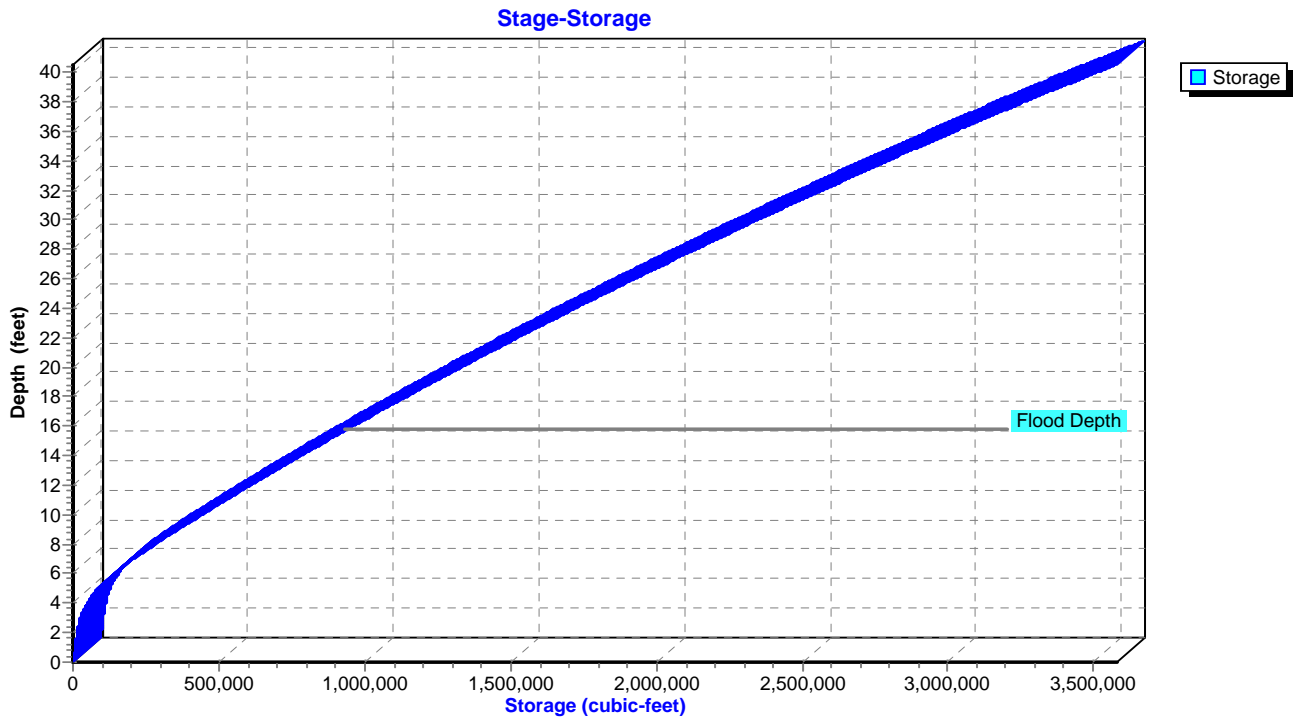
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

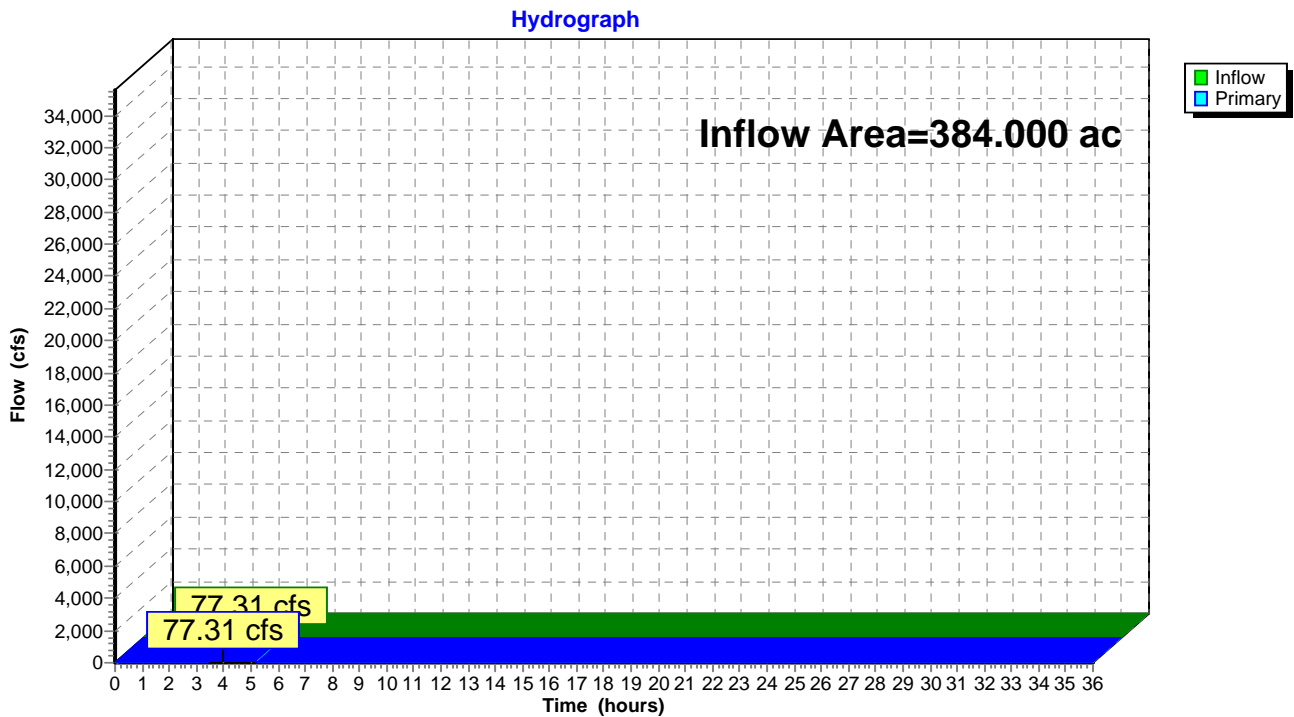


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 0.71" for 6-HR 0.1 PMF event
 Inflow = 77.31 cfs @ 3.97 hrs, Volume= 22.597 af
 Primary = 77.31 cfs @ 3.98 hrs, Volume= 22.597 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 0.86" for 6-HR 0.1 PMF event
 Inflow = 663.19 cfs @ 6.74 hrs, Volume= 677.371 af
 Outflow = 652.28 cfs @ 7.08 hrs, Volume= 670.490 af, Atten= 2%, Lag= 19.9 min
 Primary = 649.85 cfs @ 7.08 hrs, Volume= 670.270 af
 Secondary = 2.43 cfs @ 7.08 hrs, Volume= 0.219 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,004.37' @ 7.08 hrs Surf.Area= 10.682 ac Storage= 84.063 af (23.101 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 203.9 min calculated for 609.527 af (90% of inflow)
 Center-of-Mass det. time= 19.6 min (873.2 - 853.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

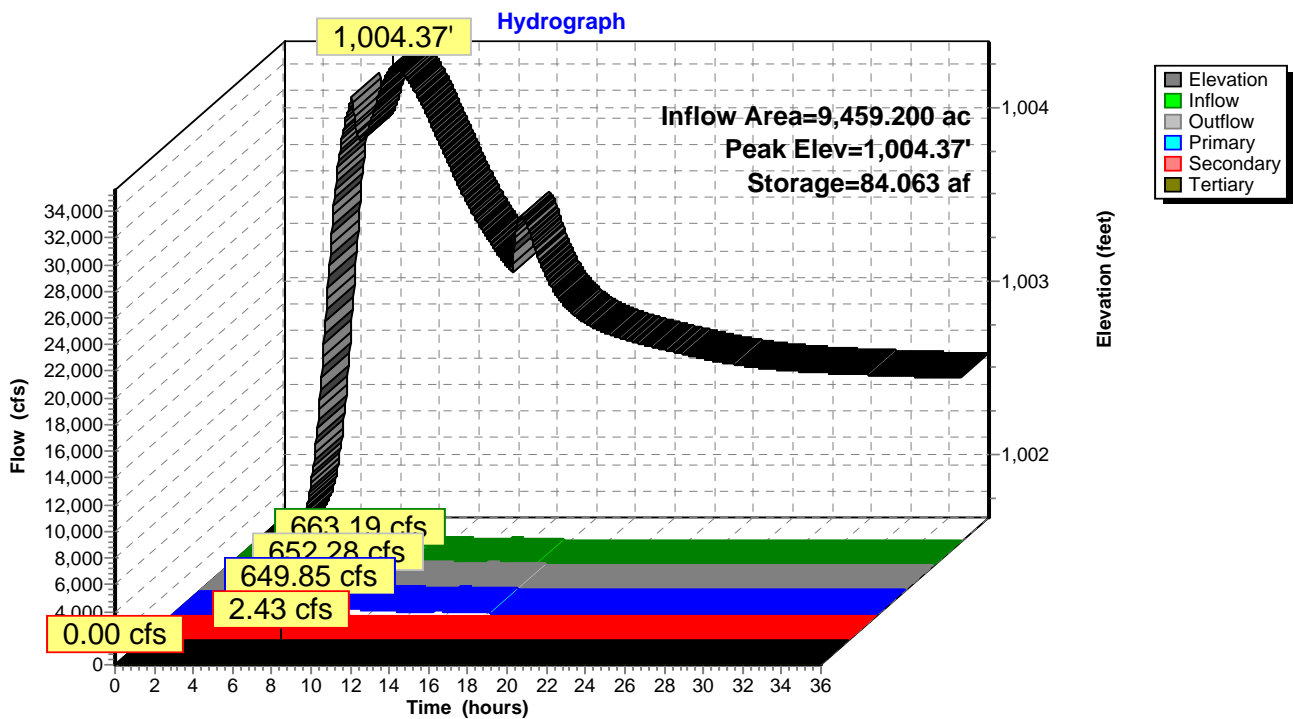
Device	Routing	Invert	Outlet Devices											
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50											
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32											
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.60 20.00											
			Width (feet) 17.00 23.00 77.00 77.00											
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80											
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00											
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00											
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00											

Primary OutFlow Max=649.85 cfs @ 7.08 hrs HW=1,004.37' TW=984.96' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 649.85 cfs @ 4.76 fps)

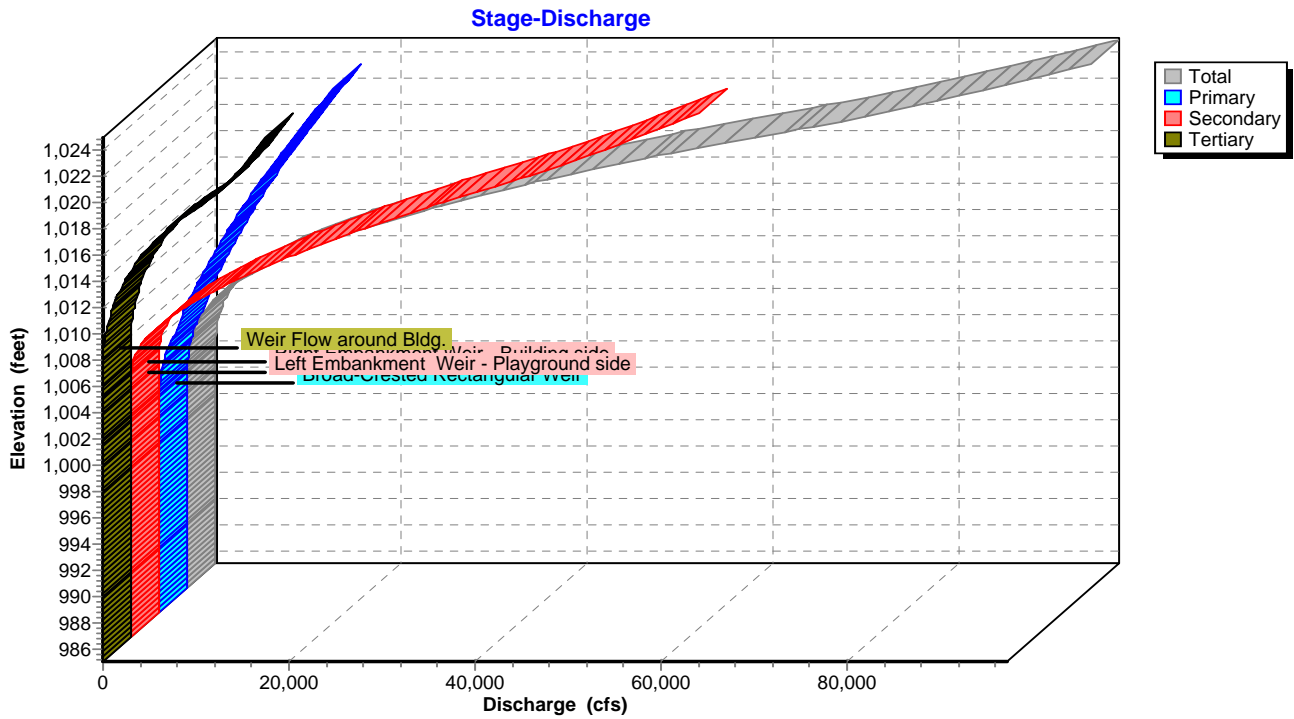
Secondary OutFlow Max=2.43 cfs @ 7.08 hrs HW=1,004.37' TW=984.96' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Controls 0.00 cfs)
 ↳ **3=Left Embankment Weir - Playground side**(Weir Controls 2.43 cfs @ 1.32 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Controls 0.00 cfs)

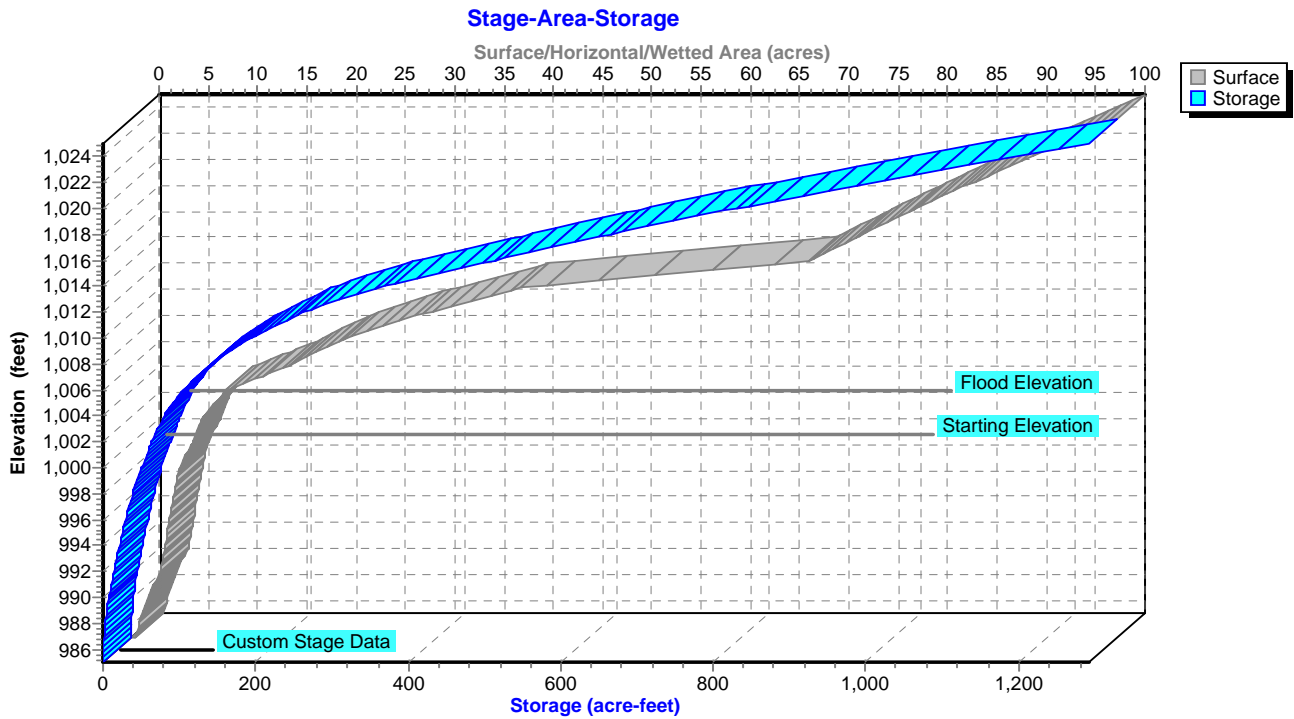
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

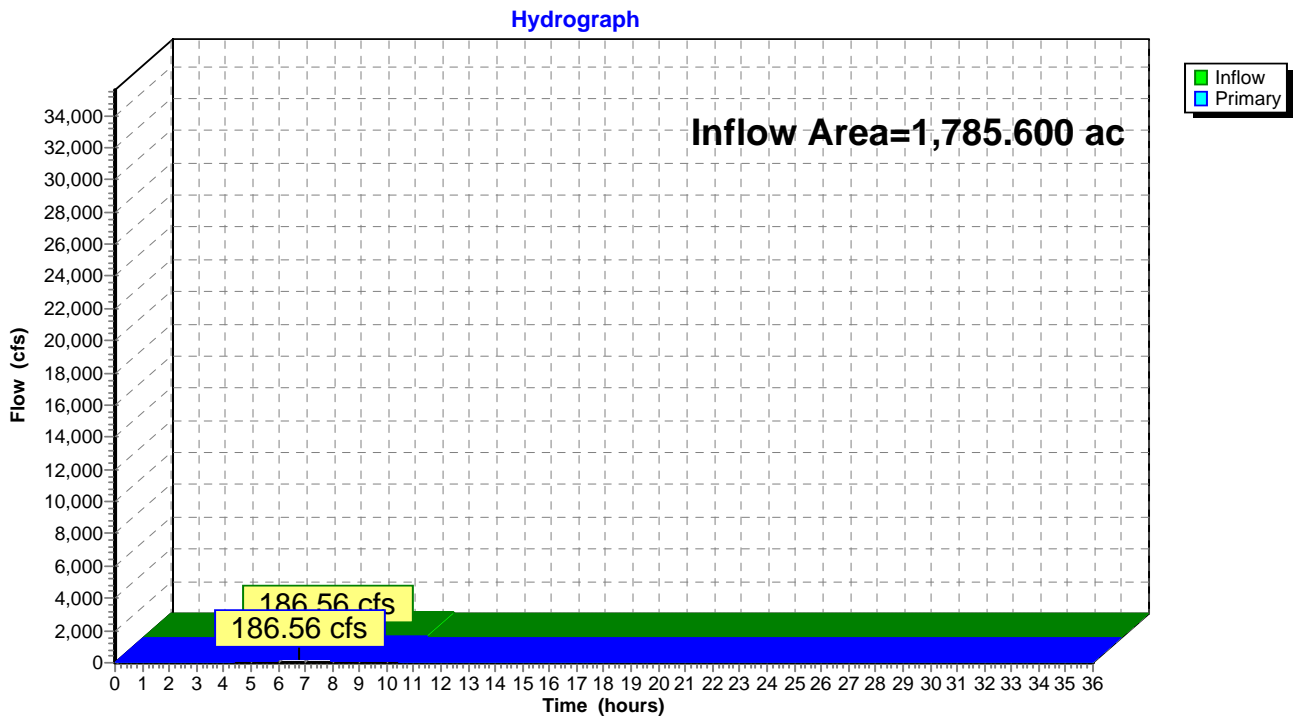


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 0.55" for 6-HR 0.1 PMF event
 Inflow = 186.56 cfs @ 6.78 hrs, Volume= 82.400 af
 Primary = 186.56 cfs @ 6.79 hrs, Volume= 82.400 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 0.55" for 6-HR 0.1 PMF event
 Inflow = 186.56 cfs @ 6.79 hrs, Volume= 82.399 af
 Outflow = 221.72 cfs @ 0.00 hrs, Volume= 428.129 af, Atten= 0%, Lag= 0.0 min
 Primary = 221.72 cfs @ 0.00 hrs, Volume= 428.129 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,097.40' @ 0.00 hrs Surf.Area= 220.000 ac Storage= 1,914.000 af
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 449.6 min (963.5 - 513.9)

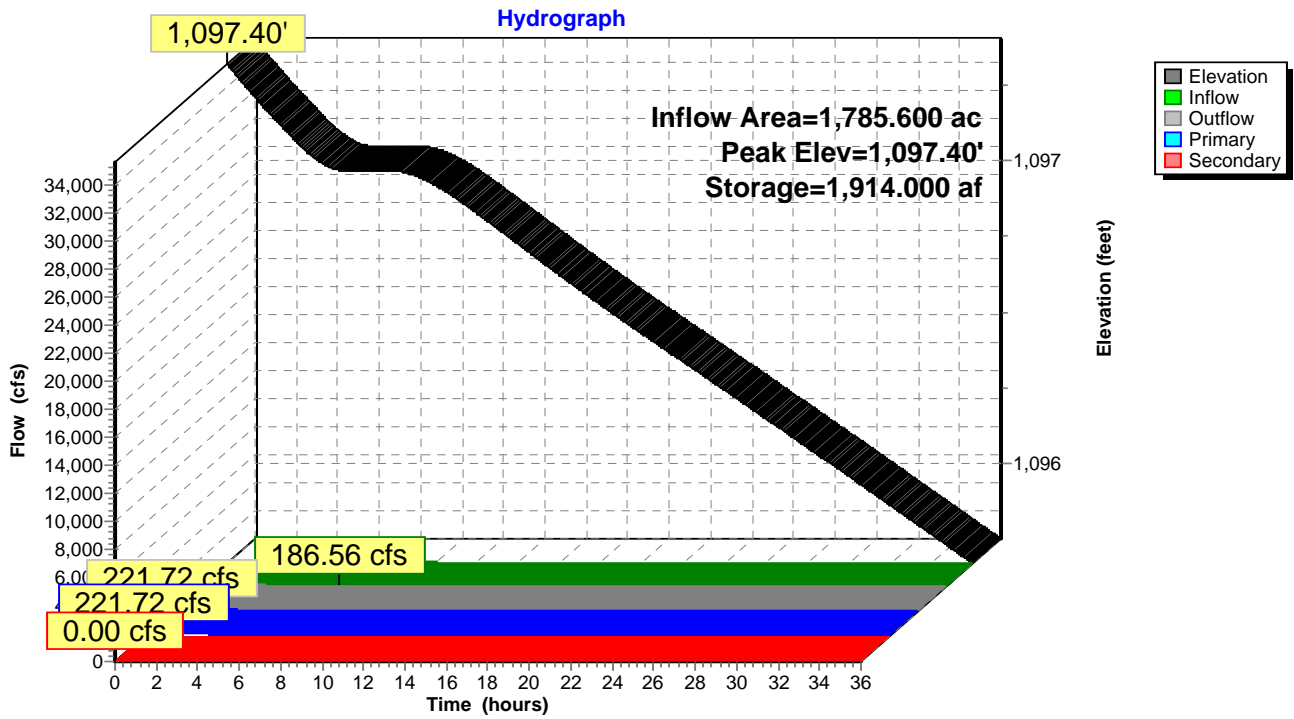
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

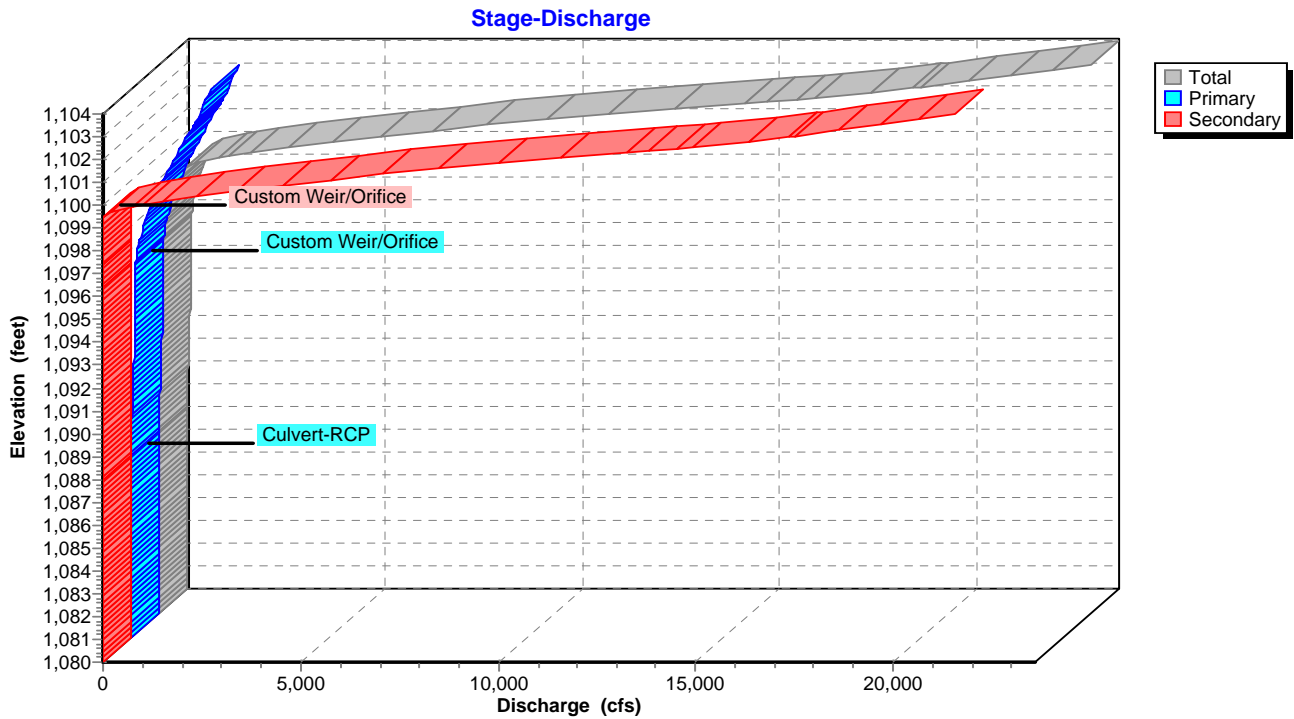
Primary OutFlow Max=221.72 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 123.47 cfs @ 17.47 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 98.25 cfs @ 3.27 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

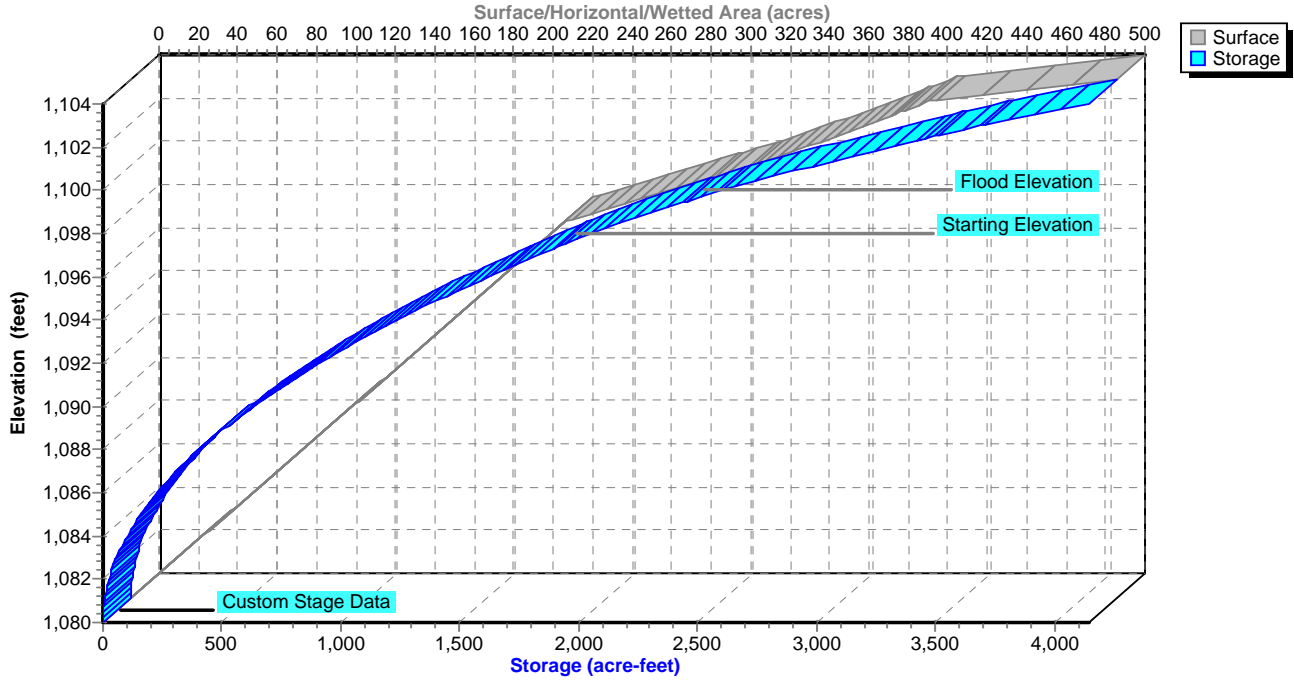


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



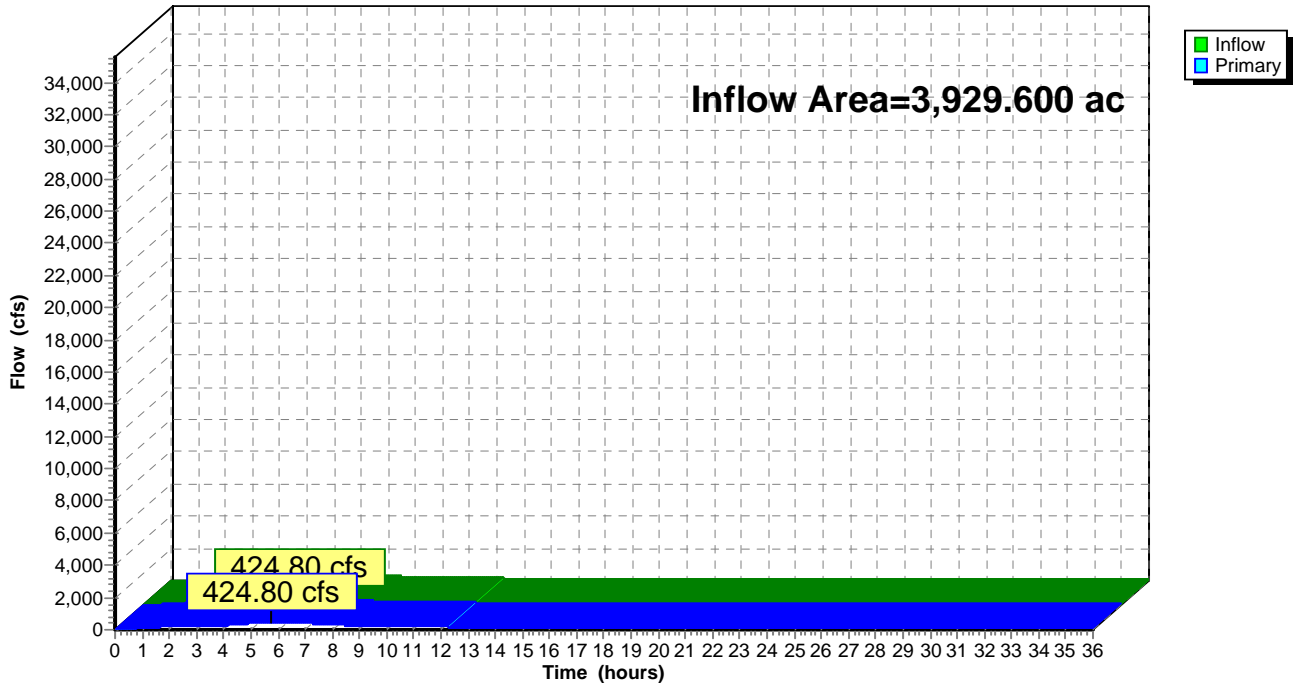
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 1.52" for 6-HR 0.1 PMF event
Inflow = 424.80 cfs @ 5.75 hrs, Volume= 496.375 af
Primary = 424.80 cfs @ 5.76 hrs, Volume= 496.375 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 0.71" for 6-HR 0.1 PMF event
 Inflow = 77.31 cfs @ 3.98 hrs, Volume= 22.597 af
 Outflow = 27.56 cfs @ 6.96 hrs, Volume= 22.390 af, Atten= 64%, Lag= 179.0 min
 Primary = 27.56 cfs @ 6.96 hrs, Volume= 22.390 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,106.46' @ 6.96 hrs Surf.Area= 27.510 ac Storage= 36.820 af (12.520 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 312.1 min (689.4 - 377.3)

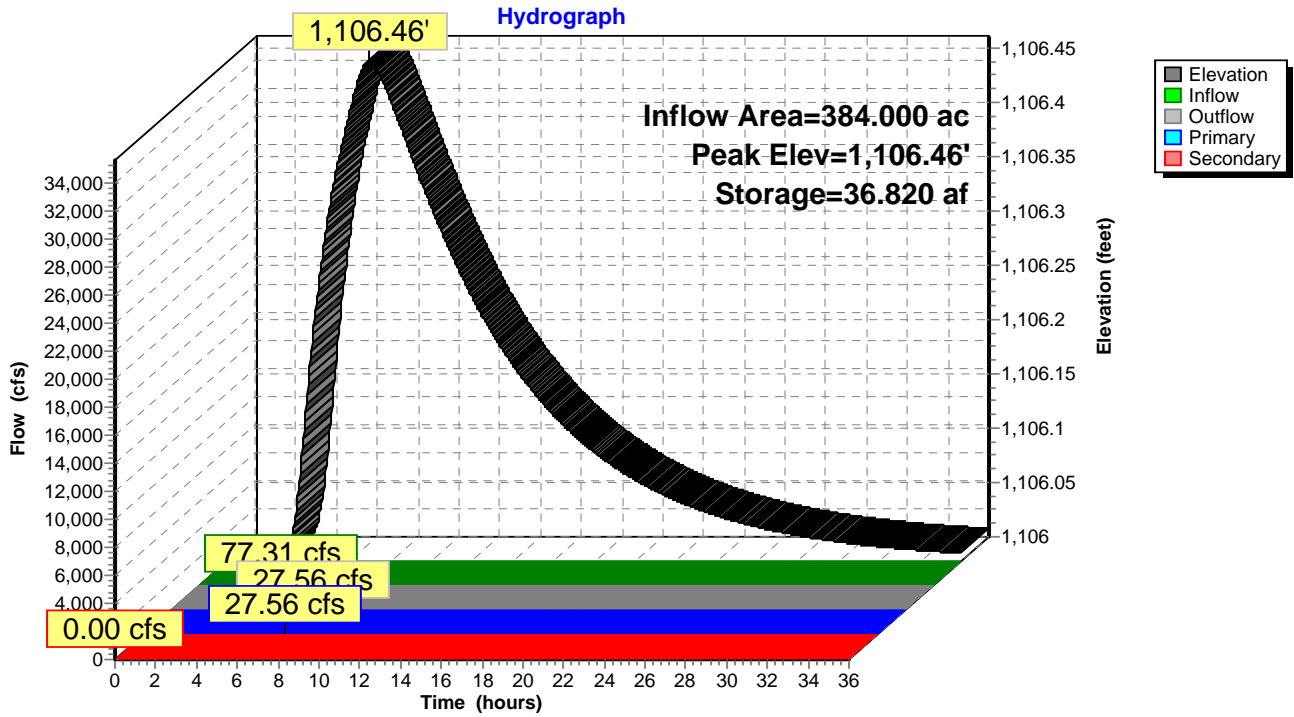
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

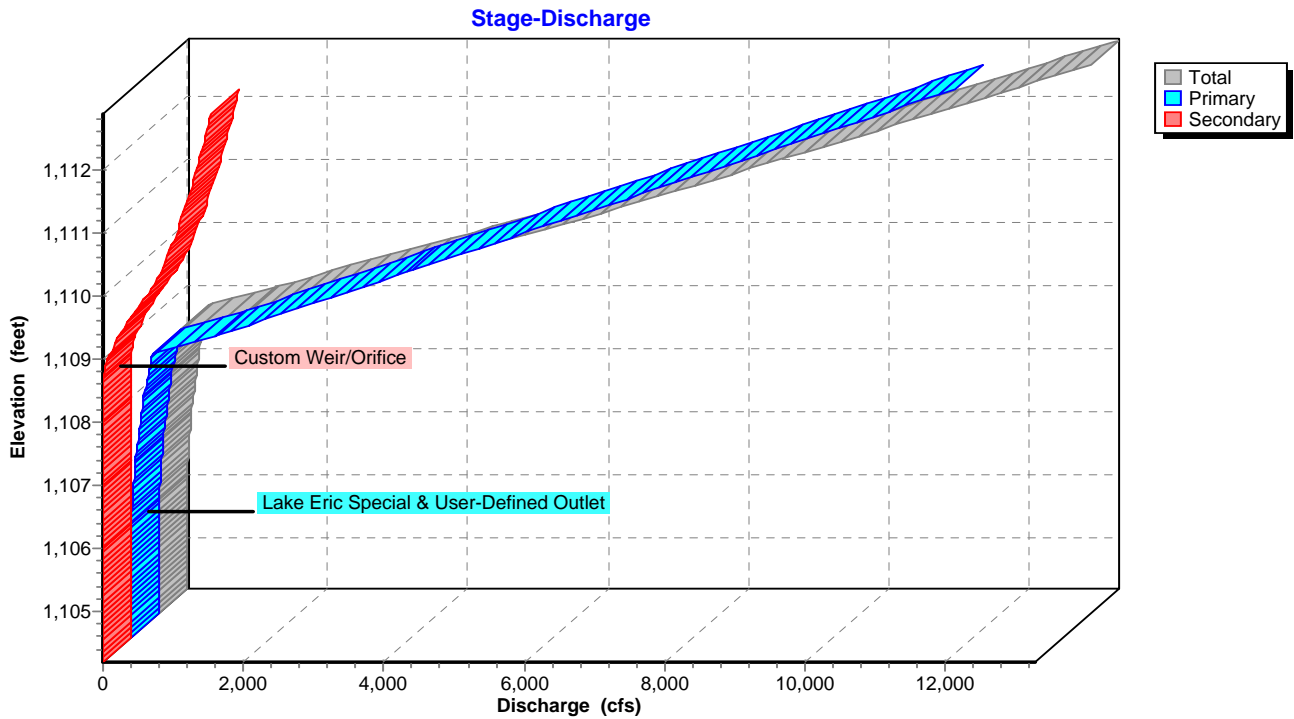
Primary OutFlow Max=27.56 cfs @ 6.96 hrs HW=1,106.46' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 27.56 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

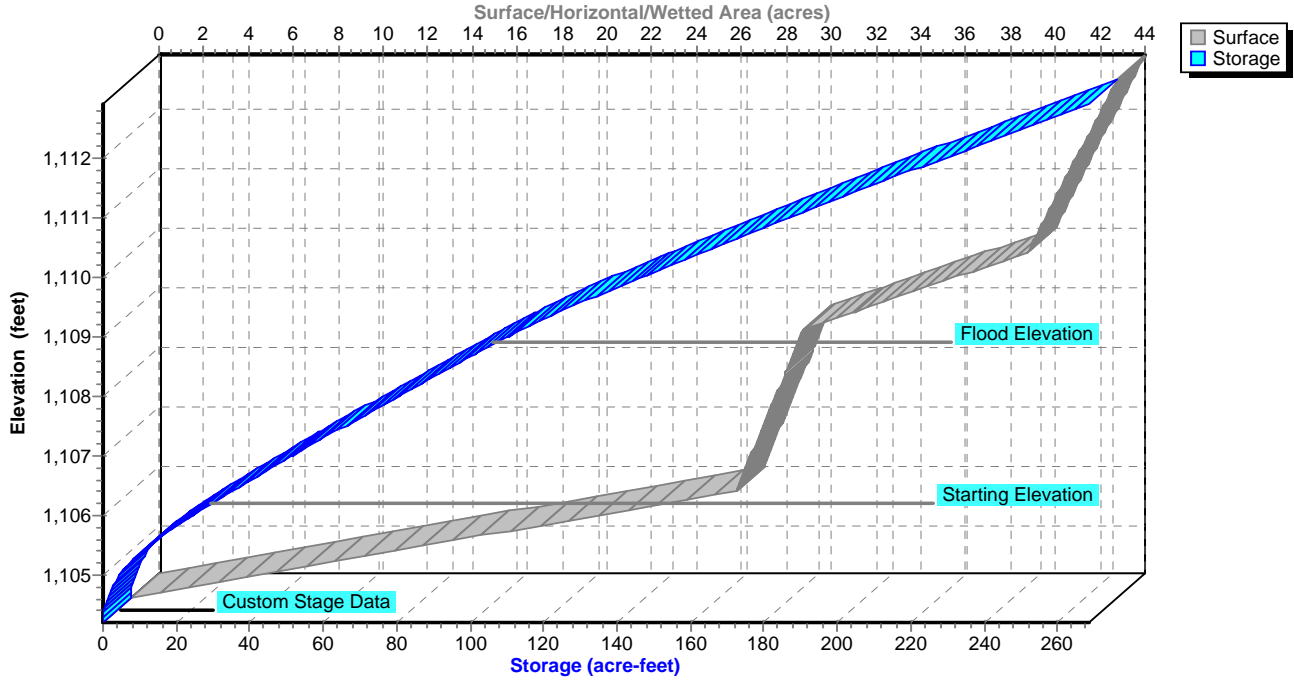


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



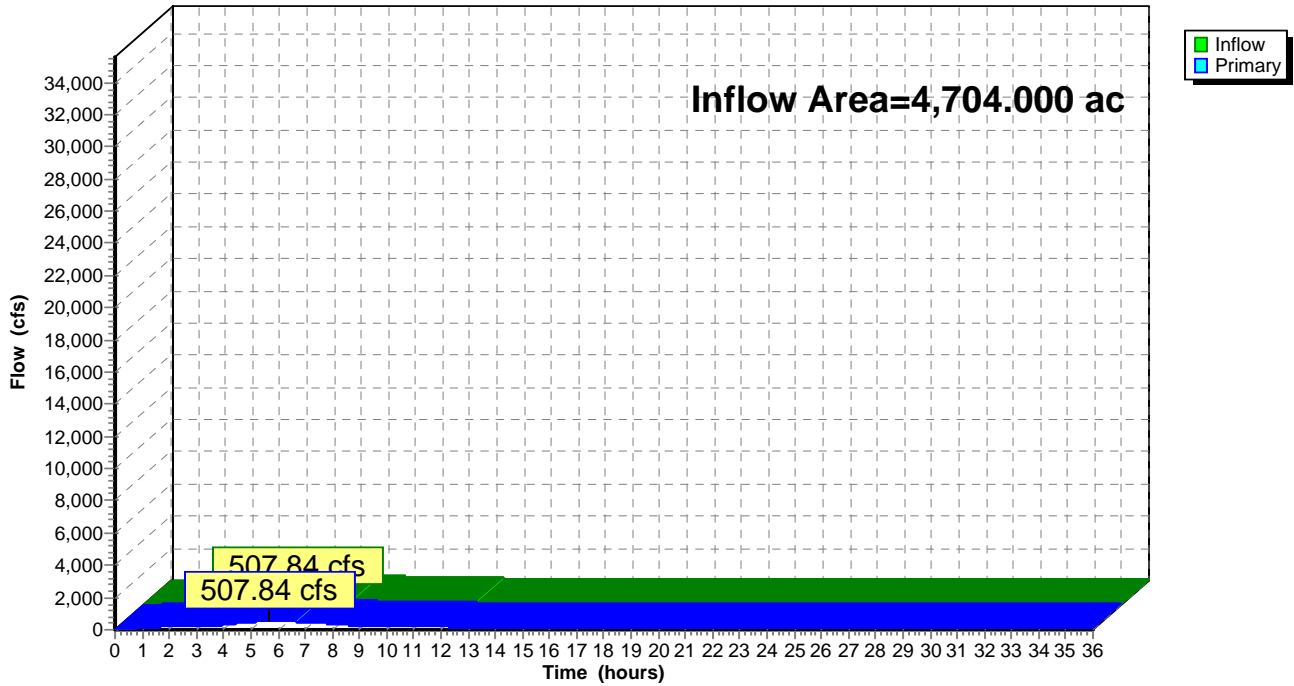
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 1.33" for 6-HR 0.1 PMF event
Inflow = 507.84 cfs @ 5.69 hrs, Volume= 522.573 af
Primary = 507.84 cfs @ 5.70 hrs, Volume= 522.573 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 0.68" for 6-HR 0.1 PMF event
 Inflow = 32.83 cfs @ 3.58 hrs, Volume= 6.498 af
 Outflow = 11.37 cfs @ 6.44 hrs, Volume= 6.431 af, Atten= 65%, Lag= 171.6 min
 Primary = 11.37 cfs @ 6.44 hrs, Volume= 6.431 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,117.60' @ 6.44 hrs Surf.Area= 3.846 ac Storage= 17.832 af (4.142 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 324.7 min (596.3 - 271.6)

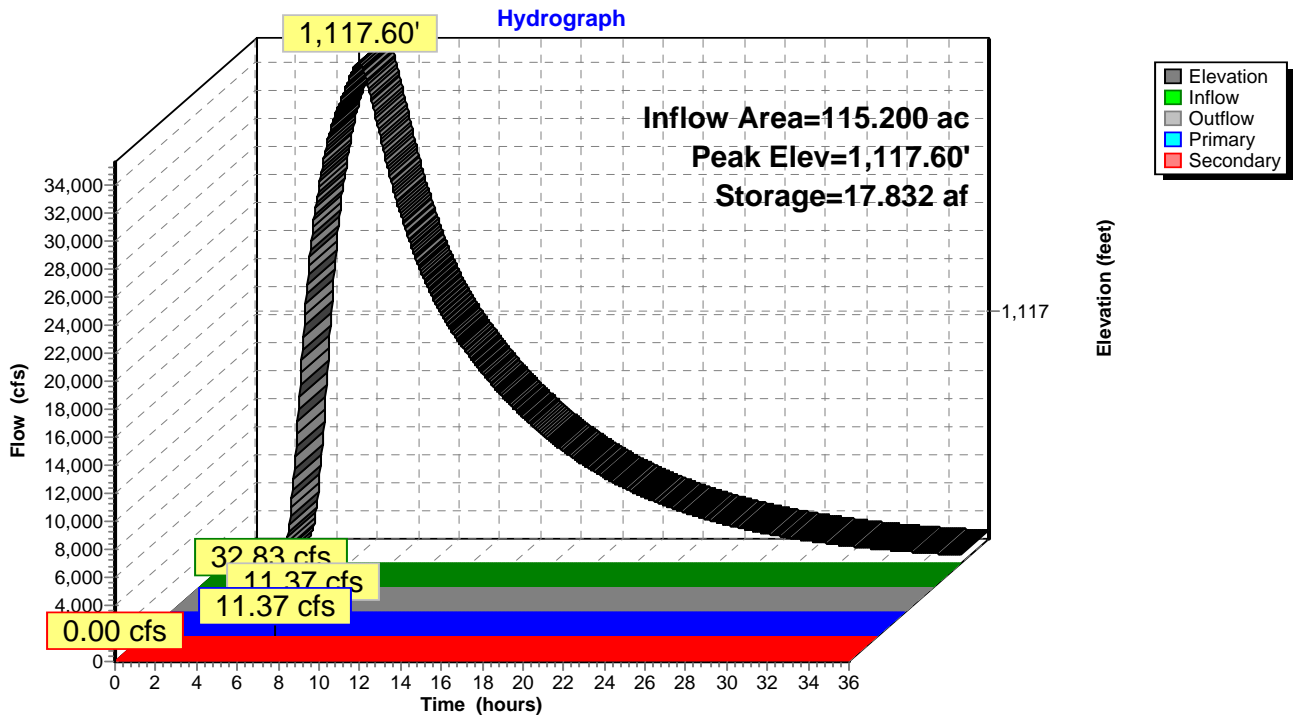
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

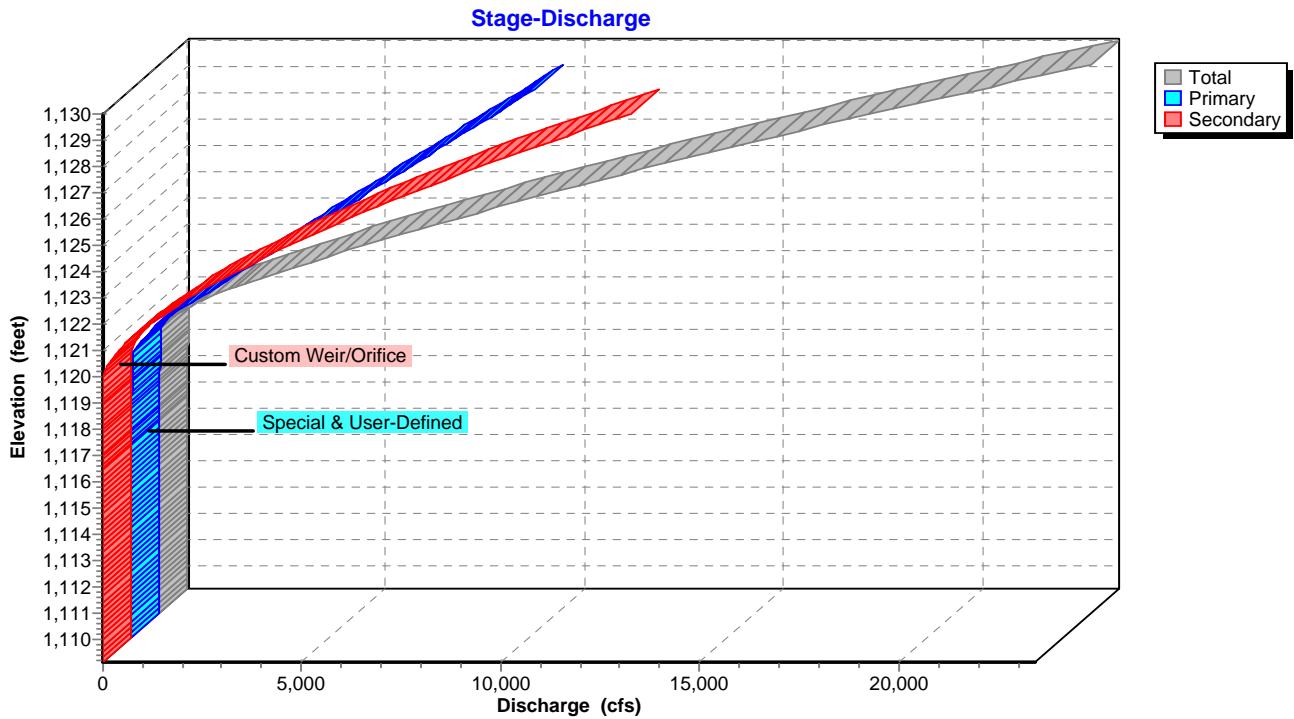
Primary OutFlow Max=11.37 cfs @ 6.44 hrs HW=1,117.60' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 11.37 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,116.50' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

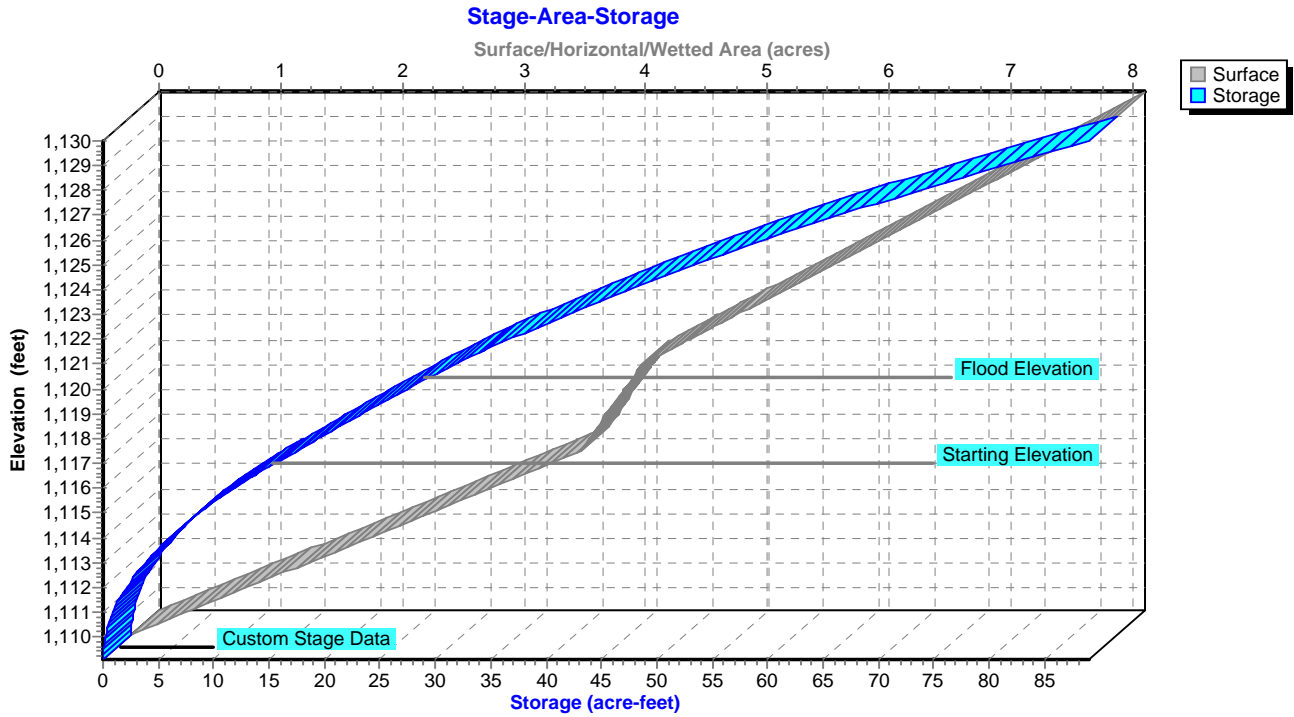
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



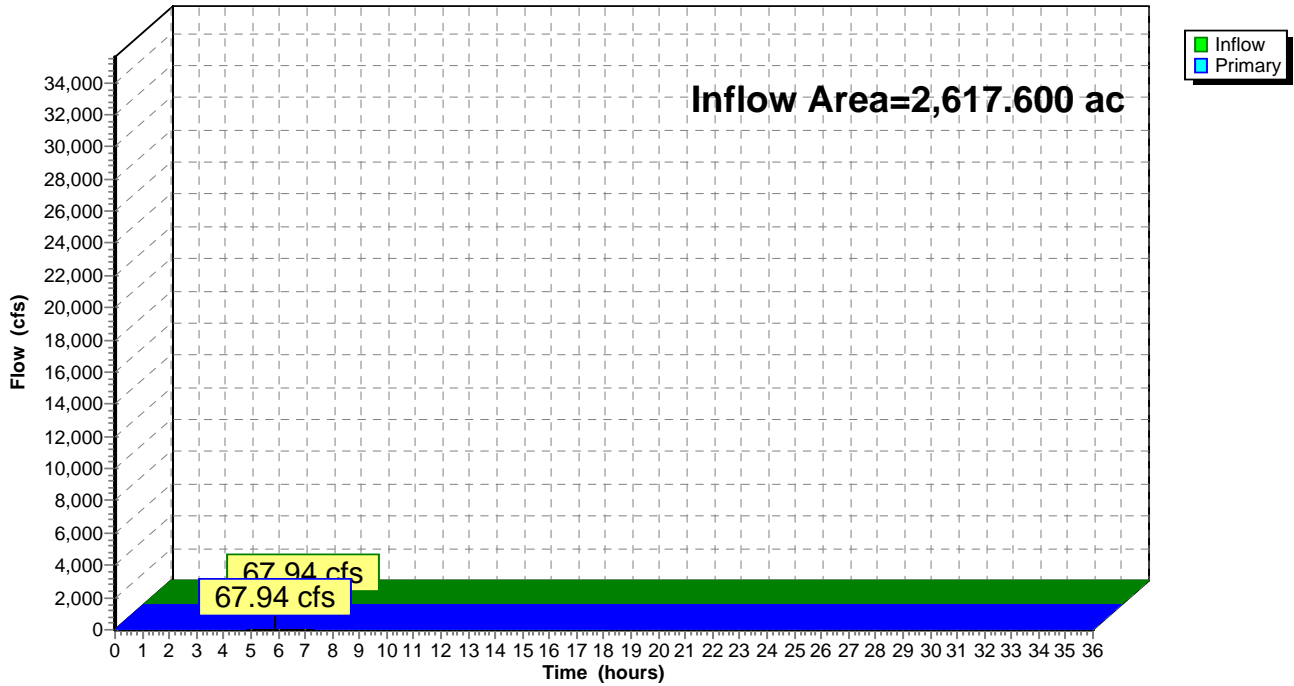
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 0.21" for 6-HR 0.1 PMF event
Inflow = 67.94 cfs @ 5.87 hrs, Volume= 45.891 af
Primary = 67.94 cfs @ 5.88 hrs, Volume= 45.891 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

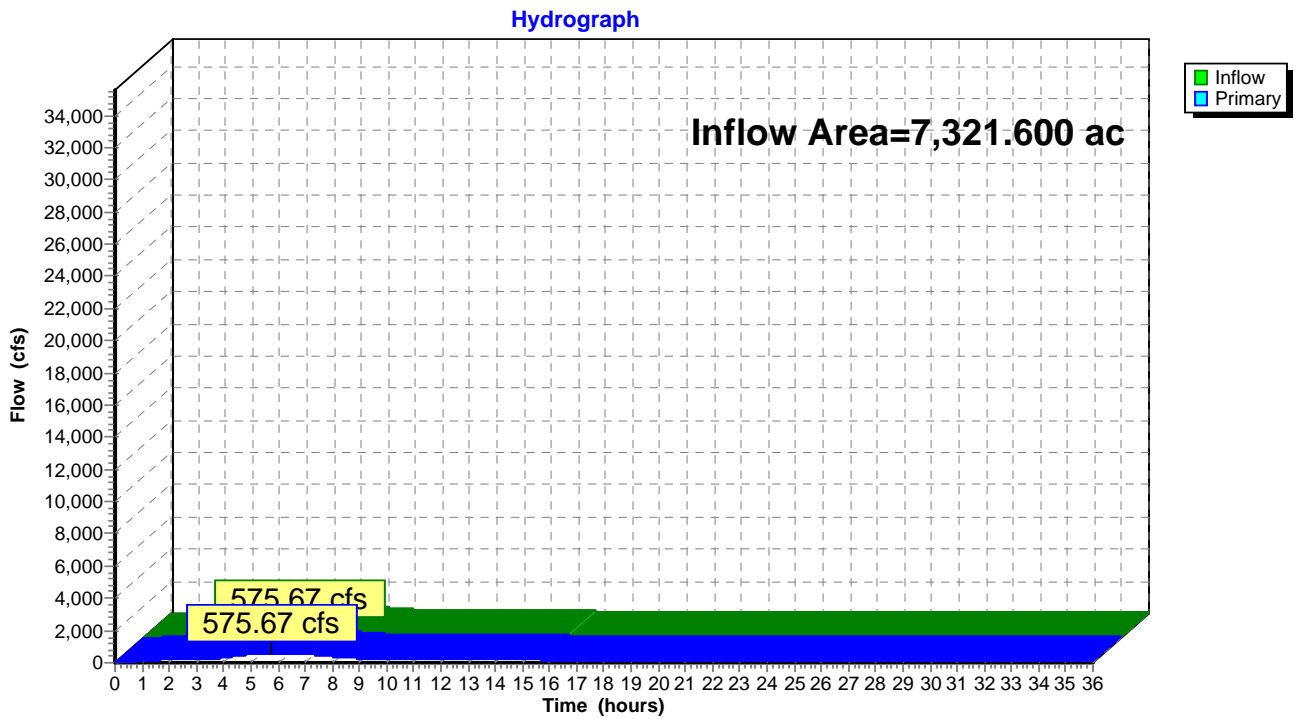


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 0.93" for 6-HR 0.1 PMF event
Inflow = 575.67 cfs @ 5.71 hrs, Volume= 568.365 af
Primary = 575.67 cfs @ 5.72 hrs, Volume= 568.365 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



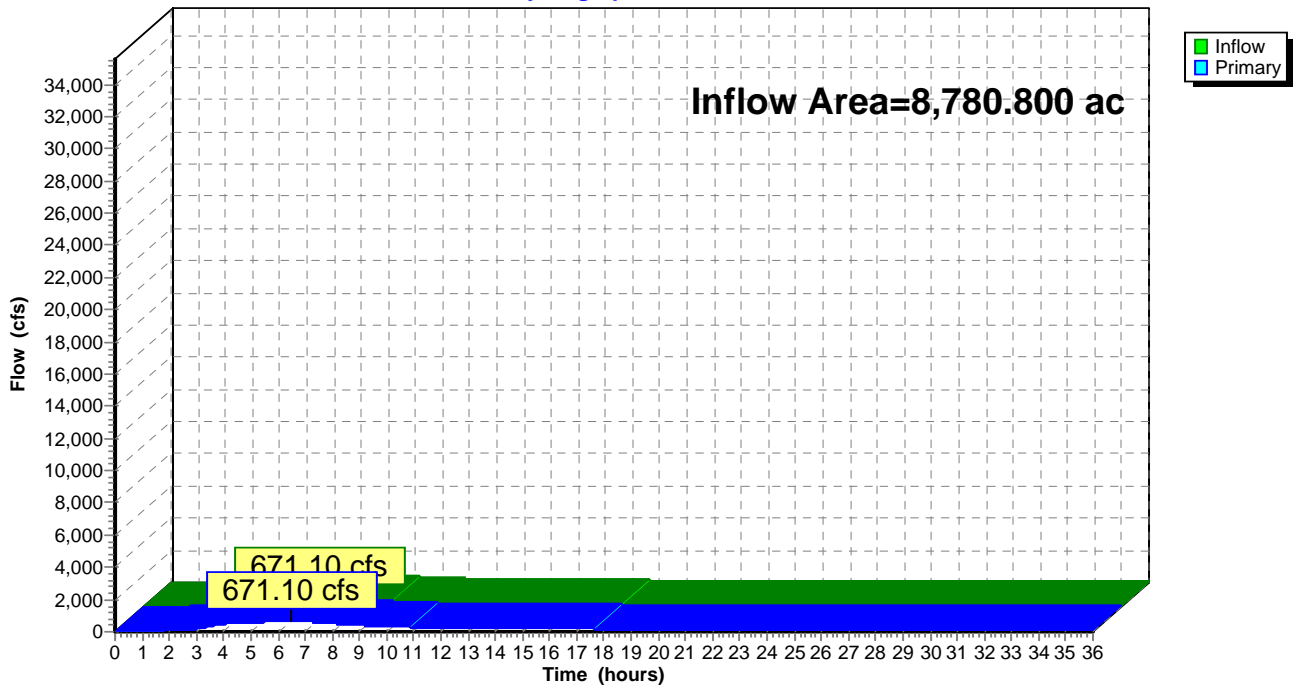
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 0.87" for 6-HR 0.1 PMF event
Inflow = 671.10 cfs @ 6.48 hrs, Volume= 636.464 af
Primary = 671.10 cfs @ 6.49 hrs, Volume= 636.464 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 0.16" for 6-HR 0.1 PMF event
 Inflow = 55.00 cfs @ 9.24 hrs, Volume= 25.501 af
 Outflow = 20.96 cfs @ 13.13 hrs, Volume= 23.792 af, Atten= 62%, Lag= 233.3 min
 Primary = 20.96 cfs @ 13.13 hrs, Volume= 23.792 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,019.90' @ 13.16 hrs Surf.Area= 11.921 ac Storage= 11.686 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 383.5 min calculated for 23.785 af (93% of inflow)
 Center-of-Mass det. time= 323.3 min (1,083.8 - 760.5)

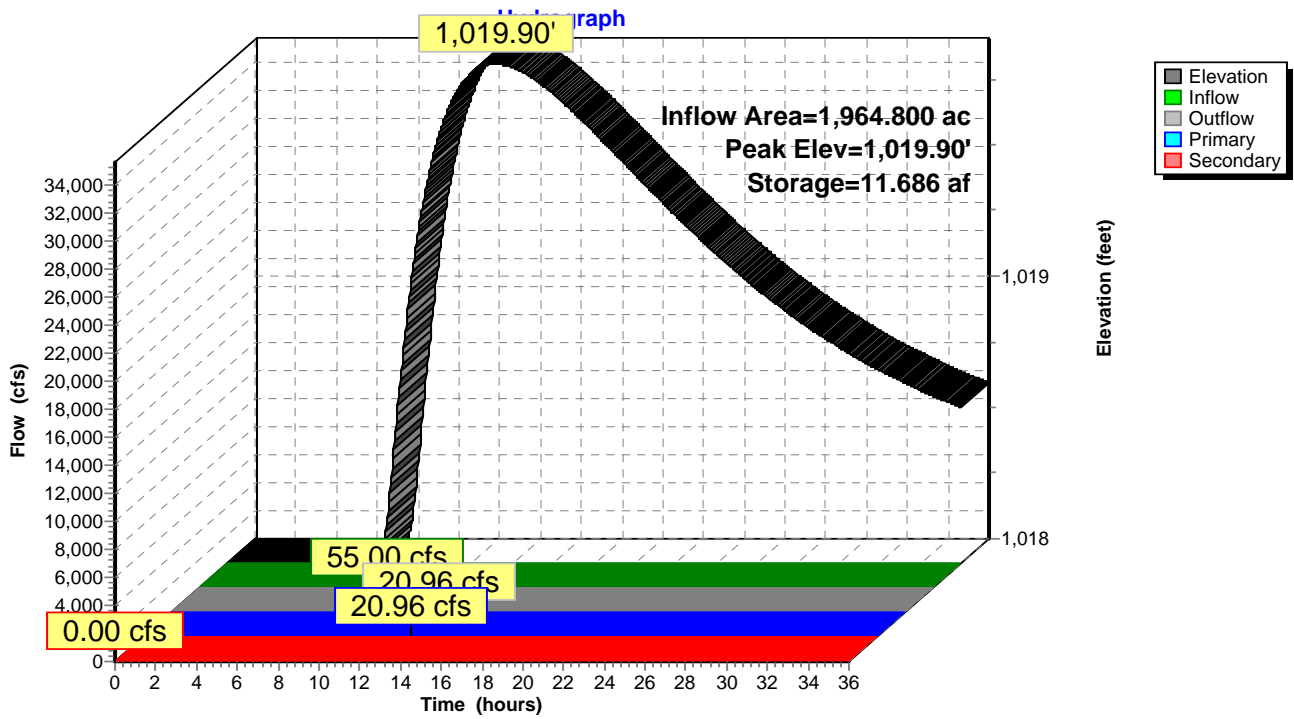
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

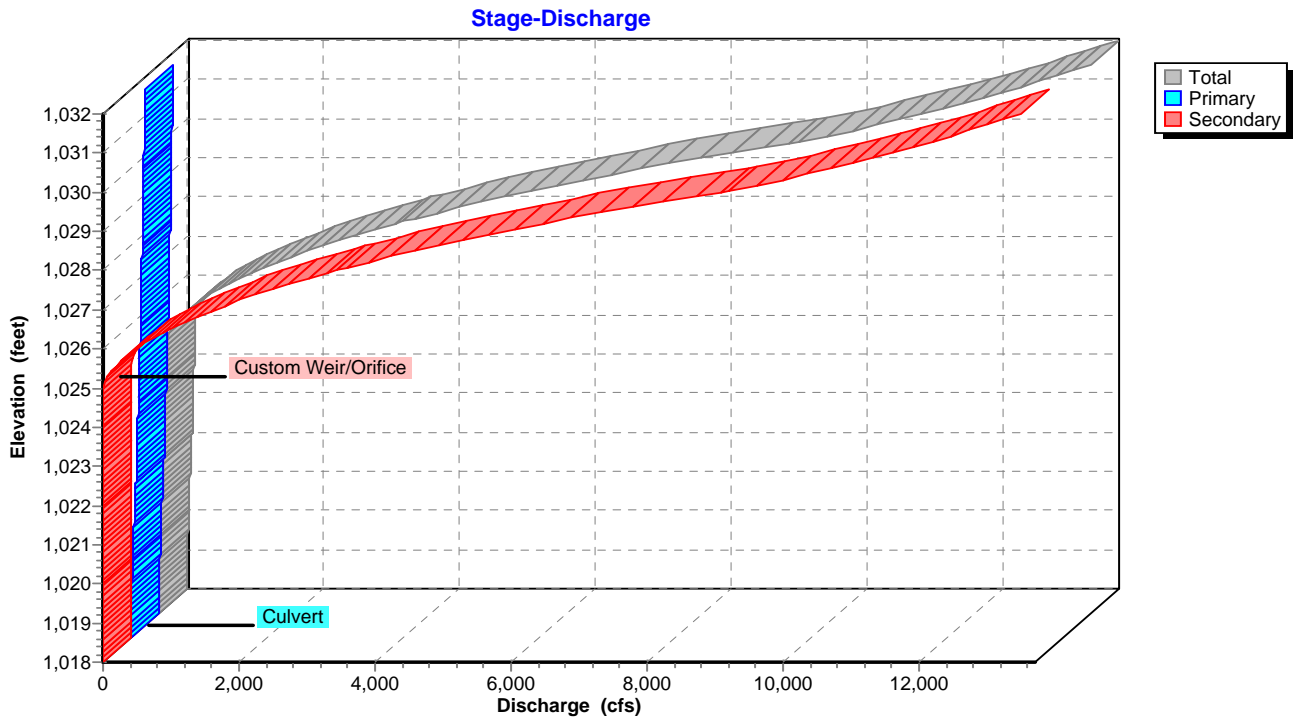
Primary OutFlow Max=20.96 cfs @ 13.13 hrs HW=1,019.90' TW=1,018.63' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 20.96 cfs @ 5.21 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,018.00' TW=1,017.50' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

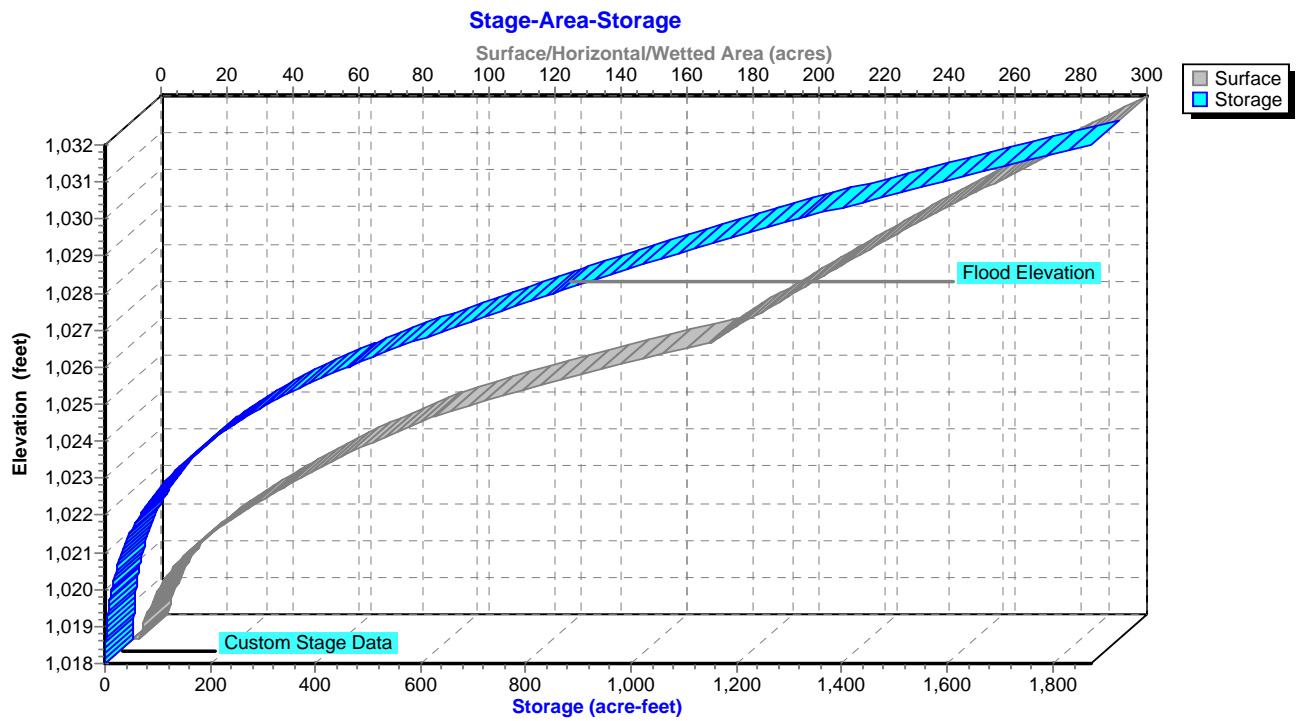
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 0.72" for 6-HR 0.1 PMF event
 Inflow = 365.52 cfs @ 5.37 hrs, Volume= 118.170 af
 Outflow = 55.00 cfs @ 9.24 hrs, Volume= 25.501 af, Atten= 85%, Lag= 232.0 min
 Primary = 55.00 cfs @ 9.24 hrs, Volume= 25.501 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,028.17' @ 9.24 hrs Surf.Area= 97.135 ac Storage= 328.051 af (108.051 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 386.8 min (760.6 - 373.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

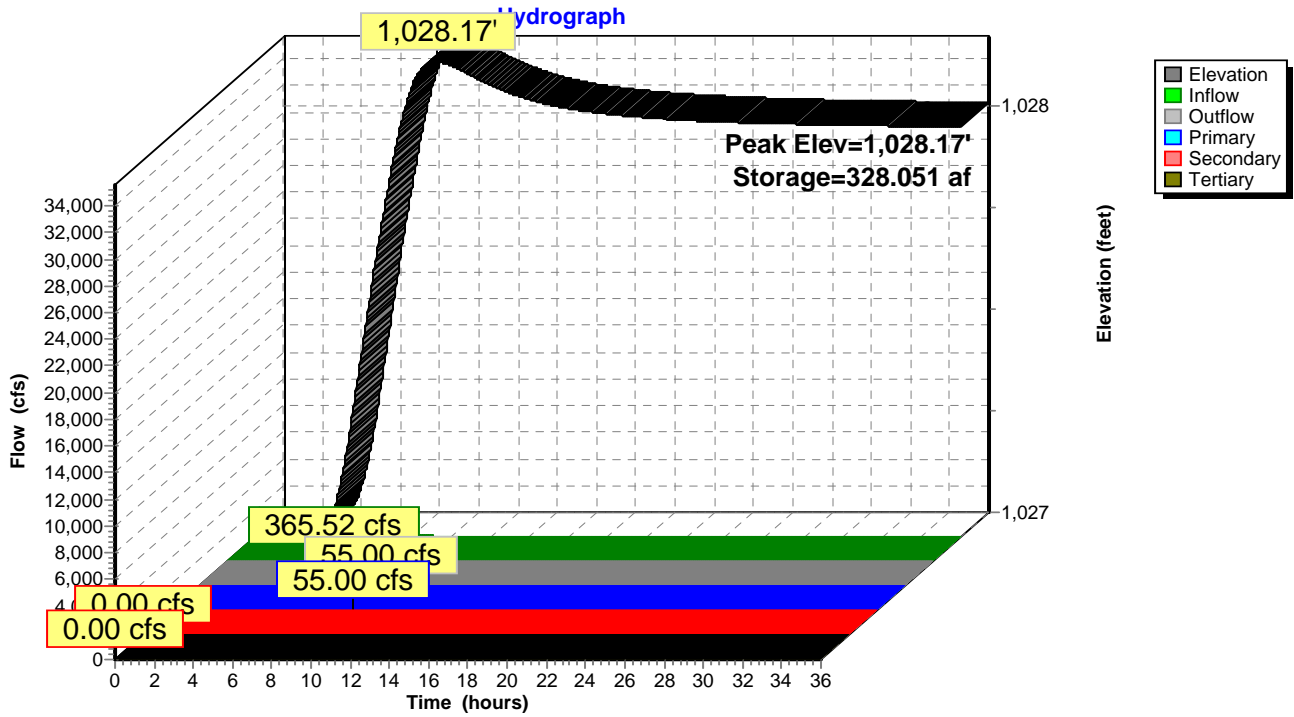
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=55.00 cfs @ 9.24 hrs HW=1,028.17' TW=1,019.19' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 55.00 cfs @ 1.10 fps)
 ↓2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

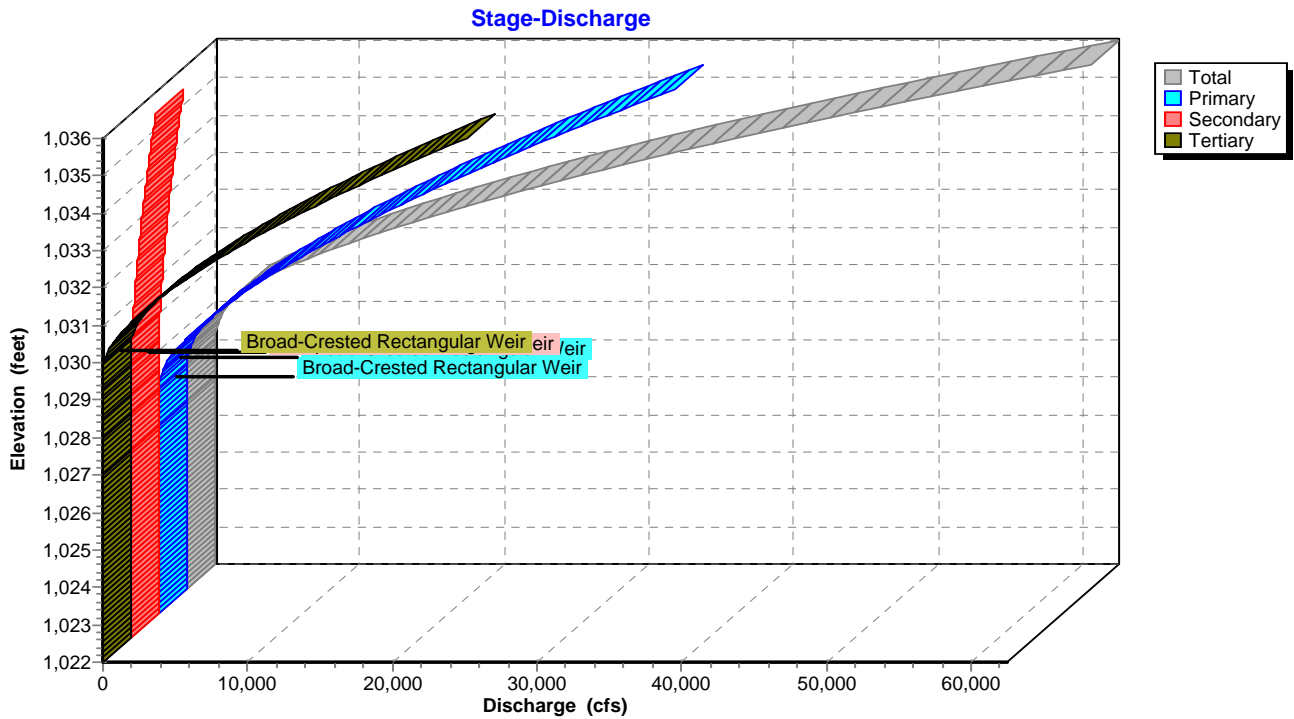
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Sippo Lake

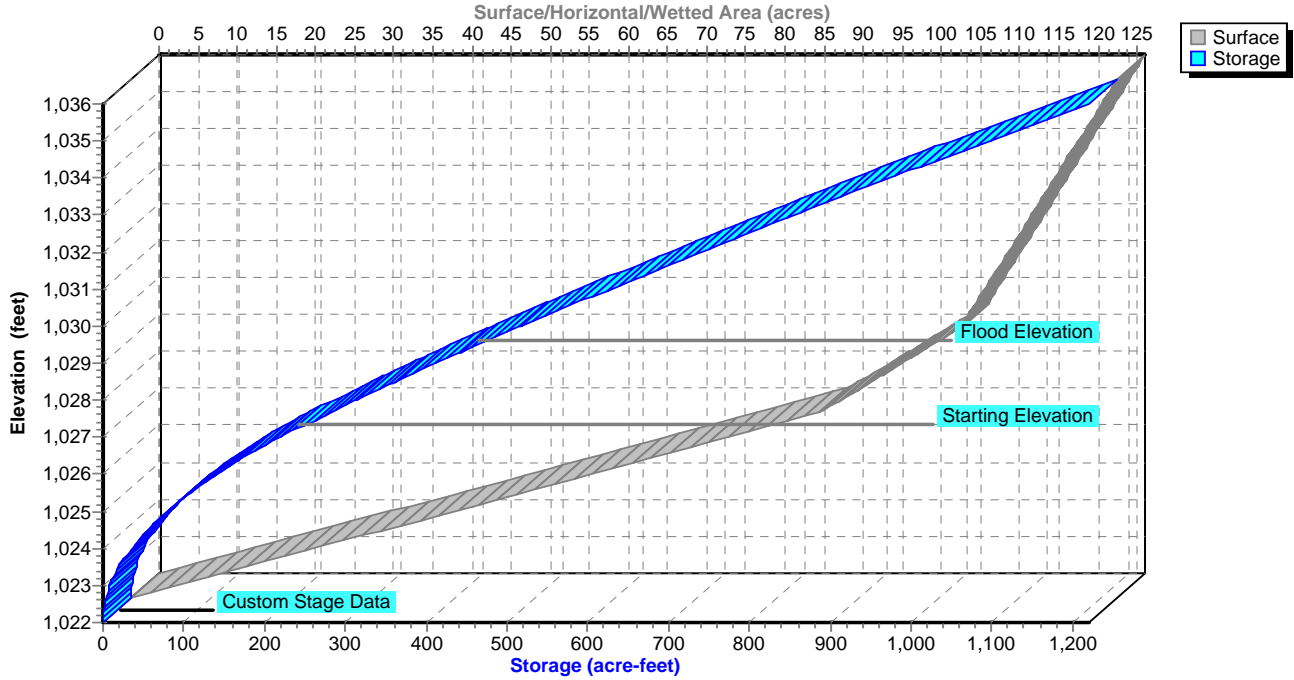


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

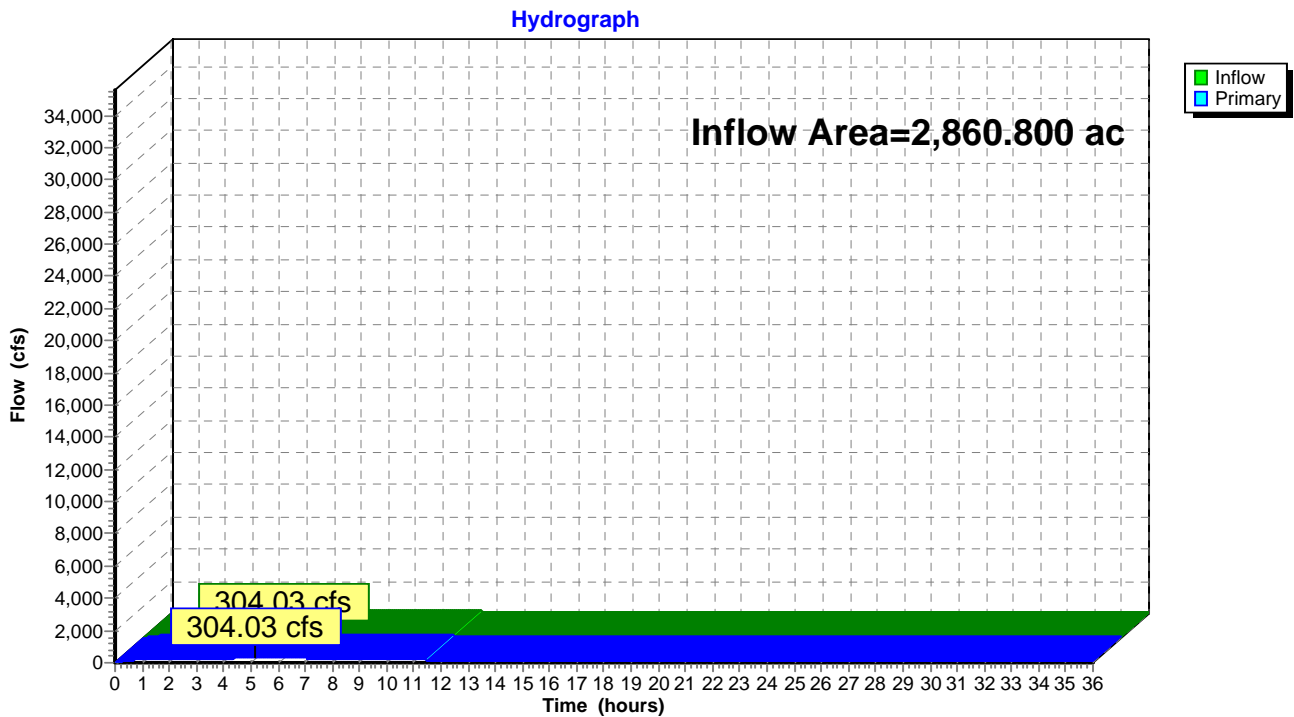


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 1.94" for 6-HR 0.1 PMF event
 Inflow = 304.03 cfs @ 5.13 hrs, Volume= 462.379 af
 Primary = 304.03 cfs @ 5.14 hrs, Volume= 462.379 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 0.85" for 6-HR 0.1 PMF event
 Inflow = 652.28 cfs @ 7.08 hrs, Volume= 670.389 af
 Outflow = 647.45 cfs @ 7.32 hrs, Volume= 670.047 af, Atten= 1%, Lag= 14.4 min
 Primary = 647.45 cfs @ 7.32 hrs, Volume= 670.047 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 984.99' @ 7.32 hrs Surf.Area= 2.740 ac Storage= 5.949 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 4.0 min calculated for 670.047 af (100% of inflow)
 Center-of-Mass det. time= 3.4 min (876.4 - 873.1)

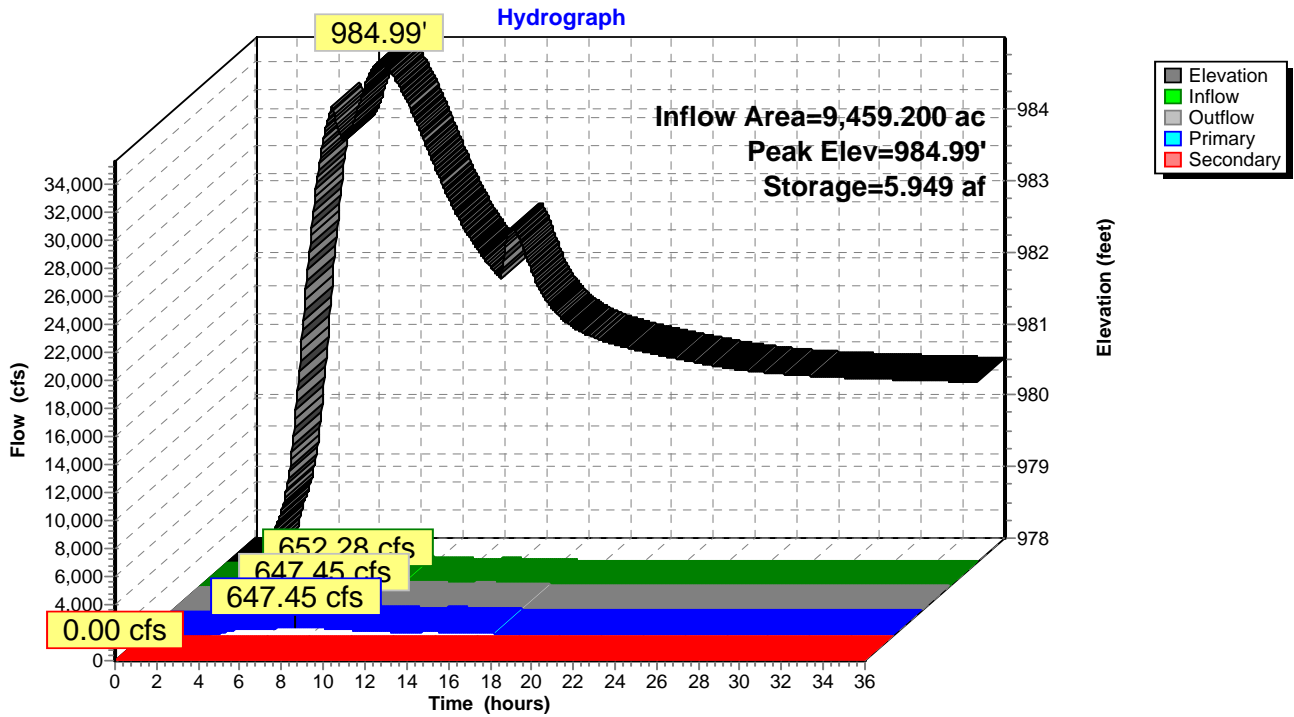
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

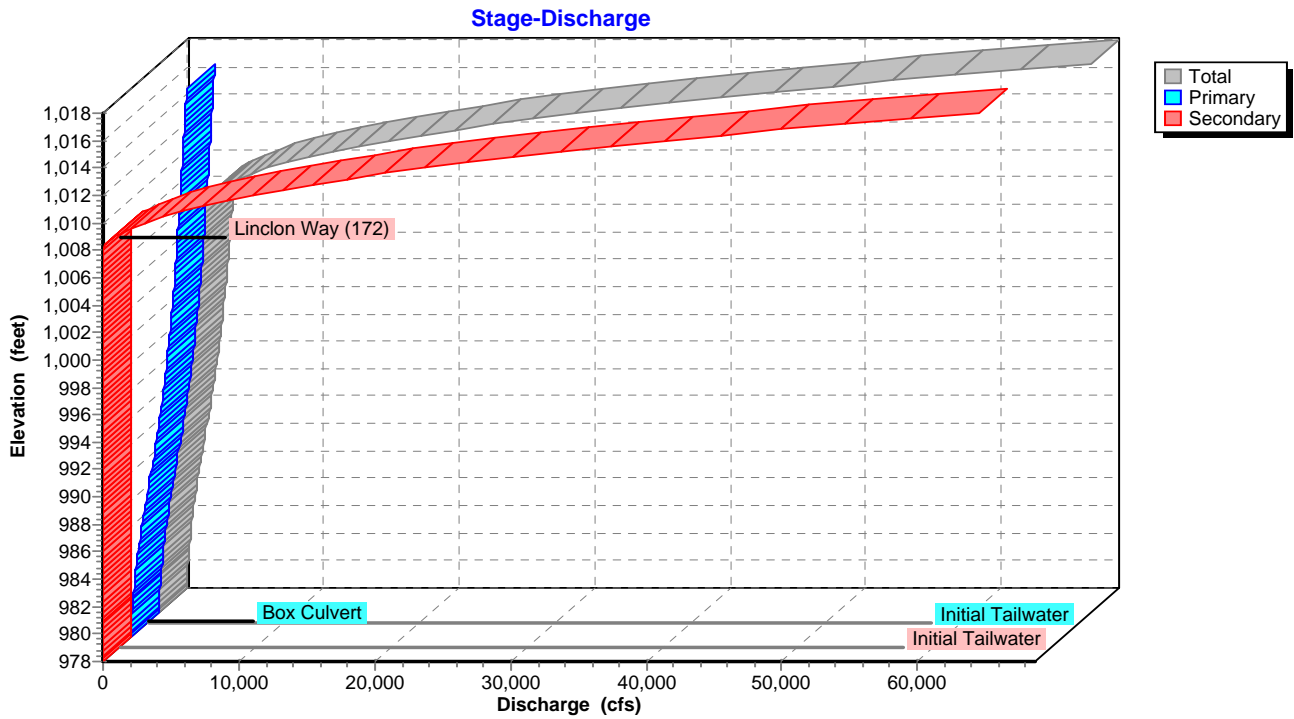
Primary OutFlow Max=647.45 cfs @ 7.32 hrs HW=984.99' TW=981.52' (Dynamic Tailwater)
 ↳1=Box Culvert (Barrel Controls 647.45 cfs @ 9.14 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

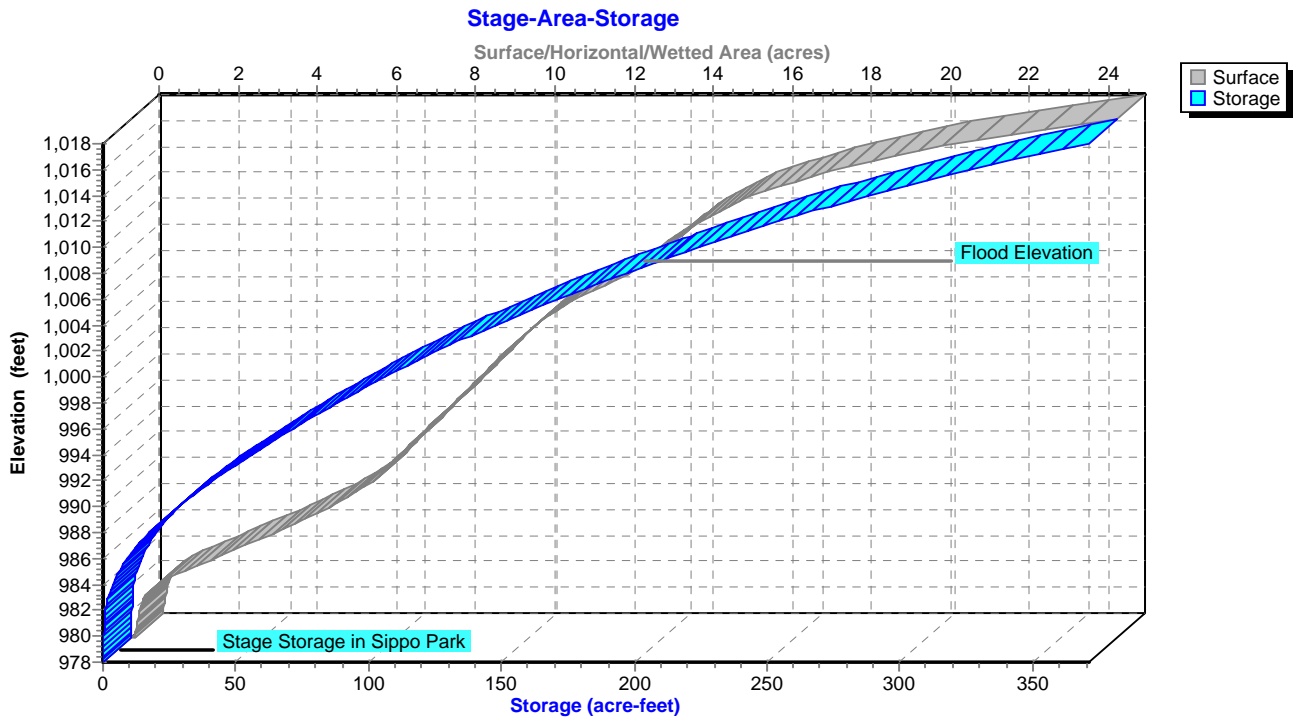
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

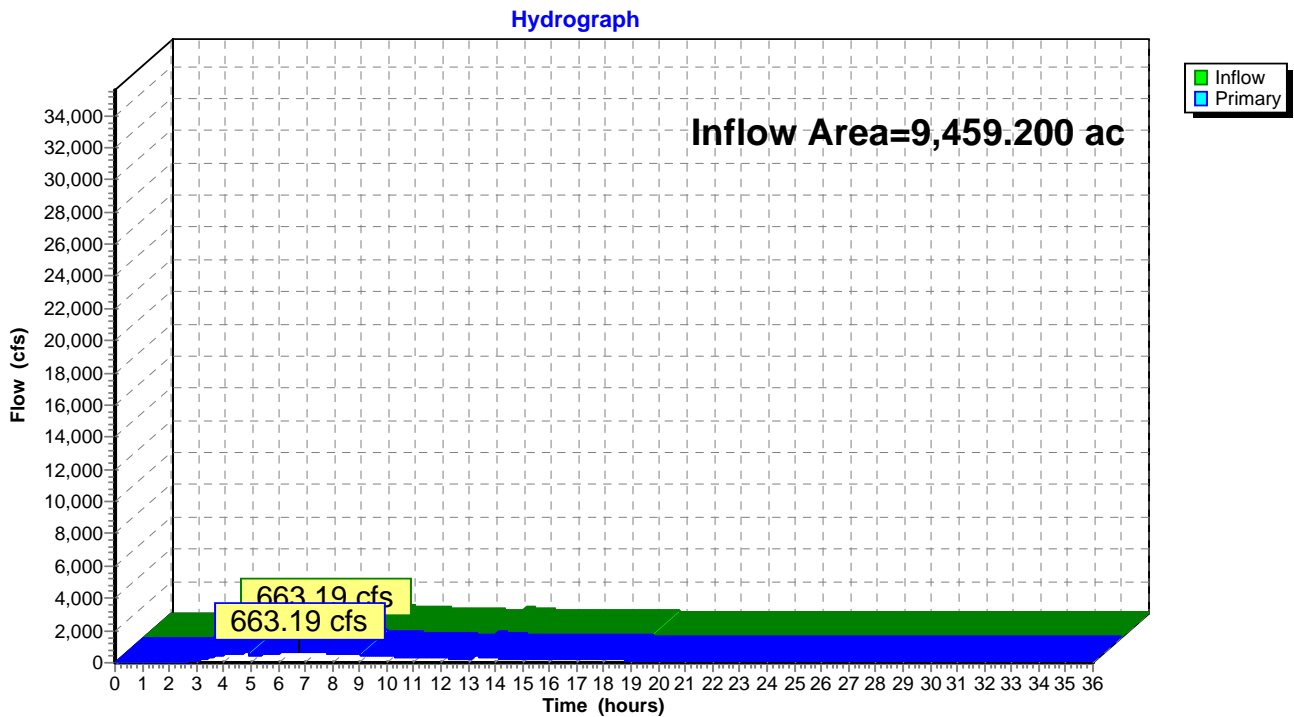


Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 0.86" for 6-HR 0.1 PMF event
Inflow = 663.19 cfs @ 6.73 hrs, Volume= 677.471 af
Primary = 663.19 cfs @ 6.74 hrs, Volume= 677.471 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19



Existing Conditions Sippo Reservoir- TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 127

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=2.56"
Tc=44.0 min CN=74 Runoff=133.69 cfs 24.549 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=2.65"
Tc=65.0 min CN=75 Runoff=289.73 cfs 59.254 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.22"
Tc=226.0 min CN=70 Runoff=678.46 cfs 258.827 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.05"
Tc=128.0 min CN=68 Runoff=644.59 cfs 183.881 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=1.97"
Tc=129.0 min CN=67 Runoff=442.67 cfs 127.266 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=2.56"
Tc=110.0 min CN=74 Runoff=596.17 cfs 154.110 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=2.65"
Tc=72.0 min CN=75 Runoff=763.91 cfs 162.244 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.10"
Tc=78.0 min CN=80 Runoff=812.80 cfs 175.438 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.13"
Tc=155.0 min CN=69 Runoff=604.65 cfs 190.028 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=2.65"
Tc=156.0 min CN=75 Runoff=1,401.47 cfs 433.121 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=1.97"
Tc=151.0 min CN=67 Runoff=344.35 cfs 107.282 af

Reach 5R: Channel 5 Avg. Flow Depth=2.84' Max Vel=5.77 fps Inflow=295.63 cfs 576.268 af
L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=295.12 cfs 571.044 af

Reach 7R: Channel 7 Avg. Flow Depth=7.49' Max Vel=3.01 fps Inflow=831.47 cfs 754.727 af
L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=788.78 cfs 746.261 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=2.96' Max Vel=2.52 fps Inflow=118.66 cfs 260.499 af
L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=118.66 cfs 259.824 af

Reach 15R: Channel 15 Avg. Flow Depth=7.97' Max Vel=2.06 fps Inflow=2,160.44 cfs 1,430.062 af
L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=1,838.38 cfs 1,400.421 af

Reach 16R: Channel 16 Avg. Flow Depth=9.81' Max Vel=2.42 fps Inflow=2,470.65 cfs 1,716.431 af
L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=2,392.05 cfs 1,695.440 af

Existing Conditions Sippo Reservoir- TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 128

Reach 18R: Sippo Creek Avg. Flow Depth=5.64' Max Vel=9.44 fps Inflow=2,499.46 cfs 1,859.198 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,499.45 cfs 1,859.080 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=325.30 cfs 83.697 af
Primary=325.30 cfs 83.697 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,006.87' Storage=120.866 af Inflow=2,671.73 cfs 1,870.526 af
1,987.72 cfs 1,668.345 af Secondary=673.97 cfs 191.812 af Tertiary=0.00 cfs 0.000 af Outflow=2,661.69 cfs 1,860.157 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=806.72 cfs 342.070 af
Primary=806.72 cfs 342.070 af

Pond 3P: Lake Cable Peak Elev=1,097.85' Storage=2,015.502 af Inflow=806.72 cfs 342.070 af
Primary=295.63 cfs 576.367 af Secondary=0.00 cfs 0.000 af Outflow=295.63 cfs 576.367 af

Pond 4C: Confluence 4 Inflow=1,392.18 cfs 936.190 af
Primary=1,392.18 cfs 936.190 af

Pond 4P: Lake O'Springs Peak Elev=1,107.58' Storage=68.471 af Inflow=325.30 cfs 83.697 af
Primary=130.12 cfs 83.244 af Secondary=0.00 cfs 0.000 af Outflow=130.12 cfs 83.244 af

Pond 5C: Confluence 5 Inflow=1,813.02 cfs 1,063.357 af
Primary=1,813.02 cfs 1,063.357 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,119.52' Storage=25.473 af Inflow=133.69 cfs 24.549 af
Primary=54.95 cfs 24.443 af Secondary=0.00 cfs 0.000 af Outflow=54.95 cfs 24.443 af

Pond 6C: Confluence 6 Inflow=363.73 cfs 367.039 af
Primary=363.73 cfs 367.039 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,160.44 cfs 1,430.228 af
Primary=2,160.44 cfs 1,430.228 af

Pond 8C: Confluence 8 Inflow=2,470.65 cfs 1,716.603 af
Primary=2,470.65 cfs 1,716.603 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,024.60' Storage=260.332 af Inflow=1,050.31 cfs 340.298 af
Primary=118.66 cfs 260.567 af Secondary=0.00 cfs 0.000 af Outflow=118.66 cfs 260.567 af

Pond 9P: Sippo Lake Peak Elev=1,028.97' Storage=408.996 af Inflow=1,401.47 cfs 433.121 af
Primary=1,050.31 cfs 340.299 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,050.31 cfs 340.299 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=831.47 cfs 754.826 af
Primary=831.47 cfs 754.826 af

Pond 16P: Lincoln Way Box Peak Elev=997.40' Storage=83.072 af Inflow=2,661.69 cfs 1,859.980 af
Primary=2,499.46 cfs 1,859.375 af Secondary=0.00 cfs 0.000 af Outflow=2,499.46 cfs 1,859.375 af

Pond 19C: Confluence 19 Inflow=2,671.73 cfs 1,870.702 af
Primary=2,671.73 cfs 1,870.702 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 1,876.000 af Average Runoff Depth = 2.38"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 133.69 cfs @ 3.38 hrs, Volume= 24.549 af, Depth= 2.56"

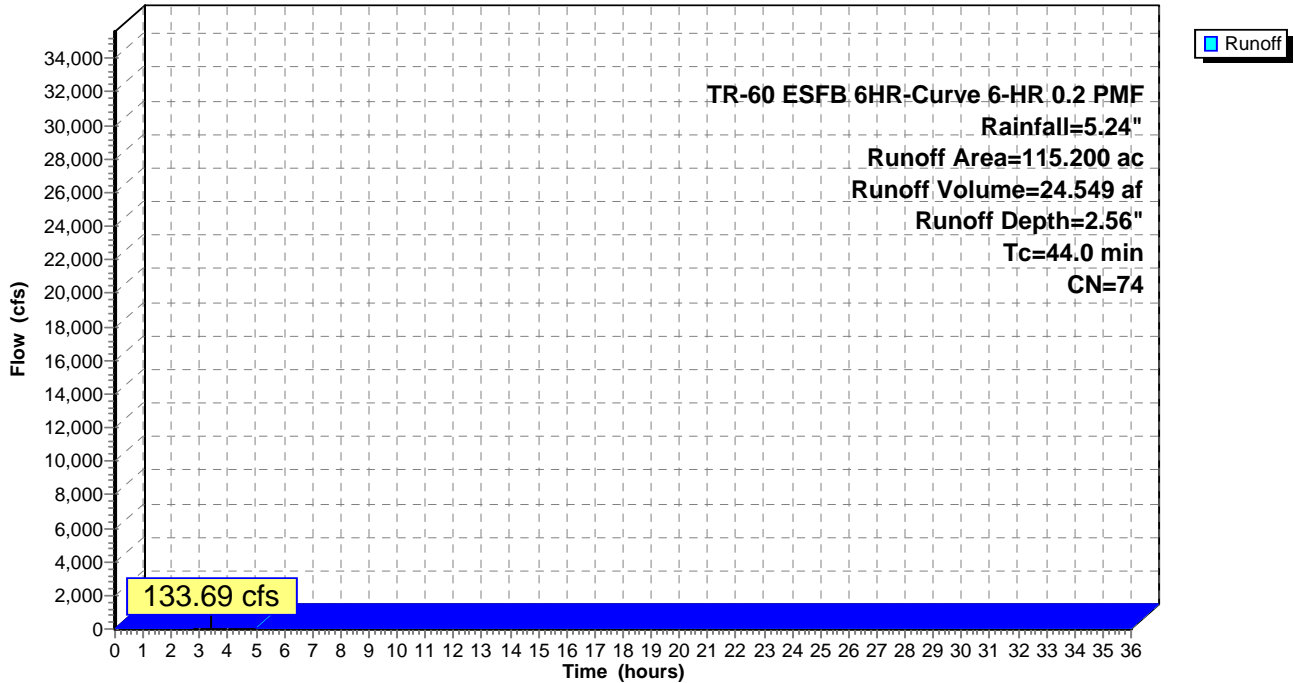
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 289.73 cfs @ 3.68 hrs, Volume= 59.254 af, Depth= 2.65"

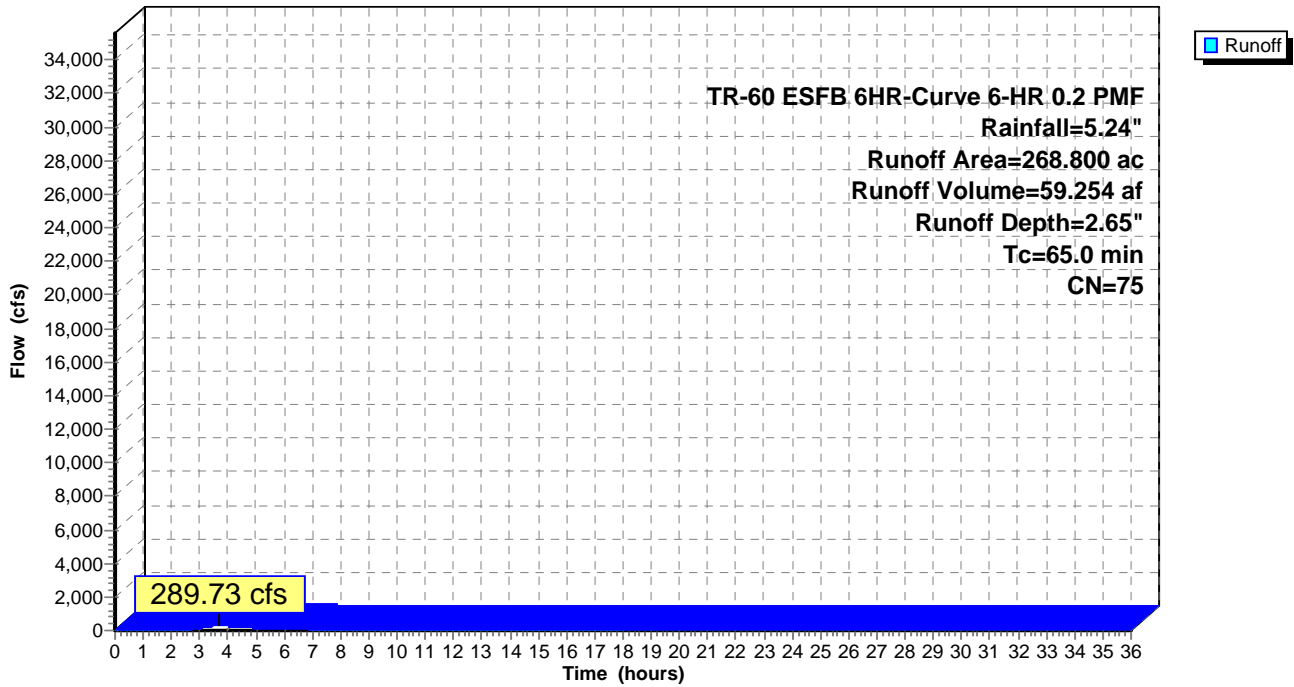
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 678.46 cfs @ 6.28 hrs, Volume= 258.827 af, Depth= 2.22"

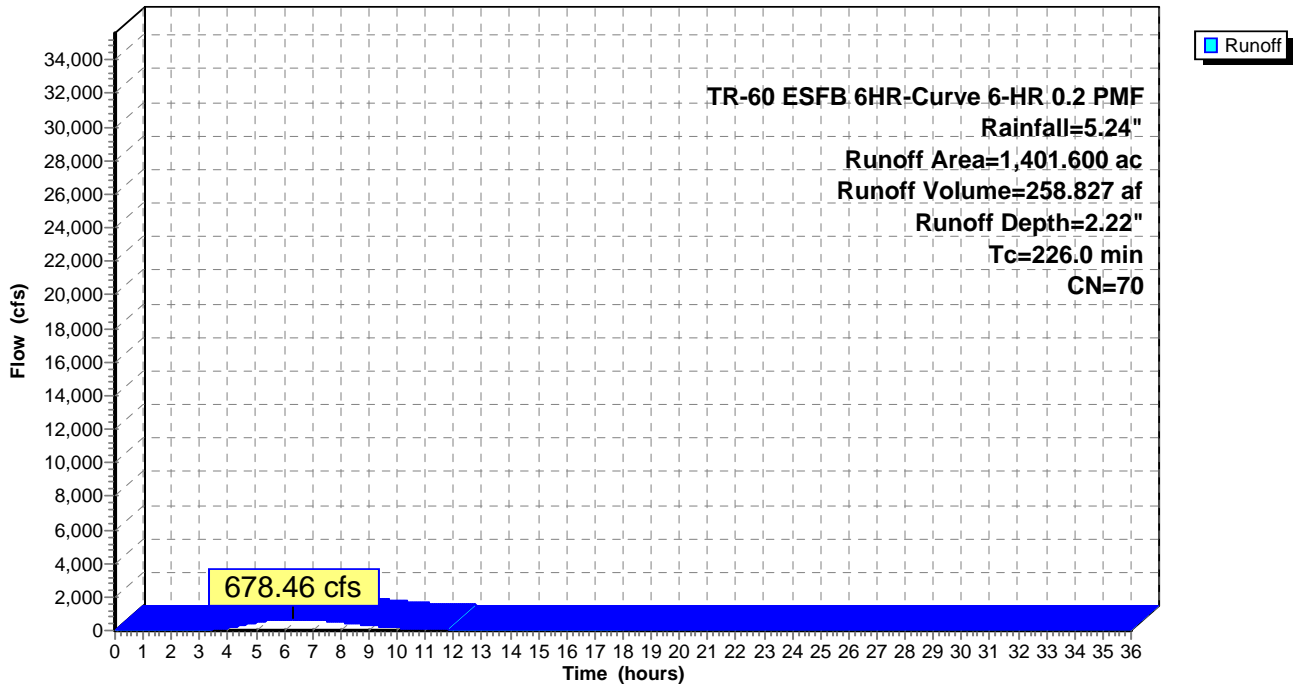
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 644.59 cfs @ 4.70 hrs, Volume= 183.881 af, Depth= 2.05"

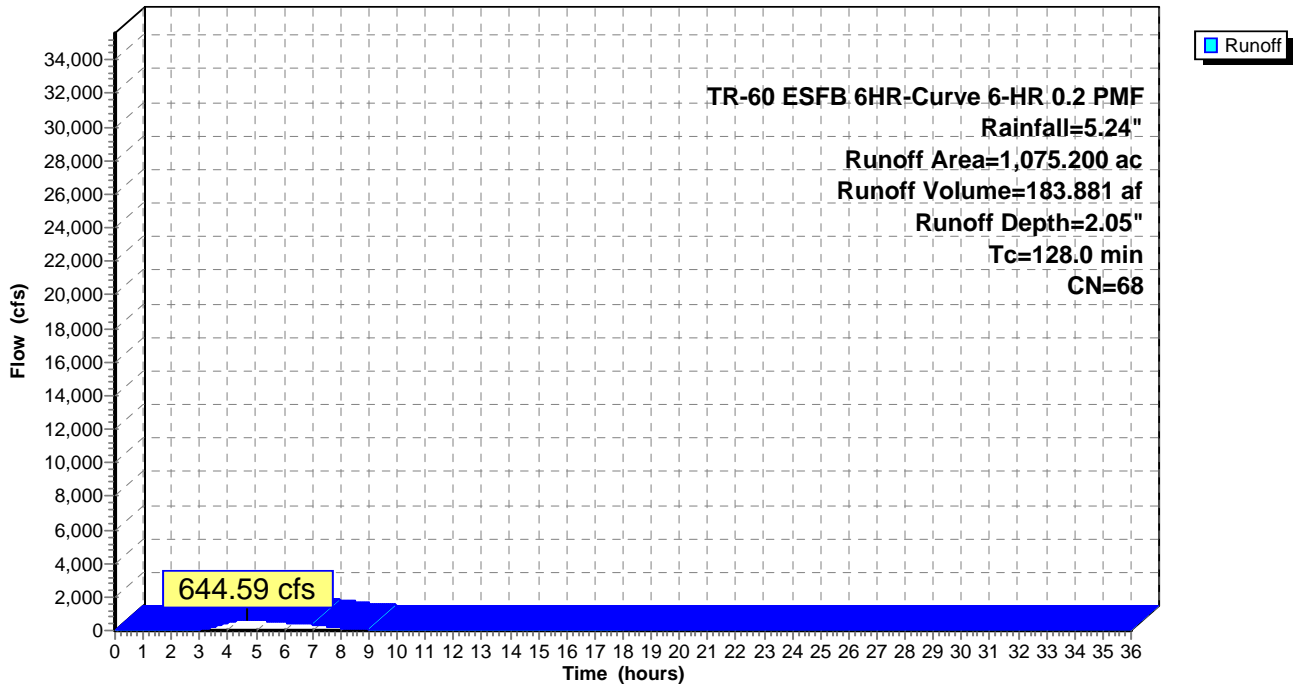
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 442.67 cfs @ 4.73 hrs, Volume= 127.266 af, Depth= 1.97"

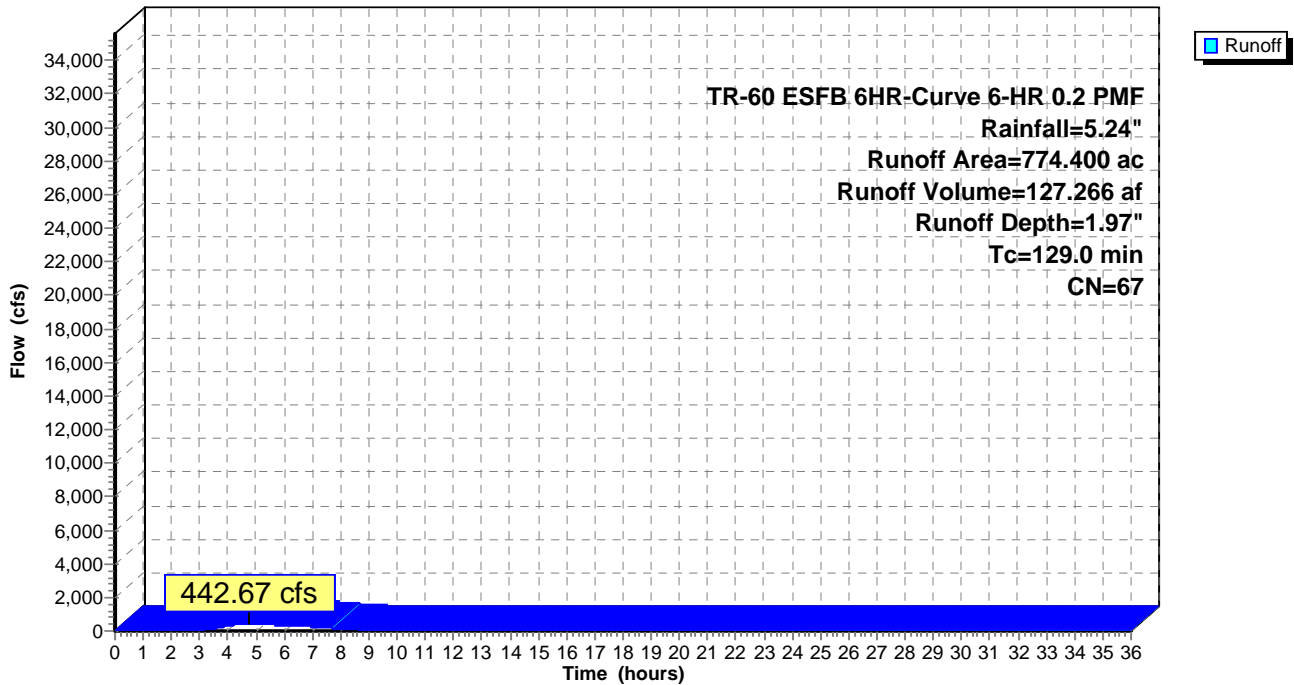
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 596.17 cfs @ 4.28 hrs, Volume= 154.110 af, Depth= 2.56"

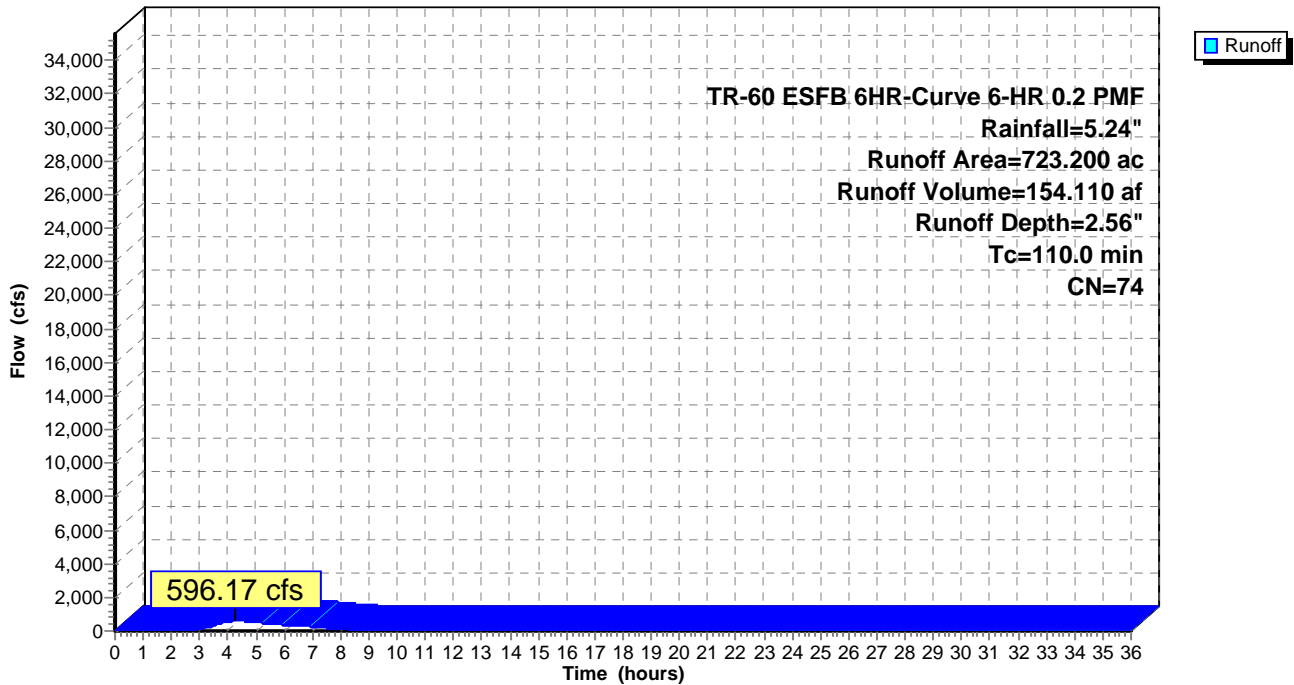
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 763.91 cfs @ 3.76 hrs, Volume= 162.244 af, Depth= 2.65"

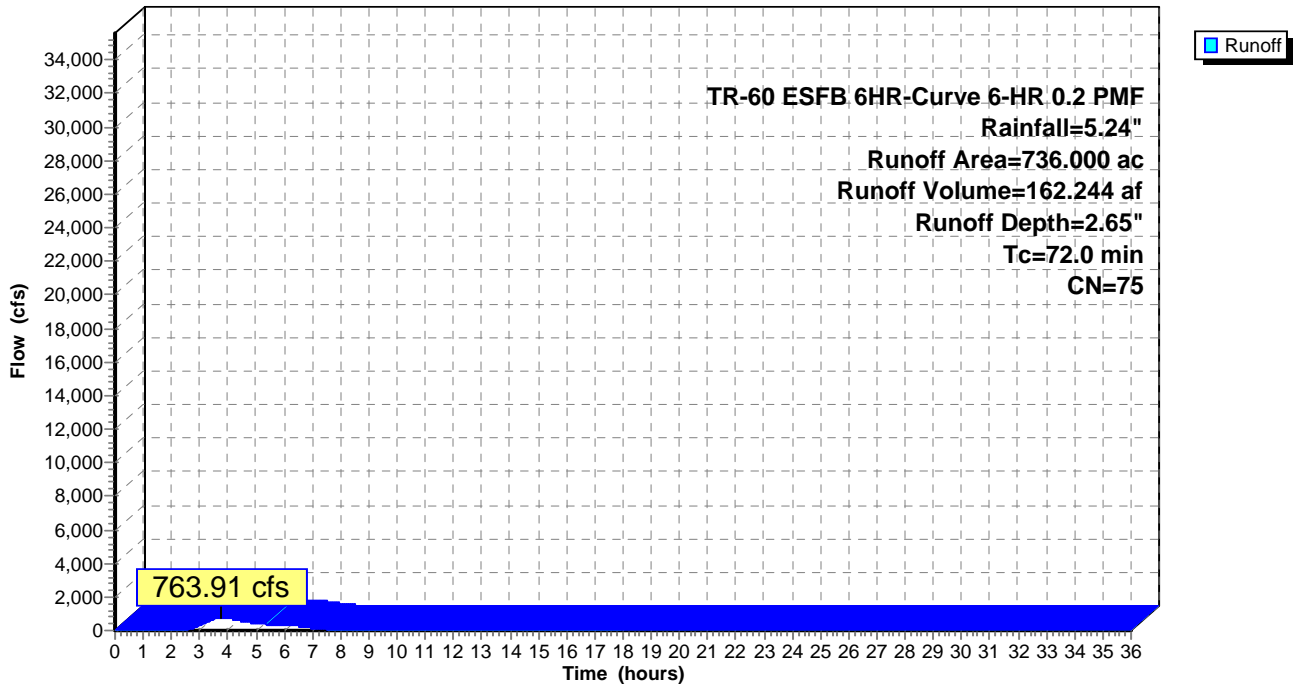
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 812.80 cfs @ 3.81 hrs, Volume= 175.438 af, Depth= 3.10"

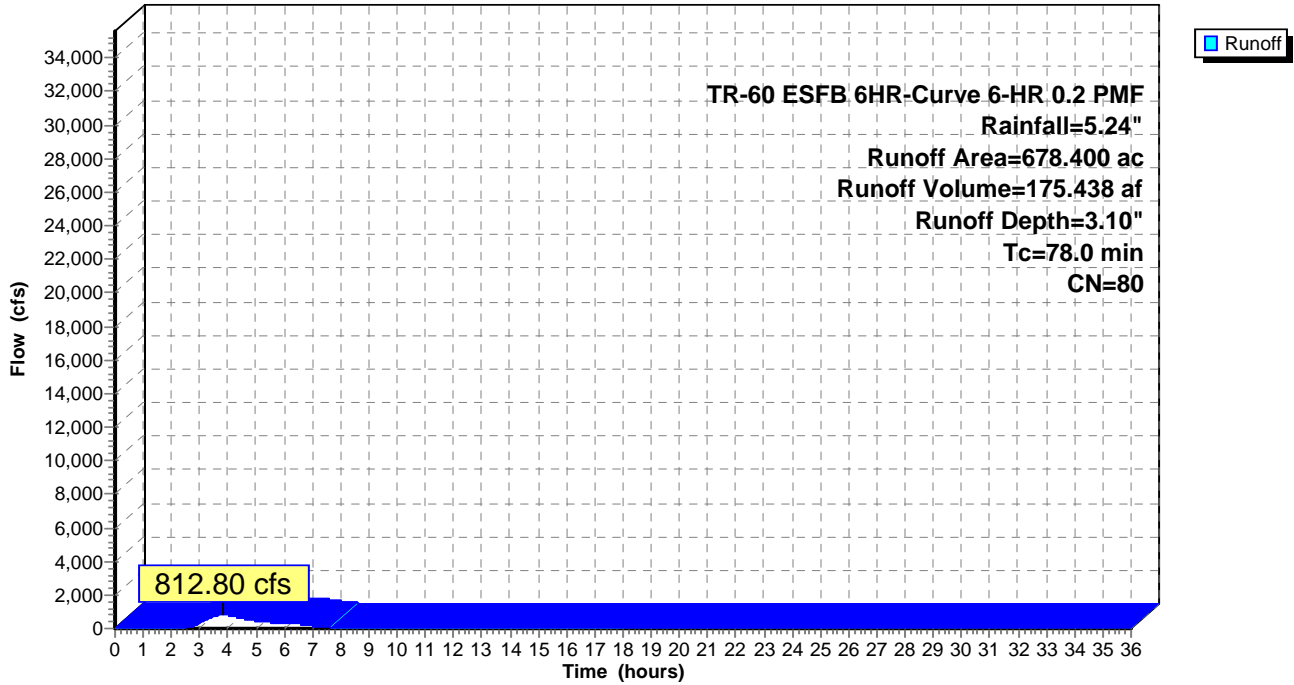
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 604.65 cfs @ 5.17 hrs, Volume= 190.028 af, Depth= 2.13"

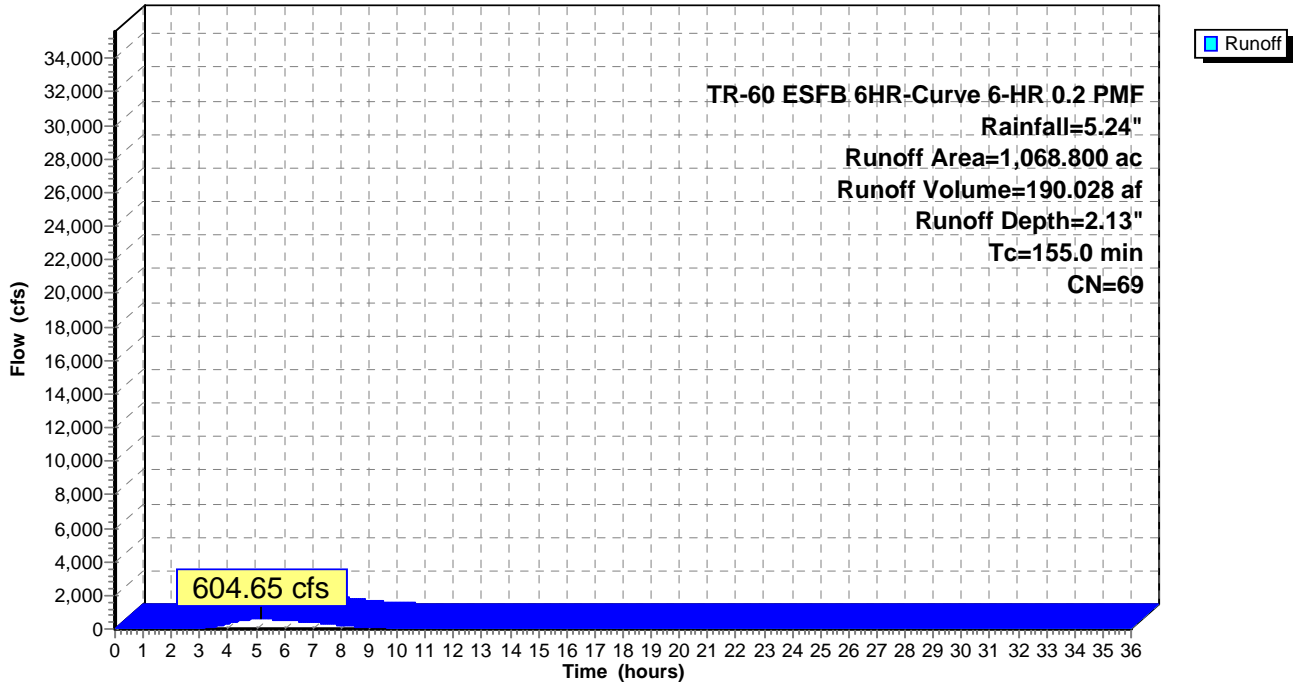
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,401.47 cfs @ 5.03 hrs, Volume= 433.121 af, Depth= 2.65"

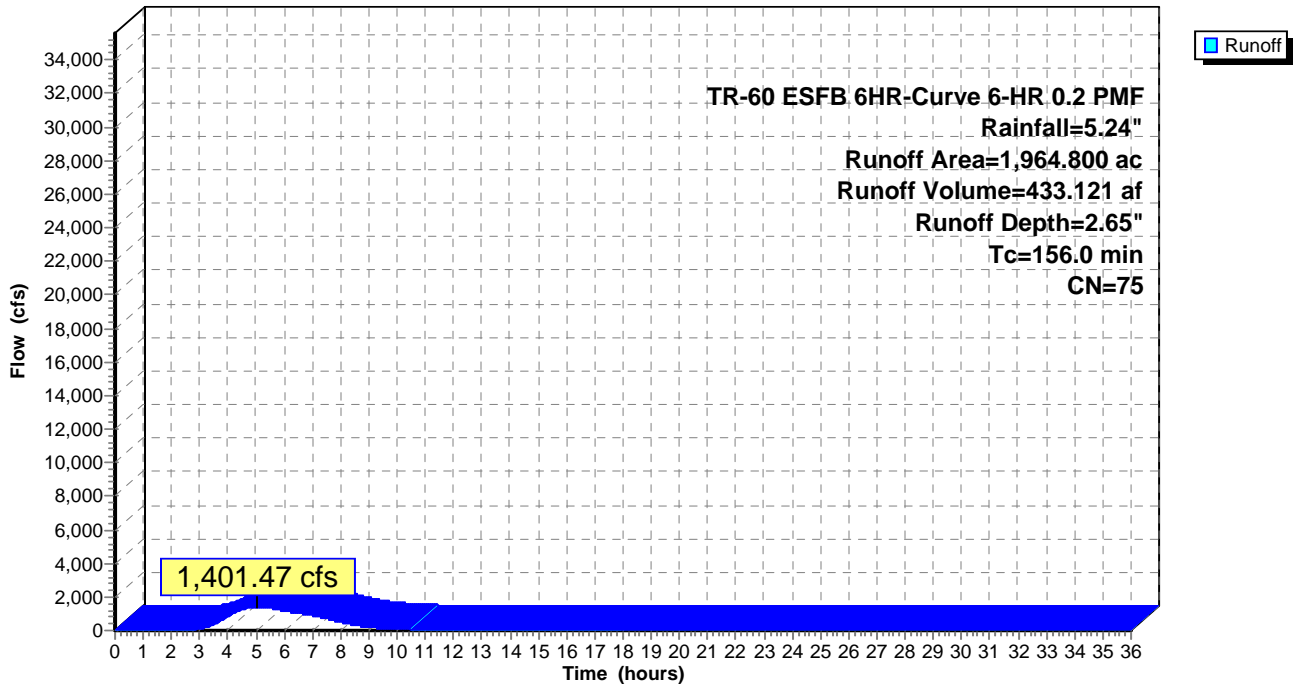
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 344.35 cfs @ 5.20 hrs, Volume= 107.282 af, Depth= 1.97"

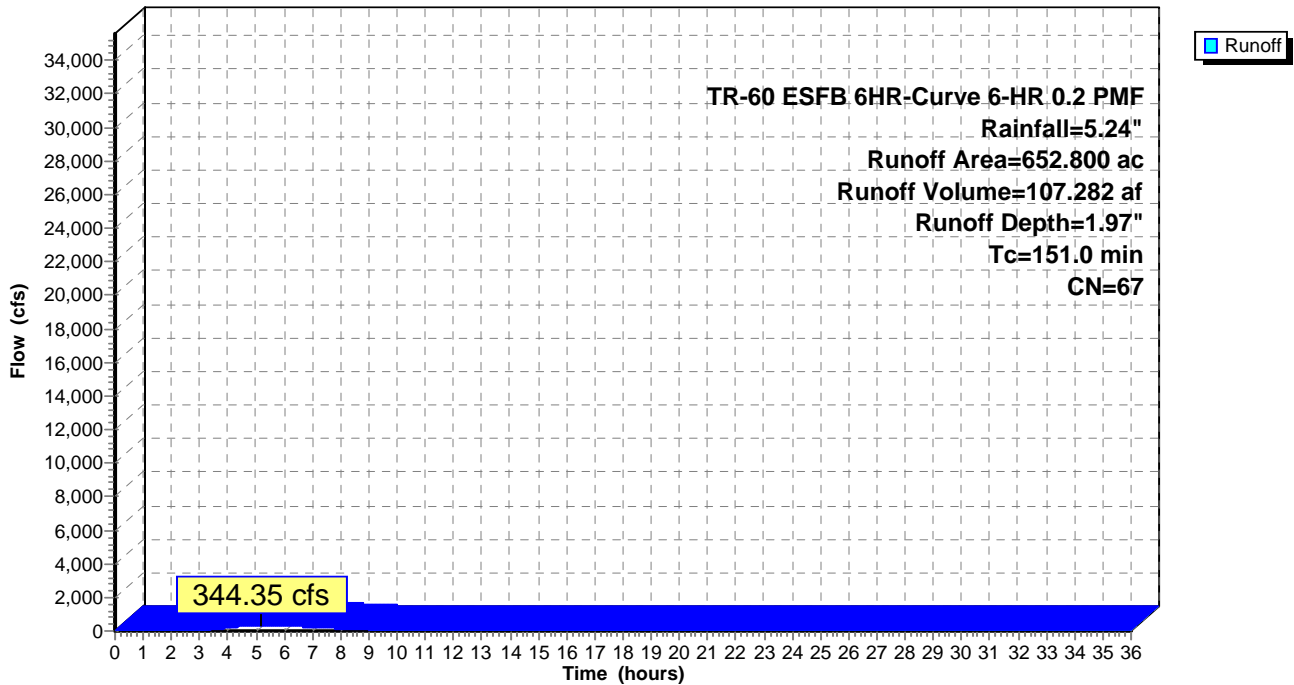
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.2 PMF Rainfall=5.24"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



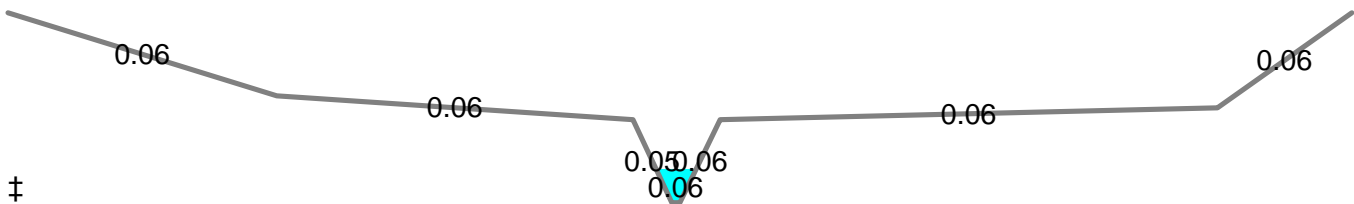
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.87" for 6-HR 0.2 PMF event
 Inflow = 295.63 cfs @ 9.56 hrs, Volume= 576.268 af
 Outflow = 295.12 cfs @ 9.90 hrs, Volume= 571.044 af, Atten= 0%, Lag= 20.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.77 fps, Min. Travel Time= 25.4 min
 Avg. Velocity = 5.11 fps, Avg. Travel Time= 28.7 min

Peak Storage= 450,248 cf @ 9.90 hrs
 Average Depth at Peak Storage= 2.84'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

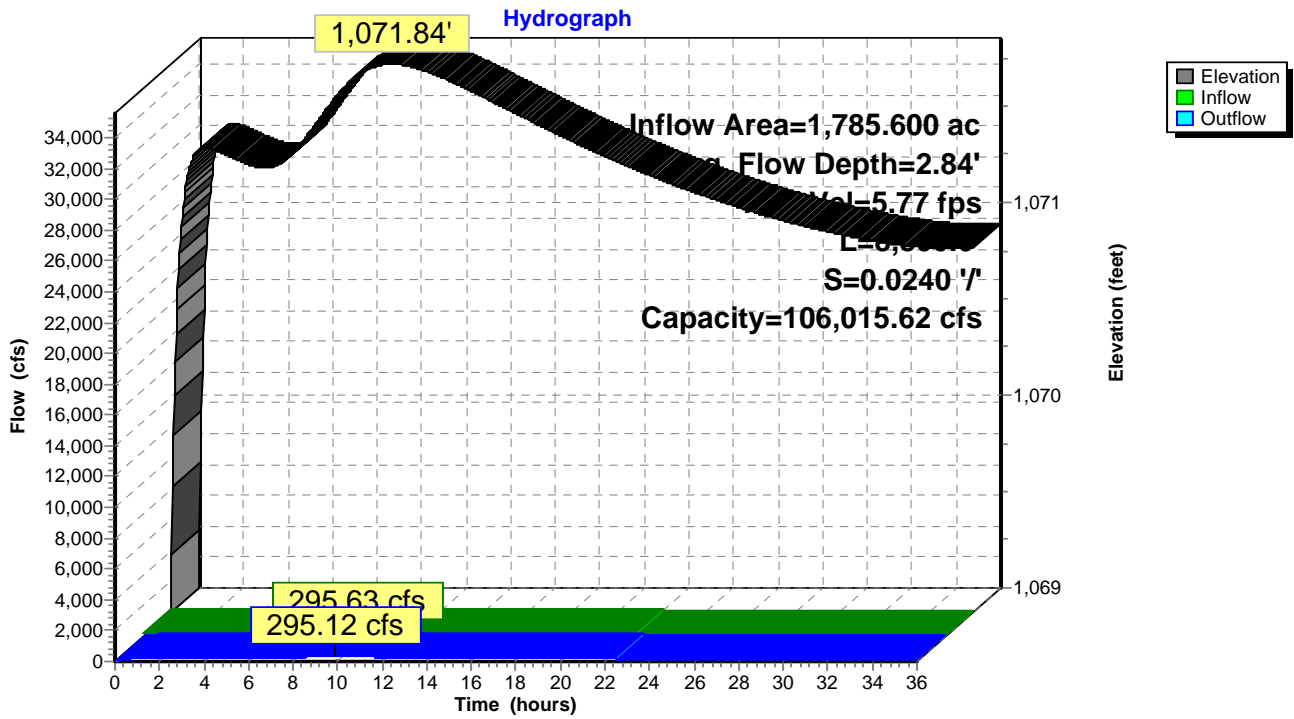
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



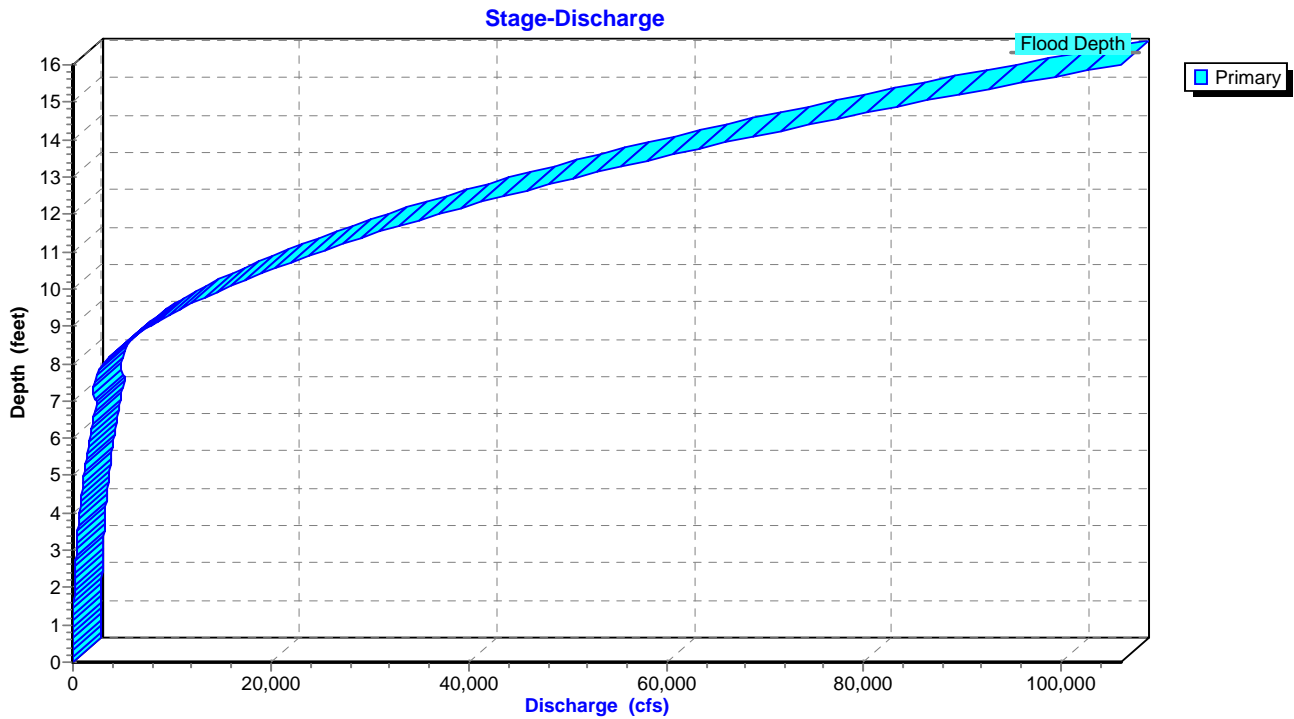
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

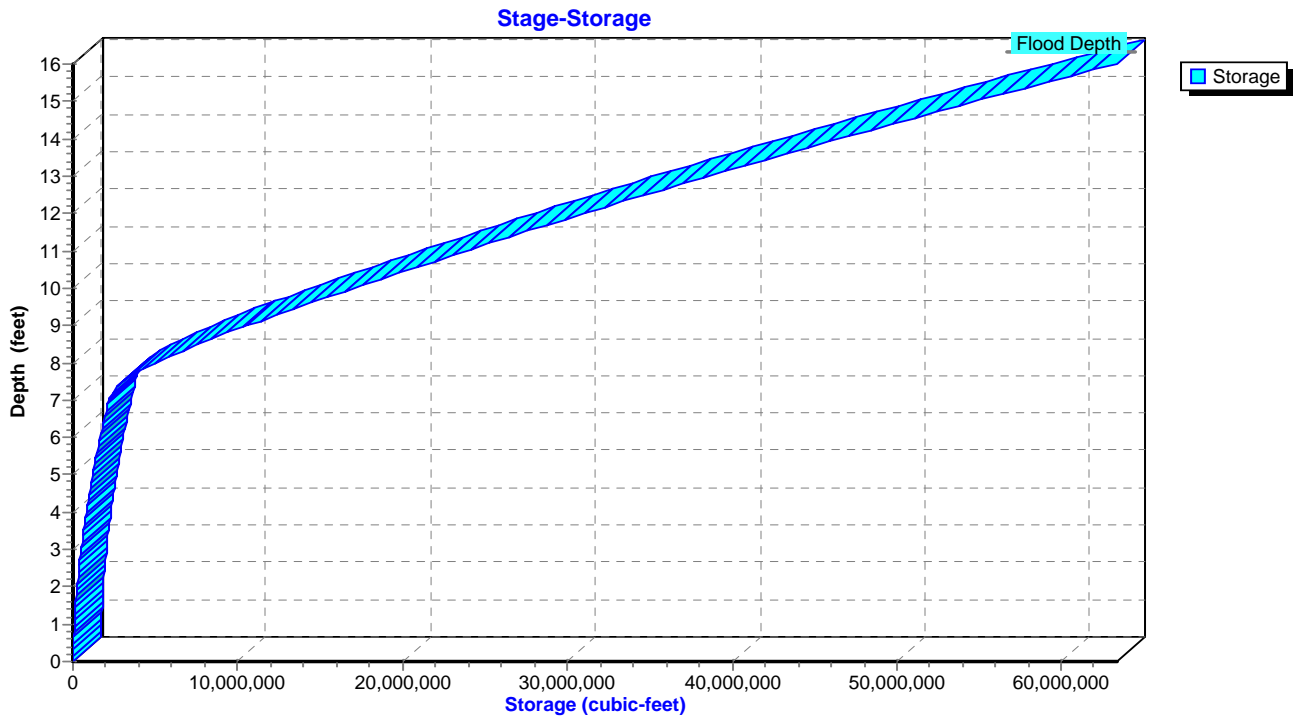
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



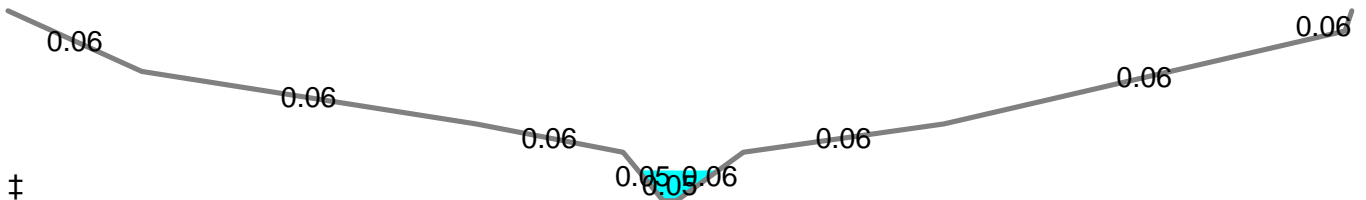
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.17" for 6-HR 0.2 PMF event
 Inflow = 831.47 cfs @ 4.71 hrs, Volume= 754.727 af
 Outflow = 788.78 cfs @ 5.26 hrs, Volume= 746.261 af, Atten= 5%, Lag= 33.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.01 fps, Min. Travel Time= 32.7 min
 Avg. Velocity = 2.20 fps, Avg. Travel Time= 44.8 min

Peak Storage= 1,545,607 cf @ 5.26 hrs
 Average Depth at Peak Storage= 7.49'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

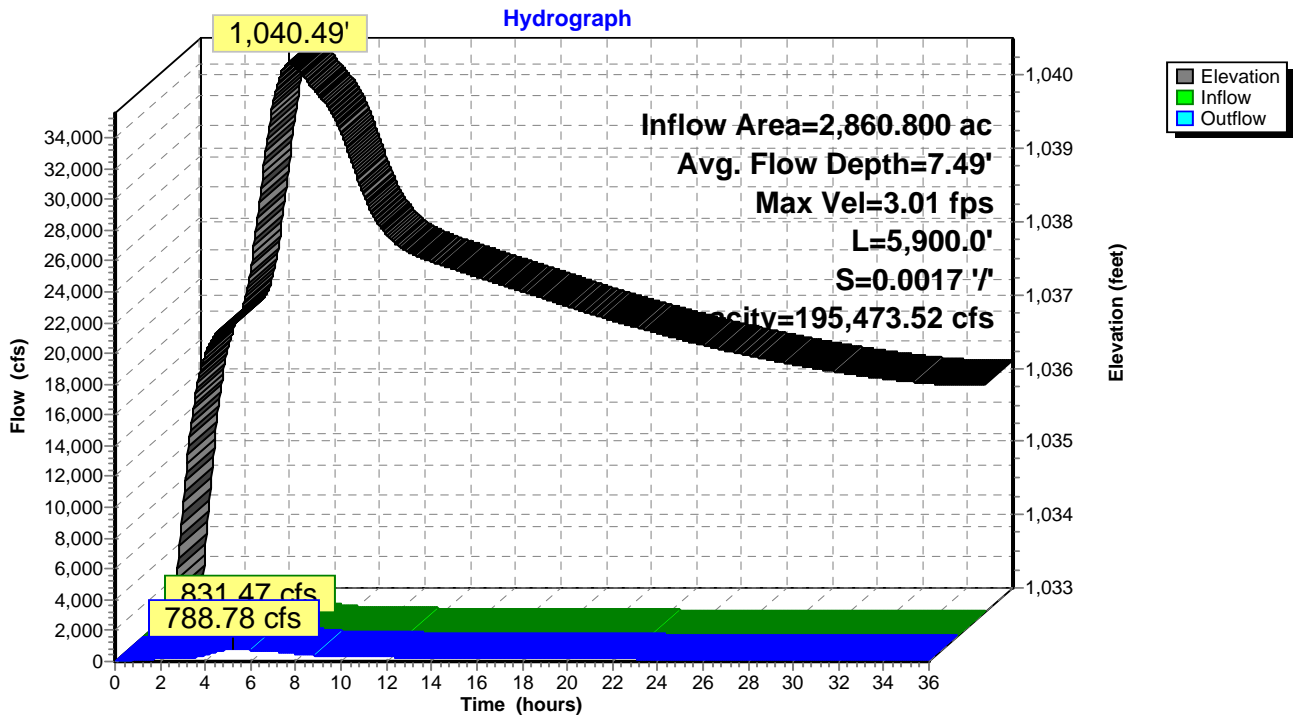
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



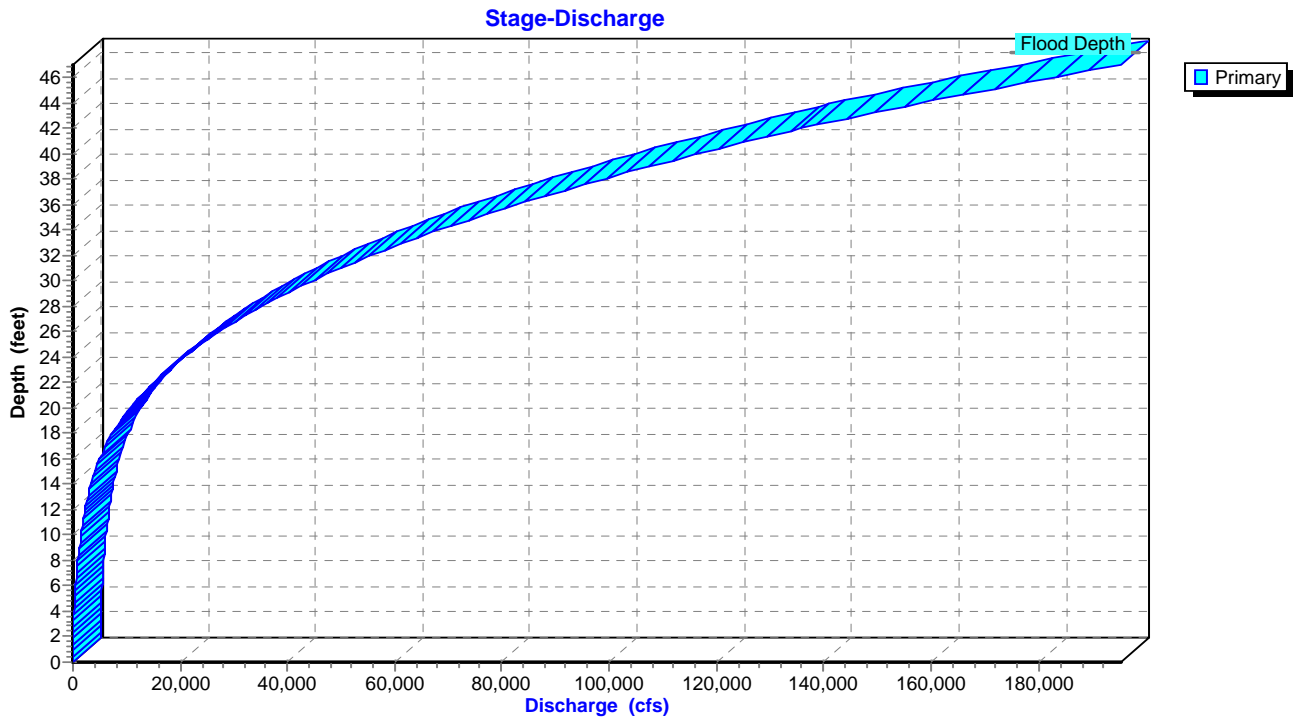
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

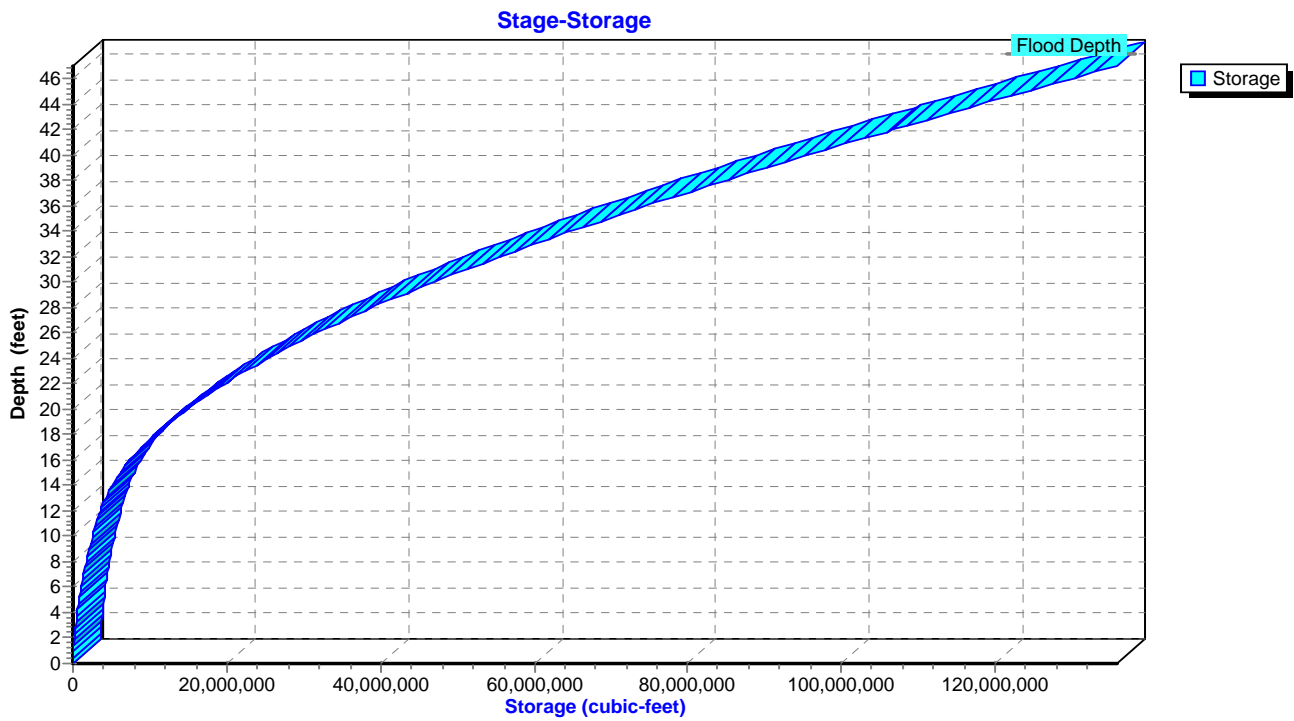
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



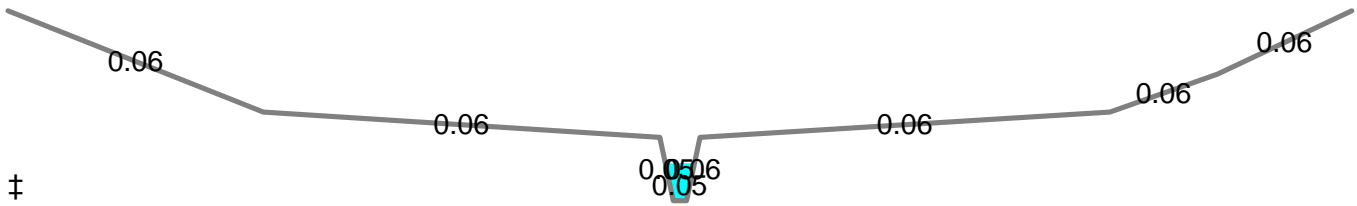
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.59" for 6-HR 0.2 PMF event
 Inflow = 118.66 cfs @ 11.58 hrs, Volume= 260.499 af
 Outflow = 118.66 cfs @ 11.65 hrs, Volume= 259.824 af, Atten= 0%, Lag= 4.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.52 fps, Min. Travel Time= 6.0 min
 Avg. Velocity = 2.37 fps, Avg. Travel Time= 6.3 min

Peak Storage= 42,397 cf @ 11.65 hrs
 Average Depth at Peak Storage= 2.96'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

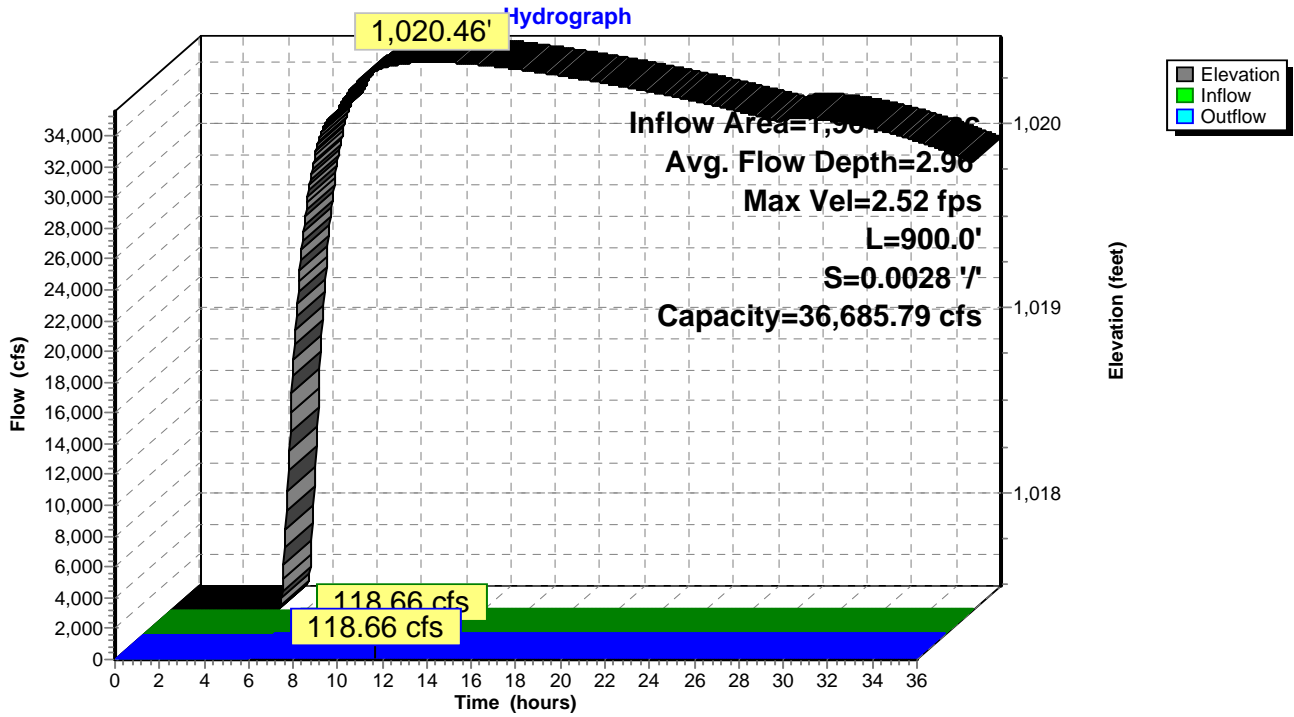
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



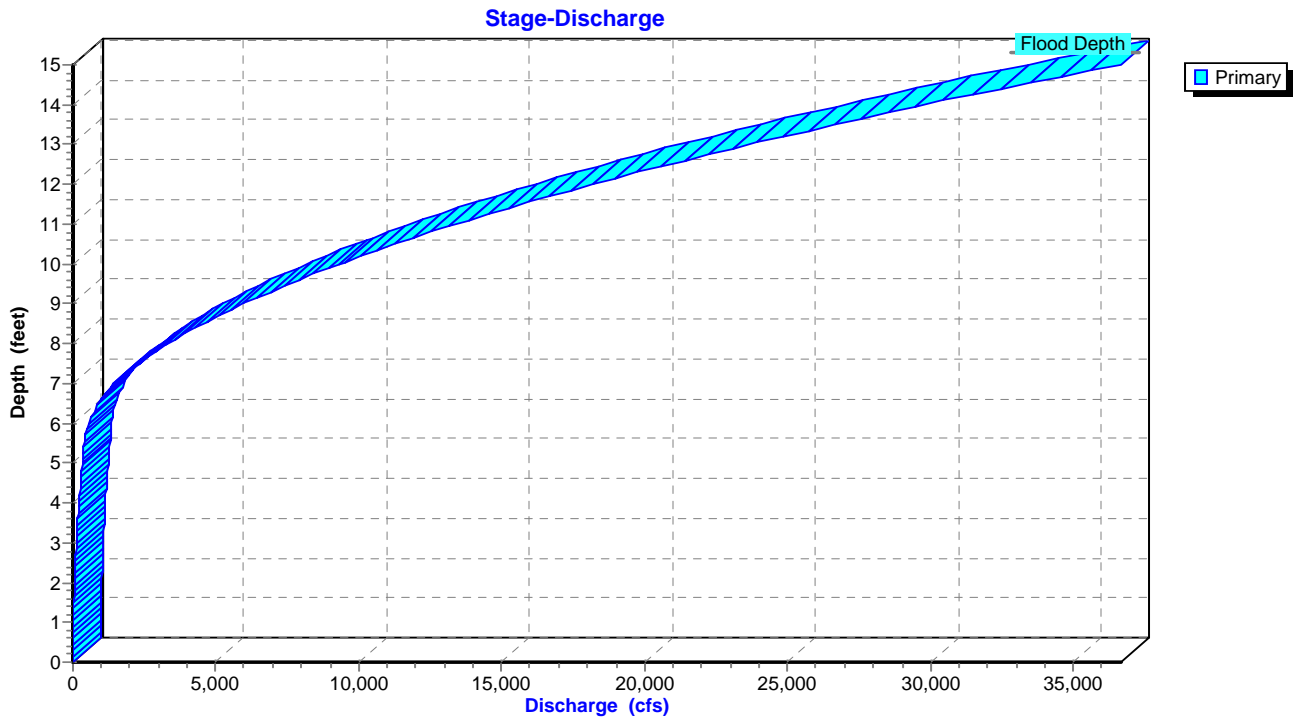
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

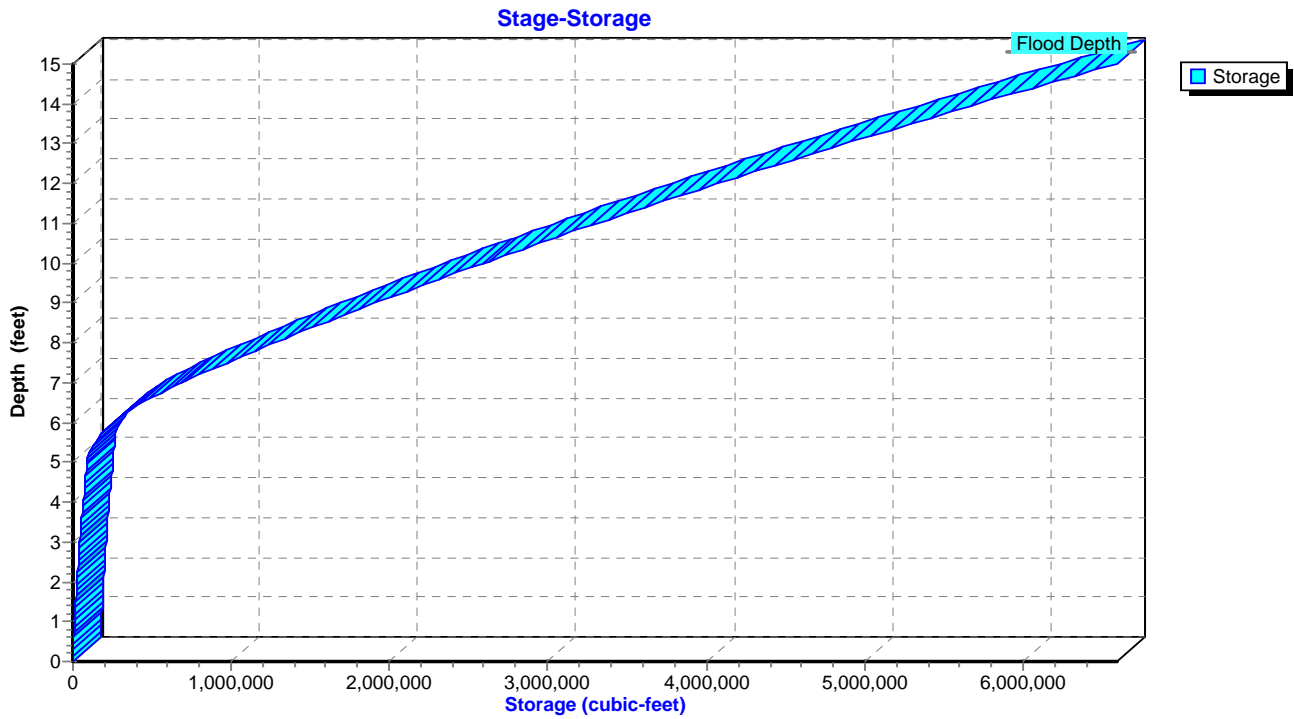
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



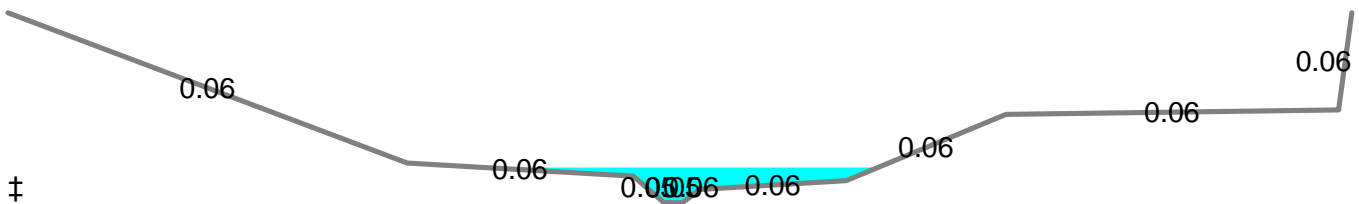
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.34" for 6-HR 0.2 PMF event
 Inflow = 2,160.44 cfs @ 5.19 hrs, Volume= 1,430.062 af
 Outflow = 1,838.38 cfs @ 6.48 hrs, Volume= 1,400.421 af, Atten= 15%, Lag= 77.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.06 fps, Min. Travel Time= 71.1 min
 Avg. Velocity = 1.49 fps, Avg. Travel Time= 98.7 min

Peak Storage= 7,854,067 cf @ 6.48 hrs
 Average Depth at Peak Storage= 7.97'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

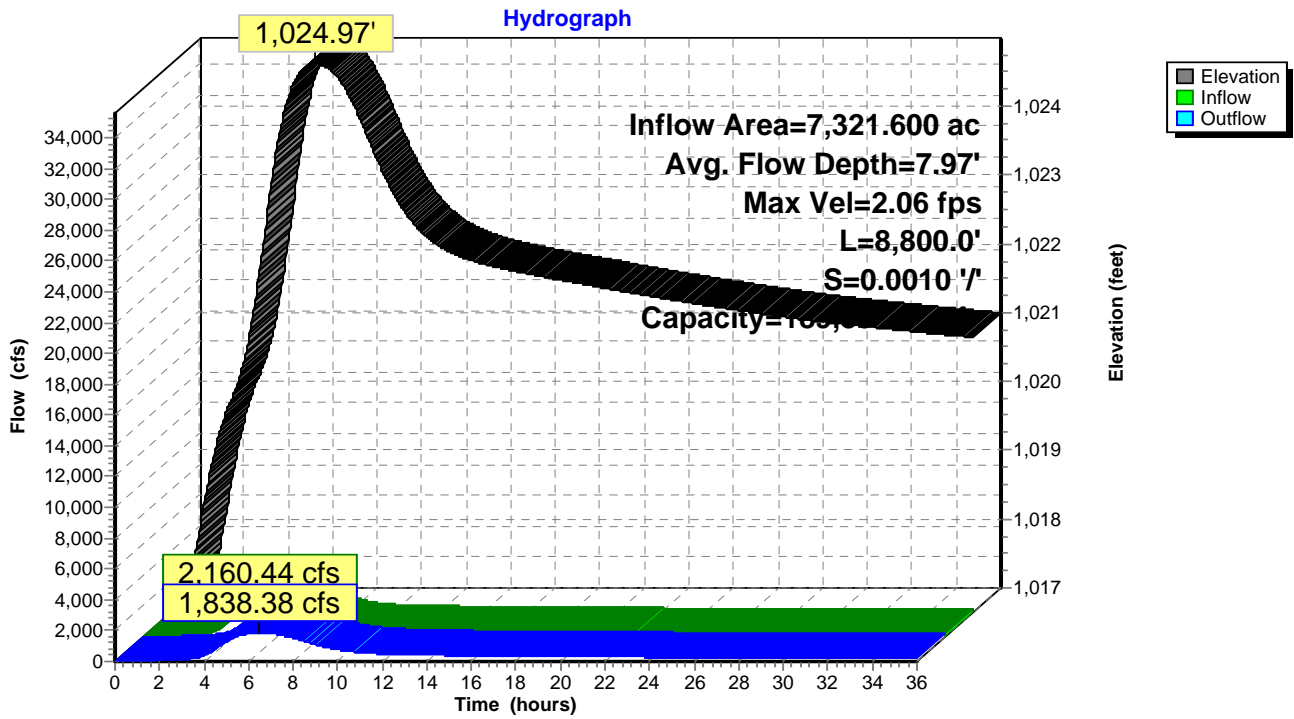
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



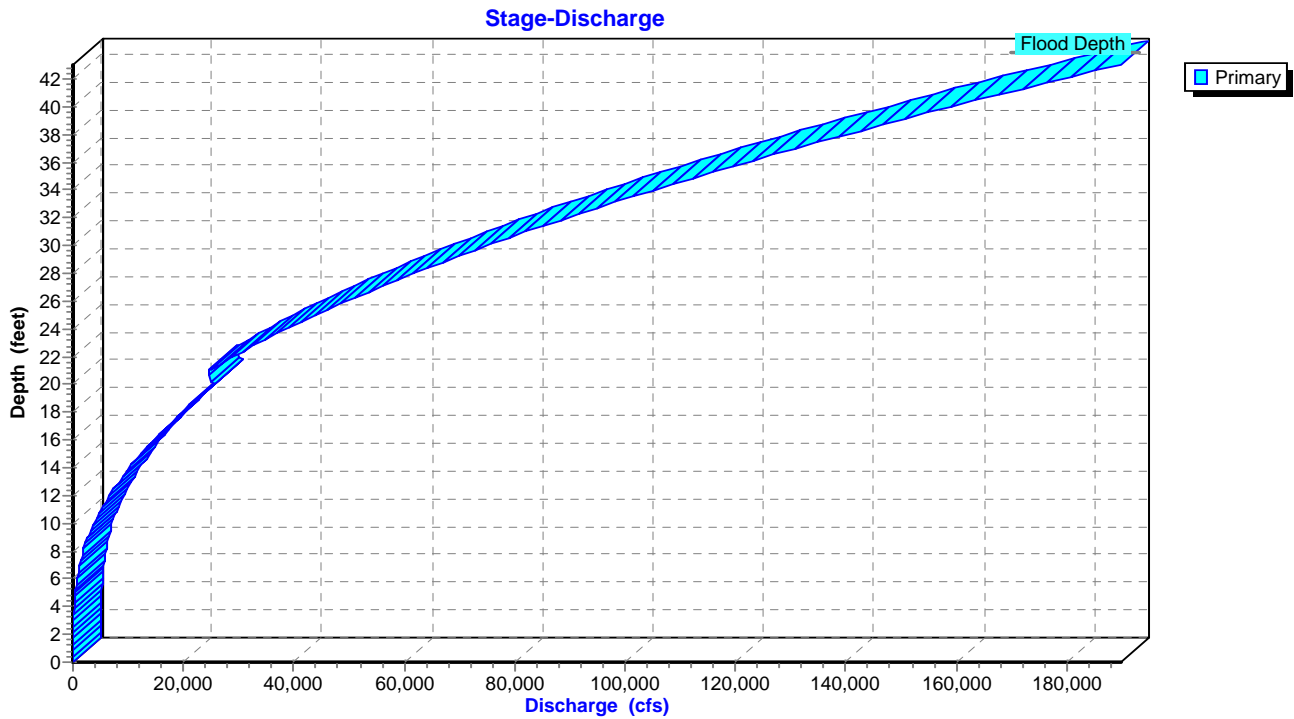
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

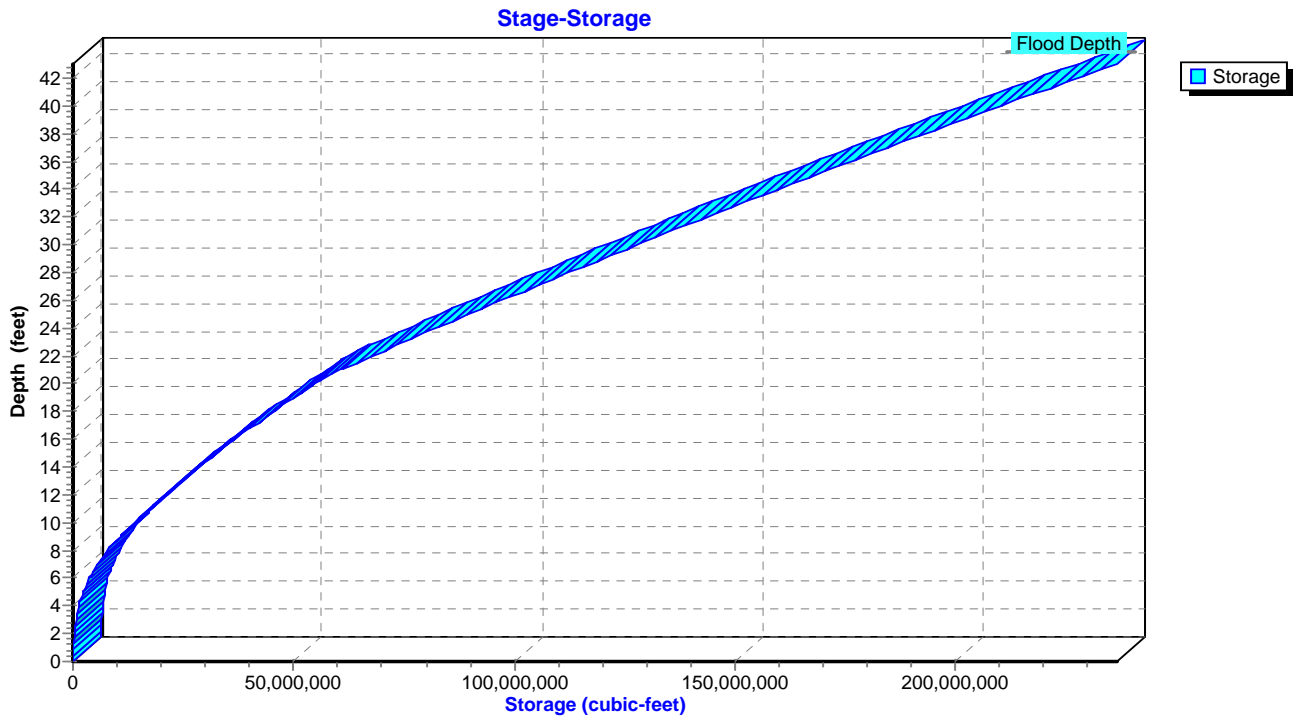
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



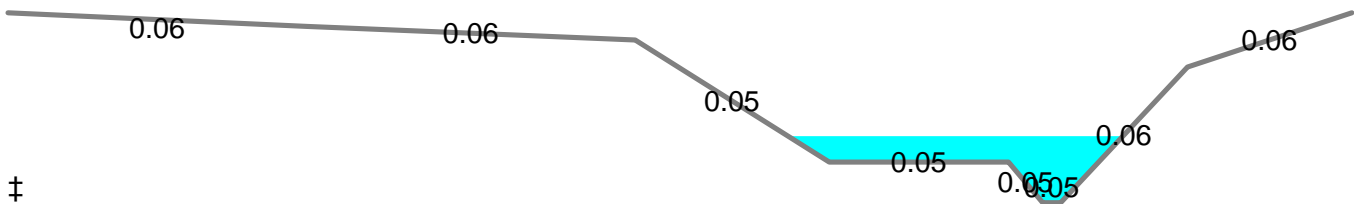
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.35" for 6-HR 0.2 PMF event
 Inflow = 2,470.65 cfs @ 6.14 hrs, Volume= 1,716.431 af
 Outflow = 2,392.05 cfs @ 6.60 hrs, Volume= 1,695.440 af, Atten= 3%, Lag= 27.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.42 fps, Min. Travel Time= 51.6 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 84.3 min

Peak Storage= 7,410,184 cf @ 6.60 hrs
 Average Depth at Peak Storage= 9.81'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

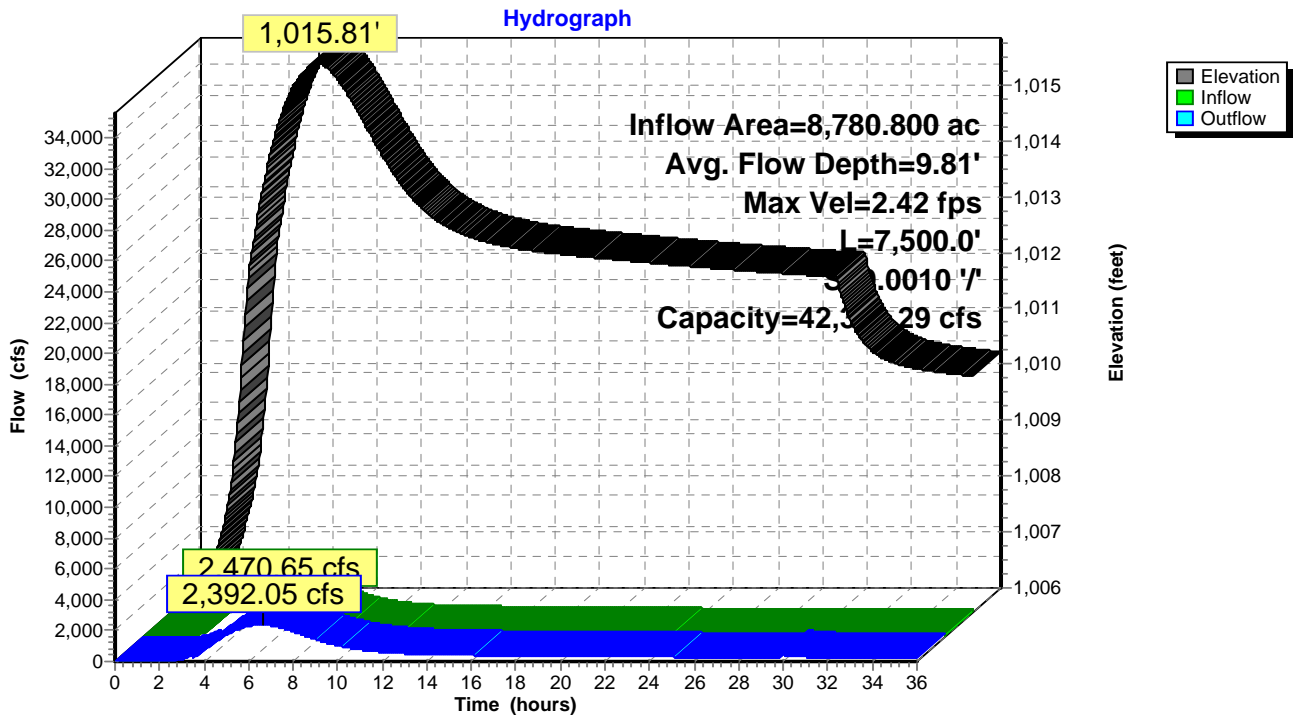
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



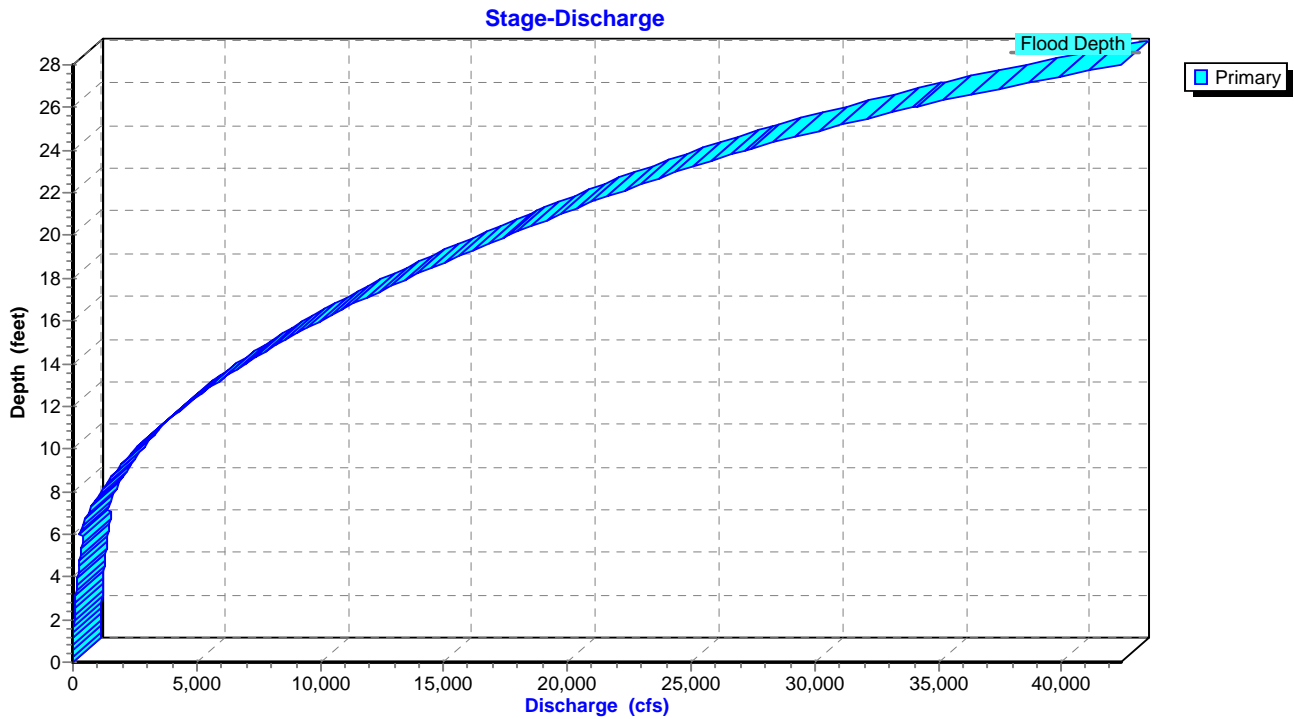
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

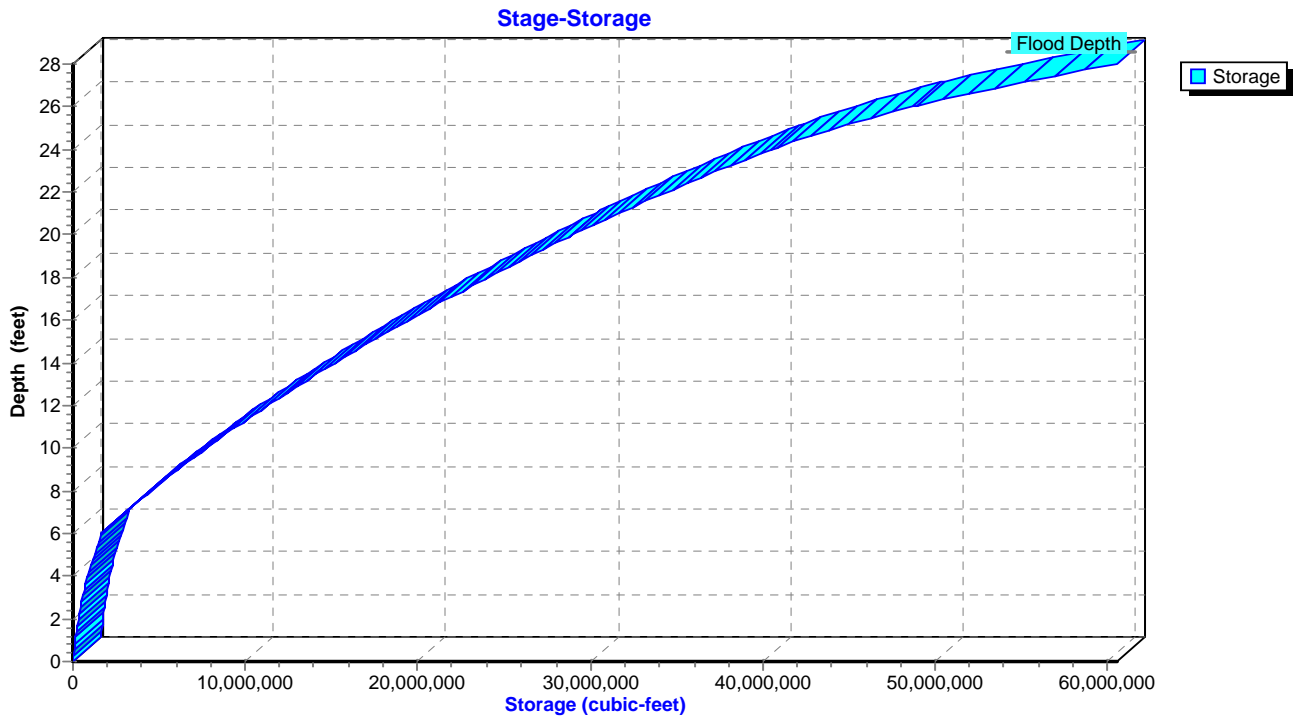
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



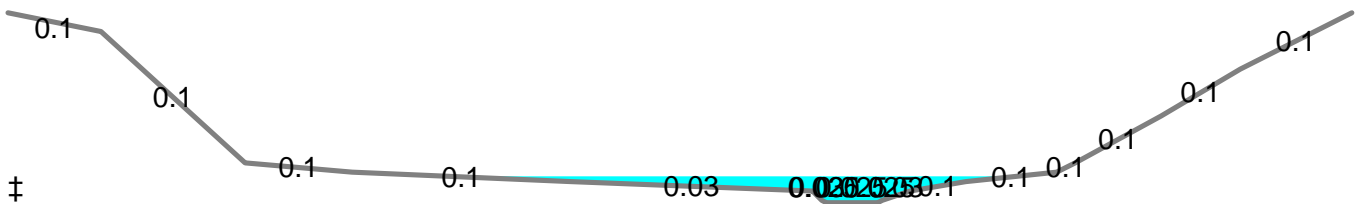
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.36" for 6-HR 0.2 PMF event
 Inflow = 2,499.46 cfs @ 7.18 hrs, Volume= 1,859.198 af
 Outflow = 2,499.45 cfs @ 7.19 hrs, Volume= 1,859.080 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.44 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.45 fps, Avg. Travel Time= 0.9 min

Peak Storage= 119,118 cf @ 7.19 hrs
 Average Depth at Peak Storage= 5.64'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

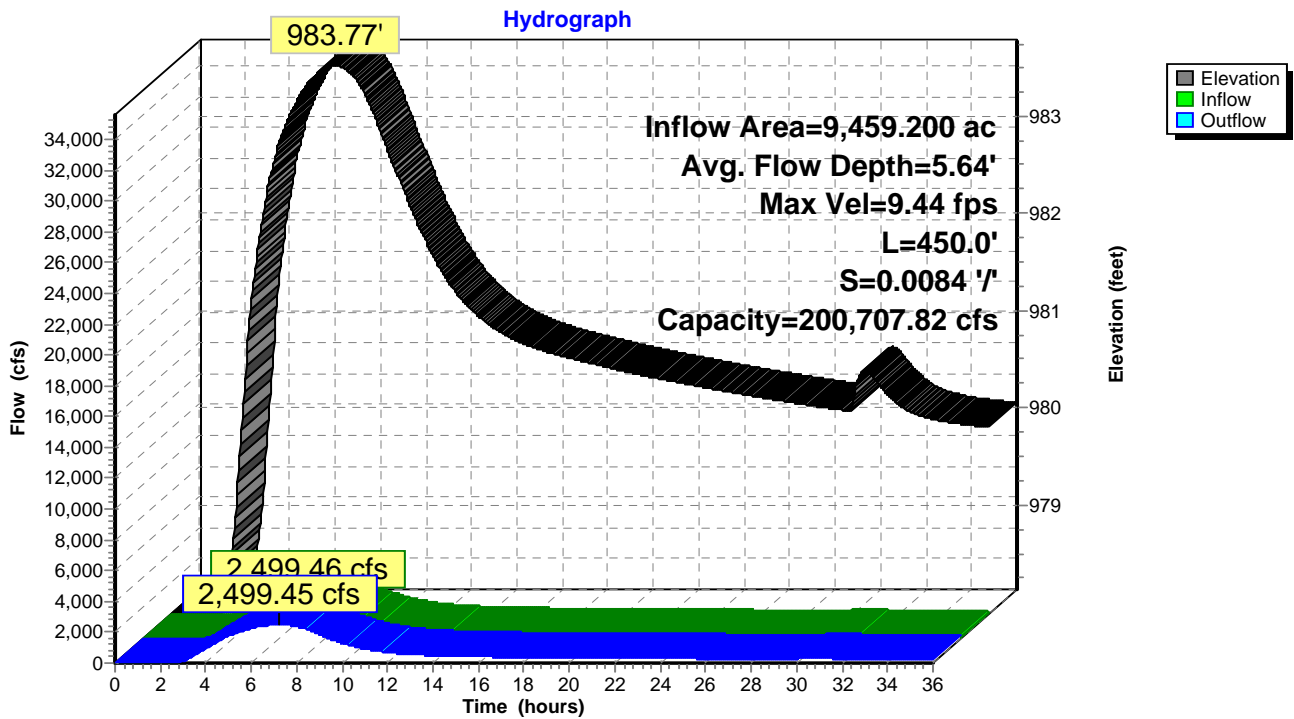
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



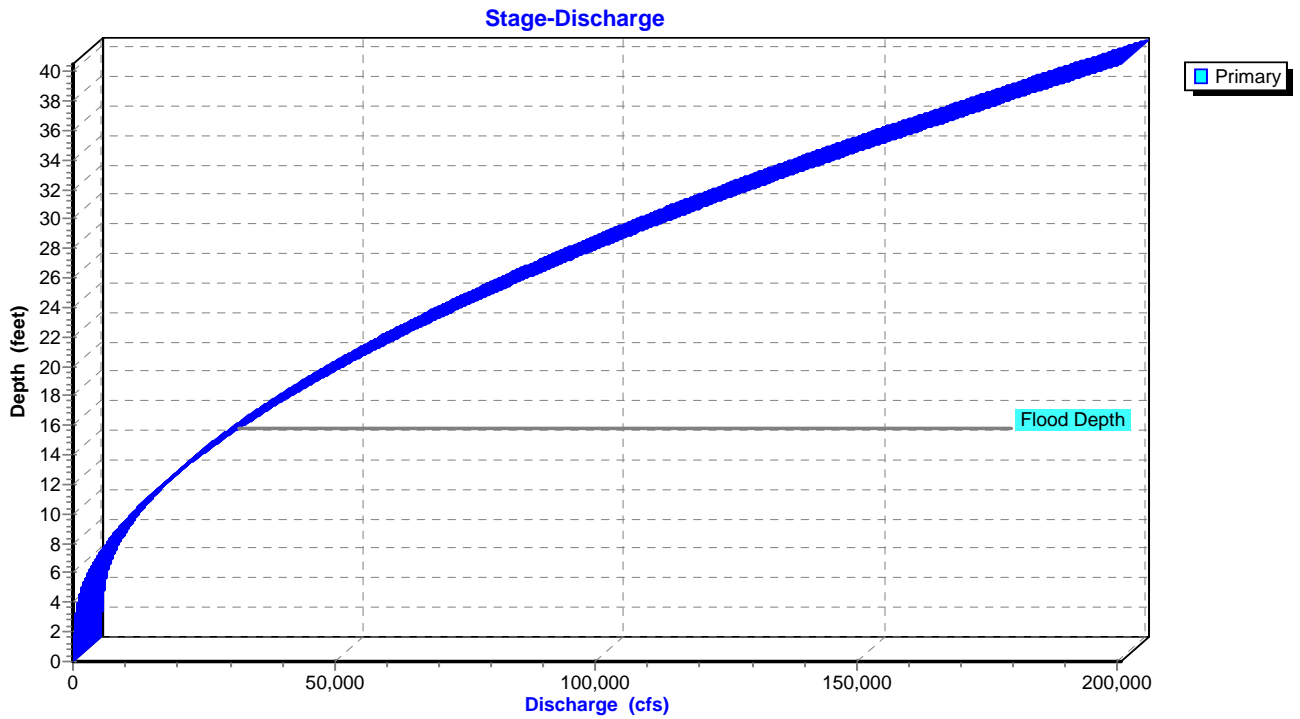
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

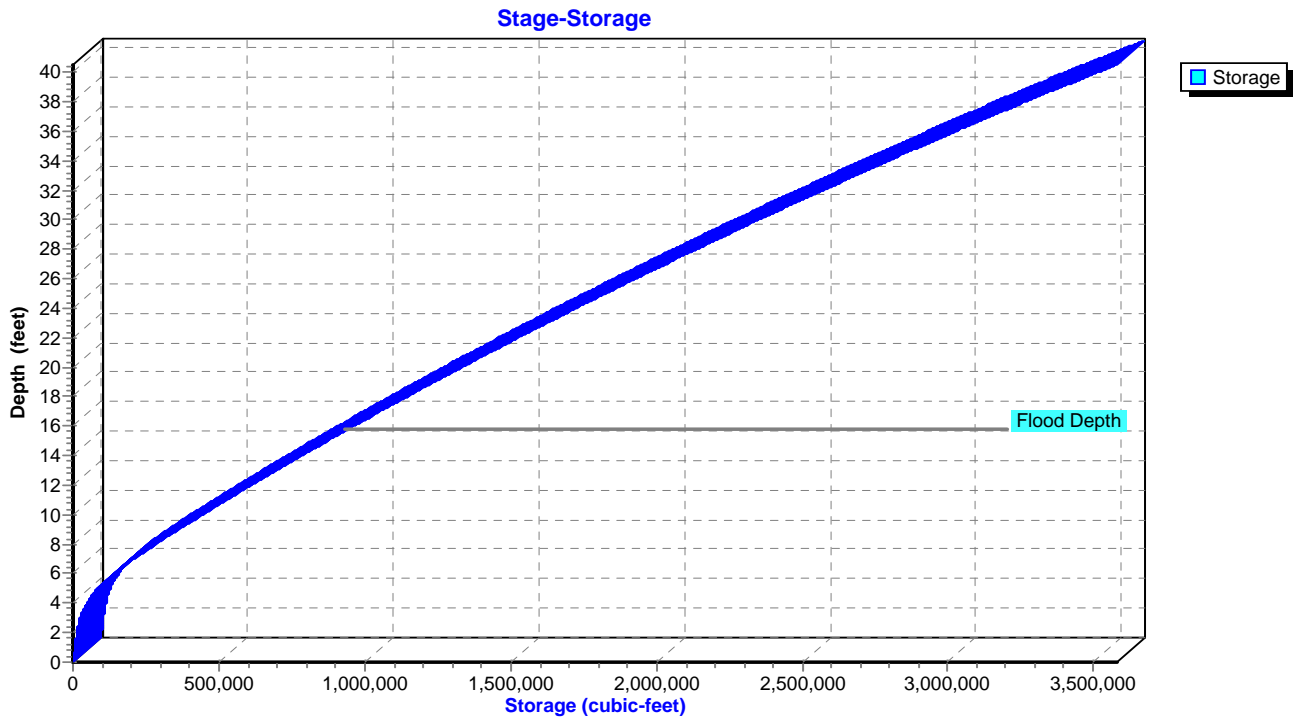
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

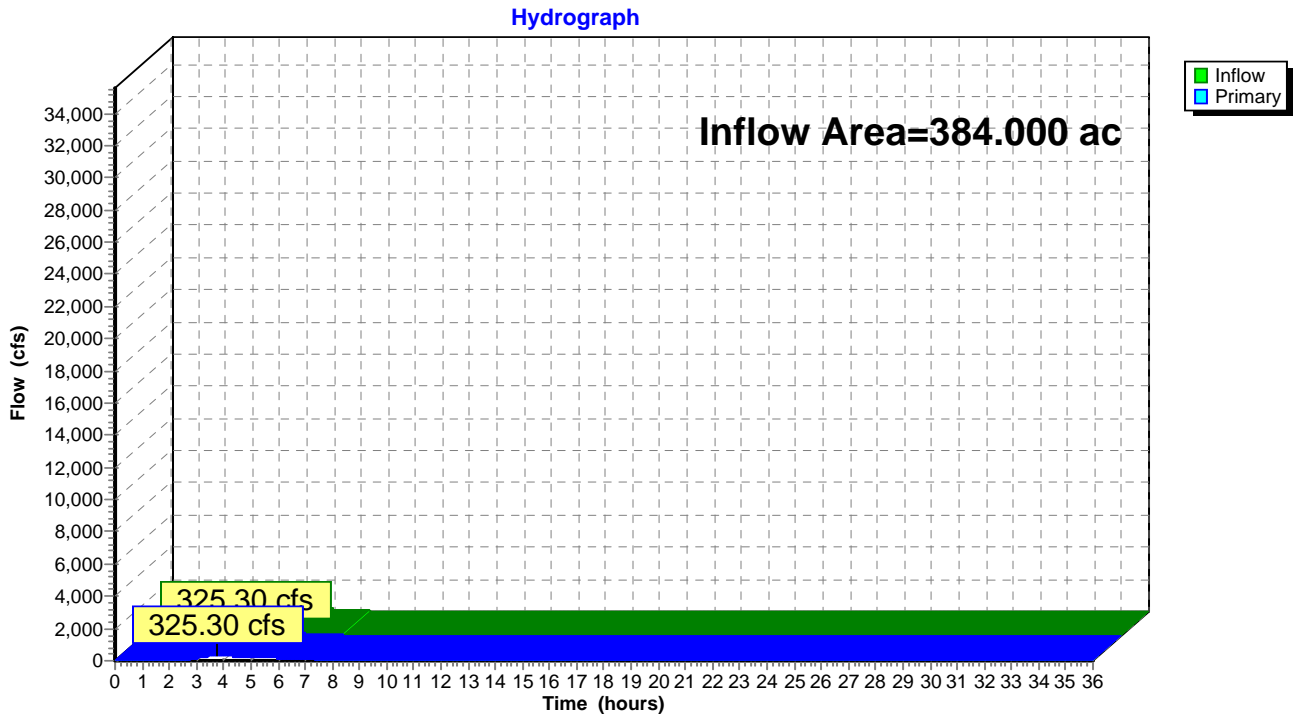


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.62" for 6-HR 0.2 PMF event
 Inflow = 325.30 cfs @ 3.76 hrs, Volume= 83.697 af
 Primary = 325.30 cfs @ 3.77 hrs, Volume= 83.697 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.37" for 6-HR 0.2 PMF event
 Inflow = 2,671.73 cfs @ 6.42 hrs, Volume= 1,870.526 af
 Outflow = 2,661.69 cfs @ 6.56 hrs, Volume= 1,860.157 af, Atten= 0%, Lag= 8.7 min
 Primary = 1,987.72 cfs @ 6.56 hrs, Volume= 1,668.345 af
 Secondary = 673.97 cfs @ 6.56 hrs, Volume= 191.812 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,006.87' @ 6.56 hrs Surf.Area= 18.409 ac Storage= 120.866 af (59.904 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

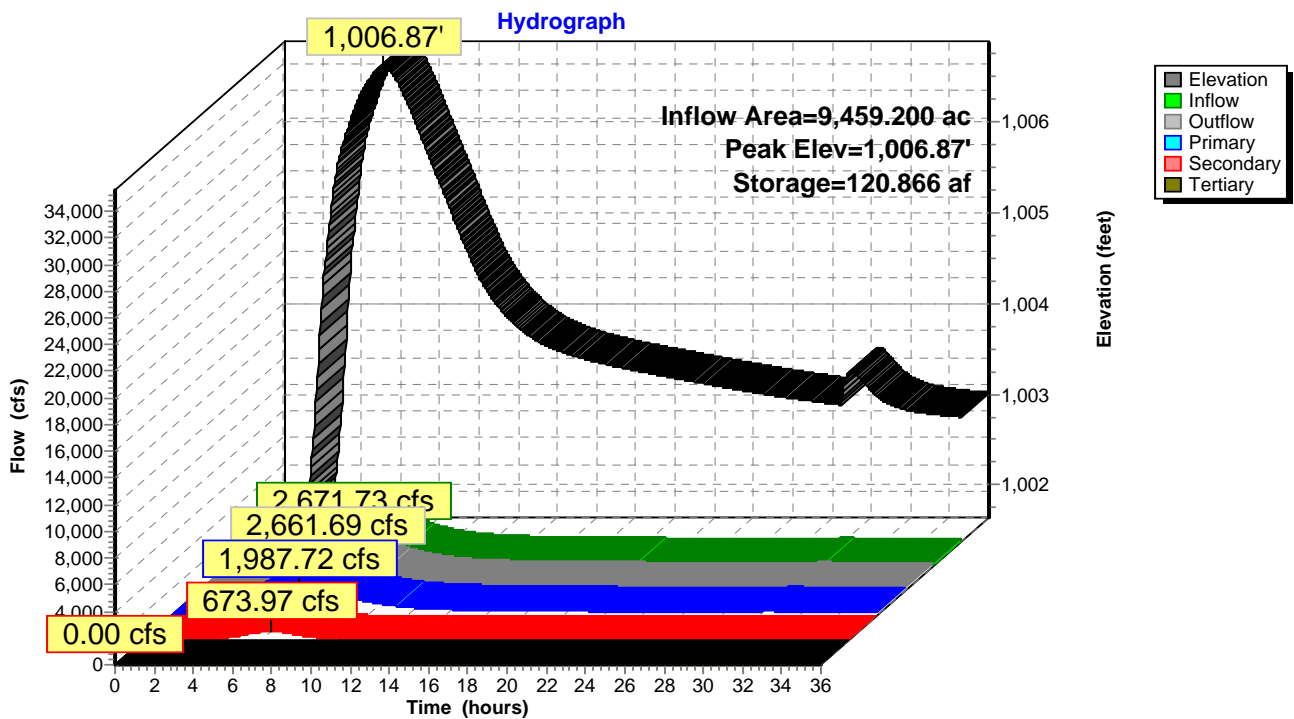
Plug-Flow detention time= 85.3 min calculated for 1,798.695 af (96% of inflow)
 Center-of-Mass det. time= 15.4 min (748.7 - 733.3)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

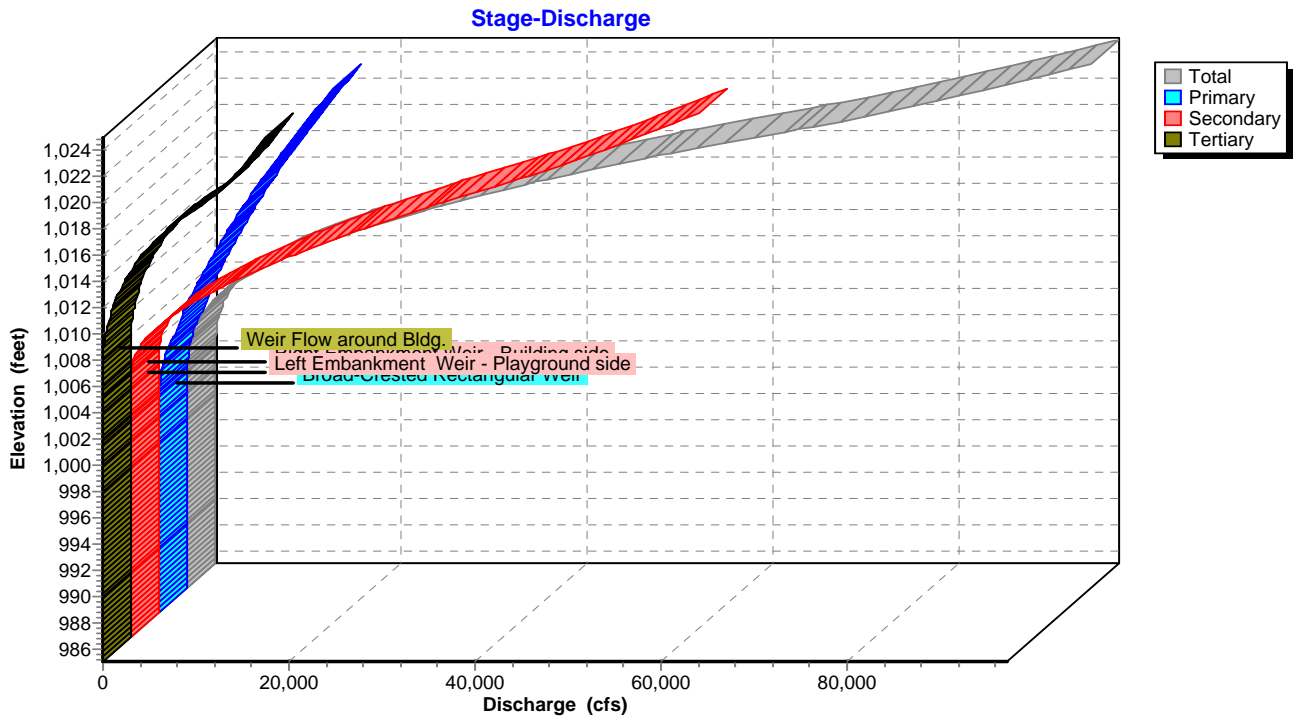
Device	Routing	Invert	Outlet Devices											
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50											
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32											
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.60 20.00											
			Width (feet) 17.00 23.00 77.00 77.00											
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80											
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00											
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00											
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00											

- Primary OutFlow** Max=1,987.72 cfs @ 6.56 hrs HW=1,006.87' TW=996.61' (Dynamic Tailwater)
 - 1=Broad-Crested Rectangular Weir (Weir Controls 1,987.72 cfs @ 7.60 fps)
- Secondary OutFlow** Max=673.97 cfs @ 6.56 hrs HW=1,006.87' TW=996.61' (Dynamic Tailwater)
 - 2=Right Embankment Weir - Building side (Weir Controls 254.56 cfs @ 3.58 fps)
 - 3=Left Embankment Weir - Playground side (Weir Controls 419.42 cfs @ 4.26 fps)
- Tertiary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 - 4=Weir Flow around Bldg. (Controls 0.00 cfs)

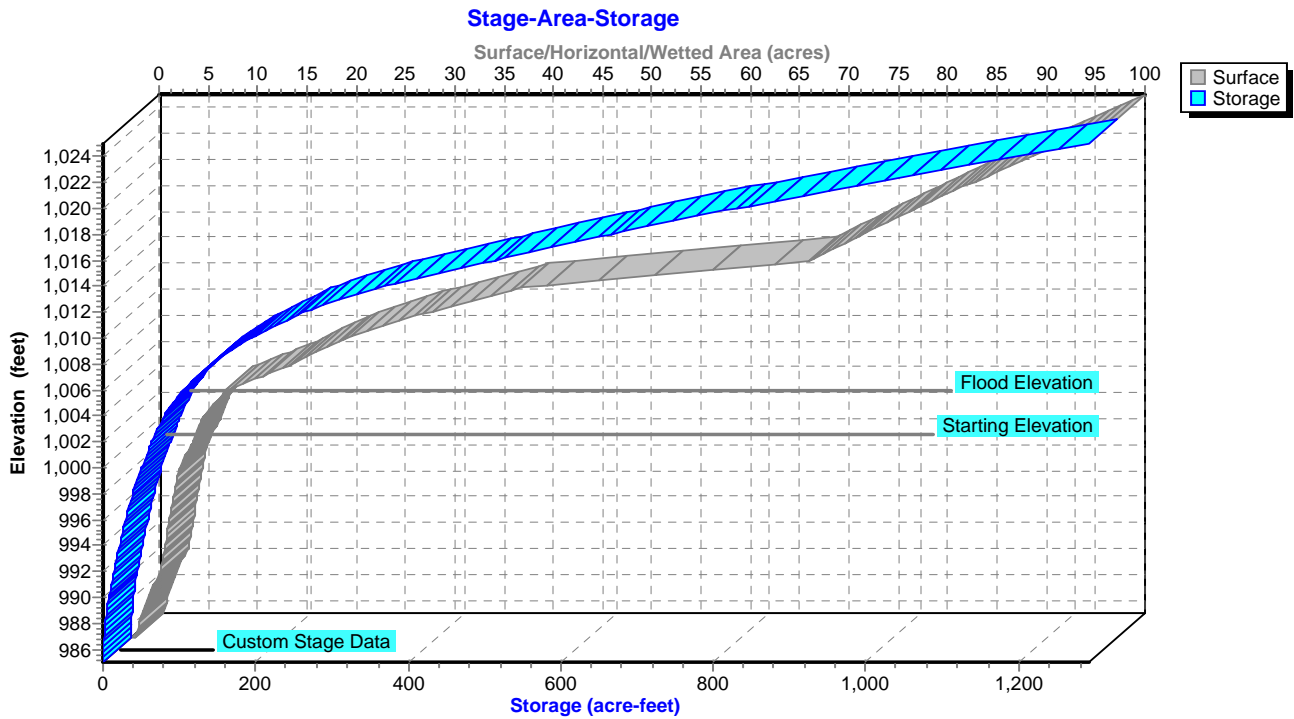
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

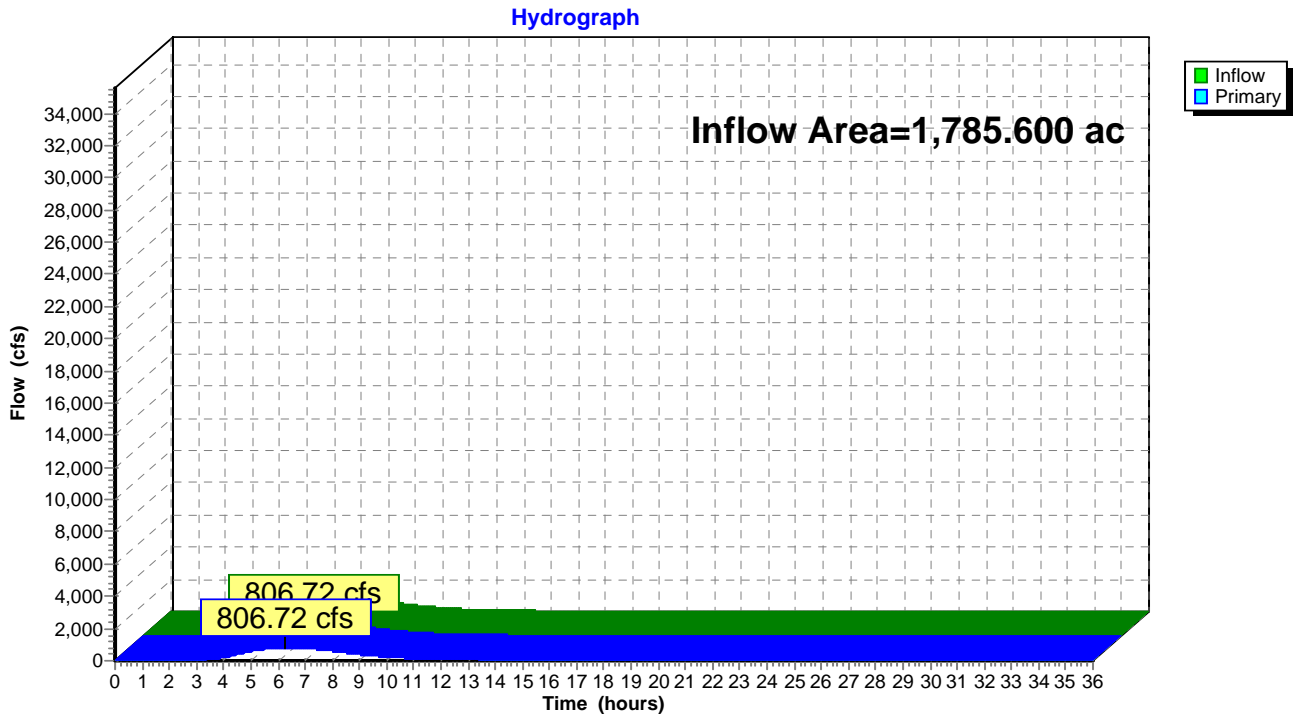


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.30" for 6-HR 0.2 PMF event
Inflow = 806.72 cfs @ 6.28 hrs, Volume= 342.070 af
Primary = 806.72 cfs @ 6.29 hrs, Volume= 342.070 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.30" for 6-HR 0.2 PMF event
 Inflow = 806.72 cfs @ 6.29 hrs, Volume= 342.070 af
 Outflow = 295.63 cfs @ 9.56 hrs, Volume= 576.367 af, Atten= 63%, Lag= 196.2 min
 Primary = 295.63 cfs @ 9.56 hrs, Volume= 576.367 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,097.85' @ 9.56 hrs Surf.Area= 236.108 ac Storage= 2,015.502 af (101.502 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 472.9 min (944.7 - 471.8)

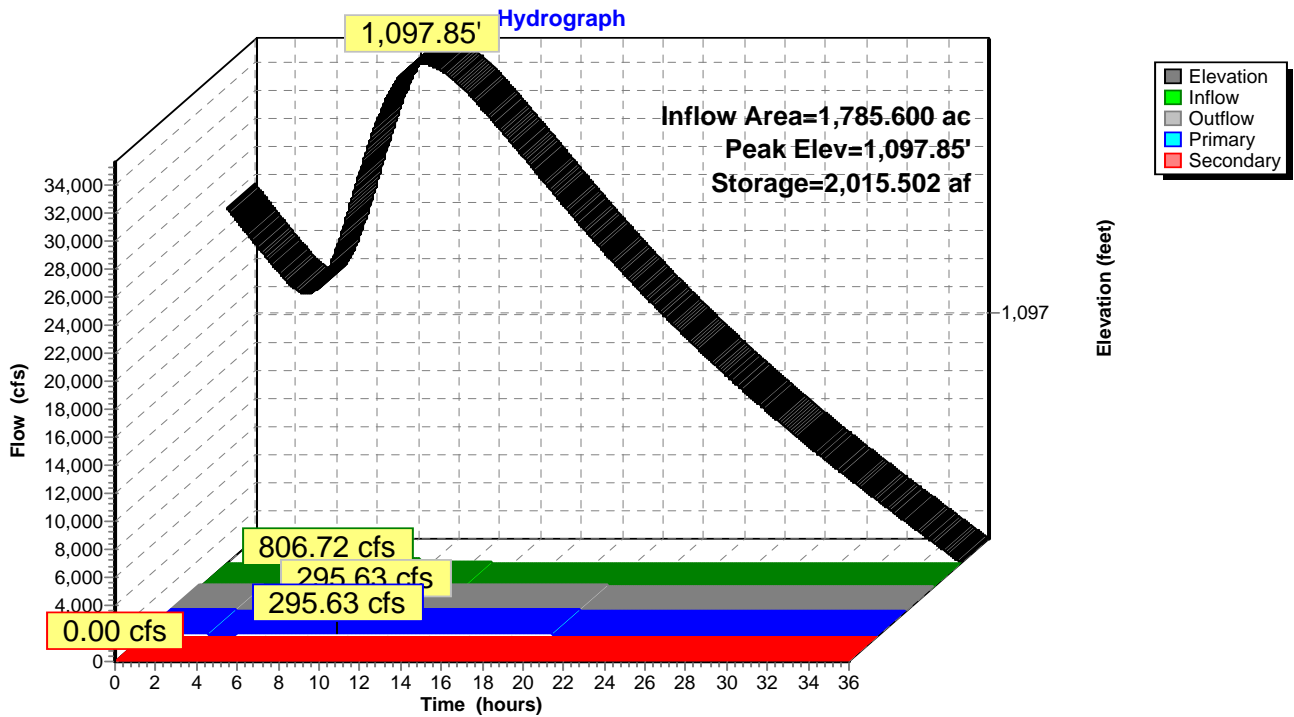
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

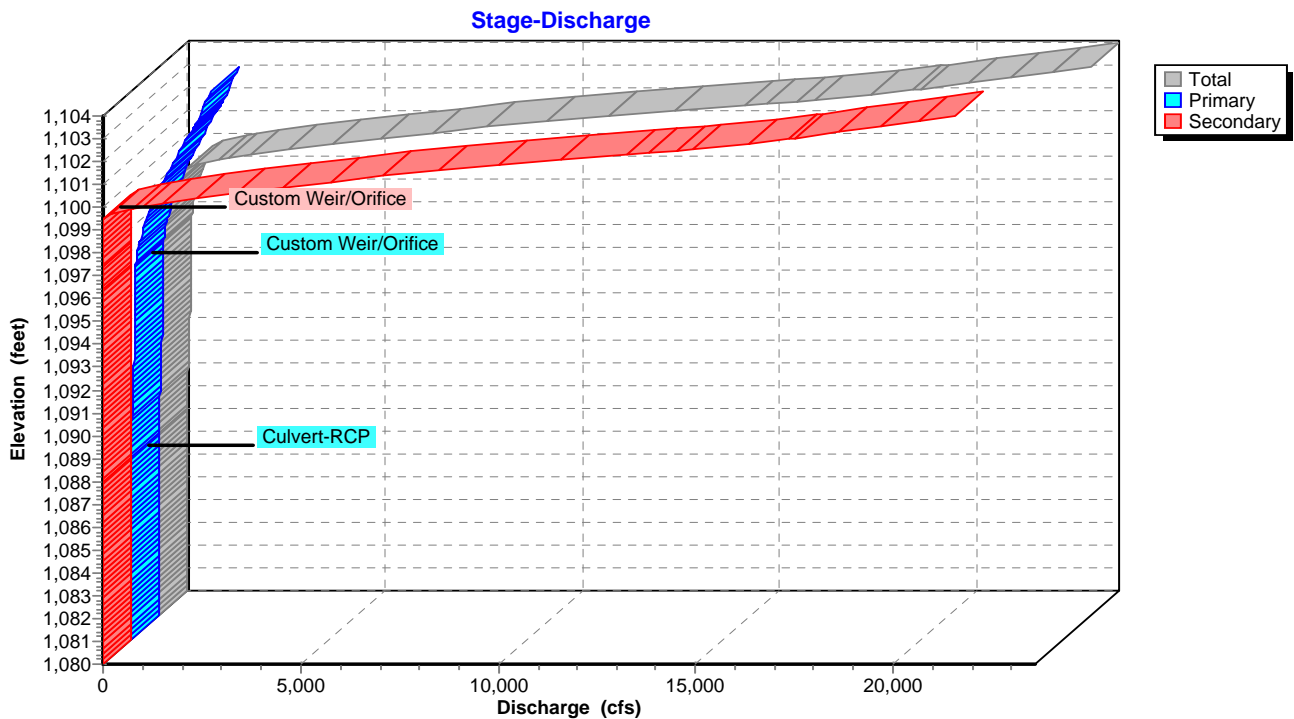
Primary OutFlow Max=295.63 cfs @ 9.56 hrs HW=1,097.85' TW=1,071.84' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 124.96 cfs @ 17.68 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 170.67 cfs @ 3.94 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

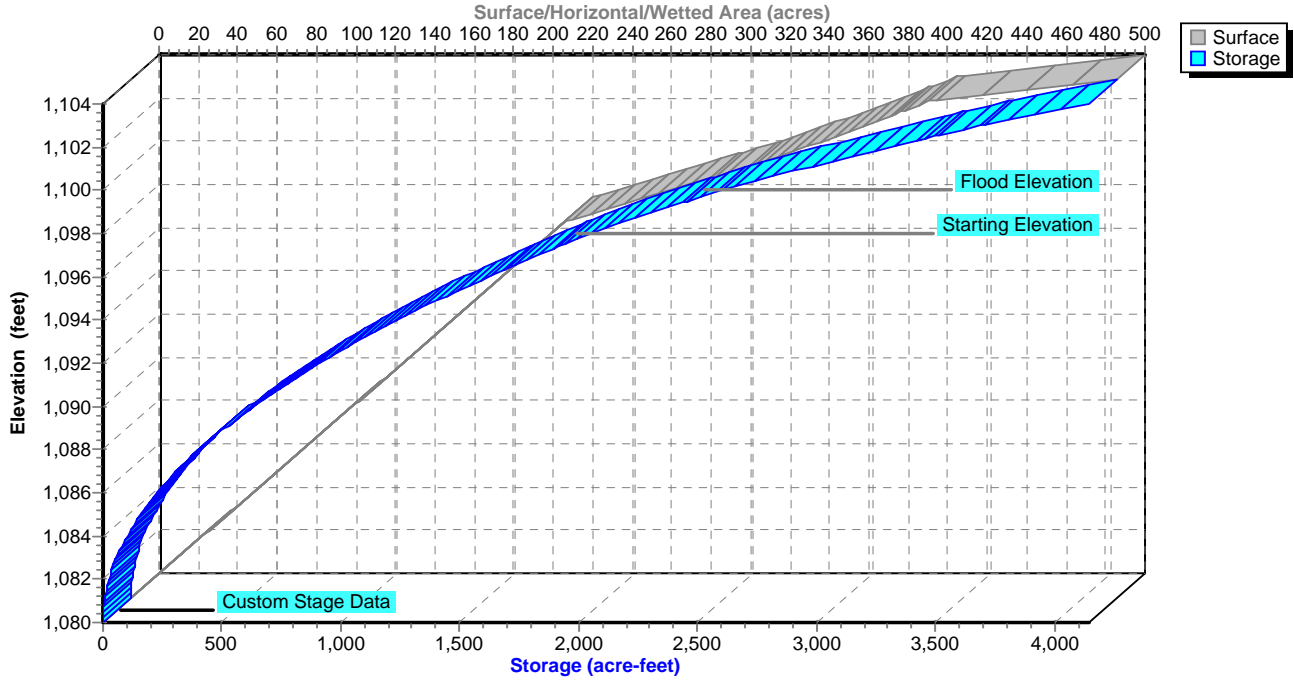


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



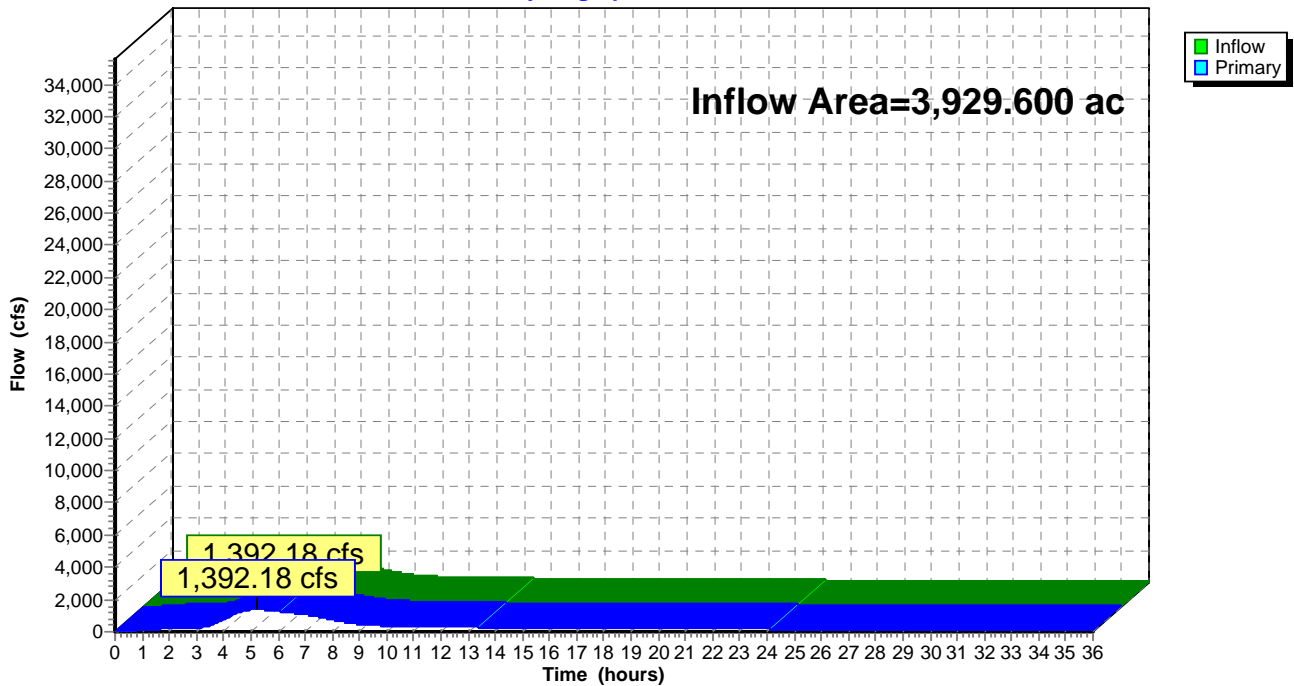
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 2.86" for 6-HR 0.2 PMF event
Inflow = 1,392.18 cfs @ 5.19 hrs, Volume= 936.190 af
Primary = 1,392.18 cfs @ 5.20 hrs, Volume= 936.190 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.62" for 6-HR 0.2 PMF event
 Inflow = 325.30 cfs @ 3.77 hrs, Volume= 83.697 af
 Outflow = 130.12 cfs @ 6.62 hrs, Volume= 83.244 af, Atten= 60%, Lag= 170.9 min
 Primary = 130.12 cfs @ 6.62 hrs, Volume= 83.244 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.58' @ 6.62 hrs Surf.Area= 28.760 ac Storage= 68.471 af (44.171 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 478.3 min calculated for 58.928 af (70% of inflow)
 Center-of-Mass det. time= 283.4 min (610.0 - 326.7)

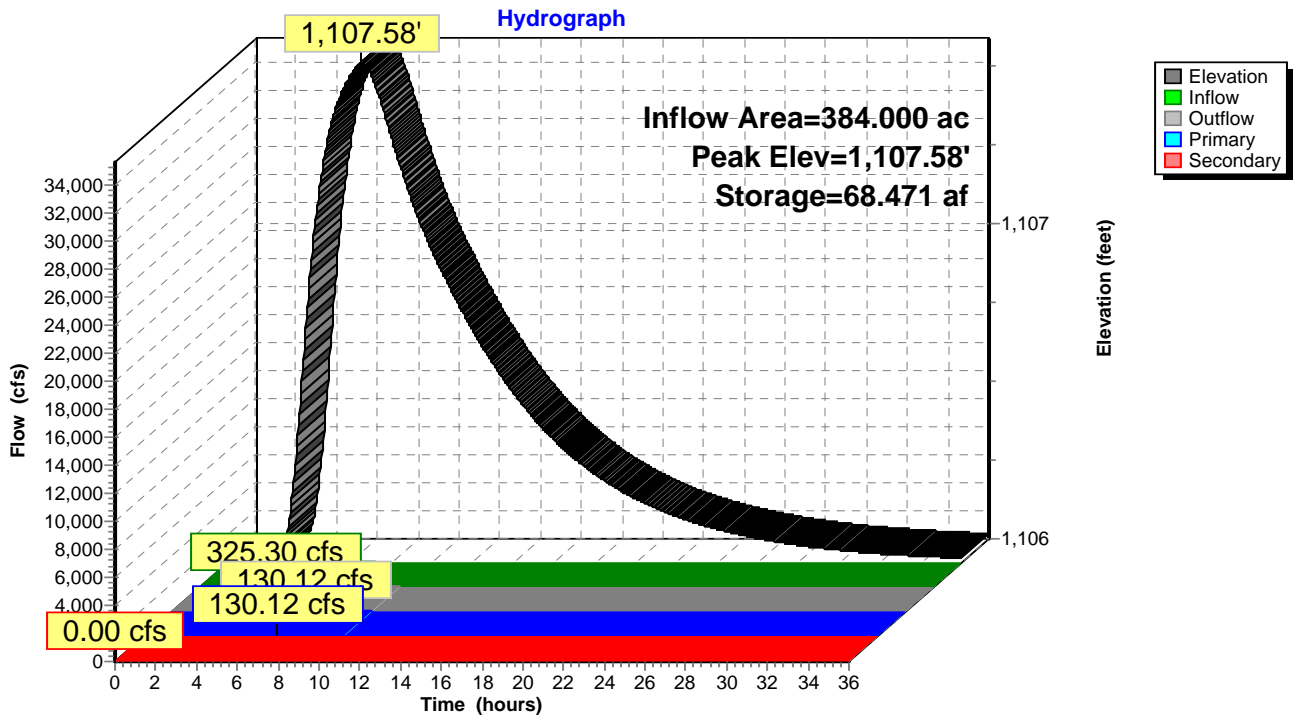
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

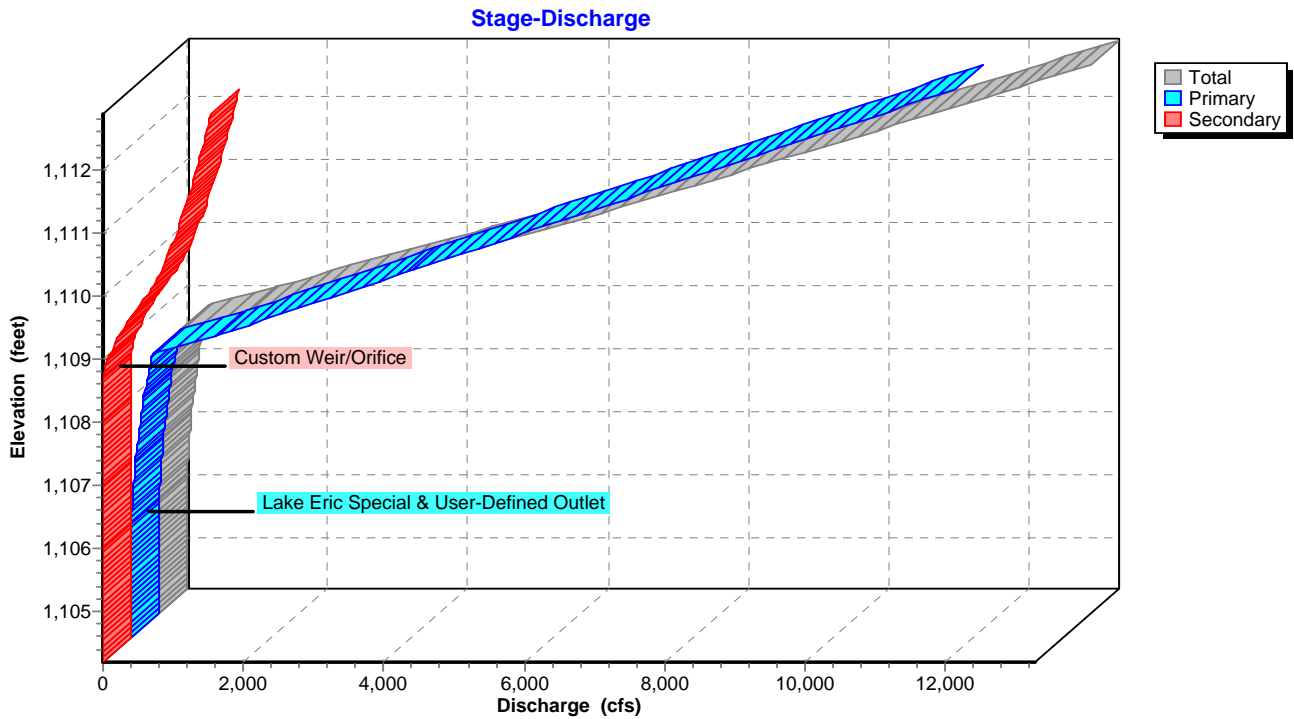
Primary OutFlow Max=130.12 cfs @ 6.62 hrs HW=1,107.58' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet(Custom Controls 130.12 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

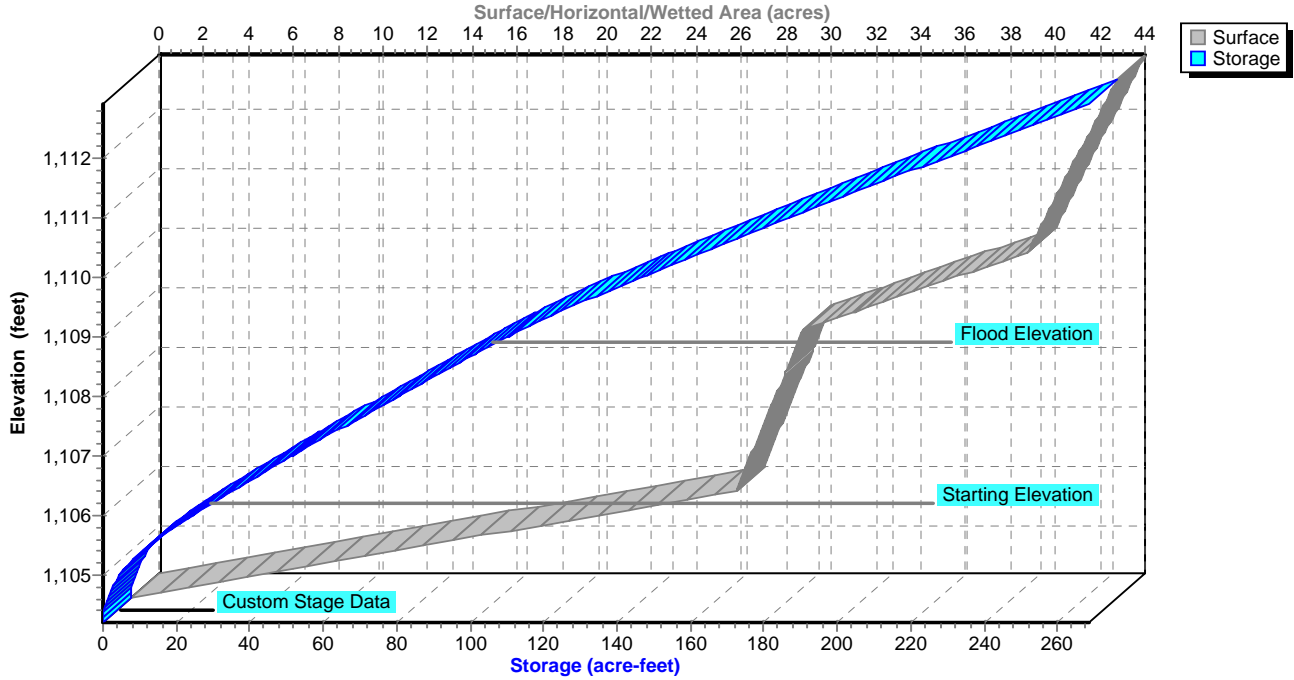


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



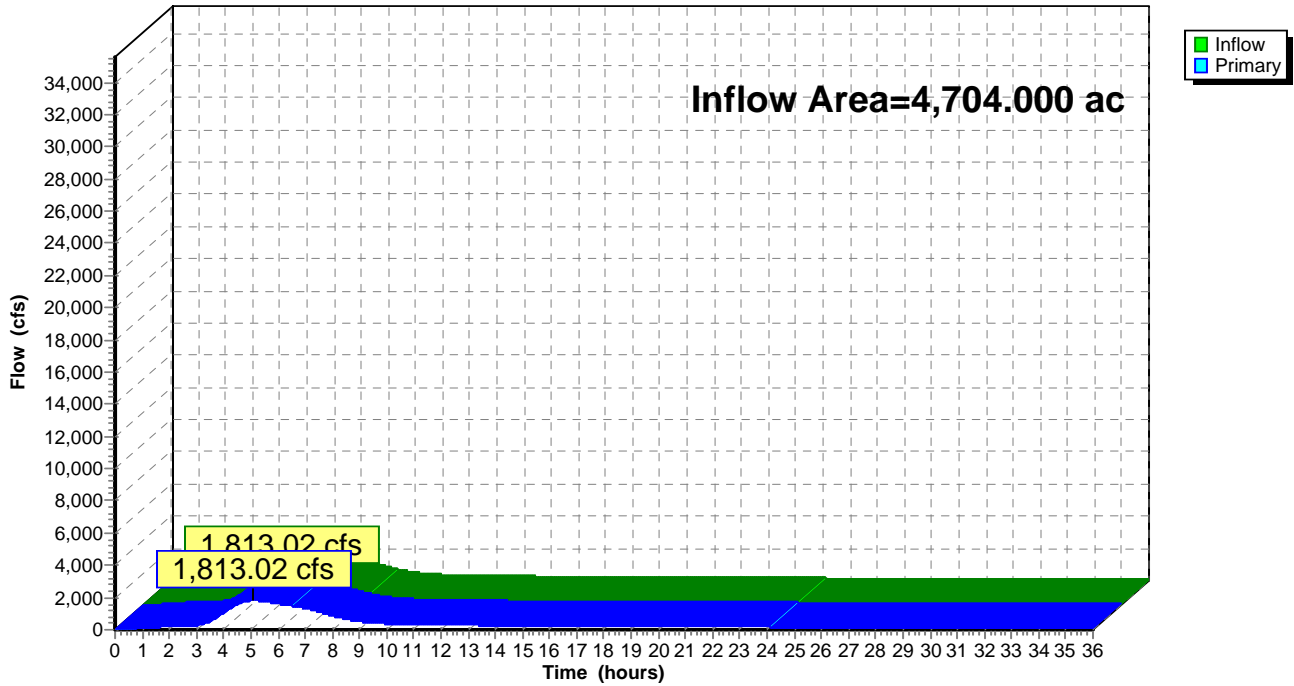
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 2.71" for 6-HR 0.2 PMF event
Inflow = 1,813.02 cfs @ 5.08 hrs, Volume= 1,063.357 af
Primary = 1,813.02 cfs @ 5.09 hrs, Volume= 1,063.357 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 2.56" for 6-HR 0.2 PMF event
 Inflow = 133.69 cfs @ 3.38 hrs, Volume= 24.549 af
 Outflow = 54.95 cfs @ 4.89 hrs, Volume= 24.443 af, Atten= 59%, Lag= 90.6 min
 Primary = 54.95 cfs @ 4.89 hrs, Volume= 24.443 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,119.52' @ 4.89 hrs Surf.Area= 4.127 ac Storage= 25.473 af (11.783 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 459.3 min calculated for 10.750 af (44% of inflow)
 Center-of-Mass det. time= 203.8 min (457.3 - 253.6)

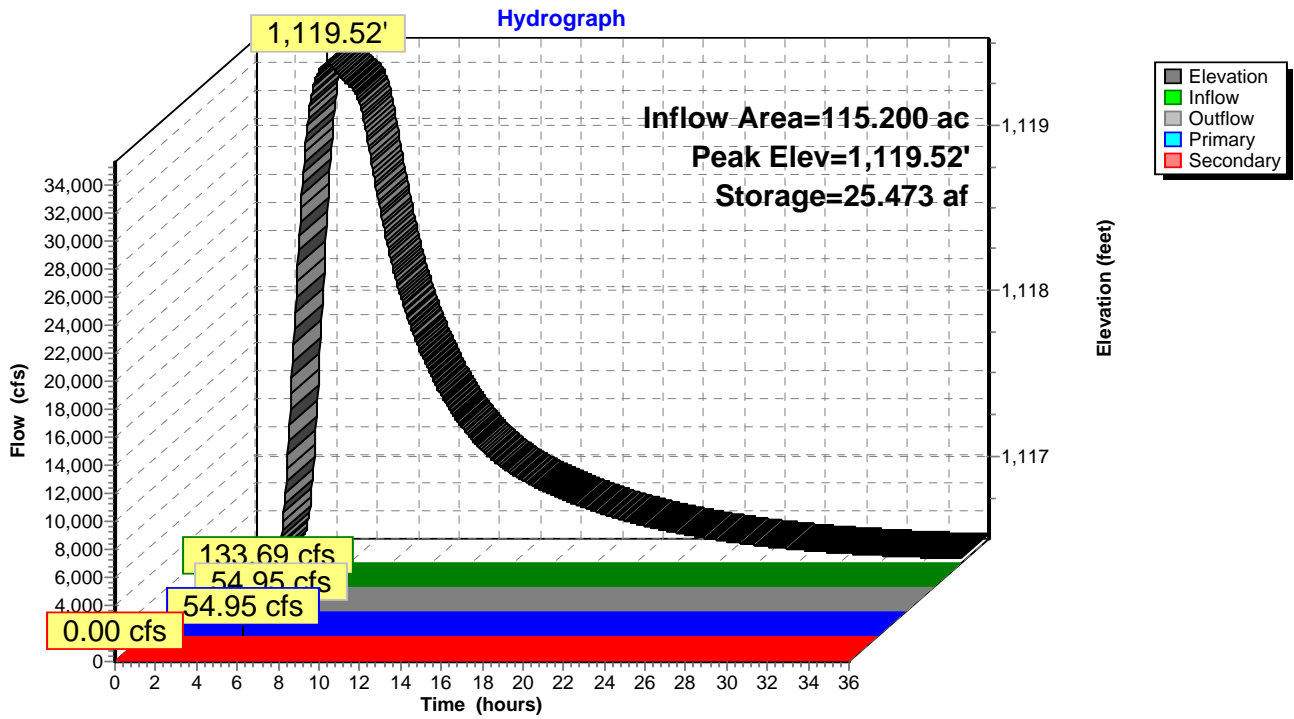
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

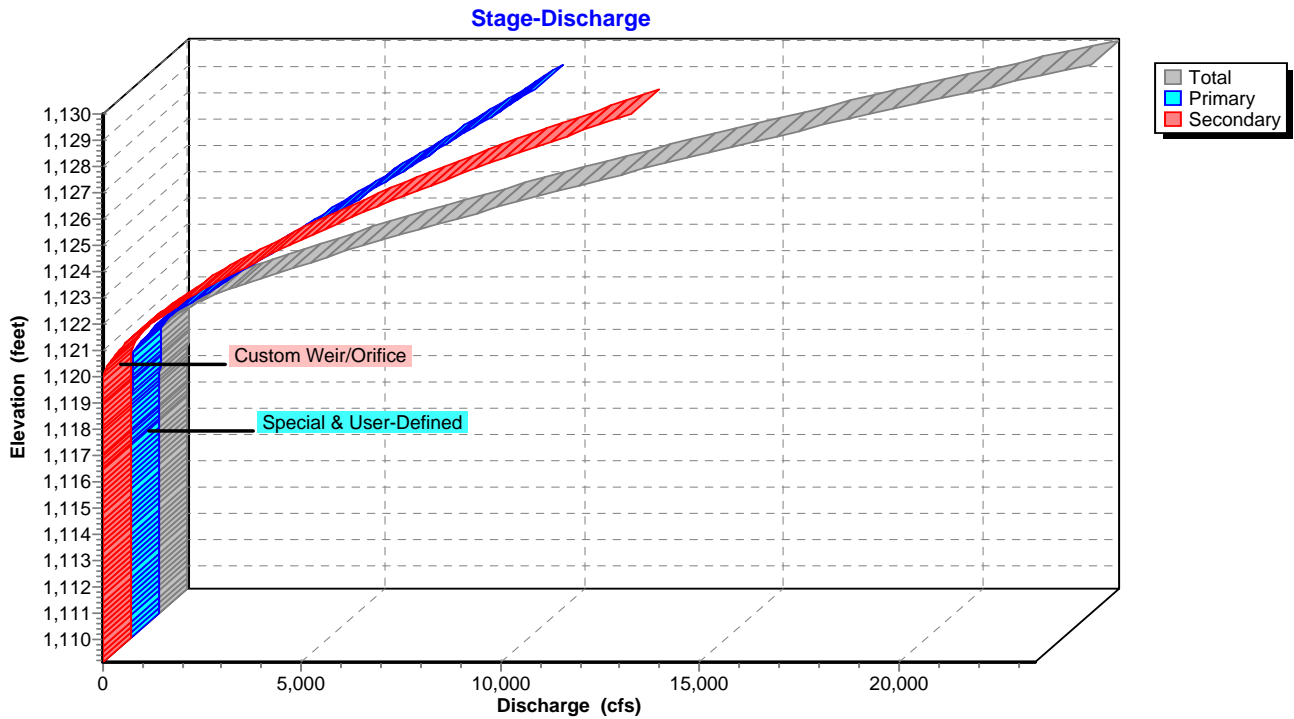
Primary OutFlow Max=54.95 cfs @ 4.89 hrs HW=1,119.52' TW=0.00' (Dynamic Tailwater)
 ↑1=Special & User-Defined (Custom Controls 54.95 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,116.50' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

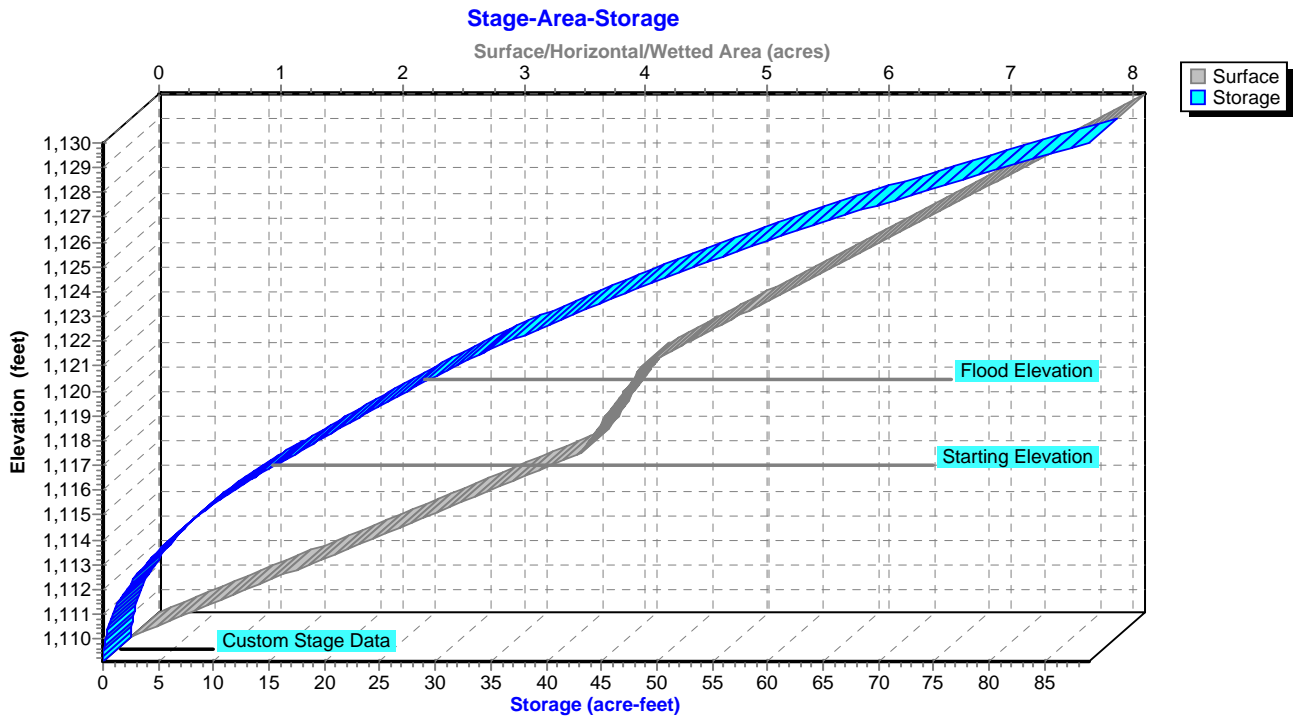
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



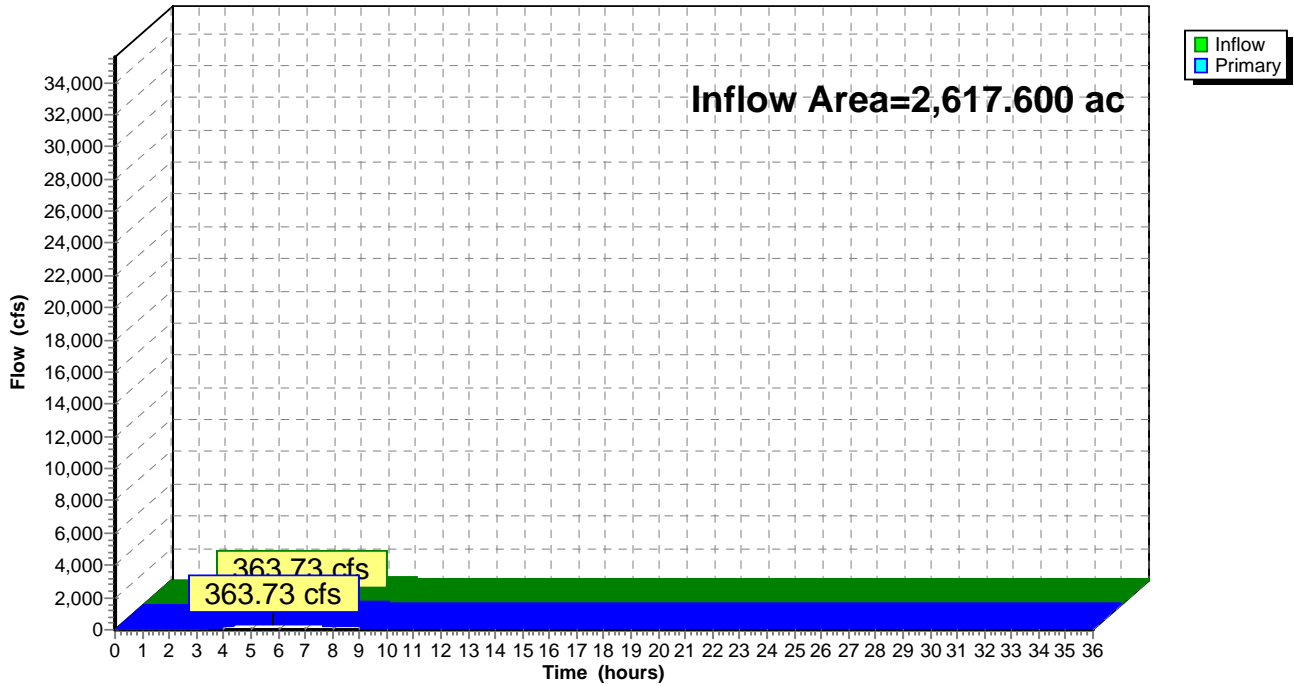
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 1.68" for 6-HR 0.2 PMF event
Inflow = 363.73 cfs @ 5.84 hrs, Volume= 367.039 af
Primary = 363.73 cfs @ 5.85 hrs, Volume= 367.039 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

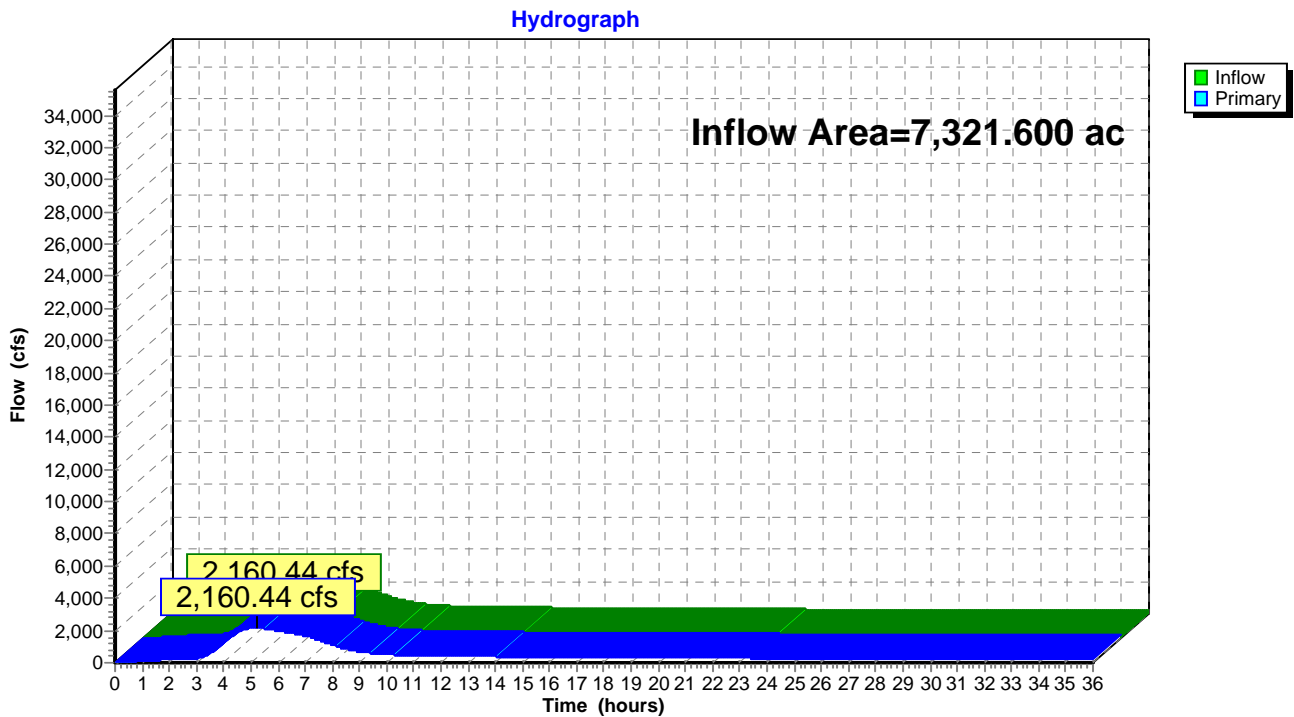


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.34" for 6-HR 0.2 PMF event
Inflow = 2,160.44 cfs @ 5.18 hrs, Volume= 1,430.228 af
Primary = 2,160.44 cfs @ 5.19 hrs, Volume= 1,430.228 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



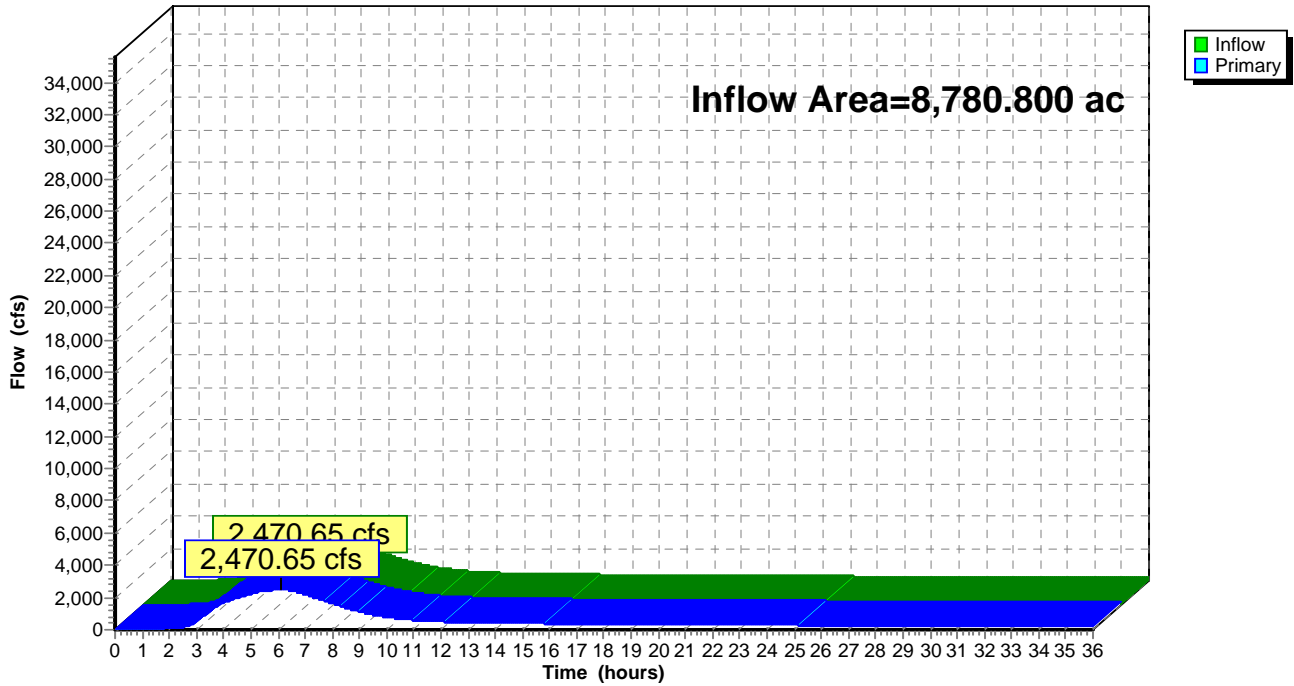
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.35" for 6-HR 0.2 PMF event
Inflow = 2,470.65 cfs @ 6.13 hrs, Volume= 1,716.603 af
Primary = 2,470.65 cfs @ 6.14 hrs, Volume= 1,716.603 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.08" for 6-HR 0.2 PMF event
 Inflow = 1,050.31 cfs @ 6.42 hrs, Volume= 340.298 af
 Outflow = 118.66 cfs @ 11.58 hrs, Volume= 260.567 af, Atten= 89%, Lag= 309.5 min
 Primary = 118.66 cfs @ 11.58 hrs, Volume= 260.567 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.60' @ 11.58 hrs Surf.Area= 113.462 ac Storage= 260.332 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 797.0 min calculated for 260.567 af (77% of inflow)
 Center-of-Mass det. time= 727.9 min (1,210.6 - 482.7)

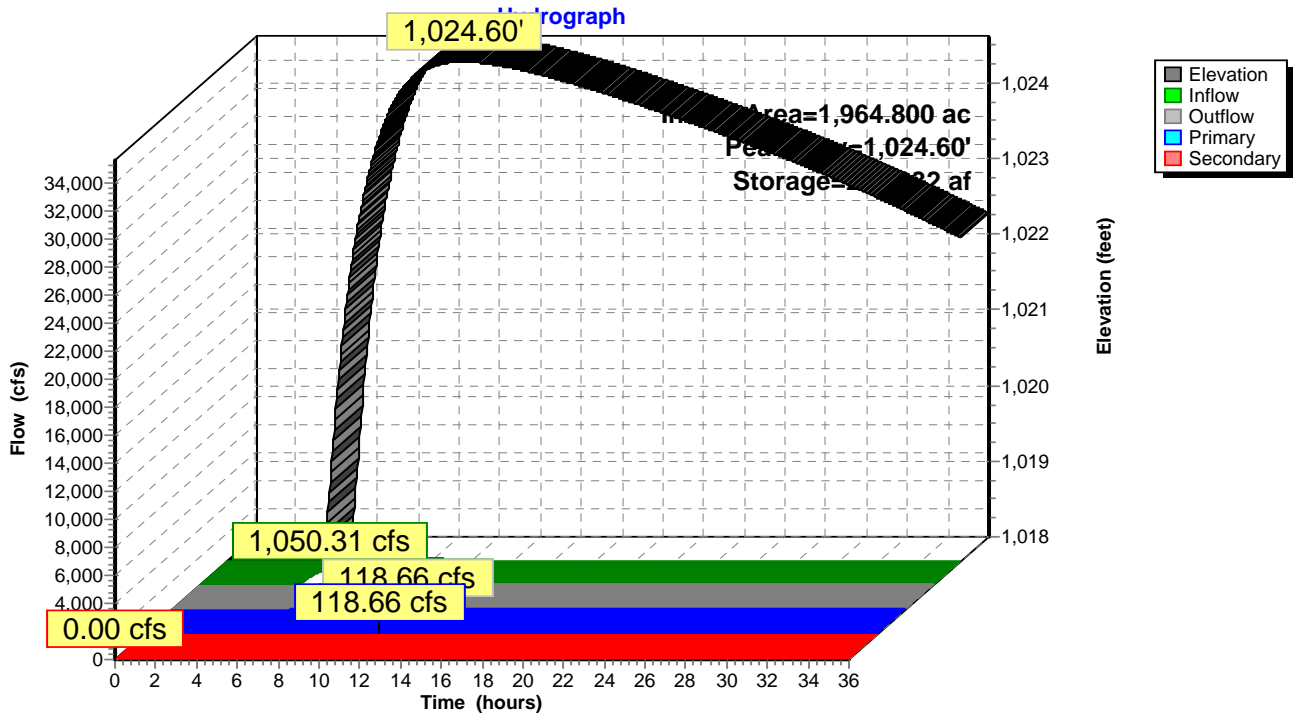
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

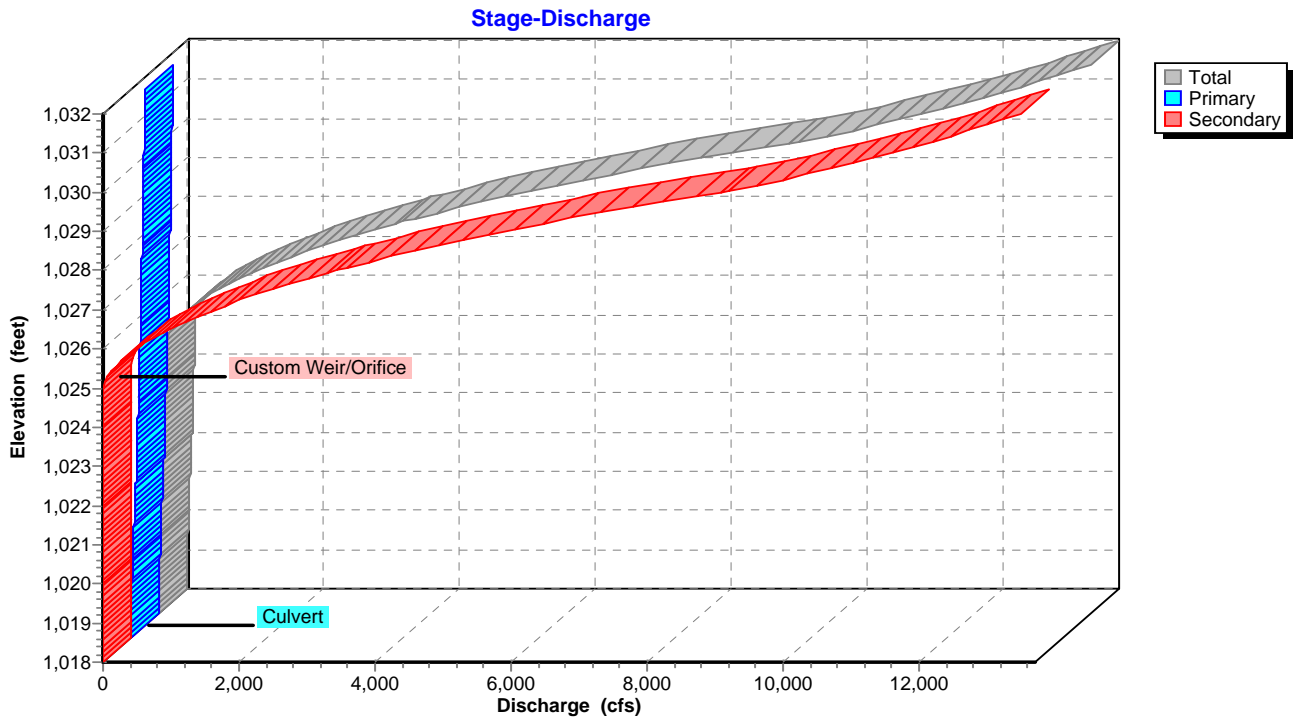
Primary OutFlow Max=118.66 cfs @ 11.58 hrs HW=1,024.60' TW=1,020.46' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 118.66 cfs @ 9.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,018.00' TW=1,017.50' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

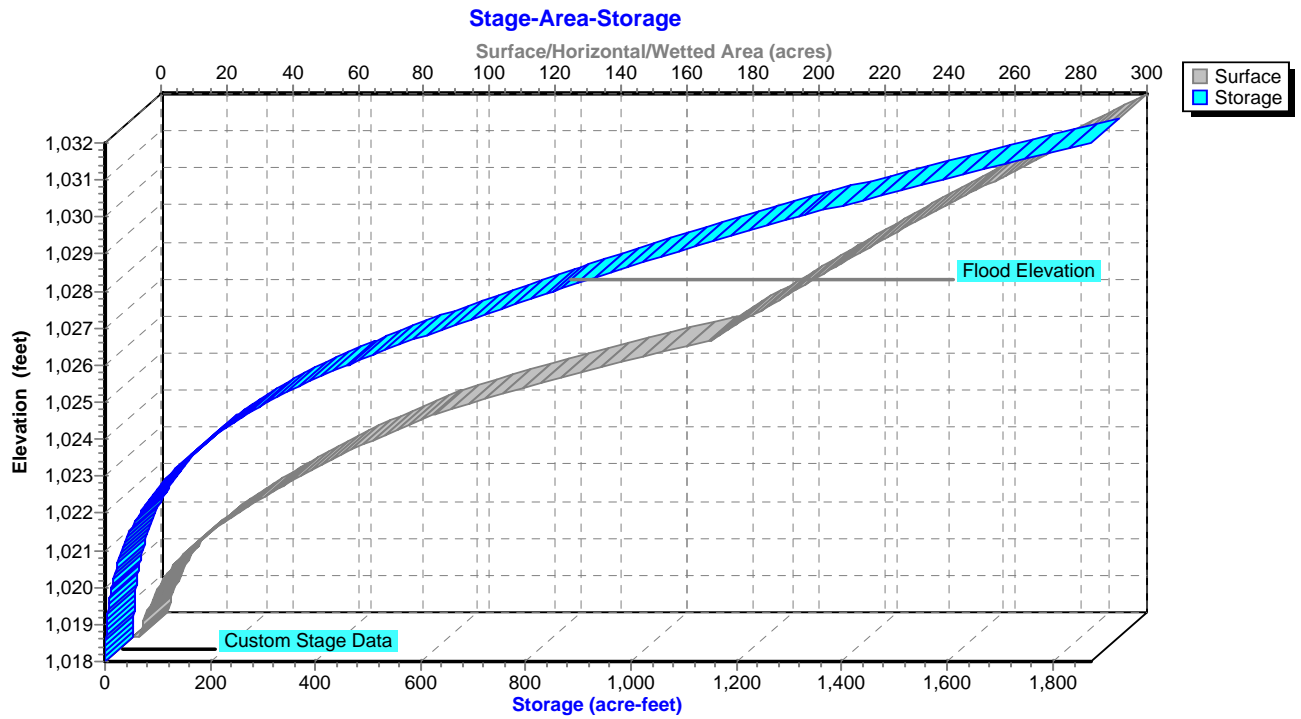
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 2.65" for 6-HR 0.2 PMF event
 Inflow = 1,401.47 cfs @ 5.03 hrs, Volume= 433.121 af
 Outflow = 1,050.31 cfs @ 6.42 hrs, Volume= 340.299 af, Atten= 25%, Lag= 83.5 min
 Primary = 1,050.31 cfs @ 6.42 hrs, Volume= 340.299 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,028.97' @ 6.42 hrs Surf.Area= 103.451 ac Storage= 408.996 af (188.996 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 388.4 min calculated for 120.299 af (28% of inflow)
 Center-of-Mass det. time= 126.3 min (482.7 - 356.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

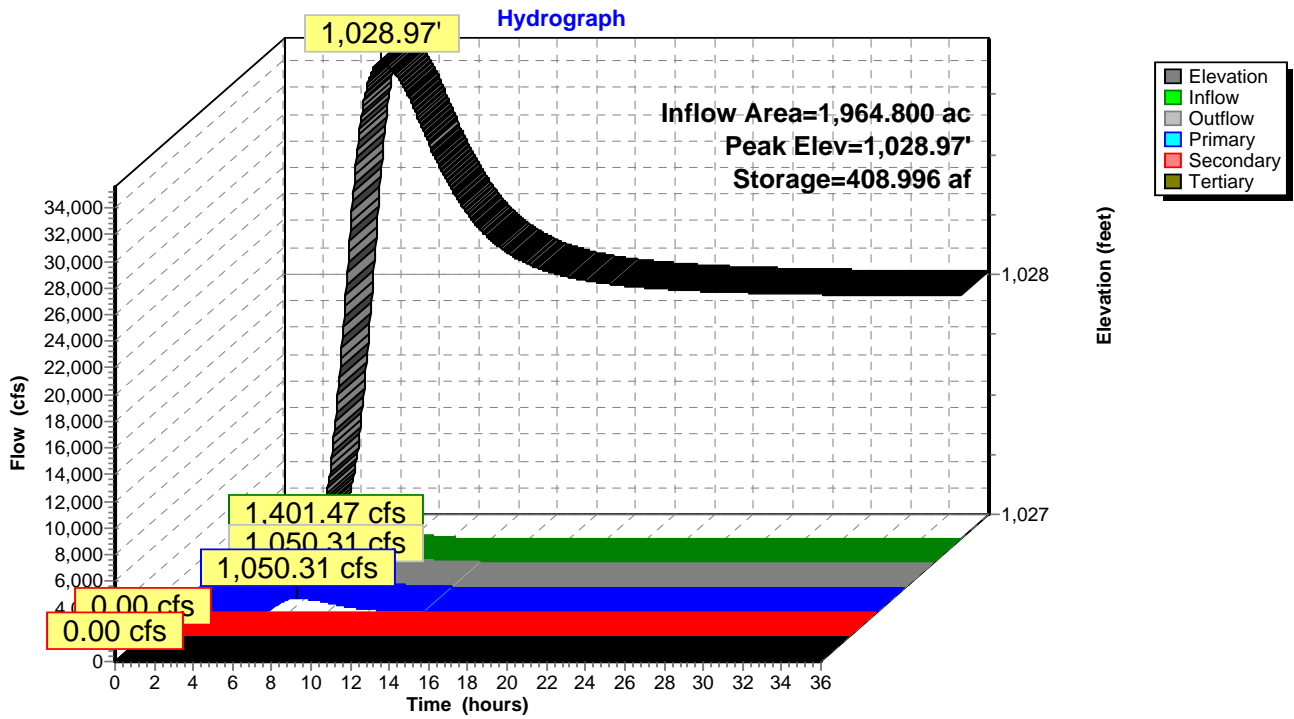
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,050.30 cfs @ 6.42 hrs HW=1,028.97' TW=1,022.44' (Dynamic Tailwater)
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 759.21 cfs @ 2.60 fps)
 ↳2=**Broad-Crested Rectangular Weir** (Weir Controls 291.09 cfs @ 1.86 fps)

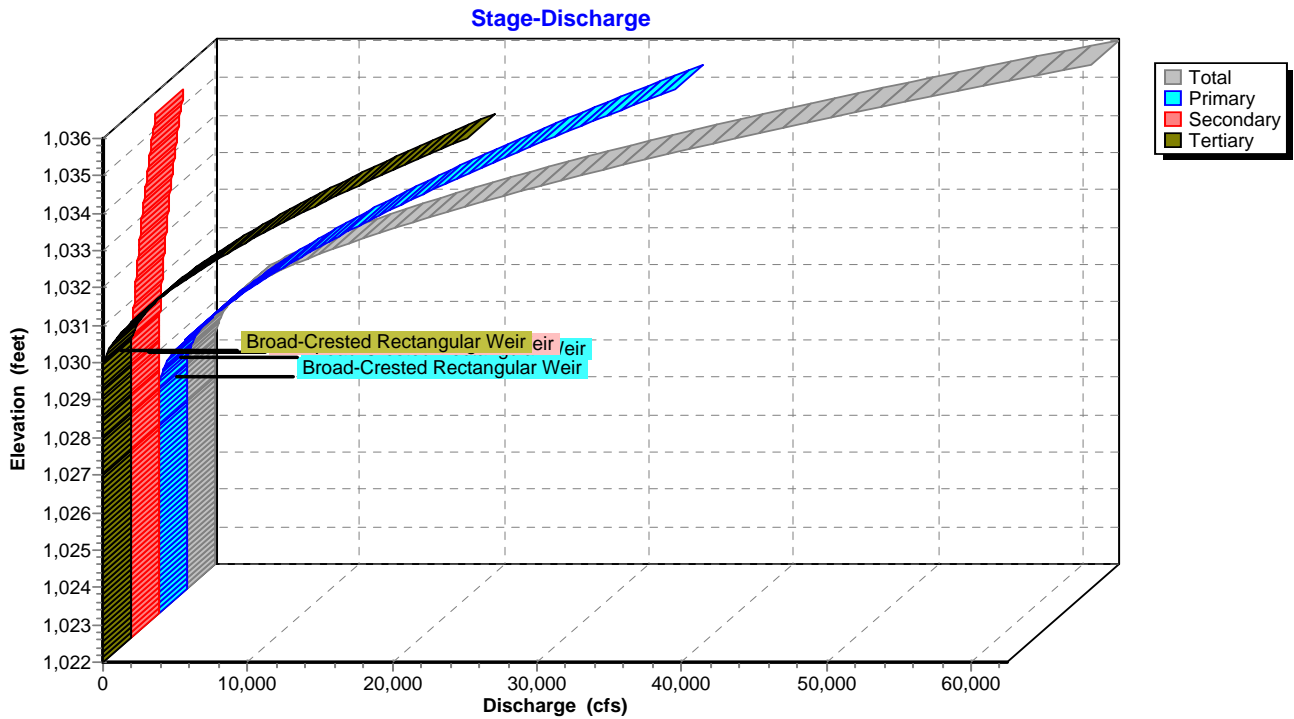
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

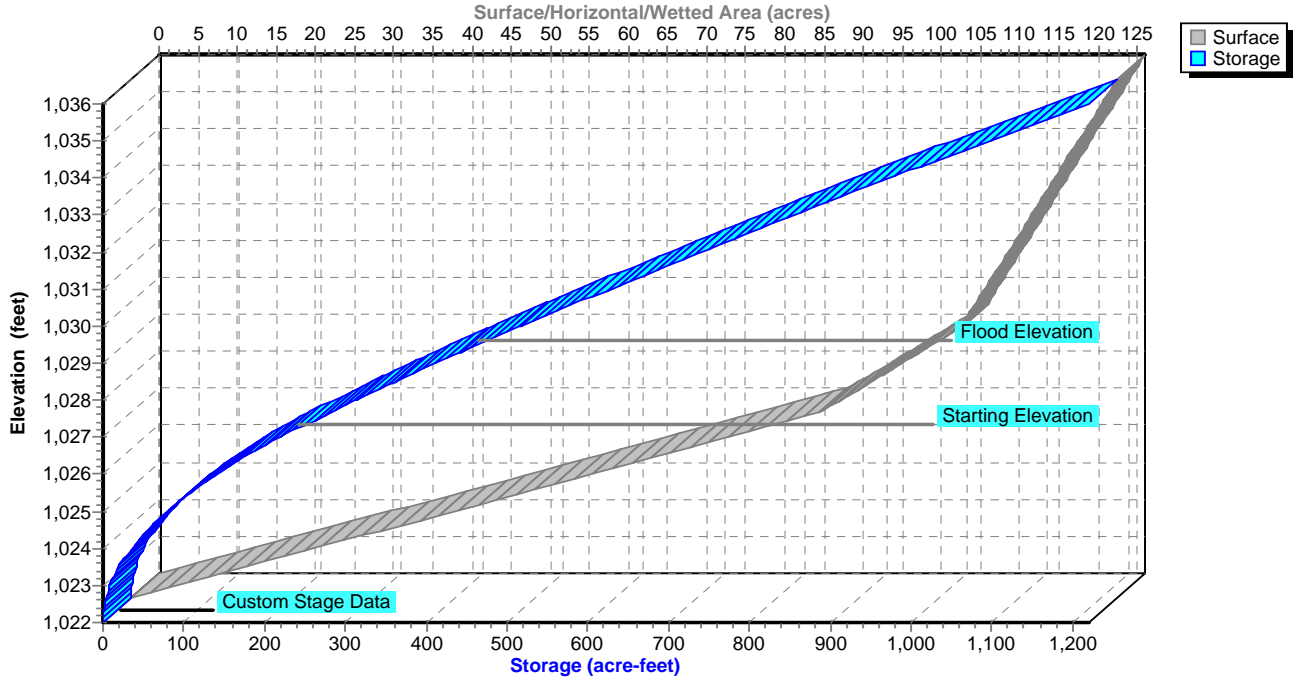


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

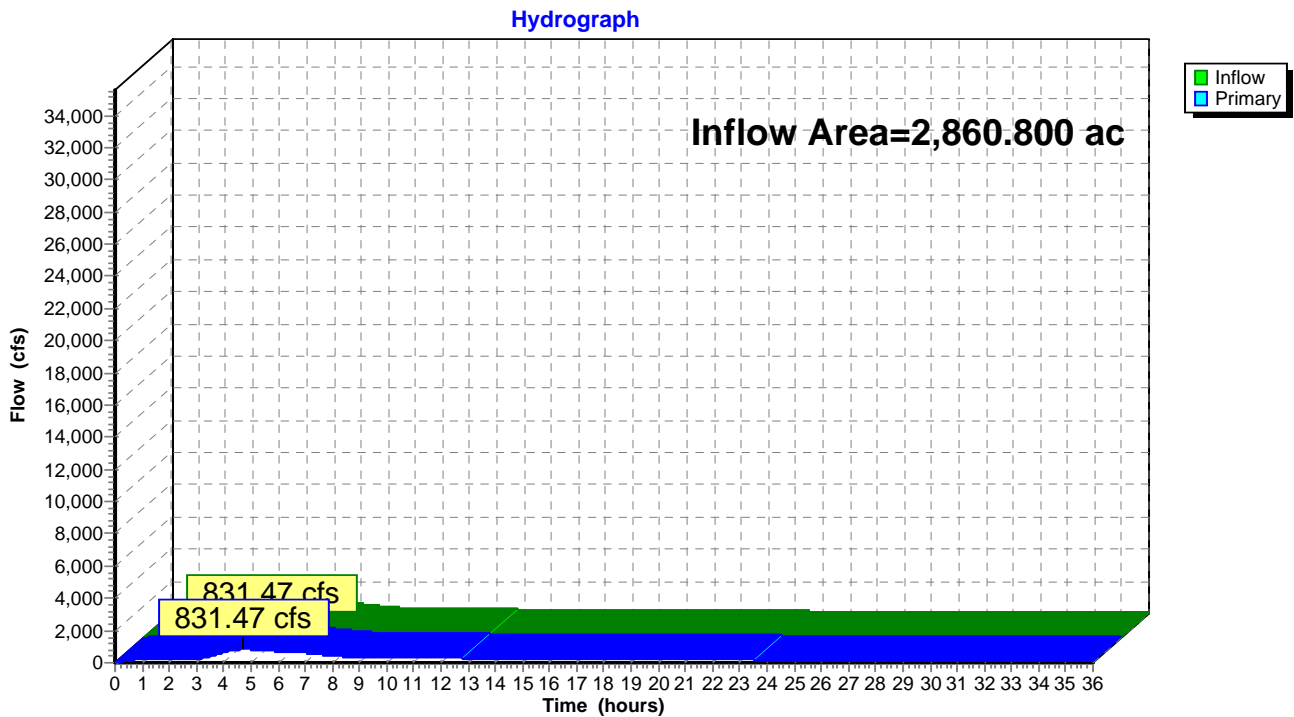


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.17" for 6-HR 0.2 PMF event
Inflow = 831.47 cfs @ 4.70 hrs, Volume= 754.826 af
Primary = 831.47 cfs @ 4.71 hrs, Volume= 754.826 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.36" for 6-HR 0.2 PMF event
 Inflow = 2,661.69 cfs @ 6.56 hrs, Volume= 1,859.980 af
 Outflow = 2,499.46 cfs @ 7.18 hrs, Volume= 1,859.375 af, Atten= 6%, Lag= 37.1 min
 Primary = 2,499.46 cfs @ 7.18 hrs, Volume= 1,859.375 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 997.40' @ 7.18 hrs Surf.Area= 8.594 ac Storage= 83.072 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 12.7 min calculated for 1,859.375 af (100% of inflow)
 Center-of-Mass det. time= 12.3 min (760.8 - 748.6)

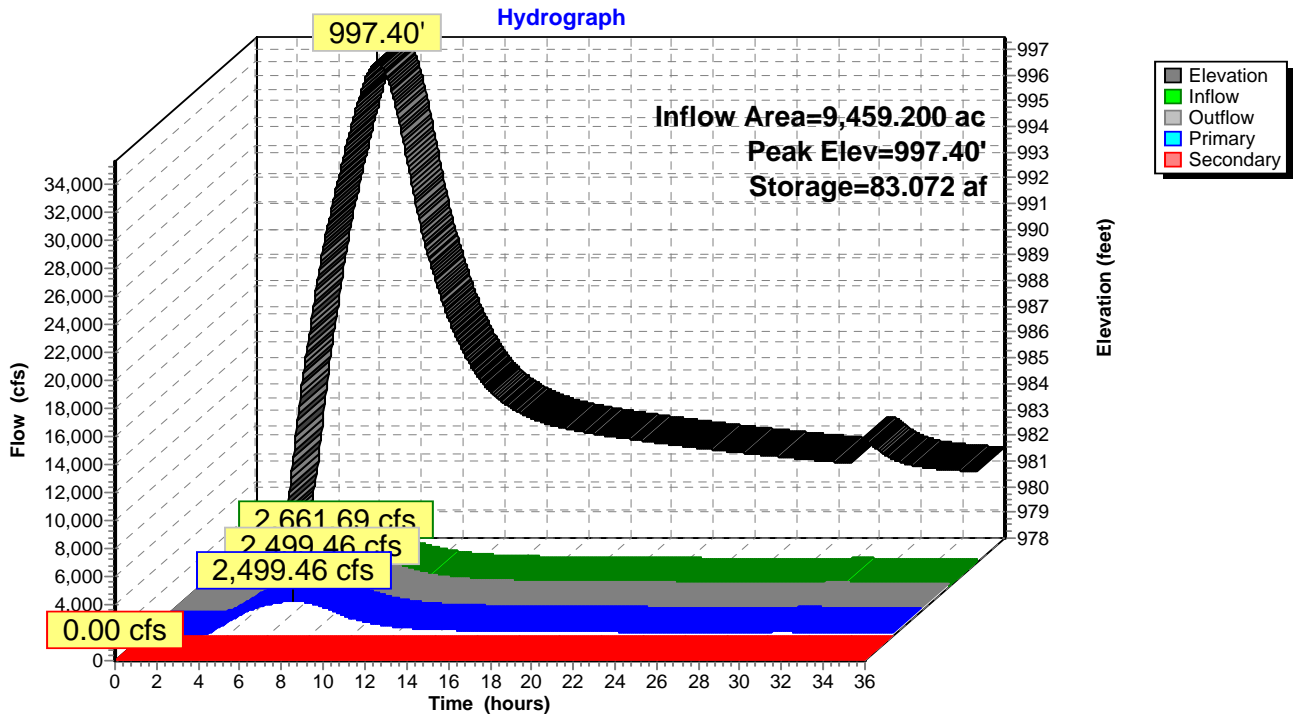
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/' Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

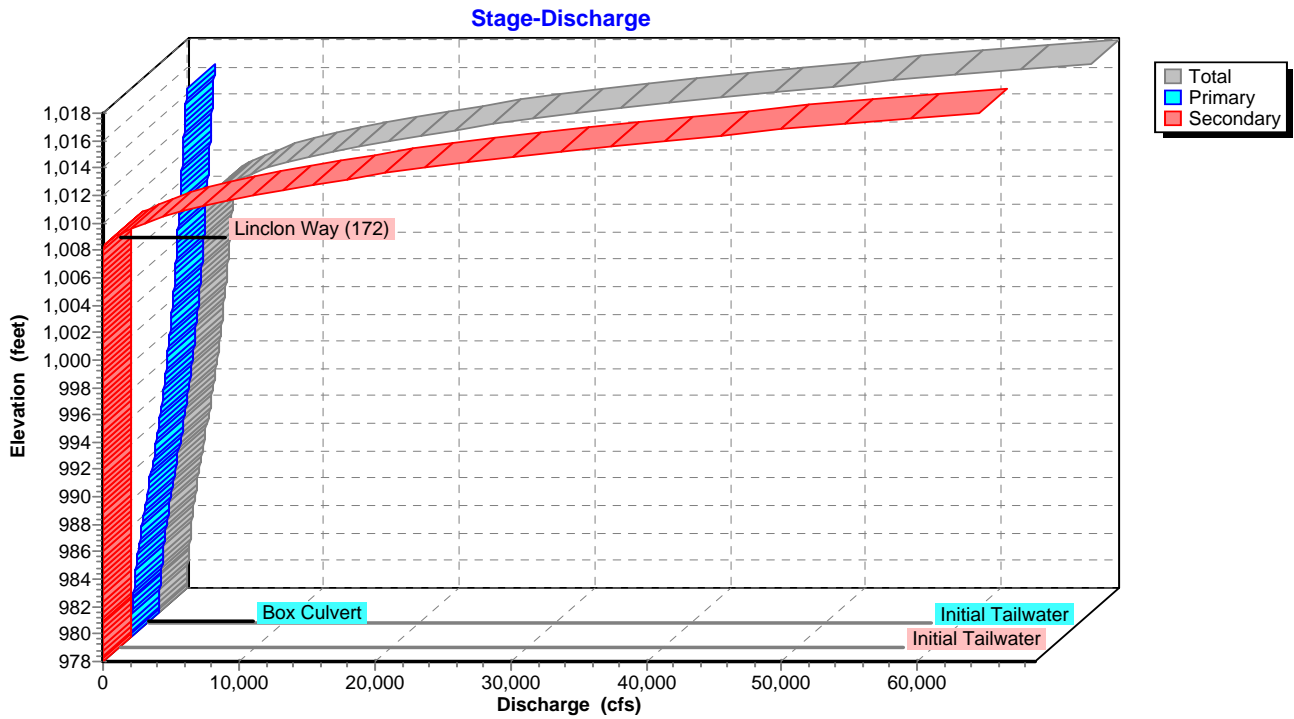
Primary OutFlow Max=2,499.45 cfs @ 7.18 hrs HW=997.40' TW=983.77' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,499.45 cfs @ 21.86 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

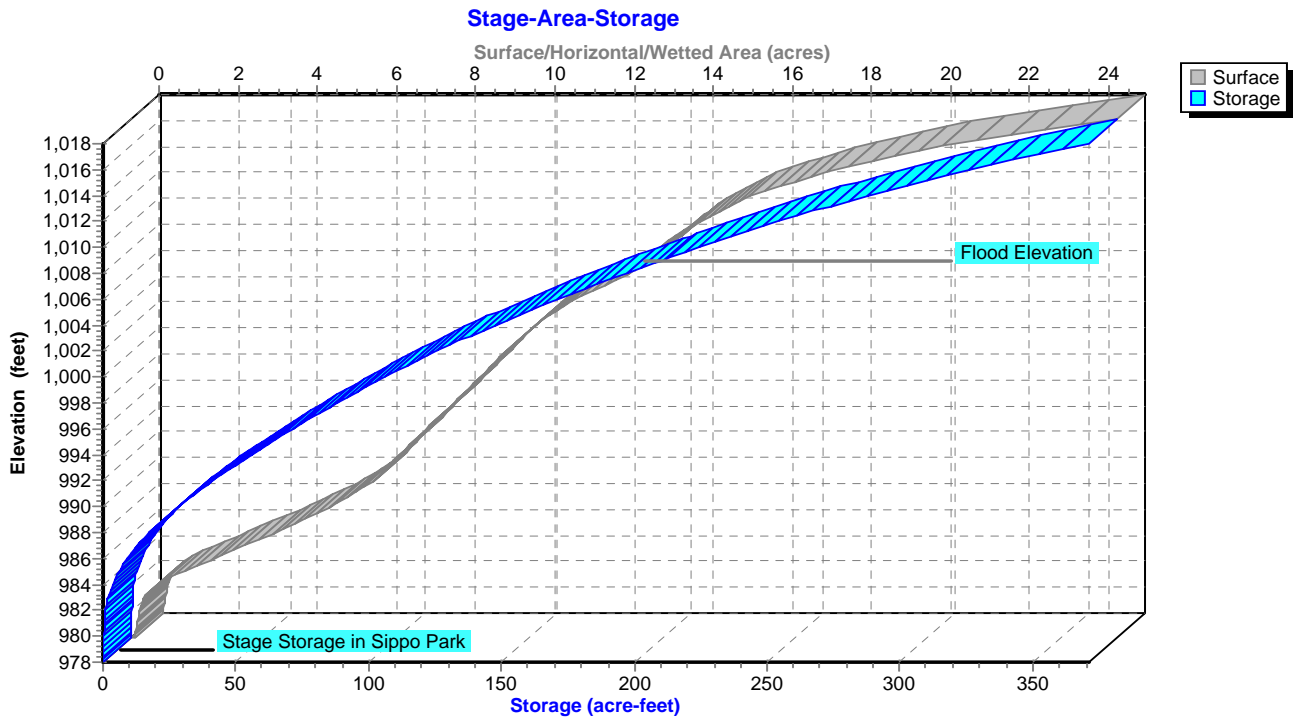
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

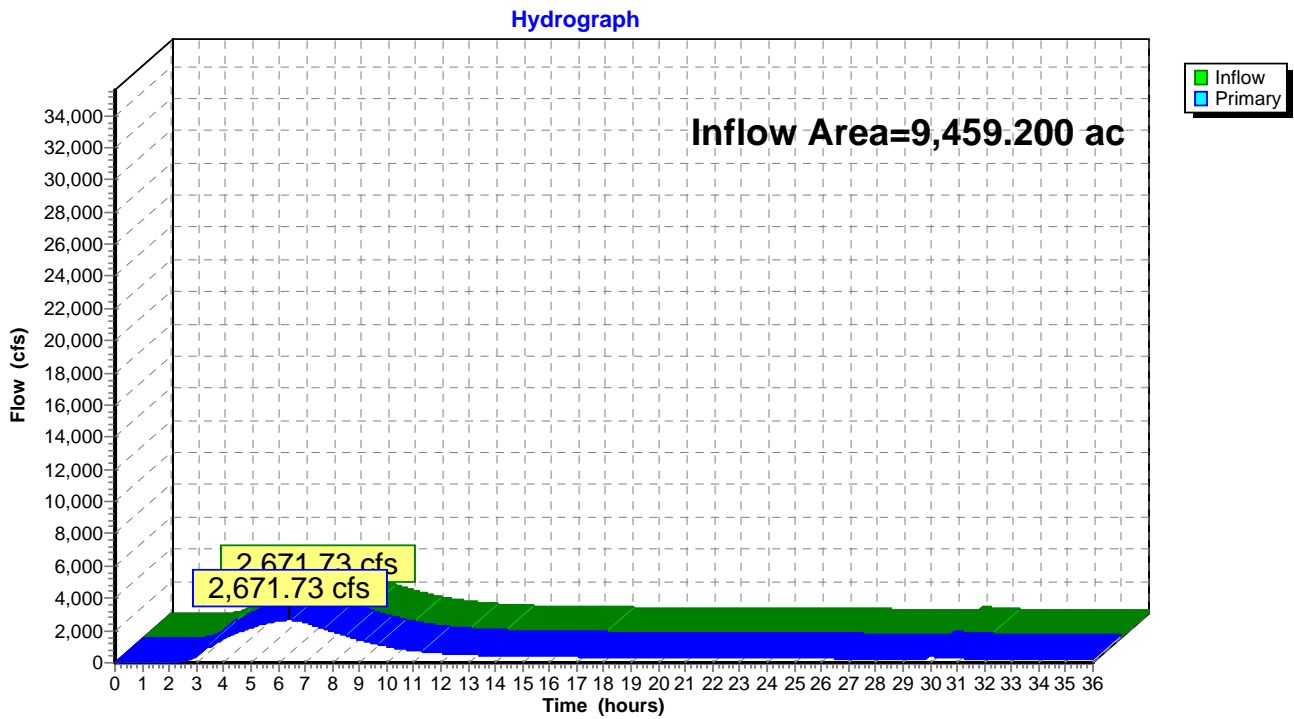


Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.37" for 6-HR 0.2 PMF event
Inflow = 2,671.73 cfs @ 6.41 hrs, Volume= 1,870.702 af
Primary = 2,671.73 cfs @ 6.42 hrs, Volume= 1,870.702 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=2.77"
 Tc=44.0 min CN=74 Runoff=145.29 cfs 26.584 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=2.86"
 Tc=65.0 min CN=75 Runoff=314.33 cfs 64.076 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.41"
 Tc=226.0 min CN=70 Runoff=739.79 cfs 281.989 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.24"
 Tc=128.0 min CN=68 Runoff=707.91 cfs 200.993 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.16"
 Tc=129.0 min CN=67 Runoff=487.01 cfs 139.348 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=2.77"
 Tc=110.0 min CN=74 Runoff=648.60 cfs 166.889 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=2.86"
 Tc=72.0 min CN=75 Runoff=829.17 cfs 175.447 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.33"
 Tc=78.0 min CN=80 Runoff=875.00 cfs 188.444 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.33"
 Tc=155.0 min CN=69 Runoff=661.66 cfs 207.367 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=2.86"
 Tc=156.0 min CN=75 Runoff=1,519.45 cfs 468.366 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.16"
 Tc=151.0 min CN=67 Runoff=377.91 cfs 117.467 af

Reach 5R: Channel 5 Avg. Flow Depth=2.91' Max Vel=5.85 fps Inflow=312.45 cfs 597.515 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=311.88 cfs 592.286 af

Reach 7R: Channel 7 Avg. Flow Depth=7.74' Max Vel=3.07 fps Inflow=896.03 cfs 793.081 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=849.13 cfs 784.598 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=3.02' Max Vel=2.54 fps Inflow=122.97 cfs 273.563 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=122.96 cfs 272.839 af

Reach 15R: Channel 15 Avg. Flow Depth=8.18' Max Vel=2.09 fps Inflow=2,357.23 cfs 1,520.997 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,002.22 cfs 1,490.151 af

Reach 16R: Channel 16 Avg. Flow Depth=10.06' Max Vel=2.49 fps Inflow=2,686.65 cfs 1,832.129 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=2,605.14 cfs 1,810.509 af

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 189

Reach 18R: Sippo Creek Avg. Flow Depth=5.78' Max Vel=9.49 fps Inflow=2,680.30 cfs 1,986.915 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,680.30 cfs 1,986.796 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=354.58 cfs 90.553 af
Primary=354.58 cfs 90.553 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,007.05' Storage=124.055 af Inflow=2,906.45 cfs 1,998.588 af
2,085.96 cfs 1,753.004 af Secondary=810.45 cfs 234.917 af Tertiary=0.00 cfs 0.000 af Outflow=2,896.41 cfs 1,987.921 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=881.11 cfs 372.072 af
Primary=881.11 cfs 372.072 af

Pond 3P: Lake Cable Peak Elev=1,097.94' Storage=2,037.321 af Inflow=881.11 cfs 372.071 af
Primary=312.45 cfs 597.614 af Secondary=0.00 cfs 0.000 af Outflow=312.45 cfs 597.614 af

Pond 4C: Confluence 4 Inflow=1,510.05 cfs 991.866 af
Primary=1,510.05 cfs 991.866 af

Pond 4P: Lake O'Springs Peak Elev=1,107.69' Storage=71.540 af Inflow=354.58 cfs 90.552 af
Primary=142.90 cfs 90.084 af Secondary=0.00 cfs 0.000 af Outflow=142.90 cfs 90.084 af

Pond 5C: Confluence 5 Inflow=1,973.41 cfs 1,131.114 af
Primary=1,973.41 cfs 1,131.114 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,119.71' Storage=26.284 af Inflow=145.29 cfs 26.584 af
Primary=60.63 cfs 26.476 af Secondary=0.00 cfs 0.000 af Outflow=60.63 cfs 26.476 af

Pond 6C: Confluence 6 Inflow=402.54 cfs 390.231 af
Primary=402.54 cfs 390.231 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,357.23 cfs 1,521.171 af
Primary=2,357.23 cfs 1,521.171 af

Pond 8C: Confluence 8 Inflow=2,686.65 cfs 1,832.308 af
Primary=2,686.65 cfs 1,832.308 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,024.86' Storage=291.935 af Inflow=1,166.04 cfs 375.539 af
Primary=122.97 cfs 273.638 af Secondary=0.00 cfs 0.000 af Outflow=122.97 cfs 273.638 af

Pond 9P: Sippo Lake Peak Elev=1,029.03' Storage=414.624 af Inflow=1,519.45 cfs 468.366 af
Primary=1,166.04 cfs 375.540 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,166.04 cfs 375.540 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=896.03 cfs 793.180 af
Primary=896.03 cfs 793.180 af

Pond 16P: Lincoln Way Box Peak Elev=999.48' Storage=101.598 af Inflow=2,896.41 cfs 1,987.736 af
Primary=2,680.30 cfs 1,987.099 af Secondary=0.00 cfs 0.000 af Outflow=2,680.30 cfs 1,987.099 af

Pond 19C: Confluence 19 Inflow=2,906.45 cfs 1,998.771 af
Primary=2,906.45 cfs 1,998.771 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 2,036.970 af Average Runoff Depth = 2.58"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 145.29 cfs @ 3.37 hrs, Volume= 26.584 af, Depth= 2.77"

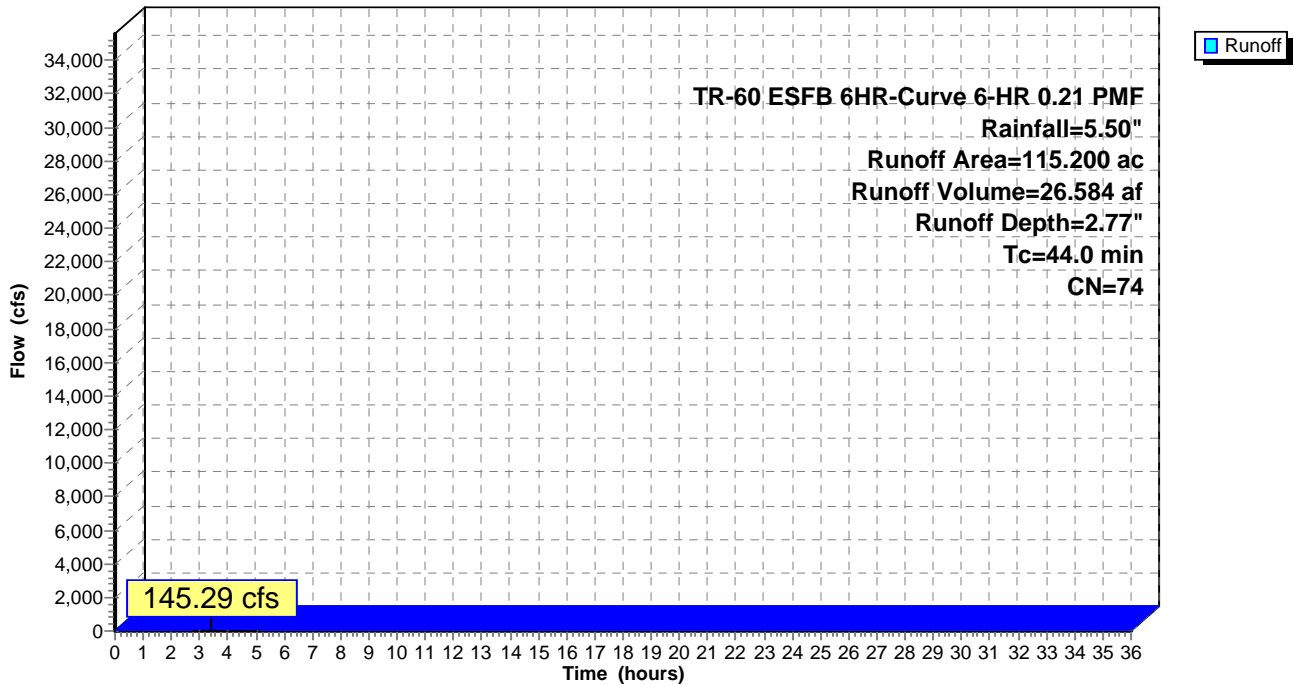
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 314.33 cfs @ 3.68 hrs, Volume= 64.076 af, Depth= 2.86"

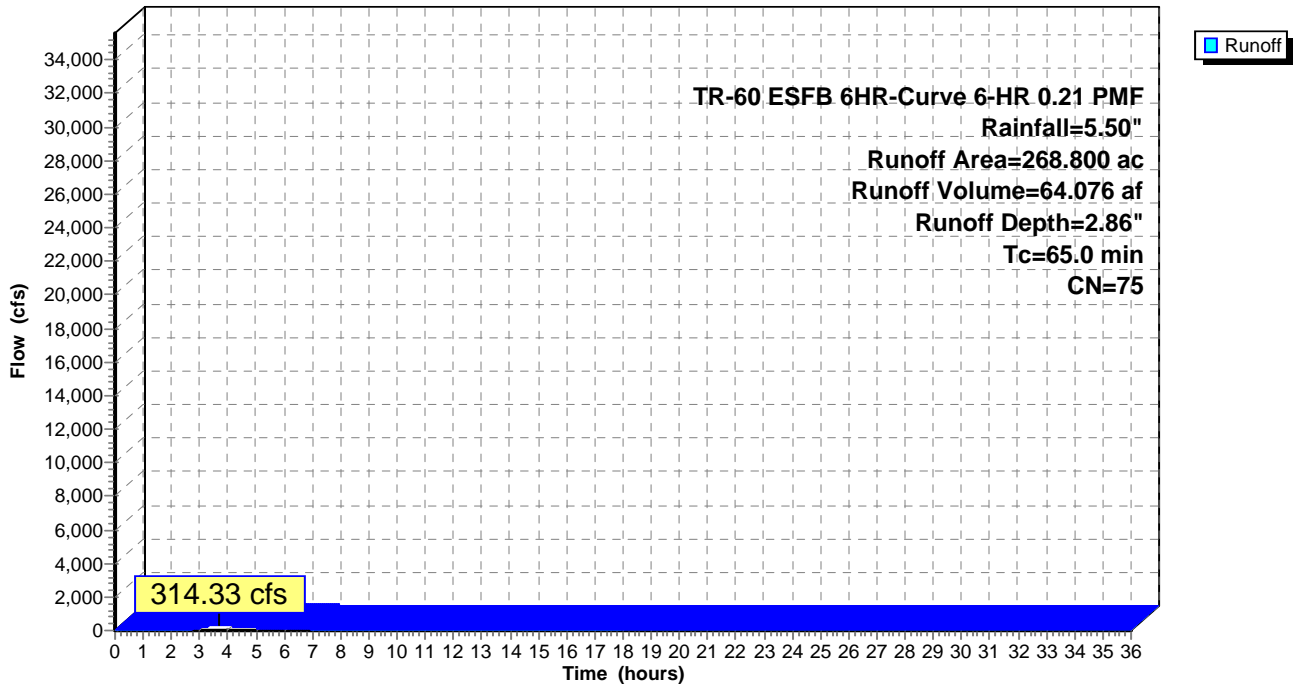
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 739.79 cfs @ 6.28 hrs, Volume= 281.989 af, Depth= 2.41"

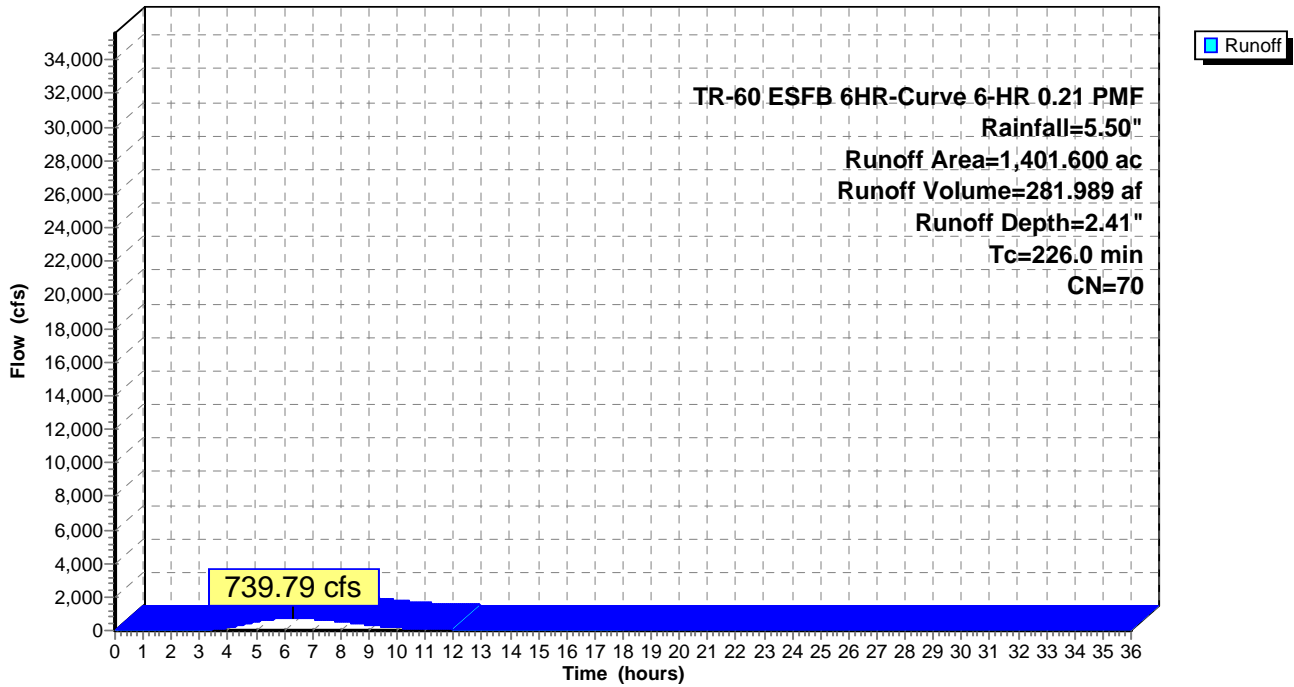
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 707.91 cfs @ 4.69 hrs, Volume= 200.993 af, Depth= 2.24"

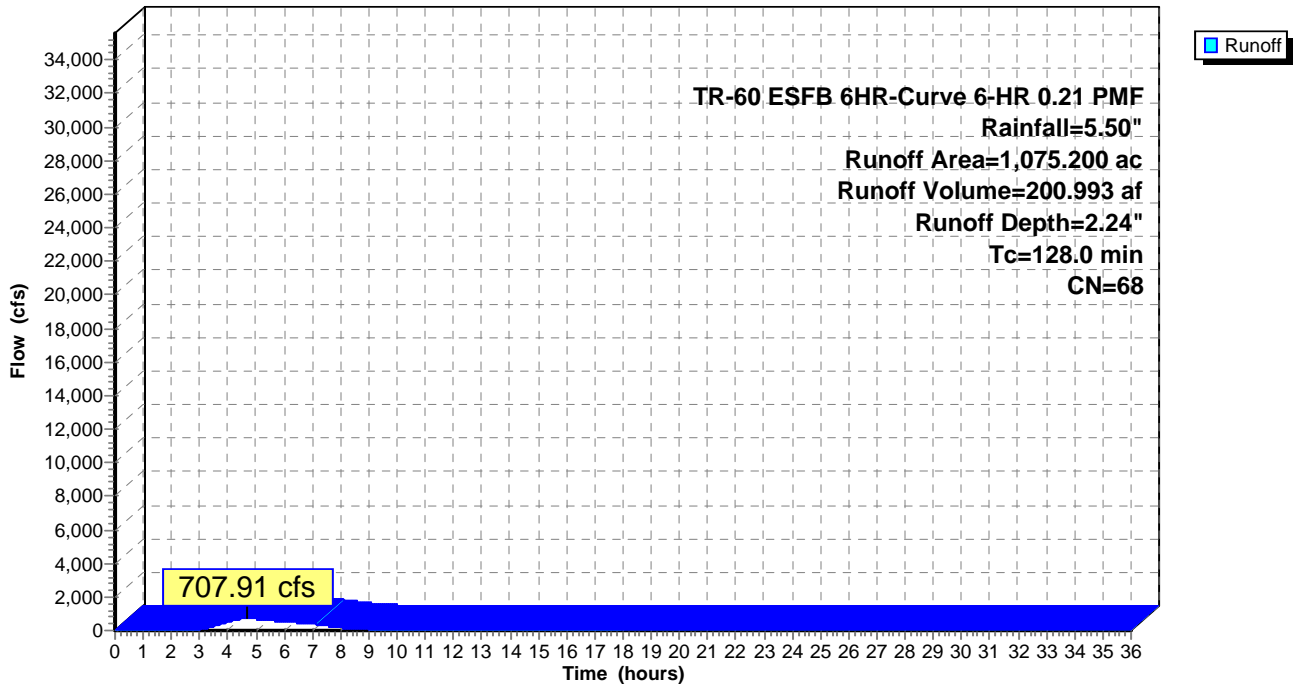
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 487.01 cfs @ 4.73 hrs, Volume= 139.348 af, Depth= 2.16"

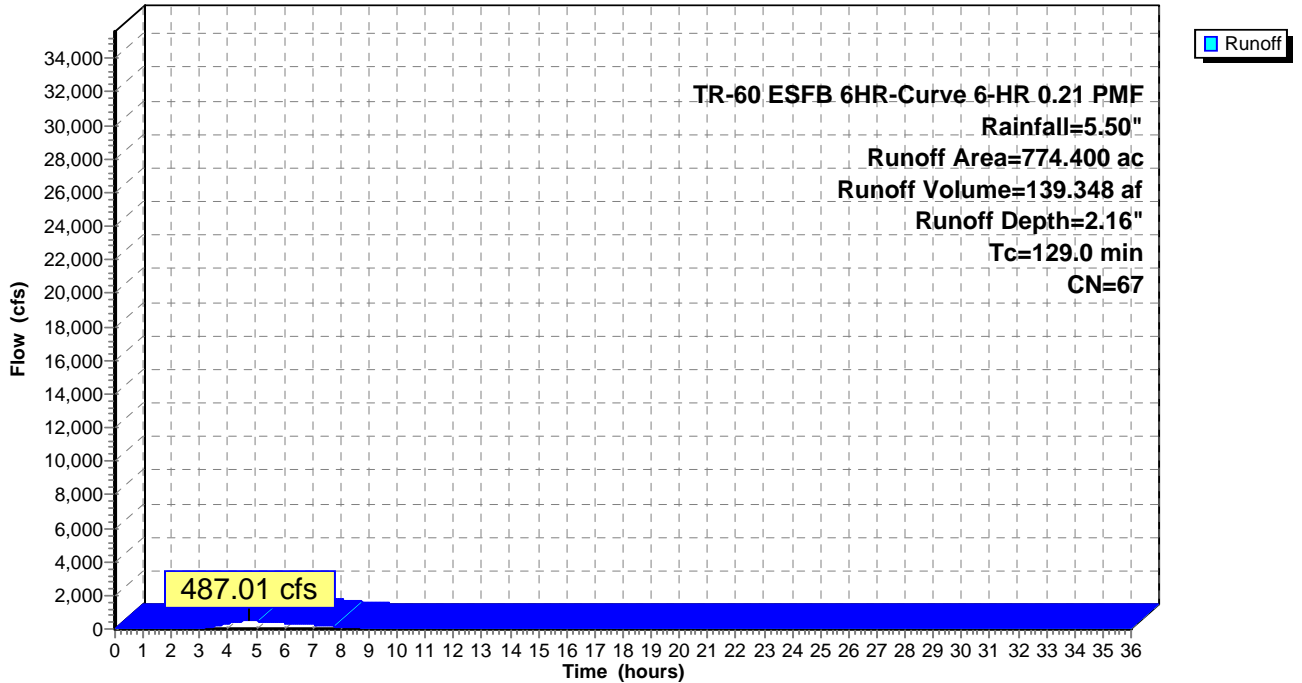
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 648.60 cfs @ 4.28 hrs, Volume= 166.889 af, Depth= 2.77"

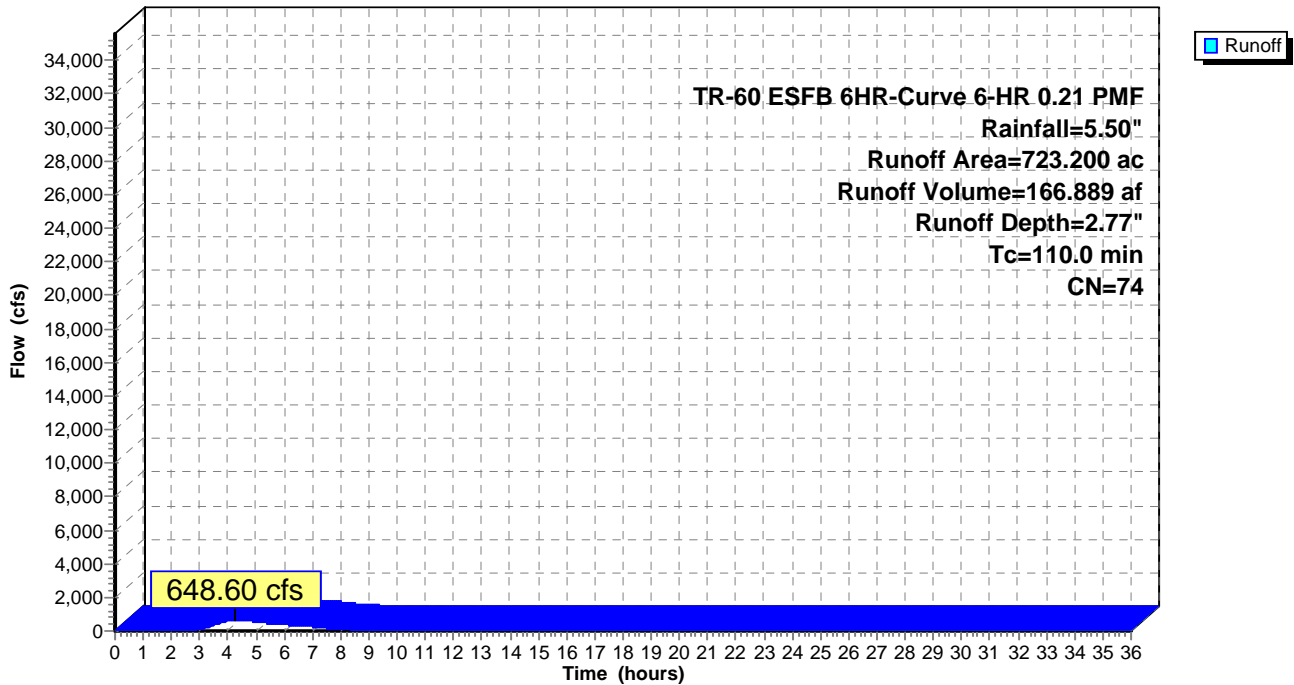
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 829.17 cfs @ 3.76 hrs, Volume= 175.447 af, Depth= 2.86"

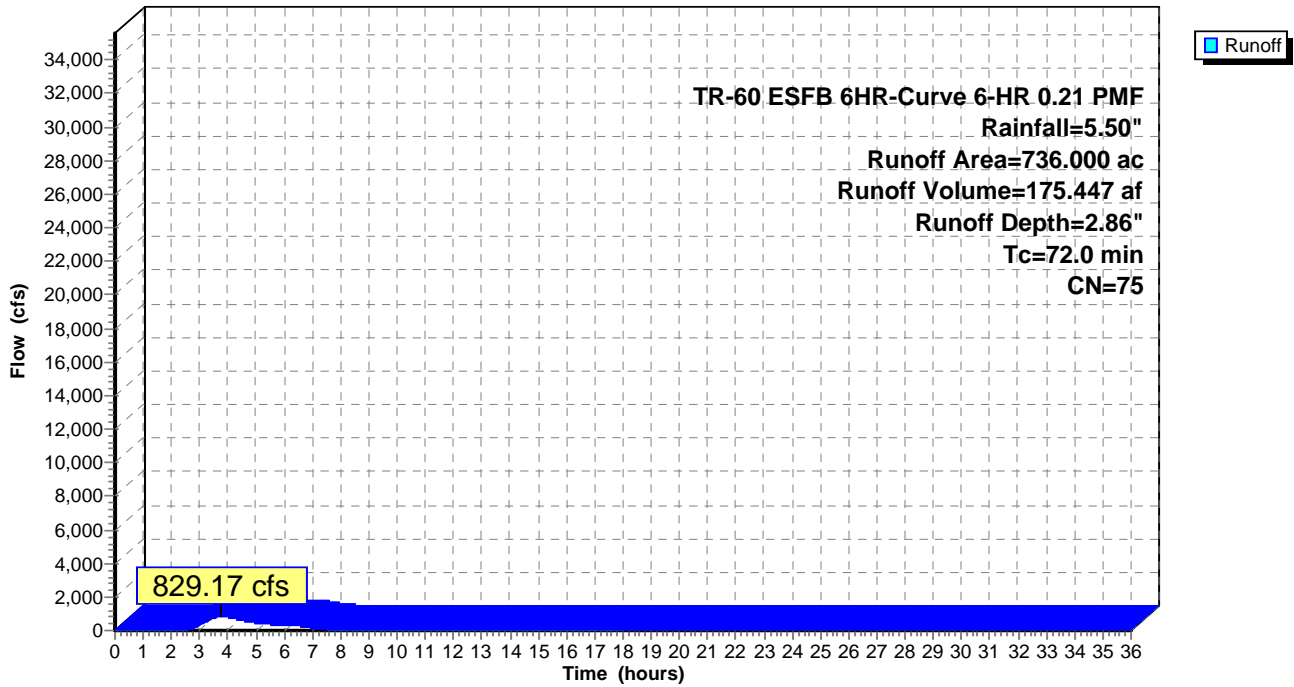
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 875.00 cfs @ 3.81 hrs, Volume= 188.444 af, Depth= 3.33"

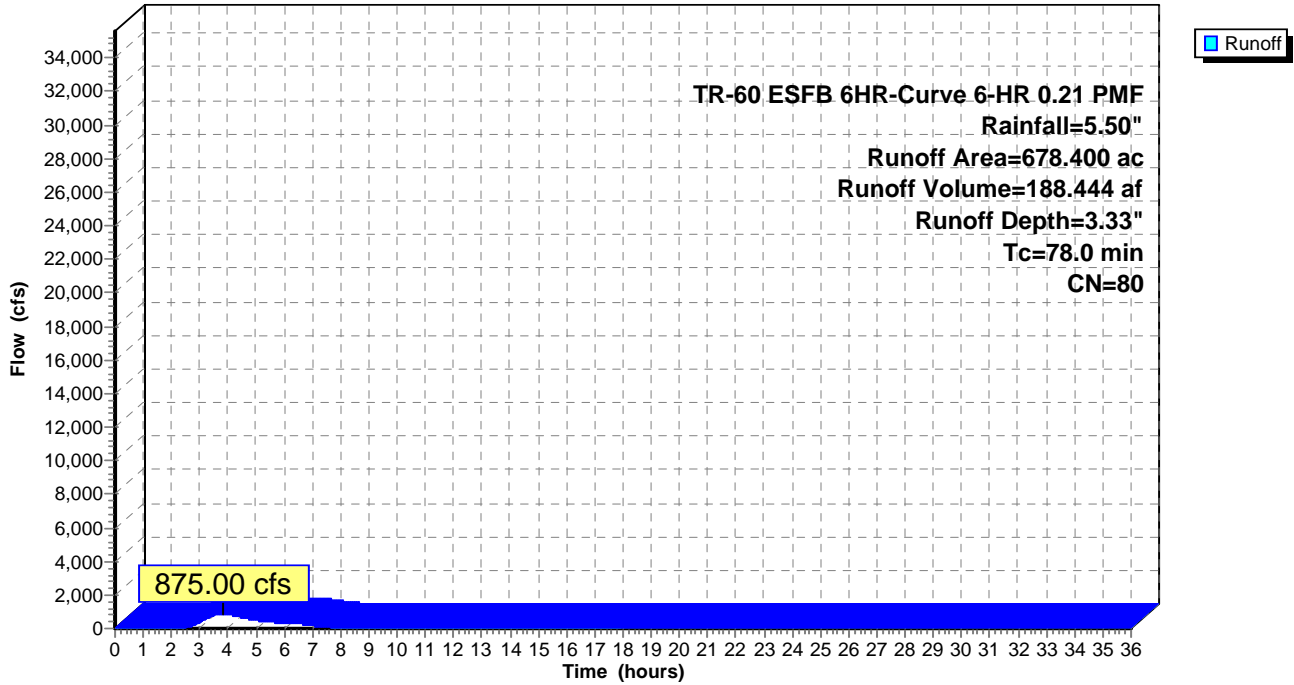
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 661.66 cfs @ 5.16 hrs, Volume= 207.367 af, Depth= 2.33"

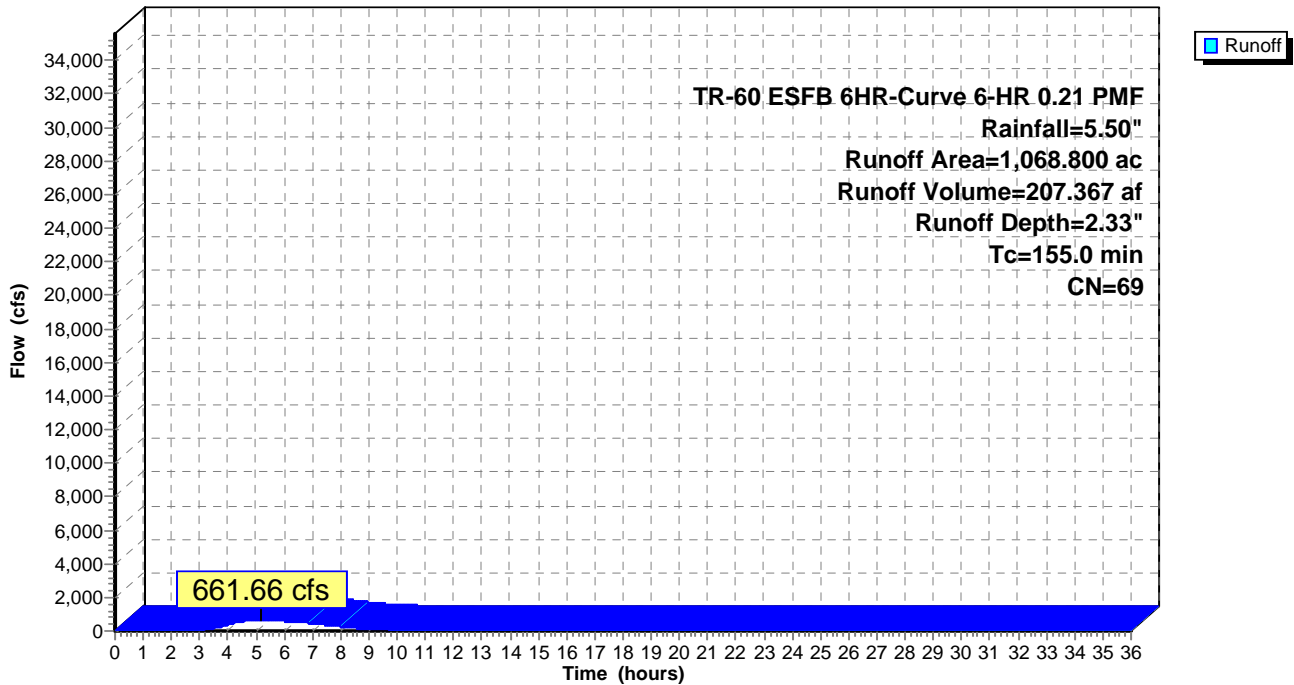
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,519.45 cfs @ 5.03 hrs, Volume= 468.366 af, Depth= 2.86"

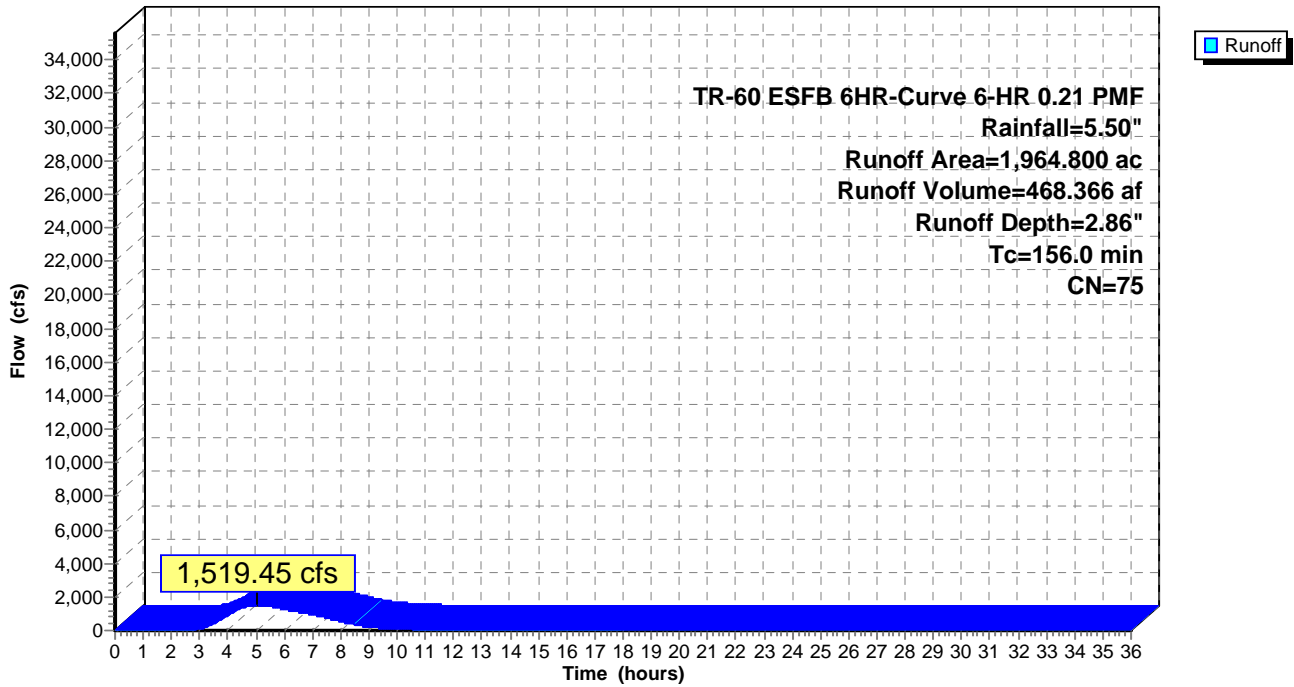
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 377.91 cfs @ 5.20 hrs, Volume= 117.467 af, Depth= 2.16"

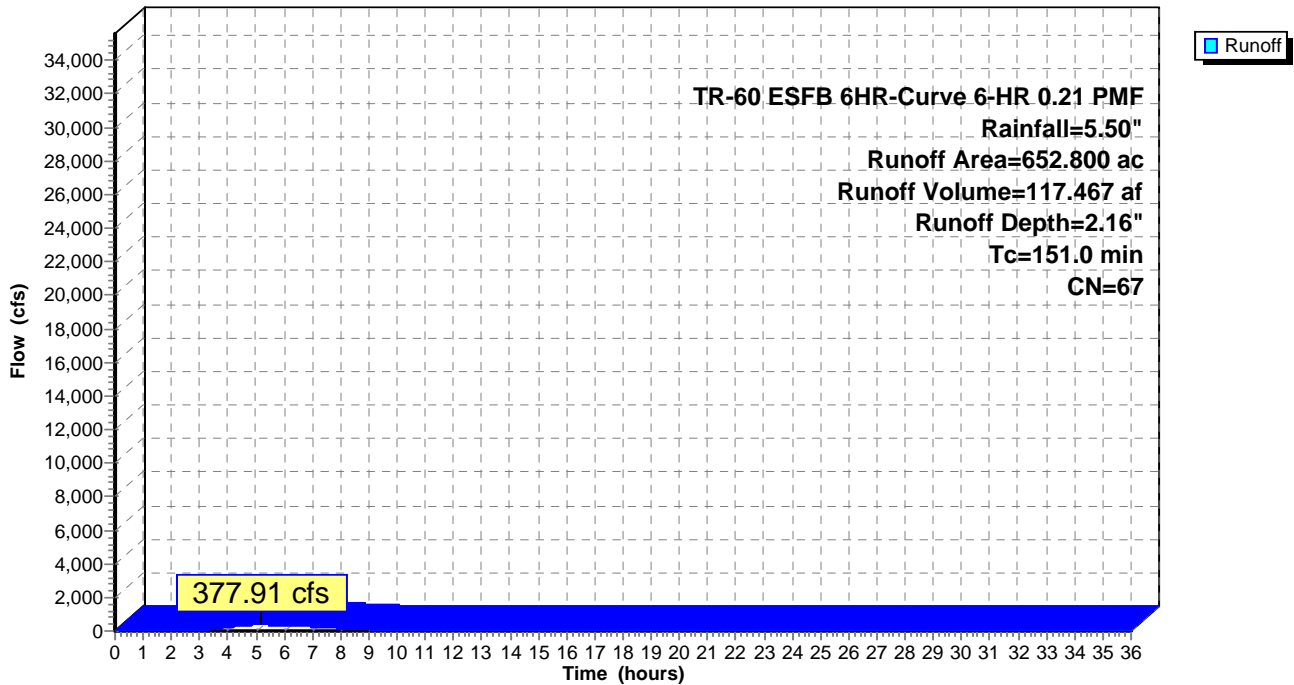
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.21 PMF Rainfall=5.50"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



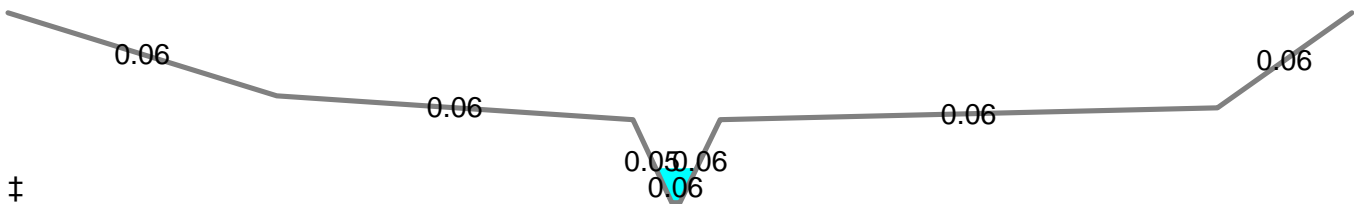
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.02" for 6-HR 0.21 PMF event
 Inflow = 312.45 cfs @ 9.60 hrs, Volume= 597.515 af
 Outflow = 311.88 cfs @ 9.94 hrs, Volume= 592.286 af, Atten= 0%, Lag= 20.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.85 fps, Min. Travel Time= 25.1 min
 Avg. Velocity = 5.15 fps, Avg. Travel Time= 28.5 min

Peak Storage= 469,006 cf @ 9.94 hrs
 Average Depth at Peak Storage= 2.91'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

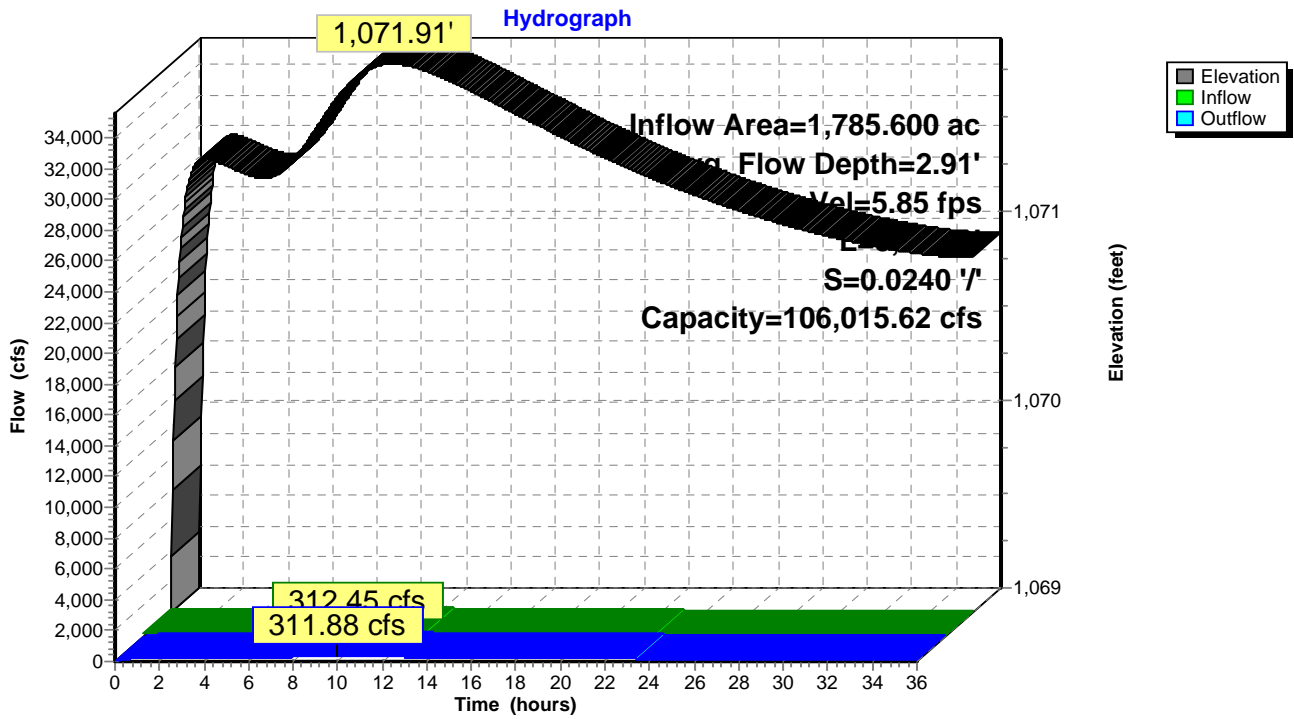
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



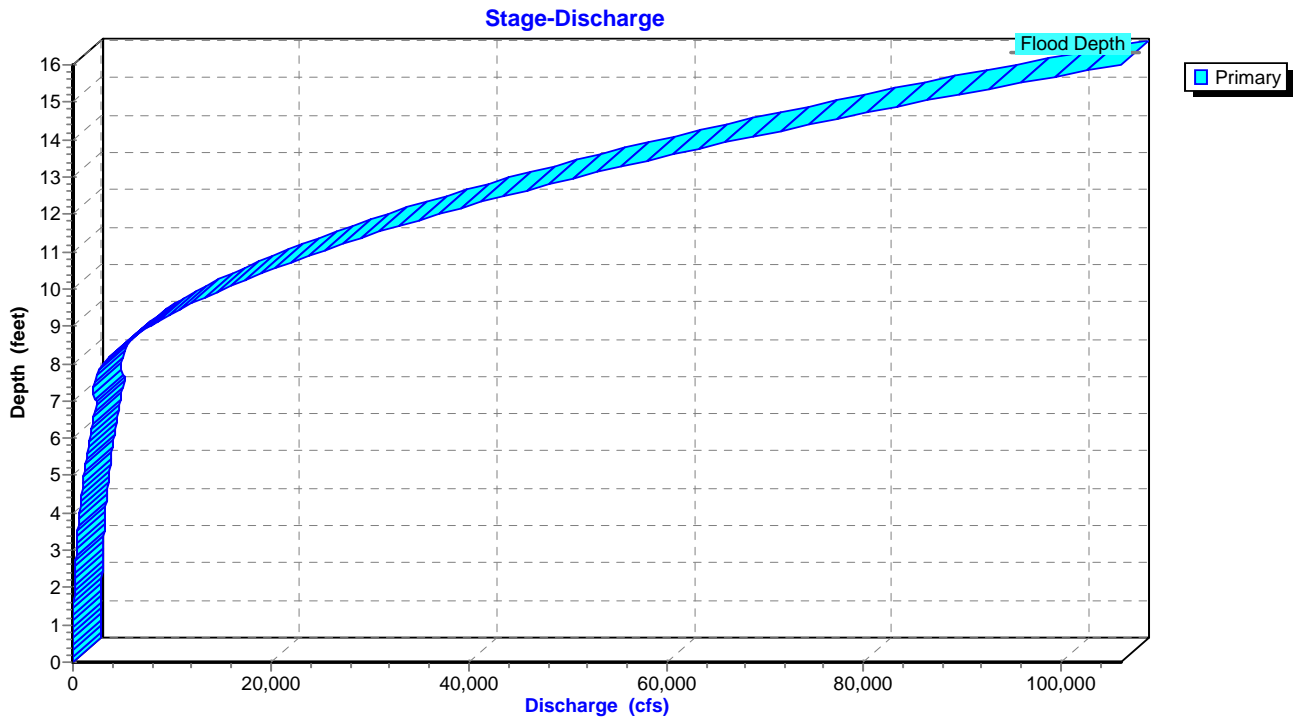
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

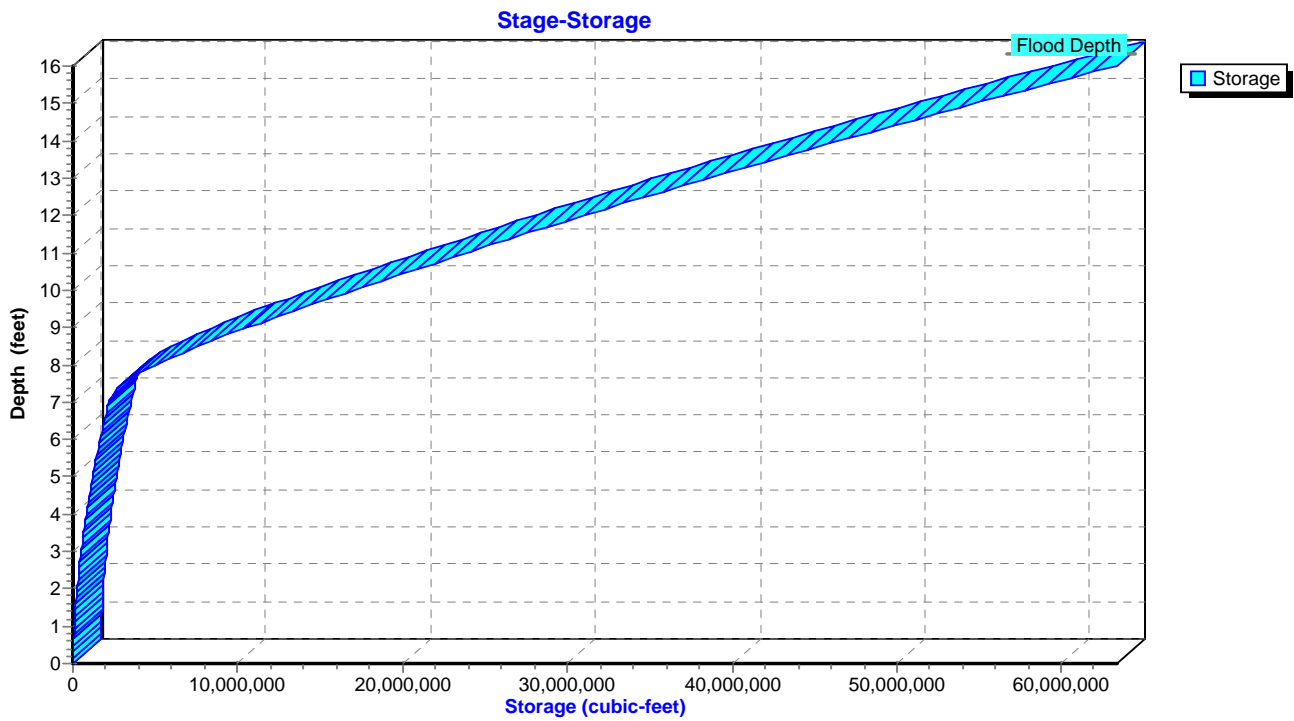
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



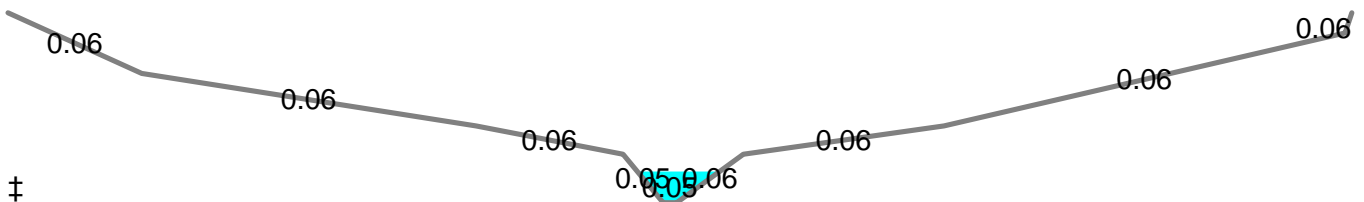
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.33" for 6-HR 0.21 PMF event
 Inflow = 896.03 cfs @ 4.71 hrs, Volume= 793.081 af
 Outflow = 849.13 cfs @ 5.23 hrs, Volume= 784.598 af, Atten= 5%, Lag= 31.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.07 fps, Min. Travel Time= 32.1 min
 Avg. Velocity = 2.22 fps, Avg. Travel Time= 44.3 min

Peak Storage= 1,635,462 cf @ 5.23 hrs
 Average Depth at Peak Storage= 7.74'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

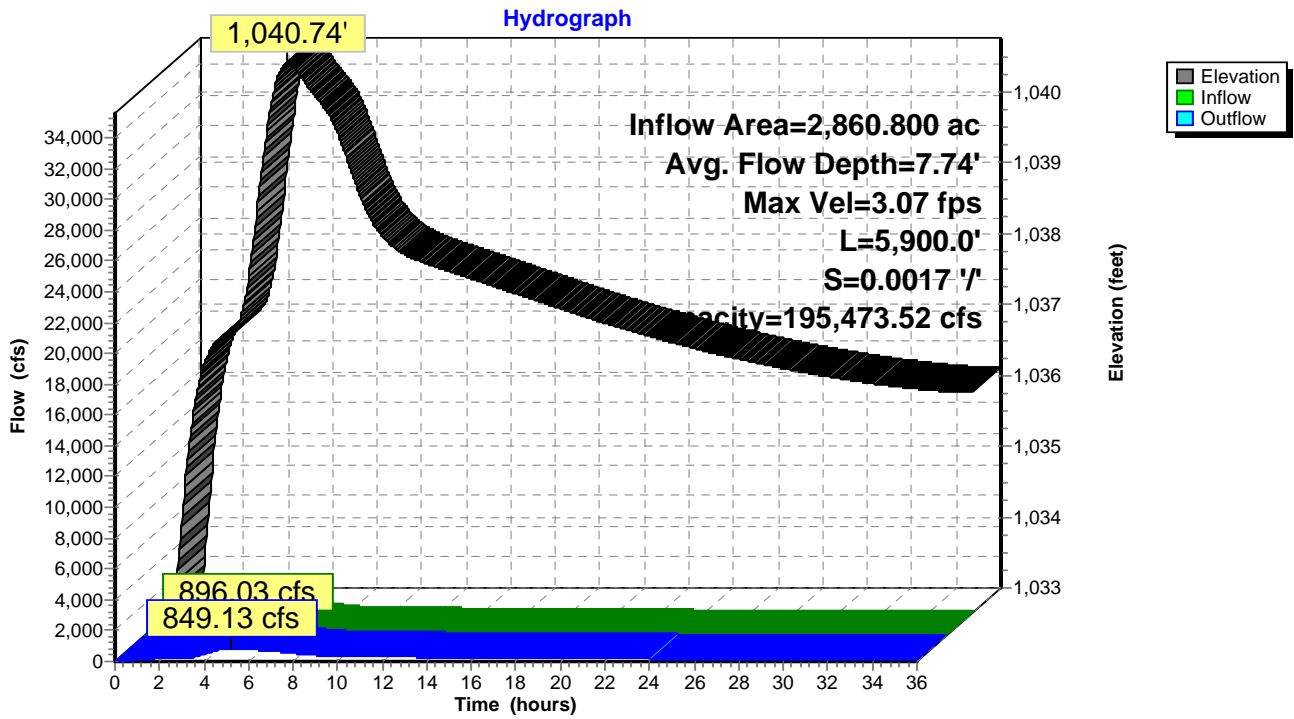
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



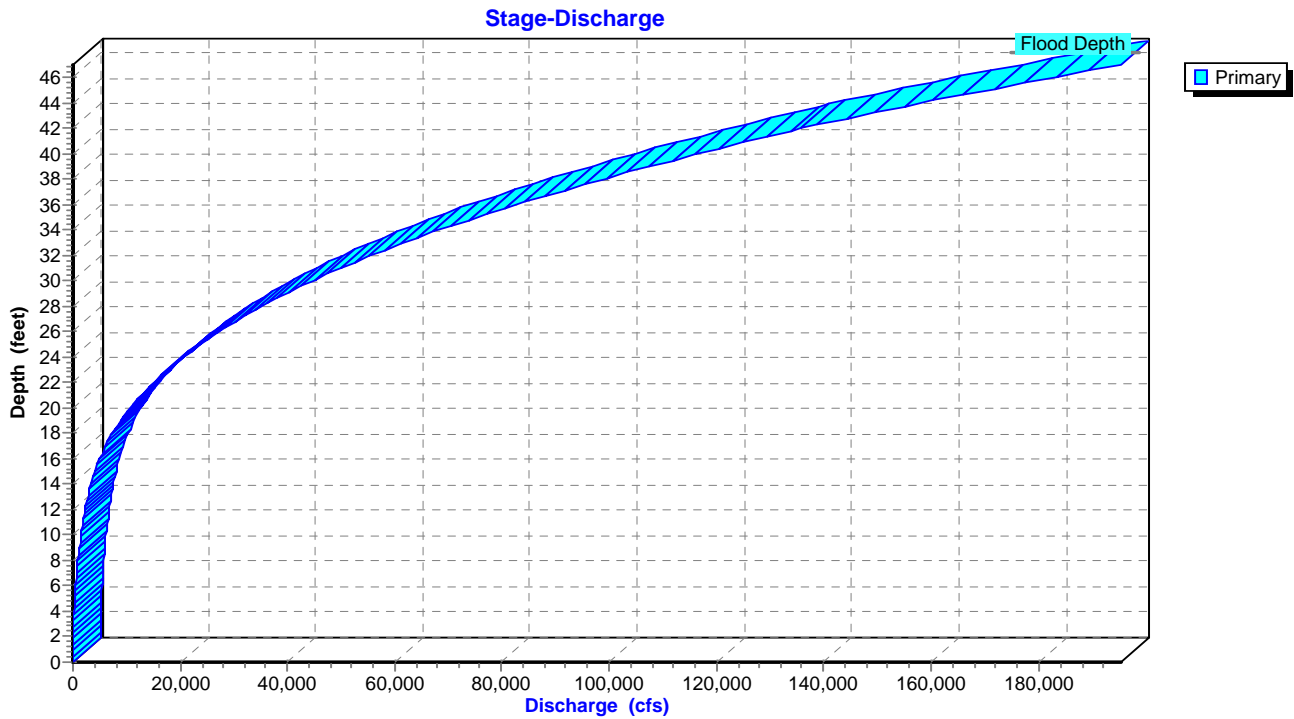
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

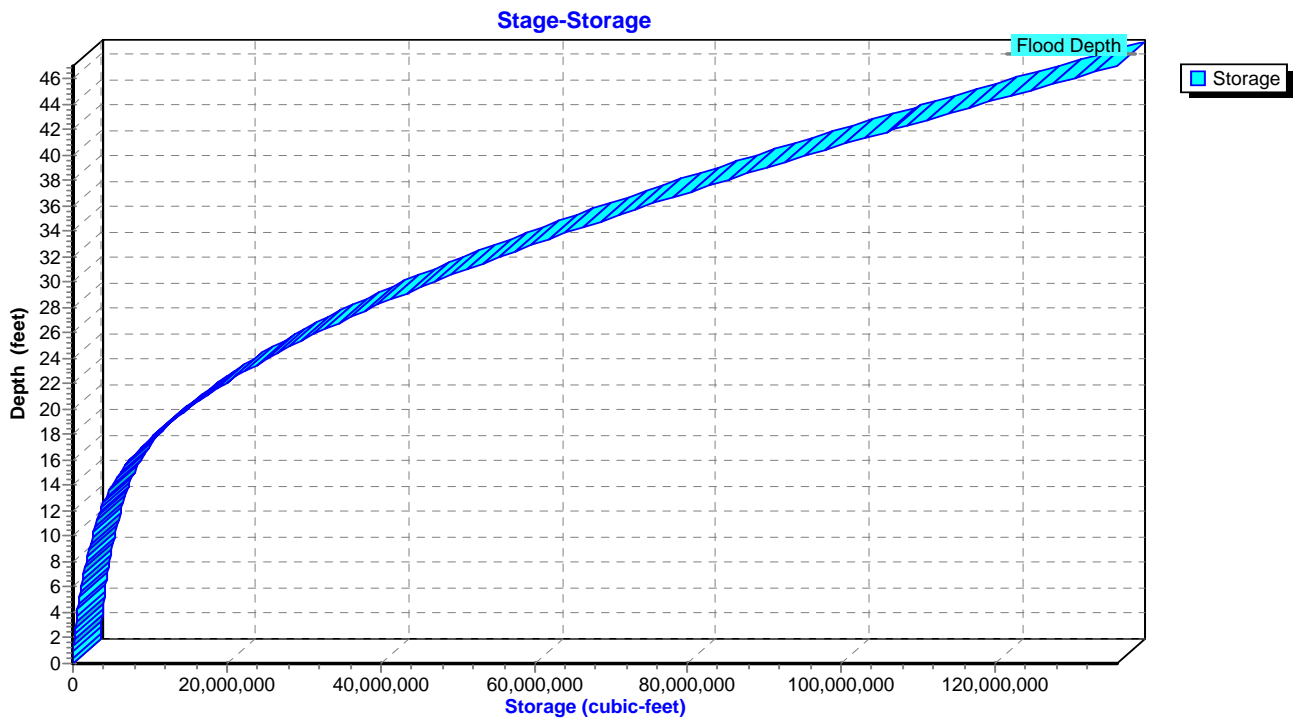
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



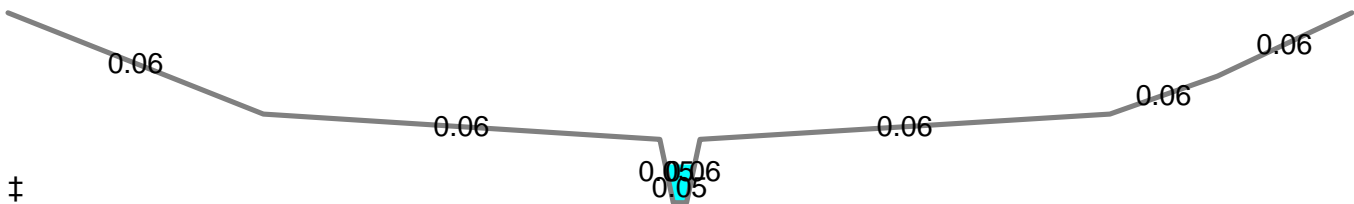
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.67" for 6-HR 0.21 PMF event
 Inflow = 122.97 cfs @ 11.58 hrs, Volume= 273.563 af
 Outflow = 122.96 cfs @ 11.65 hrs, Volume= 272.839 af, Atten= 0%, Lag= 4.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.54 fps, Min. Travel Time= 5.9 min
 Avg. Velocity = 2.41 fps, Avg. Travel Time= 6.2 min

Peak Storage= 43,508 cf @ 11.65 hrs
 Average Depth at Peak Storage= 3.02'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

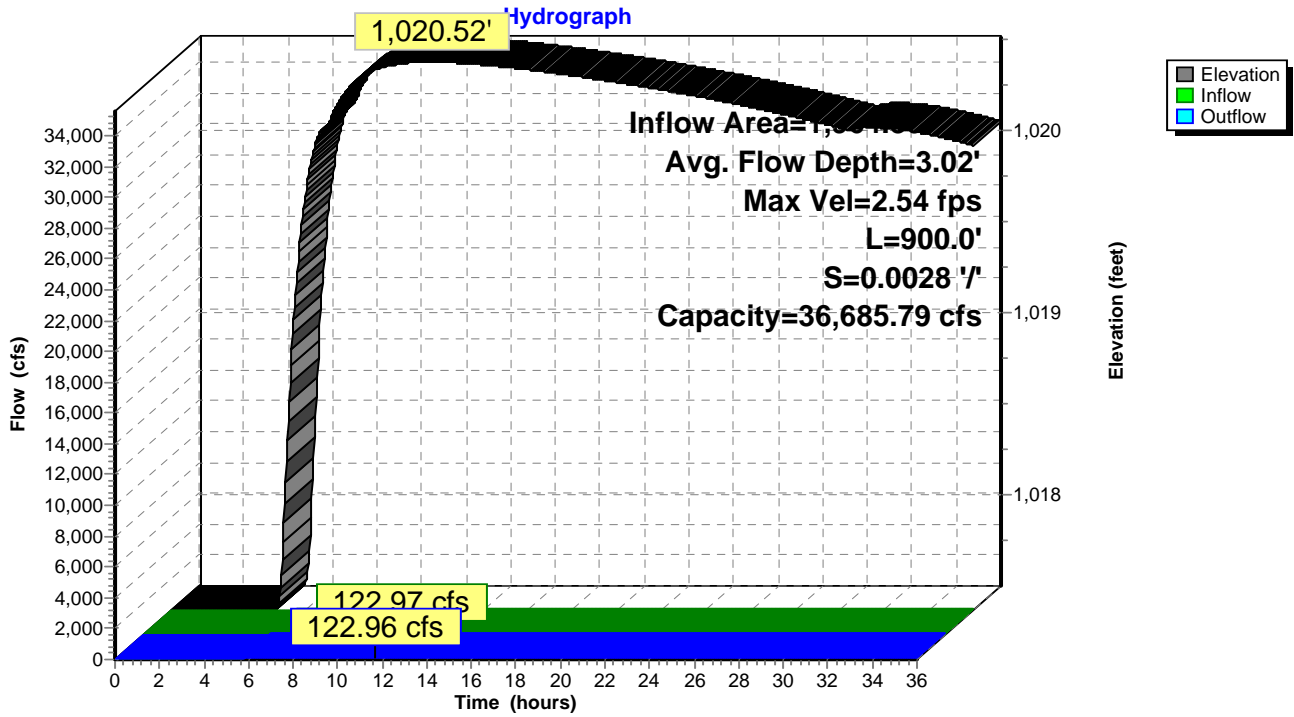
Custom cross-section, Length= 900.0' Slope= 0.0028 '/ (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



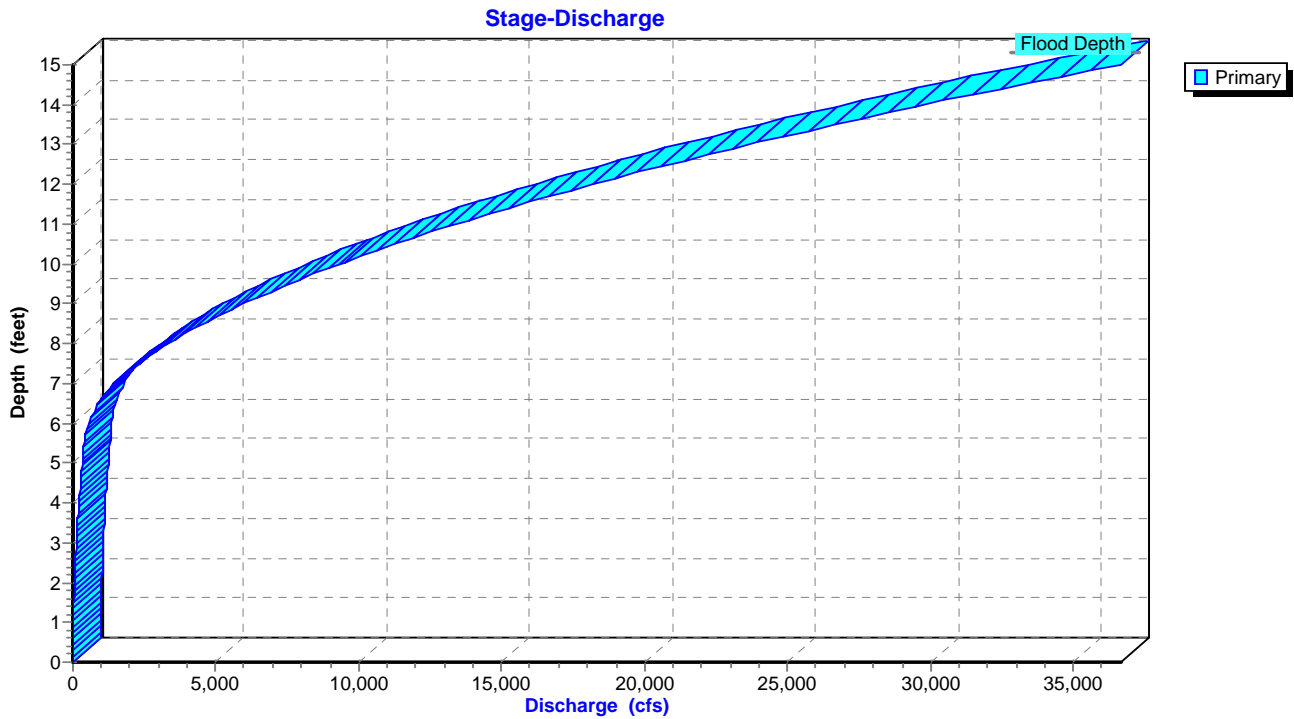
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

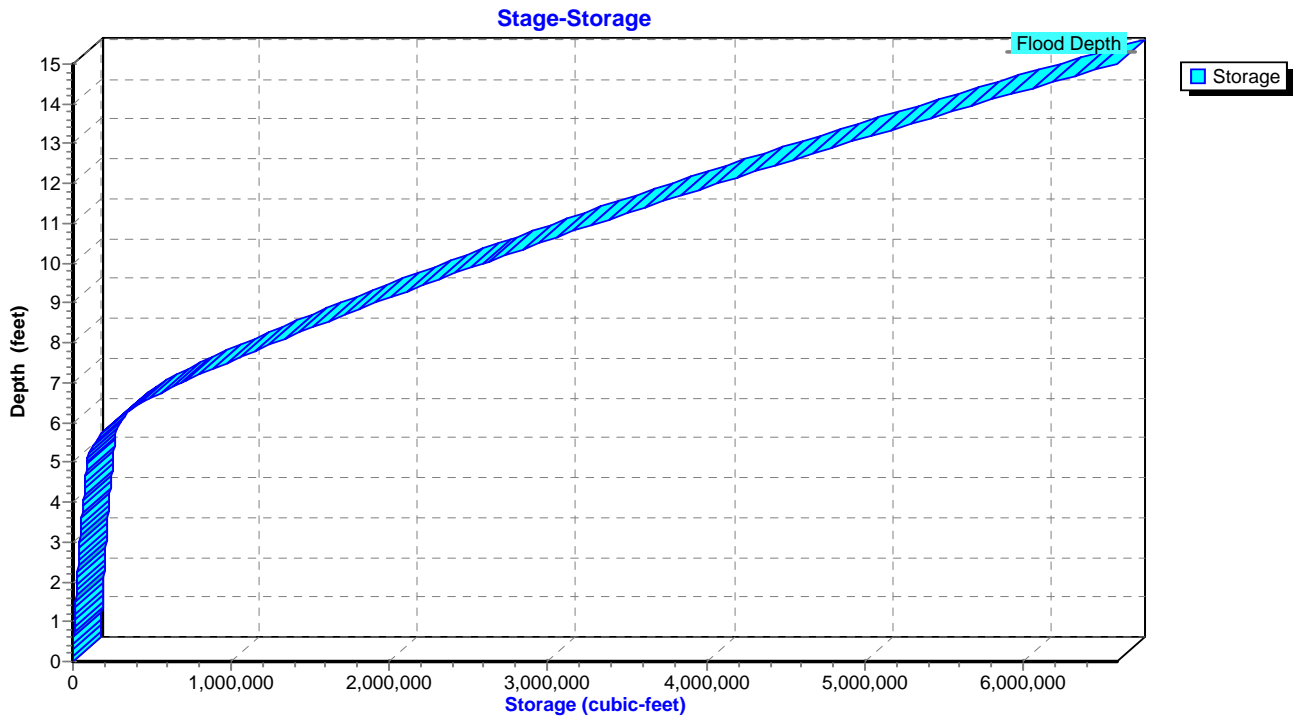
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



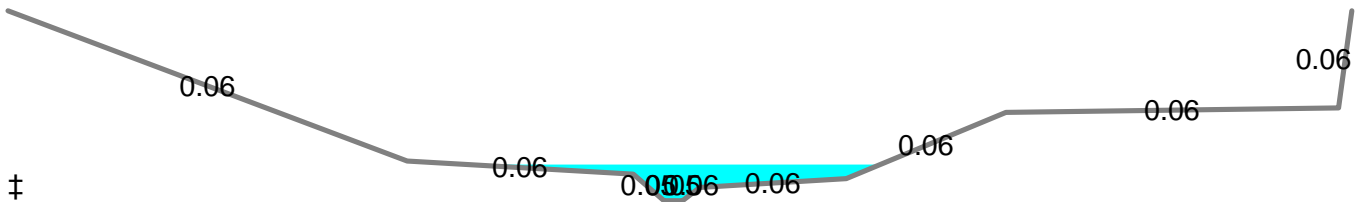
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.49" for 6-HR 0.21 PMF event
 Inflow = 2,357.23 cfs @ 5.19 hrs, Volume= 1,520.997 af
 Outflow = 2,002.22 cfs @ 6.40 hrs, Volume= 1,490.151 af, Atten= 15%, Lag= 73.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.09 fps, Min. Travel Time= 70.1 min
 Avg. Velocity = 1.49 fps, Avg. Travel Time= 98.1 min

Peak Storage= 8,421,268 cf @ 6.40 hrs
 Average Depth at Peak Storage= 8.18'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

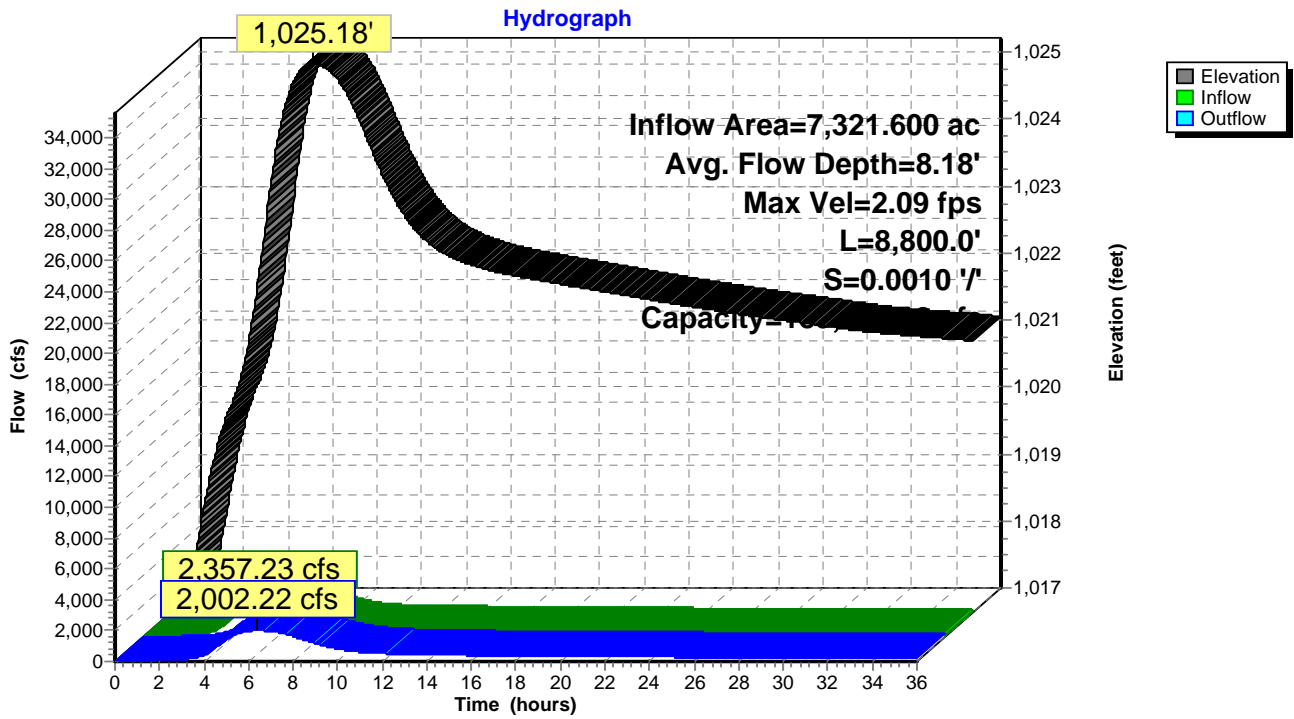
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



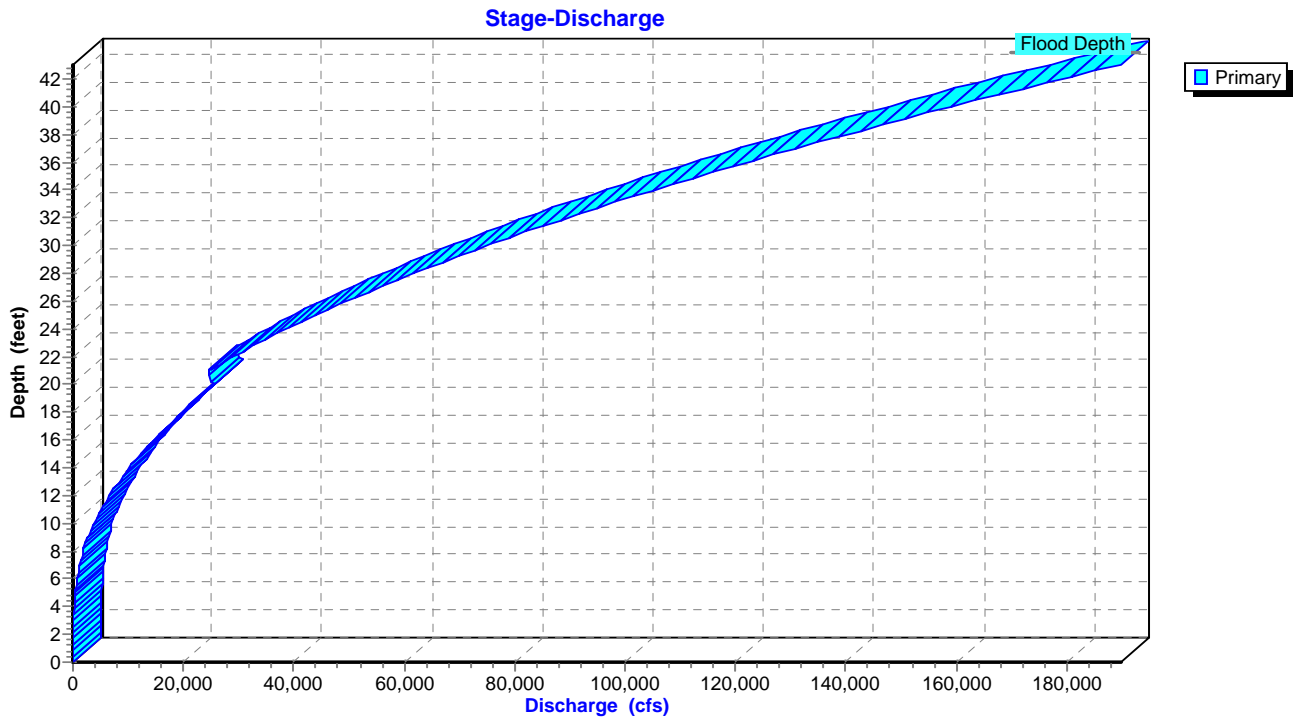
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

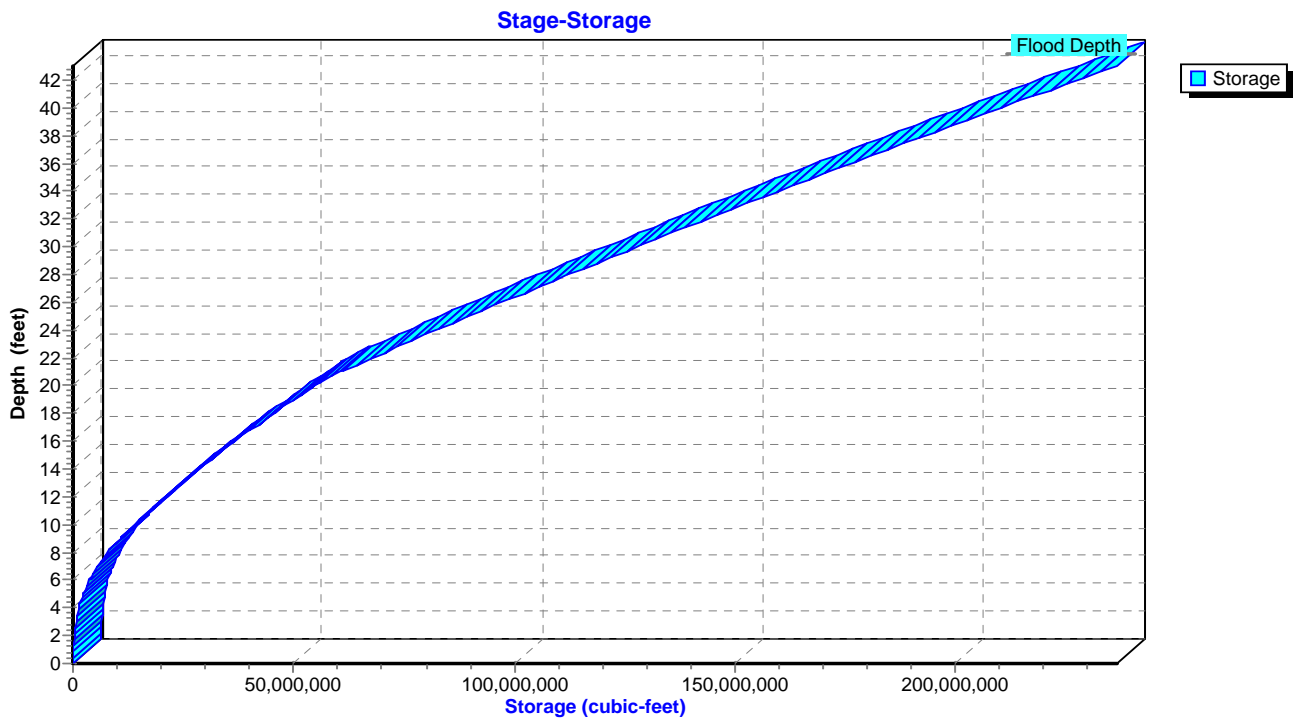
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



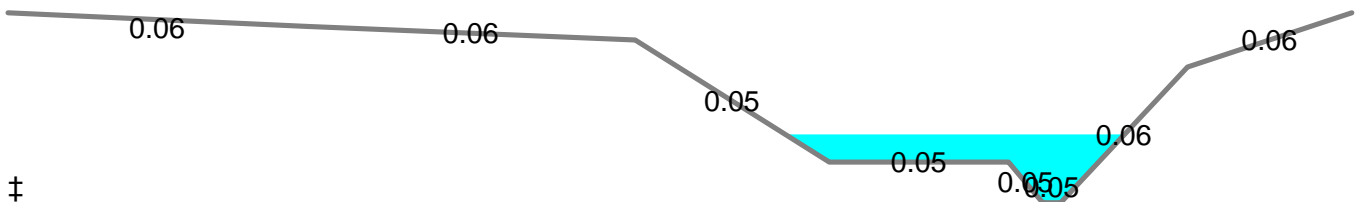
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.50" for 6-HR 0.21 PMF event
 Inflow = 2,686.65 cfs @ 6.07 hrs, Volume= 1,832.129 af
 Outflow = 2,605.14 cfs @ 6.56 hrs, Volume= 1,810.509 af, Atten= 3%, Lag= 29.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.49 fps, Min. Travel Time= 50.1 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 84.4 min

Peak Storage= 7,839,074 cf @ 6.56 hrs
 Average Depth at Peak Storage= 10.06'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

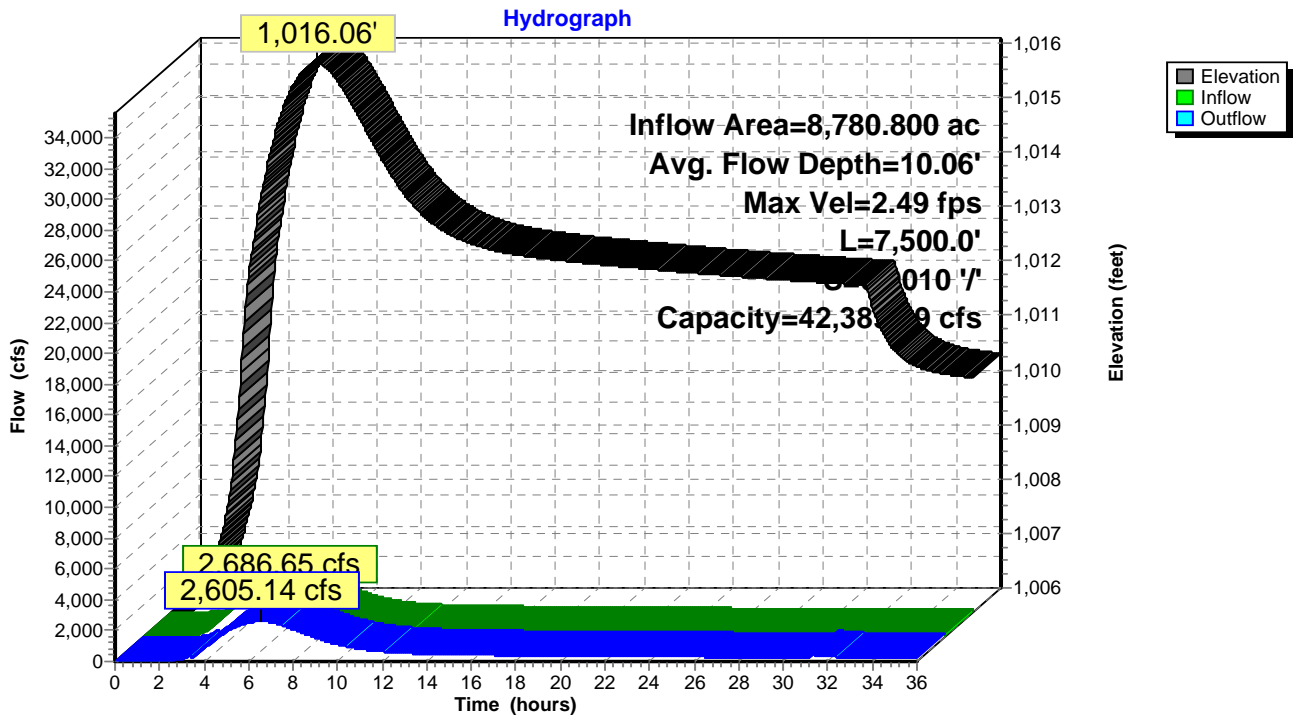
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



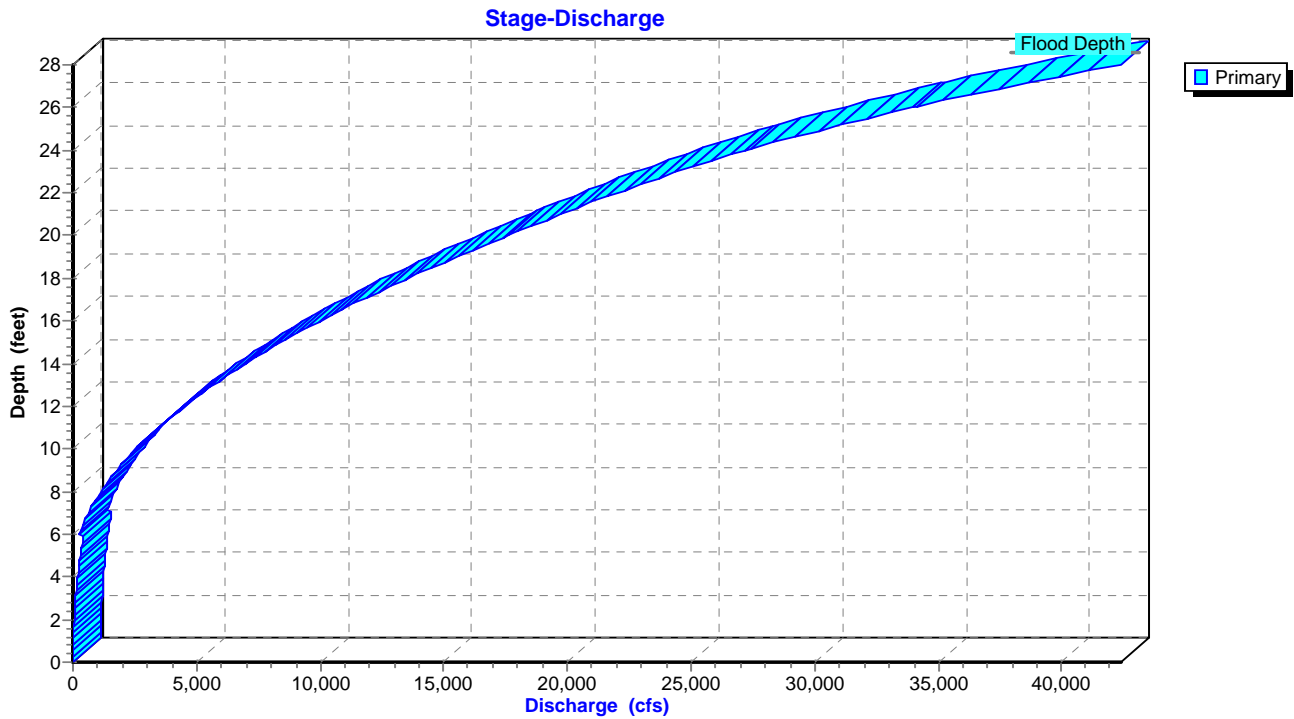
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

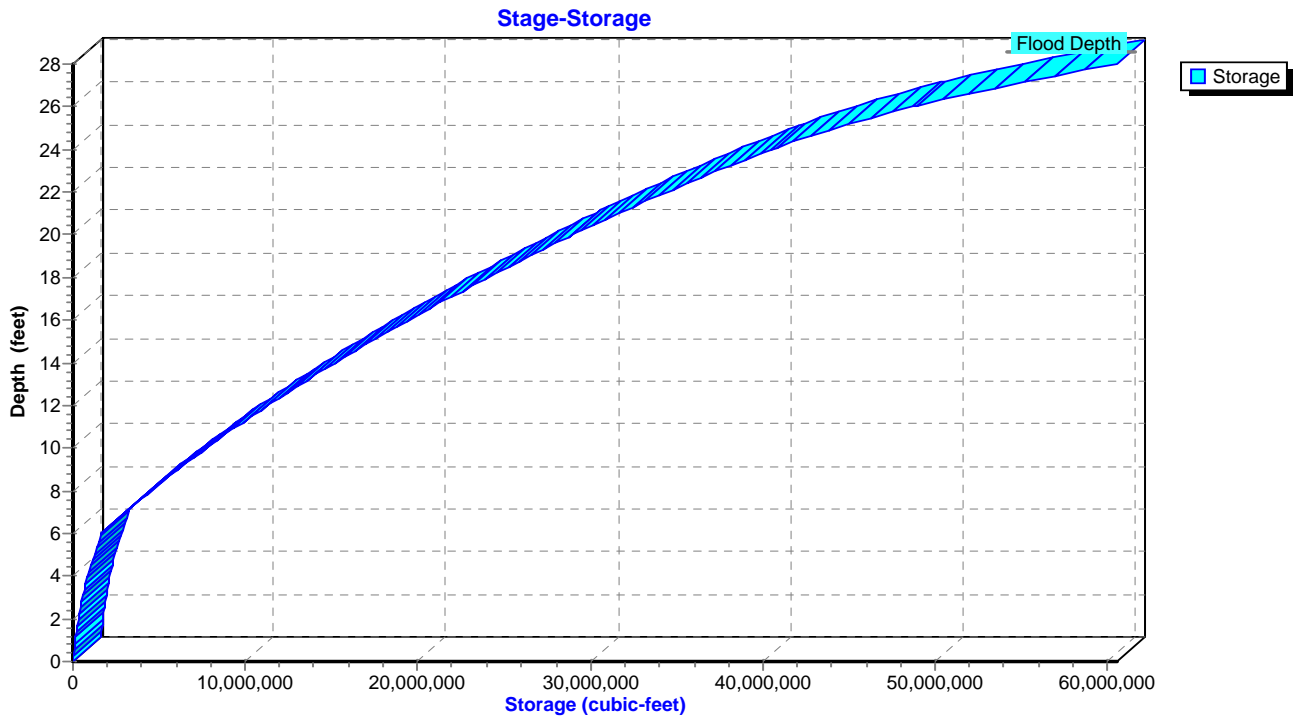
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



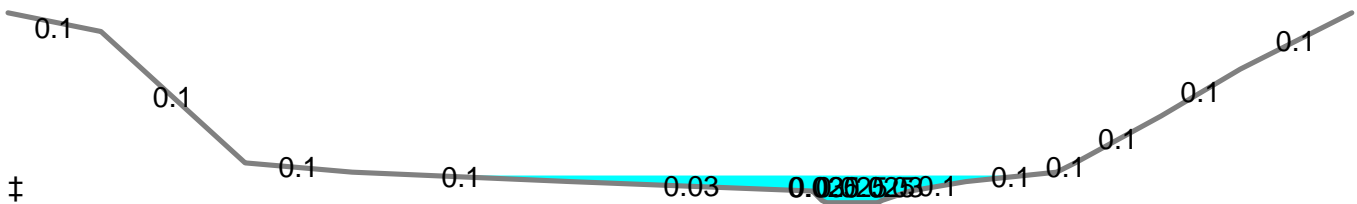
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.52" for 6-HR 0.21 PMF event
 Inflow = 2,680.30 cfs @ 7.22 hrs, Volume= 1,986.915 af
 Outflow = 2,680.30 cfs @ 7.23 hrs, Volume= 1,986.796 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.49 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.52 fps, Avg. Travel Time= 0.9 min

Peak Storage= 127,109 cf @ 7.23 hrs
 Average Depth at Peak Storage= 5.78'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

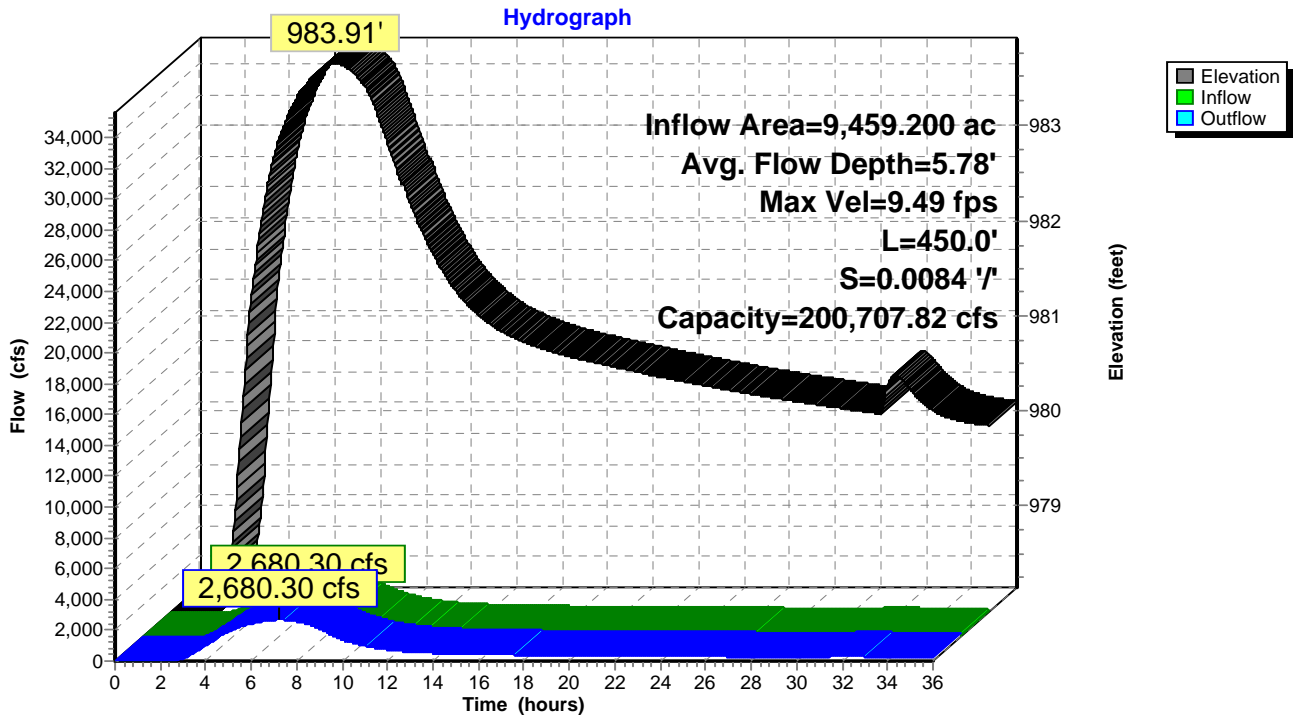
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



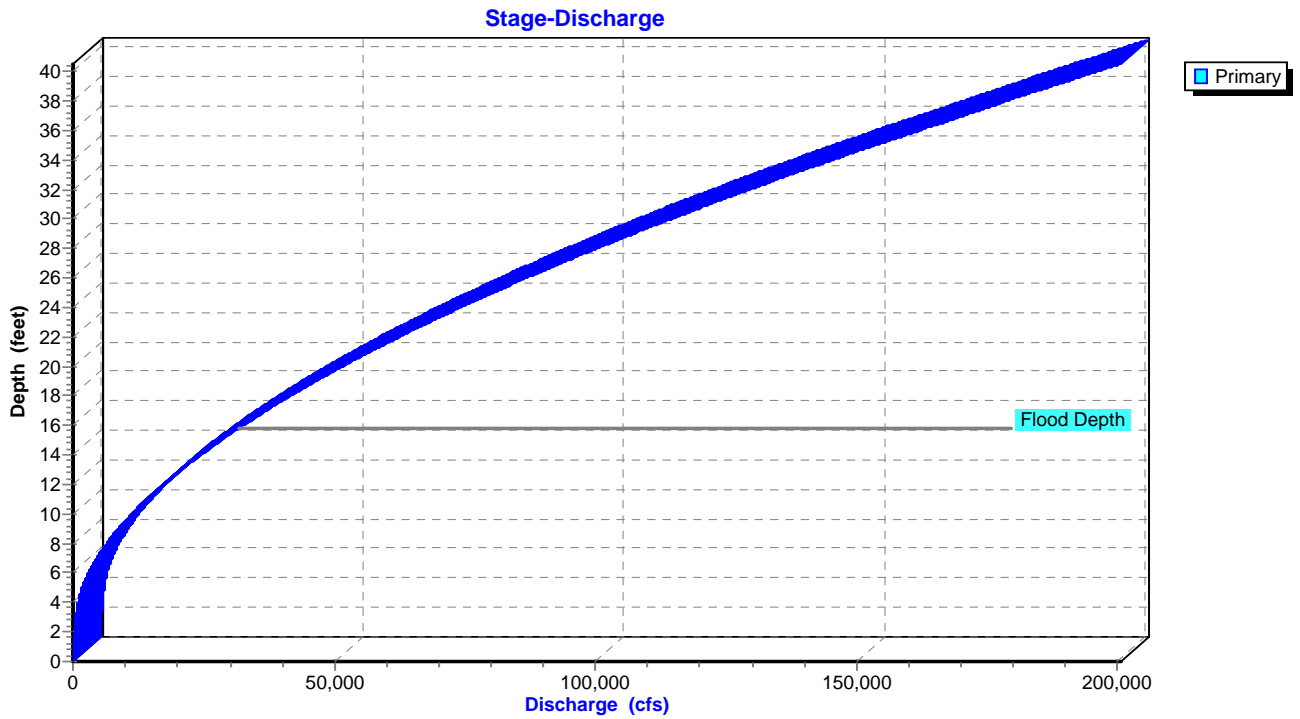
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

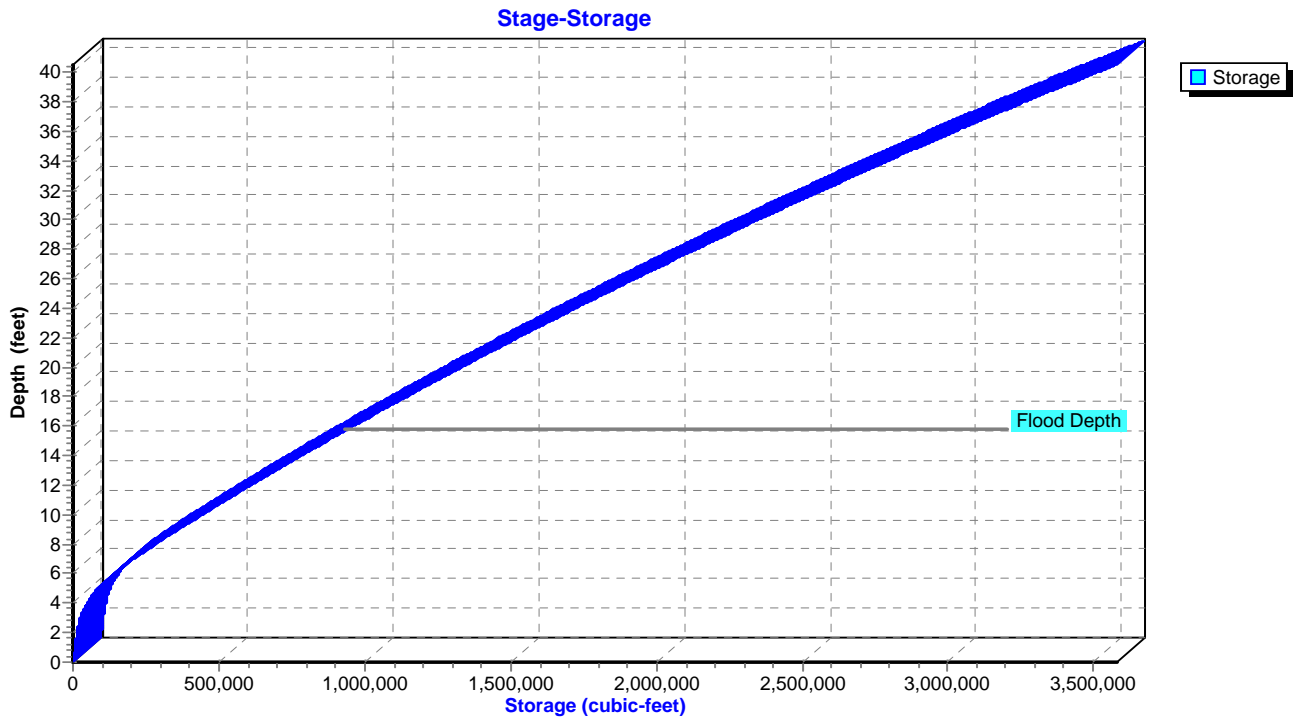
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

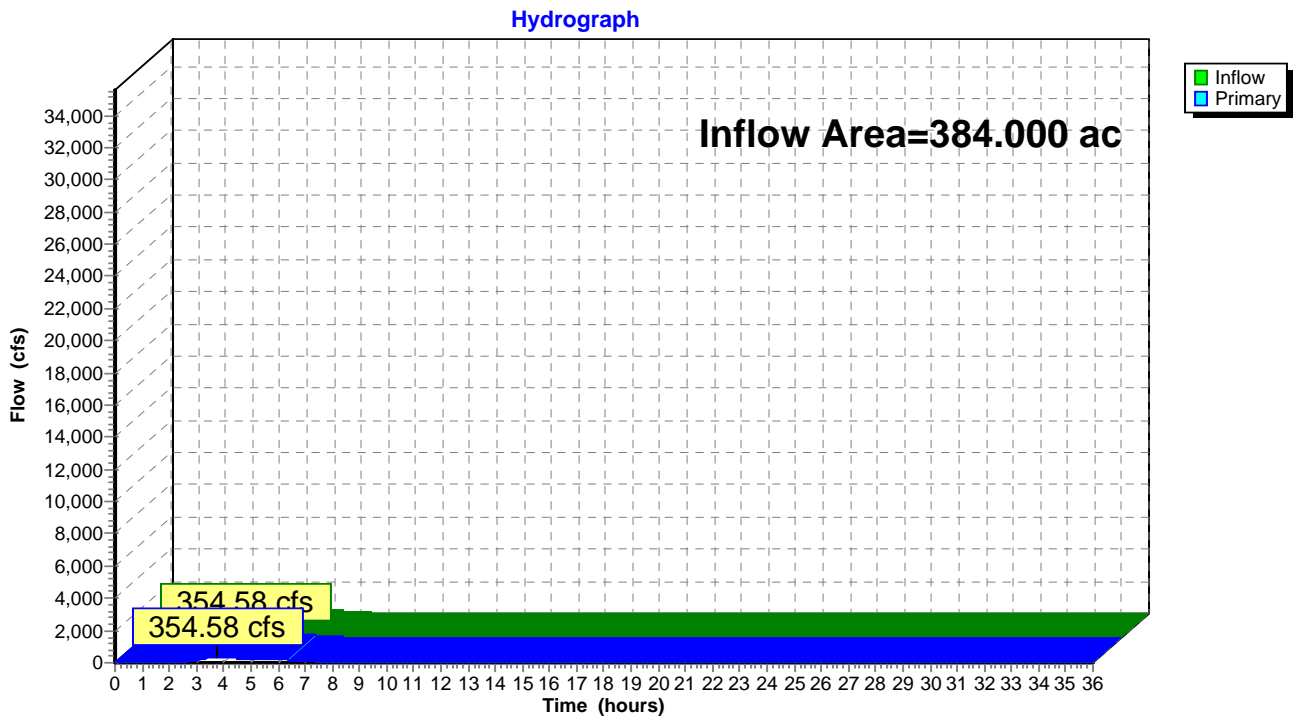


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.83" for 6-HR 0.21 PMF event
Inflow = 354.58 cfs @ 3.76 hrs, Volume= 90.553 af
Primary = 354.58 cfs @ 3.77 hrs, Volume= 90.553 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.54" for 6-HR 0.21 PMF event
 Inflow = 2,906.45 cfs @ 6.38 hrs, Volume= 1,998.588 af
 Outflow = 2,896.41 cfs @ 6.54 hrs, Volume= 1,987.921 af, Atten= 0%, Lag= 9.4 min
 Primary = 2,085.96 cfs @ 6.54 hrs, Volume= 1,753.004 af
 Secondary = 810.45 cfs @ 6.54 hrs, Volume= 234.917 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,007.05' @ 6.54 hrs Surf.Area= 18.874 ac Storage= 124.055 af (63.093 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

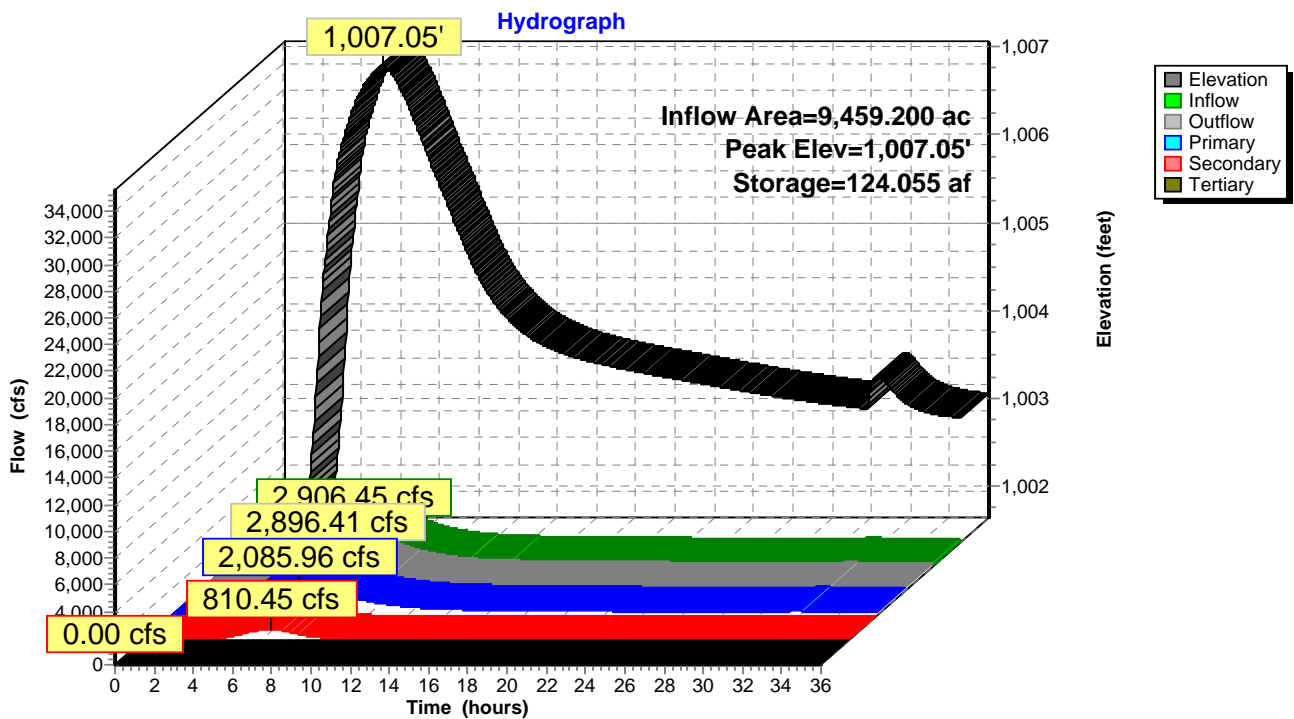
Plug-Flow detention time= 80.8 min calculated for 1,926.424 af (96% of inflow)
 Center-of-Mass det. time= 15.0 min (739.6 - 724.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

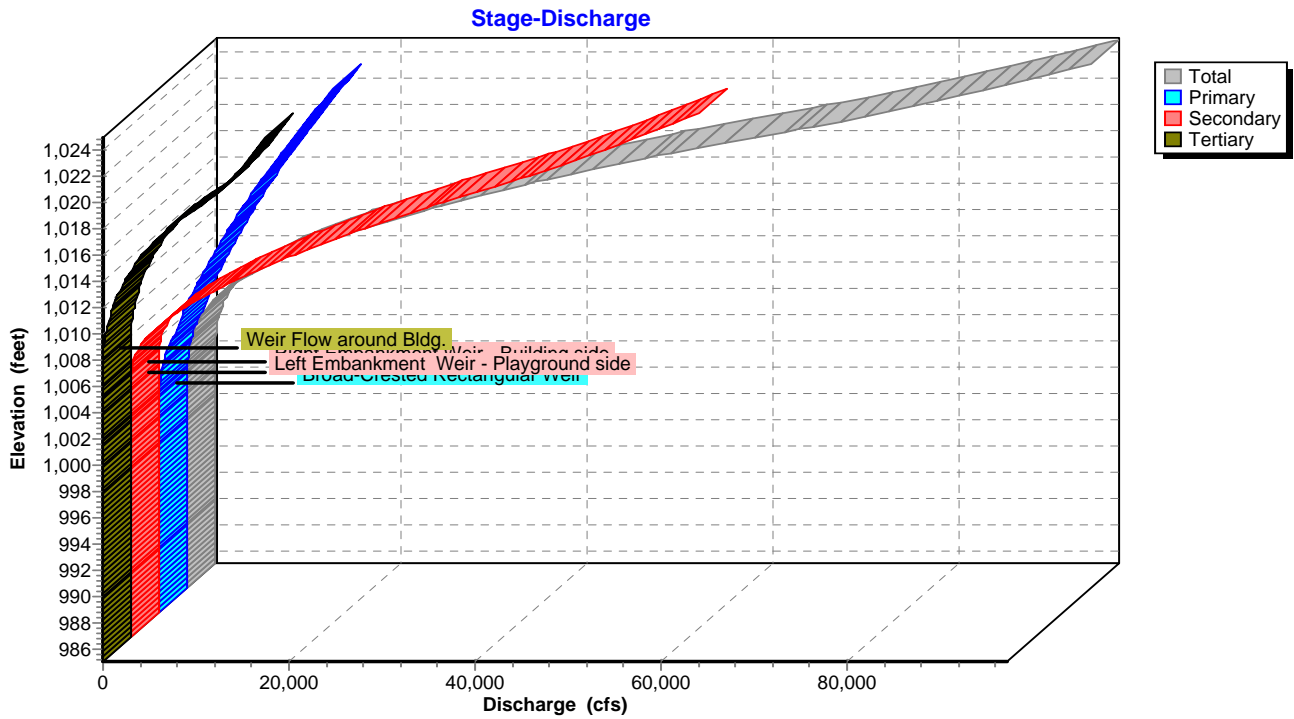
Device	Routing	Invert	Outlet Devices											
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50											
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32											
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.60 20.00											
			Width (feet) 17.00 23.00 77.00 77.00											
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80											
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00											
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00											
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00											

- Primary OutFlow Max=2,085.95 cfs @ 6.54 hrs HW=1,007.05' TW=998.40' (Dynamic Tailwater)
 - 1=Broad-Crested Rectangular Weir (Weir Controls 2,085.95 cfs @ 7.72 fps)
- Secondary OutFlow Max=810.44 cfs @ 6.54 hrs HW=1,007.05' TW=998.40' (Dynamic Tailwater)
 - 2=Right Embankment Weir - Building side (Weir Controls 317.10 cfs @ 3.76 fps)
 - 3=Left Embankment Weir - Playground side (Weir Controls 493.34 cfs @ 4.36 fps)
- Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 - 4=Weir Flow around Bldg. (Controls 0.00 cfs)

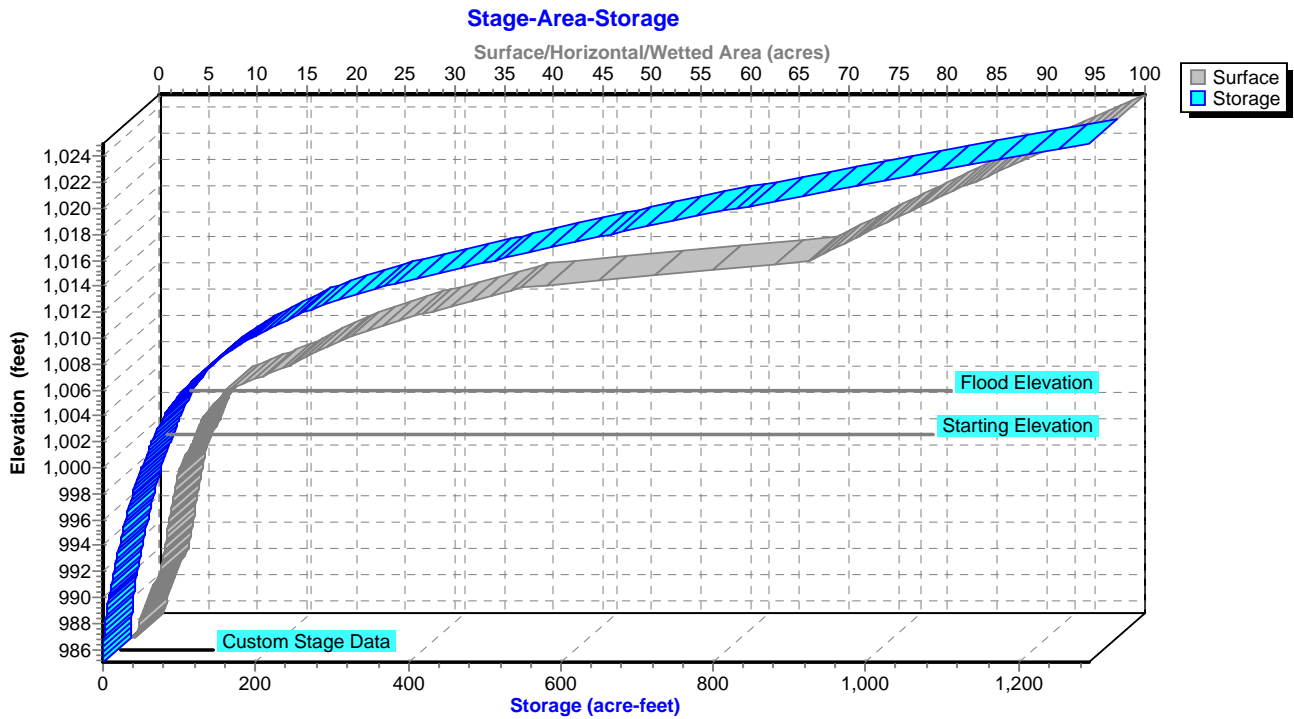
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

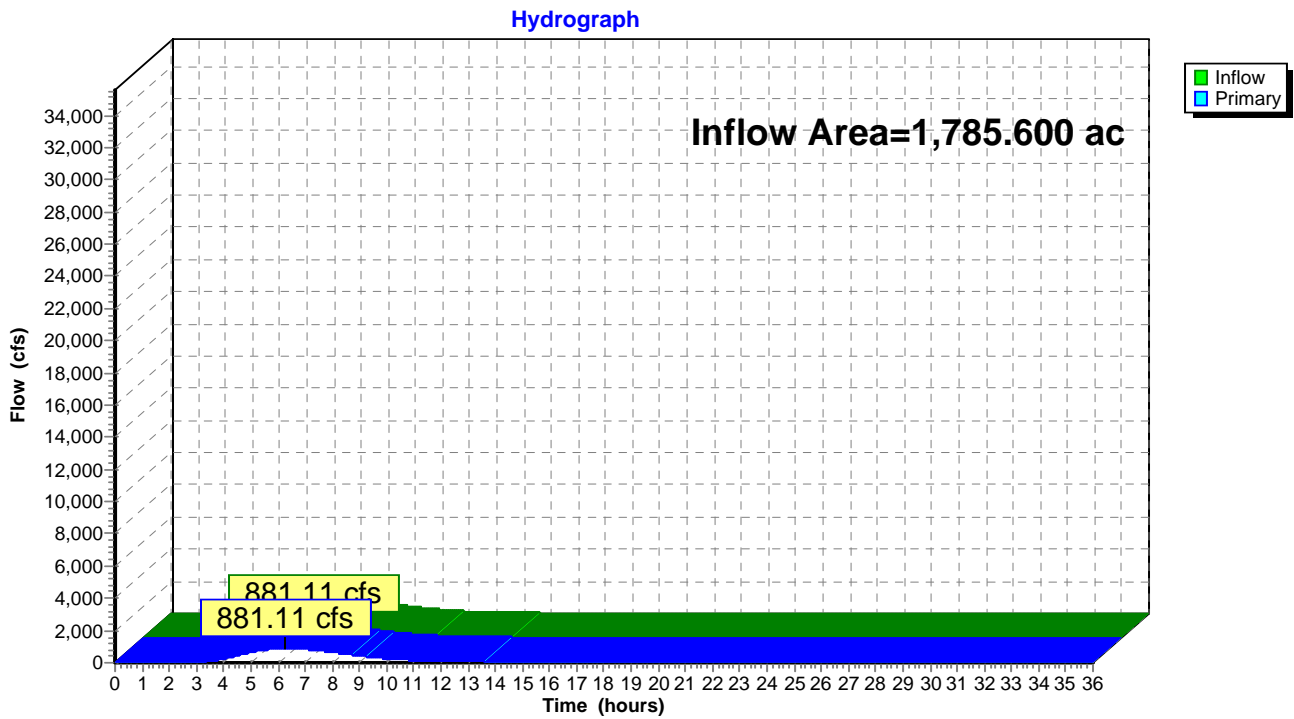


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.50" for 6-HR 0.21 PMF event
Inflow = 881.11 cfs @ 6.28 hrs, Volume= 372.072 af
Primary = 881.11 cfs @ 6.29 hrs, Volume= 372.072 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.50" for 6-HR 0.21 PMF event
 Inflow = 881.11 cfs @ 6.29 hrs, Volume= 372.071 af
 Outflow = 312.45 cfs @ 9.60 hrs, Volume= 597.614 af, Atten= 65%, Lag= 198.8 min
 Primary = 312.45 cfs @ 9.60 hrs, Volume= 597.614 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,097.94' @ 9.60 hrs Surf.Area= 239.429 ac Storage= 2,037.321 af (123.321 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 475.9 min (944.5 - 468.6)

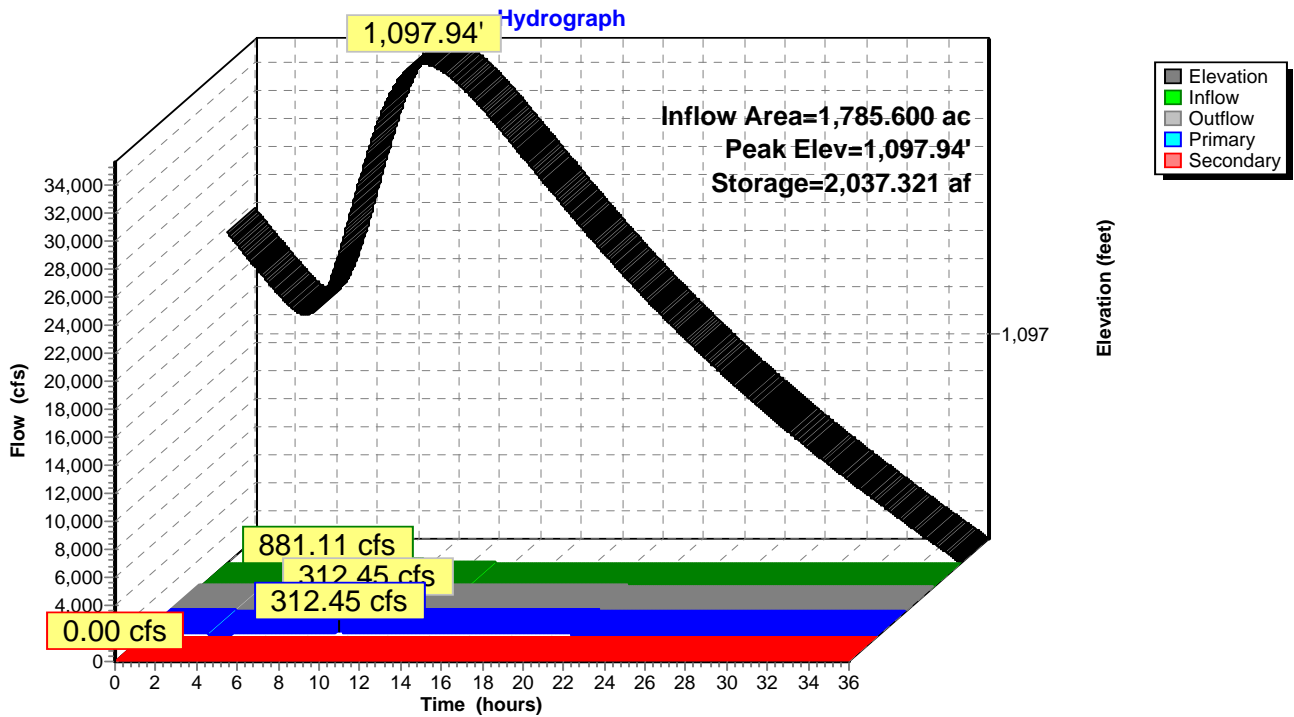
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

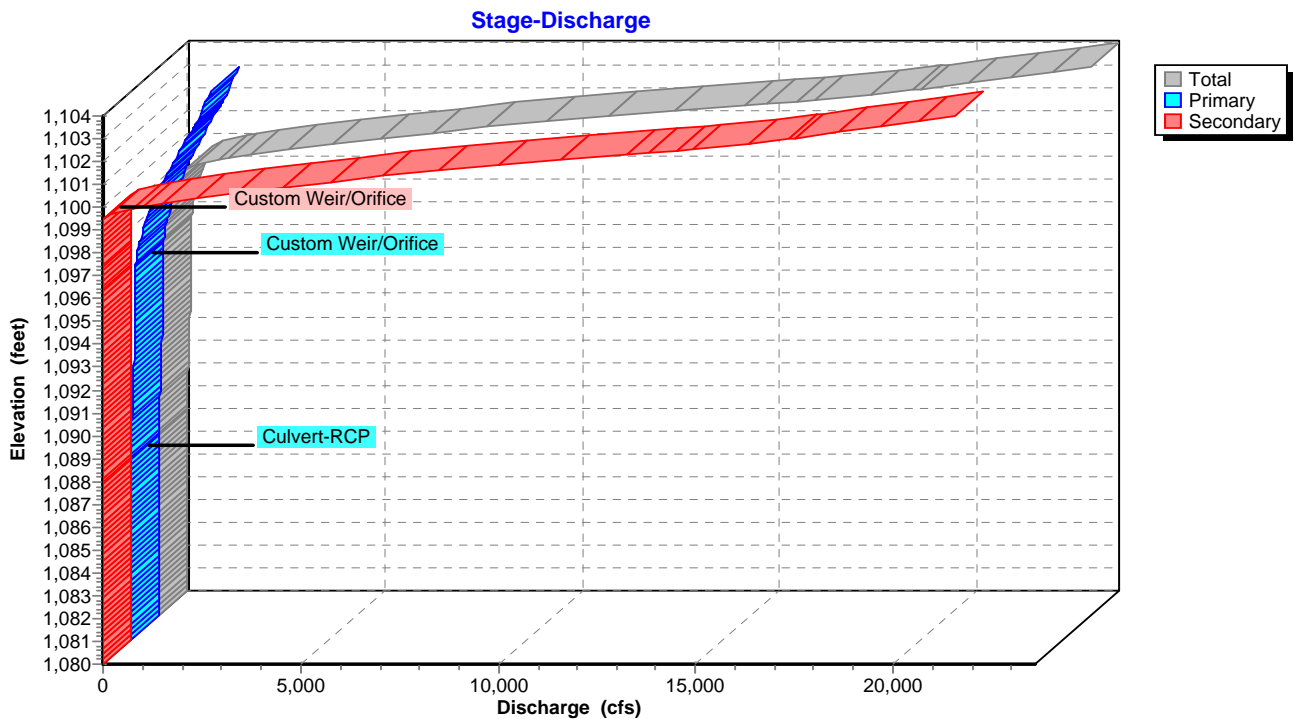
Primary OutFlow Max=312.45 cfs @ 9.60 hrs HW=1,097.94' TW=1,071.91' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 125.26 cfs @ 17.72 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 187.19 cfs @ 4.06 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

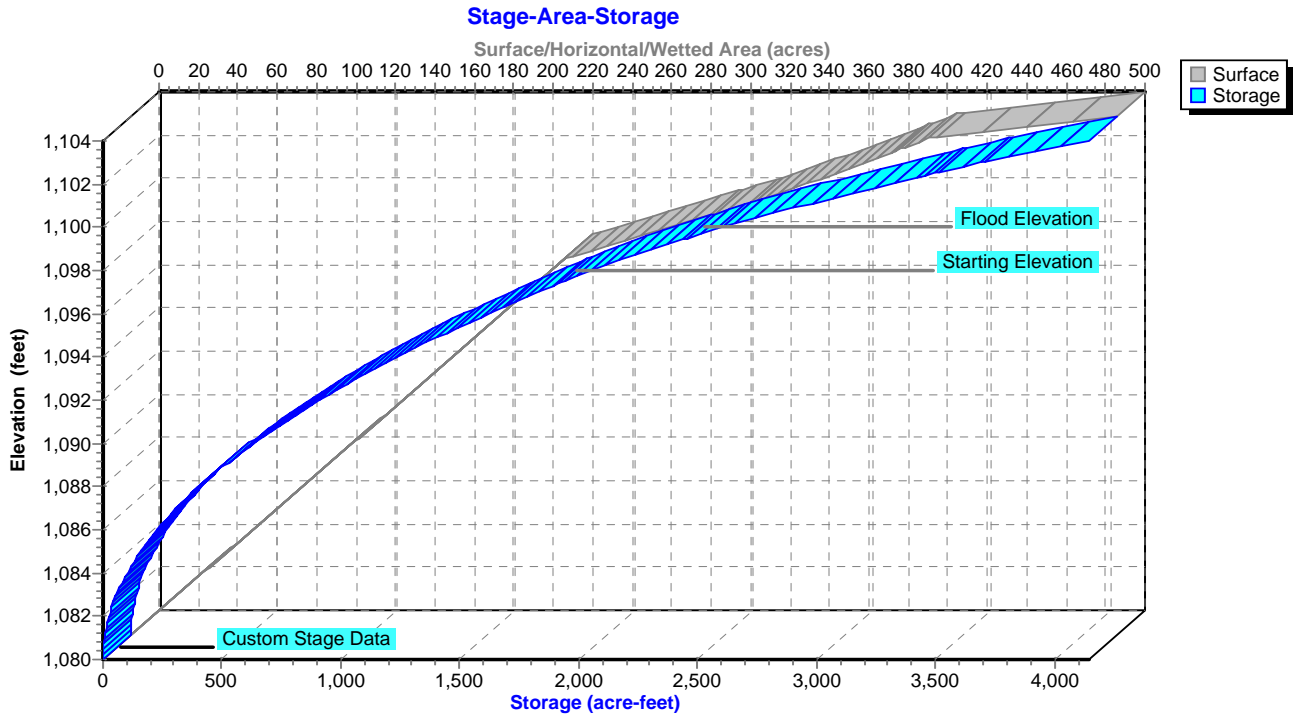
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable



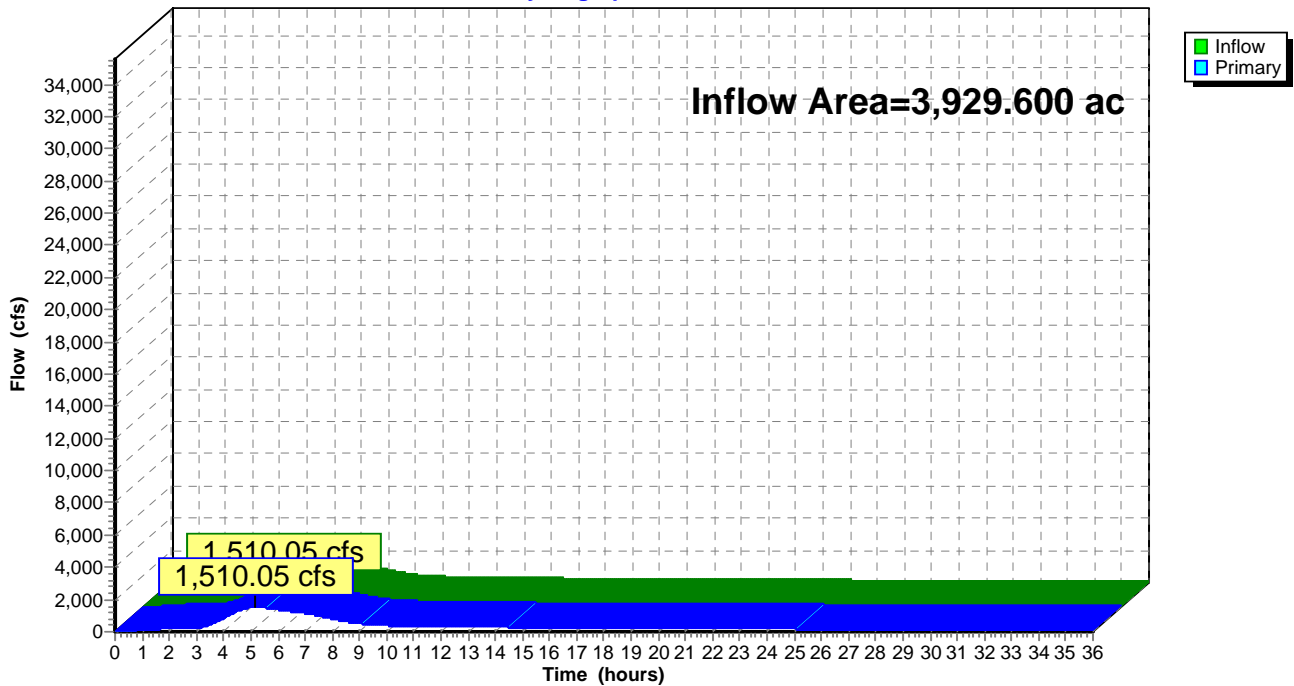
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.03" for 6-HR 0.21 PMF event
Inflow = 1,510.05 cfs @ 5.17 hrs, Volume= 991.866 af
Primary = 1,510.05 cfs @ 5.18 hrs, Volume= 991.866 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.83" for 6-HR 0.21 PMF event
 Inflow = 354.58 cfs @ 3.77 hrs, Volume= 90.552 af
 Outflow = 142.90 cfs @ 6.59 hrs, Volume= 90.084 af, Atten= 60%, Lag= 169.1 min
 Primary = 142.90 cfs @ 6.59 hrs, Volume= 90.084 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.69' @ 6.59 hrs Surf.Area= 28.879 ac Storage= 71.540 af (47.240 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 455.9 min calculated for 65.784 af (73% of inflow)
 Center-of-Mass det. time= 277.5 min (601.5 - 324.0)

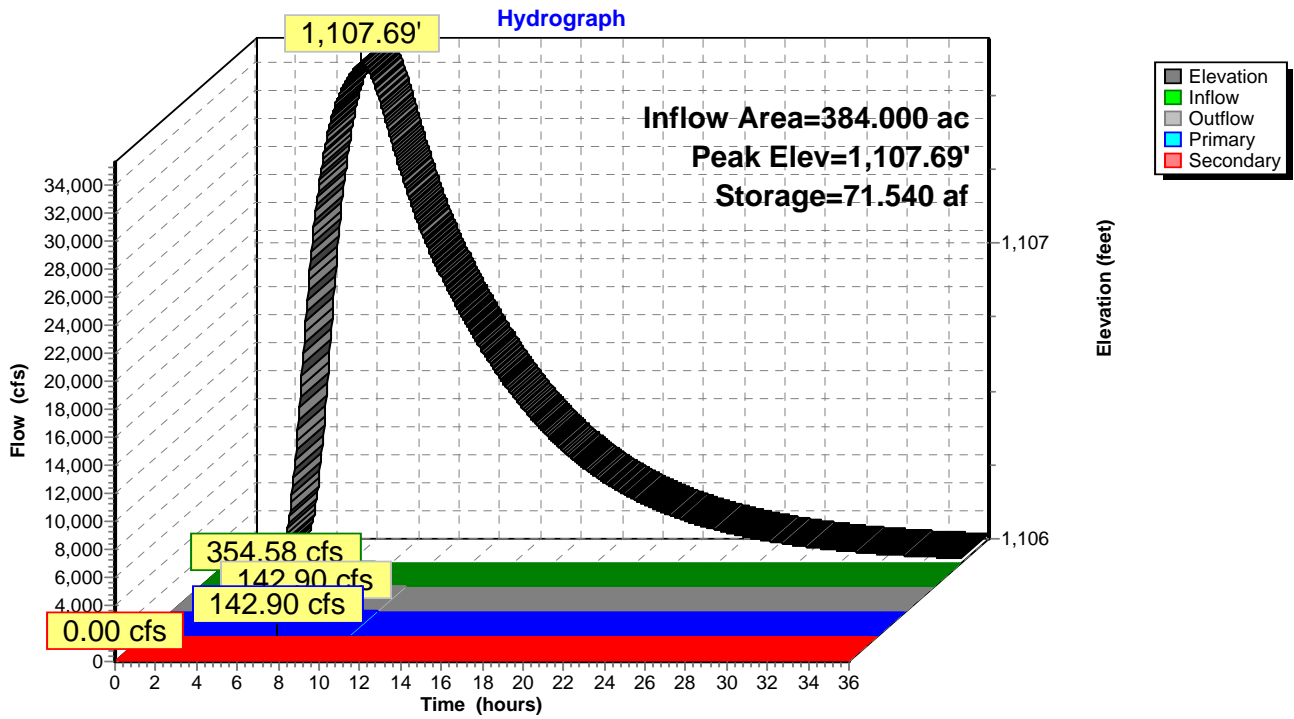
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

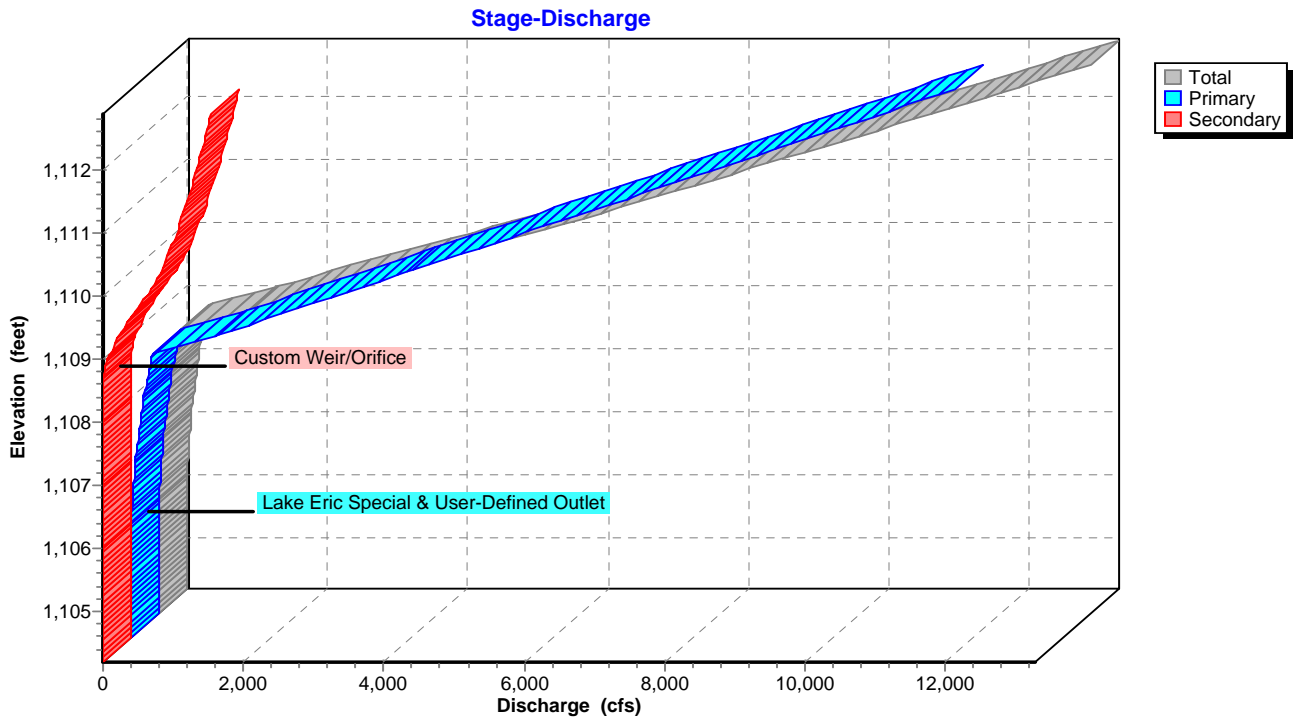
Primary OutFlow Max=142.90 cfs @ 6.59 hrs HW=1,107.69' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 142.90 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

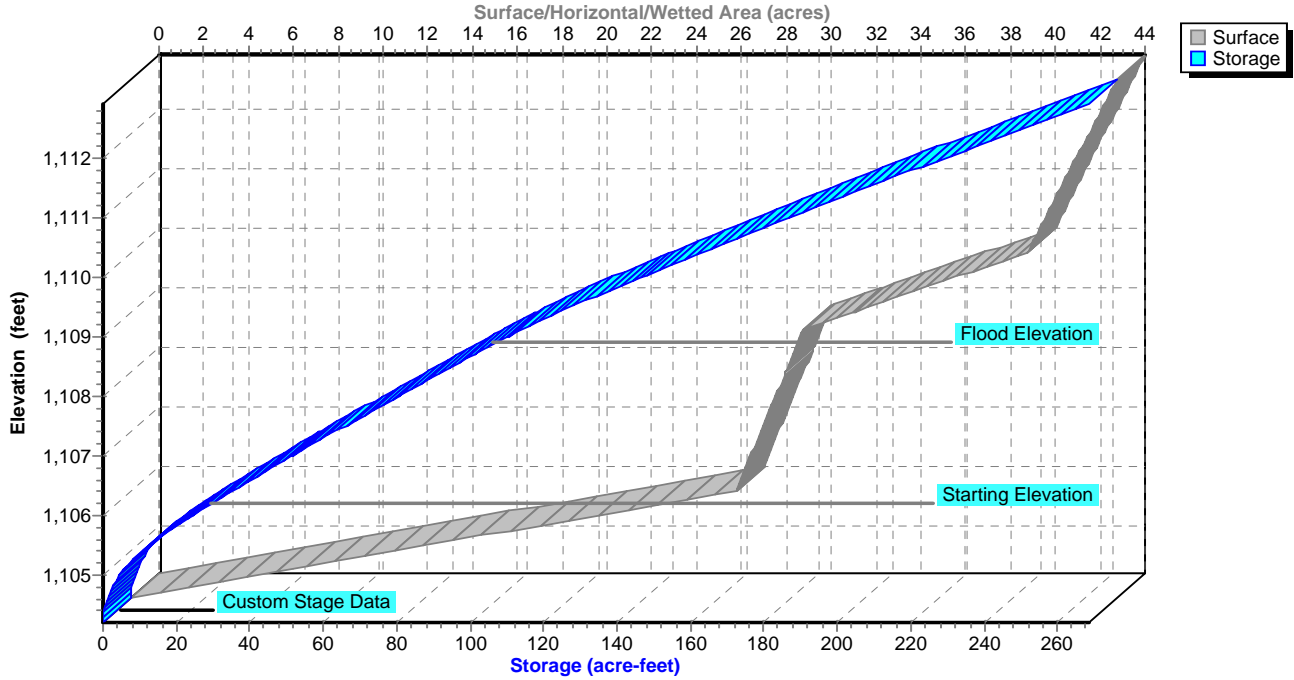


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



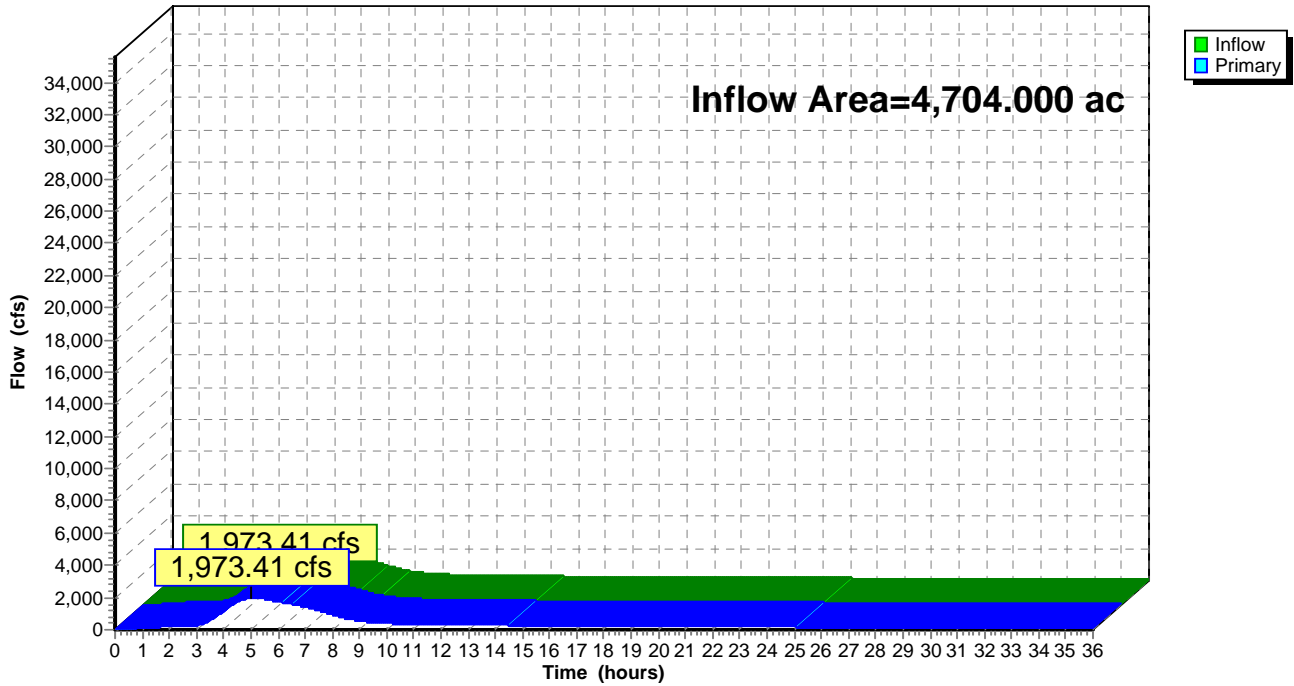
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 2.89" for 6-HR 0.21 PMF event
Inflow = 1,973.41 cfs @ 5.03 hrs, Volume= 1,131.114 af
Primary = 1,973.41 cfs @ 5.04 hrs, Volume= 1,131.114 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 2.77" for 6-HR 0.21 PMF event
 Inflow = 145.29 cfs @ 3.37 hrs, Volume= 26.584 af
 Outflow = 60.63 cfs @ 4.82 hrs, Volume= 26.476 af, Atten= 58%, Lag= 86.6 min
 Primary = 60.63 cfs @ 4.82 hrs, Volume= 26.476 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,119.71' @ 4.82 hrs Surf.Area= 4.157 ac Storage= 26.284 af (12.594 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 422.3 min calculated for 12.783 af (48% of inflow)
 Center-of-Mass det. time= 197.5 min (450.1 - 252.6)

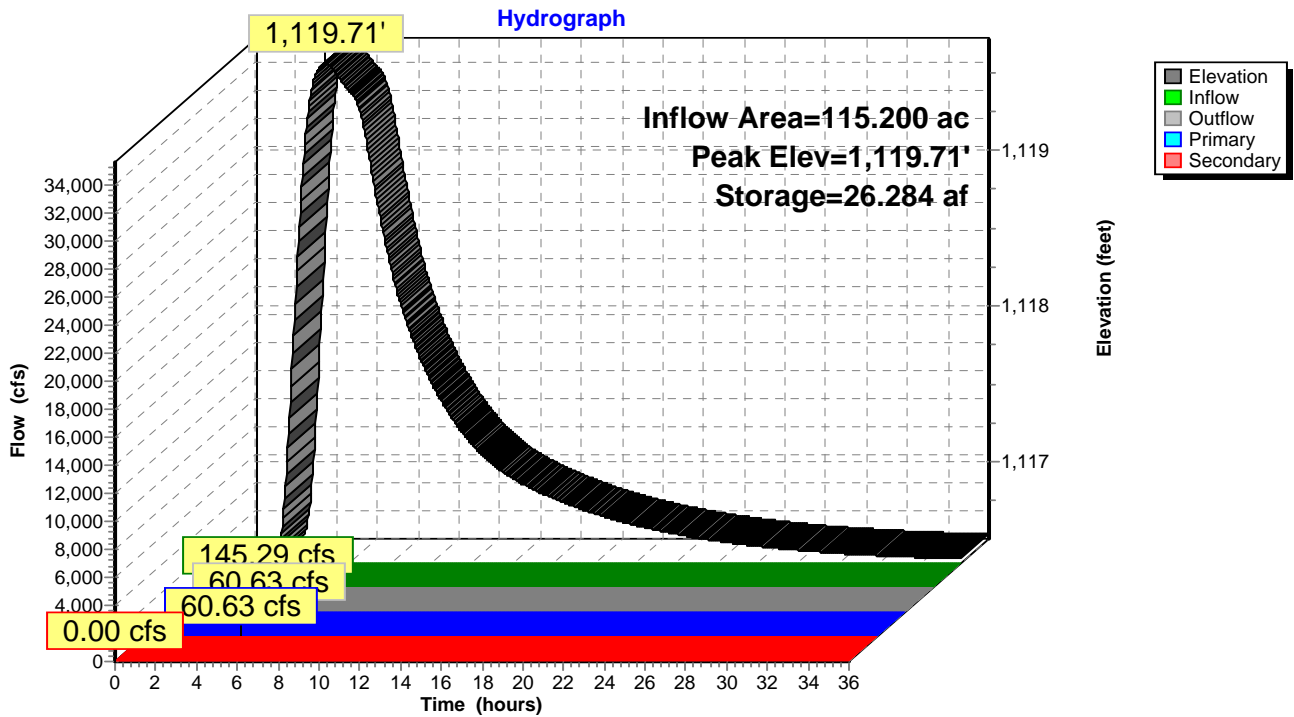
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

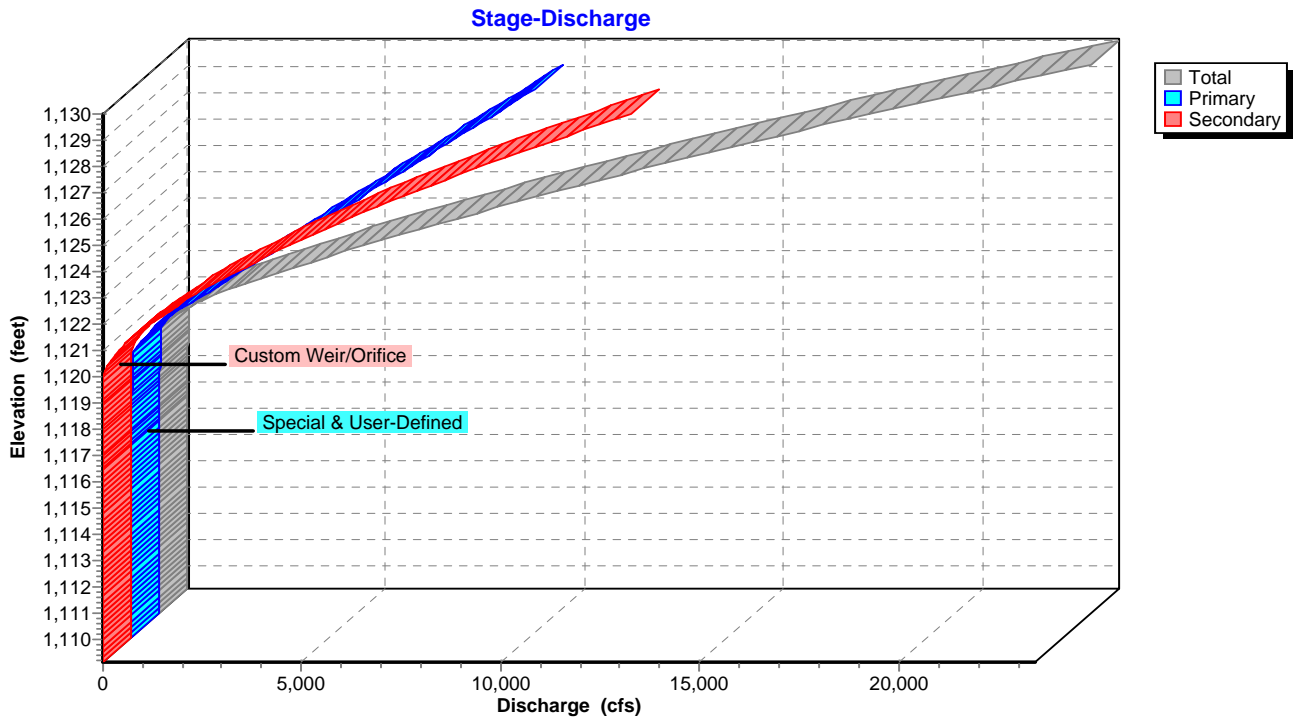
Primary OutFlow Max=60.63 cfs @ 4.82 hrs HW=1,119.71' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 60.63 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,116.50' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

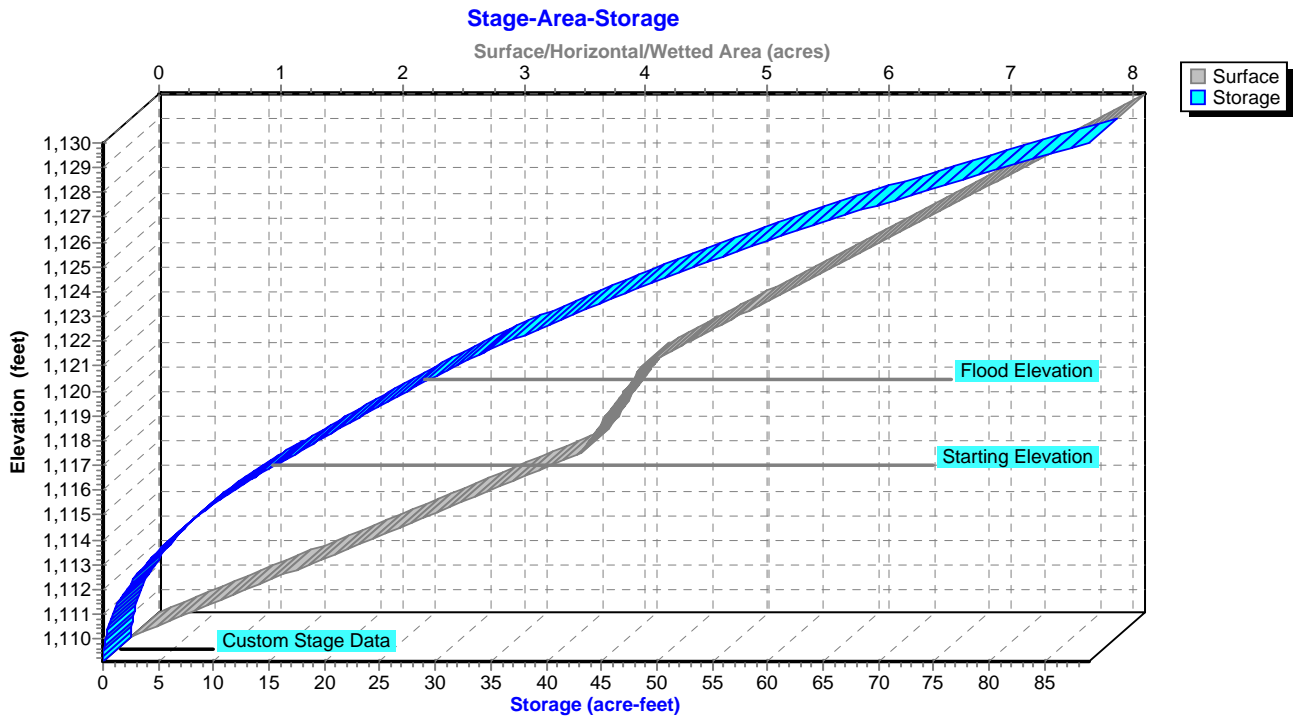
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



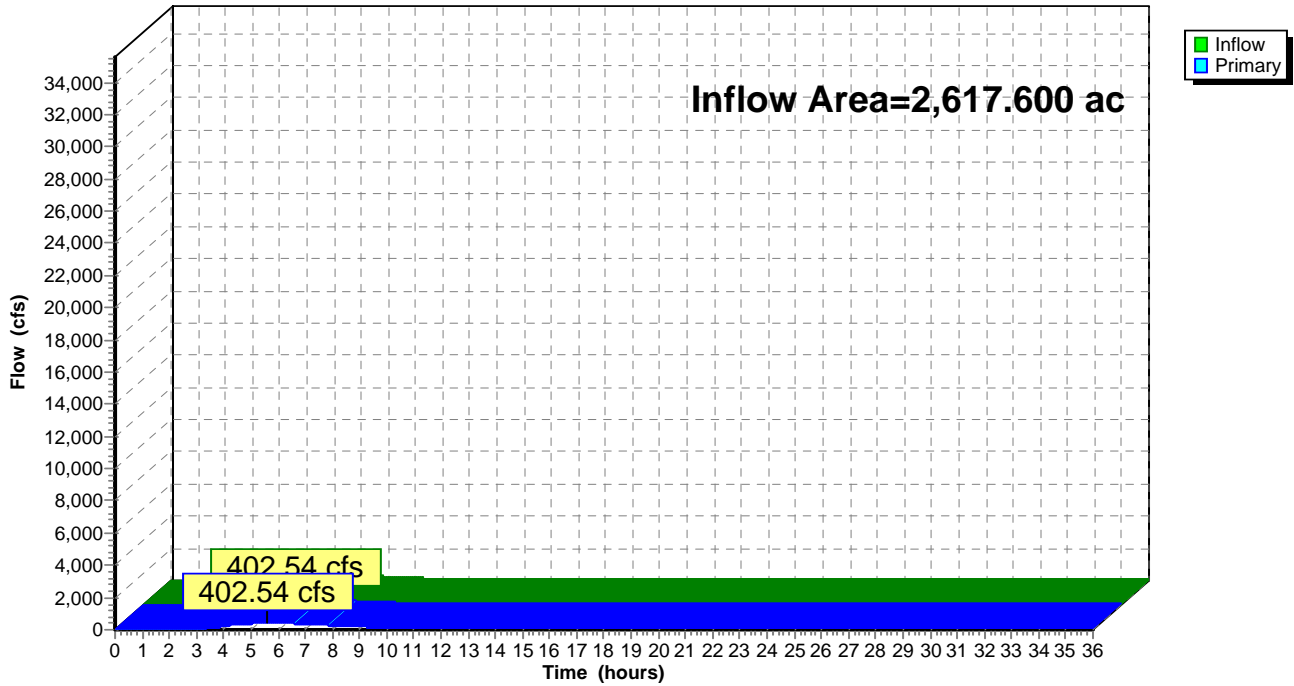
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 1.79" for 6-HR 0.21 PMF event
Inflow = 402.54 cfs @ 5.62 hrs, Volume= 390.231 af
Primary = 402.54 cfs @ 5.63 hrs, Volume= 390.231 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

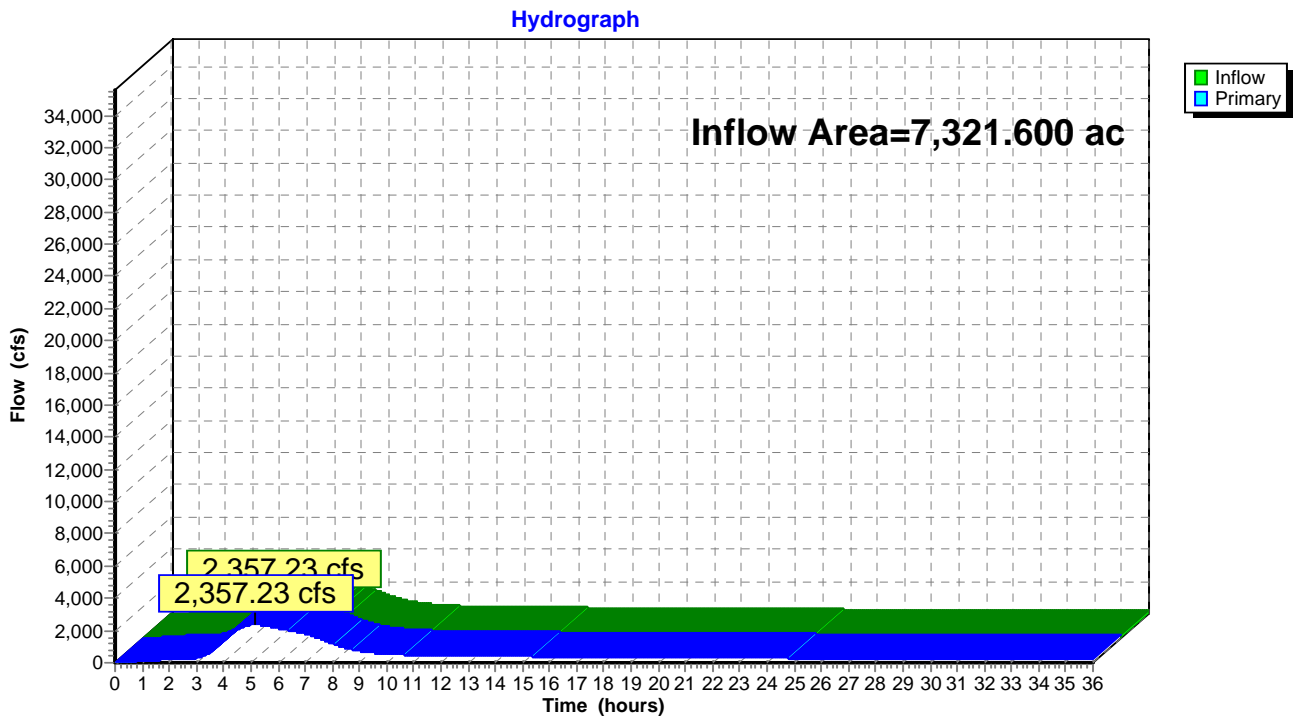


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.49" for 6-HR 0.21 PMF event
Inflow = 2,357.23 cfs @ 5.18 hrs, Volume= 1,521.171 af
Primary = 2,357.23 cfs @ 5.19 hrs, Volume= 1,521.171 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



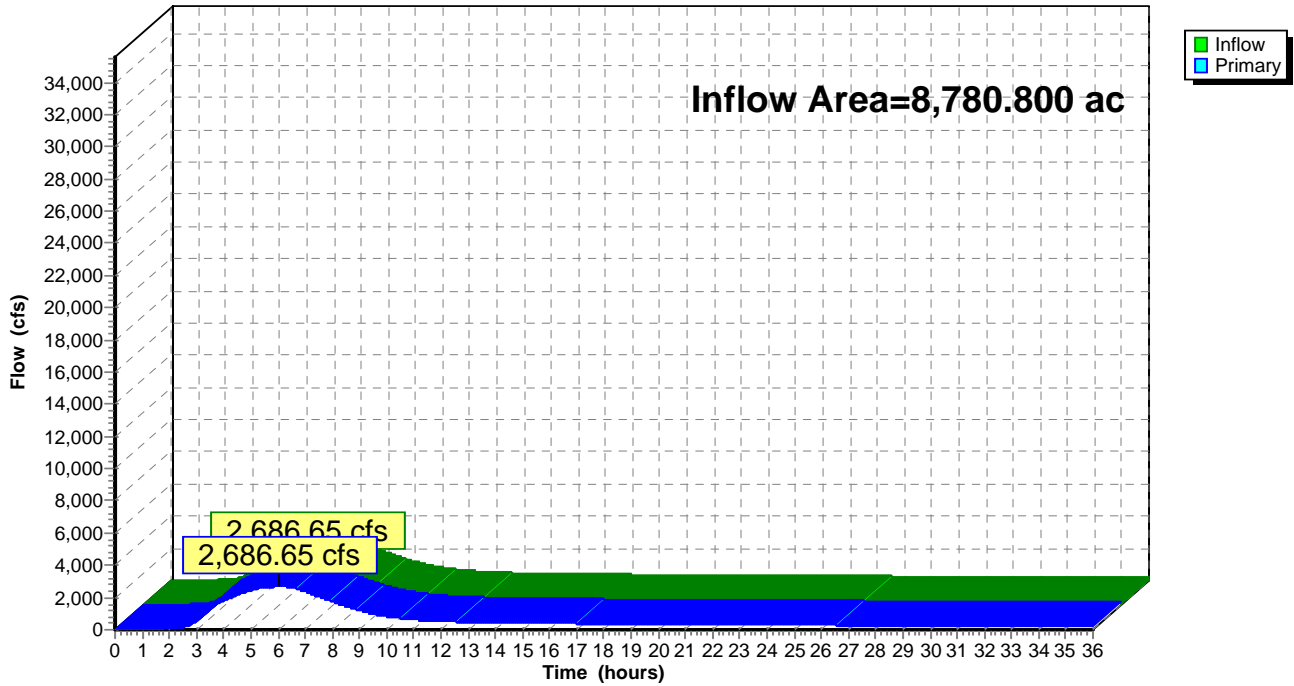
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.50" for 6-HR 0.21 PMF event
Inflow = 2,686.65 cfs @ 6.06 hrs, Volume= 1,832.308 af
Primary = 2,686.65 cfs @ 6.07 hrs, Volume= 1,832.308 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.29" for 6-HR 0.21 PMF event
 Inflow = 1,166.04 cfs @ 6.29 hrs, Volume= 375.539 af
 Outflow = 122.97 cfs @ 11.58 hrs, Volume= 273.638 af, Atten= 89%, Lag= 317.3 min
 Primary = 122.97 cfs @ 11.58 hrs, Volume= 273.638 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.86' @ 11.58 hrs Surf.Area= 124.276 ac Storage= 291.935 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 809.5 min calculated for 273.562 af (73% of inflow)
 Center-of-Mass det. time= 736.5 min (1,211.7 - 475.2)

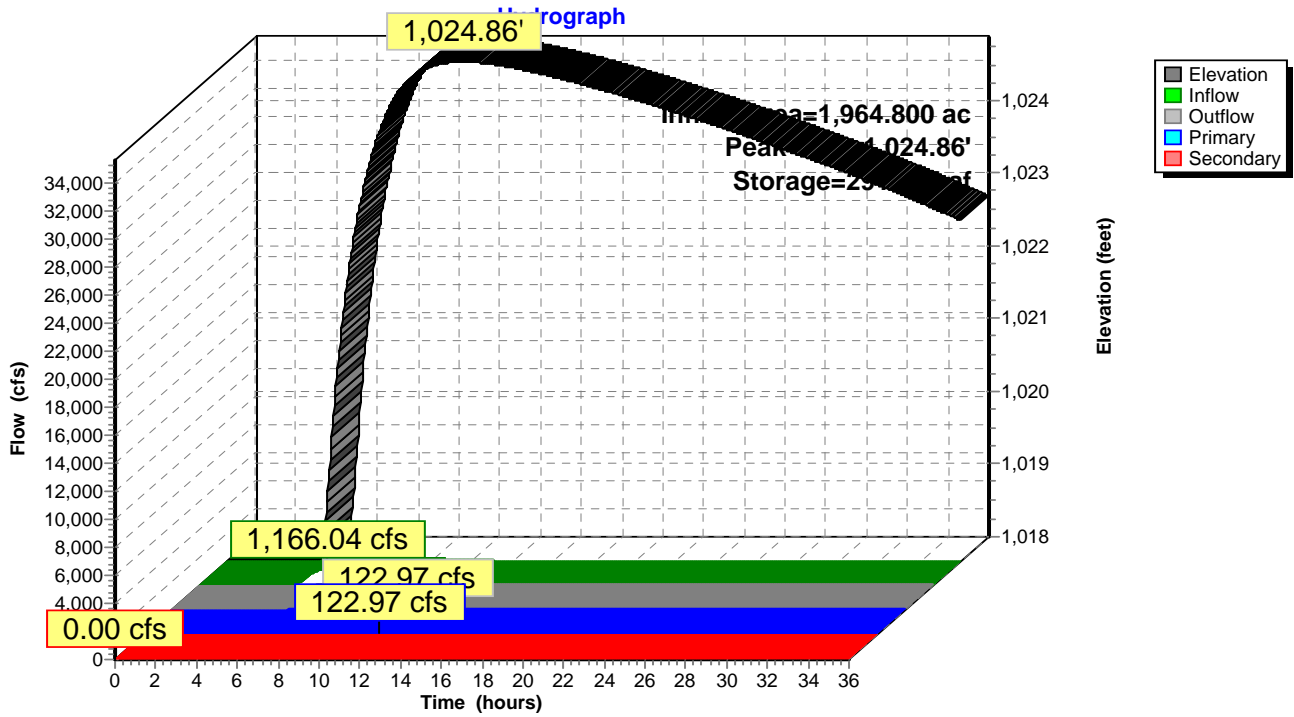
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

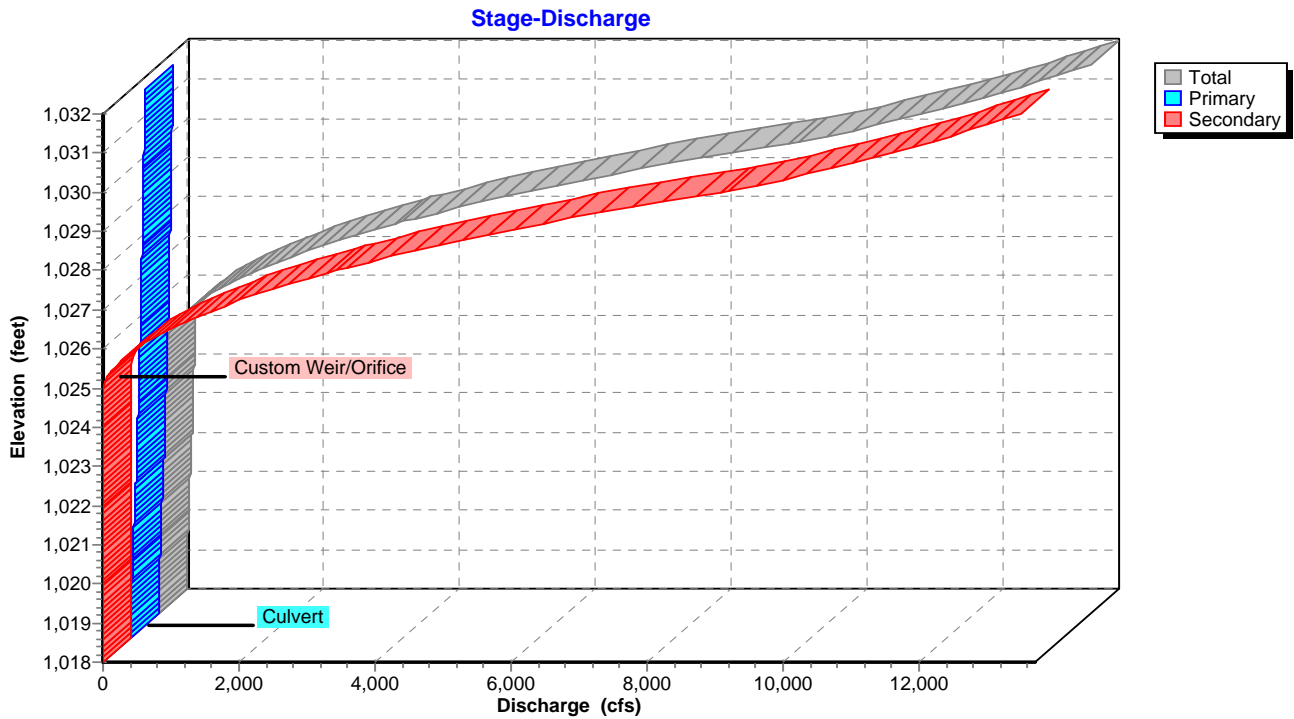
Primary OutFlow Max=122.97 cfs @ 11.58 hrs HW=1,024.86' TW=1,020.52' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 122.97 cfs @ 9.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,018.00' TW=1,017.50' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

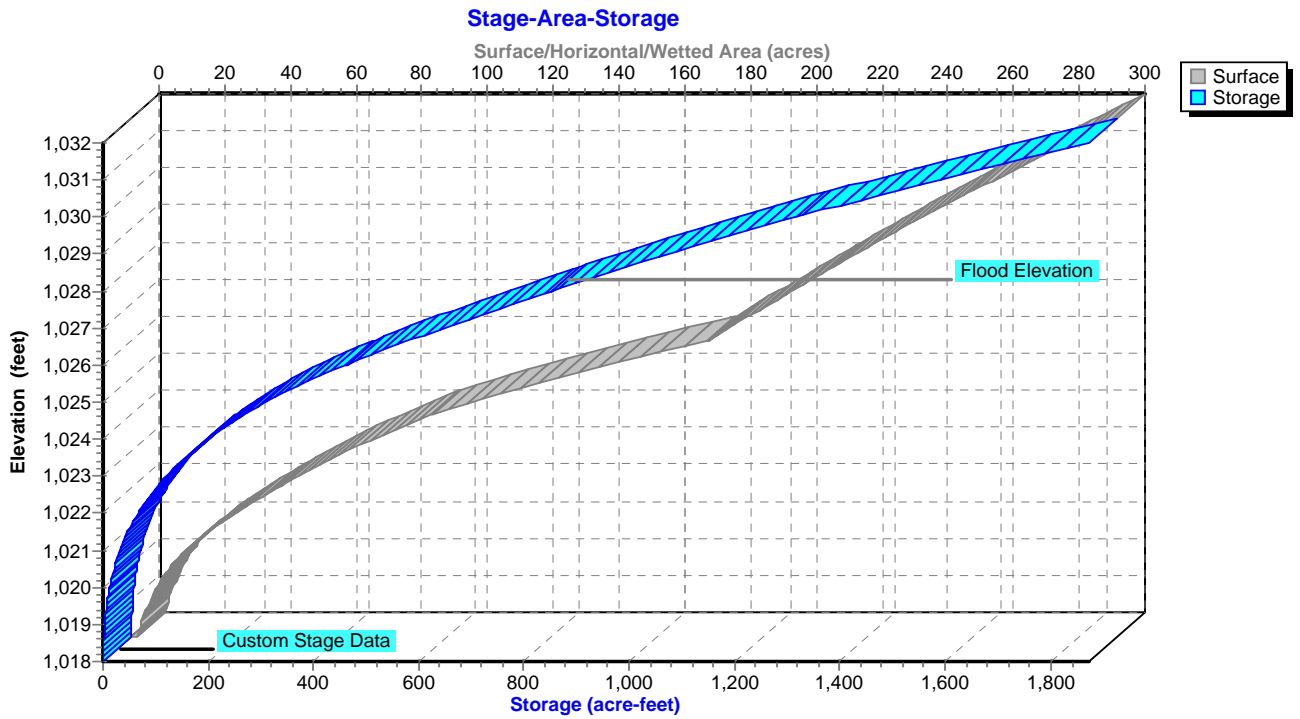
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 2.86" for 6-HR 0.21 PMF event
 Inflow = 1,519.45 cfs @ 5.03 hrs, Volume= 468.366 af
 Outflow = 1,166.04 cfs @ 6.29 hrs, Volume= 375.540 af, Atten= 23%, Lag= 75.8 min
 Primary = 1,166.04 cfs @ 6.29 hrs, Volume= 375.540 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.03' @ 6.29 hrs Surf.Area= 103.876 ac Storage= 414.624 af (194.624 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 347.6 min calculated for 155.540 af (33% of inflow)
 Center-of-Mass det. time= 119.8 min (475.2 - 355.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

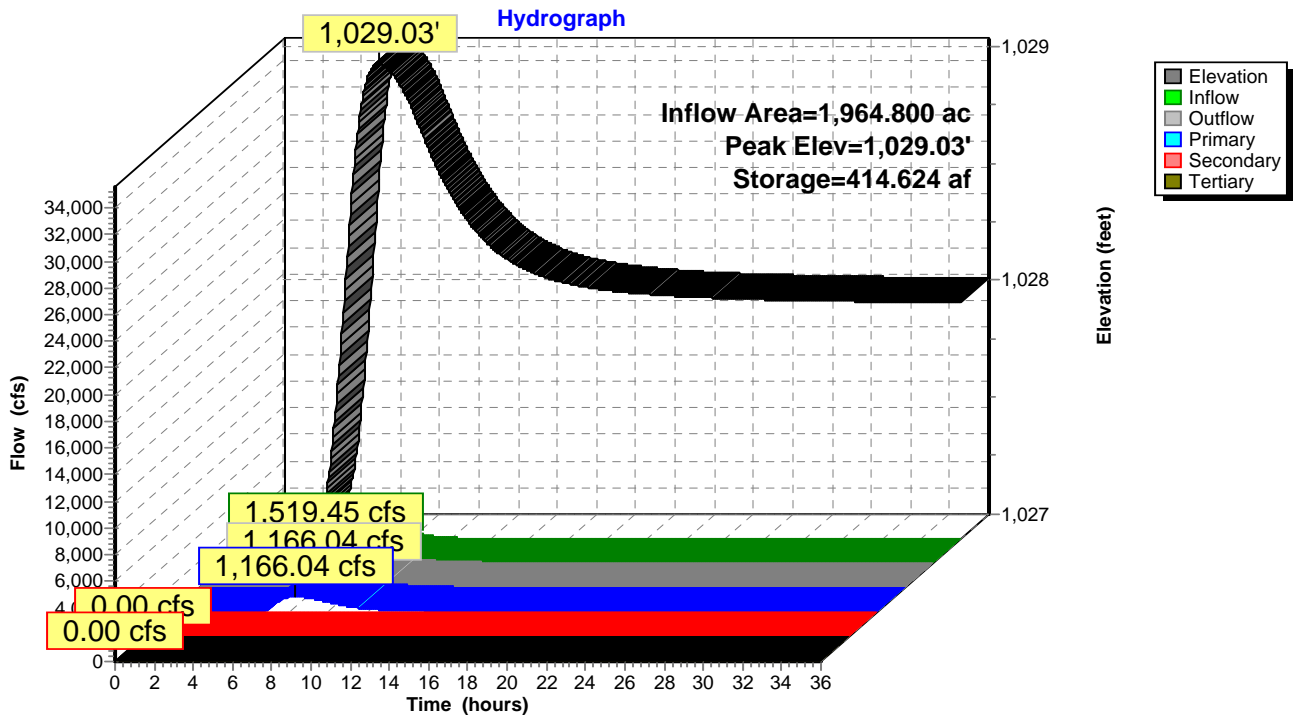
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,166.04 cfs @ 6.29 hrs HW=1,029.03' TW=1,022.56' (Dynamic Tailwater)
 ↖1=**Broad-Crested Rectangular Weir** (Weir Controls 823.58 cfs @ 2.67 fps)
 ↖2=**Broad-Crested Rectangular Weir** (Weir Controls 342.46 cfs @ 1.96 fps)

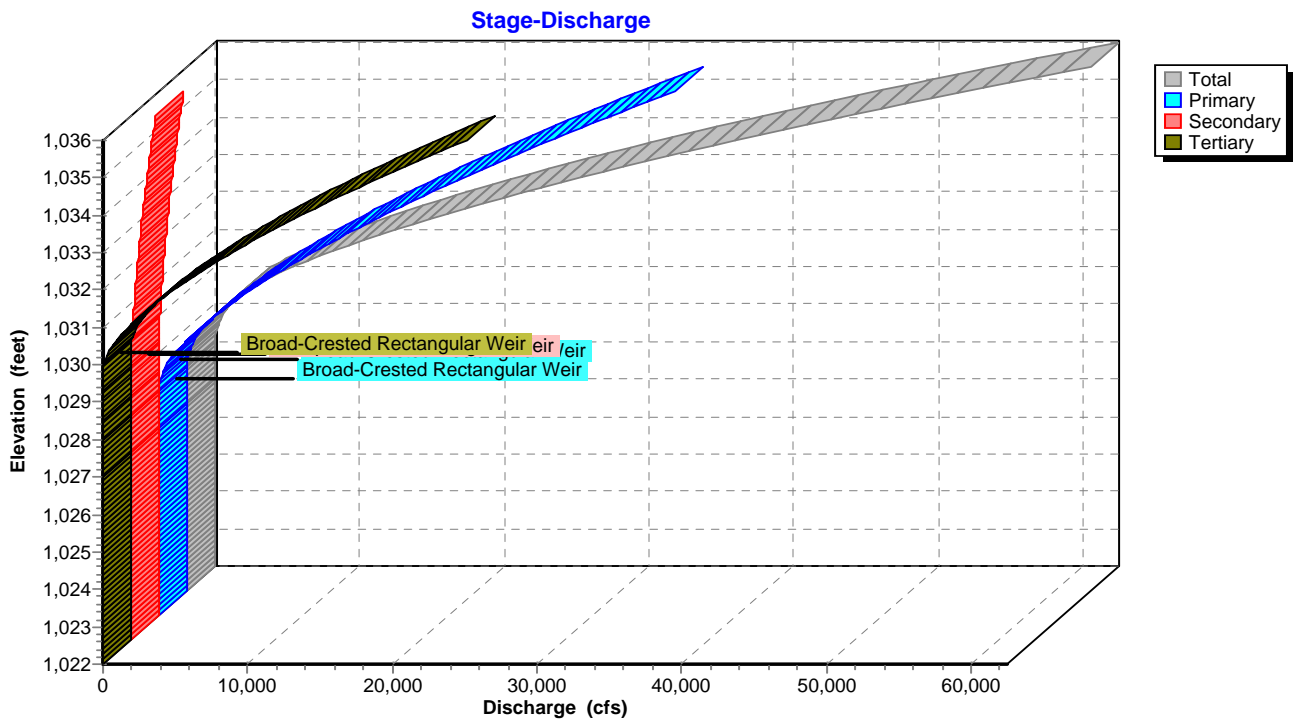
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↖3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↖4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

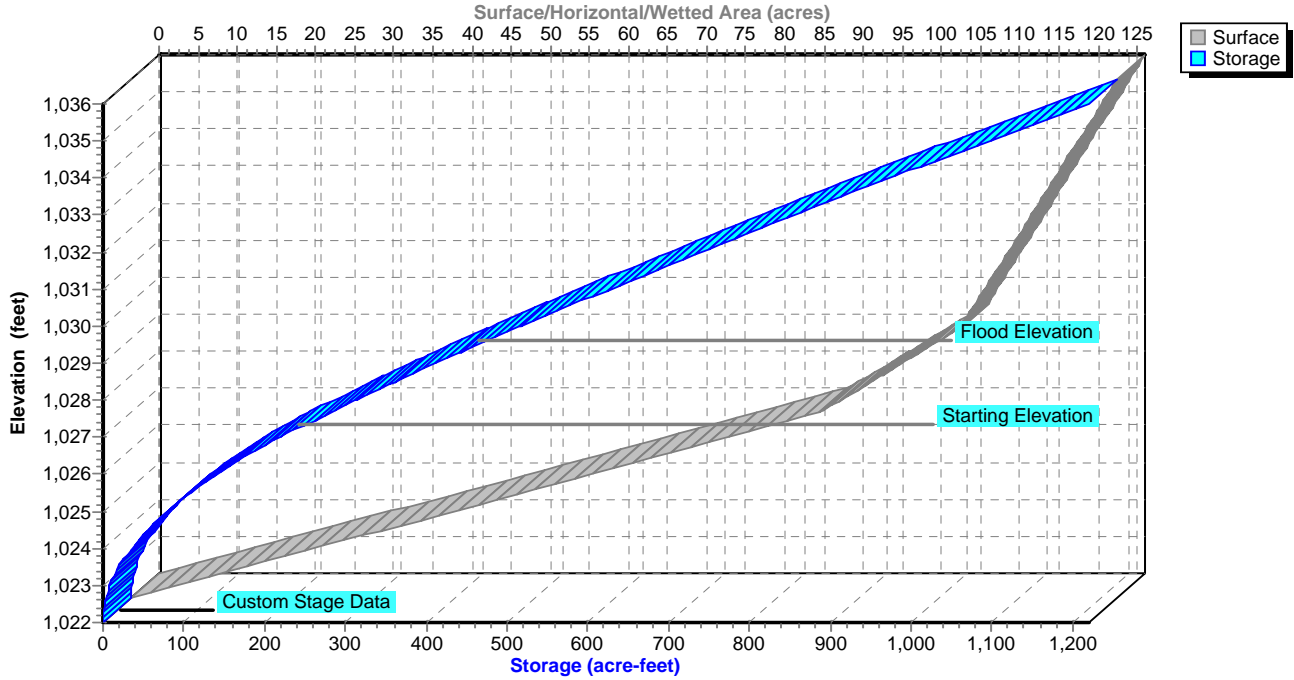


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

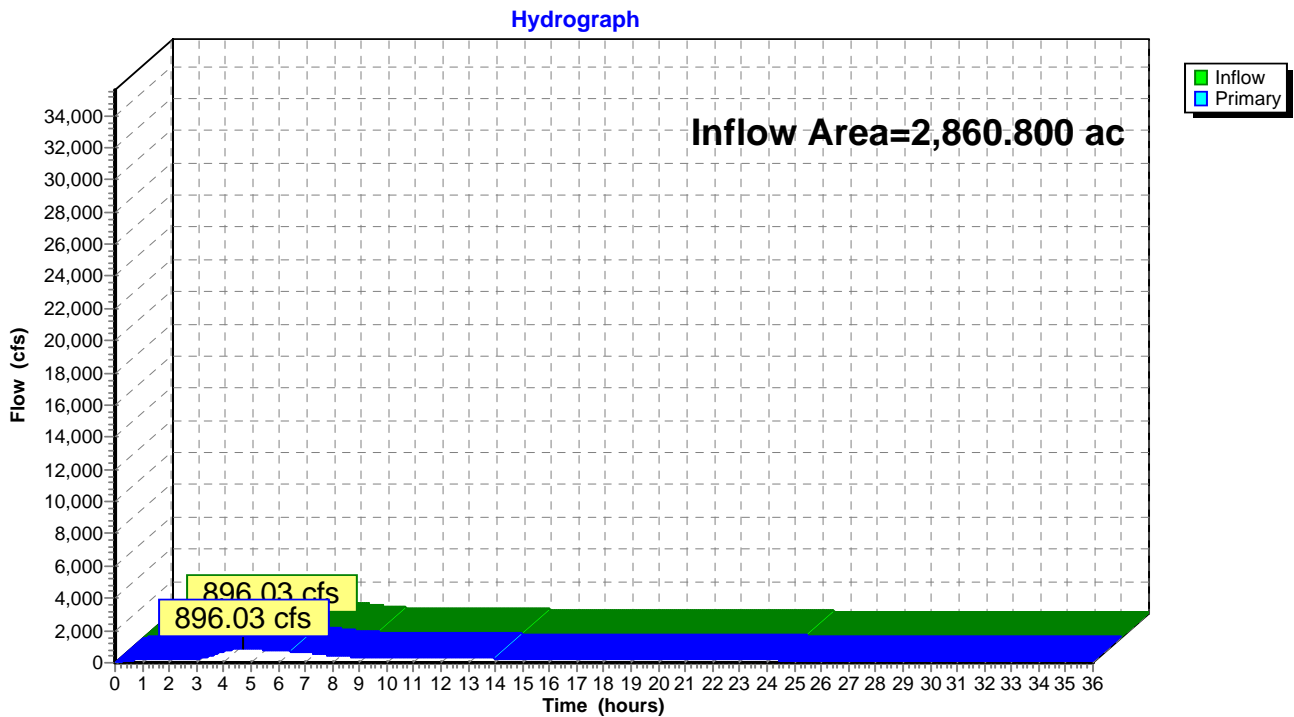


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.33" for 6-HR 0.21 PMF event
Inflow = 896.03 cfs @ 4.70 hrs, Volume= 793.180 af
Primary = 896.03 cfs @ 4.71 hrs, Volume= 793.180 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.52" for 6-HR 0.21 PMF event
 Inflow = 2,896.41 cfs @ 6.54 hrs, Volume= 1,987.736 af
 Outflow = 2,680.30 cfs @ 7.22 hrs, Volume= 1,987.099 af, Atten= 7%, Lag= 40.9 min
 Primary = 2,680.30 cfs @ 7.22 hrs, Volume= 1,987.099 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 999.48' @ 7.22 hrs Surf.Area= 9.272 ac Storage= 101.598 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 14.2 min calculated for 1,986.548 af (100% of inflow)
 Center-of-Mass det. time= 13.8 min (753.2 - 739.5)

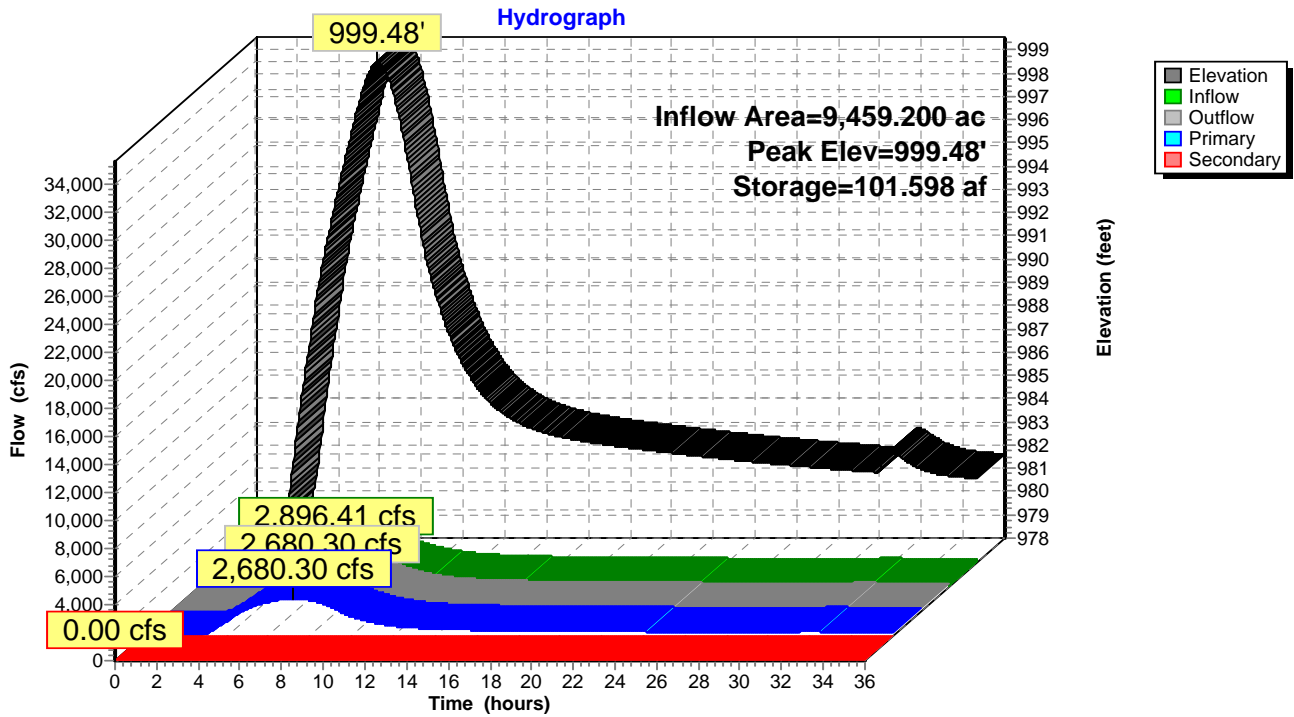
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

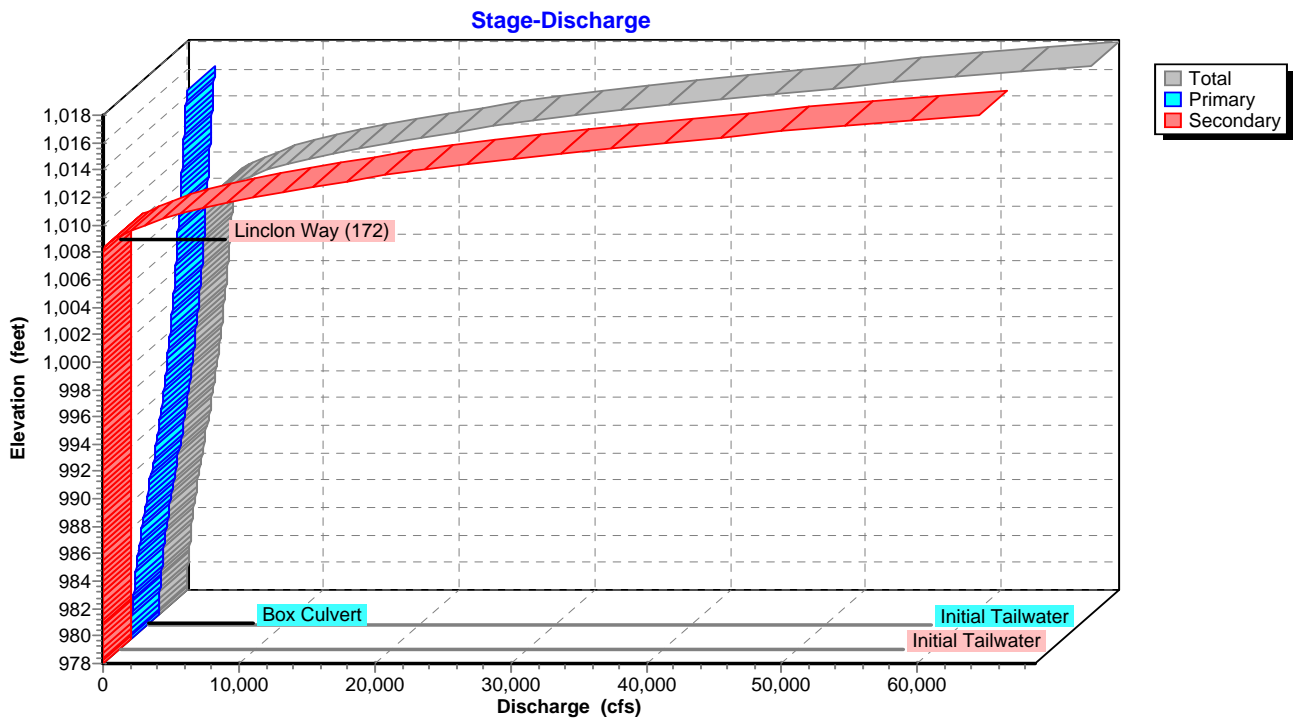
Primary OutFlow Max=2,680.29 cfs @ 7.22 hrs HW=999.48' TW=983.91' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,680.29 cfs @ 23.44 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

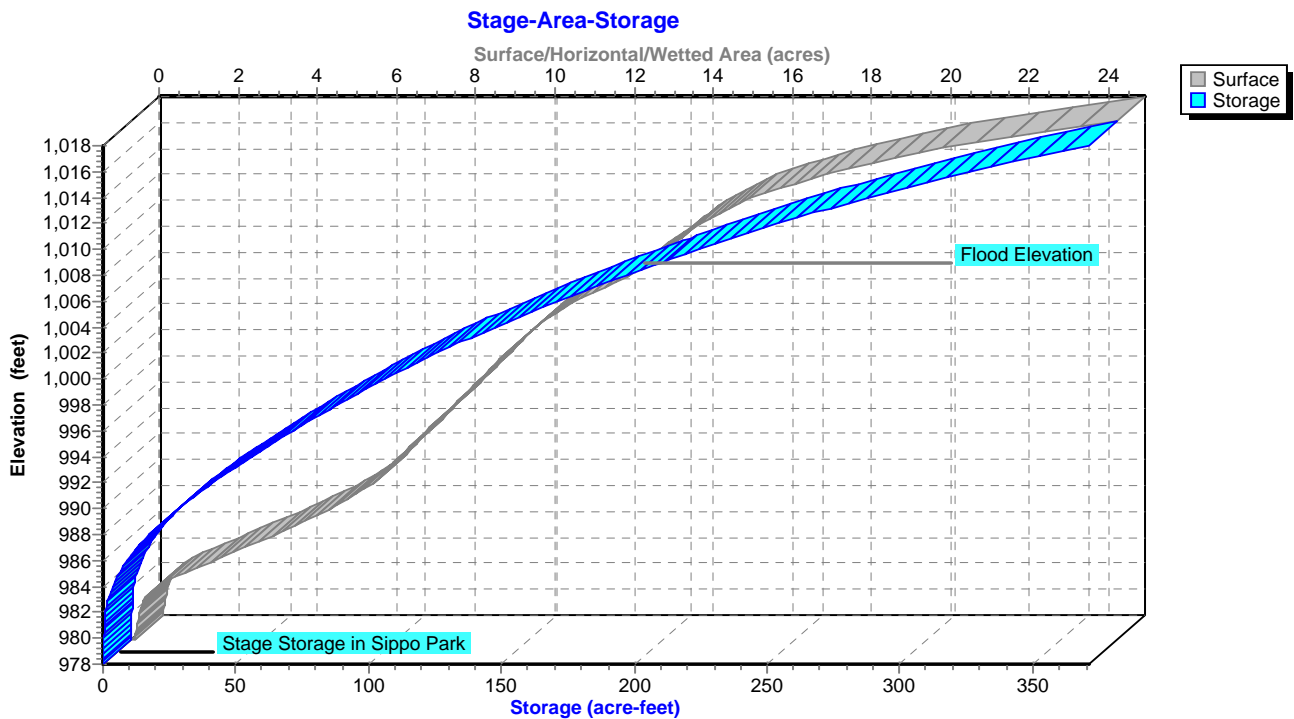
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



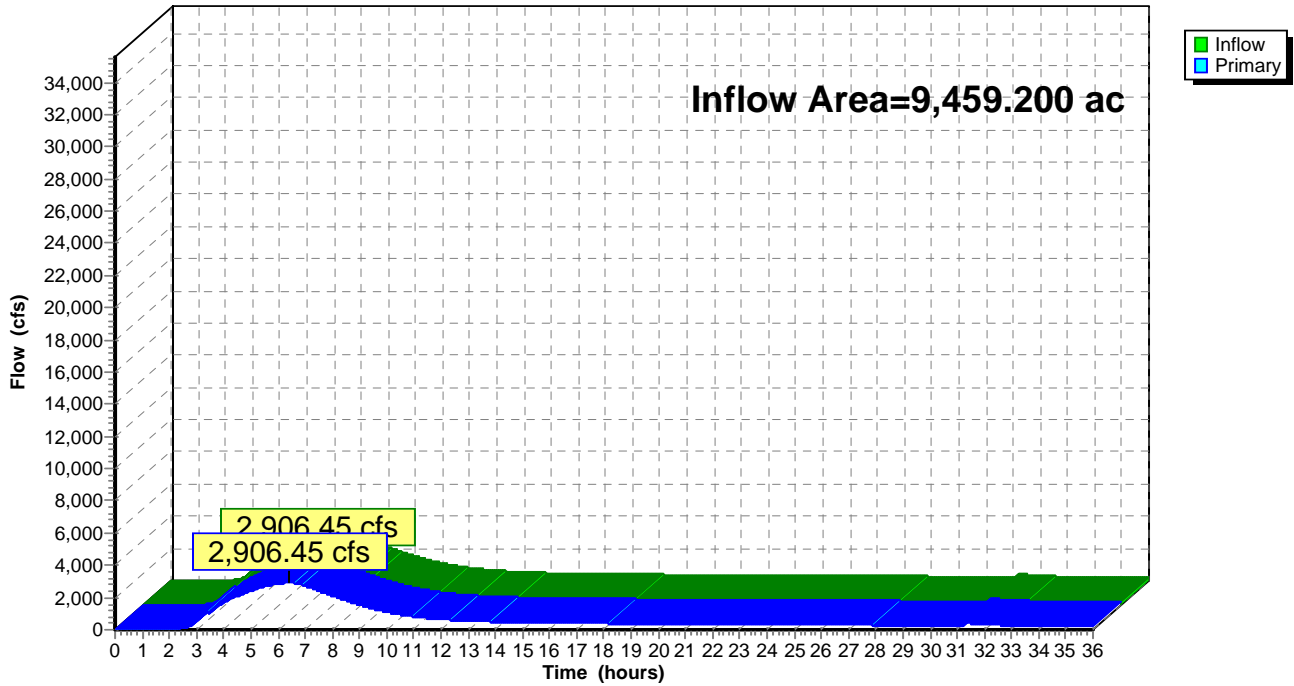
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.54" for 6-HR 0.21 PMF event
Inflow = 2,906.45 cfs @ 6.37 hrs, Volume= 1,998.771 af
Primary = 2,906.45 cfs @ 6.38 hrs, Volume= 1,998.771 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=2.98"
 Tc=44.0 min CN=74 Runoff=157.03 cfs 28.647 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=3.08"
 Tc=65.0 min CN=75 Runoff=339.23 cfs 68.960 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.62"
 Tc=226.0 min CN=70 Runoff=802.13 cfs 305.558 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.44"
 Tc=128.0 min CN=68 Runoff=772.46 cfs 218.443 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.35"
 Tc=129.0 min CN=67 Runoff=532.29 cfs 151.681 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=2.98"
 Tc=110.0 min CN=74 Runoff=701.67 cfs 179.842 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=3.08"
 Tc=72.0 min CN=75 Runoff=895.23 cfs 188.819 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.57"
 Tc=78.0 min CN=80 Runoff=937.68 cfs 201.565 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.53"
 Tc=155.0 min CN=69 Runoff=719.73 cfs 225.030 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=3.08"
 Tc=156.0 min CN=75 Runoff=1,638.90 cfs 504.064 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.35"
 Tc=151.0 min CN=67 Runoff=412.39 cfs 127.864 af

Reach 5R: Channel 5 Avg. Flow Depth=2.98' Max Vel=5.94 fps Inflow=329.82 cfs 619.659 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=329.24 cfs 614.422 af

Reach 7R: Channel 7 Avg. Flow Depth=7.99' Max Vel=3.12 fps Inflow=961.99 cfs 832.666 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=911.86 cfs 824.147 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=3.23' Max Vel=2.63 fps Inflow=139.93 cfs 287.571 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=139.92 cfs 286.818 af

Reach 15R: Channel 15 Avg. Flow Depth=8.39' Max Vel=2.12 fps Inflow=2,560.49 cfs 1,614.903 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,165.84 cfs 1,583.296 af

Reach 16R: Channel 16 Avg. Flow Depth=10.31' Max Vel=2.56 fps Inflow=2,901.22 cfs 1,951.590 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=2,819.07 cfs 1,929.374 af

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 250

Reach 18R: Sippo Creek Avg. Flow Depth=5.92' Max Vel=9.53 fps Inflow=2,858.31 cfs 2,118.464 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,858.31 cfs 2,118.344 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=384.80 cfs 97.498 af
Primary=384.80 cfs 97.498 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,007.21' Storage=127.145 af Inflow=3,142.96 cfs 2,130.560 af
2,180.31 cfs 1,837.758 af Secondary=952.82 cfs 281.783 af Tertiary=0.00 cfs 0.000 af Outflow=3,133.13 cfs 2,119.541 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=956.52 cfs 402.572 af
Primary=956.52 cfs 402.572 af

Pond 3P: Lake Cable Peak Elev=1,098.03' Storage=2,059.507 af Inflow=956.52 cfs 402.571 af
Primary=329.82 cfs 619.758 af Secondary=0.00 cfs 0.000 af Outflow=329.82 cfs 619.758 af

Pond 4C: Confluence 4 Inflow=1,631.27 cfs 1,049.077 af
Primary=1,631.27 cfs 1,049.077 af

Pond 4P: Lake O'Springs Peak Elev=1,107.80' Storage=74.635 af Inflow=384.80 cfs 97.498 af
Primary=155.73 cfs 97.015 af Secondary=0.00 cfs 0.000 af Outflow=155.73 cfs 97.015 af

Pond 5C: Confluence 5 Inflow=2,138.81 cfs 1,200.658 af
Primary=2,138.81 cfs 1,200.658 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,119.91' Storage=27.112 af Inflow=157.03 cfs 28.647 af
Primary=66.39 cfs 28.538 af Secondary=0.00 cfs 0.000 af Outflow=66.39 cfs 28.538 af

Pond 6C: Confluence 6 Inflow=442.90 cfs 414.603 af
Primary=442.90 cfs 414.603 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,560.49 cfs 1,615.082 af
Primary=2,560.49 cfs 1,615.082 af

Pond 8C: Confluence 8 Inflow=2,901.22 cfs 1,951.773 af
Primary=2,901.22 cfs 1,951.773 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,025.10' Storage=322.771 af Inflow=1,284.87 cfs 411.232 af
Primary=126.65 cfs 284.673 af Secondary=13.40 cfs 2.977 af Outflow=139.93 cfs 287.650 af

Pond 9P: Sippo Lake Peak Elev=1,029.08' Storage=420.172 af Inflow=1,638.90 cfs 504.064 af
Primary=1,284.87 cfs 411.233 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,284.87 cfs 411.233 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=961.99 cfs 832.766 af
Primary=961.99 cfs 832.766 af

Pond 16P: Lincoln Way Box Peak Elev=1,001.65' Storage=122.580 af Inflow=3,133.13 cfs 2,119.347 af
Primary=2,858.31 cfs 2,118.658 af Secondary=0.00 cfs 0.000 af Outflow=2,858.31 cfs 2,118.658 af

Pond 19C: Confluence 19 Inflow=3,142.96 cfs 2,130.749 af
Primary=3,142.96 cfs 2,130.749 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 2,200.473 af Average Runoff Depth = 2.79"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 157.03 cfs @ 3.37 hrs, Volume= 28.647 af, Depth= 2.98"

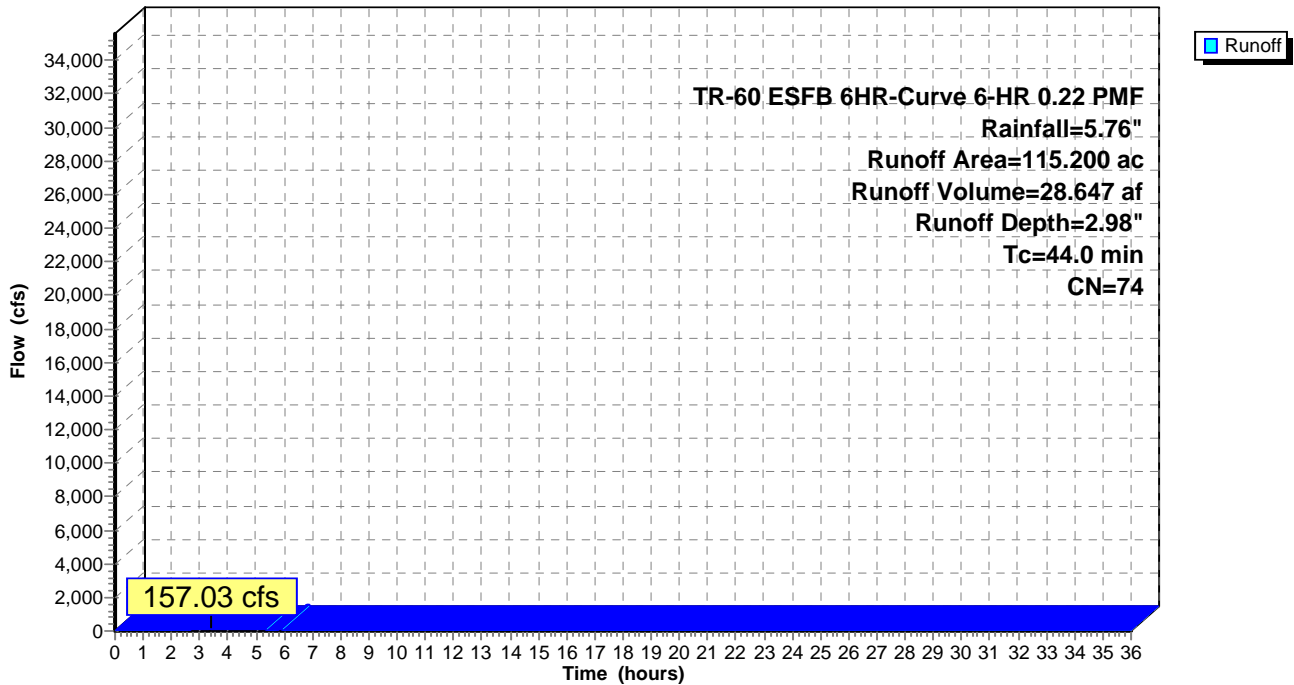
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 339.23 cfs @ 3.68 hrs, Volume= 68.960 af, Depth= 3.08"

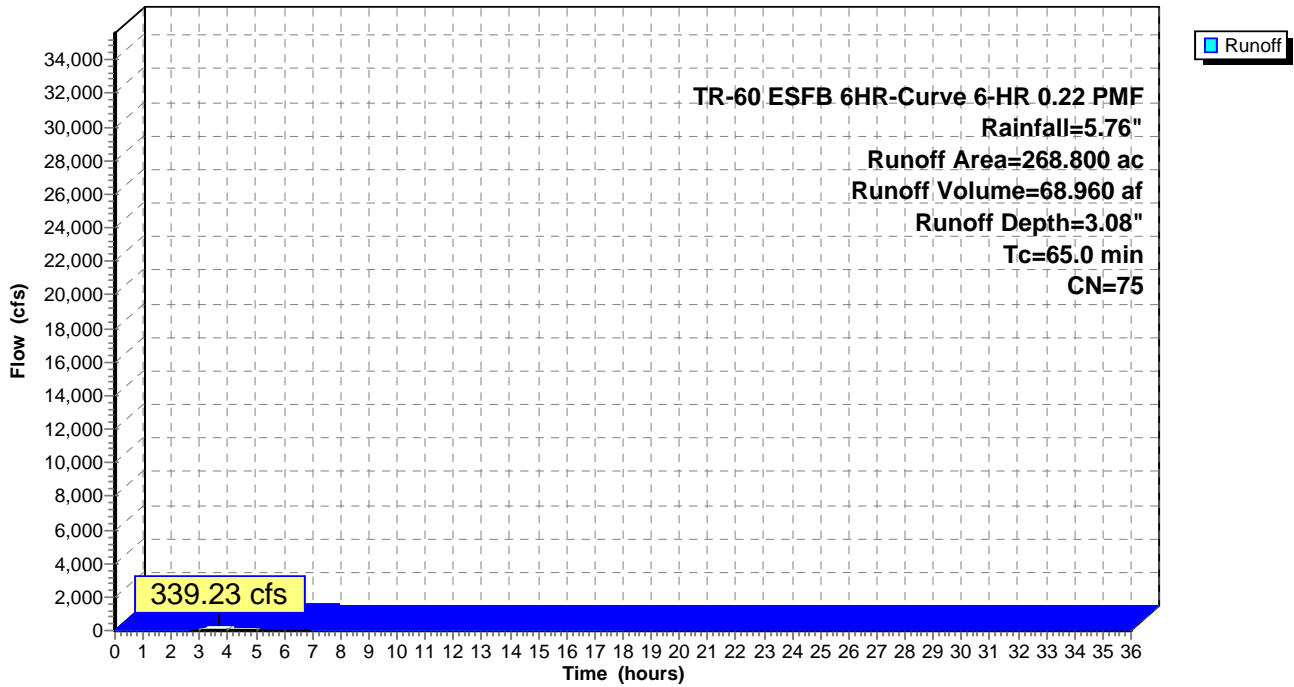
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 802.13 cfs @ 6.28 hrs, Volume= 305.558 af, Depth= 2.62"

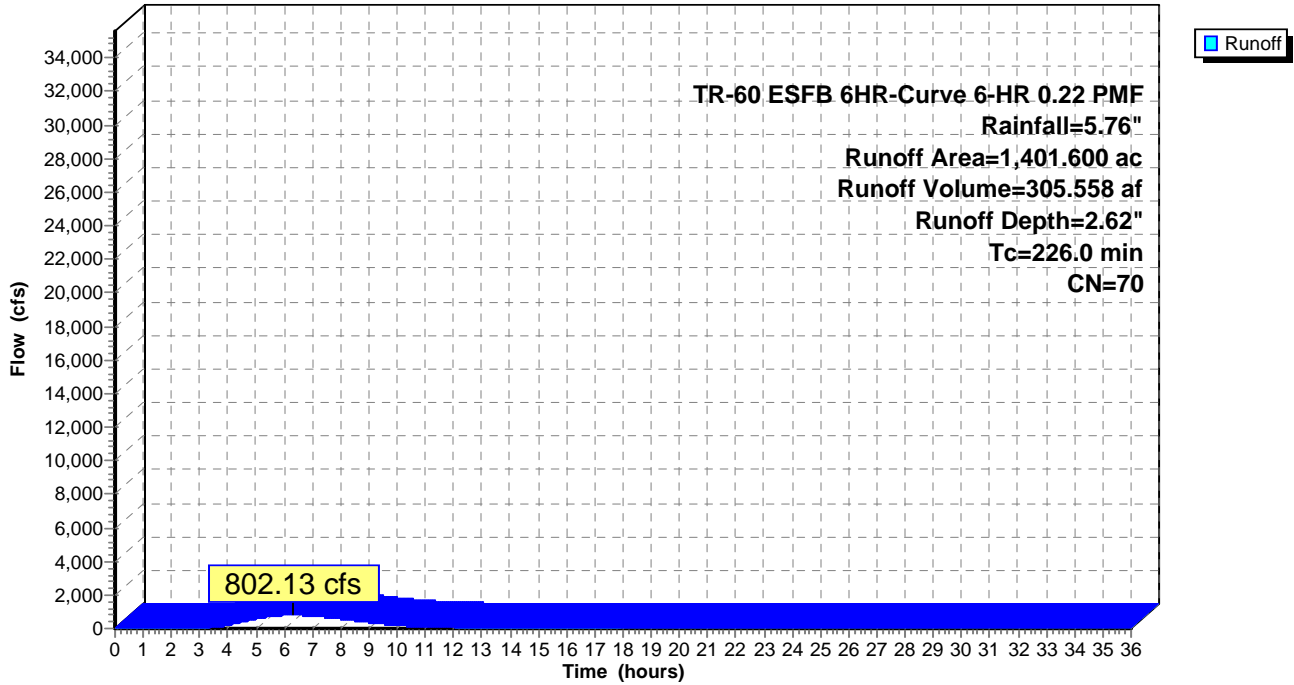
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 772.46 cfs @ 4.69 hrs, Volume= 218.443 af, Depth= 2.44"

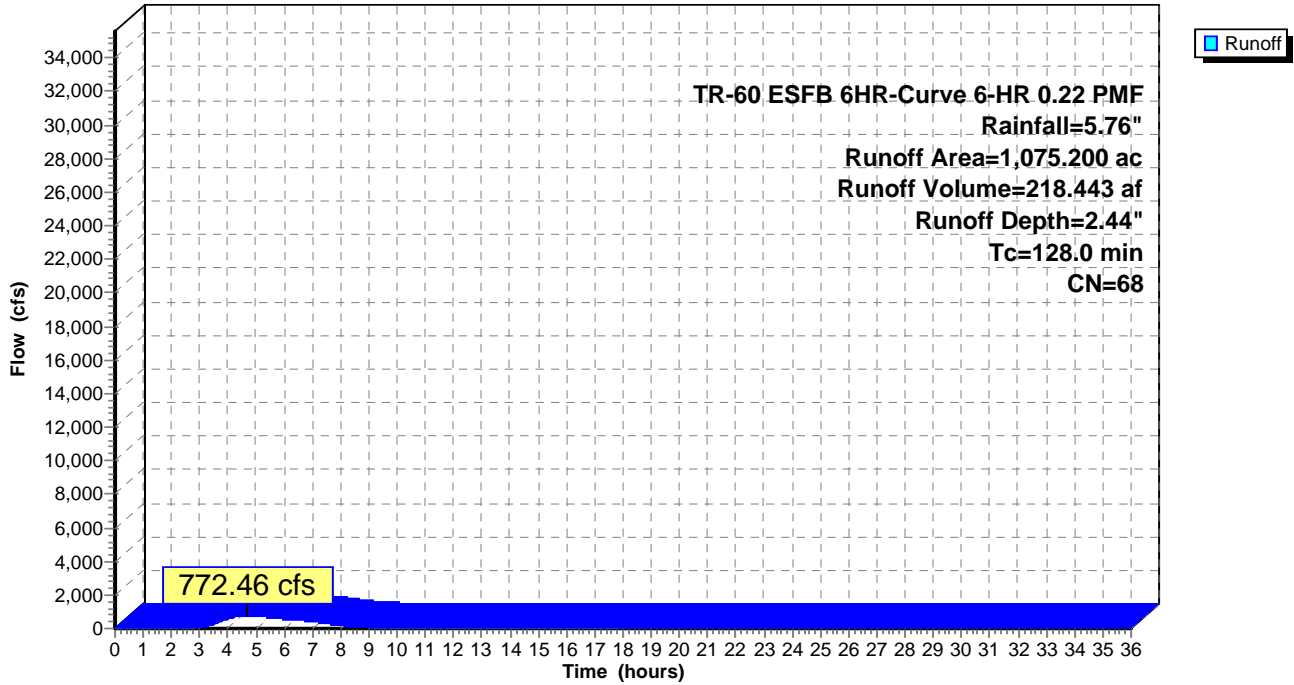
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 532.29 cfs @ 4.73 hrs, Volume= 151.681 af, Depth= 2.35"

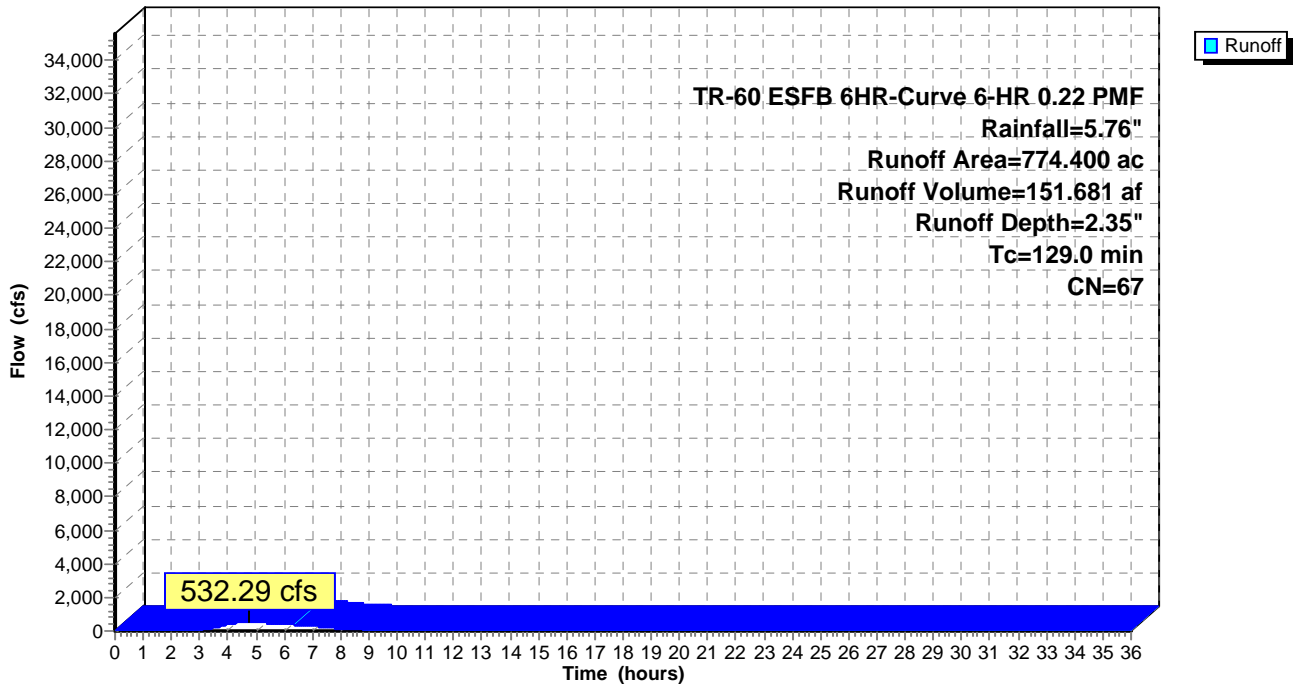
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 701.67 cfs @ 4.28 hrs, Volume= 179.842 af, Depth= 2.98"

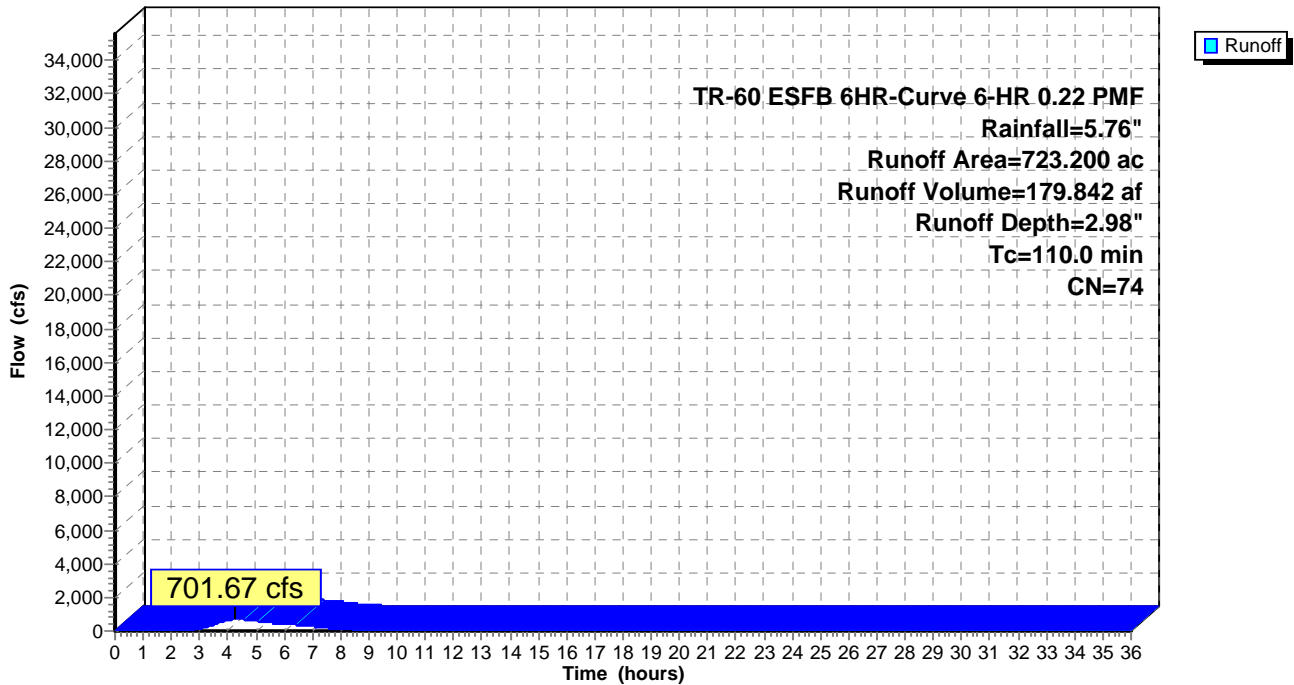
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 895.23 cfs @ 3.76 hrs, Volume= 188.819 af, Depth= 3.08"

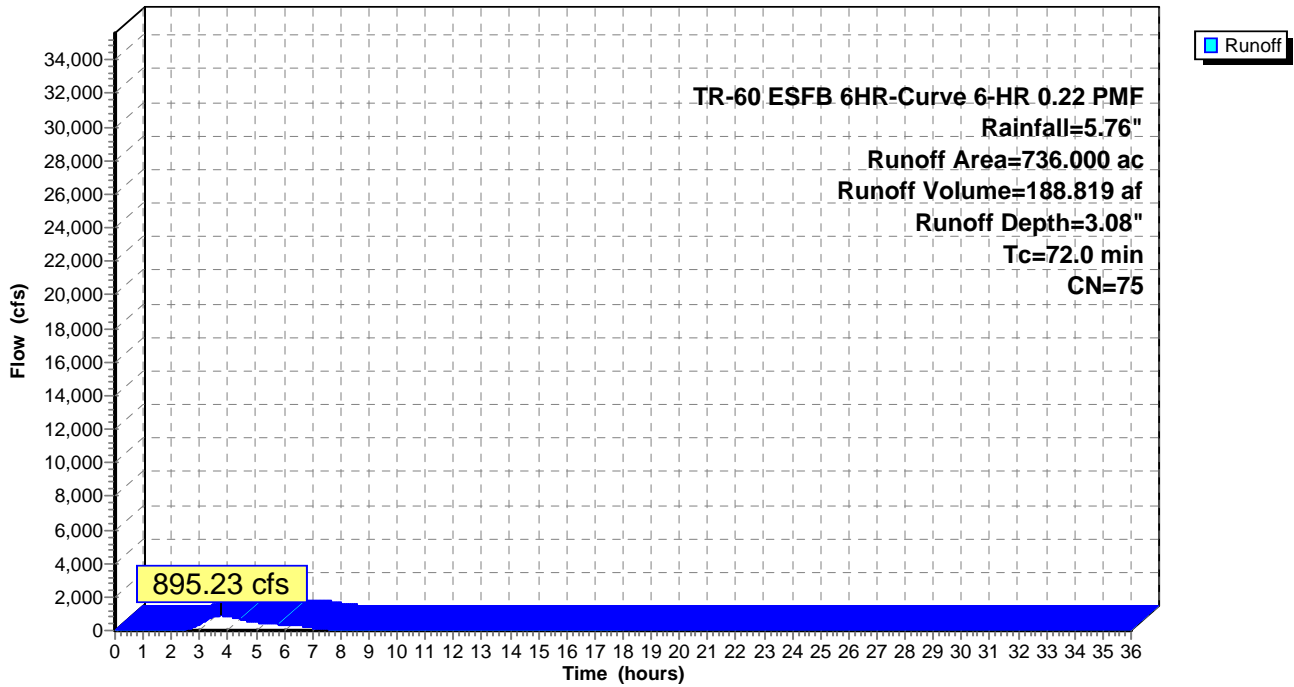
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 937.68 cfs @ 3.81 hrs, Volume= 201.565 af, Depth= 3.57"

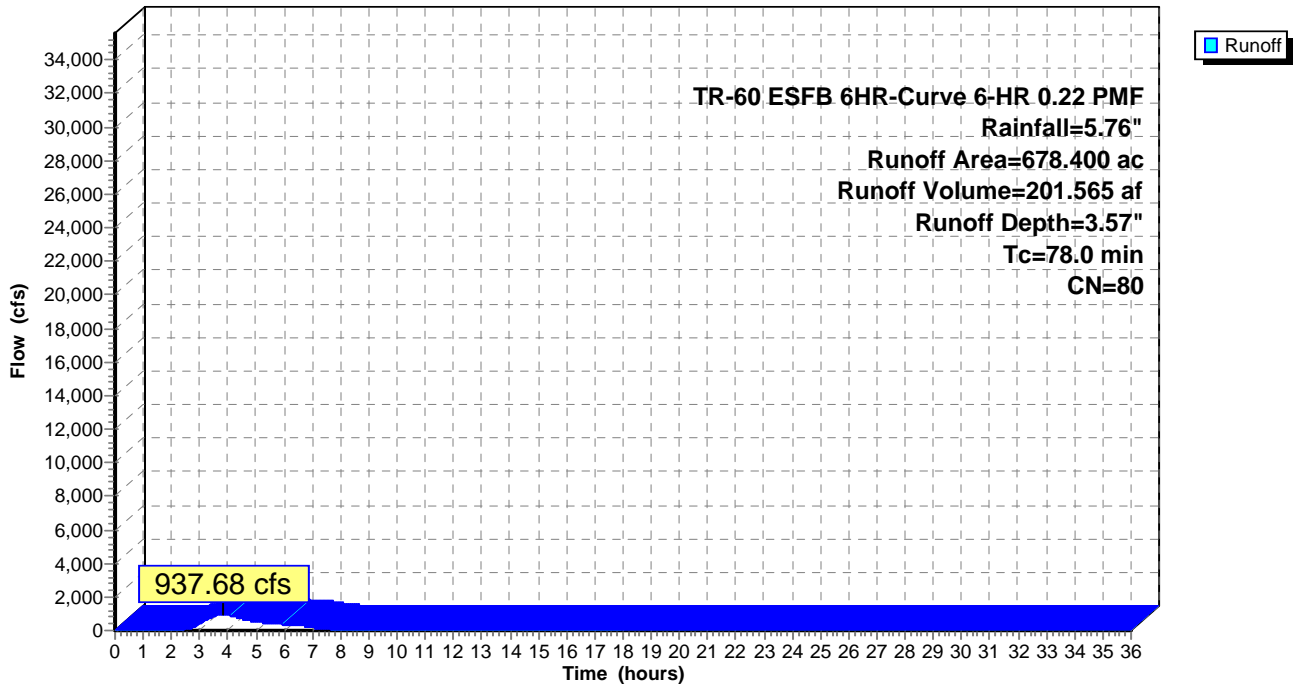
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 719.73 cfs @ 5.16 hrs, Volume= 225.030 af, Depth= 2.53"

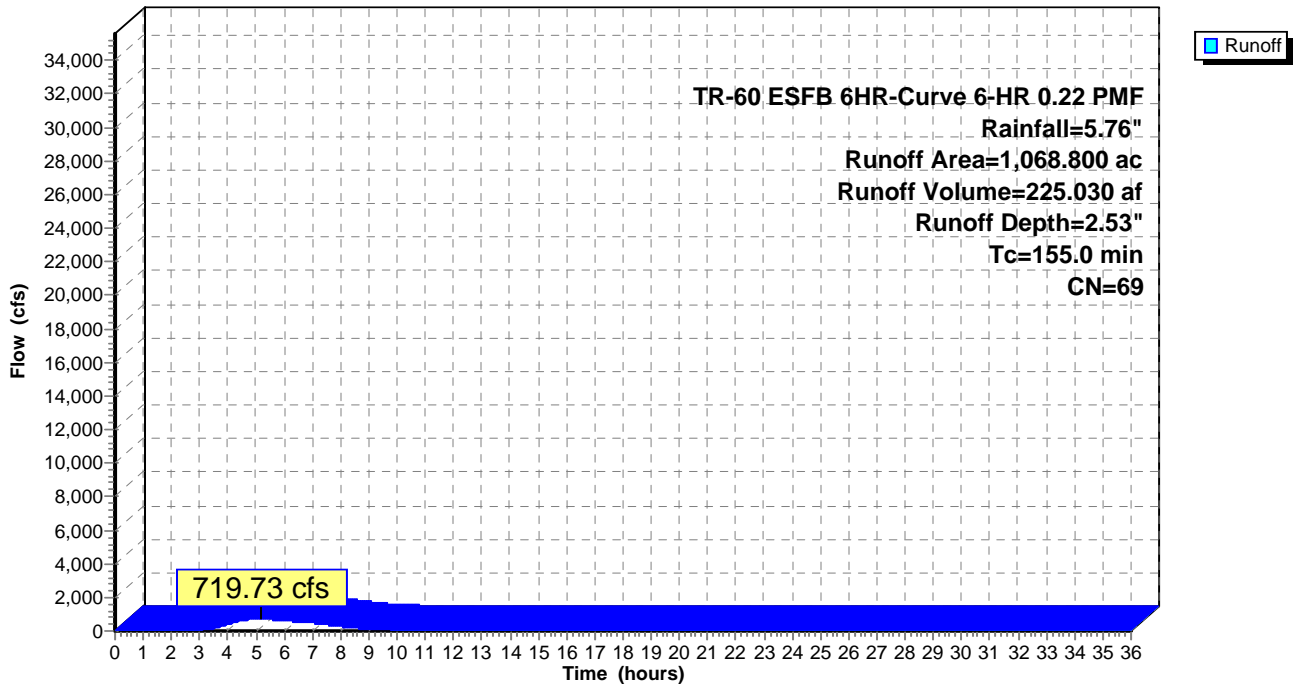
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,638.90 cfs @ 5.03 hrs, Volume= 504.064 af, Depth= 3.08"

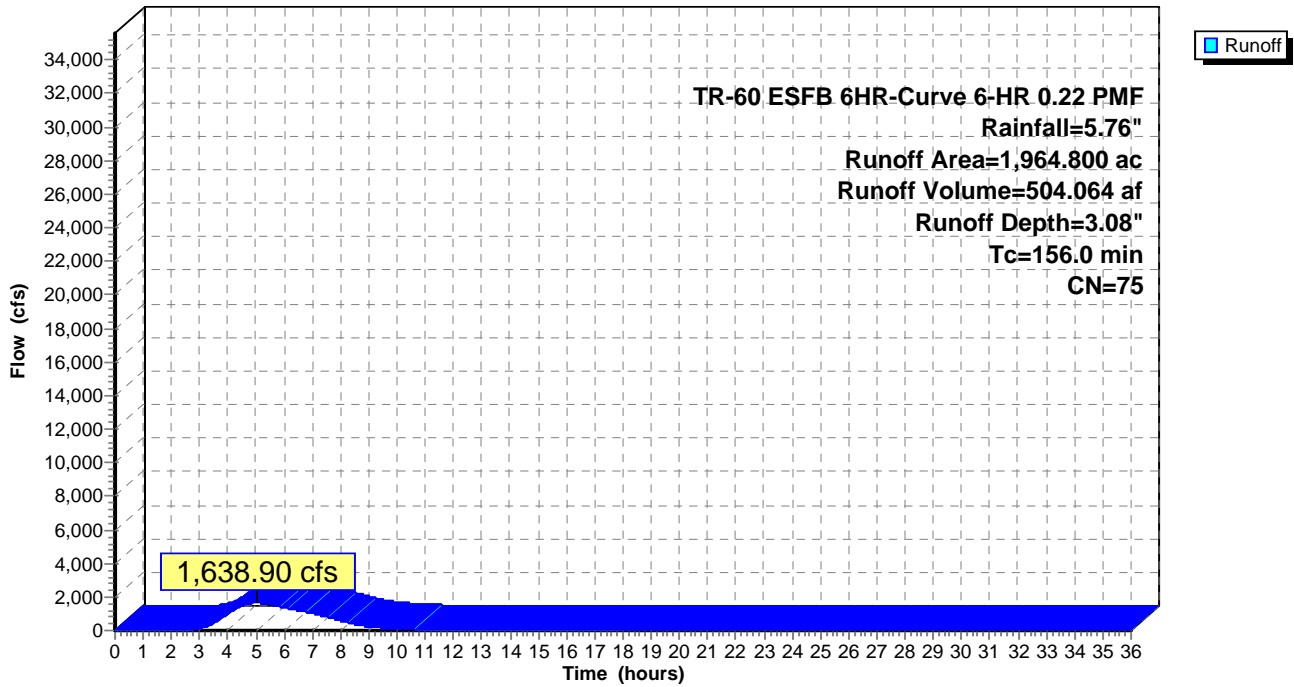
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 412.39 cfs @ 5.04 hrs, Volume= 127.864 af, Depth= 2.35"

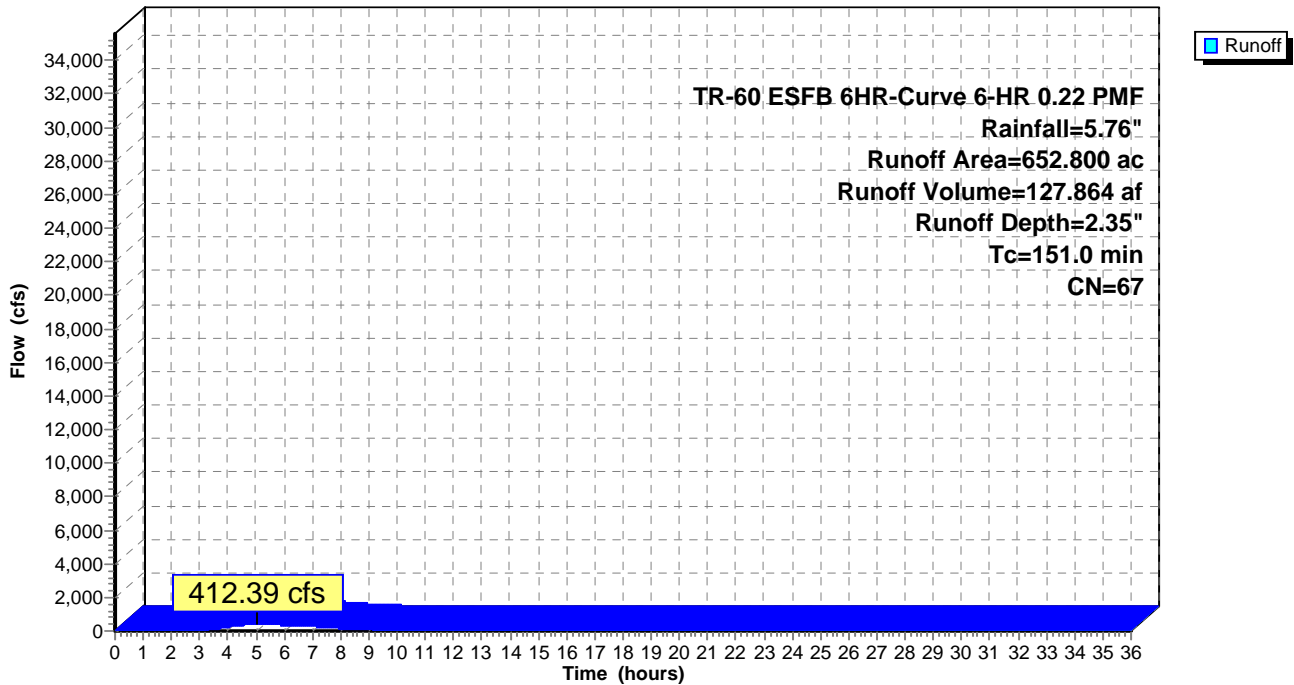
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



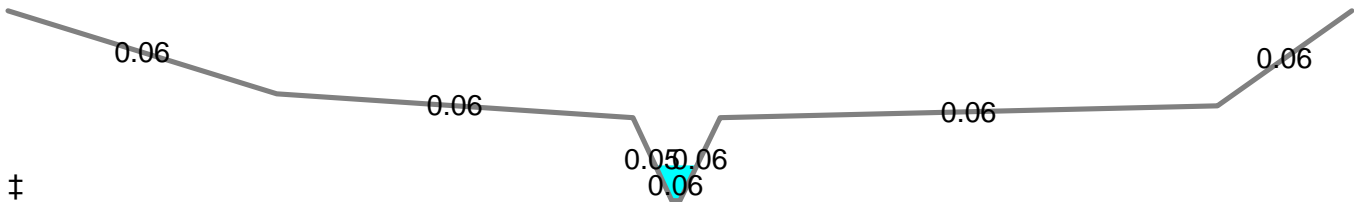
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.16" for 6-HR 0.22 PMF event
 Inflow = 329.82 cfs @ 9.64 hrs, Volume= 619.659 af
 Outflow = 329.24 cfs @ 9.96 hrs, Volume= 614.422 af, Atten= 0%, Lag= 19.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.94 fps, Min. Travel Time= 24.7 min
 Avg. Velocity = 5.20 fps, Avg. Travel Time= 28.2 min

Peak Storage= 488,235 cf @ 9.96 hrs
 Average Depth at Peak Storage= 2.98'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

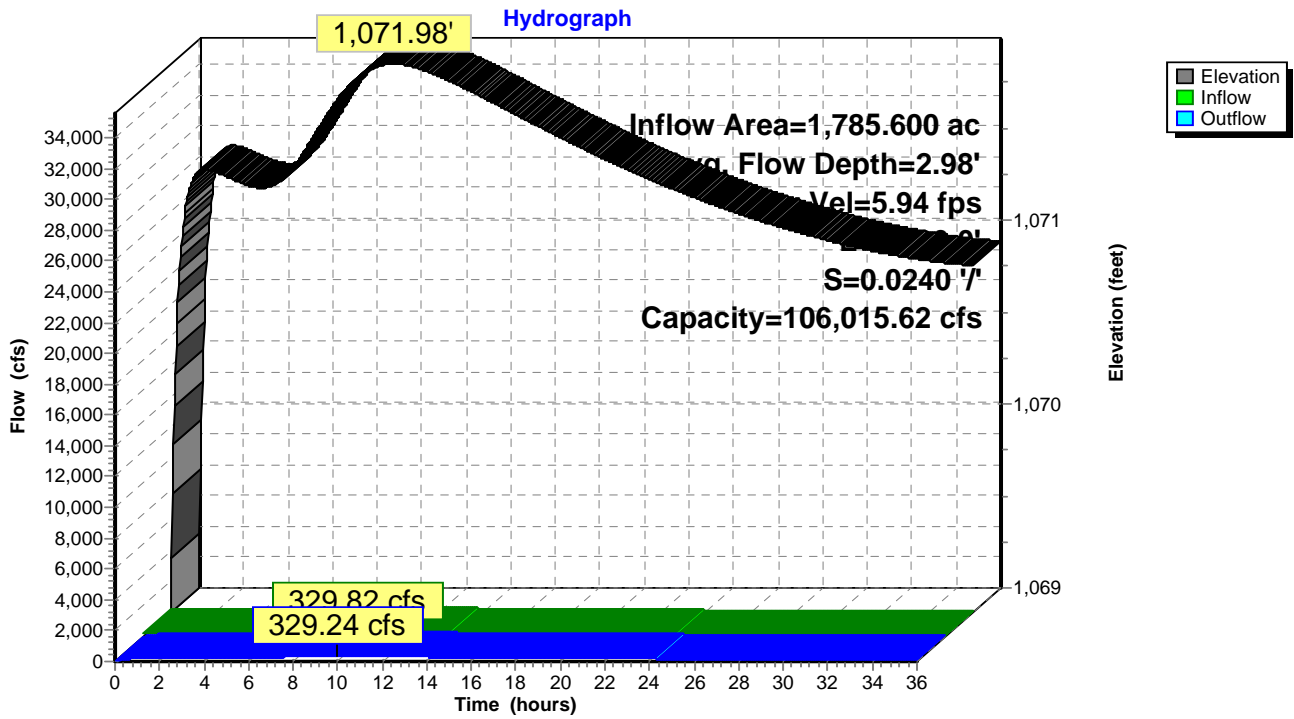
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



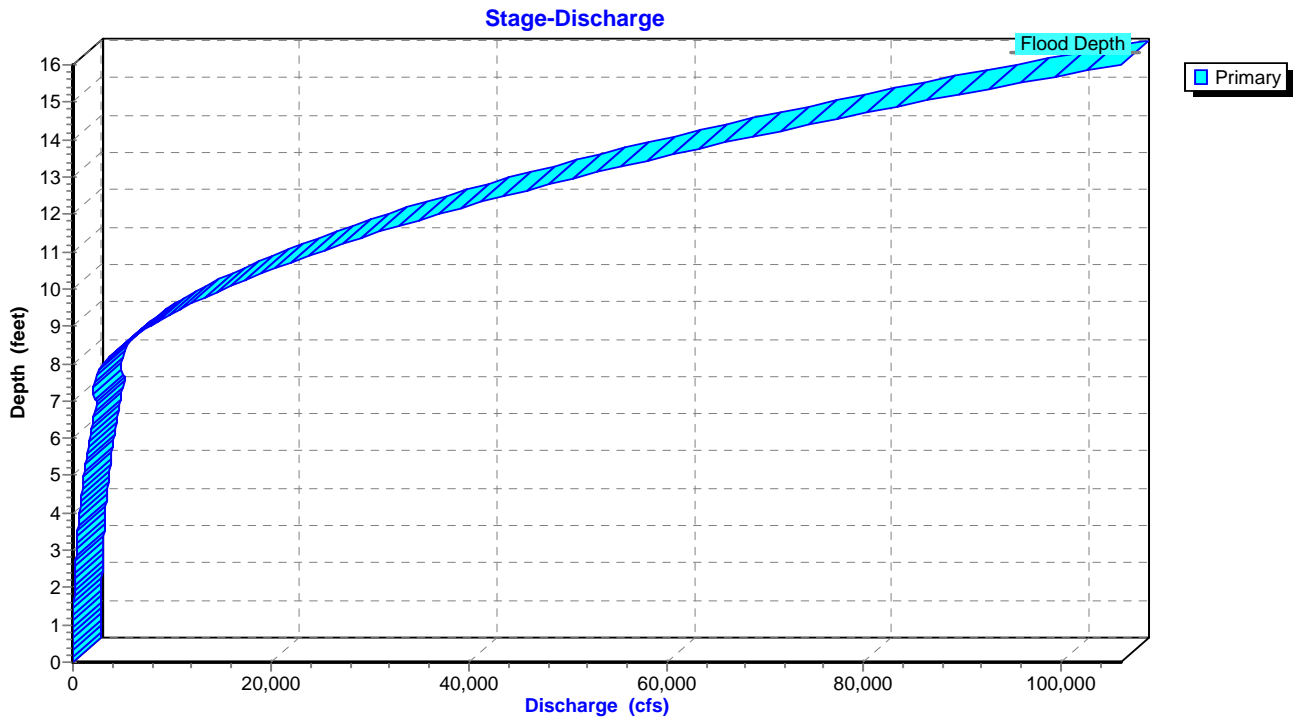
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

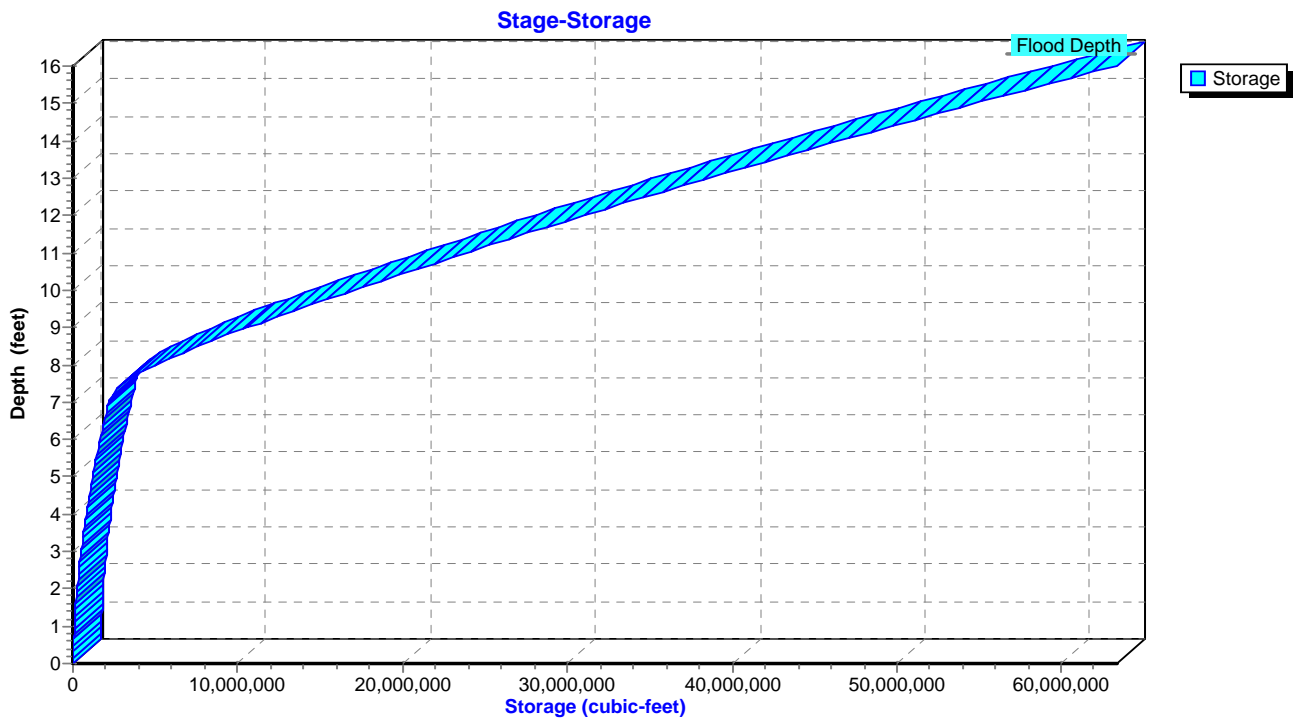
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



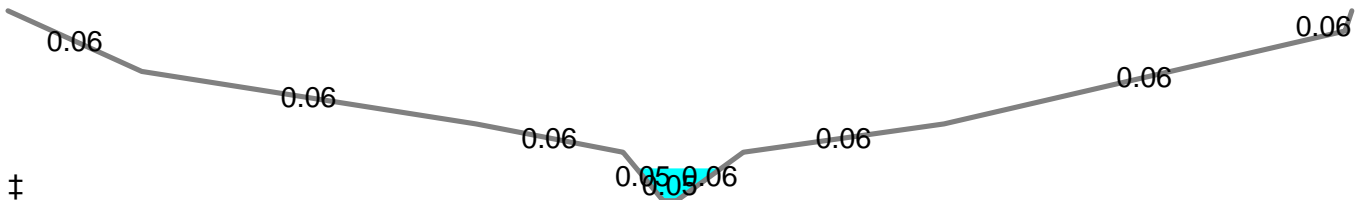
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.49" for 6-HR 0.22 PMF event
 Inflow = 961.99 cfs @ 4.70 hrs, Volume= 832.666 af
 Outflow = 911.86 cfs @ 5.20 hrs, Volume= 824.147 af, Atten= 5%, Lag= 29.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.12 fps, Min. Travel Time= 31.5 min
 Avg. Velocity = 2.24 fps, Avg. Travel Time= 43.9 min

Peak Storage= 1,725,358 cf @ 5.20 hrs
 Average Depth at Peak Storage= 7.99'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

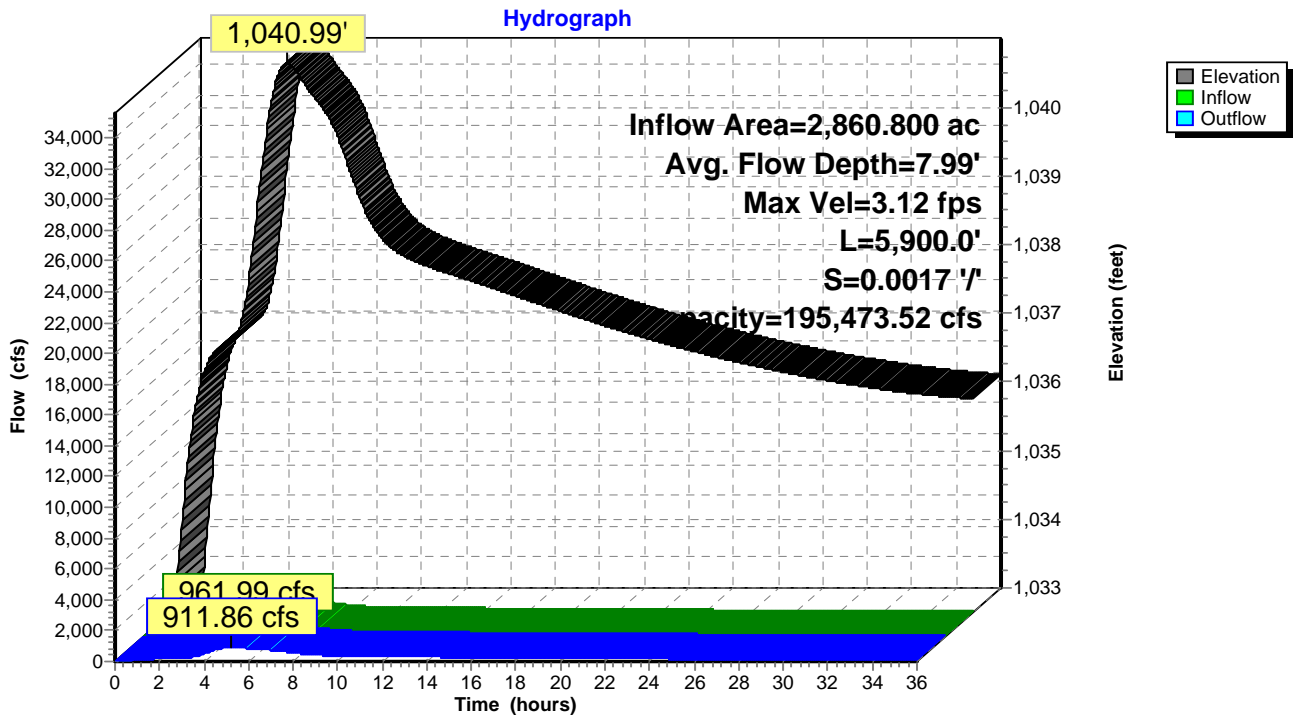
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



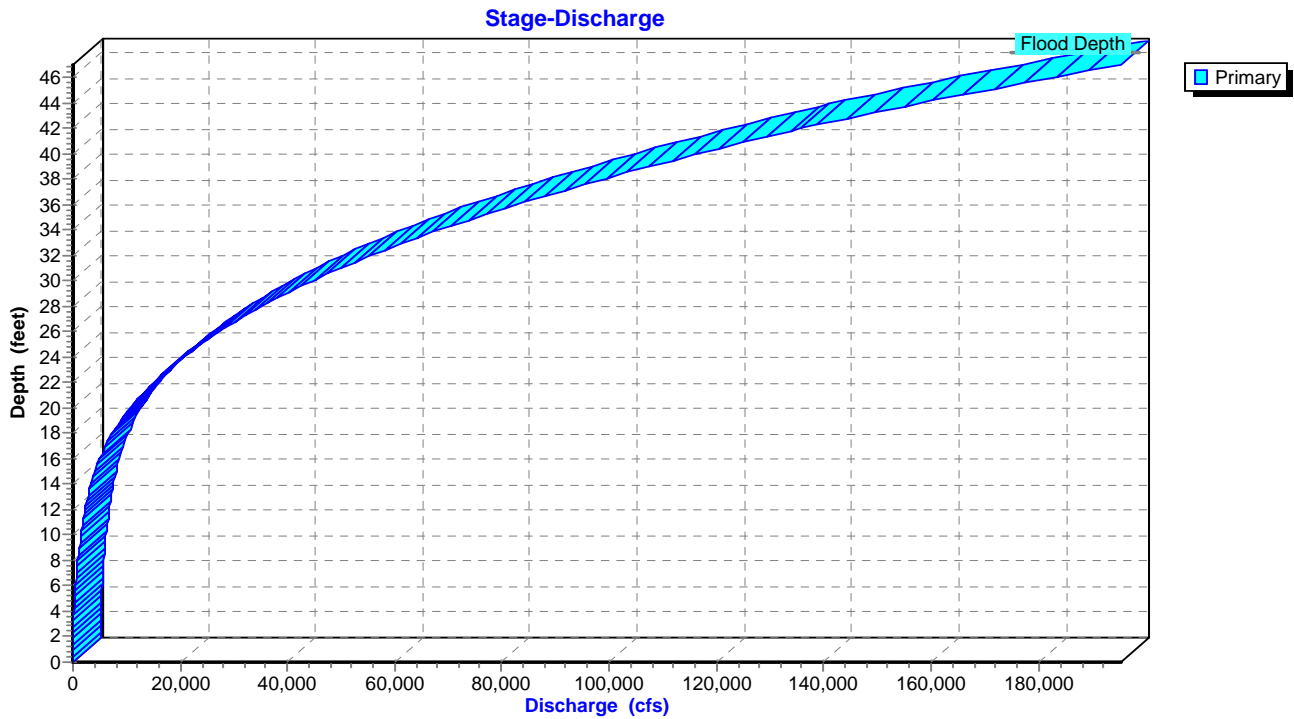
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

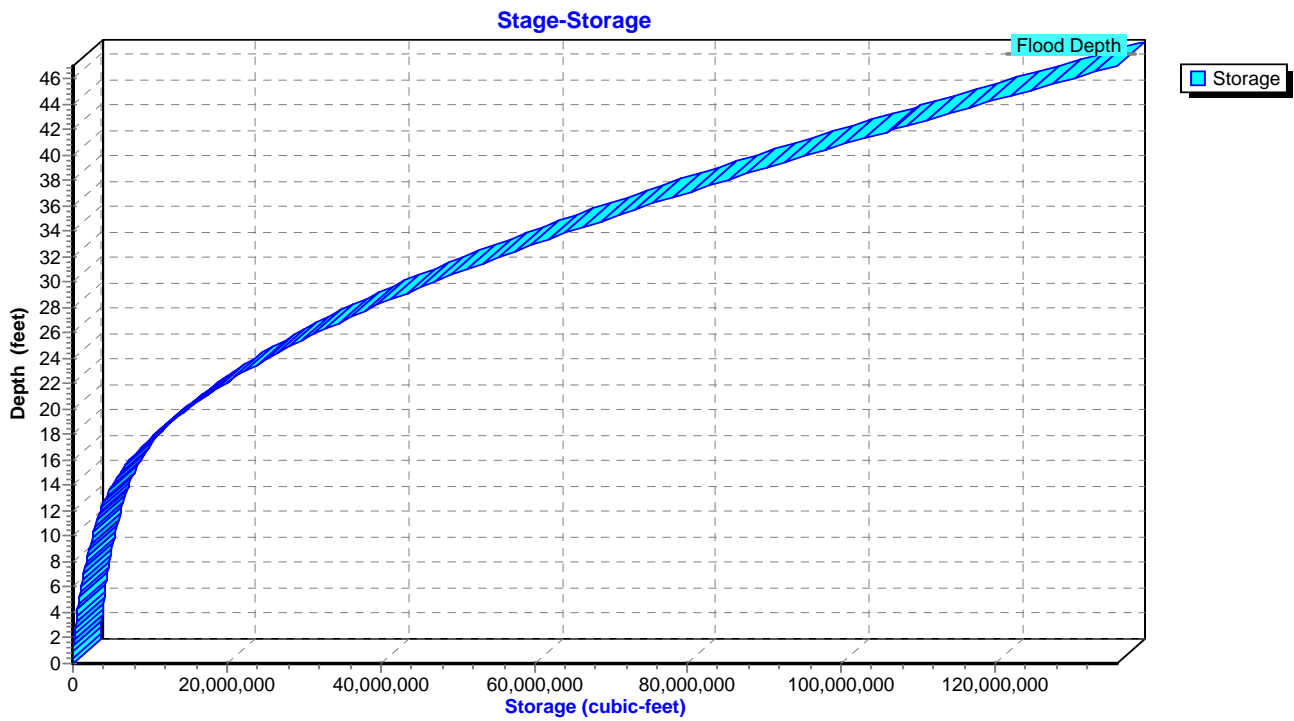
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



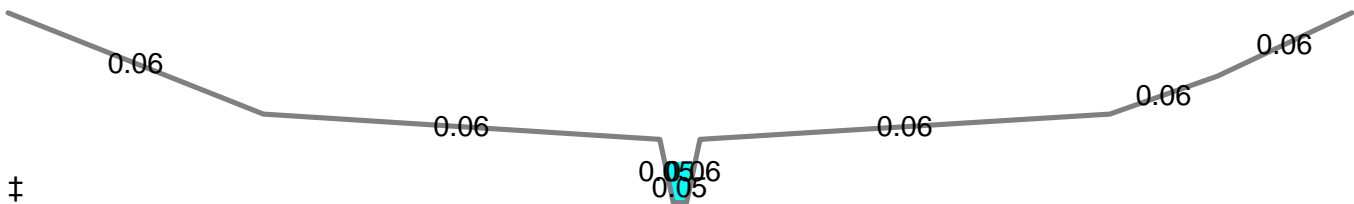
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.76" for 6-HR 0.22 PMF event
 Inflow = 139.93 cfs @ 11.37 hrs, Volume= 287.571 af
 Outflow = 139.92 cfs @ 11.44 hrs, Volume= 286.818 af, Atten= 0%, Lag= 4.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.63 fps, Min. Travel Time= 5.7 min
 Avg. Velocity = 2.44 fps, Avg. Travel Time= 6.2 min

Peak Storage= 47,818 cf @ 11.44 hrs
 Average Depth at Peak Storage= 3.23'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

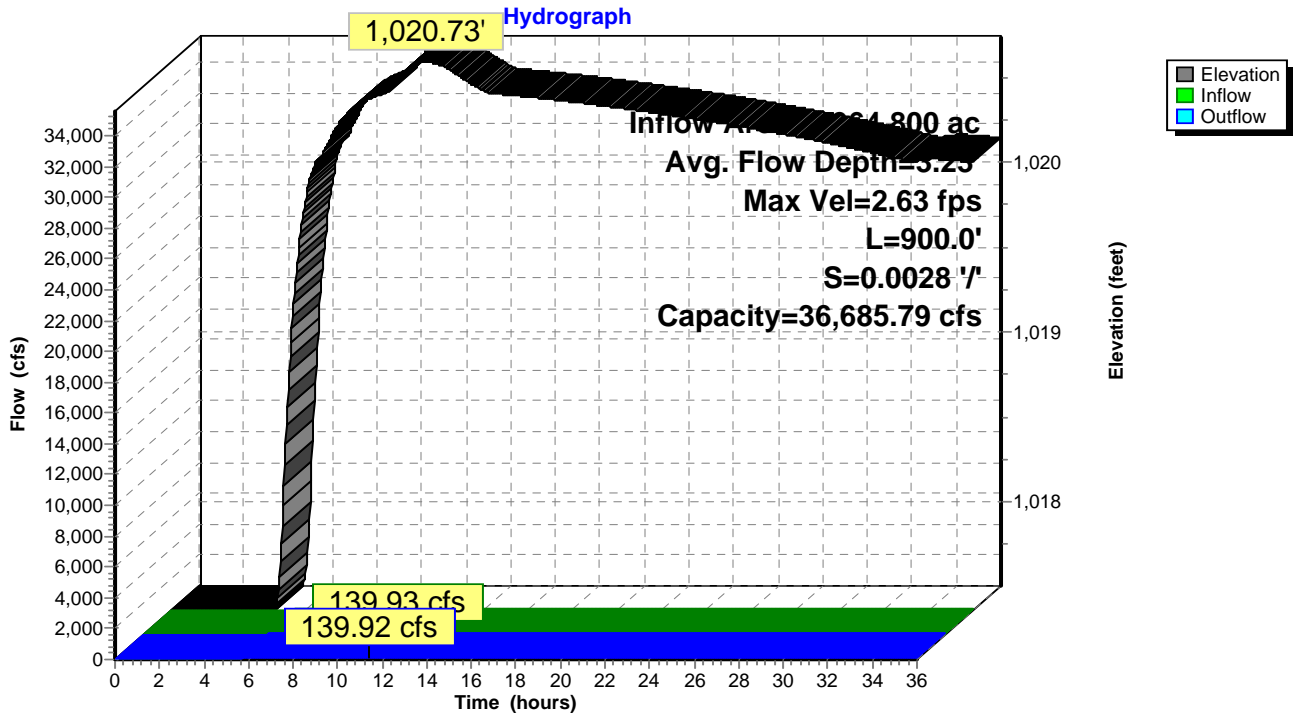
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



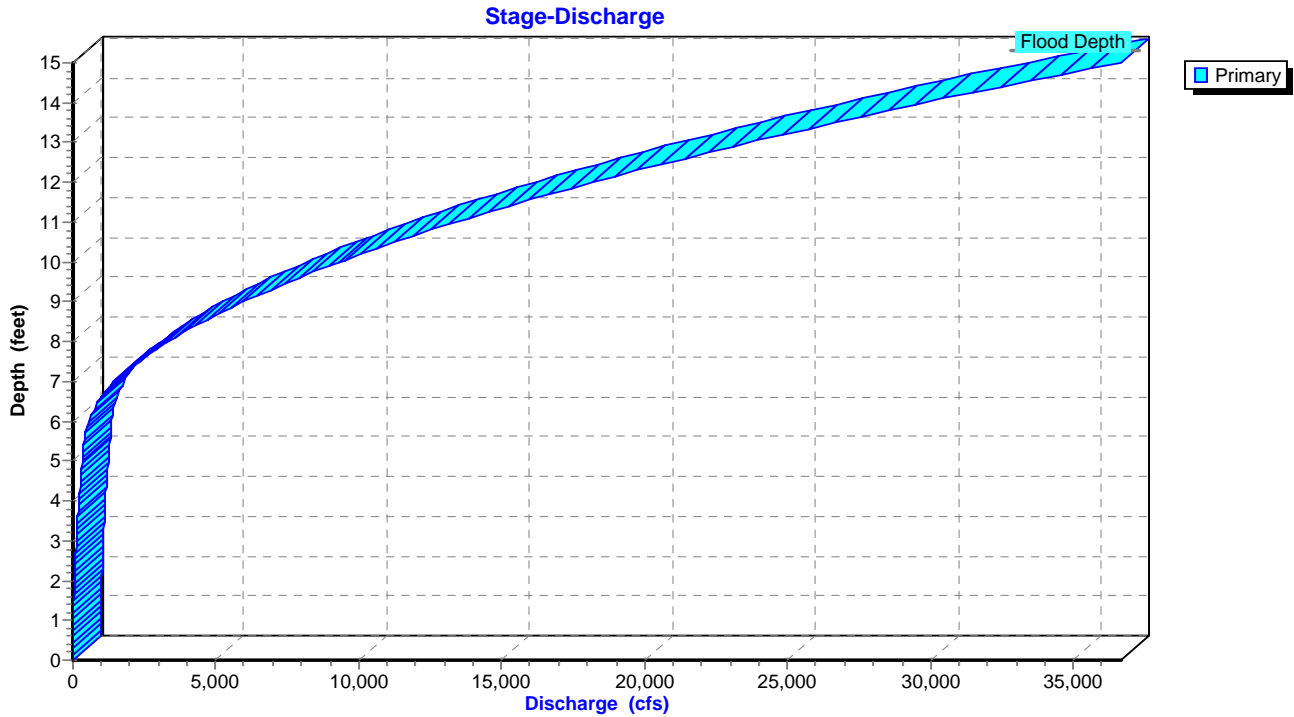
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

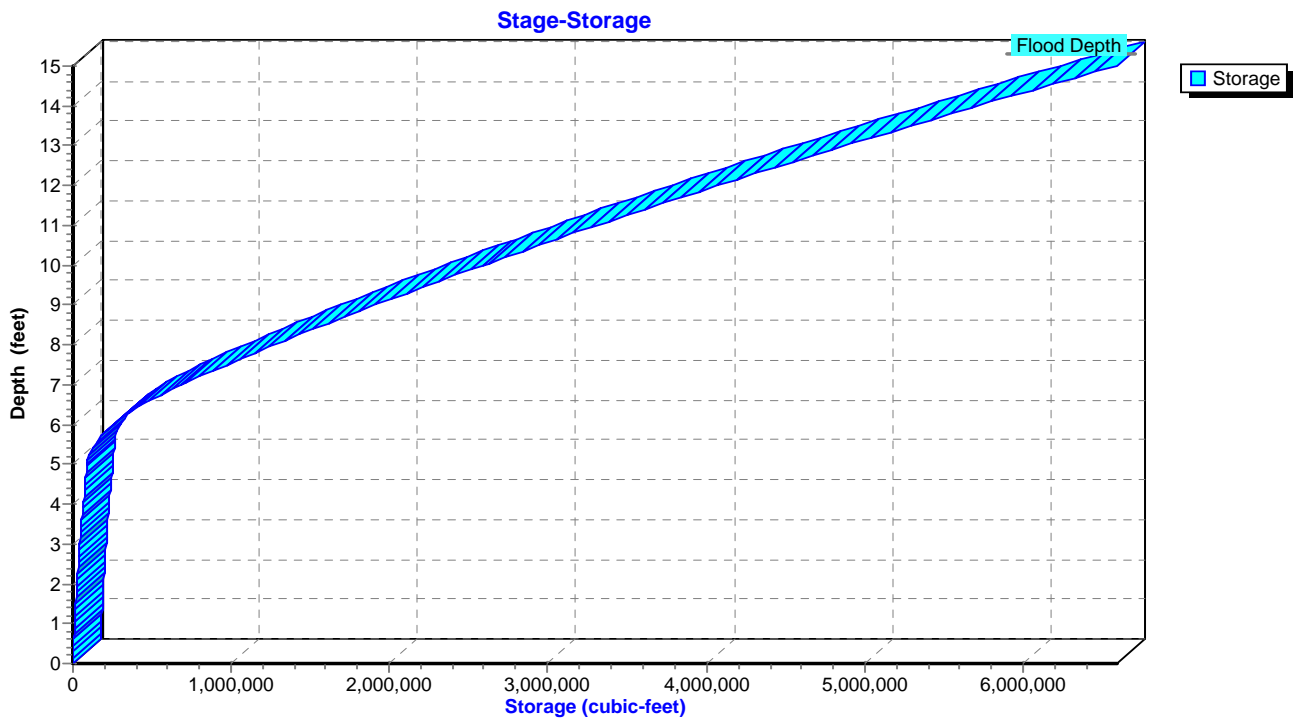
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



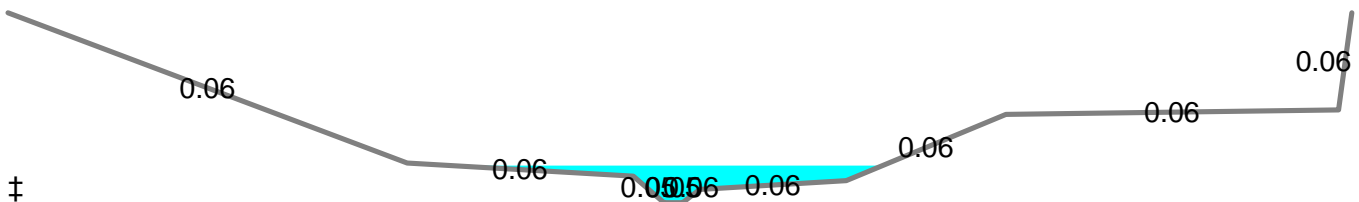
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.65" for 6-HR 0.22 PMF event
 Inflow = 2,560.49 cfs @ 5.15 hrs, Volume= 1,614.903 af
 Outflow = 2,165.84 cfs @ 6.35 hrs, Volume= 1,583.296 af, Atten= 15%, Lag= 71.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.12 fps, Min. Travel Time= 69.2 min
 Avg. Velocity = 1.50 fps, Avg. Travel Time= 97.5 min

Peak Storage= 9,004,311 cf @ 6.35 hrs
 Average Depth at Peak Storage= 8.39'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

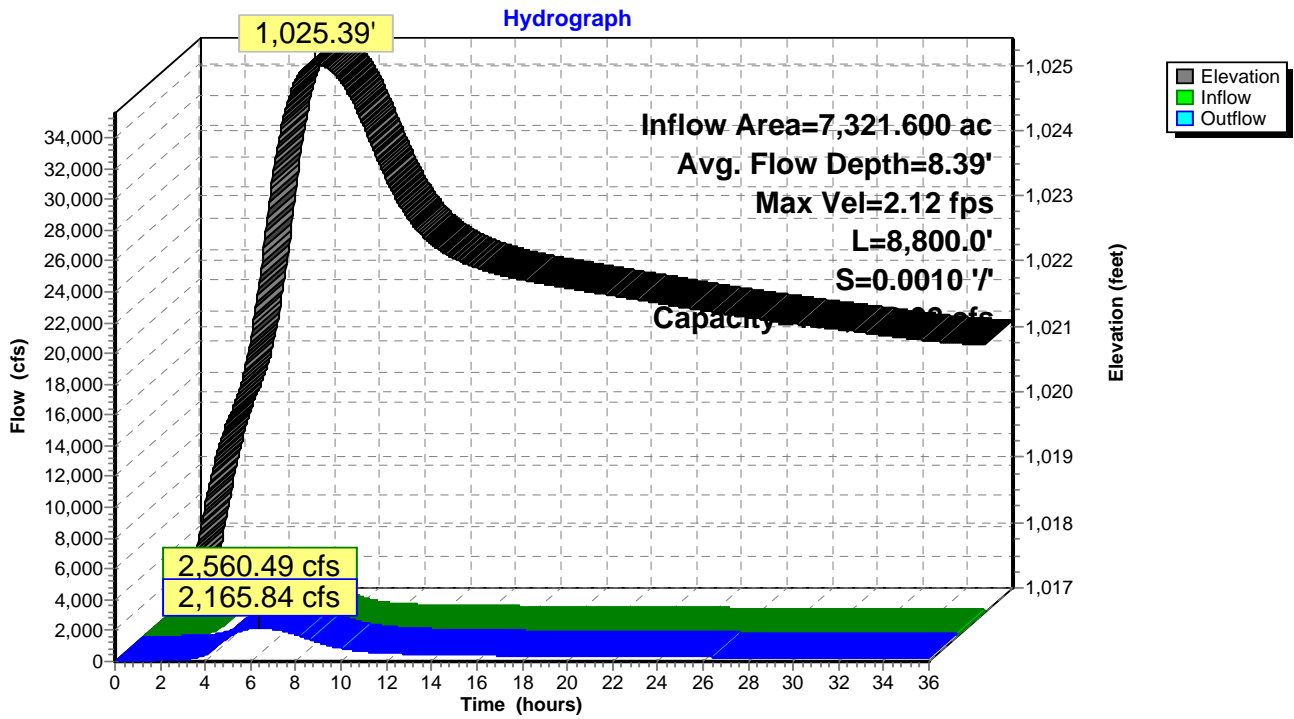
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



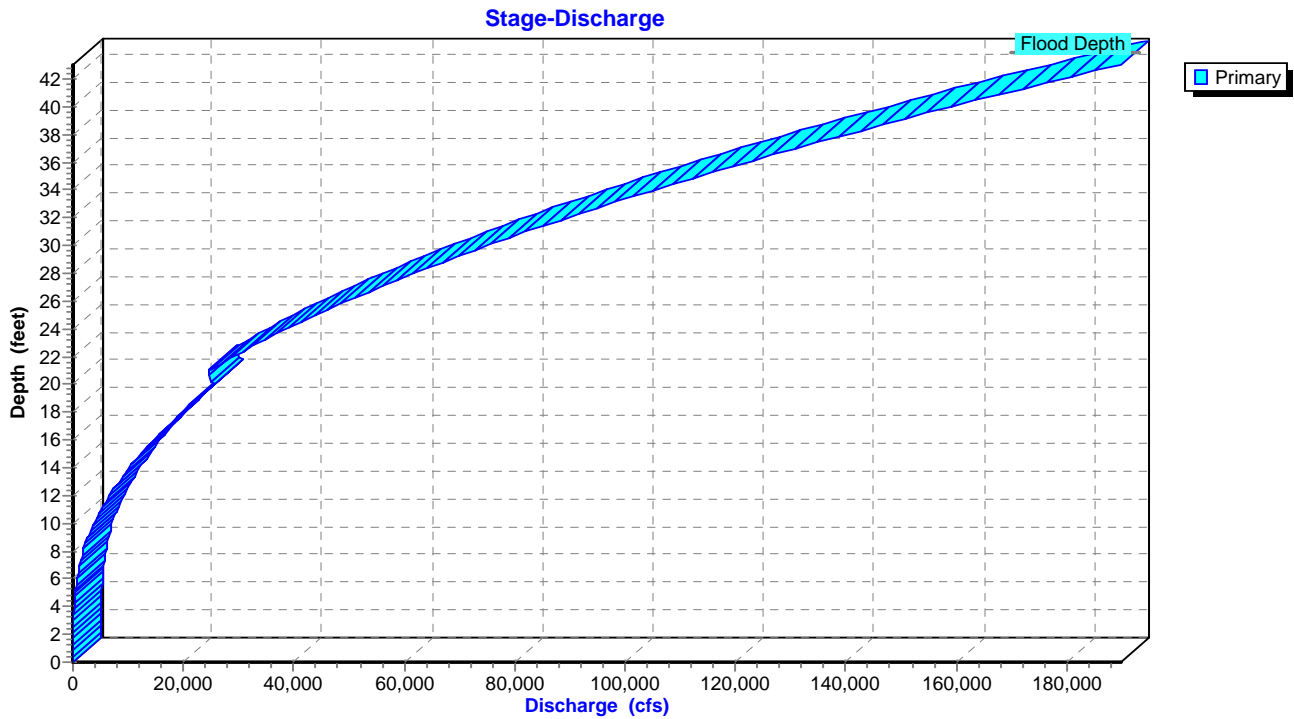
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

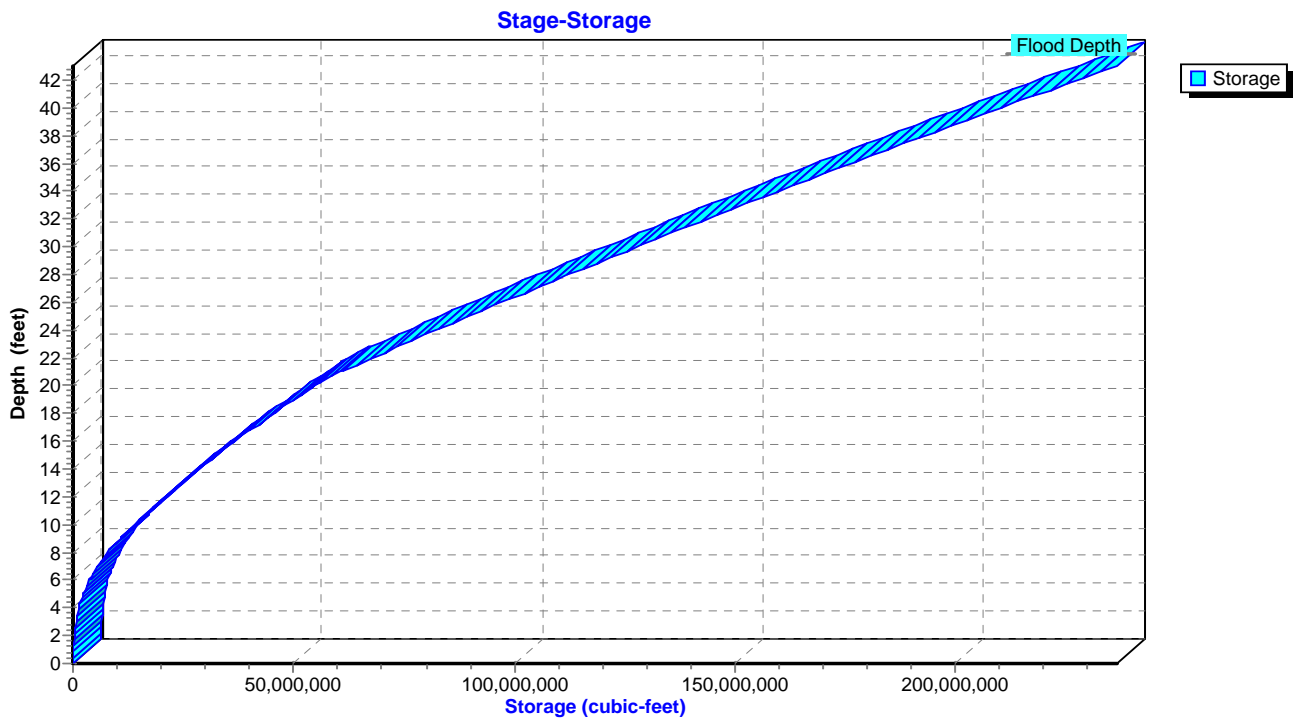
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



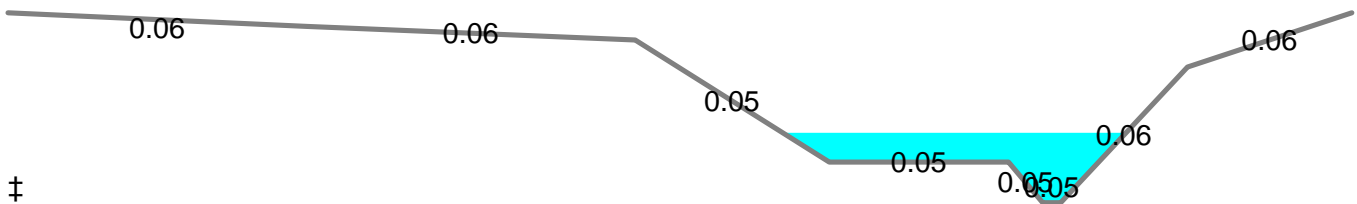
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.67" for 6-HR 0.22 PMF event
 Inflow = 2,901.22 cfs @ 6.02 hrs, Volume= 1,951.590 af
 Outflow = 2,819.07 cfs @ 6.52 hrs, Volume= 1,929.374 af, Atten= 3%, Lag= 30.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.56 fps, Min. Travel Time= 48.8 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 84.5 min

Peak Storage= 8,259,073 cf @ 6.52 hrs
 Average Depth at Peak Storage= 10.31'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

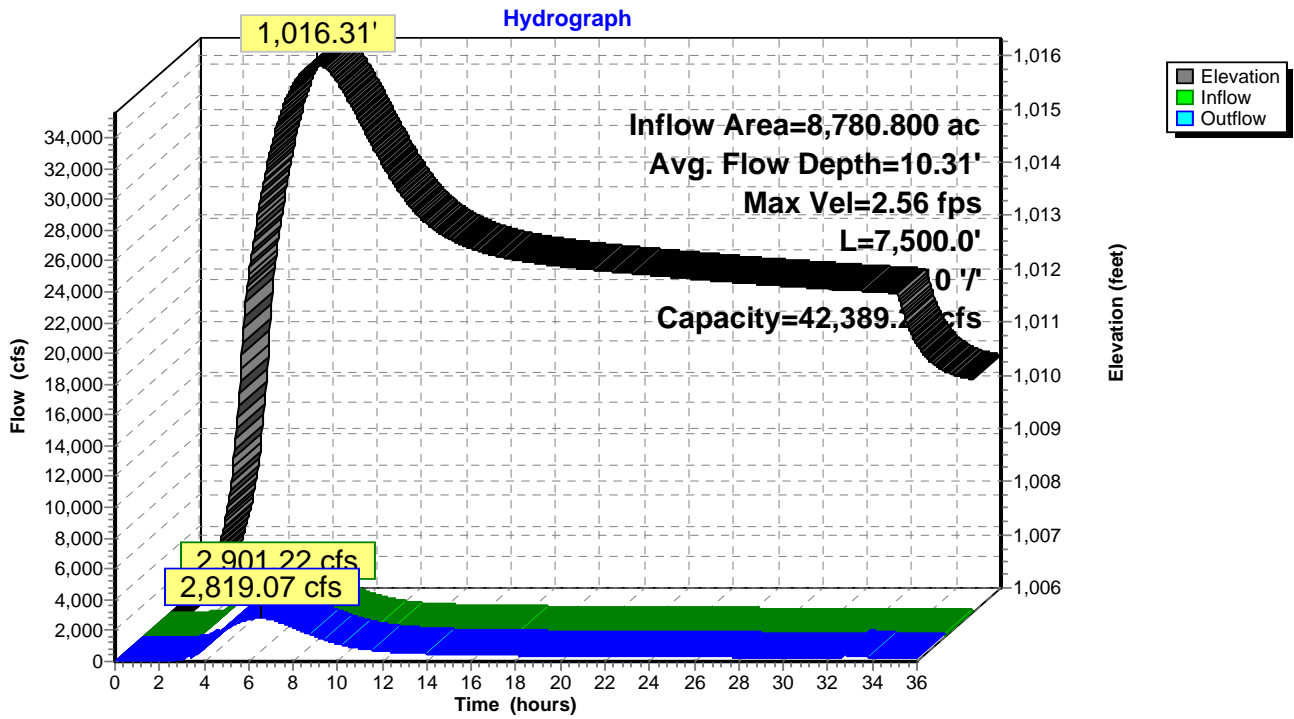
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



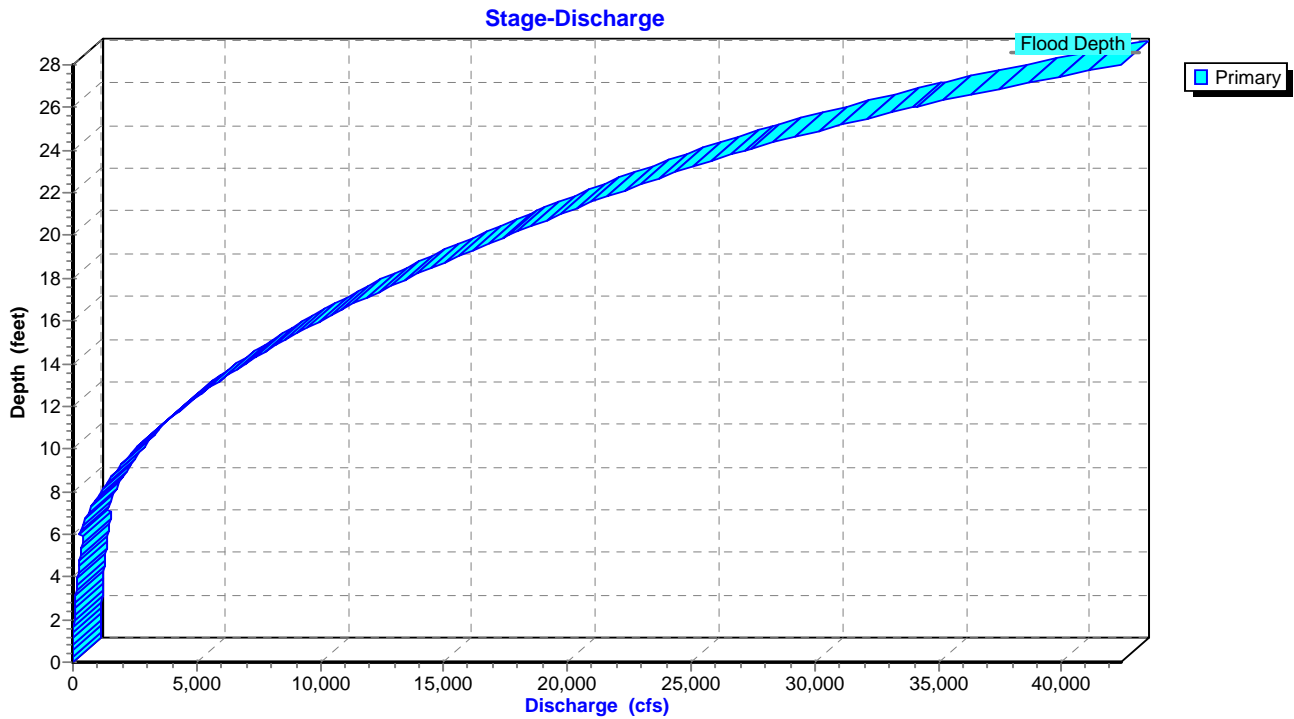
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

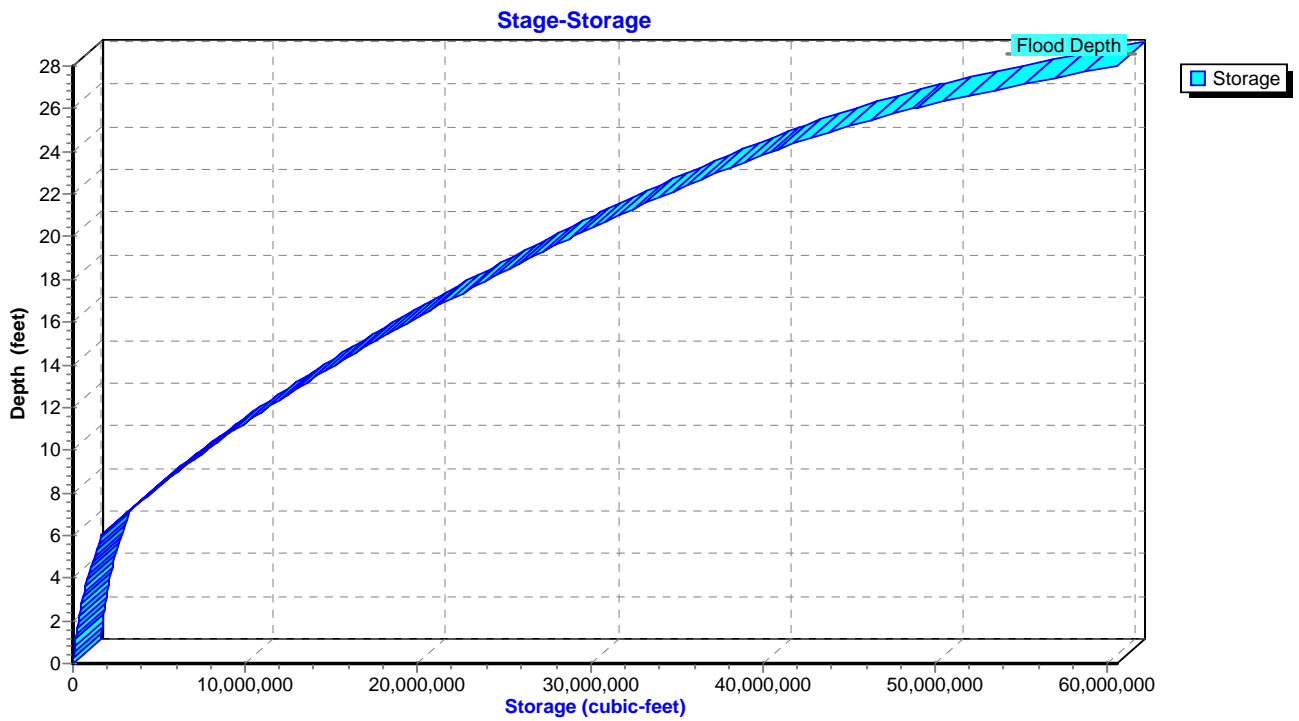
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



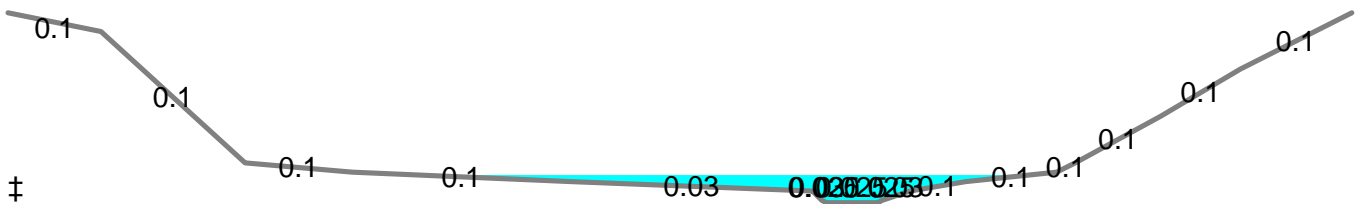
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.69" for 6-HR 0.22 PMF event
 Inflow = 2,858.31 cfs @ 7.26 hrs, Volume= 2,118.464 af
 Outflow = 2,858.31 cfs @ 7.27 hrs, Volume= 2,118.344 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.53 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.59 fps, Avg. Travel Time= 0.9 min

Peak Storage= 134,964 cf @ 7.27 hrs
 Average Depth at Peak Storage= 5.92'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

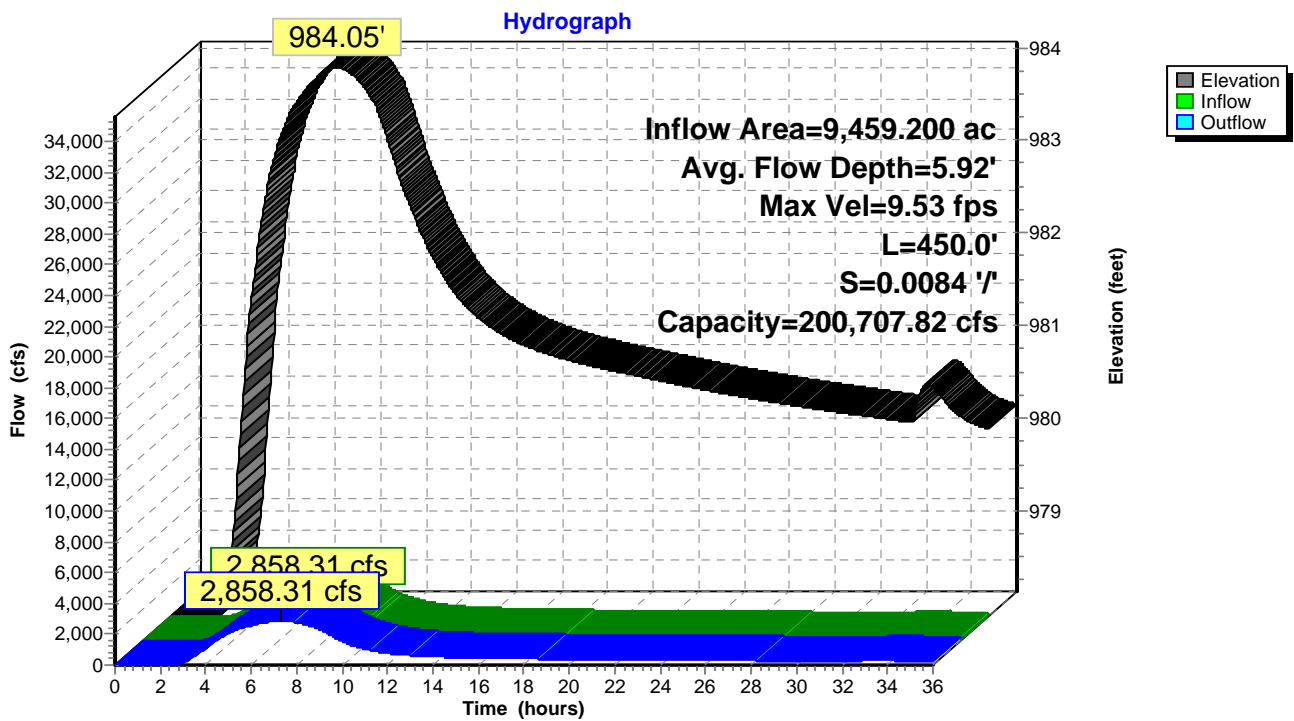
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



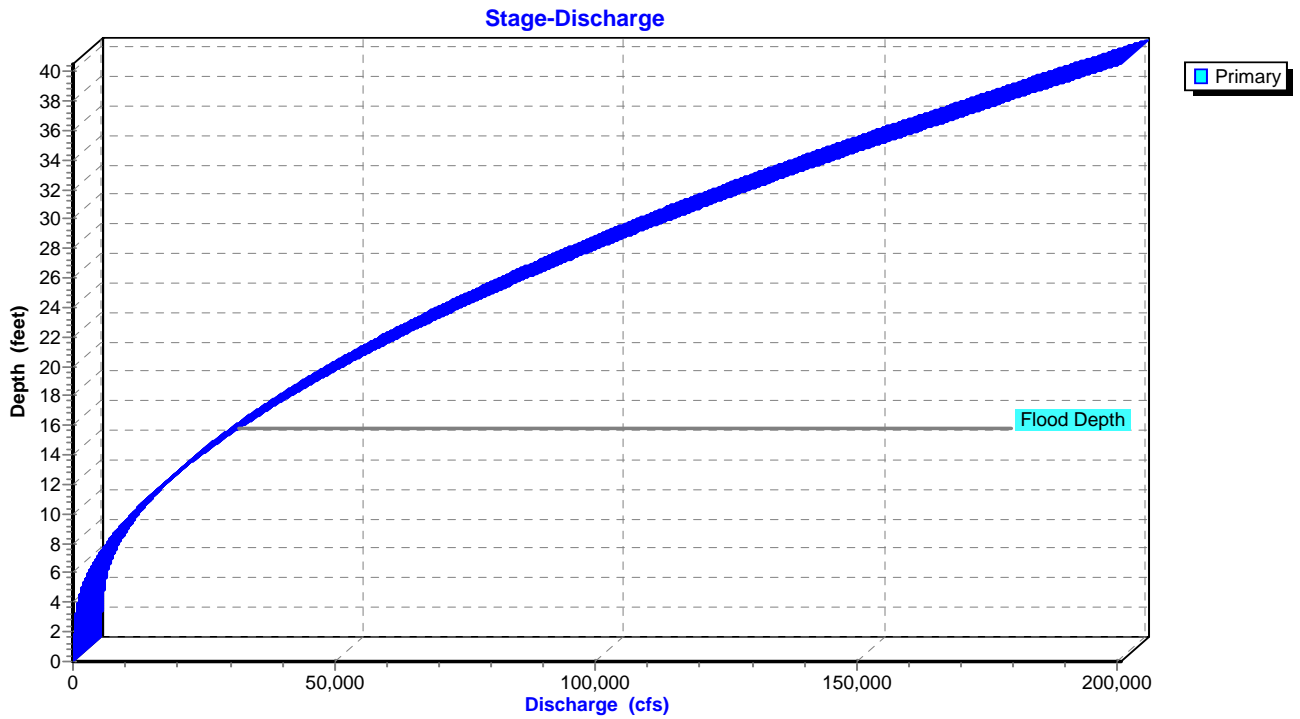
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

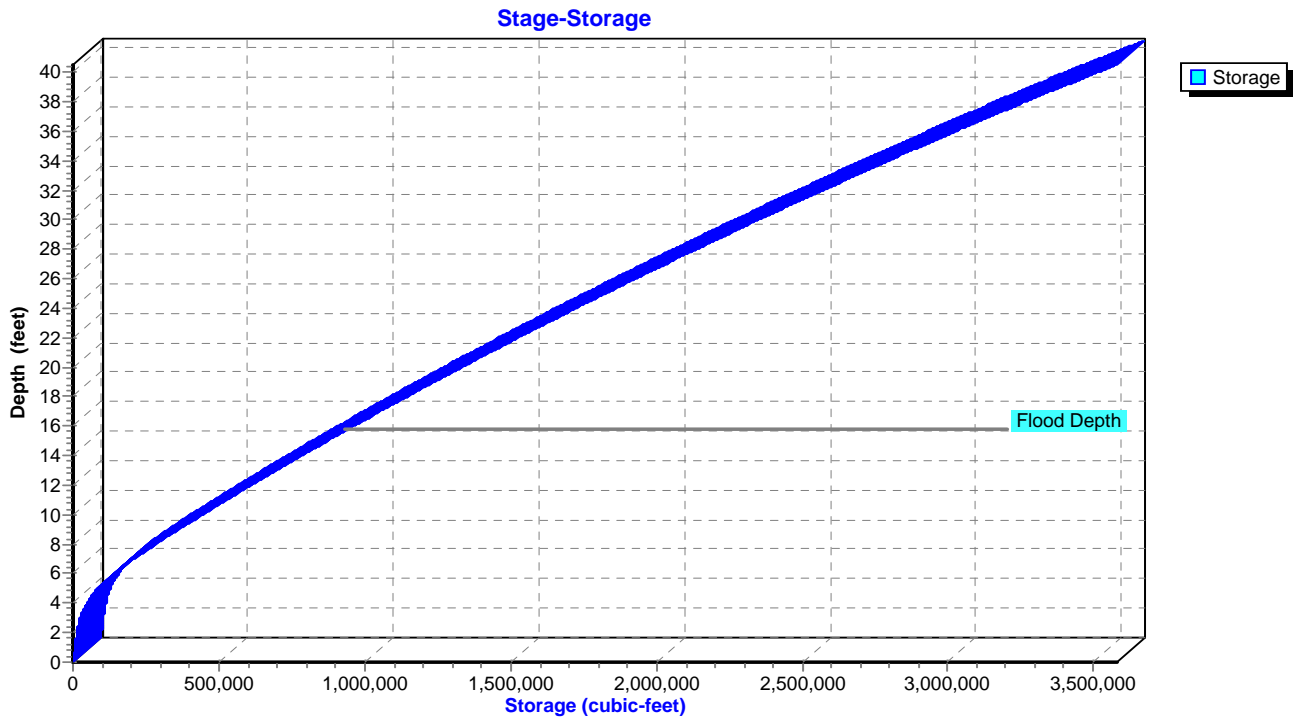
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

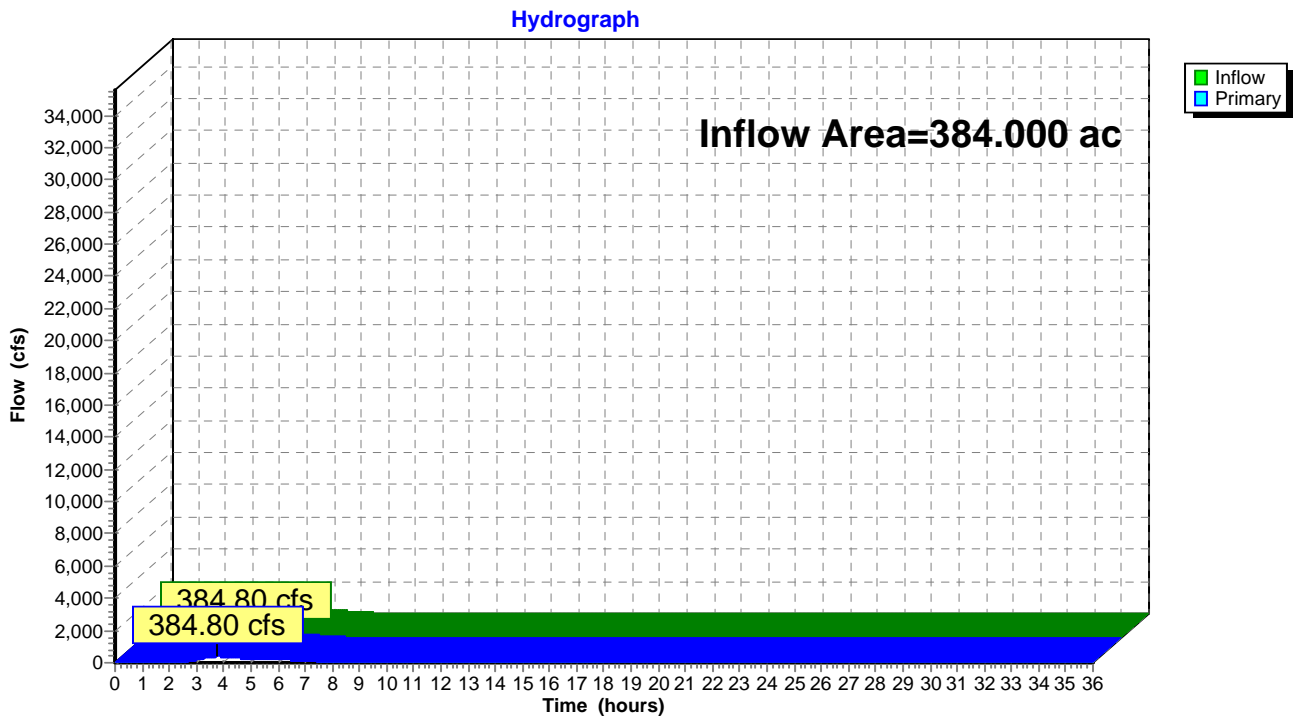


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.05" for 6-HR 0.22 PMF event
Inflow = 384.80 cfs @ 3.75 hrs, Volume= 97.498 af
Primary = 384.80 cfs @ 3.76 hrs, Volume= 97.498 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.70" for 6-HR 0.22 PMF event
 Inflow = 3,142.96 cfs @ 6.34 hrs, Volume= 2,130.560 af
 Outflow = 3,133.13 cfs @ 6.50 hrs, Volume= 2,119.541 af, Atten= 0%, Lag= 9.5 min
 Primary = 2,180.31 cfs @ 6.50 hrs, Volume= 1,837.758 af
 Secondary = 952.82 cfs @ 6.50 hrs, Volume= 281.783 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,007.21' @ 6.50 hrs Surf.Area= 19.320 ac Storage= 127.145 af (66.182 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 77.0 min calculated for 2,058.579 af (97% of inflow)
 Center-of-Mass det. time= 14.7 min (731.1 - 716.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

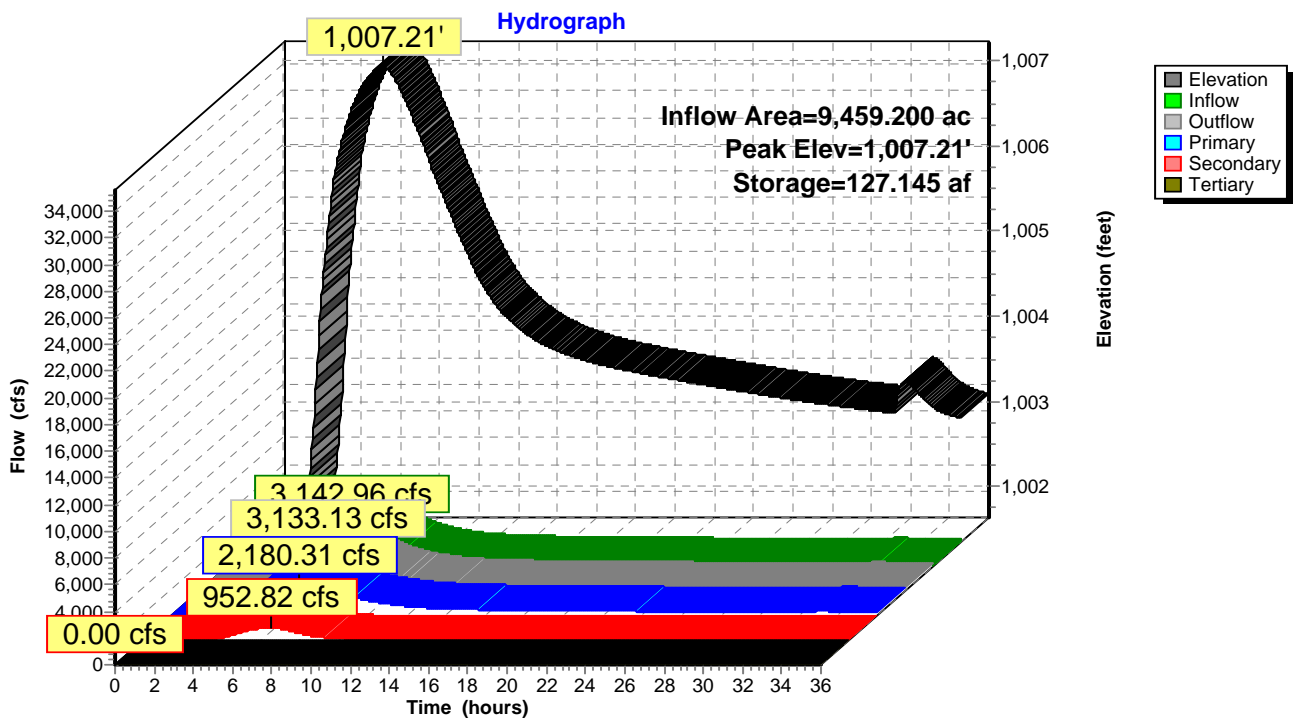
Device	Routing	Invert	Outlet Devices											
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50											
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32											
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.60 20.00											
			Width (feet) 17.00 23.00 77.00 77.00											
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80											
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00											
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00											
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00											

Primary OutFlow Max=2,180.31 cfs @ 6.50 hrs HW=1,007.21' TW=1,000.26' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,180.31 cfs @ 7.83 fps)

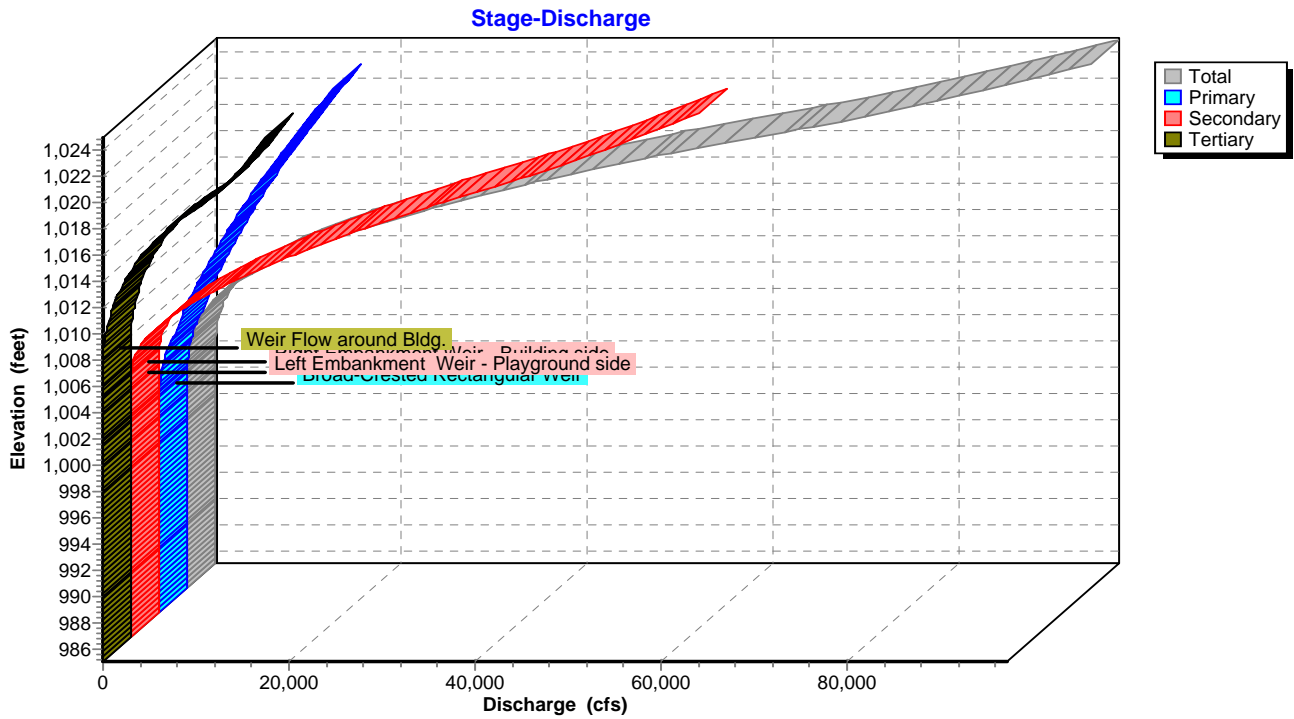
Secondary OutFlow Max=952.82 cfs @ 6.50 hrs HW=1,007.21' TW=1,000.26' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 381.62 cfs @ 3.95 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 571.20 cfs @ 4.46 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Controls 0.00 cfs)

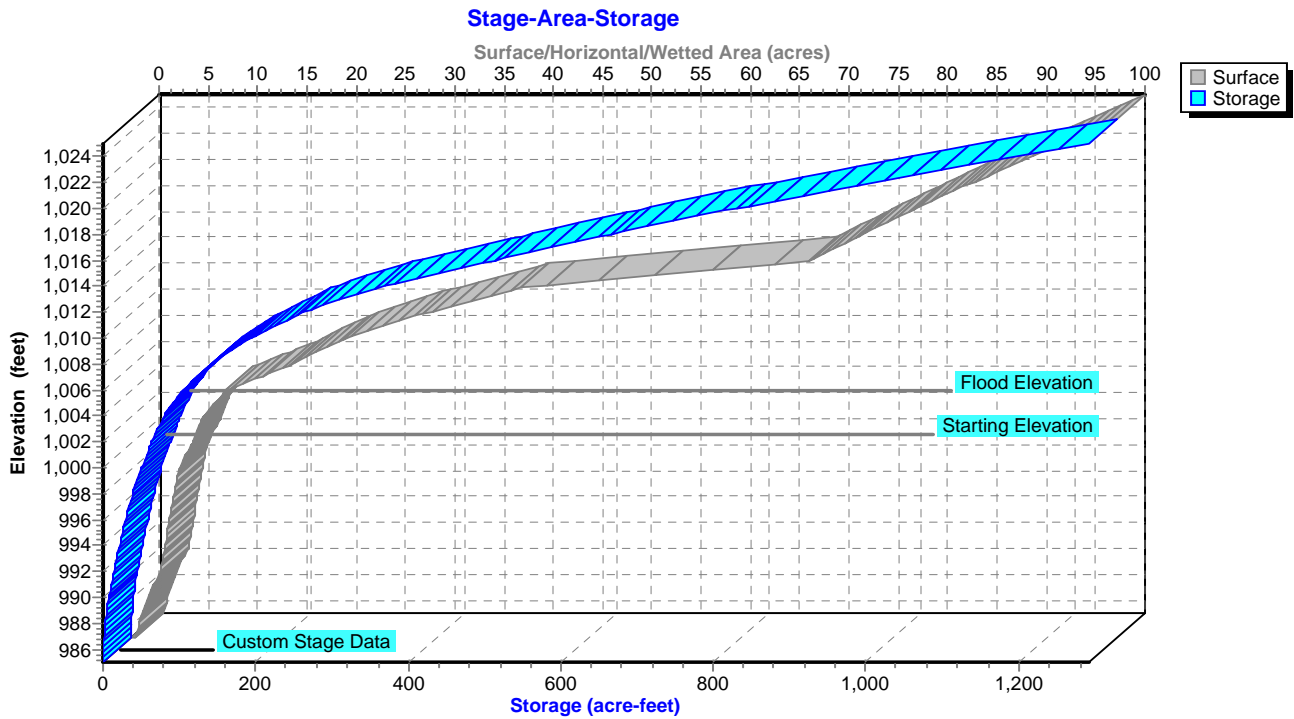
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

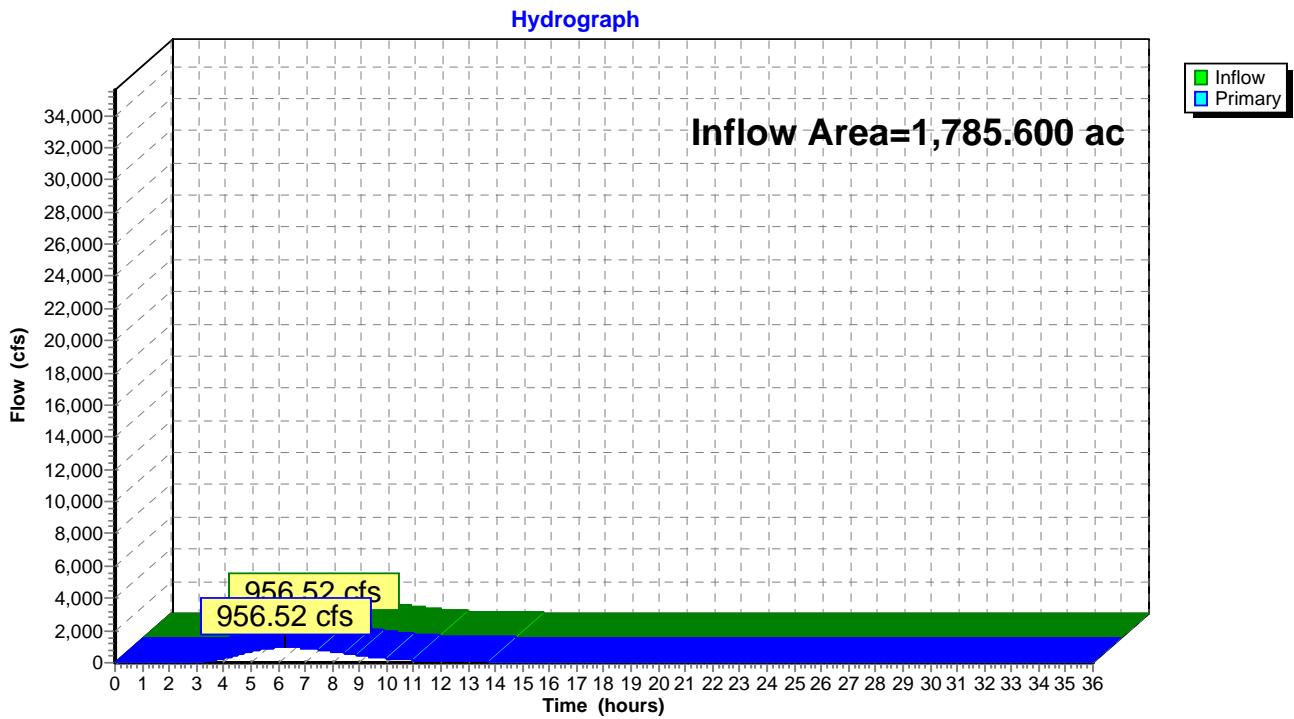


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.71" for 6-HR 0.22 PMF event
Inflow = 956.52 cfs @ 6.28 hrs, Volume= 402.572 af
Primary = 956.52 cfs @ 6.29 hrs, Volume= 402.572 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.71" for 6-HR 0.22 PMF event
 Inflow = 956.52 cfs @ 6.29 hrs, Volume= 402.571 af
 Outflow = 329.82 cfs @ 9.64 hrs, Volume= 619.758 af, Atten= 66%, Lag= 200.9 min
 Primary = 329.82 cfs @ 9.64 hrs, Volume= 619.758 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,098.03' @ 9.64 hrs Surf.Area= 242.759 ac Storage= 2,059.507 af (145.507 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 478.9 min (944.7 - 465.8)

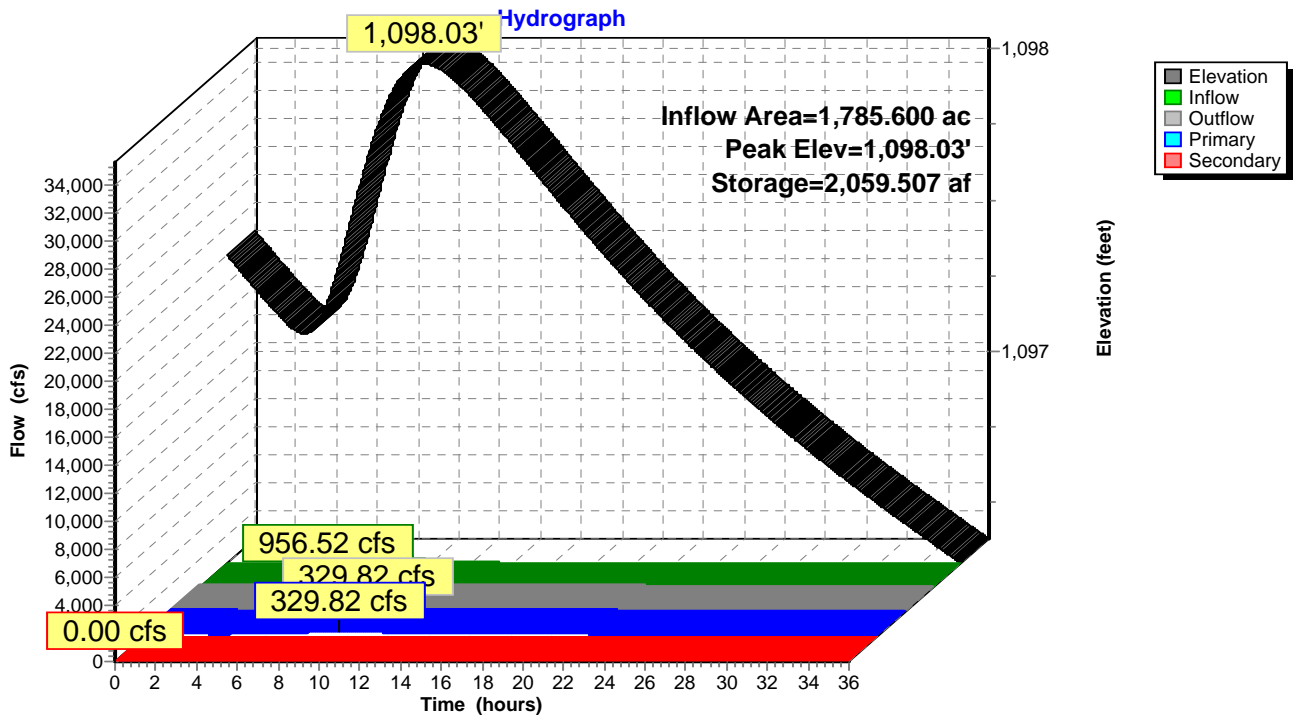
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

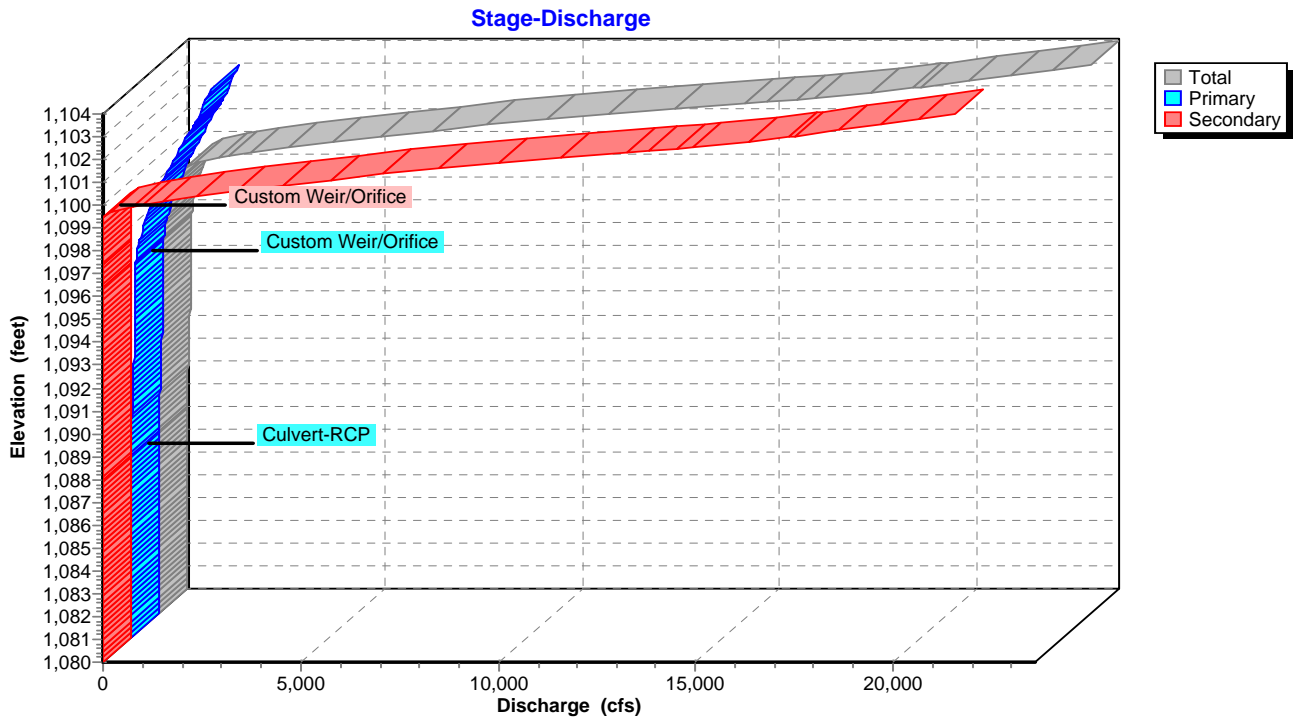
Primary OutFlow Max=329.82 cfs @ 9.64 hrs HW=1,098.03' TW=1,071.98' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 125.57 cfs @ 17.76 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 204.25 cfs @ 4.18 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

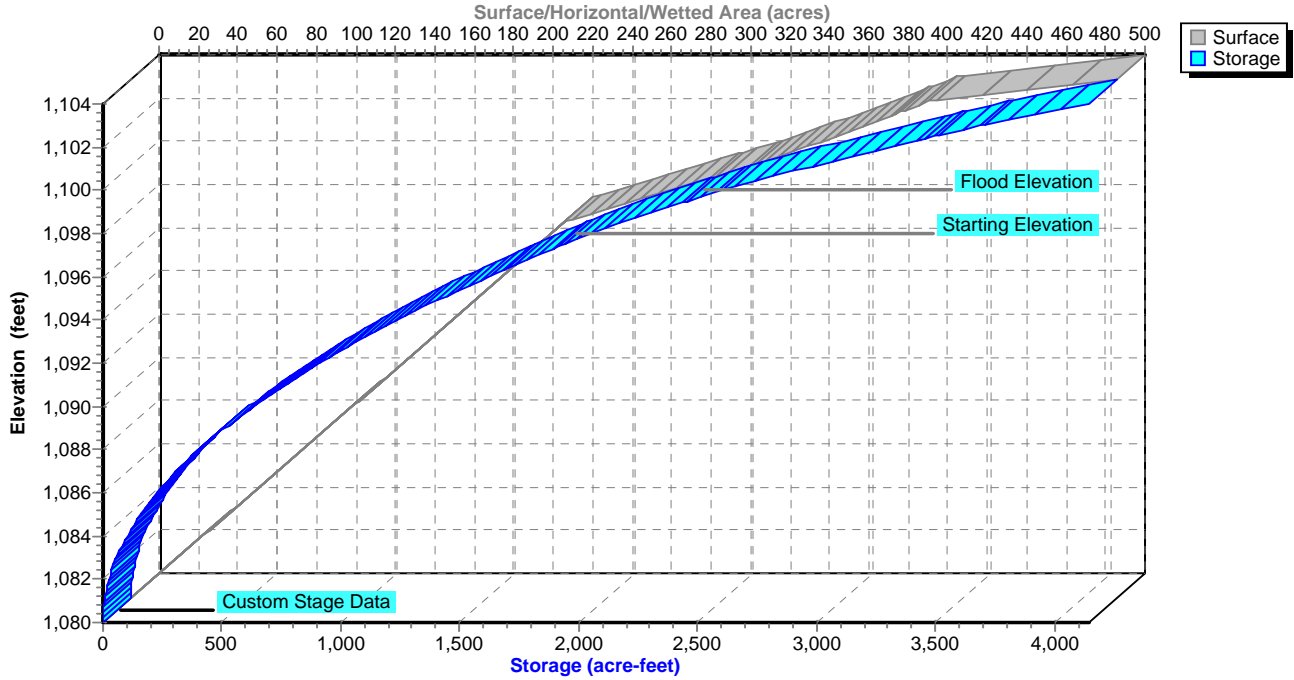


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



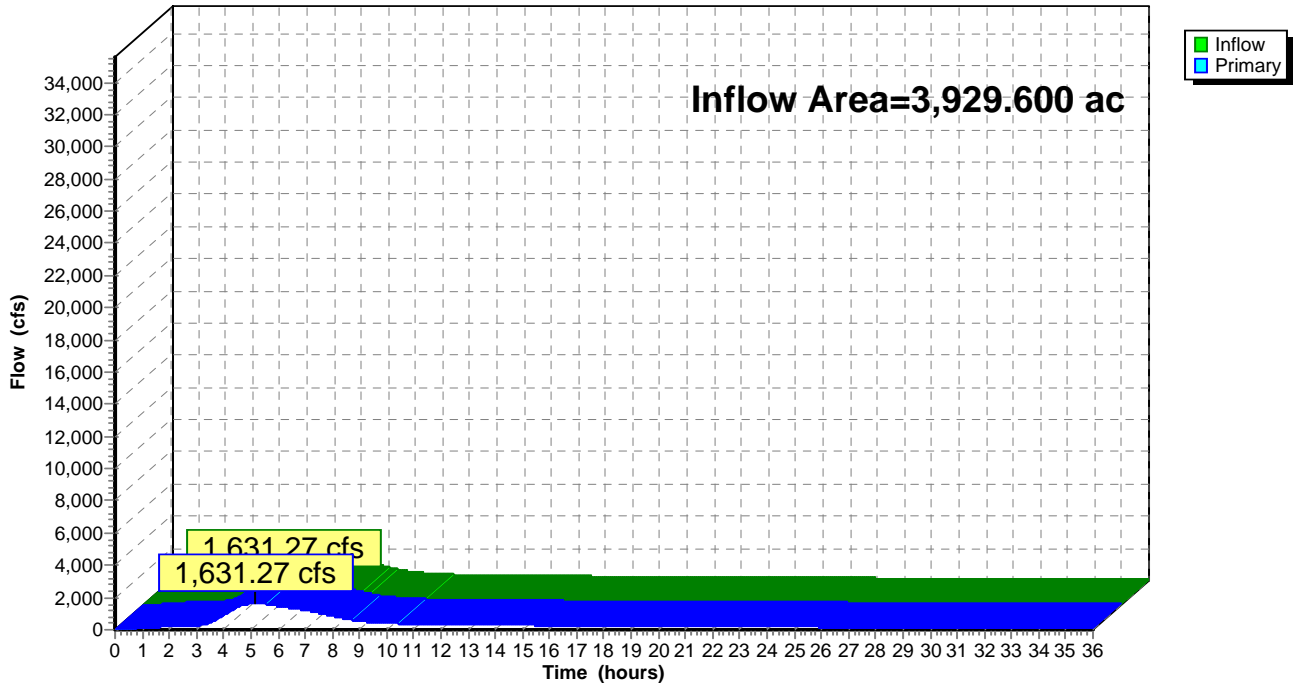
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.20" for 6-HR 0.22 PMF event
Inflow = 1,631.27 cfs @ 5.16 hrs, Volume= 1,049.077 af
Primary = 1,631.27 cfs @ 5.17 hrs, Volume= 1,049.077 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.05" for 6-HR 0.22 PMF event
 Inflow = 384.80 cfs @ 3.76 hrs, Volume= 97.498 af
 Outflow = 155.73 cfs @ 6.56 hrs, Volume= 97.015 af, Atten= 60%, Lag= 167.7 min
 Primary = 155.73 cfs @ 6.56 hrs, Volume= 97.015 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.80' @ 6.56 hrs Surf.Area= 28.998 ac Storage= 74.635 af (50.335 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 436.0 min calculated for 72.695 af (75% of inflow)
 Center-of-Mass det. time= 272.2 min (593.7 - 321.5)

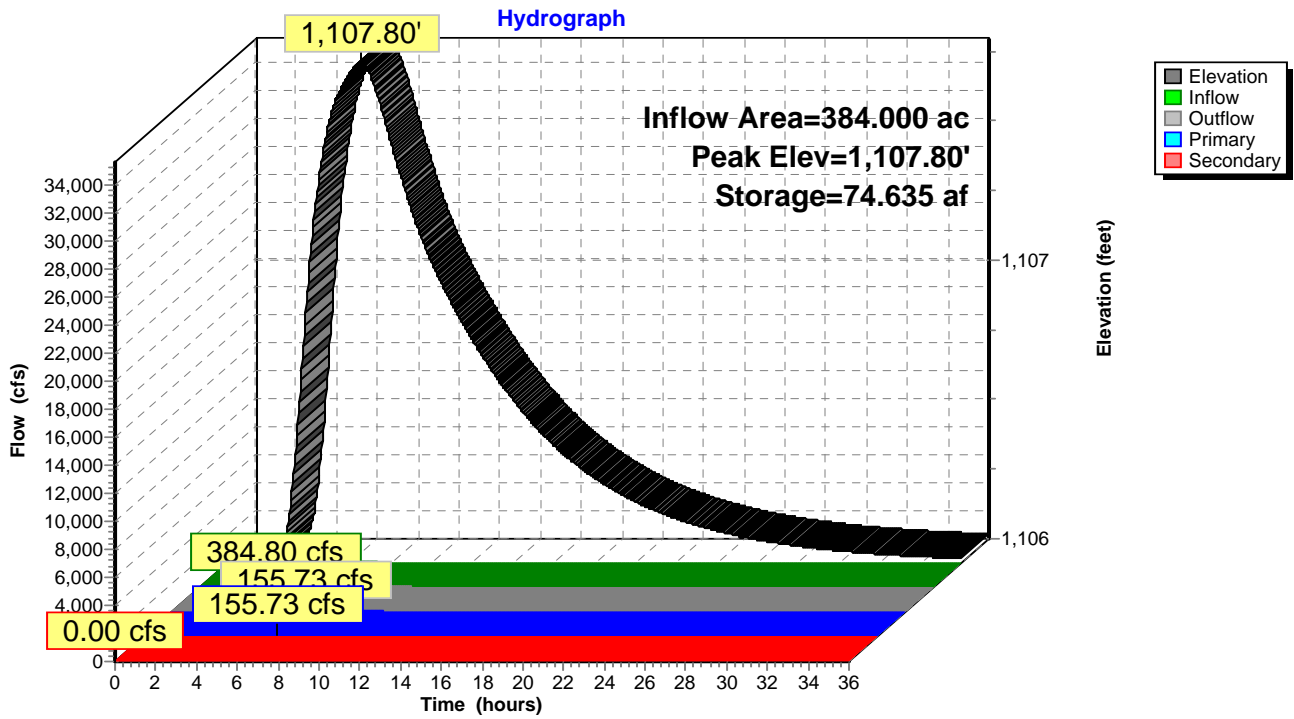
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

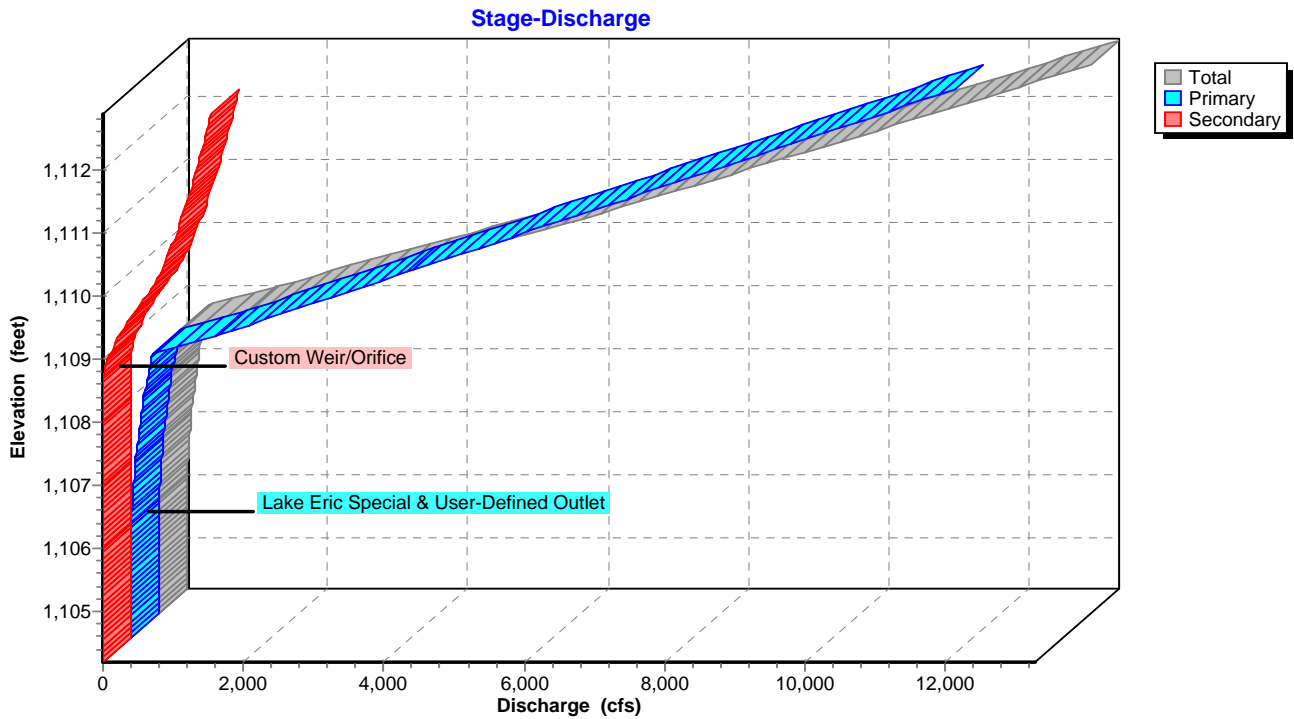
Primary OutFlow Max=155.73 cfs @ 6.56 hrs HW=1,107.80' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet(Custom Controls 155.73 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

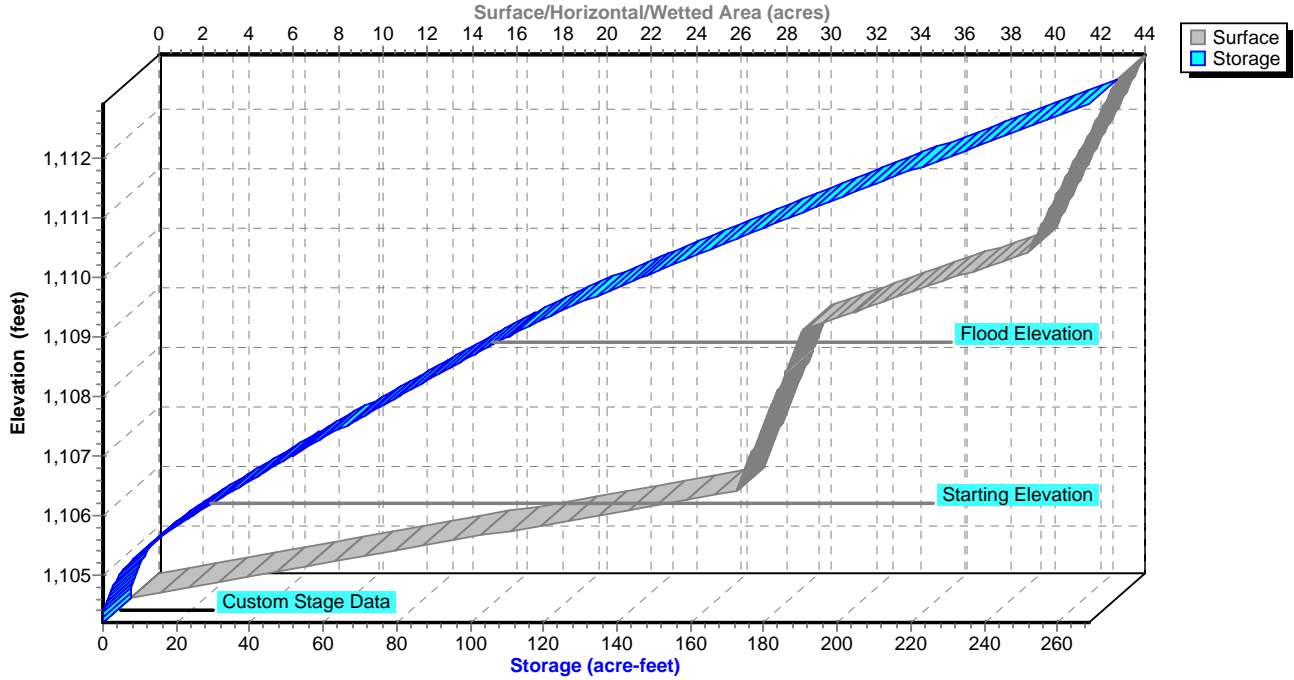


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



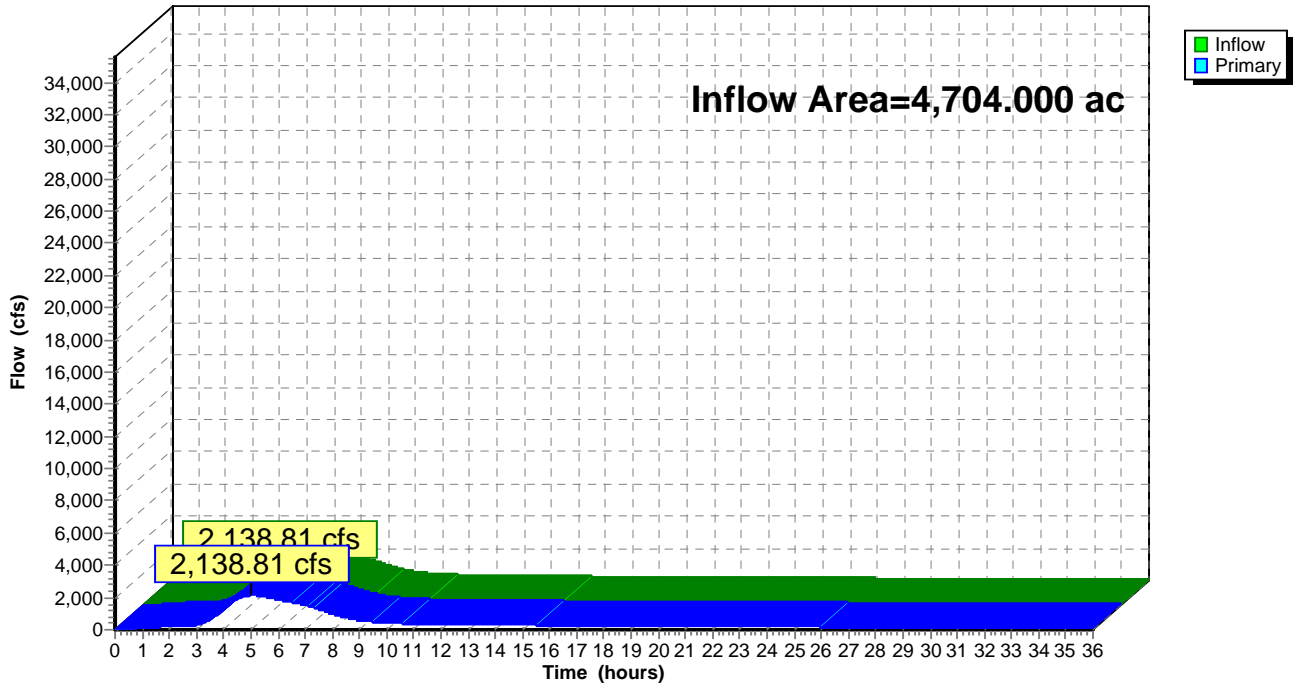
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 3.06" for 6-HR 0.22 PMF event
Inflow = 2,138.81 cfs @ 5.02 hrs, Volume= 1,200.658 af
Primary = 2,138.81 cfs @ 5.03 hrs, Volume= 1,200.658 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 2.98" for 6-HR 0.22 PMF event
 Inflow = 157.03 cfs @ 3.37 hrs, Volume= 28.647 af
 Outflow = 66.39 cfs @ 4.76 hrs, Volume= 28.538 af, Atten= 58%, Lag= 83.1 min
 Primary = 66.39 cfs @ 4.76 hrs, Volume= 28.538 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,119.91' @ 4.76 hrs Surf.Area= 4.186 ac Storage= 27.112 af (13.422 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 393.3 min calculated for 14.848 af (52% of inflow)
 Center-of-Mass det. time= 192.0 min (443.6 - 251.7)

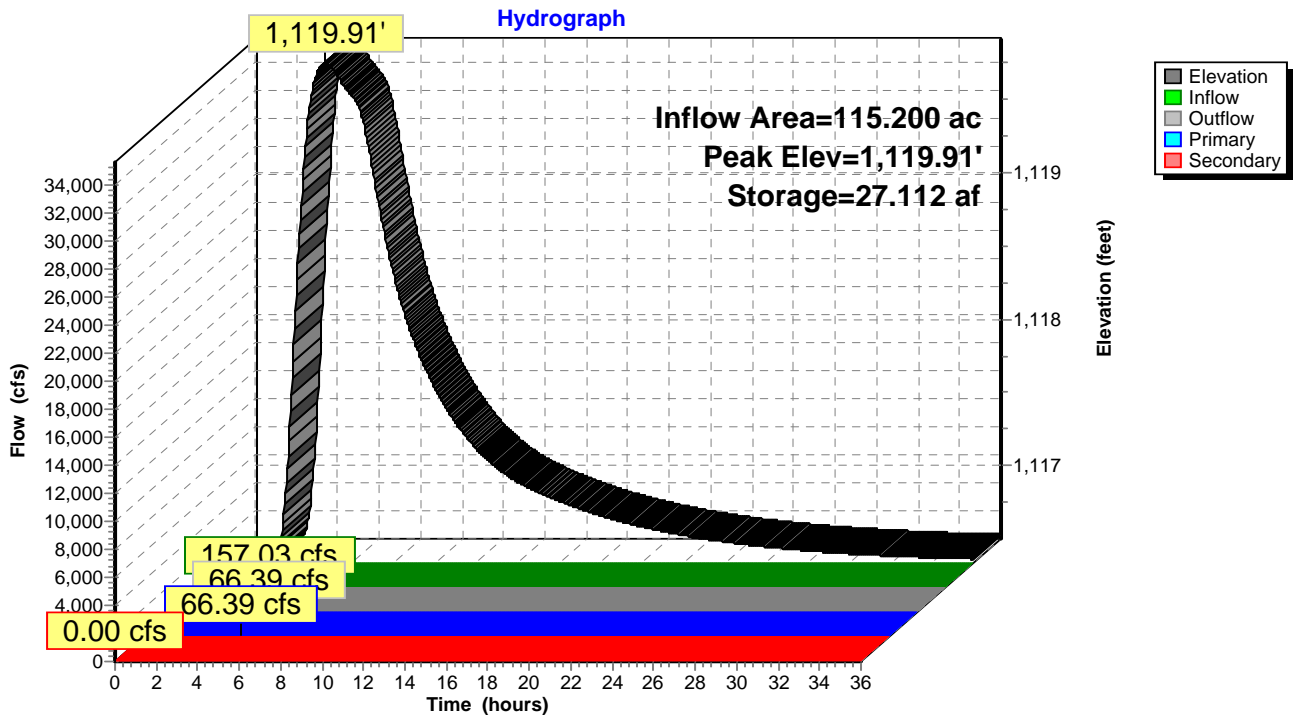
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

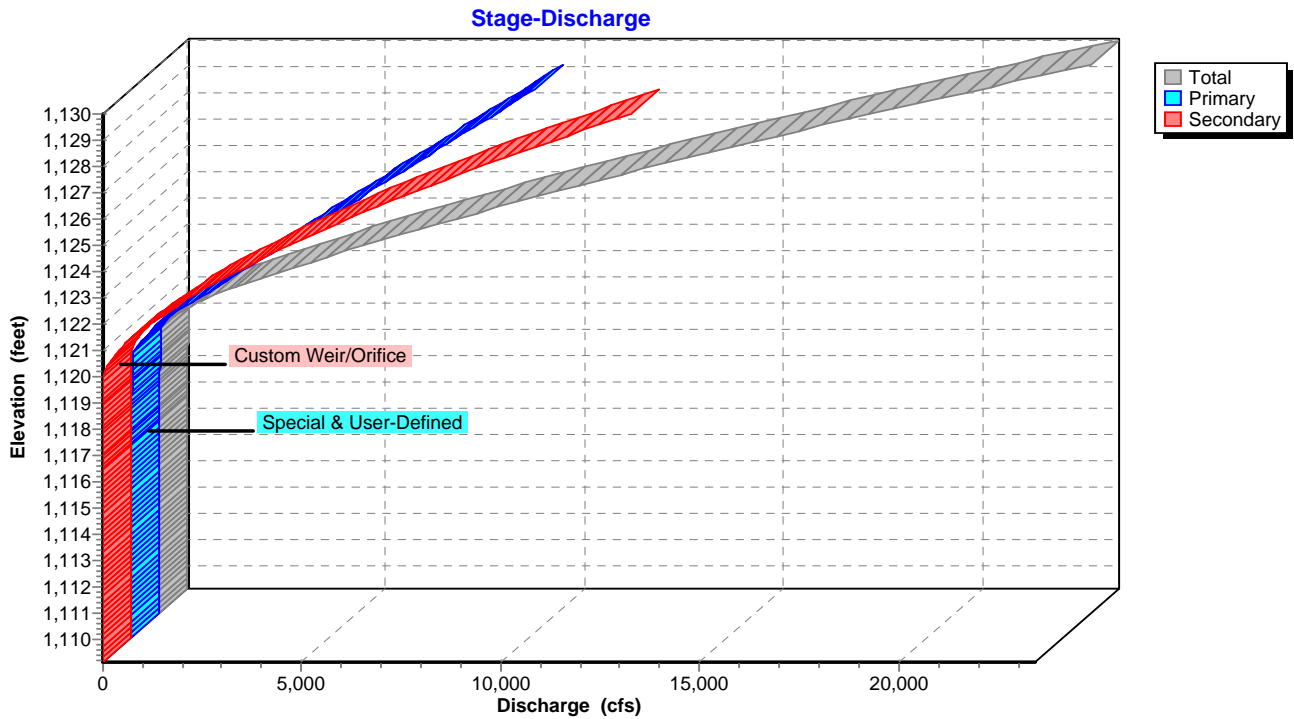
Primary OutFlow Max=66.39 cfs @ 4.76 hrs HW=1,119.91' TW=0.00' (Dynamic Tailwater)
 ↑1=Special & User-Defined (Custom Controls 66.39 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,116.50' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

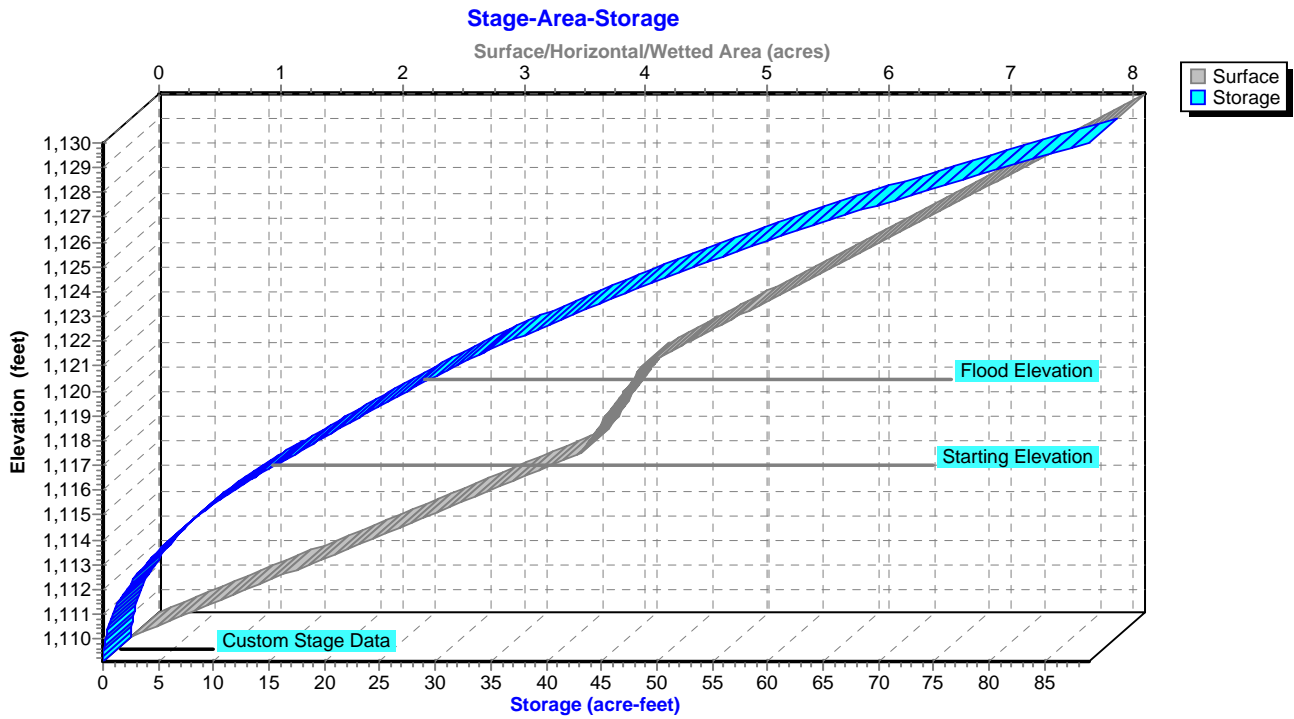
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



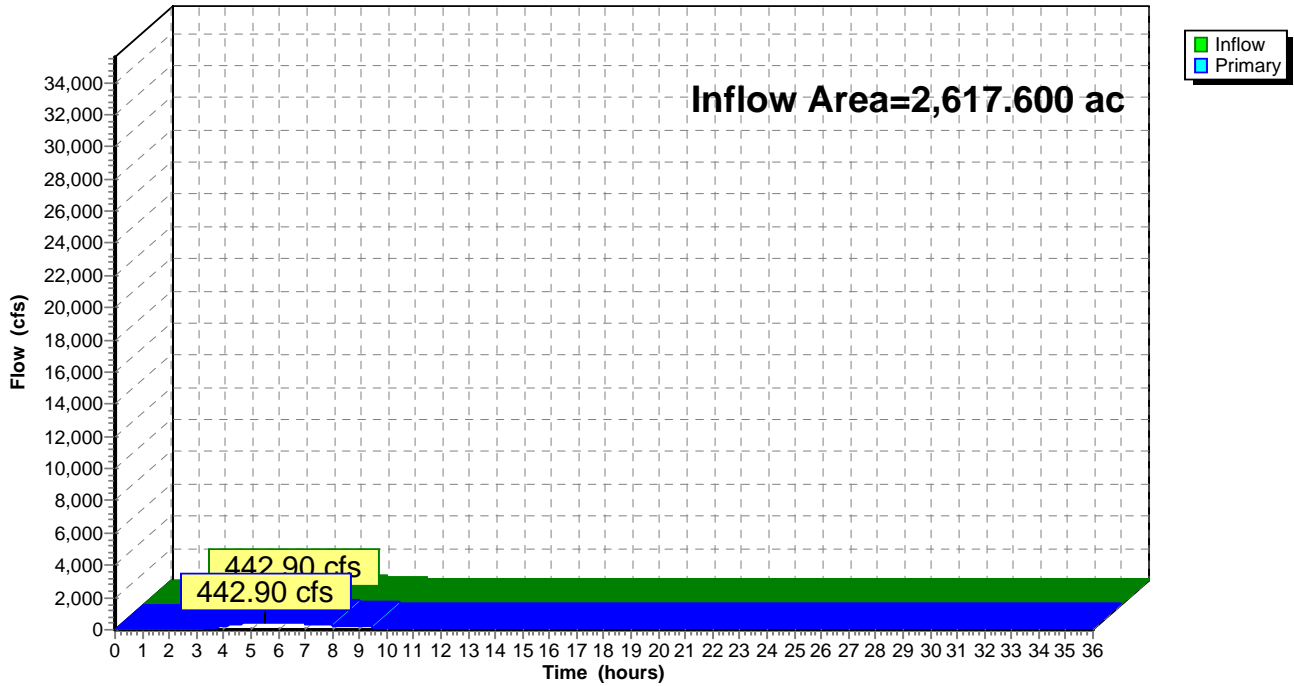
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 1.90" for 6-HR 0.22 PMF event
Inflow = 442.90 cfs @ 5.54 hrs, Volume= 414.603 af
Primary = 442.90 cfs @ 5.55 hrs, Volume= 414.603 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

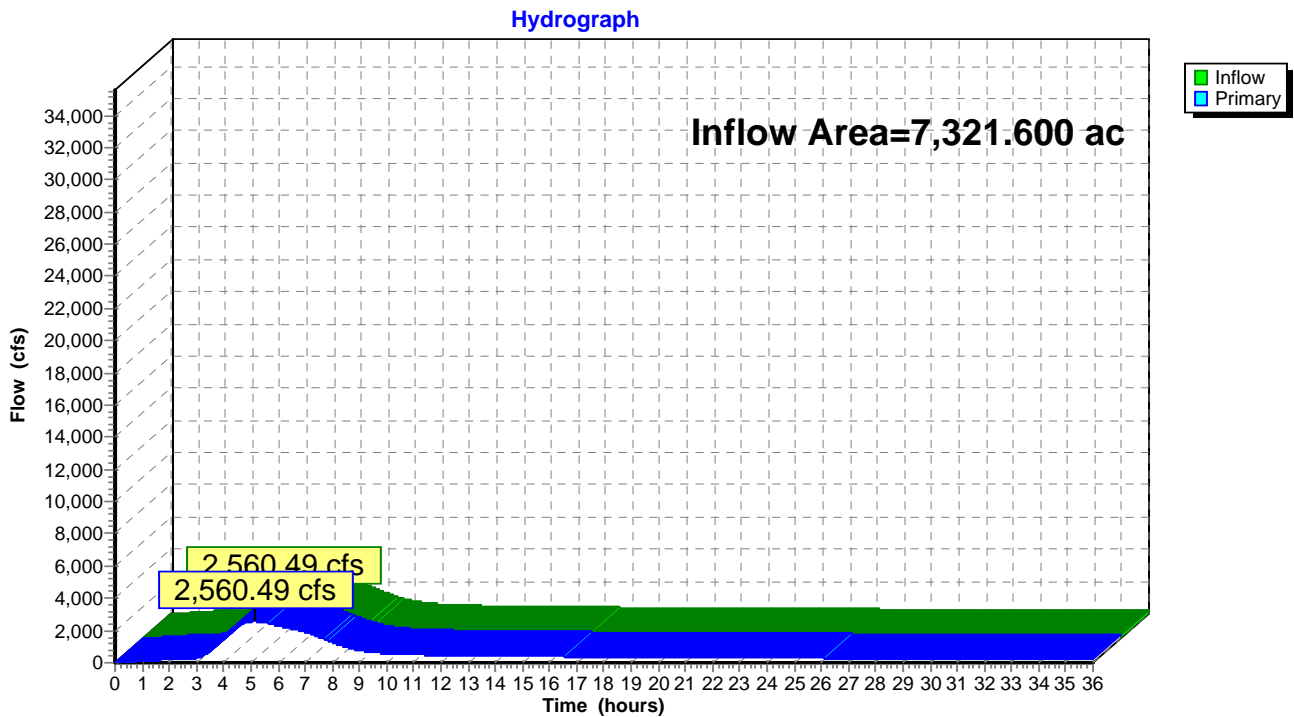


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.65" for 6-HR 0.22 PMF event
 Inflow = 2,560.49 cfs @ 5.14 hrs, Volume= 1,615.082 af
 Primary = 2,560.49 cfs @ 5.15 hrs, Volume= 1,615.082 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



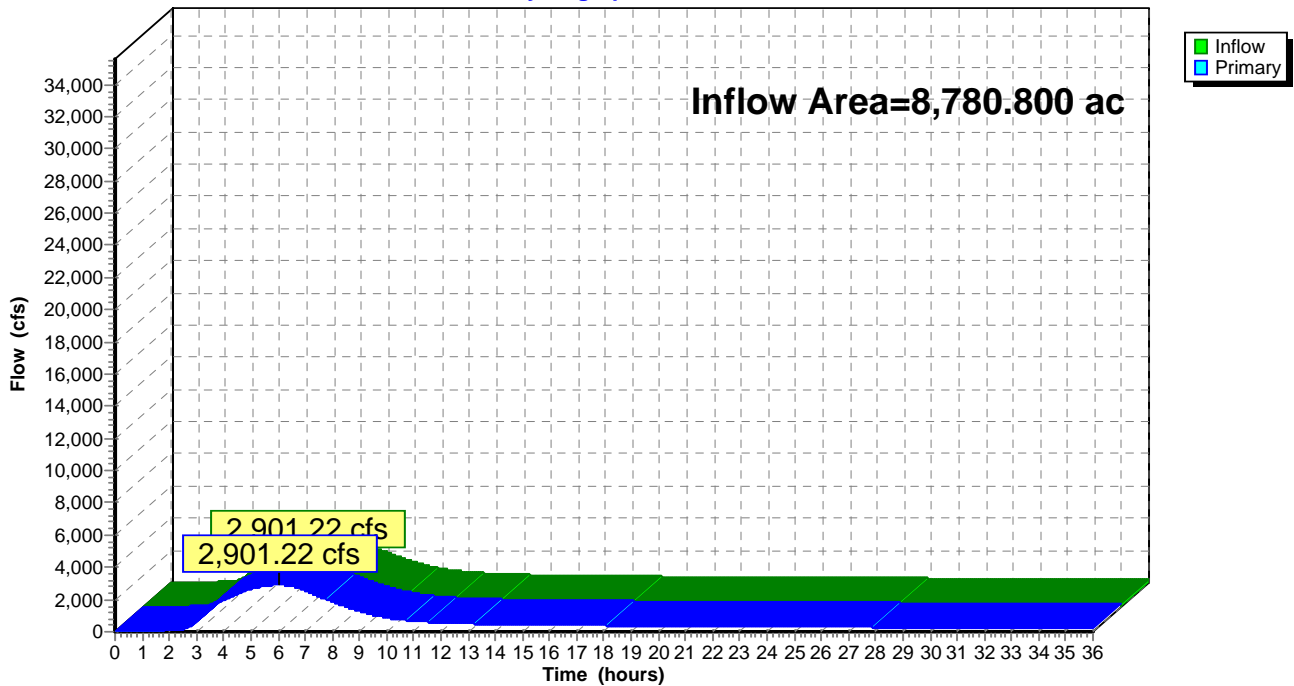
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.67" for 6-HR 0.22 PMF event
Inflow = 2,901.22 cfs @ 6.01 hrs, Volume= 1,951.773 af
Primary = 2,901.22 cfs @ 6.02 hrs, Volume= 1,951.773 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.51" for 6-HR 0.22 PMF event
 Inflow = 1,284.87 cfs @ 6.18 hrs, Volume= 411.232 af
 Outflow = 139.93 cfs @ 11.37 hrs, Volume= 287.650 af, Atten= 89%, Lag= 311.1 min
 Primary = 126.65 cfs @ 10.97 hrs, Volume= 284.673 af
 Secondary = 13.40 cfs @ 11.38 hrs, Volume= 2.977 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.10' @ 11.38 hrs Surf.Area= 134.392 ac Storage= 322.771 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 812.9 min calculated for 287.650 af (70% of inflow)
 Center-of-Mass det. time= 736.9 min (1,205.4 - 468.5)

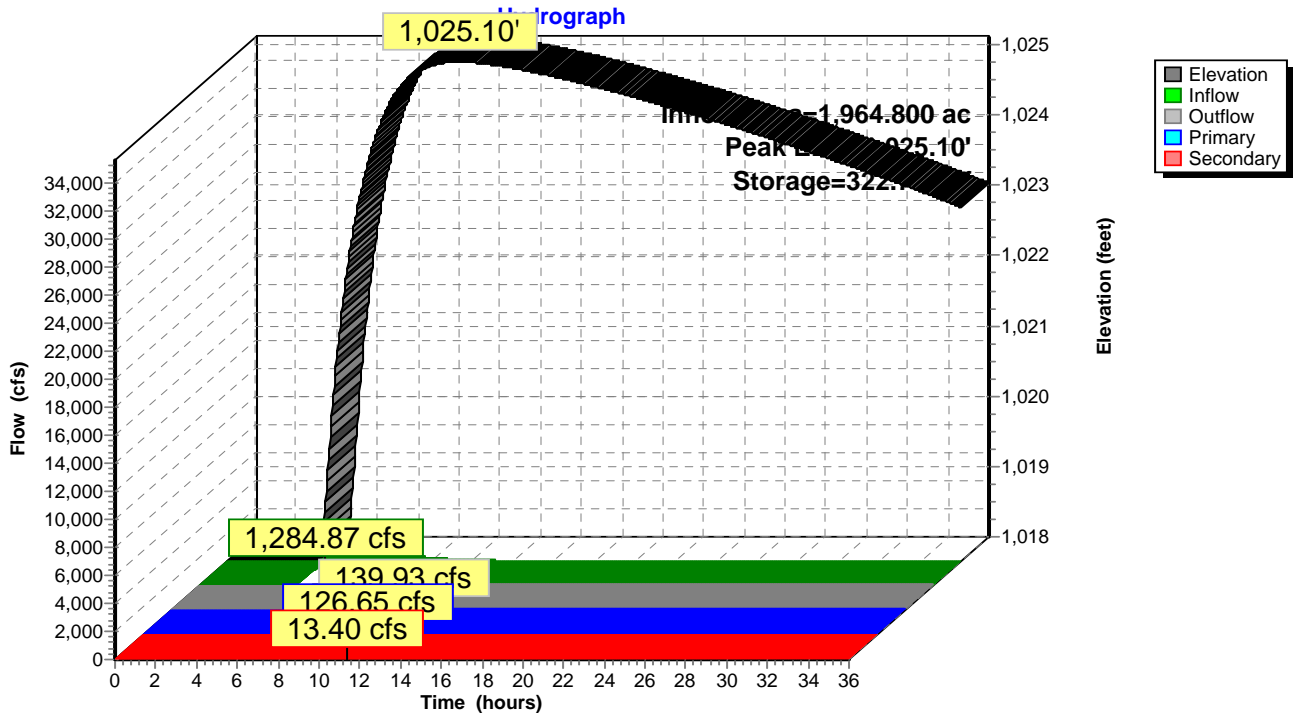
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

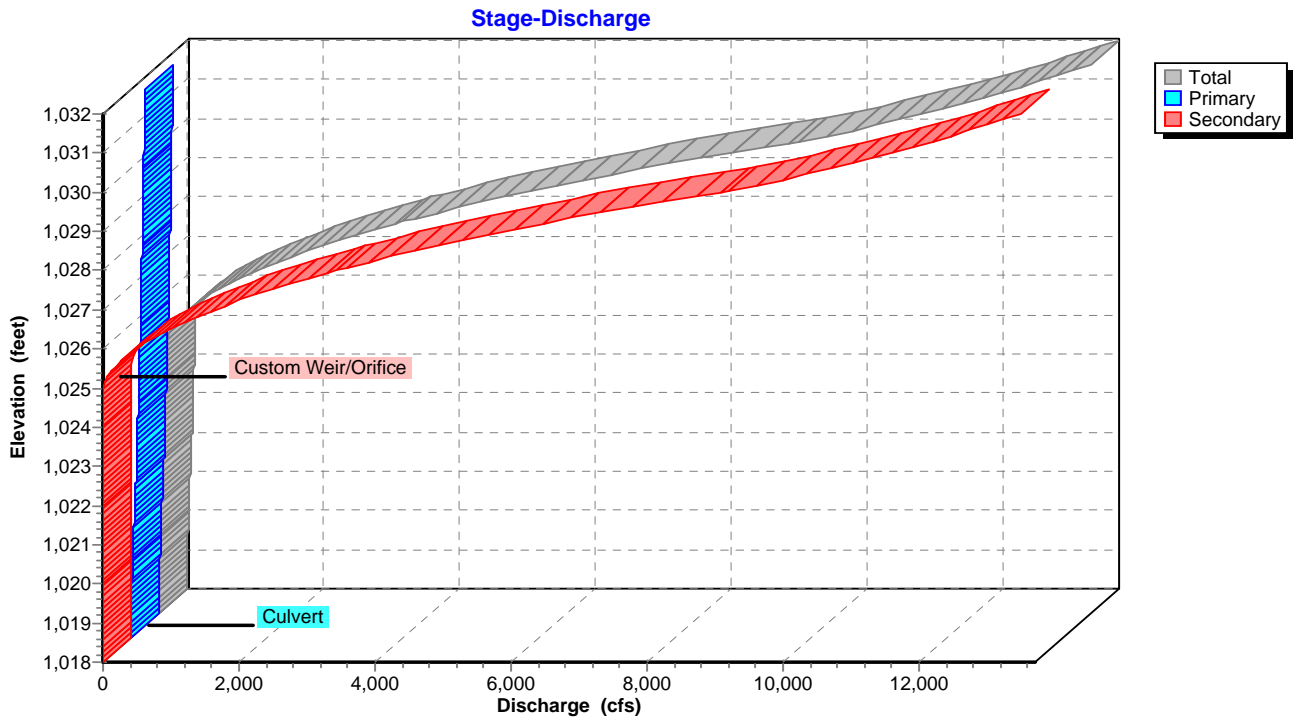
Primary OutFlow Max=126.64 cfs @ 10.97 hrs HW=1,025.10' TW=1,020.72' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 126.64 cfs @ 10.08 fps)

Secondary OutFlow Max=13.40 cfs @ 11.38 hrs HW=1,025.10' TW=1,020.73' (Dynamic Tailwater)
 ↑**2=Custom Weir/Orifice** (Weir Controls 13.40 cfs @ 1.03 fps)

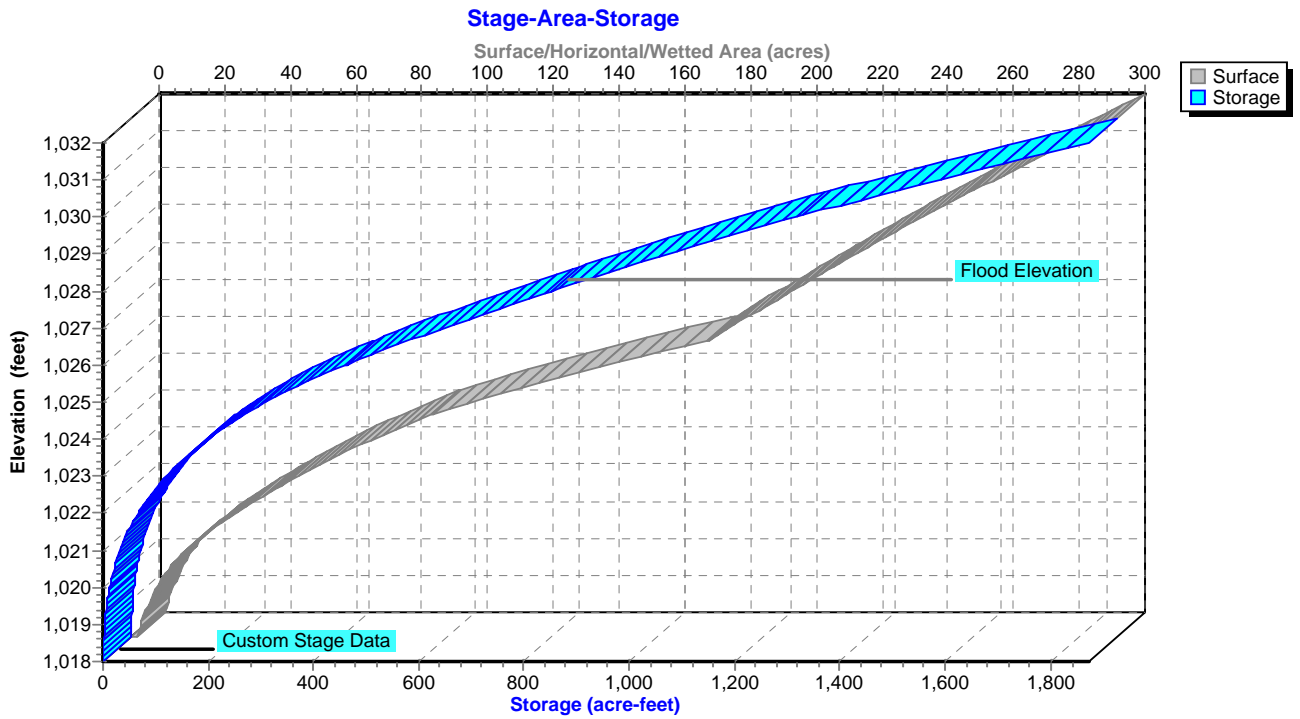
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 3.08" for 6-HR 0.22 PMF event
 Inflow = 1,638.90 cfs @ 5.03 hrs, Volume= 504.064 af
 Outflow = 1,284.87 cfs @ 6.18 hrs, Volume= 411.233 af, Atten= 22%, Lag= 69.3 min
 Primary = 1,284.87 cfs @ 6.18 hrs, Volume= 411.233 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.08' @ 6.18 hrs Surf.Area= 104.293 ac Storage= 420.172 af (200.172 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 316.6 min calculated for 191.180 af (38% of inflow)
 Center-of-Mass det. time= 114.0 min (468.5 - 354.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

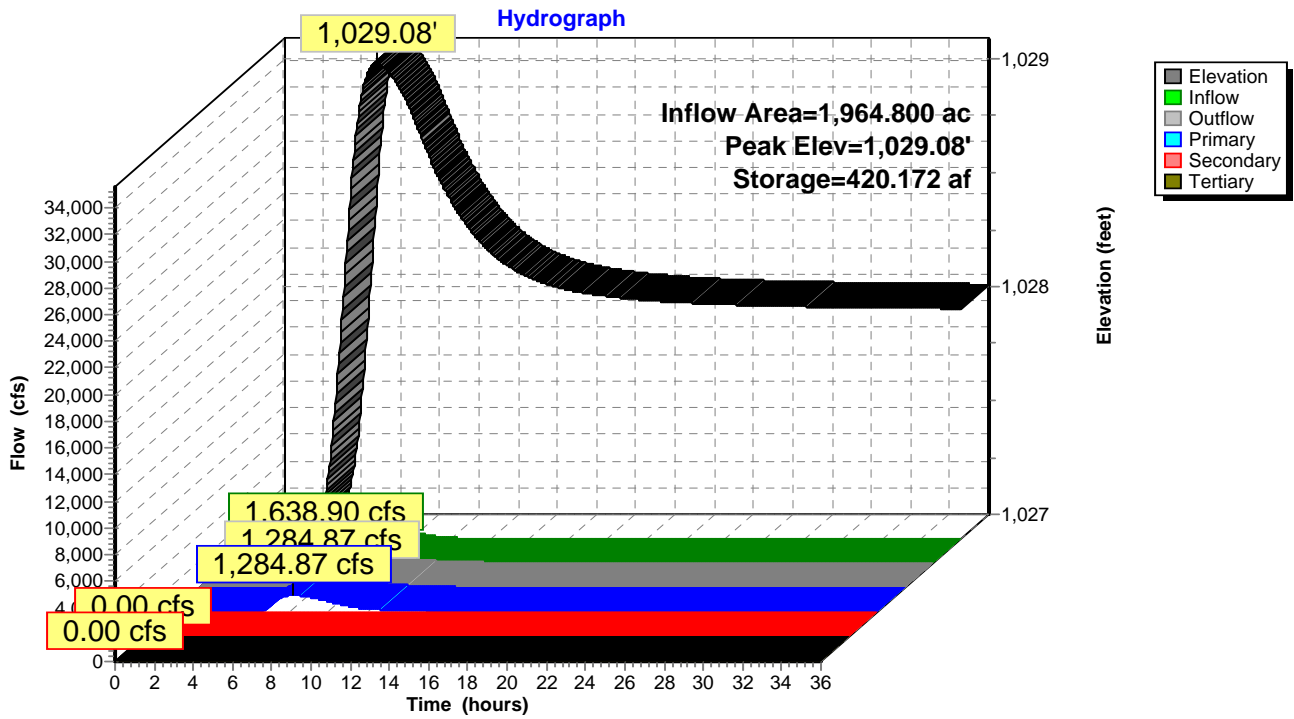
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,284.87 cfs @ 6.18 hrs HW=1,029.08' TW=1,022.69' (Dynamic Tailwater)
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 889.32 cfs @ 2.74 fps)
 ↳2=**Broad-Crested Rectangular Weir** (Weir Controls 395.55 cfs @ 2.06 fps)

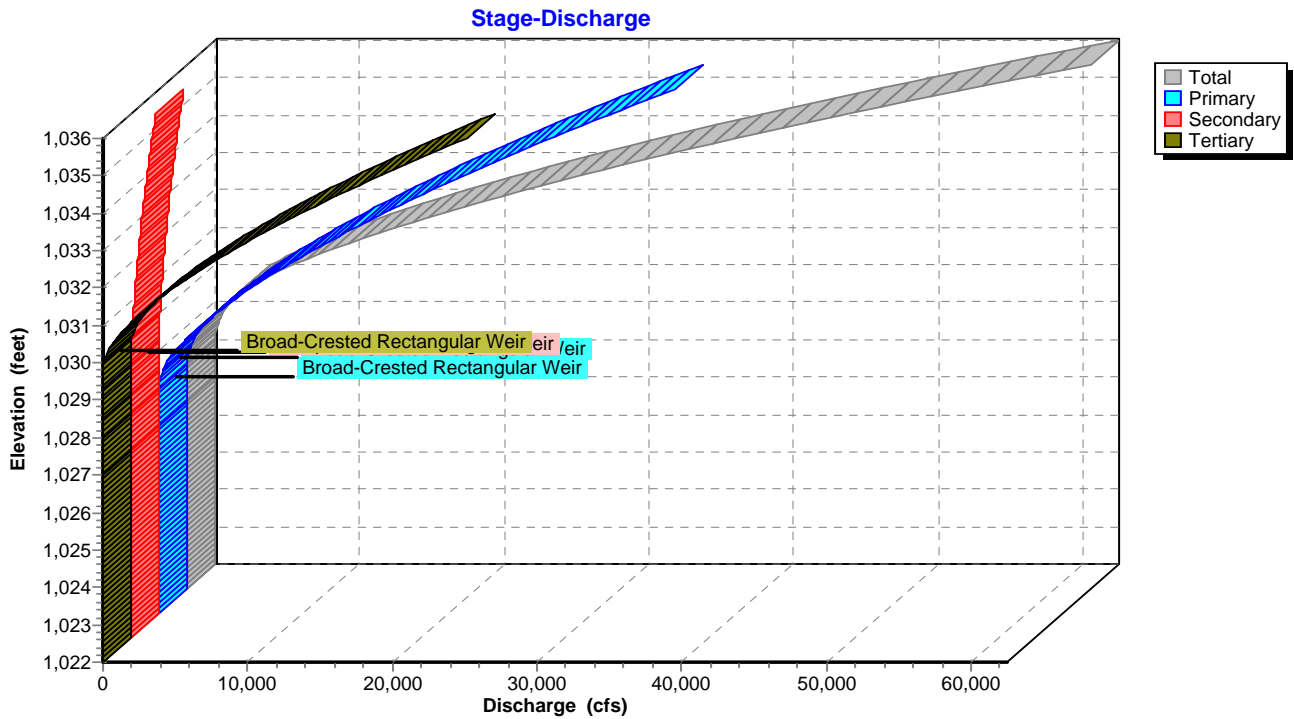
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

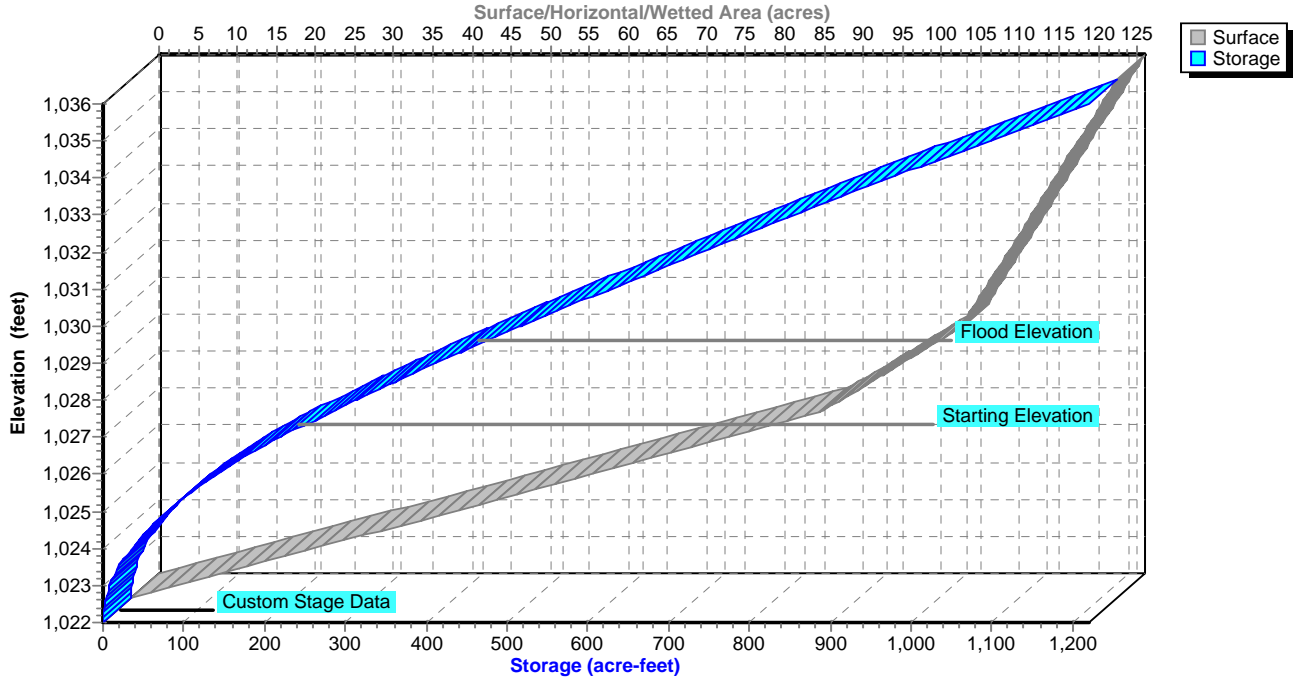


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

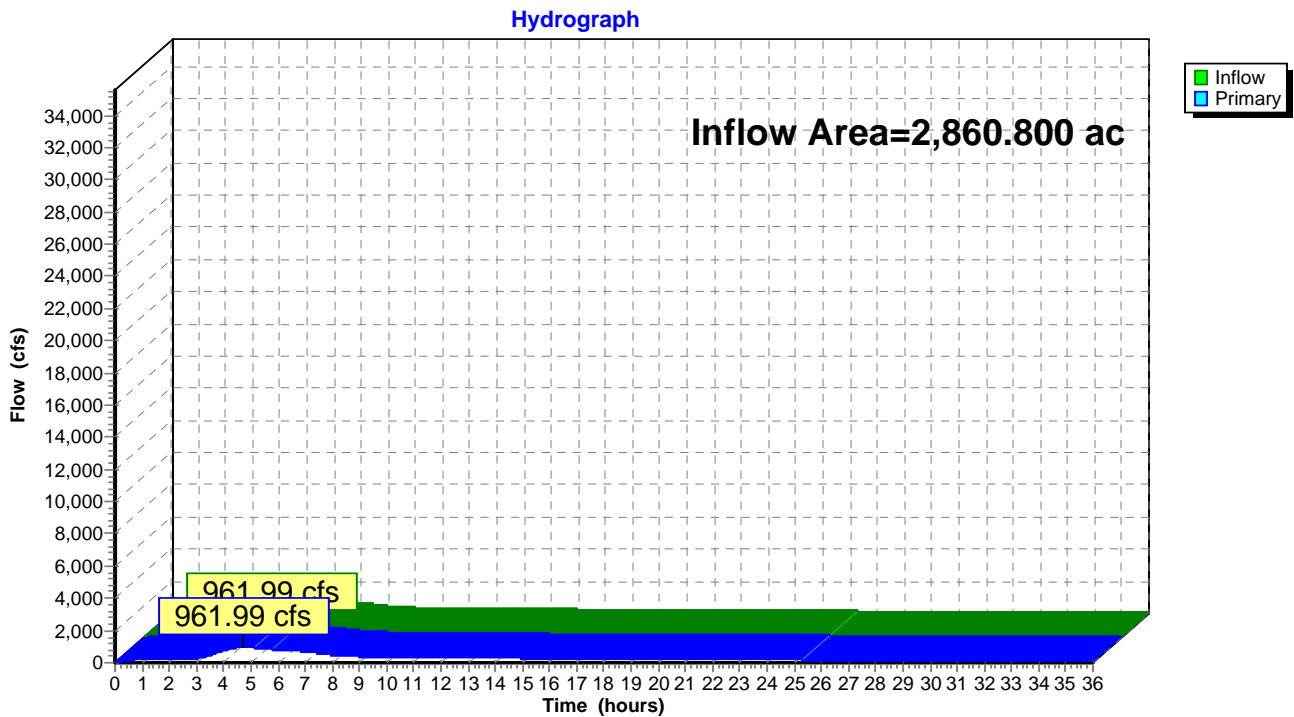


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.49" for 6-HR 0.22 PMF event
 Inflow = 961.99 cfs @ 4.69 hrs, Volume= 832.766 af
 Primary = 961.99 cfs @ 4.70 hrs, Volume= 832.766 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.69" for 6-HR 0.22 PMF event
 Inflow = 3,133.13 cfs @ 6.50 hrs, Volume= 2,119.347 af
 Outflow = 2,858.31 cfs @ 7.26 hrs, Volume= 2,118.658 af, Atten= 9%, Lag= 45.3 min
 Primary = 2,858.31 cfs @ 7.26 hrs, Volume= 2,118.658 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,001.65' @ 7.26 hrs Surf.Area= 10.050 ac Storage= 122.580 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 15.9 min calculated for 2,118.069 af (100% of inflow)
 Center-of-Mass det. time= 15.4 min (746.4 - 731.0)

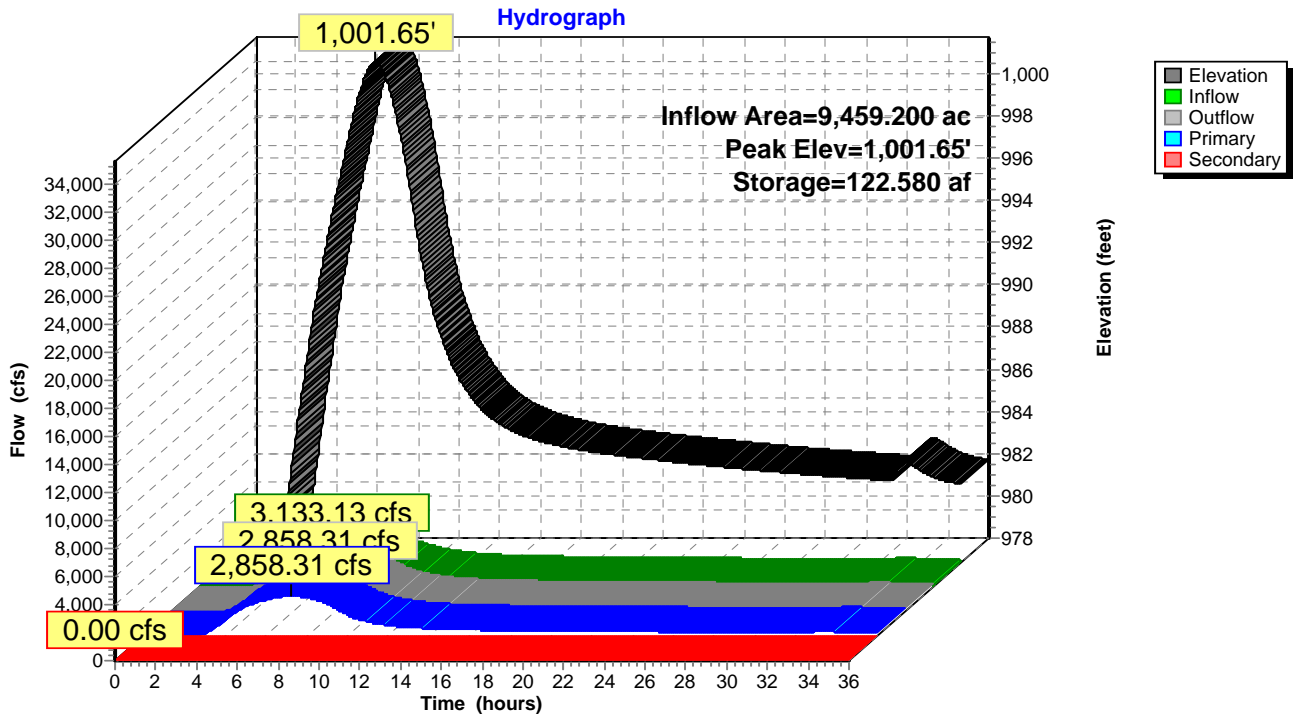
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

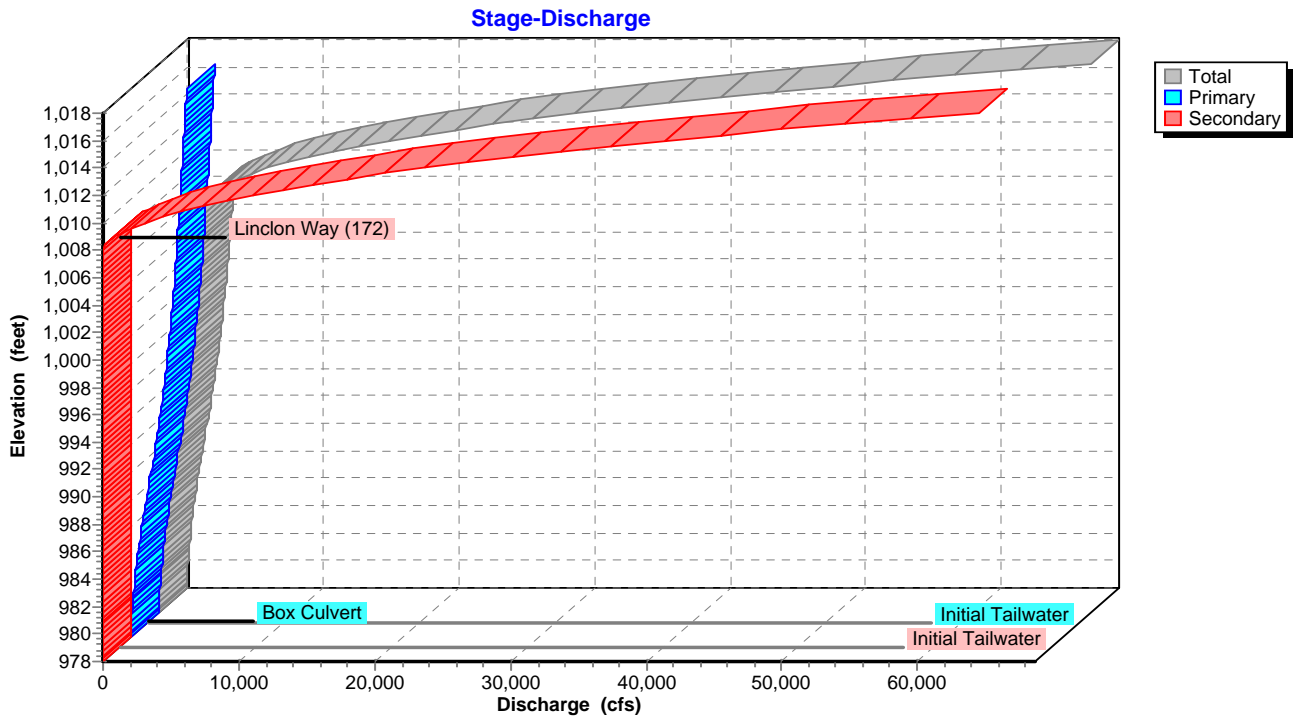
Primary OutFlow Max=2,858.30 cfs @ 7.26 hrs HW=1,001.65' TW=984.05' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,858.30 cfs @ 25.00 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

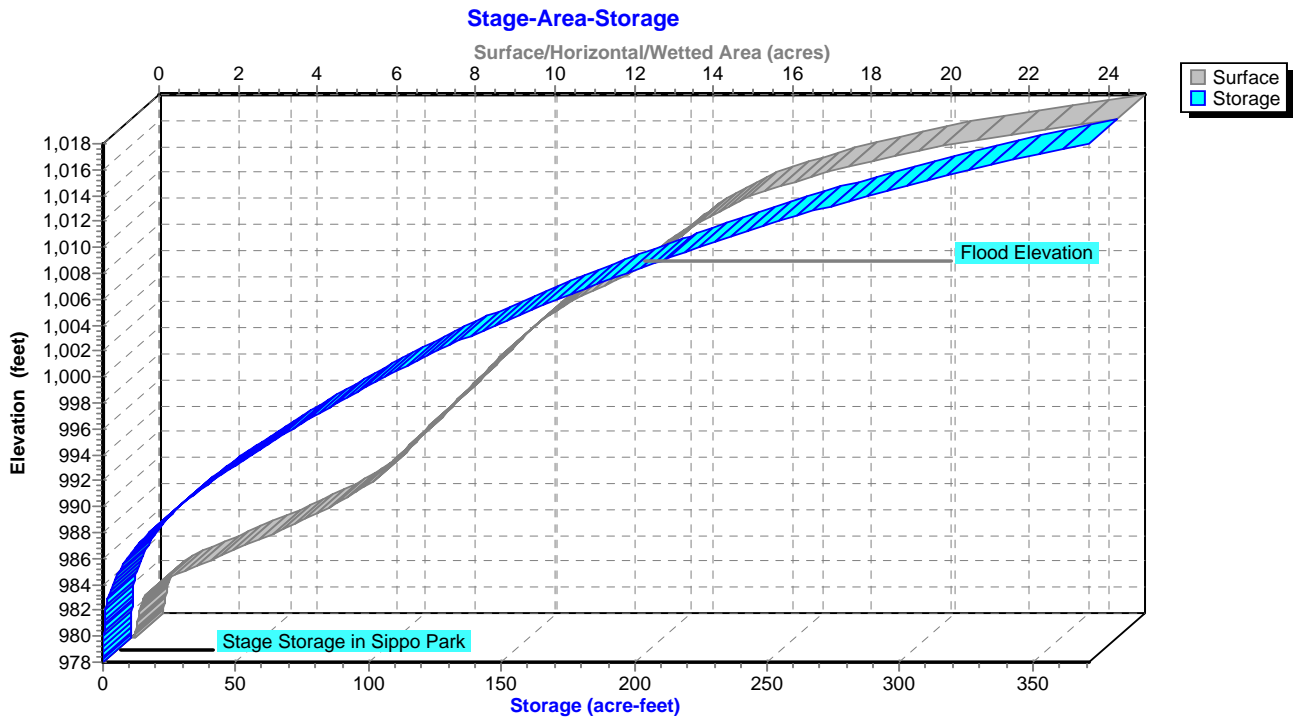
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



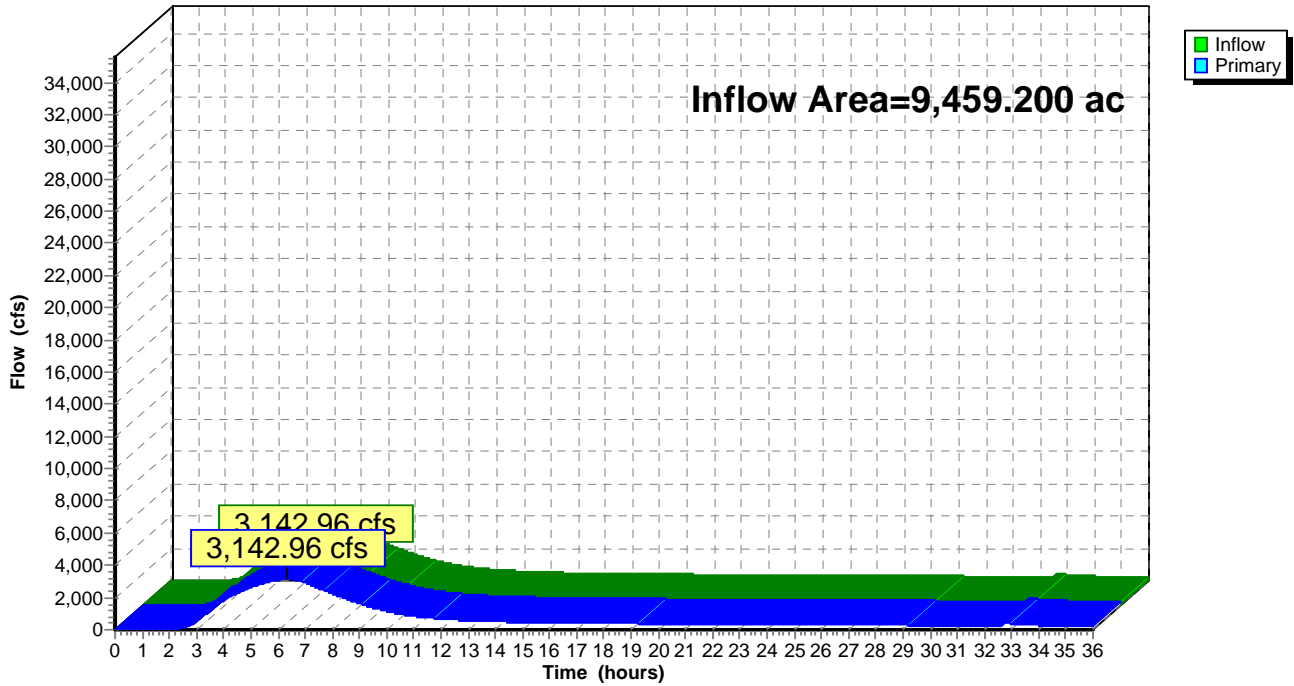
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.70" for 6-HR 0.22 PMF event
Inflow = 3,142.96 cfs @ 6.33 hrs, Volume= 2,130.749 af
Primary = 3,142.96 cfs @ 6.34 hrs, Volume= 2,130.749 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=3.21"
 Tc=44.0 min CN=74 Runoff=169.36 cfs 30.817 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=3.31"
 Tc=65.0 min CN=75 Runoff=365.35 cfs 74.091 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.83"
 Tc=226.0 min CN=70 Runoff=867.83 cfs 330.429 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.64"
 Tc=128.0 min CN=68 Runoff=840.70 cfs 236.893 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.55"
 Tc=129.0 min CN=67 Runoff=580.20 cfs 164.735 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=3.21"
 Tc=110.0 min CN=74 Runoff=757.48 cfs 193.463 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=3.31"
 Tc=72.0 min CN=75 Runoff=964.57 cfs 202.868 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.81"
 Tc=78.0 min CN=80 Runoff=1,003.20 cfs 215.298 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.74"
 Tc=155.0 min CN=69 Runoff=782.36 cfs 243.686 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=3.31"
 Tc=156.0 min CN=75 Runoff=1,764.34 cfs 541.569 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.55"
 Tc=151.0 min CN=67 Runoff=449.45 cfs 138.867 af

Reach 5R: Channel 5 Avg. Flow Depth=3.06' Max Vel=6.02 fps Inflow=348.23 cfs 643.528 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=347.61 cfs 638.264 af

Reach 7R: Channel 7 Avg. Flow Depth=8.23' Max Vel=3.17 fps Inflow=1,031.75 cfs 874.956 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=977.56 cfs 866.365 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=3.78' Max Vel=2.85 fps Inflow=189.22 cfs 312.717 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=189.19 cfs 311.957 af

Reach 15R: Channel 15 Avg. Flow Depth=8.60' Max Vel=2.15 fps Inflow=2,776.27 cfs 1,724.965 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,344.57 cfs 1,692.905 af

Reach 16R: Channel 16 Avg. Flow Depth=10.56' Max Vel=2.63 fps Inflow=3,134.58 cfs 2,088.864 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=3,048.98 cfs 2,065.707 af

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 311

Reach 18R: Sippo Creek Avg. Flow Depth=6.04' Max Vel=9.57 fps Inflow=3,025.00 cfs 2,267.722 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,024.99 cfs 2,267.600 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=416.46 cfs 104.797 af
Primary=416.46 cfs 104.797 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,007.39' Storage=130.704 af Inflow=3,395.92 cfs 2,280.604 af
273.59 cfs 1,921.684 af Secondary=1,128.13 cfs 347.250 af Tertiary=0.00 cfs 0.000 af Outflow=3,378.21 cfs 2,268.934 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=1,036.02 cfs 434.729 af
Primary=1,036.02 cfs 434.729 af

Pond 3P: Lake Cable Peak Elev=1,098.12' Storage=2,082.700 af Inflow=1,036.02 cfs 434.728 af
Primary=348.23 cfs 643.628 af Secondary=0.00 cfs 0.000 af Outflow=348.23 cfs 643.628 af

Pond 4C: Confluence 4 Inflow=1,758.53 cfs 1,109.949 af
Primary=1,758.53 cfs 1,109.949 af

Pond 4P: Lake O'Springs Peak Elev=1,107.91' Storage=77.895 af Inflow=416.46 cfs 104.797 af
Primary=169.19 cfs 104.301 af Secondary=0.00 cfs 0.000 af Outflow=169.19 cfs 104.301 af

Pond 5C: Confluence 5 Inflow=2,312.99 cfs 1,274.583 af
Primary=2,312.99 cfs 1,274.583 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.03' Storage=27.621 af Inflow=169.36 cfs 30.817 af
Primary=85.48 cfs 30.643 af Secondary=2.30 cfs 0.064 af Outflow=87.78 cfs 30.706 af

Pond 6C: Confluence 6 Inflow=484.81 cfs 450.744 af
Primary=484.81 cfs 450.744 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,776.27 cfs 1,725.146 af
Primary=2,776.27 cfs 1,725.146 af

Pond 8C: Confluence 8 Inflow=3,134.58 cfs 2,089.051 af
Primary=3,134.58 cfs 2,089.051 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,025.29' Storage=349.007 af Inflow=1,409.61 cfs 448.734 af
Primary=126.92 cfs 289.234 af Secondary=68.00 cfs 23.563 af Outflow=189.22 cfs 312.797 af

Pond 9P: Sippo Lake Peak Elev=1,029.14' Storage=425.900 af Inflow=1,764.34 cfs 541.569 af
Primary=1,409.61 cfs 448.734 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,409.61 cfs 448.734 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=1,031.75 cfs 875.056 af
Primary=1,031.75 cfs 875.056 af

Pond 16P: Lincoln Way Box Peak Elev=1,003.81' Storage=145.267 af Inflow=3,378.21 cfs 2,268.724 af
Primary=3,025.00 cfs 2,267.934 af Secondary=0.00 cfs 0.000 af Outflow=3,025.00 cfs 2,267.934 af

Pond 19C: Confluence 19 Inflow=3,395.92 cfs 2,280.804 af
Primary=3,395.92 cfs 2,280.804 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 2,372.716 af Average Runoff Depth = 3.01"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 169.36 cfs @ 3.37 hrs, Volume= 30.817 af, Depth= 3.21"

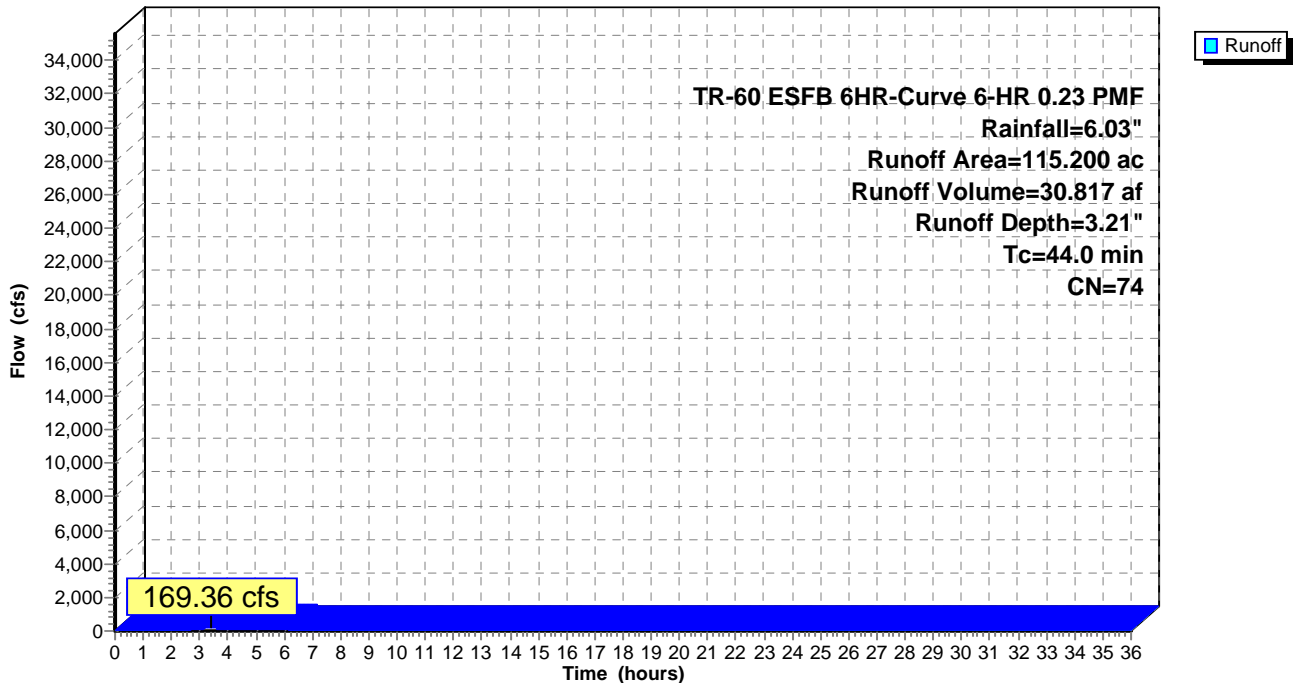
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 365.35 cfs @ 3.68 hrs, Volume= 74.091 af, Depth= 3.31"

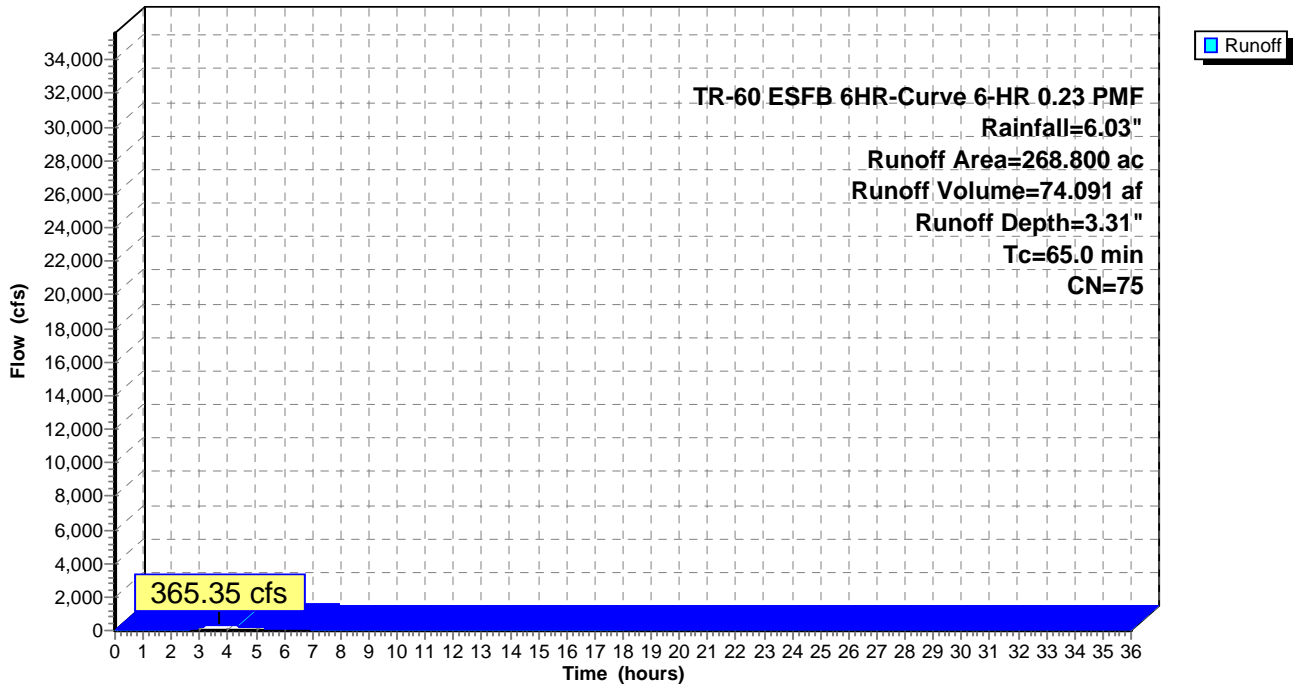
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 867.83 cfs @ 6.28 hrs, Volume= 330.429 af, Depth= 2.83"

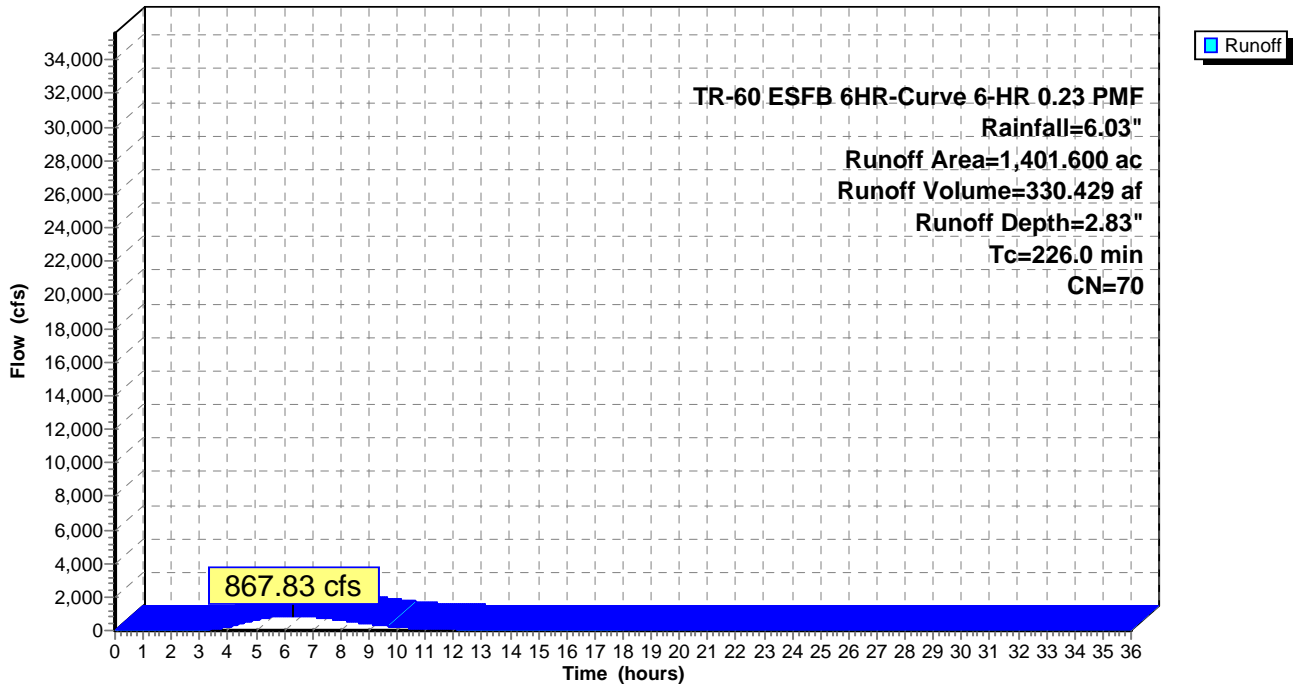
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 840.70 cfs @ 4.69 hrs, Volume= 236.893 af, Depth= 2.64"

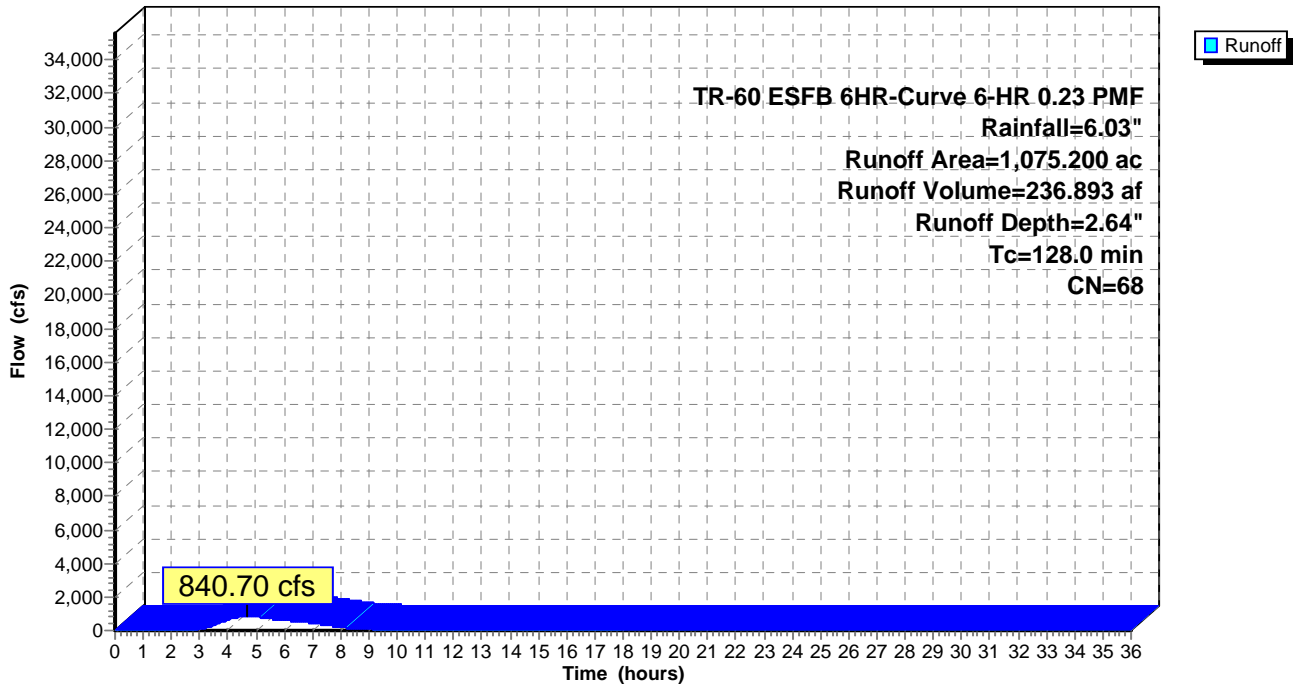
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 580.20 cfs @ 4.73 hrs, Volume= 164.735 af, Depth= 2.55"

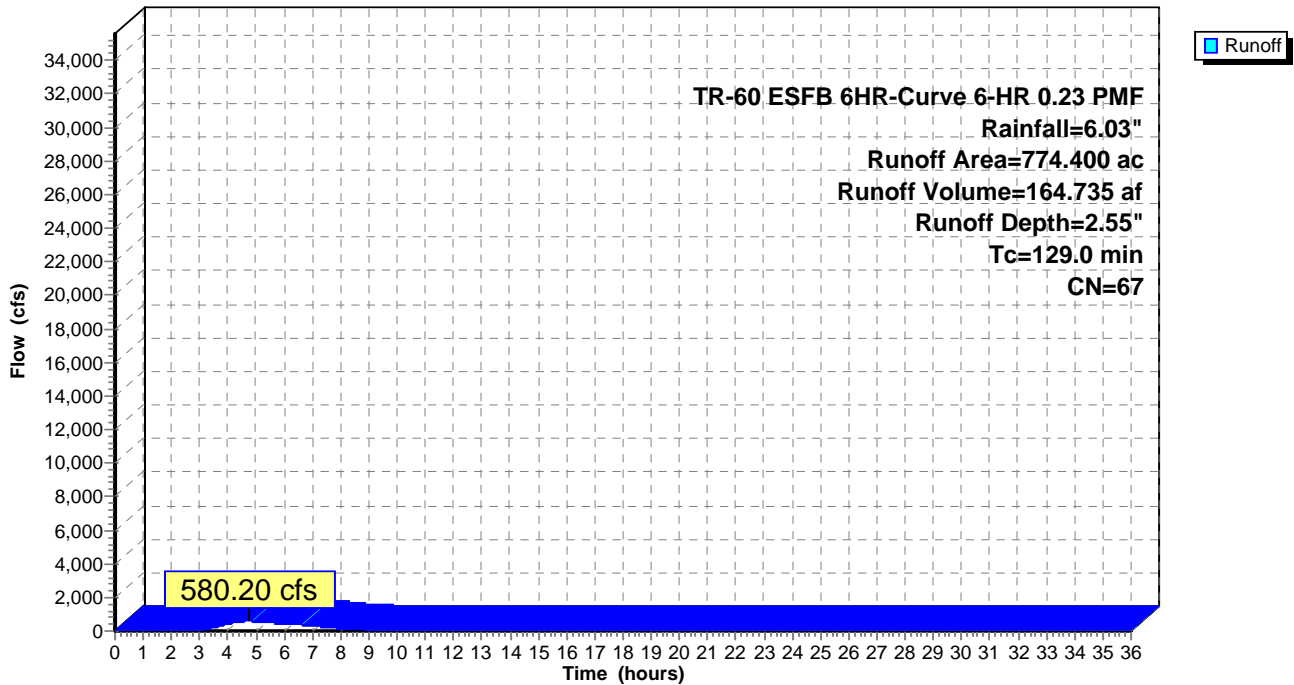
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 757.48 cfs @ 4.28 hrs, Volume= 193.463 af, Depth= 3.21"

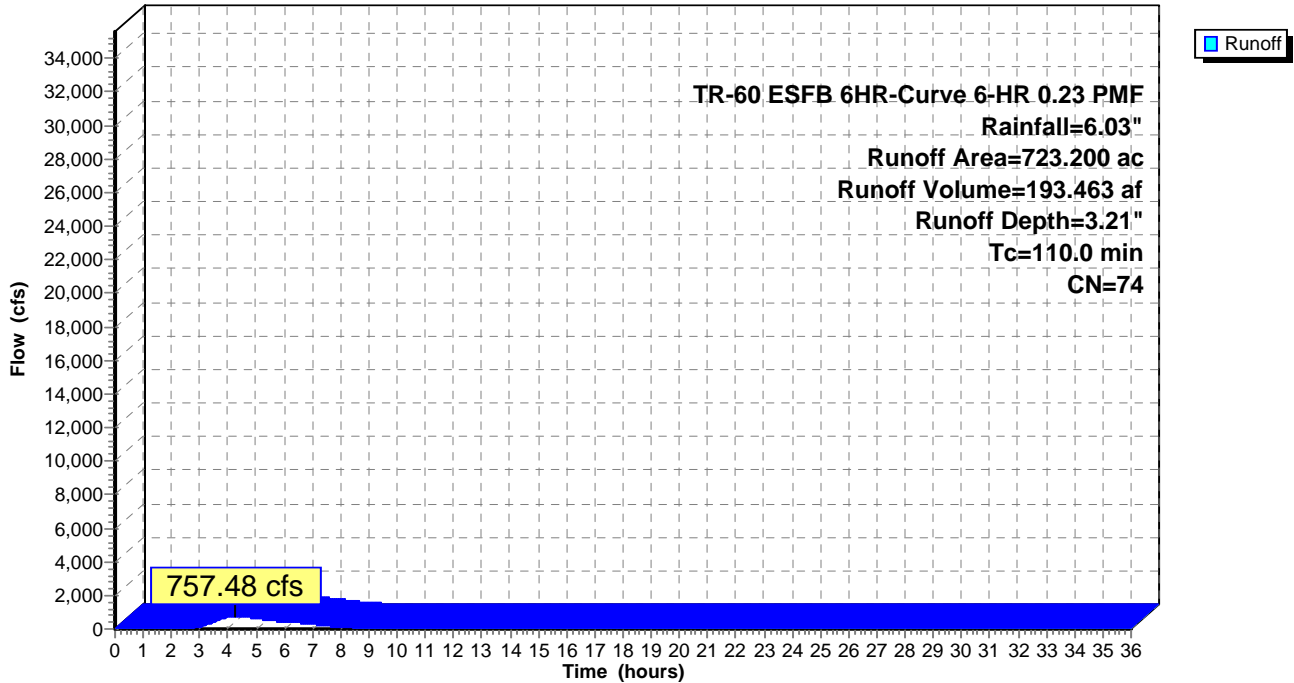
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 964.57 cfs @ 3.76 hrs, Volume= 202.868 af, Depth= 3.31"

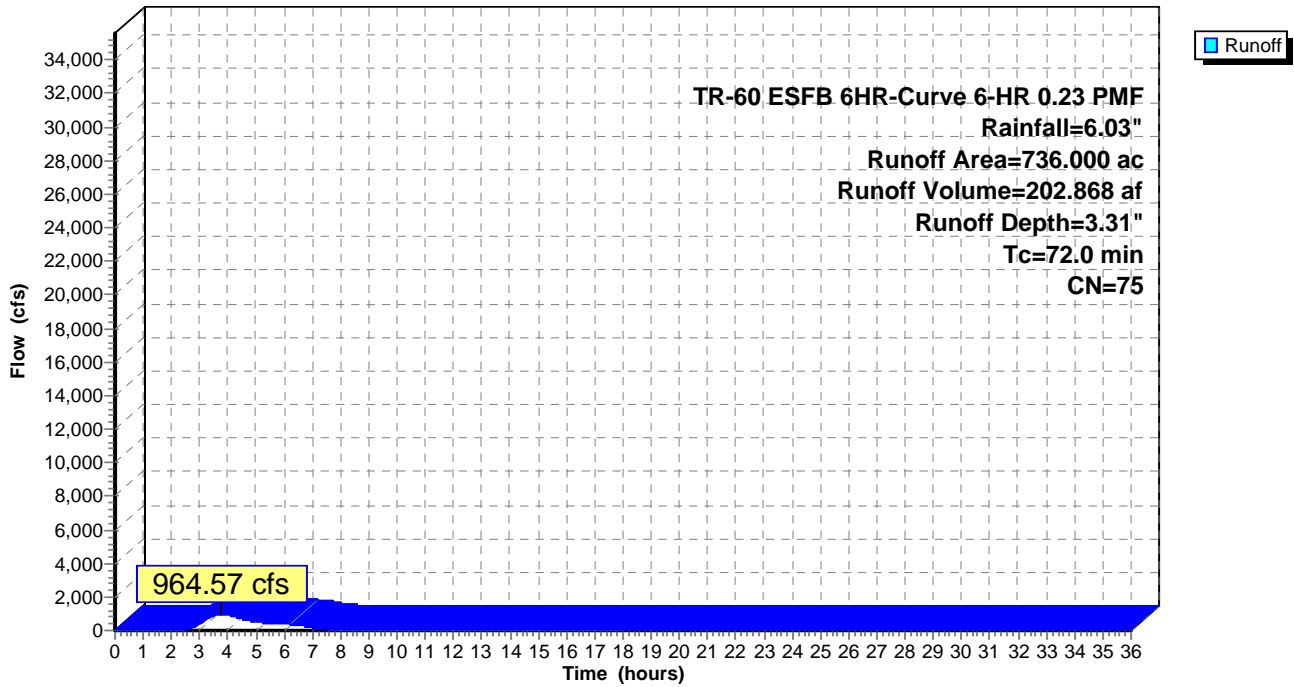
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 1,003.20 cfs @ 3.81 hrs, Volume= 215.298 af, Depth= 3.81"

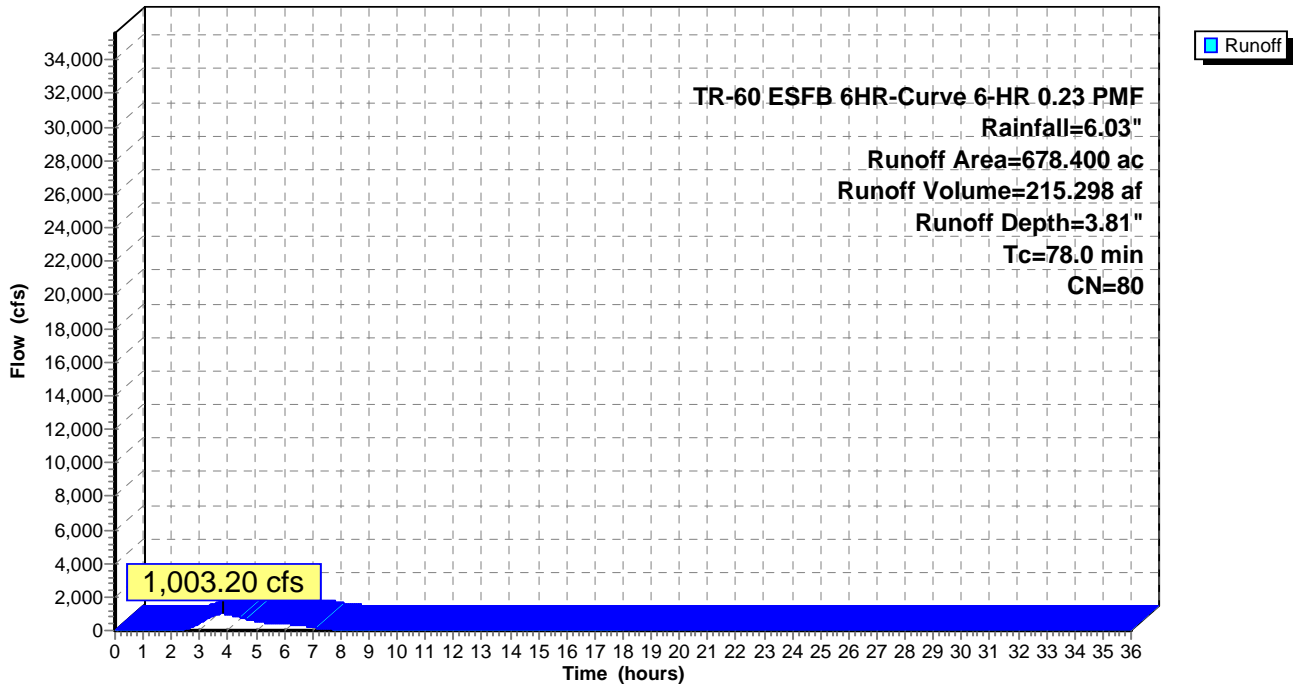
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 782.36 cfs @ 5.00 hrs, Volume= 243.686 af, Depth= 2.74"

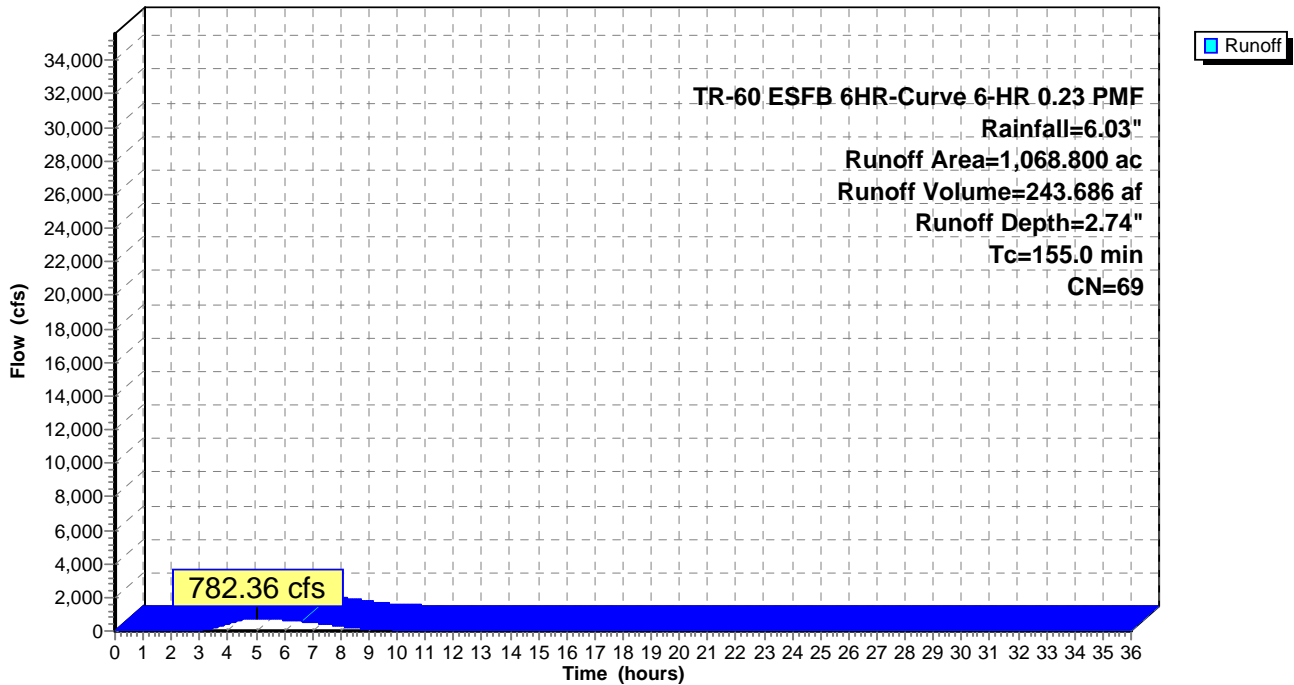
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,764.34 cfs @ 5.03 hrs, Volume= 541.569 af, Depth= 3.31"

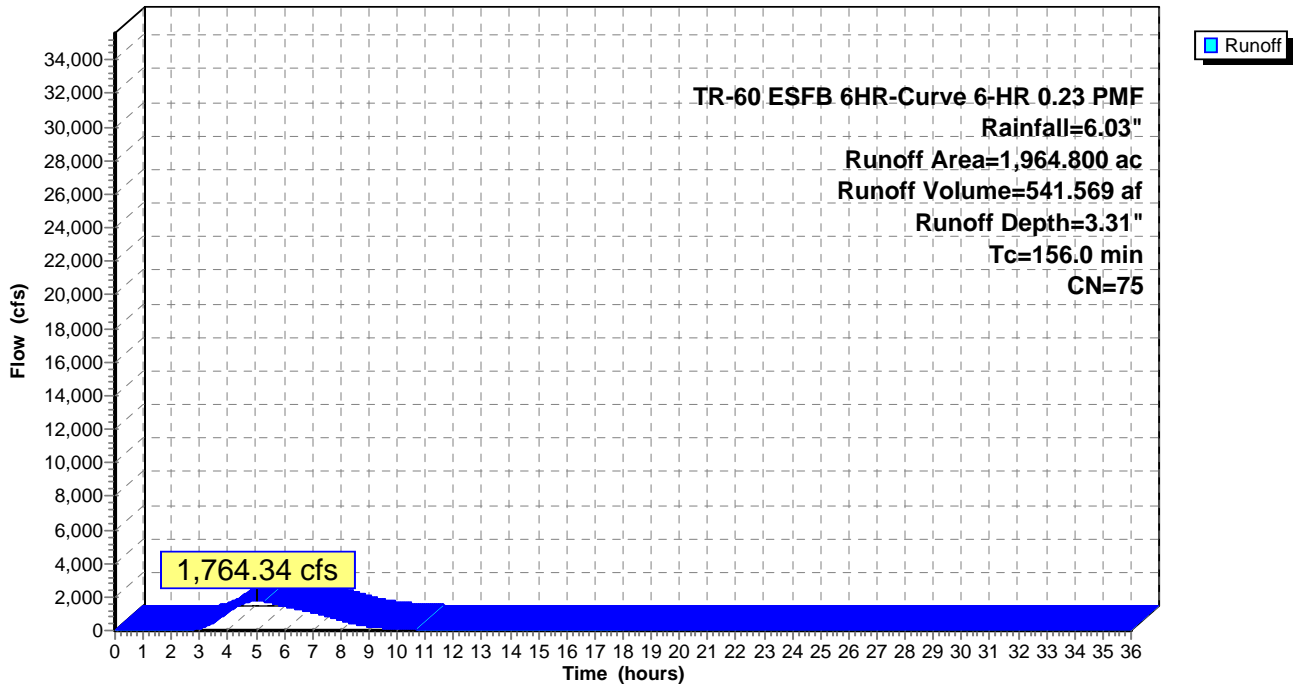
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 449.45 cfs @ 5.04 hrs, Volume= 138.867 af, Depth= 2.55"

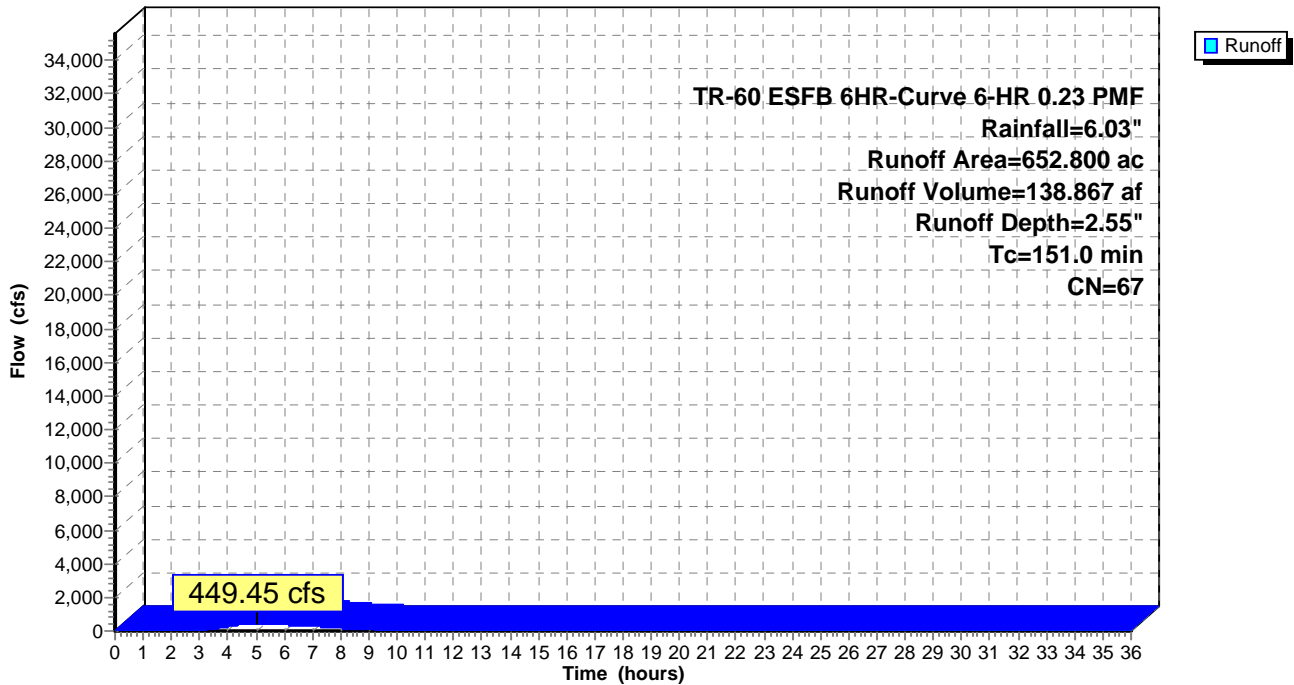
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.23 PMF Rainfall=6.03"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



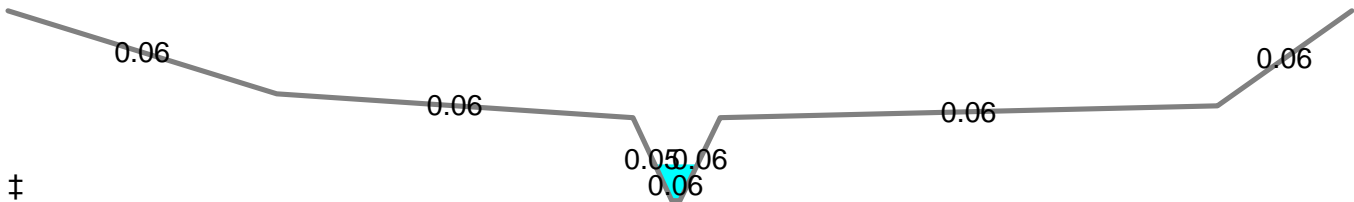
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.32" for 6-HR 0.23 PMF event
 Inflow = 348.23 cfs @ 9.67 hrs, Volume= 643.528 af
 Outflow = 347.61 cfs @ 9.99 hrs, Volume= 638.264 af, Atten= 0%, Lag= 19.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.02 fps, Min. Travel Time= 24.4 min
 Avg. Velocity= 5.24 fps, Avg. Travel Time= 28.0 min

Peak Storage= 508,114 cf @ 9.99 hrs
 Average Depth at Peak Storage= 3.06'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

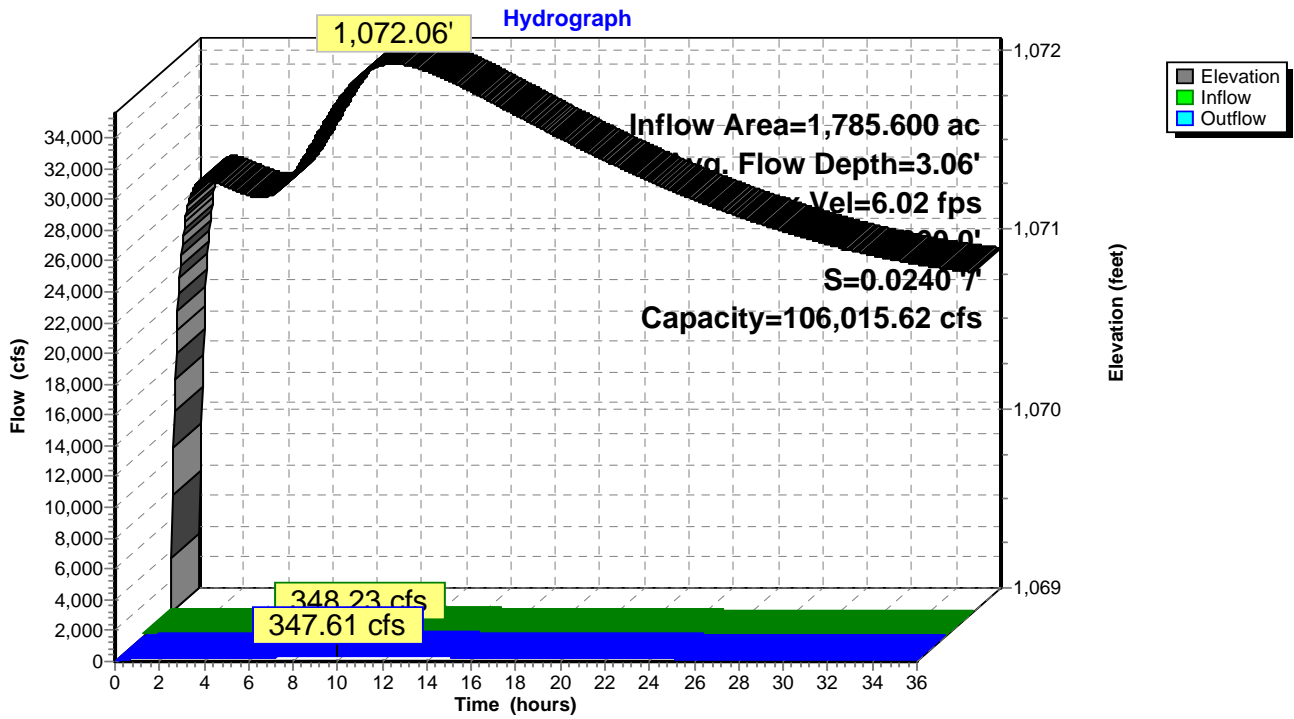
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



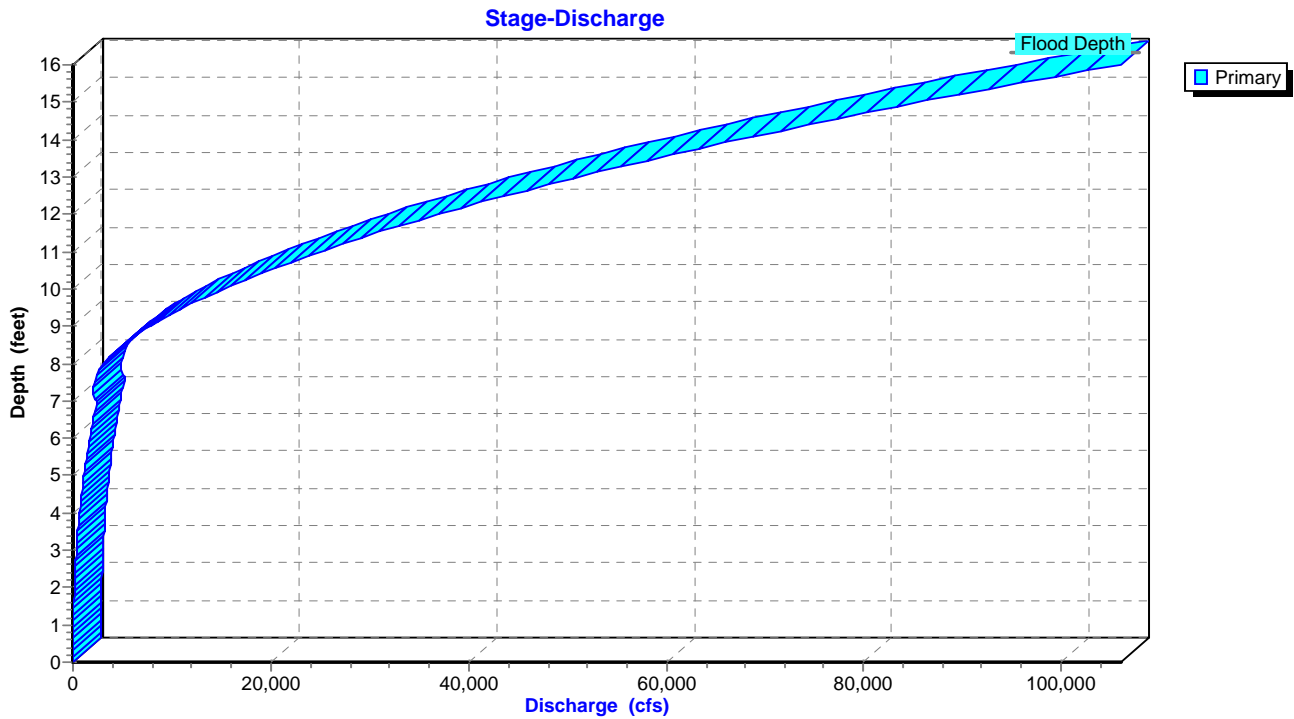
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

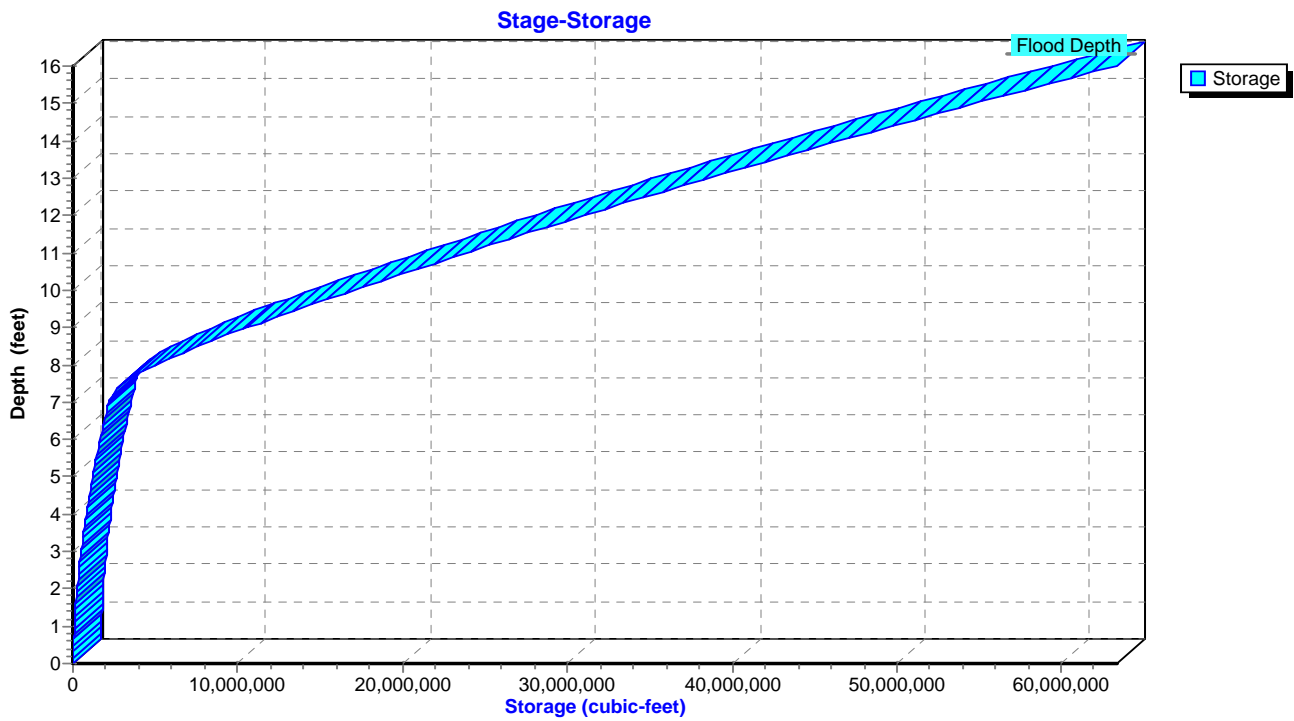
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



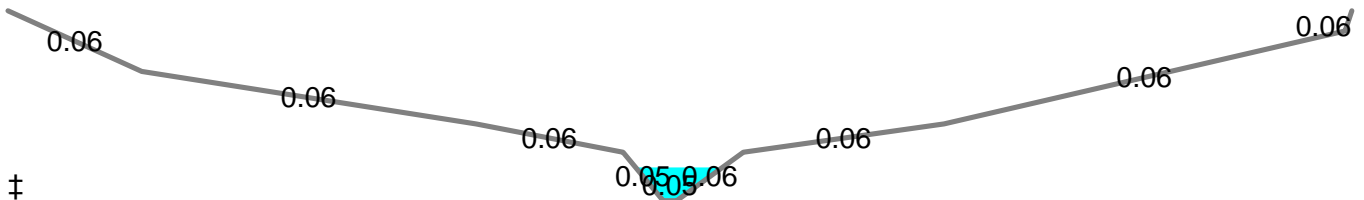
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.67" for 6-HR 0.23 PMF event
 Inflow = 1,031.75 cfs @ 4.70 hrs, Volume= 874.956 af
 Outflow = 977.56 cfs @ 5.18 hrs, Volume= 866.365 af, Atten= 5%, Lag= 28.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.17 fps, Min. Travel Time= 31.0 min
 Avg. Velocity = 2.27 fps, Avg. Travel Time= 43.4 min

Peak Storage= 1,820,055 cf @ 5.18 hrs
 Average Depth at Peak Storage= 8.23'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

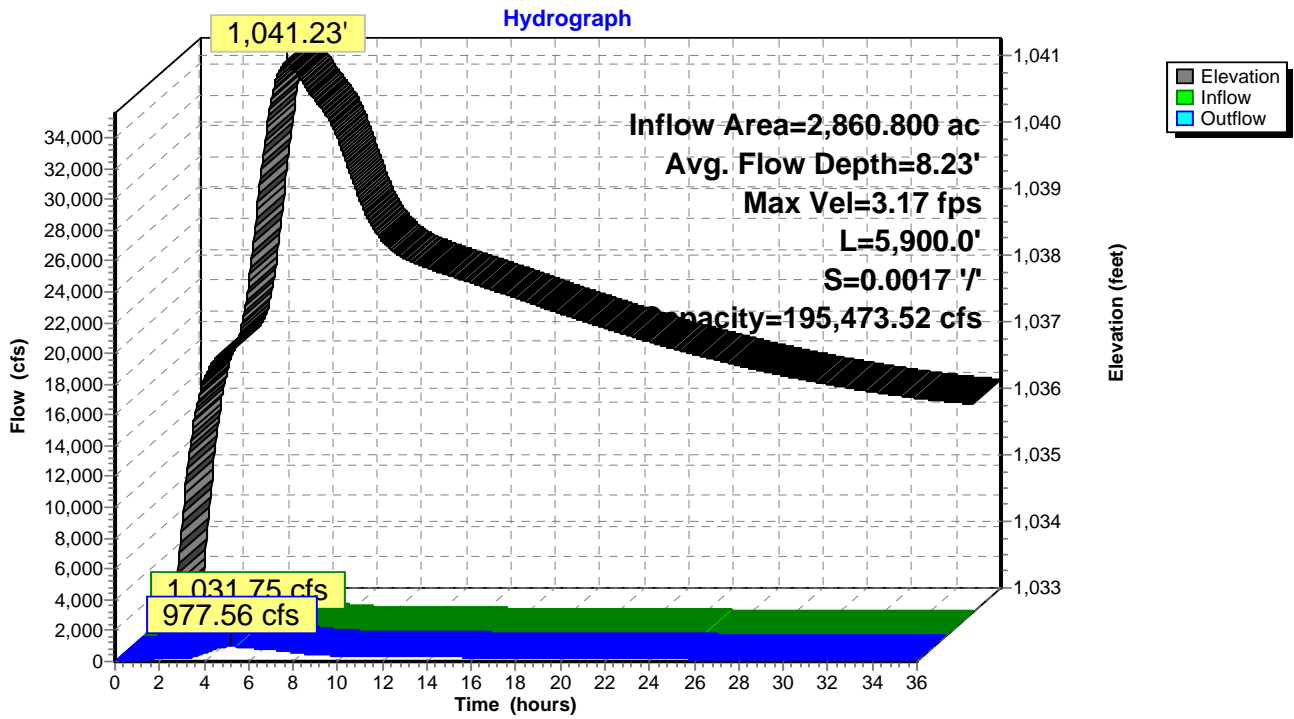
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



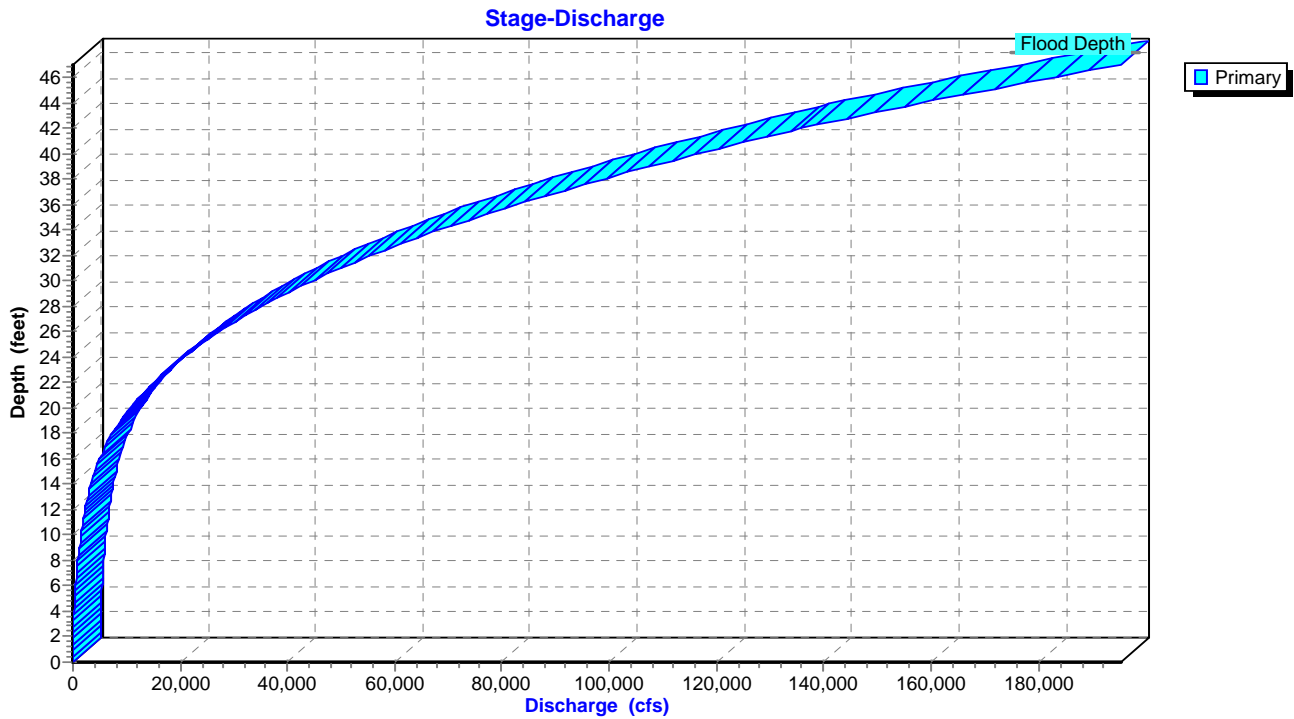
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

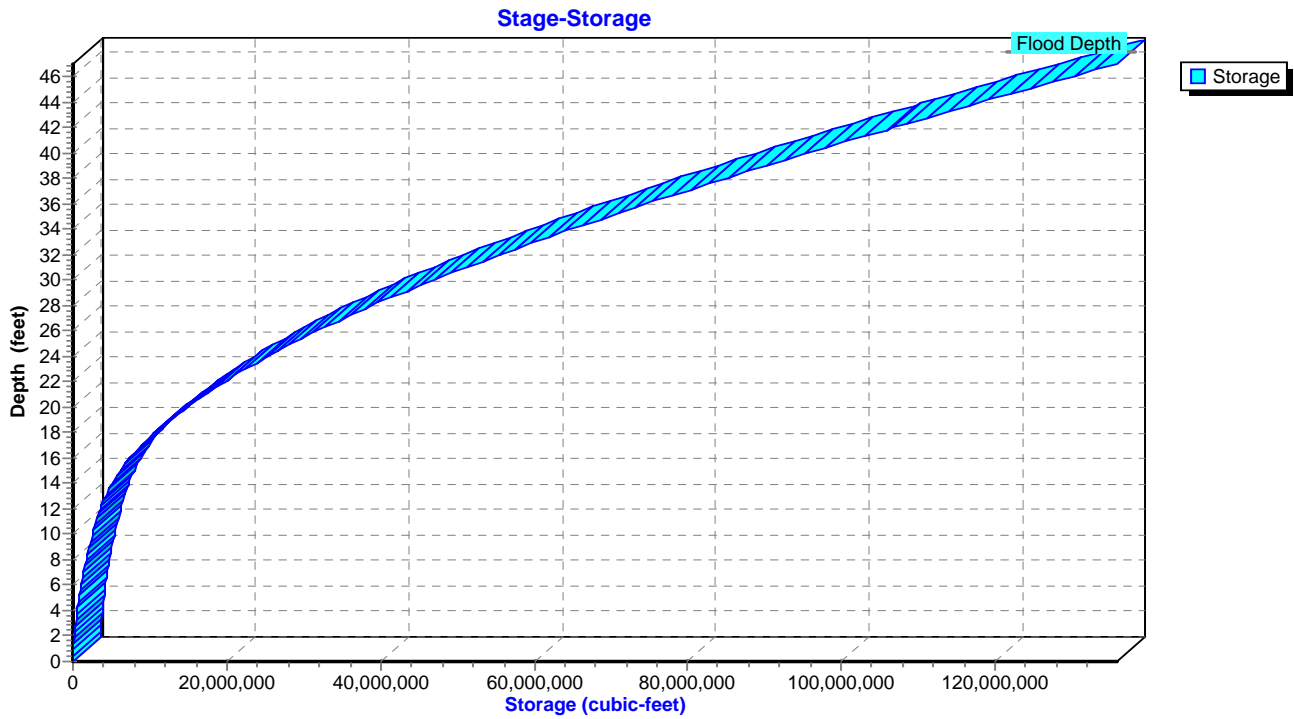
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



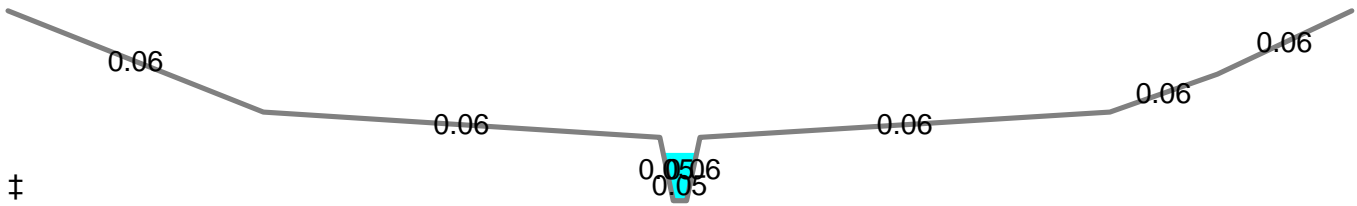
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.91" for 6-HR 0.23 PMF event
 Inflow = 189.22 cfs @ 10.81 hrs, Volume= 312.717 af
 Outflow = 189.19 cfs @ 10.88 hrs, Volume= 311.957 af, Atten= 0%, Lag= 4.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.85 fps, Min. Travel Time= 5.3 min
 Avg. Velocity = 2.49 fps, Avg. Travel Time= 6.0 min

Peak Storage= 59,688 cf @ 10.88 hrs
 Average Depth at Peak Storage= 3.78'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

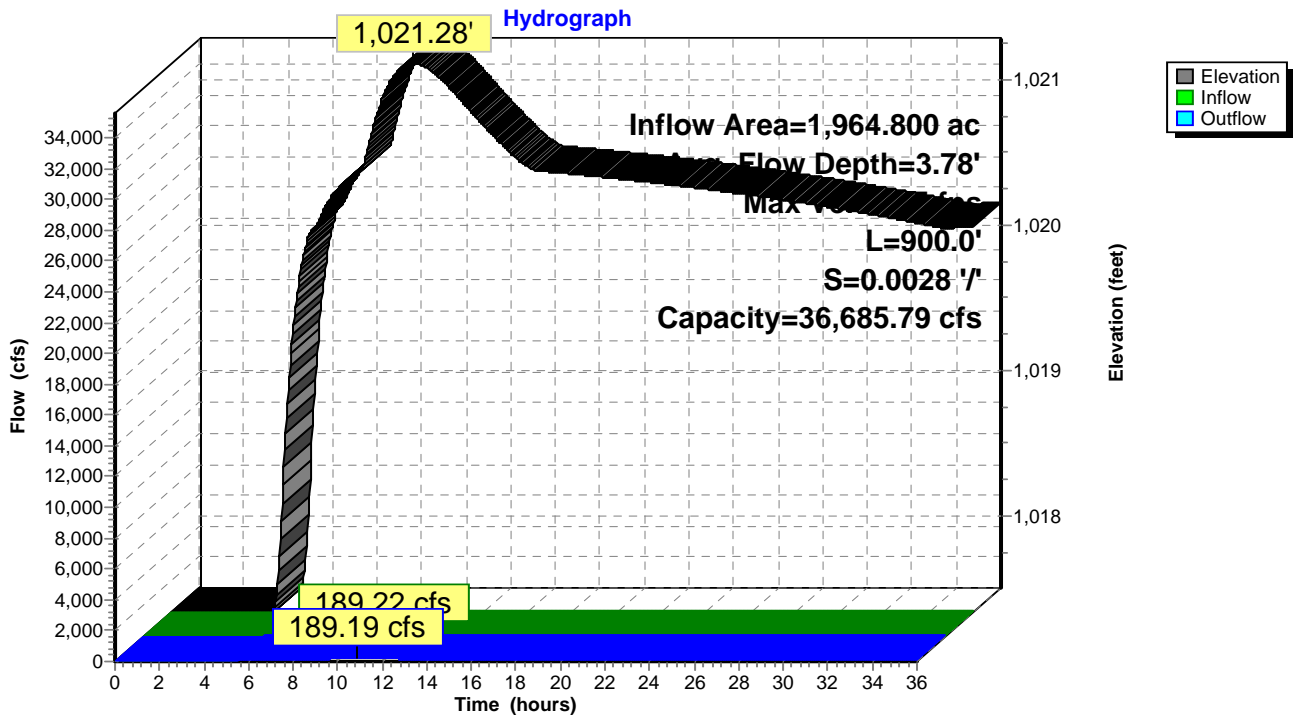
Custom cross-section, Length= 900.0' Slope= 0.0028 '/ (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



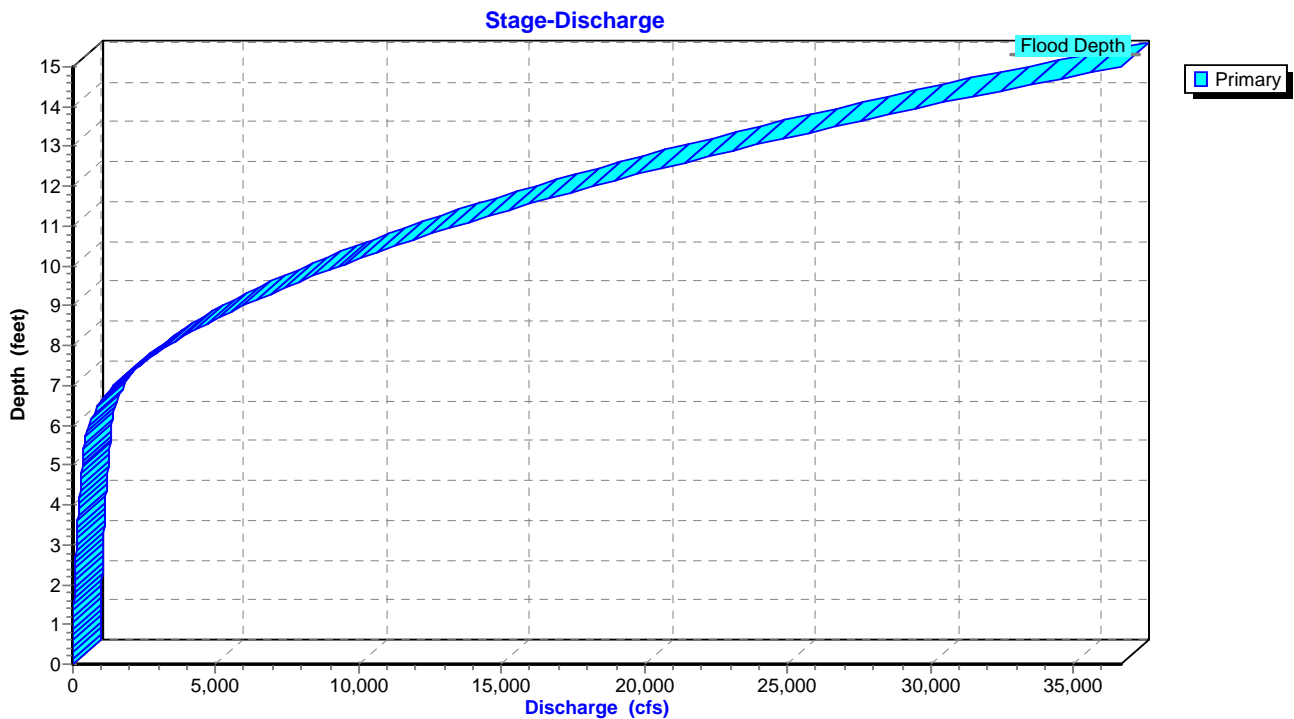
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

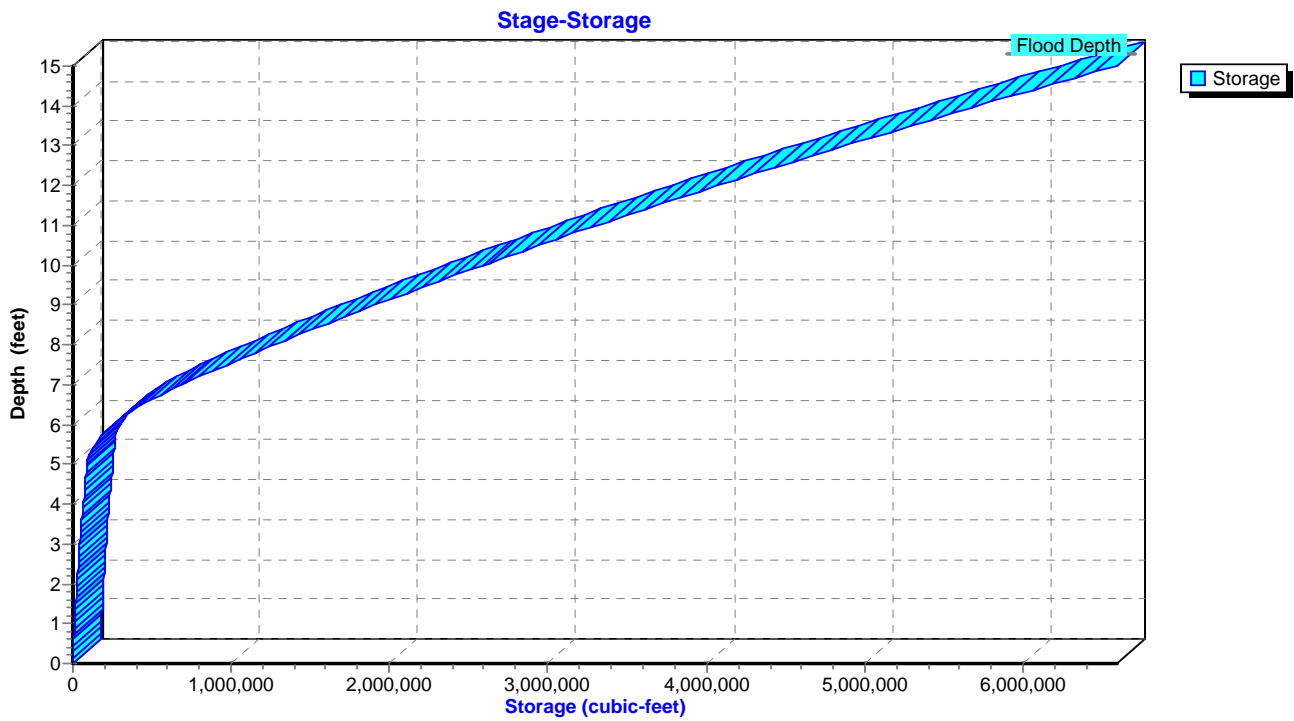
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



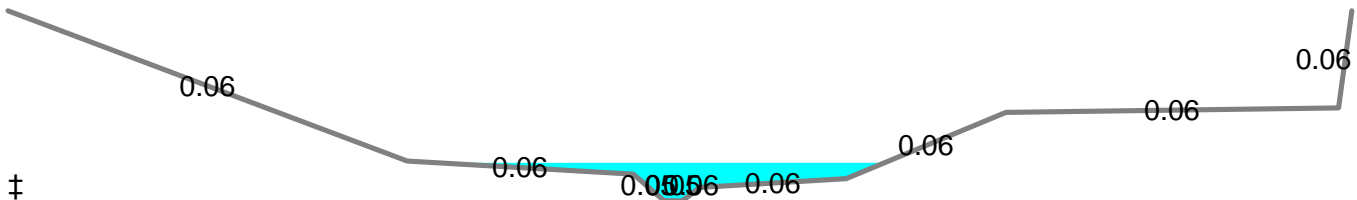
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.83" for 6-HR 0.23 PMF event
 Inflow = 2,776.27 cfs @ 5.10 hrs, Volume= 1,724.965 af
 Outflow = 2,344.57 cfs @ 6.28 hrs, Volume= 1,692.905 af, Atten= 16%, Lag= 70.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.15 fps, Min. Travel Time= 68.3 min
 Avg. Velocity = 1.52 fps, Avg. Travel Time= 96.7 min

Peak Storage= 9,608,952 cf @ 6.28 hrs
 Average Depth at Peak Storage= 8.60'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

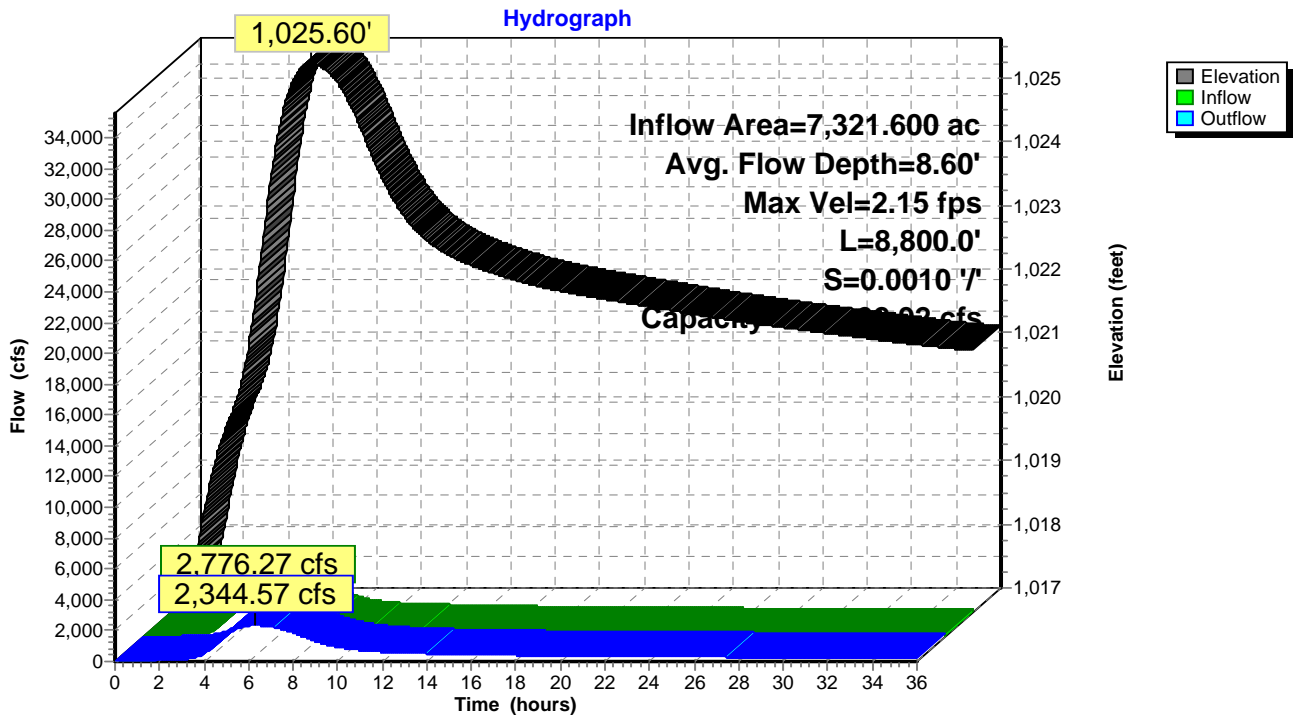
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



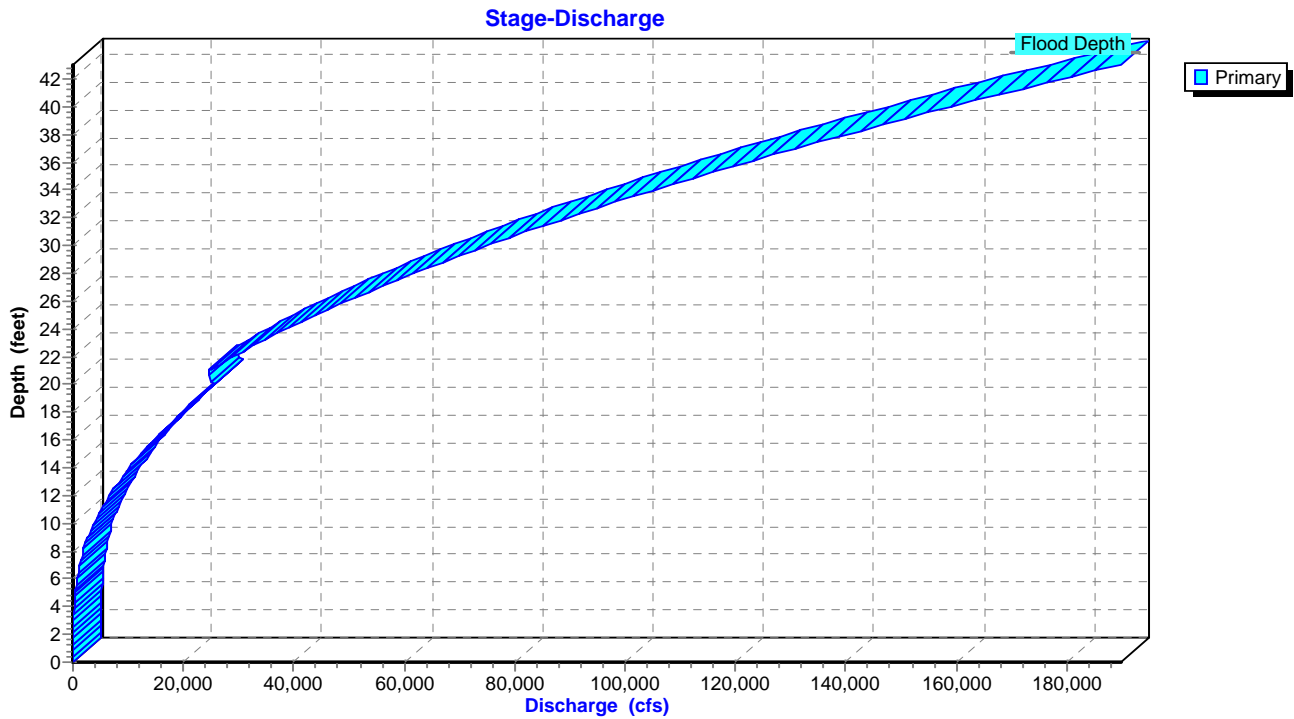
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

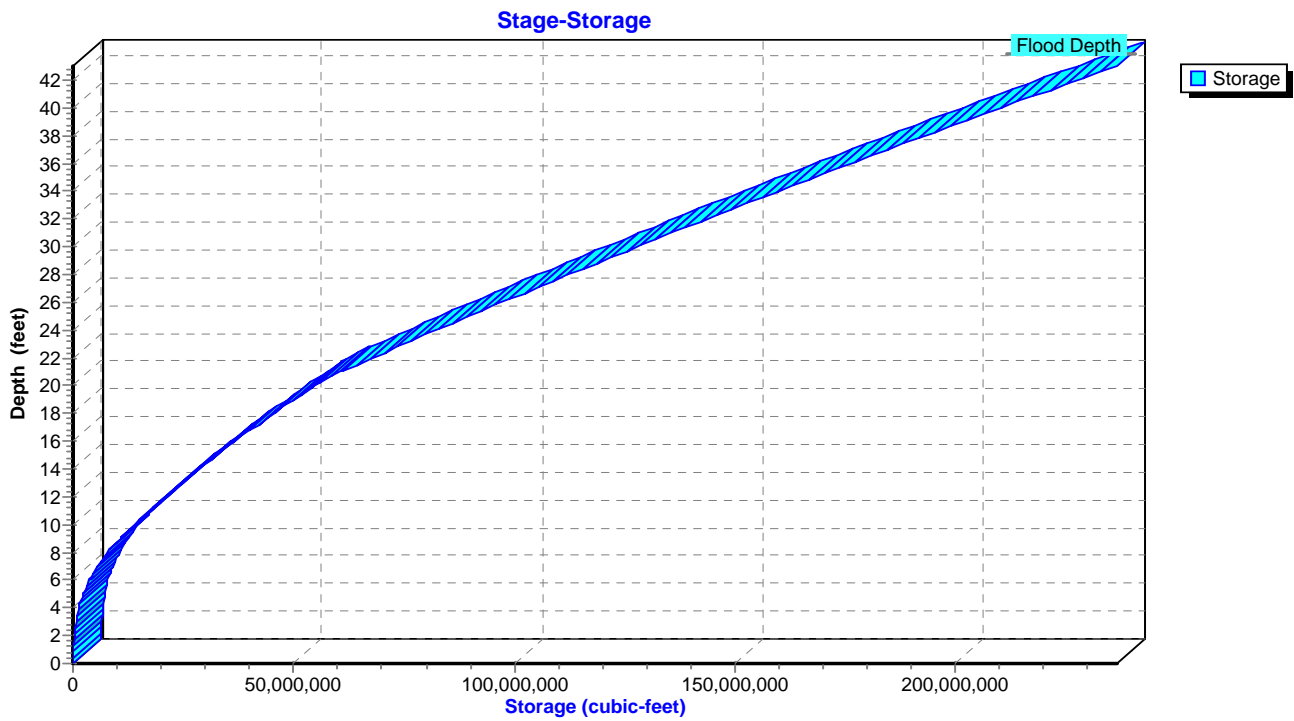
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



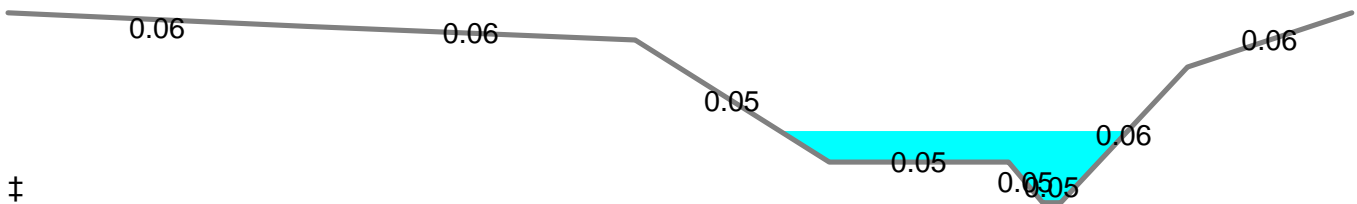
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.85" for 6-HR 0.23 PMF event
 Inflow = 3,134.58 cfs @ 6.00 hrs, Volume= 2,088.864 af
 Outflow = 3,048.98 cfs @ 6.48 hrs, Volume= 2,065.707 af, Atten= 3%, Lag= 28.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.63 fps, Min. Travel Time= 47.6 min
 Avg. Velocity = 1.49 fps, Avg. Travel Time= 84.1 min

Peak Storage= 8,699,509 cf @ 6.48 hrs
 Average Depth at Peak Storage= 10.56'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

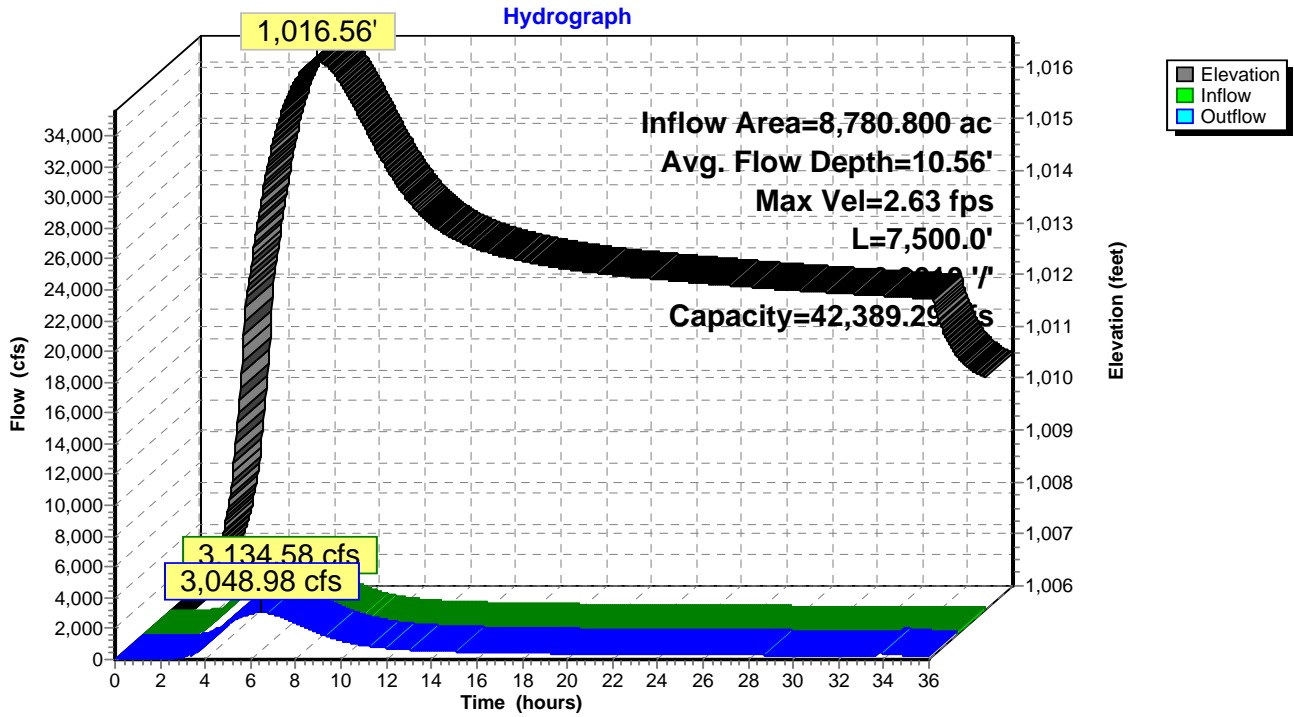
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



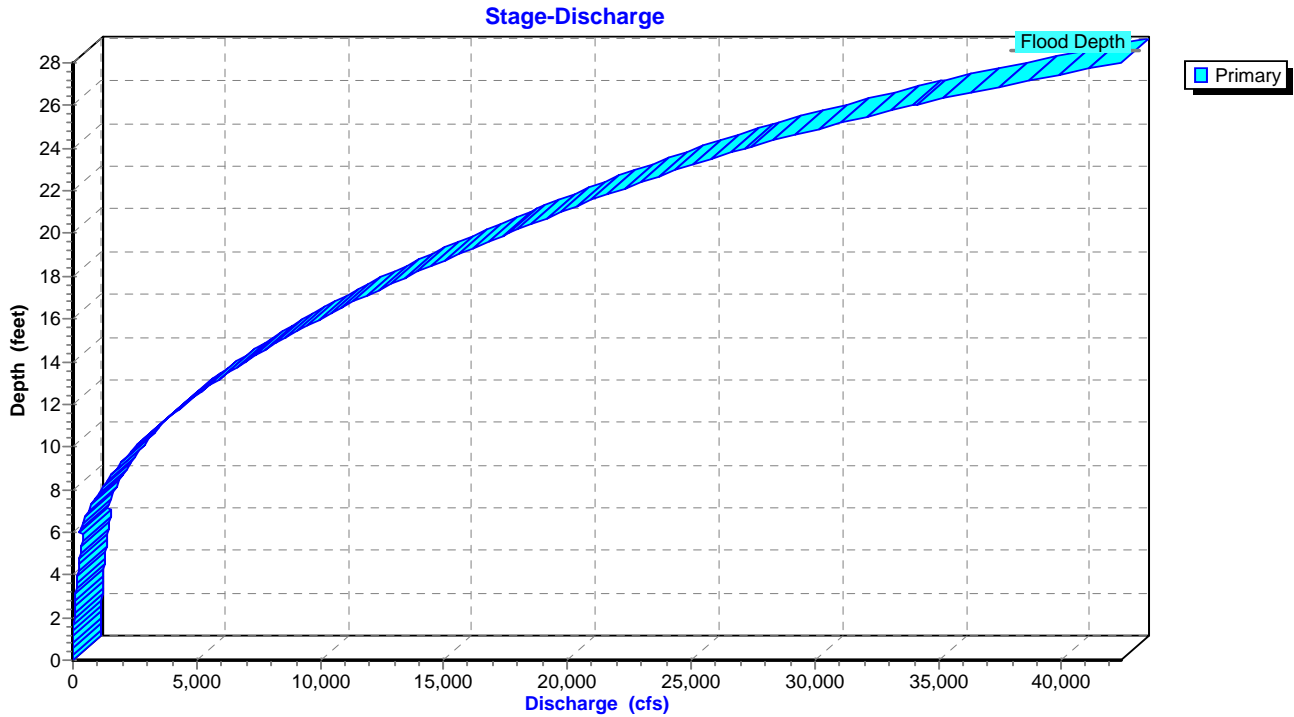
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

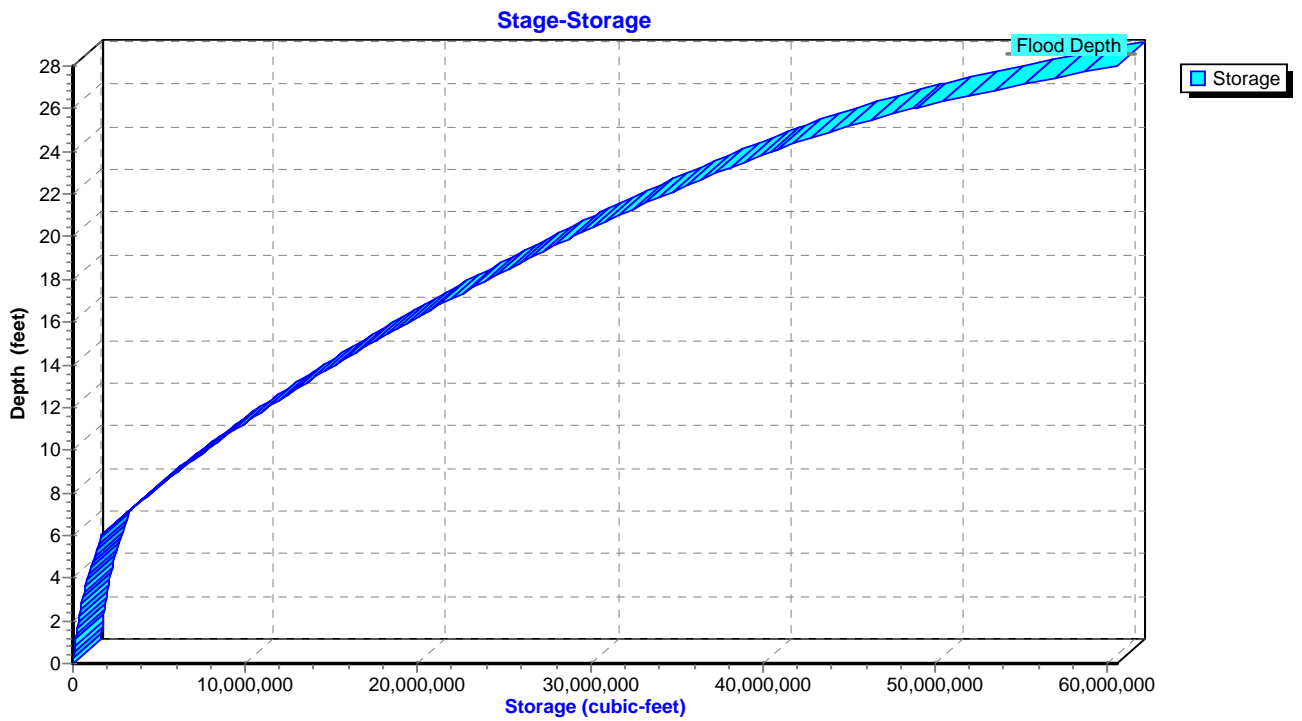
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



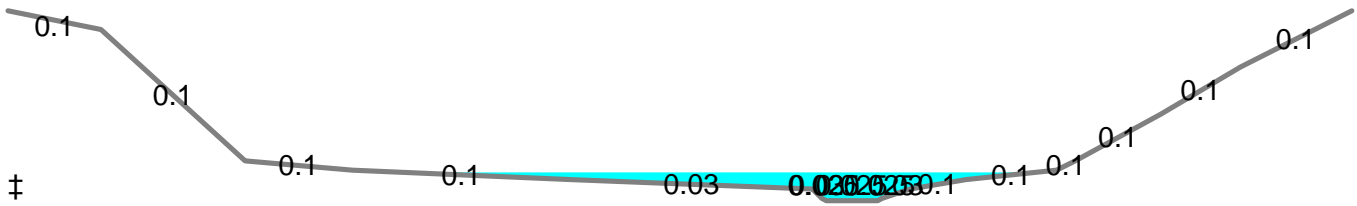
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.88" for 6-HR 0.23 PMF event
 Inflow = 3,025.00 cfs @ 7.28 hrs, Volume= 2,267.722 af
 Outflow = 3,024.99 cfs @ 7.30 hrs, Volume= 2,267.600 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.57 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.64 fps, Avg. Travel Time= 0.9 min

Peak Storage= 142,312 cf @ 7.30 hrs
 Average Depth at Peak Storage= 6.04'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

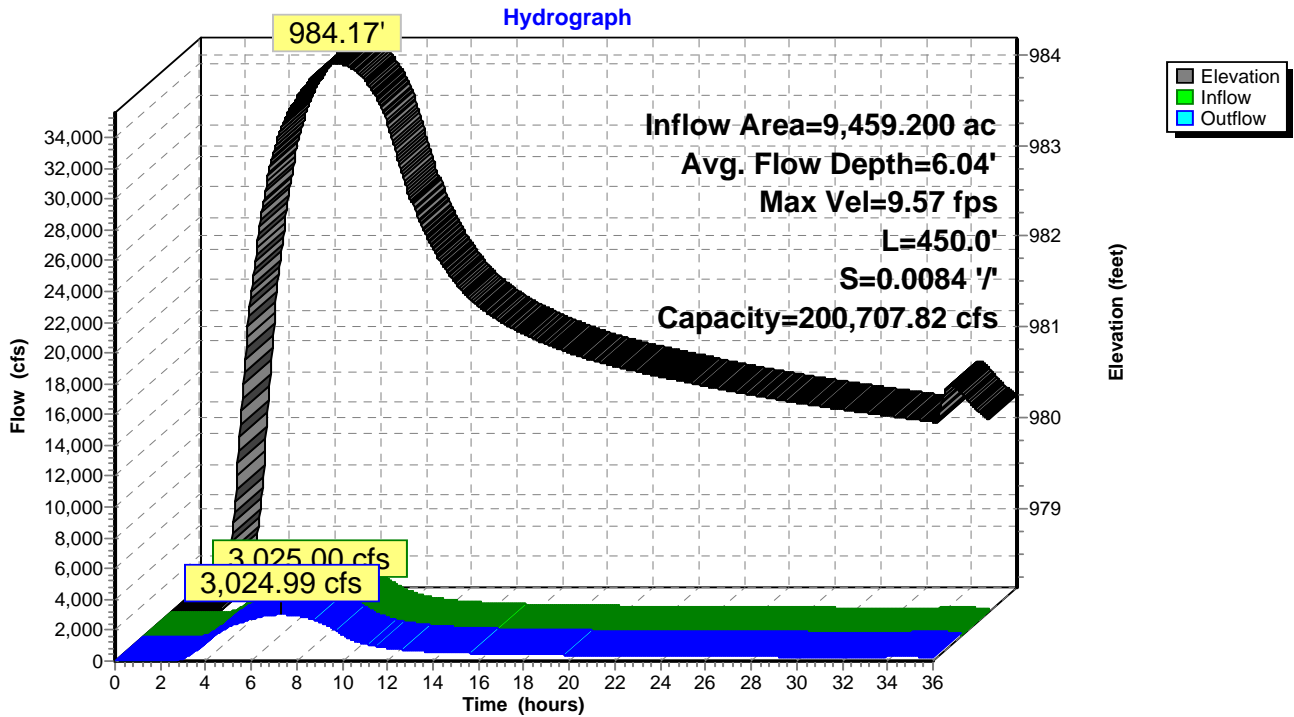
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



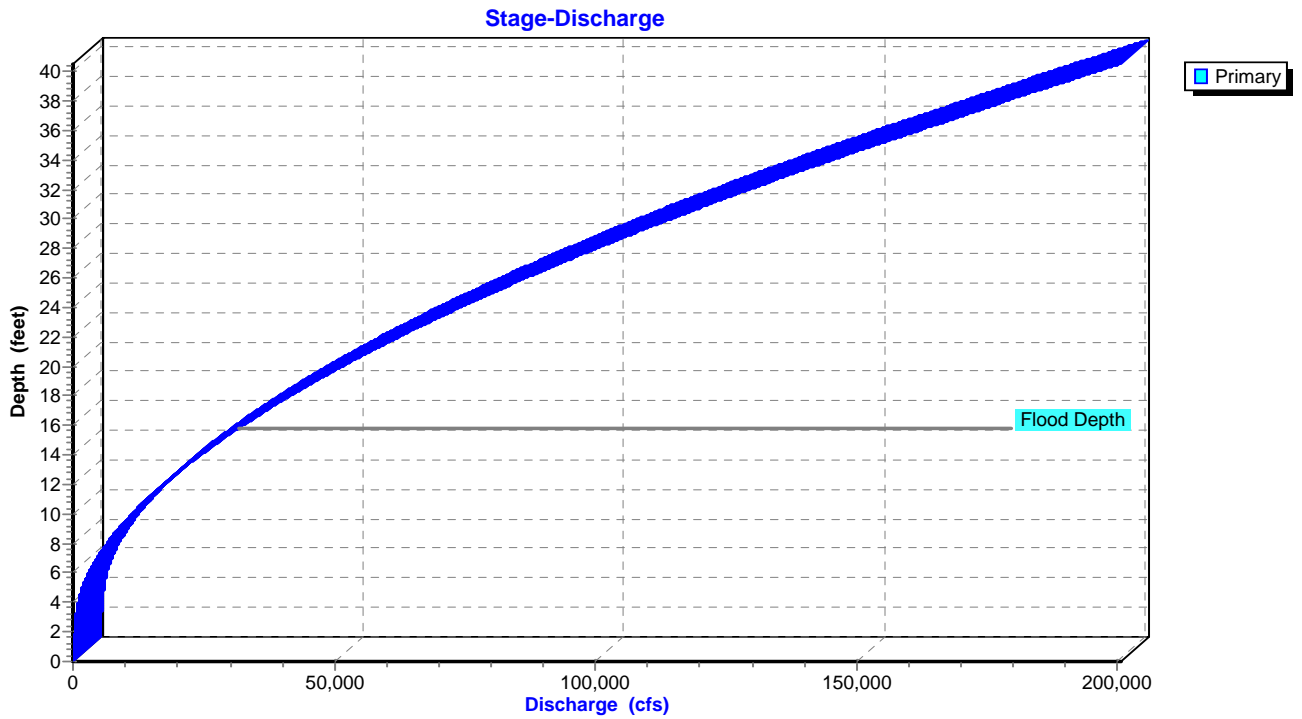
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

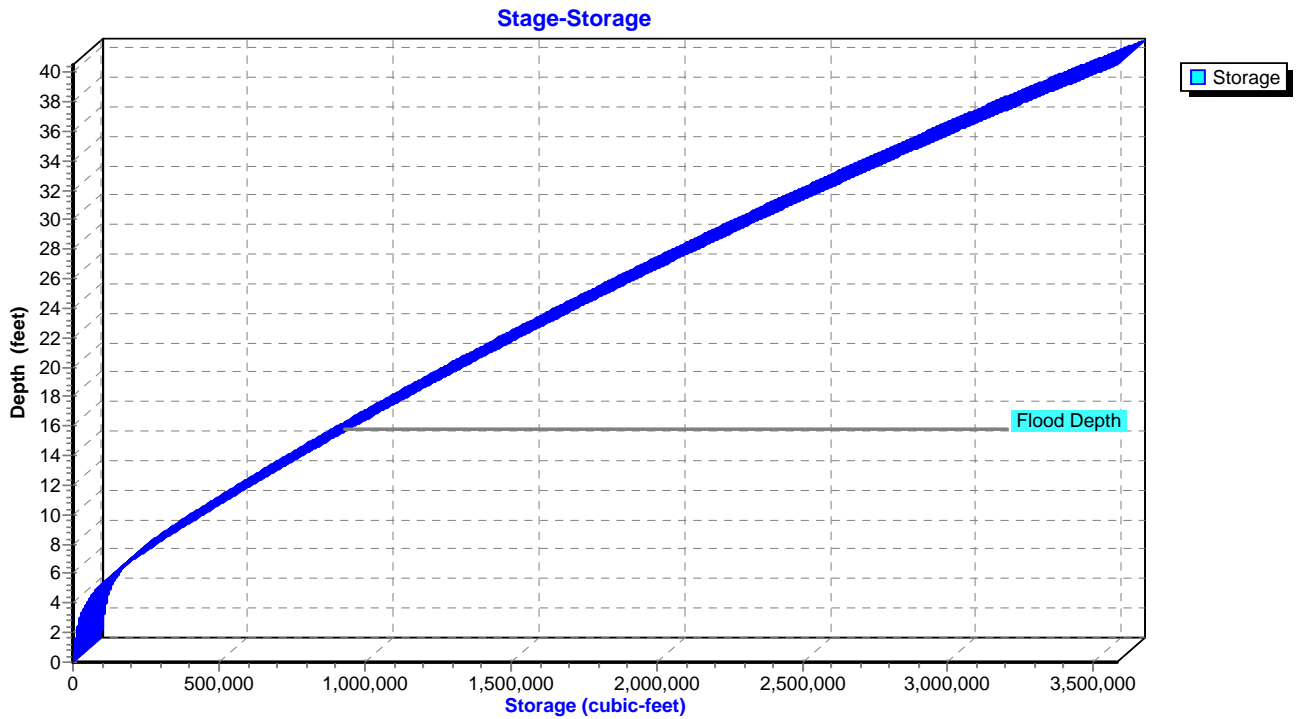
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

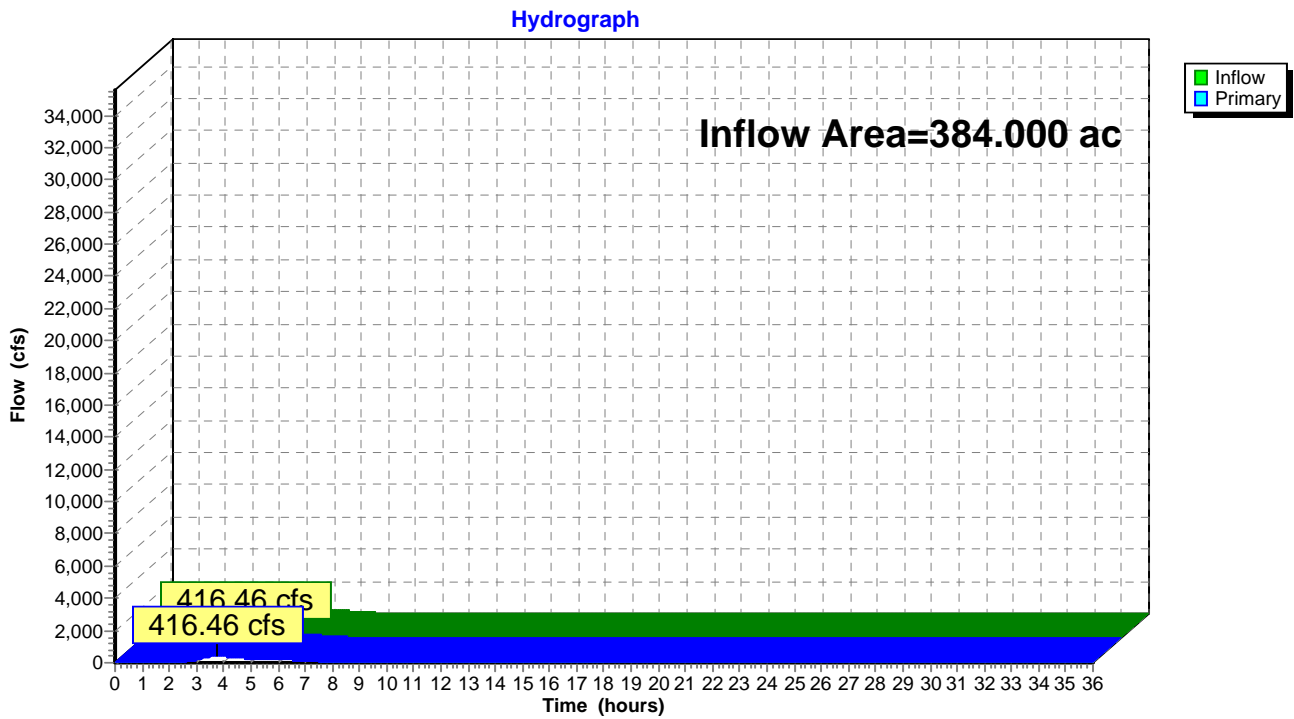


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.27" for 6-HR 0.23 PMF event
Inflow = 416.46 cfs @ 3.75 hrs, Volume= 104.797 af
Primary = 416.46 cfs @ 3.76 hrs, Volume= 104.797 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.89" for 6-HR 0.23 PMF event
 Inflow = 3,395.92 cfs @ 6.34 hrs, Volume= 2,280.604 af
 Outflow = 3,378.21 cfs @ 6.35 hrs, Volume= 2,268.934 af, Atten= 1%, Lag= 0.8 min
 Primary = 2,273.59 cfs @ 6.33 hrs, Volume= 1,921.684 af
 Secondary = 1,128.13 cfs @ 6.72 hrs, Volume= 347.250 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,007.39' @ 6.72 hrs Surf.Area= 19.826 ac Storage= 130.704 af (69.742 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 73.2 min calculated for 2,207.972 af (97% of inflow)
 Center-of-Mass det. time= 14.2 min (722.2 - 707.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

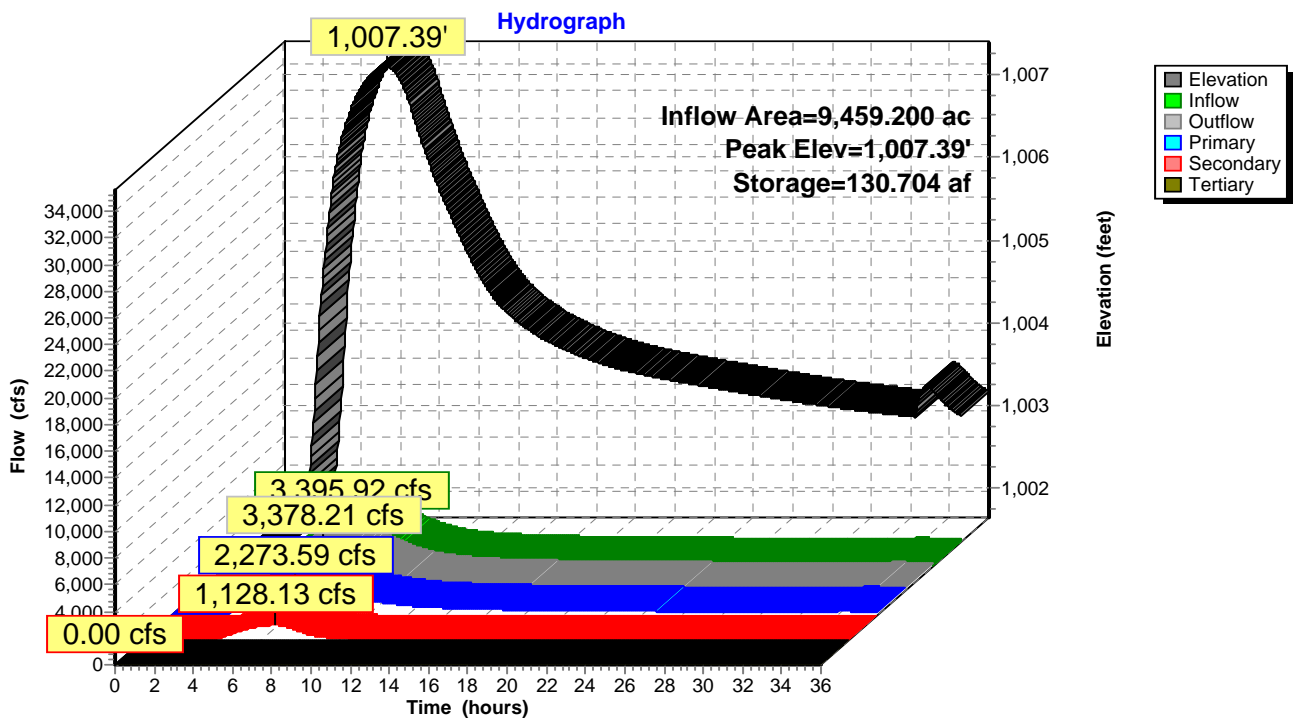
Device	Routing	Invert	Outlet Devices									
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00									
			2.50 3.00 3.50 4.00 4.50									
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69									
			2.73 2.83 2.95 3.01 3.12 3.32									
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)									
			Head (feet) 0.00 1.00 1.60 20.00									
			Width (feet) 17.00 23.00 77.00 77.00									
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)									
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80									
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00									
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)									
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00									
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00									

Primary OutFlow Max=2,272.81 cfs @ 6.33 hrs HW=1,007.36' TW=1,001.70' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,272.81 cfs @ 7.94 fps)

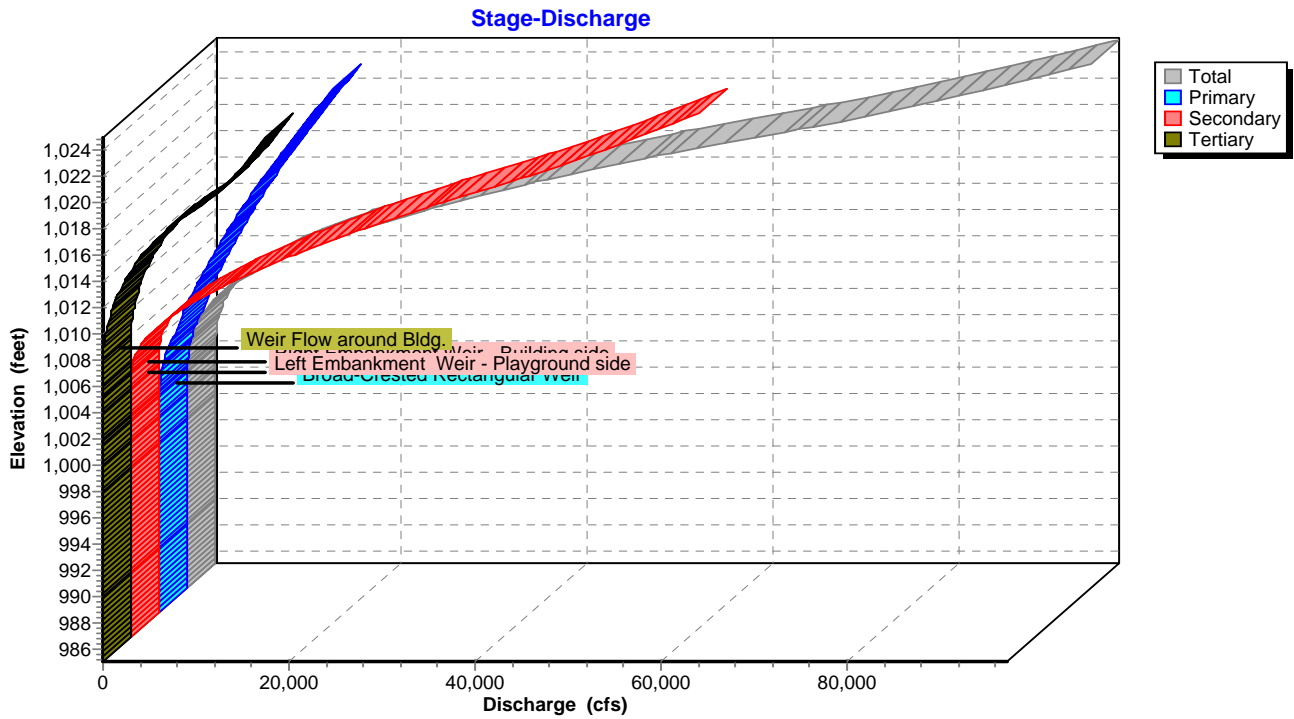
Secondary OutFlow Max=1,128.13 cfs @ 6.72 hrs HW=1,007.39' TW=1,003.05' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 459.79 cfs @ 4.15 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 668.33 cfs @ 4.57 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Controls 0.00 cfs)

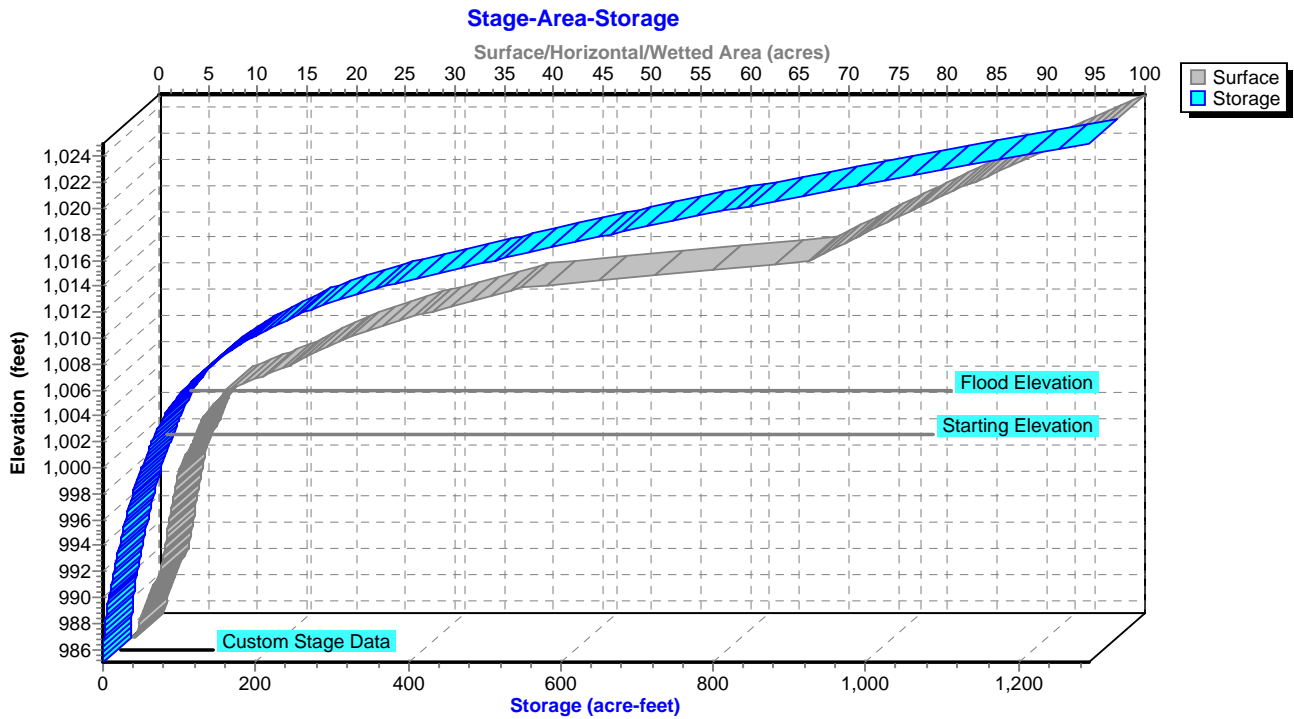
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

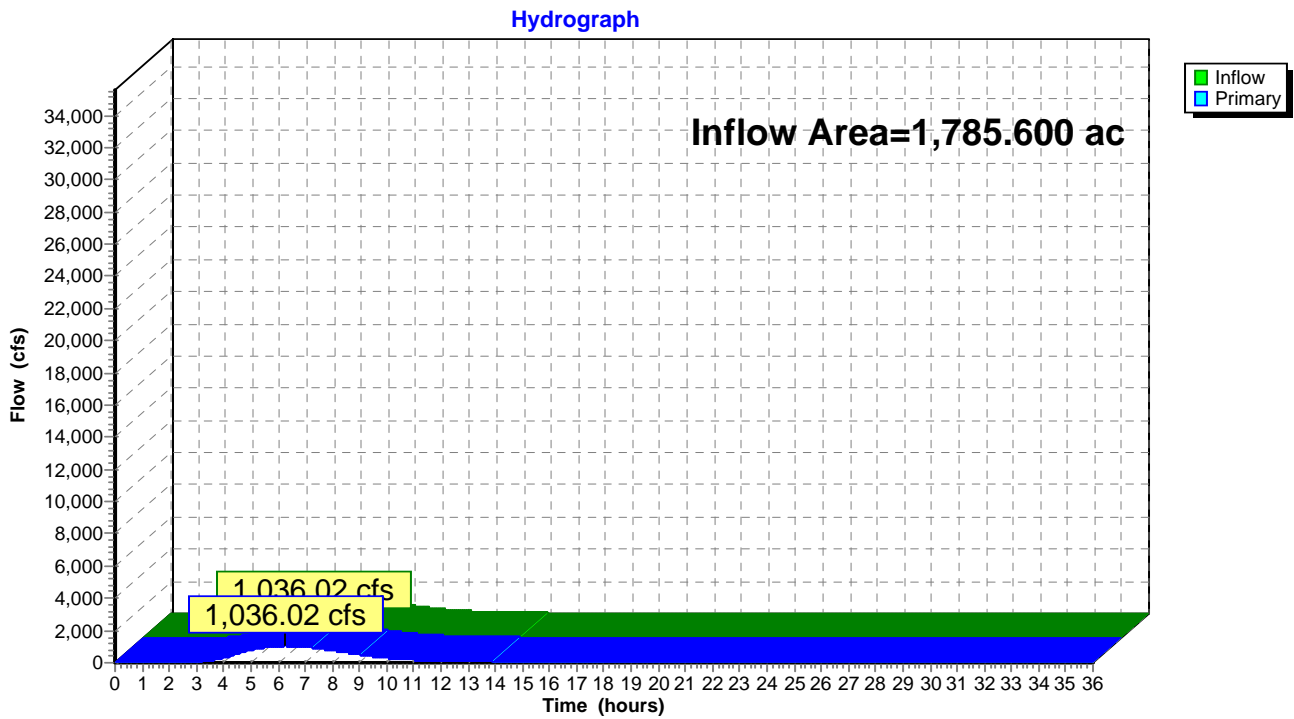


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.92" for 6-HR 0.23 PMF event
Inflow = 1,036.02 cfs @ 6.28 hrs, Volume= 434.729 af
Primary = 1,036.02 cfs @ 6.29 hrs, Volume= 434.729 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.92" for 6-HR 0.23 PMF event
 Inflow = 1,036.02 cfs @ 6.29 hrs, Volume= 434.728 af
 Outflow = 348.23 cfs @ 9.67 hrs, Volume= 643.628 af, Atten= 66%, Lag= 202.7 min
 Primary = 348.23 cfs @ 9.67 hrs, Volume= 643.628 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,098.12' @ 9.67 hrs Surf.Area= 246.192 ac Storage= 2,082.700 af (168.700 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 482.2 min (945.1 - 462.9)

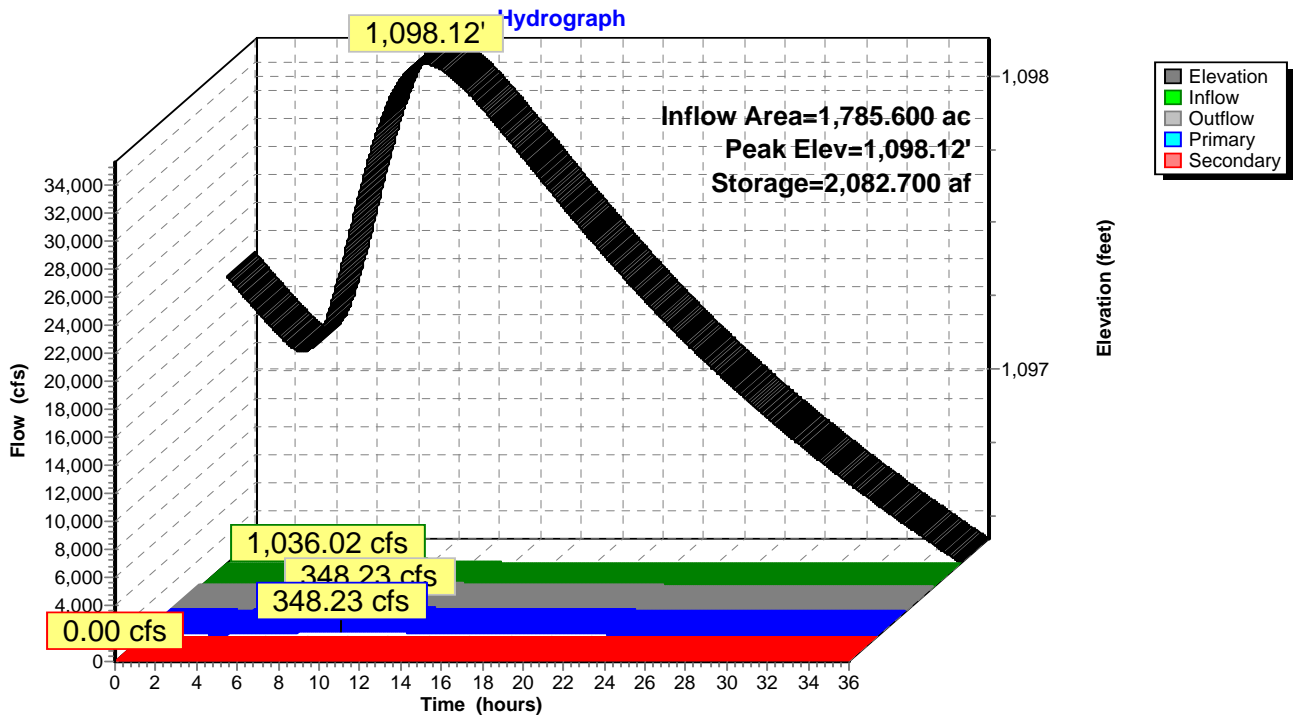
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

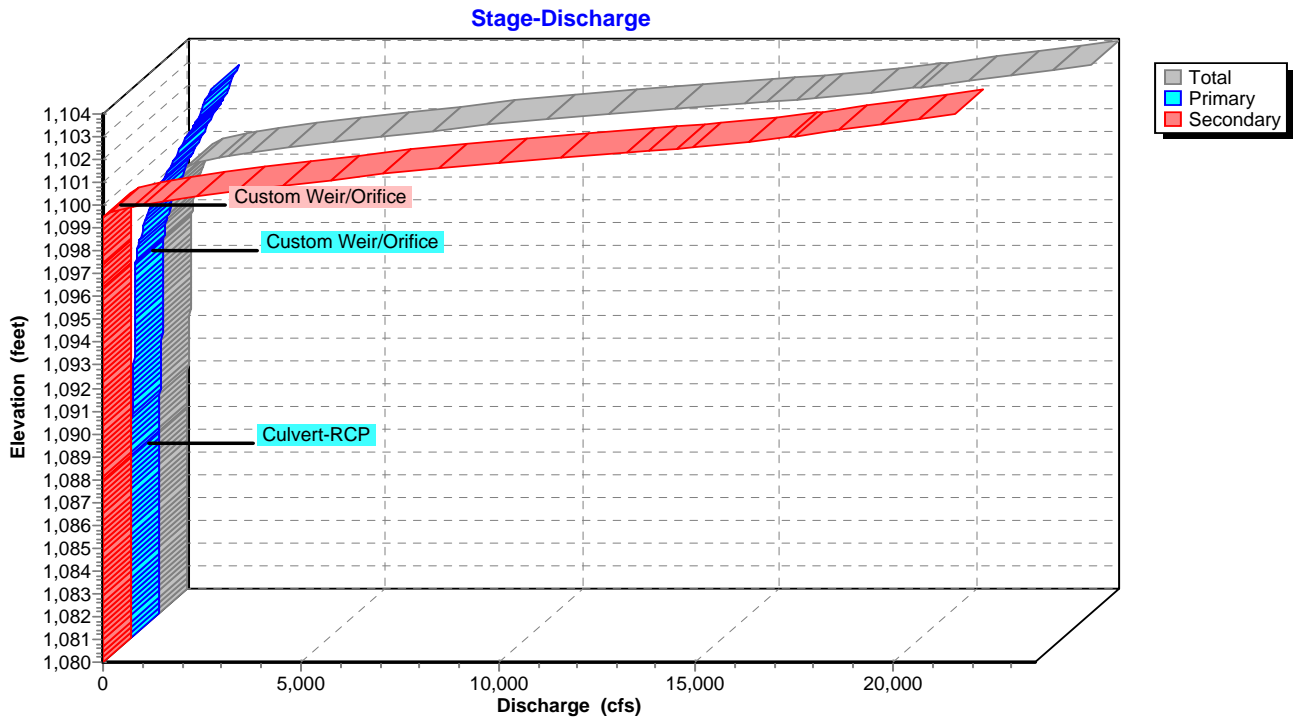
Primary OutFlow Max=348.23 cfs @ 9.67 hrs HW=1,098.12' TW=1,072.05' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 125.88 cfs @ 17.81 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 222.35 cfs @ 4.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

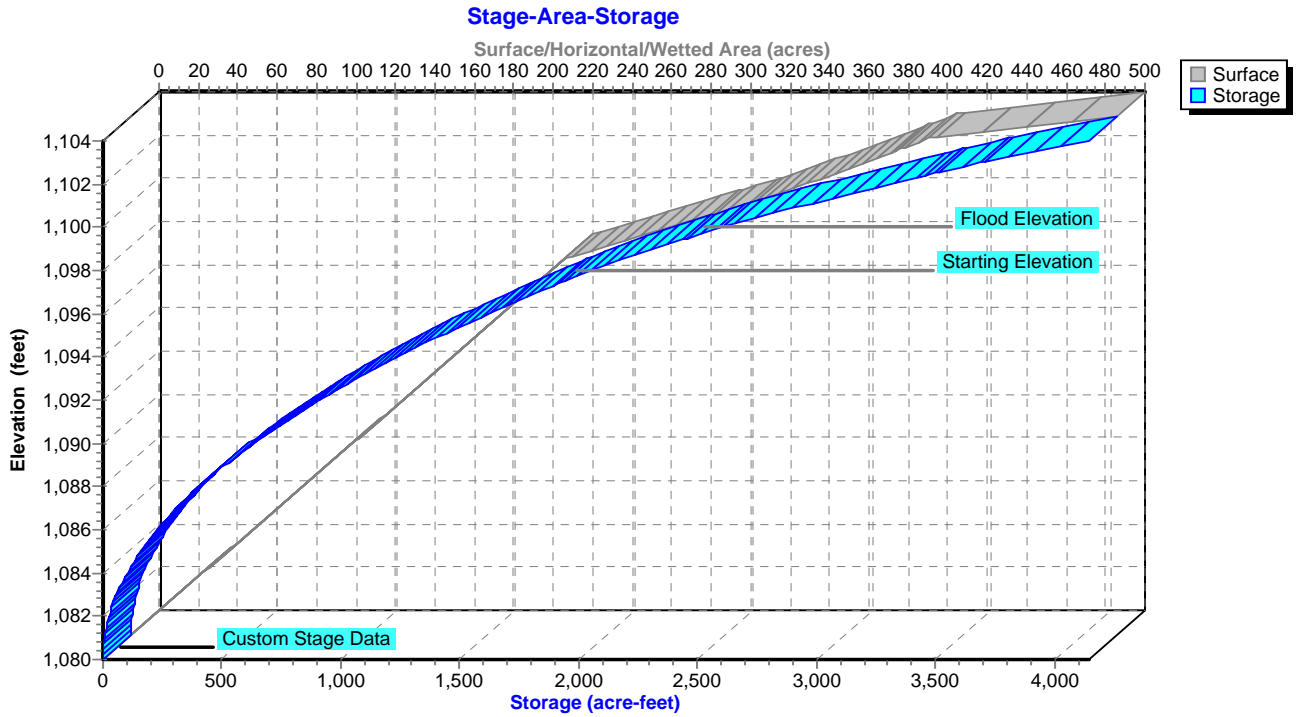
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable



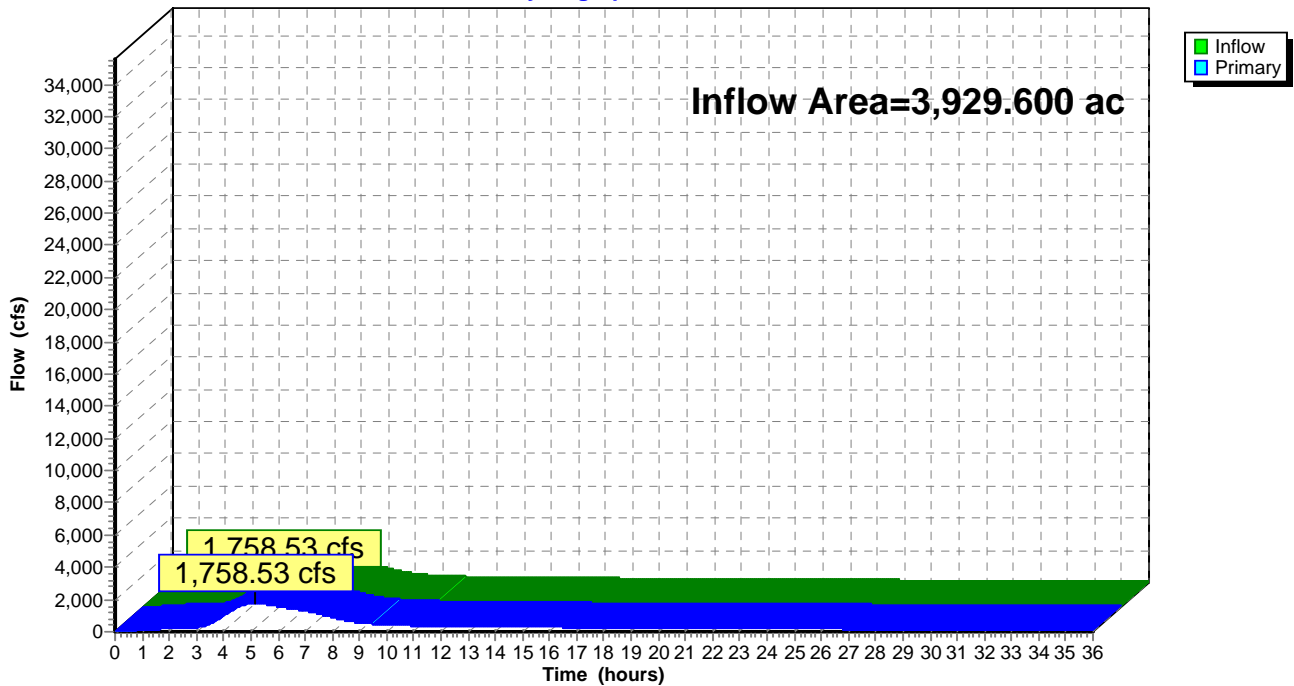
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.39" for 6-HR 0.23 PMF event
Inflow = 1,758.53 cfs @ 5.16 hrs, Volume= 1,109.949 af
Primary = 1,758.53 cfs @ 5.17 hrs, Volume= 1,109.949 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.27" for 6-HR 0.23 PMF event
 Inflow = 416.46 cfs @ 3.76 hrs, Volume= 104.797 af
 Outflow = 169.19 cfs @ 6.52 hrs, Volume= 104.301 af, Atten= 59%, Lag= 165.8 min
 Primary = 169.19 cfs @ 6.52 hrs, Volume= 104.301 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.91' @ 6.52 hrs Surf.Area= 29.122 ac Storage= 77.895 af (53.595 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 418.4 min calculated for 80.001 af (76% of inflow)
 Center-of-Mass det. time= 267.2 min (585.7 - 318.6)

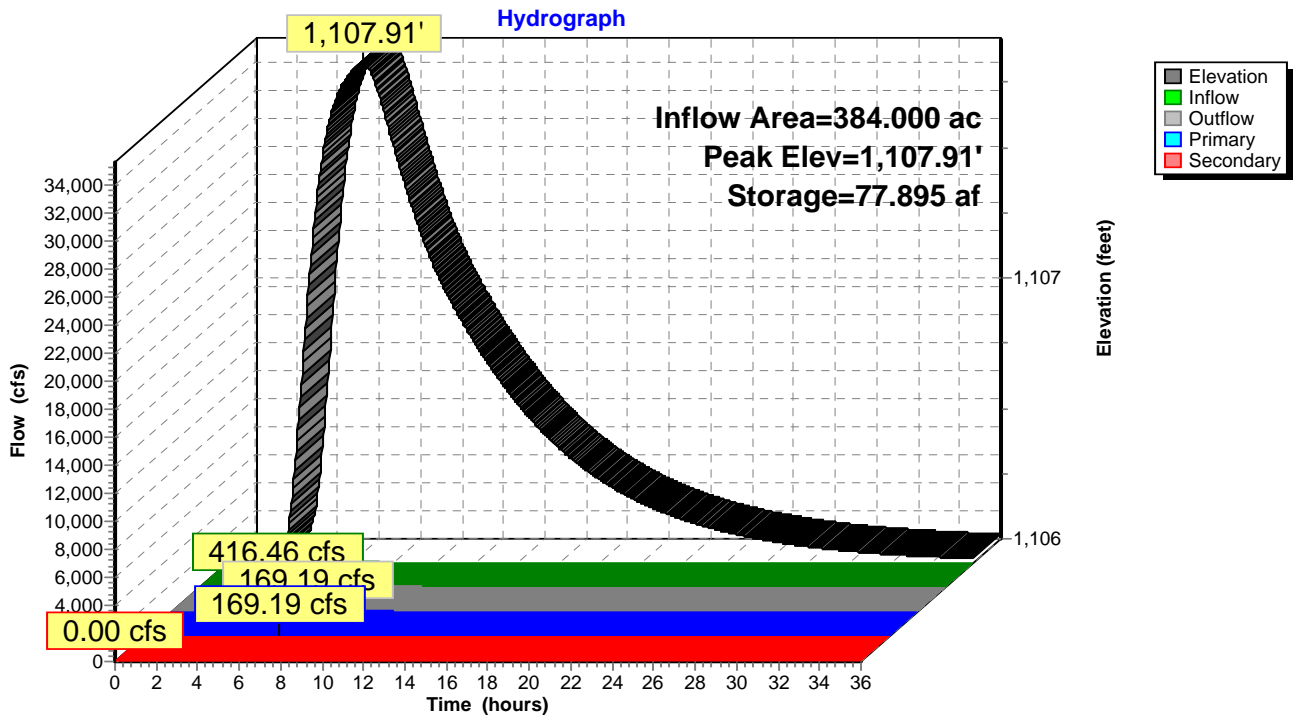
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

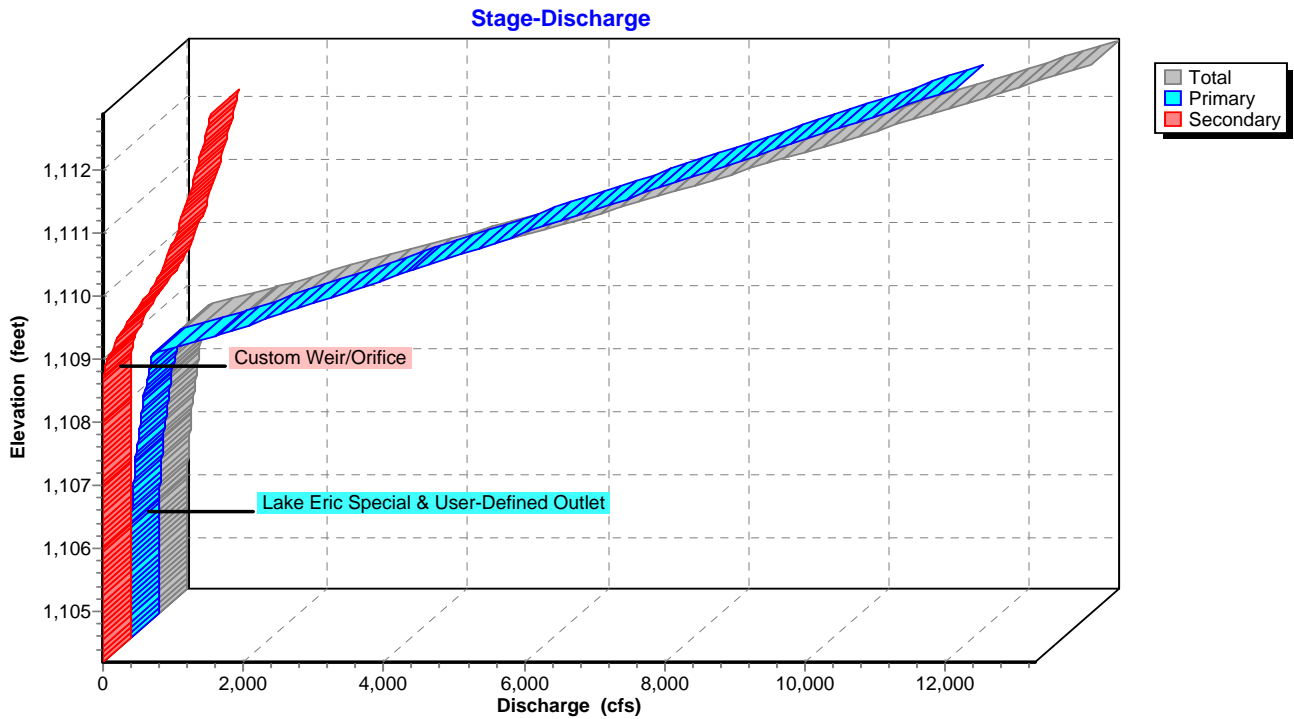
Primary OutFlow Max=169.19 cfs @ 6.52 hrs HW=1,107.91' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet(Custom Controls 169.19 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

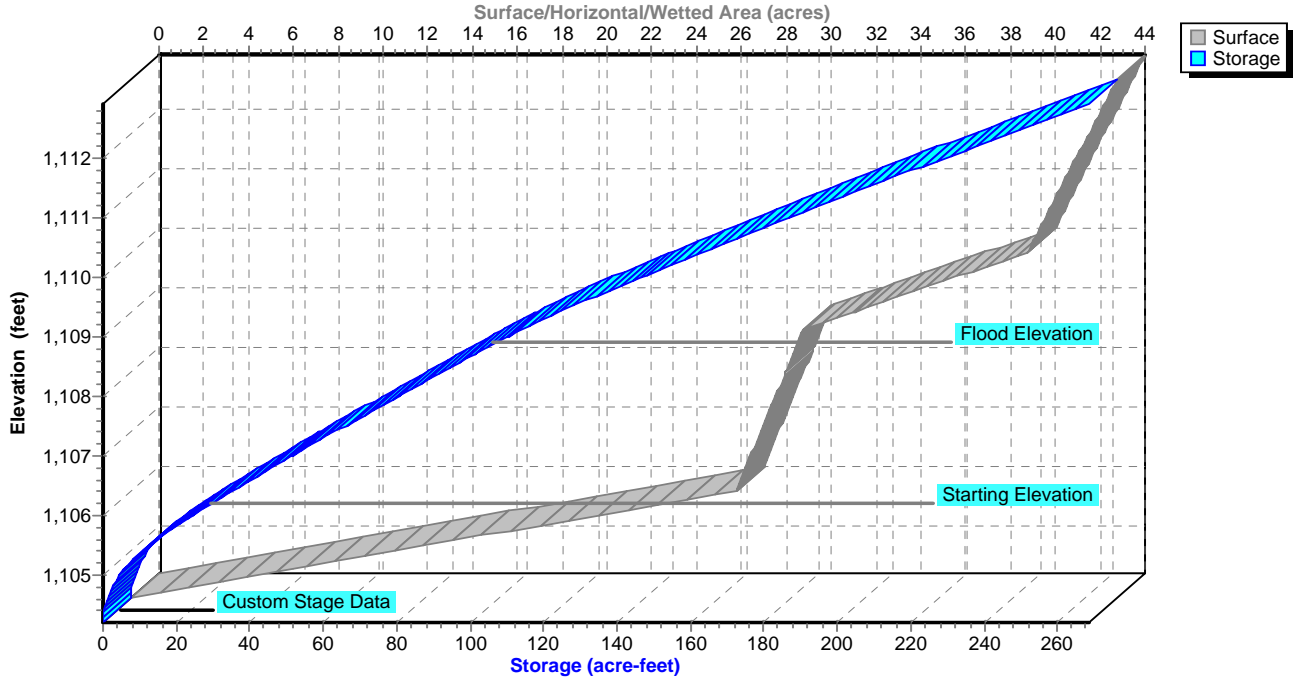


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



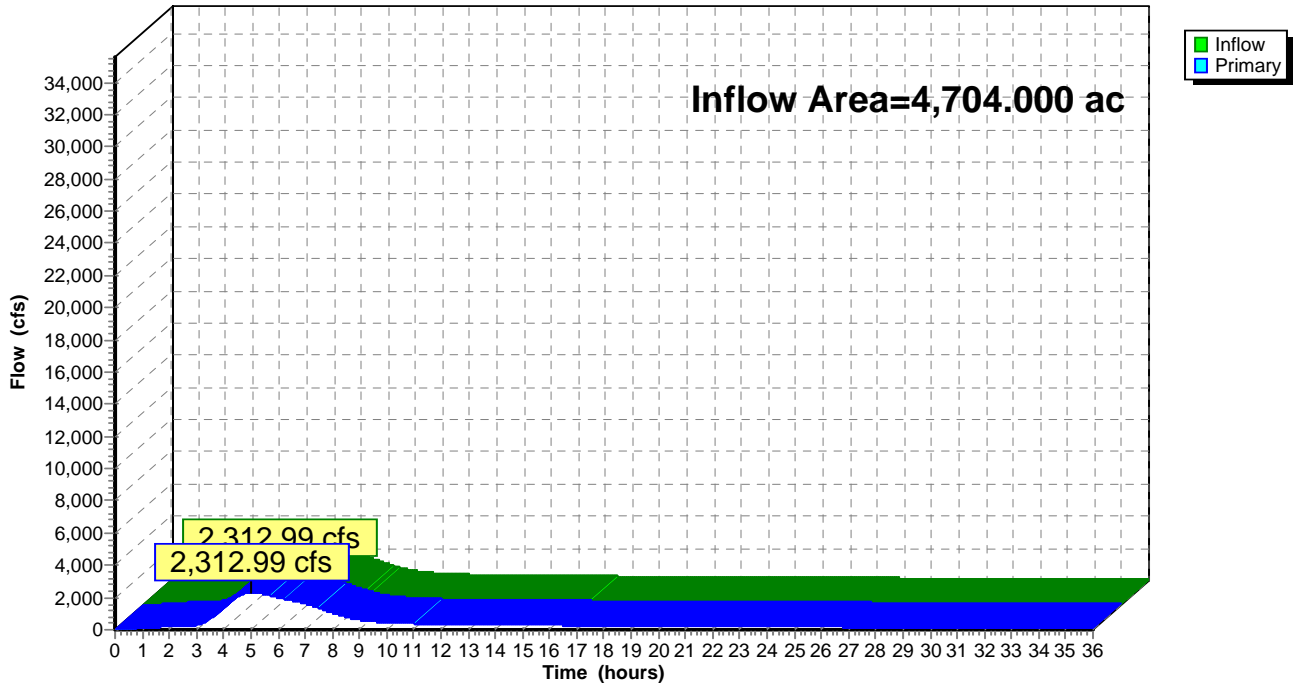
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 3.25" for 6-HR 0.23 PMF event
Inflow = 2,312.99 cfs @ 5.01 hrs, Volume= 1,274.583 af
Primary = 2,312.99 cfs @ 5.02 hrs, Volume= 1,274.583 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 3.21" for 6-HR 0.23 PMF event
 Inflow = 169.36 cfs @ 3.37 hrs, Volume= 30.817 af
 Outflow = 87.78 cfs @ 4.33 hrs, Volume= 30.706 af, Atten= 48%, Lag= 57.5 min
 Primary = 85.48 cfs @ 4.33 hrs, Volume= 30.643 af
 Secondary = 2.30 cfs @ 4.33 hrs, Volume= 0.064 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.03' @ 4.33 hrs Surf.Area= 4.212 ac Storage= 27.621 af (13.931 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 366.4 min calculated for 17.016 af (55% of inflow)
 Center-of-Mass det. time= 184.7 min (435.5 - 250.8)

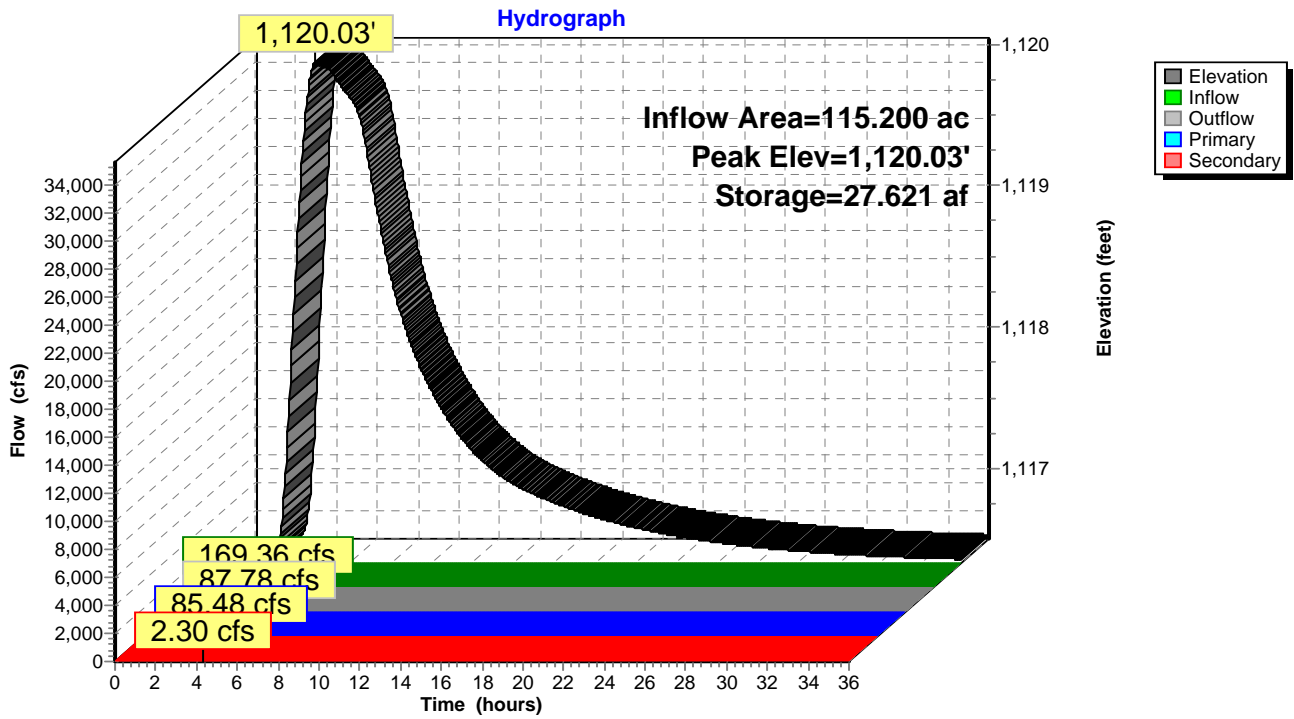
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

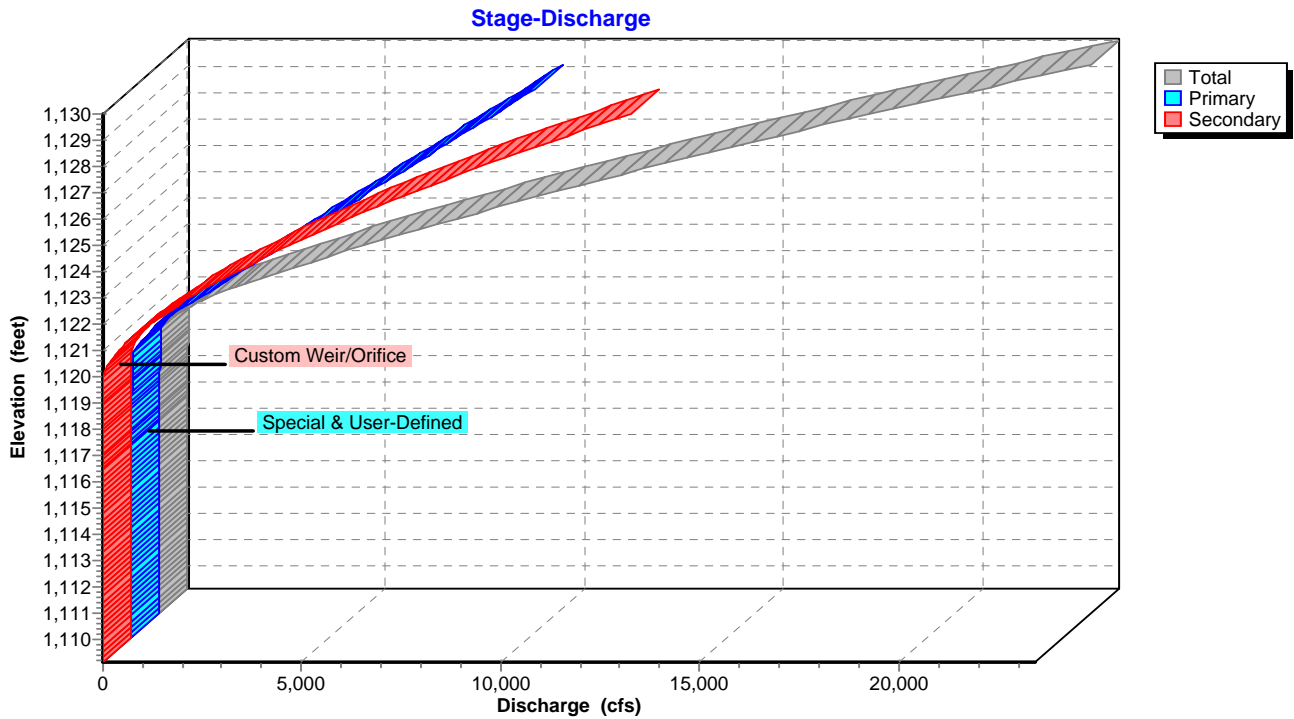
Primary OutFlow Max=85.48 cfs @ 4.33 hrs HW=1,120.03' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 85.48 cfs)

Secondary OutFlow Max=2.30 cfs @ 4.33 hrs HW=1,120.03' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 2.30 cfs @ 0.49 fps)

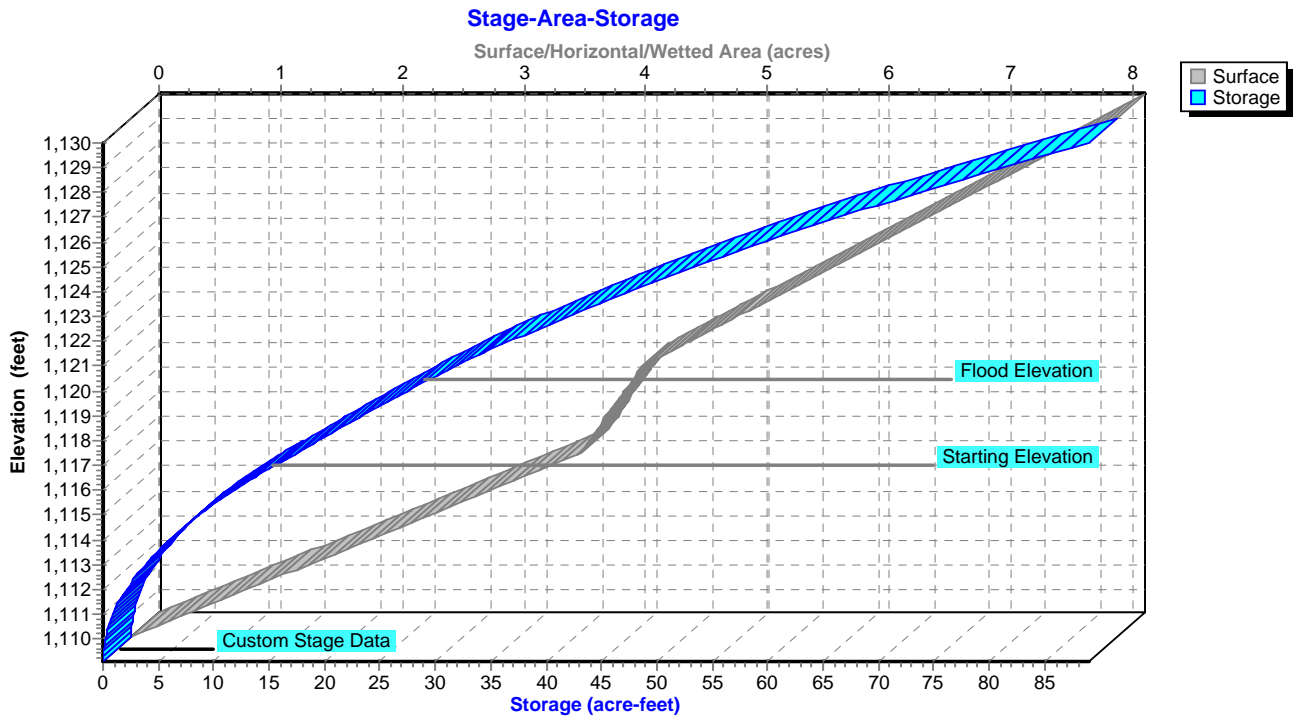
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



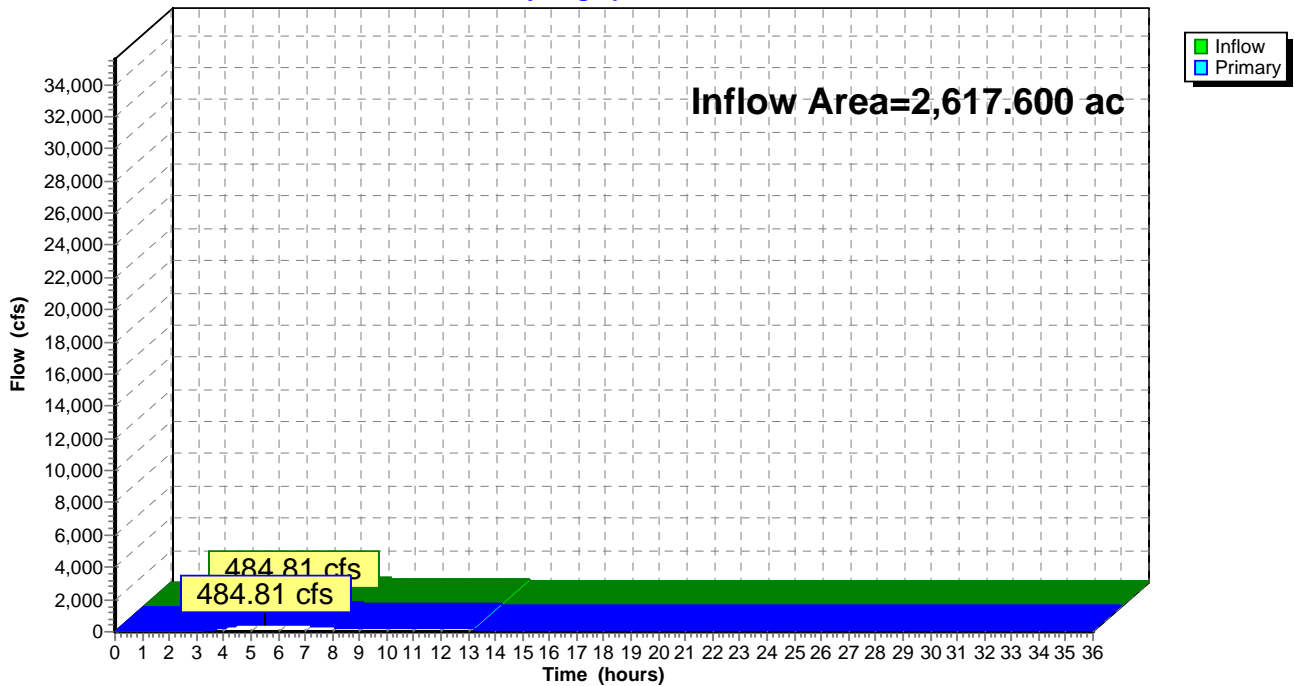
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 2.07" for 6-HR 0.23 PMF event
Inflow = 484.81 cfs @ 5.53 hrs, Volume= 450.744 af
Primary = 484.81 cfs @ 5.54 hrs, Volume= 450.744 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

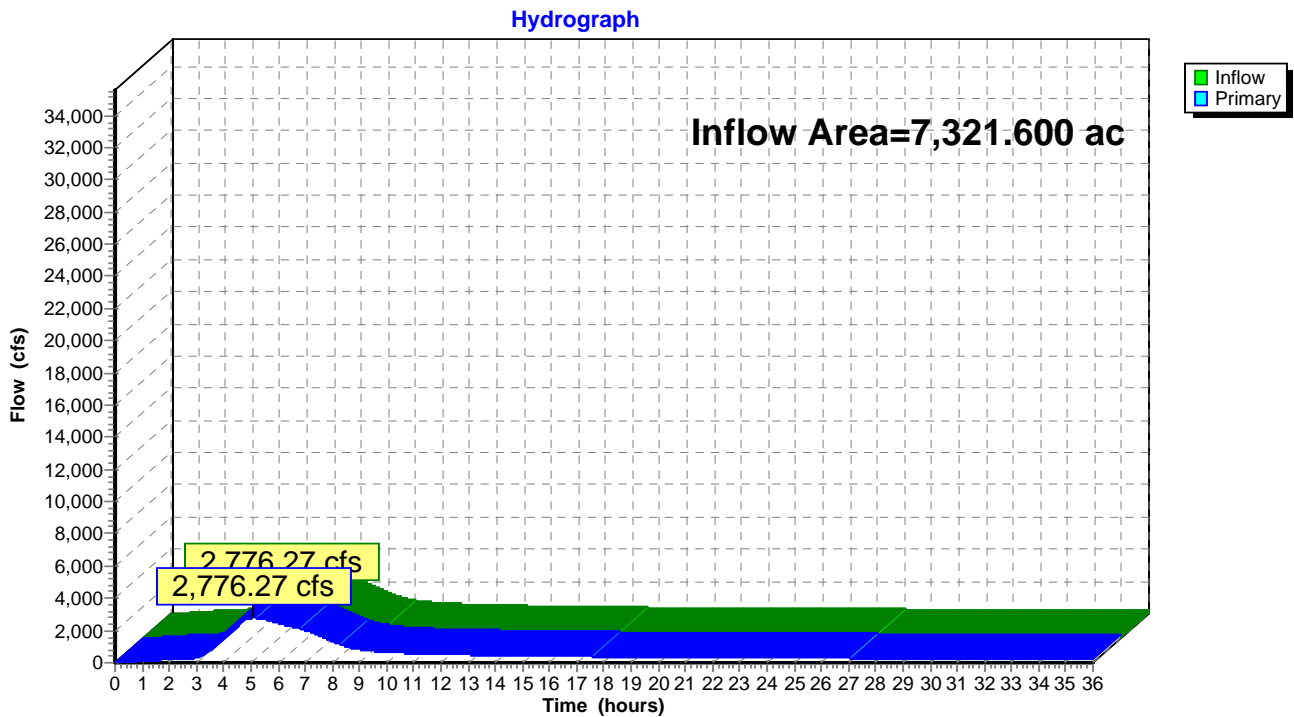


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.83" for 6-HR 0.23 PMF event
 Inflow = 2,776.27 cfs @ 5.09 hrs, Volume= 1,725.146 af
 Primary = 2,776.27 cfs @ 5.10 hrs, Volume= 1,725.146 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



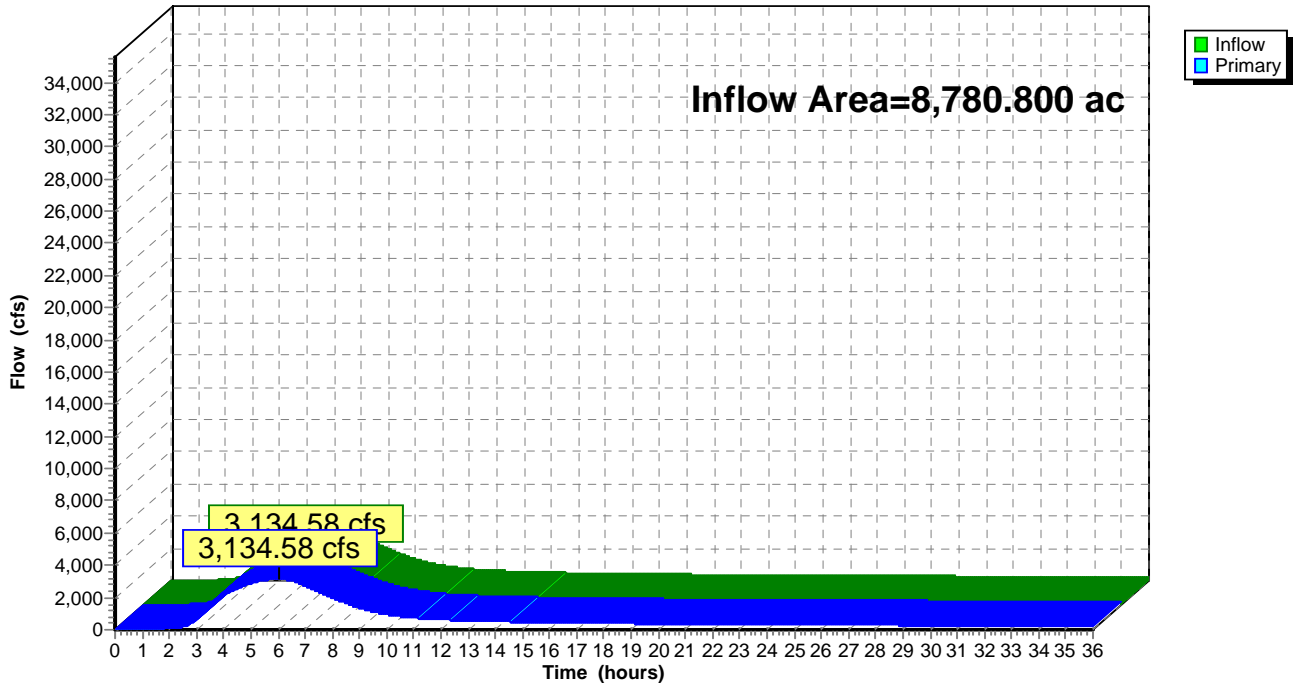
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.85" for 6-HR 0.23 PMF event
Inflow = 3,134.58 cfs @ 5.99 hrs, Volume= 2,089.051 af
Primary = 3,134.58 cfs @ 6.00 hrs, Volume= 2,089.051 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.74" for 6-HR 0.23 PMF event
 Inflow = 1,409.61 cfs @ 6.09 hrs, Volume= 448.734 af
 Outflow = 189.22 cfs @ 10.81 hrs, Volume= 312.797 af, Atten= 87%, Lag= 283.4 min
 Primary = 126.92 cfs @ 8.87 hrs, Volume= 289.234 af
 Secondary = 68.00 cfs @ 10.82 hrs, Volume= 23.563 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.29' @ 10.82 hrs Surf.Area= 142.707 ac Storage= 349.007 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 785.6 min calculated for 312.797 af (70% of inflow)
 Center-of-Mass det. time= 710.5 min (1,172.9 - 462.4)

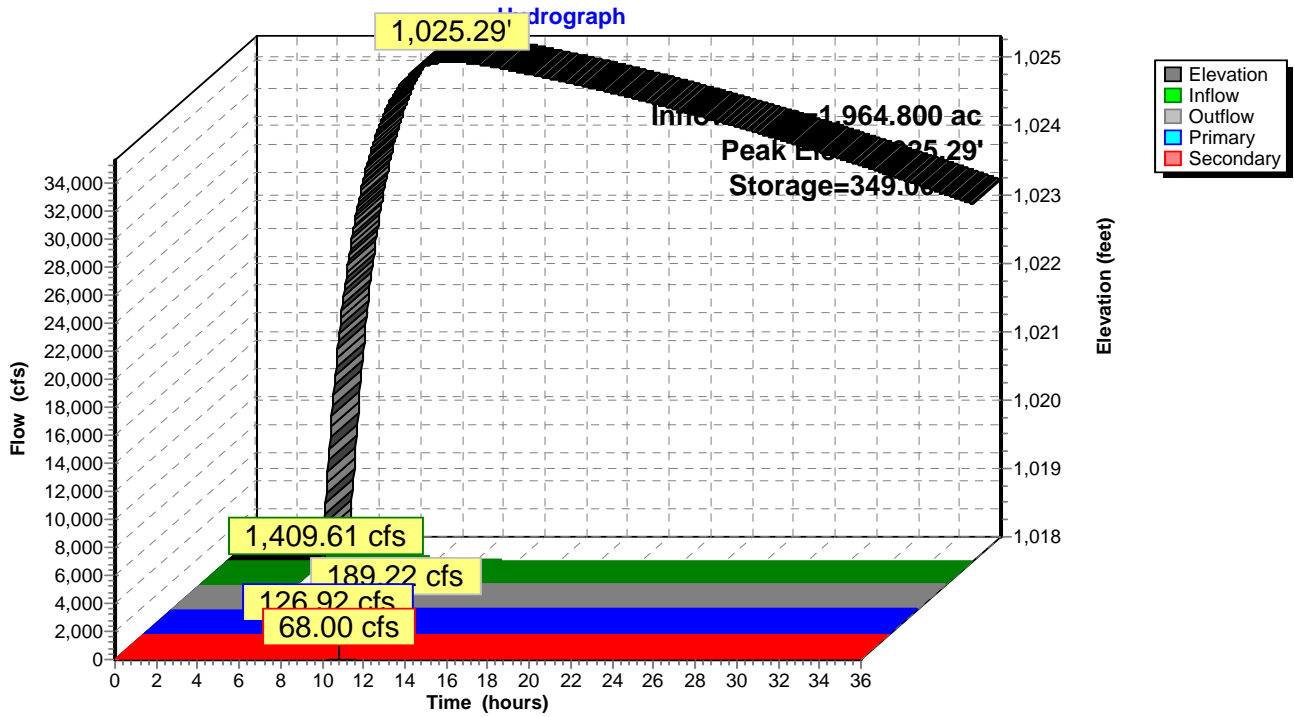
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

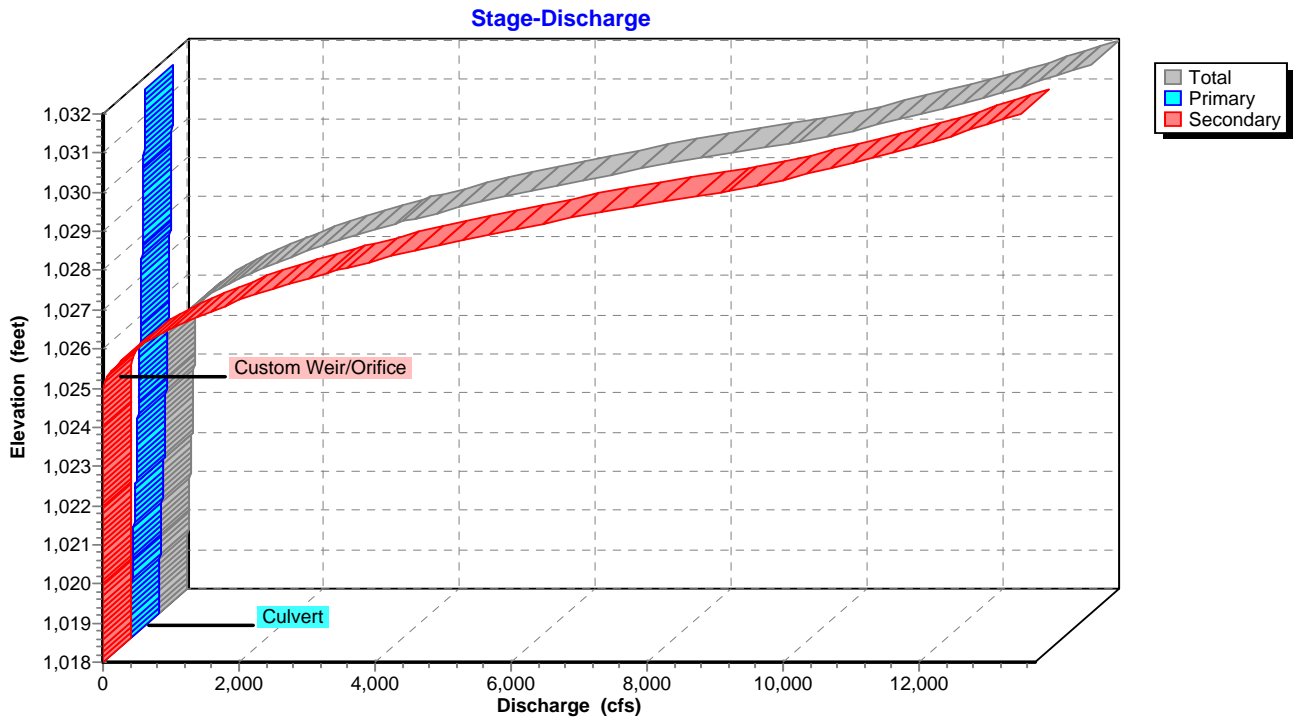
Primary OutFlow Max=126.84 cfs @ 8.87 hrs HW=1,025.11' TW=1,020.72' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 126.84 cfs @ 10.09 fps)

Secondary OutFlow Max=68.00 cfs @ 10.82 hrs HW=1,025.29' TW=1,021.28' (Dynamic Tailwater)
 ↑**2=Custom Weir/Orifice** (Weir Controls 68.00 cfs @ 1.74 fps)

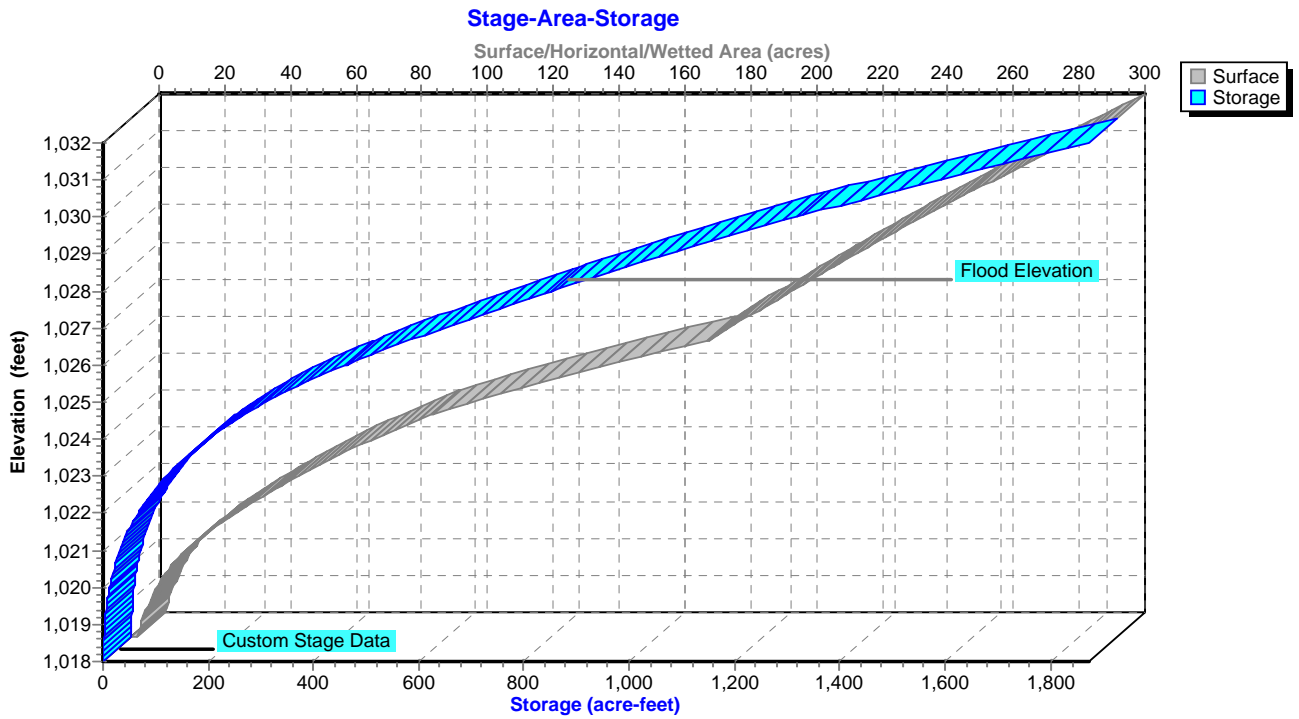
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 3.31" for 6-HR 0.23 PMF event
 Inflow = 1,764.34 cfs @ 5.03 hrs, Volume= 541.569 af
 Outflow = 1,409.61 cfs @ 6.09 hrs, Volume= 448.734 af, Atten= 20%, Lag= 63.8 min
 Primary = 1,409.61 cfs @ 6.09 hrs, Volume= 448.734 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.14' @ 6.09 hrs Surf.Area= 104.722 ac Storage= 425.900 af (205.900 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 291.5 min calculated for 228.671 af (42% of inflow)
 Center-of-Mass det. time= 108.8 min (462.4 - 353.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

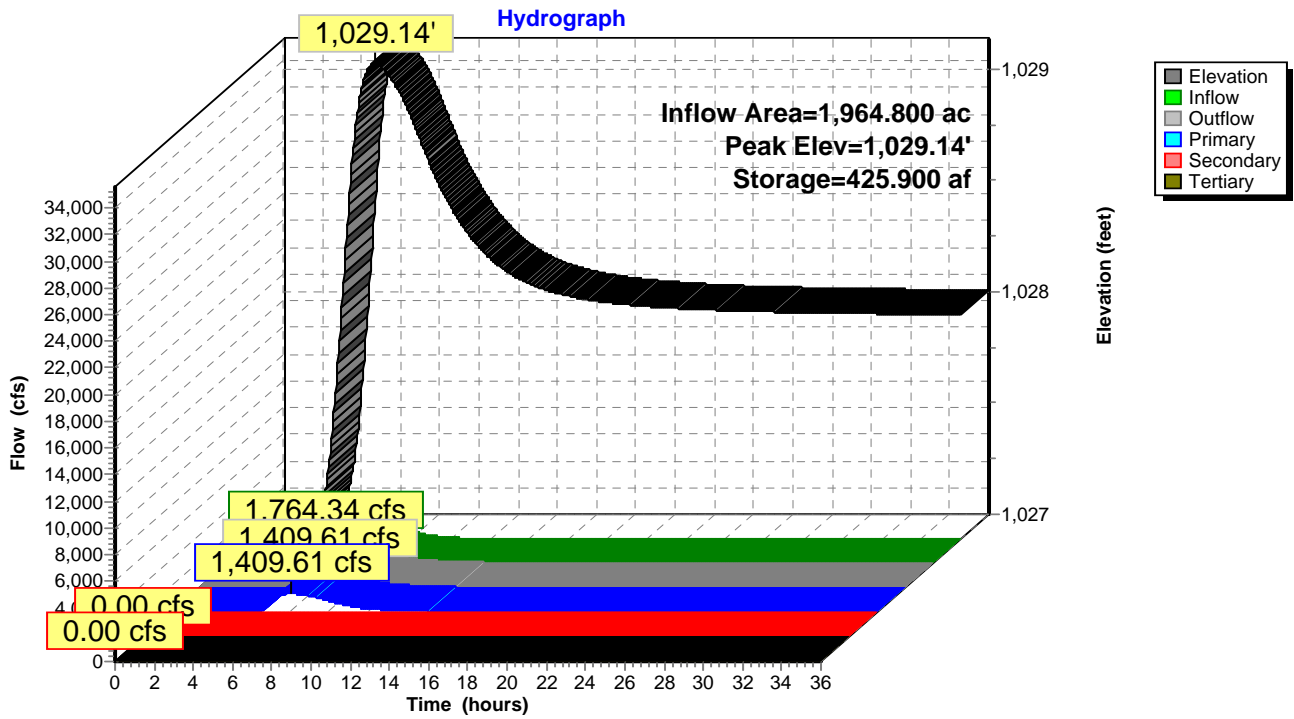
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,409.61 cfs @ 6.09 hrs HW=1,029.14' TW=1,022.82' (Dynamic Tailwater)
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 958.74 cfs @ 2.81 fps)
 ↳2=**Broad-Crested Rectangular Weir** (Weir Controls 450.87 cfs @ 2.15 fps)

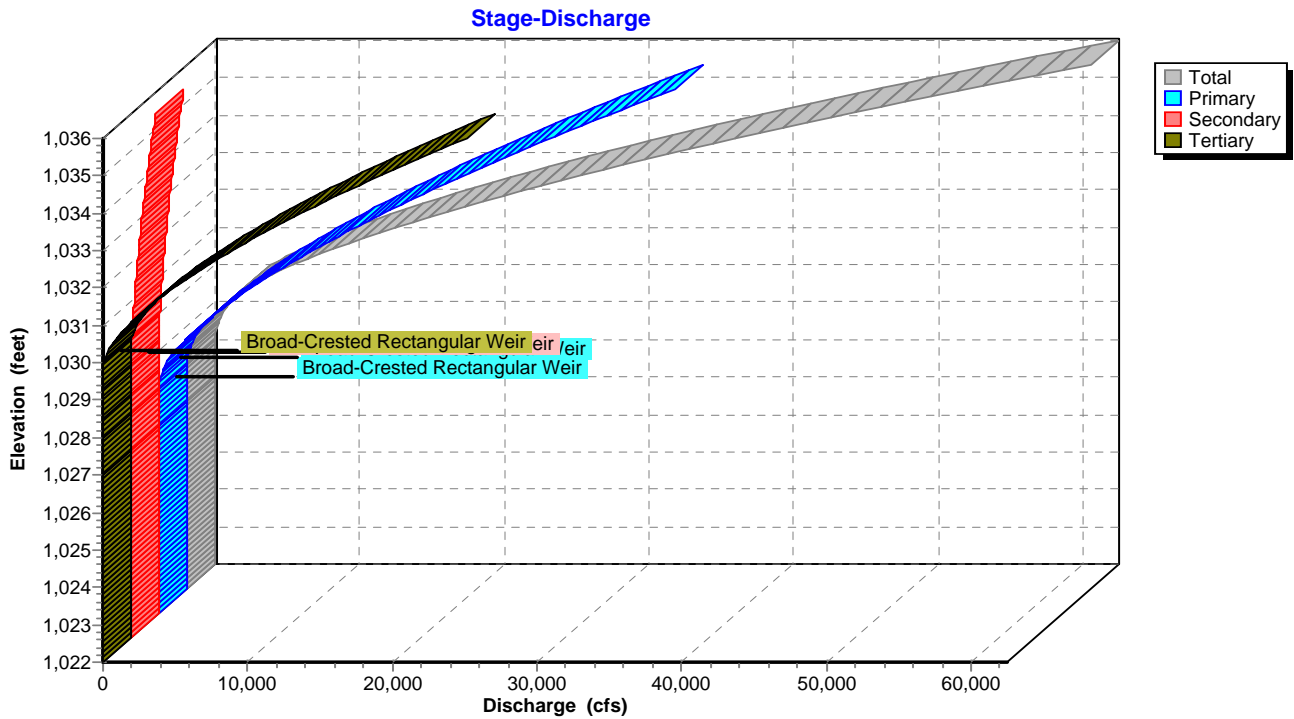
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

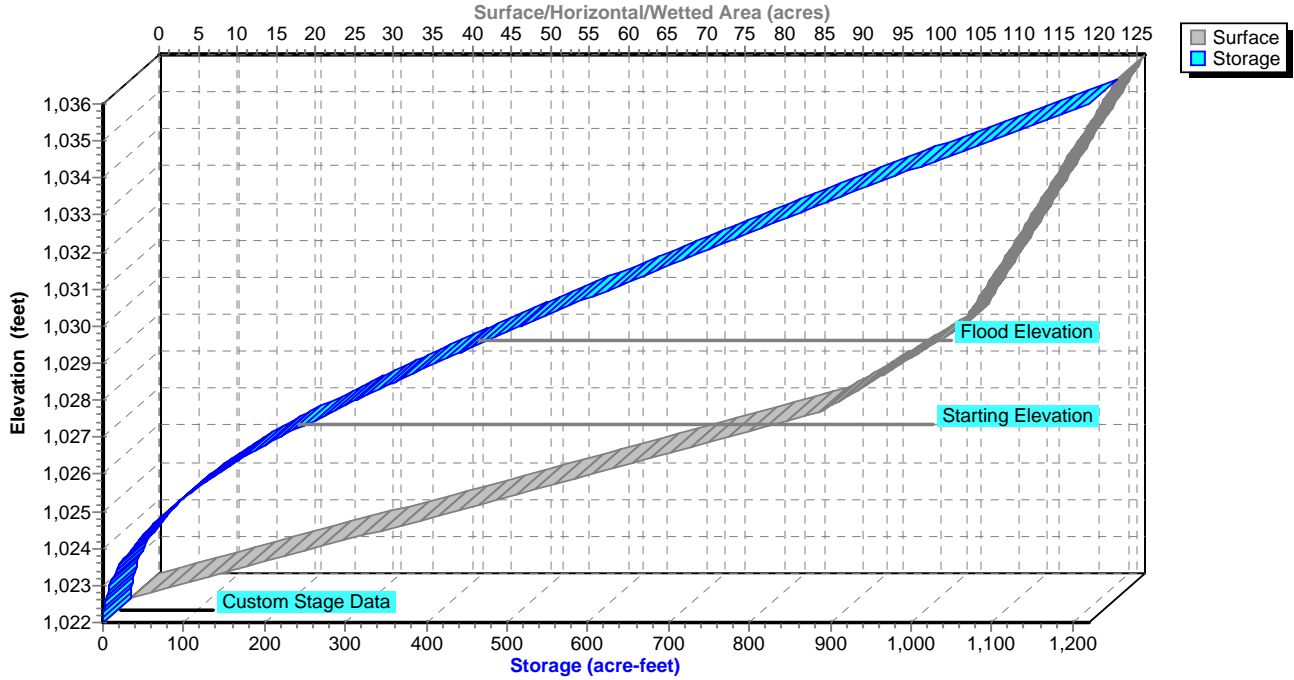


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

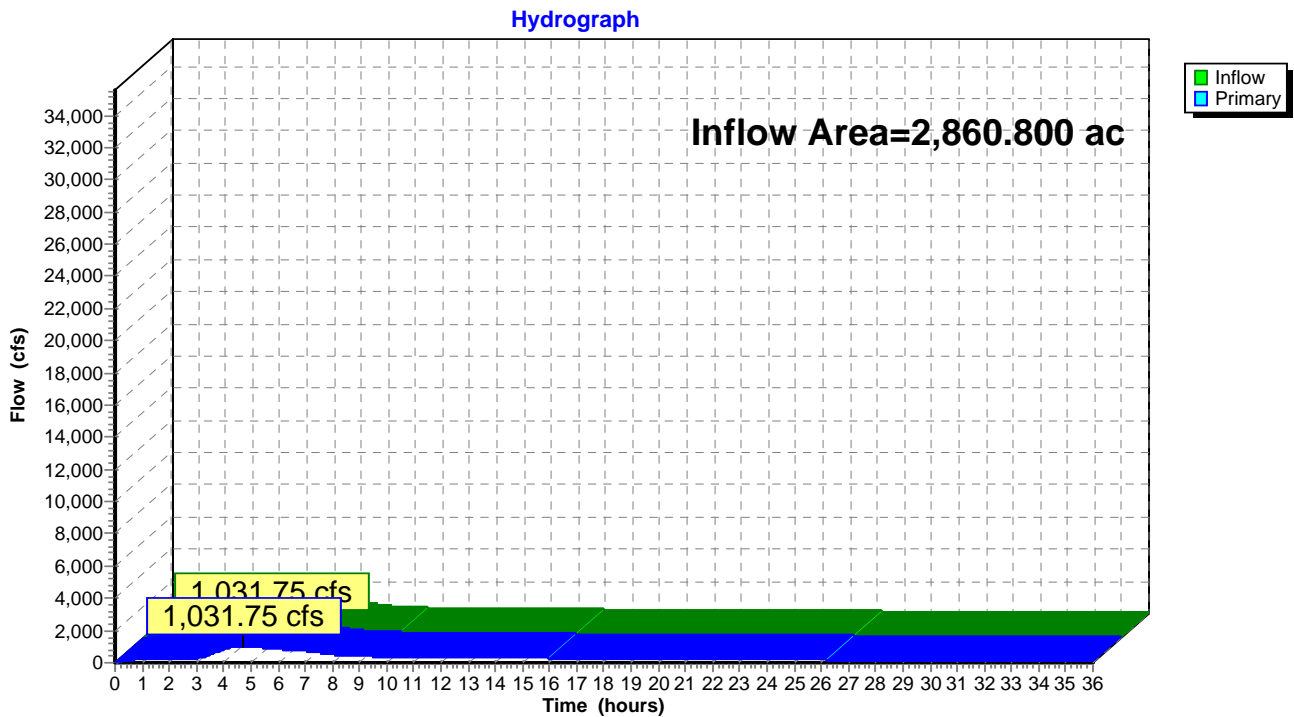


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.67" for 6-HR 0.23 PMF event
Inflow = 1,031.75 cfs @ 4.69 hrs, Volume= 875.056 af
Primary = 1,031.75 cfs @ 4.70 hrs, Volume= 875.056 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.88" for 6-HR 0.23 PMF event
 Inflow = 3,378.21 cfs @ 6.35 hrs, Volume= 2,268.724 af
 Outflow = 3,025.00 cfs @ 7.28 hrs, Volume= 2,267.934 af, Atten= 10%, Lag= 56.1 min
 Primary = 3,025.00 cfs @ 7.28 hrs, Volume= 2,267.934 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,003.81' @ 7.29 hrs Surf.Area= 11.018 ac Storage= 145.267 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 17.8 min calculated for 2,267.934 af (100% of inflow)
 Center-of-Mass det. time= 17.3 min (739.3 - 722.0)

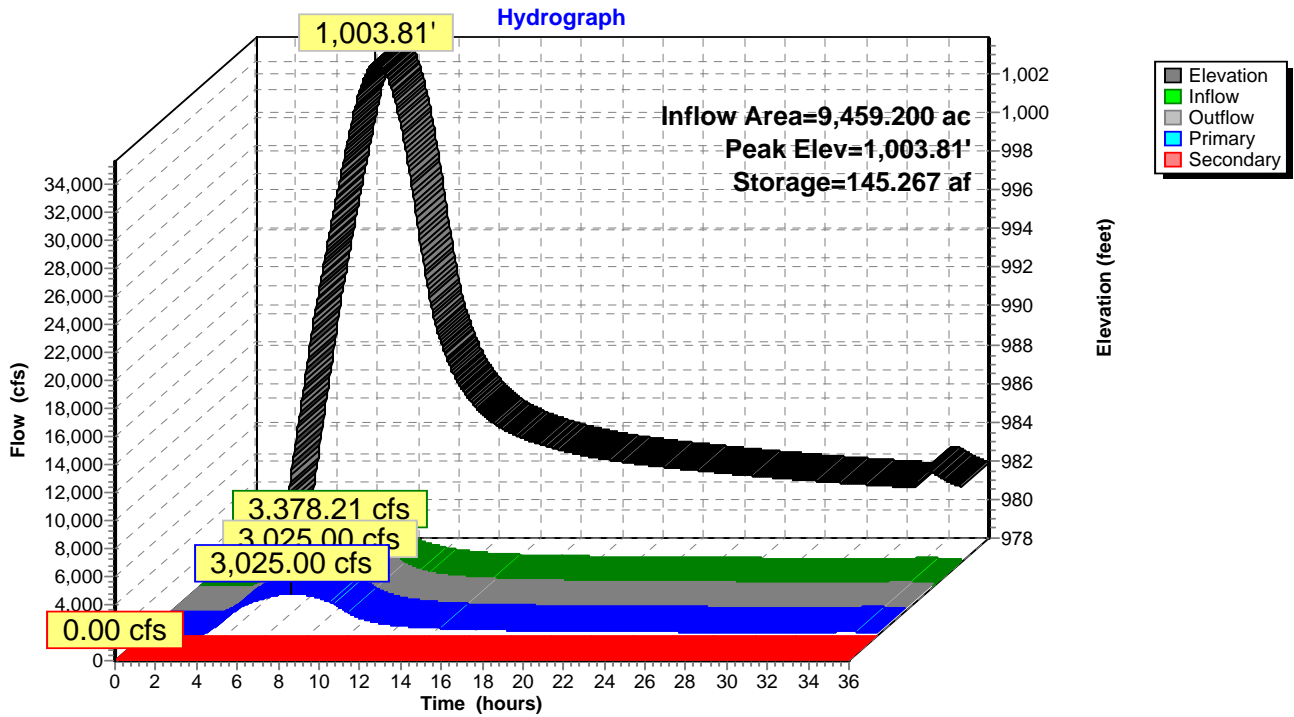
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

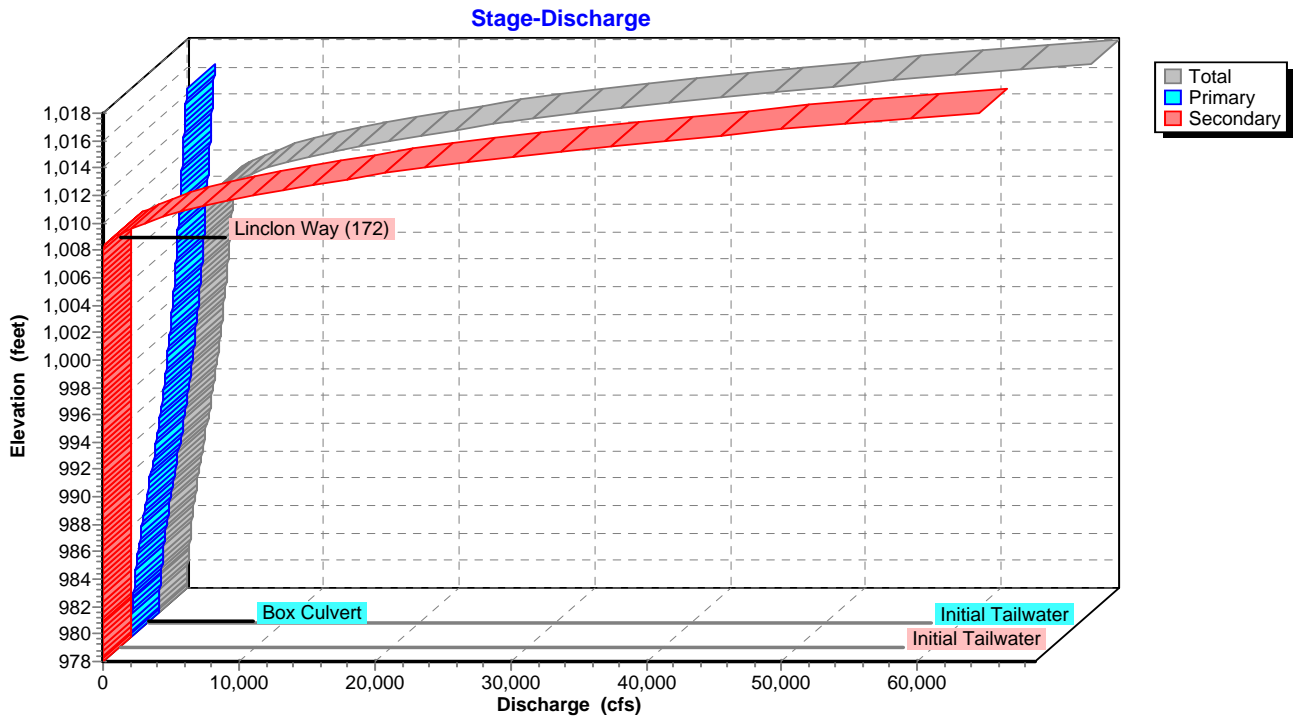
Primary OutFlow Max=3,024.99 cfs @ 7.28 hrs HW=1,003.81' TW=984.17' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,024.99 cfs @ 26.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

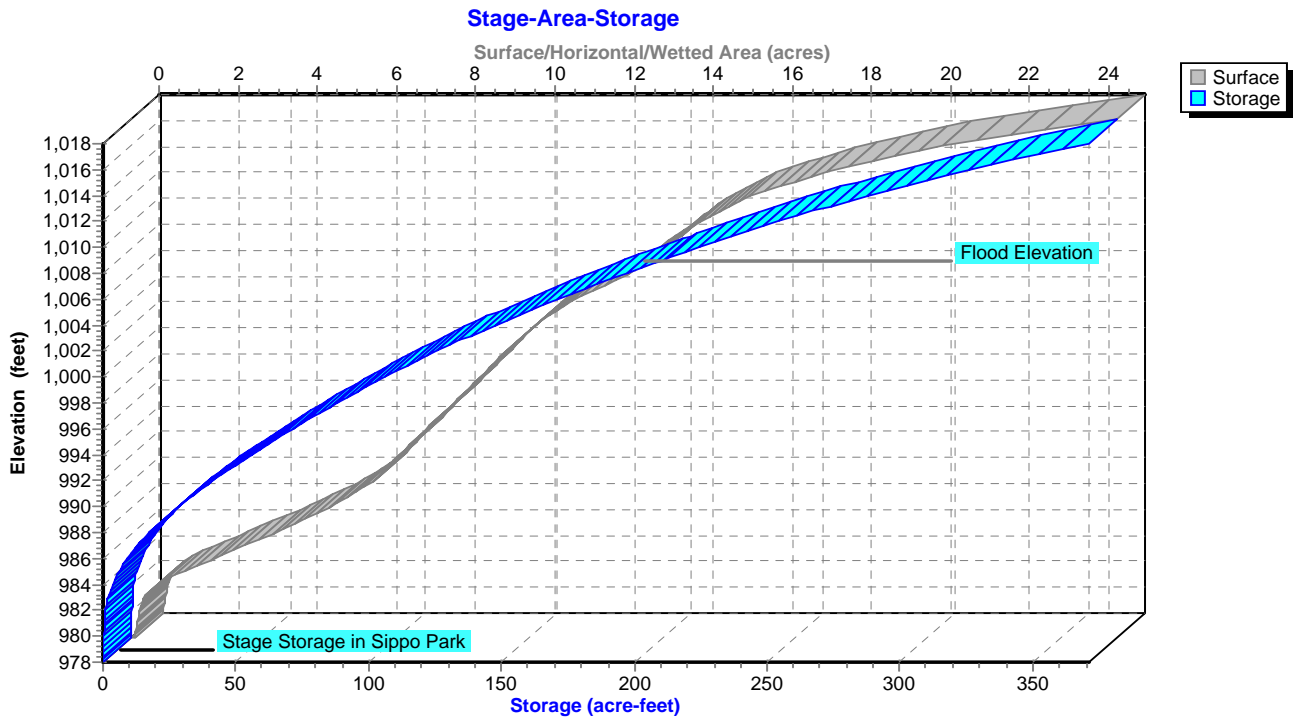
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

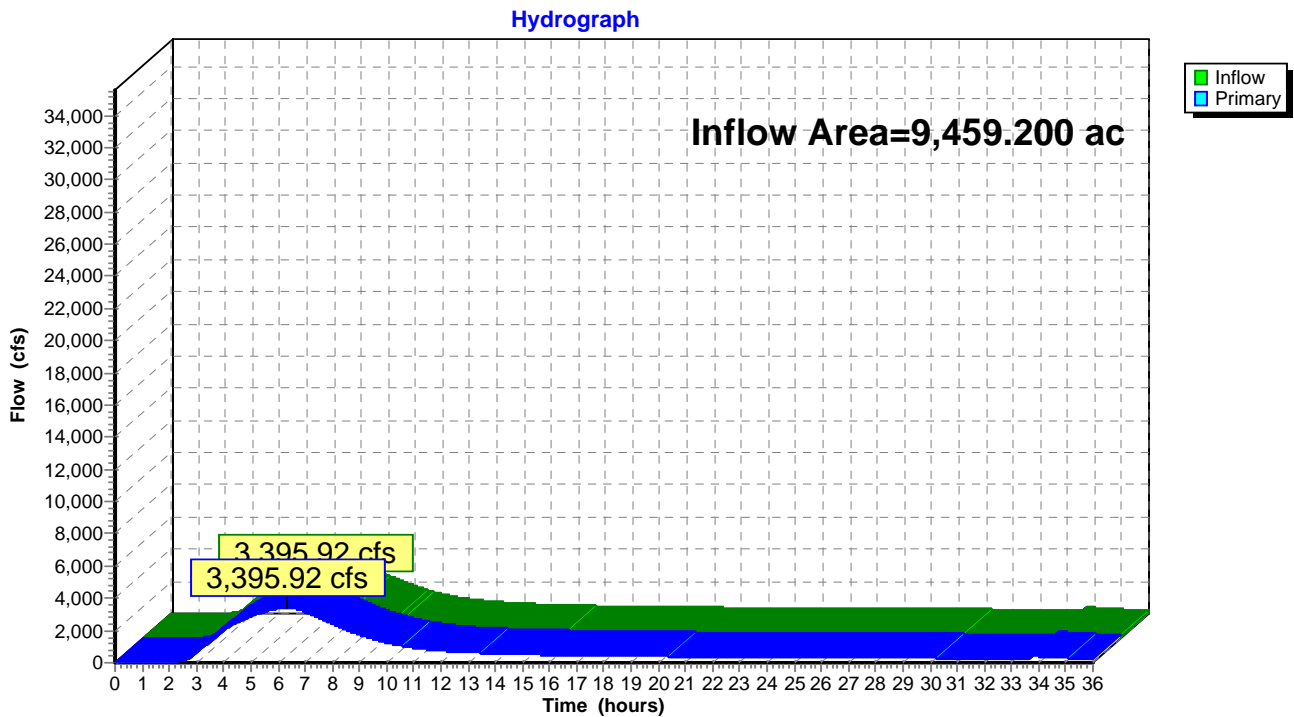


Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.89" for 6-HR 0.23 PMF event
Inflow = 3,395.92 cfs @ 6.33 hrs, Volume= 2,280.804 af
Primary = 3,395.92 cfs @ 6.34 hrs, Volume= 2,280.804 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=3.43"
 Tc=44.0 min CN=74 Runoff=181.35 cfs 32.930 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=3.53"
 Tc=65.0 min CN=75 Runoff=390.74 cfs 79.084 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=3.04"
 Tc=226.0 min CN=70 Runoff=931.95 cfs 354.729 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.85"
 Tc=128.0 min CN=68 Runoff=907.49 cfs 254.950 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.75"
 Tc=129.0 min CN=67 Runoff=627.14 cfs 177.523 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=3.43"
 Tc=110.0 min CN=74 Runoff=811.83 cfs 206.729 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=3.53"
 Tc=72.0 min CN=75 Runoff=1,031.98 cfs 216.540 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=4.04"
 Tc=78.0 min CN=80 Runoff=1,066.66 cfs 228.616 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.94"
 Tc=155.0 min CN=69 Runoff=843.67 cfs 261.930 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=3.53"
 Tc=156.0 min CN=75 Runoff=1,886.34 cfs 578.067 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.75"
 Tc=151.0 min CN=67 Runoff=485.77 cfs 149.647 af

Reach 5R: Channel 5 Avg. Flow Depth=3.13' Max Vel=6.10 fps Inflow=366.70 cfs 667.275 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=366.05 cfs 661.966 af

Reach 7R: Channel 7 Avg. Flow Depth=8.47' Max Vel=3.22 fps Inflow=1,100.11 cfs 916.713 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=1,043.05 cfs 908.032 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=4.34' Max Vel=3.06 fps Inflow=247.65 cfs 342.225 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=247.61 cfs 341.468 af

Reach 15R: Channel 15 Avg. Flow Depth=8.80' Max Vel=2.17 fps Inflow=2,990.35 cfs 1,837.950 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,515.23 cfs 1,805.449 af

Reach 16R: Channel 16 Avg. Flow Depth=10.80' Max Vel=2.69 fps Inflow=3,357.93 cfs 2,228.340 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=3,270.92 cfs 2,203.470 af

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 372

Reach 18R: Sippo Creek Avg. Flow Depth=6.14' Max Vel=9.59 fps Inflow=3,167.76 cfs 2,417.315 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,167.75 cfs 2,417.191 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=454.61 cfs 111.903 af
Primary=454.61 cfs 111.903 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,007.72' Storage=137.395 af Inflow=3,640.02 cfs 2,431.645 af
330.74 cfs 1,975.065 af Secondary=1,469.38 cfs 443.753 af Tertiary=0.00 cfs 0.000 af Outflow=3,551.26 cfs 2,418.818 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=1,114.11 cfs 466.124 af
Primary=1,114.11 cfs 466.124 af

Pond 3P: Lake Cable Peak Elev=1,098.22' Storage=2,105.661 af Inflow=1,114.11 cfs 466.123 af
Primary=366.70 cfs 667.375 af Secondary=0.00 cfs 0.000 af Outflow=366.70 cfs 667.375 af

Pond 4C: Confluence 4 Inflow=1,884.38 cfs 1,169.859 af
Primary=1,884.38 cfs 1,169.859 af

Pond 4P: Lake O'Springs Peak Elev=1,108.02' Storage=81.034 af Inflow=454.61 cfs 111.902 af
Primary=183.00 cfs 111.396 af Secondary=0.00 cfs 0.000 af Outflow=183.00 cfs 111.396 af

Pond 5C: Confluence 5 Inflow=2,484.76 cfs 1,347.279 af
Primary=2,484.76 cfs 1,347.279 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.07' Storage=27.781 af Inflow=181.35 cfs 32.930 af
Primary=105.68 cfs 32.554 af Secondary=7.62 cfs 0.265 af Outflow=113.30 cfs 32.819 af

Pond 6C: Confluence 6 Inflow=525.61 cfs 491.036 af
Primary=525.61 cfs 491.036 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,990.35 cfs 1,838.132 af
Primary=2,990.35 cfs 1,838.132 af

Pond 8C: Confluence 8 Inflow=3,357.93 cfs 2,228.528 af
Primary=3,357.93 cfs 2,228.528 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,025.44' Storage=371.494 af Inflow=1,530.85 cfs 485.228 af
Primary=127.09 cfs 290.388 af Secondary=132.70 cfs 51.917 af Outflow=247.65 cfs 342.305 af

Pond 9P: Sippo Lake Peak Elev=1,029.19' Storage=431.369 af Inflow=1,886.34 cfs 578.067 af
Primary=1,530.85 cfs 485.229 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,530.85 cfs 485.229 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=1,100.11 cfs 916.814 af
Primary=1,100.11 cfs 916.814 af

Pond 16P: Lincoln Way Box Peak Elev=1,005.75' Storage=167.887 af Inflow=3,551.26 cfs 2,418.578 af
Primary=3,167.76 cfs 2,417.560 af Secondary=0.00 cfs 0.000 af Outflow=3,167.76 cfs 2,417.560 af

Pond 19C: Confluence 19 Inflow=3,640.02 cfs 2,431.866 af
Primary=3,640.02 cfs 2,431.866 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 2,540.746 af Average Runoff Depth = 3.22"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 181.35 cfs @ 3.37 hrs, Volume= 32.930 af, Depth= 3.43"

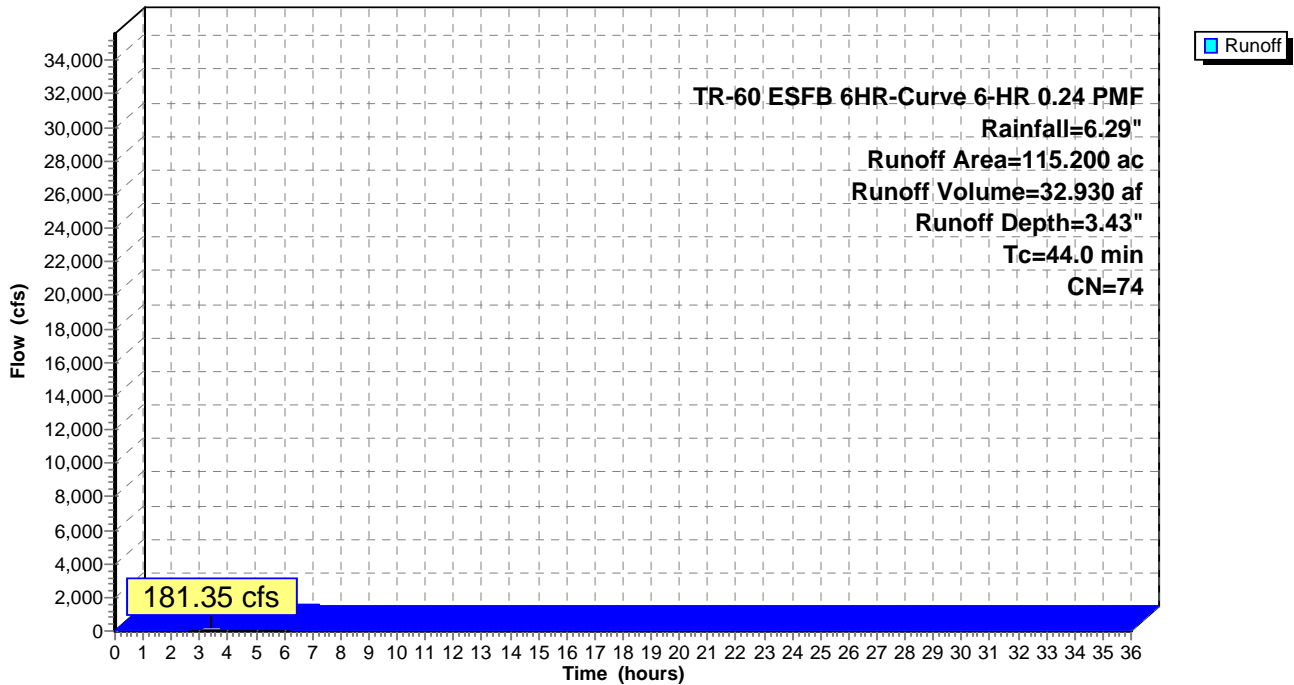
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 390.74 cfs @ 3.68 hrs, Volume= 79.084 af, Depth= 3.53"

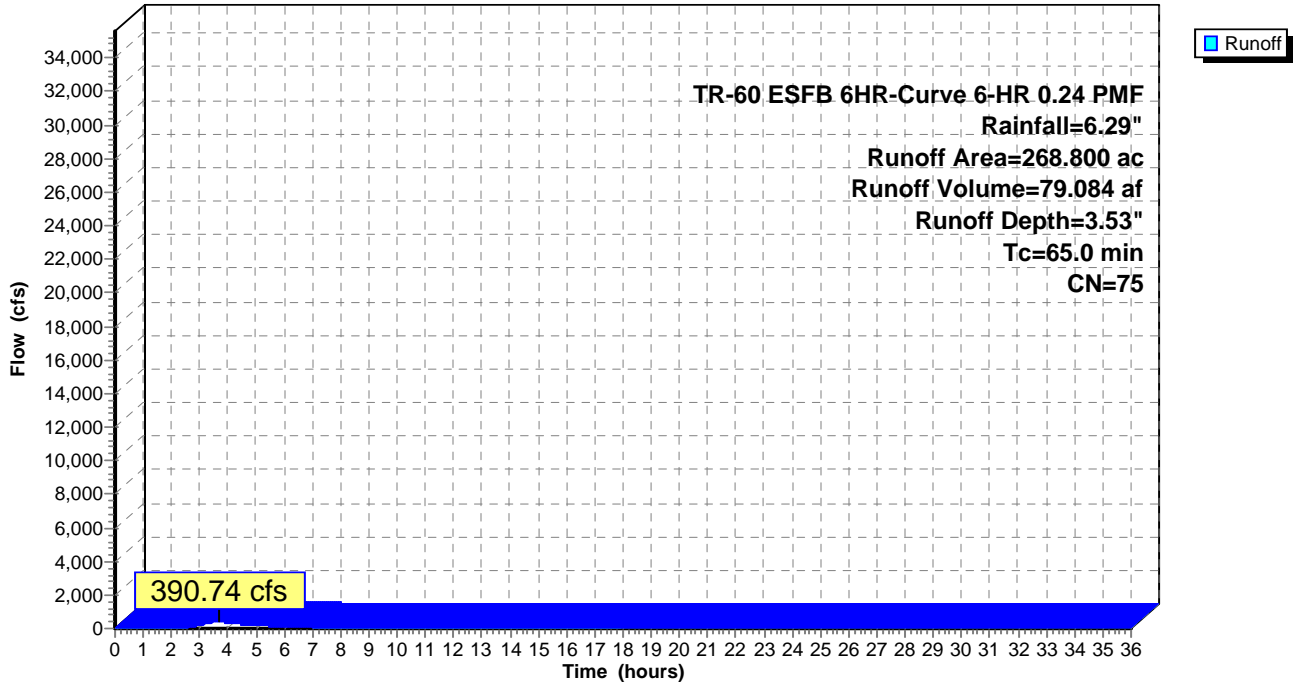
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 931.95 cfs @ 6.28 hrs, Volume= 354.729 af, Depth= 3.04"

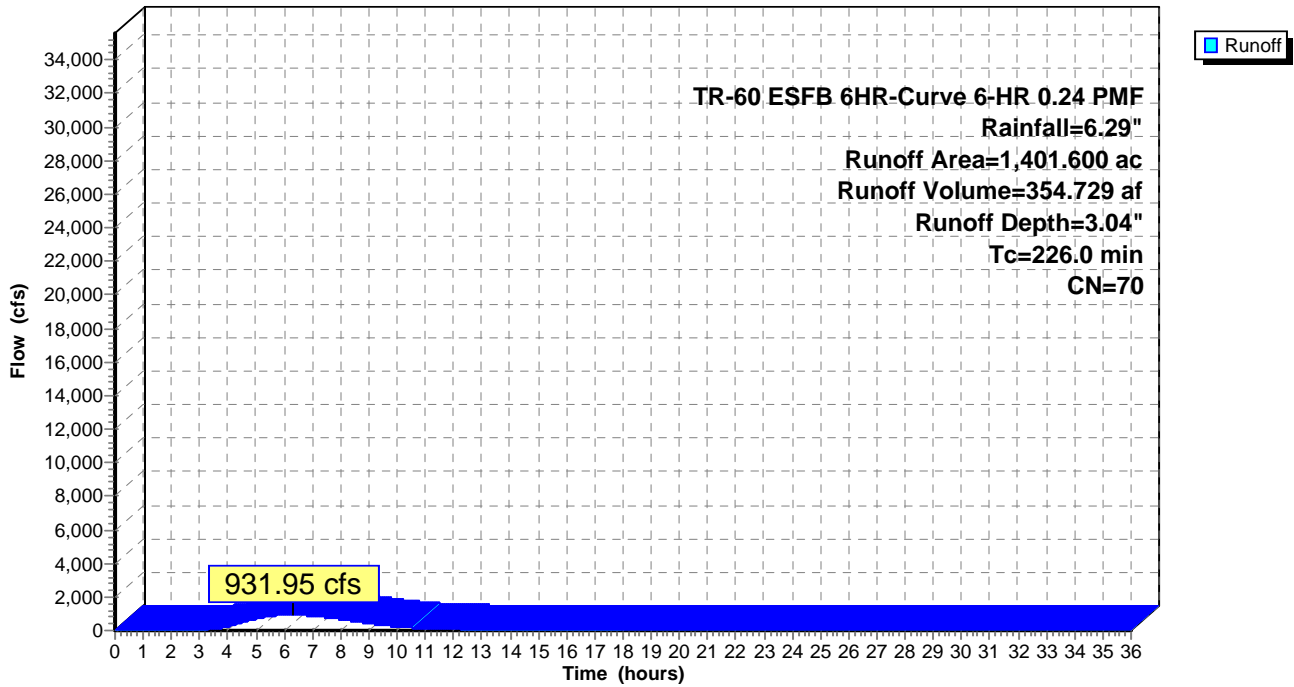
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 907.49 cfs @ 4.69 hrs, Volume= 254.950 af, Depth= 2.85"

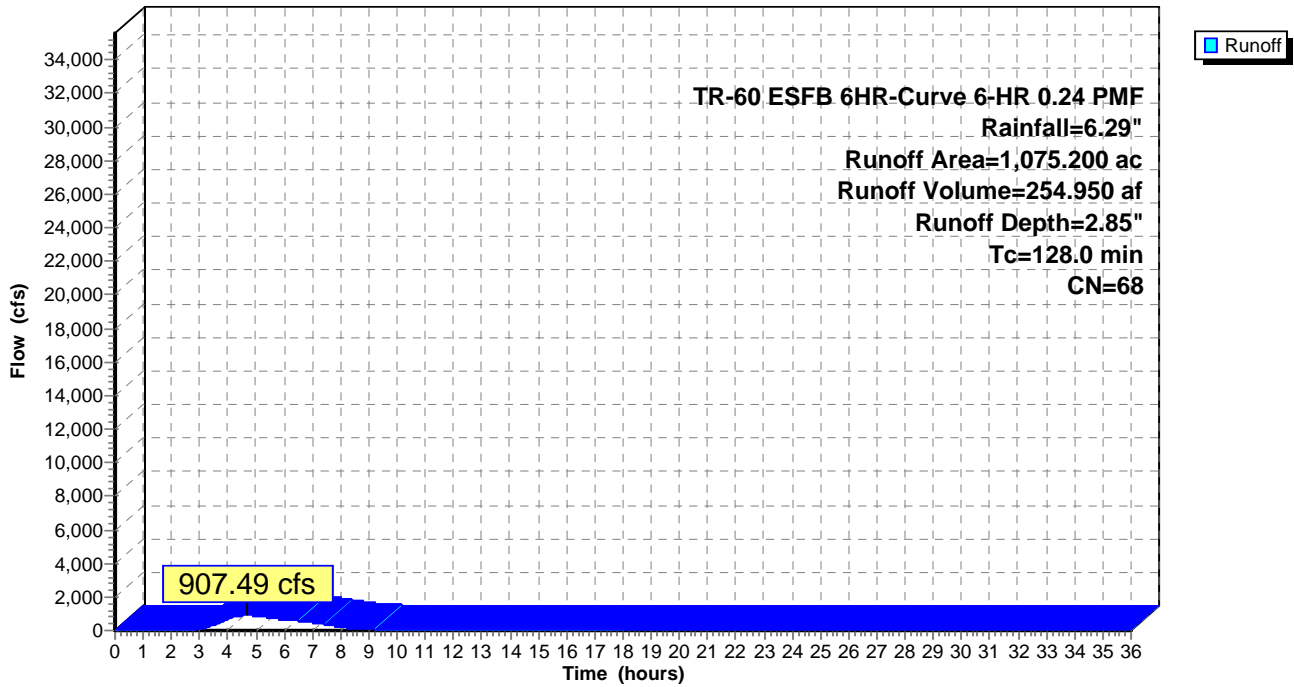
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 627.14 cfs @ 4.73 hrs, Volume= 177.523 af, Depth= 2.75"

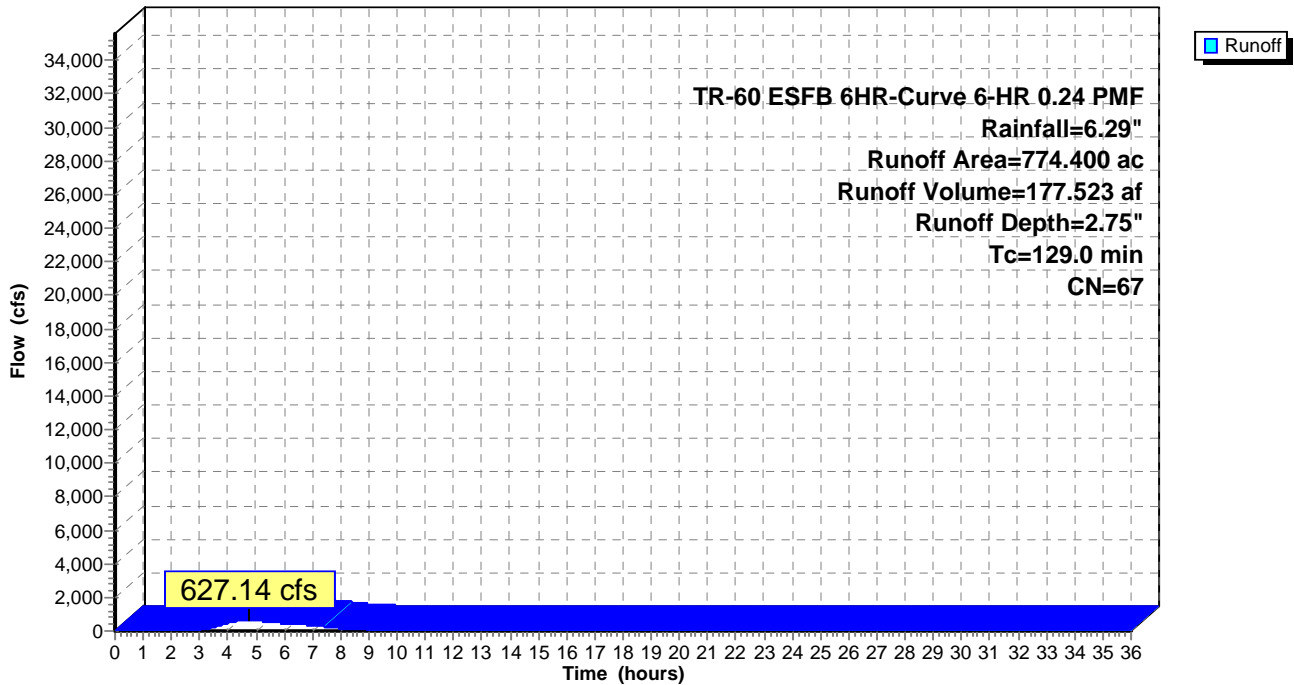
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 811.83 cfs @ 4.28 hrs, Volume= 206.729 af, Depth= 3.43"

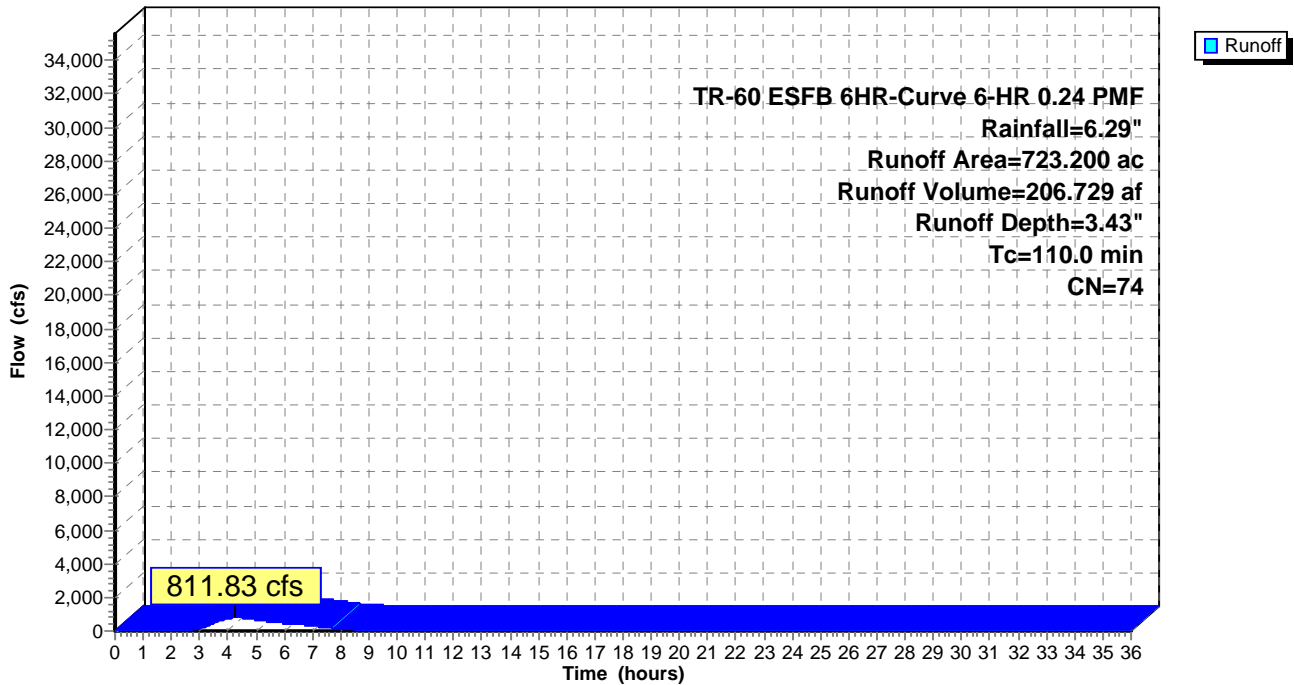
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 1,031.98 cfs @ 3.76 hrs, Volume= 216.540 af, Depth= 3.53"

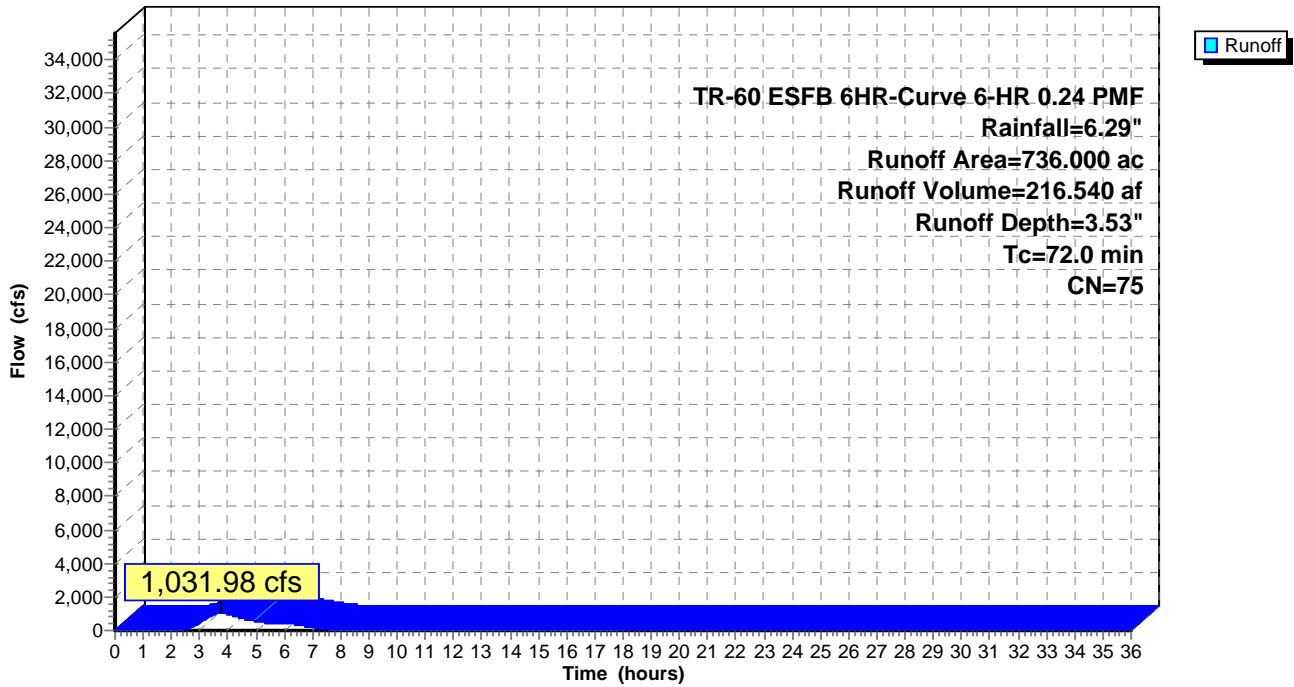
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 1,066.66 cfs @ 3.81 hrs, Volume= 228.616 af, Depth= 4.04"

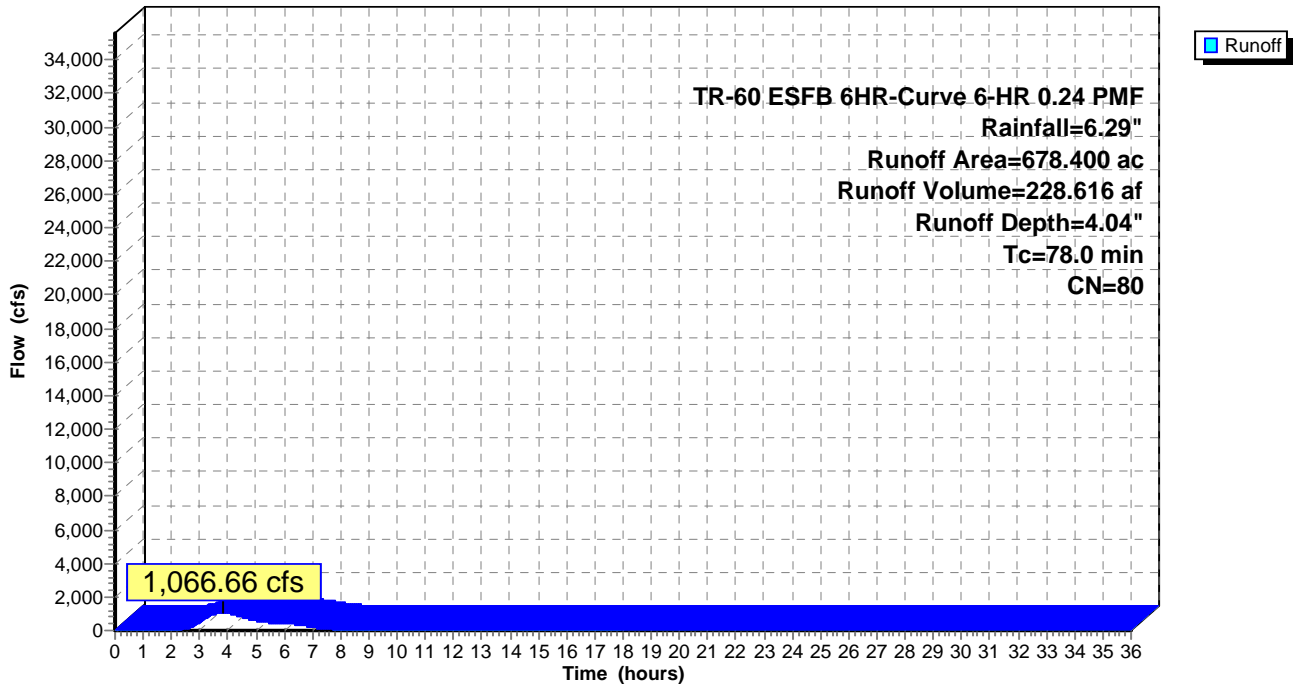
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 843.67 cfs @ 5.00 hrs, Volume= 261.930 af, Depth= 2.94"

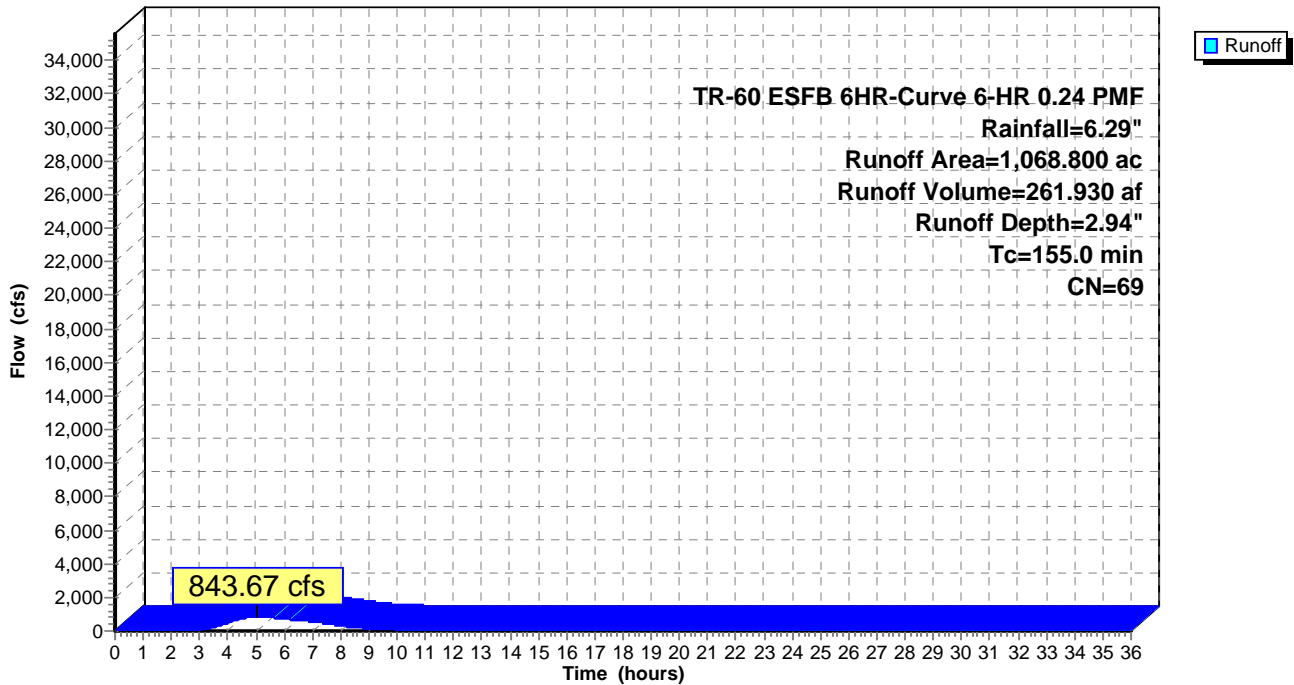
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,886.34 cfs @ 5.03 hrs, Volume= 578.067 af, Depth= 3.53"

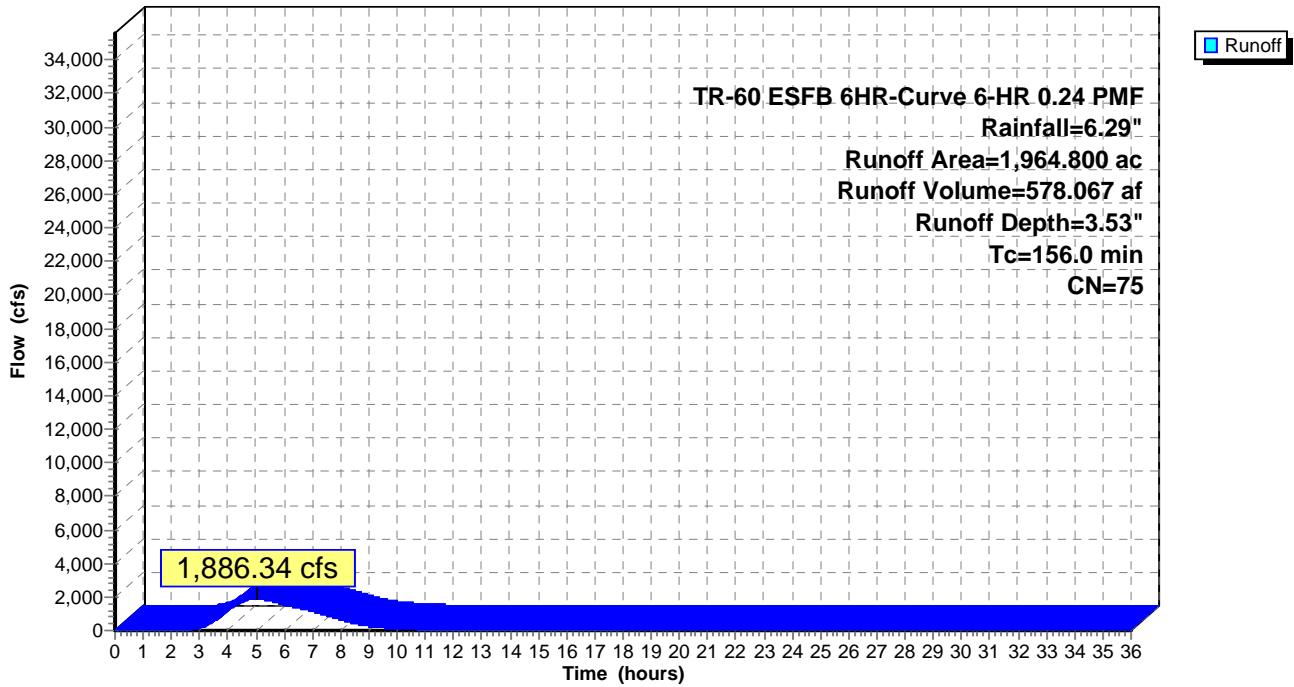
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 485.77 cfs @ 5.04 hrs, Volume= 149.647 af, Depth= 2.75"

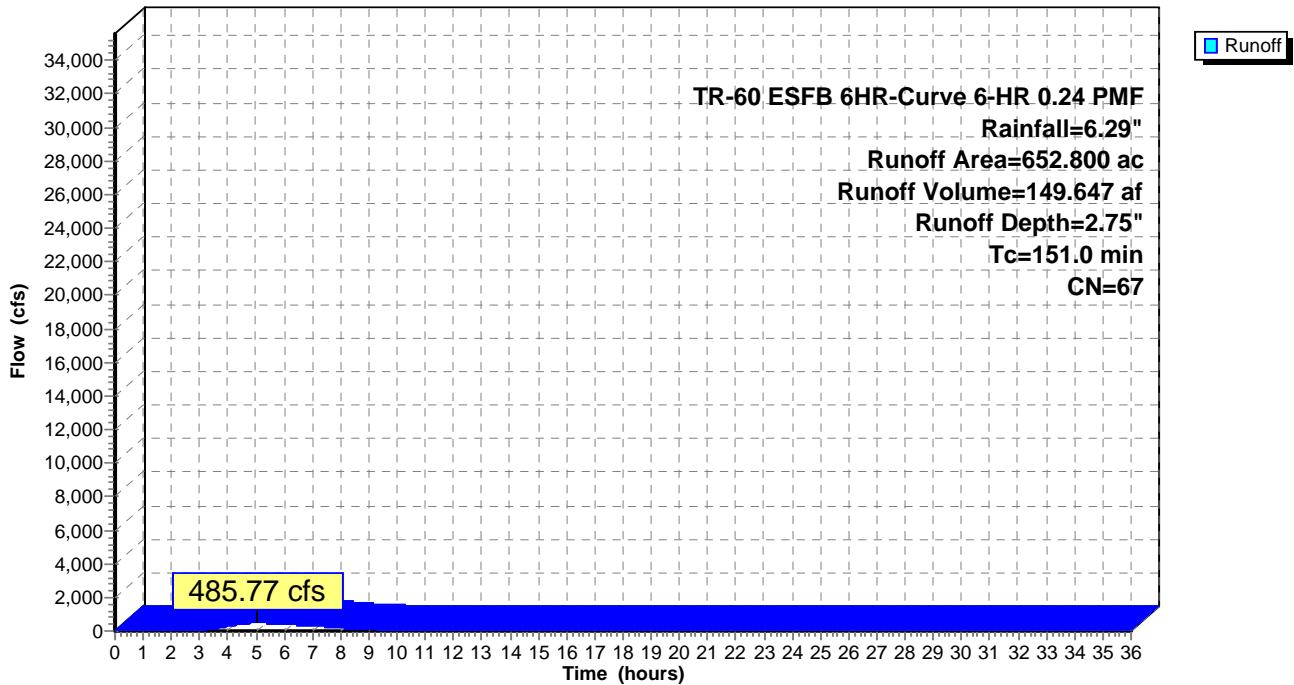
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



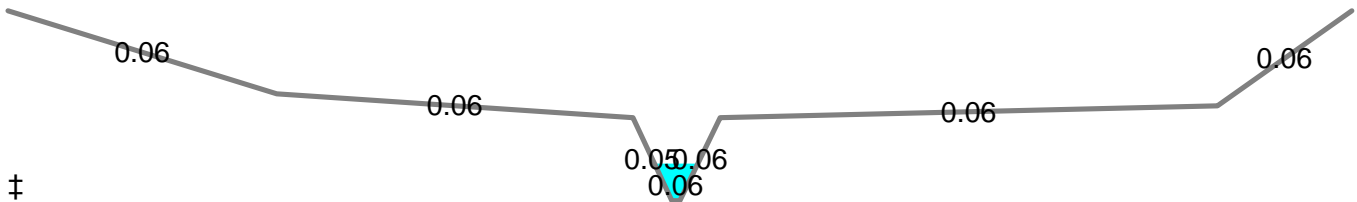
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.48" for 6-HR 0.24 PMF event
 Inflow = 366.70 cfs @ 9.69 hrs, Volume= 667.275 af
 Outflow = 366.05 cfs @ 10.00 hrs, Volume= 661.966 af, Atten= 0%, Lag= 19.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.10 fps, Min. Travel Time= 24.0 min
 Avg. Velocity = 5.29 fps, Avg. Travel Time= 27.7 min

Peak Storage= 528,076 cf @ 10.00 hrs
 Average Depth at Peak Storage= 3.13'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

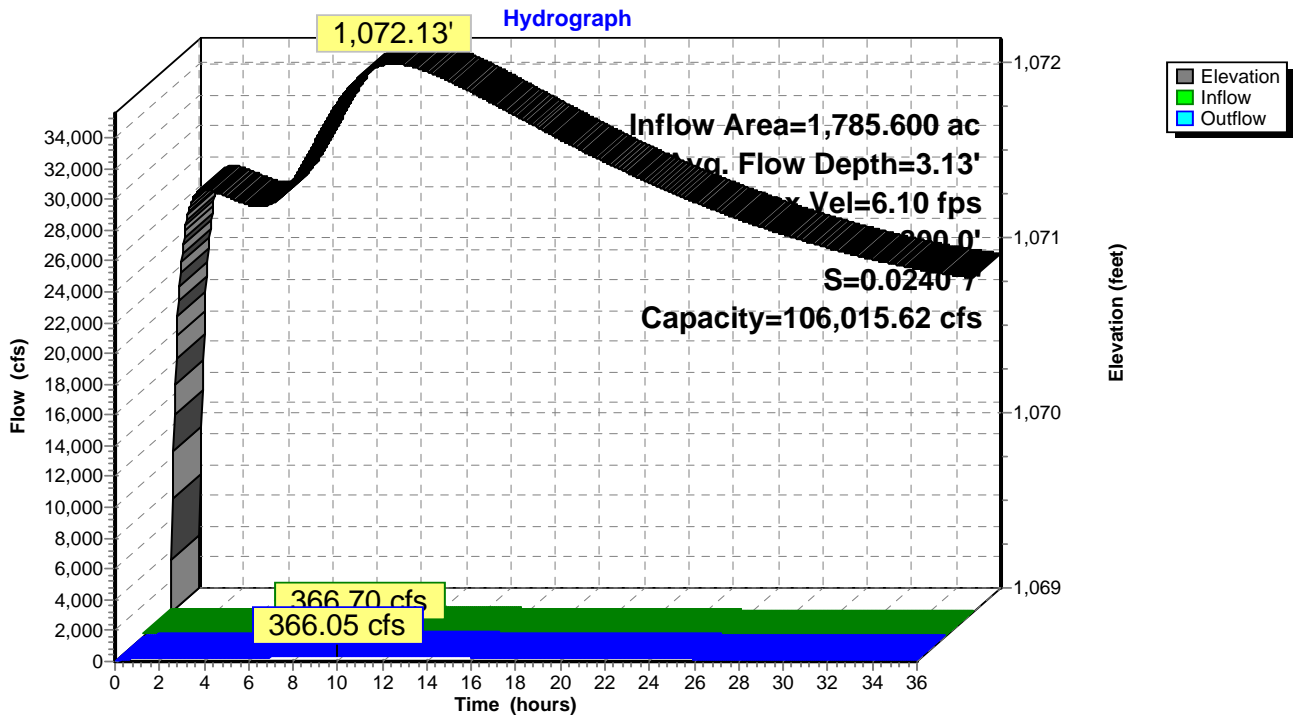
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



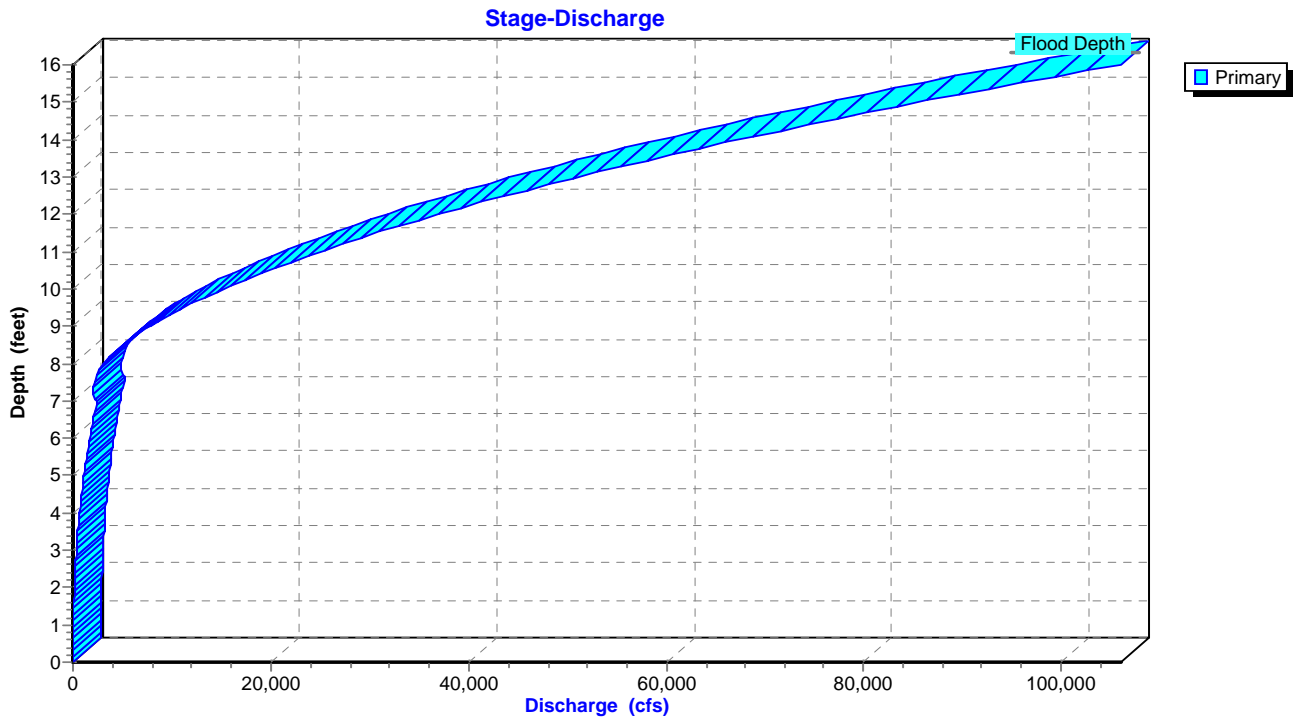
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

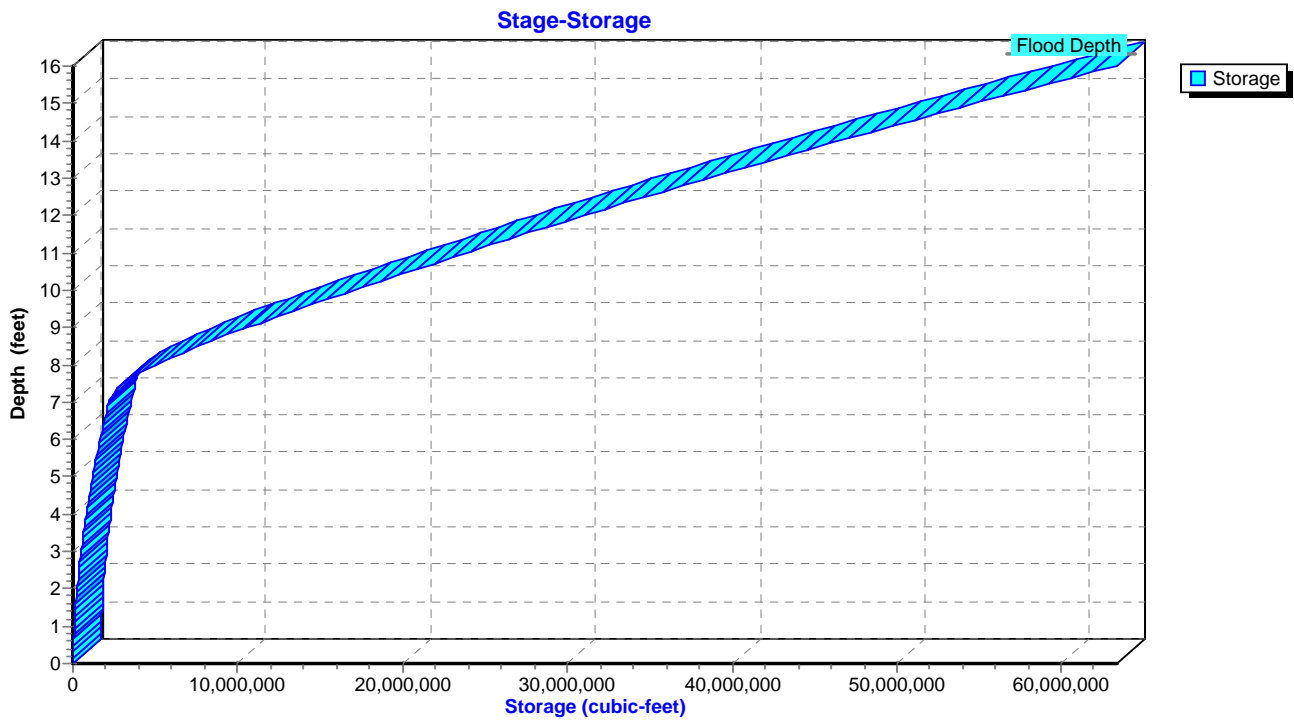
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



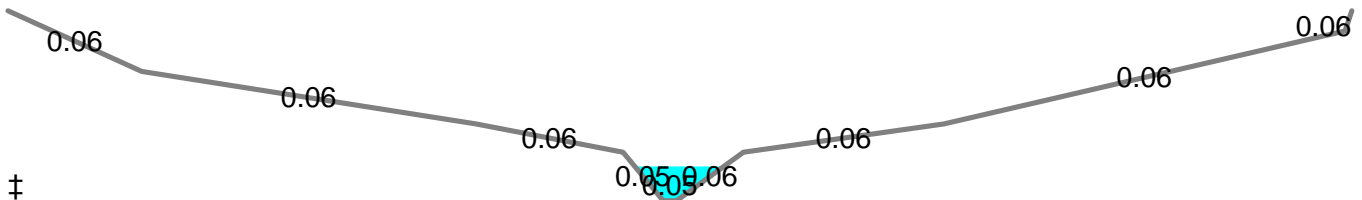
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.85" for 6-HR 0.24 PMF event
 Inflow = 1,100.11 cfs @ 4.70 hrs, Volume= 916.713 af
 Outflow = 1,043.05 cfs @ 5.15 hrs, Volume= 908.032 af, Atten= 5%, Lag= 27.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.22 fps, Min. Travel Time= 30.5 min
 Avg. Velocity = 2.29 fps, Avg. Travel Time= 43.0 min

Peak Storage= 1,910,923 cf @ 5.15 hrs
 Average Depth at Peak Storage= 8.47'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

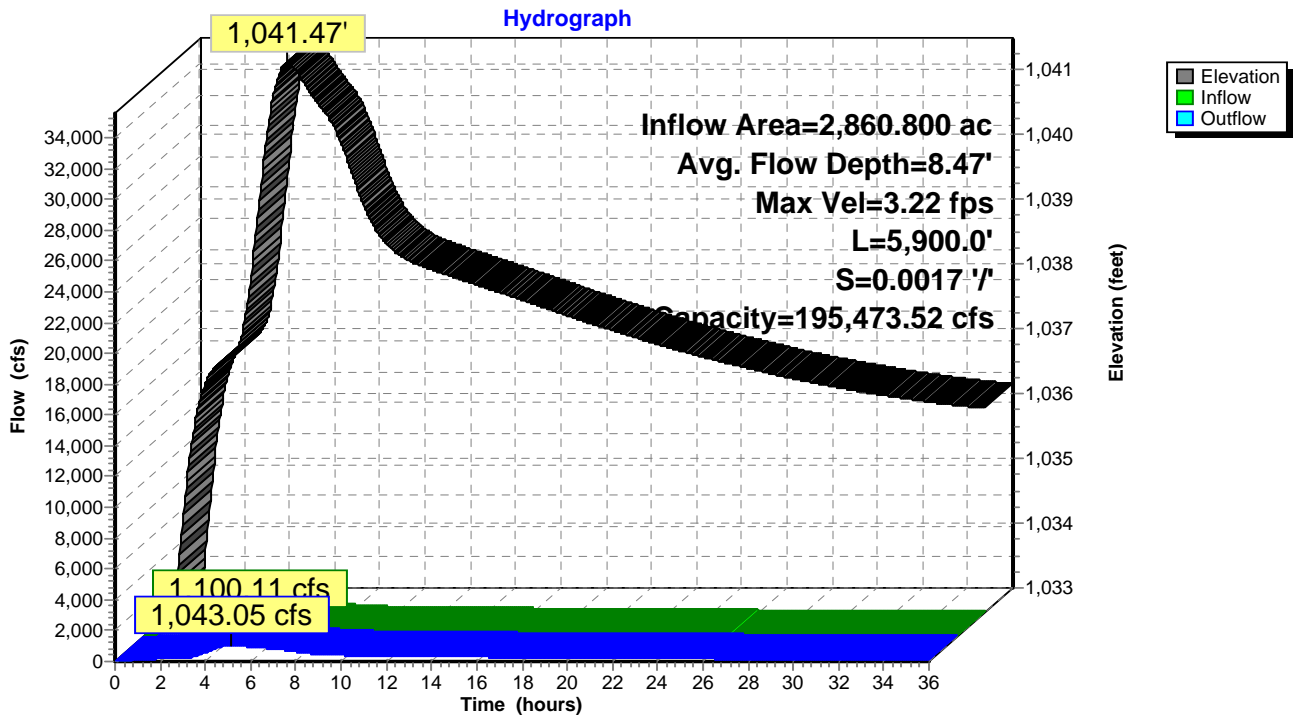
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



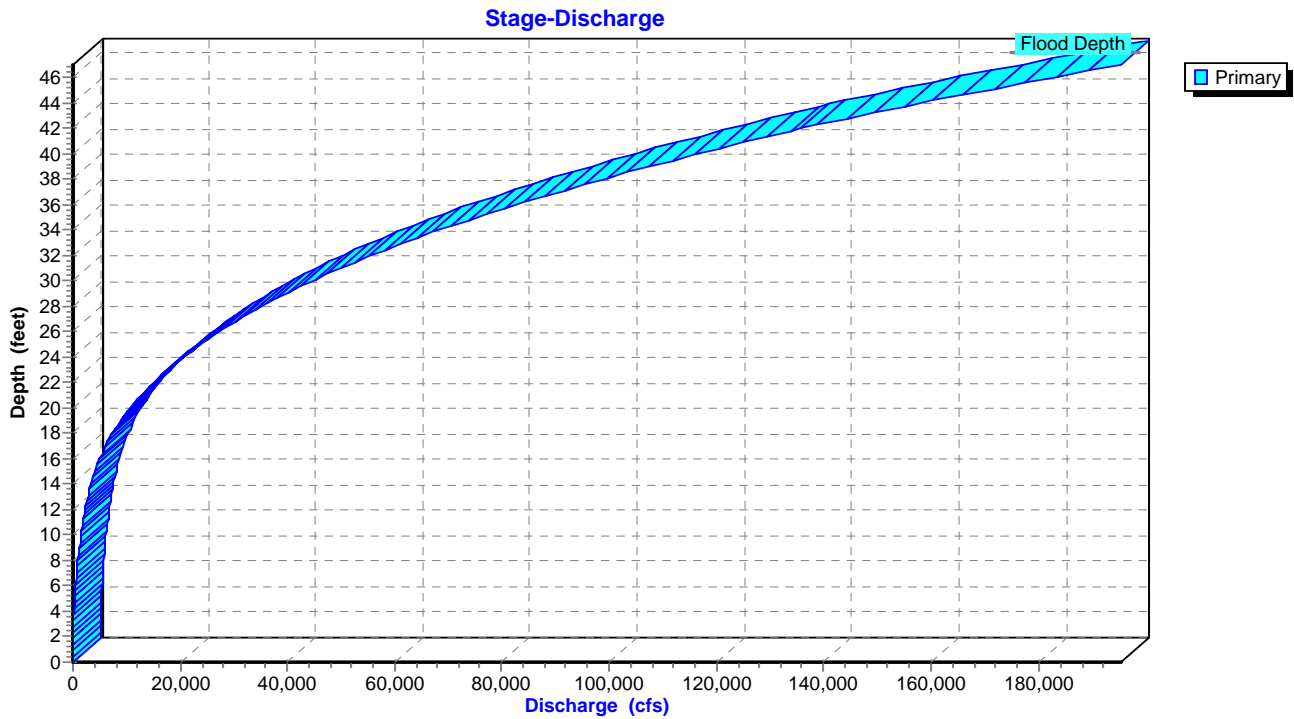
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

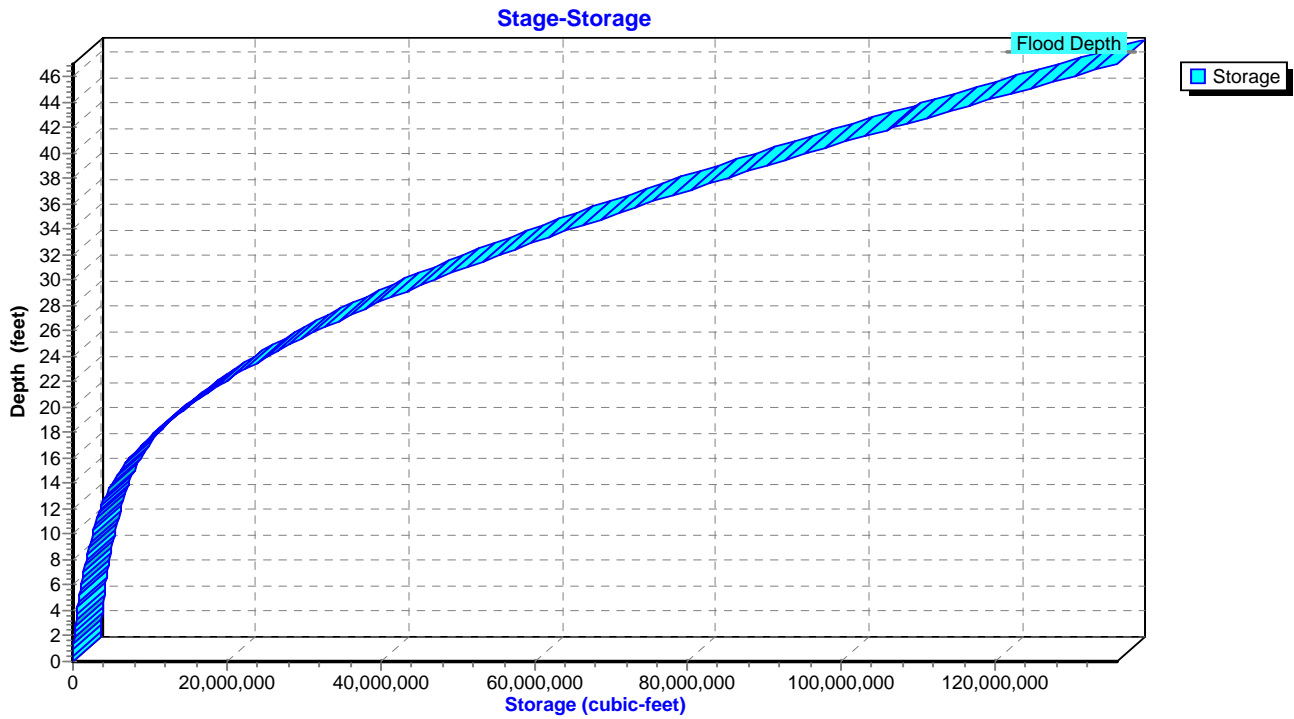
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



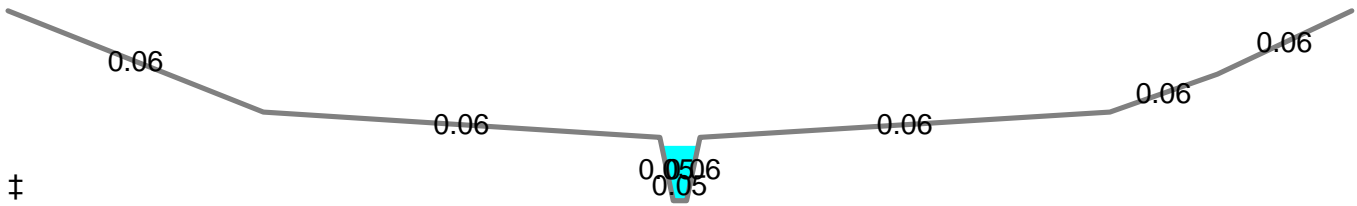
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.09" for 6-HR 0.24 PMF event
 Inflow = 247.65 cfs @ 10.32 hrs, Volume= 342.225 af
 Outflow = 247.61 cfs @ 10.38 hrs, Volume= 341.468 af, Atten= 0%, Lag= 3.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.06 fps, Min. Travel Time= 4.9 min
 Avg. Velocity = 2.53 fps, Avg. Travel Time= 5.9 min

Peak Storage= 72,858 cf @ 10.38 hrs
 Average Depth at Peak Storage= 4.34'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

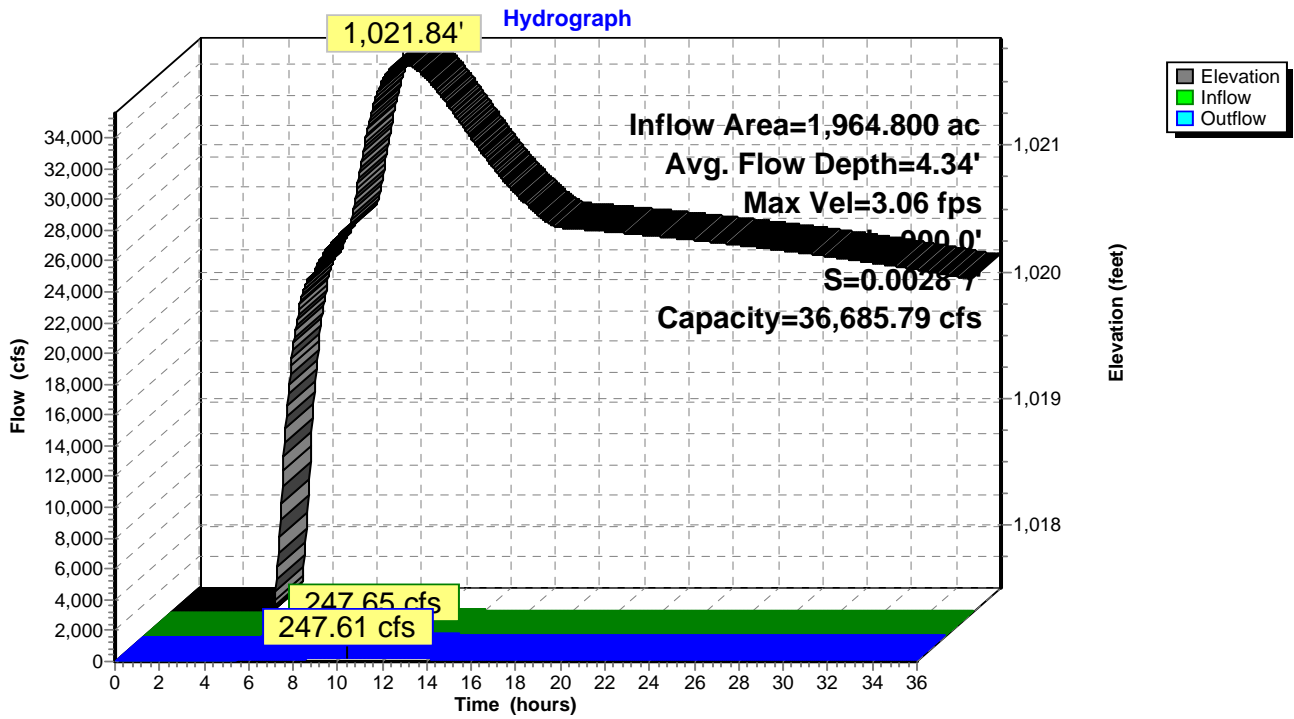
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



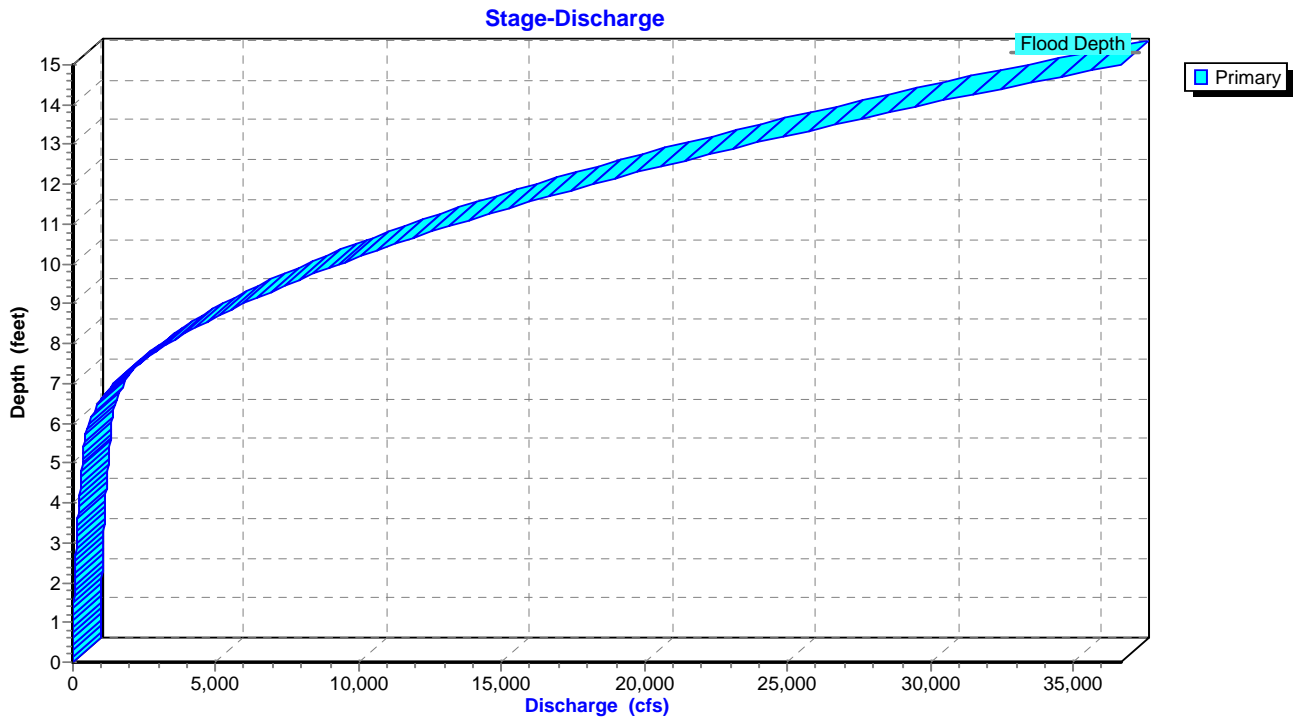
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

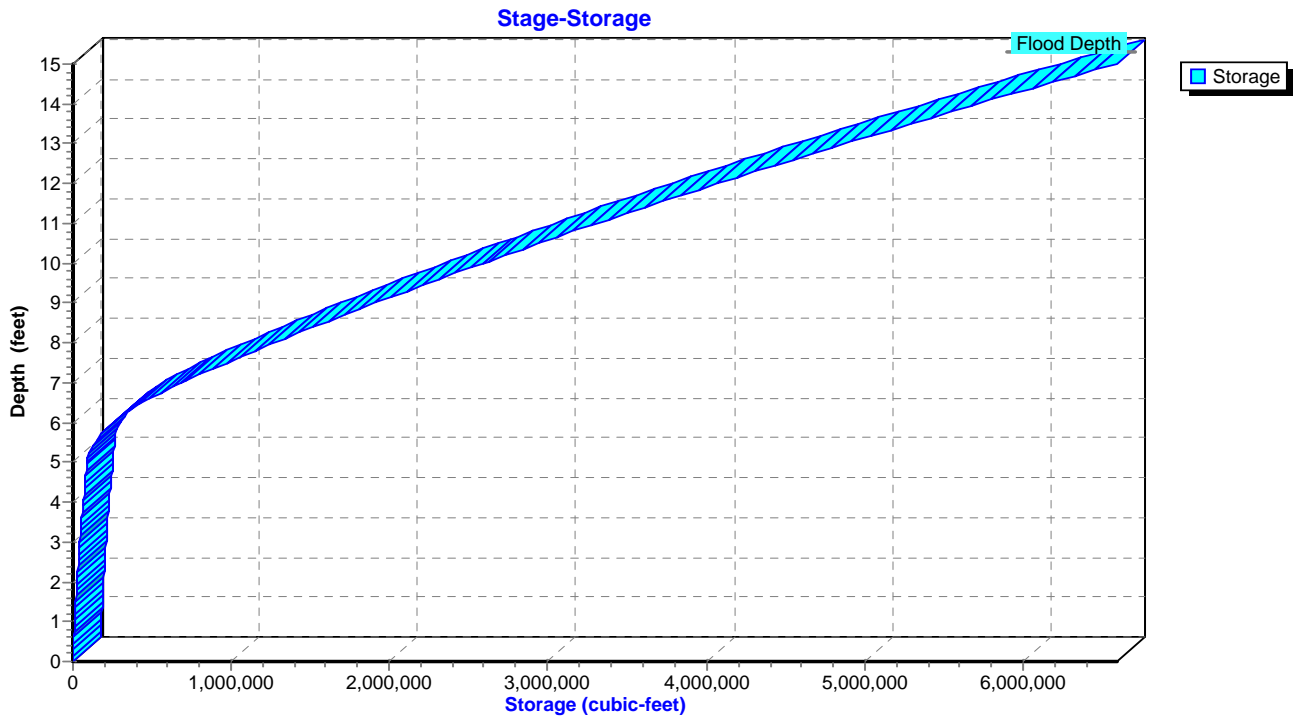
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



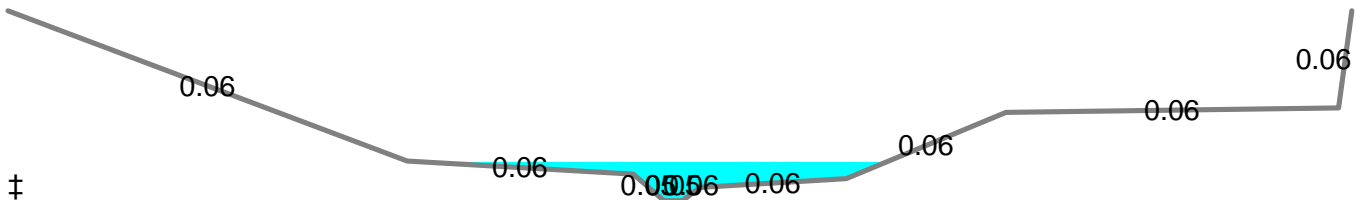
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 3.01" for 6-HR 0.24 PMF event
 Inflow = 2,990.35 cfs @ 5.06 hrs, Volume= 1,837.950 af
 Outflow = 2,515.23 cfs @ 6.23 hrs, Volume= 1,805.449 af, Atten= 16%, Lag= 70.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.17 fps, Min. Travel Time= 67.5 min
 Avg. Velocity = 1.53 fps, Avg. Travel Time= 95.8 min

Peak Storage= 10,202,923 cf @ 6.23 hrs
 Average Depth at Peak Storage= 8.80'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

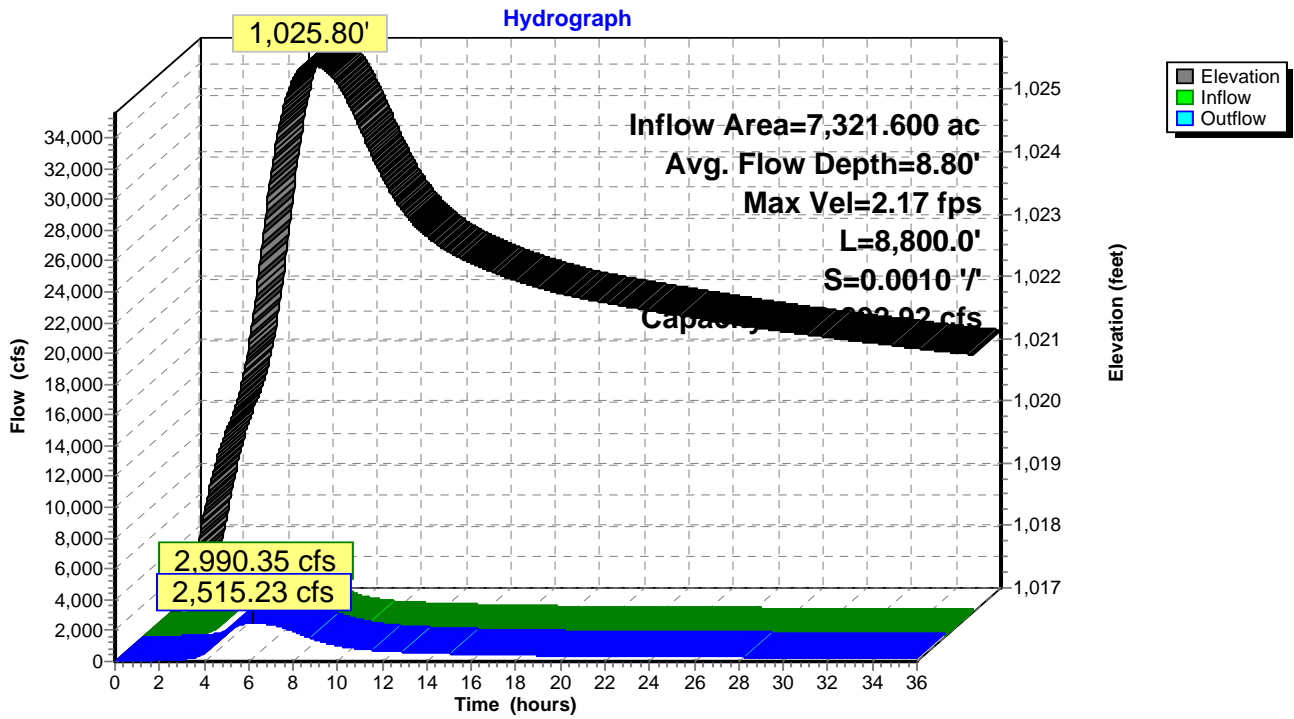
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



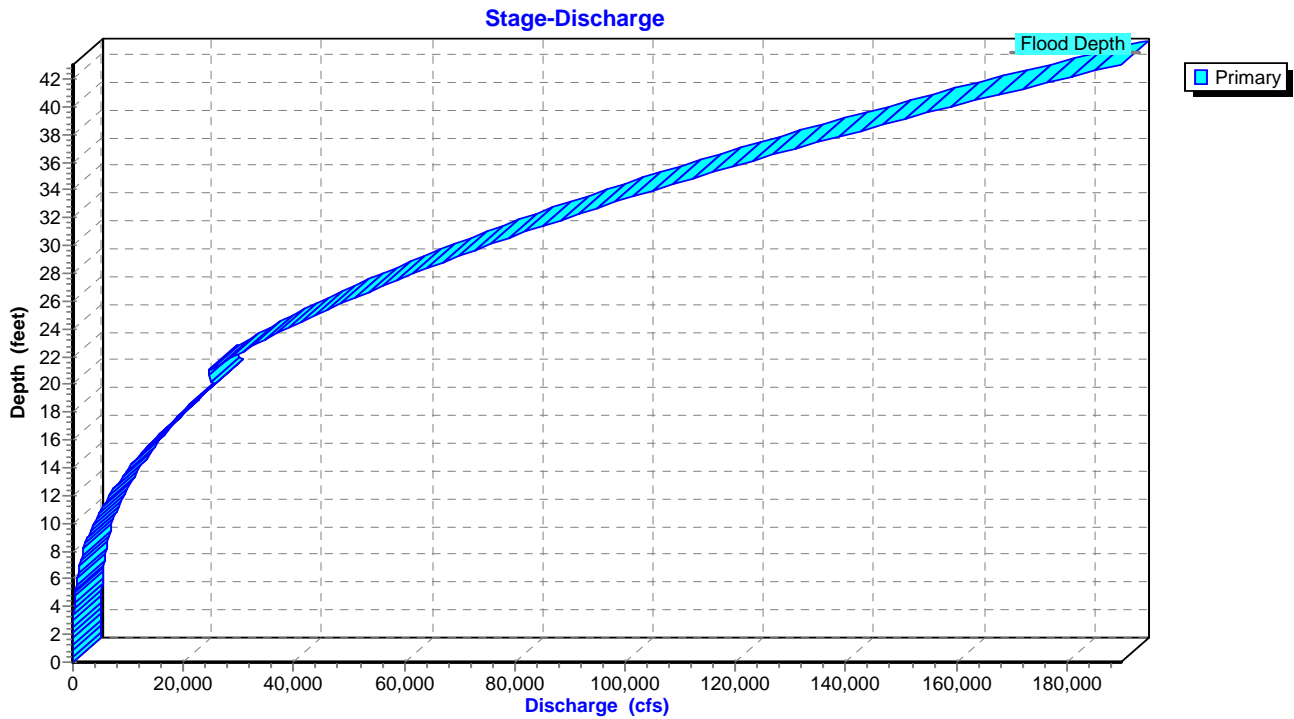
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

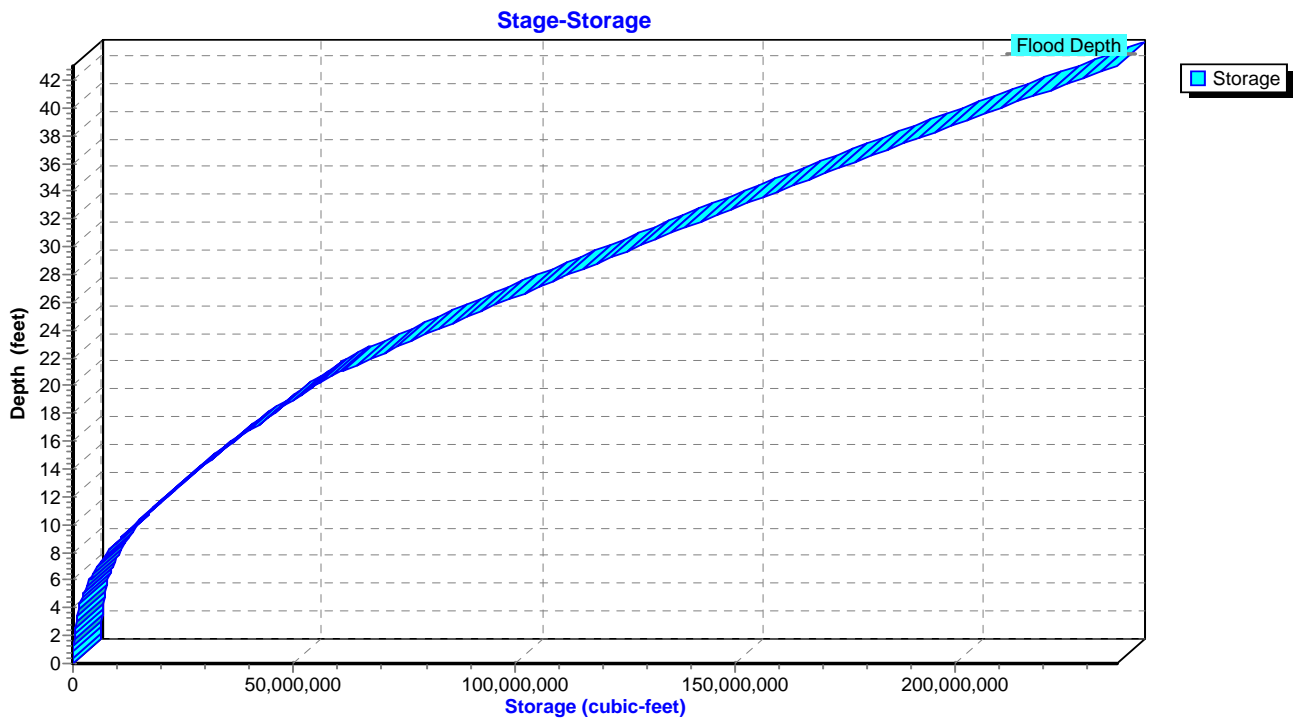
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



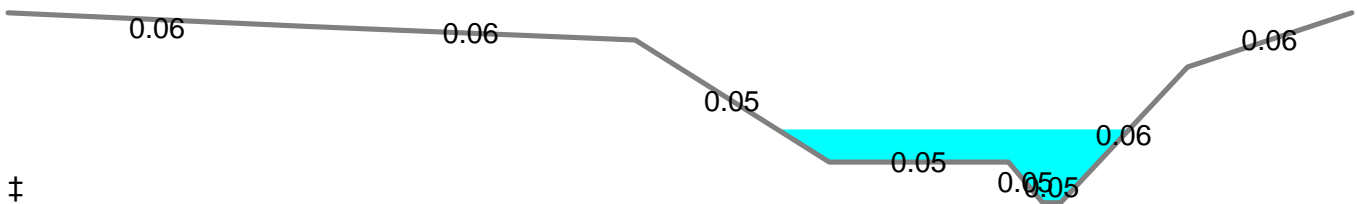
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 3.05" for 6-HR 0.24 PMF event
 Inflow = 3,357.93 cfs @ 5.96 hrs, Volume= 2,228.340 af
 Outflow = 3,270.92 cfs @ 6.44 hrs, Volume= 2,203.470 af, Atten= 3%, Lag= 29.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.69 fps, Min. Travel Time= 46.4 min
 Avg. Velocity = 1.50 fps, Avg. Travel Time= 83.5 min

Peak Storage= 9,115,220 cf @ 6.44 hrs
 Average Depth at Peak Storage= 10.80'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

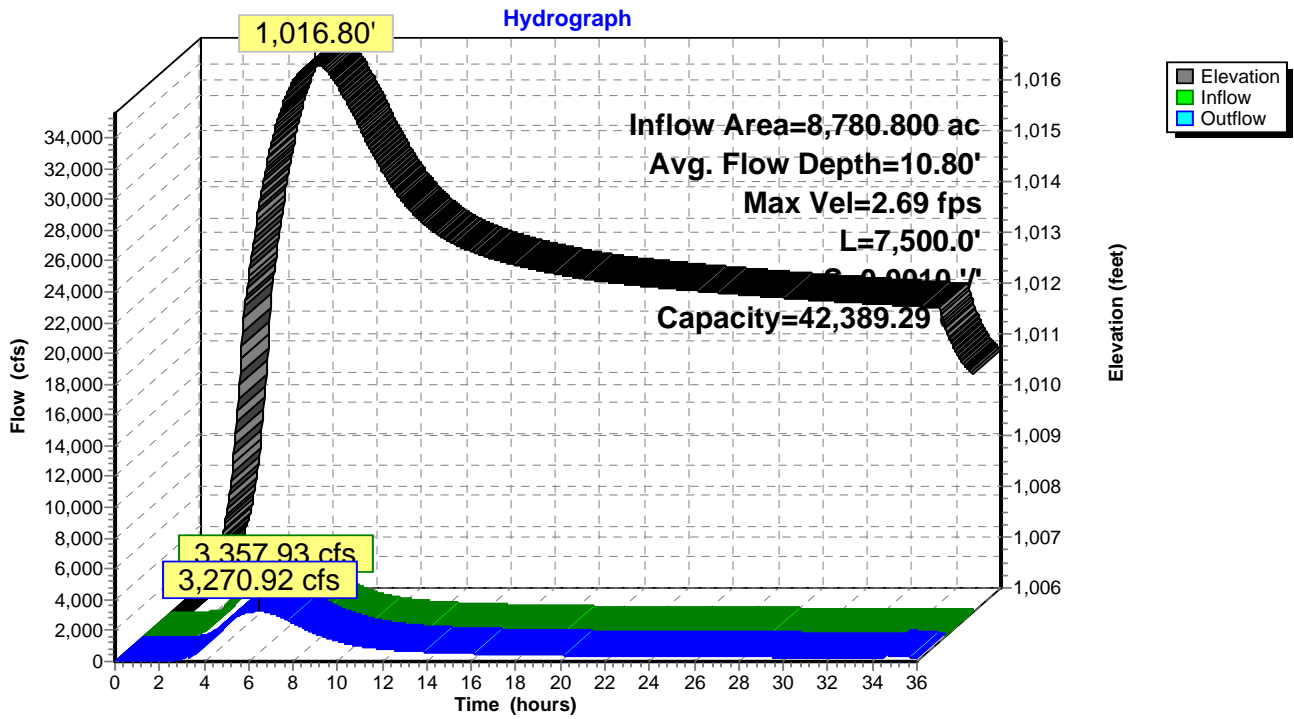
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



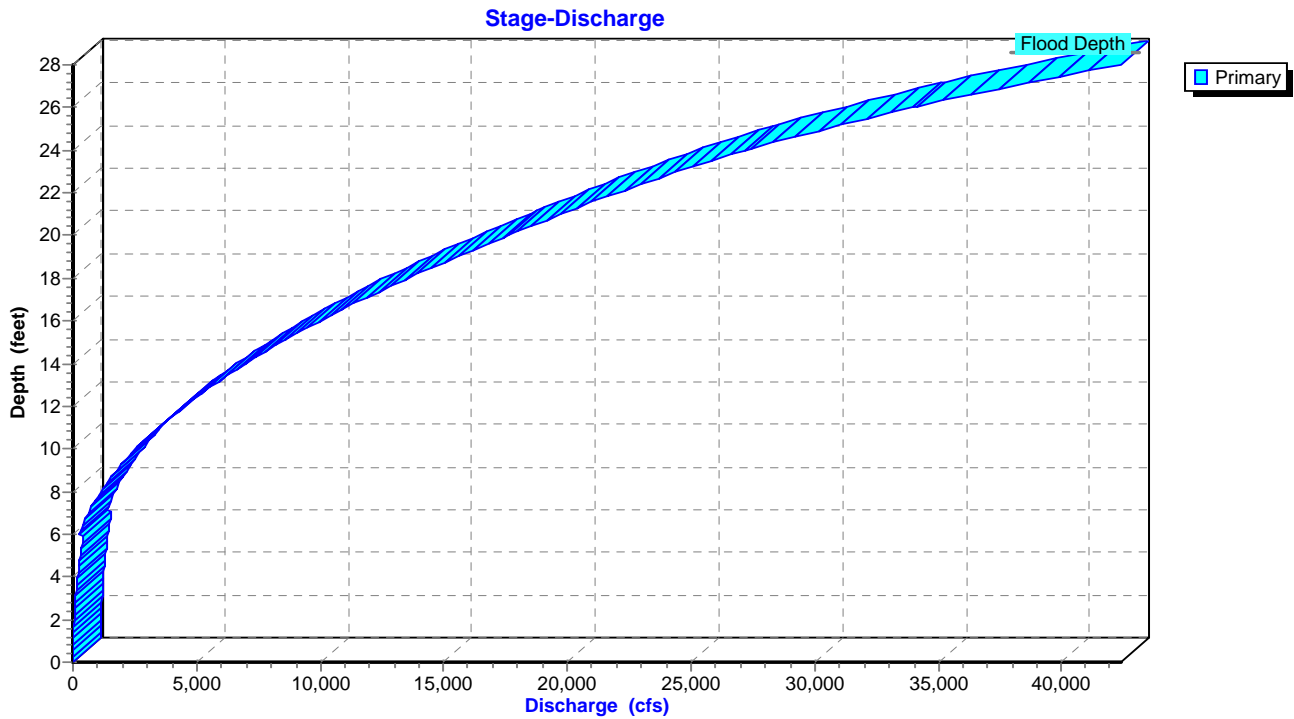
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

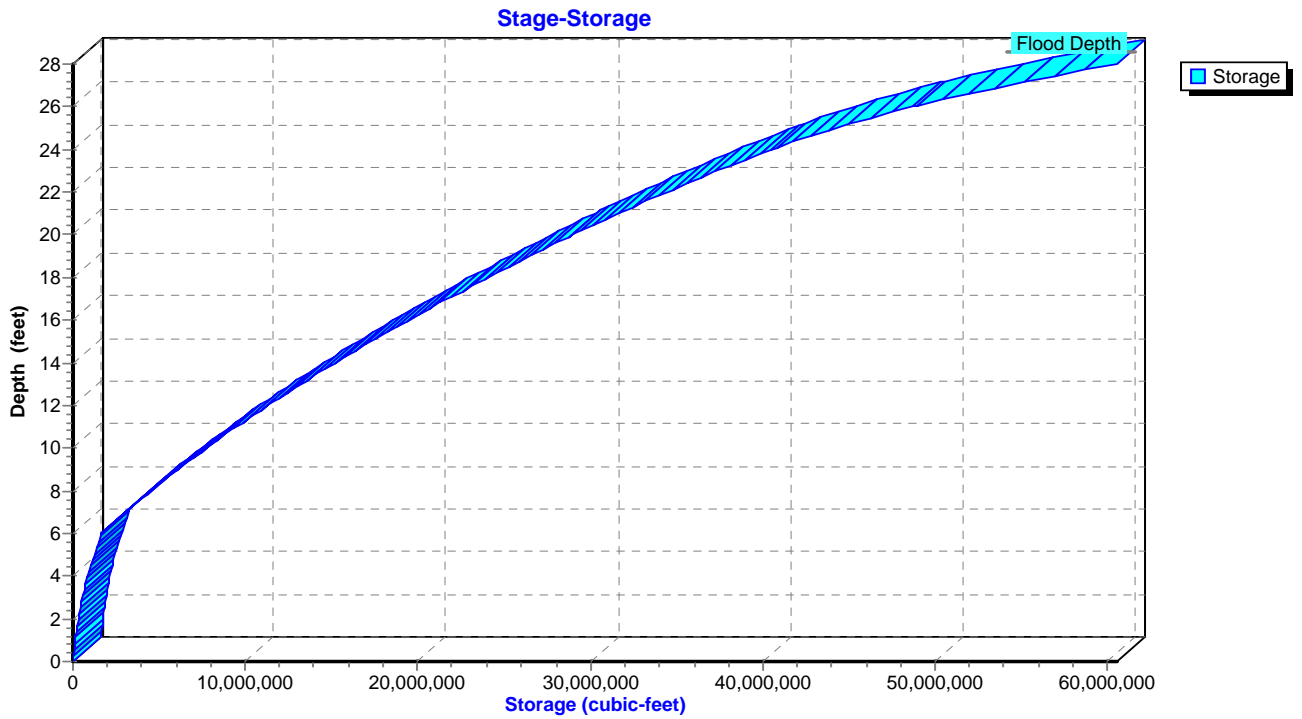
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



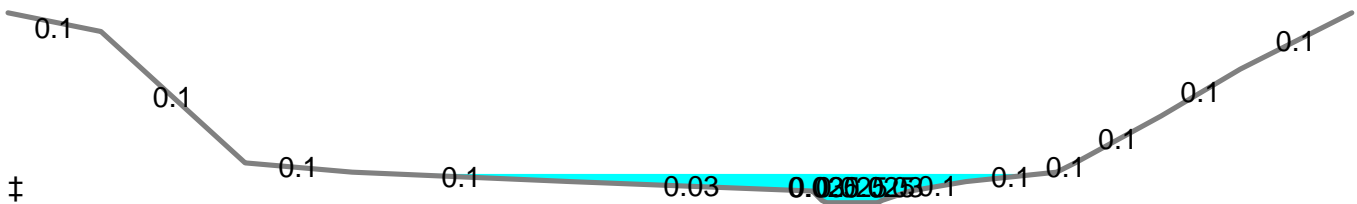
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.07" for 6-HR 0.24 PMF event
 Inflow = 3,167.76 cfs @ 7.33 hrs, Volume= 2,417.315 af
 Outflow = 3,167.75 cfs @ 7.34 hrs, Volume= 2,417.191 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.59 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.67 fps, Avg. Travel Time= 0.9 min

Peak Storage= 148,600 cf @ 7.34 hrs
 Average Depth at Peak Storage= 6.14'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

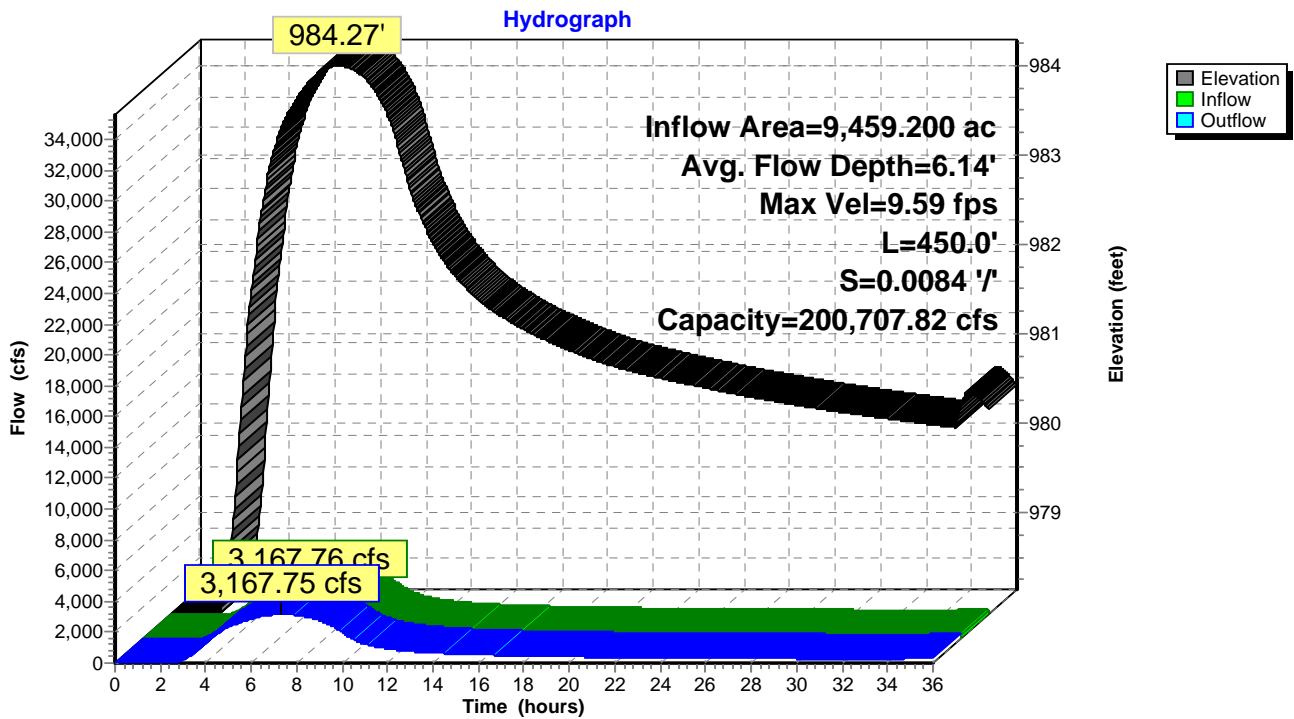
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



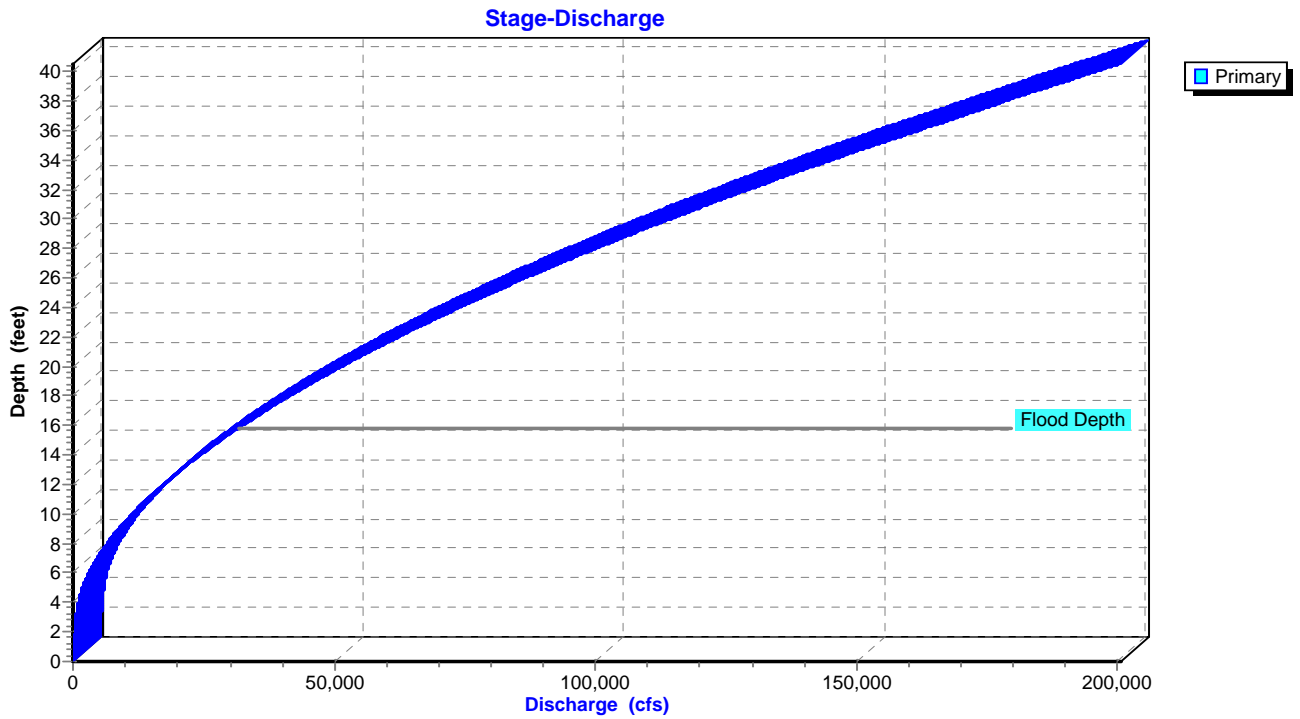
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

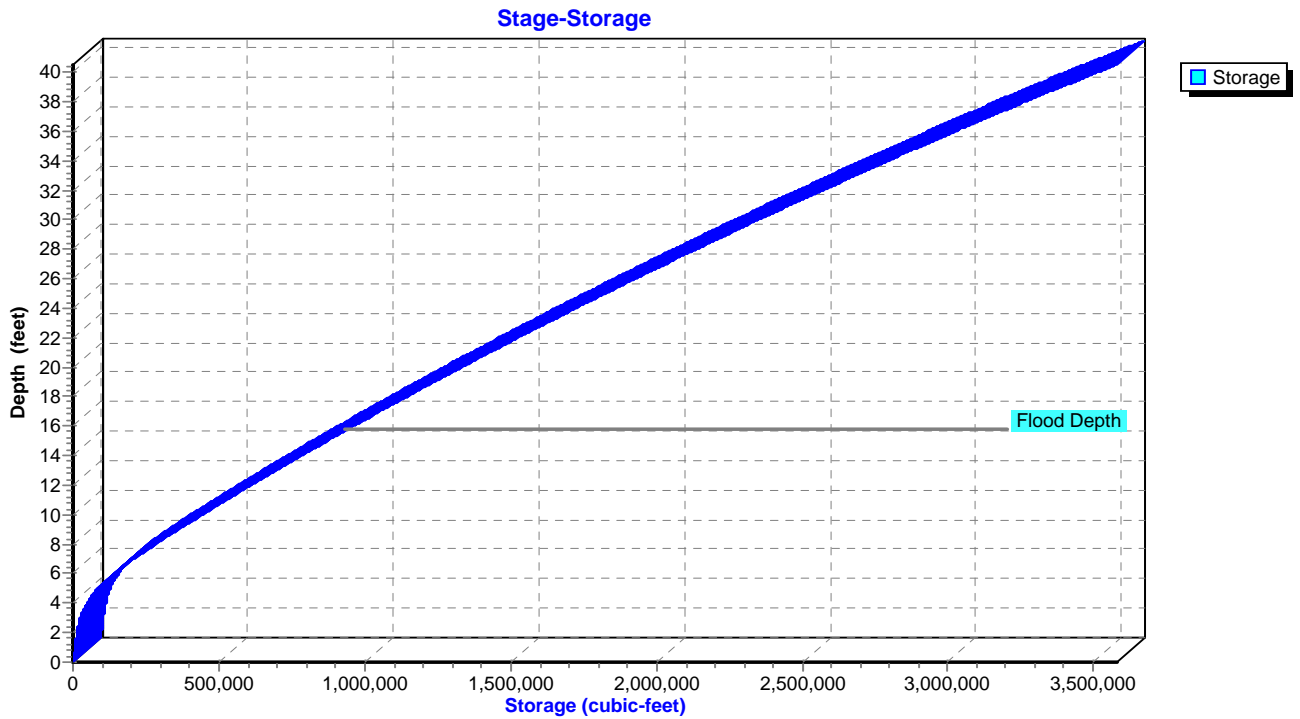
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

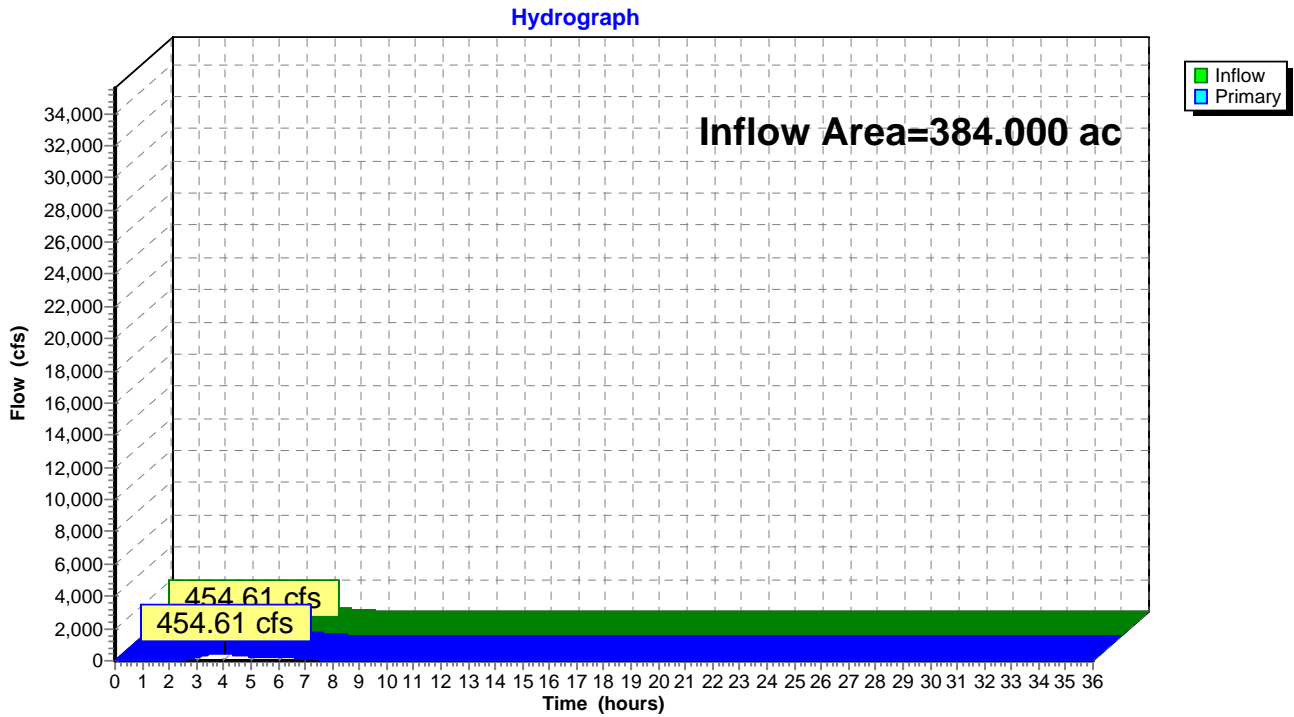


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.50" for 6-HR 0.24 PMF event
 Inflow = 454.61 cfs @ 4.03 hrs, Volume= 111.903 af
 Primary = 454.61 cfs @ 4.04 hrs, Volume= 111.903 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.08" for 6-HR 0.24 PMF event
 Inflow = 3,640.02 cfs @ 6.32 hrs, Volume= 2,431.645 af
 Outflow = 3,551.26 cfs @ 6.30 hrs, Volume= 2,418.818 af, Atten= 2%, Lag= 0.0 min
 Primary = 2,330.74 cfs @ 5.94 hrs, Volume= 1,975.065 af
 Secondary = 1,469.38 cfs @ 6.89 hrs, Volume= 443.753 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,007.72' @ 6.97 hrs Surf.Area= 20.761 ac Storage= 137.395 af (76.433 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 69.8 min calculated for 2,357.201 af (97% of inflow)
 Center-of-Mass det. time= 13.7 min (713.2 - 699.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

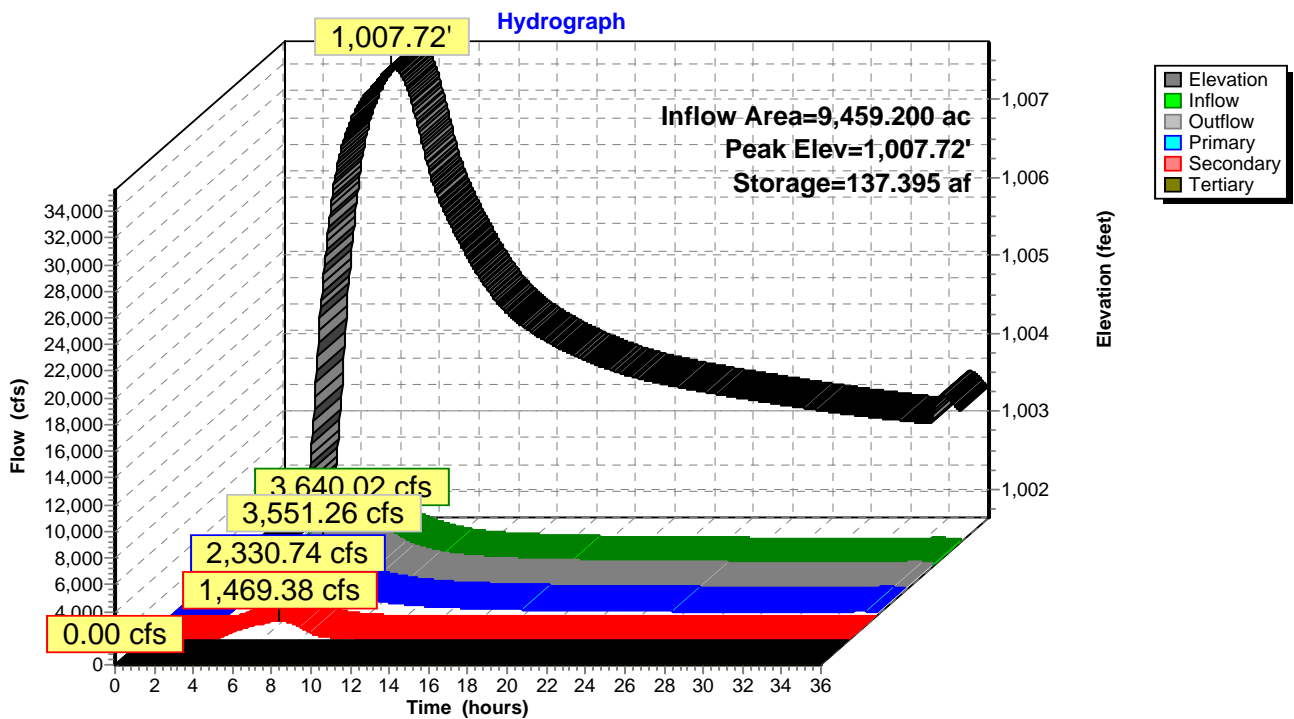
Device	Routing	Invert	Outlet Devices											
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50											
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32											
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.60 20.00											
			Width (feet) 17.00 23.00 77.00 77.00											
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80											
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00											
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)											
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00											
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00											

Primary OutFlow Max=2,329.16 cfs @ 5.94 hrs HW=1,007.46' TW=1,001.75' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 2,329.16 cfs @ 8.00 fps)

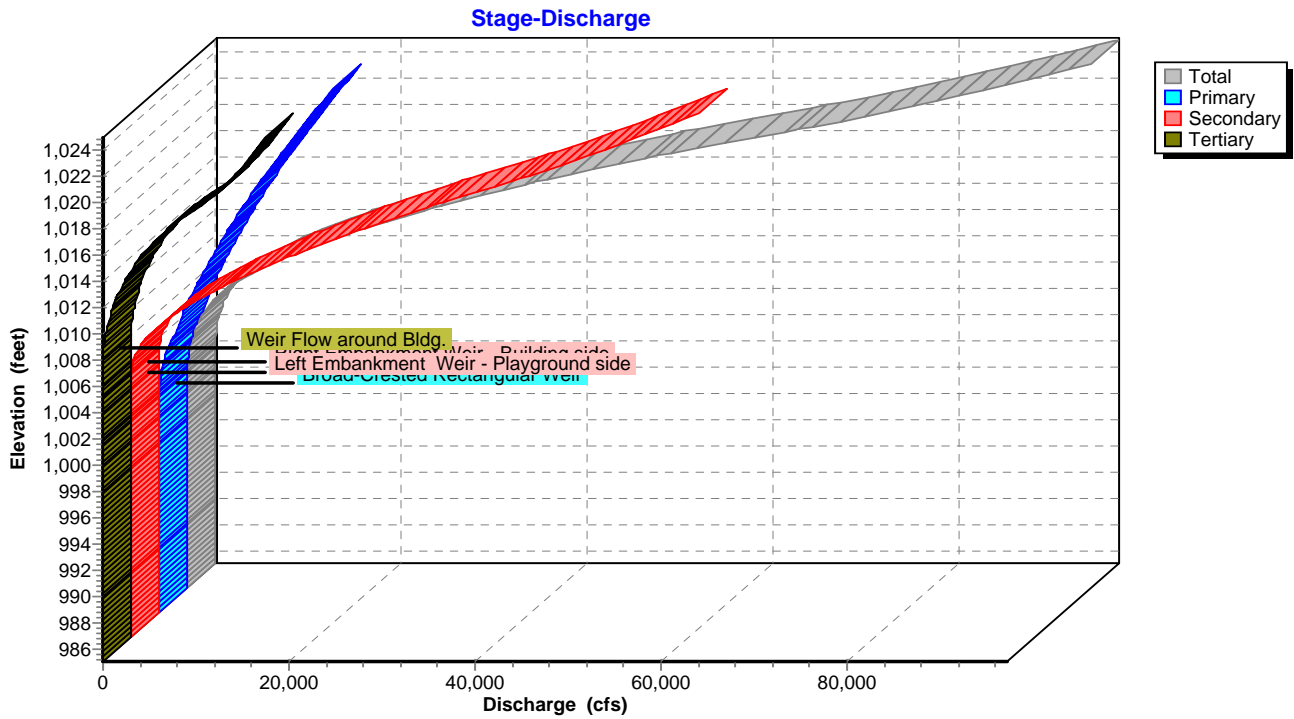
Secondary OutFlow Max=1,468.62 cfs @ 6.89 hrs HW=1,007.72' TW=1,005.33' (Dynamic Tailwater)
 ↳2=Right Embankment Weir - Building side (Weir Controls 612.50 cfs @ 4.51 fps)
 ↳3=Left Embankment Weir - Playground side (Weir Controls 856.12 cfs @ 4.69 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 ↳4=Weir Flow around Bldg. (Controls 0.00 cfs)

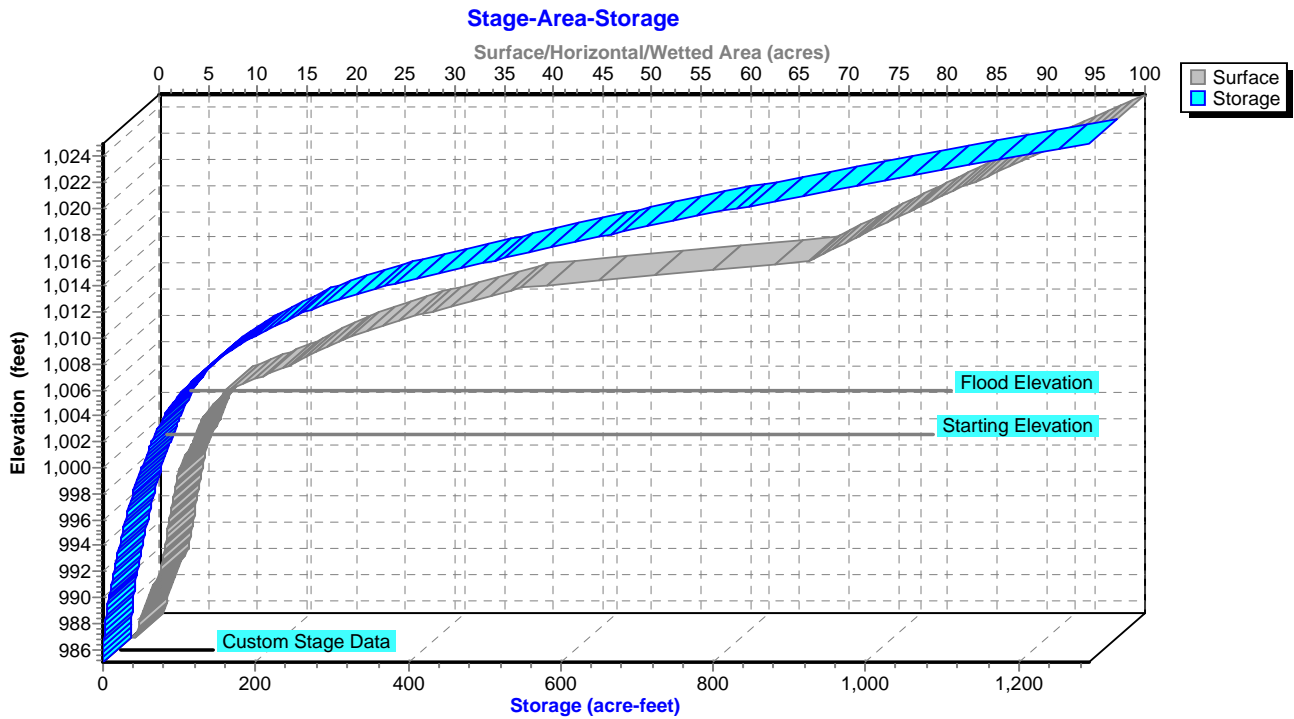
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

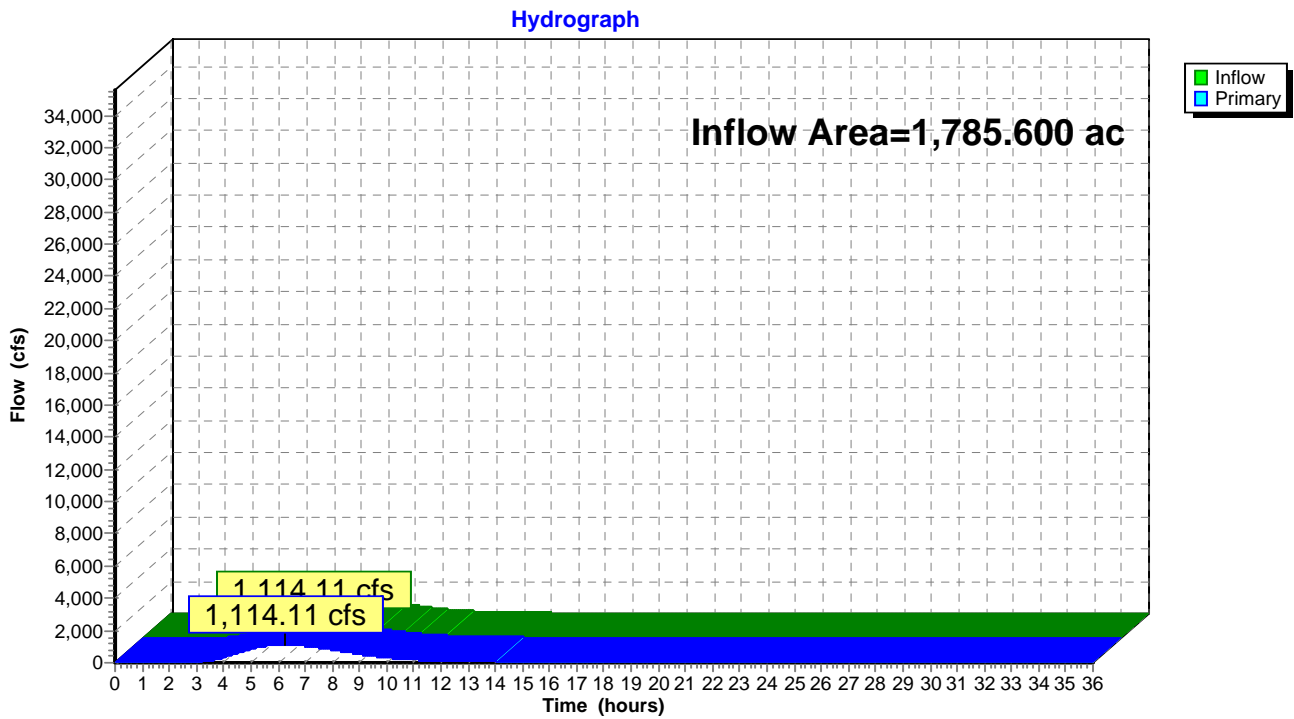


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.13" for 6-HR 0.24 PMF event
 Inflow = 1,114.11 cfs @ 6.28 hrs, Volume= 466.124 af
 Primary = 1,114.11 cfs @ 6.29 hrs, Volume= 466.124 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.13" for 6-HR 0.24 PMF event
 Inflow = 1,114.11 cfs @ 6.29 hrs, Volume= 466.123 af
 Outflow = 366.70 cfs @ 9.69 hrs, Volume= 667.375 af, Atten= 67%, Lag= 204.0 min
 Primary = 366.70 cfs @ 9.69 hrs, Volume= 667.375 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,098.22' @ 9.69 hrs Surf.Area= 249.545 ac Storage= 2,105.661 af (191.661 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 485.4 min (945.7 - 460.2)

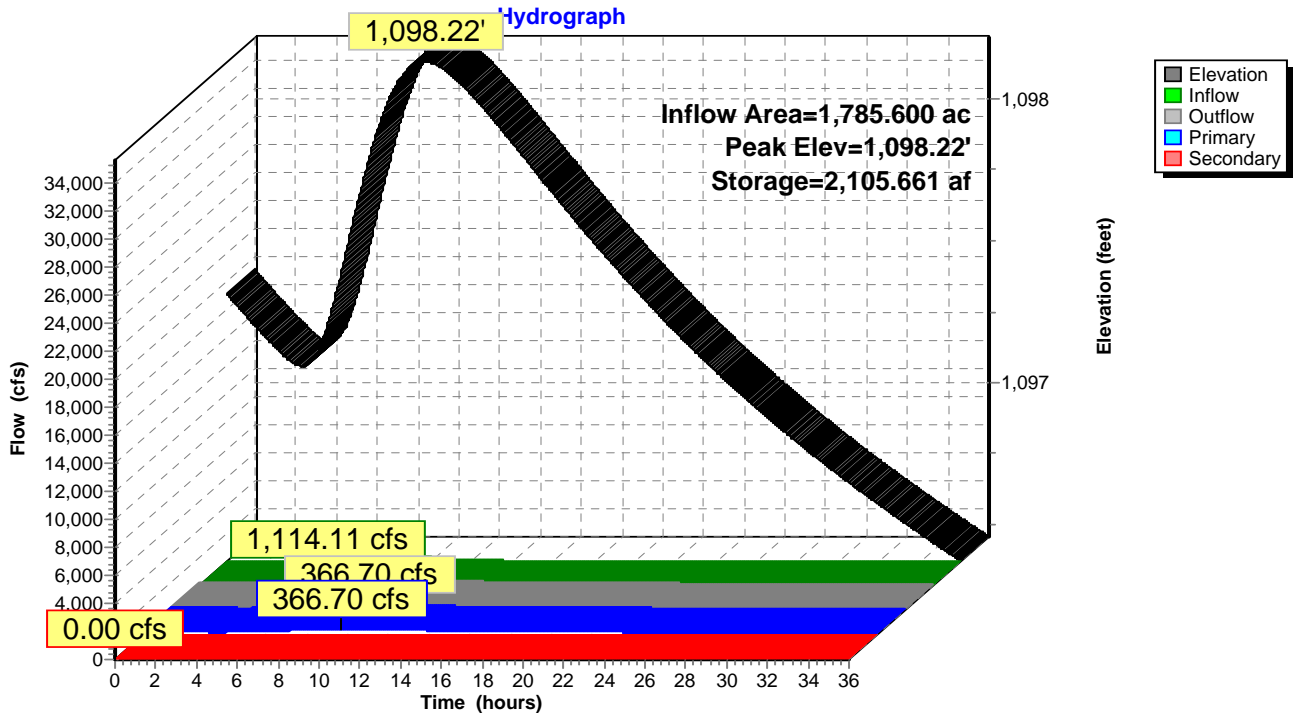
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

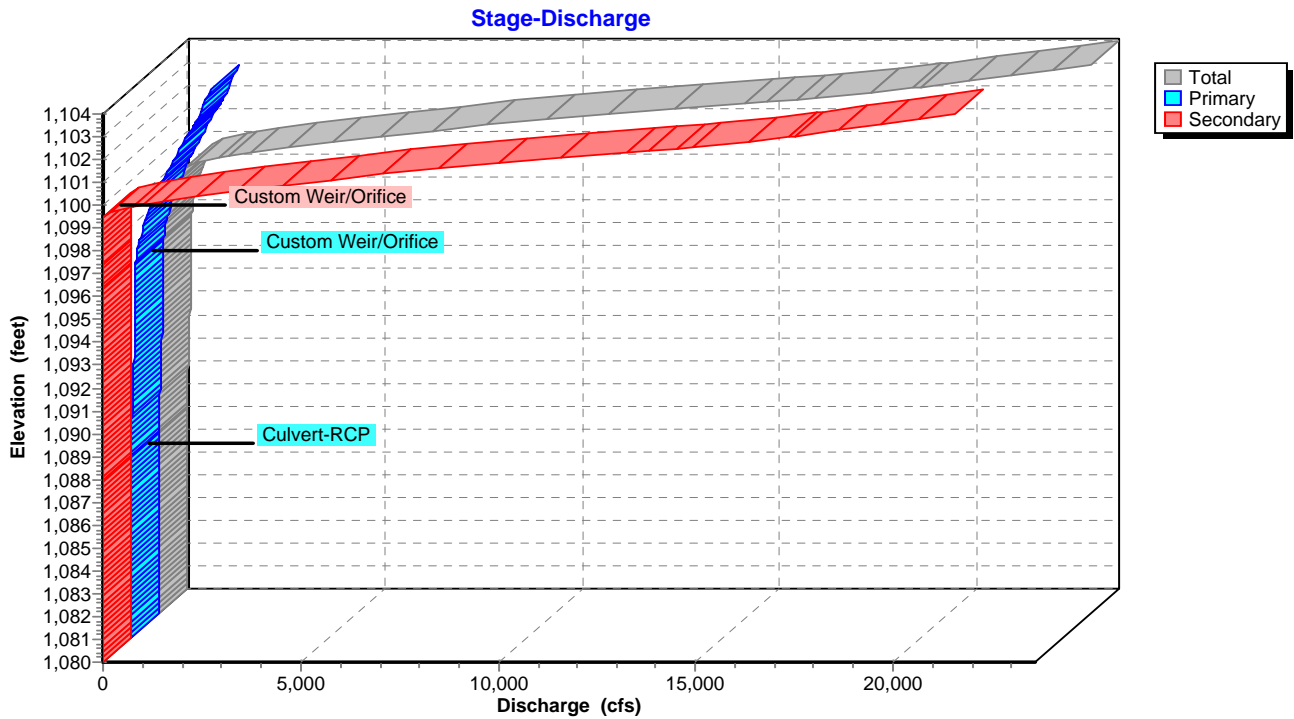
Primary OutFlow Max=366.70 cfs @ 9.69 hrs HW=1,098.22' TW=1,072.12' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 126.18 cfs @ 17.85 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 240.51 cfs @ 4.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

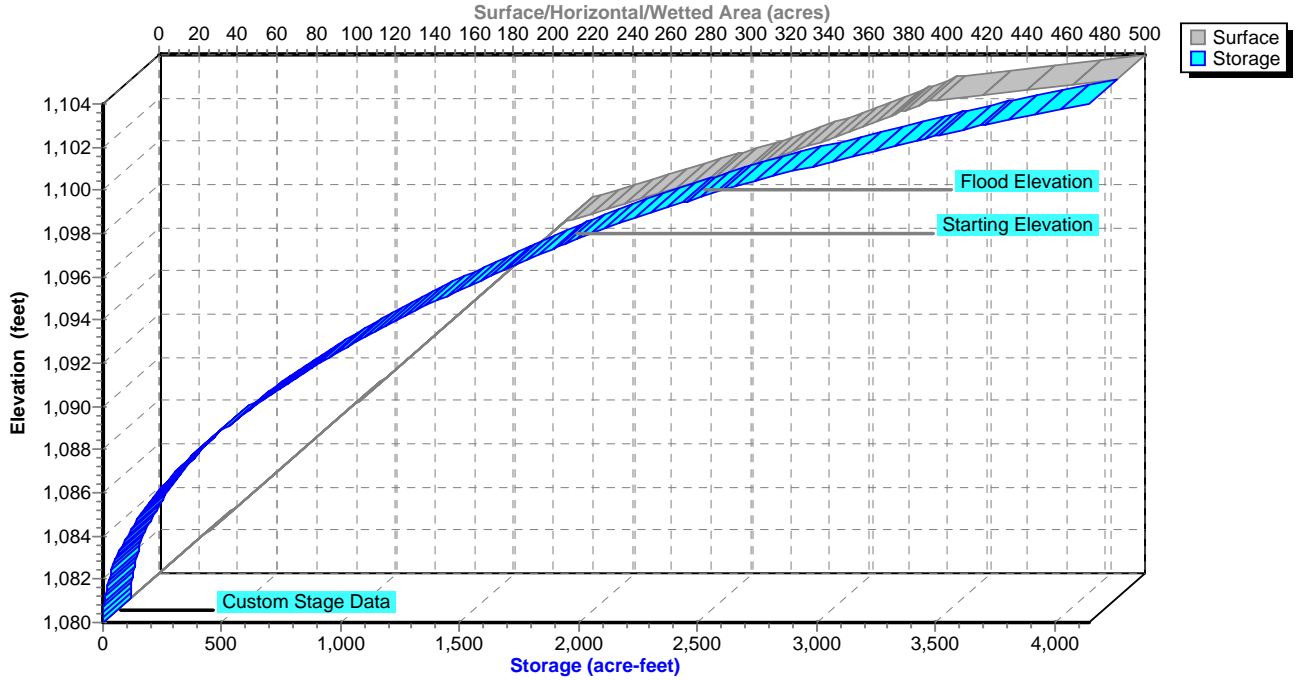


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



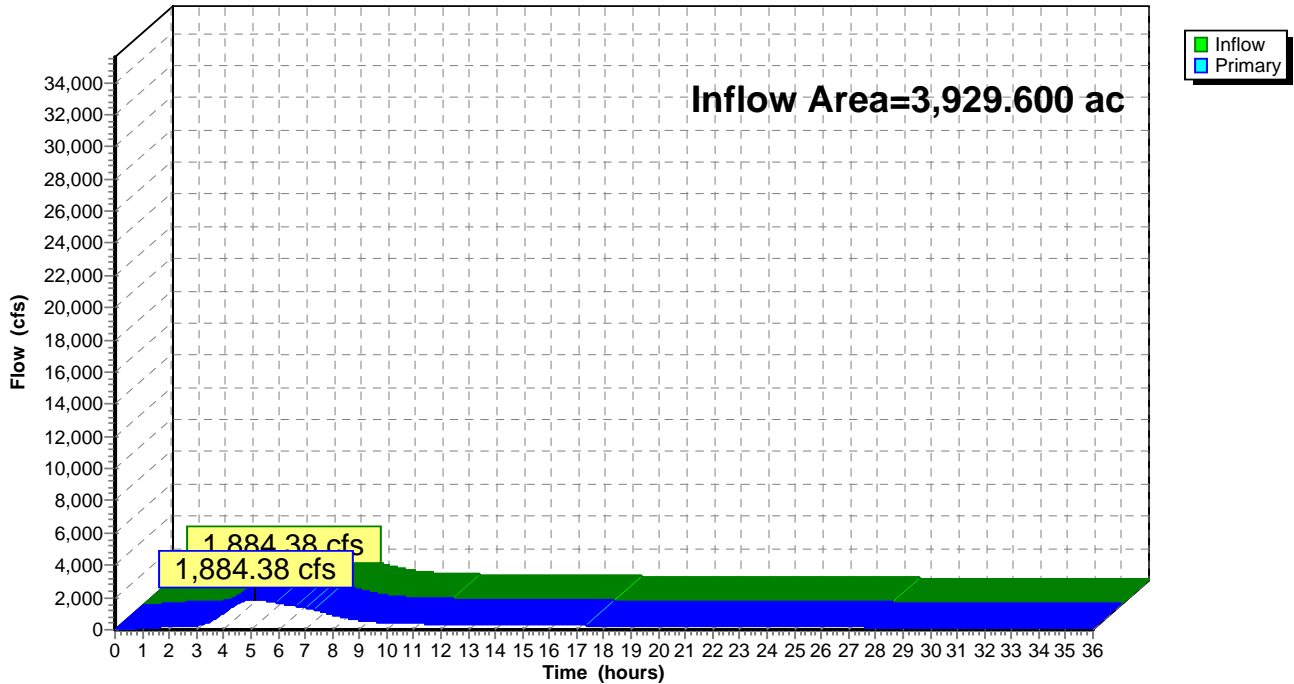
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.57" for 6-HR 0.24 PMF event
Inflow = 1,884.38 cfs @ 5.12 hrs, Volume= 1,169.859 af
Primary = 1,884.38 cfs @ 5.13 hrs, Volume= 1,169.859 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.50" for 6-HR 0.24 PMF event
 Inflow = 454.61 cfs @ 4.04 hrs, Volume= 111.902 af
 Outflow = 183.00 cfs @ 6.47 hrs, Volume= 111.396 af, Atten= 60%, Lag= 146.1 min
 Primary = 183.00 cfs @ 6.47 hrs, Volume= 111.396 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,108.02' @ 6.47 hrs Surf.Area= 29.242 ac Storage= 81.034 af (56.734 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 402.9 min calculated for 87.096 af (78% of inflow)
 Center-of-Mass det. time= 262.6 min (578.0 - 315.4)

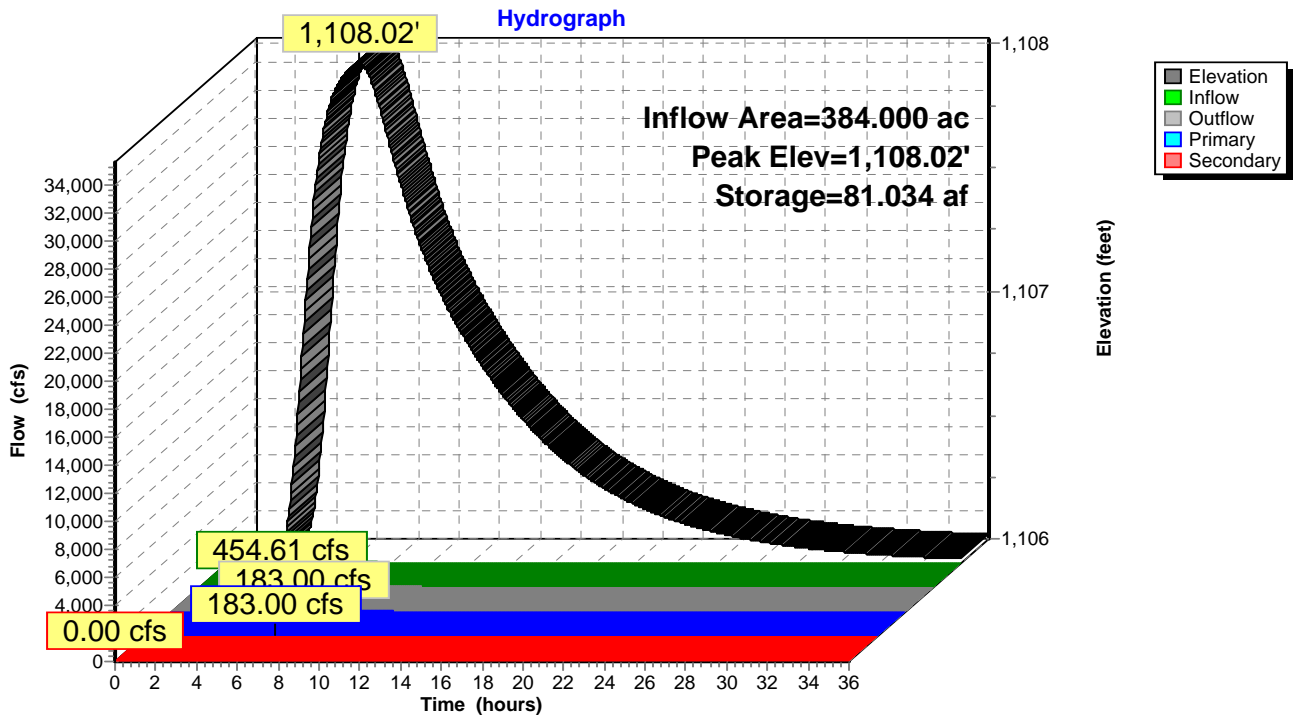
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

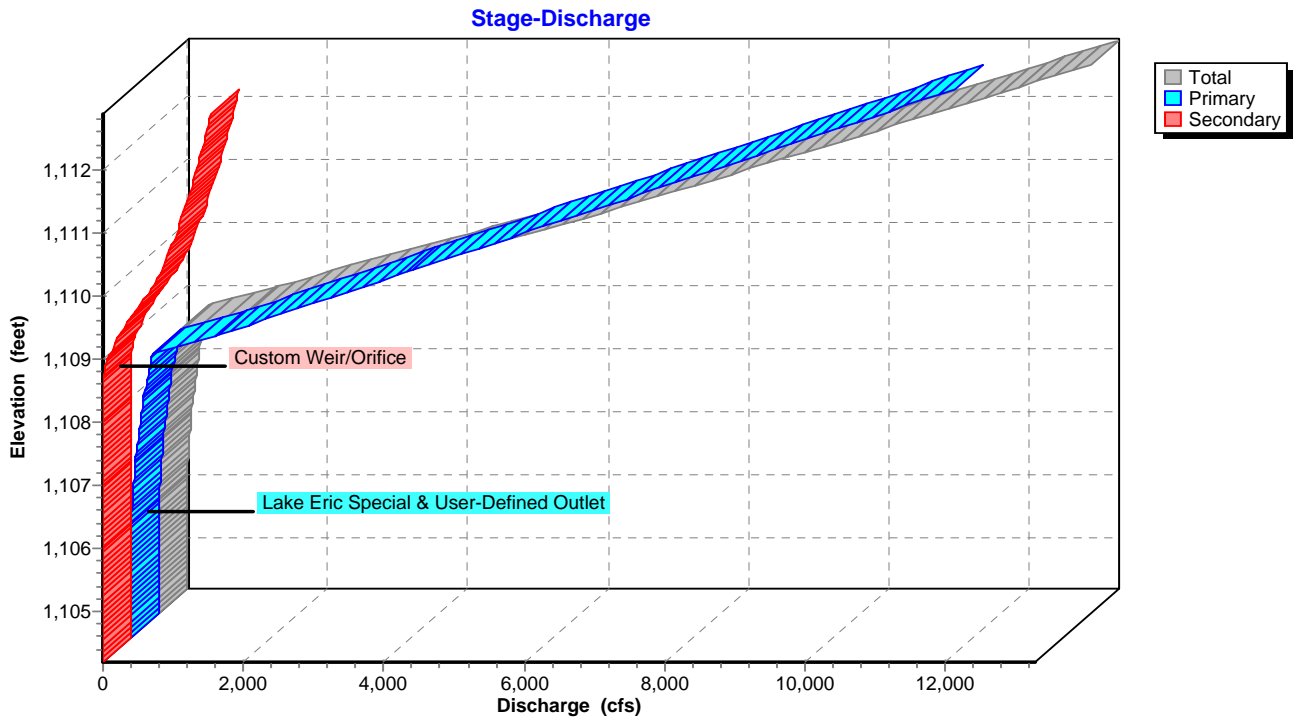
Primary OutFlow Max=183.00 cfs @ 6.47 hrs HW=1,108.02' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 183.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

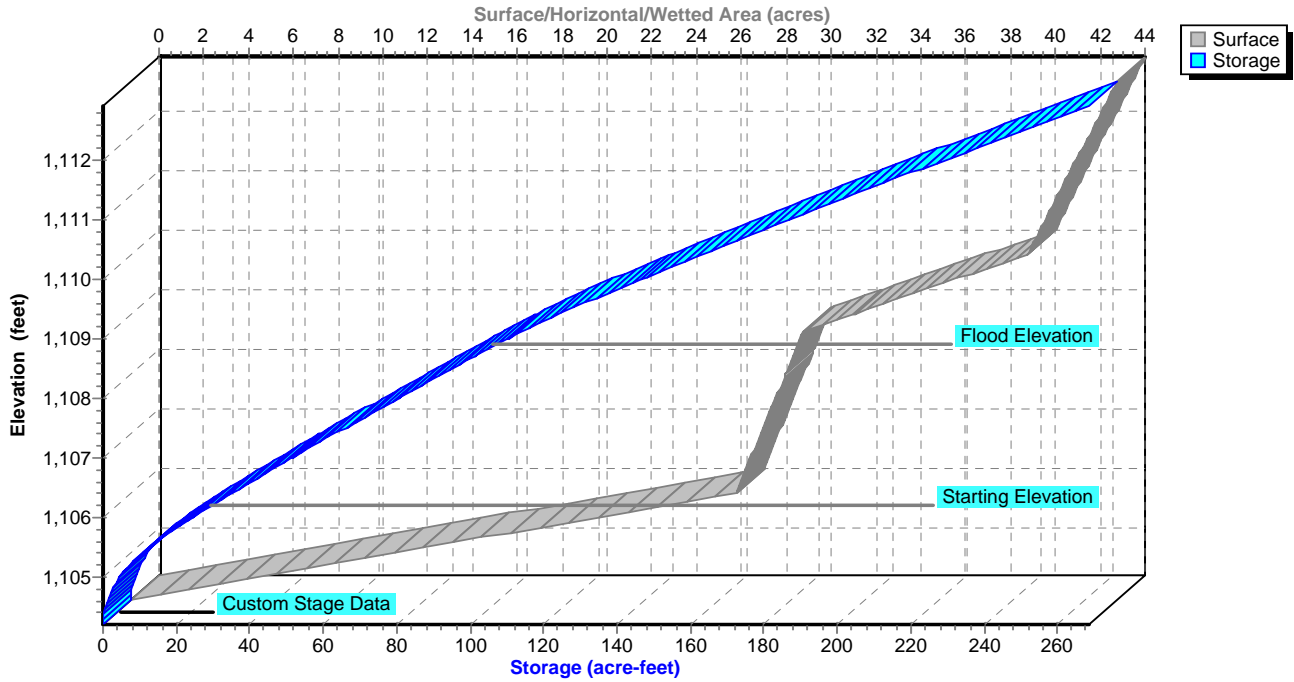


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



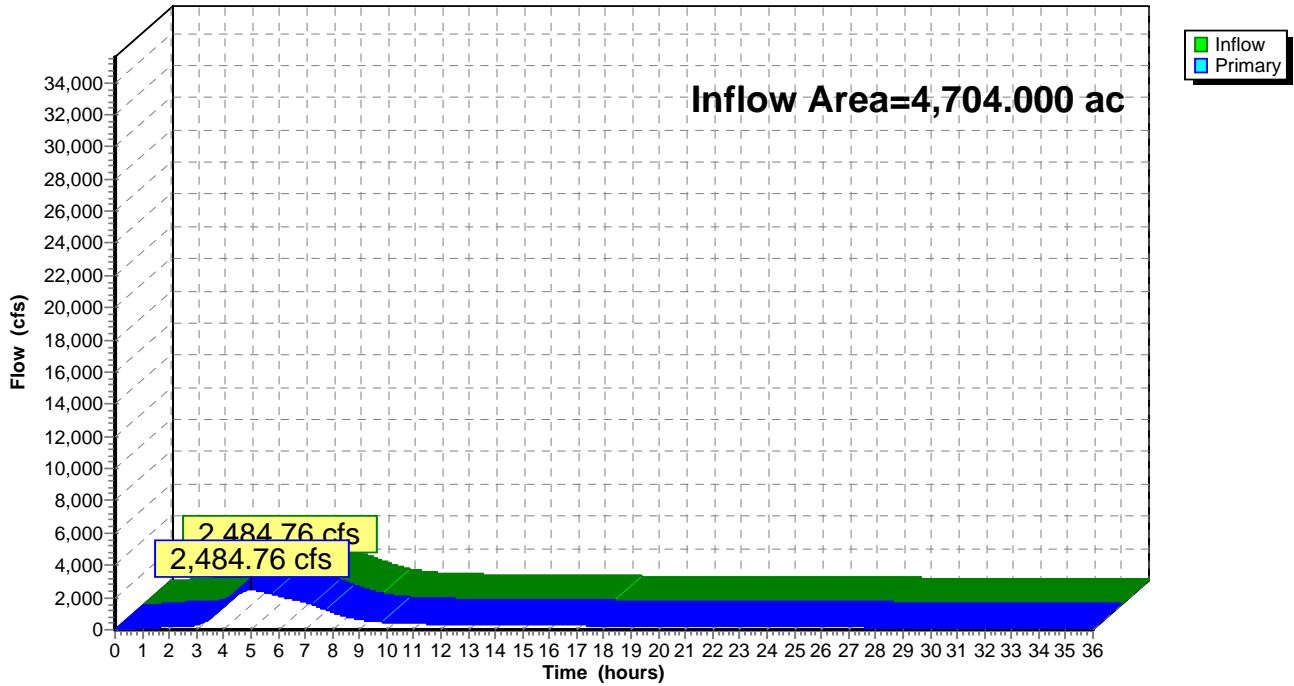
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 3.44" for 6-HR 0.24 PMF event
Inflow = 2,484.76 cfs @ 5.01 hrs, Volume= 1,347.279 af
Primary = 2,484.76 cfs @ 5.02 hrs, Volume= 1,347.279 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 3.43" for 6-HR 0.24 PMF event
 Inflow = 181.35 cfs @ 3.37 hrs, Volume= 32.930 af
 Outflow = 113.30 cfs @ 4.10 hrs, Volume= 32.819 af, Atten= 38%, Lag= 43.6 min
 Primary = 105.68 cfs @ 4.10 hrs, Volume= 32.554 af
 Secondary = 7.62 cfs @ 4.10 hrs, Volume= 0.265 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.07' @ 4.10 hrs Surf.Area= 4.227 ac Storage= 27.781 af (14.091 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 342.3 min calculated for 19.123 af (58% of inflow)
 Center-of-Mass det. time= 176.4 min (426.4 - 250.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)

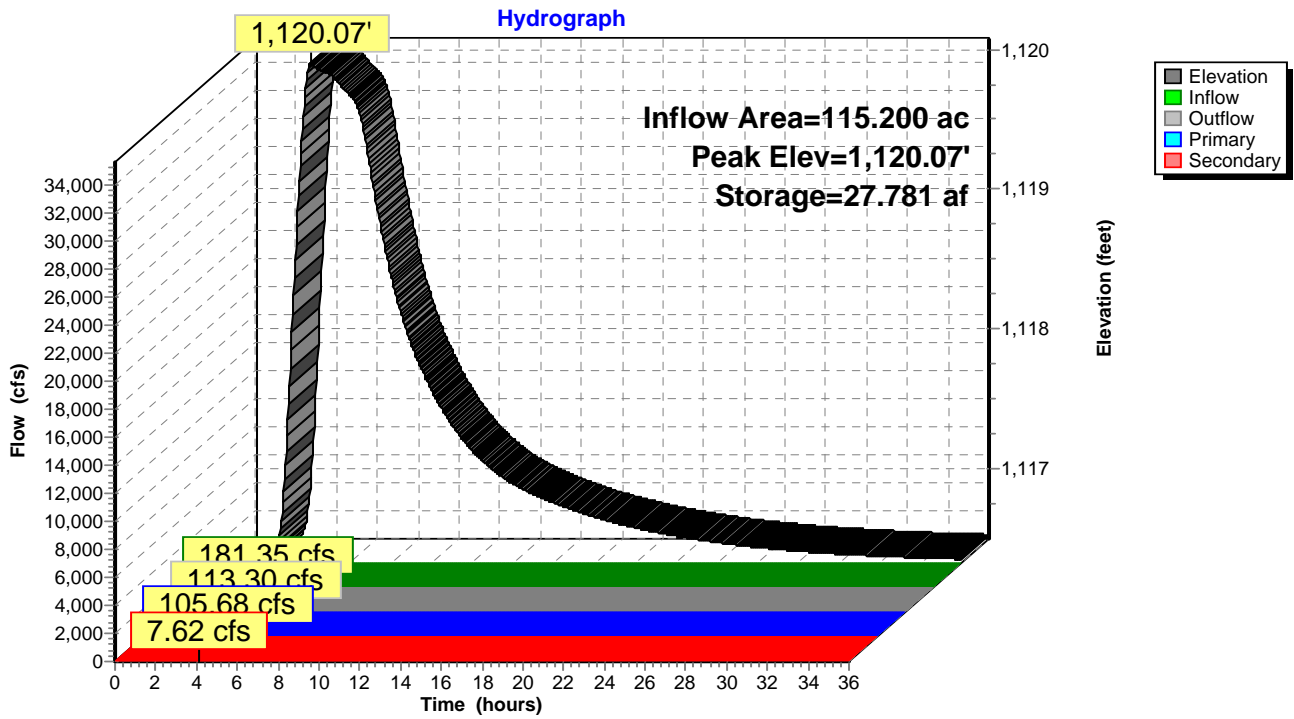
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

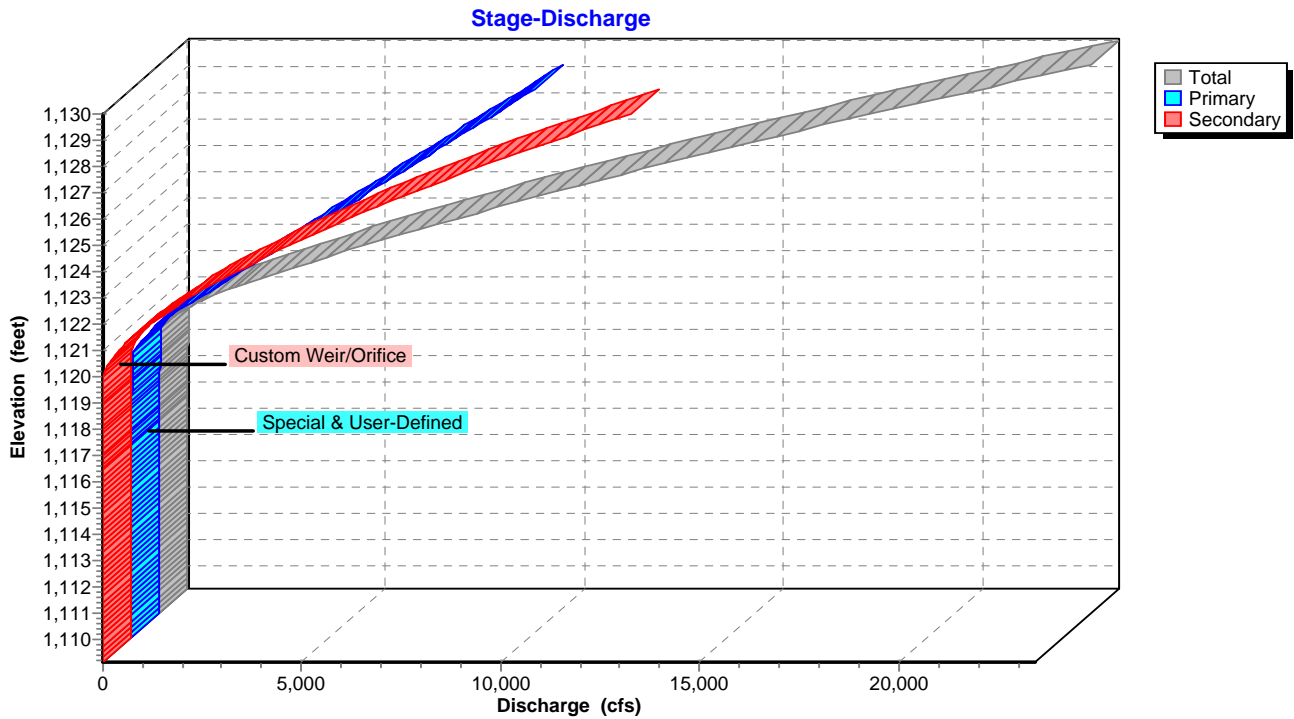
Primary OutFlow Max=105.66 cfs @ 4.10 hrs HW=1,120.07' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 105.66 cfs)

Secondary OutFlow Max=7.62 cfs @ 4.10 hrs HW=1,120.07' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 7.62 cfs @ 0.74 fps)

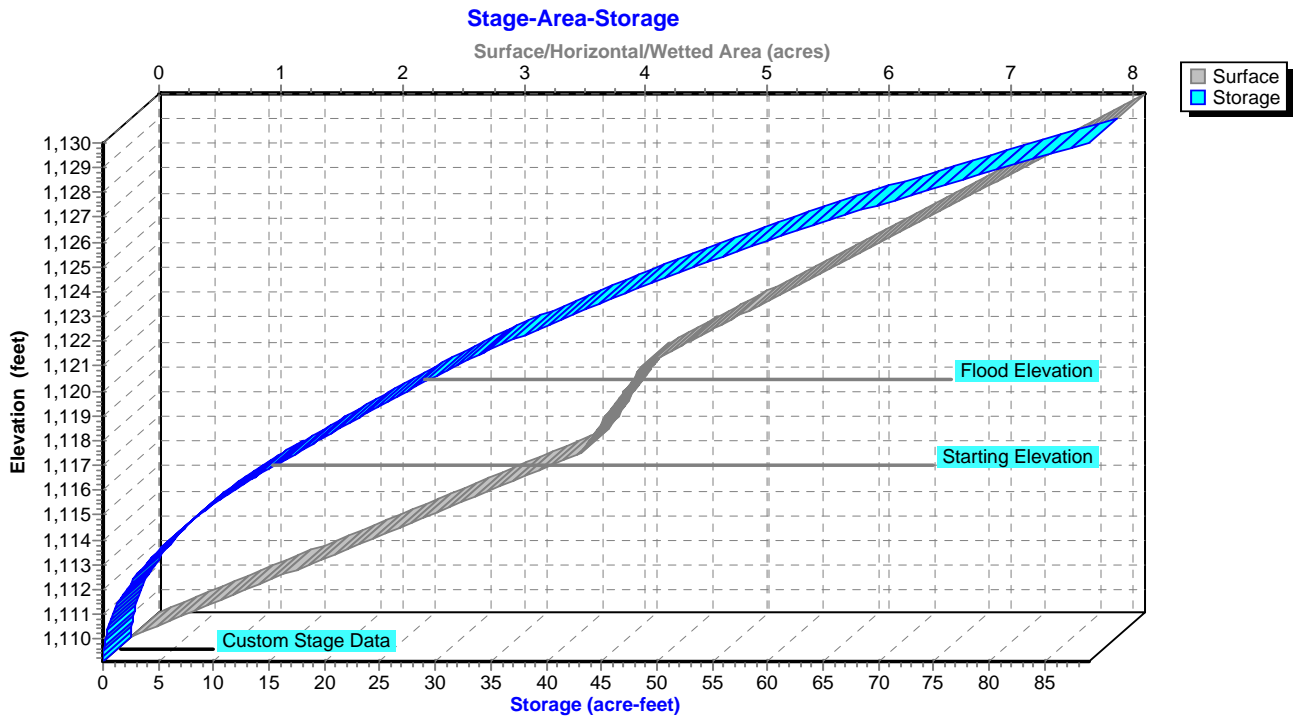
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



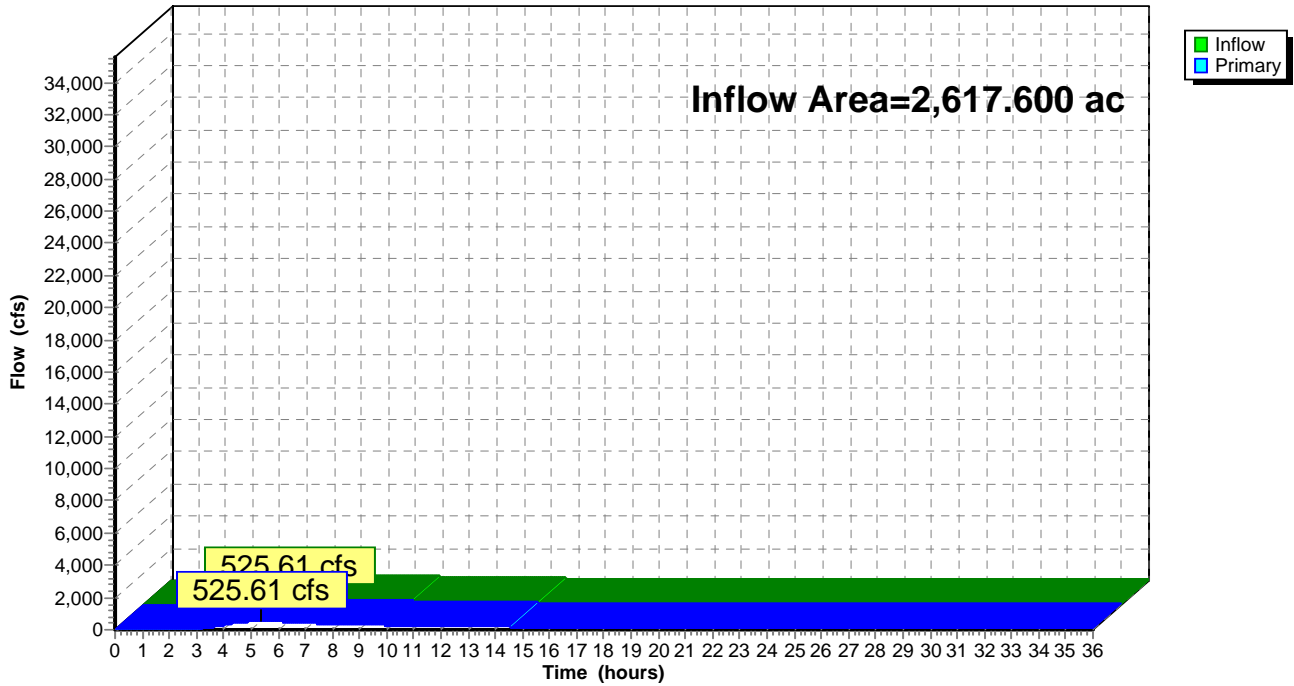
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 2.25" for 6-HR 0.24 PMF event
Inflow = 525.61 cfs @ 5.39 hrs, Volume= 491.036 af
Primary = 525.61 cfs @ 5.40 hrs, Volume= 491.036 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

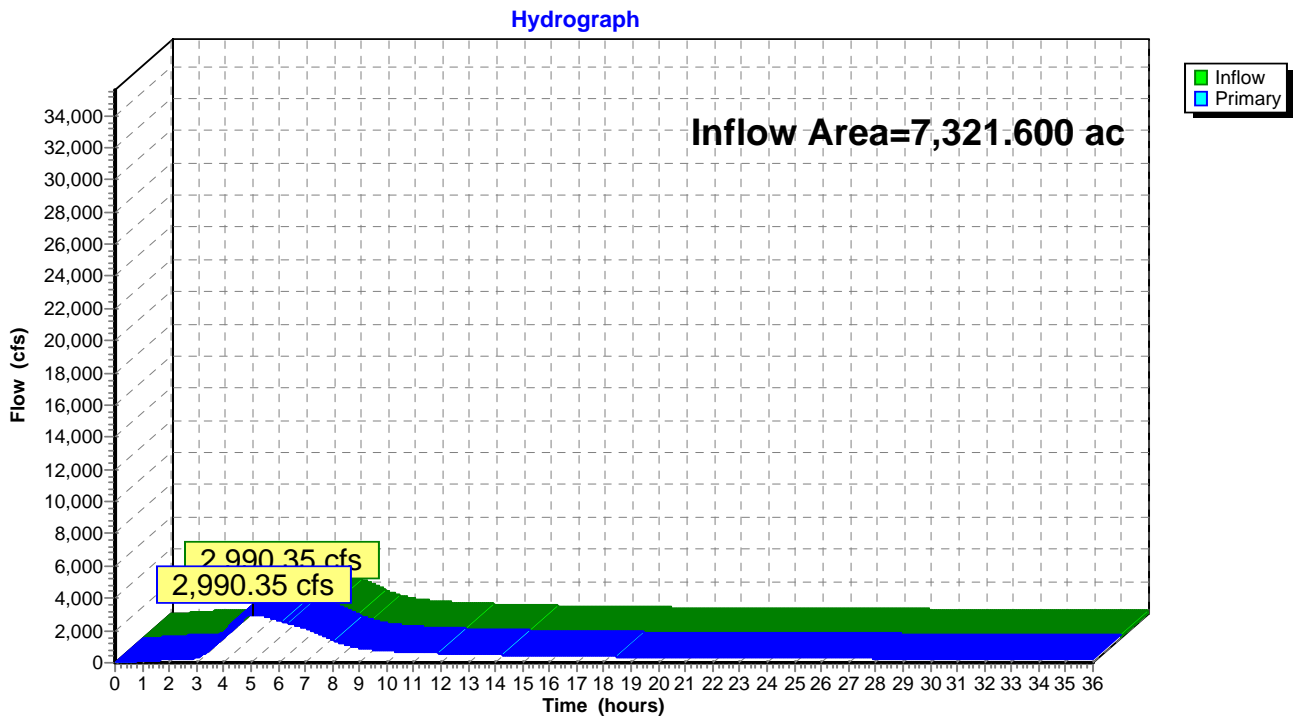


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 3.01" for 6-HR 0.24 PMF event
 Inflow = 2,990.35 cfs @ 5.05 hrs, Volume= 1,838.132 af
 Primary = 2,990.35 cfs @ 5.06 hrs, Volume= 1,838.132 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



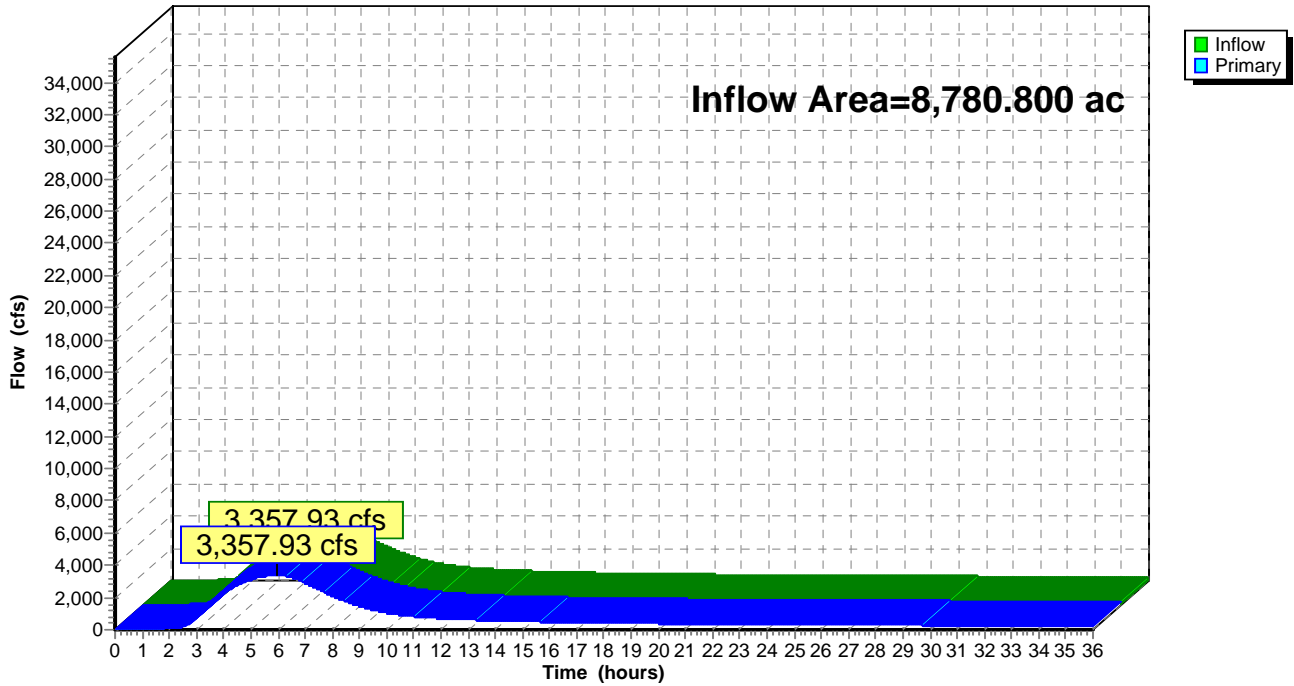
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 3.05" for 6-HR 0.24 PMF event
Inflow = 3,357.93 cfs @ 5.95 hrs, Volume= 2,228.528 af
Primary = 3,357.93 cfs @ 5.96 hrs, Volume= 2,228.528 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.96" for 6-HR 0.24 PMF event
 Inflow = 1,530.85 cfs @ 6.01 hrs, Volume= 485.228 af
 Outflow = 247.65 cfs @ 10.32 hrs, Volume= 342.305 af, Atten= 84%, Lag= 258.3 min
 Primary = 127.09 cfs @ 8.22 hrs, Volume= 290.388 af
 Secondary = 132.70 cfs @ 10.33 hrs, Volume= 51.917 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.44' @ 10.33 hrs Surf.Area= 149.645 ac Storage= 371.494 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 750.0 min calculated for 342.210 af (71% of inflow)
 Center-of-Mass det. time= 677.4 min (1,134.6 - 457.1)

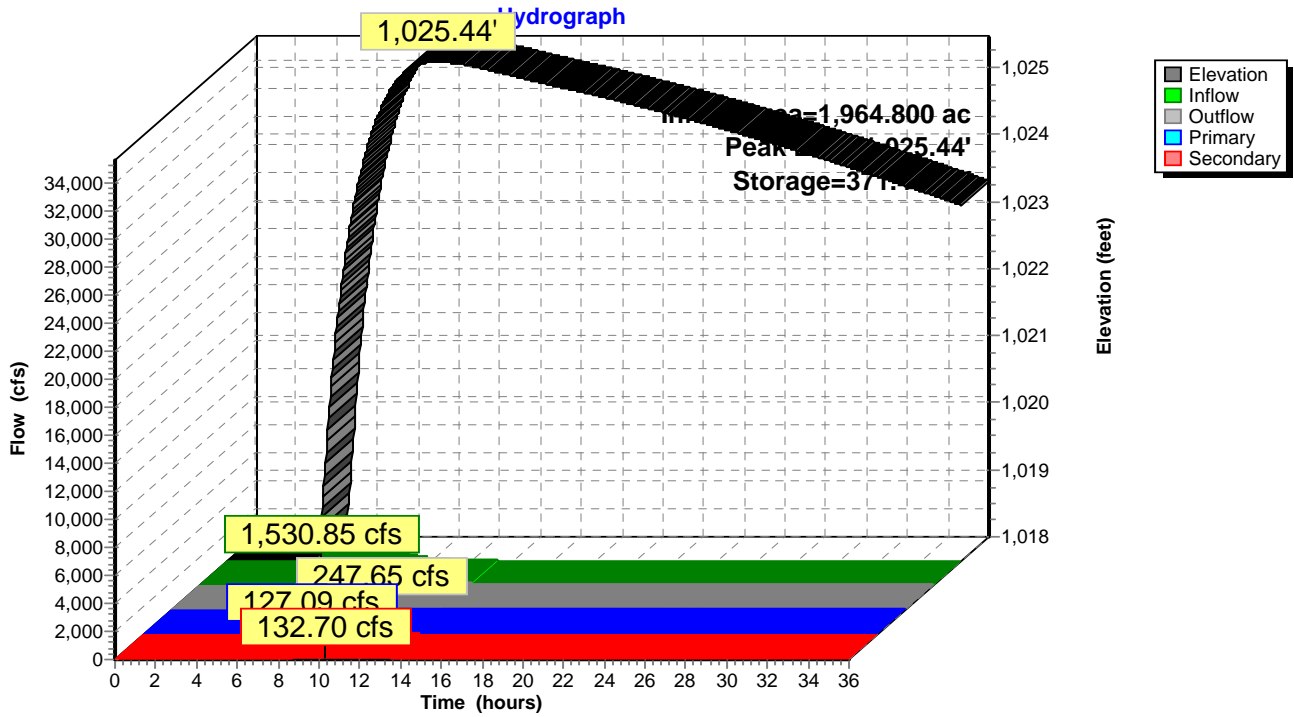
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

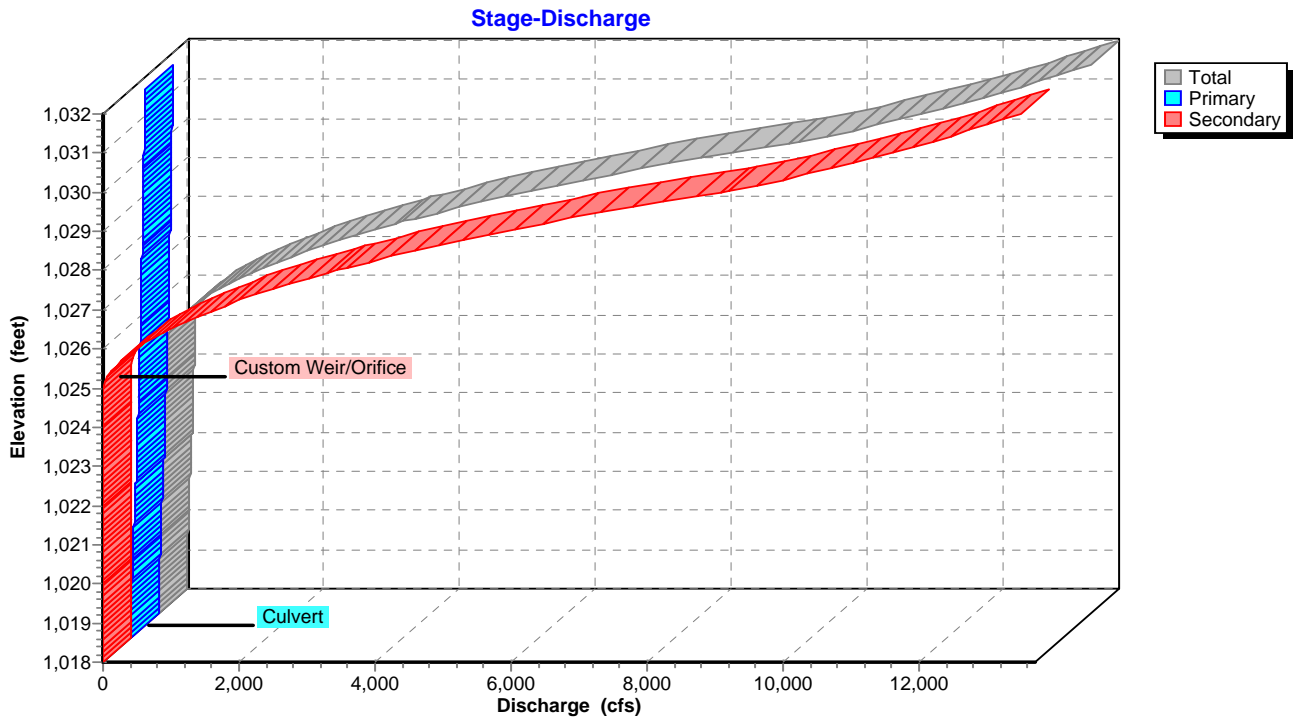
Primary OutFlow Max=126.97 cfs @ 8.22 hrs HW=1,025.13' TW=1,020.72' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 126.97 cfs @ 10.10 fps)

Secondary OutFlow Max=132.70 cfs @ 10.33 hrs HW=1,025.44' TW=1,021.84' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 132.70 cfs @ 2.14 fps)

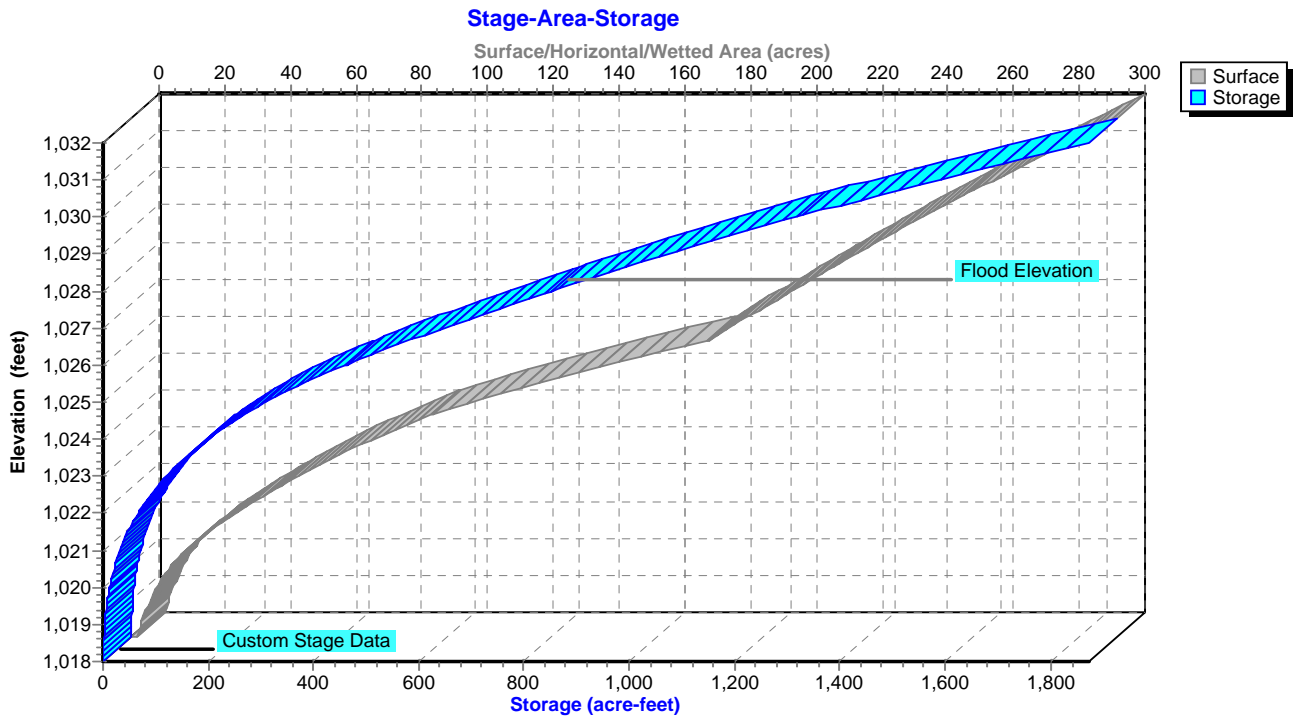
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 3.53" for 6-HR 0.24 PMF event
 Inflow = 1,886.34 cfs @ 5.03 hrs, Volume= 578.067 af
 Outflow = 1,530.85 cfs @ 6.01 hrs, Volume= 485.229 af, Atten= 19%, Lag= 59.3 min
 Primary = 1,530.85 cfs @ 6.01 hrs, Volume= 485.229 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.19' @ 6.01 hrs Surf.Area= 105.130 ac Storage= 431.369 af (211.369 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 272.1 min calculated for 265.229 af (46% of inflow)
 Center-of-Mass det. time= 104.3 min (457.1 - 352.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

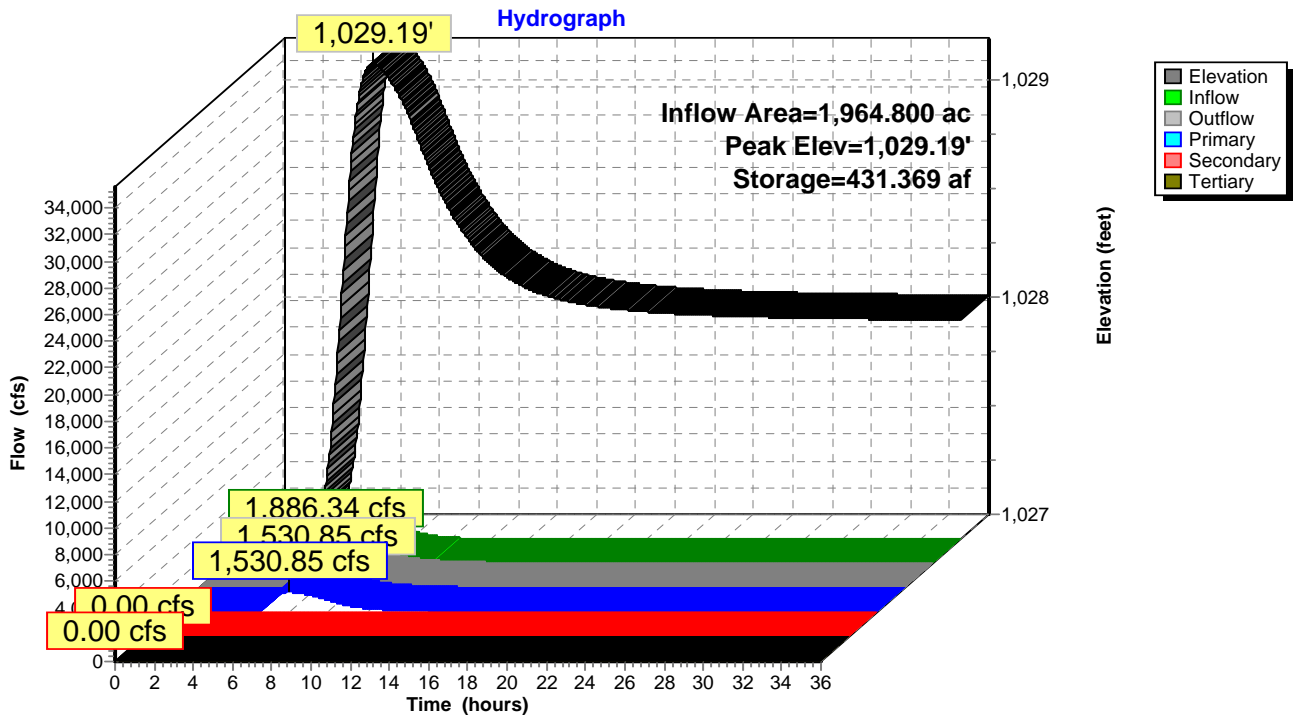
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,530.84 cfs @ 6.01 hrs HW=1,029.19' TW=1,022.95' (Dynamic Tailwater)
 ↳1=**Broad-Crested Rectangular Weir** (Weir Controls 1,026.45 cfs @ 2.88 fps)
 ↳2=**Broad-Crested Rectangular Weir** (Weir Controls 504.40 cfs @ 2.22 fps)

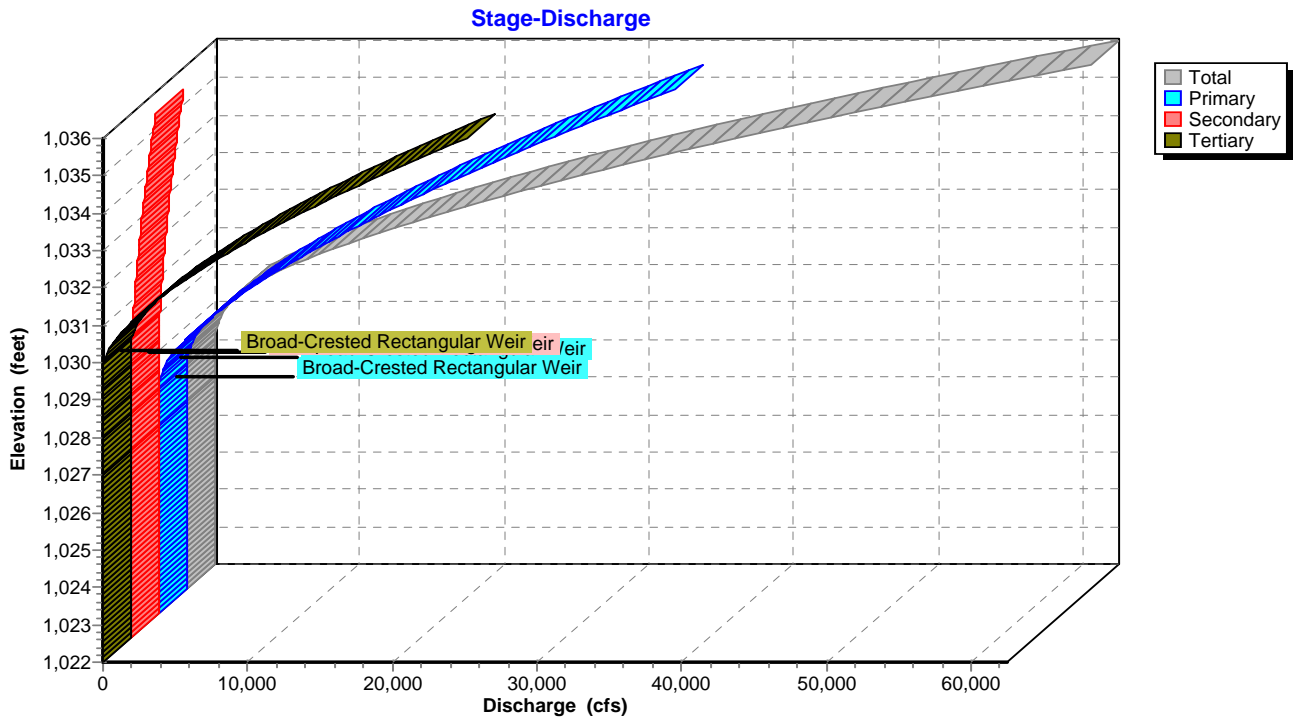
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↳4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

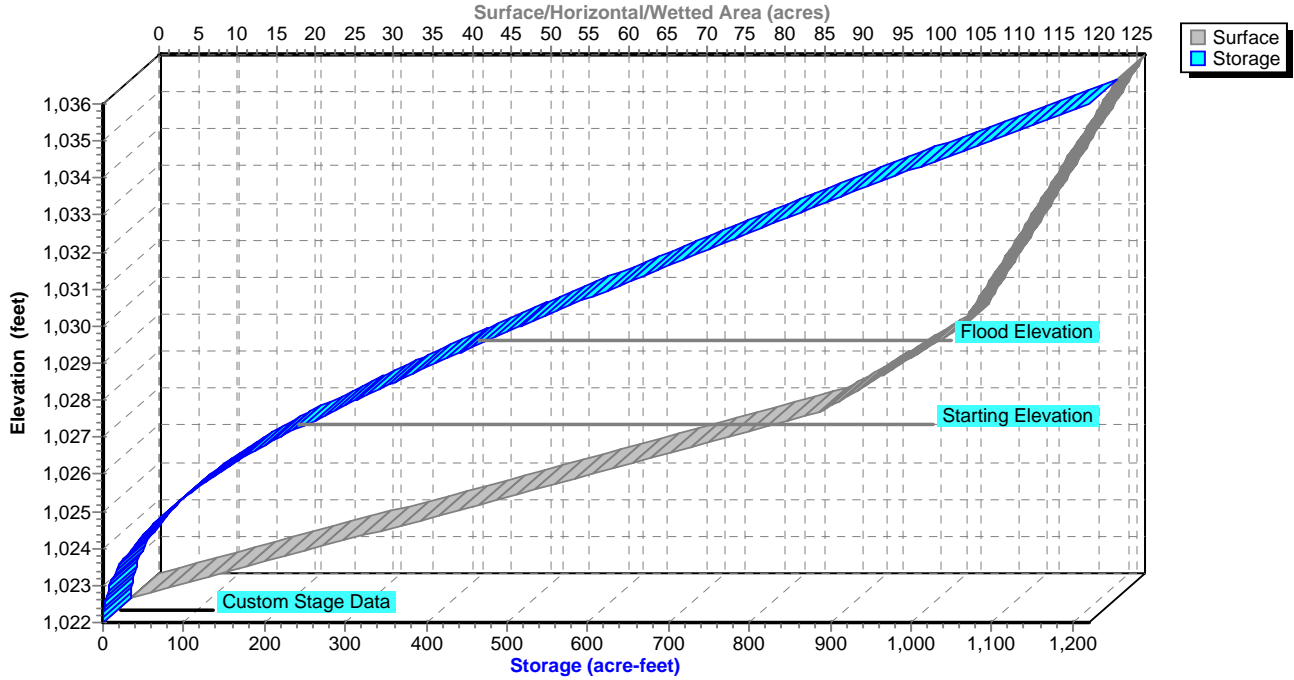


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

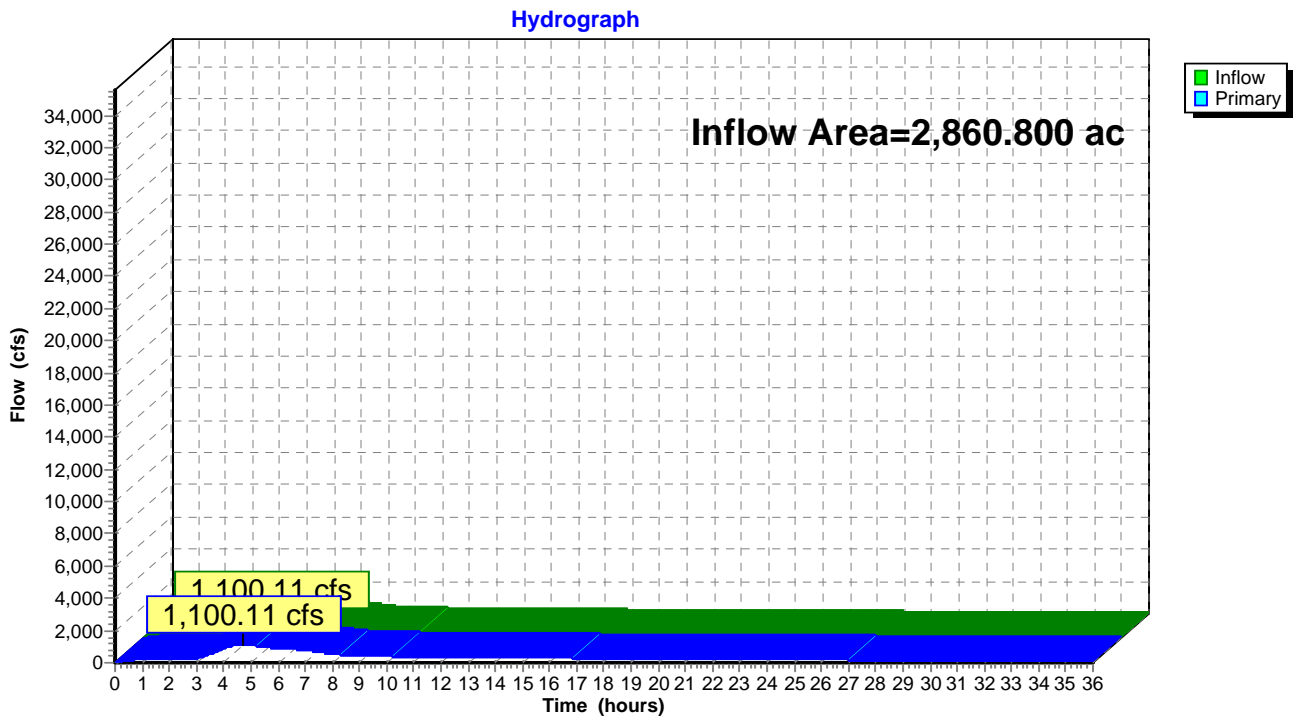


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.85" for 6-HR 0.24 PMF event
 Inflow = 1,100.11 cfs @ 4.69 hrs, Volume= 916.814 af
 Primary = 1,100.11 cfs @ 4.70 hrs, Volume= 916.814 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.07" for 6-HR 0.24 PMF event
 Inflow = 3,551.26 cfs @ 6.30 hrs, Volume= 2,418.578 af
 Outflow = 3,167.76 cfs @ 7.33 hrs, Volume= 2,417.560 af, Atten= 11%, Lag= 61.6 min
 Primary = 3,167.76 cfs @ 7.33 hrs, Volume= 2,417.560 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,005.75' @ 7.33 hrs Surf.Area= 12.353 ac Storage= 167.887 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 19.7 min calculated for 2,417.560 af (100% of inflow)
 Center-of-Mass det. time= 19.1 min (732.2 - 713.1)

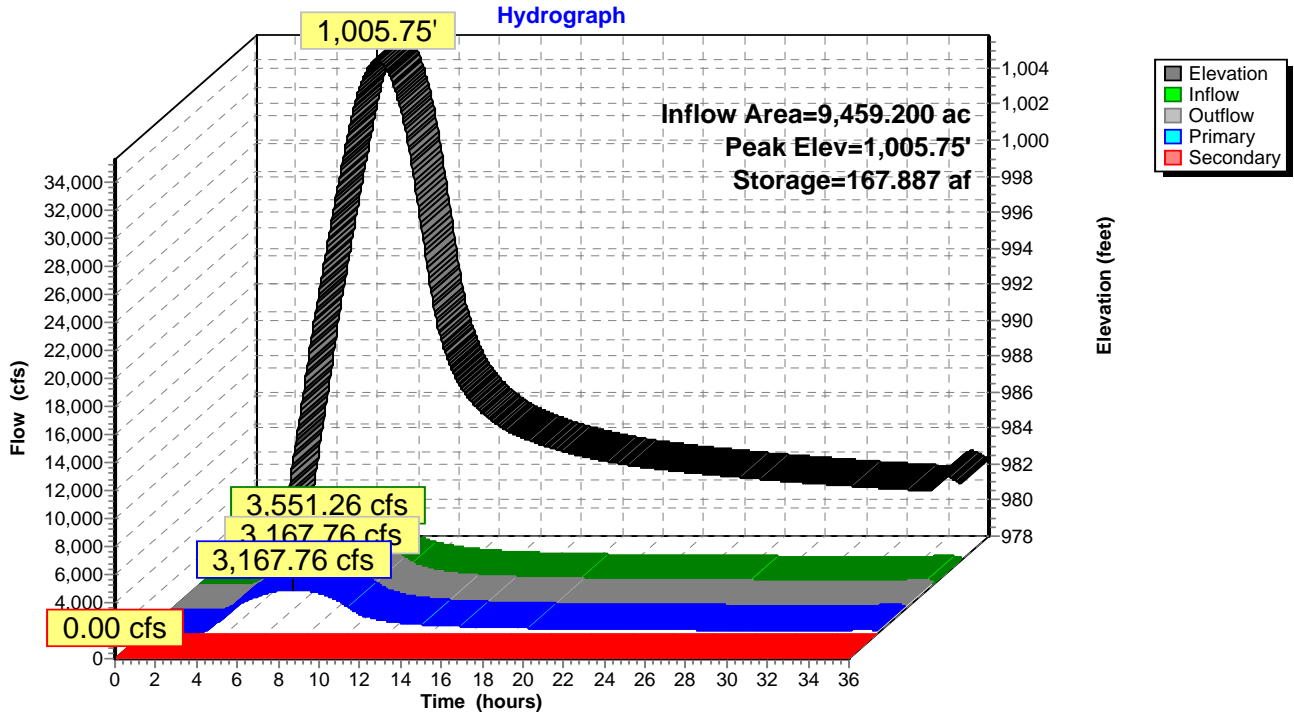
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

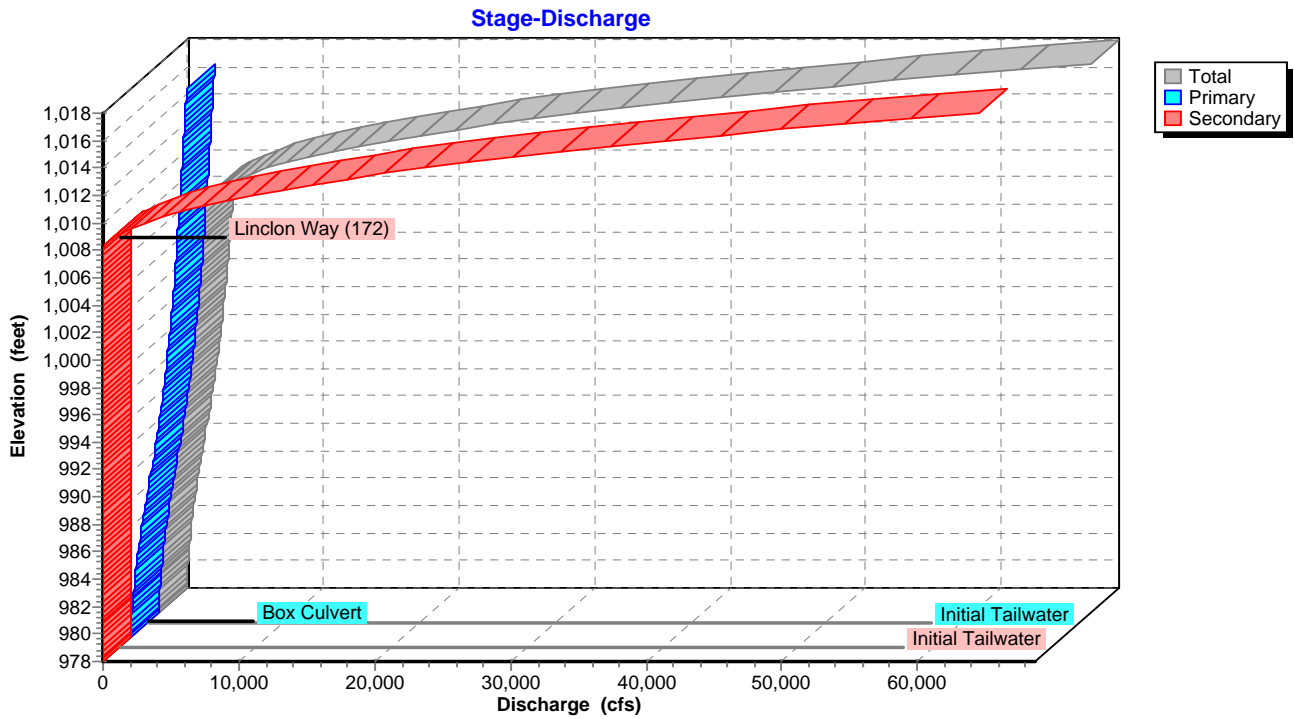
Primary OutFlow Max=3,167.75 cfs @ 7.33 hrs HW=1,005.75' TW=984.27' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,167.75 cfs @ 27.71 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

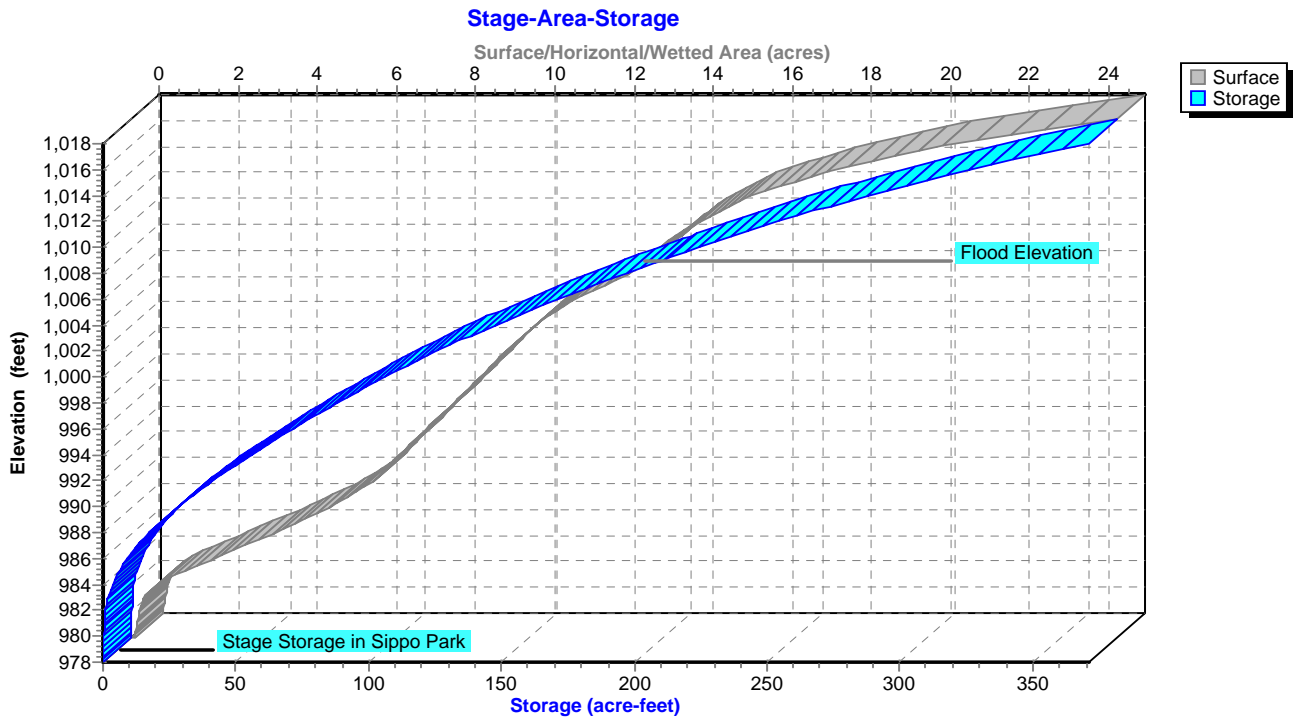
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



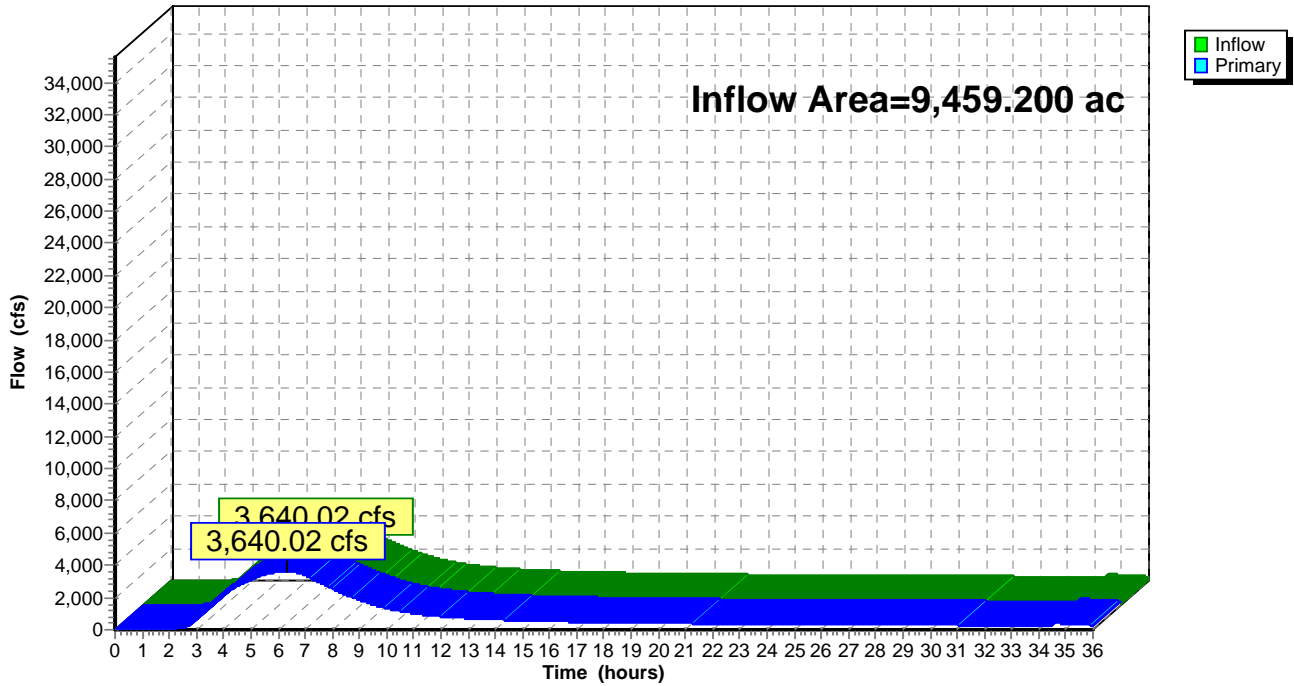
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.09" for 6-HR 0.24 PMF event
Inflow = 3,640.02 cfs @ 6.31 hrs, Volume= 2,431.866 af
Primary = 3,640.02 cfs @ 6.32 hrs, Volume= 2,431.866 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=3.64"
 Tc=44.0 min CN=74 Runoff=192.98 cfs 34.982 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=3.75"
 Tc=65.0 min CN=75 Runoff=415.35 cfs 83.930 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=3.24"
 Tc=226.0 min CN=70 Runoff=994.32 cfs 378.393 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=3.04"
 Tc=128.0 min CN=68 Runoff=972.63 cfs 272.562 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.94"
 Tc=129.0 min CN=67 Runoff=672.94 cfs 190.006 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=3.64"
 Tc=110.0 min CN=74 Runoff=864.59 cfs 219.610 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=3.75"
 Tc=72.0 min CN=75 Runoff=1,097.33 cfs 229.807 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=4.27"
 Tc=78.0 min CN=80 Runoff=1,128.40 cfs 241.502 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=3.14"
 Tc=155.0 min CN=69 Runoff=903.46 cfs 279.709 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=3.75"
 Tc=156.0 min CN=75 Runoff=2,004.56 cfs 613.485 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.94"
 Tc=151.0 min CN=67 Runoff=521.24 cfs 160.170 af

Reach 5R: Channel 5 Avg. Flow Depth=3.19' Max Vel=6.18 fps Inflow=384.71 cfs 690.739 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=384.07 cfs 685.377 af

Reach 7R: Channel 7 Avg. Flow Depth=8.69' Max Vel=3.27 fps Inflow=1,166.85 cfs 957.734 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=1,106.36 cfs 948.955 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=4.86' Max Vel=3.24 fps Inflow=311.19 cfs 373.132 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=311.12 cfs 372.374 af

Reach 15R: Channel 15 Avg. Flow Depth=8.98' Max Vel=2.20 fps Inflow=3,198.75 cfs 1,950.558 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,686.85 cfs 1,917.568 af

Reach 16R: Channel 16 Avg. Flow Depth=11.02' Max Vel=2.75 fps Inflow=3,581.16 cfs 2,366.601 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=3,490.57 cfs 2,338.683 af

Existing Conditions Sippo Reservoir-TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 433

Reach 18R: Sippo Creek Avg. Flow Depth=6.22' Max Vel=9.61 fps Inflow=3,280.91 cfs 2,563.505 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,280.90 cfs 2,563.379 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=521.11 cfs 118.799 af
Primary=521.11 cfs 118.799 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,008.28' Storage=149.493 af Inflow=3,880.61 cfs 2,579.670 af
76.85 cfs 1,997.395 af Secondary=1,829.55 cfs 567.242 af Tertiary=12.51 cfs 0.771 af Outflow=3,731.59 cfs 2,565.408 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=1,193.03 cfs 496.676 af
Primary=1,193.03 cfs 496.676 af

Pond 3P: Lake Cable Peak Elev=1,098.30' Storage=2,127.803 af Inflow=1,193.03 cfs 496.675 af
Primary=384.71 cfs 690.840 af Secondary=0.00 cfs 0.000 af Outflow=384.71 cfs 690.840 af

Pond 4C: Confluence 4 Inflow=2,006.86 cfs 1,228.560 af
Primary=2,006.86 cfs 1,228.560 af

Pond 4P: Lake O'Springs Peak Elev=1,108.11' Storage=83.758 af Inflow=521.11 cfs 118.799 af
Primary=198.94 cfs 118.284 af Secondary=0.00 cfs 0.000 af Outflow=198.94 cfs 118.284 af

Pond 5C: Confluence 5 Inflow=2,651.25 cfs 1,418.462 af
Primary=2,651.25 cfs 1,418.462 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.10' Storage=27.914 af Inflow=192.98 cfs 34.982 af
Primary=122.40 cfs 34.344 af Secondary=13.39 cfs 0.525 af Outflow=135.80 cfs 34.870 af

Pond 6C: Confluence 6 Inflow=565.85 cfs 532.464 af
Primary=565.85 cfs 532.464 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=3,198.75 cfs 1,950.742 af
Primary=3,198.75 cfs 1,950.742 af

Pond 8C: Confluence 8 Inflow=3,581.16 cfs 2,366.793 af
Primary=3,581.16 cfs 2,366.793 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,025.58' Storage=392.080 af Inflow=1,648.77 cfs 520.643 af
Primary=127.22 cfs 290.267 af Secondary=202.69 cfs 82.944 af Outflow=311.19 cfs 373.212 af

Pond 9P: Sippo Lake Peak Elev=1,029.24' Storage=436.613 af Inflow=2,004.56 cfs 613.485 af
Primary=1,648.77 cfs 520.643 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,648.77 cfs 520.643 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=1,166.85 cfs 957.837 af
Primary=1,166.85 cfs 957.837 af

Pond 16P: Lincoln Way Box Peak Elev=1,007.35' Storage=188.322 af Inflow=3,731.59 cfs 2,565.131 af
Primary=3,280.91 cfs 2,563.787 af Secondary=0.00 cfs 0.000 af Outflow=3,280.91 cfs 2,563.787 af

Pond 19C: Confluence 19 Inflow=3,880.61 cfs 2,579.928 af
Primary=3,880.61 cfs 2,579.928 af

**Total Runoff Area = 9,459.200 ac Runoff Volume = 2,704.156 af Average Runoff Depth = 3.43"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac**

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 192.98 cfs @ 3.37 hrs, Volume= 34.982 af, Depth= 3.64"

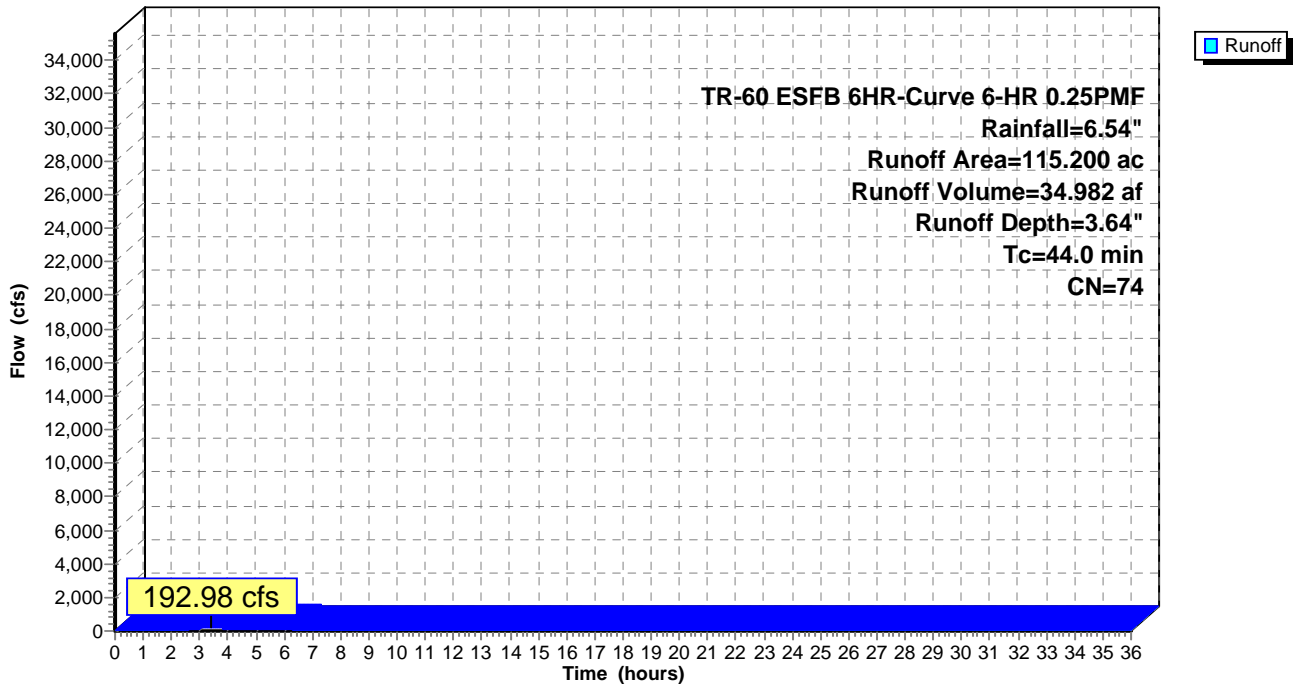
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 415.35 cfs @ 3.68 hrs, Volume= 83.930 af, Depth= 3.75"

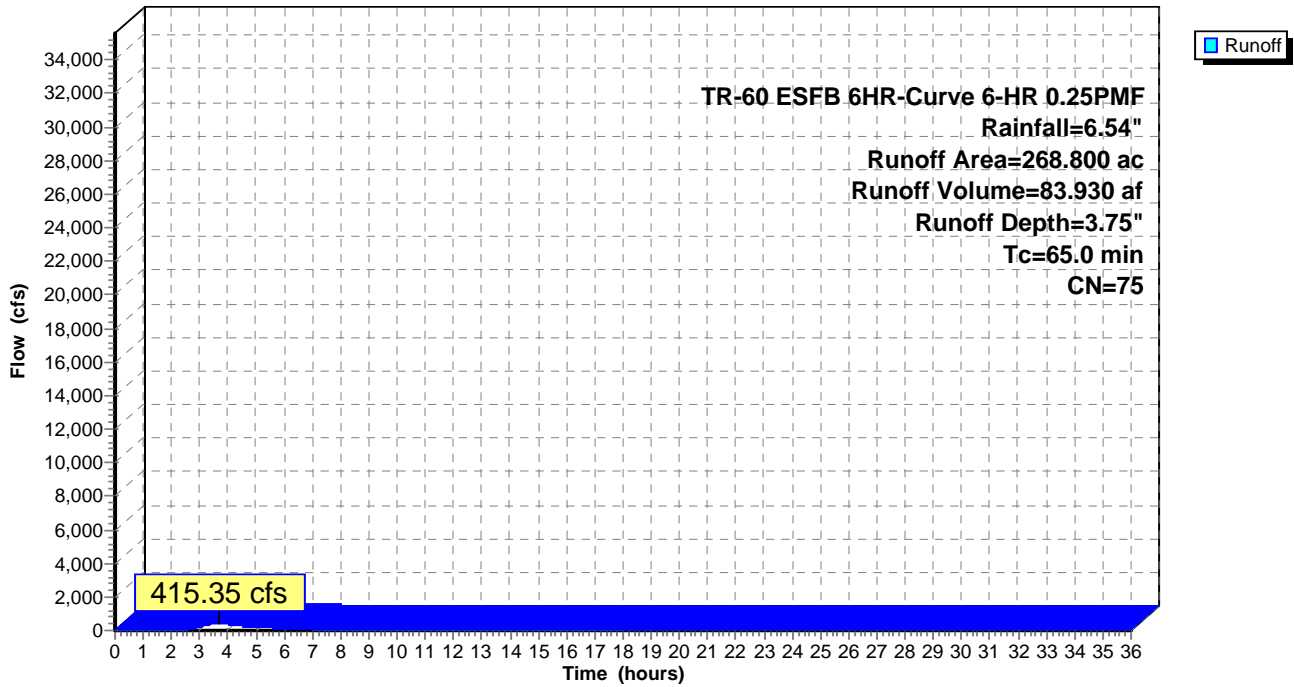
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 994.32 cfs @ 6.28 hrs, Volume= 378.393 af, Depth= 3.24"

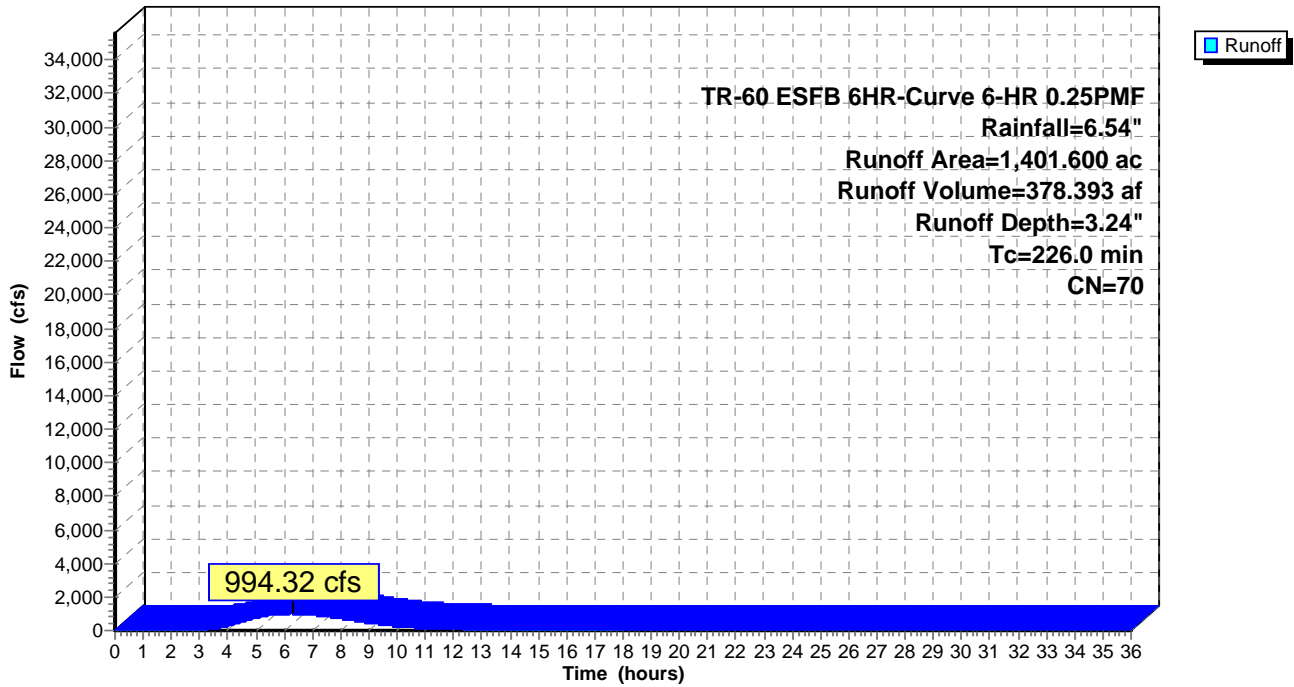
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 972.63 cfs @ 4.69 hrs, Volume= 272.562 af, Depth= 3.04"

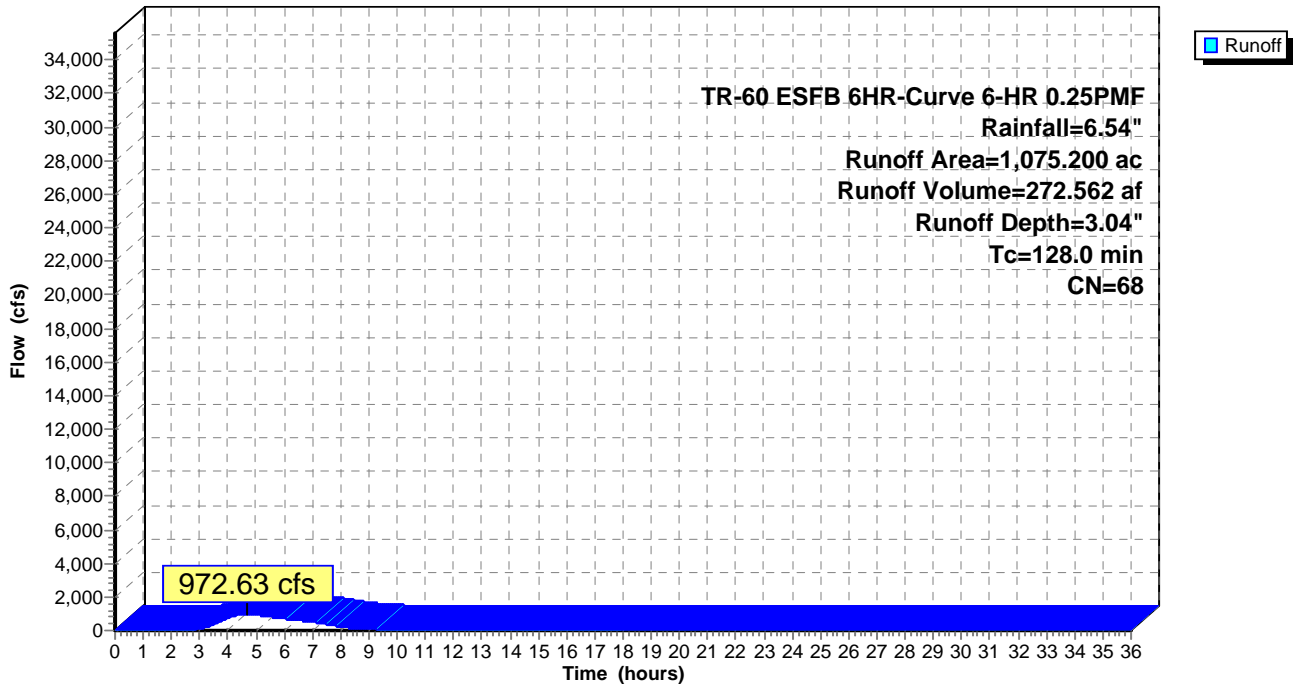
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 672.94 cfs @ 4.73 hrs, Volume= 190.006 af, Depth= 2.94"

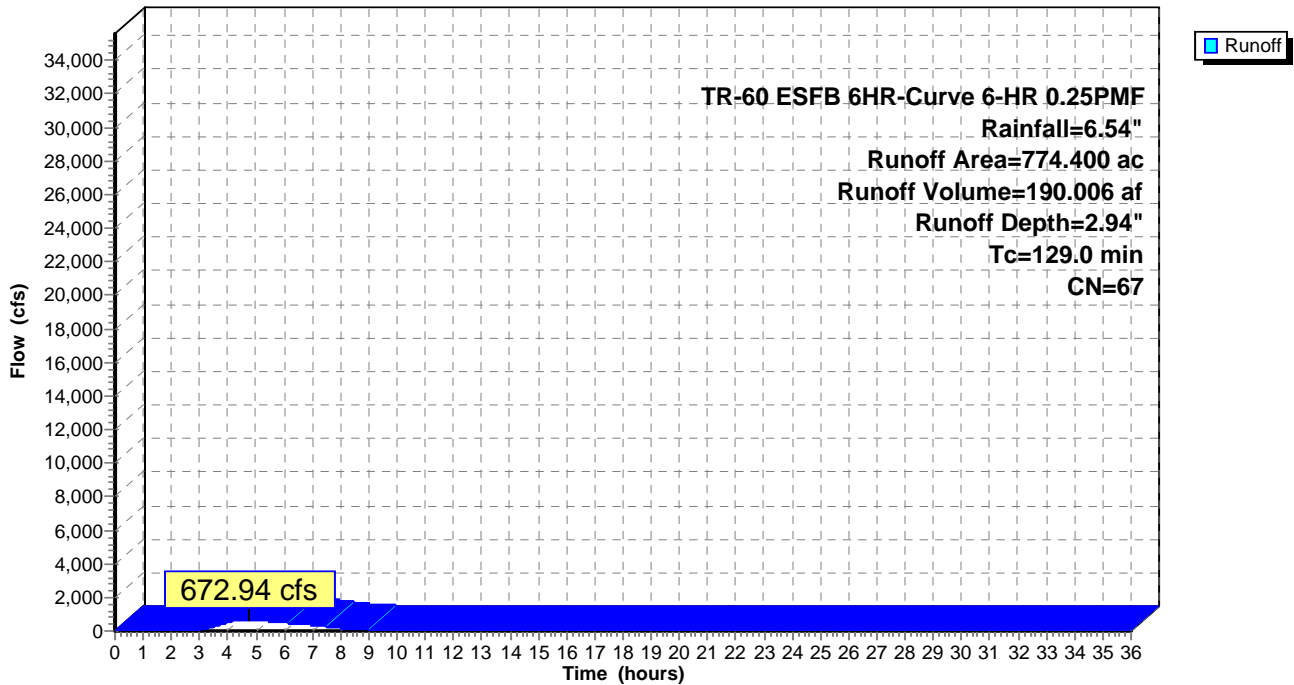
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 864.59 cfs @ 4.28 hrs, Volume= 219.610 af, Depth= 3.64"

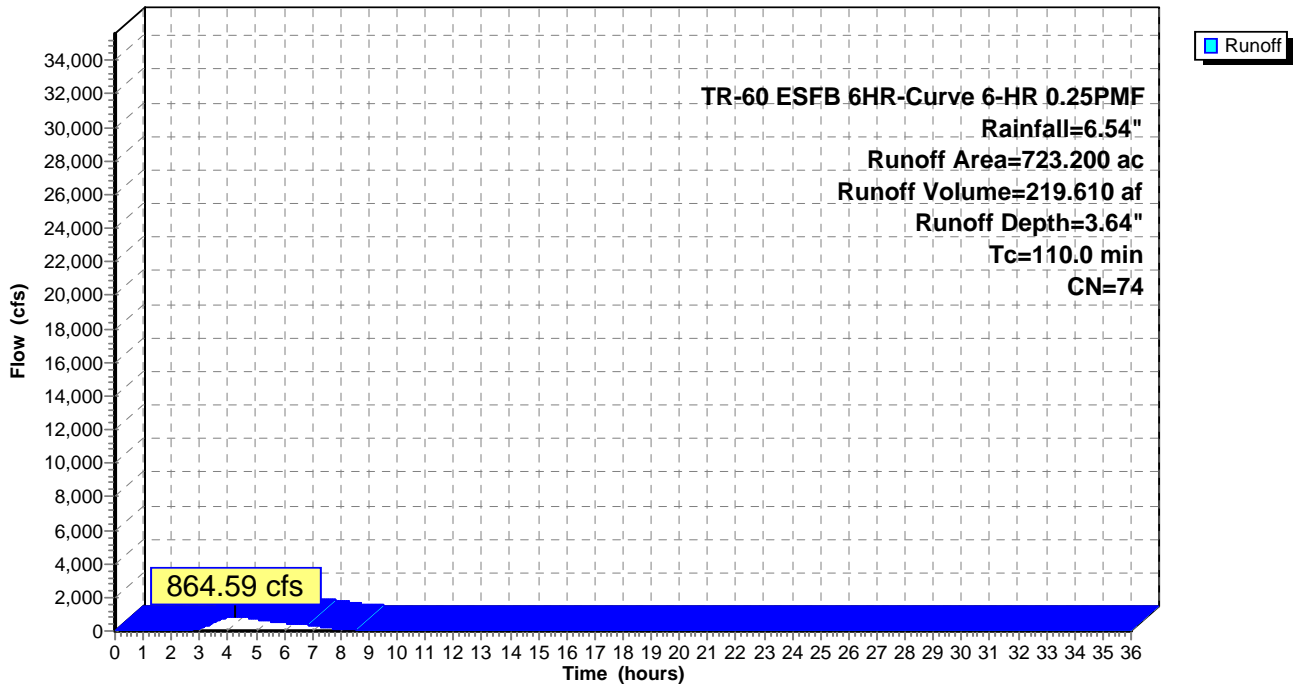
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 1,097.33 cfs @ 3.76 hrs, Volume= 229.807 af, Depth= 3.75"

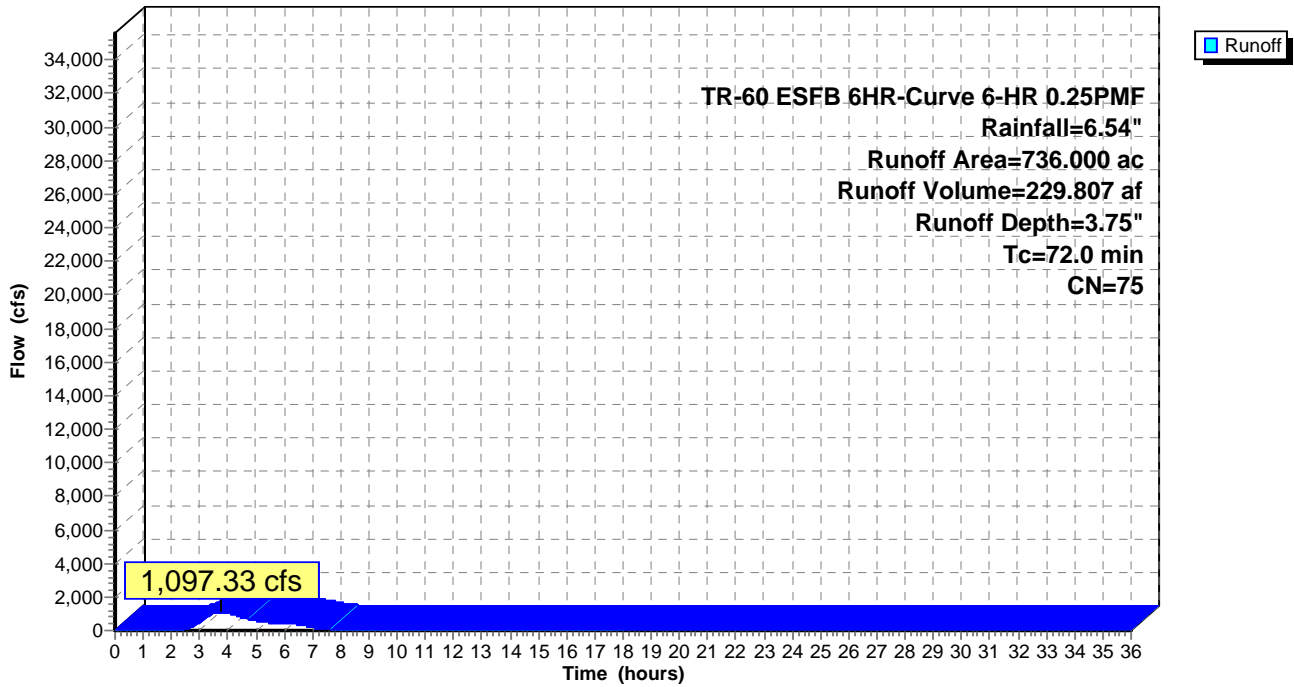
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 1,128.40 cfs @ 3.73 hrs, Volume= 241.502 af, Depth= 4.27"

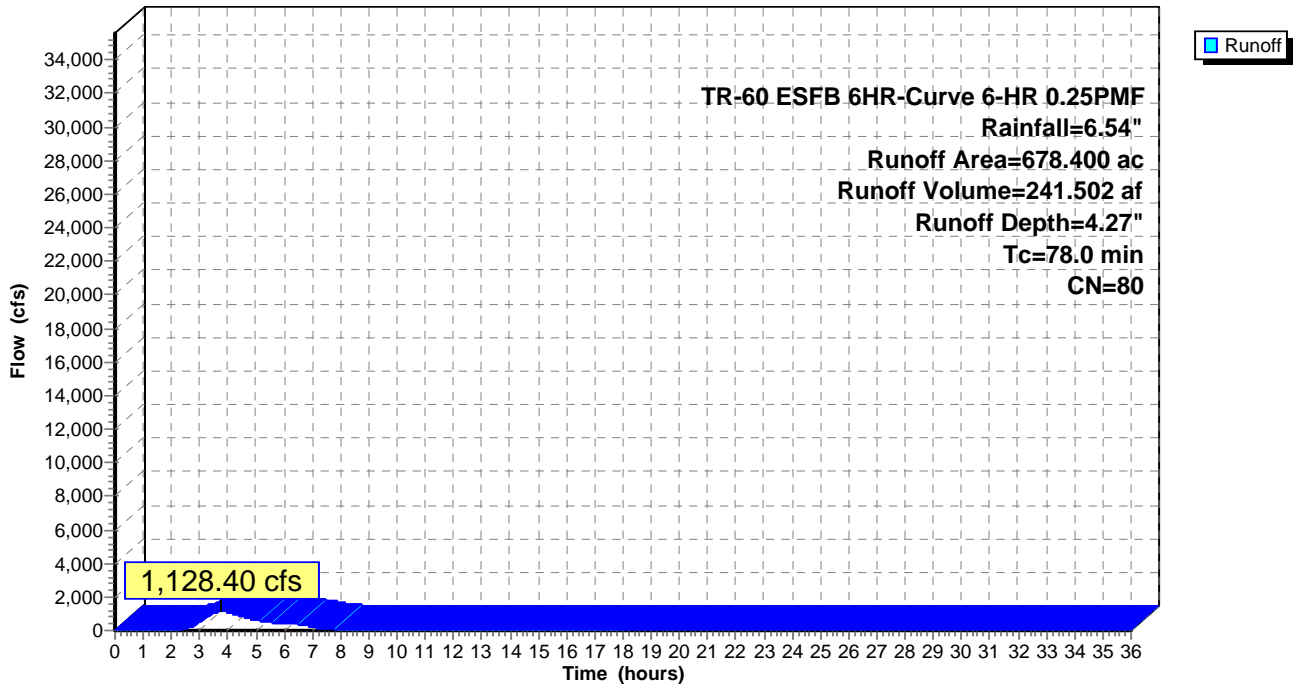
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 903.46 cfs @ 5.00 hrs, Volume= 279.709 af, Depth= 3.14"

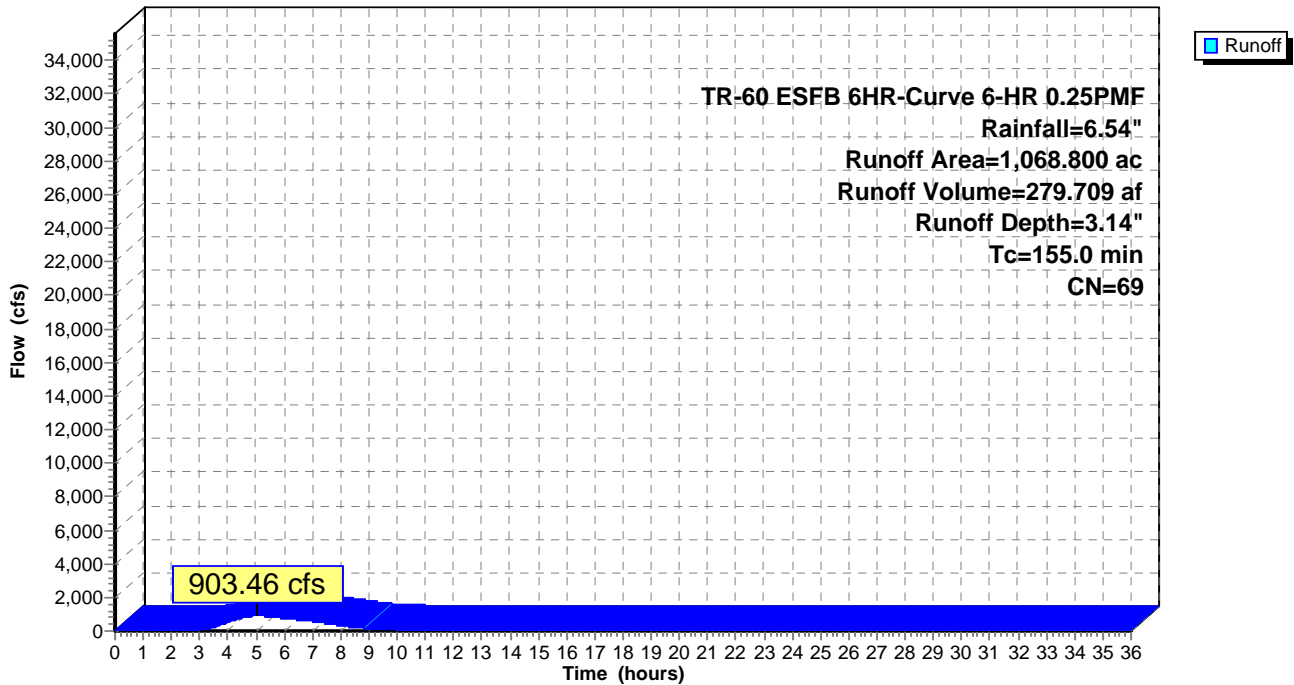
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 2,004.56 cfs @ 5.02 hrs, Volume= 613.485 af, Depth= 3.75"

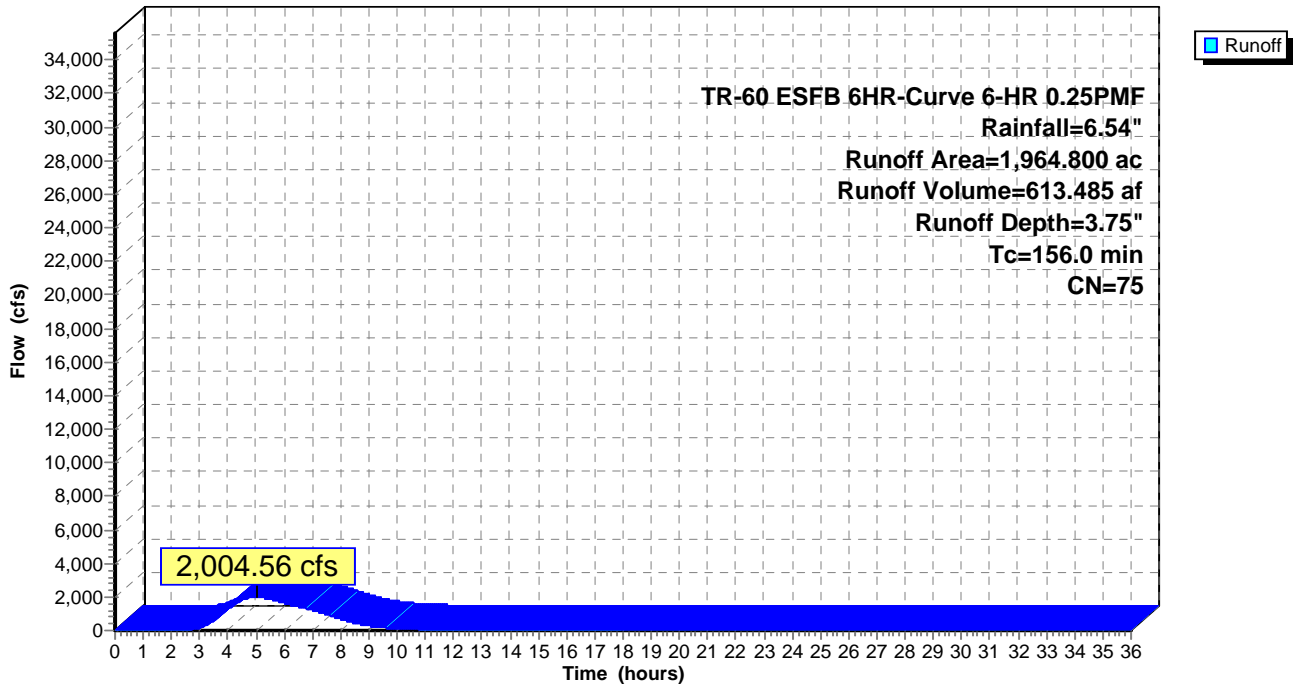
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 521.24 cfs @ 5.03 hrs, Volume= 160.170 af, Depth= 2.94"

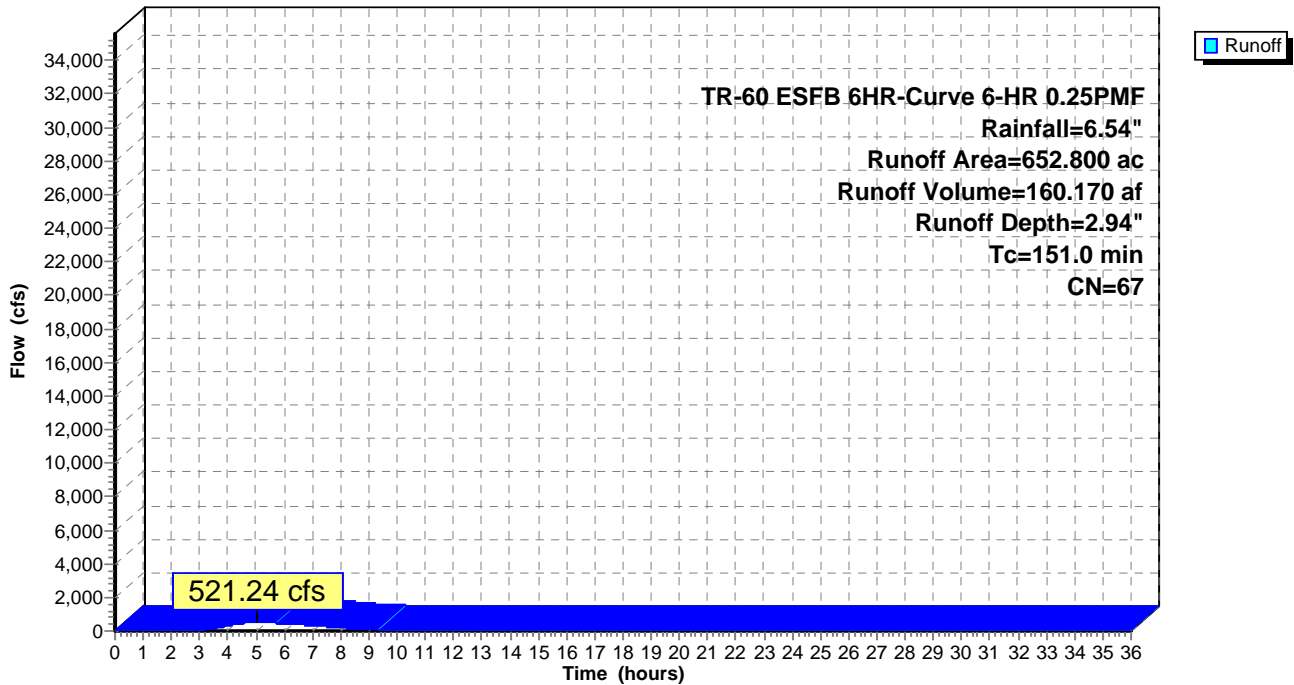
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



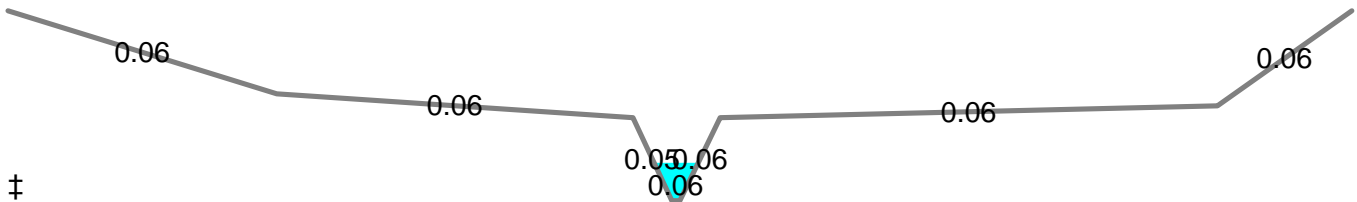
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.64" for 6-HR 0.25PMF event
 Inflow = 384.71 cfs @ 9.70 hrs, Volume= 690.739 af
 Outflow = 384.07 cfs @ 10.01 hrs, Volume= 685.377 af, Atten= 0%, Lag= 18.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.18 fps, Min. Travel Time= 23.7 min
 Avg. Velocity= 5.34 fps, Avg. Travel Time= 27.5 min

Peak Storage= 546,998 cf @ 10.01 hrs
 Average Depth at Peak Storage= 3.19'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

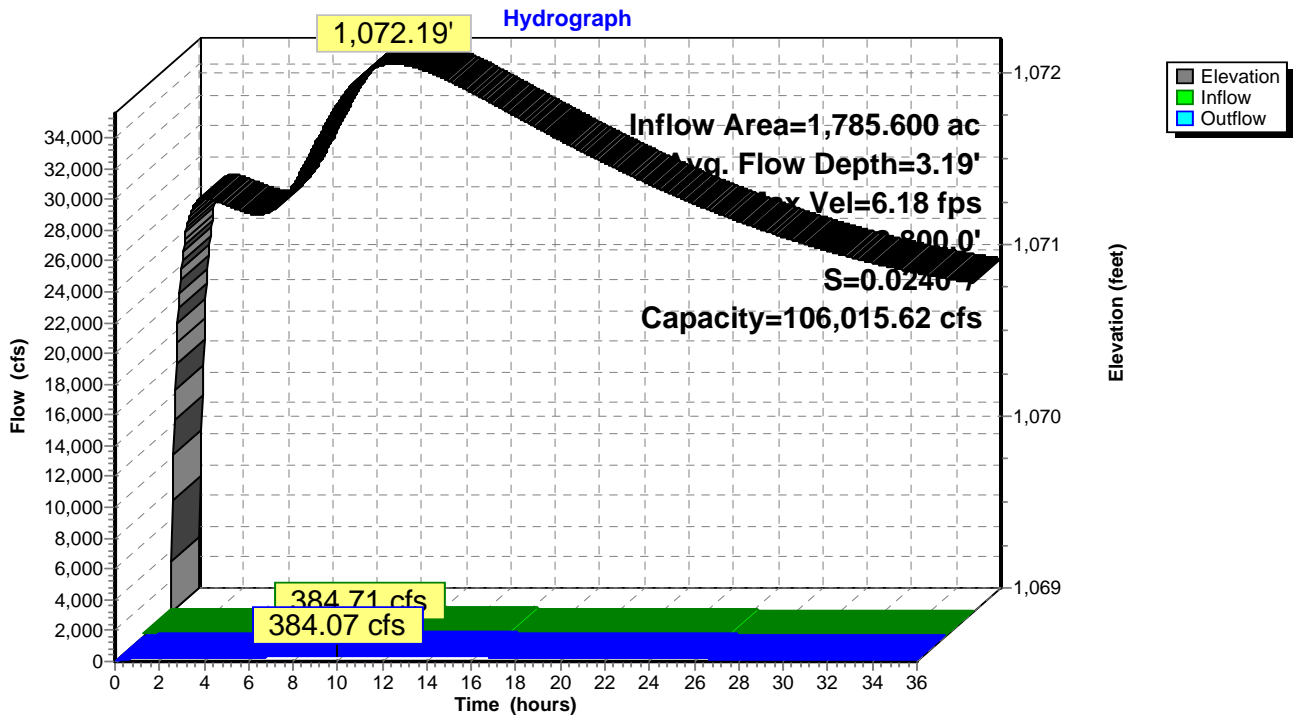
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



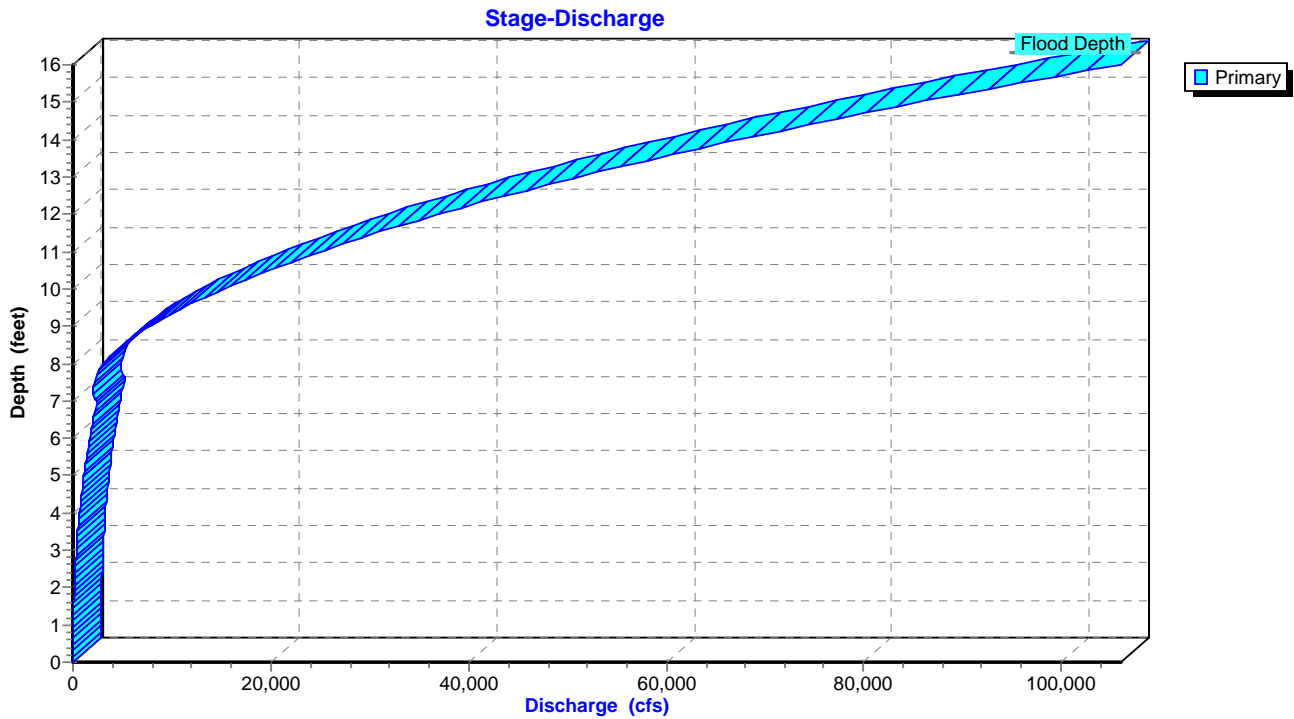
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

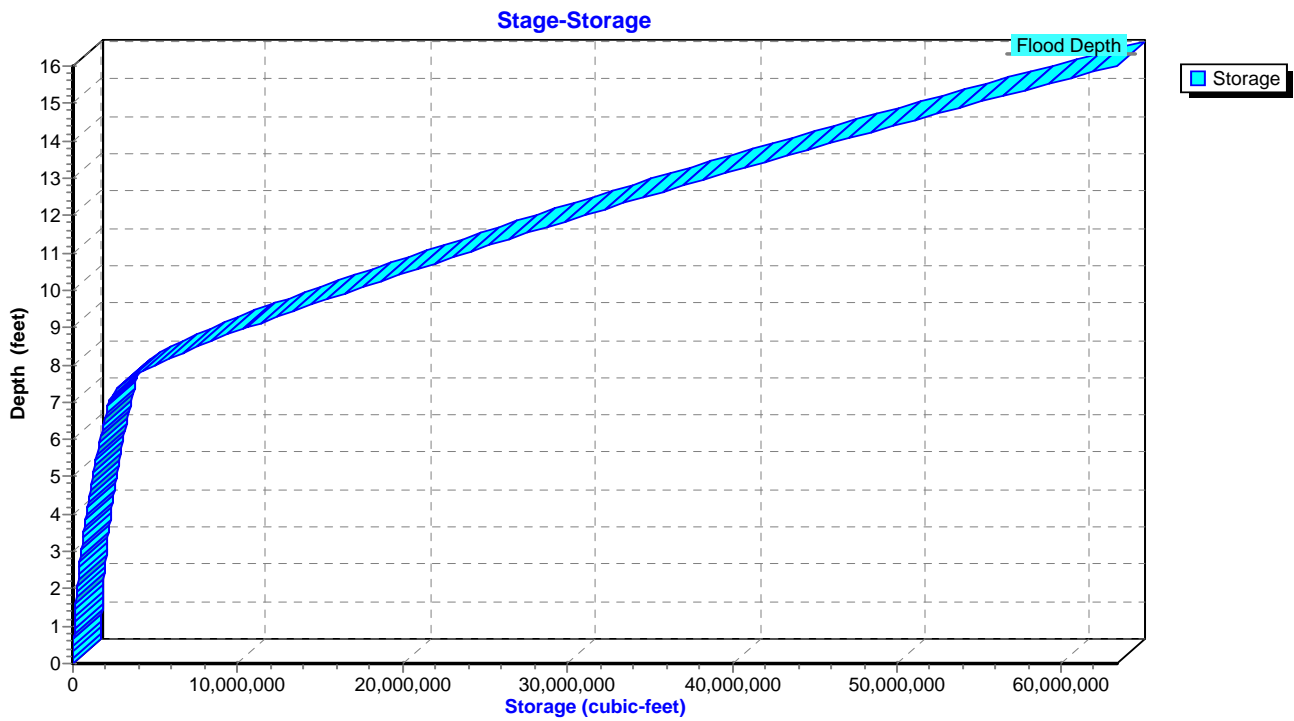
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



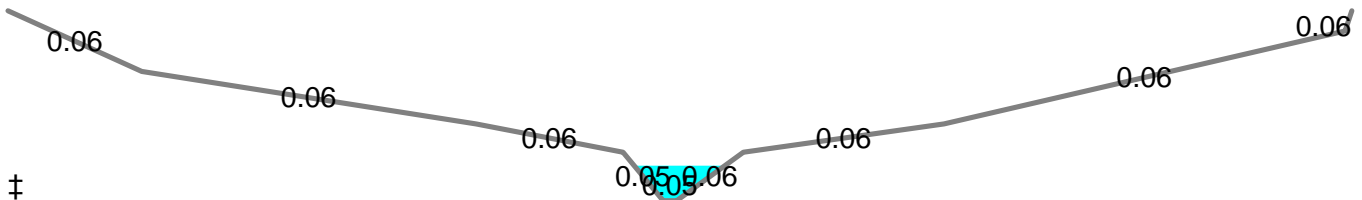
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 4.02" for 6-HR 0.25PMF event
 Inflow = 1,166.85 cfs @ 4.70 hrs, Volume= 957.734 af
 Outflow = 1,106.36 cfs @ 5.14 hrs, Volume= 948.955 af, Atten= 5%, Lag= 26.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.27 fps, Min. Travel Time= 30.1 min
 Avg. Velocity = 2.31 fps, Avg. Travel Time= 42.6 min

Peak Storage= 1,999,391 cf @ 5.14 hrs
 Average Depth at Peak Storage= 8.69'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

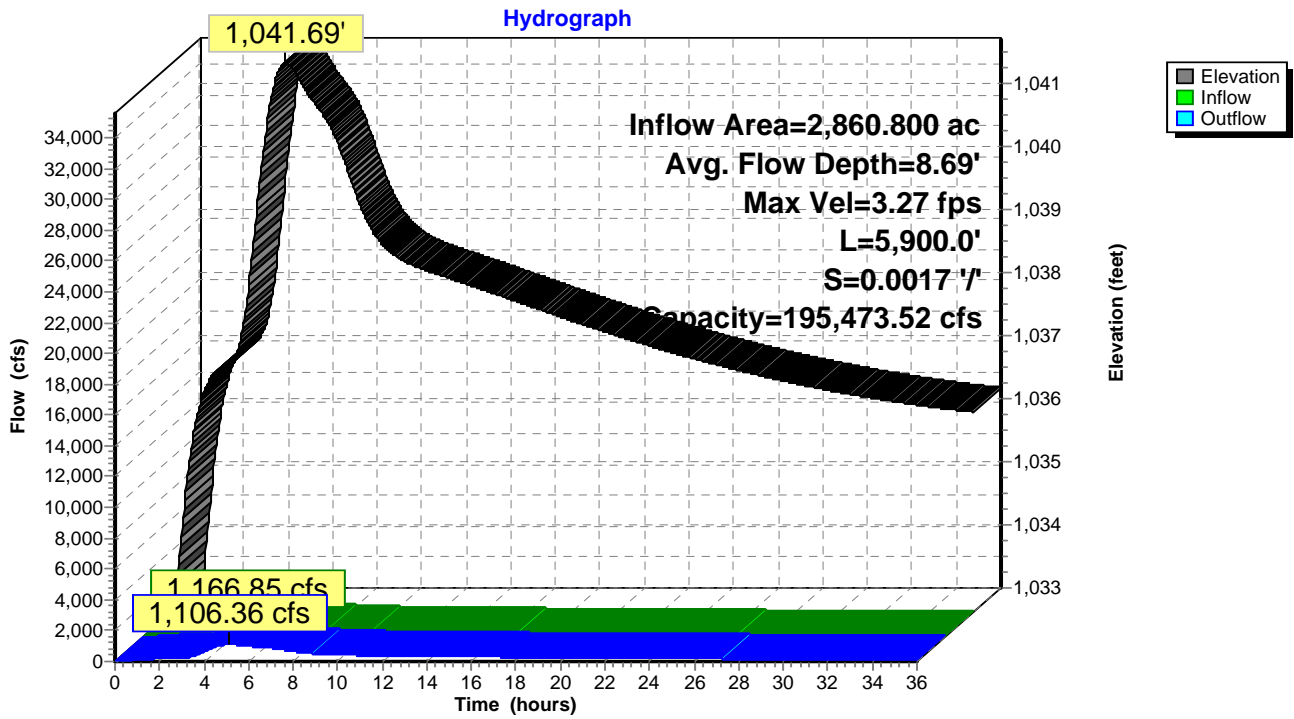
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



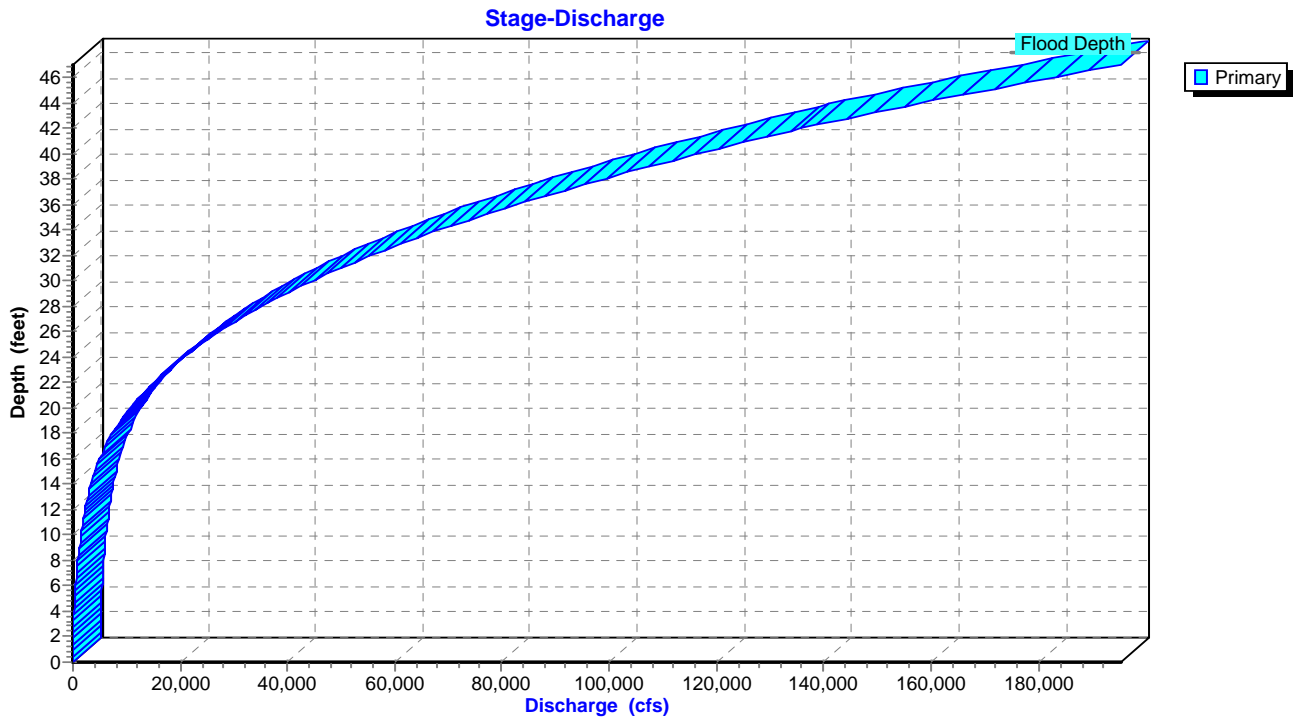
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

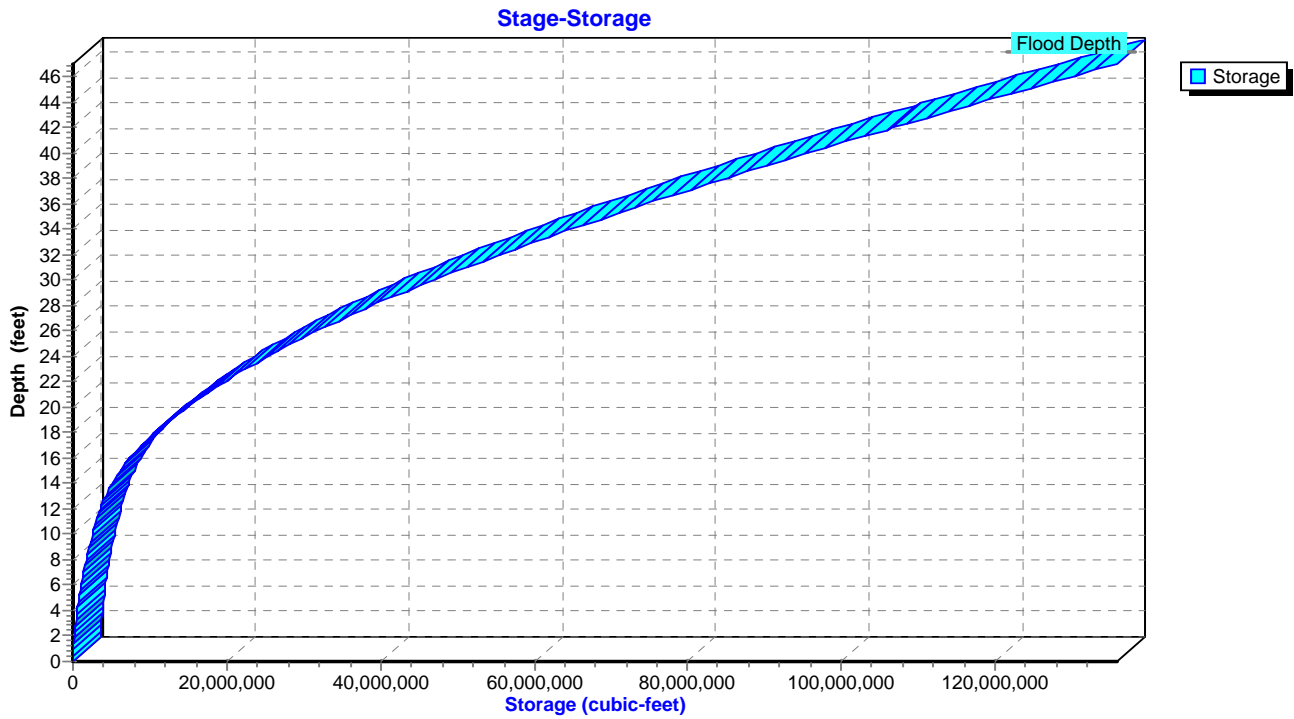
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



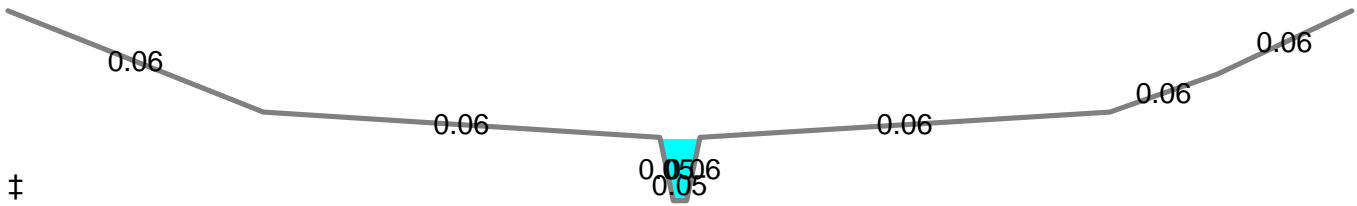
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.28" for 6-HR 0.25PMF event
 Inflow = 311.19 cfs @ 9.91 hrs, Volume= 373.132 af
 Outflow = 311.12 cfs @ 9.97 hrs, Volume= 372.374 af, Atten= 0%, Lag= 3.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.24 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 2.58 fps, Avg. Travel Time= 5.8 min

Peak Storage= 86,381 cf @ 9.97 hrs
 Average Depth at Peak Storage= 4.86'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

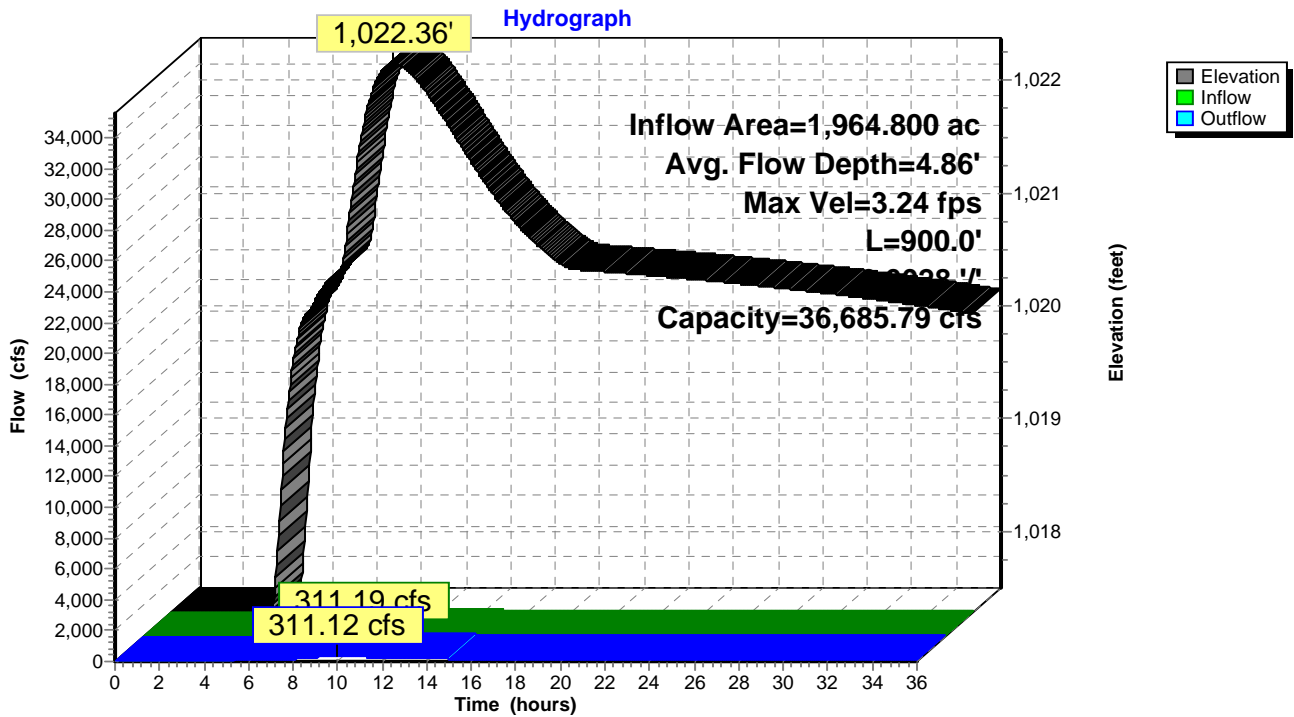
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



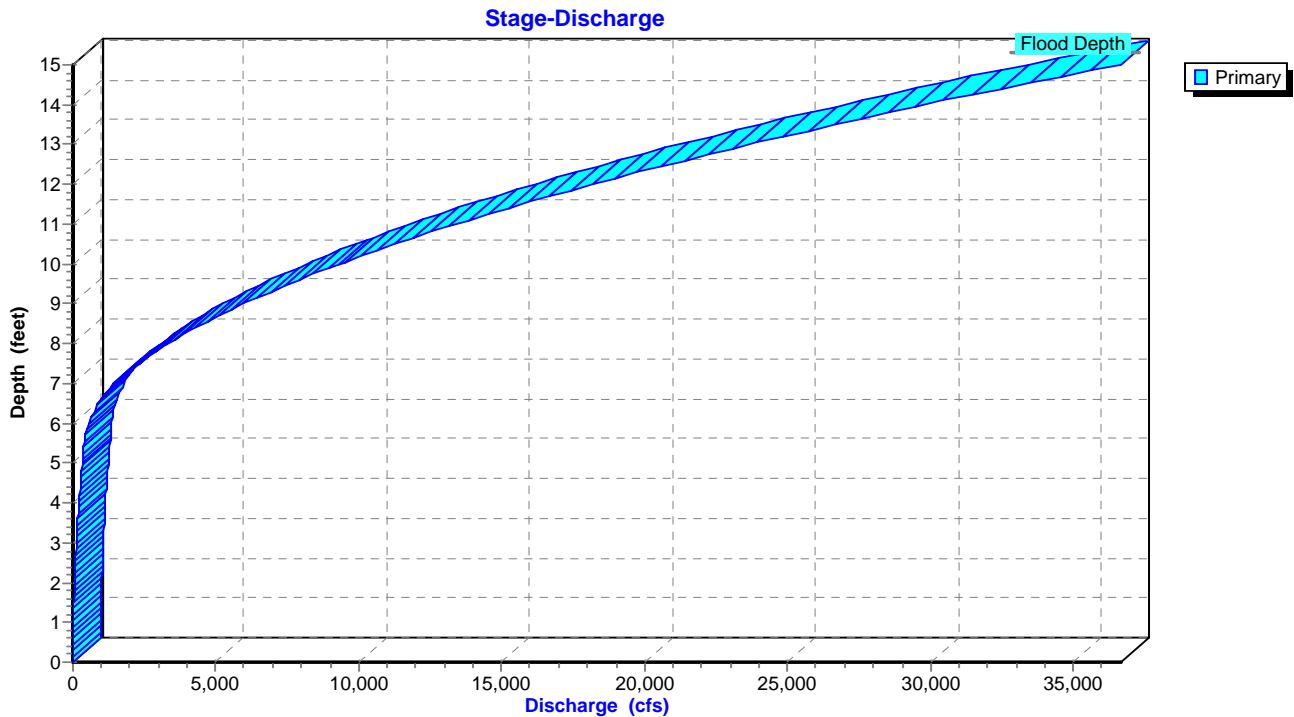
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

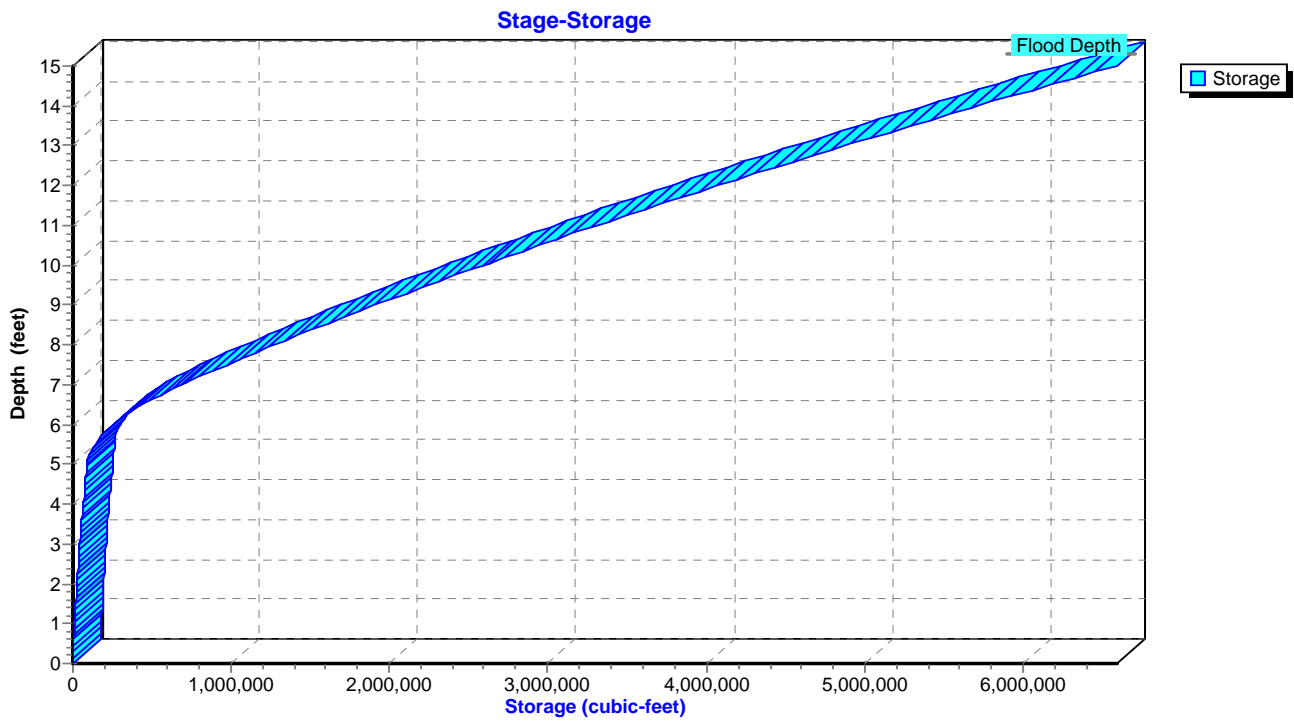
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



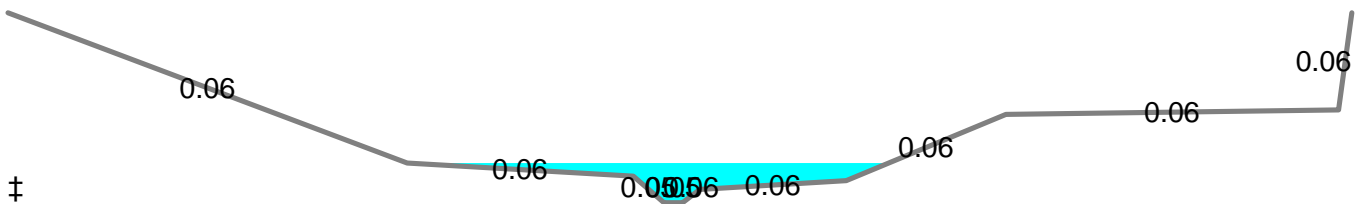
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 3.20" for 6-HR 0.25PMF event
 Inflow = 3,198.75 cfs @ 5.05 hrs, Volume= 1,950.558 af
 Outflow = 2,686.85 cfs @ 6.18 hrs, Volume= 1,917.568 af, Atten= 16%, Lag= 68.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.20 fps, Min. Travel Time= 66.8 min
 Avg. Velocity = 1.54 fps, Avg. Travel Time= 95.0 min

Peak Storage= 10,773,372 cf @ 6.18 hrs
 Average Depth at Peak Storage= 8.98'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

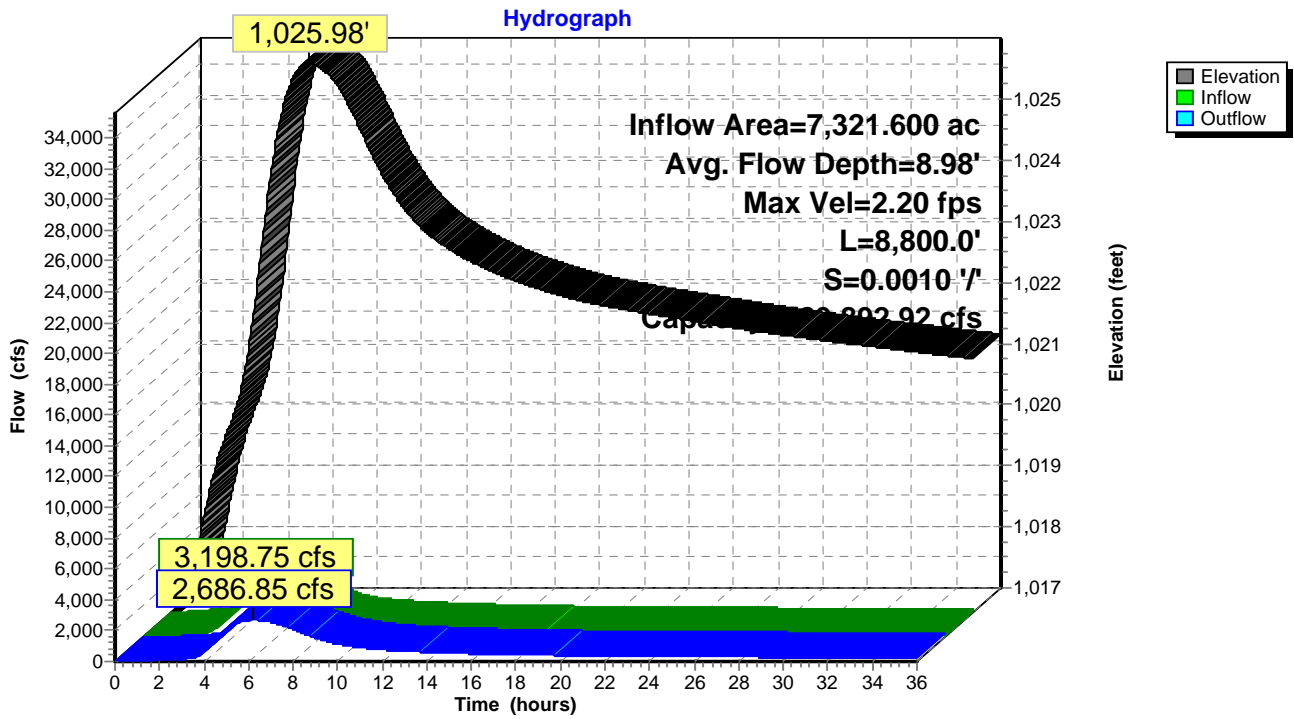
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



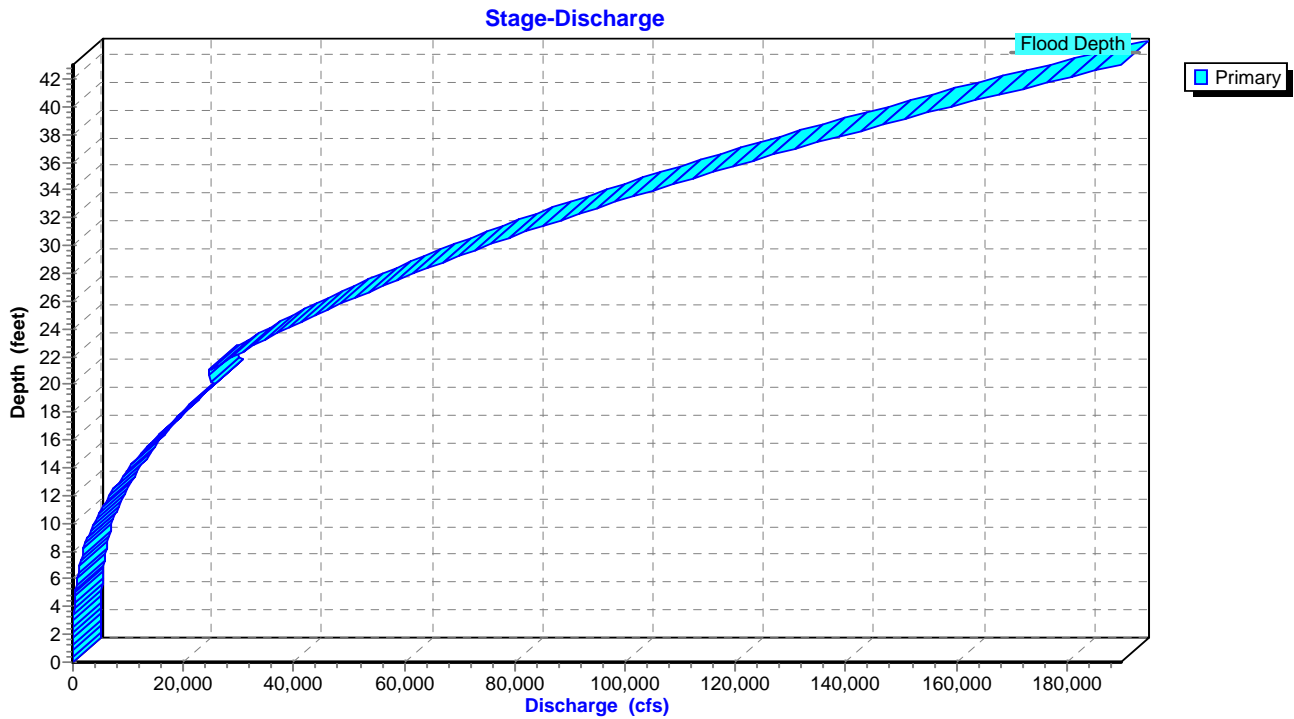
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

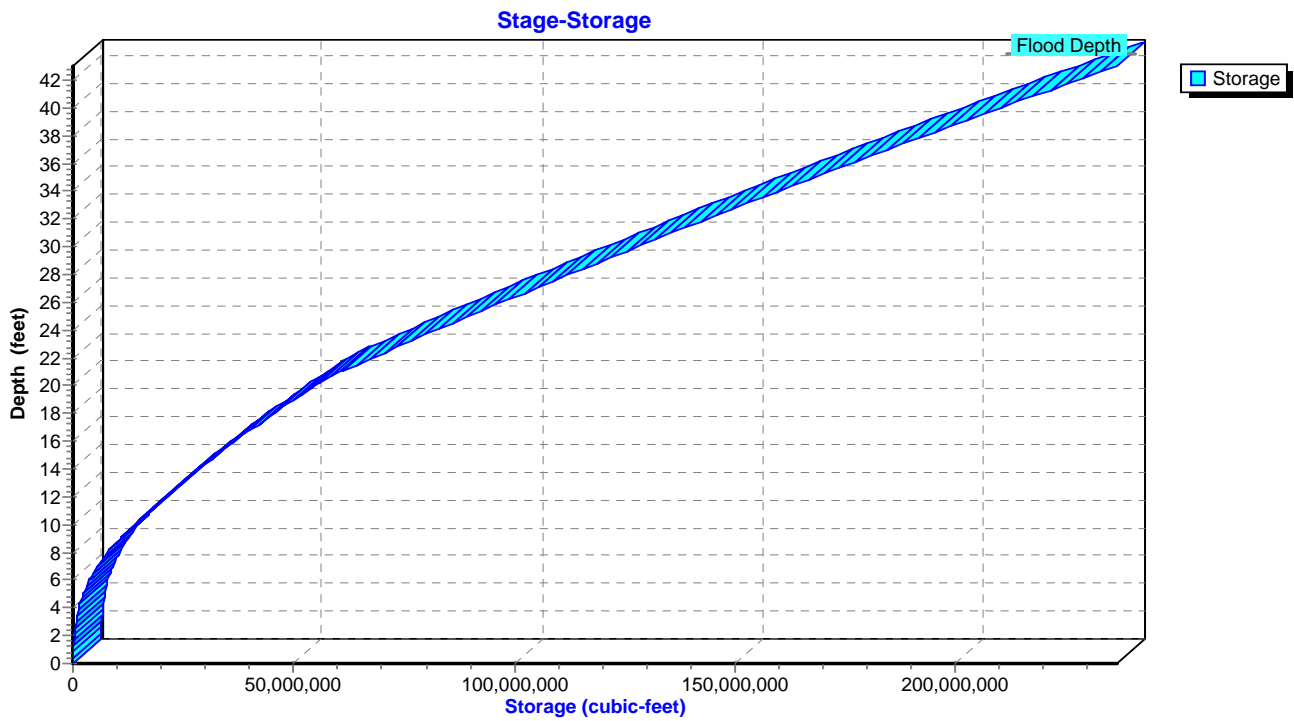
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



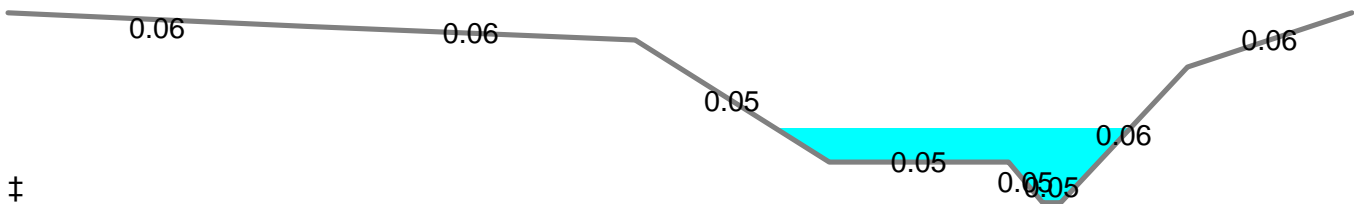
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 3.23" for 6-HR 0.25PMF event
 Inflow = 3,581.16 cfs @ 5.90 hrs, Volume= 2,366.601 af
 Outflow = 3,490.57 cfs @ 6.41 hrs, Volume= 2,338.683 af, Atten= 3%, Lag= 30.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.75 fps, Min. Travel Time= 45.4 min
 Avg. Velocity = 1.51 fps, Avg. Travel Time= 82.9 min

Peak Storage= 9,518,152 cf @ 6.41 hrs
 Average Depth at Peak Storage= 11.02'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

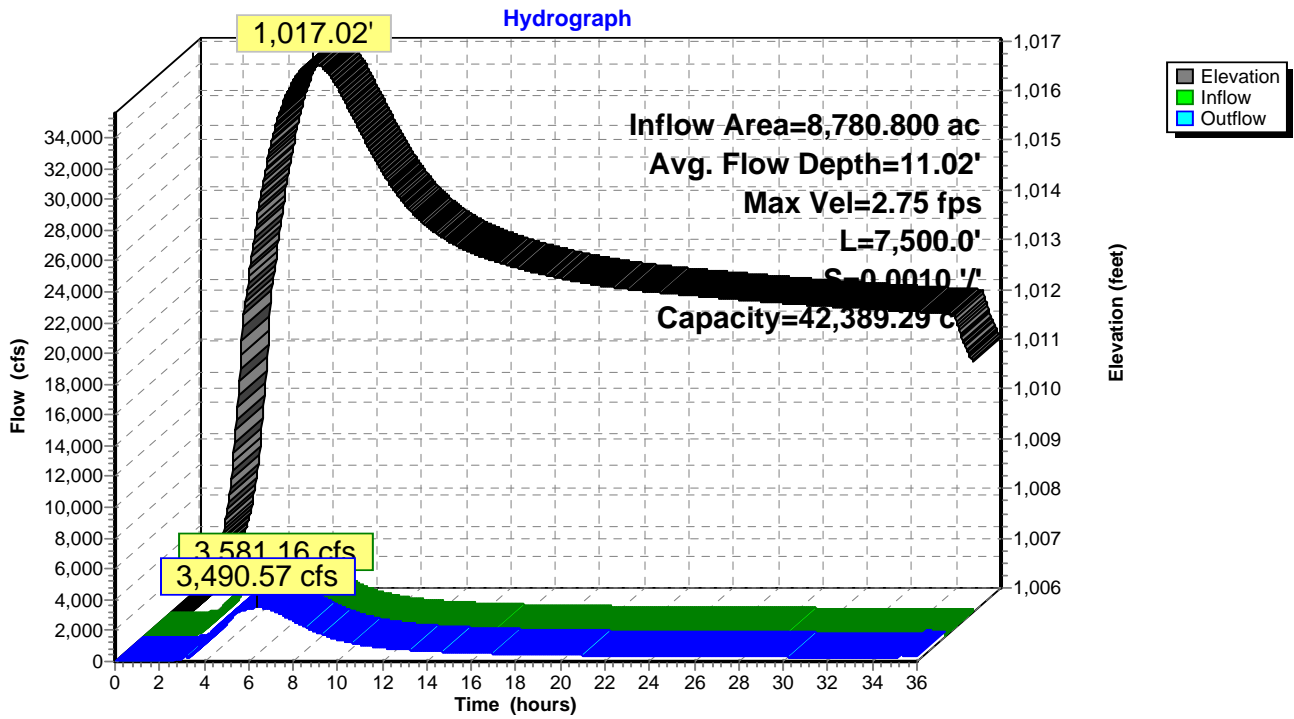
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



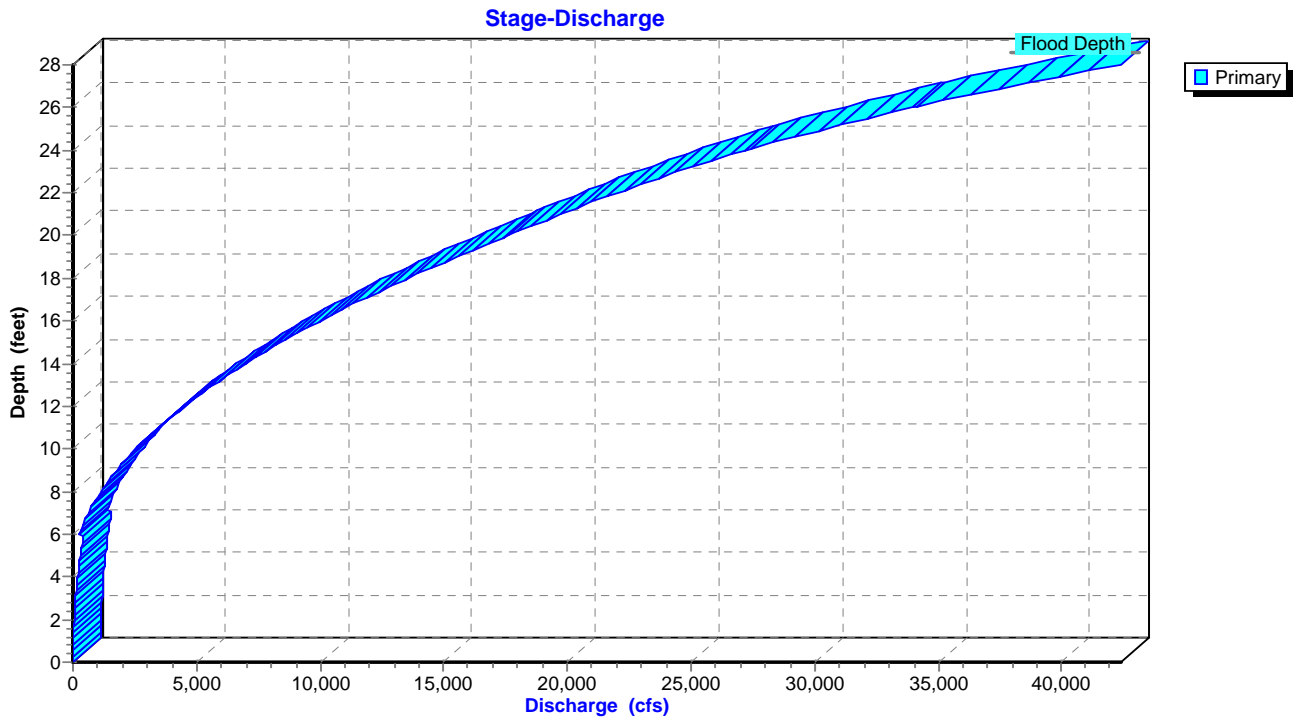
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

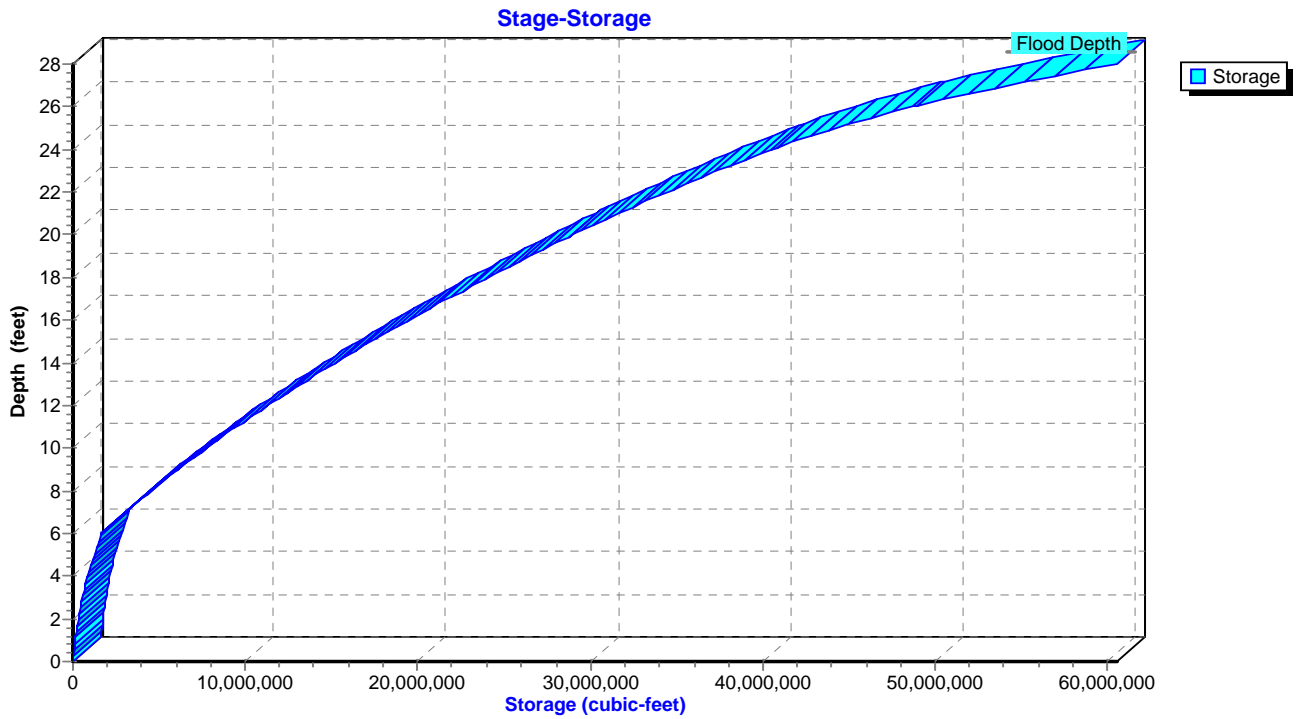
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



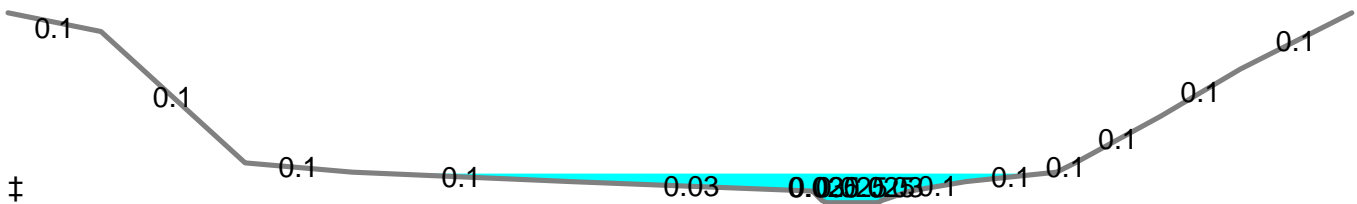
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.25" for 6-HR 0.25PMF event
 Inflow = 3,280.91 cfs @ 7.37 hrs, Volume= 2,563.505 af
 Outflow = 3,280.90 cfs @ 7.39 hrs, Volume= 2,563.379 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.61 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.70 fps, Avg. Travel Time= 0.9 min

Peak Storage= 153,579 cf @ 7.39 hrs
 Average Depth at Peak Storage= 6.22'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

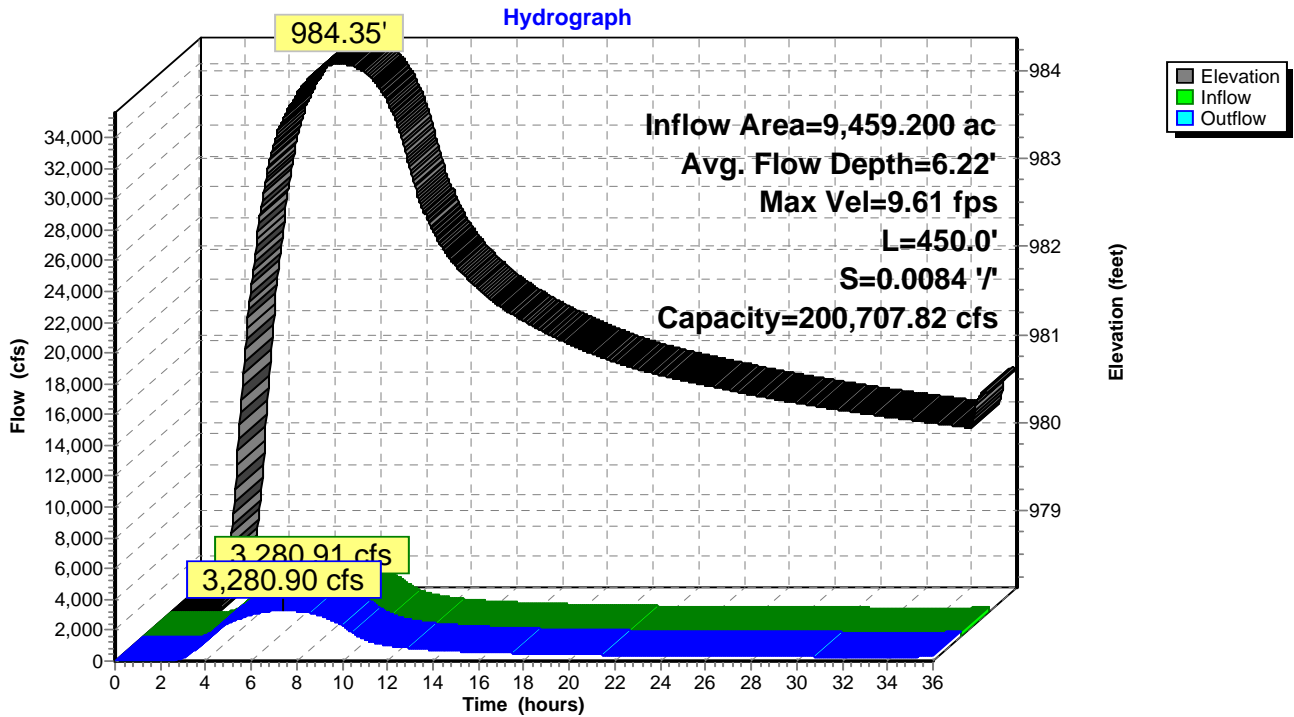
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



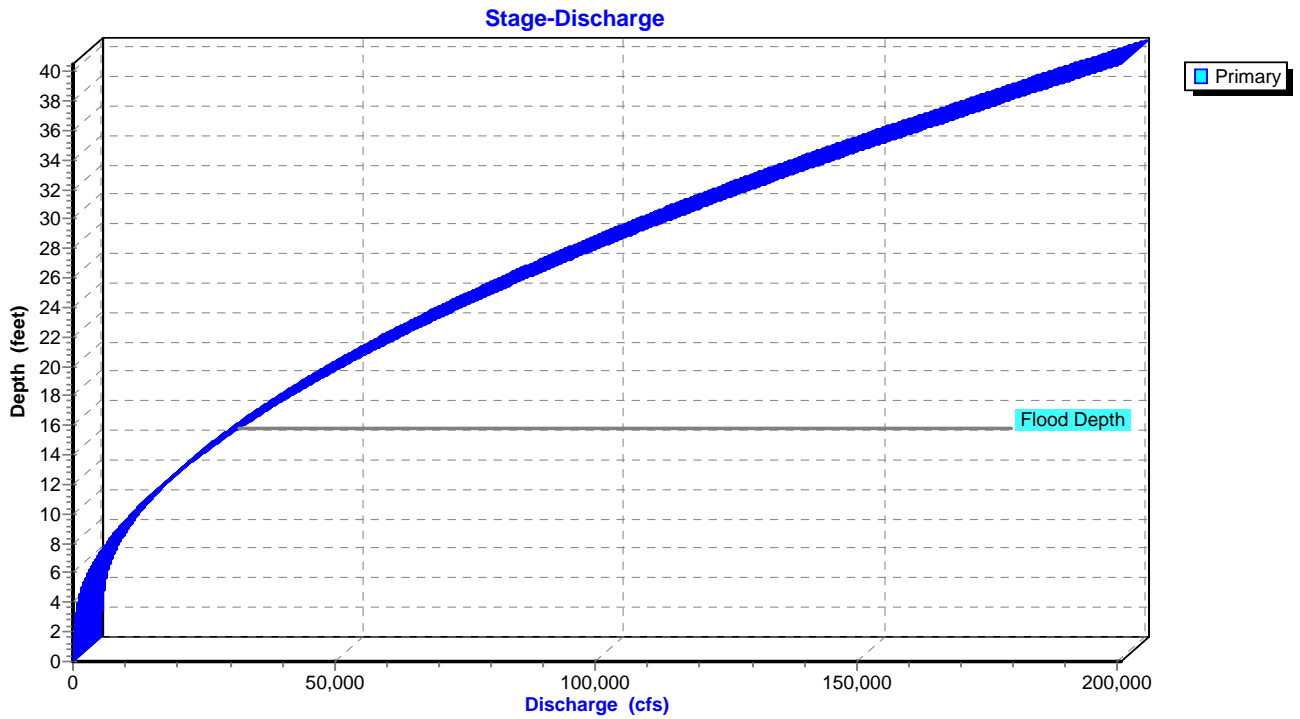
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

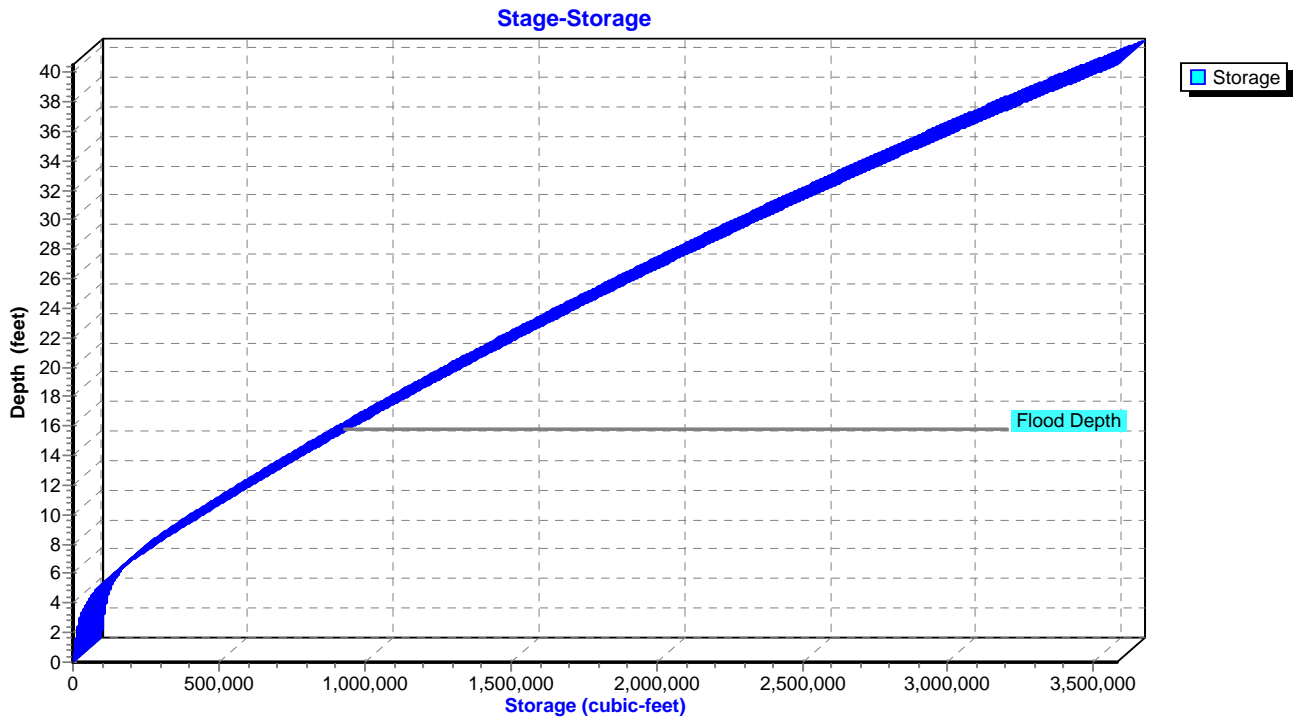
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

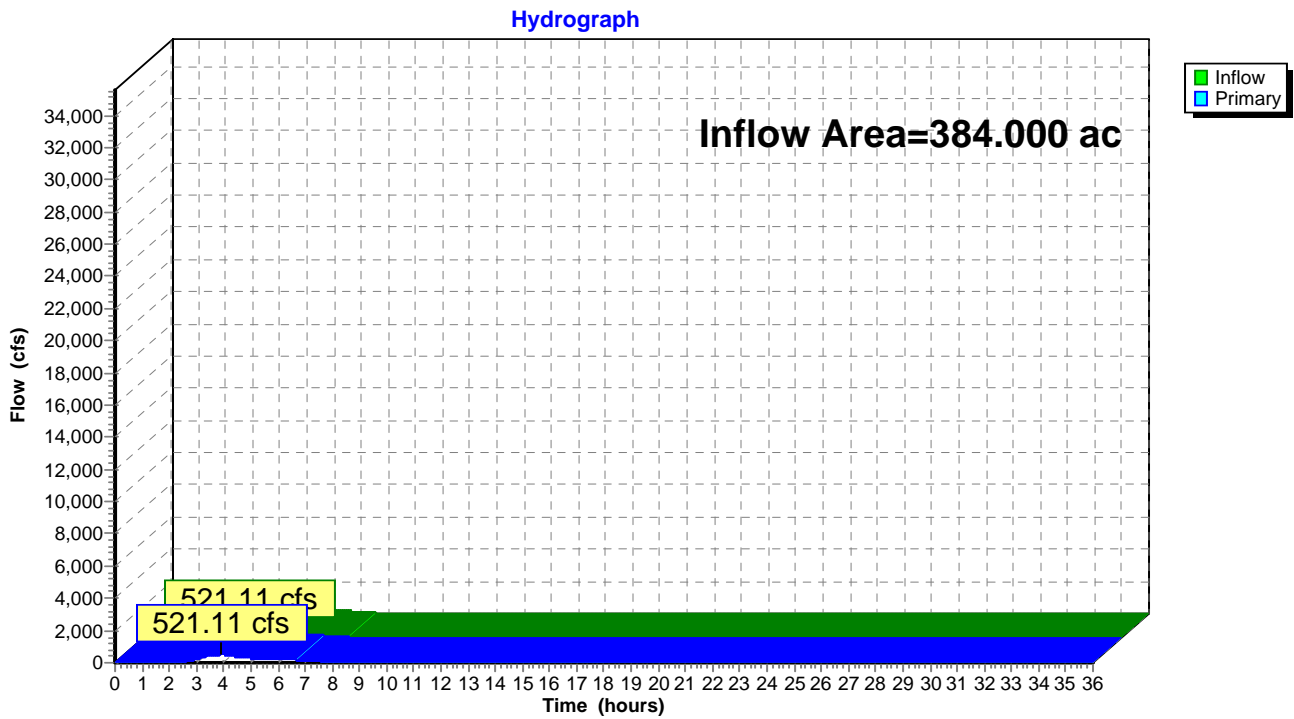


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.71" for 6-HR 0.25PMF event
Inflow = 521.11 cfs @ 3.91 hrs, Volume= 118.799 af
Primary = 521.11 cfs @ 3.92 hrs, Volume= 118.799 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.27" for 6-HR 0.25PMF event
 Inflow = 3,880.61 cfs @ 6.29 hrs, Volume= 2,579.670 af
 Outflow = 3,731.59 cfs @ 6.21 hrs, Volume= 2,565.408 af, Atten= 4%, Lag= 0.0 min
 Primary = 2,376.85 cfs @ 5.66 hrs, Volume= 1,997.395 af
 Secondary = 1,829.55 cfs @ 6.86 hrs, Volume= 567.242 af
 Tertiary = 12.51 cfs @ 7.26 hrs, Volume= 0.771 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,008.28' @ 7.26 hrs Surf.Area= 22.624 ac Storage= 149.493 af (88.531 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 66.9 min calculated for 2,503.751 af (97% of inflow)
 Center-of-Mass det. time= 13.4 min (704.3 - 691.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

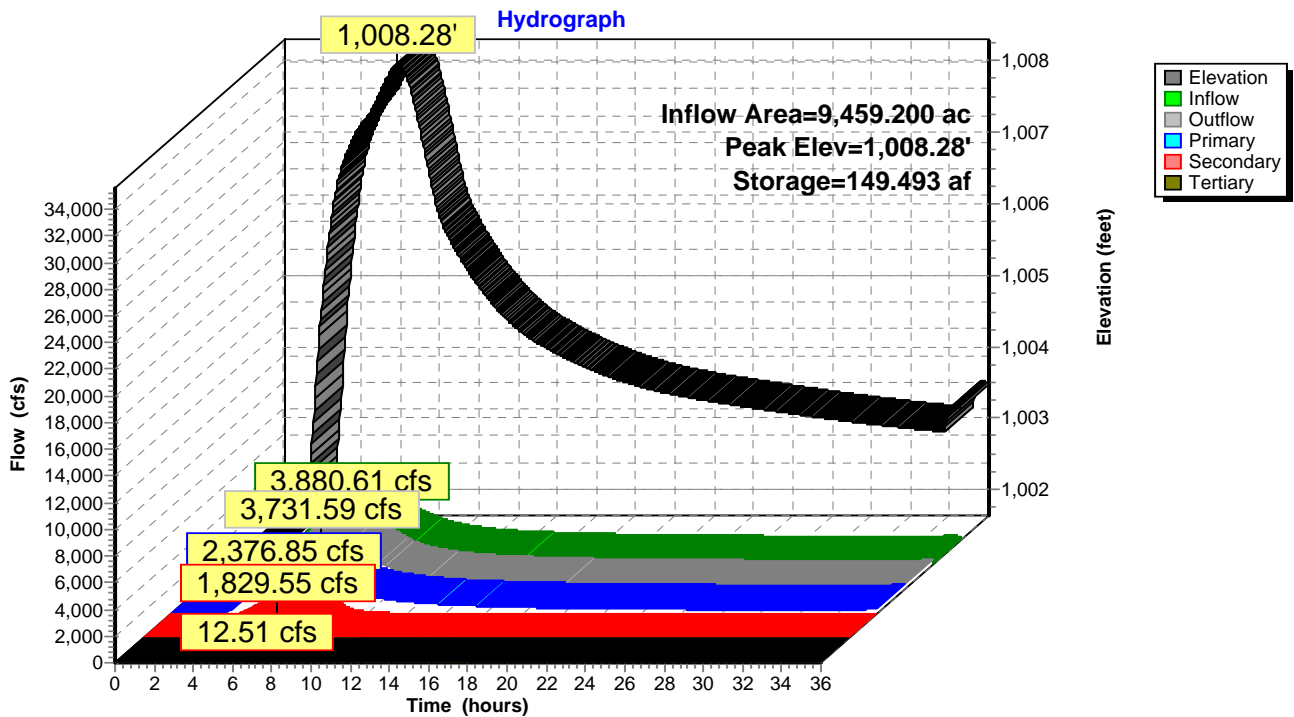
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

Primary OutFlow Max=2,374.69 cfs @ 5.66 hrs HW=1,007.54' TW=1,001.79' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,374.69 cfs @ 8.05 fps)

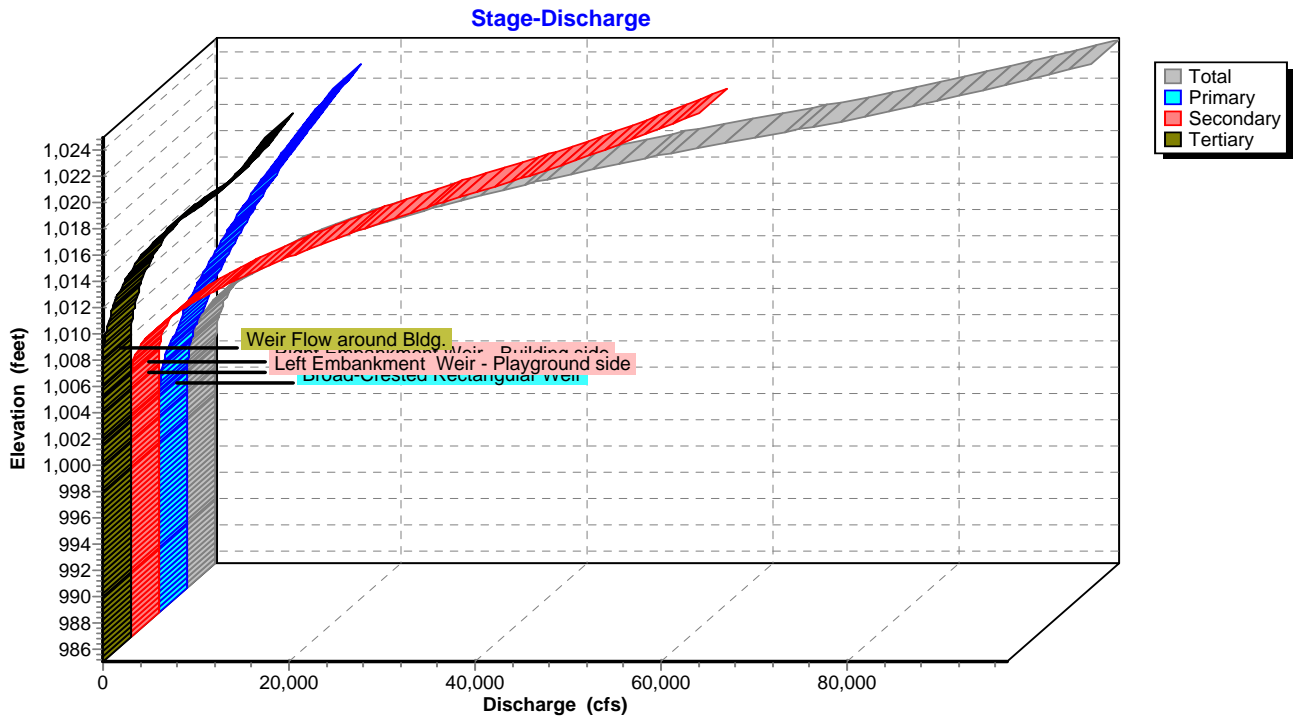
Secondary OutFlow Max=1,822.53 cfs @ 6.86 hrs HW=1,008.18' TW=1,006.89' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 769.39 cfs @ 4.49 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 1,053.14 cfs @ 4.37 fps)

Tertiary OutFlow Max=12.51 cfs @ 7.26 hrs HW=1,008.28' TW=1,007.32' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Weir Controls 12.51 cfs @ 0.85 fps)

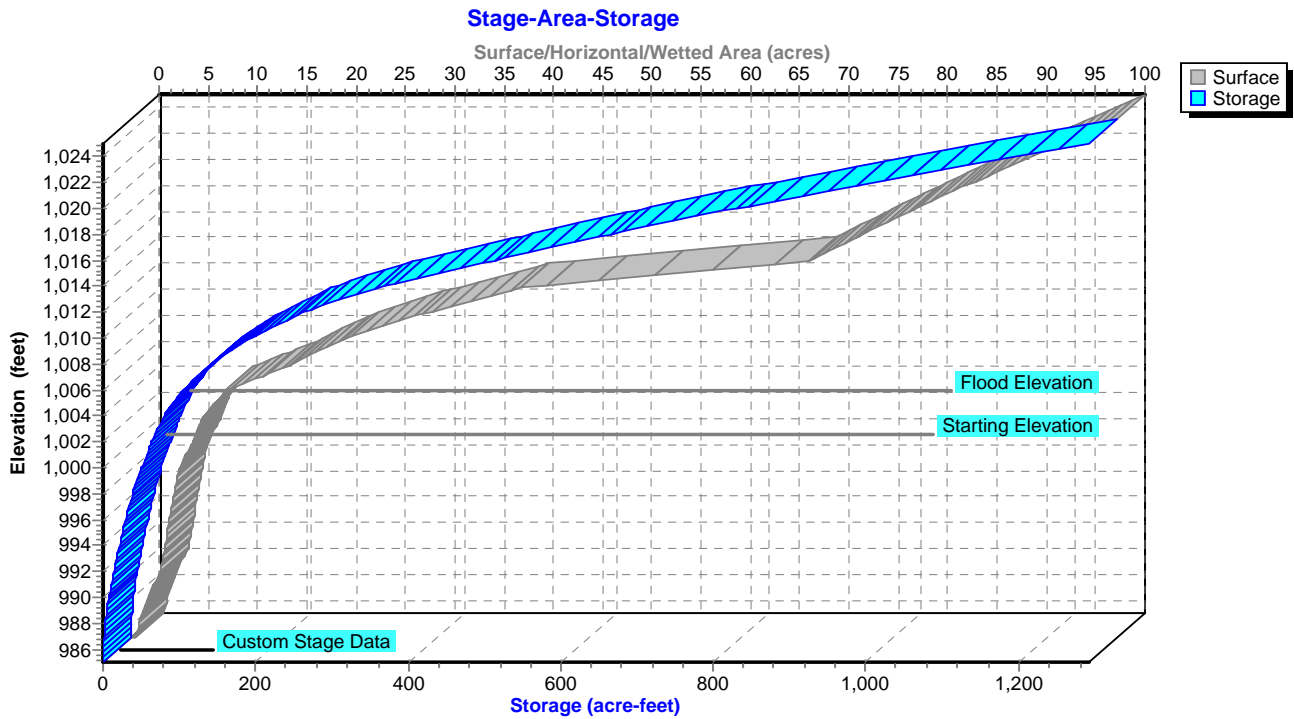
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

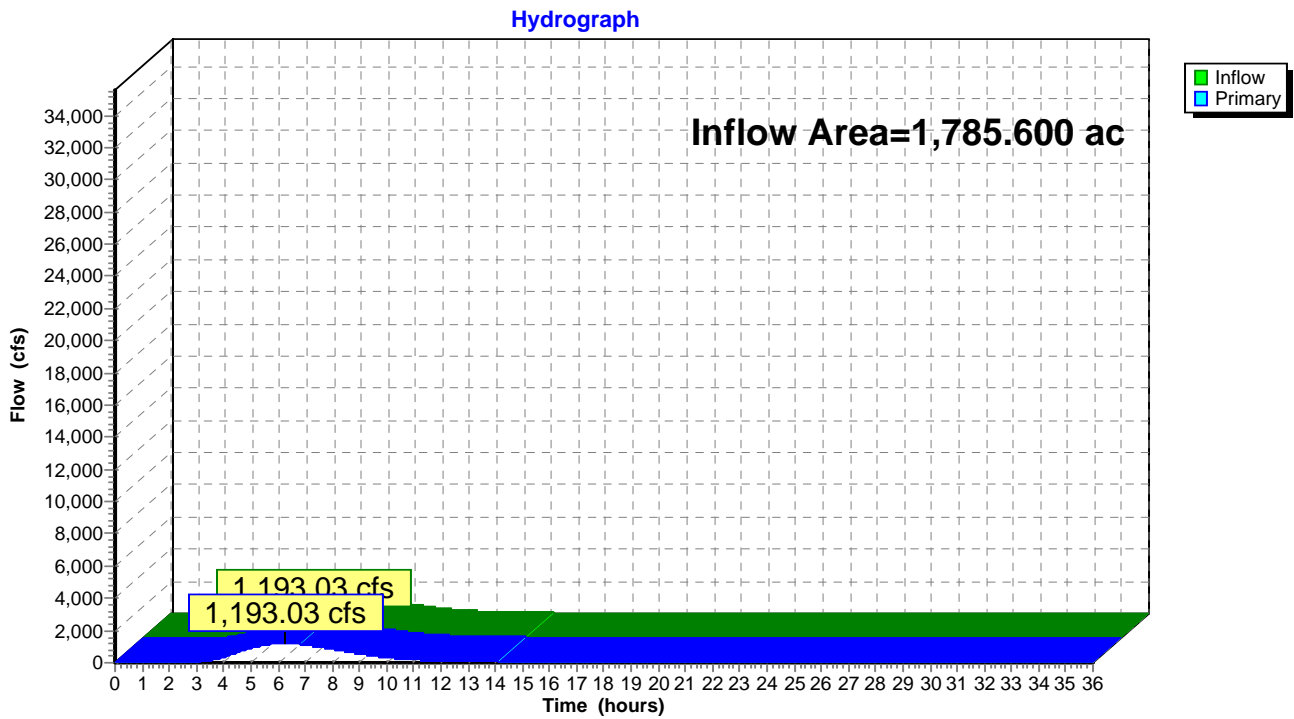


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.34" for 6-HR 0.25PMF event
 Inflow = 1,193.03 cfs @ 6.28 hrs, Volume= 496.676 af
 Primary = 1,193.03 cfs @ 6.29 hrs, Volume= 496.676 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.34" for 6-HR 0.25PMF event
 Inflow = 1,193.03 cfs @ 6.29 hrs, Volume= 496.675 af
 Outflow = 384.71 cfs @ 9.70 hrs, Volume= 690.840 af, Atten= 68%, Lag= 204.8 min
 Primary = 384.71 cfs @ 9.70 hrs, Volume= 690.840 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,098.30' @ 9.70 hrs Surf.Area= 252.736 ac Storage= 2,127.803 af (213.803 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 488.5 min (946.2 - 457.6)

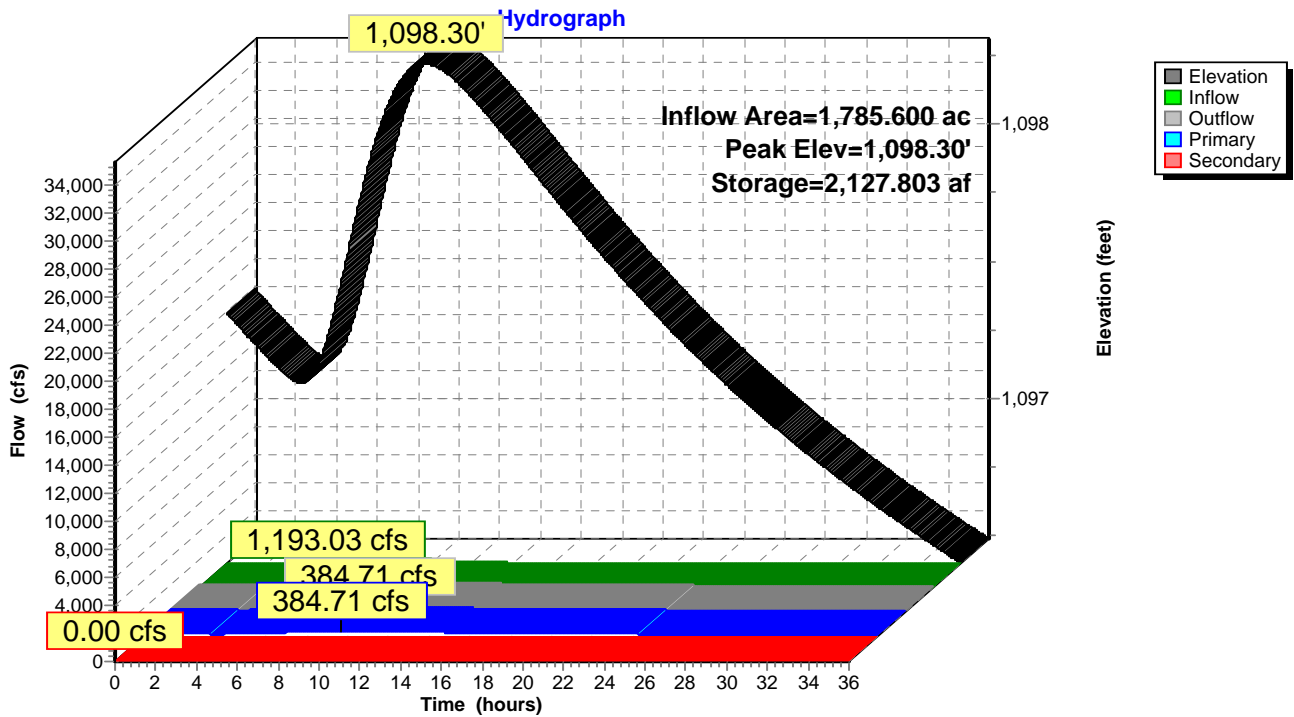
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

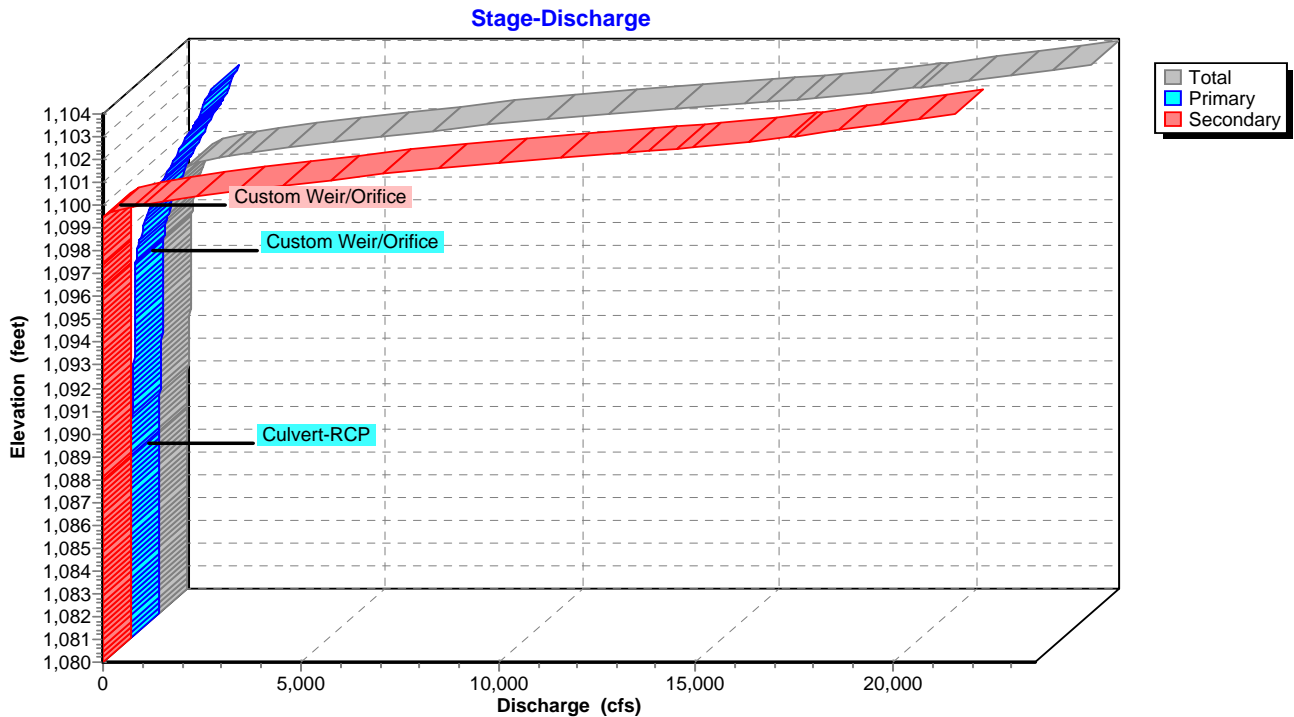
Primary OutFlow Max=384.71 cfs @ 9.70 hrs HW=1,098.30' TW=1,072.19' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 126.47 cfs @ 17.89 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 258.24 cfs @ 4.52 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

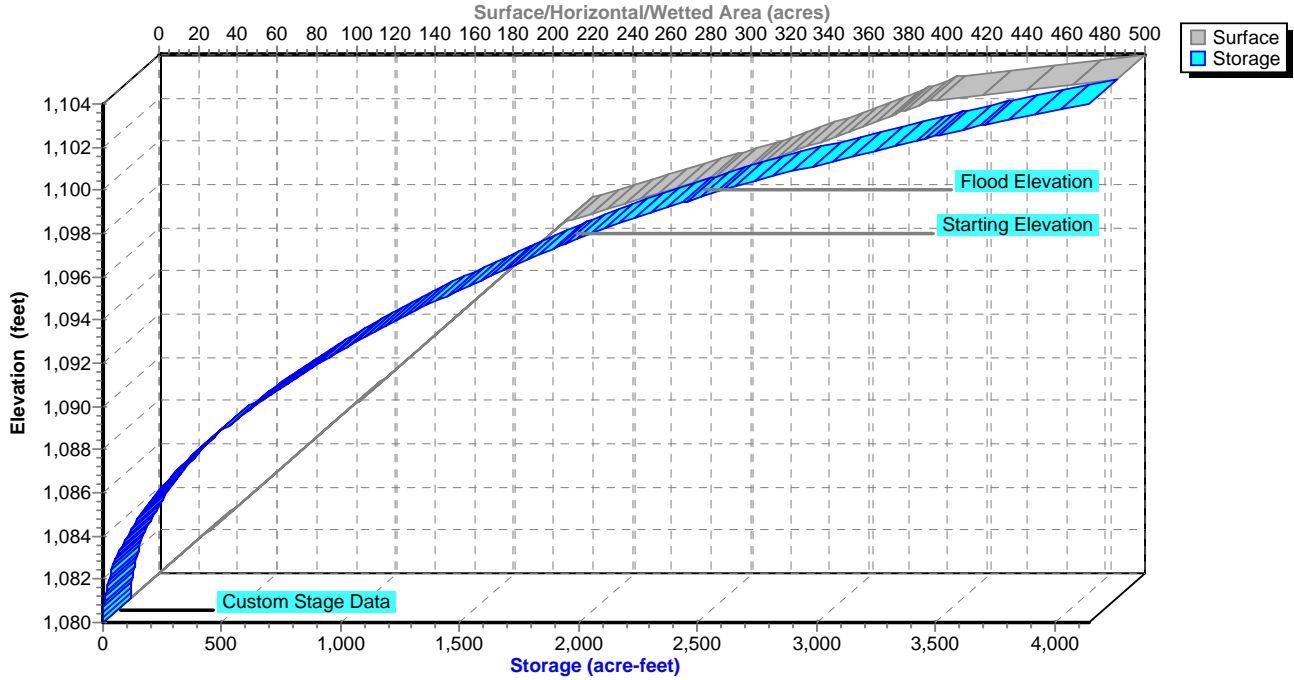


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



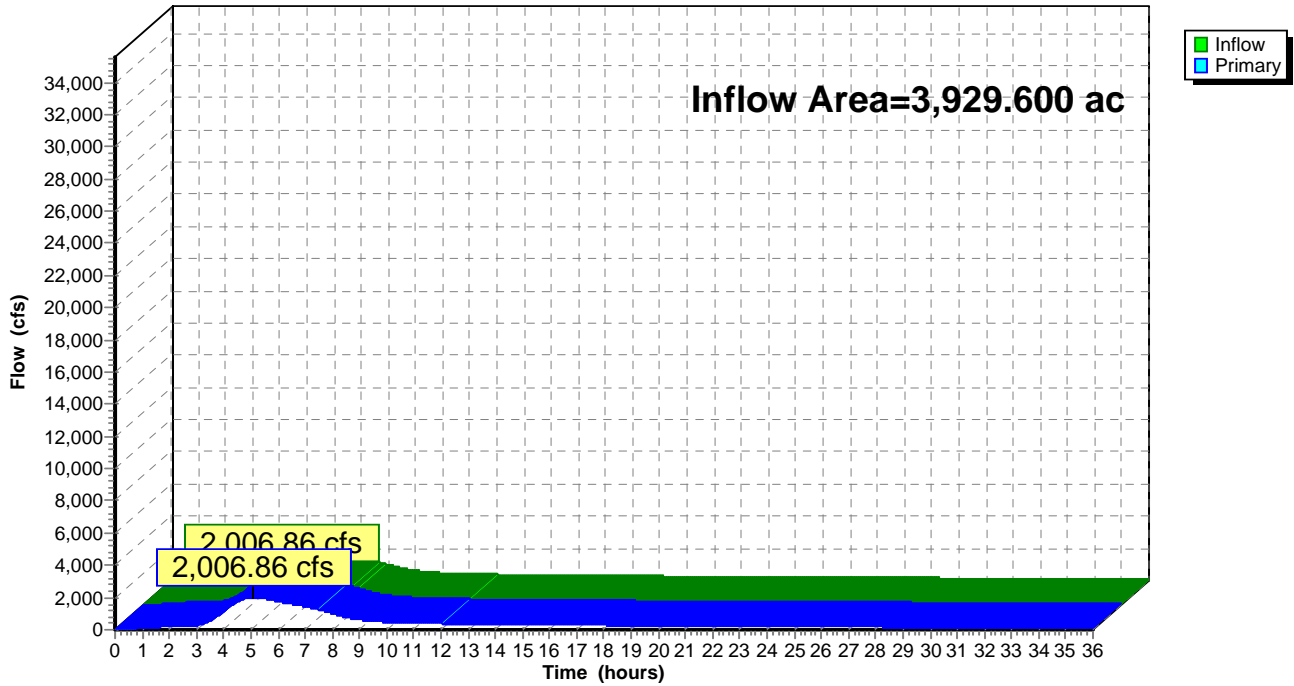
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.75" for 6-HR 0.25PMF event
Inflow = 2,006.86 cfs @ 5.09 hrs, Volume= 1,228.560 af
Primary = 2,006.86 cfs @ 5.10 hrs, Volume= 1,228.560 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.71" for 6-HR 0.25PMF event
 Inflow = 521.11 cfs @ 3.92 hrs, Volume= 118.799 af
 Outflow = 198.94 cfs @ 6.39 hrs, Volume= 118.284 af, Atten= 62%, Lag= 147.7 min
 Primary = 198.94 cfs @ 6.39 hrs, Volume= 118.284 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,108.11' @ 6.39 hrs Surf.Area= 29.345 ac Storage= 83.758 af (59.458 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 388.2 min calculated for 93.958 af (79% of inflow)
 Center-of-Mass det. time= 257.6 min (570.1 - 312.5)

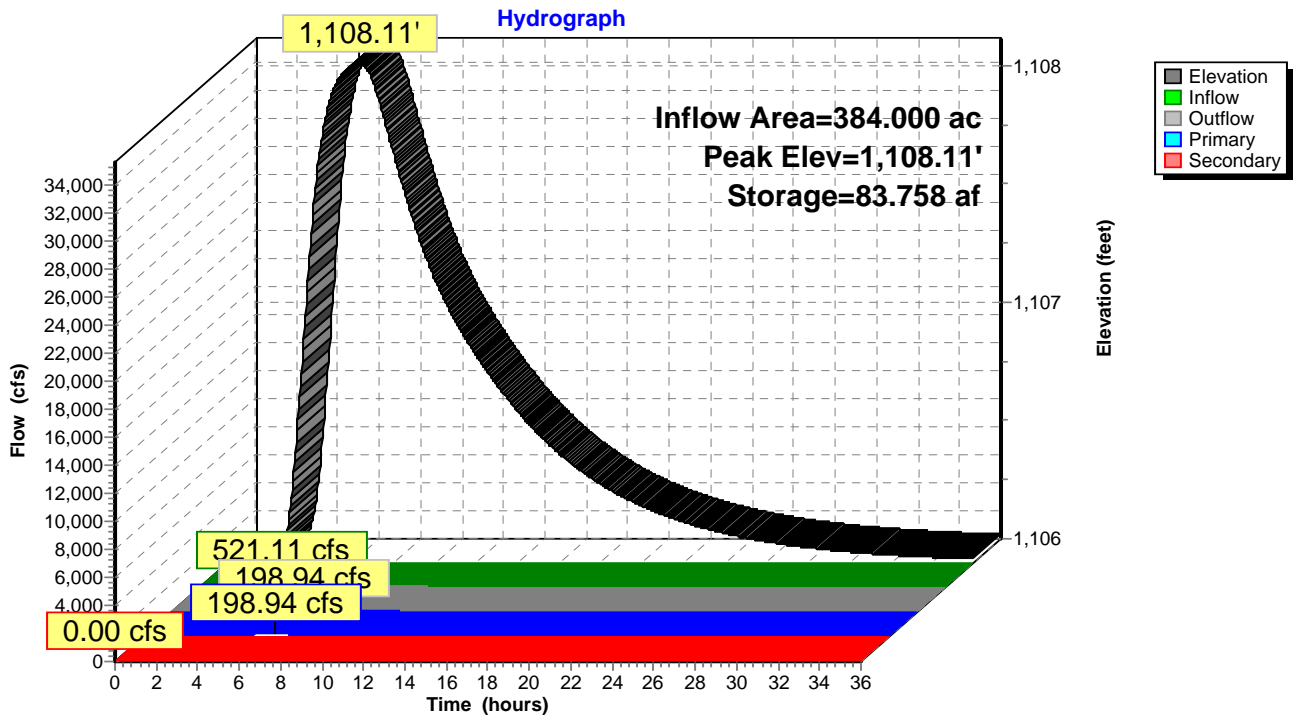
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

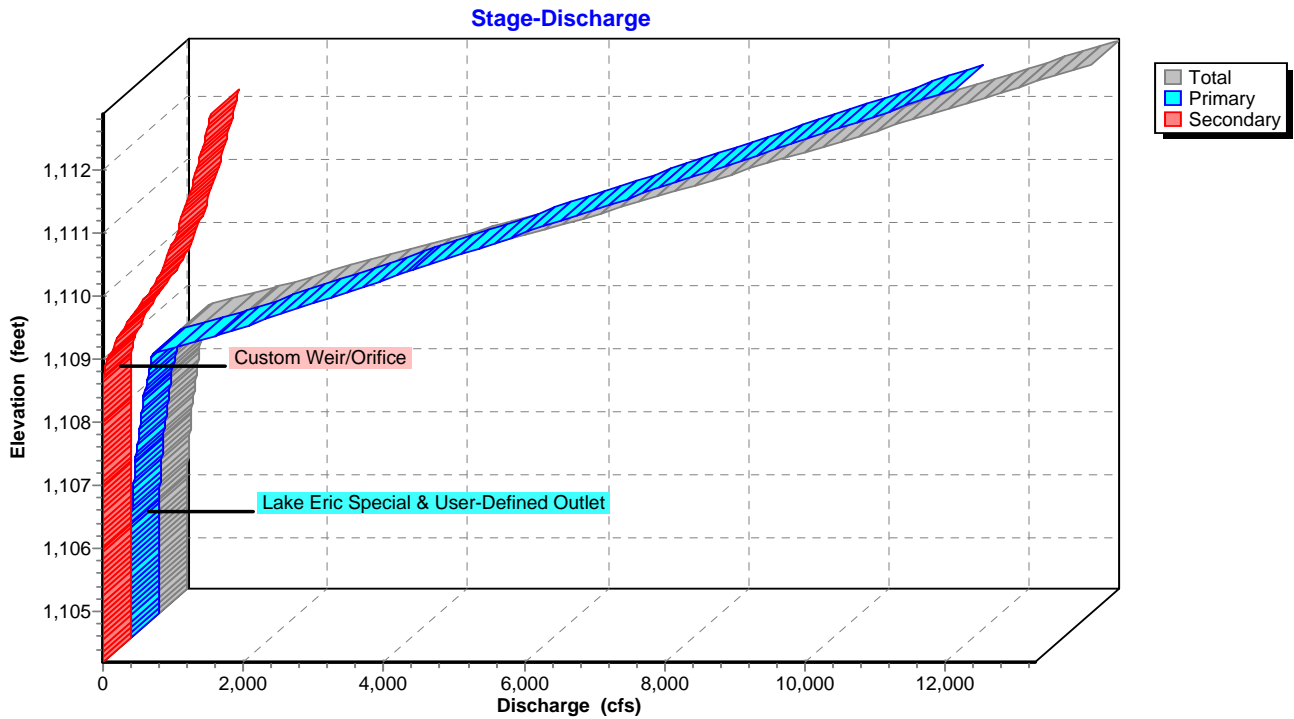
Primary OutFlow Max=198.94 cfs @ 6.39 hrs HW=1,108.11' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet(Custom Controls 198.94 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs

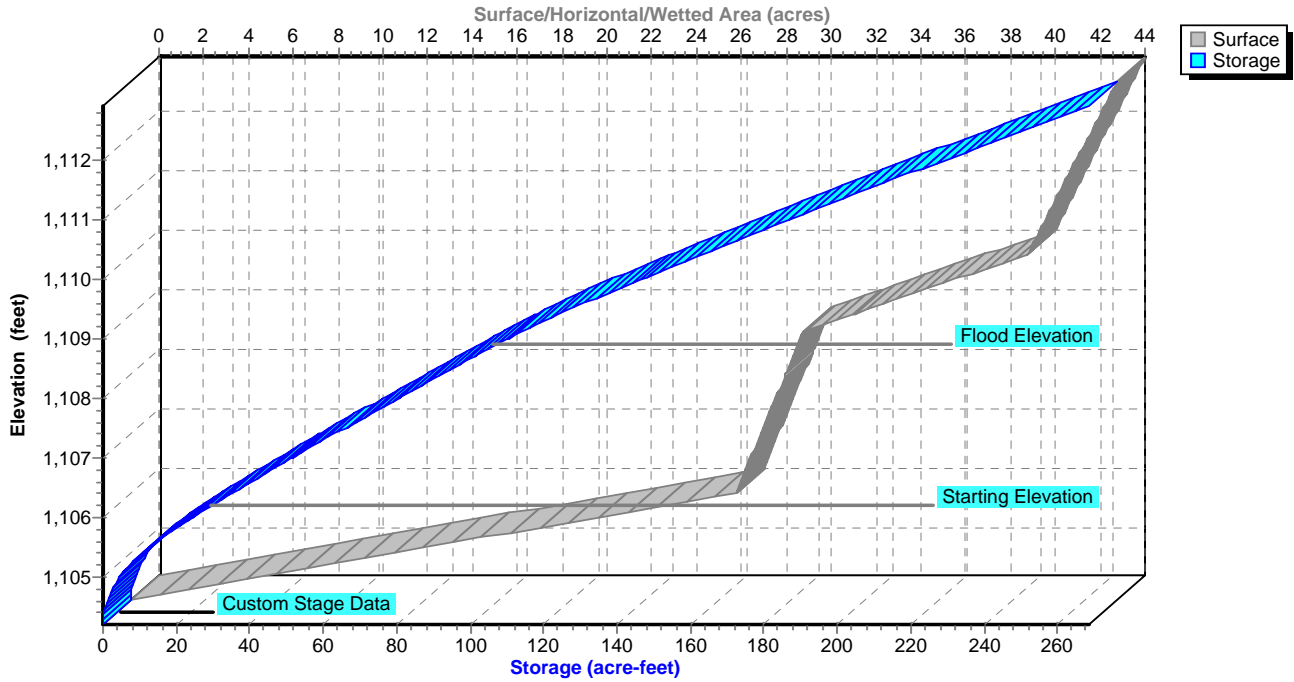


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



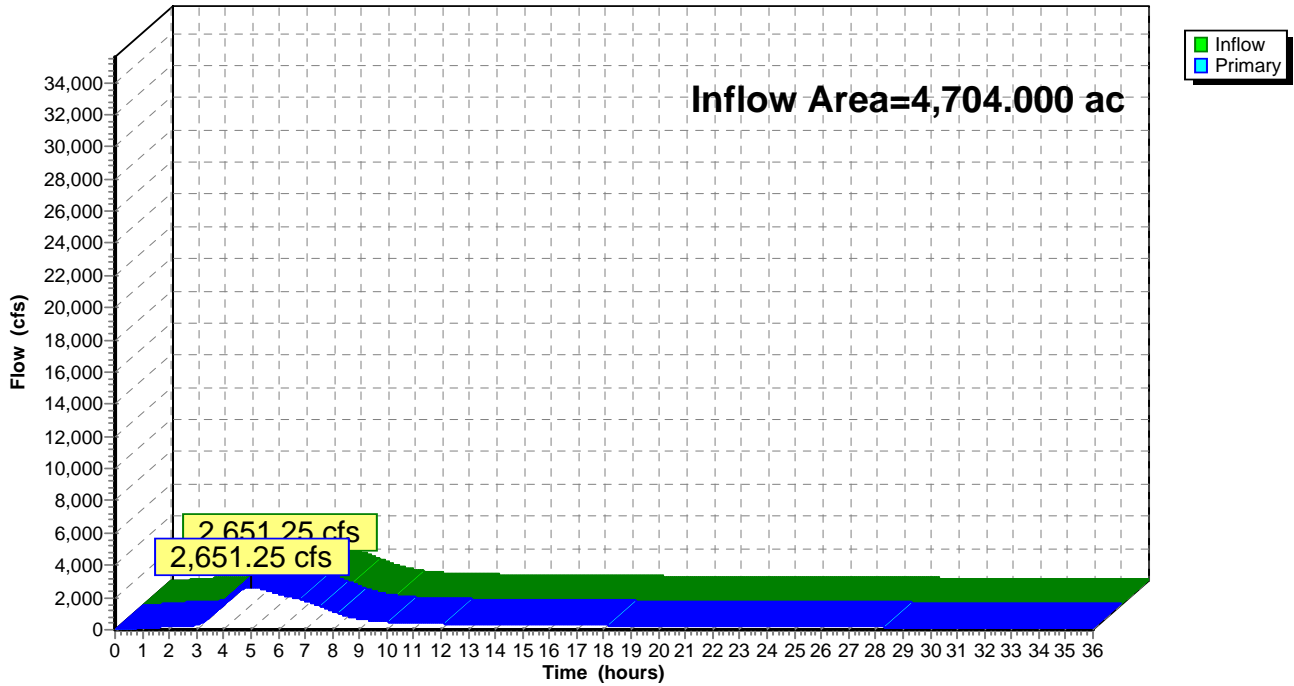
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 3.62" for 6-HR 0.25PMF event
Inflow = 2,651.25 cfs @ 5.01 hrs, Volume= 1,418.462 af
Primary = 2,651.25 cfs @ 5.02 hrs, Volume= 1,418.462 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 3.64" for 6-HR 0.25PMF event
 Inflow = 192.98 cfs @ 3.37 hrs, Volume= 34.982 af
 Outflow = 135.80 cfs @ 3.97 hrs, Volume= 34.870 af, Atten= 30%, Lag= 36.1 min
 Primary = 122.40 cfs @ 3.97 hrs, Volume= 34.344 af
 Secondary = 13.39 cfs @ 3.97 hrs, Volume= 0.525 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.10' @ 3.97 hrs Surf.Area= 4.239 ac Storage= 27.914 af (14.224 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 322.5 min calculated for 21.180 af (61% of inflow)
 Center-of-Mass det. time= 168.9 min (418.1 - 249.2)

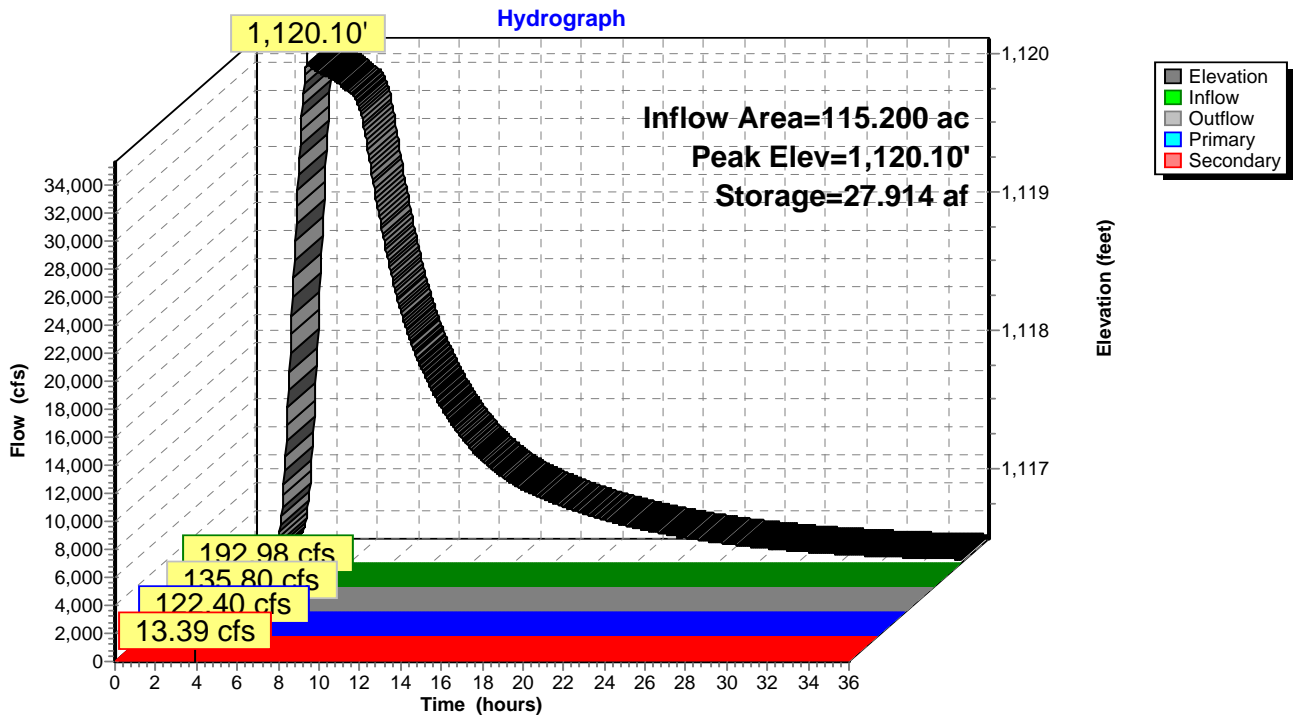
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

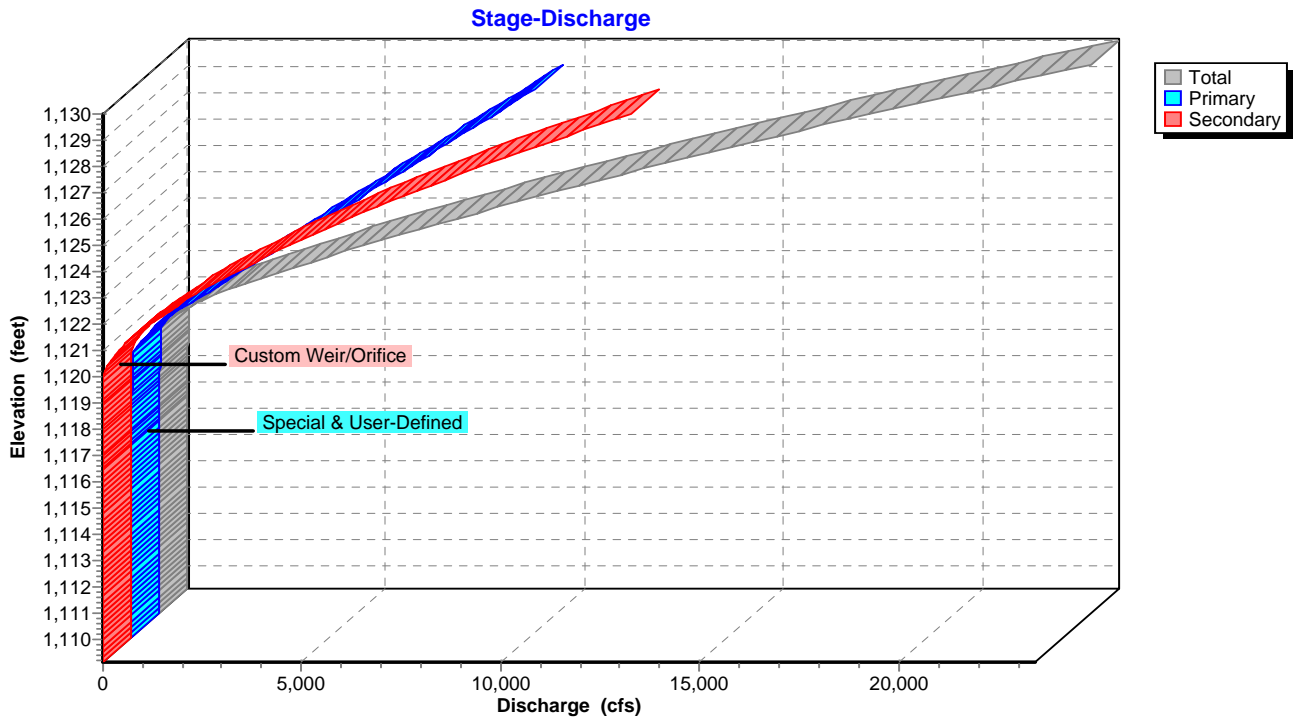
Primary OutFlow Max=122.40 cfs @ 3.97 hrs HW=1,120.10' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 122.40 cfs)

Secondary OutFlow Max=13.39 cfs @ 3.97 hrs HW=1,120.10' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 13.39 cfs @ 0.89 fps)

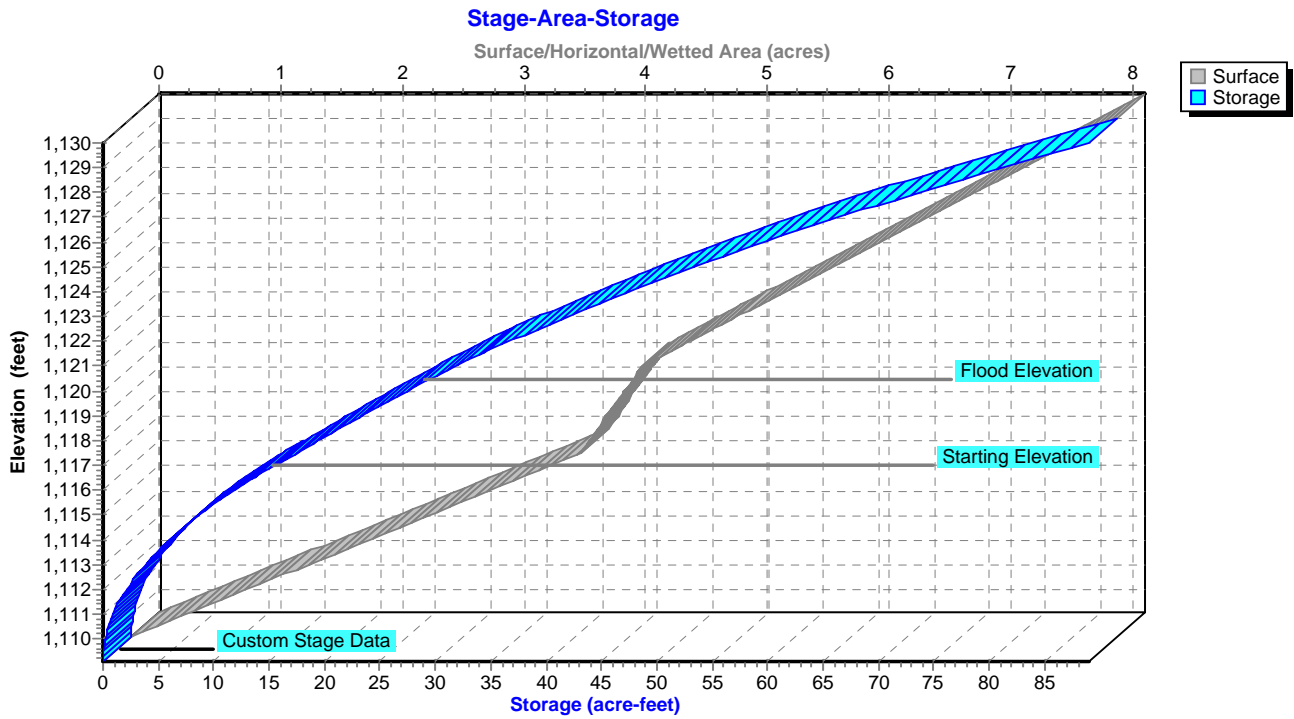
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



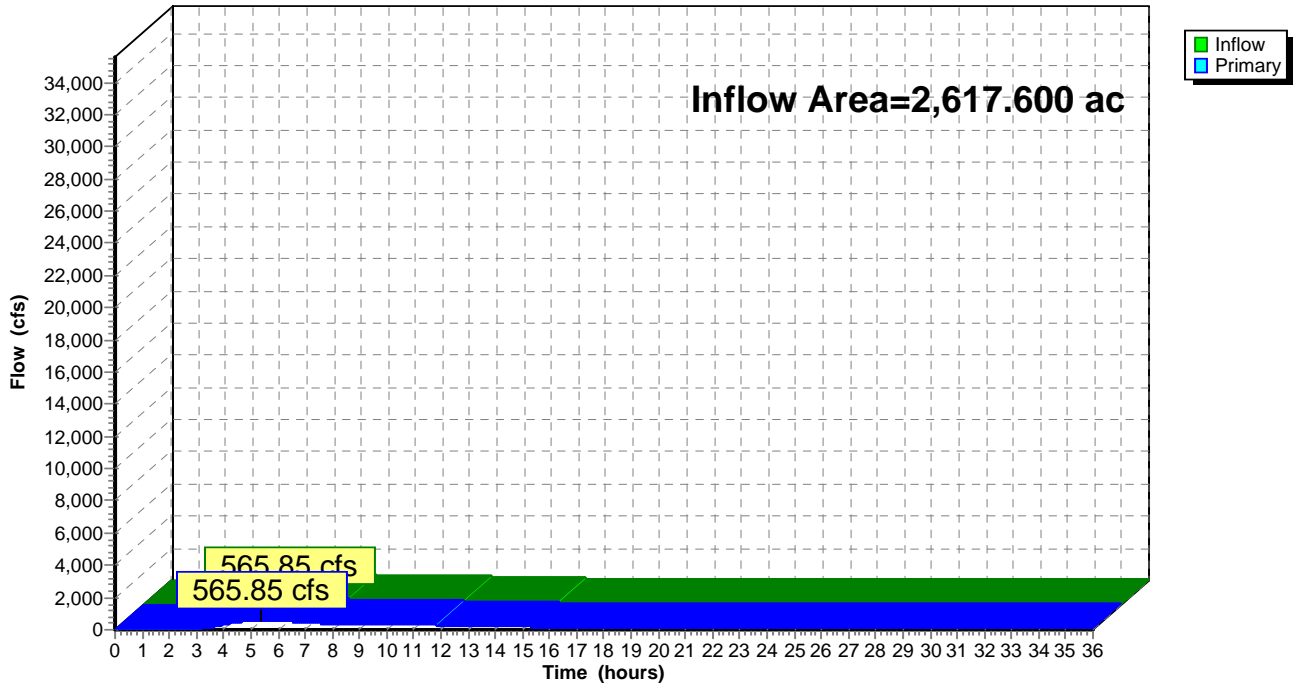
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 2.44" for 6-HR 0.25PMF event
Inflow = 565.85 cfs @ 5.37 hrs, Volume= 532.464 af
Primary = 565.85 cfs @ 5.38 hrs, Volume= 532.464 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

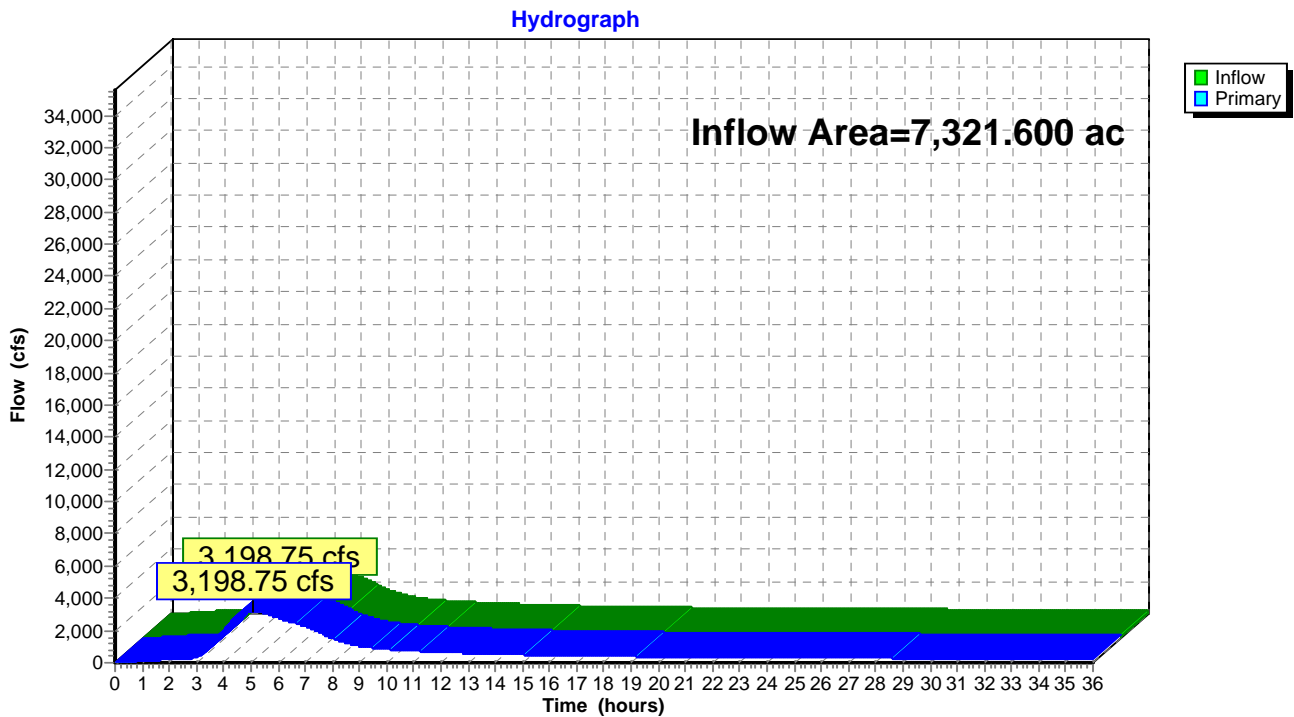


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 3.20" for 6-HR 0.25PMF event
Inflow = 3,198.75 cfs @ 5.04 hrs, Volume= 1,950.742 af
Primary = 3,198.75 cfs @ 5.05 hrs, Volume= 1,950.742 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



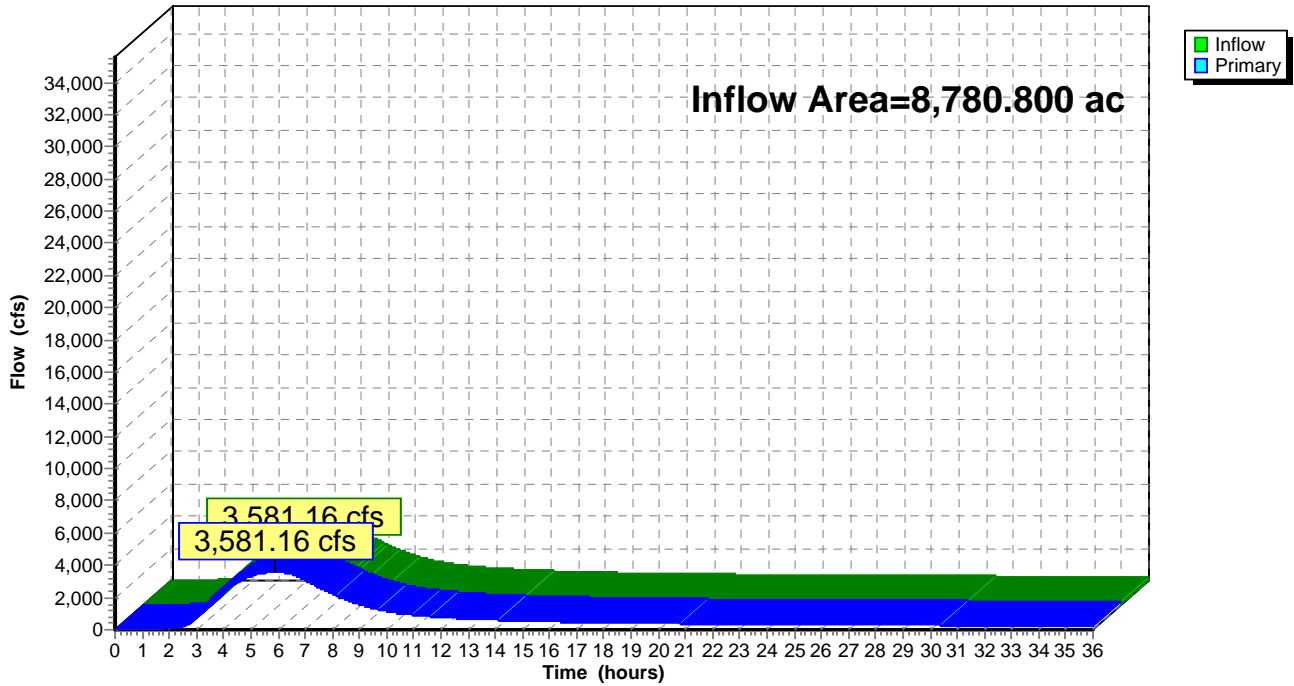
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 3.23" for 6-HR 0.25PMF event
Inflow = 3,581.16 cfs @ 5.89 hrs, Volume= 2,366.793 af
Primary = 3,581.16 cfs @ 5.90 hrs, Volume= 2,366.793 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 3.18" for 6-HR 0.25PMF event
 Inflow = 1,648.77 cfs @ 5.95 hrs, Volume= 520.643 af
 Outflow = 311.19 cfs @ 9.91 hrs, Volume= 373.212 af, Atten= 81%, Lag= 237.9 min
 Primary = 127.22 cfs @ 7.82 hrs, Volume= 290.267 af
 Secondary = 202.69 cfs @ 9.92 hrs, Volume= 82.944 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.58' @ 9.92 hrs Surf.Area= 155.859 ac Storage= 392.080 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 715.4 min calculated for 373.108 af (72% of inflow)
 Center-of-Mass det. time= 645.3 min (1,097.9 - 452.6)

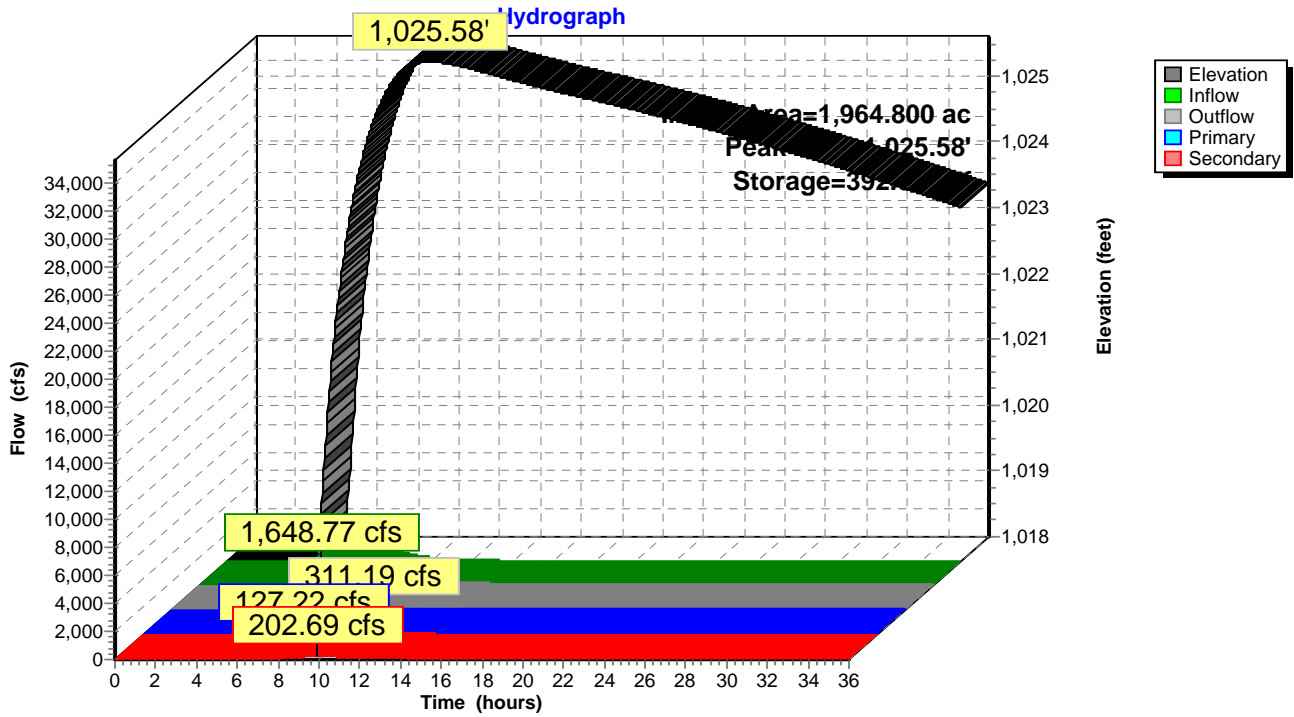
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

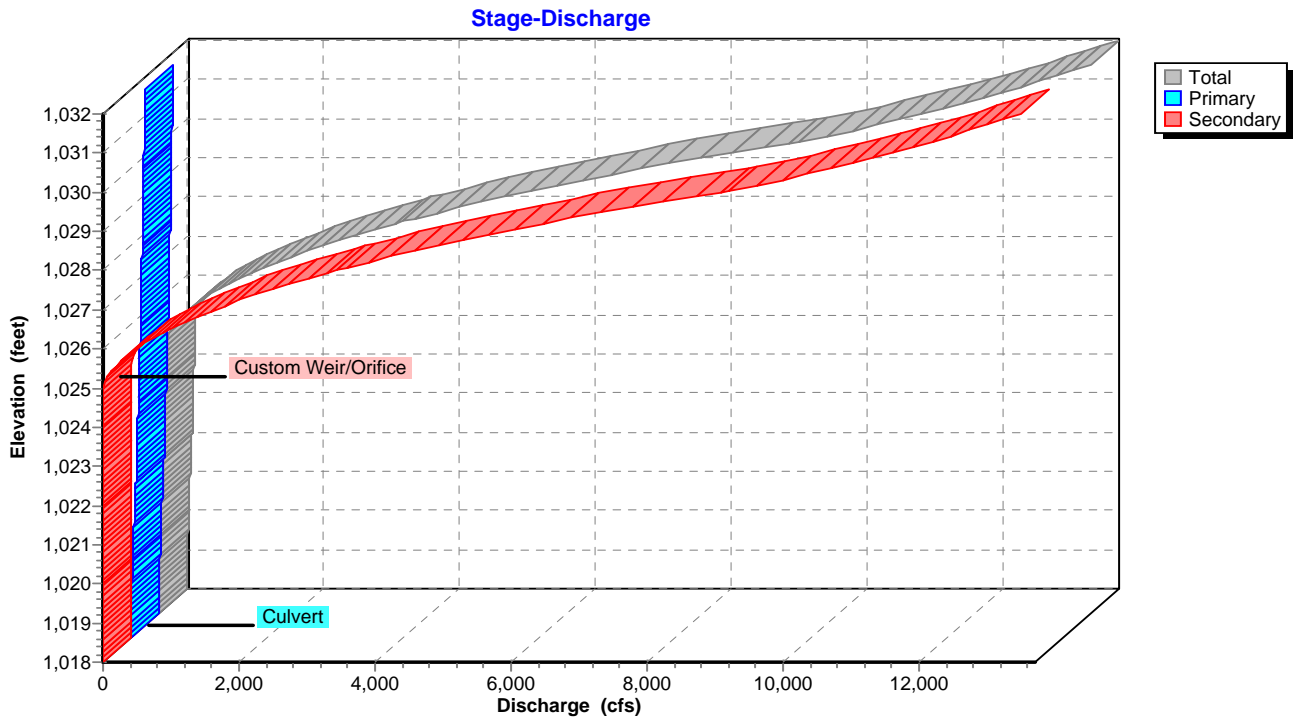
Primary OutFlow Max=127.06 cfs @ 7.82 hrs HW=1,025.14' TW=1,020.73' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 127.06 cfs @ 10.11 fps)

Secondary OutFlow Max=202.69 cfs @ 9.92 hrs HW=1,025.58' TW=1,022.36' (Dynamic Tailwater)
 ↑**2=Custom Weir/Orifice** (Weir Controls 202.69 cfs @ 2.42 fps)

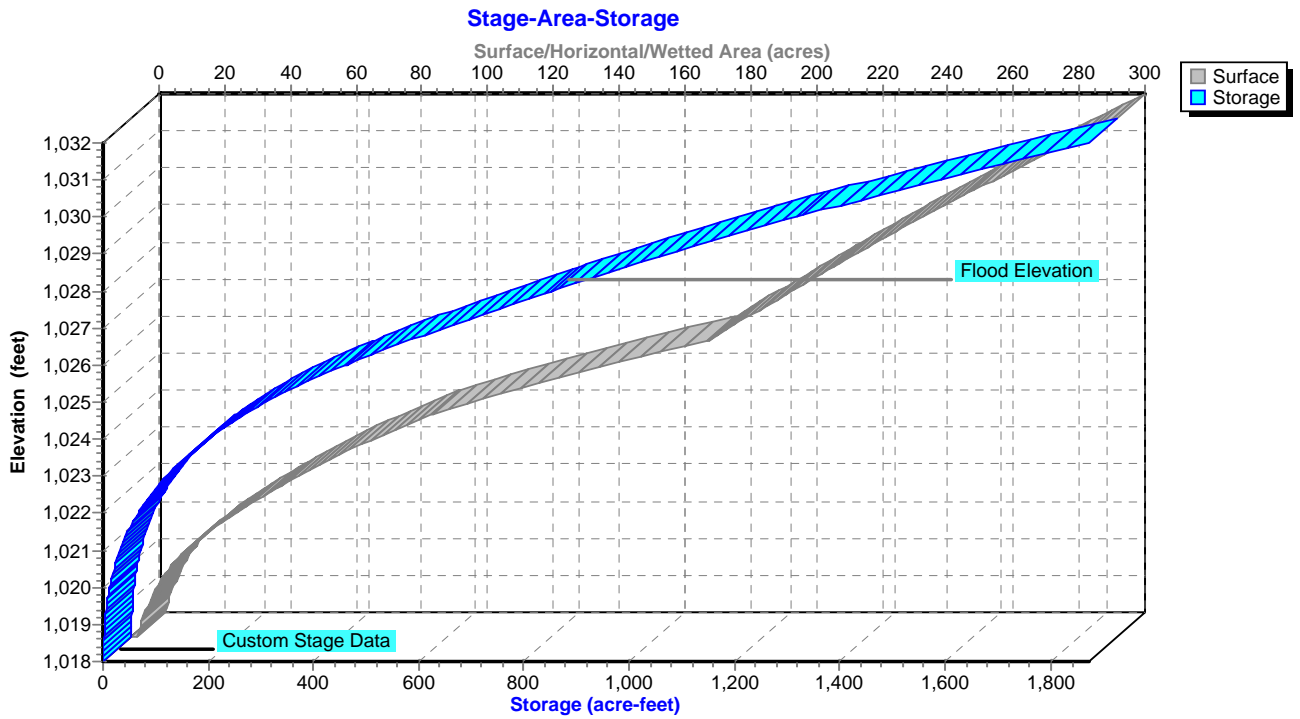
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 3.75" for 6-HR 0.25PMF event
 Inflow = 2,004.56 cfs @ 5.02 hrs, Volume= 613.485 af
 Outflow = 1,648.77 cfs @ 5.95 hrs, Volume= 520.643 af, Atten= 18%, Lag= 55.4 min
 Primary = 1,648.77 cfs @ 5.95 hrs, Volume= 520.643 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.24' @ 5.95 hrs Surf.Area= 105.520 ac Storage= 436.613 af (216.613 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 255.7 min calculated for 300.560 af (49% of inflow)
 Center-of-Mass det. time= 100.4 min (452.6 - 352.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

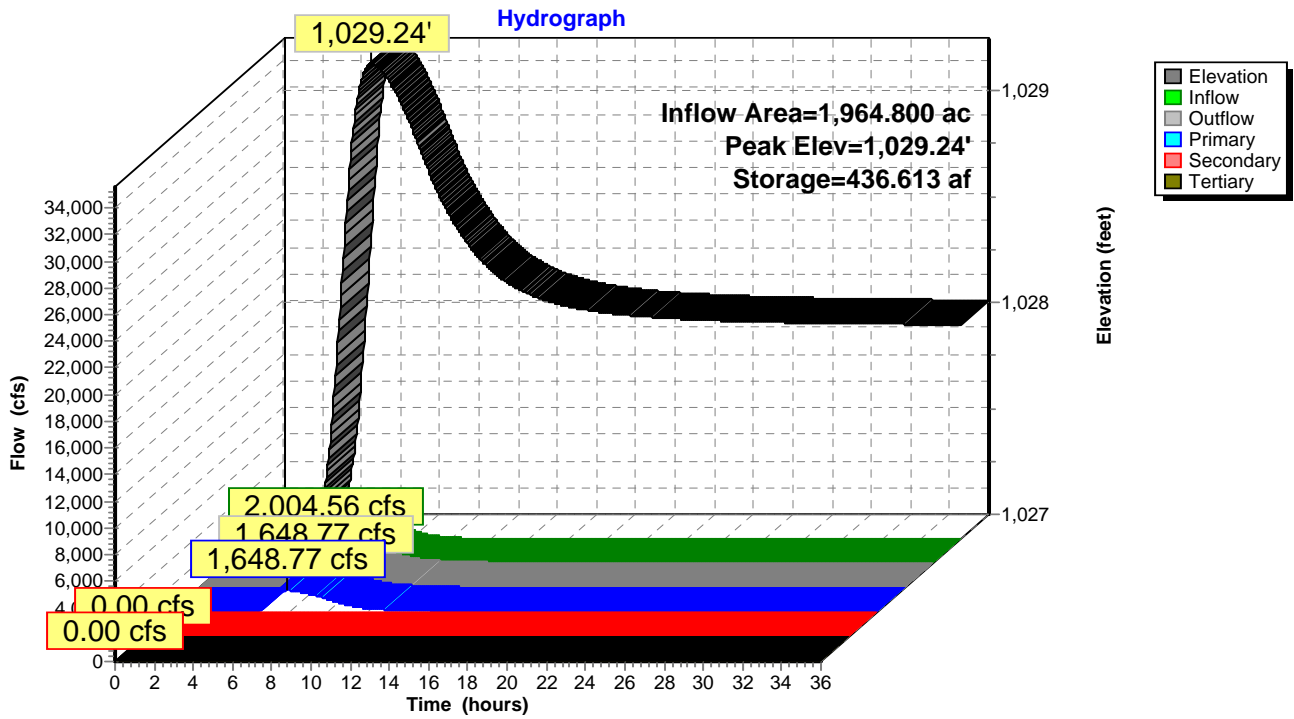
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,648.76 cfs @ 5.95 hrs HW=1,029.24' TW=1,023.08' (Dynamic Tailwater)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 1,091.83 cfs @ 2.94 fps)
 ↓2=**Broad-Crested Rectangular Weir** (Weir Controls 556.93 cfs @ 2.28 fps)

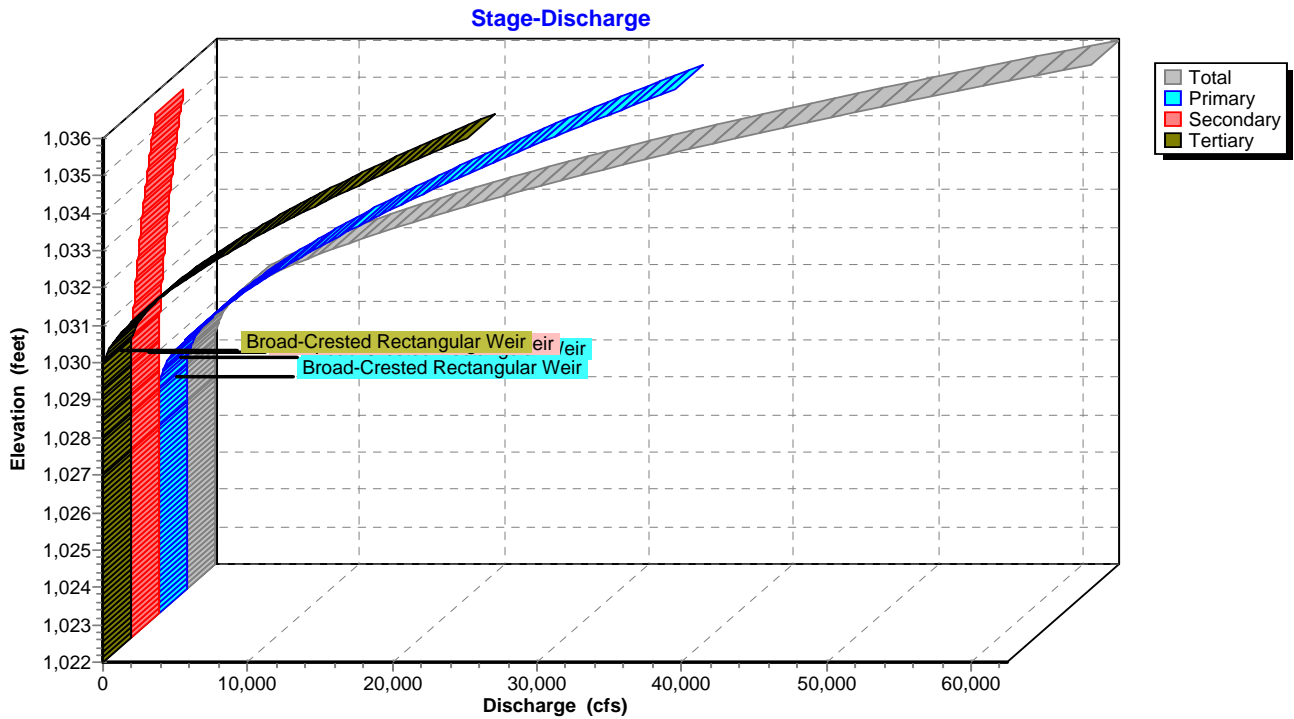
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

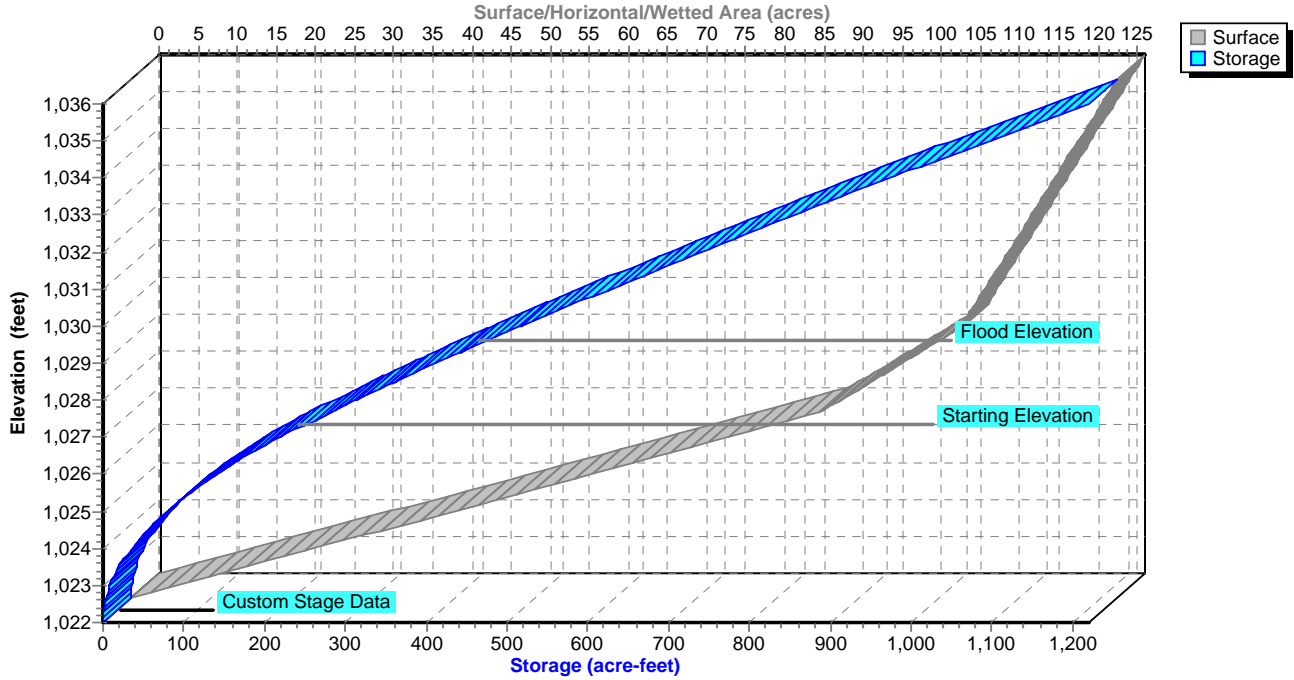


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

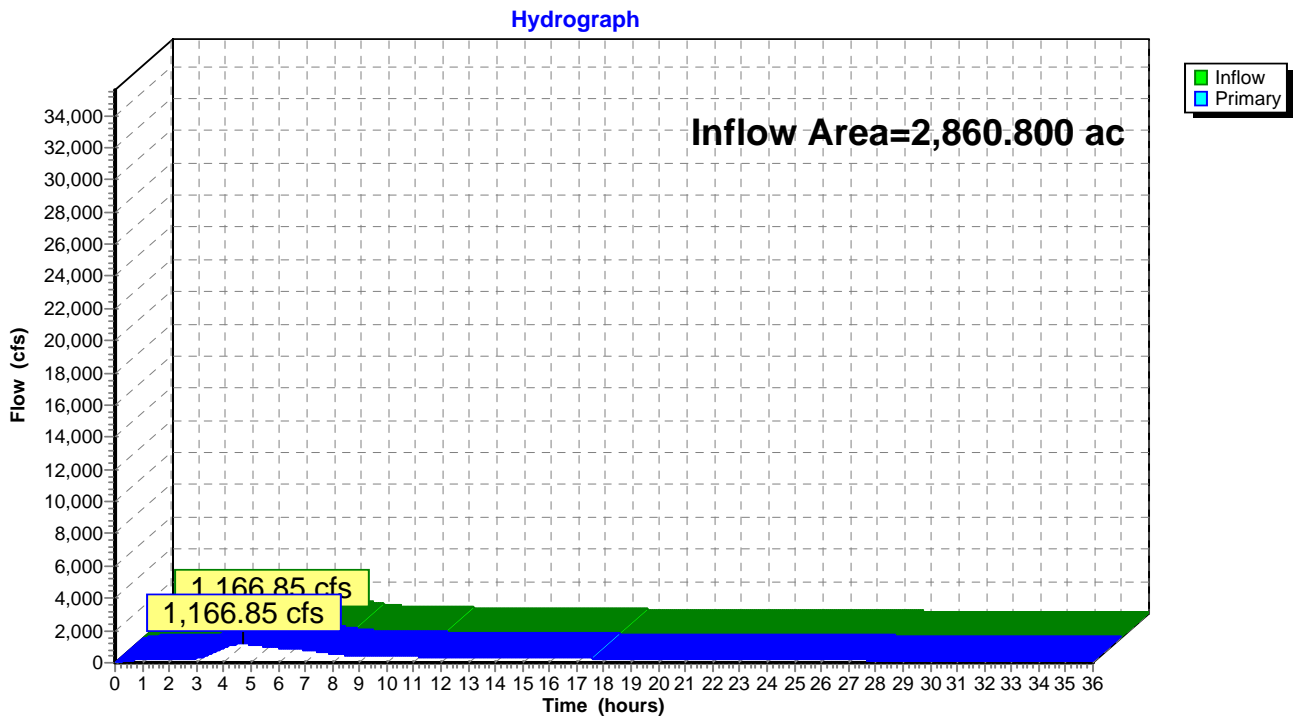


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 4.02" for 6-HR 0.25PMF event
Inflow = 1,166.85 cfs @ 4.69 hrs, Volume= 957.837 af
Primary = 1,166.85 cfs @ 4.70 hrs, Volume= 957.837 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.25" for 6-HR 0.25PMF event
 Inflow = 3,731.59 cfs @ 6.21 hrs, Volume= 2,565.131 af
 Outflow = 3,280.91 cfs @ 7.37 hrs, Volume= 2,563.787 af, Atten= 12%, Lag= 69.9 min
 Primary = 3,280.91 cfs @ 7.37 hrs, Volume= 2,563.787 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,007.35' @ 7.37 hrs Surf.Area= 13.158 ac Storage= 188.322 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 21.7 min calculated for 2,563.075 af (100% of inflow)
 Center-of-Mass det. time= 21.0 min (725.2 - 704.2)

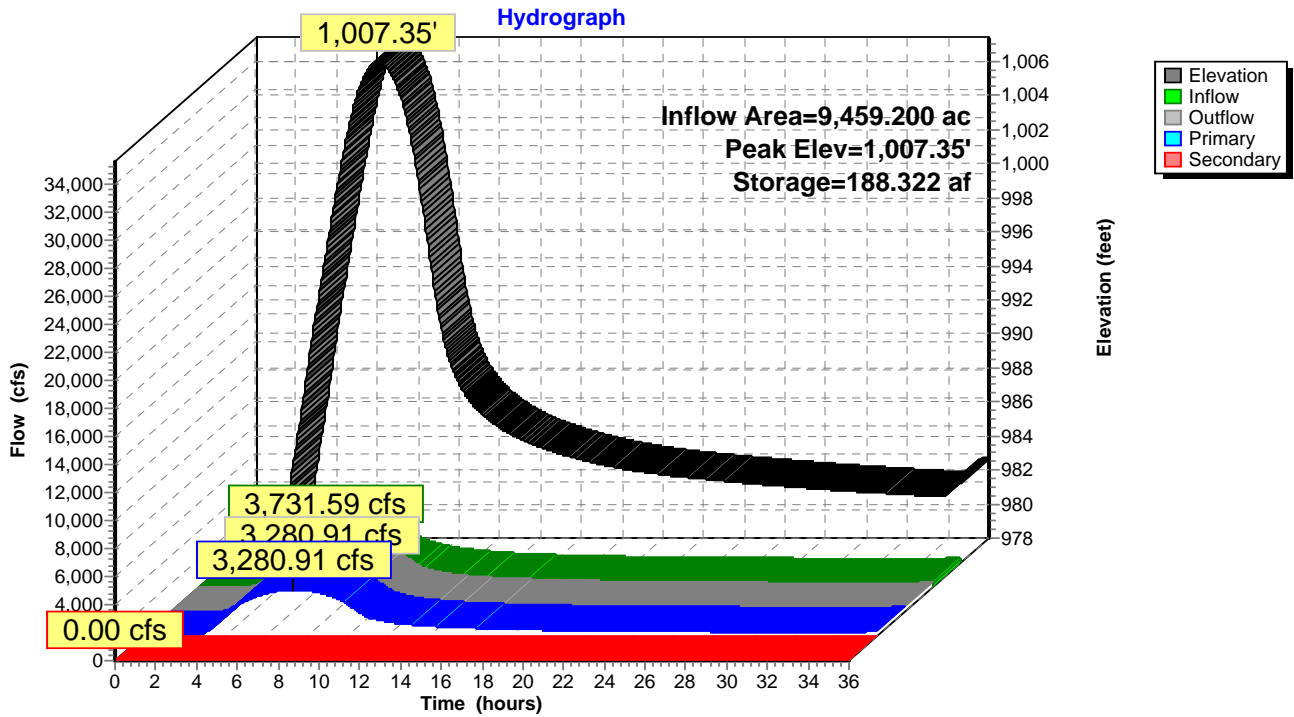
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

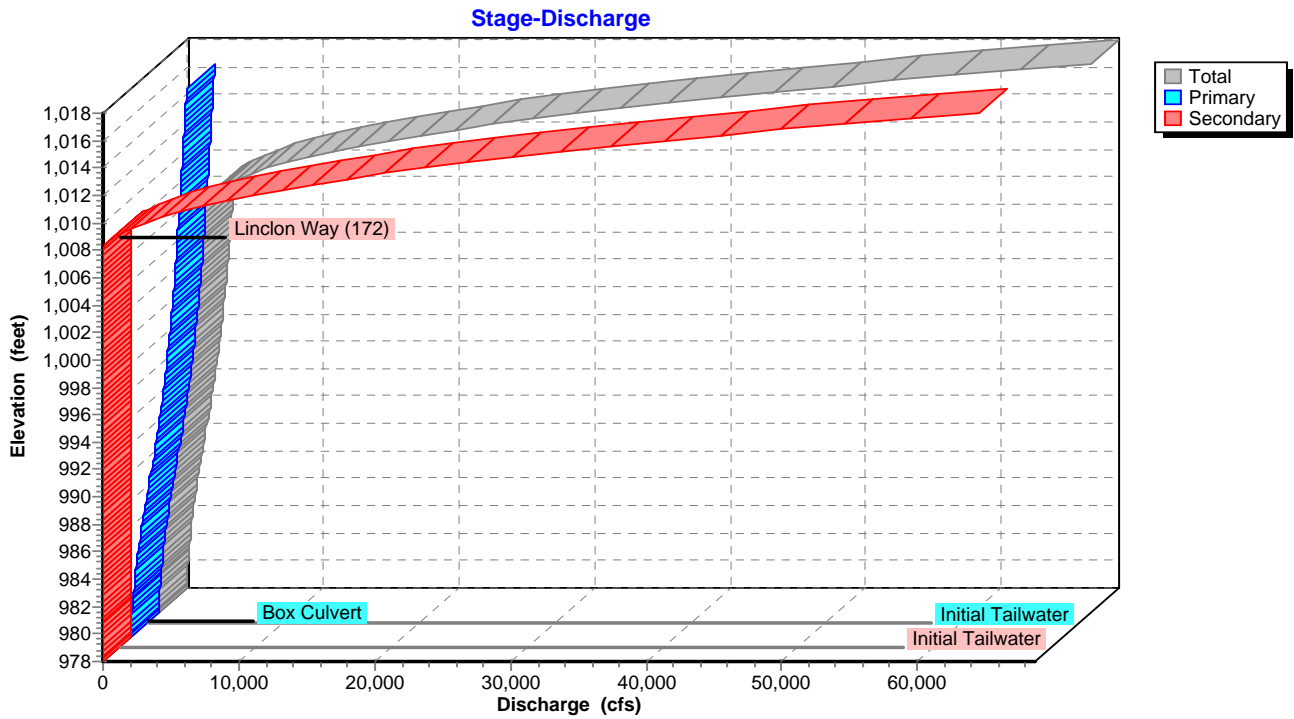
Primary OutFlow Max=3,280.90 cfs @ 7.37 hrs HW=1,007.35' TW=984.35' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,280.90 cfs @ 28.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

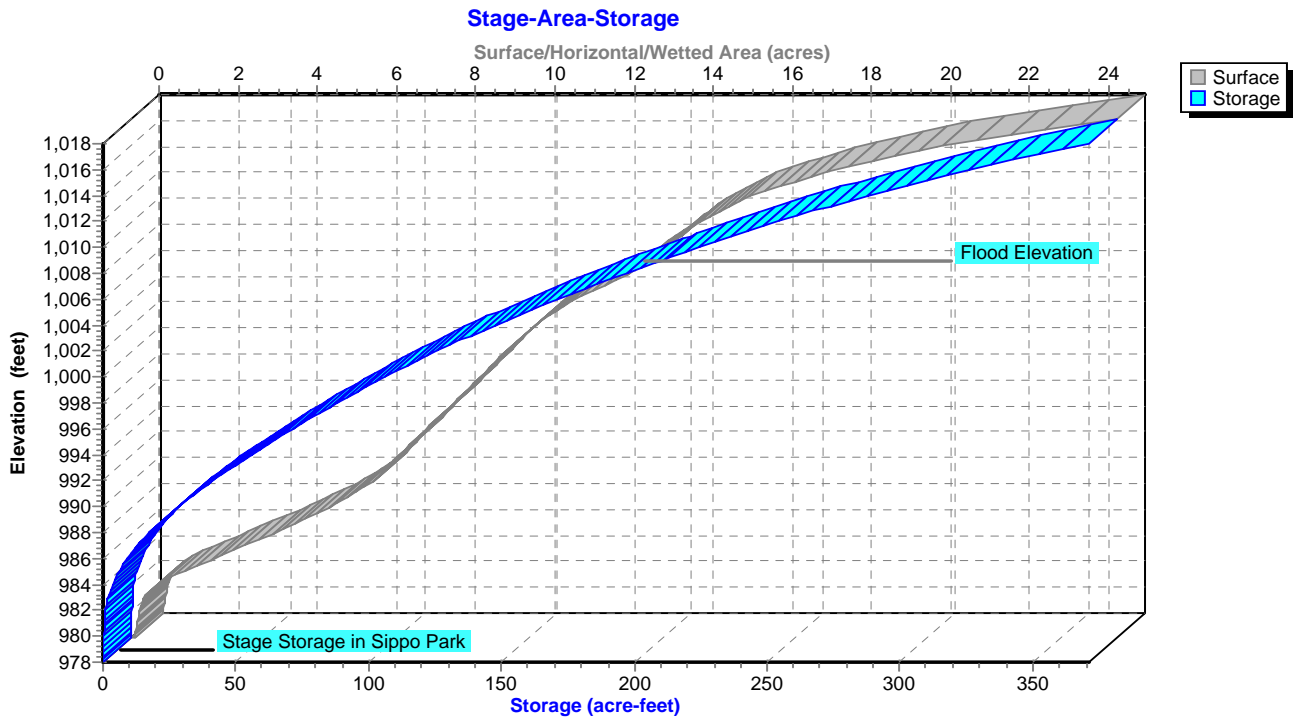
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



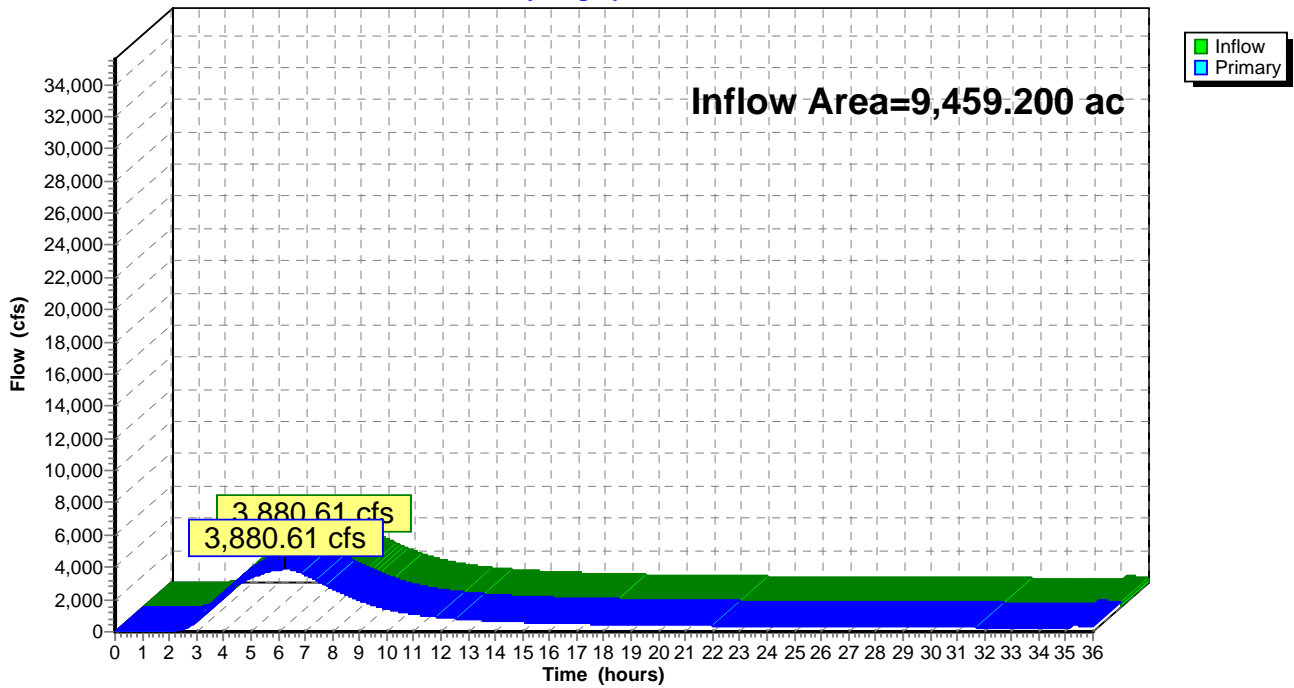
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 3.27" for 6-HR 0.25PMF event
 Inflow = 3,880.61 cfs @ 6.28 hrs, Volume= 2,579.928 af
 Primary = 3,880.61 cfs @ 6.29 hrs, Volume= 2,579.928 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=4.79"
 Tc=44.0 min CN=74 Runoff=255.72 cfs 46.001 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=4.91"
 Tc=65.0 min CN=75 Runoff=547.88 cfs 109.906 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=4.34"
 Tc=226.0 min CN=70 Runoff=1,330.65 cfs 506.405 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=4.11"
 Tc=128.0 min CN=68 Runoff=1,326.72 cfs 368.221 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=4.00"
 Tc=129.0 min CN=67 Runoff=923.34 cfs 257.947 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=4.79"
 Tc=110.0 min CN=74 Runoff=1,147.58 cfs 288.782 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=4.91"
 Tc=72.0 min CN=75 Runoff=1,446.14 cfs 300.933 af

SubcatchmentHYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=5.48"
 Tc=78.0 min CN=80 Runoff=1,458.19 cfs 310.058 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=4.22"
 Tc=155.0 min CN=69 Runoff=1,227.82 cfs 376.080 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=4.91"
 Tc=156.0 min CN=75 Runoff=2,637.72 cfs 803.362 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=4.00"
 Tc=151.0 min CN=67 Runoff=714.70 cfs 217.443 af

Reach 5R: Channel 5 Avg. Flow Depth=3.53' Max Vel=6.56 fps Inflow=485.20 cfs 821.523 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=484.41 cfs 815.811 af

Reach 7R: Channel 7 Avg. Flow Depth=9.79' Max Vel=3.49 fps Inflow=1,530.01 cfs 1,183.808 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=1,456.60 cfs 1,174.412 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=6.24' Max Vel=3.28 fps Inflow=719.13 cfs 551.456 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=716.72 cfs 550.681 af

Reach 15R: Channel 15 Avg. Flow Depth=9.88' Max Vel=2.36 fps Inflow=4,333.85 cfs 2,575.859 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=3,661.26 cfs 2,540.433 af

Reach 16R: Channel 16 Avg. Flow Depth=12.19' Max Vel=3.04 fps Inflow=4,850.76 cfs 3,129.734 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=4,724.01 cfs 3,090.854 af

Existing Conditions Sippo Reservoir- TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 494

Reach 18R: Sippo Creek Avg. Flow Depth=7.33' Max Vel=10.01 fps Inflow=5,130.37 cfs 3,387.226 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=5,130.36 cfs 3,387.104 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=778.74 cfs 155.792 af
Primary=778.74 cfs 155.792 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,010.07' Storage=196.431 af Inflow=5,227.19 cfs 3,400.480 af
1 cfs 2,220.430 af Secondary=3,145.16 cfs 1,120.857 af Tertiary=249.79 cfs 47.208 af Outflow=5,136.87 cfs 3,388.495 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=1,611.21 cfs 661.646 af
Primary=1,611.21 cfs 661.646 af

Pond 3P: Lake Cable Peak Elev=1,098.76' Storage=2,247.881 af Inflow=1,611.21 cfs 661.645 af
Primary=485.20 cfs 821.634 af Secondary=0.00 cfs 0.000 af Outflow=485.20 cfs 821.634 af

Pond 4C: Confluence 4 Inflow=2,682.95 cfs 1,550.378 af
Primary=2,682.95 cfs 1,550.378 af

Pond 4P: Lake O'Springs Peak Elev=1,108.61' Storage=98.658 af Inflow=778.74 cfs 155.792 af
Primary=285.17 cfs 155.242 af Secondary=0.00 cfs 0.000 af Outflow=285.17 cfs 155.242 af

Pond 5C: Confluence 5 Inflow=3,560.83 cfs 1,808.211 af
Primary=3,560.83 cfs 1,808.211 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.22' Storage=28.434 af Inflow=255.72 cfs 46.001 af
Primary=187.13 cfs 43.300 af Secondary=44.07 cfs 2.586 af Outflow=231.20 cfs 45.886 af

Pond 6C: Confluence 6 Inflow=835.01 cfs 768.042 af
Primary=835.01 cfs 768.042 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=4,333.85 cfs 2,576.056 af
Primary=4,333.85 cfs 2,576.056 af

Pond 8C: Confluence 8 Inflow=4,850.76 cfs 3,129.942 af
Primary=4,850.76 cfs 3,129.942 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,026.15' Storage=487.763 af Inflow=2,291.87 cfs 710.504 af
Primary=127.72 cfs 286.933 af Secondary=625.18 cfs 264.604 af Outflow=719.13 cfs 551.538 af

Pond 9P: Sippo Lake Peak Elev=1,029.49' Storage=462.933 af Inflow=2,637.72 cfs 803.362 af
Primary=2,283.97 cfs 709.810 af Secondary=7.91 cfs 0.695 af Tertiary=0.00 cfs 0.000 af Outflow=2,291.87 cfs 710.505 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=1,530.01 cfs 1,183.920 af
Primary=1,530.01 cfs 1,183.920 af

Pond 16P: Lincoln Way Box Peak Elev=1,009.44' Storage=216.791 af Inflow=5,136.87 cfs 3,388.276 af
Primary=3,366.34 cfs 3,120.006 af Secondary=1,764.77 cfs 267.440 af Outflow=5,130.37 cfs 3,387.445 af

Pond 19C: Confluence 19 Inflow=5,227.19 cfs 3,400.696 af
Primary=5,227.19 cfs 3,400.696 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 3,585.138 af Average Runoff Depth = 4.55"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 255.72 cfs @ 3.28 hrs, Volume= 46.001 af, Depth= 4.79"

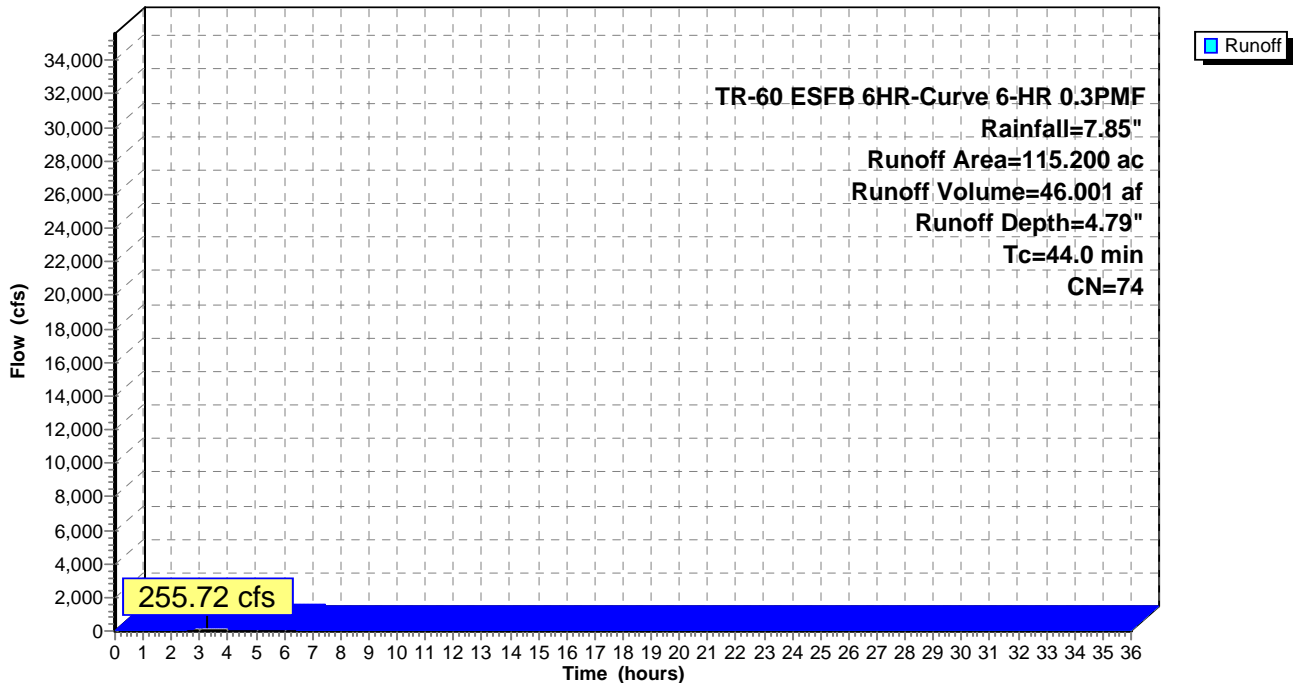
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 547.88 cfs @ 3.61 hrs, Volume= 109.906 af, Depth= 4.91"

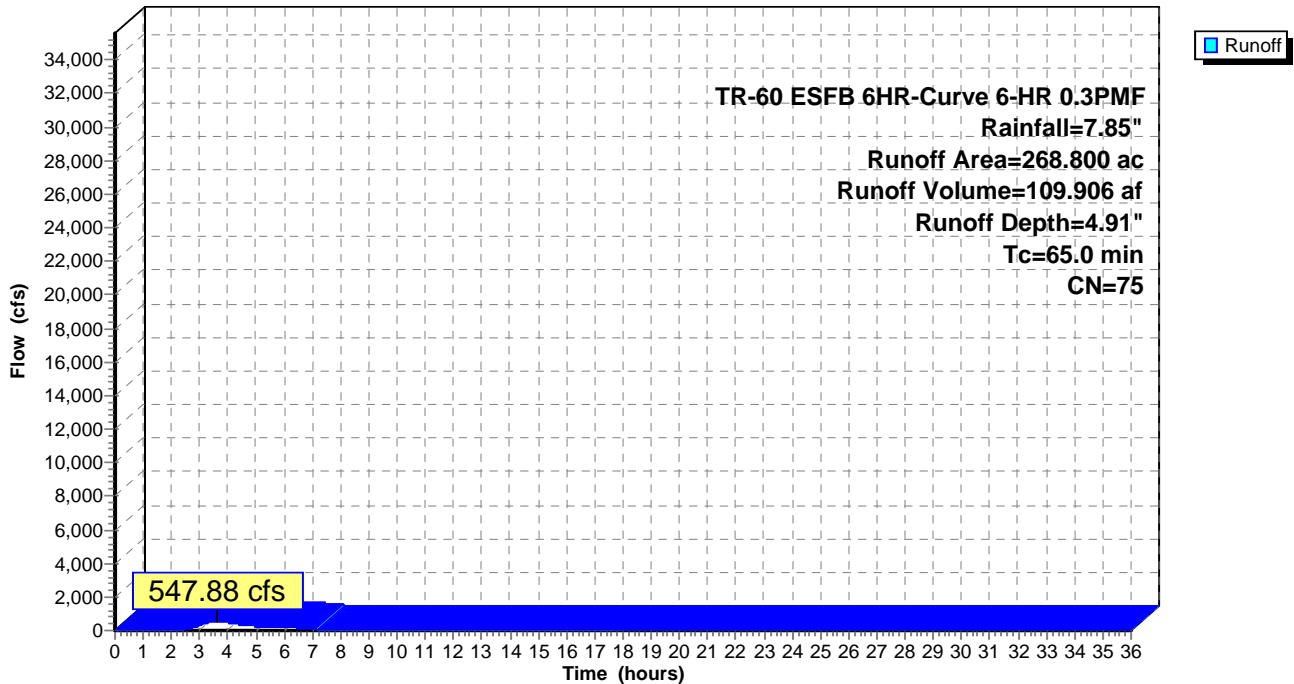
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 1,330.65 cfs @ 6.27 hrs, Volume= 506.405 af, Depth= 4.34"

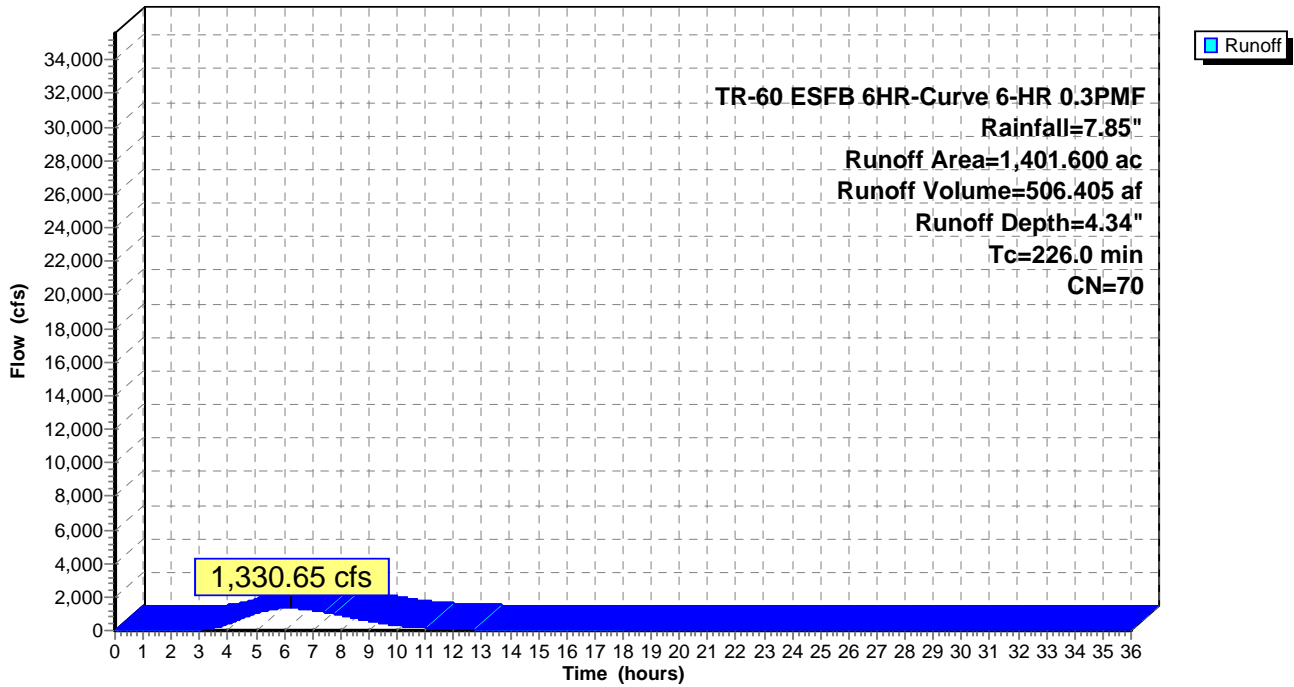
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 1,326.72 cfs @ 4.56 hrs, Volume= 368.221 af, Depth= 4.11"

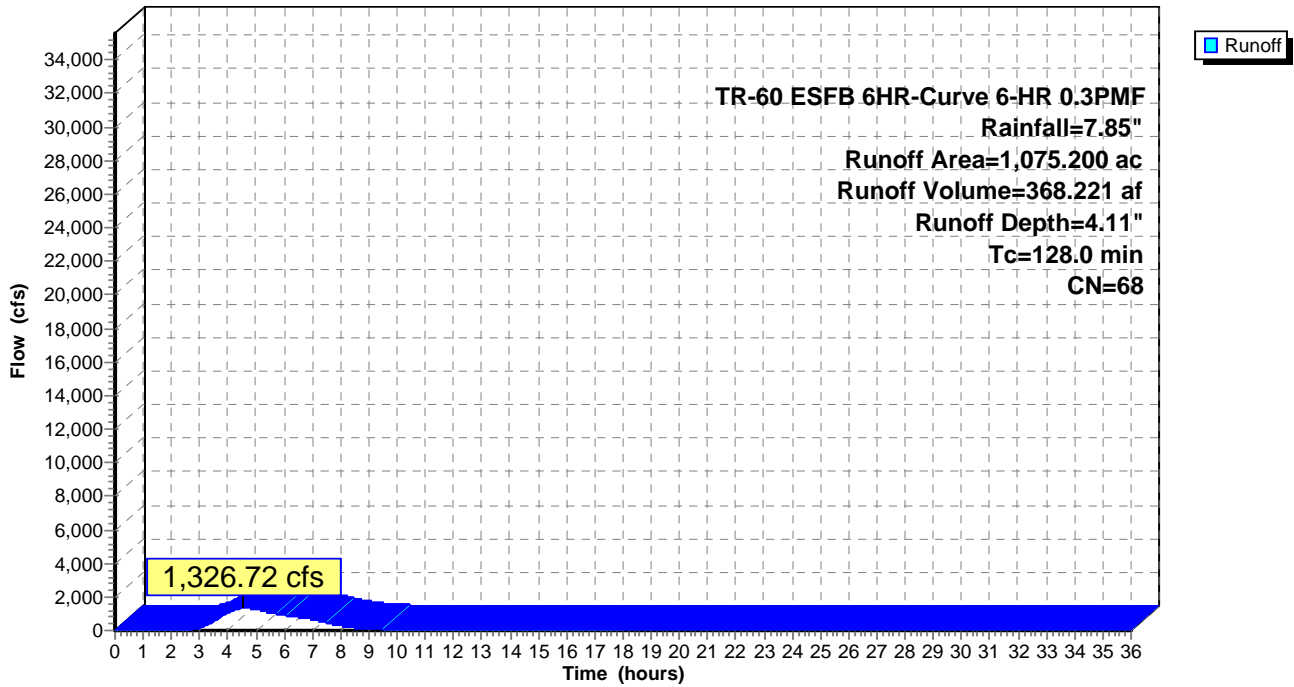
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 923.34 cfs @ 4.59 hrs, Volume= 257.947 af, Depth= 4.00"

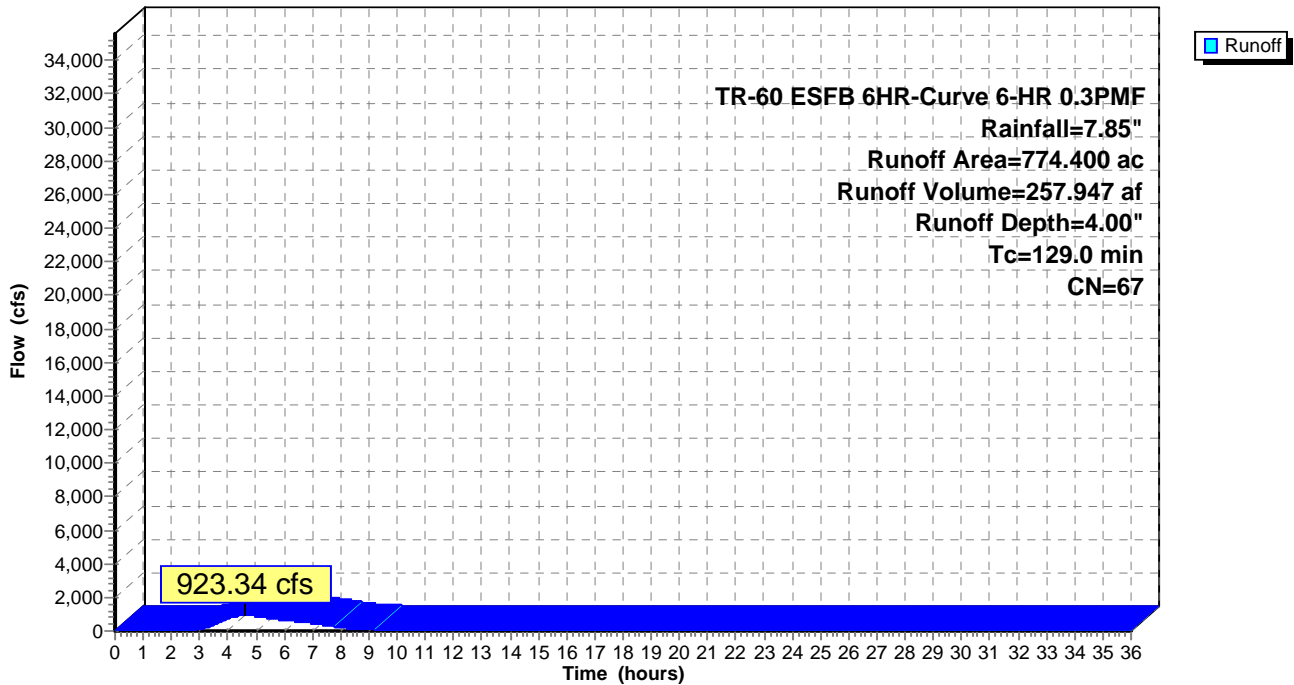
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 1,147.58 cfs @ 4.28 hrs, Volume= 288.782 af, Depth= 4.79"

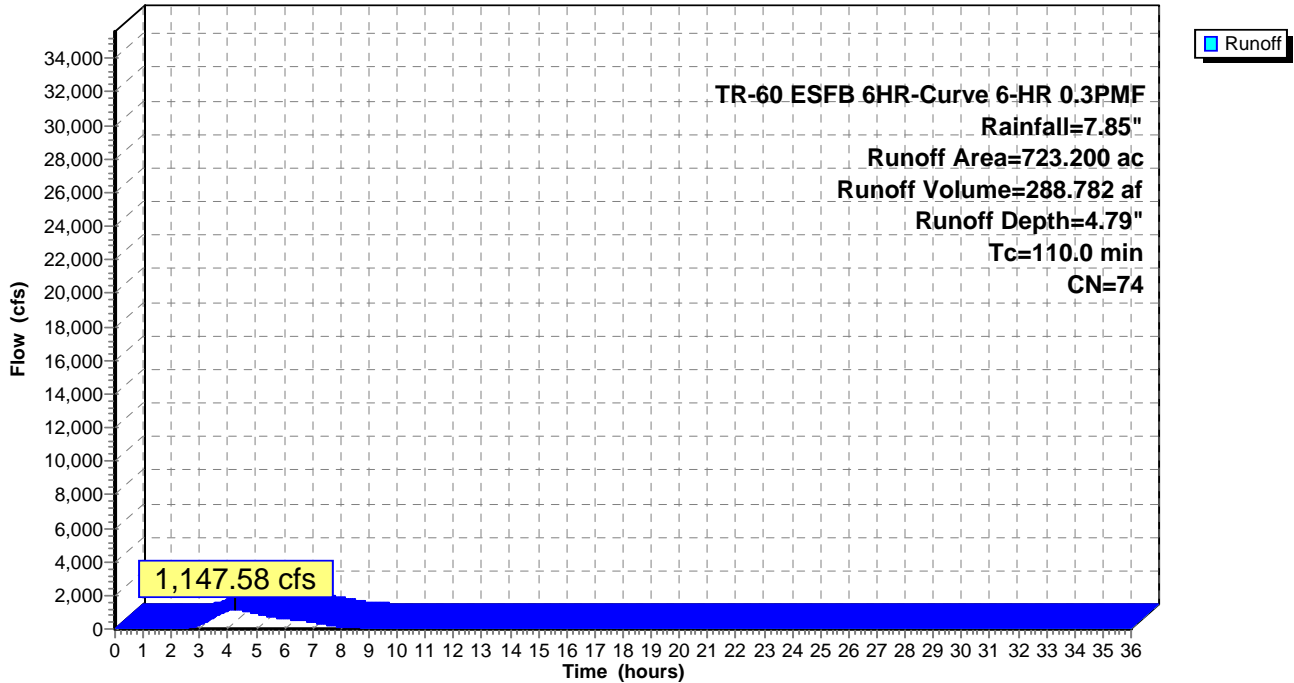
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 1,446.14 cfs @ 3.75 hrs, Volume= 300.933 af, Depth= 4.91"

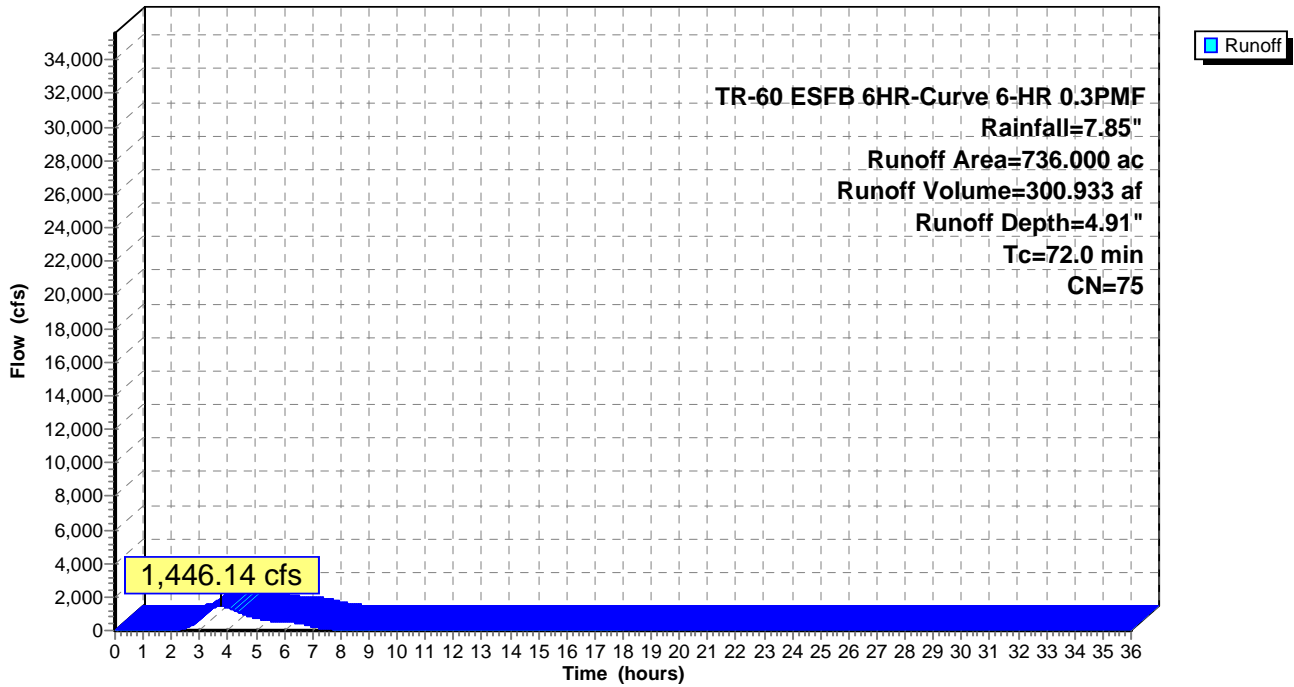
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 1,458.19 cfs @ 3.73 hrs, Volume= 310.058 af, Depth= 5.48"

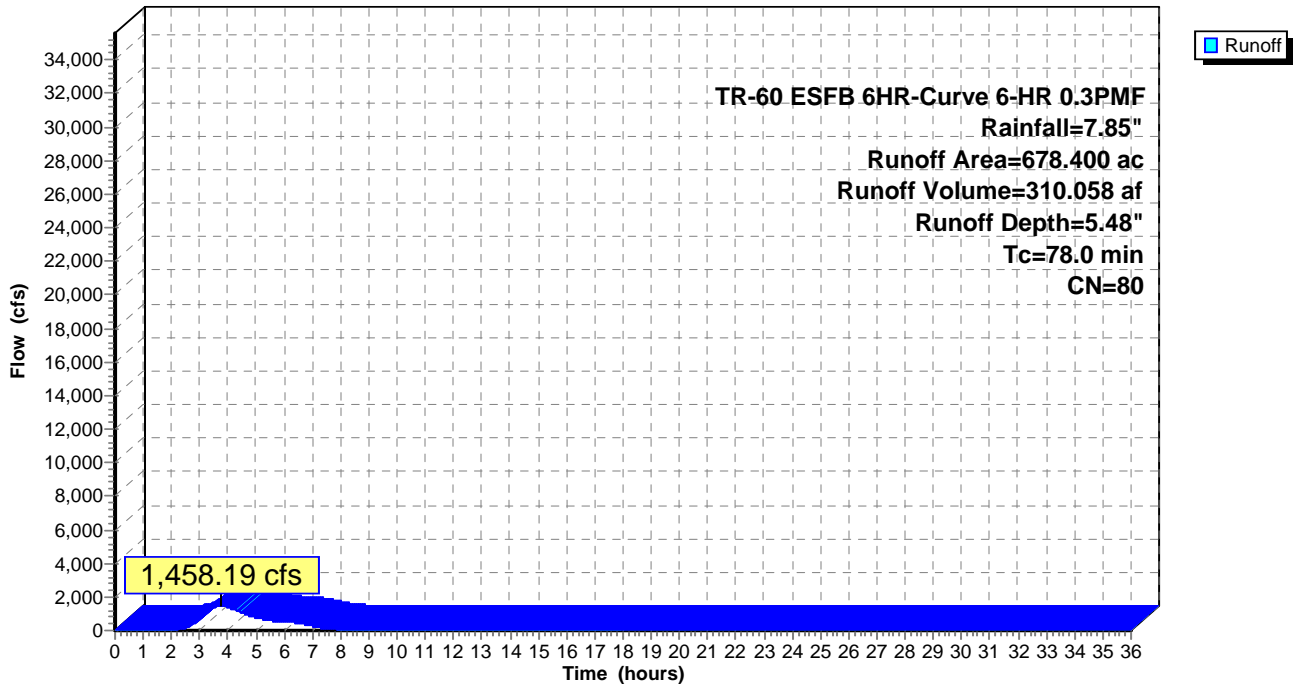
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 1,227.82 cfs @ 4.99 hrs, Volume= 376.080 af, Depth= 4.22"

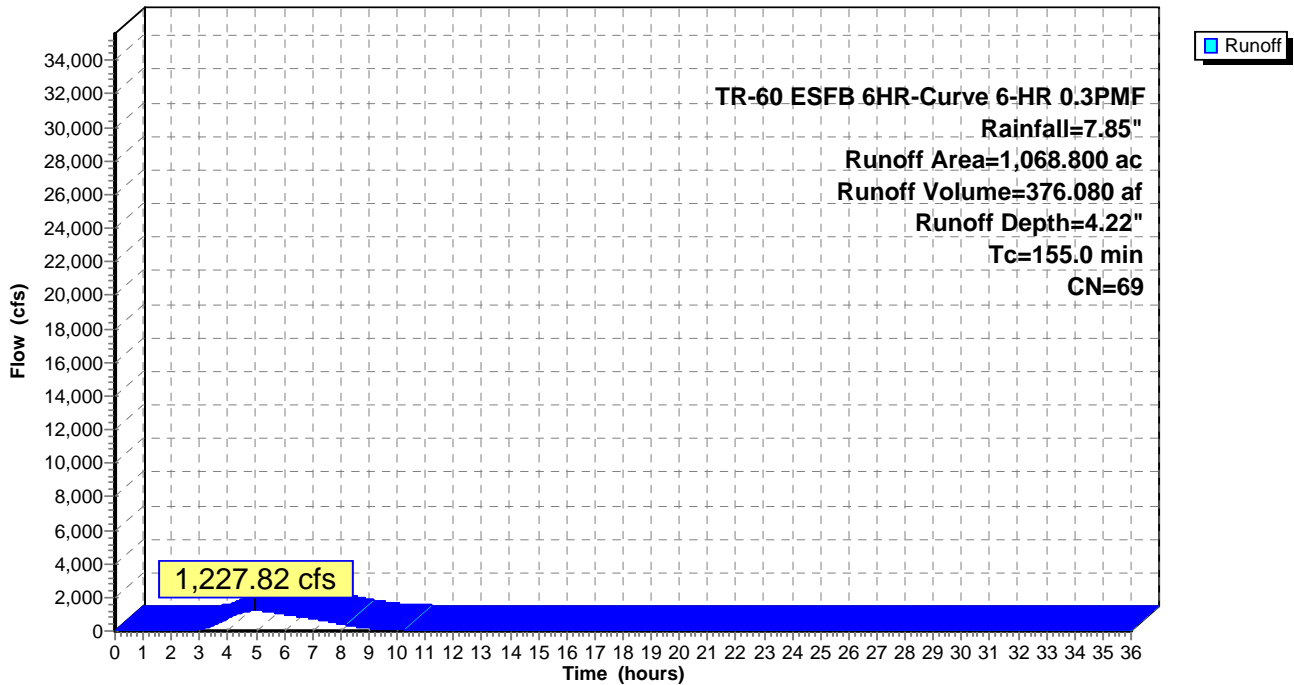
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 2,637.72 cfs @ 5.02 hrs, Volume= 803.362 af, Depth= 4.91"

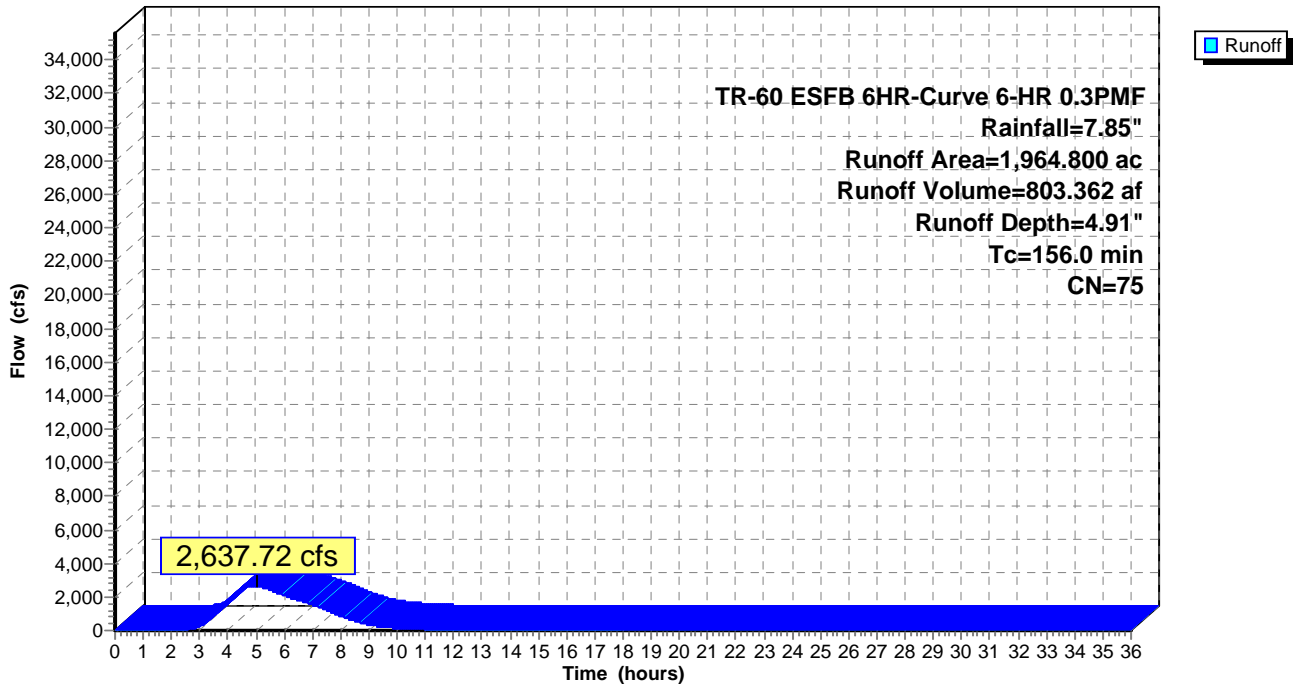
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 714.70 cfs @ 4.87 hrs, Volume= 217.443 af, Depth= 4.00"

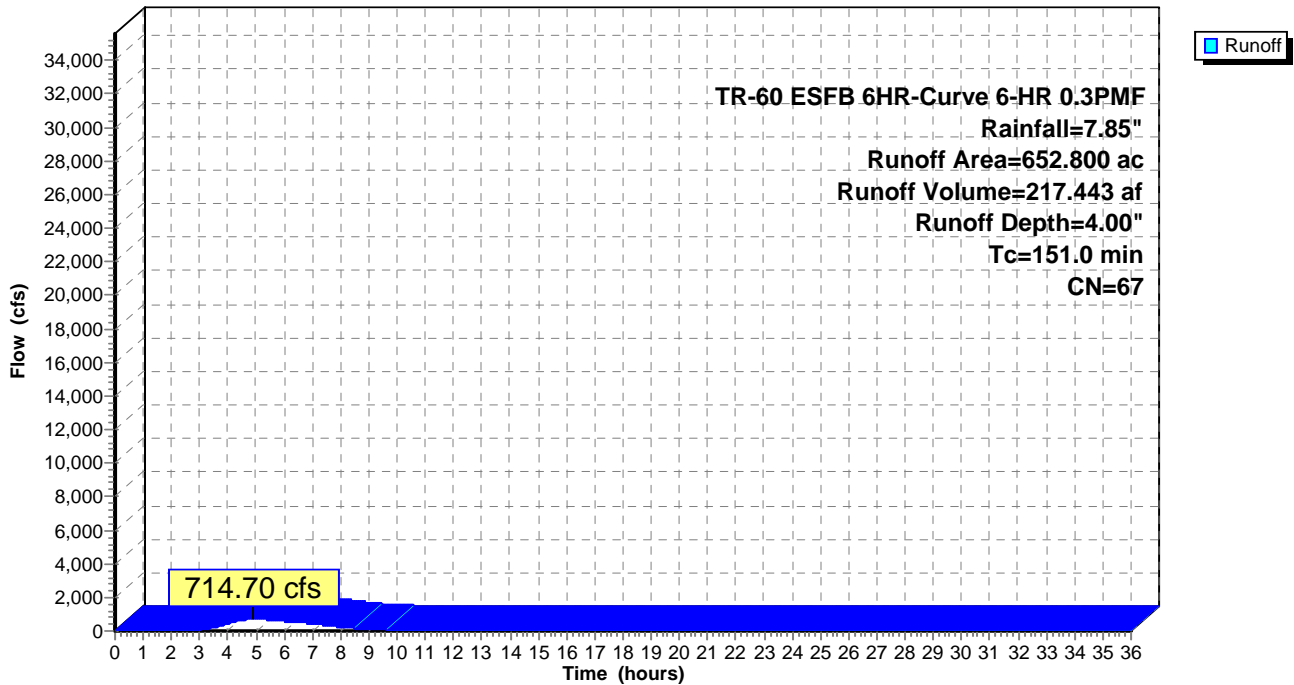
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.3PMF Rainfall=7.85"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



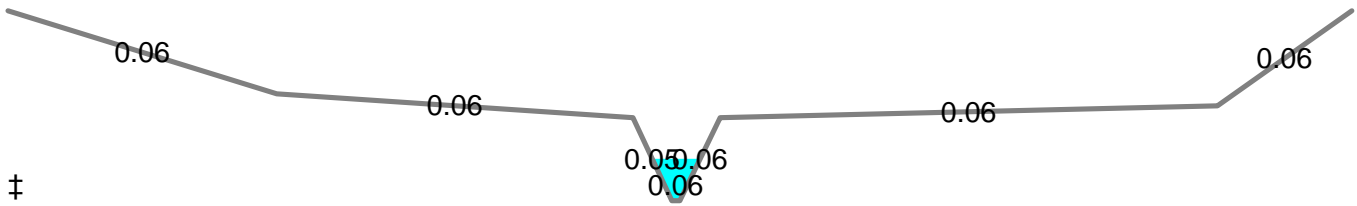
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 5.52" for 6-HR 0.3PMF event
 Inflow = 485.20 cfs @ 9.72 hrs, Volume= 821.523 af
 Outflow = 484.41 cfs @ 10.01 hrs, Volume= 815.811 af, Atten= 0%, Lag= 17.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.56 fps, Min. Travel Time= 22.4 min
 Avg. Velocity = 5.56 fps, Avg. Travel Time= 26.4 min

Peak Storage= 649,694 cf @ 10.01 hrs
 Average Depth at Peak Storage= 3.53'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

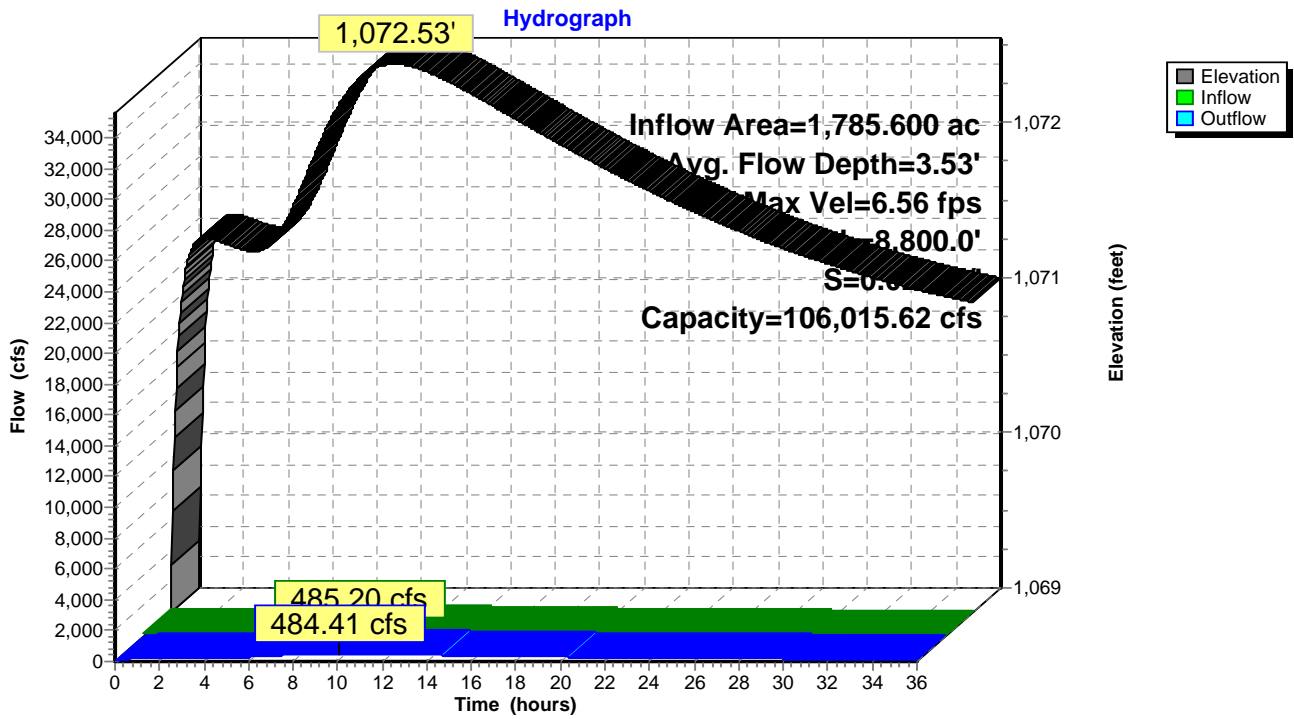
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



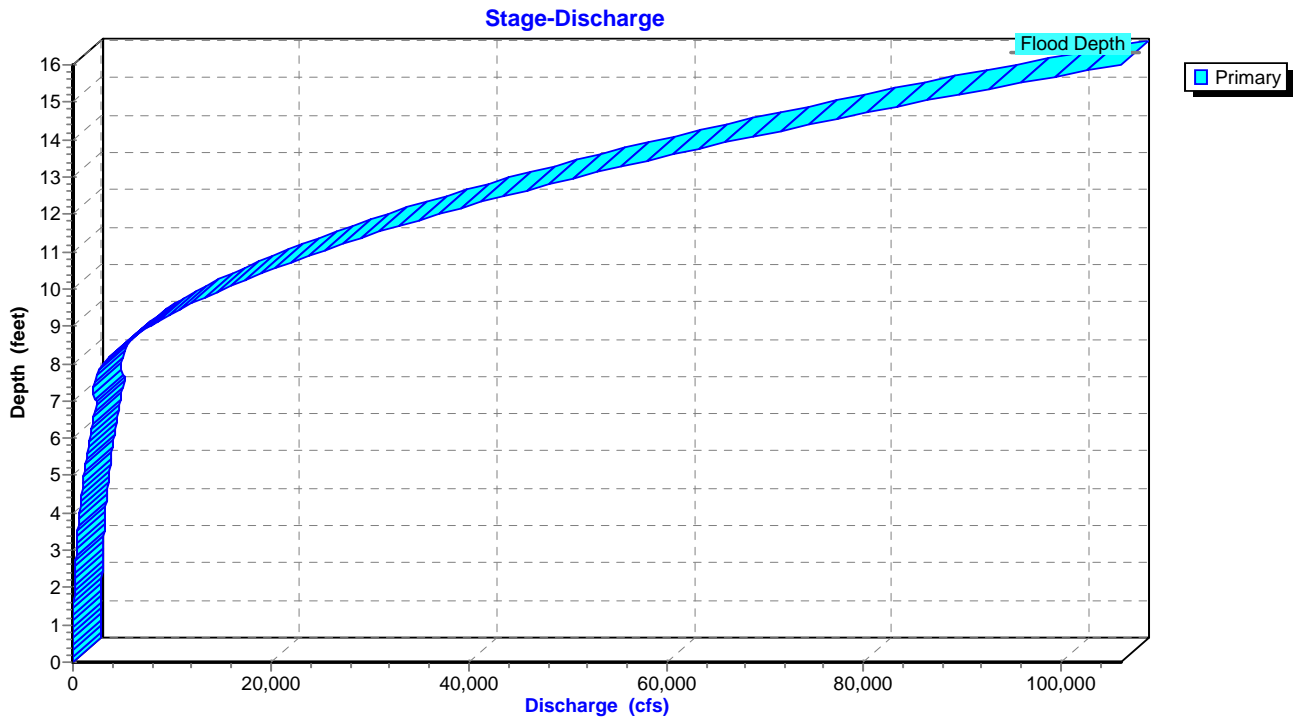
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

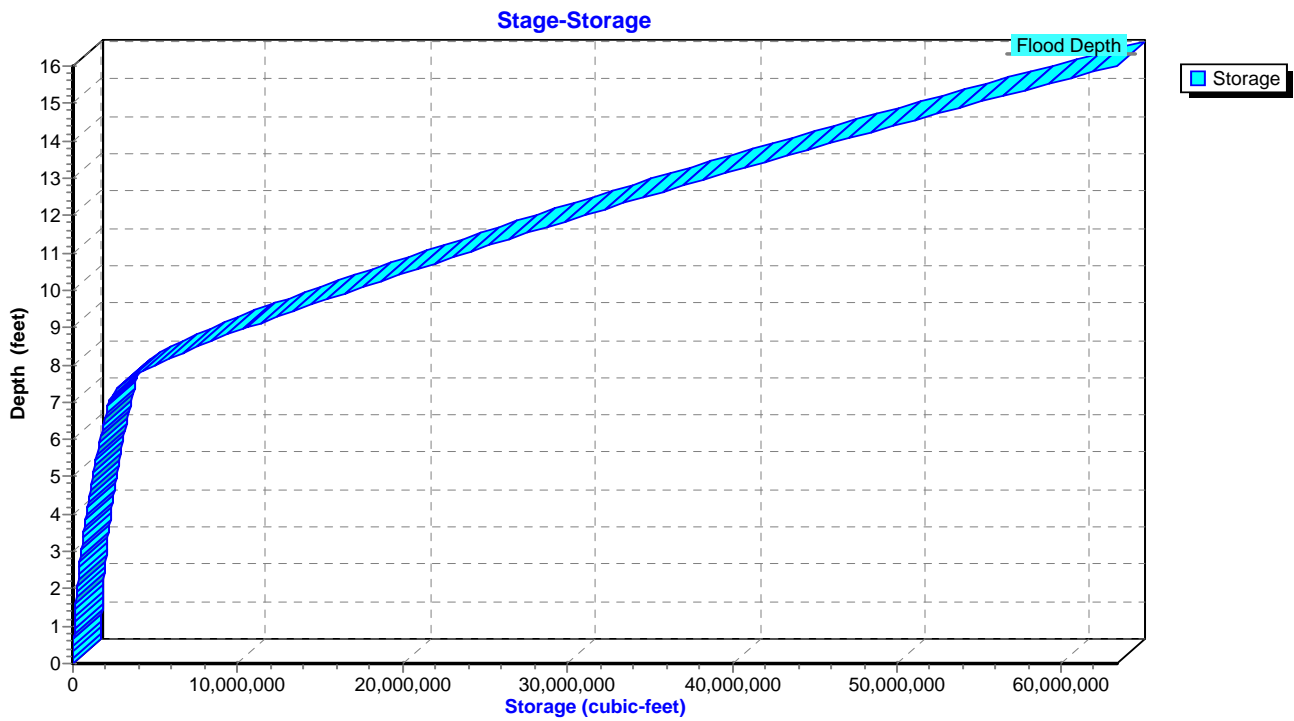
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



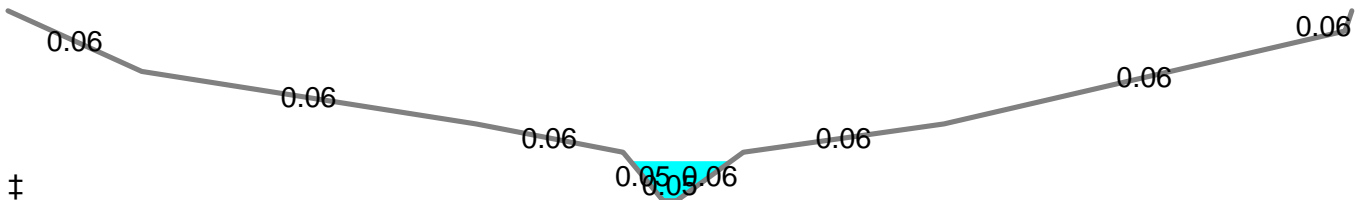
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 4.97" for 6-HR 0.3PMF event
 Inflow = 1,530.01 cfs @ 4.70 hrs, Volume= 1,183.808 af
 Outflow = 1,456.60 cfs @ 5.05 hrs, Volume= 1,174.412 af, Atten= 5%, Lag= 21.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.49 fps, Min. Travel Time= 28.2 min
 Avg. Velocity = 2.42 fps, Avg. Travel Time= 40.7 min

Peak Storage= 2,463,171 cf @ 5.05 hrs
 Average Depth at Peak Storage= 9.79'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

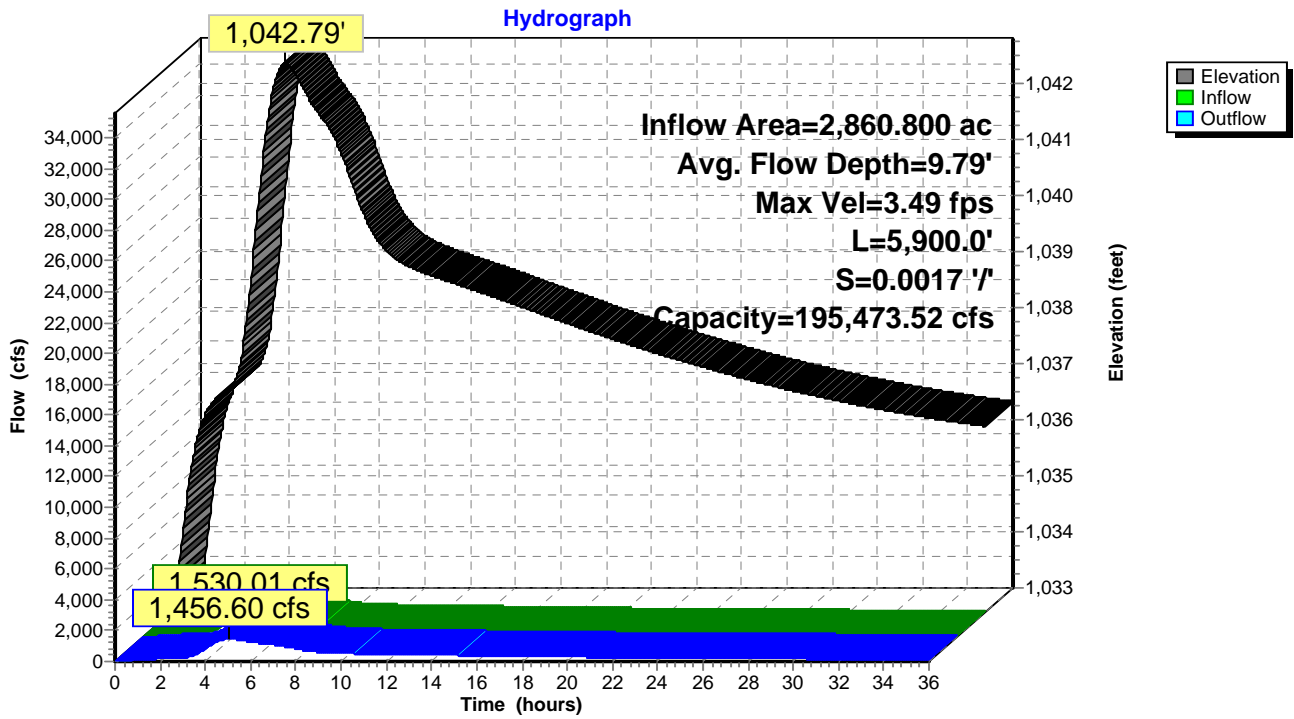
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



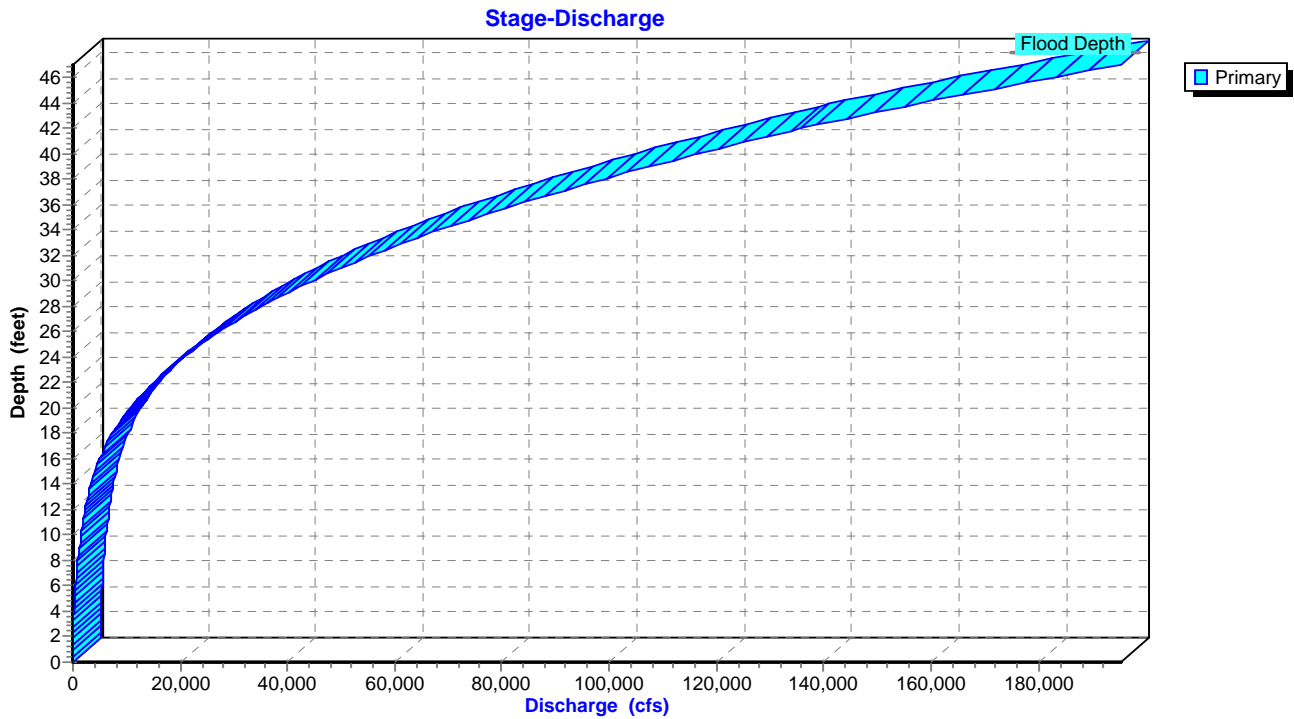
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

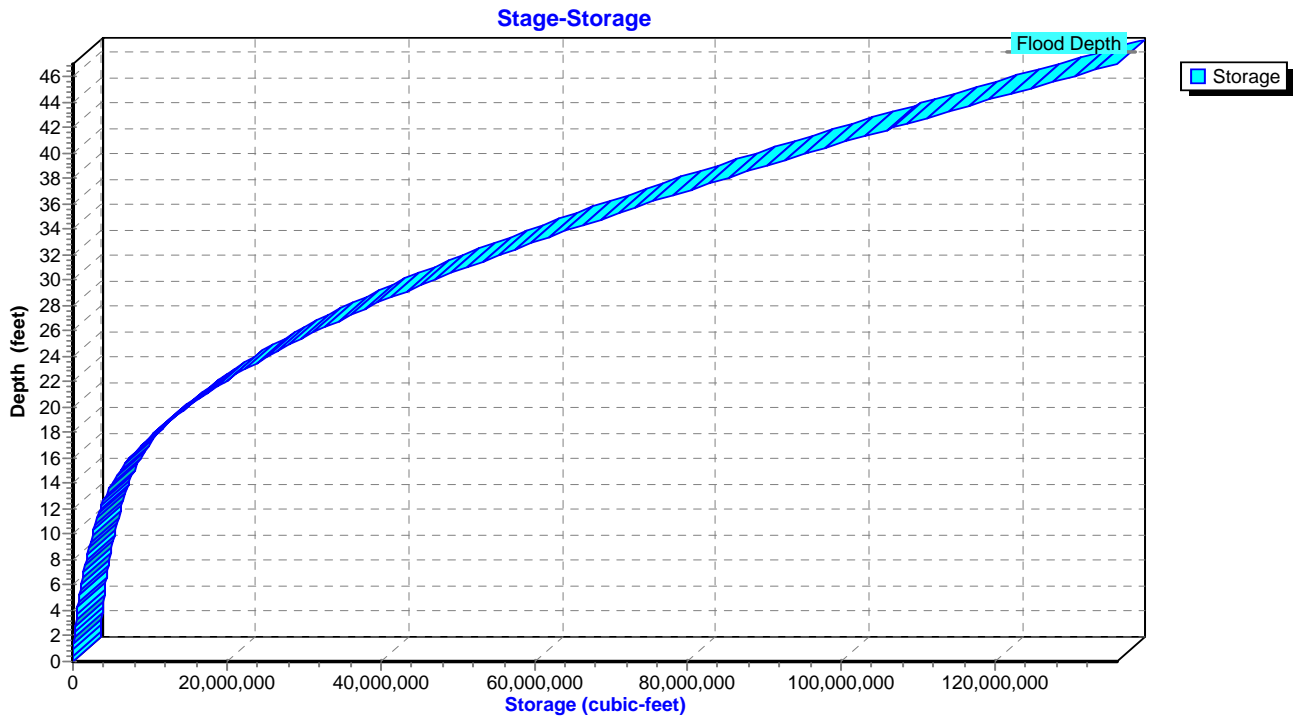
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



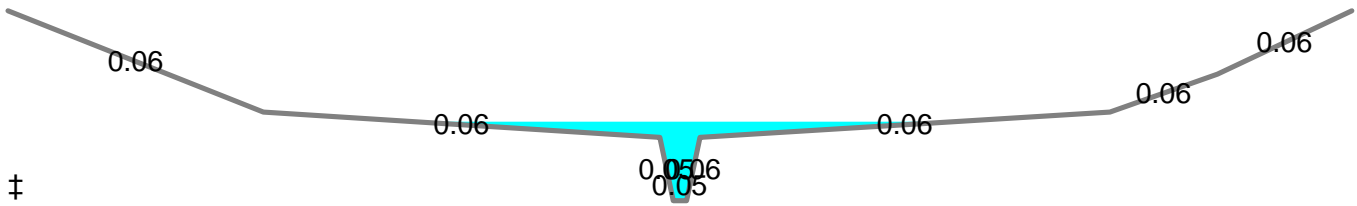
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 3.37" for 6-HR 0.3PMF event
 Inflow = 719.13 cfs @ 8.87 hrs, Volume= 551.456 af
 Outflow = 716.72 cfs @ 9.04 hrs, Volume= 550.681 af, Atten= 0%, Lag= 10.0 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.28 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 2.47 fps, Avg. Travel Time= 6.1 min

Peak Storage= 331,697 cf @ 9.04 hrs
 Average Depth at Peak Storage= 6.24'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

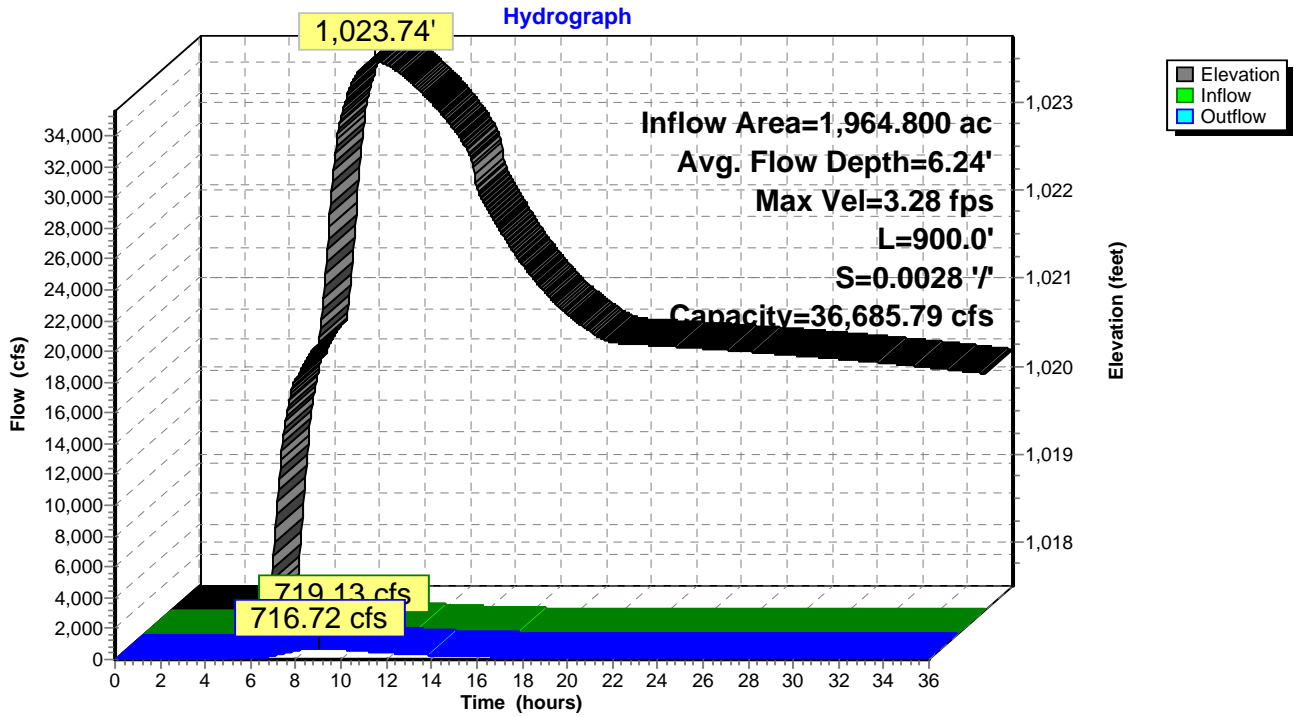
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



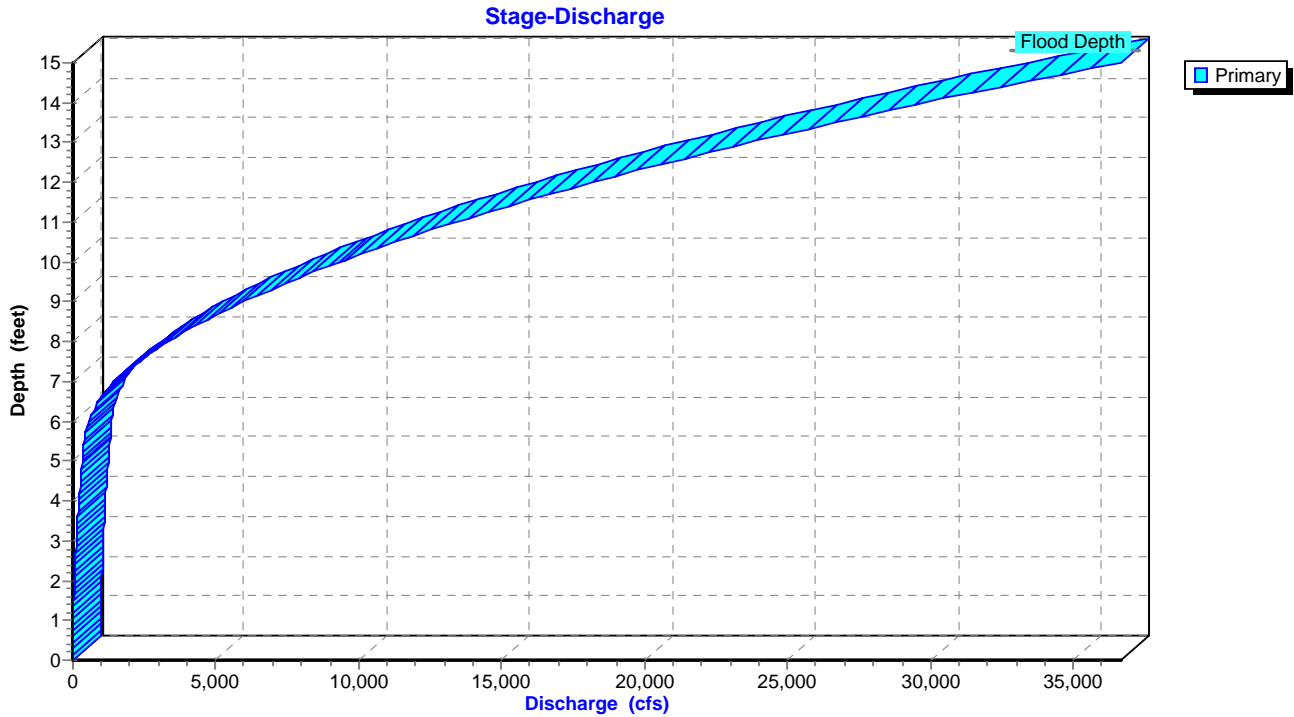
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

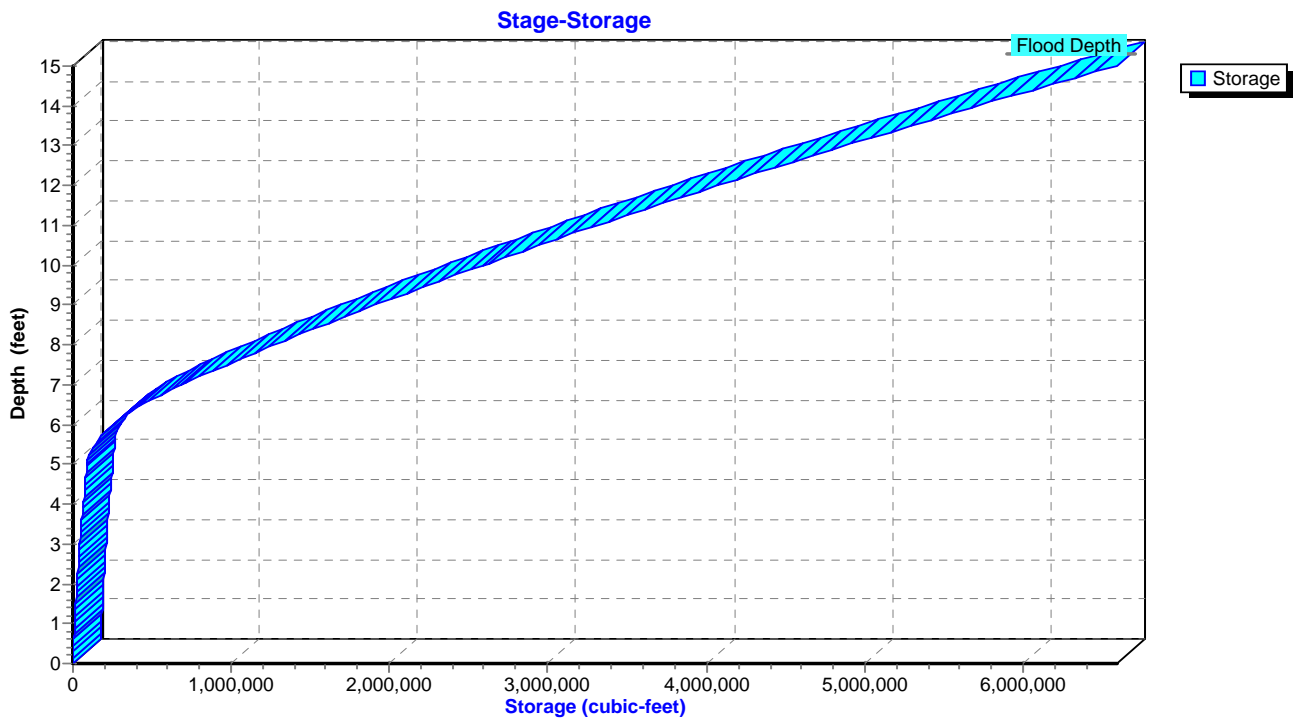
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



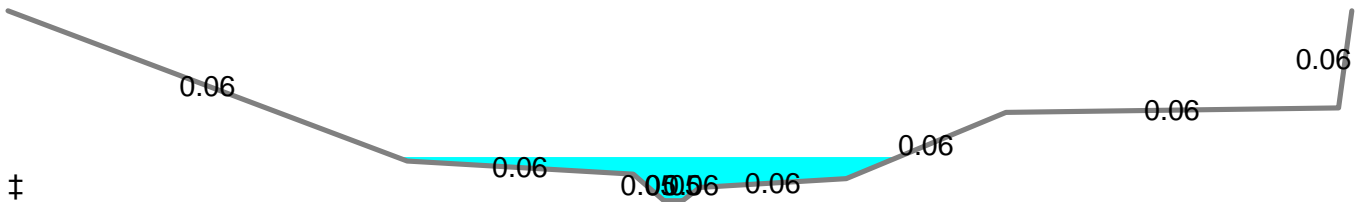
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 4.22" for 6-HR 0.3PMF event
 Inflow = 4,333.85 cfs @ 5.02 hrs, Volume= 2,575.859 af
 Outflow = 3,661.26 cfs @ 5.97 hrs, Volume= 2,540.433 af, Atten= 16%, Lag= 56.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.36 fps, Min. Travel Time= 62.3 min
 Avg. Velocity = 1.61 fps, Avg. Travel Time= 91.4 min

Peak Storage= 13,678,534 cf @ 5.97 hrs
 Average Depth at Peak Storage= 9.88'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

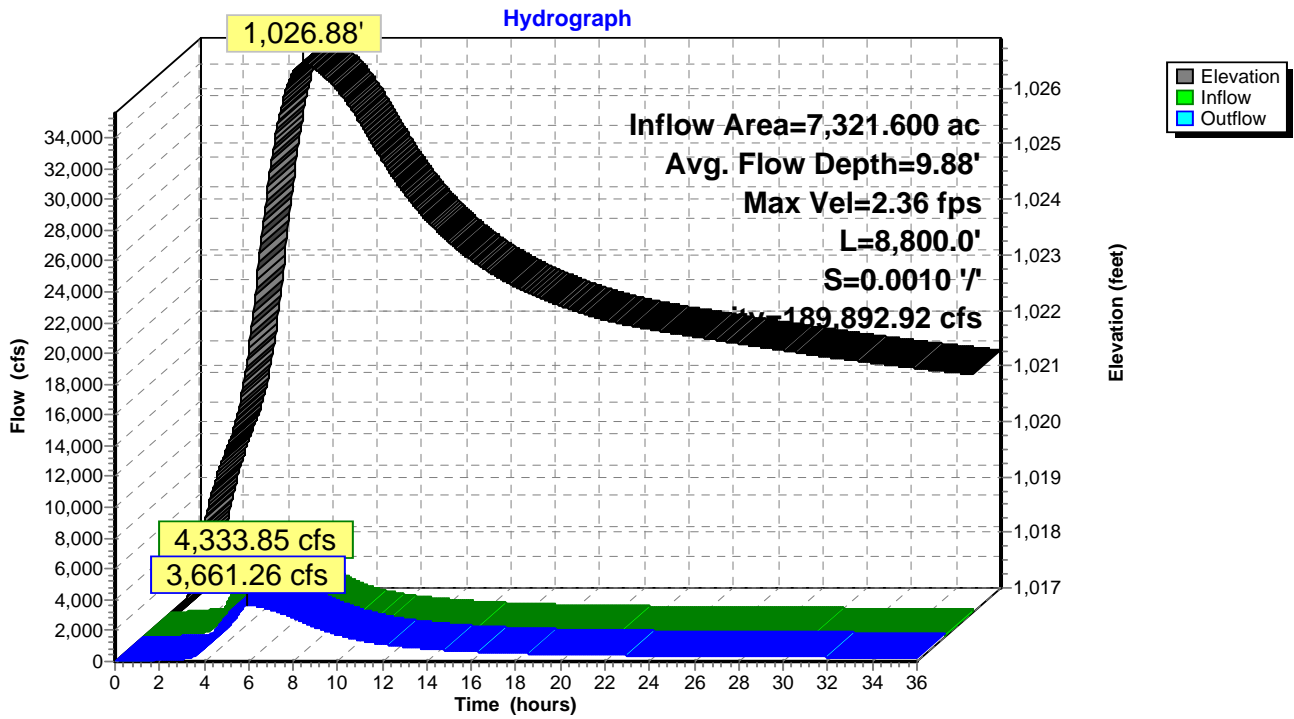
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



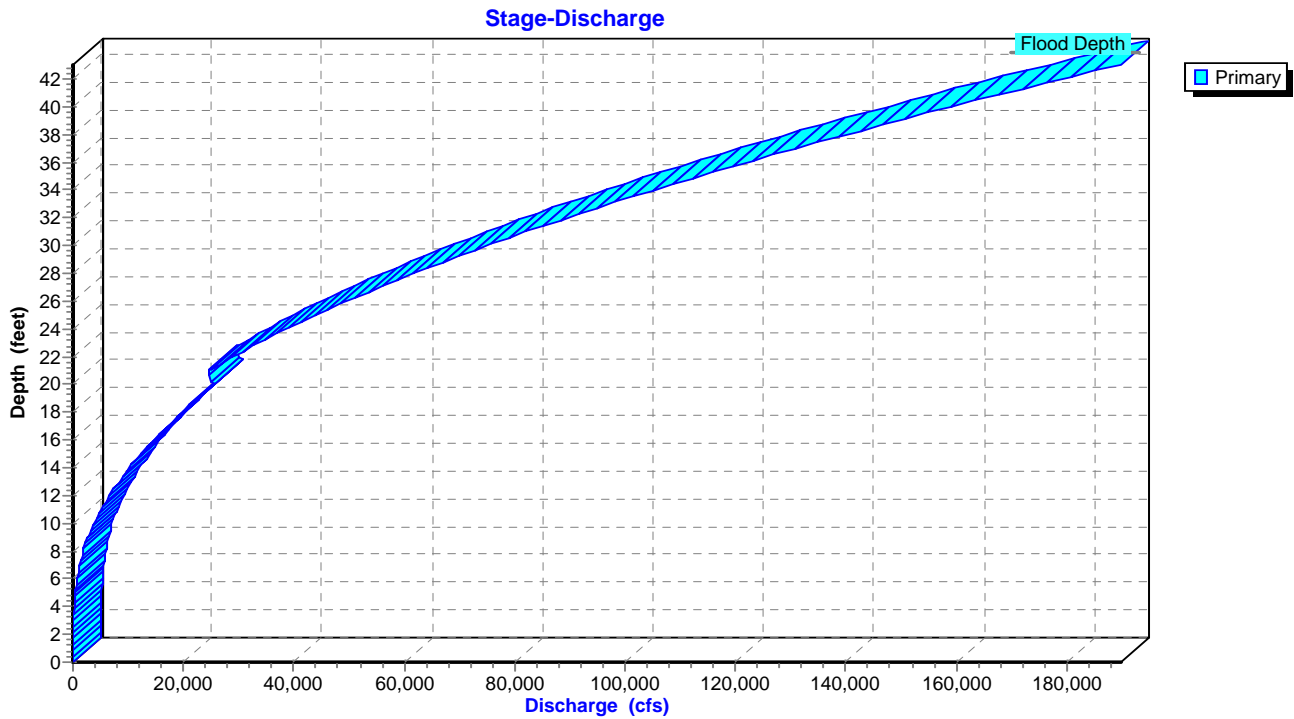
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

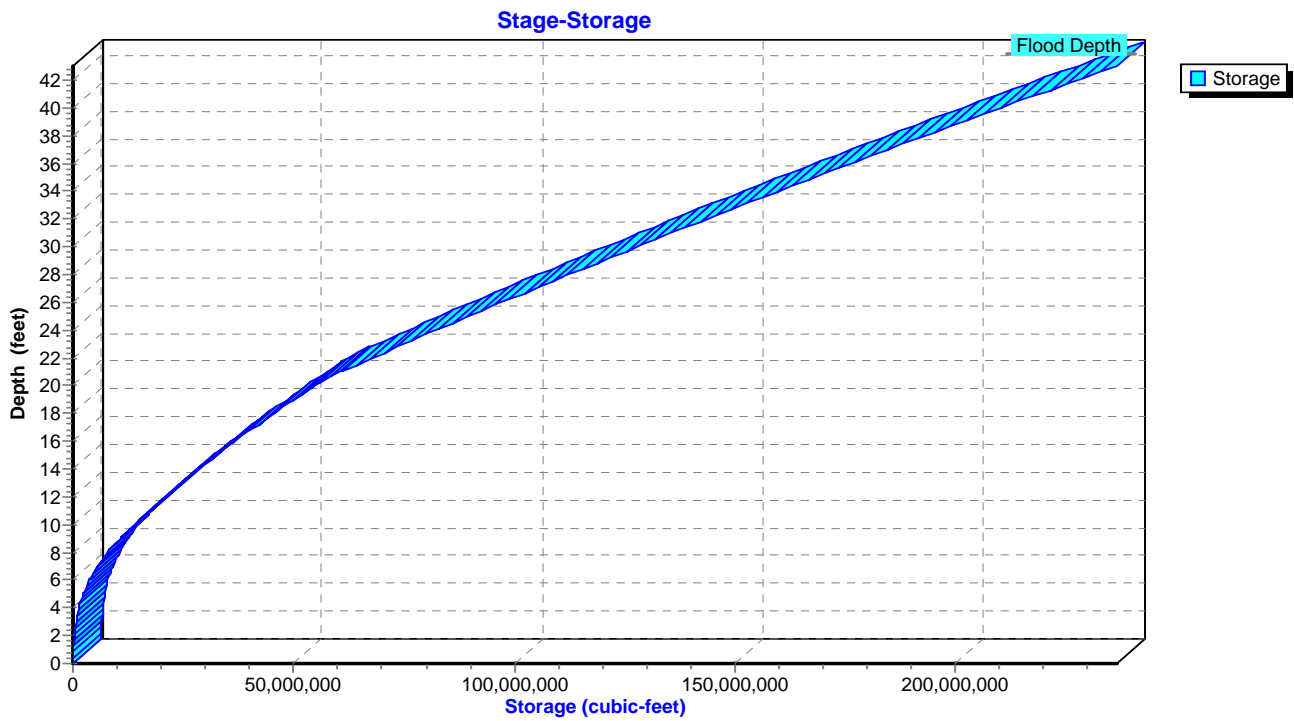
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



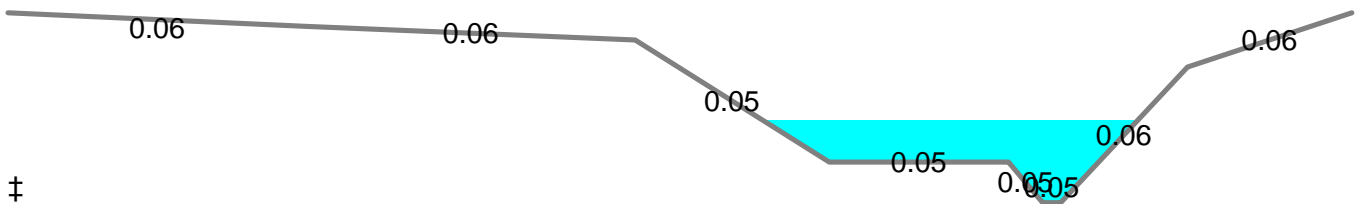
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 4.28" for 6-HR 0.3PMF event
 Inflow = 4,850.76 cfs @ 5.69 hrs, Volume= 3,129.734 af
 Outflow = 4,724.01 cfs @ 6.21 hrs, Volume= 3,090.854 af, Atten= 3%, Lag= 31.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.04 fps, Min. Travel Time= 41.1 min
 Avg. Velocity = 1.61 fps, Avg. Travel Time= 77.8 min

Peak Storage= 11,657,657 cf @ 6.21 hrs
 Average Depth at Peak Storage= 12.19'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

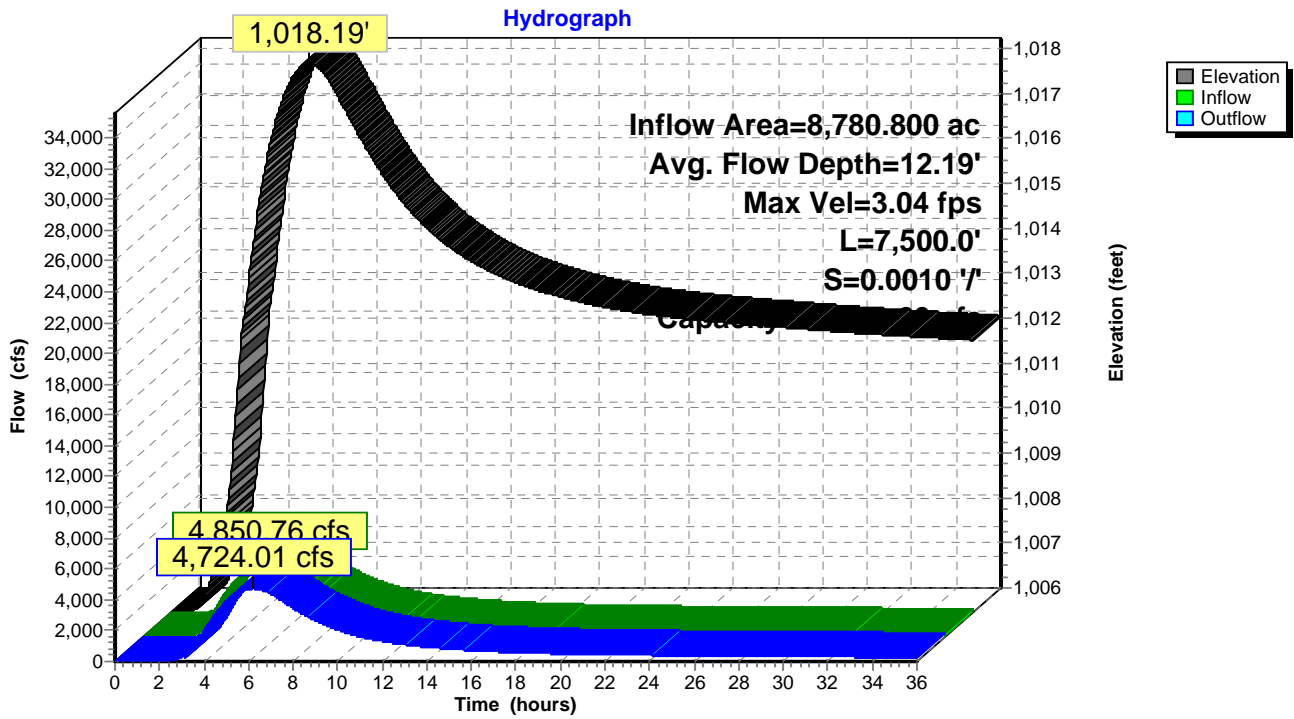
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



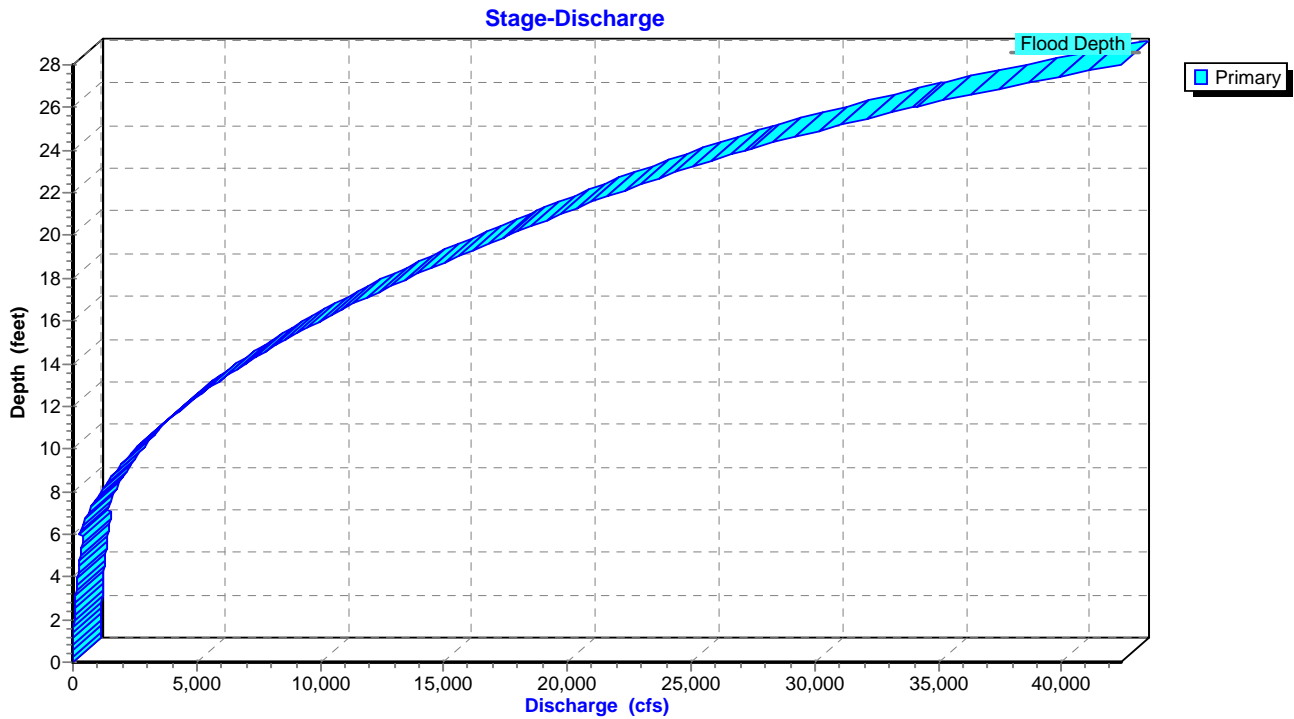
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

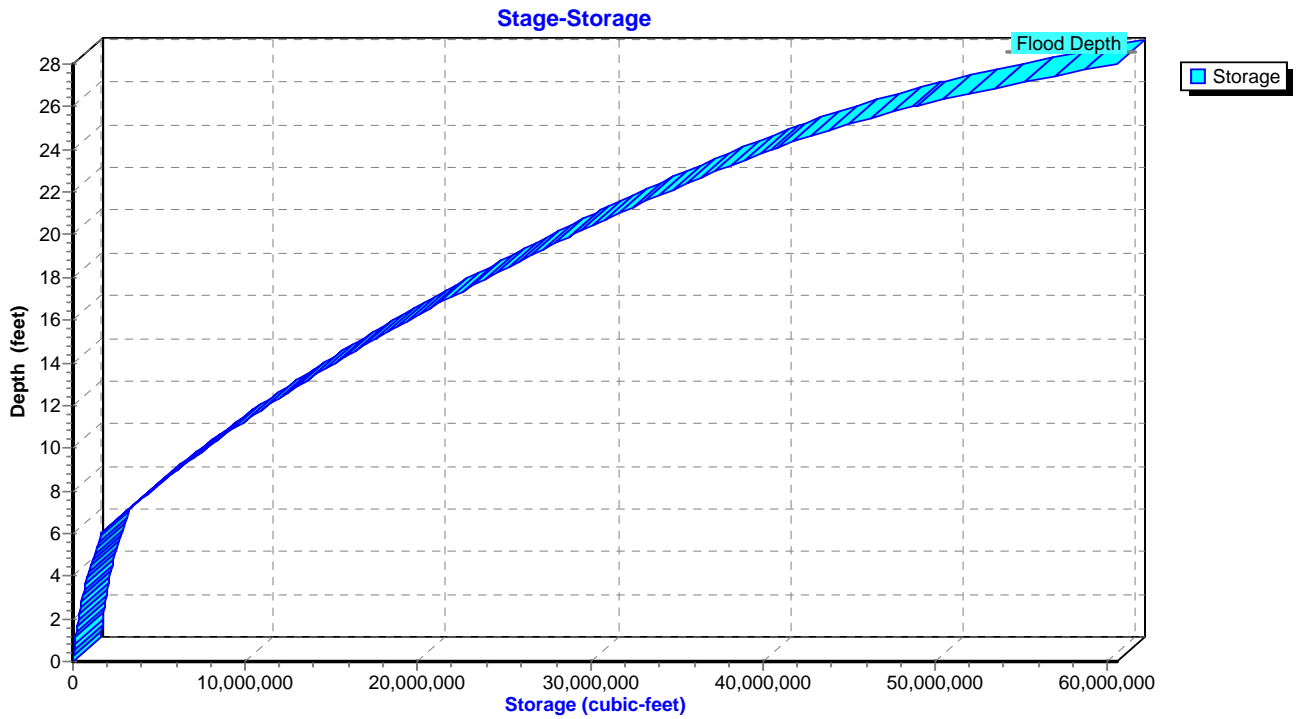
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



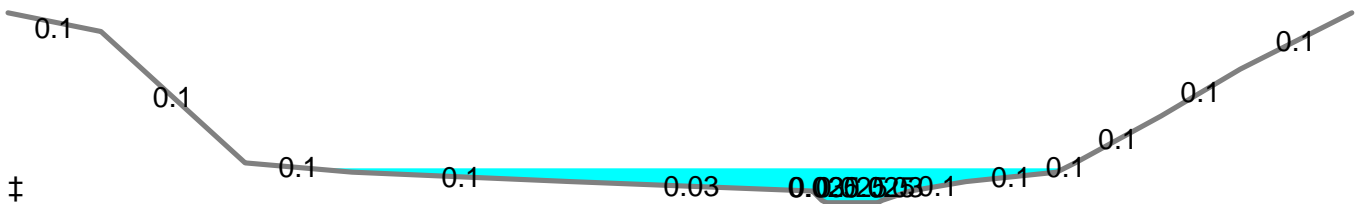
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 4.30" for 6-HR 0.3PMF event
 Inflow = 5,130.37 cfs @ 6.53 hrs, Volume= 3,387.226 af
 Outflow = 5,130.36 cfs @ 6.54 hrs, Volume= 3,387.104 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 10.01 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 8.84 fps, Avg. Travel Time= 0.8 min

Peak Storage= 230,670 cf @ 6.54 hrs
 Average Depth at Peak Storage= 7.33'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

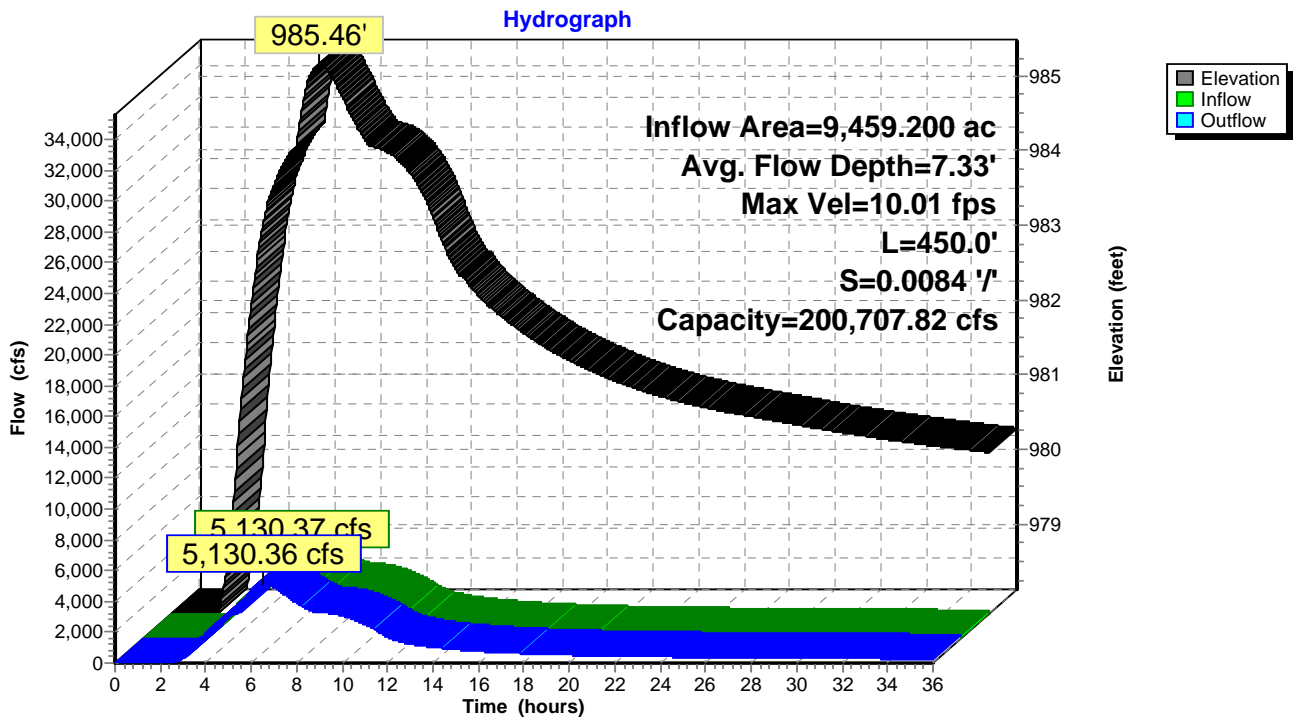
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



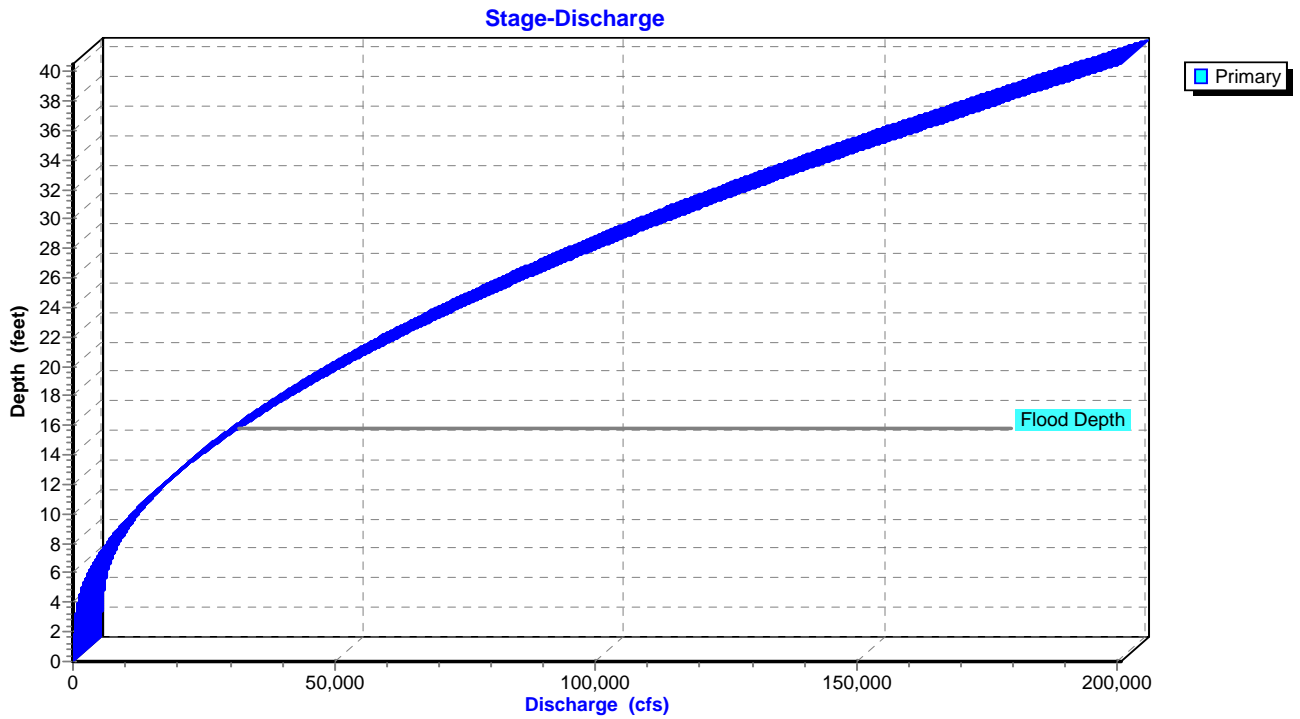
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

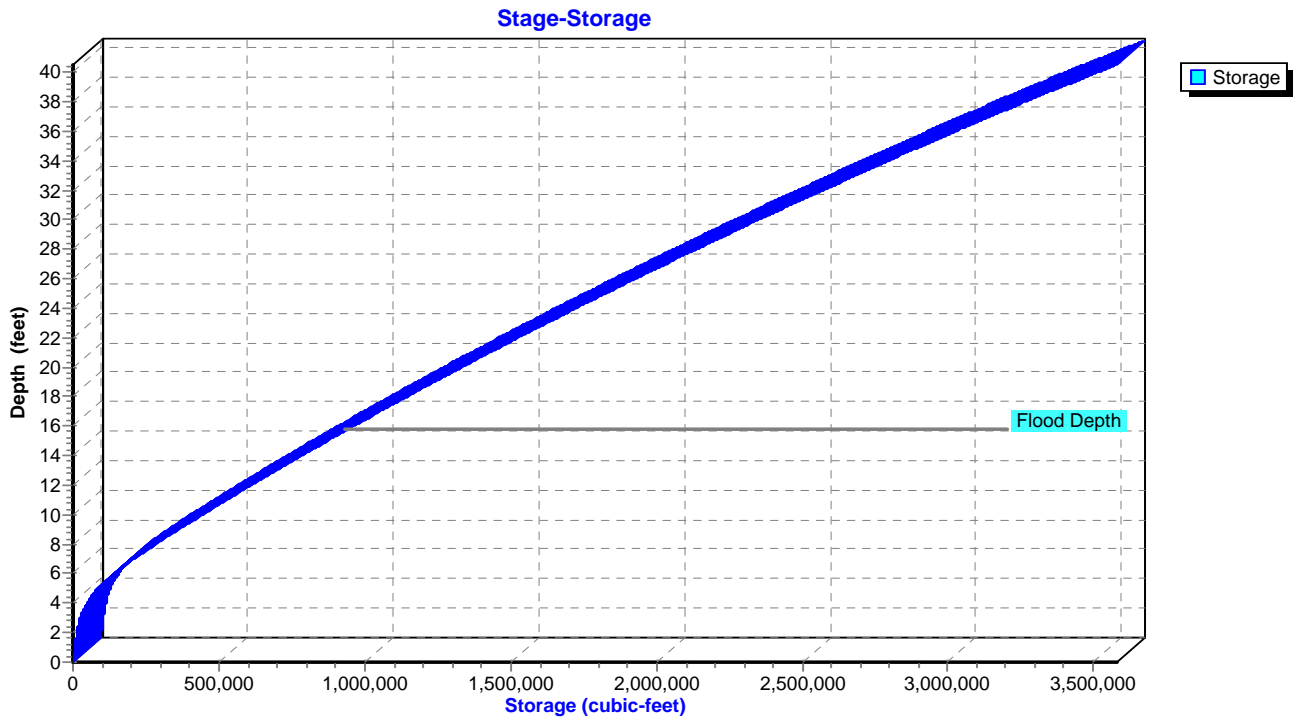
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

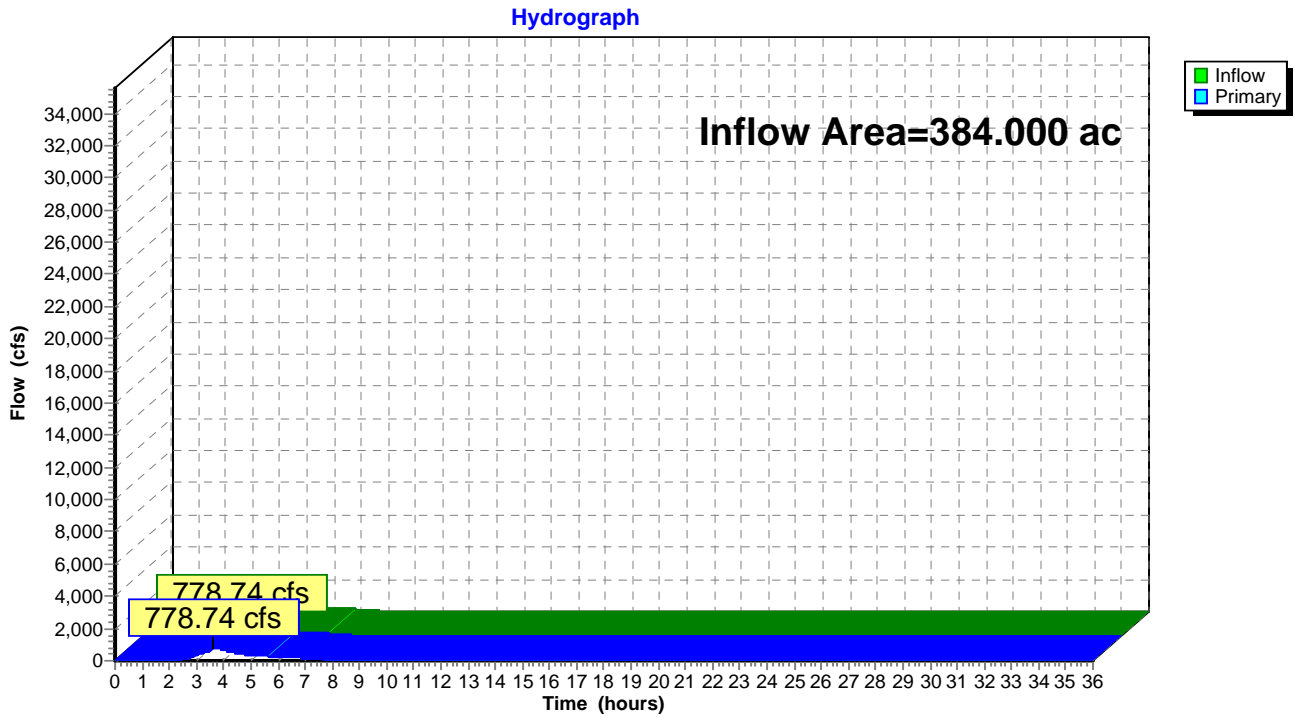


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 4.87" for 6-HR 0.3PMF event
Inflow = 778.74 cfs @ 3.63 hrs, Volume= 155.792 af
Primary = 778.74 cfs @ 3.64 hrs, Volume= 155.792 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 4.31" for 6-HR 0.3PMF event
 Inflow = 5,227.19 cfs @ 6.14 hrs, Volume= 3,400.480 af
 Outflow = 5,136.87 cfs @ 6.44 hrs, Volume= 3,388.495 af, Atten= 2%, Lag= 18.2 min
 Primary = 2,577.41 cfs @ 4.79 hrs, Volume= 2,220.430 af
 Secondary = 3,145.16 cfs @ 6.45 hrs, Volume= 1,120.857 af
 Tertiary = 249.79 cfs @ 6.48 hrs, Volume= 47.208 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,010.07' @ 6.50 hrs Surf.Area= 29.988 ac Storage= 196.431 af (135.469 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 55.6 min calculated for 3,326.609 af (98% of inflow)
 Center-of-Mass det. time= 16.0 min (671.8 - 655.7)

Volume	Invert	Avail.Storage	Storage Description			
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
985.00	0.500	500.0	0.000	0.000	0.500	
990.00	3.000	1,000.0	7.875	7.875	1.873	
998.00	4.870	2,500.0	31.179	39.054	11.469	
1,000.00	6.204	3,251.0	11.047	50.101	19.360	
1,002.00	7.243	5,147.0	13.434	63.535	48.449	
1,004.00	9.610	10,274.0	16.797	80.332	192.887	
1,006.00	16.124	11,202.9	25.455	105.787	229.335	
1,008.00	21.577	15,736.9	37.569	143.356	452.477	
1,010.00	29.674	20,301.4	51.036	194.392	752.988	
1,012.00	39.539	22,845.5	68.977	263.369	953.524	
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174	
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204	

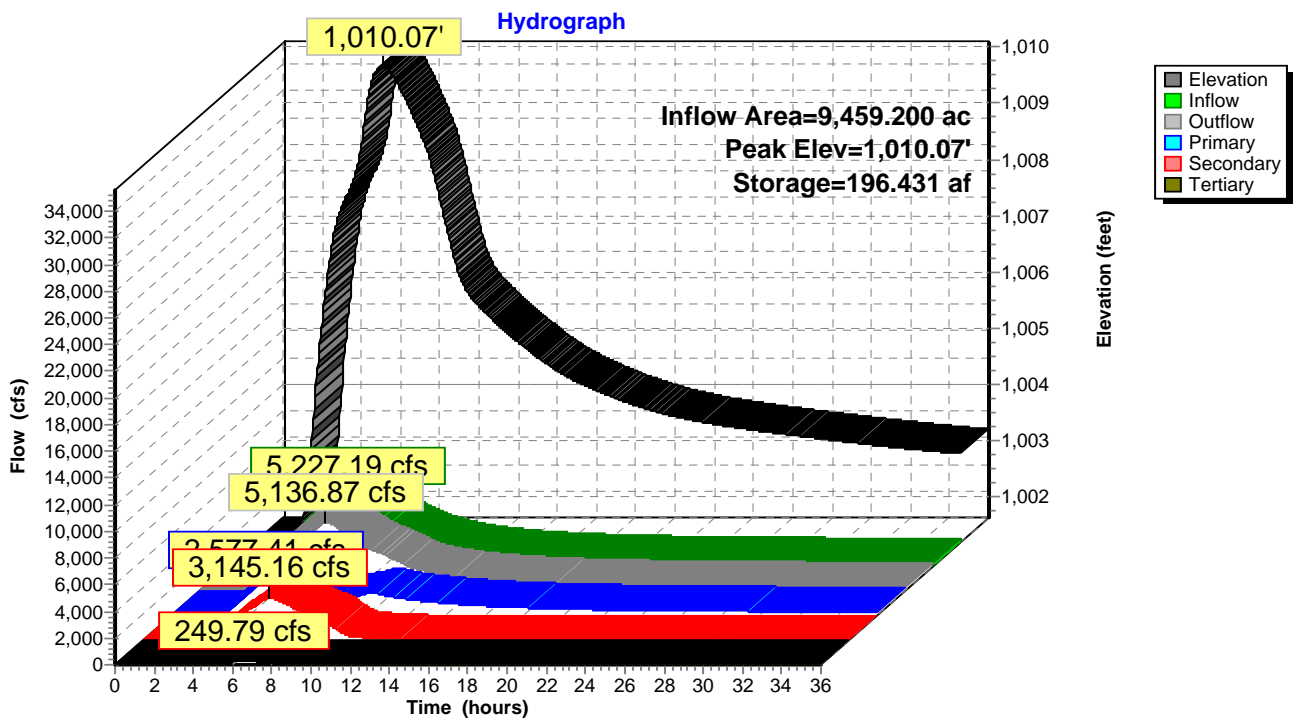
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

Primary OutFlow Max=2,572.59 cfs @ 4.79 hrs HW=1,007.87' TW=1,001.89' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,572.59 cfs @ 8.26 fps)

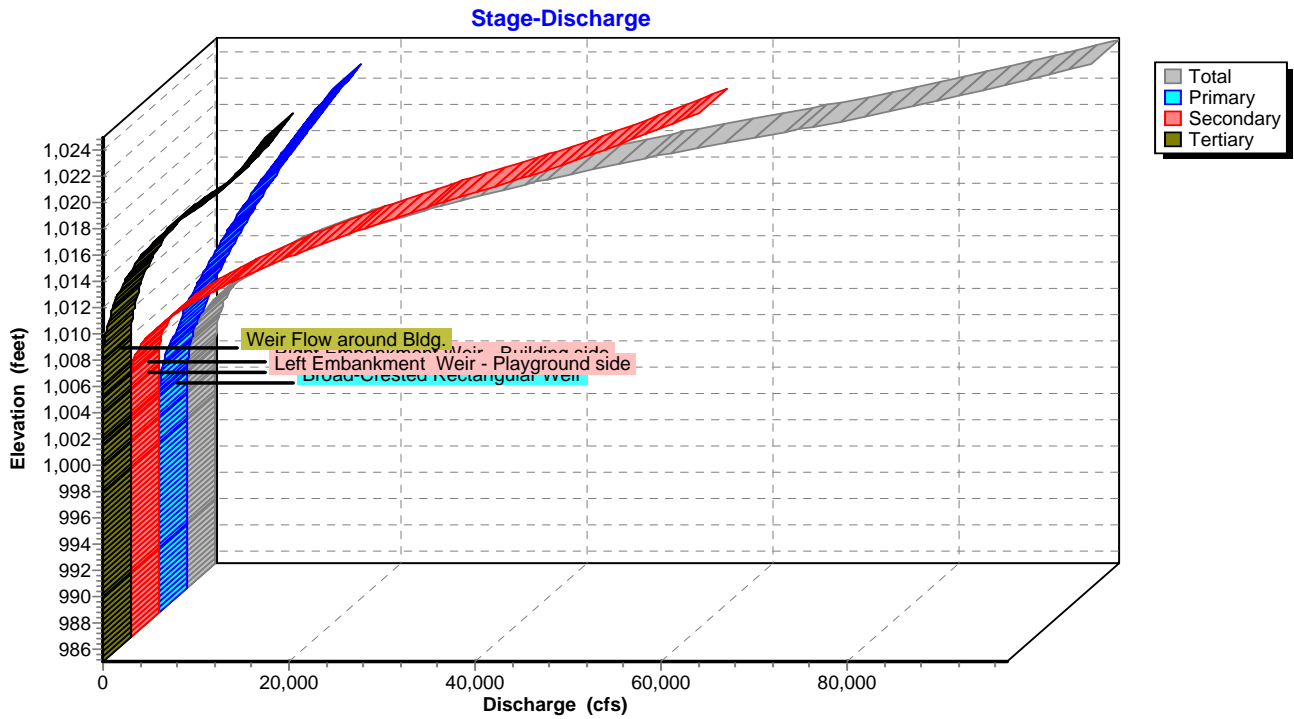
Secondary OutFlow Max=3,143.18 cfs @ 6.45 hrs HW=1,010.07' TW=1,009.43' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 1,176.73 cfs @ 3.71 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 1,966.46 cfs @ 3.64 fps)

Tertiary OutFlow Max=249.71 cfs @ 6.48 hrs HW=1,010.07' TW=1,009.43' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Weir Controls 249.71 cfs @ 1.71 fps)

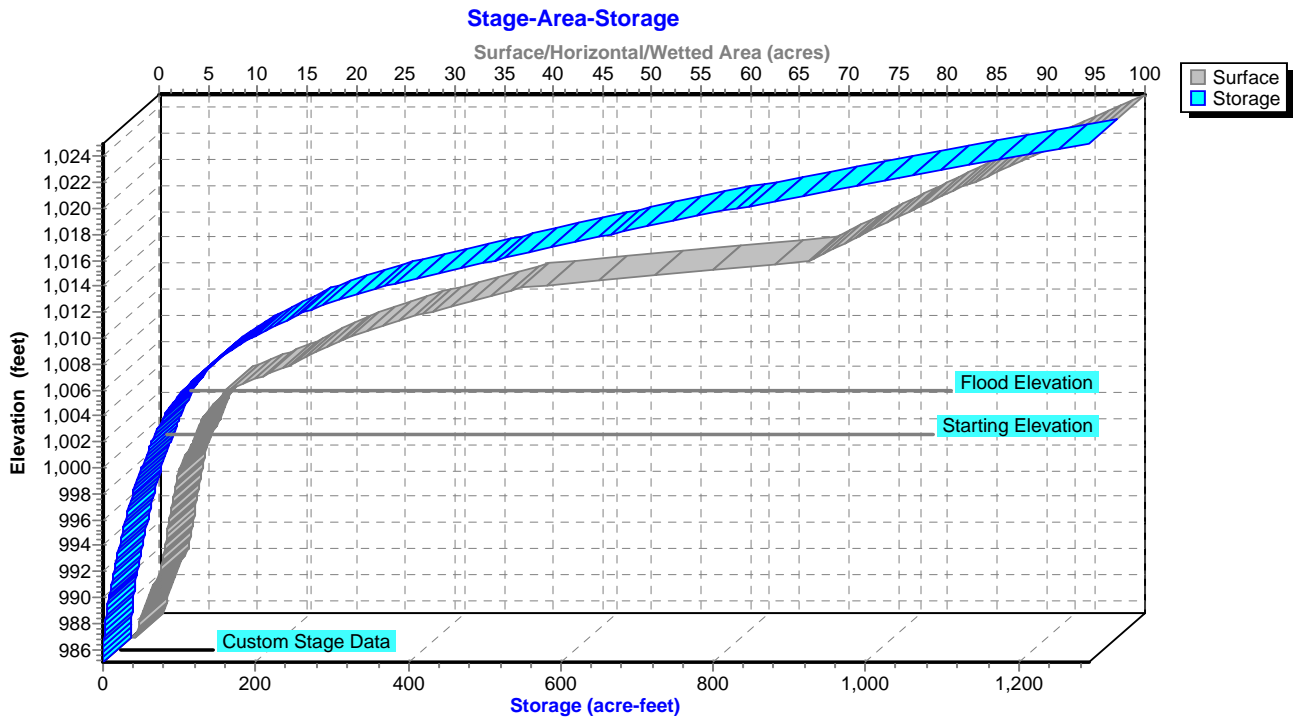
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

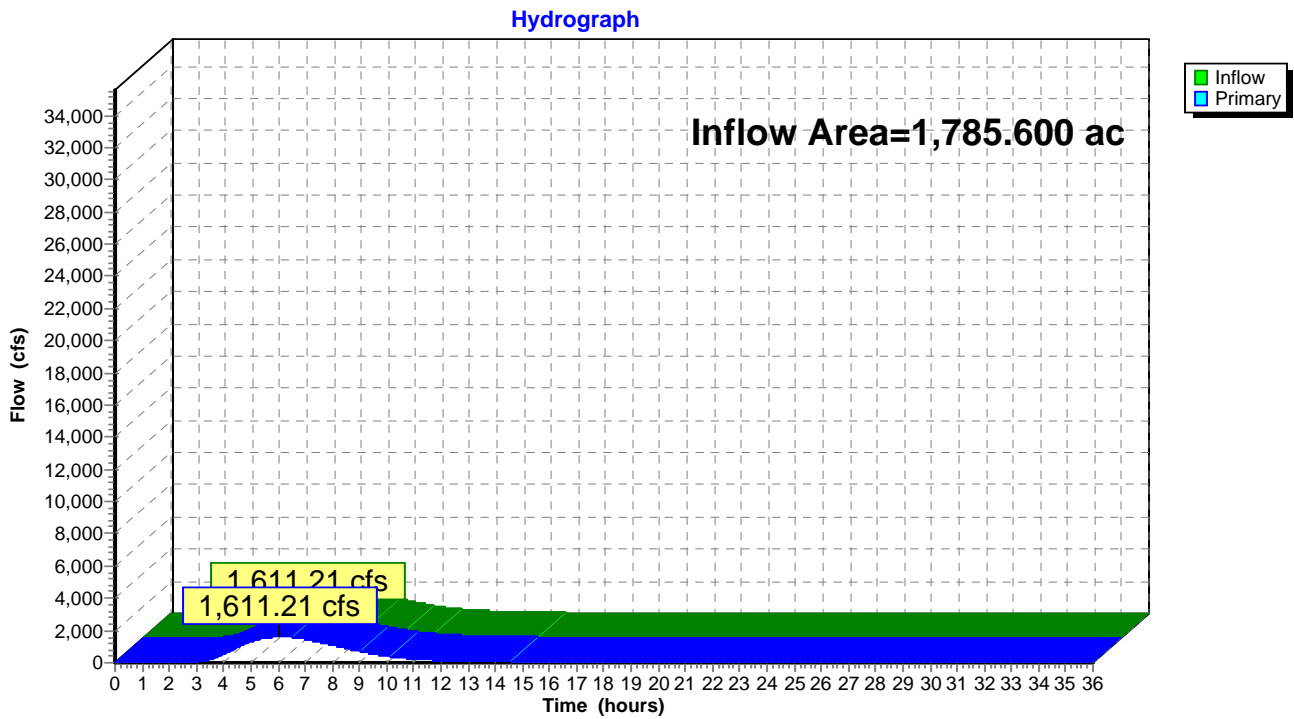


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.45" for 6-HR 0.3PMF event
 Inflow = 1,611.21 cfs @ 6.03 hrs, Volume= 661.646 af
 Primary = 1,611.21 cfs @ 6.04 hrs, Volume= 661.646 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 4.45" for 6-HR 0.3PMF event
 Inflow = 1,611.21 cfs @ 6.04 hrs, Volume= 661.645 af
 Outflow = 485.20 cfs @ 9.72 hrs, Volume= 821.634 af, Atten= 70%, Lag= 220.3 min
 Primary = 485.20 cfs @ 9.72 hrs, Volume= 821.634 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,098.76' @ 9.72 hrs Surf.Area= 269.382 ac Storage= 2,247.881 af (333.881 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 502.7 min (948.6 - 445.8)

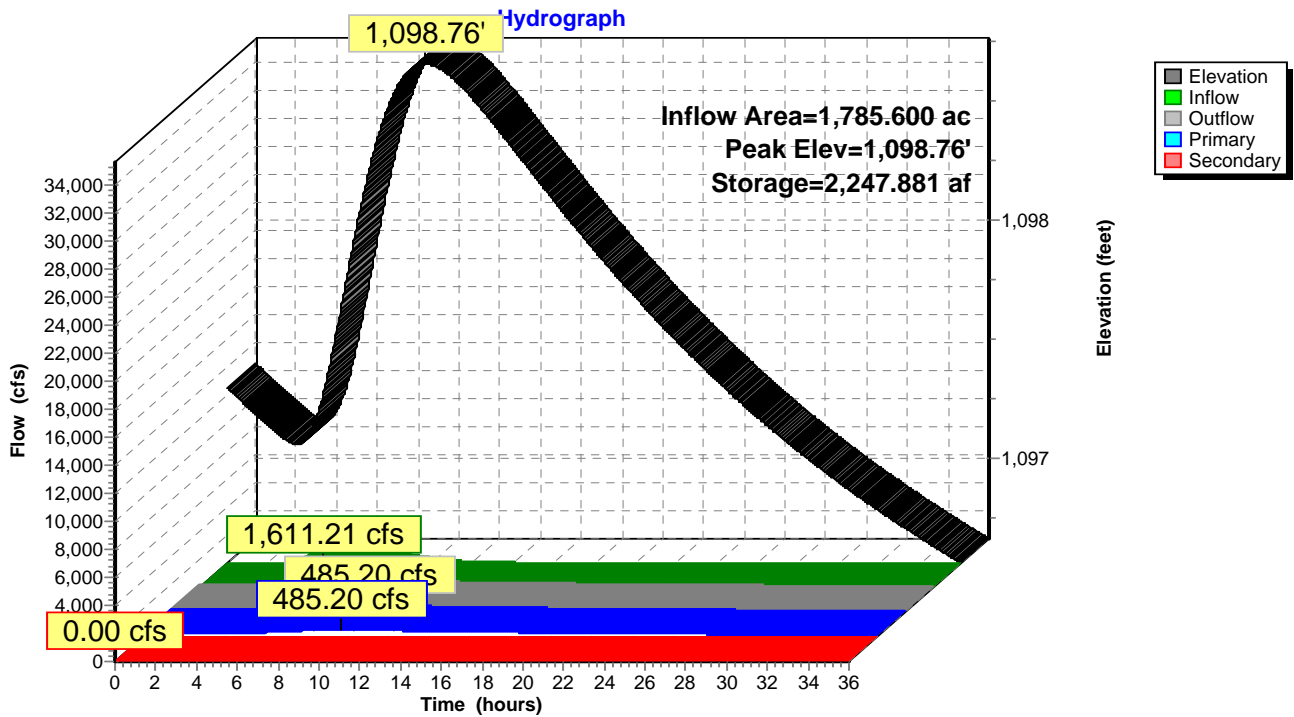
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

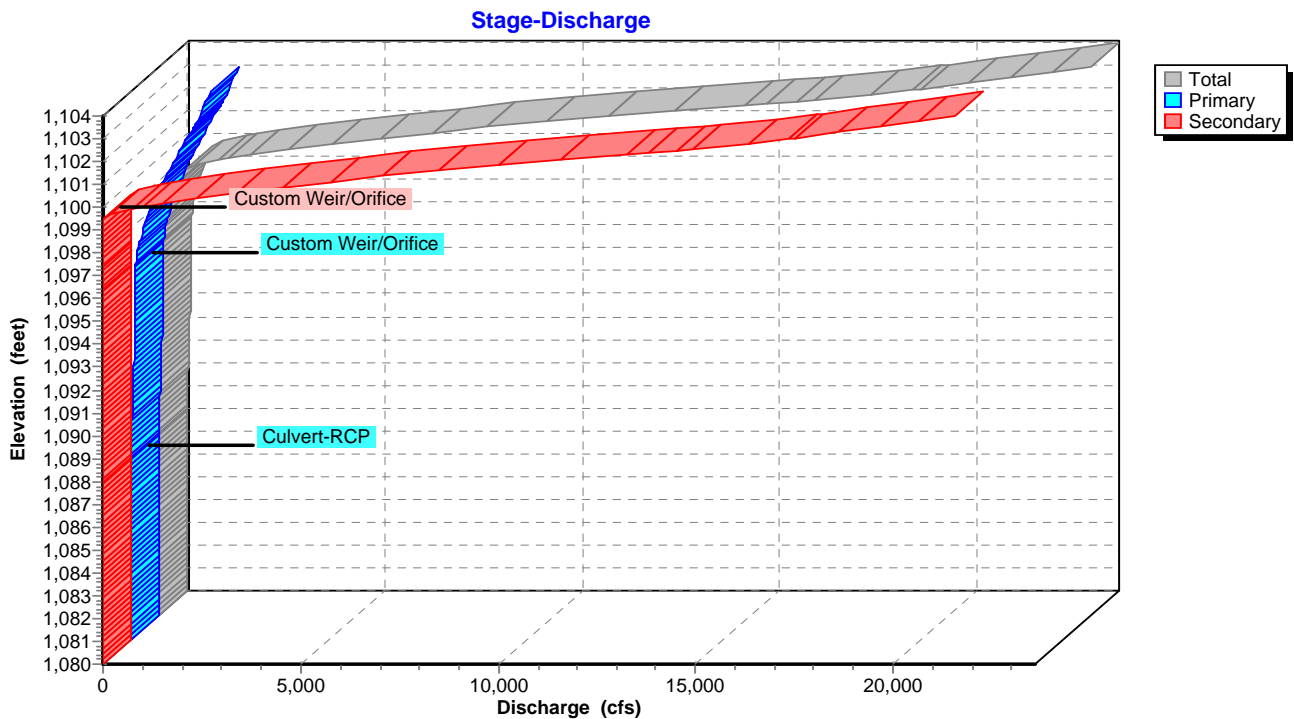
Primary OutFlow Max=485.19 cfs @ 9.72 hrs HW=1,098.76' TW=1,072.53' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 127.97 cfs @ 18.10 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 357.22 cfs @ 5.04 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

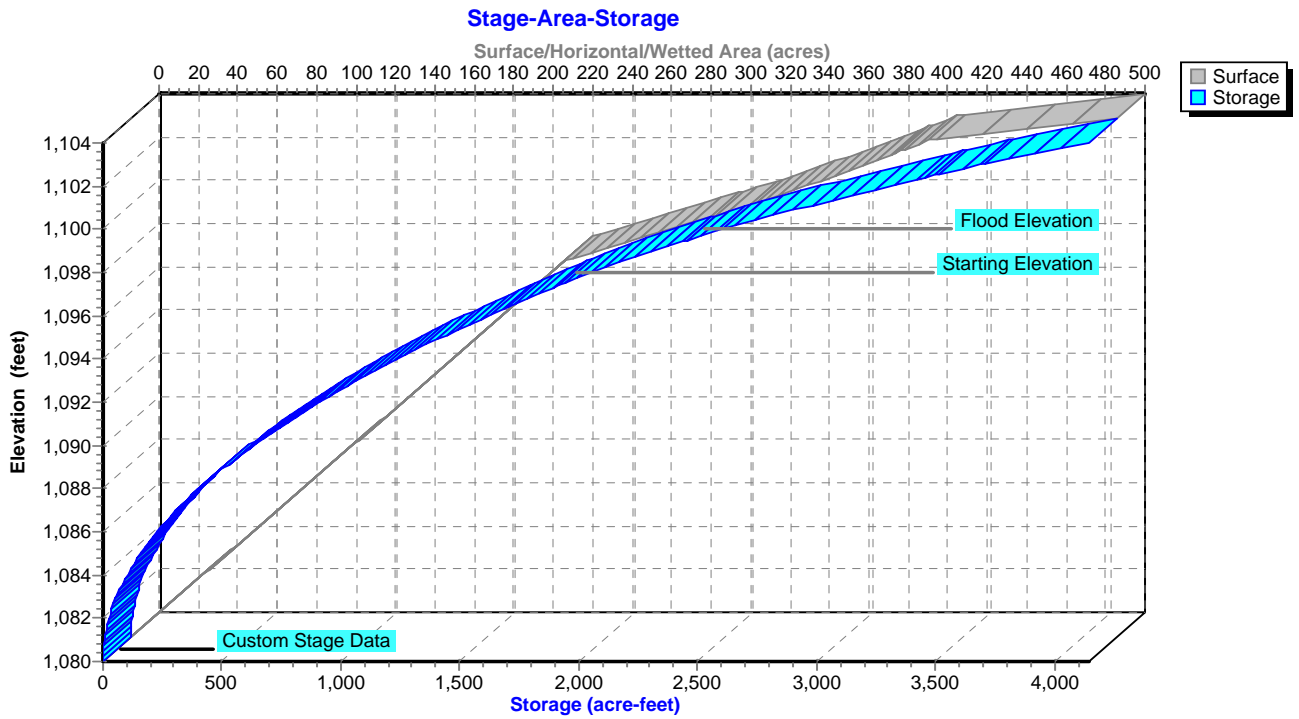
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable



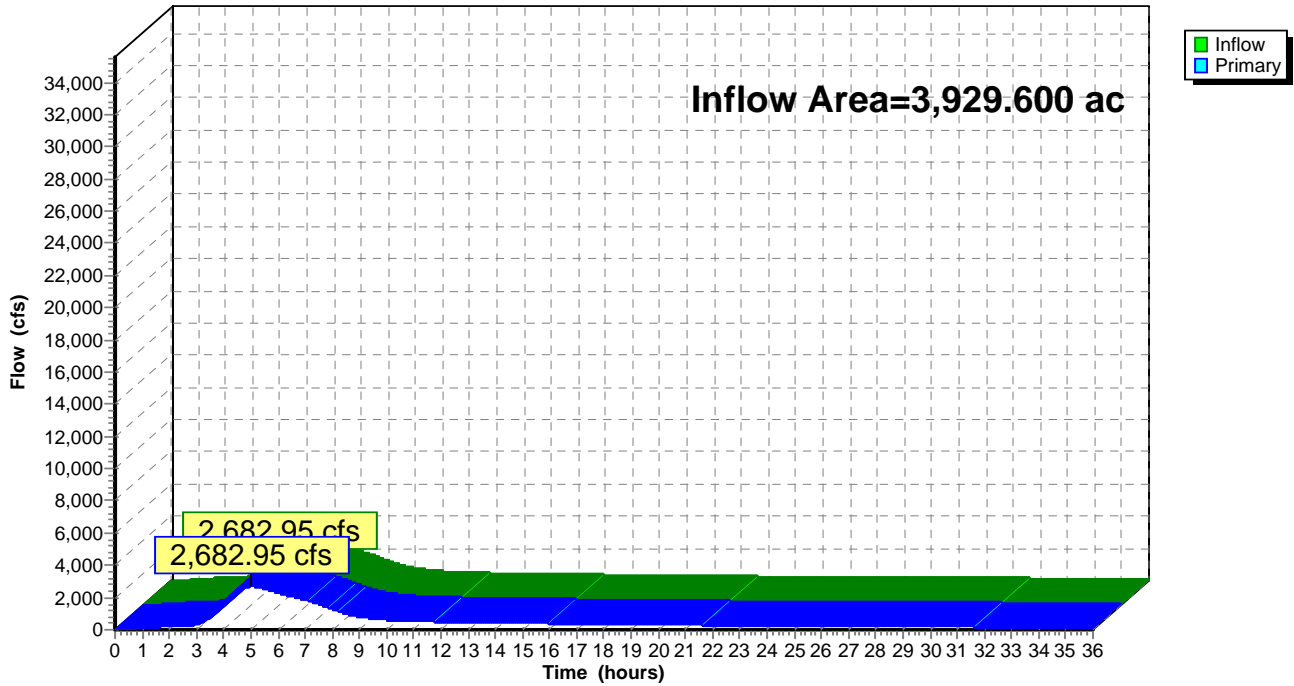
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 4.73" for 6-HR 0.3PMF event
Inflow = 2,682.95 cfs @ 5.00 hrs, Volume= 1,550.378 af
Primary = 2,682.95 cfs @ 5.01 hrs, Volume= 1,550.378 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 4.87" for 6-HR 0.3PMF event
 Inflow = 778.74 cfs @ 3.64 hrs, Volume= 155.792 af
 Outflow = 285.17 cfs @ 5.44 hrs, Volume= 155.242 af, Atten= 63%, Lag= 108.5 min
 Primary = 285.17 cfs @ 5.44 hrs, Volume= 155.242 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,108.61' @ 5.44 hrs Surf.Area= 29.904 ac Storage= 98.658 af (74.358 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 329.5 min calculated for 130.942 af (84% of inflow)
 Center-of-Mass det. time= 233.8 min (533.6 - 299.8)

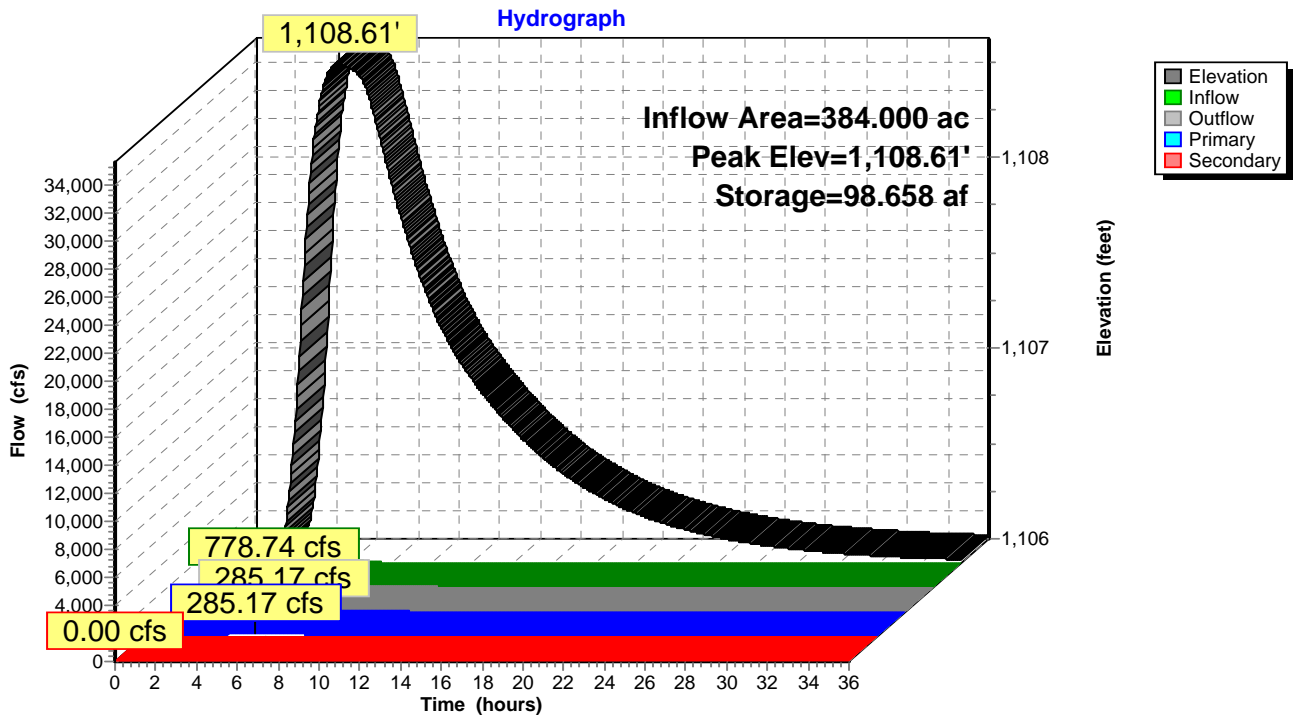
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

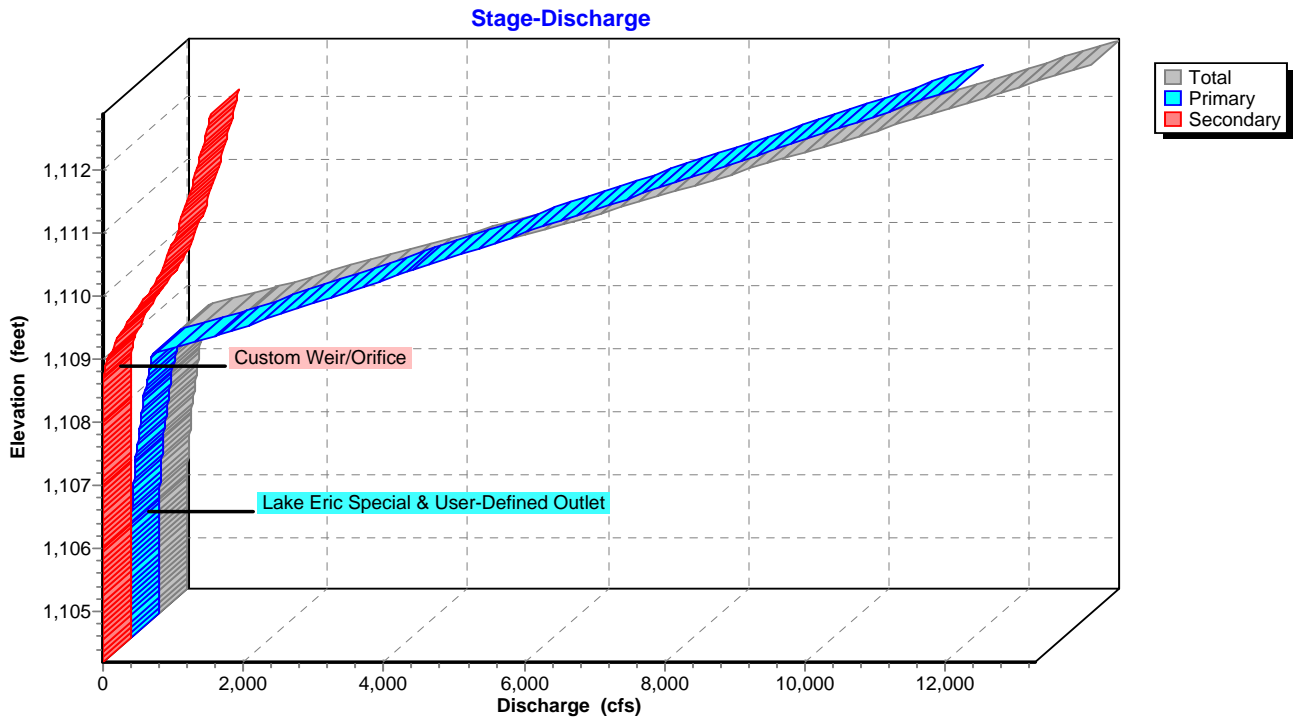
Primary OutFlow Max=285.17 cfs @ 5.44 hrs HW=1,108.61' TW=0.00' (Dynamic Tailwater)
 ↑1=Lake Eric Special & User-Defined Outlet (Custom Controls 285.17 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

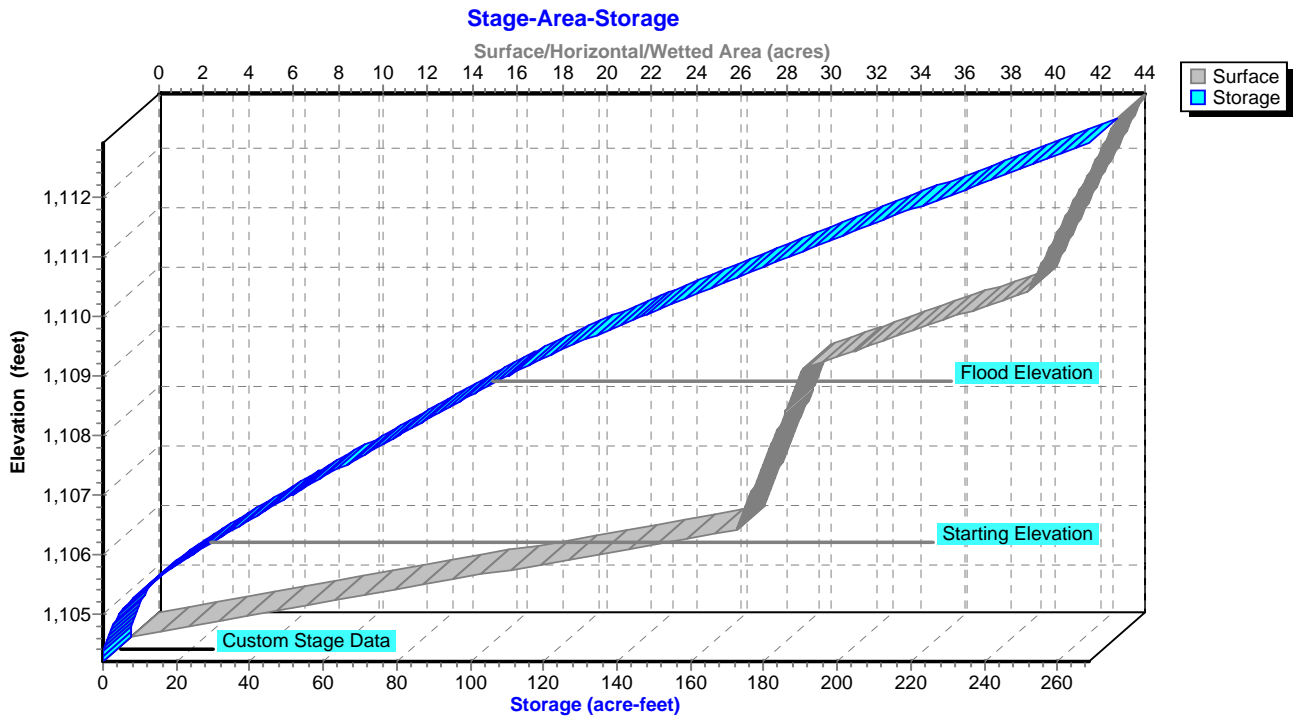
Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs



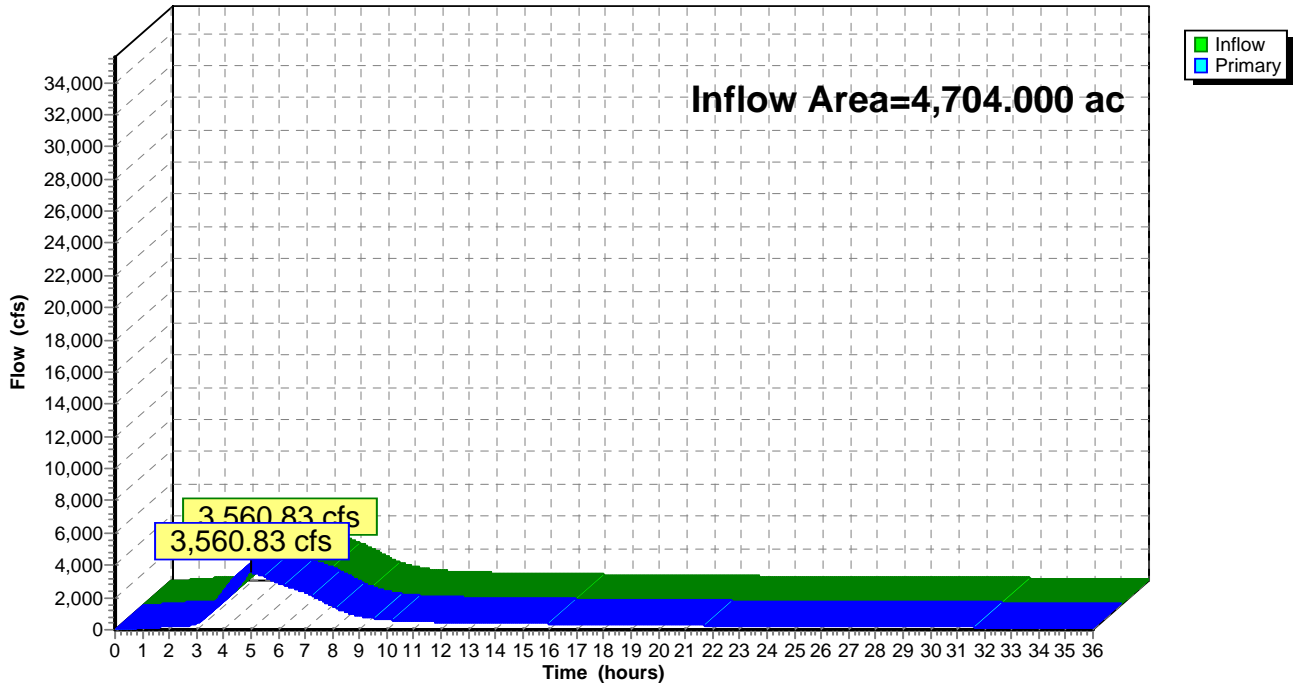
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 4.61" for 6-HR 0.3PMF event
Inflow = 3,560.83 cfs @ 4.97 hrs, Volume= 1,808.211 af
Primary = 3,560.83 cfs @ 4.98 hrs, Volume= 1,808.211 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 4.79" for 6-HR 0.3PMF event
 Inflow = 255.72 cfs @ 3.28 hrs, Volume= 46.001 af
 Outflow = 231.20 cfs @ 3.63 hrs, Volume= 45.886 af, Atten= 10%, Lag= 21.0 min
 Primary = 187.13 cfs @ 3.63 hrs, Volume= 43.300 af
 Secondary = 44.07 cfs @ 3.63 hrs, Volume= 2.586 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.22' @ 3.63 hrs Surf.Area= 4.287 ac Storage= 28.434 af (14.744 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 242.1 min calculated for 32.196 af (70% of inflow)
 Center-of-Mass det. time= 136.1 min (382.1 - 246.0)

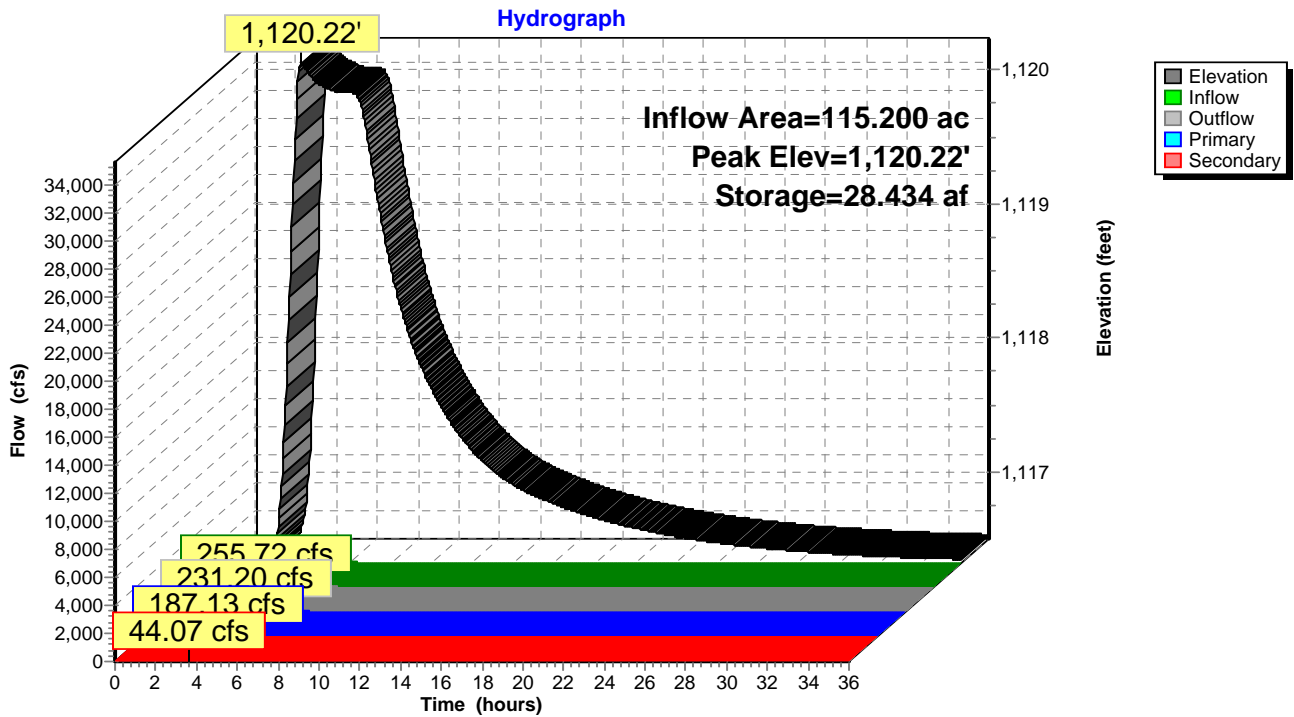
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

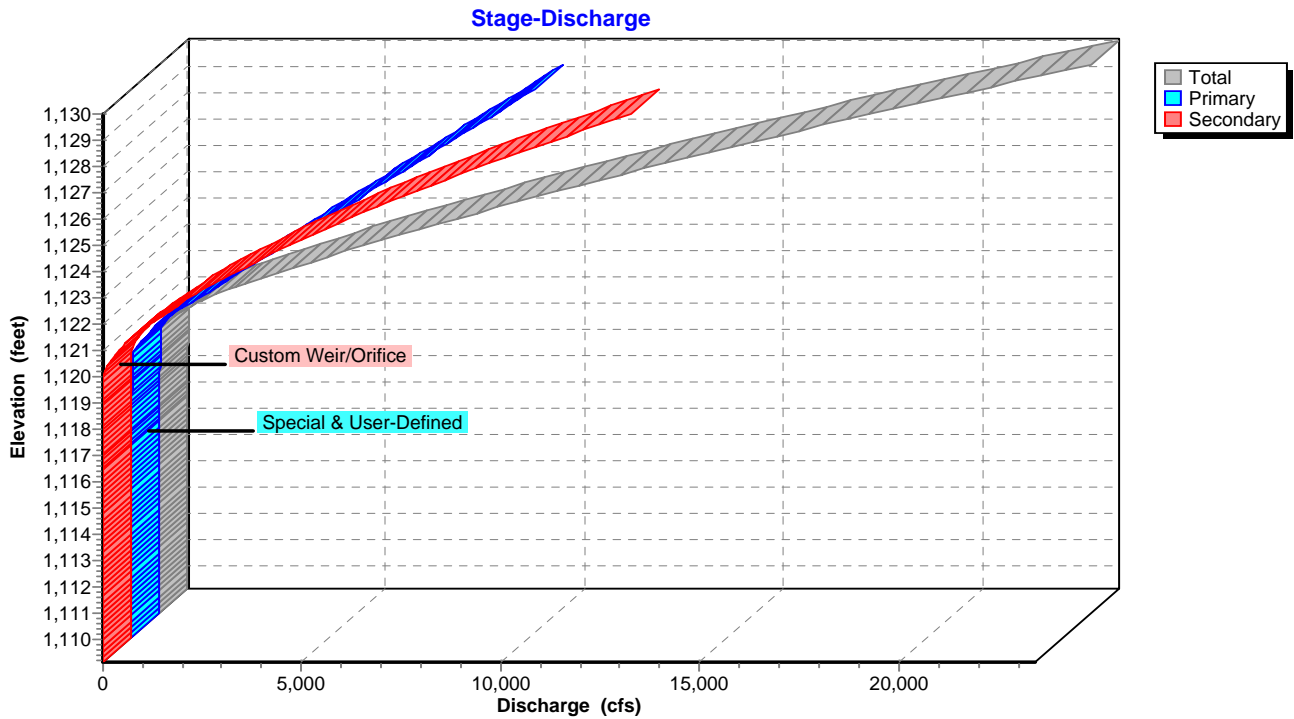
Primary OutFlow Max=187.11 cfs @ 3.63 hrs HW=1,120.22' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 187.11 cfs)

Secondary OutFlow Max=44.06 cfs @ 3.63 hrs HW=1,120.22' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 44.06 cfs @ 1.32 fps)

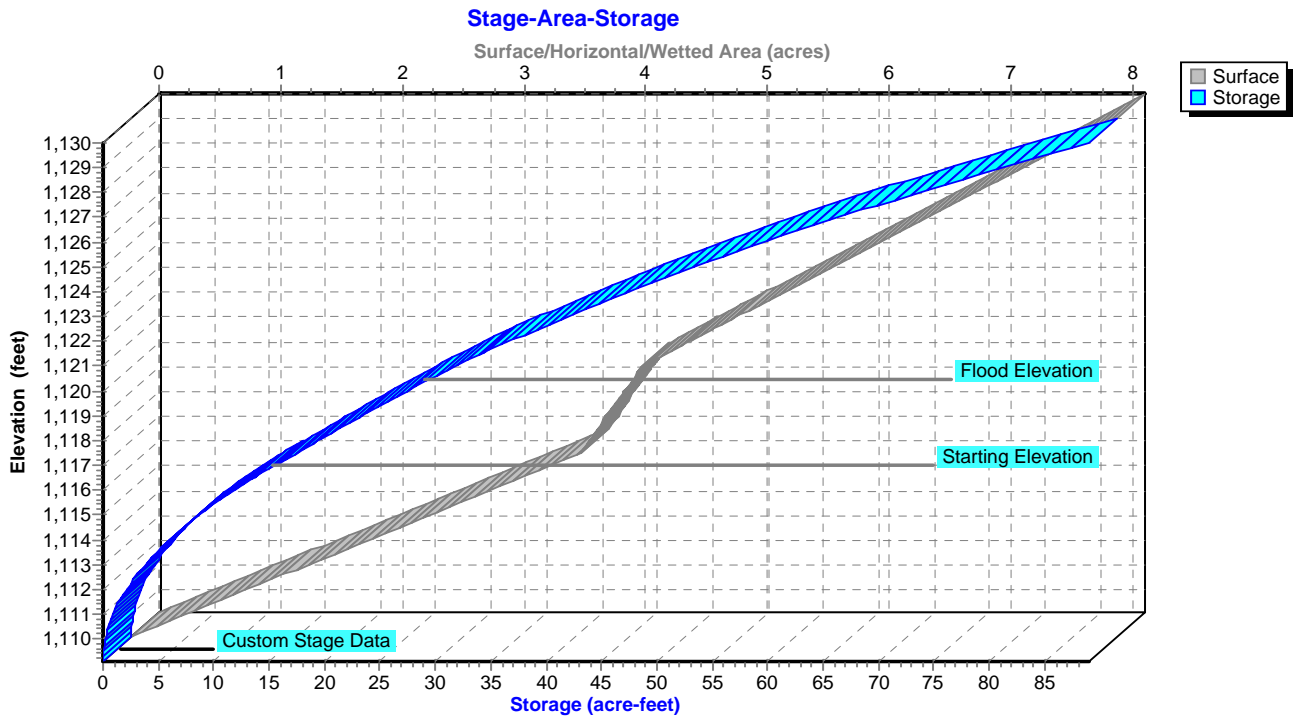
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



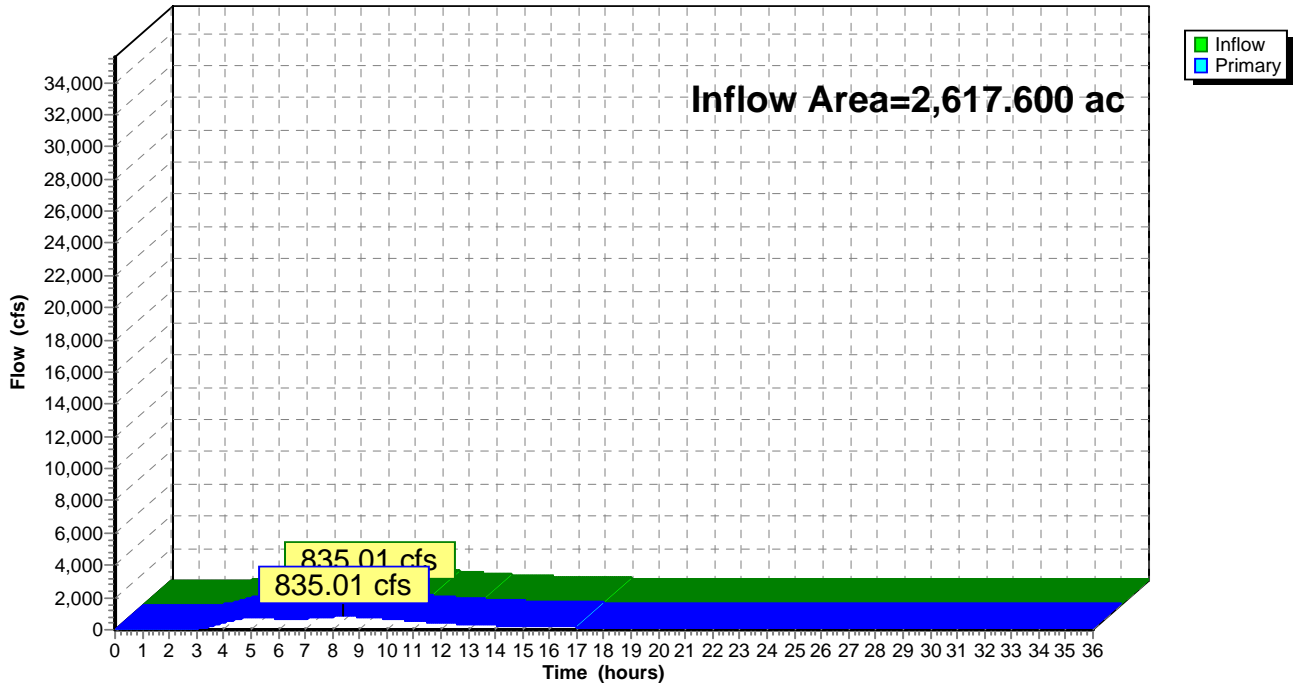
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 3.52" for 6-HR 0.3PMF event
Inflow = 835.01 cfs @ 8.35 hrs, Volume= 768.042 af
Primary = 835.01 cfs @ 8.36 hrs, Volume= 768.042 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

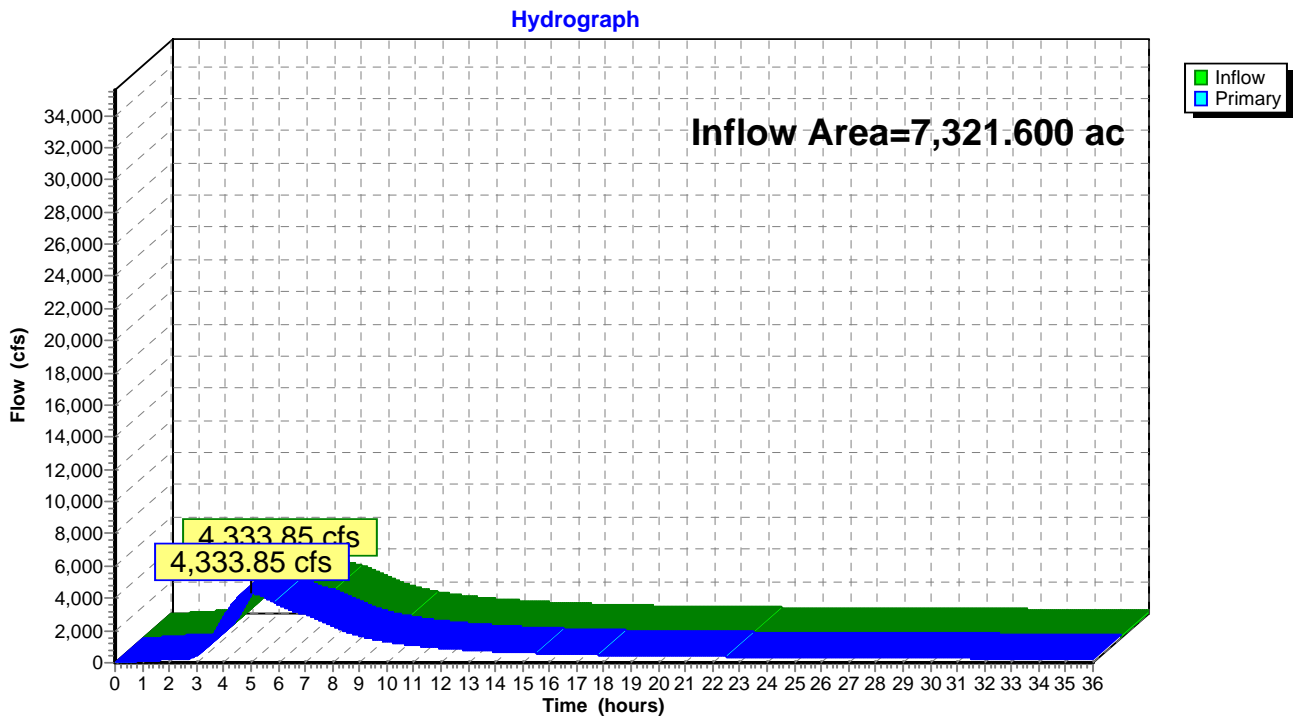


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 4.22" for 6-HR 0.3PMF event
Inflow = 4,333.85 cfs @ 5.01 hrs, Volume= 2,576.056 af
Primary = 4,333.85 cfs @ 5.02 hrs, Volume= 2,576.056 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



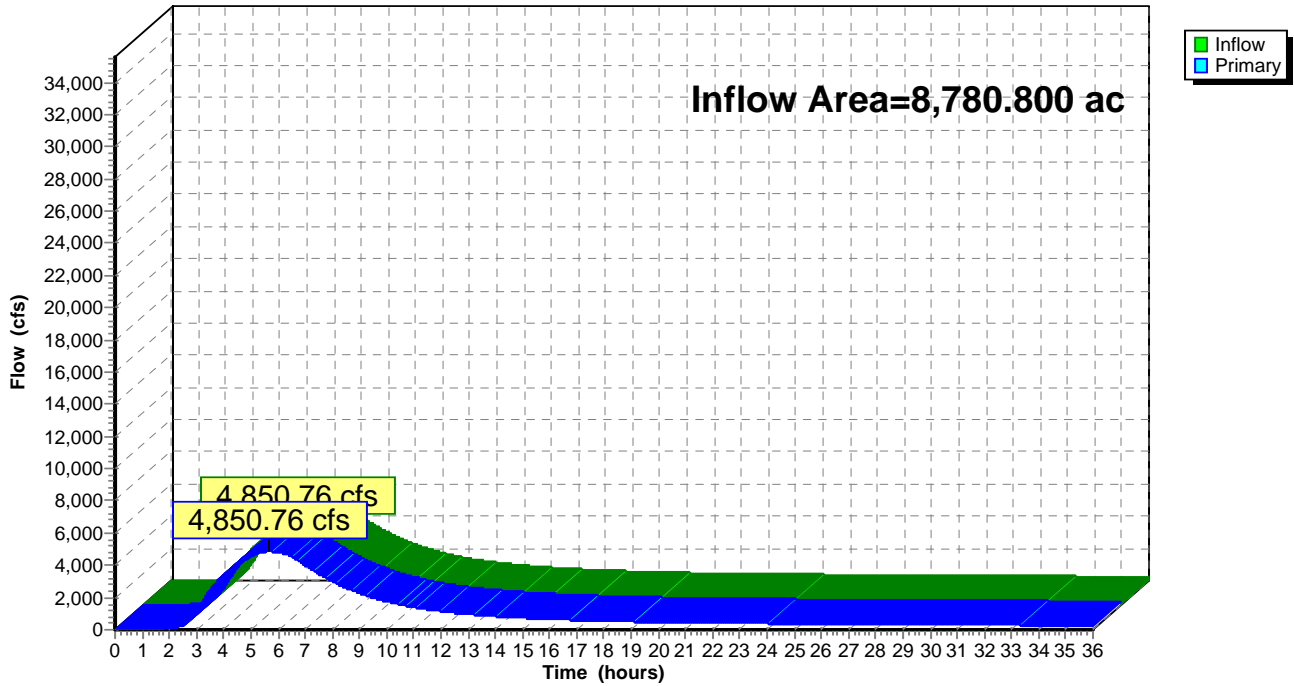
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 4.28" for 6-HR 0.3PMF event
Inflow = 4,850.76 cfs @ 5.68 hrs, Volume= 3,129.942 af
Primary = 4,850.76 cfs @ 5.69 hrs, Volume= 3,129.942 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 4.34" for 6-HR 0.3PMF event
 Inflow = 2,291.87 cfs @ 5.70 hrs, Volume= 710.504 af
 Outflow = 719.13 cfs @ 8.87 hrs, Volume= 551.538 af, Atten= 69%, Lag= 190.3 min
 Primary = 127.72 cfs @ 6.64 hrs, Volume= 286.933 af
 Secondary = 625.18 cfs @ 8.88 hrs, Volume= 264.604 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.15' @ 8.88 hrs Surf.Area= 178.706 ac Storage= 487.763 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 567.3 min calculated for 551.538 af (78% of inflow)
 Center-of-Mass det. time= 509.4 min (943.6 - 434.2)

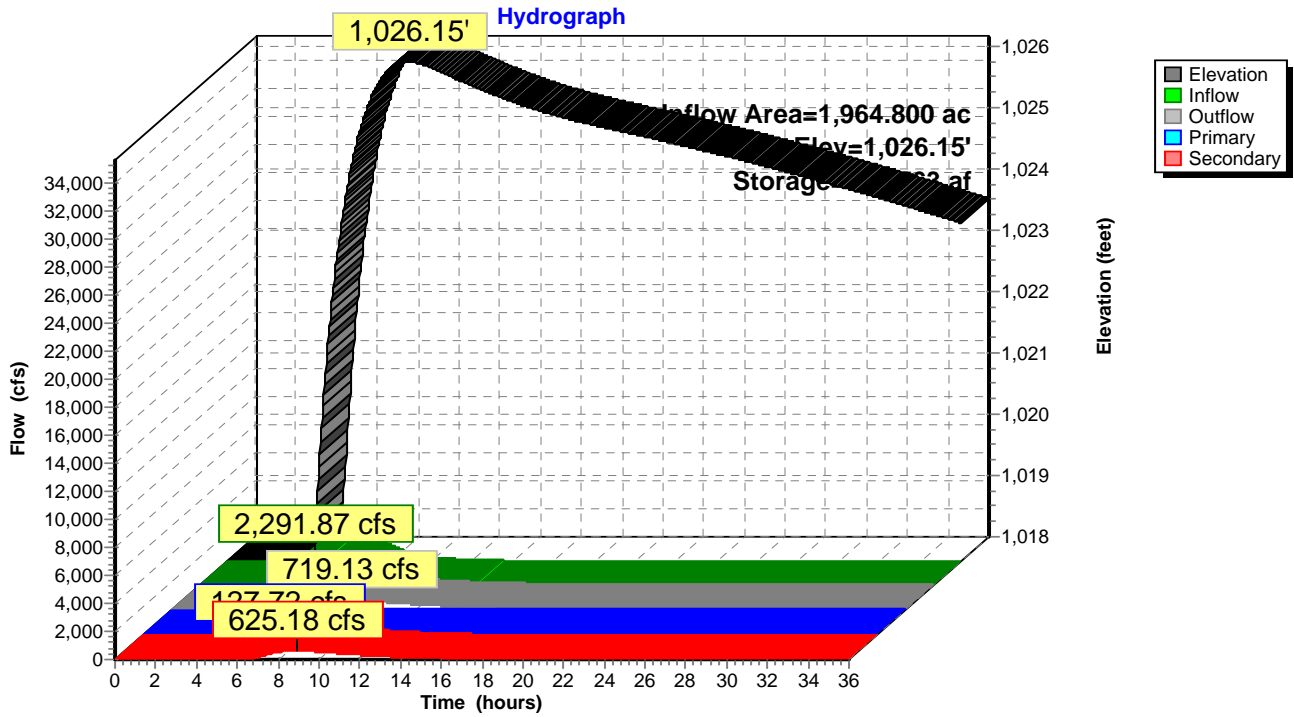
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

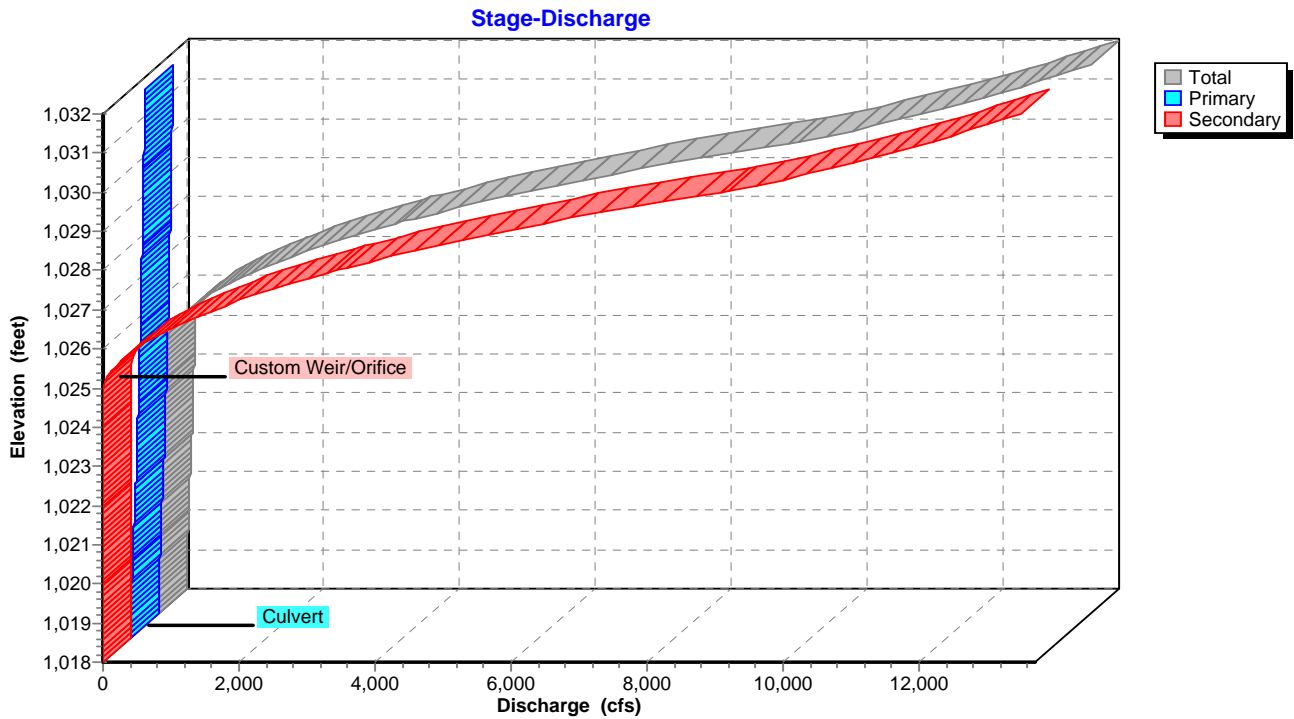
Primary OutFlow Max=127.36 cfs @ 6.64 hrs HW=1,025.17' TW=1,020.74' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 127.36 cfs @ 10.13 fps)

Secondary OutFlow Max=625.18 cfs @ 8.88 hrs HW=1,026.15' TW=1,023.74' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 625.18 cfs @ 3.34 fps)

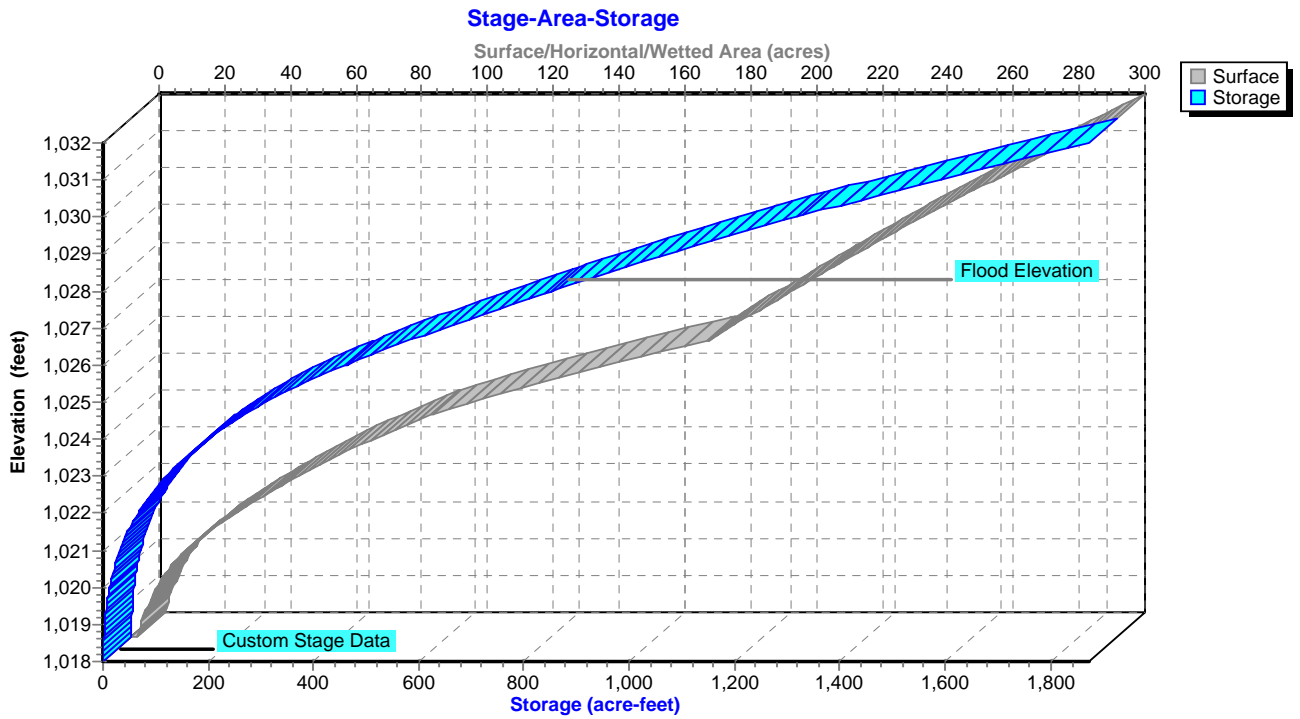
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 4.91" for 6-HR 0.3PMF event
 Inflow = 2,637.72 cfs @ 5.02 hrs, Volume= 803.362 af
 Outflow = 2,291.87 cfs @ 5.70 hrs, Volume= 710.505 af, Atten= 13%, Lag= 41.0 min
 Primary = 2,283.97 cfs @ 5.70 hrs, Volume= 709.810 af
 Secondary = 7.91 cfs @ 5.70 hrs, Volume= 0.695 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.49' @ 5.70 hrs Surf.Area= 106.557 ac Storage= 462.933 af (242.933 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 199.7 min calculated for 490.505 af (61% of inflow)
 Center-of-Mass det. time= 85.2 min (434.2 - 349.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

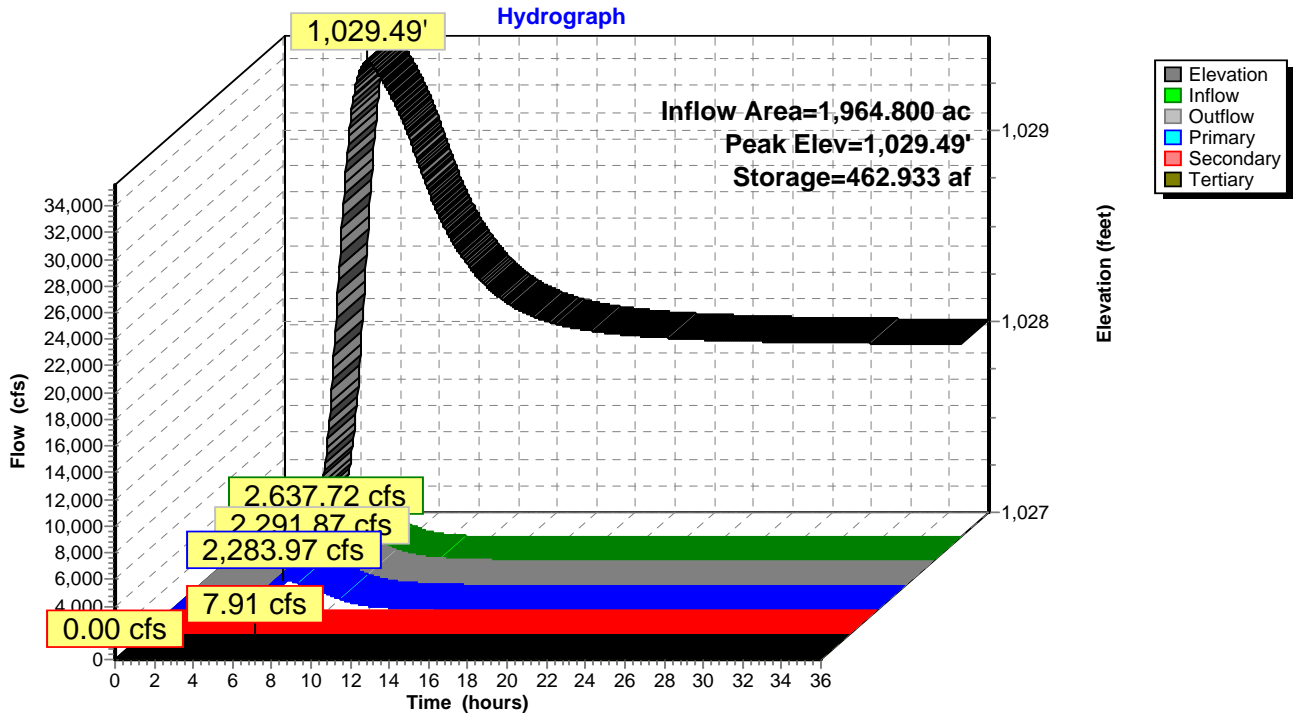
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2,283.96 cfs @ 5.70 hrs HW=1,029.49' TW=1,023.70' (Dynamic Tailwater)
 ↖1=**Broad-Crested Rectangular Weir** (Weir Controls 1,433.21 cfs @ 3.21 fps)
 ↖2=**Broad-Crested Rectangular Weir** (Weir Controls 850.75 cfs @ 2.61 fps)

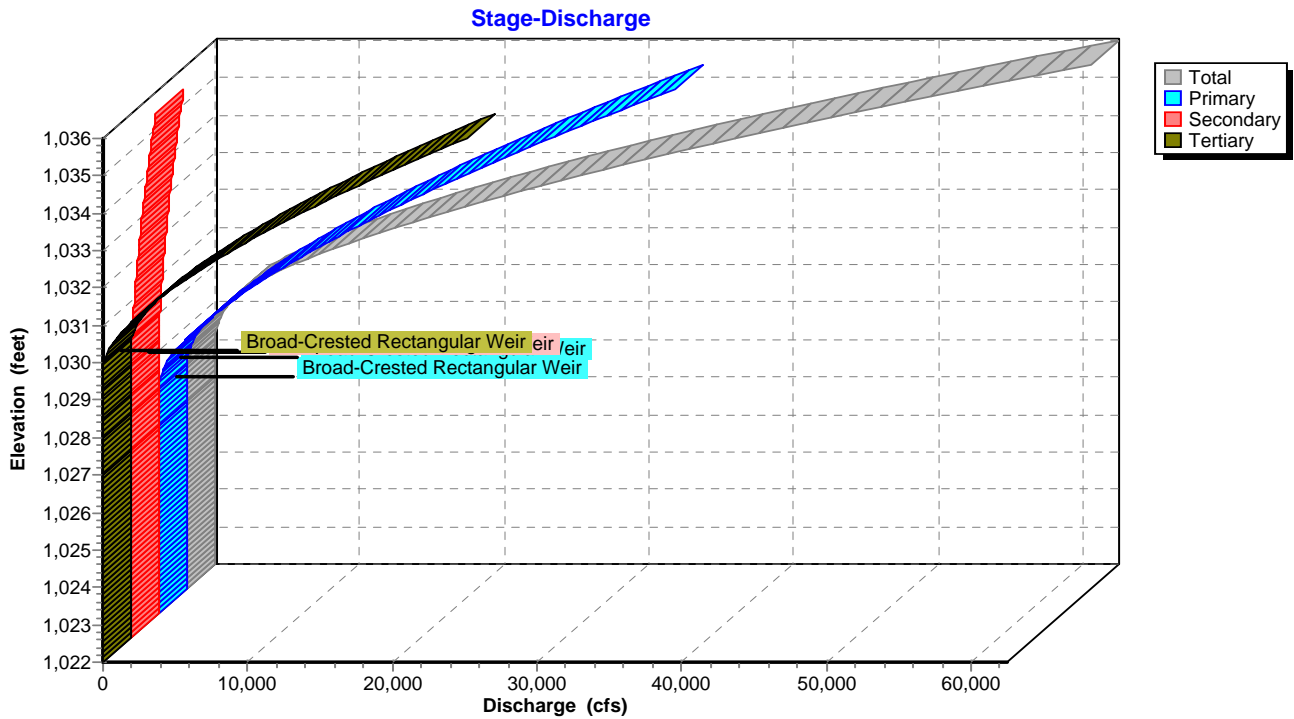
Secondary OutFlow Max=7.91 cfs @ 5.70 hrs HW=1,029.49' TW=1,023.70' (Dynamic Tailwater)
 ↖3=**Sharp-Crested Rectangular Weir** (Weir Controls 7.91 cfs @ 1.41 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↖4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

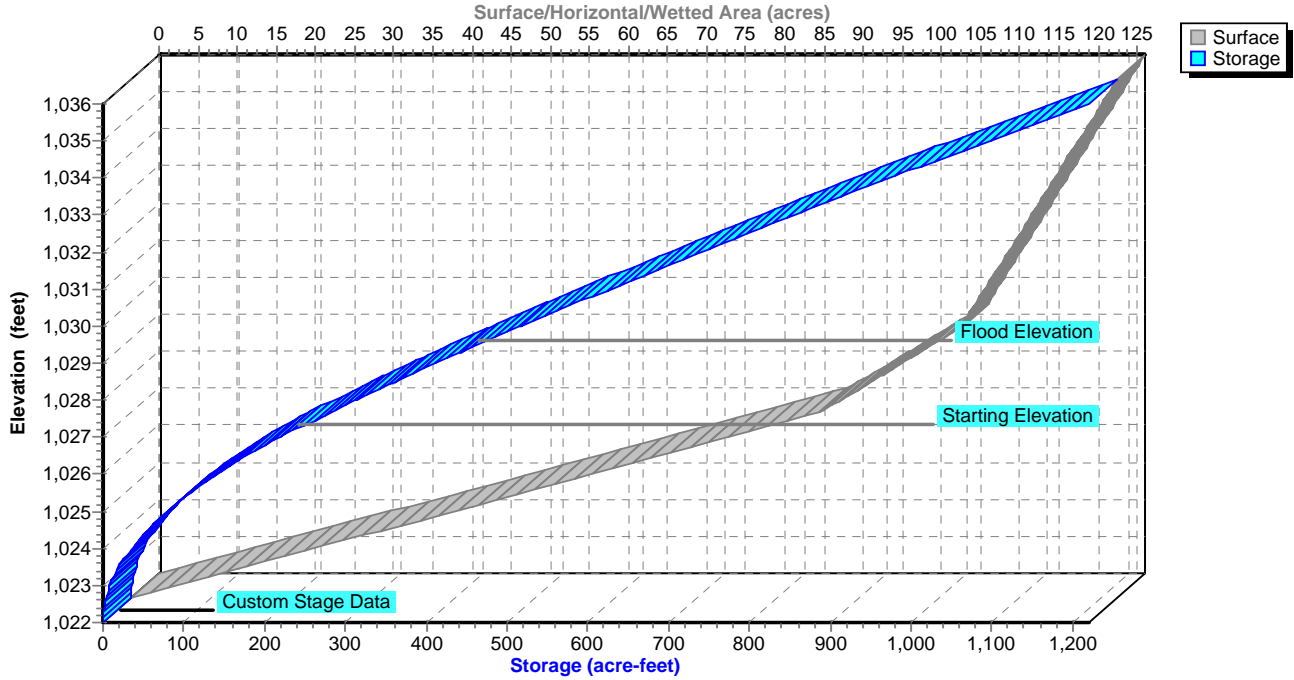


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

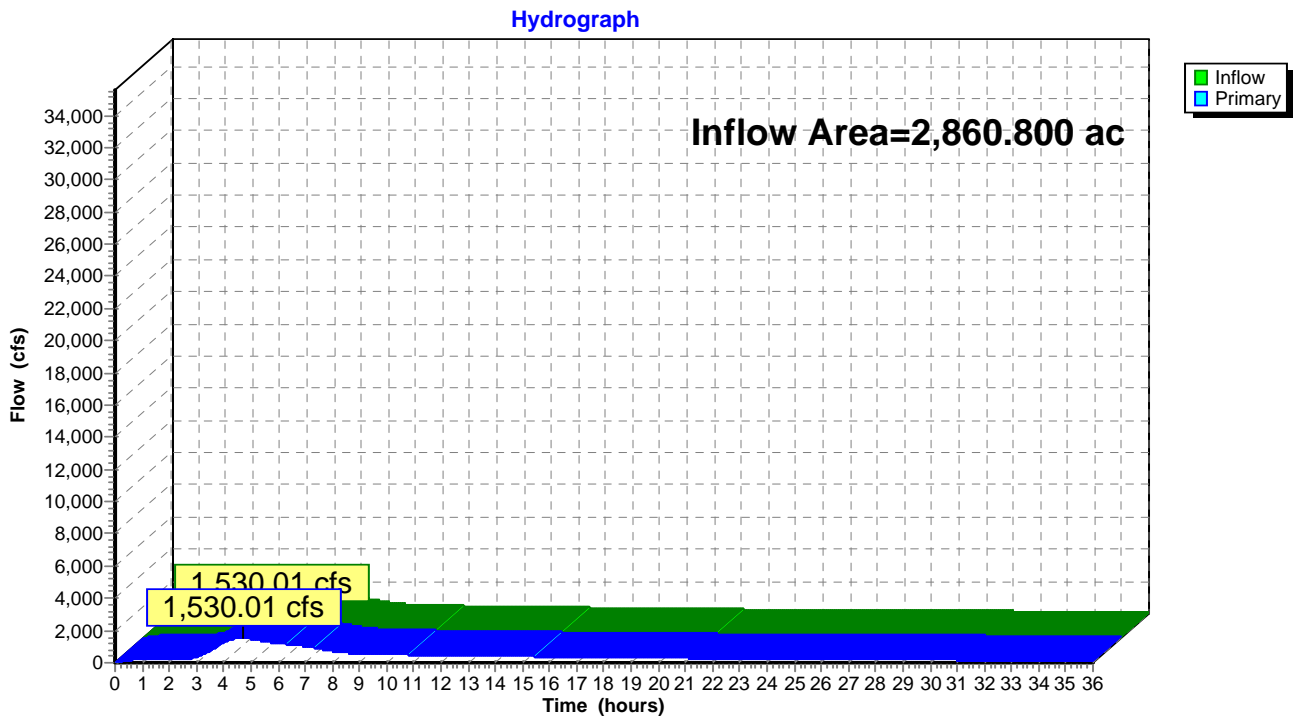


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 4.97" for 6-HR 0.3PMF event
Inflow = 1,530.01 cfs @ 4.69 hrs, Volume= 1,183.920 af
Primary = 1,530.01 cfs @ 4.70 hrs, Volume= 1,183.920 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 4.30" for 6-HR 0.3PMF event
 Inflow = 5,136.87 cfs @ 6.44 hrs, Volume= 3,388.276 af
 Outflow = 5,130.37 cfs @ 6.53 hrs, Volume= 3,387.445 af, Atten= 0%, Lag= 5.1 min
 Primary = 3,366.34 cfs @ 6.06 hrs, Volume= 3,120.006 af
 Secondary = 1,764.77 cfs @ 6.53 hrs, Volume= 267.440 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,009.44' @ 6.53 hrs Surf.Area= 14.080 ac Storage= 216.791 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 24.8 min calculated for 3,386.505 af (100% of inflow)
 Center-of-Mass det. time= 24.4 min (696.1 - 671.7)

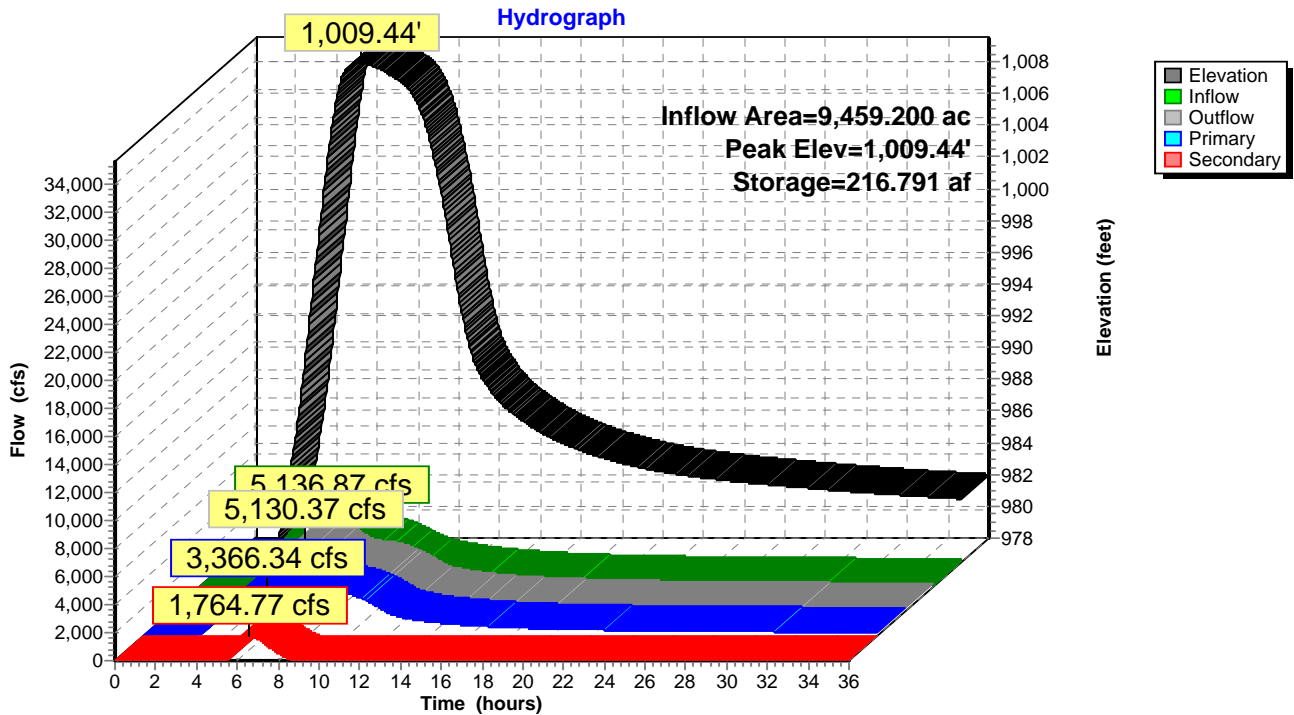
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

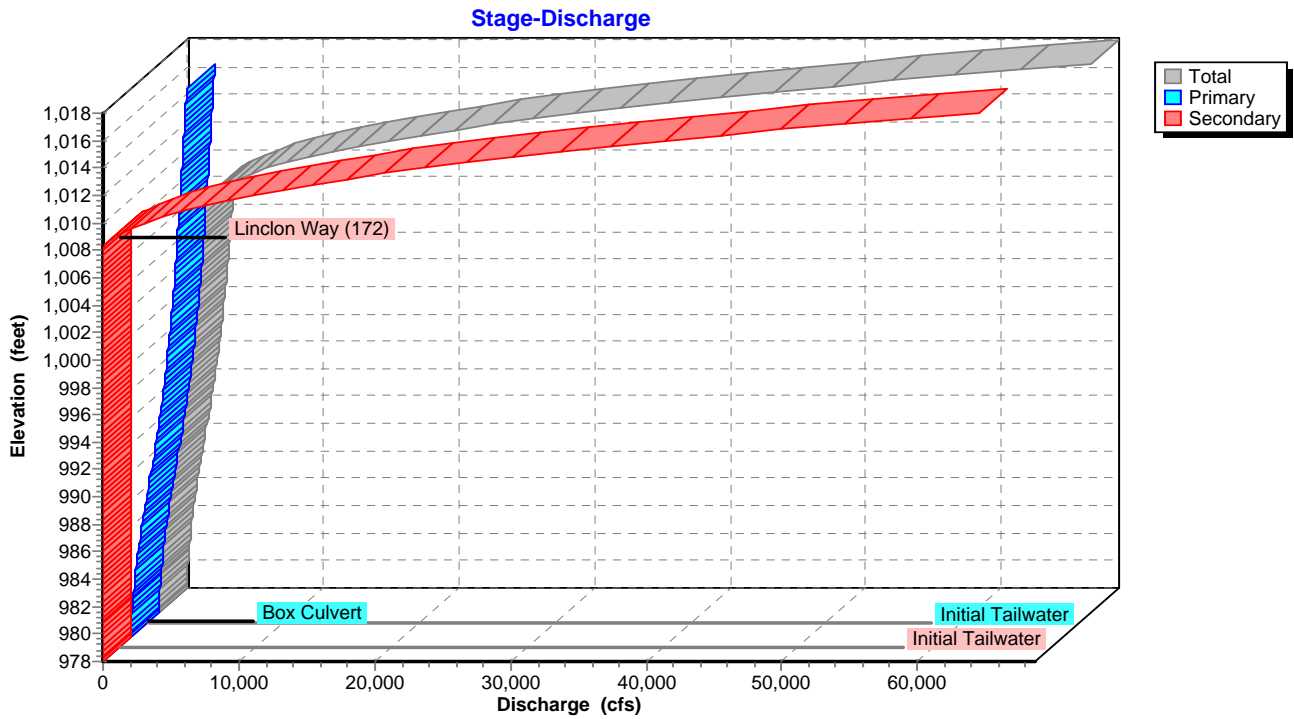
Primary OutFlow Max=3,365.82 cfs @ 6.06 hrs HW=1,009.29' TW=985.29' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,365.82 cfs @ 29.44 fps)

Secondary OutFlow Max=1,764.75 cfs @ 6.53 hrs HW=1,009.44' TW=985.46' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 1,764.75 cfs @ 3.72 fps)

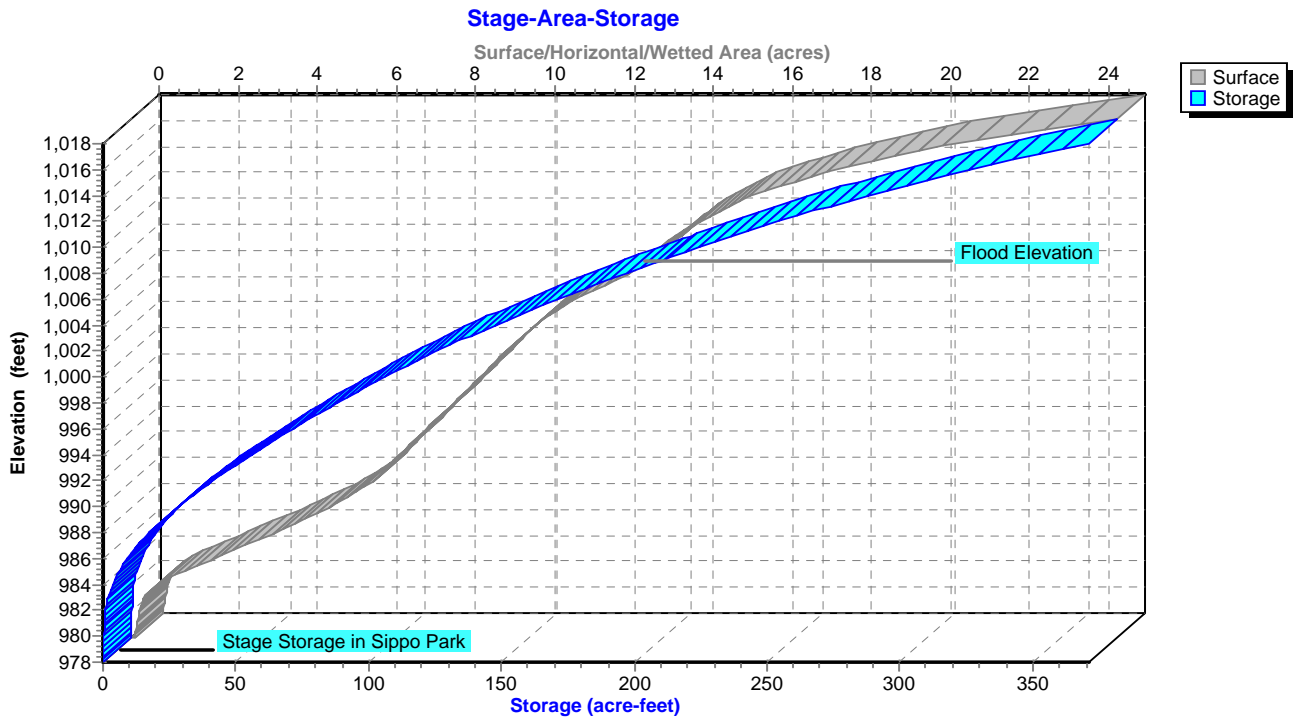
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

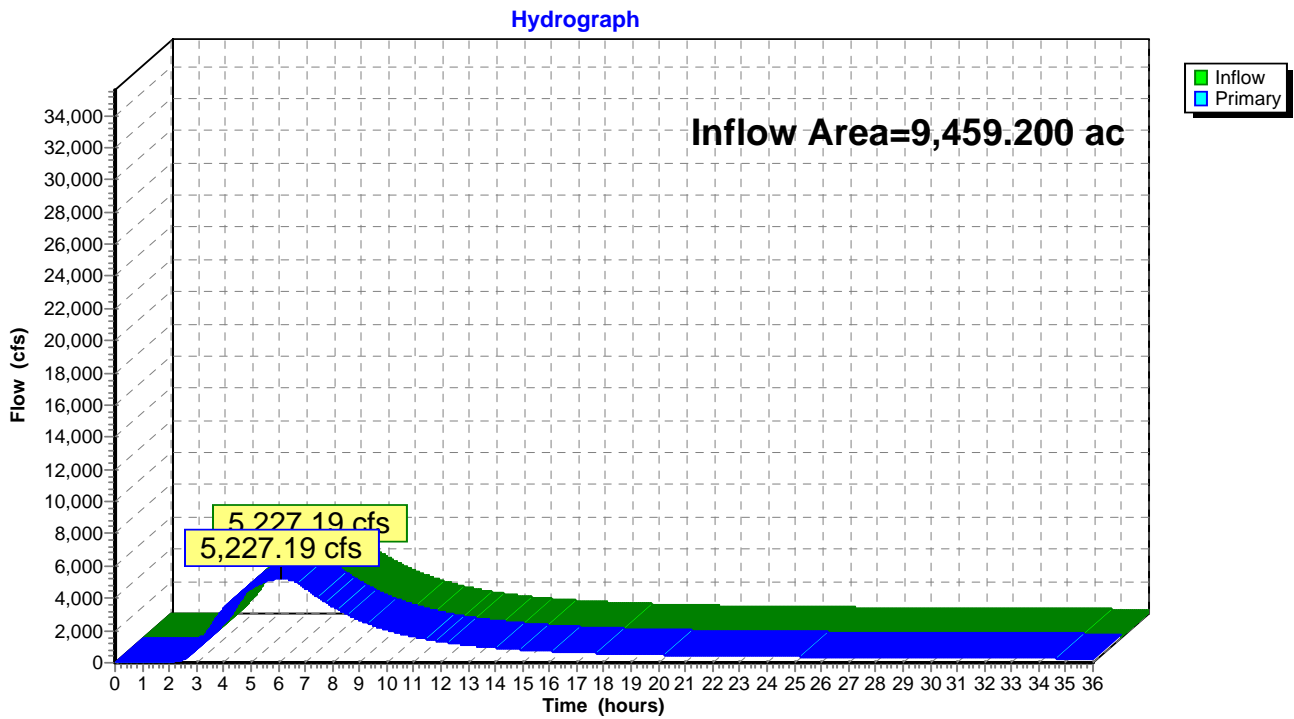


Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 4.31" for 6-HR 0.3PMF event
Inflow = 5,227.19 cfs @ 6.13 hrs, Volume= 3,400.696 af
Primary = 5,227.19 cfs @ 6.14 hrs, Volume= 3,400.696 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment HYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=7.19"
 Tc=44.0 min CN=74 Runoff=387.37 cfs 69.049 af

Subcatchment HYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=7.33"
 Tc=65.0 min CN=75 Runoff=825.16 cfs 164.084 af

Subcatchment HYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=6.66"
 Tc=226.0 min CN=70 Runoff=2,052.98 cfs 777.622 af

Subcatchment HYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=6.39"
 Tc=128.0 min CN=68 Runoff=2,094.15 cfs 572.327 af

Subcatchment HYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=6.25"
 Tc=129.0 min CN=67 Runoff=1,466.80 cfs 403.453 af

Subcatchment HYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=7.19"
 Tc=110.0 min CN=74 Runoff=1,736.15 cfs 433.474 af

Subcatchment HYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=7.33"
 Tc=72.0 min CN=75 Runoff=2,176.44 cfs 449.277 af

Subcatchment HYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=7.98"
 Tc=78.0 min CN=80 Runoff=2,130.29 cfs 451.181 af

Subcatchment HYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=6.52"
 Tc=155.0 min CN=69 Runoff=1,915.88 cfs 580.970 af

Subcatchment HYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=7.33"
 Tc=156.0 min CN=75 Runoff=3,967.55 cfs 1,199.374 af

Subcatchment HYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=6.25"
 Tc=151.0 min CN=67 Runoff=1,136.52 cfs 340.101 af

Reach 5R: Channel 5 Avg. Flow Depth=4.40' Max Vel=7.49 fps Inflow=816.42 cfs 1,114.890 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=810.05 cfs 1,108.416 af

Reach 7R: Channel 7 Avg. Flow Depth=11.73' Max Vel=3.87 fps Inflow=2,324.80 cfs 1,680.477 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=2,228.29 cfs 1,669.742 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=7.17' Max Vel=3.28 fps Inflow=1,693.09 cfs 939.577 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=1,690.66 cfs 938.793 af

Reach 15R: Channel 15 Avg. Flow Depth=11.50' Max Vel=2.67 fps Inflow=6,766.35 cfs 3,932.261 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=5,850.09 cfs 3,892.095 af

Reach 16R: Channel 16 Avg. Flow Depth=14.35' Max Vel=3.52 fps Inflow=7,700.34 cfs 4,774.377 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=7,487.70 cfs 4,731.783 af

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 555

Reach 18R: Sippo Creek Avg. Flow Depth=8.78' Max Vel=10.74 fps Inflow=8,186.84 cfs 5,167.753 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=8,186.84 cfs 5,167.628 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=1,192.99 cfs 233.016 af
Primary=1,192.99 cfs 233.016 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,011.43' Storage=241.775 af Inflow=8,226.27 cfs 5,182.474 af
cfs 2,692.793 af Secondary=5,258.27 cfs 2,295.802 af Tertiary=587.13 cfs 180.712 af Outflow=8,188.71 cfs 5,169.307 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=2,423.39 cfs 1,010.067 af
Primary=2,423.39 cfs 1,010.067 af

Pond 3P: Lake Cable Peak Elev=1,099.62' Storage=2,491.901 af Inflow=2,423.39 cfs 1,010.066 af
Primary=698.66 cfs 1,098.485 af Secondary=117.76 cfs 16.536 af Outflow=816.42 cfs 1,115.021 af

Pond 4C: Confluence 4 Inflow=4,143.54 cfs 2,250.576 af
Primary=4,143.54 cfs 2,250.576 af

Pond 4P: Lake O'Springs Peak Elev=1,108.89' Storage=106.991 af Inflow=1,192.99 cfs 233.016 af
Primary=885.62 cfs 230.180 af Secondary=33.94 cfs 2.266 af Outflow=919.55 cfs 232.447 af

Pond 5C: Confluence 5 Inflow=5,542.73 cfs 2,653.892 af
Primary=5,542.73 cfs 2,653.892 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.39' Storage=29.177 af Inflow=387.37 cfs 69.049 af
Primary=278.48 cfs 59.951 af Secondary=104.07 cfs 8.981 af Outflow=382.55 cfs 68.932 af

Pond 6C: Confluence 6 Inflow=2,088.07 cfs 1,278.810 af
Primary=2,088.07 cfs 1,278.810 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=6,766.35 cfs 3,932.481 af
Primary=6,766.35 cfs 3,932.481 af

Pond 8C: Confluence 8 Inflow=7,700.34 cfs 4,774.612 af
Primary=7,700.34 cfs 4,774.612 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,026.97' Storage=641.583 af Inflow=3,641.74 cfs 1,106.494 af
Primary=128.44 cfs 286.604 af Secondary=1,601.20 cfs 653.057 af Outflow=1,693.09 cfs 939.661 af

Pond 9P: Sippo Lake Peak Elev=1,029.93' Storage=510.088 af Inflow=3,967.55 cfs 1,199.374 af
cfs 3,593.10 cfs 1,099.328 af Secondary=48.64 cfs 7.167 af Tertiary=0.00 cfs 0.000 af Outflow=3,641.74 cfs 1,106.495 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=2,324.80 cfs 1,680.610 af
Primary=2,324.80 cfs 1,680.610 af

Pond 16P: Lincoln Way Box Peak Elev=1,010.54' Storage=232.652 af Inflow=8,188.71 cfs 5,169.058 af
Primary=3,370.92 cfs 3,803.343 af Secondary=4,841.70 cfs 1,364.660 af Outflow=8,186.84 cfs 5,168.002 af

Pond 19C: Confluence 19 Inflow=8,226.27 cfs 5,182.719 af
Primary=8,226.27 cfs 5,182.719 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 5,440.912 af Average Runoff Depth = 6.90"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 387.37 cfs @ 3.27 hrs, Volume= 69.049 af, Depth= 7.19"

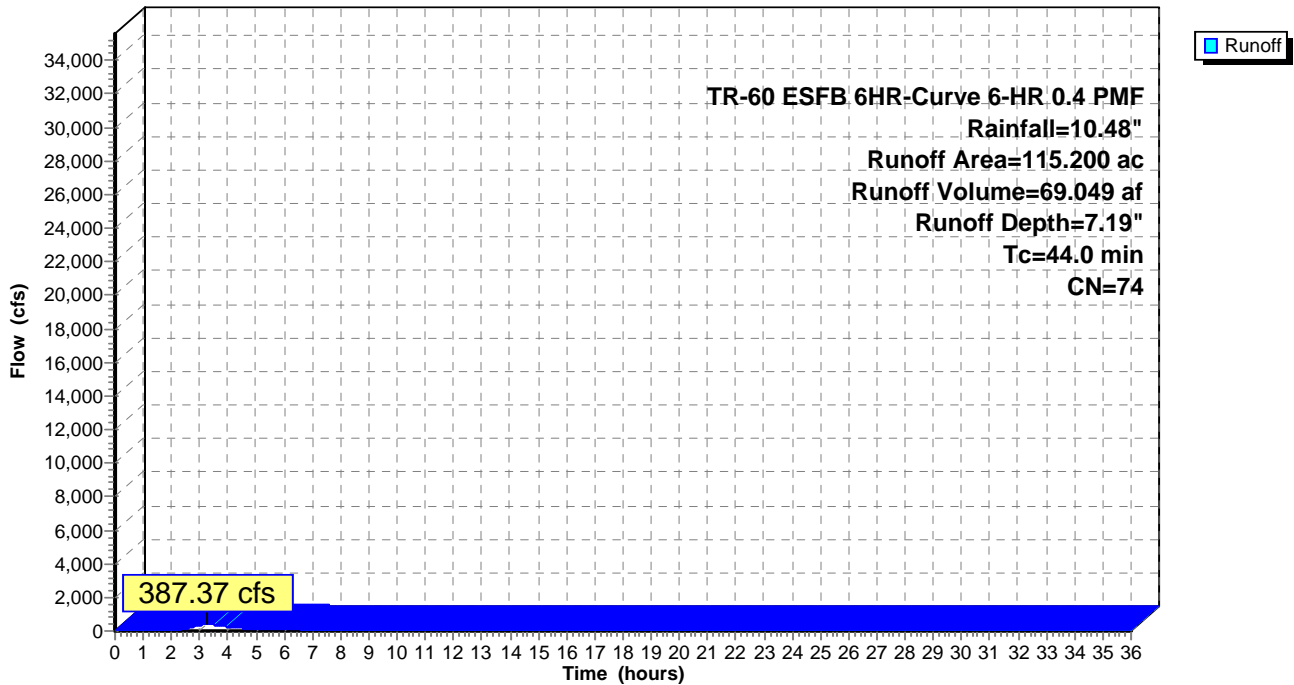
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 825.16 cfs @ 3.54 hrs, Volume= 164.084 af, Depth= 7.33"

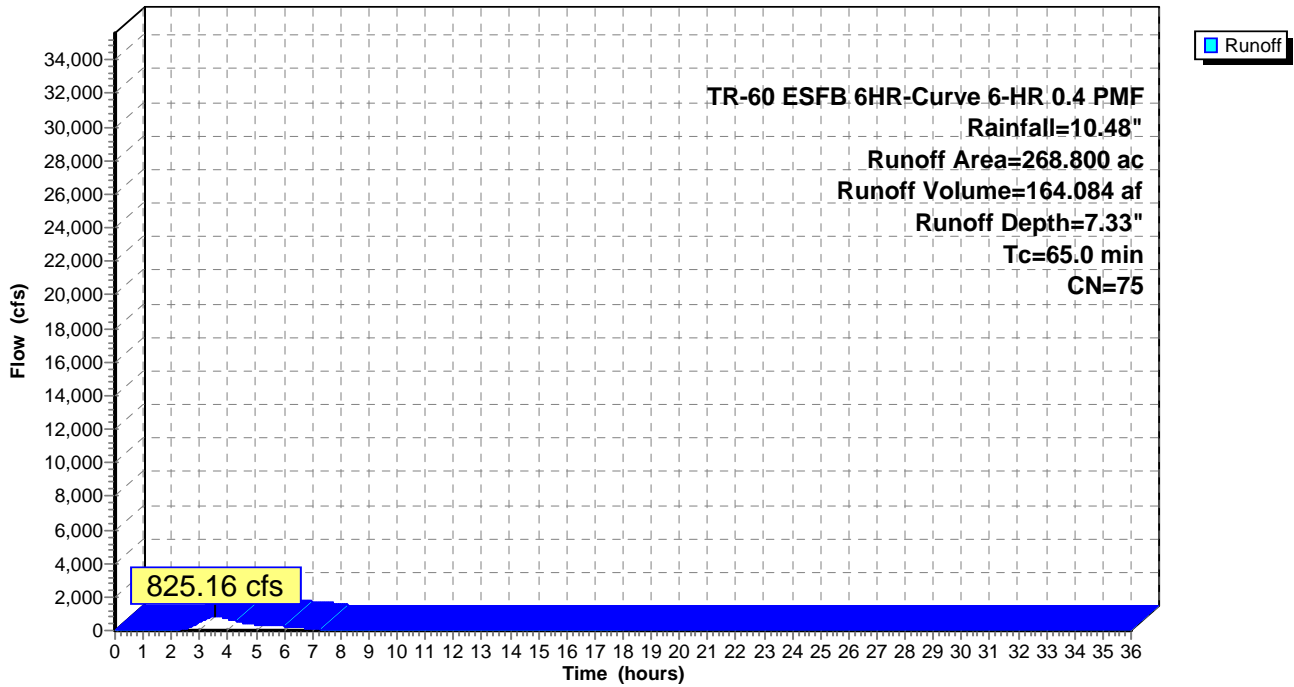
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 2,052.98 cfs @ 6.03 hrs, Volume= 777.622 af, Depth= 6.66"

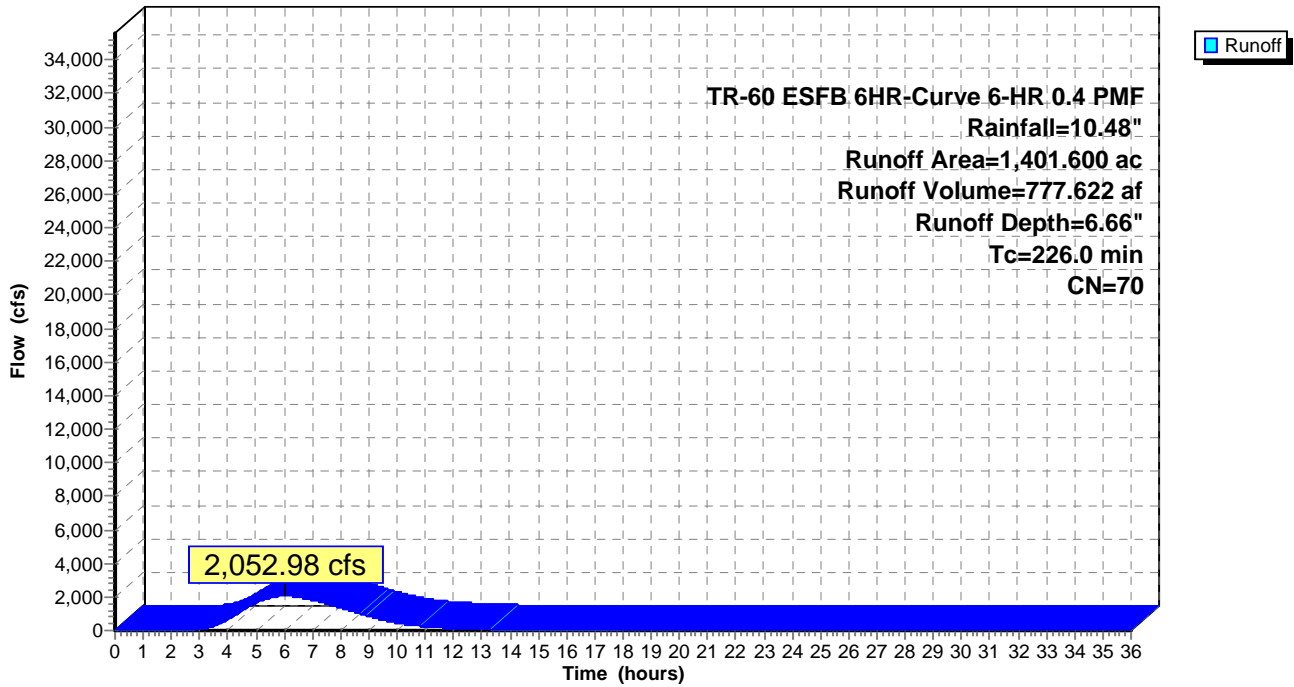
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 2,094.15 cfs @ 4.55 hrs, Volume= 572.327 af, Depth= 6.39"

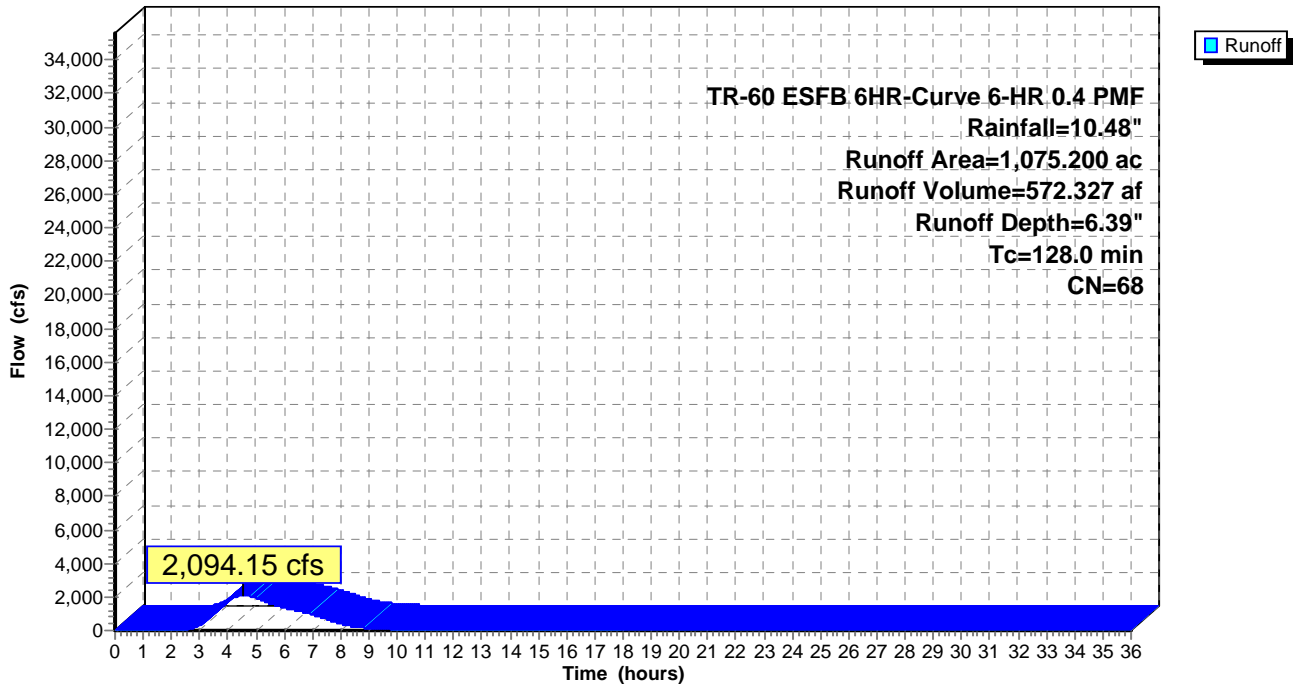
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 1,466.80 cfs @ 4.58 hrs, Volume= 403.453 af, Depth= 6.25"

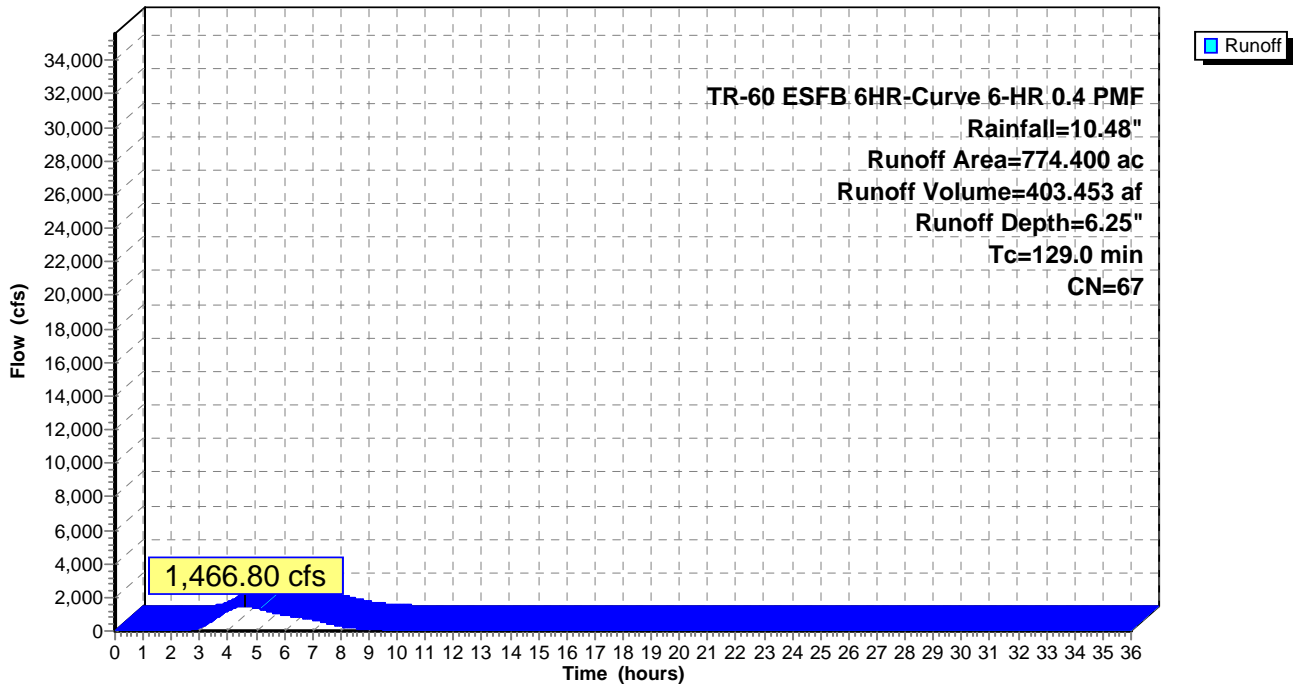
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 1,736.15 cfs @ 4.27 hrs, Volume= 433.474 af, Depth= 7.19"

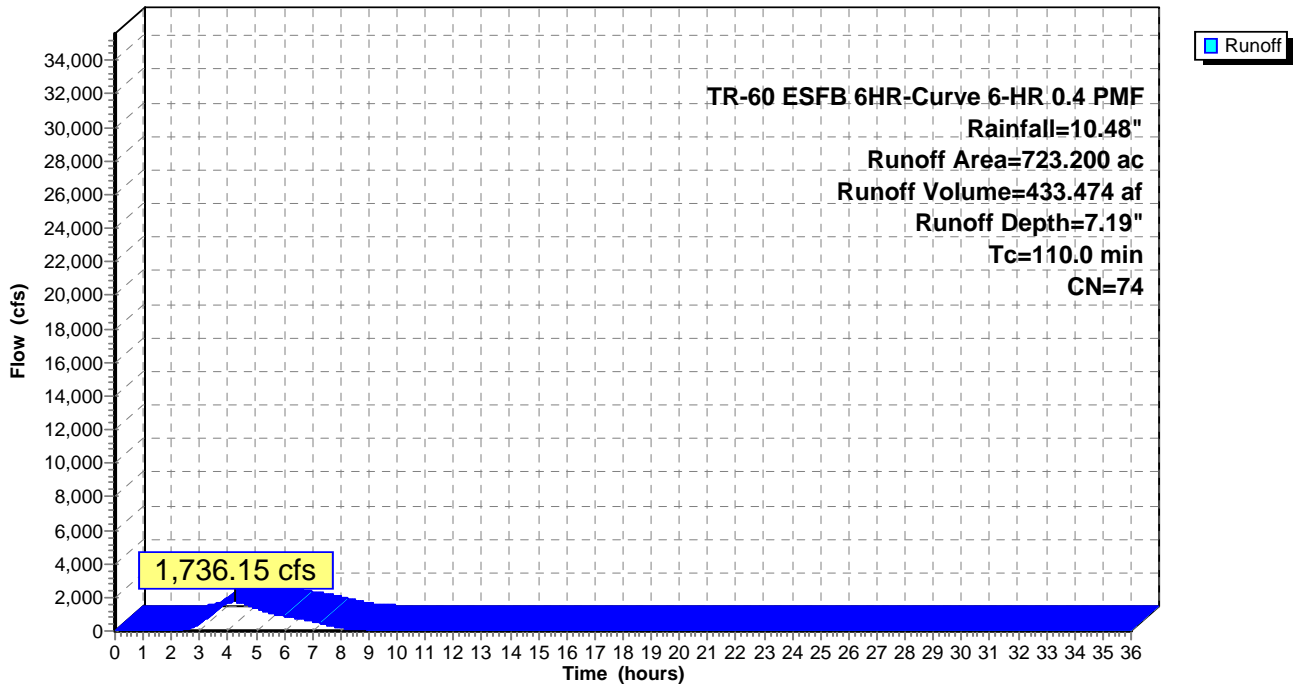
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 2,176.44 cfs @ 3.68 hrs, Volume= 449.277 af, Depth= 7.33"

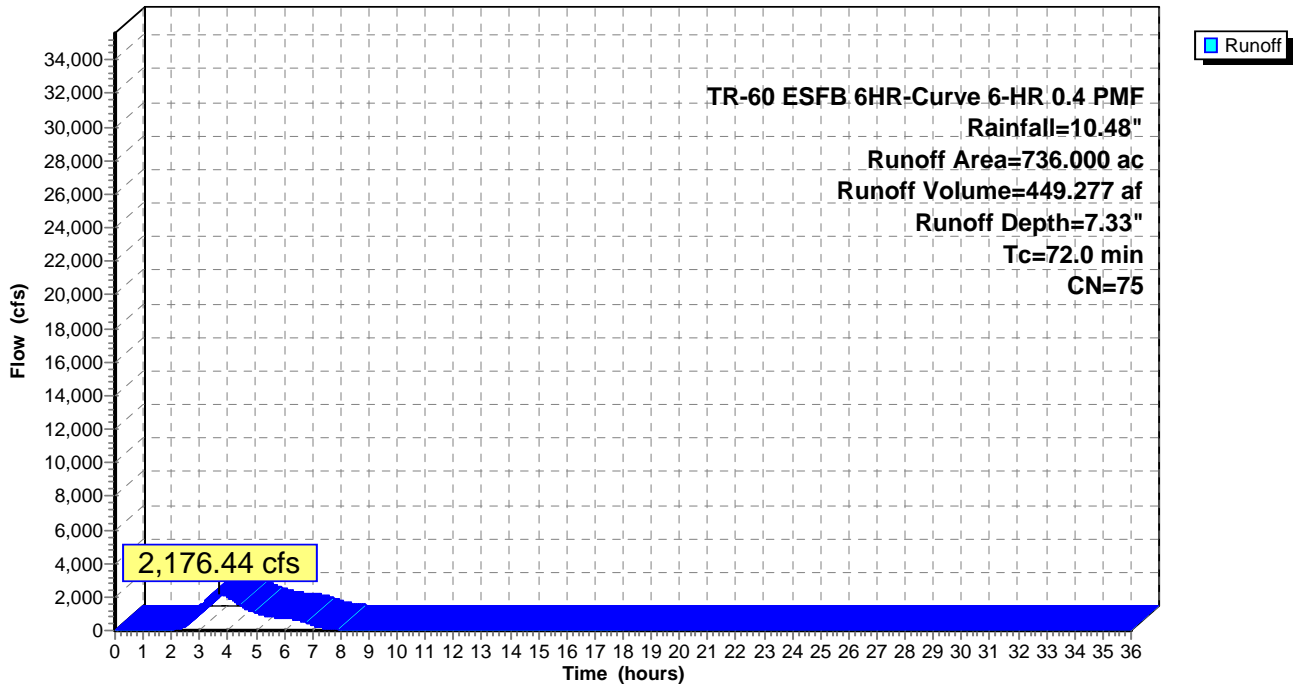
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 2,130.29 cfs @ 3.73 hrs, Volume= 451.181 af, Depth= 7.98"

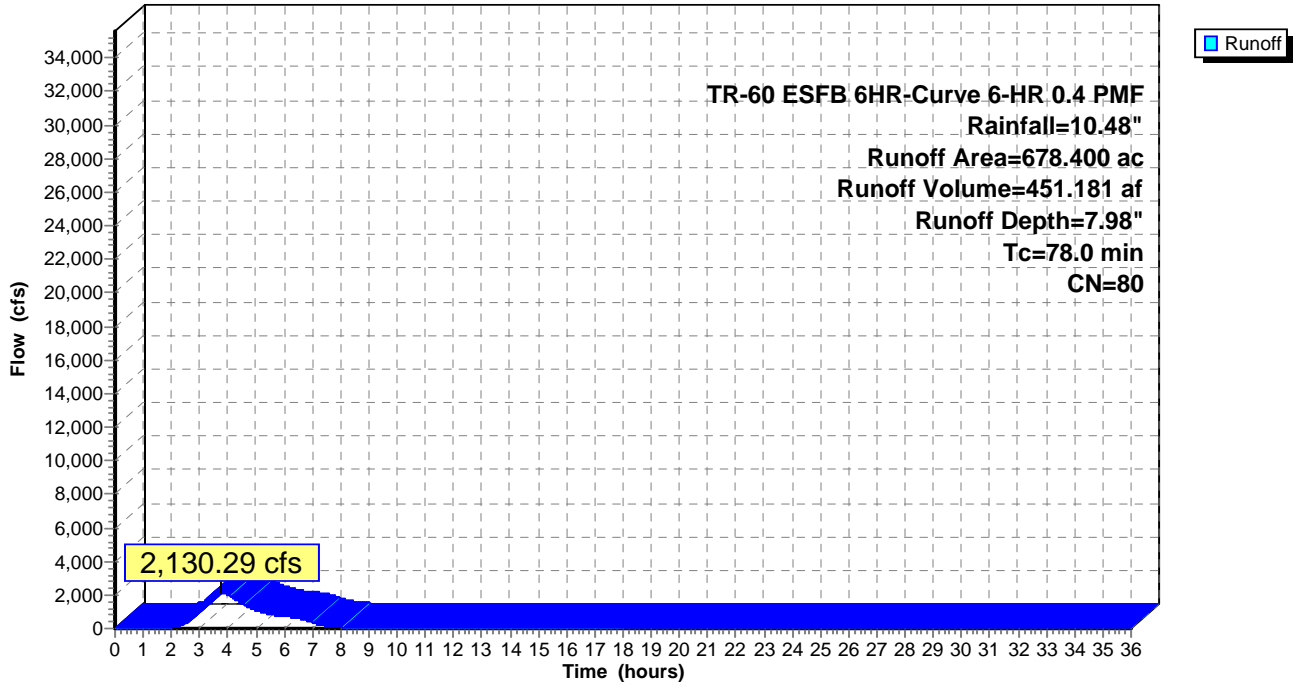
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 1,915.88 cfs @ 4.99 hrs, Volume= 580.970 af, Depth= 6.52"

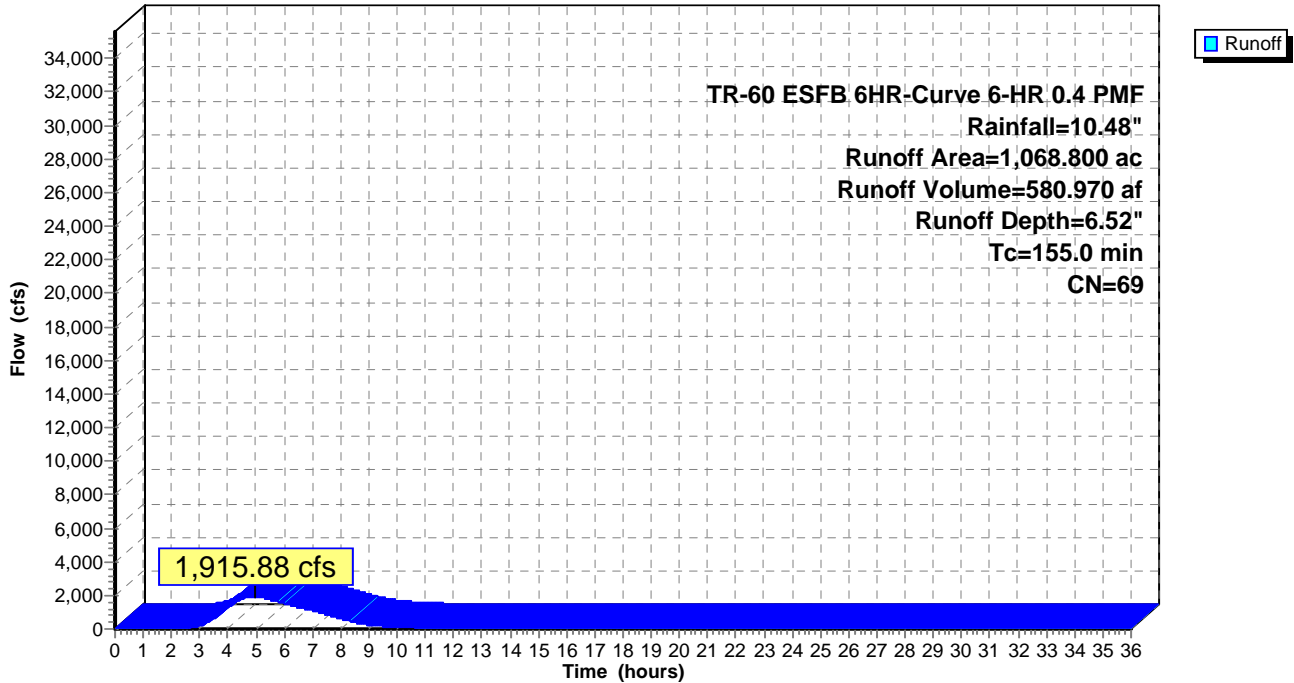
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 3,967.55 cfs @ 4.86 hrs, Volume= 1,199.374 af, Depth= 7.33"

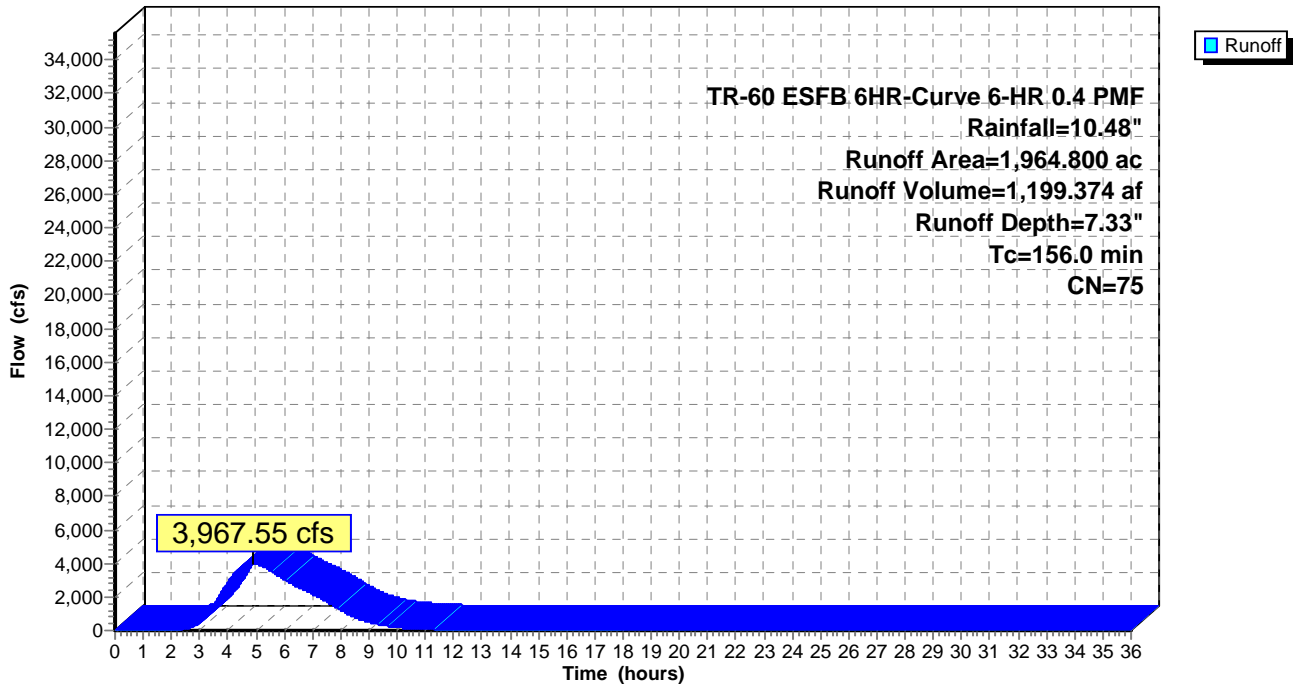
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 1,136.52 cfs @ 4.87 hrs, Volume= 340.101 af, Depth= 6.25"

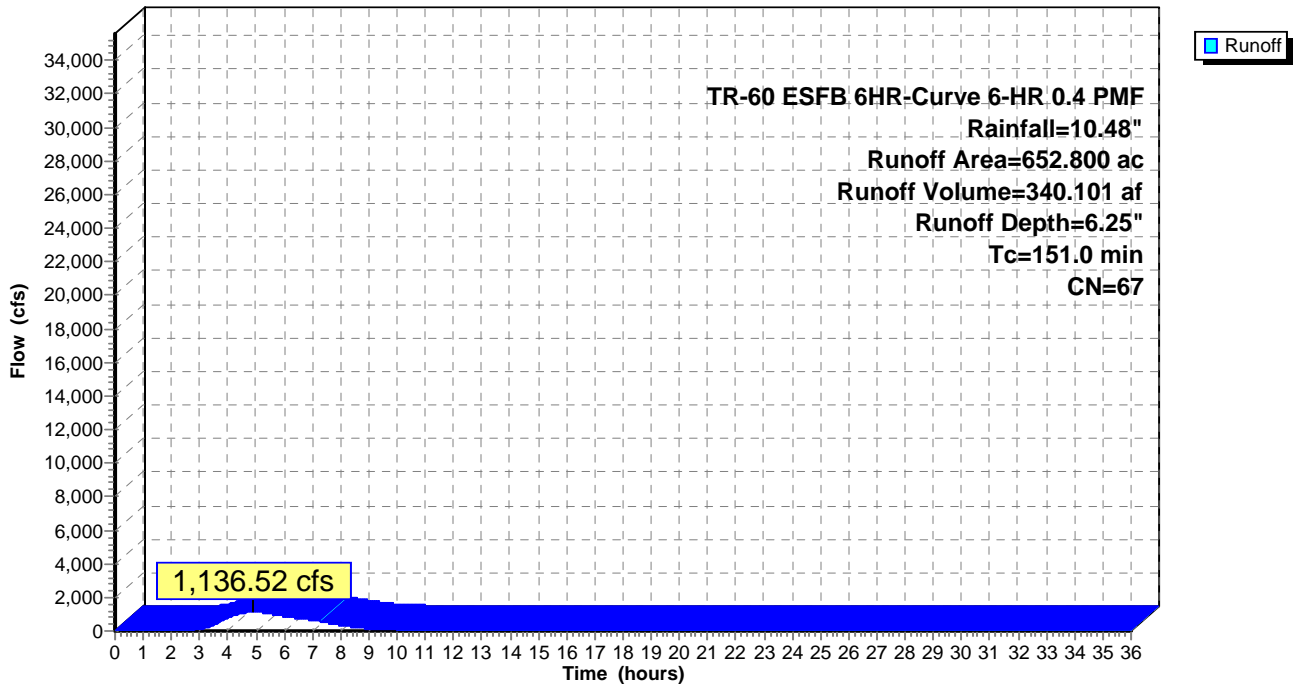
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.4 PMF Rainfall=10.48"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



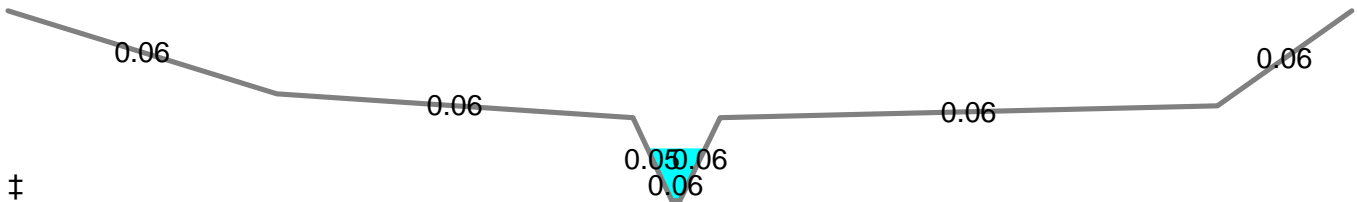
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 7.49" for 6-HR 0.4 PMF event
 Inflow = 816.42 cfs @ 9.37 hrs, Volume= 1,114.890 af
 Outflow = 810.05 cfs @ 9.62 hrs, Volume= 1,108.416 af, Atten= 1%, Lag= 15.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 7.49 fps, Min. Travel Time= 19.6 min
 Avg. Velocity = 5.98 fps, Avg. Travel Time= 24.5 min

Peak Storage= 951,808 cf @ 9.62 hrs
 Average Depth at Peak Storage= 4.40'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

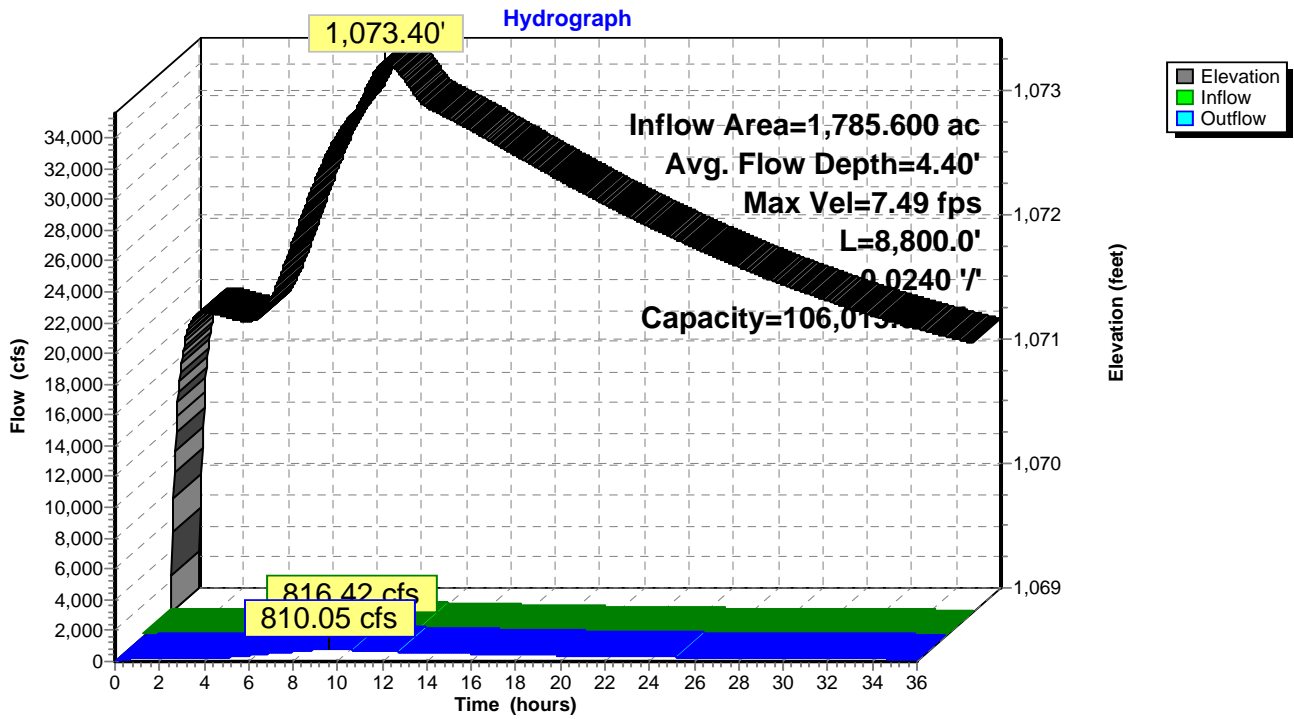
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



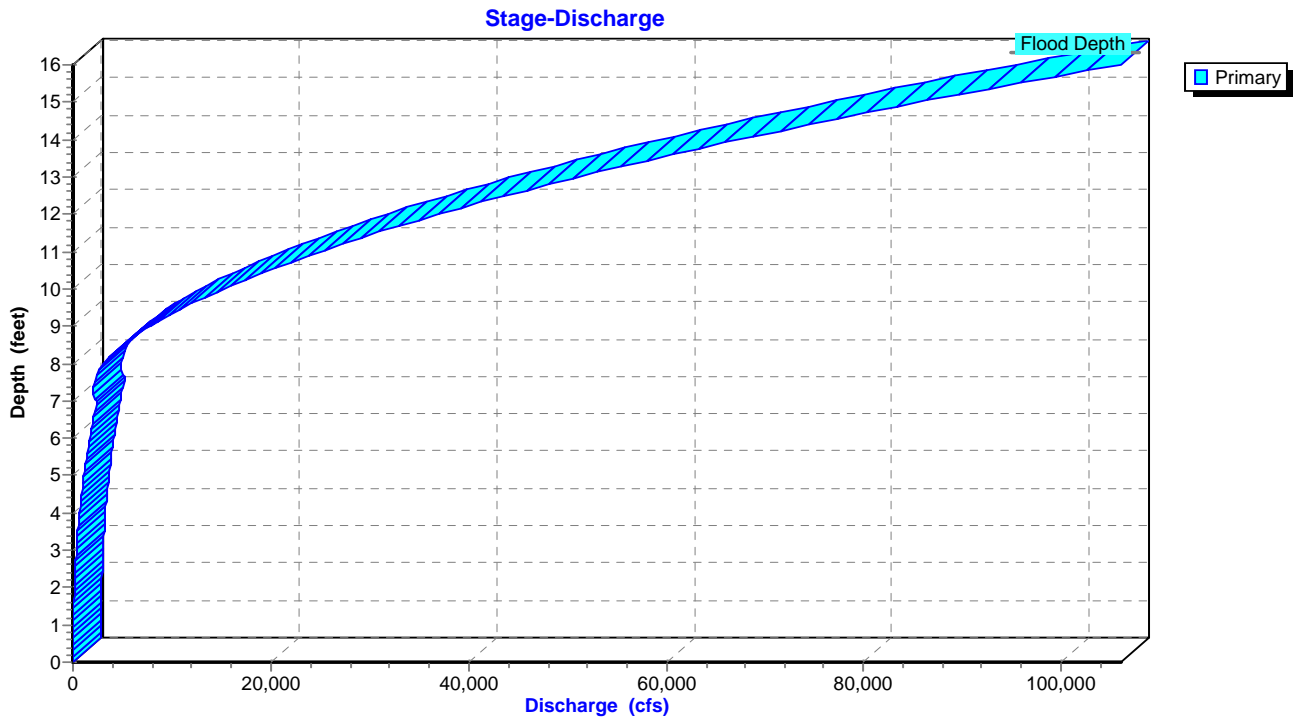
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

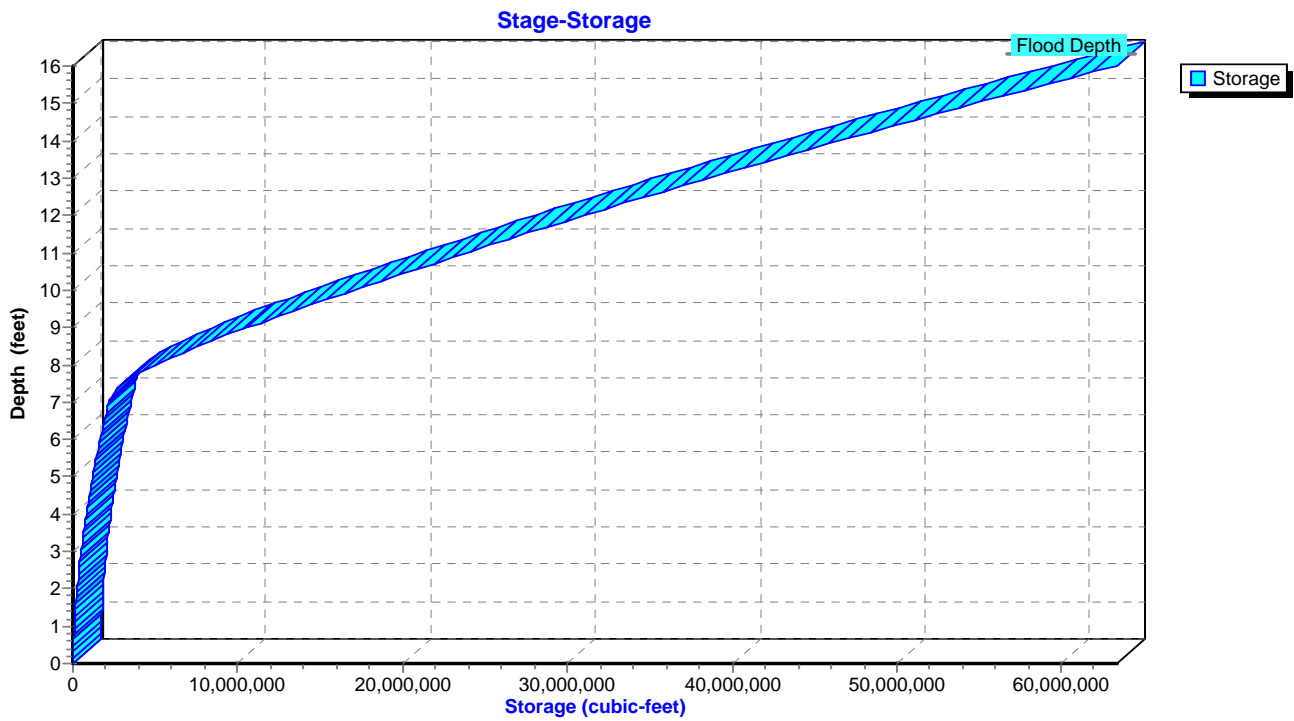
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



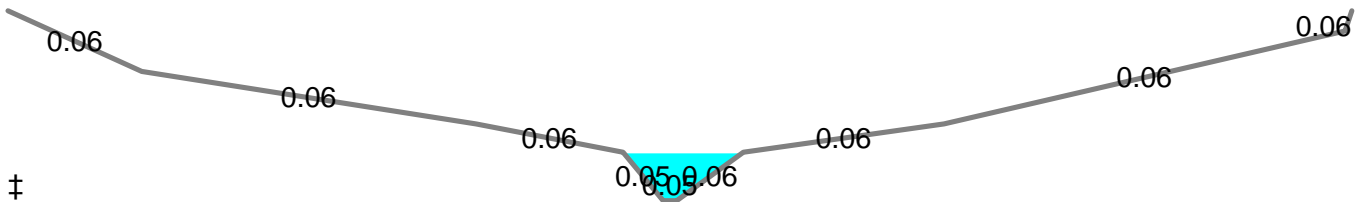
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 7.05" for 6-HR 0.4 PMF event
 Inflow = 2,324.80 cfs @ 4.56 hrs, Volume= 1,680.477 af
 Outflow = 2,228.29 cfs @ 4.96 hrs, Volume= 1,669.742 af, Atten= 4%, Lag= 23.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.87 fps, Min. Travel Time= 25.4 min
 Avg. Velocity = 2.60 fps, Avg. Travel Time= 37.8 min

Peak Storage= 3,400,593 cf @ 4.96 hrs
 Average Depth at Peak Storage= 11.73'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

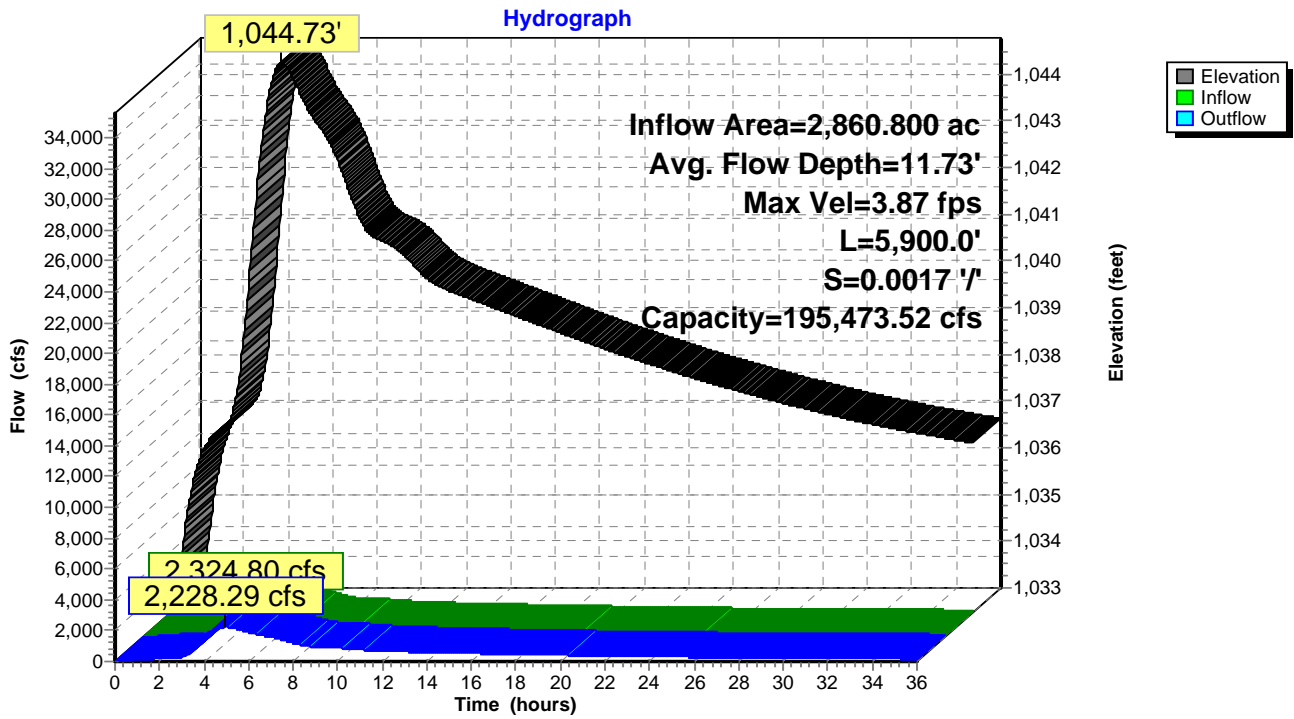
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



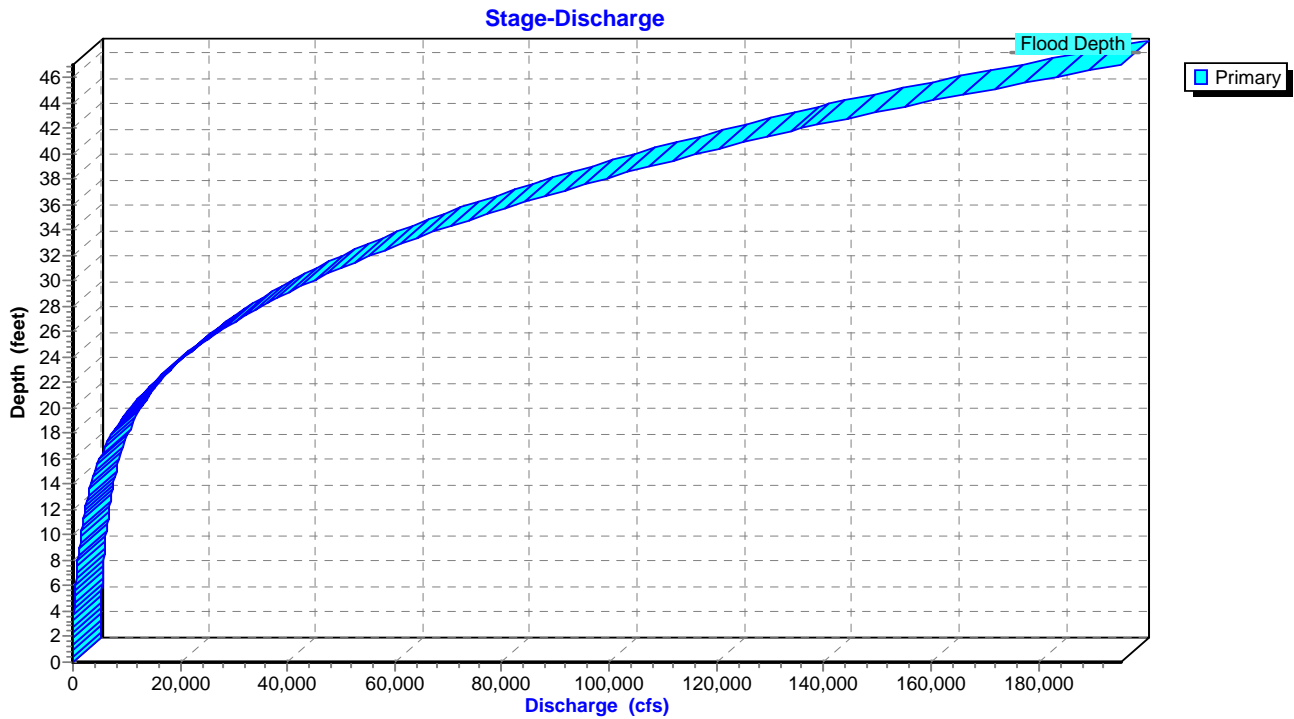
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

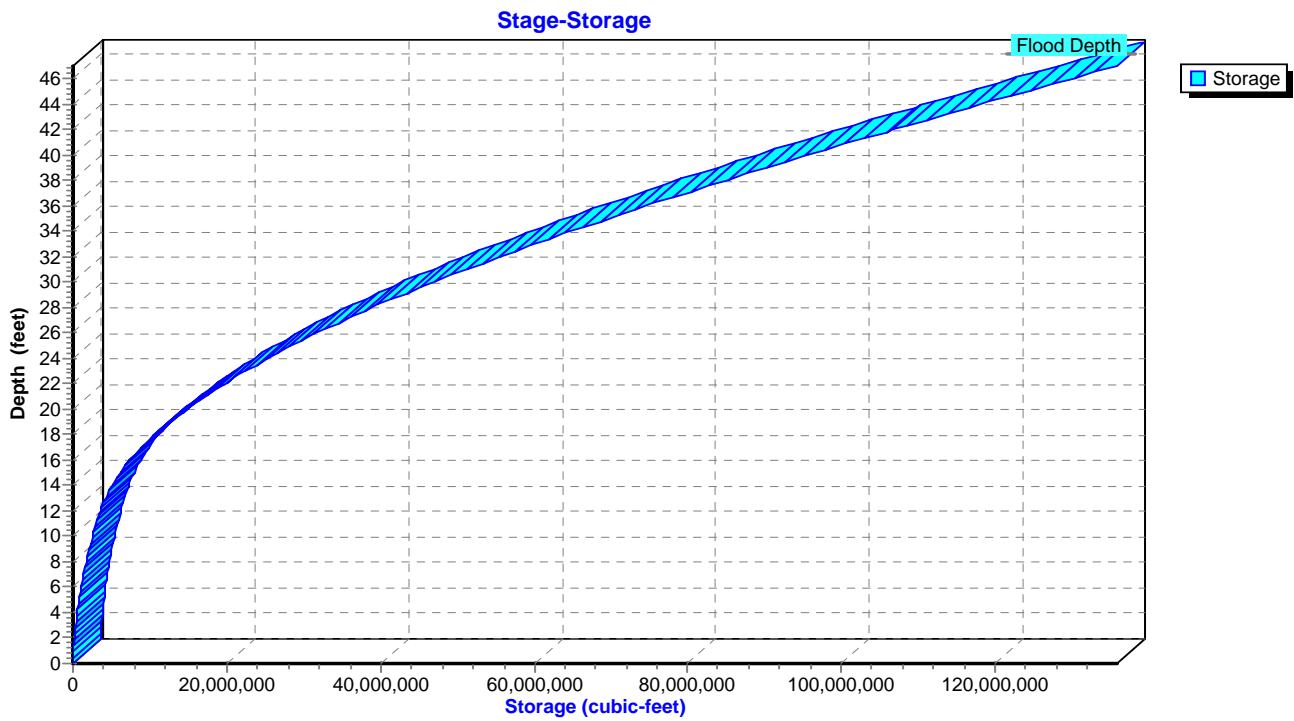
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



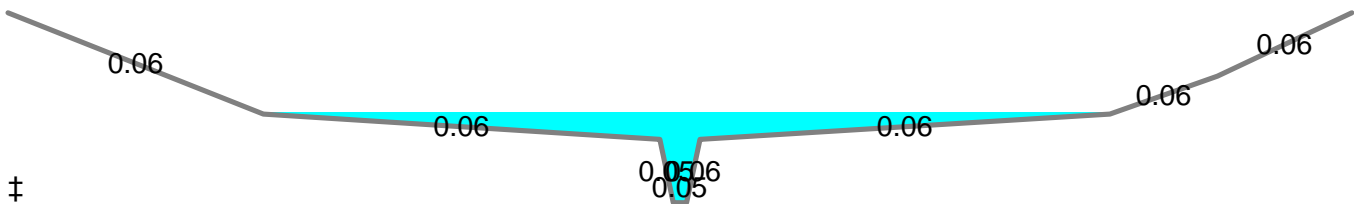
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 5.74" for 6-HR 0.4 PMF event
 Inflow = 1,693.09 cfs @ 7.99 hrs, Volume= 939.577 af
 Outflow = 1,690.66 cfs @ 8.09 hrs, Volume= 938.793 af, Atten= 0%, Lag= 6.1 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.28 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 2.41 fps, Avg. Travel Time= 6.2 min

Peak Storage= 779,388 cf @ 8.09 hrs
 Average Depth at Peak Storage= 7.17'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

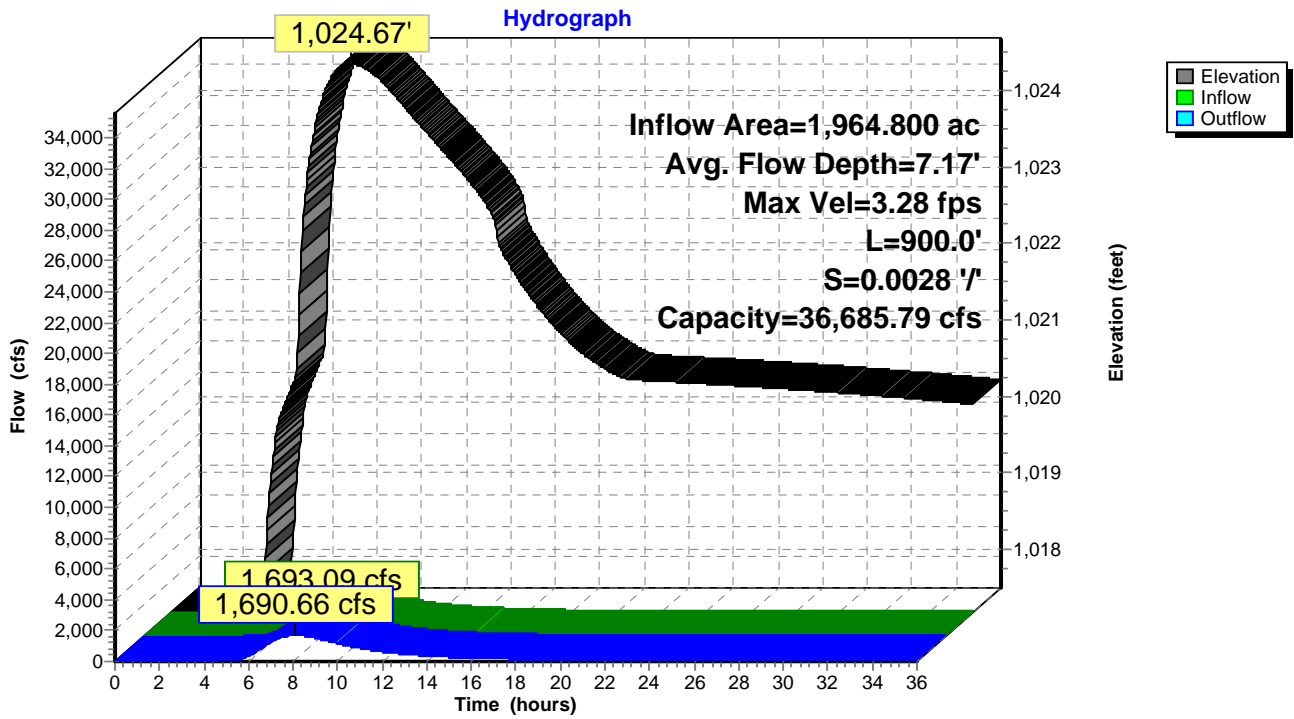
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



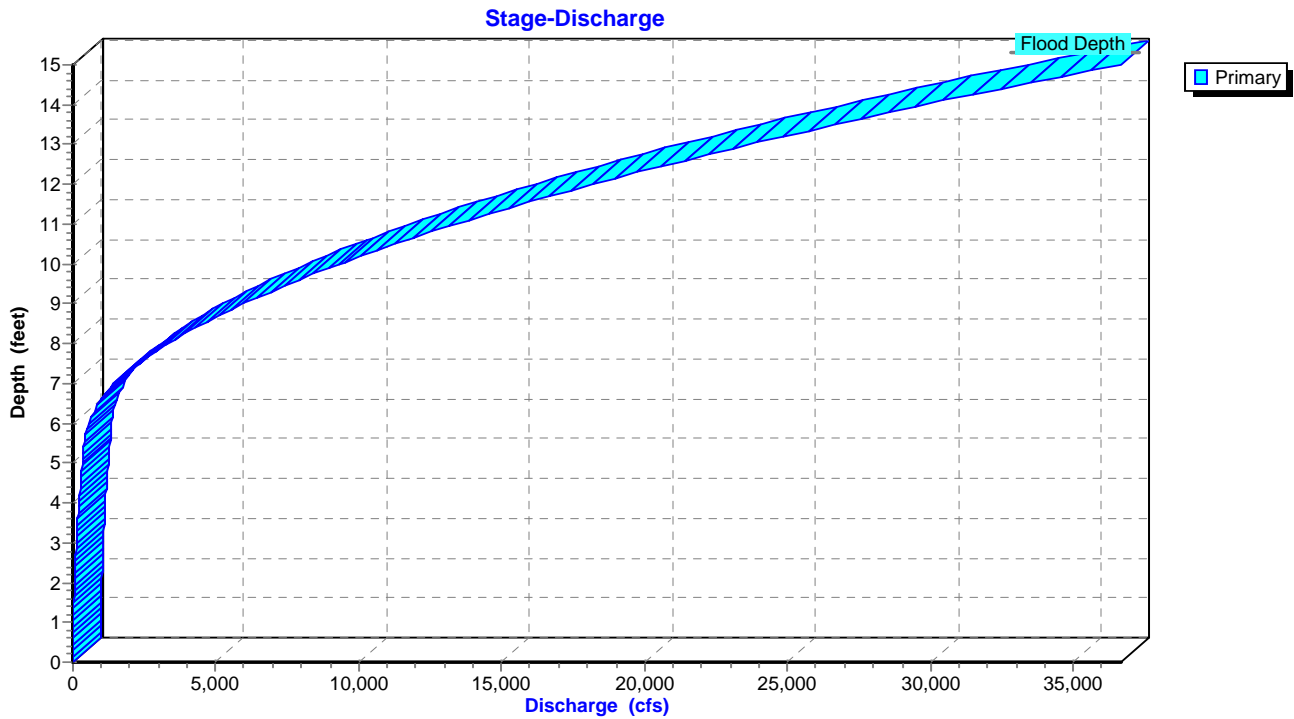
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

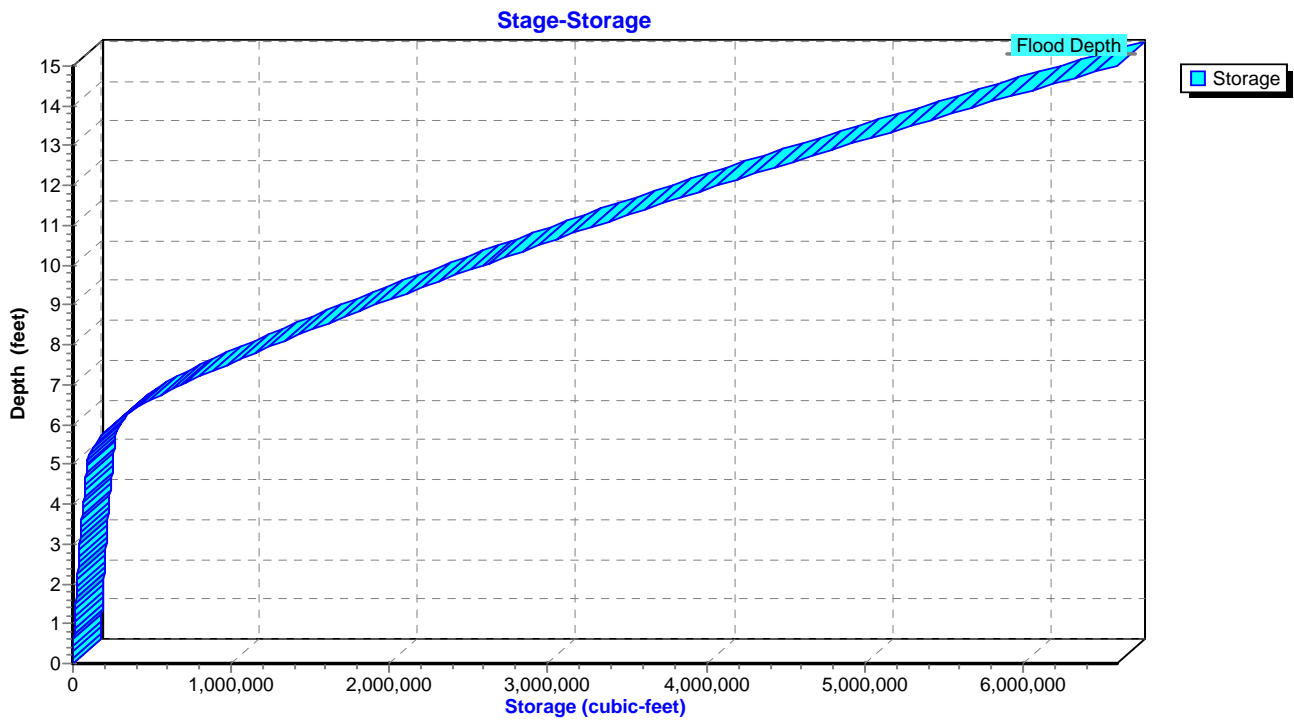
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



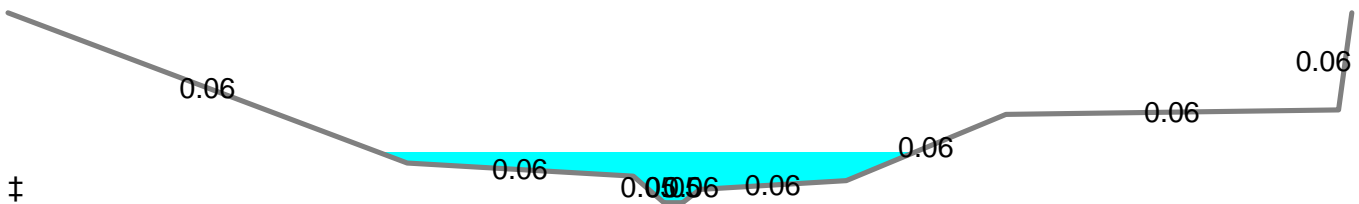
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 6.44" for 6-HR 0.4 PMF event
 Inflow = 6,766.35 cfs @ 4.88 hrs, Volume= 3,932.261 af
 Outflow = 5,850.09 cfs @ 5.73 hrs, Volume= 3,892.095 af, Atten= 14%, Lag= 50.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.67 fps, Min. Travel Time= 54.9 min
 Avg. Velocity = 1.71 fps, Avg. Travel Time= 85.8 min

Peak Storage= 19,256,845 cf @ 5.73 hrs
 Average Depth at Peak Storage= 11.50'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

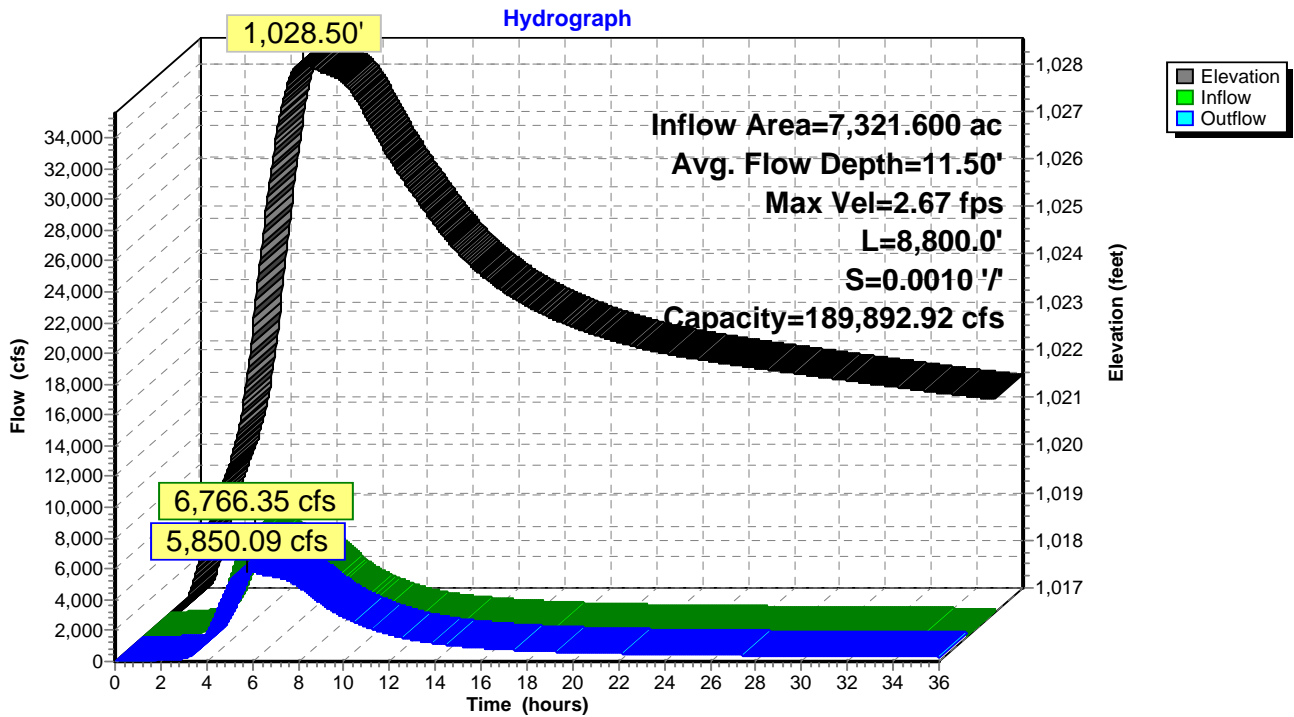
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



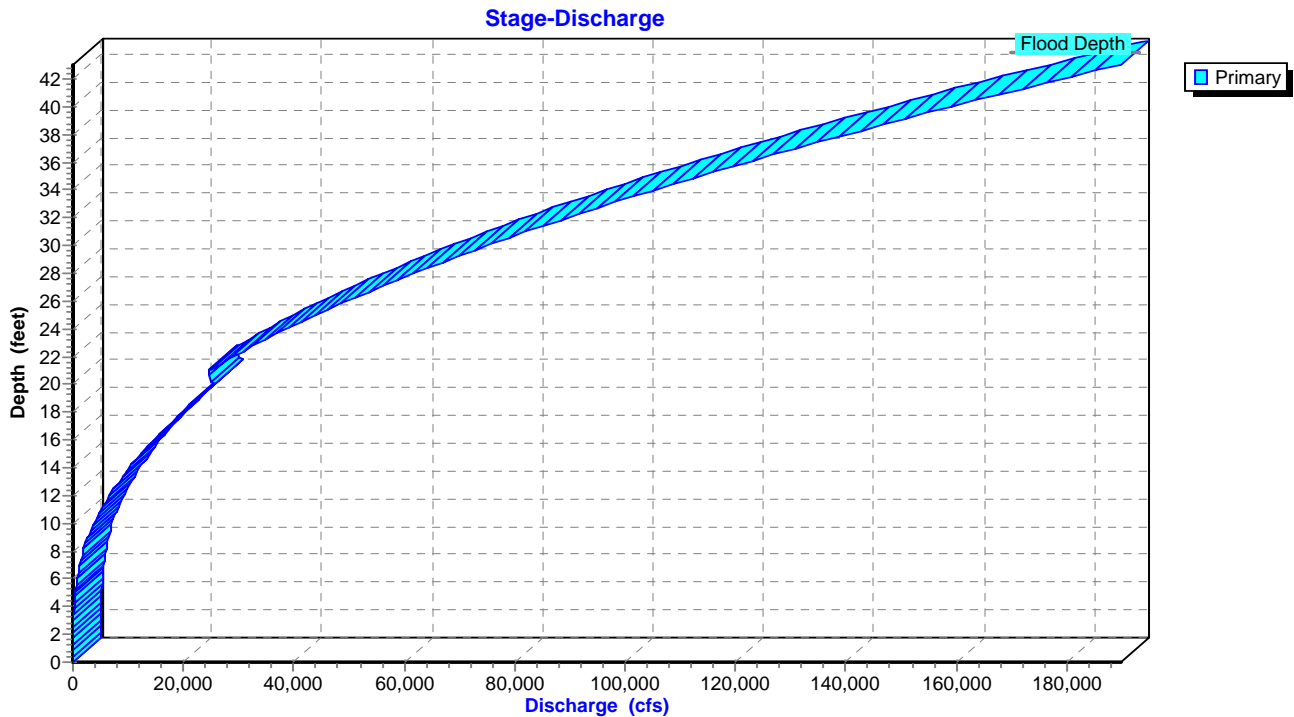
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

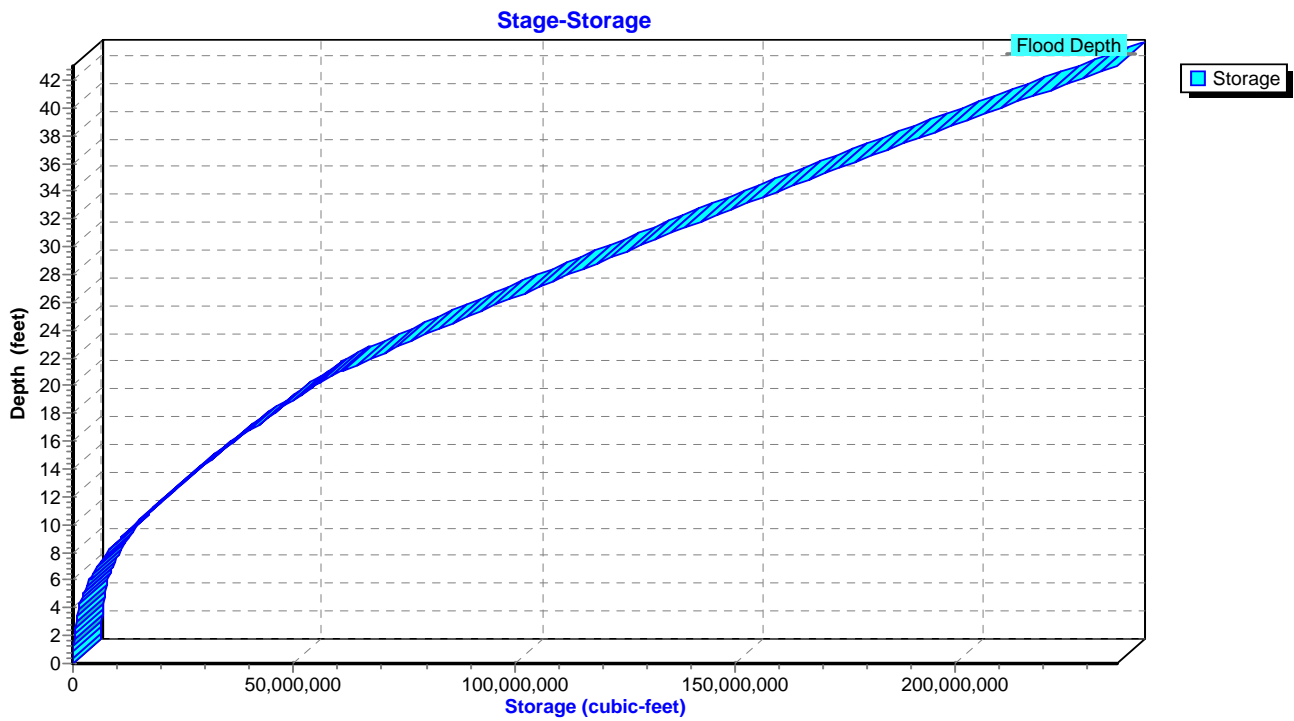
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



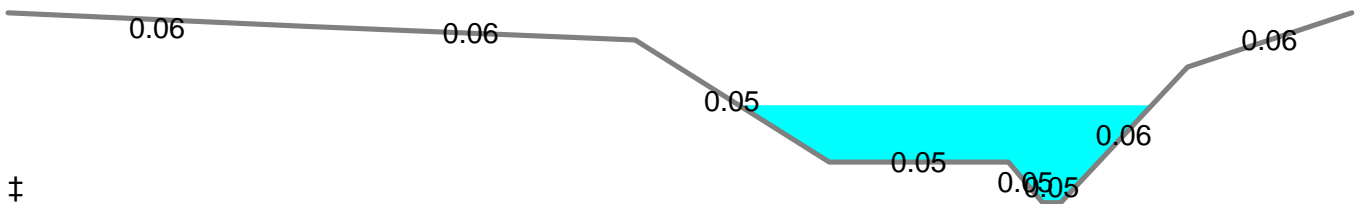
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 6.52" for 6-HR 0.4 PMF event
 Inflow = 7,700.34 cfs @ 5.42 hrs, Volume= 4,774.377 af
 Outflow = 7,487.70 cfs @ 5.91 hrs, Volume= 4,731.783 af, Atten= 3%, Lag= 29.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.52 fps, Min. Travel Time= 35.5 min
 Avg. Velocity = 1.80 fps, Avg. Travel Time= 69.6 min

Peak Storage= 15,944,862 cf @ 5.91 hrs
 Average Depth at Peak Storage= 14.35'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

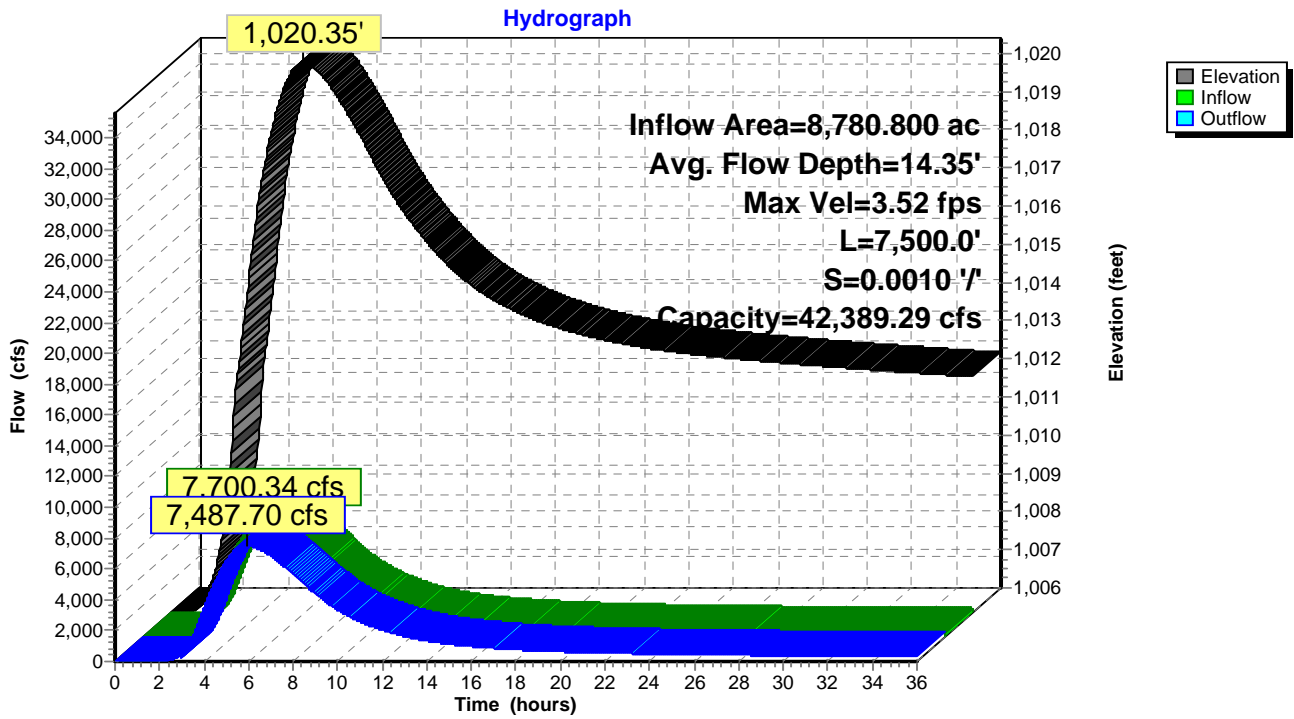
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



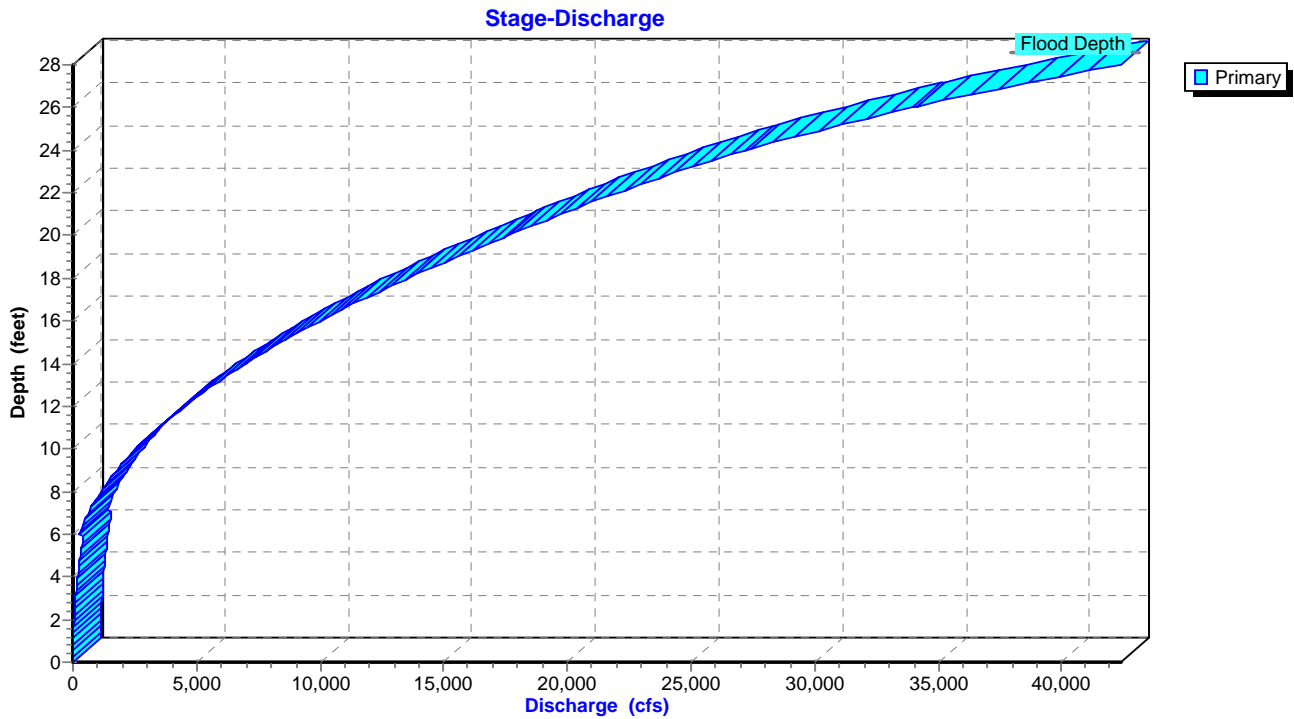
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

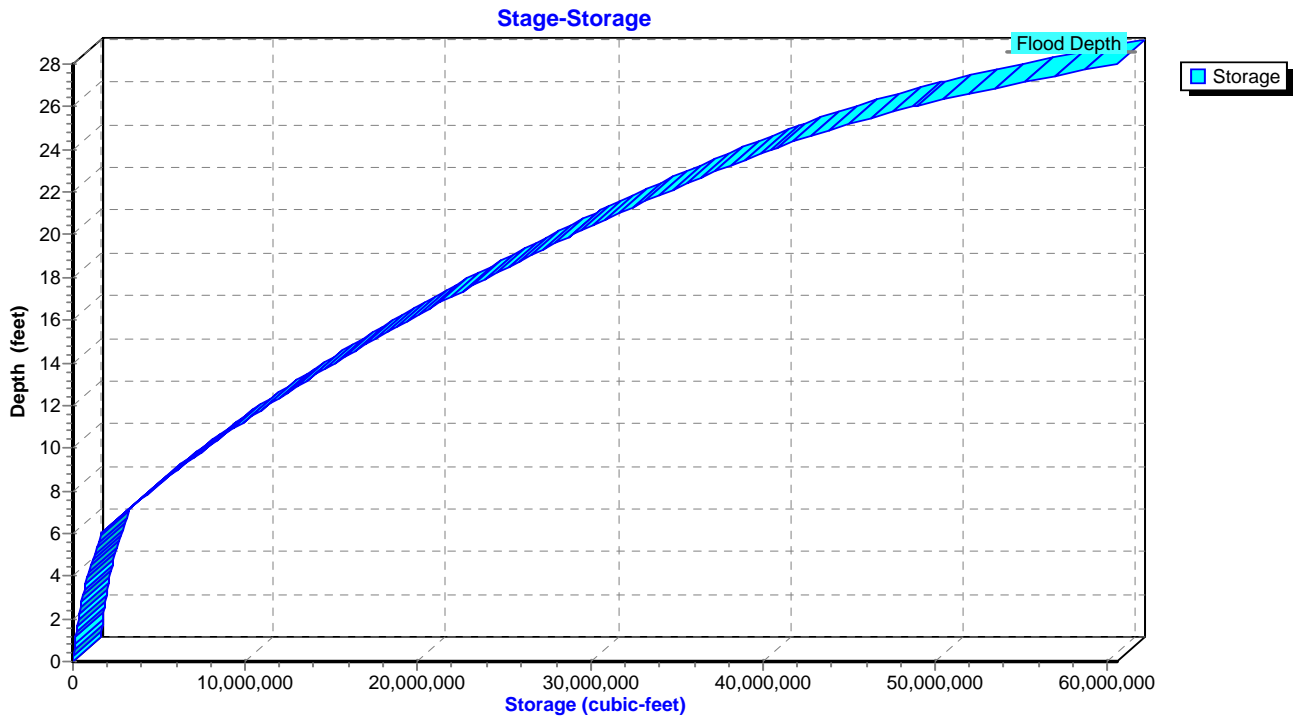
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



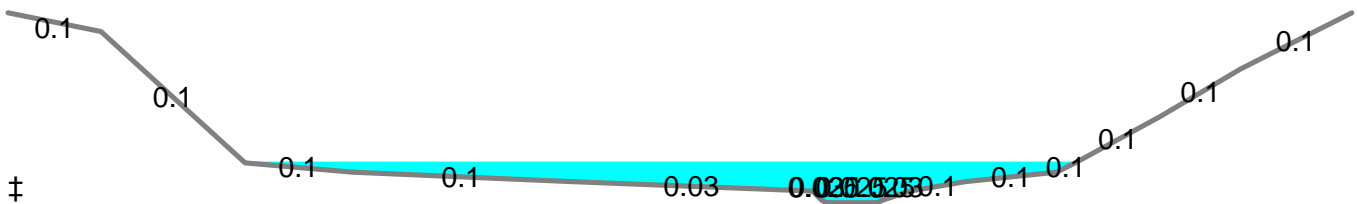
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 6.56" for 6-HR 0.4 PMF event
 Inflow = 8,186.84 cfs @ 6.07 hrs, Volume= 5,167.753 af
 Outflow = 8,186.84 cfs @ 6.08 hrs, Volume= 5,167.628 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 10.74 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 9.09 fps, Avg. Travel Time= 0.8 min

Peak Storage= 343,177 cf @ 6.08 hrs
 Average Depth at Peak Storage= 8.78'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

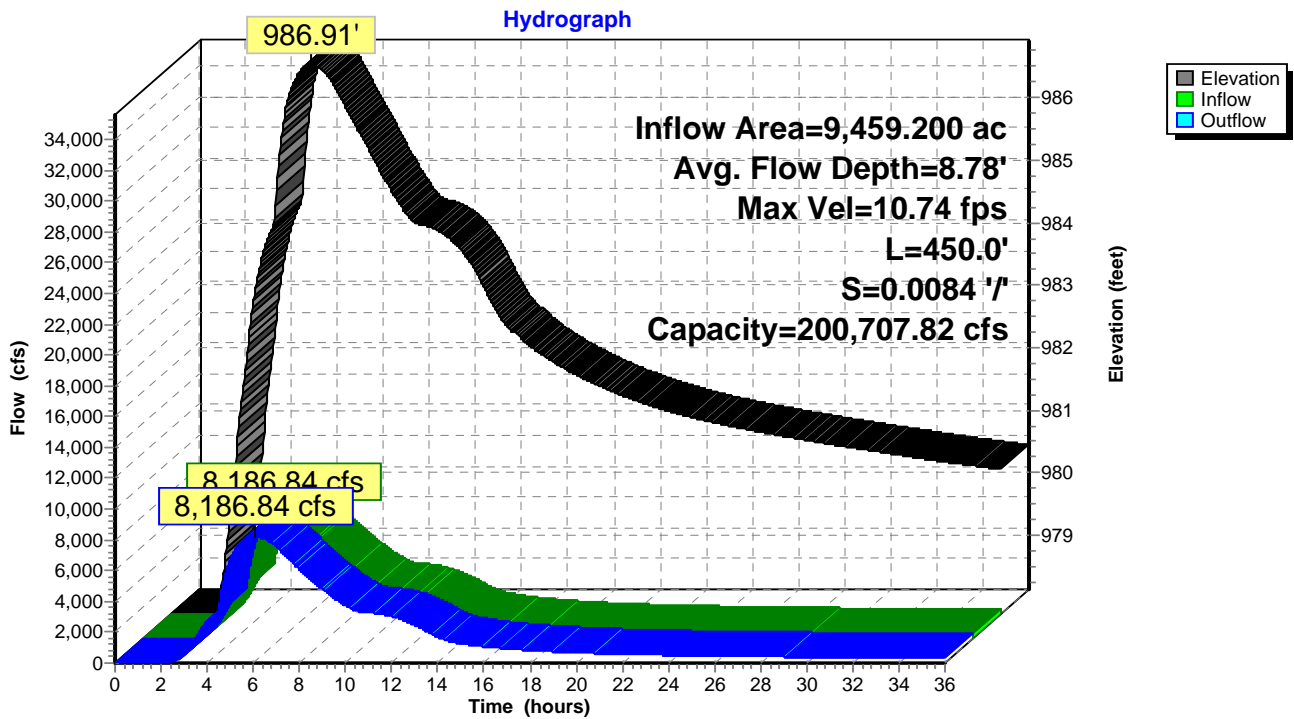
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



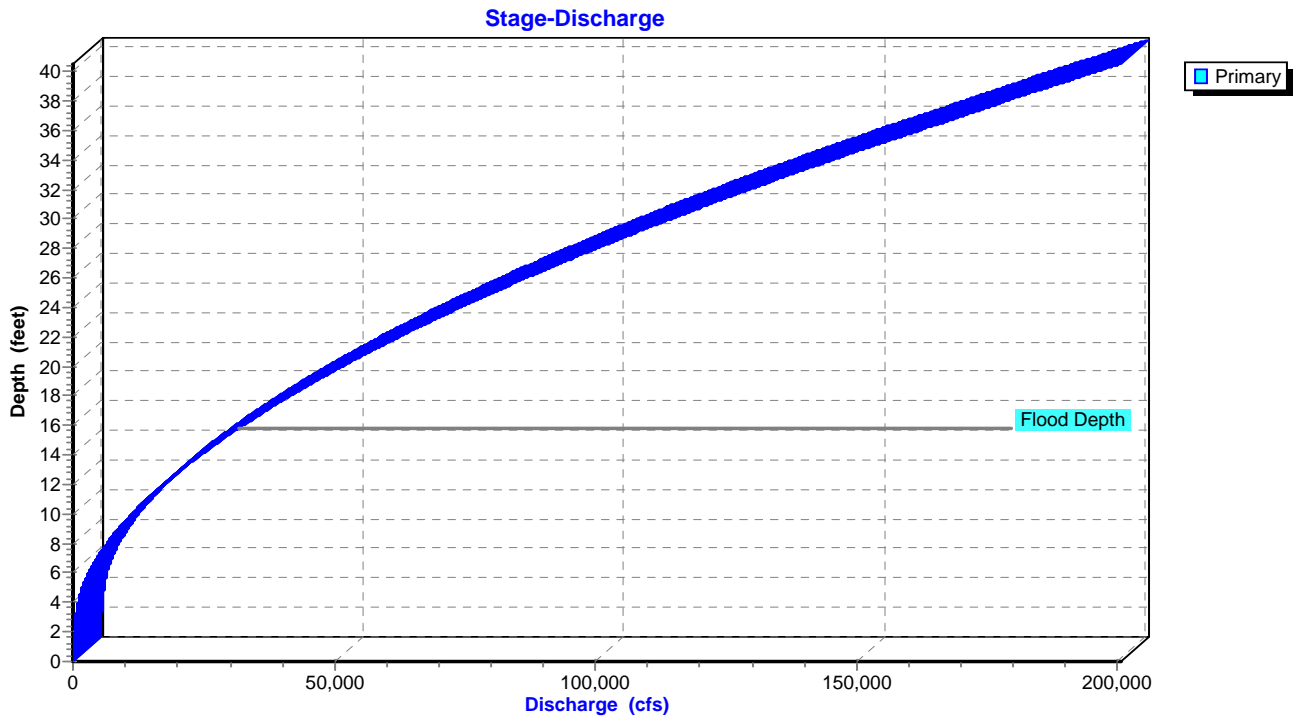
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

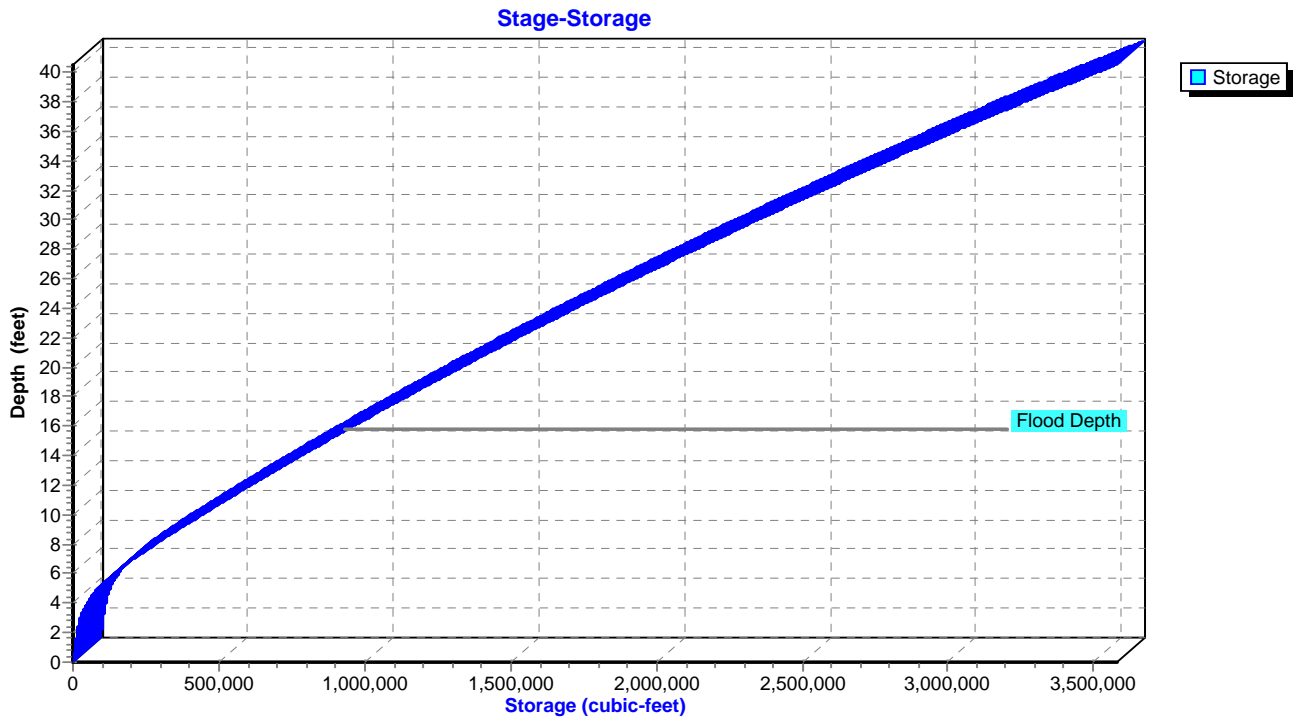
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

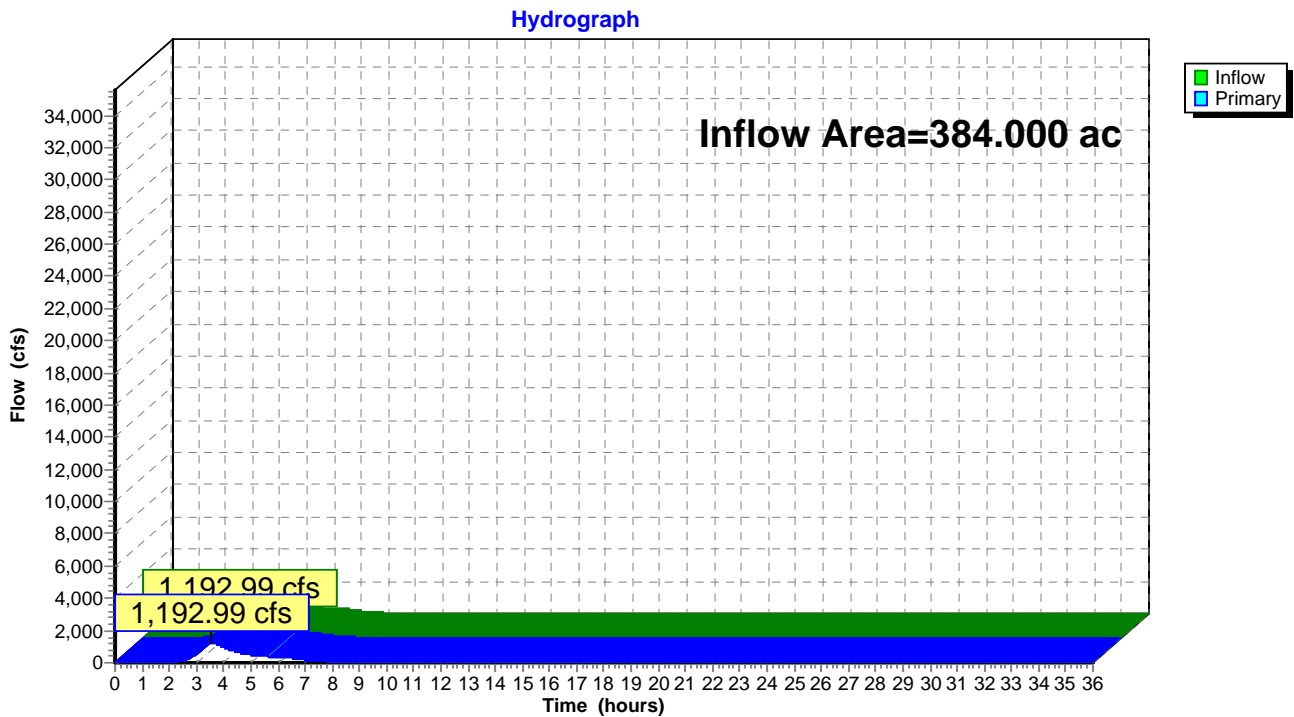


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 7.28" for 6-HR 0.4 PMF event
 Inflow = 1,192.99 cfs @ 3.51 hrs, Volume= 233.016 af
 Primary = 1,192.99 cfs @ 3.52 hrs, Volume= 233.016 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 6.57" for 6-HR 0.4 PMF event
 Inflow = 8,226.27 cfs @ 5.81 hrs, Volume= 5,182.474 af
 Outflow = 8,188.71 cfs @ 6.02 hrs, Volume= 5,169.307 af, Atten= 0%, Lag= 12.3 min
 Primary = 2,929.13 cfs @ 4.12 hrs, Volume= 2,692.793 af
 Secondary = 5,258.27 cfs @ 6.02 hrs, Volume= 2,295.802 af
 Tertiary = 587.13 cfs @ 6.03 hrs, Volume= 180.712 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,011.43' @ 6.05 hrs Surf.Area= 36.597 ac Storage= 241.775 af (180.813 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 42.0 min calculated for 5,106.926 af (99% of inflow)
 Center-of-Mass det. time= 15.5 min (628.2 - 612.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

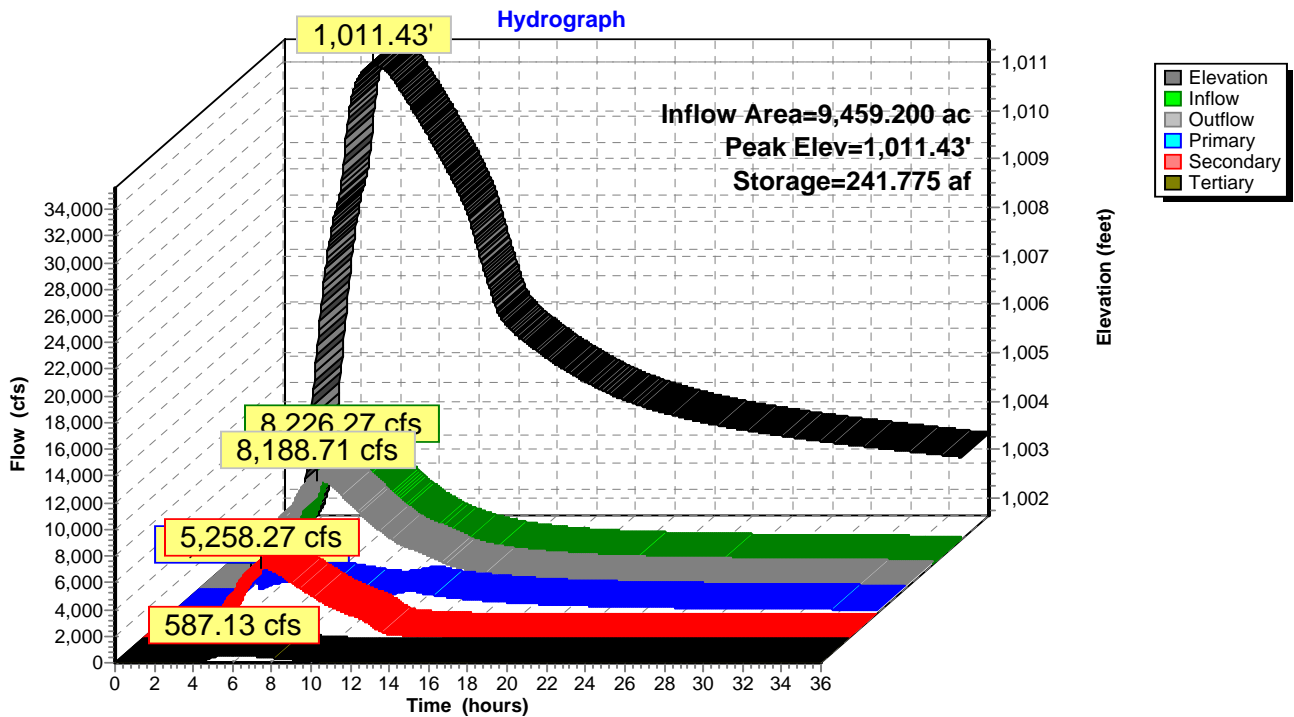
Device	Routing	Invert	Outlet Devices										
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir										
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50										
			Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32										
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28)										
			Head (feet) 0.00 1.00 1.60 20.00										
			Width (feet) 17.00 23.00 77.00 77.00										
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28)										
			Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80										
			Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00										
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28)										
			Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00										
			Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00										

Primary OutFlow Max=2,917.64 cfs @ 4.12 hrs HW=1,008.43' TW=1,002.09' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,917.64 cfs @ 8.59 fps)

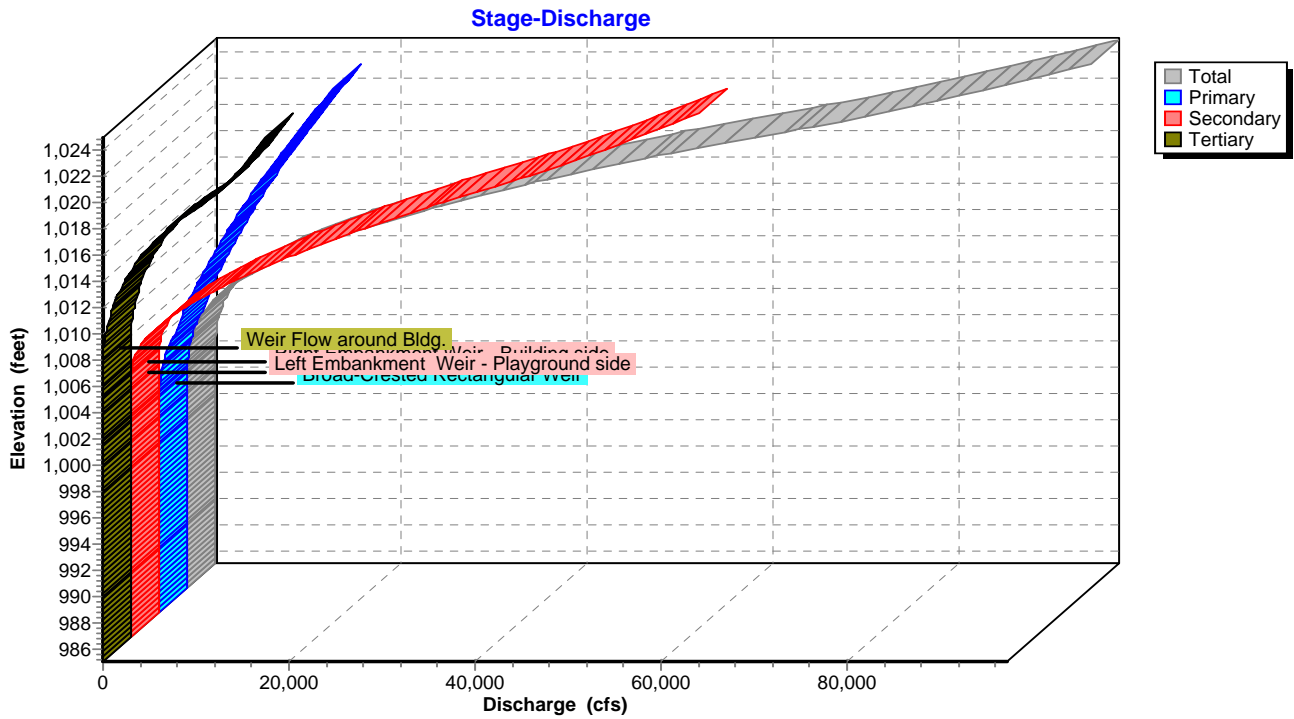
Secondary OutFlow Max=5,257.55 cfs @ 6.02 hrs HW=1,011.43' TW=1,010.54' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 1,852.44 cfs @ 4.39 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 3,405.11 cfs @ 4.32 fps)

Tertiary OutFlow Max=587.08 cfs @ 6.03 hrs HW=1,011.43' TW=1,010.54' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Weir Controls 587.08 cfs @ 2.06 fps)

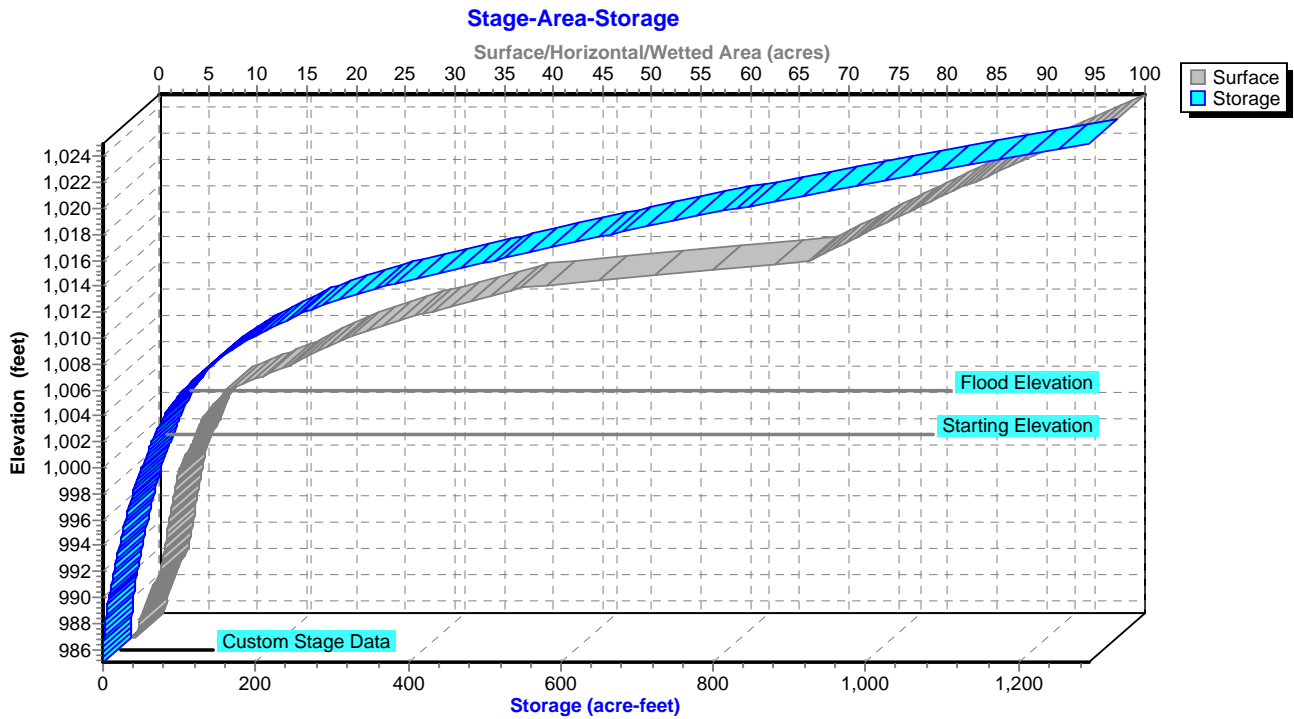
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

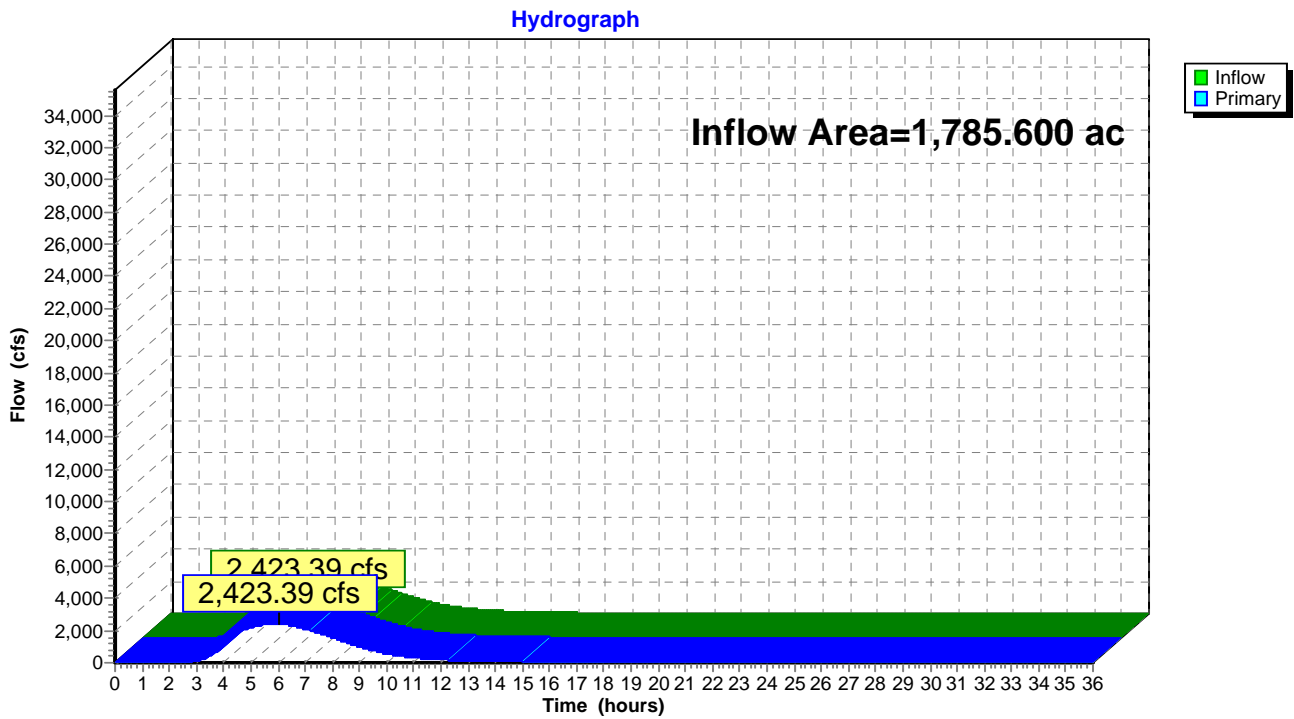


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 6.79" for 6-HR 0.4 PMF event
Inflow = 2,423.39 cfs @ 6.02 hrs, Volume= 1,010.067 af
Primary = 2,423.39 cfs @ 6.03 hrs, Volume= 1,010.067 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 6.79" for 6-HR 0.4 PMF event
 Inflow = 2,423.39 cfs @ 6.03 hrs, Volume= 1,010.066 af
 Outflow = 816.42 cfs @ 9.37 hrs, Volume= 1,115.021 af, Atten= 66%, Lag= 200.3 min
 Primary = 698.66 cfs @ 9.37 hrs, Volume= 1,098.485 af
 Secondary = 117.76 cfs @ 9.37 hrs, Volume= 16.536 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,099.62' @ 9.37 hrs Surf.Area= 301.007 ac Storage= 2,491.901 af (577.901 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 516.7 min (940.7 - 423.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

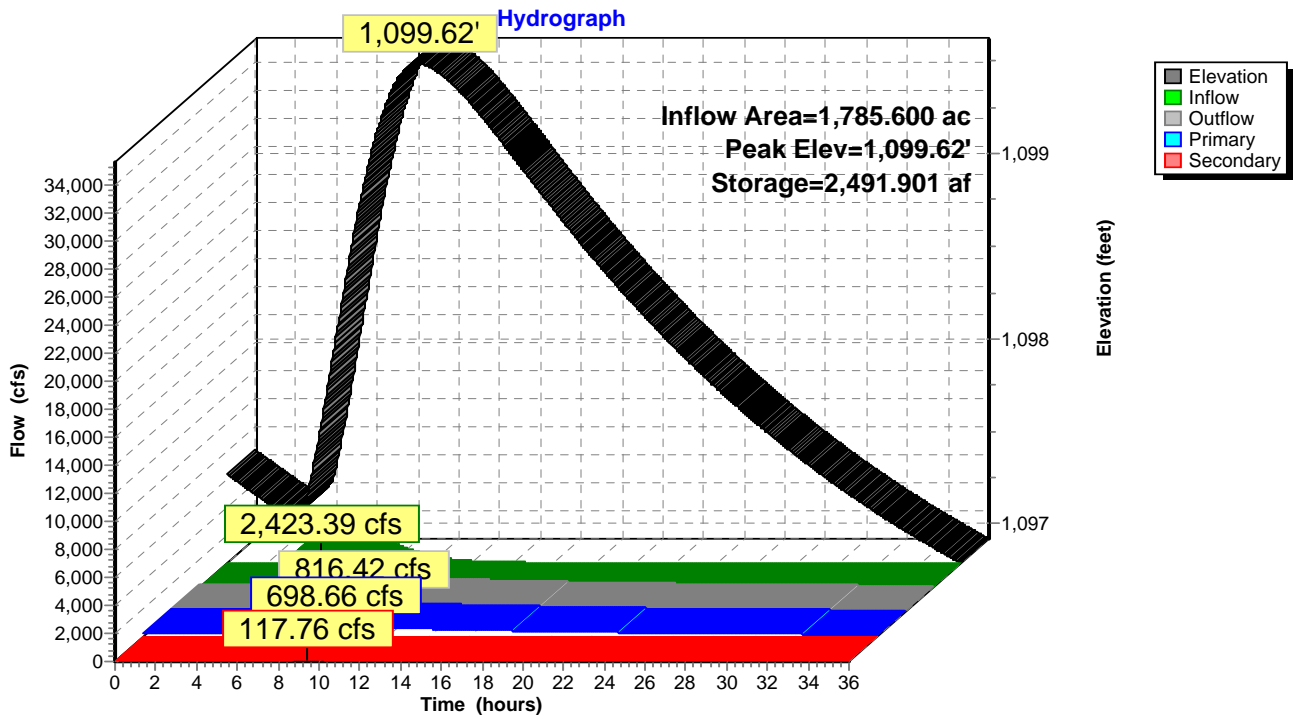
Primary OutFlow Max=698.66 cfs @ 9.37 hrs HW=1,099.62' TW=1,073.39' (Dynamic Tailwater)

- ↑1=Culvert-RCP (Barrel Controls 130.71 cfs @ 18.49 fps)
- ↓2=Custom Weir/Orifice (Weir Controls 567.95 cfs @ 5.88 fps)

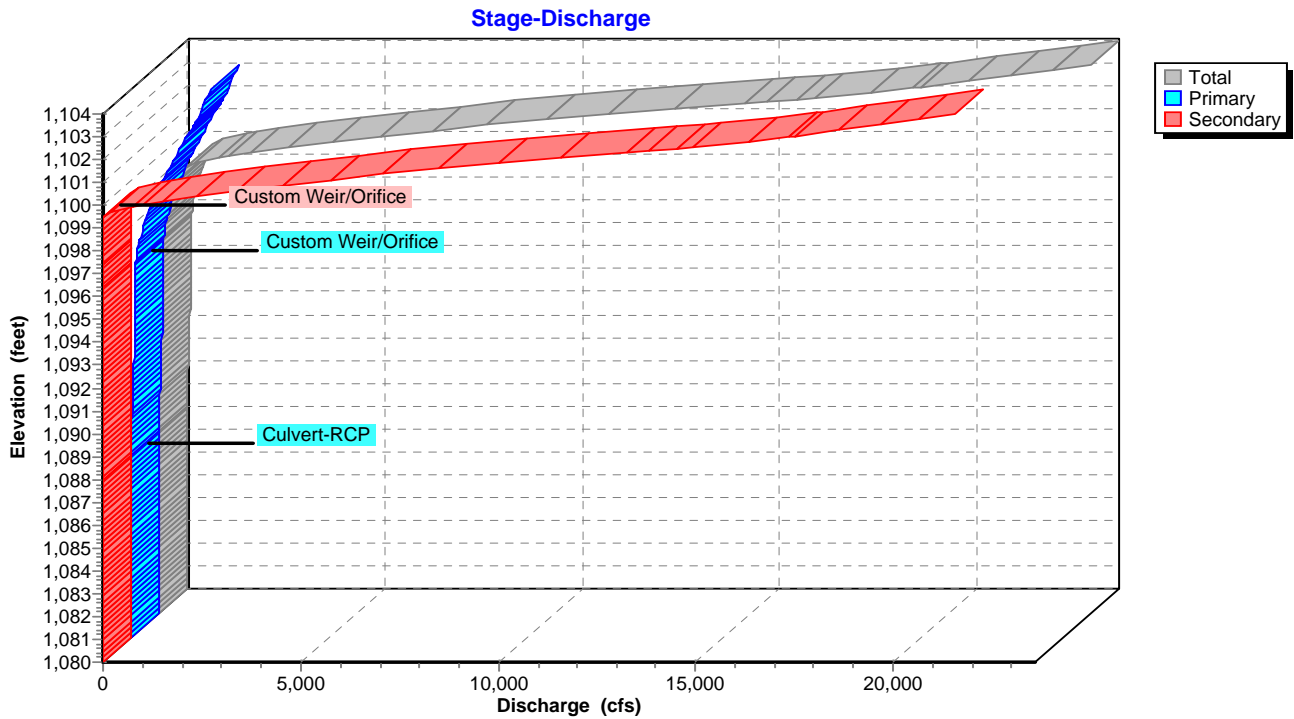
Secondary OutFlow Max=117.76 cfs @ 9.37 hrs HW=1,099.62' TW=1,073.39' (Dynamic Tailwater)

- ↑3=Custom Weir/Orifice (Weir Controls 117.76 cfs @ 0.97 fps)

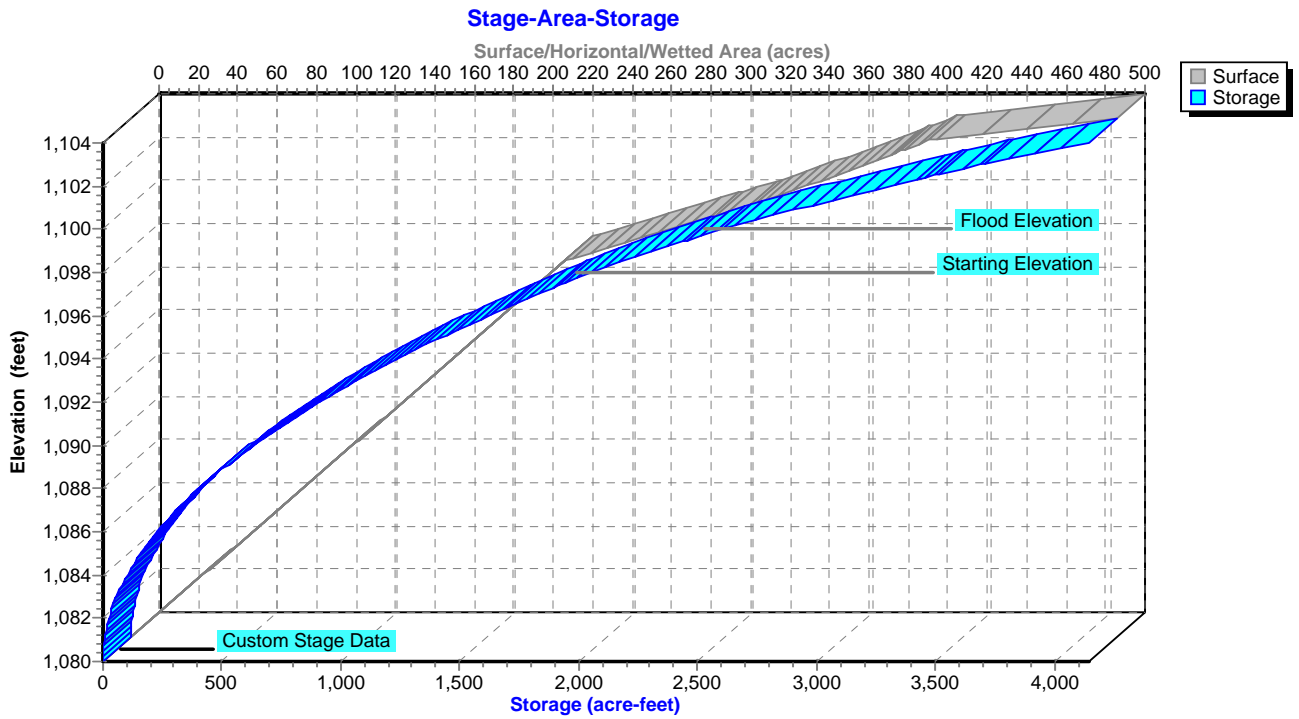
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable

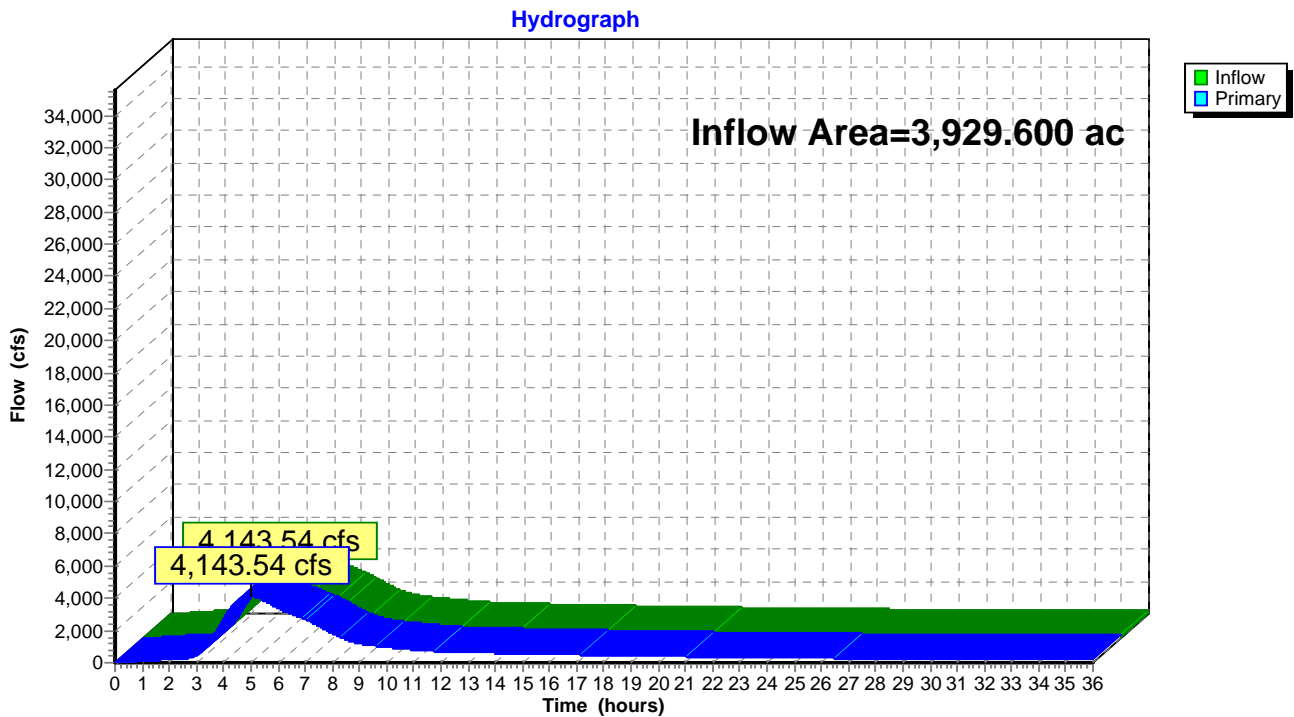


Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 6.87" for 6-HR 0.4 PMF event
Inflow = 4,143.54 cfs @ 4.99 hrs, Volume= 2,250.576 af
Primary = 4,143.54 cfs @ 5.00 hrs, Volume= 2,250.576 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 7.28" for 6-HR 0.4 PMF event
 Inflow = 1,192.99 cfs @ 3.52 hrs, Volume= 233.016 af
 Outflow = 919.55 cfs @ 4.08 hrs, Volume= 232.447 af, Atten= 23%, Lag= 33.9 min
 Primary = 885.62 cfs @ 4.08 hrs, Volume= 230.180 af
 Secondary = 33.94 cfs @ 4.08 hrs, Volume= 2.266 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,108.89' @ 4.08 hrs Surf.Area= 31.438 ac Storage= 106.991 af (82.691 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 231.1 min calculated for 208.089 af (89% of inflow)
 Center-of-Mass det. time= 173.8 min (457.5 - 283.6)

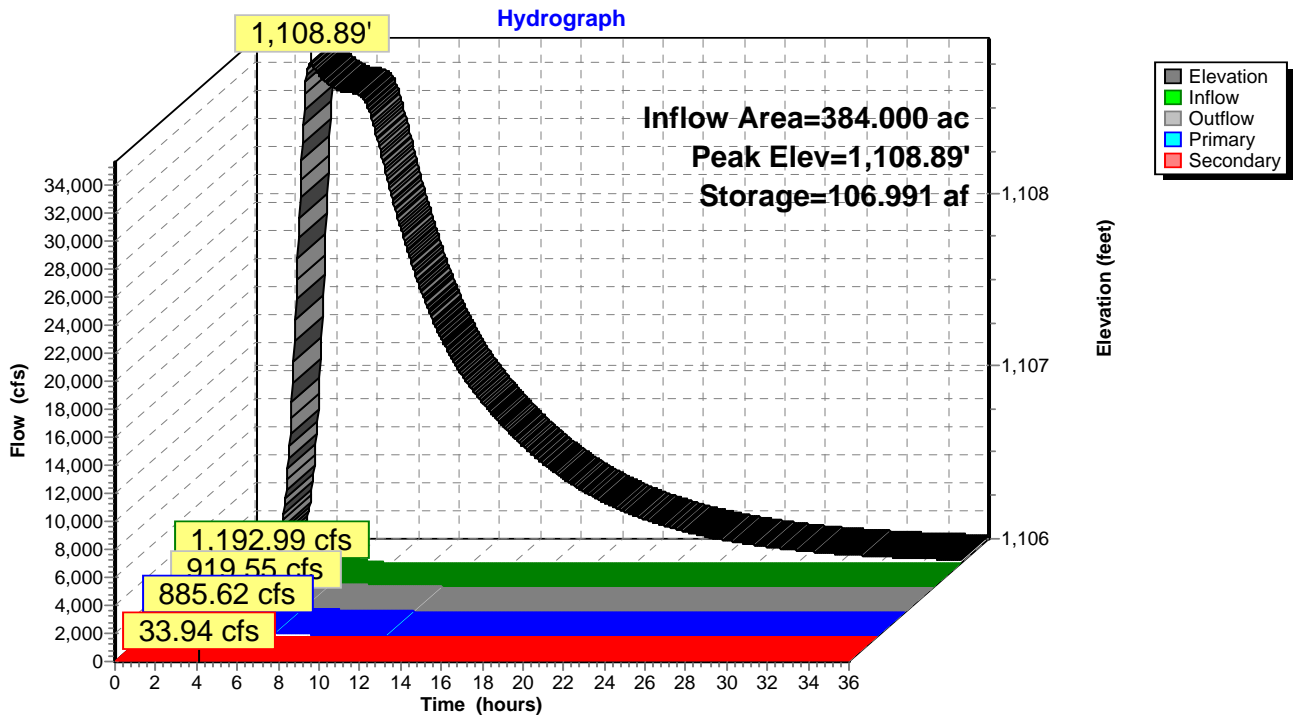
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

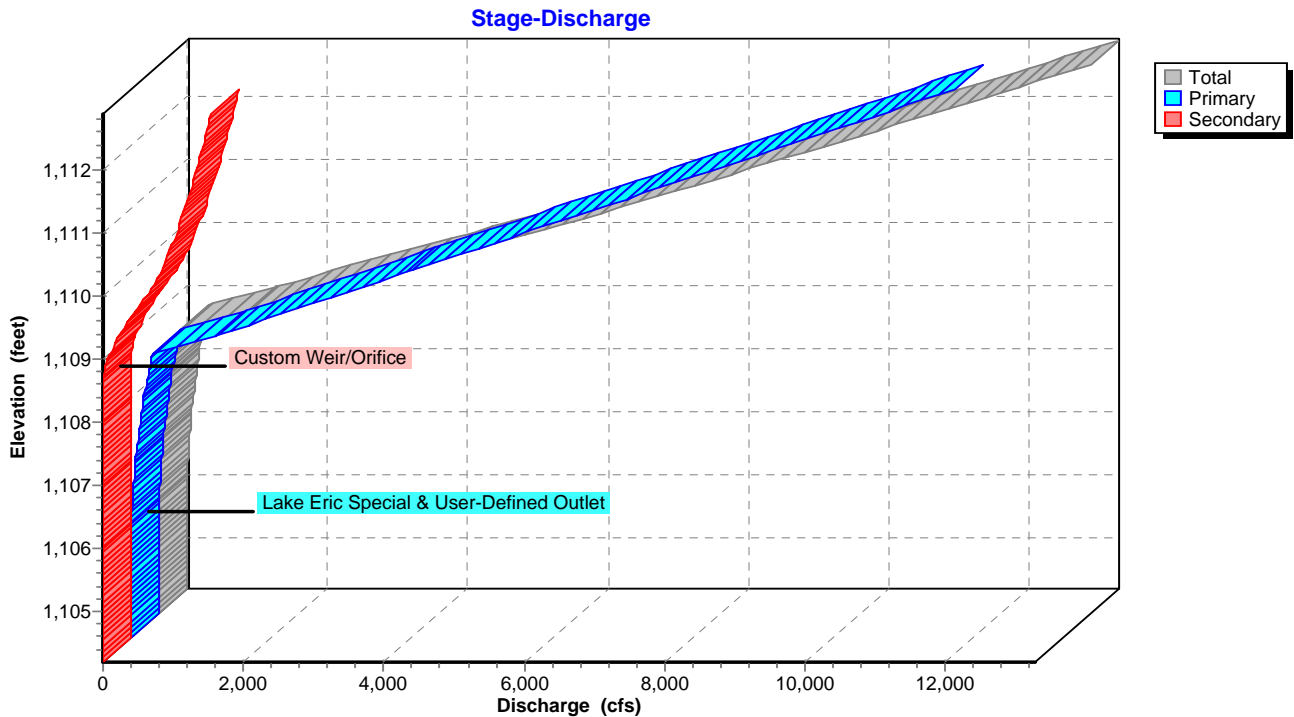
Primary OutFlow Max=885.58 cfs @ 4.08 hrs HW=1,108.89' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 885.58 cfs)

Secondary OutFlow Max=33.93 cfs @ 4.08 hrs HW=1,108.89' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 33.93 cfs @ 1.21 fps)

Pond 4P: Lake O'Springs

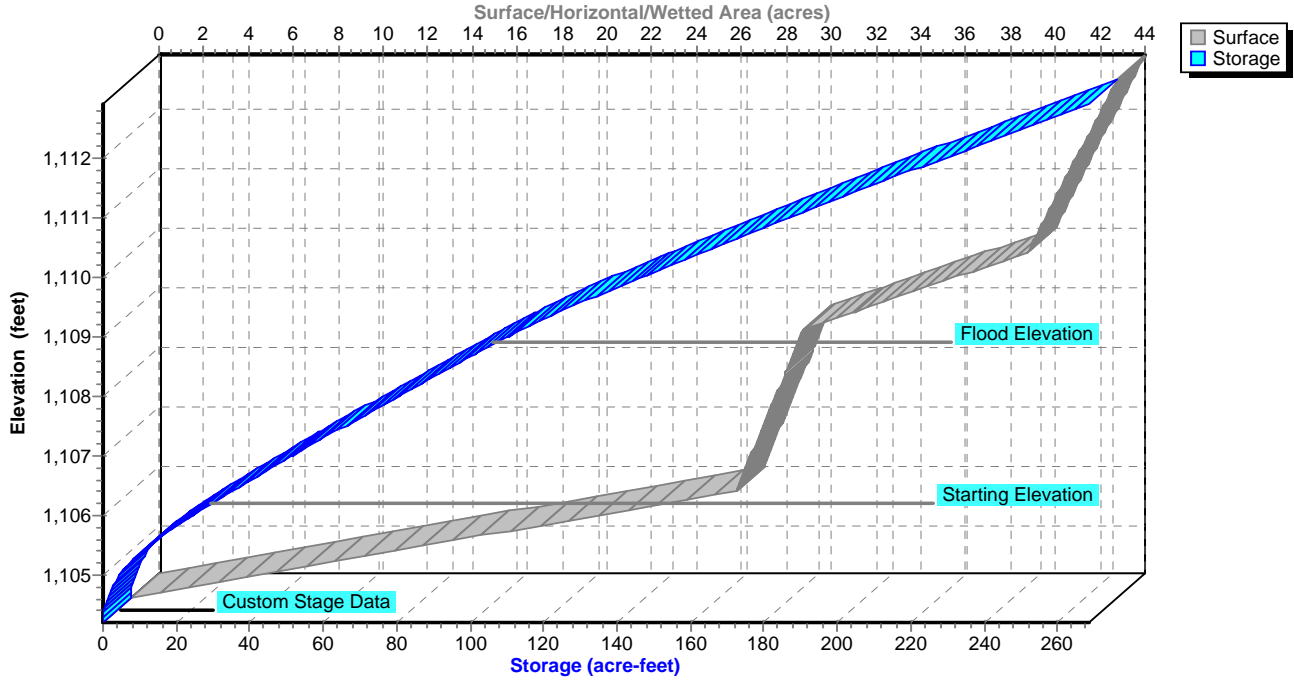


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



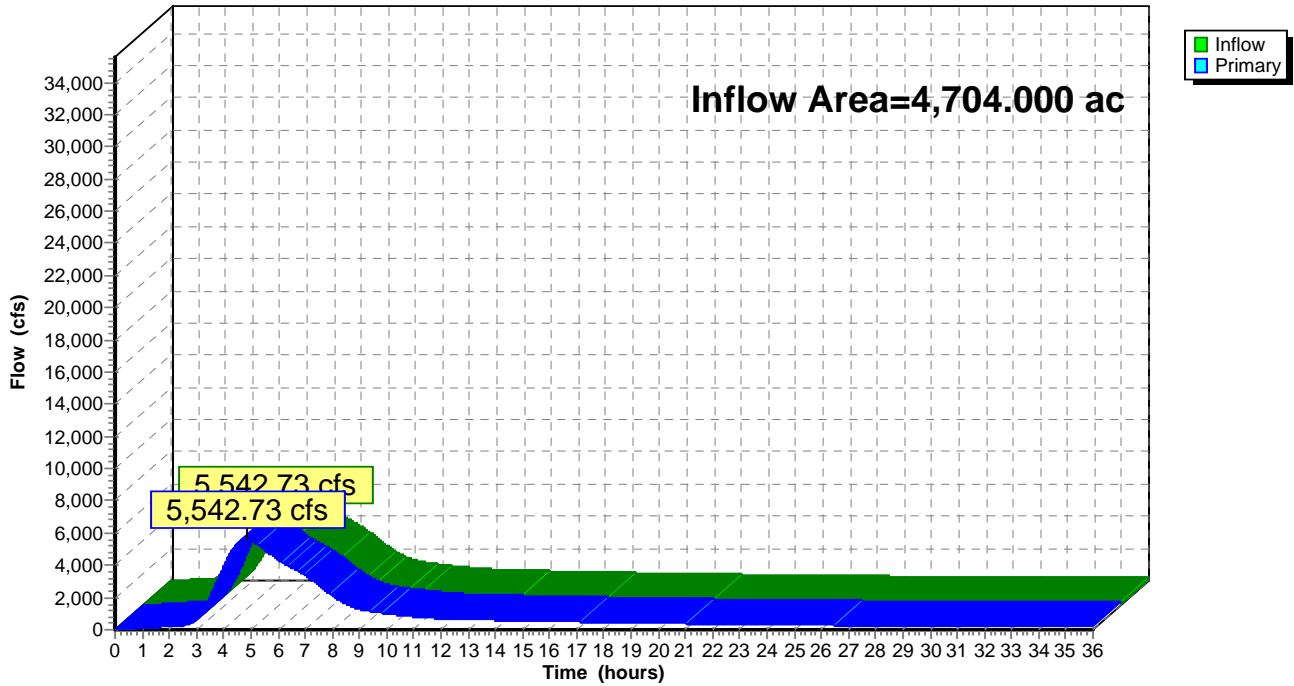
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 6.77" for 6-HR 0.4 PMF event
Inflow = 5,542.73 cfs @ 4.83 hrs, Volume= 2,653.892 af
Primary = 5,542.73 cfs @ 4.84 hrs, Volume= 2,653.892 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 7.19" for 6-HR 0.4 PMF event
 Inflow = 387.37 cfs @ 3.27 hrs, Volume= 69.049 af
 Outflow = 382.55 cfs @ 3.37 hrs, Volume= 68.932 af, Atten= 1%, Lag= 6.1 min
 Primary = 278.48 cfs @ 3.37 hrs, Volume= 59.951 af
 Secondary = 104.07 cfs @ 3.37 hrs, Volume= 8.981 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.39' @ 3.37 hrs Surf.Area= 4.354 ac Storage= 29.177 af (15.487 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 158.1 min calculated for 55.227 af (80% of inflow)
 Center-of-Mass det. time= 96.0 min (337.5 - 241.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)

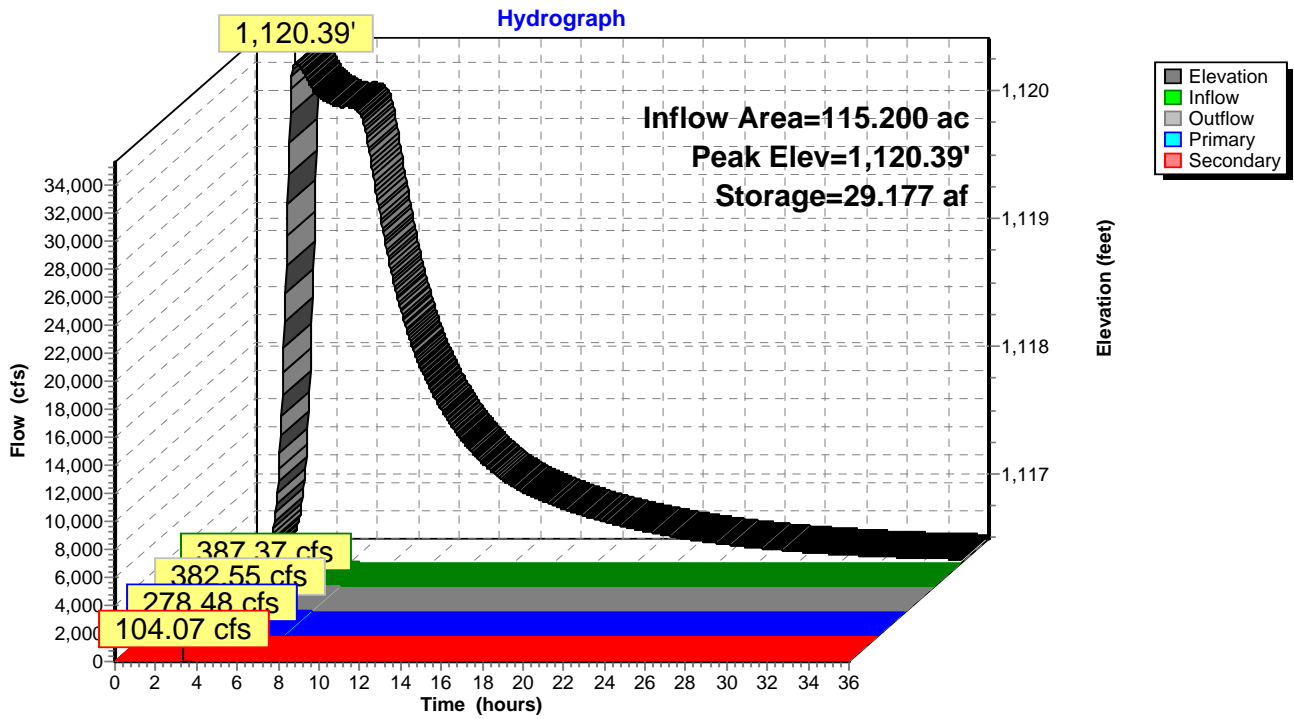
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

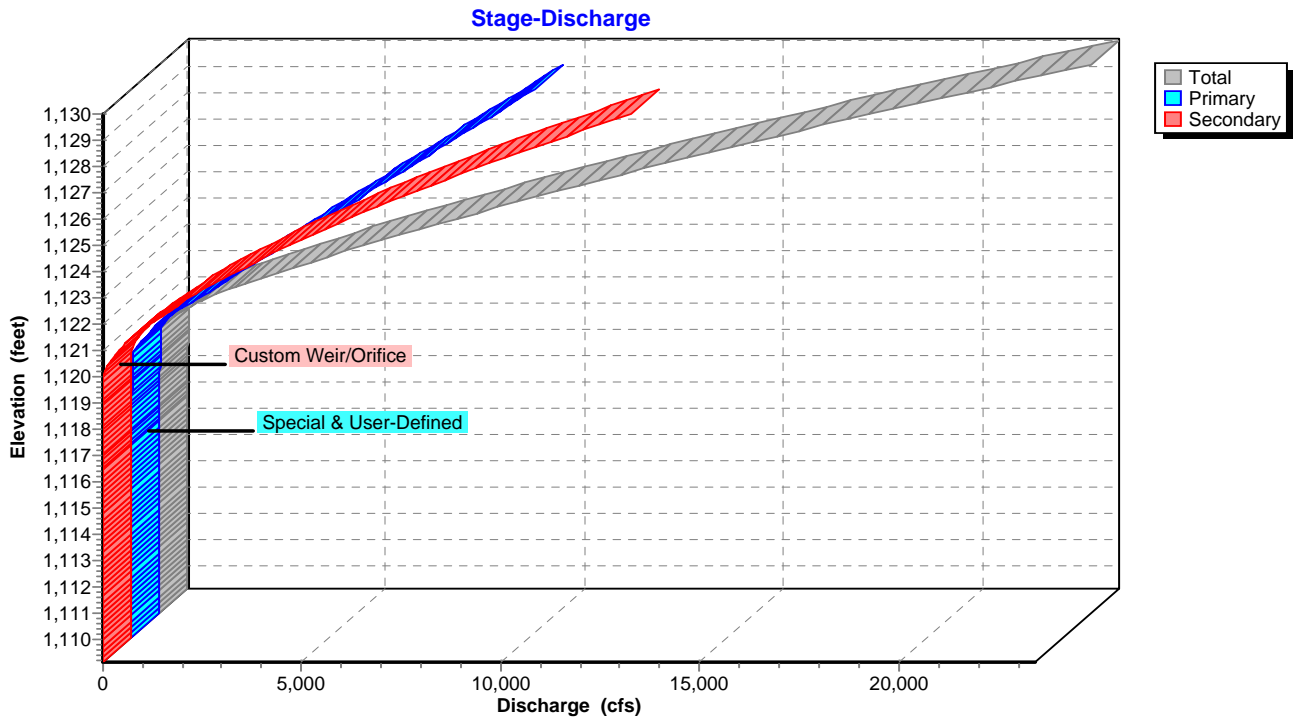
Primary OutFlow Max=278.47 cfs @ 3.37 hrs HW=1,120.39' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 278.47 cfs)

Secondary OutFlow Max=104.06 cfs @ 3.37 hrs HW=1,120.39' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 104.06 cfs @ 1.76 fps)

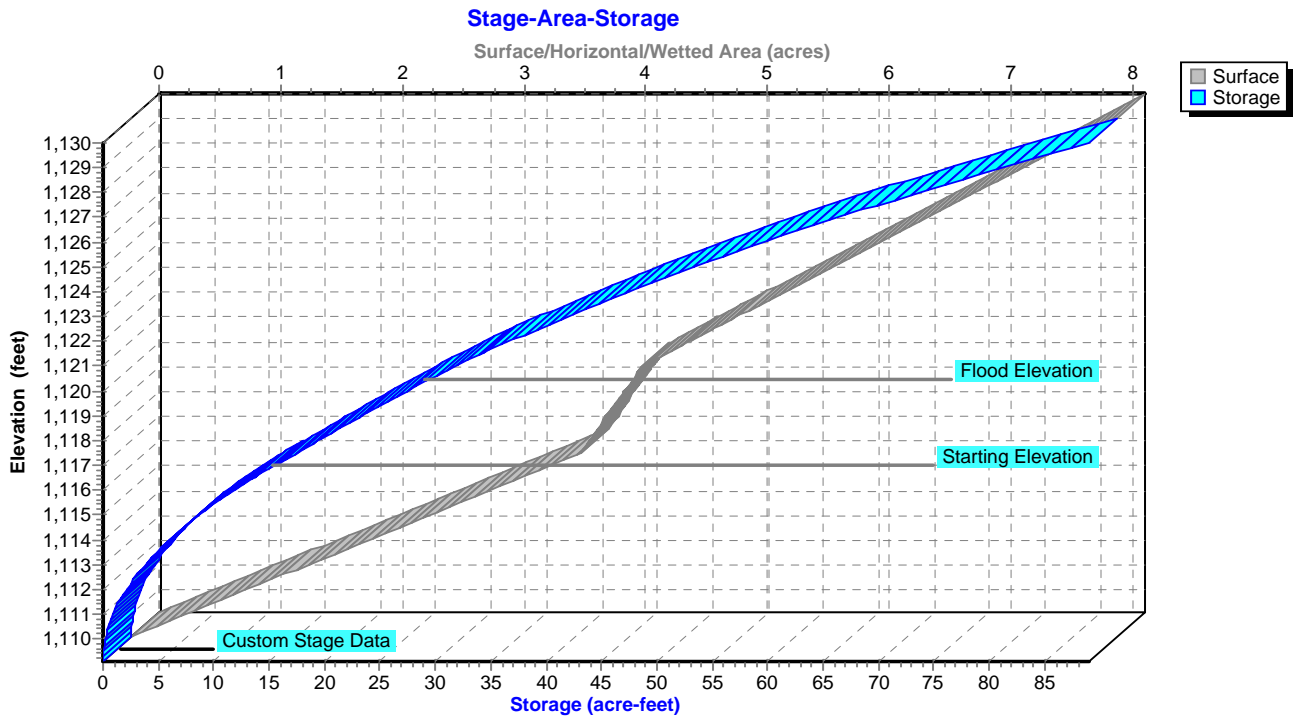
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



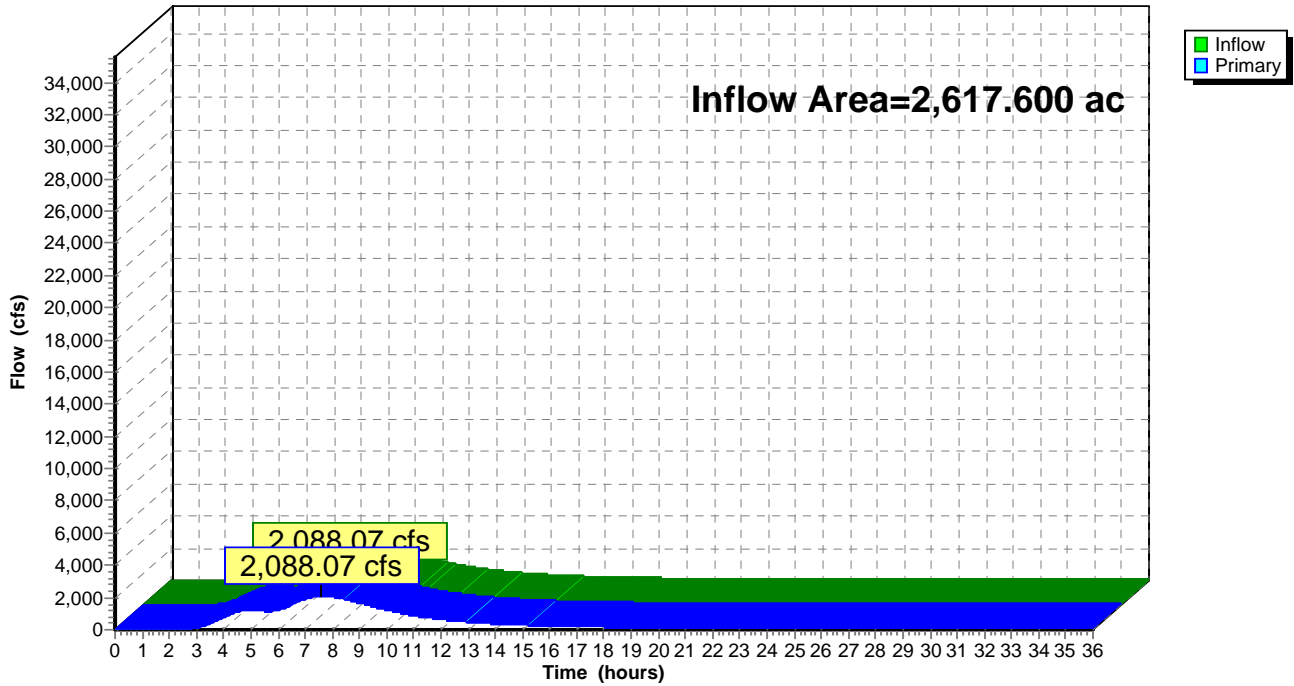
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 5.86" for 6-HR 0.4 PMF event
Inflow = 2,088.07 cfs @ 7.60 hrs, Volume= 1,278.810 af
Primary = 2,088.07 cfs @ 7.61 hrs, Volume= 1,278.810 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

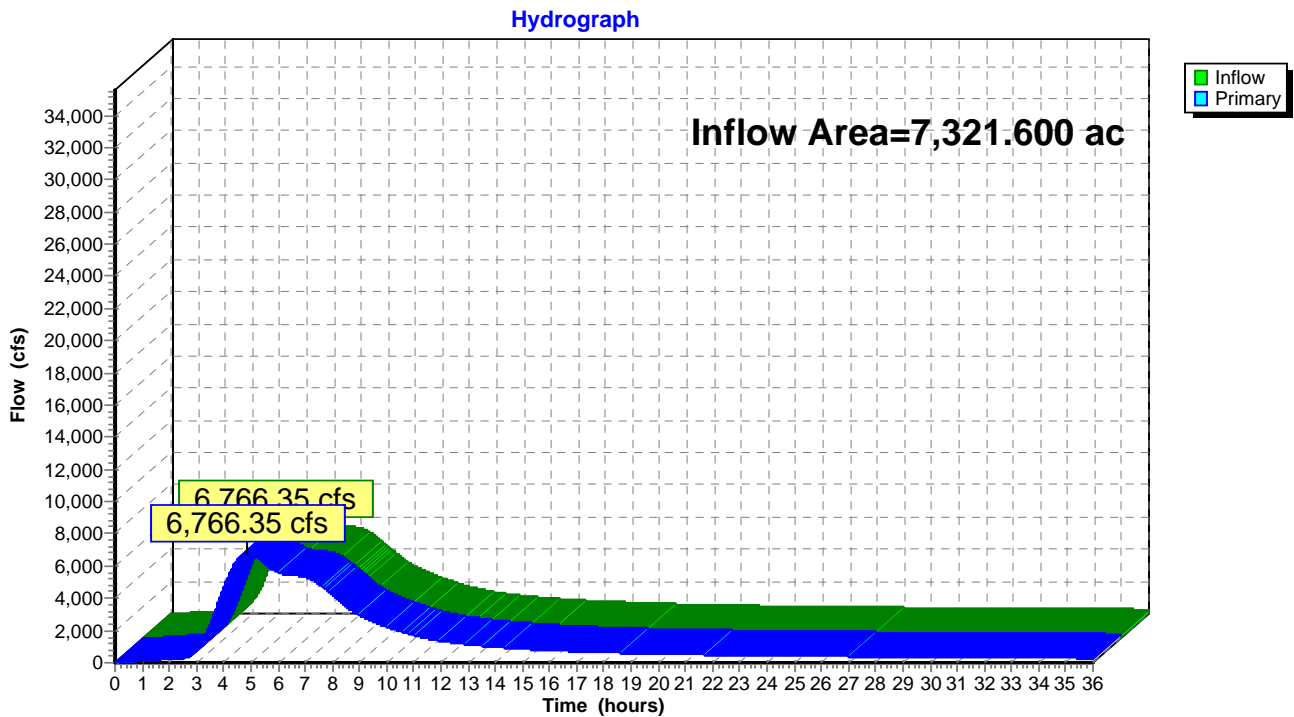


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 6.45" for 6-HR 0.4 PMF event
Inflow = 6,766.35 cfs @ 4.87 hrs, Volume= 3,932.481 af
Primary = 6,766.35 cfs @ 4.88 hrs, Volume= 3,932.481 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



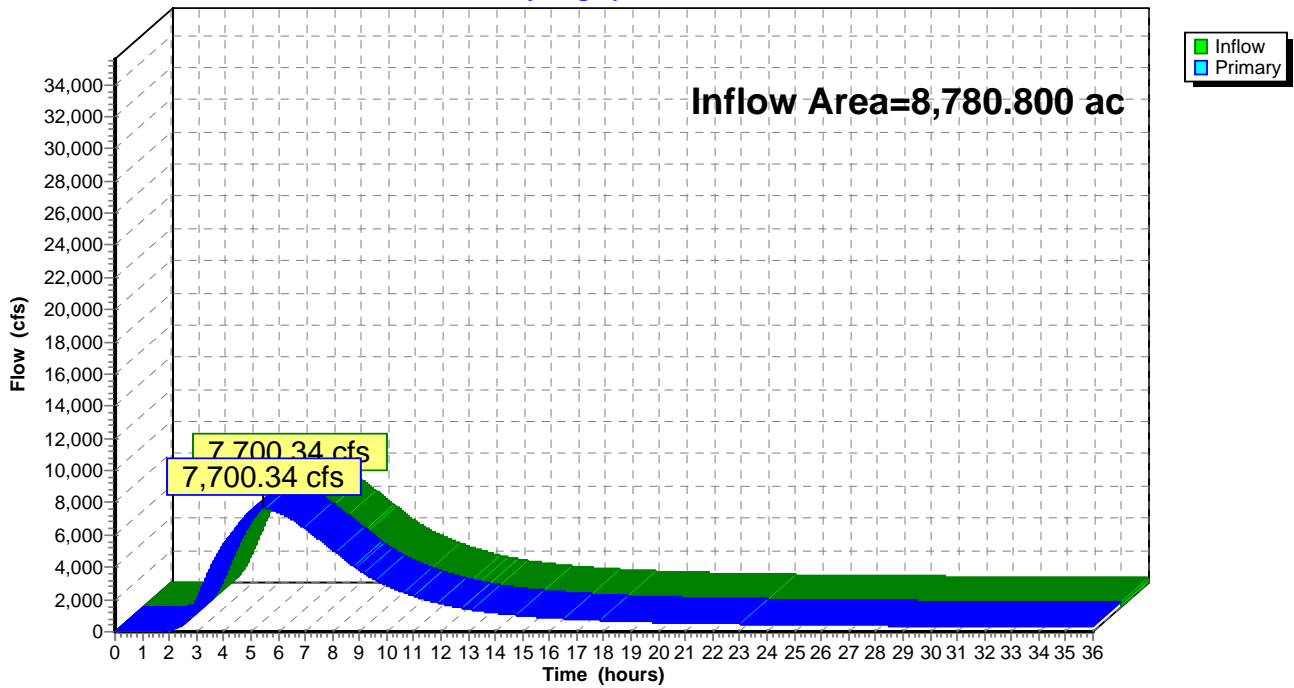
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 6.53" for 6-HR 0.4 PMF event
Inflow = 7,700.34 cfs @ 5.41 hrs, Volume= 4,774.612 af
Primary = 7,700.34 cfs @ 5.42 hrs, Volume= 4,774.612 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 6.76" for 6-HR 0.4 PMF event
 Inflow = 3,641.74 cfs @ 5.43 hrs, Volume= 1,106.494 af
 Outflow = 1,693.09 cfs @ 7.99 hrs, Volume= 939.661 af, Atten= 54%, Lag= 153.4 min
 Primary = 128.44 cfs @ 5.64 hrs, Volume= 286.604 af
 Secondary = 1,601.20 cfs @ 7.99 hrs, Volume= 653.057 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,026.97' @ 7.99 hrs Surf.Area= 193.923 ac Storage= 641.583 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 405.1 min calculated for 939.400 af (85% of inflow)
 Center-of-Mass det. time= 363.1 min (775.4 - 412.3)

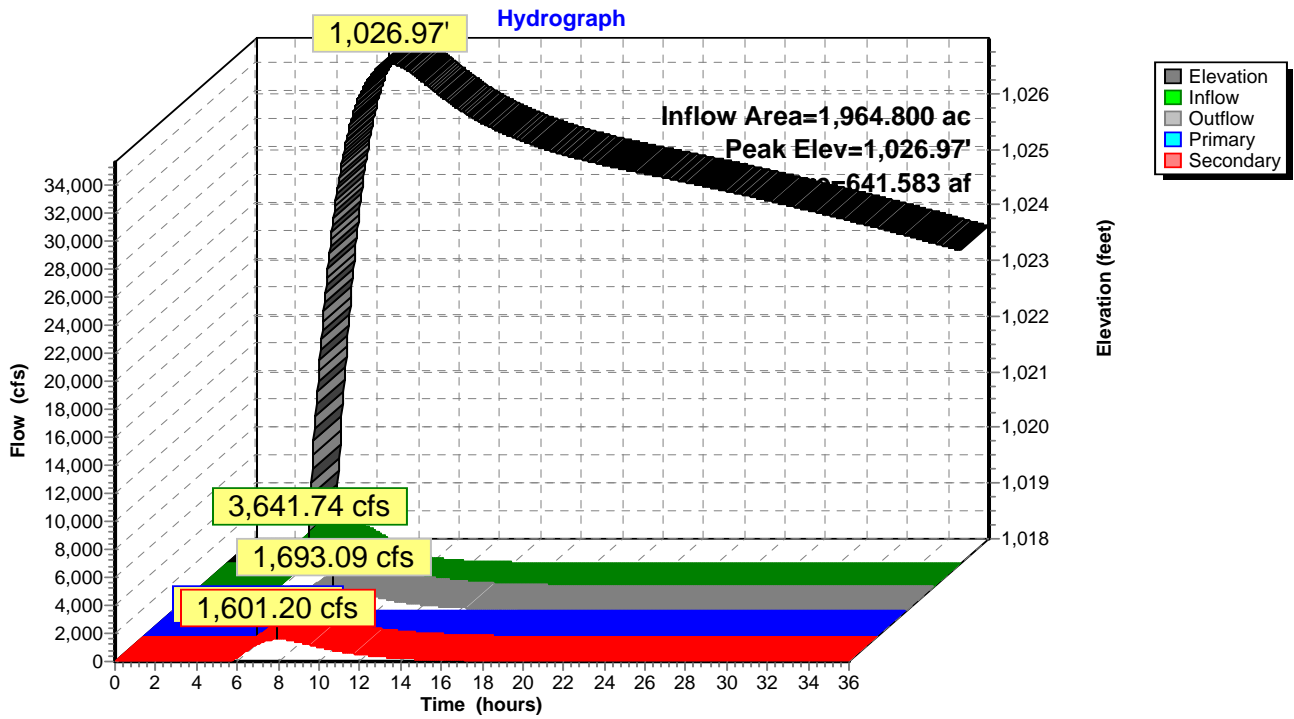
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

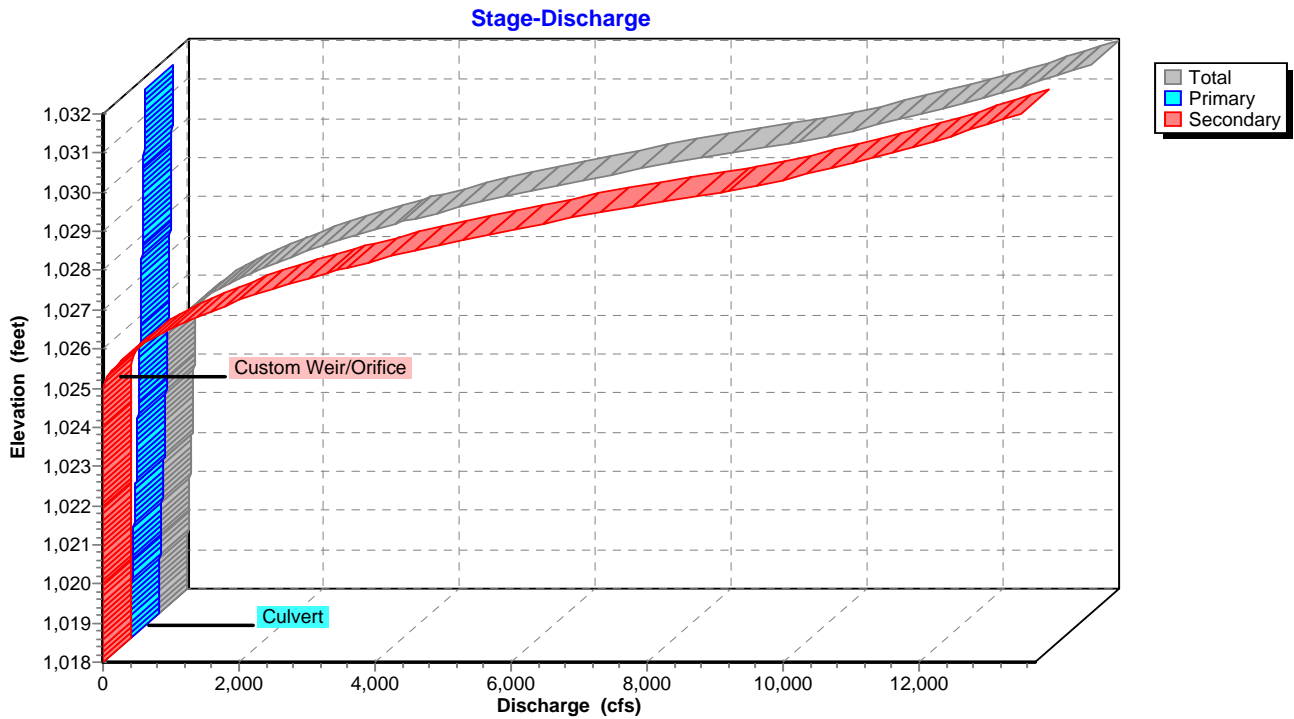
Primary OutFlow Max=127.80 cfs @ 5.64 hrs HW=1,025.21' TW=1,020.75' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 127.80 cfs @ 10.17 fps)

Secondary OutFlow Max=1,601.19 cfs @ 7.99 hrs HW=1,026.97' TW=1,024.67' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 1,601.19 cfs @ 4.30 fps)

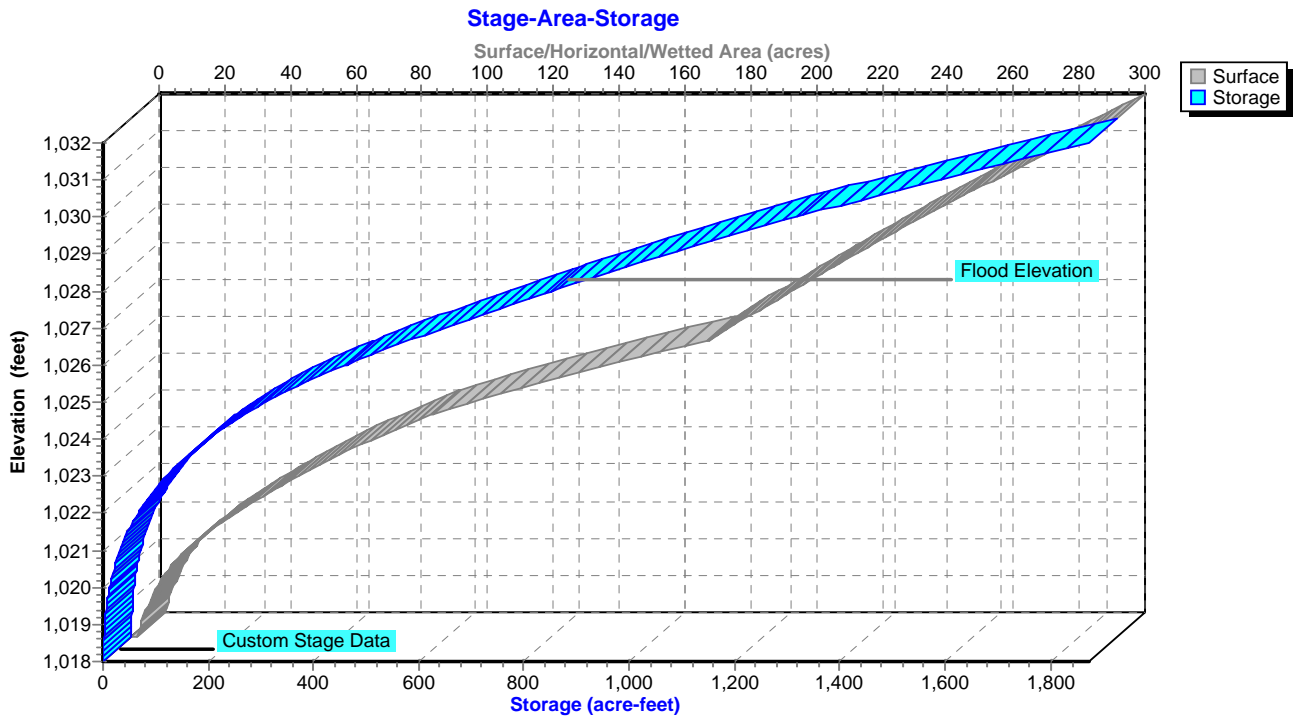
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 7.33" for 6-HR 0.4 PMF event
 Inflow = 3,967.55 cfs @ 4.86 hrs, Volume= 1,199.374 af
 Outflow = 3,641.74 cfs @ 5.43 hrs, Volume= 1,106.495 af, Atten= 8%, Lag= 34.7 min
 Primary = 3,593.10 cfs @ 5.43 hrs, Volume= 1,099.328 af
 Secondary = 48.64 cfs @ 5.43 hrs, Volume= 7.167 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.93' @ 5.43 hrs Surf.Area= 107.870 ac Storage= 510.088 af (290.088 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 143.9 min calculated for 886.249 af (74% of inflow)
 Center-of-Mass det. time= 67.8 min (412.3 - 344.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

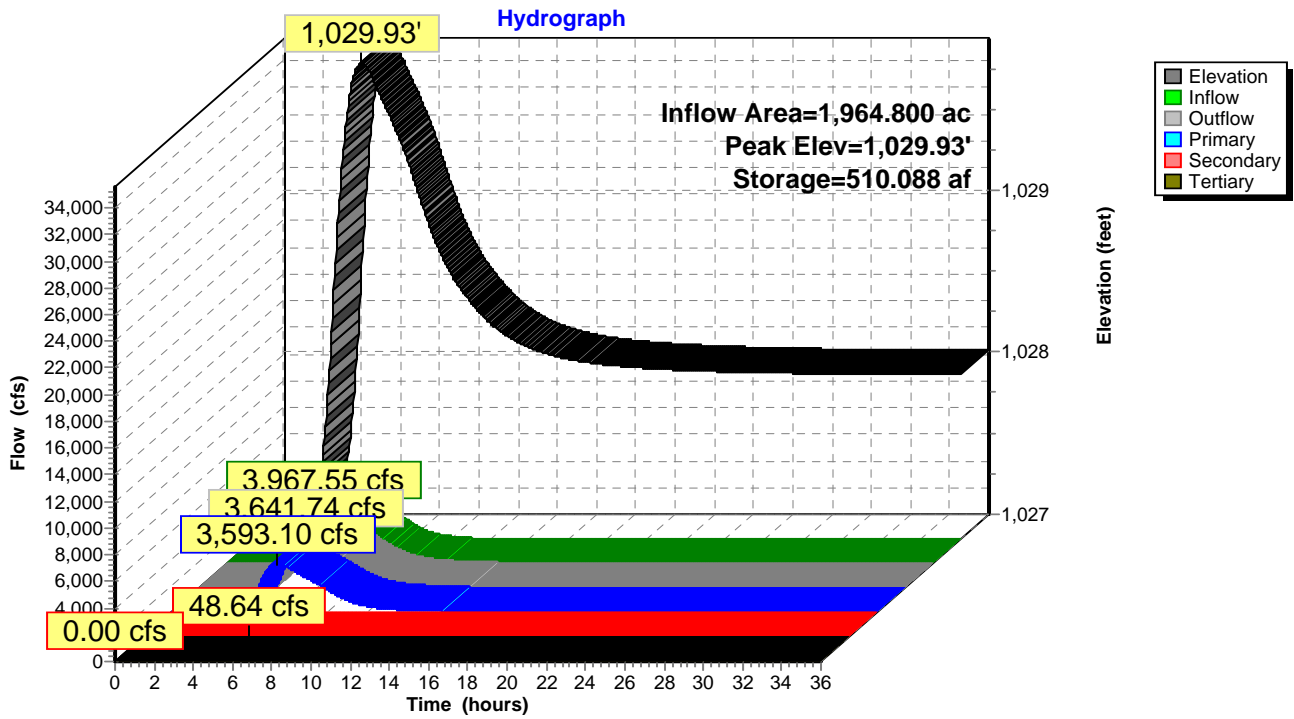
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3,593.07 cfs @ 5.43 hrs HW=1,029.93' TW=1,024.76' (Dynamic Tailwater)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 2,109.62 cfs @ 3.65 fps)
 ↓2=**Broad-Crested Rectangular Weir** (Weir Controls 1,483.45 cfs @ 3.15 fps)

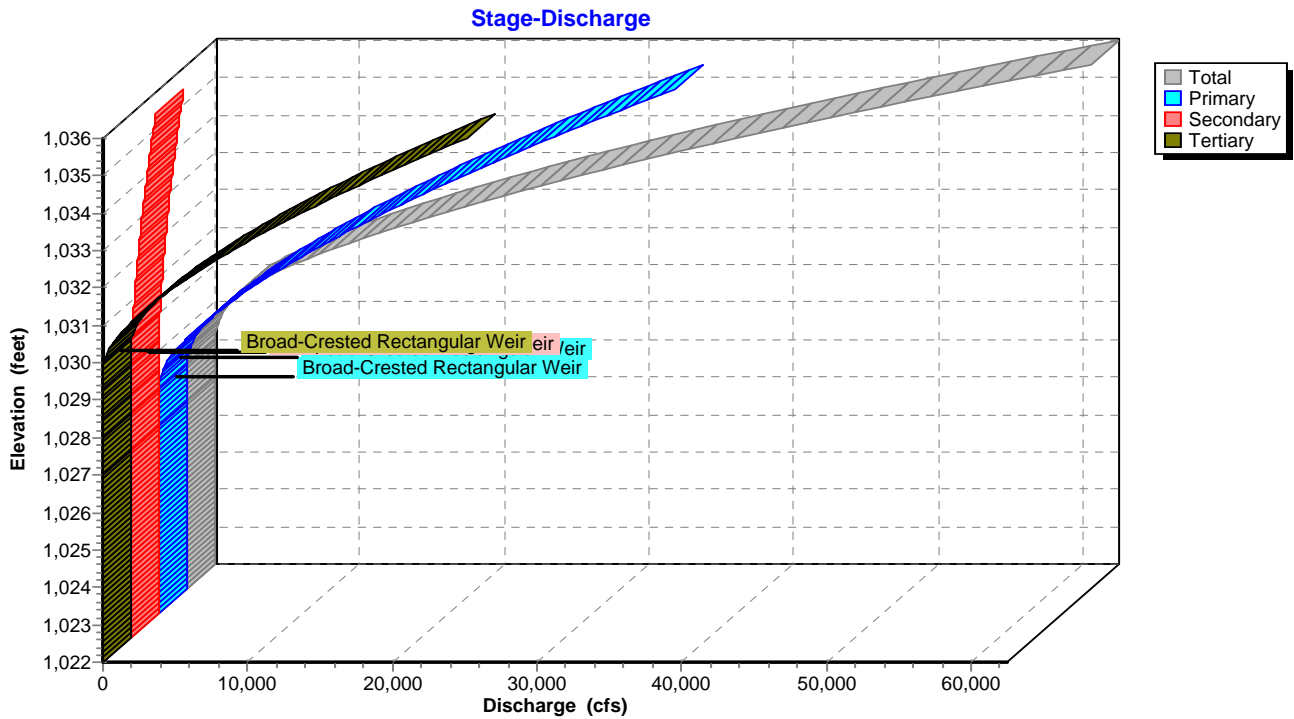
Secondary OutFlow Max=48.64 cfs @ 5.43 hrs HW=1,029.93' TW=1,024.76' (Dynamic Tailwater)
 ↑3=**Sharp-Crested Rectangular Weir** (Weir Controls 48.64 cfs @ 2.59 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake

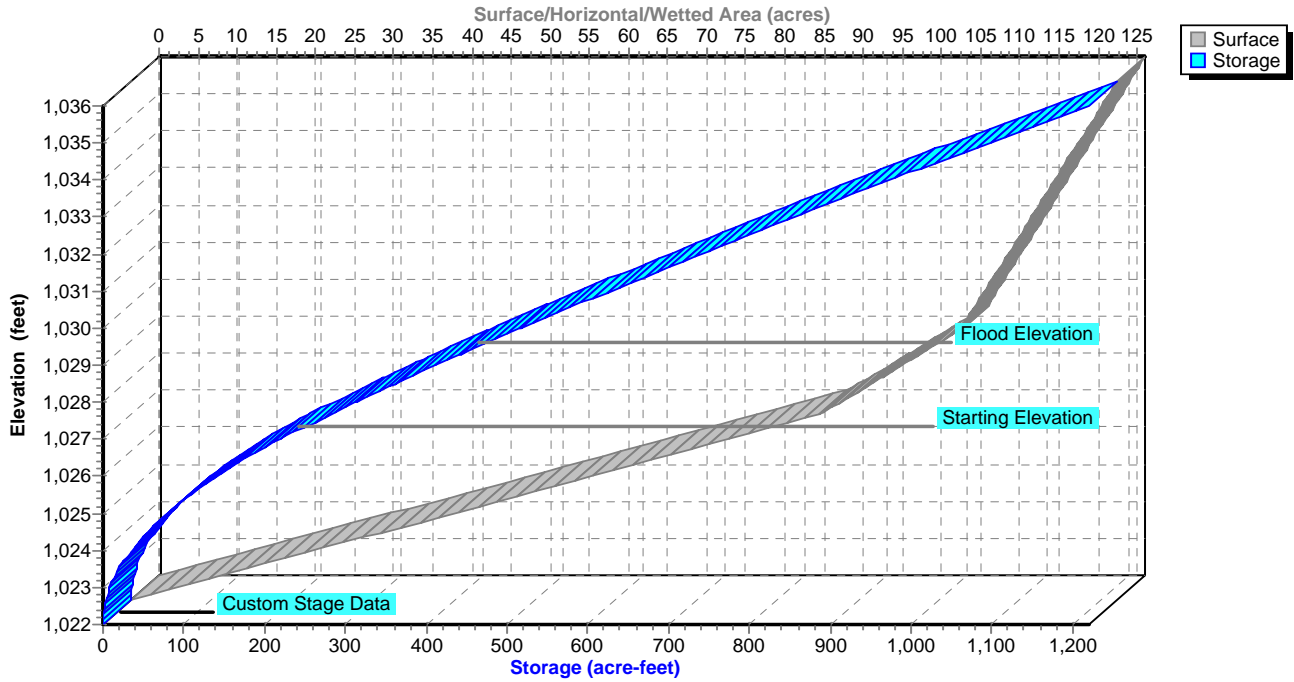


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

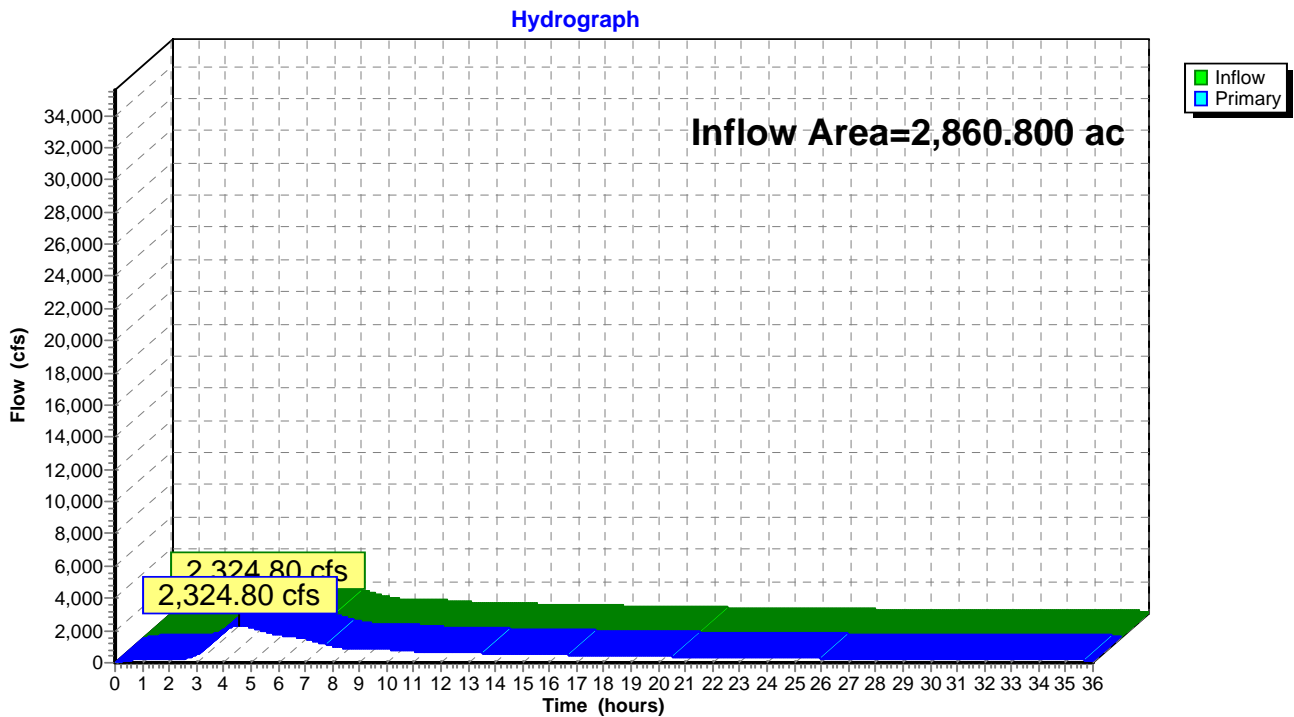


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 7.05" for 6-HR 0.4 PMF event
Inflow = 2,324.80 cfs @ 4.55 hrs, Volume= 1,680.610 af
Primary = 2,324.80 cfs @ 4.56 hrs, Volume= 1,680.610 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 6.56" for 6-HR 0.4 PMF event
 Inflow = 8,188.71 cfs @ 6.02 hrs, Volume= 5,169.058 af
 Outflow = 8,186.84 cfs @ 6.07 hrs, Volume= 5,168.002 af, Atten= 0%, Lag= 3.2 min
 Primary = 3,370.92 cfs @ 4.66 hrs, Volume= 3,803.343 af
 Secondary = 4,841.70 cfs @ 6.07 hrs, Volume= 1,364.660 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,010.54' @ 6.07 hrs Surf.Area= 14.674 ac Storage= 232.652 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 23.3 min calculated for 5,166.567 af (100% of inflow)
 Center-of-Mass det. time= 23.0 min (651.1 - 628.1)

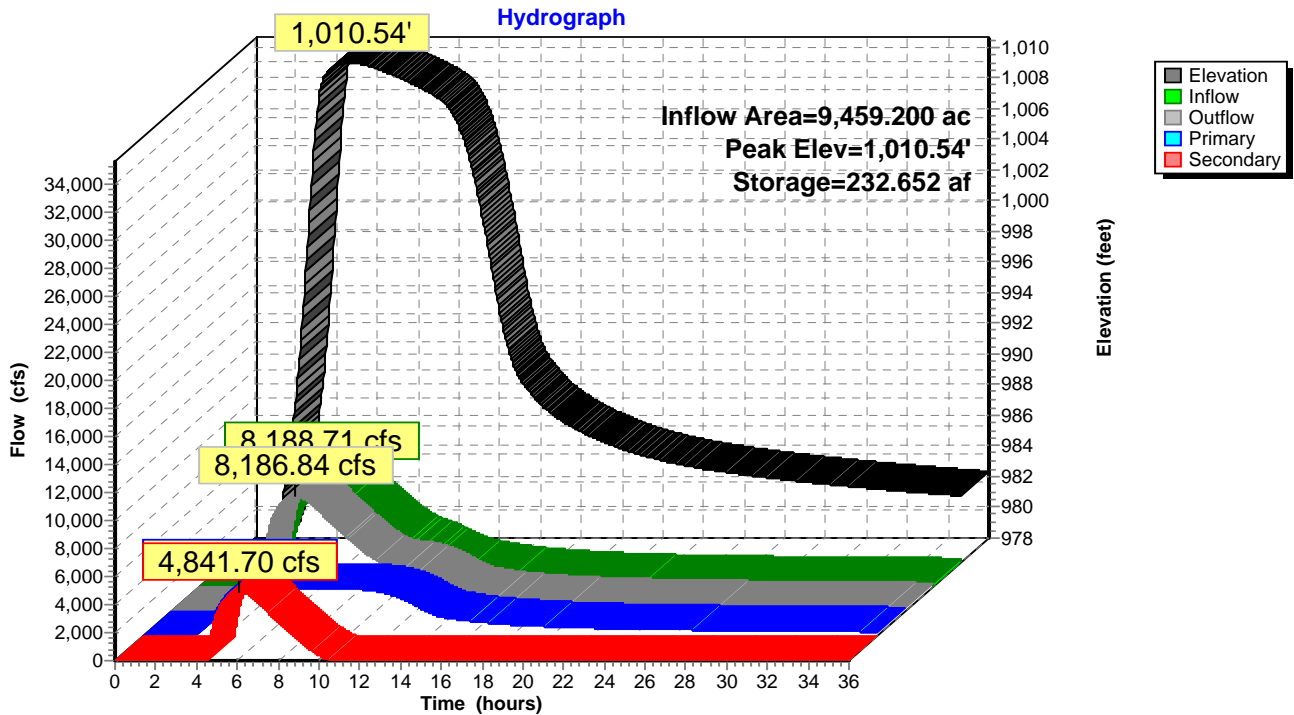
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

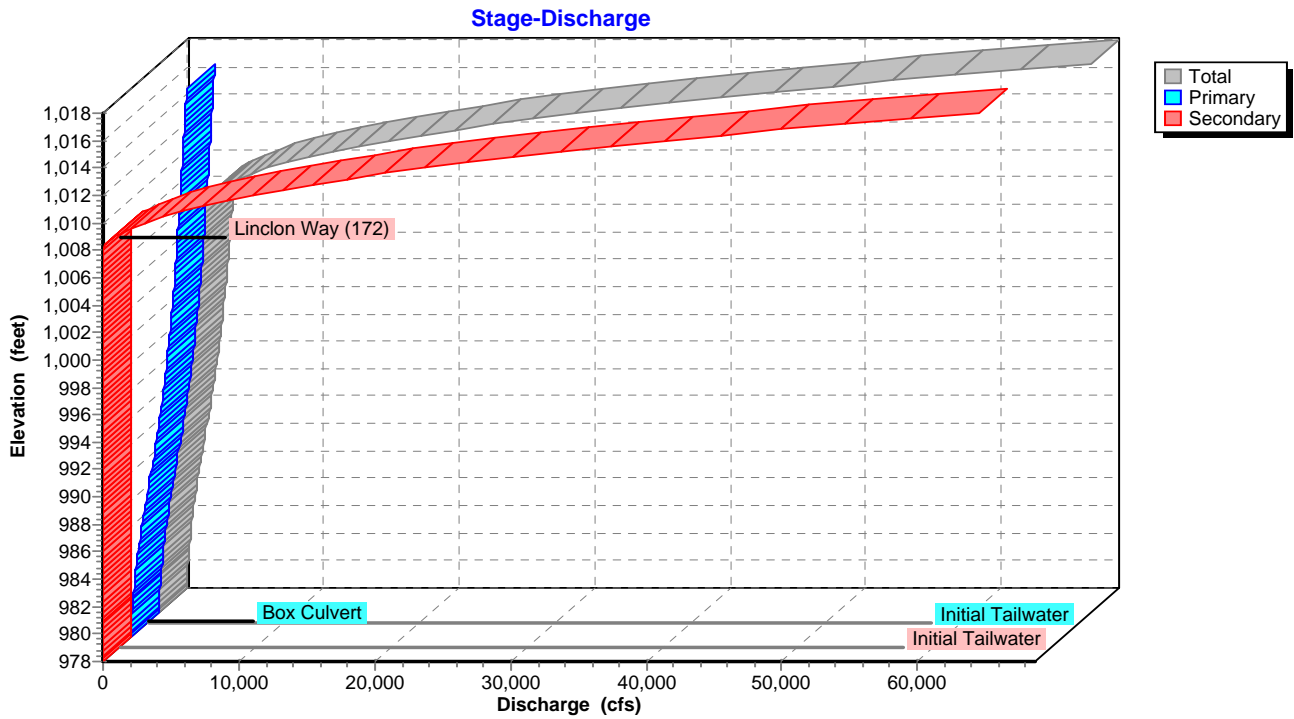
Primary OutFlow Max=3,368.21 cfs @ 4.66 hrs HW=1,009.33' TW=985.30' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,368.21 cfs @ 29.46 fps)

Secondary OutFlow Max=4,841.69 cfs @ 6.07 hrs HW=1,010.54' TW=986.91' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 4,841.69 cfs @ 4.87 fps)

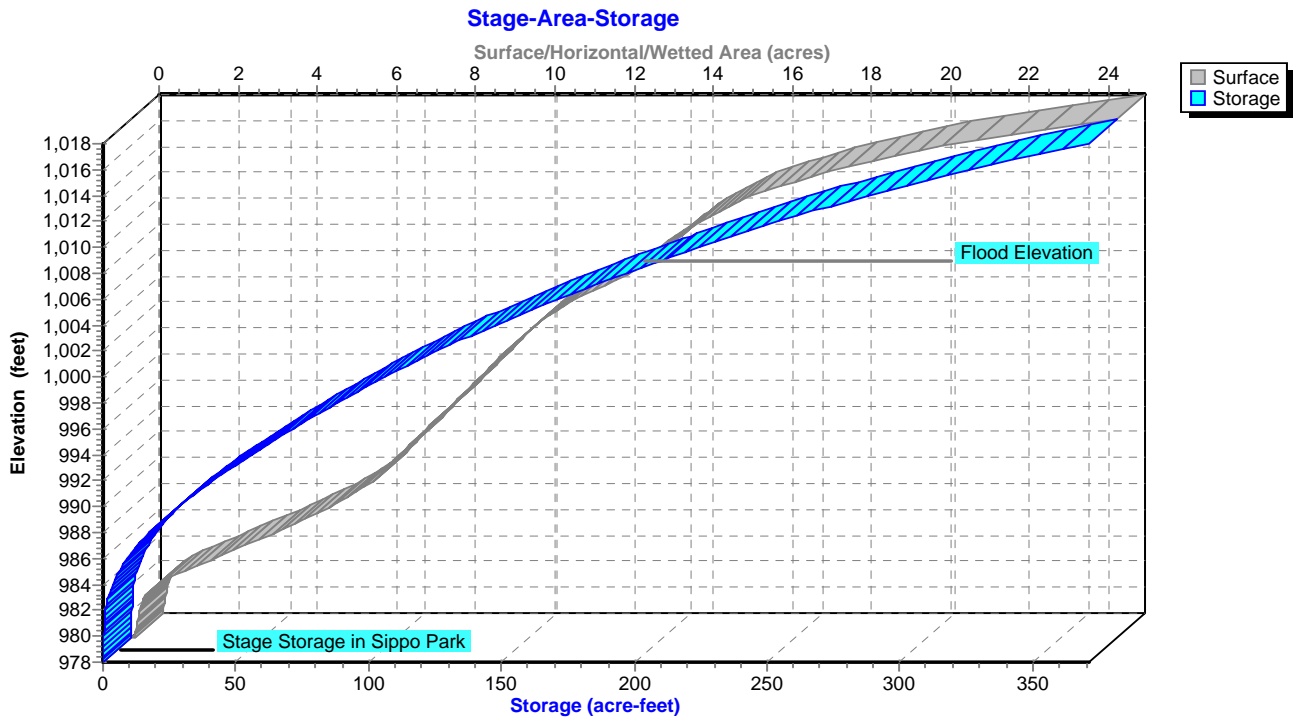
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



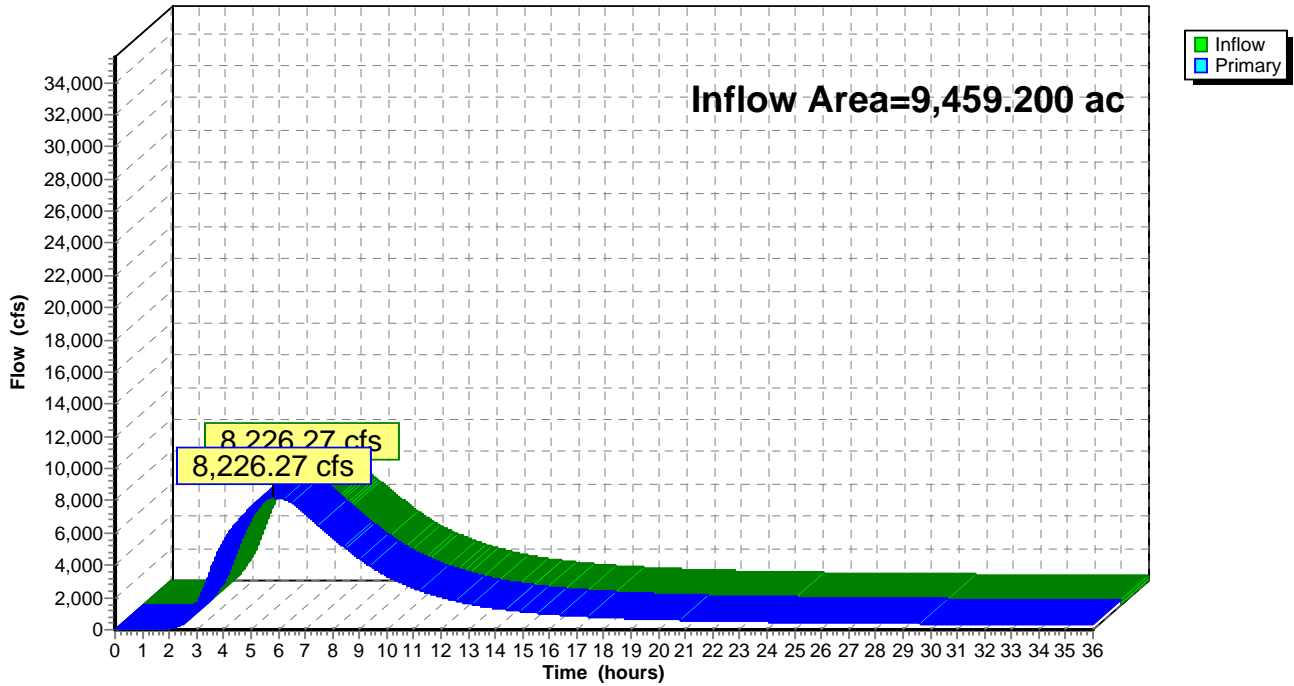
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 6.57" for 6-HR 0.4 PMF event
Inflow = 8,226.27 cfs @ 5.80 hrs, Volume= 5,182.719 af
Primary = 8,226.27 cfs @ 5.81 hrs, Volume= 5,182.719 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

SubcatchmentHYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=9.64"
 Tc=44.0 min CN=74 Runoff=520.17 cfs 92.550 af

SubcatchmentHYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=9.79"
 Tc=65.0 min CN=75 Runoff=1,106.00 cfs 219.198 af

SubcatchmentHYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=9.05"
 Tc=226.0 min CN=70 Runoff=2,794.23 cfs 1,057.009 af

SubcatchmentHYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=8.75"
 Tc=128.0 min CN=68 Runoff=2,892.68 cfs 783.786 af

SubcatchmentHYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=8.59"
 Tc=129.0 min CN=67 Runoff=2,036.94 cfs 554.655 af

SubcatchmentHYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=9.64"
 Tc=110.0 min CN=74 Runoff=2,337.59 cfs 581.009 af

SubcatchmentHYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=9.79"
 Tc=72.0 min CN=75 Runoff=2,916.69 cfs 600.184 af

SubcatchmentHYD14: HYD14 Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=10.49"
 Tc=78.0 min CN=80 Runoff=2,798.94 cfs 593.287 af

SubcatchmentHYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=8.90"
 Tc=155.0 min CN=69 Runoff=2,625.65 cfs 792.625 af

SubcatchmentHYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=9.79"
 Tc=156.0 min CN=75 Runoff=5,319.68 cfs 1,602.232 af

SubcatchmentHYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=8.59"
 Tc=151.0 min CN=67 Runoff=1,573.75 cfs 467.561 af

Reach 5R: Channel 5 Avg. Flow Depth=6.20' Max Vel=9.24 fps Inflow=1,854.00 cfs 1,462.306 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=1,840.29 cfs 1,455.666 af

Reach 7R: Channel 7 Avg. Flow Depth=13.45' Max Vel=3.92 fps Inflow=3,164.17 cfs 2,239.178 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=2,981.72 cfs 2,228.159 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=7.72' Max Vel=3.28 fps Inflow=2,725.66 cfs 1,338.725 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=2,723.21 cfs 1,337.936 af

Reach 15R: Channel 15 Avg. Flow Depth=13.00' Max Vel=2.96 fps Inflow=9,207.64 cfs 5,380.117 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=8,338.98 cfs 5,338.904 af

Reach 16R: Channel 16 Avg. Flow Depth=16.30' Max Vel=3.91 fps Inflow=10,719.08 cfs 6,519.616 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=10,497.54 cfs 6,476.192 af

Existing Conditions Sippo Reservoir-TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 616

Reach 18R: Sippo Creek Avg. Flow Depth=10.04' Max Vel=11.52 fps Inflow=11,414.16 cfs 7,053.912 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=11,414.17 cfs 7,053.787 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=1,599.17 cfs 311.630 af
Primary=1,599.17 cfs 311.630 af

Pond 1P: Sippo Creek Peak Elev=1,012.56' Storage=287.342 af Inflow=11,457.06 cfs 7,068.974 af
cfs 3,062.293 af Secondary=7,478.78 cfs 3,620.309 af Tertiary=996.25 cfs 372.936 af Outflow=11,415.24 cfs 7,055.537 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=3,279.51 cfs 1,368.060 af
Primary=3,279.51 cfs 1,368.060 af

Pond 3P: Lake Cable Peak Elev=1,100.02' Storage=2,614.873 af Inflow=3,279.51 cfs 1,368.059 af
Primary=808.28 cfs 1,202.281 af Secondary=1,045.72 cfs 260.160 af Outflow=1,854.00 cfs 1,462.441 af

Pond 4C: Confluence 4 Inflow=5,604.46 cfs 3,020.643 af
Primary=5,604.46 cfs 3,020.643 af

Pond 4P: Lake O'Springs Peak Elev=1,109.04' Storage=112.039 af Inflow=1,599.17 cfs 311.630 af
Primary=1,359.54 cfs 304.044 af Secondary=84.90 cfs 7.008 af Outflow=1,444.44 cfs 311.052 af

Pond 5C: Confluence 5 Inflow=7,530.77 cfs 3,575.157 af
Primary=7,530.77 cfs 3,575.157 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.54' Storage=29.798 af Inflow=520.17 cfs 92.550 af
Primary=353.73 cfs 75.445 af Secondary=164.91 cfs 16.987 af Outflow=518.64 cfs 92.432 af

Pond 6C: Confluence 6 Inflow=3,444.22 cfs 1,805.412 af
Primary=3,444.22 cfs 1,805.412 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=9,207.64 cfs 5,380.343 af
Primary=9,207.64 cfs 5,380.343 af

Pond 8C: Confluence 8 Inflow=10,719.08 cfs 6,519.857 af
Primary=10,719.08 cfs 6,519.857 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,027.60' Storage=767.516 af Inflow=5,078.17 cfs 1,509.336 af
Primary=128.96 cfs 287.640 af Secondary=2,632.34 cfs 1,051.170 af Outflow=2,725.66 cfs 1,338.810 af

Pond 9P: Sippo Lake Peak Elev=1,030.27' Storage=547.264 af Inflow=5,319.68 cfs 1,602.232 af
,740.26 cfs 1,472.687 af Secondary=93.64 cfs 16.758 af Tertiary=244.27 cfs 19.892 af Outflow=5,078.17 cfs 1,509.337 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Inflow=3,164.17 cfs 2,239.315 af
Primary=3,164.17 cfs 2,239.315 af

Pond 16P: Lincoln Way Box Peak Elev=1,011.38' Storage=245.134 af Inflow=11,415.24 cfs 7,055.281 af
Primary=3,376.20 cfs 4,110.681 af Secondary=8,099.29 cfs 2,943.488 af Outflow=11,414.16 cfs 7,054.169 af

Pond 19C: Confluence 19 Inflow=11,457.06 cfs 7,069.226 af
Primary=11,457.06 cfs 7,069.226 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 7,344.097 af Average Runoff Depth = 9.32"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 520.17 cfs @ 3.23 hrs, Volume= 92.550 af, Depth= 9.64"

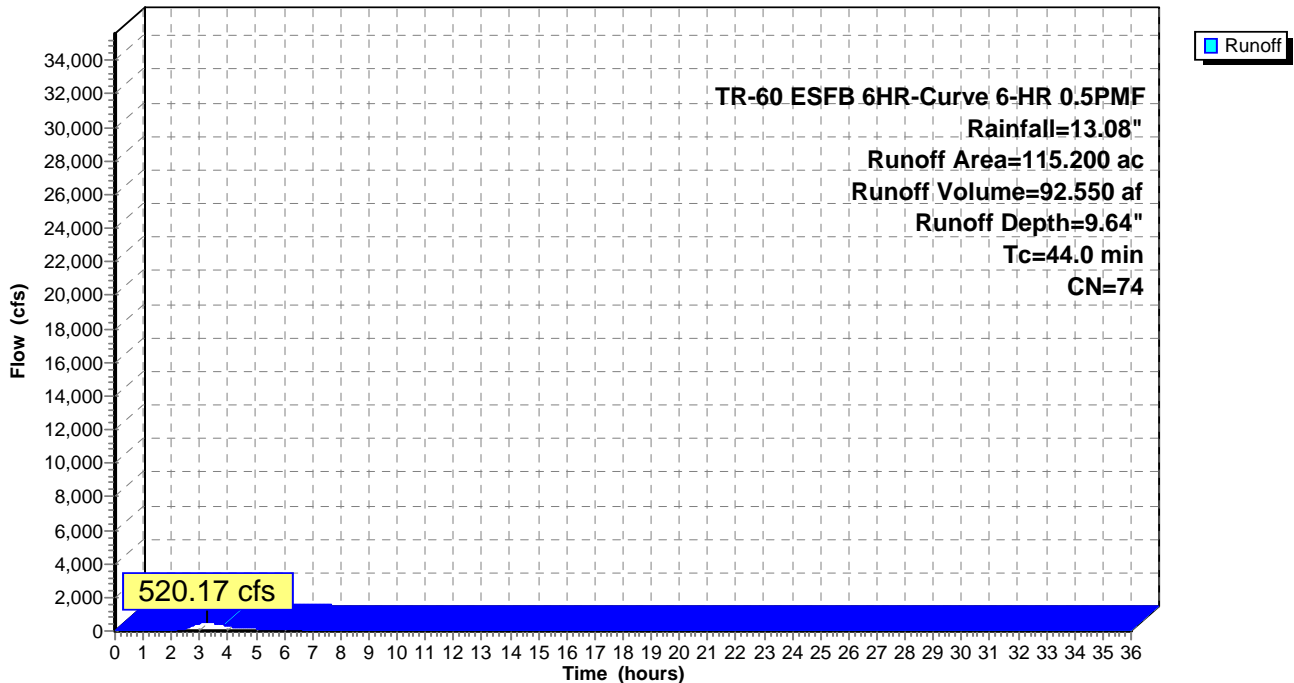
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 1,106.00 cfs @ 3.54 hrs, Volume= 219.198 af, Depth= 9.79"

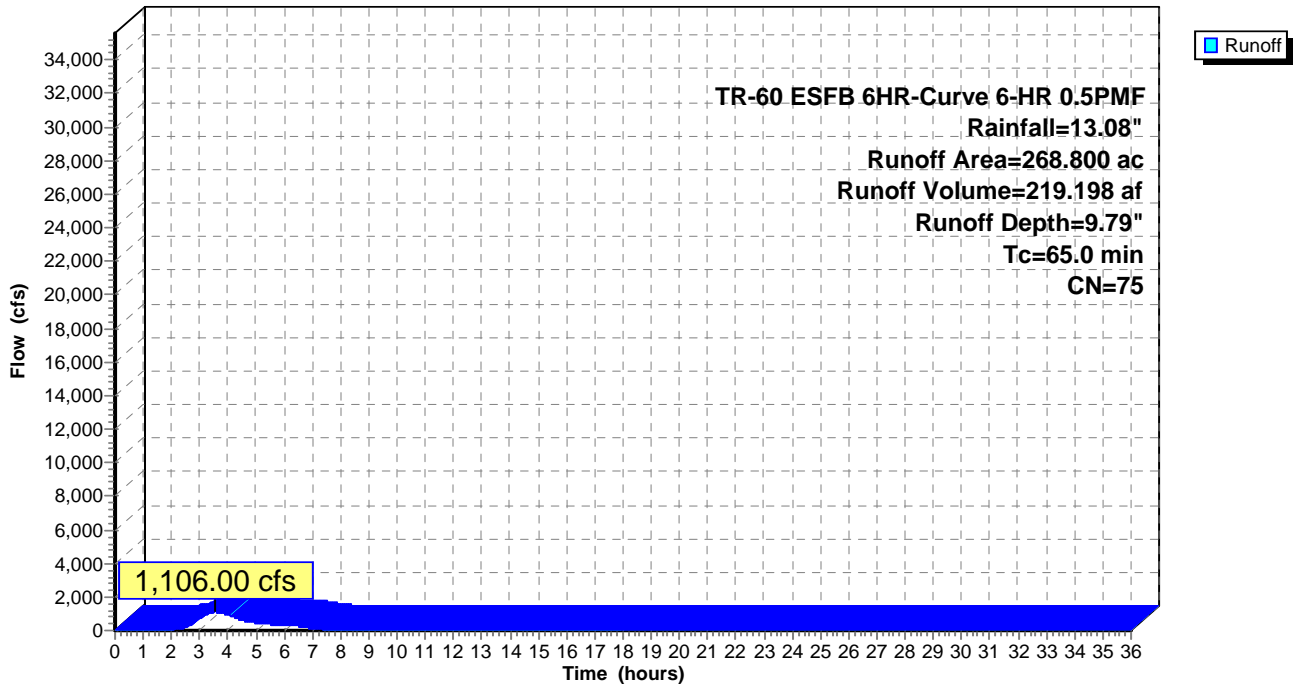
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 2,794.23 cfs @ 6.02 hrs, Volume= 1,057.009 af, Depth= 9.05"

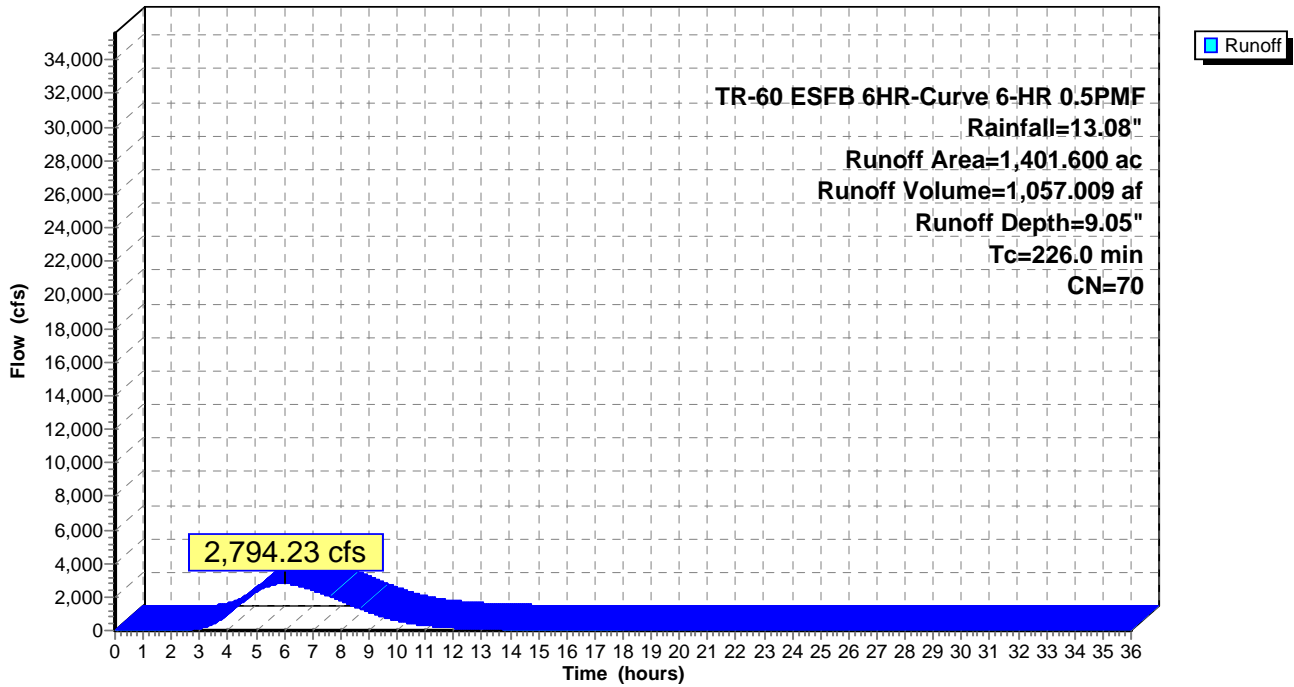
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 2,892.68 cfs @ 4.41 hrs, Volume= 783.786 af, Depth= 8.75"

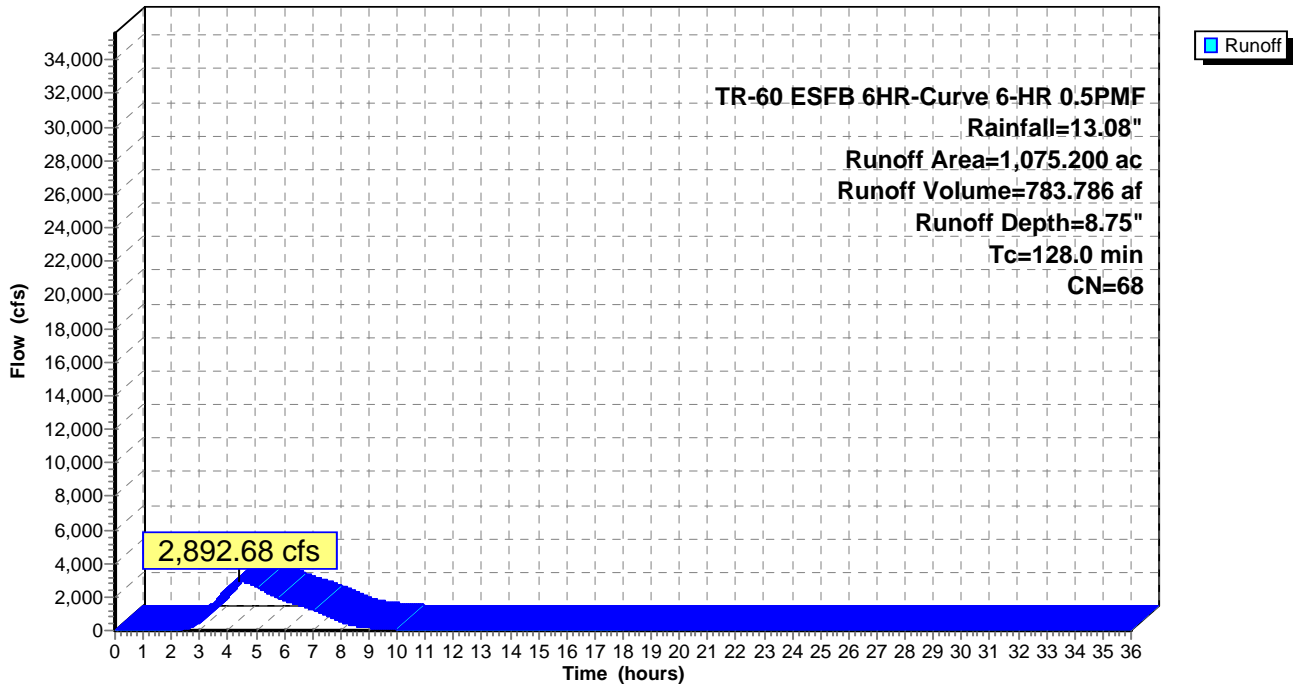
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 2,036.94 cfs @ 4.45 hrs, Volume= 554.655 af, Depth= 8.59"

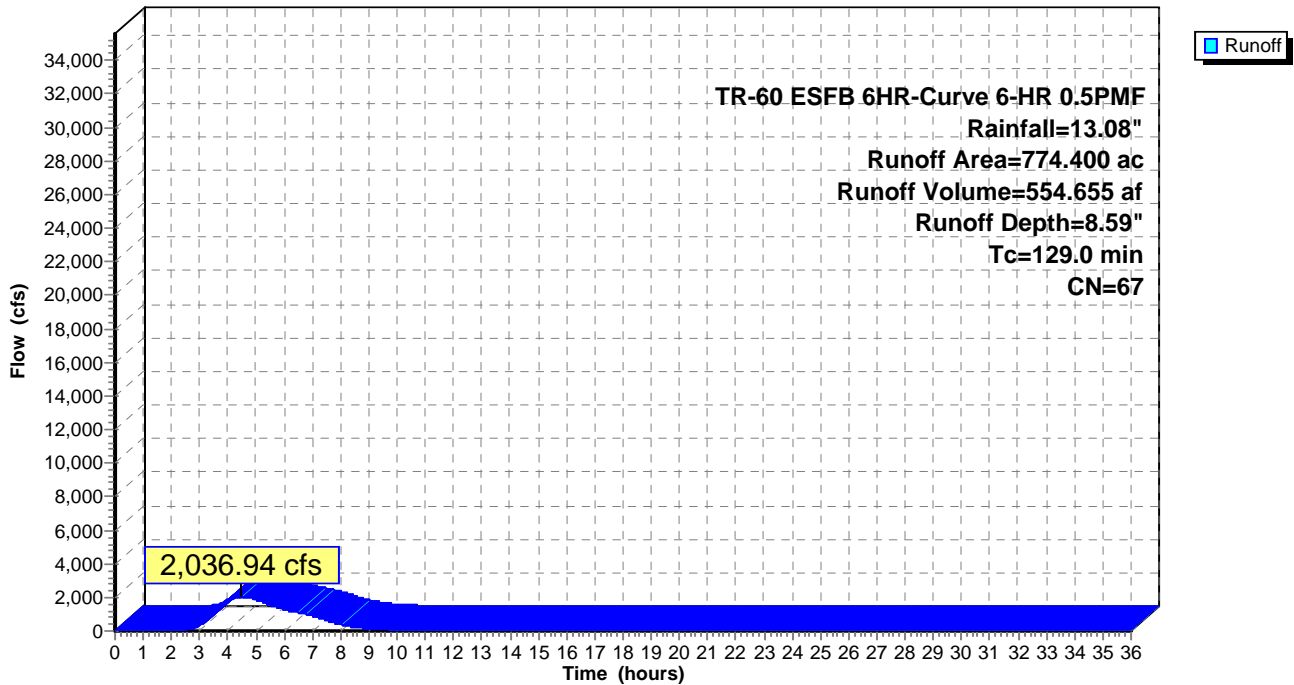
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 2,337.59 cfs @ 4.16 hrs, Volume= 581.009 af, Depth= 9.64"

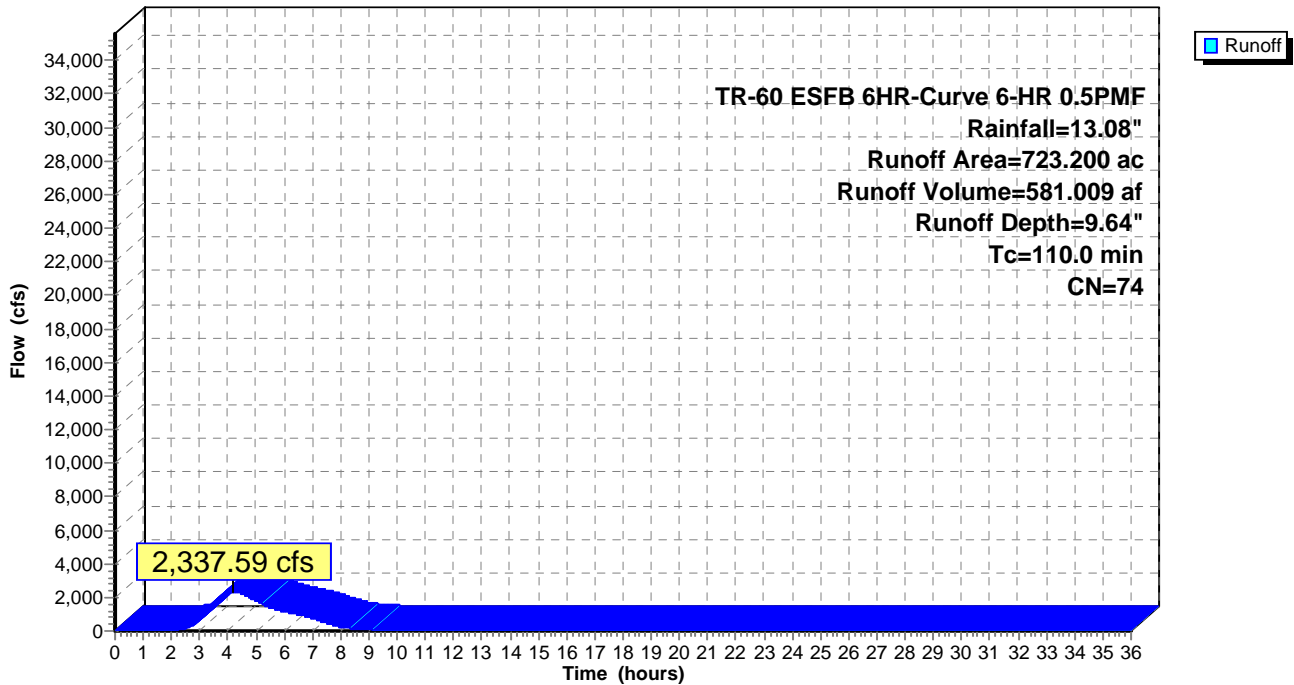
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 2,916.69 cfs @ 3.61 hrs, Volume= 600.184 af, Depth= 9.79"

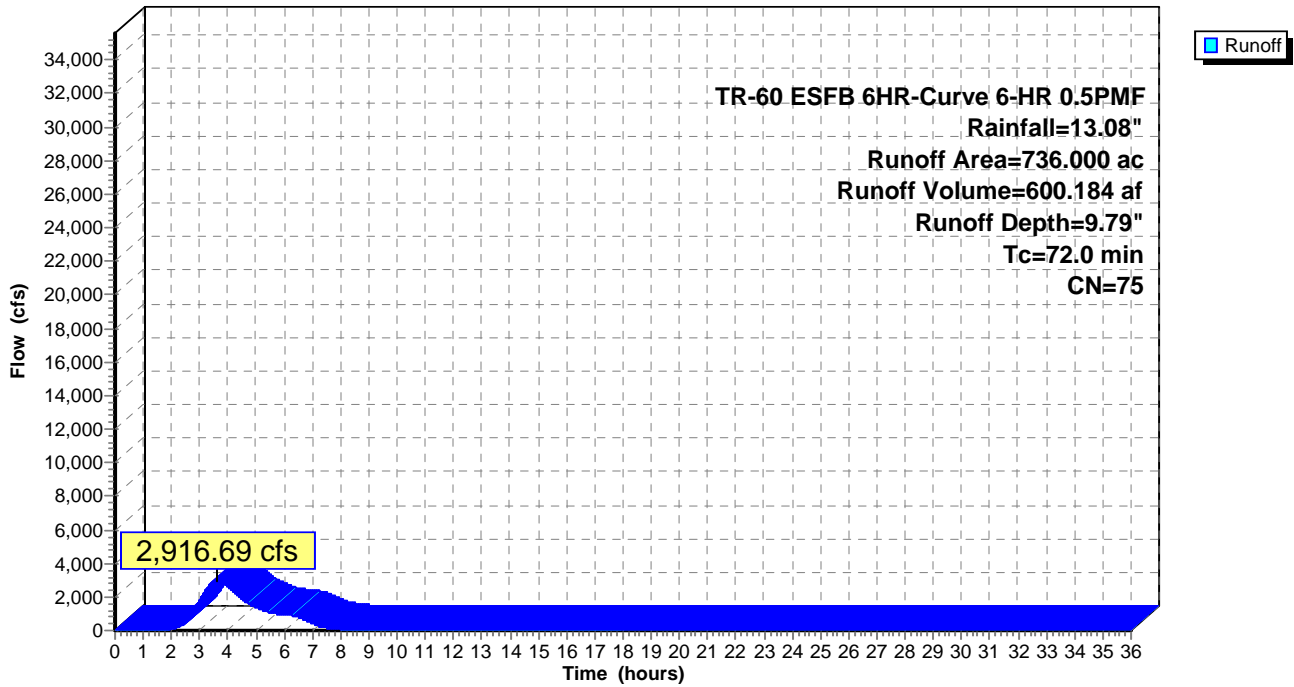
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 2,798.94 cfs @ 3.72 hrs, Volume= 593.287 af, Depth=10.49"

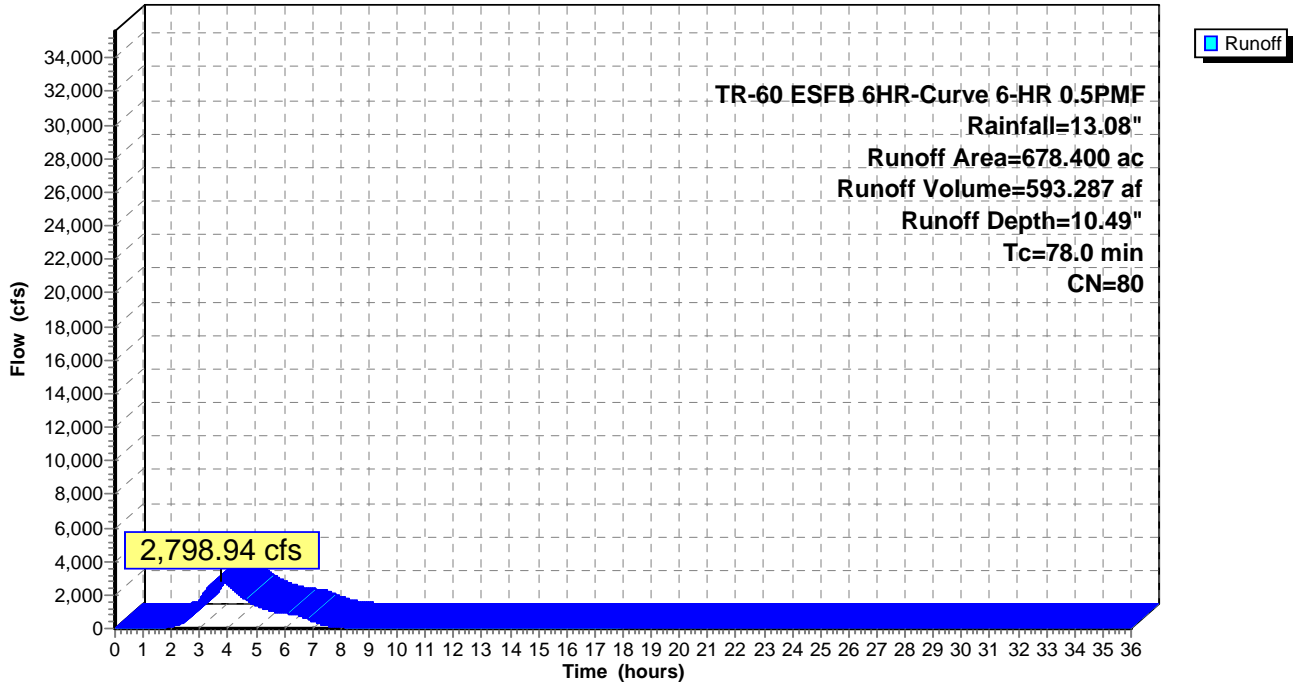
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 2,625.65 cfs @ 4.83 hrs, Volume= 792.625 af, Depth= 8.90"

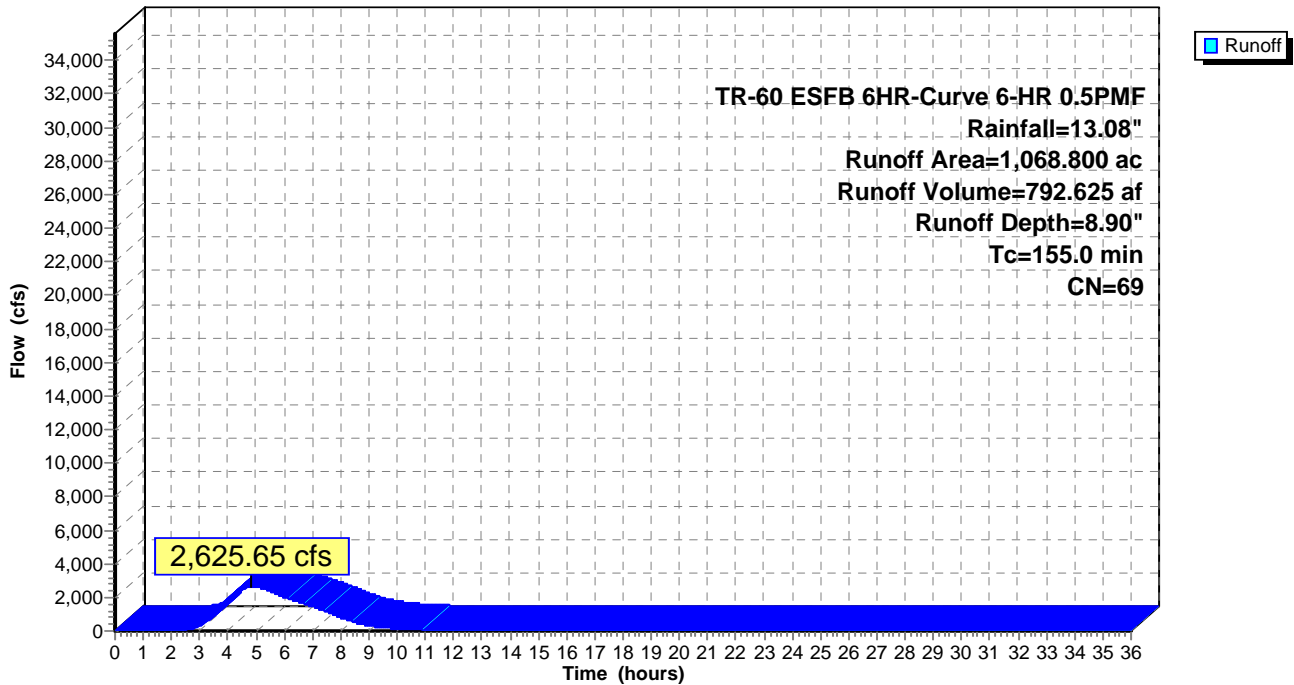
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 5,319.68 cfs @ 4.85 hrs, Volume= 1,602.232 af, Depth= 9.79"

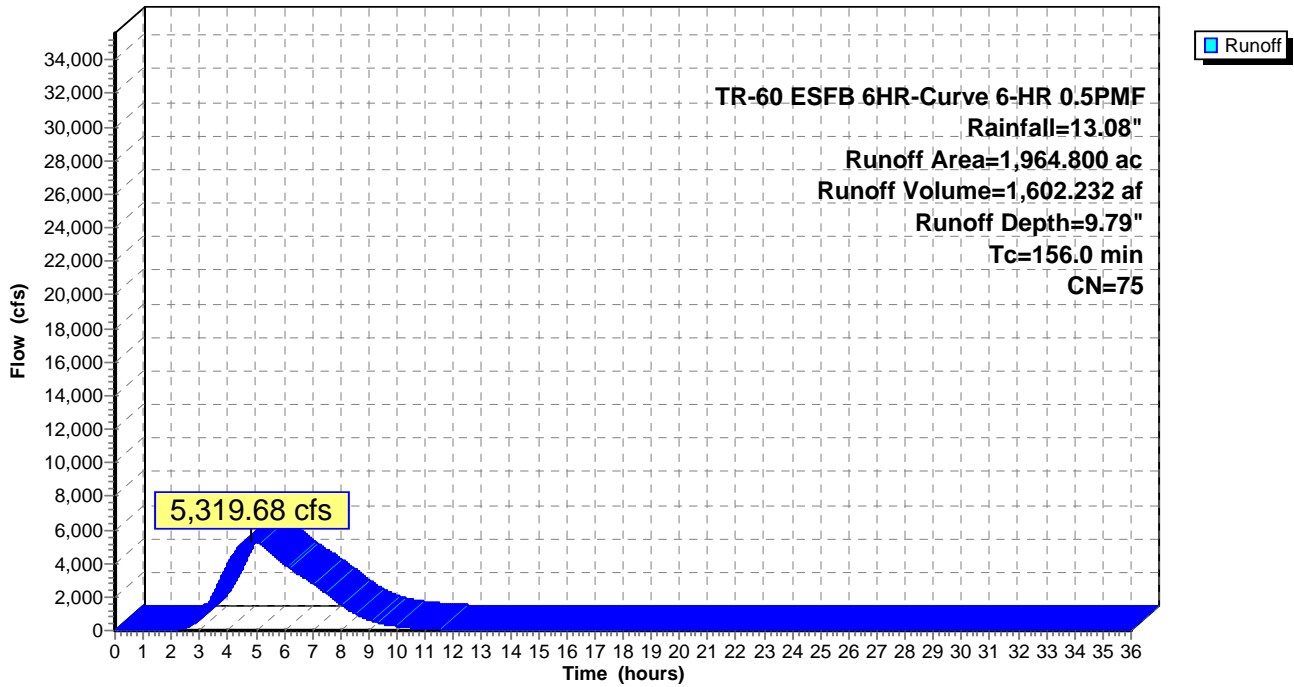
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 1,573.75 cfs @ 4.86 hrs, Volume= 467.561 af, Depth= 8.59"

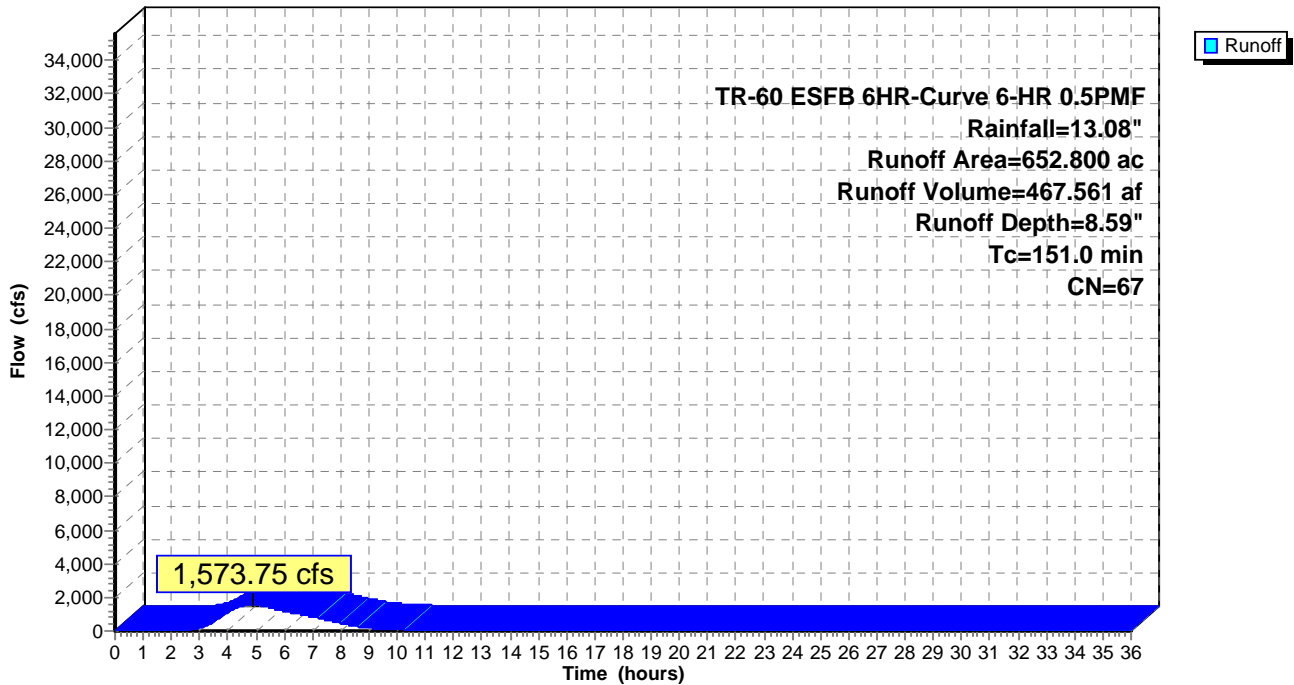
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



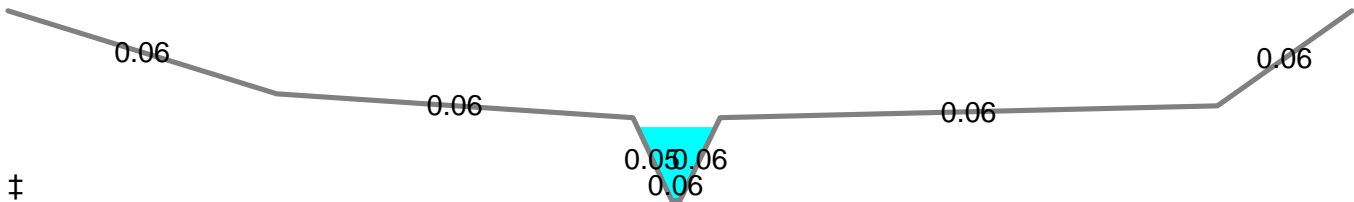
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 9.83" for 6-HR 0.5PMF event
 Inflow = 1,854.00 cfs @ 8.20 hrs, Volume= 1,462.306 af
 Outflow = 1,840.29 cfs @ 8.41 hrs, Volume= 1,455.666 af, Atten= 1%, Lag= 12.9 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.24 fps, Min. Travel Time= 15.9 min
 Avg. Velocity = 6.25 fps, Avg. Travel Time= 23.5 min

Peak Storage= 1,752,639 cf @ 8.41 hrs
 Average Depth at Peak Storage= 6.20'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

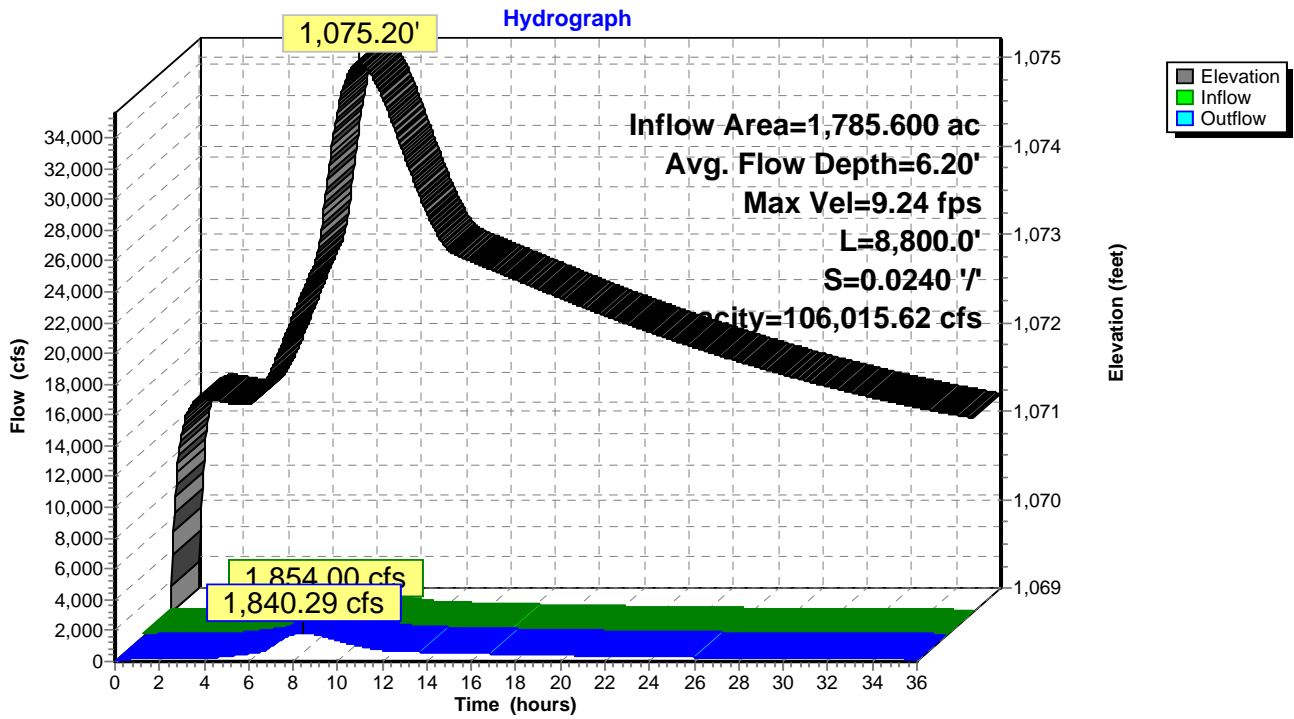
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



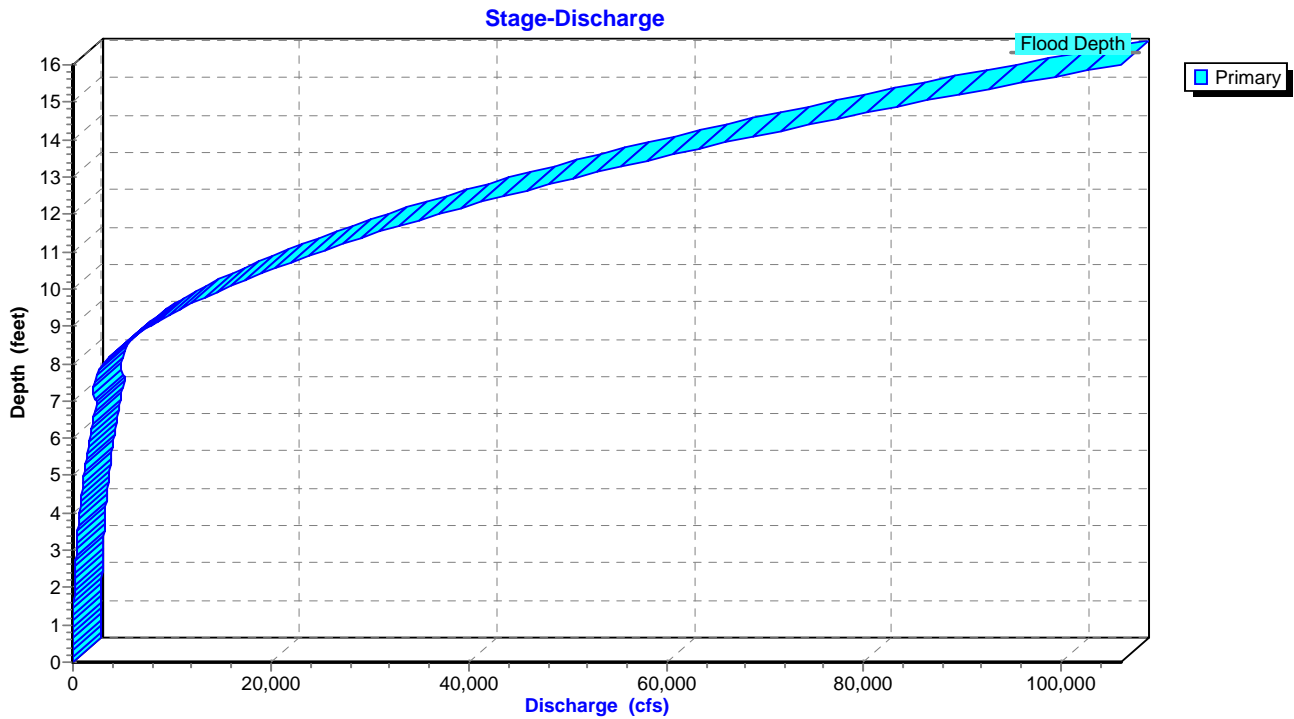
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

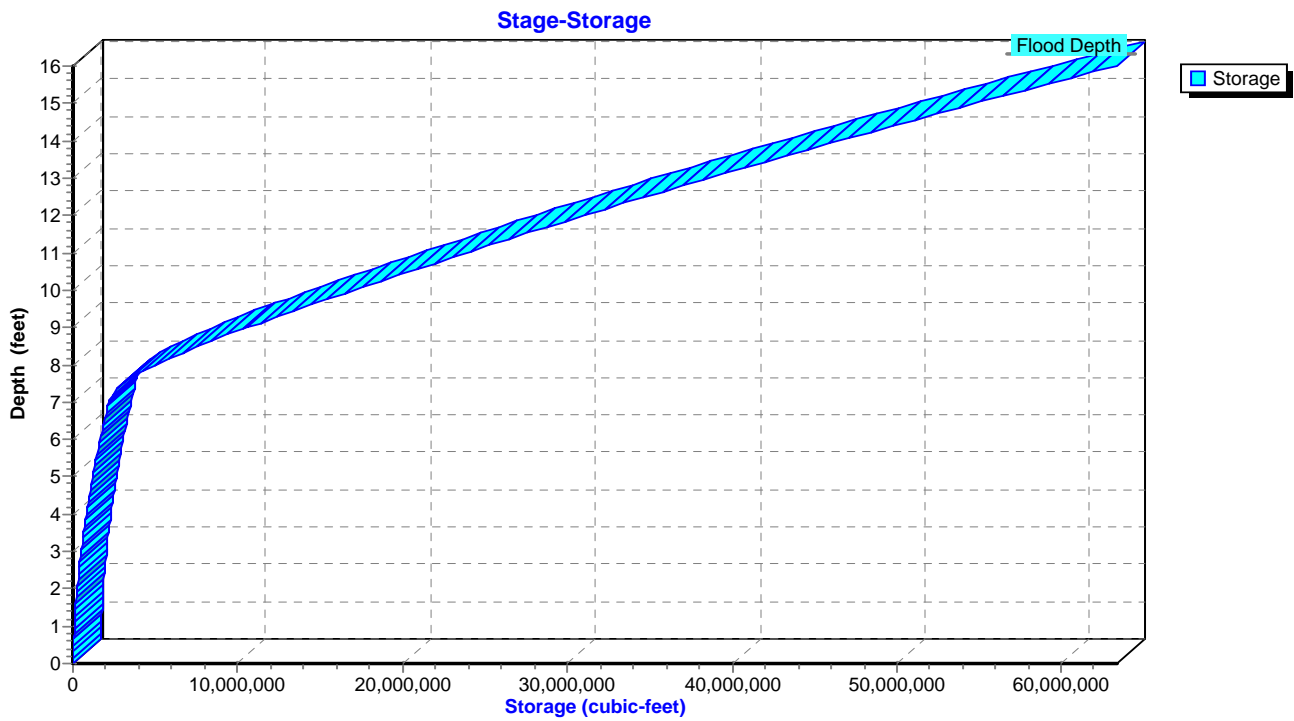
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



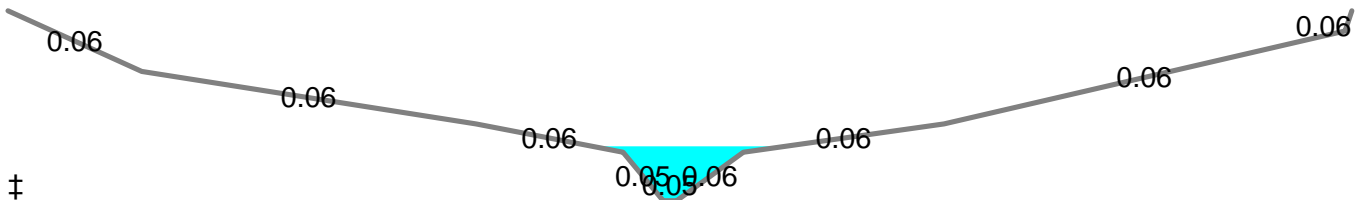
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 9.39" for 6-HR 0.5PMF event
 Inflow = 3,164.17 cfs @ 4.56 hrs, Volume= 2,239.178 af
 Outflow = 2,981.72 cfs @ 4.99 hrs, Volume= 2,228.159 af, Atten= 6%, Lag= 25.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.92 fps, Min. Travel Time= 25.1 min
 Avg. Velocity = 2.71 fps, Avg. Travel Time= 36.3 min

Peak Storage= 4,547,317 cf @ 4.99 hrs
 Average Depth at Peak Storage= 13.45'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

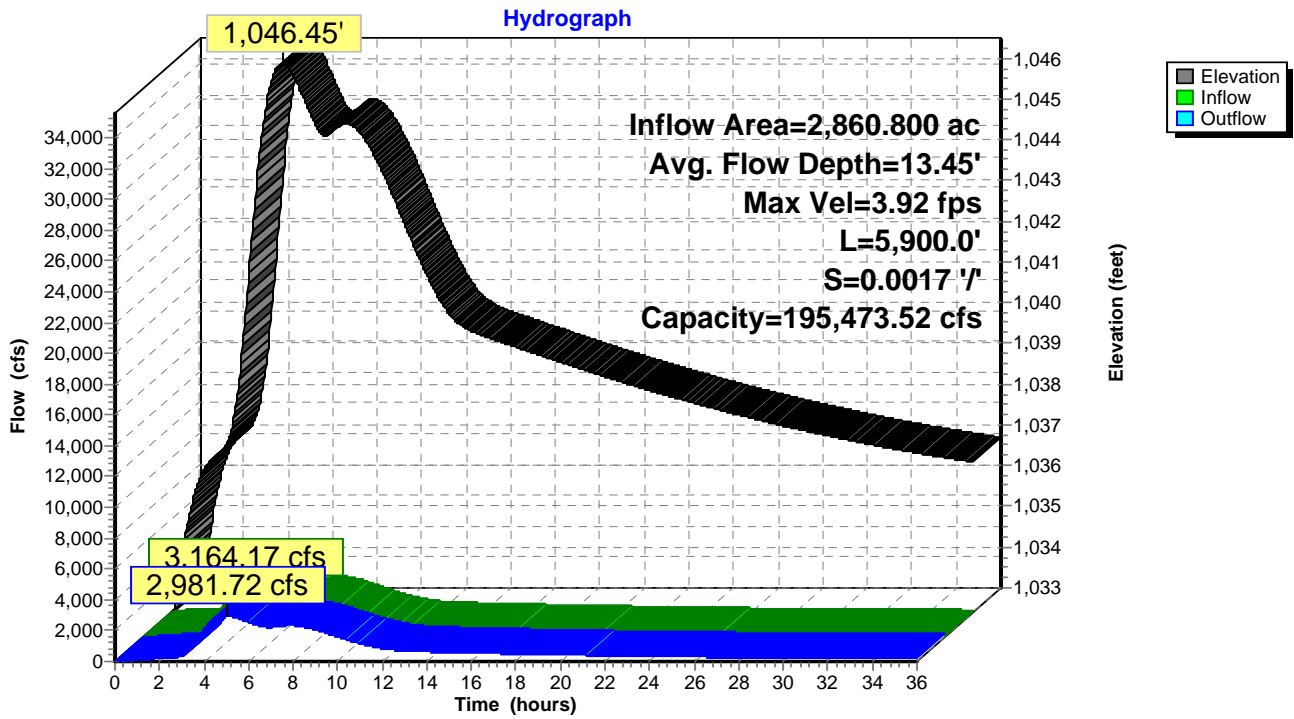
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



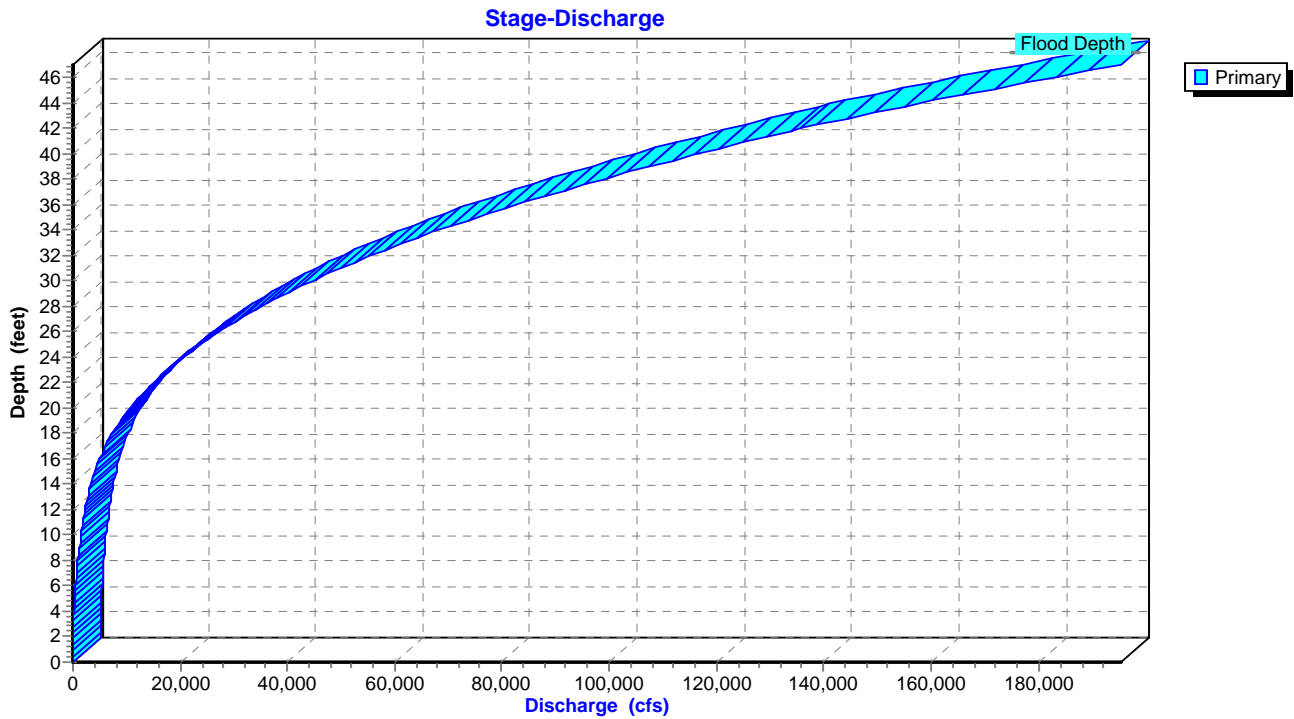
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

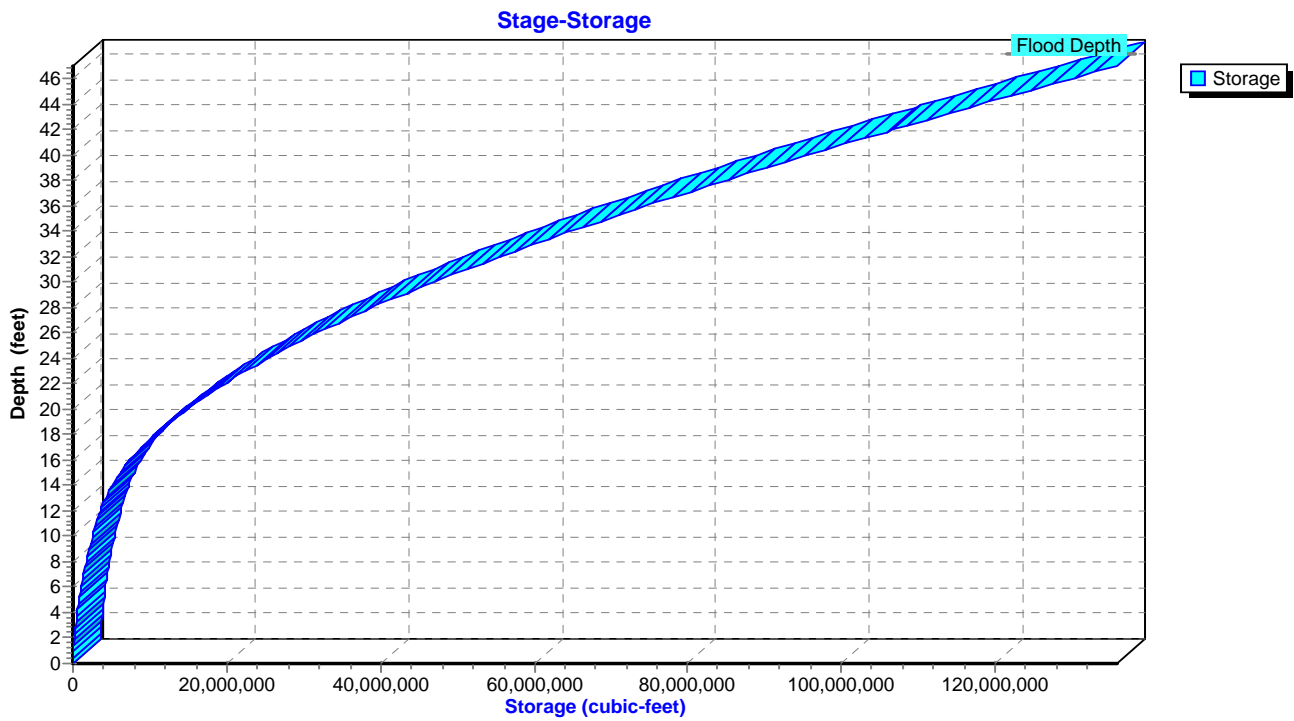
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



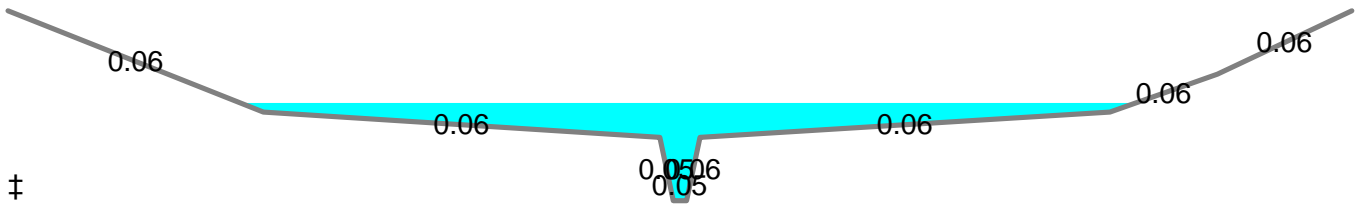
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 8.18" for 6-HR 0.5PMF event
 Inflow = 2,725.66 cfs @ 7.49 hrs, Volume= 1,338.725 af
 Outflow = 2,723.21 cfs @ 7.57 hrs, Volume= 1,337.936 af, Atten= 0%, Lag= 4.9 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.28 fps, Min. Travel Time= 4.6 min
 Avg. Velocity = 2.41 fps, Avg. Travel Time= 6.2 min

Peak Storage= 1,106,781 cf @ 7.57 hrs
 Average Depth at Peak Storage= 7.72'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

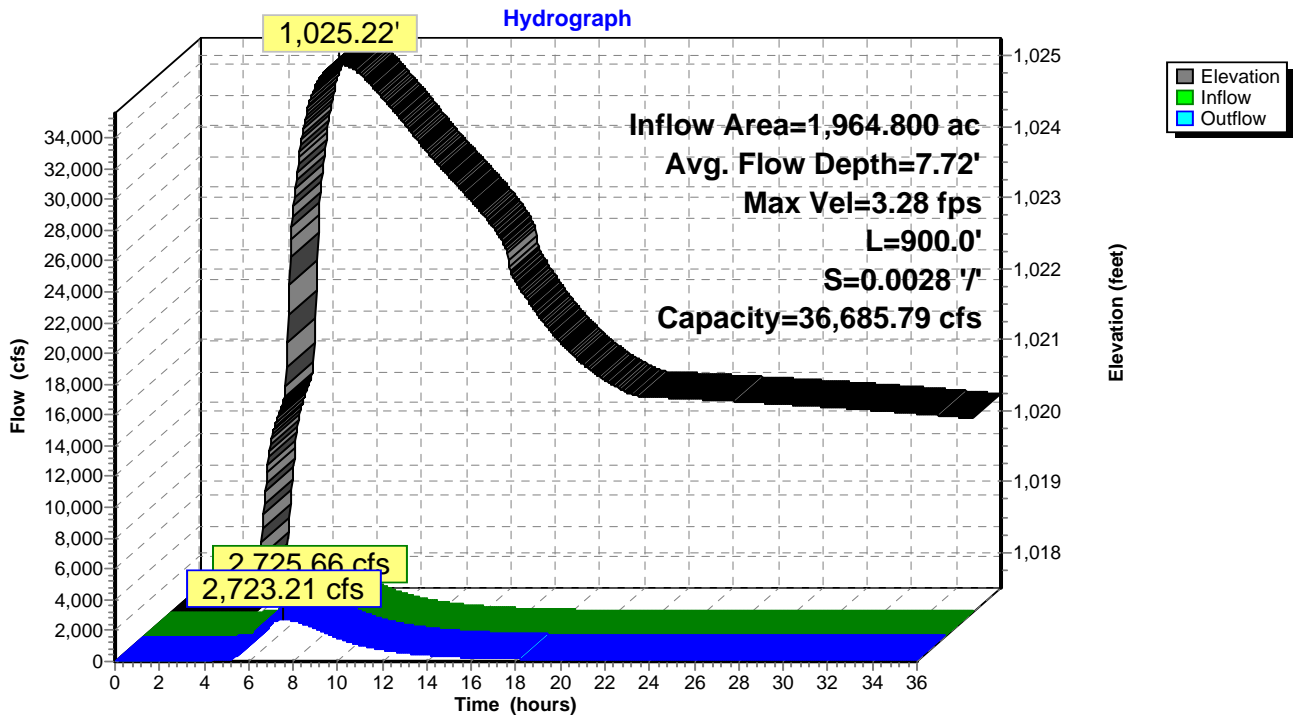
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



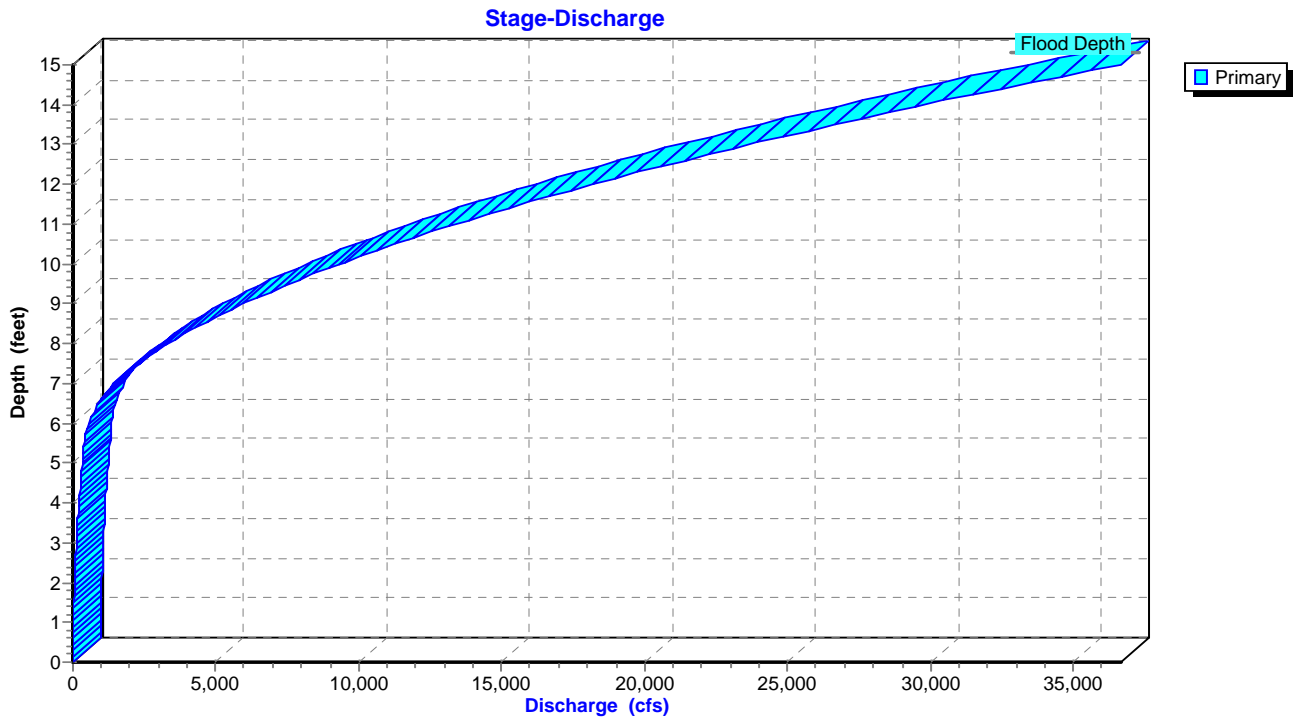
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

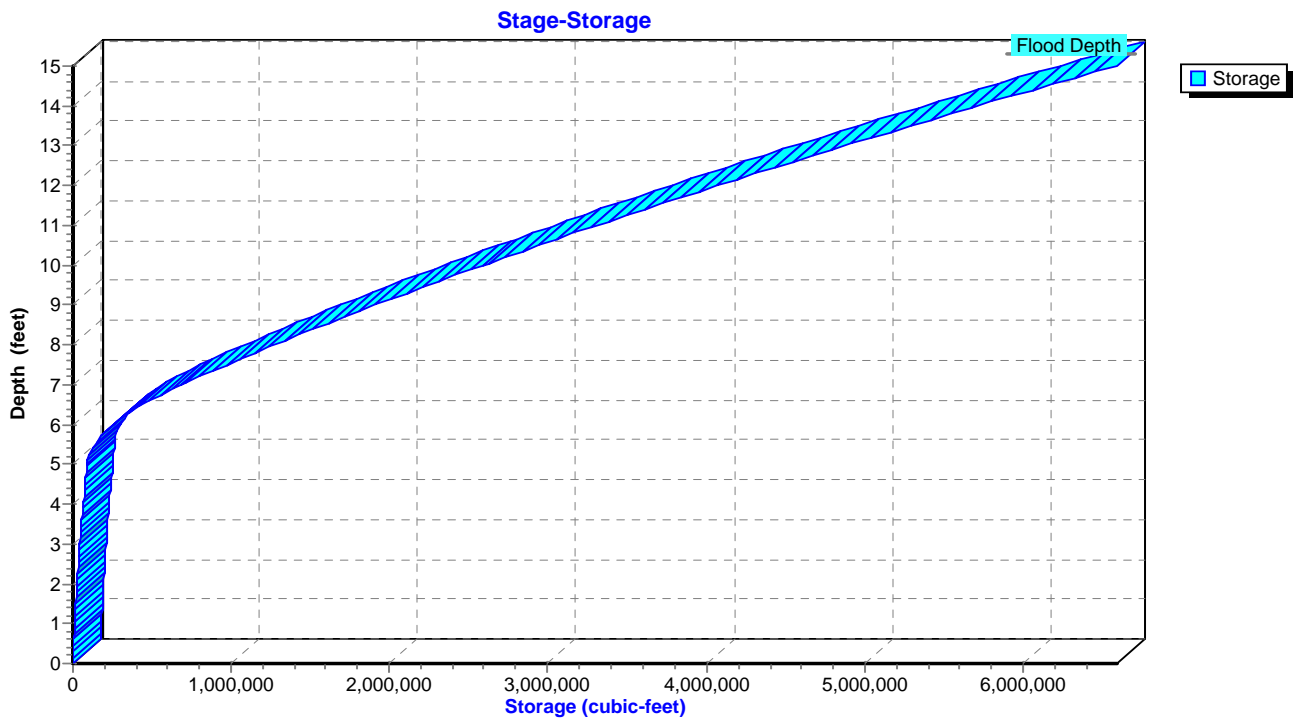
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



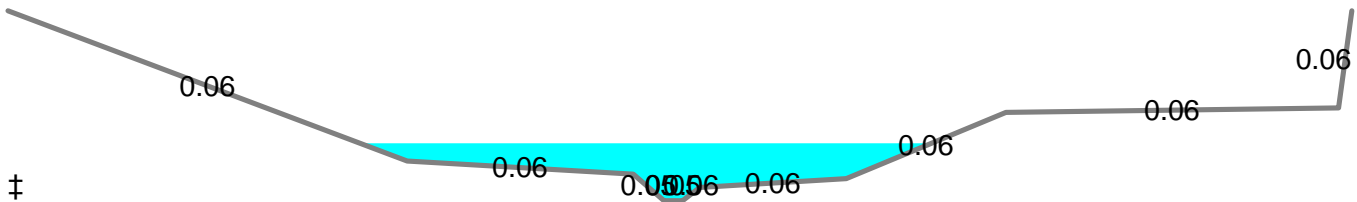
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 8.82" for 6-HR 0.5PMF event
 Inflow = 9,207.64 cfs @ 4.86 hrs, Volume= 5,380.117 af
 Outflow = 8,338.98 cfs @ 6.33 hrs, Volume= 5,338.904 af, Atten= 9%, Lag= 88.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.96 fps, Min. Travel Time= 49.5 min
 Avg. Velocity = 1.79 fps, Avg. Travel Time= 82.1 min

Peak Storage= 24,765,656 cf @ 6.33 hrs
 Average Depth at Peak Storage= 13.00'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

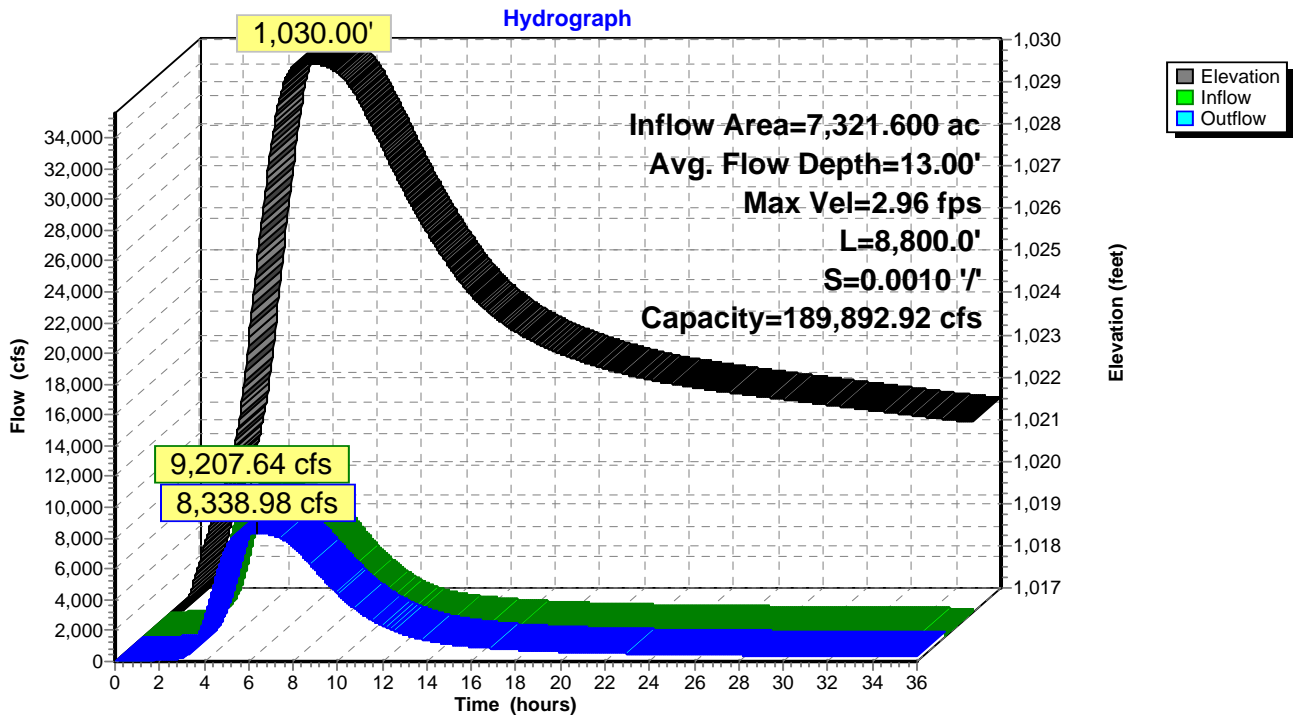
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



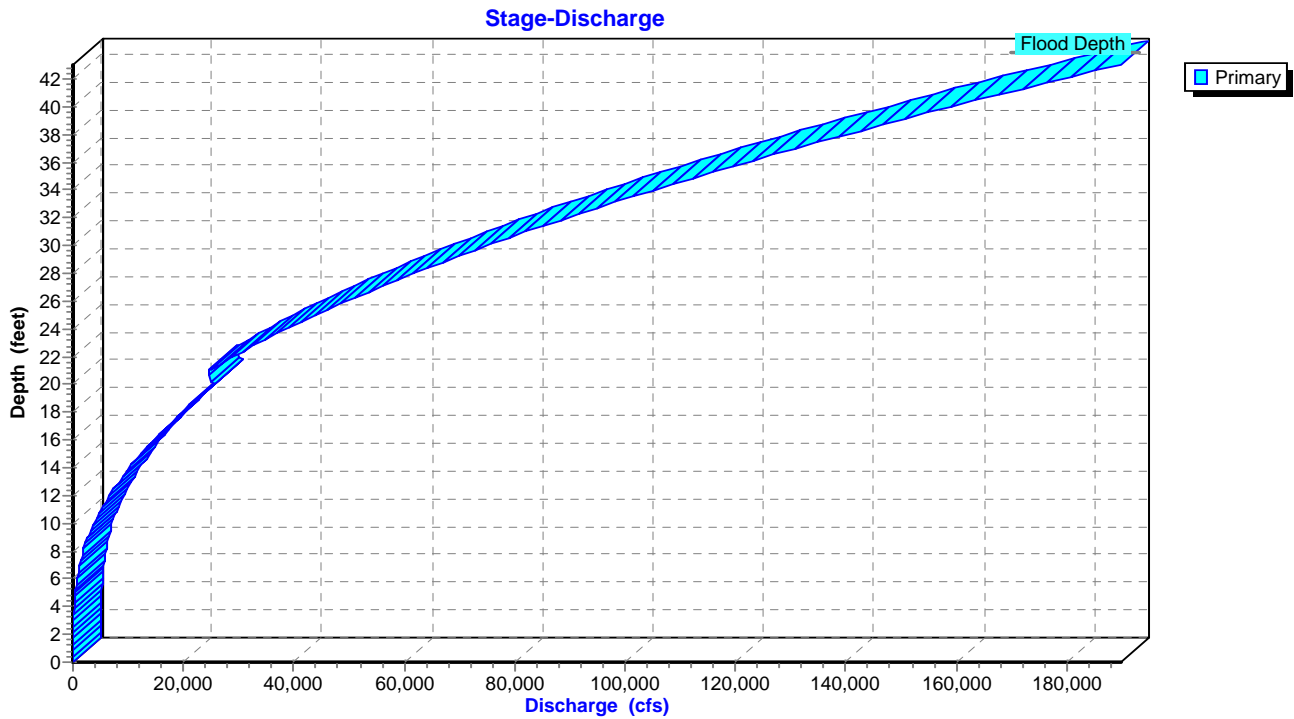
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

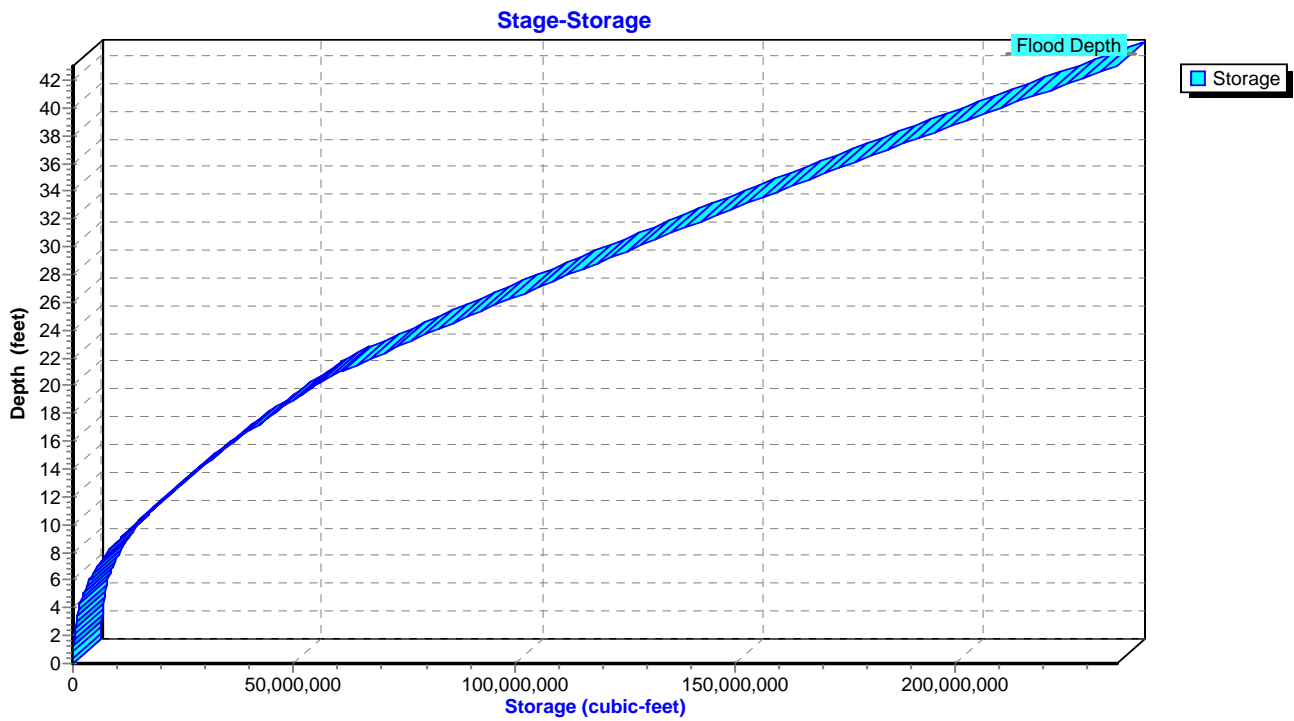
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



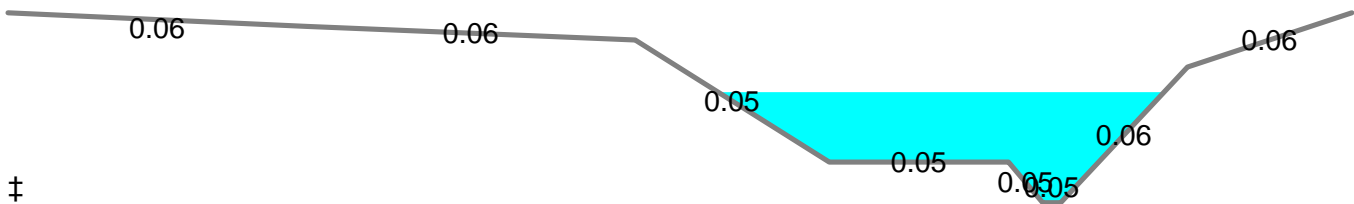
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 8.91" for 6-HR 0.5PMF event
 Inflow = 10,719.08 cfs @ 5.35 hrs, Volume= 6,519.616 af
 Outflow = 10,497.54 cfs @ 5.86 hrs, Volume= 6,476.192 af, Atten= 2%, Lag= 30.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.91 fps, Min. Travel Time= 32.0 min
 Avg. Velocity = 1.93 fps, Avg. Travel Time= 64.9 min

Peak Storage= 20,136,097 cf @ 5.86 hrs
 Average Depth at Peak Storage= 16.30'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

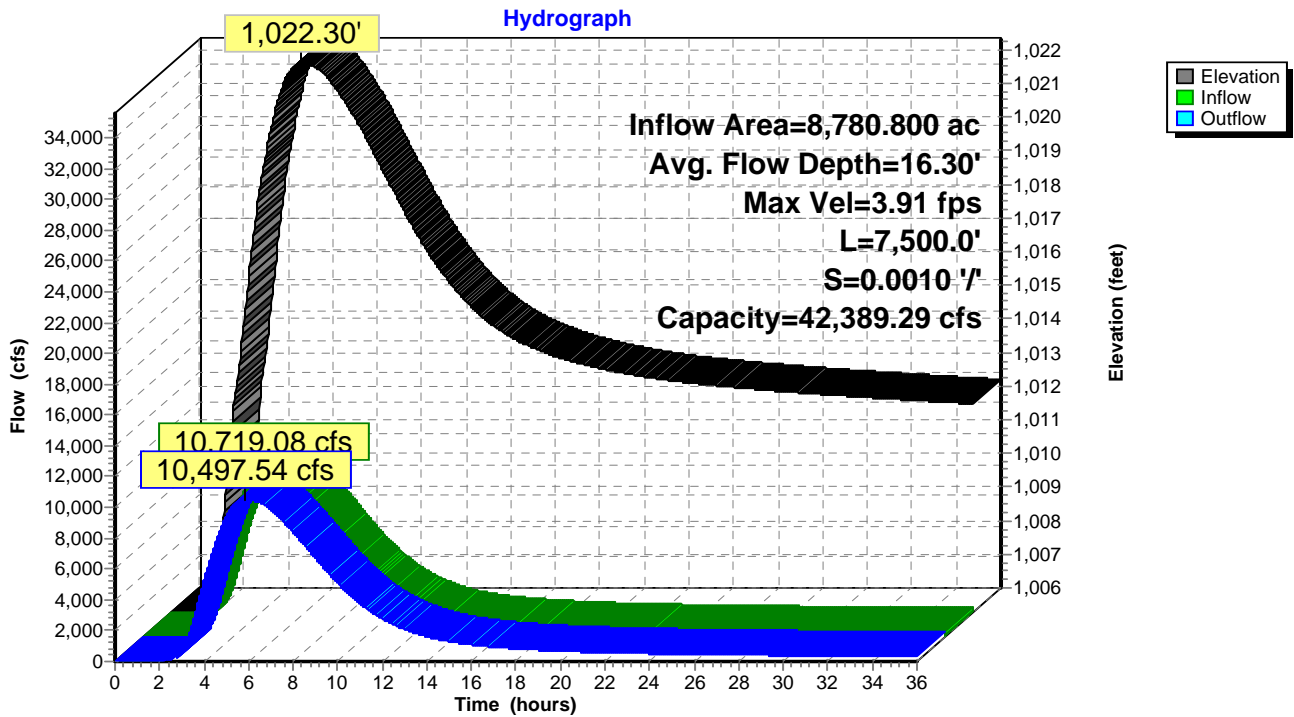
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



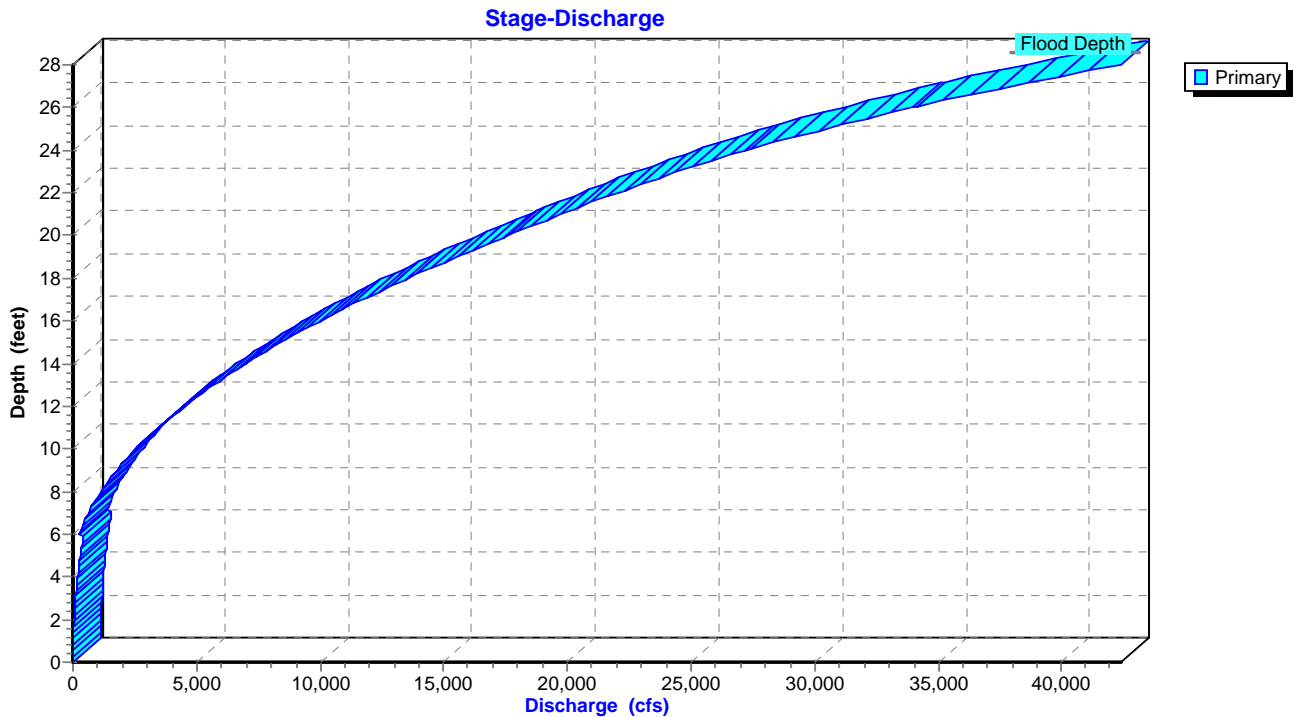
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

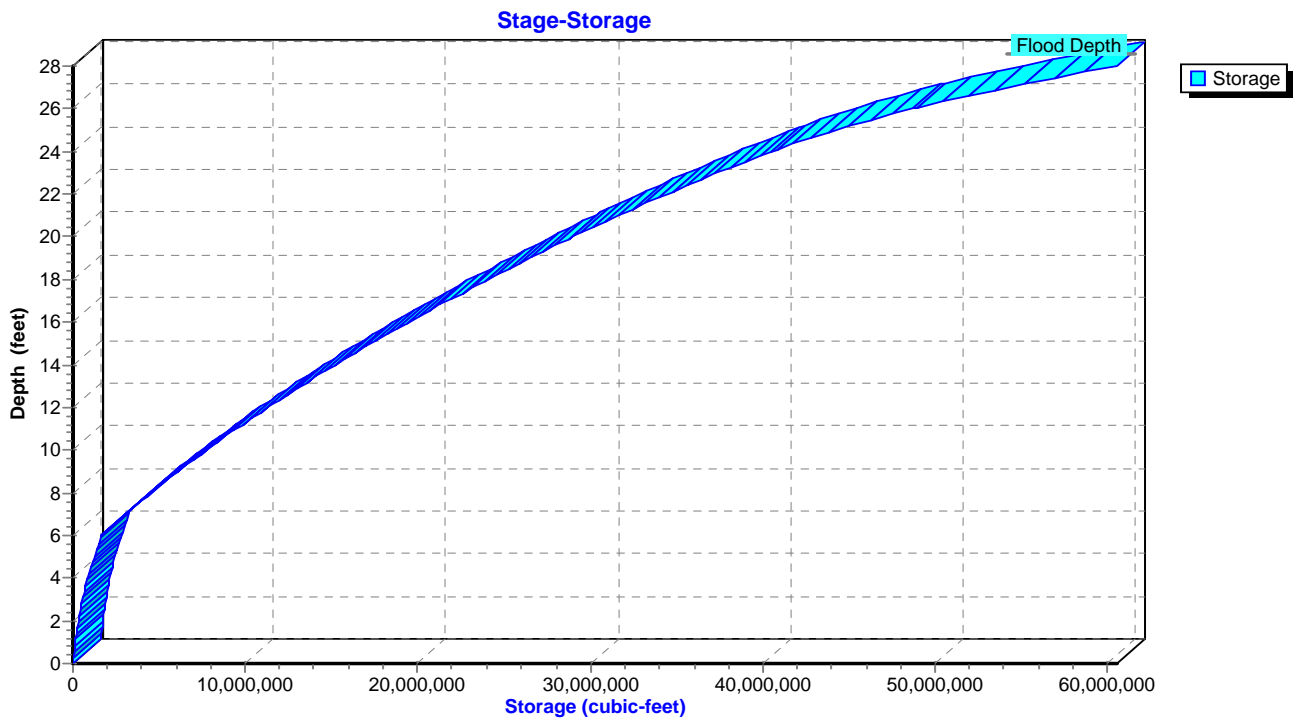
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



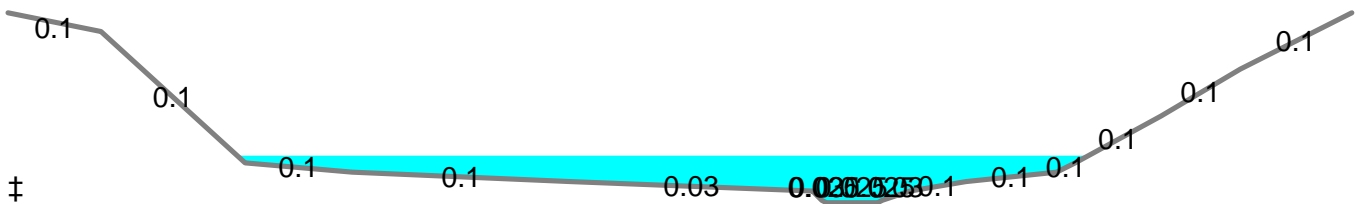
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 8.95" for 6-HR 0.5PMF event
 Inflow = 11,414.16 cfs @ 5.97 hrs, Volume= 7,053.912 af
 Outflow = 11,414.17 cfs @ 5.98 hrs, Volume= 7,053.787 af, Atten= 0%, Lag= 0.5 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 11.52 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 9.27 fps, Avg. Travel Time= 0.8 min

Peak Storage= 445,989 cf @ 5.98 hrs
 Average Depth at Peak Storage= 10.04'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

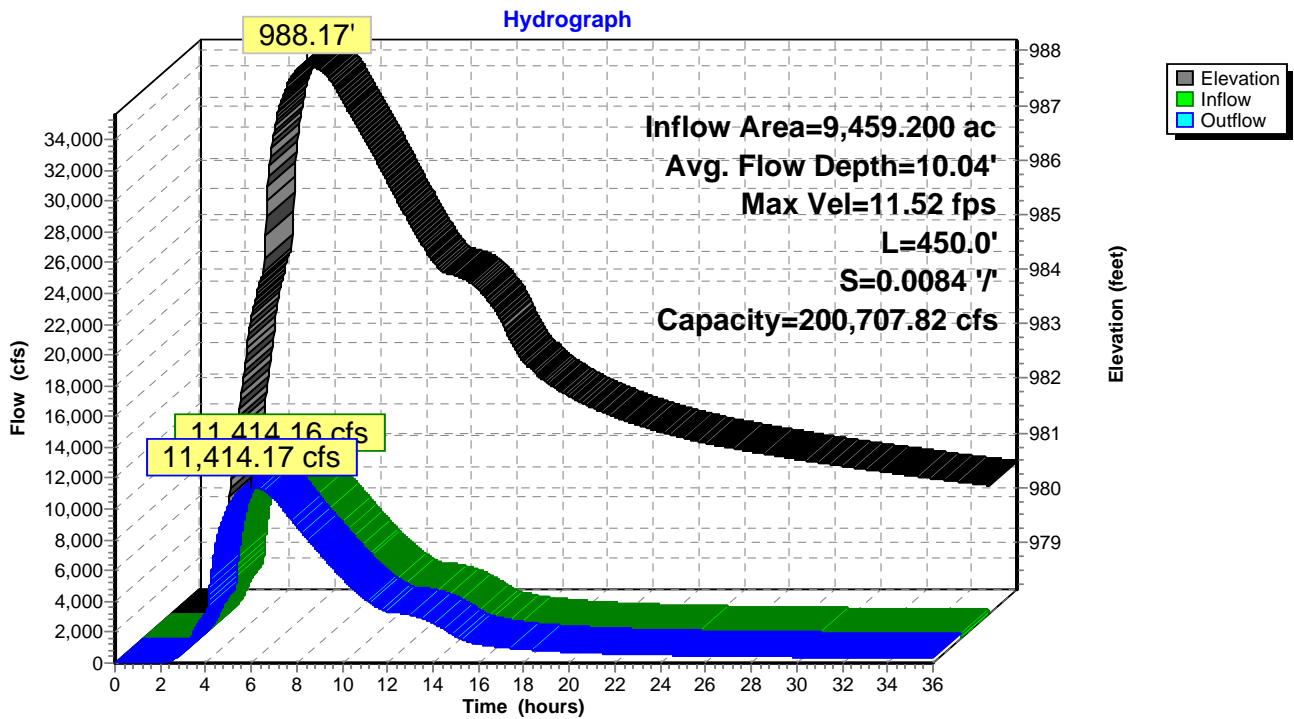
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



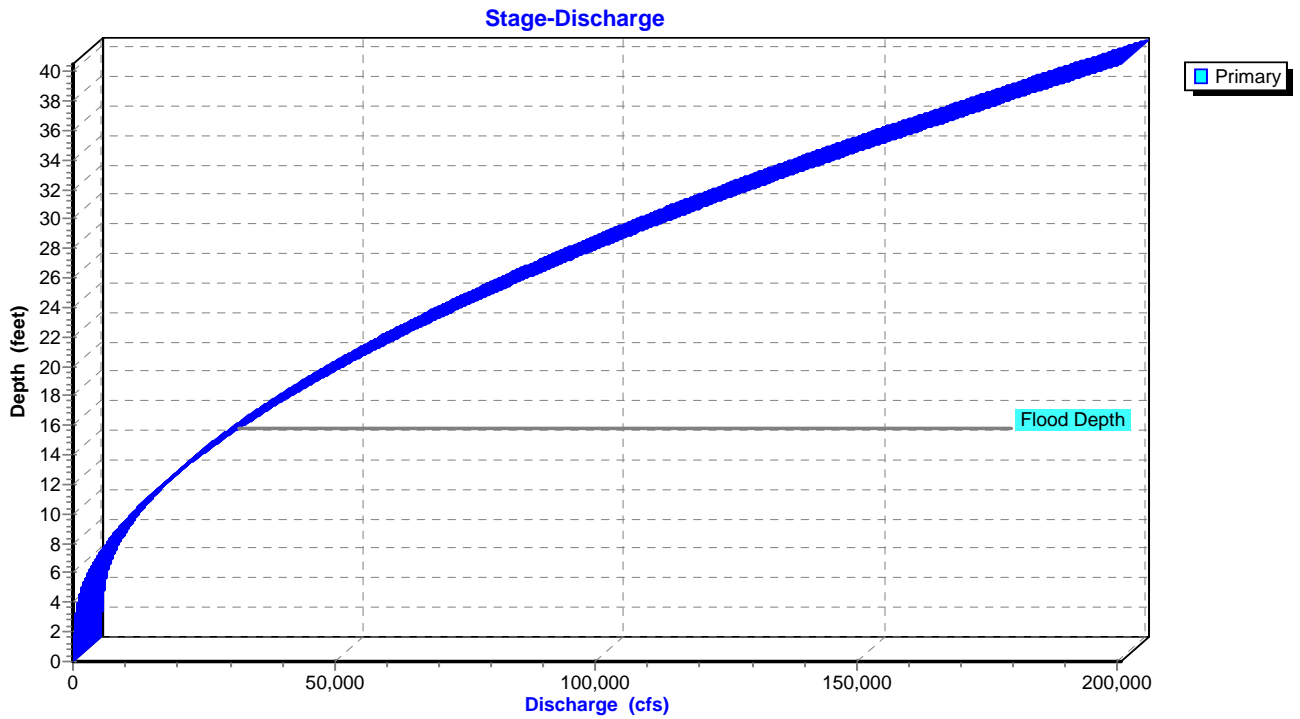
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

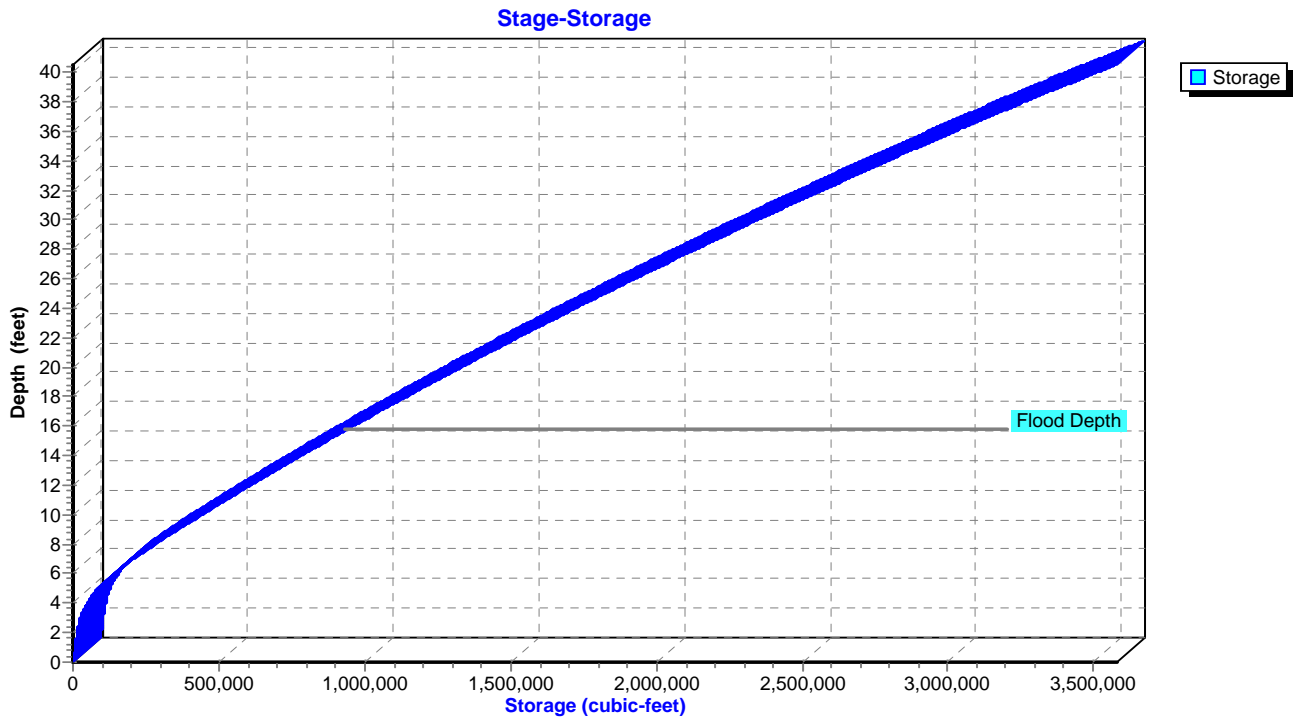
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

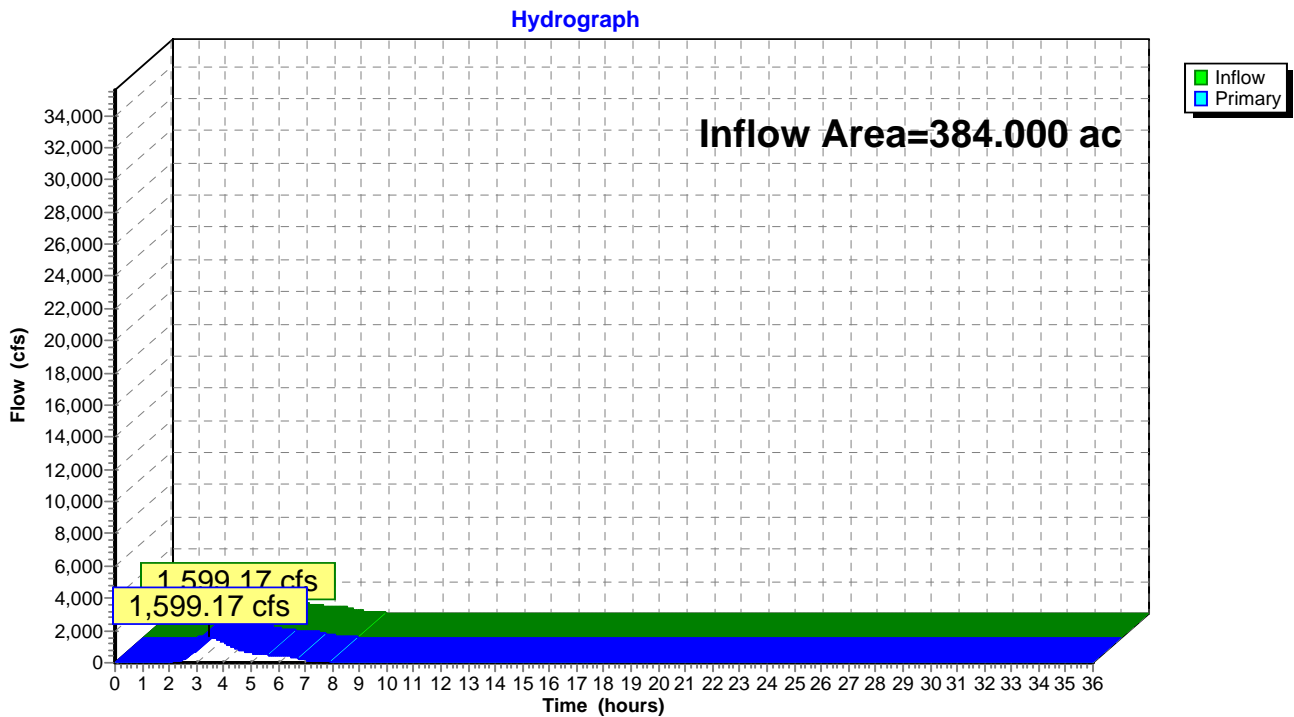


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 9.74" for 6-HR 0.5PMF event
Inflow = 1,599.17 cfs @ 3.47 hrs, Volume= 311.630 af
Primary = 1,599.17 cfs @ 3.48 hrs, Volume= 311.630 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 8.97" for 6-HR 0.5PMF event
 Inflow = 11,457.06 cfs @ 5.69 hrs, Volume= 7,068.974 af
 Outflow = 11,415.24 cfs @ 5.93 hrs, Volume= 7,055.537 af, Atten= 0%, Lag= 14.2 min
 Primary = 3,166.07 cfs @ 3.82 hrs, Volume= 3,062.293 af
 Secondary = 7,478.78 cfs @ 5.93 hrs, Volume= 3,620.309 af
 Tertiary = 996.25 cfs @ 5.94 hrs, Volume= 372.936 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,012.56' @ 5.95 hrs Surf.Area= 46.832 ac Storage= 287.342 af (226.380 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 34.3 min calculated for 6,992.633 af (99% of inflow)
 Center-of-Mass det. time= 14.7 min (586.9 - 572.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

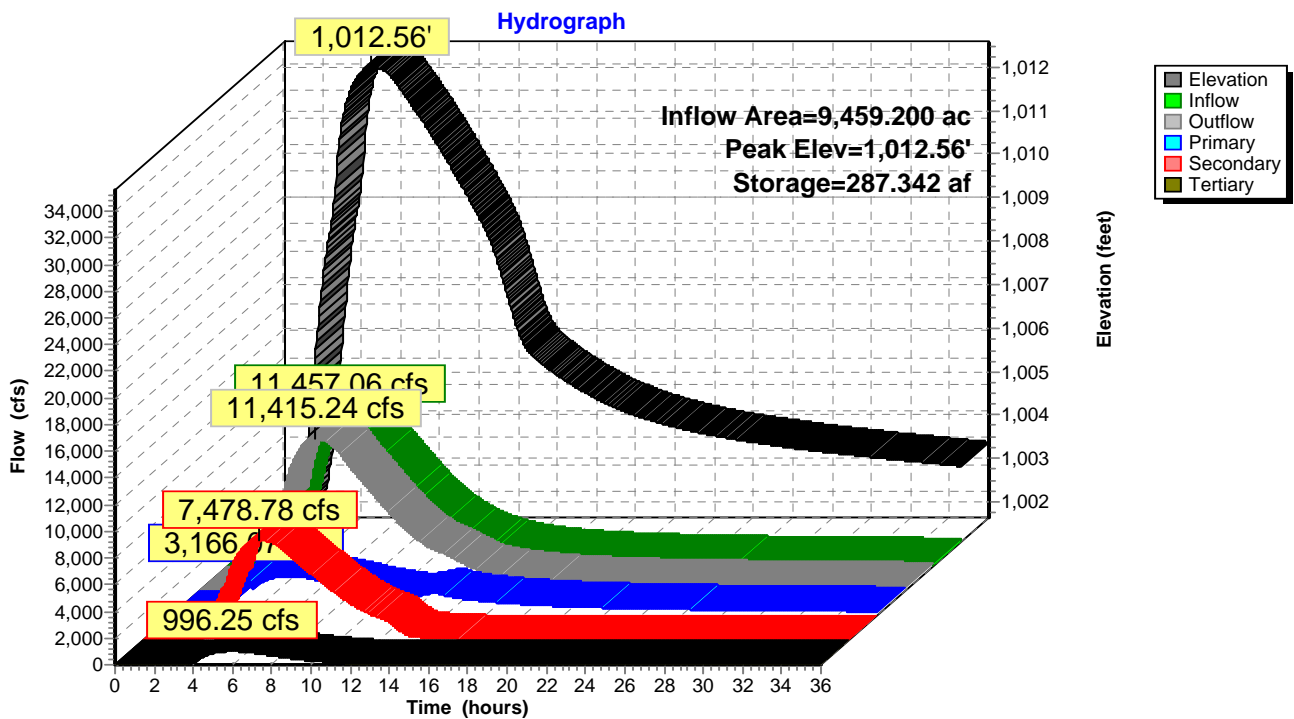
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

Primary OutFlow Max=3,147.44 cfs @ 3.82 hrs HW=1,008.80' TW=1,002.29' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 3,147.44 cfs @ 8.79 fps)

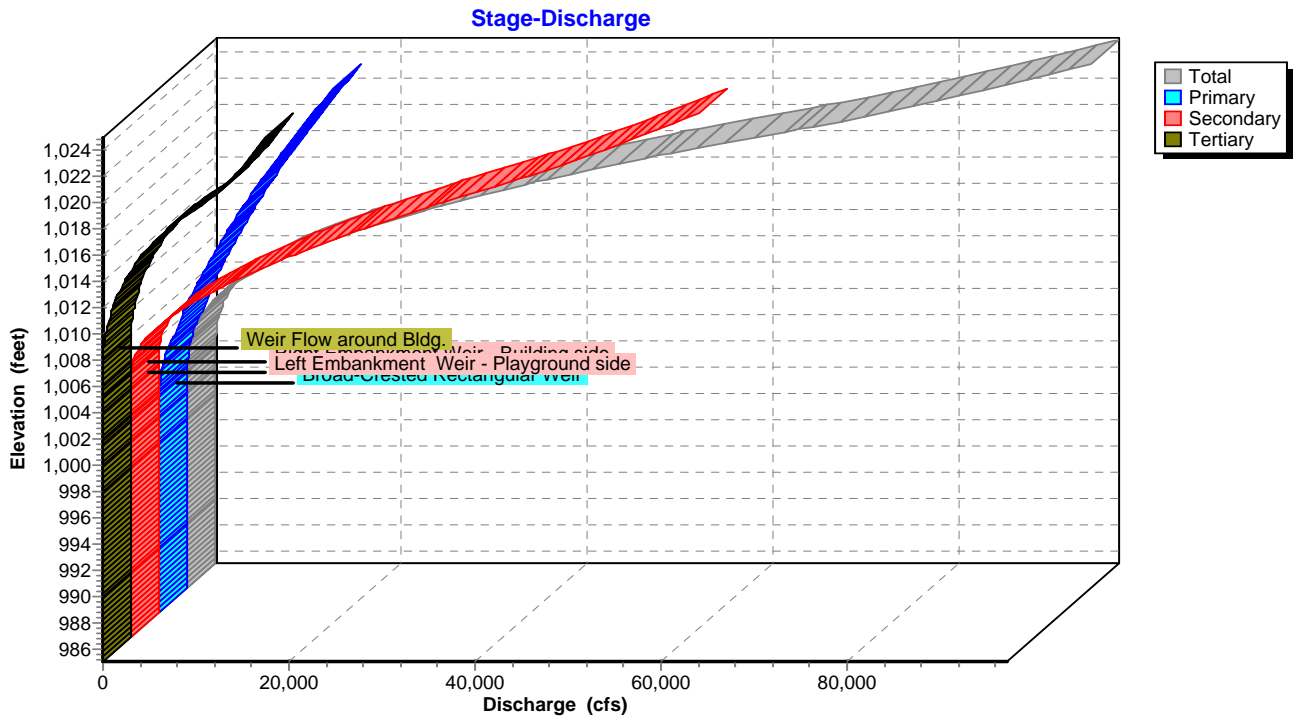
Secondary OutFlow Max=7,478.28 cfs @ 5.93 hrs HW=1,012.56' TW=1,011.38' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 2,552.50 cfs @ 5.02 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 4,925.77 cfs @ 4.95 fps)

Tertiary OutFlow Max=996.20 cfs @ 5.94 hrs HW=1,012.56' TW=1,011.38' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Weir Controls 996.20 cfs @ 2.35 fps)

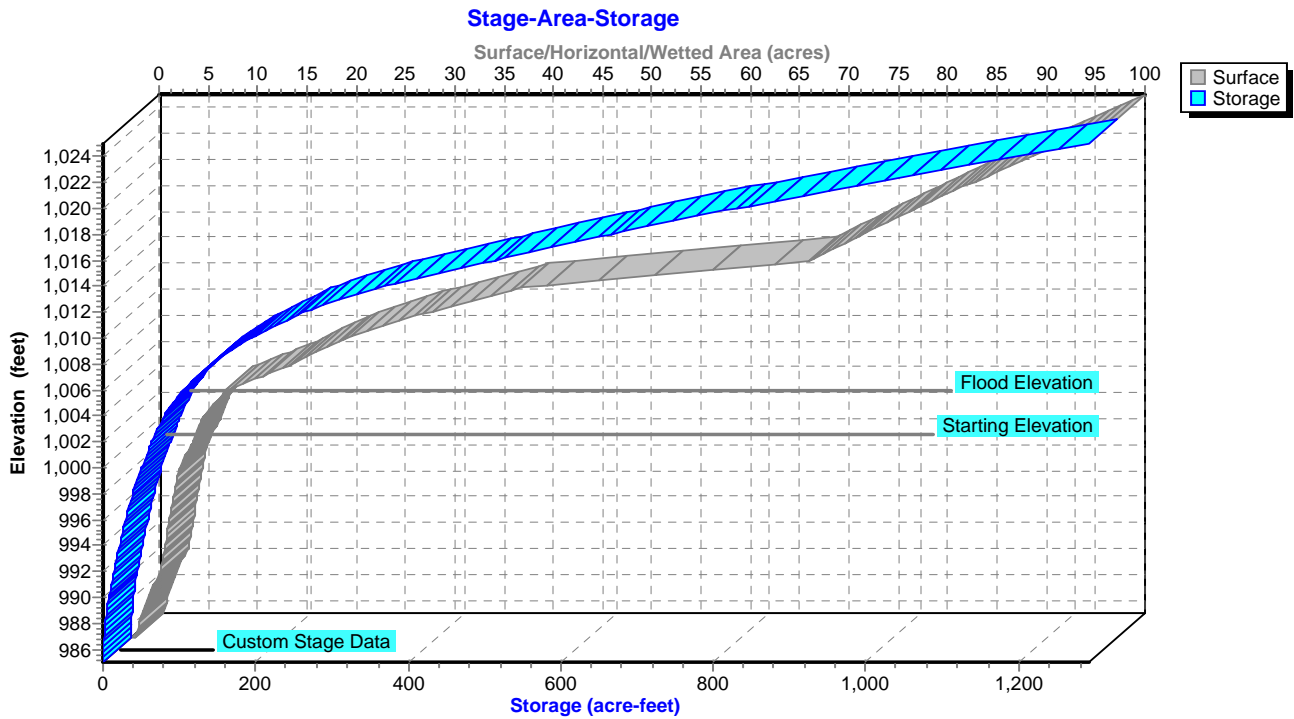
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

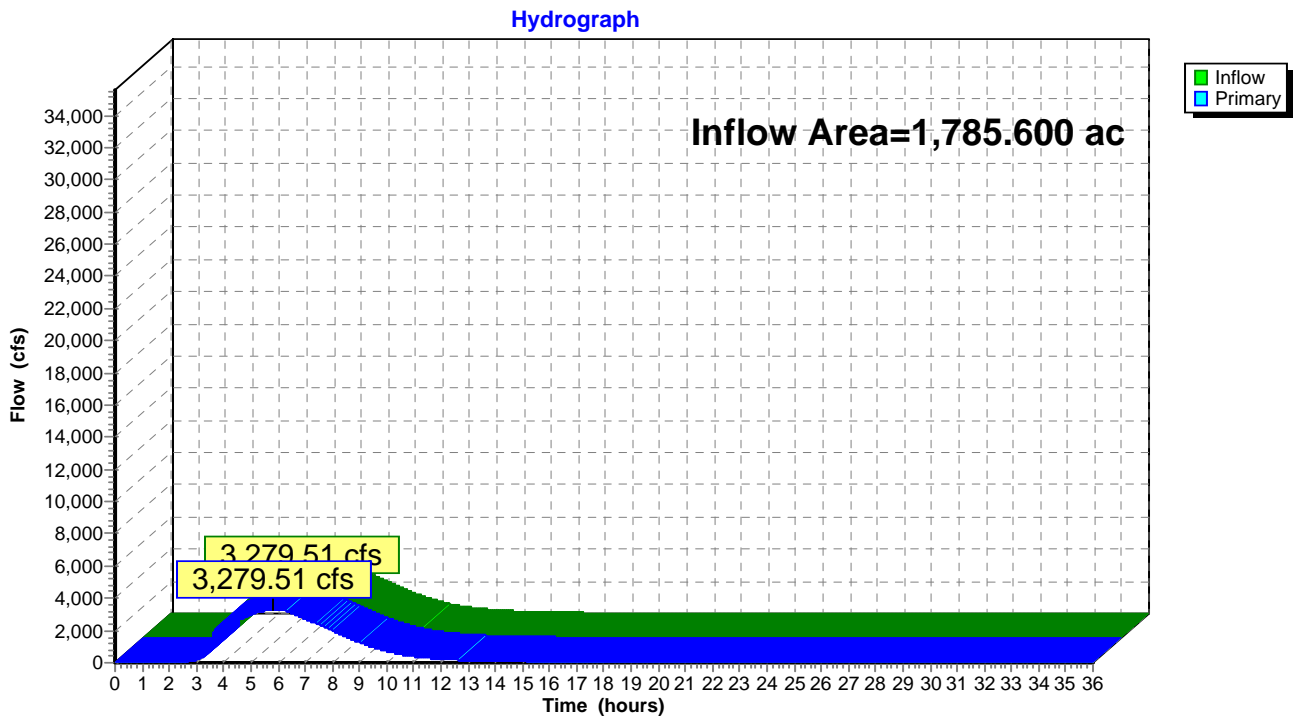


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 9.19" for 6-HR 0.5PMF event
 Inflow = 3,279.51 cfs @ 5.78 hrs, Volume= 1,368.060 af
 Primary = 3,279.51 cfs @ 5.79 hrs, Volume= 1,368.060 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 9.19" for 6-HR 0.5PMF event
 Inflow = 3,279.51 cfs @ 5.79 hrs, Volume= 1,368.059 af
 Outflow = 1,854.00 cfs @ 8.20 hrs, Volume= 1,462.441 af, Atten= 43%, Lag= 144.3 min
 Primary = 808.28 cfs @ 8.20 hrs, Volume= 1,202.281 af
 Secondary = 1,045.72 cfs @ 8.20 hrs, Volume= 260.160 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,100.02' @ 8.20 hrs Surf.Area= 317.248 ac Storage= 2,614.873 af (700.873 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 443.9 min (854.4 - 410.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

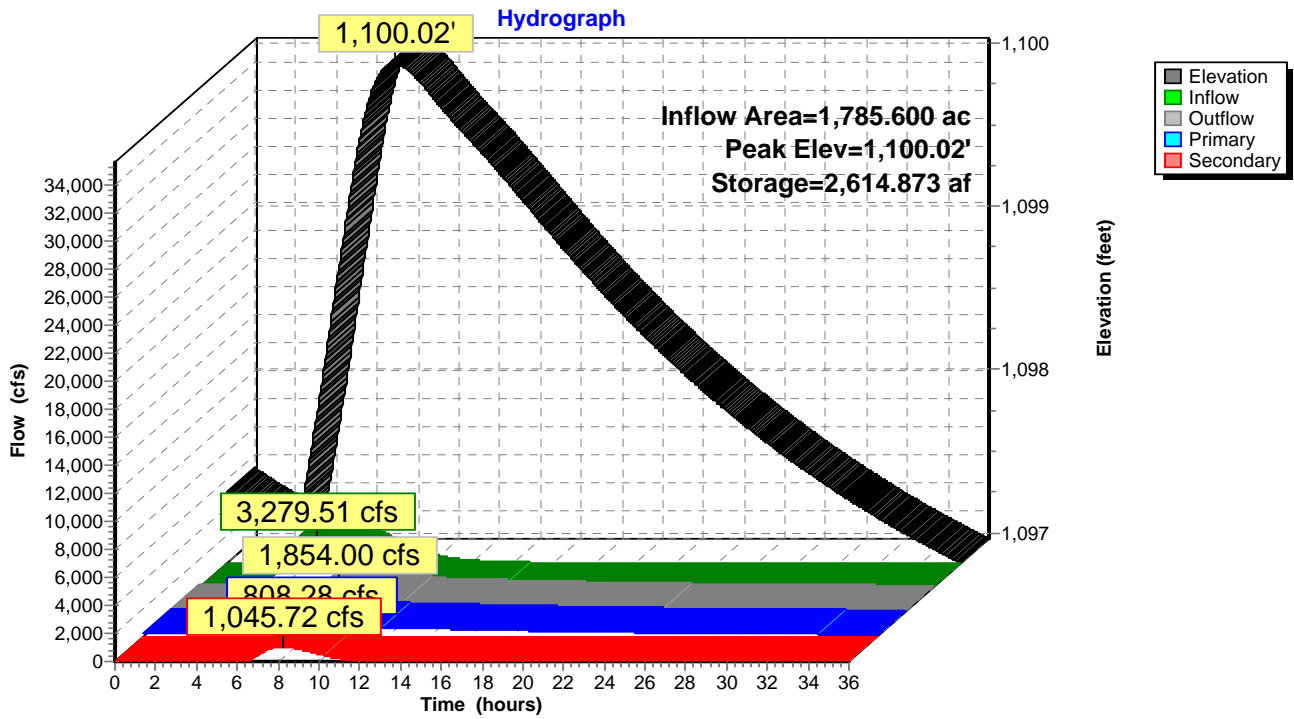
Primary OutFlow Max=808.28 cfs @ 8.20 hrs HW=1,100.02' TW=1,075.18' (Dynamic Tailwater)

- ↑ 1=Culvert-RCP (Barrel Controls 131.97 cfs @ 18.67 fps)
- ↑ 2=Custom Weir/Orifice (Weir Controls 676.31 cfs @ 6.23 fps)

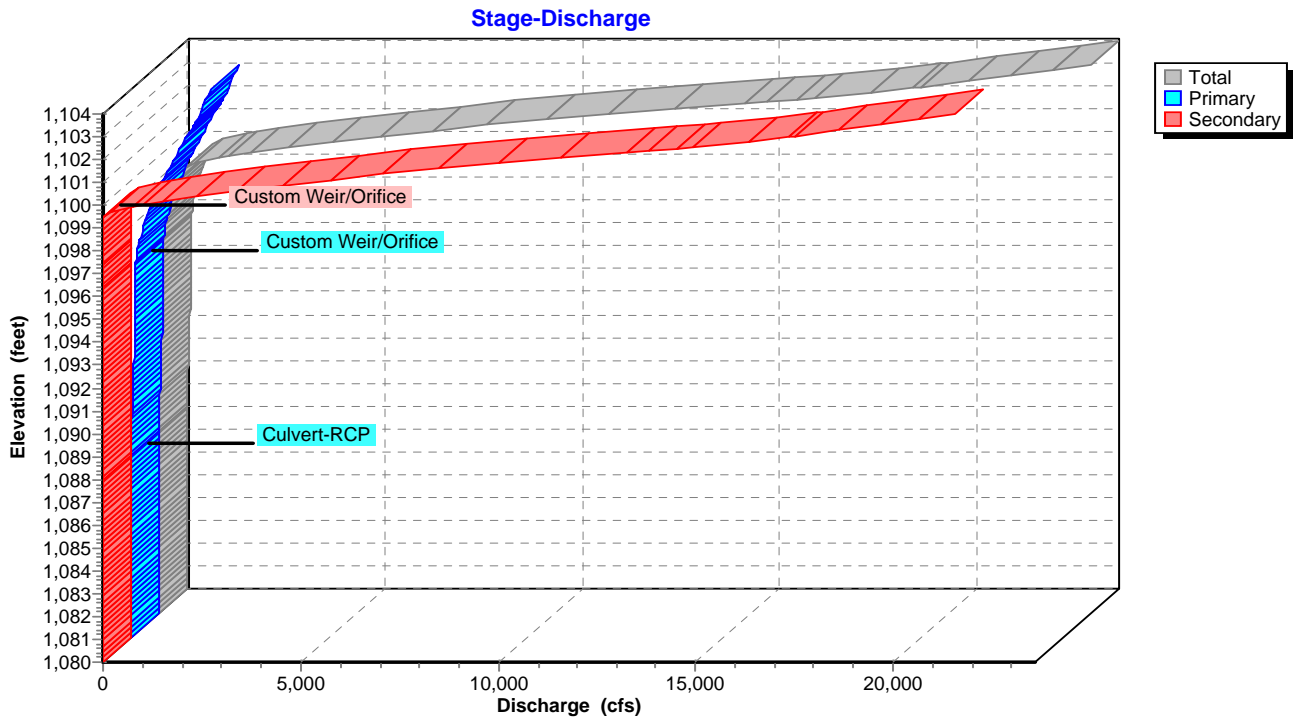
Secondary OutFlow Max=1,045.71 cfs @ 8.20 hrs HW=1,100.02' TW=1,075.18' (Dynamic Tailwater)

- ↑ 3=Custom Weir/Orifice (Weir Controls 1,045.71 cfs @ 2.02 fps)

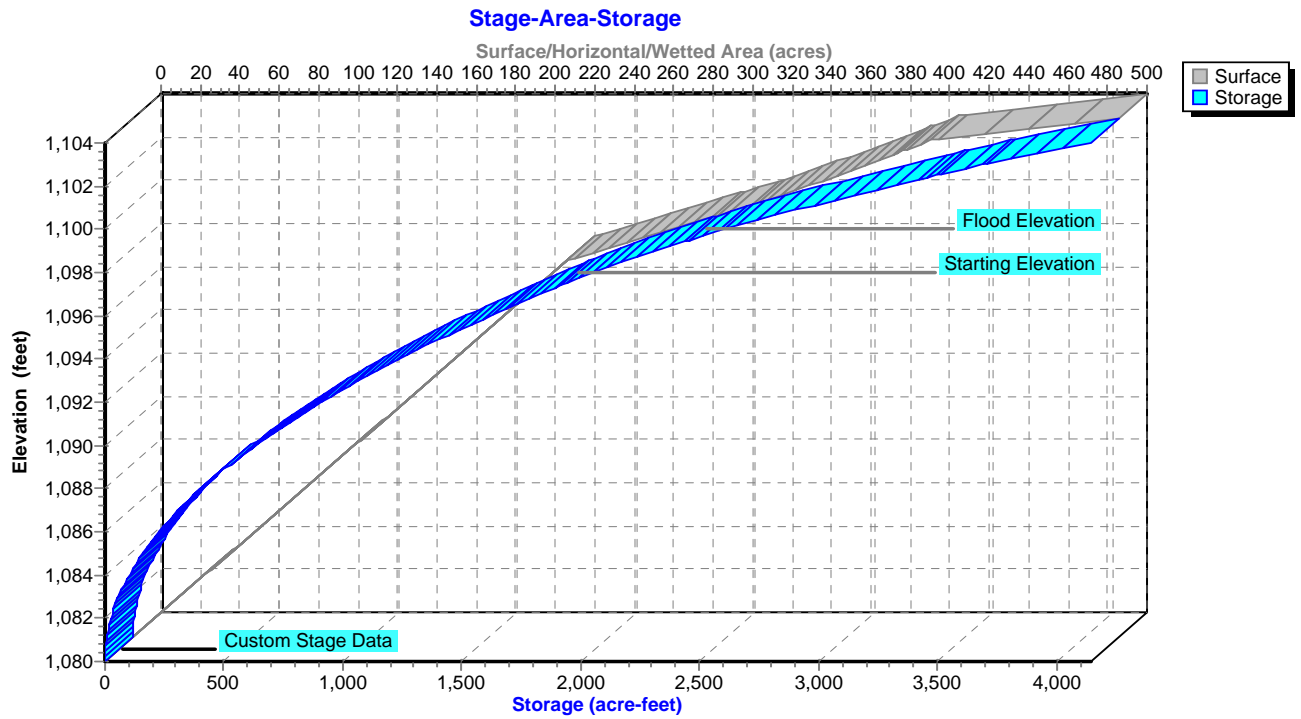
Pond 3P: Lake Cable



Pond 3P: Lake Cable



Pond 3P: Lake Cable



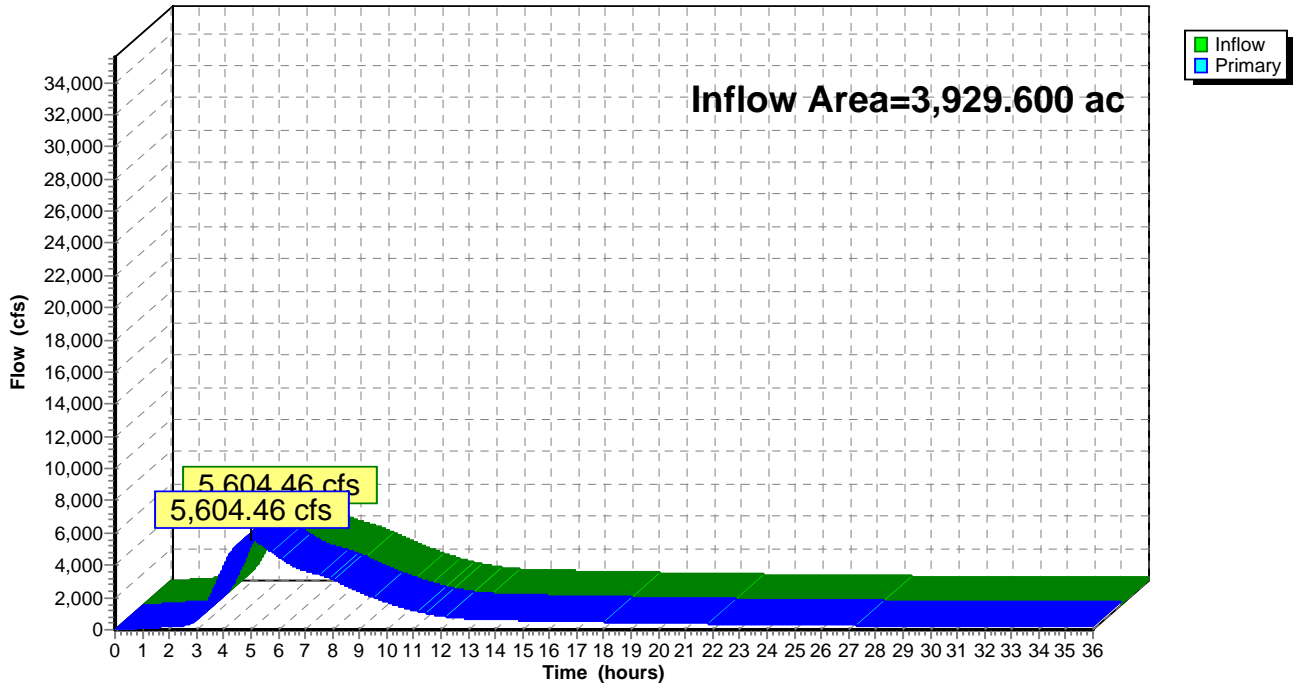
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 9.22" for 6-HR 0.5PMF event
Inflow = 5,604.46 cfs @ 4.98 hrs, Volume= 3,020.643 af
Primary = 5,604.46 cfs @ 4.99 hrs, Volume= 3,020.643 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 9.74" for 6-HR 0.5PMF event
 Inflow = 1,599.17 cfs @ 3.48 hrs, Volume= 311.630 af
 Outflow = 1,444.44 cfs @ 3.82 hrs, Volume= 311.052 af, Atten= 10%, Lag= 20.7 min
 Primary = 1,359.54 cfs @ 3.82 hrs, Volume= 304.044 af
 Secondary = 84.90 cfs @ 3.82 hrs, Volume= 7.008 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,109.04' @ 3.82 hrs Surf.Area= 32.650 ac Storage= 112.039 af (87.739 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 176.3 min calculated for 286.672 af (92% of inflow)
 Center-of-Mass det. time= 136.2 min (410.5 - 274.3)

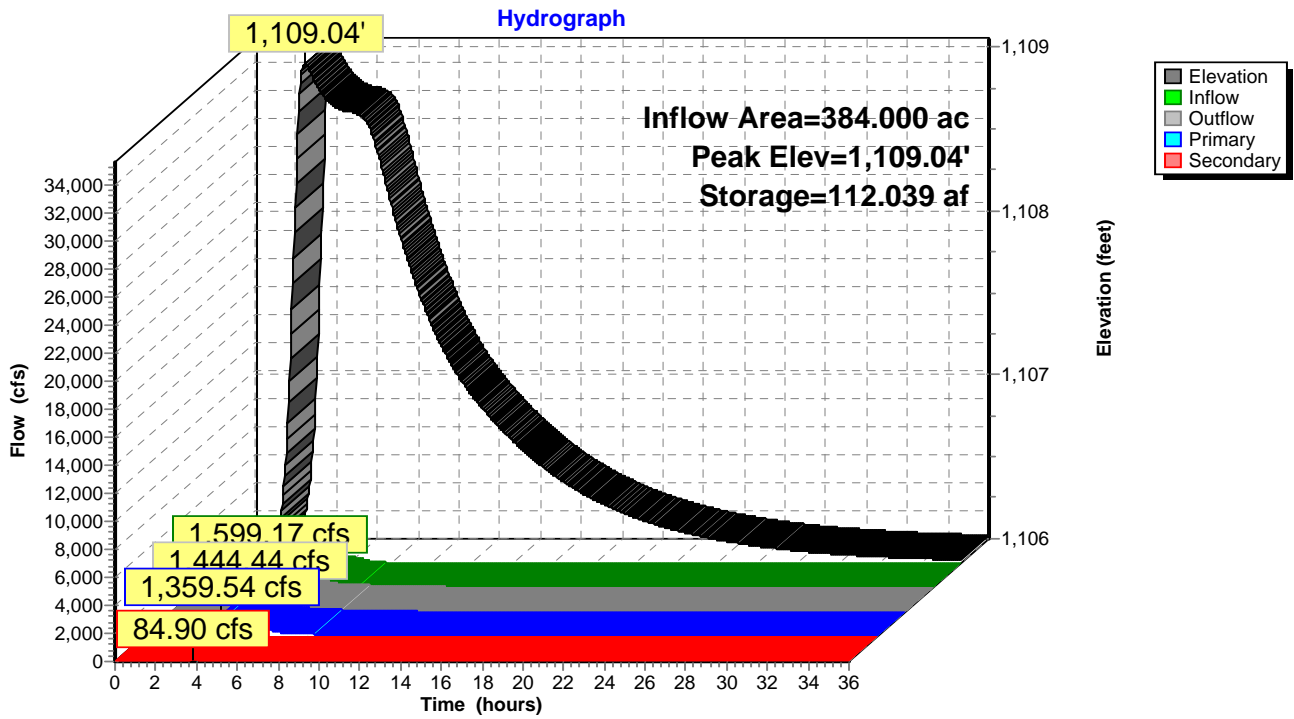
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

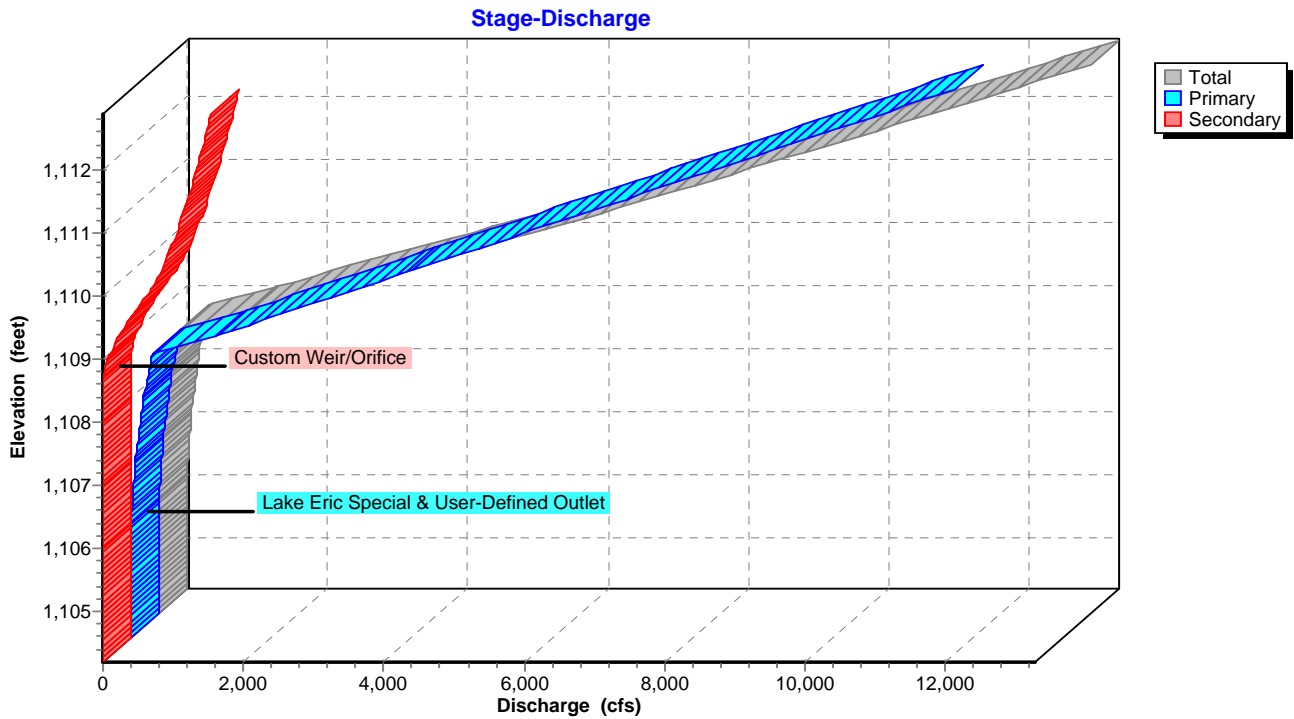
Primary OutFlow Max=1,359.48 cfs @ 3.82 hrs HW=1,109.04' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 1,359.48 cfs)

Secondary OutFlow Max=84.89 cfs @ 3.82 hrs HW=1,109.04' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 84.89 cfs @ 1.64 fps)

Pond 4P: Lake O'Springs

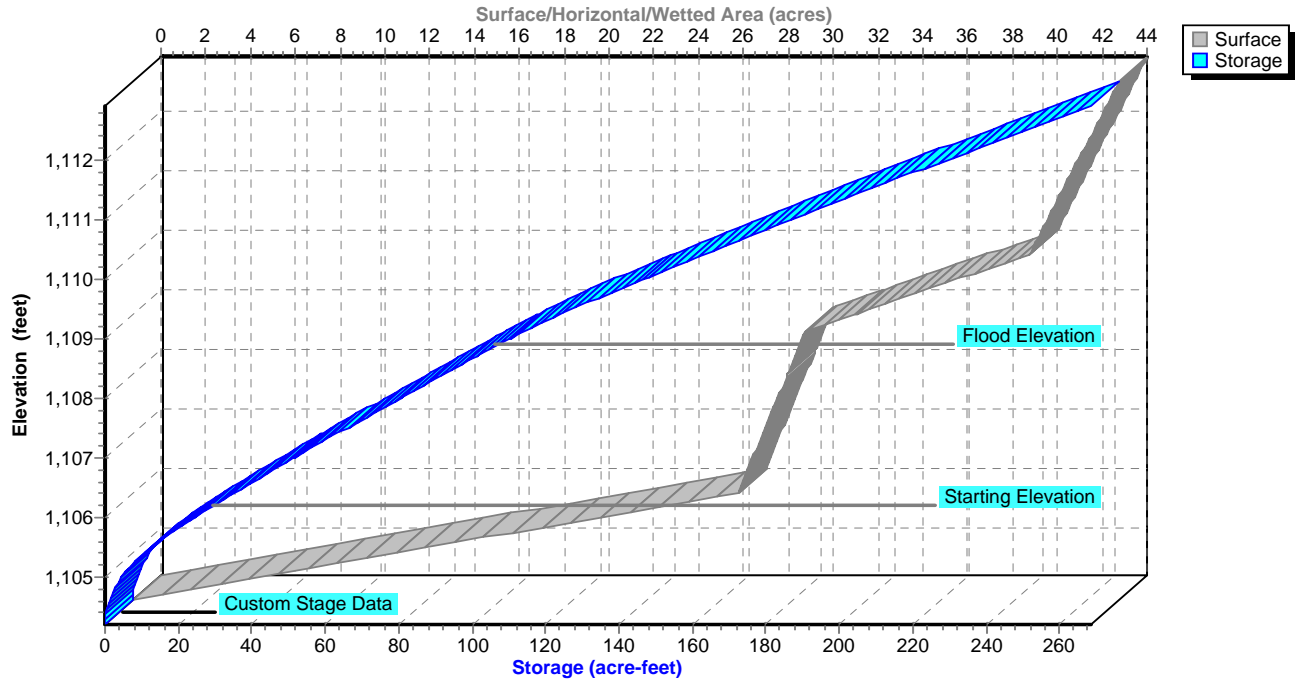


Pond 4P: Lake O'Springs



Pond 4P: Lake O'Springs

Stage-Area-Storage



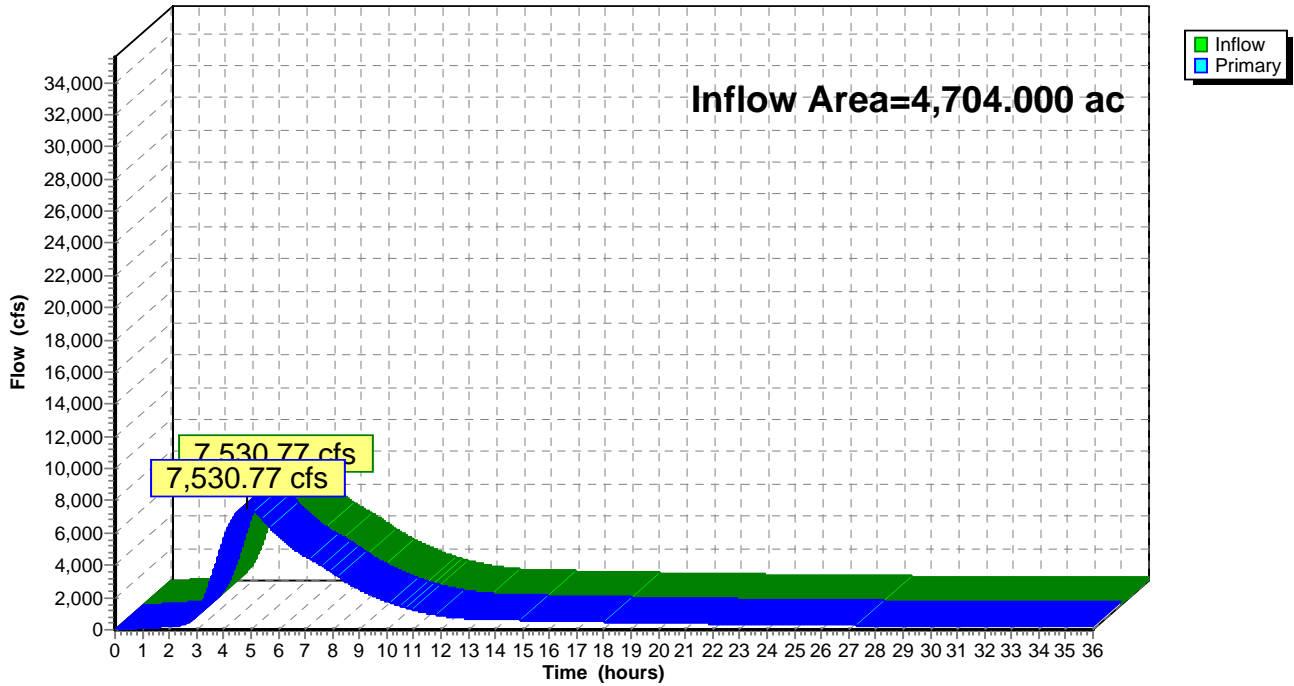
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 9.12" for 6-HR 0.5PMF event
Inflow = 7,530.77 cfs @ 4.83 hrs, Volume= 3,575.157 af
Primary = 7,530.77 cfs @ 4.84 hrs, Volume= 3,575.157 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 9.64" for 6-HR 0.5PMF event
 Inflow = 520.17 cfs @ 3.23 hrs, Volume= 92.550 af
 Outflow = 518.64 cfs @ 3.29 hrs, Volume= 92.432 af, Atten= 0%, Lag= 3.8 min
 Primary = 353.73 cfs @ 3.29 hrs, Volume= 75.445 af
 Secondary = 164.91 cfs @ 3.29 hrs, Volume= 16.987 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.54' @ 3.29 hrs Surf.Area= 4.409 ac Storage= 29.798 af (16.108 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 118.4 min calculated for 78.720 af (85% of inflow)
 Center-of-Mass det. time= 74.6 min (313.0 - 238.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)

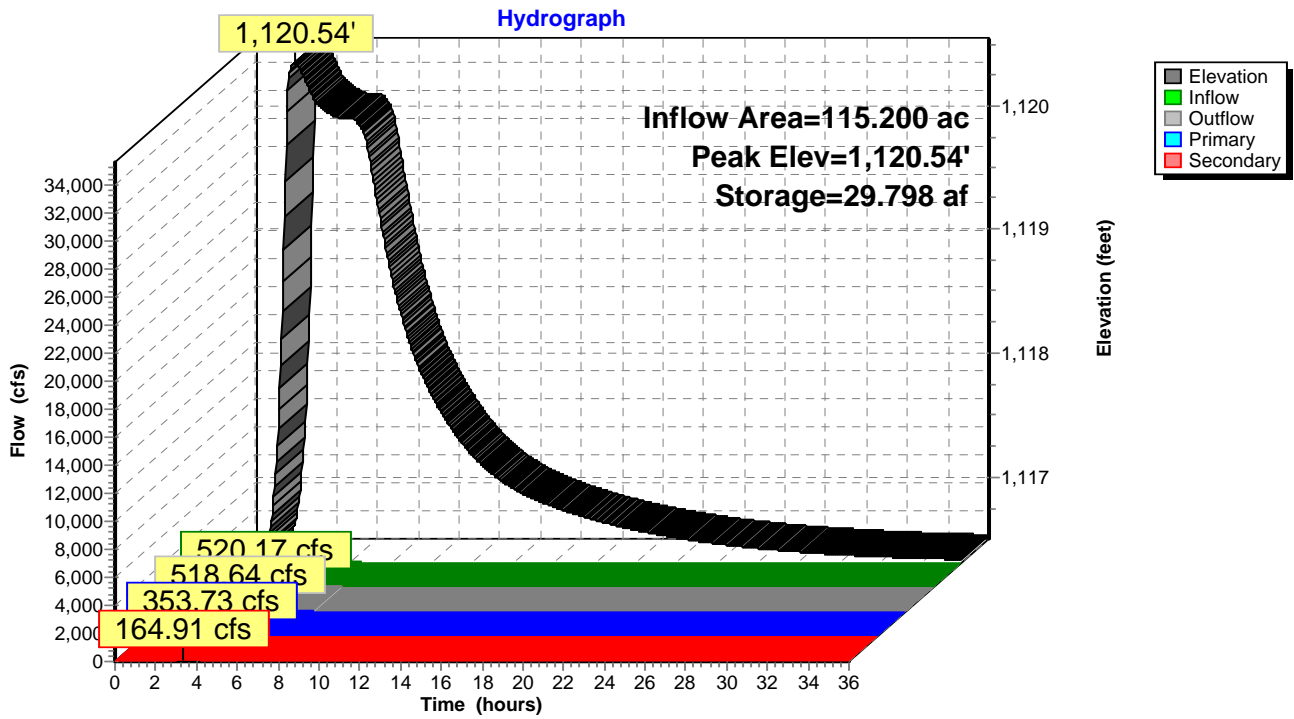
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

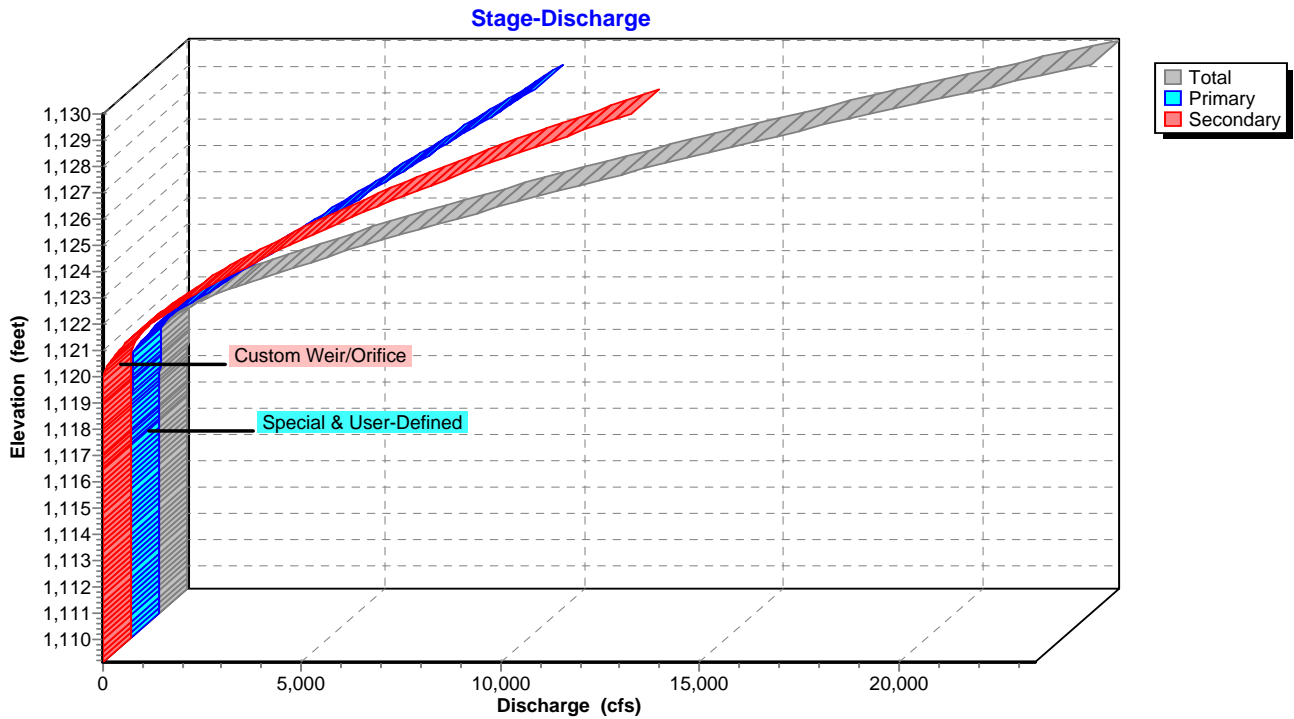
Primary OutFlow Max=353.71 cfs @ 3.29 hrs HW=1,120.54' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 353.71 cfs)

Secondary OutFlow Max=164.90 cfs @ 3.29 hrs HW=1,120.54' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 164.90 cfs @ 2.05 fps)

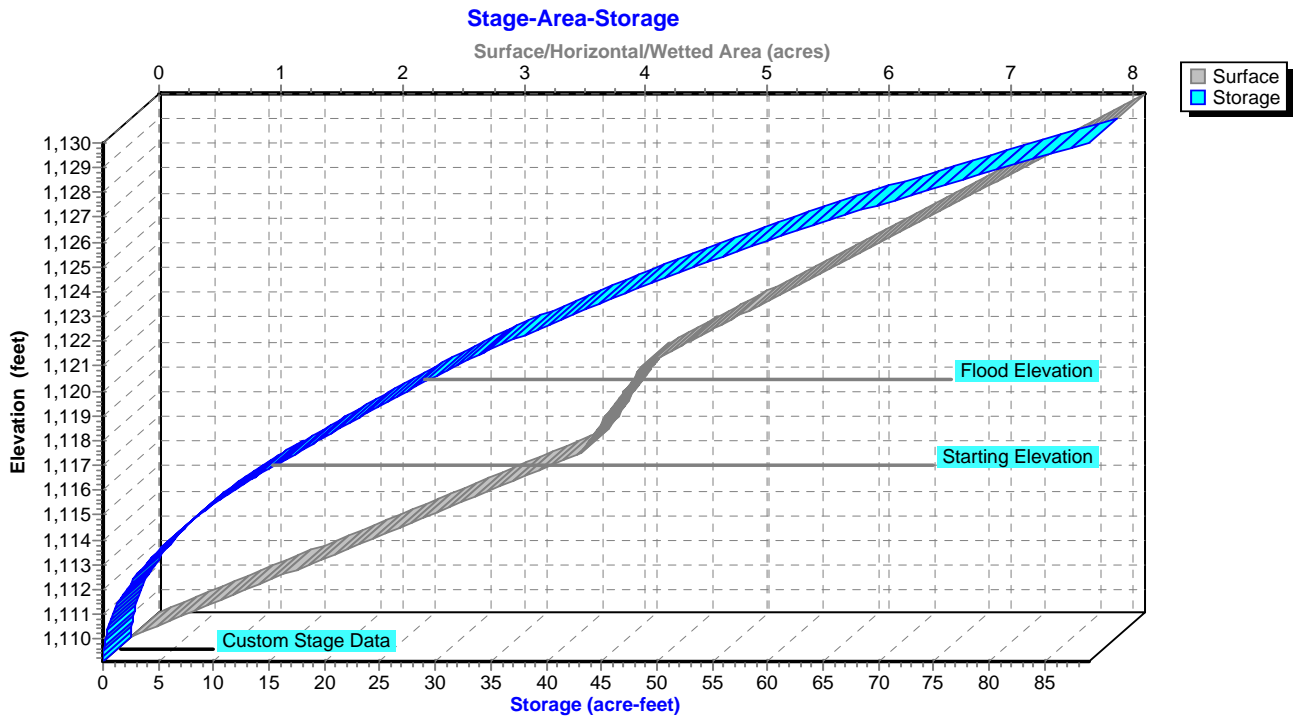
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



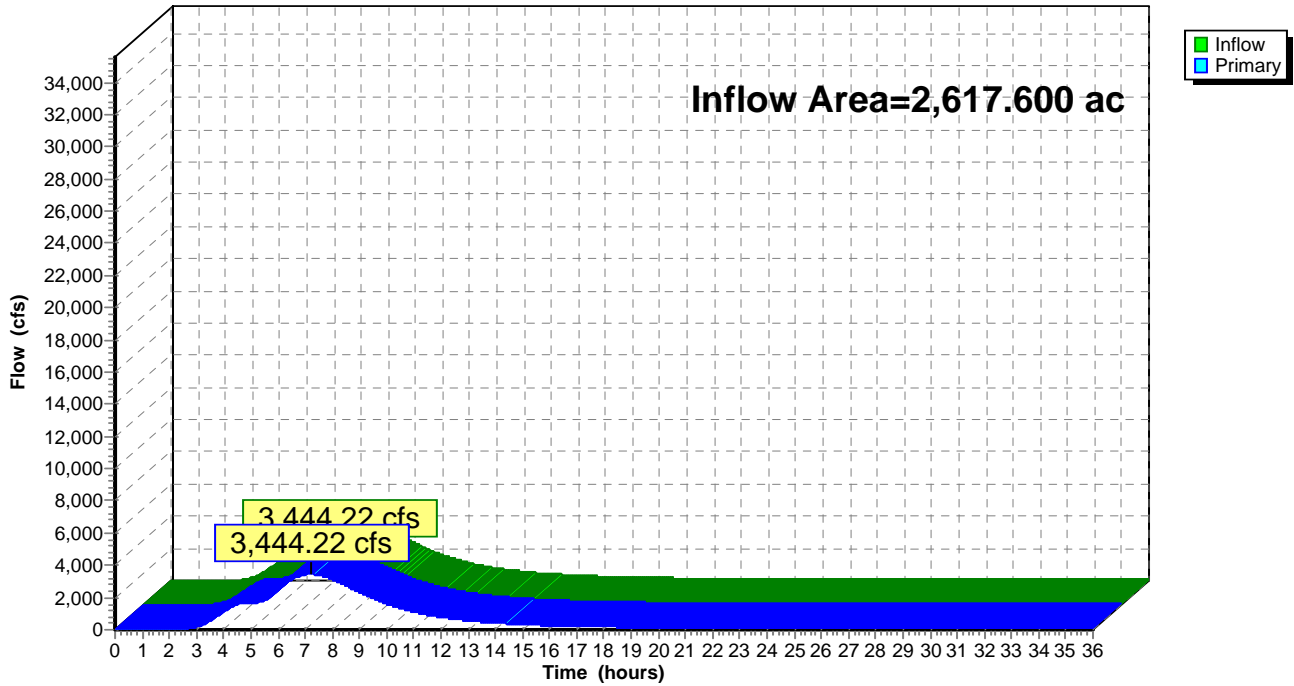
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 8.28" for 6-HR 0.5PMF event
Inflow = 3,444.22 cfs @ 7.19 hrs, Volume= 1,805.412 af
Primary = 3,444.22 cfs @ 7.20 hrs, Volume= 1,805.412 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

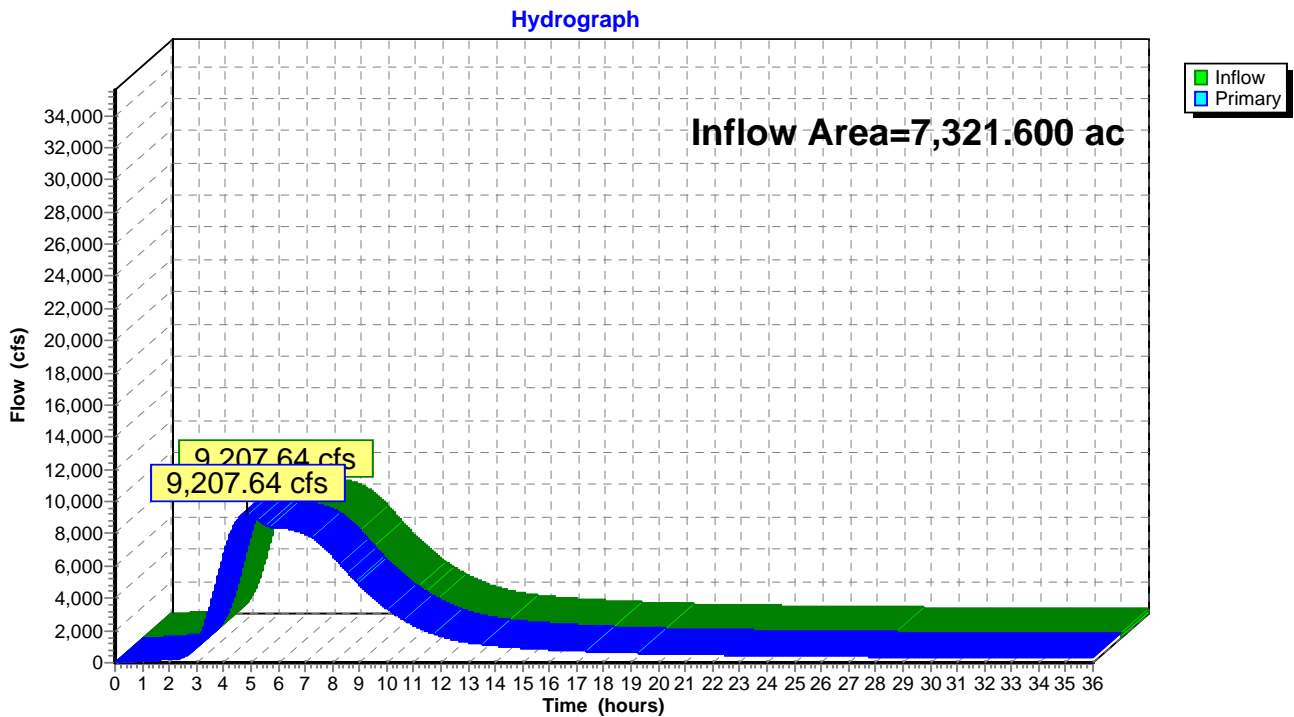


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 8.82" for 6-HR 0.5PMF event
Inflow = 9,207.64 cfs @ 4.85 hrs, Volume= 5,380.343 af
Primary = 9,207.64 cfs @ 4.86 hrs, Volume= 5,380.343 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



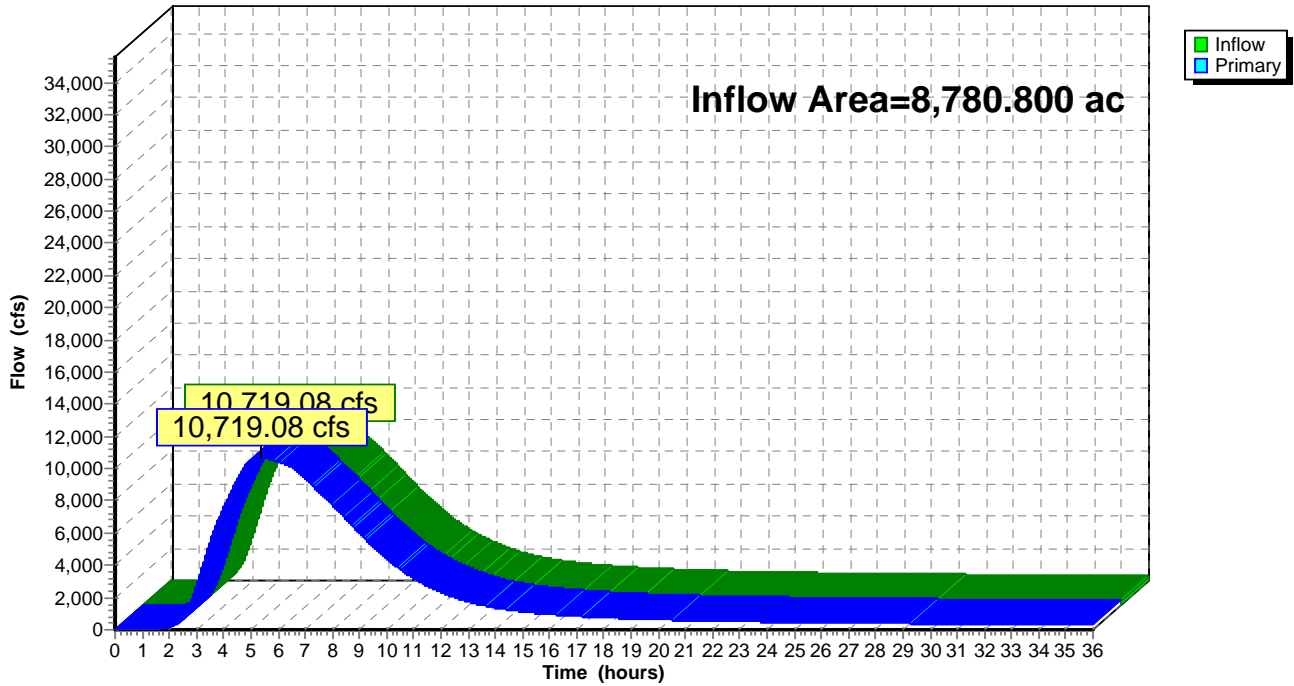
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 8.91" for 6-HR 0.5PMF event
Inflow = 10,719.08 cfs @ 5.34 hrs, Volume= 6,519.857 af
Primary = 10,719.08 cfs @ 5.35 hrs, Volume= 6,519.857 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 9.22" for 6-HR 0.5PMF event
 Inflow = 5,078.17 cfs @ 5.23 hrs, Volume= 1,509.336 af
 Outflow = 2,725.66 cfs @ 7.49 hrs, Volume= 1,338.810 af, Atten= 46%, Lag= 135.5 min
 Primary = 128.96 cfs @ 5.16 hrs, Volume= 287.640 af
 Secondary = 2,632.34 cfs @ 7.49 hrs, Volume= 1,051.170 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,027.60' @ 7.49 hrs Surf.Area= 205.949 ac Storage= 767.516 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 323.5 min calculated for 1,338.810 af (89% of inflow)
 Center-of-Mass det. time= 289.9 min (689.2 - 399.3)

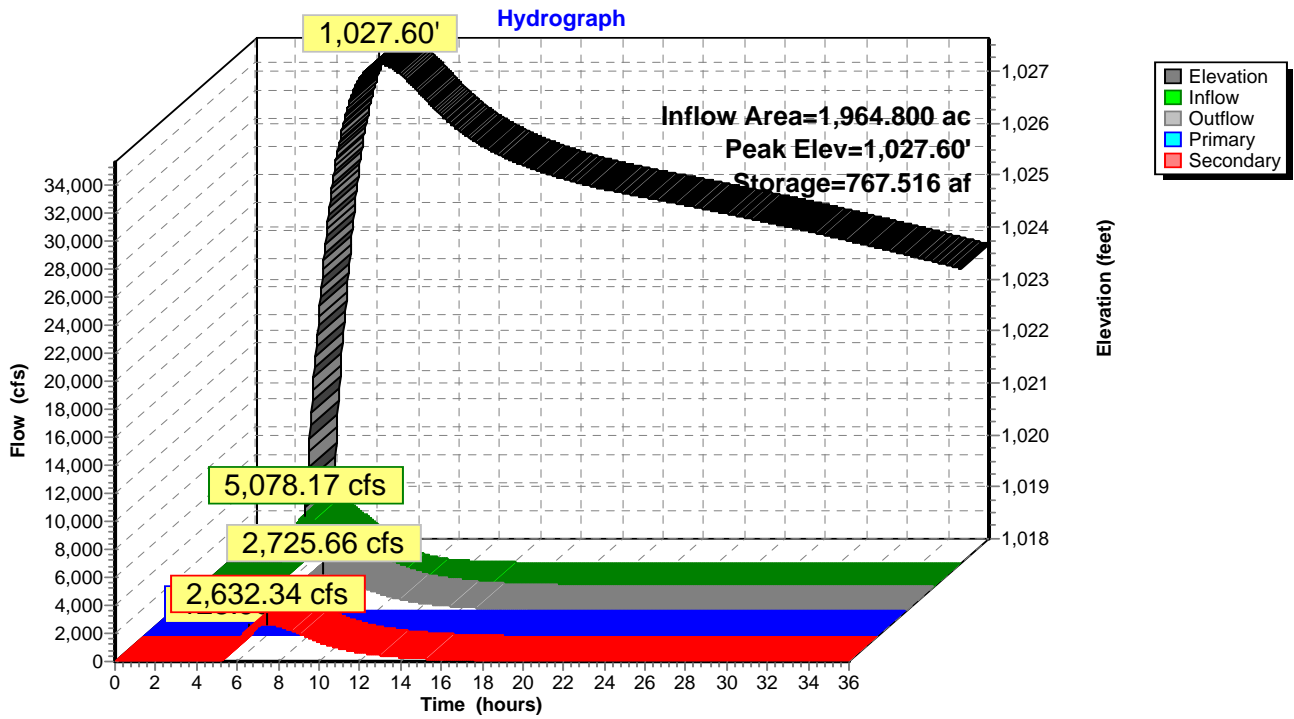
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

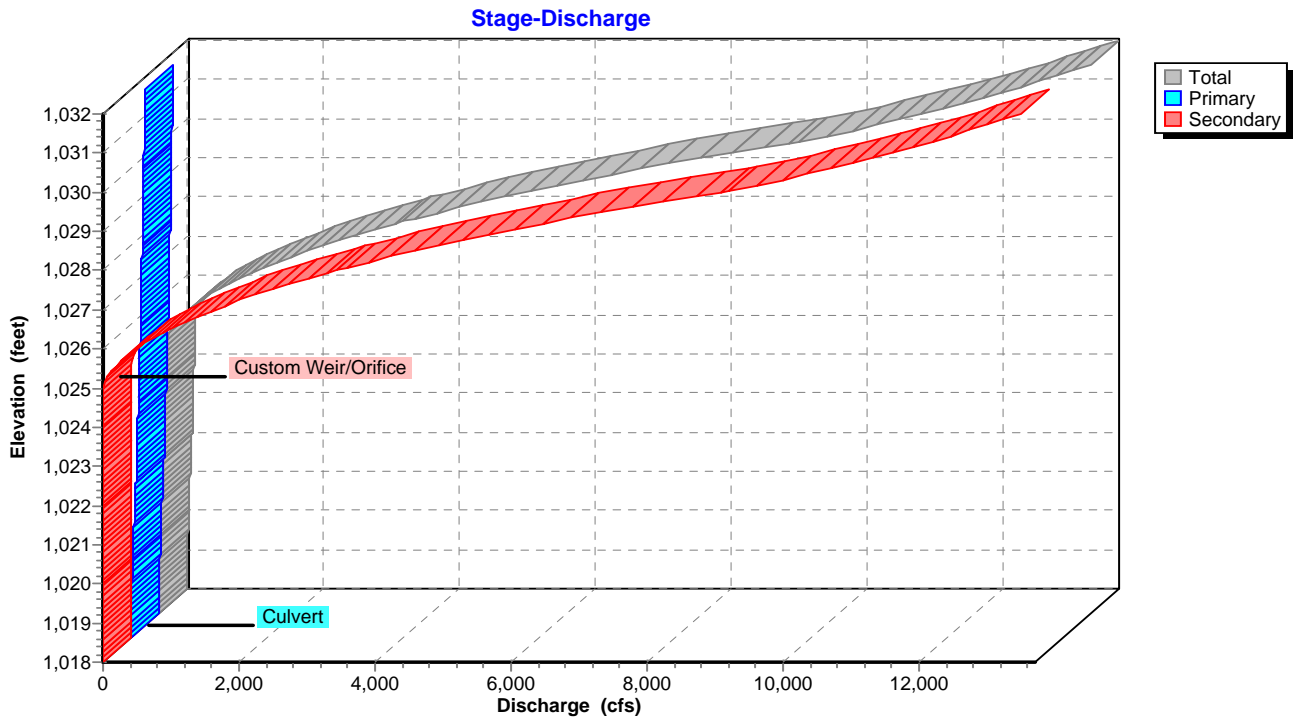
Primary OutFlow Max=128.10 cfs @ 5.16 hrs HW=1,025.25' TW=1,020.77' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 128.10 cfs @ 10.19 fps)

Secondary OutFlow Max=2,632.31 cfs @ 7.49 hrs HW=1,027.60' TW=1,025.22' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 2,632.31 cfs @ 4.87 fps)

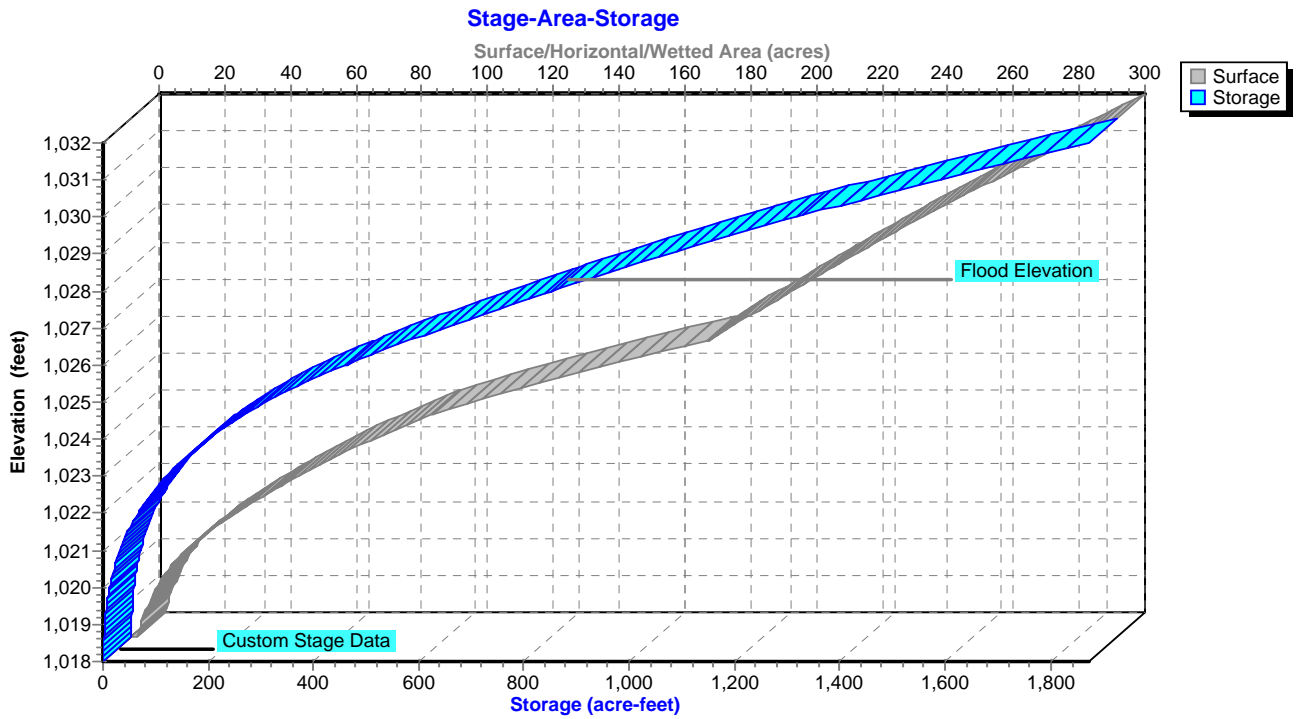
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 9.79" for 6-HR 0.5PMF event
 Inflow = 5,319.68 cfs @ 4.85 hrs, Volume= 1,602.232 af
 Outflow = 5,078.17 cfs @ 5.23 hrs, Volume= 1,509.337 af, Atten= 5%, Lag= 22.6 min
 Primary = 4,740.26 cfs @ 5.23 hrs, Volume= 1,472.687 af
 Secondary = 93.64 cfs @ 5.23 hrs, Volume= 16.758 af
 Tertiary = 244.27 cfs @ 5.23 hrs, Volume= 19.892 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,030.27' @ 5.23 hrs Surf.Area= 108.894 ac Storage= 547.264 af (327.264 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 116.2 min calculated for 1,289.337 af (80% of inflow)
 Center-of-Mass det. time= 57.7 min (399.3 - 341.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

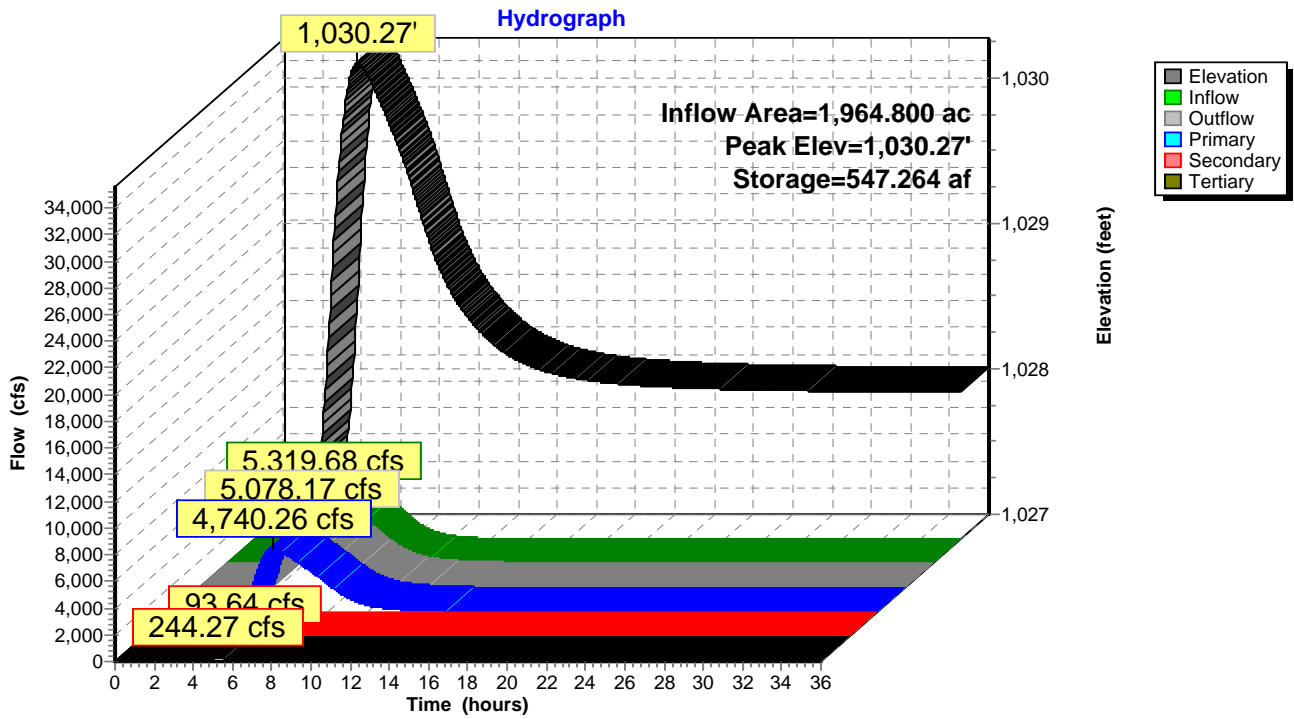
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4,740.23 cfs @ 5.23 hrs HW=1,030.27' TW=1,025.44' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 2,697.45 cfs @ 3.96 fps)
 ↓2=Broad-Crested Rectangular Weir (Weir Controls 2,042.78 cfs @ 3.50 fps)

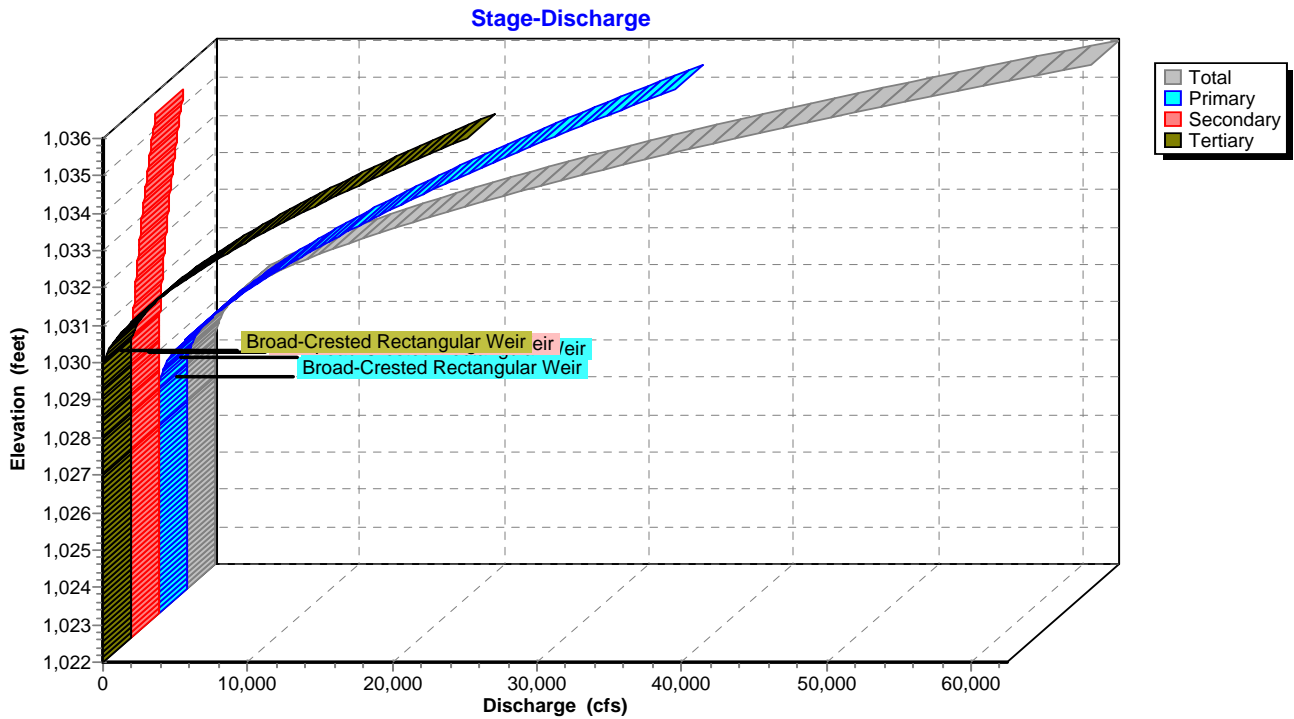
Secondary OutFlow Max=93.64 cfs @ 5.23 hrs HW=1,030.27' TW=1,025.44' (Dynamic Tailwater)
 ↑3=Sharp-Crested Rectangular Weir (Weir Controls 93.64 cfs @ 3.22 fps)

Tertiary OutFlow Max=244.26 cfs @ 5.23 hrs HW=1,030.27' TW=1,025.44' (Dynamic Tailwater)
 ↑4=Broad-Crested Rectangular Weir (Weir Controls 244.26 cfs @ 1.39 fps)

Pond 9P: Sippo Lake

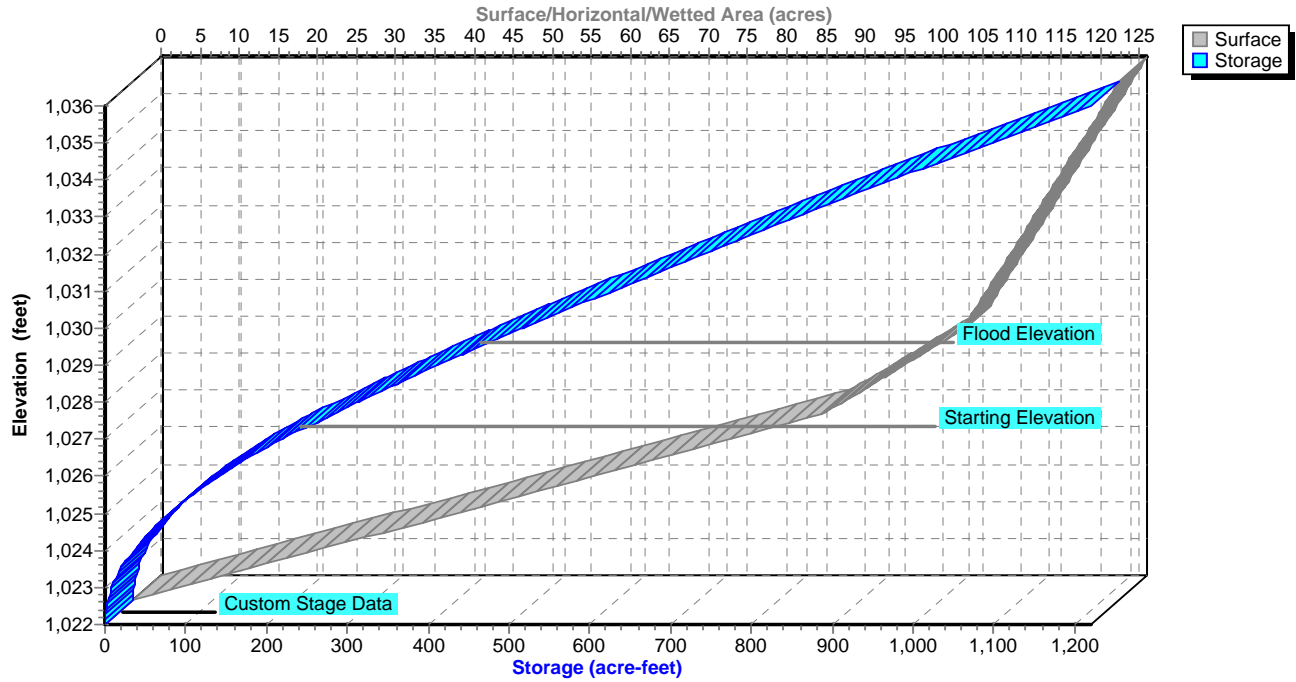


Pond 9P: Sippo Lake



Pond 9P: Sippo Lake

Stage-Area-Storage

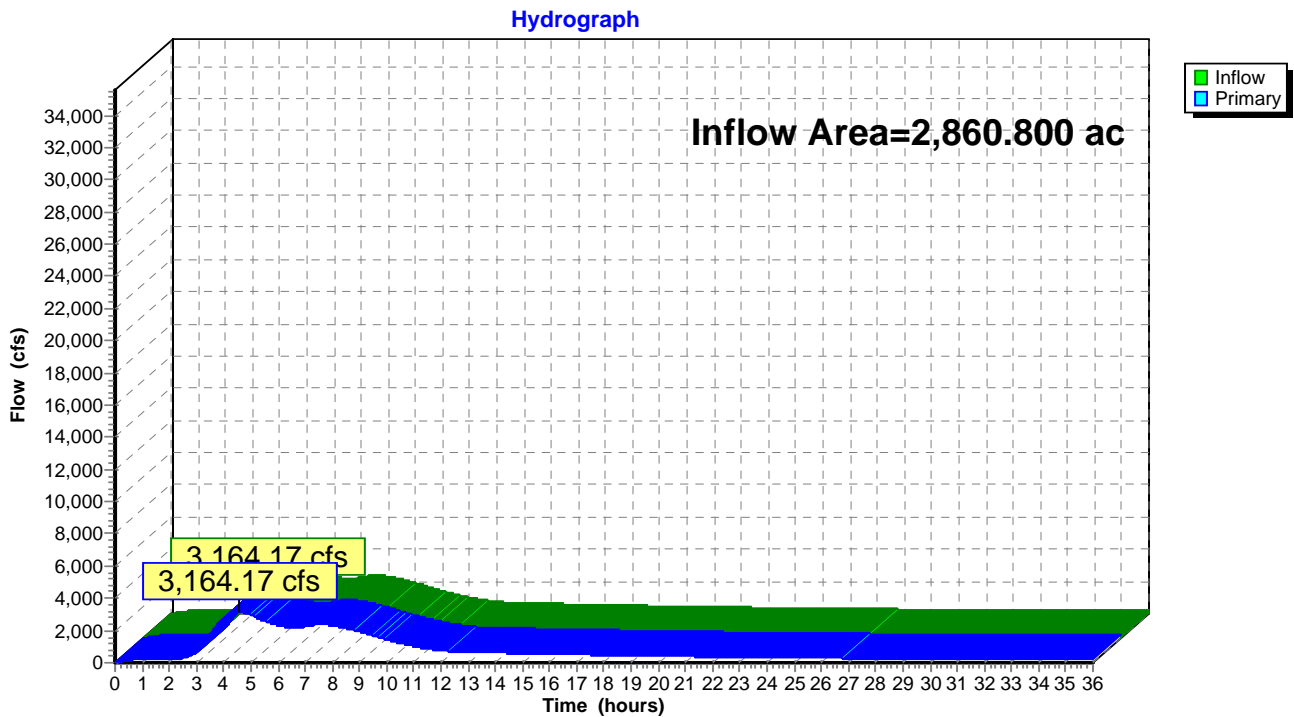


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 9.39" for 6-HR 0.5PMF event
Inflow = 3,164.17 cfs @ 4.55 hrs, Volume= 2,239.315 af
Primary = 3,164.17 cfs @ 4.56 hrs, Volume= 2,239.315 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 8.95" for 6-HR 0.5PMF event
 Inflow = 11,415.24 cfs @ 5.93 hrs, Volume= 7,055.281 af
 Outflow = 11,414.16 cfs @ 5.97 hrs, Volume= 7,054.169 af, Atten= 0%, Lag= 2.7 min
 Primary = 3,376.20 cfs @ 4.15 hrs, Volume= 4,110.681 af
 Secondary = 8,099.29 cfs @ 5.97 hrs, Volume= 2,943.488 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,011.38' @ 5.97 hrs Surf.Area= 15.219 ac Storage= 245.134 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 20.4 min calculated for 7,052.210 af (100% of inflow)
 Center-of-Mass det. time= 20.1 min (607.0 - 586.9)

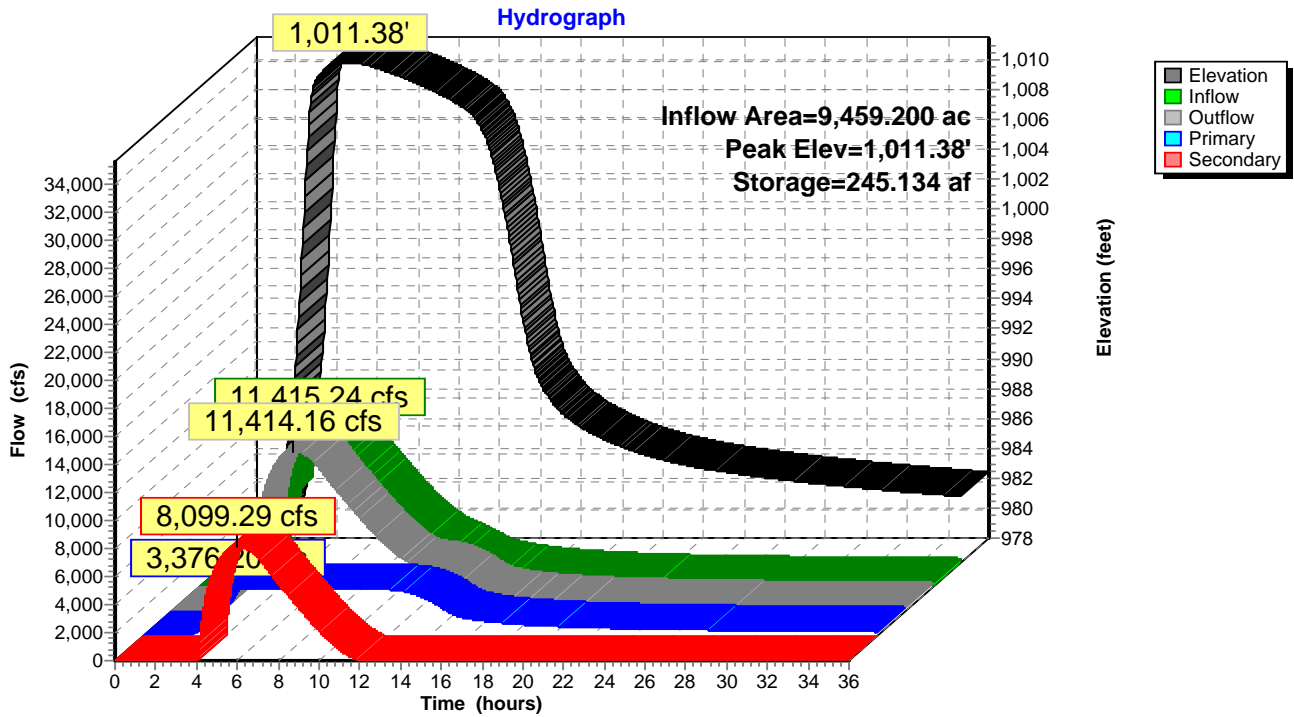
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

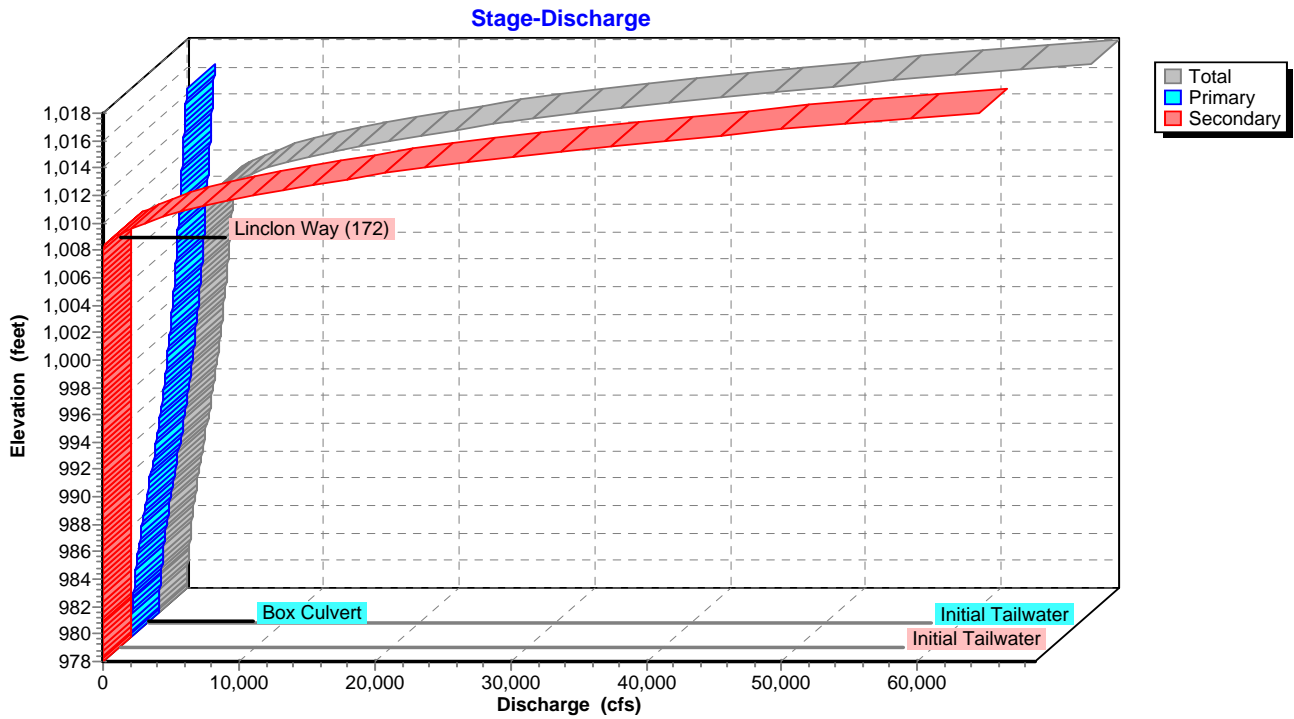
Primary OutFlow Max=3,370.56 cfs @ 4.15 hrs HW=1,009.22' TW=985.13' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,370.56 cfs @ 29.48 fps)

Secondary OutFlow Max=8,099.28 cfs @ 5.97 hrs HW=1,011.38' TW=988.17' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 8,099.28 cfs @ 5.57 fps)

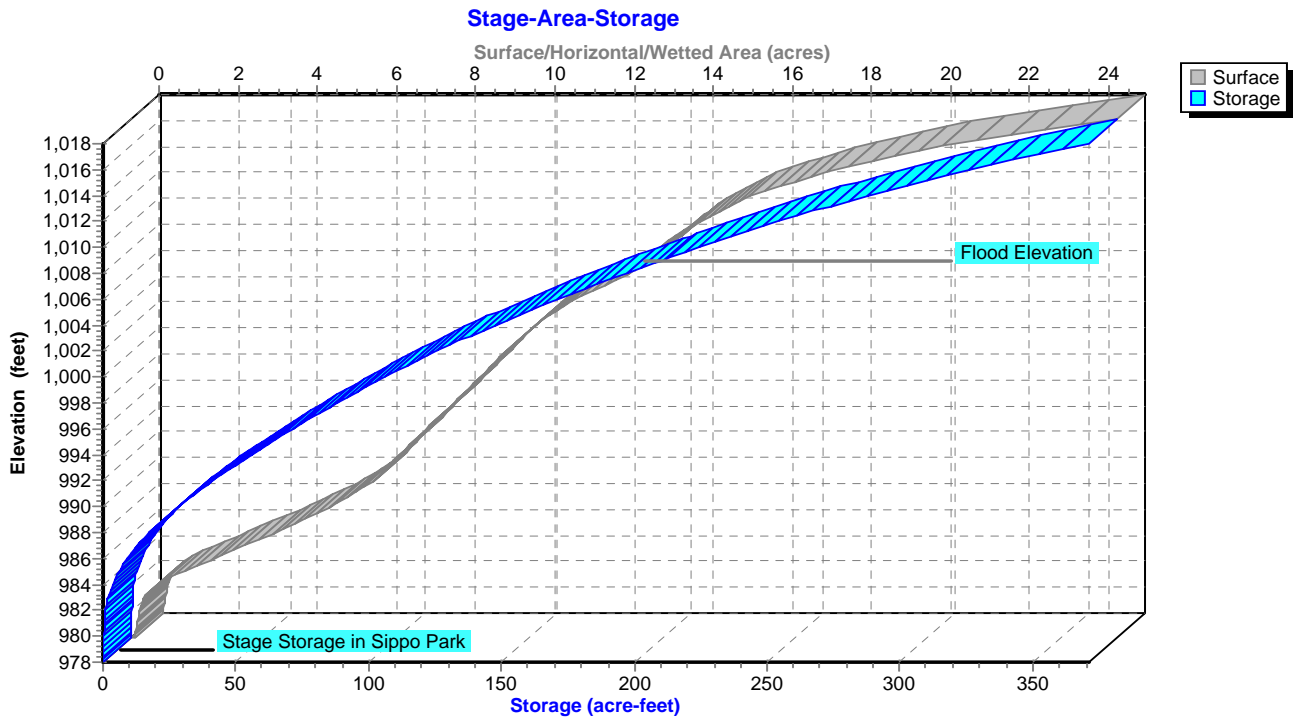
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



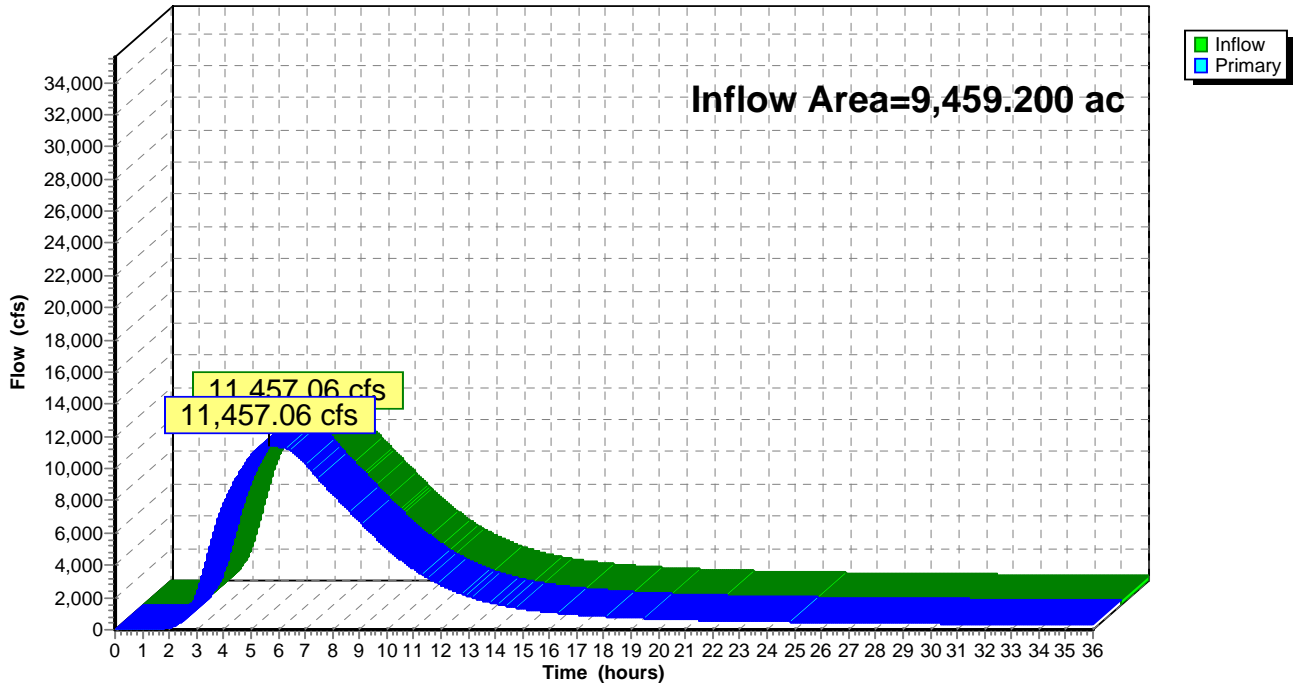
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 8.97" for 6-HR 0.5PMF event
Inflow = 11,457.06 cfs @ 5.68 hrs, Volume= 7,069.226 af
Primary = 11,457.06 cfs @ 5.69 hrs, Volume= 7,069.226 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

Hydrograph



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment HYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=2.54"
 Tc=44.0 min CN=74 Runoff=193.02 cfs 24.393 af

Subcatchment HYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=2.63"
 Tc=65.0 min CN=75 Runoff=352.23 cfs 58.886 af

Subcatchment HYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.20"
 Tc=226.0 min CN=70 Runoff=576.04 cfs 257.063 af

Subcatchment HYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.04"
 Tc=128.0 min CN=68 Runoff=626.26 cfs 182.580 af

Subcatchment HYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=1.96"
 Tc=129.0 min CN=67 Runoff=431.09 cfs 126.347 af

Subcatchment HYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=2.54"
 Tc=110.0 min CN=74 Runoff=614.77 cfs 153.135 af

Subcatchment HYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=2.63"
 Tc=72.0 min CN=75 Runoff=893.60 cfs 161.236 af

Subcatchment HYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.09"
 Tc=78.0 min CN=80 Runoff=920.10 cfs 174.442 af

Subcatchment HYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.12"
 Tc=155.0 min CN=69 Runoff=566.78 cfs 188.708 af

Subcatchment HYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=2.63"
 Tc=156.0 min CN=75 Runoff=1,321.67 cfs 430.430 af

Subcatchment HYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=1.96"
 Tc=151.0 min CN=67 Runoff=322.07 cfs 106.508 af

Reach 5R: Channel 5 Avg. Flow Depth=2.41' Max Vel=5.24 fps Inflow=221.72 cfs 503.530 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=203.77 cfs 497.900 af

Reach 7R: Channel 7 Avg. Flow Depth=7.06' Max Vel=2.92 fps Inflow=757.14 cfs 680.260 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=690.03 cfs 671.022 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=2.86' Max Vel=2.47 fps Inflow=111.02 cfs 183.479 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=111.02 cfs 182.716 af

Reach 15R: Channel 15 Avg. Flow Depth=7.48' Max Vel=1.99 fps Inflow=1,976.93 cfs 1,274.611 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=1,504.53 cfs 1,240.012 af

Reach 16R: Channel 16 Avg. Flow Depth=9.08' Max Vel=2.21 fps Inflow=1,931.47 cfs 1,553.979 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=1,830.19 cfs 1,515.784 af

Existing Conditions Sippo Reservoir-URS-Final Type II 24-hr 100 year-FEMA Rainfall=5.22"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 738

Reach 18R: Sippo Creek Avg. Flow Depth=5.16' Max Vel=9.26 fps Inflow=1,937.82 cfs 1,676.783 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=1,937.81 cfs 1,676.661 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=388.66 cfs 82.661 af
Primary=388.66 cfs 82.661 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,006.27' Storage=110.251 af Inflow=1,982.19 cfs 1,689.805 af
1,654.37 cfs 1,570.137 af Secondary=319.71 cfs 107.873 af Tertiary=0.00 cfs 0.000 af Outflow=1,974.08 cfs 1,678.010 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=669.01 cfs 336.776 af
Primary=669.01 cfs 336.776 af

Pond 3P: Lake Cable Peak Elev=1,097.40' Storage=1,914.000 af Inflow=669.01 cfs 336.770 af
Primary=221.72 cfs 503.638 af Secondary=0.00 cfs 0.000 af Outflow=221.72 cfs 503.638 af

Pond 4C: Confluence 4 Inflow=1,254.50 cfs 859.618 af
Primary=1,254.50 cfs 859.618 af

Pond 4P: Lake O'Springs Peak Elev=1,107.28' Storage=59.678 af Inflow=388.66 cfs 82.661 af
Primary=93.21 cfs 79.718 af Secondary=0.00 cfs 0.000 af Outflow=93.21 cfs 79.718 af

Pond 5C: Confluence 5 Inflow=1,654.92 cfs 985.854 af
Primary=1,654.92 cfs 985.854 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,119.31' Storage=24.617 af Inflow=193.02 cfs 24.393 af
Primary=48.91 cfs 23.776 af Secondary=0.00 cfs 0.000 af Outflow=48.91 cfs 23.776 af

Pond 6C: Confluence 6 Inflow=322.08 cfs 289.143 af
Primary=322.08 cfs 289.143 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=1,976.93 cfs 1,274.804 af
Primary=1,976.93 cfs 1,274.804 af

Pond 8C: Confluence 8 Inflow=1,931.47 cfs 1,554.181 af
Primary=1,931.47 cfs 1,554.181 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,024.15' Storage=213.367 af Inflow=799.72 cfs 334.873 af
Primary=111.02 cfs 183.560 af Secondary=0.00 cfs 0.000 af Outflow=111.02 cfs 183.560 af

Pond 9P: Sippo Lake Peak Elev=1,028.85' Storage=395.946 af Inflow=1,321.67 cfs 430.430 af
Primary=799.72 cfs 334.878 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=799.72 cfs 334.878 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=757.14 cfs 680.370 af
Primary=757.14 cfs 680.370 af

Pond 16P: Lincoln Way Box Peak Elev=992.66' Storage=46.201 af Inflow=1,974.08 cfs 1,677.797 af
Primary=1,937.82 cfs 1,676.997 af Secondary=0.00 cfs 0.000 af Outflow=1,937.82 cfs 1,676.997 af

Pond 19C: Confluence 19 Inflow=1,982.19 cfs 1,690.015 af
Primary=1,982.19 cfs 1,690.015 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 1,863.729 af Average Runoff Depth = 2.36"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 193.02 cfs @ 12.42 hrs, Volume= 24.393 af, Depth= 2.54"

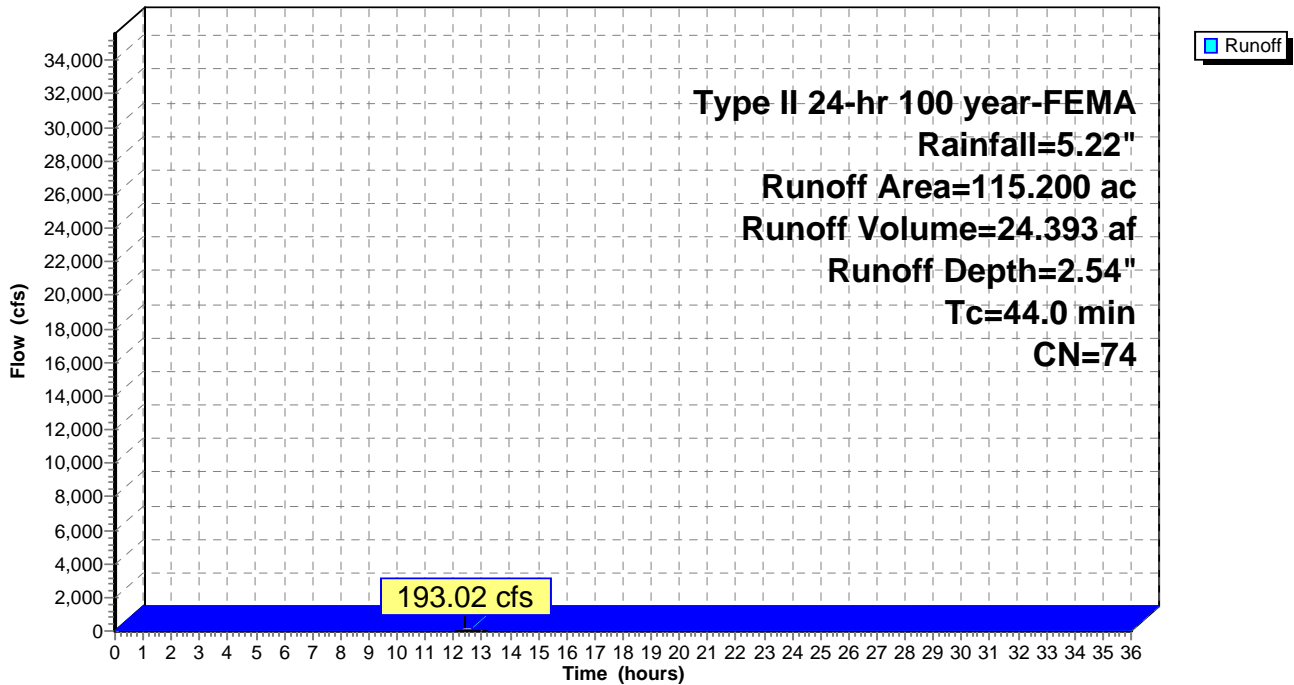
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 352.23 cfs @ 12.71 hrs, Volume= 58.886 af, Depth= 2.63"

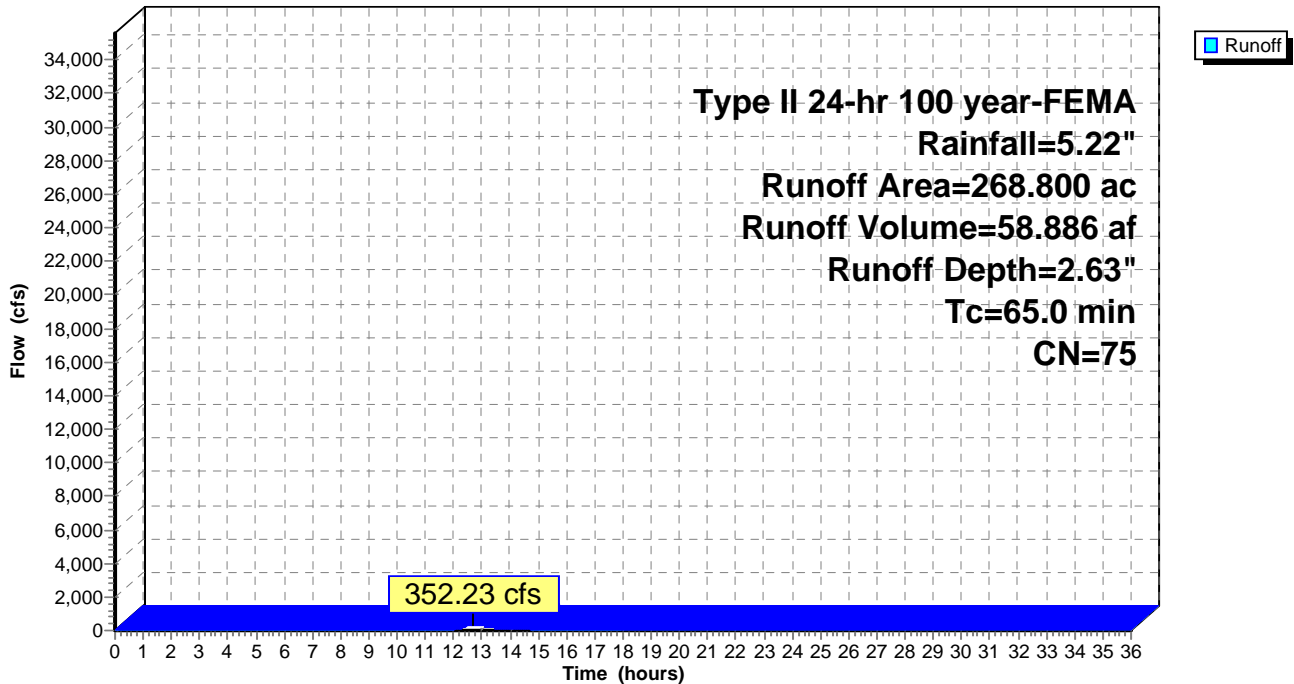
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 576.04 cfs @ 14.82 hrs, Volume= 257.063 af, Depth= 2.20"

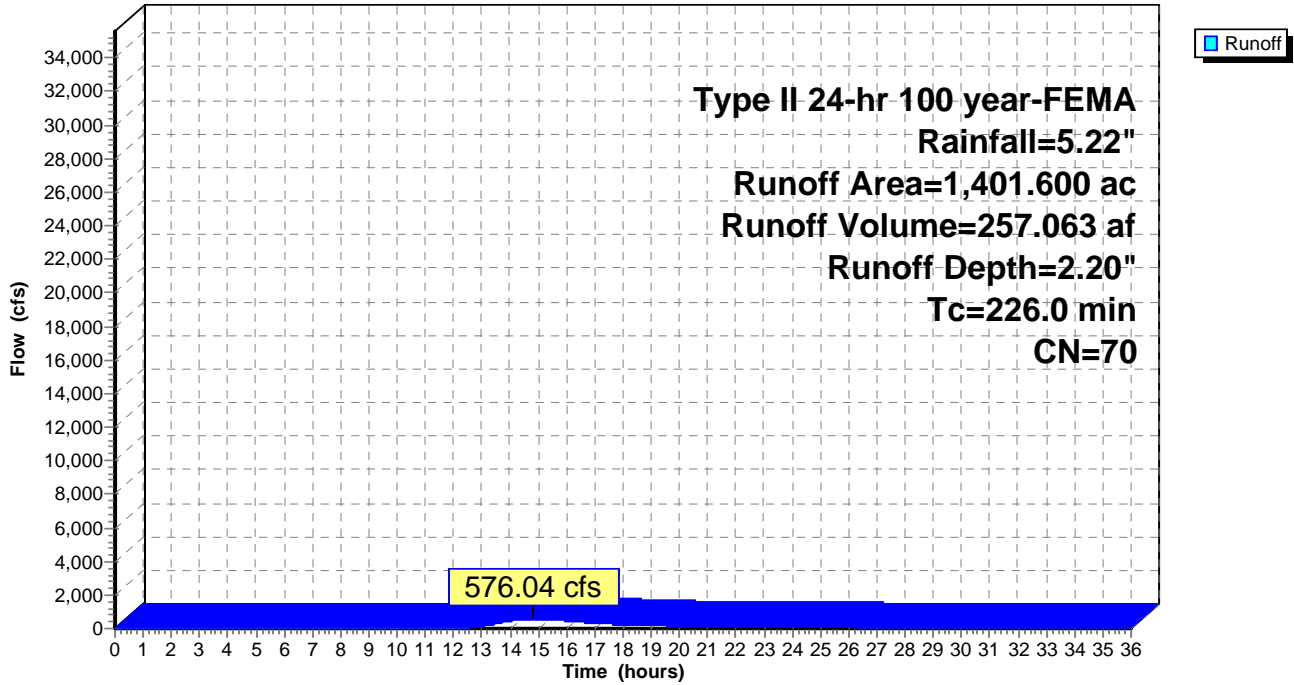
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 626.26 cfs @ 13.51 hrs, Volume= 182.580 af, Depth= 2.04"

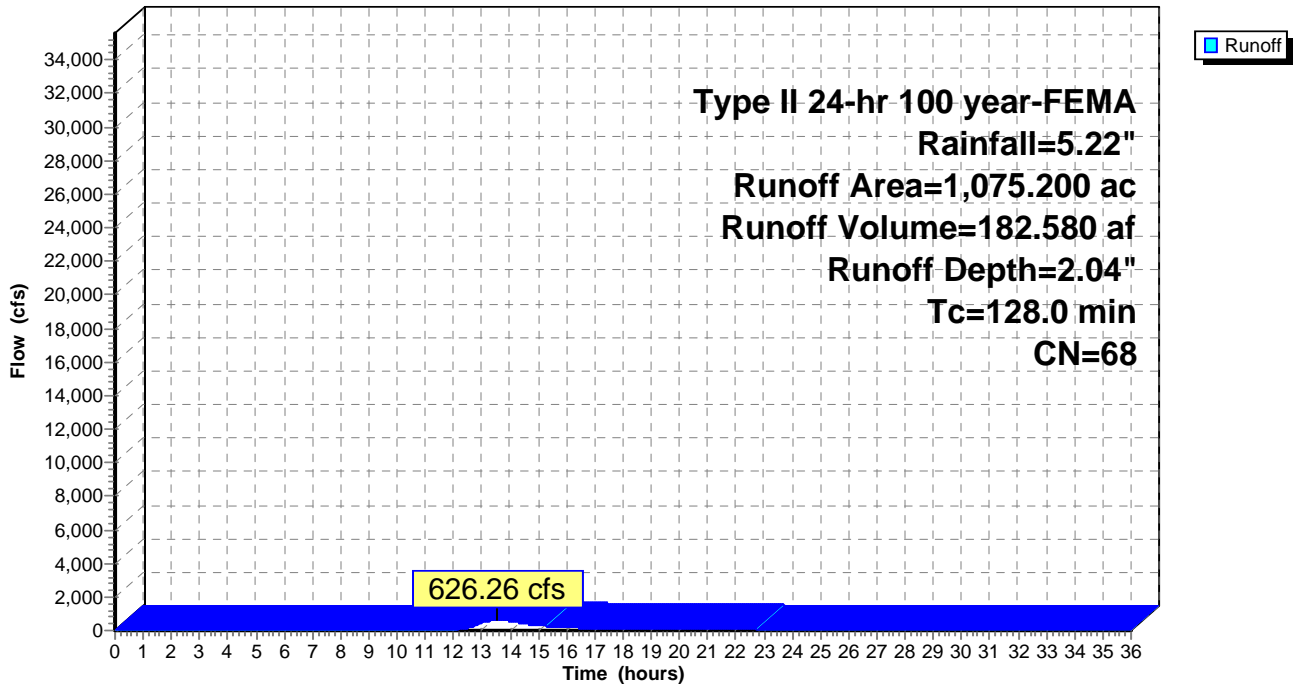
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 431.09 cfs @ 13.62 hrs, Volume= 126.347 af, Depth= 1.96"

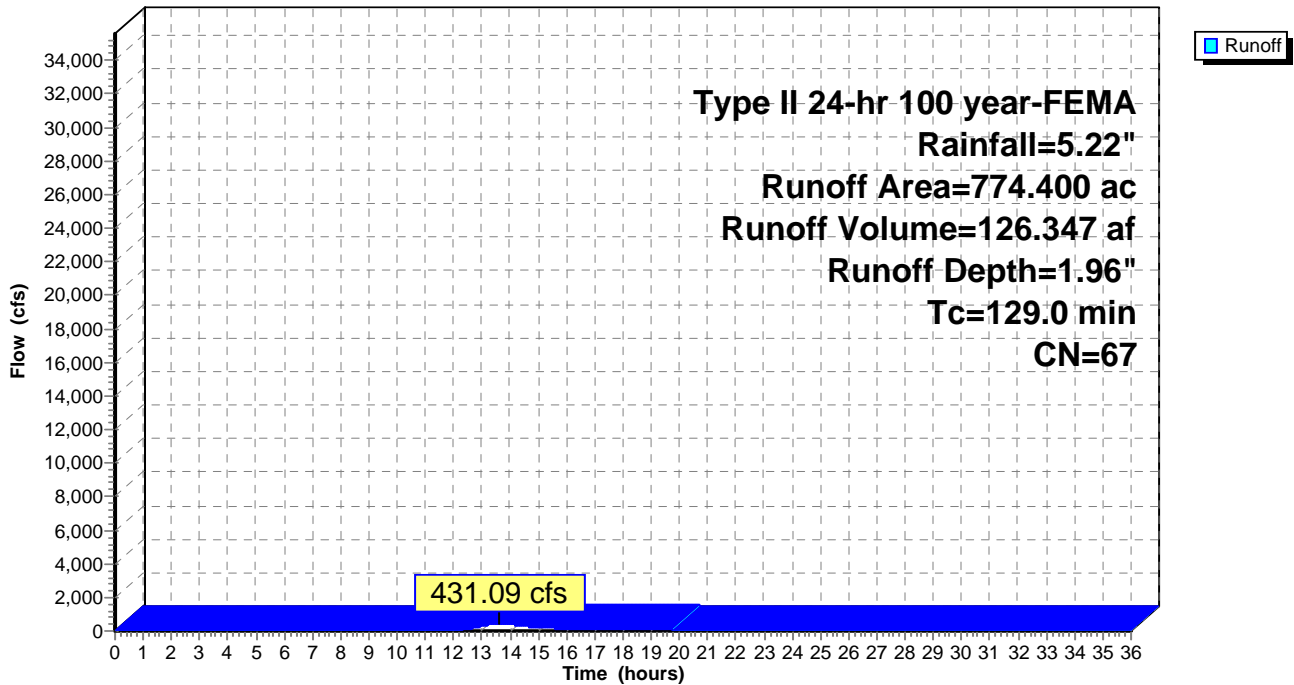
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 614.77 cfs @ 13.32 hrs, Volume= 153.135 af, Depth= 2.54"

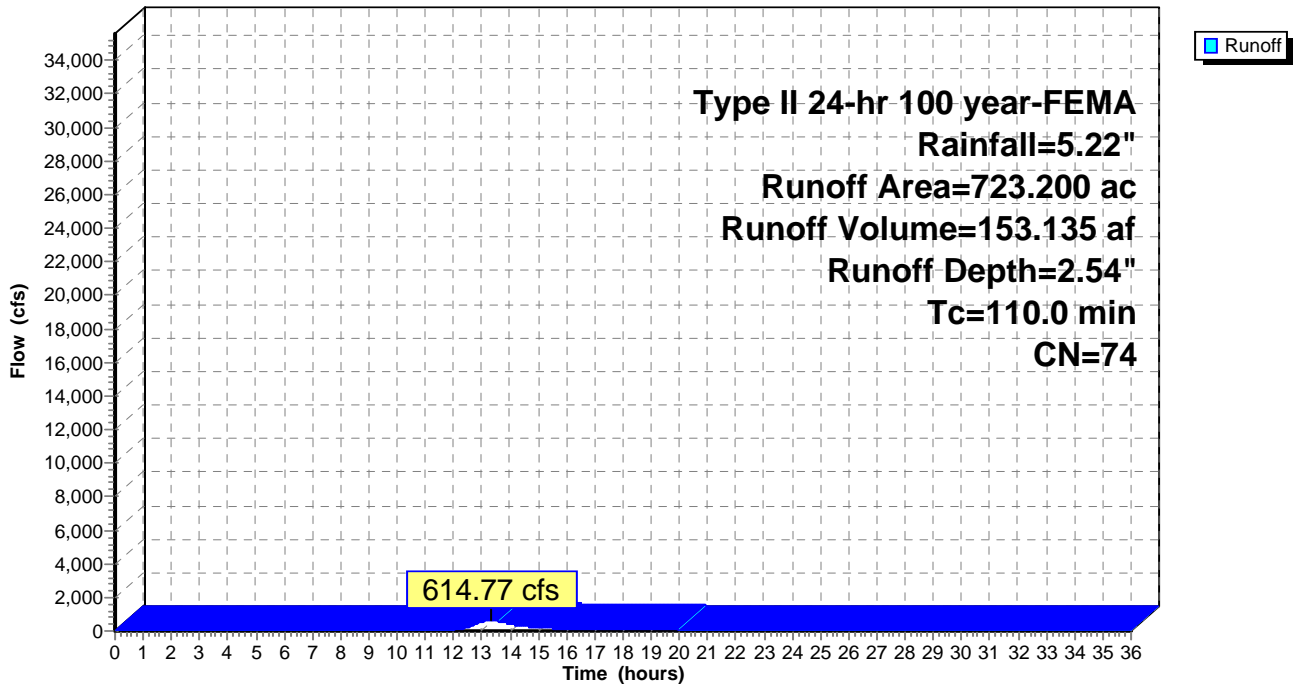
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 893.60 cfs @ 12.80 hrs, Volume= 161.236 af, Depth= 2.63"

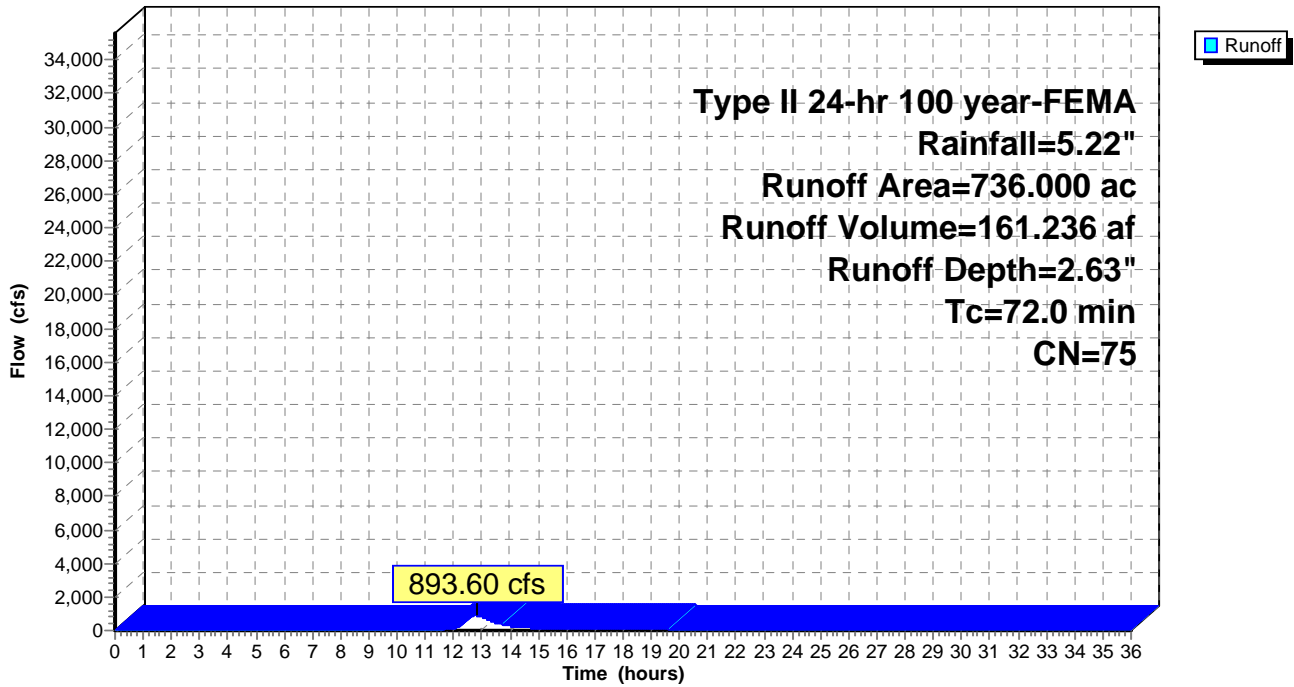
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 920.10 cfs @ 12.83 hrs, Volume= 174.442 af, Depth= 3.09"

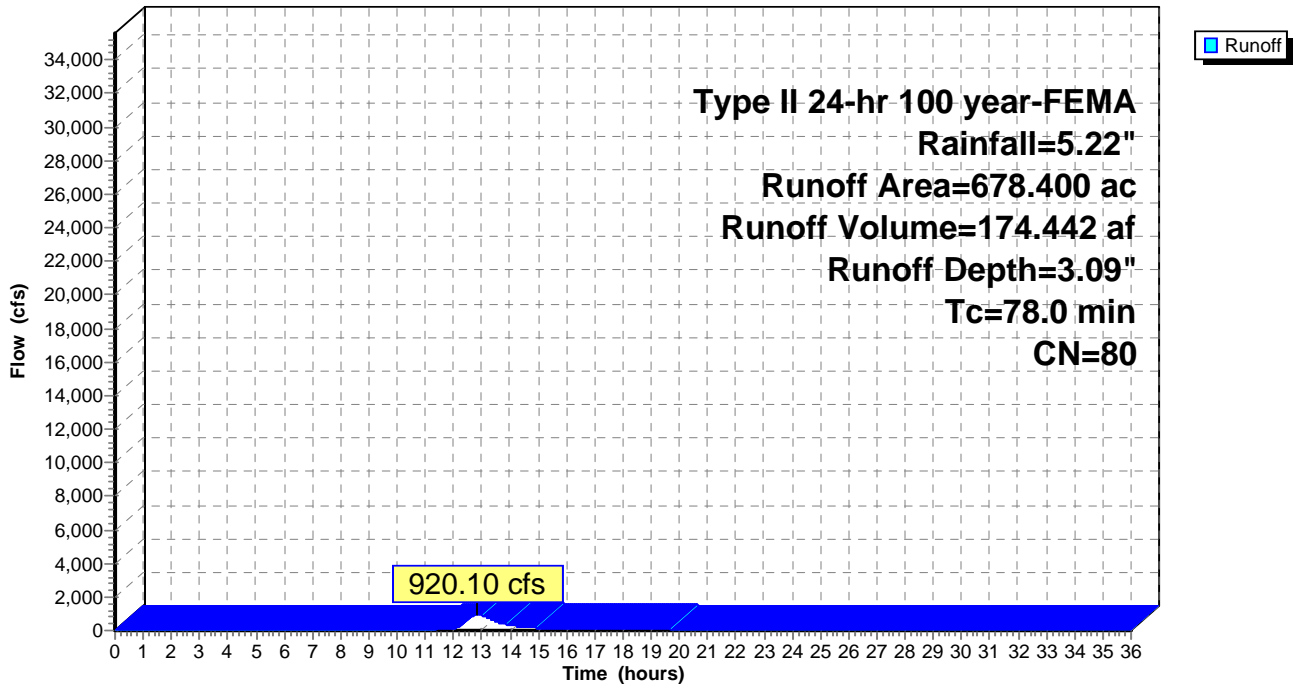
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 566.78 cfs @ 13.95 hrs, Volume= 188.708 af, Depth= 2.12"

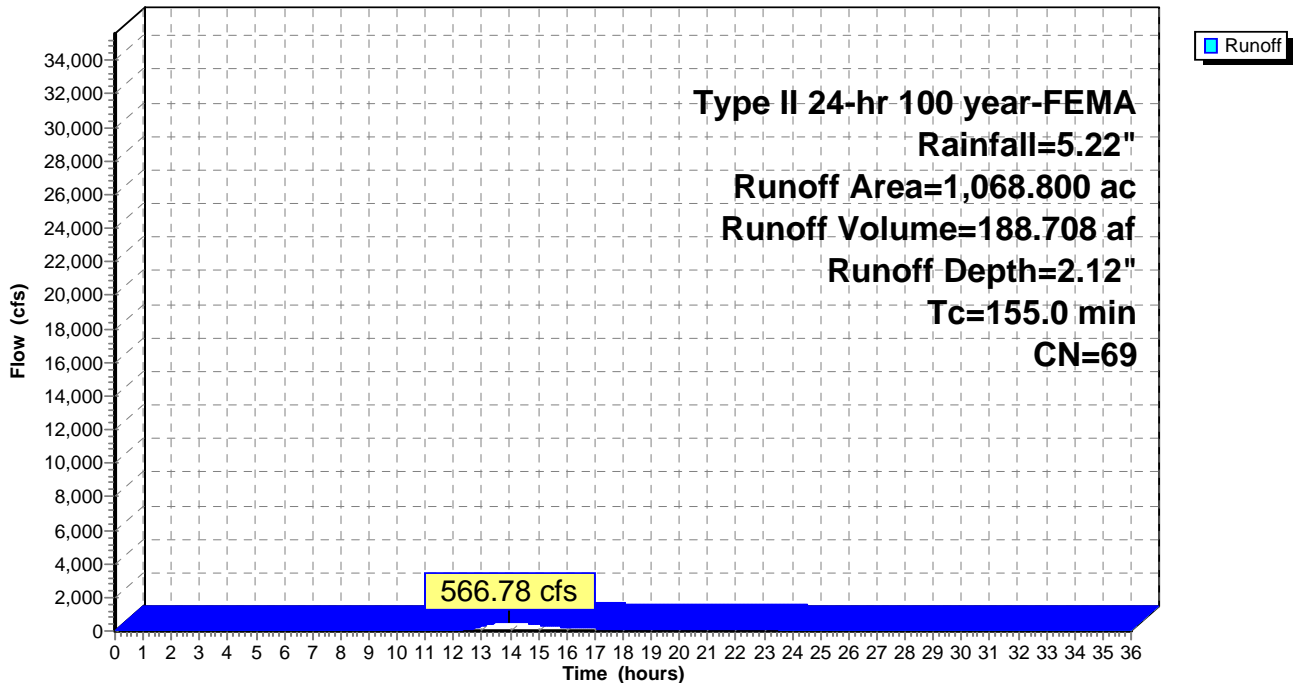
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,321.67 cfs @ 14.03 hrs, Volume= 430.430 af, Depth= 2.63"

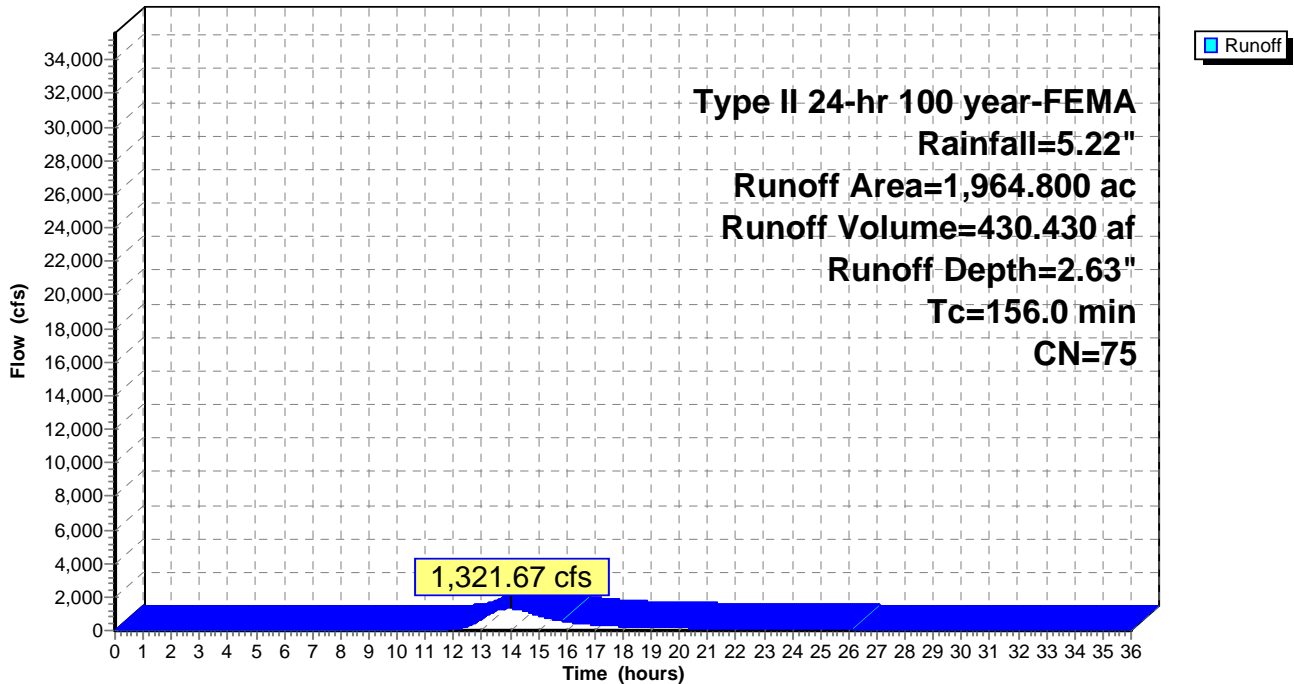
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 322.07 cfs @ 13.93 hrs, Volume= 106.508 af, Depth= 1.96"

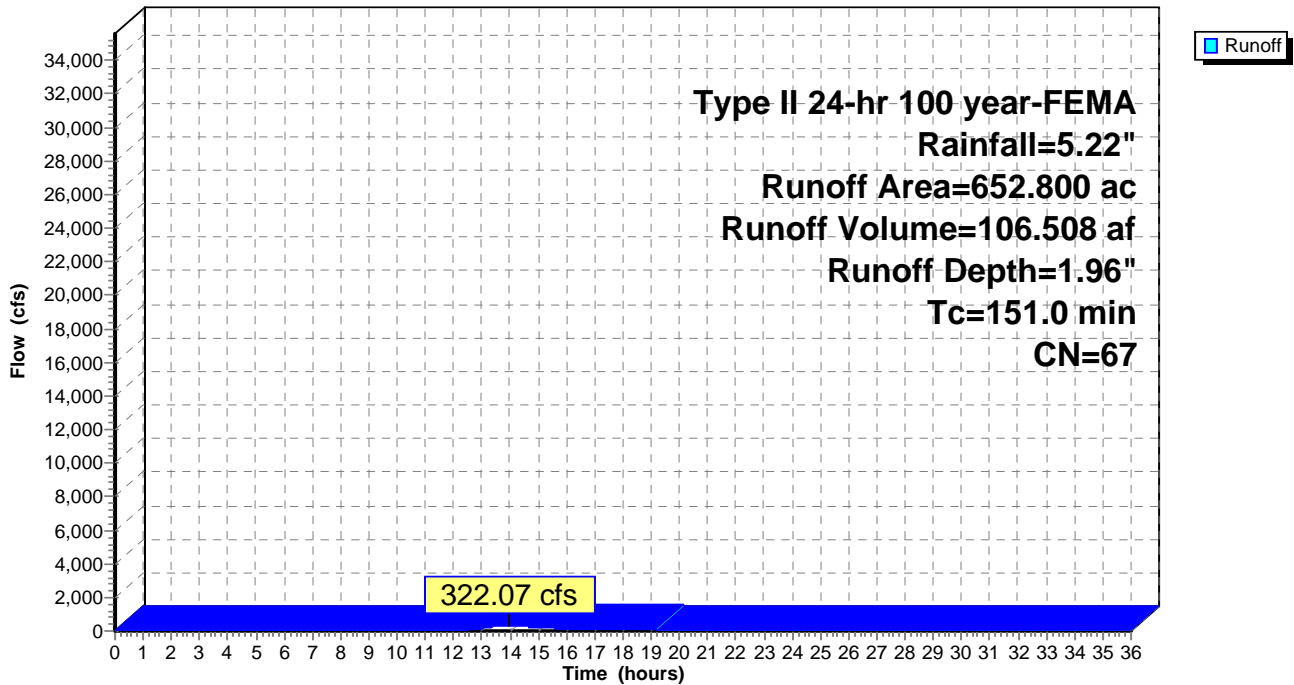
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 100 year-FEMA Rainfall=5.22"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



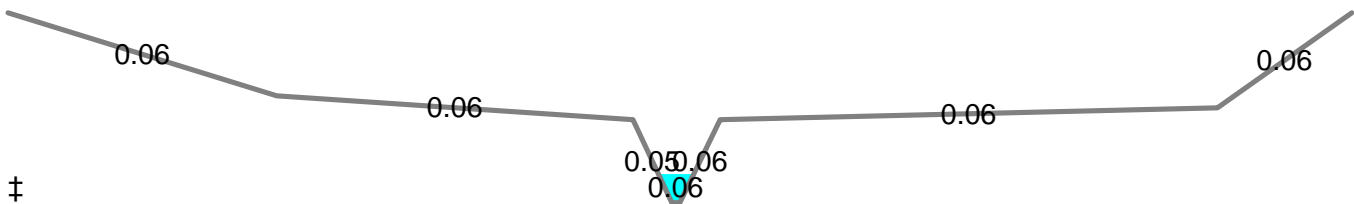
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.38" for 100 year-FEMA event
 Inflow = 221.72 cfs @ 0.00 hrs, Volume= 503.530 af
 Outflow = 203.77 cfs @ 1.54 hrs, Volume= 497.900 af, Atten= 8%, Lag= 92.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.24 fps, Min. Travel Time= 28.0 min
 Avg. Velocity = 4.96 fps, Avg. Travel Time= 29.6 min

Peak Storage= 342,459 cf @ 1.54 hrs
 Average Depth at Peak Storage= 2.41'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

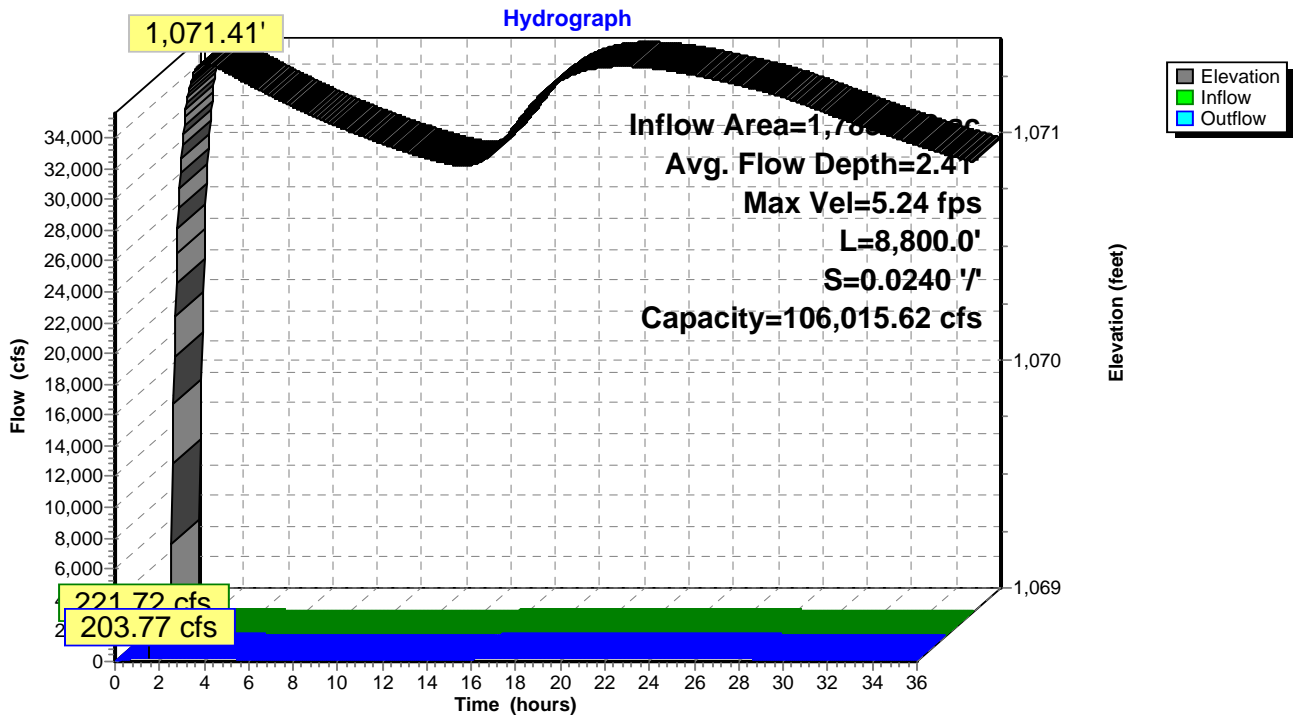
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



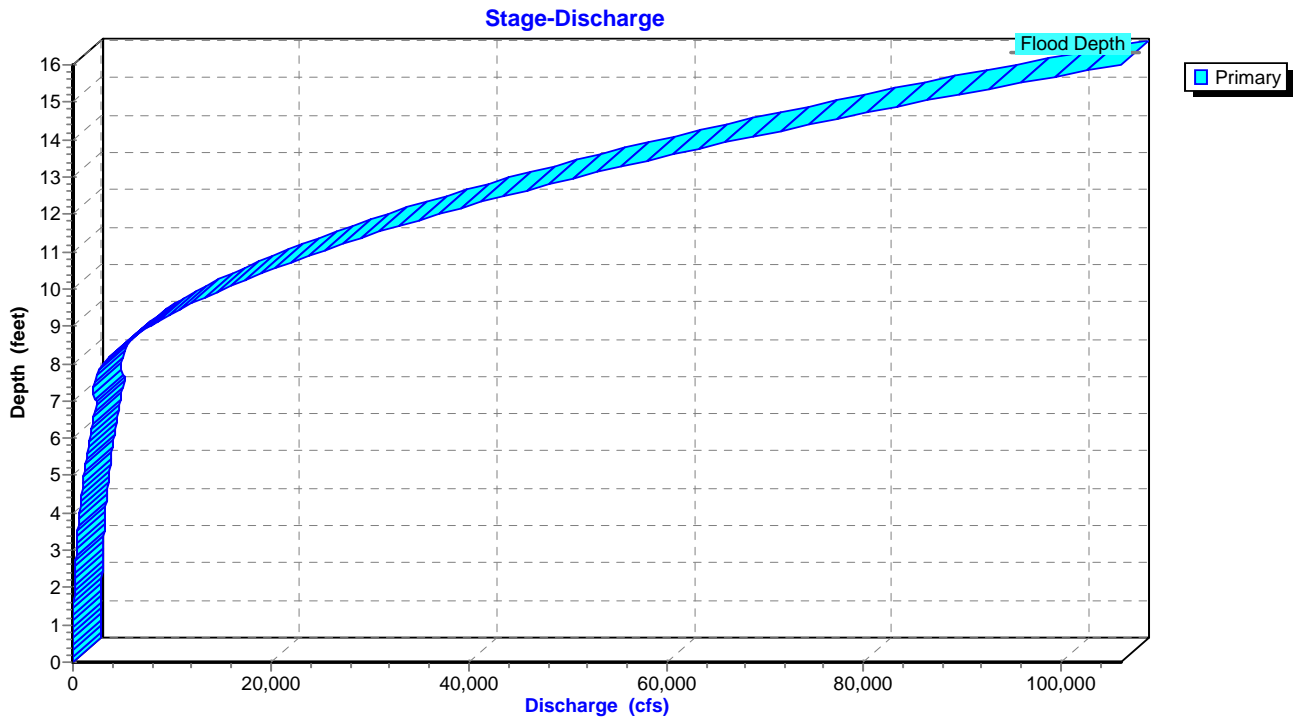
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

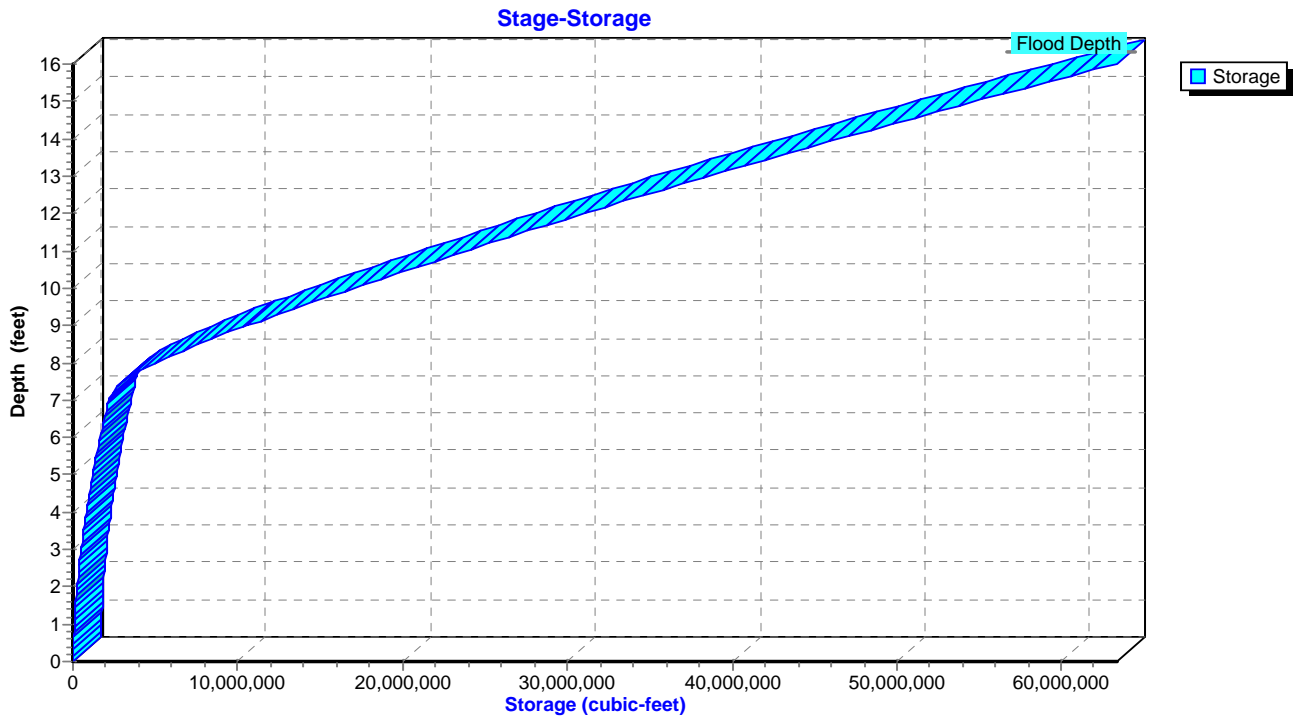
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



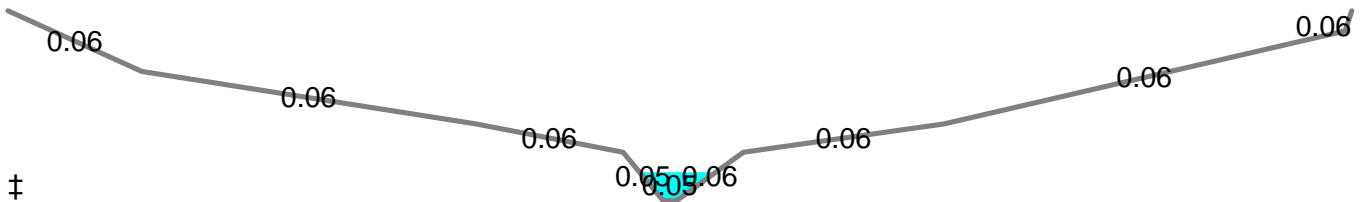
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 2.85" for 100 year-FEMA event
 Inflow = 757.14 cfs @ 13.52 hrs, Volume= 680.260 af
 Outflow = 690.03 cfs @ 14.04 hrs, Volume= 671.022 af, Atten= 9%, Lag= 30.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.92 fps, Min. Travel Time= 33.7 min
 Avg. Velocity = 2.17 fps, Avg. Travel Time= 45.3 min

Peak Storage= 1,396,100 cf @ 14.04 hrs
 Average Depth at Peak Storage= 7.06'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

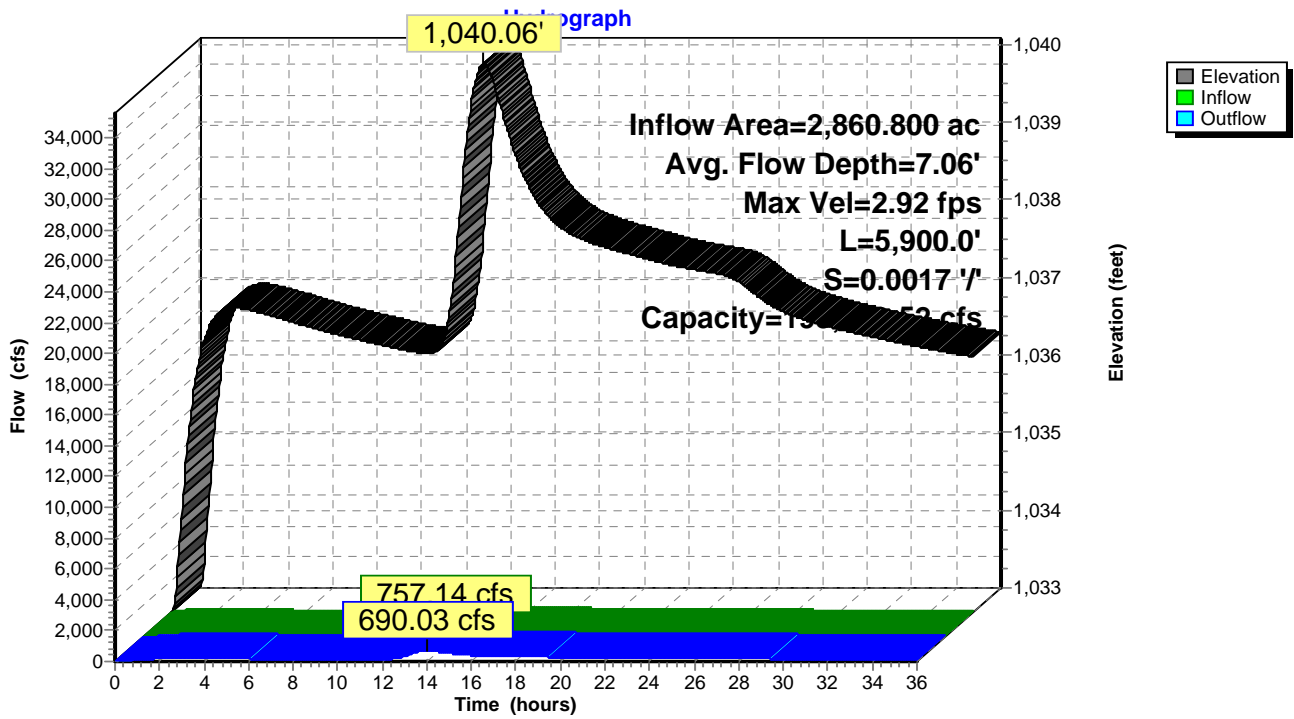
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



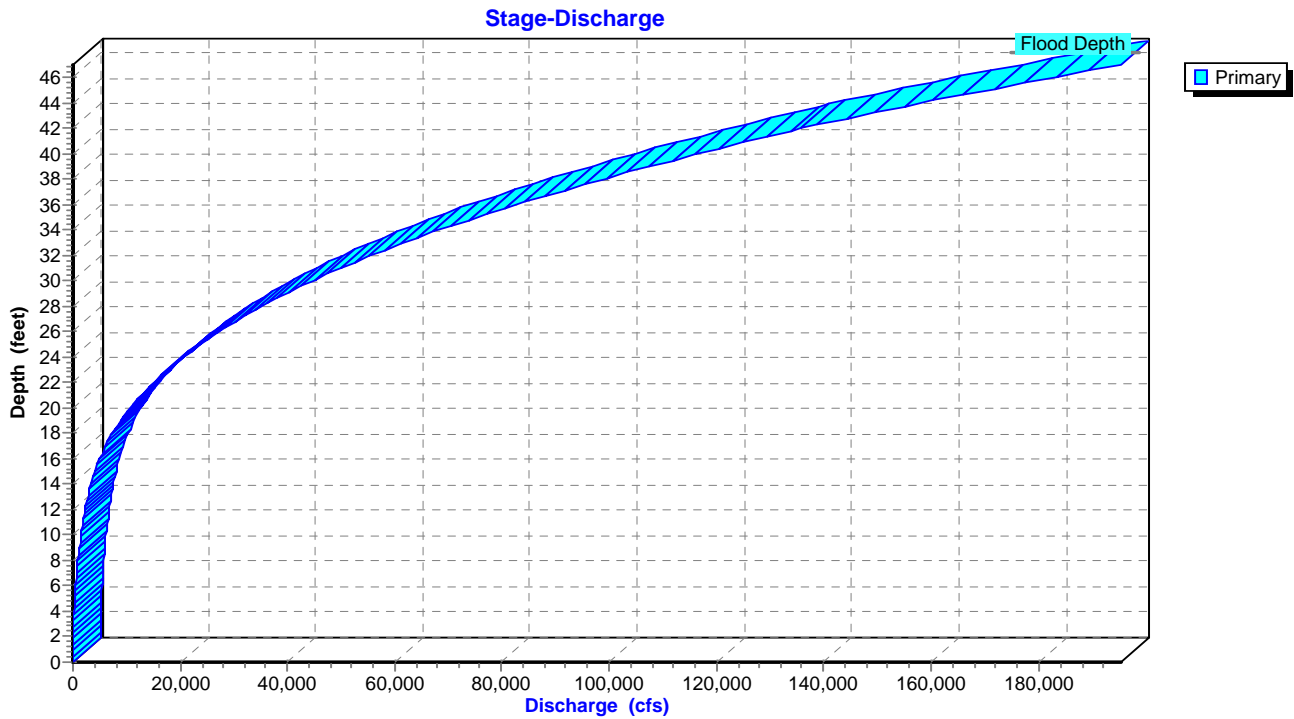
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

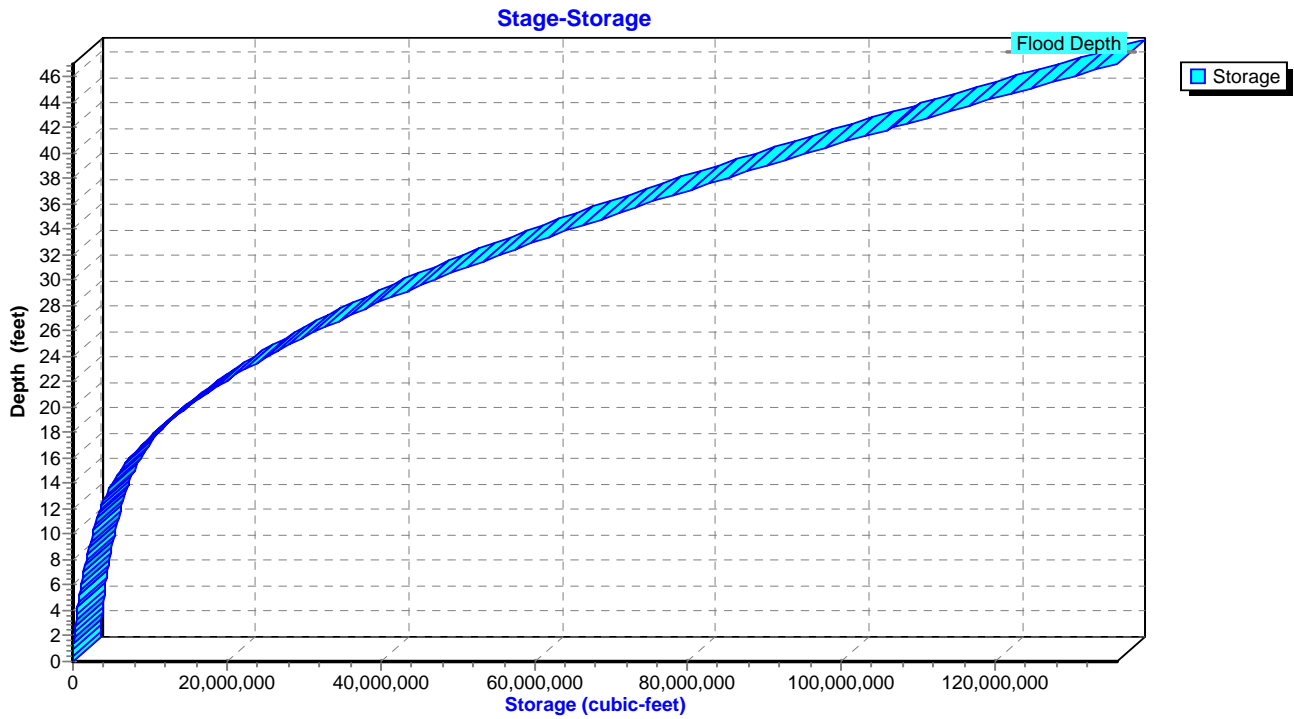
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



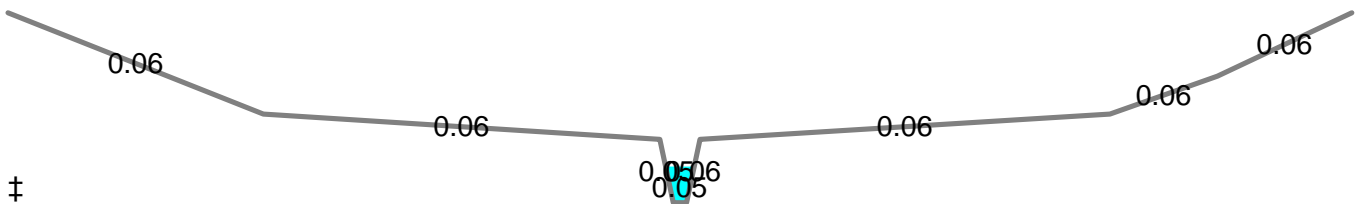
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.12" for 100 year-FEMA event
 Inflow = 111.02 cfs @ 25.35 hrs, Volume= 183.479 af
 Outflow = 111.02 cfs @ 25.42 hrs, Volume= 182.716 af, Atten= 0%, Lag= 4.4 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.47 fps, Min. Travel Time= 6.1 min
 Avg. Velocity = 2.36 fps, Avg. Travel Time= 6.4 min

Peak Storage= 40,388 cf @ 25.42 hrs
 Average Depth at Peak Storage= 2.86'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

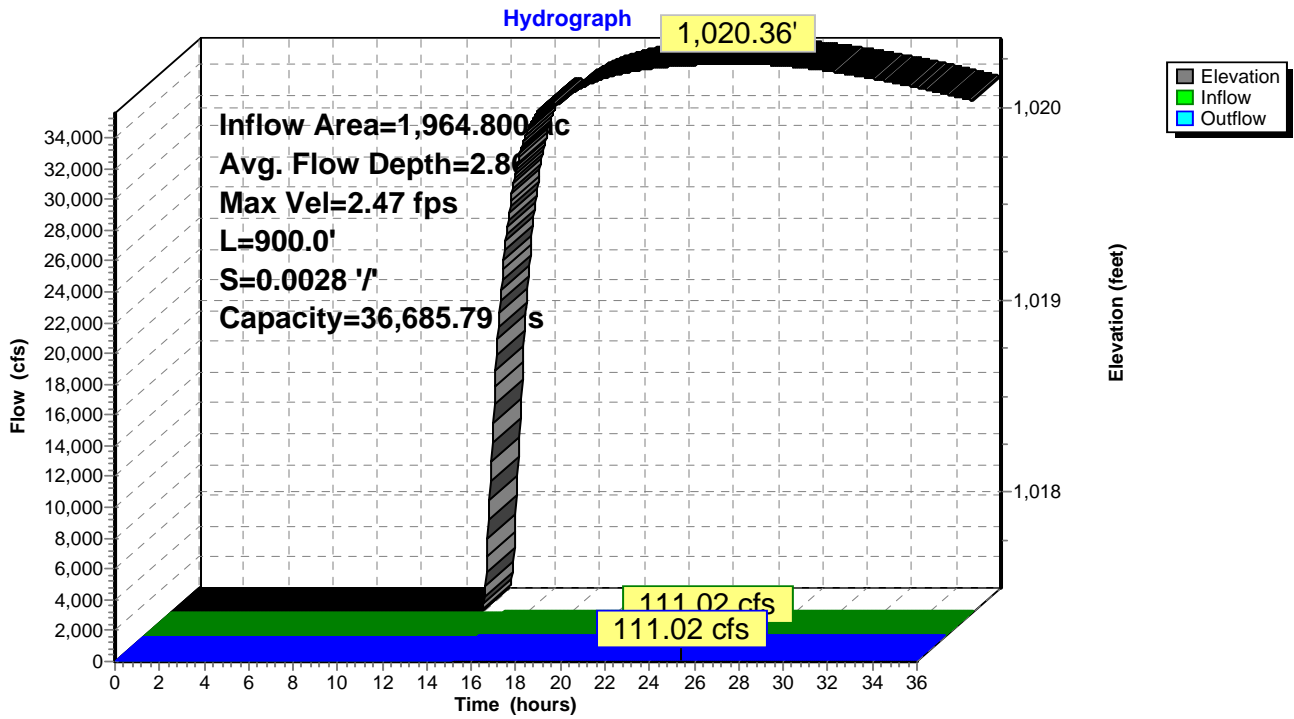
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



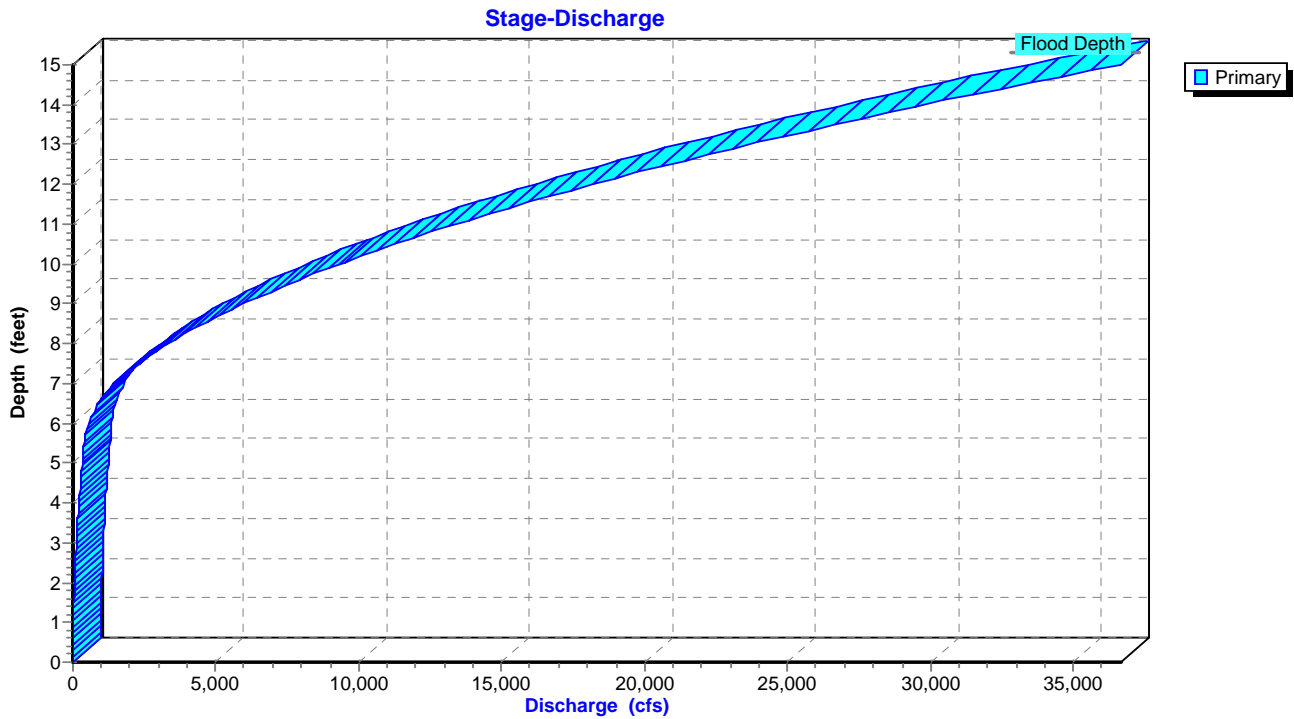
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

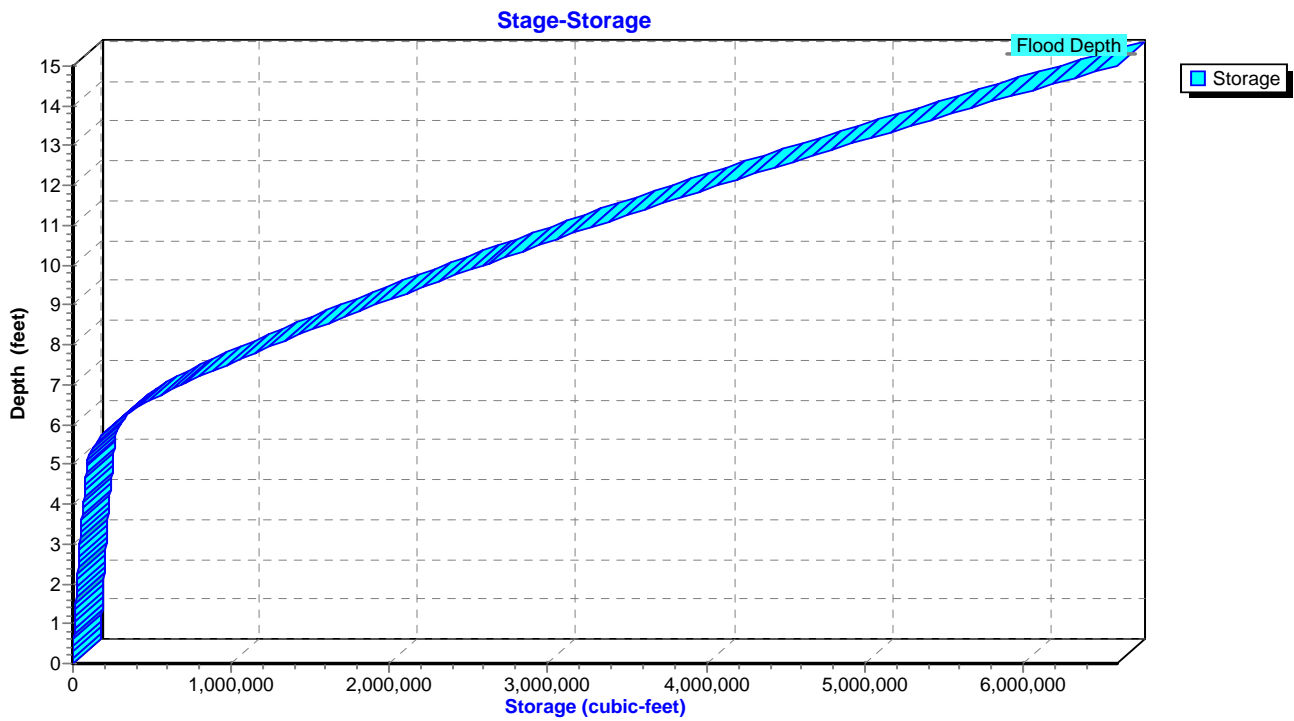
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



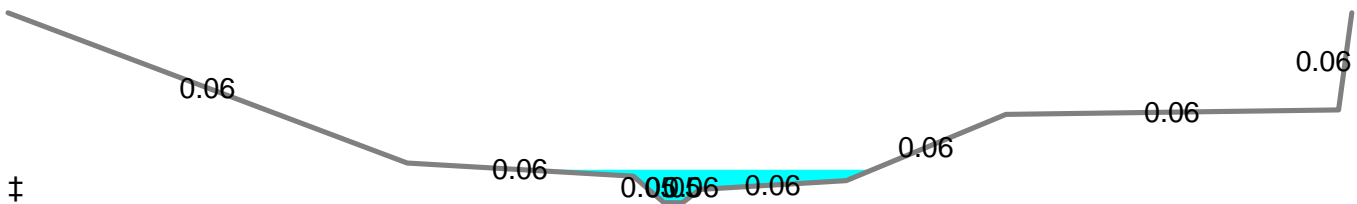
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.09" for 100 year-FEMA event
 Inflow = 1,976.93 cfs @ 13.94 hrs, Volume= 1,274.611 af
 Outflow = 1,504.53 cfs @ 14.87 hrs, Volume= 1,240.012 af, Atten= 24%, Lag= 55.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 1.99 fps, Min. Travel Time= 73.6 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 98.9 min

Peak Storage= 6,655,728 cf @ 14.87 hrs
 Average Depth at Peak Storage= 7.48'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

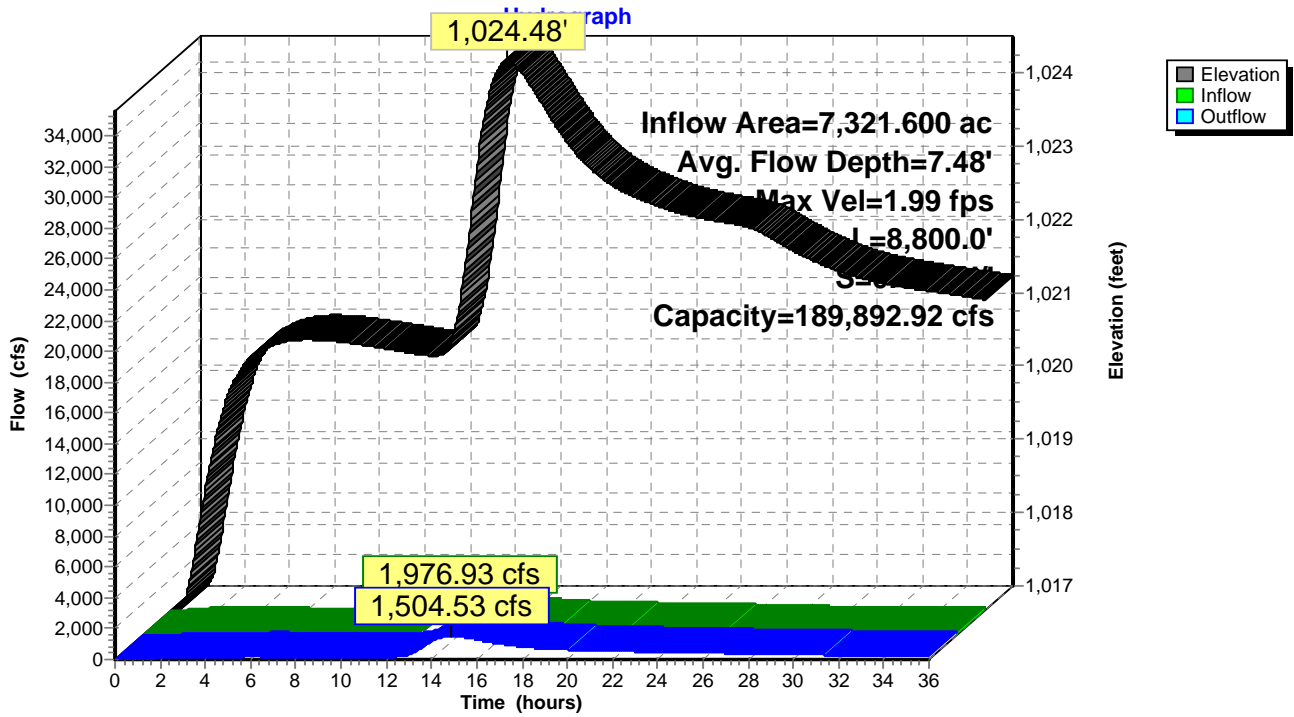
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



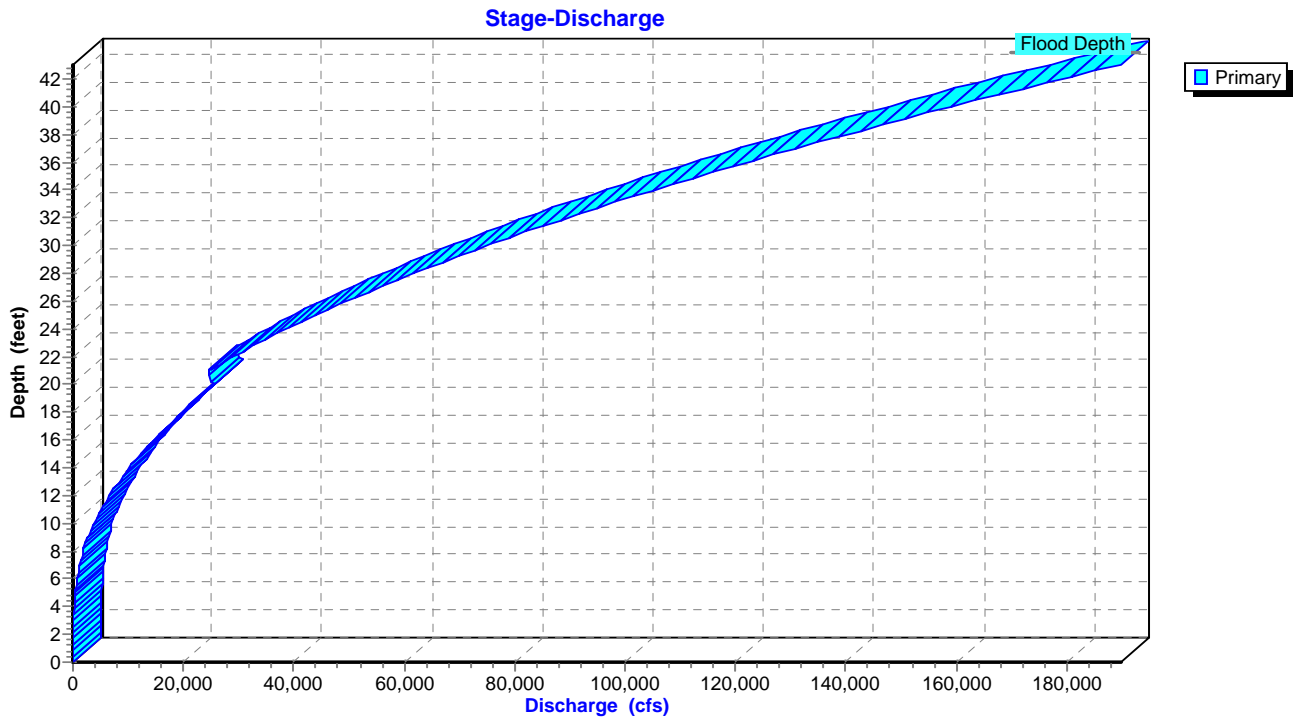
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

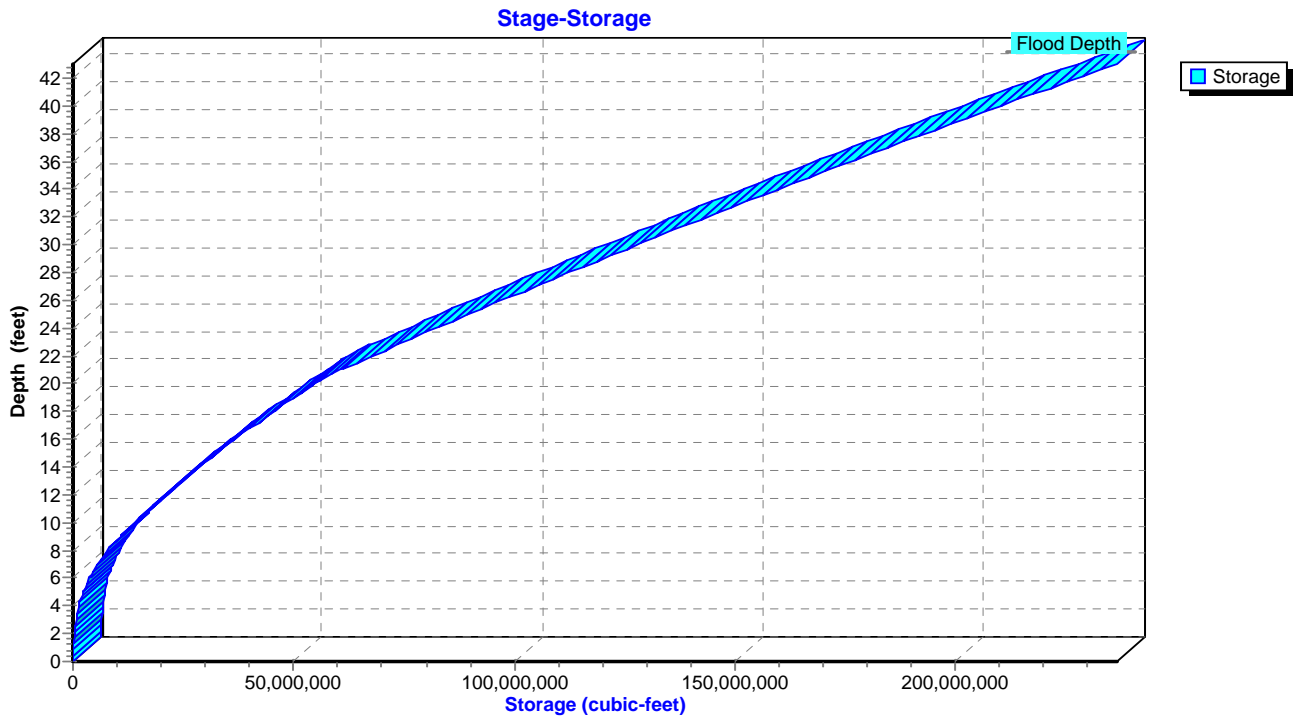
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



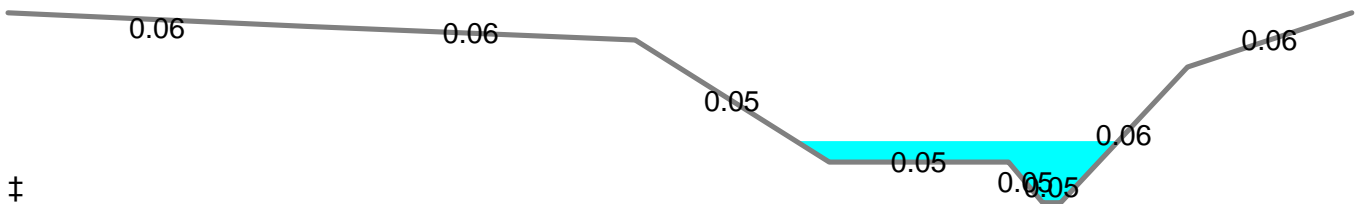
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.12" for 100 year-FEMA event
 Inflow = 1,931.47 cfs @ 14.36 hrs, Volume= 1,553.979 af
 Outflow = 1,830.19 cfs @ 15.06 hrs, Volume= 1,515.784 af, Atten= 5%, Lag= 41.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.21 fps, Min. Travel Time= 56.6 min
 Avg. Velocity = 1.48 fps, Avg. Travel Time= 84.5 min

Peak Storage= 6,217,299 cf @ 15.06 hrs
 Average Depth at Peak Storage= 9.08'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

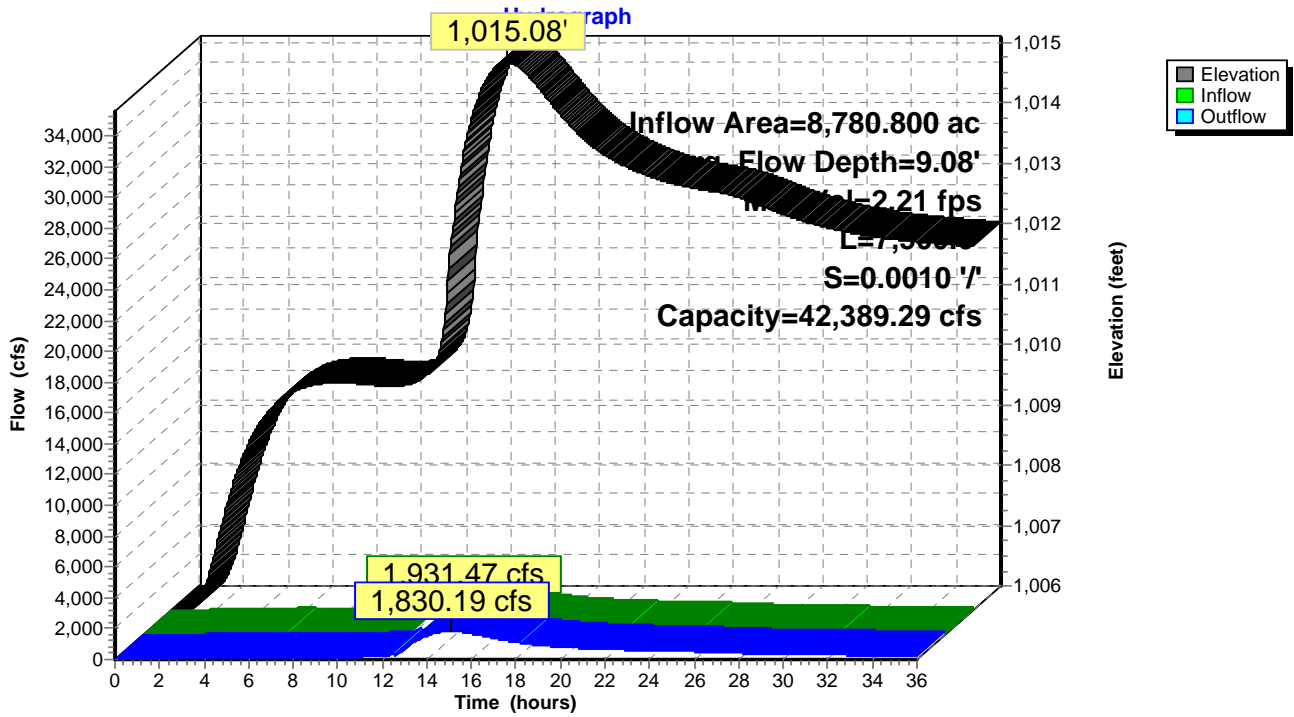
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



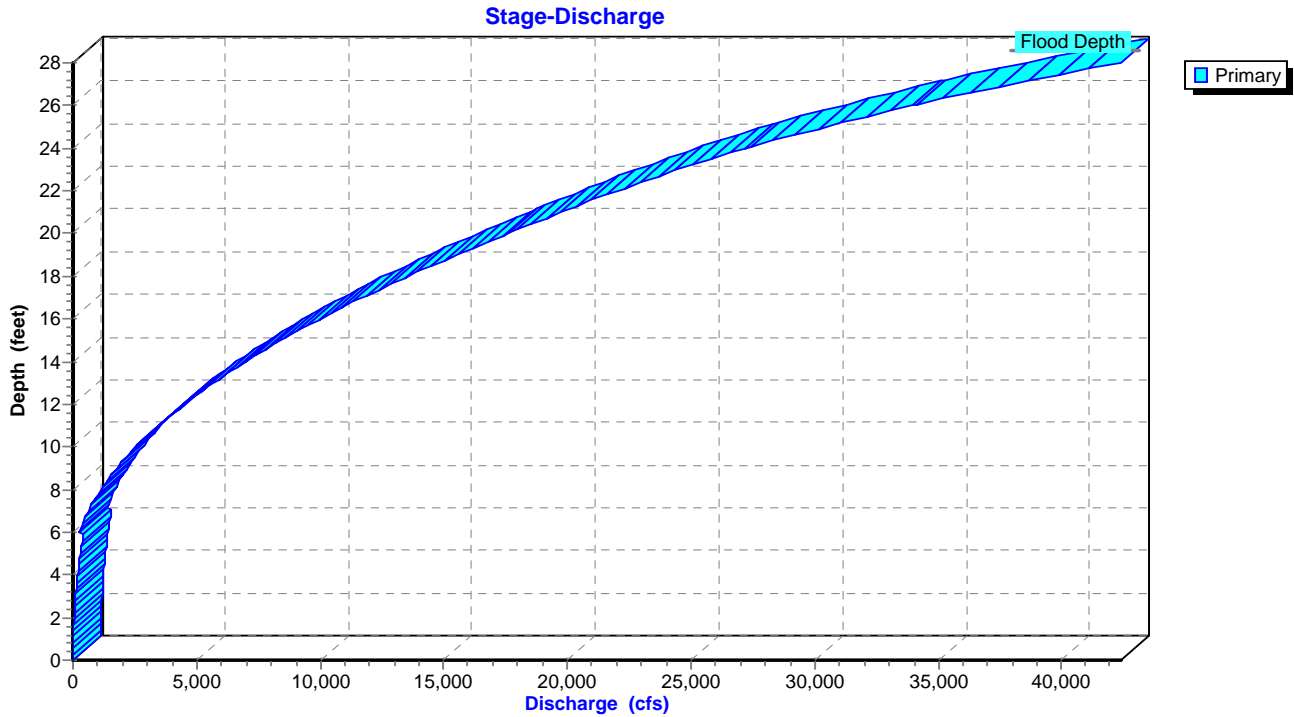
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

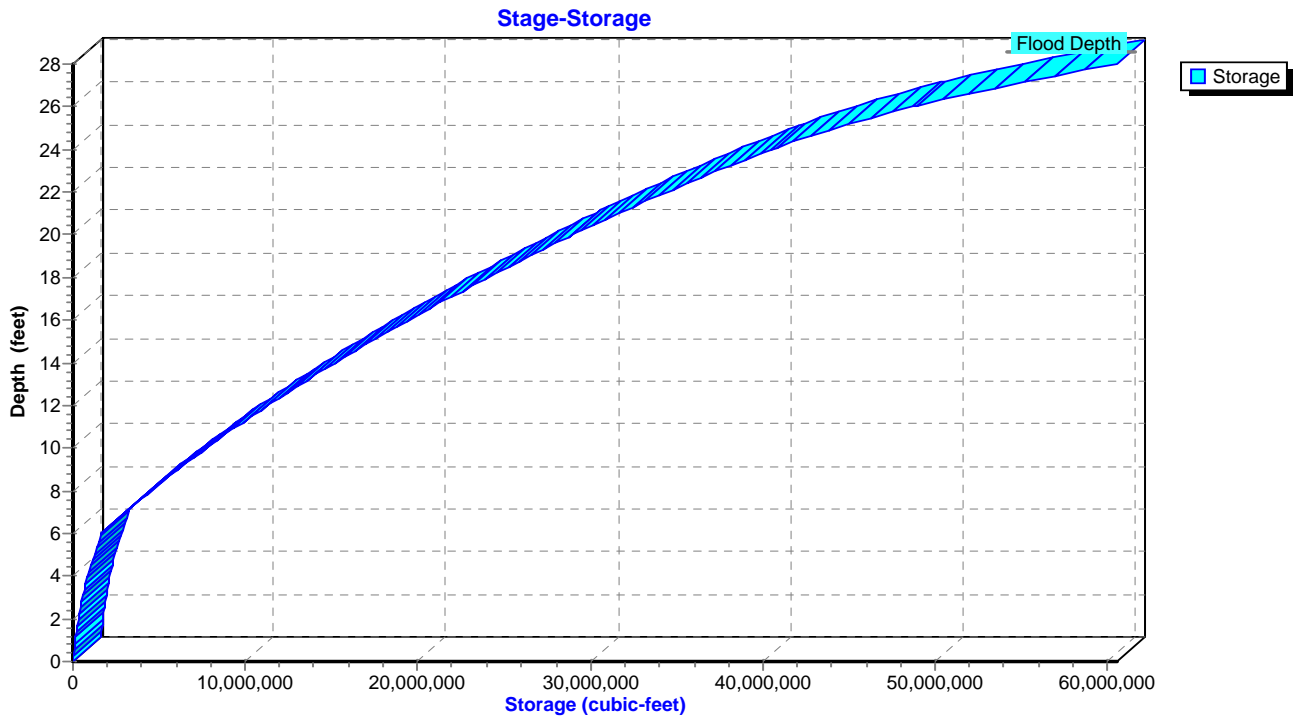
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



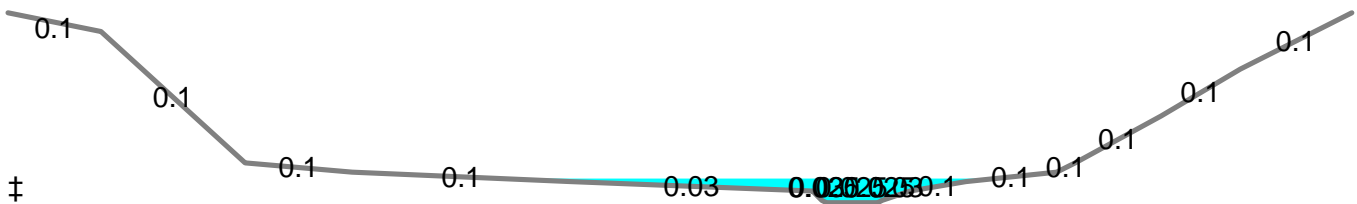
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.13" for 100 year-FEMA event
 Inflow = 1,937.82 cfs @ 15.54 hrs, Volume= 1,676.783 af
 Outflow = 1,937.81 cfs @ 15.55 hrs, Volume= 1,676.661 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.26 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.06 fps, Avg. Travel Time= 0.9 min

Peak Storage= 94,223 cf @ 15.55 hrs
 Average Depth at Peak Storage= 5.16'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

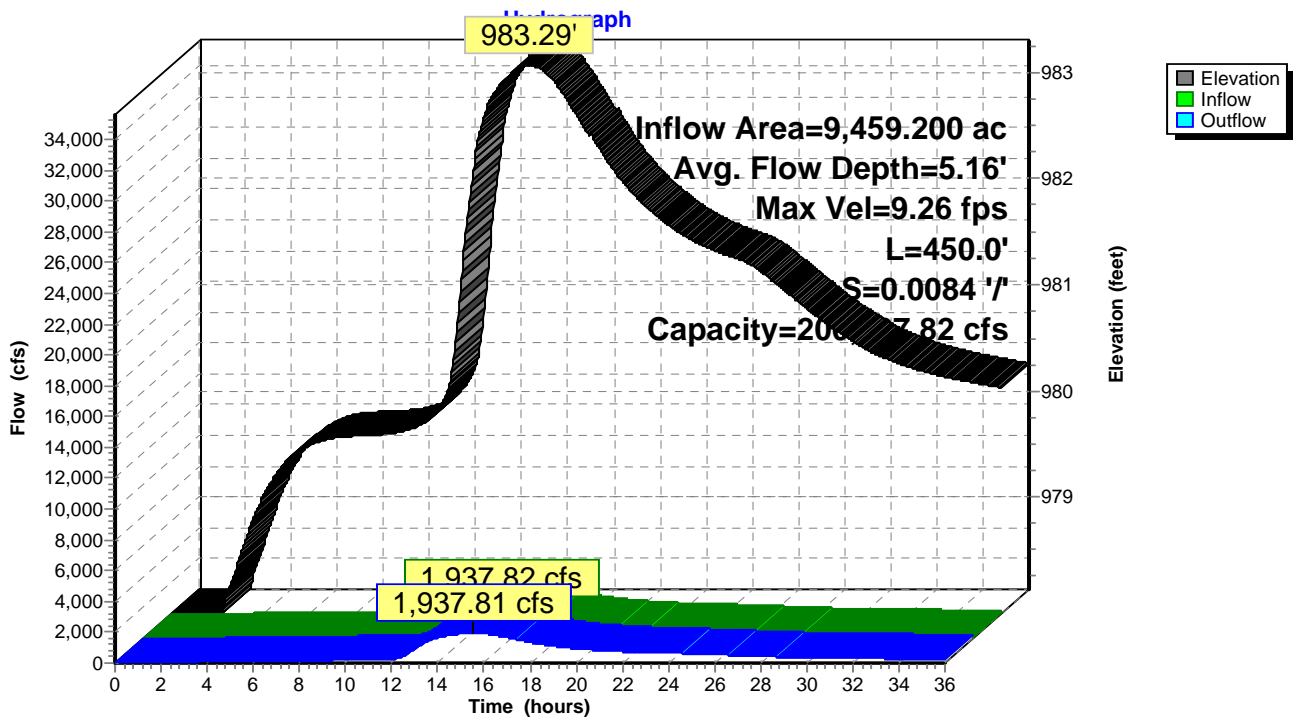
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



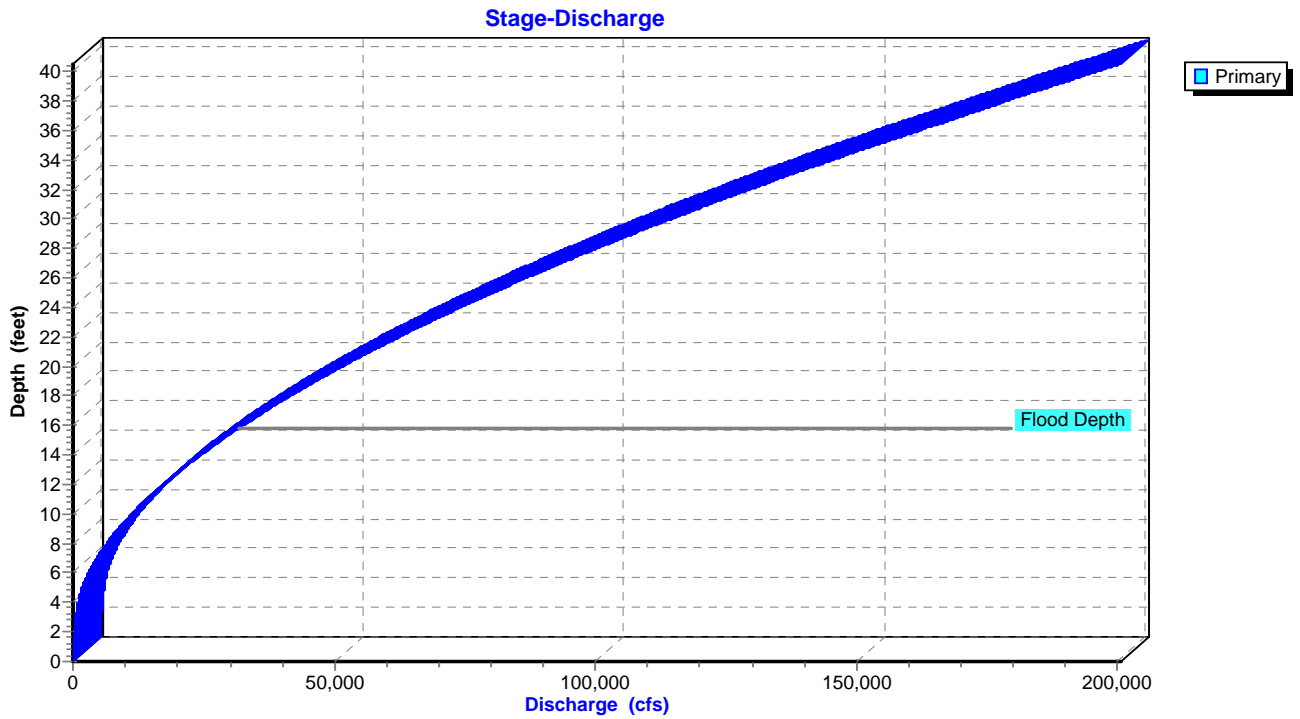
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

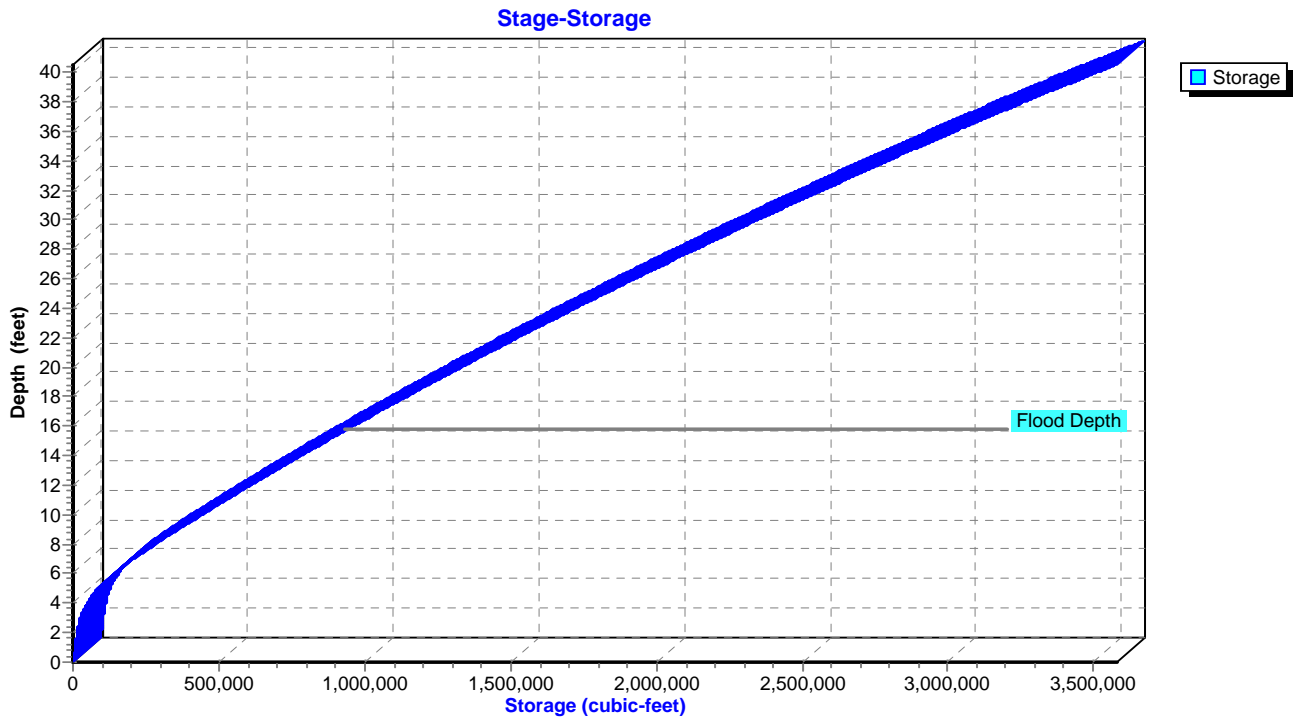
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

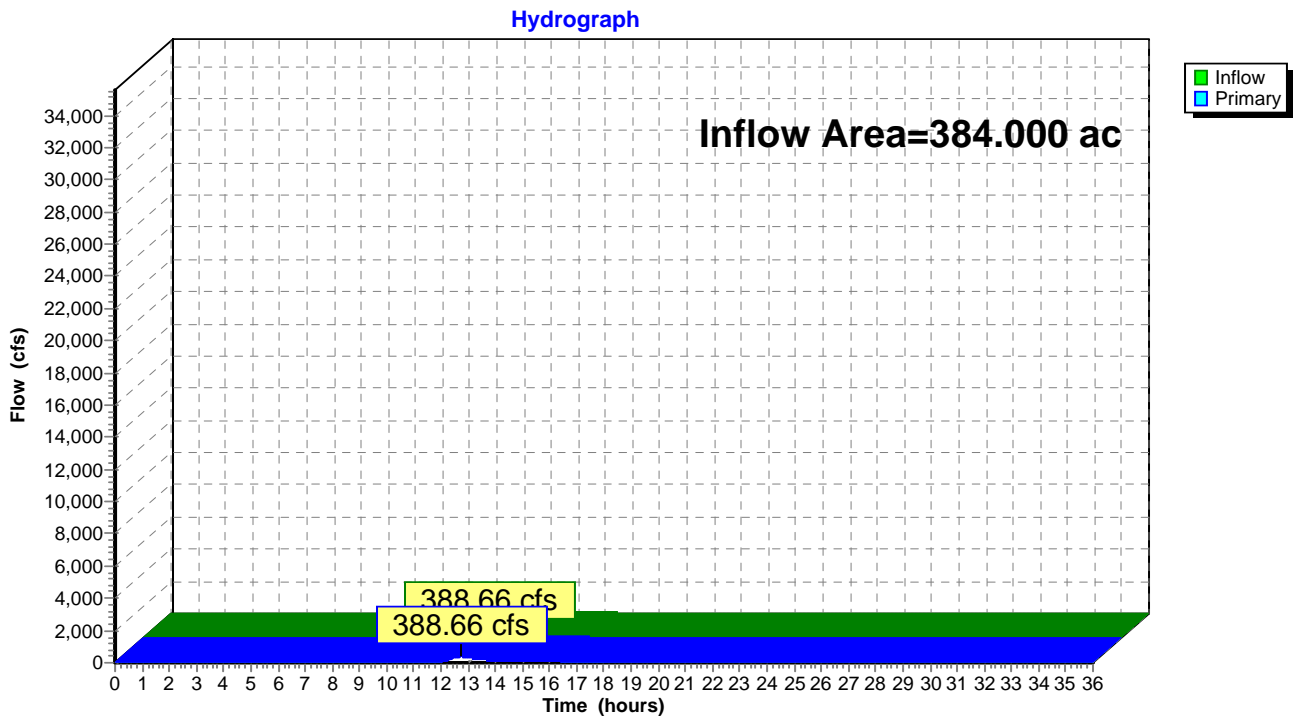


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.58" for 100 year-FEMA event
Inflow = 388.66 cfs @ 12.72 hrs, Volume= 82.661 af
Primary = 388.66 cfs @ 12.73 hrs, Volume= 82.661 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.14" for 100 year-FEMA event
 Inflow = 1,982.19 cfs @ 14.87 hrs, Volume= 1,689.805 af
 Outflow = 1,974.08 cfs @ 15.08 hrs, Volume= 1,678.010 af, Atten= 0%, Lag= 12.8 min
 Primary = 1,654.37 cfs @ 15.08 hrs, Volume= 1,570.137 af
 Secondary = 319.71 cfs @ 15.08 hrs, Volume= 107.873 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,006.27' @ 15.08 hrs Surf.Area= 16.817 ac Storage= 110.251 af (49.289 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

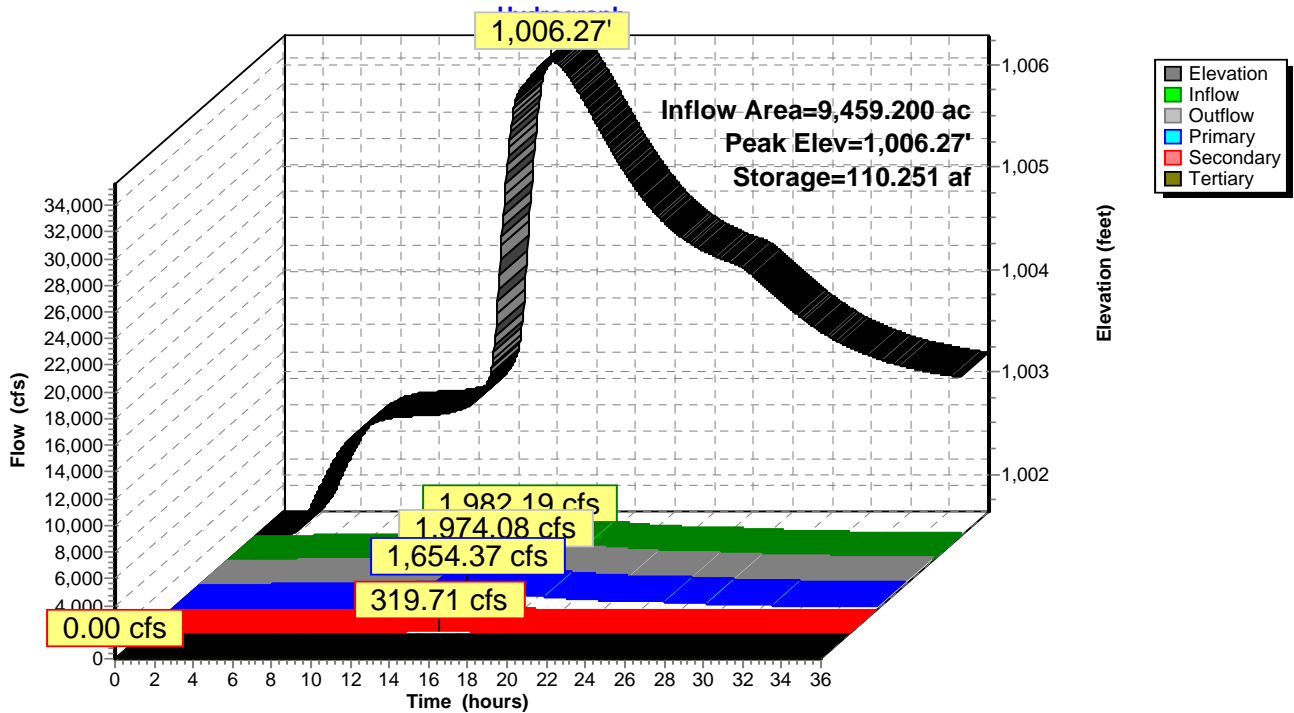
Plug-Flow detention time= 88.0 min calculated for 1,616.599 af (96% of inflow)
 Center-of-Mass det. time= 17.1 min (1,155.0 - 1,137.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

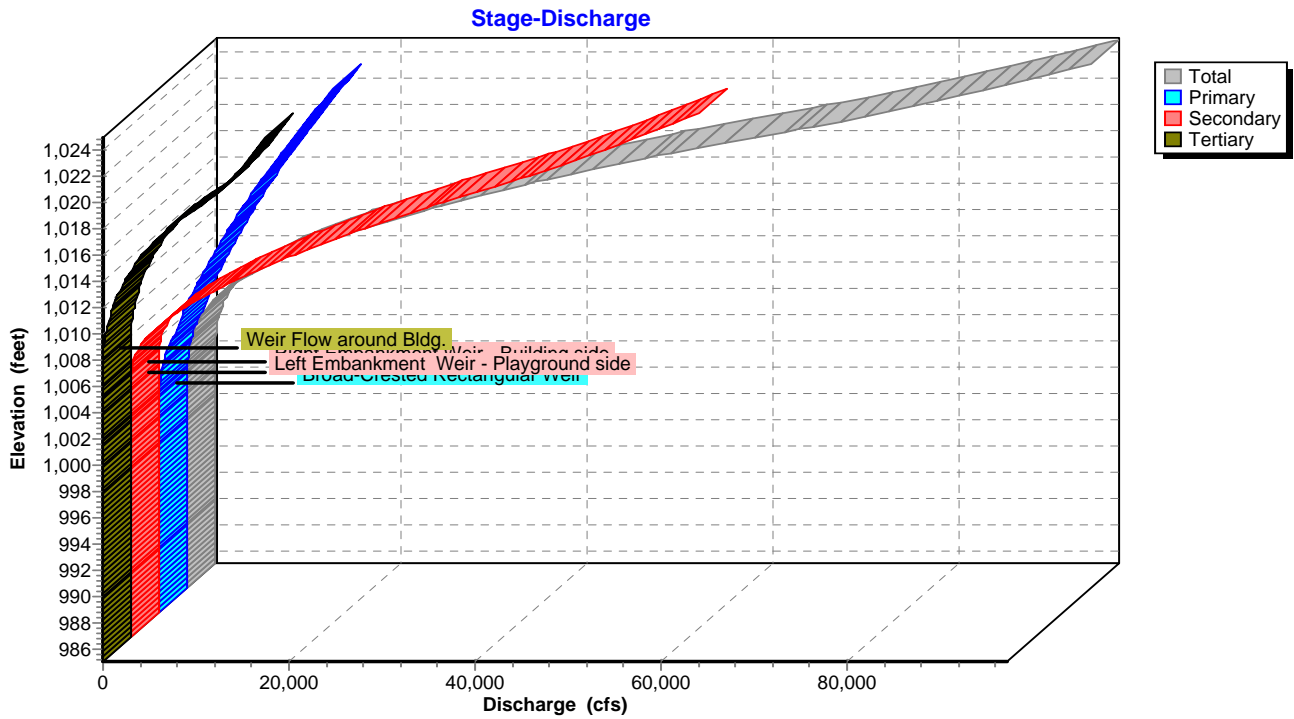
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

- Primary OutFlow Max=1,654.37 cfs @ 15.08 hrs HW=1,006.27' TW=992.47' (Dynamic Tailwater)
 - 1=Broad-Crested Rectangular Weir (Weir Controls 1,654.37 cfs @ 7.14 fps)
- Secondary OutFlow Max=319.71 cfs @ 15.08 hrs HW=1,006.27' TW=992.47' (Dynamic Tailwater)
 - 2=Right Embankment Weir - Building side (Weir Controls 98.31 cfs @ 3.33 fps)
 - 3=Left Embankment Weir - Playground side (Weir Controls 221.39 cfs @ 3.91 fps)
- Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 - 4=Weir Flow around Bldg. (Controls 0.00 cfs)

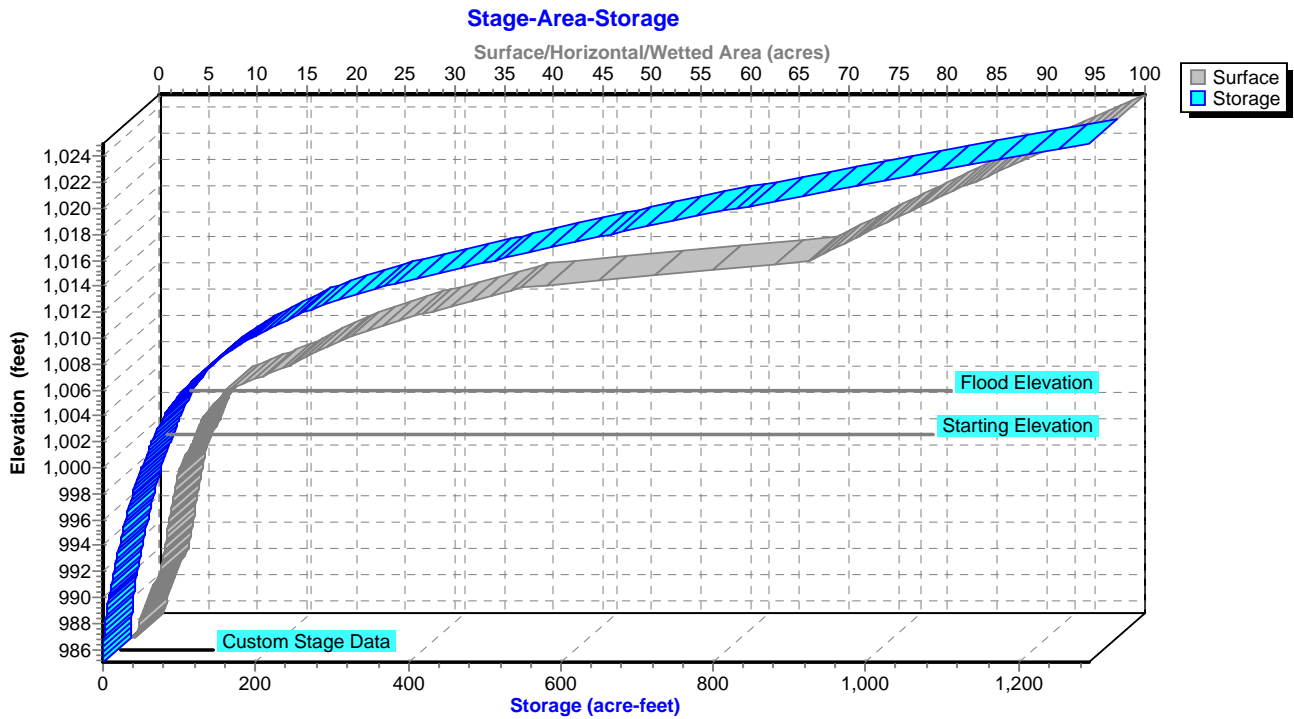
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

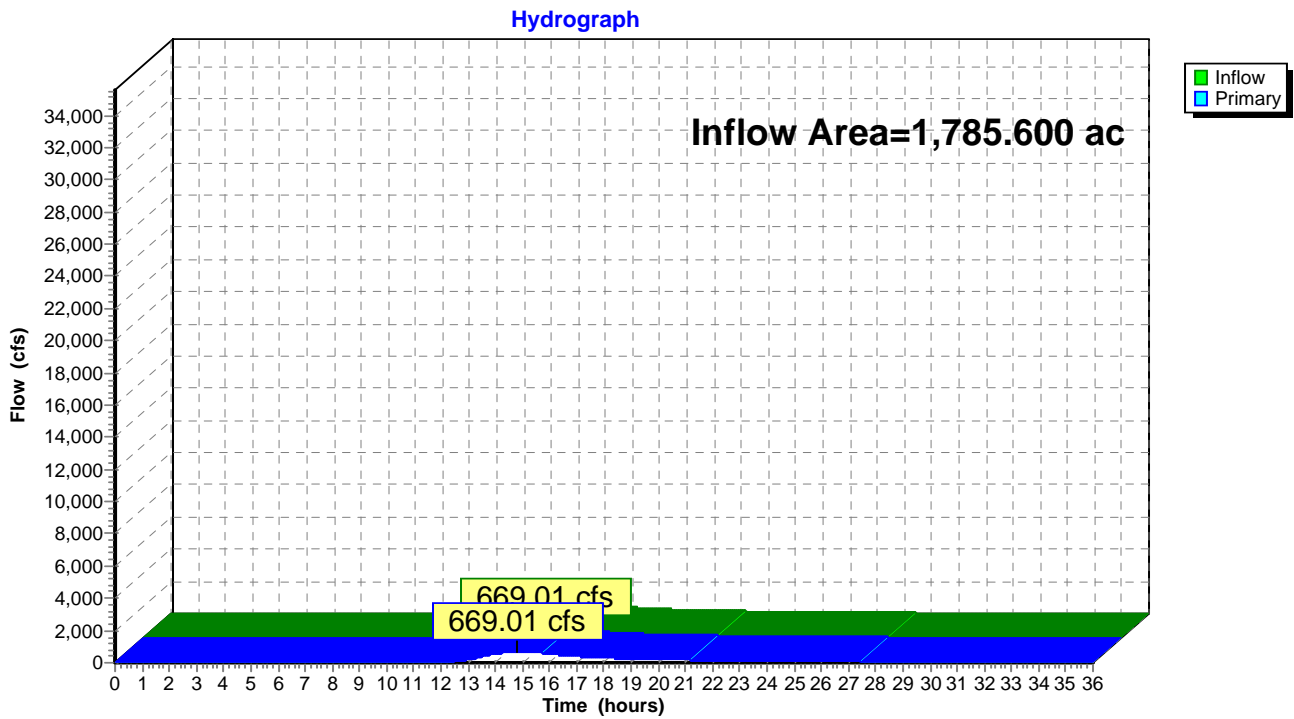


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.26" for 100 year-FEMA event
Inflow = 669.01 cfs @ 14.82 hrs, Volume= 336.776 af
Primary = 669.01 cfs @ 14.83 hrs, Volume= 336.776 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.26" for 100 year-FEMA event
 Inflow = 669.01 cfs @ 14.83 hrs, Volume= 336.770 af
 Outflow = 221.72 cfs @ 0.00 hrs, Volume= 503.638 af, Atten= 67%, Lag= 0.0 min
 Primary = 221.72 cfs @ 0.00 hrs, Volume= 503.638 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,097.40' @ 0.00 hrs Surf.Area= 220.000 ac Storage= 1,914.000 af
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: outflow precedes inflow)

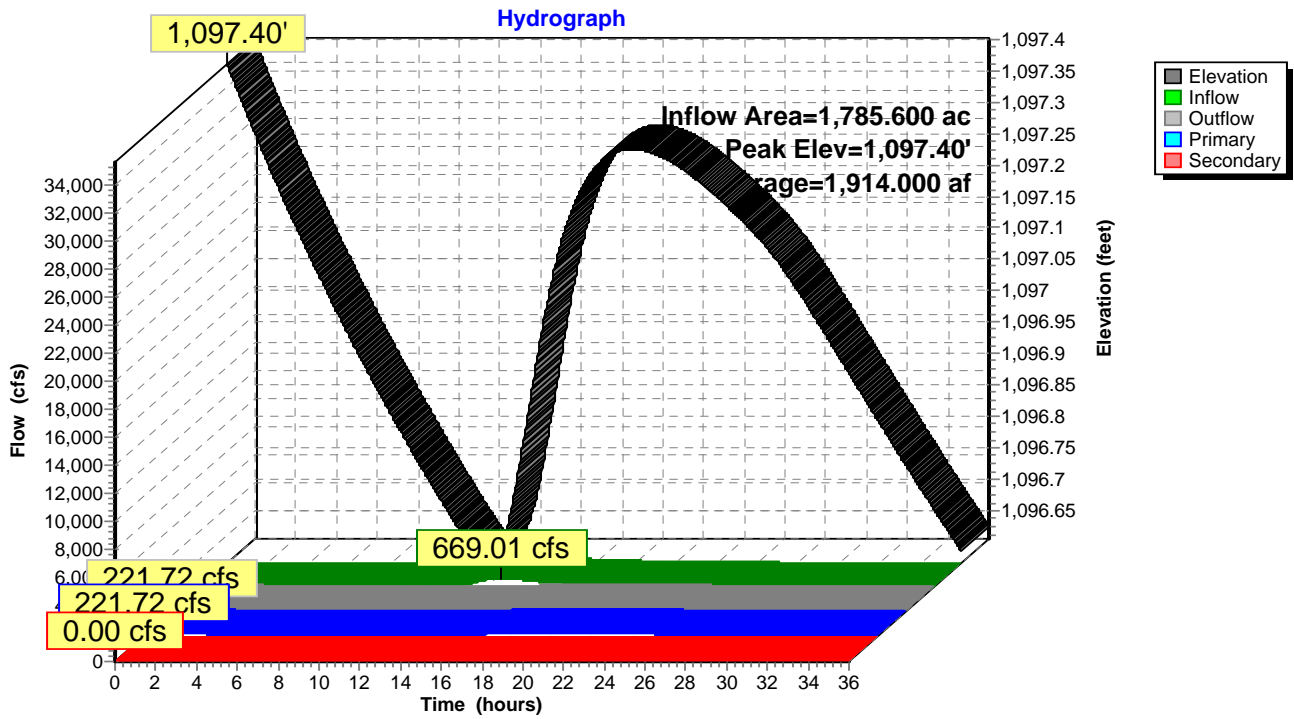
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

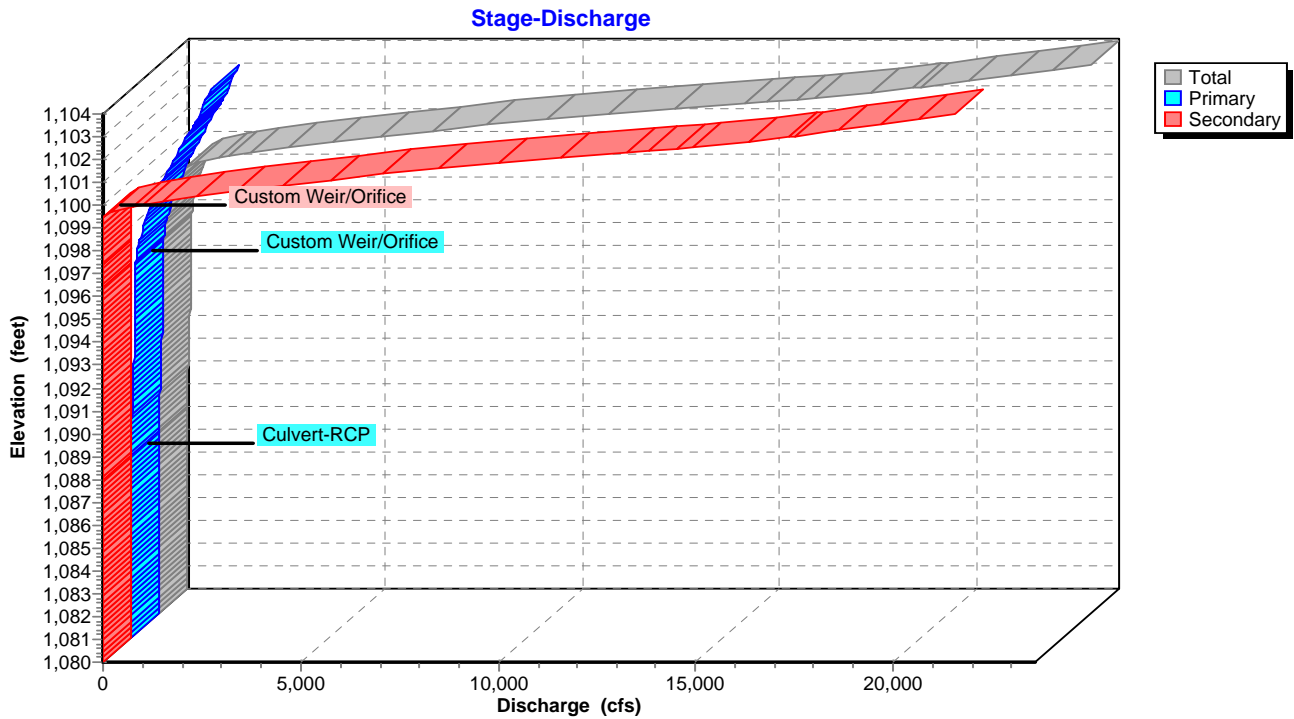
Primary OutFlow Max=221.72 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 123.47 cfs @ 17.47 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 98.25 cfs @ 3.27 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable

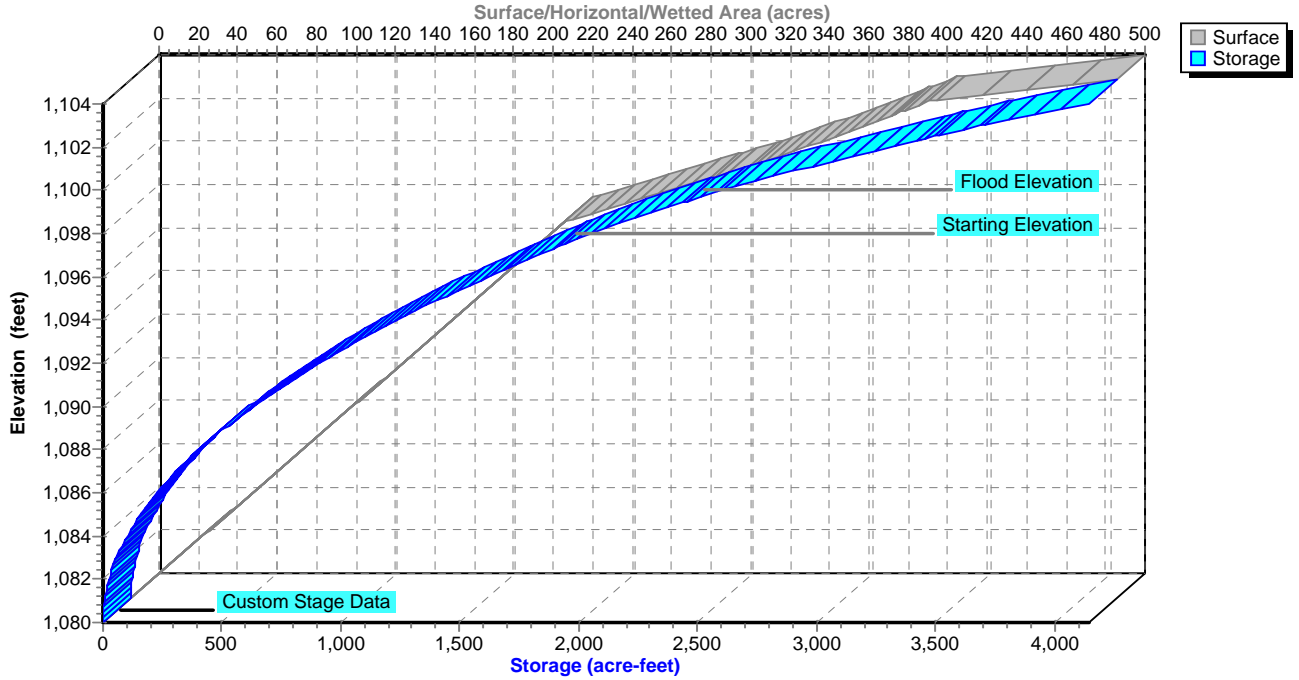


Pond 3P: Lake Cable



Pond 3P: Lake Cable

Stage-Area-Storage



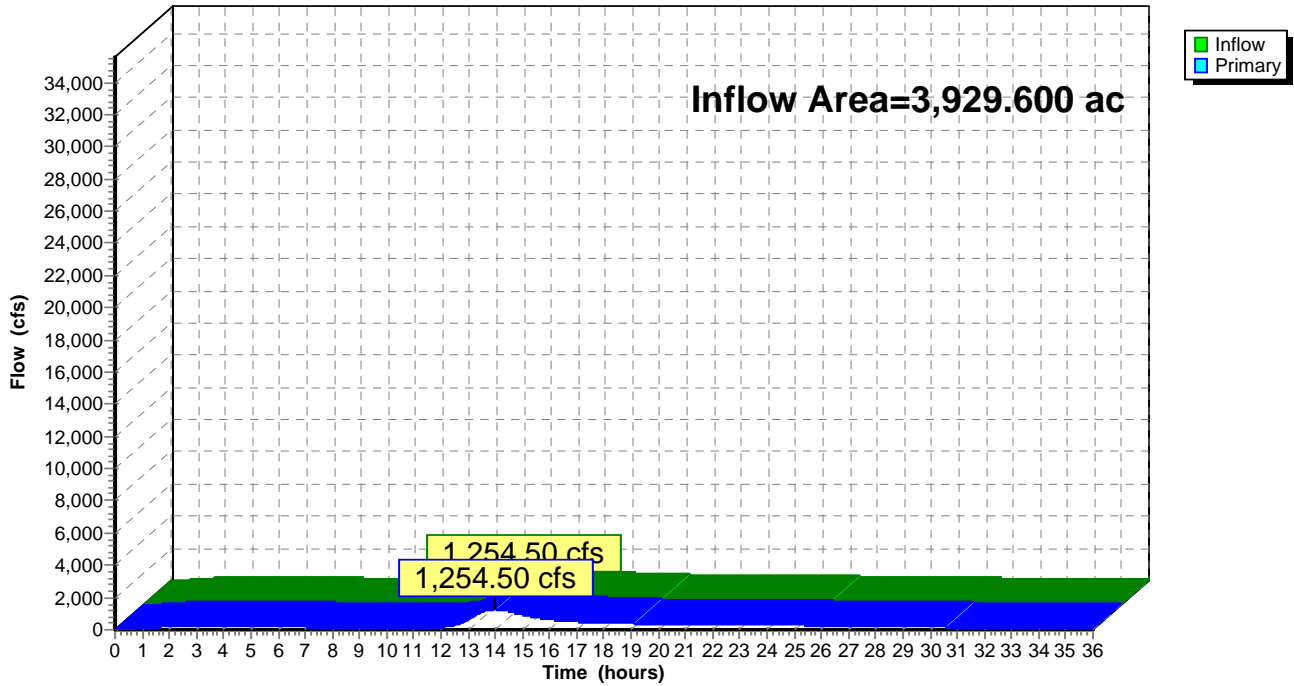
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 2.63" for 100 year-FEMA event
Inflow = 1,254.50 cfs @ 13.96 hrs, Volume= 859.618 af
Primary = 1,254.50 cfs @ 13.97 hrs, Volume= 859.618 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 2.58" for 100 year-FEMA event
 Inflow = 388.66 cfs @ 12.73 hrs, Volume= 82.661 af
 Outflow = 93.21 cfs @ 14.63 hrs, Volume= 79.718 af, Atten= 76%, Lag= 114.4 min
 Primary = 93.21 cfs @ 14.63 hrs, Volume= 79.718 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.28' @ 14.63 hrs Surf.Area= 28.419 ac Storage= 59.678 af (35.378 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 554.3 min calculated for 55.403 af (67% of inflow)
 Center-of-Mass det. time= 268.6 min (1,205.7 - 937.1)

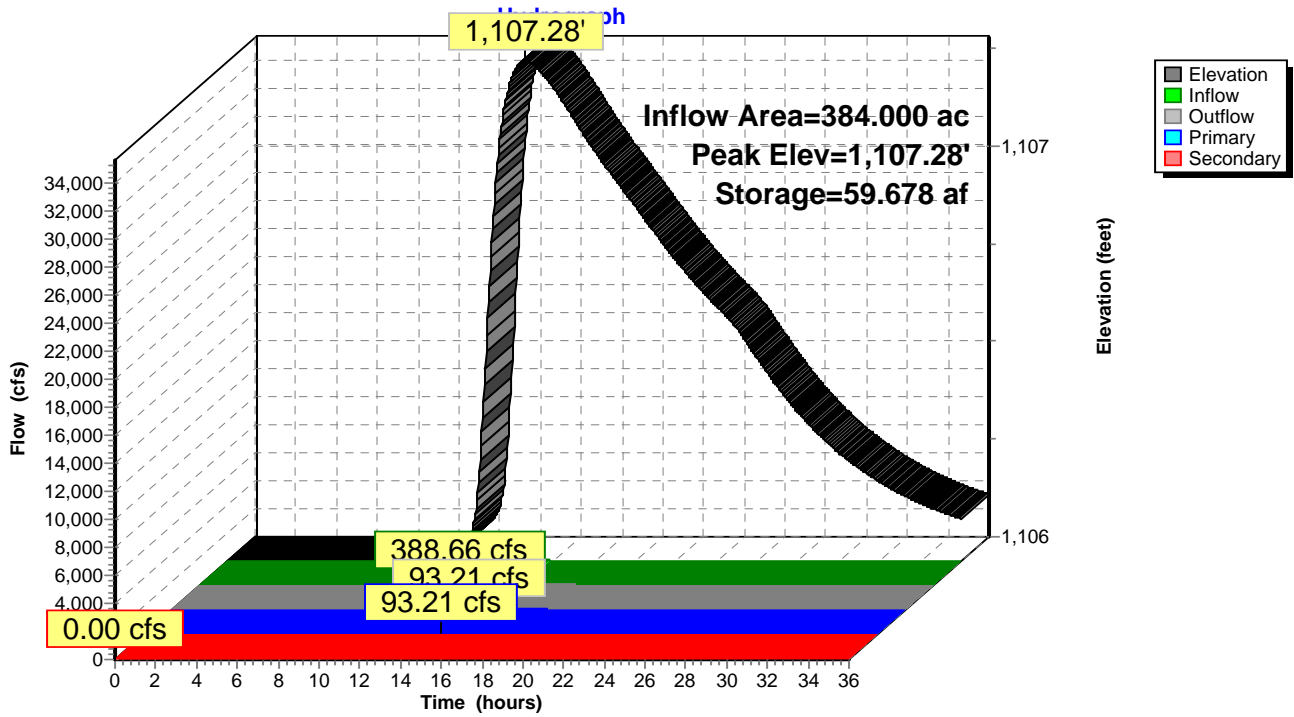
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

Primary OutFlow Max=93.21 cfs @ 14.63 hrs HW=1,107.28' TW=0.00' (Dynamic Tailwater)
 ↳1=Lake Eric Special & User-Defined Outlet (Custom Controls 93.21 cfs)

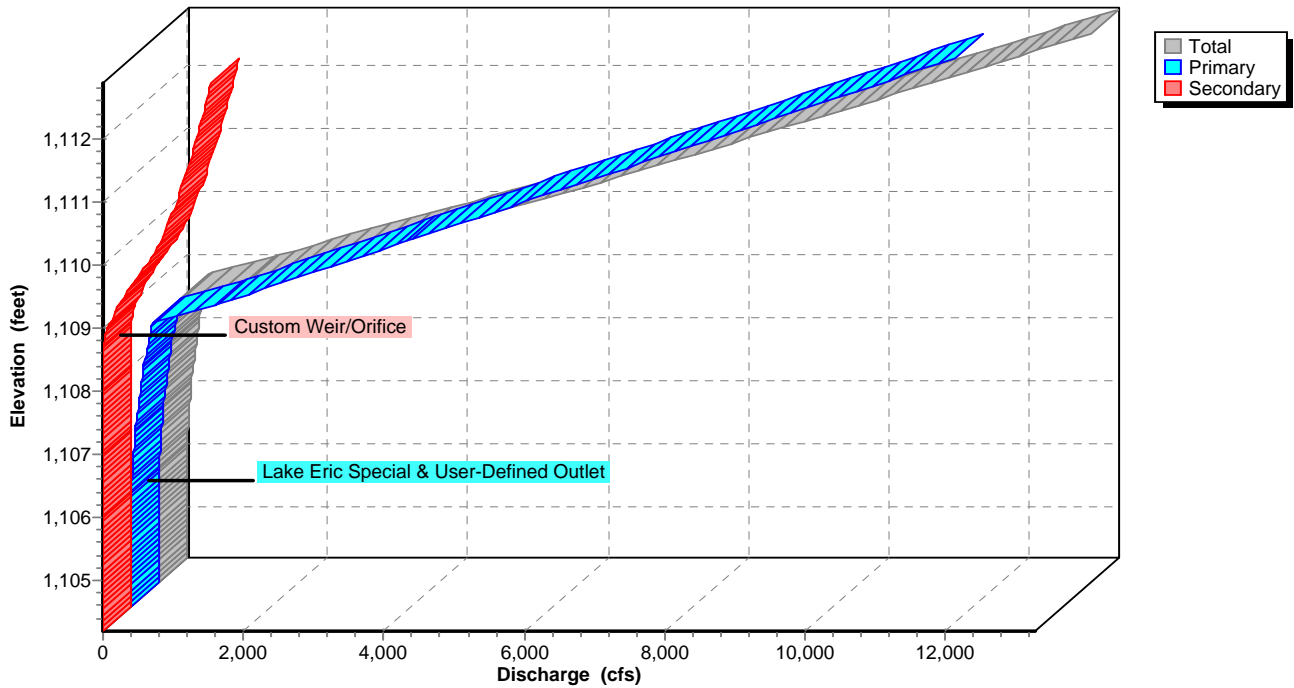
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs



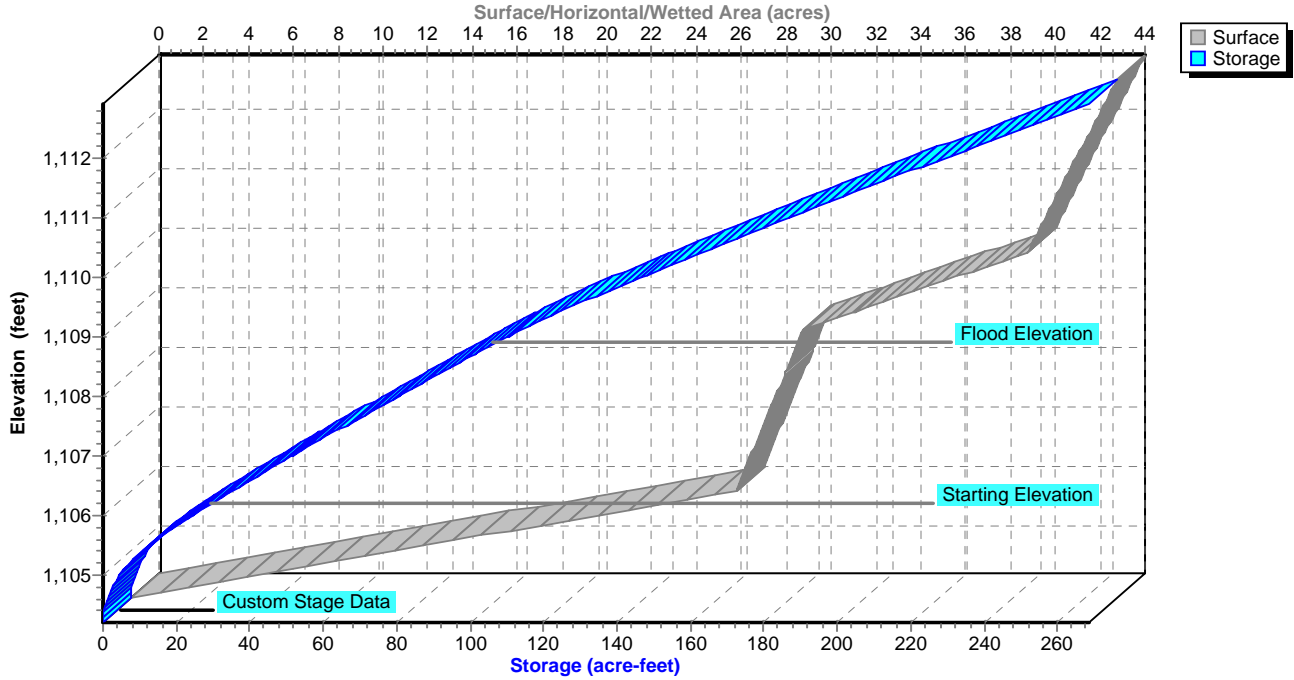
Pond 4P: Lake O'Springs

Stage-Discharge



Pond 4P: Lake O'Springs

Stage-Area-Storage



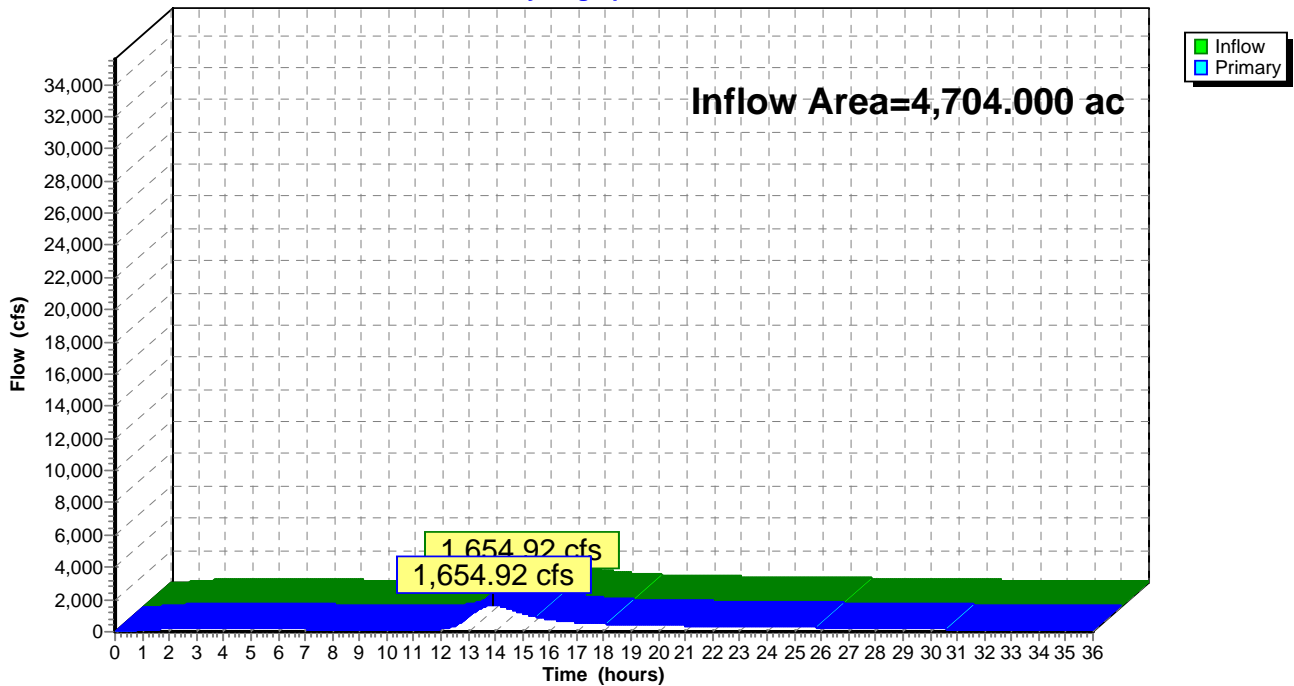
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 2.51" for 100 year-FEMA event
Inflow = 1,654.92 cfs @ 13.91 hrs, Volume= 985.854 af
Primary = 1,654.92 cfs @ 13.92 hrs, Volume= 985.854 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 2.54" for 100 year-FEMA event
 Inflow = 193.02 cfs @ 12.42 hrs, Volume= 24.393 af
 Outflow = 48.91 cfs @ 13.31 hrs, Volume= 23.776 af, Atten= 75%, Lag= 53.2 min
 Primary = 48.91 cfs @ 13.31 hrs, Volume= 23.776 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,119.31' @ 13.31 hrs Surf.Area= 4.096 ac Storage= 24.617 af (10.927 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 602.1 min calculated for 10.086 af (41% of inflow)
 Center-of-Mass det. time= 198.4 min (1,065.8 - 867.4)

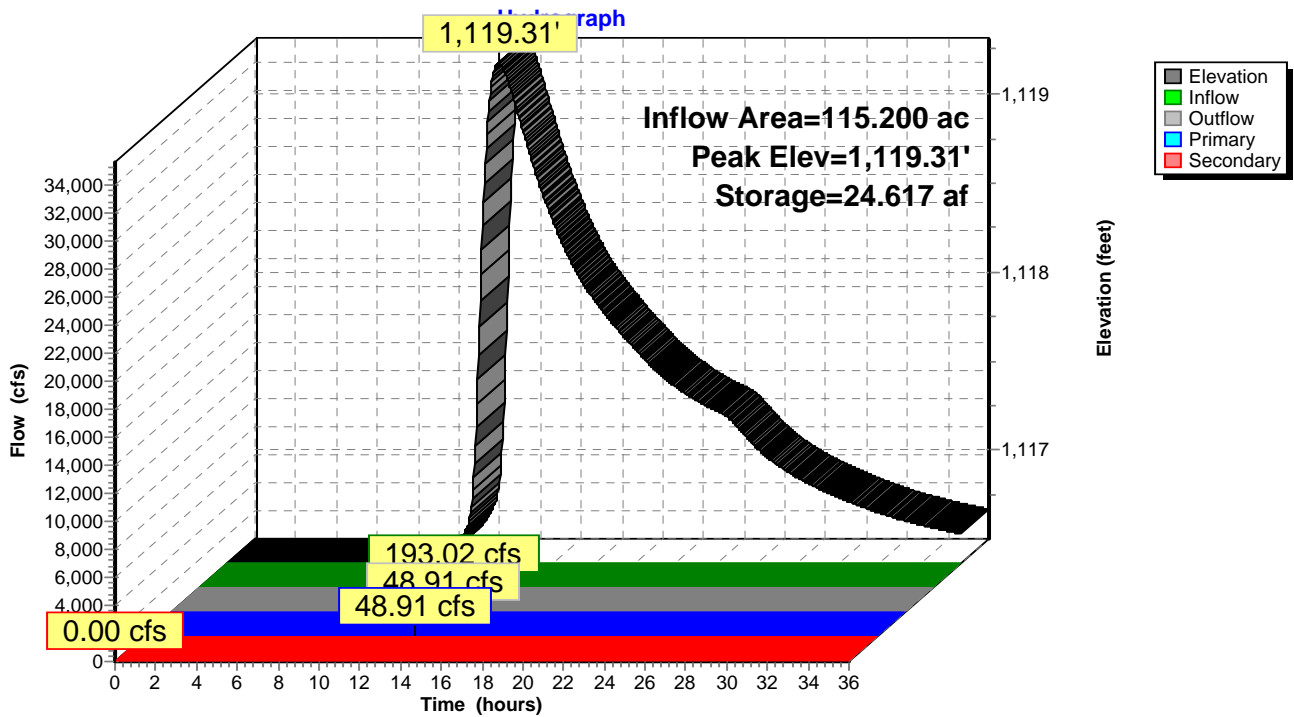
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

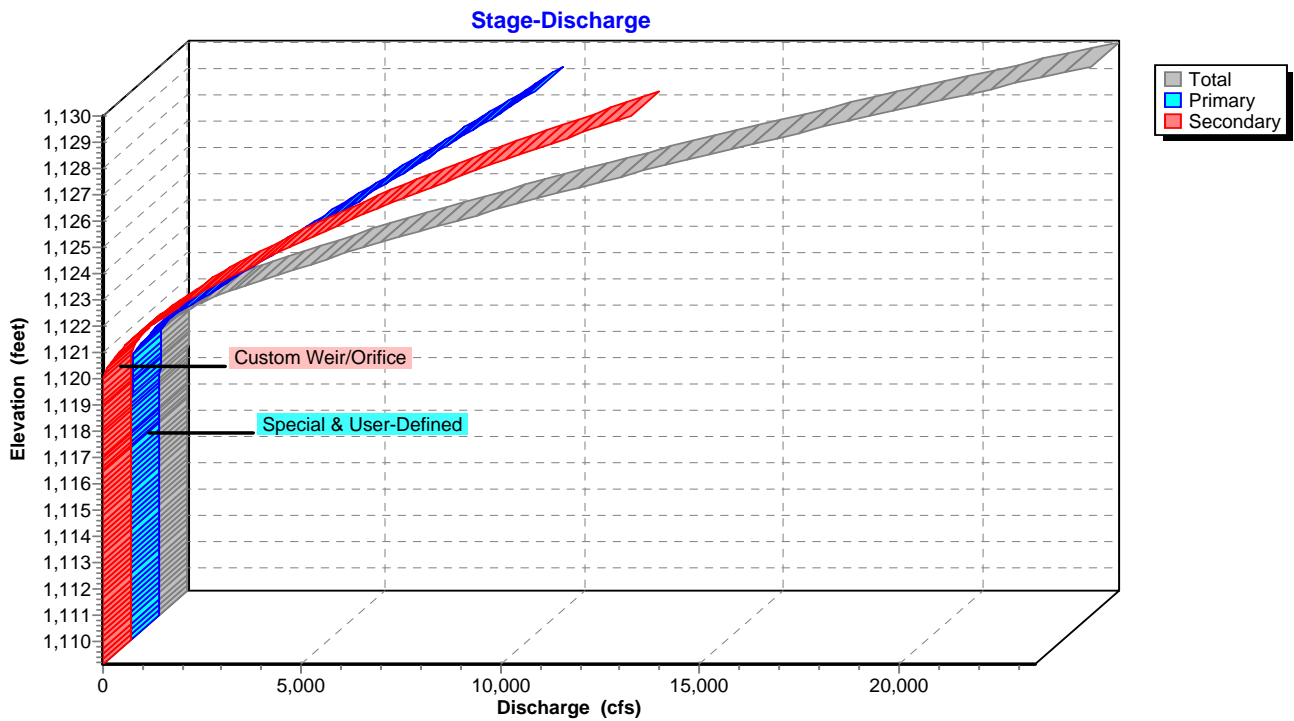
Primary OutFlow Max=48.91 cfs @ 13.31 hrs HW=1,119.31' TW=0.00' (Dynamic Tailwater)
 ↑1=Special & User-Defined (Custom Controls 48.91 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,116.50' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

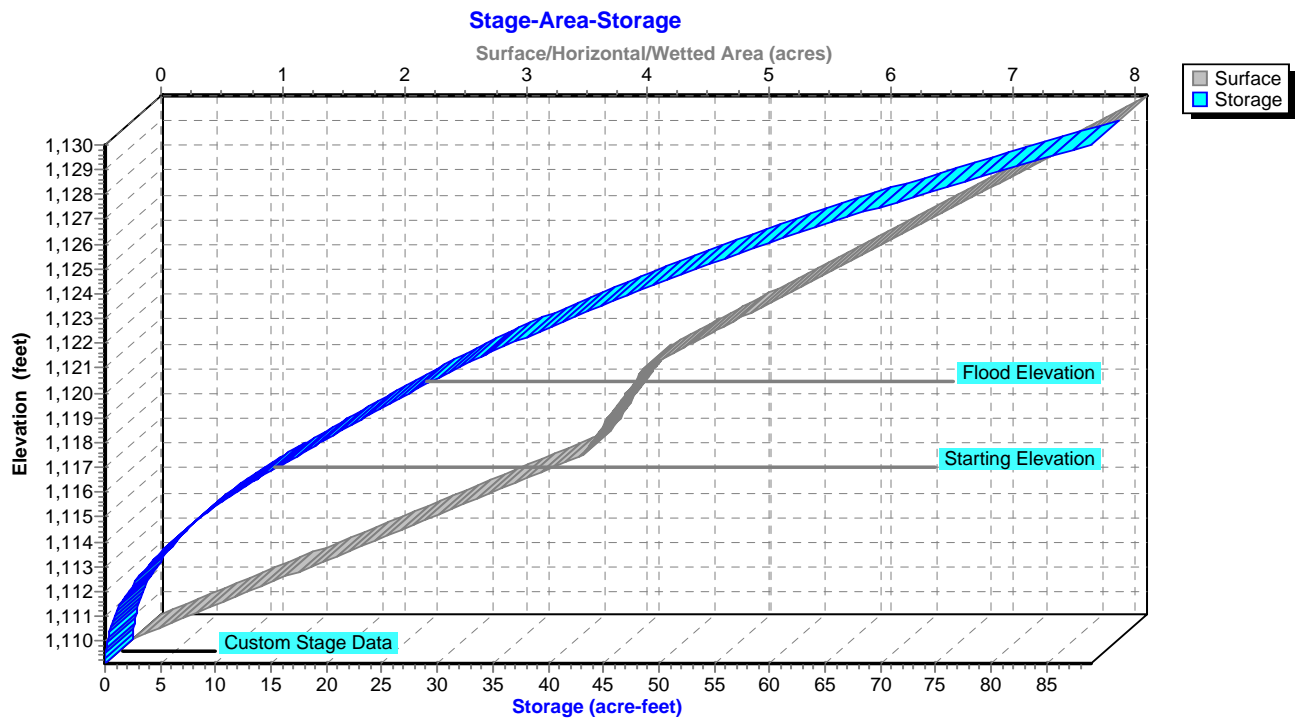
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



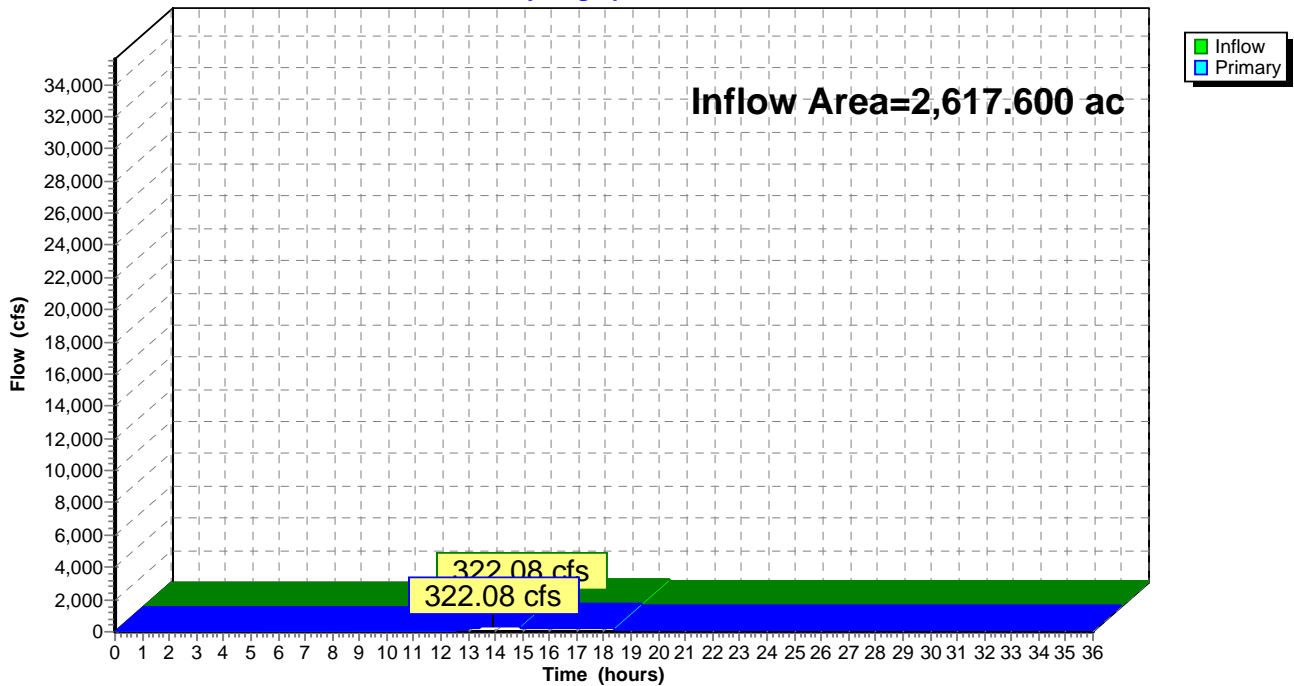
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 1.33" for 100 year-FEMA event
Inflow = 322.08 cfs @ 13.93 hrs, Volume= 289.143 af
Primary = 322.08 cfs @ 13.94 hrs, Volume= 289.143 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

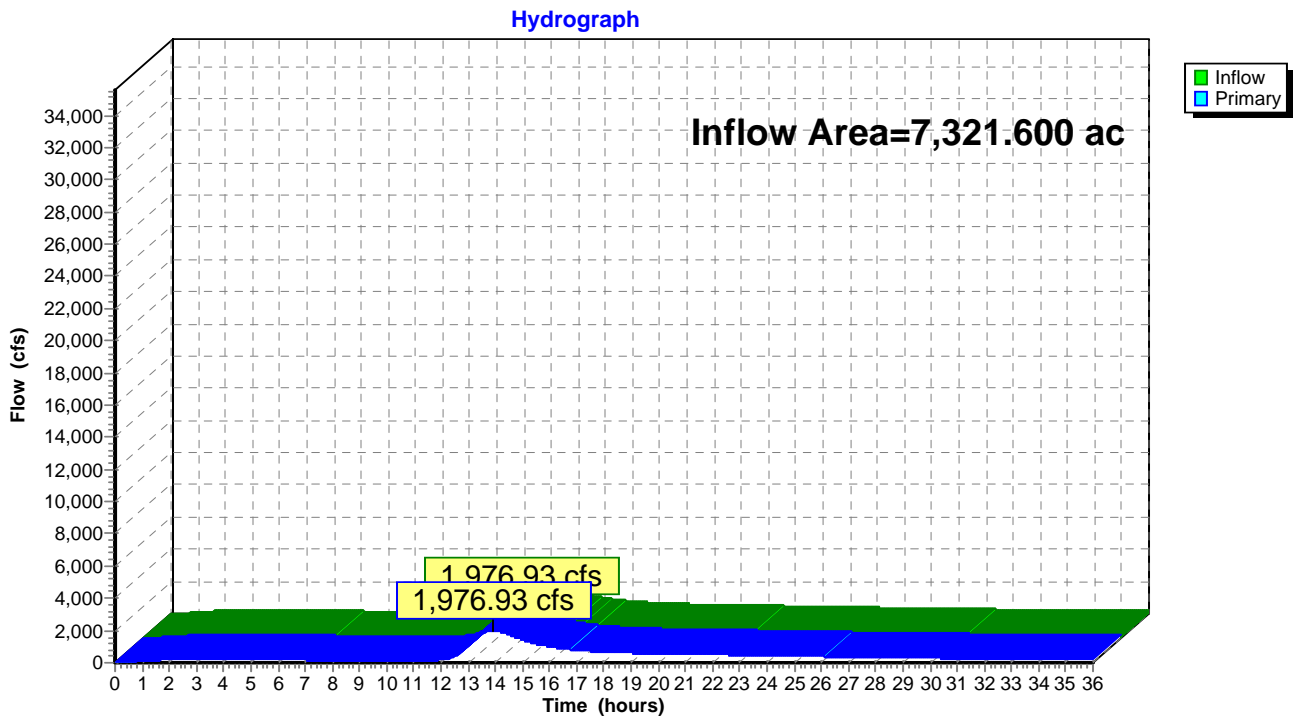


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.09" for 100 year-FEMA event
Inflow = 1,976.93 cfs @ 13.93 hrs, Volume= 1,274.804 af
Primary = 1,976.93 cfs @ 13.94 hrs, Volume= 1,274.804 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



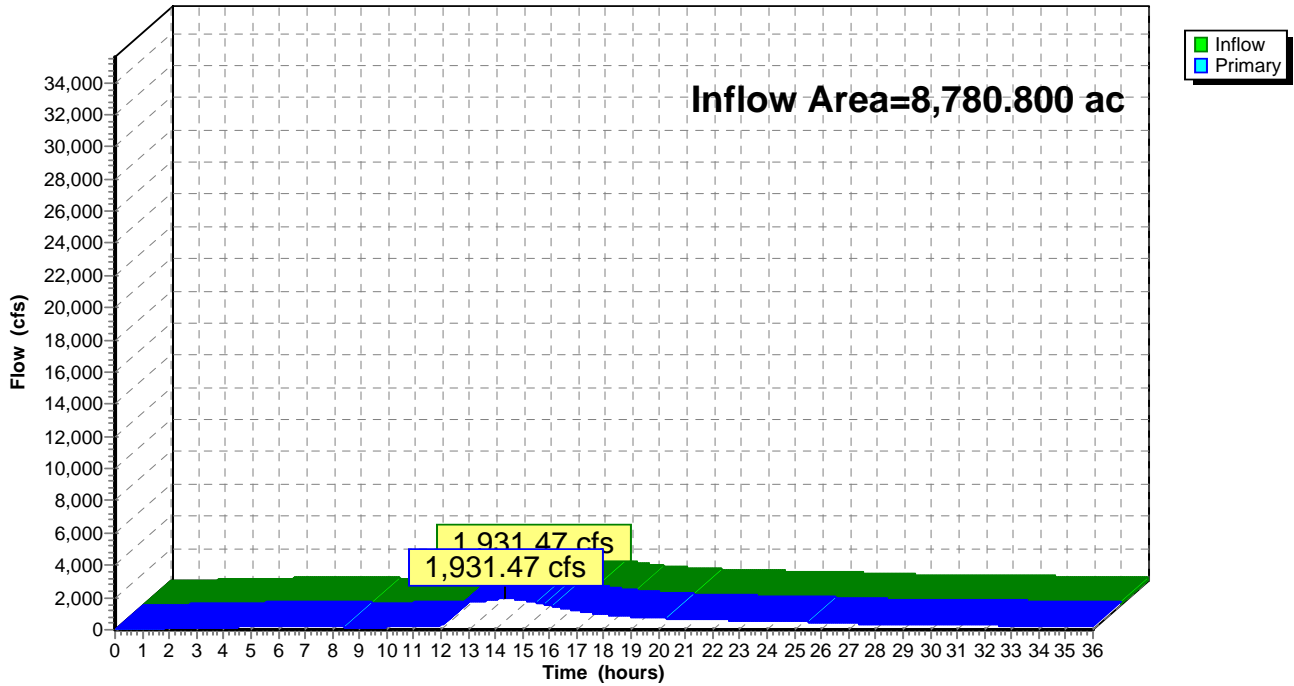
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.12" for 100 year-FEMA event
Inflow = 1,931.47 cfs @ 14.35 hrs, Volume= 1,554.181 af
Primary = 1,931.47 cfs @ 14.36 hrs, Volume= 1,554.181 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.05" for 100 year-FEMA event
 Inflow = 799.72 cfs @ 15.19 hrs, Volume= 334.873 af
 Outflow = 111.02 cfs @ 25.35 hrs, Volume= 183.560 af, Atten= 86%, Lag= 609.5 min
 Primary = 111.02 cfs @ 25.35 hrs, Volume= 183.560 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,024.15' @ 25.35 hrs Surf.Area= 96.352 ac Storage= 213.367 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 580.4 min calculated for 183.509 af (55% of inflow)
 Center-of-Mass det. time= 403.5 min (1,530.3 - 1,126.7)

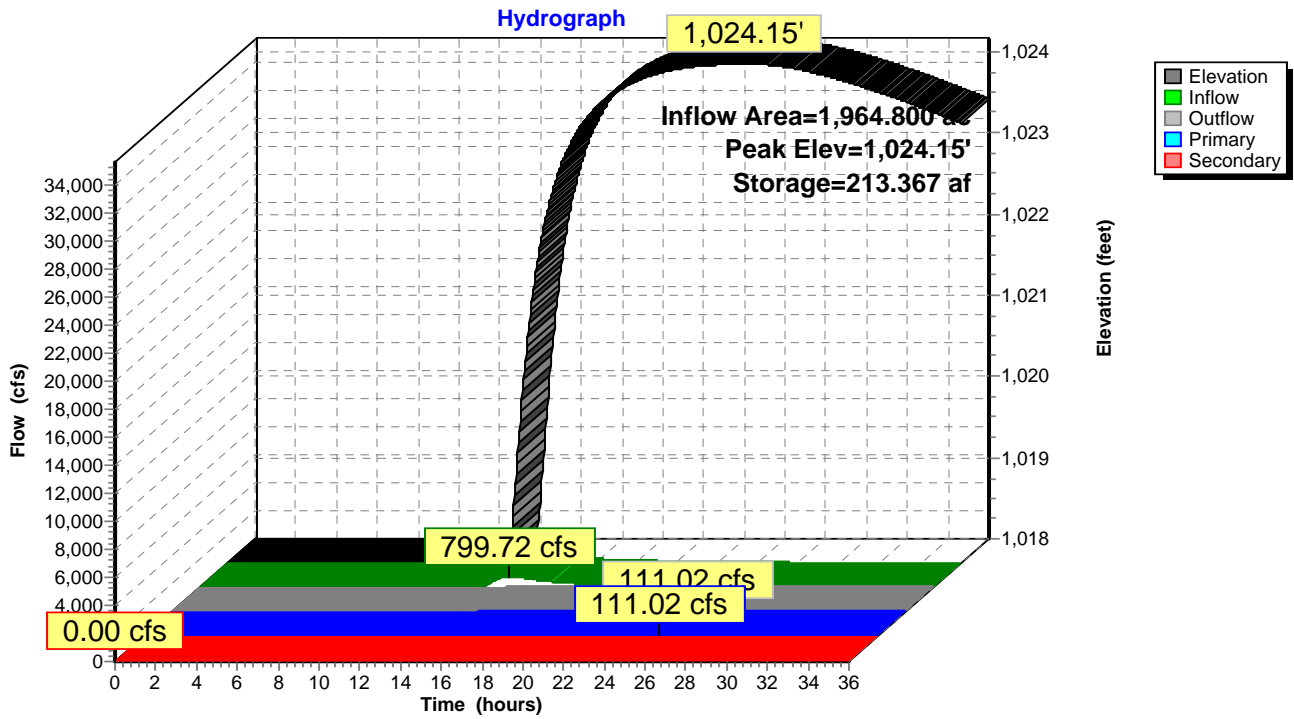
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

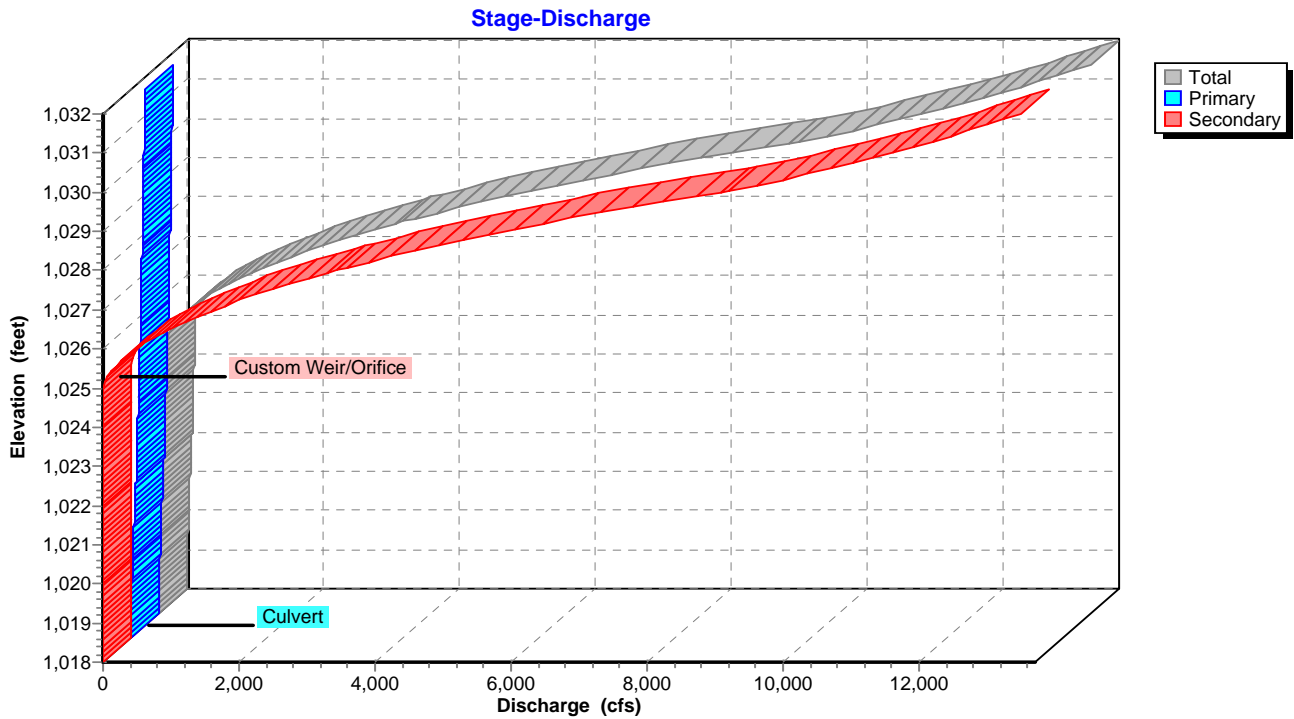
Primary OutFlow Max=111.02 cfs @ 25.35 hrs HW=1,024.15' TW=1,020.36' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 111.02 cfs @ 8.83 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,018.00' TW=1,017.50' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

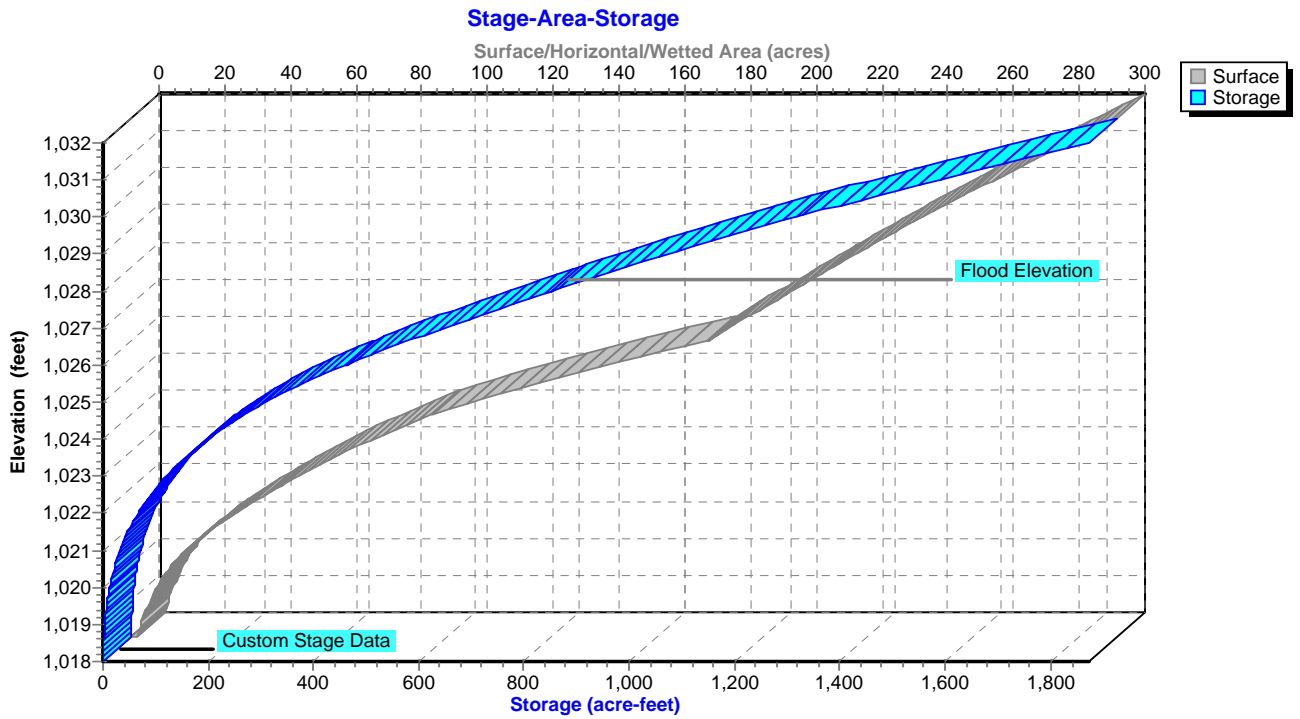
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 2.63" for 100 year-FEMA event
 Inflow = 1,321.67 cfs @ 14.03 hrs, Volume= 430.430 af
 Outflow = 799.72 cfs @ 15.19 hrs, Volume= 334.878 af, Atten= 39%, Lag= 69.3 min
 Primary = 799.72 cfs @ 15.19 hrs, Volume= 334.878 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,028.85' @ 15.19 hrs Surf.Area= 102.459 ac Storage= 395.946 af (175.946 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 621.2 min calculated for 114.878 af (27% of inflow)
 Center-of-Mass det. time= 157.3 min (1,126.8 - 969.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

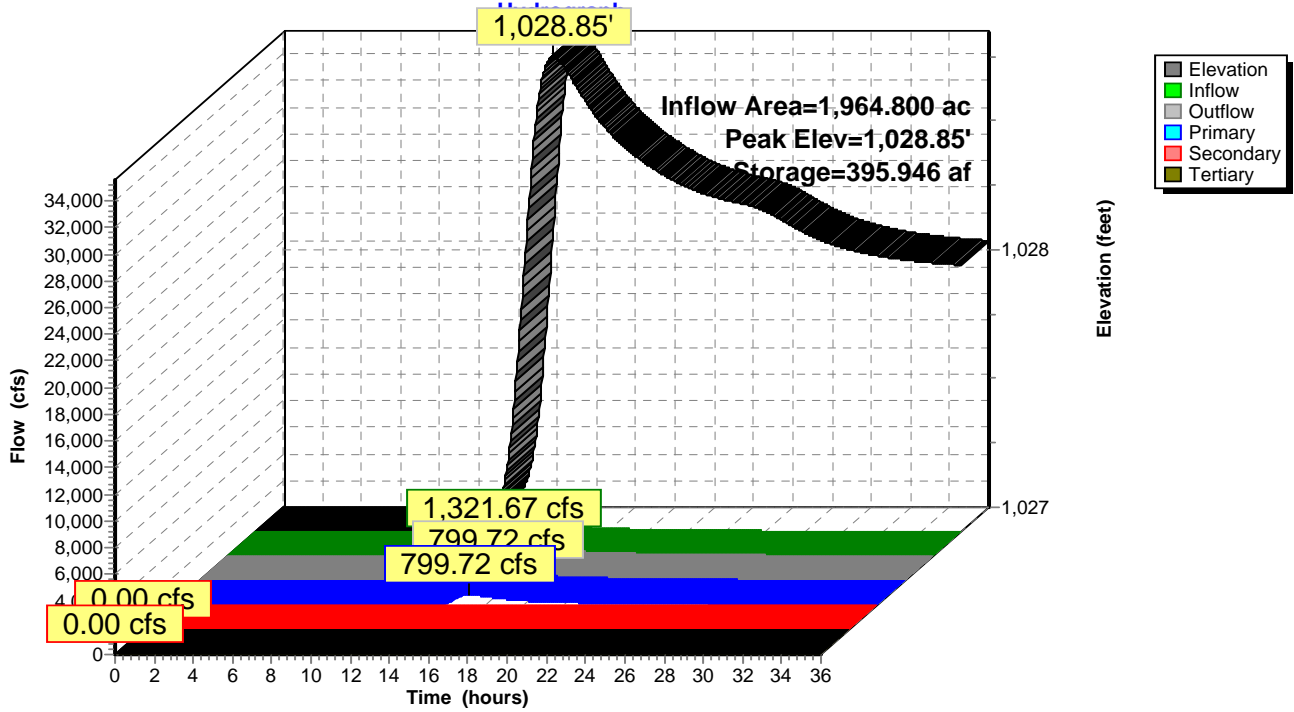
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=799.72 cfs @ 15.19 hrs HW=1,028.85' TW=1,021.66' (Dynamic Tailwater)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 617.47 cfs @ 2.43 fps)
 ↓2=**Broad-Crested Rectangular Weir** (Weir Controls 182.24 cfs @ 1.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

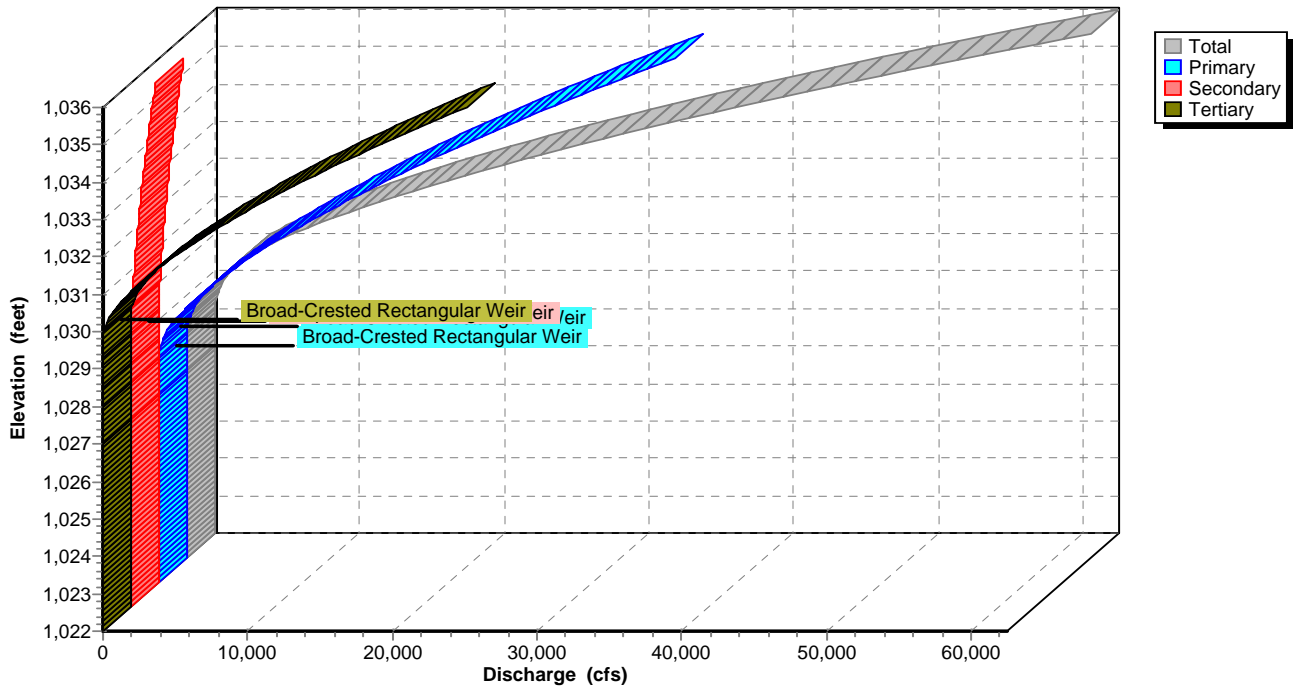
Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake



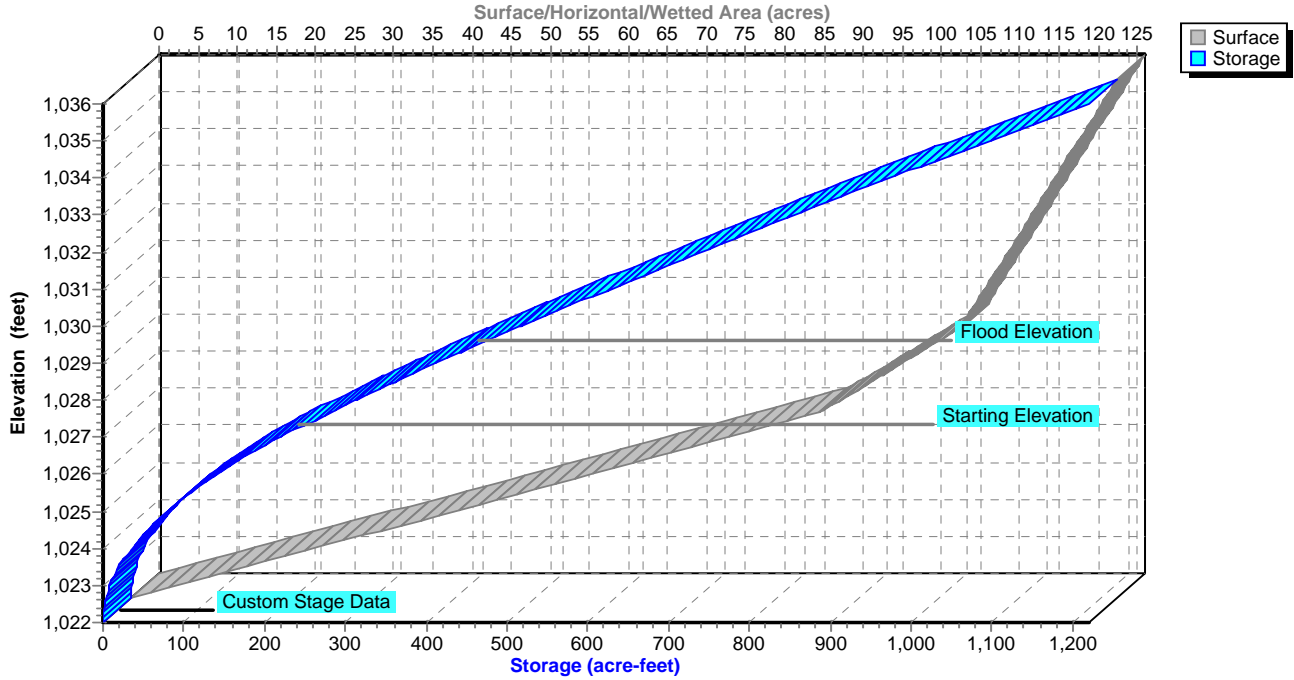
Pond 9P: Sippo Lake

Stage-Discharge



Pond 9P: Sippo Lake

Stage-Area-Storage

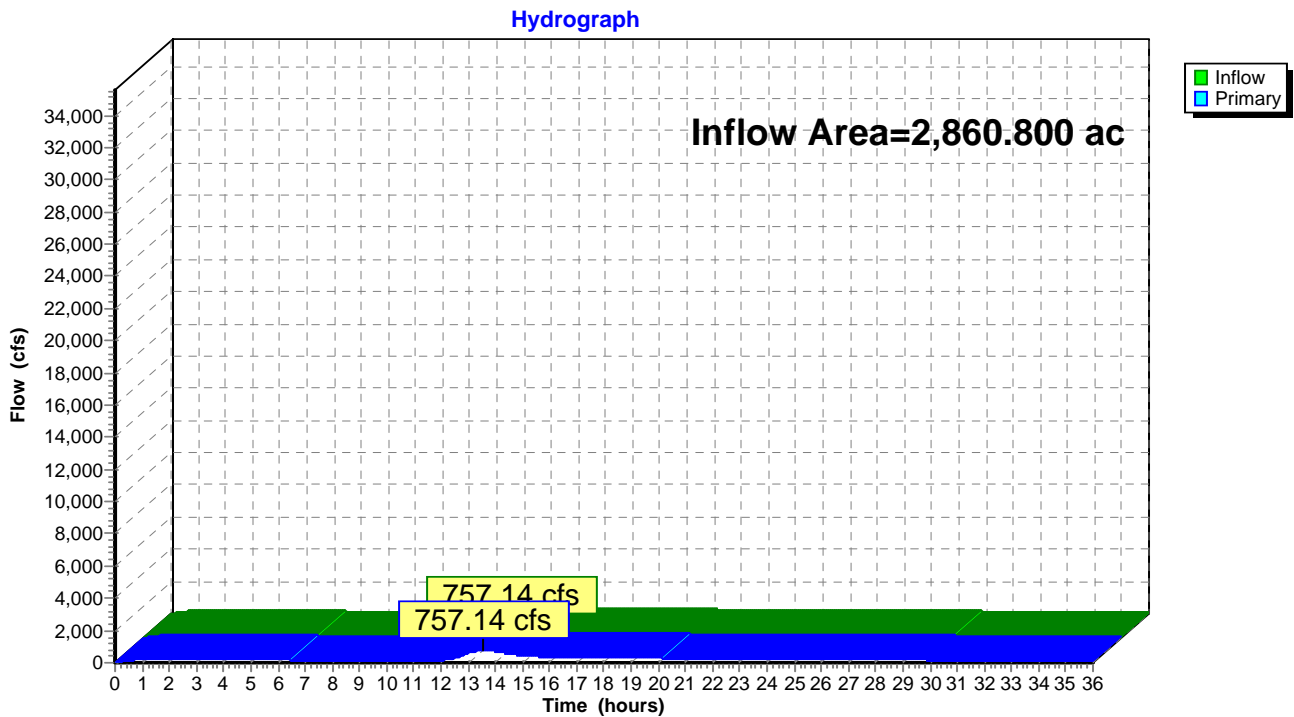


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 2.85" for 100 year-FEMA event
Inflow = 757.14 cfs @ 13.51 hrs, Volume= 680.370 af
Primary = 757.14 cfs @ 13.52 hrs, Volume= 680.370 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.13" for 100 year-FEMA event
 Inflow = 1,974.08 cfs @ 15.08 hrs, Volume= 1,677.797 af
 Outflow = 1,937.82 cfs @ 15.54 hrs, Volume= 1,676.997 af, Atten= 2%, Lag= 27.7 min
 Primary = 1,937.82 cfs @ 15.54 hrs, Volume= 1,676.997 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 992.66' @ 15.54 hrs Surf.Area= 6.981 ac Storage= 46.201 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 10.3 min calculated for 1,676.531 af (100% of inflow)
 Center-of-Mass det. time= 9.8 min (1,164.7 - 1,154.9)

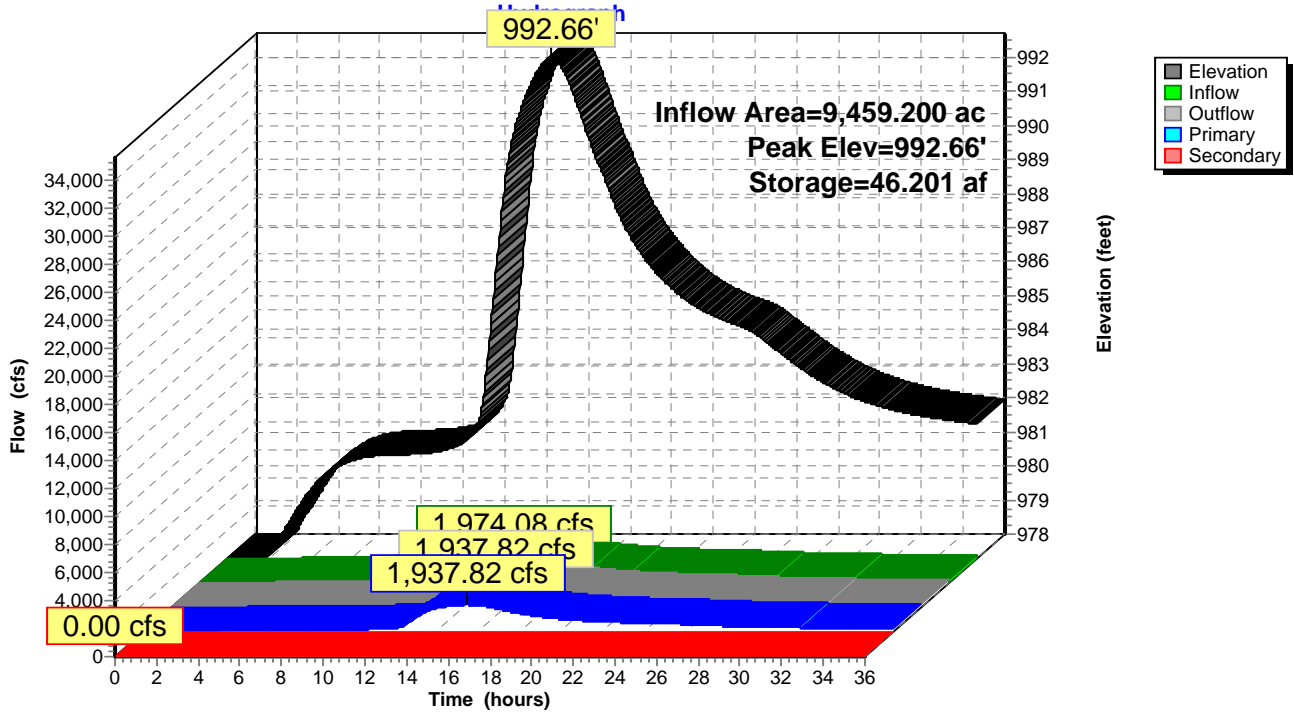
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

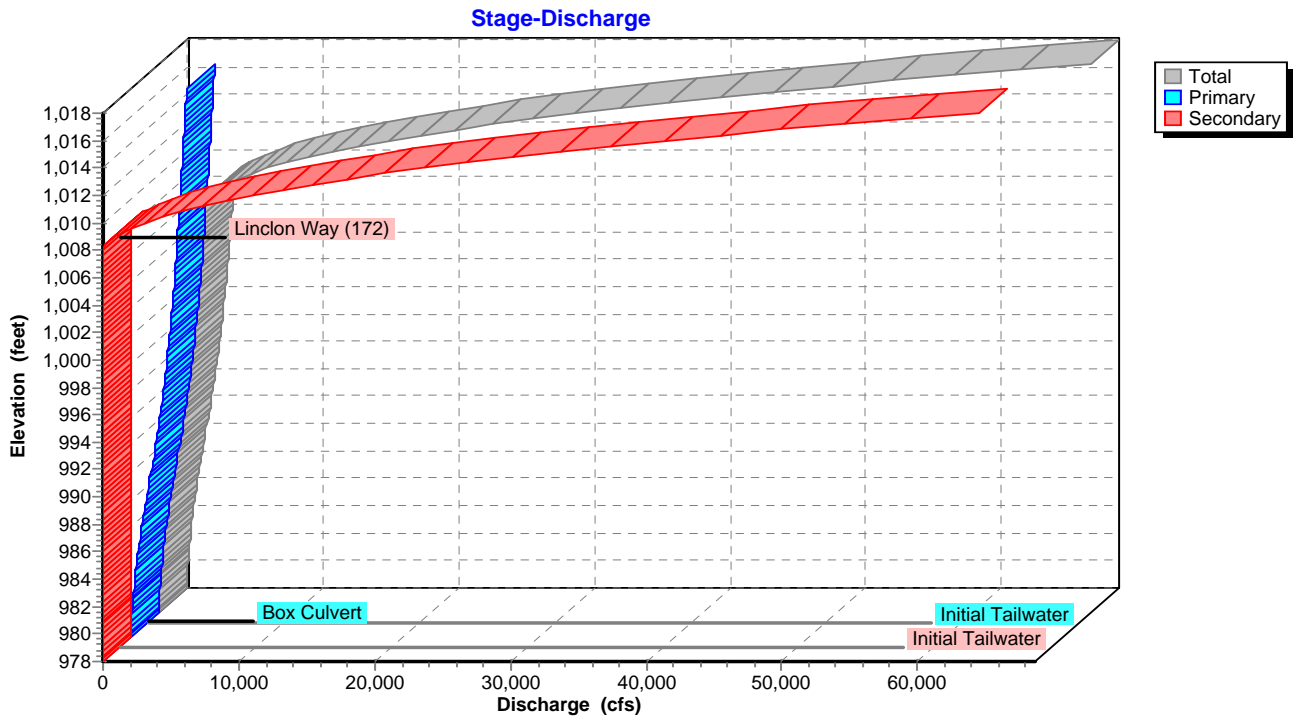
Primary OutFlow Max=1,937.81 cfs @ 15.54 hrs HW=992.66' TW=983.29' (Dynamic Tailwater)
 ↳1=Box Culvert (Barrel Controls 1,937.81 cfs @ 16.95 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

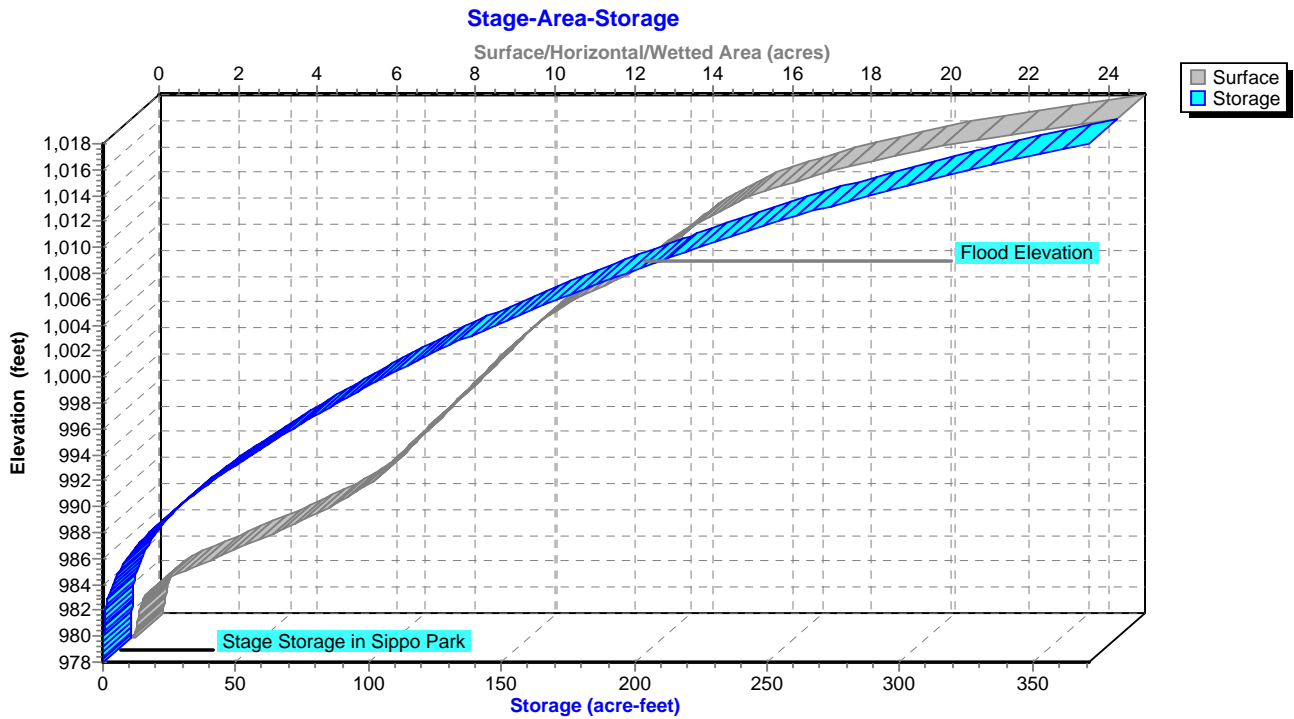
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

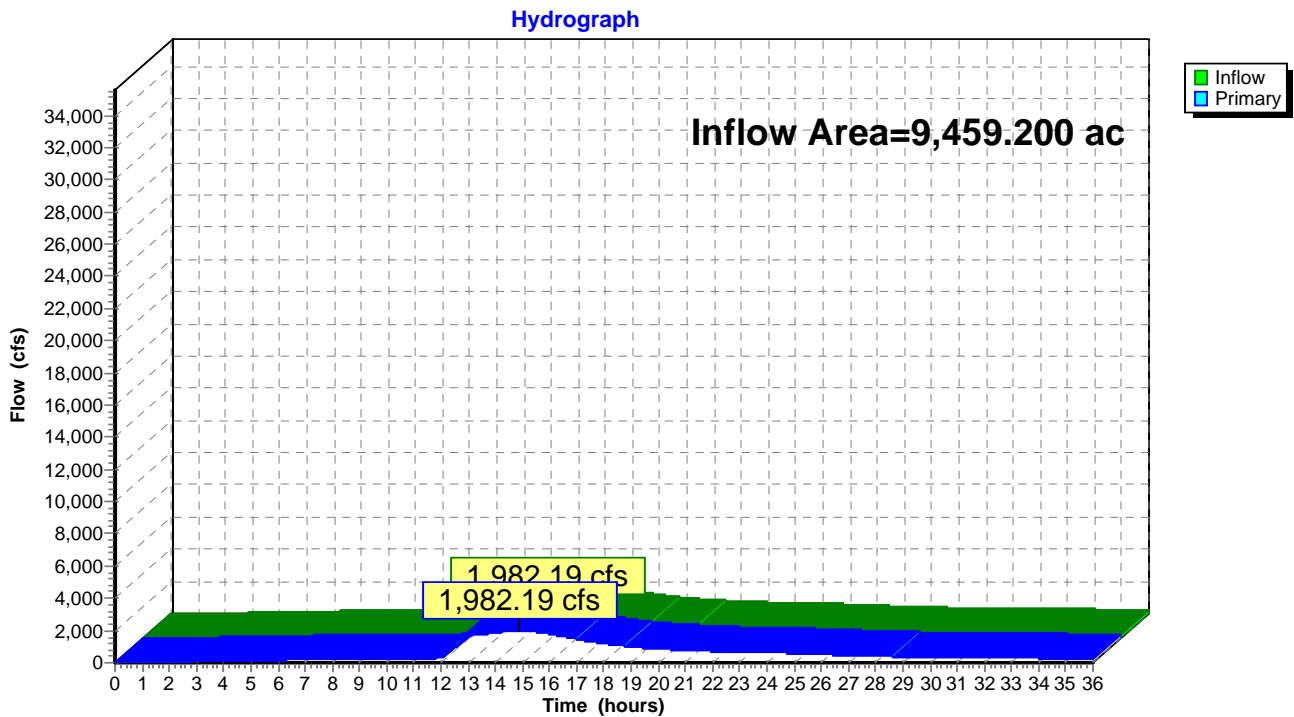


Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.14" for 100 year-FEMA event
Inflow = 1,982.19 cfs @ 14.86 hrs, Volume= 1,690.015 af
Primary = 1,982.19 cfs @ 14.87 hrs, Volume= 1,690.015 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Subcatchment HYD 1: Lake Eric Drainage Runoff Area=115.200 ac 0.00% Impervious Runoff Depth=3.25"
 Tc=44.0 min CN=74 Runoff=249.04 cfs 31.222 af

Subcatchment HYD 2: Lake O'Springs Runoff Area=268.800 ac 38.00% Impervious Runoff Depth=3.35"
 Tc=65.0 min CN=75 Runoff=451.97 cfs 75.047 af

Subcatchment HYD 3: Lake Cable Runoff Area=1,401.600 ac 25.00% Impervious Runoff Depth=2.87"
 Tc=226.0 min CN=70 Runoff=764.41 cfs 335.076 af

Subcatchment HYD 4: Hyd 4 Watershed Runoff Area=1,075.200 ac 20.00% Impervious Runoff Depth=2.68"
 Tc=128.0 min CN=68 Runoff=843.60 cfs 240.344 af

Subcatchment HYD11: HYD11 Watershed Runoff Area=774.400 ac 0.00% Impervious Runoff Depth=2.59"
 Tc=129.0 min CN=67 Runoff=583.45 cfs 167.178 af

Subcatchment HYD12: HYD12 Watershed Runoff Area=723.200 ac 0.00% Impervious Runoff Depth=3.25"
 Tc=110.0 min CN=74 Runoff=794.22 cfs 196.004 af

Subcatchment HYD13: HYD13 Watershed Runoff Area=736.000 ac 38.00% Impervious Runoff Depth=3.35"
 Tc=72.0 min CN=75 Runoff=1,147.16 cfs 205.487 af

Subcatchment HYD14: HYD14 Watershed Runoff Area=678.400 ac 25.00% Impervious Runoff Depth=3.85"
 Tc=78.0 min CN=80 Runoff=1,151.57 cfs 217.852 af

Subcatchment HYD6: HYD6 Watershed Runoff Area=1,068.800 ac 0.00% Impervious Runoff Depth=2.78"
 Tc=155.0 min CN=69 Runoff=756.16 cfs 247.174 af

Subcatchment HYD8: Sippo Lake Runoff Area=1,964.800 ac 38.00% Impervious Runoff Depth=3.35"
 Tc=156.0 min CN=75 Runoff=1,695.56 cfs 548.560 af

Subcatchment HYD9: HYD9 Watershed Runoff Area=652.800 ac 0.00% Impervious Runoff Depth=2.59"
 Tc=151.0 min CN=67 Runoff=435.70 cfs 140.927 af

Reach 5R: Channel 5 Avg. Flow Depth=2.62' Max Vel=5.51 fps Inflow=246.72 cfs 563.254 af
 L=8,800.0' S=0.0240 '/' Capacity=106,015.62 cfs Outflow=246.55 cfs 557.100 af

Reach 7R: Channel 7 Avg. Flow Depth=7.91' Max Vel=3.10 fps Inflow=976.47 cfs 797.195 af
 L=5,900.0' S=0.0017 '/' Capacity=195,473.52 cfs Outflow=892.11 cfs 787.015 af

Reach 10Ra: Channel 10 (Reach Avg. Flow Depth=3.05' Max Vel=2.56 fps Inflow=125.92 cfs 212.745 af
 L=900.0' S=0.0028 '/' Capacity=36,685.79 cfs Outflow=125.92 cfs 211.885 af

Reach 15R: Channel 15 Avg. Flow Depth=8.21' Max Vel=2.10 fps Inflow=2,625.57 cfs 1,553.384 af
 L=8,800.0' S=0.0010 '/' Capacity=189,892.92 cfs Outflow=2,019.70 cfs 1,513.312 af

Reach 16R: Channel 16 Avg. Flow Depth=9.88' Max Vel=2.44 fps Inflow=2,567.85 cfs 1,914.335 af
 L=7,500.0' S=0.0010 '/' Capacity=42,389.29 cfs Outflow=2,454.79 cfs 1,872.029 af

Existing Conditions Sippo Reservoir-URS-FinalType II 24-hr 500 year-FEMA Rainfall=6.08"

Prepared by URS Corporation

Printed 10/21/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 799

Reach 18R: Sippo Creek Avg. Flow Depth=5.65' Max Vel=9.45 fps Inflow=2,509.12 cfs 2,074.811 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,509.11 cfs 2,074.686 af

Pond 1C: CONF 1 Combined O'Springs and Eric Inflow=507.38 cfs 105.601 af
Primary=507.38 cfs 105.601 af

Pond 1P: Sippo Creek Reservoir Peak Elev=1,006.86' Storage=120.616 af Inflow=2,650.69 cfs 2,089.394 af
1,979.97 cfs 1,854.317 af Secondary=663.74 cfs 222.021 af Tertiary=0.00 cfs 0.000 af Outflow=2,643.72 cfs 2,076.338 af

Pond 2C: CONF 2 Combined Cable and O'Springs Inflow=895.39 cfs 437.273 af
Primary=895.39 cfs 437.273 af

Pond 3P: Lake Cable Peak Elev=1,097.56' Storage=1,949.614 af Inflow=895.39 cfs 437.267 af
Primary=246.72 cfs 563.376 af Secondary=0.00 cfs 0.000 af Outflow=246.72 cfs 563.376 af

Pond 4C: Confluence 4 Inflow=1,647.36 cfs 1,034.062 af
Primary=1,647.36 cfs 1,034.062 af

Pond 4P: Lake O'Springs Peak Elev=1,107.61' Storage=69.079 af Inflow=507.38 cfs 105.600 af
Primary=132.66 cfs 102.204 af Secondary=0.00 cfs 0.000 af Outflow=132.66 cfs 102.204 af

Pond 5C: Confluence 5 Inflow=2,188.06 cfs 1,201.113 af
Primary=2,188.06 cfs 1,201.113 af

Pond 5P: Lake Eric (Slagle) Peak Elev=1,120.00' Storage=27.505 af Inflow=249.04 cfs 31.222 af
Primary=70.89 cfs 30.554 af Secondary=0.09 cfs 0.000 af Outflow=70.98 cfs 30.554 af

Pond 6C: Confluence 6 Inflow=439.02 cfs 352.717 af
Primary=439.02 cfs 352.717 af

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake Inflow=2,625.57 cfs 1,553.607 af
Primary=2,625.57 cfs 1,553.607 af

Pond 8C: Confluence 8 Inflow=2,567.85 cfs 1,914.569 af
Primary=2,567.85 cfs 1,914.569 af

Pond 8P: Storage Area Genoa Rd Peak Elev=1,025.01' Storage=311.088 af Inflow=1,208.68 cfs 452.817 af
Primary=125.34 cfs 212.762 af Secondary=0.59 cfs 0.079 af Outflow=125.92 cfs 212.841 af

Pond 9P: Sippo Lake Peak Elev=1,029.05' Storage=416.635 af Inflow=1,695.56 cfs 548.560 af
Primary=1,208.68 cfs 452.822 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=1,208.68 cfs 452.822 af

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed Inflow=976.47 cfs 797.319 af
Primary=976.47 cfs 797.319 af

Pond 16P: Lincoln Way Box Peak Elev=997.51' Storage=83.995 af Inflow=2,643.72 cfs 2,076.092 af
Primary=2,509.12 cfs 2,075.058 af Secondary=0.00 cfs 0.000 af Outflow=2,509.12 cfs 2,075.058 af

Pond 19C: Confluence 19 Inflow=2,650.69 cfs 2,089.638 af
Primary=2,650.69 cfs 2,089.638 af

Total Runoff Area = 9,459.200 ac Runoff Volume = 2,404.869 af Average Runoff Depth = 3.05"
80.30% Pervious = 7,595.712 ac 19.70% Impervious = 1,863.488 ac

Summary for Subcatchment HYD 1: Lake Eric Drainage Area

Runoff = 249.04 cfs @ 12.42 hrs, Volume= 31.222 af, Depth= 3.25"

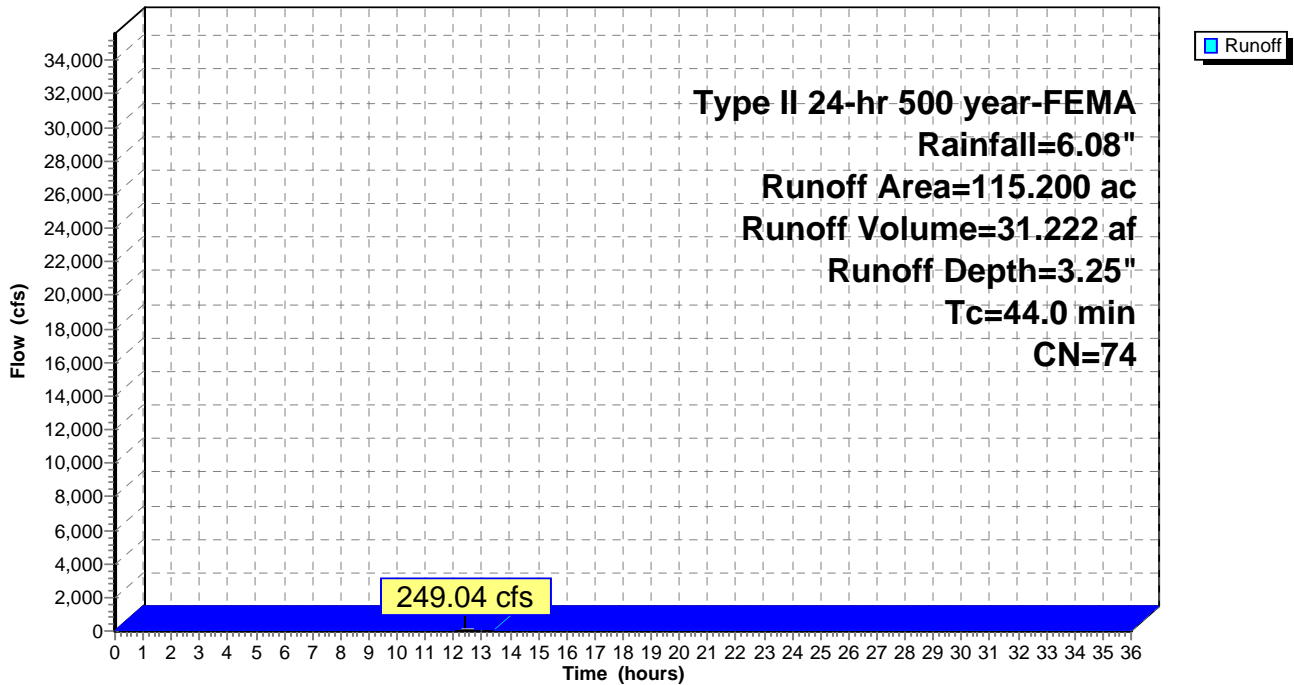
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
115.200	74	>75% Grass cover, Good, HSG C
115.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.0					Direct Entry, HEC-1 Lag Time = 0.44 hr

Subcatchment HYD 1: Lake Eric Drainage Area

Hydrograph



Summary for Subcatchment HYD 2: Lake O'Springs Watershed

Runoff = 451.97 cfs @ 12.70 hrs, Volume= 75.047 af, Depth= 3.35"

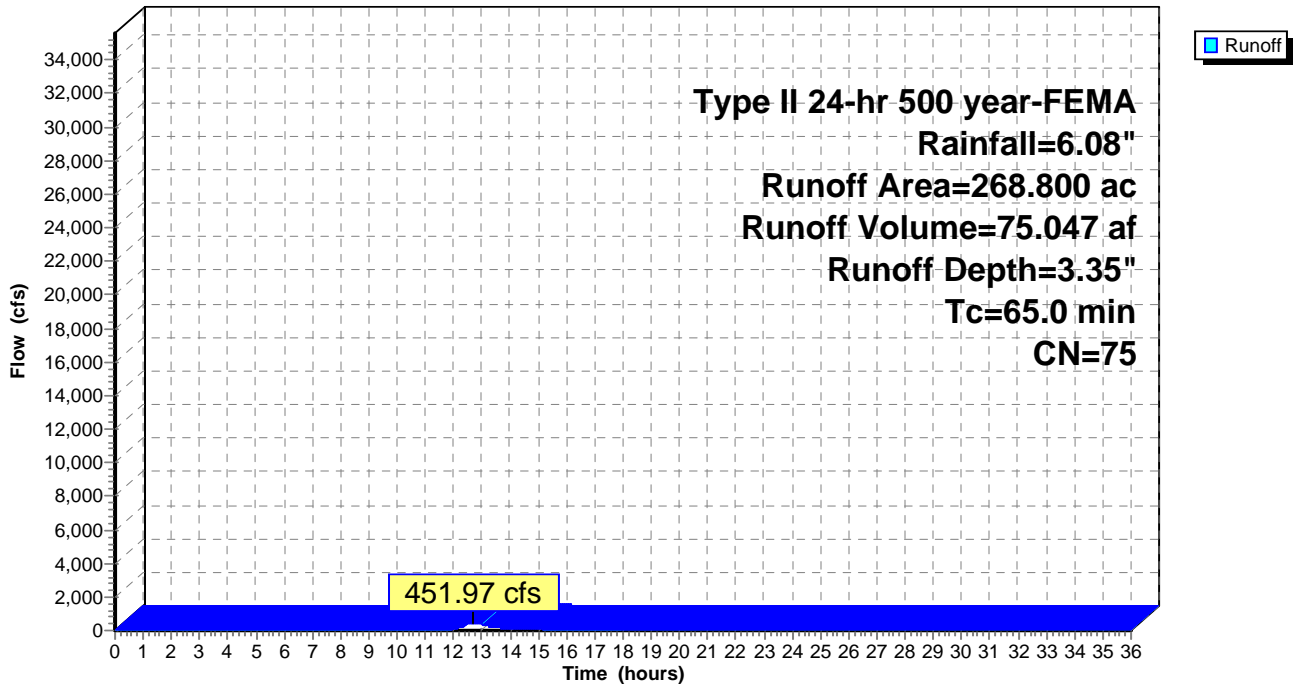
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
268.800	75	1/4 acre lots, 38% imp, HSG B
166.656		62.00% Pervious Area
102.144		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.0					Direct Entry, HEC-1 Lag Time = 0.65 hours

Subcatchment HYD 2: Lake O'Springs Watershed

Hydrograph



Summary for Subcatchment HYD 3: Lake Cable Watershed

Runoff = 764.41 cfs @ 14.82 hrs, Volume= 335.076 af, Depth= 2.87"

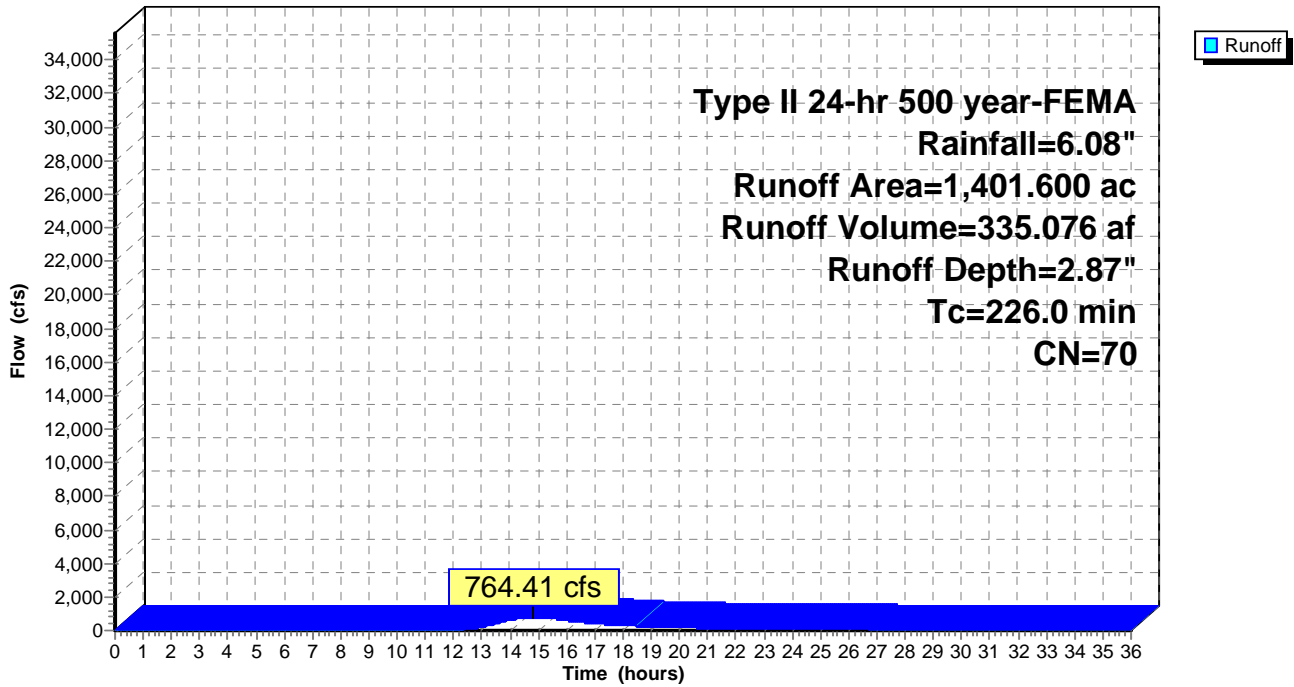
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
1,401.600	70	1/2 acre lots, 25% imp, HSG B
1,051.200		75.00% Pervious Area
350.400		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
226.0					Direct Entry, HEC-1 Lag time 2.26hr

Subcatchment HYD 3: Lake Cable Watershed

Hydrograph



Summary for Subcatchment HYD 4: Hyd 4 Watershed

Runoff = 843.60 cfs @ 13.51 hrs, Volume= 240.344 af, Depth= 2.68"

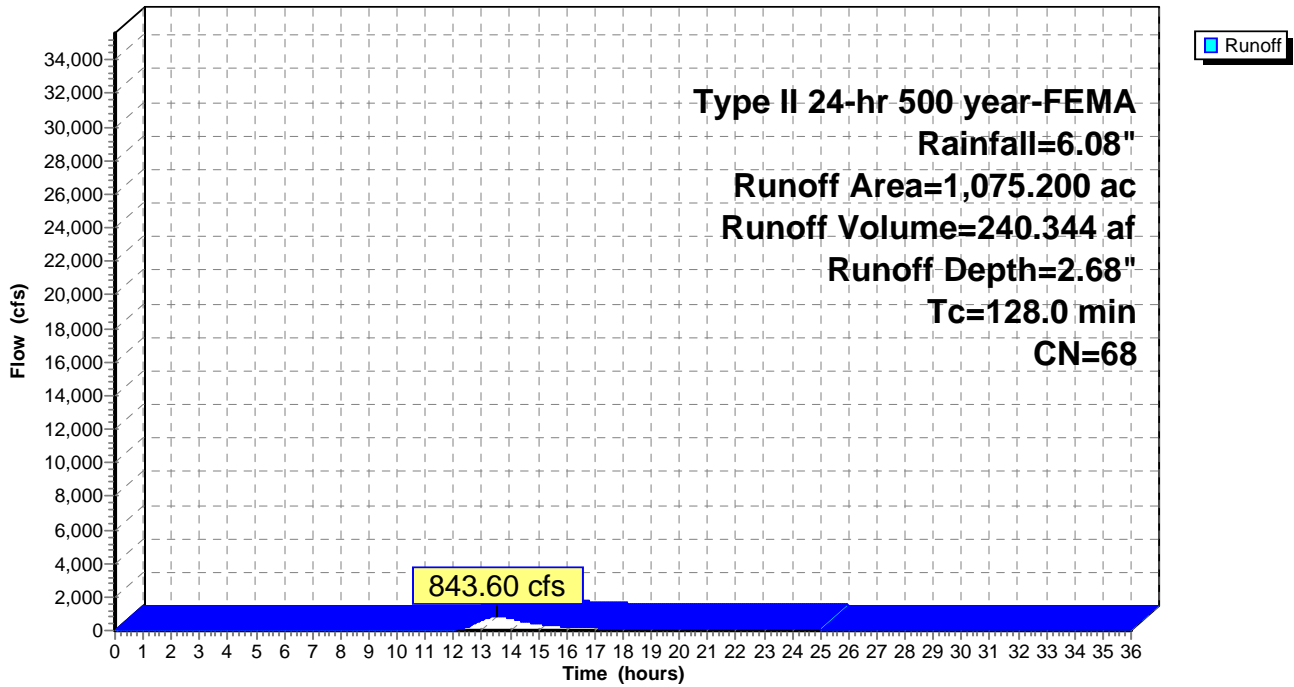
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
1,075.200	68	1 acre lots, 20% imp, HSG B
860.160		80.00% Pervious Area
215.040		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
128.0					Direct Entry, HEC-1 Lag Time = 1.28 hr

Subcatchment HYD 4: Hyd 4 Watershed

Hydrograph



Summary for Subcatchment HYD11: HYD11 Watershed

Runoff = 583.45 cfs @ 13.62 hrs, Volume= 167.178 af, Depth= 2.59"

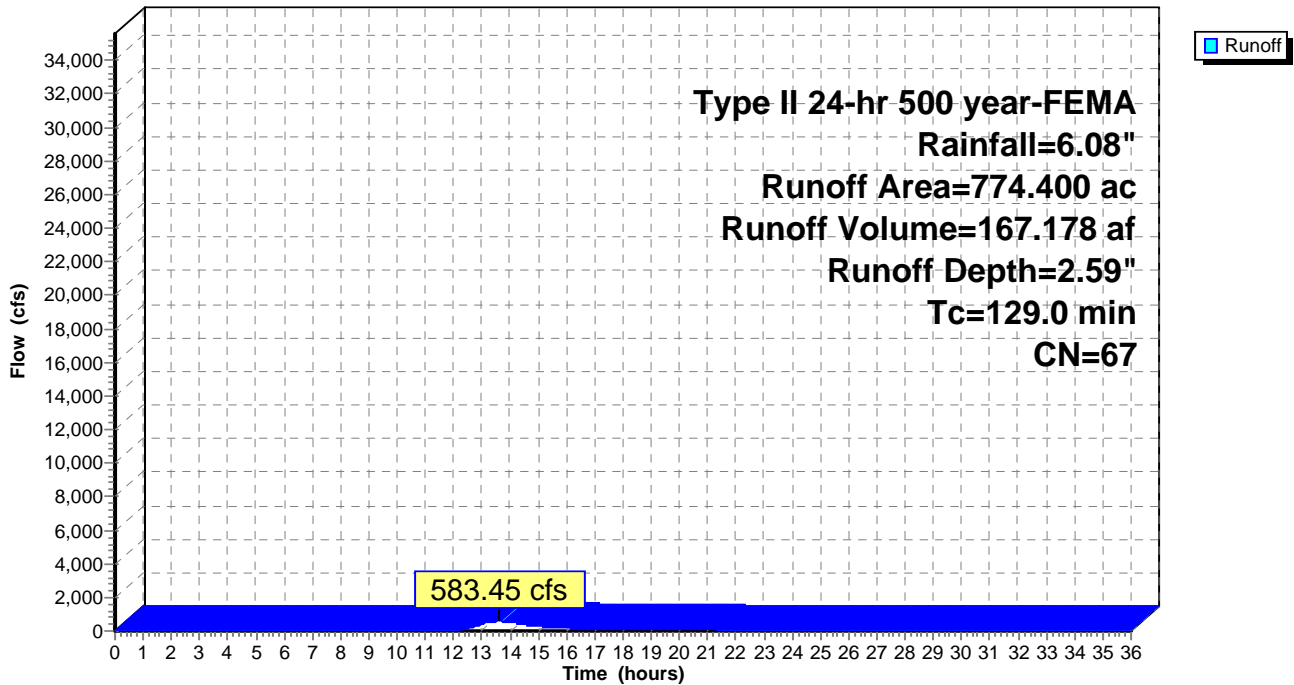
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
* 774.400	67	
774.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
129.0					Direct Entry, HEC-1 Lag Time = 1.29 hr

Subcatchment HYD11: HYD11 Watershed

Hydrograph



Summary for Subcatchment HYD12: HYD12 Watershed

Runoff = 794.22 cfs @ 13.32 hrs, Volume= 196.004 af, Depth= 3.25"

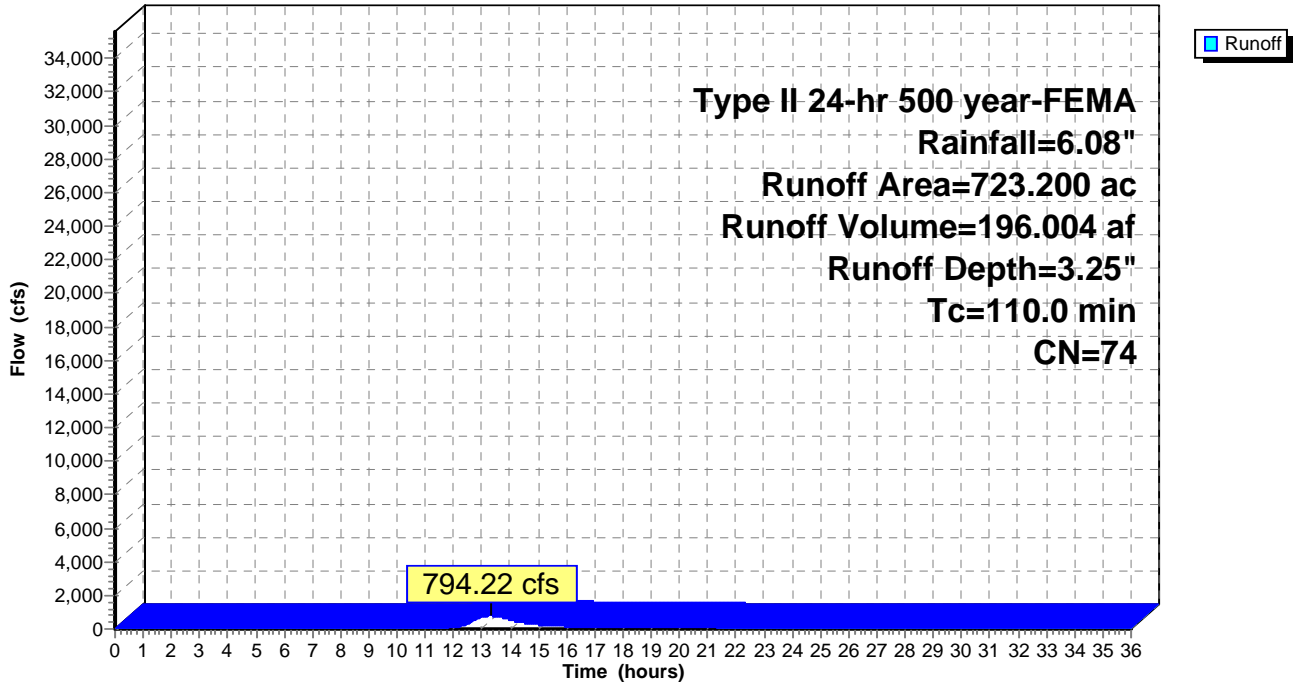
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
723.200	74	>75% Grass cover, Good, HSG C
723.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.0					Direct Entry, HEC-1 Lag Time = 1.10 hr

Subcatchment HYD12: HYD12 Watershed

Hydrograph



Summary for Subcatchment HYD13: HYD13 Watershed

Runoff = 1,147.16 cfs @ 12.80 hrs, Volume= 205.487 af, Depth= 3.35"

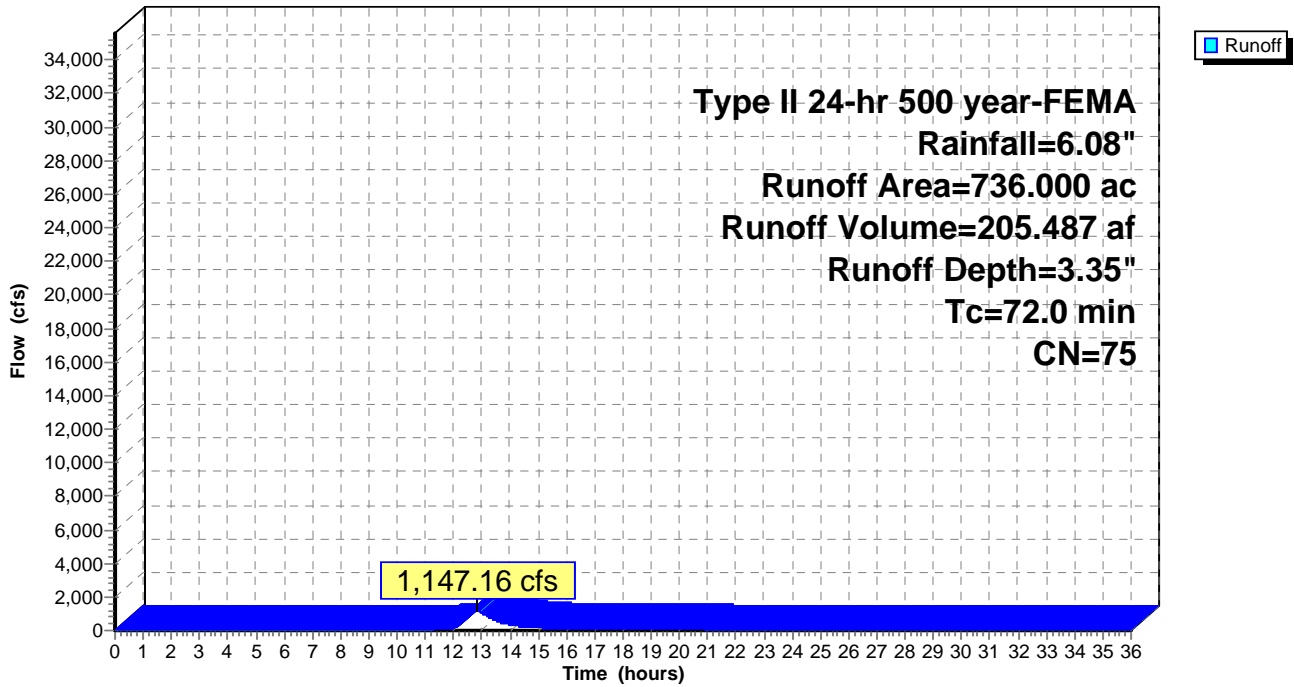
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
736.000	75	1/4 acre lots, 38% imp, HSG B
456.320		62.00% Pervious Area
279.680		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
72.0					Direct Entry, HEC-1 Lag Time = 0.72 hr

Subcatchment HYD13: HYD13 Watershed

Hydrograph



Summary for Subcatchment HYD14: HYD14 Watershed

Runoff = 1,151.57 cfs @ 12.83 hrs, Volume= 217.852 af, Depth= 3.85"

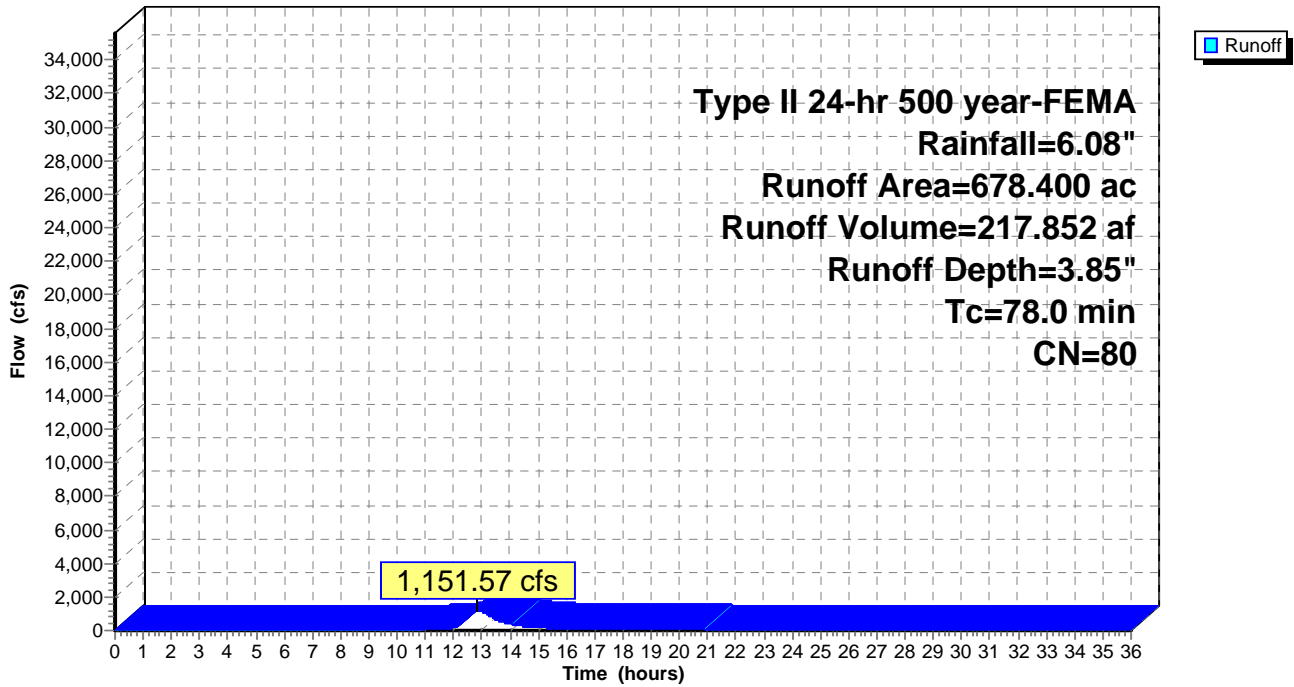
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
678.400	80	1/2 acre lots, 25% imp, HSG C
508.800		75.00% Pervious Area
169.600		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
78.0					Direct Entry, HEC-1 Lag Time = 0.78 hr

Subcatchment HYD14: HYD14 Watershed

Hydrograph



Summary for Subcatchment HYD6: HYD6 Watershed

Runoff = 756.16 cfs @ 13.95 hrs, Volume= 247.174 af, Depth= 2.78"

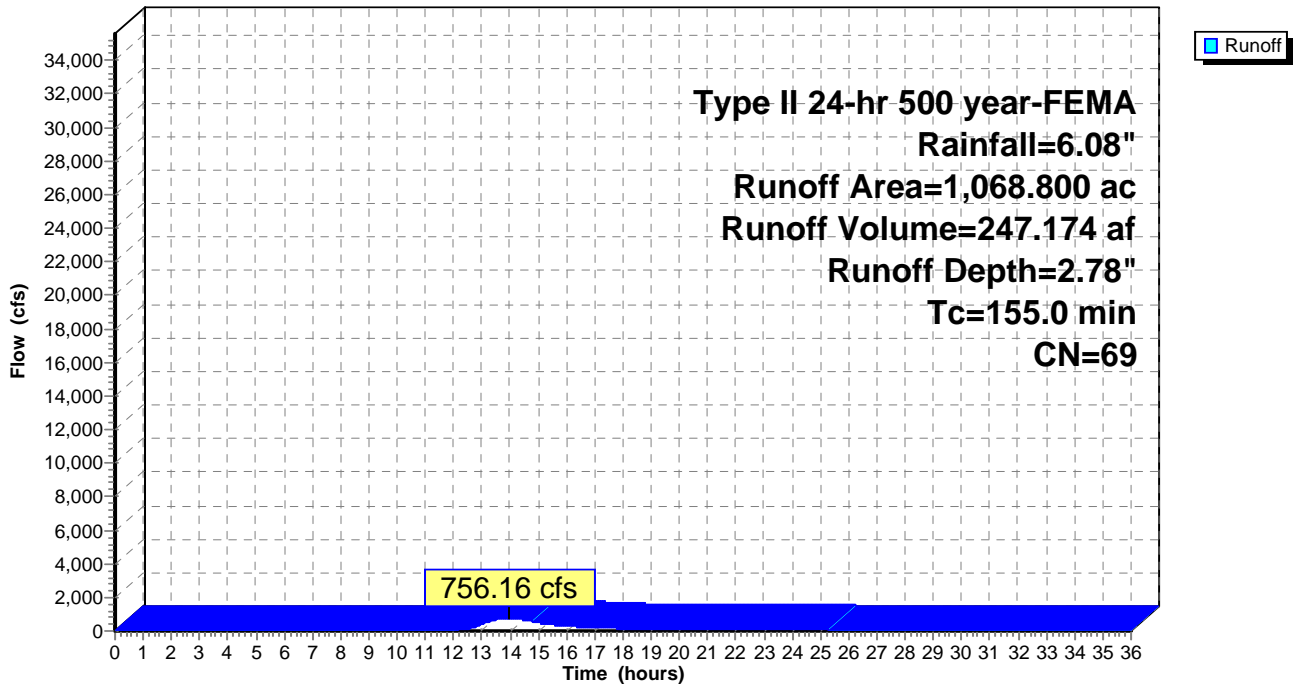
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
1,068.800	69	Pasture/grassland/range, Fair, HSG B
1,068.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
155.0					Direct Entry, HEC-1 Lag Time = 1.55 hr

Subcatchment HYD6: HYD6 Watershed

Hydrograph



Summary for Subcatchment HYD8: Sippo Lake Watershed

Runoff = 1,695.56 cfs @ 14.03 hrs, Volume= 548.560 af, Depth= 3.35"

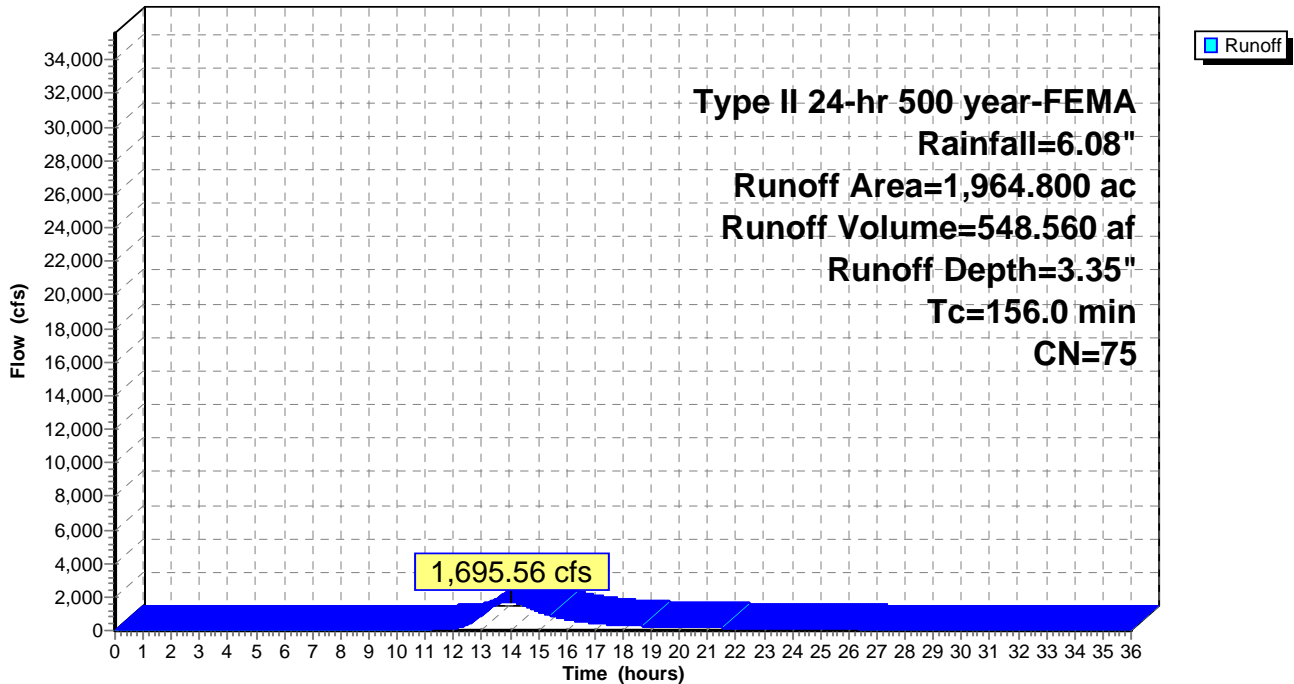
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
1,964.800	75	1/4 acre lots, 38% imp, HSG B
1,218.176		62.00% Pervious Area
746.624		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
156.0					Direct Entry, HEC-1 Lag Time = 1.56hr

Subcatchment HYD8: Sippo Lake Watershed

Hydrograph



Summary for Subcatchment HYD9: HYD9 Watershed

Runoff = 435.70 cfs @ 13.92 hrs, Volume= 140.927 af, Depth= 2.59"

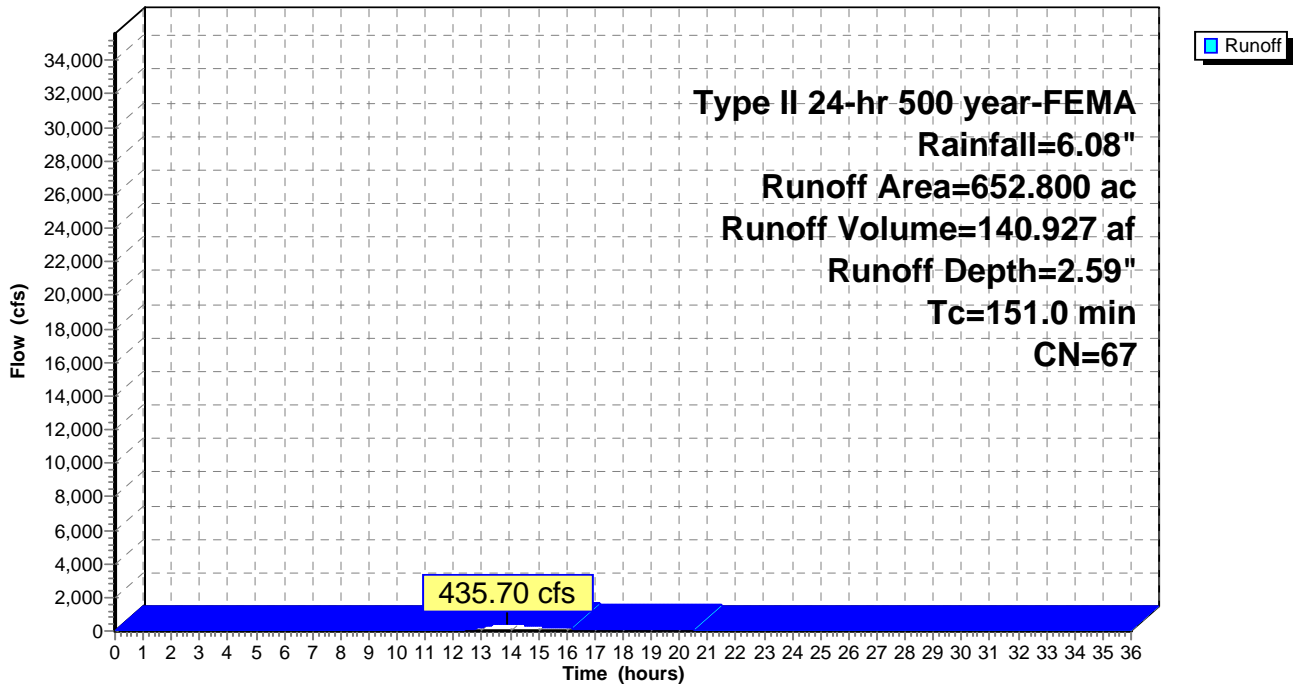
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type II 24-hr 500 year-FEMA Rainfall=6.08"

Area (ac)	CN	Description
* 652.800	67	
652.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
151.0					Direct Entry, HEC-1 Lag Time = 1.51hr

Subcatchment HYD9: HYD9 Watershed

Hydrograph



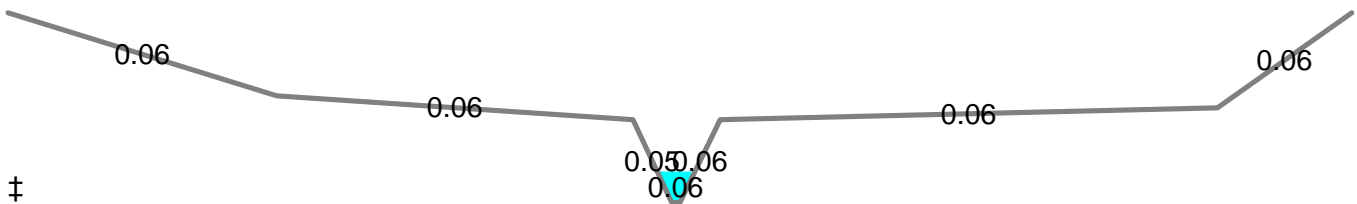
Summary for Reach 5R: Channel 5

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 3.79" for 500 year-FEMA event
 Inflow = 246.72 cfs @ 19.93 hrs, Volume= 563.254 af
 Outflow = 246.55 cfs @ 20.28 hrs, Volume= 557.100 af, Atten= 0%, Lag= 21.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.51 fps, Min. Travel Time= 26.6 min
 Avg. Velocity = 5.09 fps, Avg. Travel Time= 28.8 min

Peak Storage= 394,326 cf @ 20.28 hrs
 Average Depth at Peak Storage= 2.62'
 Defined Flood Depth= 16.00', Capacity at Flood Depth= 106,015.62 cfs
 Bank-Full Depth= 16.00', Capacity at Bank-Full= 106,015.62 cfs

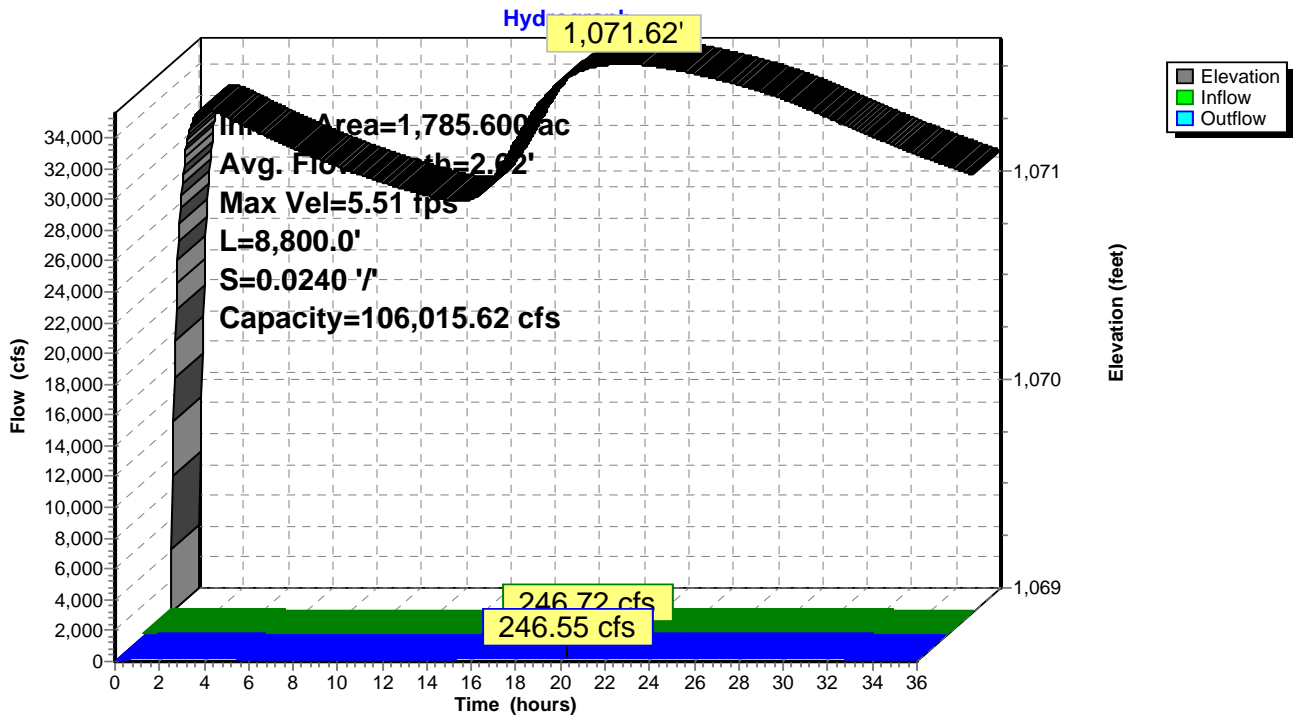
Custom cross-section, Length= 8,800.0' Slope= 0.0240 '/' (102 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,069.00', Outlet Invert= 857.80'



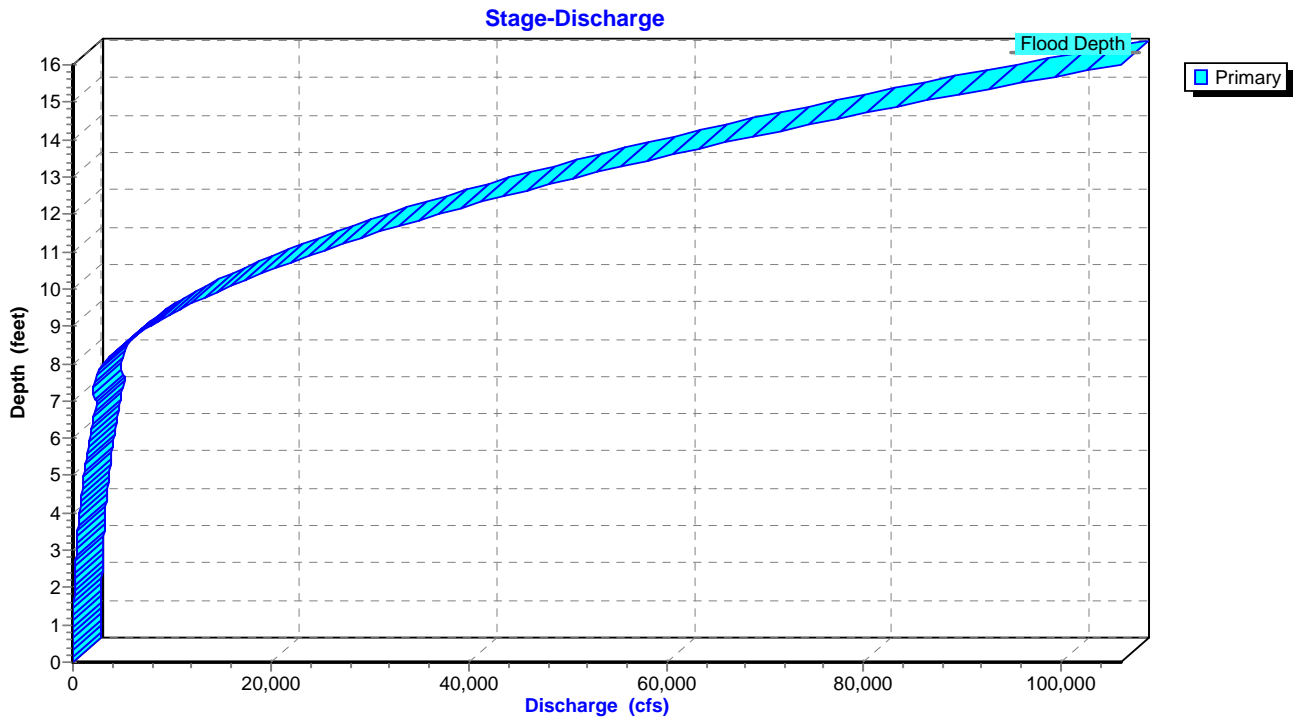
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,085.00	0.00		
200.00	1,078.00	7.00	0.060	
465.00	1,076.00	9.00	0.060	
494.00	1,069.00	16.00	0.050	
500.00	1,069.00	16.00	0.060	
530.00	1,076.00	9.00	0.060	
900.00	1,077.00	8.00	0.060	
1,000.00	1,085.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	6.0	0	0.00
7.00	248.5	66.6	2,186,800	2,476.94
8.00	564.8	569.1	4,969,800	3,087.89
9.00	1,204.8	714.2	10,601,800	7,790.91
16.00	7,198.5	1,002.1	63,346,800	106,015.62

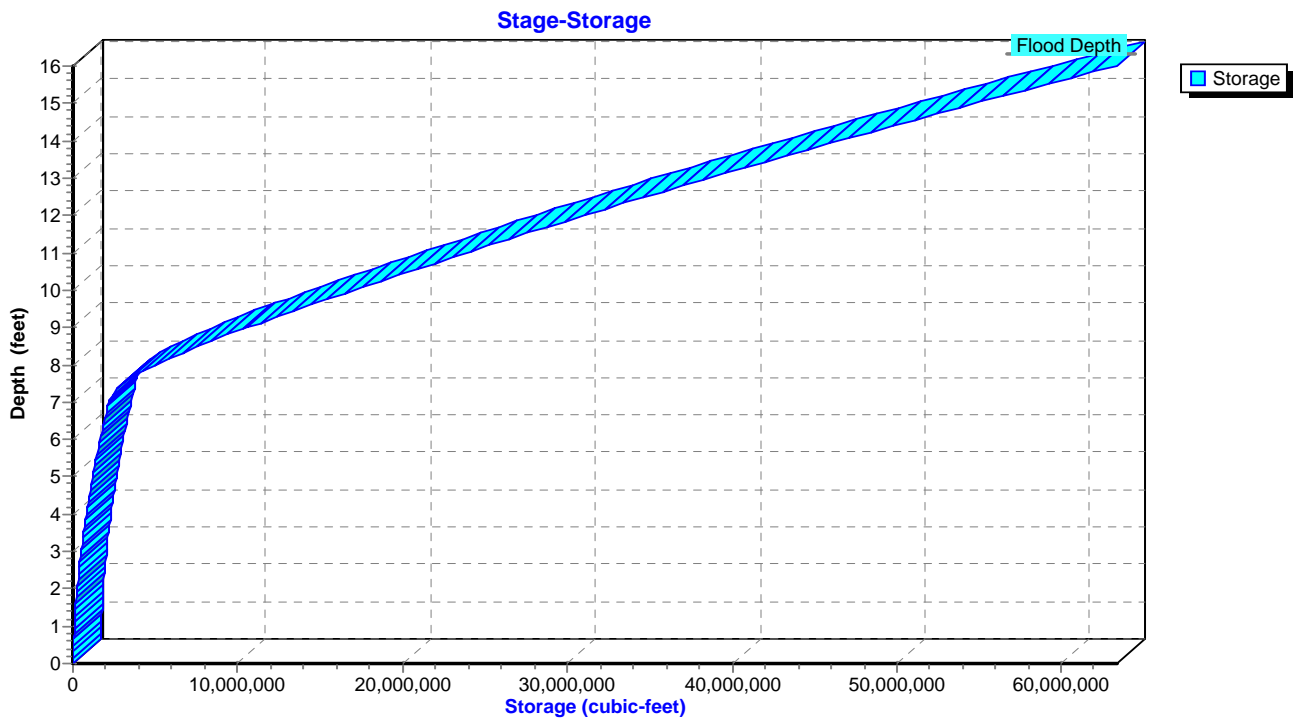
Reach 5R: Channel 5



Reach 5R: Channel 5



Reach 5R: Channel 5



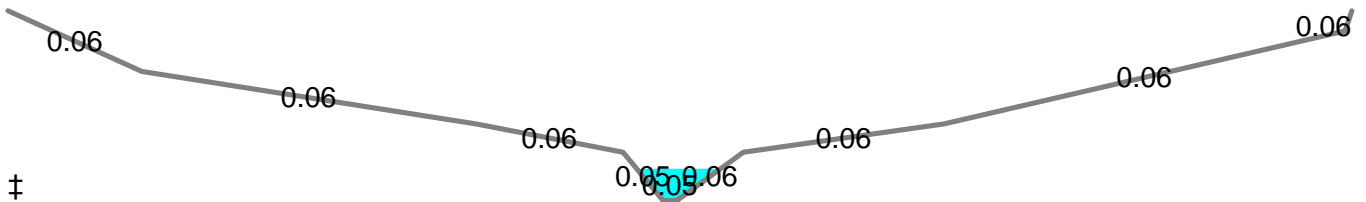
Summary for Reach 7R: Channel 7

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.34" for 500 year-FEMA event
 Inflow = 976.47 cfs @ 13.52 hrs, Volume= 797.195 af
 Outflow = 892.11 cfs @ 13.99 hrs, Volume= 787.015 af, Atten= 9%, Lag= 28.3 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.10 fps, Min. Travel Time= 31.7 min
 Avg. Velocity = 2.24 fps, Avg. Travel Time= 43.9 min

Peak Storage= 1,697,472 cf @ 13.99 hrs
 Average Depth at Peak Storage= 7.91'
 Defined Flood Depth= 47.00', Capacity at Flood Depth= 195,473.52 cfs
 Bank-Full Depth= 47.00', Capacity at Bank-Full= 195,473.52 cfs

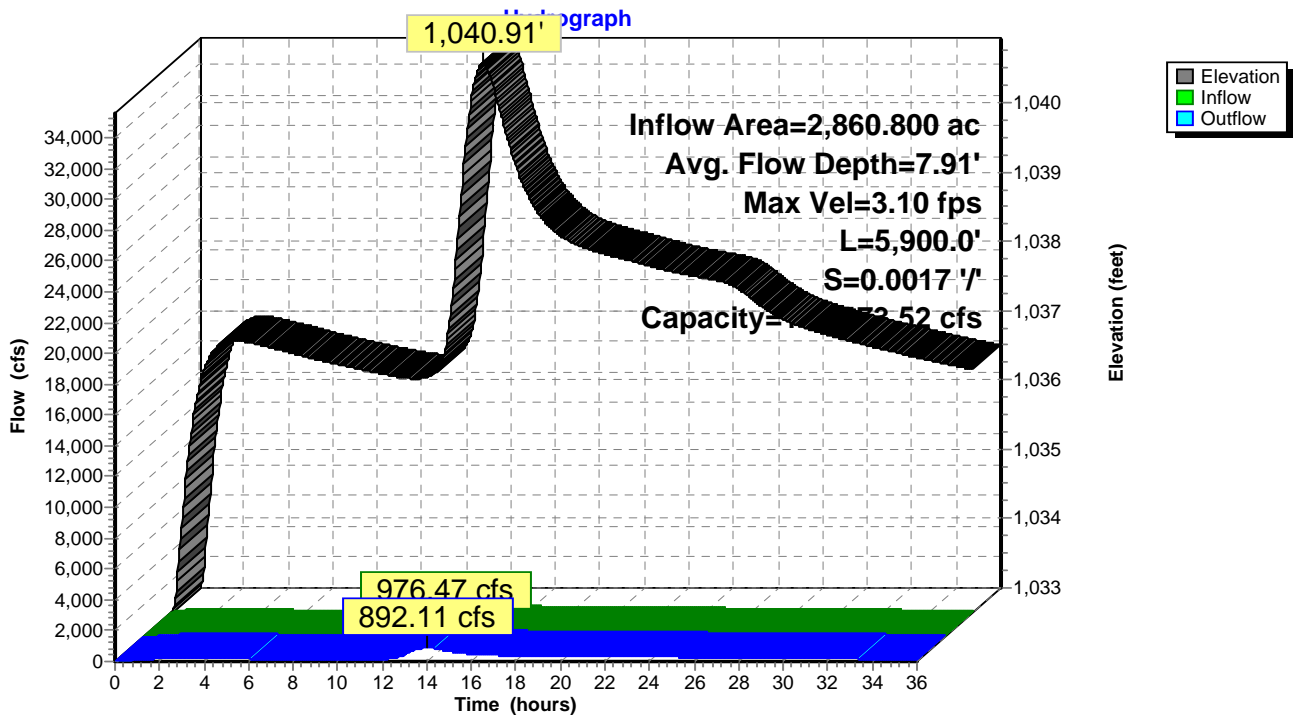
Custom cross-section, Length= 5,900.0' Slope= 0.0017 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,033.00', Outlet Invert= 1,022.97'



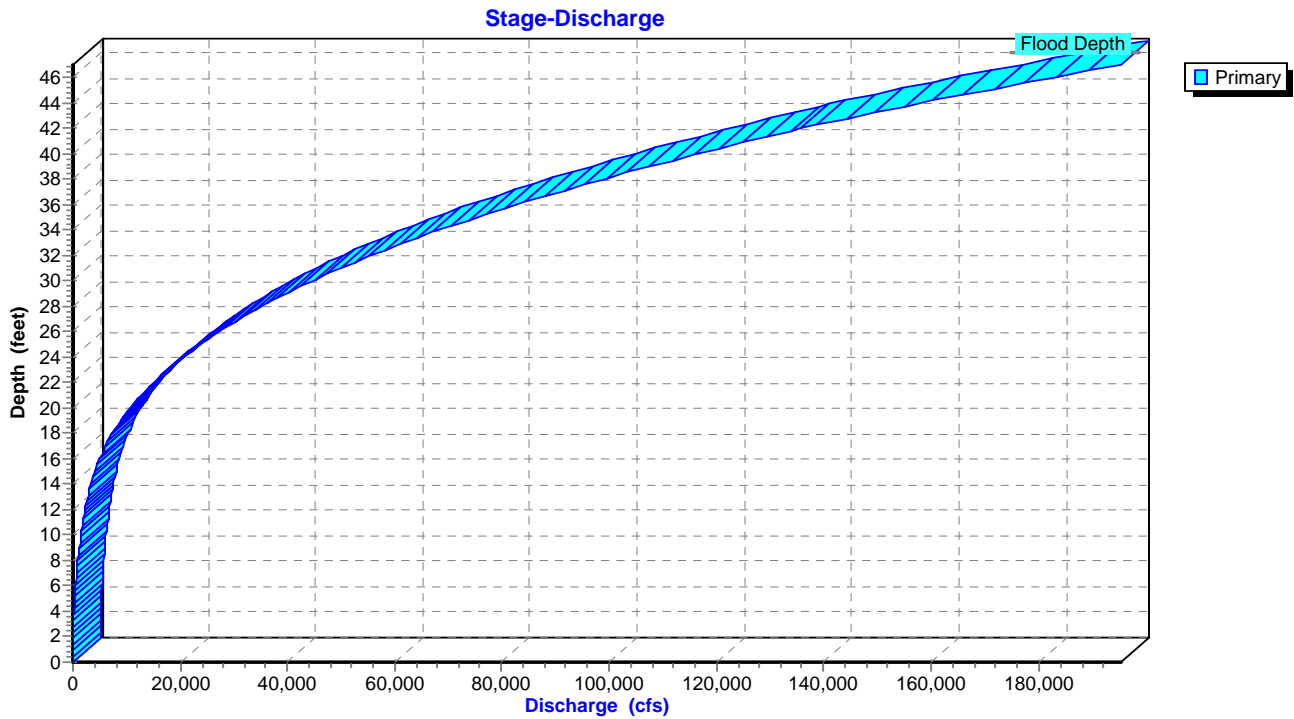
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,080.00	0.00		
100.00	1,065.00	15.00	0.060	
350.00	1,052.00	28.00	0.060	
460.00	1,045.00	35.00	0.060	
490.00	1,033.00	47.00	0.050	
500.00	1,033.00	47.00	0.050	
550.00	1,045.00	35.00	0.060	
700.00	1,052.00	28.00	0.060	
1,000.00	1,075.00	5.00	0.060	
1,005.00	1,080.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
12.00	600.0	93.7	3,540,000	2,349.60
19.00	2,140.0	354.1	12,626,000	8,862.05
32.00	9,417.2	774.5	55,561,326	55,339.93
42.00	18,098.3	972.7	106,780,167	135,620.34
47.00	23,027.5	1,013.5	135,862,250	195,473.52

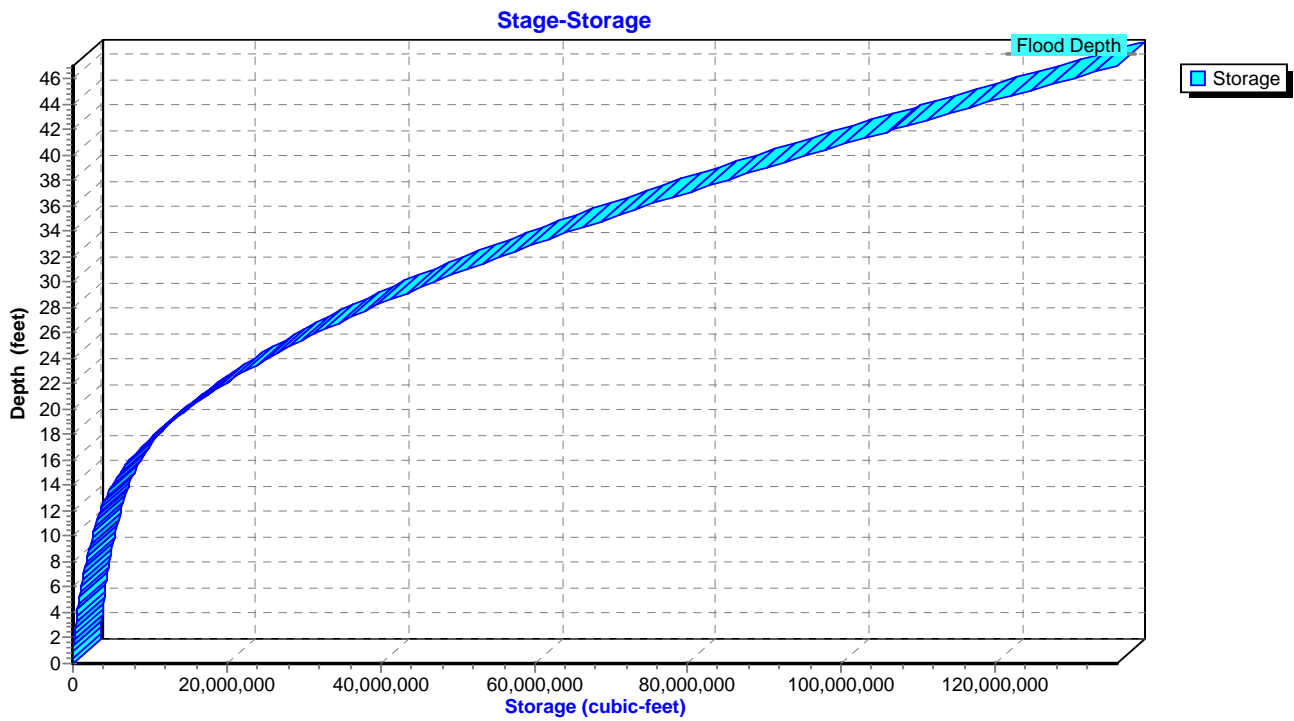
Reach 7R: Channel 7



Reach 7R: Channel 7



Reach 7R: Channel 7



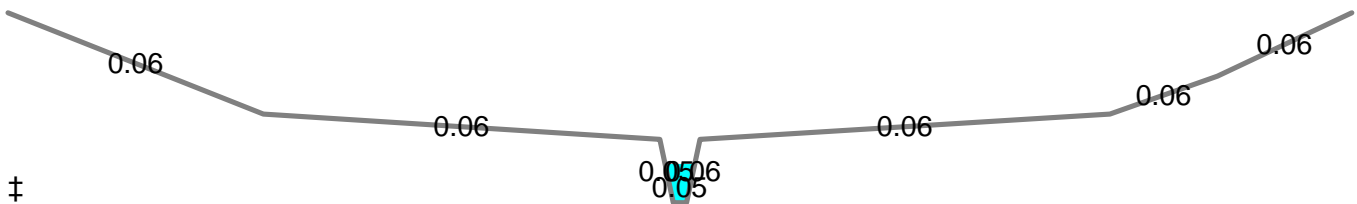
Summary for Reach 10Ra: Channel 10 (Reach West of Genoa Rd)

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 1.30" for 500 year-FEMA event
 Inflow = 125.92 cfs @ 25.70 hrs, Volume= 212.745 af
 Outflow = 125.92 cfs @ 25.77 hrs, Volume= 211.885 af, Atten= 0%, Lag= 4.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.56 fps, Min. Travel Time= 5.9 min
 Avg. Velocity = 2.45 fps, Avg. Travel Time= 6.1 min

Peak Storage= 44,274 cf @ 25.77 hrs
 Average Depth at Peak Storage= 3.05'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 36,685.79 cfs
 Bank-Full Depth= 15.00', Capacity at Bank-Full= 36,685.79 cfs

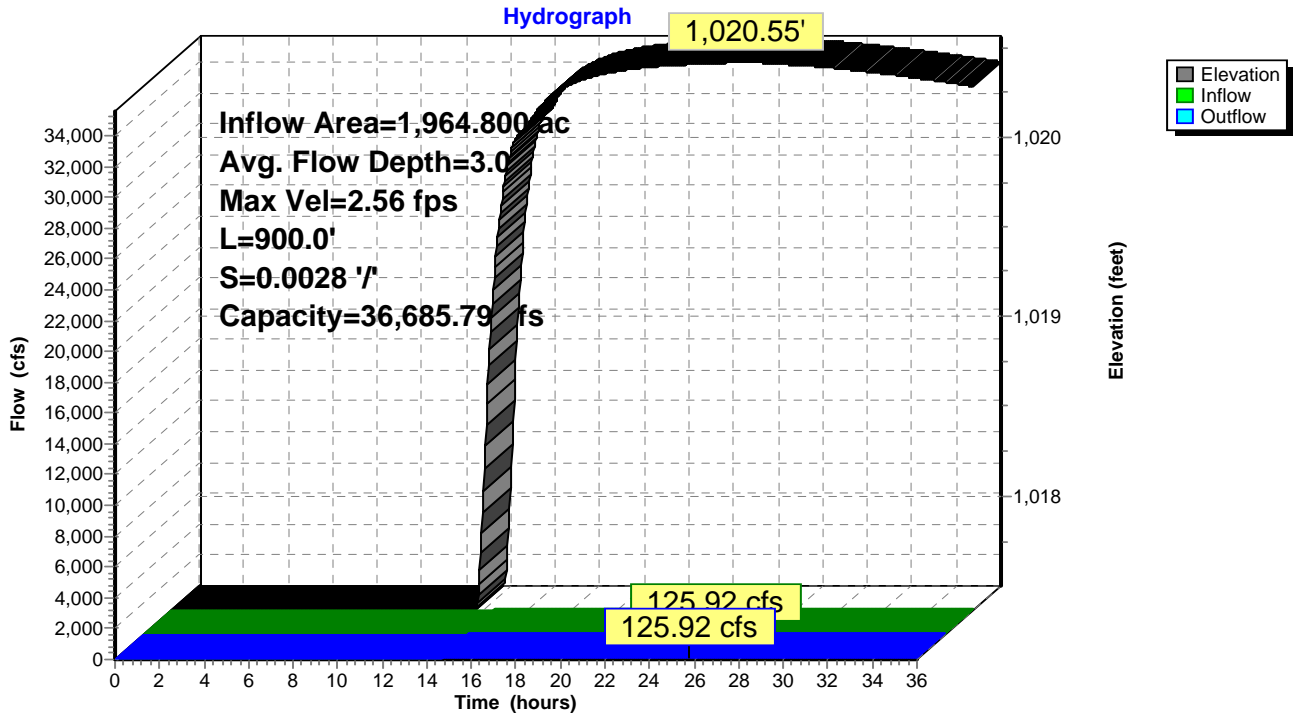
Custom cross-section, Length= 900.0' Slope= 0.0028 '/' (103 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.50', Outlet Invert= 1,015.00'



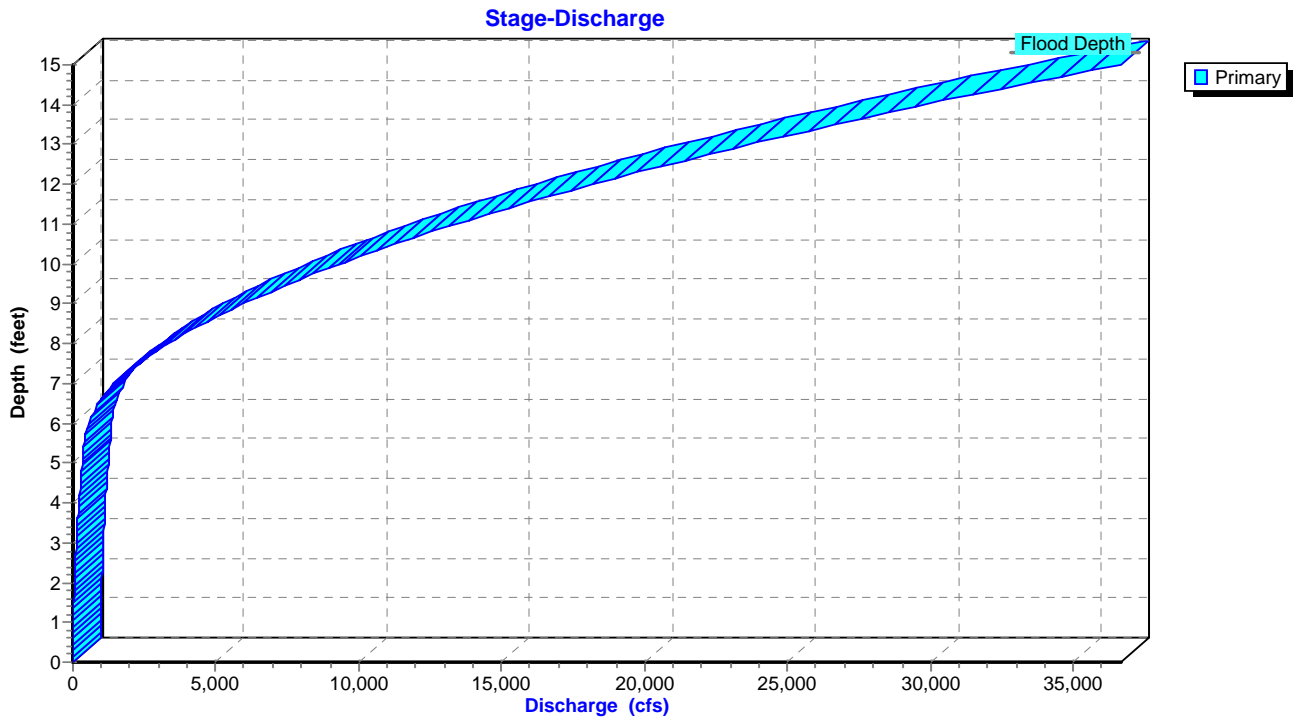
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,032.00	0.00		
190.00	1,024.00	8.00	0.060	
485.00	1,022.00	10.00	0.060	
495.00	1,017.00	15.00	0.050	
505.00	1,017.00	15.00	0.050	
515.00	1,022.00	10.00	0.060	
820.00	1,024.00	8.00	0.060	
900.00	1,027.00	5.00	0.060	
1,000.00	1,032.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
5.00	100.0	32.4	90,000	328.73
7.00	760.0	632.4	684,000	1,430.41
10.00	2,876.9	783.7	2,589,188	9,317.36
15.00	7,330.0	1,002.7	6,597,000	36,685.79

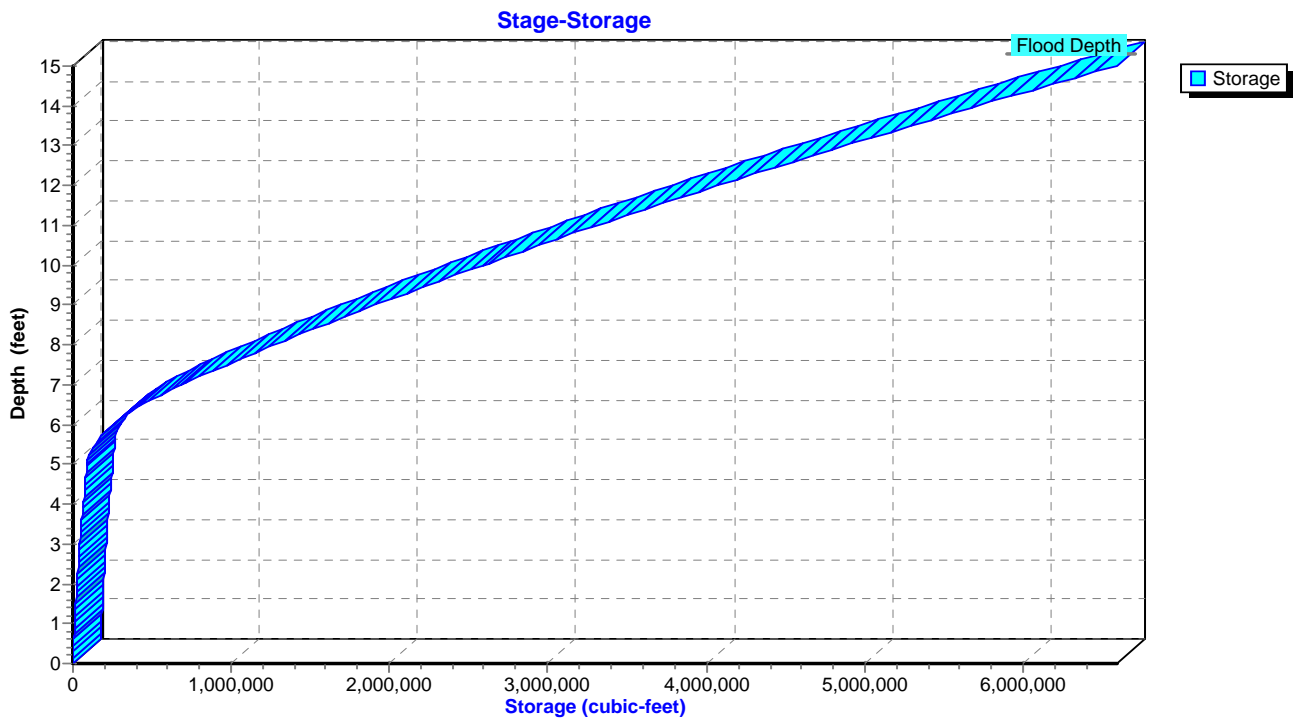
Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



Reach 10Ra: Channel 10 (Reach West of Genoa Rd)



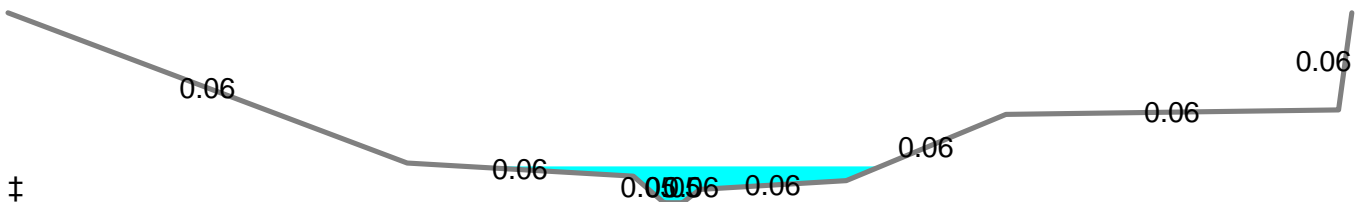
Summary for Reach 15R: Channel 15

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.55" for 500 year-FEMA event
 Inflow = 2,625.57 cfs @ 13.94 hrs, Volume= 1,553.384 af
 Outflow = 2,019.70 cfs @ 14.80 hrs, Volume= 1,513.312 af, Atten= 23%, Lag= 51.8 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.10 fps, Min. Travel Time= 70.0 min
 Avg. Velocity = 1.52 fps, Avg. Travel Time= 96.5 min

Peak Storage= 8,485,057 cf @ 14.80 hrs
 Average Depth at Peak Storage= 8.21'
 Defined Flood Depth= 43.00', Capacity at Flood Depth= 189,892.92 cfs
 Bank-Full Depth= 43.00', Capacity at Bank-Full= 189,892.92 cfs

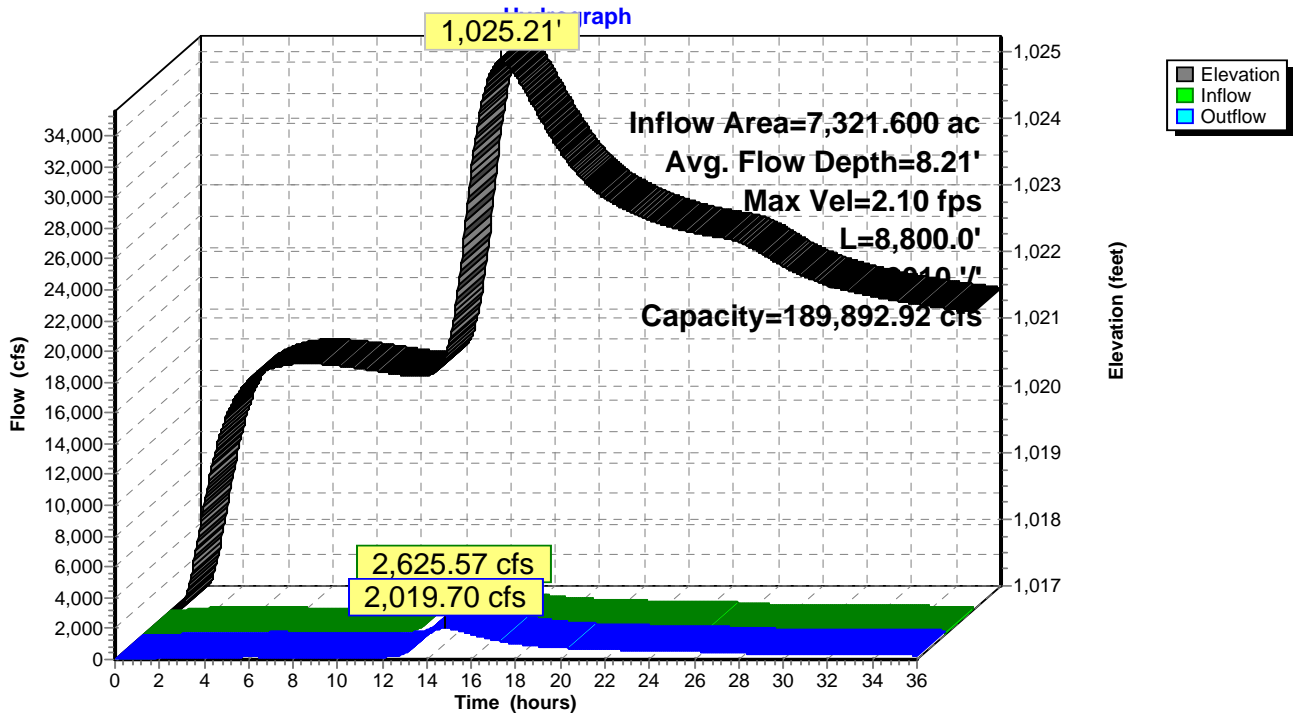
Custom cross-section, Length= 8,800.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,017.00', Outlet Invert= 1,008.20'



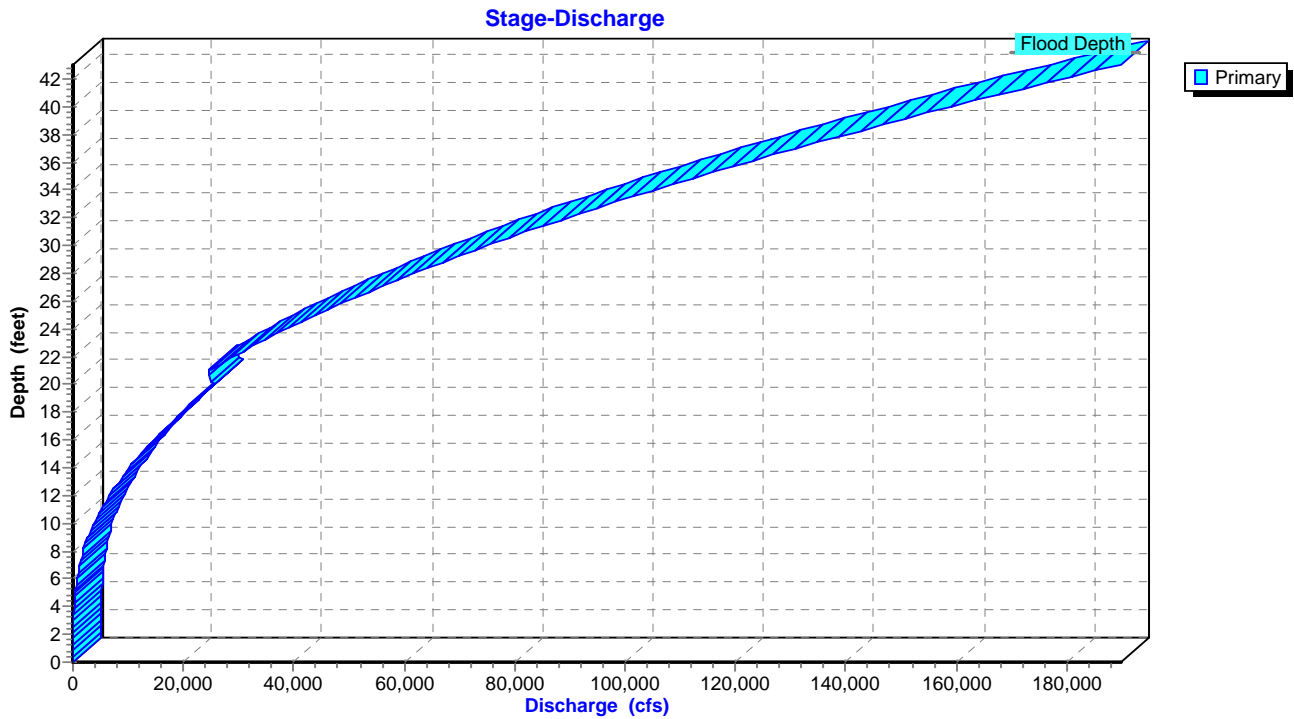
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,060.00	0.00		
300.00	1,026.00	34.00	0.060	
470.00	1,023.00	37.00	0.060	
493.00	1,017.00	43.00	0.050	
507.00	1,017.00	43.00	0.050	
520.00	1,020.00	40.00	0.060	
630.00	1,022.00	38.00	0.060	
750.00	1,037.00	23.00	0.060	
1,000.00	1,038.00	22.00	0.060	
1,010.00	1,060.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.0	0	0.00
3.00	78.8	39.2	693,000	116.39
5.00	273.4	157.2	2,406,067	396.99
6.00	435.5	169.2	3,832,400	733.92
9.00	1,230.5	363.4	10,828,400	2,703.81
20.00	6,230.3	549.8	54,826,847	25,737.78
21.00	6,906.8	808.7	60,779,788	24,784.16
43.00	26,881.5	1,028.2	236,557,200	189,892.92

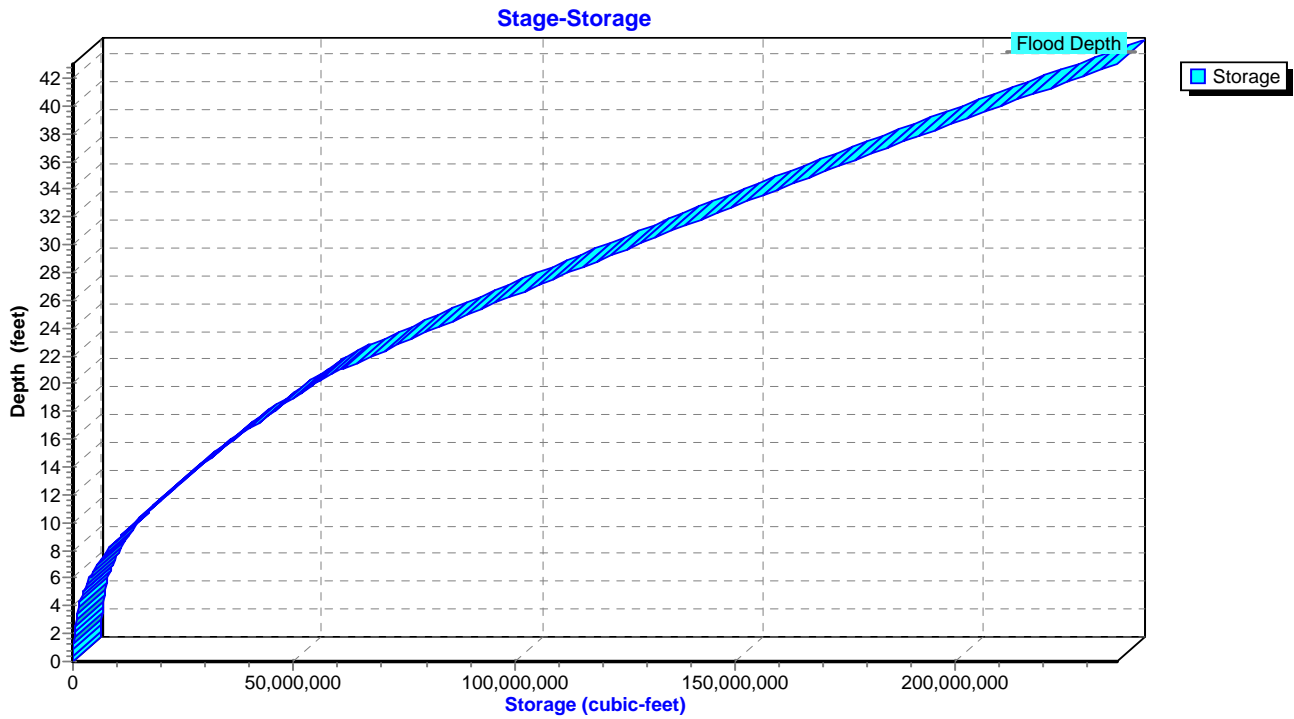
Reach 15R: Channel 15



Reach 15R: Channel 15



Reach 15R: Channel 15



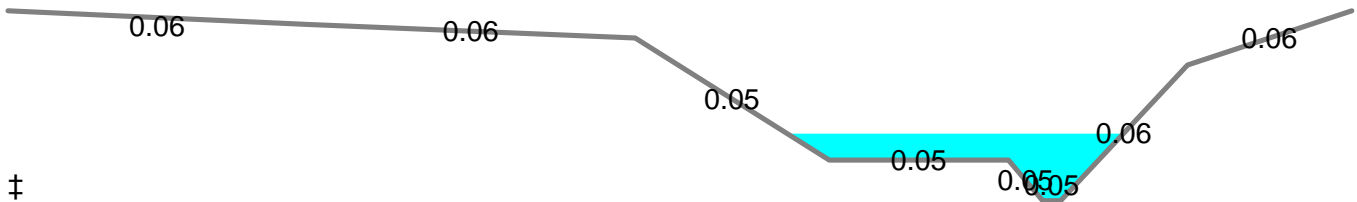
Summary for Reach 16R: Channel 16

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.62" for 500 year-FEMA event
 Inflow = 2,567.85 cfs @ 14.38 hrs, Volume= 1,914.335 af
 Outflow = 2,454.79 cfs @ 14.95 hrs, Volume= 1,872.029 af, Atten= 4%, Lag= 34.2 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.44 fps, Min. Travel Time= 51.2 min
 Avg. Velocity = 1.55 fps, Avg. Travel Time= 80.5 min

Peak Storage= 7,538,218 cf @ 14.95 hrs
 Average Depth at Peak Storage= 9.88'
 Defined Flood Depth= 28.00', Capacity at Flood Depth= 42,389.29 cfs
 Bank-Full Depth= 28.00', Capacity at Bank-Full= 42,389.29 cfs

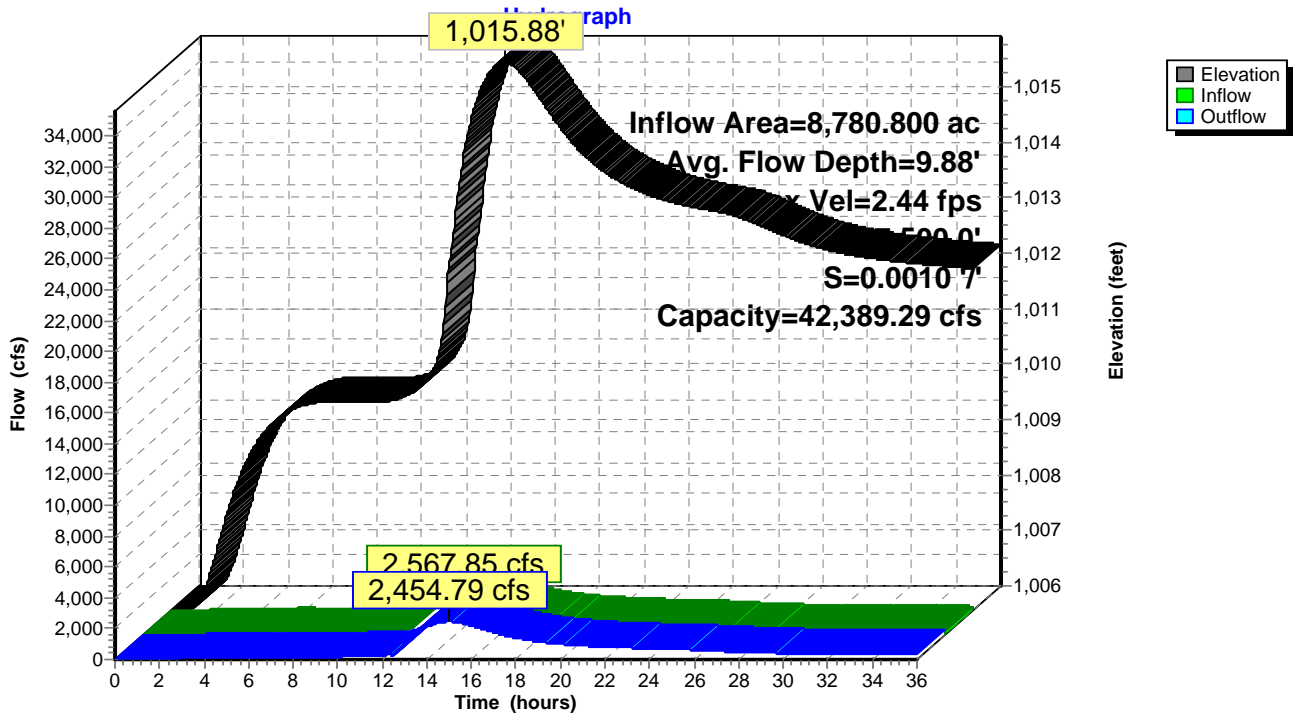
Custom cross-section, Length= 7,500.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 1,006.00', Outlet Invert= 998.50'



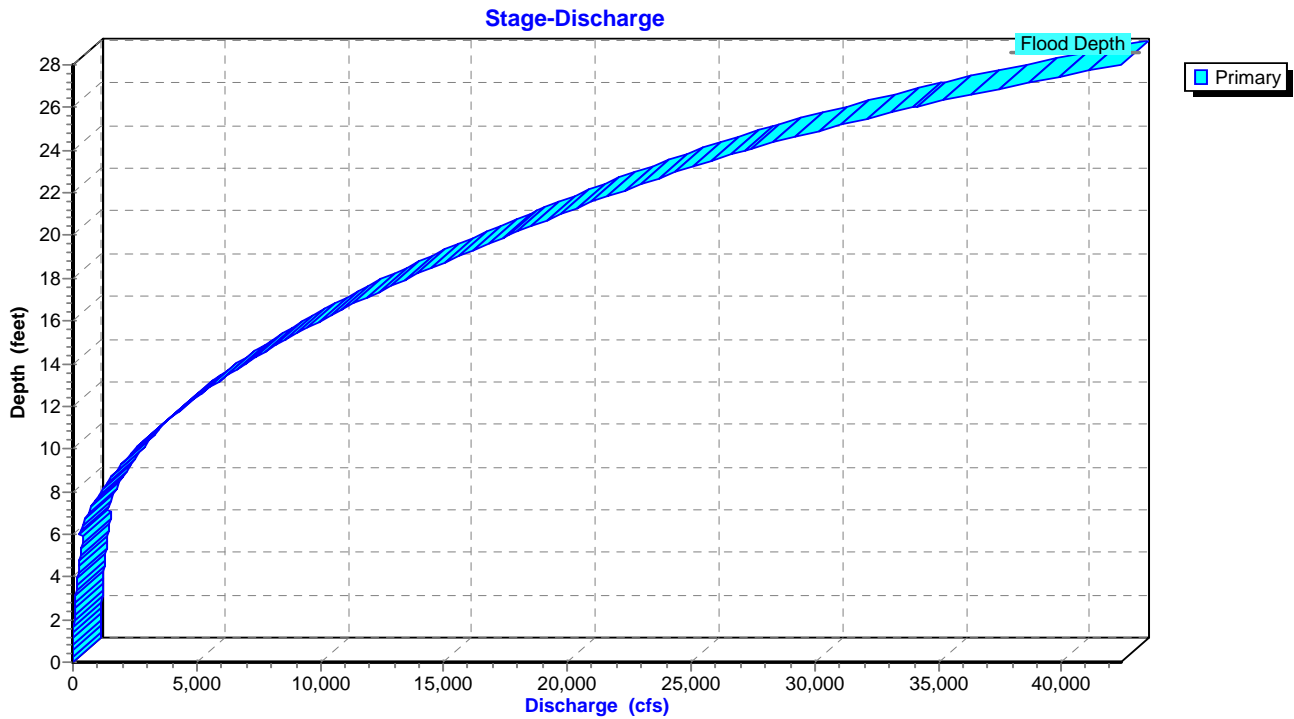
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,034.00	0.00		
200.00	1,032.00	2.00	0.060	
420.00	1,030.00	4.00	0.060	
550.00	1,012.00	22.00	0.050	
670.00	1,012.00	22.00	0.050	
693.00	1,006.00	28.00	0.050	
705.00	1,006.00	28.00	0.050	
790.00	1,026.00	8.00	0.060	
900.00	1,034.00	0.00	0.060	

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.0	0	0.00
6.00	217.5	182.0	1,631,250	246.41
20.00	3,868.8	345.2	29,015,833	17,663.27
24.00	5,401.0	429.5	40,507,500	27,141.14
26.00	6,498.5	677.1	48,738,750	33,993.67
28.00	8,071.0	904.6	60,532,500	42,389.29

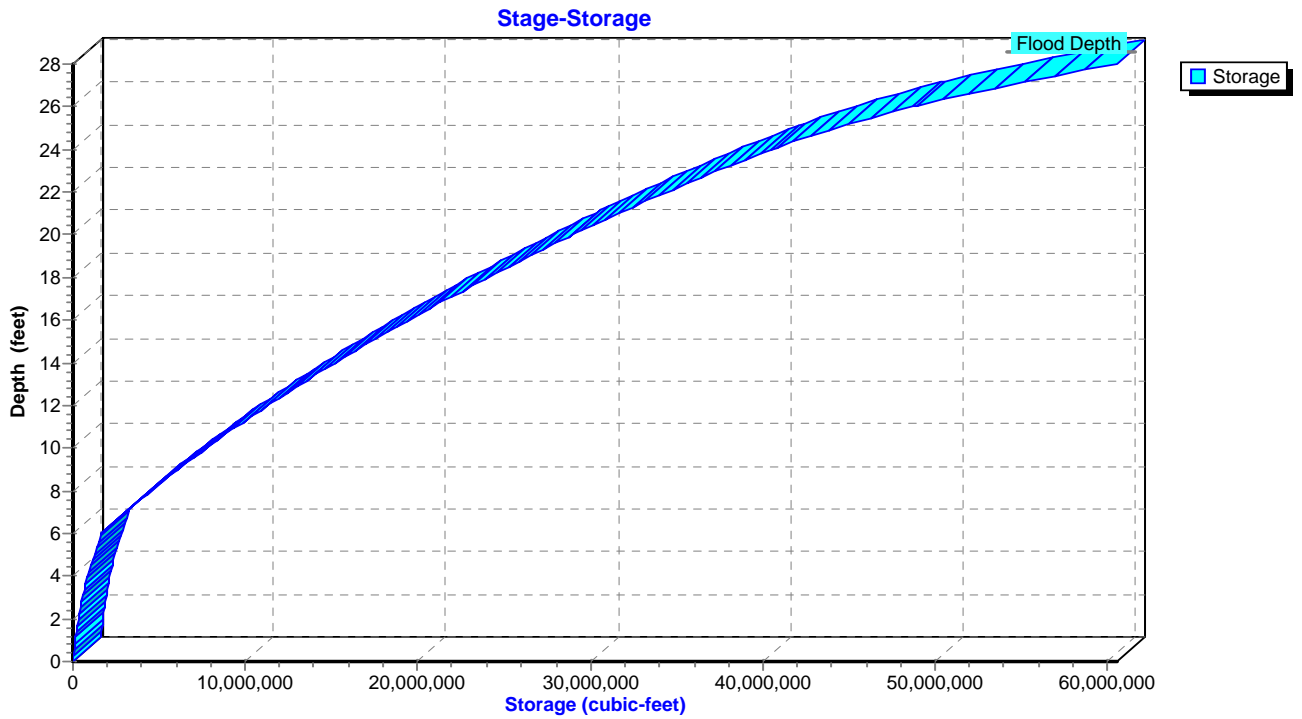
Reach 16R: Channel 16



Reach 16R: Channel 16



Reach 16R: Channel 16



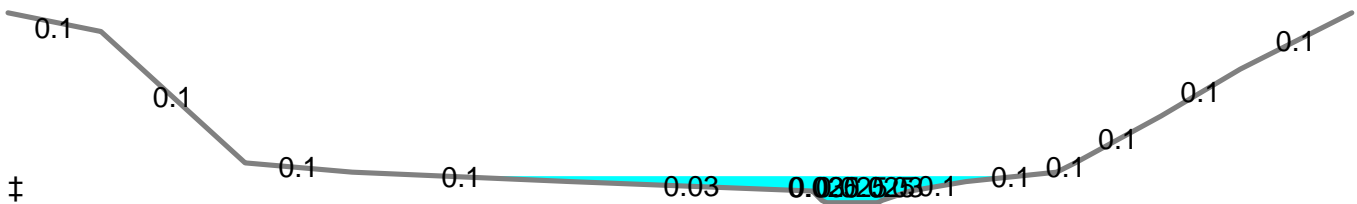
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.63" for 500 year-FEMA event
 Inflow = 2,509.12 cfs @ 15.67 hrs, Volume= 2,074.811 af
 Outflow = 2,509.11 cfs @ 15.68 hrs, Volume= 2,074.686 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.45 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 8.19 fps, Avg. Travel Time= 0.9 min

Peak Storage= 119,546 cf @ 15.68 hrs
 Average Depth at Peak Storage= 5.65'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

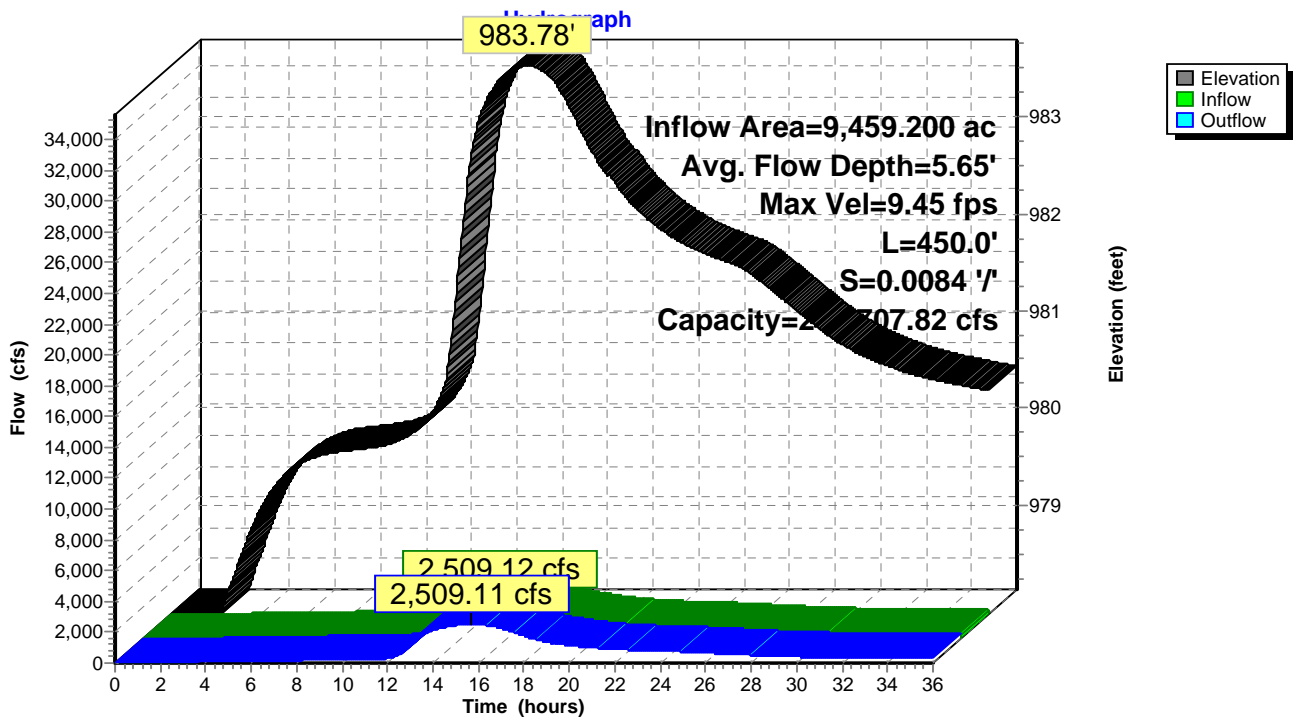
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



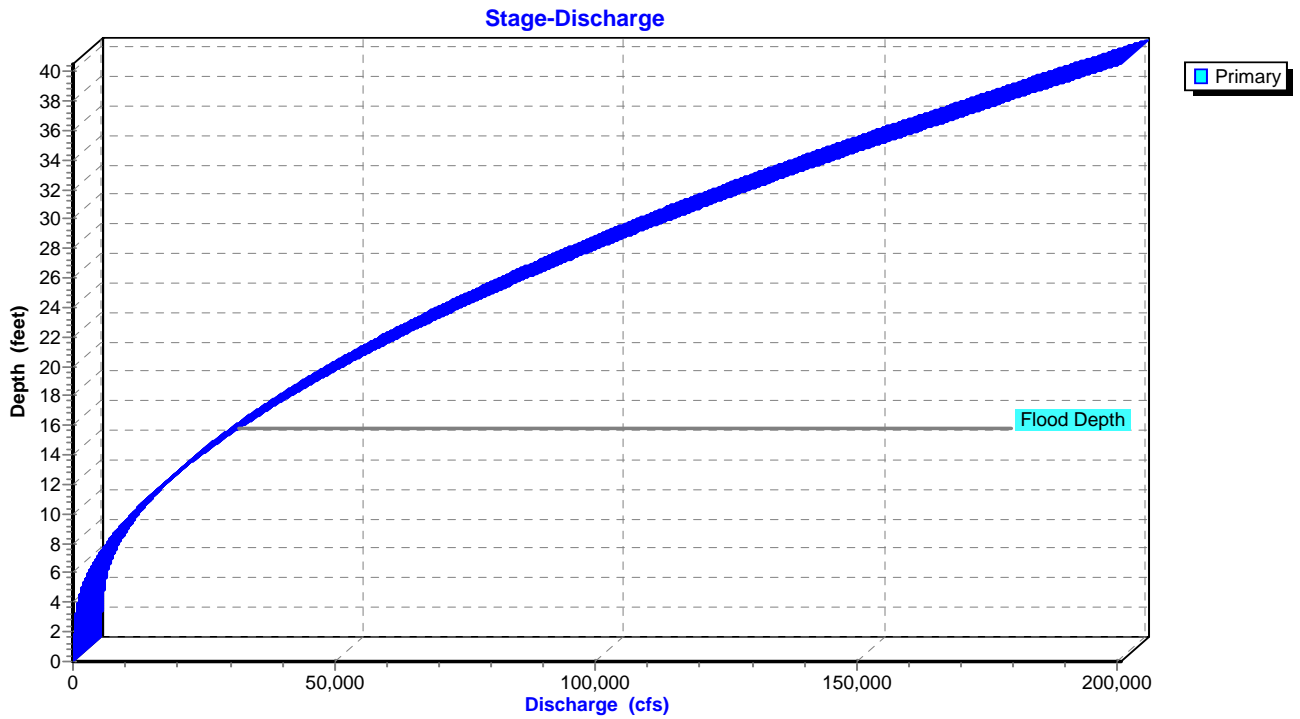
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

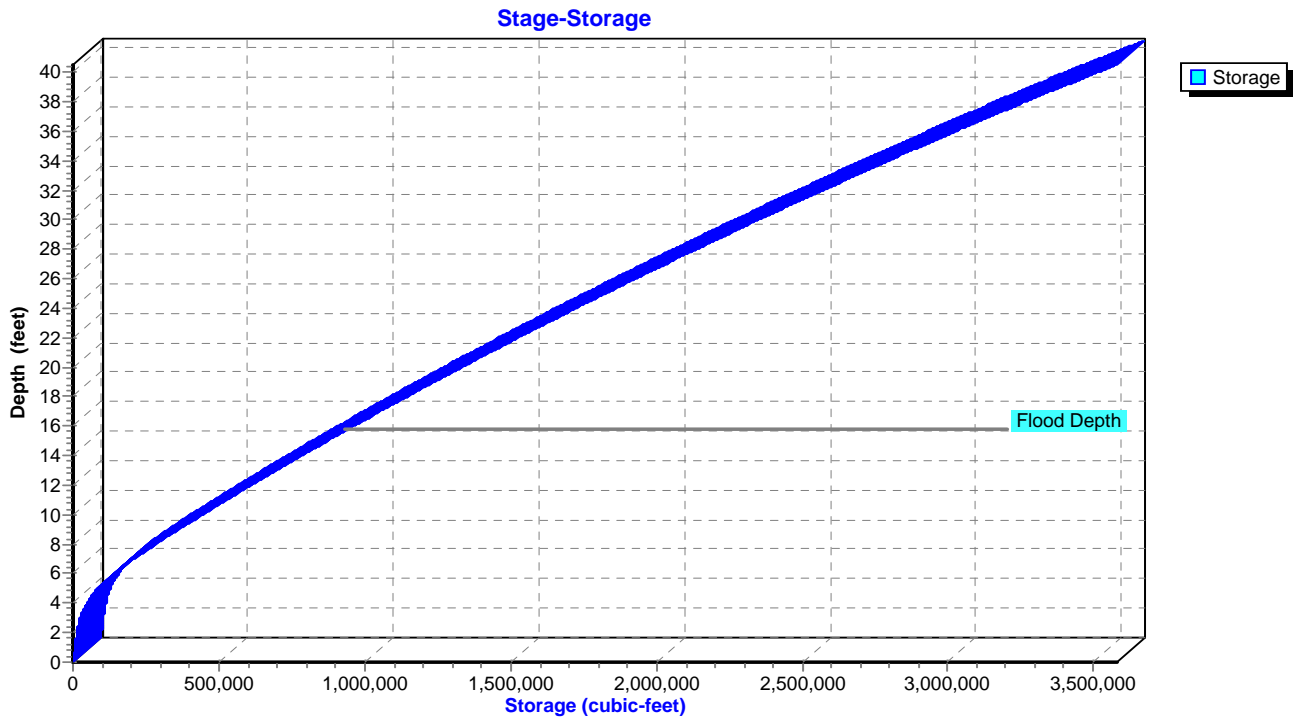
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

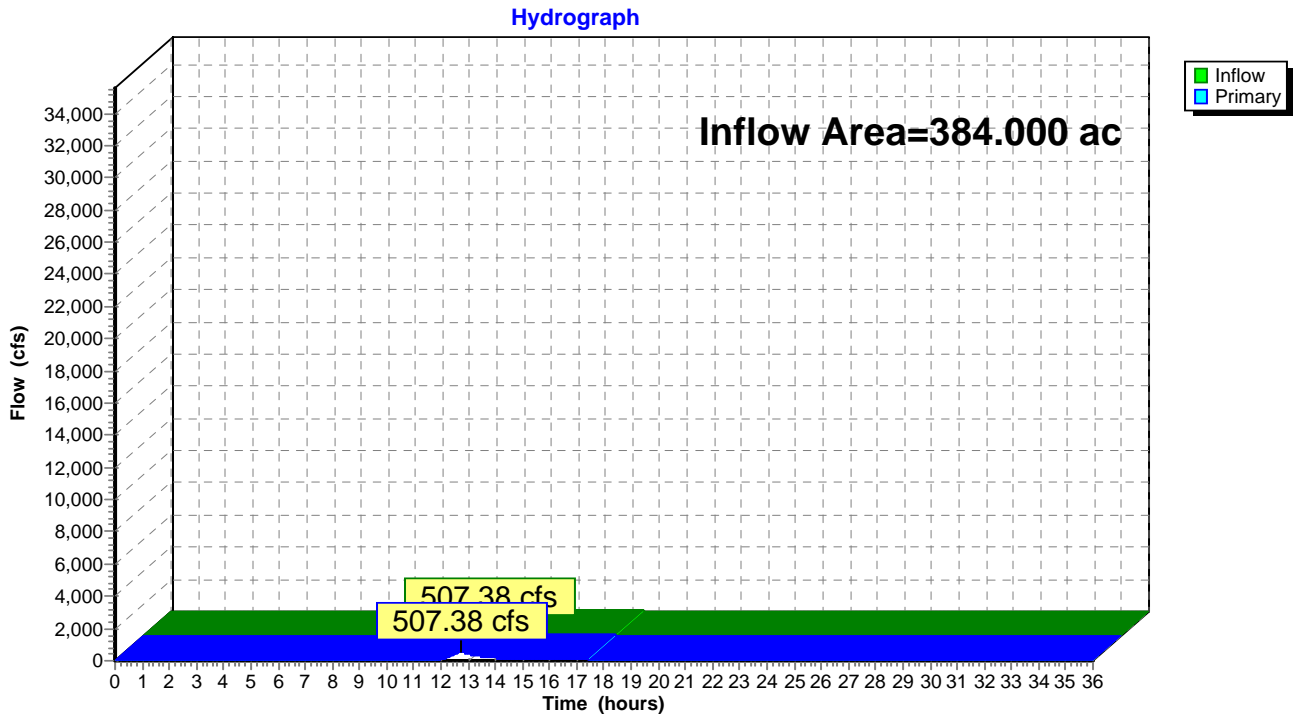


Summary for Pond 1C: CONF 1 Combined O'Springs and Eric

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.30" for 500 year-FEMA event
Inflow = 507.38 cfs @ 12.71 hrs, Volume= 105.601 af
Primary = 507.38 cfs @ 12.72 hrs, Volume= 105.601 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 1C: CONF 1 Combined O'Springs and Eric



Summary for Pond 1P: Sippo Creek Reservoir - Existing Conditions

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.65" for 500 year-FEMA event
 Inflow = 2,650.69 cfs @ 14.79 hrs, Volume= 2,089.394 af
 Outflow = 2,643.72 cfs @ 14.94 hrs, Volume= 2,076.338 af, Atten= 0%, Lag= 9.0 min
 Primary = 1,979.97 cfs @ 14.94 hrs, Volume= 1,854.317 af
 Secondary = 663.74 cfs @ 14.94 hrs, Volume= 222.021 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,006.86' @ 14.94 hrs Surf.Area= 18.373 ac Storage= 120.616 af (59.654 af above start)
 Flood Elev= 1,005.00' Surf.Area= 12.657 ac Storage= 91.431 af (30.469 af above start)

Plug-Flow detention time= 73.9 min calculated for 2,015.376 af (96% of inflow)
 Center-of-Mass det. time= 16.0 min (1,146.4 - 1,130.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

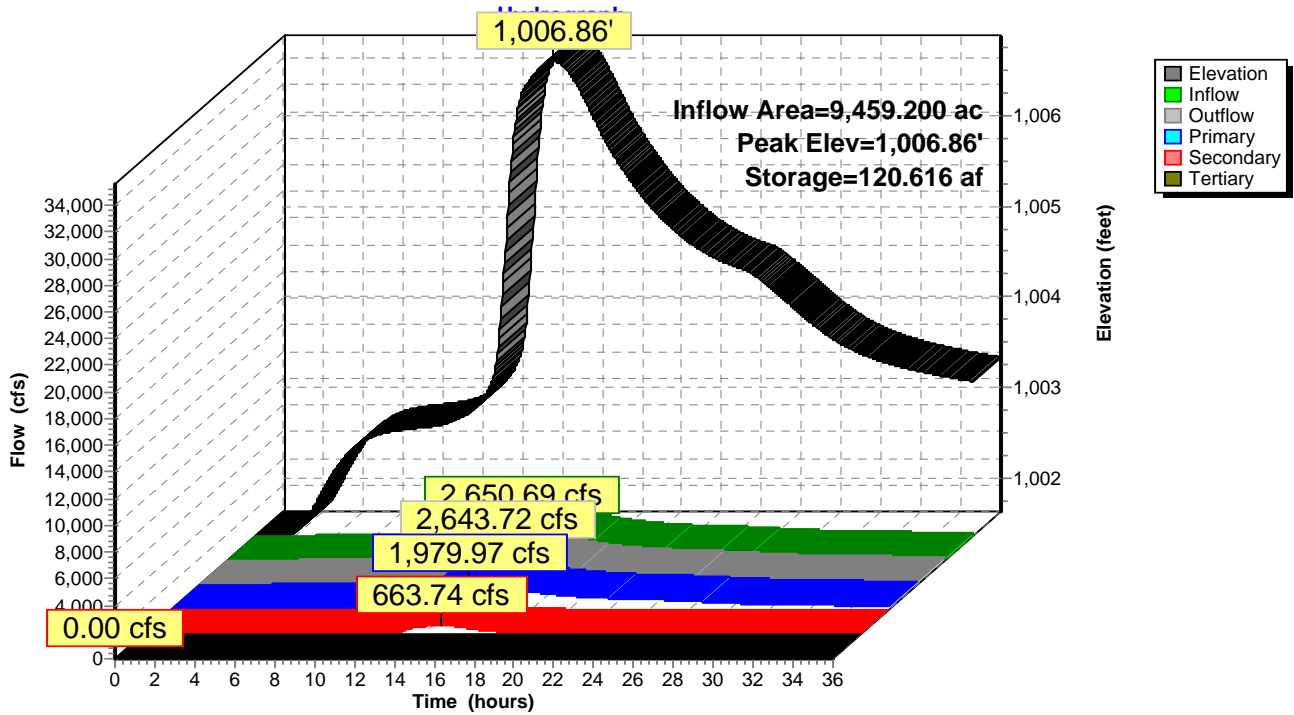
Device	Routing	Invert	Outlet Devices
#1	Primary	1,001.64'	50.0' long x 2.9' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.45 2.58 2.66 2.66 2.65 2.64 2.65 2.69 2.69 2.73 2.83 2.95 3.01 3.12 3.32
#2	Secondary	1,005.00'	Right Embankment Weir - Building side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.60 20.00 Width (feet) 17.00 23.00 77.00 77.00
#3	Secondary	1,004.20'	Left Embankment Weir - Playground side, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 1.80 3.80 5.80 15.80 Width (feet) 10.00 22.00 45.00 130.00 180.00 205.00
#4	Tertiary	1,008.00'	Weir Flow around Bldg. X 0.50, Cv= 2.62 (C= 3.28) Head (feet) 0.00 2.00 4.00 6.00 8.00 10.00 12.00 Width (feet) 50.00 90.00 122.00 166.00 240.00 334.00 420.00

Primary OutFlow Max=1,979.97 cfs @ 14.94 hrs HW=1,006.86' TW=996.69' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 1,979.97 cfs @ 7.59 fps)

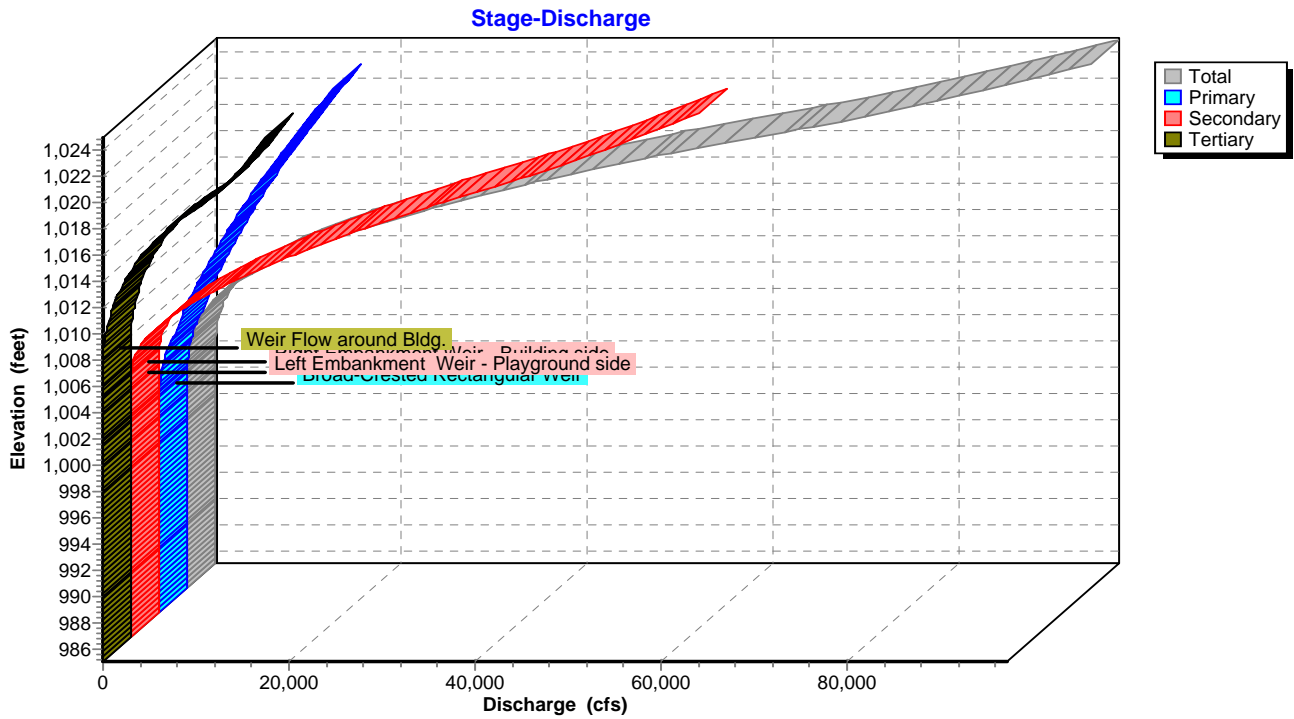
Secondary OutFlow Max=663.74 cfs @ 14.94 hrs HW=1,006.86' TW=996.69' (Dynamic Tailwater)
 ↳ **2=Right Embankment Weir - Building side** (Weir Controls 249.85 cfs @ 3.57 fps)
 ↳ **3=Left Embankment Weir - Playground side** (Weir Controls 413.89 cfs @ 4.26 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.64' TW=978.00' (Dynamic Tailwater)
 ↳ **4=Weir Flow around Bldg.** (Controls 0.00 cfs)

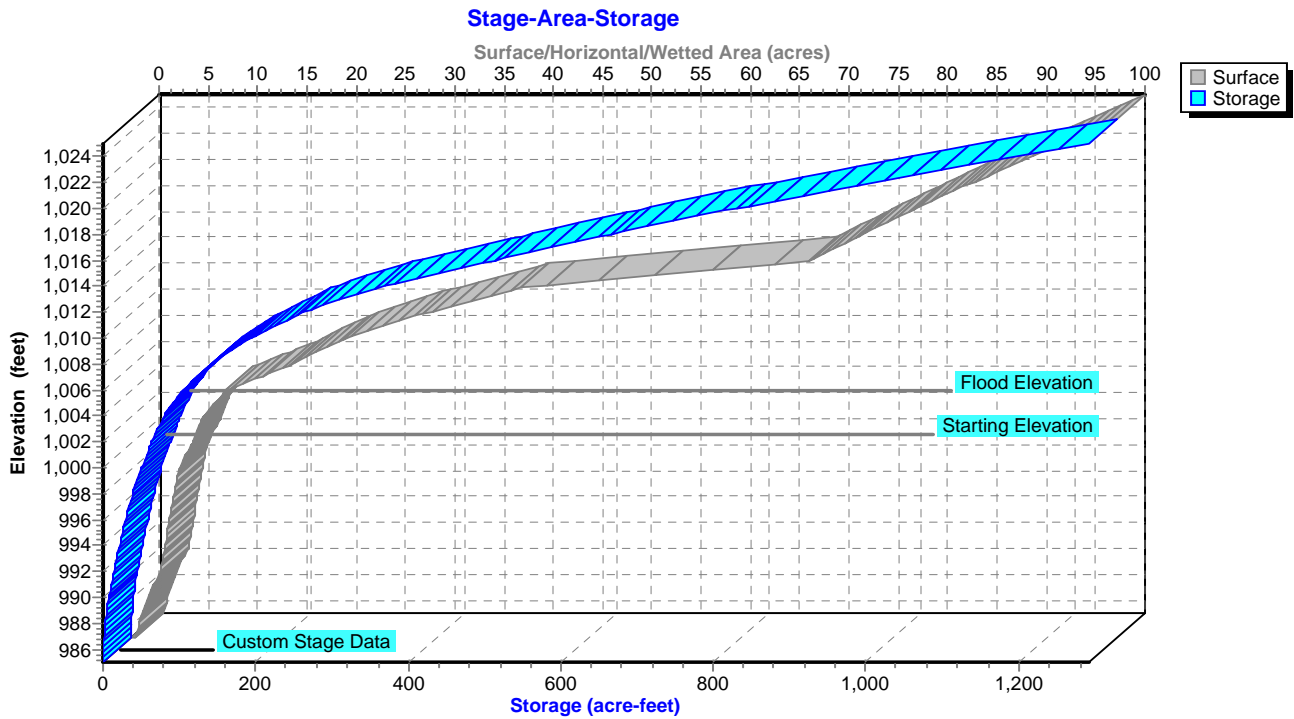
Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions



Pond 1P: Sippo Creek Reservoir - Existing Conditions

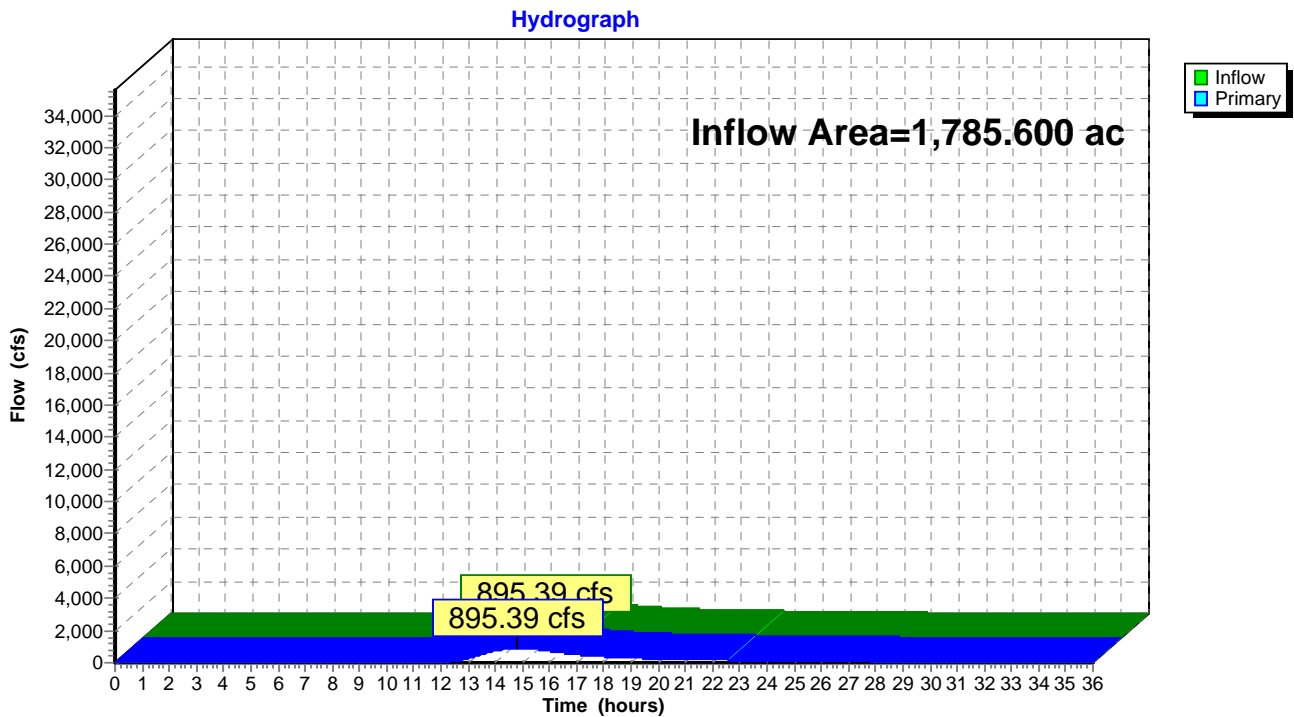


Summary for Pond 2C: CONF 2 Combined Cable and O'Springs

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.94" for 500 year-FEMA event
Inflow = 895.39 cfs @ 14.82 hrs, Volume= 437.273 af
Primary = 895.39 cfs @ 14.83 hrs, Volume= 437.273 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 2C: CONF 2 Combined Cable and O'Springs



Summary for Pond 3P: Lake Cable

Inflow Area = 1,785.600 ac, 25.34% Impervious, Inflow Depth > 2.94" for 500 year-FEMA event
 Inflow = 895.39 cfs @ 14.83 hrs, Volume= 437.267 af
 Outflow = 246.72 cfs @ 19.93 hrs, Volume= 563.376 af, Atten= 72%, Lag= 306.2 min
 Primary = 246.72 cfs @ 19.93 hrs, Volume= 563.376 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,097.40' Surf.Area= 220.000 ac Storage= 1,914.000 af
 Peak Elev= 1,097.56' @ 19.93 hrs Surf.Area= 225.783 ac Storage= 1,949.614 af (35.614 af above start)
 Flood Elev= 1,099.50' Surf.Area= 296.000 ac Storage= 2,455.800 af (541.800 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= 31.5 min (1,102.4 - 1,070.9)

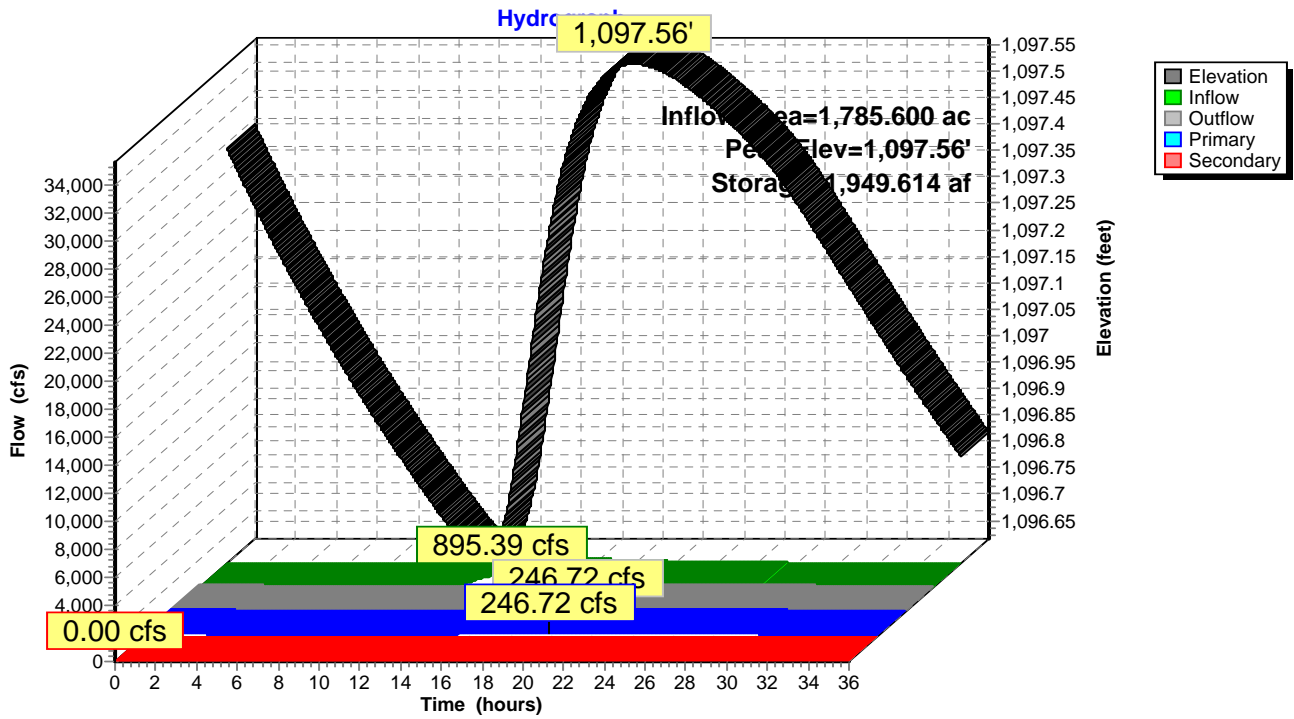
Volume	Invert	Avail.Storage	Storage Description
#1	1,080.00'	4,144.025 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,080.00	0.000	0.000	0.000
1,097.40	220.000	1,914.000	1,914.000
1,099.50	296.000	541.800	2,455.800
1,100.00	316.700	153.175	2,608.975
1,103.00	405.000	1,082.550	3,691.525
1,104.00	500.000	452.500	4,144.025

Device	Routing	Invert	Outlet Devices
#1	Primary	1,088.00'	36.0" Round Culvert-RCP L= 450.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 1,088.00' / 1,076.00' S= 0.0267 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished
#2	Primary	1,096.40'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 3.10 6.00 Width (feet) 30.00 30.00 30.00
#3	Secondary	1,099.50'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 3.00 Width (feet) 1,000.00 1,000.00

Primary OutFlow Max=246.72 cfs @ 19.93 hrs HW=1,097.56' TW=1,071.62' (Dynamic Tailwater)
 ↑1=Culvert-RCP (Barrel Controls 124.01 cfs @ 17.54 fps)
 ↓2=Custom Weir/Orifice (Weir Controls 122.71 cfs @ 3.53 fps)

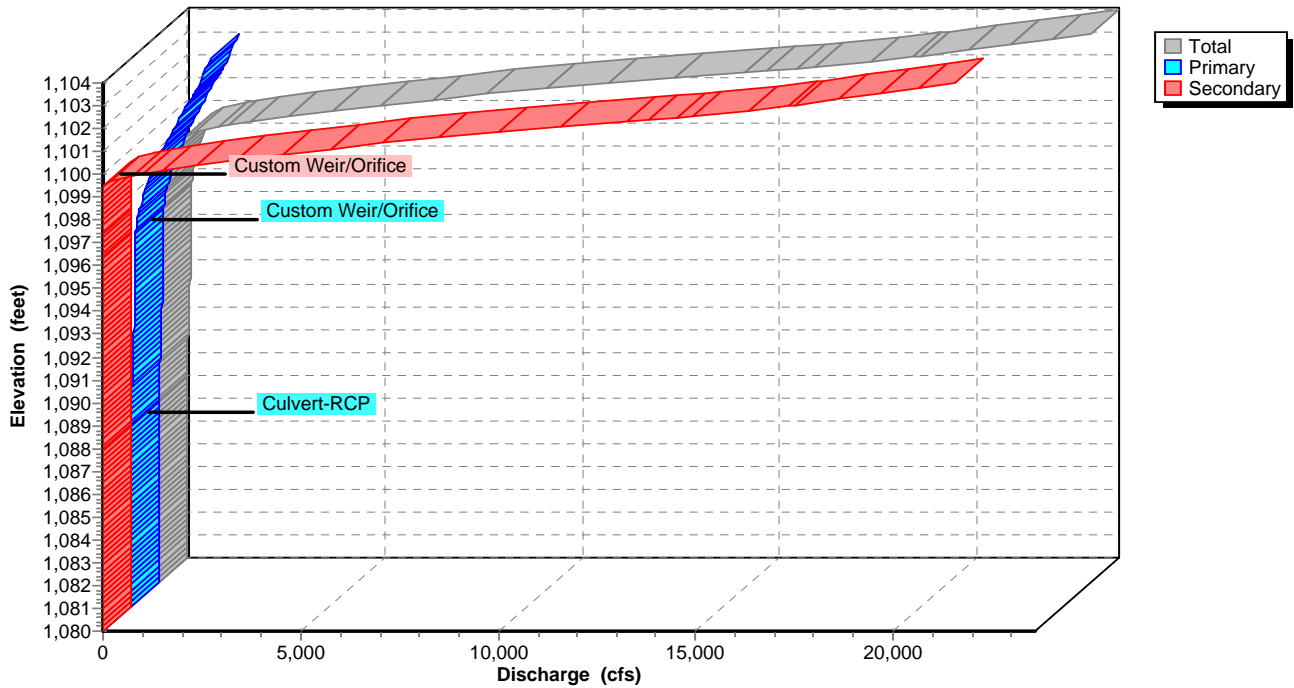
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,097.40' TW=1,069.00' (Dynamic Tailwater)
 ↑3=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 3P: Lake Cable



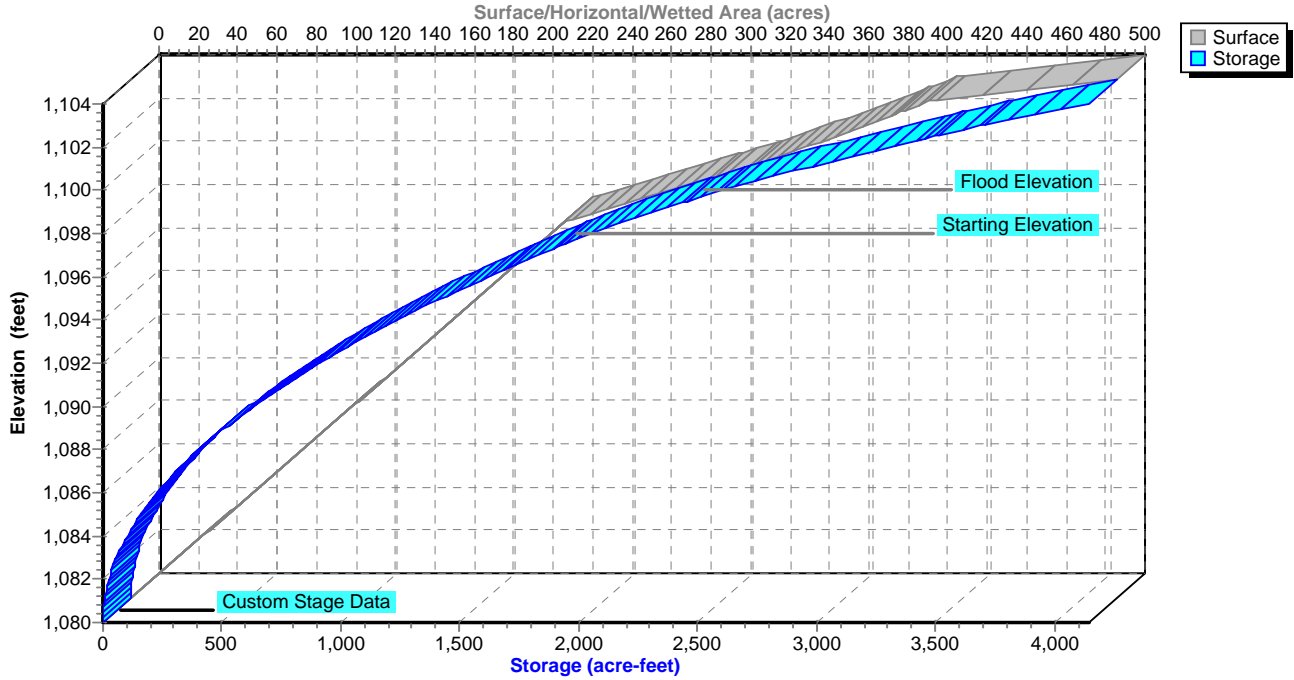
Pond 3P: Lake Cable

Stage-Discharge



Pond 3P: Lake Cable

Stage-Area-Storage



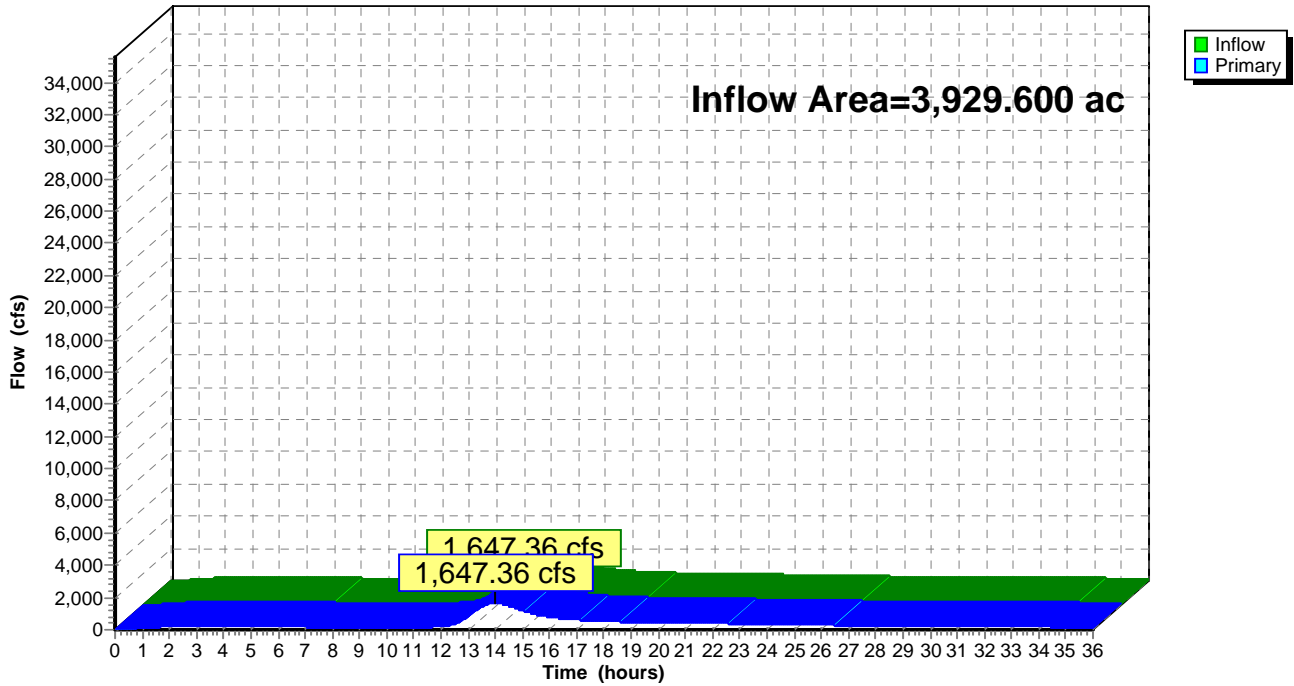
Summary for Pond 4C: Confluence 4

Inflow Area = 3,929.600 ac, 16.99% Impervious, Inflow Depth > 3.16" for 500 year-FEMA event
Inflow = 1,647.36 cfs @ 13.95 hrs, Volume= 1,034.062 af
Primary = 1,647.36 cfs @ 13.96 hrs, Volume= 1,034.062 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 4C: Confluence 4

Hydrograph



Summary for Pond 4P: Lake O'Springs

Inflow Area = 384.000 ac, 26.60% Impervious, Inflow Depth > 3.30" for 500 year-FEMA event
 Inflow = 507.38 cfs @ 12.72 hrs, Volume= 105.600 af
 Outflow = 132.66 cfs @ 14.42 hrs, Volume= 102.204 af, Atten= 74%, Lag= 101.6 min
 Primary = 132.66 cfs @ 14.42 hrs, Volume= 102.204 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,106.00' Surf.Area= 27.000 ac Storage= 24.300 af
 Peak Elev= 1,107.61' @ 14.42 hrs Surf.Area= 28.784 ac Storage= 69.079 af (44.779 af above start)
 Flood Elev= 1,108.70' Surf.Area= 30.000 ac Storage= 101.250 af (76.950 af above start)

Plug-Flow detention time= 477.4 min calculated for 77.882 af (74% of inflow)
 Center-of-Mass det. time= 252.1 min (1,178.1 - 926.0)

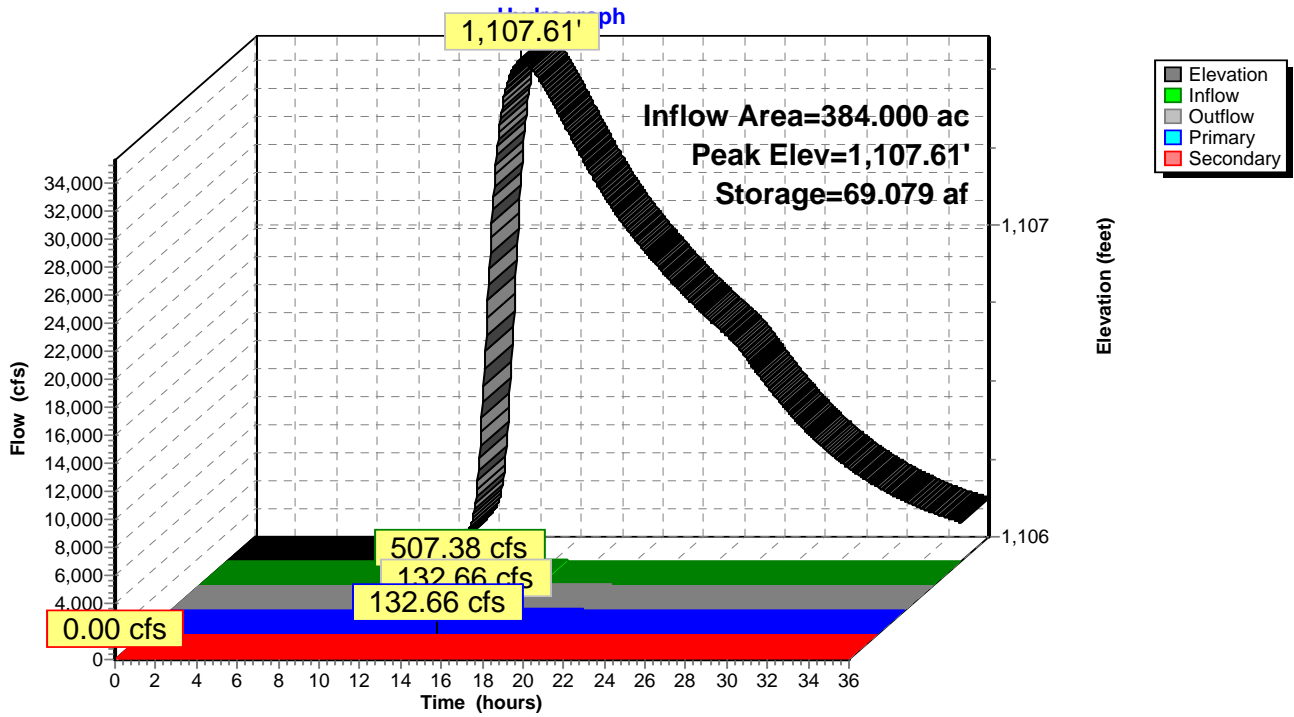
Volume	Invert	Avail.Storage	Storage Description
#1	1,104.20'	268.550 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,104.20	0.000	0.000	0.000
1,106.00	27.000	24.300	24.300
1,108.70	30.000	76.950	101.250
1,110.00	40.000	45.500	146.750
1,112.90	44.000	121.800	268.550

Device	Routing	Invert	Outlet Devices
#1	Primary	1,106.00'	Lake Eric Special & User-Defined Outlet Head (feet) 0.00 1.00 2.00 2.70 3.00 4.00 Disch. (cfs) 0.000 60.000 180.000 300.000 1,240.000 3,930.000
#2	Secondary	1,108.70'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 1.30 Width (feet) 150.00 150.00

Primary OutFlow Max=132.66 cfs @ 14.42 hrs HW=1,107.61' TW=0.00' (Dynamic Tailwater)
 ↑1=Lake Eric Special & User-Defined Outlet (Custom Controls 132.66 cfs)

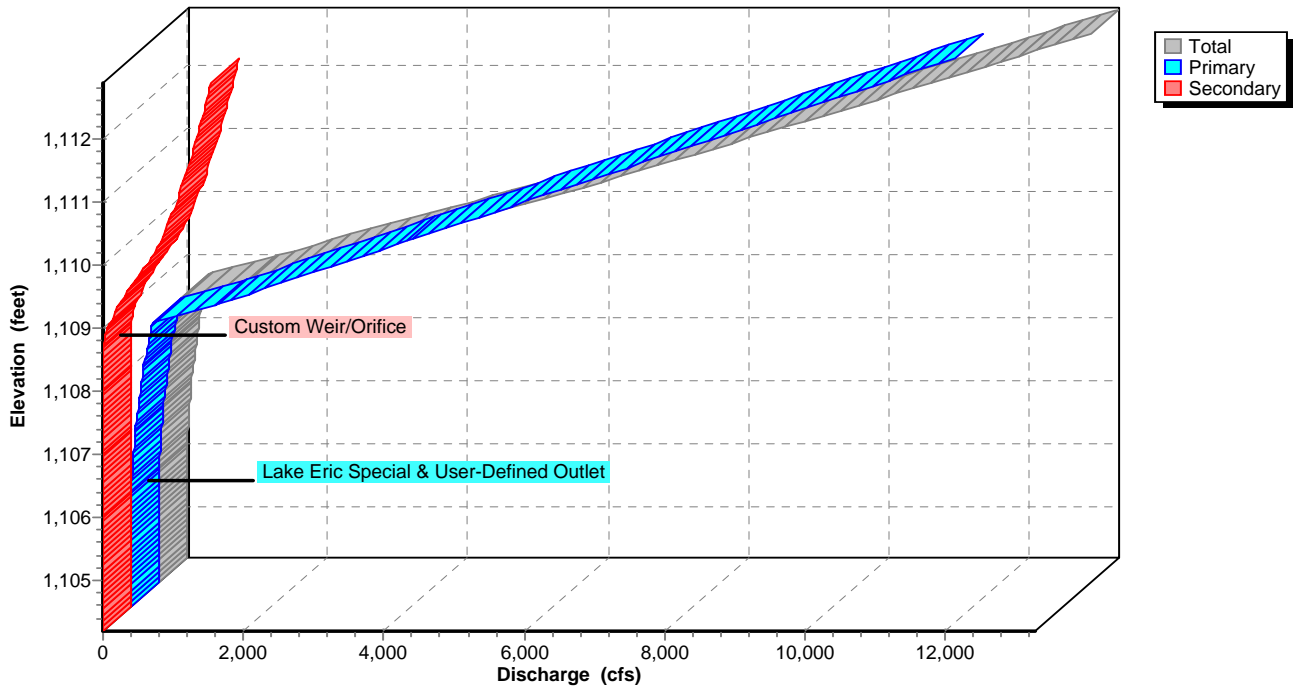
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,106.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Controls 0.00 cfs)

Pond 4P: Lake O'Springs



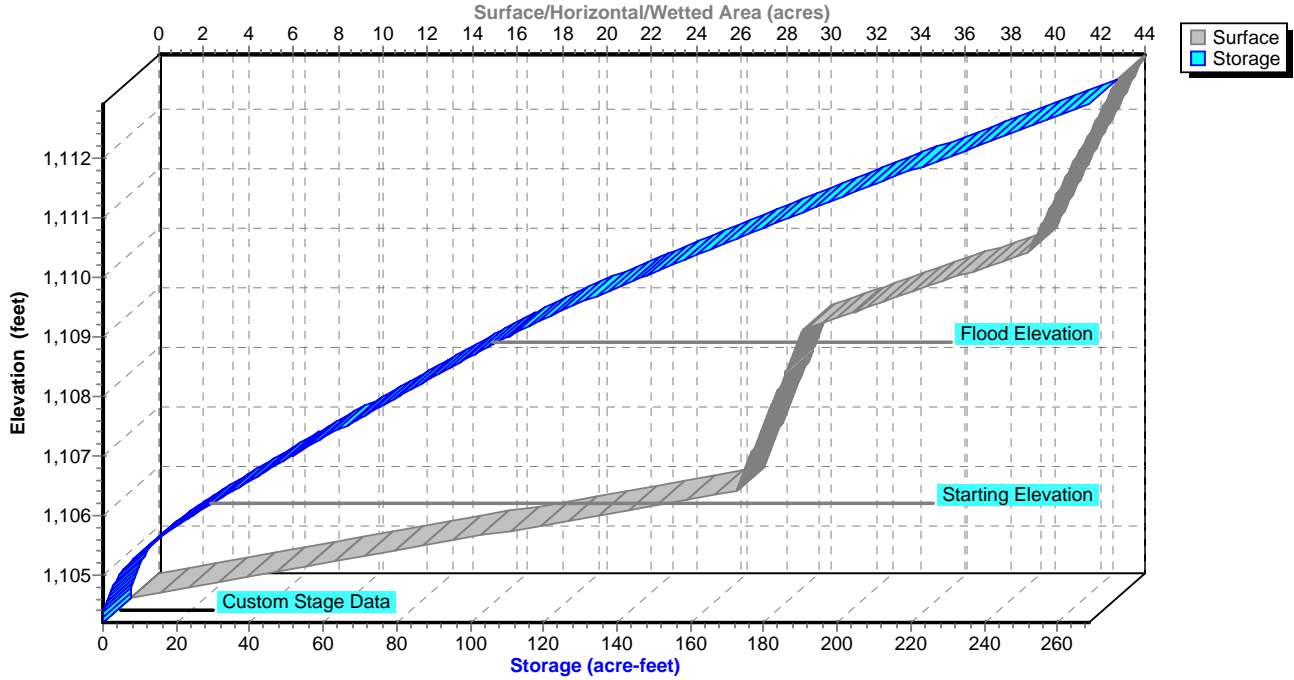
Pond 4P: Lake O'Springs

Stage-Discharge



Pond 4P: Lake O'Springs

Stage-Area-Storage



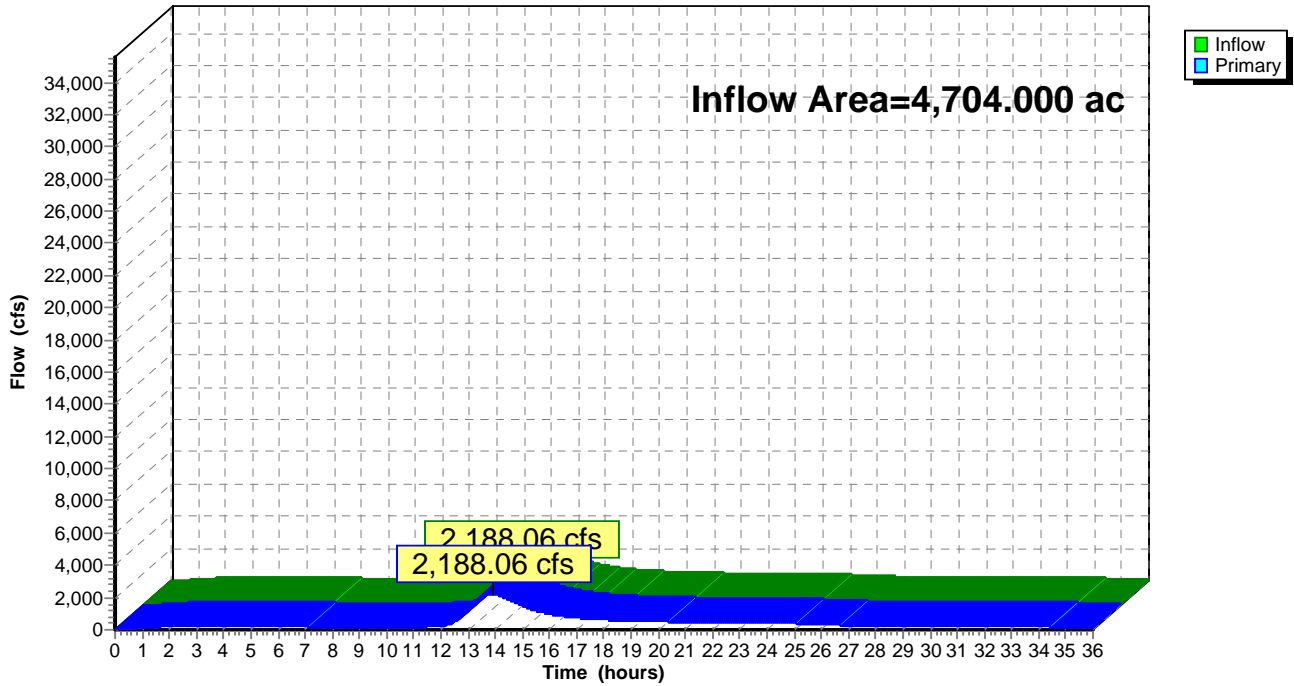
Summary for Pond 5C: Confluence 5

Inflow Area = 4,704.000 ac, 14.19% Impervious, Inflow Depth > 3.06" for 500 year-FEMA event
Inflow = 2,188.06 cfs @ 13.90 hrs, Volume= 1,201.113 af
Primary = 2,188.06 cfs @ 13.91 hrs, Volume= 1,201.113 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 5C: Confluence 5

Hydrograph



Summary for Pond 5P: Lake Eric (Slagle)

Inflow Area = 115.200 ac, 0.00% Impervious, Inflow Depth = 3.25" for 500 year-FEMA event
 Inflow = 249.04 cfs @ 12.42 hrs, Volume= 31.222 af
 Outflow = 70.98 cfs @ 13.21 hrs, Volume= 30.554 af, Atten= 71%, Lag= 47.2 min
 Primary = 70.89 cfs @ 13.21 hrs, Volume= 30.554 af
 Secondary = 0.09 cfs @ 13.21 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,116.50' Surf.Area= 3.700 ac Storage= 13.690 af
 Peak Elev= 1,120.00' @ 13.21 hrs Surf.Area= 4.201 ac Storage= 27.505 af (13.815 af above start)
 Flood Elev= 1,120.00' Surf.Area= 4.200 ac Storage= 27.490 af (13.800 af above start)

Plug-Flow detention time= 482.9 min calculated for 16.864 af (54% of inflow)
 Center-of-Mass det. time= 182.9 min (1,043.2 - 860.3)

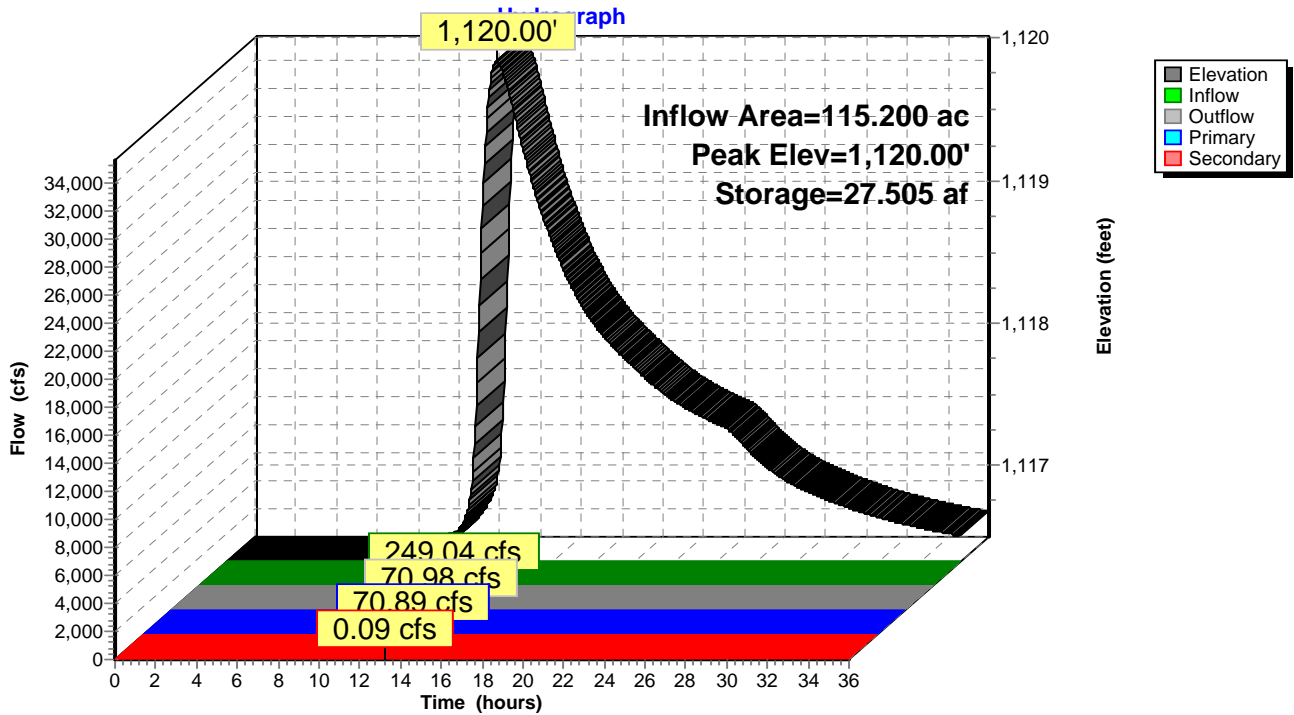
Volume	Invert	Avail.Storage	Storage Description
#1	1,109.10'	88.990 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,109.10	0.000	0.000	0.000
1,116.50	3.700	13.690	13.690
1,118.00	3.900	5.700	19.390
1,120.00	4.200	8.100	27.490
1,130.00	8.100	61.500	88.990

Device	Routing	Invert	Outlet Devices
#1	Primary	1,116.50'	Special & User-Defined Head (feet) 0.00 0.50 1.50 2.50 3.50 4.50 5.00 Disch. (cfs) 0.000 3.000 17.000 40.000 69.000 600.000 1,130.000
#2	Secondary	1,120.00'	Custom Weir/Orifice, Cv= 2.24 (C= 2.80) Head (feet) 0.00 10.00 Width (feet) 150.00 150.00

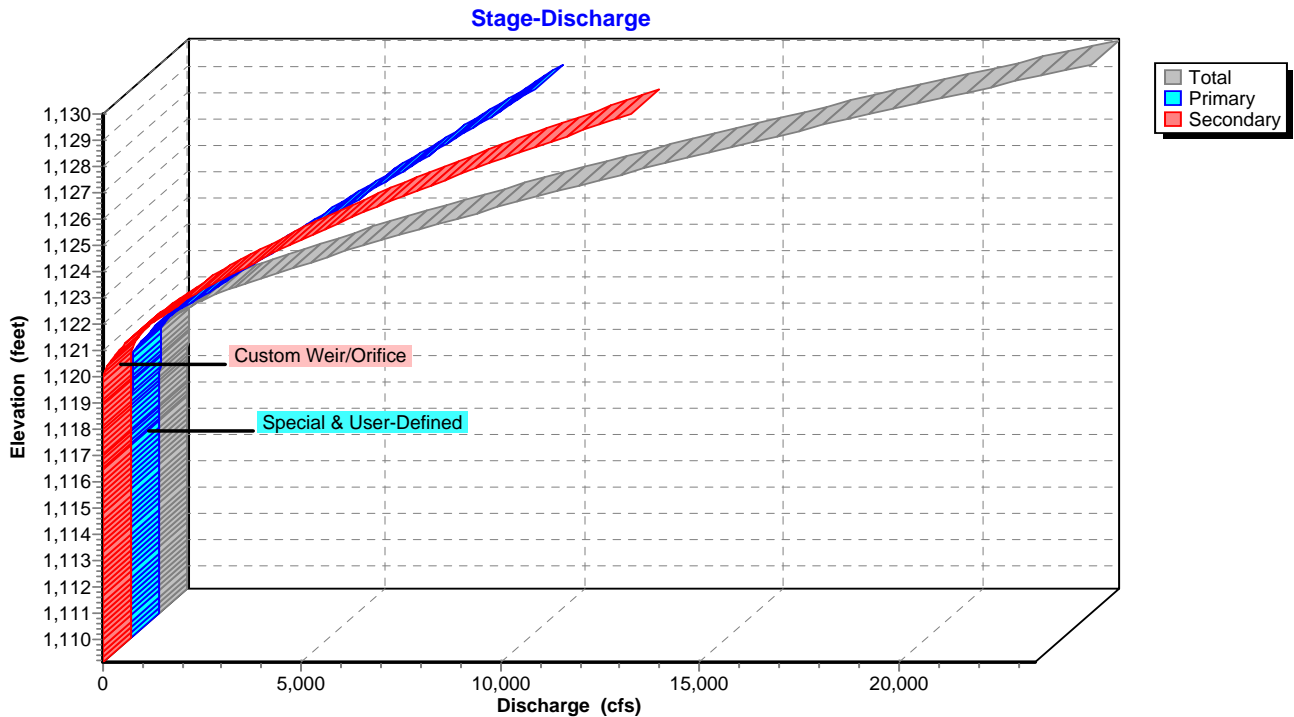
Primary OutFlow Max=70.88 cfs @ 13.21 hrs HW=1,120.00' TW=0.00' (Dynamic Tailwater)
 ↳1=Special & User-Defined (Custom Controls 70.88 cfs)

Secondary OutFlow Max=0.09 cfs @ 13.21 hrs HW=1,120.00' TW=0.00' (Dynamic Tailwater)
 ↳2=Custom Weir/Orifice (Weir Controls 0.09 cfs @ 0.17 fps)

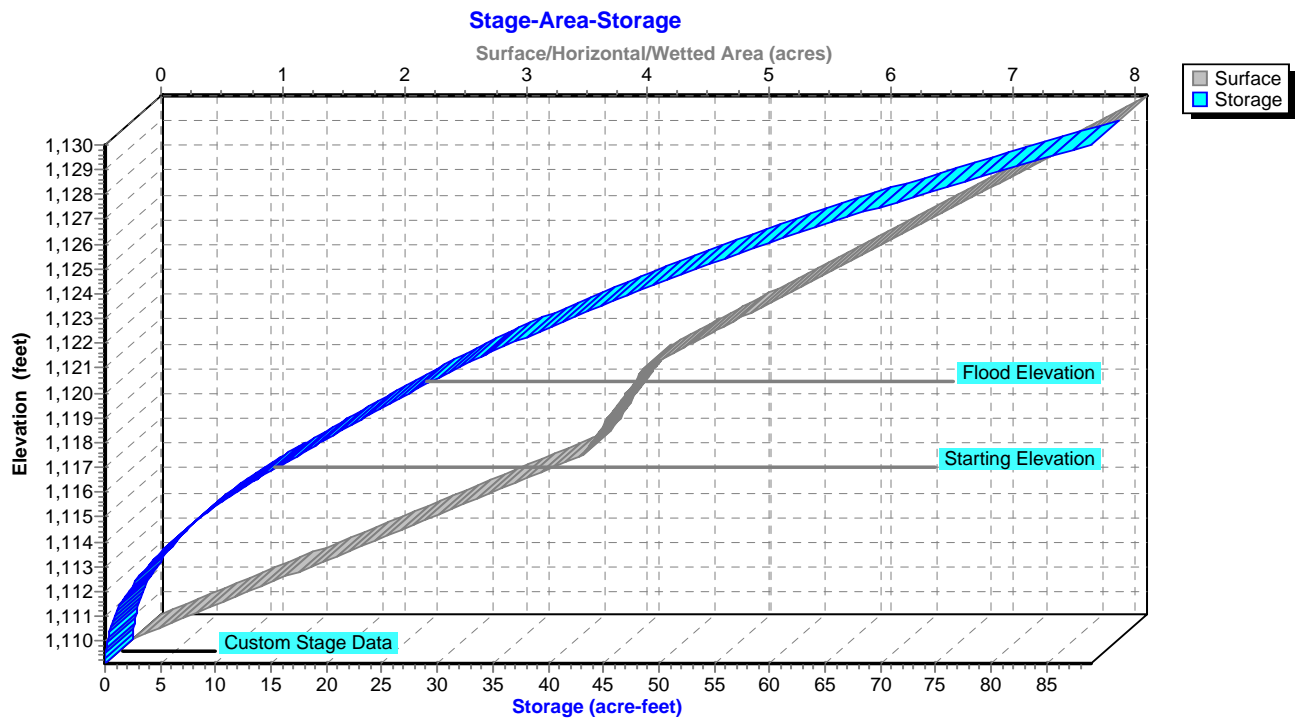
Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



Pond 5P: Lake Eric (Slagle)



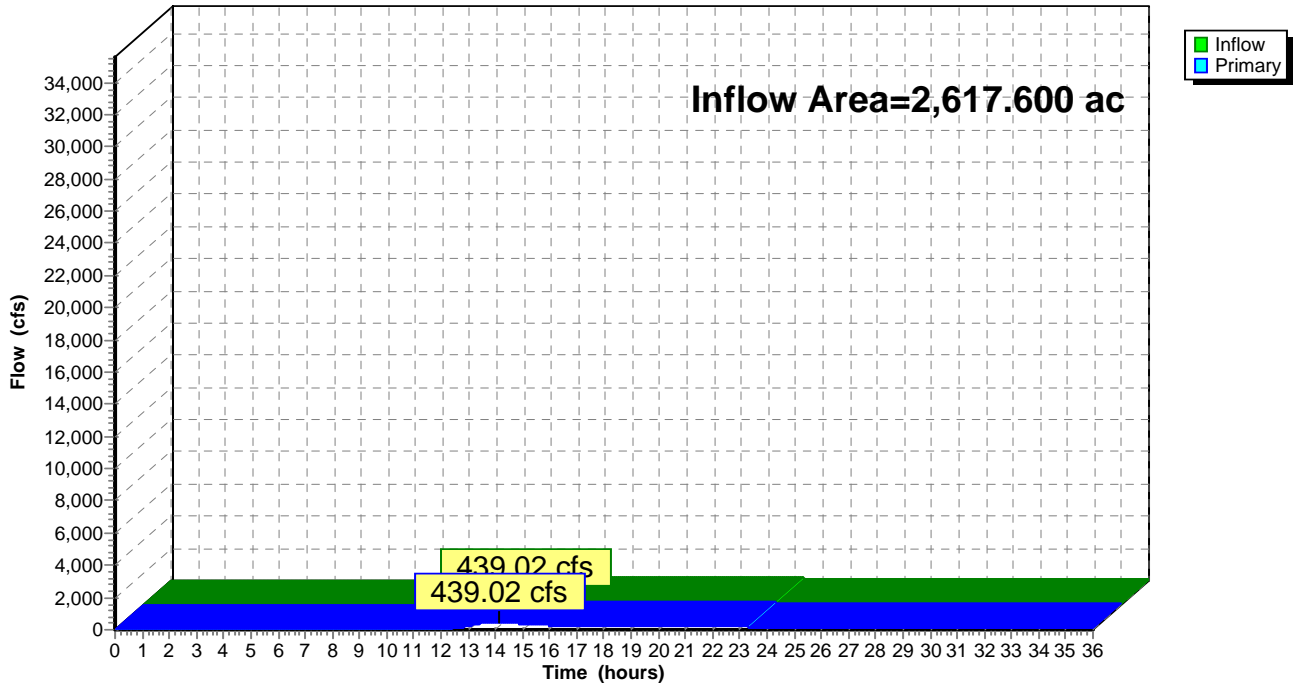
Summary for Pond 6C: Confluence 6

Inflow Area = 2,617.600 ac, 28.52% Impervious, Inflow Depth > 1.62" for 500 year-FEMA event
Inflow = 439.02 cfs @ 14.10 hrs, Volume= 352.717 af
Primary = 439.02 cfs @ 14.11 hrs, Volume= 352.717 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 6C: Confluence 6

Hydrograph

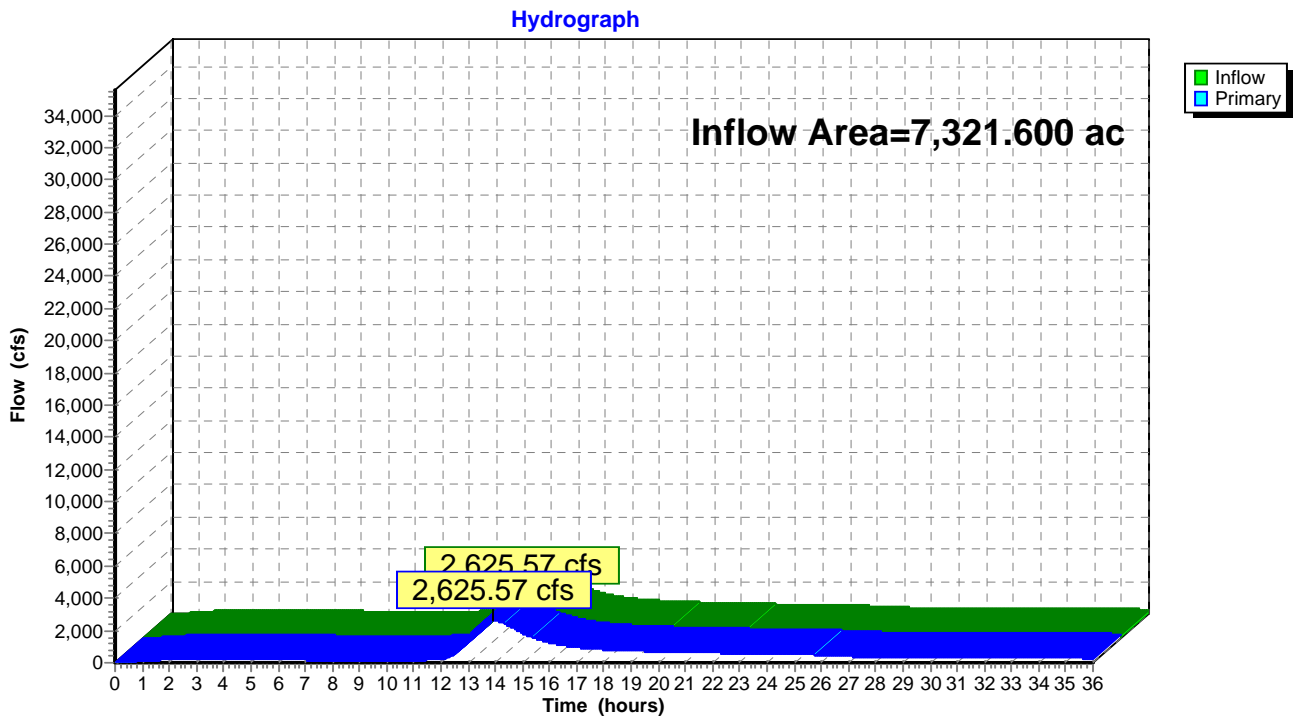


Summary for Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake

Inflow Area = 7,321.600 ac, 19.32% Impervious, Inflow Depth > 2.55" for 500 year-FEMA event
Inflow = 2,625.57 cfs @ 13.93 hrs, Volume= 1,553.607 af
Primary = 2,625.57 cfs @ 13.94 hrs, Volume= 1,553.607 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 7C: Confluence 7 - Combined North Watershed and Sippo Lake



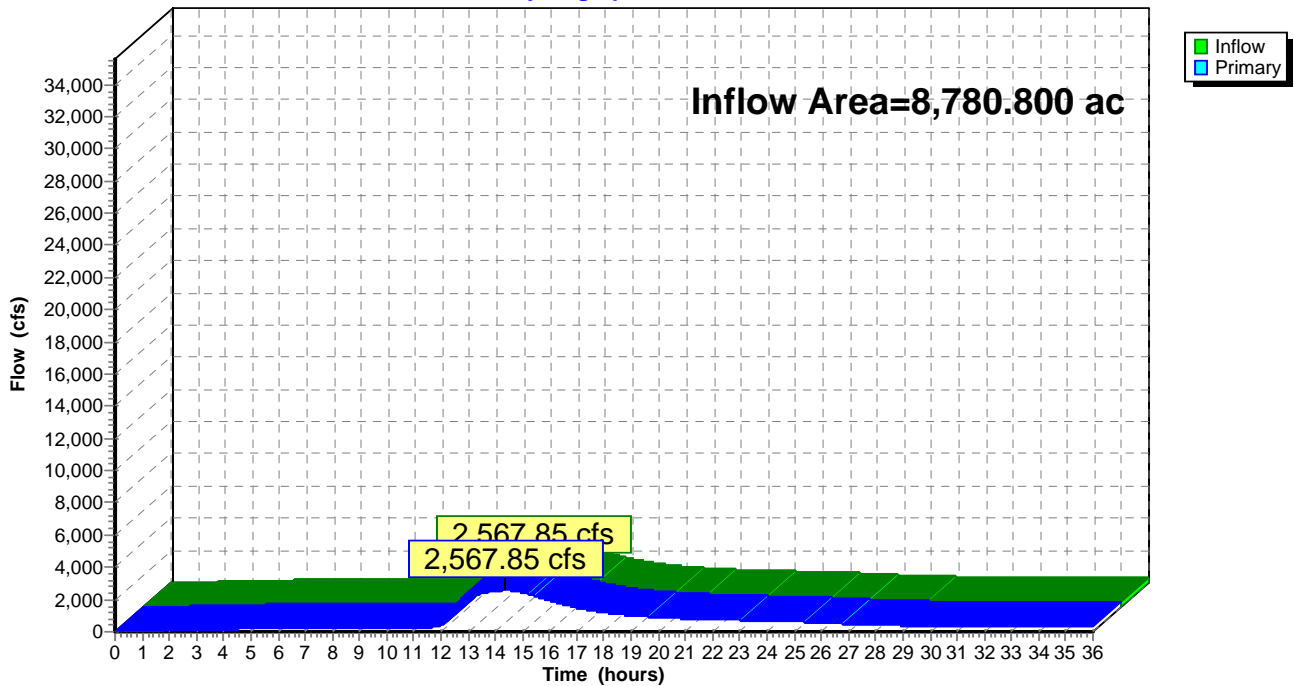
Summary for Pond 8C: Confluence 8

Inflow Area = 8,780.800 ac, 19.29% Impervious, Inflow Depth > 2.62" for 500 year-FEMA event
Inflow = 2,567.85 cfs @ 14.37 hrs, Volume= 1,914.569 af
Primary = 2,567.85 cfs @ 14.38 hrs, Volume= 1,914.569 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 8C: Confluence 8

Hydrograph



Summary for Pond 8P: Storage Area Genoa Rd

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth > 2.77" for 500 year-FEMA event
 Inflow = 1,208.68 cfs @ 14.89 hrs, Volume= 452.817 af
 Outflow = 125.92 cfs @ 25.70 hrs, Volume= 212.841 af, Atten= 90%, Lag= 648.4 min
 Primary = 125.34 cfs @ 25.70 hrs, Volume= 212.762 af
 Secondary = 0.59 cfs @ 25.70 hrs, Volume= 0.079 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,025.01' @ 25.70 hrs Surf.Area= 130.605 ac Storage= 311.088 af
 Flood Elev= 1,028.00' Surf.Area= 213.745 ac Storage= 851.153 af

Plug-Flow detention time= 613.2 min calculated for 212.782 af (47% of inflow)
 Center-of-Mass det. time= 428.6 min (1,524.1 - 1,095.6)

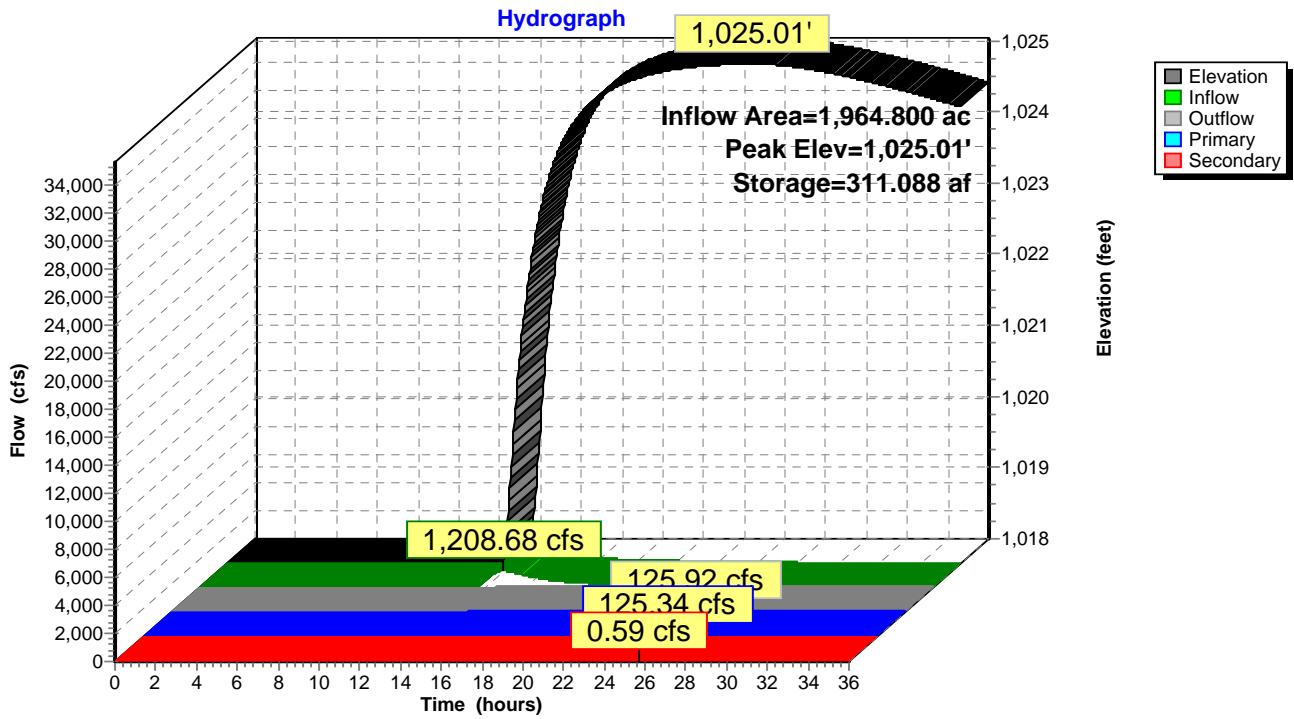
Volume	Invert	Avail.Storage	Storage Description		
#1	1,018.00'	1,873.781 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
1,018.00	1.828	9,236.2	0.000	0.000	1.828
1,020.00	12.667	15,179.0	12.871	12.871	266.894
1,022.00	44.456	16,532.1	53.902	66.773	345.285
1,024.00	91.000	31,384.9	132.707	199.480	1,645.455
1,026.00	176.087	39,123.0	262.448	461.929	2,642.179
1,032.00	300.000	45,000.0	1,411.853	1,873.781	3,545.375

Device	Routing	Invert	Outlet Devices
#1	Primary	1,018.00'	48.0" Round Culvert L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,018.00' / 1,017.00' S= 0.0167 '/' Cc= 0.900 n= 0.025 Corrugated metal
#2	Secondary	1,025.00'	Custom Weir/Orifice, Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 3.00 5.00 Width (feet) 125.00 192.00 308.00 415.00

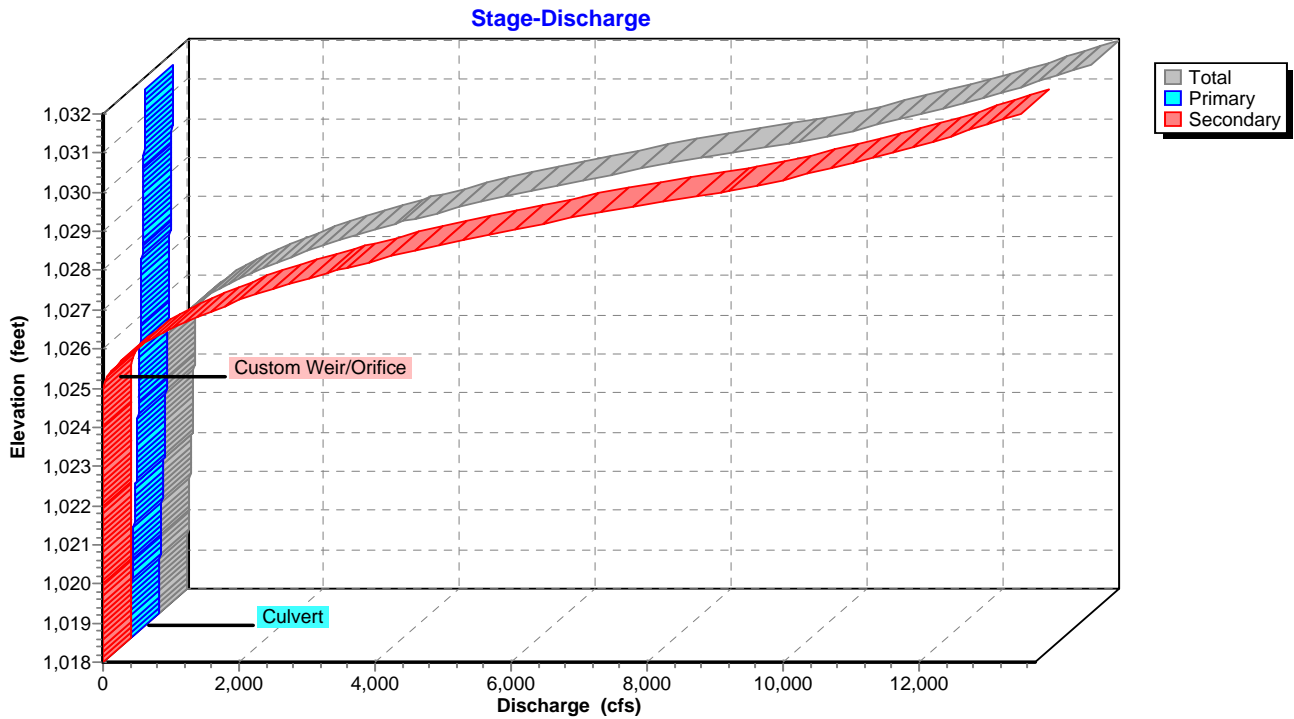
Primary OutFlow Max=125.34 cfs @ 25.70 hrs HW=1,025.01' TW=1,020.55' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 125.34 cfs @ 9.97 fps)

Secondary OutFlow Max=0.59 cfs @ 25.70 hrs HW=1,025.01' TW=1,020.55' (Dynamic Tailwater)
 ↑2=Custom Weir/Orifice (Weir Controls 0.59 cfs @ 0.37 fps)

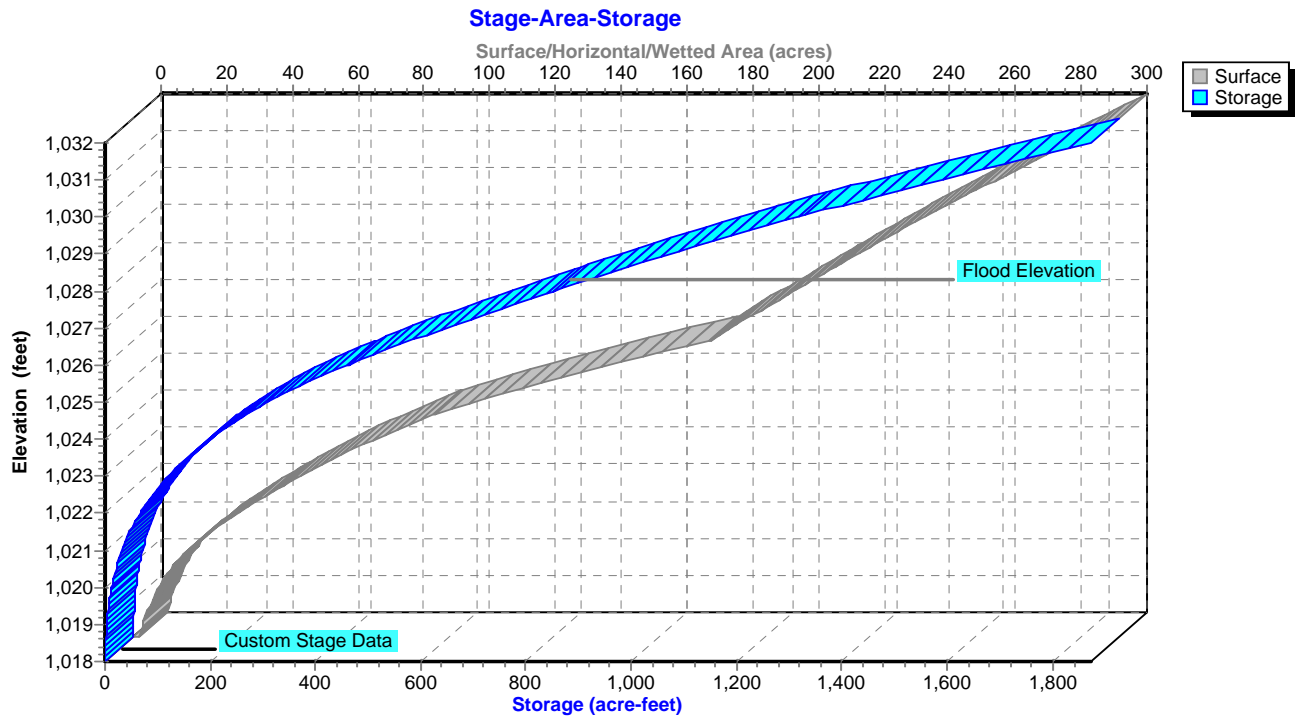
Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Pond 8P: Storage Area Genoa Rd



Summary for Pond 9P: Sippo Lake

Inflow Area = 1,964.800 ac, 38.00% Impervious, Inflow Depth = 3.35" for 500 year-FEMA event
 Inflow = 1,695.56 cfs @ 14.03 hrs, Volume= 548.560 af
 Outflow = 1,208.68 cfs @ 14.89 hrs, Volume= 452.822 af, Atten= 29%, Lag= 51.9 min
 Primary = 1,208.68 cfs @ 14.89 hrs, Volume= 452.822 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,027.00' Surf.Area= 88.000 ac Storage= 220.000 af
 Peak Elev= 1,029.05' @ 14.89 hrs Surf.Area= 104.028 ac Storage= 416.635 af (196.635 af above start)
 Flood Elev= 1,029.30' Surf.Area= 106.000 ac Storage= 443.100 af (223.100 af above start)

Plug-Flow detention time= 456.4 min calculated for 232.758 af (42% of inflow)
 Center-of-Mass det. time= 133.0 min (1,095.6 - 962.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,022.00'	1,220.300 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,022.00	0.000	0.000	0.000
1,027.00	88.000	220.000	220.000
1,029.30	106.000	223.100	443.100
1,036.00	126.000	777.200	1,220.300

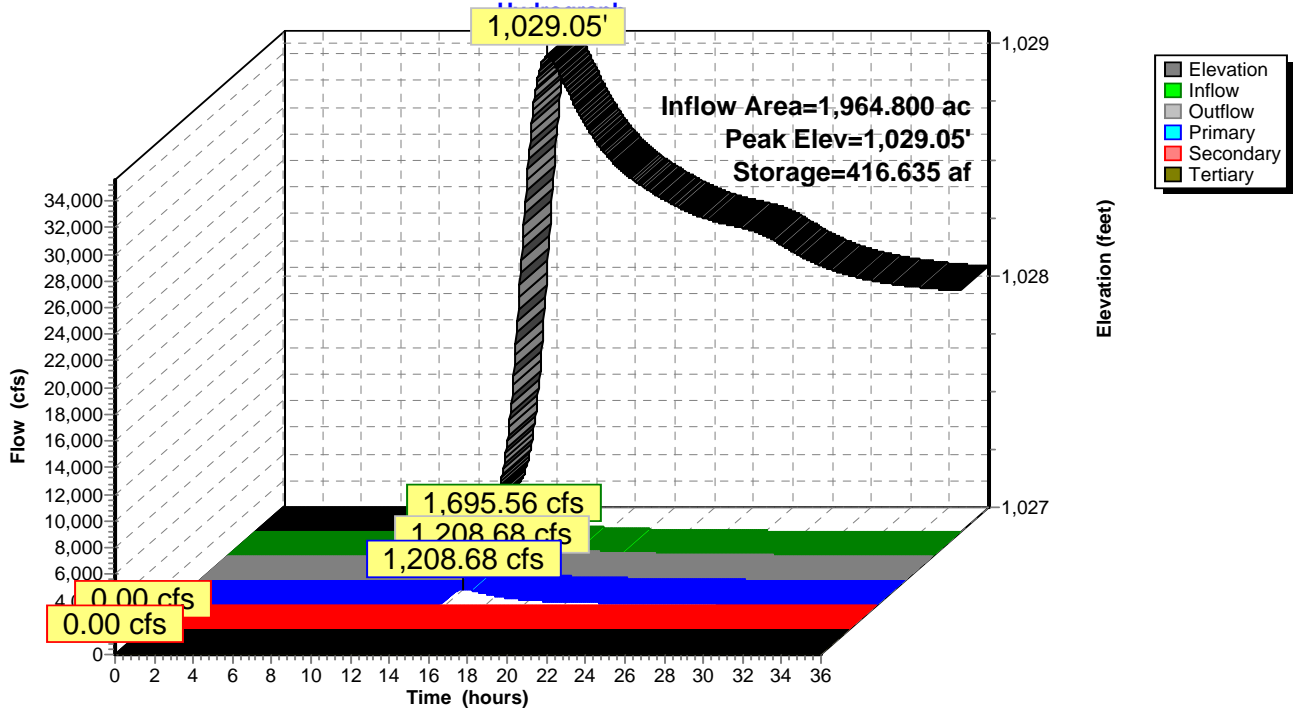
Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	300.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	1,028.50'	330.0' long x 30.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Secondary	1,029.30'	30.0' long Sharp-Crested Rectangular Weir 0 End Contraction(s)
#4	Tertiary	1,030.00'	650.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1,208.67 cfs @ 14.89 hrs HW=1,029.05' TW=1,022.20' (Dynamic Tailwater)
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 847.23 cfs @ 2.69 fps)
 ↓2=**Broad-Crested Rectangular Weir** (Weir Controls 361.43 cfs @ 2.00 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑3=**Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

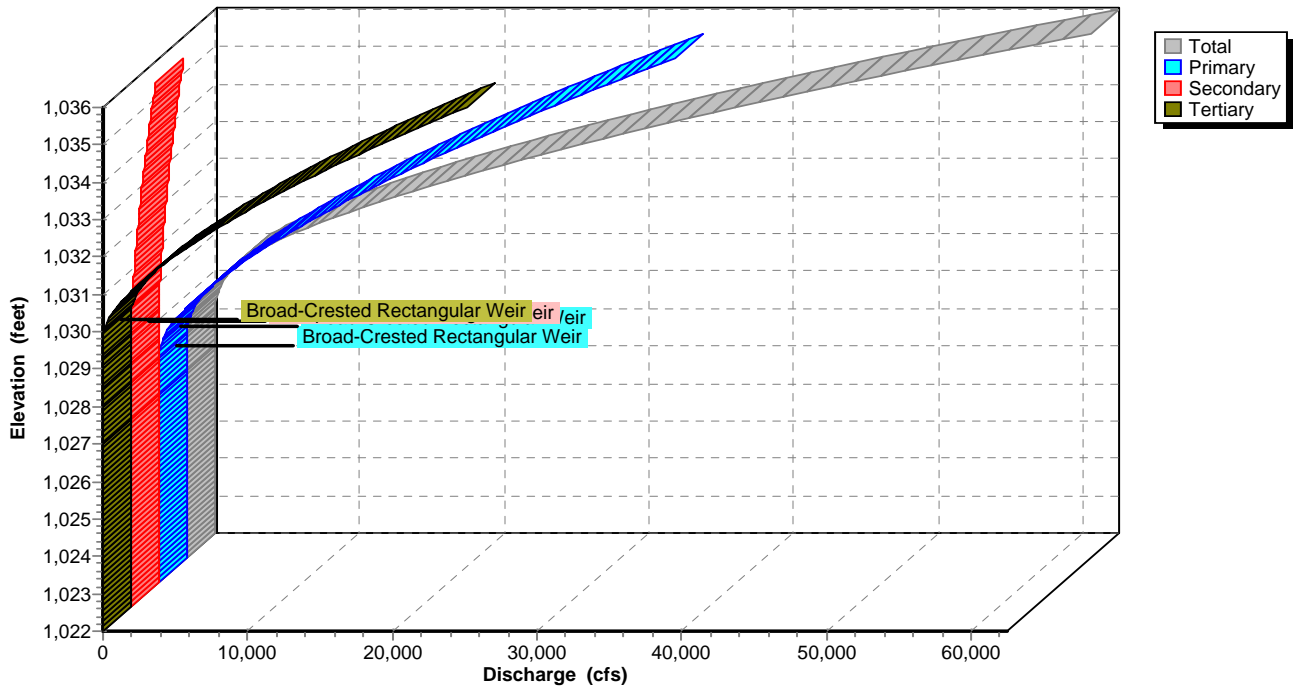
Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,027.00' TW=1,018.00' (Dynamic Tailwater)
 ↑4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 9P: Sippo Lake



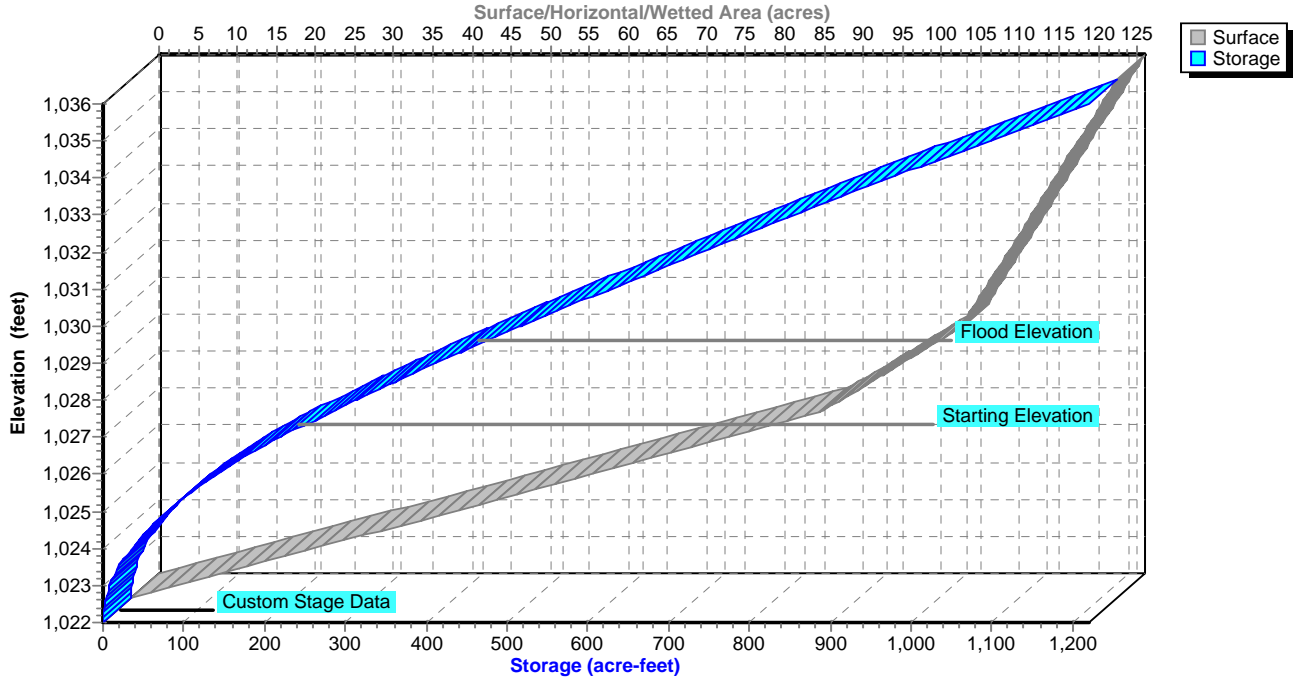
Pond 9P: Sippo Lake

Stage-Discharge



Pond 9P: Sippo Lake

Stage-Area-Storage

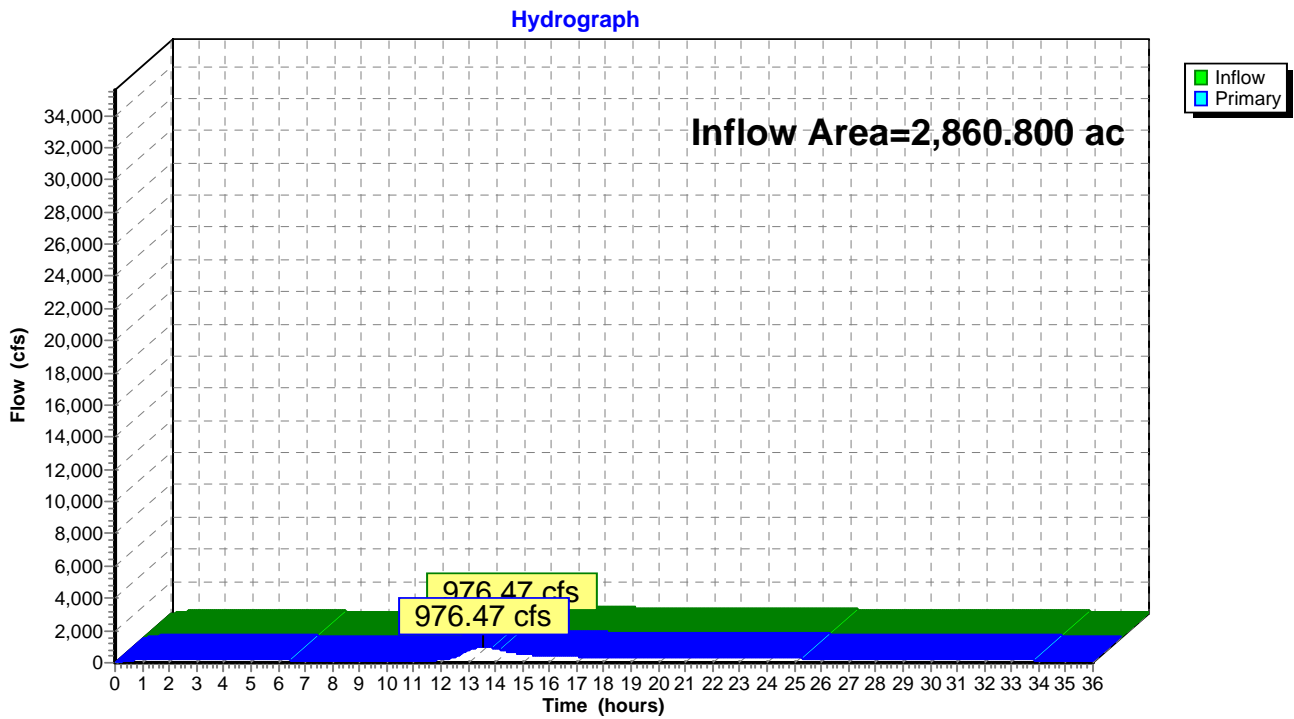


Summary for Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed

Inflow Area = 2,860.800 ac, 23.34% Impervious, Inflow Depth > 3.34" for 500 year-FEMA event
Inflow = 976.47 cfs @ 13.51 hrs, Volume= 797.319 af
Primary = 976.47 cfs @ 13.52 hrs, Volume= 797.319 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 13P: Confluence 3 - Combined Watershed NW and North Watershed



Summary for Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.63" for 500 year-FEMA event
 Inflow = 2,643.72 cfs @ 14.94 hrs, Volume= 2,076.092 af
 Outflow = 2,509.12 cfs @ 15.67 hrs, Volume= 2,075.058 af, Atten= 5%, Lag= 43.9 min
 Primary = 2,509.12 cfs @ 15.67 hrs, Volume= 2,075.058 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 997.51' @ 15.67 hrs Surf.Area= 8.632 ac Storage= 83.995 af
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 13.5 min calculated for 2,074.481 af (100% of inflow)
 Center-of-Mass det. time= 13.0 min (1,159.4 - 1,146.3)

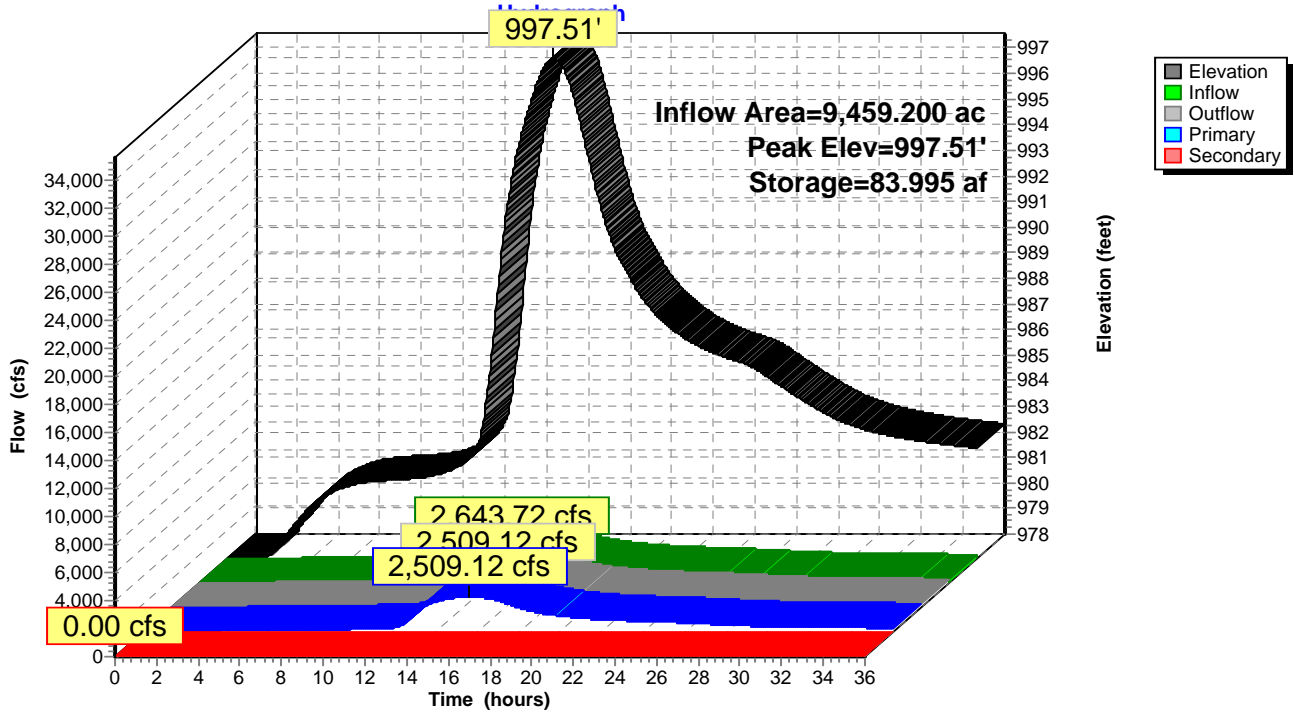
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.63 (C= 3.29) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

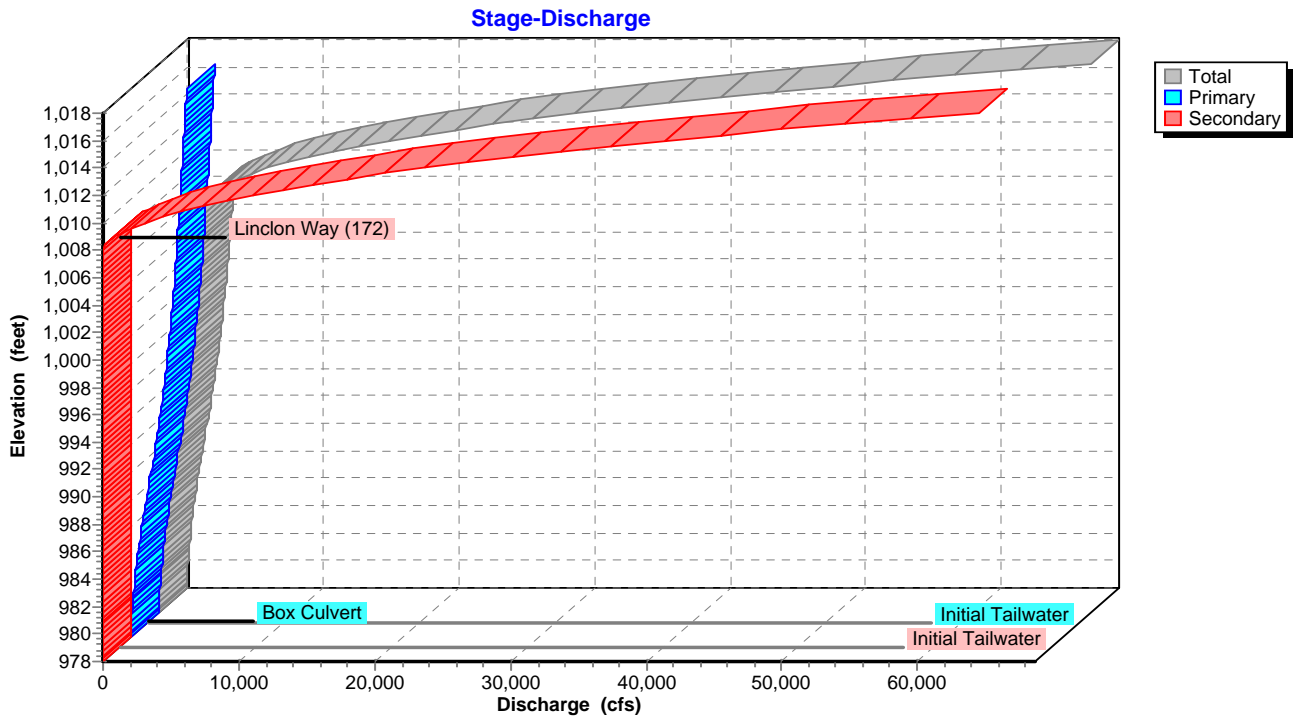
Primary OutFlow Max=2,509.11 cfs @ 15.67 hrs HW=997.51' TW=983.78' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,509.11 cfs @ 21.95 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=978.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

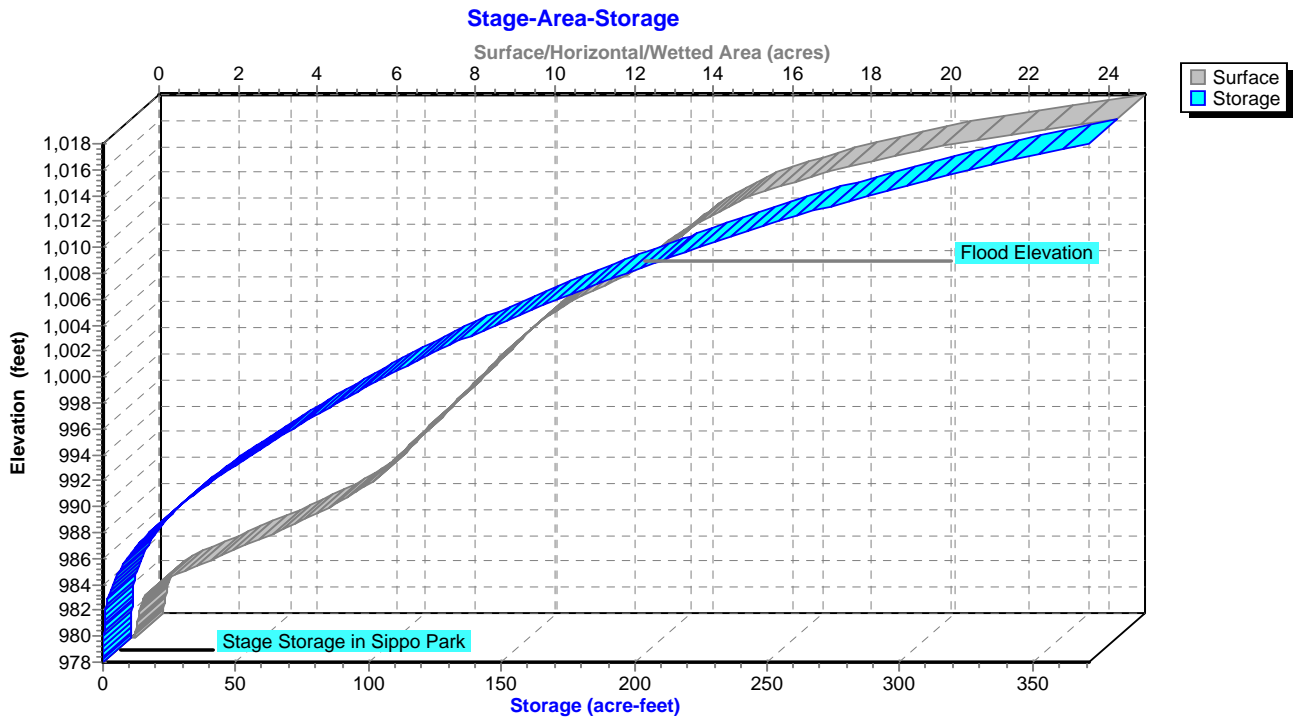
Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



Pond 16P: Lincoln Way Box Culvert-Weir - Sippo Park Storage-



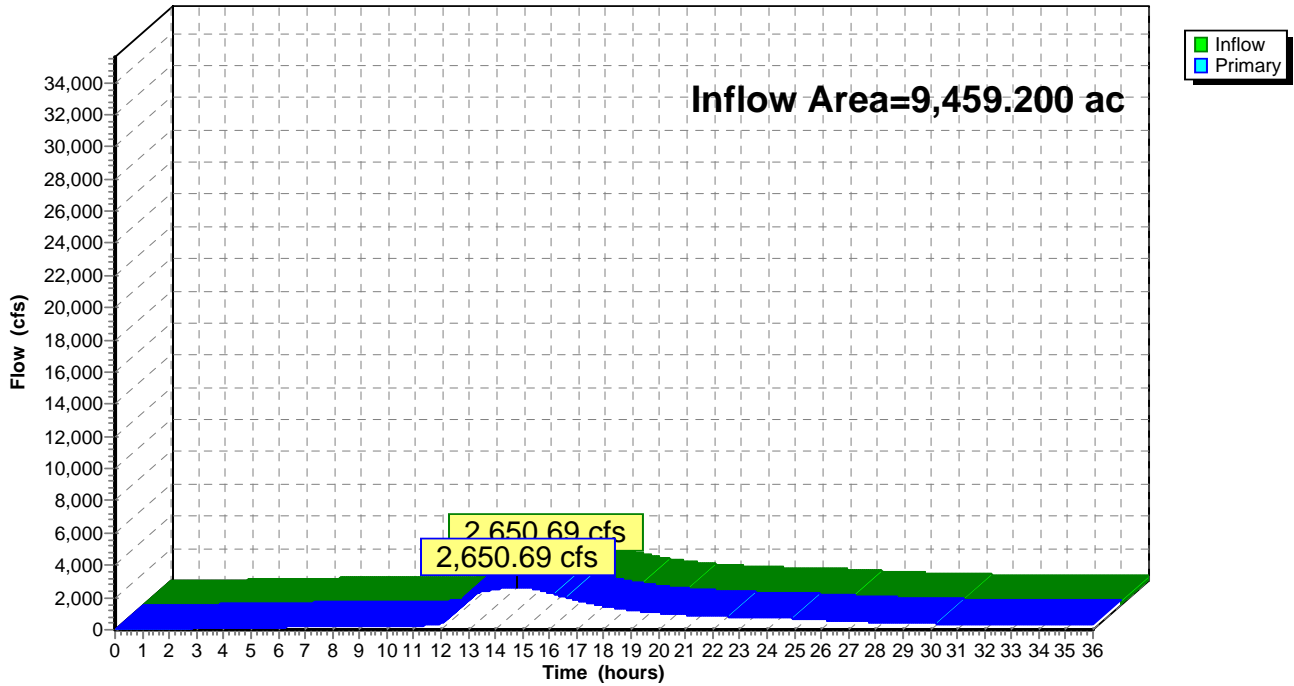
Summary for Pond 19C: Confluence 19

Inflow Area = 9,459.200 ac, 19.70% Impervious, Inflow Depth > 2.65" for 500 year-FEMA event
Inflow = 2,650.69 cfs @ 14.78 hrs, Volume= 2,089.638 af
Primary = 2,650.69 cfs @ 14.79 hrs, Volume= 2,089.638 af, Atten= 0%, Lag= 0.6 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Pond 19C: Confluence 19

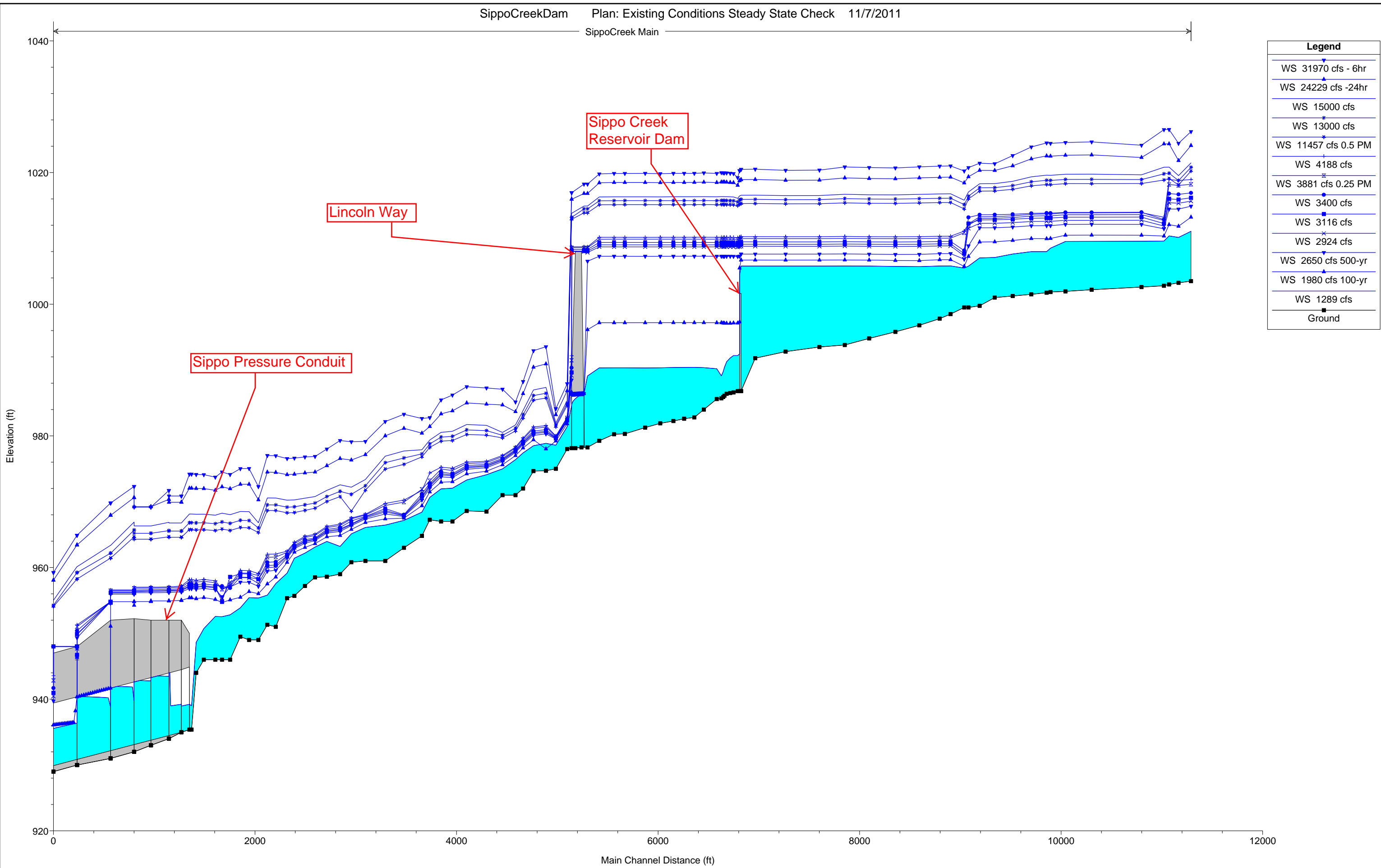
Hydrograph



Appendix 2
HEC-RAS Output

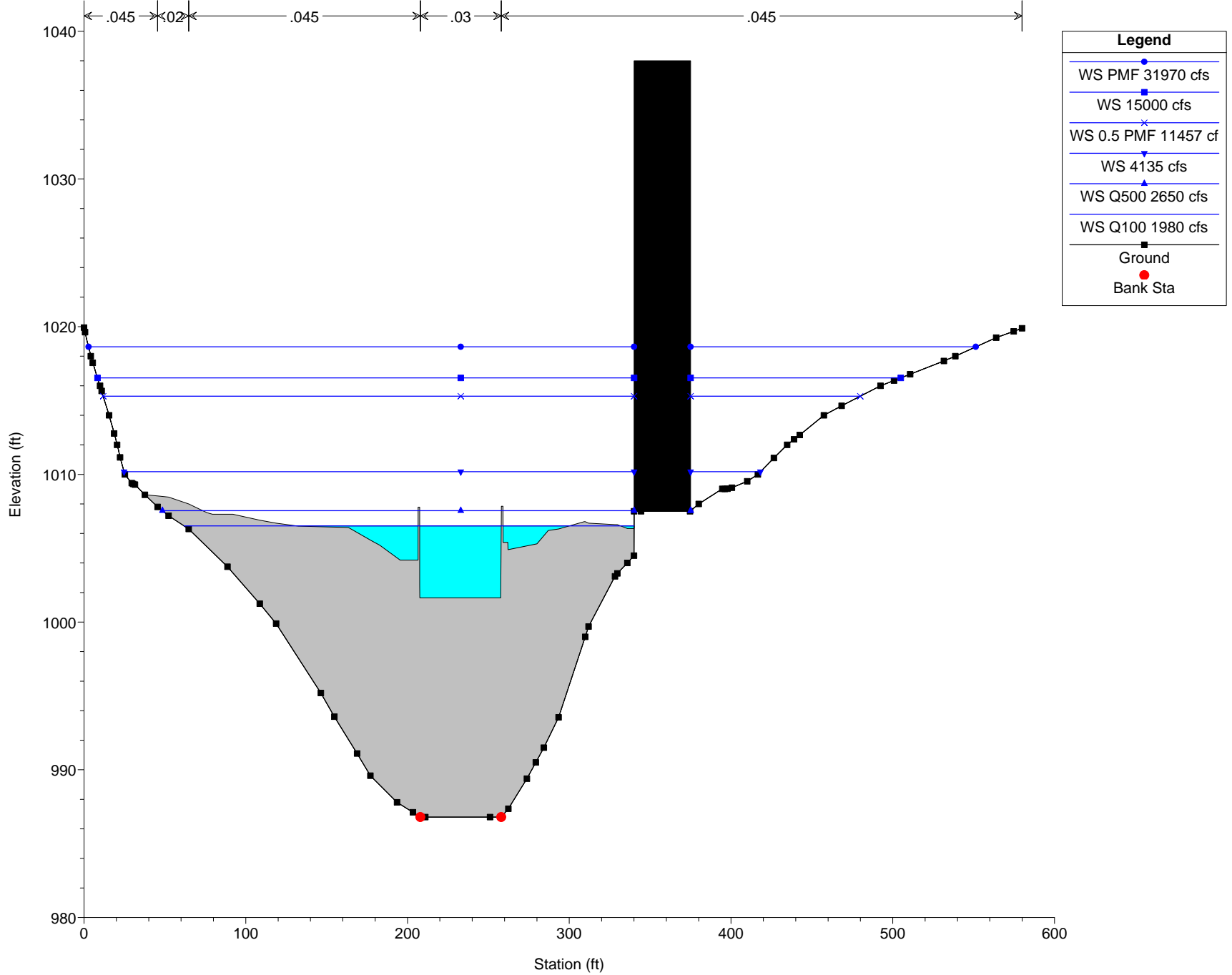
SIPPO CREEK HEC-RAS GEOMETRY



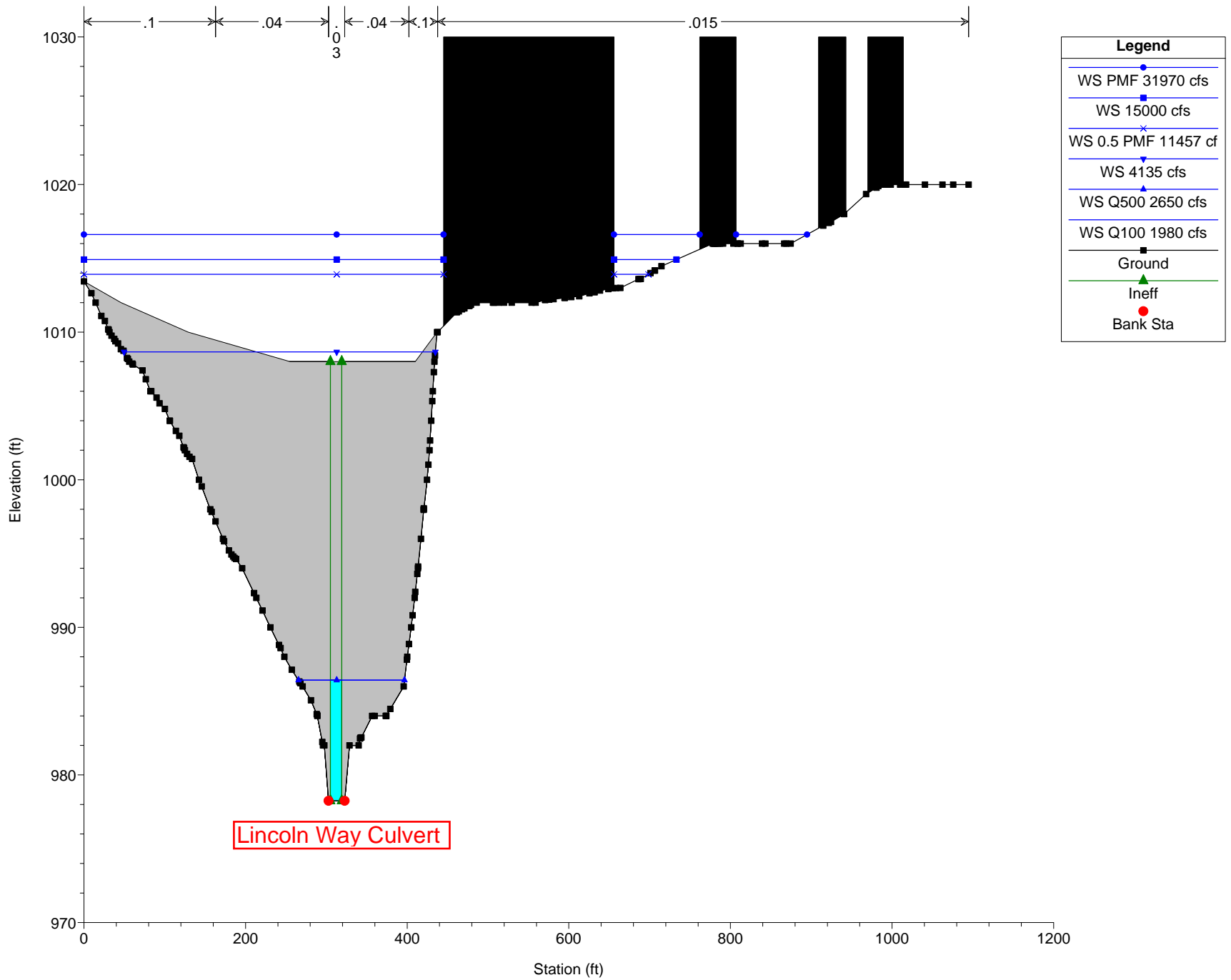


Legend	
WS 31970 cfs - 6hr	▲
WS 24229 cfs - 24hr	▲
WS 15000 cfs	▲
WS 13000 cfs	▲
WS 11457 cfs 0.5 PM	▲
WS 4188 cfs	▲
WS 3881 cfs 0.25 PM	▲
WS 3400 cfs	▲
WS 3116 cfs	▲
WS 2924 cfs	▲
WS 2650 cfs 500-yr	▲
WS 1980 cfs 100-yr	▲
WS 1289 cfs	■
Ground	■

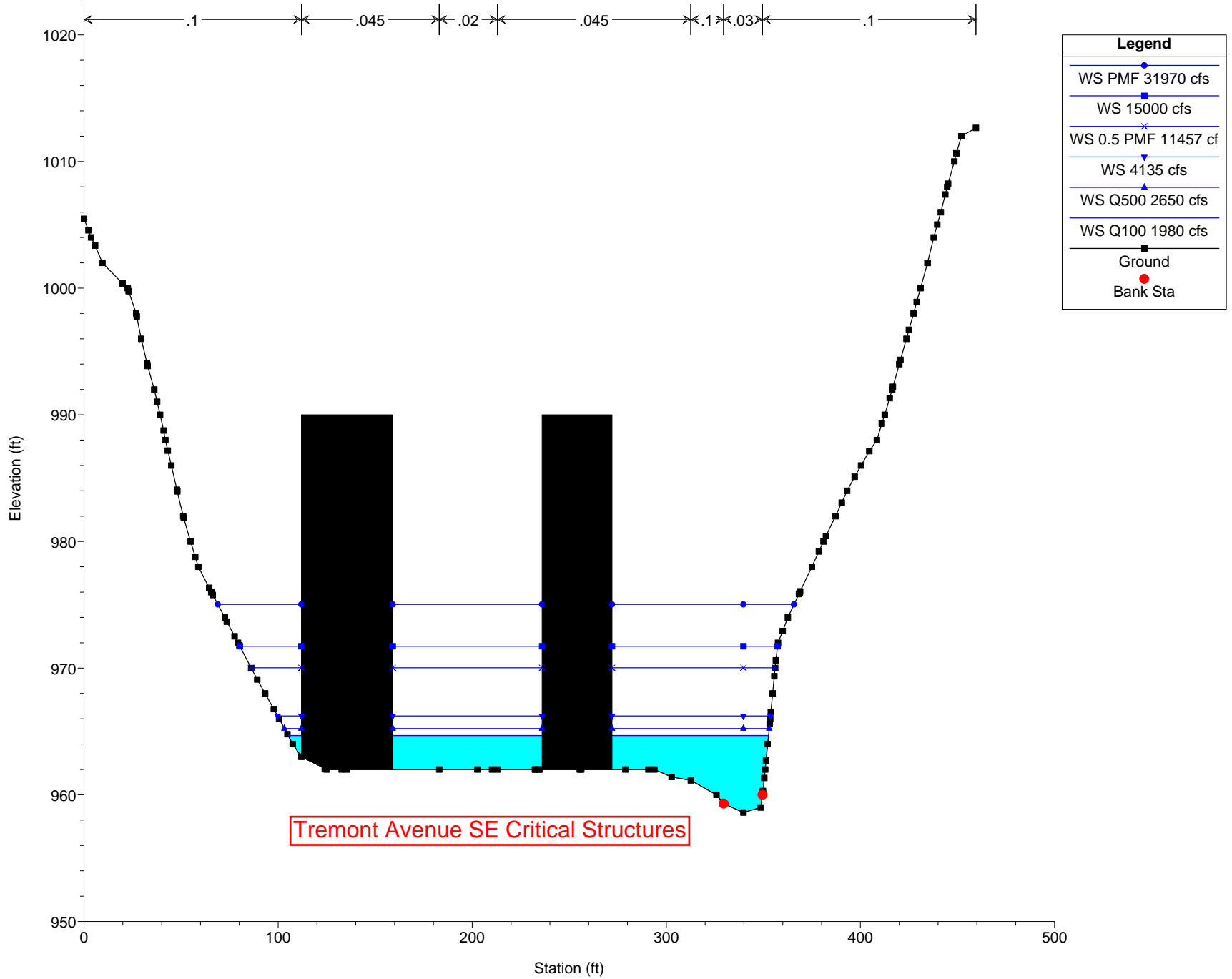
SippoCreekDam Plan: Existing Conditions Final 9/20/2011
 Sippo Reservoir Dam



SippoCreekDam Plan: Existing Conditions Final 9/20/2011



SippoCreekDam Plan: Existing Conditions Final 9/20/2011
RS 2823



Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	11383.45	1289 cfs	1289.00	1087.85	149.80	51.34	7.57	1003.50	1011.08	1008.31	1011.67	0.001816	2.98	6.70	0.67	1.07	0.43
Main	11383.45	1980 cfs 100-yr	1980.00	1298.27	586.38	95.35	9.72	1003.50	1013.23	1010.90	1013.63	0.001323	2.13	6.23	0.94	1.02	0.35
Main	11383.45	2650 cfs 500-yr	2650.00	1493.12	1013.36	143.52	11.38	1003.50	1014.89	1011.75	1015.23	0.000796	1.98	6.12	1.06	1.03	0.32
Main	11383.45	2924 cfs	2924.00	1553.94	1204.14	165.93	12.15	1003.50	1015.66	1012.01	1015.97	0.000663	1.90	5.96	1.08	1.01	0.30
Main	11383.45	3116 cfs	3116.00	1599.03	1335.29	181.69	12.66	1003.50	1016.18	1012.20	1016.46	0.000599	1.87	5.89	1.10	1.01	0.29
Main	11383.45	3400 cfs	3400.00	1666.66	1528.29	205.05	13.40	1003.50	1016.91	1012.44	1017.18	0.000529	1.83	5.80	1.12	1.00	0.28
Main	11383.45	3881 cfs 0.25 PM	3881.00	1775.05	1859.62	246.33	14.71	1003.50	1018.22	1012.83	1018.45	0.000428	1.76	5.63	1.13	0.97	0.26
Main	11383.45	4188 cfs	4188.00	1854.97	2063.40	269.63	15.42	1003.50	1018.93	1013.05	1019.16	0.000388	1.74	5.61	1.15	0.95	0.25
Main	11383.45	11457 cfs 0.5 PM	11457.00	4817.20	5854.62	785.18	16.71	1003.50	1020.23	1016.81	1021.47	0.002613	4.13	13.44	2.83	2.25	0.58
Main	11383.45	13000 cfs	13000.00	5327.19	6698.66	974.15	17.29	1003.50	1020.80	1017.39	1022.20	0.002758	4.40	14.37	3.05	2.50	0.61
Main	11383.45	15000 cfs	15000.00	5969.45	7776.69	1253.87	17.95	1003.50	1021.46	1018.04	1023.05	0.002949	4.74	15.51	3.33	2.86	0.65
Main	11383.45	24229 cfs -24hr	24229.00	8669.06	12468.79	3091.15	20.60	1003.50	1024.11	1021.38	1026.43	0.003824	5.87	19.63	4.23	4.18	0.76
Main	11383.45	31970 cfs -6hr	31970.00	9978.72	16123.81	5867.47	22.72	1003.50	1026.23	1023.49	1028.48	0.003440	5.96	20.49	4.40	4.85	0.76
Main	11259.68	1289 cfs	1289.00	1178.91	47.42	62.67	6.57	1003.25	1010.15	1008.74	1011.38	0.001961	6.46	9.32	1.36	1.64	0.64
Main	11259.68	1980 cfs 100-yr	1980.00	1694.40	146.09	139.52	8.27	1003.25	1011.84	1010.37	1013.35	0.002013	4.92	10.65	0.90	1.73	0.65
Main	11259.68	2650 cfs 500-yr	2650.00	1683.14	719.55	247.32	10.88	1003.25	1014.45	1010.10	1015.10	0.000933	2.57	8.04	1.12	1.37	0.43
Main	11259.68	2924 cfs	2924.00	1701.21	932.13	290.65	11.77	1003.25	1015.34	1010.10	1015.86	0.000665	2.32	7.51	1.15	1.31	0.39
Main	11259.68	3116 cfs	3116.00	1725.48	1070.54	319.99	12.33	1003.25	1015.90	1010.10	1016.37	0.000552	2.21	7.27	1.16	1.28	0.37
Main	11259.68	3400 cfs	3400.00	1775.28	1272.05	352.67	13.11	1003.25	1016.69	1010.10	1017.10	0.000439	2.10	7.04	1.18	1.21	0.34
Main	11259.68	3881 cfs 0.25 PM	3881.00	1848.54	1610.76	421.70	14.48	1003.25	1018.05	1010.10	1018.39	0.000297	1.93	6.64	1.19	1.12	0.31
Main	11259.68	4188 cfs	4188.00	1885.33	1790.56	512.12	15.23	1003.25	1018.80	1010.10	1019.10	0.000243	1.86	6.43	1.18	1.15	0.29
Main	11259.68	11457 cfs 0.5 PM	11457.00	5431.22	4770.54	1255.24	14.54	1003.25	1018.12	1018.12	1020.99	0.001880	5.64	19.41	3.48	3.28	0.90
Main	11259.68	13000 cfs	13000.00	5859.26	5555.38	1585.37	15.21	1003.25	1018.79	1018.79	1021.71	0.001698	5.78	20.02	3.68	3.56	0.90
Main	11259.68	15000 cfs	15000.00	6390.62	6532.38	2076.99	15.96	1003.25	1019.54	1019.54	1022.54	0.001639	6.02	20.81	3.92	4.01	0.92
Main	11259.68	24229 cfs -24hr	24229.00	8912.35	10731.29	4585.36	18.25	1003.25	1021.82	1021.82	1025.78	0.001639	7.43	25.38	4.95	6.19	1.05
Main	11259.68	31970 cfs -6hr	31970.00	10135.95	14015.11	7818.93	20.86	1003.25	1024.43	1024.39	1027.92	0.001070	7.32	25.26	4.94	6.94	0.97
Main	11165.78	1289 cfs	1289.00	1086.60	103.86	98.54	7.21	1003.00	1010.38	1009.60	1011.02	0.001932	5.55	6.84	4.37	1.98	0.45
Main	11165.78	1980 cfs 100-yr	1980.00	1605.94	176.80	197.26	8.92	1003.00	1012.09	1010.90	1012.98	0.002427	6.42	8.18	5.43	2.48	0.48
Main	11165.78	2650 cfs 500-yr	2650.00	1727.63	733.75	188.62	11.30	1003.00	1014.47	1010.10	1014.97	0.001621	3.17	6.94	1.64	1.35	0.36
Main	11165.78	2924 cfs	2924.00	1604.03	1095.45	224.53	12.26	1003.00	1015.42	1010.66	1015.74	0.001199	2.51	5.94	1.59	1.08	0.30
Main	11165.78	3116 cfs	3116.00	1544.40	1306.48	265.11	12.84	1003.00	1016.01	1010.95	1016.25	0.001000	2.26	5.46	1.56	1.03	0.27
Main	11165.78	3400 cfs	3400.00	1479.63	1579.11	341.26	13.64	1003.00	1016.81	1011.34	1016.99	0.000790	2.00	4.93	1.50	0.99	0.24
Main	11165.78	3881 cfs 0.25 PM	3881.00	1365.18	1978.64	537.18	15.02	1003.00	1018.19	1011.93	1018.30	0.000561	1.66	4.13	1.36	0.98	0.19
Main	11165.78	4188 cfs	4188.00	1310.33	2180.70	696.97	15.76	1003.00	1018.93	1014.28	1019.02	0.000454	1.53	3.77	1.27	1.03	0.17
Main	11165.78	11457 cfs 0.5 PM	11457.00	3494.54	5992.85	1969.61	15.93	1003.00	1019.09	1017.13	1019.68	0.001184	4.04	9.96	3.37	2.79	0.44
Main	11165.78	13000 cfs	13000.00	3519.60	6921.67	2558.73	16.73	1003.00	1019.90	1017.42	1020.40	0.000964	3.91	9.55	3.28	3.02	0.41
Main	11165.78	15000 cfs	15000.00	3743.11	7808.74	3448.15	17.66	1003.00	1020.83	1017.98	1021.31	0.000835	3.82	9.62	3.09	3.40	0.40
Main	11165.78	24229 cfs -24hr	24229.00	3990.50	13658.78	6579.72	21.19	1003.00	1024.36	1019.39	1024.70	0.000520	3.81	8.55	3.31	3.72	0.33
Main	11165.78	31970 cfs -6hr	31970.00	4429.87	18298.80	9241.33	23.37	1003.00	1026.54	1026.54	1026.88	0.000466	4.01	8.61	3.58	3.95	0.31
Main	11114.83	1289 cfs	1289.00	1141.17	41.04	106.79	6.70	1002.80	1009.60	1009.60	1010.77	0.001767	7.47	9.14	3.77	2.90	0.62
Main	11114.83	1980 cfs 100-yr	1980.00	1725.90	66.99	187.10	7.46	1002.80	1010.36	1010.36	1012.49	0.002628	10.08	12.42	5.28	4.18	0.80
Main	11114.83	2650 cfs 500-yr	2650.00	2268.19	95.59	286.22	8.56	1002.80	1011.46	1010.76	1014.21	0.002037	11.47	14.23	6.25	5.08	0.86
Main	11114.83	2924 cfs	2924.00	2487.73	107.57	328.71	8.99	1002.80	1011.88	1011.24	1014.88	0.001839	11.97	14.87	6.60	5.41	0.87
Main	11114.83	3116 cfs	3116.00	2638.17	116.41	361.42	9.36	1002.80	1012.26	1011.56	1015.35	0.001663	12.17	15.14	6.78	5.59	0.87
Main	11114.83	3400 cfs	3400.00	2858.26	129.81	411.93	9.96	1002.80	1012.85	1012.01	1016.05	0.001432	12.37	15.42	6.98	5.81	0.86
Main	11114.83	3881 cfs 0.25 PM	3881.00	3267.48	147.52	466.01	9.83	1002.80	1012.72	1012.72	1017.01	0.002133	14.33	17.86	8.07	6.70	1.00
Main	11114.83	4188 cfs	4188.00	3506.98	161.77	519.25	10.31	1002.80	1013.21	1013.21	1017.68	0.002139	14.64	18.26	8.32	6.96	1.00
Main	11114.83	11457 cfs 0.5 PM	11457.00	3376.52	6306.50	1773.98	15.97	1002.80	1018.87	1018.87	1019.58	0.001403	4.13	11.35	3.62	2.42	0.50
Main	11114.83	13000 cfs	13000.00	3251.53	7658.37	2090.10	16.91	1002.80	1019.80	1019.80	1020.34	0.001263	3.83	10.33	3.50	2.33	0.44
Main	11114.83	15000 cfs	15000.00	3187.37	9322.36	2490.28	17.92	1002.80	1020.81	1020.81	1021.24	0.001145	3.65	9.55	3.46	2.31	0.40
Main	11114.83	24229 cfs -24hr	24229.00	3402.07	16590.52	4236.41	21.45	1002.80	1024.35	1024.35	1024.67	0.000954	3.66	8.52	3.69	2.46	0.32
Main	11114.83	31970 cfs -6hr	31970.00	3802.00	22521.47	5646.53	23.63	1002.80	1026.52	1026.52	1026.86	0.000912	3.92	8.64	4.02	2.67	0.31
Main	10892.05	1289 cfs	1289.00	971.91	145.06	172.03	6.83	1002.60	1009.57	1009.57	1010.01	0.000581	3.75	6.08	1.55	1.90	0.41
Main	10892.05	1980 cfs 100-yr	1980.00	1428.03	260.35	291.62	7.74	1002.60	1010.48	1010.48	1011.19	0.000824	4.37	7.87	1.95	2.11	0.50
Main	10892.05	2650 cfs 500-yr	2650.00	1580.56	380.13	689.32	9.40	1002.60	1012.13	1012.13	1012.63	0.000575	3.45	7.18	1.74	2.08	0.40
Main	10892.05	2924 cfs	2924.00	1623.98	423.57	876.45	10.02	1002.60	1012.75	1012.75	1013.19	0.000513	3.17	6.92	1.67	2.01	0.39

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	10892.05	3116 cfs	3116.00	1642.79	453.82	1019.38	10.50	1002.60	1013.24		1013.63	0.000463	2.98	6.68	1.61	1.97	0.36
Main	10892.05	3400 cfs	3400.00	1669.33	498.56	1232.11	11.23	1002.60	1013.97		1014.30	0.000401	2.76	6.35	1.52	1.92	0.33
Main	10892.05	3881 cfs 0.25 PM	3881.00	1968.45	567.33	1345.22	10.89	1002.60	1013.63	1011.24	1014.13	0.000606	3.39	7.72	1.85	2.30	0.41
Main	10892.05	4188 cfs	4188.00	2067.16	613.80	1507.05	11.17	1002.60	1013.91	1011.51	1014.43	0.000625	3.44	7.90	1.89	2.38	0.42
Main	10892.05	11457 cfs 0.5 PM	11457.00	4201.87	1717.28	5537.86	15.59	1002.60	1018.33		1019.21	0.000905	4.70	11.51	2.58	3.93	0.51
Main	10892.05	13000 cfs	13000.00	4649.83	1929.06	6421.11	16.20	1002.60	1018.93		1019.92	0.000937	4.95	12.26	2.66	4.23	0.54
Main	10892.05	15000 cfs	15000.00	5209.67	2221.28	7569.05	16.93	1002.60	1019.66		1020.78	0.000968	5.25	13.14	2.76	4.58	0.56
Main	10892.05	24229 cfs -24hr	24229.00	7754.49	3621.67	12852.85	19.55	1002.60	1022.29		1024.02	0.001108	6.29	16.94	2.96	5.92	0.68
Main	10892.05	31970 cfs - 6hr	31970.00	9387.67	5535.07	17047.26	21.41	1002.60	1024.15		1026.15	0.001156	6.87	18.72	3.48	6.65	0.71
Main	10397.80	1289 cfs	1289.00	445.41	195.73	647.87	6.92	1002.20	1009.55		1009.61	0.000176	1.48	3.22	1.06	1.19	0.22
Main	10397.80	1980 cfs 100-yr	1980.00	657.76	336.39	985.85	7.88	1002.20	1010.50		1010.61	0.000242	1.84	4.17	1.44	1.44	0.26
Main	10397.80	2650 cfs 500-yr	2650.00	768.89	471.05	1410.06	9.51	1002.20	1012.14		1012.23	0.000187	1.81	4.04	1.45	1.49	0.23
Main	10397.80	2924 cfs	2924.00	816.08	526.56	1581.36	10.12	1002.20	1012.74		1012.84	0.000174	1.81	4.03	1.46	1.51	0.22
Main	10397.80	3116 cfs	3116.00	846.19	566.34	1703.47	10.60	1002.20	1013.22		1013.32	0.000162	1.80	3.99	1.45	1.51	0.22
Main	10397.80	3400 cfs	3400.00	890.26	625.80	1883.94	11.32	1002.20	1013.94		1014.03	0.000146	1.78	3.93	1.44	1.51	0.21
Main	10397.80	3881 cfs 0.25 PM	3881.00	1033.68	710.19	2137.13	10.97	1002.20	1013.60		1013.72	0.000217	2.13	4.71	1.72	1.79	0.25
Main	10397.80	4188 cfs	4188.00	1100.27	769.95	2317.77	11.25	1002.20	1013.87		1014.01	0.000227	2.21	4.89	1.79	1.87	0.26
Main	10397.80	11457 cfs 0.5 PM	11457.00	2351.45	3040.23	6065.32	15.69	1002.20	1018.31		1018.59	0.000387	3.26	7.49	2.62	2.97	0.33
Main	10397.80	13000 cfs	13000.00	2527.89	3815.27	6656.83	16.34	1002.20	1018.97		1019.26	0.000409	3.39	7.73	2.85	3.07	0.34
Main	10397.80	15000 cfs	15000.00	2737.98	4881.14	7380.89	17.14	1002.20	1019.76		1020.07	0.000432	3.55	7.98	3.13	3.18	0.34
Main	10397.80	24229 cfs -24hr	24229.00	3620.89	10096.24	10511.87	20.06	1002.20	1022.69		1023.08	0.000529	4.25	9.02	4.25	3.60	0.35
Main	10397.80	31970 cfs - 6hr	31970.00	4280.86	14587.81	13101.33	22.03	1002.20	1024.65		1025.12	0.000583	4.75	9.71	4.99	3.89	0.36
Main	10137.55	1289 cfs	1289.00	310.21	505.09	473.69	7.54	1001.95	1009.53		1009.55	0.000296	1.02	1.96	0.93	0.84	0.13
Main	10137.55	1980 cfs 100-yr	1980.00	439.40	769.44	771.16	8.50	1001.95	1010.49		1010.53	0.000328	1.27	2.47	1.15	1.09	0.15
Main	10137.55	2650 cfs 500-yr	2650.00	528.46	1016.35	1105.18	10.14	1001.95	1012.13		1012.17	0.000213	1.25	2.49	1.10	1.14	0.14
Main	10137.55	2924 cfs	2924.00	564.06	1116.46	1243.48	10.75	1001.95	1012.74		1012.78	0.000190	1.25	2.51	1.08	1.15	0.13
Main	10137.55	3116 cfs	3116.00	586.66	1185.52	1343.82	11.23	1001.95	1013.22		1013.26	0.000171	1.23	2.49	1.05	1.16	0.13
Main	10137.55	3400 cfs	3400.00	618.86	1286.71	1494.43	11.96	1001.95	1013.95		1013.98	0.000147	1.21	2.47	1.01	1.16	0.13
Main	10137.55	3881 cfs 0.25 PM	3881.00	717.79	1472.54	1690.67	11.61	1001.95	1013.60		1013.64	0.000225	1.45	2.95	1.23	1.37	0.15
Main	10137.55	4188 cfs	4188.00	764.68	1585.73	1837.59	11.89	1001.95	1013.88		1013.93	0.000232	1.50	3.07	1.26	1.43	0.16
Main	10137.55	11457 cfs 0.5 PM	11457.00	1762.79	4209.47	5484.74	16.33	1001.95	1018.32		1018.45	0.000340	2.32	5.15	1.72	2.55	0.22
Main	10137.55	13000 cfs	13000.00	1961.77	4771.62	6266.61	16.97	1001.95	1018.96		1019.11	0.000359	2.47	5.52	1.81	2.75	0.24
Main	10137.55	15000 cfs	15000.00	2215.29	5500.78	7283.93	17.75	1001.95	1019.74		1019.91	0.000380	2.64	5.96	1.92	2.98	0.25
Main	10137.55	24229 cfs -24hr	24229.00	3363.34	8895.56	11970.11	20.64	1001.95	1022.63		1022.91	0.000471	3.34	7.78	2.38	3.87	0.30
Main	10137.55	31970 cfs - 6hr	31970.00	4233.20	11574.85	16161.95	22.58	1001.95	1024.57		1024.94	0.000530	3.84	8.95	2.69	4.56	0.33
Main	9989.336	1289 cfs	1289.00	959.22	275.89	53.89	6.65	1001.85	1008.51	1008.51	1009.42	0.002236	5.17	8.78	2.41	2.12	0.60
Main	9989.336	1980 cfs 100-yr	1980.00	972.39	824.00	183.61	8.12	1001.85	1009.98		1010.43	0.001132	3.59	7.29	2.57	1.89	0.45
Main	9989.336	2650 cfs 500-yr	2650.00	863.18	1368.86	417.96	10.07	1001.85	1011.94		1012.12	0.000403	2.54	5.21	2.22	1.62	0.29
Main	9989.336	2924 cfs	2924.00	855.65	1549.72	518.62	10.72	1001.85	1012.58		1012.74	0.000314	2.38	4.85	2.14	1.59	0.26
Main	9989.336	3116 cfs	3116.00	845.75	1673.97	596.28	11.23	1001.85	1013.09		1013.22	0.000260	2.26	4.58	2.06	1.56	0.24
Main	9989.336	3400 cfs	3400.00	835.58	1852.25	712.17	11.98	1001.85	1013.84		1013.95	0.000201	2.11	4.24	1.96	1.51	0.22
Main	9989.336	3881 cfs 0.25 PM	3881.00	1006.45	2100.10	774.45	11.56	1001.85	1013.42		1013.60	0.000330	2.62	5.30	2.42	1.84	0.27
Main	9989.336	4188 cfs	4188.00	1047.19	2276.89	863.92	11.84	1001.85	1013.70		1013.88	0.000328	2.67	5.38	2.48	1.90	0.28
Main	9989.336	11457 cfs 0.5 PM	11457.00	1813.04	6600.25	3043.71	16.29	1001.85	1018.15		1018.39	0.000333	3.30	6.77	3.12	2.81	0.30
Main	9989.336	13000 cfs	13000.00	1948.23	7569.33	3482.44	16.94	1001.85	1018.80		1019.04	0.000342	3.43	7.00	3.26	2.92	0.30
Main	9989.336	15000 cfs	15000.00	2111.24	8809.39	4079.37	17.72	1001.85	1019.58		1019.84	0.000348	3.57	7.25	3.42	3.07	0.30
Main	9989.336	24229 cfs -24hr	24229.00	2831.79	14489.19	6908.02	20.62	1001.85	1022.49		1022.83	0.000367	4.23	8.35	4.12	3.69	0.32
Main	9989.336	31970 cfs - 6hr	31970.00	3418.04	19306.64	9245.32	22.58	1001.85	1024.44		1024.86	0.000382	4.69	9.21	4.65	4.04	0.34
Main	9950.847	1289 cfs	1289.00	1131.83	97.36	59.81	5.78	1001.75	1007.99	1006.36	1008.67	0.001269	6.18	6.96	3.21	3.82	0.51
Main	9950.847	1980 cfs 100-yr	1980.00	1287.88	616.31	75.81	7.74	1001.75	1009.95		1010.32	0.000622	2.99	5.91	1.49	2.41	0.37
Main	9950.847	2650 cfs 500-yr	2650.00	1088.94	1440.00	121.06	9.73	1001.75	1011.94		1012.06	0.000268	1.89	3.98	1.37	1.48	0.22
Main	9950.847	2924 cfs	2924.00	1063.12	1717.73	143.15	10.38	1001.75	1012.59		1012.68	0.000219	1.73	3.64	1.34	1.30	0.20
Main	9950.847	3116 cfs	3116.00	1040.19	1914.17	161.65	10.89	1001.75	1013.10		1013.17	0.000187	1.62	3.39	1.29	1.19	0.18
Main	9950.847	3400 cfs	3400.00	1014.59	2194.91	190.50	11.64	1001.75	1013.85		1013.91	0.000150	1.49	3.10	1.23	1.08	0.16
Main	9950.847	3881 cfs 0.25 PM	3881.00	1229.47	2442.80	208.73	11.23	1001.75	1013.43		1013.53	0.000242	1.86	3.89	1.51	1.36	0.20
Main	9950.847	4188 cfs	4188.00	1273.43	2683.08	231.50	11.51	1001.75	1013.71		1013.81	0.000244	1.89	3.93	1.55	1.37	0.20

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	9950.847	11457 cfs 0.5 PM	11457.00	2199.68	8393.38	863.94	15.97	1001.75	1018.18		1018.31	0.000297	2.43	4.90	2.23	1.73	0.22
Main	9950.847	13000 cfs	13000.00	2390.69	9593.15	1016.17	16.61	1001.75	1018.82		1018.96	0.000313	2.53	5.11	2.34	1.81	0.22
Main	9950.847	15000 cfs	15000.00	2614.32	11169.99	1215.69	17.40	1001.75	1019.61		1019.76	0.000328	2.65	5.34	2.46	1.89	0.23
Main	9950.847	24229 cfs -24hr	24229.00	3437.99	18631.34	2159.67	20.32	1001.75	1022.53		1022.72	0.000376	3.10	6.01	2.99	2.13	0.24
Main	9950.847	31970 cfs - 6hr	31970.00	4047.22	24915.49	3007.30	22.29	1001.75	1024.50		1024.73	0.000406	3.43	6.45	3.37	2.29	0.24
Main	9798.714	1289 cfs	1289.00	987.99	172.43	128.59	6.44	1001.50	1007.99		1008.30	0.000960	3.21	5.07	1.25	1.86	0.35
Main	9798.714	1980 cfs 100-yr	1980.00	1082.44	688.60	208.96	8.42	1001.50	1009.97		1010.14	0.000476	2.40	4.25	1.60	1.49	0.26
Main	9798.714	2650 cfs 500-yr	2650.00	1105.35	1243.50	301.15	10.36	1001.50	1011.92		1012.02	0.000250	2.01	3.52	1.61	1.28	0.19
Main	9798.714	2924 cfs	2924.00	1134.71	1447.73	341.56	11.01	1001.50	1012.57		1012.66	0.000217	1.96	3.40	1.63	1.25	0.18
Main	9798.714	3116 cfs	3116.00	1150.02	1594.24	371.74	11.51	1001.50	1013.07		1013.15	0.000192	1.91	3.30	1.62	1.23	0.17
Main	9798.714	3400 cfs	3400.00	1172.18	1810.36	417.46	12.26	1001.50	1013.81		1013.89	0.000163	1.83	3.16	1.60	1.19	0.16
Main	9798.714	3881 cfs 0.25 PM	3881.00	1389.99	2022.11	468.89	11.83	1001.50	1013.39		1013.50	0.000261	2.25	3.88	1.93	1.45	0.20
Main	9798.714	4188 cfs	4188.00	1463.44	2213.28	511.29	12.11	1001.50	1013.66		1013.78	0.000270	2.31	3.99	2.01	1.50	0.20
Main	9798.714	11457 cfs 0.5 PM	11457.00	2976.95	6857.75	1622.30	16.43	1001.50	1017.98		1018.24	0.000440	3.53	5.98	3.30	2.42	0.26
Main	9798.714	13000 cfs	13000.00	3280.78	7853.76	1865.46	17.05	1001.50	1018.60		1018.89	0.000477	3.76	6.36	3.54	2.58	0.27
Main	9798.714	15000 cfs	15000.00	3660.29	9138.32	2201.39	17.79	1001.50	1019.35		1019.68	0.000524	4.03	6.79	3.82	2.78	0.28
Main	9798.714	24229 cfs -24hr	24229.00	5332.04	15063.85	3833.11	20.52	1001.50	1022.08		1022.59	0.000716	5.10	8.58	4.89	3.64	0.33
Main	9798.714	31970 cfs - 6hr	31970.00	6649.72	20002.97	5317.31	22.34	1001.50	1023.89		1024.56	0.000855	5.87	9.83	5.65	4.33	0.37
Main	9614.268	1289 cfs	1289.00	673.71	395.83	219.45	6.19	1001.25	1007.63		1007.92	0.001397	3.61	5.40	2.52	2.91	0.38
Main	9614.268	1980 cfs 100-yr	1980.00	770.63	878.58	330.79	8.25	1001.25	1009.69		1009.87	0.000633	2.94	4.64	2.49	2.15	0.28
Main	9614.268	2650 cfs 500-yr	2650.00	810.95	1356.64	482.41	10.29	1001.25	1011.73		1011.85	0.000335	2.47	3.91	2.32	1.71	0.21
Main	9614.268	2924 cfs	2924.00	839.54	1529.49	554.98	10.96	1001.25	1012.39		1012.51	0.000291	2.41	3.80	2.32	1.68	0.20
Main	9614.268	3116 cfs	3116.00	855.65	1650.07	610.29	11.47	1001.25	1012.91		1013.02	0.000259	2.36	3.70	2.29	1.65	0.19
Main	9614.268	3400 cfs	3400.00	880.47	1826.56	692.97	12.23	1001.25	1013.67		1013.77	0.000220	2.30	3.57	2.26	1.62	0.18
Main	9614.268	3881 cfs 0.25 PM	3881.00	1044.13	2065.96	770.91	11.72	1001.25	1013.16		1013.32	0.000361	2.83	4.42	2.76	1.99	0.23
Main	9614.268	4188 cfs	4188.00	1104.45	2240.30	843.25	11.98	1001.25	1013.42		1013.59	0.000375	2.93	4.58	2.88	2.06	0.23
Main	9614.268	11457 cfs 0.5 PM	11457.00	2411.36	6399.27	2646.37	16.02	1001.25	1017.46		1017.90	0.000693	4.85	7.47	4.94	3.55	0.33
Main	9614.268	13000 cfs	13000.00	2674.89	7285.09	3040.03	16.57	1001.25	1018.01		1018.51	0.000767	5.19	8.01	5.30	3.82	0.35
Main	9614.268	15000 cfs	15000.00	3025.66	8484.79	3489.55	17.23	1001.25	1018.67		1019.26	0.000864	5.60	8.72	5.75	4.07	0.37
Main	9614.268	24229 cfs -24hr	24229.00	4482.82	13801.99	5944.19	19.59	1001.25	1021.03		1022.01	0.001307	7.24	11.36	7.44	5.41	0.45
Main	9614.268	31970 cfs - 6hr	31970.00	5626.66	18244.82	8098.52	21.13	1001.25	1022.57		1023.85	0.001714	8.32	13.22	8.50	6.38	0.51
Main	9435.728	1289 cfs	1289.00	827.97	253.16	207.87	5.87	1001.00	1007.10		1007.64	0.001359	4.63	7.04	3.14	2.58	0.51
Main	9435.728	1980 cfs 100-yr	1980.00	920.73	656.68	402.58	8.25	1001.00	1009.48		1009.75	0.000569	3.16	5.57	2.45	2.08	0.34
Main	9435.728	2650 cfs 500-yr	2650.00	981.96	1040.65	627.40	10.39	1001.00	1011.62		1011.79	0.000312	2.55	4.72	2.14	1.82	0.26
Main	9435.728	2924 cfs	2924.00	1016.97	1181.66	725.37	11.07	1001.00	1012.30		1012.45	0.000274	2.47	4.59	2.11	1.81	0.24
Main	9435.728	3116 cfs	3116.00	1033.88	1279.33	802.79	11.60	1001.00	1012.82		1012.97	0.000244	2.40	4.45	2.06	1.80	0.23
Main	9435.728	3400 cfs	3400.00	1060.97	1422.38	916.66	12.37	1001.00	1013.60		1013.73	0.000209	2.32	4.28	2.02	1.79	0.21
Main	9435.728	3881 cfs 0.25 PM	3881.00	1264.41	1602.68	1013.91	11.82	1001.00	1013.04		1013.25	0.000345	2.89	5.34	2.49	2.19	0.27
Main	9435.728	4188 cfs	4188.00	1336.95	1740.30	1110.74	12.07	1001.00	1013.30		1013.51	0.000360	2.99	5.53	2.59	2.29	0.28
Main	9435.728	11457 cfs 0.5 PM	11457.00	2935.63	5010.39	3510.98	15.98	1001.00	1017.20		1017.76	0.000692	5.07	9.18	4.53	4.20	0.40
Main	9435.728	13000 cfs	13000.00	3264.82	5700.39	4034.79	16.49	1001.00	1017.71		1018.36	0.000770	5.47	9.89	4.90	4.57	0.43
Main	9435.728	15000 cfs	15000.00	3687.17	6598.59	4714.24	17.09	1001.00	1018.32		1019.08	0.000869	5.97	10.77	5.36	5.01	0.46
Main	9435.728	24229 cfs -24hr	24229.00	5654.79	10815.80	7758.42	19.09	1001.00	1020.32		1021.72	0.001389	8.10	14.79	7.36	6.82	0.60
Main	9435.728	31970 cfs - 6hr	31970.00	7401.77	14549.89	10018.35	20.11	1001.00	1021.34		1023.45	0.001951	9.82	18.39	9.09	8.00	0.72
Main	9285.969	1289 cfs	1289.00	836.02	203.38	249.59	7.14	999.75	1007.03		1007.38	0.001576	3.48	5.71	1.84	2.21	0.38
Main	9285.969	1980 cfs 100-yr	1980.00	898.05	687.54	394.42	9.57	999.75	1009.46		1009.64	0.000932	2.62	4.57	2.01	1.80	0.26
Main	9285.969	2650 cfs 500-yr	2650.00	945.89	1189.80	514.31	11.72	999.75	1011.60		1011.73	0.000597	2.27	3.93	2.07	1.47	0.20
Main	9285.969	2924 cfs	2924.00	977.94	1365.04	581.02	12.40	999.75	1012.29		1012.40	0.000387	2.24	3.84	2.10	1.44	0.19
Main	9285.969	3116 cfs	3116.00	992.94	1486.09	636.97	12.92	999.75	1012.81		1012.92	0.000330	2.20	3.74	2.09	1.43	0.18
Main	9285.969	3400 cfs	3400.00	1016.23	1663.52	720.25	13.70	999.75	1013.59		1013.69	0.000270	2.14	3.61	2.08	1.42	0.17
Main	9285.969	3881 cfs 0.25 PM	3881.00	1214.17	1865.15	801.68	13.14	999.75	1013.02		1013.18	0.000504	2.65	4.50	2.54	1.74	0.22
Main	9285.969	4188 cfs	4188.00	1282.85	2029.81	875.34	13.39	999.75	1013.28		1013.45	0.000526	2.75	4.67	2.66	1.81	0.22
Main	9285.969	11457 cfs 0.5 PM	11457.00	2736.94	5954.37	2765.69	17.29	999.75	1017.18		1017.62	0.000898	4.71	7.71	4.75	3.36	0.33
Main	9285.969	13000 cfs	13000.00	3031.37	6792.90	3175.73	17.80	999.75	1017.69		1018.20	0.000994	5.08	8.30	5.13	3.65	0.35
Main	9285.969	15000 cfs	15000.00	3403.88	7885.29	3710.83	18.41	999.75	1018.30		1018.90	0.001087	5.52	9.01	5.59	4.00	0.37
Main	9285.969	24229 cfs -24hr	24229.00	5090.21	12984.44	6154.35	20.45	999.75	1020.34		1021.41	0.001494	7.43	12.13	7.56	5.48	0.47

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	9285.969	31970 cfs - 6hr	31970.00	6508.32	17355.37	8106.31	21.54	999.75	1021.43		1022.99	0.001866	8.96	14.73	9.16	6.57	0.56
Main	9175	1289 cfs	1289.00	1289.00			6.04	999.50	1005.78		1006.96	0.003044	8.70	8.70			0.62
Main	9175	1980 cfs 100-yr	1980.00	1980.00			7.52	999.50	1007.26	1005.61	1009.05	0.004481	10.74	10.74			0.69
Main	9175	2650 cfs 500-yr	2650.00	2650.00			9.12	999.50	1008.86	1006.85	1011.04	0.004361	11.85	11.85			0.69
Main	9175	2924 cfs	2924.00	2178.74	708.30	36.96	11.79	999.50	1011.53	1007.33	1012.19	0.001876	3.72	7.54	1.51	1.39	0.39
Main	9175	3116 cfs	3116.00	2110.79	950.44	54.77	12.51	999.50	1012.25	1007.67	1012.76	0.001533	3.24	6.88	1.55	1.34	0.34
Main	9175	3400 cfs	3400.00	2054.46	1258.35	87.18	13.46	999.50	1013.20	1008.15	1013.57	0.001214	2.81	6.23	1.57	1.16	0.30
Main	9175	3881 cfs 0.25 PM	3881.00	2715.32	1101.77	63.91	12.26	999.50	1012.00	1010.86	1012.90	0.001578	4.32	9.04	1.96	1.81	0.45
Main	9175	4188 cfs	4188.00	2848.83	1266.32	72.85	12.48	999.50	1012.22	1011.11	1013.16	0.001619	4.40	9.31	2.09	1.81	0.46
Main	9175	11457 cfs 0.5 PM	11457.00	5131.77	5448.37	876.86	16.26	999.50	1016.00	1014.48	1017.27	0.002199	5.48	12.87	3.89	2.99	0.56
Main	9175	13000 cfs	13000.00	5606.87	6301.12	1092.01	16.68	999.50	1016.42	1015.02	1017.82	0.002291	5.78	13.71	4.22	3.15	0.59
Main	9175	15000 cfs	15000.00	6085.54	7394.83	1519.64	17.31	999.50	1017.05	1015.58	1018.52	0.002354	6.01	14.34	4.51	3.50	0.61
Main	9175	24229 cfs -24hr	24229.00	7943.12	12095.96	4189.93	19.63	999.50	1019.37	1019.37	1021.06	0.002463	6.93	16.50	5.55	5.03	0.66
Main	9175	31970 cfs - 6hr	31970.00	9339.90	15761.77	6868.33	21.01	999.50	1020.75		1022.67	0.002503	7.73	18.13	6.26	6.23	0.70
Main	9132.836	1289 cfs	1289.00	1289.00			5.75	999.50	1005.49		1006.79	0.001426	9.14	9.14			0.67
Main	9132.836	1980 cfs 100-yr	1980.00	1980.00			6.01	999.50	1005.75	1005.61	1008.55	0.001817	13.43	13.43			0.97
Main	9132.836	2650 cfs 500-yr	2650.00	2650.00			7.11	999.50	1006.85	1006.85	1010.44	0.001638	15.20	15.20			1.00
Main	9132.836	2924 cfs	2924.00	2924.00			7.59	999.50	1007.33	1007.33	1011.16	0.000970	15.71	15.71			1.00
Main	9132.836	3116 cfs	3116.00	3116.00			7.93	999.50	1007.67	1007.67	1011.66	0.000905	16.02	16.02			1.00
Main	9132.836	3400 cfs	3400.00	3400.00			8.41	999.50	1008.15	1008.15	1012.37	0.000863	16.49	16.49			1.00
Main	9132.836	3881 cfs 0.25 PM	3881.00	3169.75	681.58	29.67	11.12	999.50	1010.86	1010.86	1012.59	0.000661	6.14	11.62	1.99	1.81	0.61
Main	9132.836	4188 cfs	4188.00	3305.96	842.61	39.43	11.37	999.50	1011.11	1011.11	1012.85	0.000657	6.09	11.86	2.16	1.98	0.62
Main	9132.836	11457 cfs 0.5 PM	11457.00	5983.74	4943.28	529.98	14.74	999.50	1014.48	1014.48	1016.85	0.000681	7.23	16.56	4.61	3.50	0.76
Main	9132.836	13000 cfs	13000.00	6344.05	5898.70	757.25	15.39	999.50	1015.13	1015.02	1017.45	0.000703	7.25	16.81	4.87	3.69	0.76
Main	9132.836	15000 cfs	15000.00	6847.72	7069.28	1083.00	16.06	999.50	1015.80	1015.58	1018.16	0.000753	7.42	17.39	5.21	3.99	0.76
Main	9132.836	24229 cfs -24hr	24229.00	8650.07	12139.25	3439.68	18.69	999.50	1018.43	1018.43	1020.77	0.000916	7.87	18.87	6.20	5.20	0.77
Main	9132.836	31970 cfs - 6hr	31970.00	9722.47	15855.37	6392.16	20.51	999.50	1020.24		1022.48	0.000999	8.20	19.34	6.63	6.38	0.75
Main	8997.774	1289 cfs	1289.00	744.40	314.70	229.90	7.07	998.50	1005.82		1006.08	0.000643	2.98	5.12	1.59	2.58	0.34
Main	8997.774	1980 cfs 100-yr	1980.00	941.62	696.49	341.89	8.02	998.50	1006.77		1007.05	0.000665	3.00	5.71	1.95	2.48	0.36
Main	8997.774	2650 cfs 500-yr	2650.00	1048.43	1135.46	466.11	8.94	998.50	1007.69	1005.63	1007.94	0.000578	2.88	5.70	2.15	2.22	0.34
Main	8997.774	2924 cfs	2924.00	924.33	1435.59	564.09	10.11	998.50	1008.87	1005.95	1009.00	0.000304	2.24	4.45	1.86	1.73	0.25
Main	8997.774	3116 cfs	3116.00	934.00	1568.11	613.89	10.42	998.50	1009.18	1006.14	1009.30	0.000283	2.21	4.36	1.87	1.72	0.24
Main	8997.774	3400 cfs	3400.00	962.18	1753.27	684.54	10.79	998.50	1009.54	1006.36	1009.66	0.000270	2.21	4.34	1.91	1.73	0.23
Main	8997.774	3881 cfs 0.25 PM	3881.00	1021.89	2057.26	801.85	11.29	998.50	1010.04	1006.63	1010.16	0.000264	2.27	4.41	1.99	1.79	0.23
Main	8997.774	4188 cfs	4188.00	1060.13	2250.67	877.20	11.59	998.50	1010.34	1006.78	1010.46	0.000262	2.31	4.45	2.05	1.83	0.23
Main	8997.774	11457 cfs 0.5 PM	11457.00	1892.82	6831.96	2732.22	16.70	998.50	1015.45	1009.13	1015.63	0.000260	3.04	5.51	2.91	2.53	0.24
Main	8997.774	13000 cfs	13000.00	2068.57	7765.90	3165.53	17.35	998.50	1016.10		1016.30	0.000274	3.21	5.80	3.09	2.70	0.25
Main	8997.774	15000 cfs	15000.00	2300.94	8958.63	3740.43	18.02	998.50	1016.77		1017.00	0.000300	3.46	6.21	3.33	2.93	0.26
Main	8997.774	24229 cfs -24hr	24229.00	3293.86	14383.91	6551.24	20.55	998.50	1019.30		1019.66	0.000403	4.41	7.80	4.24	3.89	0.30
Main	8997.774	31970 cfs - 6hr	31970.00	4059.85	18856.49	9053.66	22.25	998.50	1021.00		1021.46	0.000474	5.03	8.88	4.85	4.51	0.33
Main	8889.001	1289 cfs	1289.00	688.35	361.93	238.72	7.66	997.80	1005.80		1005.99	0.000339	2.31	4.44	1.28	1.99	0.28
Main	8889.001	1980 cfs 100-yr	1980.00	847.11	796.35	336.54	8.61	997.80	1006.76		1006.95	0.000382	2.38	4.85	1.63	2.02	0.29
Main	8889.001	2650 cfs 500-yr	2650.00	938.69	1277.58	433.73	9.53	997.80	1007.68		1007.85	0.000344	2.37	4.86	1.83	1.92	0.28
Main	8889.001	2924 cfs	2924.00	831.62	1602.30	490.08	10.71	997.80	1008.86		1008.95	0.000190	1.93	3.83	1.63	1.55	0.21
Main	8889.001	3116 cfs	3116.00	843.83	1744.98	527.19	11.02	997.80	1009.17		1009.26	0.000179	1.92	3.78	1.65	1.54	0.20
Main	8889.001	3400 cfs	3400.00	873.22	1945.87	580.91	11.38	997.80	1009.53		1009.62	0.000174	1.94	3.79	1.70	1.56	0.20
Main	8889.001	3881 cfs 0.25 PM	3881.00	932.69	2277.34	670.97	11.88	997.80	1010.03		1010.12	0.000174	2.02	3.87	1.79	1.63	0.20
Main	8889.001	4188 cfs	4188.00	970.57	2488.45	728.98	12.18	997.80	1010.33		1010.42	0.000175	2.06	3.93	1.85	1.67	0.20
Main	8889.001	11457 cfs 0.5 PM	11457.00	1770.47	7471.49	2215.05	17.29	997.80	1015.44		1015.60	0.000190	2.87	5.05	2.76	2.36	0.21
Main	8889.001	13000 cfs	13000.00	1936.39	8484.98	2578.64	17.94	997.80	1016.09		1016.26	0.000202	3.04	5.32	2.94	2.52	0.22
Main	8889.001	15000 cfs	15000.00	2157.05	9790.67	3052.29	18.61	997.80	1016.76		1016.96	0.000223	3.29	5.72	3.18	2.76	0.23
Main	8889.001	24229 cfs -24hr	24229.00	3111.07	15759.89	5358.04	21.13	997.80	1019.28		1019.60	0.000308	4.25	7.26	4.12	3.71	0.28
Main	8889.001	31970 cfs - 6hr	31970.00	3852.67	20693.25	7424.07	22.82	997.80	1020.97		1021.40	0.000368	4.89	8.33	4.76	4.30	0.31
Main	8687.422	1289 cfs	1289.00	777.02	252.14	259.84	8.81	996.80	1005.71		1005.92	0.000160	2.23	4.42	0.84	2.59	0.26
Main	8687.422	1980 cfs 100-yr	1980.00	1005.12	609.96	364.92	9.73	996.80	1006.63		1006.87	0.000209	2.28	5.17	1.12	2.82	0.29

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	8687.422	2650 cfs 500-yr	2650.00	1123.59	1076.02	450.40	10.66	996.80	1007.57		1007.78	0.000206	2.22	5.28	1.34	2.58	0.28
Main	8687.422	2924 cfs	2924.00	1012.42	1433.30	478.28	11.89	996.80	1008.80		1008.91	0.000125	1.77	4.26	1.24	1.88	0.22
Main	8687.422	3116 cfs	3116.00	1031.58	1576.47	507.95	12.21	996.80	1009.11		1009.22	0.000121	1.76	4.23	1.26	1.84	0.21
Main	8687.422	3400 cfs	3400.00	1072.03	1775.40	552.57	12.57	996.80	1009.47		1009.58	0.000120	1.78	4.27	1.31	1.83	0.21
Main	8687.422	3881 cfs 0.25 PM	3881.00	1150.36	2101.56	629.08	13.07	996.80	1009.97		1010.09	0.000124	1.85	4.41	1.40	1.86	0.21
Main	8687.422	4188 cfs	4188.00	1199.61	2309.74	678.65	13.37	996.80	1010.27		1010.39	0.000127	1.89	4.49	1.46	1.89	0.22
Main	8687.422	11457 cfs 0.5 PM	11457.00	2194.18	7254.39	2008.43	18.49	996.80	1015.39		1015.56	0.000159	2.63	5.94	2.31	2.37	0.24
Main	8687.422	13000 cfs	13000.00	2399.55	8264.26	2336.19	19.13	996.80	1016.03		1016.22	0.000171	2.79	6.28	2.47	2.52	0.25
Main	8687.422	15000 cfs	15000.00	2672.92	9561.45	2765.63	19.79	996.80	1016.69		1016.91	0.000191	3.02	6.76	2.69	2.75	0.27
Main	8687.422	24229 cfs -24hr	24229.00	3849.66	15515.41	4863.93	22.29	996.80	1019.20		1019.55	0.000270	3.93	8.65	3.54	3.65	0.32
Main	8687.422	31970 cfs - 6hr	31970.00	4764.32	20464.95	6740.74	23.97	996.80	1020.87		1021.33	0.000328	4.55	9.95	4.13	4.24	0.36
Main	8449.557	1289 cfs	1289.00	684.72	373.18	231.10	9.84	995.80	1005.75		1005.85	0.000045	1.80	3.34	0.95	1.95	0.19
Main	8449.557	1980 cfs 100-yr	1980.00	931.55	716.07	332.38	10.75	995.80	1006.65		1006.80	0.000069	2.00	4.17	1.15	2.31	0.22
Main	8449.557	2650 cfs 500-yr	2650.00	1090.70	1150.12	409.18	11.66	995.80	1007.56		1007.72	0.000082	2.07	4.49	1.33	2.39	0.23
Main	8449.557	2924 cfs	2924.00	1033.75	1478.51	411.74	12.88	995.80	1008.78		1008.88	0.000060	1.75	3.86	1.24	1.93	0.19
Main	8449.557	3116 cfs	3116.00	1064.53	1621.42	430.06	13.19	995.80	1009.09		1009.19	0.000060	1.76	3.88	1.27	1.92	0.19
Main	8449.557	3400 cfs	3400.00	1118.64	1822.17	459.19	13.55	995.80	1009.45		1009.56	0.000062	1.80	3.97	1.33	1.93	0.19
Main	8449.557	3881 cfs 0.25 PM	3881.00	1216.72	2154.14	510.14	14.05	995.80	1009.95		1010.06	0.000066	1.89	4.16	1.43	1.99	0.20
Main	8449.557	4188 cfs	4188.00	1278.15	2367.57	542.27	14.35	995.80	1010.25		1010.36	0.000069	1.94	4.28	1.49	2.02	0.20
Main	8449.557	11457 cfs 0.5 PM	11457.00	2492.99	7522.19	1441.82	19.42	995.80	1015.32		1015.53	0.000110	2.85	6.17	2.49	2.43	0.25
Main	8449.557	13000 cfs	13000.00	2736.64	8582.00	1681.36	20.06	995.80	1015.96		1016.19	0.000121	3.03	6.56	2.67	2.57	0.26
Main	8449.557	15000 cfs	15000.00	3057.28	9943.06	1999.66	20.71	995.80	1016.61		1016.87	0.000137	3.29	7.09	2.91	2.79	0.27
Main	8449.557	24229 cfs -24hr	24229.00	4422.21	16141.14	3665.65	23.16	995.80	1019.06		1019.49	0.000200	4.28	9.18	3.85	3.75	0.34
Main	8449.557	31970 cfs - 6hr	31970.00	5479.77	21286.57	5203.66	24.80	995.80	1020.70		1021.25	0.000245	4.96	10.62	4.49	4.35	0.38
Main	8190.037	1289 cfs	1289.00	535.82	363.34	389.84	10.89	994.80	1005.79	998.17	1005.82	0.000004	1.16	1.61	0.87	1.10	0.09
Main	8190.037	1980 cfs 100-yr	1980.00	782.89	572.44	624.67	11.80	994.80	1006.70	999.13	1006.75	0.000008	1.51	2.17	1.07	1.52	0.11
Main	8190.037	2650 cfs 500-yr	2650.00	996.08	796.09	857.83	12.71	994.80	1007.61	999.85	1007.67	0.000010	1.72	2.56	1.17	1.82	0.13
Main	8190.037	2924 cfs	2924.00	1022.11	944.12	957.76	13.90	994.80	1008.80	1000.20	1008.85	0.000009	1.54	2.40	1.03	1.72	0.11
Main	8190.037	3116 cfs	3116.00	1067.11	1029.33	1019.56	14.21	994.80	1009.11	1000.34	1009.16	0.000009	1.56	2.45	1.05	1.76	0.11
Main	8190.037	3400 cfs	3400.00	1137.84	1151.31	1110.85	14.57	994.80	1009.47	1000.55	1009.53	0.000010	1.61	2.55	1.09	1.83	0.12
Main	8190.037	3881 cfs 0.25 PM	3881.00	1260.04	1355.83	1265.13	15.07	994.80	1009.97	1000.88	1010.03	0.000012	1.71	2.73	1.17	1.96	0.12
Main	8190.037	4188 cfs	4188.00	1336.90	1488.77	1362.33	15.36	994.80	1010.26	1001.09	1010.33	0.000013	1.78	2.84	1.22	2.04	0.13
Main	8190.037	11457 cfs 0.5 PM	11457.00	2840.64	4765.14	3851.22	20.43	994.80	1015.33	1005.00	1015.48	0.000030	2.66	4.54	2.05	2.83	0.18
Main	8190.037	13000 cfs	13000.00	3140.32	5455.17	4404.51	21.07	994.80	1015.97	1005.51	1016.14	0.000034	2.83	4.86	2.21	2.98	0.19
Main	8190.037	15000 cfs	15000.00	3533.21	6342.71	5124.09	21.72	994.80	1016.62	1005.93	1016.82	0.000039	3.07	5.31	2.43	3.20	0.20
Main	8190.037	24229 cfs -24hr	24229.00	5129.73	10250.81	8848.47	24.20	994.80	1019.10	1009.07	1019.40	0.000065	3.71	6.92	3.20	3.41	0.25
Main	8190.037	31970 cfs - 6hr	31970.00	6357.94	13474.48	12137.58	25.86	994.80	1020.76	1010.62	1021.14	0.000086	4.21	8.02	3.73	3.82	0.28
Main	7947.906	1289 cfs	1289.00	171.45	614.54	503.01	11.90	993.80	1005.81		1005.81	0.000004	0.43	0.47	0.43	0.42	0.02
Main	7947.906	1980 cfs 100-yr	1980.00	259.23	947.51	773.26	12.83	993.80	1006.73		1006.73	0.000006	0.61	0.66	0.60	0.60	0.03
Main	7947.906	2650 cfs 500-yr	2650.00	342.18	1272.45	1035.37	13.74	993.80	1007.64		1007.65	0.000009	0.75	0.81	0.74	0.73	0.04
Main	7947.906	2924 cfs	2924.00	372.10	1407.81	1144.09	14.93	993.80	1008.83		1008.84	0.000008	0.75	0.82	0.74	0.73	0.04
Main	7947.906	3116 cfs	3116.00	394.93	1502.19	1218.88	15.24	993.80	1009.14		1009.15	0.000008	0.78	0.85	0.77	0.76	0.04
Main	7947.906	3400 cfs	3400.00	428.93	1641.66	1329.42	15.60	993.80	1009.50		1009.51	0.000009	0.82	0.90	0.81	0.81	0.04
Main	7947.906	3881 cfs 0.25 PM	3881.00	486.30	1879.08	1515.62	16.10	993.80	1010.00		1010.01	0.000010	0.90	0.99	0.89	0.89	0.04
Main	7947.906	4188 cfs	4188.00	522.63	2031.22	1634.15	16.40	993.80	1010.30		1010.31	0.000011	0.95	1.04	0.94	0.93	0.05
Main	7947.906	11457 cfs 0.5 PM	11457.00	1336.16	5680.01	4440.83	21.49	993.80	1015.40		1015.45	0.000029	1.80	2.03	1.79	1.75	0.08
Main	7947.906	13000 cfs	13000.00	1504.98	6458.68	5036.34	22.14	993.80	1016.04		1016.10	0.000033	1.96	2.22	1.95	1.91	0.08
Main	7947.906	15000 cfs	15000.00	1724.03	7467.74	5808.24	22.80	993.80	1016.70		1016.77	0.000039	2.18	2.47	2.16	2.12	0.09
Main	7947.906	24229 cfs -24hr	24229.00	2716.68	12146.50	9365.82	25.29	993.80	1019.19		1019.34	0.000068	3.07	3.51	3.06	2.98	0.12
Main	7947.906	31970 cfs - 6hr	31970.00	3532.98	16091.31	12345.71	26.95	993.80	1020.85		1021.07	0.000093	3.73	4.29	3.72	3.61	0.15
Main	7696.011	1289 cfs	1289.00	420.49	573.82	294.70	12.04	993.50	1005.79		1005.81	0.000008	0.76	1.16	0.86	0.44	0.06
Main	7696.011	1980 cfs 100-yr	1980.00	626.14	890.97	462.89	12.96	993.50	1006.71		1006.73	0.000014	1.05	1.60	1.19	0.62	0.08
Main	7696.011	2650 cfs 500-yr	2650.00	815.16	1203.67	631.16	13.86	993.50	1007.61		1007.64	0.000019	1.27	1.95	1.43	0.76	0.09
Main	7696.011	2924 cfs	2924.00	868.47	1346.19	709.34	15.05	993.50	1008.80		1008.83	0.000016	1.24	1.91	1.39	0.75	0.09
Main	7696.011	3116 cfs	3116.00	917.64	1439.28	759.08	15.36	993.50	1009.11		1009.14	0.000017	1.28	1.98	1.44	0.78	0.09
Main	7696.011	3400 cfs	3400.00	991.64	1576.30	832.06	15.72	993.50	1009.47		1009.51	0.000018	1.35	2.09	1.52	0.82	0.09

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	7696.011	3881 cfs 0.25 PM	3881.00	1117.32	1808.40	955.28	16.21	993.50	1009.96		1010.01	0.000021	1.47	2.29	1.65	0.90	0.10
Main	7696.011	4188 cfs	4188.00	1196.56	1957.45	1033.99	16.50	993.50	1010.25		1010.30	0.000023	1.54	2.40	1.73	0.95	0.10
Main	7696.011	11457 cfs 0.5 PM	11457.00	2900.72	5537.90	3018.38	21.52	993.50	1015.27		1015.43	0.000059	2.74	4.47	3.04	1.77	0.17
Main	7696.011	13000 cfs	13000.00	3246.75	6294.19	3459.07	22.14	993.50	1015.89		1016.08	0.000068	2.97	4.86	3.29	1.93	0.18
Main	7696.011	15000 cfs	15000.00	3697.05	7273.08	4029.87	22.77	993.50	1016.52		1016.75	0.000080	3.29	5.39	3.63	2.15	0.20
Main	7696.011	24229 cfs -24hr	24229.00	5710.79	11795.83	6722.39	25.10	993.50	1018.85		1019.29	0.000140	4.57	7.55	5.02	3.06	0.27
Main	7696.011	31970 cfs - 6hr	31970.00	7345.50	15594.50	9030.01	26.62	993.50	1020.37		1021.01	0.000192	5.53	9.15	6.05	3.76	0.31
Main	7360.720	1289 cfs	1289.00	348.12	528.39	412.50	12.89	992.80	1005.79		1005.80	0.000004	0.75	0.90	0.69	0.73	0.04
Main	7360.720	1980 cfs 100-yr	1980.00	518.93	828.24	632.83	13.81	992.80	1006.71		1006.72	0.000007	1.05	1.25	0.97	1.02	0.06
Main	7360.720	2650 cfs 500-yr	2650.00	676.64	1127.44	845.92	14.71	992.80	1007.61		1007.64	0.000010	1.28	1.53	1.19	1.24	0.07
Main	7360.720	2924 cfs	2924.00	724.53	1267.51	931.97	15.90	992.80	1008.80		1008.83	0.000009	1.27	1.52	1.19	1.22	0.07
Main	7360.720	3116 cfs	3116.00	766.64	1356.59	992.78	16.21	992.80	1009.11		1009.14	0.000009	1.32	1.58	1.24	1.27	0.07
Main	7360.720	3400 cfs	3400.00	829.88	1487.35	1082.77	16.57	992.80	1009.47		1009.50	0.000010	1.40	1.67	1.31	1.34	0.07
Main	7360.720	3881 cfs 0.25 PM	3881.00	937.47	1708.34	1235.19	17.06	992.80	1009.96		1010.00	0.000011	1.53	1.83	1.44	1.47	0.08
Main	7360.720	4188 cfs	4188.00	1005.70	1849.53	1332.77	17.35	992.80	1010.25		1010.29	0.000012	1.61	1.93	1.52	1.54	0.08
Main	7360.720	11457 cfs 0.5 PM	11457.00	2510.06	5304.44	3642.51	22.36	992.80	1015.26		1015.40	0.000033	3.02	3.74	2.91	2.79	0.14
Main	7360.720	13000 cfs	13000.00	2816.20	6042.44	4141.36	22.98	992.80	1015.88		1016.05	0.000038	3.27	4.08	3.17	3.01	0.15
Main	7360.720	15000 cfs	15000.00	3213.59	6997.14	4789.27	23.60	992.80	1016.50		1016.71	0.000046	3.61	4.54	3.51	3.30	0.16
Main	7360.720	24229 cfs -24hr	24229.00	4989.26	11418.88	7820.86	25.93	992.80	1018.83		1019.23	0.000081	5.00	6.41	4.93	4.46	0.22
Main	7360.720	31970 cfs - 6hr	31970.00	6424.21	15130.49	10415.29	27.43	992.80	1020.33		1020.93	0.000110	6.01	7.80	5.97	5.30	0.26
Main	7059.152	1289 cfs	1289.00	274.47	560.67	453.86	13.90	991.80	1005.80		1005.80	0.000003	0.51	0.66	0.50	0.46	0.03
Main	7059.152	1980 cfs 100-yr	1980.00	407.18	867.71	705.11	14.81	991.80	1006.71		1006.72	0.000006	0.71	0.91	0.64	0.64	0.04
Main	7059.152	2650 cfs 500-yr	2650.00	528.68	1168.63	952.69	15.72	991.80	1007.62		1007.63	0.000009	0.88	1.12	0.87	0.79	0.05
Main	7059.152	2924 cfs	2924.00	563.51	1298.07	1062.42	16.91	991.80	1008.81		1008.82	0.000008	0.87	1.11	0.87	0.78	0.05
Main	7059.152	3116 cfs	3116.00	595.48	1385.80	1134.71	17.22	991.80	1009.12		1009.13	0.000008	0.90	1.15	0.90	0.81	0.05
Main	7059.152	3400 cfs	3400.00	643.64	1515.24	1241.12	17.57	991.80	1009.48		1009.49	0.000009	0.95	1.22	0.96	0.85	0.05
Main	7059.152	3881 cfs 0.25 PM	3881.00	725.63	1734.29	1421.08	18.07	991.80	1009.97		1009.99	0.000010	1.05	1.33	1.05	0.94	0.06
Main	7059.152	4188 cfs	4188.00	777.53	1874.33	1536.14	18.36	991.80	1010.26		1010.28	0.000011	1.10	1.40	1.11	0.99	0.06
Main	7059.152	11457 cfs 0.5 PM	11457.00	1918.11	5261.33	4277.56	23.40	991.80	1015.30		1015.37	0.000032	2.07	2.72	2.12	1.83	0.10
Main	7059.152	13000 cfs	13000.00	2150.82	5979.56	4869.61	24.03	991.80	1015.93		1016.01	0.000037	2.25	2.97	2.31	1.98	0.11
Main	7059.152	15000 cfs	15000.00	2452.92	6908.76	5638.33	24.67	991.80	1016.57		1016.67	0.000044	2.49	3.30	2.57	2.18	0.12
Main	7059.152	24229 cfs -24hr	24229.00	3800.65	11185.93	9242.42	27.05	991.80	1018.95		1019.15	0.000079	3.45	4.66	3.62	2.96	0.16
Main	7059.152	31970 cfs - 6hr	31970.00	4886.32	14749.83	12333.86	28.62	991.80	1020.52		1020.80	0.000108	4.13	5.67	4.39	3.51	0.19
Main	6933.617	1289 cfs	1289.00	658.62	385.47	244.90	18.99	986.80	1005.80	989.23	1005.80		0.42	0.69	0.29	0.30	0.03
Main	6933.617	1980 cfs 100-yr	1980.00	983.71	608.27	388.02	19.91	986.80	1006.71	989.96	1006.72		0.59	0.99	0.42	0.43	0.04
Main	6933.617	2650 cfs 500-yr	2650.00	1274.93	846.03	529.04	20.81	986.80	1007.61	990.54	1007.63		0.73	1.23	0.53	0.54	0.05
Main	6933.617	2924 cfs	2924.00	1351.11	978.61	594.28	22.00	986.80	1008.80	990.76	1008.82		0.73	1.23	0.55	0.55	0.05
Main	6933.617	3116 cfs	3116.00	1425.32	1054.90	635.77	22.31	986.80	1009.11	990.91	1009.13		0.76	1.28	0.57	0.57	0.05
Main	6933.617	3400 cfs	3400.00	1537.13	1165.86	697.01	22.67	986.80	1009.47	991.11	1009.49		0.81	1.36	0.61	0.60	0.05
Main	6933.617	3881 cfs 0.25 PM	3881.00	1726.75	1353.29	800.96	23.17	986.80	1009.97	991.47	1009.99		0.89	1.49	0.68	0.66	0.05
Main	6933.617	4188 cfs	4188.00	1845.82	1474.32	867.86	23.46	986.80	1010.26	991.67	1010.28		0.93	1.57	0.72	0.69	0.06
Main	6933.617	11457 cfs 0.5 PM	11457.00	4369.64	4546.60	2540.76	28.49	986.80	1015.29	995.44	1015.37		1.78	3.07	1.51	1.26	0.10
Main	6933.617	13000 cfs	13000.00	4879.46	5211.72	2908.82	29.12	986.80	1015.92	996.07	1016.01		1.93	3.35	1.66	1.36	0.11
Main	6933.617	15000 cfs	15000.00	5543.16	6071.84	3385.01	29.75	986.80	1016.55	996.83	1016.66		2.14	3.73	1.86	1.49	0.12
Main	6933.617	24229 cfs -24hr	24229.00	8451.68	10084.04	5693.29	32.12	986.80	1018.92	999.72	1019.14		2.96	5.26	2.70	2.01	0.16
Main	6933.617	31970 cfs - 6hr	31970.00	10731.60	13459.02	7779.38	33.68	986.80	1020.48	1001.98	1020.79		3.54	6.37	3.31	2.38	0.19
Main	6926.12	Inl Struct															
Main	6918.617	1289 cfs	1289.00	915.17	241.85	131.98	5.65	986.80	992.45		992.57	0.000362	2.42	3.24	1.53	1.42	0.24
Main	6918.617	1980 cfs 100-yr	1980.00	1207.66	475.79	296.55	10.50	986.80	997.30		997.36	0.000086	1.57	2.30	1.06	1.05	0.13
Main	6918.617	2650 cfs 500-yr	2650.00	1288.66	835.41	525.94	20.51	986.80	1007.31		1007.32	0.000012	0.75	1.26	0.54	0.55	0.05
Main	6918.617	2924 cfs	2924.00	1354.75	975.79	593.46	21.93	986.80	1008.73		1008.74	0.000010	0.74	1.24	0.55	0.55	0.05
Main	6918.617	3116 cfs	3116.00	1429.08	1051.99	634.92	22.24	986.80	1009.04		1009.05	0.000011	0.77	1.29	0.57	0.57	0.05
Main	6918.617	3400 cfs	3400.00	1540.43	1163.40	696.16	22.61	986.80	1009.41		1009.43	0.000012	0.81	1.36	0.61	0.61	0.05
Main	6918.617	3881 cfs 0.25 PM	3881.00	1730.38	1350.68	799.94	23.10	986.80	1009.90		1009.92	0.000014	0.89	1.50	0.68	0.66	0.05
Main	6918.617	4188 cfs	4188.00	1849.67	1471.61	866.73	23.40	986.80	1010.20		1010.22	0.000015	0.94	1.58	0.72	0.70	0.06

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	6918.617	11457 cfs 0.5 PM	11457.00	4378.62	4541.86	2536.52	28.42	986.80	1015.22		1015.29	0.000045	1.78	3.08	1.52	1.26	0.10
Main	6918.617	13000 cfs	13000.00	4890.46	5206.18	2903.36	29.04	986.80	1015.84		1015.93	0.000052	1.94	3.37	1.67	1.37	0.11
Main	6918.617	15000 cfs	15000.00	5557.87	6064.23	3377.90	29.65	986.80	1016.45		1016.56	0.000063	2.15	3.75	1.87	1.50	0.12
Main	6918.617	24229 cfs -24hr	24229.00	8486.25	10071.12	5671.63	31.96	986.80	1018.76		1018.98	0.000115	2.99	5.31	2.72	2.03	0.17
Main	6918.617	31970 cfs - 6hr	31970.00	10790.30	13449.29	7730.42	33.48	986.80	1020.28		1020.60	0.000163	3.59	6.45	3.35	2.40	0.20
Main	6900.112	1289 cfs	1289.00	1272.96	6.70	9.34	5.38	986.80	992.20		992.54	0.000480	4.41	4.73	0.65	0.74	0.36
Main	6900.112	1980 cfs 100-yr	1980.00	1904.20	32.74	43.06	10.32	986.80	997.14		997.34	0.000122	3.11	3.69	0.57	0.68	0.20
Main	6900.112	2650 cfs 500-yr	2650.00	2271.56	257.81	120.63	20.43	986.80	1007.25		1007.32	0.000015	1.21	2.22	0.33	0.31	0.09
Main	6900.112	2924 cfs	2924.00	2395.77	355.53	172.70	21.85	986.80	1008.67		1008.73	0.000013	1.11	2.19	0.35	0.33	0.08
Main	6900.112	3116 cfs	3116.00	2524.96	397.52	193.52	22.16	986.80	1008.98		1009.04	0.000014	1.14	2.28	0.37	0.35	0.09
Main	6900.112	3400 cfs	3400.00	2718.61	457.83	223.56	22.53	986.80	1009.35		1009.42	0.000015	1.19	2.41	0.41	0.37	0.09
Main	6900.112	3881 cfs 0.25 PM	3881.00	3049.49	557.85	273.66	23.01	986.80	1009.83		1009.92	0.000017	1.28	2.65	0.46	0.41	0.10
Main	6900.112	4188 cfs	4188.00	3256.94	624.05	307.00	23.30	986.80	1010.12		1010.21	0.000019	1.34	2.80	0.49	0.44	0.10
Main	6900.112	11457 cfs 0.5 PM	11457.00	7587.90	2550.45	1318.65	28.15	986.80	1014.97		1015.27	0.000052	2.26	5.39	1.15	0.92	0.18
Main	6900.112	13000 cfs	13000.00	8464.88	2982.78	1552.34	28.72	986.80	1015.54		1015.90	0.000060	2.44	5.89	1.28	1.01	0.19
Main	6900.112	15000 cfs	15000.00	9612.67	3534.32	1853.01	29.27	986.80	1016.09		1016.53	0.000072	2.69	6.57	1.44	1.12	0.21
Main	6900.112	24229 cfs -24hr	24229.00	14683.81	6192.63	3352.56	31.24	986.80	1018.06		1018.91	0.000131	3.71	9.40	2.17	1.60	0.30
Main	6900.112	31970 cfs - 6hr	31970.00	18763.18	8488.28	4718.54	32.42	986.80	1019.24		1020.50	0.000184	4.48	11.58	2.73	1.96	0.36
Main	6858.315	1289 cfs	1289.00	1261.55	24.18	3.27	5.59	986.60	992.20		992.51	0.001224	4.06	4.51	0.79	0.44	0.34
Main	6858.315	1980 cfs 100-yr	1980.00	1825.87	118.12	36.01	10.54	986.60	997.15		997.32	0.000249	2.57	3.47	0.64	0.61	0.19
Main	6858.315	2650 cfs 500-yr	2650.00	1713.28	629.18	307.55	20.66	986.60	1007.28		1007.30	0.000019	0.86	1.66	0.49	0.41	0.06
Main	6858.315	2924 cfs	2924.00	1744.84	771.83	407.32	22.08	986.60	1008.70		1008.72	0.000016	0.81	1.58	0.49	0.43	0.06
Main	6858.315	3116 cfs	3116.00	1828.75	838.95	448.30	22.39	986.60	1009.01		1009.03	0.000017	0.84	1.63	0.52	0.45	0.06
Main	6858.315	3400 cfs	3400.00	1956.59	936.24	507.17	22.76	986.60	1009.38		1009.41	0.000018	0.88	1.72	0.55	0.49	0.06
Main	6858.315	3881 cfs 0.25 PM	3881.00	2177.71	1098.51	604.78	23.25	986.60	1009.87		1009.90	0.000021	0.95	1.87	0.61	0.54	0.07
Main	6858.315	4188 cfs	4188.00	2317.70	1204.59	665.72	23.54	986.60	1010.16		1010.19	0.000023	1.00	1.97	0.65	0.57	0.07
Main	6858.315	11457 cfs 0.5 PM	11457.00	5165.08	3948.07	2343.84	28.49	986.60	1015.10		1015.21	0.000059	1.79	3.63	1.38	1.11	0.12
Main	6858.315	13000 cfs	13000.00	5711.12	4521.15	2767.73	29.09	986.60	1015.70		1015.83	0.000068	1.94	3.93	1.51	1.24	0.13
Main	6858.315	15000 cfs	15000.00	6431.88	5260.79	3307.34	29.68	986.60	1016.29		1016.44	0.000081	2.15	4.34	1.68	1.40	0.14
Main	6858.315	24229 cfs -24hr	24229.00	9571.20	8712.65	5945.15	31.85	986.60	1018.46		1018.73	0.000142	2.99	6.01	2.42	2.05	0.19
Main	6858.315	31970 cfs - 6hr	31970.00	12042.46	11620.49	8307.05	33.23	986.60	1019.84		1020.23	0.000196	3.60	7.25	2.98	2.51	0.22
Main	6825.169	1289 cfs	1289.00	1251.63	19.29	18.08	4.96	986.50	991.84		992.44	0.002764	5.37	6.35	0.78	0.99	0.50
Main	6825.169	1980 cfs 100-yr	1980.00	1629.09	242.92	107.99	10.23	986.50	997.11		997.31	0.000333	2.43	4.01	0.89	0.78	0.22
Main	6825.169	2650 cfs 500-yr	2650.00	1288.29	797.59	564.13	20.41	986.50	1007.28		1007.30	0.000017	0.75	1.59	0.52	0.48	0.06
Main	6825.169	2924 cfs	2924.00	1312.65	940.94	670.41	21.83	986.50	1008.70		1008.72	0.000014	0.72	1.51	0.52	0.47	0.06
Main	6825.169	3116 cfs	3116.00	1376.30	1015.28	724.42	22.14	986.50	1009.01		1009.03	0.000015	0.74	1.56	0.55	0.49	0.06
Main	6825.169	3400 cfs	3400.00	1473.27	1123.60	803.13	22.51	986.50	1009.38		1009.40	0.000016	0.78	1.65	0.58	0.52	0.06
Main	6825.169	3881 cfs 0.25 PM	3881.00	1641.03	1304.97	935.00	23.00	986.50	1009.87		1009.90	0.000019	0.85	1.80	0.64	0.58	0.07
Main	6825.169	4188 cfs	4188.00	1748.86	1424.35	1014.79	23.29	986.50	1010.16		1010.19	0.000021	0.90	1.89	0.68	0.61	0.07
Main	6825.169	11457 cfs 0.5 PM	11457.00	3891.32	4322.12	3243.56	28.25	986.50	1015.12		1015.20	0.000053	1.65	3.47	1.40	1.18	0.11
Main	6825.169	13000 cfs	13000.00	4309.30	4923.34	3767.36	28.85	986.50	1015.72		1015.82	0.000060	1.79	3.76	1.53	1.30	0.12
Main	6825.169	15000 cfs	15000.00	4860.87	5700.63	4438.50	29.44	986.50	1016.31		1016.43	0.000072	1.99	4.16	1.71	1.47	0.13
Main	6825.169	24229 cfs -24hr	24229.00	7284.44	9307.29	7637.27	31.62	986.50	1018.50		1018.71	0.000129	2.83	5.80	2.47	2.16	0.18
Main	6825.169	31970 cfs - 6hr	31970.00	9221.67	12348.29	10400.04	33.01	986.50	1019.89		1020.20	0.000179	3.47	7.03	3.05	2.70	0.22
Main	6790.440	1289 cfs	1289.00	894.72	173.44	220.84	4.86	986.40	991.26	990.47	992.30	0.005520	7.41	9.21	4.65	5.59	0.74
Main	6790.440	1980 cfs 100-yr	1980.00	999.36	462.06	518.58	10.71	986.40	997.11		997.30	0.000346	2.40	4.67	1.46	1.76	0.25
Main	6790.440	2650 cfs 500-yr	2650.00	623.52	1111.88	914.61	20.89	986.40	1007.29		1007.30	0.000011	0.68	1.49	0.59	0.56	0.06
Main	6790.440	2924 cfs	2924.00	638.37	1266.30	1019.33	22.31	986.40	1008.71		1008.72	0.000009	0.65	1.43	0.59	0.54	0.05
Main	6790.440	3116 cfs	3116.00	670.01	1357.20	1088.80	22.61	986.40	1009.02		1009.03	0.000010	0.67	1.48	0.61	0.55	0.05
Main	6790.440	3400 cfs	3400.00	718.02	1490.29	1191.69	22.99	986.40	1009.39		1009.40	0.000010	0.71	1.56	0.65	0.58	0.06
Main	6790.440	3881 cfs 0.25 PM	3881.00	800.80	1713.87	1366.33	23.48	986.40	1009.88		1009.89	0.000012	0.77	1.71	0.71	0.64	0.06
Main	6790.440	4188 cfs	4188.00	852.66	1857.11	1478.23	23.77	986.40	1010.17		1010.19	0.000013	0.81	1.79	0.76	0.67	0.06
Main	6790.440	11457 cfs 0.5 PM	11457.00	1861.22	5132.35	4463.44	28.74	986.40	1015.14		1015.19	0.000034	1.53	3.24	1.45	1.32	0.11
Main	6790.440	13000 cfs	13000.00	2065.57	5823.80	5110.63	29.34	986.40	1015.74		1015.80	0.000040	1.67	3.52	1.59	1.45	0.11
Main	6790.440	15000 cfs	15000.00	2334.61	6720.04	5945.35	29.94	986.40	1016.34		1016.41	0.000048	1.86	3.90	1.77	1.62	0.13
Main	6790.440	24229 cfs -24hr	24229.00	3522.27	10856.59	9850.14	32.14	986.40	1018.54		1018.69	0.000087	2.66	5.48	2.53	2.36	0.17

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	6790.440	31970 cfs - 6hr	31970.00	4475.80	14327.47	13166.73	33.55	986.40	1019.95		1020.16	0.000122	3.27	6.67	3.12	2.92	0.20
Main	6768.254	1289 cfs	1289.00	946.94	205.10	136.96	4.19	986.10	990.39	990.39	992.11	0.007637	10.30	11.20	8.66	8.09	0.96
Main	6768.254	1980 cfs 100-yr	1980.00	955.63	635.94	388.43	10.90	986.10	997.10		997.29	0.000290	2.82	4.34	2.67	1.59	0.23
Main	6768.254	2650 cfs 500-yr	2650.00	450.07	1541.76	658.17	21.09	986.10	1007.29		1007.30	0.000009	0.66	1.06	0.79	0.40	0.04
Main	6768.254	2924 cfs	2924.00	462.54	1717.31	744.15	22.51	986.10	1008.71		1008.72	0.000008	0.63	1.02	0.76	0.38	0.04
Main	6768.254	3116 cfs	3116.00	485.57	1831.67	798.76	22.82	986.10	1009.02		1009.03	0.000008	0.65	1.05	0.79	0.40	0.04
Main	6768.254	3400 cfs	3400.00	520.57	2000.33	879.10	23.19	986.10	1009.39		1009.40	0.000009	0.69	1.11	0.83	0.42	0.04
Main	6768.254	3881 cfs 0.25 PM	3881.00	580.99	2285.25	1014.76	23.68	986.10	1009.88		1009.89	0.000011	0.75	1.22	0.91	0.46	0.04
Main	6768.254	4188 cfs	4188.00	618.05	2464.03	1105.92	23.97	986.10	1010.17		1010.19	0.000012	0.79	1.28	0.96	0.49	0.05
Main	6768.254	11457 cfs 0.5 PM	11457.00	1380.82	6597.79	3478.39	28.94	986.10	1015.14		1015.19	0.000031	1.49	2.36	1.80	1.01	0.08
Main	6768.254	13000 cfs	13000.00	1537.41	7472.02	3990.57	29.55	986.10	1015.75		1015.80	0.000036	1.63	2.58	1.97	1.11	0.08
Main	6768.254	15000 cfs	15000.00	1742.89	8606.31	4650.80	30.14	986.10	1016.34		1016.41	0.000043	1.82	2.87	2.19	1.25	0.09
Main	6768.254	24229 cfs -24hr	24229.00	2655.41	13822.57	7751.02	32.35	986.10	1018.55		1018.68	0.000079	2.60	4.07	3.13	1.83	0.13
Main	6768.254	31970 cfs - 6hr	31970.00	3392.21	18183.75	10394.04	33.76	986.10	1019.96		1020.16	0.000111	3.21	4.98	3.85	2.28	0.15
Main	6755.926	1289 cfs	1289.00	987.60	184.95	116.45	3.86	985.90	989.76	990.13	991.96	0.008971	11.53	12.67	8.91	8.86	1.14
Main	6755.926	1980 cfs 100-yr	1980.00	916.24	675.67	388.09	11.23	985.90	997.13		997.27	0.000160	2.06	4.04	1.45	1.45	0.21
Main	6755.926	2650 cfs 500-yr	2650.00	548.58	1303.70	797.72	21.39	985.90	1007.29		1007.30	0.000009	0.61	1.27	0.59	0.47	0.05
Main	6755.926	2924 cfs	2924.00	567.18	1440.99	915.83	22.81	985.90	1008.71		1008.72	0.000008	0.59	1.23	0.58	0.46	0.05
Main	6755.926	3116 cfs	3116.00	596.11	1534.85	985.04	23.12	985.90	1009.02		1009.03	0.000009	0.61	1.28	0.60	0.47	0.05
Main	6755.926	3400 cfs	3400.00	639.92	1673.48	1086.60	23.49	985.90	1009.39		1009.40	0.000009	0.64	1.35	0.63	0.50	0.05
Main	6755.926	3881 cfs 0.25 PM	3881.00	715.83	1909.28	1255.89	23.98	985.90	1009.88		1009.89	0.000011	0.70	1.48	0.69	0.55	0.05
Main	6755.926	4188 cfs	4188.00	761.66	2055.41	1370.92	24.27	985.90	1010.17		1010.19	0.000012	0.74	1.56	0.73	0.58	0.06
Main	6755.926	11457 cfs 0.5 PM	11457.00	1703.49	5404.55	4348.96	29.24	985.90	1015.14		1015.18	0.000033	1.42	2.89	1.37	1.22	0.09
Main	6755.926	13000 cfs	13000.00	1896.62	6110.87	4992.51	29.85	985.90	1015.75		1015.80	0.000038	1.55	3.15	1.50	1.35	0.10
Main	6755.926	15000 cfs	15000.00	2150.00	7028.11	5821.89	30.44	985.90	1016.34		1016.41	0.000046	1.73	3.50	1.67	1.51	0.11
Main	6755.926	24229 cfs -24hr	24229.00	3274.88	11233.47	9720.66	32.65	985.90	1018.55		1018.68	0.000085	2.49	4.97	2.39	2.22	0.15
Main	6755.926	31970 cfs - 6hr	31970.00	4182.77	14738.97	13048.26	34.06	985.90	1019.97		1020.15	0.000120	3.06	6.08	2.93	2.76	0.18
Main	6737.893	1289 cfs	1289.00	940.31	240.91	107.78	3.28	985.70	989.12	990.13	991.69	0.013349	11.83	14.21	7.86	8.89	1.38
Main	6737.893	1980 cfs 100-yr	1980.00	591.79	1038.10	350.11	11.36	985.70	997.19		997.24	0.000111	1.38	2.58	1.22	0.99	0.14
Main	6737.893	2650 cfs 500-yr	2650.00	460.01	1463.00	726.98	21.45	985.70	1007.29		1007.30	0.000009	0.54	1.06	0.56	0.40	0.04
Main	6737.893	2924 cfs	2924.00	482.65	1600.94	840.41	22.87	985.70	1008.71		1008.72	0.000008	0.53	1.05	0.55	0.39	0.04
Main	6737.893	3116 cfs	3116.00	507.30	1697.30	911.40	23.18	985.70	1009.02		1009.03	0.000008	0.55	1.08	0.57	0.41	0.04
Main	6737.893	3400 cfs	3400.00	544.64	1841.14	1014.23	23.55	985.70	1009.39		1009.40	0.000009	0.58	1.15	0.60	0.44	0.04
Main	6737.893	3881 cfs 0.25 PM	3881.00	608.93	2086.46	1185.61	24.05	985.70	1009.88		1009.89	0.000011	0.64	1.25	0.66	0.49	0.05
Main	6737.893	4188 cfs	4188.00	649.07	2243.18	1295.75	24.34	985.70	1010.17		1010.18	0.000012	0.67	1.32	0.70	0.52	0.05
Main	6737.893	11457 cfs 0.5 PM	11457.00	1488.64	5905.68	4062.69	29.31	985.70	1015.15		1015.18	0.000036	1.32	2.52	1.36	1.10	0.08
Main	6737.893	13000 cfs	13000.00	1661.10	6678.39	4660.51	29.92	985.70	1015.75		1015.80	0.000042	1.45	2.75	1.49	1.21	0.09
Main	6737.893	15000 cfs	15000.00	1886.90	7681.73	5431.37	30.51	985.70	1016.35		1016.40	0.000051	1.62	3.06	1.66	1.36	0.10
Main	6737.893	24229 cfs -24hr	24229.00	2893.54	12282.39	9053.07	32.73	985.70	1018.57		1018.67	0.000097	2.35	4.38	2.39	2.00	0.13
Main	6737.893	31970 cfs - 6hr	31970.00	3709.33	16117.37	12143.30	34.15	985.70	1019.98		1020.14	0.000140	2.90	5.38	2.95	2.49	0.16
Main	6692.140	1289 cfs	1289.00	718.53	357.07	213.39	4.38	985.60	990.20	989.30	990.81	0.001342	4.50	7.91	2.47	4.17	0.67
Main	6692.140	1980 cfs 100-yr	1980.00	633.06	642.84	704.10	11.36	985.60	997.19		997.23	0.000059	1.12	2.68	0.71	1.13	0.14
Main	6692.140	2650 cfs 500-yr	2650.00	544.30	815.20	1290.50	21.46	985.60	1007.29		1007.30	0.000007	0.50	1.22	0.31	0.57	0.05
Main	6692.140	2924 cfs	2924.00	576.83	889.09	1458.08	22.88	985.60	1008.71		1008.72	0.000006	0.50	1.21	0.31	0.58	0.04
Main	6692.140	3116 cfs	3116.00	608.93	948.55	1558.53	23.19	985.60	1009.02		1009.02	0.000006	0.52	1.27	0.32	0.61	0.05
Main	6692.140	3400 cfs	3400.00	657.01	1036.93	1706.06	23.56	985.60	1009.39		1009.40	0.000007	0.55	1.34	0.34	0.65	0.05
Main	6692.140	3881 cfs 0.25 PM	3881.00	739.44	1186.38	1955.18	24.05	985.60	1009.88		1009.89	0.000008	0.61	1.48	0.38	0.72	0.05
Main	6692.140	4188 cfs	4188.00	791.54	1281.90	2114.55	24.35	985.60	1010.17		1010.18	0.000009	0.65	1.57	0.40	0.76	0.06
Main	6692.140	11457 cfs 0.5 PM	11457.00	1947.36	3565.79	5943.85	29.30	985.60	1015.13		1015.18	0.000031	1.35	3.20	0.84	1.63	0.10
Main	6692.140	13000 cfs	13000.00	2188.02	4052.07	6759.91	29.90	985.60	1015.73		1015.79	0.000036	1.49	3.53	0.93	1.80	0.11
Main	6692.140	15000 cfs	15000.00	2501.69	4681.94	7816.37	30.49	985.60	1016.32		1016.40	0.000044	1.67	3.95	1.04	2.02	0.13
Main	6692.140	24229 cfs -24hr	24229.00	3921.80	7596.78	12710.41	32.66	985.60	1018.49		1018.66	0.000086	2.45	5.79	1.54	2.99	0.18
Main	6692.140	31970 cfs - 6hr	31970.00	5091.22	10048.49	16830.29	34.04	985.60	1019.86		1020.12	0.000123	3.06	7.21	1.92	3.74	0.22
Main	6564.443	1289 cfs	1289.00	577.03	161.31	550.66	6.21	984.00	990.36		990.52	0.000352	2.15	4.42	1.04	1.75	0.31
Main	6564.443	1980 cfs 100-yr	1980.00	450.59	226.03	1303.39	13.05	984.00	997.20		997.22	0.000029	0.85	1.64	0.36	0.91	0.08

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	6564.443	2650 cfs 500-yr	2650.00	422.89	346.33	1880.79	23.14	984.00	1007.29		1007.29	0.000004	0.42	0.87	0.20	0.47	0.03
Main	6564.443	2924 cfs	2924.00	444.93	379.30	2099.77	24.56	984.00	1008.71		1008.71	0.000004	0.42	0.86	0.20	0.46	0.03
Main	6564.443	3116 cfs	3116.00	469.53	403.56	2242.91	24.87	984.00	1009.02		1009.02	0.000004	0.44	0.90	0.20	0.48	0.03
Main	6564.443	3400 cfs	3400.00	506.43	439.50	2454.07	25.24	984.00	1009.39		1009.40	0.000005	0.47	0.95	0.22	0.51	0.03
Main	6564.443	3881 cfs 0.25 PM	3881.00	569.56	500.40	2811.03	25.73	984.00	1009.88		1009.89	0.000006	0.51	1.05	0.24	0.57	0.04
Main	6564.443	4188 cfs	4188.00	609.86	539.61	3038.53	26.02	984.00	1010.17		1010.18	0.000006	0.54	1.11	0.26	0.60	0.04
Main	6564.443	11457 cfs 0.5 PM	11457.00	1489.68	1460.48	8506.85	30.99	984.00	1015.14		1015.17	0.000022	1.09	2.28	0.53	1.20	0.07
Main	6564.443	13000 cfs	13000.00	1668.81	1653.92	9677.27	31.59	984.00	1015.75		1015.78	0.000026	1.20	2.51	0.58	1.31	0.08
Main	6564.443	15000 cfs	15000.00	1904.02	1906.63	11189.35	32.19	984.00	1016.34		1016.38	0.000032	1.33	2.81	0.65	1.46	0.09
Main	6564.443	24229 cfs -24hr	24229.00	2943.24	3056.98	18228.78	34.39	984.00	1018.54		1018.62	0.000064	1.91	4.07	0.95	2.09	0.12
Main	6564.443	31970 cfs - 6hr	31970.00	3747.56	3982.23	24240.21	35.79	984.00	1019.94		1020.07	0.000093	2.35	4.98	1.16	2.57	0.15
Main	6469.916	1289 cfs	1289.00	426.59	119.69	742.72	7.60	982.80	990.40		990.46	0.000182	1.35	2.79	0.74	1.16	0.18
Main	6469.916	1980 cfs 100-yr	1980.00	412.58	188.03	1379.39	14.40	982.80	997.20		997.21	0.000021	0.70	1.42	0.37	0.69	0.07
Main	6469.916	2650 cfs 500-yr	2650.00	405.47	241.73	2002.80	24.49	982.80	1007.29		1007.29	0.000004	0.42	0.82	0.21	0.43	0.03
Main	6469.916	2924 cfs	2924.00	434.83	265.84	2223.34	25.91	982.80	1008.71		1008.71	0.000003	0.43	0.83	0.21	0.44	0.03
Main	6469.916	3116 cfs	3116.00	460.74	283.15	2372.11	26.22	982.80	1009.02		1009.02	0.000004	0.45	0.87	0.22	0.46	0.03
Main	6469.916	3400 cfs	3400.00	499.40	308.80	2591.80	26.59	982.80	1009.39		1009.40	0.000004	0.48	0.93	0.23	0.49	0.03
Main	6469.916	3881 cfs 0.25 PM	3881.00	565.26	352.25	2963.49	27.08	982.80	1009.88		1009.89	0.000005	0.53	1.04	0.26	0.55	0.04
Main	6469.916	4188 cfs	4188.00	607.05	379.94	3201.02	27.37	982.80	1010.17		1010.18	0.000005	0.57	1.10	0.27	0.59	0.04
Main	6469.916	11457 cfs 0.5 PM	11457.00	1554.26	1041.47	8861.27	32.33	982.80	1015.13		1015.17	0.000021	1.24	2.39	0.58	1.30	0.07
Main	6469.916	13000 cfs	13000.00	1752.30	1183.15	10064.55	32.93	982.80	1015.74		1015.78	0.000025	1.37	2.64	0.64	1.44	0.08
Main	6469.916	15000 cfs	15000.00	2009.87	1366.20	11623.93	33.53	982.80	1016.33		1016.38	0.000031	1.54	2.98	0.72	1.63	0.09
Main	6469.916	24229 cfs -24hr	24229.00	3183.06	2211.98	18833.96	35.70	982.80	1018.50		1018.62	0.000063	2.30	4.43	1.05	2.44	0.13
Main	6469.916	31970 cfs - 6hr	31970.00	4154.30	2924.65	24891.05	37.08	982.80	1019.88		1020.06	0.000095	2.89	5.56	1.31	3.07	0.16
Main	6368.388	1289 cfs	1289.00	468.03	23.40	797.56	7.72	982.60	990.39		990.44	0.000146	1.25	2.43	0.44	1.01	0.15
Main	6368.388	1980 cfs 100-yr	1980.00	464.29	39.12	1476.59	14.53	982.60	997.20		997.21	0.000018	0.68	1.28	0.22	0.62	0.06
Main	6368.388	2650 cfs 500-yr	2650.00	461.89	62.99	2125.12	24.61	982.60	1007.29		1007.29	0.000003	0.41	0.75	0.12	0.40	0.03
Main	6368.388	2924 cfs	2924.00	497.25	71.82	2354.93	26.03	982.60	1008.71		1008.71	0.000003	0.42	0.77	0.12	0.41	0.03
Main	6368.388	3116 cfs	3116.00	527.28	77.14	2511.58	26.34	982.60	1009.02		1009.02	0.000003	0.44	0.80	0.13	0.43	0.03
Main	6368.388	3400 cfs	3400.00	572.02	84.96	2743.02	26.71	982.60	1009.39		1009.39	0.000004	0.47	0.86	0.14	0.46	0.03
Main	6368.388	3881 cfs 0.25 PM	3881.00	648.15	98.23	3134.62	27.21	982.60	1009.88		1009.89	0.000004	0.53	0.96	0.15	0.52	0.03
Main	6368.388	4188 cfs	4188.00	696.47	106.85	3384.68	27.50	982.60	1010.17		1010.18	0.000005	0.56	1.02	0.16	0.55	0.03
Main	6368.388	11457 cfs 0.5 PM	11457.00	1796.36	338.09	9322.55	32.46	982.60	1015.13		1015.16	0.000019	1.23	2.22	0.36	1.23	0.07
Main	6368.388	13000 cfs	13000.00	2026.56	390.46	10582.99	33.06	982.60	1015.73		1015.77	0.000023	1.36	2.46	0.39	1.36	0.08
Main	6368.388	15000 cfs	15000.00	2325.62	458.71	12215.66	33.65	982.60	1016.33		1016.37	0.000028	1.53	2.77	0.44	1.54	0.08
Main	6368.388	24229 cfs -24hr	24229.00	3688.02	792.89	19748.09	35.83	982.60	1018.50		1018.61	0.000058	2.27	4.13	0.67	2.30	0.12
Main	6368.388	31970 cfs - 6hr	31970.00	4816.09	1091.34	26062.58	37.20	982.60	1019.88		1020.05	0.000087	2.86	5.19	0.84	2.91	0.15
Main	6261.580	1289 cfs	1289.00	397.49	39.10	852.41	8.14	982.25	990.39		990.42	0.000163	1.19	2.33	0.74	0.99	0.14
Main	6261.580	1980 cfs 100-yr	1980.00	398.43	62.84	1518.73	14.95	982.25	997.20		997.21	0.000020	0.66	1.27	0.31	0.61	0.06
Main	6261.580	2650 cfs 500-yr	2650.00	392.56	98.20	2159.24	25.04	982.25	1007.29		1007.29	0.000003	0.41	0.75	0.16	0.40	0.03
Main	6261.580	2924 cfs	2924.00	422.36	110.99	2390.65	26.46	982.25	1008.71		1008.71	0.000003	0.42	0.76	0.17	0.41	0.03
Main	6261.580	3116 cfs	3116.00	447.82	118.90	2549.27	26.77	982.25	1009.02		1009.02	0.000004	0.44	0.80	0.17	0.43	0.03
Main	6261.580	3400 cfs	3400.00	485.75	130.57	2783.68	27.14	982.25	1009.39		1009.39	0.000004	0.47	0.85	0.18	0.46	0.03
Main	6261.580	3881 cfs 0.25 PM	3881.00	550.32	150.29	3180.39	27.63	982.25	1009.88		1009.89	0.000005	0.52	0.95	0.20	0.52	0.03
Main	6261.580	4188 cfs	4188.00	591.29	163.01	3433.70	27.92	982.25	1010.17		1010.18	0.000005	0.55	1.01	0.22	0.55	0.03
Main	6261.580	11457 cfs 0.5 PM	11457.00	1523.89	485.28	9447.83	32.88	982.25	1015.13		1015.16	0.000021	1.22	2.21	0.47	1.23	0.07
Main	6261.580	13000 cfs	13000.00	1719.10	556.17	10724.73	33.48	982.25	1015.73		1015.77	0.000025	1.35	2.44	0.52	1.36	0.07
Main	6261.580	15000 cfs	15000.00	1972.79	647.99	12379.22	34.07	982.25	1016.32		1016.37	0.000031	1.52	2.76	0.58	1.54	0.08
Main	6261.580	24229 cfs -24hr	24229.00	3128.97	1084.13	20015.91	36.25	982.25	1018.50		1018.60	0.000064	2.27	4.11	0.86	2.31	0.12
Main	6261.580	31970 cfs - 6hr	31970.00	4086.71	1462.25	26421.05	37.62	982.25	1019.87		1020.04	0.000097	2.85	5.17	1.08	2.91	0.15
Main	6131.449	1289 cfs	1289.00	515.40	131.55	642.05	8.44	981.90	990.34		990.40	0.000166	1.41	2.91	1.01	1.06	0.18
Main	6131.449	1980 cfs 100-yr	1980.00	454.16	167.62	1358.21	15.30	981.90	997.20		997.21	0.000020	0.71	1.41	0.39	0.66	0.06
Main	6131.449	2650 cfs 500-yr	2650.00	446.05	236.56	1967.39	25.39	981.90	1007.29		1007.29	0.000004	0.43	0.84	0.20	0.45	0.03
Main	6131.449	2924 cfs	2924.00	480.56	267.21	2176.23	26.81	981.90	1008.71		1008.71	0.000004	0.44	0.85	0.20	0.46	0.03
Main	6131.449	3116 cfs	3116.00	509.61	286.49	2319.91	27.12	981.90	1009.02		1009.02	0.000004	0.46	0.90	0.21	0.48	0.03
Main	6131.449	3400 cfs	3400.00	552.87	314.87	2532.27	27.49	981.90	1009.39		1009.39	0.000004	0.49	0.96	0.22	0.52	0.03

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	6131.449	3881 cfs 0.25 PM	3881.00	626.48	362.80	2891.72	27.98	981.90	1009.88		1009.89	0.000005	0.55	1.07	0.25	0.58	0.04
Main	6131.449	4188 cfs	4188.00	673.13	394.03	3120.83	28.27	981.90	1010.17		1010.18	0.000006	0.58	1.13	0.26	0.61	0.04
Main	6131.449	11457 cfs 0.5 PM	11457.00	1733.66	1192.08	8531.27	33.22	981.90	1015.12		1015.16	0.000020	1.27	2.49	0.58	1.36	0.08
Main	6131.449	13000 cfs	13000.00	1955.58	1366.89	9677.54	33.82	981.90	1015.72		1015.77	0.000024	1.41	2.75	0.64	1.51	0.08
Main	6131.449	15000 cfs	15000.00	2244.04	1592.70	11163.26	34.41	981.90	1016.31		1016.37	0.000029	1.59	3.11	0.72	1.71	0.09
Main	6131.449	24229 cfs -24hr	24229.00	3558.48	2661.81	18008.72	36.57	981.90	1018.47		1018.59	0.000057	2.36	4.64	1.08	2.56	0.14
Main	6131.449	31970 cfs - 6hr	31970.00	4646.67	3586.76	23736.56	37.92	981.90	1019.82		1020.02	0.000085	2.96	5.84	1.35	3.23	0.17
Main	5982.247	1289 cfs	1289.00	462.39	619.99	206.62	9.07	981.25	990.32		990.37	0.000061	1.38	2.55	1.18	0.90	0.15
Main	5982.247	1980 cfs 100-yr	1980.00	428.89	951.88	599.23	15.94	981.25	997.19		997.21	0.000013	0.74	1.35	0.67	0.63	0.06
Main	5982.247	2650 cfs 500-yr	2650.00	427.99	1205.89	1016.12	26.04	981.25	1007.29		1007.29	0.000003	0.41	0.82	0.41	0.34	0.03
Main	5982.247	2924 cfs	2924.00	450.64	1295.44	1177.92	27.46	981.25	1008.71		1008.71	0.000003	0.41	0.82	0.41	0.34	0.03
Main	5982.247	3116 cfs	3116.00	475.55	1372.72	1267.74	27.77	981.25	1009.02		1009.02	0.000003	0.43	0.86	0.42	0.36	0.03
Main	5982.247	3400 cfs	3400.00	512.91	1487.82	1399.28	28.14	981.25	1009.39		1009.39	0.000003	0.45	0.91	0.45	0.39	0.03
Main	5982.247	3881 cfs 0.25 PM	3881.00	576.78	1683.64	1620.58	28.63	981.25	1009.88		1009.88	0.000004	0.50	1.01	0.50	0.43	0.03
Main	5982.247	4188 cfs	4188.00	616.57	1806.35	1765.08	28.92	981.25	1010.17		1010.18	0.000004	0.53	1.07	0.53	0.46	0.03
Main	5982.247	11457 cfs 0.5 PM	11457.00	1445.96	4472.11	5538.93	33.88	981.25	1015.13		1015.15	0.000015	1.09	2.14	1.04	1.00	0.06
Main	5982.247	13000 cfs	13000.00	1614.01	5021.23	6364.76	34.48	981.25	1015.73		1015.76	0.000018	1.20	2.34	1.13	1.11	0.07
Main	5982.247	15000 cfs	15000.00	1833.57	5736.74	7429.70	35.07	981.25	1016.32		1016.36	0.000023	1.34	2.62	1.26	1.25	0.08
Main	5982.247	24229 cfs -24hr	24229.00	2807.50	8958.65	12462.85	37.25	981.25	1018.50		1018.57	0.000045	1.94	3.77	1.81	1.83	0.11
Main	5982.247	31970 cfs - 6hr	31970.00	3590.74	11590.73	16788.53	38.62	981.25	1019.87		1019.98	0.000065	2.39	4.65	2.23	2.27	0.13
Main	5779.970	1289 cfs	1289.00	305.42	812.90	170.68	9.94	980.30	990.34		990.35	0.000029	0.77	1.34	0.68	0.70	0.07
Main	5779.970	1980 cfs 100-yr	1980.00	380.11	1344.27	255.62	16.80	980.30	997.20		997.20	0.000008	0.56	0.99	0.52	0.44	0.04
Main	5779.970	2650 cfs 500-yr	2650.00	416.22	1720.88	512.91	26.89	980.30	1007.29		1007.29	0.000002	0.34	0.68	0.35	0.22	0.02
Main	5779.970	2924 cfs	2924.00	446.57	1871.55	605.88	28.31	980.30	1008.71		1008.71	0.000002	0.34	0.69	0.36	0.23	0.02
Main	5779.970	3116 cfs	3116.00	473.12	1988.34	654.54	28.62	980.30	1009.02		1009.02	0.000002	0.36	0.72	0.37	0.24	0.02
Main	5779.970	3400 cfs	3400.00	512.82	2162.32	724.86	28.99	980.30	1009.39		1009.39	0.000003	0.38	0.77	0.40	0.25	0.03
Main	5779.970	3881 cfs 0.25 PM	3881.00	580.20	2456.90	843.90	29.48	980.30	1009.88		1009.88	0.000003	0.42	0.86	0.44	0.28	0.03
Main	5779.970	4188 cfs	4188.00	622.96	2644.41	920.63	29.77	980.30	1010.17		1010.18	0.000004	0.45	0.91	0.47	0.30	0.03
Main	5779.970	11457 cfs 0.5 PM	11457.00	1567.06	6899.68	2990.26	34.73	980.30	1015.13		1015.15	0.000014	0.94	1.97	1.00	0.66	0.06
Main	5779.970	13000 cfs	13000.00	1762.73	7792.38	3444.89	35.33	980.30	1015.73		1015.75	0.000017	1.03	2.18	1.10	0.73	0.06
Main	5779.970	15000 cfs	15000.00	2065.63	9166.80	3767.57	35.92	980.30	1016.32		1016.35	0.000021	1.15	2.51	1.27	0.76	0.07
Main	5779.970	24229 cfs -24hr	24229.00	3203.71	14410.42	6614.87	38.09	980.30	1018.49		1018.56	0.000042	1.66	3.67	1.84	1.12	0.10
Main	5779.970	31970 cfs - 6hr	31970.00	4125.52	18704.49	9139.99	39.47	980.30	1019.87		1019.97	0.000061	2.04	4.56	2.28	1.39	0.13
Main	5673.110	1289 cfs	1289.00	236.14	859.40	193.46	10.09	980.25	990.34		990.35	0.000030	0.68	1.15	0.61	0.66	0.06
Main	5673.110	1980 cfs 100-yr	1980.00	304.44	1361.91	313.65	16.95	980.25	997.20		997.20	0.000009	0.51	0.88	0.47	0.49	0.04
Main	5673.110	2650 cfs 500-yr	2650.00	361.77	1819.84	468.40	27.04	980.25	1007.29		1007.29	0.000003	0.36	0.66	0.34	0.29	0.02
Main	5673.110	2924 cfs	2924.00	394.09	2003.21	526.70	28.46	980.25	1008.71		1008.71	0.000003	0.36	0.68	0.35	0.30	0.02
Main	5673.110	3116 cfs	3116.00	418.94	2134.10	562.96	28.77	980.25	1009.02		1009.02	0.000003	0.38	0.72	0.37	0.31	0.02
Main	5673.110	3400 cfs	3400.00	455.69	2327.30	617.01	29.14	980.25	1009.39		1009.39	0.000003	0.41	0.77	0.40	0.33	0.03
Main	5673.110	3881 cfs 0.25 PM	3881.00	517.90	2653.75	709.36	29.63	980.25	1009.88		1009.88	0.000004	0.45	0.86	0.44	0.36	0.03
Main	5673.110	4188 cfs	4188.00	560.96	2879.79	747.26	29.92	980.25	1010.17		1010.18	0.000005	0.48	0.92	0.48	0.37	0.03
Main	5673.110	11457 cfs 0.5 PM	11457.00	1431.03	7555.62	2470.36	34.87	980.25	1015.12		1015.15	0.000018	1.03	2.02	1.02	0.82	0.06
Main	5673.110	13000 cfs	13000.00	1605.24	8501.45	2893.31	35.48	980.25	1015.73		1015.75	0.000021	1.13	2.22	1.13	0.90	0.07
Main	5673.110	15000 cfs	15000.00	1830.83	9724.74	3444.43	36.07	980.25	1016.32		1016.35	0.000026	1.25	2.49	1.26	0.98	0.07
Main	5673.110	24229 cfs -24hr	24229.00	2811.51	15091.06	6326.43	38.24	980.25	1018.49		1018.55	0.000051	1.72	3.61	1.84	1.27	0.10
Main	5673.110	31970 cfs - 6hr	31970.00	3584.03	19358.47	9027.50	39.62	980.25	1019.87		1019.96	0.000073	2.06	4.44	2.22	1.51	0.12
Main	5526.262	1289 cfs	1289.00	262.36	694.63	332.02	11.08	979.25	990.33		990.34	0.000108	0.86	1.50	0.76	0.81	0.08
Main	5526.262	1980 cfs 100-yr	1980.00	317.12	1177.82	485.06	17.94	979.25	997.19		997.20	0.000034	0.65	1.12	0.61	0.57	0.05
Main	5526.262	2650 cfs 500-yr	2650.00	365.19	1621.05	663.76	28.04	979.25	1007.29		1007.29	0.000010	0.46	0.83	0.45	0.38	0.03
Main	5526.262	2924 cfs	2924.00	397.09	1791.25	735.66	29.46	979.25	1008.71		1008.71	0.000010	0.47	0.86	0.47	0.39	0.03
Main	5526.262	3116 cfs	3116.00	421.96	1909.73	784.31	29.76	979.25	1009.01		1009.02	0.000012	0.50	0.90	0.49	0.40	0.03
Main	5526.262	3400 cfs	3400.00	458.85	2084.87	856.28	30.14	979.25	1009.39		1009.39	0.000014	0.53	0.97	0.53	0.43	0.03
Main	5526.262	3881 cfs 0.25 PM	3881.00	521.42	2381.11	978.47	30.63	979.25	1009.88		1009.88	0.000017	0.59	1.08	0.59	0.48	0.03
Main	5526.262	4188 cfs	4188.00	561.01	2569.38	1057.61	30.92	979.25	1010.17		1010.17	0.000019	0.63	1.15	0.63	0.51	0.04
Main	5526.262	11457 cfs 0.5 PM	11457.00	1435.20	6867.33	3154.48	35.86	979.25	1015.11		1015.14	0.000064	1.33	2.54	1.37	1.03	0.07
Main	5526.262	13000 cfs	13000.00	1609.71	7738.27	3652.02	36.45	979.25	1015.71		1015.75	0.000074	1.46	2.80	1.51	1.14	0.08

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl	
Main	5526.262	15000 cfs	15000.00	1835.68	8863.87	4300.45	37.04	979.25	1016.29		1016.34	0.000091	1.62	3.15	1.69	1.26	0.09	
Main	5526.262	24229 cfs -24hr	24229.00	2817.88	13821.44	7589.68	39.19	979.25	1018.44		1018.54	0.000165	2.22	4.57	2.43	1.64	0.13	
Main	5526.262	31970 cfs - 6hr	31970.00	3573.32	17690.16	10706.51	40.54	979.25	1019.79		1019.94	0.000221	2.62	5.60	2.97	1.91	0.15	
Main	5409.418	1289 cfs	1289.00	1289.00			10.85	978.25	989.10		984.65	990.22	8.48	8.48			0.45	
Main	5409.418	1980 cfs 100-yr	1980.00	1980.00			17.88	978.25	996.13		986.76	997.10	7.91	7.91			0.33	
Main	5409.418	2650 cfs 500-yr	2650.00	2650.00			28.27	978.25	1006.52		988.61	1007.22	6.69	6.69			0.22	
Main	5409.418	2924 cfs	2924.00	2924.00			29.61	978.25	1007.86		989.29	1008.63	7.05	7.05			0.23	
Main	5409.418	3116 cfs	3116.00	3113.65	1.58	0.78	20.86	978.25	1008.07		989.76	1008.93	7.04	7.45		0.10	0.29	
Main	5409.418	3400 cfs	3400.00	3369.16	20.64	10.20	21.11	978.25	1008.32		990.47	1009.29	6.34	7.97	0.26	0.29	0.31	
Main	5409.418	3881 cfs 0.25 PM	3881.00	3788.19	62.15	30.67	21.37	978.25	1008.58		991.60	1009.76	6.11	8.85	0.43	0.48	0.34	
Main	5409.418	4188 cfs	4188.00	4046.38	94.85	46.78	21.51	978.25	1008.72		992.29	1010.04	6.07	9.39	0.53	0.59	0.36	
Main	5409.418	11457 cfs 0.5 PM	11457.00	6141.14	3475.93	1839.94	26.68	978.25	1013.89		1012.15	1015.02	3.96	11.49	2.12	2.55	0.39	
Main	5409.418	13000 cfs	13000.00	6517.02	4191.26	2291.72	27.26	978.25	1014.47		1012.64	1015.63	4.09	11.93	2.31	2.79	0.40	
Main	5409.418	15000 cfs	15000.00	7147.51	5021.90	2830.60	27.71	978.25	1014.92		1013.28	1016.21	4.40	12.88	2.58	3.12	0.43	
Main	5409.418	24229 cfs -24hr	24229.00	9186.53	8765.36	6277.11	29.61	978.25	1016.82		1015.63	1018.38	5.37	15.49	3.47	4.50	0.50	
Main	5409.418	31970 cfs - 6hr	31970.00	10112.63	11517.23	10340.13	31.03	978.25	1018.24		1017.04	1019.78	5.88	16.27	3.90	5.54	0.51	
Main	5312.23		Culvert															
Main	5251.314	1289 cfs	1289.00	1289.00			6.40	978.13	984.53		984.53	987.74	0.006470	14.38	14.38		1.00	
Main	5251.314	1980 cfs 100-yr	1980.00	1980.00			8.51	978.13	986.64		986.64	990.93	0.006090	16.63	16.63		1.00	
Main	5251.314	2650 cfs 500-yr	2650.00	2650.00			10.36	978.13	988.49		988.49	993.67	0.006003	18.28	18.28		1.00	
Main	5251.314	2924 cfs	2924.00	2924.00			11.03	978.13	989.16		989.16	994.73	0.005952	18.93	18.93		1.00	
Main	5251.314	3116 cfs	3116.00	3116.00			11.51	978.13	989.64		989.64	995.45	0.005885	19.34	19.34		1.00	
Main	5251.314	3400 cfs	3400.00	3400.00			12.22	978.13	990.35		990.35	996.48	0.005777	19.87	19.87		1.00	
Main	5251.314	3881 cfs 0.25 PM	3881.00	3881.00			13.35	978.13	991.48		991.48	998.18	0.005751	20.77	20.77		1.00	
Main	5251.314	4188 cfs	4188.00	4188.00			14.04	978.13	992.17		992.17	999.22	0.005688	21.30	21.30		1.00	
Main	5251.314	11457 cfs 0.5 PM	11457.00	7295.25	3178.04	983.71	28.21	978.13	1012.90		1012.90	1014.99	0.002247	4.81	14.42	2.75	1.36	0.48
Main	5251.314	13000 cfs	13000.00	7929.23	3854.45	1216.31	28.52	978.13	1013.21		1013.21	1015.53	0.002503	5.10	15.50	3.10	1.53	0.51
Main	5251.314	15000 cfs	15000.00	8407.50	4956.25	1636.25	29.13	978.13	1013.82		1013.82	1016.14	0.002589	5.19	16.09	3.48	1.74	0.53
Main	5251.314	24229 cfs -24hr	24229.00	10224.27	10144.67	3860.06	31.25	978.13	1015.94		1015.94	1018.29	0.002968	5.77	18.24	4.77	2.55	0.57
Main	5251.314	31970 cfs - 6hr	31970.00	11936.01	14368.82	5665.17	32.25	978.13	1016.94		1016.94	1019.67	0.003439	6.52	20.63	5.78	3.08	0.64
Main	5207.865	1289 cfs	1289.00	1083.11	18.77	187.12	2.92	978.00	981.39		983.00	986.54	0.014126	14.74	19.67	5.12	6.52	2.03
Main	5207.865	1980 cfs 100-yr	1980.00	1552.41	44.87	382.72	3.38	978.00	981.85		983.89	989.35	0.014163	17.47	24.40	6.97	8.85	2.34
Main	5207.865	2650 cfs 500-yr	2650.00	1976.78	63.77	609.46	3.74	978.00	982.21		984.49	991.76	0.013894	19.40	28.04	6.29	10.89	2.56
Main	5207.865	2924 cfs	2924.00	2141.72	76.89	705.39	3.87	978.00	982.34		984.72	992.68	0.013901	20.09	29.39	6.32	11.66	2.63
Main	5207.865	3116 cfs	3116.00	2255.08	87.48	773.45	3.95	978.00	982.42		984.89	993.31	0.013862	20.52	30.28	6.34	12.17	2.68
Main	5207.865	3400 cfs	3400.00	2418.95	107.03	874.03	4.07	978.00	982.54		985.12	994.22	0.013728	21.13	31.55	6.50	12.89	2.76
Main	5207.865	3881 cfs 0.25 PM	3881.00	2689.04	146.52	1045.44	4.25	978.00	982.72		985.43	995.70	0.013610	22.03	33.57	6.79	14.03	2.87
Main	5207.865	4188 cfs	4188.00	2856.90	176.19	1154.91	4.36	978.00	982.83		985.64	996.61	0.013542	22.53	34.79	6.98	14.71	2.94
Main	5207.865	11457 cfs 0.5 PM	11457.00	5865.88	2000.74	3590.38	6.14	978.00	984.61		988.55	1008.34	0.003601	28.29	50.67	14.50	23.74	3.60
Main	5207.865	13000 cfs	13000.00	6327.70	2597.50	4074.80	6.48	978.00	984.95		988.94	1008.88	0.004038	28.46	51.78	15.45	24.48	3.58
Main	5207.865	15000 cfs	15000.00	6869.96	3393.20	4736.84	6.89	978.00	985.36		989.55	1009.43	0.004193	28.75	52.91	16.39	25.61	3.55
Main	5207.865	24229 cfs -24hr	24229.00	8945.87	7771.12	7512.02	8.39	978.00	986.86		991.74	1011.42	0.004749	30.58	56.57	20.66	29.12	3.44
Main	5207.865	31970 cfs - 6hr	31970.00	10409.06	11935.96	9624.99	9.45	978.00	987.92		993.37	1012.78	0.005609	32.01	58.41	23.59	30.62	3.35
Main	5095.508	1289 cfs	1289.00	1055.68	212.79	20.54	3.08	975.00	978.58		979.99	982.49	0.032995	12.57	17.26	6.75	2.08	1.73
Main	5095.508	1980 cfs 100-yr	1980.00	1511.01	417.83	51.17	3.72	975.00	979.22		980.57	984.34	0.038719	12.51	20.51	6.46	2.57	1.88
Main	5095.508	2650 cfs 500-yr	2650.00	1861.81	709.47	78.72	4.01	975.00	979.51		981.04	985.76	0.045182	13.60	23.42	7.94	3.02	2.06
Main	5095.508	2924 cfs	2924.00	1997.41	835.99	90.60	4.11	975.00	979.61		981.21	986.31	0.047705	14.03	24.52	8.49	3.19	2.13
Main	5095.508	3116 cfs	3116.00	2091.90	924.75	99.35	4.18	975.00	979.68		981.32	986.69	0.049401	14.30	25.26	8.81	3.30	2.18
Main	5095.508	3400 cfs	3400.00	2224.94	1062.92	112.14	4.27	975.00	979.77		981.48	987.22	0.051837	14.73	26.29	9.33	3.46	2.24
Main	5095.508	3881 cfs 0.25 PM	3881.00	2443.51	1303.14	134.35	4.41	975.00	979.91		981.73	988.10	0.055838	15.43	27.97	10.17	3.73	2.35
Main	5095.508	4188 cfs	4188.00	2579.06	1460.08	148.86	4.49	975.00	979.99		981.93	988.65	0.058316	15.86	28.99	10.67	3.89	2.41
Main	5095.508	11457 cfs 0.5 PM	11457.00	4980.26	5897.45	579.29	5.87	975.00	981.37		984.43	996.62	0.083765	22.59	42.75	18.94	7.31	3.11
Main	5095.508	13000 cfs	13000.00	5359.92	6965.02	675.06	6.14	975.00	981.64		984.82	997.37	0.082583	23.22	44.01	19.87	7.72	3.13
Main	5095.508	15000 cfs	15000.00	5824.02	8377.85	798.13	6.47	975.00	981.97		985.26	998.25	0.080899	23.93	45.41	20.91	8.17	3.15
Main	5095.508	24229 cfs -24hr	24229.00	7580.96	15322.43	1325.61	7.71	975.00	983.21		987.21	1001.49	0.073757	26.99	49.56	25.27	9.59	3.14

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	5095.508	31970 cfs - 6hr	31970.00	8855.44	21364.58	1749.98	8.63	975.00	984.13	988.69	1003.79	0.068266	28.87	51.77	27.84	10.35	3.11
Main	4997.530	1289 cfs	1289.00	560.07	604.53	124.39	4.02	974.70	978.87	978.40	979.28	0.003311	4.15	6.97	3.16	3.21	0.61
Main	4997.530	1980 cfs 100-yr	1980.00	1118.74	697.79	163.47	3.17	974.70	978.02	978.98	981.10	0.028545	10.82	17.62	7.09	7.74	1.74
Main	4997.530	2650 cfs 500-yr	2650.00	817.02	1493.90	339.08	5.45	974.70	980.30	979.39	980.71	0.002295	4.32	7.49	3.73	3.26	0.57
Main	4997.530	2924 cfs	2924.00	856.29	1682.77	384.94	5.70	974.70	980.55	979.55	980.95	0.002192	4.34	7.51	3.80	3.26	0.55
Main	4997.530	3116 cfs	3116.00	883.89	1815.17	416.95	5.86	974.70	980.71	979.65	981.12	0.002140	4.36	7.53	3.86	3.28	0.55
Main	4997.530	3400 cfs	3400.00	924.19	2011.42	464.39	6.10	974.70	980.95	979.81	981.35	0.002074	4.39	7.57	3.93	3.30	0.54
Main	4997.530	3881 cfs 0.25 PM	3881.00	990.46	2345.57	544.96	6.48	974.70	981.33	980.06	981.74	0.001977	4.44	7.64	4.03	3.36	0.53
Main	4997.530	4188 cfs	4188.00	1032.23	2559.53	596.24	6.71	974.70	981.56	980.18	981.97	0.001930	4.48	7.68	4.09	3.39	0.52
Main	4997.530	11457 cfs 0.5 PM	11457.00	1814.01	7960.45	1682.54	10.91	974.70	985.76	982.40	986.28	0.001436	5.40	8.31	5.43	3.86	0.44
Main	4997.530	13000 cfs	13000.00	1975.60	9111.80	1912.61	11.63	974.70	986.48	982.73	987.03	0.001399	5.58	8.49	5.64	3.95	0.44
Main	4997.530	15000 cfs	15000.00	2183.18	10604.99	2211.82	12.51	974.70	987.36	983.11	987.95	0.001361	5.79	8.72	5.90	4.06	0.43
Main	4997.530	24229 cfs -24hr	24229.00	3119.85	17501.72	3607.43	16.09	974.70	990.94	984.83	991.70	0.001256	6.59	9.69	6.86	4.48	0.43
Main	4997.530	31970 cfs - 6hr	31970.00	3883.90	23291.95	4794.16	18.69	974.70	993.54	986.08	994.42	0.001204	7.11	10.38	7.48	4.75	0.42
Main	4873.143	1289 cfs	1289.00	483.76	295.42	509.83	3.52	974.65	978.51		978.85	0.003873	3.54	6.78	2.69	2.79	0.64
Main	4873.143	1980 cfs 100-yr	1980.00	592.28	583.61	804.10	4.42	974.65	979.40	978.53	979.70	0.003306	3.54	6.61	3.13	2.84	0.55
Main	4873.143	2650 cfs 500-yr	2650.00	707.28	856.30	1086.42	5.09	974.65	980.08		980.39	0.003195	3.72	6.85	3.50	2.99	0.53
Main	4873.143	2924 cfs	2924.00	753.12	967.69	1203.19	5.35	974.65	980.33		980.65	0.003182	3.80	6.95	3.62	3.05	0.53
Main	4873.143	3116 cfs	3116.00	785.68	1045.47	1284.85	5.51	974.65	980.50		980.83	0.003168	3.86	7.03	3.71	3.10	0.53
Main	4873.143	3400 cfs	3400.00	833.67	1160.79	1405.55	5.75	974.65	980.74		981.07	0.003150	3.95	7.15	3.84	3.17	0.53
Main	4873.143	3881 cfs 0.25 PM	3881.00	913.93	1357.26	1609.81	6.13	974.65	981.12		981.47	0.003144	4.08	7.35	4.03	3.29	0.52
Main	4873.143	4188 cfs	4188.00	965.00	1483.00	1740.01	6.36	974.65	981.35		981.72	0.003140	4.17	7.48	4.15	3.36	0.52
Main	4873.143	11457 cfs 0.5 PM	11457.00	2118.94	4537.61	4800.46	10.43	974.65	985.42		986.08	0.003268	5.81	10.02	6.15	4.69	0.55
Main	4873.143	13000 cfs	13000.00	2353.78	5200.69	5445.53	11.13	974.65	986.12		986.84	0.003283	6.07	10.43	6.45	4.90	0.55
Main	4873.143	15000 cfs	15000.00	2654.77	6065.47	6279.76	11.98	974.65	986.97		987.76	0.003297	6.37	10.92	6.81	5.15	0.56
Main	4873.143	24229 cfs -24hr	24229.00	4006.24	10122.61	10100.16	15.44	974.65	990.43		991.51	0.003319	7.50	12.79	8.10	6.05	0.57
Main	4873.143	31970 cfs - 6hr	31970.00	5106.55	13589.29	13274.16	17.95	974.65	992.94		994.23	0.003316	8.22	14.03	8.91	6.63	0.58
Main	4770.454	1289 cfs	1289.00	900.31	120.90	267.78	5.09	972.00	977.40	977.40	978.38	0.003971	5.20	9.35	3.09	2.38	0.73
Main	4770.454	1980 cfs 100-yr	1980.00	1179.96	240.29	559.75	5.85	972.00	978.16	978.16	979.28	0.004504	5.53	10.67	3.88	3.01	0.78
Main	4770.454	2650 cfs 500-yr	2650.00	1426.12	376.80	847.08	6.38	972.00	978.69	978.69	979.97	0.004798	5.99	11.82	4.75	3.49	0.82
Main	4770.454	2924 cfs	2924.00	1526.63	432.28	965.08	6.55	972.00	978.86	978.86	980.22	0.005009	6.21	12.32	5.08	3.68	0.85
Main	4770.454	3116 cfs	3116.00	1591.05	473.24	1051.71	6.68	972.00	979.00	979.00	980.39	0.005108	6.32	12.58	5.28	3.80	0.86
Main	4770.454	3400 cfs	3400.00	1684.11	534.52	1181.37	6.88	972.00	979.19	979.19	980.64	0.005253	6.47	12.95	5.56	3.95	0.87
Main	4770.454	3881 cfs 0.25 PM	3881.00	1843.53	637.50	1399.97	7.16	972.00	979.47	979.47	981.03	0.005525	6.77	13.61	6.02	4.22	0.90
Main	4770.454	4188 cfs	4188.00	1940.59	704.74	1542.68	7.34	972.00	979.65	979.65	981.27	0.005677	6.93	13.98	6.28	4.37	0.91
Main	4770.454	11457 cfs 0.5 PM	11457.00	3939.68	2355.23	5162.09	10.39	972.00	982.70	982.70	985.53	0.007421	9.88	20.04	10.31	7.02	1.10
Main	4770.454	13000 cfs	13000.00	4324.70	2718.43	5956.88	10.91	972.00	983.22	983.22	986.27	0.007652	10.34	20.96	10.88	7.44	1.12
Main	4770.454	15000 cfs	15000.00	4812.96	3193.60	6993.44	11.54	972.00	983.85	983.85	987.17	0.007820	10.89	22.05	11.54	7.93	1.14
Main	4770.454	24229 cfs -24hr	24229.00	6956.08	5437.89	11835.04	14.10	972.00	986.42	986.42	990.84	0.008423	12.93	26.07	13.85	9.75	1.22
Main	4770.454	31970 cfs - 6hr	31970.00	8675.08	7369.04	15925.88	15.94	972.00	988.25	988.25	993.50	0.008683	14.27	28.77	15.26	10.94	1.27
Main	4694.740	1289 cfs	1289.00	938.31	218.99	131.70	4.89	971.00	976.39	976.39	977.93	0.005201	6.51	11.47	4.39	1.99	0.91
Main	4694.740	1980 cfs 100-yr	1980.00	1216.13	362.53	401.35	5.50	971.00	977.00	977.49	978.78	0.005748	6.81	13.21	5.35	3.07	0.99
Main	4694.740	2650 cfs 500-yr	2650.00	1447.93	498.90	703.17	5.98	971.00	977.48	978.06	979.42	0.006233	7.21	14.46	6.00	3.81	1.04
Main	4694.740	2924 cfs	2924.00	1537.67	554.11	832.22	6.16	971.00	977.66	978.22	979.66	0.006469	7.37	14.93	6.22	4.07	1.06
Main	4694.740	3116 cfs	3116.00	1599.86	592.93	923.21	6.27	971.00	977.77	978.34	979.83	0.006580	7.50	15.25	6.38	4.24	1.07
Main	4694.740	3400 cfs	3400.00	1690.63	650.59	1058.78	6.42	971.00	977.92	978.50	980.06	0.006737	7.69	15.73	6.60	4.48	1.09
Main	4694.740	3881 cfs 0.25 PM	3881.00	1834.86	758.71	1287.43	6.66	971.00	978.16	978.75	980.42	0.007047	8.03	16.47	7.07	4.86	1.12
Main	4694.740	4188 cfs	4188.00	1927.29	829.81	1430.90	6.79	971.00	978.29	978.90	980.65	0.007237	8.27	16.97	7.40	5.10	1.15
Main	4694.740	11457 cfs 0.5 PM	11457.00	3709.14	2579.32	5168.55	9.24	971.00	980.74	981.73	984.70	0.009458	12.07	23.99	12.15	8.88	1.39
Main	4694.740	13000 cfs	13000.00	4049.52	2957.84	5992.64	9.65	971.00	981.15	982.19	985.42	0.009728	12.69	25.09	12.84	9.47	1.42
Main	4694.740	15000 cfs	15000.00	4473.65	3452.50	7073.85	10.16	971.00	981.66	982.80	986.29	0.009993	13.40	26.33	13.62	10.16	1.46
Main	4694.740	24229 cfs -24hr	24229.00	6325.44	5769.89	12133.67	12.18	971.00	983.68	985.17	989.85	0.010788	16.09	31.05	16.44	12.76	1.57
Main	4694.740	31970 cfs - 6hr	31970.00	7785.12	7746.04	16438.84	13.65	971.00	985.15	986.92	992.45	0.011168	17.82	34.09	18.15	14.43	1.63
Main	4565.850	1289 cfs	1289.00	957.87	78.21	252.92	3.61	971.00	974.98	975.56	976.81	0.008478	7.57	12.40	3.44	3.60	1.15
Main	4565.850	1980 cfs 100-yr	1980.00	1245.68	184.75	549.57	4.24	971.00	975.62	976.23	977.58	0.009049	7.98	13.73	4.15	4.87	1.18

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	4565.850	2650 cfs 500-yr	2650.00	1491.94	317.59	840.47	4.73	971.00	976.11	976.71	978.21	0.009383	8.38	14.73	4.73	5.69	1.19
Main	4565.850	2924 cfs	2924.00	1583.40	380.20	960.40	4.91	971.00	976.29	976.88	978.43	0.009477	8.51	15.05	4.95	5.95	1.20
Main	4565.850	3116 cfs	3116.00	1649.21	424.07	1042.72	5.03	971.00	976.41	977.03	978.59	0.009600	8.64	15.32	5.11	6.13	1.20
Main	4565.850	3400 cfs	3400.00	1740.70	493.12	1166.17	5.20	971.00	976.58	977.23	978.80	0.009732	8.78	15.64	5.31	6.37	1.21
Main	4565.850	3881 cfs 0.25 PM	3881.00	1889.94	616.41	1374.65	5.48	971.00	976.85	977.50	979.15	0.009921	9.00	16.12	5.62	6.73	1.21
Main	4565.850	4188 cfs	4188.00	1980.46	699.87	1507.67	5.65	971.00	977.03	977.69	979.35	0.010054	9.12	16.38	5.79	6.93	1.21
Main	4565.850	11457 cfs 0.5 PM	11457.00	3802.03	3331.09	4323.88	8.31	971.00	979.69	980.41	983.01	0.011682	11.76	21.36	9.24	9.93	1.31
Main	4565.850	13000 cfs	13000.00	4166.60	3937.71	4895.69	8.70	971.00	980.08	980.88	983.65	0.012054	12.26	22.36	9.71	10.44	1.34
Main	4565.850	15000 cfs	15000.00	4637.09	4735.65	5627.26	9.14	971.00	980.52	981.37	984.46	0.012538	12.93	23.69	10.35	11.10	1.38
Main	4565.850	24229 cfs -24hr	24229.00	5995.60	9509.53	8723.87	13.32	971.00	984.69	983.54	987.47	0.004023	11.10	21.03	9.50	9.73	1.02
Main	4565.850	31970 cfs - 6hr	31970.00	7345.22	13347.15	11277.63	15.71	971.00	987.09	985.14	989.97	0.003620	11.36	21.84	9.96	9.90	0.97
Main	4407.253	1289 cfs	1289.00	736.59	30.49	521.92	5.33	968.50	974.10	972.98	974.56	0.003013	3.92	6.84	1.18	2.67	0.52
Main	4407.253	1980 cfs 100-yr	1980.00	1013.16	102.19	864.65	5.86	968.50	974.64	973.80	975.31	0.003010	4.82	8.55	1.99	3.59	0.62
Main	4407.253	2650 cfs 500-yr	2650.00	1233.34	207.43	1209.23	6.39	968.50	975.16	974.62	975.95	0.002809	5.35	9.55	2.61	4.21	0.67
Main	4407.253	2924 cfs	2924.00	1315.72	260.87	1347.42	6.58	968.50	975.36	974.79	976.19	0.002790	5.53	9.89	2.87	4.43	0.68
Main	4407.253	3116 cfs	3116.00	1371.91	300.41	1443.68	6.71	968.50	975.49	974.92	976.35	0.002786	5.66	10.11	3.05	4.57	0.69
Main	4407.253	3400 cfs	3400.00	1454.60	360.02	1585.38	6.89	968.50	975.66	975.13	976.57	0.002798	5.85	10.44	3.28	4.77	0.70
Main	4407.253	3881 cfs 0.25 PM	3881.00	1593.84	463.29	1823.88	7.16	968.50	975.93	975.42	976.92	0.002875	6.17	11.01	3.64	5.11	0.73
Main	4407.253	4188 cfs	4188.00	1671.25	539.47	1977.28	7.36	968.50	976.13	975.58	977.15	0.002828	6.29	11.23	3.82	5.26	0.73
Main	4407.253	11457 cfs 0.5 PM	11457.00	3175.00	2775.16	5506.85	11.35	968.50	980.12	978.39	981.43	0.002160	7.63	13.84	5.72	7.01	0.72
Main	4407.253	13000 cfs	13000.00	3465.70	3296.00	6238.30	12.02	968.50	980.79	978.83	982.16	0.002126	7.83	14.26	5.95	7.22	0.73
Main	4407.253	15000 cfs	15000.00	3835.91	3978.32	7185.77	12.82	968.50	981.60	979.42	983.04	0.002097	8.07	14.80	6.23	7.47	0.73
Main	4407.253	24229 cfs -24hr	24229.00	5451.42	7201.62	11575.96	16.04	968.50	984.81	980.62	986.52	0.002012	8.76	16.81	7.17	8.05	0.74
Main	4407.253	31970 cfs - 6hr	31970.00	6655.38	9958.82	15355.79	18.50	968.50	987.28	982.88	989.07	0.001895	8.94	17.79	7.54	8.17	0.73
Main	4211.037	1289 cfs	1289.00	767.00	72.40	449.60	4.04	968.60	973.30	973.30	974.01	0.004372	4.63	8.48	2.72	2.78	0.74
Main	4211.037	1980 cfs 100-yr	1980.00	888.75	139.43	951.81	4.97	968.60	974.22	973.30	974.75	0.003707	4.23	7.99	2.49	3.17	0.63
Main	4211.037	2650 cfs 500-yr	2650.00	983.05	248.63	1418.32	5.67	968.60	974.92	973.30	975.38	0.003238	4.24	7.75	2.86	3.44	0.57
Main	4211.037	2924 cfs	2924.00	1029.99	291.19	1602.82	5.90	968.60	975.15	973.30	975.60	0.003129	4.31	7.81	3.00	3.57	0.57
Main	4211.037	3116 cfs	3116.00	1063.89	320.90	1731.21	6.04	968.60	975.30	973.30	975.76	0.003097	4.37	7.87	3.09	3.66	0.56
Main	4211.037	3400 cfs	3400.00	1115.34	364.64	1920.01	6.25	968.60	975.50	973.30	975.97	0.003094	4.47	7.98	3.22	3.79	0.56
Main	4211.037	3881 cfs 0.25 PM	3881.00	1207.86	437.42	2235.72	6.54	968.60	975.80	973.30	976.29	0.002898	4.68	8.25	3.44	4.02	0.57
Main	4211.037	4188 cfs	4188.00	1257.25	487.27	2443.48	6.77	968.60	976.02	973.30	976.52	0.002713	4.75	8.31	3.54	4.12	0.56
Main	4211.037	11457 cfs 0.5 PM	11457.00	2358.54	1719.55	7378.91	10.96	968.60	980.22	978.39	980.87	0.001993	5.93	9.62	4.88	5.53	0.51
Main	4211.037	13000 cfs	13000.00	2589.00	1987.20	8423.80	11.65	968.60	980.90	978.39	981.60	0.001980	6.13	9.93	5.08	5.74	0.51
Main	4211.037	15000 cfs	15000.00	2882.80	2334.28	9782.92	12.48	968.60	981.73	978.39	982.48	0.001976	6.37	10.33	5.32	5.97	0.52
Main	4211.037	24229 cfs -24hr	24229.00	4168.49	3934.62	16125.90	15.76	968.60	985.01	980.62	985.95	0.001932	7.18	11.83	6.15	6.76	0.53
Main	4211.037	31970 cfs - 6hr	31970.00	5185.53	5297.35	21487.12	18.22	968.60	987.47	982.88	988.53	0.001842	7.62	12.72	6.59	7.20	0.53
Main	4069.035	1289 cfs	1289.00	994.15	48.66	246.19	4.88	967.00	972.05	972.25	973.31	0.004891	5.95	10.17	1.62	2.77	0.81
Main	4069.035	1980 cfs 100-yr	1980.00	1255.50	81.10	643.40	5.86	967.00	973.03	973.03	974.22	0.002451	5.63	10.69	1.67	3.47	0.78
Main	4069.035	2650 cfs 500-yr	2650.00	1485.07	113.71	1051.23	6.50	967.00	973.67	973.67	974.90	0.002469	5.81	11.40	1.79	4.01	0.79
Main	4069.035	2924 cfs	2924.00	1561.28	127.65	1235.07	6.75	967.00	973.92	973.92	975.14	0.002453	5.82	11.53	1.81	4.17	0.78
Main	4069.035	3116 cfs	3116.00	1617.33	137.07	1361.60	6.90	967.00	974.07	974.07	975.30	0.002456	5.90	11.70	1.84	4.32	0.78
Main	4069.035	3400 cfs	3400.00	1701.95	150.57	1547.48	7.07	967.00	974.24	974.24	975.51	0.002482	6.07	12.01	1.89	4.57	0.80
Main	4069.035	3881 cfs 0.25 PM	3881.00	1763.74	175.95	1941.31	7.58	967.00	974.75	973.92	975.88	0.002360	5.92	11.61	1.84	4.76	0.74
Main	4069.035	4188 cfs	4188.00	1797.05	193.34	2197.61	7.92	967.00	975.09	973.92	976.14	0.002251	5.81	11.32	1.81	4.83	0.71
Main	4069.035	11457 cfs 0.5 PM	11457.00	3218.96	700.89	7537.15	12.13	967.00	979.30	979.30	980.58	0.002364	7.11	13.24	2.33	7.06	0.67
Main	4069.035	13000 cfs	13000.00	3515.47	825.64	8658.89	12.76	967.00	979.93	979.93	981.30	0.002433	7.40	13.74	2.46	7.43	0.68
Main	4069.035	15000 cfs	15000.00	3896.23	1003.72	10100.05	13.52	967.00	980.69	979.93	982.17	0.002255	7.72	14.37	2.64	7.82	0.69
Main	4069.035	24229 cfs -24hr	24229.00	5501.15	1845.10	16882.75	16.62	967.00	983.79	980.62	985.64	0.002778	8.70	16.51	3.24	8.97	0.71
Main	4069.035	31970 cfs - 6hr	31970.00	6724.76	2581.89	22663.35	19.03	967.00	986.20	982.88	988.22	0.002787	9.15	17.63	3.56	9.50	0.71
Main	3956.761	1289 cfs	1289.00	569.16	85.51	634.34	4.95	967.00	971.95	970.38	972.21	0.003051	2.93	5.57	1.11	2.44	0.44
Main	3956.761	1980 cfs 100-yr	1980.00	784.19	141.65	1054.16	5.96	967.00	972.96	971.07	973.28	0.003066	3.32	6.38	1.32	2.88	0.46
Main	3956.761	2650 cfs 500-yr	2650.00	979.19	196.86	1473.95	6.77	967.00	973.77	971.61	974.15	0.003123	3.63	7.00	1.48	3.22	0.47
Main	3956.761	2924 cfs	2924.00	1055.27	219.11	1649.62	7.07	967.00	974.07	971.84	974.46	0.003111	3.74	7.23	1.54	3.34	0.48
Main	3956.761	3116 cfs	3116.00	1104.84	233.96	1777.20	7.26	967.00	974.26	972.03	974.67	0.003096	3.82	7.37	1.57	3.44	0.48
Main	3956.761	3400 cfs	3400.00	1177.87	255.98	1966.15	7.54	967.00	974.54	972.23	974.96	0.003090	3.94	7.57	1.62	3.57	0.49

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	3956.761	3881 cfs 0.25 PM	3881.00	1301.40	293.40	2286.20	7.96	967.00	974.96		975.42	0.003097	4.14	7.92	1.71	3.80	0.49
Main	3956.761	4188 cfs	4188.00	1376.30	317.47	2494.23	8.24	967.00	975.24		975.72	0.002426	4.23	8.09	1.75	3.91	0.50
Main	3956.761	11457 cfs 0.5 PM	11457.00	3058.86	878.84	7519.30	12.21	967.00	979.21		980.25	0.002836	6.55	12.14	2.62	6.47	0.61
Main	3956.761	13000 cfs	13000.00	3398.76	1000.26	8600.98	12.81	967.00	979.81		980.98	0.002979	6.93	12.85	2.76	6.89	0.63
Main	3956.761	15000 cfs	15000.00	3836.02	1151.86	10012.12	13.53	967.00	980.53		981.85	0.003174	7.39	13.73	2.92	7.38	0.66
Main	3956.761	24229 cfs -24hr	24229.00	5768.39	1874.60	16586.00	16.34	967.00	983.34		985.33	0.004006	9.03	17.10	3.48	9.17	0.75
Main	3956.761	31970 cfs - 6hr	31970.00	7285.34	2531.86	22152.80	18.47	967.00	985.47		987.88	0.004456	9.90	19.11	3.80	10.15	0.78
Main	3844.176	1289 cfs	1289.00	730.33	156.98	401.69	3.39	967.25	970.65	970.65	971.78	0.008110	5.78	10.77	2.34	4.55	1.03
Main	3844.176	1980 cfs 100-yr	1980.00	1027.60	251.99	700.41	4.21	967.25	971.48	971.48	972.83	0.007813	6.29	12.19	2.65	5.17	1.05
Main	3844.176	2650 cfs 500-yr	2650.00	1301.48	345.26	1003.26	4.82	967.25	972.08	972.08	973.68	0.007978	6.79	13.50	2.93	5.69	1.08
Main	3844.176	2924 cfs	2924.00	1406.67	390.51	1126.82	5.09	967.25	972.36	972.36	973.99	0.007850	6.83	13.80	3.03	5.71	1.08
Main	3844.176	3116 cfs	3116.00	1477.66	421.50	1216.84	5.28	967.25	972.54	972.54	974.20	0.007767	6.86	13.99	3.09	5.74	1.07
Main	3844.176	3400 cfs	3400.00	1580.58	466.14	1353.28	5.52	967.25	972.79	972.79	974.49	0.007643	6.94	14.29	3.19	5.80	1.07
Main	3844.176	3881 cfs 0.25 PM	3881.00	1745.41	539.87	1595.72	5.92	967.25	973.19	973.19	974.95	0.007649	7.03	14.72	3.32	5.89	1.07
Main	3844.176	4188 cfs	4188.00	1664.27	573.13	1950.60	7.10	967.25	974.36		975.40	0.005997	5.55	11.71	2.69	4.89	0.77
Main	3844.176	11457 cfs 0.5 PM	11457.00	3382.33	1417.82	6656.85	10.99	967.25	978.25		979.88	0.004480	7.67	15.38	3.56	7.59	0.82
Main	3844.176	13000 cfs	13000.00	3746.60	1595.25	7658.15	11.51	967.25	978.78		980.59	0.004708	8.12	16.26	3.75	8.10	0.84
Main	3844.176	15000 cfs	15000.00	4215.80	1826.76	8957.44	12.11	967.25	979.37		981.43	0.004941	8.69	17.39	4.00	8.73	0.88
Main	3844.176	24229 cfs -24hr	24229.00	6343.33	2908.65	14977.02	14.16	967.25	981.42	980.28	984.75	0.005911	11.16	22.38	5.07	11.40	1.05
Main	3844.176	31970 cfs - 6hr	31970.00	8067.59	3797.80	20104.61	15.51	967.25	982.77	982.08	987.19	0.006021	12.88	25.99	5.79	13.25	1.16
Main	3765.976	1289 cfs	1289.00	983.60	237.70	67.70	3.41	964.80	968.41	969.08	970.75	0.011681	9.87	13.74	5.33	4.70	1.31
Main	3765.976	1980 cfs 100-yr	1980.00	1360.09	471.17	148.75	4.38	964.80	969.38	970.06	971.90	0.010499	10.19	14.79	6.24	5.55	1.25
Main	3765.976	2650 cfs 500-yr	2650.00	1688.53	720.71	240.76	5.25	964.80	970.25	970.79	972.82	0.009819	10.30	15.32	6.75	5.99	1.18
Main	3765.976	2924 cfs	2924.00	1815.40	828.02	280.57	5.58	964.80	970.58	971.08	973.16	0.009403	10.36	15.50	6.94	6.13	1.16
Main	3765.976	3116 cfs	3116.00	1902.10	904.36	309.55	5.81	964.80	970.81	971.27	973.40	0.009123	10.39	15.60	7.05	6.20	1.14
Main	3765.976	3400 cfs	3400.00	2022.98	1021.58	355.45	6.18	964.80	971.18	971.56	973.73	0.008672	10.31	15.59	7.14	6.25	1.11
Main	3765.976	3881 cfs 0.25 PM	3881.00	2211.44	1227.52	442.04	6.88	964.80	971.88	971.94	974.28	0.007783	10.02	15.31	7.14	6.24	1.03
Main	3765.976	4188 cfs	4188.00	2412.26	1308.60	467.14	6.70	964.80	971.70	971.70	974.72	0.005978	11.26	17.16	7.97	6.97	1.17
Main	3765.976	11457 cfs 0.5 PM	11457.00	4536.05	3633.81	3287.13	11.80	964.80	976.80	976.80	979.43	0.003283	9.71	18.31	8.84	6.31	0.94
Main	3765.976	13000 cfs	13000.00	4958.78	4058.09	3983.13	12.26	964.80	977.27	977.27	980.11	0.003226	10.23	19.25	9.29	6.91	0.97
Main	3765.976	15000 cfs	15000.00	5462.24	4594.39	4943.37	12.89	964.80	977.89	977.89	980.94	0.003203	10.74	20.18	9.72	7.57	0.99
Main	3765.976	24229 cfs -24hr	24229.00	7559.21	7108.91	9560.88	15.41	964.80	980.41	980.41	984.23	0.003496	12.61	23.37	11.32	9.86	1.05
Main	3765.976	31970 cfs - 6hr	31970.00	8884.99	9511.18	13573.83	17.64	964.80	982.64	982.06	986.57	0.003499	13.23	23.99	12.19	10.73	1.01
Main	3588.168	1289 cfs	1289.00	864.38	413.63	10.98	4.13	963.00	967.16	967.53	968.56	0.011225	6.22	11.36	3.32	1.67	0.99
Main	3588.168	1980 cfs 100-yr	1980.00	1200.89	761.99	17.12	4.47	963.00	967.49	968.16	969.63	0.012704	7.84	14.60	4.69	2.17	1.22
Main	3588.168	2650 cfs 500-yr	2650.00	1500.28	1126.62	23.10	4.72	963.00	967.75	968.64	970.59	0.013112	9.19	17.25	5.85	2.59	1.40
Main	3588.168	2924 cfs	2924.00	1610.77	1287.67	25.56	4.83	963.00	967.86	968.80	970.93	0.013078	9.63	18.11	6.27	2.72	1.45
Main	3588.168	3116 cfs	3116.00	1687.58	1401.13	27.29	4.90	963.00	967.93	968.92	971.17	0.013020	9.93	18.71	6.55	2.81	1.49
Main	3588.168	3400 cfs	3400.00	1799.55	1570.64	29.81	4.99	963.00	968.02	969.08	971.52	0.012717	10.38	19.57	6.97	2.95	1.54
Main	3588.168	3881 cfs 0.25 PM	3881.00	1455.04	2389.34	36.62	6.91	963.00	969.94	969.34	970.94	0.003629	6.26	11.43	5.07	1.70	0.77
Main	3588.168	4188 cfs	4188.00	1507.84	2639.62	40.54	7.23	963.00	970.25	969.50	971.23	0.003460	6.25	11.33	5.14	1.70	0.74
Main	3588.168	11457 cfs 0.5 PM	11457.00	2864.47	8433.28	159.24	12.64	963.00	975.67	972.41	976.76	0.002381	7.19	12.30	6.60	1.94	0.61
Main	3588.168	13000 cfs	13000.00	3142.39	9667.09	190.52	13.61	963.00	976.64	972.92	977.76	0.002264	7.35	12.53	6.79	1.98	0.60
Main	3588.168	15000 cfs	15000.00	3511.82	11255.94	232.24	14.68	963.00	977.71	973.51	978.91	0.002258	7.63	12.99	7.11	2.06	0.60
Main	3588.168	24229 cfs -24hr	24229.00	5262.11	18527.31	439.58	18.11	963.00	981.14	976.03	982.89	0.002601	9.19	15.77	8.71	2.50	0.65
Main	3588.168	31970 cfs - 6hr	31970.00	6619.45	24722.40	628.14	20.26	963.00	983.29		985.49	0.002806	10.37	17.74	9.94	2.82	0.69
Main	3402.445	1289 cfs	1289.00	844.91	387.00	57.09	5.19	961.00	966.44	966.25	967.27	0.002958	4.67	8.81	2.74	1.47	0.68
Main	3402.445	1980 cfs 100-yr	1980.00	1094.94	790.65	94.42	6.13	961.00	967.39	966.97	968.27	0.003317	5.00	9.66	3.51	1.66	0.69
Main	3402.445	2650 cfs 500-yr	2650.00	1318.44	1198.76	132.80	6.88	961.00	968.14	967.53	969.09	0.003664	5.34	10.36	4.06	1.80	0.70
Main	3402.445	2924 cfs	2924.00	1397.58	1377.35	149.07	7.19	961.00	968.45	967.74	969.40	0.003722	5.42	10.51	4.23	1.83	0.69
Main	3402.445	3116 cfs	3116.00	1451.63	1503.61	160.76	7.41	961.00	968.66	967.88	969.62	0.003725	5.47	10.60	4.35	1.86	0.69
Main	3402.445	3400 cfs	3400.00	1534.74	1687.05	178.21	7.69	961.00	968.95	968.12	969.92	0.003926	5.58	10.80	4.52	1.90	0.69
Main	3402.445	3881 cfs 0.25 PM	3881.00	1667.72	2003.53	209.75	8.18	961.00	969.43		970.43	0.004074	5.71	11.04	4.76	1.96	0.68
Main	3402.445	4188 cfs	4188.00	1751.20	2206.39	230.41	8.48	961.00	969.73		970.74	0.004167	5.79	11.18	4.89	1.99	0.68
Main	3402.445	11457 cfs 0.5 PM	11457.00	3571.64	7061.99	823.37	13.71	961.00	974.96		976.41	0.004151	7.31	14.10	7.02	2.67	0.67
Main	3402.445	13000 cfs	13000.00	3921.84	8103.05	975.11	14.67	961.00	975.93		977.43	0.004081	7.49	14.46	7.27	2.78	0.67

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	3402.445	15000 cfs	15000.00	4426.87	9398.27	1174.86	15.66	961.00	976.92		978.57	0.004085	7.83	15.30	7.63	2.97	0.68
Main	3402.445	24229 cfs -24hr	24229.00	6535.63	15653.04	2040.33	18.75	961.00	980.00		982.47	0.004219	9.72	18.86	9.78	3.74	0.77
Main	3402.445	31970 cfs - 6hr	31970.00	8097.24	21122.28	2750.48	20.92	961.00	982.17		985.05	0.004382	10.46	20.95	10.51	4.17	0.81
Main	3205.869	1289 cfs	1289.00	746.28	352.11	190.61	5.09	961.00	966.09		966.62	0.003572	3.65	7.33	2.99	1.42	0.57
Main	3205.869	1980 cfs 100-yr	1980.00	1065.08	598.01	316.91	5.84	961.00	966.84		967.61	0.004331	4.41	9.12	3.73	1.84	0.66
Main	3205.869	2650 cfs 500-yr	2650.00	1365.64	843.40	440.96	6.35	961.00	967.35		968.39	0.004952	5.12	10.74	4.42	2.21	0.75
Main	3205.869	2924 cfs	2924.00	1484.82	946.52	492.66	6.55	961.00	967.55		968.68	0.005235	5.38	11.33	4.67	2.35	0.78
Main	3205.869	3116 cfs	3116.00	1564.73	1021.58	529.69	6.70	961.00	967.70		968.90	0.005459	5.52	11.67	4.82	2.42	0.79
Main	3205.869	3400 cfs	3400.00	1699.42	1120.51	580.07	6.77	961.00	967.77		969.15	0.005340	5.92	12.55	5.18	2.61	0.85
Main	3205.869	3881 cfs 0.25 PM	3881.00	1912.84	1298.85	669.31	6.97	961.00	967.97	967.55	969.60	0.005709	6.44	13.71	5.67	2.86	0.91
Main	3205.869	4188 cfs	4188.00	2048.52	1413.14	726.33	7.08	961.00	968.08	967.77	969.88	0.006046	6.78	14.45	5.99	3.02	0.96
Main	3205.869	11457 cfs 0.5 PM	11457.00	4712.97	4488.63	2255.40	10.74	961.00	971.74	971.74	975.41	0.007506	9.80	21.92	9.33	4.77	1.18
Main	3205.869	13000 cfs	13000.00	5274.10	5104.60	2621.30	11.41	961.00	972.41	972.41	976.42	0.006710	10.18	23.10	9.65	5.04	1.21
Main	3205.869	15000 cfs	15000.00	5904.70	6011.61	3083.69	12.37	961.00	973.37	973.37	977.55	0.005873	10.42	23.86	9.97	5.23	1.20
Main	3205.869	24229 cfs -24hr	24229.00	8280.84	10898.02	5050.15	16.14	961.00	977.14	977.14	981.50	0.004139	10.75	25.64	10.48	5.67	1.12
Main	3205.869	31970 cfs - 6hr	31970.00	10073.33	15354.26	6542.41	18.16	961.00	979.16	979.16	984.04	0.003700	11.62	27.73	11.62	6.13	1.15
Main	3065.593	1289 cfs	1289.00	828.32	248.16	212.52	4.24	960.80	965.11	965.11	966.06	0.003928	4.55	9.58	2.56	2.12	0.82
Main	3065.593	1980 cfs 100-yr	1980.00	1117.48	548.50	314.02	4.91	960.80	965.79	965.79	966.95	0.003770	5.14	11.15	3.46	2.48	0.89
Main	3065.593	2650 cfs 500-yr	2650.00	1361.52	879.28	409.21	5.49	960.80	966.36	966.36	967.65	0.003723	5.55	12.16	4.08	2.72	0.92
Main	3065.593	2924 cfs	2924.00	1463.40	1011.89	448.71	5.66	960.80	966.54	966.54	967.91	0.003762	5.77	12.67	4.33	2.85	0.94
Main	3065.593	3116 cfs	3116.00	1542.13	1096.99	476.89	5.74	960.80	966.61	966.61	968.08	0.003832	6.00	13.18	4.54	2.96	0.97
Main	3065.593	3400 cfs	3400.00	1584.74	1301.52	513.74	6.19	960.80	967.07	967.07	968.34	0.003530	5.62	12.54	4.38	2.84	0.89
Main	3065.593	3881 cfs 0.25 PM	3881.00	1711.96	1598.30	570.74	6.50	960.80	967.38	967.38	968.68	0.003540	5.80	12.92	4.68	2.93	0.89
Main	3065.593	4188 cfs	4188.00	1801.30	1778.87	607.83	6.64	960.80	967.52	967.52	968.88	0.003580	5.99	13.30	4.91	3.03	0.91
Main	3065.593	11457 cfs 0.5 PM	11457.00	4148.62	5784.06	1524.32	7.69	960.80	968.57	970.05	973.54	0.011989	12.33	26.43	11.09	6.09	1.68
Main	3065.593	13000 cfs	13000.00	3582.41	7898.73	1518.86	10.24	960.80	971.12	970.49	973.10	0.002918	8.61	17.15	8.56	4.02	0.94
Main	3065.593	15000 cfs	15000.00	3830.32	9473.90	1695.78	11.33	960.80	972.21	970.97	974.04	0.002604	8.46	16.57	8.56	3.89	0.87
Main	3065.593	24229 cfs -24hr	24229.00	5133.55	16534.21	2561.24	15.44	960.80	976.32	973.11	978.03	0.001961	8.42	16.30	8.75	3.82	0.73
Main	3065.593	31970 cfs - 6hr	31970.00	6179.35	22532.94	3257.72	18.23	960.80	979.11	974.70	980.85	0.001749	8.61	16.61	9.02	3.85	0.69
Main	2954.488	1289 cfs	1289.00	879.73	171.20	238.07	4.00	959.00	963.20	963.87	965.12	0.007485	7.93	12.67	2.64	8.46	1.12
Main	2954.488	1980 cfs 100-yr	1980.00	767.82	935.32	276.85	5.68	959.00	964.87	964.36	965.37	0.002070	4.38	7.80	3.10	5.37	0.58
Main	2954.488	2650 cfs 500-yr	2650.00	892.47	1414.99	342.55	6.28	959.00	965.48	964.77	966.00	0.002149	4.68	8.19	3.57	5.62	0.58
Main	2954.488	2924 cfs	2924.00	941.93	1613.27	368.80	6.50	959.00	965.70	964.91	966.23	0.002181	4.80	8.35	3.74	5.72	0.58
Main	2954.488	3116 cfs	3116.00	975.54	1753.56	386.90	6.66	959.00	965.85	965.01	966.39	0.002196	4.88	8.45	3.84	5.78	0.58
Main	2954.488	3400 cfs	3400.00	1024.68	1961.82	413.50	6.87	959.00	966.07	965.15	966.62	0.002217	4.99	8.59	3.99	5.87	0.58
Main	2954.488	3881 cfs 0.25 PM	3881.00	1110.71	2311.24	459.05	7.20	959.00	966.39	965.37	966.98	0.002298	5.21	8.90	4.25	6.05	0.58
Main	2954.488	4188 cfs	4188.00	1163.06	2537.46	487.48	7.40	959.00	966.60	965.50	967.20	0.002330	5.33	9.06	4.39	6.14	0.59
Main	2954.488	11457 cfs 0.5 PM	11457.00	2179.62	8180.31	1097.07	11.58	959.00	970.77	967.97	971.60	0.002239	6.72	10.85	6.09	6.79	0.56
Main	2954.488	13000 cfs	13000.00	2372.94	9404.17	1222.89	12.37	959.00	971.57		972.42	0.002163	6.88	11.06	6.29	6.80	0.55
Main	2954.488	15000 cfs	15000.00	2618.86	10995.32	1385.82	13.36	959.00	972.56		973.45	0.002071	7.05	11.30	6.50	6.80	0.54
Main	2954.488	24229 cfs -24hr	24229.00	3708.91	18385.08	2135.01	17.35	959.00	976.55		977.60	0.001844	7.74	12.32	7.30	6.82	0.52
Main	2954.488	31970 cfs - 6hr	31970.00	4584.75	24622.20	2763.06	20.09	959.00	979.29		980.49	0.001791	8.26	13.15	7.89	6.91	0.52
Main	2823.359	1289 cfs	1289.00	568.84	717.11	3.04	5.05	958.60	963.96	963.14	964.23	0.002468	3.15	5.62	2.36	0.61	0.44
Main	2823.359	1980 cfs 100-yr	1980.00	751.34	1223.64	5.02	5.77	958.60	964.68		965.01	0.002840	3.76	6.50	3.03	0.72	0.48
Main	2823.359	2650 cfs 500-yr	2650.00	920.29	1722.60	7.12	6.32	958.60	965.23		965.64	0.003100	4.29	7.26	3.57	0.81	0.51
Main	2823.359	2924 cfs	2924.00	987.23	1928.74	8.03	6.52	958.60	965.43		965.88	0.003197	4.49	7.55	3.77	0.85	0.52
Main	2823.359	3116 cfs	3116.00	1033.06	2074.26	8.69	6.66	958.60	965.57		966.04	0.003269	4.61	7.73	3.90	0.87	0.53
Main	2823.359	3400 cfs	3400.00	1100.02	2290.29	9.69	6.86	958.60	965.77		966.27	0.003369	4.79	7.99	4.00	0.90	0.54
Main	2823.359	3881 cfs 0.25 PM	3881.00	1215.59	2653.99	11.41	7.15	958.60	966.06		966.62	0.003408	5.12	8.48	4.40	0.96	0.56
Main	2823.359	4188 cfs	4188.00	1286.70	2888.73	12.57	7.34	958.60	966.25		966.84	0.003441	5.30	8.74	4.58	1.00	0.57
Main	2823.359	11457 cfs 0.5 PM	11457.00	2798.06	8610.48	48.46	11.12	958.60	970.03		971.22	0.003386	7.81	12.55	7.11	1.49	0.66
Main	2823.359	13000 cfs	13000.00	3095.48	9846.29	58.23	11.87	958.60	970.78		972.05	0.003266	8.08	13.01	7.39	1.55	0.67
Main	2823.359	15000 cfs	15000.00	3476.73	11451.33	71.95	12.81	958.60	971.72		973.08	0.003126	8.38	13.54	7.70	1.62	0.67
Main	2823.359	24229 cfs -24hr	24229.00	5224.20	18847.15	157.65	16.56	958.60	975.47		977.24	0.002900	9.47	15.73	8.82	1.75	0.68
Main	2823.359	31970 cfs - 6hr	31970.00	6678.45	25003.79	287.76	19.09	958.60	978.00		980.11	0.002953	10.23	17.45	9.62	2.00	0.70

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	2705.758	1289 cfs	1289.00	774.74	492.89	21.37	4.34	958.50	963.11	963.11	963.87	0.004008	4.54	8.79	2.71	1.51	0.74
Main	2705.758	1980 cfs 100-yr	1980.00	1026.84	921.07	32.09	4.86	958.50	963.63	963.63	964.60	0.004195	5.47	10.41	3.75	1.80	0.83
Main	2705.758	2650 cfs 500-yr	2650.00	1232.91	1374.66	42.43	5.32	958.50	964.09	964.09	965.19	0.004326	6.09	11.42	4.49	1.98	0.87
Main	2705.758	2924 cfs	2924.00	1313.35	1563.97	46.68	5.48	958.50	964.25	964.25	965.41	0.004374	6.32	11.79	4.76	2.05	0.89
Main	2705.758	3116 cfs	3116.00	1371.82	1694.50	49.68	5.58	958.50	964.35	964.35	965.56	0.004500	6.51	12.10	4.96	2.10	0.90
Main	2705.758	3400 cfs	3400.00	1456.53	1889.32	54.15	5.73	958.50	964.50	964.49	965.78	0.004592	6.77	12.53	5.23	2.18	0.92
Main	2705.758	3881 cfs 0.25 PM	3881.00	1558.52	2260.70	61.78	6.10	958.50	964.87		966.13	0.004500	6.89	12.59	5.49	2.19	0.90
Main	2705.758	4188 cfs	4188.00	1629.56	2491.70	66.75	6.30	958.50	965.07		966.35	0.004547	7.02	12.74	5.68	2.22	0.89
Main	2705.758	11457 cfs 0.5 PM	11457.00	3174.80	8073.54	208.67	10.24	958.50	969.01		970.74	0.003903	8.98	15.27	8.16	2.65	0.84
Main	2705.758	13000 cfs	13000.00	3480.66	9273.86	245.48	11.03	958.50	969.80		971.59	0.003665	9.17	15.54	8.41	2.70	0.82
Main	2705.758	15000 cfs	15000.00	3876.21	10827.54	296.25	12.01	958.50	970.78		972.64	0.003422	9.39	15.89	8.69	2.75	0.81
Main	2705.758	24229 cfs -24hr	24229.00	5736.52	17925.82	566.66	15.73	958.50	974.50		976.82	0.003068	10.51	17.96	9.94	3.09	0.80
Main	2705.758	31970 cfs - 6hr	31970.00	7315.16	23827.73	827.11	18.10	958.50	976.87		979.67	0.003133	11.50	19.90	10.97	3.43	0.82
Main	2605.517	1289 cfs	1289.00	854.88	414.34	19.78	4.99	957.20	962.19	962.04	962.99	0.004005	5.03	8.56	2.94	1.29	0.68
Main	2605.517	1980 cfs 100-yr	1980.00	1075.56	873.91	30.52	5.85	957.20	963.05	962.75	963.85	0.003712	5.29	9.19	3.71	1.41	0.67
Main	2605.517	2650 cfs 500-yr	2650.00	1277.41	1331.48	41.11	6.47	957.20	963.67	963.24	964.55	0.003875	5.72	9.86	4.34	1.53	0.68
Main	2605.517	2924 cfs	2924.00	1355.90	1522.54	45.55	6.70	957.20	963.90	963.41	964.81	0.003978	5.88	10.10	4.56	1.57	0.69
Main	2605.517	3116 cfs	3116.00	1417.54	1649.79	48.67	6.82	957.20	964.02	963.53	964.97	0.004016	6.05	10.37	4.74	1.61	0.70
Main	2605.517	3400 cfs	3400.00	1498.18	1848.44	53.38	7.04	957.20	964.24		965.22	0.004119	6.23	10.63	4.96	1.66	0.71
Main	2605.517	3881 cfs 0.25 PM	3881.00	1633.73	2185.77	61.50	7.37	957.20	964.57		965.61	0.004284	6.51	11.07	5.29	1.73	0.72
Main	2605.517	4188 cfs	4188.00	1725.17	2396.12	66.71	7.54	957.20	964.74		965.84	0.004353	6.73	11.43	5.52	1.79	0.73
Main	2605.517	11457 cfs 0.5 PM	11457.00	3405.80	7838.37	212.84	11.48	957.20	968.68		970.33	0.003565	8.58	14.81	7.71	2.37	0.77
Main	2605.517	13000 cfs	13000.00	3708.53	9040.84	250.63	12.31	957.20	969.51		971.19	0.003340	8.68	15.04	7.88	2.42	0.76
Main	2605.517	15000 cfs	15000.00	4099.31	10598.17	302.52	13.34	957.20	970.54		972.26	0.003117	8.81	15.34	8.08	2.48	0.74
Main	2605.517	24229 cfs -24hr	24229.00	5928.27	17727.45	573.29	17.17	957.20	974.37		976.44	0.002796	9.70	17.24	9.09	2.81	0.73
Main	2605.517	31970 cfs - 6hr	31970.00	7473.02	23667.58	829.40	19.60	957.20	976.80		979.26	0.002850	10.54	19.04	9.97	3.11	0.76
Main	2500.830	1289 cfs	1289.00	990.48	268.33	30.20	4.90	955.70	961.41	961.41	962.53	0.005880	4.19	9.65	1.45	1.56	0.77
Main	2500.830	1980 cfs 100-yr	1980.00	1267.42	663.27	49.31	5.82	955.70	962.34	962.34	963.44	0.004207	4.26	10.39	2.11	1.71	0.76
Main	2500.830	2650 cfs 500-yr	2650.00	1531.40	1051.49	67.12	6.35	955.70	962.87	962.87	964.10	0.004542	4.72	11.50	2.68	1.90	0.80
Main	2500.830	2924 cfs	2924.00	1642.08	1207.49	74.43	6.52	955.70	963.03	963.03	964.35	0.004783	4.95	12.03	2.90	2.00	0.83
Main	2500.830	3116 cfs	3116.00	1700.76	1335.50	79.74	6.68	955.70	963.20	963.20	964.51	0.004745	5.02	12.15	3.02	2.02	0.83
Main	2500.830	3400 cfs	3400.00	1808.90	1503.64	87.46	6.84	955.70	963.36	963.36	964.75	0.004939	5.23	12.62	3.23	2.10	0.85
Main	2500.830	3881 cfs 0.25 PM	3881.00	1985.03	1795.26	100.71	7.10	955.70	963.61	963.61	965.12	0.005264	5.57	13.35	3.57	2.23	0.88
Main	2500.830	4188 cfs	4188.00	2077.83	2000.66	109.51	7.31	955.70	963.82	963.82	965.35	0.005287	5.69	13.57	3.74	2.27	0.88
Main	2500.830	11457 cfs 0.5 PM	11457.00	3845.65	7242.23	369.12	11.84	955.70	968.35		969.94	0.003175	7.02	15.51	5.81	2.66	0.79
Main	2500.830	13000 cfs	13000.00	4182.58	8381.22	436.20	12.70	955.70	969.22		970.82	0.003011	7.16	15.72	6.04	2.71	0.78
Main	2500.830	15000 cfs	15000.00	4614.13	9856.39	529.48	13.76	955.70	970.28		971.91	0.002844	7.33	16.01	6.29	2.77	0.76
Main	2500.830	24229 cfs -24hr	24229.00	6604.87	16601.79	1022.34	17.66	955.70	974.18		976.11	0.002626	8.26	17.85	7.39	3.23	0.75
Main	2500.830	31970 cfs - 6hr	31970.00	8262.53	22244.90	1462.57	20.11	955.70	976.62		978.91	0.002699	9.07	19.62	8.25	3.61	0.77
Main	2428.753	1289 cfs	1289.00	1065.32	163.99	59.70	3.70	955.33	959.15	959.83	961.82	0.007599	7.67	14.38	2.32	2.56	1.32
Main	2428.753	1980 cfs 100-yr	1980.00	1451.54	405.57	122.90	5.33	955.33	960.78	961.49	962.91	0.005726	5.54	13.60	2.03	2.44	1.04
Main	2428.753	2650 cfs 500-yr	2650.00	1726.86	756.37	166.77	6.01	955.33	961.45	962.07	963.58	0.005894	5.57	14.37	2.60	2.58	1.03
Main	2428.753	2924 cfs	2924.00	1829.72	910.52	183.76	6.22	955.33	961.67	962.25	963.82	0.006076	5.68	14.70	2.84	2.64	1.04
Main	2428.753	3116 cfs	3116.00	1901.71	1018.68	195.61	6.36	955.33	961.81	962.41	963.98	0.006041	5.77	14.95	3.00	2.69	1.05
Main	2428.753	3400 cfs	3400.00	2004.87	1181.72	213.42	6.55	955.33	962.00	962.58	964.20	0.006216	5.91	15.30	3.22	2.76	1.05
Main	2428.753	3881 cfs 0.25 PM	3881.00	2170.48	1465.33	245.20	6.85	955.33	962.30	962.84	964.56	0.006459	6.15	15.83	3.58	2.88	1.07
Main	2428.753	4188 cfs	4188.00	2275.56	1647.06	265.38	7.03	955.33	962.48	963.03	964.78	0.006469	6.31	16.19	3.80	2.96	1.08
Main	2428.753	11457 cfs 0.5 PM	11457.00	3676.14	6991.52	789.33	12.86	955.33	968.31		969.61	0.001355	6.23	14.29	5.37	2.83	0.70
Main	2428.753	13000 cfs	13000.00	4011.77	8083.44	904.80	13.72	955.33	969.17		970.51	0.001367	6.42	14.61	5.63	2.89	0.70
Main	2428.753	15000 cfs	15000.00	4439.19	9501.65	1059.16	14.78	955.33	970.23		971.62	0.001377	6.64	15.01	5.92	2.96	0.69
Main	2428.753	24229 cfs -24hr	24229.00	6392.75	16017.82	1818.43	18.66	955.33	974.11		975.85	0.001518	7.66	17.12	7.12	3.37	0.70
Main	2428.753	31970 cfs - 6hr	31970.00	8002.69	21461.72	2505.59	21.11	955.33	976.56		978.64	0.001618	8.48	18.95	8.02	3.74	0.73
Main	2316.257	1289 cfs	1289.00	806.71	133.17	349.12	6.47	951.00	957.56	955.05	957.96	0.002704	3.92	6.15	1.91	2.74	0.43
Main	2316.257	1980 cfs 100-yr	1980.00	1144.06	282.86	553.08	7.47	951.00	958.56	955.96	959.13	0.002601	4.60	7.55	2.50	3.34	0.49
Main	2316.257	2650 cfs 500-yr	2650.00	1414.17	480.82	755.00	8.49	951.00	959.57	957.43	960.21	0.001759	4.77	8.21	2.74	3.62	0.50
Main	2316.257	2924 cfs	2924.00	1500.07	584.13	839.80	8.98	951.00	960.07	957.72	960.69	0.001580	4.68	8.23	2.76	3.63	0.48

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	2316.257	3116 cfs	3116.00	1557.55	658.44	900.01	9.29	951.00	960.37	957.89	960.99	0.001504	4.66	8.27	2.81	3.66	0.48
Main	2316.257	3400 cfs	3400.00	1634.95	775.31	989.73	9.77	951.00	960.86	958.22	961.46	0.001377	4.60	8.25	2.86	3.67	0.47
Main	2316.257	3881 cfs 0.25 PM	3881.00	1759.86	985.19	1135.95	10.51	951.00	961.60	958.67	962.17	0.001239	4.51	8.25	2.90	3.70	0.45
Main	2316.257	4188 cfs	4188.00	1826.01	1139.63	1222.35	10.97	951.00	962.06	958.95	962.61	0.001163	4.44	8.21	2.92	3.69	0.44
Main	2316.257	11457 cfs 0.5 PM	11457.00	3375.30	4839.72	3241.98	17.57	951.00	968.66		969.26	0.000775	4.97	9.47	4.00	4.38	0.40
Main	2316.257	13000 cfs	13000.00	3718.45	5587.90	3693.66	18.42	951.00	969.50		970.16	0.000798	5.20	9.95	4.23	4.61	0.41
Main	2316.257	15000 cfs	15000.00	4154.74	6560.76	4284.50	19.46	951.00	970.55		971.27	0.000820	5.48	10.52	4.48	4.87	0.42
Main	2316.257	24229 cfs -24hr	24229.00	6183.02	10880.57	7165.41	23.36	951.00	974.45		975.48	0.000951	6.48	13.05	5.24	6.01	0.48
Main	2316.257	31970 cfs - 6hr	31970.00	7641.05	14886.65	9442.31	25.89	951.00	976.98		978.22	0.001044	7.18	14.55	5.92	6.67	0.50
Main	2232.403	1289 cfs	1289.00	984.37	62.52	242.11	4.16	951.30	955.81	955.81	957.60	0.004676	6.53	12.18	3.84	2.42	1.05
Main	2232.403	1980 cfs 100-yr	1980.00	1292.04	218.20	469.76	5.85	951.30	957.50	957.50	958.84	0.004954	4.80	11.36	2.84	2.11	0.83
Main	2232.403	2650 cfs 500-yr	2650.00	1303.55	665.49	680.96	7.80	951.30	959.45	959.45	960.06	0.002890	3.51	8.61	2.94	1.81	0.51
Main	2232.403	2924 cfs	2924.00	1353.82	816.87	753.31	8.33	951.30	959.98	959.98	960.54	0.002620	3.44	8.36	3.04	1.79	0.54
Main	2232.403	3116 cfs	3116.00	1396.83	915.75	803.42	8.65	951.30	960.30	960.30	960.84	0.002343	3.43	8.31	3.12	1.80	0.50
Main	2232.403	3400 cfs	3400.00	1456.27	1066.40	877.33	9.16	951.30	960.81	960.81	961.31	0.002336	3.40	8.19	3.20	1.79	0.48
Main	2232.403	3881 cfs 0.25 PM	3881.00	1567.51	1311.30	1002.19	9.91	951.30	961.56	961.56	962.04	0.002178	3.41	8.14	3.34	1.81	0.46
Main	2232.403	4188 cfs	4188.00	1639.92	1466.15	1081.93	10.36	951.30	962.01	962.01	962.49	0.002109	3.43	8.15	3.42	1.83	0.45
Main	2232.403	11457 cfs 0.5 PM	11457.00	2964.03	5939.22	2553.75	17.01	951.30	968.66		969.16	0.001428	3.99	8.97	4.49	2.10	0.38
Main	2232.403	13000 cfs	13000.00	3250.60	6893.35	2856.05	17.86	951.30	969.51		970.06	0.001465	4.20	9.36	4.77	2.19	0.39
Main	2232.403	15000 cfs	15000.00	3611.33	8141.89	3246.79	18.92	951.30	970.57		971.17	0.001509	4.44	9.82	5.09	2.30	0.40
Main	2232.403	24229 cfs -24hr	24229.00	5227.46	13920.67	5080.86	22.85	951.30	974.50		975.34	0.001657	5.41	11.78	6.35	2.76	0.43
Main	2232.403	31970 cfs - 6hr	31970.00	6553.46	18779.21	6637.33	25.36	951.30	977.01		978.08	0.001830	6.13	13.30	7.25	3.11	0.47
Main	2143.723	1289 cfs	1289.00	1200.82	8.17	80.01	6.17	949.00	955.37	953.86	956.49	0.003017	5.75	8.81	0.30	1.32	0.63
Main	2143.723	1980 cfs 100-yr	1980.00	1863.97	8.42	107.62	6.82	949.00	956.02	955.39	958.26	0.004665	7.35	12.37	0.23	1.30	0.84
Main	2143.723	2650 cfs 500-yr	2650.00	2349.79	24.98	275.23	7.94	949.00	957.14	957.14	959.62	0.004001	6.33	13.40	0.27	1.84	0.84
Main	2143.723	2924 cfs	2924.00	2535.66	36.13	352.21	8.36	949.00	957.56	957.56	960.11	0.003597	5.99	13.73	0.28	2.01	0.84
Main	2143.723	3116 cfs	3116.00	2612.17	57.85	445.99	9.01	949.00	958.21	957.82	960.46	0.002997	5.14	13.12	0.30	2.07	0.77
Main	2143.723	3400 cfs	3400.00	2847.41	63.91	488.68	9.03	949.00	958.23	958.23	960.89	0.004112	5.58	14.27	0.33	2.25	0.84
Main	2143.723	3881 cfs 0.25 PM	3881.00	3160.66	98.66	621.68	9.57	949.00	958.78	958.78	961.62	0.004004	5.44	14.94	0.39	2.47	0.85
Main	2143.723	4188 cfs	4188.00	3361.53	121.09	705.39	9.87	949.00	959.08	959.08	962.05	0.003975	5.44	15.40	0.43	2.61	0.86
Main	2143.723	11457 cfs 0.5 PM	11457.00	6801.41	1897.00	2758.59	16.11	949.00	965.32	965.32	968.75	0.002553	5.35	19.10	1.76	3.91	0.84
Main	2143.723	13000 cfs	13000.00	7420.96	2460.45	3118.59	16.80	949.00	966.01	966.01	969.62	0.002452	5.61	19.98	2.07	4.12	0.86
Main	2143.723	15000 cfs	15000.00	8229.48	3226.91	3543.61	17.60	949.00	966.80	966.80	970.70	0.002350	5.95	21.16	2.46	4.32	0.89
Main	2143.723	24229 cfs -24hr	24229.00	11417.89	7363.71	5447.40	21.08	949.00	970.28	970.28	974.83	0.002327	6.98	24.51	3.93	4.80	0.94
Main	2143.723	31970 cfs - 6hr	31970.00	13882.97	10767.78	7319.25	23.08	949.00	972.28	972.28	977.51	0.002530	7.88	27.22	4.87	5.47	1.00
Main	2051.261	1289 cfs	1289.00	1028.98	23.01	237.00	6.37	949.00	955.43		956.07	0.004784	4.46	7.16	0.93	1.97	0.50
Main	2051.261	1980 cfs 100-yr	1980.00	1533.46	52.79	393.76	7.29	949.00	956.35	954.47	957.41	0.004720	5.11	9.32	0.75	2.59	0.61
Main	2051.261	2650 cfs 500-yr	2650.00	1798.28	320.49	531.23	8.71	949.00	957.77	955.58	958.67	0.002285	4.12	9.15	1.33	2.59	0.55
Main	2051.261	2924 cfs	2924.00	1864.35	478.21	581.44	9.39	949.00	958.44	955.82	959.23	0.001885	3.79	8.80	1.46	2.51	0.51
Main	2051.261	3116 cfs	3116.00	1888.53	613.11	614.36	9.97	949.00	959.03		959.72	0.001583	3.51	8.39	1.51	2.40	0.47
Main	2051.261	3400 cfs	3400.00	2155.86	568.63	675.51	9.45	949.00	958.50	957.29	959.54	0.002456	4.34	10.11	1.69	2.89	0.58
Main	2051.261	3881 cfs 0.25 PM	3881.00	2330.40	786.72	763.88	10.09	949.00	959.14	957.73	960.16	0.002313	4.27	10.24	1.87	2.94	0.57
Main	2051.261	4188 cfs	4188.00	2439.84	928.60	819.56	10.46	949.00	959.52	957.98	960.53	0.002233	4.25	10.33	1.96	2.97	0.56
Main	2051.261	11457 cfs 0.5 PM	11457.00	4018.81	5684.50	1753.69	16.97	949.00	966.03	962.36	966.73	0.001124	4.25	10.49	3.34	2.90	0.45
Main	2051.261	13000 cfs	13000.00	4261.06	6817.68	1921.26	18.07	949.00	967.13	962.87	967.80	0.001041	4.30	10.45	3.52	2.85	0.43
Main	2051.261	15000 cfs	15000.00	4563.97	8283.52	2152.52	19.43	949.00	968.48	963.53	969.13	0.000955	4.37	10.41	3.71	2.82	0.42
Main	2051.261	24229 cfs -24hr	24229.00	6161.16	14671.54	3396.30	23.59	949.00	972.65	965.71	973.40	0.000955	5.09	11.57	4.65	3.18	0.42
Main	2051.261	31970 cfs - 6hr	31970.00	7533.54	19966.15	4470.32	25.98	949.00	975.04	967.23	975.95	0.001053	5.77	12.85	5.40	3.56	0.44
Main	1964.138	1289 cfs	1289.00	1109.96	95.54	83.50	4.00	949.49	953.88	953.88	955.55	0.004375	8.51	11.10	2.96	4.36	0.98
Main	1964.138	1980 cfs 100-yr	1980.00	1534.52	279.73	165.76	5.60	949.49	955.48	955.48	956.96	0.003233	6.41	10.96	2.14	4.35	0.82
Main	1964.138	2650 cfs 500-yr	2650.00	1564.56	844.61	240.83	7.90	949.49	957.78		958.39	0.001587	3.94	9.72	2.12	3.16	0.50
Main	1964.138	2924 cfs	2924.00	1624.39	1026.41	273.20	8.59	949.49	958.47		959.00	0.001330	3.68	7.57	2.10	3.04	0.46
Main	1964.138	3116 cfs	3116.00	1661.08	1155.90	299.02	9.17	949.49	959.05		959.52	0.001076	3.44	7.25	2.02	2.92	0.42
Main	1964.138	3400 cfs	3400.00	1877.76	1203.62	318.62	8.66	949.49	958.54		959.23	0.002148	4.21	8.68	2.41	3.48	0.52
Main	1964.138	3881 cfs 0.25 PM	3881.00	2051.22	1455.42	374.36	9.30	949.49	959.17		959.87	0.002223	4.18	8.83	2.46	3.56	0.51
Main	1964.138	4188 cfs	4188.00	2152.73	1626.05	409.22	9.68	949.49	959.56		960.24	0.002214	4.16	8.90	2.50	3.60	0.50

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	1964.138	11457 cfs 0.5 PM	11457.00	3523.72	6839.66	1093.63	16.21	949.49	966.09		966.58	0.000814	4.30	8.70	3.51	3.53	0.38
Main	1964.138	13000 cfs	13000.00	3794.02	7955.69	1250.29	17.30	949.49	967.17		967.67	0.000770	4.39	8.78	3.66	3.56	0.37
Main	1964.138	15000 cfs	15000.00	4139.25	9404.73	1456.03	18.64	949.49	968.51		969.01	0.000724	4.51	8.89	3.83	3.59	0.36
Main	1964.138	24229 cfs -24hr	24229.00	5867.71	15919.26	2442.04	22.77	949.49	972.64		973.30	0.000782	5.37	10.32	4.77	4.04	0.38
Main	1964.138	31970 cfs - 6hr	31970.00	7313.77	21315.87	3340.36	25.14	949.49	975.01		975.84	0.000899	6.11	11.65	5.52	4.50	0.41
Main	1862.561	1289 cfs	1289.00	1217.71	42.08	29.21	6.81	946.00	952.81	951.13	954.11	0.002984	7.56	9.37	2.40	1.27	0.63
Main	1862.561	1980 cfs 100-yr	1980.00	1786.19	125.42	68.39	9.09	946.00	955.09	952.77	956.58	0.002534	6.81	10.31	1.81	1.41	0.60
Main	1862.561	2650 cfs 500-yr	2650.00	2035.70	503.30	111.00	11.04	946.00	957.04	953.96	958.18	0.002236	5.38	9.67	2.52	1.36	0.51
Main	1862.561	2924 cfs	2924.00	2108.96	685.03	130.01	11.80	946.00	957.80	956.06	958.81	0.002277	5.08	9.37	2.71	1.33	0.48
Main	1862.561	3116 cfs	3116.00	2071.04	901.48	143.48	12.58	946.00	958.58	956.30	959.38	0.002129	4.37	8.63	2.52	1.24	0.43
Main	1862.561	3400 cfs	3400.00	2647.61	611.77	140.62	10.89	946.00	956.89	956.61	958.88	0.002356	7.15	12.75	3.24	1.79	0.68
Main	1862.561	3881 cfs 0.25 PM	3881.00	2964.24	753.33	163.43	11.11	946.00	957.11	957.11	959.47	0.002621	7.77	13.99	3.68	1.97	0.74
Main	1862.561	4188 cfs	4188.00	3136.86	871.54	179.60	11.34	946.00	957.34	957.34	959.84	0.002715	7.99	14.51	3.95	2.05	0.76
Main	1862.561	11457 cfs 0.5 PM	11457.00	4005.83	6862.55	588.63	19.62	946.00	965.62		966.46	0.000654	5.35	10.71	4.85	1.68	0.43
Main	1862.561	13000 cfs	13000.00	4289.62	8027.32	683.06	20.70	946.00	966.70		967.55	0.000630	5.47	10.87	5.06	1.72	0.42
Main	1862.561	15000 cfs	15000.00	4650.39	9537.78	811.83	22.03	946.00	968.03		968.90	0.000604	5.60	11.07	5.30	1.77	0.42
Main	1862.561	24229 cfs -24hr	24229.00	6529.92	16285.22	1413.86	25.97	946.00	971.97		973.17	0.000689	6.69	13.18	6.65	2.10	0.46
Main	1862.561	31970 cfs - 6hr	31970.00	8132.01	21870.83	1967.15	28.13	946.00	974.13		975.68	0.000815	7.67	15.16	7.77	2.42	0.50
Main	1782.724	1289 cfs	1289.00	1138.88	89.57	60.55	6.53	946.00	952.53		953.86	0.002856	7.25	9.82	3.47	1.69	0.68
Main	1782.724	1980 cfs 100-yr	1980.00	1715.95	143.63	120.42	8.68	946.00	954.68		956.36	0.002013	7.42	11.12	2.91	1.90	0.67
Main	1782.724	2650 cfs 500-yr	2650.00	2247.92	227.94	174.13	9.57	946.00	955.57	953.90	957.88	0.001853	7.85	13.22	2.52	2.26	0.75
Main	1782.724	2924 cfs	2924.00	2514.44	219.31	190.25	9.34	946.00	955.34	954.00	958.42	0.002091	9.43	15.13	3.11	2.59	0.87
Main	1782.724	3116 cfs	3116.00	2710.03	211.76	194.21	8.86	946.00	954.86	954.53	958.88	0.002391	11.25	17.21	3.96	2.94	1.02
Main	1782.724	3400 cfs	3400.00	2224.08	974.77	201.14	11.18	946.00	957.18	957.18	958.49	0.001569	5.21	11.19	2.79	1.92	0.59
Main	1782.724	3881 cfs 0.25 PM	3881.00	2805.80	832.18	243.01	10.70	946.00	956.70	957.47	959.18	0.003475	7.05	14.75	3.15	2.53	0.79
Main	1782.724	4188 cfs	4188.00	2989.69	937.93	260.37	10.76	946.00	956.76	957.65	959.51	0.003746	7.44	15.63	3.42	2.68	0.84
Main	1782.724	11457 cfs 0.5 PM	11457.00	2876.38	8125.46	455.15	19.85	946.00	965.85		966.29	0.000564	4.31	8.15	4.11	1.39	0.32
Main	1782.724	13000 cfs	13000.00	3088.46	9396.89	514.65	20.92	946.00	966.92		967.38	0.000555	4.44	8.30	4.29	1.42	0.32
Main	1782.724	15000 cfs	15000.00	3357.49	11048.45	594.06	22.25	946.00	968.25		968.74	0.000545	4.59	8.49	4.49	1.45	0.32
Main	1782.724	24229 cfs -24hr	24229.00	4725.93	18552.49	950.58	26.27	946.00	972.27		972.96	0.000657	5.60	10.12	5.65	1.65	0.35
Main	1782.724	31970 cfs - 6hr	31970.00	5883.32	24818.81	1267.87	28.51	946.00	974.51		975.42	0.000801	6.45	11.61	6.61	1.83	0.38
Main	1715.933	1289 cfs	1289.00	1048.49	129.60	110.91	6.57	946.00	952.57		953.57	0.004167	6.13	8.77	4.18	1.86	0.60
Main	1715.933	1980 cfs 100-yr	1980.00	1401.73	382.05	196.22	9.15	946.00	955.15		955.96	0.000888	4.76	8.41	2.84	1.71	0.49
Main	1715.933	2650 cfs 500-yr	2650.00	1562.26	837.71	250.04	10.61	946.00	956.61		957.25	0.000704	4.17	8.09	2.92	1.61	0.44
Main	1715.933	2924 cfs	2924.00	1651.70	1001.47	270.83	10.89	946.00	956.89		957.55	0.000735	4.28	8.33	3.11	1.66	0.44
Main	1715.933	3116 cfs	3116.00	1724.42	1105.49	286.10	11.03	946.00	957.03		957.72	0.000774	4.40	8.59	3.26	1.71	0.46
Main	1715.933	3400 cfs	3400.00	1809.33	1283.57	307.10	11.30	946.00	957.30	955.64	958.01	0.000800	4.50	8.79	3.44	1.74	0.46
Main	1715.933	3881 cfs 0.25 PM	3881.00	1957.14	1580.78	343.08	11.70	946.00	957.70	956.33	958.45	0.000855	4.70	9.19	3.73	1.82	0.47
Main	1715.933	4188 cfs	4188.00	2036.63	1786.25	365.13	11.98	946.00	957.98	956.57	958.74	0.000870	4.78	9.34	3.89	1.84	0.48
Main	1715.933	11457 cfs 0.5 PM	11457.00	3241.25	7278.82	936.94	19.62	946.00	965.62		966.24	0.000525	4.98	9.07	5.05	1.86	0.36
Main	1715.933	13000 cfs	13000.00	3545.24	8387.90	1066.86	20.66	946.00	966.66		967.32	0.000532	5.20	9.42	5.32	1.94	0.37
Main	1715.933	15000 cfs	15000.00	3932.61	9830.15	1237.24	21.95	946.00	967.95		968.67	0.000538	5.45	9.84	5.64	2.03	0.37
Main	1715.933	24229 cfs -24hr	24229.00	5817.33	16376.94	2034.73	25.74	946.00	971.74		972.87	0.000694	6.88	12.41	7.24	2.56	0.43
Main	1715.933	31970 cfs - 6hr	31970.00	7425.01	21874.38	2670.61	27.72	946.00	973.72		975.30	0.000876	8.10	14.71	8.59	2.97	0.49
Main	1601.778	1289 cfs	1289.00	1191.59	50.85	46.57	4.73	946.00	950.73	950.73	952.97	0.007639	9.65	12.48	2.80	2.32	1.01
Main	1601.778	1980 cfs 100-yr	1980.00	1019.85	903.03	57.12	9.44	946.00	955.44		955.68	0.000593	2.31	5.35	1.51	0.83	0.31
Main	1601.778	2650 cfs 500-yr	2650.00	1156.64	1420.46	72.90	10.82	946.00	956.82		957.04	0.000480	2.30	5.29	1.69	0.77	0.28
Main	1601.778	2924 cfs	2924.00	1241.10	1602.27	80.63	11.10	946.00	957.10		957.33	0.000508	2.41	5.53	1.81	0.79	0.29
Main	1601.778	3116 cfs	3116.00	1304.18	1725.64	86.18	11.25	946.00	957.25		957.49	0.000537	2.50	5.74	1.89	0.82	0.30
Main	1601.778	3400 cfs	3400.00	1387.85	1917.34	94.82	11.52	946.00	957.52		957.78	0.000562	2.60	5.97	2.00	0.84	0.31
Main	1601.778	3881 cfs 0.25 PM	3881.00	1530.07	2240.74	110.18	11.91	946.00	957.91		958.20	0.000609	2.78	6.36	2.17	0.89	0.32
Main	1601.778	4188 cfs	4188.00	1613.72	2453.47	120.82	12.19	946.00	958.19		958.49	0.000626	2.87	6.55	2.27	0.92	0.33
Main	1601.778	11457 cfs 0.5 PM	11457.00	3033.99	7811.04	611.97	19.74	946.00	965.74		966.09	0.000420	3.40	7.61	3.15	1.24	0.30
Main	1601.778	13000 cfs	13000.00	3338.55	8925.63	735.82	20.80	946.00	966.80		967.17	0.000425	3.55	7.95	3.32	1.33	0.31
Main	1601.778	15000 cfs	15000.00	3723.99	10373.70	902.31	22.10	946.00	968.10		968.51	0.000429	3.73	8.34	3.53	1.42	0.31
Main	1601.778	24229 cfs -24hr	24229.00	5550.71	17011.74	1666.56	26.00	946.00	972.00		972.63	0.000547	4.72	10.57	4.57	1.88	0.37

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	1601.778	31970 cfs - 6hr	31970.00	7076.93	22577.25	2315.82	28.11	946.00	974.11		974.97	0.000681	5.56	12.46	5.44	2.24	0.41
Main	1526.039	1289 cfs	1289.00	1193.68	20.69	74.63	4.64	944.00	948.64	949.42	952.10	0.009881	13.78	15.40	3.79	7.05	1.26
Main	1526.039	1980 cfs 100-yr	1980.00	1148.51	692.65	138.84	11.27	944.00	955.27		955.63	0.000507	2.91	6.10	1.70	1.62	0.32
Main	1526.039	2650 cfs 500-yr	2650.00	1258.98	1136.48	254.54	12.71	944.00	956.71		956.99	0.000431	2.72	5.93	1.90	1.54	0.29
Main	1526.039	2924 cfs	2924.00	1341.17	1283.35	299.48	12.98	944.00	956.98		957.28	0.000458	2.83	6.19	2.02	1.64	0.30
Main	1526.039	3116 cfs	3116.00	1404.75	1382.29	328.95	13.12	944.00	957.12		957.44	0.000486	2.93	6.41	2.12	1.71	0.31
Main	1526.039	3400 cfs	3400.00	1484.40	1536.66	378.95	13.39	944.00	957.39		957.73	0.000511	3.03	6.64	2.23	1.81	0.32
Main	1526.039	3881 cfs 0.25 PM	3881.00	1620.67	1795.88	464.45	13.78	944.00	957.78		958.15	0.000557	3.21	7.04	2.42	1.97	0.33
Main	1526.039	4188 cfs	4188.00	1697.24	1966.29	524.47	14.05	944.00	958.05		958.44	0.000575	3.30	7.23	2.52	2.06	0.34
Main	1526.039	11457 cfs 0.5 PM	11457.00	2795.46	6049.14	2612.41	21.71	944.00	965.71		966.05	0.000395	3.63	7.71	3.22	2.84	0.29
Main	1526.039	13000 cfs	13000.00	3036.95	6860.30	3102.76	22.77	944.00	966.77		967.13	0.000400	3.77	7.99	3.37	3.02	0.29
Main	1526.039	15000 cfs	15000.00	3340.27	7905.44	3754.29	24.09	944.00	968.09		968.47	0.000404	3.94	8.30	3.53	3.22	0.30
Main	1526.039	24229 cfs -24hr	24229.00	4812.46	12684.00	6732.54	28.00	944.00	972.00		972.57	0.000511	4.92	10.29	4.44	4.21	0.34
Main	1526.039	31970 cfs - 6hr	31970.00	6046.32	16645.36	9278.32	30.13	944.00	974.13		974.89	0.000632	5.76	12.02	5.20	5.02	0.39
Main	1480.719	1289 cfs	1289.00	1289.00			3.62	935.38	939.00	942.03	950.20	0.024895	26.86	26.86			2.49
Main	1480.719	1980 cfs 100-yr	1980.00	1097.40	808.63	73.97	14.92	935.38	955.40	944.21	955.54		2.47	3.62	1.99	0.82	0.16
Main	1480.719	2650 cfs 500-yr	2650.00	1200.34	1277.79	171.87	16.32	935.38	956.79	946.13	956.93		2.48	3.62	2.27	1.00	0.16
Main	1480.719	2924 cfs	2924.00	1277.13	1440.77	206.10	16.59	935.38	957.07	946.86	957.21		2.61	3.78	2.42	1.09	0.16
Main	1480.719	3116 cfs	3116.00	1336.07	1551.37	228.57	16.74	935.38	957.22	947.35	957.37		2.71	3.92	2.54	1.15	0.17
Main	1480.719	3400 cfs	3400.00	1409.93	1723.02	267.05	17.01	935.38	957.48	948.07	957.65		2.82	4.08	2.68	1.23	0.17
Main	1480.719	3881 cfs 0.25 PM	3881.00	1535.53	2012.19	333.28	17.40	935.38	957.88	953.33	958.07		3.02	4.34	2.93	1.37	0.18
Main	1480.719	4188 cfs	4188.00	1605.41	2201.99	380.60	17.68	935.38	958.16	953.43	958.36		3.12	4.46	3.06	1.45	0.19
Main	1480.719	11457 cfs 0.5 PM	11457.00	2504.34	6847.02	2105.64	25.28	935.38	965.75	956.79	966.01		3.71	4.87	4.14	2.29	0.17
Main	1480.719	13000 cfs	13000.00	2706.69	7801.16	2492.16	26.34	935.38	966.81	957.18	967.09		3.88	5.05	4.35	2.43	0.17
Main	1480.719	15000 cfs	15000.00	2955.79	9028.85	3015.37	27.65	935.38	968.12	957.76	968.43		4.06	5.26	4.59	2.60	0.18
Main	1480.719	24229 cfs -24hr	24229.00	4161.57	14591.63	5475.80	31.57	935.38	972.04	960.00	972.52		5.10	6.48	5.82	3.42	0.20
Main	1480.719	31970 cfs - 6hr	31970.00	5165.17	19208.43	7596.40	33.71	935.38	974.18	961.62	974.82		5.98	7.53	6.84	4.11	0.23
Main	1430.15		Culvert														
Main	1379.577	1289 cfs	1289.00	1289.00			3.99	934.98	938.97	941.63	948.21		24.39	24.39			2.15
Main	1379.577	1980 cfs 100-yr	1980.00	1715.45	248.21	16.34	14.09	934.98	955.01	943.83	955.51		3.60	6.08	1.13	0.34	0.29
Main	1379.577	2650 cfs 500-yr	2650.00	2110.72	483.96	55.33	15.39	934.98	956.31	945.73	956.90		3.58	6.85	1.49	0.51	0.31
Main	1379.577	2924 cfs	2924.00	2299.37	556.84	67.79	15.59	934.98	956.51	946.46	957.18		3.78	7.37	1.63	0.57	0.33
Main	1379.577	3116 cfs	3116.00	2438.68	602.32	75.00	15.67	934.98	956.58	946.95	957.33		3.97	7.77	1.73	0.61	0.35
Main	1379.577	3400 cfs	3400.00	2627.72	682.33	89.95	15.87	934.98	956.78	947.65	957.61		4.16	8.27	1.87	0.67	0.37
Main	1379.577	3881 cfs 0.25 PM	3881.00	2957.91	809.75	113.34	16.09	934.98	957.00	953.43	958.02		4.55	9.18	2.12	0.76	0.40
Main	1379.577	4188 cfs	4188.00	3153.68	901.74	132.58	16.28	934.98	957.19	949.55	958.31		4.73	9.68	2.26	0.82	0.42
Main	1379.577	11457 cfs 0.5 PM	11457.00	5938.22	3988.62	1530.16	23.68	934.98	964.59	959.92	965.94		4.87	12.53	3.80	1.85	0.45
Main	1379.577	13000 cfs	13000.00	6508.40	4621.93	1869.68	24.63	934.98	965.54	960.67	967.00		5.07	13.20	4.05	2.01	0.47
Main	1379.577	15000 cfs	15000.00	7208.91	5453.44	2337.65	25.85	934.98	966.76	961.57	968.33		5.28	13.93	4.34	2.19	0.48
Main	1379.577	24229 cfs -24hr	24229.00	10642.09	9179.53	4407.37	29.00	934.98	969.91	965.13	972.43		6.71	18.33	5.85	3.01	0.60
Main	1379.577	31970 cfs - 6hr	31970.00	13669.16	12183.40	6117.45	29.95	934.98	970.86	967.39	974.68		8.29	22.80	7.32	3.85	0.73
Main	1317.58		Culvert														
Main	1255.590	1289 cfs	1289.00	1289.00			10.00	934.00	944.00	940.65	945.47		9.73	9.73			0.54
Main	1255.590	1980 cfs 100-yr	1980.00	1762.36	212.17	5.47	14.50	934.00	954.92	942.83	955.43		3.67	6.07	0.95	0.21	0.28
Main	1255.590	2650 cfs 500-yr	2650.00	2174.12	430.27	45.62	15.80	934.00	956.23	944.75	956.83		3.42	6.87	1.24	0.41	0.30
Main	1255.590	2924 cfs	2924.00	2364.93	498.19	60.88	16.01	934.00	956.43	945.47	957.12		3.57	7.38	1.35	0.47	0.32
Main	1255.590	3116 cfs	3116.00	2508.48	538.88	68.64	16.08	934.00	956.50	945.94	957.27		3.74	7.79	1.44	0.51	0.34
Main	1255.590	3400 cfs	3400.00	2704.08	610.13	85.79	16.25	934.00	956.68	946.69	957.54		3.91	8.31	1.55	0.57	0.36
Main	1255.590	3881 cfs 0.25 PM	3881.00	3036.96	729.02	115.02	16.49	934.00	956.91	947.85	957.95		4.23	9.20	1.75	0.67	0.40
Main	1255.590	4188 cfs	4188.00	3242.53	808.98	136.49	16.64	934.00	957.07	948.57	958.22		4.40	9.73	1.88	0.73	0.42
Main	1255.590	11457 cfs 0.5 PM	11457.00	5755.94	3689.73	2011.33	24.25	934.00	964.68	959.95	965.83		4.05	11.86	3.01	1.80	0.42
Main	1255.590	13000 cfs	13000.00	6290.17	4264.22	2445.61	25.18	934.00	965.60	960.69	966.83		4.22	12.48	3.21	1.96	0.44
Main	1255.590	15000 cfs	15000.00	6924.41	5021.03	3054.57	26.44	934.00	966.87	961.55	966.17		4.37	13.08	3.41	2.13	0.45
Main	1255.590	24229 cfs -24hr	24229.00	10009.88	8400.99	5818.14	29.93	934.00	970.35	964.81	972.28		5.46	16.71	4.48	2.97	0.54

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	1255.590	31970 cfs - 6hr	31970.00	12723.42	11171.54	8075.04	31.27	934.00	971.70	966.96	974.47		6.61	20.32	5.48	3.72	0.64
Main	1166.32	Culvert															
Main	1077.047	1289 cfs	1289.00	1289.00			10.41	933.00	943.41	939.65	944.77		9.34	9.34			0.51
Main	1077.047	1980 cfs 100-yr	1980.00	1818.54	140.46	21.00	14.91	933.00	954.83	941.84	955.35		3.69	6.07	0.89	0.27	0.28
Main	1077.047	2650 cfs 500-yr	2650.00	2214.11	325.36	110.53	16.26	933.00	956.18	943.74	956.78		3.34	6.77	1.27	0.53	0.30
Main	1077.047	2924 cfs	2924.00	2405.89	380.74	137.36	16.48	933.00	956.40	944.46	957.07		3.51	7.26	1.40	0.60	0.32
Main	1077.047	3116 cfs	3116.00	2552.82	412.16	151.02	16.54	933.00	956.46	944.97	957.21		3.69	7.68	1.49	0.64	0.33
Main	1077.047	3400 cfs	3400.00	2752.49	468.77	178.74	16.71	933.00	956.63	945.69	957.48		3.87	8.20	1.62	0.71	0.35
Main	1077.047	3881 cfs 0.25 PM	3881.00	3089.46	565.04	226.51	16.95	933.00	956.86	946.85	957.89		4.20	9.07	1.84	0.82	0.39
Main	1077.047	4188 cfs	4188.00	3298.49	629.74	259.77	17.10	933.00	957.02	947.54	958.15		4.39	9.60	1.98	0.88	0.41
Main	1077.047	11457 cfs 0.5 PM	11457.00	6198.35	3172.40	2086.25	24.38	933.00	964.29	959.71	965.71		4.60	12.65	3.71	1.83	0.45
Main	1077.047	13000 cfs	13000.00	6817.50	3698.65	2483.86	25.28	933.00	965.20	960.50	966.75		4.83	13.42	4.01	1.97	0.47
Main	1077.047	15000 cfs	15000.00	7596.85	4387.22	3015.93	26.40	933.00	966.32	961.35	968.03		5.09	14.32	4.36	2.14	0.49
Main	1077.047	24229 cfs -24hr	24229.00	11373.00	7458.80	5397.20	29.32	933.00	969.23	964.86	972.16		6.69	19.30	6.09	2.99	0.63
Main	1077.047	31970 cfs - 6hr	31970.00	15025.11	9834.52	7110.37	29.26	933.00	969.18	967.30	974.31		8.86	25.55	8.06	3.95	0.83
Main	993.45	Culvert															
Main	910.2854	1289 cfs	1289.00	1289.00			10.73	932.00	942.73	938.65	944.01		9.07	9.07			0.49
Main	910.2854	1980 cfs 100-yr	1980.00	1971.82	2.22	5.96	14.66	932.00	954.26	940.84	954.94		5.88	6.64	0.18	0.22	0.31
Main	910.2854	2650 cfs 500-yr	2650.00	2392.95	76.62	180.42	16.36	932.00	955.96	942.75	956.69		4.06	7.23	0.72	0.84	0.31
Main	910.2854	2924 cfs	2924.00	2599.69	98.35	225.96	16.55	932.00	956.15	943.48	956.98		4.23	7.76	0.83	0.95	0.34
Main	910.2854	3116 cfs	3116.00	2767.21	105.92	242.87	16.56	932.00	956.16	943.97	957.10		4.49	8.25	0.88	1.02	0.36
Main	910.2854	3400 cfs	3400.00	2985.14	127.54	287.32	16.70	932.00	956.30	944.68	957.37		4.71	8.83	0.99	1.13	0.38
Main	910.2854	3881 cfs 0.25 PM	3881.00	3353.63	164.41	362.97	16.89	932.00	956.49	945.85	957.78		5.11	9.81	1.17	1.31	0.42
Main	910.2854	4188 cfs	4188.00	3587.80	188.31	411.89	16.99	932.00	956.59	946.57	958.04		5.37	10.43	1.28	1.43	0.45
Main	910.2854	11457 cfs 0.5 PM	11457.00	5302.38	1973.64	4180.99	25.04	932.00	964.63	960.12	965.49		4.38	10.46	2.63	3.08	0.37
Main	910.2854	13000 cfs	13000.00	5653.89	2328.86	5017.25	26.08	932.00	965.68	960.75	966.54		4.52	10.71	2.78	3.32	0.37
Main	910.2854	15000 cfs	15000.00	6108.93	2786.79	6104.28	27.30	932.00	966.90	961.61	967.78		4.71	11.05	2.97	3.61	0.37
Main	910.2854	24229 cfs -24hr	24229.00	8487.97	4907.40	10833.63	31.03	932.00	970.63	964.43	971.83		5.82	13.51	3.88	4.77	0.43
Main	910.2854	31970 cfs - 6hr	31970.00	10460.61	6618.62	14890.77	32.71	932.00	972.31	966.13	973.89		6.84	15.80	4.60	5.78	0.49
Main	793.67	Culvert															
Main	677.0554	1289 cfs	1289.00	1289.00			10.82	931.00	941.82	937.65	943.08		8.99	8.99			0.48
Main	677.0554	1980 cfs 100-yr	1980.00	1980.00			20.08	931.00	951.08	939.84	951.94		7.44	7.44			0.29
Main	677.0554	2650 cfs 500-yr	2650.00	2650.00			23.59	931.00	954.59	941.74	955.71		8.48	8.48			0.31
Main	677.0554	2924 cfs	2924.00	2924.00			23.80	931.00	954.80	942.45	956.13		9.27	9.27			0.34
Main	677.0554	3116 cfs	3116.00	3116.00			23.66	931.00	954.66	942.97	956.19		9.94	9.94			0.36
Main	677.0554	3400 cfs	3400.00	3400.00			23.74	931.00	954.74	943.66	956.55		10.81	10.81			0.39
Main	677.0554	3881 cfs 0.25 PM	3881.00	3881.00			23.66	931.00	954.66	944.85	957.04		12.38	12.38			0.45
Main	677.0554	4188 cfs	4188.00	4188.00			23.45	931.00	954.45	945.57	957.27		13.48	13.48			0.49
Main	677.0554	11457 cfs 0.5 PM	11457.00	8414.64	601.61	2440.75	21.06	931.00	961.43	961.43	965.38		5.42	18.58	1.13	2.16	0.71
Main	677.0554	13000 cfs	13000.00	9193.21	795.16	3011.62	21.81	931.00	962.17	962.17	966.42		5.47	19.60	1.24	2.38	0.74
Main	677.0554	15000 cfs	15000.00	10008.83	1129.66	3861.50	23.00	931.00	963.36	963.36	967.64		5.18	20.24	1.23	2.61	0.74
Main	677.0554	24229 cfs -24hr	24229.00	12566.69	4259.56	7402.75	27.56	931.00	967.92	967.92	971.60		3.84	21.21	1.26	3.15	0.71
Main	677.0554	31970 cfs - 6hr	31970.00	14537.23	7794.98	9637.79	29.43	931.00	969.80	969.80	973.59		3.95	22.97	1.64	3.55	0.75
Main	510.57	Culvert															
Main	344.0778	1289 cfs	1289.00	1289.00			10.38	930.00	940.38	936.65	941.75		9.37	9.37			0.51
Main	344.0778	1980 cfs 100-yr	1980.00	1980.00			16.33	930.00	946.33	938.84	947.63		9.15	9.15			0.40
Main	344.0778	2650 cfs 500-yr	2650.00	2650.00			17.69	930.00	947.69	940.73	949.68		11.30	11.30			0.47
Main	344.0778	2924 cfs	2924.00	2924.00			17.69	930.00	947.69	941.44	950.11		12.47	12.47			0.52
Main	344.0778	3116 cfs	3116.00	3116.00			16.73	930.00	946.73	941.96	949.80		14.06	14.06			0.61
Main	344.0778	3400 cfs	3400.00	3400.00			16.58	930.00	946.58	942.68	950.30		15.47	15.47			0.67
Main	344.0778	3881 cfs 0.25 PM	3881.00	3881.00			16.54	930.00	946.54	943.85	951.41		17.71	17.71			0.77
Main	344.0778	4188 cfs	4188.00	4188.00			15.96	930.00	945.96	944.57	952.05		19.80	19.80			0.87

HEC-RAS Plan: SS-EX-Check River: SippoCreek Reach: Main (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Q Channel (cfs)	Q Left (cfs)	Q Right (cfs)	Hydr Depth C (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Frctn Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Vel Left (ft/s)	Vel Right (ft/s)	Froude # Chl
Main	344.0778	11457 cfs 0.5 PM	11457.00	7840.78	2030.90	1585.32	22.13	930.00	958.25	958.25	961.57		3.37	17.65	1.09	1.47	0.66
Main	344.0778	13000 cfs	13000.00	8314.03	2767.24	1918.74	23.11	930.00	959.22	959.22	962.43		3.15	17.93	1.15	1.52	0.66
Main	344.0778	15000 cfs	15000.00	8952.78	3739.47	2307.75	24.00	930.00	960.12	960.12	963.33		3.10	18.58	1.28	1.61	0.67
Main	344.0778	24229 cfs -24hr	24229.00	11512.67	8573.89	4142.44	27.30	930.00	963.42	963.42	966.70		3.04	21.01	1.64	1.89	0.71
Main	344.0778	31970 cfs - 6hr	31970.00	13573.45	12873.10	5523.45	28.79	930.00	964.91	964.91	968.58		3.34	23.49	2.02	2.12	0.77
Main	226.91		Culvert														
Main	109.7401	1289 cfs	1289.00	1289.00			6.57	929.00	935.57	935.65	938.97		14.81	14.81			1.02
Main	109.7401	1980 cfs 100-yr	1980.00	1980.00			7.08	929.00	936.08	937.84	943.00		21.12	21.12			1.40
Main	109.7401	2650 cfs 500-yr	2650.00	2650.00			10.73	929.00	939.73	939.73	945.12		18.64	18.64			1.00
Main	109.7401	2924 cfs	2924.00	2924.00			11.44	929.00	940.44	940.44	946.22		19.28	19.28			1.00
Main	109.7401	3116 cfs	3116.00	3116.00			11.96	929.00	940.96	940.96	946.96		19.67	19.67			1.00
Main	109.7401	3400 cfs	3400.00	3400.00			12.68	929.00	941.68	941.68	948.04		20.23	20.23			1.00
Main	109.7401	3881 cfs 0.25 PM	3881.00	3881.00			13.85	929.00	942.85	942.85	949.80		21.15	21.15			1.00
Main	109.7401	4188 cfs	4188.00	4188.00			14.57	929.00	943.57	943.57	950.88		21.69	21.69			1.00
Main	109.7401	11457 cfs 0.5 PM	11457.00	6384.77	3491.12	1581.12	18.85	929.00	954.07	954.07	956.57		2.66	16.96	1.25	1.40	0.69
Main	109.7401	13000 cfs	13000.00	7086.89	4091.94	1821.17	19.05	929.00	954.27	954.27	957.23		2.89	18.63	1.39	1.55	0.75
Main	109.7401	15000 cfs	15000.00	7626.09	5266.78	2107.13	19.80	929.00	955.02	955.02	957.98		2.86	19.29	1.51	1.56	0.76
Main	109.7401	24229 cfs -24hr	24229.00	9336.14	11140.93	3751.92	22.85	929.00	958.08	958.08	960.61		2.68	20.46	1.85	1.47	0.75
Main	109.7401	31970 cfs - 6hr	31970.00	11001.74	15366.86	5601.40	24.01	929.00	959.23	959.23	962.09		2.99	22.95	2.18	1.78	0.83

Appendix 3
Dam Failure Parameter Spreadsheets
And HydroCAD Dam Failure Analysis

Sippo Creek Reservoir 100-YR Dam Breach Parameters (with Tailwater conditions)

Input Parameters			
Water Height (ft)	H=	13.61 ft	4.15105 m
Crest Width (ft)	C=	15 ft	4.575 m
Storage Volume (ac-ft)	V _s =	104.1 ac-ft	128,405 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	3	3
Downstream slope (Z ₂ : 1)	Z ₂ =	2.5	2.5
Breach Sideslope	Z _b =	1	1
Surface Area of Reservoir	S _a =	18.4 acres	74,462 m ²

Peak Discharge			
MacDonald & Langridge-Monopolis = ²	check w/ Max C		4,412 cfs
Q _p = 3.1B _u H ^{1.5}	[C / (C + T _r *sqrt(H))]³		4,387 cfs
C = 23.4(S _a /B _u) =	15.11		
Froelich = ²		113.96 cms	4,024 cfs
Q _p = 0.607V _s ^{0.295} H ^{1.24}	Overtopping		
B _u = 9.5K _o (V _s *H) ^{0.25}	58.28 ft	Piping	40.80 ft
T _r = 0.59(V _s ^{0.47})/H ^{0.91}	0.487 hrs		0.341 hrs

Peak Discharge			
National Weather Service (NWS) = ²	check w/ Min C	Max B _u	check w/ Min B _a
Q _p = Q _o +3.1B _u (C/(T _r +C/H ^{0.5}))³	Max C	4,723 cfs	2,309 cfs
Q _o =		6,477 cfs	3,167 cfs
Q _o =	0 cfs		
B _u =	58.28 ft ²		
C = 23.4(S _a /B _u) =	15.11		
T _r =	0.487 hrs		
Natural Resource Conservation Service (NRCS) = ²			
Q _p = 3.2H ^{2.5} =		2,187 cfs	

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	1416.801
BFF = V _w (H)	
Volume of Eroded Material =	667 yds ³
V _m = 2.50 (BFF) ^{.77}	
Breach Base Width =	14.89 ft
W _b = 27V _m - H ² (CZ ₁ + HZ ₂ Z ₃ /3) / (C + HZ ₂ /2)	
Z ₃ = Z ₁ + Z ₂ =	5.5
Breach Top Width =	42.11 ft
Average Breach Width =	28.50 ft
Breach Development Time =	0.44 hrs
T = .042 V _m ^{.36} Piping	0.306 hrs

Von Thun and Gillette ¹	
Breach Base Width =	40.45 ft
Average Breach Width =	16.48 m / 54.06 ft
B _u = 2.5H + C _o C _o is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 0.99 hrs / lower bound 0.52 hrs
*Erosion Resistant T _r = 0.020H + 0.25	T _r = B _u / 4H
Breach Development Time =	upper bound 0.21 hrs / lower bound 0.20 hrs
*highly erodible T _r = 0.015H	T _r = B _a / 4H + 61.0

Min C	with Min C	North	East	South	West
C= 7.96 Von Thun	3.1*B _u = 180.681	H= 21			18 ft
C= 7.39 Froelich	C/(H ^{0.5})= 4.096 2.002	T= 1.03			hrs
	T _r +C/(H ^{0.5})= 4.582 2.489	B _u = 86.4			ft
		V _w = 1475	1475	1475	1475 ac-ft
		S _a = 75	75	75	75 acres
		Q _p = 15k-25.5k			12.5k-23.3 cfs

Minimum Time to Failure	
Tf= H/120=	0.11 hrs
	6.805 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 500-YR Dam Breach Parameters (with Tailwater conditions)

Input Parameters		
Water Height (ft)	H=	9.35 ft / 2.85175 m
Crest Width (ft)	C=	15 ft / 4.575 m
Storage Volume (ac-ft)	V _s =	83.9 ac-ft / 103,489 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	3 / 3
Downstream slope (Z ₂ : 1)	Z ₂ =	2.5 / 2.5
Breach Sideslope	Z _b =	1 / 1
Surface Area of Reservoir	S _a =	18.5 acres / 74,867 m ²

Peak Discharge		
MacDonald & Langridge-Monopolis ²	check w/ Max C	2,824 cfs
$Q_p = 3.1B_b H^{1.5} [C / (C + T_f \sqrt{H})]^3$ $C = 23.4(S_a/B_b) = 13.53$		2,818 cfs
Froelich ²	67.13 cms	2,371 cfs
$Q_p = 0.607V_s^{0.295} H^{1.24}$ $B_b = 9.5K_o(V_s * H)^{0.25}$ $T_f = 0.59(V_s^{0.47})/H^{0.91}$	Overtopping 50.28 ft 0.619 hrs	Piping 35.19 ft 0.433 hrs

Peak Discharge		
National Weather Service (NWS) ²	check w/ Min C	5,105 cfs
$Q_p = Q_o + 3.1B_b(C/(T_f + C/H^{0.5}))^3$ $Q_o = 2650$ cfs $B_b = 50.28$ ft ² $C = 23.4(S_a/B_b) = 13.53$ $T_f = 0.619$ hrs	Max B _b Max C	4,213 cfs 5,659 cfs 4,565 cfs
Natural Resource Conservation Service (NRCS) ²		855 cfs
$Q_p = 3.2H^{2.5} = 855$ cfs		

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	784.465
BFF = V _w (H)	
Volume of Eroded Material =	423 yds ³
V _m = 2.50 (BFF) ^{0.77}	
Breach Base Width =	22.65 ft
$W_b = \frac{27V_m - H^2 (CZ_u + HZ_d Z_y/3)}{H (C + HZ_d/2)}$	
Z3 = Z1 + Z2 =	5.5
Breach Top Width =	41.35 ft
Average Breach Width =	32.00 ft
Breach Development Time =	0.37 hrs
Piping $T = .042 V_m^{.36}$	0.259 hrs

Von Thun and Gillette ¹	
Breach Base Width =	34.05 ft
Average Breach Width =	13.23 m / 43.40 ft
B _b = 2.5H + C ₀ C ₀ is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 1.16 hrs lower bound 0.44 hrs
*Erosion Resistant T _f = 0.020H + 0.25	T _f = B _b / 4H
Breach Development Time =	upper bound 0.18 hrs lower bound 0.14 hrs
*highly erodible T _f = 0.015H	T _f = B _a / 4H + 61.0

Min C	with Min C
C= 9.97 Von Thun	3.1*B _b = 155.858
C= 8.61 Froelich	C/(H ^{0.5})= 4.424 2.816
	T _f +C/(H ^{0.5})= 5.043 3.435

	North	East	South	West
H=	21			18 ft
T=	1.03			hrs
B _b =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _a =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Minimum Time to Failure	
T _f = H/120=	0.08 hrs
	4.675 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 6-HR 0.22 PMF Dam Breach Parameters (with Tailwater conditions)

Input Parameters		
Water Height (ft)	H=	5.56 ft / 1.6958 m
Crest Width (ft)	C=	15 ft / 4.575 m
Storage Volume (ac-ft)	V _s =	66.7 ac-ft / 82,273 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	2 / 2
Downstream slope (Z ₂ : 1)	Z ₂ =	2 / 2
Breach Sideslope	Z _b =	1 / 1
Surface Area of Reservoir	S _a =	19.4 acres / 78,509 m ²

Peak Discharge		
MacDonald & Langridge-Monopolis ²	check w/ Max C	1,823 cfs
$Q_p = 3.1B_u H^{1.5} [C / (C + T_f \sqrt{\text{sqrt}(H)})]^3$ $C = 23.4(S_u/B_u) = 10.09$		1,823 cfs
Froelich ²	32.93 cms	1,163 cfs
$Q_p = 0.607V_s^{0.295} H^{1.24}$ $B_u = 9.5K_C(V_s * H)^{0.25}$ $T_f = 0.59(V_s^{0.47})/H^{0.91}$	Overtopping 41.69 ft 0.892 hrs	Piping 29.18 ft 0.624124359

Peak Discharge		
National Weather Service (NWS) ²	check w/ Min C	4,141 cfs
$Q_p = Q_o + 3.1B_u(C/(T_f + C/H^{0.5}))^3$ $Q_o = 3,143 \text{ cfs}$ $B_u = 41.69 \text{ ft}^2$ $C = 23.4(S_u/B_u) = 10.09$ $T_f = 0.892 \text{ hrs}$	Max B _u 4,103 cfs	check w/ Min B _u 4,220 cfs 4,179 cfs
Natural Resource Conservation Service (NRCS) ²		233 cfs
$Q_p = 3.2H^{2.5} = 233 \text{ cfs}$		

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	370.852
BFF = V _w (H)	
Volume of Eroded Material =	238 yds ³
V _m = 2.50 (BFF) ^{0.77}	
Breach Base Width =	39.44 ft
$W_b = \frac{27V_m - H^2 (CZ_u + HZ_d Z_y/3)}{H (C + HZ_d/2)}$	
Z ₃ = Z ₁ + Z ₂ =	4
Breach Top Width =	50.56 ft
Average Breach Width =	45.00 ft
Breach Development Time =	0.30 hrs
$T = .042 V_m^{-.36} \cdot 0.21075998$	

Von Thun and Gillette ¹	
Breach Base Width =	28.36 ft
Average Breach Width =	10.34 m / 33.92 ft
B _u = 2.5H + C ₀ C ₀ is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 1.52 hrs lower bound 0.36 hrs
Erosion Resistant T _f = 0.020H + 0.25	T _f = B _u / 4H
Breach Development Time =	upper bound 0.15 hrs lower bound 0.08 hrs
Highly erodible T _f = 0.015H	T _f = B _a / 4H + 61.0

Min C			
C=	13.38 Von Thun	with Min C	
C=	10.89 Froelich	3.1*B _u = 129.237	
		C/(H ^{0.5})= 4.278	4.618
		T _f +C/(H ^{0.5})= 5.170	5.510

	North	East	South	West
H=	21			18 ft
T=	1.03			hrs
B _u =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _w =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Overtopping Minimum Time to Failure	
T _f =	H/120= 0.05 hrs
	2.78 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 6-HR 0.24 PMF Dam Breach Parameters (with Tailwater conditions)

Input Parameters			
Water Height (ft)	H=	1.97 ft	0.60085 m
Crest Width (ft)	C=	15 ft	4.575 m
Storage Volume (ac-ft)	V _s =	35.83 ac-ft	44,196 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	2	2
Downstream slope (Z ₂ : 1)	Z ₂ =	2	2
Breach Sideslope	Z _b =	1	1
Surface Area of Reservoir	S _a =	20.77 acres	84,053 m ²

Peak Discharge			
MacDonald & Langridge-Monopolis ²	check w/ Max C		412 cfs
Q _p = 3.1B _u H ^{1.5} [C / (C + T _r *sqrt(H))] ³			412 cfs
C = 23.4(S _a /B _u) =	10.10		
Froehlich ²		7.57 cms	267 cfs
Q _p = 0.607V _s ^{0.295} H ^{1.24}	Overtopping		Piping
B _u = 9.5K _o (V _s *H) ^{0.25}	27.54 ft		19.28 ft
T _r = 0.59(V _s ^{0.47})/H ^{0.91}	1.712 hrs		1.198068875

Peak Discharge			
National Weather Service (NWS) ²	check w/ Min C	Max B _u	check w/ Min B _a
Q _p = Q _o +3.1B _u (C/(T _r +C/H ^{0.5})) ³	Max C	3,801 cfs	3,921 cfs
Q _o = 3,640 cfs			
B _u = 27.54 ft ²			
C = 23.4(S _a /B _u) =	10.10		
T _r = 1.712 hrs			
Natural Resource Conservation Service (NRCS) ²			
Q _p = 3.2H ^{2.5} =		17 cfs	

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	70.5851
BFF = V _w (H)	
Volume of Eroded Material =	66 yds ³
V _m = 2.50 (BFF) ^{.77}	
Breach Base Width =	46.14 ft
W _b = 27V _m - H ² (CZ ₁ + HZ ₂ Z ₃ /3) / (C + HZ ₂ /2)	
Z ₃ = Z ₁ + Z ₂ =	4
Breach Top Width =	50.08 ft
Average Breach Width =	48.11 ft
Breach Development Time =	0.19 hrs
T = .042 V _m ^{.36} / 0.13306658	

Von Thun and Gillette ¹	
Breach Base Width =	22.97 ft
Average Breach Width =	7.60 m / 24.94 ft
B _u = 2.5H + C _o C _o is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 3.16 hrs / lower bound 0.29 hrs
*Erosion Resistant T _r = 0.020H + 0.25	T _r = B _u / 4H
Breach Development Time =	upper bound 0.12 hrs / lower bound 0.03 hrs
*highly erodible T _r = 0.015H	T _r = B _a / 4H + 61.0

Min C
 C= 19.49 Von Thun
 C= 17.65 Froelich
 with Min C
 3.1*B_u= 85.3618
 C/(H^{0.5}) = 7.198 12.575
 T_r+C/(H^{0.5}) = 8.910 14.287

	North	East	South	West
H=	21			18 ft
T=	1.03			hrs
B _u =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _a =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Overtopping Minimum Time to Failure	
Tf= H/120=	0.02 hrs
	0.985 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl
² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology
³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 6-HR 0.25 PMF Dam Breach Parameters (with Tailwater conditions)

Input Parameters		
Water Height (ft)	H=	0.93 ft / 0.28365 m
Crest Width (ft)	C=	15 ft / 4.575 m
Storage Volume (ac-ft)	V _s =	20.1 ac-ft / 24,793 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	2 / 2
Downstream slope (Z ₂ : 1)	Z ₂ =	2 / 2
Breach Sideslope	Z _b =	1 / 1
Surface Area of Reservoir	S _a =	22.63 acres / 91,580 m ²

Peak Discharge		
MacDonald & Langridge-Monopolis ²	check w/ Max C	114 cfs
$Q_p = 3.1B_s H^{1.5} [C / (C + T_f \sqrt{\text{sgt}(H)})]^3$ $C = 23.4(S_a/B_s) = 12.89$		114 cfs
Froehlich ²	2.52 cms	89 cfs
$Q_p = 0.607V_s^{0.295} H^{1.24}$ $B_s = 9.5K_C(V_s * H)^{0.25}$ $T_f = 0.59(V_s^{0.47})/H^{0.91}$	Overtopping 19.75 ft 2.582 hrs	Piping 13.83 ft

Peak Discharge		
National Weather Service (NWS) ²	check w/ Min C	Max B _s 3,923 cfs
$Q_p = Q_o + 3.1B_s(C/(T_f + C/H^{0.5}))^3$ $Q_o = 3,881 \text{ cfs}$ $B_s = 19.75 \text{ ft}^2$ $C = 23.4(S_a/B_s) = 12.89$ $T_f = 2.582 \text{ hrs}$	Max C	3,913 cfs
Natural Resource Conservation Service (NRCS) ²		check w/ Min B _a 3,948 cfs
$Q_p = 3.2H^{2.5} = 3 \text{ cfs}$		

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	18.693
BFF = V _w (H)	
Volume of Eroded Material =	24 yds ³
V _m = 2.50 (BFF) ^{0.77}	
Breach Base Width =	40.14 ft
$W_b = \frac{27V_m - H^2 (CZ_1 + HZ_2 Z_3/3)}{H (C + HZ_2/2)}$	
Z ₃ = Z ₁ + Z ₂ =	4
Breach Top Width =	42.00 ft
Average Breach Width =	41.07 ft
Breach Development Time =	0.13 hrs
$T = .042 V_m^{-.36}$	0.09206937

Von Thun and Gillette ¹	
Breach Base Width =	21.41 ft
Average Breach Width =	6.81 m / 22.34 ft
B _s = 2.5H + C ₀ C ₀ is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 6.00 hrs lower bound 0.27 hrs
Erosion Resistant T _f = 0.020H + 0.25	T _f = B _s / 4H
Breach Development Time =	upper bound 0.11 hrs lower bound 0.01 hrs
Highly erodible T _f = 0.015H	T _f = B _a / 4H + 61.0

Min C		with Min C	
C=	23.70 Von Thun	3.1*B _s =	61.2358
C=	26.81 Froelich	C/(H ^{0.5})=	13.370 27.798
		T _f +C/(H ^{0.5})=	15.953 30.381

	North	East	South	West
H=	21			18 ft
T=	1.03			hrs
B _s =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _a =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Overtopping Minimum Time to Failure	
T _f =	H/120= 0.01 hrs
	0.465 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 6-HR 0.5 PMF Dam Breach Parameters (with Tailwater conditions)

Input Parameters			
Water Height (ft)	H=	1.2 ft	0.366 m
Crest Width (ft)	C=	15 ft	4.575 m
Storage Volume (ac-ft)	V _s =	48.9 ac-ft	60,317 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	2	2
Downstream slope (Z ₂ : 1)	Z ₂ =	2	2
Breach Sideslope	Z _b =	1	1
Surface Area of Reservoir	S _a =	47.44 acres	191,983 m ²

Peak Discharge			
MacDonald & Langridge-Monopolis ²	check w/ Max C		303 cfs
Q _p = 3.1B _a H ^{1.5}	[C / (C + T _f *sqrt(H))]³		303 cfs
C = 23.4(S _a /B _a) =	14.92		
Froelich ²		4.49 cms	159 cfs
Q _p = 0.607V _s ^{0.295} H ^{1.24}	Overtopping		Piping
B _a = 9.5K _o (V _s *H) ^{0.25}	26.29 ft		18.41 ft
T _f = 0.59(V _s ^{0.47})/H ^{0.91}	3.110 hrs		2.177059414

Peak Discharge			
National Weather Service (NWS) ²	check w/ Min C	Max B _a	check w/ Min B _a
Q _p = Q _o +3.1B _a (C/(T _f +C/H ^{0.5}))³	Max C	11,542 cfs	11,697 cfs
Q _o =		11,457 cfs	
B _a =		26.29 ft ²	
C = 23.4(S _a /B _a) =	14.92		
T _f =		3.110 hrs	
Natural Resource Conservation Service (NRCS) ²			
Q _p = 3.2H ^{2.5} =		5 cfs	

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	58.68
BFF = V _w (H)	
Volume of Eroded Material =	58 yds ³
V _m = 2.50 (BFF) ^{.77}	
Breach Base Width =	73.21 ft
W _b = 27V _m - H ² (CZ ₃ + HZ ₂ Z ₃ /3) / (C + HZ ₂ /2)	
Z ₃ = Z ₁ + Z ₂ =	4
Breach Top Width =	75.61 ft
Average Breach Width =	74.41 ft
Breach Development Time =	0.18 hrs
T = .042 V _m ^{.36}	0.12642448

Von Thun and Gillette ¹	
Breach Base Width =	21.81 ft
Average Breach Width =	7.02 m 23.01 ft
B _a = 2.5H + C _o C _o is based on vol =	6.1 Page 15
Breach Development Time =	upper bound 4.79 hrs lower bound 0.27 hrs
Erosion Resistant	
T _f = 0.020H + 0.25	T _f = B _a / 4H
Breach Development Time =	upper bound 0.11 hrs lower bound 0.02 hrs
Highly erodible	
T _f = 0.015H	T _f = B _a / (4H + 61.0)

Min C		with Min C	
C =	48.23 Von Thun	3.1*B _a =	81.5094
C =	42.22 Froelich	C/(H ^{0.5}) =	13.619 38.541
		T _f +C/(H ^{0.5}) =	16.729 41.651

	North	East	South	West
H =	21			18 ft
T =	1.03			hrs
B _a =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _a =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Overtopping Minimum Time to Failure	
T _f =	H/120 = 0.01 hrs
	0.6 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

³ - NWS Simple Dam Break Analysis Equation (1999)

Sippo Creek Reservoir 6-HR PMF Dam Breach Parameters (with Tailwater conditions)

Input Parameters			
Water Height (ft)	H=	2.8 ft	0.854 m
Crest Width (ft)	C=	15 ft	4.575 m
Storage Volume (ac-ft)	V _s =	206.34 ac-ft	254,516 m ³
Upstream slope (Z ₁ : 1)	Z ₁ =	2	2
Downstream slope (Z ₂ : 1)	Z ₂ =	2	2
Breach Sideslope	Z _b =	1	1
Surface Area of Reservoir	S _a =	77.7 acres	314,441 m ²

Peak Discharge			
MacDonald & Langridge-Monopolis = ²	check w/ Max C		2,273 cfs
Q _p = 3.1B _a H ^{1.5}	[C / (C + T _r *sqrt(H))]³		2,277 cfs
C = 23.4(S _a /B _a) =	11.59		
Froehlich = ²		19.63 cms	693 cfs
Q _p = 0.607V _s ^{0.295} H ^{1.24}	Overtopping		Piping
B _a = 9.5K _o (V _s *H) ^{0.25}	46.58 ft		32.60 ft
T _r = 0.59(V _s ^{0.47})/H ^{0.91}	2.830 hrs		1.981027268

Peak Discharge			
National Weather Service (NWS) ²	check w/ Min C	Max B _a	check w/ Min B _a
Q _p = Q _o +3.1B _a (C/(T _r +C/H ^{0.5}))³	Max C	32,450 cfs	33,586 cfs
Q _o = 31970 cfs			
B _a = 46.58 ft ²			
C = 23.4(S _a /B _a) =	11.59		
T _r = 2.830 hrs			
Natural Resource Conservation Service (NRCS) ²			
Q _p = 3.2H ^{2.5} =		42 cfs	

MacDonald & Langridge-Monopolis ²	
Breach Formation Factor =	577.752
BFF = V _w (H)	
Volume of Eroded Material =	335 yds ³
V _m = 2.50 (BFF) ^{.77}	
Breach Base Width =	154.06 ft
$W_b = \frac{27V_m - H^2 (CZ_1 + HZ_2Z_3/3)}{H (C + HZ_2/2)}$	
Z ₃ = Z ₁ + Z ₂ =	4
Breach Top Width =	159.66 ft
Average Breach Width =	156.86 ft
Breach Development Time =	0.34 hrs
T = .042 V _m ^{.36}	0.23831999

Von Thun and Gillette ¹	
Breach Base Width =	24.22 ft
Average Breach Width =	8.24 m / 27.02 ft
B _a = 2.5H + C _o	C _o is based on vol = 6.1 Page 15
Breach Development Time =	upper bound 2.41 hrs lower bound 0.31 hrs
Erosion Resistant	T _r = 0.020H + 0.25
Breach Development Time =	upper bound 0.13 hrs lower bound 0.04 hrs
Highly erodible	T _r = 0.015H

Min C		with Min C	
C = 67.30	Von Thun	3.1*B _a = 144.385	
C = 39.04	Froehlich	C/(H ^{0.5}) = 6.927	23.329
		T _r +C/(H ^{0.5}) = 9.757	26.159

	North	East	South	West
H =	21			18 ft
T =	1.03			hrs
B _a =	86.4			ft
V _w =	1475	1475	1475	1475 ac-ft
S _a =	75	75	75	75 acres
Q _p =	15k-25.5k			12.5k-23.3 cfs

Overtopping Minimum Time to Failure	
T _f = H/120 =	0.02 hrs
	1.4 min

¹ - Prediction of Embankment Dam Breach Parameters - DSO-98-004 by Tony L. Wahl

² - Dam Safety Guidelines - Dam Break Inundation Analysis and Downstream Hazard Classification - Technical Note 1 - Washington State Dept. of Ecology

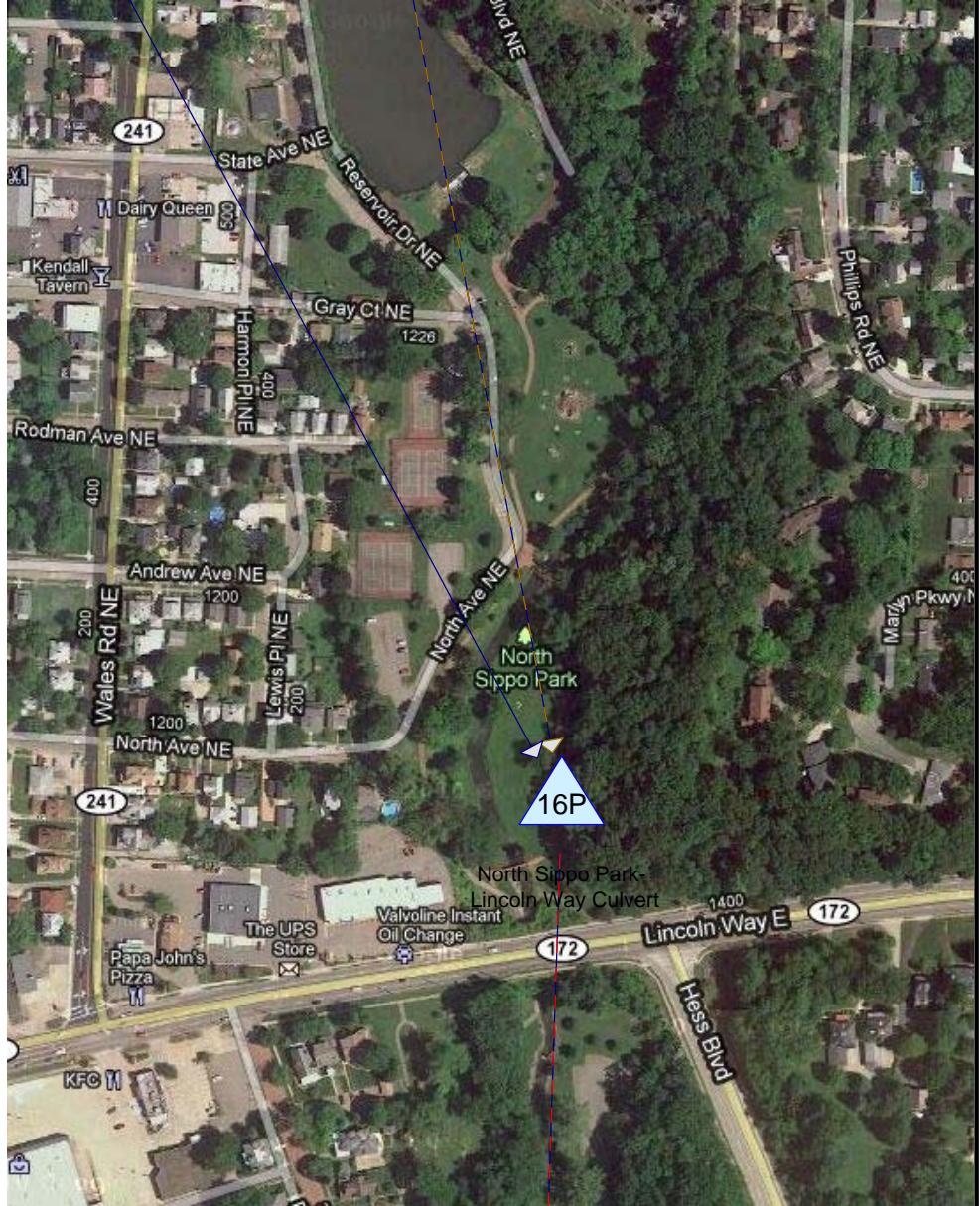
³ - NWS Simple Dam Break Analysis Equation (1999)



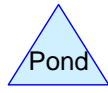
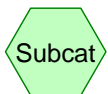
Constant inflow -
baseflow only



Sippo Reservoir -
Existing Conditions -
Sunny Day DBA



Sippo Creek Channel
Downstream of Lincoln
Way



Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-SunnyDay
Prepared by URS Corporation, Printed 10/31/2011
HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-SunnyDay

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-SunnyDay

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-SunnyDay

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir-URS-DBA-Sun*Type II 24-hr Sunny Day Rainfall=0.04"*

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Channel Avg. Flow Depth=4.49' Max Vel=9.08 fps Inflow=1,289.17 cfs 90.929 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=1,288.66 cfs 90.897 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,001.64' Storage=60.962 af Inflow=0.00 cfs 0.000 af
Outflow=3,498.98 cfs 60.962 af

Pond 16P: North Sippo Park- Lincoln Peak Elev=988.87' Storage=22.258 af Inflow=3,498.98 cfs 90.706 af
Primary=1,289.17 cfs 90.937 af Secondary=0.00 cfs 0.000 af Outflow=1,289.17 cfs 90.937 af

Pond 32P: Constant inflow - baseflow only Peak Elev=1,004.24' Inflow=10.00 cfs 29.752 af
Outflow=10.00 cfs 29.752 af

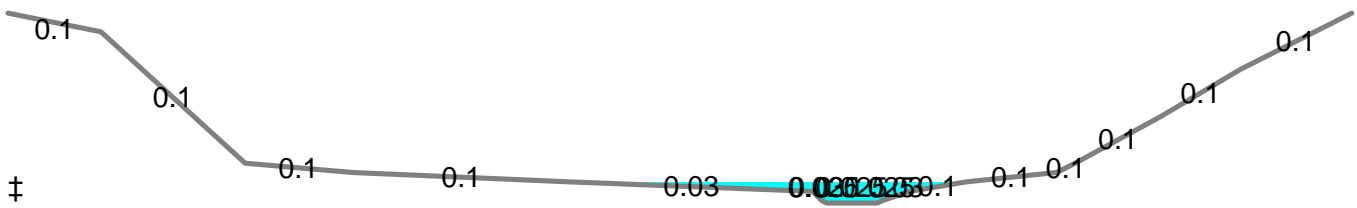
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 1,289.17 cfs @ 0.21 hrs, Volume= 90.929 af
 Outflow = 1,288.66 cfs @ 0.22 hrs, Volume= 90.897 af, Atten= 0%, Lag= 0.9 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.08 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 2.69 fps, Avg. Travel Time= 2.8 min

Peak Storage= 65,153 cf @ 0.22 hrs
 Average Depth at Peak Storage= 4.49'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

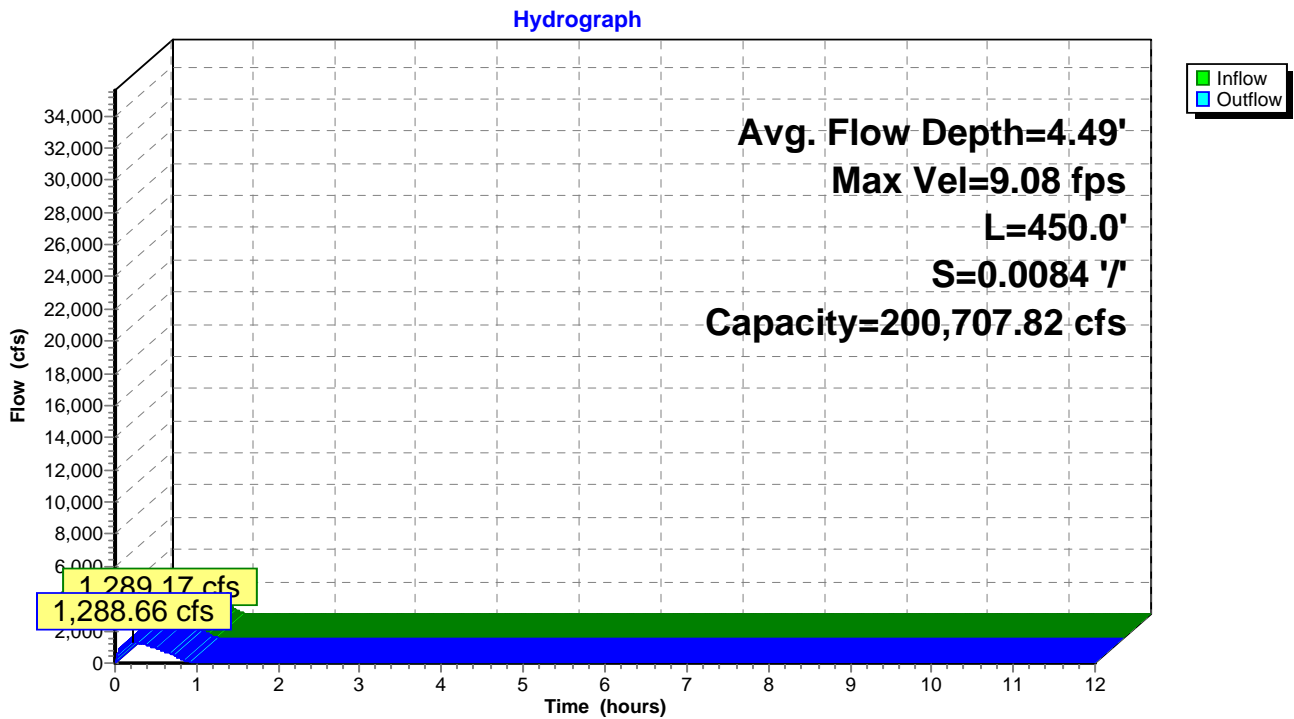
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



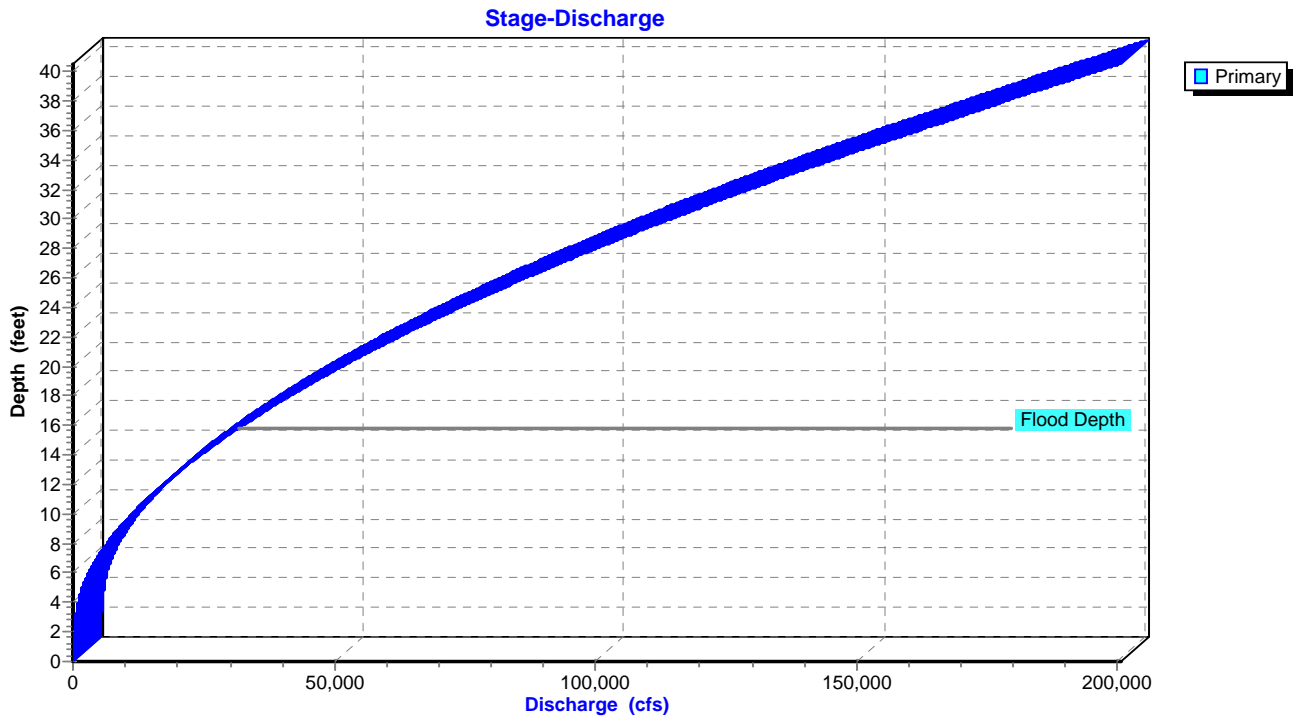
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

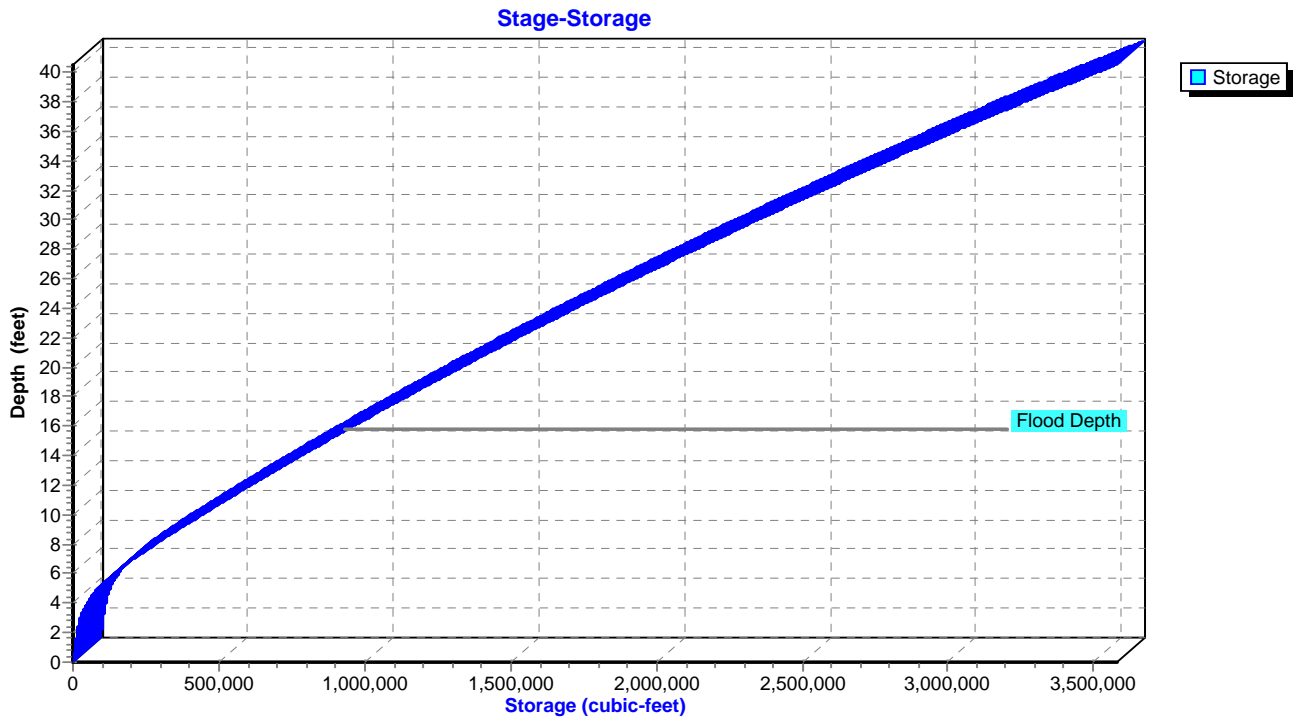
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - Sunny DayDBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 3,498.98 cfs @ 0.00 hrs, Volume= 60.962 af, Atten= 0%, Lag= 0.0 min
 Primary = 3,498.98 cfs @ 0.00 hrs, Volume= 60.962 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.64' Surf.Area= 7.050 ac Storage= 60.962 af
 Peak Elev= 1,001.64' @ 0.00 hrs Surf.Area= 7.050 ac Storage= 60.962 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af (82.393 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

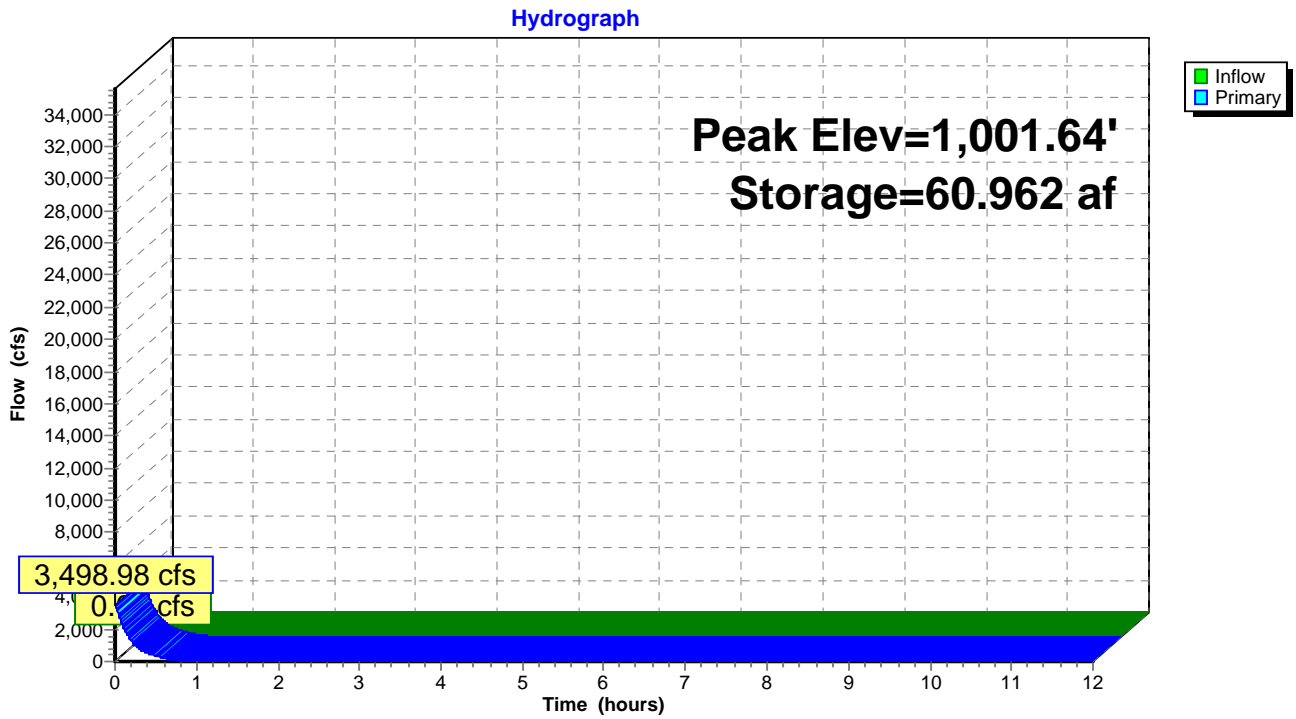
Volume	Invert	Avail.Storage	Storage Description
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

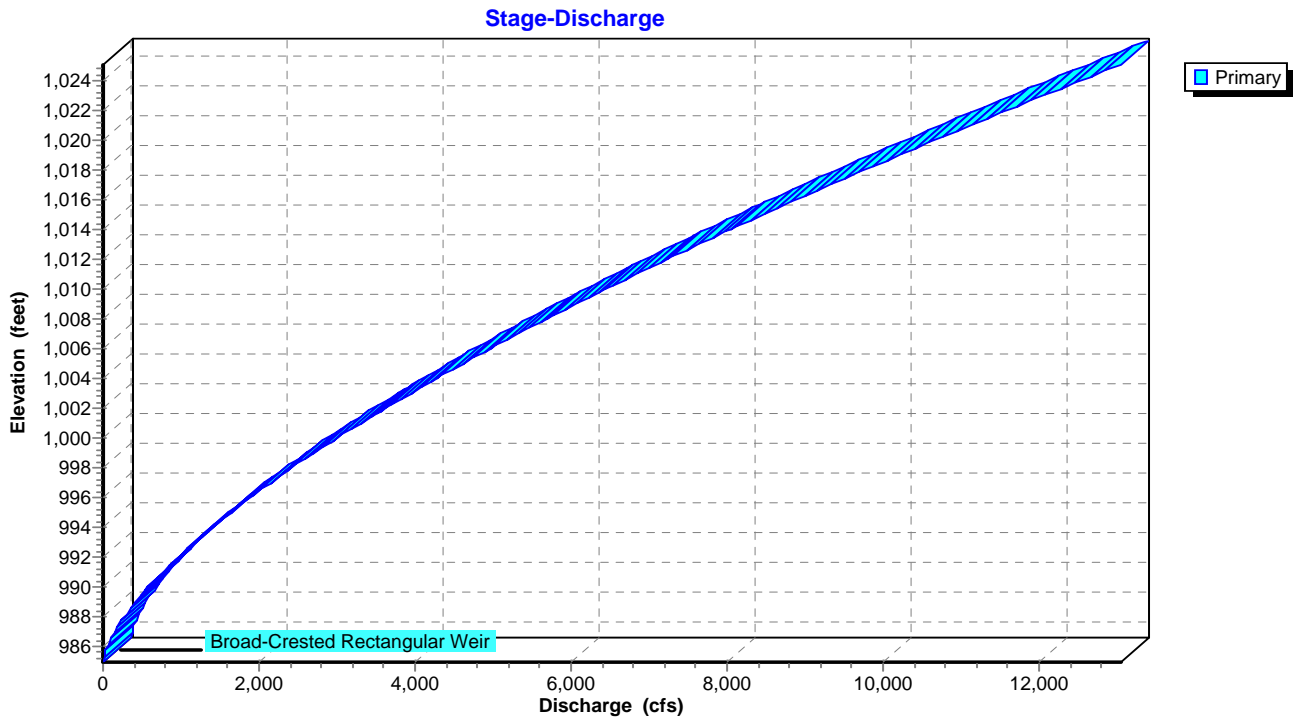
Device	Routing	Invert	Outlet Devices
#1	Primary	985.00'	19.6' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 20.00 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 2.63

Primary OutFlow Max=3,498.98 cfs @ 0.00 hrs HW=1,001.64' TW=980.00' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 3,498.98 cfs @ 10.73 fps)

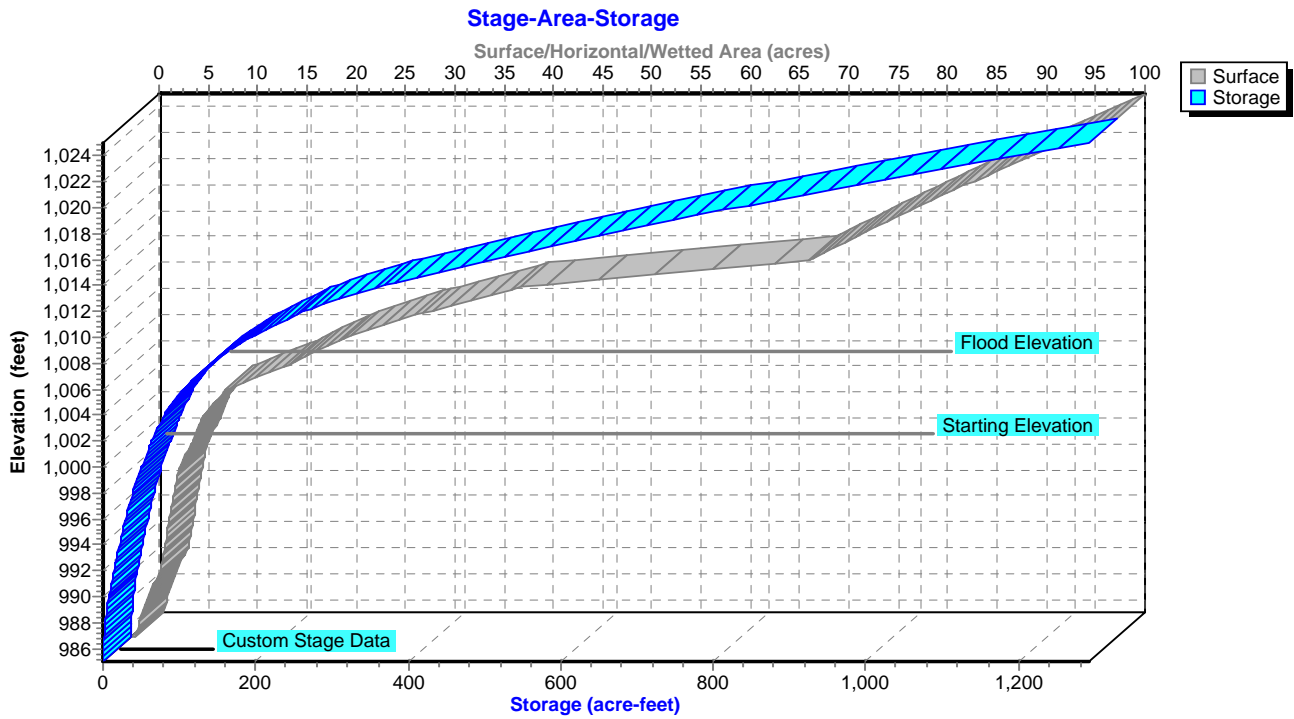
Pond 1P: Sippo Reservoir - Existing Conditions - Sunny DayDBA



Pond 1P: Sippo Reservoir - Existing Conditions - Sunny DayDBA



Pond 1P: Sippo Reservoir - Existing Conditions - Sunny DayDBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 3,498.98 cfs @ 0.00 hrs, Volume= 90.706 af
 Outflow = 1,289.17 cfs @ 0.21 hrs, Volume= 90.937 af, Atten= 63%, Lag= 12.3 min
 Primary = 1,289.17 cfs @ 0.21 hrs, Volume= 90.937 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 980.00' Surf.Area= 0.221 ac Storage= 0.313 af
 Peak Elev= 988.87' @ 0.21 hrs Surf.Area= 5.476 ac Storage= 22.258 af (21.945 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (196.714 af above start)

Plug-Flow detention time= 8.9 min calculated for 90.599 af (100% of inflow)
 Center-of-Mass det. time= 6.0 min (368.0 - 362.0)

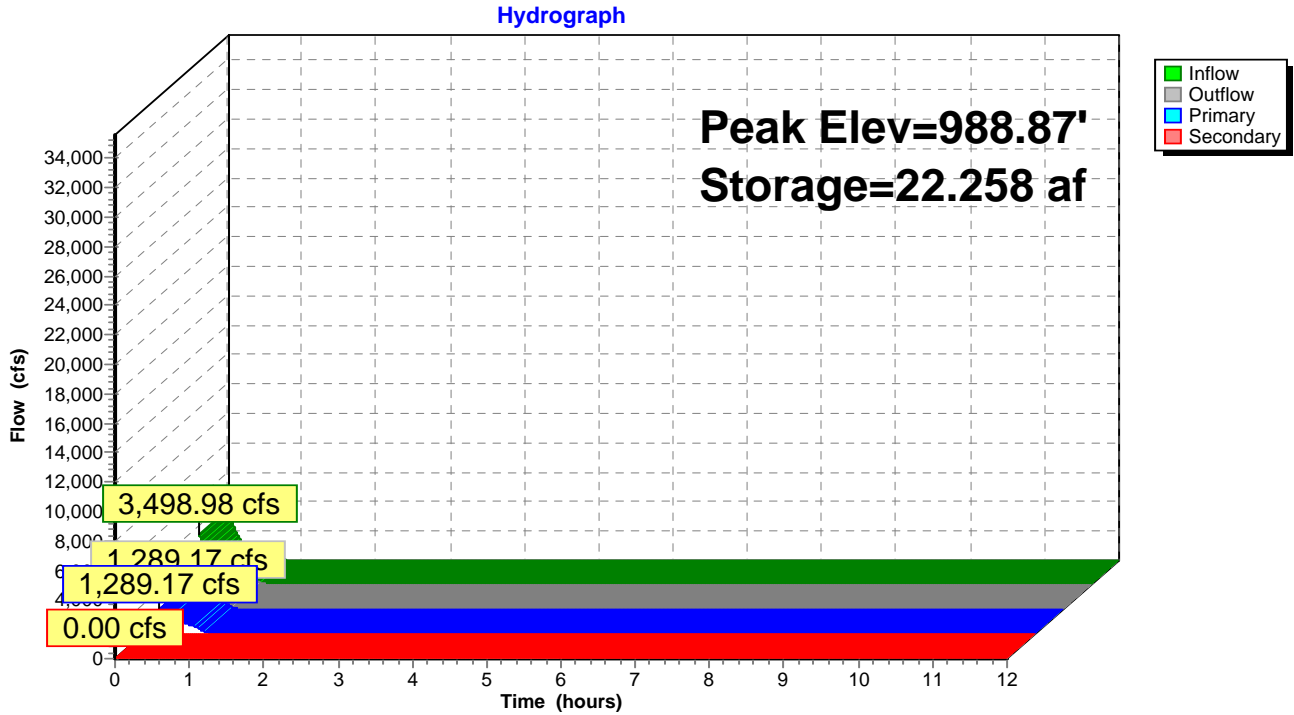
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

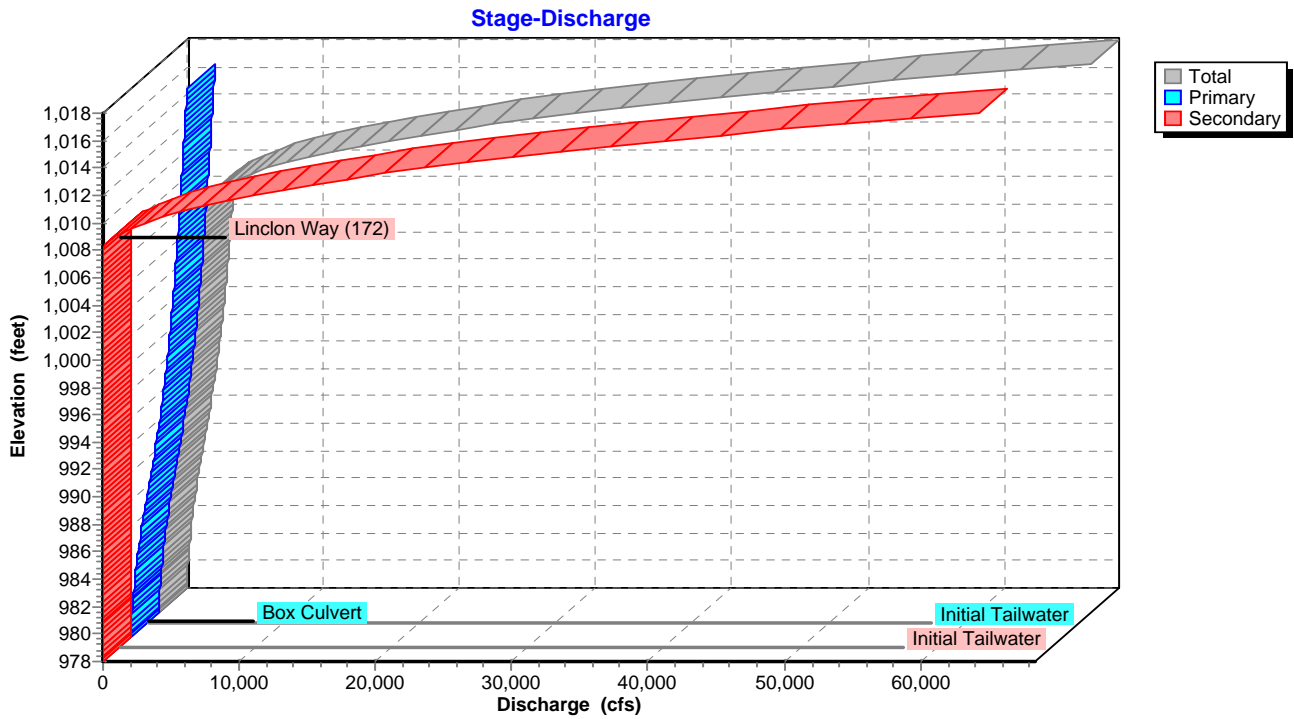
Primary OutFlow Max=1,288.95 cfs @ 0.21 hrs HW=988.87' TW=982.61' (Dynamic Tailwater)
 ↳1=Box Culvert (Barrel Controls 1,288.95 cfs @ 11.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=980.00' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

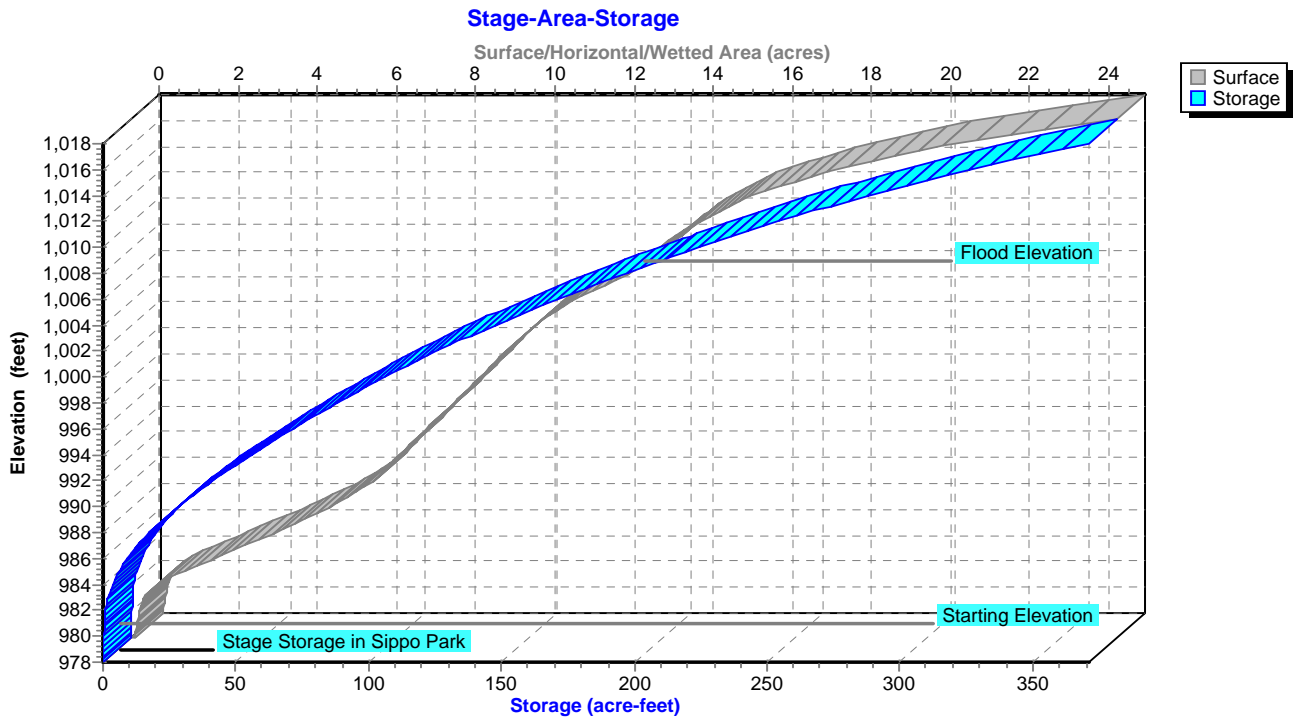
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - baseflow only

Inflow = 10.00 cfs @ 0.00 hrs, Volume= 29.752 af, Incl. 10.00 cfs Base Flow
 Outflow = 10.00 cfs @ 0.01 hrs, Volume= 29.752 af, Atten= 0%, Lag= 0.6 min
 Primary = 10.00 cfs @ 0.01 hrs, Volume= 29.752 af

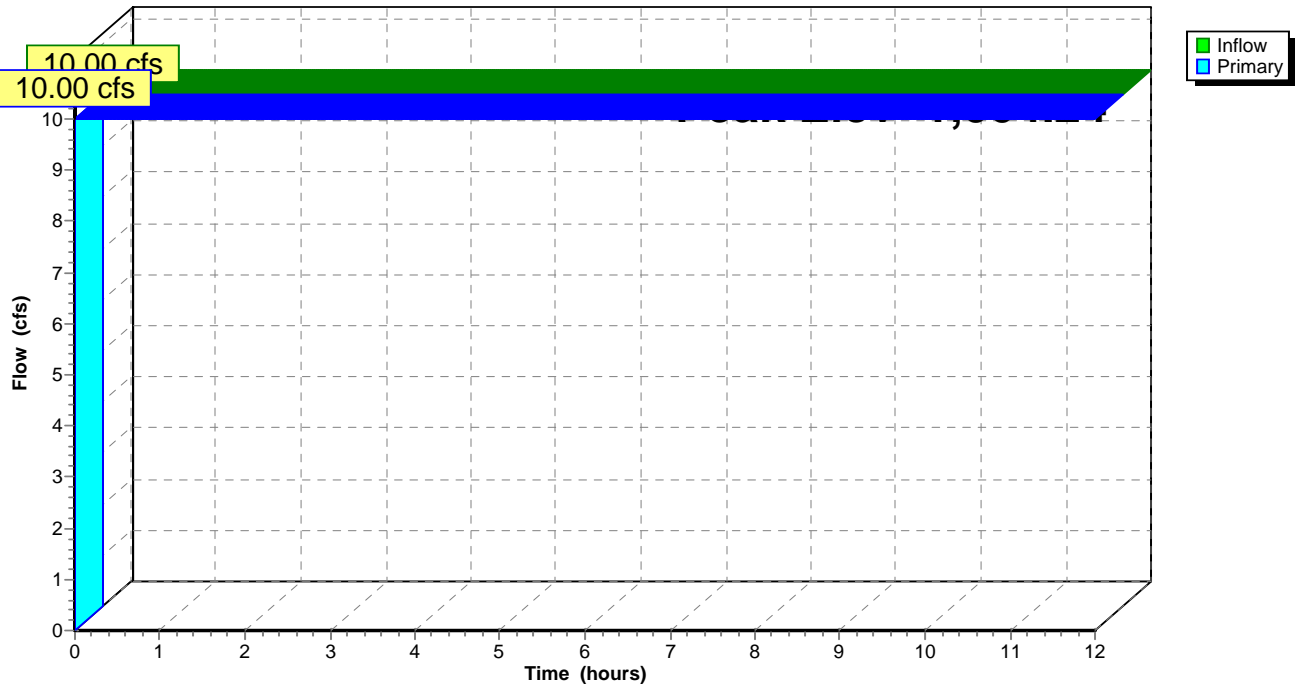
Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,004.24' @ 0.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

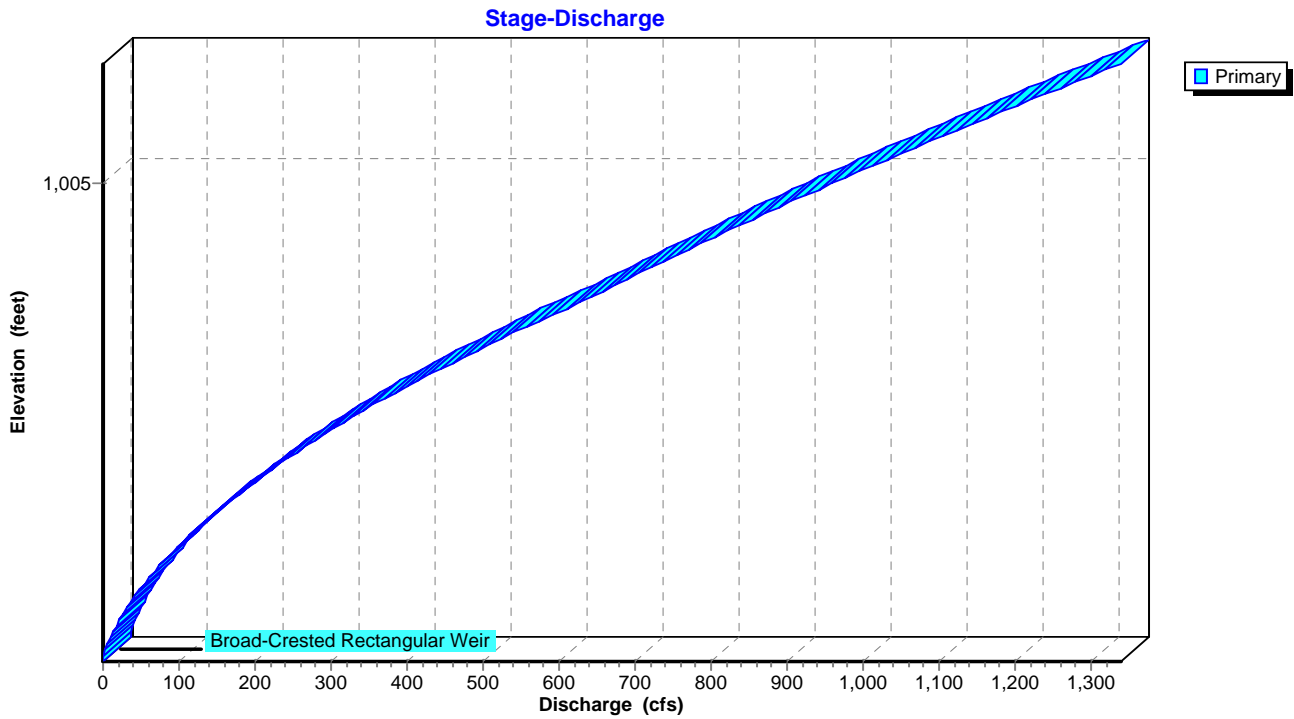
Primary OutFlow Max=10.00 cfs @ 0.01 hrs HW=1,004.24' TW=983.75' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 10.00 cfs @ 0.48 fps)

Pond 32P: Constant inflow - baseflow only

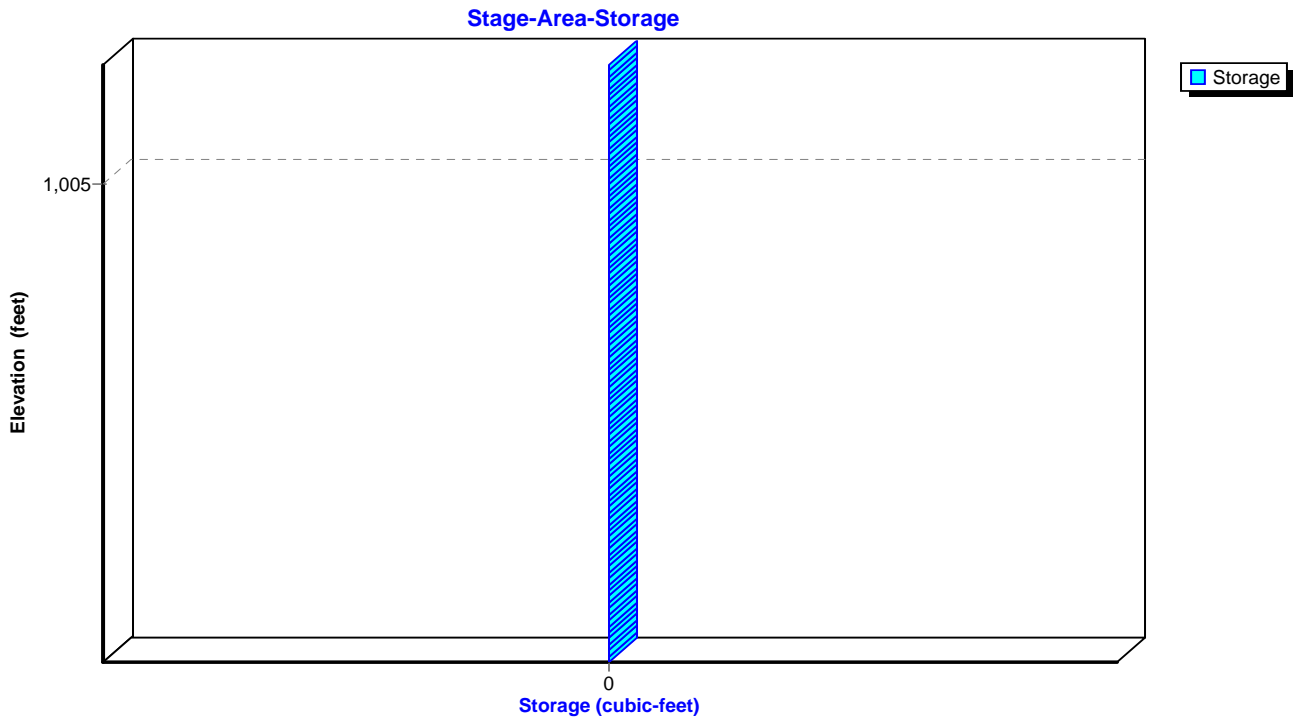
Hydrograph

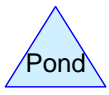
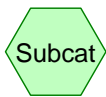
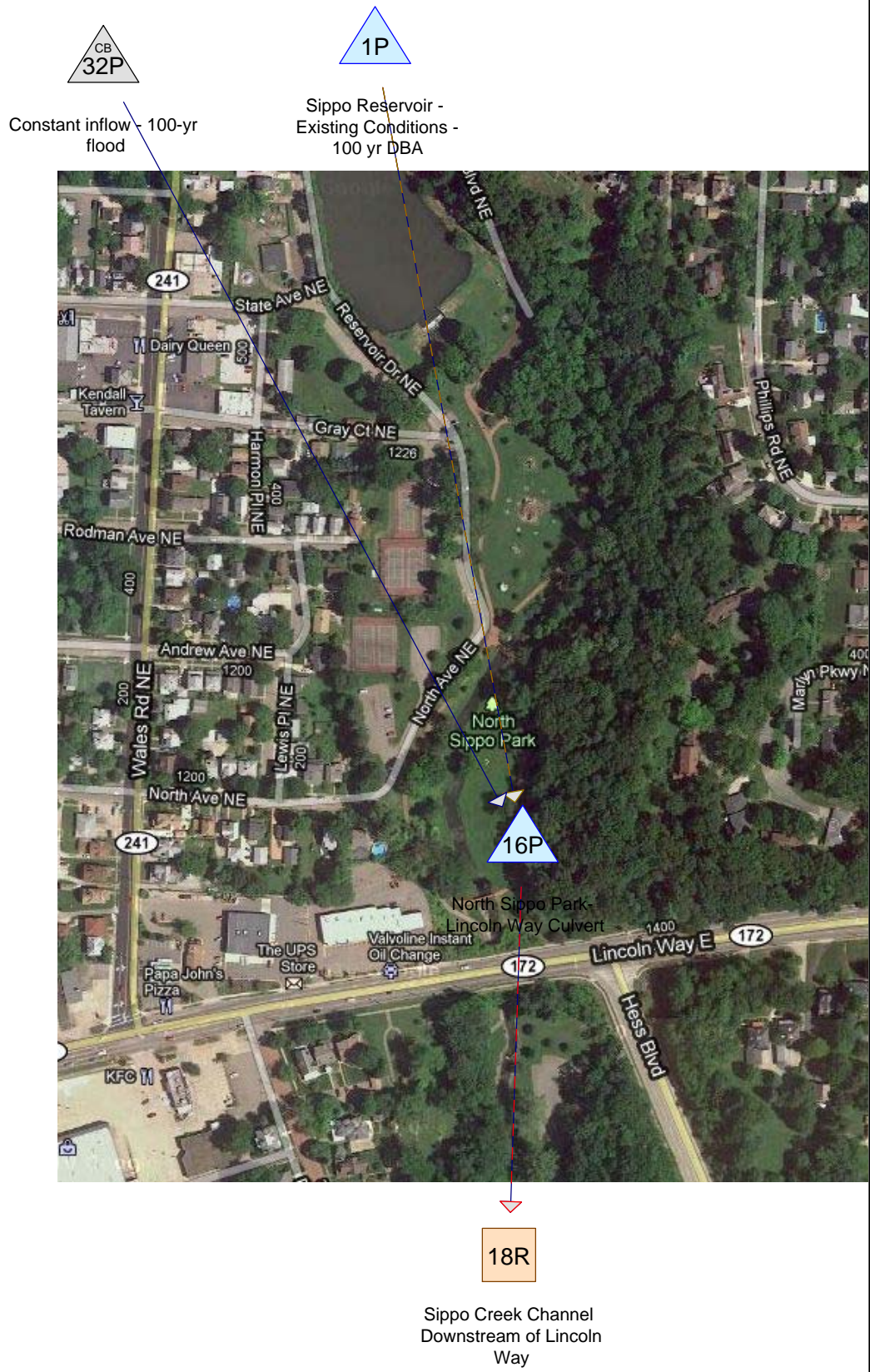


Pond 32P: Constant inflow - baseflow only



Pond 32P: Constant inflow - baseflow only





Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-100yr flood
 Prepared by URS Corporation, Printed 10/31/2011
 HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-100yr flood

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-100yr flood

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-100yr flood

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir-URS-DBA Type II 24-hr 100 year-FEMA Rainfall=5.22"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=5.75' Max Vel=9.48 fps Inflow=2,642.94 cfs 5,979.902 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,642.80 cfs 5,979.333 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,006.27' Storage=110.233 af Inflow=0.00 cfs 0.000 af
Outflow=4,416.23 cfs 92.614 af

Pond 16P: North Sippo Park- Peak Elev=999.04' Storage=97.543 af Inflow=6,320.15 cfs 5,981.887 af
Primary=2,642.94 cfs 5,981.539 af Secondary=0.00 cfs 0.000 af Outflow=2,642.94 cfs 5,981.539 af

Pond 32P: Constant inflow - 100-yr flood Peak Elev=1,005.51' Inflow=1,980.00 cfs 5,890.909 af
Outflow=1,980.00 cfs 5,890.909 af

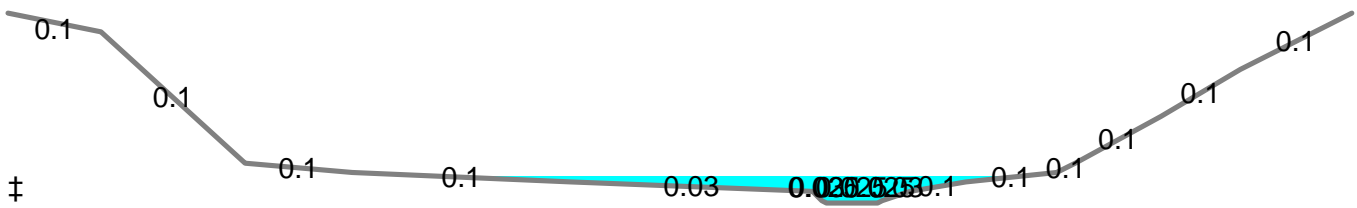
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 2,642.94 cfs @ 0.31 hrs, Volume= 5,979.902 af
 Outflow = 2,642.80 cfs @ 0.32 hrs, Volume= 5,979.333 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.48 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 9.28 fps, Avg. Travel Time= 0.8 min

Peak Storage= 125,452 cf @ 0.32 hrs
 Average Depth at Peak Storage= 5.75'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

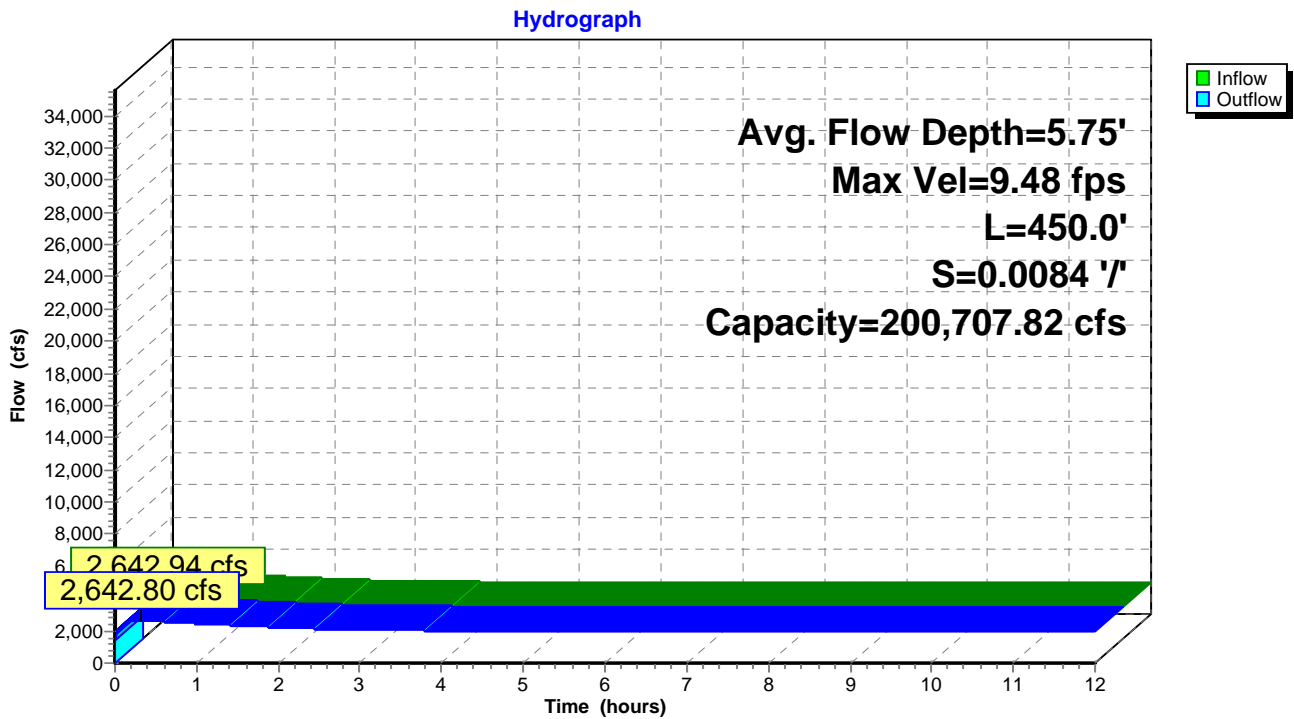
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



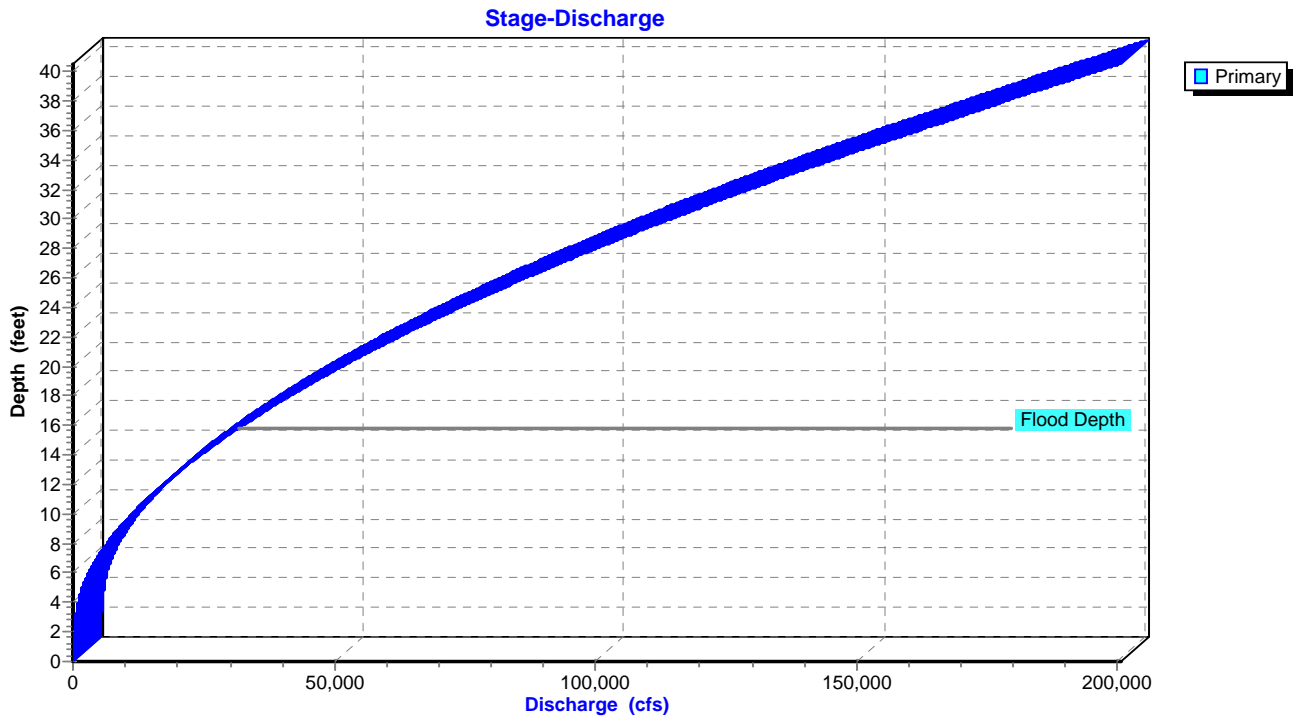
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

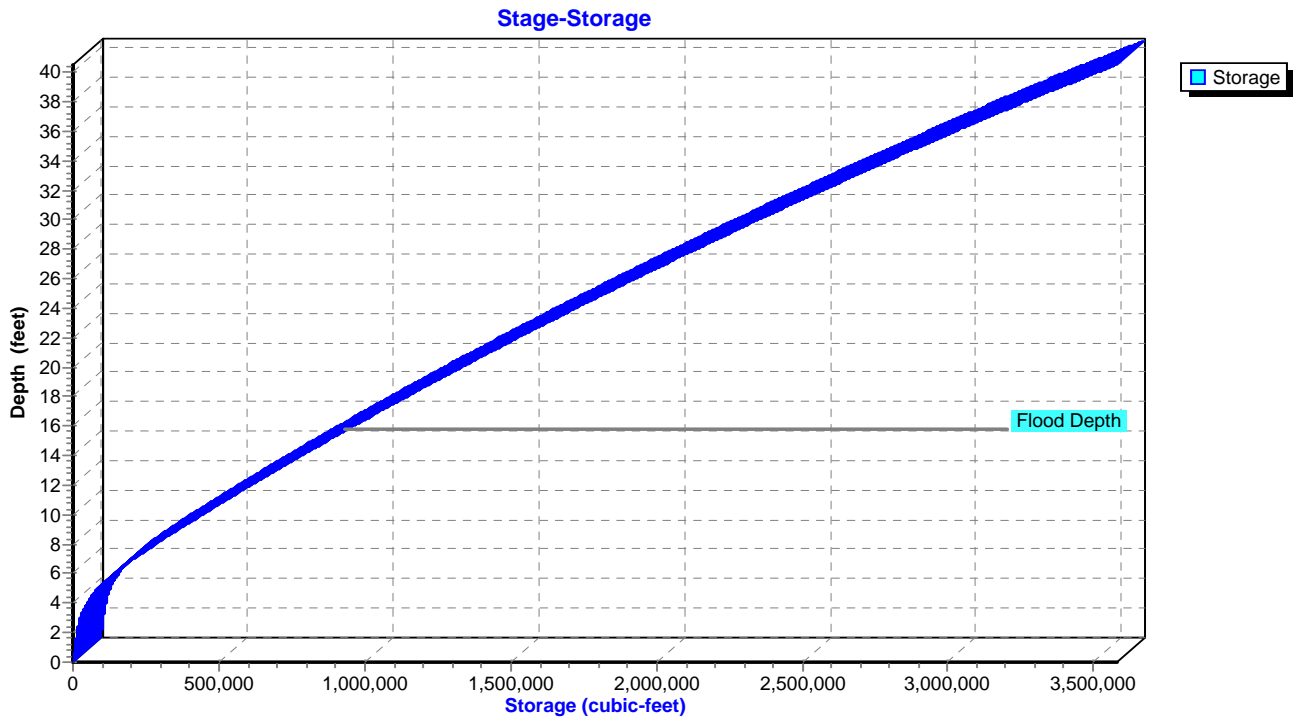
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 100 yr DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 4,416.23 cfs @ 0.00 hrs, Volume= 92.614 af, Atten= 0%, Lag= 0.0 min
 Primary = 4,416.23 cfs @ 0.00 hrs, Volume= 92.614 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,006.27' Surf.Area= 16.814 ac Storage= 110.233 af
 Peak Elev= 1,006.27' @ 0.00 hrs Surf.Area= 16.814 ac Storage= 110.233 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af (33.123 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

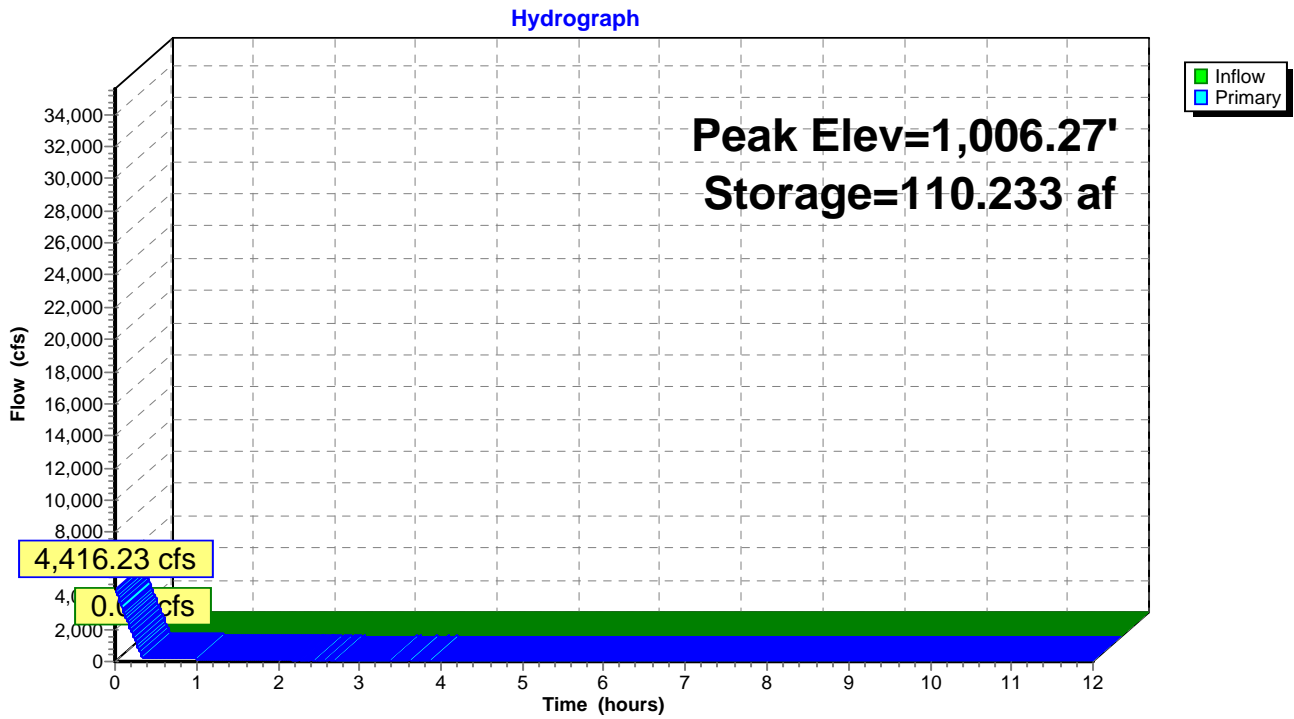
Volume	Invert	Avail.Storage	Storage Description
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

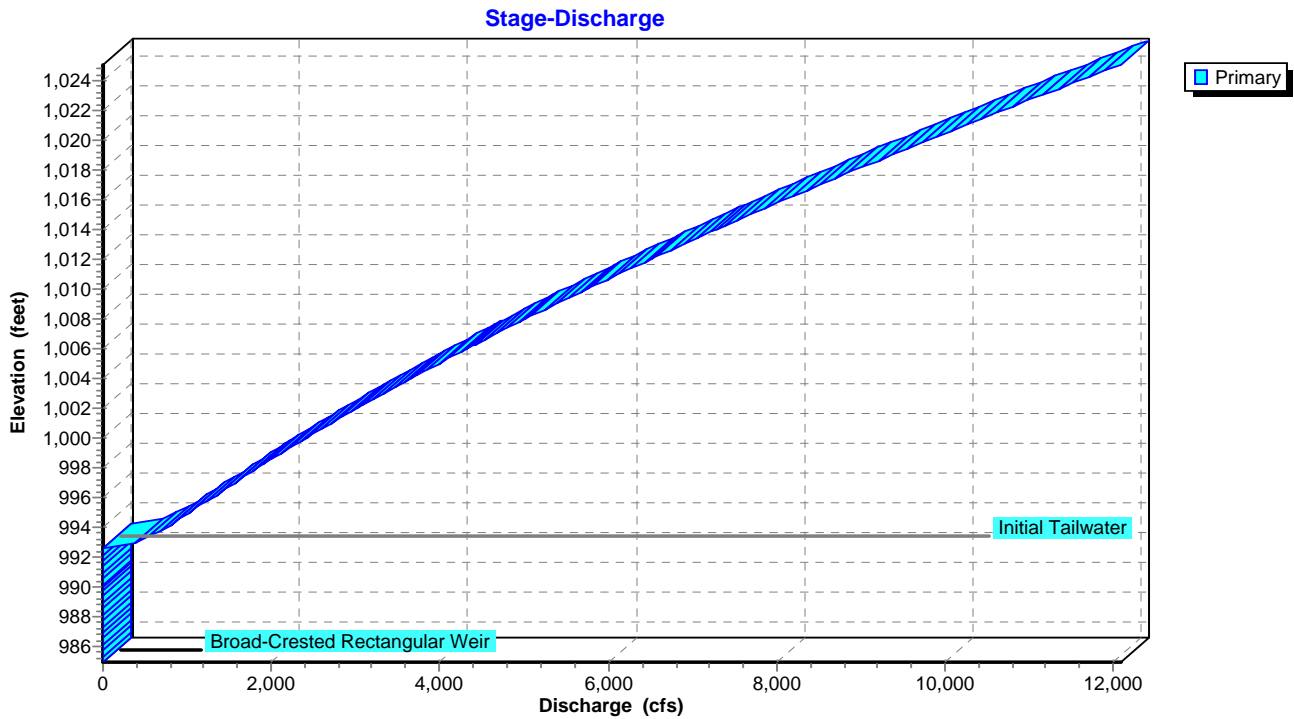
Device	Routing	Invert	Outlet Devices
#1	Primary	985.00'	18.8' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 20.00 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 2.63

Primary OutFlow Max=4,416.23 cfs @ 0.00 hrs HW=1,006.27' TW=992.66' (Dynamic Tailwater)
 ↑**1=Broad-Crested Rectangular Weir** (Weir Controls 4,416.23 cfs @ 11.04 fps)

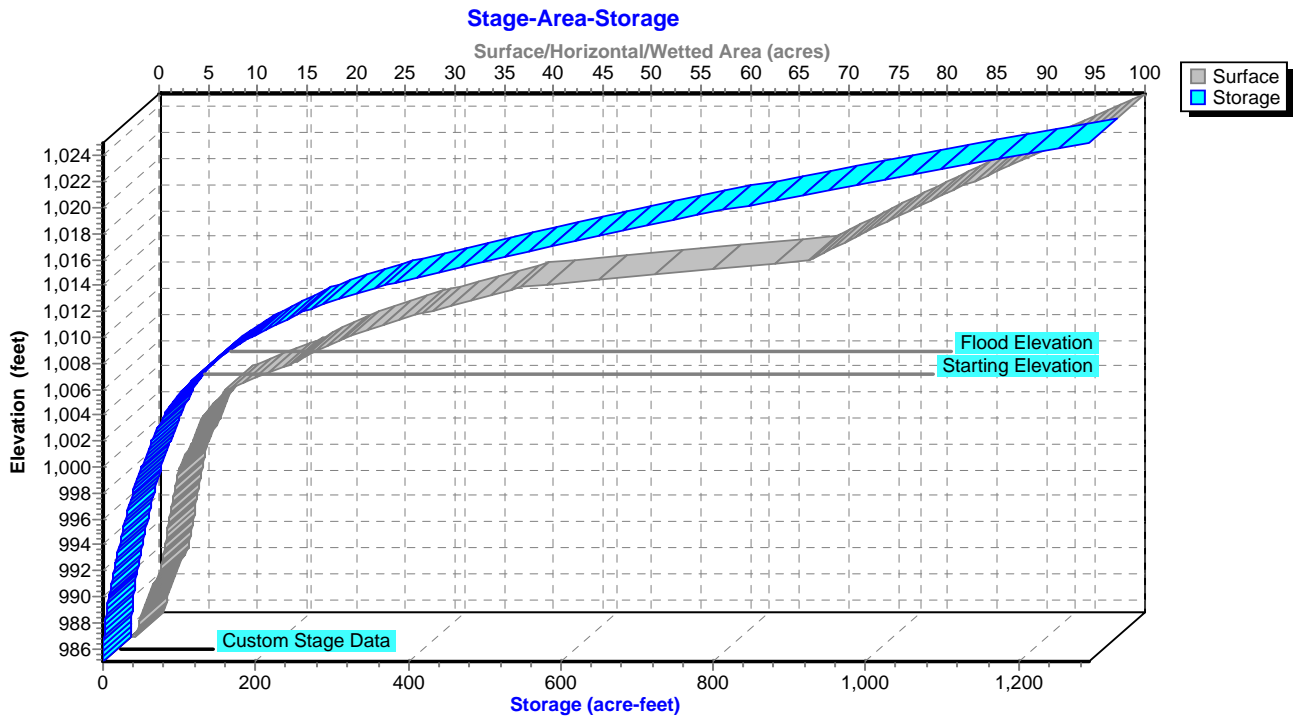
Pond 1P: Sippo Reservoir - Existing Conditions - 100 yr DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 100 yr DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 100 yr DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 6,320.15 cfs @ 0.01 hrs, Volume= 5,981.887 af
 Outflow = 2,642.94 cfs @ 0.31 hrs, Volume= 5,981.539 af, Atten= 58%, Lag= 17.7 min
 Primary = 2,642.94 cfs @ 0.31 hrs, Volume= 5,981.539 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Starting Elev= 992.66' Surf.Area= 6.980 ac Storage= 46.190 af
 Peak Elev= 999.04' @ 0.31 hrs Surf.Area= 9.131 ac Storage= 97.543 af (51.353 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (150.838 af above start)

Plug-Flow detention time= 18.1 min calculated for 5,935.349 af (99% of inflow)
 Center-of-Mass det. time= 1.3 min (1,065.1 - 1,063.7)

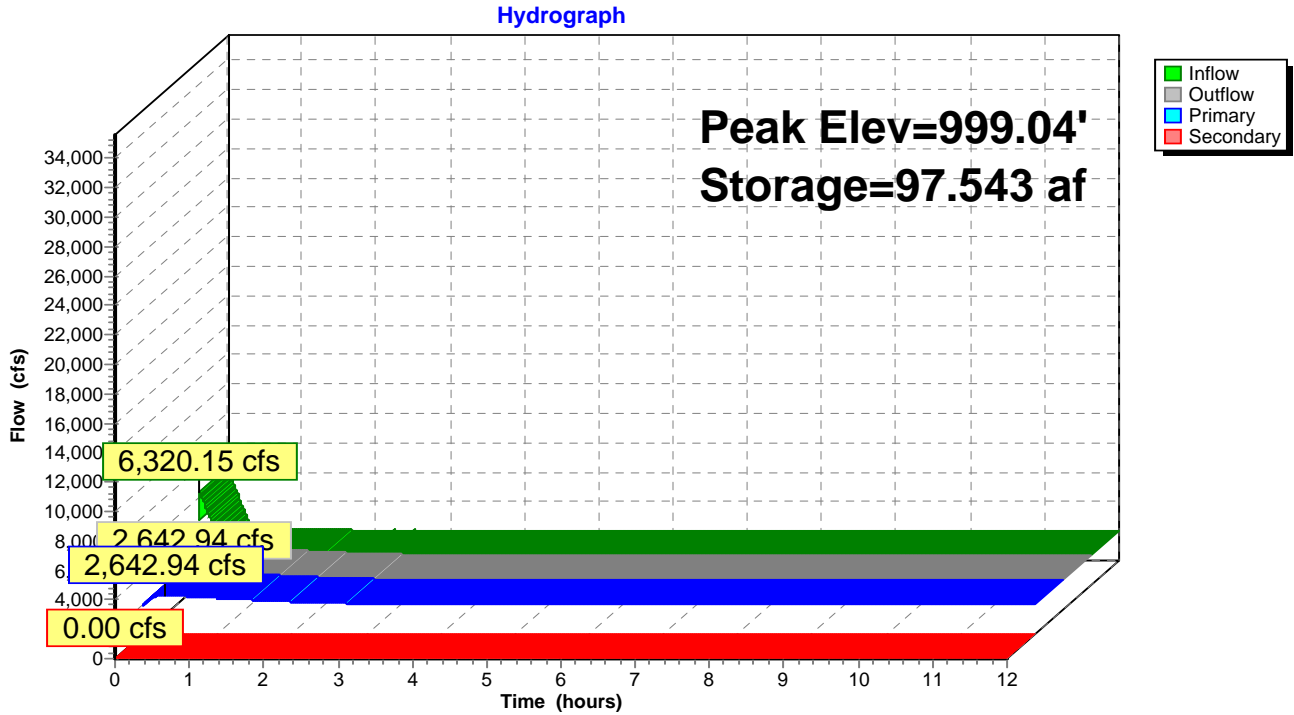
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/' Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

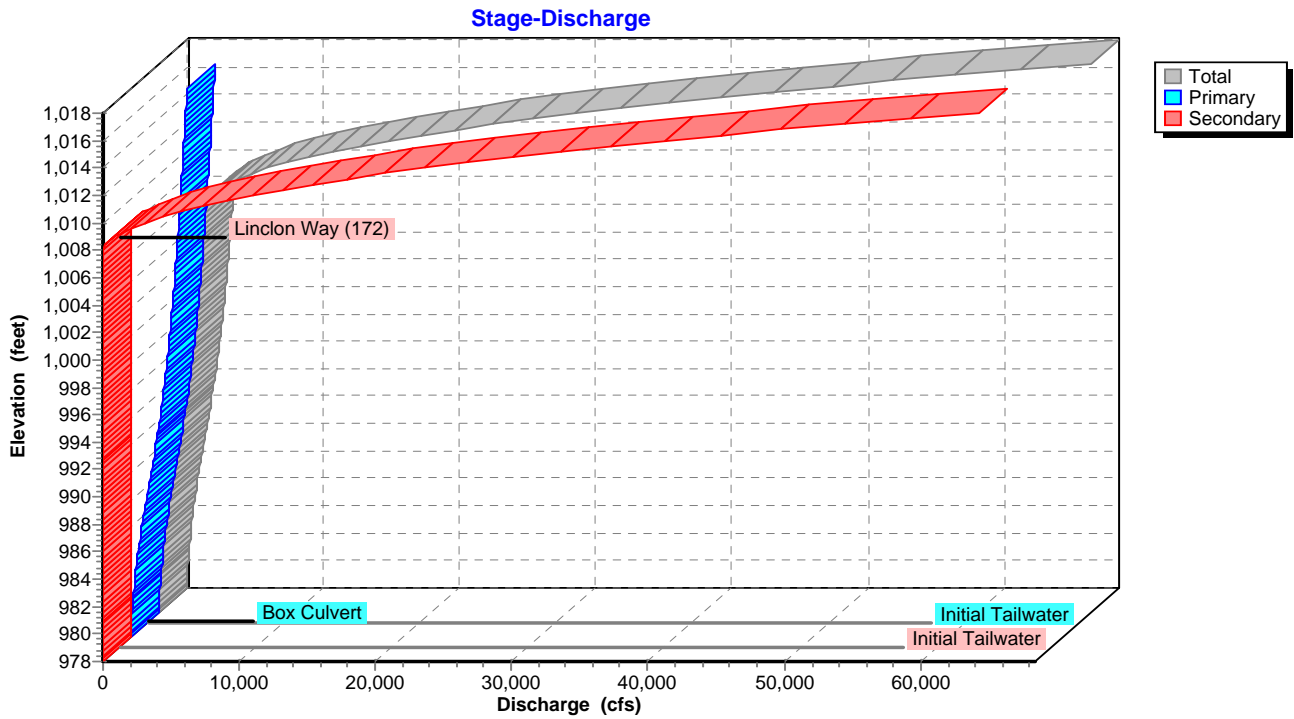
Primary OutFlow Max=2,642.74 cfs @ 0.31 hrs HW=999.03' TW=983.88' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,642.74 cfs @ 23.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=992.66' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

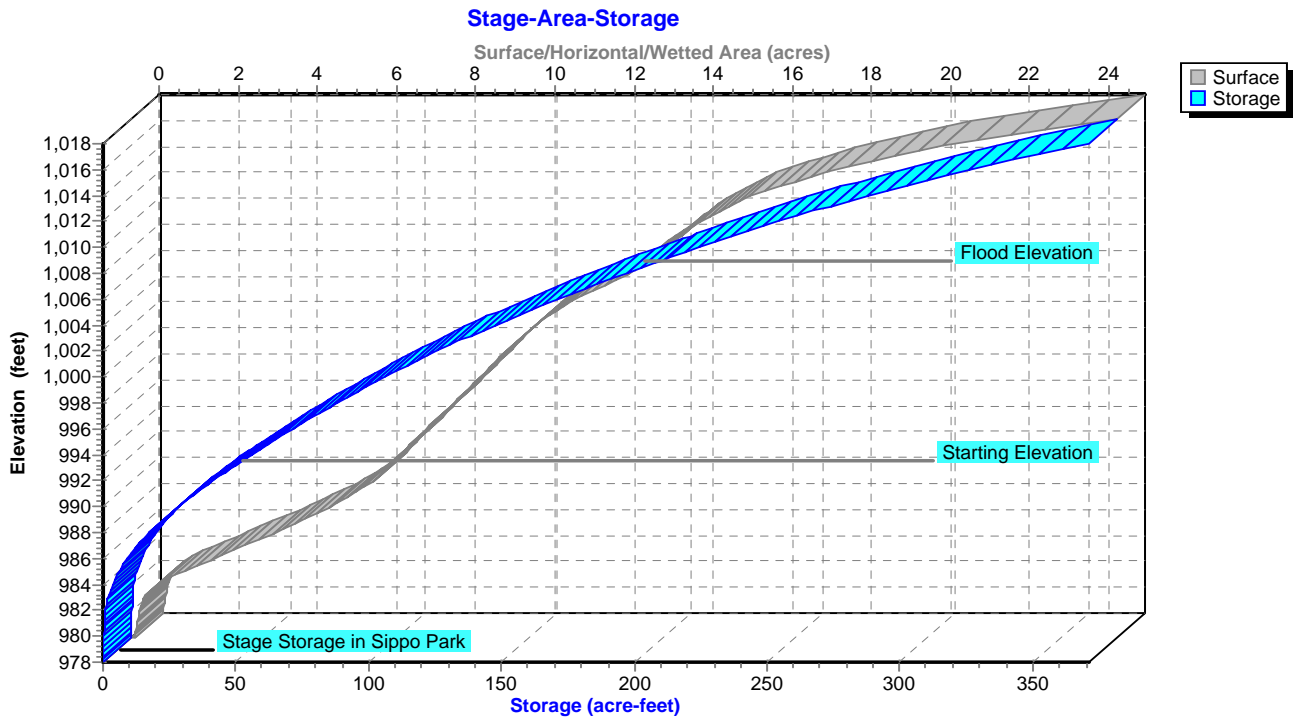
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 100-yr flood

Inflow = 1,980.00 cfs @ 0.00 hrs, Volume= 5,890.909 af, Incl. 1,980.00 cfs Base Flow
 Outflow = 1,980.00 cfs @ 0.01 hrs, Volume= 5,890.909 af, Atten= 0%, Lag= 0.6 min
 Primary = 1,980.00 cfs @ 0.01 hrs, Volume= 5,890.909 af

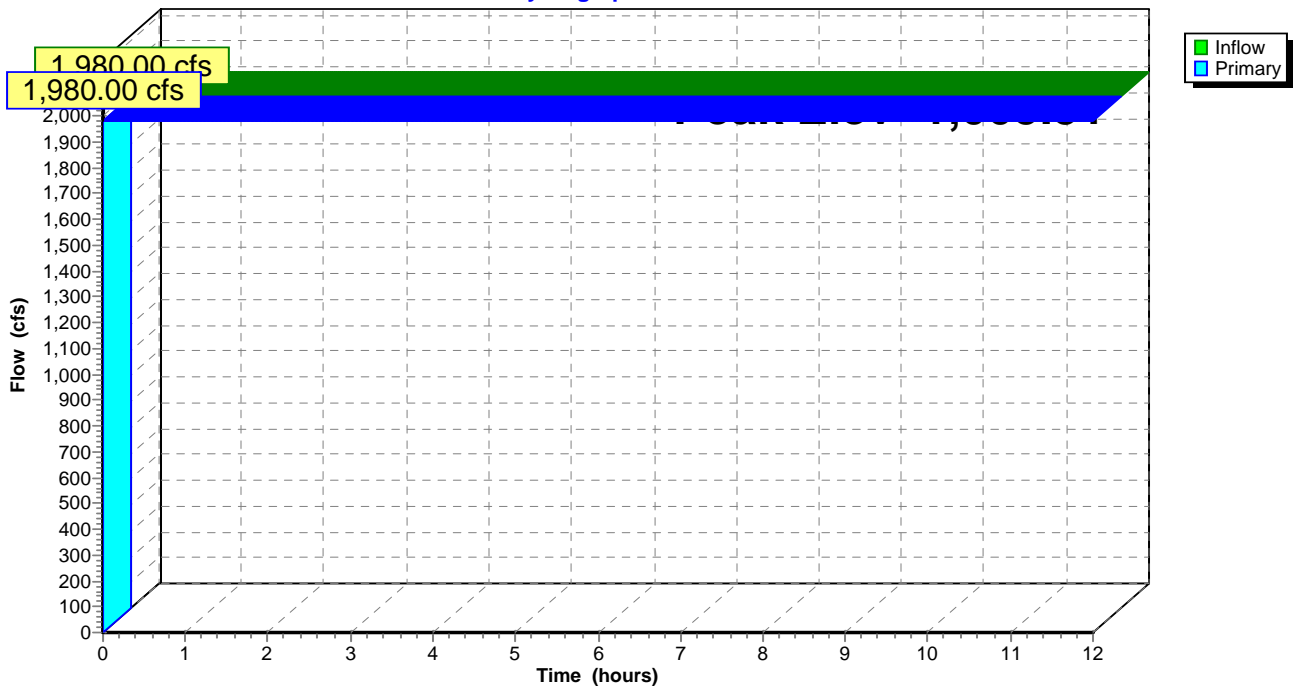
Routing by Sim-Route method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,005.51' @ 0.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

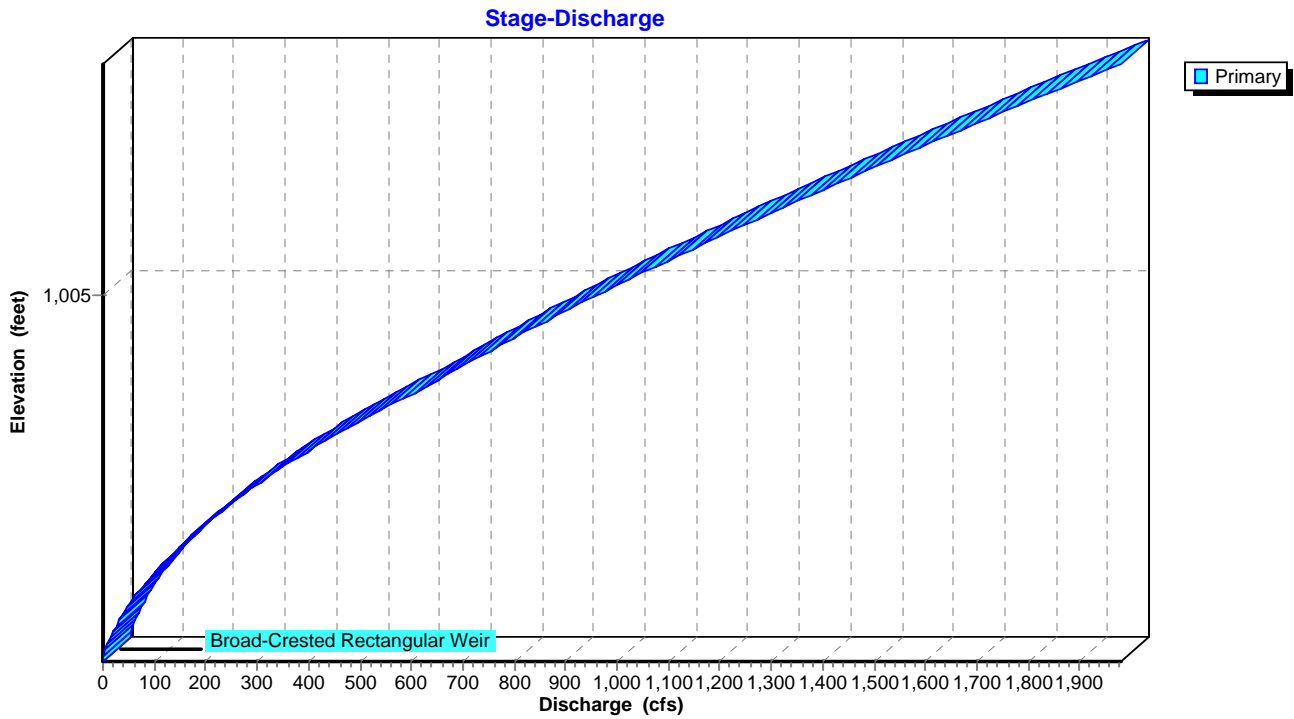
Primary OutFlow Max=1,980.00 cfs @ 0.01 hrs HW=1,005.51' TW=992.95' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 1,980.00 cfs @ 3.03 fps)

Pond 32P: Constant inflow - 100-yr flood

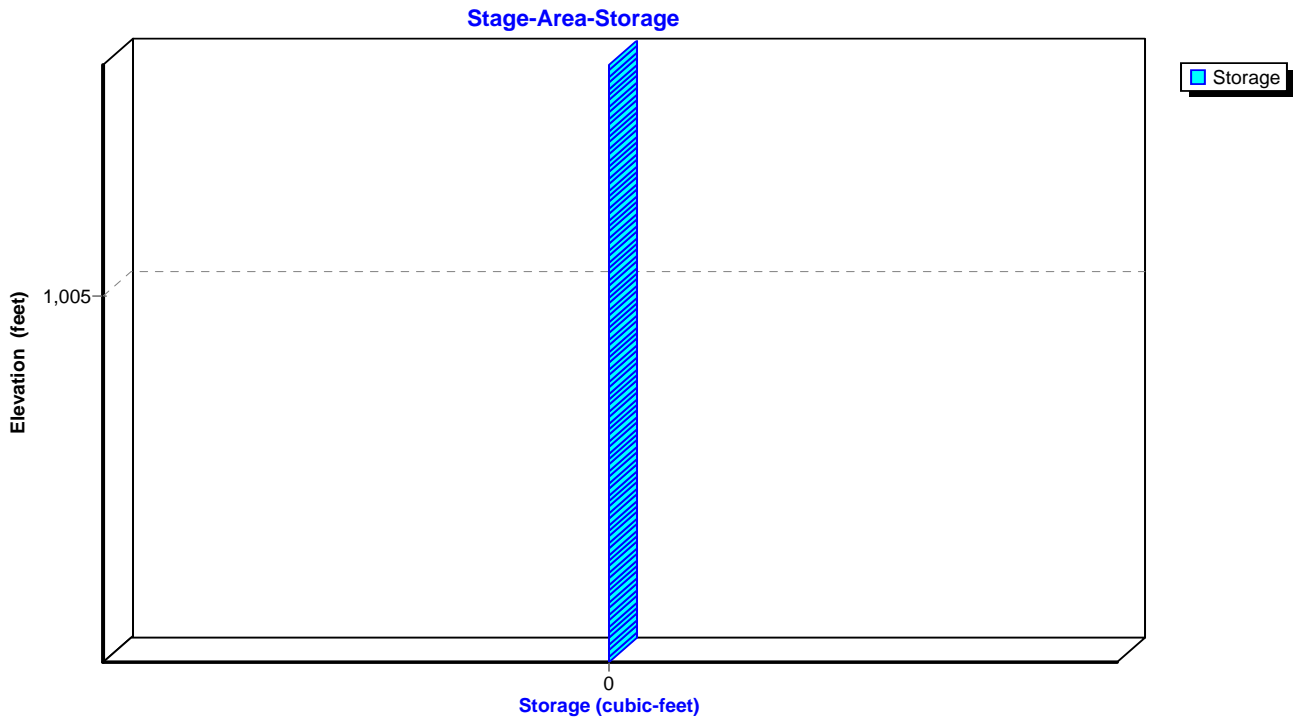
Hydrograph

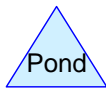
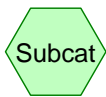
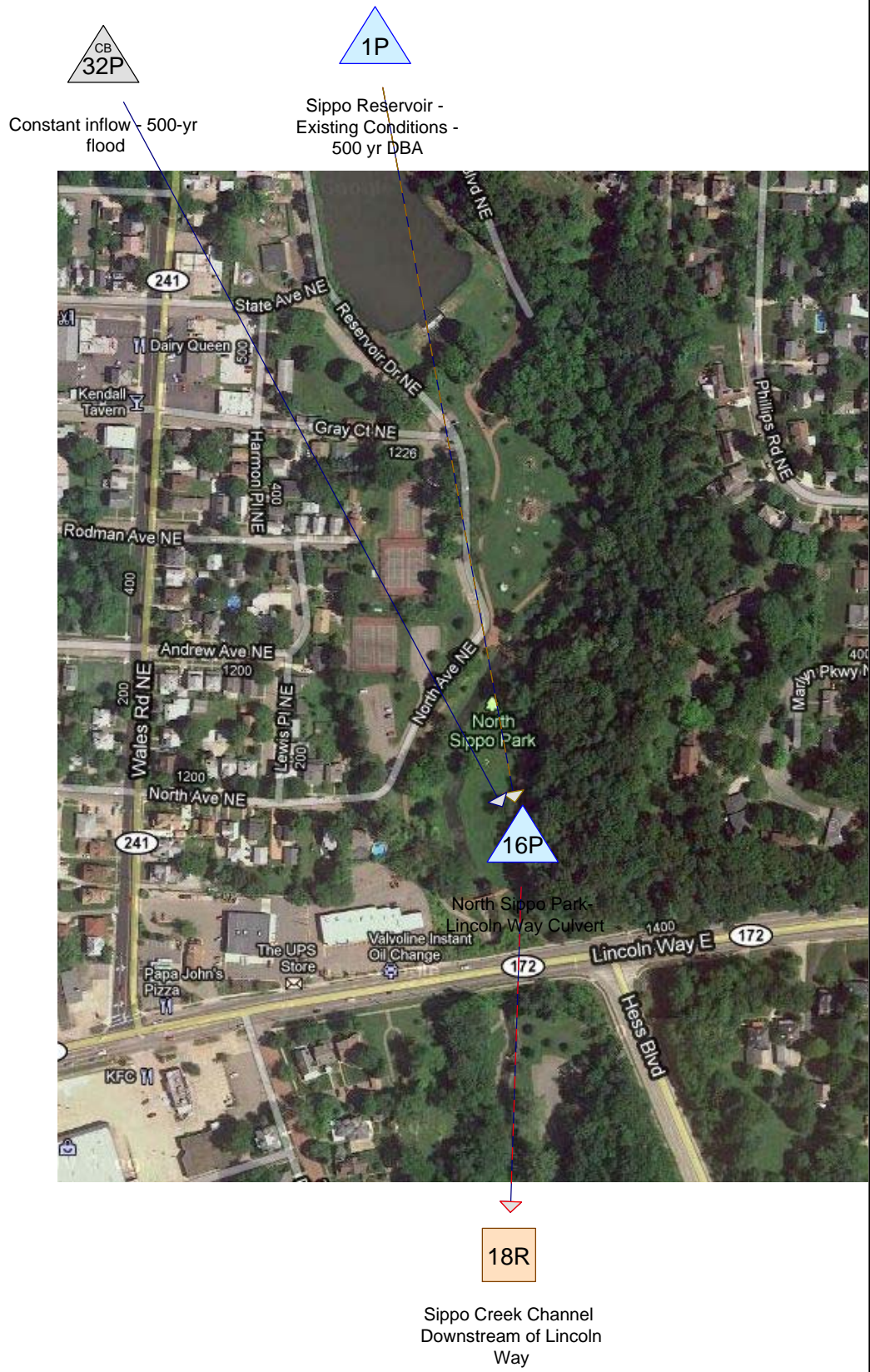


Pond 32P: Constant inflow - 100-yr flood



Pond 32P: Constant inflow - 100-yr flood





Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-500yr flood

Prepared by URS Corporation, Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-500yr flood

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-500yr flood

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-500yr flood

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir-URS-DBA Type II 24-hr 500 year-FEMA Rainfall=6.08"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=5.97' Max Vel=9.54 fps Inflow=2,923.71 cfs 10,571.568 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=2,923.57 cfs 10,570.871 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,006.86' Storage=120.609 af Inflow=0.00 cfs 0.000 af
Outflow=2,852.05 cfs 75.691 af

Pond 16P: North Sippo Park- Peak Elev=1,002.48' Storage=131.074 af Inflow=5,468.97 cfs 10,585.898 af
Primary=2,923.71 cfs 10,573.758 af Secondary=0.00 cfs 0.000 af Outflow=2,923.71 cfs 10,573.758 af

Pond 32P: Constant inflow - 500-yr flood Peak Elev=1,005.79' Inflow=2,650.00 cfs 10,512.397 af
Outflow=2,650.00 cfs 10,512.397 af

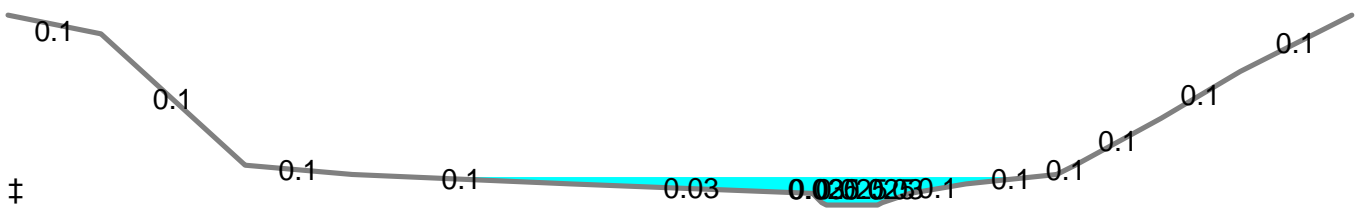
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 2,923.71 cfs @ 0.38 hrs, Volume= 10,571.568 af
 Outflow = 2,923.57 cfs @ 0.39 hrs, Volume= 10,570.871 af, Atten= 0%, Lag= 0.7 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.54 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 9.49 fps, Avg. Travel Time= 0.8 min

Peak Storage= 137,844 cf @ 0.39 hrs
 Average Depth at Peak Storage= 5.97'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

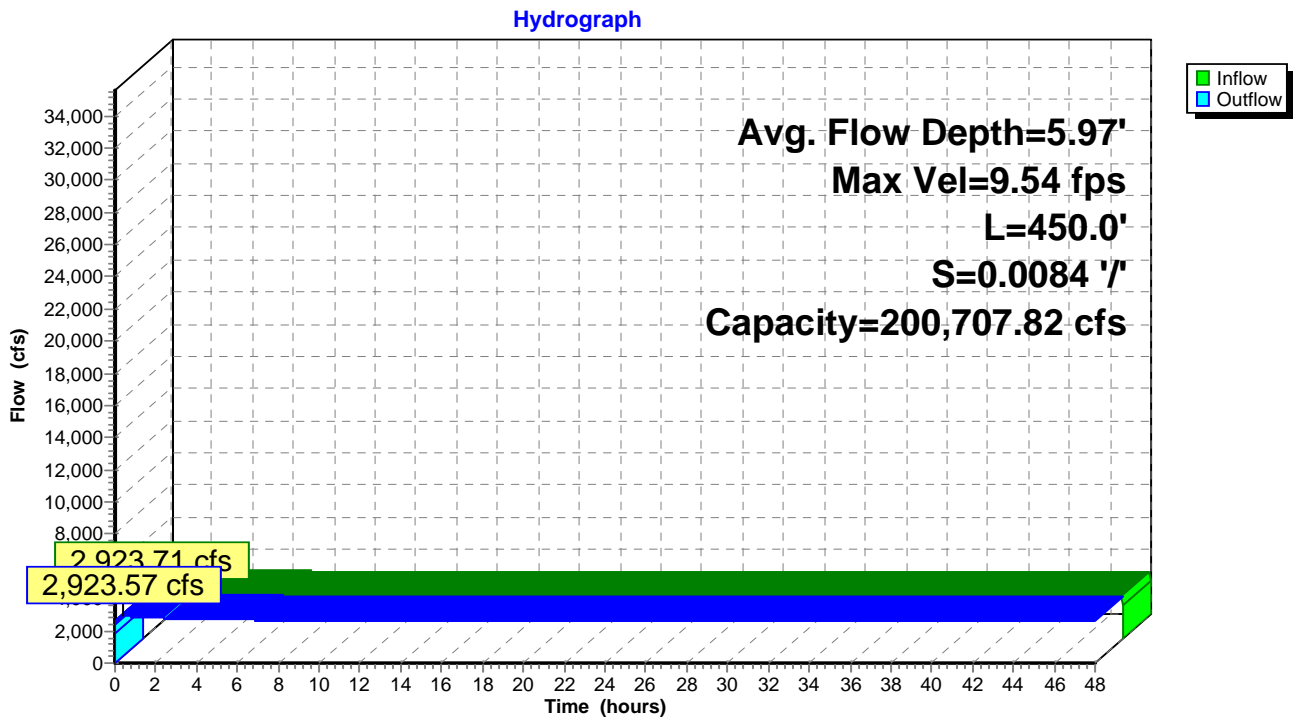
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



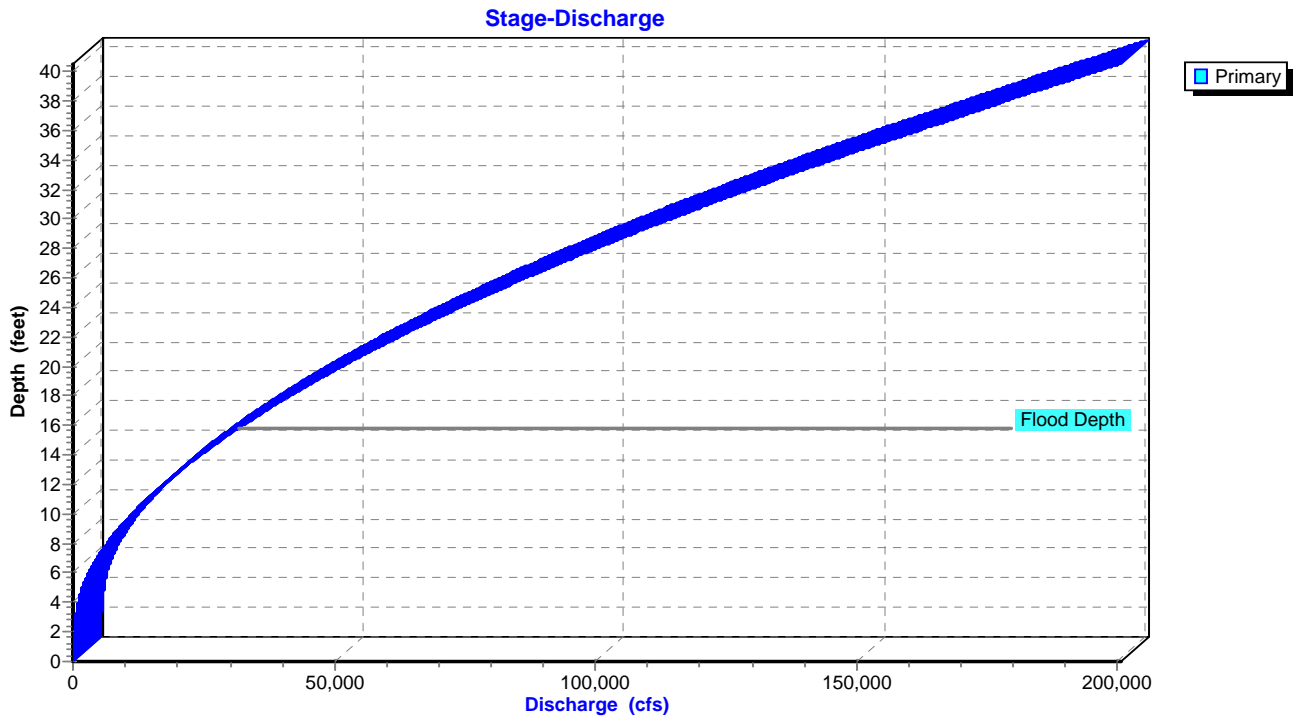
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

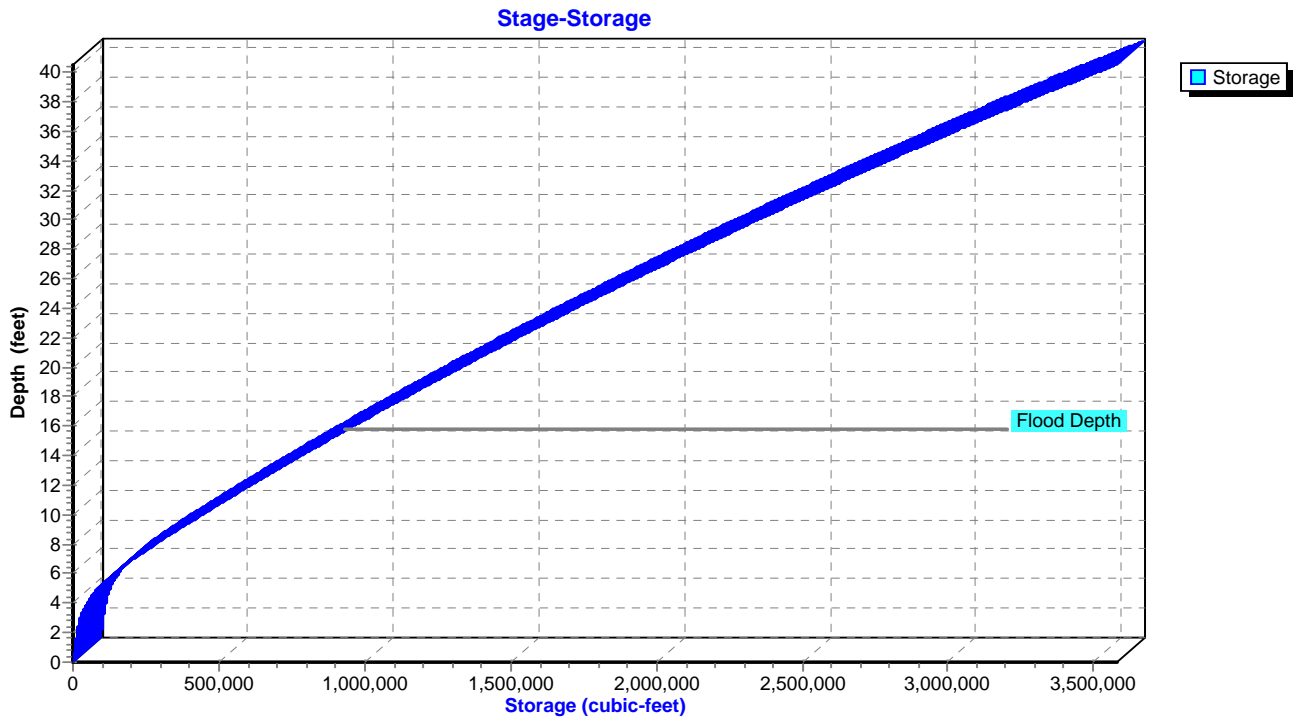
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 500 yr DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 2,852.05 cfs @ 0.00 hrs, Volume= 75.691 af, Atten= 0%, Lag= 0.0 min
 Primary = 2,852.05 cfs @ 0.00 hrs, Volume= 75.691 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,006.86' Surf.Area= 18.372 ac Storage= 120.609 af
 Peak Elev= 1,006.86' @ 0.00 hrs Surf.Area= 18.372 ac Storage= 120.609 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af (22.746 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

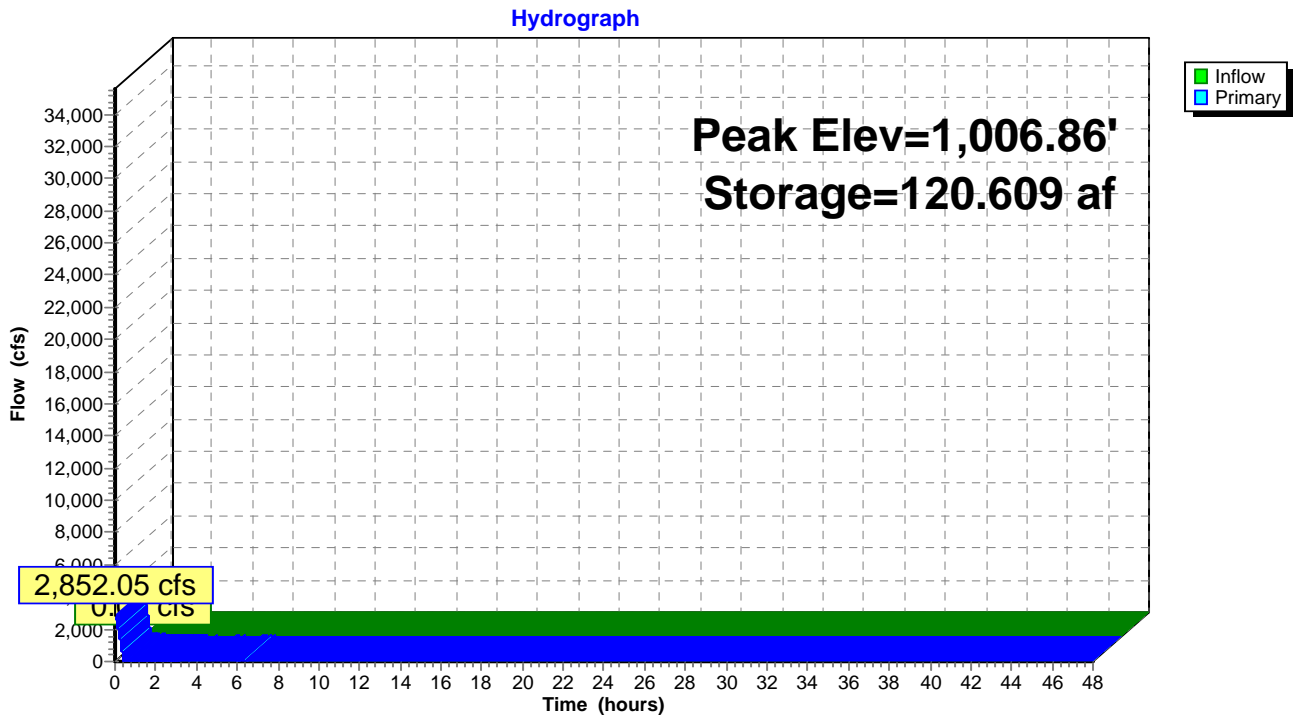
Volume	Invert	Avail.Storage	Storage Description
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

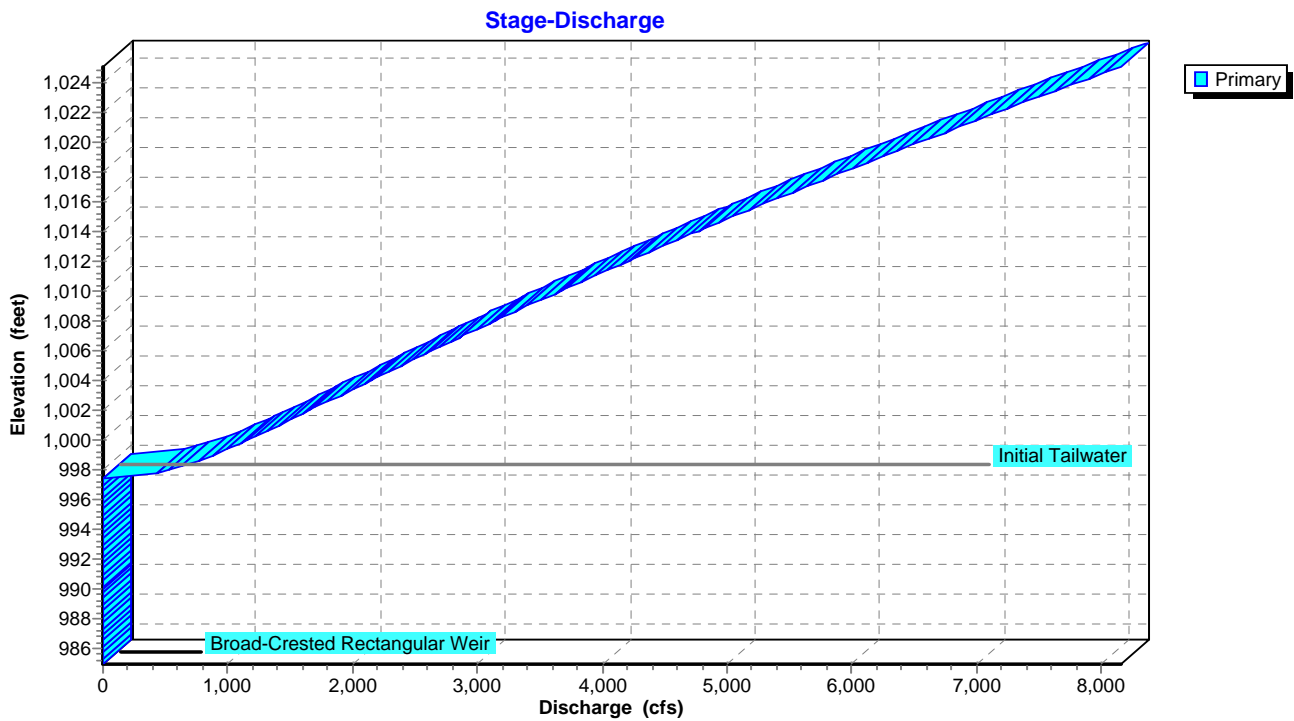
Device	Routing	Invert	Outlet Devices
#1	Primary	985.00'	13.2' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 20.00 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 2.63

Primary OutFlow Max=2,852.05 cfs @ 0.00 hrs HW=1,006.86' TW=997.51' (Dynamic Tailwater)
 ↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2,852.05 cfs @ 9.88 fps)

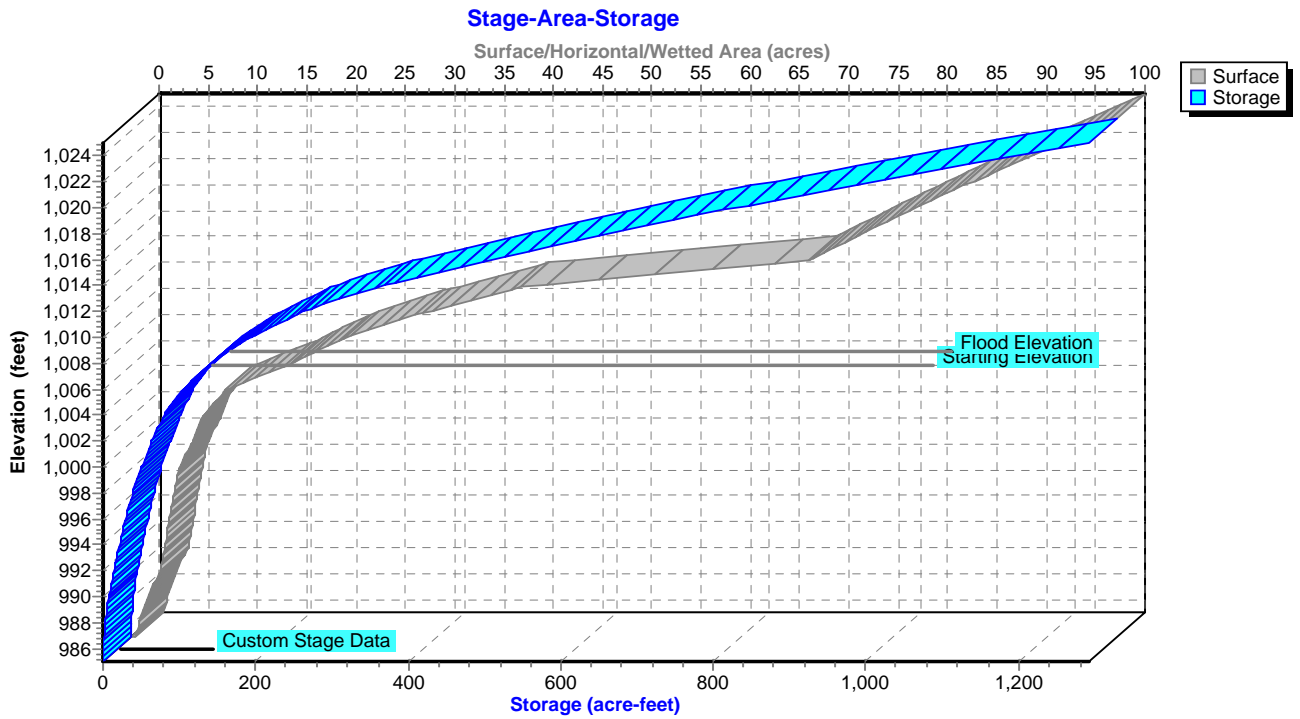
Pond 1P: Sippo Reservoir - Existing Conditions - 500 yr DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 500 yr DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 500 yr DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 5,468.97 cfs @ 0.01 hrs, Volume= 10,585.898 af
 Outflow = 2,923.71 cfs @ 0.38 hrs, Volume= 10,573.758 af, Atten= 47%, Lag= 21.9 min
 Primary = 2,923.71 cfs @ 0.38 hrs, Volume= 10,573.758 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 997.51' Surf.Area= 8.631 ac Storage= 83.984 af
 Peak Elev= 1,002.48' @ 0.38 hrs Surf.Area= 10.401 ac Storage= 131.074 af (47.089 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (113.044 af above start)

Plug-Flow detention time= 27.2 min calculated for 10,489.774 af (99% of inflow)
 Center-of-Mass det. time= 2.7 min (1,432.8 - 1,430.1)

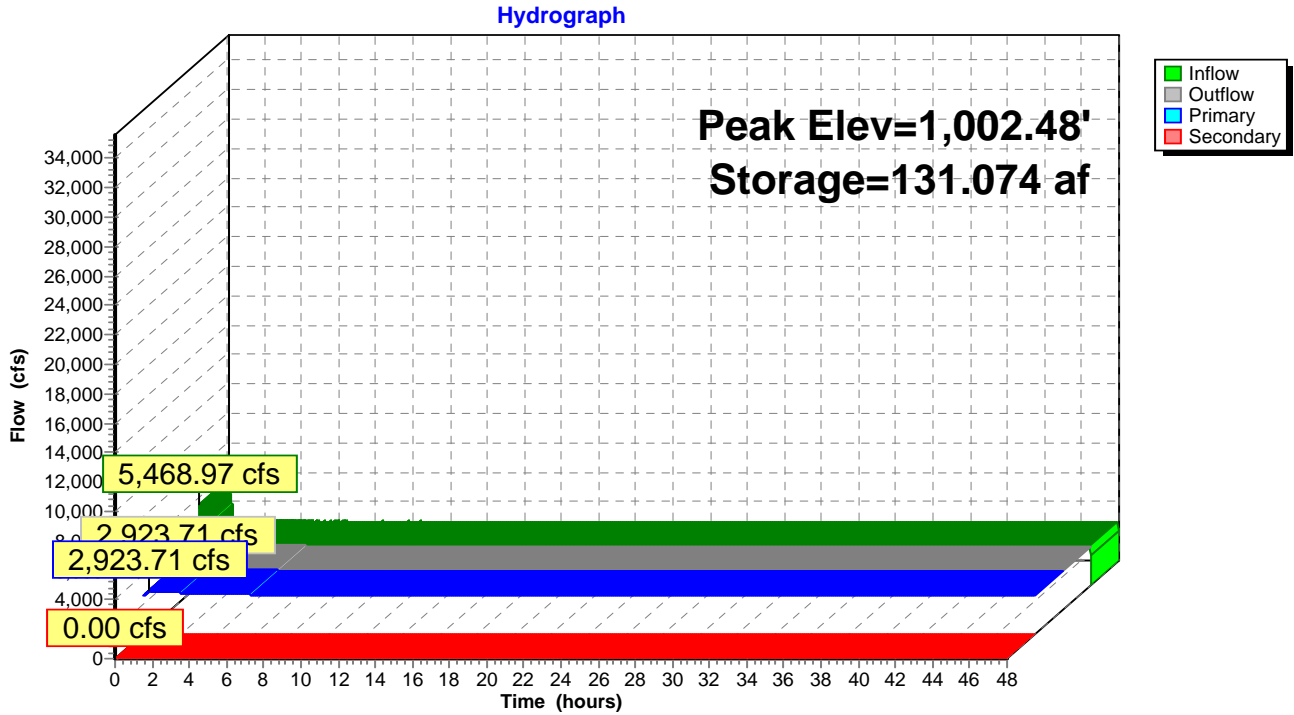
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

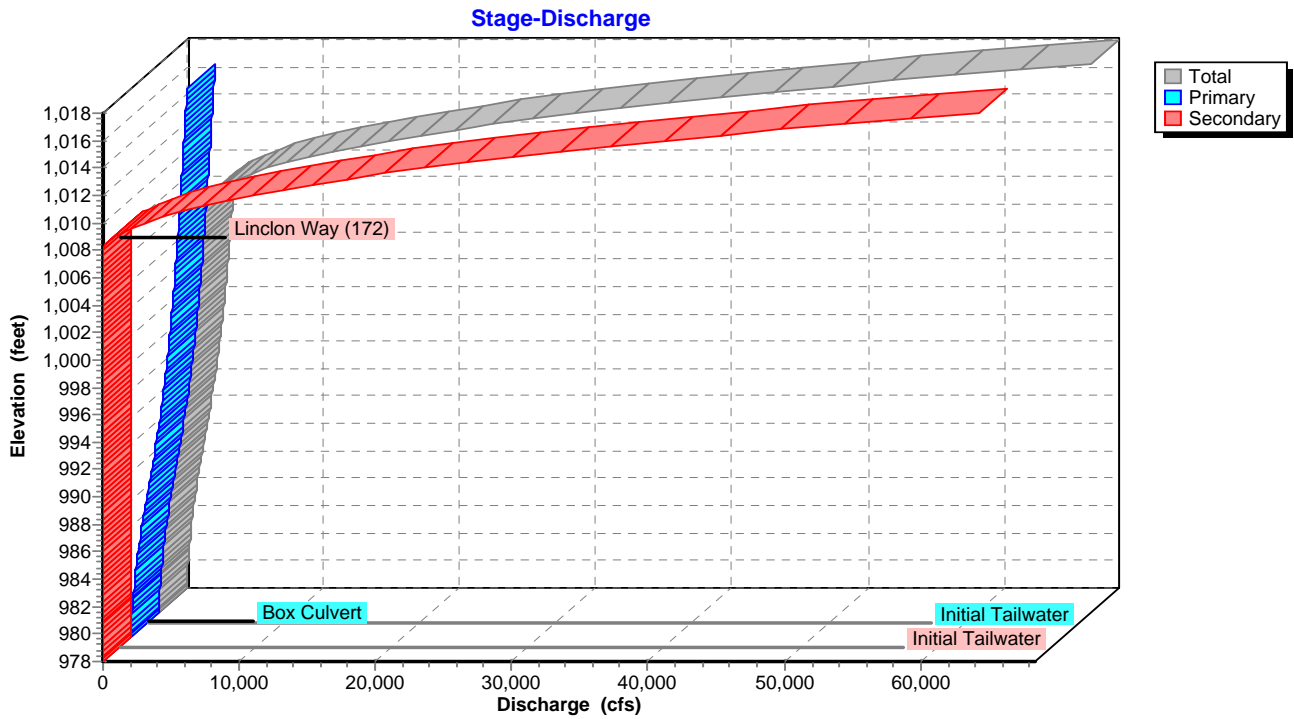
Primary OutFlow Max=2,923.43 cfs @ 0.38 hrs HW=1,002.48' TW=984.10' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 2,923.43 cfs @ 25.57 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=997.51' TW=978.13' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Controls 0.00 cfs)

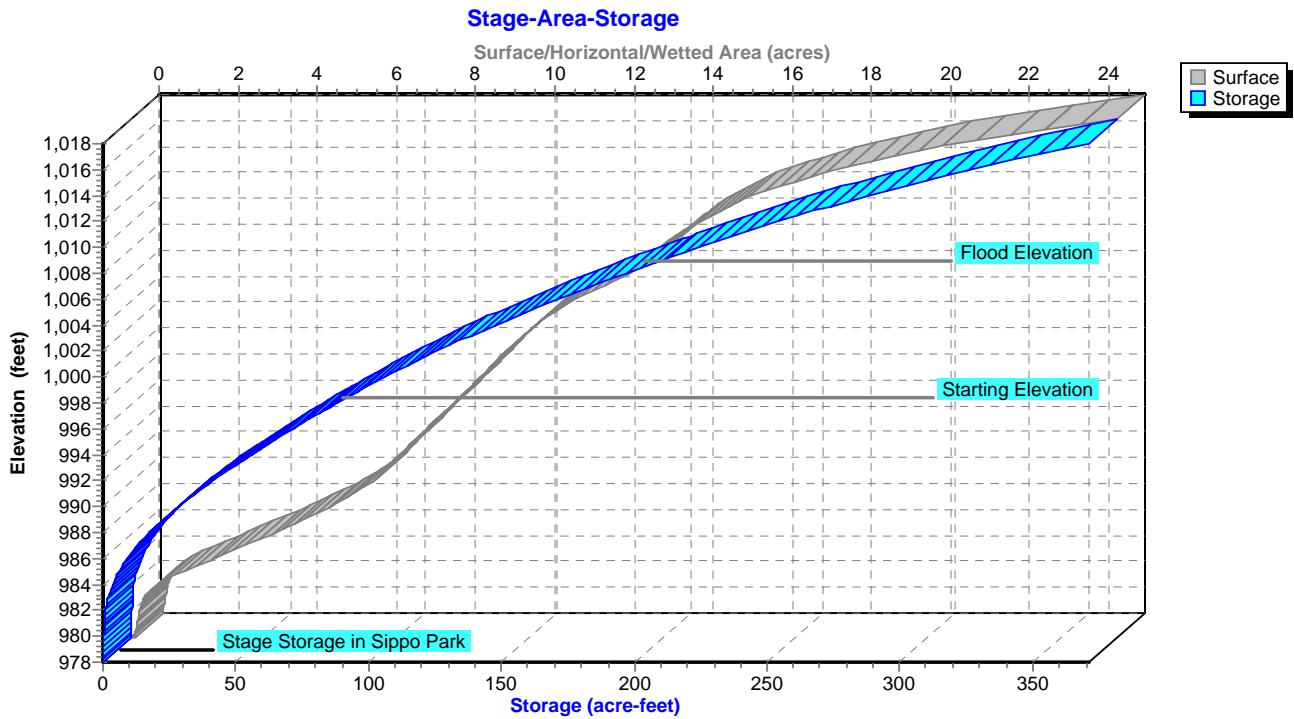
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 500-yr flood

Inflow = 2,650.00 cfs @ 0.00 hrs, Volume= 10,512.397 af, Incl. 2,650.00 cfs Base Flow
 Outflow = 2,650.00 cfs @ 0.01 hrs, Volume= 10,512.397 af, Atten= 0%, Lag= 0.6 min
 Primary = 2,650.00 cfs @ 0.01 hrs, Volume= 10,512.397 af

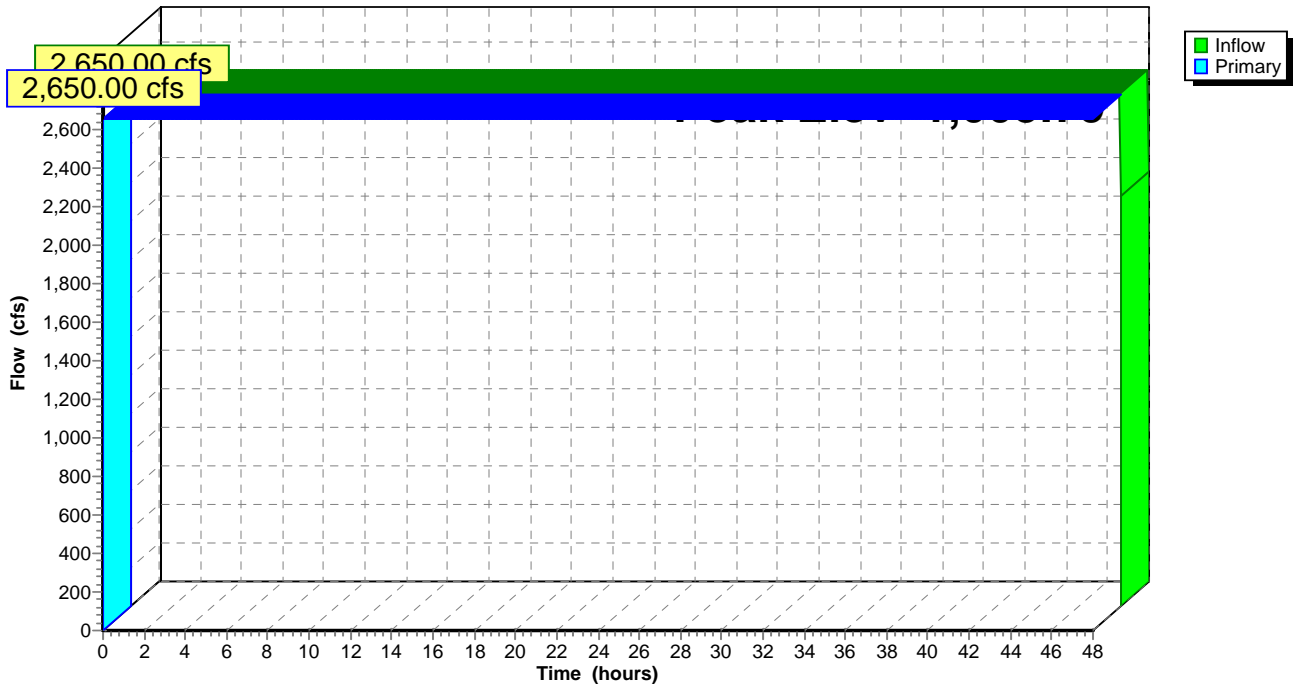
Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,005.79' @ 0.01 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

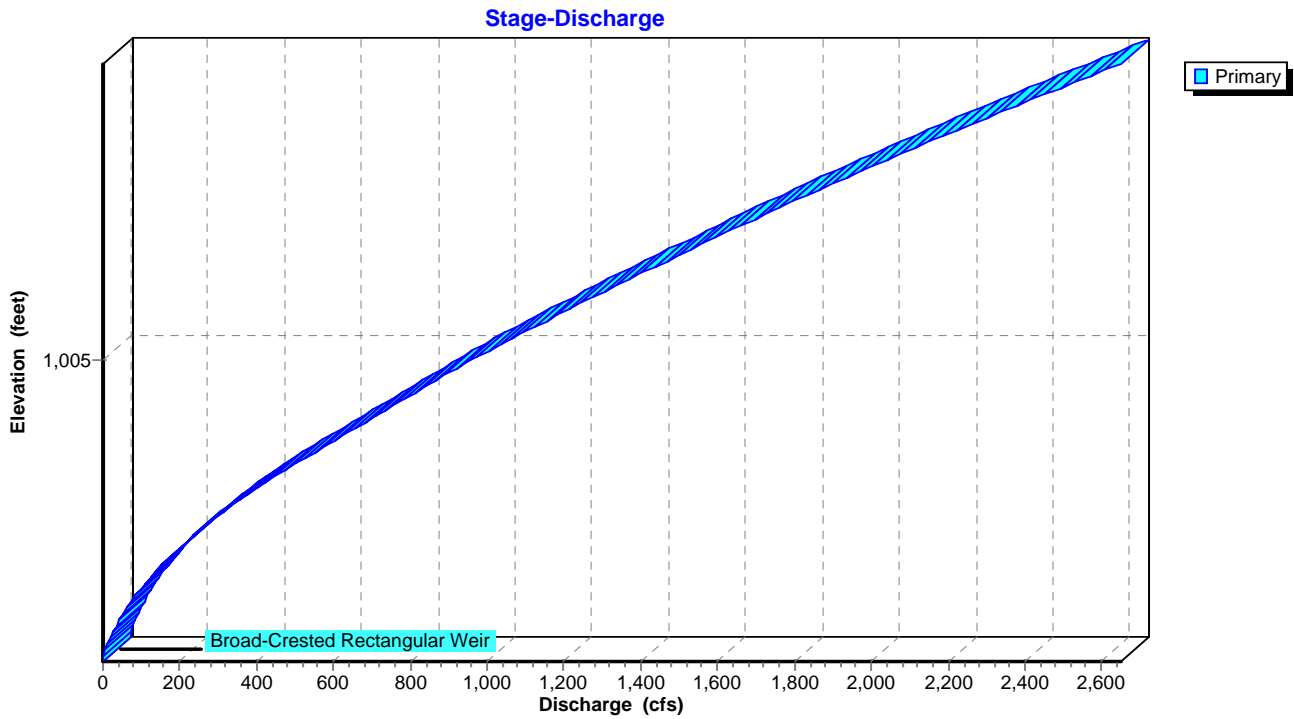
Primary OutFlow Max=2,650.00 cfs @ 0.01 hrs HW=1,005.79' TW=997.54' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 2,650.00 cfs @ 3.34 fps)

Pond 32P: Constant inflow - 500-yr flood

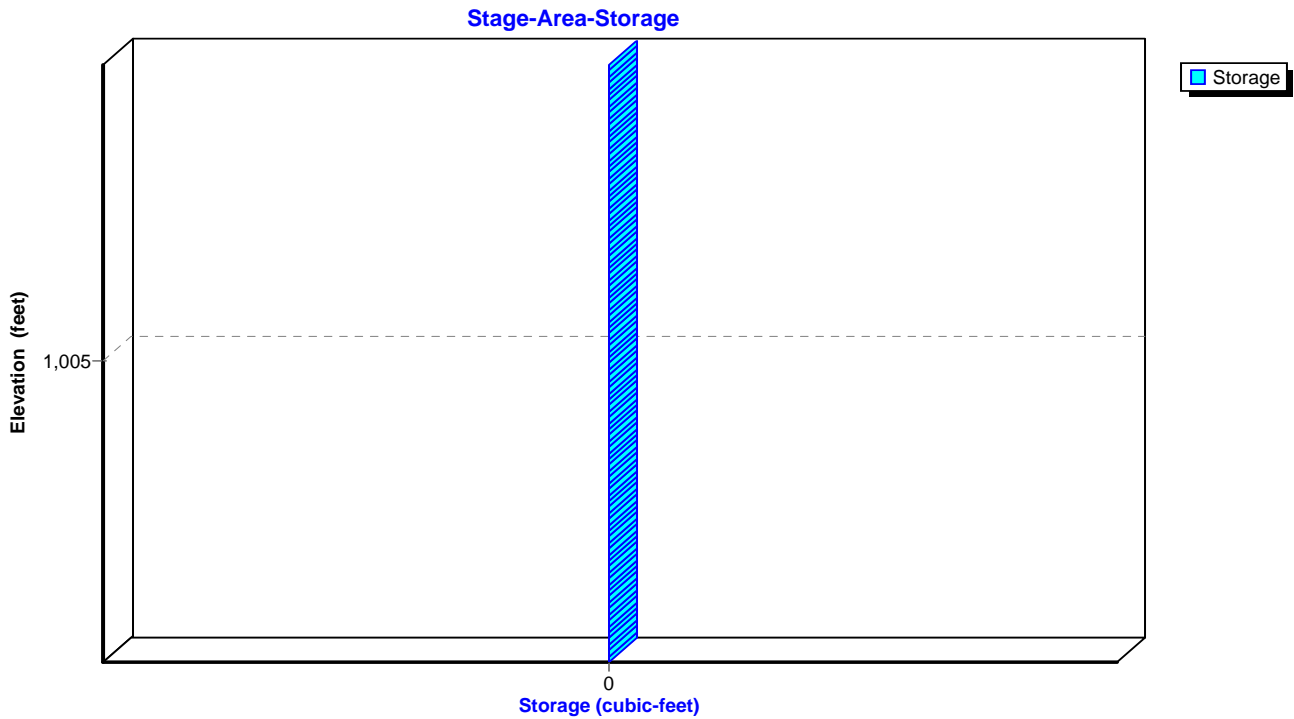
Hydrograph



Pond 32P: Constant inflow - 500-yr flood



Pond 32P: Constant inflow - 500-yr flood

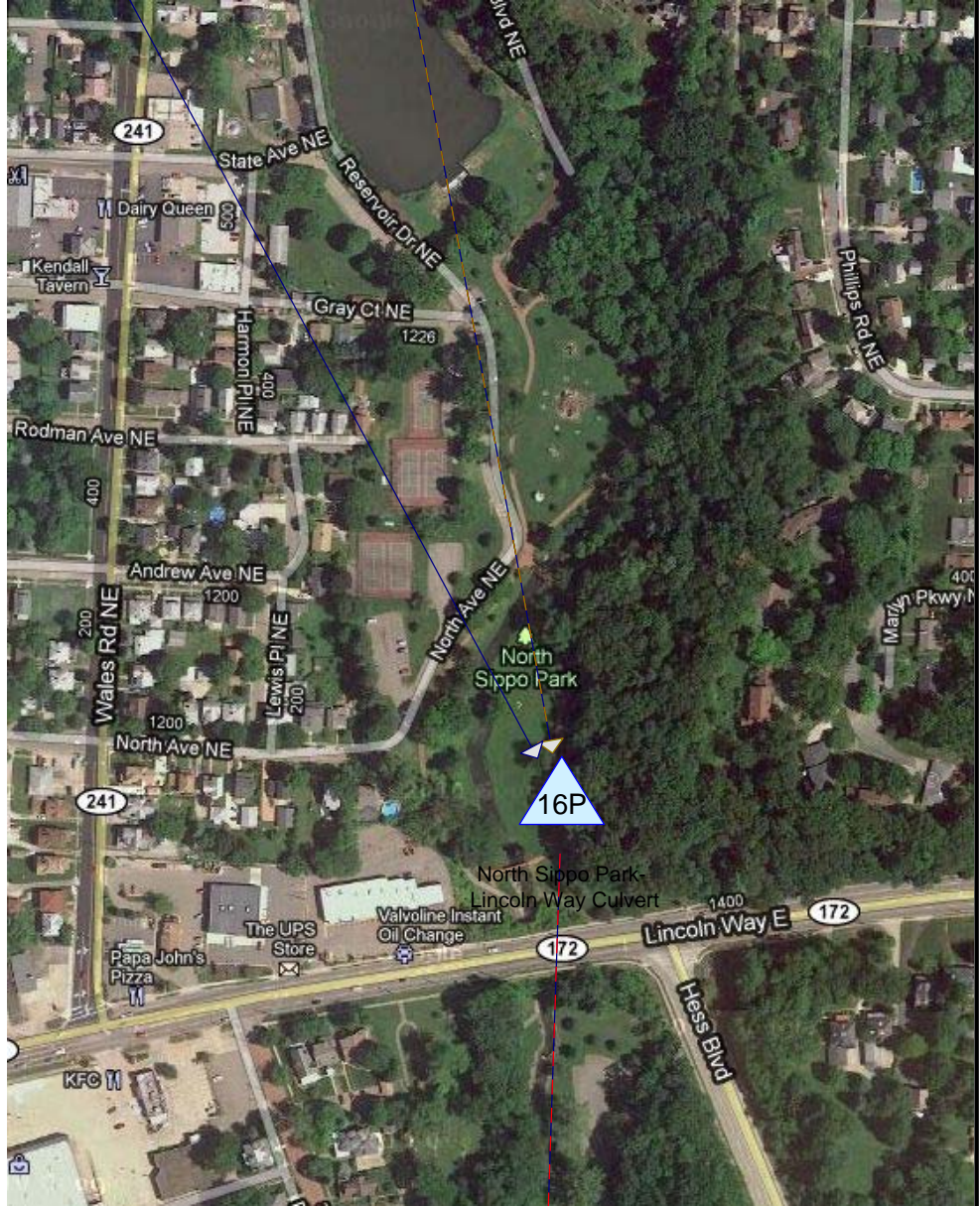




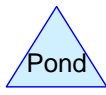
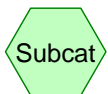
Constant inflow - 0.22 PMF



Sippo Reservoir - Existing Conditions - 0.22 PMF DBA



Sippo Creek Channel
Downstream of Lincoln
Way



Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-22PMF

Prepared by URS Corporation, Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-22PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-22PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-22PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.22 PMF Rainfall=5.76"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=6.12' Max Vel=9.59 fps Inflow=3,143.00 cfs 12,459.969 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,143.00 cfs 12,459.180 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,007.21' Storage=127.206 af Inflow=0.00 cfs 0.000 af
Outflow=1,839.43 cfs 35.606 af

Pond 16P: North Sippo Park- Peak Elev=1,005.40' Storage=163.699 af Inflow=4,965.44 cfs 12,501.108 af
Primary=3,143.00 cfs 12,462.566 af Secondary=0.00 cfs 0.000 af Outflow=3,143.00 cfs 12,462.566 af

Pond 32P: Constant inflow - 0.22 PMF Peak Elev=1,006.27' Inflow=3,143.00 cfs 12,468.099 af
Outflow=3,143.00 cfs 12,468.099 af

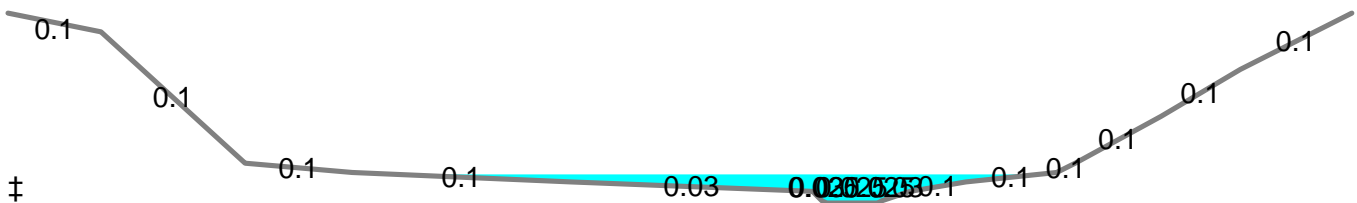
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 3,143.00 cfs @ 47.99 hrs, Volume= 12,459.969 af
 Outflow = 3,143.00 cfs @ 47.87 hrs, Volume= 12,459.180 af, Atten= 0%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.59 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 9.59 fps, Avg. Travel Time= 0.8 min

Peak Storage= 147,510 cf @ 47.97 hrs
 Average Depth at Peak Storage= 6.12'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'

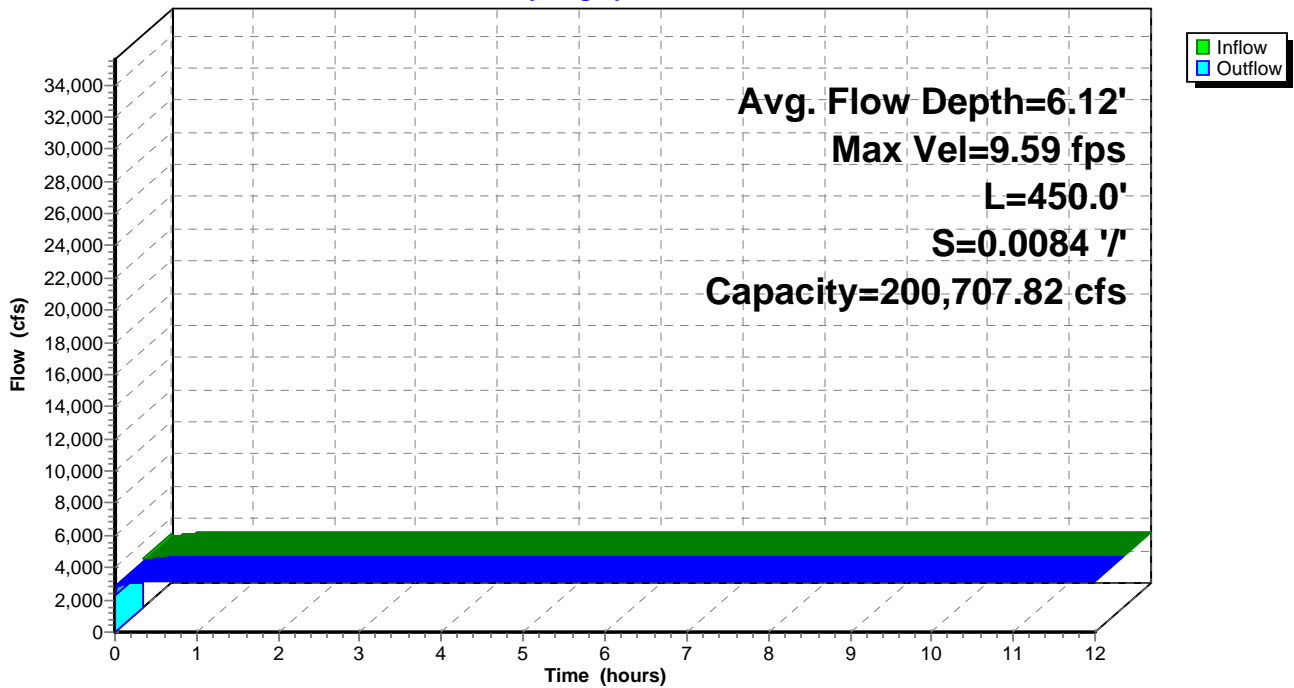


Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

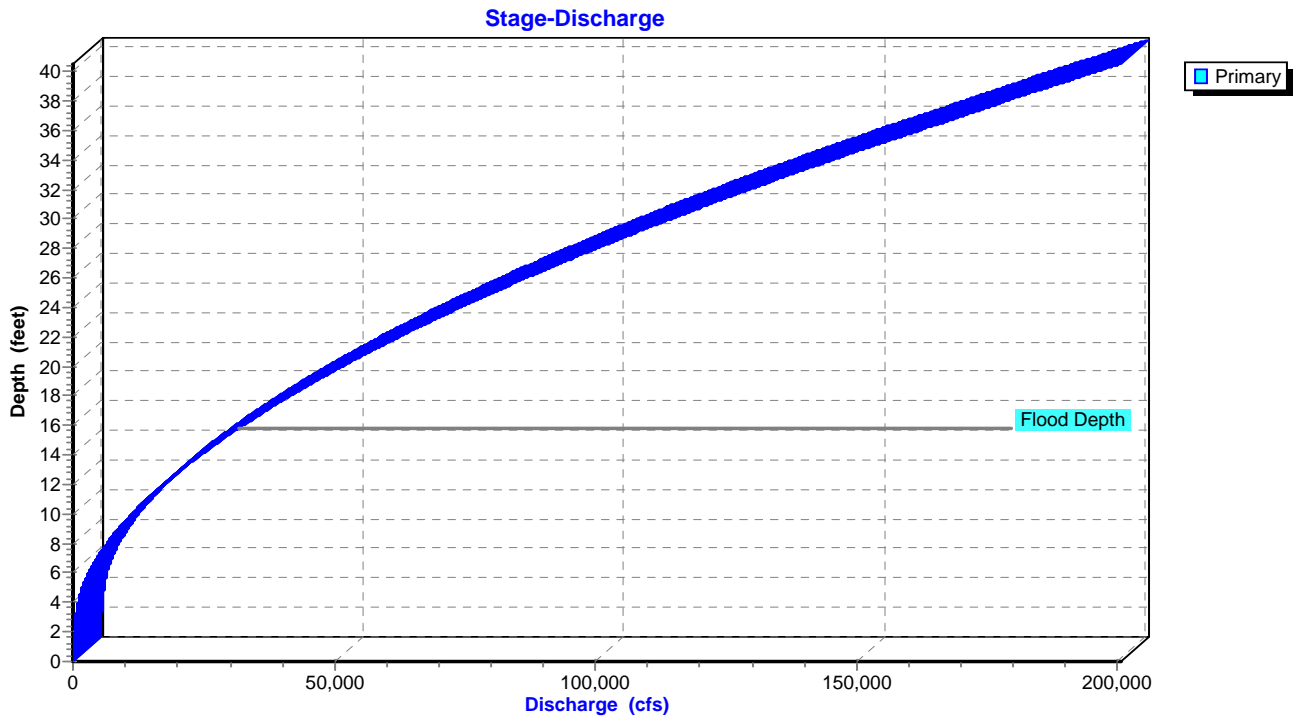
Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

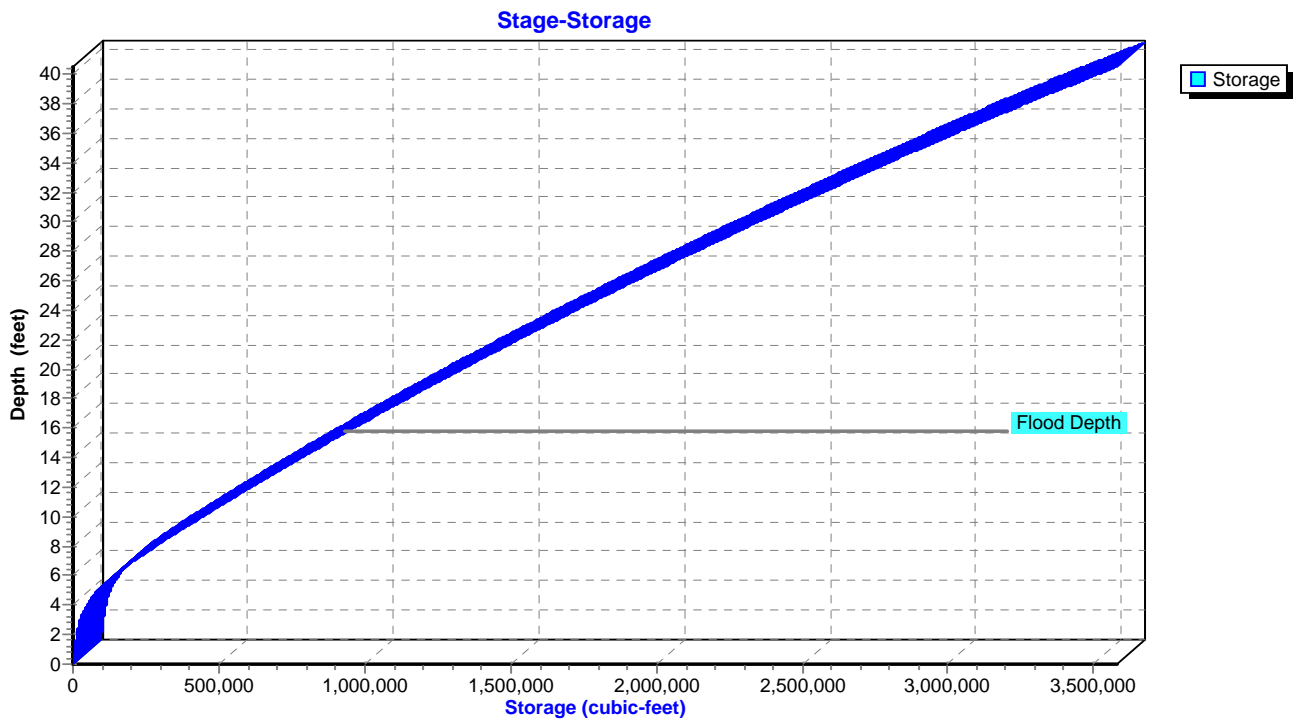
Hydrograph



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 0.22 PMF DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 1,839.43 cfs @ 0.00 hrs, Volume= 35.606 af, Atten= 0%, Lag= 0.0 min
 Primary = 1,839.43 cfs @ 0.00 hrs, Volume= 35.606 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,007.21' Surf.Area= 19.328 ac Storage= 127.206 af
 Peak Elev= 1,007.21' @ 0.00 hrs Surf.Area= 19.328 ac Storage= 127.206 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af (16.149 af above start)

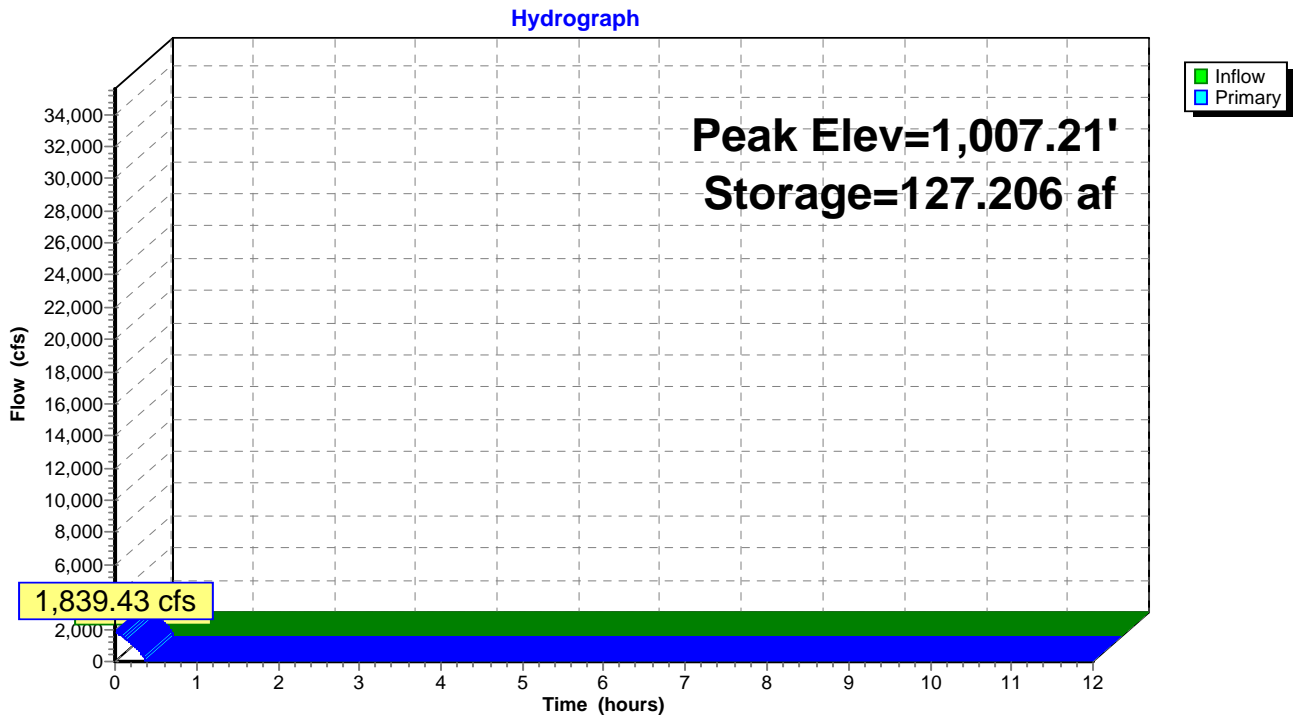
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

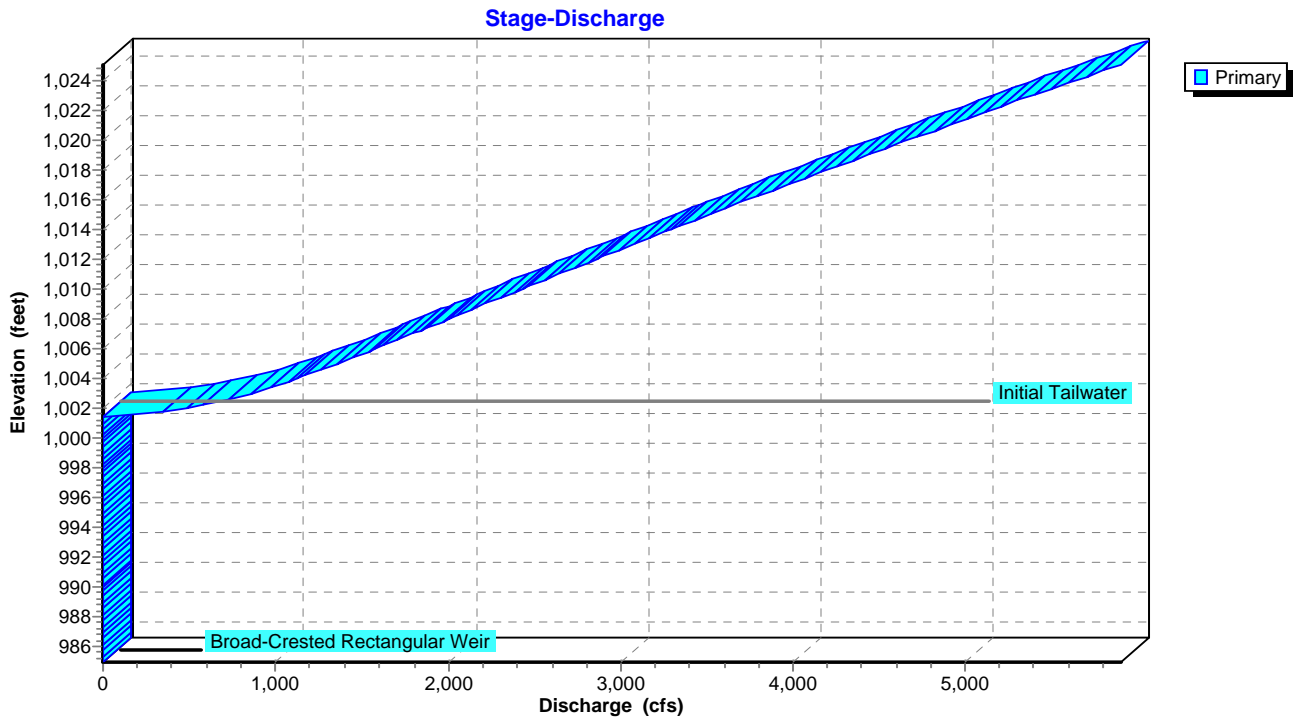
Device	Routing	Invert	Outlet Devices									
#1	Primary	985.00'	10.0' long x 50.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	20.00
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	2.63

Primary OutFlow Max=1,839.43 cfs @ 0.00 hrs HW=1,007.21' TW=1,001.65' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 1,839.43 cfs @ 8.28 fps)

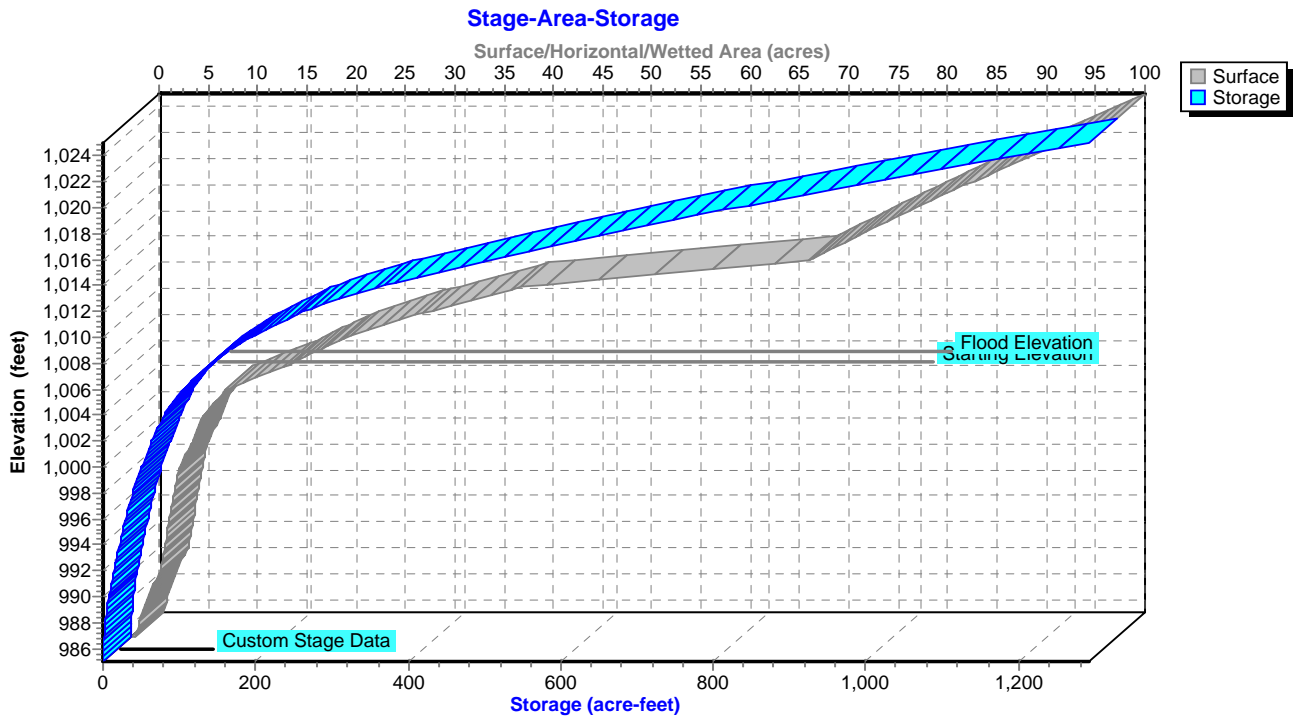
Pond 1P: Sippo Reservoir - Existing Conditions - 0.22 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.22 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.22 PMF DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 4,965.44 cfs @ 0.01 hrs, Volume= 12,501.108 af
 Outflow = 3,143.00 cfs @ 47.99 hrs, Volume= 12,462.566 af, Atten= 37%, Lag= 2,878.8 min
 Primary = 3,143.00 cfs @ 47.99 hrs, Volume= 12,462.566 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,001.65' Surf.Area= 10.049 ac Storage= 122.574 af
 Peak Elev= 1,005.40' @ 47.99 hrs Surf.Area= 12.104 ac Storage= 163.699 af (41.125 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (74.454 af above start)

Plug-Flow detention time= 37.7 min calculated for 12,339.992 af (99% of inflow)
 Center-of-Mass det. time= 5.0 min (1,440.9 - 1,435.9)

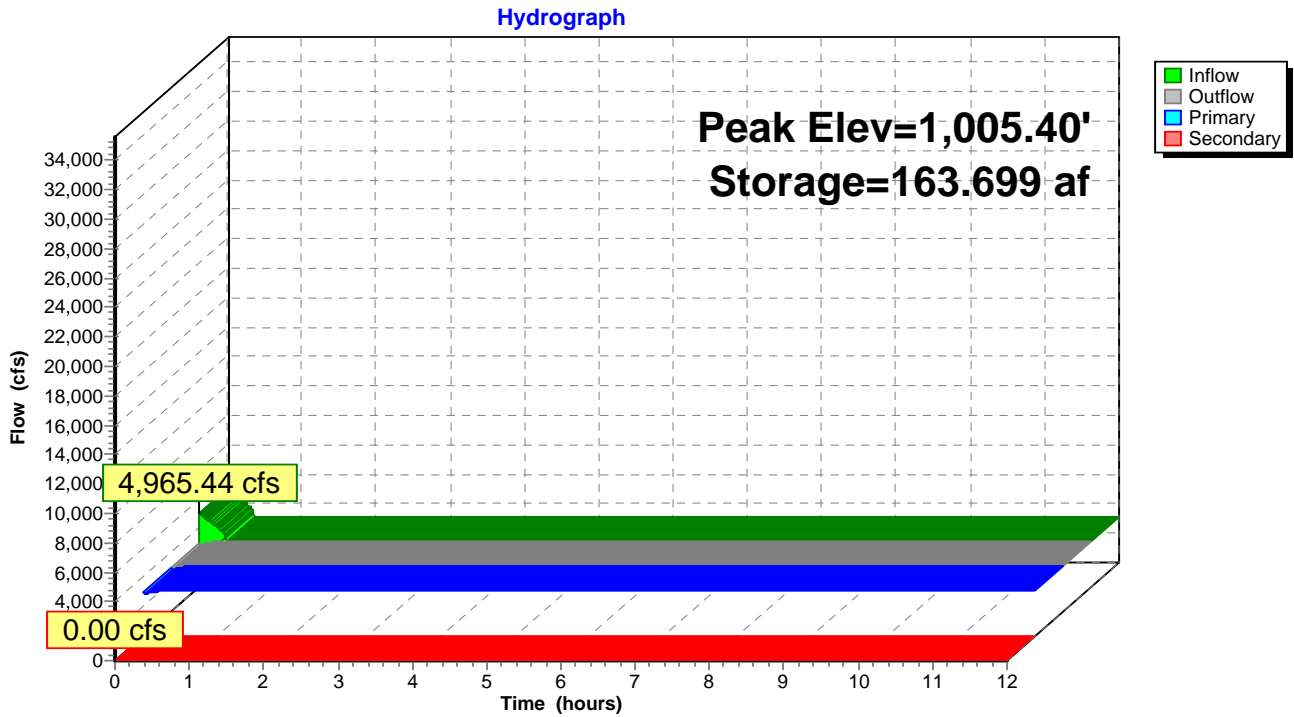
Volume	Invert	Avail.Storage	Storage Description			
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)	
978.00	0.100	200.0	0.000	0.000	0.100	
981.00	0.300	500.0	0.573	0.573	0.484	
982.00	0.659	1,392.9	0.468	1.041	3.572	
984.00	2.018	2,470.7	2.553	3.595	11.180	
986.00	3.584	3,300.7	5.528	9.122	19.932	
988.00	5.007	3,247.5	8.551	17.674	20.586	
990.00	6.111	3,143.9	11.100	28.773	21.805	
992.00	6.773	3,217.1	12.878	41.652	22.668	
994.00	7.411	3,271.9	14.179	55.831	23.334	
996.00	8.110	3,253.8	15.516	71.347	23.597	
998.00	8.804	3,273.8	16.909	88.256	23.878	
1,000.00	9.441	3,318.6	18.241	106.497	24.439	
1,002.00	10.181	3,437.0	19.617	126.114	25.908	
1,004.00	11.109	3,548.6	21.283	147.398	27.341	
1,006.00	12.538	3,553.4	23.633	171.030	27.516	
1,008.00	13.465	3,829.8	25.997	197.028	31.248	
1,010.00	14.326	4,085.3	27.787	224.814	34.947	
1,012.00	15.633	4,329.5	29.949	254.764	38.706	
1,014.00	17.576	4,742.6	33.190	287.954	45.555	
1,016.00	20.521	5,940.5	38.059	326.013	68.935	
1,018.00	24.905	6,310.6	45.355	371.368	77.223	

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/' Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

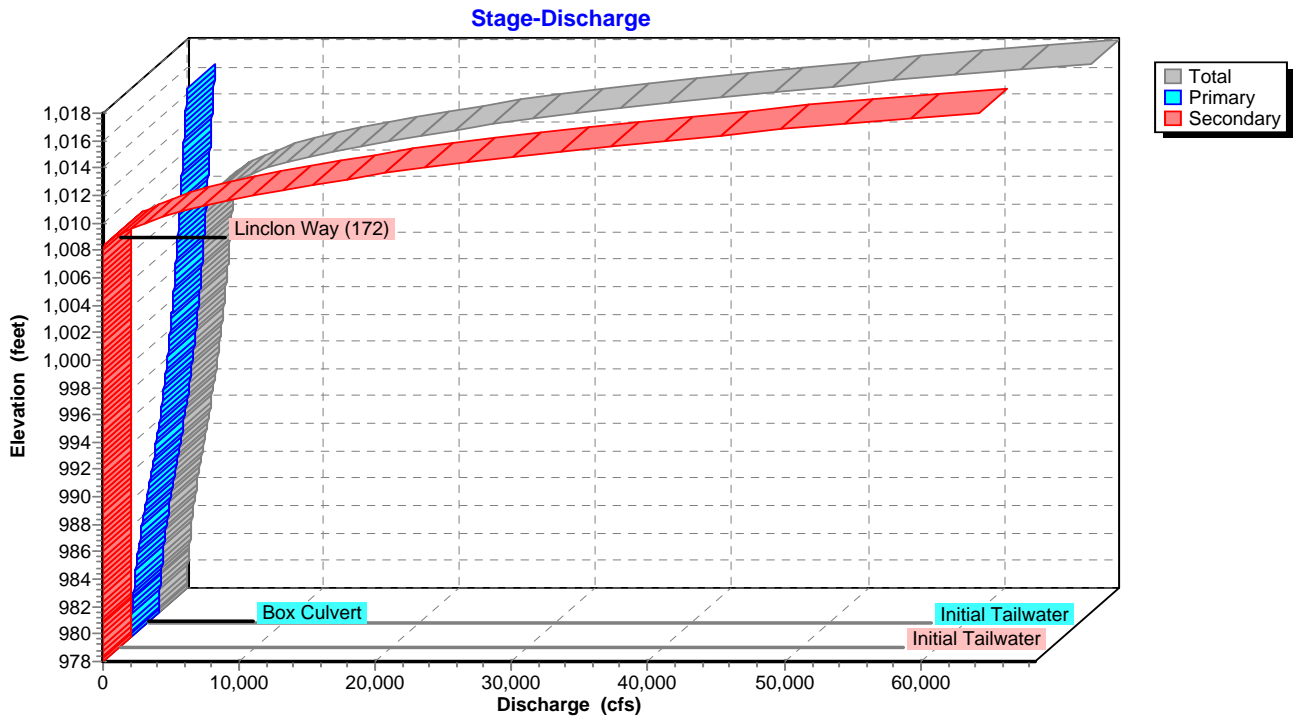
Primary OutFlow Max=3,143.00 cfs @ 47.99 hrs HW=1,005.40' TW=984.25' (Dynamic Tailwater)
1=Box Culvert (Inlet Controls 3,143.00 cfs @ 27.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,001.65' TW=978.13' (Dynamic Tailwater)
2=Linclon Way (172) (Controls 0.00 cfs)

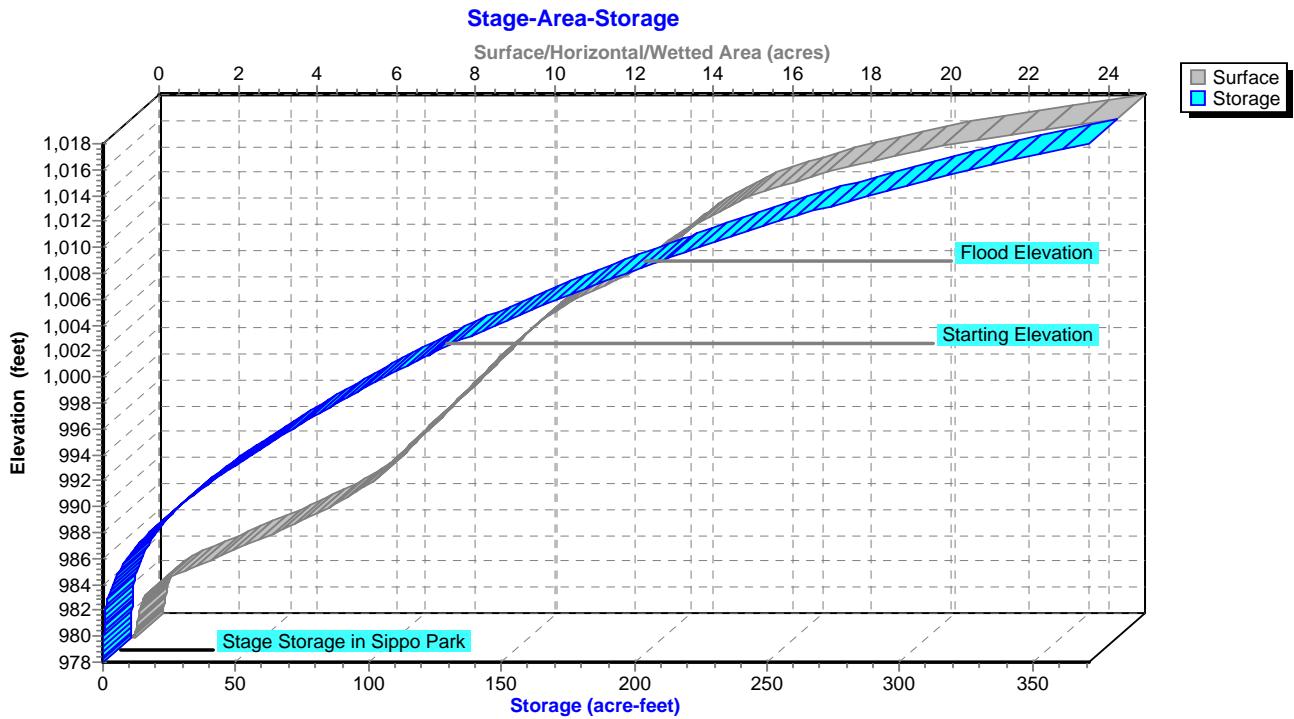
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 0.22 PMF

Inflow = 3,143.00 cfs @ 0.00 hrs, Volume= 12,468.099 af, Incl. 3,143.00 cfs Base Flow
 Outflow = 3,143.00 cfs @ 18.41 hrs, Volume= 12,468.099 af, Atten= 0%, Lag= 1,104.6 min
 Primary = 3,143.00 cfs @ 18.41 hrs, Volume= 12,468.099 af

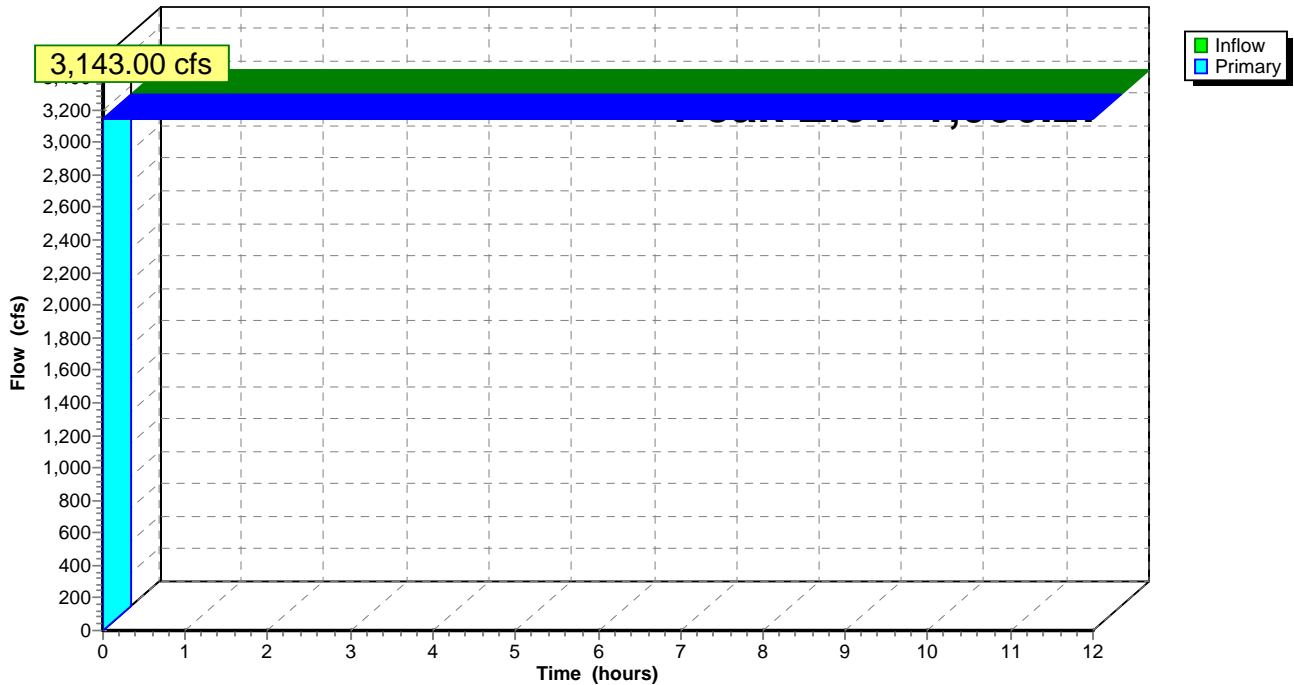
Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,006.27' @ 47.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

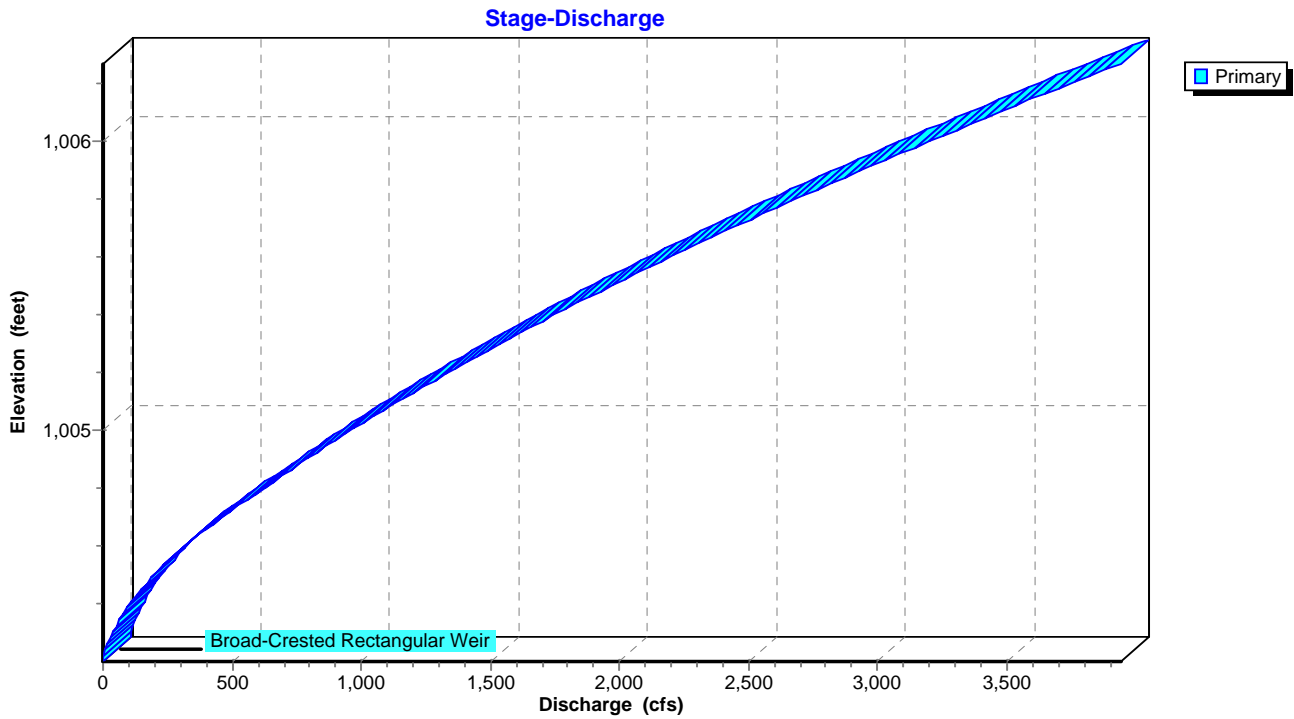
Primary OutFlow Max=3,143.00 cfs @ 18.41 hrs HW=1,006.27' TW=1,005.40' (Dynamic Tailwater)
 ←1=Broad-Crested Rectangular Weir (Weir Controls 3,143.00 cfs @ 3.04 fps)

Pond 32P: Constant inflow - 0.22 PMF

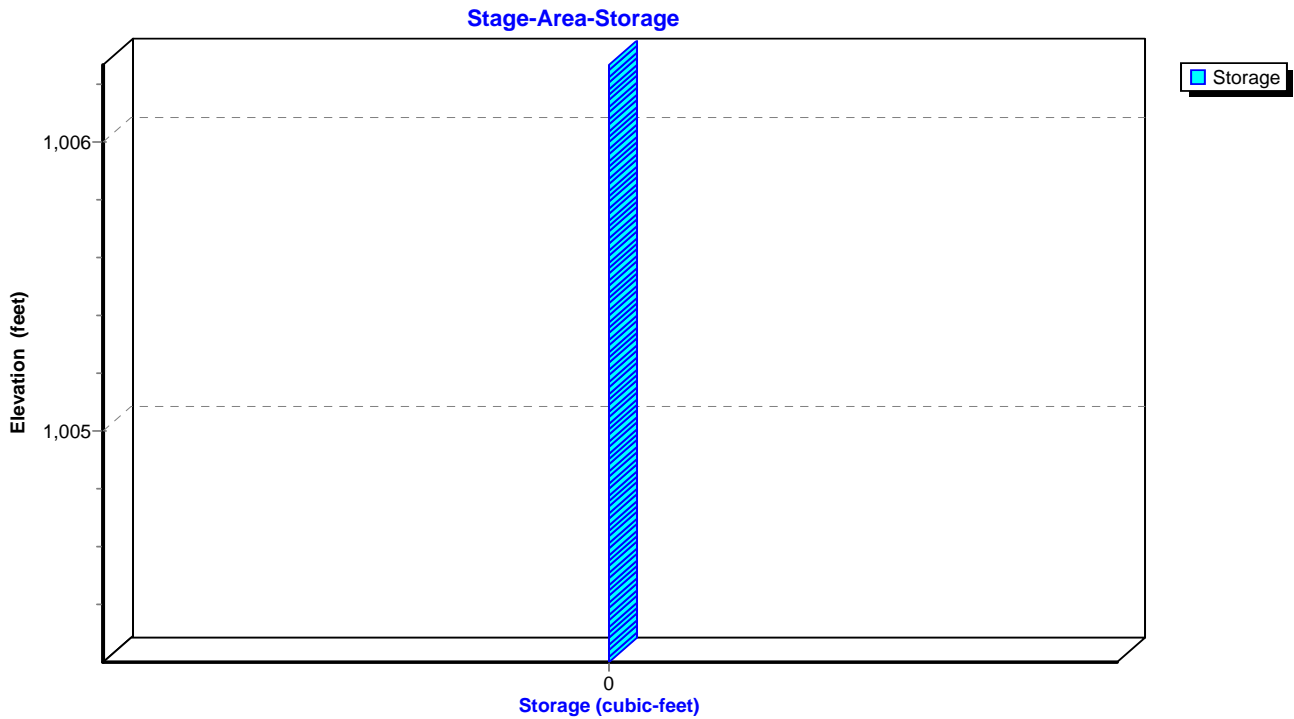
Hydrograph



Pond 32P: Constant inflow - 0.22 PMF



Pond 32P: Constant inflow - 0.22 PMF

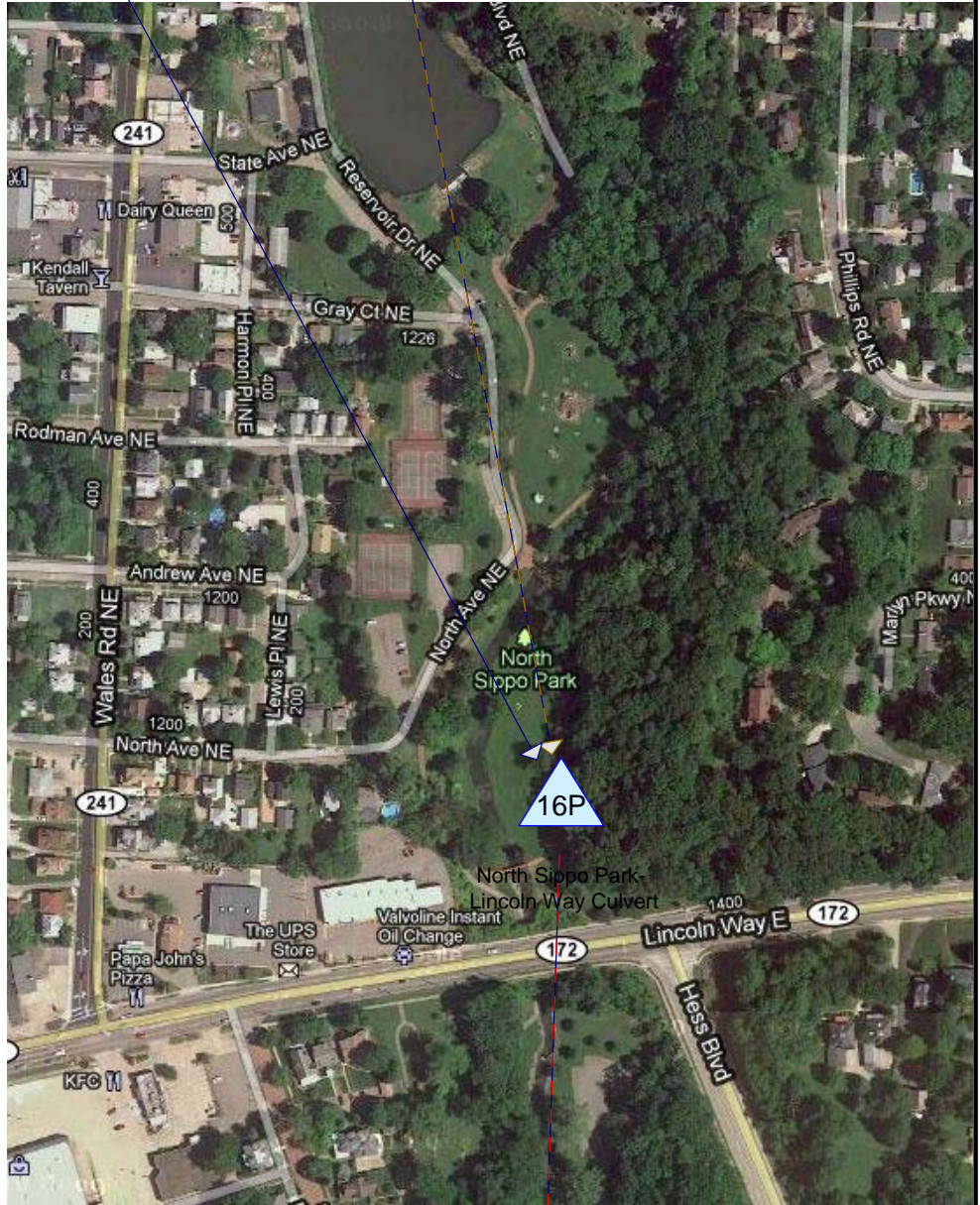




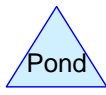
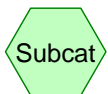
Constant inflow - 0.24 PMF



Sippo Reservoir - Existing Conditions - 0.24 PMF DBA



Sippo Creek Channel
Downstream of Lincoln
Way



Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-24PMF

Prepared by URS Corporation, Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-24PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-24PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-24PMF

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir TR-60 ESFB 6HR-Curve 6-HR 0.24 PMF Rainfall=6.29"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=6.46' Max Vel=9.67 fps Inflow=3,640.00 cfs 14,410.233 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,640.00 cfs 14,409.353 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,007.72' Storage=137.428 af Inflow=0.00 cfs 0.000 af
Outflow=411.19 cfs 9.307 af

Pond 16P: North Sippo Park- Peak Elev=1,008.49' Storage=203.647 af Inflow=4,050.76 cfs 14,445.968 af
Primary=3,349.48 cfs 13,284.382 af Secondary=290.52 cfs 1,128.859 af Outflow=3,640.00 cfs 14,413.241 af

Pond 32P: Constant inflow - 0.24 PMF Peak Elev=1,008.60' Inflow=3,640.00 cfs 14,439.669 af
Outflow=3,640.00 cfs 14,439.669 af

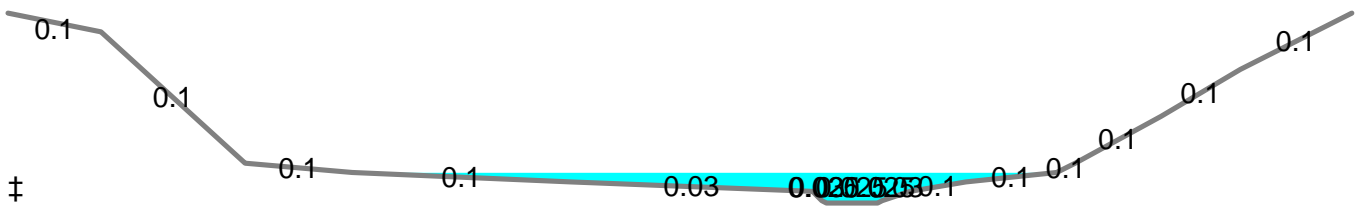
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 3,640.00 cfs @ 5.50 hrs, Volume= 14,410.233 af
 Outflow = 3,640.00 cfs @ 6.16 hrs, Volume= 14,409.353 af, Atten= 0%, Lag= 39.8 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.67 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 9.67 fps, Avg. Travel Time= 0.8 min

Peak Storage= 169,357 cf @ 6.16 hrs
 Average Depth at Peak Storage= 6.46'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'

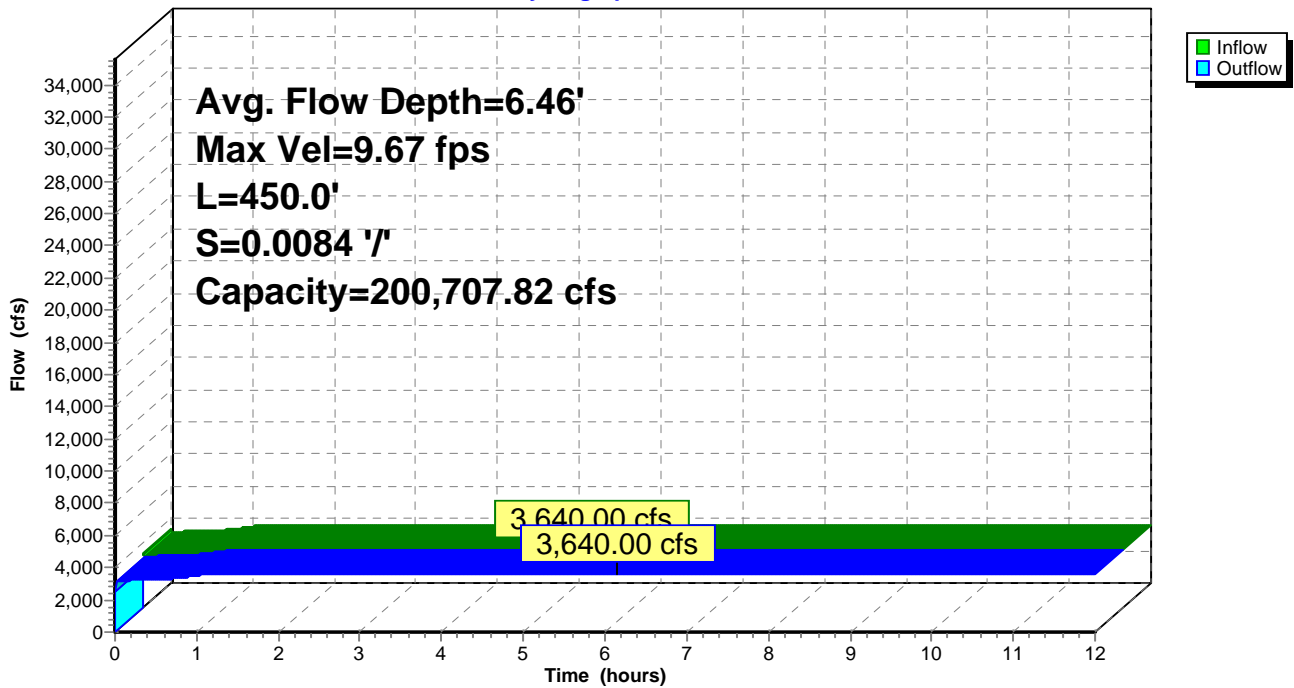


Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

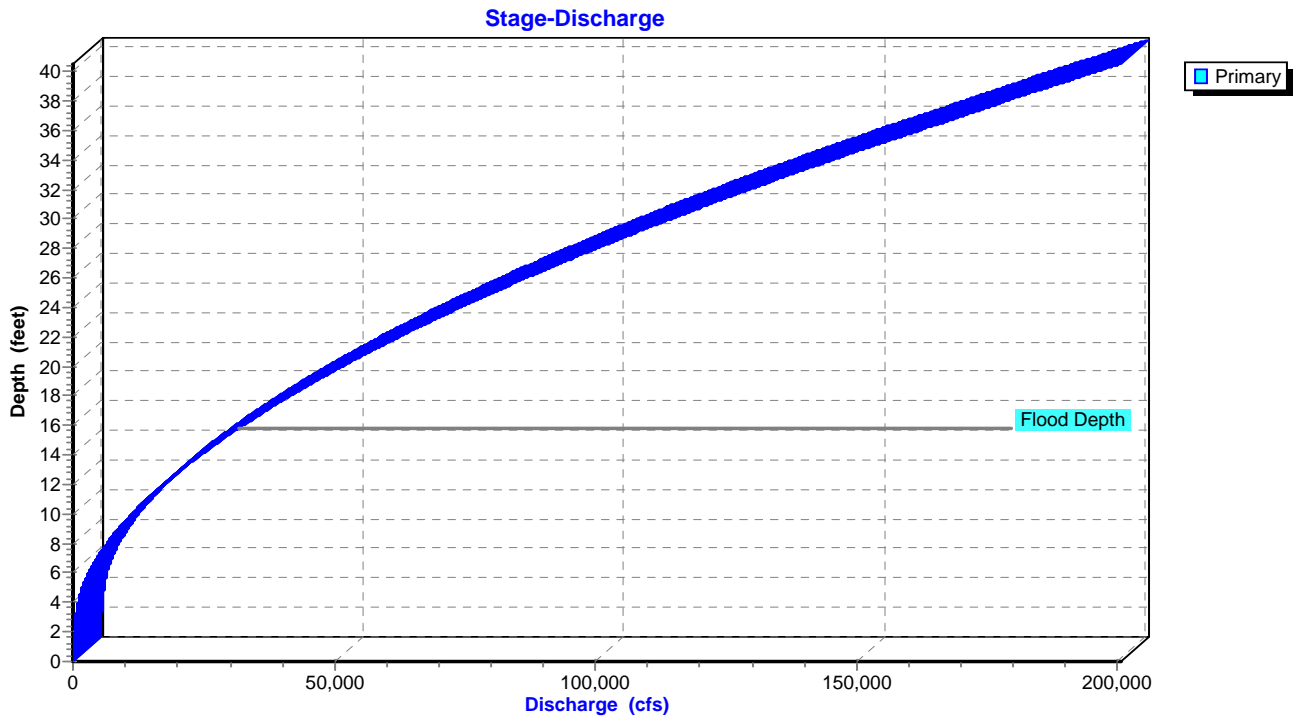
Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

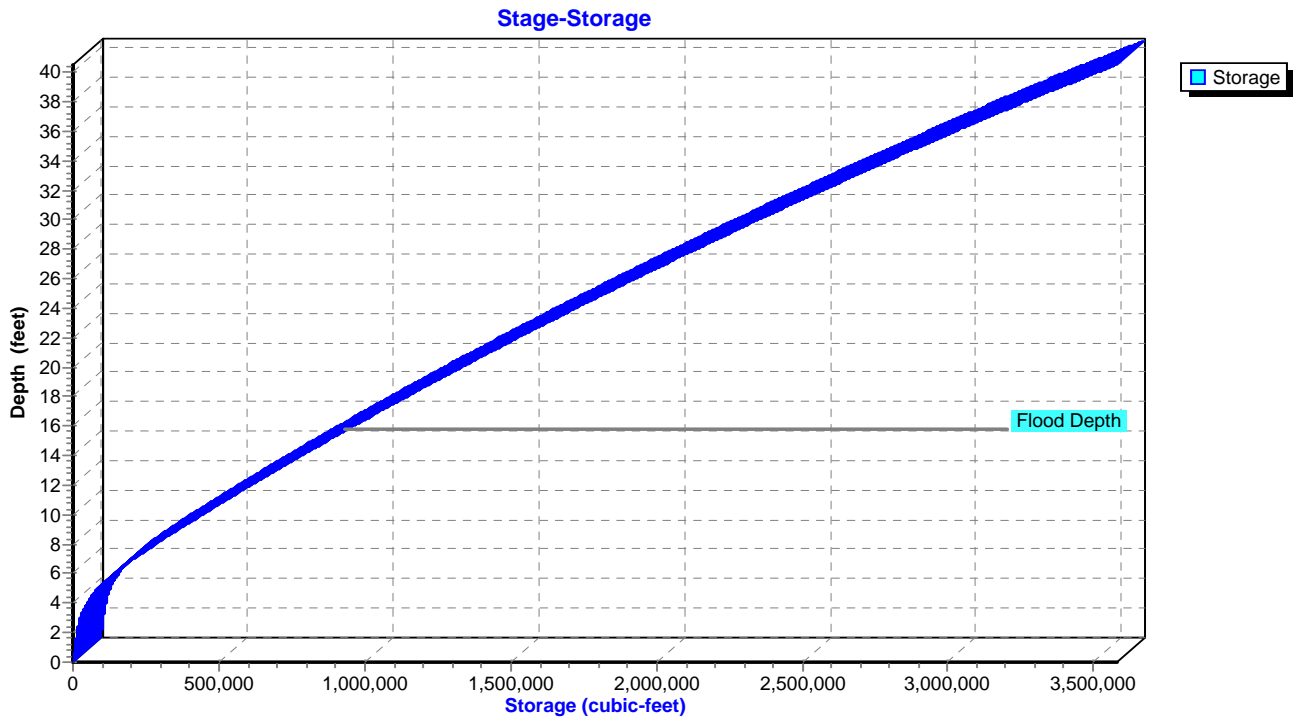
Hydrograph



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 0.24 PMF DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 411.19 cfs @ 0.02 hrs, Volume= 9.307 af, Atten= 0%, Lag= 1.3 min
 Primary = 411.19 cfs @ 0.02 hrs, Volume= 9.307 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,007.72' Surf.Area= 20.766 ac Storage= 137.428 af
 Peak Elev= 1,007.72' @ 0.00 hrs Surf.Area= 20.766 ac Storage= 137.428 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af (5.928 af above start)

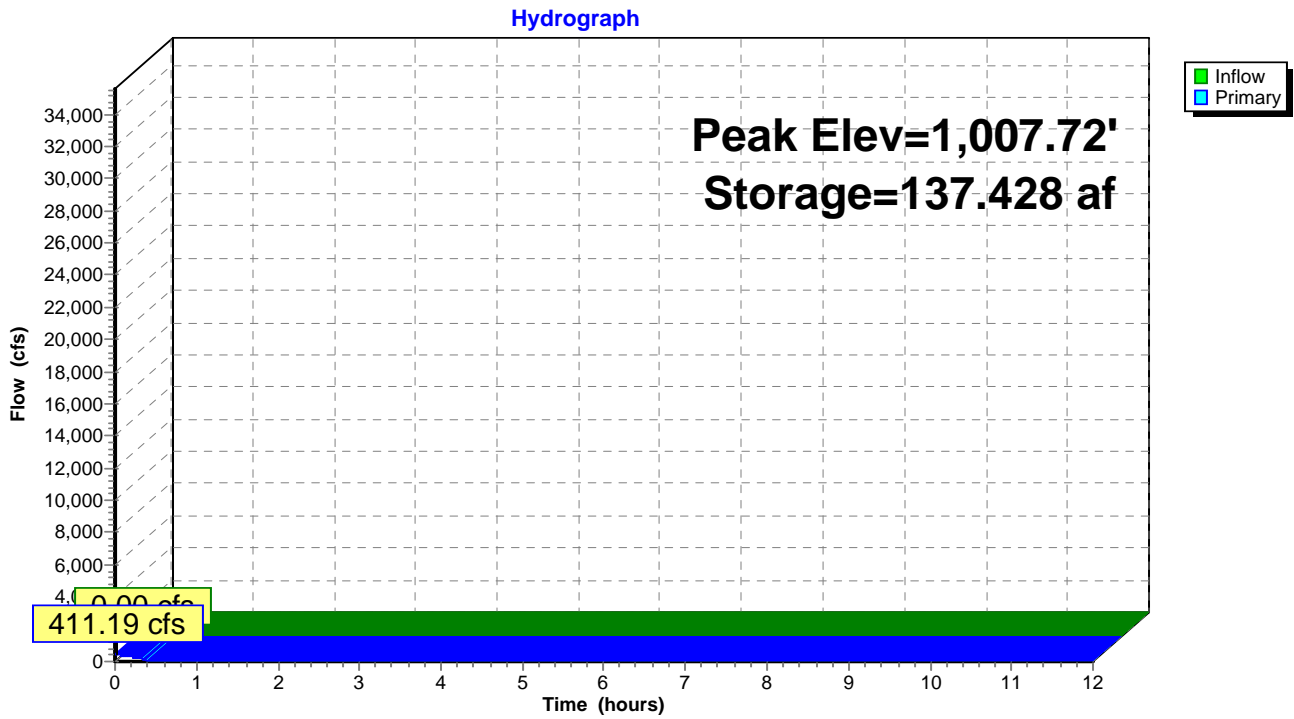
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

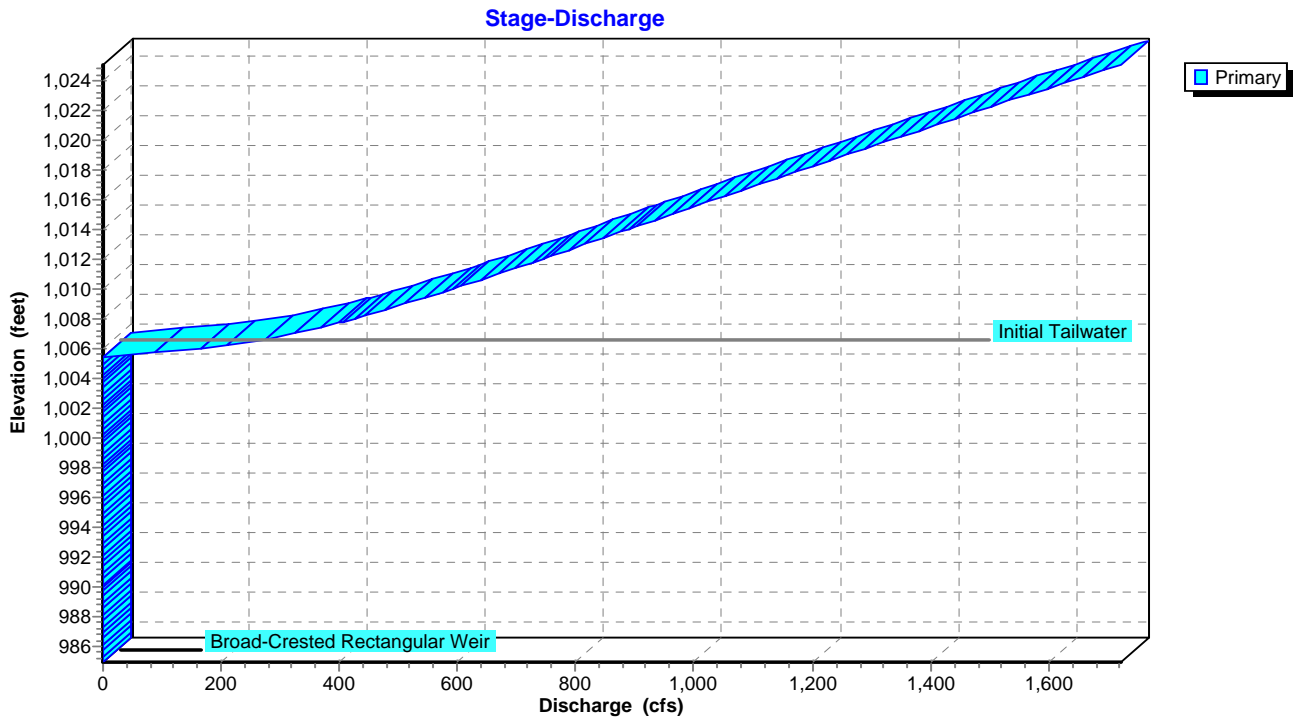
Device	Routing	Invert	Outlet Devices									
#1	Primary	985.00'	3.1' long x 50.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	20.00
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	2.63

Primary OutFlow Max=405.88 cfs @ 0.02 hrs HW=1,007.68' TW=1,005.61' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 405.88 cfs @ 5.77 fps)

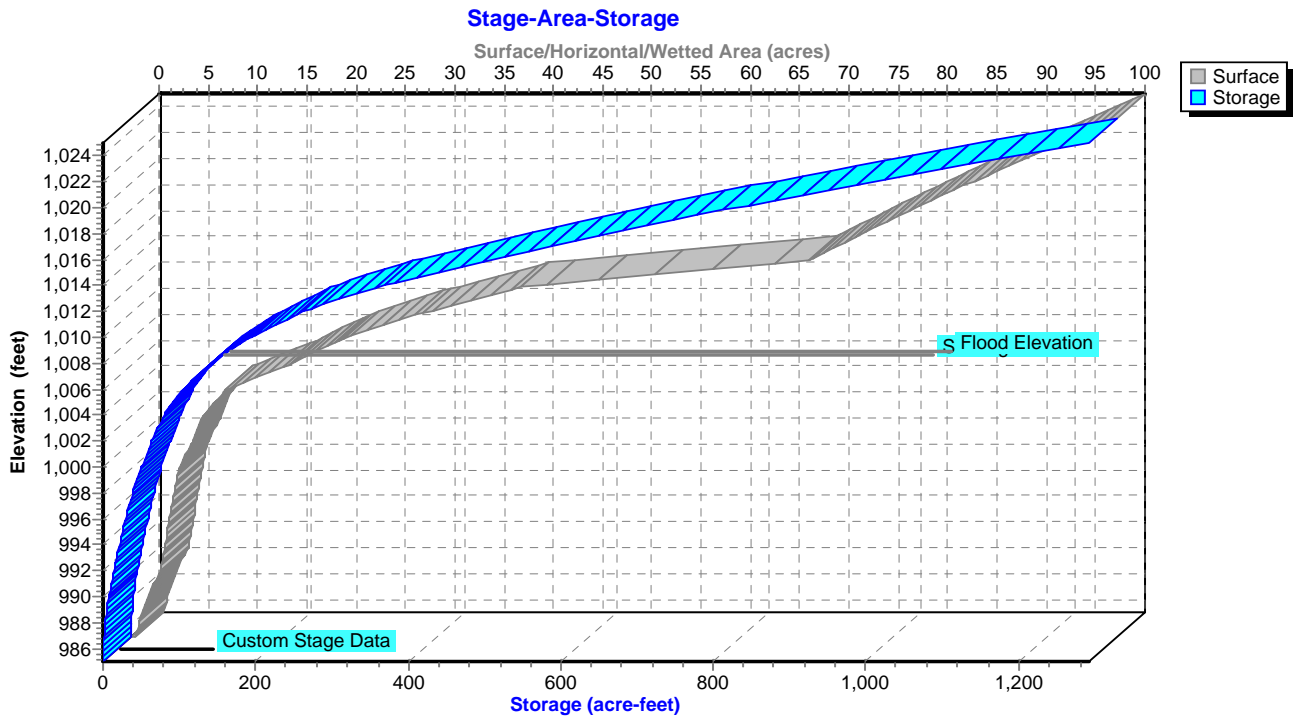
Pond 1P: Sippo Reservoir - Existing Conditions - 0.24 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.24 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.24 PMF DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 4,050.76 cfs @ 0.02 hrs, Volume= 14,445.968 af
 Outflow = 3,640.00 cfs @ 5.50 hrs, Volume= 14,413.241 af, Atten= 10%, Lag= 328.5 min
 Primary = 3,349.48 cfs @ 5.50 hrs, Volume= 13,284.382 af
 Secondary = 290.52 cfs @ 5.50 hrs, Volume= 1,128.859 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,005.75' Surf.Area= 12.355 ac Storage= 167.919 af
 Peak Elev= 1,008.49' @ 5.50 hrs Surf.Area= 13.673 ac Storage= 203.647 af (35.729 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (29.109 af above start)

Plug-Flow detention time= 40.6 min calculated for 14,245.323 af (99% of inflow)
 Center-of-Mass det. time= 3.8 min (1,442.9 - 1,439.1)

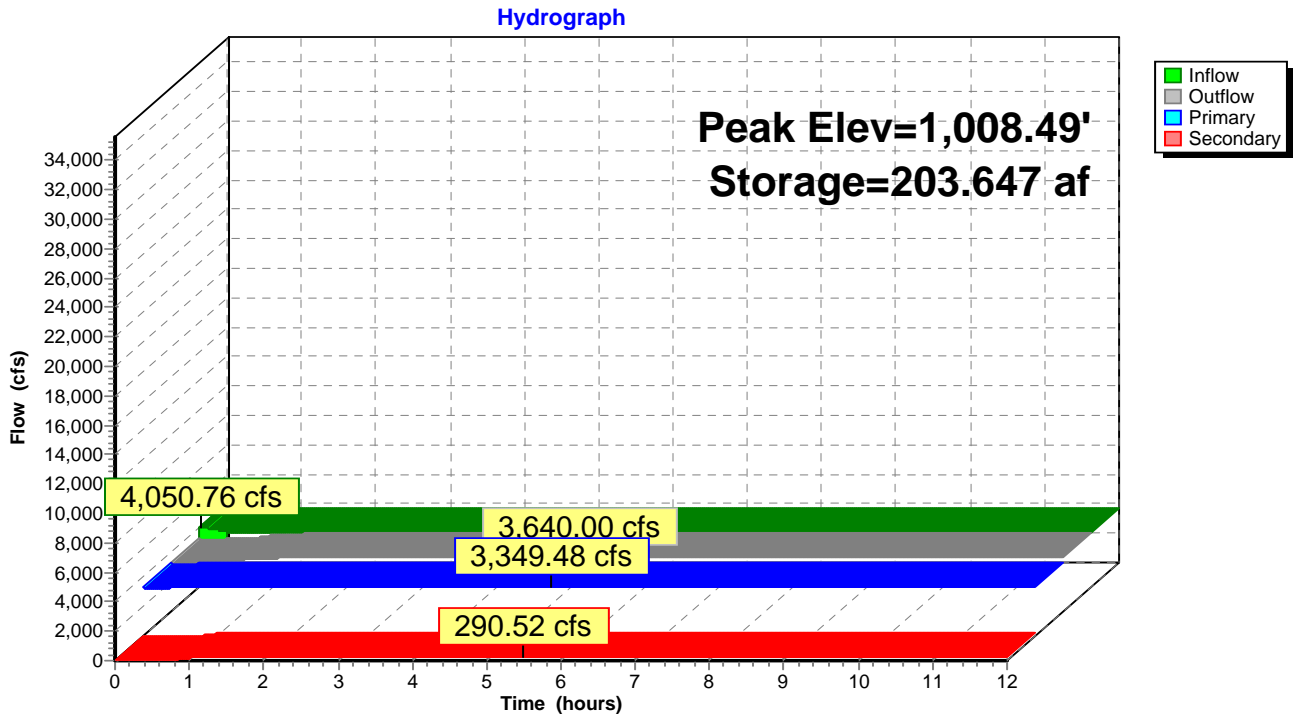
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 ' / ' Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

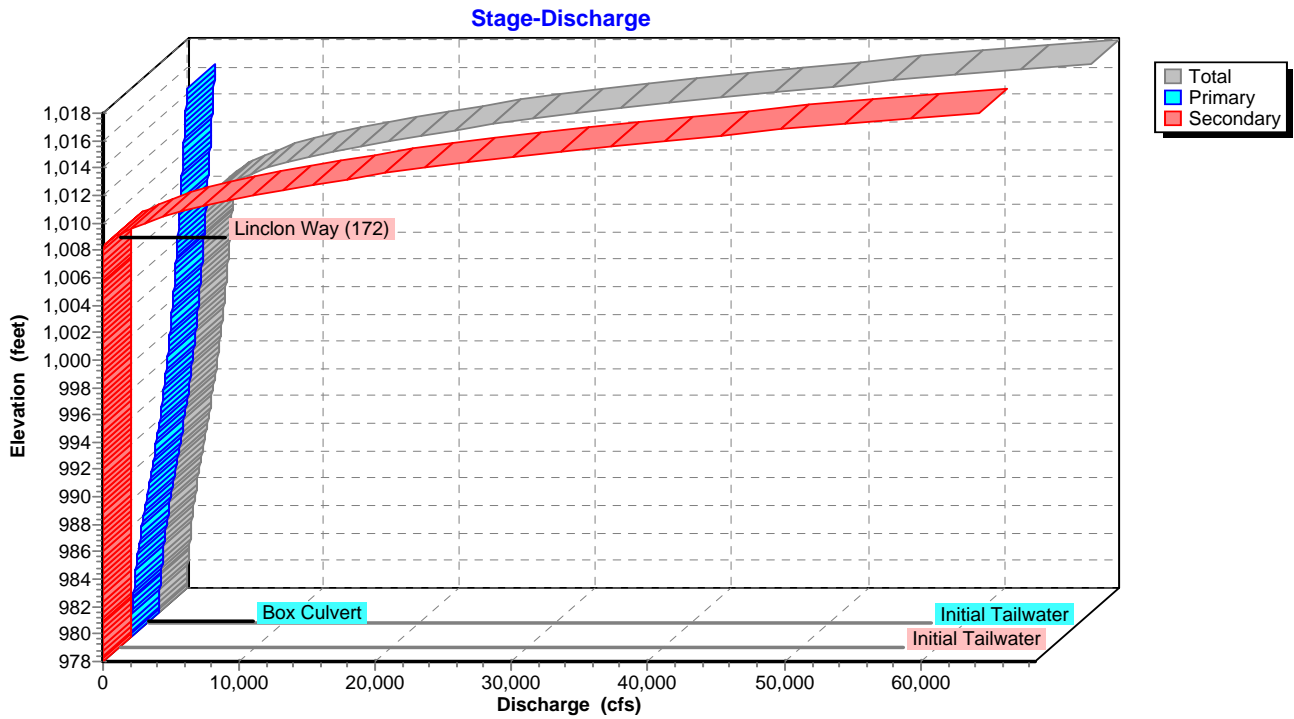
Primary OutFlow Max=3,349.48 cfs @ 5.50 hrs HW=1,008.49' TW=984.59' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,349.48 cfs @ 29.30 fps)

Secondary OutFlow Max=290.52 cfs @ 5.50 hrs HW=1,008.49' TW=984.59' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 290.52 cfs @ 2.23 fps)

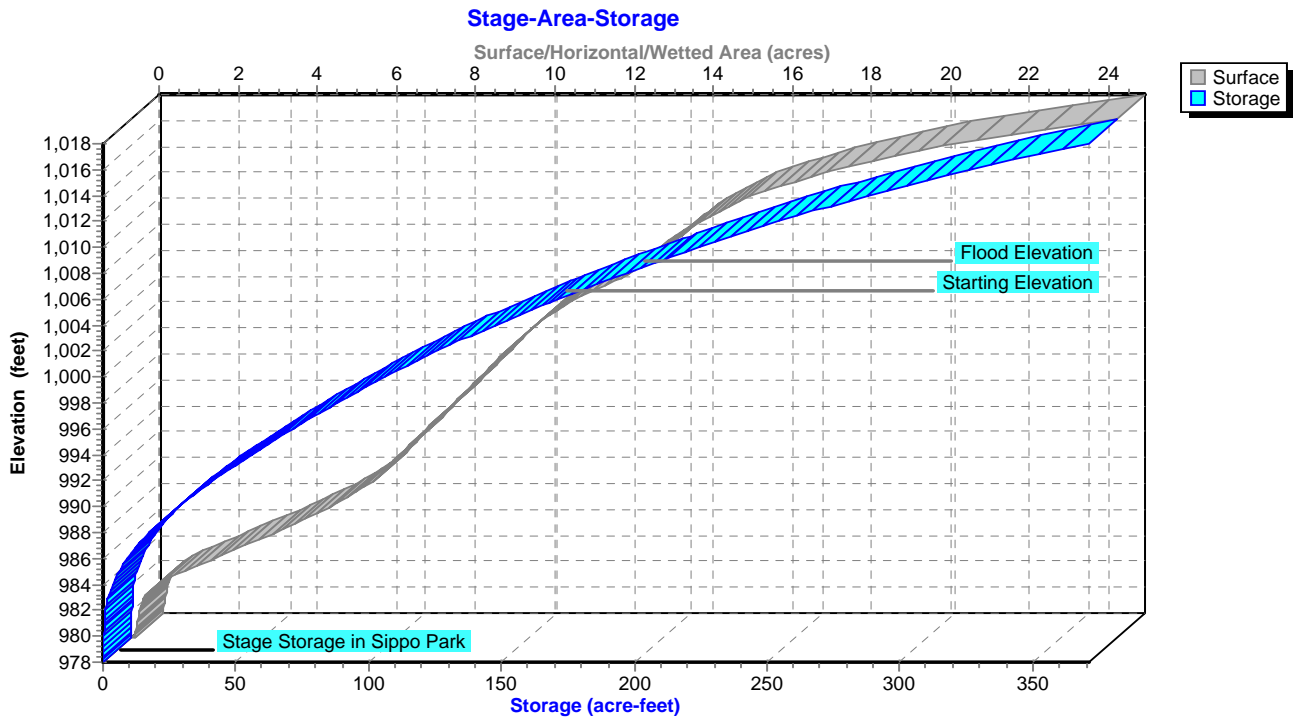
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 0.24 PMF

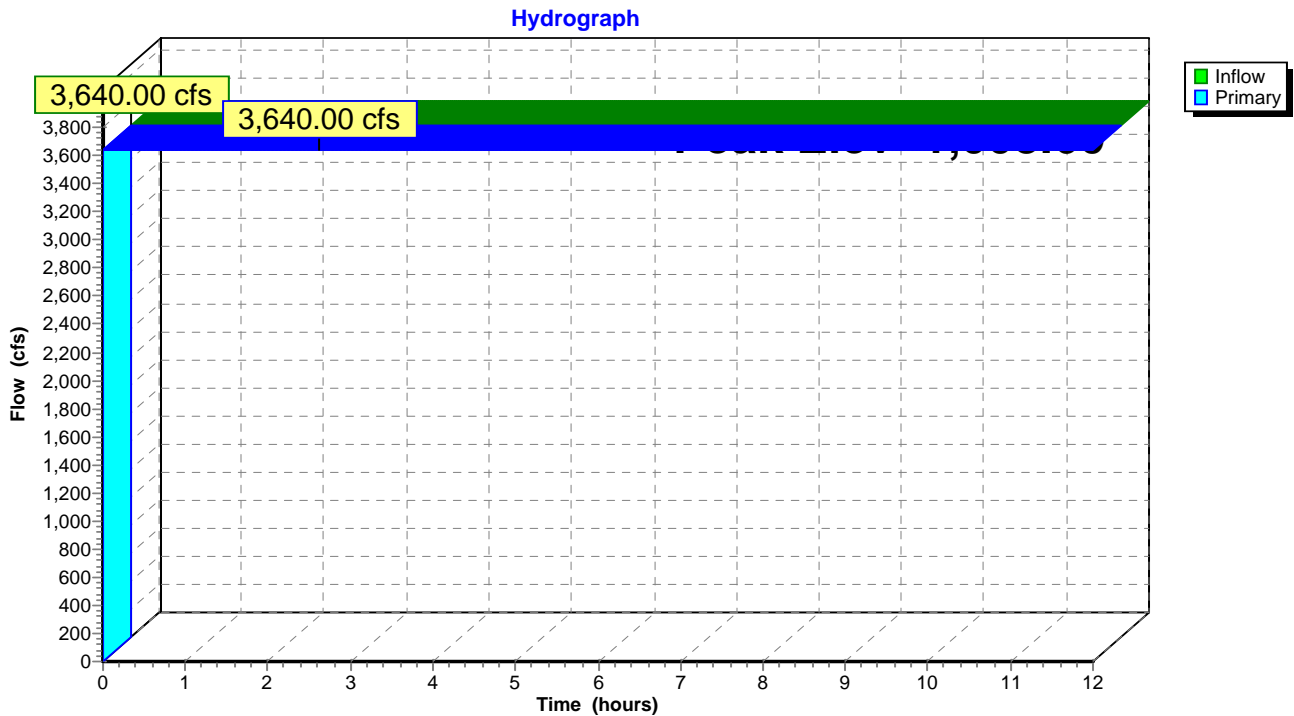
Inflow = 3,640.00 cfs @ 0.00 hrs, Volume= 14,439.669 af, Incl. 3,640.00 cfs Base Flow
 Outflow = 3,640.00 cfs @ 2.63 hrs, Volume= 14,439.669 af, Atten= 0%, Lag= 157.6 min
 Primary = 3,640.00 cfs @ 2.63 hrs, Volume= 14,439.669 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,008.60' @ 5.48 hrs

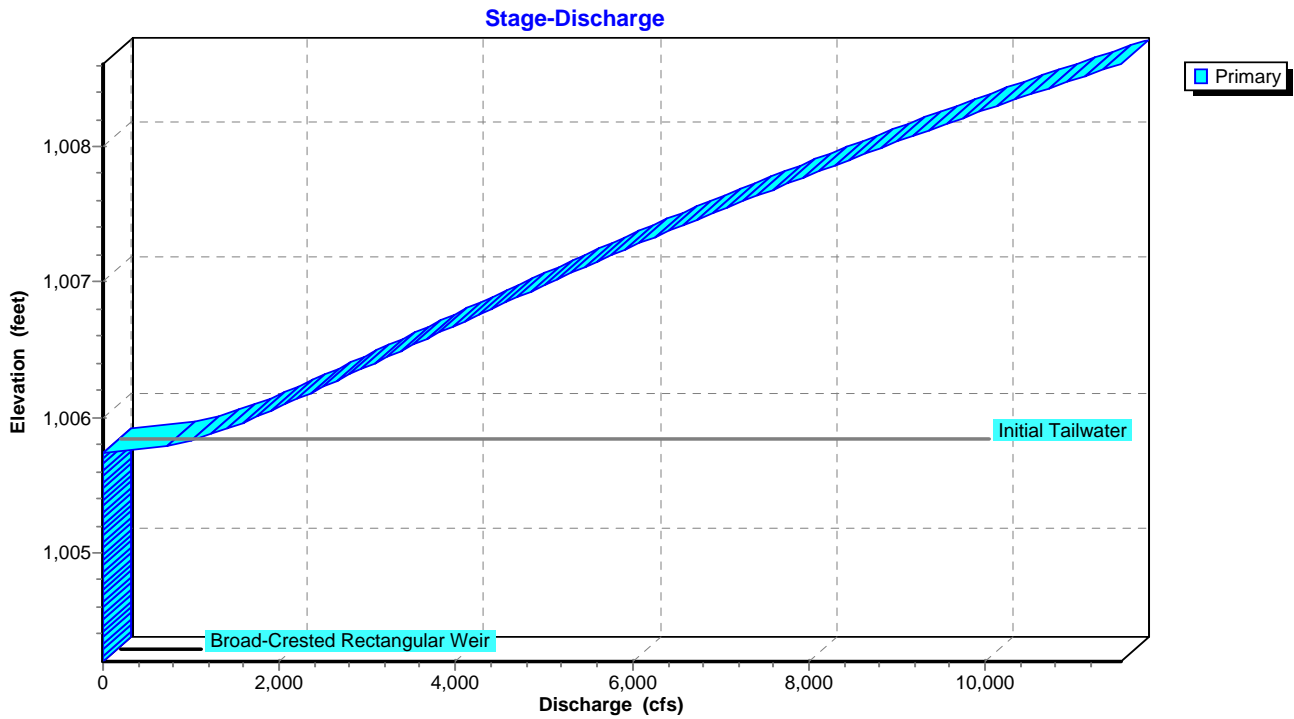
Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3,640.00 cfs @ 2.63 hrs HW=1,008.60' TW=1,008.49' (Dynamic Tailwater)
 ←1=Broad-Crested Rectangular Weir (Weir Controls 3,640.00 cfs @ 1.65 fps)

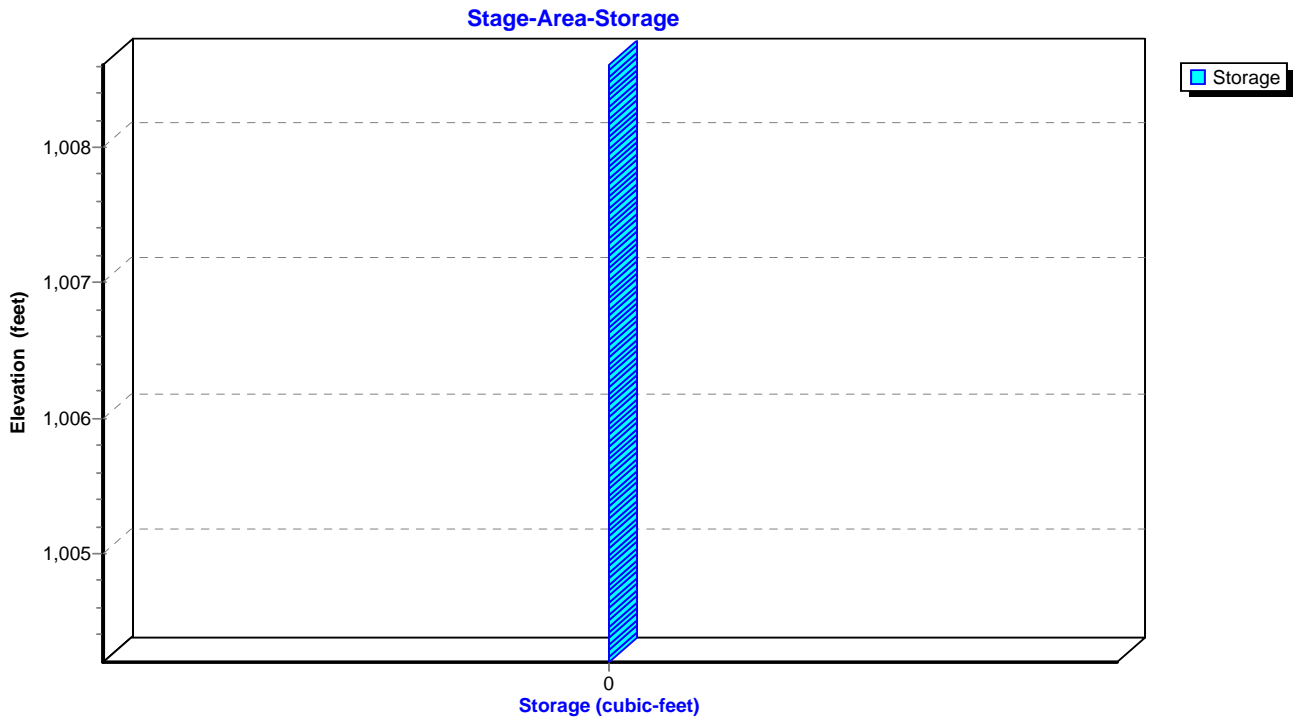
Pond 32P: Constant inflow - 0.24 PMF



Pond 32P: Constant inflow - 0.24 PMF



Pond 32P: Constant inflow - 0.24 PMF

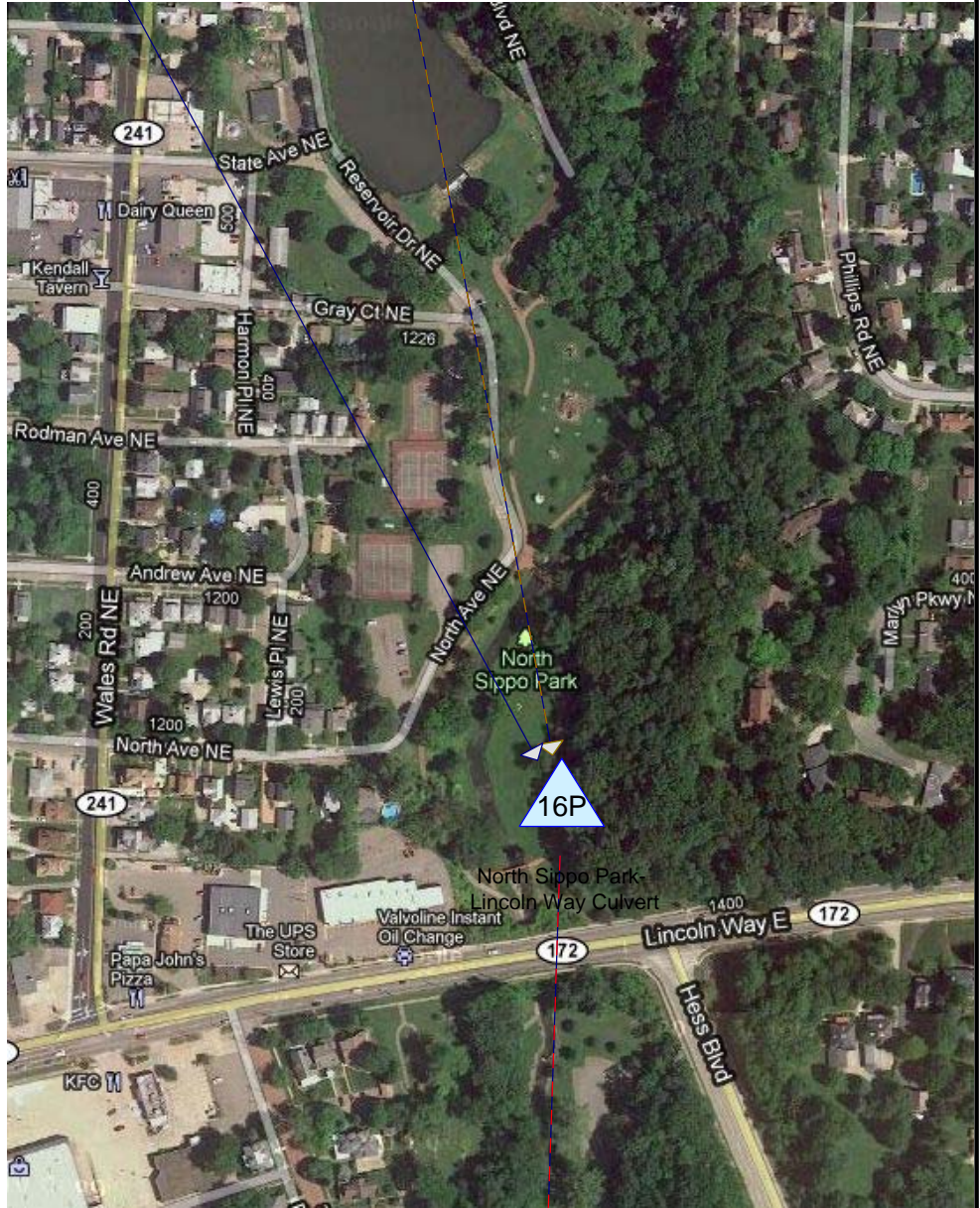




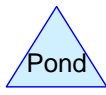
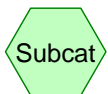
Constant inflow - 0.25 PMF



Sippo Reservoir - Existing Conditions - 0.25 PMF DBA



Sippo Creek Channel
Downstream of Lincoln Way



Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-25PMF

Prepared by URS Corporation, Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-25PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-25PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-25PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir-TR-60 ESFB 6HR-Curve 6-HR 0.25PMF Rainfall=6.54"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=6.61' Max Vel=9.72 fps Inflow=3,881.00 cfs 15,376.275 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=3,881.00 cfs 15,375.356 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,008.28' Storage=149.544 af Inflow=0.00 cfs 0.000 af
Outflow=118.59 cfs 1.999 af

Pond 16P: North Sippo Park- Peak Elev=1,008.70' Storage=206.588 af Inflow=3,998.99 cfs 15,394.494 af
Primary=3,438.01 cfs 13,315.636 af Secondary=524.77 cfs 2,063.846 af Outflow=3,881.00 cfs 15,379.482 af

Pond 32P: Constant inflow - 0.25 PMF Peak Elev=1,008.82' Inflow=3,881.00 cfs 15,395.702 af
Outflow=3,881.00 cfs 15,395.702 af

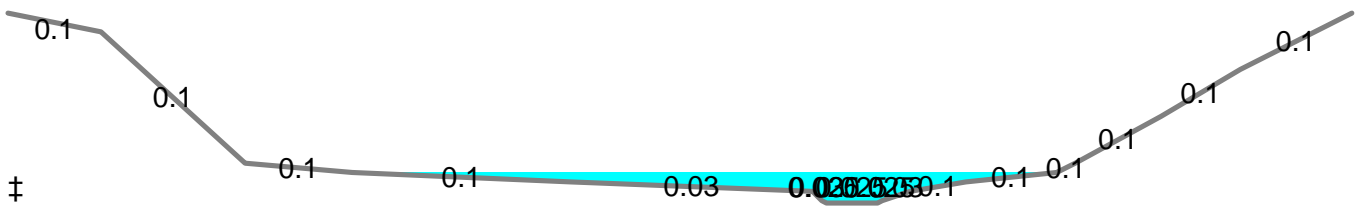
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 3,881.00 cfs @ 4.06 hrs, Volume= 15,376.275 af
 Outflow = 3,881.00 cfs @ 5.93 hrs, Volume= 15,375.356 af, Atten= 0%, Lag= 112.2 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 9.72 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 9.72 fps, Avg. Travel Time= 0.8 min

Peak Storage= 179,735 cf @ 5.93 hrs
 Average Depth at Peak Storage= 6.61'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'

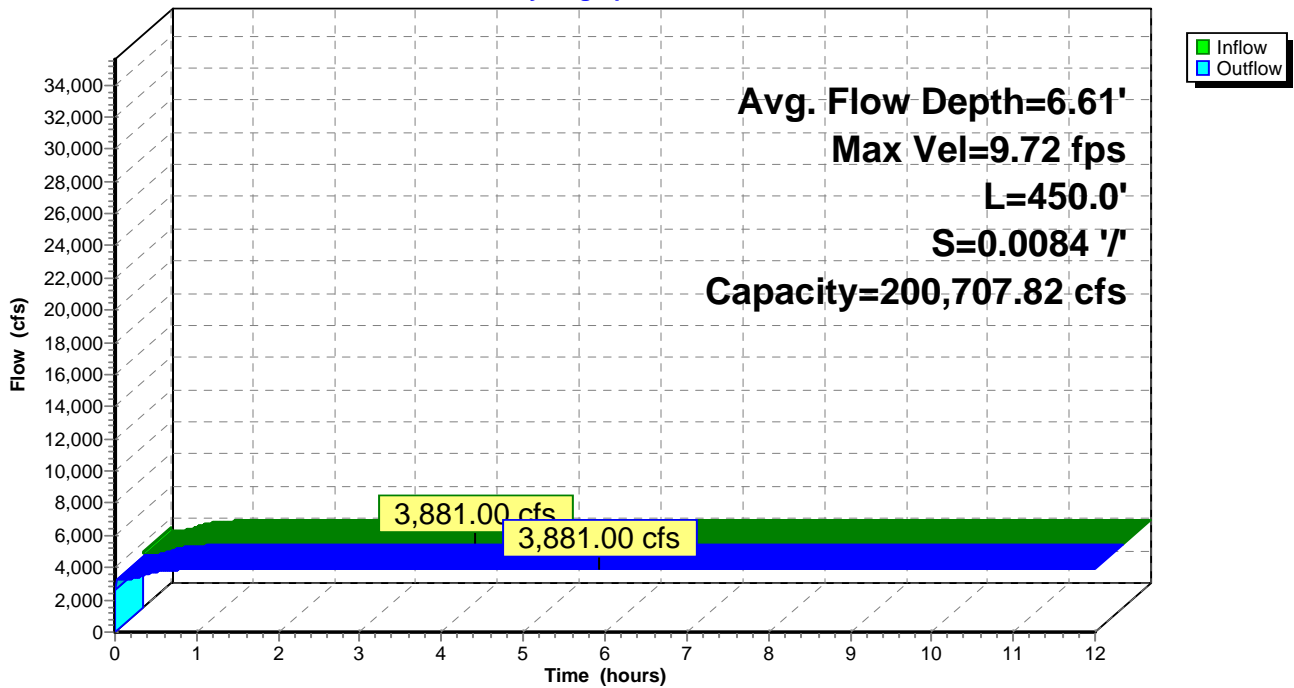


Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

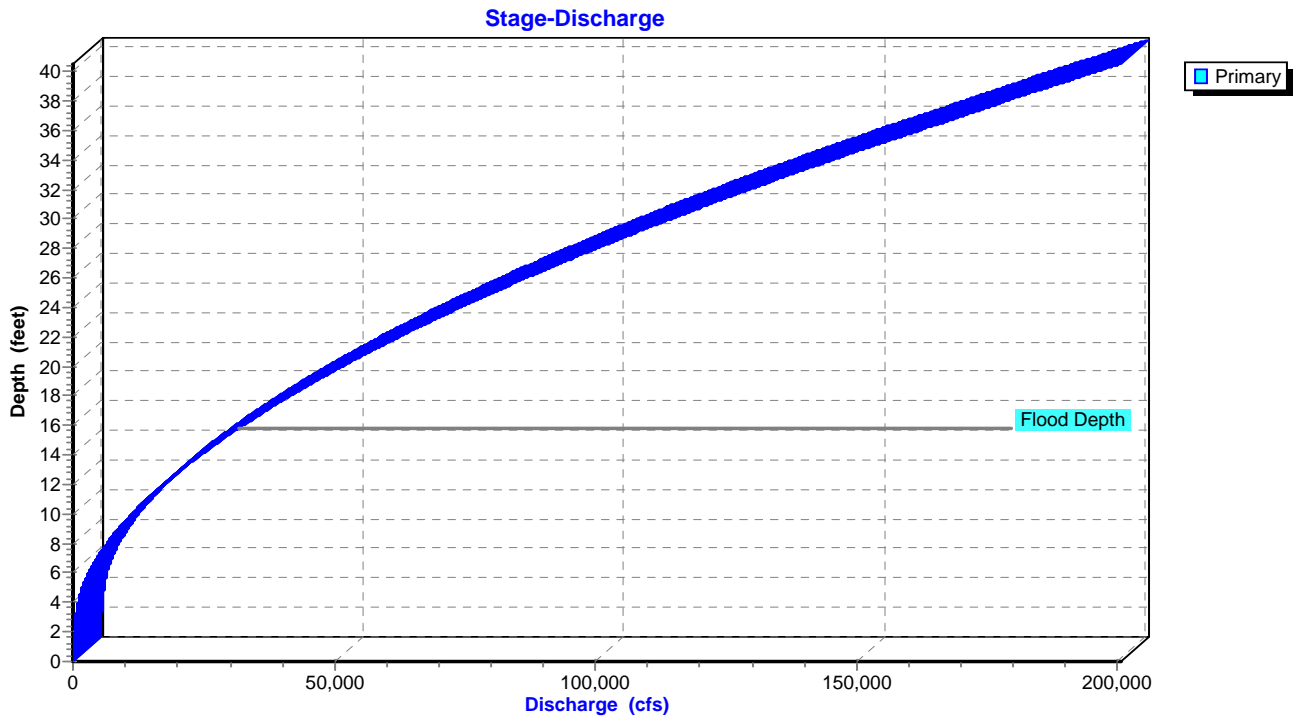
Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

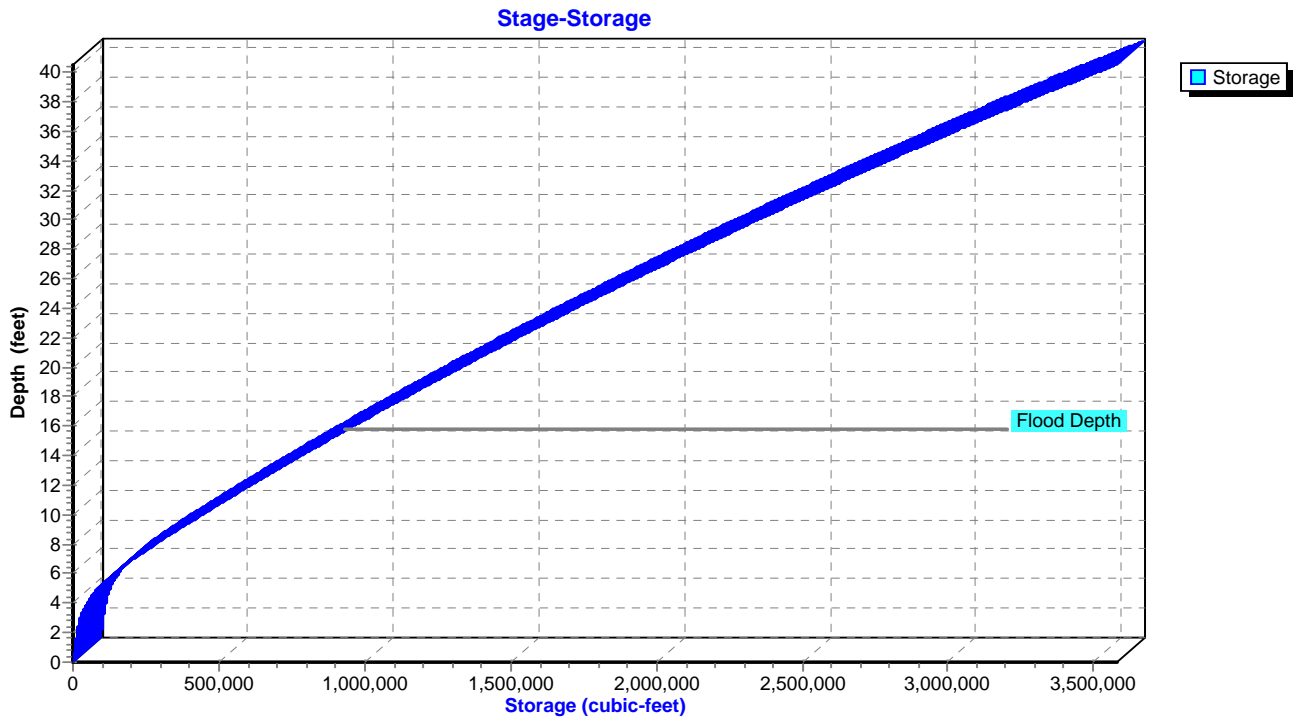
Hydrograph



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 0.25 PMF DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 118.59 cfs @ 0.02 hrs, Volume= 1.999 af, Atten= 0%, Lag= 1.4 min
 Primary = 118.59 cfs @ 0.02 hrs, Volume= 1.999 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,008.28' Surf.Area= 22.633 ac Storage= 149.544 af
 Peak Elev= 1,008.28' @ 0.00 hrs Surf.Area= 22.633 ac Storage= 149.544 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

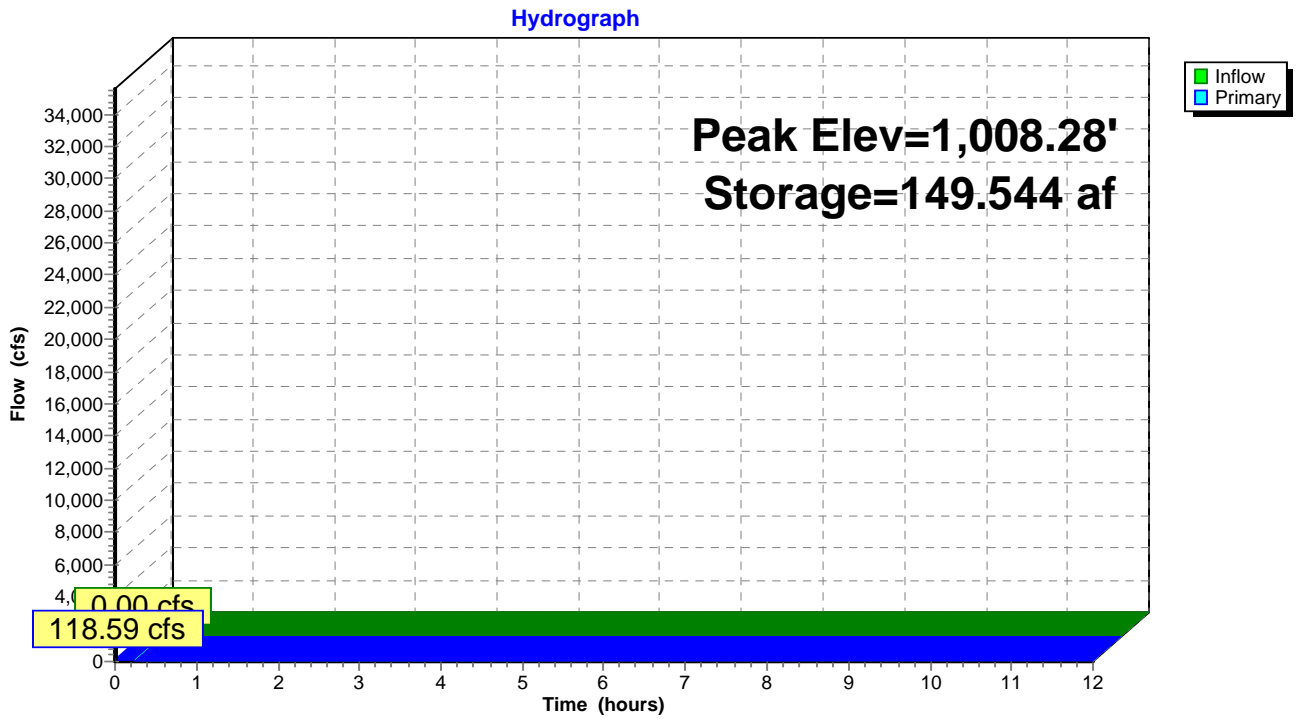
Volume	Invert	Avail.Storage	Storage Description
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

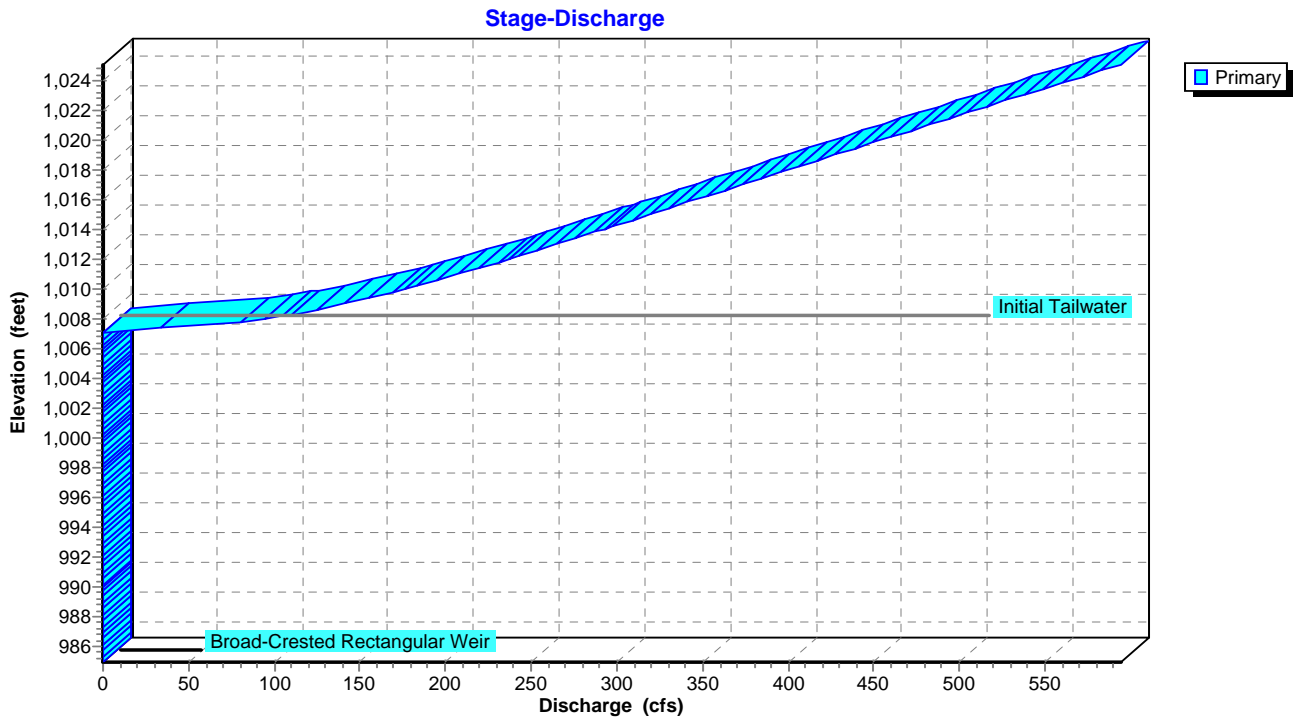
Device	Routing	Invert	Outlet Devices
#1	Primary	985.00'	1.1' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 20.00 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 2.63

Primary OutFlow Max=115.86 cfs @ 0.02 hrs HW=1,008.27' TW=1,007.19' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 115.86 cfs @ 4.53 fps)

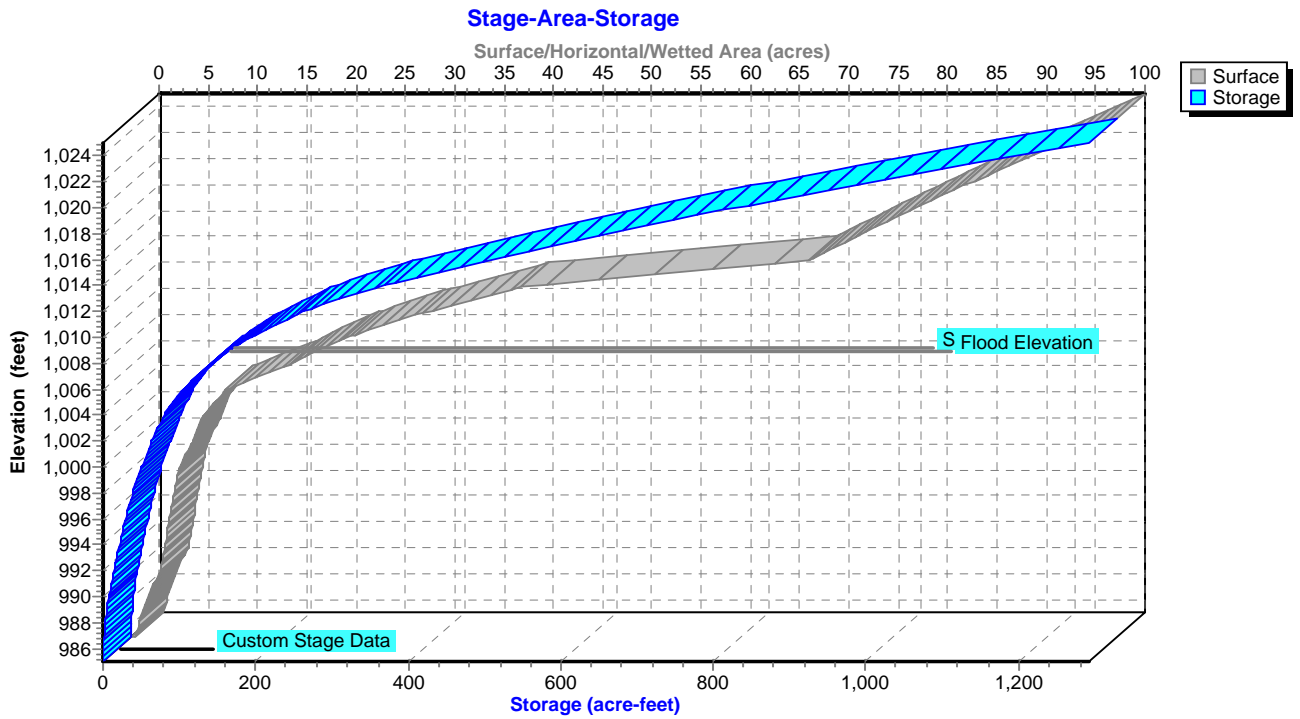
Pond 1P: Sippo Reservoir - Existing Conditions - 0.25 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.25 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.25 PMF DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 3,998.99 cfs @ 0.02 hrs, Volume= 15,394.494 af
 Outflow = 3,881.00 cfs @ 4.06 hrs, Volume= 15,379.482 af, Atten= 3%, Lag= 242.4 min
 Primary = 3,438.01 cfs @ 0.00 hrs, Volume= 13,315.636 af
 Secondary = 524.77 cfs @ 3.86 hrs, Volume= 2,063.846 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,007.35' Surf.Area= 13.160 ac Storage= 188.375 af
 Peak Elev= 1,008.70' @ 3.86 hrs Surf.Area= 13.764 ac Storage= 206.588 af (18.213 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af (8.653 af above start)

Plug-Flow detention time= 38.6 min calculated for 15,187.943 af (99% of inflow)
 Center-of-Mass det. time= 2.0 min (1,441.8 - 1,439.8)

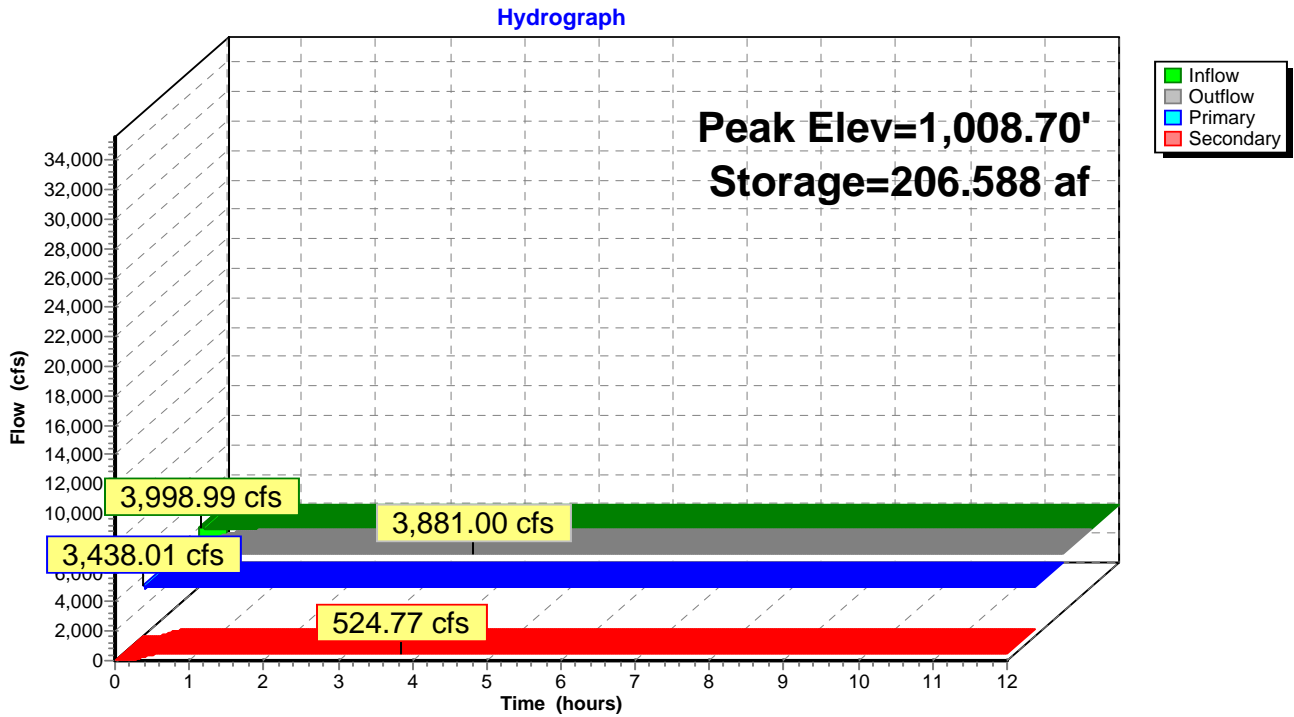
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

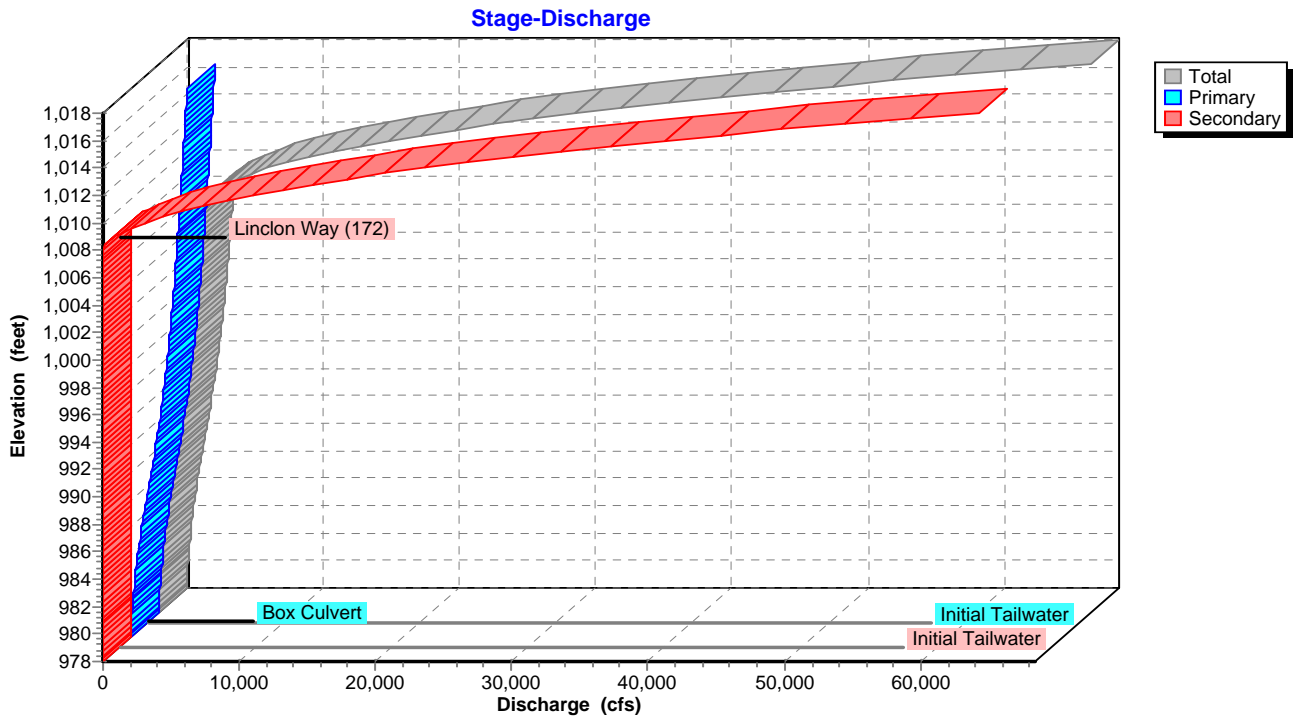
Primary OutFlow Max=3,438.01 cfs @ 0.00 hrs HW=1,007.35' TW=978.13' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,438.01 cfs @ 30.07 fps)

Secondary OutFlow Max=524.77 cfs @ 3.86 hrs HW=1,008.70' TW=984.74' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 524.77 cfs @ 2.65 fps)

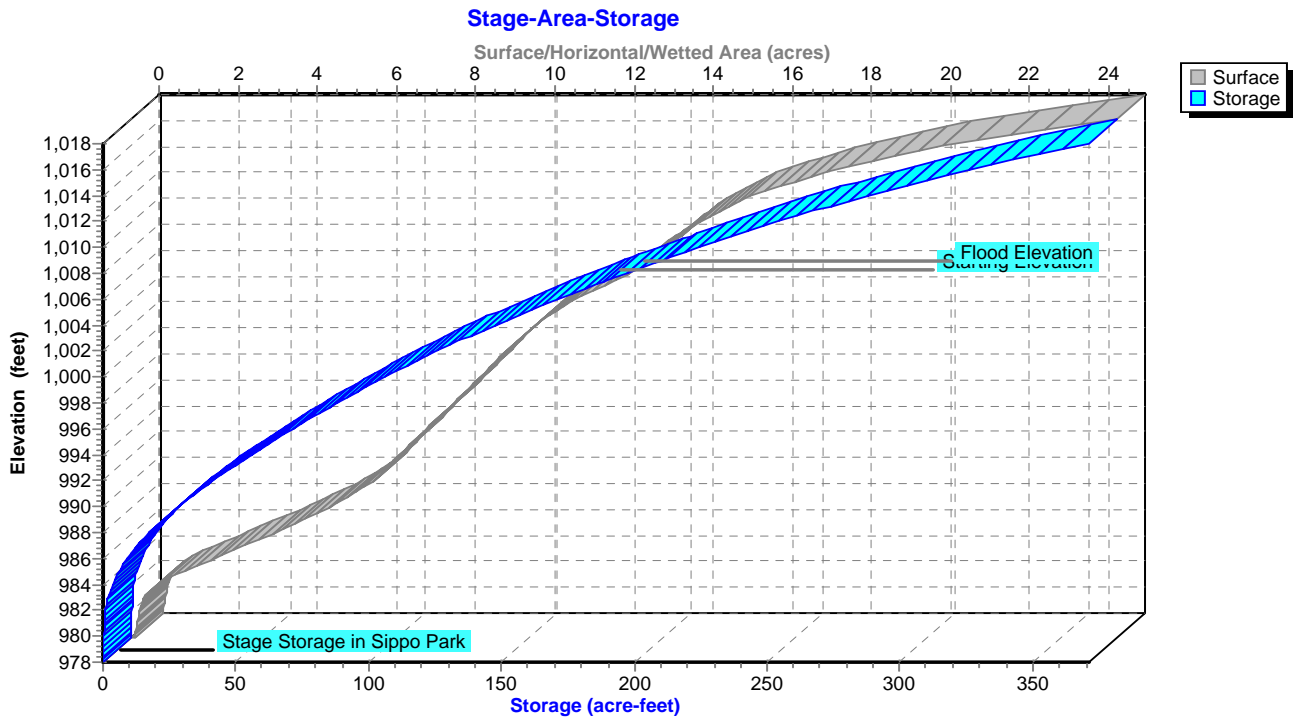
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 0.25 PMF

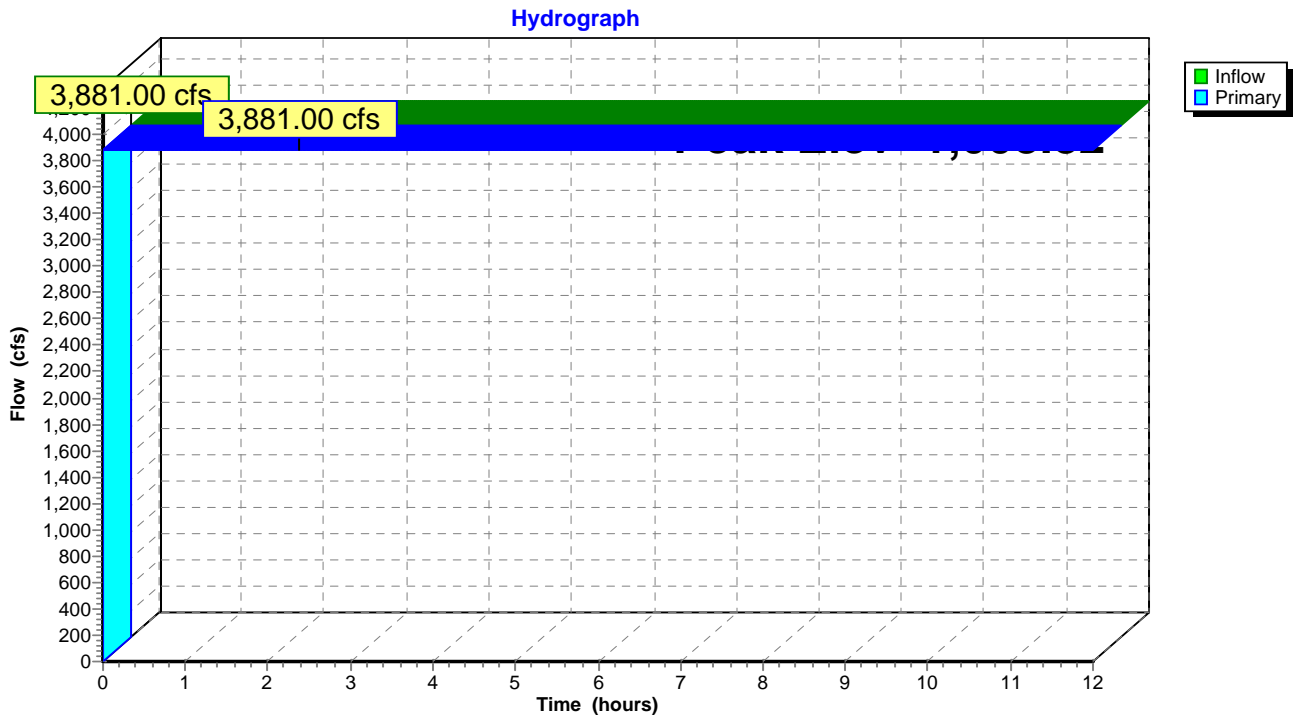
Inflow = 3,881.00 cfs @ 0.00 hrs, Volume= 15,395.702 af, Incl. 3,881.00 cfs Base Flow
 Outflow = 3,881.00 cfs @ 2.38 hrs, Volume= 15,395.702 af, Atten= 0%, Lag= 142.9 min
 Primary = 3,881.00 cfs @ 2.38 hrs, Volume= 15,395.702 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,008.82' @ 3.87 hrs

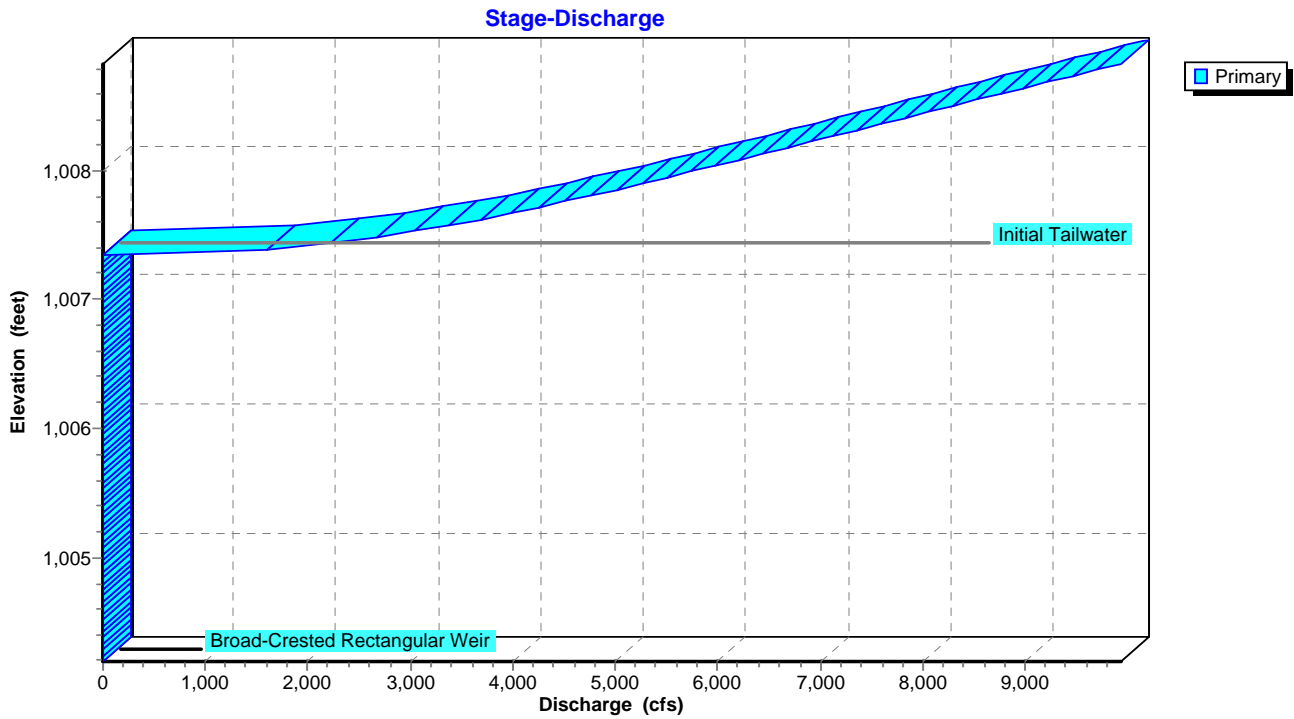
Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=3,881.00 cfs @ 2.38 hrs HW=1,008.82' TW=1,008.70' (Dynamic Tailwater)
 ←1=Broad-Crested Rectangular Weir (Weir Controls 3,881.00 cfs @ 1.68 fps)

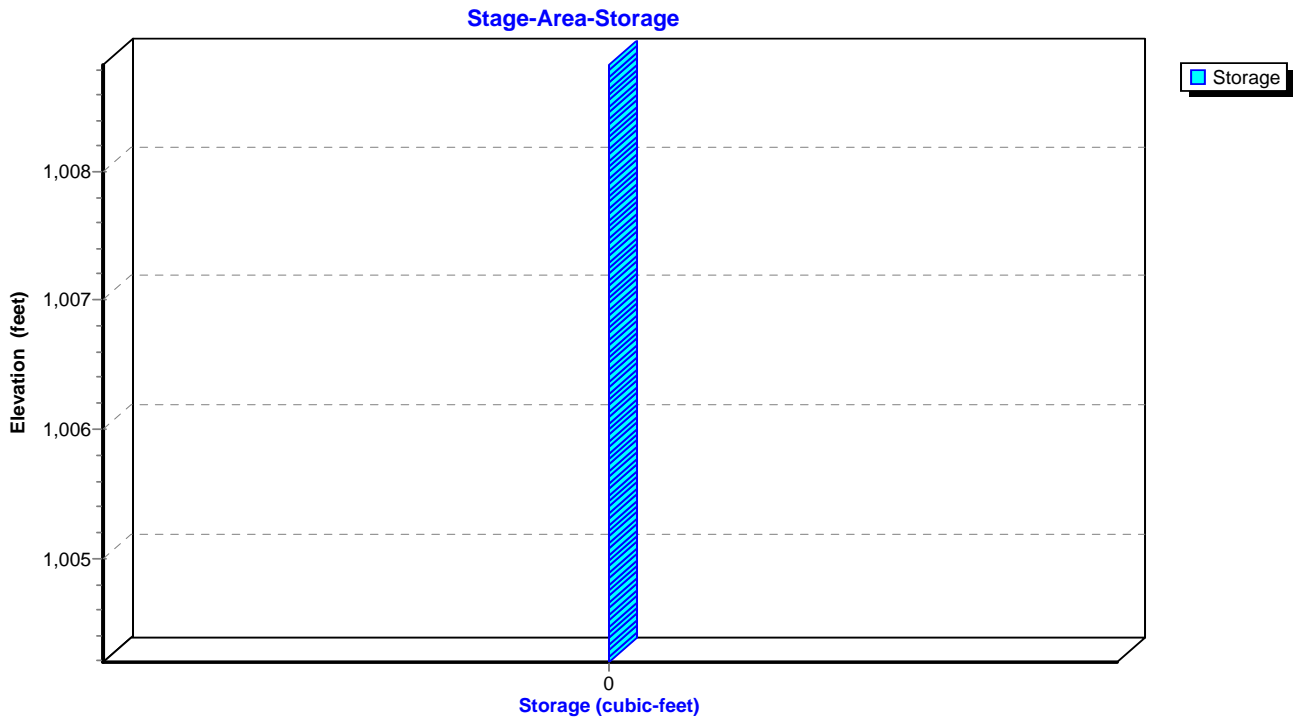
Pond 32P: Constant inflow - 0.25 PMF

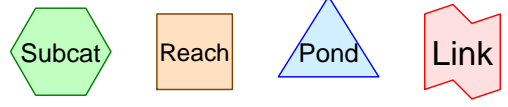
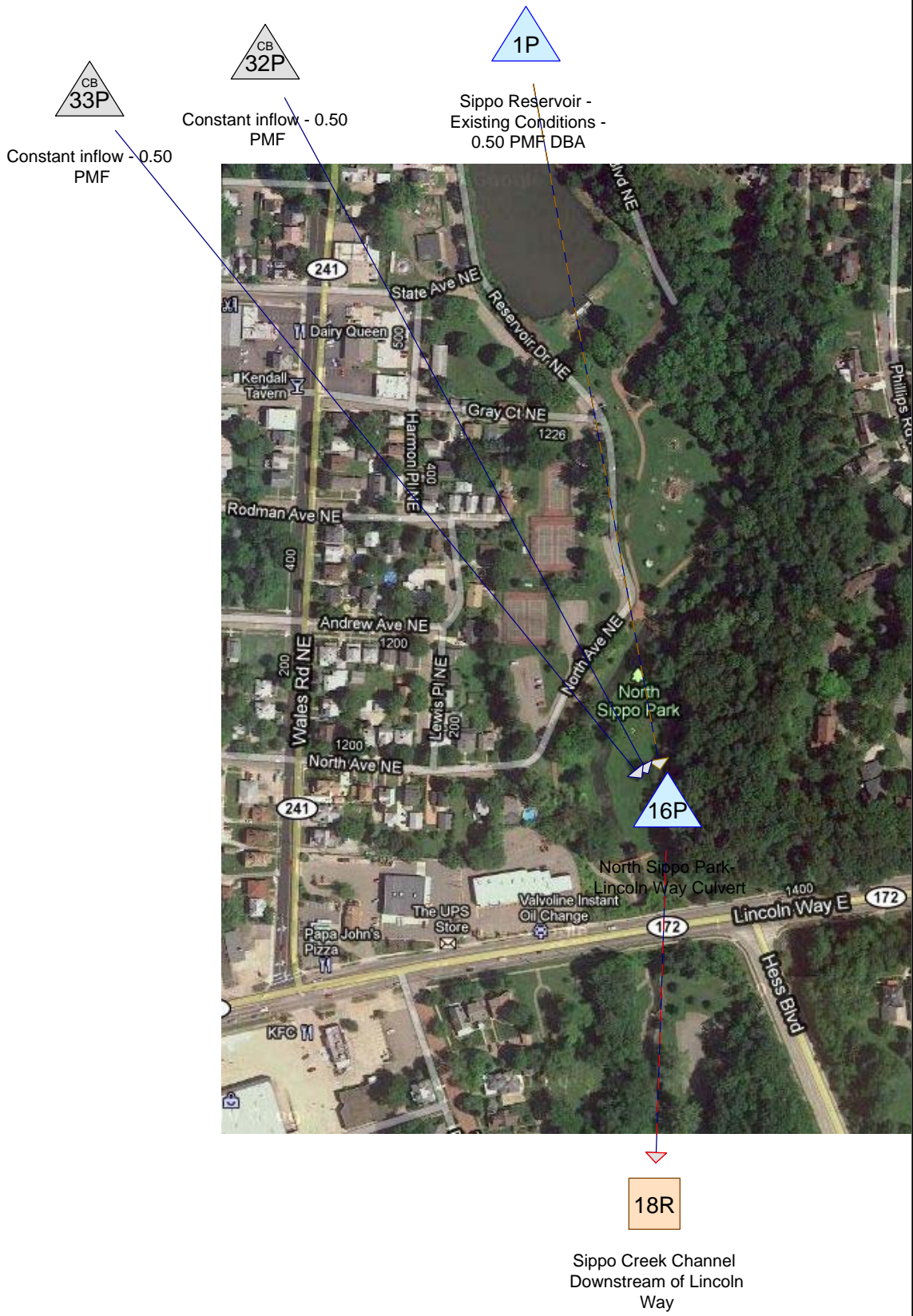


Pond 32P: Constant inflow - 0.25 PMF



Pond 32P: Constant inflow - 0.25 PMF





Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-50PMF
 Prepared by URS Corporation, Printed 10/31/2011
 HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-50PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-50PMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-50PMF

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Existing Conditions Sippo Reservoir-TR-60 ESFB 6HR-Curve 6-HR 0.5PMF Rainfall=13.08"

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=10.14' Max Vel=11.58 fps Inflow=11,792.69 cfs 45,486.814 af
L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=11,700.60 cfs 45,486.015 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,012.56' Storage=287.540 af Inflow=0.00 cfs 0.000 af
Outflow=312.38 cfs 47.219 af

Pond 16P: North Sippo Park- Peak Elev=1,011.45' Storage=246.240 af Inflow=11,766.38 cfs 45,487.006 af
Primary=3,705.66 cfs 13,153.252 af Secondary=8,387.95 cfs 32,343.030 af Outflow=11,792.69 cfs 45,496.282 af

Pond 32P: Constant inflow - 0.50 PMF Peak Elev=1,011.68' Inflow=9,000.00 cfs 35,702.479 af
Outflow=9,000.00 cfs 35,702.479 af

Pond 33P: Constant inflow - 0.50 PMF Peak Elev=1,011.46' Inflow=2,457.00 cfs 9,746.777 af
Outflow=2,457.00 cfs 9,746.777 af

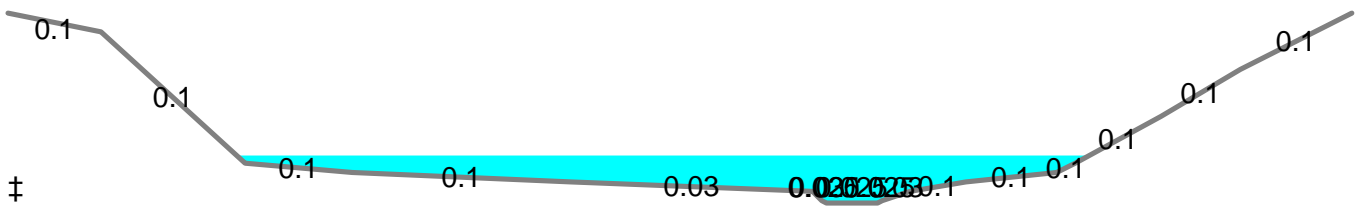
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 11,792.69 cfs @ 0.00 hrs, Volume= 45,486.814 af
 Outflow = 11,700.60 cfs @ 0.29 hrs, Volume= 45,486.015 af, Atten= 1%, Lag= 17.7 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 11.58 fps, Min. Travel Time= 0.6 min
 Avg. Velocity = 11.53 fps, Avg. Travel Time= 0.7 min

Peak Storage= 454,542 cf @ 0.29 hrs
 Average Depth at Peak Storage= 10.14'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

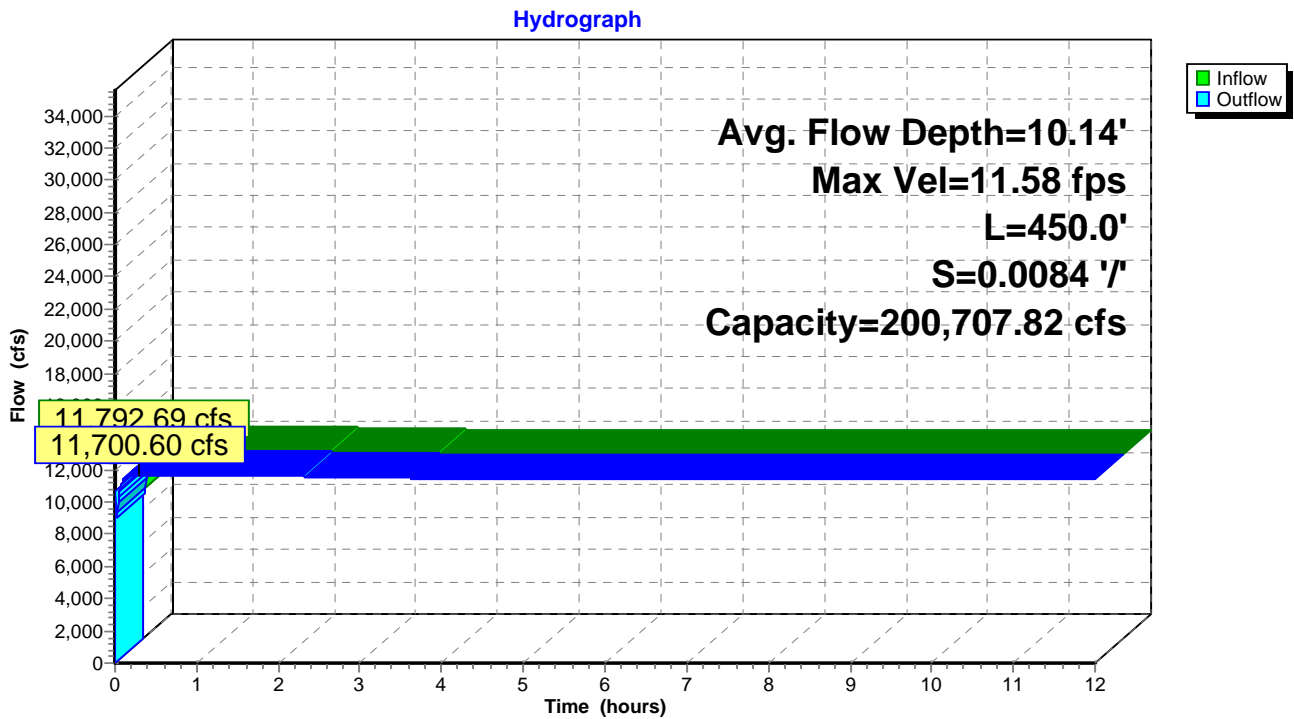
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



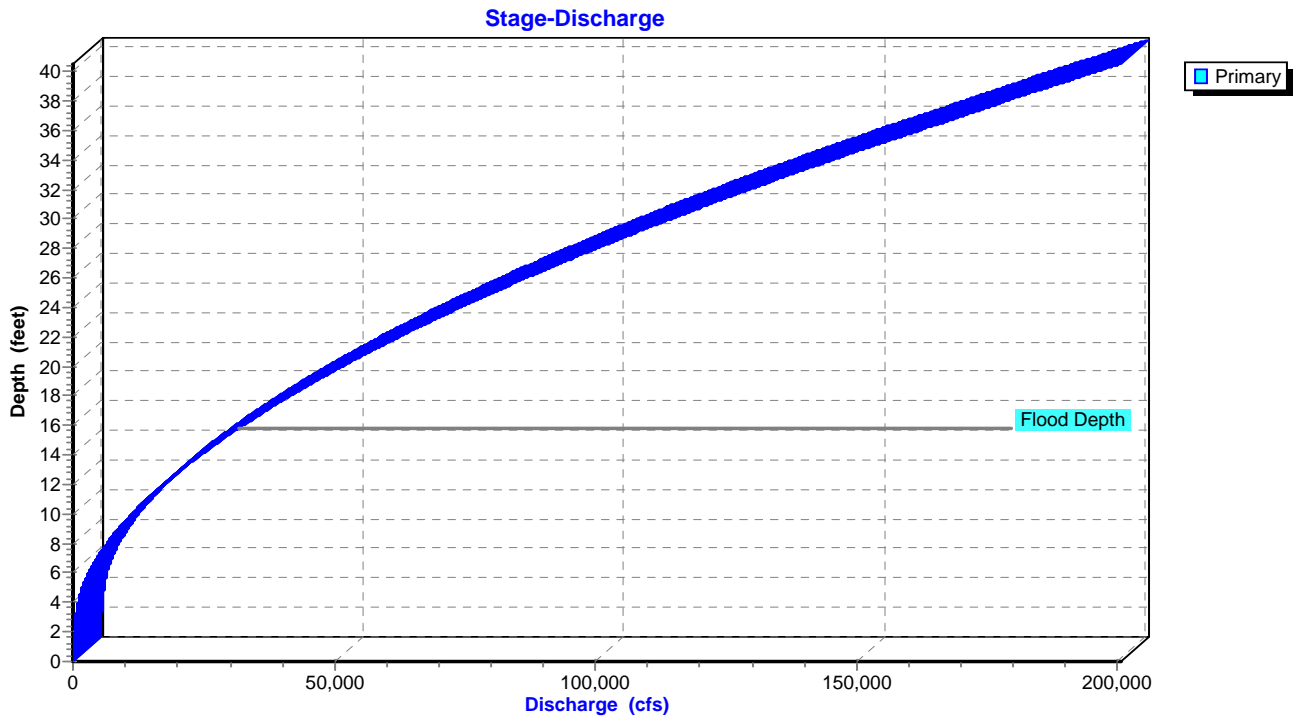
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

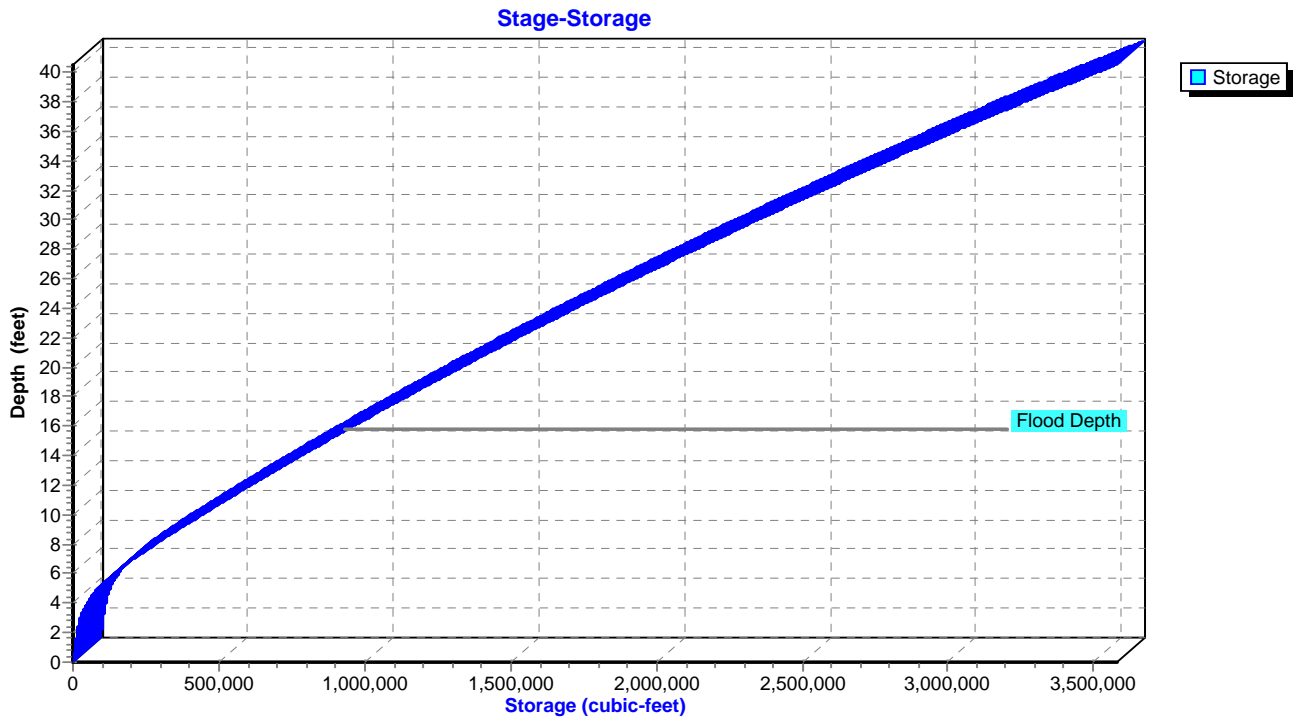
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 0.50 PMF DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 312.38 cfs @ 0.02 hrs, Volume= 47.219 af, Atten= 0%, Lag= 1.4 min
 Primary = 312.38 cfs @ 0.02 hrs, Volume= 47.219 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,012.56' Surf.Area= 46.890 ac Storage= 287.540 af
 Peak Elev= 1,012.56' @ 0.00 hrs Surf.Area= 46.890 ac Storage= 287.540 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

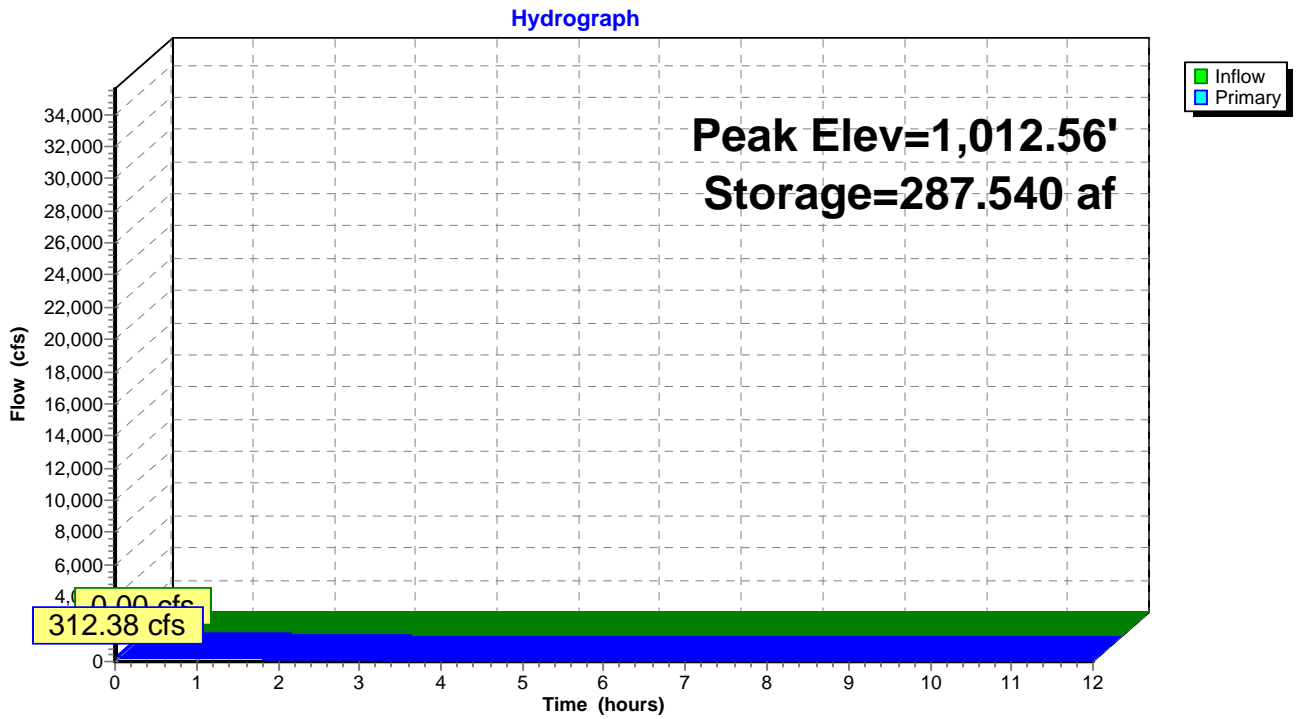
Volume	Invert	Avail.Storage	Storage Description
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

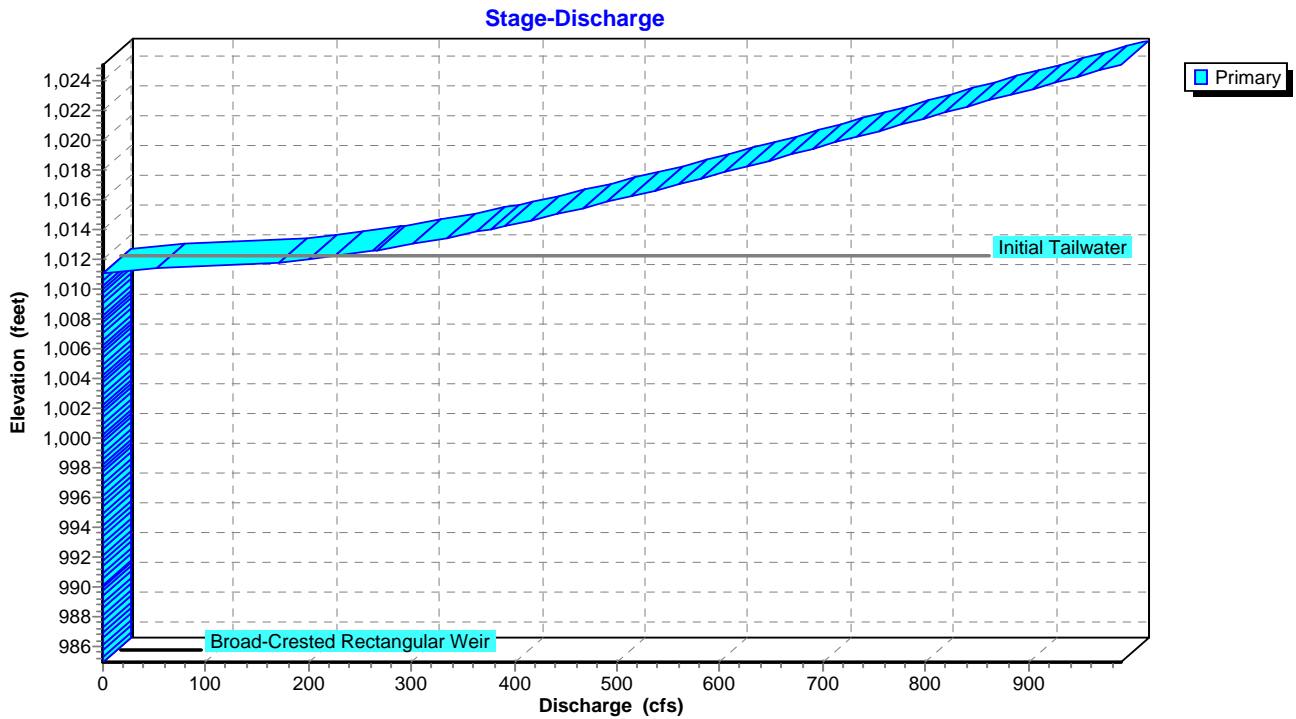
Device	Routing	Invert	Outlet Devices
#1	Primary	985.00'	2.0' long x 50.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 20.00 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63 2.63

Primary OutFlow Max=296.96 cfs @ 0.02 hrs HW=1,012.55' TW=1,010.93' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 296.96 cfs @ 5.39 fps)

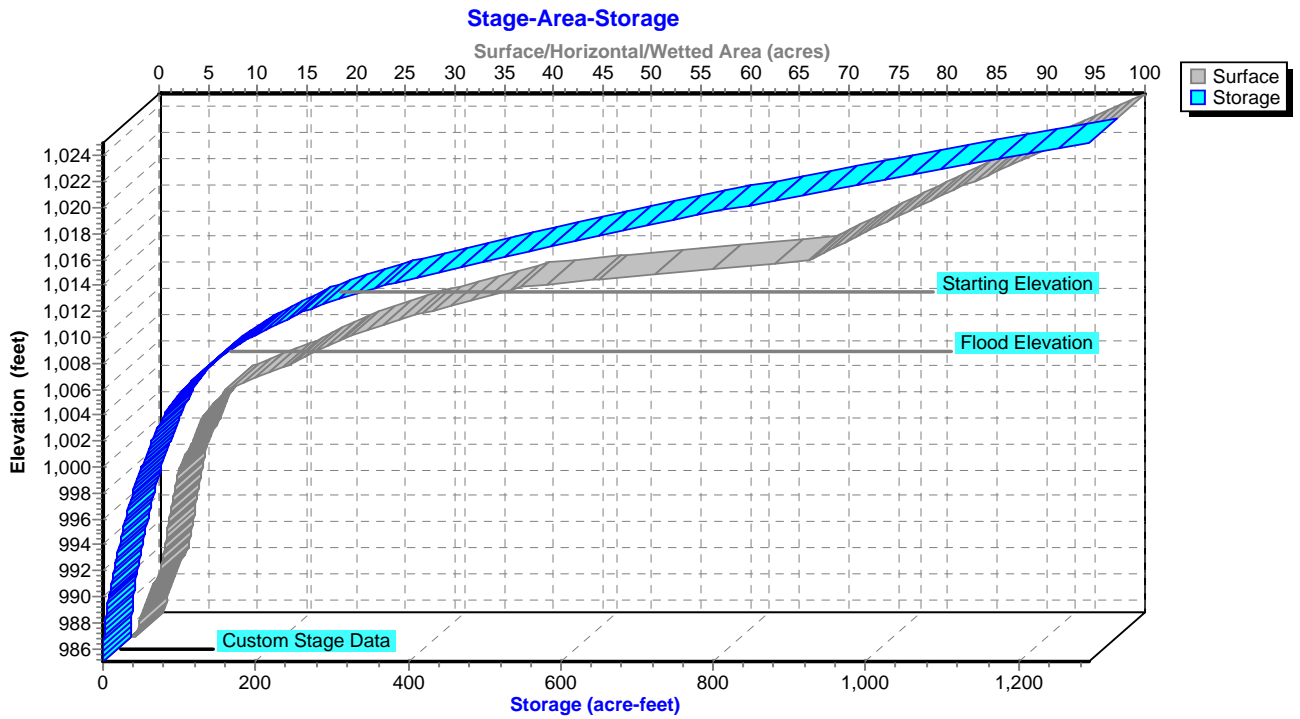
Pond 1P: Sippo Reservoir - Existing Conditions - 0.50 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.50 PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 0.50 PMF DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 11,766.38 cfs @ 0.02 hrs, Volume= 45,487.006 af
 Outflow = 11,792.69 cfs @ 0.00 hrs, Volume= 45,496.282 af, Atten= 0%, Lag= 0.0 min
 Primary = 3,705.66 cfs @ 0.00 hrs, Volume= 13,153.252 af
 Secondary = 8,387.95 cfs @ 0.29 hrs, Volume= 32,343.030 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,011.38' Surf.Area= 15.222 ac Storage= 245.199 af
 Peak Elev= 1,011.45' @ 0.29 hrs Surf.Area= 15.267 ac Storage= 246.240 af (1.041 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 15.5 min calculated for 45,251.083 af (99% of inflow)
 Center-of-Mass det. time= 0.3 min (1,438.9 - 1,438.6)

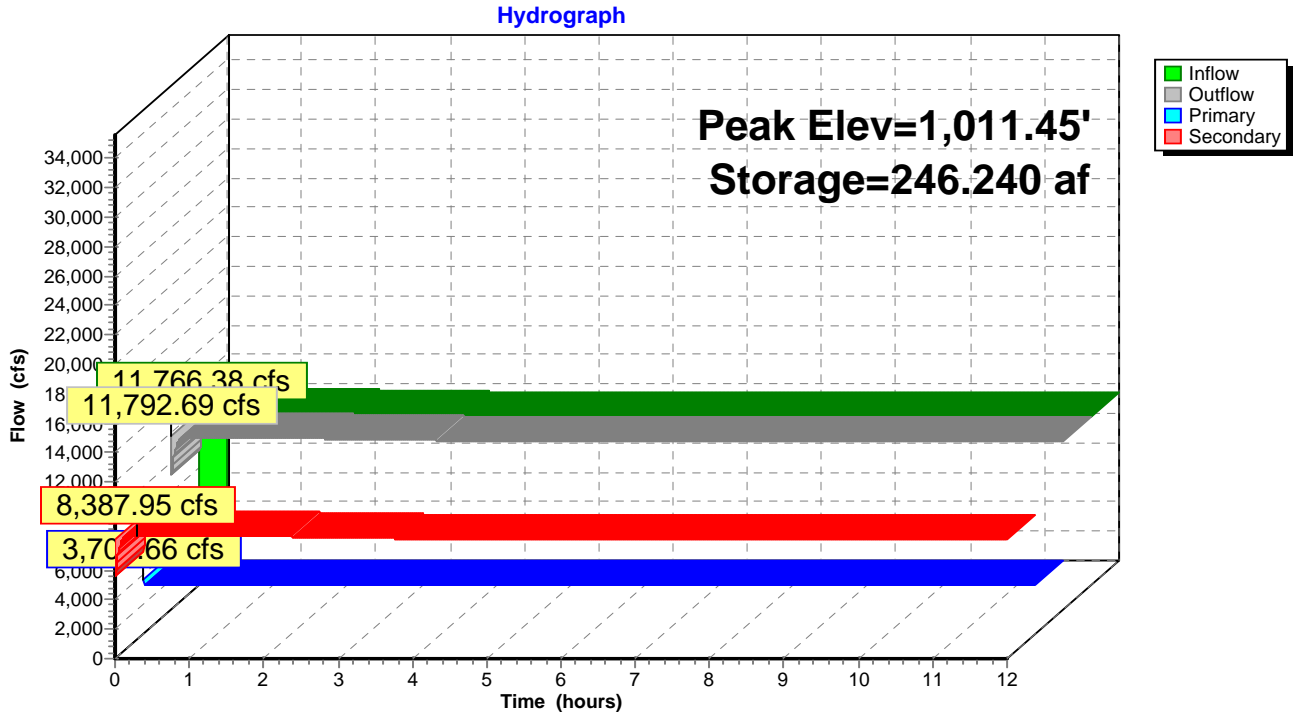
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/' Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

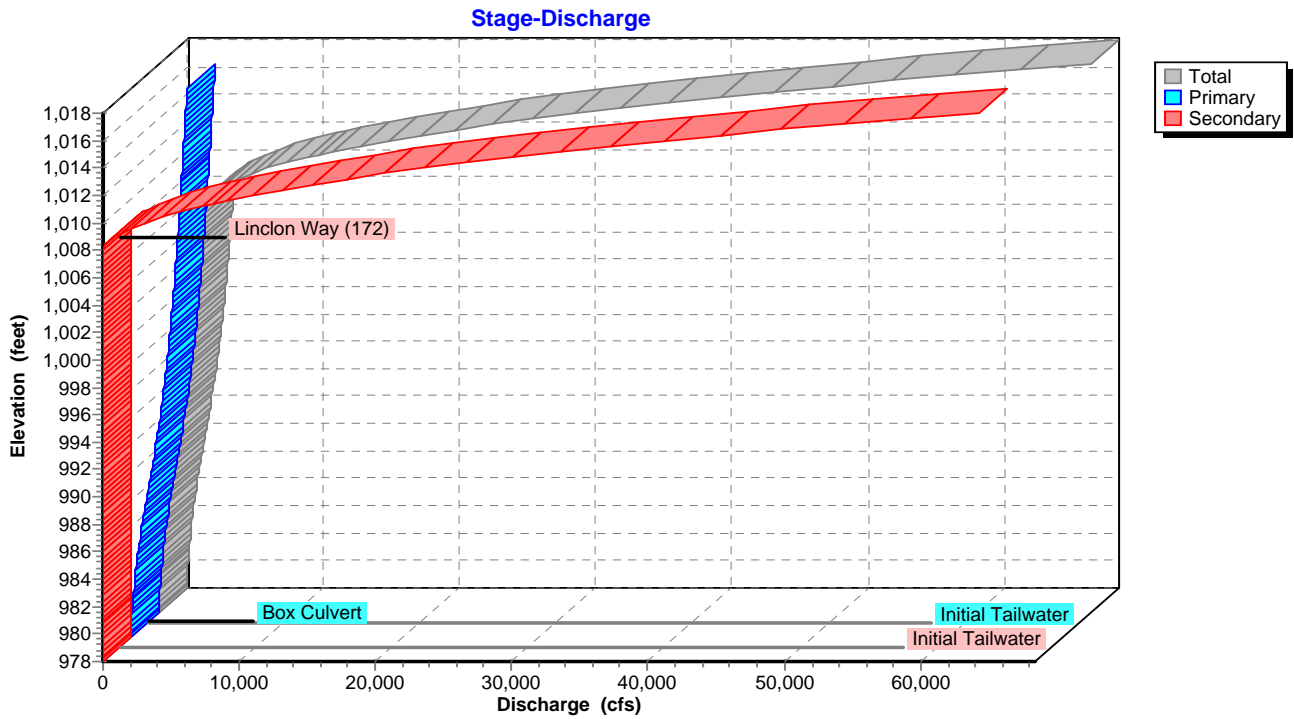
Primary OutFlow Max=3,705.66 cfs @ 0.00 hrs HW=1,011.38' TW=978.13' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,705.66 cfs @ 32.41 fps)

Secondary OutFlow Max=8,387.94 cfs @ 0.29 hrs HW=1,011.45' TW=988.27' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 8,387.94 cfs @ 5.61 fps)

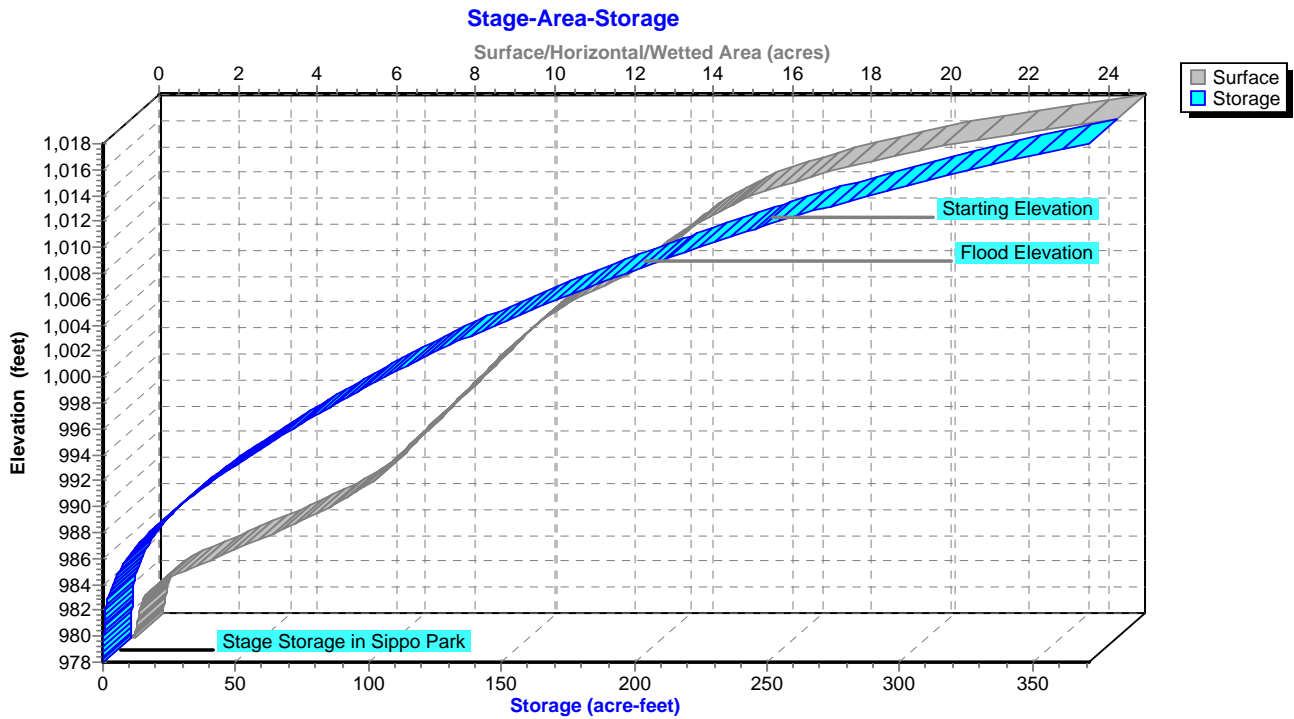
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 0.50 PMF

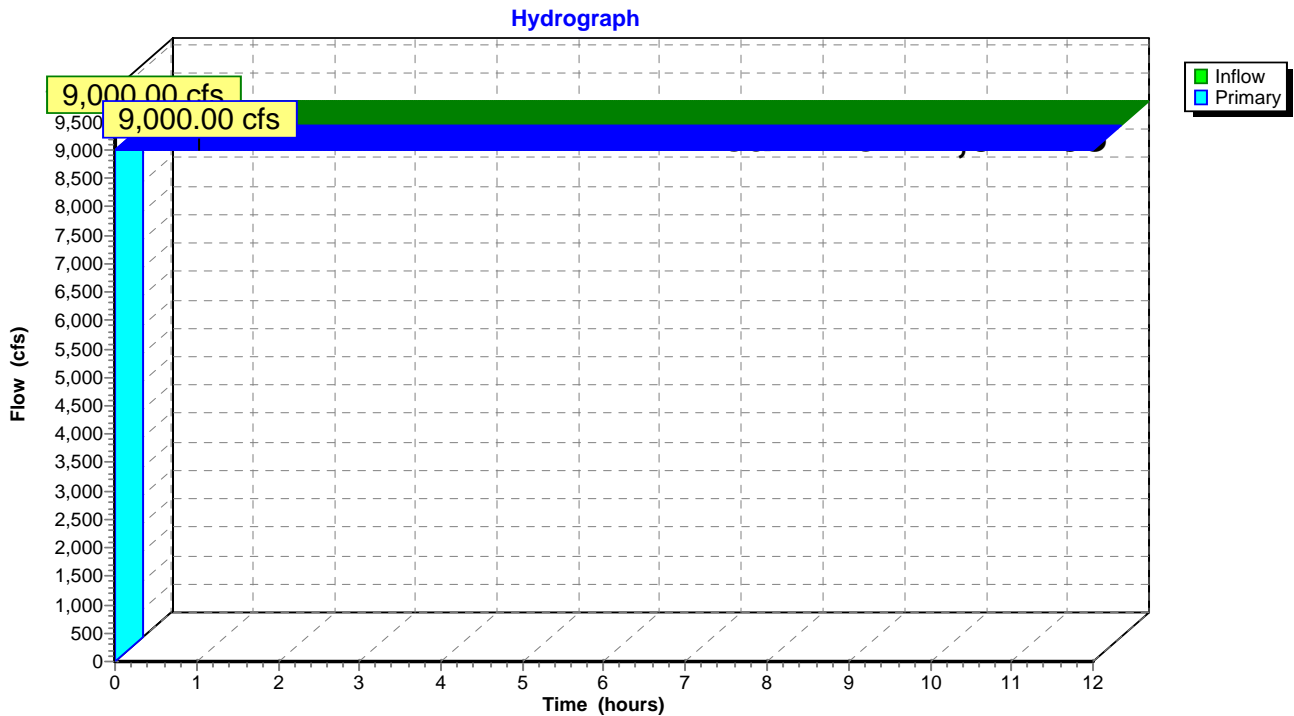
Inflow = 9,000.00 cfs @ 0.00 hrs, Volume= 35,702.479 af, Incl. 9,000.00 cfs Base Flow
 Outflow = 9,000.00 cfs @ 1.02 hrs, Volume= 35,702.479 af, Atten= 0%, Lag= 61.3 min
 Primary = 9,000.00 cfs @ 1.02 hrs, Volume= 35,702.479 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,011.68' @ 0.30 hrs

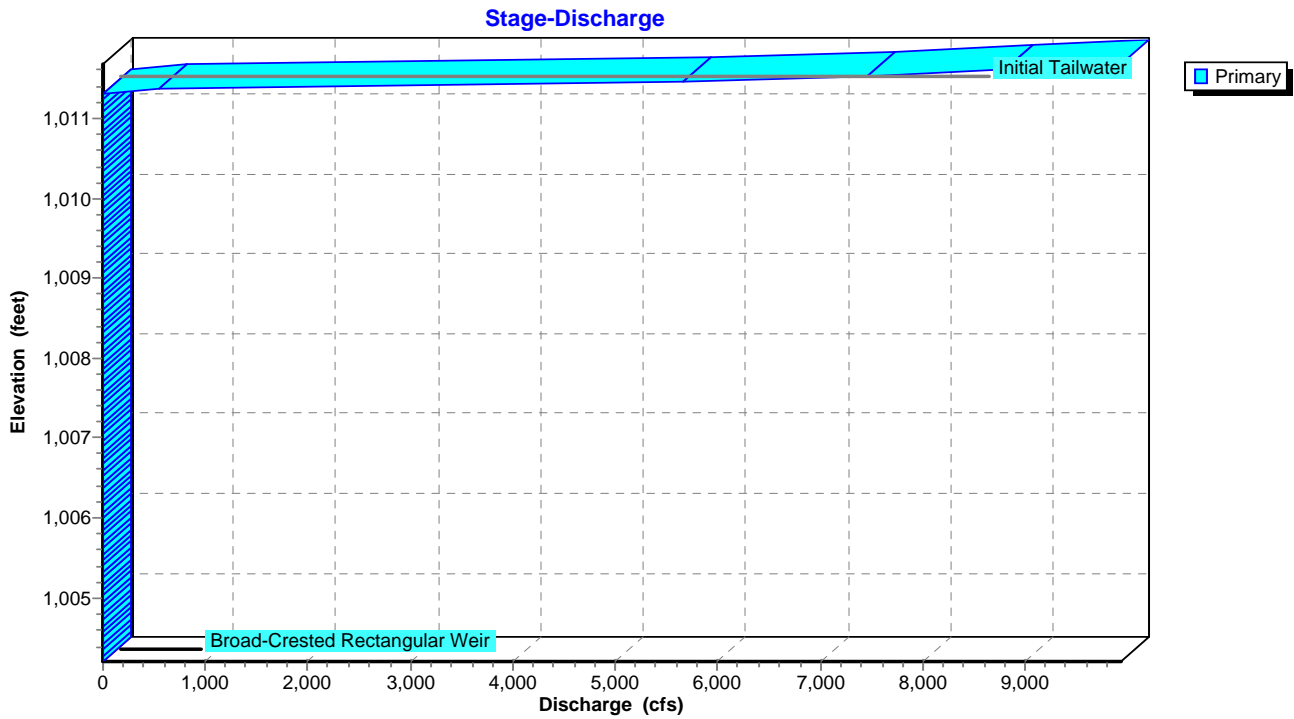
Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=9,001.77 cfs @ 1.02 hrs HW=1,011.67' TW=1,011.44' (Dynamic Tailwater)
 ←1=Broad-Crested Rectangular Weir (Weir Controls 9,001.77 cfs @ 2.41 fps)

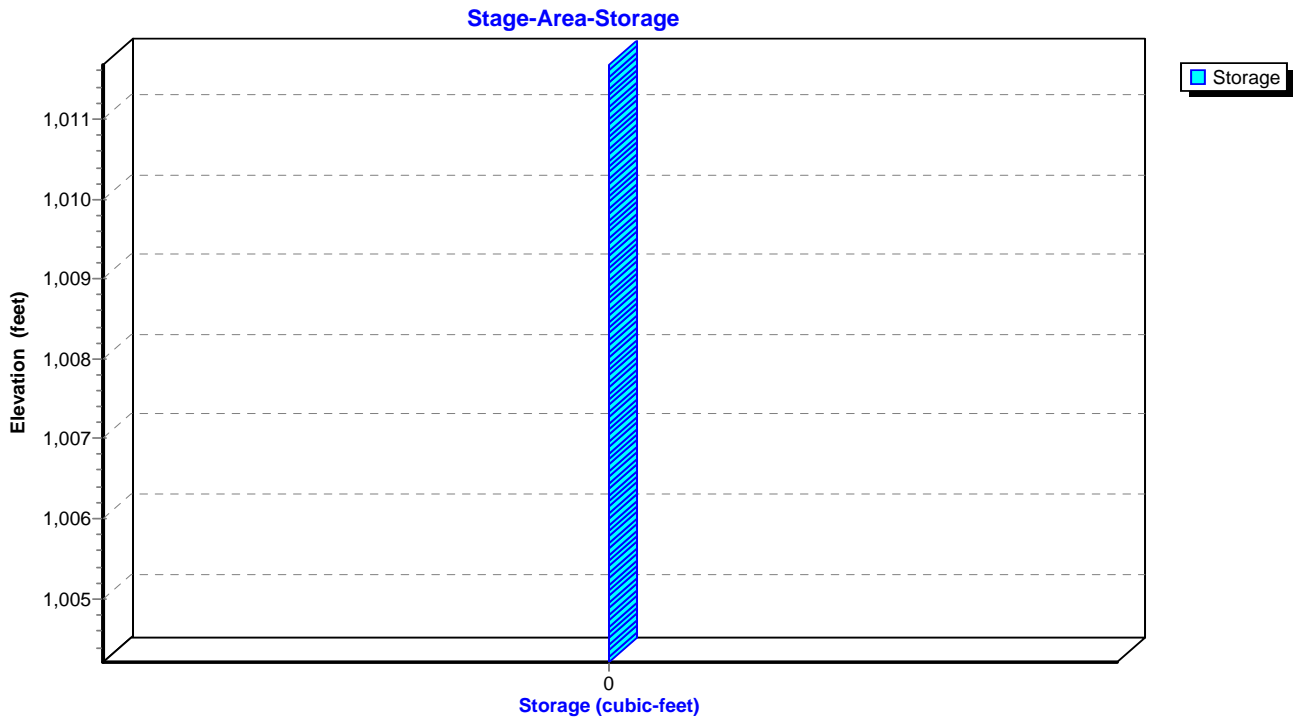
Pond 32P: Constant inflow - 0.50 PMF



Pond 32P: Constant inflow - 0.50 PMF



Pond 32P: Constant inflow - 0.50 PMF



Summary for Pond 33P: Constant inflow - 0.50 PMF

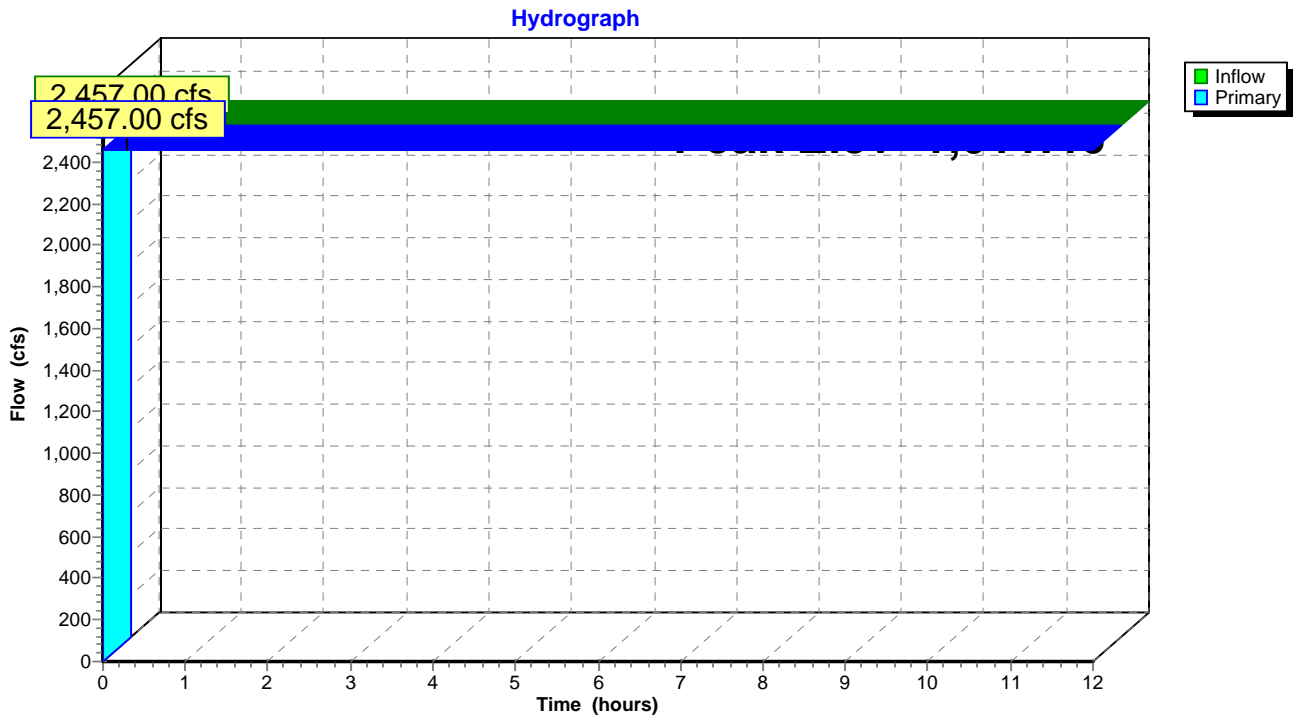
Inflow = 2,457.00 cfs @ 0.00 hrs, Volume= 9,746.777 af, Incl. 2,457.00 cfs Base Flow
 Outflow = 2,457.00 cfs @ 0.28 hrs, Volume= 9,746.777 af, Atten= 0%, Lag= 16.8 min
 Primary = 2,457.00 cfs @ 0.28 hrs, Volume= 9,746.777 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,011.46' @ 0.30 hrs

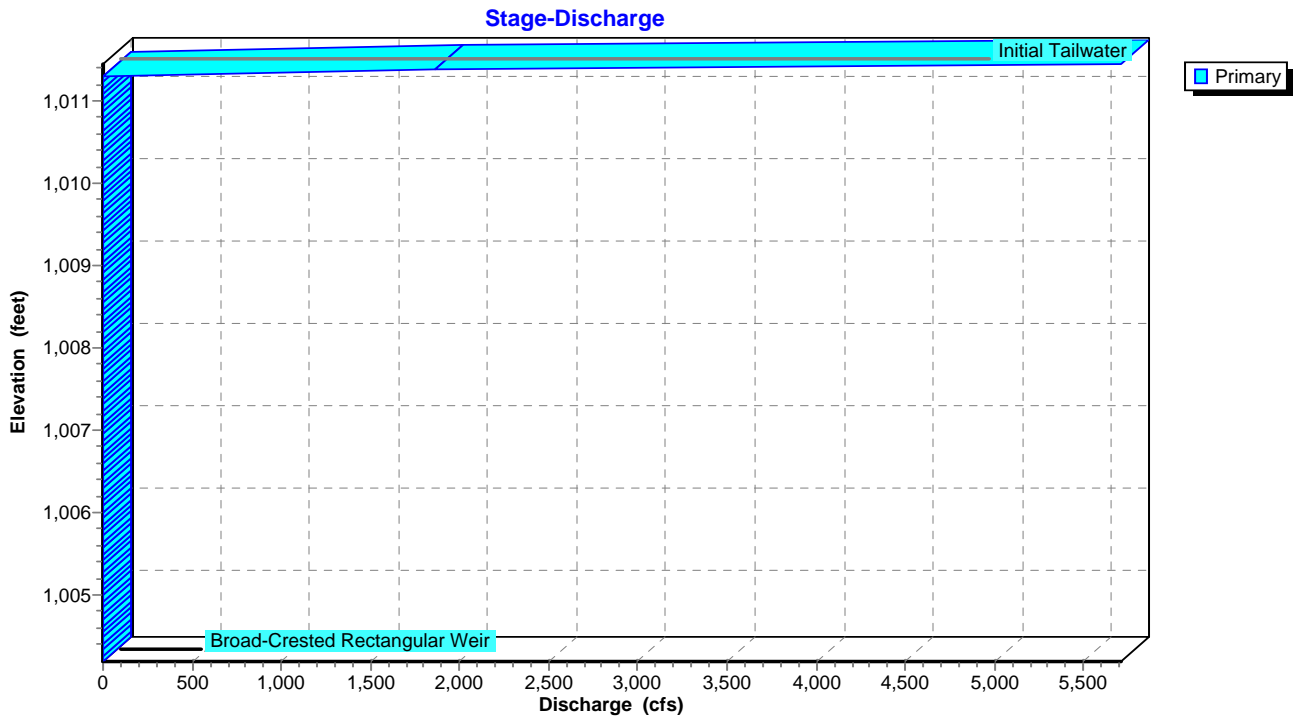
Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=2,452.05 cfs @ 0.28 hrs HW=1,011.46' TW=1,011.45' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 2,452.05 cfs @ 0.68 fps)

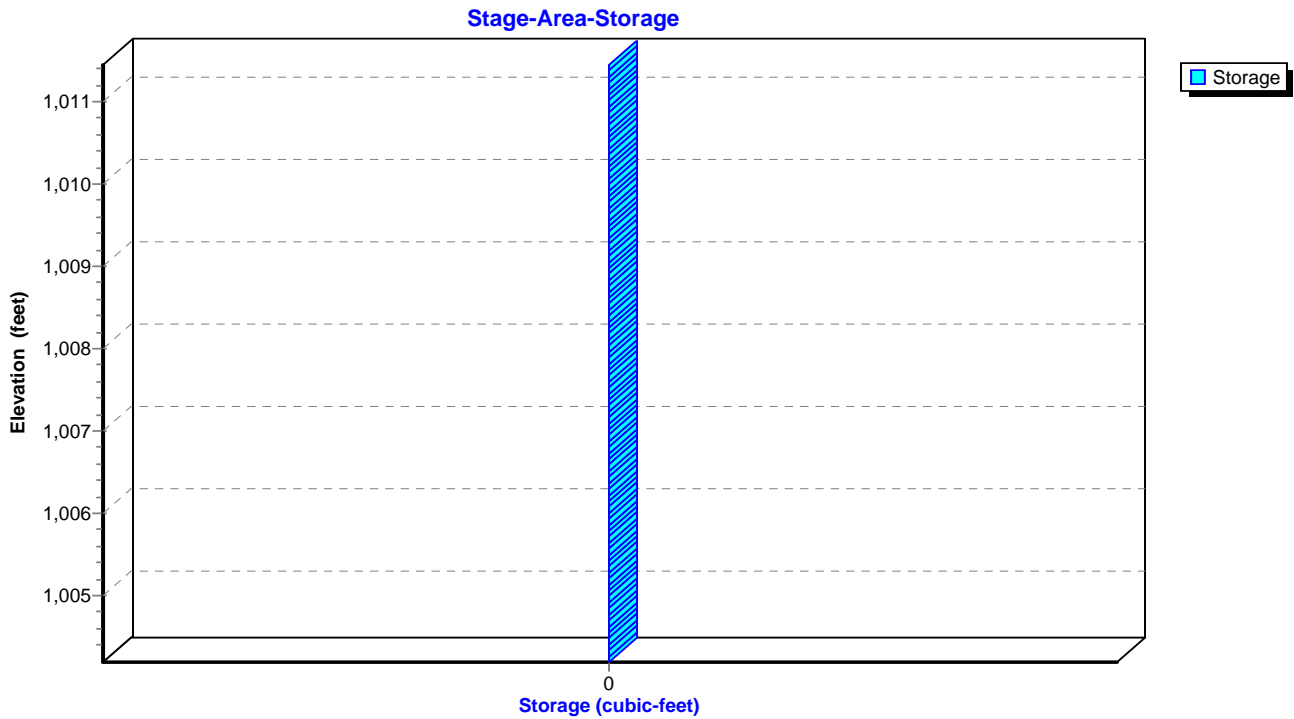
Pond 33P: Constant inflow - 0.50 PMF

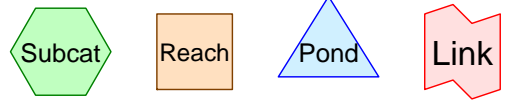
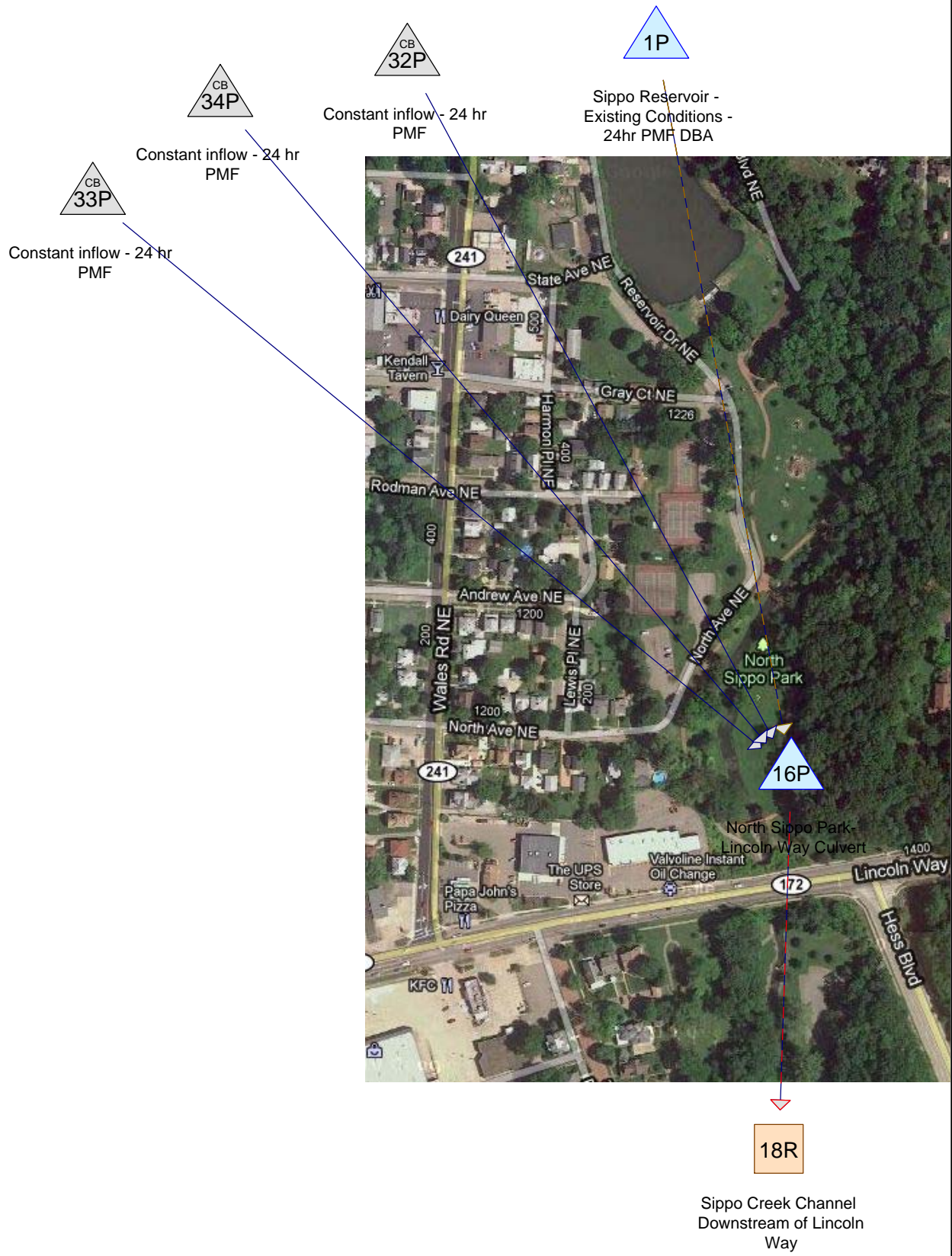


Pond 33P: Constant inflow - 0.50 PMF



Pond 33P: Constant inflow - 0.50 PMF





Drainage Diagram for Existing Conditions Sippo Reservoir-URS-DBA-24-hrPMF
 Prepared by URS Corporation, Printed 10/31/2011
 HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Existing Conditions Sippo Reservoir-URS-DBA-24-hrPMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.000	0	TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-24-hrPMF

Prepared by URS Corporation

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Printed 10/31/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.000		TOTAL AREA

Existing Conditions Sippo Reservoir-URS-DBA-24-hrPMF

Prepared by URS Corporation

Printed 10/31/2011

HydroCAD® 9.10 s/n 04378 © 2010 HydroCAD Software Solutions LLC

Page 4

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Fill (inches)
1	16P	978.25	978.13	121.8	0.0010	0.015	168.0	98.0	0.0

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Sim-Route method - Pond routing by Sim-Route method

Reach 18R: Sippo Creek Avg. Flow Depth=14.80' Max Vel=14.53 fps Inflow=24,228.91 cfs 92,049.489 af
 L=450.0' S=0.0084 '/' Capacity=200,707.82 cfs Outflow=27,541.58 cfs 92,051.346 af

Pond 1P: Sippo Reservoir - Existing Peak Elev=1,015.62' Storage=484.911 af Inflow=0.00 cfs 0.000 af
 Outflow=1,353.05 cfs 146.943 af

Pond 16P: North Sippo Park- Peak Elev=1,013.65' Storage=281.851 af Inflow=24,517.05 cfs 92,049.776 af
 Primary=3,837.70 cfs 12,719.310 af Secondary=21,032.72 cfs 79,349.329 af Outflow=24,228.91 cfs 92,068.639 af

Pond 32P: Constant inflow - 24 hr PMF Peak Elev=1,013.76' Inflow=9,000.00 cfs 35,702.479 af
 Outflow=9,000.00 cfs 35,702.479 af

Pond 33P: Constant inflow - 24 hr PMF Peak Elev=1,013.68' Inflow=5,172.00 cfs 20,517.025 af
 Outflow=5,172.00 cfs 20,517.025 af

Pond 34P: Constant inflow - 24 hr PMF Peak Elev=1,013.76' Inflow=9,000.00 cfs 35,702.479 af
 Outflow=9,000.00 cfs 35,702.479 af

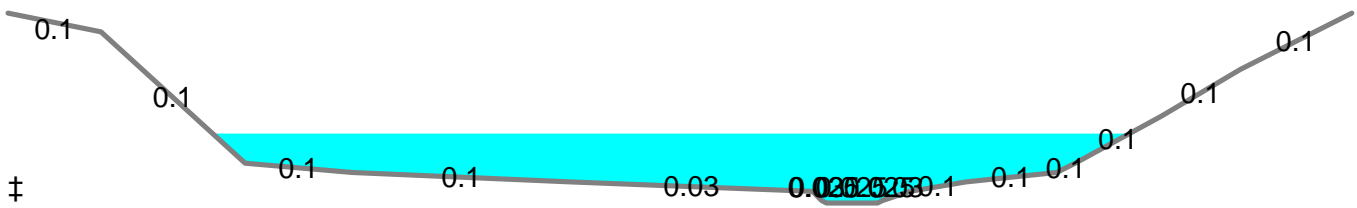
Summary for Reach 18R: Sippo Creek Channel Downstream of Lincoln Way

Inflow = 24,228.91 cfs @ 0.18 hrs, Volume= 92,049.489 af
 Outflow = 27,541.58 cfs @ 0.01 hrs, Volume= 92,051.346 af, Atten= 0%, Lag= 0.0 min

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 14.53 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 13.85 fps, Avg. Travel Time= 0.5 min

Peak Storage= 852,787 cf @ 0.01 hrs
 Average Depth at Peak Storage= 14.80'
 Defined Flood Depth= 15.00', Capacity at Flood Depth= 28,360.41 cfs
 Bank-Full Depth= 40.50', Capacity at Bank-Full= 200,707.82 cfs

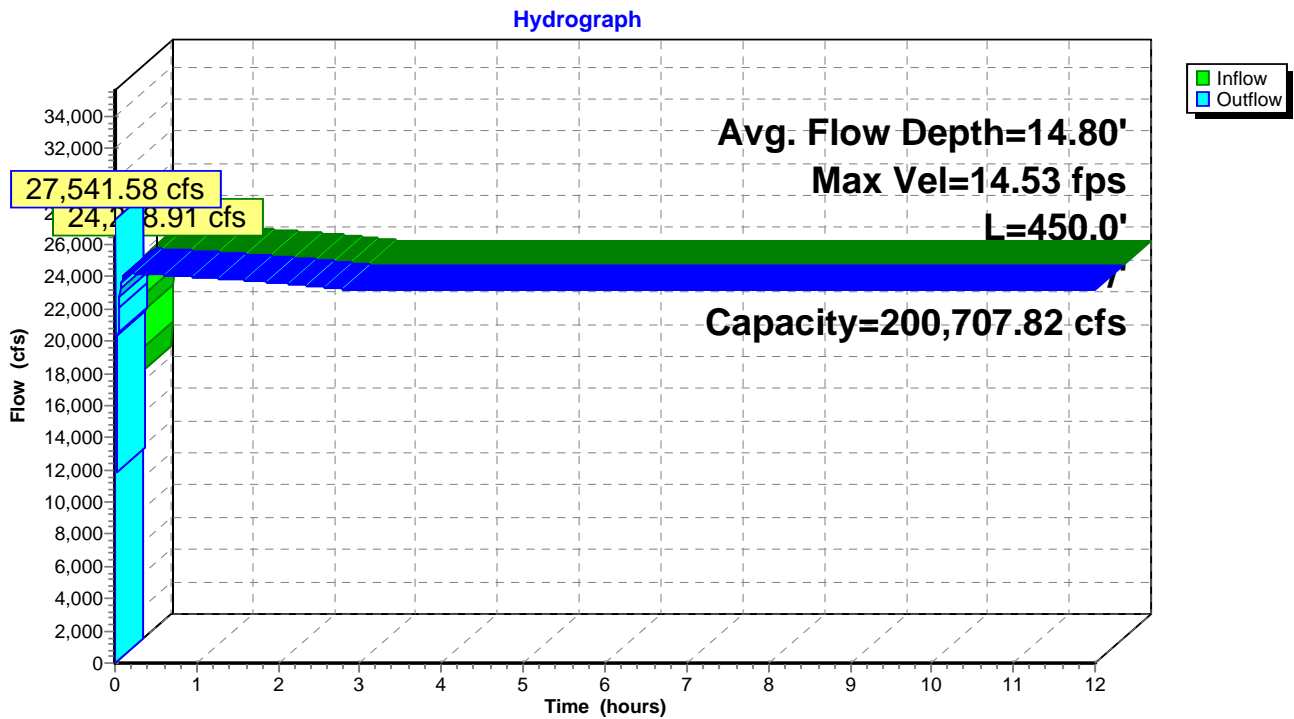
Custom cross-section, Length= 450.0' Slope= 0.0084 '/' (1006 Elevation Intervals)
 Flow calculated by Manning's Subdivision method
 Inlet Invert= 978.13', Outlet Invert= 974.35'



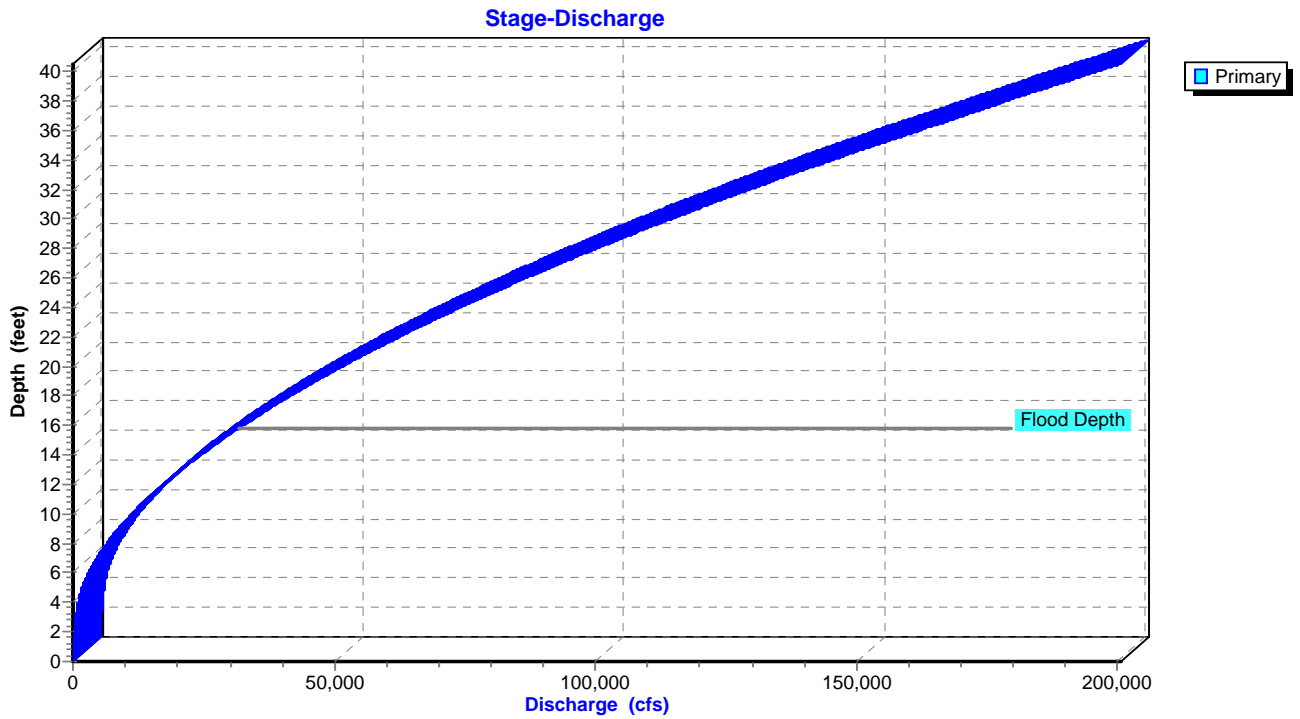
Offset (feet)	Elevation (feet)	Chan.Depth (feet)	n	Description
0.00	1,012.00	0.00		
20.00	1,008.00	4.00	0.100	Heavy timber, flow below branches
51.00	980.00	32.00	0.100	Heavy timber, flow below branches
74.00	978.00	34.00	0.100	Heavy timber, flow below branches
121.00	976.00	36.00	0.100	Heavy timber, flow below branches
173.00	974.00	38.00	0.030	Short grass
175.00	972.00	40.00	0.030	Short grass
176.00	971.50	40.50	0.025	Stream, clean & straight
187.00	971.50	40.50	0.025	Stream, clean & straight
188.00	972.00	40.00	0.025	Stream, clean & straight
194.00	974.00	38.00	0.030	Short grass
206.00	976.00	36.00	0.100	Heavy timber, flow below branches
225.50	978.00	34.00	0.100	Heavy timber, flow below branches
229.50	980.00	32.00	0.100	Heavy timber, flow below branches
248.00	990.00	22.00	0.100	Heavy timber, flow below branches
265.00	1,000.00	12.00	0.100	Heavy timber, flow below branches
289.00	1,012.00	0.00	0.100	Heavy timber, flow below branches

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	11.0	0	0.00
0.50	6.0	13.2	2,700	19.29
2.50	40.0	22.4	18,000	347.53
4.50	146.0	86.6	65,701	1,300.01
6.50	382.5	153.2	172,125	3,703.14
8.50	712.5	180.8	320,625	7,536.06
18.50	2,645.4	216.7	1,190,411	44,005.23
28.50	4,866.4	251.4	2,189,893	103,800.74
36.50	6,855.0	281.2	3,084,750	166,501.22
40.50	7,955.0	310.6	3,579,750	200,707.82

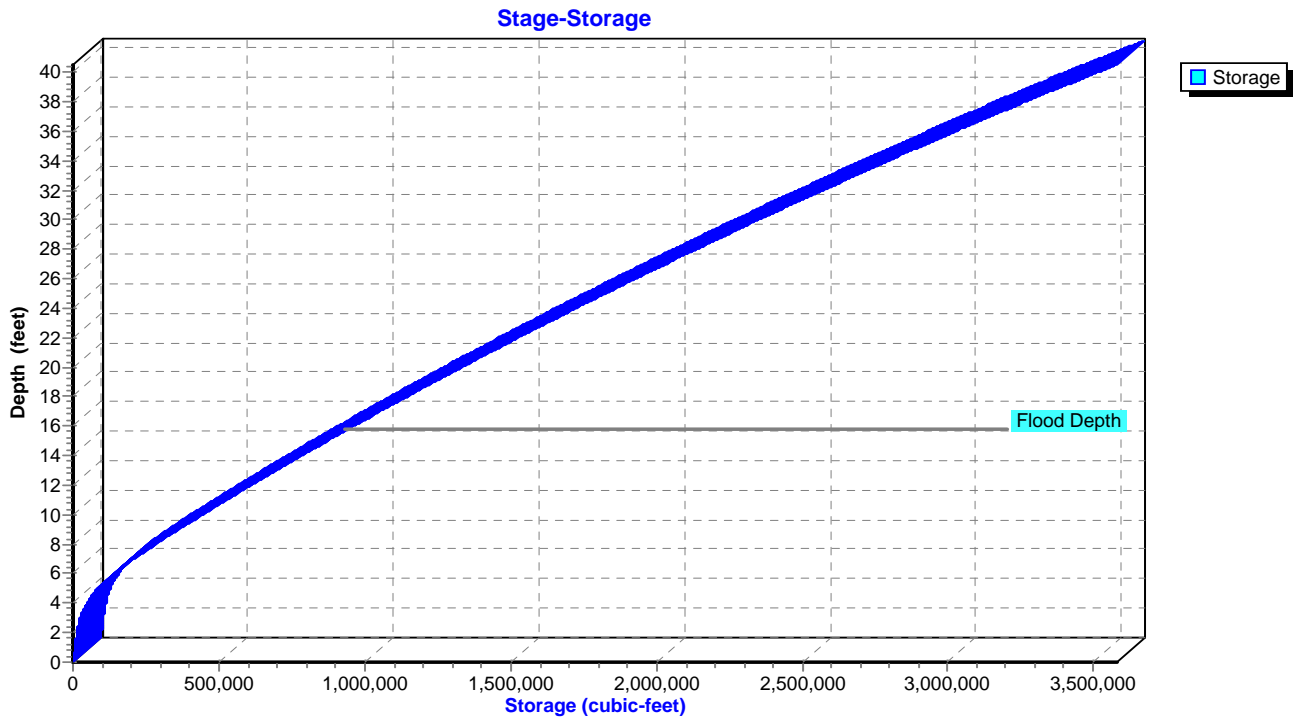
Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Reach 18R: Sippo Creek Channel Downstream of Lincoln Way



Summary for Pond 1P: Sippo Reservoir - Existing Conditions - 24hr PMF DBA

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 1,353.05 cfs @ 0.02 hrs, Volume= 146.943 af, Atten= 0%, Lag= 1.3 min
 Primary = 1,353.05 cfs @ 0.02 hrs, Volume= 146.943 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,015.62' Surf.Area= 72.915 ac Storage= 484.911 af
 Peak Elev= 1,015.62' @ 0.00 hrs Surf.Area= 72.915 ac Storage= 484.911 af
 Flood Elev= 1,008.00' Surf.Area= 21.577 ac Storage= 143.356 af

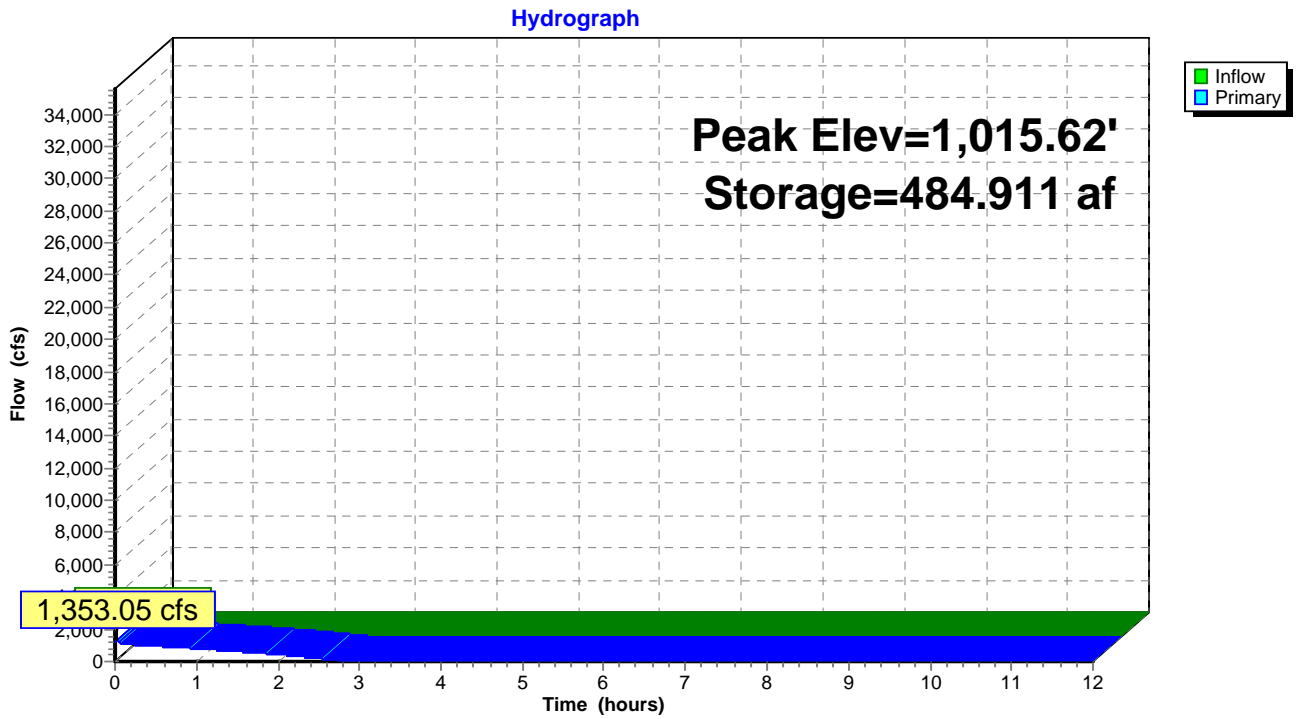
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	985.00'	1,292.544 af	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
985.00	0.500	500.0	0.000	0.000	0.500
990.00	3.000	1,000.0	7.875	7.875	1.873
998.00	4.870	2,500.0	31.179	39.054	11.469
1,000.00	6.204	3,251.0	11.047	50.101	19.360
1,002.00	7.243	5,147.0	13.434	63.535	48.449
1,004.00	9.610	10,274.0	16.797	80.332	192.887
1,006.00	16.124	11,202.9	25.455	105.787	229.335
1,008.00	21.577	15,736.9	37.569	143.356	452.477
1,010.00	29.674	20,301.4	51.036	194.392	752.988
1,012.00	39.539	22,845.5	68.977	263.369	953.524
1,014.00	68.669	34,370.5	106.876	370.246	2,158.174
1,025.00	100.000	50,000.0	922.298	1,292.544	4,567.204

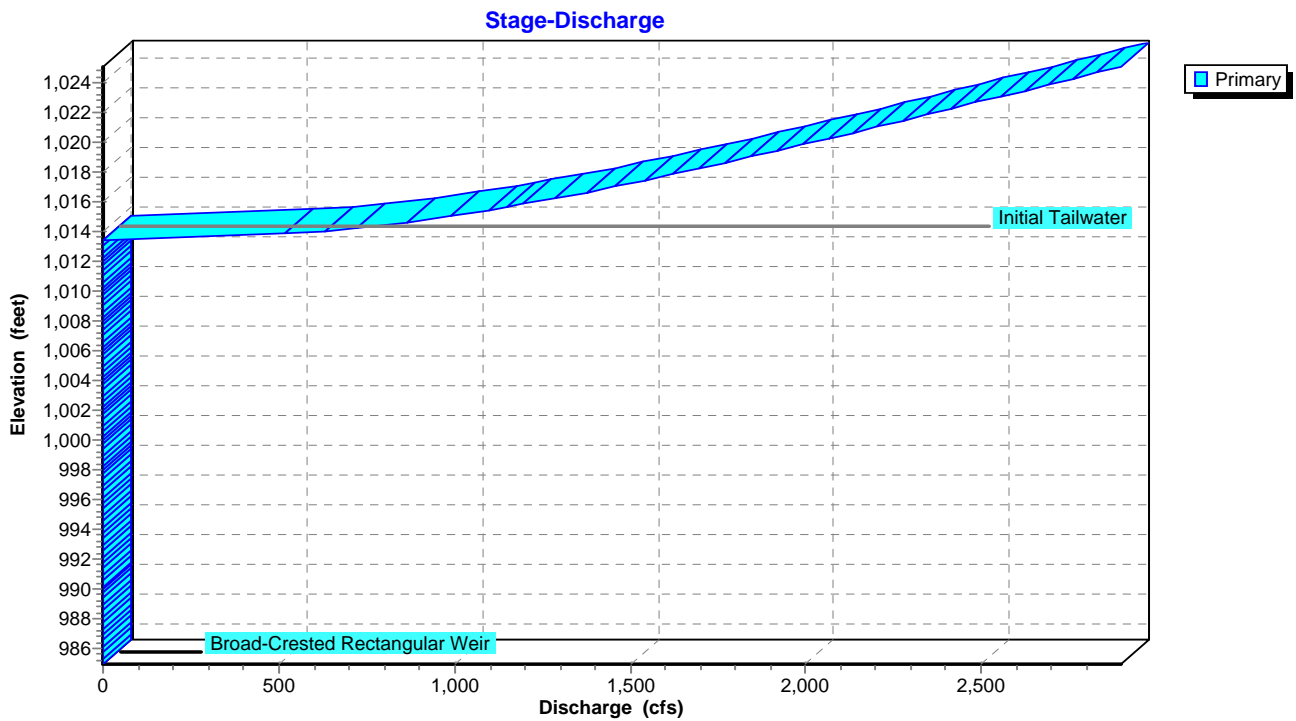
Device	Routing	Invert	Outlet Devices									
#1	Primary	985.00'	6.2' long x 50.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	20.00
			Coef. (English)	2.68	2.70	2.70	2.64	2.63	2.64	2.64	2.63	2.63

Primary OutFlow Max=1,267.39 cfs @ 0.02 hrs HW=1,015.59' TW=1,012.82' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 1,267.39 cfs @ 6.68 fps)

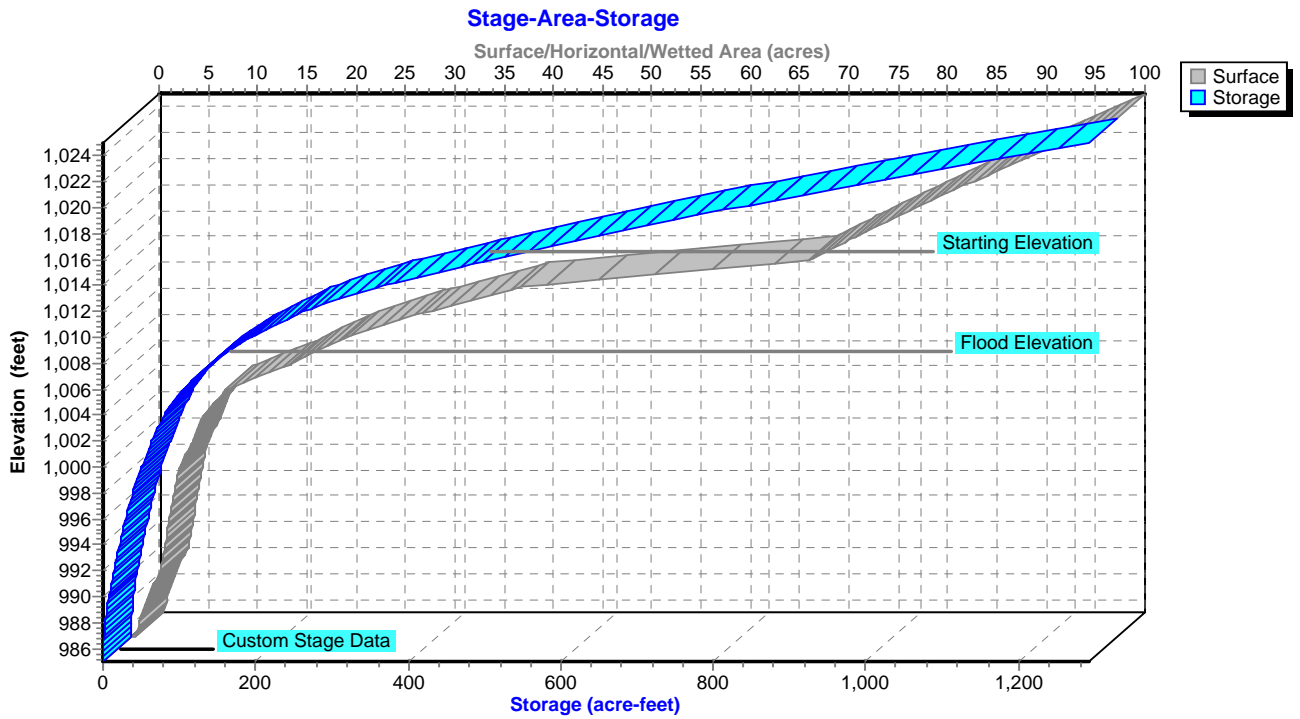
Pond 1P: Sippo Reservoir - Existing Conditions - 24hr PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 24hr PMF DBA



Pond 1P: Sippo Reservoir - Existing Conditions - 24hr PMF DBA



Summary for Pond 16P: North Sippo Park- Lincoln Way Culvert

Inflow = 24,517.05 cfs @ 0.02 hrs, Volume= 92,049.776 af
 Outflow = 24,228.91 cfs @ 0.18 hrs, Volume= 92,068.639 af, Atten= 1%, Lag= 9.7 min
 Primary = 3,837.70 cfs @ 0.00 hrs, Volume= 12,719.310 af
 Secondary = 21,032.72 cfs @ 0.18 hrs, Volume= 79,349.329 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Starting Elev= 1,013.48' Surf.Area= 17.060 ac Storage= 278.949 af
 Peak Elev= 1,013.65' @ 0.18 hrs Surf.Area= 17.227 ac Storage= 281.851 af (2.902 af above start)
 Flood Elev= 1,008.00' Surf.Area= 13.465 ac Storage= 197.028 af

Plug-Flow detention time= 8.7 min calculated for 91,789.690 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (1,438.1 - 1,437.8)

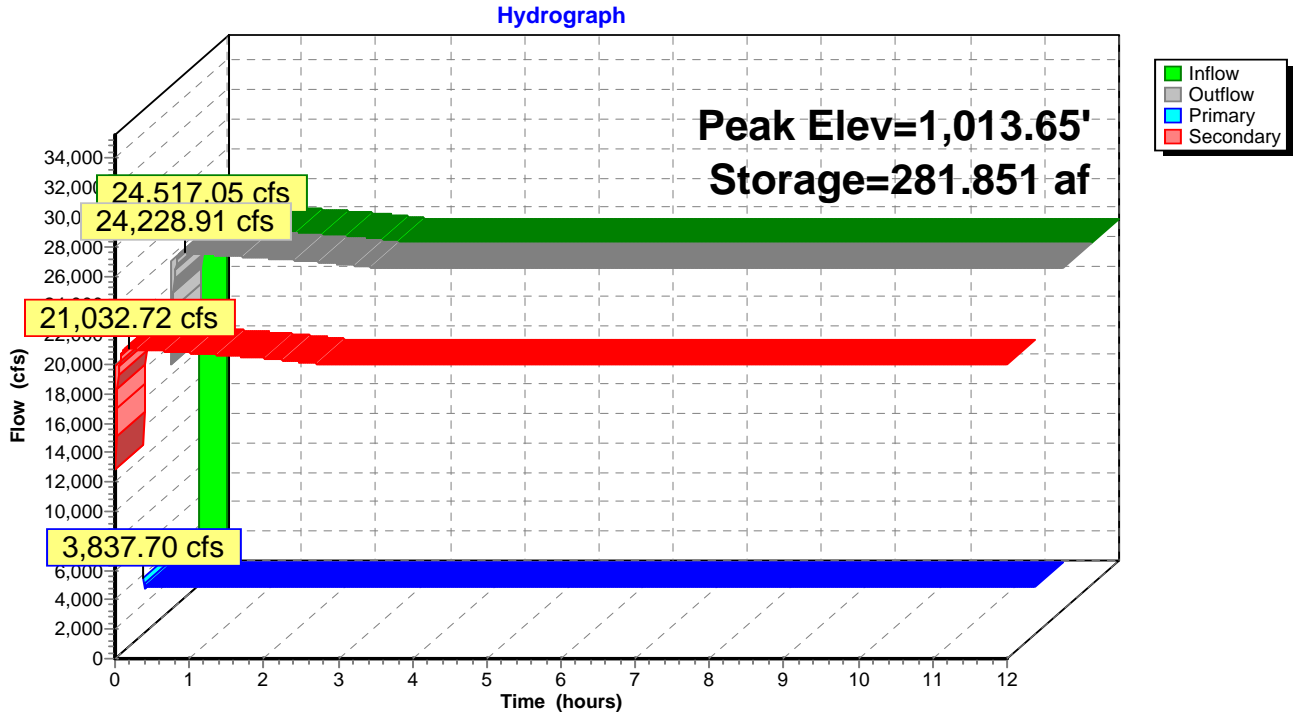
Volume	Invert	Avail.Storage	Storage Description		
#1	978.00'	371.368 af	Stage Storage in Sippo Park (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (acres)	Perim. (feet)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
978.00	0.100	200.0	0.000	0.000	0.100
981.00	0.300	500.0	0.573	0.573	0.484
982.00	0.659	1,392.9	0.468	1.041	3.572
984.00	2.018	2,470.7	2.553	3.595	11.180
986.00	3.584	3,300.7	5.528	9.122	19.932
988.00	5.007	3,247.5	8.551	17.674	20.586
990.00	6.111	3,143.9	11.100	28.773	21.805
992.00	6.773	3,217.1	12.878	41.652	22.668
994.00	7.411	3,271.9	14.179	55.831	23.334
996.00	8.110	3,253.8	15.516	71.347	23.597
998.00	8.804	3,273.8	16.909	88.256	23.878
1,000.00	9.441	3,318.6	18.241	106.497	24.439
1,002.00	10.181	3,437.0	19.617	126.114	25.908
1,004.00	11.109	3,548.6	21.283	147.398	27.341
1,006.00	12.538	3,553.4	23.633	171.030	27.516
1,008.00	13.465	3,829.8	25.997	197.028	31.248
1,010.00	14.326	4,085.3	27.787	224.814	34.947
1,012.00	15.633	4,329.5	29.949	254.764	38.706
1,014.00	17.576	4,742.6	33.190	287.954	45.555
1,016.00	20.521	5,940.5	38.059	326.013	68.935
1,018.00	24.905	6,310.6	45.355	371.368	77.223

Device	Routing	Invert	Outlet Devices
#1	Primary	978.25'	168.0" W x 98.0" H Box Box Culvert L= 121.8' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 978.25' / 978.13' S= 0.0010 '/ Cc= 0.900 n= 0.015 Brickwork
#2	Secondary	1,008.00'	Linclon Way (172), Cv= 2.62 (C= 3.28) Head (feet) 0.00 1.00 2.00 4.00 6.00 8.00 10.00 Width (feet) 233.00 373.00 475.00 630.00 790.00 940.00 1,090.00

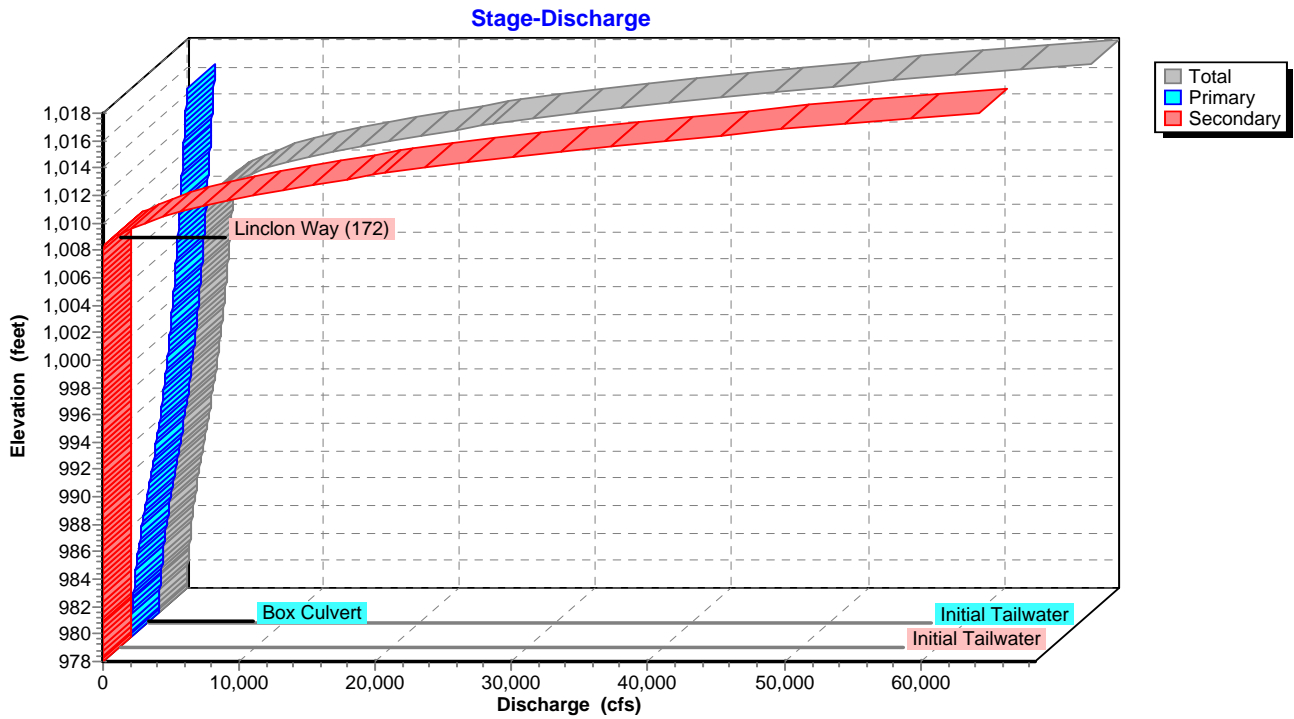
Primary OutFlow Max=3,837.70 cfs @ 0.00 hrs HW=1,013.48' TW=978.13' (Dynamic Tailwater)
 ↳1=Box Culvert (Inlet Controls 3,837.70 cfs @ 33.57 fps)

Secondary OutFlow Max=21,032.64 cfs @ 0.18 hrs HW=1,013.65' TW=992.08' (Dynamic Tailwater)
 ↳2=Linclon Way (172) (Weir Controls 21,032.64 cfs @ 7.06 fps)

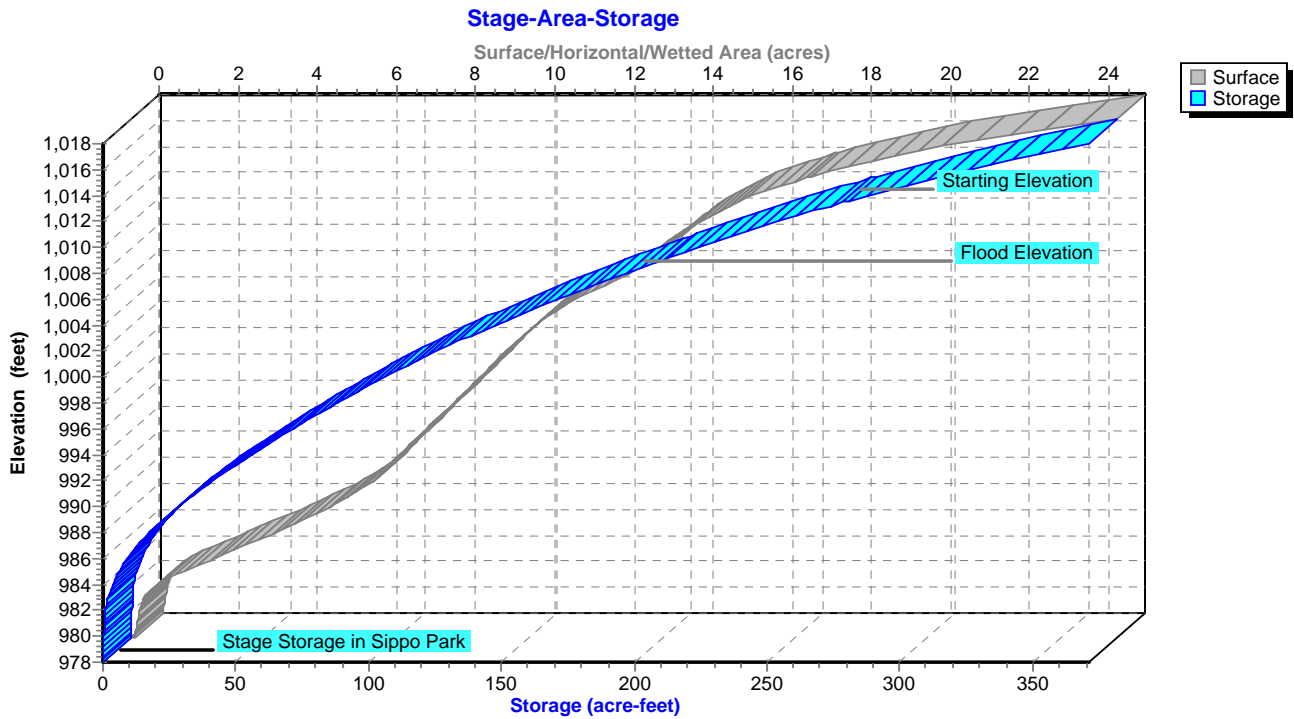
Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Pond 16P: North Sippo Park- Lincoln Way Culvert



Summary for Pond 32P: Constant inflow - 24 hr PMF

Inflow = 9,000.00 cfs @ 0.00 hrs, Volume= 35,702.479 af, Incl. 9,000.00 cfs Base Flow
 Outflow = 9,000.00 cfs @ 1.34 hrs, Volume= 35,702.479 af, Atten= 0%, Lag= 80.3 min
 Primary = 9,000.00 cfs @ 1.34 hrs, Volume= 35,702.479 af

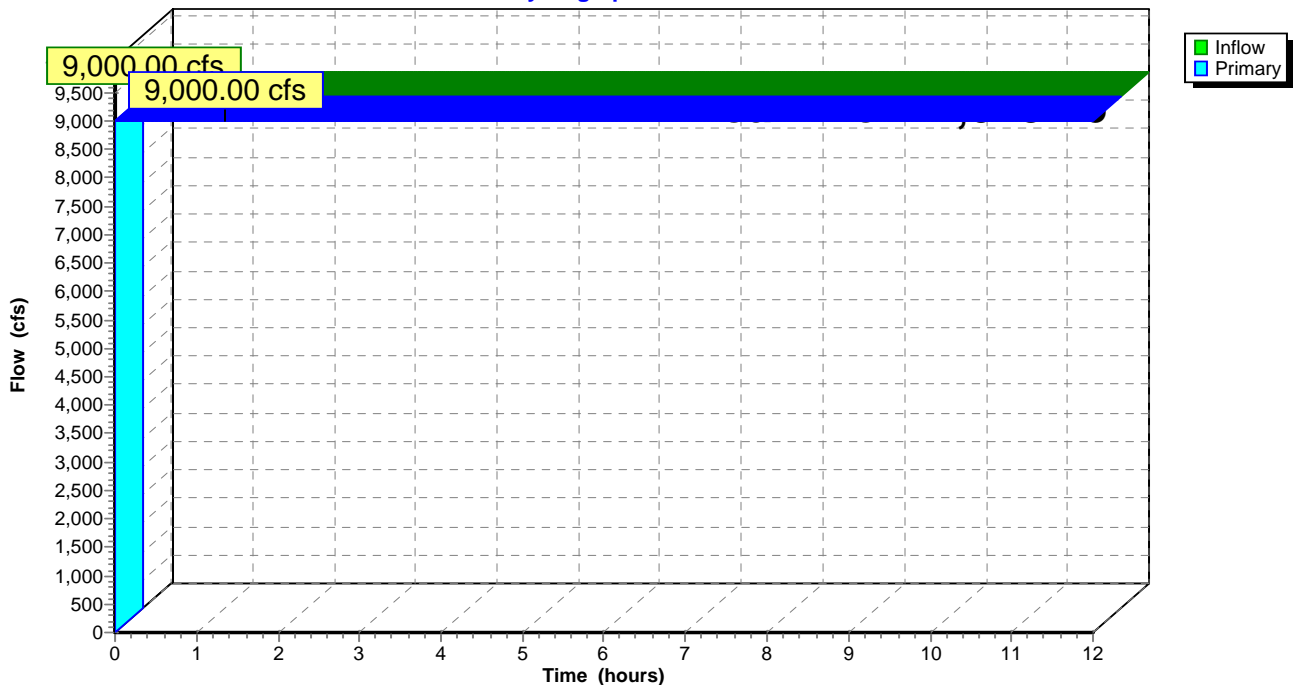
Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,013.76' @ 0.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

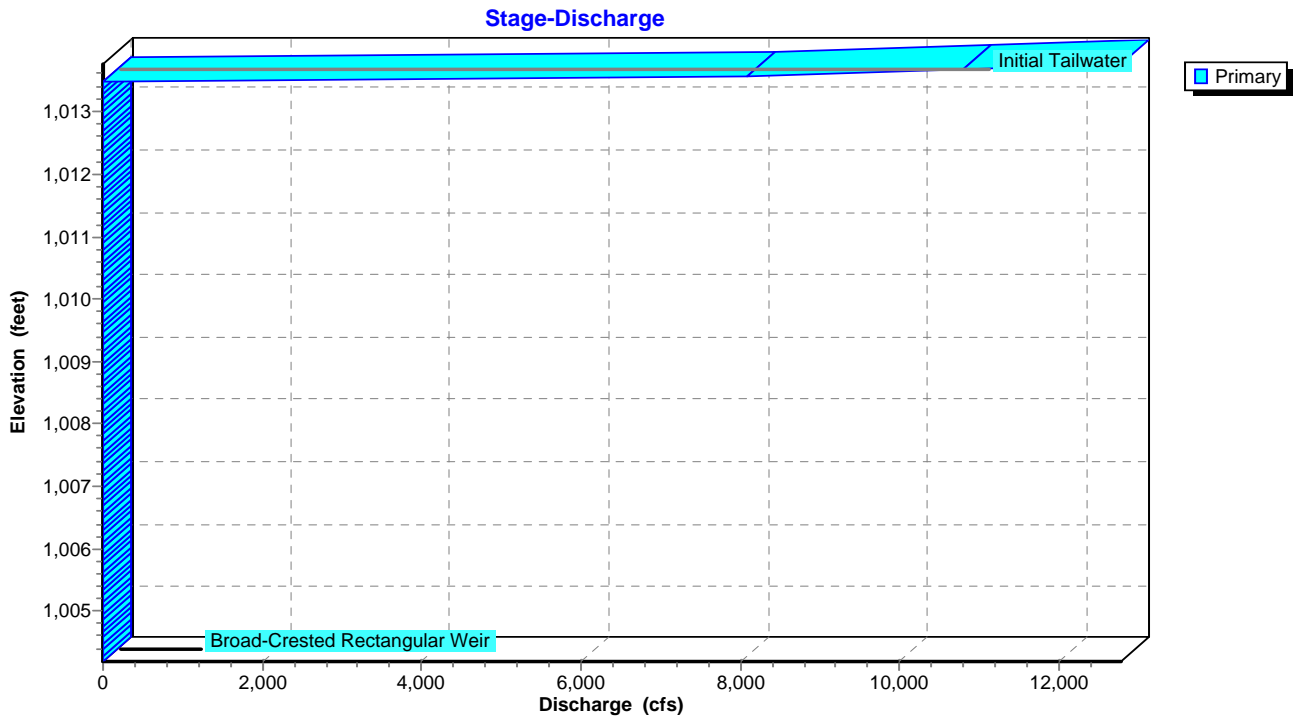
Primary OutFlow Max=9,014.74 cfs @ 1.34 hrs HW=1,013.71' TW=1,013.60' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 9,014.74 cfs @ 1.90 fps)

Pond 32P: Constant inflow - 24 hr PMF

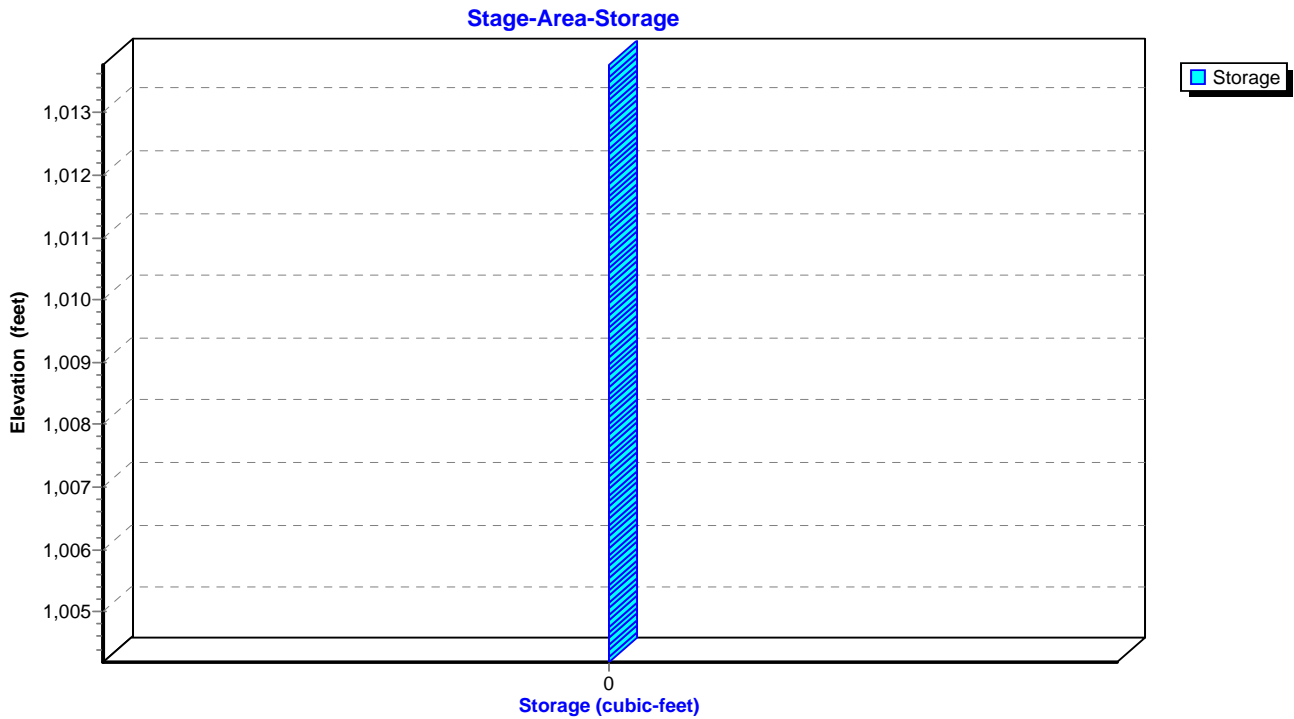
Hydrograph



Pond 32P: Constant inflow - 24 hr PMF



Pond 32P: Constant inflow - 24 hr PMF



Summary for Pond 33P: Constant inflow - 24 hr PMF

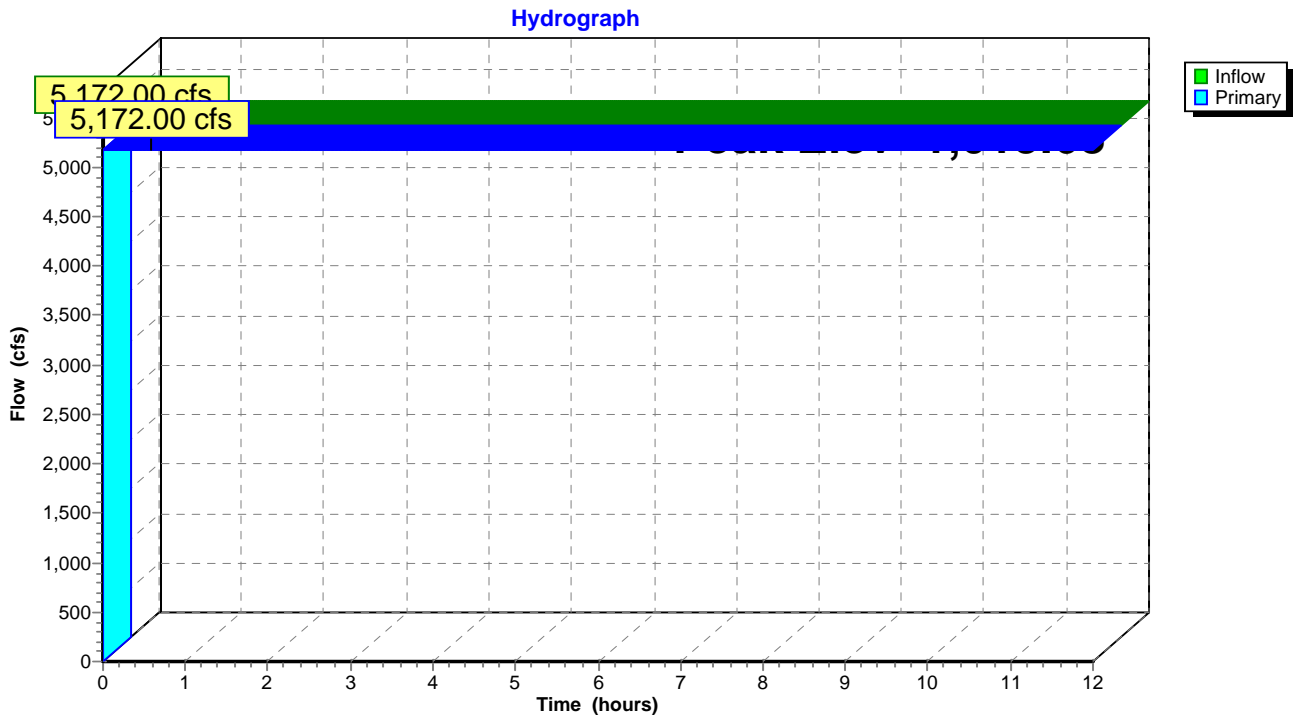
Inflow = 5,172.00 cfs @ 0.00 hrs, Volume= 20,517.025 af, Incl. 5,172.00 cfs Base Flow
 Outflow = 5,172.00 cfs @ 0.57 hrs, Volume= 20,517.025 af, Atten= 0%, Lag= 34.5 min
 Primary = 5,172.00 cfs @ 0.57 hrs, Volume= 20,517.025 af

Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,013.68' @ 0.19 hrs

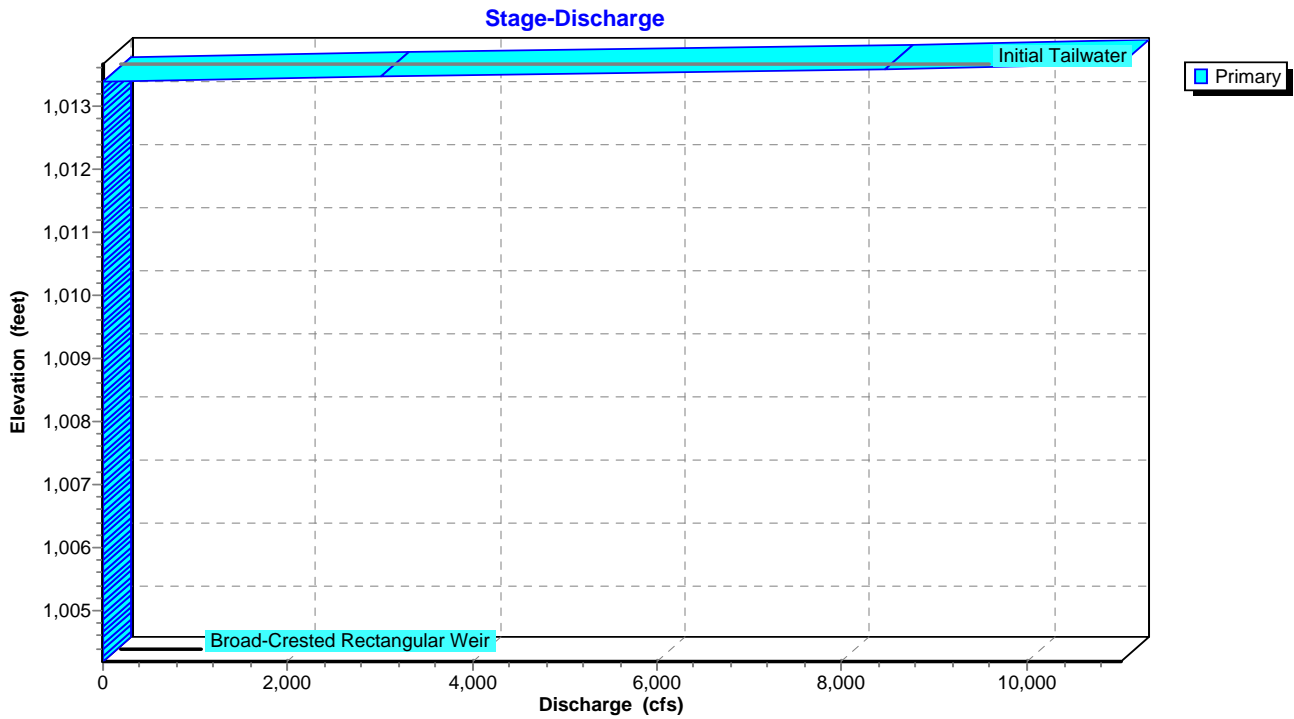
Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=5,204.86 cfs @ 0.57 hrs HW=1,013.66' TW=1,013.63' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 5,204.86 cfs @ 1.10 fps)

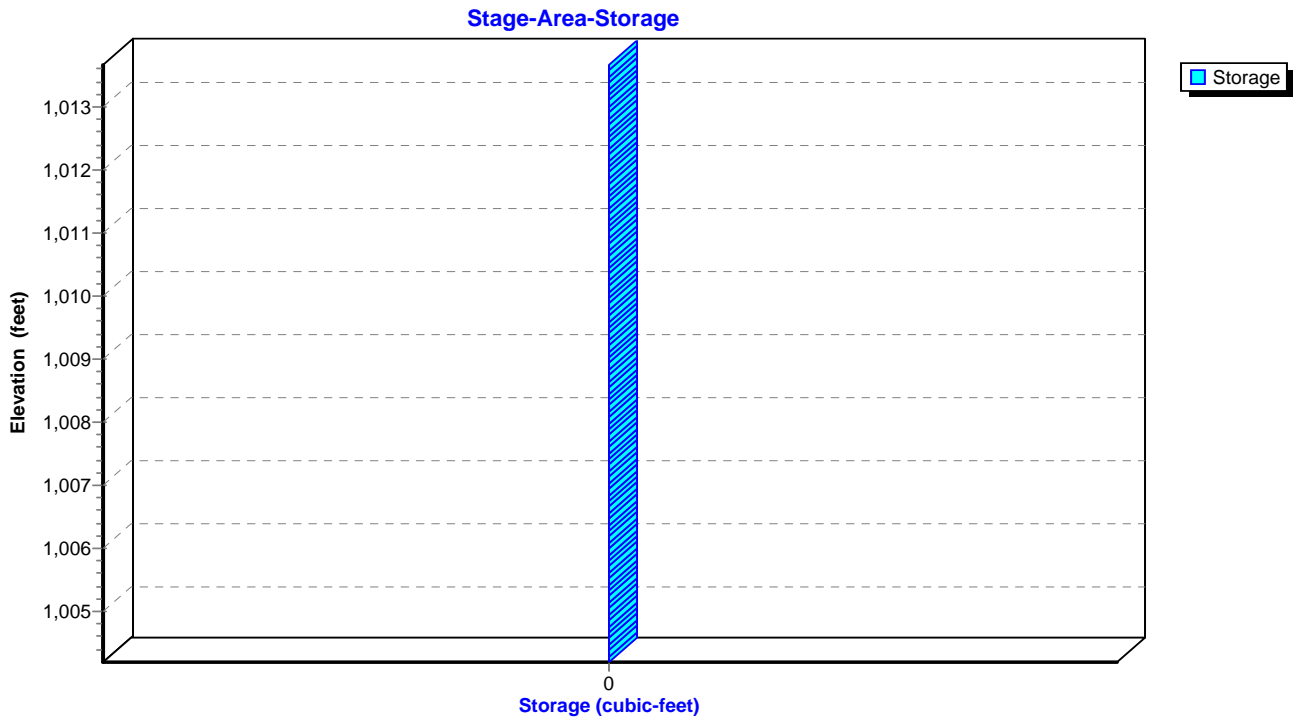
Pond 33P: Constant inflow - 24 hr PMF



Pond 33P: Constant inflow - 24 hr PMF



Pond 33P: Constant inflow - 24 hr PMF



Summary for Pond 34P: Constant inflow - 24 hr PMF

Inflow = 9,000.00 cfs @ 0.00 hrs, Volume= 35,702.479 af, Incl. 9,000.00 cfs Base Flow
 Outflow = 9,000.00 cfs @ 1.34 hrs, Volume= 35,702.479 af, Atten= 0%, Lag= 80.3 min
 Primary = 9,000.00 cfs @ 1.34 hrs, Volume= 35,702.479 af

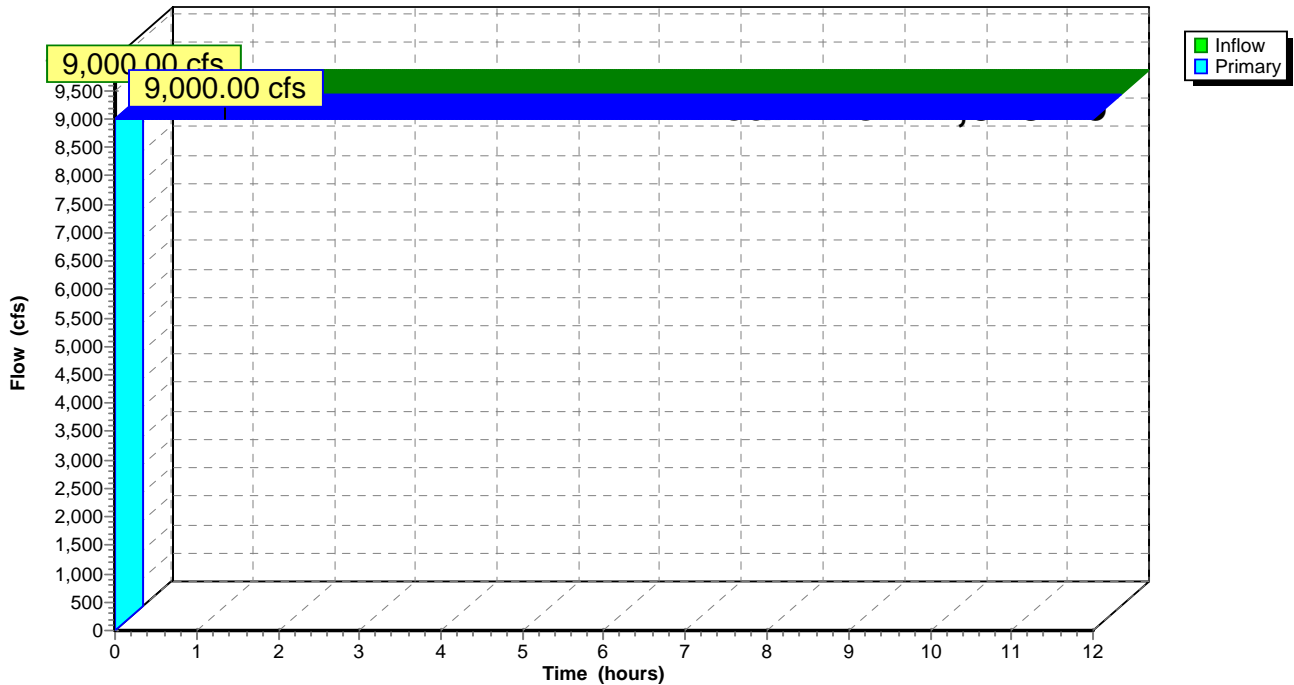
Routing by Sim-Route method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,013.76' @ 0.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1,004.20'	500.0' long x 5.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

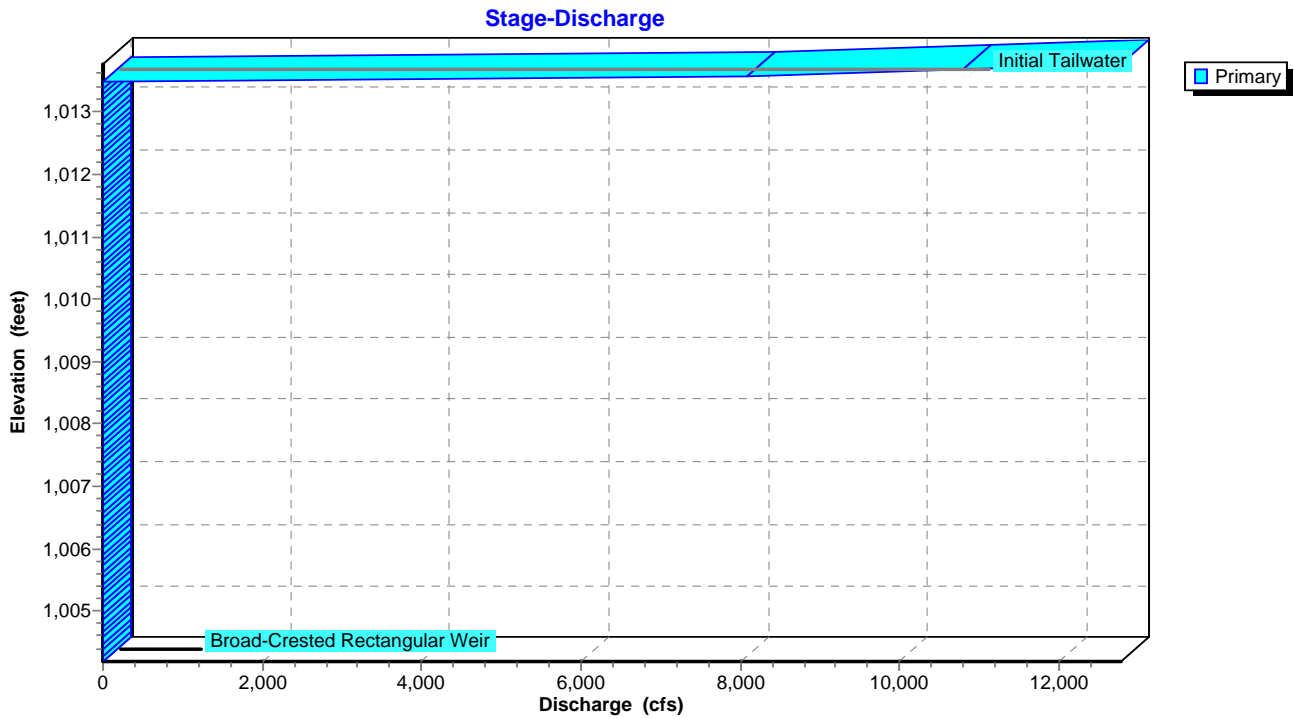
Primary OutFlow Max=9,014.74 cfs @ 1.34 hrs HW=1,013.71' TW=1,013.60' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 9,014.74 cfs @ 1.90 fps)

Pond 34P: Constant inflow - 24 hr PMF

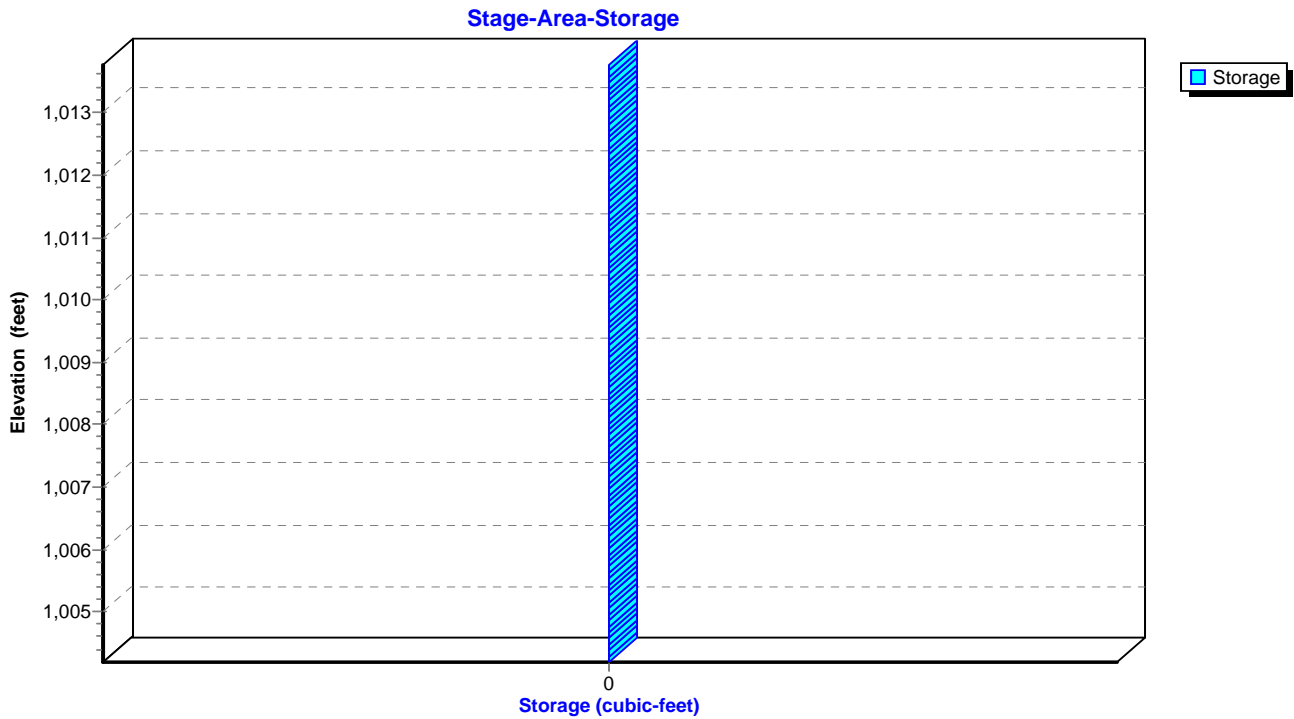
Hydrograph



Pond 34P: Constant inflow - 24 hr PMF



Pond 34P: Constant inflow - 24 hr PMF



Appendix 4
Information Sheets
(Lincoln Way Culvert and Sippo
Pressure Conduit)

49

PE

U.S. 30
Massillon

8

59'9"

Stone & Concrete
Arch.

BRIDGE NO.

TOWNSHIP

ROAD NO.

SECTION

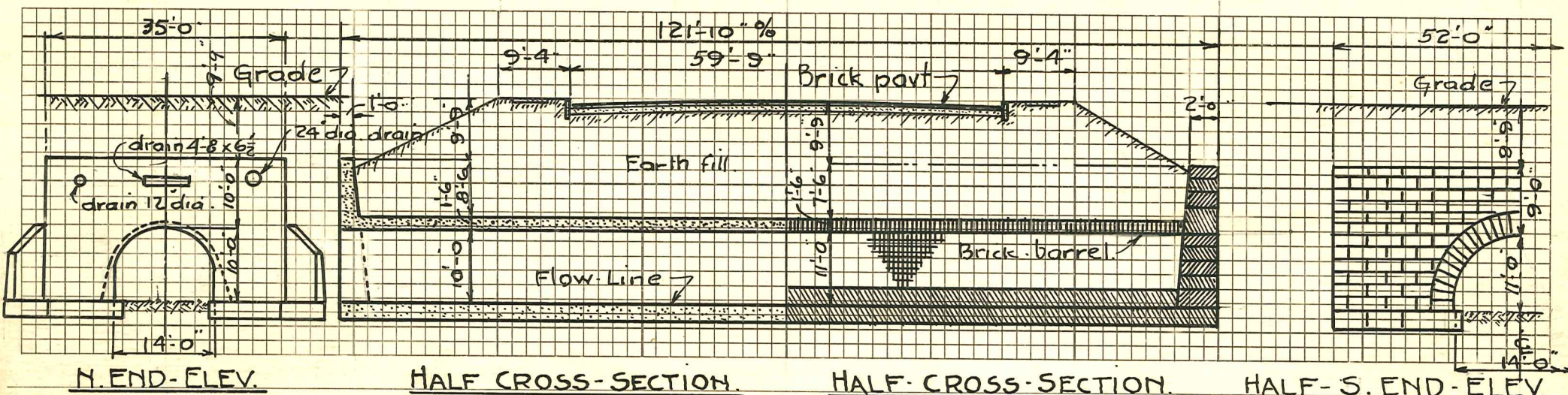
H10 H12 H15 H20
STRENGTH

15-18 19-22 23+
ROADWAY

12- 12-14 14+ OPEN
CLEARANCE

A B G S T
TYPE

SKETCH OF STRUCTURE SHOWING DIMENSIONS



N. END - ELEV.

HALF CROSS-SECTION.

HALF CROSS-SECTION.

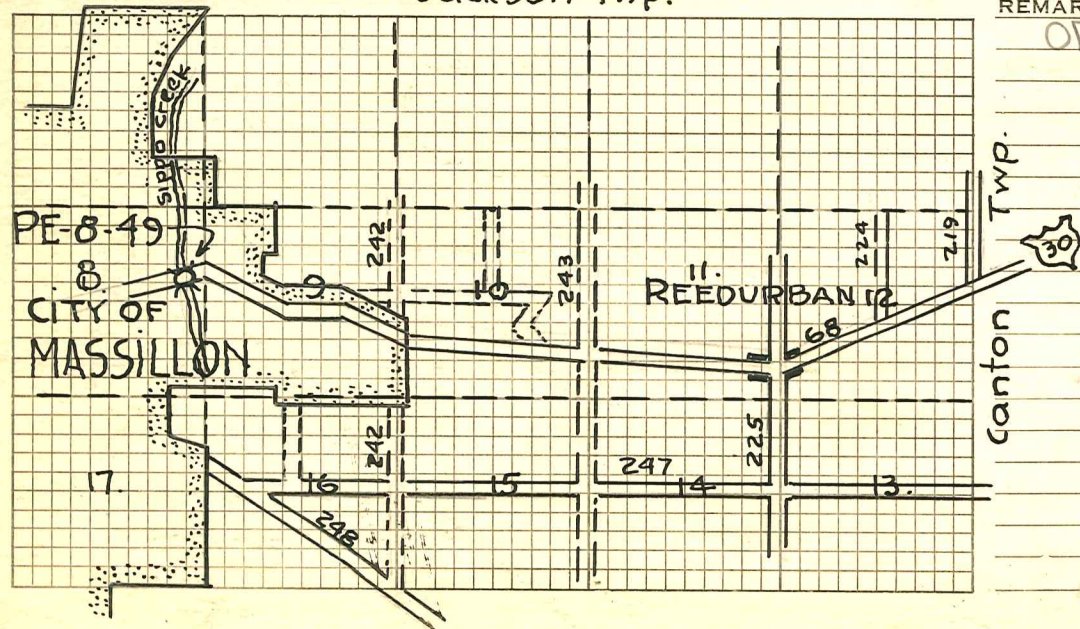
HALF - S. END - ELEV.

(Showing Typical design of
new Concrete part at N. end)

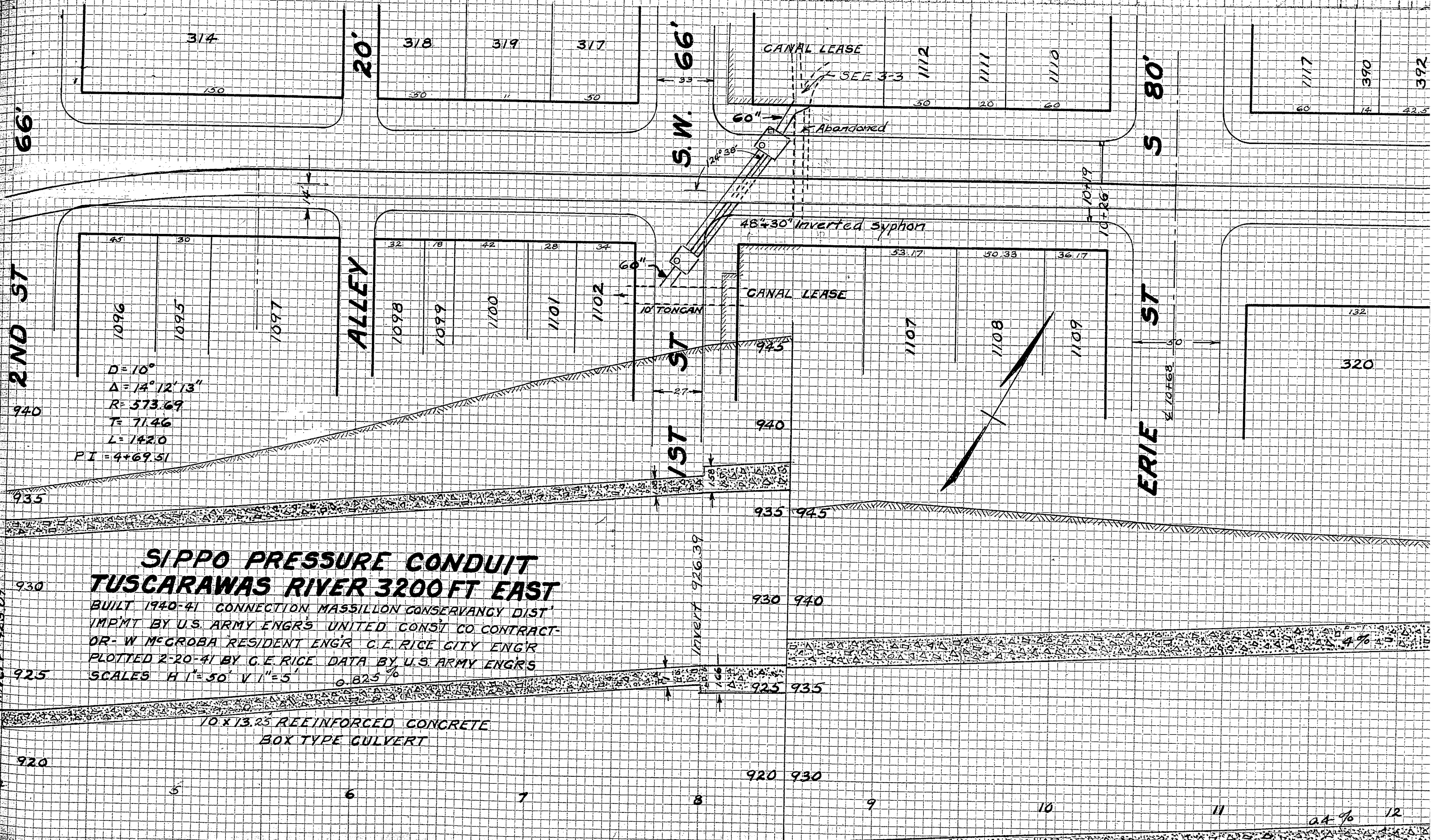
(Showing Typical design of
Original Structure)

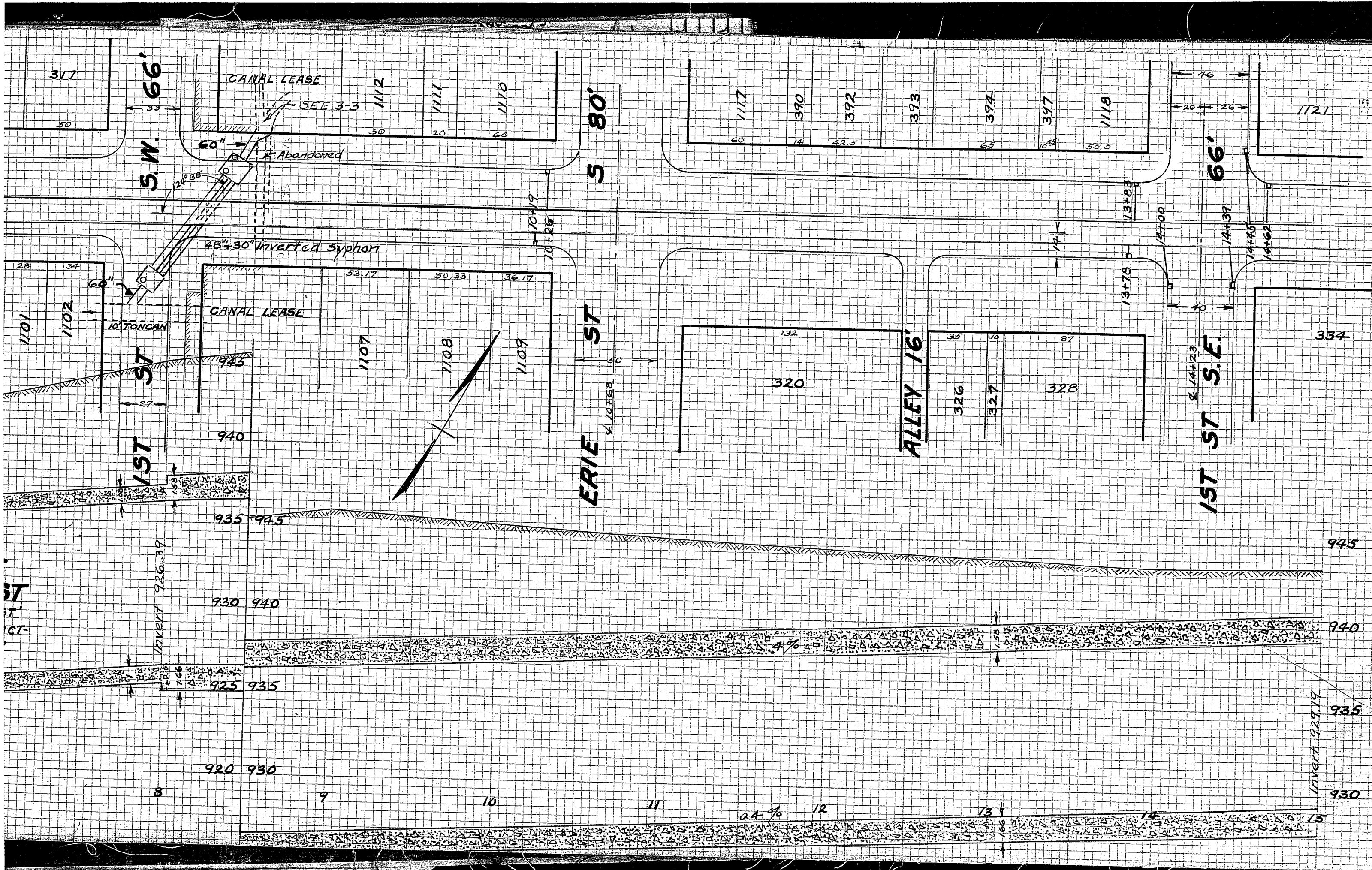
LOCATION SKETCH

Jackson Twp.



REMARKS Arch in good condition. 3-25-1954
ODOT Inspected





317

S.W. 66'

CANAL LEASE

SEE 3-3

1112

1111

1110

S 80'

1117

390

392

393

394

397

1118

1121

66'

1st ST

48\"

CANAL LEASE

10' TONGAN

1107

1108

1109

ERIE ST

ALLEY 16'

1st ST S.E.

334

ST
ST
CT-

INVERT 926.39

935 945

930 940

925 935

920 930

945

940

935

930

INVERT 929.19

8

9

10

11

0.4%

12

13

14

15

FACTORY ST.

TREMONT ST S.E. 80°

ALLEY 20'

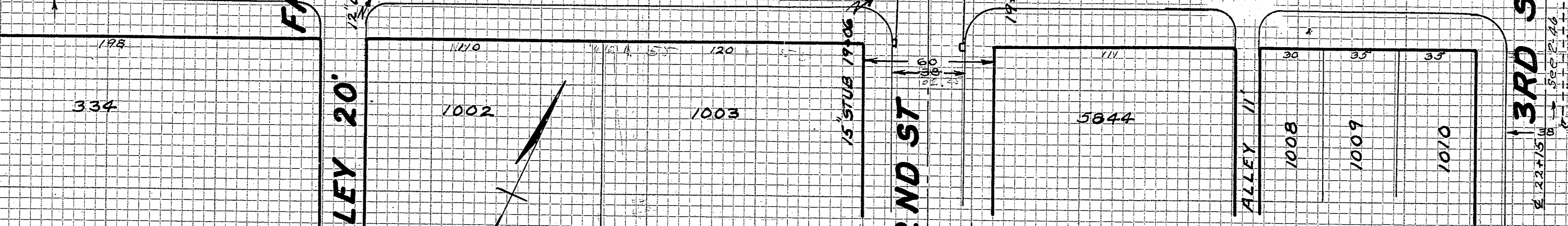
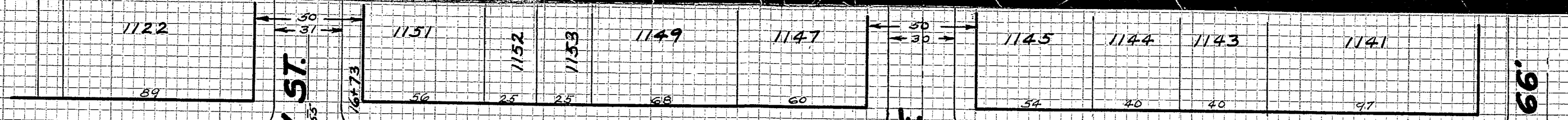
2ND ST

3RD ST S.E. 66'

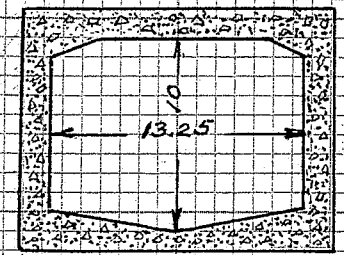
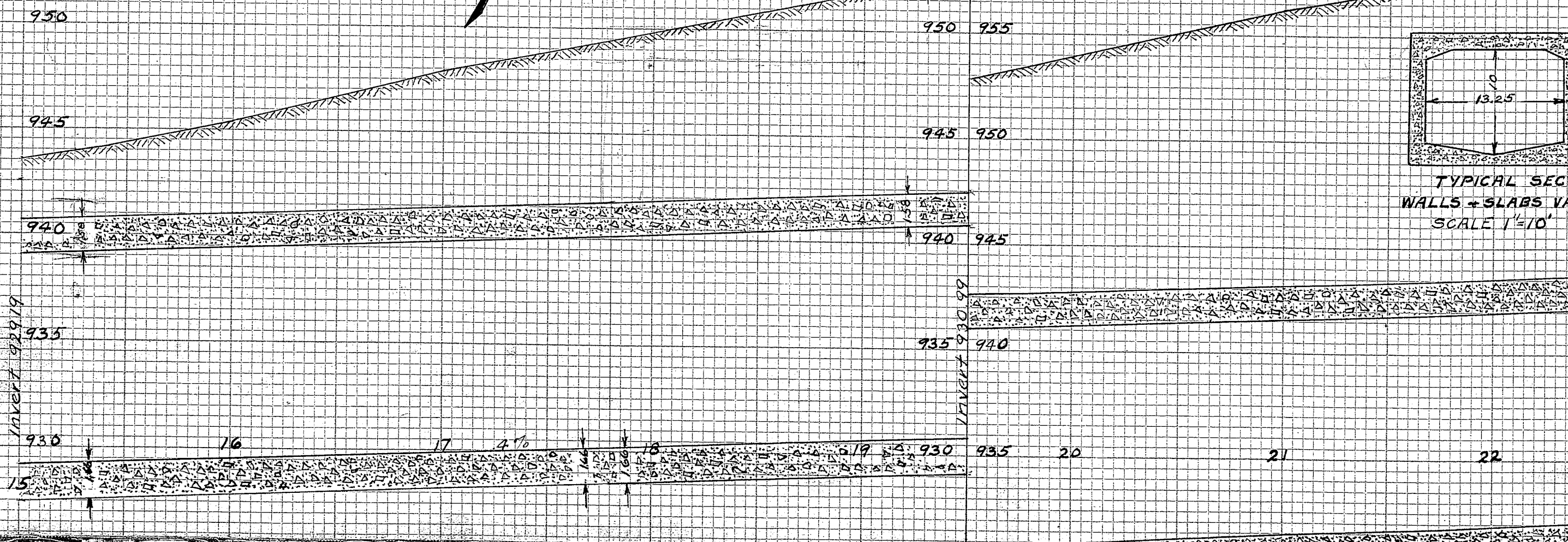
12" BLIND STUBS 16+73

15" STUB 19+06

12" LINE CONNECTS TO DROP #14+23



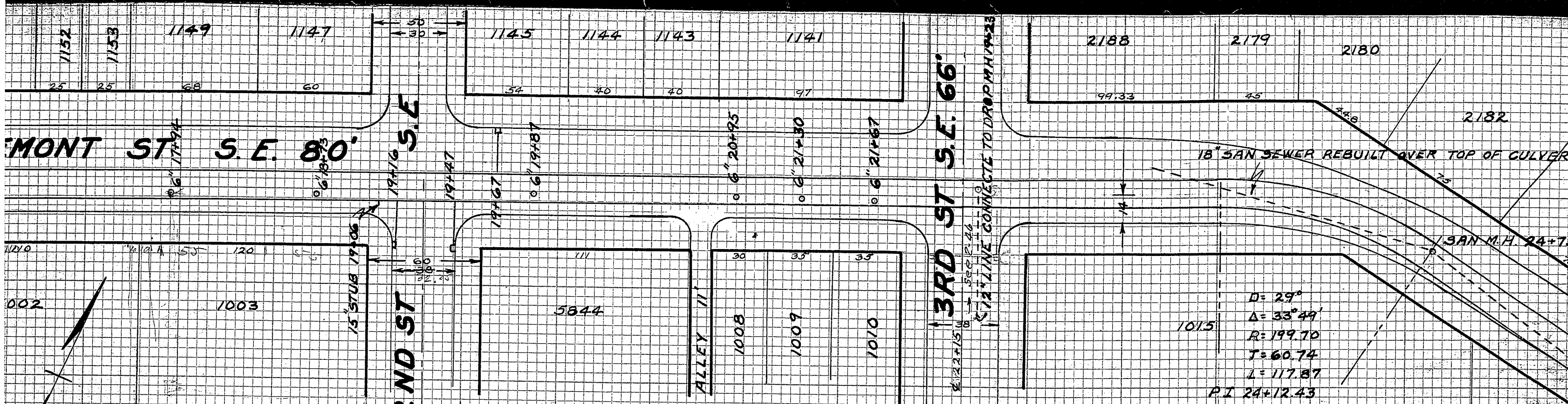
NOTE ALL 6" ROOF DRAIN STUBS 4.37' SOUTH OF 1/2 CONDUIT



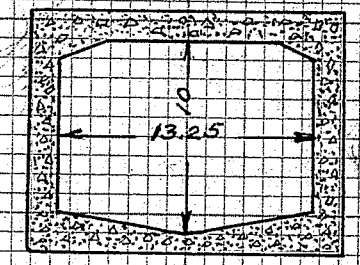
TYPICAL SECTION WALLS + SLABS VARIABLE SCALE 1"=10'

Invert 929.19

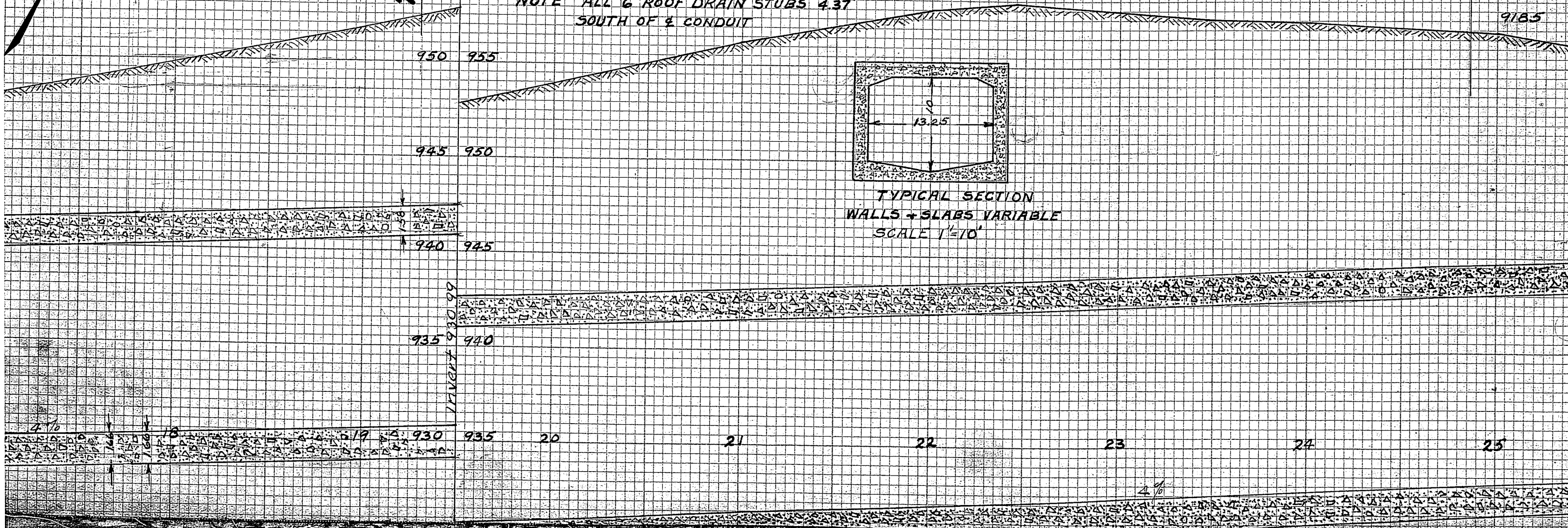
66' O.B. 1421.1



NOTE ALL 6" ROOF DRAIN STUBS 4.37'
SOUTH OF & CONDUIT



TYPICAL SECTION
WALLS + SLABS VARIABLE
SCALE 1"=10'



2183 2184 2185 2186 2187

O.L. 62

D= 40° 20'
Δ= 15° 38'
R= 145.70
T= 20.00
L= 39.74

5357

P.I. 29+97.96

SAN OFF-SET M.H. 26+66

9493

SR 2-50

5358

9185 9186 9187

9192

9193

9194

9195

9196

9197

9198

W.I. PIPE RAILING

CONCRETE WALL

TREMONT AVE. S.E. 60'

PEARL AVE S.E. 50'

M.H. 0+00

160

155

150

145

140

137
CONC
VISOR
H. P/I
134-4
147-2

26

27

28

ROR

INVERT 935.38 30+27.38

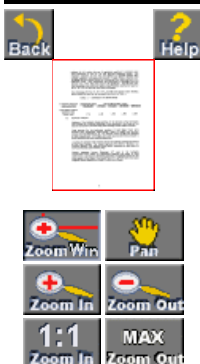
30+67.88

10'R

30

INVERT 935.38

Appendix 5
Federal Emergency Management
Agency – Flood Insurance Study
Information



Bulletin No. 45, involve the use of regression equations to calculate peak flood discharges for the 10-, 50- and 100-year frequency events. The regression equations for this area are based on a regional analysis using multiple regression techniques and at least 10 years of data obtained from 14 gaging stations located within the Tuscarawas River Basin upstream from Stillwater Creek. They incorporate the parameters of drainage area and channel slope, which had been found to be significant. The 500-year peak flood discharges were estimated using a log-probability distribution based on the 2-, 10-, 50- and 100-year peak flood discharges.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
EAST SIPPO CREEK Upstream from Culvert Inlet	17.8	1,100	1,700	1,980	2,650

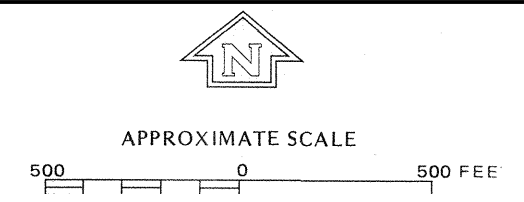
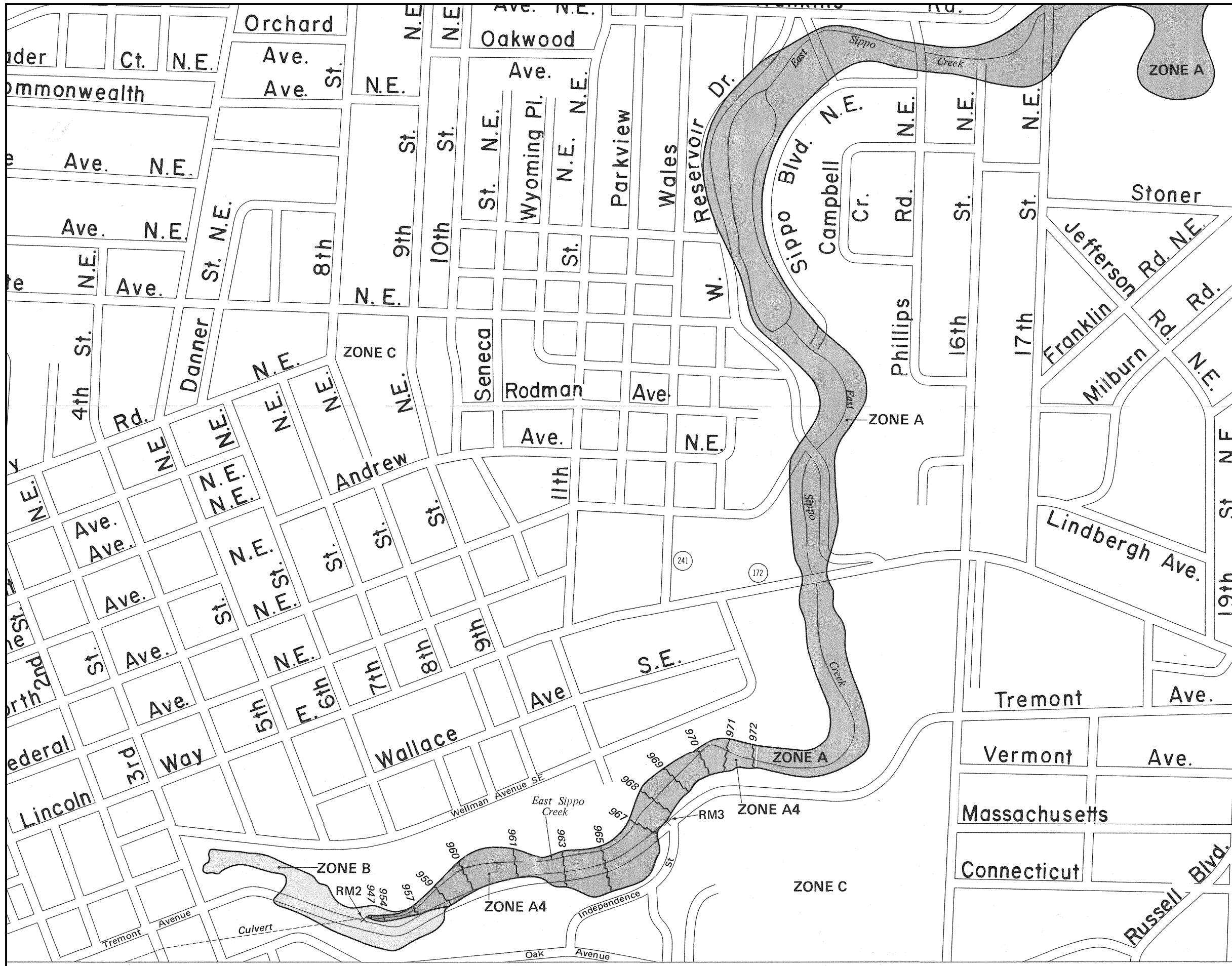
3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

Cross sections for the backwater analyses of East Sippo Creek were obtained from topographic maps having a scale of 1:2400 with two-foot contour intervals (Reference 12). The channel bottom profile was obtained by field measurement. All bridges, dams and culverts were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the streams and flood plain areas. Roughness factors for the main channel of East Sippo Creek range from 0.011 to 0.050 with flood plain roughness values ranging from 0.060 to 0.100 for all floods.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
MASSILLON,
OHIO
STARK COUNTY

PANEL 2 OF 5

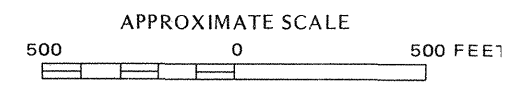
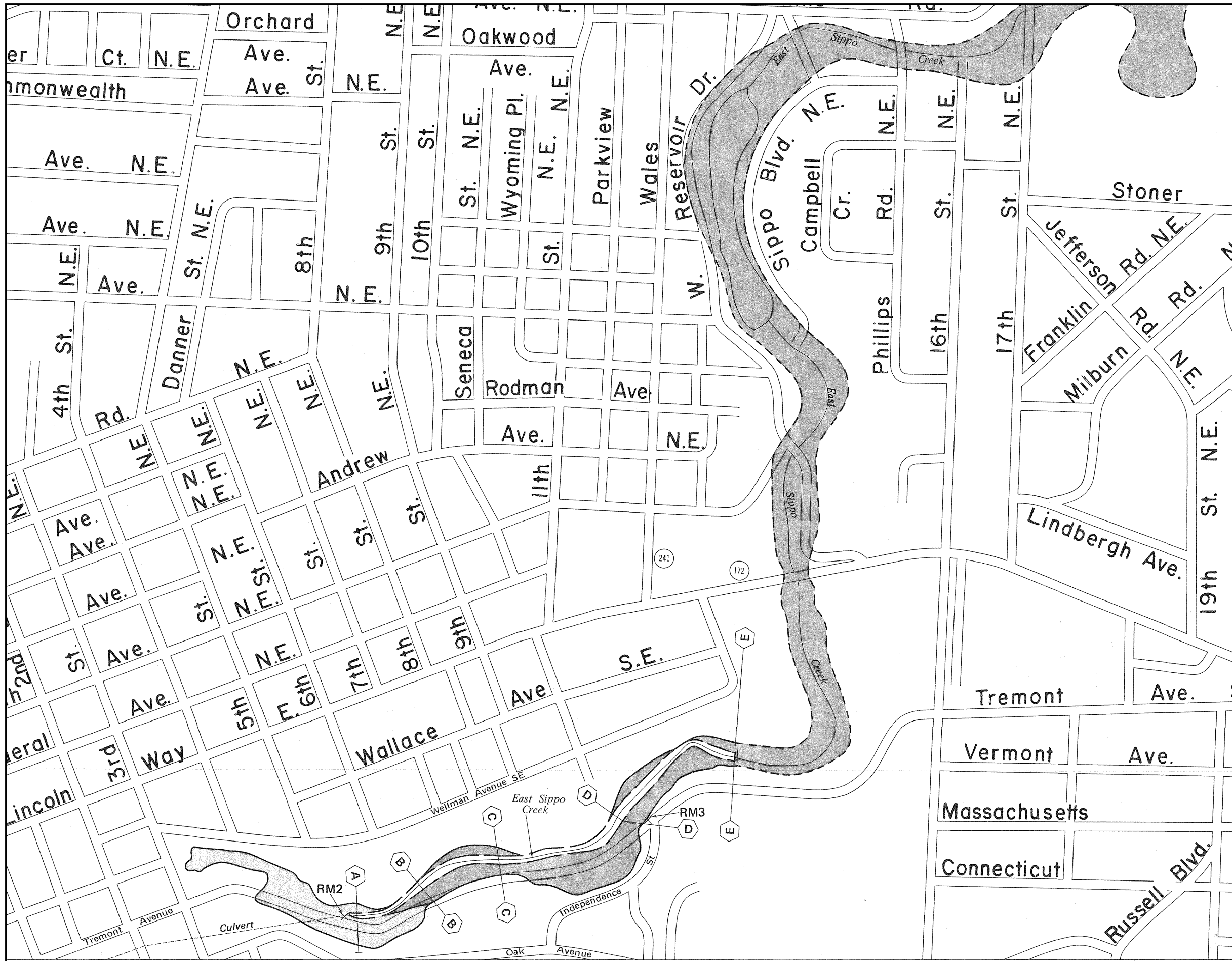
COMMUNITY-PANEL NUMBER
390517 0002 C

EFFECTIVE DATE:
JULY 5, 1982



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY
FLOOD BOUNDARY AND
FLOODWAY MAP

CITY OF
MASSILLON,
OHIO
STARK COUNTY

PANEL 2 OF 5
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
390517 0002

EFFECTIVE DATE:
JULY 5, 1982



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

