

Drainage Reports

Abbreviated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

**GEOTECHNICAL EXPLORATION REPORT
SERENO CANYON PHASE 1 ON-SITE IMPROVEMENTS
SWC OF HAPPY VALLEY ROAD ALIGNMENT AND 126TH STREET
SCOTTSDALE, ARIZONA**



Prepared for:

**Crown Community Development
c/o Wood, Patel & Associates, Inc.
Attention: Mr. Curtis Brown, P.E., R.L.S.
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021**

Project No. 06-0201.R05



Environmental ♦ Geotechnical ♦ Chemical ♦ Materials Testing

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Prepared by:

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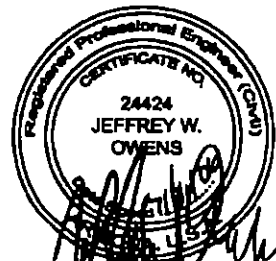


Project No. 06-0201.R05

July 31, 2006



By: _____
Marvin J. Silva, Ph.D., P.E.



Reviewed By: _____
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Figure 1. Site Plan

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REPORT

1.0 PROJECT INFORMATION

Based on information provided by Wood, Patel & Associates, Inc. (Wood/Patel), we understand the proposed on-site improvements of the Sereno Canyon Phase 1 residential development will include new water and gravity sewer lines, and full street paving. The new water and gravity sewer lines will consist of 8-inch diameter ductile iron pipe (D.I.P.) and 8-inch diameter SDR-35 P.V.C. sewer pipe, respectively. The water and gravity sewer lines will be installed with a minimum amount of cover. Some portions of the new pipes will likely have to be deepened to avoid conflicts with existing underground utilities.

We previously prepared a preliminary geotechnical exploration report for the proposed Sereno Canyon residential development. The report is titled *Preliminary Geotechnical Exploration, McDowell Mountain Valley 565, SWC of Happy Valley Road & 128th Street, Scottsdale, Arizona* (Project No. 00-0122A.R01A, report dated February 1, 2006). The results of the field and laboratory testing previously conducted were used (where appropriate) in the preparation of this report.

2.0 SITE DESCRIPTION

The Site of the proposed on-site improvements of the Sereno Canyon Phase 1 residential development is located on the eastern edge of Scottsdale in Maricopa County, Arizona, as shown on Figure 1. The Site is located within native desert land with steep hills. The Site is bounded on the north by the Happy Valley Road alignment followed by vacant desert land, on the east by the 126th Street alignment followed by vacant desert land, on the south by vacant desert land, and on the west by the 122nd Street alignment followed by vacant desert land and single-family residences (south).

At the time of our field exploration, several natural ephemeral washes were observed traversing the Site in a primarily west to east direction. Vegetation included a moderate to dense growth of grass, weeds, shrubs, cacti, and mature trees. The heavier vegetation was concentrated near the washes. The ground surface across the Site was undulating and appeared to have a gentle slope downwards to the northeast. Debris consisting of shingles and construction materials were observed scattered in the southwest portion of the Site.

No significant thicknesses of spread, end dumped, or stockpiled fill soils were encountered or observed on the Site at the time of our exploration.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

The field exploration was conducted on June 21 and 22, 2006 by Jennifer Tran and Joe Spadola, both of GEC - SA&B. The field exploration included drilling 3 exploratory test borings (designated as Nos. 24, 25, and 27) and excavating 6 backhoe test pits (designated as TP-19 through TP-23, and TP-26) at selected locations along the proposed streets of the Site. The approximate locations of the test borings and the test pits are all shown on Figure 1.



The test borings were drilled with a CME-75 drill rig and crew supplied by Enviro-Drill, Inc. (EDI - Phoenix, Arizona). The test borings were advanced using 7-inch diameter hollow-stem augers to depths of approximately 14 feet below the existing ground surface (bgs). Relatively undisturbed samples were obtained at selected depths (where possible) from the test borings using a 2.42-inch I.D. ring-lined barrel sampler. Representative samples were also obtained from the test borings at selected depths by driving a 2.0-inch O.D., standard split-spoon (SPT) sampler. Grab samples of representative soils were also obtained at selected depths from each of the test borings for visual classification and possible subsequent laboratory testing.

The test pits were excavated with a CAT-416B backhoe and crew supplied by Environmental Response, Inc. (ERI - Phoenix, Arizona). The test pits were advanced using an 18-inch wide bucket to depths ranging from approximately 6 to 10 feet bgs. During the test pit excavation, the soils encountered were visually classified and logged by GEC - SA&B's field engineer. Bulk grab samples of representative soils were obtained at selected depths from each of the test pits for visual classification and possible subsequent laboratory testing. Test pit logs presenting the results of the field exploration are presented in Appendix A.

Selected samples obtained during the geotechnical exploration were subjected to laboratory testing to obtain the data necessary to develop geotechnical recommendations for the project. The laboratory results are presented in Appendix B. A summary of the laboratory tests performed in conjunction with this exploration is presented in the following table.

LABORATORY TESTING SUMMARY

Laboratory Test	Sample Type	Number of Tests	Purpose
Sieve Analysis	Grab	7	Soil Classification and Pavement Design
Atterberg Limits (PI)	Grab	7	Soil Classification and Pavement Design

4.0 SOIL CONDITIONS

Soil profiles at the test boring and test pit locations were found to be only slightly variable, and detailed descriptions are presented on the individual test boring and test pit logs included in Appendix A of this report. In general, the subsurface profile consisted of two distinct layers. The surface layer was comprised of alluvial and /or residual (weathered in-place) deposits of clayey sand (SC), clayey silty sand (SM-SC), and silty sand (SM) soils. These surface sandy soils contained variable amounts of gravel, exhibited plasticities in the no to medium range, had relative densities in the very dense range, and contained no calcium carbonate cementation (caliche). At depths ranging from roughly 4 to 13 feet bgs, the surface soil layer was underlain by a layer comprised of moderately to highly weathered granitic bedrock. This weathered bedrock layer was also noted to be variably decomposed and altered. Backhoe bucket refusal at depths ranging from about 6 to 8 feet bgs was encountered in Test Pits TP-19, TP-21, TP-22, and TP-23. Refusal was due to the presence of the weathered granitic bedrock.

In situ moisture contents of the soils encountered in the test borings were generally described as being slightly damp throughout the depths explored. Groundwater was not encountered in any of the test borings or test pit during the drilling/excavating operations.

The above soil descriptions are general and variations along the entire water line and sewer line alignments should be expected. Refer to the individual boring logs included in Appendix A for a more detailed description of the soil profile at the individual test boring and test pit locations.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

This section of the report presents discussions and geotechnical recommendations pertaining to excavation, support and installation of the proposed new water line and gravity sewer line. This section also presents geotechnical engineering recommendations for use in the design and construction of the proposed street improvements associated with the Sereno Canyon Phase 1 residential development. The recommendations and discussions contained in this report are based upon our present understanding of the project, the City of Scottsdale's technical design requirements, and the results of the field and laboratory testing which are presented in Appendices A and B of this report. Alternative recommendations may be possible and will be considered upon request.

5.2 Construction Excavations

We expect that trenches can be cut nearly vertically into the majority of the Site surface and shallow subsurface soils, and they should remain temporarily stable for a sufficient length of time to install shoring, trench jacks, or trench boxes (shields). However, rapid and unpredictable caving may occur where existing surface fills, backfills, clean sand soils, stratified clean sand and silt deposits, buried facilities, etc. are encountered or adjoin the trench. Over-break and slope raveling or caving may occur in the coarser grained clayey and silty sand surface soil. If excavations undercut existing facilities or structures, underpinning should be provided to prevent settlement or distress to the existing facilities or structures. Little or no surface settlement is expected in areas adjoining sloped construction cuts or braced vertical trenches. Personnel entry into laterally unsupported or inadequately sloped trenches or excavations is not recommended.

5.3 Excavation Conditions

The test drilling and field sampling were performed, in part, for purposes of determining the degree of difficulty for excavating the surface and subsurface soils underlying the expected water line and sewer line alignments. It is not possible to accurately correlate auger drilling results with the ease or difficulty of digging for various types and sizes of excavation equipment. However, materials types that may present difficult excavation conditions can often be delineated from the rate and difficulty of drilling (including auger refusal), and standard penetration testing and sampling using a standard 2.0-inch O.D., split-spoon (SPT) sampler.



We present the following general comments regarding excavation conditions for the designers' information with the understanding that they are estimations based only on test boring data. More accurate information regarding excavation conditions should be evaluated by contractors or other interested parties from test excavations using the intended equipment. Contractors must be made aware that variable excavation conditions may be encountered at any location along the alignment of the proposed pipe lines, especially considering the variable soil types and the stratifications that are typically encountered within the general area of the Site.

Shallow excavations into the near surface soils (upper roughly 4 to 13 feet bgs) should be possible with conventional earth excavating equipment. Excavations that extend below depths ranging from 4 to 13 feet will probably require heavy to very heavy excavating equipment with ripping capabilities due to the presence of the weathered granitic bedrock materials. Deeper excavations into this weathered bedrock layer will likely require a trackhoe, ram-hoe, or other heavy excavator with ripping capabilities to efficiently excavate these materials. The bedrock becomes more competent with depth, and deeper excavations into the bedrock will likely require specialized rock excavating equipment or blasting. In case of caving and raveling in open excavations, the excavations should be braced or sloped as required to provide personnel safety and satisfy local safety code regulations.

5.4 Non-Structural Backfill

On-site soils may be used for trench backfills in non-structural areas, below concrete sidewalk areas, and below existing or proposed new pavements. On-site soils are predominantly clayey sands, clayey silty sands, and silty sands with a fines content (percent passing the #200 sieve) and plasticity index (PI) generally higher than allowed for water settling by the Maricopa Association of Governments' (MAG) Standard Specifications. Subsequently, we do not recommend water settling of these materials in areas near structures, below paved areas, or in heavy equipment corridors. Rather, we recommend mechanical compaction. Uniform moisture distribution, generally near optimum, and relatively thin to moderate lift thicknesses (8 inches $\pm$ compacted) will be required to facilitate compaction of these soils in confined trenches.

5.5 Pipe Bedding Materials

The existing surface and subsurface soils at the test boring locations were clayey sand, clayey silty sand, and silty sand soils. The majority of these soils will likely not be suitable for use as pipe bedding. Therefore, it is apparent that the pipe bedding material for this project will likely consist entirely of imported fill material. Where pipe bedding consists of open graded gravels (imported pea gravel, or similar), a filter fabric may be required between the bedding material and the backfill soils to prevent a migration of fines from finer-grained backfill soils into the bedding material. All pipe bedding material should conform to the appropriate MAG and/or the City of Scottsdale Supplemental Specifications.



5.6 Corrosion

Corrosion is most likely to occur in fills and natural soils with high moisture contents. Results of laboratory tests conducted in our preliminary report and in areas adjacent to the Site were evaluated to determine the corrosion potential of the Site soils. Laboratory tests were performed on five composite samples (three tests were performed on samples taken from other areas of the Sereno Canyon residential development and two tests were conducted in our preliminary geotechnical exploration) of the on-site native soils to determine the soluble salts, sulfate, and chloride content. The results of these laboratory tests are included in Appendix B. The soluble sulfate content of the tested site soils ranged between 0.0004 and 0.0160 percent, which is substantially less than 0.1 percent. According to the criteria of the 2000 and 2003 International Building Code (IBC), Table 1904.3, results less than 0.1 percent indicate a negligible level of sulfate exposure. Therefore, no additional requirements for concrete exposed to sulfate-containing solutions are required. In addition, the soluble salts content on these soils ranged between 0.0160 and 0.1700 percent, and the soluble chloride content of these soils ranged between 0.0010 and 0.0016 percent. Based on these values, the corrosion potential of the Site soils to concrete is expected to range from negligible to low. Therefore, concrete in contact with the Site soils should use either Type II or Type I low alkali Portland cement. (Note: These are the cements that are used routinely throughout Arizona.)

Laboratory minimum resistivity and pH tests were also conducted. The pH of the soils tested were between 6.8 and 7.9, which are in the typical range for desert soils in the Phoenix metropolitan area. Minimum resistivity values between 1,490 and 2,580 ohm-cm were recorded on the soils sampled from the Site. These results indicate that the fine-grained site soils, especially when of elevated moisture content, are highly corrosive to buried ferrous metals. Therefore, special protection appears to be warranted for buried metal piping or other conduit that would be in contact with the site soils. Special protection may also be necessary where dissimilar metals are placed in close proximity or are joined. Consideration should be given to the use of approved non-metallic or coated conduits.

We recommend that the results of our laboratory testing (Appendix B of this report) be reviewed by a person or firm experienced in corrosion protection designs for the actual construction at the Site, and/or the appropriate pipe or material manufacturer should be contacted for their recommendations based on the conditions at the Site.

5.7 Pavement Design Recommendations

Geotechnical engineering recommendations for use in the design and construction of proposed new street improvements associated with the Sereno Canyon Phase 1 residential development is included in the following paragraphs. These recommendations are based upon our understanding of the project, the City of Scottsdale technical design requirements (*Design Standards & Policies Manual, City of Scottsdale - 2004 Update*), and the results of GEC - SA&B's field and laboratory testing at the Site to date.



The design of the new asphalt concrete (AC) pavement section for the proposed local residential streets was performed in general accordance with the City of Scottsdale's Design Standards & Policies Manual (2004 Update). Site grading within new pavement areas should be accomplished as recommended in this report to provide subgrade support for flexible pavements. A compacted subgrade of on-site granular soils or imported soils with comparable supporting properties is assumed. The following tabulation presents the recommended pavement section:

RECOMMENDED AC PAVEMENT SECTION

Roadway Section	Minimum AC Thickness	Minimum Base Course Thickness*
Local Residential Streets	3.0"	6.0"

* - The top 4 inches of base course shall be ABC. The balance shall be ABC or Select material.

The tabulated pavement section is considered a minimal section based upon the expected traffic and the existing subgrade conditions. However, it is expected to function with periodic maintenance and overlays if good drainage is provided and maintained. Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade. Locally, 2- and 3-inch asphalt pavement sections often become brittle and experience cracking before the 20-year life is attained. Therefore, the bituminous surface should be sealed after an initial summer of use (and routinely thereafter) to minimize water infiltration directly through the pavement section and to retard premature oxidation of the surfacing.

In proposed bituminous pavement areas, the moisture content of the subgrade soils and fill materials should be maintained at a moisture content of 2 percent below optimum or lower. At these moisture contents pumping would not be expected to occur. Pumping of the pavement subgrade soils could be detrimental to pavement performance. Therefore, if pumping occurs during compaction of the pavement subgrade, then the wet soils should be removed and replaced with drier soils, or the wet soils should be spread and allowed to dry.

In areas where trenches are placed in, cross, or otherwise disturb existing pavements, pavement patches should conform with the City of Scottsdale Standard Details or the appropriate MAG requirements. As a guideline, asphalt concrete patches matching the existing pavement thicknesses are recommended.

6.0 CONSTRUCTION RECOMMENDATIONS

6.1 Fill Materials

All fill materials should be inorganic soils free of vegetation, debris, organics, and fragments larger than 6 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer. The



native surface and subsurface soils derived from areas of on-site excavation may be used as fill and backfill in all non-structural areas, and below concrete sidewalks and existing or proposed new pavements.

Any imported fill or backfill materials utilized at the Site for general fill material should conform to the following specification requirements:

IMPORTED FILL/BACKFILL SPECIFICATIONS

Property	Specification	Remarks
Maximum Particle Size	6"	Maximum size may be reduced at architect's/owner's direction to satisfy project, trenching or landscaping requirements, etc.
Maximum Percent Passing #200 Sieve	55	None
Maximum Plasticity Index (PI)	15	None
Maximum Percent Expansion	2.0%	Performed in a consolidometer (ASTM D2435), with the sample remolded to 95% of the maximum ASTM D698 density and 2% below optimum moisture, and confined under a 100 psf surcharge pressure. The compacted sample is then inundated and allowed to swell/expand until equilibrium is reached.

6.2 Bedding

Bedding Materials for use beneath the proposed pipe lines should be well graded granular materials meeting the City of Scottsdale Supplements to MAG and/or MAG Specifications for Bedding (MAG Section 601).

6.3 Base Course

Base course materials for use beneath pavement areas should be well graded sand and gravel materials meeting the City of Scottsdale Supplements to MAG and/or the Maricopa Association of Governments (MAG) Specifications for Aggregate Base Course Materials (MAG Section 702, ABC).

6.4 Pavement

Pavement materials should be in accordance with the requirements of the City of Scottsdale Supplements to MAG and/or MAG Standard Specifications for Asphalt Concrete (MAG Section 710, Type 19 mm or 12.5 mm). Placement requirements for the asphaltic concrete pavement should be in accordance with the requirements presented in the MAG Standard Specifications for Asphalt Concrete Pavement (MAG Section 321). Observation and testing should be performed as necessary to verify conformance with these recommended specifications, especially compaction requirements for asphalt concrete surfacing.



6.5 Site Grading

Preparation of the pipe line alignments for construction may include the removal of vegetation or existing structures (pavements, etc.), and excavation to proposed subsurface structure grade. The following recommendations are presented for site grading within the proposed excavation and pavement areas. In addition, criteria for the placement of backfill and fill materials are also presented. All phases of earthwork should be performed under observation and testing directed by a qualified geotechnical engineer.

1. Remove any existing vegetation and organic contaminants, existing pavements, subsurface remnants of any former facilities, any surface fills and backfills, and any unstable (loose, disturbed, wet, etc.) soils, if encountered, from all proposed excavation and pavement areas. Observe the cleared surface before and during subsequent excavation for evidence of debris-laden soils, disturbance, or loose zones requiring additional removal.
2. In pavement areas, make any cuts that may be necessary to achieve finished subgrade level.
3. Widen any depressions as necessary to accommodate compaction equipment and provide a level base for placing fill.
4. In pavement areas, subsequent to the surface clearing and grubbing efforts, the exposed natural ground surface should be prepared to a minimum depth of 8 inches below all proposed pavement areas. Subgrade preparation should consist of scarification, moisture conditioning (where necessary), and compaction.
5. In below grade structure areas (pipelines, etc.), clean the subgrade of all loose or disturbed soils. Over-excavations below deep structures or pipe lines should be backfilled with lean concrete or as otherwise directed in the field by the geotechnical engineer.
6. Place backfill or fill materials required to elevate Site areas to specified subbase grade. Fill materials should be placed and compacted in horizontal lifts of thicknesses compatible with the compaction equipment used.
7. Compaction of subgrade soil, backfill, subbase fill, and base course materials should be accomplished to the following density criteria:



DENSITY CRITERIA AND MOISTURE CONTENT GUIDELINES

Material	Area of Placement	Percent Compaction (ASTM D698)	Moisture Content Guidelines
Exposed Subgrade Soils and Fills of On-Site or Approved Imported Soils	Below asphalt pavement: 0 to 2 feet below finished subgrade 2 to 5 feet below finished subgrade 5 feet or more below finished subgrade	95 min. 95 min. 98 min.	Opt. -2% or lower Opt. $\pm 3\%$ Opt. $\pm 3\%$
Base Course	Below asphalt pavement	100 min.	Opt. -2% or lower
Pipe Bedding	Pipe bedding	90 min.	Opt. $\pm 3\%$
Utility Trench Backfill	Utility trenches and other backfill areas used for pavement or utility line support	According to the City of Scottsdale Standard Detail 2201, the City of Scottsdale Supplement to MAG and/or MAG Specifications for Compaction Densities (MAG 601.4.4)	

Natural undisturbed soils or compacted soils subsequently disturbed or removed by construction operations should be replaced with materials compacted as specified above, or as directed in the field by the geotechnical engineer.

7.0 LIMITATIONS

This report was prepared for the sole use of Crown Community Development, and Wood, Patel & Associates, Inc. (the "Client"), their consultants, their counsel, and their contractors, exclusively, and it is subject to the terms and conditions presented in our contract. No other person may rely on this report without the prior written consent of GEC - SA&B.

Our geotechnical services were performed to present data to aid in the design and construction of the proposed on-site improvements of the Sereno Canyon Phase 1 residential development for the Client as described in the report. The data was developed based upon the results of the field exploration and laboratory testing completed by GEC - SA&B, and our engineering analysis of these conditions in relation to the proposed development. The field exploration, laboratory test results, and development plans provided the basis for our geotechnical engineering discussions and recommendations presented in the report. We should be notified if Site conditions other than those described in the report are encountered during construction, or if the proposed development plans change, so we can review and modify this report, if necessary. This report should only be reviewed and used in its entirety. Additional information which was not readily available to GEC - SA&B at the time of this report may result in a modification of the discussions and recommendations presented. This report and its contents shall not be used by the Client, owner, or other parties for other developments or structures on this Site, for future additions or alterations to this project, or for other projects or other sites, without prior written agreement from GEC - SA&B.

Our services did not include an evaluation of seismic activity, faults, ground subsidence, earth fissuring, or other potential geologic or mining hazards that may be present at the Site. This



report also did not address any potential environmental liabilities that may be associated with the Site.

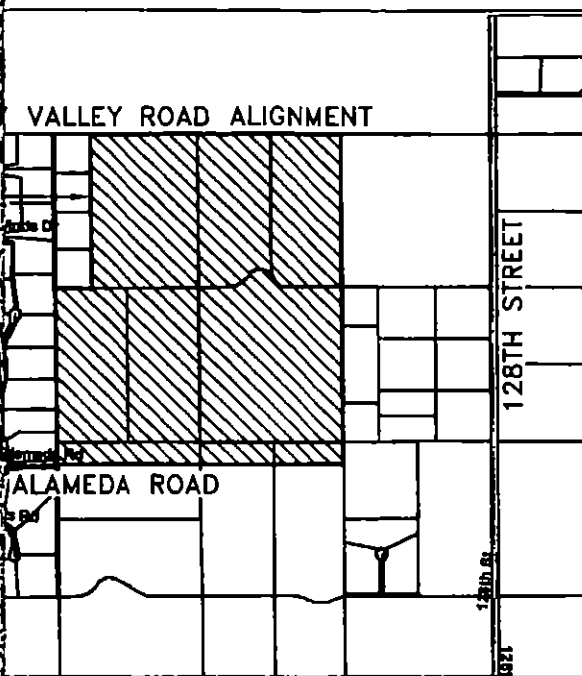


FIGURES

HAPPY VALLEY ROAD ALIGNMENT



VALLEY ROAD ALIGNMENT



TY MAP



SITE PLAN

KEY

- ⊕ Test Boring
- ⊕ Test Pit

E PLAN

eno Canyon Phase I

eno Canyon

E of Happy Valley Road Alignment and
th Street

ottsdale, Arizona

Project No. 06-0201 R05

06cad/06-0201/06-0201 R05.Fig1

APPENDIX A

I. Unified Soil Classification System (USCS) per ASTM D-2487:

Coarse-Grained Soils Less Than 50% Fines		
Major Division	Group Symbol	Soil Description
GRAVELS More than half the coarse fraction is larger than the No. 4 sieve	GW	Well-graded gravel or gravel-sand mixtures, less than 5% fines
	GP	Poorly graded gravel or gravel-sand mixtures, less than 5% fines
	GM	Silty gravel, gravel-sand-silt mixtures, more than 12% fines
	GC	Clayey gravel, gravel-sand-clay mixtures, more than 12% fines
SANDS More than half the coarse fraction is smaller than the No. 4 sieve	SW	Well-graded sands or gravelly sands, less than 5% fines
	SP	Poorly graded sands or gravelly sands, less than 5% fines
	SM	Silty sands, sand-silt mixtures, more than 12% fines
	SC	Clayey sands, sandy-clay mixtures, more than 12% fines

Note: Coarse-grained soils receive dual symbols if they contain 5 to 12% fines (e.g., SW-SM, GP-GC, etc.).

Fine-Grained Soils More Than 50% Fines		
Major Division	Group Symbol	Soil Description
SILTS AND CLAYS with a liquid limit less than 50	ML	Inorganic silts, very fine sands, silty or clayey fine sands
	CL	Inorganic clays of low to medium plasticity
	OL	Organic silts or organic silty-clays of low plasticity
SILTS AND CLAYS with a liquid limit greater than 50	MH	Inorganic silts or silty clays of high plasticity
	CH	Inorganic clays of high plasticity
	OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS	PT	Peat, muck, and other highly organic soils

Note: Fine-grained soils receive dual symbols if their plasticity index is between 4 and 7 and their liquid limit is less than 30 (e.g., ML-CL, etc.).

II. Soil Grain Size:

U.S. Standard Sieve								
12"	3"	3/4"	#4	#10	#40	#200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		
305	76	19	4.8	2.0	0.42	0.074		0.002
Soil Grain Size in Millimeters								

III. Sampler Driving Record - Blow count indicates number of blows for a standard 140-lb hammer to drive the sampler as shown below:

Type	No. of Blows	Description
Standard split spoon	10-15-25	10 blows drove sampler initial 6 inches, 15 blows drove sampler next 6 inches, 25 blows for final 6 inches
Standard split spoon	15-50/5"	15 blows drove sampler initial 6 inches, 50 blows drove sampler next 5 inches
Standard split spoon	50/3"	50 blows drove sampler 3 inches during initial 6-inch seating interval
Ring sampler	30	30 blows drove sampler 12 inches, no initial seating increment
Ring sampler	50/8"	50 blows drove sampler 8 inches, no initial seating increment
Bullnose	18	18 blows drove 2.0-inch O.D. bullnose 12 inches
Bullnose	100/9"	100 blows drove 2.0-inch O.D. bullnose 9 inches

Project Name: Seren Canyon	Drilled By: Enviro-Drill, Inc.	Date Started: 6/21/2006	Ground Elev.: N/A
Location: SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ	Logged By: Jennifer Tran	Date Completed: 6/21/2006	Total Depth: 14.3 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND	SAMPLES		BLOWS
			BULK	DRIVE	
		 Bulk/Grab  Ring-Lined Barrel Sampler (Ring)  Standard Penetration Test (SPT)			
		SUMMARY OF SUBSURFACE CONDITIONS			
2		CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.			50/4"
4					
6		SILTY SAND (SM): brown; very dense; none to low plasticity; no cementation; with gravel; slightly damp; portions of layer have appearance of decomposed granite.			50/3"
8					
10		GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.			50/2"
12					
14					50/3"
16		Stopped test drilling at 14.0 feet. Sampler refusal at about 14.3 feet. No groundwater encountered in test boring.			
18					
20					



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The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Sereno Canyon

Drilled By:

Enviro-Drill, Inc.

Date Started:

6/21/2006

Surface Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Jennifer Tran

Date Completed:

6/21/2006

Total Depth:

14.1 feet

SAMPLE LEGEND



Bulk/Grab

Ring-Lined
Barrel Sampler
(Ring)Standard
Penetration
Test (SPT)

SUMMARY OF SUBSURFACE CONDITIONS

SAMPLES

BULK

DRIVE

BLOWS

DEPTH (FEET)

GRAPHIC
LOG

CLAYEY SAND (SC): brown; very dense; low plasticity; no cementation; some gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.
stratified lenses of silty sand (SM) below at about 1 foot.

SILTY SAND (SM): brown; very dense; none to low plasticity; no cementation; with gravel; slightly damp; portions of layer have appearance of decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Stopped test drilling at 14.0 feet.
Sampler refusal at 14.1 feet.
No groundwater encountered in test boring.

50/5"

50/3"

50/1"

50/1"



Project Name:

Sereno Canyon

Drilled By:

Enviro-Drill, Inc.

Date Started:

6/21/2006

Ground Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Jennifer Tran

Date Completed:

6/21/2006

Total Depth:

14.3 feet

SAMPLE LEGEND



Bulk/Grab

Ring-Lined
Barrel Sampler
(Ring)Standard
Penetration
Test (SPT)

SAMPLES

BULK

DRIVE

BLOWS

SUMMARY OF SUBSURFACE CONDITIONS

CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; some grave; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Stopped test drilling at 14.0 feet.
Sampler refusal at about 14.3 feet.
No groundwater encountered in test boring.

50/4"

50/3"

50/2"

50/3"

DEPTH (FEET)

GRAPHIC
LOG

2

4

6

8

10

12

14

16

18

20



Project Name:

Sereno Canyon

Drilled By:

Env. Response, Inc.

Date Started:

6/22/2006

Surface Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Joe Spadola

Date Completed:

6/22/2006

Total Depth:

8 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

SUMMARY OF SUBSURFACE CONDITIONS

BULK
DRIVE

DEPTH (FEET)

GRAPHIC
LOG

GRAVELLY CLAYEY SILTY SAND (SM-SC): brown; very dense; low plasticity; no cementation; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Bucket refusal at about 8.0 feet.
No groundwater encountered in test pit.

2

4

6

8

10

12

14

16

18

20



Project Name:

Seren Canyon

Drilled By:

Env. Response, Inc.

Date Started:

6/22/2006

Surface Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Joe Spadola

Date Completed:

6/22/2006

Total Depth:

10 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

BULK

DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

DEPTH (FEET)

GRAPHIC
LOG

CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; some gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Stopped excavating at about 10.0 feet.
No groundwater encountered in test pit.



Project Name:

Sereno Canyon

Drilled By:

Env. Response, Inc.

Date Started:

6/22/2006

Surface Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Joe Spadola

Date Completed:

6/22/2006

Total Depth:

6 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

BULK

DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

GRAVELLY CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Bucket refusal at about 6.0 feet.
No groundwater encountered in test pit.

DEPTH (FEET)

GRAPHIC
LOG

2

4

6

8

10

12

14

16

18

20



Project Name: Sereno Canyon	Drilled By: Env. Response, Inc.	Date Started: 6/22/2006	Surface Elev.: N/A
Location: SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ	Logged By: Joe Spadola	Date Completed: 6/22/2006	Total Depth: 6 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND		SAMPLES	
		SUMMARY OF SUBSURFACE CONDITIONS		BULK	DRIVE
2		 Bulk/Grab			
4					
6		CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.			
		GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.			
		Bucket refusal at about 6.0 feet. No groundwater encountered in test pit.			
8					
10					
12					
14					
16					
18					
20					



GEC - SA&B
2801 South 35th Street
Phoenix, Arizona 85034
Phone: (602) 393-4800
Fax: (602) 393-4801

The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Serenio Canyon

Drilled By:

Env. Response, Inc.

Date Started:

6/22/2006

Surface Elev.:

N/A

Location:

SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ

Logged By:

Joe Spadola

Date Completed:

6/22/2006

Total Depth:

7.5 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

BULK
DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

DEPTH (FEET)

GRAPHIC
LOG

GRAVELLY CLAYEY SAND (SC): brown; very dense; low plasticity; no cementation; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.

Bucket refusal at about 7.5 feet.
No groundwater encountered in test pit.



Project Name: Sereno Canyon	Drilled By: Env. Response, Inc.	Date Started: 6/22/2006	Surface Elev.: N/A
Location: SWC of Happy Valley Road Alignment & 126th Street, Scottsdale, AZ	Logged By: Joe Spadola	Date Completed: 6/22/2006	Total Depth: 10 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND	SAMPLES	
			BULK	DRIVE
		 Bulk/Grab		
		SUMMARY OF SUBSURFACE CONDITIONS		
2		CLAYEY SAND (SC): brown; very dense; medium plasticity; no cementation; some gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.		
4				
6		GRANITE: brown; moderately to highly weathered and altered bedrock; variably decomposed.		
8				
10		Stopped test excavating at 10.0 feet. No groundwater encountered in test pit.		
12				
14				
16				
18				
20				

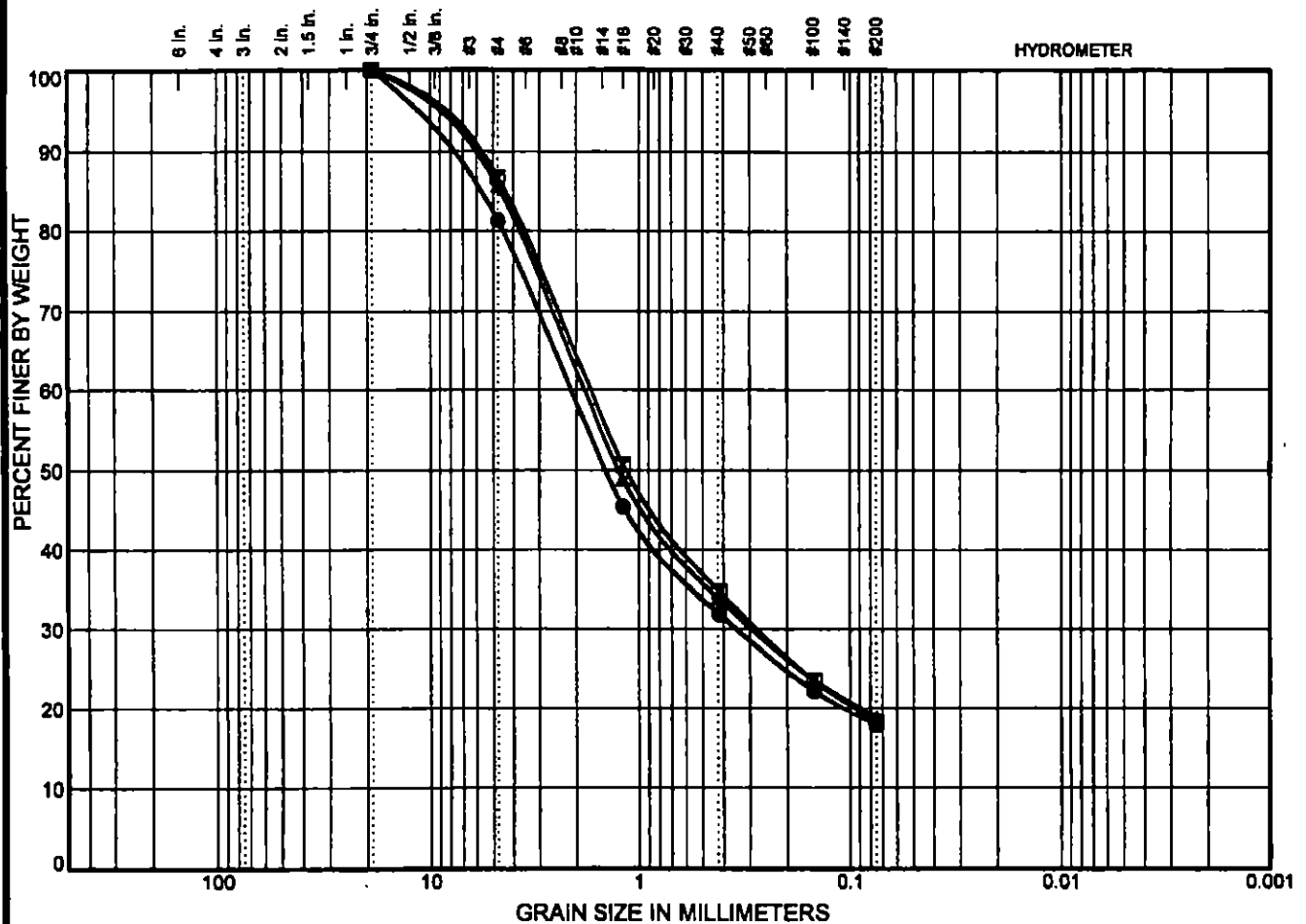


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The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

APPENDIX B

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

	Source	% Cobbles	% Gravel	% Sand	% Silt	% Clay	D60	D30	D10	Cu	Cc
●	24	0	19	83	18	18	2.083	0.343			
■	25	0	13	89	18	18	1.701	0.272			
▲	27	0	14	87	19	19	1.807	0.286			

SAMPLE REFERENCE AND DATA

	Source	Depth (ft.)	USCS	Description	PI	LL
●	24	0.0 - 5.0	SC	Clayey Sand	17	33
■	25	0.0 - 4.0	SC	Clayey Sand	9	29
▲	27	0.0 - 4.0	SC	Clayey Sand	20	34

TECH GRAIN SIZE MULTIPLE 08-0201 GP J GEC GDT 7/2000



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Client:

Crown Community Development

Project No.:

08-0201

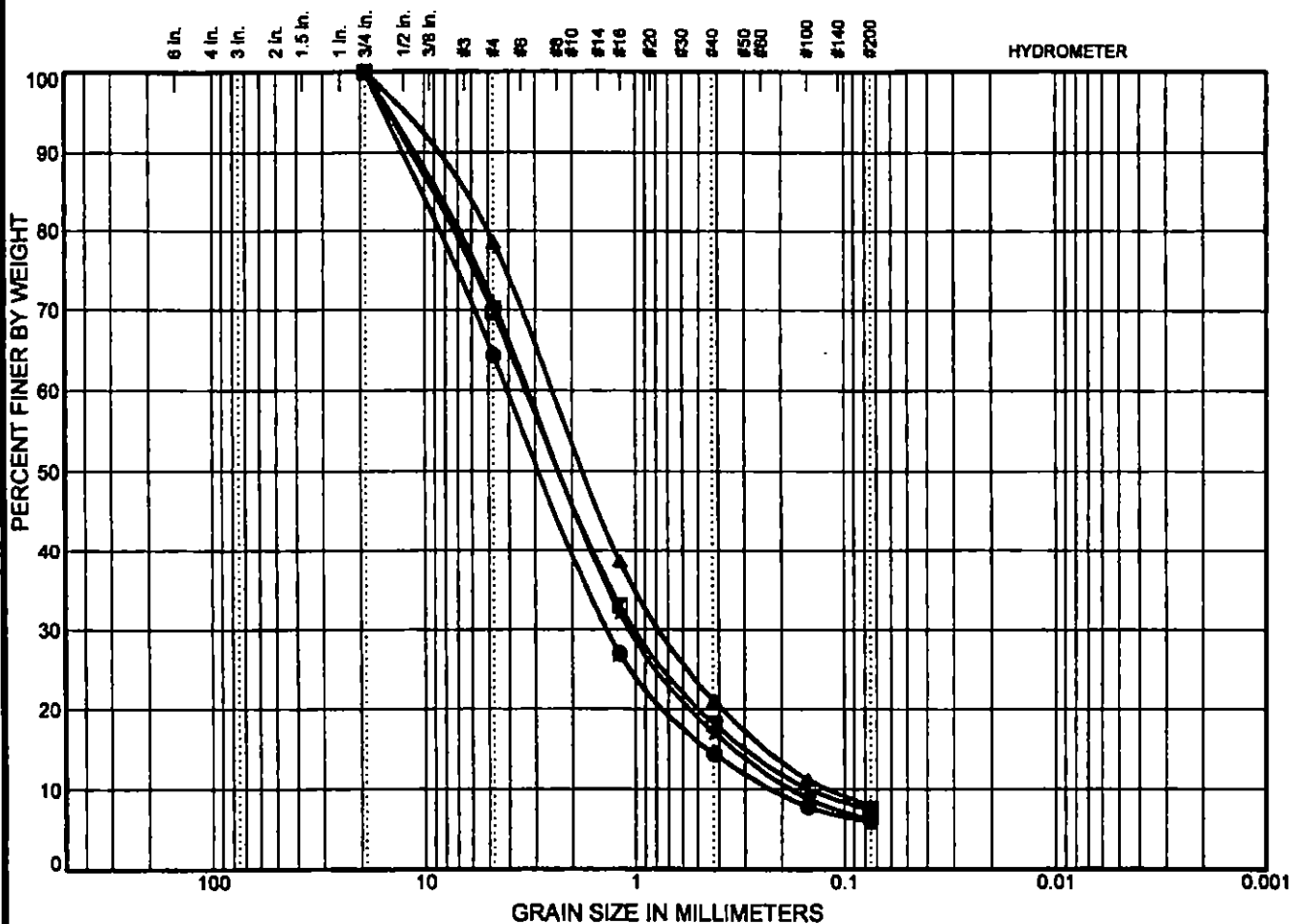
Project:

Sereno Canyon

Location:

SWC of Happy Valley Road Alignment & 126th Street,

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

	Source	% Cobbles	% Gravel	% Sand	% Silt	% Clay	D60	D30	D10	Cu	Cc
●	TP-19	0	36	58	6.0		4.042	1.329	0.209	19.36	2.09
■	TP-21	0	30	62	7.5		3.291	0.984	0.146	22.53	1.93
▲	TP-22	0	21	71	7.9		2.494	0.714	0.116	21.50	1.76
★	TP-23	0	29	65	6.2		3.219	1.026	0.173	18.66	1.90

SAMPLE REFERENCE AND DATA

	Source	Depth (ft.)	USCS	Description	PI	LL
●	TP-19	0.0 - 5.0	SM-SC	Clayey Silty Sand	6	27
■	TP-21	0.0 - 5.0	SC	Clayey Sand	13	32
▲	TP-22	0.0 - 5.0	SC	Clayey Sand	13	32
★	TP-23	0.0 - 4.0	SC	Clayey Sand	8	28

OTEC GRAD SIZE MULTIPLE 06-0201.GPJ GEC.GDT 7/26/08



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Client:

Crown Community Development

Project No.:

06-0201

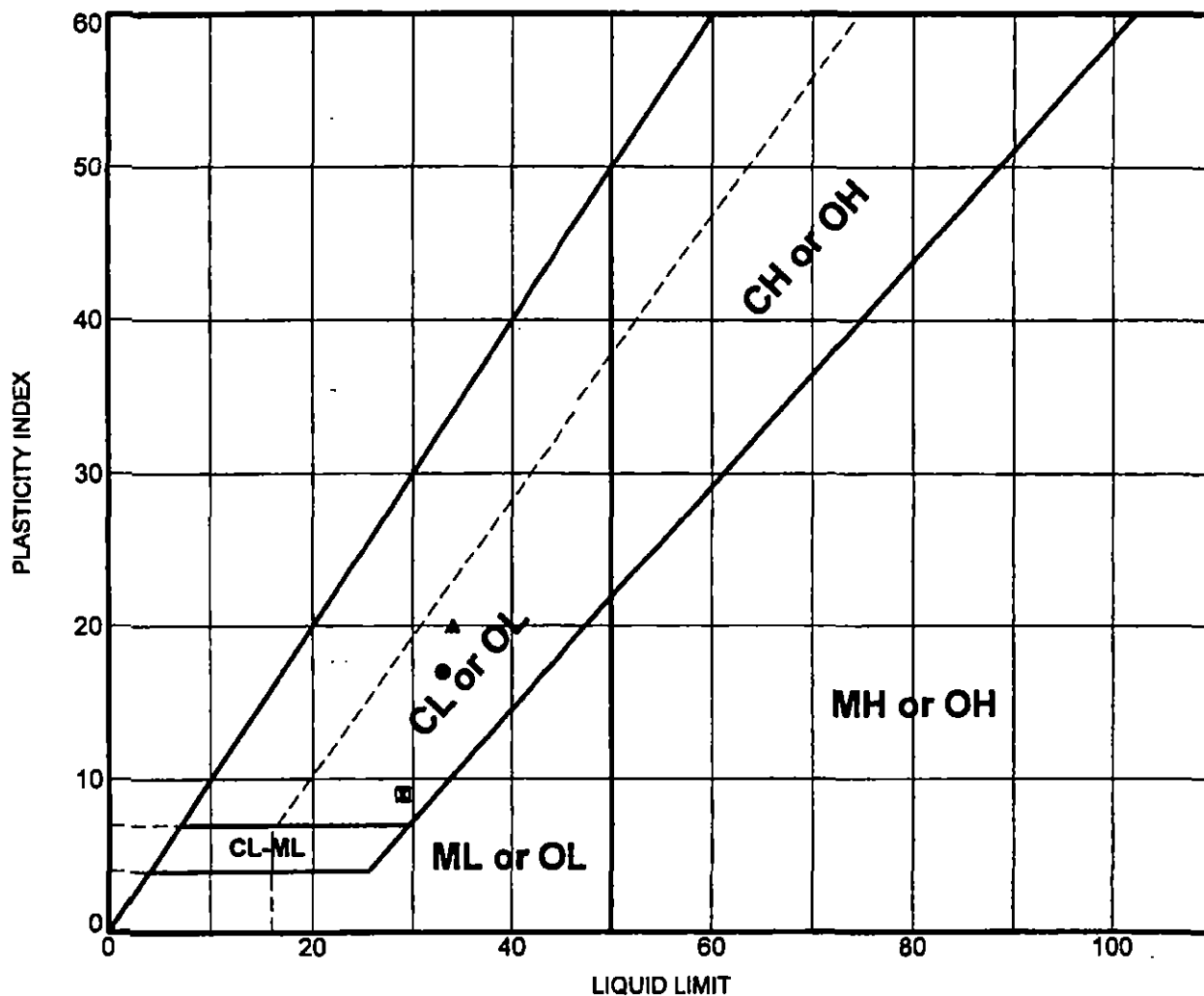
Project:

Sereno Canyon

Location:

SWC of Happy Valley Road Alignment & 126th Street,
Scottsdale, AZ

ATTERBERG LIMITS TEST REPORT



TEST RESULTS						
Sample Reference		Sample Properties and Data				
Source	Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% < No. 200	USCS
● 24	0.0 - 5.0	33	16	17	18	SC
■ 25	0.0 - 4.0	29	20	9	18	SC
▲ 27	0.0 - 4.0	34	14	20	19	SC

GEOTECH/ATTERBERG LIMITS MULTIPLE 06-0201.GPJ GEC.GDT 7/28/08



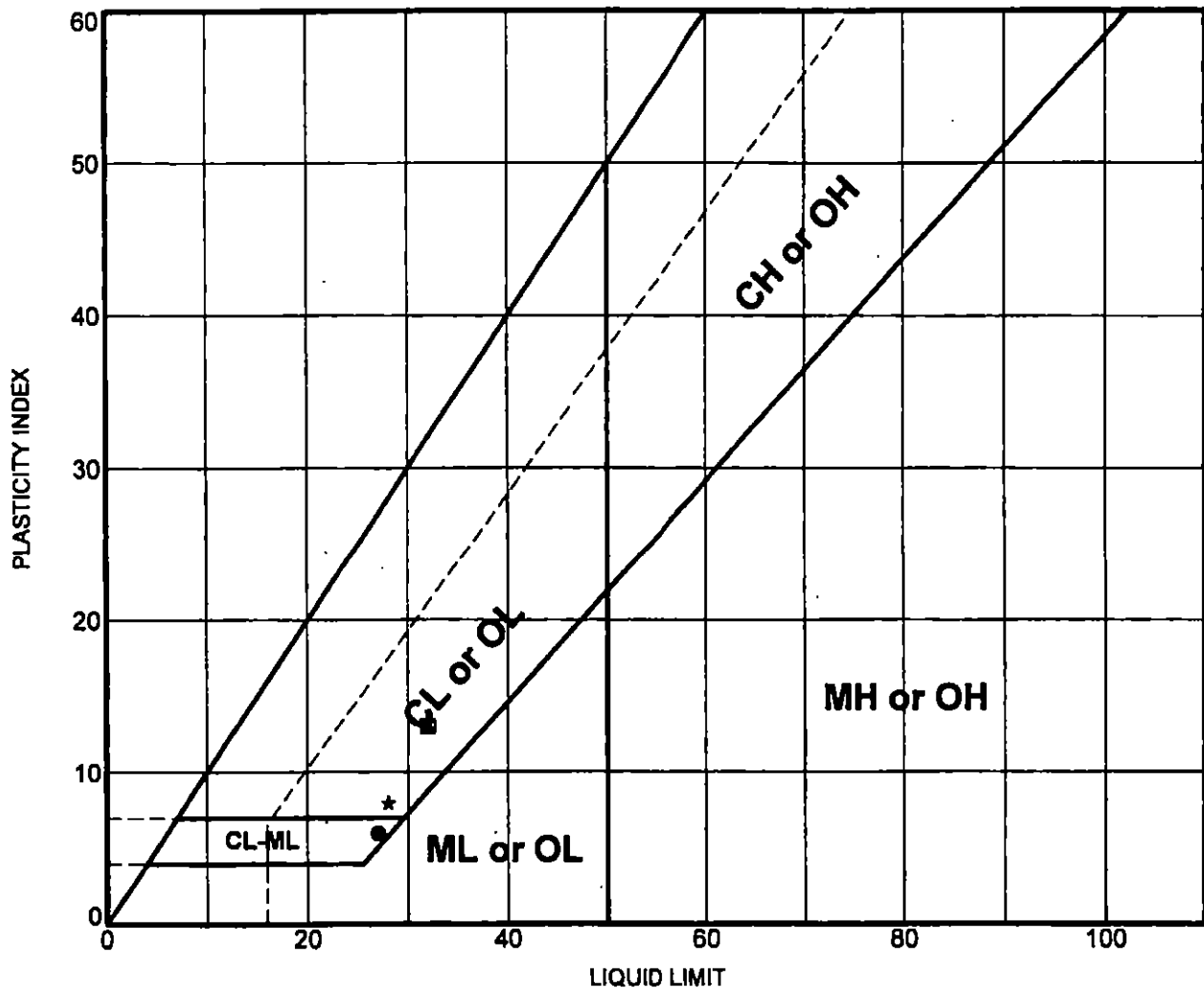
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 Phone: (602) 393-4800
 Fax: (602) 393-4801

Client: Crown Community Development

Project No.:
 06-0201

Project: Sereno Canyon
Location: SWC of Happy Valley Road Alignment & 126th Street,
 Scottsdale, AZ

ATTERBERG LIMITS TEST REPORT



TEST RESULTS						
Sample Reference		Sample Properties and Data				
Source	Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% < No. 200	USCS
● TP-19	0.0 - 5.0	27	21	6	6.0	SM-SC
■ TP-21	0.0 - 5.0	32	19	13	7.5	SC
▲ TP-22	0.0 - 5.0	32	19	13	7.9	SC
★ TP-23	0.0 - 4.0	28	20	8	6.2	SC



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Client:

Crown Community Development

Project No.:

06-0201

Project:
Location:

Sereno Canyon
SWC of Happy Valley Road Alignment & 128th Street,
Scottsdale, AZ

REPORT ON SOLUBLE SALTS, SULFATE & CHLORIDE TESTS

Sereno Canyon Phase 1
SWC of Happy Valley Road Alignment and 126th Street
Scottsdale, Arizona

SAMPLE:

DATE: July 27, 2006

Source: As Noted Below, Refer to the Site Plan (Figure 1)
Type: Bulk Samples from Auger Cuttings
Material: On-Site Surface and Subsurface Soils
Sampled by: GEC - SA&B / J. Tran

TESTED: Laboratory Soluble Salts (ADOT Method ARIZ 237b), Sulfate (ARIZ 733) and Chloride (ARIZ 736) tests (all conducted by IAS Laboratories).

TEST RESULTS

Test Boring (depth)	Soluble Salts (%)	Sulfate (%)	Chloride (%)
R1 (0.0' - 3.0')	0.0220	0.0004	0.0010
7 (0.0' - 5.0')	0.0160	0.0006	0.0014
16 (0.0' - 5.0')	0.0260	0.0005	0.0016
B1 (0.0' - 4.0') (Previous test results)	0.0290	0.0160	Not tested
B7 (4.0' - 9.0') (Previous test results)	0.1700	0.0026	Not tested



REPORT ON LABORATORY pH & MINIMUM RESISTIVITY TESTING

Sereno Canyon Phase 1
SWC of Happy Valley Road Alignment and 126th Street
Scottsdale, Arizona

SAMPLE:

DATE: July 27, 2006

Source: As Noted Below, Refer to the Site Plan (Figure 1)
Type: Bulk Samples from Auger Cuttings
Material: On-Site Subsurface Soils
Sampled by: GEC - SA&B / J. Tran

TESTED: Laboratory pH and Minimum Resistivity tests (Arizona/ADOT236b method).

TEST RESULTS

Test Boring (depth)	pH	Minimum Resistivity (ohm-cm)
R1 (0.0' - 3.0')	7.9	1,830
7 (0.0' - 5.0')	6.8	1,490
16 (0.0' - 5.0')	7.6	2,580
B1 (0.0' - 4.0') (Previous test results)	6.9	Not tested
B7 (4.0' - 9.0') (Previous test results)	7.7	Not tested



**GEOTECHNICAL EXPLORATION REPORT
SERENO CANYON PHASES 2, 3, AND 4 ON-SITE IMPROVEMENTS
SW OF HAPPY VALLEY ROAD ALIGNMENT AND 128TH STREET
SCOTTSDALE, ARIZONA**



Prepared for:

**Crown Community Development
c/o Wood, Patel & Associates, Inc.
Attention: Mr. Curtis Brown, P.E., R.L.S.
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021**

Project No. 06-0201A.R01



Environmental ♦ Geotechnical ♦ Chemical ♦ Materials Testing

2801 South 35th Street, Phoenix, AZ 85034

**GEOTECHNICAL EXPLORATION REPORT
SERENO CANYON PHASES 2, 3, AND 4 ON-SITE IMPROVEMENTS
SW OF HAPPY VALLEY ROAD ALIGNMENT AND 128TH STREET
SCOTTSDALE, ARIZONA**

Prepared for:

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c/o Wood, Patel & Associates, Inc.
Attention: Mr. Curtis Brown, P.E., R.L.S.
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021**

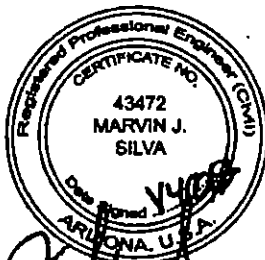
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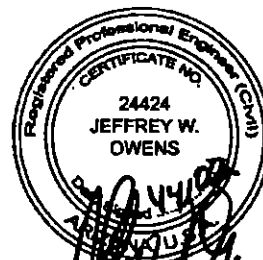


Project No. 06-0201A.R01

January 4, 2007



By: Marvin J. Silva, Ph.D., P.E.



Reviewed By: Jeffrey W. Owens, P.E.

Copies to: Addressee (5)

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FIGURES

Figure 1. Site Plan

APPENDIX A

Legend

Boring Logs

APPENDIX B

Laboratory Test Results



REPORT

1.0 PROJECT INFORMATION

This report presents the results of GEC - SA&B's geotechnical exploration services for the proposed on-site improvements of the Sereno Canyon Phases 2, 3, and 4 located southwest of the Happy Valley Road alignment and the 128th Street alignment in Scottsdale, Arizona, as shown on Figure 1 (Site Plan).

We understand Sereno Canyon is a 330-acre residential custom lot subdivision. The development is planned in four phases and includes approximately 122 lots ranging in size from 2 to 3 acres and an 11-acre Community Center with amenities such as jacuzzis, pools, water falls, and restaurant facilities. We previously prepared a Geotechnical Exploration Report for the on-site improvements in Phase 1. We understand the proposed on-site improvements for Phases 2, 3, and 4 of the Sereno Canyon residential development will include new water and gravity sewer lines, and full street paving. The new water and gravity sewer lines will consist of 8-inch diameter ductile iron pipe (D.I.P.) and 8-inch diameter SDR-35 P.V.C. sewer pipe, respectively. The water and gravity sewer lines will be installed with a minimum amount of cover. Some portions of the new pipes will likely have to be deepened to avoid conflicts with existing underground utilities.

We previously prepared a preliminary geotechnical exploration report for the proposed Sereno Canyon residential development. The report is titled *Preliminary Geotechnical Exploration, McDowell Mountain Valley 565, SWC of Happy Valley Road & 128th Street, Scottsdale, Arizona* (Project No. 00-0122A.R01A, report dated August 4, 2000). We also prepared two geotechnical reports for Phase 1 of the residential development. The first report is titled *Geotechnical Exploration Report, Sereno Canyon Phase 1 On-Site Improvements, SWC of Happy Road Alignment and 126th Street, Scottsdale, Arizona* (Project No. 06-0201.R05, report dated July 31, 2006). The second report is titled *Geotechnical Exploration Report, Sereno Canyon Community Center, SWC of Happy Road Alignment and 126th Street, Scottsdale, Arizona* (Project No. 06-0201.R06, report dated August 2, 2006). The results of the field and laboratory testing previously conducted were used (where appropriate) in the preparation of this report.

2.0 SITE DESCRIPTION

The Site of the proposed on-site improvements of the Sereno Canyon Phases 2, 3, and 4 residential development is located on the eastern edge of Scottsdale in Maricopa County, Arizona, within a portion of Section 11, Township 4 North, Range 5 East. The Site is currently an assemblage of undeveloped parcels bound to the west by the existing Sonoran Crest Development (122nd Street Alignment), to the east by the 128th Street alignment, to the north by the Happy Valley Road alignment, and to the south by the McDowell Mountain Sonoran Preserve.

At the time of our field exploration, several natural ephemeral washes were observed traversing the Site in a primarily west to east direction. Vegetation included a moderate to dense growth of grass, weeds, shrubs, cacti, and mature trees. The heavier vegetation was concentrated near the



No significant thicknesses of spread, end dumped, or stockpiled fill soils were encountered or observed on the Site at the time of our exploration.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

The field exploration was conducted on December 8 and 9, 2006 by Jim Barker and James Friedrich, both of GEC - SA&B. The field exploration included drilling 8 exploratory test borings (designated as Nos. 2, 5-8, and 10-12) and excavating 4 test pits (designated as TP-1, TP-3, TP-4, and TP-9) at selected locations along the proposed streets of the Site. The approximate locations of the test borings and the test pits are all shown on Figure 1.

The test borings were drilled with a CME-75 drill rig and crew supplied by Enviro-Drill, Inc. (EDI - Phoenix, Arizona). The test borings were advanced using 8-inch diameter hollow-stem augers to depths ranging from approximately 10 to 15 feet below the existing ground surface (bgs). Relatively undisturbed samples were obtained at selected depths (where possible) from the test borings using a 2.42-inch I.D. ring-lined barrel sampler. Representative samples were also obtained from the test borings at selected depths by driving a 2.0-inch O.D., standard split-spoon (SPT) sampler. Grab samples of representative soils were also obtained at selected depths from each of the test borings for visual classification and possible subsequent laboratory testing.

The test pits were excavated with a CAT-446B backhoe and crew supplied by Environmental Response, Inc. (ERI - Phoenix, Arizona). The test pits were advanced using an 18-inch wide bucket to depths ranging from approximately 5 to 10 feet bgs. During the test pit excavation, the soils encountered were visually classified and logged by GEC - SA&B's field engineer. Bulk grab samples of representative soils were obtained at selected depths from each of the test pits for visual classification and possible subsequent laboratory testing. Test boring/pit logs presenting the results of the field exploration are presented in Appendix A.

Selected samples obtained during the geotechnical exploration were subjected to laboratory testing to obtain the data necessary to develop geotechnical recommendations for the project. The laboratory results are presented in Appendix B. A summary of the laboratory tests performed in conjunction with this exploration is presented in the following table.

LABORATORY TESTING SUMMARY

Laboratory Test	Sample Type	Number of Tests	Purpose
Percent Passing #200 Sieve	Grab	12	Soil Classification and Pavement Design
Atterberg Limits (PI)	Grab	12	Soil Classification and Pavement Design
Soluble Salts, Sulfates & Chlorides	Grab	1	Soil corrosion characteristics
pH & Resistivity	Grab	1	Soil corrosion characteristics



Laboratory Test	Sample Type	Number of Tests	Purpose
pH & Resistivity	Grab	1	Soil corrosion characteristics
Moisture/Density*	Ring	15	Soil moisture/density information

* - Dry density and moisture content information is presented on the boring logs.

4.0 SOIL CONDITIONS

Soil profiles at the test boring and test pit locations were found to be only slightly variable, and detailed descriptions are presented on the individual test boring and test pit logs included in Appendix A of this report. In general, the subsurface profile consisted of two distinct layers. The surface layer was comprised of alluvial and/or residual (weathered in-place) deposits of clayey sand (SC), poorly graded sand (SP-SC), and silty sand (SM) soils. These surface sandy soils contained variable amounts of gravel, exhibited plasticities in the no to medium range, had relative densities in the medium dense to very dense range, and contained no to weak calcium carbonate cementation (caliche). At depths ranging from roughly 1 to 10 feet bgs, the surface soil layer was underlain by a layer comprised of moderately to highly weathered granitic bedrock. This weathered bedrock layer was also noted to be variably decomposed and altered. Backhoe bucket refusal at depths ranging from about 5 to 6 feet bgs was encountered in Test Pits TP-3, TP-4, and TP-9. Refusal was due to the presence of the weathered granitic bedrock.

In situ moisture contents of the soils encountered in the test borings were generally described as being slightly damp throughout the depths explored. Groundwater was not encountered in any of the test borings or test pits during the drilling/excavating operations.

The above soil descriptions are general and variations along the entire water line and sewer line alignments should be expected. Refer to the individual boring logs included in Appendix A for a more detailed description of the soil profile at the individual test boring and test pit locations.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

This section of the report presents discussions and geotechnical recommendations pertaining to excavation, support and installation of the proposed new water line and gravity sewer line. This section also presents geotechnical engineering recommendations for use in the design and construction of the proposed street improvements associated with the Sereno Canyon Phases 2, 3, and 4 residential development. The recommendations and discussions contained in this report are based upon our present understanding of the project, the City of Scottsdale's technical design requirements, and the results of the field and laboratory testing which are presented in Appendices A and B of this report. Alternative recommendations may be possible and will be considered upon request.



5.2 Construction Excavations

We expect that trenches can be cut nearly vertically into the majority of the Site surface and shallow subsurface soils, and they should remain temporarily stable for a sufficient length of time to install shoring, trench jacks, or trench boxes (shields). However, rapid and unpredictable caving may occur where existing surface fills, backfills, clean sand soils, stratified clean sand and silt deposits, buried facilities, etc. are encountered or adjoin the trench. Over-break and slope raveling or caving may occur in the coarser grained clayey and silty sand surface soil. If excavations undercut existing facilities or structures, underpinning should be provided to prevent settlement or distress to the existing facilities or structures. Little or no surface settlement is expected in areas adjoining sloped construction cuts or braced vertical trenches. Personnel entry into laterally unsupported or inadequately sloped trenches or excavations is not recommended.

5.3 Excavation Conditions

The test drilling and field sampling were performed, in part, for purposes of determining the degree of difficulty for excavating the surface and subsurface soils underlying the expected water line and sewer line alignments. It is not possible to accurately correlate auger drilling results with the ease or difficulty of digging for various types and sizes of excavation equipment. However, materials types that may present difficult excavation conditions can often be delineated from the rate and difficulty of drilling (including auger refusal), and standard penetration testing and sampling using a standard 2.0-inch O.D., split-spoon (SPT) sampler.

We present the following general comments regarding excavation conditions for the designers' information with the understanding that they are estimations based only on test boring data. More accurate information regarding excavation conditions should be evaluated by contractors or other interested parties from test excavations using the intended equipment. Contractors must be made aware that variable excavation conditions may be encountered at any location along the alignment of the proposed pipe lines, especially considering the variable soil types and the stratifications that are typically encountered within the general area of the Site.

Shallow excavations into the near surface soils (upper roughly 1 to 10 feet bgs) should be possible with conventional earth excavating equipment. Excavations that extend below depths ranging from 1 to 10 feet will probably require heavy to very heavy excavating equipment with ripping capabilities due to the presence of the weathered granitic bedrock materials. Deeper excavations into this weathered bedrock layer will likely require a trackhoe, ram-hoe, or other heavy excavator with ripping capabilities to efficiently excavate these materials. The bedrock becomes more competent with depth, and deeper excavations into the bedrock will likely require specialized rock excavating equipment or blasting. In case of caving and raveling in open excavations, the excavations should be braced or sloped as required to provide personnel safety and satisfy local safety code regulations.



5.4 Earthwork Factors

Earthwork losses due to ground height losses and shrinkage were estimated based on the laboratory and field testing, and from our past experience with similar soils. As indicated previously in this report, the subsurface profile consisted generally of two distinct layers. The surface layer was comprised of alluvial and/or residual (weathered-in-place) deposits of clayey sand, poorly graded sand, and silty sand soils, containing variable amounts of gravel. At depths ranging from roughly 1 to 10 feet bgs, the surface soil layer was underlain by a layer comprised of moderately to highly weathered granitic bedrock.

The ground height losses due to subgrade compaction (assumes 8-inch compacted depth) for the existing ground surface across the majority of the Site are estimated to be on the order of 0.8 to 1.2 inches. This value is expected to be larger (in the range of 1.5 to 2 inches) where higher levels of compaction are specified and/or where the existing natural soils are disturbed and/or loose. This value is also expected to be smaller (in the range of 0.5 to 0.8 inches) where the existing natural soils are dense and/or where lower levels of compaction are specified.

The shrinkage losses from cut to fill zones have been estimated by this firm to be on the order of 10 to 15 percent for the upper alluvial and/or residual soils, and 5 to 10 percent for the highly weathered granitic bedrock. These estimates do not include compaction to greater depths or densities than assumed, losses due to wind or wastage, over-excavation, for cuts in existing fill areas, etc.

5.5 Non-Structural Backfill

On-site soils may be used for trench backfills in non-structural areas, below concrete sidewalk areas, and below existing or proposed new pavements. On-site soils are predominantly clayey sands, poorly graded sands, and silty sands with a fines content (percent passing the #200 sieve) and plasticity index (PI) generally higher than allowed for water settling by the Maricopa Association of Governments' (MAG) Standard Specifications. Subsequently, we do not recommend water settling of these materials in areas near structures, below paved areas, or in heavy equipment corridors. Rather, we recommend mechanical compaction. Uniform moisture distribution, generally near optimum, and relatively thin to moderate lift thicknesses (8 inches $\pm$ compacted) will be required to facilitate compaction of these soils in confined trenches.

5.6 Pipe Bedding Materials

The existing surface and subsurface soils at the test boring locations were clayey sand, poorly graded sand, and silty sand soils. The majority of these soils will likely not be suitable for use as pipe bedding. Therefore, it is apparent that the pipe bedding material for this project will likely consist entirely of imported fill material. Where pipe bedding consists of open graded gravels (imported pea gravel, or similar), a filter fabric may be required between the bedding material and the backfill soils to prevent a migration of fines from finer-grained backfill soils into the bedding



material. All pipe bedding material should conform to the appropriate MAG and/or the City of Scottsdale Supplemental Specifications.

5.7 Corrosion

Corrosion is most likely to occur in fills and natural soils with high moisture contents. Laboratory tests were performed on a composite sample of the on-site native soils to determine the soluble salts, sulfate, and chloride content. The results of these laboratory tests are included in Appendix B. In addition, results of laboratory tests conducted in our previous reports and in areas adjacent to the Site were evaluated to determine the corrosion potential of the site soils. The soluble sulfate content of the tested site soils is 0.0009 percent, which is substantially less than 0.1 percent. According to the criteria of the 2000 and 2003 International Building Code (IBC), Table 1904.3, results less than 0.1 percent indicate a negligible level of sulfate exposure. Therefore, no additional requirements for concrete exposed to sulfate-containing solutions are required. In addition, the soluble salts content of the soils is 0.0200 percent, and the soluble chloride content of the soils is 0.0010 percent. Based on these values, the corrosion potential of the site soils to concrete is expected to range from negligible to low. Therefore, concrete in contact with the Site soils should use either Type II or Type I low alkali Portland cement. (Note: These are the cements that are used routinely throughout Arizona.)

Laboratory minimum resistivity and pH tests were also conducted. The pH of the soils tested was 7.9, which is in the typical range for desert soils in the Phoenix metropolitan area. Minimum resistivity value of 2,576 ohm-cm was recorded on the soils sampled from the Site. These results indicate that the fine-grained site soils, especially when of elevated moisture content, are highly corrosive to buried ferrous metals. Therefore, special protection appears to be warranted for buried metal piping or other conduit that would be in contact with the site soils. Special protection may also be necessary where dissimilar metals are placed in close proximity or are joined. Consideration should be given to the use of approved non-metallic or coated conduits.

We recommend that the results of our laboratory testing (Appendix B of this report) be reviewed by a person or firm experienced in corrosion protection designs for the actual construction at the Site, and/or the appropriate pipe or material manufacturer should be contacted for their recommendations based on the conditions at the Site.

5.8 Pavement Design Recommendations

Geotechnical engineering recommendations for use in the design and construction of proposed new street improvements associated with the Sereno Canyon Phases 2, 3, and 4 residential development is included in the following paragraphs. These recommendations are based upon our understanding of the project, the City of Scottsdale's technical design requirements (*Design Standards & Policies Manual, City of Scottsdale - 2004 Update*), and the results of GEC - SA&B's field and laboratory testing at the Site to date.



The design of the new asphalt concrete (AC) pavement section for the proposed local residential streets was performed in general accordance with the City of Scottsdale's Design Standards & Policies Manual (2004 Update). Site grading within new pavement areas should be accomplished as recommended in this report to provide subgrade support for flexible pavements. A compacted subgrade of on-site granular soils or imported soils with comparable supporting properties is assumed. The following tabulation presents the recommended pavement section:

RECOMMENDED AC PAVEMENT SECTION

Roadway Section	Minimum AC Thickness	Minimum Base Course Thickness*
Local Residential Streets	3.0"	6.0"

* - The top 4 inches of base course shall be ABC. The balance shall be ABC or Select material.

The tabulated pavement section is considered a minimal section based upon the expected traffic and the existing subgrade conditions. However, it is expected to function with periodic maintenance and overlays if good drainage is provided and maintained. Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade. Locally, 2- and 3-inch asphalt pavement sections often become brittle and experience cracking before the 20-year life is attained. Therefore, the bituminous surface should be sealed after an initial summer of use (and routinely thereafter) to minimize water infiltration directly through the pavement section and to retard premature oxidation of the surfacing.

In proposed bituminous pavement areas, the moisture content of the subgrade soils and fill materials should be maintained at a moisture content of 2 percent below optimum or lower. At these moisture contents pumping would not be expected to occur. Pumping of the pavement subgrade soils could be detrimental to pavement performance. Therefore, if pumping occurs during compaction of the pavement subgrade, then the wet soils should be removed and replaced with drier soils, or the wet soils should be spread and allowed to dry.

In areas where trenches are placed in, cross, or otherwise disturb existing pavements, pavement patches should conform with the City of Scottsdale Standard Details or the appropriate MAG requirements. As a guideline, asphalt concrete patches matching the existing pavement thicknesses are recommended.

6.0 CONSTRUCTION RECOMMENDATIONS

6.1 Fill Materials

All fill materials should be inorganic soils free of vegetation, debris, organics, and fragments larger than 6 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer. The



native surface and subsurface soils derived from areas of on-site excavation may be used as fill and backfill in all non-structural areas, and below concrete sidewalks and existing or proposed new pavements.

Any imported fill or backfill materials utilized at the Site for general fill material should conform to the following specification requirements:

IMPORTED FILL/BACKFILL SPECIFICATIONS

Property	Specification	Remarks
Maximum Particle Size	6"	Maximum size may be reduced at architect's/owner's direction to satisfy project, trenching or landscaping requirements, etc.
Maximum Percent Passing #200 Sieve	55	None
Maximum Plasticity Index (PI)	15	None
Maximum Percent Expansion	2.0%	Performed in a consolidometer (ASTM D2435), with the sample remolded to 95% of the maximum ASTM D698 density and 2% below optimum moisture, and confined under a 100 psf surcharge pressure. The compacted sample is then inundated and allowed to swell/expand until equilibrium is reached.

6.2 Bedding

Bedding Materials for use beneath the proposed pipe lines should be well graded granular materials meeting the City of Scottsdale Supplements to MAG and/or MAG Specifications for Bedding (MAG Section 601).

6.3 Base Course

Base course materials for use beneath pavement areas should be well graded sand and gravel materials meeting the City of Scottsdale Supplements to MAG and/or the Maricopa Association of Governments (MAG) Specifications for Aggregate Base Course Materials (MAG Section 702, ABC).

6.4 Pavement

Pavement materials should be in accordance with the requirements of the City of Scottsdale Supplements to MAG and/or MAG Standard Specifications for Asphalt Concrete (MAG Section 710, Type 19 mm or 12.5 mm). Placement requirements for the asphaltic concrete pavement should be in accordance with the requirements presented in the MAG Standard Specifications for Asphalt Concrete Pavement (MAG Section 321). Observation and testing should be performed as necessary to verify conformance with these recommended specifications, especially compaction requirements for asphalt concrete surfacing.



6.5 Site Grading

Preparation of the pipe line alignments for construction may include the removal of vegetation or existing structures (pavements, etc.), and excavation to proposed subsurface structure grade. The following recommendations are presented for site grading within the proposed excavation and pavement areas. In addition, criteria for the placement of backfill and fill materials are also presented. All phases of earthwork should be performed under observation and testing directed by a qualified geotechnical engineer.

1. Remove any existing vegetation and organic contaminants, existing pavements, subsurface remnants of any former facilities, any surface fills and backfills, and any unstable (loose, disturbed, wet, etc.) soils, if encountered, from all proposed excavation and pavement areas. Observe the cleared surface before and during subsequent excavation for evidence of debris-laden soils, disturbance, or loose zones requiring additional removal.
2. In pavement areas, make any cuts that may be necessary to achieve finished subgrade level.
3. Widen any depressions as necessary to accommodate compaction equipment and provide a level base for placing fill.
4. In pavement areas, subsequent to the surface clearing and grubbing efforts, the exposed natural ground surface should be prepared to a minimum depth of 8 inches below all proposed pavement areas. Subgrade preparation should consist of scarification, moisture conditioning (where necessary), and compaction.
5. In below grade structure areas (pipelines, etc.), clean the subgrade of all loose or disturbed soils. Over-excavations below deep structures or pipe lines should be backfilled with lean concrete or as otherwise directed in the field by the geotechnical engineer.
6. Place backfill or fill materials required to elevate Site areas to specified subbase grade. Fill materials should be placed and compacted in horizontal lifts of thicknesses compatible with the compaction equipment used.
7. Compaction of subgrade soil, backfill, subbase fill, and base course materials should be accomplished to the following density criteria:



DENSITY CRITERIA AND MOISTURE CONTENT GUIDELINES

Material	Area of Placement	Percent Compaction (ASTM D698)	Moisture Content Guidelines
Exposed Subgrade Soils and Fills of On-Site or Approved Imported Soils	Below asphalt pavement: 0 to 2 feet below finished subgrade 2 to 5 feet below finished subgrade 5 feet or more below finished subgrade	95 min. 95 min. 98 min.	Opt. -2% or lower Opt. $\pm 3\%$ Opt. $\pm 3\%$
Base Course	Below asphalt pavement	100 min.	Opt. -2% or lower
Pipe Bedding	Pipe bedding	90 min.	Opt. $\pm 3\%$
Utility Trench Backfill	Utility trenches and other backfill areas used for pavement or utility line support	According to the City of Scottsdale Standard Detail 2201, the City of Scottsdale Supplement to MAG and/or MAG Specifications for Compaction Densities (MAG 601.4.4)	

Natural undisturbed soils or compacted soils subsequently disturbed or removed by construction operations should be replaced with materials compacted as specified above, or as directed in the field by the geotechnical engineer.

7.0 LIMITATIONS

This report was prepared for the sole use of Crown Community Development, and Wood, Patel & Associates, Inc. (the "Client"), their consultants, their counsel, and their contractors, exclusively, and it is subject to the terms and conditions presented in our contract. No other person may rely on this report without the prior written consent of Geotechnical and Environmental Consultants, Inc. (d.b.a. GEC - SA&B).

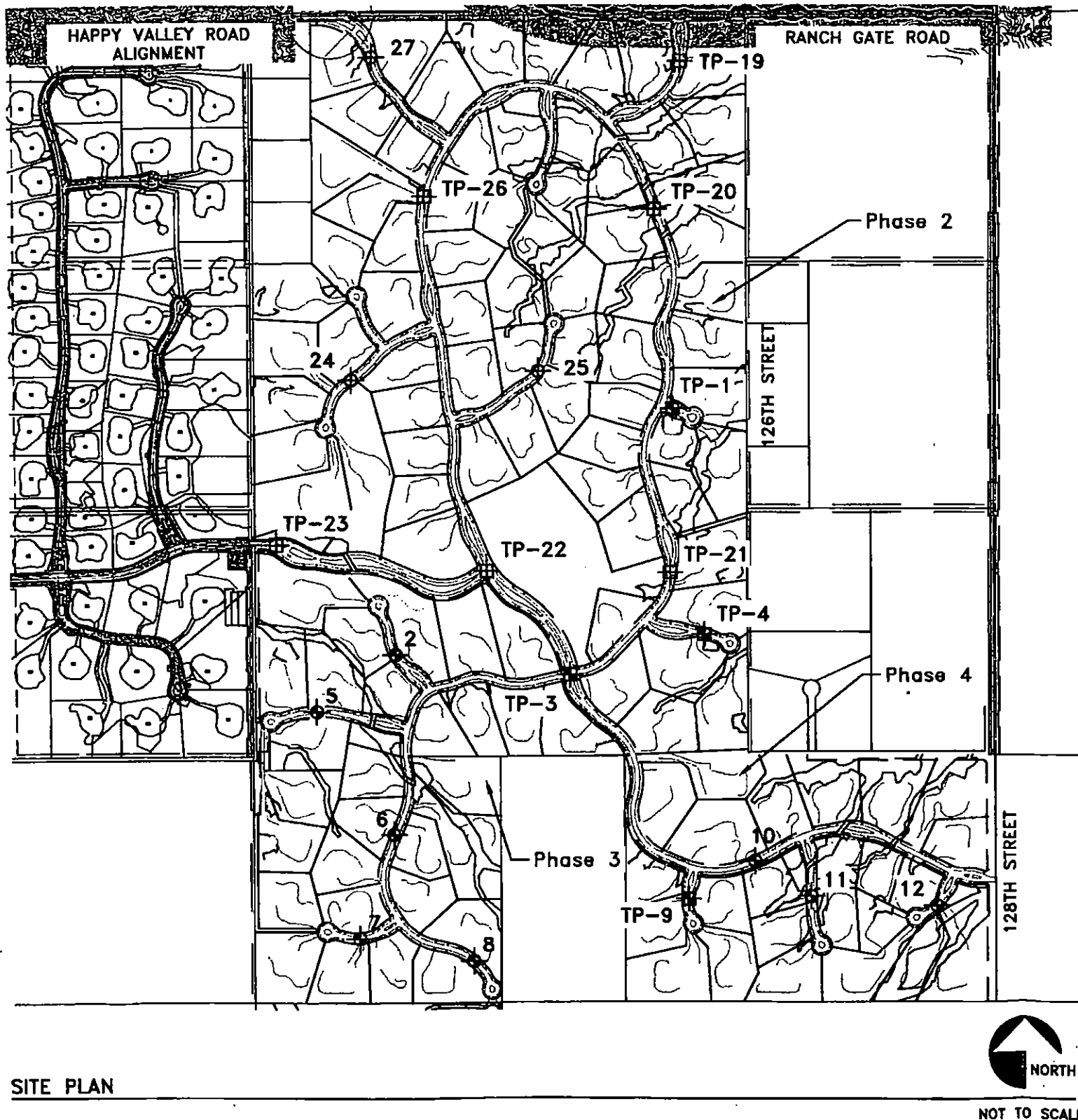
Our geotechnical services were performed to present data to aid in the design and construction of the proposed on-site improvements of the Sereno Canyon Phases 2, 3, and 4 residential development for the Client as described in the report. The data was developed based upon the results of the field exploration and laboratory testing completed by GEC - SA&B, and our engineering analysis of these conditions in relation to the proposed development. The field exploration, laboratory test results, and development plans provided the basis for our geotechnical engineering discussions and recommendations presented in the report. We should be notified if Site conditions other than those described in the report are encountered during construction, or if the proposed development plans change, so we can review and modify this report, if necessary. This report should only be reviewed and used in its entirety. Additional information which was not readily available to GEC - SA&B at the time of this report may result in a modification of the discussions and recommendations presented. This report and its contents shall not be used by the Client, owner, or other parties for other developments or structures on this Site, for future additions or alterations to this project, or for other projects or other sites, without prior written agreement from GEC - SA&B.



Our services did not include an evaluation of seismic activity, faults, ground subsidence, earth fissuring, or other potential geologic or mining hazards that may be present at the Site. This report also did not address any potential environmental liabilities that may be associated with the Site.



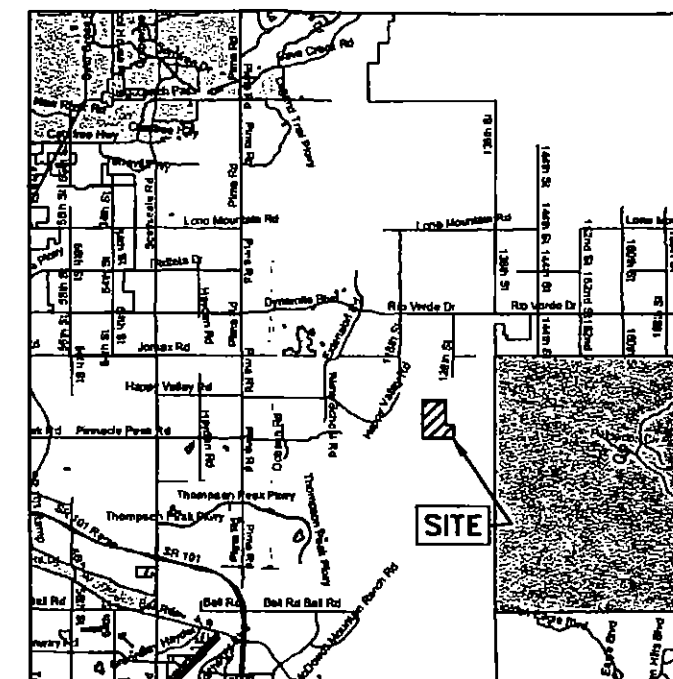
FIGURES



SITE PLAN

KEY

- Test Boring
- Test Pit
- Previous Test Boring-Phase 1
- Previous Test Pit-Phase 1



VICINITY MAP



FIGURE 1

SITE PLAN

Sereno Canyon - Phases 2, 3, and 4
SW of Happy Valley Road Alignment
and 128th Street
Scottsdale, Arizona

0600d/06-0201A/06-0201A.Fig1

Project No. 06-0201A

APPENDIX A

LEGEND

I. Unified Soil Classification System ASTM D-2487:

Coarse-Grained Soils Less Than 50% Fines		
Major Division	Group Symbol	Soil Description
GRAVEL More than half the coarse fraction is larger than the No. 4 sieve	GW	Well-graded gravel or gravel-sand mixtures, less than 5% fines
	GP	Poorly graded gravel or gravel-sand mixtures, less than 5% fines
	GM	Silty gravel, gravel-sand-silt mixtures, more than 12% fines
	GC	Clayey gravel, gravel-sand-clay mixtures, more than 12% fines
SANDS More than half the coarse fraction is smaller than the No. 4 sieve	SW	Well-graded sands or gravelly sands, less than 5% fines
	SP	Poorly graded sands or gravelly sands, less than 5% fines
	SM	Silty sands, sand-silt mixtures, more than 12% fines
	SC	Clayey sands, sandy-clay mixtures, more than 12% fines

Note: Coarse-grained soils receive dual symbols if they contain 5 to 12% fines (e.g., SW-SM, GP-GC, etc.).

Fine-Grained Soils More Than 50% fines		
Major Division	Group Symbol	Soil Description
SILTS AND CLAYS with a liquid limit less than 50	ML	Inorganic silts, very fine sands, silty or clayey fine sands
	CL	Inorganic clays of low to medium plasticity
	OL	Organic silts or organic silty-clays of low plasticity
SILTS AND CLAYS with a liquid limit greater than 50	MH	Inorganic silts or silty clays of high plasticity
	CH	Inorganic clays of high plasticity
	OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS	PT	Peat, muck, and other highly organic soils

Notes: Fine-grained soils receive dual symbol if their plasticity index is between 4 and 7 and its liquid limit is less than 30.

II. Soil Grain Size:

U.S. Standard Sieve							
12"	3"	3/4"	4	10	40	200	
BOULDERS	COBBLES	GRAVEL		SAND			SILT
		COARSE	FINE	COARSE	MEDIUM	FINE	
305	76	19	4.8	2.0	0.42	0.074	0.005
Soil Grain Size in Millimeters							

III. Sampler Driving Record:

Blow count indicates number of blows for a standard 140-lb hammer to drive the sampler as shown below :

Type	No. of Blows	Description
Standard split spoon	10-15-25	10 blows drove sampler initial 6 inches, 15 blows drove sampler next 6 inches, 25 blows for final 6 inches
Standard split spoon	15-50/5"	15 blows drove sampler initial 6 inches, 50 blows drove sampler next 5 inches
Standard split spoon	50/3"	50 blows drove sampler 3 inches during initial 6-inch seating interval
Ring sampler	30	30 blows drove sampler 12 inches, no initial seating increment
Ring sampler	50/8"	50 blows drove sampler 8 inches, no initial seating increment
Bullnose	18	18 blows drove 2.0-inch O.D. bullnose 12 inches
Bullnose	100/9"	100 blows drove 2.0-inch O.D. bullnose 9 inches

NR = No Recovery

Project Name:

Serenio Canyon - Phases 2, 3, and 4

Excavated By:

ERI

Date Started:

12/8/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Friedrich

Date Completed:

12/8/2006

Total Depth:

10 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

SUMMARY OF SUBSURFACE CONDITIONS

BULK

DRIVE

POORLY GRADED SAND (SP-SC): brown; medium dense to very dense; medium plasticity; no to weak cementation; with clay and gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.

Stopped excavation at 10.0 feet.
No groundwater encountered in test pit.

DEPTH (FEET)

GRAPHIC LOG

2

4

6

8

10

12

14

16

18



Project Name:

Sereno Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

14.2 feet

SAMPLE LEGEND



Bulk/Grab

Ring-Lined
Barrel Sampler
(Ring)Standard
Penetration
Test (SPT)

SAMPLES

BULK

DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

BLOWS

DRY UNIT WT.
(pcf)

MOISTURE (%)

CLAYEY SAND (SC): brown; medium dense; low to medium plasticity; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

very dense below about 5 feet.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.

soft to medium hard below about 9 feet.

Stopped test drilling at 14.0 feet.
Sampler refusal at about 14.2 feet
No groundwater encountered in test boring.

27

109

3

50/4"

113

3

50/5"

50/2"



Project Name:

Serenio Canyon - Phases 2, 3, and 4

Excavated By:

ERI

Date Started:

12/8/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Friedrich

Date Completed:

12/8/2006

Total Depth:

5 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

BULK
DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

SILTY SAND (SM): brown; medium dense to very dense; non-plastic; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.
medium hard below about 4 feet.

Bucket refusal at 5.0 feet.
No groundwater encountered in test pit.

DEPTH (FEET)

GRAPHIC
LOG

2

4

6

8

10

12

14

16

18



Project Name:

Sereno Canyon - Phases 2, 3, and 4

Excavated By:

ERI

Date Started:

12/8/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Friedrich

Date Completed:

12/8/2006

Total Depth:

6 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

SUMMARY OF SUBSURFACE CONDITIONS

BULK
DRIVE

DEPTH (FEET)

GRAPHIC
LOG

POORLY GRADED SAND (SP-SC): brown; medium dense to very dense; medium plasticity; no to weak cementation; with clay and gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.

medium hard below about 5 feet.

Bucket refusal at 6.0 feet.
No groundwater encountered in test pit.

2

4

6

8

10

12

14

16

18



Project Name:

Sereno Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

14.1 feet

SAMPLE LEGEND



Bulk/Grab

Ring-Lined
Barrel Sampler
(Ring)Standard
Penetration
Test (SPT)

SAMPLES

BULK

DRIVE

BLOWS

DRY UNIT WT.
(pcf)

MOISTURE (%)

SUMMARY OF SUBSURFACE CONDITIONS

CLAYEY SAND (SC): brown; very dense; medium plasticity; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.
soft to medium hard below about 5 feet.

Stopped test drilling at 14.0 feet.
Sampler refusal at about 14.1 feet
No groundwater encountered in test boring.

50/6"

117

2

50/4"

121

2

50/3"-NR

50/1"-NR



Project Name:

Serenio Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

10.4 feet

SAMPLE LEGEND



Bulk/Grab

Ring-Lined
Barrel Sampler
(Ring)Standard
Penetration
Test (SPT)

SAMPLES

BULK

DRIVE

BLOWS

DRY UNIT WT.
(pcf)

MOISTURE (%)

DEPTH (FEET)

GRAPHIC
LOG

SUMMARY OF SUBSURFACE CONDITIONS

POORLY GRADED SAND (SP-SC): brown; very dense; medium plasticity; no to weak cementation; with clay and gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft. soft to medium hard below about 3 feet.

Stopped test drilling at 9.0 feet.
Sampler refusal at about 10.4 feet
No groundwater encountered in test boring.

33-49-50/5"

50/8"

120

2

50/6"

118

1



GEC - SA&B
2801 South 35th Street
Phoenix, Arizona 85034
Phone: (602) 393-4800
Fax: (602) 393-4801

The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Serenio Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

14.9 feet

		SAMPLE LEGEND			SAMPLES													
DEPTH (FEET)	GRAPHIC LOG	 Bulk/Grab	 Ring-Lined Barrel Sampler (Ring)	 Standard Penetration Test (SPT)														
		SUMMARY OF SUBSURFACE CONDITIONS					BULK	DRIVE	BLOWS	DRY UNIT WT. (pcf)	MOISTURE (%)							
2		CLAYEY SAND (SC): brown; very dense; medium plasticity; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.							50/7"	117	3							
4										GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft. soft to medium hard below about 5 feet.							50/6"	114
6																		
8																		
10				34-50/6"														
12																		
14																		
16	Stopped test drilling at 14.0 feet. Sampler refusal at about 14.9 feet No groundwater encountered in test boring.						44-50/5"											
18																		



Project Name: Sereno Canyon - Phases 2, 3, and 4	Drilled By: Enviro-Drill Inc.	Date Started: 12/7/2006	Ground Elev.: N/A
Location: SW of Happy Valley Road Alignment and 128th Street	Logged By: J. Barker	Date Completed: 12/7/2006	Total Depth: 14.9 feet

		SAMPLE LEGEND			SAMPLES					
DEPTH (FEET)	GRAPHIC LOG		Bulk/Grab		Ring-Lined Barrel Sampler (Ring)		Standard Penetration Test (SPT)			
		SUMMARY OF SUBSURFACE CONDITIONS							BULK	DRIVE
		POORLY GRADED SAND (SC): brown; very dense; medium plasticity; no to weak cementation; with clay and gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.								
2		GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft. soft to medium hard below about 3 feet.								50/6"-NR
4										
6										50/5"-NR
8										
10										48-33-24
12										
14										38-50/5"
16		Stopped test drilling at 14.0 feet. Sampler refusal at about 14.9 feet No groundwater encountered in test boring.								
18										



GEC - SA&B
2801 South 35th Street
Phoenix, Arizona 85034
Phone: (602) 393-4800
Fax: (602) 393-4801

The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Serenio Canyon - Phases 2, 3, and 4

Excavated By:

ERI

Date Started:

12/8/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Friedrich

Date Completed:

12/8/2006

Total Depth:

6 feet

SAMPLE LEGEND



Bulk/Grab

SAMPLES

BULK

DRIVE

SUMMARY OF SUBSURFACE CONDITIONS

CLAYEY SAND (SC): brown; medium dense to very dense; medium plasticity; no to weak cementation; some gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.

GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft.

soft to medium hard below about 5 feet.

Bucket refusal at 6.0 feet.
No groundwater encountered in test pit.

DEPTH (FEET)

GRAPHIC LOG

2

4

6

8

10

12

14

16

18



Project Name: Serenio Canyon - Phases 2, 3, and 4	Drilled By: Enviro-Drill Inc.	Date Started: 12/7/2006	Ground Elev.: N/A
Location: SW of Happy Valley Road Alignment and 128th Street	Logged By: J. Barker	Date Completed: 12/7/2006	Total Depth: 14.5 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND	SAMPLES		BLOWS	DRY UNIT WT. (pcf)	MOISTURE (%)
			BULK	DRIVE			
		 Bulk/Grab  Ring-Lined Barrel Sampler (Ring)  Standard Penetration Test (SPT)					
		SUMMARY OF SUBSURFACE CONDITIONS					
0 - 2		CLAYEY SAND (SC): brown; very dense; medium plasticity; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.					
2 - 14		GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft. soft to medium hard below about 3 feet.			50/6"	117	2
					50/6"	114	3
					38-34-47		
					50/6"-NR		
14 - 16		Stopped test drilling at 14.0 feet. Sampler refusal at about 14.5 feet No groundwater encountered in test boring.					
16 - 18							



GEC - SA&B
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Phone: (602) 393-4800
Fax: (602) 393-4801

The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Sereno Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

14.9 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND	SAMPLES		BLOWS	DRY UNIT WT. (pcf)	MOISTURE (%)
			BULK	DRIVE			
2		CLAYEY SAND (SC): brown; medium dense; low to medium plasticity; no to weak cementation; with gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.					
4					18	113	2
6		GRANITE: whitish-tan to brown; moderately to highly weathered and altered bedrock; variably decomposed; very soft to soft. soft to medium hard below about 5 feet.			50/11"	119	1
8							
10					22-24-29		
12							
14					21-50/5"		
16		Stopped test drilling at 14.0 feet. Sampler refusal at about 14.9 feet No groundwater encountered in test boring.					
18							



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The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

Project Name:

Serenio Canyon - Phases 2, 3, and 4

Drilled By:

Enviro-Drill Inc.

Date Started:

12/7/2006

Ground Elev.:

N/A

Location:

SW of Happy Valley Road Alignment and 128th Street

Logged By:

J. Barker

Date Completed:

12/7/2006

Total Depth:

10 feet

DEPTH (FEET)	GRAPHIC LOG	SAMPLE LEGEND	SAMPLES		BLOWS	DRY UNIT WT. (pcf)	MOISTURE (%)
			BULK	DRIVE			
		 Bulk/Grab  Ring-Lined Barrel Sampler (Ring)					
		SUMMARY OF SUBSURFACE CONDITIONS					
2		SILTY SAND (SM): brown; medium dense; non-plastic; no cementation; some gravel; slightly damp.					
4					23	115	2
6		SILTY CLAYEY SAND (SC-SM): brown; medium dense; no to low plasticity; no to weak cementation; some gravel; slightly damp; layer has appearance of very highly weathered and decomposed granite.			26	102	3
8							
10		Stopped test drilling at 9.0 feet. Stopped sampling at 10.0 feet No groundwater encountered in test boring.			25	116	2
12							
14							
16							
18							

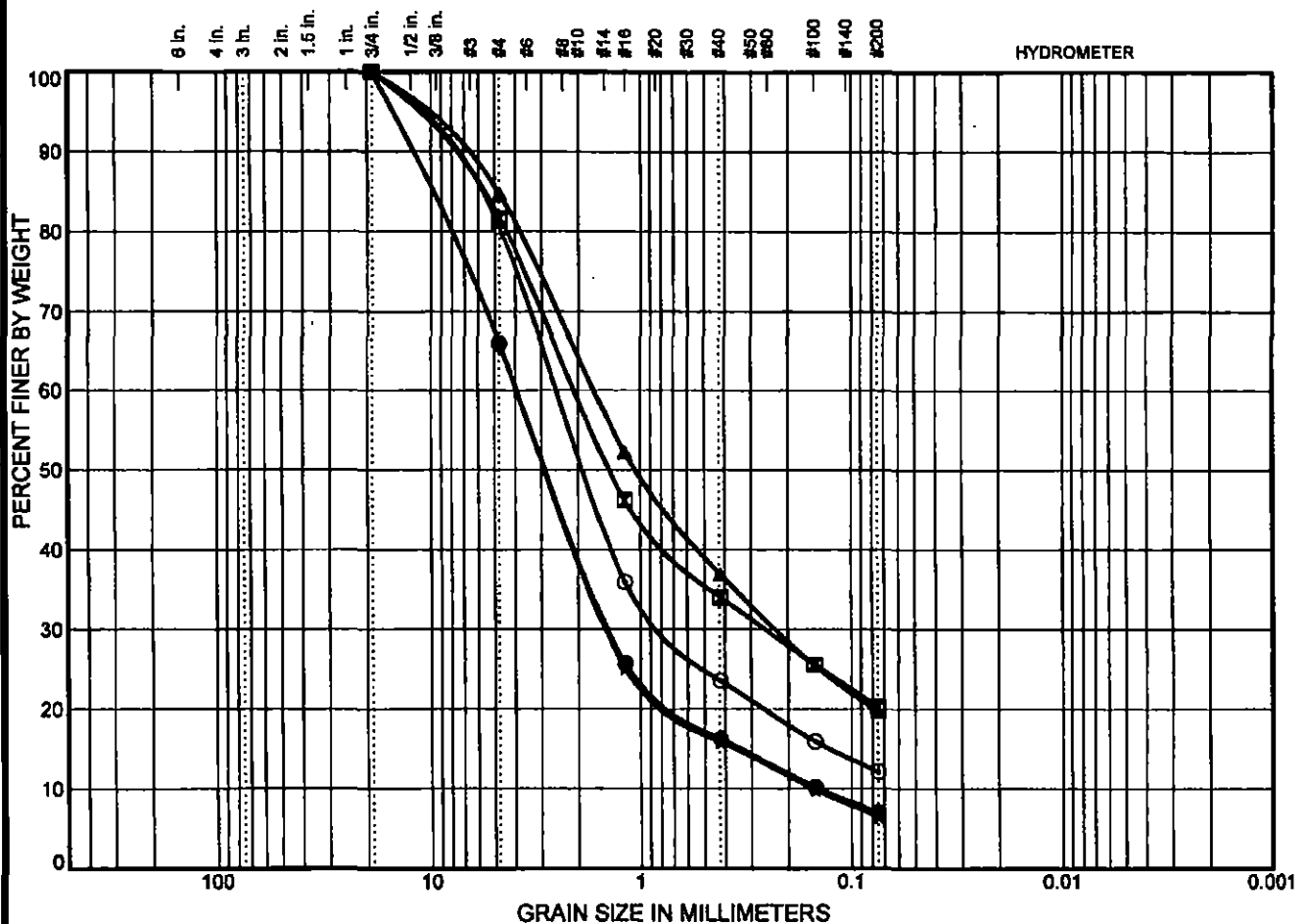


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The information presented on the boring log represents subsurface soil and rock conditions at the specific location and time designated. Changes between soil types may be transitional and approximate. This information was developed to aid in preparing this report. Other parties are fully responsible for their interpretations and conclusions.

APPENDIX B

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

	Source	% Cobbles	% Gravel	% Sand	% Silt	% Clay	D60	D30	D10	Cu	Cc
●	1	0	34	59	7.0		3.878	1.377	0.142	27.29	3.44
■	2	0	18	81	20		2.04	0.258			
▲	3	0	15	65	20		1.658	0.225			
★	4	0	34	59	6.5		3.9	1.404	0.152	25.63	3.32
⊙	5	0	19	68	12		2.511	0.721		49.46	4.08

SAMPLE REFERENCE AND DATA

	Source	Depth (ft.)	USCS	Description	PI	LL
●	1	0.0 - 3.0	SP-SC	Poorly Graded Sand	18	40
■	2	0.0 - 2.0	SC	Clayey Sand	10	30
▲	3	0.0 - 0.5	SM	Silty Sand	NP	NV
★	4	0.0 - 2.0	SP-SC	Poorly Graded Sand	14	34
⊙	5	1.0 - 4.0	SC	Clayey Sand	13	33

TECH GRAIN SIZE MULTIPLE 06-0201A.GPJ GEC.GDT 1/2007



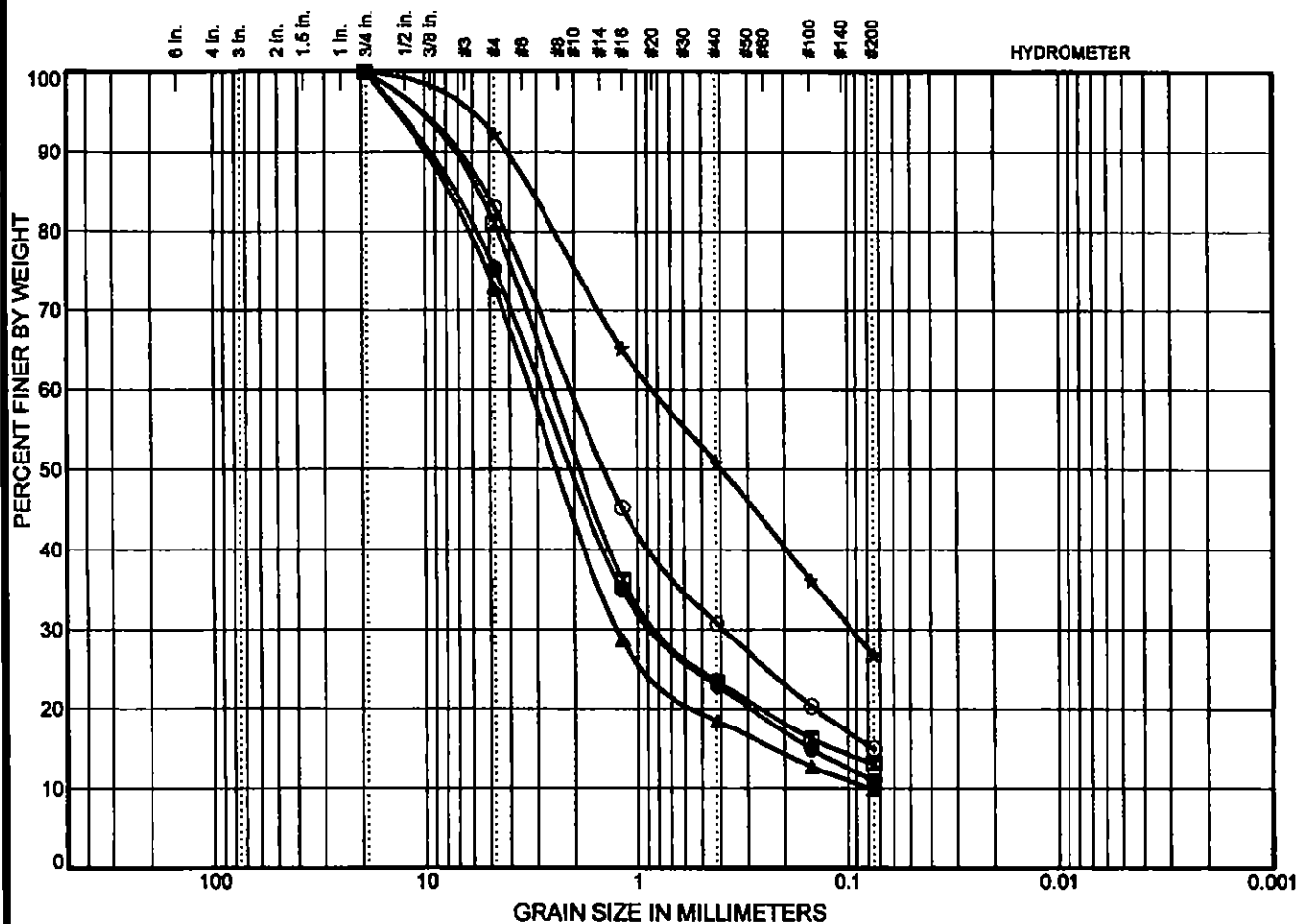
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 Fax: (602) 393-4801

Client:
Project:
Location:

Crown Community Development
 Sereno Canyon - Phases 2, 3, and 4
 SW of Happy Valley Road Alignment and 128th Street

Project No.:
 06-0201A

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

	Source	% Cobbles	% Gravel	% Sand	% Silt	% Clay	D60	D30	D10	Cu	Cc
●	6	0	25	84	11		2.808	0.773		44.57	3.38
■	7	0	19	88	13		2.48	0.715			
▲	8	0	27	83	9.9		3.171	1.241	0.076	41.54	6.36
★	9	0	8	65	27		0.818	0.095			
◎	10	0	17	68	15		2.046	0.39			

SAMPLE REFERENCE AND DATA

	Source	Depth (ft.)	USCS	Description	PI	LL
●	6	0.0 - 2.0	SP-SC	Poorly Graded Sand	12	33
■	7	0.0 - 4.0	SC	Clayey Sand	15	33
▲	8	0.0 - 2.0	SP-SC	Poorly Graded Sand	12	32
★	9	0.0 - 0.5	SC	Clayey Sand	13	32
◎	10	0.0 - 2.0	SC	Clayey Sand	17	36

TECH GRAIN SIZE MULTIPLE 06-0201A.GPJ GEC.GDT 1/9/07



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Crown Community Development

Project No.:

06-0201A

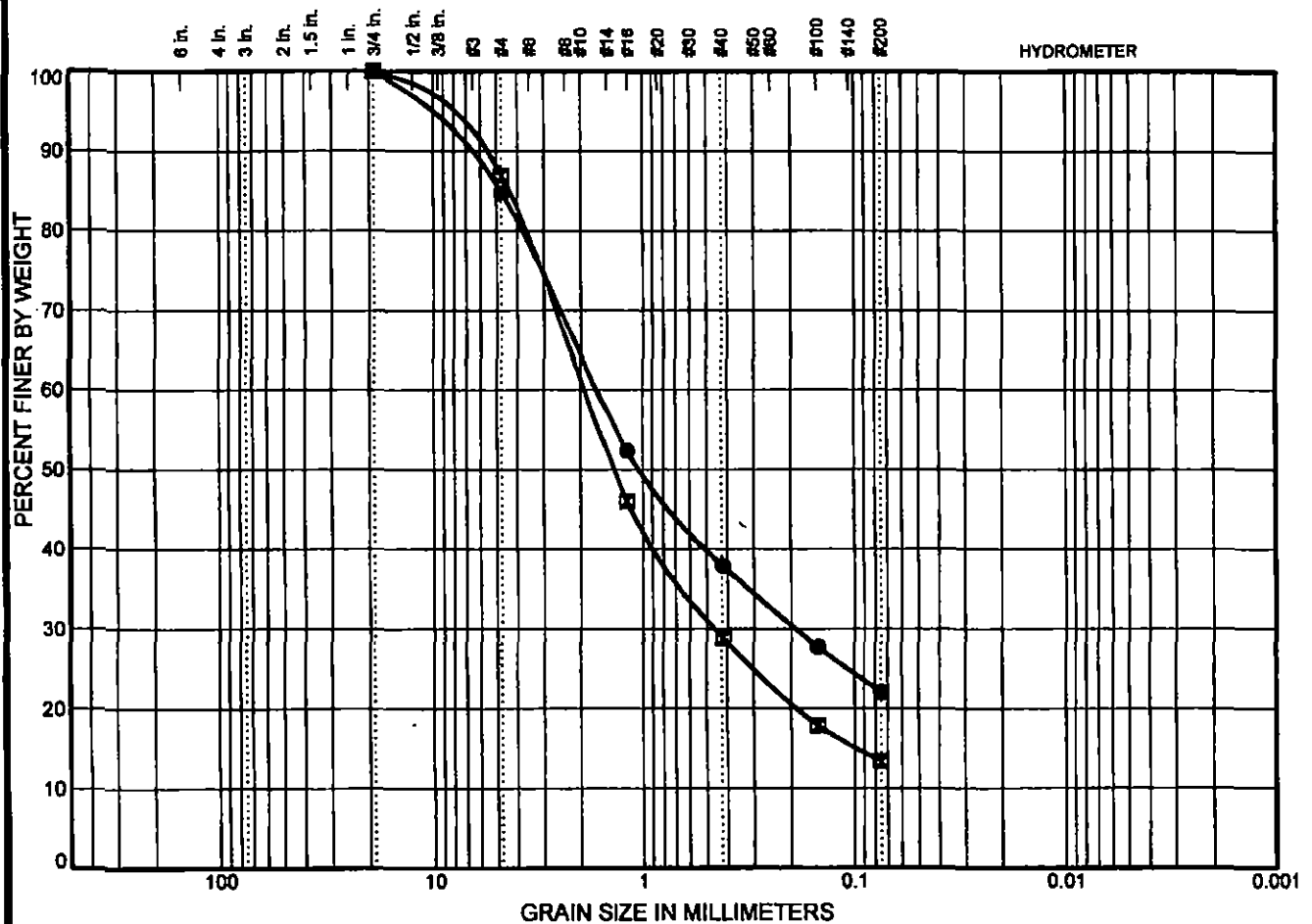
Project:

Sereno Canyon - Phases 2, 3, and 4

Location:

SW of Happy Valley Road Alignment and 128th Street

PARTICLE SIZE DISTRIBUTION



TEST RESULTS

	Source	% Cobbles	% Gravel	% Sand	% Silt	% Clay	D60	D30	D10	Cu	Cc
●	11	0	15	63	22		1.646	0.188			
■	12	0	13	74	13		1.909	0.45			

SAMPLE REFERENCE AND DATA

	Source	Depth (ft.)	USCS	Description	PI	LL
●	11	0.0 - 4.0	SC	Clayey Sand	9	32
■	12	0.0 - 5.0	SM	Silty Sand	NP	NV

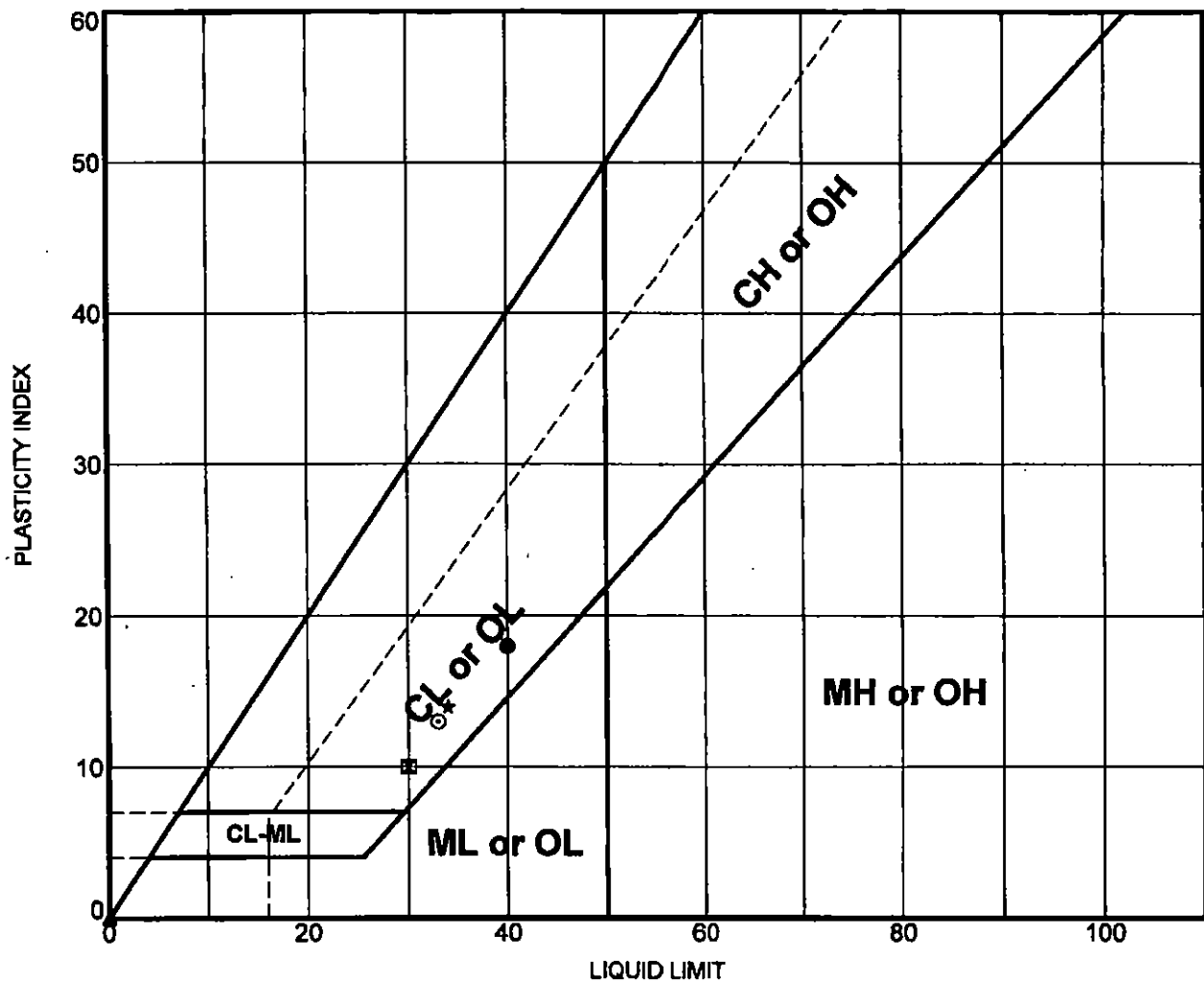
TECH GRAIN SIZE MULTIPLE 06-0201A.GPJ GEC.GDT 12/07



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Project:	Sereno Canyon - Phases 2, 3, and 4		
Location:	SW of Happy Valley Road Alignment and 128th Street		

ATTERBERG LIMITS TEST REPORT



TEST RESULTS

Sample Reference		Sample Properties and Data				
Source	Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% < No. 200	USCS
● 1	0.0 - 3.0	40	22	18	7.0	SP-SC
■ 2	0.0 - 2.0	30	20	10	20	SC
▲ 3	0.0 - 0.5	NV	NV	NP	20	SM
★ 4	0.0 - 2.0	34	20	14	6.5	SP-SC
◎ 5	1.0 - 4.0	33	20	13	12	SC

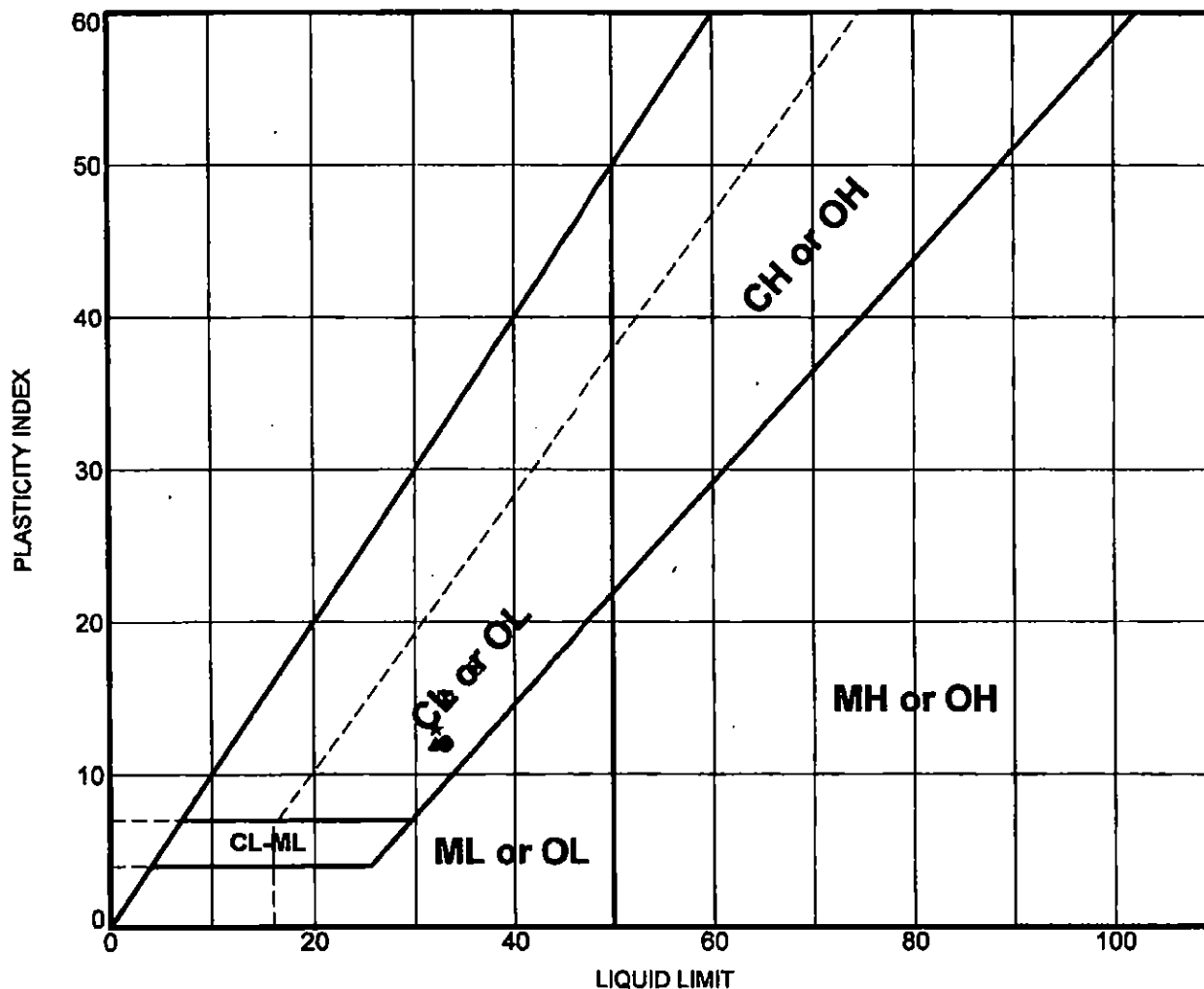
DTECHATTERBERG LIMITS MULTIPLE 06-0201A.GPJ GEC.GIT 1/3/07



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 2801 South 35th Street
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Client:	Crown Community Development	Project No.:	06-0201A
Project:	Sereno Canyon - Phases 2, 3, and 4		
Location:	SW of Happy Valley Road Alignment and 128th Street		

ATTERBERG LIMITS TEST REPORT



TEST RESULTS

TEST RESULTS						
Sample Reference		Sample Properties and Data				
Source	Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% < No. 200	USCS
● 6	0.0 - 2.0	33	21	12	11	SP-SC
■ 7	0.0 - 4.0	33	18	15	13	SC
▲ 8	0.0 - 2.0	32	20	12	9.9	SP-SC
★ 9	0.0 - 0.5	32	19	13	27	SC
◎ 10	0.0 - 2.0	36	19	17	15	SC

TECHATTERBERG LIMITS MULTIPLE 08-0201A, GPJ GEC, QDT 1/2/07



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Client:

Crown Community Development

Project No.:

08-0201A

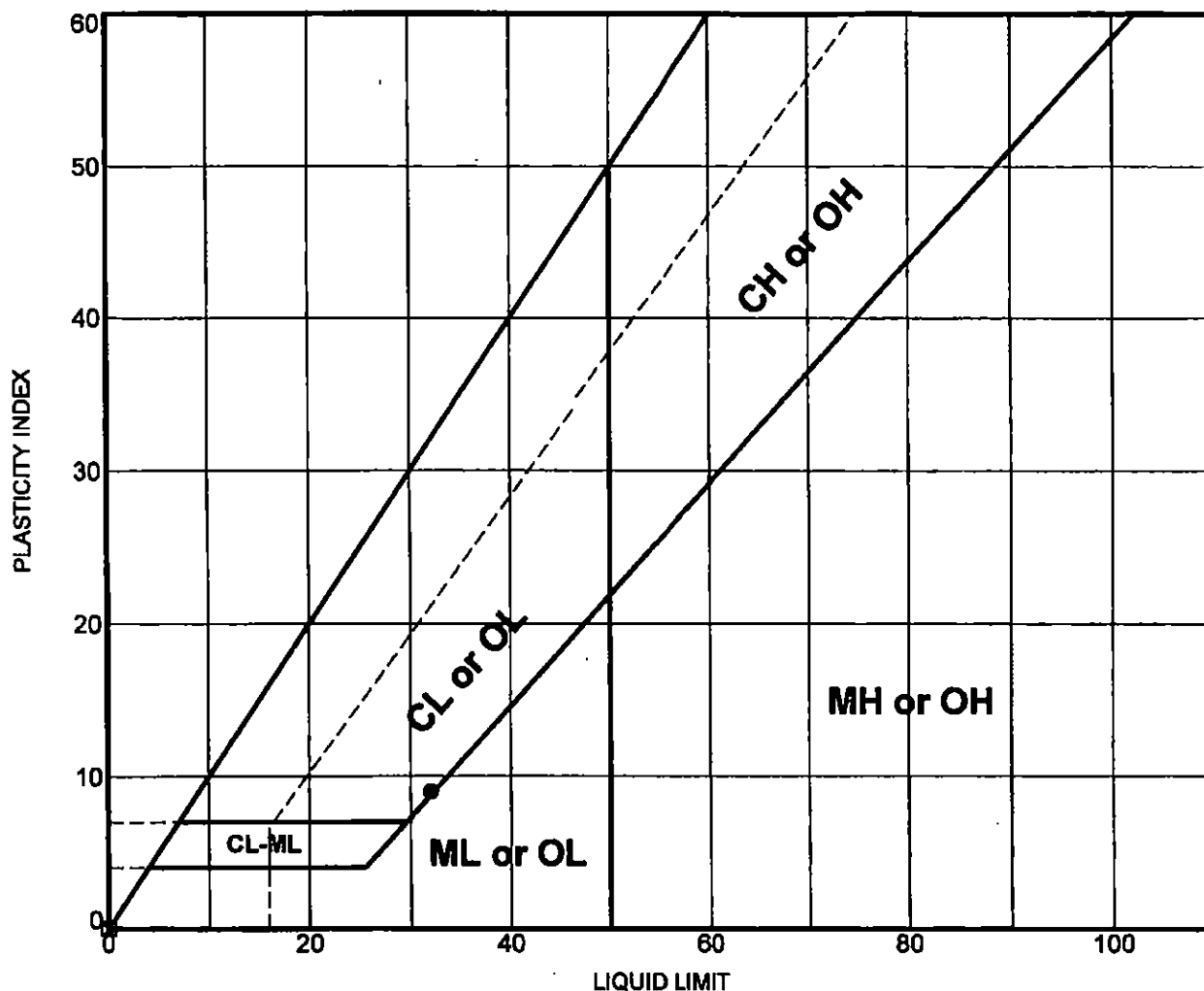
Project:

Sereno Canyon - Phases 2, 3, and 4

Location:

SW of Happy Valley Road Alignment and 128th Street

ATTERBERG LIMITS TEST REPORT



TEST RESULTS

TEST RESULTS						
Sample Reference			Sample Properties and Data			
Source	Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% < No. 200	USCS
● 11	0.0 - 4.0	32	23	9	22	SC
■ 12	0.0 - 5.0	NV	NV	NP	13	SM



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Client:	Crown Community Development	Project No.:	06-0201A
Project:	Sereno Canyon - Phases 2, 3, and 4		
Location:	SW of Happy Valley Road Alignment and 128th Street		

REPORT ON SOLUBLE SALTS, SULFATE & CHLORIDE TESTS

Sereno Canyon - Phases 2, 3, and 4
SW of Happy Valley Road Alignment and 128th Street
Scottsdale, Arizona

SAMPLE:**DATE:** December 22, 2006

Source: As Noted Below, Refer to the Site Plan (Figure 1)
Type: Bulk Samples from Test Pits and Auger Cuttings
Material: On-Site Surface and Subsurface Soils
Sampled by: GEC - SA&B / J. Barker

TESTED: Laboratory Soluble Salts (ADOT Method ARIZ 237b), Sulfate (ARIZ 733) and Chloride (ARIZ 736) tests (all conducted by IAS Laboratories).

TEST RESULTS

Test Boring (depth)	Soluble Salts (%)	Sulfate (%)	Chloride (%)
6 (0.0' - 2.0')	0.0200	0.0009	0.0010



REPORT ON LABORATORY pH & MINIMUM RESISTIVITY TESTING

Sereno Canyon - Phases 2, 3, and 4
SW of Happy Valley Road Alignment and 128th Street
Scottsdale, Arizona

SAMPLE:

DATE: December 22, 2006

Source: As Noted Below, Refer to the Site Plan (Figure 1)
Type: Bulk Samples from Test Pits and Auger Cuttings
Material: On-Site Surface and Subsurface Soils
Sampled by: GEC - SA&B / J. Barker

TESTED: Laboratory pH and Minimum Resistivity tests (Arizona/ADOT236b method).

TEST RESULTS

Test Boring (depth)	pH	Minimum Resistivity (ohm-cm)
6 (0.0' - 2.0')	7.9	2,576



Date: September 18, 2012

To: City of Scottsdale, Development Services Department
7447 E. Indian School Road, Scottsdale, AZ 85251

From: JE Fuller/Hydrology & Geomorphology, Inc.
Brian Schalk, P.E., CFM
1 W. Deer Valley Road, Phoenix, AZ 85027
[@jefuller.com](mailto:jefuller.com); 623-889-0166 x308

Re: **Sereno Canyon Master Drainage Plan Amendment II**

To Whom It May Concern:

Due to a revision of the proposed Sereno Canyon land-use plan, an amendment to the Sereno Canyon Master Drainage Plan (MDP) is being submitted to the City of Scottsdale (City) for review and approval. Revisions to the approved MDP are documented in the attached *Sereno Canyon Master Drainage Plan Amendment II (Amendment II)* report.

Additional, detailed discussion regarding the MDP is provided in the following two previously submitted and approved reports:

- *Sereno Canyon Master Drainage Plan (Approved MDP)*; November 15, 2006.
- *Sereno Canyon Master Drainage Plan Amendment (Amendment I)*; January 9, 2012.

It should be noted that the approach to stormwater mitigation (hydrologic analyses, design of drainage facilities, etc.), as presented in *Amendment II*, is consistent with approaches put forward in both the *Approved MDP* and *Amendment I* reports. Again, the modifications to the MDP, as presented in the attached *Amendment II* report, are based only on revisions to the proposed land-use plan. Furthermore, the computations and calculations presented in *Amendment II* are in accordance with the City's current *Grading and Drainage Design Standards and Policies* (January 2010) or have been previously reviewed by the City.

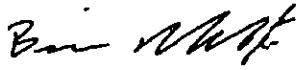
Amendment II addresses stormwater storage impact to natural area open space (NAOS). As discussed in Section 4.3, the City requires on-site storage of runoff from the 100-year, 2-hour frequency event. In addition, under the Environmentally Sensitive Lands Ordinance (ESLO) there are requirements for providing natural area open space along wash corridors. Sereno Canyon is intended to be a low-impact development that maintains and incorporates natural Sonoran Desert landscape. It is this natural landscape that is inherent to the proposed development's appeal. Therefore, one significant design objective is to minimize mass grading, consistent with the requirements of the ESLO.

Based on the *Amendment II* preliminary stormwater storage basin calculations, approximately 10 acres in total will be disturbed for stormwater storage. Disturbance is defined by basin

grading; however, these areas of disturbance will be landscaped to blend with the surrounding natural desert. In addition to the disturbed area, the total area of inundation/ponding associated with stormwater storage basins is approximately 14.5 acres. The total area of inundation and the total area of disturbance do not correlate given the ponding that occurs within portions of undisturbed wash.

Please feel free to contact me with questions and/or comments regarding *Amendment II*.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Schalk".

Brian Schalk, P.E., CFM
@jefuller.com
623-889-0166 x308

SERENO CANYON MASTER DRAINAGE PLAN

AMENDMENT II

September 18, 2012

Prepared by:



JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

JE Fuller/Hydrology & Geomorphology, Inc.
1 W. Deer Valley Rd., Ste. 101
Phoenix, AZ 85027
623-889-0166 x308

Prepared for:

City of Scottsdale
7447 E. Indian School Rd., Ste. 205
Scottsdale, AZ 85251
and
LVA Urban Design Studio
120 S. Ash Ave.
Tempe, AZ 85281

City of Scottsdale Plan Check #7424-05-7



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6



Appendices

- Appendix A** **Conceptual Land-Use Plan**
 100-Year Composite C-Value Evaluation Spreadsheet
- Appendix B** **Exhibit B-1. Land-Use C-Value Overview**
 Exhibit B-2. Areally Weighted C-Value per HEC-1 Subbasin
 Exhibit B-3. Conceptual Stormwater Storage Basin Locations
 Exhibit B-4. HEC-1 Subbasins and Flowpaths
 Exhibit B-5. Proposed HEC-1 Land-Use
 Exhibit B-6. HEC-1 Schematic
 Exhibit B-7. Developed Drainage Condition
- Appendix C** **Stormwater Storage Calculations**
- Appendix D** **Proposed Condition Hydrologic Modeling (HEC-1 Modeling)**

DVD

- Land-Use Shape File**
- 100-Year Composite C-Value Evaluation Spreadsheet**
- DDMS Files and HEC-1 Models**



1 Introduction

1.1 Report Purpose

Due to the newly proposed Sereno Canyon land-use plan, the *Sereno Canyon Master Drainage Plan Amendment II (Amendment II)* is being submitted to the City of Scottsdale (City) for review and approval. *Amendment II* documents the revised hydrologic conditions resulting from the proposed change in land-use. It should be noted that the hydrologic modeling, computational approaches and drainage concepts presented in *Amendment II* adhere significantly to those discussed in the following two approved reports:

- *Sereno Canyon Master Drainage Plan (Approved MDP)*; November 15, 2006.
- *Sereno Canyon Master Drainage Plan Amendment (Amendment I)*; January 9, 2012.

Where differences in hydrologic modeling, computational approaches and/or drainage concepts occur, City reviewers have been informed. It should be noted that *Amendment II* is an amendment to *Amendment I*; therefore, the reader is encouraged to reference the *Approved MDP* and *Amendment I* for additional details regarding currently approved drainage concepts and facilities.

The newly proposed conceptual land-use plan is provided in Appendix A.

1.2 Proposed Land-Use Plan Description

Sereno Canyon is intended to be a low-impact development that maintains and incorporates natural Sonoran Desert landscape. It is this natural landscape that is inherent to the proposed development's appeal. Therefore, one significant design objective is to minimize mass grading, consistent with the requirements of the City's Environmentally Sensitive Lands Ordinance (ESLO).

As discussed above, *Amendment II* has been prepared in support of a proposed change in land-use. Four primary land-use types are being proposed within the Sereno Canyon Development: Estate Residential, Villa Lot Residential, Resort Residential and Resort & Spa. A brief description of each land-use is provided below. Proposed land-use hydrology is discussed in Sections 4 and 5 (stormwater storage and HEC-1 modeling, respectively). The conceptual land-use plan for the Sereno Canyon Development is provided in Appendix A.

1.2.1 Estate Lot Residential

Estate Lot Residential land-use will consist of single family residence located on lots that are typically two to three acres or greater in size. The City land-use code associated with this development is R1-130. The comparable Flood Control District of Maricopa County (FCDMC) land-use code is LU 120.

1.2.2 Villa Lot Residential

Villa Lot Residential land-use will consist of single family residences located on lots that are one acre or greater in size. The City land-use code associated with this development is R1-43. The comparable FCDMC land-use code is LU 130.

1.2.3 Resort Residential

Resort Residential units will be a combination of attached and detached housing types at an average density of approximately two units per acre. The City land-use code associated with this development is R1-18 although the actual underlying zoning district for the Resort Residential area is R-4R. The comparable FCDMC land-use code is LU 140.

1.2.4 Resort & Spa

The Sereno Canyon Spa & Resort property will be a low-intensity, experiential resort that integrates within the surrounding natural desert. The resort will be comprised of 100 rooms and will include spa and restaurant services. The City land use code associated with this development is R-4R. The comparable FCDMC land use code is LU 510.

1.3 Special Conditions

Special conditions are discussed in *Amendment I*.

2 Existing Conditions

For this Master Drainage Plan amendment (*Amendment II*), the existing condition is considered unaltered, natural Sonoran Desert as discussed in the *Approved MDP* and *Amendment I*. Given that *Amendment II* has been prepared in support of a change in proposed land-use, additional existing condition hydrologic and hydraulic analyses were not required or performed. Please refer to *Amendment I* for detailed discussion regarding the most recent existing condition hydrologic and hydraulic modeling.

3 Proposed Master Drainage Plan Concept

The proposed Master Drainage Plan (MDP) concept, as presented in the *Approved MDP and Amendment I*, has not been modified under *Amendment II*.

3.1 Existing Drainages

The proposed MDP concept for the Sereno Canyon Development allows existing drainages to be maintained in their natural location and condition where possible. Under the plan, flow enters and exits the project site at historic locations. In addition, flow exiting the project site will not adversely impact downstream property owners through increases in peak discharge, volume or velocity. Detailed discussion regarding the MDP concept is provided in the *Approved MDP and Amendment I*.

3.2 Roadway Runoff

Roadway runoff will be conveyed according to the City's *Design Standards and Policy Manual*. Curb openings and/or storm drain outlets will be located at wash crossings. Additional discussion regarding roadway runoff is provided in *Section 3.1* of the *Approved MDP*.

3.3 Stormwater Storage Facilities

In accordance with the *Approved MDP and Amendment I*, the required 100-year, 2-hour stormwater storage volume (see *Section 4*) is retained through the use of in-line storage basins. In-line storage basins are located within significant drainages at the following locations:

1. Roadway crossings.
2. Just upstream of development boundaries.
3. Locations where preliminary grading of basins has occurred.

Flows routed through the in-line storage basins are metered by the use of outlet structures, which will typically be designed as either a weir structure or elevated drop inlet structure. Proposed drainage structures are discussed in additional detail in the *Approved MDP and Amendment I*.

Discussion regarding required stormwater storage and the associated hydrologic modeling of this storage - as a result of the proposed change in land-use - is provided in *Sections 4 and 5*, respectively.

4 Stormwater Storage Calculations

Additional discussion regarding the approach to stormwater storage (on-site retention) within the Sereno Canyon Development is provided in *Sections 3.3 and 3.5 of the Approved MDP and Section 6 of Amendment I*. Stormwater storage basins will be further assessed during subsequent, more detailed design phases of the Sereno Canyon Development. The stormwater storage volumes and basin configurations and locations presented within this report have been estimated using the best available information and a series of assumptions as outlined below.

4.1 Required 100-Year, 2-Hour Stormwater Storage Volume

As discussed in the *Approved MDP and Amendment I*, 100-year, 2-hour stormwater storage is provided for runoff from the improved areas within the overall project site. This approach to stormwater mitigation is consistent with *Section 4-1.807 of the City's Design Standards and Policy Manual*, which states that the following Modified Rational Method equation is the only acceptable method for determining the required stormwater storage volume:

$$V_r = (P/12)/A \cdot C$$

V_r = Required storage volume in acre-feet.

P = Precipitation amount, equal to the depth of the 100-year, 2-hour rainfall.

A = Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.

C = Runoff coefficient, Rational Method values.

Stormwater storage facilities have been sized to meet the required stormwater storage volume for the 100-year, 2-hour storm event, as well as to ensure post-development discharges do not adversely impact downstream property owners.

4.1.1 Precipitation

According to NOAA Atlas 14 rainfall data obtained from the City-approved DDMSW program, the 100-year, 2-hour rainfall for the project site is approximately 2.7 inches.

4.1.2 Runoff Coefficient (C-Value) per Land-Use Type

As part of this amendment (*Amendment II*), the determination/calculation of land-use-specific Runoff Coefficients (C-Values) differed from what was previously presented under the *Approved MDP and Amendment I*. Of principal difference is the assignment of appropriate land-use-specific C-Values based on appropriate areas of assumed disturbance (developed portion of a lot). This is to say that the 100-year Composite C-Values presented in the *City's Design Standards & Policies Manual, Figure 4.1-4, Runoff Coefficients for Use with Rational Method (Figure 4.1-4)* were considered too low given that it was unlikely that any lot would be fully disturbed/developed (it is assumed that a portion of the lot would remain natural, undisturbed desert). Therefore, under *Amendment II*, land-use specific runoff coefficients (C-Values) were

calculated for Estate Lots, Villa Lots and Resort Residential Lots (Resort & Spa lots were assumed fully developed; therefore, no change in C-value was necessary or calculated). Runoff coefficients for each of these three residential land-use types were calculated using the following three-step approach:

Step 1. An evaluation of land-use runoff coefficients (C-values) - as presented in *Figure 4.1-4* - was conducted to determine the "assumed disturbed area" for both the impervious area and the desert landscaping area within each land-use classification. This evaluation (back-calculation of Composite C-Values) was based on the City's land-use-specific 100-year Composite C-Values (*Figure 4.1-4*), the City's Specific Surface Type C-Values (*Figure 4.14*) and the City-assumed lot size for the associated City land-use code. Through back-calculations, the resulting breakdown in "assumed disturbed area" for the three subject land-use types are shown on the 100-Year Composite C-Value Evaluation Spreadsheet (C-Value Spreadsheet) provided in Appendix A. Of particular importance was the determination of the impervious areas for the Estate Lots, Villa Lots and Resort Residential Lots, which were 0.84 acre, 0.31 acre and 0.16 acre, respectively (see C-Value Spreadsheet, Appendix A). Given that these impervious area values are City-implied (again, determined through back-calculations); these values were maintained for calculating the land-use-specific C-Values based on appropriate areas of assumed disturbance (**Step 3 below**).

Step 2. Based on the likelihood that no one lot would be fully disturbed/developed, an area of disturbance per lot was assumed (see below Table 4-1 and see C-Value Spreadsheet, Appendix A).

Table 4-1. Assumed Disturbed Area per Lot.

Land-Use Description	Associated City Land-Use Code	Assumed Lot Size		Assumed Disturbed Area per Lot		
		Sq Ft	Acres	%	Sq Ft.	Acres
Estate Lots Avg. Lot = 3 Acres	R1-130	130,000	3.0	33%	42,900	1.0
Villa Lots Avg. Lot = 1 Acre	R1-43	43,000	1.0	50%	21,500	0.5
Resort Residential Lots (2 Units/Acre) Avg. Lot Approx. ½ Acre	R1-18	18,000	0.4	67%	12,060	0.3

Step 3. By maintaining the determined impervious areas for the Estate Lots, Villa Lots and Resort Residential Lots (0.84 acres, 0.31 acres and 0.16 acres, respectively - see **Step 1 above**), and using the assumed area of disturbance per lot (see **Step 2 above**), land-use-specific C-Values based on appropriate areas of assumed disturbance/development were calculated (see Table 4-2 and see C-Value Spreadsheet, Appendix A). A land-use C-Value overview (**Exhibit B-1**) is provided in Appendix B. A land-use shape file and land-use-specific C-Value spreadsheet calculations are provided on the attached DVD.

Table 4-2. Land-Use-Specific C-Values Based on Assumed Disturbance per Lot.

Land-Use Description	Calculated Land-Use-Specific C-Values
Estate Lots Avg. Lot = 3 Acres	0.87
Villa Lots Avg. Lot = 1 Acre	0.76
Resort Residential Lots (2 Units/Acre) Avg. Lot Approx. ½ Acre	0.73

4.1.3 Composite C-Value Calculation for Required Stormwater Storage Volume

Disturbed area land-use-specific C-values (see Section 4.1.2) were areally weighted, per HEC-1 subbasin (see Section 5), to determine the composite C-value for the calculation of the subbasin's required stormwater storage volume. Areal weighting of C-values was accomplished using ArcGIS. The resulting composite C-values used for stormwater storage volume calculations per HEC-1 subbasin are shown on **Exhibit B-2**, located in Appendix B. Required storage volumes were modeled in proposed/developed condition HEC-1 models as reservoir routing steps (see Section 5). Stormwater storage calculations per HEC-1 subbasin are provided in Appendix C.

4.2 Stormwater Storage Facilities

The proposed stormwater storage facilities concept presented in the in the *Approved MDP* and *Amendment I*, has not been modified under *Amendment II*.

4.2.1 Stormwater Storage Basins

As discussed in Section 3.3, in accordance with the *Approved MDP*, the required 100-year, 2-hour stormwater storage volume (see Section 4.1) is detained through the use of in-line storage basins. In-line storage basins are located within significant drainages at the following strategic locations:

1. Roadway crossings.
2. Just upstream of development boundaries.
3. Locations where preliminary grading of basins has occurred.

Stormwater storage basins are shown graphically on the Conceptual Stormwater Storage Basin Locations exhibit (**Exhibit B-3**), provided in Appendix B. The stormwater storage basins shown on **Exhibit B-3** do not reflect the final design grading, size or location of any retention basin. Final design, grading and location of retention basins will be completed during more detailed site development phasing. Therefore, the shape, precise location, configuration and depths of the stormwater storage basins shown on **Exhibit B-3** will be modified as more detailed design of the Sereno Canyon Development takes place under future phasing. The basin lines shown on **Exhibit B-3** represent a conceptual basin footprint, but cannot be assumed to be identical to the final basin designs, which will be completed with the phased final design of the site.

4.2.2 Outlet Structures

Flows routed through the in-line storage basins are metered by the use of outlet structures, which will typically be designed as either a weir structure or elevated drop inlet structure. For the purpose of this MDP amendment, outlet structures were assumed to be elevated drop inlet structures having grated inlets. In addition, it was assumed that the grated inlets would be constructed at a slope such that the vertical difference between top- and bottom-of-grate was equal to 1.5 feet. Knowing the 100-year peak discharge for each basin (see Section 5), and assuming a hydraulic head on the grate equal to 1.5 feet, the Weir Equation was used to determine the length of required open area at the bottom-of-grate elevation. Therefore, the required length of open area at the bottom-of-grate elevation was calculated as:

$$L = Q_{100} / (C_{weir} \cdot H^{1.5})$$

L = Required length of open area at the bottom-of-grate elevation.

Q_{100} = The 100-year, 6-hour peak discharge entering the basin.

C_{weir} = Weir coefficient = 2.8.

H = Hydraulic head.

Outlet structures range in height from approximately 3 feet to approximately 6 feet from base to top of grate. Height of structures was based on the following:

- Design objective to minimize grading/excavation within a wash.
- Height of already constructed structures.

Weir equation calculations are provided with the stormwater storage volume calculations in Appendix C.

In addition to the grated outlet, outlet structures will be fitted with a stormwater bleed-off pipe. Bleed-off pipes will be designed during subsequent phases and will ensure the drawdown of ponded water will be in accordance with City criteria. Bleed-off was considered hydrologically insignificant and was not accounted for in HEC-1 modeling.

As part of the subsequent detailed design phases, final outlet structure configurations will be determined, but structures will be designed to accommodate flows such that downstream property owners will not be adversely impacted by an increase in peak discharge. Proposed drainage structures are discussed in additional detail in *Section 3.5 of the Approved MDP*.

4.3 Impacts to Natural Area Open Space (NAOS)

The City requires on-site storage of runoff from the 100-year, 2-hour frequency event. In addition, under the Environmentally Sensitive Lands Ordinance (ESLO) there are requirements for providing natural area open space along wash corridors. Sereno Canyon is intended to be a low-impact development that maintains and incorporates natural Sonoran Desert landscape. It is this natural landscape that is inherent to the proposed development's appeal. Therefore, one

significant design objective is to minimize mass grading, consistent with the requirements of the ESLO.

Based on the above preliminary stormwater storage basin calculations, approximately 10 acres in total will be disturbed for stormwater storage. Disturbance is defined by basin grading; however, these areas of disturbance will be landscaped to blend with the surrounding area.

In addition to the disturbed area, the total area of inundation/ponding associated with stormwater storage basins is approximately 14.5 acres. The total area of inundation and the total area of disturbance do not correlate given the ponding that occurs within portions of undisturbed wash.

5 Proposed Condition Hydrologic Modeling (HEC-1 Modeling)

5.1 Hydrologic Procedures, Parameter Selection and Assumptions

Amendment II has been prepared in support of a proposed change in land-use. Therefore, only the proposed developed condition HEC-1 modeling has been revised under *Amendment II*. Existing condition HEC-1 modeling is discussed in detail in *Amendment I*. However, it should be noted that the hydrologic modeling approach has not been modified and adheres to the approach documented in *Amendment I*.

Rainfall runoff modeling of the proposed developed condition was accomplished using the U.S. Army Corps of Engineers HEC-1 computer program, version 4.1. HEC-1 models were developed based on guidelines presented in the City's *Design Standards and Policy Manual* (January 2010) and FCDMC *Hydrology Drainage Design Manual for Maricopa County, AZ* (FCDMC *Hydrology Manual*). In addition, the Drainage Design Management System (DDMS, version 4.6.0) program provided by FCDMC was used to develop the HEC-1 model framework.

HEC-1 models were developed for the 2-, 10- and 100-year, 6-hour events. HEC-1 model identification is provided below in Table 5-1. Additional discussion regarding HEC-1 model input and development is provided below.

Table 5-1. HEC-1 Model Identification

HEC-1 Model	Condition and Storm Event
SerenoAmend_II_DEV_2_6.dat	Developed Condition 2-Year, 6-Hour
SerenoAmend_II_DEV_10_6.dat	Developed Condition 10-Year, 6-Hour
SerenoAmend_II_DEV_100_6.dat	Developed Condition 100-Year, 6-Hour

5.1.1 Design Storm Events

Per the City's *Design Standards and Policy Manual*, hydrologic modeling was completed for the 2-, 10- and 100-year, 6-hour design storm events. Maximum rainfall values for the project area were determined using DDMS and are listed below in Table 5-2.

Table 5-2. Maximum Design Storm Rainfall Values.

Design Storm	Maximum Rainfall Value
2-Year, 6-Hour	1.4 inches
10-Year, 6-Hour	2.1 inches
100-Year, 6-Hour	3.2 inches

The developed condition HEC-1 model uses the depth/area record (HEC-1 ID = JD) and cumulative precipitation time series (HEC-1 ID = PC) to simulate the rainfall depths, area reduction and rainfall distributions as outlined in the *FCDMC Hydrology Manual*.

HEC-1 rainfall distribution (HEC-1 PC Record) and depth/area relationships (HEC-1 JD Record) were computed using DDMS.

5.1.2 Subbasin Boundaries

Project specific, on-site, 1-foot contour topography and proposed roadway alignments were used to delineate proposed condition subbasins within the Sereno Canyon Development. Subbasin delineations have not been revised under *Amendment II*. Existing condition and proposed condition subbasin boundaries coincided for a straightforward, direct comparison of pre- versus post-development discharges. Downstream subbasin limits are typically defined by a roadway alignment, multi-stream convergence location, proposed stormwater storage basin location and/or project boundary.

Off-site subbasin boundaries also coincide and were delineated using 2-foot contour topography.

Additional discussion regarding existing condition subbasin boundaries is provided in *Amendment I*. Developed condition subbasin boundaries are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B.

5.1.3 Soils

Detailed discussion regarding soils information used for HEC-1 modeling is provided in *Amendment I*.

5.1.4 Developed Condition Land-Use

As discussed above in Section 1.2, the following primary land-uses are being proposed for the Sereno Canyon Development: Estate Residential, Villa Lot Residential, Resort Residential and Resort & Spa. Hydrologic characteristics of the proposed land-use types, applicable for HEC-1 modeling, are listed below in Table 5-3. The conceptual land-use plan is provided in Appendix A. In addition, proposed HEC-1 land use is shown on **Exhibit B-5**, provided in Appendix B.

Table 5-3. Proposed Land-Use Hydrologic Characteristics.

Land-Use Description	Associated City Land-Use Code	FCDMC Land-Use Code	IA	RTIMP	Veg Cover	DTHETA	Kb
Resort Residential (2 DU/Ac.) Average Lot = ½ Acre	R1-18	140	0.25	30%	50%	Normal	Min.
Villa Lot Average Lot = 1 Acre	R1-43	130	0.30	15%	50%	Normal	Min.
Estate Lot Average Lot = 3 Acres	R1-130	120	0.30	5%	30%	Normal	Min.
Resort & Spa	R-4R	510	0.10	80%	75%	Normal	Min.
General Transportation	Road	605	0.10	100%	0%	Normal	Min.

Notes:

1. DU = Dwelling Unit
2. IA = Initial Abstraction in inches
3. RTIMP = Percent Impervious
4. DTHETA = Antecedent Moisture Condition
5. Kb = Resistance Coefficient

5.1.5 Rainfall Losses (Infiltration)

Rainfall losses were based on the Green and Ampt Infiltration Equation, as outlined in the *FCDMC Hydrology Manual*.

Infiltration is a function of ground surface characteristics, soil characteristics and land management practices. Green and Ampt infiltration calculations require the estimation of the following five parameters:

1. Initial Surface Retention Loss (HEC-1 ID = IA);
2. Hydraulic Conductivity (HEC-1 ID = XKSAT);
3. Wetting Front Capillary Suction (HEC-1 ID = PSIF);
4. Volumetric Soil Moisture Deficit (HEC-1 ID = DTHETA); and
5. Percent of Impervious Area within Subbasin (HEC-1 ID = RTIMP).

Rainfall loss parameter computations were made with DDMS. DDMS output tables are provided in Appendix D.

5.1.6 Clark Unit Hydrograph

The Clark Unit Hydrograph calculation, per the *FCDMC Hydrology Manual*, was utilized to compute developed condition peak discharges and volumes at select concentration points. Clark Unit Hydrograph parameters include the time of concentration (T_c), storage coefficient (R) and time-area relation. T_c and R values were computed using DDMS.

5.1.6.1 of Concentration

The time of concentration (T_c) for use with the Clark Unit Hydrograph is estimated using the following equation from the *FCDMC Hydrology Manual*:

$$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

T_c = time of concentration.

L = length of hydraulically longest flow path (miles).

S = watercourse slope (feet/mile).

K_b = representative watershed resistance coefficient.

i = average rainfall excess intensity (inches/hour).

Solution for the T_c equation is an iterative process and dependent on i , and was accomplished using the FCDMC's DDMS computer program. The T_c equation parameters L and S are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B. Developed condition subbasin T_c values are provided in the DDMS output tables, provided in Appendix D.

5.1.6.2 Coefficient

The Clark Unit Hydrograph storage coefficient (R) is estimated using the following equation:

$$R = 0.37T_c^{1.11}A^{-0.57}L^{0.80}$$

T_c = time of concentration.

A = drainage area (square miles).

L = length of hydraulically longest flow path (miles).

The R equation parameters A and L are shown on the HEC-1 Subbasins and Flowpaths exhibit (**Exhibit B-4**), provided in Appendix B. Developed condition subbasin R values are provided in the DDMS output tables, provided in Appendix D.

5.1.6.3 -Area Relation

A dimensionless time-area relation of contributing area versus travel time to subbasin outlet is required for the Clark Unit Hydrograph procedure. Because the Sereno Canyon Development is focused on open space and maintaining the natural Sonoran Desert landscape, the Natural Watershed time-area relation was used for HEC-1 modeling of developed conditions.

5.1.7 Flood Hydrograph Routing

Flood hydrograph routing was performed using the storage routing record (HEC-1 Record = RS) for both channel and reservoir (stormwater storage basin) routing in HEC-1.

5.1.7.1 Routing

HEC-1 normal depth channel routing was used to model the natural desert drainages found within the Sereno Canyon Development. Normal depth channel routing accounts for the time lag and peak flow attenuation of the flood hydrograph. Peak flow attenuation is accomplished through channel storage, which is defined from the following channel characteristics:

1. Eight-point cross-section.
2. Manning's roughness coefficient.
3. Routing reach length.
4. Routing reach slope.

In addition, normal depth routing with HEC-1 requires calculation of the reach storage routing step number (HEC-1 ID = NSTPS), which was computed for each storm event using the FCDMC's DDMS program. HEC-1 channel routing output from DDMS is provided in Appendix D.

5.1.7.2 (Stormwater Storage Basin) Routing

Reservoir (stormwater storage basin) routing of flow was accomplished with HEC-1 through the use of a stage-storage-discharge relationship (HEC-1 IDs = SE, SV and SQ, respectively). Reservoir routing is only used during hydrologic analysis of the developed condition to account for flow through stormwater storage basins. Reservoir routing with HEC-1 requires use of a reach storage routing step number (HEC-1 ID = NSTPS) equal to one. Calculations for development of the stage-storage-discharge relationship are provided in Appendix C.

5.1.8 HEC-1 Model Arrangement

HEC-1 subbasin, flood hydrograph routing and combination steps have been assembled to reflect the developed condition model logic that is shown on the HEC-1 schematic (**Exhibits B-6**), provided in Appendix B. HEC-1 simulation logic proceeds downstream until a final concentration point is reached, which is located at the project boundary.

The HEC-1 time specification record (HEC-1 Record = IT) is used to define the number of minutes in the tabulation interval (HEC-1 ID = NMIN) at which peak discharges are computed for each flood hydrograph ordinate, and the number of hydrograph ordinates (HEC-1 ID = NQ) to be computed. The existing condition and proposed condition HEC-1 models use NMIN and NQ values of one minute and 2,000 ordinates, respectively.

The HEC-1 time interval for input data (HEC-1 Record = IN) is used to define the number of minutes (HEC-1 ID = JMIN)) in each rainfall distribution (HEC-1 ID = PC) tabulation interval. Based on the 6-hour design storm duration, an IN value of 15 minutes was utilized.

5.2 HEC-1 Modeling Results

Developed condition peak discharges were compared to verify the existing condition (pre-development) versus proposed condition (post-development) criteria was met along the project boundary.

Incorporating the 100-year, 2-hour stormwater retention requirement (see Section 4) into the HEC-1 modeling substantially reduces the post-development peak discharge at various locations. At some locations, the required stormwater retention resulted in over a 50 percent reduction of peak discharge. This large reduction is attributed to the difference between hydrologic calculation/computation methodologies for stormwater retention requirements and general hydrologic modeling (HEC-1). Rainfall runoff modeling was completed using HEC-1, while the stormwater storage volume calculation was completed using a modified Rational Equation. Typically when comparing peak flow values, discharges calculated using the Rational Method are higher than those computed with HEC-1.

As shown at this conceptual level of design, retention basins substantially attenuate flow, which can significantly reduce the discharge within a wash. However, as part of the low-impact design concept for wash corridors, the existing-condition flow conditions are maintained to the maximum extent practicable. Therefore, as the level of design detail and analysis increases for subsequent reports, retention basins will be reassessed. Reassessment will include resizing of basins to adequately meet the low impact design concept, while ensuring no adverse impacts to downstream property owners.

Existing condition and proposed condition peak discharges (100-year, 6-hour) at key locations along the project site boundary are listed in Table 5-4 below. In addition, peak discharges for existing and proposed condition HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided in table format in Appendix D. Developed condition peak discharges for the 100-year, 6-hour design storm are listed in table format on the Developed Drainage Condition exhibit (**Exhibits B-7**), located in Appendix B. The developed condition HEC-1 schematic is shown on **Exhibit B-6**,

C

provided in Appendix B. Developed condition HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided in Appendix D. Developed condition DDMS files and HEC-1 models (2-, 10-, and 100-year, 6-hour) are provided electronically on the attached DVD.

Table 5-4. Existing and Developed Condition Discharges (100-Yr, 6-Hr) Along Project Site Boundary.

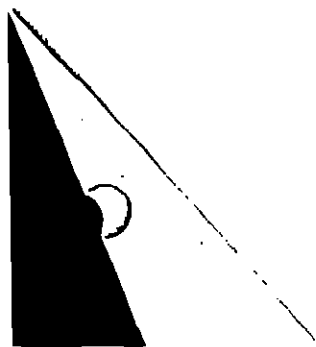
HEC-1 ID	Existing Condition 100-Year, 6-Hour Peak Discharge (cfs)	Developed Condition 100-Year, 6-Hour Peak Discharge (cfs)	Existing - Developed (cfs)
CE01A	201	185	16
CE04A	46	19	27
CE065A	108	48	60
CE11A	49	27	22
CE17A	57	23	34
CE23A	148	135	13
CE24A	60	30	30
CE25A	25	14	11
CW07A	39	26	13
CW09A	101	69	32
CW10A	107	45	62
SBE02A	75	74	1
SBE03A	14	6	8
SBE08A	2	3	-1
SBE09A	6	7	-1
SBE10A	2	3	-1
SBE12A	4	2	2
SBE13A	7	2	5
SBE16A	2	3	-1
SBE18A	2	0	2
SBE19A	3	3	0
SBE20A	3	3	0
SBE21A	2	3	-1
SBE26A	15	8	7
SBE27A	4	2	2
SBE28A	23	17	6
SBE29A	29	21	8

C

HEC-1 ID	Existing Condition 100-Year, 6-Hour Peak Discharge (cfs)	Developed Condition 100-Year, 6-Hour Peak Discharge (cfs)	Existing - Developed (cfs)
SBW01A	5	5	0
SBW02A	13	12	1
SBW04A	5	6	-1
SBW05A	19	16	3
SBW06A	8	5	3
SBW08A	19	12	7
SBW11A	3	3	0
SBW12A	38	26	12
SBW13A	3	3	0
SBW14A	23	14	9

As is shown in Table 5-4, at 6 locations the developed condition 100-yr, 6-hr peak discharge is 1 cfs higher than the existing condition peak discharge. However, at these locations the existing condition (pre-development) versus proposed condition (post-development) criteria is still assumed to be met given the following:

- Peak 100-year flows at these locations are relatively small, no greater than 7 cfs.
- The stormwater storage basins presented in *Amendment II* are preliminarily sized. Stormwater storage basin locations and volumes will be further assessed during subsequent, more detailed design phases of the Sereno Canyon Development. During these subsequent phases of design, basins will be resized/developed to meet the no adverse impact criteria.



6 Hydraulic Analysis

As stated in Section 1.1, *Amendment II* documents the revised hydrologic conditions resulting from the proposed change in land-use. Although proposed changes to land-use necessitated a reanalysis of developed hydrologic conditions (required stormwater storage volume and peak discharges along project site boundary), it is believed that revised discharges would not significantly change the floodplain limits presented in *Amendment I*; and therefore, no hydraulic reanalysis was completed under *Amendment II*.

The decision to not perform hydraulic analyses under *Amendment II* is further supported given the certainty that discharges will be revised once again as part of the detailed site design phase. During the detailed site design phase, final floodplain limits will be identified. However, it is anticipated that the final floodplain limits will not significantly differ from those presented in *Amendment I*.

APPENDIX A

Ranch Gate Rd.



100-Year Composite C-Value Evaluation

Based on City of Scottsdale Design Standards and Policies Manual, Figure 4.1-4.

					Impervious Area (Structure, Patio, Pool, Driveway, Etc.)				Desert Landscaping			
Land-Use Description	Associated City Land-Use Code	City-Assumed Lot Size		100-Yr Composite C-Value	100-Yr C-Value	Implied % Impervious	Calculated Disturbed Area		100-Yr C-Value	Implied % Desert	Calculated Disturbed Area	
		Square Feet	Acres				Square Feet	Acres			Square Feet	Acres
Estate Lot Avg. Lot = 3 Ac.	R1-130	130,000	3.0	0.59	0.95	28%	36,400	0.84	0.45	72%	93,600	2.15
Villa Lots Avg. Lot = 1 Ac.	R1-43	43,000	1.0	0.61	0.95	31%	13,330	0.31	0.45	69%	29,670	0.68
Resort Residential (2 Units/Ac) Avg. Lot = 1/2 Ac.	R1-18	18,000	0.4	0.64	0.95	38%	6,840	0.16	0.45	62%	11,160	0.26
Resort & Spa	R-4R	N/A	N/A	0.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paved Street	-	N/A	N/A	0.95	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Calculated by JE Fuller/Hydrology & Geomorphology, Inc.

Calculated by JE Fuller/Hydrology & Geomorphology, Inc.								Impervious Area (Structure, Patio, Pool, Driveway, Etc.)				Desert Landscaping			
Land-Use Description	Associated City Land-Use Code	City-Assumed Lot Size		Assumed Disturbed Area			100-Yr Composite C-Value	100-Yr C-Value	Implied % Impervious	Calculated Disturbed Area		100-Yr C-Value	Implied % Desert	Calculated Disturbed Area	
		Square Feet	Acres	%	Square Feet	Acres				Square Feet	Acres			Square Feet	Acres
Estate Lot Avg. Lot = 3 Ac.	R1-130	130,000	3.0	33%	42,900	1.0	0.87	0.95	85%	36,400	0.84	0.45	15%	6,500	0.15
Villa Lots Avg. Lot = 1 Ac.	R1-43	43,000	1.0	50%	21,500	0.5	0.76	0.95	62%	13,330	0.31	0.45	38%	8,170	0.19
Resort Residential (2 Units/Ac) Avg. Lot = 1/2 Ac.	R1-18	18,000	0.4	67%	12,060	0.3	0.73	0.95	57%	6,840	0.16	0.45	43%	5,220	0.12
Resort & Spa	R-4R	N/A	N/A	100%	N/A	N/A	0.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paved Street	-	N/A	N/A	100%	N/A	N/A	0.95	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Assumption:

- 1. Difference between R1-130, R1-43 and R1-18 C-values (Design Standards & Policies Manual, Grading & Drainage, Figure 4.1-4) seem incongruent when comparing implied % impervious areas and lot sizes.
- 2. Design Standards & Policies Manual, Grading & Drainage, Section 4-1.807: "A = Area in acres; the developed portion of the entire site in acres, ..., on which any man made change is planned ..."
- 3. Only a portion of each lot will be "developed"; therefore, calculated composite C-value based on the assumed percentage of disturbed area.

APPENDIX B

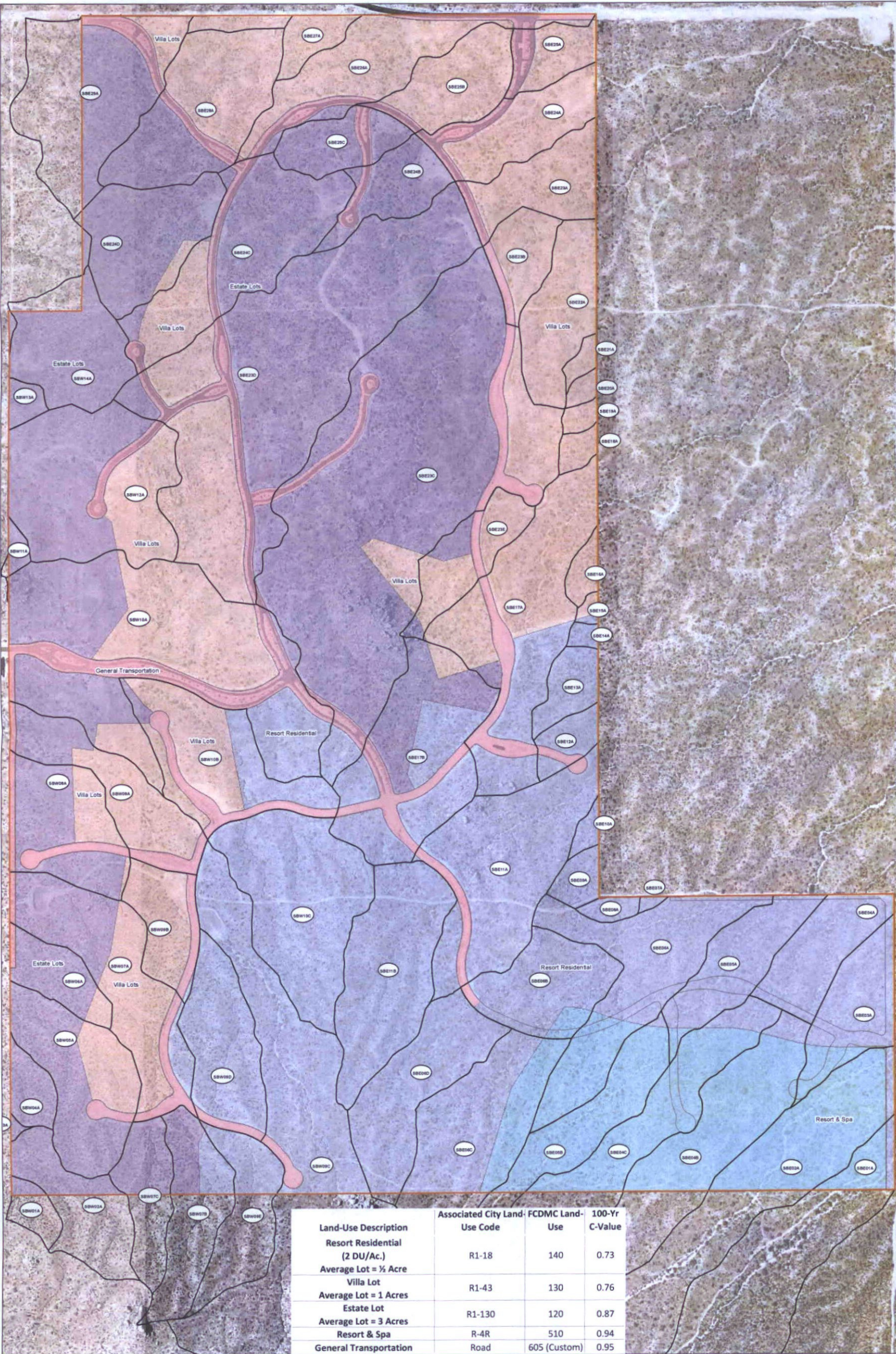
Exhibits

Exhibit B-1

Land-Use C-Value Overview

Exhibit B-2

Areally Weighted C-Value per HEC-1 Subbasin



Land-Use Description	Associated City Land- Use Code	FCDMC Land- Use	100-Yr C-Value
Resort Residential (2 DU/Ac.) Average Lot = 1/2 Acre	R1-18	140	0.73
Villa Lot Average Lot = 1 Acres	R1-43	130	0.76
Estate Lot Average Lot = 3 Acres	R1-130	120	0.87
Resort & Spa	R-4R	510	0.94
General Transportation	Road	605 (Custom)	0.95



JE FULLER
HYDROLOGY & GEOMORPHOLOGY, LLC

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Sheet 1 of 1

**SERENO CANYON
PROPOSED LAND USE
"C" VALUES**

SCOTTSDALE, ARIZONA

SEPTEMBER 2012

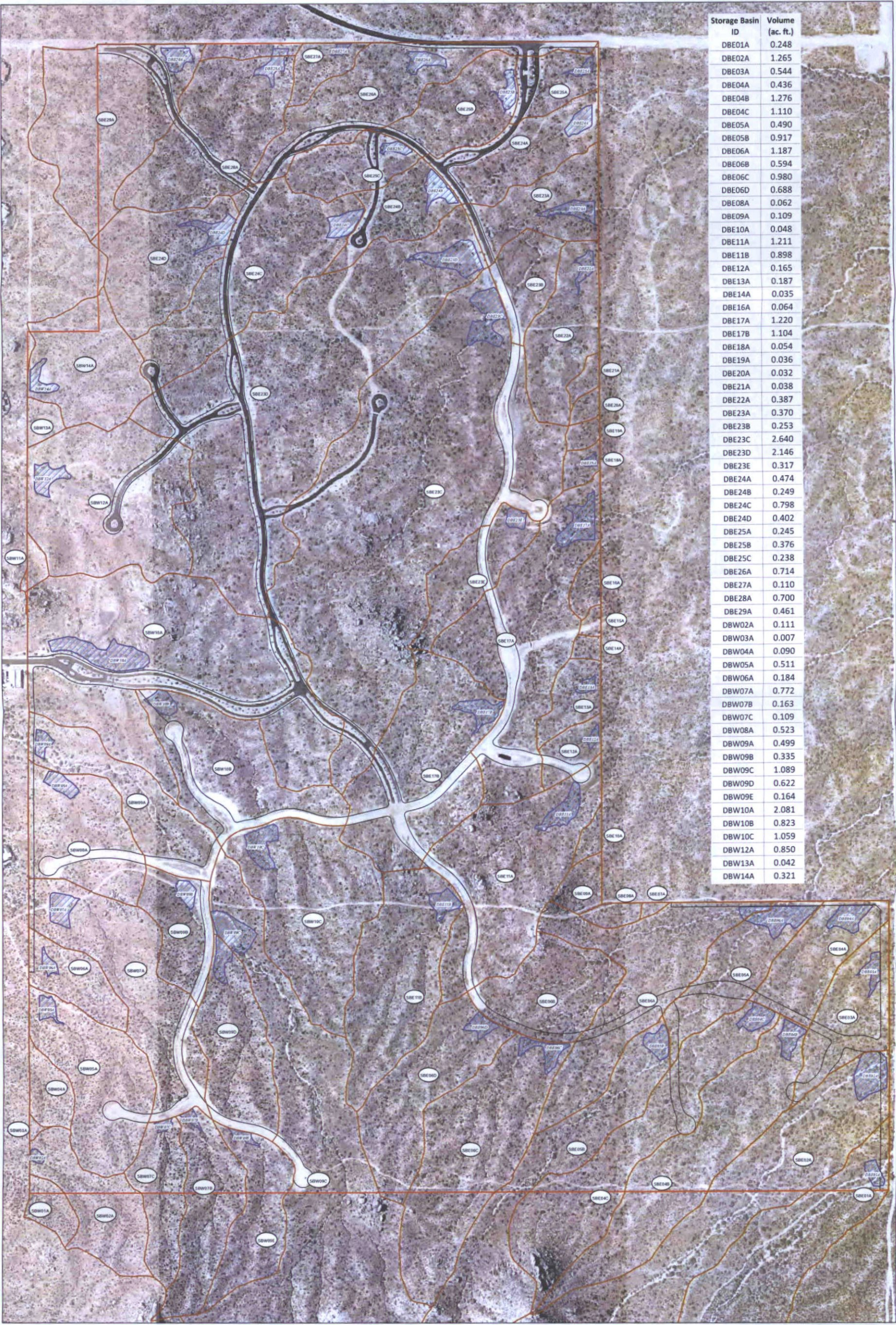
- Sereno Canyon Project Boundary
- Sub-Basins
- Roads

Legend

- Proposed Land Use
Descrip
- Estate Lots
- General Transportation
- Open Space
- Resort & Spa
- Resort Residential
- Villa Lots

Exhibit B-3

Conceptual Stormwater Storage Basin Locations



Storage Basin ID	Volume (ac. ft.)
DBE01A	0.248
DBE02A	1.265
DBE03A	0.544
DBE04A	0.436
DBE04B	1.276
DBE04C	1.110
DBE05A	0.490
DBE05B	0.917
DBE06A	1.187
DBE06B	0.594
DBE06C	0.980
DBE06D	0.688
DBE08A	0.062
DBE09A	0.109
DBE10A	0.048
DBE11A	1.211
DBE11B	0.898
DBE12A	0.165
DBE13A	0.187
DBE14A	0.035
DBE16A	0.064
DBE17A	1.220
DBE17B	1.104
DBE18A	0.054
DBE19A	0.036
DBE20A	0.032
DBE21A	0.038
DBE22A	0.387
DBE23A	0.370
DBE23B	0.253
DBE23C	2.640
DBE23D	2.146
DBE23E	0.317
DBE24A	0.474
DBE24B	0.249
DBE24C	0.798
DBE24D	0.402
DBE25A	0.245
DBE25B	0.376
DBE25C	0.238
DBE26A	0.714
DBE27A	0.110
DBE28A	0.700
DBE29A	0.461
DBW02A	0.111
DBW03A	0.007
DBW04A	0.090
DBW05A	0.511
DBW06A	0.184
DBW07A	0.772
DBW07B	0.163
DBW07C	0.109
DBW08A	0.523
DBW09A	0.499
DBW09B	0.335
DBW09C	1.089
DBW09D	0.622
DBW09E	0.164
DBW10A	2.081
DBW10B	0.823
DBW10C	1.059
DBW12A	0.850
DBW13A	0.042
DBW14A	0.321

Aerial Imagery dated 2010



100 50 0 50 100
Feet



Sheet 1 of 1



SERENO CANYON
PROPOSED STORAGE BASINS EXHIBIT

SCOTTSDALE, ARIZONA

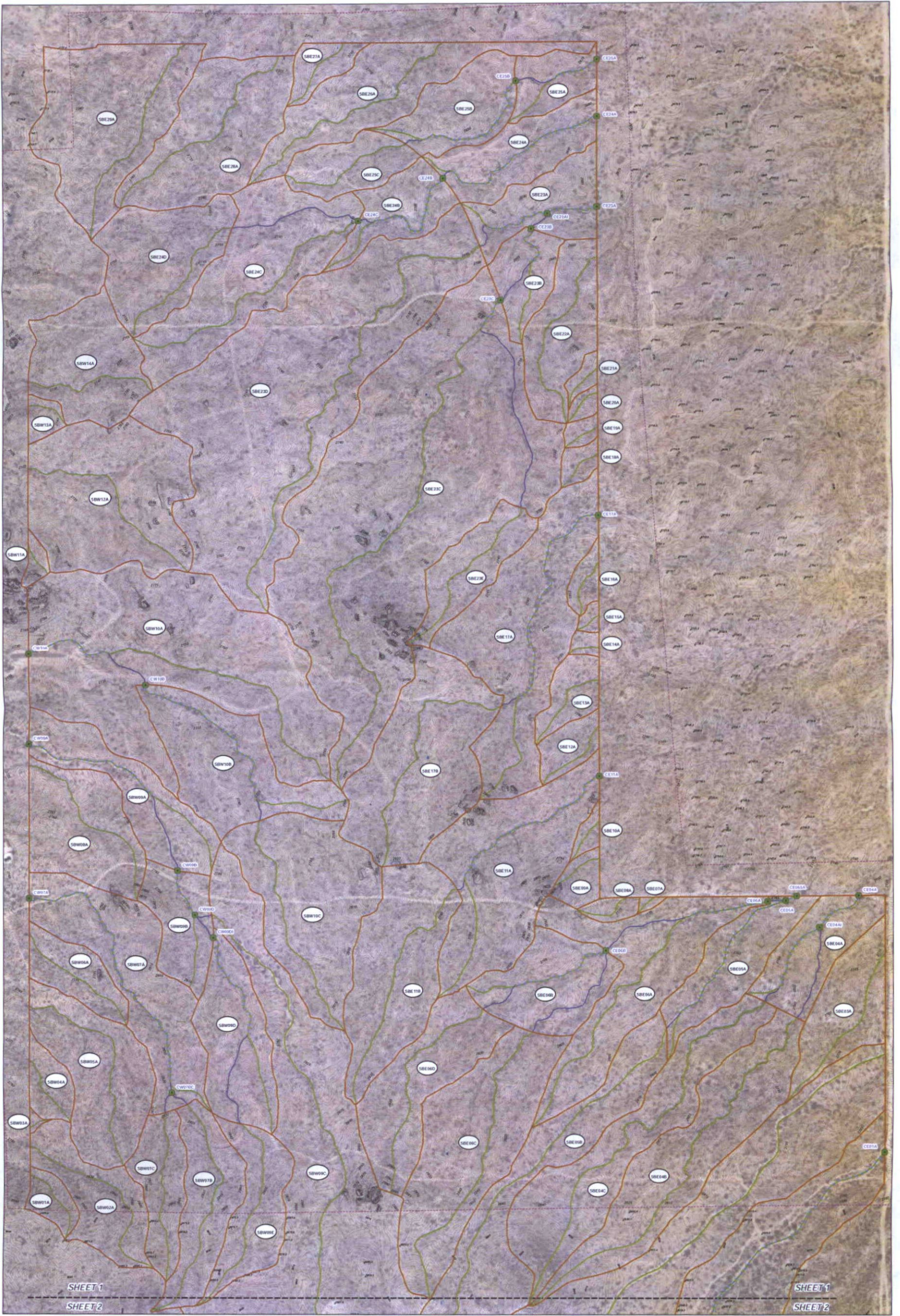
SEPTEMBER 2012

Legend

- Sub-Basins
- Sereno_Canyon_Project_Boundary
- Roads
- Detention Basin

Exhibit B-4

HEC-1 Subbasins and Flowpaths



Aerial Imagery dated 2007



Sheet 1 of 2



SERENO CANYON
SUBBASINS AND FLOWPATHS
SCOTTSDALE, ARIZONA
SEPTEMBER 2012

Legend

- | | |
|------------------------|--------------|
| ● Concentration Points | Flowpaths |
| Sub-Basins | Type |
| --- Matchline | Route |
| | TC |
| | TC and Route |



Aerial Imagery dated 2007



JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

200 100 0 200
Feet



Sheet 2 of 2

SERENO CANYON SUBBASINS AND FLOWPATHS

SCOTTSDALE, ARIZONA

SEPTEMBER 2012

Legend

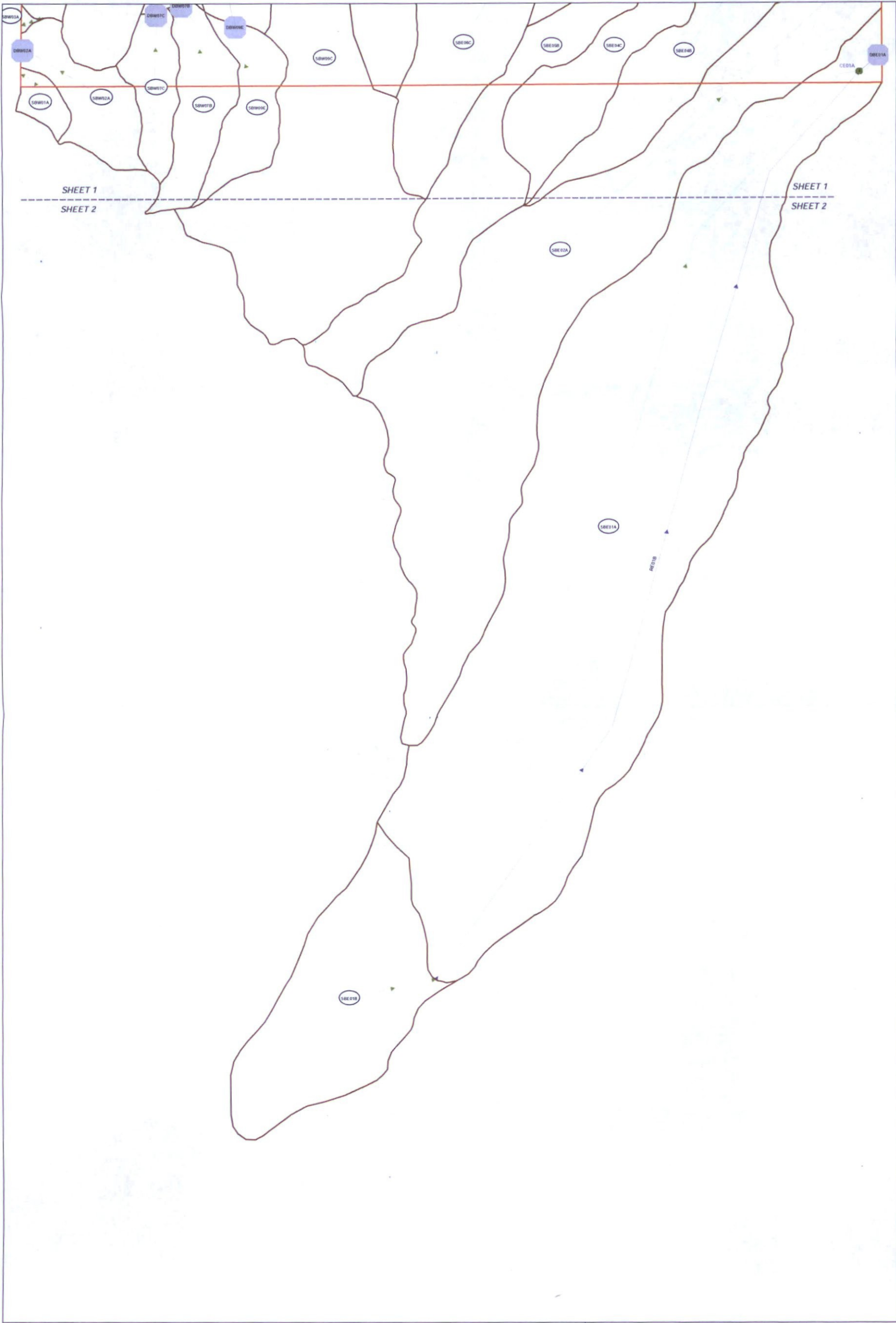
- | | |
|----------------------|--------------|
| Concentration Points | Flowpaths |
| Sub-Basins | Type |
| Matchline | Route |
| | TC |
| | TC and Route |

Exhibit B-5

Proposed HEC-1 Land-Use

Exhibit B-6

HEC-1 Schematics



Note: Existing and Proposed Condition HEC-1 Schematics area identical except for detention basins modeled in the proposed condition.



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Sheet 2 of 2

SERENO CANYON
HEC-1 SCHEMATICS
SCOTTSDALE, ARIZONA
SEPTEMBER 2012



Legend

Flow Lines

Line Type

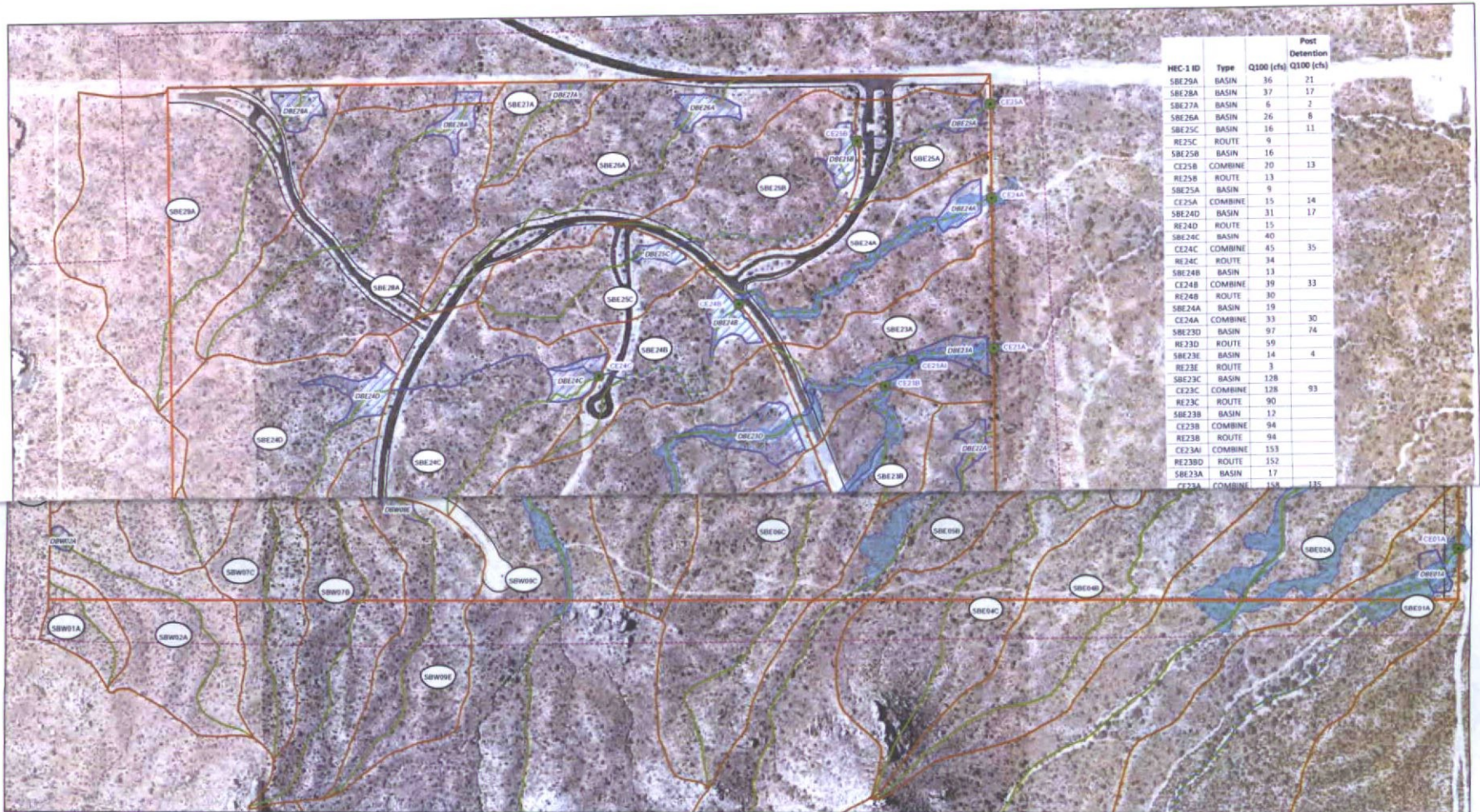
 ROUTE

 TC

 Non-Route Connection

Exhibit B-7

Developed Drainage Condition



Aerial Imagery dated 2010



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190 95 0 95 190
Feet



Sheet 1 of 1



SERENO CANYON PROPOSED DRAINAGE CONDITION EXHIBIT

SCOTTSDALE, ARIZONA

SEPTEMBER 2012

Legend

- Concentration Points
- Sub-Basins
- Sereno_Canyon_Project_Boundary
- Roads
- Detention Basin
- Proposed Floodplains
- Sub-Basin Flowline Type
- Route
- TC
- TC and Route

APPENDIX C

Stormwater Storage Calculations

Sereno Canyon

Volume Required Calculations

100-Year 2-Hour Precipitation Depth*:

2.707

*Rainfall From DDMSW Rainfall Computation

$$V_r = (P/12) AC$$

V_r = Required storage volume in acre-feet.

P = Precipitation amount = The depth of the 100-year 2-hour rainfall, from figure in [Appendix 4-1D](#) at the site.

A = Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.

C = Runoff coefficient; Rational Method values from [Figure 4.1-4](#).

Proposed Conditions

DET_Basin ID	A (acres)	C	V_{REQ100} (ac-ft)
DBE01A SBE01A	1.23	0.894	0.248
DBE02A SBE02A	6.03	0.930	1.265
DBE03A SBE03A	3.12	0.771	0.544
DBE04A SBE04A	2.65	0.730	0.436
DBE04B SBE04B	6.10	0.926	1.276
DBE04C SBE04C	5.39	0.913	1.110
DBE05A SBE05A	2.94	0.739	0.490
DBE05B SBE05B	4.34	0.937	0.917
DBE06A SBE06A	6.65	0.791	1.187
DBE06B SBE06B	3.50	0.753	0.594
DBE06C SBE06C	5.48	0.792	0.980
DBE06D SBE06D	4.18	0.730	0.688
DBE08A SBE08A	0.38	0.730	0.062
DBE09A SBE09A	0.66	0.730	0.109
DBE10A SBE10A	0.29	0.730	0.048
DBE11A SBE11A	7.20	0.746	1.211
DBE11B SBE11B	5.45	0.730	0.898
DBE12A SBE12A	0.96	0.761	0.165
DBE13A SBE13A	1.14	0.730	0.187
DBE14A SBE14A	0.21	0.730	0.035
DBE16A SBE16A	0.37	0.760	0.064
DBE17A SBE17A	6.97	0.776	1.220
DBE17B SBE17B	6.09	0.803	1.104
DBE18A SBE18A	0.31	0.760	0.054
DBE19A SBE19A	0.21	0.760	0.036
DBE20A SBE20A	0.18	0.760	0.032
DBE21A SBE21A	0.22	0.760	0.038
DBE22A SBE22A	2.25	0.760	0.387

Proposed Conditions

DET_Basin ID		A (acres)	C	V_{REQ100} (ac-ft)
DBE23A	SBE23A	2.12	0.774	0.370
DBE23B	SBE23B	1.42	0.787	0.253
DBE23C	SBE23C	13.59	0.861	2.640
DBE23D	SBE23D	11.24	0.847	2.146
DBE23E	SBE23E	1.76	0.795	0.317
DBE24A	SBE24A	2.65	0.792	0.474
DBE24B	SBE24B	1.26	0.879	0.249
DBE24C	SBE24C	4.16	0.850	0.798
DBE24D	SBE24D	2.07	0.863	0.402
DBE25A	SBE25A	1.34	0.809	0.245
DBE25B	SBE25B	2.16	0.772	0.376
DBE25C	SBE25C	1.20	0.880	0.238
DBE26A	SBE26A	3.95	0.802	0.714
DBE27A	SBE27A	0.64	0.760	0.110
DBE28A	SBE28A	3.83	0.812	0.700
DBE29A	SBE29A	2.37	0.864	0.461
DBW02A	SBW02A	0.57	0.870	0.111
DBW03A	SBW03A	0.04	0.870	0.007
DBW04A	SBW04A	0.46	0.870	0.090
DBW05A	SBW05A	2.69	0.843	0.511
DBW06A	SBW06A	0.95	0.858	0.184
DBW07A	SBW07A	4.17	0.820	0.772
DBW07B	SBW07B	0.89	0.816	0.163
DBW07C	SBW07C	0.56	0.870	0.109
DBW08A	SBW08A	2.71	0.857	0.523
DBW09A	SBW09A	2.71	0.817	0.499
DBW09B	SBW09B	1.88	0.790	0.335
DBW09C	SBW09C	6.55	0.737	1.089
DBW09D	SBW09D	3.71	0.742	0.622
DBW09E	SBW09E	0.99	0.732	0.164
DBW10A	SBW10A	11.19	0.824	2.081
DBW10B	SBW10B	4.63	0.788	0.823
DBW10C	SBW10C	6.43	0.730	1.059
DBW12A	SBW12A	4.48	0.840	0.850
DBW13A	SBW13A	0.21	0.870	0.042
DBW14A	SBW14A	1.63	0.870	0.321

Basin DBE29A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.11670	0.00000	0.00000	0
0.4	0.12191	0.04772	0.04772	0.04772
0.8	0.12736	0.04985	0.09757	0.09757
1.2	0.13305	0.05208	0.14966	0.14966
1.6	0.13900	0.05441	0.20407	0.20407
2	0.14521	0.05684	0.26091	0.26091
2.4	0.15170	0.05938	0.32029	0.32029
2.8	0.15848	0.06203	0.38232	0.38232
3.2	0.16556	0.06481	0.44713	0.44713
3.6	0.17296	0.06770	0.51483	0.51483
4	0.18069	0.07073	0.58556	0.58556
4.4	0.19438	0.07501	0.66057	0.66057
4.8	0.20911	0.08070	0.74127	0.74127
5.2	0.22495	0.08681	0.82808	0.8280793
5.6	0.24200	0.09339	0.92147	0.9214693
5.8	0.25100	0.04930	0.97077	0.9707692

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	1.2
4.00	3.5
4.25	6.4
4.50	9.8
4.75	13.7
5.00	18.0
5.25	22.7
5.50	27.7
5.75	33.1
6.00	38.7
6.25	44.7

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.4	0.05	0.00
0.8	0.10	0.00
1.2	0.15	0.00
1.6	0.20	0.00
2	0.26	0.00
2.4	0.32	0.00
2.8	0.38	0.00
3.2	0.45	0.00
3.6	0.51	0.49
4	0.59	3.46
4.4	0.66	8.43
4.8	0.74	14.56
5.2	0.83	21.75
5.6	0.92	29.86
5.8	0.97	33.08

		0.174									
Sediment Volume		Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment	Approximate Longitudinal Slope		Approximate Existing Side Slopes		Area Adjustment Factor	Assumed Structure Height
0 ac-ft		0.251 ac	4 H:1V	4 ft	0.4 ft	0.03 ft/ft		6 H:1V		1.87	2.3 ft
Basin Name		Grate Bottom Elevation Above Basin Invert			100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient				
DBE29A		3.5 ft			36 cfs	3.5 ft	2.8				

NOTES

¹ Area calculated based upon exponential decay relationship. A = Ao*e^(-s*depth)

² Average end area method used

³ Rating curve calculated using standard weir equation: Q = CLH^1.5

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Actual height is 3-feet

actual grate width is 7.67-feet

Volume Required	Volume Provided	Enough Volume	Disturbed Area
0.461	0.498		

0.18069 ac

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.50	0
4.75	2.5
5.00	6.9
5.25	12.7
5.50	19.6
5.75	27.4
6.00	36.0
6.25	45.4
6.50	55.4
6.75	66.2
7.00	77.5
7.25	89.4

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.07	0.00
1	0.13	0.00
1.5	0.21	0.00
2	0.28	0.00
2.5	0.36	0.00
3	0.45	0.00
3.5	0.54	0.00
4	0.64	0.00
4.5	0.74	0.00
5	0.84	6.93
5.5	0.95	19.60
6	1.08	36.01

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.253 ac	4 H:1V	5.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE28A

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
4.5 ft		36 cfs		7 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.700	0.736

Enough Volume

Disturbed Area

0.23092 ac

Basin DBE27A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.03506	0.00000	0.00000	0
0.3	0.03623	0.01069	0.01069	0.01069
0.6	0.03744	0.01105	0.02174	0.02174
0.9	0.03868	0.01142	0.03316	0.03316
1.2	0.03997	0.01180	0.04496	0.04496
1.5	0.04131	0.01219	0.05715	0.05715
1.8	0.04268	0.01260	0.06975	0.06975
2.1	0.04411	0.01302	0.08277	0.08277
2.4	0.04558	0.01345	0.09622	0.09622
2.7	0.04710	0.01390	0.11012	0.11012
3	0.04867	0.01436	0.12449	0.12449
3.3	0.05141	0.01501	0.13950	0.13950
3.6	0.05430	0.01586	0.15535	0.15535
3.9	0.05736	0.01675	0.17210	0.1721024
4.2	0.06059	0.01769	0.18979	0.1897943
4.5	0.06400	0.01869	0.20848	0.2084826

Sediment Volume
0 ac-ft

Basin Name
DBE27A

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.064 ac	4 H:1V	3 ft	0.3 ft

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3 ft	6 cfs	2 ft	2.8

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	0.7
3.50	2.0
3.75	3.6
4.00	5.6
4.25	7.8
4.50	10.3
4.75	13.0
5.00	15.8
5.25	18.9
5.50	22.1
5.75	25.5

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.3	0.01	0.00
0.6	0.02	0.00
0.9	0.03	0.00
1.2	0.04	0.00
1.5	0.06	0.00
1.8	0.07	0.00
2.1	0.08	0.00
2.4	0.10	0.00
2.7	0.11	0.00
3	0.12	0.00
3.3	0.14	0.96
3.6	0.16	2.64
3.9	0.17	4.81
4.2	0.19	7.38
4.5	0.21	10.29

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.110	0.124

Enough Volume

Disturbed Area

0.04867 ac

Basin DBE25C:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.07048	0.00000	0.00000	0
0.33	0.07307	0.02369	0.02369	0.02369
0.66	0.07576	0.02456	0.04824	0.04824
0.99	0.07854	0.02546	0.07370	0.07370
1.32	0.08142	0.02639	0.10010	0.10010
1.65	0.08441	0.02736	0.12746	0.12746
1.98	0.08751	0.02837	0.15583	0.15583
2.31	0.09073	0.02941	0.18524	0.18524
2.64	0.09406	0.03049	0.21573	0.21573
2.97	0.09752	0.03161	0.24734	0.24734
3.3	0.10110	0.03277	0.28011	0.28011
3.63	0.10481	0.03397	0.31409	0.31409
3.96	0.10866	0.03522	0.34931	0.34931
4.29	0.11507	0.03692	0.38622	0.386223
4.62	0.12222	0.03915	0.42538	0.4253756
4.95	0.12981	0.04158	0.46696	0.4669601
5	0.13100	0.00652	0.47348	0.4734803

Sediment Volume
0 ac-ft

Basin Name
DBE25C

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.131 ac	4 H:1V	4 ft	0.33 ft

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3 ft	15 cfs	6 ft	2.8

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	2.1
3.50	5.9
3.75	10.9
4.00	16.8
4.25	23.5
4.50	30.9
4.75	38.9
5.00	47.5
5.25	56.7
5.50	66.4
5.75	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.02	0.00
0.66	0.05	0.00
0.99	0.07	0.00
1.32	0.10	0.00
1.65	0.13	0.00
1.98	0.16	0.00
2.31	0.19	0.00
2.64	0.22	0.00
2.97	0.25	0.00
3.3	0.28	2.87
3.63	0.31	8.53
3.96	0.35	15.86
4.29	0.39	24.66
4.62	0.43	34.72
4.95	0.47	45.79
5	0.47	47.52

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	2 ft

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.238	0.250

Enough Volume

Disturbed Area

0.10944 ac

Basin DBE25B:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.11055	0.00000	0.00000	0
0.4	0.11549	0.04521	0.04521	0.04521
0.8	0.12065	0.04723	0.09243	0.09243
1.2	0.12604	0.04934	0.14177	0.14177
1.6	0.13167	0.05154	0.19332	0.19332
2	0.13756	0.05385	0.24716	0.24716
2.4	0.14371	0.05625	0.30341	0.30341
2.8	0.15013	0.05877	0.36218	0.36218
3.2	0.15684	0.06139	0.42357	0.42357
3.6	0.16384	0.06414	0.48771	0.48771
4	0.17117	0.06700	0.55471	0.55471
4.4	0.17882	0.07000	0.62471	0.62471
4.8	0.19096	0.07396	0.69866	0.69866
5.2	0.20543	0.07928	0.77794	0.7779429
5.5	0.21700	0.06336	0.84131	0.8413077

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.217 ac	4 H:1V	4.5 ft	0.4 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	2.5 ft

Basin Name
DBE25B

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3 ft	31 cfs	6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. A = Ao*e^(-s*depth)

² Average end area method used

³ Rating curve calculated using standard weir equation: Q = CLH^1.5

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	2.1
3.50	5.9
3.75	10.9
4.00	16.8
4.25	23.5
4.50	30.9
4.75	38.9
5.00	47.5
5.25	56.7
5.50	66.4
5.75	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.4	0.05	0.00
0.8	0.09	0.00
1.2	0.14	0.00
1.6	0.19	0.00
2	0.25	0.00
2.4	0.30	0.00
2.8	0.36	0.00
3.2	0.42	1.68
3.6	0.49	7.93
4	0.55	16.80
4.4	0.62	27.91
4.8	0.70	40.62
5.2	0.78	54.86
5.5	0.84	56.70

Volume Required	Volume Provided
0.376	0.393

Enough Volume

Disturbed Area

0.18185 ac

Basin DBE25A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.05865	0.00000	0.00000	0
0.3	0.06060	0.01789	0.01789	0.01789
0.6	0.06262	0.01848	0.03637	0.03637
0.9	0.06471	0.01910	0.05547	0.05547
1.2	0.06687	0.01974	0.07521	0.07521
1.5	0.06910	0.02039	0.09560	0.09560
1.8	0.07140	0.02107	0.11668	0.11668
2.1	0.07378	0.02178	0.13845	0.13845
2.4	0.07624	0.02250	0.16096	0.16096
2.7	0.07878	0.02325	0.18421	0.18421
3	0.08141	0.02403	0.20824	0.20824
3.3	0.08412	0.02483	0.23306	0.23306
3.6	0.08692	0.02566	0.25872	0.25872
3.9	0.08982	0.02651	0.28523	0.2852324
4.2	0.09418	0.02760	0.31283	0.3128331
4.5	0.09949	0.02905	0.34188	0.3418842
4.8	0.10509	0.03069	0.37257	0.3725711
5	0.10900	0.02141	0.39398	0.3939802

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.109 ac	4 H:1V	4 ft	0.3 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE25A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3.5 ft	38 cfs	8 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. A = Ao*e^(-s*depth)

² Average end area method used

³ Rating curve calculated using standard weir equation: Q = CLH^1.5

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	2.8
4.00	7.9
4.25	14.5
4.50	22.4
4.75	31.3
5.00	41.2
5.25	51.9
5.50	63.4
5.75	75.6
6.00	88.5
6.25	102.2

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.3	0.02	0.00
0.6	0.04	0.00
0.9	0.06	0.00
1.2	0.08	0.00
1.5	0.10	0.00
1.8	0.12	0.00
2.1	0.14	0.00
2.4	0.16	0.00
2.7	0.18	0.00
3	0.21	0.00
3.3	0.23	0.00
3.6	0.26	1.12
3.9	0.29	5.87
4.2	0.31	13.22
4.5	0.34	22.40
4.8	0.37	33.27
5	0.39	41.15

Volume Required	Volume Provided
0.245	0.250

Enough Volume

Disturbed Area

0.09128 ac

Bassin UBE24U:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.12500	0.00000	0.00000	0
0.5	0.13202	0.06425	0.06425	0.06425
1	0.13943	0.06786	0.13212	0.13212
1.5	0.14727	0.07168	0.20379	0.20379
2	0.15554	0.07570	0.27949	0.27949
2.5	0.16427	0.07995	0.35945	0.35945
3	0.17350	0.08444	0.44389	0.44389
3.5	0.18325	0.08919	0.53308	0.53308
4	0.19354	0.09420	0.62727	0.62727
4.5	0.20441	0.09949	0.72676	0.72676
5	0.21589	0.10508	0.83184	0.83184
Sediment Volume			Basin Top Area	
0 ac-ft			0.403 ac	

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	2.1
3.50	5.9
3.75	10.9
4.00	16.8
4.25	23.5
4.50	30.9
4.75	38.9
5.00	47.5
5.25	56.7
5.50	66.4
5.75	76.6

[illegible]

Basin Name
DBE24D

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.403 ac	4 H:1V	5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3 ft		30 cfs		6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.402	0.444

Enough Volume

Disturbed Area

0.21589 ac

Basın DBE24C:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	2.7
3.50	7.7
3.75	14.1
4.00	21.7
4.25	30.3
4.50	39.9
4.75	50.2
5.00	61.4
5.25	73.2
5.50	85.8
5.75	99.0

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.45	0.08	0.00
0.9	0.17	0.00
1.35	0.25	0.00
1.8	0.35	0.00
2.25	0.45	0.00
2.7	0.55	0.00
3.15	0.66	1.63
3.6	0.77	10.24
4.05	0.89	23.43
4.5	1.02	39.87
4.95	1.15	59.15
5	1.17	61.38

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.314 ac	4 H:1V	4.5 ft	0.45 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes		Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V		1.87	2 ft

Basin Name
DBE24C

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3 ft	69 cfs	7.75 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

^a SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.798	0.623

SPECIAL CASE: Difference to Basin DBE24B

Disturbed Area
0.2866 ac

Basin DBE24B:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	2.7
3.50	7.7
3.75	14.1
4.00	21.7
4.25	30.3
4.50	39.9
4.75	50.2
5.00	61.4
5.25	73.2
5.50	85.8
6.00	112.8

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.45	0.06	0.00
0.9	0.13	0.00
1.35	0.20	0.00
1.8	0.27	0.00
2.25	0.35	0.00
2.7	0.43	0.00
3.15	0.51	1.63
3.6	0.60	10.24
4.05	0.70	23.43
4.5	0.80	39.87
4.95	0.91	59.15
5.4	1.02	80.76
5.85	1.15	73.24
6	1.20	73.24

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.305 ac	4 H:1V	4 ft	0.45 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1 V	1.87	3 ft

Basin Name
DBE24B

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3 ft		81 cfs		7.75 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 * e^{(-s * \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.424	0.486

Enough Volume

SPECIAL CASE!	
DBE24C	0.175
SBE24B	0.249

Disturbed Area

0.2124 ac

Basin DBE24A:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	2.5
4.00	6.9
4.25	12.7
4.50	19.6
4.75	27.4
5.00	36.0
5.25	45.4
5.50	55.4
5.75	66.2
6.00	77.5
6.25	89.4

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.06	0.00
1	0.13	0.00
1.5	0.20	0.00
2	0.27	0.00
2.5	0.35	0.00
3	0.44	0.00
3.5	0.52	0.00
4	0.62	6.93
4.5	0.71	19.60
5	0.82	36.01
5.5	0.93	55.44

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.241 ac	4 H:1V	4.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	2 ft

Basin Name
DBE24A

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3.5 ft		94 cfs		7 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 * e^{(-s * depth)}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.474	0.524

Enough Volume

Disturbed Area

0.20078 ac

Basin DBE23D:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.21027	0.00000	0.00000	0
0.5	0.22208	0.10809	0.10809	0.10809
1	0.23456	0.11416	0.22225	0.22225
1.5	0.24773	0.12057	0.34282	0.34282
2	0.26165	0.12734	0.47017	0.47017
2.5	0.28666	0.13708	0.60724	0.60724
3	0.31407	0.15018	0.75743	0.75743
3.5	0.34409	0.16454	0.92197	0.92197
4	0.37699	0.18027	1.10224	1.10224
4.5	0.41303	0.19750	1.29974	1.29974
5	0.45252	0.21639	1.51613	1.51613
5.5	0.49578	0.23707	1.75320	1.75320
6	0.54318	0.25974	2.01294	2.01294
6.5	0.59511	0.28457	2.29751	2.2975109
7	0.65200	0.31178	2.60929	2.6092874

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
6.50	0
6.75	5.5
7.00	15.5
7.25	28.5
7.50	43.9
7.75	61.3
8.00	80.6
8.25	101.6
8.50	124.1
8.75	148.1
9.00	173.4
9.25	200.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.11	0.00
1	0.22	0.00
1.5	0.34	0.00
2	0.47	0.00
2.5	0.61	0.00
3	0.76	0.00
3.5	0.92	0.00
4	1.10	0.00
4.5	1.30	0.00
5	1.52	0.00
5.5	1.75	0.00
6	2.01	0.00
6.5	2.30	0.00
7	2.61	15.51
8	2.61	80.61

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.652 ac	4 H:1V	2 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	0.5 ft

Basin Name
DBE23D

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
6.5 ft	98 cfs	15.67 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
2.146	2.298

Enough Volume

Disturbed Area

0.26165 ac

Basin DBE23E:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	1.1
3.50	3.0
3.75	5.5
4.00	8.4
4.25	11.7
4.50	15.4
4.75	19.4
5.00	23.8
5.25	28.4
5.50	33.2
5.75	38.3

[illegible]

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.164 ac	4 H:1V	3.5 ft	0.45 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes		Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V		1.87	1.5 ft

Basin Name
DBE23E

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3 ft		14 cfs		3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.317	0.331

Enough Volume

Disturbed Area

0.13745 ac

Basin DBE23C:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	9.8
6.00	27.7
6.25	50.9
6.50	78.4
6.75	109.6
7.00	144.0
7.25	181.5
7.50	221.7
7.75	264.6
8.00	309.9
8.25	357.5

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.15	0.00
1	0.31	0.00
1.5	0.47	0.00
2	0.65	0.00
2.5	0.84	0.00
3	1.03	0.00
3.5	1.24	0.00
4	1.46	0.00
4.5	1.69	0.00
5	1.93	0.00
5.5	2.19	0.00
6	2.46	27.72
6.5	2.76	78.40
7	3.08	144.03

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.672 ac	4 H:1V	6 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE23C

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
5.5 ft		140 cfs		28 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship: $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
2.640	2.192

SPECIAL CASE: Difference to Basin DBE23A

Disturbed Area

0.55984 ac

Basin DBE23A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.17054	0.00000	0.00000	0
0.5	0.18012	0.08766	0.08766	0.08766
1	0.19023	0.09259	0.18025	0.18025
1.5	0.20092	0.09779	0.27804	0.27804
2	0.21220	0.10328	0.38132	0.38132
2.5	0.22412	0.10908	0.49040	0.49040
3	0.23671	0.11521	0.60561	0.60561
3.5	0.25001	0.12168	0.72729	0.72729
4	0.26405	0.12852	0.85581	0.85581
4.5	0.27888	0.13573	0.99154	0.99154
5	0.29455	0.14336	1.13490	1.13490
5.5	0.31109	0.15141	1.28631	1.28631
6	0.32857	0.15991	1.44622	1.44622
6.5	0.34702	0.16890	1.61512	1.6151219
7	0.38020	0.18181	1.79693	1.7969271
7.5	0.41655	0.19919	1.99611	1.9961135
8	0.45637	0.21823	2.21434	2.2143426
8.5	0.50000	0.23909	2.45344	2.453435

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
7.00	0
7.25	17.5
7.50	49.5
7.75	90.9
8.00	140.0
8.25	195.7
8.50	257.2
8.75	324.1
9.00	396.0
9.25	472.5
9.50	553.4
9.75	638.5

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.09	0.00
1	0.18	0.00
1.5	0.28	0.00
2	0.38	0.00
2.5	0.49	0.00
3	0.61	0.00
3.5	0.73	0.00
4	0.86	0.00
4.5	0.99	0.00
5	1.13	0.00
5.5	1.29	0.00
6	1.45	0.00
6.5	1.62	0.00
7	1.80	0.00
7.5	2.00	49.50
8	2.21	140.00
8.5	2.45	257.20

Sediment Volume
0-ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.5 ac	4 H:1V	6.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE23A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
7 ft	253 cfs	50 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.072	1.797

Enough Volume

SPECIAL CASE I

DBE23D	
DBE23C	0.44869
SBE23B	0.25288
SBE23A	0.37043

Disturbed Area

0.34702 ac

Basin DBE22A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.06666	0.00000	0.00000	0
0.5	0.07304	0.03492	0.03492	0.03492
1	0.08002	0.03826	0.07319	0.07319
1.5	0.08767	0.04192	0.11511	0.11511
2	0.09605	0.04593	0.16104	0.16104
2.5	0.10523	0.05032	0.21136	0.21136
3	0.11529	0.05513	0.26649	0.26649
3.5	0.12632	0.06040	0.32690	0.32690
4	0.13839	0.06618	0.39307	0.39307
4.5	0.15162	0.07250	0.46558	0.46558
5	0.16612	0.07944	0.54501	0.54501
5.5	0.18200	0.08703	0.63204	0.63204

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.00	0
4.25	1.4
4.50	4.0
4.75	7.3
5.00	11.2
5.25	15.7
5.50	20.6
5.75	25.9
6.00	31.7
6.25	37.8
6.50	44.3
6.75	51.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.03	0.00
1	0.07	0.00
1.5	0.12	0.00
2	0.16	0.00
2.5	0.21	0.00
3	0.27	0.00
3.5	0.33	0.00
4	0.39	0.00
4.5	0.47	3.96
5	0.55	11.20
5.5	0.63	20.58

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.182 ac	4 H:1V	0 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE22A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4 ft	19 cfs	4 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.387	0.393

Enough Volume

Disturbed Area

0.06666 ac

Basin DBE18A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.02890	0.00000	0.00000	0
0.25	0.03025	0.00739	0.00739	0.00739
0.5	0.03166	0.00774	0.01513	0.01513
0.75	0.03314	0.00810	0.02323	0.02323
1	0.03469	0.00848	0.03171	0.03171
1.25	0.03631	0.00888	0.04059	0.04059
1.5	0.03801	0.00929	0.04988	0.04988
1.75	0.03978	0.00972	0.05960	0.05960
2	0.04164	0.01018	0.06978	0.06978
2.25	0.04359	0.01065	0.08044	0.08044
2.5	0.04562	0.01115	0.09159	0.09159
2.75	0.04775	0.01167	0.10326	0.10326
3	0.04999	0.01222	0.11548	0.11548
3.25	0.05232	0.01279	0.12827	0.1282663
3.5	0.05476	0.01339	0.14165	0.1416519
3.75	0.05732	0.01401	0.15566	0.1556627
4	0.06000	0.01467	0.17033	0.1703281

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
2.50	0
2.75	0.4
3.00	1.0
3.25	1.8
3.50	2.8
3.75	3.9
4.00	5.1
4.25	6.5
4.50	7.9
4.75	9.5
5.00	11.1
5.25	12.8

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.25	0.01	0.00
0.5	0.02	0.00
0.75	0.02	0.00
1	0.03	0.00
1.25	0.04	0.00
1.5	0.05	0.00
1.75	0.06	0.00
2	0.07	0.00
2.25	0.08	0.00
2.5	0.09	0.00
2.75	0.10	0.35
3	0.12	0.99
3.25	0.13	1.82
3.5	0.14	2.80
3.75	0.16	3.91
4	0.17	5.14

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.06 ac	4 H:1V	0 ft	0.25 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE18A	2.5 ft	3 cfs	1 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * depth)}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.054	0.092

Enough Volume

Disturbed Area

0.0289 ac

Basin DBE17B:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.15869	0.00000	0.00000	0
0.5	0.16761	0.08157	0.08157	0.08157
1	0.17702	0.08616	0.16773	0.16773
1.5	0.18696	0.09100	0.25873	0.25873
2	0.19747	0.09611	0.35483	0.35483
2.5	0.20856	0.10151	0.45634	0.45634
3	0.22027	0.10721	0.56355	0.56355
3.5	0.23264	0.11323	0.67678	0.67678
4	0.24571	0.11959	0.79636	0.79636
4.5	0.25951	0.12631	0.92267	0.92267
5	0.27409	0.13340	1.05607	1.05607
5.5	0.28949	0.14089	1.19697	1.19697
6	0.30575	0.14881	1.34577	1.34577
6.5	0.33498	0.16018	1.50595	1.505953
7	0.36700	0.17549	1.68145	1.6814468

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.367 ac	4 H:1V	6 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE17B

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
5.5 ft	47 cfs	10 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	3.5
6.00	9.9
6.25	18.2
6.50	28.0
6.75	39.1
7.00	51.4
7.25	64.8
7.50	79.2
7.75	94.5
8.00	110.7
8.25	127.7

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.08	0.00
1	0.17	0.00
1.5	0.26	0.00
2	0.35	0.00
2.5	0.46	0.00
3	0.56	0.00
3.5	0.68	0.00
4	0.80	0.00
4.5	0.92	0.00
5	1.06	0.00
5.5	1.20	0.00
6	1.35	9.90
6.5	1.51	28.00
7	1.68	51.44

Volume Required	Volume Provided
1.104	1.197

Enough Volume

Disturbed Area

0.30575 ac

Basin DBE17A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.17058	0.00000	0.00000	0
0.5	0.18688	0.08937	0.08937	0.08937
1	0.20475	0.09791	0.18727	0.18727
1.5	0.22433	0.10727	0.29454	0.29454
2	0.24577	0.11752	0.41207	0.41207
2.5	0.26927	0.12876	0.54083	0.54083
3	0.29501	0.14107	0.68190	0.68190
3.5	0.32322	0.15456	0.83646	0.83646
4	0.35412	0.16933	1.00579	1.00579
4.5	0.38797	0.18552	1.19131	1.19131
5	0.42506	0.20326	1.39457	1.39457
5.5	0.46570	0.22269	1.61726	1.61726
6	0.51022	0.24398	1.86124	1.86124
6.5	0.55900	0.26731	2.12855	2.1285454

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.00	0
5.25	6.3
5.50	17.8
5.75	32.7
6.00	50.4
6.25	70.4
6.50	92.6
6.75	116.7
7.00	142.6
7.25	170.1
7.50	199.2
7.75	229.8
-	

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.09	0.00
1	0.19	0.00
1.5	0.29	0.00
2	0.41	0.00
2.5	0.54	0.00
3	0.68	0.00
3.5	0.84	0.00
4	1.01	0.00
4.5	1.19	0.00
5	1.39	0.00
5.5	1.62	17.82
6	1.86	50.40
6.5	2.13	92.59

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.559 ac	4 H:1V	0 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE17A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
5 ft	91 cfs	18 ft	2.8

NOTES

- ¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$
- ² Average end area method used
- ³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$
- ⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.
- ⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table
- ⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.220	1.395

Enough Volume

Disturbed Area

0.17058 ac

Basin DBE13A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.03243	0.00000	0.00000	0
0.5	0.03553	0.01699	0.01699	0.01699
1	0.03893	0.01861	0.03560	0.03560
1.5	0.04265	0.02039	0.05600	0.05600
2	0.04672	0.02234	0.07834	0.07834
2.5	0.05119	0.02448	0.10282	0.10282
3	0.05609	0.02682	0.12964	0.12964
3.5	0.06145	0.02938	0.15902	0.15902
4	0.06732	0.03219	0.19121	0.19121
4.5	0.07376	0.03527	0.22648	0.22648
5	0.08081	0.03864	0.26513	0.26513
5.5	0.08854	0.04234	0.30746	0.30746
6	0.09700	0.04638	0.35385	0.35385

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.50	0
4.75	0.7
5.00	2.0
5.25	3.6
5.50	5.6
5.75	7.8
6.00	10.3
6.25	13.0
6.50	15.8
6.75	18.9
7.00	22.1
7.25	25.5

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.02	0.00
1	0.04	0.00
1.5	0.06	0.00
2	0.08	0.00
2.5	0.10	0.00
3	0.13	0.00
3.5	0.16	0.00
4	0.19	0.00
4.5	0.23	0.00
5	0.27	1.98
5.5	0.31	5.60
6	0.35	10.29

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.097 ac	4 H:1V	0 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE13A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4.5 ft	9 cfs	2 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.187	0.226

Enough Volume

Disturbed Area

0.03243 ac

Basin DBE12A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.04711	0.00000	0.00000	0
0.33	0.04884	0.01583	0.01583	0.01583
0.66	0.05064	0.01641	0.03225	0.03225
0.99	0.05250	0.01702	0.04926	0.04926
1.32	0.05442	0.01764	0.06691	0.06691
1.65	0.05642	0.01829	0.08520	0.08520
1.98	0.05850	0.01896	0.10416	0.10416
2.31	0.06064	0.01966	0.12382	0.12382
2.64	0.06287	0.02038	0.14420	0.14420
2.97	0.06518	0.02113	0.16532	0.16532
3.3	0.06908	0.02215	0.18748	0.18748
3.63	0.07337	0.02350	0.21098	0.21098
3.96	0.07792	0.02496	0.23594	0.23594
4.29	0.08276	0.02651	0.26246	0.2624559
4.5	0.08600	0.01772	0.28018	0.2801762

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	0.7
3.50	2.0
3.75	3.6
4.00	5.6
4.25	7.8
4.50	10.3
4.75	13.0
5.00	15.8
5.25	18.9
5.50	22.1
5.75	25.5

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.02	0.00
0.66	0.03	0.00
0.99	0.05	0.00
1.32	0.07	0.00
1.65	0.09	0.00
1.98	0.10	0.00
2.31	0.12	0.00
2.64	0.14	0.00
2.97	0.17	0.00
3.3	0.19	0.96
3.63	0.21	2.84
3.96	0.24	5.29
4.29	0.26	8.22
4.5	0.28	10.29

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.086 ac	4 H:1V	3 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE12A	3 ft	6 cfs	2 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. A = Ao*e^(-s*depth)

² Average end area method used

³ Rating curve calculated using standard weir equation: Q = CLH^1.5

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.165	0.167

Enough Volume

Disturbed Area

0.06553 ac

Basin DBE11B:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.12064	0.00000	0.00000	0
0.5	0.12742	0.06201	0.06201	0.06201
1	0.13457	0.06550	0.12751	0.12751
1.5	0.14213	0.06918	0.19669	0.19669
2	0.15012	0.07306	0.26975	0.26975
2.5	0.15855	0.07717	0.34692	0.34692
3	0.16745	0.08150	0.42842	0.42842
3.5	0.17686	0.08608	0.51450	0.51450
4	0.18679	0.09091	0.60541	0.60541
4.5	0.19729	0.09602	0.70143	0.70143
5	0.20837	0.10141	0.80284	0.80284
5.5	0.22007	0.10711	0.90995	0.90995
6	0.23243	0.11313	1.02308	1.02308
6.5	0.25465	0.12177	1.14485	1.1448525
7	0.27900	0.13341	1.27827	1.2782661

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.279 ac	4 H:1V	6 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE11B	5.5 ft	39 cfs	8 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	2.8
6.00	7.9
6.25	14.5
6.50	22.4
6.75	31.3
7.00	41.2
7.25	51.9
7.50	63.4
7.75	75.6
8.00	88.5
8.25	102.2

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.06	0.00
1	0.13	0.00
1.5	0.20	0.00
2	0.27	0.00
2.5	0.35	0.00
3	0.43	0.00
3.5	0.51	0.00
4	0.61	0.00
4.5	0.70	0.00
5	0.80	0.00
5.5	0.91	0.00
6	1.02	7.92
6.5	1.14	22.40
7	1.28	41.15

Volume Required	Volume Provided
0.898	0.910

Enough Volume

Disturbed Area

0.23243 ac

Volume Calculations:				
Elevation	Area¹ (acres)	volume² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.14043	0.00000	0.00000	0
0.5	0.14832	0.07219	0.07219	0.07219
1	0.15665	0.07624	0.14843	0.14843
1.5	0.16545	0.08052	0.22895	0.22895
2	0.17474	0.08505	0.31400	0.31400
2.5	0.18455	0.08982	0.40382	0.40382
3	0.19492	0.09487	0.49869	0.49869
3.5	0.20587	0.10020	0.59889	0.59889
4	0.21743	0.10583	0.70471	0.70471
4.5	0.23822	0.11391	0.81863	0.81863
5	0.26099	0.12480	0.94343	0.94343
5.5	0.28595	0.13674	1.08016	1.08016
6	0.31328	0.14981	1.22997	1.22997
6.5	0.34323	0.16413	1.39410	1.3941015
7	0.37605	0.17982	1.57392	1.5739223
7.5	0.41200	0.19701	1.77093	1.7709345
Sediment Volume			Basin Top Area	
0 ac-ft			0.412 ac	

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
6.00	0
6.25	5.6
6.50	15.8
6.75	29.1
7.00	44.8
7.25	62.6
7.50	82.3
7.75	103.7
8.00	126.7
8.25	151.2
8.50	177.1
8.75	204.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.07	0.00
1	0.15	0.00
1.5	0.23	0.00
2	0.31	0.00
2.5	0.40	0.00
3	0.50	0.00
3.5	0.60	0.00
4	0.70	0.00
4.5	0.82	0.00
5	0.94	0.00
5.5	1.08	0.00
6	1.23	0.00
6.5	1.39	15.84
7	1.57	44.80
7.5	1.77	82.30

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
DBE11A	6 ft		81 cfs		16 ft	2.8

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.211	1.230

Enough Volume

Disturbed Area

0.21743 ac

Basin DBE06D:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	2.5
6.00	6.9
6.25	12.7
6.50	19.6
6.75	27.4
7.00	36.0
7.25	45.4
7.50	55.4
7.75	66.2
8.00	77.5
8.25	89.4

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.05	0.00
1	0.10	0.00
1.5	0.15	0.00
2	0.20	0.00
2.5	0.26	0.00
3	0.33	0.00
3.5	0.39	0.00
4	0.46	0.00
4.5	0.53	0.00
5	0.61	0.00
5.5	0.69	0.00
6	0.78	6.93
6.5	0.87	19.60
7	0.97	36.01

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.212 ac	4 H:1V	6 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
D8E06D

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
5.5 ft		31 cfs		7 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

^a SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "Volume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.688	0.691

Enough Volume

Disturbed Area

0.17662 ac

Basin DBE06C:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.50	0
4.75	2.8
5.00	7.9
5.25	14.5
5.50	22.4
5.75	31.3
6.00	41.2
6.25	51.9
6.50	63.4
6.75	75.6
7.00	88.5
7.25	102.2

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.08	0.00
1	0.17	0.00
1.5	0.26	0.00
2	0.35	0.00
2.5	0.45	0.00
3	0.56	0.00
3.5	0.67	0.00
4	0.79	0.00
4.5	0.92	0.00
5	1.05	7.92
5.5	1.19	22.40
6	1.34	41.15

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.315 ac	4 H:1V	5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	5 H:1V	2.02	1.5 ft

Basin Name
DBE06C

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4.5 ft	40 cfs	8 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.980	0.917

[SPECIAL CASE: Difference to Basin DBE06A

Disturbed Area
0.27249 ac

Basin DBE05B:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	2.1
6.00	5.9
6.25	10.9
6.50	16.8
6.75	23.5
7.00	30.9
7.25	38.9
7.50	47.5
7.75	56.7
8.00	66.4
8.25	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.06	0.00
1	0.13	0.00
1.5	0.20	0.00
2	0.27	0.00
2.5	0.35	0.00
3	0.43	0.00
3.5	0.52	0.00
4	0.61	0.00
4.5	0.71	0.00
5	0.81	0.00
5.5	0.92	0.00
6	1.03	5.94
6.5	1.16	16.80
7	1.29	30.86

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.282 ac	4 H:1V	6 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE05B

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
5.5 ft		27 cfs		6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.917	0.920

Enough Volume

Disturbed Area

0.23493 ac

Basin DBE06A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.25186	0.00000	0.00000	0
0.5	0.26601	0.12947	0.12947	0.12947
1	0.28095	0.13674	0.26621	0.26621
1.5	0.29673	0.14442	0.41063	0.41063
2	0.31340	0.15253	0.56316	0.56316
2.5	0.33100	0.16110	0.72426	0.72426
3	0.34959	0.17015	0.89441	0.89441
3.5	0.36923	0.17971	1.07412	1.07412
4	0.38997	0.18980	1.26392	1.26392
4.5	0.41188	0.20046	1.46438	1.46438
5	0.43501	0.21172	1.67610	1.67610
5.5	0.45944	0.22361	1.89972	1.89972
6	0.48525	0.23617	2.13589	2.13589
6.5	0.51251	0.24944	2.38533	2.3853294
7	0.56150	0.26850	2.65383	2.6538326
7.5	0.61519	0.29417	2.94801	2.9480054
8	0.67400	0.32230	3.27030	3.270302

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.674 ac	4 H:1V	6.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE06A	6.5 ft	151 cfs	30 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
6.50	0
6.75	10.5
7.00	29.7
7.25	54.6
7.50	84.0
7.75	117.4
8.00	154.3
8.25	194.5
8.50	237.6
8.75	283.5
9.00	332.0
9.25	383.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.13	0.00
1	0.27	0.00
1.5	0.41	0.00
2	0.56	0.00
2.5	0.72	0.00
3	0.89	0.00
3.5	1.07	0.00
4	1.26	0.00
4.5	1.46	0.00
5	1.68	0.00
5.5	1.90	0.00
6	2.14	0.00
6.5	2.39	0.00
7	2.65	29.70
7.5	2.95	84.00
8	3.27	154.32

Volume Required	Volume Provided
2.334	2.385

Enough Volume

special case1	
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SBE06A	1.18677
SBE06B	0.59425
SBE05A	0.49041
DBE06C	0.06227

Disturbed Area

0.51251 ac

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.50	0
5.75	1.8
6.00	4.9
6.25	9.1
6.50	14.0
6.75	19.6
7.00	25.7
7.25	32.4
7.50	39.6
7.75	47.3
8.00	55.3
8.25	63.8

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.07	0.00
1	0.14	0.00
1.5	0.21	0.00
2	0.29	0.00
2.5	0.37	0.00
3	0.46	0.00
3.5	0.55	0.00
4	0.65	0.00
4.5	0.75	0.00
5	0.86	0.00
5.5	0.98	0.00
6	1.10	4.95
6.5	1.23	14.00
7	1.37	25.72

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow into Basin	Grate Width	Weir Coefficient
DBE04C	5.5 ft		25 cfs	5 ft	2.8

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.110	0.978

SPECIAL CASE: EXCESS TO BASIN DBE04A

Disturbed Area

0.24993 ac

Basin DBE04B:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.00	0
5.25	2.1
5.50	5.9
5.75	10.9
6.00	16.8
6.25	23.5
6.50	30.9
6.75	38.9
7.00	47.5
7.25	56.7
7.50	66.4
7.75	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.07	0.00
1	0.14	0.00
1.5	0.21	0.00
2	0.29	0.00
2.5	0.37	0.00
3	0.46	0.00
3.5	0.55	0.00
4	0.65	0.00
4.5	0.75	0.00
5	0.86	0.00
5.5	0.97	5.94
6	1.10	16.80
6.5	1.23	30.86

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.283 ac	4 H:1V	5.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE04B

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
5 ft		28 cfs		6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.276	0.860

SPECIAL CASE: EXCESS TO BASIN DBE04A

Disturbed Area
0.23577 ac

Basin DBE04A:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.00	0
5.25	4.2
5.50	11.9
5.75	21.8
6.00	33.6
6.25	47.0
6.50	61.7
6.75	77.8
7.00	95.0
7.25	113.4
7.50	132.8
7.75	153.2

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.09	0.00
1	0.18	0.00
1.5	0.27	0.00
2	0.37	0.00
2.5	0.48	0.00
3	0.59	0.00
3.5	0.71	0.00
4	0.84	0.00
4.5	0.97	0.00
5	1.11	0.00
5.5	1.26	11.88
6	1.42	33.60
6.5	1.60	61.73

Sediment Volume	.
0 ac-ft	

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.366 ac	4 H:1V	5.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE04A

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
5 ft		61 cfs		12 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.983	1.112

Enough Volume

SPECIAL CASE I	
SBE04A	0.4362
DBE04B	0.4195
DBE04C	0.1314

Disturbed Area

0.30491 ac

Basin DBE03A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.05135	0.00000	0.00000	0
0.5	0.05626	0.02690	0.02690	0.02690
1	0.06164	0.02948	0.05638	0.05638
1.5	0.06753	0.03229	0.08867	0.08867
2	0.07399	0.03538	0.12405	0.12405
2.5	0.08106	0.03876	0.16281	0.16281
3	0.08881	0.04247	0.20528	0.20528
3.5	0.09730	0.04653	0.25181	0.25181
4	0.10661	0.05098	0.30279	0.30279
4.5	0.11680	0.05585	0.35864	0.35864
5	0.12796	0.06119	0.41983	0.41983
5.5	0.14020	0.06704	0.48687	0.48687
6	0.15360	0.07345	0.56032	0.56032
6.5	0.16828	0.08047	0.64079	0.6407906
7	0.18437	0.08816	0.72896	0.7289552
7.5	0.20200	0.09659	0.82555	0.8255485

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.202 ac	6 H:1V	0 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	2.36	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE03A	6 ft	20 cfs	4 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship: A = Ao*e^(-s*depth)

² Average end area method used

³ Rating curve calculated using standard weir equation: Q = CLH^1.5

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
6.00	0
6.25	1.4
6.50	4.0
6.75	7.3
7.00	11.2
7.25	15.7
7.50	20.6
7.75	25.9
8.00	31.7
8.25	37.8
8.50	44.3
8.75	51.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.03	0.00
1	0.06	0.00
1.5	0.09	0.00
2	0.12	0.00
2.5	0.16	0.00
3	0.21	0.00
3.5	0.25	0.00
4	0.30	0.00
4.5	0.36	0.00
5	0.42	0.00
5.5	0.49	0.00
6	0.56	0.00
6.5	0.64	3.96
7	0.73	11.20
7.5	0.83	20.58

Volume Required	Volume Provided
0.544	0.560

Enough Volume

Disturbed Area

0.05135 ac

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.00	0
4.25	1.4
4.50	4.0
4.75	7.3
5.00	11.2
5.25	15.7
5.50	20.6
5.75	25.9
6.00	31.7
6.25	37.8
6.50	44.3
6.75	51.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.12	0.00
1	0.25	0.00
1.5	0.39	0.00
2	0.55	0.00
2.5	0.71	0.00
3	0.89	0.00
3.5	1.07	0.00
4	1.28	0.00
4.5	1.50	3.96
5	1.74	11.20
5.5	2.00	20.58
6	2.29	31.68
7	2.29	52.00

Sediment Volume
- 0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.606 ac	5 H:1V	4 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	2.11	2 ft

Basin Name
DBE02A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4 ft	80 cfs	4 ft	2.8

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.265	1.277

Enough Volume

Disturbed Area

0.42059 ac

Basin DBE01A:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
2.50	0
2.75	14.0
3.00	39.6
3.25	72.7
3.50	112.0
3.75	156.5
4.00	205.8
4.25	259.3
4.50	316.8
4.75	378.0
5.00	442.7
5.25	510.8

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.03	0.00
0.66	0.06	0.00
0.99	0.09	0.00
1.32	0.12	0.00
1.65	0.15	0.00
1.98	0.19	0.00
2.31	0.23	0.00
2.64	0.27	7.84
2.97	0.31	36.53
3.3	0.36	80.60
3.63	0.41	135.15
3.96	0.46	197.88
4	0.47	205.76

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.165 ac	4 H:1V	0 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBE01A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
2.5 ft	202 cfs	40 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.248	0.252

Enough Volume

Disturbed Area

0.07948 ac

Basın DBW14A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	Σ Volume (ac-ft)	Available Water Volume
0	0.11723	0.00000	0.00000	0
0.3	0.12114	0.03576	0.03576	0.03576
0.6	0.12518	0.03695	0.07270	0.07270
0.9	0.12935	0.03818	0.11088	0.11088
1.2	0.13366	0.03945	0.15034	0.15034
1.5	0.13812	0.04077	0.19110	0.19110
1.8	0.14272	0.04213	0.23323	0.23323
2.1	0.14748	0.04353	0.27676	0.27676
2.4	0.15240	0.04498	0.32174	0.32174
2.7	0.15748	0.04648	0.36822	0.36822
3	0.16273	0.04803	0.41625	0.41625
3.3	0.17189	0.05019	0.46645	0.46645
3.6	0.18157	0.05302	0.51946	0.51946
3.9	0.19179	0.05600	0.57547	0.5754673
4.2	0.20259	0.05916	0.63462	0.6346248
4.5	0.21400	0.06249	0.69711	0.6971136
Sediment Volume			Basin Top Area	
0 ac-ft			0.214 ac	

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
2.50	0
2.75	1.1
3.00	3.0
3.25	5.5
3.50	8.4
3.75	11.7
4.00	15.4
4.25	19.4
4.50	23.8
4.75	28.4
5.00	33.2
5.25	38.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.3	0.04	0.00
0.6	0.07	0.00
0.9	0.11	0.00
1.2	0.15	0.00
1.5	0.19	0.00
1.8	0.23	0.00
2.1	0.28	0.00
2.4	0.32	0.00
2.7	0.37	0.84
3	0.42	2.97
3.3	0.47	6.04
3.6	0.52	9.74
3.9	0.58	13.95
4.2	0.63	18.64
4.5	0.70	23.76

Approximate Longitudinal Slope	Approximate Existing Side Slopes		Area Adjustment Factor		Assumed Structure Height
0.03 ft/ft	6 H:1V		1.87		2 ft

Basin Name	Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow into Basin		Grate Width	Weir Coefficient
DBW14A	2.5 ft		30 cfs		3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.321	0.337

Enough Volume

Disturbed Area

0.16273 ac

Basin DBW12A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.14934	0.00000	0.00000	0
0.5	0.15773	0.07677	0.07677	0.07677
1	0.16659	0.08108	0.15784	0.15784
1.5	0.17594	0.08563	0.24348	0.24348
2	0.18583	0.09044	0.33392	0.33392
2.5	0.19626	0.09552	0.42944	0.42944
3	0.20729	0.10089	0.53033	0.53033
3.5	0.21893	0.10655	0.63688	0.63688
4	0.23123	0.11254	0.74942	0.74942
4.5	0.24422	0.11886	0.86828	0.86828
5	0.25793	0.12554	0.99382	0.99382
5.5	0.27242	0.13259	1.12641	1.12641
6	0.29847	0.14272	1.26913	1.26913
6.5	0.32700	0.15637	1.42550	1.4254992

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.327 ac	4 H:1V	5.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	2 ft

Basin Name
DBW12A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4.5 ft	53 cfs	6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.50	0
4.75	2.1
5.00	5.9
5.25	10.9
5.50	16.8
5.75	23.5
6.00	30.9
6.25	38.9
6.50	47.5
6.75	56.7
7.00	66.4
7.25	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.08	0.00
1	0.16	0.00
1.5	0.24	0.00
2	0.33	0.00
2.5	0.43	0.00
3	0.53	0.00
3.5	0.64	0.00
4	0.75	0.00
4.5	0.87	0.00
5	0.99	5.94
5.5	1.13	16.80
6	1.27	30.86
6.5	1.43	47.52

Volume Required	Volume Provided
0.850	0.868

Enough Volume

Disturbed Area

0.27242 ac

Basin DBW10B:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.09867	0.00000	0.00000	0
0.6	0.10535	0.06121	0.06121	0.06121
1.2	0.11249	0.06535	0.12656	0.12656
1.8	0.12012	0.06978	0.19634	0.19634
2.4	0.12826	0.07451	0.27086	0.27086
3	0.13695	0.07956	0.35042	0.35042
3.6	0.14624	0.08496	0.43538	0.43538
4.2	0.15615	0.09071	0.52609	0.52609
4.8	0.16673	0.09686	0.62296	0.62296
5.4	0.17803	0.10343	0.72638	0.72638
6	0.19010	0.11044	0.83682	0.83682
6.6	0.20298	0.11792	0.95474	0.95474
7.2	0.21674	0.12592	1.08066	1.08066
7.8	0.23143	0.13445	1.21511	1.2151091
8.17	0.24400	0.08795	1.30306	1.3030631

Sediment Volume
0 ac-ft

Basin Name
DBW10B

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
7.67	0
7.92	4.4
8.17	12.4
8.42	22.7
8.67	35.0
8.92	48.9
9.17	64.3
9.42	81.0
9.67	99.0
9.92	118.1
10.17	138.3
10.42	159.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.6	0.06	0.00
1.2	0.13	0.00
1.8	0.20	0.00
2.4	0.27	0.00
3	0.35	0.00
3.6	0.44	0.00
4.2	0.53	0.00
4.8	0.62	0.00
5.4	0.73	0.00
6	0.84	0.00
6.6	0.95	0.00
7.2	1.08	0.00
7.8	1.22	2.27
8.17	1.30	12.37

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.244 ac	4 H:1V	8 ft	0.6 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	0.5 ft

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
7.67 ft	77 cfs	12.5 ft	2.8

NOTES

- ¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$
- ² Average end area method used
- ³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$
- ⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.
- ⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table
- ⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.823	1.186

SPECIAL CASE I	
DBW10C	0
SBW10B	0.82273

Enough Volume

Disturbed Area
0.23822 ac

Basin DBW10A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.31628	0.00000	0.00000	0
0.6	0.33772	0.19620	0.19620	0.19620
1.2	0.36061	0.20950	0.40570	0.40570
1.8	0.38505	0.22370	0.62940	0.62940
2.4	0.41115	0.23886	0.86826	0.86826
3	0.43902	0.25505	1.12331	1.12331
3.6	0.46877	0.27234	1.39565	1.39565
4.2	0.50054	0.29079	1.68644	1.68644
4.8	0.53447	0.31050	1.99694	1.99694
5.4	0.57069	0.33155	2.32849	2.32849
6	0.60937	0.35402	2.68251	2.68251
6.6	0.67993	0.38679	3.06930	3.06930
7.2	0.75866	0.43158	3.50088	3.50088
7.8	0.84651	0.48155	3.98243	3.9824332
8	0.87800	0.17245	4.15488	4.1548844

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.00	0
5.25	7.0
5.50	19.8
5.75	36.4
6.00	56.0
6.25	78.3
6.50	102.9
6.75	129.6
7.00	158.4
7.25	189.0
7.50	221.4
8.00	291.0

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.6	0.20	0.00
1.2	0.41	0.00
1.8	0.63	0.00
2.4	0.87	0.00
3	1.12	0.00
3.6	1.40	0.00
4.2	1.69	0.00
4.8	2.00	0.00
5.4	2.33	14.68
6	2.68	56.00
6.6	3.07	113.58
7.2	3.50	182.88
7.8	3.98	189.00
8	4.15	189.00

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.878 ac	4 H:1V	6 ft	0.6 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	3 ft

Basin Name
DBW10A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow into Basin	Grate Width	Weir Coefficient
5 ft	169 cfs	20 ft	2.8

Actual height is 4-feet

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
2.081	2.107

Enough Volume

Disturbed Area

0.60937 ac

Basin DBW10C:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.10674	0.00000	0.00000	0
0.5	0.11694	0.05592	0.05592	0.05592
1	0.12812	0.06126	0.11718	0.11718
1.5	0.14037	0.06712	0.18430	0.18430
2	0.15379	0.07354	0.25784	0.25784
2.5	0.16849	0.08057	0.33841	0.33841
3	0.18460	0.08827	0.42668	0.42668
3.5	0.20225	0.09671	0.52340	0.52340
4	0.22158	0.10596	0.62935	0.62935
4.5	0.24276	0.11609	0.74544	0.74544
5	0.26597	0.12718	0.87262	0.87262
5.5	0.29140	0.13934	1.01197	1.01197
6	0.31926	0.15267	1.16463	1.16463
6.5	0.34978	0.16726	1.33189	1.3318934
7	0.38322	0.18325	1.51514	1.5151448
7.5	0.41986	0.20077	1.71592	1.7159156
8	0.46000	0.21997	1.93588	1.9358806

Sediment Volume
0 ac-ft

Basin Name
DBW10C

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
6.50	0
6.75	3.2
7.00	8.9
7.25	16.4
7.50	25.2
7.75	35.2
8.00	46.3
8.25	58.3
8.50	71.3
8.75	85.1
9.00	99.6
9.25	114.9

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.06	0.00
1	0.12	0.00
1.5	0.18	0.00
2	0.26	0.00
2.5	0.34	0.00
3	0.43	0.00
3.5	0.52	0.00
4	0.63	0.00
4.5	0.75	0.00
5	0.87	0.00
5.5	1.01	0.00
6	1.16	0.00
6.5	1.33	0.00
7	1.52	8.91
7.5	1.72	25.20
8	1.94	46.30

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.46 ac	4 H:1V	0 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
6.5 ft	46 cfs	9 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.059	1.332

Enough Volume

Disturbed Area

0.10674 ac

Basin DBW09E:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.04485	0.00000	0.00000	0
0.33	0.04763	0.01526	0.01526	0.01526
0.66	0.05059	0.01621	0.03147	0.03147
0.99	0.05373	0.01721	0.04868	0.04868
1.32	0.05707	0.01828	0.06696	0.06696
1.65	0.06061	0.01942	0.08638	0.08638
1.98	0.06438	0.02062	0.10700	0.10700
2.31	0.06838	0.02191	0.12891	0.12891
2.64	0.07263	0.02327	0.15217	0.15217
2.97	0.07714	0.02471	0.17688	0.17688
3.3	0.08193	0.02625	0.20313	0.20313
3.63	0.08702	0.02788	0.23101	0.23101
3.96	0.09242	0.02961	0.26061	0.26061
4.29	0.09816	0.03145	0.29206	0.2920597
4.5	0.10200	0.02102	0.31308	0.3130768

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.102 ac	4 H:1V	0 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW09E

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3 ft	12 cfs	3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.00	0
3.25	1.1
3.50	3.0
3.75	5.5
4.00	8.4
4.25	11.7
4.50	15.4
4.75	19.4
5.00	23.8
5.25	28.4
5.50	33.2
5.75	38.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.02	0.00
0.66	0.03	0.00
0.99	0.05	0.00
1.32	0.07	0.00
1.65	0.09	0.00
1.98	0.11	0.00
2.31	0.13	0.00
2.64	0.15	0.00
2.97	0.18	0.00
3.3	0.20	1.43
3.63	0.23	4.26
3.96	0.26	7.93
4.29	0.29	12.33
4.5	0.31	15.43

Volume Required	Volume Provided
0.164	0.179

Enough Volume

Disturbed Area

0.04485 ac

Basin DBW09C:

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	7.0
4.00	19.8
4.25	36.4
4.50	56.0
4.75	78.3
5.00	102.9
5.25	129.6
5.50	158.4
5.75	189.0
6.00	221.4
6.25	255.4

[illegible]

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.809 ac	4 H:1V	3 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW09C

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3.5 ft		100 cfs		20 ft	2.8

0.285

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
1.711	1.731

	Enough Volume
--	----------------------

special case

SBW09C	1.08949
SBW09D	0.62159

Disturbed Area

0.56148 ac

Basin DBW09B:

[illegible]

Flow Calcs ^a :	
Elevation	Flow (cfs)
0.00	0
4.00	0
4.25	7.4
4.50	20.8
4.75	38.2
5.00	58.8
5.25	82.2
5.50	108.0
5.75	136.1
6.00	166.3
6.25	198.5
6.50	232.4
6.75	268.1

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.05	0.00
1	0.10	0.00
1.5	0.15	0.00
2	0.21	0.00
2.5	0.27	0.00
3	0.34	0.00
3.5	0.40	0.00
4	0.48	0.00
4.5	0.55	20.79
5	0.63	58.80
5.5	0.72	108.02

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.186 ac	4 H:1V	4.5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW09B

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
4 ft		104 cfs		21 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.335	0.476
Difference to Basin DBW09A	

	Enough Volume
--	----------------------

SPECIAL CASE I

DBW09C

SBW09B 0.33481

Disturbed Area

0.15496 ac

[illegible]

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.50	0
4.75	8.1
5.00	22.8
5.25	41.8
5.50	64.4
5.75	90.0
6.00	118.3
6.25	149.1
6.50	182.2
6.75	217.4
7.00	254.6
7.25	293.7

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.05	0.00
1	0.09	0.00
1.5	0.14	0.00
2	0.20	0.00
2.5	0.25	0.00
3	0.31	0.00
3.5	0.38	0.00
4	0.44	0.00
4.5	0.51	0.00
5	0.59	22.77
5.5	0.67	64.40
6	0.76	118.31

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
DBW09A	4.5 ft		116 cfs		23 ft	2.8

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

^a SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.499	0.514

Enough Volume

SPECIAL CASE!

SBW09A 0.49913

Disturbed Area

0.14448 ac

Basin DBW08A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.13021	0.00000	0.00000	0
0.33	0.13499	0.04376	0.04376	0.04376
0.66	0.13995	0.04537	0.08912	0.08912
0.99	0.14509	0.04703	0.13615	0.13615
1.32	0.15042	0.04876	0.18491	0.18491
1.65	0.15594	0.05055	0.23546	0.23546
1.98	0.16167	0.05241	0.28787	0.28787
2.31	0.16761	0.05433	0.34220	0.34220
2.64	0.17376	0.05633	0.39852	0.39852
2.97	0.18014	0.05839	0.45692	0.45692
3.3	0.18676	0.06054	0.51746	0.51746
3.63	0.19362	0.06276	0.58022	0.58022
3.96	0.20073	0.06507	0.64529	0.64529
4.29	0.21257	0.06819	0.71348	0.7134806
4.62	0.22578	0.07233	0.78581	0.7858083
4.95	0.23980	0.07682	0.86263	0.8626285
5	0.24200	0.01205	0.87467	0.8746735
Sediment Volume				
0 ac-ft				

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	2.1
4.00	5.9
4.25	10.9
4.50	16.8
4.75	23.5
5.00	30.9
5.25	38.9
5.50	47.5
5.75	56.7
6.00	66.4
6.25	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.04	0.00
0.66	0.09	0.00
0.99	0.14	0.00
1.32	0.18	0.00
1.65	0.24	0.00
1.98	0.29	0.00
2.31	0.34	0.00
2.64	0.40	0.00
2.97	0.46	0.00
3.3	0.52	0.00
3.63	0.58	1.09
3.96	0.65	5.33
4.29	0.71	11.85
4.62	0.79	20.01
4.95	0.86	29.39
5	0.87	30.86

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.242 ac	4 H:1V	4 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBW08A	3.5 ft	28 cfs	6 ft	2.8

NOTES

- ¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$
- ² Average end area method used
- ³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$
- ⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.
- ⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table
- ⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.523	0.555

Enough Volume

Disturbed Area

0.20216 ac

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.02729	0.00000	0.00000	0
0.33	0.02898	0.00928	0.00928	0.00928
0.66	0.03078	0.00986	0.01915	0.01915
0.99	0.03270	0.01047	0.02962	0.02962
1.32	0.03473	0.01112	0.04075	0.04075
1.65	0.03688	0.01182	0.05256	0.05256
1.98	0.03917	0.01255	0.06511	0.06511
2.31	0.04161	0.01333	0.07844	0.07844
2.64	0.04419	0.01416	0.09260	0.09260
2.97	0.04694	0.01504	0.10763	0.10763
3.3	0.04985	0.01597	0.12360	0.12360
3.63	0.05295	0.01696	0.14057	0.14057
3.96	0.05624	0.01802	0.15858	0.15858
4.29	0.05973	0.01913	0.17772	0.1777163
4.62	0.06344	0.02032	0.19804	0.1980398
4.95	0.06738	0.02159	0.21963	0.2196256
5	0.06800	0.00338	0.22301	0.2230102

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.068 ac	4 H:1V	0 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW07C

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
3.5 ft	11 cfs	3 ft	2.8

NOTES

- ¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{(-s \cdot \text{depth})}$
- ² Average end area method used
- ³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$
- ⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.
- ⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table
- ⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.109	0.134

Enough Volume

Disturbed Area
0.02729 ac

Basın DBW07B:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	Σ Volume (ac-ft)	Available Water Volume
0	0.03652	0.00000	0.00000	0
0.33	0.03879	0.01243	0.01243	0.01243
0.66	0.04120	0.01320	0.02562	0.02562
0.99	0.04375	0.01402	0.03964	0.03964
1.32	0.04647	0.01489	0.05453	0.05453
1.65	0.04936	0.01581	0.07034	0.07034
1.98	0.05242	0.01679	0.08713	0.08713
2.31	0.05568	0.01784	0.10497	0.10497
2.64	0.05914	0.01895	0.12392	0.12392
2.97	0.06281	0.02012	0.14404	0.14404
3.3	0.06671	0.02137	0.16541	0.16541
3.63	0.07086	0.02270	0.18811	0.18811
3.96	0.07526	0.02411	0.21222	0.21222
4.29	0.07993	0.02561	0.23783	0.237826
4.62	0.08490	0.02720	0.26502	0.2650236
4.95	0.09017	0.02889	0.29391	0.2939107
5	0.09100	0.00453	0.29844	0.2984401

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	1.1
4.00	3.0
4.25	5.5
4.50	8.4
4.75	11.7
5.00	15.4
5.25	19.4
5.50	23.8
5.75	28.4
6.00	33.2
6.25	38.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.01	0.00
0.66	0.03	0.00
0.99	0.04	0.00
1.32	0.05	0.00
1.65	0.07	0.00
1.98	0.09	0.00
2.31	0.10	0.00
2.64	0.12	0.00
2.97	0.14	0.00
3.3	0.17	0.00
3.63	0.19	0.55
3.96	0.21	2.66
4.29	0.24	5.93
4.62	0.27	10.00
4.95	0.29	14.69
5	0.30	15.43

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.091 ac	4 H:1V	0 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW07B

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3.5 ft		13 cfs		3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

^a SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.163	0.179

	Enough Volume
--	----------------------

Disturbed Area

0.03652 ac

[illegible]

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
4 ft		52 cfs		11 ft	2.8

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.00	0
4.25	3.9
4.50	10.9
4.75	20.0
5.00	30.8
5.25	43.0
5.50	56.6
5.75	71.3
6.00	87.1
6.25	104.0
6.50	121.7
6.75	140.5

[illegible]

Volume Required	Volume Provided
0.772	0.875

0.3012 ac

Basin DBW06A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.04735	0.00000	0.00000	0
0.33	0.05029	0.01611	0.01611	0.01611
0.66	0.05342	0.01711	0.03322	0.03322
0.99	0.05674	0.01818	0.05140	0.05140
1.32	0.06026	0.01930	0.07070	0.07070
1.65	0.06400	0.02050	0.09121	0.09121
1.98	0.06798	0.02178	0.11299	0.11299
2.31	0.07220	0.02313	0.13612	0.13612
2.64	0.07669	0.02457	0.16068	0.16068
2.97	0.08145	0.02609	0.18677	0.18677
3.3	0.08651	0.02771	0.21449	0.21449
3.63	0.09188	0.02943	0.24392	0.24392
3.96	0.09759	0.03126	0.27519	0.27519
4.29	0.10365	0.03320	0.30839	0.30839
4.62	0.11009	0.03527	0.34366	0.3436572
4.95	0.11693	0.03746	0.38112	0.381115
5	0.11800	0.00587	0.38699	0.3869882

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
3.50	0
3.75	1.1
4.00	3.0
4.25	5.5
4.50	8.4
4.75	11.7
5.00	15.4
5.25	19.4
5.50	23.8
5.75	28.4
6.00	33.2
6.25	38.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.33	0.02	0.00
0.66	0.03	0.00
0.99	0.05	0.00
1.32	0.07	0.00
1.65	0.09	0.00
1.98	0.11	0.00
2.31	0.14	0.00
2.64	0.16	0.00
2.97	0.19	0.00
3.3	0.21	0.00
3.63	0.24	0.55
3.96	0.28	2.66
4.29	0.31	5.93
4.62	0.34	10.00
4.95	0.38	14.69
5	0.39	15.43

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.118 ac	4 H:1V	0 ft	0.33 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
D8W06A

Grate Bottom Elevation Above Basin Invert		100-year Peak Inflow Into Basin		Grate Width	Weir Coefficient
3.5 ft		12 cfs		3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_0 \cdot e^{-(s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.184	0.232

Enough Volume

Disturbed Area

0.04735 ac

[illegible]

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.05	0.00
1	0.09	0.00
1.5	0.15	0.00
2	0.20	0.00
2.5	0.26	0.00
3	0.32	0.00
3.5	0.38	0.00
4	0.45	0.00
4.5	0.52	0.00
5	0.59	5.94
5.5	0.67	16.80
6	0.76	30.86

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.05	0.00
1	0.09	0.00
1.5	0.15	0.00
2	0.20	0.00
2.5	0.26	0.00
3	0.32	0.00
3.5	0.38	0.00
4	0.45	0.00
4.5	0.52	0.00
5	0.59	5.94
5.5	0.67	16.80
6	0.76	30.86

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4.5 ft	29 cfs	6 ft	2.8

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

0.16247 ac

Basin DBE26A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.11491	0.00000	0.00000	0
0.5	0.12136	0.05907	0.05907	0.05907
1	0.12818	0.06238	0.12145	0.12145
1.5	0.13538	0.06589	0.18734	0.18734
2	0.14298	0.06959	0.25693	0.25693
2.5	0.15101	0.07350	0.33043	0.33043
3	0.15949	0.07763	0.40806	0.40806
3.5	0.16845	0.08199	0.49004	0.49004
4	0.17792	0.08659	0.57663	0.57663
4.5	0.18791	0.09146	0.66809	0.66809
5	0.19846	0.09659	0.76468	0.76468
5.5	0.21744	0.10398	0.86866	0.86866
6	0.23823	0.11392	0.98257	0.98257
6.5	0.26100	0.12481	1.10738	1.1073809

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.261 ac	4 H:1V	5 ft	0.5 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name	Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
DBE26A	5 ft	27 cfs	6 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o \cdot e^{(-s \cdot \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
5.00	0
5.25	2.1
5.50	5.9
5.75	10.9
6.00	16.8
6.25	23.5
6.50	30.9
6.75	38.9
7.00	47.5
7.25	56.7
7.50	66.4
7.75	76.6

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.5	0.06	0.00
1	0.12	0.00
1.5	0.19	0.00
2	0.26	0.00
2.5	0.33	0.00
3	0.41	0.00
3.5	0.49	0.00
4	0.58	0.00
4.5	0.67	0.00
5	0.76	0.00
5.5	0.87	5.94
6	0.98	16.80
6.5	1.11	30.86

Volume Required	Volume Provided
0.714	0.765

Enough Volume

Disturbed Area

0.19846 ac

Basin DBW02A:

Volume Calculations:				
Elevation	Area ¹ (acres)	Volume ² (ac-ft)	ΣVolume (ac-ft)	Available Water Volume
0	0.03551	0.00000	0.00000	0
0.4	0.03709	0.01452	0.01452	0.01452
0.8	0.03875	0.01517	0.02969	0.02969
1.2	0.04048	0.01585	0.04554	0.04554
1.6	0.04229	0.01656	0.06209	0.06209
2	0.04418	0.01730	0.07939	0.07939
2.4	0.04616	0.01807	0.09746	0.09746
2.8	0.04822	0.01888	0.11633	0.11633
3.2	0.05038	0.01972	0.13605	0.13605
3.6	0.05263	0.02060	0.15665	0.15665
4	0.05498	0.02152	0.17817	0.17817
4.4	0.05744	0.02248	0.20066	0.20066
4.8	0.06134	0.02375	0.22441	0.22441
5.2	0.06598	0.02546	0.24987	0.2498738
5.5	0.06970	0.02035	0.27023	0.2702265

Flow Calcs ³ :	
Elevation	Flow (cfs)
0.00	0
4.00	0
4.25	1.1
4.50	3.0
4.75	5.5
5.00	8.4
5.25	11.7
5.50	15.4
5.75	19.4
6.00	23.8
6.25	28.4
6.50	33.2
6.75	38.3

HEC-1 Input:		
SE ⁴	SV ⁵	SQ ⁶
0	0.00	0.00
0.4	0.01	0.00
0.8	0.03	0.00
1.2	0.05	0.00
1.6	0.06	0.00
2	0.08	0.00
2.4	0.10	0.00
2.8	0.12	0.00
3.2	0.14	0.00
3.6	0.16	0.00
4	0.18	0.00
4.4	0.20	2.20
4.8	0.22	6.04
5.2	0.25	11.07
5.5	0.27	15.43

Sediment Volume
0 ac-ft

Basin Top Area	Basin Side Slopes	Basin Cut Depth	Elevation Increment
0.0697 ac	4 H:1V	4.5 ft	0.4 ft

Approximate Longitudinal Slope	Approximate Existing Side Slopes	Area Adjustment Factor	Assumed Structure Height
0.03 ft/ft	6 H:1V	1.87	1.5 ft

Basin Name
DBW02A

Grate Bottom Elevation Above Basin Invert	100-year Peak Inflow Into Basin	Grate Width	Weir Coefficient
4 ft	15 cfs	3 ft	2.8

NOTES

¹ Area calculated based upon exponential decay relationship. $A = A_o * e^{(-s * \text{depth})}$

² Average end area method used

³ Rating curve calculated using standard weir equation: $Q = CLH^{1.5}$

⁴ SE (Elevations) are taken from the "Elevation" column in the "Volume Calculations" table.

⁵ SV (volume in ac-ft) values are from the "ΣVolume" column in the "Volume Calculations" table

⁶ SQ (flow in cfs) values are interpolated from rating curve shown in "Flow Calcs"

Volume Required	Volume Provided
0.111	0.178

Enough Volume

Disturbed Area

0.05841 ac

APPENDIX D

Developed Condition Hydrologic Modeling (HEC-1 Modeling)



HEC-1 Model Output

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

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10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

10/1/80

Developed Condition HEC-1 Model

100-Year, 6-Hour Storm

HEC-1 ID	Existing Condition 100-Year, 6-Hour Peak Discharge (cfs)	Proposed Condition 100-Year, 6-Hour Peak Discharge (cfs)	Existing - Proposed (cfs)
CE01A	201	185	16
CE04A	46	19	27
CE065A	108	48	60
CE11A	49	27	22
CE17A	57	23	34
CE23A	148	135	13
CE24A	60	30	30
CE25A	25	14	11
CW07A	39	26	13
CW09A	101	69	32
CW10A	107	45	62
SBE02A	75	74	1
SBE03A	14	6	8
SBE08A	2	3	-1
SBE09A	6	7	-1
SBE10A	2	3	-1
SBE12A	4	2	2
SBE13A	7	2	5
SBE16A	2	3	-1
SBE18A	2	0	2
SBE19A	3	3	0
SBE20A	3	3	0
SBE21A	2	3	-1
SBE26A	15	8	7
SBE27A	4	2	2
SBE28A	23	17	6
SBE29A	29	21	8
SBW01A	5	5	0
SBW02A	13	12	1
SBW04A	5	6	-1
SBW05A	19	16	3
SBW06A	8	5	3
SBW08A	19	12	7
SBW11A	3	3	0
SBW12A	38	26	12
SBW13A	3	3	0
SBW14A	23	14	9

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*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 18SEP12 TIME 11:18:56
*****

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*****
* U.S. ARMY COR
* HYDROLOGIC EN
* 609 SEC
* DAVIS, CAL
* (916)
*****

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X X XXXXXXX XXXXX X
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HE THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE I THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRA NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUE DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1         ID      Flood Control District of Maricopa County
2         ID      Sereno Canyon Developed Conditions
3         ID      100 YEAR
4         ID      6 Hour Storm
5         ID      Unit Hydrograph: Clark
6         ID      09/18/2012
7         ID      Sereno Canyon-Developed Conditions
8         ID      100-Year, 6-Hour Storm Event
9         ID      Prepared By: JE Fuller Hydrology and Geomorphology
10        ID      Modeled By: Brian Schalk P.E., CFM and Nathan Logan P.E., CFM
11        ID      Submitted To: City of Scottsdale
12        IT      1 01DEC11      0      2000
13        IN      15
14        IO      5
          *DIAGRAM
          *
15        JD      3.178  0.0001
16        PC      0.000  0.008  0.016  0.025  0.033  0.041  0.050  0.058  0.066  0.074
17        PC      0.087  0.099  0.118  0.138  0.216  0.377  0.834  0.911  0.931  0.950
18        PC      0.962  0.972  0.983  0.991  1.000
19        JD      3.159  0.5000
20        PC      0.000  0.008  0.016  0.025  0.033  0.041  0.050  0.058  0.066  0.074
21        PC      0.087  0.099  0.118  0.138  0.216  0.377  0.834  0.911  0.931  0.950
22        PC      0.962  0.972  0.983  0.991  1.000
23        JD      3.099  2.8
24        PC      0.000  0.009  0.016  0.025  0.034  0.042  0.051  0.059  0.068  0.077
25        PC      0.088  0.101  0.121  0.164  0.253  0.451  0.694  0.836  0.900  0.938
26        PC      0.950  0.963  0.975  0.988  1.000
          *
27        KK      SBE29A  BASIN
28        KM      SBE29A Basin Runoff
29        BA      0.015
30        LG      0.20  0.25  6.00  0.23  10
31        UC      0.200  0.195
32        UA      0  5.0  16.0  30.0  65.0  77.0  84.0  90.0  94.0  97.0
33        UA      100
34        ZW      A=SERENO C=FLOW F=CALC
          *
35        KK      DBE29A STORAGE
36        KM      Retention Basin Storage/Outflow rating curve for Basin DBE29A
37        RS      1  STOR  0
38        SV      0.01  0.05  0.10  0.15  0.20  0.25  0.30  0.35  0.40  0.45

```

		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
40	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.49
41	SQ	3.46	8.43	14.56	21.75	29.86	33.07				
42	SE	0.10	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
43	SE	4.00	4.40	4.80	5.20	5.60	5.80				
44	ZW	A=SERENO C=FLOW F=CALC									

*

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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45	KK	SBE28A BASIN									
46	KM	SBE28A Basin Runoff									
47	BA	0.013									
48	LG	0.29	0.25	6.00	0.20	17					
49	UC	0.134	0.141								
50	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
51	UA	100									
52	ZW	A=SERENO C=FLOW F=CALC									

*

53	KK	DBE28A STORAGE									
54	KM	Retention Basin Storage/Outflow rating curve for Basin DBE28A									
55	RS	1	STOR	0							
56	SV	0.01	0.07	0.13	0.21	0.28	0.36	0.45	0.54	0.64	0.74
57	SV	0.84	0.95	1.08							
58	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
59	SQ	-6.93	19.60	36.01							
60	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
61	SE	5.00	5.50	6.00							
62	ZW	A=SERENO C=FLOW F=CALC									

*

63	KK	SBE27A BASIN									
64	KM	SBE27A Basin Runoff									
65	BA	0.002									
66	LG	0.30	0.25	6.00	0.22	15					
67	UC	0.081	0.104								
68	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
69	UA	100									
70	ZW	A=SERENO C=FLOW F=CALC									

*

71	KK	DBE27A STORAGE									
72	KM	Retention Basin Storage/Outflow rating curve for Basin DBE27A									
73	RS	1	STOR	0							
74	SV	0.01	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.10	0.11
75	SV	0.12	0.14	0.16	0.17	0.19	0.21				
76	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
77	SQ	0.01	0.96	2.64	4.81	7.38	10.29				
78	SE	0.10	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
79	SE	3.00	3.30	3.60	3.90	4.20	4.50				
80	ZW	A=SERENO C=FLOW F=CALC									

*

81	KK	SBE26A BASIN									
82	KM	SBE26A Basin Runoff									
83	BA	0.010									
84	LG	0.26	0.25	6.00	0.20	31					
85	UC	0.137	0.180								
86	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
87	UA	100									
88	ZW	A=SERENO C=FLOW F=CALC									

*

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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89	KK	DBE26A STORAGE									
90	KM	Retention Basin Storage/Outflow rating curve for Basin DBE26A									
91	RS	1	STOR	0							
92	SV	0.01	0.06	0.12	0.19	0.26	0.33	0.41	0.49	0.58	0.67
93	SV	0.76	0.87	0.98	1.11						
94	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
95	SQ	0.01	5.94	16.80	30.86						
96	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
97	SE	5.00	5.50	6.00	6.50						
98	ZW	A=SERENO C=FLOW F=CALC									

*

101 BA 0.005
 102 LG 0.27 0.25 6.00 0.18 17
 103 UC 0.098 0.105
 104 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 105 UA 100
 106 ZW A=SERENO C=FLOW F=CALC
 *

107 KK DBE25C STORAGE
 108 KM Retention Basin Storage/Outflow rating curve for Basin DBE25C
 109 RS 1 STOR 0
 110 SV 0.01 0.02 0.05 0.07 0.10 0.13 0.16 0.19 0.22 0.25
 111 SV 0.28 0.31 0.35 0.39 0.43 0.47 0.47
 112 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 113 SQ 2.87 8.53 15.86 24.66 34.72 45.79 47.52
 114 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 115 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
 116 ZW A=SERENO C=FLOW F=CALC
 *

117 KK RE25C ROUTE
 118 KM Route runoff from SBE25C through Basin SBE25B
 119 RS 1 FLOW
 120 RC 0.060 0.060 0.060 709 0.0268 2694.40
 121 RX 0.00 21.00 53.00 58.00 63.00 70.00 90.00 99.00
 122 RY 2694.3 2691.90 2688.00 2687.00 2687.00 2689.00 2693.30 2694.40
 123 ZW A=SERENO C=FLOW F=CALC
 *

124 KK SBE25B BASIN
 125 KM SBE25B Basin Runoff
 126 BA 0.006
 127 LG 0.29 0.25 6.00 0.21 20
 128 UC 0.125 0.164
 129 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 130 UA 100
 131 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

132 KK CE25B COMBINE
 133 KM Combine Route RE25C and Basin SBE25B
 134 HC 2
 135 ZW A=SERENO C=FLOW F=CALC
 *

136 KK DBE25B STORAGE
 137 KM Retention Basin Storage/Outflow rating curve for Basin DBE25B
 138 RS 1 STOR 0
 139 SV 0.01 0.05 0.09 0.14 0.19 0.25 0.30 0.36 0.42 0.49
 140 SV 0.55 0.62 0.70 0.78 0.84
 141 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.68 7.93
 142 SQ 16.80 27.91 40.62 54.86 56.70
 143 SE 0.10 0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60
 144 SE 4.00 4.40 4.80 5.20 5.50
 145 ZW A=SERENO C=FLOW F=CALC
 *

146 KK RE25B ROUTE
 147 KM Route runoff from CE25B through Basin SBE25A
 148 RS 1 FLOW
 149 RC 0.060 0.060 0.060 412 0.0279 2680.70
 150 RX 0.00 16.00 29.00 32.00 32.10 36.00 47.00 67.00
 151 RY 2680.3 2678.70 2677.10 2676.00 2676.00 2676.90 2678.00 2680.70
 152 ZW A=SERENO C=FLOW F=CALC
 *

153 KK SBE25A BASIN
 154 KM SBE25A Basin Runoff
 155 BA 0.003
 156 LG 0.25 0.25 6.00 0.20 38
 157 UC 0.087 0.107
 158 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 159 UA 100
 160 ZW A=SERENO C=FLOW F=CALC
 *

161 KK CE25A COMBINE
 162 KM Combine Route RE25B and Basin SBE25A

ZW A=SERENO C=FLOW F=CALC

DBE25A STORAGE										
KM	Retention Basin		Storage/Outflow rating curve for Basin DBE25A							
RS	1	STOR	0							
SV	0.01	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18
SV	0.21	0.23	0.26	0.29	0.31	0.34	0.37	0.39		
SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
SQ	0.01	0.01	1.12	5.87	13.22	22.40	33.27	41.15		
SE	0.10	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
SE	3.00	3.30	3.60	3.90	4.20	4.50	4.80	5.00		
ZW	A=SERENO C=FLOW F=CALC									

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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KK      CLEAR COMBINE
KM      Clear Hydrograph Stack
HC      5
ZW      A=SERENO C=FLOW F=CALC

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KK	SBE24D	BASIN								
KM	SBE254D Basin Runoff									
BA	0.010	.								
LG	0.30	0.25	6.00	0.19	6					
UC	0.113	0.099								
UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
UA	100									
ZW	A=SERENO C=FLOW F=CALC									

KK	DBE24D STORAGE									
KM	Retention Basin Storage/Outflow rating curve for Basin DBE24D									
RS	1	STOR	0							
SV	0.01	0.06	0.13	0.20	0.28	0.36	0.44	0.53	0.63	0.73
SV	0.83									
SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	5.94	16.80	30.86
SQ	47.52									
SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
SE	5.00									
ZW	A=SERENO C=FLOW F=CALC									

KK	RE24D	ROUTE							
KM	Route runoff from basin SBE24D through Basin SBE24C								
RS	1	FLOW							
RC	0.060	0.060	0.060	634	0.0252	2725.50			
RX	0.00	16.00	24.00	27.00	31.00	34.00	44.00	60.00	
RY	2725.5	2723.20	2721.80	2721.00	2721.00	2722.00	2723.00	2726.10	
ZW	A=SERENO C=FLOW F=CALC								

KK	SBE24C	BASIN								
KM	SBE24C Basin Runoff									
BA	0.015									
LG	0.28	0.25	6.00	0.19	17					
UC	0.150	0.168								
UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
UA	100									
ZW	A=SERENO C=FLOW F=CALC									

KK CE24C COMBINE
KM Combine RE24D and SBE24C
HC 2
ZW A=SERENO C=FLOW F=CALC

HEC-1 INPUT

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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KK	DBE24C STORAGE									
KM	Retention Basin		Storage/Outflow rating curve for Basin DBE24C							
RS	1	STOR	0							
SV	0.01	0.08	0.17	0.25	0.35	0.45	0.55	0.66	0.77	0.89
SV	1.02	1.15	1.17							
SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.63	10.21	22.17

223	SE	0.10	0.50	0.90	1.40	1.80	2.30	2.70	3.20	3.60	4.10
224	SE	4.50	5.00	5.00							
225	ZW	A=SERENO C=FLOW F=CALC									

*

226	KK	RE24C ROUTE									
227	KM	Route flow from CE24C through Basin SBE24B									
228	RS	1	FLOW								
229	RC	0.060	0.060	0.060	624	0.0232	2706.80				
230	RX	10.00	25.00	45.00	49.00	55.00	62.00	75.00	103.00		
231	RY	2706.8	2705.20	2702.10	2701.00	2701.00	2702.00	2703.30	2706.70		
232	ZW	A=SERENO C=FLOW F=CALC									

*

233	KK	SBE24B BASIN										
234	KM	SBE24B Basin Runoff										
235	BA	0.005										
236	LG	0.28	0.25	6.00	0.18	15						
237	UC	0.123	0.180									
238	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
239	UA	100										
240	ZW	A=SERENO C=FLOW F=CALC										

*

241	KK	CE24B COMBINE									
242	KM	Combine RE24C and SBE24B									
243	HC	2									
244	ZW	A=SERENO C=FLOW F=CALC									

*

245	KK	DBE24B STORAGE										
246	KM	Retention Basin Storage/Outflow rating curve for Basin DBE24B										
247	RS	1	STOR	0								
248	SV	0.01	0.06	0.13	0.20	0.27	0.35	0.43	0.51	0.60	0.70	
249	SV	0.80	0.91	1.02	1.15	1.20						
250	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.63	10.24	23.43	
251	SQ	39.87	59.15	80.76	73.24	73.24						
252	SE	0.10	0.50	0.90	1.40	1.80	2.30	2.70	3.20	3.60	4.10	
253	SE	4.50	5.00	5.40	5.90	6.00						
254	ZW	A=SERENO C=FLOW F=CALC										

*

HEC-1 INPUT

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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255	KK	RE24B ROUTE									
256	KM	Route flow from CE24B through Basin SBE24A									
257	RS	1	FLOW								
258	RC	0.060	0.060	0.060	873	0.0229	2690.20				
259	RX	0.00	10.00	16.00	23.00	27.00	35.00	49.00	67.00		
260	RY	2689.8	2688.70	2687.90	2687.00	2687.00	2687.90	2688.80	2690.20		
261	ZW	A=SERENO C=FLOW F=CALC									

*

262	KK	SBE24A BASIN										
263	KM	SBE24A Basin Runoff										
264	BA	0.007										
265	LG	0.27	0.25	6.00	0.20	29						
266	UC	0.131	0.174									
267	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
268	UA	100										
269	ZW	A=SERENO C=FLOW F=CALC										

*

270	KK	CE24A COMBINE									
271	KM	Combine RE24B and SBE24A									
272	HC	2									
273	ZW	A=SERENO C=FLOW F=CALC									

*

274	KK	DBE24A STORAGE										
275	KM	Retention Basin Storage/Outflow rating curve for Basin DBE24A										
276	RS	1	STOR	0								
277	SV	0.01	0.06	0.13	0.20	0.27	0.35	0.44	0.52	0.62	0.71	
278	SV	0.82	0.93									
279	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	6.93	19.60	
280	SQ	36.01	55.44									
281	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
282	SE	5.00	5.50									
283	ZW	A=SERENO C=FLOW F=CALC										

*

284 KK SBE23D BASIN
 285 KM SBE23D Basin Runoff
 286 BA 0.041
 287 LG 0.28 0.25 6.00 0.19 15
 288 UC 0.198 0.207
 289 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 290 UA 100
 291 ZW A=SERENO C=FLOW F=CALC
 *

292 KK DBE23D STORAGE
 293 KM Retention Basin Storage/Outflow rating curve for Basin DBE23D
 294 RS 1 STOR 0
 295 SV 0.01 0.11 0.22 0.34 0.47 0.61 0.76 0.92 1.10 1.30
 296 SV 1.52 1.75 2.01 2.30 2.61 2.61
 297 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 298 SQ 0.01 0.01 0.01 0.01 15.51 80.61
 HEC-1 INPUT

1
 LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 299 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 300 SE 5.00 5.50 6.00 6.50 7.00 8.00
 301 ZW A=SERENO C=FLOW F=CALC
 *

302 KK RE23D ROUTE
 303 KM Route flow from SBE23D through Basin SBE23A
 304 RS 1 FLOW
 305 RC 0.060 0.060 0.060 465 0.0269 2688.30
 306 RX 0.00 14.00 27.00 32.00 40.00 44.00 55.00 68.00
 307 RY 2688.3 2687.30 2685.00 2684.10 2684.00 2685.00 2686.10 2686.70
 308 ZW A=SERENO C=FLOW F=CALC
 *

309 KK SBE23E BASIN
 310 KM SBE23E Basin Runoff
 311 BA 0.005
 312 LG 0.29 0.25 6.00 0.20 19
 313 UC 0.106 0.152
 314 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 315 UA 100
 316 ZW A=SERENO C=FLOW F=CALC
 *

317 KK DBE23E STORAGE
 318 KM Retention Basin Storage/Outflow rating curve for Basin DBE23E
 319 RS 1 STOR 0
 320 SV 0.01 0.04 0.09 0.14 0.19 0.24 0.29 0.35 0.41 0.48
 321 SV 0.55
 322 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.63 3.96 9.07
 323 SQ 15.43
 324 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
 325 SE 4.50
 326 ZW A=SERENO C=FLOW F=CALC
 *

327 KK RE23E ROUTE
 328 KM Route flow from SBE23E through Basin SBE23C
 329 RS 2 FLOW
 330 RC 0.060 0.060 0.060 1112 0.0261 2720.00
 331 RX 0.00 20.00 57.00 64.00 65.00 70.00 90.00 114.00
 332 RY 2720.0 2716.50 2712.10 2711.00 2711.00 2713.20 2716.60 2719.90
 333 ZW A=SERENO C=FLOW F=CALC
 *

334 KK SBE23C BASIN
 335 KM SBE23C Basin Runoff
 336 BA 0.053
 337 LG 0.28 0.25 6.00 0.18 13
 338 UC 0.199 0.201
 339 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 340 UA 100
 341 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT
 LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

342 KK CE23C COMBINE
 343 KM Combine RE23E and SBE23C
 344

345 ZW A=SERENO C=FLOW F=CALC
*
346 KK DBE23C STORAGE
347 KM Retention Basin Storage/Outflow rating curve for Basin DBE23C
348 RS 1 STOR 0
349 SV 0.01 0.15 0.31 0.47 0.65 0.84 1.03 1.24 1.46 1.69
350 SV 1.93 2.19 2.46 2.76 3.08
351 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
352 SQ 0.01 0.01 27.72 78.40 144.03
353 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
354 SE 5.00 5.50 6.00 6.50 7.00
355 ZW A=SERENO C=FLOW F=CALC
*

356 KK RE23C ROUTE
357 KM Route flow from CE23C through SBE23B
358 RS 1 FLOW
359 RC 0.060 0.060 0.060 457 0.0235 2693.90
360 RX 0.00 15.00 28.00 35.00 35.10 45.00 86.00 114.00
361 RY 2693.8 2692.20 2691.00 2690.00 2690.00 2690.90 2692.90 2693.90
362 ZW A=SERENO C=FLOW F=CALC
*

363 KK SBE23B BASIN
364 KM SBE23B Basin Runoff
365 BA 0.004
366 LG 0.27 0.25 6.00 0.20 28
367 UC 0.097 0.119
368 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
369 UA 100
370 ZW A=SERENO C=FLOW F=CALC
*

371 KK CE23B COMBINE
372 KM Combine flow from RE23C and SBE23B
373 HC 2
374 ZW A=SERENO C=FLOW F=CALC
*

375 KK RE23B ROUTE
376 KM Route flow from CE23B into SBE23A to intermediate combine
377 RS 1 FLOW
378 RC 0.060 0.060 0.060 112 0.0267 2685.90
379 RX 0.00 8.00 12.00 14.00 24.00 30.00 32.00 49.00
380 RY 2685.6 2684.80 2684.20 2684.00 2684.00 2684.70 2685.00 2685.90
381 ZW A=SERENO C=FLOW F=CALC
*

1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

382 KK CE23AI COMBINE
383 KM Intermediate combine of RE23D and RE23B to route through SBE23A
384 HC 2
385 ZW A=SERENO C=FLOW F=CALC
*

386 KK RE23BD ROUTE
387 KM Route Intermediate combined flow from CE23AI through SBE23A
388 RS 1 FLOW
389 RC 0.060 0.060 0.060 238 0.0242 2685.00
390 RX 0.00 21.00 62.00 74.00 82.00 86.00 101.00 141.00
391 RY 2684.9 2682.70 2681.00 2679.00 2679.00 2680.10 2681.90 2685.00
392 ZW A=SERENO C=FLOW F=CALC
*

393 KK SBE23A BASIN
394 KM SBE23A Basin Runoff
395 BA 0.006
396 LG 0.29 0.25 6.00 0.21 21
397 UC 0.120 0.135
398 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
399 UA 100
400 ZW A=SERENO C=FLOW F=CALC
*

401 KK CE23A COMBINE
402 KM Combine flow from SBE23A and RE23BD
403 HC 2
404 ZW A=SERENO C=FLOW F=CALC

405 KK DBE23A STORAGE
 406 KM Retention Basin Storage/Outflow rating curve for Basin DBE23A
 407 RS 1 STOR 0
 408 SV 0.01 0.09 0.18 0.28 0.38 0.49 0.61 0.73 0.86 0.99
 409 SV 1.13 1.29 1.45 1.62 1.80 2.00 2.21 2.45
 410 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 411 SQ 0.01 0.01 0.01 0.01 0.01 49.50 140.00 257.20
 412 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 413 SE 5.00 5.50 6.00 6.50 7.00 7.50 8.00 8.50
 414 ZW A=SERENO C=FLOW F=CALC
 *

415 KK CLEAR COMBINE
 416 HC 3
 417 ZW A=SERENO C=FLOW F=CALC
 *

418 KK SBE22A BASIN
 419 KM SBE22A Basin Runoff
 420 BA 0.007
 421 LG 0.30 0.25 6.00 0.22 15
 422 UC 0.117 0.147
 423 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

424 UA 100
 425 ZW A=SERENO C=FLOW F=CALC
 *

426 KK DBE22A STORAGE
 427 KM Retention Basin Storage/Outflow rating curve for Basin DBE22A
 428 RS 1 STOR 0
 429 SV 0.01 0.03 0.07 0.12 0.16 0.21 0.27 0.33 0.39 0.47
 430 SV 0.55 0.63
 431 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 3.96
 432 SQ 11.20 20.58
 433 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 434 SE 5.00 5.50
 435 ZW A=SERENO C=FLOW F=CALC
 *

436 KK SBE21A BASIN
 437 KM SBE21A Basin Runoff
 438 BA 0.001
 439 LG 0.30 0.25 6.00 0.22 15
 440 UC 0.063 0.080
 441 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 442 UA 100
 443 ZW A=SERENO C=FLOW F=CALC
 *

444 KK SBE20A BASIN
 445 KM SBE20A Basin Runoff
 446 BA 0.001
 447 LG 0.30 0.25 6.00 0.22 15
 448 UC 0.056 0.059
 449 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 450 UA 100
 451 ZW A=SERENO C=FLOW F=CALC
 *

452 KK SBE19A BASIN
 453 KM SBE19A Basin Runoff
 454 BA 0.001
 455 LG 0.30 0.25 6.00 0.22 15
 456 UC 0.057 0.060
 457 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 458 UA 100
 459 ZW A=SERENO C=FLOW F=CALC
 *

460 KK SBE18A BASIN
 461 KM SBE18A Basin Runoff
 462 BA 0.001
 463 LG 0.30 0.25 6.00 0.22 15
 464 UC 0.065 0.083
 465 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 466 UA 100
 467 ZW A=SERENO C=FLOW F=CALC

LINE	ID	1	2	3	4	5	6	7	8	9	10	
468	KK	DBE18A STORAGE										
469	KM	Retention Basin Storage/Outflow rating curve for Basin DBE18A										
470	RS	1	STOR	0								
471	SV	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	
472	SV	0.09	0.10	0.12	0.13	0.14	0.16	0.17				
473	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
474	SQ	0.01	0.35	0.99	1.82	2.80	3.91	5.14				
475	SE	0.10	0.30	0.50	0.80	1.00	1.30	1.50	1.80	2.00	2.30	
476	SE	2.50	2.80	3.00	3.30	3.50	3.80	4.00				
477	ZW	A=SERENO C=FLOW F=CALC										
	*											
478	KK	CLEAR COMBINE										
479	KM	Clear Hydrograph Stack										
480	HC	6										
481	ZW	A=SERENO C=FLOW F=CALC										
	*											
482	KK	SBE17B BASIN										
483	KM	SBE17B Basin Runoff										
484	BA	0.016										
485	LG	0.25	0.25	6.00	0.20	30						
486	UC	0.128	0.123									
487	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
488	UA	100										
489	ZW	A=SERENO C=FLOW F=CALC										
	*											
490	KK	DBE17B STORAGE										
491	KM	Retention Basin Storage/Outflow rating curve for Basin DBE17B										
492	RS	1	STOR	0								
493	SV	0.01	0.08	0.17	0.26	0.35	0.46	0.56	0.68	0.80	0.92	
494	SV	1.06	1.20	1.35	1.51	1.68						
495	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
496	SQ	0.01	0.01	9.90	28.00	51.44						
497	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
498	SE	5.00	5.50	6.00	6.50	7.00						
499	ZW	A=SERENO C=FLOW F=CALC										
	*											
500	KK	RE17B ROUTE										
501	KM	Route flow from SBE17B through SBE 17A										
502	RS	2	FLOW									
503	RC	0.060	0.060	0.060	1169	0.0265	2740.10					
504	RX	0.00	9.00	22.00	33.00	44.00	54.00	62.00	69.00			
505	RY	2740.1	2738.60	2737.00	2736.10	2736.00	2737.00	2738.40	2740.10			
506	ZW	A=SERENO C=FLOW F=CALC										
	*											

LINE	ID	1	2	3	4	5	6	7	8	9	10	
507	KK	SBE17A BASIN										
508	KM	SBE17A Basin Runoff										
509	BA	0.018										
510	LG	0.26	0.25	6.00	0.21	29						
511	UC	0.141	0.163									
512	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
513	UA	100										
514	ZW	A=SERENO C=FLOW F=CALC										
	*											
515	KK	CE17A COMBINE										
516	KM	Combine flow from RE17B and SBE17A										
517	HC	2										
518	ZW	A=SERENO C=FLOW F=CALC										
	*											
519	KK	DBE17A STORAGE										
520	KM	Retention Basin Storage/Outflow rating curve for Basin DBE17A										
521	RS	1	STOR	0								
522	SV	0.01	0.09	0.19	0.29	0.41	0.54	0.68	0.84	1.01	1.19	
523	SV	1.39	1.62	1.86	2.13							
524	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
525	SQ	0.01	17.82	50.40	92.59							
526	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
527	SE	5.00	5.50	6.00	6.50	7.00						
528	ZW	A=SERENO C=FLOW F=CALC										
	*											

```

528      ZW  A=SERENO C=FLOW F=CALC
      *

529      KK  SBE16A  BASIN
530      KM      SBE16A Basin Runoff
531      BA  0.001
532      LG  0.30    0.25    6.00    0.22    15
533      UC  0.069  0.102
534      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
535      UA  100
536      ZW  A=SERENO C=FLOW F=CALC
      *

537      KK  SBE13A  BASIN
538      KM      SBE13A Basin Runoff
539      BA  0.003
540      LG  0.25    0.25    6.00    0.22    30
541      UC  0.080  0.089
542      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
543      UA  100
544      ZW  A=SERENO C=FLOW F=CALC
      *

545      KK  DBE13A STORAGE
546      KM      Retention Basin Storage/Outflow rating curve for Basin DBE13A
547      RS  1      STOR      0
548      SV  0.01  0.02    0.04    0.06    0.08    0.10    0.13    0.16    0.19    0.23
549      SV  0.27  0.31    0.35
550      SQ  0.01  0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
      HEC-1 INPUT

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

551      SQ  1.98    5.60    10.29
552      SE  0.10    0.50    1.00    1.50    2.00    2.50    3.00    3.50    4.00    4.50
553      SE  5.00    5.50    6.00
554      ZW  A=SERENO C=FLOW F=CALC
      *

555      KK  SBE12A  BASIN
556      KM      SBE12A Basin Runoff
557      BA  0.002
558      LG  0.23    0.25    6.00    0.21    40
559      UC  0.076  0.096
560      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
561      UA  100
562      ZW  A=SERENO C=FLOW F=CALC
      *

563      KK  DBE12A STORAGE
564      KM      Retention Basin Storage/Outflow rating curve for Basin DBE12A
565      RS  1      STOR      0
566      SV  0.01  0.02    0.03    0.05    0.07    0.09    0.10    0.12    0.14    0.17
567      SV  0.19  0.21    0.24    0.26    0.28
568      SQ  0.01  0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
569      SQ  0.96  2.84    5.29    8.22    10.29
570      SE  0.10  0.30    0.70    1.00    1.30    1.70    2.00    2.30    2.60    3.00
571      SE  3.30  3.60    4.00    4.30    4.50
572      ZW  A=SERENO C=FLOW F=CALC
      *

573      KK  SBE11B  BASIN
574      KM      SBE11B Basin Runoff
575      BA  0.013
576      LG  0.25    0.25    6.00    0.22    30
577      UC  0.125  0.135
578      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
579      UA  100
580      ZW  A=SERENO C=FLOW F=CALC
      *

581      KK  DBE11B STORAGE
582      KM      Retention Basin Storage/Outflow rating curve for Basin DBE11B
583      RS  1      STOR      0
584      SV  0.01  0.06    0.13    0.20    0.27    0.35    0.43    0.51    0.61    0.70
585      SV  0.80  0.91    1.02    1.14    1.28
586      SQ  0.01  0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
587      SQ  0.01  0.01    7.92    22.40    41.15
588      SE  0.10  0.50    1.00    1.50    2.00    2.50    3.00    3.50    4.00    4.50
589      SE  5.00  5.50    6.00    6.50    7.00
590      ZW  A=SERENO C=FLOW F=CALC
      *

```


LINE	ID	1	2	3	4	5	6	7	8	9	10	
591	KK	RE11B ROUTE										
592	KM	Route flow from SBE11B through SBE11A										
593	RS	1	FLOW									
594	RC	0.060	0.060	0.060	914	0.0334	2770.20					
595	RX	0.00	10.00	16.00	23.00	25.00	34.00	48.00	64.00			
596	RY	2770.2	2767.10	2765.30	2762.00	2762.00	2765.00	2766.60	2768.30			
597	ZW	A=SERENO C=FLOW F=CALC										
	*											
598	KK	SBE11A BASIN										
599	KM	SBE11A Basin Runoff										
600	BA	0.016										
601	LG	0.24	0.25	6.00	0.21	35						
602	UC	0.140	0.159									
603	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
604	UA	100										
605	ZW	A=SERENO C=FLOW F=CALC										
	*											
606	KK	CE11A COMBINE										
607	KM	Combine flow from RE11B and SBE11A										
608	HC	2										
609	ZW	A=SERENO C=FLOW F=CALC										
	*											
610	KK	DBE11A STORAGE										
611	KM	Retention Basin Storage/Outflow rating curve for Basin DBE11A										
612	RS	1	STOR	0								
613	SV	0.01	0.07	0.15	0.23	0.31	0.40	0.50	0.60	0.70	0.82	
614	SV	0.94	1.08	1.23	1.39	1.57	1.77					
615	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
616	SQ	0.01	0.01	0.01	15.84	44.80	82.30					
617	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
618	SE	5.00	5.50	6.00	6.50	7.00	7.50					
619	ZW	A=SERENO C=FLOW F=CALC										
	*											
620	KK	CLEAR COMBINE										
621	KM	Clear Hydrograph Stack										
622	HC	6										
623	ZW	A=SERENO C=FLOW F=CALC										
	*											
624	KK	SBE10A BASIN										
625	KM	SBE10A Basin Runoff										
626	BA	0.001										
627	LG	0.25	0.25	6.00	0.22	30						
628	UC	0.060	0.077									
629	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
630	UA	100										
631	ZW	A=SERENO C=FLOW F=CALC										
	*											

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10	
632	KK	SBE09A BASIN										
633	KM	SBE09A Basin Runoff										
634	BA	0.002										
635	LG	0.25	0.25	6.00	0.22	30						
636	UC	0.059	0.050									
637	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
638	UA	100										
639	ZW	A=SERENO C=FLOW F=CALC										
	*											
640	KK	SBE08A BASIN										
641	KM	SBE08A Basin Runoff										
642	BA	0.001										
643	LG	0.25	0.25	6.00	0.22	30						
644	UC	0.062	0.078									
645	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
646	UA	100										
647	ZW	A=SERENO C=FLOW F=CALC										
	*											
648	KK	CLEAR COMBINE										

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650      HC      4
651      ZW      A=SERENO C=FLOW F=CALC
        *

652      KK      SBE06D  BASIN
653      KM      SBE06D Basin Runoff
654      BA      0.010
655      LG      0.25      0.25      6.00      0.22      29
656      UC      0.118      0.137
657      UA      0      5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
658      UA      100
659      ZW      A=SERENO C=FLOW F=CALC
        *

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660      KK      DBE06D STORAGE
661      KM      Retention Basin Storage/Outflow rating curve for Basin DBE06D
662      RS      1      STOR      0
663      SV      0.01      0.05      0.10      0.15      0.20      0.26      0.33      0.39      0.46      0.53
664      SV      0.61      0.69      0.78      0.87      0.97
665      SQ      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
666      SQ      0.01      0.01      6.93      19.60      36.01
667      SE      0.10      0.50      1.00      1.50      2.00      2.50      3.00      3.50      4.00      4.50
668      SE      5.00      5.50      6.00      6.50      7.00
669      ZW      A=SERENO C=FLOW F=CALC
        *

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670      KK      RE06D  ROUTE
671      KM      Route flow from SBE06D through Basin SBE06B
672      RS      1      FLOW
673      RC      0.060      0.060      0.060      677      0.0369      2785.90
674      RX      0.00      15.00      27.00      34.00      41.00      45.00      52.00      59.00
675      RY      2785.8      2784.00      2783.00      2782.00      2782.00      2782.70      2784.20      2785.90

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HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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676      ZW      A=SERENO C=FLOW F=CALC
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677      KK      SBE06C  BASIN
678      KM      SBE06C Basin Runoff
679      BA      0.016
680      LG      0.17      0.25      6.00      0.25      31
681      UC      0.180      0.211
682      UA      0      5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
683      UA      100
684      ZW      A=SERENO C=FLOW F=CALC
        *

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685      KK      DBE06C STORAGE
686      KM      Retention Basin Storage/Outflow rating curve for Basin DBE06C
687      RS      1      STOR      0
688      SV      0.01      0.08      0.17      0.26      0.35      0.45      0.56      0.67      0.79      0.92
689      SV      1.05      1.19      1.34
690      SQ      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
691      SQ      7.92      22.40      41.15
692      SE      0.10      0.50      1.00      1.50      2.00      2.50      3.00      3.50      4.00      4.50
693      SE      5.00      5.50      6.00
694      ZW      A=SERENO C=FLOW F=CALC
        *

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695      KK      RE06C  ROUTE
696      KM      Route flow from SBE06C through Basin SBE06B
697      RS      1      FLOW
698      RC      0.060      0.060      0.060      591      0.0431      2786.60
699      RX      0.00      6.00      16.00      26.00      36.00      40.00      41.00      44.00
700      RY      2786.6      2786.00      2785.00      2784.00      2784.00      2785.00      2785.50      2786.40
701      ZW      A=SERENO C=FLOW F=CALC
        *

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702      KK      SBE06B  BASIN
703      KM      SBE06B Basin Runoff
704      BA      0.008
705      LG      0.23      0.25      6.00      0.22      35
706      UC      0.100      0.094
707      UA      0      5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
708      UA      100
709      ZW      A=SERENO C=FLOW F=CALC
        *

```

```

710      KK      CE06B COMBINE
711      KM      Combine RE06D, RE06C and SBE06C

```

713

ZW A=SERENO C=FLOW F=CALC

*

HEC-1 INPUT

1

LINE	ID	1	2	3	4	5	6	7	8	9	10	
714	KK	RE06B ROUTE										
715	KM	Route flow from CE06B through Basin SBE06A										
716	RS	1 FLOW										
717	RC	0.060	0.060	0.060	814	0.0319	2761.00					
718	RX	0.00	21.00	55.00	63.00	82.00	92.00	104.00	113.00			
719	RY	2761.0	2758.90	2758.50	2758.00	2758.00	2758.50	2759.70	2760.80			
720	ZW	A=SERENO C=FLOW F=CALC										
	*											
721	KK	SBE06A BASIN										
722	KM	SBE06A Basin Runoff										
723	BA	0.014										
724	LG	0.21	0.25	6.00	0.23	45						
725	UC	0.147	0.202									
726	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
727	UA	100										
728	ZW	A=SERENO C=FLOW F=CALC										
	*											
729	KK	CE06A COMBINE										
730	KM	Combine flow from RE06B and Basin SBE 06A										
731	HC	2										
732	ZW	A=SERENO C=FLOW F=CALC										
	*											
733	KK	SBE05B BASIN										
734	KM	SBE05B Basin Runoff										
735	BA	0.022										
736	LG	0.10	0.25	6.00	0.28	24						
737	UC	0.326	0.582									
738	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
739	UA	100										
740	ZW	A=SERENO C=FLOW F=CALC										
	*											
741	KK	DBE05B STORAGE										
742	KM	Retention Basin Storage/Outflow rating curve for Basin DBE05B										
743	RS	1 STOR 0										
744	SV	0.01	0.06	0.13	0.20	0.27	0.35	0.43	0.52	0.61	0.71	
745	SV	0.81	0.92	1.03	1.16	1.29						
746	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
747	SQ	0.01	0.01	5.94	16.80	30.86						
748	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
749	SE	5.00	5.50	6.00	6.50	7.00						
750	ZW	A=SERENO C=FLOW F=CALC										
	*											
751	KK	RE05B ROUTE										
752	KM	Route flow from SBE05B through SBE05A										
753	RS	1 FLOW										
754	RC	0.060	0.060	0.060	907	0.0435	2760.30					
755	RX	0.00	11.00	26.00	40.00	47.00	56.00	76.00	89.00			
756	RY	2760.1	2759.00	2757.70	2757.00	2757.00	2757.40	2758.80	2760.30			
757	ZW	A=SERENO C=FLOW F=CALC										
	*											

HEC-1 INPUT

1

LINE	ID	1	2	3	4	5	6	7	8	9	10	
758	KK	SBE05A BASIN										
759	KM	SBE05A Basin Runoff										
760	BA	0.007										
761	LG	0.24	0.25	6.00	0.22	32						
762	UC	0.121	0.165									
763	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
764	UA	100										
765	ZW	A=SERENO C=FLOW F=CALC										
	*											
766	KK	CE05A COMBINE										
767	KM	Combine flow from RE05B and SBE05A										
768	HC	2										
769	ZW	A=SERENO C=FLOW F=CALC										
	*											

770 KK CE065A COMBINE
 771 KM Combine flow from CE06A and CE05A
 772 HC 2
 773 ZW A=SERENO C=FLOW F=CALC
 *

774 KK DBE06A STORAGE
 775 KM Retention Basin Storage/Outflow rating curve for Basin DBE06A
 776 RS 1 STOR 0
 777 SV 0.01 0.13 0.27 0.41 0.56 0.72 0.89 1.07 1.26 1.46
 778 SV 1.68 1.90 2.14 2.39 2.65 2.95 3.27
 779 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 780 SQ 0.01 0.01 0.01 0.01 0.01 29.70 84.00 154.32
 781 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 782 SE 5.00 5.50 6.00 6.50 7.00 7.50 8.00
 783 ZW A=SERENO C=FLOW F=CALC
 *

784 KK SBE04C BASIN
 785 KM SBE04C Basin Runoff
 786 BA 0.014
 787 LG 0.11 0.25 6.00 0.27 45
 788 UC 0.218 0.367
 789 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 790 UA 100
 791 ZW A=SERENO C=FLOW F=CALC
 *

792 KK DBE04C STORAGE
 793 KM Retention Basin Storage/Outflow rating curve for Basin DBE04C
 794 RS 1 STOR 0
 795 SV 0.01 0.07 0.14 0.21 0.29 0.37 0.46 0.55 0.65 0.75
 796 SV 0.86 0.98 1.10 1.23 1.37
 797 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 798 SQ 0.01 0.01 4.95 14.00 25.72
 799 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 800 SE 5.00 5.50 6.00 6.50 7.00
 801 ZW A=SERENO C=FLOW F=CALC
 *

1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

802 KK RE04C ROUTE
 803 KM Route flow from SBE04C into SBE04A
 804 RS 1 FLOW
 805 RC 0.060 0.060 0.060 455 0.0363 2755.00
 806 RX 0.00 17.00 22.00 27.00 32.00 44.00 61.00 88.00
 807 RY 2755.0 2753.00 2751.90 2750.00 2750.00 2751.90 2753.20 2754.90
 808 ZW A=SERENO C=FLOW F=CALC
 *

809 KK SBE04B BASIN
 810 KM SBE04B Basin Runoff
 811 BA 0.015
 812 LG 0.11 0.25 6.00 0.27 50
 813 UC 0.208 0.327
 814 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 815 UA 100
 816 ZW A=SERENO C=FLOW F=CALC
 *

817 KK DBE04B STORAGE
 818 KM Retention Basin Storage/Outflow rating curve for Basin DBE04B
 819 RS 1 STOR 0
 820 SV 0.01 0.07 0.14 0.21 0.29 0.37 0.46 0.55 0.65 0.75
 821 SV 0.86 0.97 1.10 1.23
 822 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 823 SQ 0.01 5.94 16.80 30.86
 824 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 825 SE 5.00 5.50 6.00 6.50
 826 ZW A=SERENO C=FLOW F=CALC
 *

827 KK RE04B ROUTE
 828 KM Route flow from SBE04B into SBE04A
 829 RS 1 FLOW
 830 RC 0.060 0.060 0.060 449 0.0367 2755.00
 831 RX 0.00 15.00 24.00 28.00 30.00 33.00 46.00 62.00
 832 RY 2754.9 2752.60 2750.80 2750.00 2750.00 2751.00 2752.90 2755.00
 833 ZW A=SERENO C=FLOW F=CALC

```

834 KK CE04AI COMBINE
835 KM Intermediate Combine flows from RE04C and RE04B
836 HC 2
837 ZW A=SERENO C=FLOW F=CALC
      *

838 KK RE04CB ROUTE
839 KM Route flow from CE04AI through rest of Basin SBE04A
840 RS 1 FLOW
841 RC 0.060 0.060 0.060 247 0.0344 2744.90
842 RX 0.00 11.00 21.00 31.00 34.00 50.00 69.00 88.00
843 RY 2744.9 2742.70 2741.40 2740.00 2740.00 2741.80 2743.00 2743.90
844 ZW A=SERENO C=FLOW F=CALC
      *
  
```

1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

845 KK SBE04A BASIN
846 KM SBE04A Basin Runoff
847 BA 0.006
848 LG 0.25 0.25 6.00 0.22 30
849 UC 0.104 0.122
850 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
851 UA 100
852 ZW A=SERENO C=FLOW F=CALC
      *

853 KK CE04A COMBINE
854 KM Combine Flows from RE04CB and SBE04A
855 HC 2
856 ZW A=SERENO C=FLOW F=CALC
      *
  
```

```

857 KK DBE04A STORAGE
858 KM Retention Basin Storage/Outflow rating curve for Basin DBE04A
859 RS 1 STOR 0
860 SV 0.01 0.09 0.18 0.27 0.37 0.48 0.59 0.71 0.84 0.97
861 SV 1.11 1.26 1.42 1.60
862 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
863 SQ 0.01 11.88 33.60 61.73
864 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
865 SE 5.00 5.50 6.00 6.50
866 ZW A=SERENO C=FLOW F=CALC
      *
  
```

```

867 KK SBE03A BASIN
868 KM SBE03A Basin Runoff
869 BA 0.007
870 LG 0.22 0.25 6.00 0.23 40
871 UC 0.104 0.117
872 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
873 UA 100
874 ZW A=SERENO C=FLOW F=CALC
      *
  
```

```

875 KK DBE03A STORAGE
876 KM Retention Basin Storage/Outflow rating curve for Basin DBE03A
877 RS 1 STOR 0
878 SV 0.01 0.03 0.06 0.09 0.12 0.16 0.21 0.25 0.30 0.36
879 SV 0.42 0.49 0.56 0.64 0.73 0.83
880 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
881 SQ 0.01 0.01 0.01 3.96 11.20 20.58
882 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
883 SE 5.00 5.50 6.00 6.50 7.00 7.50
884 ZW A=SERENO C=FLOW F=CALC
      *
  
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1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

885 KK SBE02A BASIN
886 KM SBE02A Basin Runoff
887 BA 0.068
888 LG 0.10 0.25 6.00 0.28 11
889 UC 0.419 0.583
890 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
891 UA 100
892 ZW A=SERENO C=FLOW F=CALC
      *
  
```

893 KK DBE02A STORAGE
 894 KM Retention Basin Storage/Outflow rating curve for Basin DBE02A
 895 RS 1 STOR 0
 896 SV 0.01 0.12 0.25 0.39 0.55 0.71 0.89 1.07 1.28 1.50
 897 SV 1.74 2.00 2.29 2.29
 898 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 3.96
 899 SQ 11.20 20.58 31.68 52.00
 900 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 901 SE 5.00 5.50 6.00 7.00
 902 ZW A=SERENO C=FLOW F=CALC
 *

903 KK SBE01B BASIN
 904 KM SBE01B Basin Runoff
 905 BA 0.024
 906 LG 0.10 0.23 6.20 0.26 25
 907 UC 0.222 0.173
 908 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 909 UA 100
 910 ZW A=SERENO C=FLOW F=CALC
 *

911 KK RE01B ROUTE
 912 KM Route flow from SBE01B through Basin SBE01A
 913 RS 2 FLOW
 914 RC 0.060 0.060 0.060 5189 0.0788 2910.00
 915 RX 0.00 23.00 87.00 103.00 111.00 119.00 158.00 178.00
 916 RY 2910.0 2908.00 2906.00 2905.50 2904.40 2905.50 2907.00 2910.00
 917 ZW A=SERENO C=FLOW F=CALC
 *

918 KK SBE01A BASIN
 919 KM SBE01A Basin Runoff
 920 BA 0.119
 921 LG 0.10 0.25 6.00 0.28 3
 922 UC 0.456 0.508
 923 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 924 UA 100
 925 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

926 KK CE01A COMBINE
 927 HC 2
 928 ZW A=SERENO C=FLOW F=CALC
 *

929 KK DBE01A STORAGE
 930 KM Retention Basin Storage/Outflow rating curve for Basin DBE01A
 931 RS 1 STOR 0
 932 SV 0.01 0.03 0.06 0.09 0.12 0.15 0.19 0.23 0.27 0.31
 933 SV 0.36 0.41 0.46 0.47
 934 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 7.84 36.53
 935 SQ 80.60 135.15 197.88 205.76
 936 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 937 SE 3.30 3.60 4.00 4.00
 938 ZW A=SERENO C=FLOW F=CALC
 *

939 KK CLEAR COMBINE
 940 KM Clear Hydrograph Stack
 941 HC 6
 942 ZW A=SERENO C=FLOW F=CALC
 *

943 KK SBW14A BASIN
 944 KM SBW14A Basin Runoff
 945 BA 0.009
 946 LG 0.28 0.25 6.00 0.20 4
 947 UC 0.109 0.085
 948 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 949 UA 100
 950 ZW A=SERENO C=FLOW F=CALC
 *

951 KK DBW14A STORAGE
 952 KM Retention Basin Storage/Outflow rating curve for Basin DBW14A
 953 RS 1 STOR 0

		SV	0.42	0.47	0.52	0.58	0.63	0.70				
955	SV	0.42	0.47	0.52	0.58	0.63	0.70					
956	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.84
957	SQ	2.97	6.04	9.74	13.95	18.64	23.76					
958	SE	0.10	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	
959	SE	3.00	3.30	3.60	3.90	4.20	4.50					
960	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	SBW13A	BASIN								
961	KK	SBW13A	BASIN									
962	KM	SBW13A Basin Runoff										
963	BA	0.001										
964	LG	0.30	0.25	6.00	0.18	5						
965	UC	0.055	0.058									
966	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
967	UA	100										
968	ZW	A=SERENO C=FLOW F=CALC										

*

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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		KK	SBW12A	BASIN								
969	KK	SBW12A	BASIN									
970	KM	SBW12A Basin Runoff										
971	BA	0.017										
972	LG	0.29	0.25	6.00	0.19	13						
973	UC	0.115	0.091									
974	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
975	UA	100										
976	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	DBW12A	STORAGE								
977	KK	DBW12A	STORAGE									
978	KM	Retention Basin Storage/Outflow rating curve for Basin DBW12A										
979	RS	1	STOR	0								
980	SV	0.01	0.08	0.16	0.24	0.33	0.43	0.53	0.64	0.75	0.87	
981	SV	0.99	1.13	1.27	1.43							
982	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
983	SQ	5.94	16.80	30.86	47.52							
984	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
985	SE	5.00	5.50	6.00	6.50							
986	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	SBW11A	BASIN								
987	KK	SBW11A	BASIN									
988	KM	SBW11A Basin Runoff										
989	BA	0.001										
990	LG	0.30	0.25	6.00	0.18	5						
991	UC	0.047	0.039									
992	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
993	UA	100										
994	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	CLEAR	COMBINE								
995	KK	CLEAR	COMBINE									
996	KM	Clear Hydrograph Stack										
997	HC	5										
998	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	SBW10C	BASIN								
999	KK	SBW10C	BASIN									
1000	KM	SBW10C Basin Runoff										
1001	BA	0.015										
1002	LG	0.25	0.25	6.00	0.22	30						
1003	UC	0.119	0.109									
1004	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
1005	UA	100										
1006	ZW	A=SERENO C=FLOW F=CALC										

*

		KK	DBW10C	STORAGE								
1007	KK	DBW10C	STORAGE									
1008	KM	Retention Basin Storage/Outflow rating curve for Basin DBW10C										
1009	RS	1	STOR	0								
1010	SV	0.01	0.06	0.12	0.18	0.26	0.34	0.43	0.52	0.63	0.75	
1011	SV	0.87	1.01	1.16	1.33	1.52	1.72	1.94				
1012	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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1013	SQ	0.01	0.01	0.01	0.01	8.91	25.20	46.30			
1014	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50

1

```

1016      ZW      A=SERENO C=FLOW F=CALC
          *

1017      KK      RW10C      ROUTE
1018      KM      Route flow from SBW10C through Basin SBW10B
1019      RS      2      FLOW
1020      RC      0.060      0.060      0.060      952      0.0310      2757.80
1021      RX      0.00      34.00      47.00      62.00      62.10      68.00      73.00      78.00
1022      RY      2757.8      2754.40      2754.00      2752.10      2752.00      2753.70      2755.70      2757.50
1023      ZW      A=SERENO C=FLOW F=CALC
          *

1024      KK      SBW10B      BASIN
1025      KM      SBW10B Basin Runoff
1026      BA      0.012
1027      LG      0.25      0.25      6.00      0.20      33
1028      UC      0.132      0.161
1029      UA      0      5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
1030      UA      100
1031      ZW      A=SERENO C=FLOW F=CALC
          *

1032      KK      CW10B COMBINE
1033      KM      Combine flow from RW10C and SBW10B
1034      HC      2
1035      ZW      A=SERENO C=FLOW F=CALC
          *

1036      KK      DBW10B STORAGE
1037      KM      Retention Basin Storage/Outflow rating curve for Basin DBW10B
1038      RS      1      STOR      0
1039      SV      0.01      0.06      0.13      0.20      0.27      0.35      0.44      0.53      0.62      0.73
1040      SV      0.84      0.95      1.08      1.22      1.30
1041      SQ      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
1042      SQ      0.01      0.01      0.01      2.27      12.37
1043      SE      0.10      0.60      1.20      1.80      2.40      3.00      3.60      4.20      4.80      5.40
1044      SE      6.00      6.60      7.20      7.80      8.20
1045      ZW      A=SERENO C=FLOW F=CALC
          *

1046      KK      RW10B      ROUTE
1047      KM      Route flow from CE10WB through Basin SBW10A
1048      RS      1      FLOW
1049      RC      0.060      0.060      0.060      653      0.0276      2732.00
1050      RX      0.00      68.00      75.00      79.00      86.00      92.00      106.00      150.00
1051      RY      2732.0      2728.10      2721.10      2726.10      2726.00      2726.60      2727.00      2732.00
1052      ZW      A=SERENO C=FLOW F=CALC
          *

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1

HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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1053      KK      SBW10A      BASIN
1054      KM      SBW10A Basin Runoff
1055      BA      0.033
1056      LG      0.26      0.25      6.00      0.19      27
1057      UC      0.153      0.136
1058      UA      0      5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
1059      UA      100
1060      ZW      A=SERENO C=FLOW F=CALC
          *

1061      KK      CW10A COMBINE
1062      KM      Combine flow from RW10B and SBW10A
1063      HC      2
1064      ZW      A=SERENO C=FLOW F=CALC
          *

1065      KK      DBW10A STORAGE
1066      KM      Retention Basin Storage/Outflow rating curve for Basin DBW10A
1067      RS      1      STOR      0
1068      SV      0.01      0.20      0.41      0.63      0.87      1.12      1.40      1.69      2.00      2.33
1069      SV      2.68      3.07      3.50      3.98      4.15
1070      SQ      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01      14.68
1071      SQ      56.00      113.58      182.88      189.00      189.00
1072      SE      0.10      0.60      1.20      1.80      2.40      3.00      3.60      4.20      4.80      5.40
1073      SE      6.00      6.60      7.20      7.80      8.00
1074      ZW      A=SERENO C=FLOW F=CALC
          *

1075      KK      SBW09E      BASIN

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```

1077 BA 0.006
1078 LG 0.15 0.25 6.00 0.26 11
1079 UC 0.196 0.296
1080 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1081 UA 100
1082 ZW A=SERENO C=FLOW F=CALC
*

1083 KK DBW09E STORAGE
1084 KM Retention Basin Storage/Outflow rating curve for Basin DBW09E
1085 RS 1 STOR 0
1086 SV 0.01 0.02 0.03 0.05 0.07 0.09 0.11 0.13 0.15 0.18
1087 SV 0.20 0.23 0.26 0.29 0.31
1088 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1089 SQ 1.43 4.26 7.93 12.33 15.43
1090 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1091 SE 3.30 3.60 4.00 4.30 4.50
1092 ZW A=SERENO C=FLOW F=CALC
*

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1

HEC-1 INPUT

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1093 KK RW09E ROUTE
1094 KM Route flow from SBW09E through Basin SBW09D
1095 RS 1 FLOW
1096 RC 0.060 0.060 0.060 985 0.0442 2805.10
1097 RX 0.00 10.00 12.00 14.00 17.00 23.00 29.00 48.00
1098 RY 2805.3 2803.10 2802.10 2800.70 2800.70 2802.00 2802.90 2805.10
1099 ZW A=SERENO C=FLOW F=CALC
*

1100 KK SBW09D BASIN
1101 KM SBW09D Basin Runoff
1102 BA 0.008
1103 LG 0.24 0.25 6.00 0.21 34
1104 UC 0.114 0.137
1105 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1106 UA 100
1107 ZW A=SERENO C=FLOW F=CALC
*

1108 KK CW09DI COMBINE
1109 HC 2
1110 ZW A=SERENO C=FLOW F=CALC
*

1111 KK SBW09C BASIN
1112 KM SBW09C Basin Runoff
1113 BA 0.044
1114 LG 0.15 0.25 6.00 0.26 11
1115 UC 0.310 0.359
1116 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1117 UA 100
1118 ZW A=SERENO C=FLOW F=CALC
*

1119 KK CW09D COMBINE
1120 KM Combine flow from CW09DI and SBW09C
1121 HC 2
1122 ZW A=SERENO C=FLOW F=CALC
*

1123 KK DBW09C STORAGE
1124 KM Retention Basin Storage/Outflow rating curve for Basin DBW09C
1125 RS 1 STOR 0
1126 SV 0.01 0.21 0.43 0.66 0.90 1.16 1.44 1.73 2.05 2.41
1127 SV 2.79
1128 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 19.80 56.00
1129 SQ 102.88
1130 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1131 SE 5.00
1132 ZW A=SERENO C=FLOW F=CALC
*

```

1

HEC-1 INPUT

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1133 KK RW09D ROUTE
1134 KM Route flow from CW09D through Basin SBW09D

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1199 KK DBW08A STORAGE
1200 KM Retention Basin Storage/Outflow rating curve for Basin DBW08A
1201 RS 1 STOR 0
1202 SV 0.01 0.04 0.09 0.14 0.18 0.24 0.29 0.34 0.40 0.46
1203 SV 0.52 0.58 0.65 0.71 0.79 0.86 0.87
1204 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1205 SQ 0.01 1.09 5.33 11.85 20.01 29.39 30.86
1206 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1207 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1208 ZW A=SERENO C=FLOW F=CALC

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*

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1209 KK SBW07C BASIN
1210 KM SBW07C Basin Runoff
1211 BA 0.005
1212 LG 0.21 0.25 6.00 0.23 3
1213 UC 0.162 0.231
1214 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1215 UA 100
1216 ZW A=SERENO C=FLOW F=CALC

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*

HEC-1 INPUT

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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```

1217 KK DBW07C STORAGE
1218 KM Retention Basin Storage/Outflow rating curve for Basin DBW07C
1219 RS 1 STOR 0
1220 SV 0.01 0.01 0.02 0.03 0.04 0.05 0.07 0.08 0.09 0.11
1221 SV 0.12 0.14 0.16 0.18 0.20 0.22 0.22
1222 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1223 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
1224 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1225 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1226 ZW A=SERENO C=FLOW F=CALC

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*

```

1227 KK SBW07B BASIN
1228 KM SBW07B Basin Runoff
1229 BA 0.007
1230 LG 0.17 0.25 6.00 0.25 6
1231 UC 0.202 0.315
1232 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1233 UA 100
1234 ZW A=SERENO C=FLOW F=CALC

```

*

```

1235 KK DBW07B STORAGE
1236 KM Retention Basin Storage/Outflow rating curve for Basin DBW07B
1237 RS 1 STOR 0
1238 SV 0.01 0.01 0.03 0.04 0.05 0.07 0.09 0.10 0.12 0.14
1239 SV 0.17 0.19 0.21 0.24 0.27 0.29 0.30
1240 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1241 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
1242 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1243 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1244 ZW A=SERENO C=FLOW F=CALC

```

*

```

1245 KK CW07BC COMBINE
1246 KM Combine flow from SBW07C and SBW07B
1247 HC 2
1248 ZW A=SERENO C=FLOW F=CALC

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*

```

1249 KK RW07BC ROUTE
1250 KM Route flow from CW07BC through SBW07A
1251 RS 1 FLOW
1252 RC 0.060 0.060 0.060 1452 0.0465 2800.10
1253 RX 0.00 6.00 20.00 26.00 29.00 38.00 50.00 68.00
1254 RY 2800.1 2799.00 2796.00 2793.00 2793.00 2796.00 2797.00 2798.40
1255 ZW A=SERENO C=FLOW F=CALC

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*

HEC-1 INPUT

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

```

1256 KK SBW07A BASIN

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1321	UC	0.071	0.080								
1322	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1323	UA	100									
1324	ZW	A=SERENO C=FLOW F=CALC									

1325	KK	SBW02A BASIN									
1326	KM	SBW02A Basin Runoff									
1327	BA	0.007									
1328	LG	0.18	0.25	6.00	0.24	2					
1329	UC	0.183	0.241								
1330	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1331	UA	100									
1332	ZW	A=SERENO C=FLOW F=CALC									

1333	KK	DBW02A STORAGE									
1334	KM	Retention Basin Storage/Outflow rating curve for Basin DBW02A									
1335	RS	1	STOR	0							
1336	SV	0.01	0.01	0.03	0.05	0.06	0.08	0.10	0.12	0.14	0.16
1337	SV	0.18	0.20	0.22	0.25	0.27					
1338	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1339	SQ	0.01	2.20	6.04	11.07	15.43					
1340	SE	0.10	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
1341	SE	4.00	4.40	4.80	5.20	5.50					
1342	ZW	A=SERENO C=FLOW F=CALC									

1

HEC-1 INPUT

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
------	---

1343	KK	SBW01A BASIN									
1344	KM	SBW01A Basin Runoff									
1345	BA	0.002									
1346	LG	0.14	0.25	6.00	0.26	1					
1347	UC	0.143	0.196								
1348	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1349	UA	100									
1350	ZW	A=SERENO C=FLOW F=CALC									

1351	KK	CLEAR COMBINE									
1352	KM	Clear Hydrograph Stack									
1353	HC	6									
1354	ZZ										

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
LINE	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
27	SBE29A	
	V	
	V	
35	DBE29A	
	.	
45	SBE28A	
	V	
	V	
53	DBE28A	
	.	
	.	
63	SBE27A	
	V	
	V	
71	DBE27A	
	.	
	.	
81	SBE26A	
	V	
	V	
89	DBE26A	
	.	
	.	
99	SBE25C	
	V	
	V	
107	DBE25C	

117	.	.	.	.	V RE25C
124	.	.	.	.	SBE25B
132	.	.	.	.	CE25B
	.	.	.	.	V
	.	.	.	.	V
136	.	.	.	.	DBE25B
	.	.	.	.	V
	.	.	.	.	V
146	.	.	.	.	RE25B
153	.	.	.	.	SBE25A
161	.	.	.	.	CE25A
	.	.	.	.	V
	.	.	.	.	V
165	.	.	.	.	DBE25A
175	CLEAR	.	.	.	.
179	.	SBE24D	.	.	V
	.	.	.	.	V
	.	.	.	.	V
187	.	DBE24D	.	.	V
	.	.	.	.	V
197	.	RE24D	.	.	.
204	.	.	SBE24C	.	.
212	.	CE24C	.	.	V
	.	.	.	.	V
	.	.	.	.	V
216	.	DBE24C	.	.	V
	.	.	.	.	V
	.	.	.	.	V
226	.	RE24C	.	.	.
233	.	.	SBE24B	.	.
241	.	CE24B	.	.	V
	.	.	.	.	V
	.	.	.	.	V
245	.	DBE24B	.	.	V
	.	.	.	.	V
	.	.	.	.	V
255	.	RE24B	.	.	.
262	.	.	SBE24A	.	.
270	.	CE24A	.	.	V
	.	.	.	.	V
274	.	DBE24A	.	.	.
284	.	.	SBE23D	.	V
	.	.	.	.	V
292	.	.	DBE23D	.	V
	.	.	.	.	V
	.	.	.	.	V
302	.	.	RE23D	.	.
309	.	.	.	SBE23E	V
	.	.	.	.	V

			V	
			V	
327			RE23E	
334				SBE23C
342			CE23C	
			V	
			V	
346			DBE23C	
			V	
			V	
356			RE23C	
363				SBE23B
371			CE23B	
			V	
			V	
375			RE23B	
382		CE23A1		
		V		
		V		
386		RE23BD		
393			SBE23A	
401		CE23A		
		V		
		V		
405		DBE23A		
415	CLEAR			
418		SBE22A		
		V		
		V		
426		DBE22A		
436			SBE21A	
444				SBE20A
452				SBE19A
460				SBE18A
				V
				V
468				DBE18A
478	CLEAR			
482		SBE17B		
		V		
		V		
490		DBE17B		
		V		
		V		
500		RE17B		
507			SBE17A	
515		CE17A		
		V		

519	DBE17A				
529		SBE16A			
537			SBE13A		
			V		
			V		
545			DBE13A		
555				SBE12A	
				V	
				V	
563				DBE12A	
573					SBE11B
					V
					V
581					DBE11B
					V
					V
591					RE11B
598					
					SBE11A
606					CE11A
					V
					V
610					DBE11A
620	CLEAR				
624		SBE10A			
632			SBE09A		
640				SBE08A	
648	CLEAR				
652		SBE06D			
		V			
		V			
660		DBE06D			
		V			
		V			
670		RE06D			
677			SBE06C		
			V		
			V		
685			DBE06C		
			V		
			V		
695			RE06C		
702				SBE06B	
710		CE06B			
		V			
		V			
714		RE06B			
721			SBE06A		
730					

733	.	.	SBE05B	.
	.	.	V	.
	.	.	V	.
741	.	.	DBE05B	.
	.	.	V	.
	.	.	V	.
751	.	.	RE05B	.
	.	.	.	.
758	.	.	.	SBE05A
	.	.	.	.
766	.	.	CE05A.....	.
	.	.	.	.
770	.	.	CE065A.....	.
	.	.	V	.
	.	.	V	.
774	.	.	DBE06A	.
	.	.	.	.
784	.	.	SBE04C	.
	.	.	V	.
	.	.	V	.
792	.	.	DBE04C	.
	.	.	V	.
	.	.	V	.
802	.	.	RE04C	.
	.	.	.	.
809	.	.	.	SBE04B
	.	.	.	V
	.	.	.	V
817	.	.	.	DBE04B
	.	.	.	V
	.	.	.	V
827	.	.	.	RE04B
	.	.	.	.
	.	.	.	.
834	.	.	CE04A1.....	.
	.	.	V	.
	.	.	V	.
838	.	.	RE04CB	.
	.	.	.	.
845	.	.	.	SBE04A
	.	.	.	.
	.	.	.	.
853	.	.	CE04A.....	.
	.	.	V	.
	.	.	V	.
857	.	.	DBE04A	.
	.	.	.	.
867	.	.	.	SBE03A
	.	.	.	V
	.	.	.	V
875	.	.	.	DBE03A
	.	.	.	.
	.	.	.	.
885	.	.	.	SBE02A
	.	.	.	V
	.	.	.	V
893	.	.	.	DBE02A
	.	.	.	.
	.	.	.	.
903	.	.	.	SBE01B
	.	.	.	V
	.	.	.	V
911	.	.	.	RE01B
	.	.	.	.
	.	.	.	.
918	.	.	.	SBE01A
	.	.	.	.
	.	.	.	.
926	.	.	.	CE01A.....
	.	.	.	V
	.	.	.	V
929	.	.	.	DBE01A
	.	.	.	.

943	.	SBW14A		
	.	V		
	.	V		
951	.	DBW14A		
	.	.		
961	.	.	SBW13A	
	.	.	.	
969	.	.	.	SBW12A
	.	.	.	V
	.	.	.	V
977	.	.	DBW12A	
	.	.	.	
987	.	.	.	SBW11A
	.	.	.	
995	.	.	.	
	.	.	.	
	CLEAR			
	.	.		
999	.	SBW10C		
	.	V		
	.	V		
1007	.	DBW10C		
	.	V		
	.	V		
1017	.	RW10C		
	.	.		
1024	.	.	SBW10B	
	.	.	.	
1032	.	CW10B.....		
	.	V		
	.	V		
1036	.	DBW10B		
	.	V		
	.	V		
1046	.	RW10B		
	.	.		
1053	.	.	SBW10A	
	.	.	.	
1061	.	CW10A.....		
	.	V		
	.	V		
1065	.	DBW10A		
	.	.		
1075	.	.	SBW09E	
	.	.	V	
	.	.	V	
1083	.	.	DBW09E	
	.	.	V	
	.	.	V	
1093	.	.	RW09E	
	.	.	.	
1100	.	.	.	SBW09D
	.	.	.	
1108	.	.	CW09DI.....	
	.	.	.	
1111	.	.	.	SBW09C
	.	.	.	
1119	.	.	CW09D.....	
	.	.	V	
	.	.	V	
1123	.	.	DBW09C	
	.	.	V	
	.	.	V	
1133	.	.	RW09D	
	.	.	.	
1140	.	.	.	SBW09B

1148	.	.	CW09B.....		
	.	.	V		
	.	.	V		
1152	.	.	DBW09B		
	.	.	V		
	.	.	V		
1162	.	.	RW09B		
	.	.	.		
1169	.	.	.	SBW09A	
	.	.	.	.	
1177	.	.	CW09A.....		
	.	.	V		
	.	.	V		
1181	.	.	DBW09A		
	.	.	.		
1191	.	.	.	SBW08A	
	.	.	.	V	
	.	.	.	V	
1199	.	.	.	DBW08A	
	.	.	.	.	
1209	.	.	.	SBW07C	
	.	.	.	V	
	.	.	.	V	
1217	.	.	.	DBW07C	
	.	.	.	.	
1227	.	.	.	.	SBW07B
	.	.	.	.	V
	.	.	.	.	V
1235	.	.	.	.	DBW07B
	.	.	.	.	.
	.	.	.	.	.
1245	.	.	.	CW07BC.....	
	.	.	.	V	
	.	.	.	V	
1249	.	.	.	RW07BC	
	.	.	.	.	
1256	.	.	.	.	SBW07A
	.	.	.	.	.
	.	.	.	.	.
1264	.	.	.	CW07A.....	
	.	.	.	V	
	.	.	.	V	
1268	.	.	.	DBW07A	
	.	.	.	.	
1278	.	.	.	.	
	CLEAR.....				
1281	.	.	SBW06A		
	.	.	V		
	.	.	V		
1289	.	.	DBW06A		
	.	.	.		
1299	.	.	SBW05A		
	.	.	V		
	.	.	V		
1307	.	.	DBW05A		
	.	.	.		
1317	.	.	.	SBW04A	
	.	.	.	.	
1325	.	.	.	.	SBW02A
	.	.	.	.	V
	.	.	.	.	V
1333	.	.	.	.	DBW02A
	.	.	.	.	.
1343	.	.	.	.	.
	.	.	.	.	SBW01A
	.	.	.	.	.
1351	.	.	.	.	.
	CLEAR.....				

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1*****

* U.S. ARMY COR
* HYDROLOGIC EN
* 609 SEC
* DAVIS, CAL
* (916)
*

[illegible]

INDEX STORM NO. 2

STRM	3.16	PRECIPITATION DEPTH
TRDA	0.50	TRANSPPOSITION DRAINAGE AREA

20 PI

PRECIPITATION PATTERN

[illegible]

23 JD

INDEX STORM NO. 3

STRM	3.10	PRECIPITATION DEPTH
TRDA	2.80	TRANSPPOSITION DRAINAGE AREA

24 PI

PRECIPITATION PATTERN

[illegible]

```
-----DSS---ZOPEN: Existing File Opened, File: C:\FCDMC\ST\Models\K.DSS
Unit: 71; DSS Versions - Software: 6-LD, File: 6-LD
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```

-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07BC/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07BC/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07BC/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/RW07BC/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/RW07BC/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/RW07BC/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/CW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 144: /SERENO/CLEAR/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 144: /SERENO/CLEAR/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 144: /SERENO/CLEAR/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW06A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW06A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW06A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW06A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW06A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW06A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW05A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW05A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW05A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW05A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW05A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW05A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW04A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW04A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW04A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW02A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW02A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW02A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW02A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW02A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/DBW02A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW01A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW01A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 18: /SERENO/SBW01A/FLOW/02DEC1911/1MIN/CALC/

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1

RUNOFF SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMU STAGE
					6-HOUR	24-HOUR	72-HOUR		
+	HYDROGRAPH AT								
+		SBE29A	36.	4.05	3.	1.	1.	0.01	
	ROUTED TO								
+		DBE29A	21.	4.23	2.	1.	0.	0.01	
	HYDROGRAPH AT								
+		SBE28A	37.	4.03	3.	1.	0.	0.01	
	ROUTED TO								
+		DBE28A	17.	4.20	1.	0.	0.	0.01	
	HYDROGRAPH AT								
+		SBE27A	6.	4.02	0.	0.	0.	0.00	
	ROUTED TO								
+		DBE27A	2.	4.18	0.	0.	0.	0.00	
	HYDROGRAPH AT								
+		SBE26A	26.	4.03	2.	1.	0.	0.01	
	ROUTED TO								
+		DBE26A	8.	4.35	1.	0.	0.	0.01	
	HYDROGRAPH AT								
+		SBE25C	16.	4.02	1.	0.	0.	0.00	
	ROUTED TO								
+		DBE25C	11.	4.08	1.	0.	0.	0.00	
	ROUTED TO								

+	HYDROGRAPH AT	SBE25B	16.	4.03	1.	0.	0.	0.01
+	2 COMBINED AT	CE25B	20.	4.10	2.	0.	0.	0.01
+	ROUTED TO	DBE25B	13.	4.25	1.	0.	0.	0.01
+	ROUTED TO	RE25B	13.	4.30	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE25A	9.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CE25A	15.	4.28	2.	0.	0.	0.01
+	ROUTED TO	DBE25A	14.	4.32	1.	0.	0.	0.01
+	5 COMBINED AT	CLEAR	58.	4.28	6.	1.	1.	0.05
+	HYDROGRAPH AT	SBE24D	31.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DBE24D	17.	4.12	1.	0.	0.	0.01
+	ROUTED TO	RE24D	15.	4.18	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE24C	40.	4.03	3.	1.	1.	0.01
+	2 COMBINED AT	CE24C	45.	4.08	4.	1.	1.	0.02
+	ROUTED TO	DBE24C	35.	4.22	3.	1.	1.	0.02
+	ROUTED TO	RE24C	34.	4.27	3.	1.	1.	0.02
+	HYDROGRAPH AT	SBE24B	13.	4.03	1.	0.	0.	0.00
+	2 COMBINED AT	CE24B	39.	4.25	4.	1.	1.	0.03
+	ROUTED TO	DBE24B	33.	4.37	3.	1.	1.	0.03
+	ROUTED TO	RE24B	30.	4.45	3.	1.	1.	0.03
+	HYDROGRAPH AT	SBE24A	19.	4.03	2.	0.	0.	0.01
+	2 COMBINED AT	CE24A	33.	4.43	5.	1.	1.	0.04
+	ROUTED TO	DBE24A	30.	4.53	4.	1.	1.	0.04
+	HYDROGRAPH AT	SBE23D	97.	4.07	8.	2.	2.	0.04
+	ROUTED TO	DBE23D	74.	4.17	3.	1.	1.	0.04
+	ROUTED TO	RE23D	59.	4.23	3.	1.	1.	0.04
+	HYDROGRAPH AT	SBE23E	14.	4.02	1.	0.	0.	0.00
+	ROUTED TO	DBE23E	4.	4.30	0.	0.	0.	0.00

+		RE23E	3.	4.45	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE23C	128.	4.05	11.	3.	2.	0.05
+	2 COMBINED AT	CE23C	128.	4.05	11.	3.	2.	0.06
+	ROUTED TO	DBE23C	93.	4.18	7.	2.	1.	0.06
+	ROUTED TO	RE23C	90.	4.22	7.	2.	1.	0.06
+	HYDROGRAPH AT	SBE23B	12.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CE23B	94.	4.22	8.	2.	1.	0.06
+	ROUTED TO	RE23B	94.	4.22	8.	2.	1.	0.06
+	2 COMBINED AT	CE23AI	153.	4.22	11.	3.	2.	0.10
+	ROUTED TO	RE23BD	152.	4.23	11.	3.	2.	0.10
+	HYDROGRAPH AT	SBE23A	17.	4.02	1.	0.	0.	0.01
+	2 COMBINED AT	CE23A	158.	4.23	12.	3.	2.	0.11
+	ROUTED TO	DBE23A	135.	4.32	9.	2.	2.	0.11
+	3 COMBINED AT	CLEAR	204.	4.32	18.	5.	3.	0.20
+	HYDROGRAPH AT	SBE22A	19.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DBE22A	7.	4.23	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE21A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE20A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE19A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE18A	3.	4.00	0.	0.	0.	0.00
+	ROUTED TO	DBE18A	0.	4.38	0.	0.	0.	0.00
+	6 COMBINED AT	CLEAR	211.	4.32	19.	5.	4.	0.21
+	HYDROGRAPH AT	SBE17B	48.	4.02	4.	1.	1.	0.02
+	ROUTED TO	DBE17B	17.	4.23	1.	0.	0.	0.02
+	ROUTED TO	RE17B	13.	4.38	1.	0.	0.	0.02
+	HYDROGRAPH AT	SBE17A	49.	4.03	4.	1.	1.	0.02
+	2 COMBINED AT	CE17A	49.	4.03	5.	1.	1.	0.03
+	ROUTED TO	DBE17A	23.	4.40	2.	1.	0.	0.02

+	HYDROGRAPH AT	SBE16A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE13A	10.	4.00	1.	0.	0.	0.00
+	ROUTED TO	DBE13A	2.	4.20	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE12A	6.	4.00	0.	0.	0.	0.00
+	ROUTED TO	DBE12A	2.	4.22	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE11B	38.	4.03	3.	1.	1.	0.01
+	ROUTED TO	DBE11B	15.	4.22	1.	0.	0.	0.01
+	ROUTED TO	RE11B	13.	4.30	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE11A	44.	4.03	4.	1.	1.	0.02
+	2 COMBINED AT	CE11A	44.	4.03	5.	1.	1.	0.03
+	ROUTED TO	DBE11A	27.	4.32	2.	1.	0.	0.03
+	6 COMBINED AT	CLEAR	262.	4.32	25.	6.	5.	0.28
+	HYDROGRAPH AT	SBE10A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE09A	7.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE08A	3.	4.00	0.	0.	0.	0.00
+	4 COMBINED AT	CLEAR	263.	4.32	26.	7.	5.	0.28
+	HYDROGRAPH AT	SBE06D	29.	4.02	2.	1.	0.	0.01
+	ROUTED TO	DBE06D	12.	4.20	1.	0.	0.	0.01
+	ROUTED TO	RE06D	11.	4.28	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE06C	39.	4.05	4.	1.	1.	0.02
+	ROUTED TO	DBE06C	19.	4.28	2.	0.	0.	0.02
+	ROUTED TO	RE06C	19.	4.33	2.	0.	0.	0.02
+	HYDROGRAPH AT	SBE06B	26.	4.02	2.	0.	0.	0.01
+	3 COMBINED AT	CE06B	33.	4.28	4.	1.	1.	0.03
+	ROUTED TO	RE06B	30.	4.37	4.	1.	1.	0.03
+	HYDROGRAPH AT	SBE06A	36.	4.03	4.	1.	1.	0.01
+	2 COMBINED AT	CE06A	59.	4.05	8.	2.	1.	0.05
+	HYDROGRAPH AT							

+	ROUTED TO	DBE05B	17.	4.55	3.	1.	1.	0.02
+	ROUTED TO	RE05B	16.	4.67	3.	1.	1.	0.02
+	HYDROGRAPH AT	SBE05A	19.	4.03	2.	0.	0.	0.01
+	2 COMBINED AT	CE05A	19.	4.03	4.	1.	1.	0.03
+	2 COMBINED AT	CE065A	77.	4.03	12.	3.	2.	0.08
+	ROUTED TO	DBE06A	48.	4.43	8.	2.	1.	0.08
+	HYDROGRAPH AT	SBE04C	26.	4.08	3.	1.	1.	0.01
+	ROUTED TO	DBE04C	10.	4.53	2.	0.	0.	0.01
+	ROUTED TO	RE04C	10.	4.58	2.	0.	0.	0.01
+	HYDROGRAPH AT	SBE04B	30.	4.07	4.	1.	1.	0.01
+	ROUTED TO	DBE04B	17.	4.37	2.	1.	0.	0.01
+	ROUTED TO	RE04B	17.	4.38	2.	1.	0.	0.01
+	2 COMBINED AT	CE04AI	25.	4.50	4.	1.	1.	0.03
+	ROUTED TO	RE04CB	25.	4.52	4.	1.	1.	0.03
+	HYDROGRAPH AT	SBE04A	18.	4.02	1.	0.	0.	0.01
+	2 COMBINED AT	CE04A	26.	4.50	5.	1.	1.	0.04
+	ROUTED TO	DBE04A	19.	4.77	3.	1.	1.	0.04
+	HYDROGRAPH AT	SBE03A	22.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DBE03A	6.	4.25	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBE02A	79.	4.18	13.	3.	2.	0.07
+	ROUTED TO	DBE02A	74.	4.32	10.	2.	2.	0.07
+	HYDROGRAPH AT	SBE01B	61.	4.07	5.	1.	1.	0.02
+	ROUTED TO	RE01B	41.	4.27	5.	1.	1.	0.02
+	HYDROGRAPH AT	SBE01A	146.	4.18	21.	5.	4.	0.12
+	2 COMBINED AT	CE01A	185.	4.22	26.	7.	5.	0.14
+	ROUTED TO	DBE01A	185.	4.22	26.	7.	5.	0.14
+	6 COMBINED AT	CLEAR	517.	4.32	71.	18.	13.	0.61

+		SBW14A	28.	4.02	2.	0.	0.	0.01
+	ROUTED TO							
+		DBW14A	14.	4.12	1.	0.	0.	0.01
+	HYDROGRAPH AT							
+		SBW13A	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT							
+		SBW12A	53.	4.02	3.	1.	1.	0.02
+	ROUTED TO							
+		DBW12A	26.	4.13	2.	0.	0.	0.02
+	HYDROGRAPH AT							
+		SBW11A	3.	4.00	0.	0.	0.	0.00
+	5 COMBINED AT							
+		CLEAR	531.	4.32	74.	19.	13.	0.64
+	HYDROGRAPH AT							
+		SBW10C	46.	4.02	3.	1.	1.	0.01
+	ROUTED TO							
+		DBW10C	7.	4.33	1.	0.	0.	0.01
+	ROUTED TO							
+		RW10C	7.	4.45	1.	0.	0.	0.01
+	HYDROGRAPH AT							
+		SBW10B	33.	4.03	3.	1.	1.	0.01
+	2 COMBINED AT							
+		CW10B	33.	4.03	4.	1.	1.	0.03
+	ROUTED TO							
+		DBW10B	10.	4.50	1.	0.	0.	0.03
+	ROUTED TO							
+		RW10B	10.	4.55	1.	0.	0.	0.03
+	HYDROGRAPH AT							
+		SBW10A	95.	4.03	7.	2.	1.	0.03
+	2 COMBINED AT							
+		CW10A	95.	4.03	9.	2.	2.	0.06
+	ROUTED TO							
+		DBW10A	45.	4.20	5.	1.	1.	0.06
+	HYDROGRAPH AT							
+		SBW09E	12.	4.07	1.	0.	0.	0.01
+	ROUTED TO							
+		DBW09E	8.	4.23	1.	0.	0.	0.01
+	ROUTED TO							
+		RW09E	7.	4.33	1.	0.	0.	0.01
+	HYDROGRAPH AT							
+		SBW09D	23.	4.02	2.	0.	0.	0.01
+	2 COMBINED AT							
+		CW09DI	23.	4.02	3.	1.	0.	0.01
+	HYDROGRAPH AT							
+		SBW09C	73.	4.12	8.	2.	2.	0.04
+	2 COMBINED AT							
+		CW09D	91.	4.10	11.	3.	2.	0.06
+	ROUTED TO							
+		DBW09C	67.	4.32	8.	2.	1.	0.06
+	ROUTED TO							
+		RW09D	67.	4.33	8.	2.	1.	0.06
+	HYDROGRAPH AT							
+		SBW09B	16.	4.00	1.	0.	0.	0.00
+	2 COMBINED AT							
+		CW09B	68.	4.13	9.	2.	2.	0.05

+	ROUTED TO	DBW09B	68.	4.35	8.	2.	1.	0.06
+	ROUTED TO	RW09B	65.	4.42	8.	2.	1.	0.06
+	HYDROGRAPH AT	SBW09A	21.	4.03	2.	0.	0.	0.01
+	2 COMBINED AT	CW09A	69.	4.40	10.	2.	2.	0.07
+	ROUTED TO	DBW09A	69.	4.43	9.	2.	2.	0.07
+	HYDROGRAPH AT	SBW08A	28.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DBW08A	12.	4.15	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBW07C	11.	4.05	1.	0.	0.	0.00
+	ROUTED TO	DBW07C	9.	4.15	1.	0.	0.	0.00
+	HYDROGRAPH AT	SBW07B	13.	4.07	1.	0.	0.	0.01
+	ROUTED TO	DBW07B	10.	4.22	1.	0.	0.	0.01
+	2 COMBINED AT	CW07BC	18.	4.18	2.	0.	0.	0.01
+	ROUTED TO	RW07BC	15.	4.30	2.	0.	0.	0.01
+	HYDROGRAPH AT	SBW07A	33.	4.03	3.	1.	1.	0.01
+	2 COMBINED AT	CW07A	34.	4.05	4.	1.	1.	0.03
+	ROUTED TO	DBW07A	26.	4.33	3.	1.	0.	0.03
+	5 COMBINED AT	CLEAR	588.	4.33	88.	22.	16.	0.81
+	HYDROGRAPH AT	SBW06A	12.	4.02	1.	0.	0.	0.00
+	ROUTED TO	DBW06A	5.	4.17	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW05A	29.	4.02	2.	1.	0.	0.01
+	ROUTED TO	DBW05A	16.	4.15	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBW04A	6.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW02A	15.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBW02A	12.	4.15	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBW01A	5.	4.03	0.	0.	0.	0.00
+	6 COMBINED AT	CLEAR	603.	4.32	90.	23.	17.	0.83

*** NORMAL END OF HEC-1 ***

-----DSS---ZCLOSE Unit: 71, File: C:\FCDMC\ST\Models\K.DSS
Pointer Utilization: 2.67
Number of Records: 2505
File Size: 7165.3 Kbytes
Percent Inactive: 0.0

Developed Condition HEC-1 Model

10-Year, 6-Hour Storm

HEC-1 ID	Existing Condition 10-Year, 6-Hour Peak Discharge (cfs)	Proposed Condition 10-Year, 6-Hour Peak Discharge (cfs)	Existing - Proposed (cfs)
CE01A	92	80	12
CE04A	19	0	19
CE065A	46	2	44
CE11A	22	0	22
CE17A	25	0	25
CE23A	62	0	62
CE24A	26	1	25
CE25A	11	0	11
CW07A	17	2	15
CW09A	43	13	30
CW10A	48	1	47
SBE02A	31	16	15
SBE03A	6	0	6
SBE08A	1	2	-1
SBE09A	3	4	-1
SBE10A	1	2	-1
SBE12A	2	0	2
SBE13A	3	0	3
SBE16A	1	2	-1
SBE18A	1	0	1
SBE19A	1	2	-1
SBE20A	1	2	-1
SBE21A	1	2	-1
SBE26A	7	0	7
SBE27A	2	0	2
SBE28A	10	0	10
SBE29A	13	4	9
SBW01A	2	2	0
SBW02A	6	3	3
SBW04A	2	4	-2
SBW05A	9	0	9
SBW06A	4	0	4
SBW08A	9	0	9
SBW11A	2	2	0
SBW12A	18	1	17
SBW13A	1	2	-1
SBW14A	11	2	9

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* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
* RUN DATE 18SEP12 TIME 11:18:55
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* U.S. ARMY COR
* HYDROLOGIC EN
* 609 SEC
* DAVIS, CAL
* (916)
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HE
 THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE I
 THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRA
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUE
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	Flood Control District of Maricopa County									
2	ID	Sereno Canyon Developed Conditions									
3	ID	10 YEAR									
4	ID	6 Hour Storm									
5	ID	Unit Hydrograph: Clark									
6	ID	09/18/2012									
7	ID	Sereno Canyon-Developed Conditions									
8	ID	10-Year, 6-Hour Storm Event									
9	ID	Prepared By: JE Fuller Hydrology and Geomorphology									
10	ID	Modeled By: Brian Schalk P.E., CFM and Nathan Logan P.E., CFM									
11	ID	Submitted To: City of Scottsdale									
12	IT	1	01DEC11	0	2000						
13	IN	15									
14	IO	5									
	*DIAGRAM										
15	JD	2.108	0.0001								
16	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
17	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
18	PC	0.962	0.972	0.983	0.991	1.000					
19	JD	2.095	0.5000								
20	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
21	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
22	PC	0.962	0.972	0.983	0.991	1.000					
23	JD	2.055	2.8								
24	PC	0.000	0.009	0.016	0.025	0.034	0.042	0.051	0.059	0.068	0.077
25	PC	0.088	0.101	0.121	0.164	0.253	0.451	0.694	0.836	0.900	0.938
26	PC	0.950	0.963	0.975	0.988	1.000					
	*										
27	KK	SBE29A	BASIN								
28	KM	SBE29A Basin Runoff									
29	BA	0.015									
30	LG	0.20	0.25	6.00	0.23	10					
31	UC	0.257	0.257								
32	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
33	UA	100									
34	ZW	A=SERENO C=FLOW F=CALC									
	*										
35	KK	DBE29A	STORAGE								
36	KM	Retention Basin Storage/Outflow rating curve for Basin DBE29A									
37	RS	1	STOR	0							

Sereno Amend 11-10yr Outflow

40	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.49
41	SQ	3.46	8.43	14.56	21.75	29.86	33.07				
42	SE	0.10	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
43	SE	4.00	4.40	4.80	5.20	5.60	5.80				
44	ZW	A=SERENO C=FLOW F=CALC									
	*										

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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45	KK	SBE28A BASIN									
46	KM	SBE28A Basin Runoff									
47	BA	0.013									
48	LG	0.29	0.25	6.00	0.20	17					
49	UC	0.171	0.184								
50	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
51	UA	100									
52	ZW	A=SERENO C=FLOW F=CALC									
	*										

53	KK	DBE28A STORAGE									
54	KM	Retention Basin Storage/Outflow rating curve for Basin DBE28A									
55	RS	1	STOR	0							
56	SV	0.01	0.07	0.13	0.21	0.28	0.36	0.45	0.54	0.64	0.74
57	SV	0.84	0.95	1.08							
58	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
59	SQ	6.93	19.60	36.01							
60	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
61	SE	5.00	5.50	6.00							
62	ZW	A=SERENO C=FLOW F=CALC									
	*										

63	KK	SBE27A BASIN									
64	KM	SBE27A Basin Runoff									
65	BA	0.002									
66	LG	0.30	0.25	6.00	0.22	15					
67	UC	0.104	0.137								
68	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
69	UA	100									
70	ZW	A=SERENO C=FLOW F=CALC									
	*										

71	KK	DBE27A STORAGE									
72	KM	Retention Basin Storage/Outflow rating curve for Basin DBE27A									
73	RS	1	STOR	0							
74	SV	0.01	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.10	0.11
75	SV	0.12	0.14	0.16	0.17	0.19	0.21				
76	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
77	SQ	0.01	0.96	2.64	4.81	7.38	10.29				
78	SE	0.10	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
79	SE	3.00	3.30	3.60	3.90	4.20	4.50				
80	ZW	A=SERENO C=FLOW F=CALC									
	*										

81	KK	SBE26A BASIN									
82	KM	SBE26A Basin Runoff									
83	BA	0.010									
84	LG	0.26	0.25	6.00	0.20	31					
85	UC	0.171	0.230								
86	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
87	UA	100									
88	ZW	A=SERENO C=FLOW F=CALC									
	*										

1

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
------	----	---	---	---	---	---	---	---	---	---	----

89	KK	DBE26A STORAGE									
90	KM	Retention Basin Storage/Outflow rating curve for Basin DBE26A									
91	RS	1	STOR	0							
92	SV	0.01	0.06	0.12	0.19	0.26	0.33	0.41	0.49	0.58	0.67
93	SV	0.76	0.87	0.98	1.11						
94	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
95	SQ	0.01	5.94	16.80	30.86						
96	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
97	SE	5.00	5.50	6.00	6.50						
98	ZW	A=SERENO C=FLOW F=CALC									
	*										

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101 BA 0.005
102 LG 0.27 0.25 6.00 0.18 17
103 UC 0.124 0.137
104 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
105 UA 100
106 ZW A=SERENO C=FLOW F=CALC
*

107 KK DBE25C STORAGE
108 KM Retention Basin Storage/Outflow rating curve for Basin DBE25C
109 RS 1 STOR 0
110 SV 0.01 0.02 0.05 0.07 0.10 0.13 0.16 0.19 0.22 0.25
111 SV 0.28 0.31 0.35 0.39 0.43 0.47 0.47
112 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
113 SQ 2.87 8.53 15.86 24.66 34.72 45.79 47.52
114 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
115 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
116 ZW A=SERENO C=FLOW F=CALC
*

117 KK RE25C ROUTE
118 KM Route runoff from SBE25C through Basin SBE25B
119 RS 1 FLOW
120 RC 0.060 0.060 0.060 709 0.0268 2694.40
121 RX 0.00 21.00 53.00 58.00 63.00 70.00 90.00 99.00
122 RY 2694.3 2691.90 2688.00 2687.00 2687.00 2689.00 2693.30 2694.40
123 ZW A=SERENO C=FLOW F=CALC
*

124 KK SBE25B BASIN
125 KM SBE25B Basin Runoff
126 BA 0.006
127 LG 0.29 0.25 6.00 0.21 20
128 UC 0.158 0.214
129 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
130 UA 100
131 ZW A=SERENO C=FLOW F=CALC
*

1 HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

132 KK CE25B COMBINE
133 KM Combine Route RE25C and Basin SBE25B
134 HC 2
135 ZW A=SERENO C=FLOW F=CALC
*

136 KK DBE25B STORAGE
137 KM Retention Basin Storage/Outflow rating curve for Basin DBE25B
138 RS 1 STOR 0
139 SV 0.01 0.05 0.09 0.14 0.19 0.25 0.30 0.36 0.42 0.49
140 SV 0.55 0.62 0.70 0.78 0.84
141 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.68 7.93
142 SQ 16.80 27.91 40.62 54.86 56.70
143 SE 0.10 0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60
144 SE 4.00 4.40 4.80 5.20 5.50
145 ZW A=SERENO C=FLOW F=CALC
*

146 KK RE25B ROUTE
147 KM Route runoff from CE25B through Basin SBE25A
148 RS 1 FLOW
149 RC 0.060 0.060 0.060 412 0.0279 2680.70
150 RX 0.00 16.00 29.00 32.00 32.10 36.00 47.00 67.00
151 RY 2680.3 2678.70 2677.10 2676.00 2676.00 2676.90 2678.00 2680.70
152 ZW A=SERENO C=FLOW F=CALC
*

153 KK SBE25A BASIN
154 KM SBE25A Basin Runoff
155 BA 0.003
156 LG 0.25 0.25 6.00 0.20 38
157 UC 0.108 0.135
158 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
159 UA 100
160 ZW A=SERENO C=FLOW F=CALC
*

161 KK CE25A COMBINE

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164      ZW  A=SERENO C=FLOW F=CALC
      *
165      KK  DBE25A STORAGE
166      KM  Retention Basin Storage/Outflow rating curve for Basin DBE25A
167      RS  1      STOR      0
168      SV  0.01    0.02    0.04    0.06    0.08    0.10    0.12    0.14    0.16    0.18
169      SV  0.21    0.23    0.26    0.29    0.31    0.34    0.37    0.39
170      SQ  0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
171      SQ  0.01    0.01    1.12    5.87    13.22    22.40    33.27    41.15
172      SE  0.10    0.30    0.60    0.90    1.20    1.50    1.80    2.10    2.40    2.70
173      SE  3.00    3.30    3.60    3.90    4.20    4.50    4.80    5.00
174      ZW  A=SERENO C=FLOW F=CALC
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HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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175      KK  CLEAR COMBINE
176      KM  Clear Hydrograph Stack
177      HC  5
178      ZW  A=SERENO C=FLOW F=CALC
      *
179      KK  SBE24D  BASIN
180      KM  SBE254D Basin Runoff
181      BA  0.010
182      LG  0.30    0.25    6.00    0.19    6
183      UC  0.146    0.132
184      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
185      UA  100
186      ZW  A=SERENO C=FLOW F=CALC
      *

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187      KK  DBE24D STORAGE
188      KM  Retention Basin Storage/Outflow rating curve for Basin DBE24D
189      RS  1      STOR      0
190      SV  0.01    0.06    0.13    0.20    0.28    0.36    0.44    0.53    0.63    0.73
191      SV  0.83
192      SQ  0.01    0.01    0.01    0.01    0.01    0.01    0.01    5.94    16.80    30.86
193      SQ  47.52
194      SE  0.10    0.50    1.00    1.50    2.00    2.50    3.00    3.50    4.00    4.50
195      SE  5.00
196      ZW  A=SERENO C=FLOW F=CALC
      *

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197      KK  RE24D  ROUTE
198      KM  Route runoff from basin SBE24D through Basin SBE24C
199      RS  1      FLOW
200      RC  0.060    0.060    0.060    634    0.0252    2725.50
201      RX  0.00    16.00    24.00    27.00    31.00    34.00    44.00    60.00
202      RY  2725.5    2723.20    2721.80    2721.00    2721.00    2722.00    2723.00    2726.10
203      ZW  A=SERENO C=FLOW F=CALC
      *

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204      KK  SBE24C  BASIN
205      KM  SBE24C Basin Runoff
206      BA  0.015
207      LG  0.28    0.25    6.00    0.19    17
208      UC  0.190    0.219
209      UA  0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
210      UA  100
211      ZW  A=SERENO C=FLOW F=CALC
      *

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212      KK  CE24C COMBINE
213      KM  Combine RE24D and SBE24C
214      HC  2
215      ZW  A=SERENO C=FLOW F=CALC
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HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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216      KK  DBE24C STORAGE
217      KM  Retention Basin Storage/Outflow rating curve for Basin DBE24C
218      RS  1      STOR      0
219      SV  0.01    0.08    0.17    0.25    0.35    0.45    0.55    0.66    0.77    0.89
220      SV  1.02    1.15    1.17

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223 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
224 SE 4.50 5.00 5.00
225 ZW A=SERENO C=FLOW F=CALC
*

226 KK RE24C ROUTE
227 KM Route flow from CE24C through Basin SBE24B
228 RS 1 FLOW
229 RC 0.060 0.060 0.060 624 0.0232 2706.80
230 RX 10.00 25.00 45.00 49.00 55.00 62.00 75.00 103.00
231 RY 2706.8 2705.20 2702.10 2701.00 2701.00 2702.00 2703.30 2706.70
232 ZW A=SERENO C=FLOW F=CALC
*

233 KK SBE24B BASIN
234 KM SBE24B Basin Runoff
235 BA 0.005
236 LG 0.28 0.25 6.00 0.18 15
237 UC 0.156 0.234
238 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
239 UA 100
240 ZW A=SERENO C=FLOW F=CALC
*

241 KK CE24B COMBINE
242 KM Combine RE24C and SBE24B
243 HC 2
244 ZW A=SERENO C=FLOW F=CALC
*

245 KK DBE24B STORAGE
246 KM Retention Basin Storage/Outflow rating curve for Basin DBE24B
247 RS 1 STOR 0
248 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.43 0.51 0.60 0.70
249 SV 0.80 0.91 1.02 1.15 1.20
250 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.63 10.24 23.43
251 SQ 39.87 59.15 80.76 73.24 73.24
252 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
253 SE 4.50 5.00 5.40 5.90 6.00
254 ZW A=SERENO C=FLOW F=CALC
*

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1

HEC-1 INPUT

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

255 KK RE24B ROUTE
256 KM Route flow from CE24B through Basin SBE24A
257 RS 1 FLOW
258 RC 0.060 0.060 0.060 873 0.0229 2690.20
259 RX 0.00 10.00 16.00 23.00 27.00 35.00 49.00 67.00
260 RY 2689.8 2688.70 2687.90 2687.00 2687.00 2687.90 2688.80 2690.20
261 ZW A=SERENO C=FLOW F=CALC
*

262 KK SBE24A BASIN
263 KM SBE24A Basin Runoff
264 BA 0.007
265 LG 0.27 0.25 6.00 0.20 29
266 UC 0.164 0.223
267 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
268 UA 100
269 ZW A=SERENO C=FLOW F=CALC
*

270 KK CE24A COMBINE
271 KM Combine RE24B and SBE24A
272 HC 2
273 ZW A=SERENO C=FLOW F=CALC
*

274 KK DBE24A STORAGE
275 KM Retention Basin Storage/Outflow rating curve for Basin DBE24A
276 RS 1 STOR 0
277 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.44 0.52 0.62 0.71
278 SV 0.82 0.93
279 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 6.93 19.60
280 SQ 36.01 55.44
281 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
282 SE 5.00 5.50
283 ZW A=SERENO C=FLOW F=CALC

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284 KK SBE23D BASIN
 285 KM SBE23D Basin Runoff
 286 BA 0.041
 287 LG 0.28 0.25 6.00 0.19 15
 288 UC 0.252 0.271
 289 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 290 UA 100
 291 ZW A=SERENO C=FLOW F=CALC
 *

292 KK DBE23D STORAGE
 293 KM Retention Basin Storage/Outflow rating curve for Basin DBE23D
 294 RS 1 STOR 0
 295 SV 0.01 0.11 0.22 0.34 0.47 0.61 0.76 0.92 1.10 1.30
 296 SV 1.52 1.75 2.01 2.30 2.61 2.61
 297 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 298 SQ 0.01 0.01 0.01 0.01 15.51 80.61
 HEC-1 INPUT

1
 LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 299 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 300 SE 5.00 5.50 6.00 6.50 7.00 8.00
 301 ZW A=SERENO C=FLOW F=CALC
 *

302 KK RE23D ROUTE
 303 KM Route flow from SBE23D through Basin SBE23A
 304 RS 1 FLOW
 305 RC 0.060 0.060 0.060 465 0.0269 2688.30
 306 RX 0.00 14.00 27.00 32.00 40.00 44.00 55.00 68.00
 307 RY 2688.3 2687.30 2685.00 2684.10 2684.00 2685.00 2686.10 2686.70
 308 ZW A=SERENO C=FLOW F=CALC
 *

309 KK SBE23E BASIN
 310 KM SBE23E Basin Runoff
 311 BA 0.005
 312 LG 0.29 0.25 6.00 0.20 19
 313 UC 0.135 0.198
 314 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 315 UA 100
 316 ZW A=SERENO C=FLOW F=CALC
 *

317 KK DBE23E STORAGE
 318 KM Retention Basin Storage/Outflow rating curve for Basin DBE23E
 319 RS 1 STOR 0
 320 SV 0.01 0.04 0.09 0.14 0.19 0.24 0.29 0.35 0.41 0.48
 321 SV 0.55
 322 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.63 3.96 9.07
 323 SQ 15.43
 324 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
 325 SE 4.50
 326 ZW A=SERENO C=FLOW F=CALC
 *

327 KK RE23E ROUTE
 328 KM Route flow from SBE23E through Basin SBE23C
 329 RS 2 FLOW
 330 RC 0.060 0.060 0.060 1112 0.0261 2720.00
 331 RX 0.00 20.00 57.00 64.00 65.00 70.00 90.00 114.00
 332 RY 2720.0 2716.50 2712.10 2711.00 2711.00 2713.20 2716.60 2719.90
 333 ZW A=SERENO C=FLOW F=CALC
 *

334 KK SBE23C BASIN
 335 KM SBE23C Basin Runoff
 336 BA 0.053
 337 LG 0.28 0.25 6.00 0.18 13
 338 UC 0.253 0.262
 339 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 340 UA 100
 341 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

342 KK CE23C COMBINE

345 ZW A=SERENO C=FLOW F=CALC
*
346 KK DBE23C STORAGE
347 KM Retention Basin Storage/Outflow rating curve for Basin DBE23C
348 RS 1 STOR 0
349 SV 0.01 0.15 0.31 0.47 0.65 0.84 1.03 1.24 1.46 1.69
350 SV 1.93 2.19 2.46 2.76 3.08
351 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
352 SQ 0.01 0.01 27.72 78.40 144.03
353 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
354 SE 5.00 5.50 6.00 6.50 7.00
355 ZW A=SERENO C=FLOW F=CALC
*

356 KK RE23C ROUTE
357 KM Route flow from CE23C through SBE23B
358 RS 1 FLOW
359 RC 0.060 0.060 0.060 457 0.0235 2693.90
360 RX 0.00 15.00 28.00 35.00 35.10 45.00 86.00 114.00
361 RY 2693.8 2692.20 2691.00 2690.00 2690.00 2690.90 2692.90 2693.90
362 ZW A=SERENO C=FLOW F=CALC
*

363 KK SBE23B BASIN
364 KM SBE23B Basin Runoff
365 BA 0.004
366 LG 0.27 0.25 6.00 0.20 28
367 UC 0.122 0.152
368 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
369 UA 100
370 ZW A=SERENO C=FLOW F=CALC
*

371 KK CE23B COMBINE
372 KM Combine flow from RE23C and SBE23B
373 HC 2
374 ZW A=SERENO C=FLOW F=CALC
*

375 KK RE23B ROUTE
376 KM Route flow from CE23B into SBE23A to intermediate combine
377 RS 1 FLOW
378 RC 0.060 0.060 0.060 112 0.0267 2685.90
379 RX 0.00 8.00 12.00 14.00 24.00 30.00 32.00 49.00
380 RY 2685.6 2684.80 2684.20 2684.00 2684.00 2684.70 2685.00 2685.90
381 ZW A=SERENO C=FLOW F=CALC
*

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

382 KK CE23AI COMBINE
383 KM Intermediate combine of RE23D and RE23B to route through SBE23A
384 HC 2
385 ZW A=SERENO C=FLOW F=CALC
*

386 KK RE23BD ROUTE
387 KM Route Intermediate combined flow from CE23AI through SBE23A
388 RS 1 FLOW
389 RC 0.060 0.060 0.060 238 0.0242 2685.00
390 RX 0.00 21.00 62.00 74.00 82.00 86.00 101.00 141.00
391 RY 2684.9 2682.70 2681.00 2679.00 2679.00 2680.10 2681.90 2685.00
392 ZW A=SERENO C=FLOW F=CALC
*

393 KK SBE23A BASIN
394 KM SBE23A Basin Runoff
395 BA 0.006
396 LG 0.29 0.25 6.00 0.21 21
397 UC 0.152 0.176
398 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
399 UA 100
400 ZW A=SERENO C=FLOW F=CALC
*

401 KK CE23A COMBINE
402 KM Combine flow from SBE23A and RE23BD
403 HC 2

405 KK DBE23A STORAGE
 406 KM Retention Basin Storage/Outflow rating curve for Basin DBE23A
 407 RS 1 STOR 0
 408 SV 0.01 0.09 0.18 0.28 0.38 0.49 0.61 0.73 0.86 0.99
 409 SV 1.13 1.29 1.45 1.62 1.80 2.00 2.21 2.45
 410 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 411 SQ 0.01 0.01 0.01 0.01 0.01 49.50 140.00 257.20
 412 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 413 SE 5.00 5.50 6.00 6.50 7.00 7.50 8.00 8.50
 414 ZW A=SERENO C=FLOW F=CALC
 *

415 KK CLEAR COMBINE
 416 HC 3
 417 ZW A=SERENO C=FLOW F=CALC
 *

418 KK SBE22A BASIN
 419 KM SBE22A Basin Runoff
 420 BA 0.007
 421 LG 0.30 0.25 6.00 0.22 15
 422 UC 0.150 0.194
 423 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 HEC-1 INPUT

1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

424 UA 100
 425 ZW A=SERENO C=FLOW F=CALC
 *

426 KK DBE22A STORAGE
 427 KM Retention Basin Storage/Outflow rating curve for Basin DBE22A
 428 RS 1 STOR 0
 429 SV 0.01 0.03 0.07 0.12 0.16 0.21 0.27 0.33 0.39 0.47
 430 SV 0.55 0.63
 431 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 3.96
 432 SQ 11.20 20.58
 433 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 434 SE 5.00 5.50
 435 ZW A=SERENO C=FLOW F=CALC
 *

436 KK SBE21A BASIN
 437 KM SBE21A Basin Runoff
 438 BA 0.001
 439 LG 0.30 0.25 6.00 0.22 15
 440 UC 0.081 0.106
 441 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 442 UA 100
 443 ZW A=SERENO C=FLOW F=CALC
 *

444 KK SBE20A BASIN
 445 KM SBE20A Basin Runoff
 446 BA 0.001
 447 LG 0.30 0.25 6.00 0.22 15
 448 UC 0.072 0.078
 449 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 450 UA 100
 451 ZW A=SERENO C=FLOW F=CALC
 *

452 KK SBE19A BASIN
 453 KM SBE19A Basin Runoff
 454 BA 0.001
 455 LG 0.30 0.25 6.00 0.22 15
 456 UC 0.073 0.079
 457 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 458 UA 100
 459 ZW A=SERENO C=FLOW F=CALC
 *

460 KK SBE18A BASIN
 461 KM SBE18A Basin Runoff
 462 BA 0.001
 463 LG 0.30 0.25 6.00 0.22 15
 464 UC 0.083 0.110
 465 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 466 UA 100

LINE	ID	1	2	3	4	5	6	7	8	9	10	
468	KK	DBE18A STORAGE										
469	KM	Retention Basin Storage/Outflow rating curve for Basin DBE18A										
470	RS	1	STOR	0								
471	SV	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	
472	SV	0.09	0.10	0.12	0.13	0.14	0.16	0.17				
473	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
474	SQ	0.01	0.35	0.99	1.82	2.80	3.91	5.14				
475	SE	0.10	0.30	0.50	0.80	1.00	1.30	1.50	1.80	2.00	2.30	
476	SE	2.50	2.80	3.00	3.30	3.50	3.80	4.00				
477	ZW	A=SERENO C=FLOW F=CALC										
	*											
478	KK	CLEAR COMBINE										
479	KM	Clear Hydrograph Stack										
480	HC	6										
481	ZW	A=SERENO C=FLOW F=CALC										
	*											
482	KK	SBE17B BASIN										
483	KM	SBE17B Basin Runoff										
484	BA	0.016										
485	LG	0.25	0.25	6.00	0.20	30						
486	UC	0.159	0.157									
487	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
488	UA	100										
489	ZW	A=SERENO C=FLOW F=CALC										
	*											
490	KK	DBE17B STORAGE										
491	KM	Retention Basin Storage/Outflow rating curve for Basin DBE17B										
492	RS	1	STOR	0								
493	SV	0.01	0.08	0.17	0.26	0.35	0.46	0.56	0.68	0.80	0.92	
494	SV	1.06	1.20	1.35	1.51	1.68						
495	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
496	SQ	0.01	0.01	9.90	28.00	51.44						
497	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	
498	SE	5.00	5.50	6.00	6.50	7.00						
499	ZW	A=SERENO C=FLOW F=CALC										
	*											
500	KK	RE17B ROUTE										
501	KM	Route flow from SBE17B through SBE 17A										
502	RS	2	FLOW									
503	RC	0.060	0.060	0.060	1169	0.0265	2740.10					
504	RX	0.00	9.00	22.00	33.00	44.00	54.00	62.00	69.00			
505	RY	2740.1	2738.60	2737.00	2736.10	2736.00	2737.00	2738.40	2740.10			
506	ZW	A=SERENO C=FLOW F=CALC										
	*											

LINE	ID	1	2	3	4	5	6	7	8	9	10	
507	KK	SBE17A BASIN										
508	KM	SBE17A Basin Runoff										
509	BA	0.018										
510	LG	0.26	0.25	6.00	0.21	29						
511	UC	0.176	0.209									
512	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
513	UA	100										
514	ZW	A=SERENO C=FLOW F=CALC										
	*											
515	KK	CE17A COMBINE										
516	KM	Combine flow from RE17B and SBE17A										
517	HC	2										
518	ZW	A=SERENO C=FLOW F=CALC										
	*											
519	KK	DBE17A STORAGE										
520	KM	Retention Basin Storage/Outflow rating curve for Basin DBE17A										
521	RS	1	STOR	0								
522	SV	0.01	0.09	0.19	0.29	0.41	0.54	0.68	0.84	1.01	1.19	
523	SV	1.39	1.62	1.86	2.13							
524	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
525	SQ	0.01	17.82	50.40	92.59							

528 ZW A=SERENO C=FLOW F=CALC
*

529 KK SBE16A BASIN

530 KM SBE16A Basin Runoff

531 BA 0.001

532 LG 0.30 0.25 6.00 0.22 15

533 UC 0.088 0.135

534 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0

535 UA 100

536 ZW A=SERENO C=FLOW F=CALC
*

537 KK SBE13A BASIN

538 KM SBE13A Basin Runoff

539 BA 0.003

540 LG 0.25 0.25 6.00 0.22 30

541 UC 0.100 0.114

542 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0

543 UA 100

544 ZW A=SERENO C=FLOW F=CALC
*

545 KK DBE13A STORAGE

546 KM Retention Basin Storage/Outflow rating curve for Basin DBE13A

547 RS 1 STOR 0

548 SV 0.01 0.02 0.04 0.06 0.08 0.10 0.13 0.16 0.19 0.23

549 SV 0.27 0.31 0.35

550 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

551 SQ 1.98 5.60 10.29

552 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50

553 SE 5.00 5.50 6.00

554 ZW A=SERENO C=FLOW F=CALC
*

555 KK SBE12A BASIN

556 KM SBE12A Basin Runoff

557 BA 0.002

558 LG 0.23 0.25 6.00 0.21 40

559 UC 0.093 0.121

560 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0

561 UA 100

562 ZW A=SERENO C=FLOW F=CALC
*

563 KK DBE12A STORAGE

564 KM Retention Basin Storage/Outflow rating curve for Basin DBE12A

565 RS 1 STOR 0

566 SV 0.01 0.02 0.03 0.05 0.07 0.09 0.10 0.12 0.14 0.17

567 SV 0.19 0.21 0.24 0.26 0.28

568 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01

569 SQ 0.96 2.84 5.29 8.22 10.29

570 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00

571 SE 3.30 3.60 4.00 4.30 4.50

572 ZW A=SERENO C=FLOW F=CALC
*

573 KK SBE11B BASIN

574 KM SBE11B Basin Runoff

575 BA 0.013

576 LG 0.25 0.25 6.00 0.22 30

577 UC 0.157 0.174

578 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0

579 UA 100

580 ZW A=SERENO C=FLOW F=CALC
*

581 KK DBE11B STORAGE

582 KM Retention Basin Storage/Outflow rating curve for Basin DBE11B

583 RS 1 STOR 0

584 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.43 0.51 0.61 0.70

585 SV 0.80 0.91 1.02 1.14 1.28

586 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01

587 SQ 0.01 0.01 7.92 22.40 41.15

588 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50

589 SE 5.00 5.50 6.00 6.50 7.00

590 ZW A=SERENO C=FLOW F=CALC

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

591 KK RE11B ROUTE
592 KM Route flow from SBE11B through SBE11A
593 RS 1 FLOW
594 RC 0.060 0.060 0.060 914 0.0334 2770.20
595 RX 0.00 10.00 16.00 23.00 25.00 34.00 48.00 64.00
596 RY 2770.2 2767.10 2765.30 2762.00 2762.00 2765.00 2766.60 2768.30
597 ZW A=SERENO C=FLOW F=CALC
*

598 KK SBE11A BASIN
599 KM SBE11A Basin Runoff
600 BA 0.016
601 LG 0.24 0.25 6.00 0.21 35
602 UC 0.173 0.202
603 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
604 UA 100
605 ZW A=SERENO C=FLOW F=CALC
*

606 KK CE11A COMBINE
607 KM Combine flow from RE11B and SBE11A
608 HC 2
609 ZW A=SERENO C=FLOW F=CALC
*

610 KK DBE11A STORAGE
611 KM Retention Basin Storage/Outflow rating curve for Basin DBE11A
612 RS 1 STOR 0
613 SV 0.01 0.07 0.15 0.23 0.31 0.40 0.50 0.60 0.70 0.82
614 SV 0.94 1.08 1.23 1.39 1.57 1.77
615 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
616 SQ 0.01 0.01 0.01 15.84 44.80 82.30
617 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
618 SE 5.00 5.50 6.00 6.50 7.00 7.50
619 ZW A=SERENO C=FLOW F=CALC
*

620 KK CLEAR COMBINE
621 KM Clear Hydrograph Stack
622 HC 6
623 ZW A=SERENO C=FLOW F=CALC
*

624 KK SBE10A BASIN
625 KM SBE10A Basin Runoff
626 BA 0.001
627 LG 0.25 0.25 6.00 0.22 30
628 UC 0.076 0.098
629 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
630 UA 100
631 ZW A=SERENO C=FLOW F=CALC
*

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1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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632 KK SBE09A BASIN
633 KM SBE09A Basin Runoff
634 BA 0.002
635 LG 0.25 0.25 6.00 0.22 30
636 UC 0.073 0.064
637 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
638 UA 100
639 ZW A=SERENO C=FLOW F=CALC
*

640 KK SBE08A BASIN
641 KM SBE08A Basin Runoff
642 BA 0.001
643 LG 0.25 0.25 6.00 0.22 30
644 UC 0.077 0.100
645 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
646 UA 100
647 ZW A=SERENO C=FLOW F=CALC
*

```

650 HC 4
 651 ZW A=SERENO C=FLOW F=CALC
 *

652 KK SBE06D BASIN
 653 KM SBE06D Basin Runoff
 654 BA 0.010
 655 LG 0.25 0.25 6.00 0.22 29
 656 UC 0.148 0.176
 657 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 658 UA 100
 659 ZW A=SERENO C=FLOW F=CALC
 *

660 KK DBE06D STORAGE
 661 KM Retention Basin Storage/Outflow rating curve for Basin DBE06D
 662 RS 1 STOR 0
 663 SV 0.01 0.05 0.10 0.15 0.20 0.26 0.33 0.39 0.46 0.53
 664 SV 0.61 0.69 0.78 0.87 0.97
 665 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 666 SQ 0.01 0.01 6.93 19.60 36.01
 667 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 668 SE 5.00 5.50 6.00 6.50 7.00
 669 ZW A=SERENO C=FLOW F=CALC
 *

670 KK RE06D ROUTE
 671 KM Route flow from SBE06D through Basin SBE06B
 672 RS 1 FLOW
 673 RC 0.060 0.060 0.060 677 0.0369 2785.90
 674 RX 0.00 15.00 27.00 34.00 41.00 45.00 52.00 59.00
 675 RY 2785.8 2784.00 2783.00 2782.00 2782.00 2782.00 2782.70 2784.20 2785.90
 HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

676 ZW A=SERENO C=FLOW F=CALC
 *

677 KK SBE06C BASIN
 678 KM SBE06C Basin Runoff
 679 BA 0.016
 680 LG 0.17 0.25 6.00 0.25 31
 681 UC 0.225 0.269
 682 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 683 UA 100
 684 ZW A=SERENO C=FLOW F=CALC
 *

685 KK DBE06C STORAGE
 686 KM Retention Basin Storage/Outflow rating curve for Basin DBE06C
 687 RS 1 STOR 0
 688 SV 0.01 0.08 0.17 0.26 0.35 0.45 0.56 0.67 0.79 0.92
 689 SV 1.05 1.19 1.34
 690 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 691 SQ 7.92 22.40 41.15
 692 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 693 SE 5.00 5.50 6.00
 694 ZW A=SERENO C=FLOW F=CALC
 *

695 KK RE06C ROUTE
 696 KM Route flow from SBE06C through Basin SBE06B
 697 RS 1 FLOW
 698 RC 0.060 0.060 0.060 591 0.0431 2786.60
 699 RX 0.00 6.00 16.00 26.00 36.00 40.00 41.00 44.00
 700 RY 2786.6 2786.00 2785.00 2784.00 2784.00 2785.00 2785.50 2786.40
 701 ZW A=SERENO C=FLOW F=CALC
 *

702 KK SBE06B BASIN
 703 KM SBE06B Basin Runoff
 704 BA 0.008
 705 LG 0.23 0.25 6.00 0.22 35
 706 UC 0.125 0.119
 707 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 708 UA 100
 709 ZW A=SERENO C=FLOW F=CALC
 *

710 KK CE06B COMBINE
 = SBE06D, DBE06D and SBE06B

713

ZW A=SERENO C=FLOW F=CALC

*

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

714 KK RE06B ROUTE
 715 KM Route flow from CE06B through Basin SBE06A
 716 RS 1 FLOW
 717 RC 0.060 0.060 0.060 814 0.0319 2761.00
 718 RX 0.00 21.00 55.00 63.00 82.00 92.00 104.00 113.00
 719 RY 2761.0 2758.90 2758.50 2758.00 2758.00 2758.50 2759.70 2760.80
 720 ZW A=SERENO C=FLOW F=CALC

*

721 KK SBE06A BASIN
 722 KM SBE06A Basin Runoff
 723 BA 0.014
 724 LG 0.21 0.25 6.00 0.23 45
 725 UC 0.180 0.253
 726 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 727 UA 100
 728 ZW A=SERENO C=FLOW F=CALC

*

729 KK CE06A COMBINE
 730 KM Combine flow from RE06B and Basin SBE 06A
 731 HC 2
 732 ZW A=SERENO C=FLOW F=CALC

*

733 KK SBE05B BASIN
 734 KM SBE05B Basin Runoff
 735 BA 0.022
 736 LG 0.10 0.25 6.00 0.28 24
 737 UC 0.410 0.750
 738 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 739 UA 100
 740 ZW A=SERENO C=FLOW F=CALC

*

741 KK DBE05B STORAGE
 742 KM Retention Basin Storage/Outflow rating curve for Basin DBE05B
 743 RS 1 STOR 0
 744 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.43 0.52 0.61 0.71
 745 SV 0.81 0.92 1.03 1.16 1.29
 746 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 747 SQ 0.01 0.01 5.94 16.80 30.86
 748 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 749 SE 5.00 5.50 6.00 6.50 7.00
 750 ZW A=SERENO C=FLOW F=CALC

*

751 KK RE05B ROUTE
 752 KM Route flow from SBE05B through SBE05A
 753 RS 1 FLOW
 754 RC 0.060 0.060 0.060 907 0.0435 2760.30
 755 RX 0.00 11.00 26.00 40.00 47.00 56.00 76.00 89.00
 756 RY 2760.1 2759.00 2757.70 2757.00 2757.00 2757.40 2758.80 2760.30
 757 ZW A=SERENO C=FLOW F=CALC

*

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

758 KK SBE05A BASIN
 759 KM SBE05A Basin Runoff
 760 BA 0.007
 761 LG 0.24 0.25 6.00 0.22 32
 762 UC 0.151 0.211
 763 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 764 UA 100
 765 ZW A=SERENO C=FLOW F=CALC

*

766 KK CE05A COMBINE
 767 KM Combine flow from RE05B and SBE05A
 768 HC 2
 769 ZW A=SERENO C=FLOW F=CALC

770 KK CE065A COMBINE
 771 KM Combine flow from CE06A and CE05A
 772 HC 2
 773 ZW A=SERENO C=FLOW F=CALC
 *

774 KK DBE06A STORAGE
 775 KM Retention Basin Storage/Outflow rating curve for Basin DBE06A
 776 RS 1 STOR 0
 777 SV 0.01 0.13 0.27 0.41 0.56 0.72 0.89 1.07 1.26 1.46
 778 SV 1.68 1.90 2.14 2.39 2.65 2.95 3.27
 779 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 780 SQ 0.01 0.01 0.01 0.01 29.70 84.00 154.32
 781 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 782 SE 5.00 5.50 6.00 6.50 7.00 7.50 8.00
 783 ZW A=SERENO C=FLOW F=CALC
 *

784 KK SBE04C BASIN
 785 KM SBE04C Basin Runoff
 786 BA 0.014
 787 LG 0.11 0.25 6.00 0.27 45
 788 UC 0.268 0.459
 789 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 790 UA 100
 791 ZW A=SERENO C=FLOW F=CALC
 *

792 KK DBE04C STORAGE
 793 KM Retention Basin Storage/Outflow rating curve for Basin DBE04C
 794 RS 1 STOR 0
 795 SV 0.01 0.07 0.14 0.21 0.29 0.37 0.46 0.55 0.65 0.75
 796 SV 0.86 0.98 1.10 1.23 1.37
 797 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 798 SQ 0.01 0.01 4.95 14.00 25.72
 799 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 800 SE 5.00 5.50 6.00 6.50 7.00
 801 ZW A=SERENO C=FLOW F=CALC
 *

1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

802 KK RE04C ROUTE
 803 KM Route flow from SBE04C into SBE04A
 804 RS 1 FLOW
 805 RC 0.060 0.060 0.060 455 0.0363 2755.00
 806 RX 0.00 17.00 22.00 27.00 32.00 44.00 61.00 88.00
 807 RY 2755.0 2753.00 2751.90 2750.00 2750.00 2751.90 2753.20 2754.90
 808 ZW A=SERENO C=FLOW F=CALC
 *

809 KK SBE04B BASIN
 810 KM SBE04B Basin Runoff
 811 BA 0.015
 812 LG 0.11 0.25 6.00 0.27 50
 813 UC 0.253 0.407
 814 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 815 UA 100
 816 ZW A=SERENO C=FLOW F=CALC
 *

817 KK DBE04B STORAGE
 818 KM Retention Basin Storage/Outflow rating curve for Basin DBE04B
 819 RS 1 STOR 0
 820 SV 0.01 0.07 0.14 0.21 0.29 0.37 0.46 0.55 0.65 0.75
 821 SV 0.86 0.97 1.10 1.23
 822 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 823 SQ 0.01 5.94 16.80 30.86
 824 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 825 SE 5.00 5.50 6.00 6.50
 826 ZW A=SERENO C=FLOW F=CALC
 *

827 KK RE04B ROUTE
 828 KM Route flow from SBE04B into SBE04A
 829 RS 1 FLOW
 830 RC 0.060 0.060 0.060 449 0.0367 2755.00
 831 RX 0.00 15.00 24.00 28.00 30.00 33.00 46.00 62.00
 832 RY 2754.9 2752.60 2750.80 2750.00 2750.00 2751.00 2752.90 2755.00
 ZW A=SERENO C=FLOW F=CALC

834 KK CE04AI COMBINE
 835 KM Intermediate Combine flows from RE04C and RE04B
 836 HC 2
 837 ZW A=SERENO C=FLOW F=CALC
 *
 838 KK RE04CB ROUTE
 839 KM Route flow from CE04AI through rest of Basin SBE04A
 840 RS 1 FLOW
 841 RC 0.060 0.060 0.060 247 0.0344 2744.90
 842 RX 0.00 11.00 21.00 31.00 34.00 50.00 69.00 88.00
 843 RY 2744.9 2742.70 2741.40 2740.00 2740.00 2741.80 2743.00 2743.90
 844 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

845 KK SBE04A BASIN
 846 KM SBE04A Basin Runoff
 847 BA 0.006
 848 LG 0.25 0.25 6.00 0.22 30
 849 UC 0.130 0.156
 850 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 851 UA 100
 852 ZW A=SERENO C=FLOW F=CALC
 *
 853 KK CE04A COMBINE
 854 KM Combine Flows from RE04CB and SBE04A
 855 HC 2
 856 ZW A=SERENO C=FLOW F=CALC
 *

857 KK DBE04A STORAGE
 858 KM Retention Basin Storage/Outflow rating curve for Basin DBE04A
 859 RS 1 STOR 0
 860 SV 0.01 0.09 0.18 0.27 0.37 0.48 0.59 0.71 0.84 0.97
 861 SV 1.11 1.26 1.42 1.60
 862 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 863 SQ 0.01 11.88 33.60 61.73
 864 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 865 SE 5.00 5.50 6.00 6.50
 866 ZW A=SERENO C=FLOW F=CALC
 *

867 KK SBE03A BASIN
 868 KM SBE03A Basin Runoff
 869 BA 0.007
 870 LG 0.22 0.25 6.00 0.23 40
 871 UC 0.128 0.148
 872 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 873 UA 100
 874 ZW A=SERENO C=FLOW F=CALC
 *

875 KK DBE03A STORAGE
 876 KM Retention Basin Storage/Outflow rating curve for Basin DBE03A
 877 RS 1 STOR 0
 878 SV 0.01 0.03 0.06 0.09 0.12 0.16 0.21 0.25 0.30 0.36
 879 SV 0.42 0.49 0.56 0.64 0.73 0.83
 880 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 881 SQ 0.01 0.01 0.01 3.96 11.20 20.58
 882 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 883 SE 5.00 5.50 6.00 6.50 7.00 7.50
 884 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

885 KK SBE02A BASIN
 886 KM SBE02A Basin Runoff
 887 BA 0.068
 888 LG 0.10 0.25 6.00 0.28 11
 889 UC 0.536 0.767
 890 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 891 UA 100
 ZW A=SERENO C=FLOW F=CALC

893 KK DBE02A STORAGE
 894 KM Retention Basin Storage/Outflow rating curve for Basin DBE02A
 895 RS 1 STOR 0
 896 SV 0.01 0.12 0.25 0.39 0.55 0.71 0.89 1.07 1.28 1.50
 897 SV 1.74 2.00 2.29 2.29
 898 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 3.96
 899 SQ 11.20 20.58 31.68 52.00
 900 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 901 SE 5.00 5.50 6.00 7.00
 902 ZW A=SERENO C=FLOW F=CALC
 *

903 KK SBE01B BASIN
 904 KM SBE01B Basin Runoff
 905 BA 0.024
 906 LG 0.10 0.23 6.20 0.26 25
 907 UC 0.277 0.222
 908 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 909 UA 100
 910 ZW A=SERENO C=FLOW F=CALC
 *

911 KK RE01B ROUTE
 912 KM Route flow from SBE01B through Basin SBE01A
 913 RS 2 FLOW
 914 RC 0.060 0.060 0.060 5189 0.0788 2910.00
 915 RX 0.00 23.00 87.00 103.00 111.00 119.00 158.00 178.00
 916 RY 2910.0 2908.00 2906.00 2905.50 2904.40 2905.50 2907.00 2910.00
 917 ZW A=SERENO C=FLOW F=CALC
 *

918 KK SBE01A BASIN
 919 KM SBE01A Basin Runoff
 920 BA 0.119
 921 LG 0.10 0.25 6.00 0.28 3
 922 UC 0.592 0.679
 923 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 924 UA 100
 925 ZW A=SERENO C=FLOW F=CALC
 *

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HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

926 KK CE01A COMBINE
 927 HC 2
 928 ZW A=SERENO C=FLOW F=CALC
 *

929 KK DBE01A STORAGE
 930 KM Retention Basin Storage/Outflow rating curve for Basin DBE01A
 931 RS 1 STOR 0
 932 SV 0.01 0.03 0.06 0.09 0.12 0.15 0.19 0.23 0.27 0.31
 933 SV 0.36 0.41 0.46 0.47
 934 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 7.84 36.53
 935 SQ 80.60 135.15 197.88 205.76
 936 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 937 SE 3.30 3.60 4.00 4.00
 938 ZW A=SERENO C=FLOW F=CALC
 *

939 KK CLEAR COMBINE
 940 KM Clear Hydrograph Stack
 941 HC 6
 942 ZW A=SERENO C=FLOW F=CALC
 *

943 KK SBW14A BASIN
 944 KM SBW14A Basin Runoff
 945 BA 0.009
 946 LG 0.28 0.25 6.00 0.20 4
 947 UC 0.141 0.113
 948 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 949 UA 100
 950 ZW A=SERENO C=FLOW F=CALC
 *

951 KK DBW14A STORAGE
 952 KM Retention Basin Storage/Outflow rating curve for Basin DBW14A
 -- --

955	SV	0.42	0.47	0.52	0.58	0.63	0.70				
956	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.84
957	SQ	2.97	6.04	9.74	13.95	18.64	23.76				
958	SE	0.10	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
959	SE	3.00	3.30	3.60	3.90	4.20	4.50				
960	ZW	A=SERENO C=FLOW F=CALC									
	*										
961	KK	SBW13A BASIN									
962	KM	SBW13A Basin Runoff									
963	BA	0.001									
964	LG	0.30	0.25	6.00	0.18	5					
965	UC	0.071	0.076								
966	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
967	UA	100									
968	ZW	A=SERENO C=FLOW F=CALC									
	*										

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HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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969	KK	SBW12A BASIN									
970	KM	SBW12A Basin Runoff									
971	BA	0.017									
972	LG	0.29	0.25	6.00	0.19	13					
973	UC	0.147	0.119								
974	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
975	UA	100									
976	ZW	A=SERENO C=FLOW F=CALC									
	*										

977	KK	DBW12A STORAGE									
978	KM	Retention Basin Storage/Outflow rating curve for Basin DBW12A									
979	RS	1	STOR	0							
980	SV	0.01	0.08	0.16	0.24	0.33	0.43	0.53	0.64	0.75	0.87
981	SV	0.99	1.13	1.27	1.43						
982	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
983	SQ	5.94	16.80	30.86	47.52						
984	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
985	SE	5.00	5.50	6.00	6.50						
986	ZW	A=SERENO C=FLOW F=CALC									
	*										

987	KK	SBW11A BASIN									
988	KM	SBW11A Basin Runoff									
989	BA	0.001									
990	LG	0.30	0.25	6.00	0.18	5					
991	UC	0.061	0.052								
992	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
993	UA	100									
994	ZW	A=SERENO C=FLOW F=CALC									
	*										

995	KK	CLEAR COMBINE									
996	KM	Clear Hydrograph Stack									
997	HC	5									
998	ZW	A=SERENO C=FLOW F=CALC									
	*										

999	KK	SBW10C BASIN									
1000	KM	SBW10C Basin Runoff									
1001	BA	0.015									
1002	LG	0.25	0.25	6.00	0.22	30					
1003	UC	0.148	0.140								
1004	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1005	UA	100									
1006	ZW	A=SERENO C=FLOW F=CALC									
	*										

1007	KK	DBW10C STORAGE									
1008	KM	Retention Basin Storage/Outflow rating curve for Basin DBW10C									
1009	RS	1	STOR	0							
1010	SV	0.01	0.06	0.12	0.18	0.26	0.34	0.43	0.52	0.63	0.75
1011	SV	0.87	1.01	1.16	1.33	1.52	1.72	1.94			
1012	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
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1013	SQ	0.01	0.01	0.01	0.01	8.91	25.20	46.30			
	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50

1

1016 ZW A=SERENO C=FLOW F=CALC
*

1017 KK RW10C ROUTE
1018 KM Route flow from SBW10C through Basin SBW10B
1019 RS 2 FLOW
1020 RC 0.060 0.060 0.060 952 0.0310 2757.80
1021 RX 0.00 34.00 47.00 62.00 62.10 68.00 73.00 78.00
1022 RY 2757.8 2754.40 2754.00 2752.10 2752.00 2753.70 2755.70 2757.50
1023 ZW A=SERENO C=FLOW F=CALC
*

1024 KK SBW10B BASIN
1025 KM SBW10B Basin Runoff
1026 BA 0.012
1027 LG 0.25 0.25 6.00 0.20 33
1028 UC 0.164 0.204
1029 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1030 UA 100
1031 ZW A=SERENO C=FLOW F=CALC
*

1032 KK CW10B COMBINE
1033 KM Combine flow from RW10C and SBW10B
1034 HC 2
1035 ZW A=SERENO C=FLOW F=CALC
*

1036 KK DBW10B STORAGE
1037 KM Retention Basin Storage/Outflow rating curve for Basin DBW10B
1038 RS 1 STOR 0
1039 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.44 0.53 0.62 0.73
1040 SV 0.84 0.95 1.08 1.22 1.30
1041 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1042 SQ 0.01 0.01 0.01 2.27 12.37
1043 SE 0.10 0.60 1.20 1.80 2.40 3.00 3.60 4.20 4.80 5.40
1044 SE 6.00 6.60 7.20 7.80 8.20
1045 ZW A=SERENO C=FLOW F=CALC
*

1046 KK RW10B ROUTE
1047 KM Route flow from CE10WB through Basin SBW10A
1048 RS 1 FLOW
1049 RC 0.060 0.060 0.060 653 0.0276 2732.00
1050 RX 0.00 68.00 75.00 79.00 86.00 92.00 106.00 150.00
1051 RY 2732.0 2728.10 2721.10 2726.10 2726.00 2726.60 2727.00 2732.00
1052 ZW A=SERENO C=FLOW F=CALC
*

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HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1053 KK SBW10A BASIN
1054 KM SBW10A Basin Runoff
1055 BA 0.033
1056 LG 0.26 0.25 6.00 0.19 27
1057 UC 0.191 0.174
1058 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1059 UA 100
1060 ZW A=SERENO C=FLOW F=CALC
*

1061 KK CW10A COMBINE
1062 KM Combine flow from RW10B and SBW10A
1063 HC 2
1064 ZW A=SERENO C=FLOW F=CALC
*

1065 KK DBW10A STORAGE
1066 KM Retention Basin Storage/Outflow rating curve for Basin DBW10A
1067 RS 1 STOR 0
1068 SV 0.01 0.20 0.41 0.63 0.87 1.12 1.40 1.69 2.00 2.33
1069 SV 2.68 3.07 3.50 3.98 4.15
1070 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 14.68
1071 SQ 56.00 113.58 182.88 189.00 189.00
1072 SE 0.10 0.60 1.20 1.80 2.40 3.00 3.60 4.20 4.80 5.40
1073 SE 6.00 6.60 7.20 7.80 8.00
1074 ZW A=SERENO C=FLOW F=CALC
*

1077 BA 0.006
 1078 LG 0.15 0.25 6.00 0.26 11
 1079 UC 0.251 0.390
 1080 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1081 UA 100
 1082 ZW A=SERENO C=FLOW F=CALC
 *

1083 KK DBW09E STORAGE
 1084 KM Retention Basin Storage/Outflow rating curve for Basin DBW09E
 1085 RS 1 STOR 0
 1086 SV 0.01 0.02 0.03 0.05 0.07 0.09 0.11 0.13 0.15 0.18
 1087 SV 0.20 0.23 0.26 0.29 0.31
 1088 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 1089 SQ 1.43 4.26 7.93 12.33 15.43
 1090 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 1091 SE 3.30 3.60 4.00 4.30 4.50
 1092 ZW A=SERENO C=FLOW F=CALC
 *

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HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1093 KK RW09E ROUTE
 1094 KM Route flow from SBW09E through Basin SBW09D
 1095 RS 1 FLOW
 1096 RC 0.060 0.060 0.060 985 0.0442 2805.10
 1097 RX 0.00 10.00 12.00 14.00 17.00 23.00 29.00 48.00
 1098 RY 2805.3 2803.10 2802.10 2800.70 2800.70 2802.00 2802.90 2805.10
 1099 ZW A=SERENO C=FLOW F=CALC
 *

1100 KK SBW09D BASIN
 1101 KM SBW09D Basin Runoff
 1102 BA 0.008
 1103 LG 0.24 0.25 6.00 0.21 34
 1104 UC 0.141 0.175
 1105 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1106 UA 100
 1107 ZW A=SERENO C=FLOW F=CALC
 *

1108 KK CW09DI COMBINE
 1109 HC 2
 1110 ZW A=SERENO C=FLOW F=CALC
 *

1111 KK SBW09C BASIN
 1112 KM SBW09C Basin Runoff
 1113 BA 0.044
 1114 LG 0.15 0.25 6.00 0.26 11
 1115 UC 0.397 0.474
 1116 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1117 UA 100
 1118 ZW A=SERENO C=FLOW F=CALC
 *

1119 KK CW09D COMBINE
 1120 KM Combine flow from CW09DI and SBW09C
 1121 HC 2
 1122 ZW A=SERENO C=FLOW F=CALC
 *

1123 KK DBW09C STORAGE
 1124 KM Retention Basin Storage/Outflow rating curve for Basin DBW09C
 1125 RS 1 STOR 0
 1126 SV 0.01 0.21 0.43 0.66 0.90 1.16 1.44 1.73 2.05 2.41
 1127 SV 2.79
 1128 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 19.80 56.00
 1129 SQ 102.88
 1130 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 1131 SE 5.00
 1132 ZW A=SERENO C=FLOW F=CALC
 *

1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1133 KK RW09D ROUTE
 Route flow from CW09D through Basin SBW09B

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1136 RC 0.060 0.060 0.060 367 0.0368 2782.10
1137 RX 0.00 11.00 27.00 31.00 38.00 42.00 73.00 90.00
1138 RY 2782.1 2780.10 2780.00 2779.00 2779.00 2779.50 2780.90 2781.30
1139 ZW A=SERENO C=FLOW F=CALC
*

1140 KK SBW09B BASIN
1141 KM SBW09B Basin Runoff
1142 BA 0.005
1143 LG 0.27 0.25 6.00 0.20 29
1144 UC 0.109 0.110
1145 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1146 UA 100
1147 ZW A=SERENO C=FLOW F=CALC
*

1148 KK CW09B COMBINE
1149 KM Combine flow from RW09D and SBW09B
1150 HC 2
1151 ZW A=SERENO C=FLOW F=CALC
*

1152 KK DBW09B STORAGE
1153 KM Retention Basin Storage/Outflow rating curve for Basin DBW09B
1154 RS 1 STOR 0
1155 SV 0.01 0.05 0.10 0.15 0.21 0.27 0.34 0.40 0.48 0.55
1156 SV 0.63 0.72
1157 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 20.79
1158 SQ 58.80 108.02
1159 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1160 SE 5.00 5.50
1161 ZW A=SERENO C=FLOW F=CALC
*

1162 KK RW09B ROUTE
1163 KM Route flow from CW09B through Basin SBW09A
1164 RS 1 FLOW
1165 RC 0.060 0.060 0.060 1036 0.0415 2765.60
1166 RX 0.00 8.00 49.00 58.00 67.00 72.00 85.00 104.00
1167 RY 2764.9 2764.80 2764.00 2763.00 2763.00 2764.00 2765.10 2765.60
1168 ZW A=SERENO C=FLOW F=CALC
*

1169 KK SBW09A BASIN
1170 KM SBW09A Basin Runoff
1171 BA 0.008
1172 LG 0.27 0.25 6.00 0.20 24
1173 UC 0.161 0.227
1174 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1175 UA 100
1176 ZW A=SERENO C=FLOW F=CALC
*

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1

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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1177 KK CW09A COMBINE
1178 KM Combine flow from RW09B and SBW09A
1179 HC 2
1180 ZW A=SERENO C=FLOW F=CALC
*

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1181 KK DBW09A STORAGE
1182 KM Retention Basin Storage/Outflow rating curve for Basin DBW09A
1183 RS 1 STOR 0
1184 SV 0.01 0.04 0.08 0.12 0.17 0.21 0.26 0.32 0.37 0.43
1185 SV 0.50 0.57 0.64
1186 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1187 SQ 22.77 64.40 118.31
1188 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1189 SE 5.00 5.50 6.00
1190 ZW A=SERENO C=FLOW F=CALC
*

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1191 KK SBW08A BASIN
1192 KM SBW08A Basin Runoff
1193 BA 0.009
1194 LG 0.27 0.25 6.00 0.18 21
1195 UC 0.129 0.136
1196 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1197 UA 100

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1199 KK DBW08A STORAGE
 1200 KM Retention Basin Storage/Outflow rating curve for Basin DBW08A
 1201 RS 1 STOR 0
 1202 SV 0.01 0.04 0.09 0.14 0.18 0.24 0.29 0.34 0.40 0.46
 1203 SV 0.52 0.58 0.65 0.71 0.79 0.86 0.87
 1204 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 1205 SQ 0.01 1.09 5.33 11.85 20.01 29.39 30.86
 1206 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 1207 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
 1208 ZW A=SERENO C=FLOW F=CALC
 *

1209 KK SBW07C BASIN
 1210 KM SBW07C Basin Runoff
 1211 BA 0.005
 1212 LG 0.21 0.25 6.00 0.23 3
 1213 UC 0.210 0.310
 1214 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1215 UA 100
 1216 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1217 KK DBW07C STORAGE
 1218 KM Retention Basin Storage/Outflow rating curve for Basin DBW07C
 1219 RS 1 STOR 0
 1220 SV 0.01 0.01 0.02 0.03 0.04 0.05 0.07 0.08 0.09 0.11
 1221 SV 0.12 0.14 0.16 0.18 0.20 0.22 0.22
 1222 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 1223 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
 1224 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 1225 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
 1226 ZW A=SERENO C=FLOW F=CALC
 *

1227 KK SBW07B BASIN
 1228 KM SBW07B Basin Runoff
 1229 BA 0.007
 1230 LG 0.17 0.25 6.00 0.25 6
 1231 UC 0.261 0.419
 1232 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1233 UA 100
 1234 ZW A=SERENO C=FLOW F=CALC
 *

1235 KK DBW07B STORAGE
 1236 KM Retention Basin Storage/Outflow rating curve for Basin DBW07B
 1237 RS 1 STOR 0
 1238 SV 0.01 0.01 0.03 0.04 0.05 0.07 0.09 0.10 0.12 0.14
 1239 SV 0.17 0.19 0.21 0.24 0.27 0.29 0.30
 1240 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 1241 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
 1242 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 1243 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
 1244 ZW A=SERENO C=FLOW F=CALC
 *

1245 KK CW07BC COMBINE
 1246 KM Combine flow from SBW07C and SBW07B
 1247 HC 2
 1248 ZW A=SERENO C=FLOW F=CALC
 *

1249 KK RW07BC ROUTE
 1250 KM Route flow from CW07BC through SBW07A
 1251 RS 1 FLOW
 1252 RC 0.060 0.060 0.060 1452 0.0465 2800.10
 1253 RX 0.00 6.00 20.00 26.00 29.00 38.00 50.00 68.00
 1254 RY 2800.1 2799.00 2796.00 2793.00 2793.00 2796.00 2797.00 2798.40
 1255 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

*** DBW07B BASIN

1258	BA	0.013									
1259	LG	0.28	0.25	6.00	0.20	22					
1260	UC	0.180	0.249								
1261	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1262	UA	100									
1263	ZW	A=SERENO C=FLOW F=CALC									
	*										
1264	KK	CW07A COMBINE									
1265	KM	Combine flow from RW07BC and SBW07A									
1266	HC	2									
1267	ZW	A=SERENO C=FLOW F=CALC									
	*										
1268	KK	DBW07A STORAGE									
1269	KM	Retention Basin Storage/Outflow rating curve for Basin DBW07A									
1270	RS	1	STOR	0							
1271	SV	0.01	0.09	0.18	0.28	0.39	0.50	0.62	0.74	0.88	1.01
1272	SV	1.16	1.32								
1273	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	10.89
1274	SQ	30.80	56.58								
1275	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
1276	SE	5.00	5.50								
1277	ZW	A=SERENO C=FLOW F=CALC									
	*										
1278	KK	CLEAR COMBINE									
1279	HC	5									
1280	ZW	A=SERENO C=FLOW F=CALC									
	*										
1281	KK	SBW06A BASIN									
1282	KM	SBW06A Basin Runoff									
1283	BA	0.004									
1284	LG	0.29	0.25	6.00	0.18	11					
1285	UC	0.116	0.145								
1286	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1287	UA	100									
1288	ZW	A=SERENO C=FLOW F=CALC									
	*										
1289	KK	DBW06A STORAGE									
1290	KM	Retention Basin Storage/Outflow rating curve for Basin DBW06A									
1291	RS	1	STOR	0							
1292	SV	0.01	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.16	0.19
1293	SV	0.21	0.24	0.28	0.31	0.34	0.38	0.39			
1294	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1295	SQ	0.01	0.55	2.66	5.93	10.00	14.69	15.43			
1296	SE	0.10	0.30	0.70	1.00	1.30	1.70	2.00	2.30	2.60	3.00
1297	SE	3.30	3.60	4.00	4.30	4.60	5.00	5.00			
1298	ZW	A=SERENO C=FLOW F=CALC									
	*										
HEC-1 INPUT											
LINE	ID	1	2	3	4	5	6	7	8	9	10
1299	KK	SBW05A BASIN									
1300	KM	SBW05A Basin Runoff									
1301	BA	0.010									
1302	LG	0.29	0.25	6.00	0.19	11					
1303	UC	0.147	0.168								
1304	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1305	UA	100									
1306	ZW	A=SERENO C=FLOW F=CALC									
	*										
1307	KK	DBW05A STORAGE									
1308	KM	Retention Basin Storage/Outflow rating curve for Basin DBW05A									
1309	RS	1	STOR	0							
1310	SV	0.01	0.05	0.09	0.15	0.20	0.26	0.32	0.38	0.45	0.52
1311	SV	0.59	0.67	0.76							
1312	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1313	SQ	5.94	16.80	30.86							
1314	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
1315	SE	5.00	5.50	6.00							
1316	ZW	A=SERENO C=FLOW F=CALC									
	*										
1317	KK	SBW04A BASIN									
1318	KM	SBW04A Basin Runoff									
	BA	0.002									

```

1321 UC 0.091 0.107
1322 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1323 UA 100
1324 ZW A=SERENO C=FLOW F=CALC
*

1325 KK SBW02A BASIN
1326 KM SBW02A Basin Runoff
1327 BA 0.007
1328 LG 0.18 0.25 6.00 0.24 2
1329 UC 0.238 0.322
1330 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1331 UA 100
1332 ZW A=SERENO C=FLOW F=CALC
*

```

```

1333 KK DBW02A STORAGE
1334 KM Retention Basin Storage/Outflow rating curve for Basin DBW02A
1335 RS 1 STOR 0
1336 SV 0.01 0.01 0.03 0.05 0.06 0.08 0.10 0.12 0.14 0.16
1337 SV 0.18 0.20 0.22 0.25 0.27
1338 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1339 SQ 0.01 2.20 6.04 11.07 15.43
1340 SE 0.10 0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60
1341 SE 4.00 4.40 4.80 5.20 5.50
1342 ZW A=SERENO C=FLOW F=CALC
*

```

1 HEC-1 INPUT

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

```

1343 KK SBW01A BASIN
1344 KM SBW01A Basin Runoff
1345 BA 0.002
1346 LG 0.14 0.25 6.00 0.26 1
1347 UC 0.186 0.262
1348 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1349 UA 100
1350 ZW A=SERENO C=FLOW F=CALC
*

```

```

1351 KK CLEAR COMBINE
1352 KM Clear Hydrograph Stack
1353 HC 6
*
1354 ZZ

```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

27 SBE29A
   V
   V
35 DBE29A
   .
   .
45 . SBE28A
   . V
   . V
53 . DBE28A
   .
   .
63 . SBE27A
   . V
   . V
71 . DBE27A
   .
   .
81 . SBE26A
   . V
   . V
89 . DBE26A
   .
   .
99 . SBE25C
   . V
   . V
   . DBE25C

```

117	.	.	.	.	V RE25C
124	.	.	.	.	SBE25B
132	.	.	.	.	CE25B.....
136	.	.	.	.	V V DBE25B
146	.	.	.	.	V V RE25B
153	.	.	.	.	SBE25A
161	.	.	.	.	CE25A.....
165	.	.	.	.	V V DBE25A
175	CLEAR.....				
179	.	SBE24D	.	.	V
187	.	DBE24D	.	.	V
197	.	RE24D	.	.	V
204	.	SBE24C	.	.	
212	.	CE24C.....	.	.	V
216	.	DBE24C	.	.	V
226	.	RE24C	.	.	V
233	.	SBE24B	.	.	
241	.	CE24B.....	.	.	V
245	.	DBE24B	.	.	V
255	.	RE24B	.	.	V
262	.	SBE24A	.	.	
270	.	CE24A.....	.	.	V
274	.	DBE24A	.	.	V
284	.	SBE23D	.	.	V
292	.	DBE23D	.	.	V
302	.	RE23D	.	.	V
309	.	SBE23E	.	.	V

327 V
RE23E
334 SBE23C
342 CE23C
V
V
346 DBE23C
V
V
356 RE23C
363 SBE23B
371 CE23B
V
V
375 RE23B
382 CE23AI
V
V
386 RE23BD
393 SBE23A
401 CE23A
V
V
405 DBE23A
415 CLEAR
418 SBE22A
V
V
426 DBE22A
436 SBE21A
444 SBE20A
452 SBE19A
460 SBE18A
V
V
468 DBE18A
478 CLEAR
482 SBE17B
V
V
490 DBE17B
V
V
500 RE17B
507 SBE17A
515 CE17A

519

DBE17A

529

SBE16A

537

SBE13A

V

V

545

DBE13A

555

SBE12A

V

V

563

DBE12A

573

SBE11B

V

V

581

DBE11B

V

V

591

RE11B

598

SBE11A

606

CE11A

V

V

610

DBE11A

620

CLEAR

624

SBE10A

632

SBE09A

640

SBE08A

648

CLEAR

652

SBE06D

V

V

660

DBE06D

V

V

670

RE06D

677

SBE06C

V

V

685

DBE06C

V

V

695

RE06C

702

SBE06B

710

CE06B

V

V

714

RE06B

721

SBE06A

733

SBE05B

V

V

741

DBE05B

V

V

751

RE05B

758

SBE05A

766

CE05A.....

770

CE065A.....

V

V

774

DBE06A

784

SBE04C

V

V

792

DBE04C

V

V

802

RE04C

809

SBE04B

V

V

817

DBE04B

V

V

827

RE04B

834

CE04AI.....

V

V

838

RE04CB

845

SBE04A

853

CE04A.....

V

V

857

DBE04A

867

SBE03A

V

V

875

DBE03A

885

SBE02A

V

V

893

DBE02A

903

SBE01B

V

V

911

RE01B

918

SBE01A

926

CE01A.....

V

V

929

DBE01A

943	.	SBW14A	.	.	.
	.	V	.	.	.
	.	V	.	.	.
951	.	DBW14A	.	.	.
	.	.	.	.	.
961	.	.	SBW13A	.	.
	.	.	.	.	.
969	.	.	.	SBW12A	.
	.	.	.	V	.
	.	.	.	V	.
977	.	.	.	DBW12A	.
	.	.	.	.	.
987	.	.	.	.	SBW11A
	.	.	.	.	.
995	.	.	.	.	.
	CLEAR	.	.	.	.
	.	.	.	.	.
999	.	SBW10C	.	.	.
	.	V	.	.	.
	.	V	.	.	.
1007	.	DBW10C	.	.	.
	.	V	.	.	.
	.	V	.	.	.
1017	.	RW10C	.	.	.
	.	.	.	.	.
1024	.	.	SBW10B	.	.
	.	.	.	.	.
1032	.	CW10B	.	.	.
	.	V	.	.	.
	.	V	.	.	.
1036	.	DBW10B	.	.	.
	.	V	.	.	.
	.	V	.	.	.
1046	.	RW10B	.	.	.
	.	.	.	.	.
1053	.	.	SBW10A	.	.
	.	.	.	.	.
1061	.	CW10A	.	.	.
	.	V	.	.	.
	.	V	.	.	.
1065	.	DBW10A	.	.	.
	.	.	.	.	.
1075	.	.	SBW09E	.	.
	.	.	V	.	.
	.	.	V	.	.
1083	.	.	DBW09E	.	.
	.	.	V	.	.
	.	.	V	.	.
1093	.	.	RW09E	.	.
	.	.	.	.	.
1100	.	.	.	SBW09D	.
	.	.	.	.	.
1108	.	.	CW09DI	.	.
	.	.	.	.	.
1111	.	.	.	SBW09C	.
	.	.	.	.	.
1119	.	.	CW09D	.	.
	.	.	V	.	.
	.	.	V	.	.
1123	.	.	DBW09C	.	.
	.	.	V	.	.
	.	.	V	.	.
1133	.	.	RW09D	.	.
	.	.	.	.	.
1140	.	.	.	SBW09B	.
	.	.	.	.	.

1148	.	.	CW09B.....		
	.	.	V		
	.	.	V		
1152	.	.	DBW09B		
	.	.	V		
	.	.	V		
1162	.	.	RW09B		
	.	.	.		
1169	.	.		SBW09A	
	.	.	.		
1177	.	.	CW09A.....		
	.	.	V		
	.	.	V		
1181	.	.	DBW09A		
	.	.	.		
1191	.	.		SBW08A	
	.	.	.	V	
	.	.	.	V	
1199	.	.		DBW08A	
	.	.	.		
1209	.	.		SBW07C	
	.	.	.	V	
	.	.	.	V	
1217	.	.		DBW07C	
	.	.	.		
1227	.	.			SBW07B
	.	.	.		V
	.	.	.		V
1235	.	.			DBW07B
	.	.	.		
1245	.	.		CW07BC.....	
	.	.	.	V	
	.	.	.	V	
1249	.	.		RW07BC	
	.	.	.		
1256	.	.			SBW07A
	.	.	.		
1264	.	.		CW07A.....	
	.	.	.	V	
	.	.	.	V	
1268	.	.		DBW07A	
	.	.	.		
1278	CLEAR.....	.			
	.	.			
1281		SBW06A			
	.	V			
	.	V			
1289		DBW06A			
	.	.			
1299			SBW05A		
	.	.	V		
	.	.	V		
1307			DBW05A		
	.	.	.		
1317				SBW04A	
	.	.	.		
1325				SBW02A	
	.	.	.	V	
	.	.	.	V	
1333				DBW02A	
	.	.	.		
1343					SBW01A
	.	.	.		
1351	CLEAR.....	.			

```

* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 18SEP12 TIME 11:10:55
*
* .....
```

* U.S. ARMY COR
* HYDROLOGIC EN
* 609 SEC
* DAVIS, CAL
* (916)
*

Flood Control District of Maricopa County
Sereno Canyon Developed Conditions
10 YEAR
6 Hour Storm
Unit Hydrograph: Clark
09/18/2012
Sereno Canyon-Developed Conditions
100-Year, 6-Hour Storm Event
Prepared By: JE Fuller Hydrology and Geomorphology
Modeled By: Brian Schalk P.E., CFM and Nathan Logan P.E., CFM
Submitted To: City of Scottsdale

```

14 IO      OUTPUT CONTROL VARIABLES
           IPRNT      5  PRINT CONTROL
           IPLOT      0  PLOT CONTROL
           OSCAL      0.  HYDROGRAPH PLOT SCALE

```

IT	HYDROGRAPH TIME DATA	
	NMIN	1 MINUTES IN COMPUTATION INTERVAL
	IDATE	1DEC11 STARTING DATE
	ITIME	0000 STARTING TIME
	NQ	2000 NUMBER OF HYDROGRAPH ORDINATES
	NDDATE	2DEC11 ENDING DATE
	NDTIME	0919 ENDING TIME
	ICENT	19 CENTURY MARK

COMPUTATION INTERVAL 0.02 HOURS
TOTAL TIME BASE 33.32 HOURS

ENGLISH UNITS	
DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE- FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

```

15 JD          INDEX STORM NO. 1
                STRM          2.11  PRECIPITATION DEPTH
                TRDA          0.00  TRANSPOSITION DRAINAGE AREA

```

16 PI	PRECIPITATION PATTERN								
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.03	
0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	


```

-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE25A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE25A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE25A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CE25A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CE25A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CE25A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE25A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE25A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE25A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 129: /SERENO/CLEAR/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 129: /SERENO/CLEAR/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 129: /SERENO/CLEAR/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE24D/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE24D/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE24D/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE24D/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE24D/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBE24D/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RE24D/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RE24D/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RE24D/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBE24C/FLOW/30NOV1911/1MIN/CALC/

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-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW07B/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07B/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07B/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07B/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07BC/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07BC/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07BC/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RW07BC/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RW07BC/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/RW07BC/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/CW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW07A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 136: /SERENO/CLEAR/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 136: /SERENO/CLEAR/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 136: /SERENO/CLEAR/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW06A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW06A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW06A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW06A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW06A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW06A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW05A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW05A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW05A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW05A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW05A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW05A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW04A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW04A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW04A/FLOW/02DEC1911/1MIN/CALC/
WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW02A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW02A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW02A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW02A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW02A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/DBW02A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW01A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW01A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 17: /SERENO/SBW01A/FLOW/02DEC1911/1MIN/CALC/

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RUNOFF SUMMARY
 FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMU STAGE
					6-HOUR	24-HOUR	72-HOUR		
+	HYDROGRAPH AT								
+		SBE29A	18.	4.08	2.	0.	0.	0.01	
	ROUTED TO								
+		DBE29A	4.	4.53	1.	0.	0.	0.01	
	HYDROGRAPH AT								
+		SBE28A	19.	4.05	1.	0.	0.	0.01	
	ROUTED TO								
+		DBE28A	0.	0.00	0.	0.	0.	0.01	
	HYDROGRAPH AT								
+		SBE27A	3.	4.02	0.	0.	0.	0.00	
	ROUTED TO								
+		DBE27A	0.	0.00	0.	0.	0.	0.00	
	HYDROGRAPH AT								
+		SBE26A	14.	4.05	1.	0.	0.	0.01	
	ROUTED TO								
+		DBE26A	0.	0.00	0.	0.	0.	0.01	
	HYDROGRAPH AT								
		DBE25C	0.	4.03	1.	0.	0.	0.00	

+	ROUTED TO	DBE25C	1.	4.40	0.	0.	0.	0.00
+	ROUTED TO	RE25C	1.	4.52	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE25B	8.	4.05	1.	0.	0.	0.01
+	2 COMBINED AT	CE25B	8.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBE25B	0.	5.32	0.	0.	0.	0.01
+	ROUTED TO	RE25B	0.	5.52	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE25A	6.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CE25A	6.	4.02	0.	0.	0.	0.01
+	ROUTED TO	DBE25A	0.	7.05	0.	0.	0.	0.01
+	5 COMBINED AT	CLEAR	4.	4.53	1.	0.	0.	0.05
+	HYDROGRAPH AT	SBE24D	17.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DBE24D	1.	4.45	0.	0.	0.	0.01
+	ROUTED TO	RE24D	1.	4.58	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE24C	21.	4.07	2.	0.	0.	0.01
+	2 COMBINED AT	CE24C	21.	4.07	2.	0.	0.	0.02
+	ROUTED TO	DBE24C	5.	4.50	1.	0.	0.	0.02
+	ROUTED TO	RE24C	4.	4.60	1.	0.	0.	0.02
+	HYDROGRAPH AT	SBE24B	7.	4.05	1.	0.	0.	0.00
+	2 COMBINED AT	CE24B	7.	4.05	1.	0.	0.	0.03
+	ROUTED TO	DBE24B	1.	5.57	0.	0.	0.	0.03
+	ROUTED TO	RE24B	1.	5.78	0.	0.	0.	0.03
+	HYDROGRAPH AT	SBE24A	10.	4.05	1.	0.	0.	0.01
+	2 COMBINED AT	CE24A	10.	4.05	1.	0.	0.	0.04
+	ROUTED TO	DBE24A	1.	6.53	0.	0.	0.	0.04
+	HYDROGRAPH AT	SBE23D	49.	4.08	5.	1.	1.	0.04
+	ROUTED TO	DBE23D	0.	0.00	0.	0.	0.	0.04
+	ROUTED TO	RE23D	0.	0.25	0.	0.	0.	0.04

+	ROUTED TO	DBE23E	0.	0.00	0.	0.	0.	0.00
+	ROUTED TO	RE23E	0.	0.42	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE23C	64.	4.08	6.	1.	1.	0.05
+	2 COMBINED AT	CE23C	64.	4.08	6.	1.	1.	0.06
+	ROUTED TO	DBE23C	16.	4.53	1.	0.	0.	0.06
+	ROUTED TO	RE23C	16.	4.58	1.	0.	0.	0.06
+	HYDROGRAPH AT	SBE23B	7.	4.03	1.	0.	0.	0.00
+	2 COMBINED AT	CE23B	16.	4.58	2.	1.	0.	0.06
+	ROUTED TO	RE23B	16.	4.60	2.	1.	0.	0.06
+	2 COMBINED AT	CE23AI	16.	4.60	2.	1.	0.	0.10
+	ROUTED TO	RE23BD	16.	4.62	2.	1.	0.	0.10
+	HYDROGRAPH AT	SBE23A	9.	4.03	1.	0.	0.	0.01
+	2 COMBINED AT	CE23A	16.	4.62	3.	1.	0.	0.11
+	ROUTED TO	DBE23A	0.	0.00	0.	0.	0.	0.11
+	3 COMBINED AT	CLEAR	4.	4.53	1.	0.	0.	0.20
+	HYDROGRAPH AT	SBE22A	10.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBE22A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE21A	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE20A	2.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE19A	2.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE18A	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DBE18A	0.	0.00	0.	0.	0.	0.00
+	6 COMBINED AT	CLEAR	6.	4.00	1.	0.	0.	0.21
+	HYDROGRAPH AT	SBE17B	27.	4.03	2.	1.	0.	0.02
+	ROUTED TO	DBE17B	0.	0.00	0.	0.	0.	0.02
+	ROUTED TO	RE17B	0.	0.57	0.	0.	0.	0.02
+	HYDROGRAPH AT	SBE17A	26.	4.05	2.	1.	0.	0.02

		CE17A	26.	4.05	2.	1.	0.	0.03
+	ROUTED TO							
+		DBE17A	0.	0.00	0.	0.	0.	0.03
	HYDROGRAPH AT							
+		SBE16A	2.	4.02	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBE13A	6.	4.02	0.	0.	0.	0.00
	ROUTED TO							
+		DBE13A	0.	0.00	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBE12A	4.	4.02	0.	0.	0.	0.00
	ROUTED TO							
+		DBE12A	0.	0.00	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBE11B	21.	4.05	2.	0.	0.	0.01
	ROUTED TO							
+		DBE11B	0.	0.00	0.	0.	0.	0.01
	ROUTED TO							
+		RE11B	0.	0.53	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBE11A	24.	4.05	2.	1.	0.	0.02
	2 COMBINED AT							
+		CE11A	24.	4.05	2.	1.	0.	0.03
	ROUTED TO							
+		DBE11A	0.	0.00	0.	0.	0.	0.03
	6 COMBINED AT							
+		CLEAR	7.	4.02	1.	0.	0.	0.28
	HYDROGRAPH AT							
+		SBE10A	2.	4.02	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBE09A	4.	4.00	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBE08A	2.	4.02	0.	0.	0.	0.00
	4 COMBINED AT							
+		CLEAR	15.	4.00	2.	1.	0.	0.28
	HYDROGRAPH AT							
+		SBE06D	16.	4.03	1.	0.	0.	0.01
	ROUTED TO							
+		DBE06D	0.	0.00	0.	0.	0.	0.01
	ROUTED TO							
+		RE06D	0.	0.50	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBE06C	20.	4.08	2.	1.	0.	0.02
	ROUTED TO							
+		DBE06C	2.	4.92	0.	0.	0.	0.02
	ROUTED TO							
+		RE06C	1.	5.07	0.	0.	0.	0.02
	HYDROGRAPH AT							
+		SBE06B	15.	4.02	1.	0.	0.	0.01
	3 COMBINED AT							
+		CE06B	15.	4.02	1.	0.	0.	0.03
	ROUTED TO							
+		RE06B	12.	4.08	1.	0.	0.	0.03
	HYDROGRAPH AT							
		SBE06A	20.	4.05	2.	1.	0.	0.01

+	2 COMBINED AT	CE06A	32.	4.07	3.	1.	1.	0.05
+	HYDROGRAPH AT	SBE05B	13.	4.20	3.	1.	0.	0.02
+	ROUTED TO	DBE05B	3.	5.35	1.	0.	0.	0.02
+	ROUTED TO	RE05B	3.	5.53	1.	0.	0.	0.02
+	HYDROGRAPH AT	SBE05A	10.	4.05	1.	0.	0.	0.01
+	2 COMBINED AT	CE05A	10.	4.05	2.	0.	0.	0.03
+	2 COMBINED AT	CE065A	42.	4.07	5.	1.	1.	0.08
+	ROUTED TO	DBE06A	2.	6.60	0.	0.	0.	0.08
+	HYDROGRAPH AT	SBE04C	14.	4.10	2.	1.	0.	0.01
+	ROUTED TO	DBE04C	1.	6.00	0.	0.	0.	0.01
+	ROUTED TO	RE04C	1.	6.12	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE04B	16.	4.10	2.	1.	0.	0.01
+	ROUTED TO	DBE04B	4.	4.87	1.	0.	0.	0.01
+	ROUTED TO	RE04B	4.	4.92	1.	0.	0.	0.01
+	2 COMBINED AT	CE04AI	4.	4.92	1.	0.	0.	0.03
+	ROUTED TO	RE04CB	4.	4.95	1.	0.	0.	0.03
+	HYDROGRAPH AT	SBE04A	10.	4.03	1.	0.	0.	0.01
+	2 COMBINED AT	CE04A	10.	4.03	1.	0.	0.	0.04
+	ROUTED TO	DBE04A	0.	0.00	0.	0.	0.	0.04
+	HYDROGRAPH AT	SBE03A	12.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DBE03A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE02A	34.	4.27	7.	2.	1.	0.07
+	ROUTED TO	DBE02A	16.	4.98	4.	1.	1.	0.07
+	HYDROGRAPH AT	SBE01B	32.	4.08	3.	1.	1.	0.02
+	ROUTED TO	RE01B	21.	4.35	3.	1.	1.	0.02
+	HYDROGRAPH AT	SBE01A	60.	4.27	11.	3.	2.	0.12
+	2 COMBINED AT	CE01A	80.	4.30	14.	3.	2.	0.14

+	6 COMBINED AT	CLEAR	79.	4.33	19.	5.	4.	0.61
+	HYDROGRAPH AT	SBW14A	16.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DBW14A	2.	4.35	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW13A	2.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW12A	30.	4.03	2.	0.	0.	0.02
+	ROUTED TO	DBW12A	1.	4.58	0.	0.	0.	0.02
+	HYDROGRAPH AT	SBW11A	2.	4.00	0.	0.	0.	0.00
+	5 COMBINED AT	CLEAR	80.	4.33	19.	5.	4.	0.64
+	HYDROGRAPH AT	SBW10C	26.	4.03	2.	0.	0.	0.01
+	ROUTED TO	DBW10C	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RW10C	0.	0.65	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW10B	18.	4.05	2.	0.	0.	0.01
+	2 COMBINED AT	CW10B	18.	4.05	2.	0.	0.	0.03
+	ROUTED TO	DBW10B	0.	0.00	0.	0.	0.	0.03
+	ROUTED TO	RW10B	0.	0.47	0.	0.	0.	0.03
+	HYDROGRAPH AT	SBW10A	52.	4.05	4.	1.	1.	0.03
+	2 COMBINED AT	CW10A	52.	4.05	4.	1.	1.	0.06
+	ROUTED TO	DBW10A	1.	4.92	0.	0.	0.	0.06
+	HYDROGRAPH AT	SBW09E	5.	4.10	1.	0.	0.	0.01
+	ROUTED TO	DBW09E	2.	4.57	0.	0.	0.	0.01
+	ROUTED TO	RW09E	2.	4.73	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW09D	13.	4.03	1.	0.	0.	0.01
+	2 COMBINED AT	CW09DI	13.	4.03	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBW09C	33.	4.17	4.	1.	1.	0.04
+	2 COMBINED AT	CW09D	42.	4.13	6.	1.	1.	0.06
+	ROUTED TO	DBW09C	15.	4.73	2.	1.	0.	0.06
+	ROUTED TO	RW09D	15.	4.75	2.	1.	0.	0.06

+		SBW09B	9.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT							
+		CW09B	15.	4.75	3.	1.	1.	0.06
	ROUTED TO							
+		DBW09B	14.	4.85	2.	1.	0.	0.06
	ROUTED TO							
+		RW09B	13.	5.00	2.	1.	0.	0.06
	HYDROGRAPH AT							
+		SBW09A	11.	4.05	1.	0.	0.	0.01
+	2 COMBINED AT							
+		CW09A	13.	4.98	3.	1.	1.	0.07
	ROUTED TO							
+		DBW09A	13.	5.03	2.	1.	0.	0.07
	HYDROGRAPH AT							
+		SBW08A	16.	4.03	1.	0.	0.	0.01
	ROUTED TO							
+		DBW08A	0.	4.95	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBW07C	5.	4.07	0.	0.	0.	0.00
	ROUTED TO							
+		DBW07C	2.	4.43	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBW07B	6.	4.10	1.	0.	0.	0.01
	ROUTED TO							
+		DBW07B	2.	4.53	0.	0.	0.	0.01
+	2 COMBINED AT							
+		CW07BC	4.	4.50	1.	0.	0.	0.01
	ROUTED TO							
+		RW07BC	3.	4.68	1.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBW07A	17.	4.05	2.	0.	0.	0.01
+	2 COMBINED AT							
+		CW07A	17.	4.05	2.	1.	0.	0.03
	ROUTED TO							
+		DBW07A	2.	5.18	0.	0.	0.	0.03
+	5 COMBINED AT							
+		CLEAR	80.	4.33	21.	6.	4.	0.81
	HYDROGRAPH AT							
+		SBW06A	7.	4.03	0.	0.	0.	0.00
	ROUTED TO							
+		DBW06A	0.	0.00	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBW05A	15.	4.03	1.	0.	0.	0.01
	ROUTED TO							
+		DBW05A	0.	5.65	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBW04A	4.	4.02	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		SBW02A	7.	4.08	1.	0.	0.	0.01
	ROUTED TO							
+		DBW02A	3.	4.40	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBW01A	2.	4.07	0.	0.	0.	0.00
+	6 COMBINED AT							
			81	4.35	21.	6.	4.	0.83

*** NORMAL END OF HEC-1 ***

-----DSS---ZCLOSE Unit: 71, File: C:\FCDMC\ST\Models\K.DSS
Pointer Utilization: 2.67
Number of Records: 2505
File Size: 7165.3 Kbytes
Percent Inactive: 0.0

Developed Condition HEC-1 Model

2-Year, 6-Hour Storm

HEC-1 ID	Existing Condition 2-Year, 6-Hour Peak Discharge (cfs)	Proposed Condition 2-Year, 6-Hour Peak Discharge (cfs)	Existing - Proposed (cfs)
CE01A	42	35	7
CE04A	8	0	8
CE065A	19	0	19
CE11A	9	0	9
CE17A	11	0	11
CE23A	26	0	26
CE24A	11	0	11
CE25A	5	0	5
CW07A	7	0	7
CW09A	18	0	18
CW10A	20	0	20
SBE02A	13	3	10
SBE03A	3	0	3
SBE08A	1	1	0
SBE09A	1	2	-1
SBE10A	1	1	0
SBE12A	1	0	1
SBE13A	1	0	1
SBE16A	0	1	-1
SBE18A	1	0	1
SBE19A	1	1	0
SBE20A	1	1	0
SBE21A	1	1	0
SBE26A	3	0	3
SBE27A	1	0	1
SBE28A	4	0	4
SBE29A	6	0	6
SBW01A	1	1	0
SBW02A	3	0	3
SBW04A	1	2	-1
SBW05A	4	0	4
SBW06A	2	0	2
SBW08A	4	0	4
SBW11A	1	1	0
SBW12A	8	0	8
SBW13A	1	1	0
SBW14A	5	0	5

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*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 18SEP12 TIME 11:18:54 *
*****

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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*****

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X X XXXXXXX XXXXX X
X X X X X XX
X X X X X X
XXXXXXX XXXX X XXXXX X
X X X X X X
X X X X X X
X X XXXXXXX XXXXX XXX

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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

```

1 ID Flood Control District of Maricopa County
2 ID Sereno Canyon Developed Conditions
3 ID 2 YEAR
4 ID 6 Hour Storm
5 ID Unit Hydrograph: Clark
6 ID 09/18/2012
7 ID Sereno Canyon-Developed Conditions
8 ID 2-Year, 6-Hour Storm Event
9 ID Prepared By: JE Fuller Hydrology and Geomorphology
10 ID Modeled By: Brian Schalk P.E., CFM and Nathan Logan P.E., CFM
11 ID Submitted To: City of Scottsdale
12 IT 1 01DEC11 0 2000
13 IN 15
14 IO 5
  *DIAGRAM
  *
15 JD 1.421 0.0001
16 PC 0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
17 PC 0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
18 PC 0.962 0.972 0.983 0.991 1.000
19 JD 1.412 0.5000
20 PC 0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
21 PC 0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
22 PC 0.962 0.972 0.983 0.991 1.000
23 JD 1.385 2.8
24 PC 0.000 0.009 0.016 0.025 0.034 0.042 0.051 0.059 0.068 0.077
25 PC 0.088 0.101 0.121 0.164 0.253 0.451 0.694 0.836 0.900 0.938
26 PC 0.950 0.963 0.975 0.988 1.000
  *

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```

27 KK SBE29A BASIN
28 KM SBE29A Basin Runoff
29 BA 0.015
30 LG 0.20 0.25 6.00 0.23 10
31 UC 0.300 0.306
32 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
33 UA 100
34 ZW A=SERENO C=FLOW F=CALC
  *

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35 KK DBE29A STORAGE
36 KM Retention Basin Storage/Outflow rating curve for Basin DBE29A
37 RS 1 STOR 0
38 SV 0.01 0.05 0.10 0.15 0.20 0.26 0.32 0.38 0.45 0.51
39 SV 0.59 0.66 0.74 0.83 0.92 0.97
40 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.49
41 SQ 3.46 8.43 14.56 21.75 29.86 33.07
42 SE 0.10 0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60
43 SE 4.00 4.40 4.80 5.20 5.60 5.80
44 ZW A=SERENO C=FLOW F=CALC
  *

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1

HEC-1 INPUT

PAGE 2

45 KK SBE28A BASIN
46 KM SBE28A Basin Runoff
47 BA 0.013
48 LG 0.29 0.25 6.00 0.20 17
49 UC 0.198 0.217
50 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
51 UA 100
52 ZW A=SERENO C=FLOW F=CALC
*

53 KK DBE28A STORAGE
54 KM Retention Basin Storage/Outflow rating curve for Basin DBE28A
55 RS 1 STOR 0
56 SV 0.01 0.07 0.13 0.21 0.28 0.36 0.45 0.54 0.64 0.74
57 SV 0.84 0.95 1.08
58 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
59 SQ 6.93 19.60 36.01
60 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
61 SE 5.00 5.50 6.00
62 ZW A=SERENO C=FLOW F=CALC
*

63 KK SBE27A BASIN
64 KM SBE27A Basin Runoff
65 BA 0.002
66 LG 0.30 0.25 6.00 0.22 15
67 UC 0.121 0.162
68 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
69 UA 100
70 ZW A=SERENO C=FLOW F=CALC
*

71 KK DBE27A STORAGE
72 KM Retention Basin Storage/Outflow rating curve for Basin DBE27A
73 RS 1 STOR 0
74 SV 0.01 0.01 0.02 0.03 0.04 0.06 0.07 0.08 0.10 0.11
75 SV 0.12 0.14 0.16 0.17 0.19 0.21
76 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
77 SQ 0.01 0.96 2.64 4.81 7.38 10.29
78 SE 0.10 0.30 0.60 0.90 1.20 1.50 1.80 2.10 2.40 2.70
79 SE 3.00 3.30 3.60 3.90 4.20 4.50
80 ZW A=SERENO C=FLOW F=CALC
*

81 KK SBE26A BASIN
82 KM SBE26A Basin Runoff
83 BA 0.010
84 LG 0.26 0.25 6.00 0.20 31
85 UC 0.196 0.267
86 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
87 UA 100
88 ZW A=SERENO C=FLOW F=CALC
*

HEC-1 INPUT

PAGE 3

1
LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

89 KK DBE26A STORAGE
90 KM Retention Basin Storage/Outflow rating curve for Basin DBE26A
91 RS 1 STOR 0
92 SV 0.01 0.06 0.12 0.19 0.26 0.33 0.41 0.49 0.58 0.67
93 SV 0.76 0.87 0.98 1.11
94 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
95 SQ 0.01 5.94 16.80 30.86
96 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
97 SE 5.00 5.50 6.00 6.50
98 ZW A=SERENO C=FLOW F=CALC
*

99 KK SBE25C BASIN
100 KM SBE25C Basin Runoff
101 BA 0.005
102 LG 0.27 0.25 6.00 0.18 17
103 UC 0.144 0.162
104 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
105 UA 100
106 ZW A=SERENO C=FLOW F=CALC
*

107 KK DBE25C STORAGE
108 KM Retention Basin Storage/Outflow rating curve for Basin DBE25C
109 RS 1 STOR 0
110 SV 0.01 0.02 0.05 0.07 0.10 0.13 0.16 0.19 0.22 0.25
111 SV 0.28 0.31 0.35 0.39 0.43 0.47 0.47
112 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
113 SQ 2.87 8.53 15.86 24.66 34.72 45.79 47.52
114 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
115 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
116 ZW A=SERENO C=FLOW F=CALC
*

119 RS 1 FLOW
 120 RC 0.060 0.060 0.060 709 0.0268 2694.40
 121 RX 0.00 21.00 53.00 58.00 63.00 70.00 90.00 99.00
 122 RY 2694.3 2691.90 2688.00 2687.00 2687.00 2689.00 2693.30 2694.40
 123 ZW A=SERENO C=FLOW F=CALC
 *

124 KK SBE25B BASIN
 125 KM SBE25B Basin Runoff
 126 BA 0.006
 127 LG 0.29 0.25 6.00 0.21 20
 128 UC 0.183 0.252
 129 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 130 UA 100
 131 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

PAGE 4

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

132 KK CE25B COMBINE
 133 KM Combine Route RE25C and Basin SBE25B
 134 HC 2
 135 ZW A=SERENO C=FLOW F=CALC
 *

136 KK DBE25B STORAGE
 137 KM Retention Basin Storage/Outflow rating curve for Basin DBE25B
 138 RS 1 STOR 0
 139 SV 0.01 0.05 0.09 0.14 0.19 0.25 0.30 0.36 0.42 0.49
 140 SV 0.55 0.62 0.70 0.78 0.84
 141 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.68 7.93
 142 SQ 16.80 27.91 40.62 54.86 56.70
 143 SE 0.10 0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60
 144 SE 4.00 4.40 4.80 5.20 5.50
 145 ZW A=SERENO C=FLOW F=CALC
 *

146 KK RE25B ROUTE
 147 KM Route runoff from CE25B through Basin SBE25A
 148 RS 1 FLOW
 149 RC 0.060 0.060 0.060 412 0.0279 2680.70
 150 RX 0.00 16.00 29.00 32.00 32.10 36.00 47.00 67.00
 151 RY 2680.3 2678.70 2677.10 2676.00 2676.00 2676.90 2678.00 2680.70
 152 ZW A=SERENO C=FLOW F=CALC
 *

153 KK SBE25A BASIN
 154 KM SBE25A Basin Runoff
 155 BA 0.003
 156 LG 0.25 0.25 6.00 0.20 38
 157 UC 0.122 0.156
 158 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 159 UA 100
 160 ZW A=SERENO C=FLOW F=CALC
 *

161 KK CE25A COMBINE
 162 KM Combine Route RE25B and Basin SBE25A
 163 HC 2
 164 ZW A=SERENO C=FLOW F=CALC
 *

165 KK DBE25A STORAGE
 166 KM Retention Basin Storage/Outflow rating curve for Basin DBE25A
 167 RS 1 STOR 0
 168 SV 0.01 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.16 0.18
 169 SV 0.21 0.23 0.26 0.29 0.31 0.34 0.37 0.39
 170 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 171 SQ 0.01 0.01 1.12 5.87 13.22 22.40 33.27 41.15
 172 SE 0.10 0.30 0.60 0.90 1.20 1.50 1.80 2.10 2.40 2.70
 173 SE 3.00 3.30 3.60 3.90 4.20 4.50 4.80 5.00
 174 ZW A=SERENO C=FLOW F=CALC
 *

HEC-1 INPUT

PAGE 5

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

175 KK CLEAR COMBINE
 176 KM Clear Hydrograph Stack
 177 HC 5
 178 ZW A=SERENO C=FLOW F=CALC
 *

179 KK SBE24D BASIN
 180 KM SBE254D Basin Runoff
 181 BA 0.010
 182 LG 0.30 0.25 6.00 0.19 6
 183 UC 0.172 0.159

```

187 KK DBE24D STORAGE
188 KM Retention Basin Storage/Outflow rating curve for Basin DBE24D
189 RS 1 STOR 0
190 SV 0.01 0.06 0.13 0.20 0.28 0.36 0.44 0.53 0.63 0.73
191 SV 0.83
192 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 5.94 16.80 30.86
193 SQ 47.52
194 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
195 SE 5.00
196 ZW A=SERENO C=FLOW F=CALC
197
197 KK RE24D ROUTE
198 KM Route runoff from basin SBE24D through Basin SBE24C
199 RS 1 FLOW
200 RC 0.060 0.060 0.060 634 0.0252 2725.50
201 RX 0.00 16.00 24.00 27.00 31.00 34.00 44.00 60.00
202 RY 2725.5 2723.20 2721.80 2721.00 2721.00 2722.00 2723.00 2726.10
203 ZW A=SERENO C=FLOW F=CALC
204
204 KK SBE24C BASIN
205 KM SBE24C Basin Runoff
206 BA 0.015
207 LG 0.28 0.25 6.00 0.19 17
208 UC 0.221 0.259
209 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
210 UA 100
211 ZW A=SERENO C=FLOW F=CALC
212
212 KK CE24C COMBINE
213 KM Combine RE24D and SBE24C
214 HC 2
215 ZW A=SERENO C=FLOW F=CALC

```

1

HEC-1 INPUT

PAGE 6

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

216 KK DBE24C STORAGE
217 KM Retention Basin Storage/Outflow rating curve for Basin DBE24C
218 RS 1 STOR 0
219 SV 0.01 0.08 0.17 0.25 0.35 0.45 0.55 0.66 0.77 0.89
220 SV 1.02 1.15 1.17
221 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.63 10.24 23.43
222 SQ 39.87 59.15 61.38
223 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
224 SE 4.50 5.00 5.00
225 ZW A=SERENO C=FLOW F=CALC
226
226 KK RE24C ROUTE
227 KM Route flow from CE24C through Basin SBE24B
228 RS 1 FLOW
229 RC 0.060 0.060 0.060 624 0.0232 2706.80
230 RX 10.00 25.00 45.00 49.00 55.00 62.00 75.00 103.00
231 RY 2706.8 2705.20 2702.10 2701.00 2701.00 2702.00 2703.30 2706.70
232 ZW A=SERENO C=FLOW F=CALC
233
233 KK SBE24B BASIN
234 KM SBE24B Basin Runoff
235 BA 0.005
236 LG 0.28 0.25 6.00 0.18 15
237 UC 0.182 0.278
238 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
239 UA 100
240 ZW A=SERENO C=FLOW F=CALC
241
241 KK CE24B COMBINE
242 KM Combine RE24C and SBE24B
243 HC 2
244 ZW A=SERENO C=FLOW F=CALC
245
245 KK DBE24B STORAGE
246 KM Retention Basin Storage/Outflow rating curve for Basin DBE24B
247 RS 1 STOR 0
248 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.43 0.51 0.60 0.70
249 SV 0.80 0.91 1.02 1.15 1.20
250 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 1.63 10.24 23.43
251 SQ 39.87 59.15 80.76 73.24 73.24
252 SE 0.10 0.50 0.90 1.40 1.80 2.30 2.70 3.20 3.60 4.10
253 SE 4.50 5.00 5.40 5.90 6.00
254 ZW A=SERENO C=FLOW F=CALC

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255 KK RE24B ROUTE
 256 KM Route flow from CE24B through Basin SBE24A
 257 RS 1 FLOW
 258 RC 0.060 0.060 0.060 873 0.0229 2690.20
 259 RX 0.00 10.00 16.00 23.00 27.00 35.00 49.00 67.00
 260 RY 2689.8 2688.70 2687.90 2687.00 2687.00 2687.90 2688.80 2690.20
 261 ZW A=SERENO C=FLOW F=CALC
 *

262 KK SBE24A BASIN
 263 KM SBE24A Basin Runoff
 264 BA 0.007
 265 LG 0.27 0.25 6.00 0.20 29
 266 UC 0.188 0.260
 267 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 268 UA 100
 269 ZW A=SERENO C=FLOW F=CALC
 *

270 KK CE24A COMBINE
 271 KM Combine RE24B and SBE24A
 272 HC 2
 273 ZW A=SERENO C=FLOW F=CALC
 *

274 KK DBE24A STORAGE
 275 KM Retention Basin Storage/Outflow rating curve for Basin DBE24A
 276 RS 1 STOR 0
 277 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.44 0.52 0.62 0.71
 278 SV 0.82 0.93
 279 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 6.93 19.60
 280 SQ 36.01 55.44
 281 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 282 SE 5.00 5.50
 283 ZW A=SERENO C=FLOW F=CALC
 *

284 KK SBE23D BASIN
 285 KM SBE23D Basin Runoff
 286 BA 0.041
 287 LG 0.28 0.25 6.00 0.19 15
 288 UC 0.294 0.321
 289 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 290 UA 100
 291 ZW A=SERENO C=FLOW F=CALC
 *

292 KK DBE23D STORAGE
 293 KM Retention Basin Storage/Outflow rating curve for Basin DBE23D
 294 RS 1 STOR 0
 295 SV 0.01 0.11 0.22 0.34 0.47 0.61 0.76 0.92 1.10 1.30
 296 SV 1.52 1.75 2.01 2.30 2.61 2.61
 297 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 298 SQ 0.01 0.01 0.01 0.01 15.51 80.61
 HEC-1 INPUT

1

PAGE 8

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 299 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 300 SE 5.00 5.50 6.00 6.50 7.00 8.00
 301 ZW A=SERENO C=FLOW F=CALC
 *

302 KK RE23D ROUTE
 303 KM Route flow from SBE23D through Basin SBE23A
 304 RS 1 FLOW
 305 RC 0.060 0.060 0.060 465 0.0269 2688.30
 306 RX 0.00 14.00 27.00 32.00 40.00 44.00 55.00 68.00
 307 RY 2688.3 2687.30 2685.00 2684.10 2684.00 2685.00 2686.10 2686.70
 308 ZW A=SERENO C=FLOW F=CALC
 *

309 KK SBE23E BASIN
 310 KM SBE23E Basin Runoff
 311 BA 0.005
 312 LG 0.29 0.25 6.00 0.20 19
 313 UC 0.156 0.234
 314 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 315 UA 100
 316 ZW A=SERENO C=FLOW F=CALC
 *

317 KK DBE23E STORAGE
 318 KM Retention Basin Storage/Outflow rating curve for Basin DBE23E
 319 RS 1 STOR 0
 320 SV 0.01 0.04 0.09 0.14 0.19 0.24 0.29 0.35 0.41 0.48
 321 SV 0.55
 322 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.63 3.96 9.07
 323 SQ 15.43

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327      KK  RE23E  ROUTE
328      KM      Route flow from SBE23E through Basin SBE23C
329      RS      2      FLOW
330      RC      0.060  0.060  0.060  1112  0.0261 2720.00
331      RX      0.00  20.00  57.00  64.00  65.00  70.00  90.00 114.00
332      RY      2720.0 2716.50 2712.10 2711.00 2711.00 2713.20 2716.60 2719.90
333      ZW      A=SERENO C=FLOW F=CALC
      *

334      KK  SBE23C  BASIN
335      KM      SBE23C Basin Runoff
336      BA      0.053
337      LG      0.28  0.25  6.00  0.18  13
338      UC      0.296  0.312
339      UA      0  5.0  16.0  30.0  65.0  77.0  84.0  90.0  94.0  97.0
340      UA      100
341      ZW      A=SERENO C=FLOW F=CALC
      *

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HEC-1 INPUT

PAGE 9

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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342      KK  CE23C COMBINE
343      KM      Combine RE23E and SBE23C
344      HC      2
345      ZW      A=SERENO C=FLOW F=CALC
      *

346      KK  DBE23C STORAGE
347      KM      Retention Basin Storage/Outflow rating curve for Basin DBE23C
348      RS      1      STOR      0
349      SV      0.01  0.15  0.31  0.47  0.65  0.84  1.03  1.24  1.46  1.69
350      SV      1.93  2.19  2.46  2.76  3.08
351      SQ      0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
352      SQ      0.01  0.01  27.72  78.40  144.03
353      SE      0.10  0.50  1.00  1.50  2.00  2.50  3.00  3.50  4.00  4.50
354      SE      5.00  5.50  6.00  6.50  7.00
355      ZW      A=SERENO C=FLOW F=CALC
      *

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356      KK  RE23C  ROUTE
357      KM      Route flow from CE23C through SBE23B
358      RS      1      FLOW
359      RC      0.060  0.060  0.060  457  0.0235 2693.90
360      RX      0.00  15.00  28.00  35.00  35.10  45.00  86.00 114.00
361      RY      2693.8 2692.20 2691.00 2690.00 2690.00 2690.90 2692.90 2693.90
362      ZW      A=SERENO C=FLOW F=CALC
      *

```

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363      KK  SBE23B  BASIN
364      KM      SBE23B Basin Runoff
365      BA      0.004
366      LG      0.27  0.25  6.00  0.20  28
367      UC      0.140  0.178
368      UA      0  5.0  16.0  30.0  65.0  77.0  84.0  90.0  94.0  97.0
369      UA      100
370      ZW      A=SERENO C=FLOW F=CALC
      *

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```

371      KK  CE23B COMBINE
372      KM      Combine flow from RE23C and SBE23B
373      HC      2
374      ZW      A=SERENO C=FLOW F=CALC
      *

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375      KK  RE23B  ROUTE
376      KM      Route flow from CE23B into SBE23A to intermediate combine
377      RS      1      FLOW
378      RC      0.060  0.060  0.060  112  0.0267 2685.90
379      RX      0.00  8.00  12.00  14.00  24.00  30.00  32.00  49.00
380      RY      2685.6 2684.80 2684.20 2684.00 2684.00 2684.70 2685.00 2685.90
381      ZW      A=SERENO C=FLOW F=CALC
      *

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382      KK  CE23AI COMBINE
383      KM      Intermediate combine of RE23D and RE23B to route through SBE23A
384      HC      2
385      ZW      A=SERENO C=FLOW F=CALC
      *

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386      KK  RE23BD  ROUTE
387      KM      Route Intermediate combined flow from CE23AI through SBE23A
388      RS      1      FLOW
389      RC      0.060  0.060  0.060  238  0.0242 2685.00

```

393 KK SBE23A BASIN
 394 KM SBE23A Basin Runoff
 395 BA 0.006
 396 LG 0.29 0.25 6.00 0.21 21
 397 UC 0.176 0.206
 398 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 399 UA 100
 400 ZW A=SERENO C=FLOW F=CALC
 *

401 KK CE23A COMBINE
 402 KM Combine flow from SBE23A and RE23BD
 403 HC 2
 404 ZW A=SERENO C=FLOW F=CALC
 *

405 KK DBE23A STORAGE
 406 KM Retention Basin Storage/Outflow rating curve for Basin DBE23A
 407 RS 1 STOR 0
 408 SV 0.01 0.09 0.18 0.28 0.38 0.49 0.61 0.73 0.86 0.99
 409 SV 1.13 1.29 1.45 1.62 1.80 2.00 2.21 2.45
 410 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 411 SQ 0.01 0.01 0.01 0.01 0.01 49.50 140.00 257.20
 412 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 413 SE 5.00 5.50 6.00 6.50 7.00 7.50 8.00 8.50
 414 ZW A=SERENO C=FLOW F=CALC
 *

415 KK CLEAR COMBINE
 416 HC 3
 417 ZW A=SERENO C=FLOW F=CALC
 *

418 KK SBE22A BASIN
 419 KM SBE22A Basin Runoff
 420 BA 0.007
 421 LG 0.30 0.25 6.00 0.22 15
 422 UC 0.175 0.229
 423 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

424 UA 100
 425 ZW A=SERENO C=FLOW F=CALC
 *

426 KK DBE22A STORAGE
 427 KM Retention Basin Storage/Outflow rating curve for Basin DBE22A
 428 RS 1 STOR 0
 429 SV 0.01 0.03 0.07 0.12 0.16 0.21 0.27 0.33 0.39 0.47
 430 SV 0.55 0.63
 431 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 3.96
 432 SQ 11.20 20.58
 433 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 434 SE 5.00 5.50
 435 ZW A=SERENO C=FLOW F=CALC
 *

436 KK SBE21A BASIN
 437 KM SBE21A Basin Runoff
 438 BA 0.001
 439 LG 0.30 0.25 6.00 0.22 15
 440 UC 0.094 0.125
 441 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 442 UA 100
 443 ZW A=SERENO C=FLOW F=CALC
 *

444 KK SBE20A BASIN
 445 KM SBE20A Basin Runoff
 446 BA 0.001
 447 LG 0.30 0.25 6.00 0.22 15
 448 UC 0.084 0.092
 449 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 450 UA 100
 451 ZW A=SERENO C=FLOW F=CALC
 *

452 KK SBE19A BASIN
 453 KM SBE19A Basin Runoff
 454 BA 0.001
 455 LG 0.30 0.25 6.00 0.22 15
 456 UC 0.084 0.093
 457 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 458 UA 100
 459 ZW A=SERENO C=FLOW F=CALC
 *

```

463 LG 0.30 0.25 6.00 0.22 15
464 UC 0.097 0.130
465 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
466 UA 100
467 ZW A=SERENO C=FLOW F=CALC

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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468 KK DBE18A STORAGE
469 KM Retention Basin Storage/Outflow rating curve for Basin DBE18A
470 RS 1 STOR 0
471 SV 0.01 0.01 0.02 0.02 0.03 0.04 0.05 0.06 0.07 0.08
472 SV 0.09 0.10 0.12 0.13 0.14 0.16 0.17
473 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
474 SQ 0.01 0.35 0.99 1.82 2.80 3.91 5.14
475 SE 0.10 0.30 0.50 0.80 1.00 1.30 1.50 1.80 2.00 2.30
476 SE 2.50 2.80 3.00 3.30 3.50 3.80 4.00
477 ZW A=SERENO C=FLOW F=CALC

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478 KK CLEAR COMBINE
479 KM Clear Hydrograph Stack
480 HC 6
481 ZW A=SERENO C=FLOW F=CALC

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```

482 KK SBE17B BASIN
483 KM SBE17B Basin Runoff
484 BA 0.016
485 LG 0.25 0.25 6.00 0.20 30
486 UC 0.182 0.182
487 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
488 UA 100
489 ZW A=SERENO C=FLOW F=CALC

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```

490 KK DBE17B STORAGE
491 KM Retention Basin Storage/Outflow rating curve for Basin DBE17B
492 RS 1 STOR 0
493 SV 0.01 0.08 0.17 0.26 0.35 0.46 0.56 0.68 0.80 0.92
494 SV 1.06 1.20 1.35 1.51 1.68
495 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
496 SQ 0.01 0.01 9.90 28.00 51.44
497 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
498 SE 5.00 5.50 6.00 6.50 7.00
499 ZW A=SERENO C=FLOW F=CALC

```

```

500 KK RE17B ROUTE
501 KM Route flow from SBE17B through SBE 17A
502 RS 2 FLOW
503 RC 0.060 0.060 0.060 1169 0.0265 2740.10
504 RX 0.00 9.00 22.00 33.00 44.00 54.00 62.00 69.00
505 RY 2740.1 2738.60 2737.00 2736.10 2736.00 2737.00 2738.40 2740.10
506 ZW A=SERENO C=FLOW F=CALC

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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507 KK SBE17A BASIN
508 KM SBE17A Basin Runoff
509 BA 0.018
510 LG 0.26 0.25 6.00 0.21 29
511 UC 0.202 0.243
512 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
513 UA 100
514 ZW A=SERENO C=FLOW F=CALC

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```

515 KK CE17A COMBINE
516 KM Combine flow from RE17B and SBE17A
517 HC 2
518 ZW A=SERENO C=FLOW F=CALC

```

```

519 KK DBE17A STORAGE
520 KM Retention Basin Storage/Outflow rating curve for Basin DBE17A
521 RS 1 STOR 0
522 SV 0.01 0.09 0.19 0.29 0.41 0.54 0.68 0.84 1.01 1.19
523 SV 1.39 1.62 1.86 2.13
524 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
525 SQ 0.01 17.82 50.40 92.59
526 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
527 SE 5.00 5.50 6.00 6.50
528 ZW A=SERENO C=FLOW F=CALC

```

531 BA 0.001
 532 LG 0.30 0.25 6.00 0.22 15
 533 UC 0.102 0.159
 534 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 535 UA 100
 536 ZW A=SERENO C=FLOW F=CALC
 *

537 KK SBE13A BASIN
 538 KM SBE13A Basin Runoff
 539 BA 0.003
 540 LG 0.25 0.25 6.00 0.22 30
 541 UC 0.114 0.133
 542 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 543 UA 100
 544 ZW A=SERENO C=FLOW F=CALC
 *

545 KK DBE13A STORAGE
 546 KM Retention Basin Storage/Outflow rating curve for Basin DBE13A
 547 RS 1 STOR 0
 548 SV 0.01 0.02 0.04 0.06 0.08 0.10 0.13 0.16 0.19 0.23
 549 SV 0.27 0.31 0.35
 550 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 551 SQ 1.98 5.60 10.29
 552 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 553 SE 5.00 5.50 6.00
 554 ZW A=SERENO C=FLOW F=CALC
 *

555 KK SBE12A BASIN
 556 KM SBE12A Basin Runoff
 557 BA 0.002
 558 LG 0.23 0.25 6.00 0.21 40
 559 UC 0.106 0.140
 560 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 561 UA 100
 562 ZW A=SERENO C=FLOW F=CALC
 *

563 KK DBE12A STORAGE
 564 KM Retention Basin Storage/Outflow rating curve for Basin DBE12A
 565 RS 1 STOR 0
 566 SV 0.01 0.02 0.03 0.05 0.07 0.09 0.10 0.12 0.14 0.17
 567 SV 0.19 0.21 0.24 0.26 0.28
 568 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 569 SQ 0.96 2.84 5.29 8.22 10.29
 570 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
 571 SE 3.30 3.60 4.00 4.30 4.50
 572 ZW A=SERENO C=FLOW F=CALC
 *

573 KK SBE11B BASIN
 574 KM SBE11B Basin Runoff
 575 BA 0.013
 576 LG 0.25 0.25 6.00 0.22 30
 577 UC 0.179 0.202
 578 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 579 UA 100
 580 ZW A=SERENO C=FLOW F=CALC
 *

581 KK DBE11B STORAGE
 582 KM Retention Basin Storage/Outflow rating curve for Basin DBE11B
 583 RS 1 STOR 0
 584 SV 0.01 0.06 0.13 0.20 0.27 0.35 0.43 0.51 0.61 0.70
 585 SV 0.80 0.91 1.02 1.14 1.28
 586 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 587 SQ 0.01 0.01 7.92 22.40 41.15
 588 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 589 SE 5.00 5.50 6.00 6.50 7.00
 590 ZW A=SERENO C=FLOW F=CALC
 *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 591 KK RE11B ROUTE
 592 KM Route flow from SBE11B through SBE11A
 593 RS 1 FLOW
 594 RC 0.060 0.060 0.060 914 0.0314 2770.20
 595 RX 0.00 10.00 16.00 23.00 25.00 34.00 48.00 64.00
 596 RY 2770.2 2767.10 2765.30 2762.00 2762.00 2765.00 2766.60 2768.30
 597 ZW A=SERENO C=FLOW F=CALC
 *

601 LG 0.24 0.25 6.00 0.21 35
 602 UC 0.198 0.233
 603 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 604 UA 100
 605 ZW A=SERENO C=FLOW F=CALC
 *

606 KK CELIA COMBINE
 607 KM Combine flow from RE11B and SBE11A
 608 HC 2
 609 ZW A=SERENO C=FLOW F=CALC
 *

610 KK DBE11A STORAGE
 611 KM Retention Basin Storage/Outflow rating curve for Basin DBE11A
 612 RS 1 STOR 0
 613 SV 0.01 0.07 0.15 0.23 0.31 0.40 0.50 0.60 0.70 0.82
 614 SV 0.94 1.08 1.23 1.39 1.57 1.77
 615 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 616 SQ 0.01 0.01 0.01 15.84 44.80 82.30
 617 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 618 SE 5.00 5.50 6.00 6.50 7.00 7.50
 619 ZW A=SERENO C=FLOW F=CALC
 *

620 KK CLEAR COMBINE
 621 KM Clear Hydrograph Stack
 622 HC 6
 623 ZW A=SERENO C=FLOW F=CALC
 *

624 KK SBE10A BASIN
 625 KM SBE10A Basin Runoff
 626 BA 0.001
 627 LG 0.25 0.25 6.00 0.22 30
 628 UC 0.086 0.114
 629 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 630 UA 100
 631 ZW A=SERENO C=FLOW F=CALC
 *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

632 KK SBE09A BASIN
 633 KM SBE09A Basin Runoff
 634 BA 0.002
 635 LG 0.25 0.25 6.00 0.22 30
 636 UC 0.084 0.074
 637 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 638 UA 100
 639 ZW A=SERENO C=FLOW F=CALC
 *

640 KK SBE08A BASIN
 641 KM SBE08A Basin Runoff
 642 BA 0.001
 643 LG 0.25 0.25 6.00 0.22 30
 644 UC 0.088 0.117
 645 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 646 UA 100
 647 ZW A=SERENO C=FLOW F=CALC
 *

648 KK CLEAR COMBINE
 649 KM Clear Hydrograph Stack
 650 HC 4
 651 ZW A=SERENO C=FLOW F=CALC
 *

652 KK SBE06D BASIN
 653 KM SBE06D Basin Runoff
 654 BA 0.010
 655 LG 0.25 0.25 6.00 0.22 29
 656 UC 0.170 0.205
 657 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 658 UA 100
 659 ZW A=SERENO C=FLOW F=CALC
 *

660 KK DBE06D STORAGE
 661 KM Retention Basin Storage/Outflow rating curve for Basin DBE06D
 662 RS 1 STOR 0
 663 SV 0.01 0.05 0.10 0.15 0.20 0.26 0.33 0.39 0.46 0.53
 664 SV 0.61 0.69 0.78 0.87 0.97
 665 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 666 SQ 0.01 0.01 6.93 19.60 36.01
 667 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 668 SE 5.00 5.50 6.00 6.50 7.00
 669 ZW A=SERENO C=FLOW F=CALC

671 KM Route flow from SBE06D through Basin SBE06B
 672 RS 1 FLOW
 673 RC 0.060 0.060 0.060 677 0.0369 2785.90
 674 RX 0.00 15.00 27.00 34.00 41.00 45.00 52.00 59.00
 675 RY 2785.8 2784.00 2783.00 2782.00 2782.00 2782.70 2784.20 2785.90
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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

676 ZW A=SERENO C=FLOW F=CALC
 *

677 KK SBE06C BASIN
 678 KM SBE06C Basin Runoff
 679 BA 0.016
 680 LG 0.17 0.25 6.00 0.25 31
 681 UC 0.257 0.312
 682 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 683 UA 100
 684 ZW A=SERENO C=FLOW F=CALC
 *

685 KK DBE06C STORAGE
 686 KM Retention Basin Storage/Outflow rating curve for Basin DBE06C
 687 RS 1 STOR 0
 688 SV 0.01 0.08 0.17 0.26 0.35 0.45 0.56 0.67 0.79 0.92
 689 SV 1.05 1.19 1.34
 690 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 691 SQ 7.92 22.40 41.15
 692 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 693 SE 5.00 5.50 6.00
 694 ZW A=SERENO C=FLOW F=CALC
 *

695 KK RE06C ROUTE
 696 KM Route flow from SBE06C through Basin SBE06B
 697 RS 1 FLOW
 698 RC 0.060 0.060 0.060 591 0.0431 2786.60
 699 RX 0.00 6.00 16.00 26.00 36.00 40.00 41.00 44.00
 700 RY 2786.6 2786.00 2785.00 2784.00 2784.00 2785.00 2785.50 2786.40
 701 ZW A=SERENO C=FLOW F=CALC
 *

702 KK SBE06B BASIN
 703 KM SBE06B Basin Runoff
 704 BA 0.008
 705 LG 0.23 0.25 6.00 0.22 35
 706 UC 0.142 0.138
 707 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 708 UA 100
 709 ZW A=SERENO C=FLOW F=CALC
 *

710 KK CE06B COMBINE
 711 KM Combine RE06D, RE06C and SBE06B
 712 HC 3
 713 ZW A=SERENO C=FLOW F=CALC
 *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

714 KK RE06B ROUTE
 715 KM Route flow from CE06B through Basin SBE06A
 716 RS 1 FLOW
 717 RC 0.060 0.060 0.060 814 0.0319 2761.00
 718 RX 0.00 21.00 55.00 63.00 82.00 92.00 104.00 113.00
 719 RY 2761.0 2758.90 2758.50 2758.00 2758.00 2758.50 2759.70 2760.80
 720 ZW A=SERENO C=FLOW F=CALC
 *

721 KK SBE06A BASIN
 722 KM SBE06A Basin Runoff
 723 BA 0.014
 724 LG 0.21 0.25 6.00 0.23 45
 725 UC 0.204 0.290
 726 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 727 UA 100
 728 ZW A=SERENO C=FLOW F=CALC
 *

729 KK CE06A COMBINE
 730 KM Combine flow from RE06B and Basin SBE 06A
 731 HC 2
 732 ZW A=SERENO C=FLOW F=CALC
 *

733 KK SBE05B BASIN
 734 KM SBE05B Basin Runoff
 735 BA 0.022

```

739      UA      100
740      ZW      A=SERENO C=FLOW F=CALC
      *

741      KK      DBE05B STORAGE
742      KM      Retention Basin Storage/Outflow rating curve for Basin DBE05B
743      RS      1      STOR      0
744      SV      0.01  0.06  0.13  0.20  0.27  0.35  0.43  0.52  0.61  0.71
745      SV      0.81  0.92  1.03  1.16  1.29
746      SQ      0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
747      SQ      0.01  0.01  5.94  16.80  30.86
748      SE      0.10  0.50  1.00  1.50  2.00  2.50  3.00  3.50  4.00  4.50
749      SE      5.00  5.50  6.00  6.50  7.00
750      ZW      A=SERENO C=FLOW F=CALC
      *

751      KK      RE05B  ROUTE
752      KM      Route flow from SBE05B through SBE05A
753      RS      1      FLOW
754      RC      0.060  0.060  0.060  907  0.0435  2760.30
755      RX      0.00  11.00  26.00  40.00  47.00  56.00  76.00  89.00
756      RY      2760.1  2759.00  2757.70  2757.00  2757.00  2757.40  2758.80  2760.30
757      ZW      A=SERENO C=FLOW F=CALC
      *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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758      KK      SBE05A  BASIN
759      KM      SBE05A Basin Runoff
760      BA      0.007
761      LG      0.24  0.25  6.00  0.22  32
762      UC      0.172  0.245
763      UA      0      5.0  16.0  30.0  65.0  77.0  84.0  90.0  94.0  97.0
764      UA      100
765      ZW      A=SERENO C=FLOW F=CALC
      *

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766      KK      CE05A COMBINE
767      KM      Combine flow from RE05B and SBE05A
768      HC      2
769      ZW      A=SERENO C=FLOW F=CALC
      *

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770      KK      CE06A COMBINE
771      KM      Combine flow from CE06A and CE05A
772      HC      2
773      ZW      A=SERENO C=FLOW F=CALC
      *

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```

774      KK      DBE06A STORAGE
775      KM      Retention Basin Storage/Outflow rating curve for Basin DBE06A
776      RS      1      STOR      0
777      SV      0.01  0.13  0.27  0.41  0.56  0.72  0.89  1.07  1.26  1.46
778      SV      1.68  1.90  2.14  2.39  2.65  2.95  3.27
779      SQ      0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
780      SQ      0.01  0.01  0.01  0.01  29.70  84.00  154.32
781      SE      0.10  0.50  1.00  1.50  2.00  2.50  3.00  3.50  4.00  4.50
782      SE      5.00  5.50  6.00  6.50  7.00  7.50  8.00
783      ZW      A=SERENO C=FLOW F=CALC
      *

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784      KK      SBE04C  BASIN
785      KM      SBE04C Basin Runoff
786      BA      0.014
787      LG      0.11  0.25  6.00  0.27  45
788      UC      0.302  0.526
789      UA      0      5.0  16.0  30.0  65.0  77.0  84.0  90.0  94.0  97.0
790      UA      100
791      ZW      A=SERENO C=FLOW F=CALC
      *

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792      KK      DBE04C STORAGE
793      KM      Retention Basin Storage/Outflow rating curve for Basin DBE04C
794      RS      1      STOR      0
795      SV      0.01  0.07  0.14  0.21  0.29  0.37  0.46  0.55  0.65  0.75
796      SV      0.86  0.98  1.10  1.23  1.37
797      SQ      0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
798      SQ      0.01  0.01  4.95  14.00  25.72
799      SE      0.10  0.50  1.00  1.50  2.00  2.50  3.00  3.50  4.00  4.50
800      SE      5.00  5.50  6.00  6.50  7.00
801      ZW      A=SERENO C=FLOW F=CALC
      *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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802      KK      RE04C  ROUTE
803      KM      Route flow from SBE04C into SBE04A

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807 RY 2755.0 2753.00 2751.90 2750.00 2750.00 2751.90 2753.20 2754.90
808 ZW A=SERENO C=FLOW F=CALC
*

809 KK SBE04B BASIN
810 KM SBE04B Basin Runoff
811 BA 0.015
812 LG 0.11 0.25 6.00 0.27 50
813 UC 0.285 0.464
814 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
815 UA 100
816 ZW A=SERENO C=FLOW F=CALC
*

817 KK DBE04B STORAGE
818 KM Retention Basin Storage/Outflow rating curve for Basin DBE04B
819 RS 1 STOR 0
820 SV 0.01 0.07 0.14 0.21 0.29 0.37 0.46 0.55 0.65 0.75
821 SV 0.86 0.97 1.10 1.23
822 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
823 SQ 0.01 5.94 16.80 30.86
824 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
825 SE 5.00 5.50 6.00 6.50
826 ZW A=SERENO C=FLOW F=CALC
*

827 KK RE04B ROUTE
828 KM Route flow from SBE04B into SBE04A
829 RS 1 FLOW
830 RC 0.060 0.060 0.060 449 0.0367 2755.00
831 RX 0.00 15.00 24.00 28.00 30.00 33.00 46.00 62.00
832 RY 2754.9 2752.60 2750.80 2750.00 2750.00 2751.00 2752.90 2755.00
833 ZW A=SERENO C=FLOW F=CALC
*

834 KK CE04AI COMBINE
835 KM Intermediate Combine flows from RE04C and RE04B
836 HC 2
837 ZW A=SERENO C=FLOW F=CALC
*

838 KK RE04CB ROUTE
839 KM Route flow from CE04AI through rest of Basin SBE04A
840 RS 1 FLOW
841 RC 0.060 0.060 0.060 247 0.0344 2744.90
842 RX 0.00 11.00 21.00 31.00 34.00 50.00 69.00 88.00
843 RY 2744.9 2742.70 2741.40 2740.00 2740.00 2741.80 2743.00 2743.90
844 ZW A=SERENO C=FLOW F=CALC
*

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

845 KK SBE04A BASIN
846 KM SBE04A Basin Runoff
847 BA 0.006
848 LG 0.25 0.25 6.00 0.22 30
849 UC 0.149 0.181
850 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
851 UA 100
852 ZW A=SERENO C=FLOW F=CALC
*

853 KK CE04A COMBINE
854 KM Combine Flows from RE04CB and SBE04A
855 HC 2
856 ZW A=SERENO C=FLOW F=CALC
*

857 KK DBE04A STORAGE
858 KM Retention Basin Storage/Outflow rating curve for Basin DBE04A
859 RS 1 STOR 0
860 SV 0.01 0.09 0.18 0.27 0.37 0.48 0.59 0.71 0.84 0.97
861 SV 1.11 1.26 1.42 1.60
862 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
863 SQ 0.01 11.88 33.60 61.73
864 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
865 SE 5.00 5.50 6.00 6.50
866 ZW A=SERENO C=FLOW F=CALC
*

867 KK SBE03A BASIN
868 KM SBE03A Basin Runoff
869 BA 0.007
870 LG 0.22 0.25 6.00 0.23 40
871 UC 0.145 0.170
872 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
873 UA 100
874 ZW A=SERENO C=FLOW F=CALC
*

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877	RS	1	STOR	0							
878	SV	0.01	0.03	0.06	0.09	0.12	0.16	0.21	0.25	0.30	0.36
879	SV	0.42	0.49	0.56	0.64	0.73	0.83				
880	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
881	SQ	0.01	0.01	0.01	3.96	11.20	20.58				
882	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
883	SE	5.00	5.50	6.00	6.50	7.00	7.50				
884	ZW	A=SERENO	C=FLOW	F=CALC							

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[illegible]

885	KK	SBE02A	BASIN									
886	KM	SBE02A Basin Runoff										
887	BA	0.068										
888	LG	0.10	0.25	6.00	0.28	11						
889	UC	0.625	0.910									
890	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
891	UA	100										
892	ZW	A=SERENO C=FLOW F=CALC										

893	KK	DBE02A STORAGE									
894	KM	Retention Basin Storage/Outflow rating curve for Basin DBE02A									
895	RS	1	STOR 0								
896	SV	0.01	0.12	0.25	0.39	0.55	0.71	0.89	1.07	1.28	1.50
897	SV	1.74	2.00	2.29	2.29						
898	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	3.96
899	SQ	11.20	20.58	31.68	52.00						
900	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
901	SE	5.00	5.50	6.00	7.00						
902	ZW	A=SERENO C=FLOW F=CALC									

903	KK	SBE01B	BASIN									
904	KM	,SBE01B Basin Runoff										
905	BA	0.024										
906	LG	0.10	0.23	6.20	0.26	25						
907	UC	0.318	0.259									
908	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
909	UA	100										
910	ZW	A=SERENO C=FLOW F=CALC										

[illegible]

918	KK	SBE01A	BASIN									
919	KM	SBE01A Basin Runoff										
920	BA	0.119										
921	LG	0.10	0.25	6.00	0.28	3						
922	UC	0.697	0.814									
923	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
924	UA	100										
925	ZW	A=SERENO C=FLOW F=CALC										

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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926      KK      CE01A COMBINE
927      HC      2
928      ZW      A=SERENO C=FLOW F=CALC

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929	KK	DBE01A STORAGE									
930	KM	Retention Basin Storage/Outflow rating curve for Basin DBE01A									
931	RS	1	STOR	0							
932	SV	0.01	0.03	0.06	0.09	0.12	0.15	0.19	0.23	0.27	0.31
933	SV	0.36	0.41	0.46	0.47						
934	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	7.84	36.53
935	SQ	80.60	135.15	197.88	205.76						
936	SE	0.10	0.30	0.70	1.00	1.30	1.70	2.00	2.30	2.60	3.00
937	SE	3.30	3.60	4.00	4.00						
938	ZW	A=SERENO C=FLOW F=CALC									

939 KK CLEAR COMBINE
940 KM Clear Hydrograph
941 HC 6
942 ZW A=SERENO C=FLOW F=CALC

945 BA 0.009
 946 LG 0.28 0.25 6.00 0.20 4
 947 UC 0.167 0.137
 948 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 949 UA 100
 950 ZW A=SERENO C=FLOW F=CALC
 *

951 KK DBW14A STORAGE
 952 KM Retention Basin Storage/Outflow rating curve for Basin DBW14A
 953 RS 1 STOR 0
 954 SV 0.01 0.04 0.07 0.11 0.15 0.19 0.23 0.28 0.32 0.37
 955 SV 0.42 0.47 0.52 0.58 0.63 0.70
 956 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.84
 957 SQ 2.97 6.04 9.74 13.95 18.64 23.76
 958 SE 0.10 0.30 0.60 0.90 1.20 1.50 1.80 2.10 2.40 2.70
 959 SE 3.00 3.30 3.60 3.90 4.20 4.50
 960 ZW A=SERENO C=FLOW F=CALC
 *

961 KK SBW13A BASIN
 962 KM SBW13A Basin Runoff
 963 BA 0.001
 964 LG 0.30 0.25 6.00 0.18 5
 965 UC 0.084 0.092
 966 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 967 UA 100
 968 ZW A=SERENO C=FLOW F=CALC
 *

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

969 KK SBW12A BASIN
 970 KM SBW12A Basin Runoff
 971 BA 0.017
 972 LG 0.29 0.25 6.00 0.19 13
 973 UC 0.172 0.141
 974 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 975 UA 100
 976 ZW A=SERENO C=FLOW F=CALC
 *

977 KK DBW12A STORAGE
 978 KM Retention Basin Storage/Outflow rating curve for Basin DBW12A
 979 RS 1 STOR 0
 980 SV 0.01 0.08 0.16 0.24 0.33 0.43 0.53 0.64 0.75 0.87
 981 SV 0.99 1.13 1.27 1.43
 982 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
 983 SQ 5.94 16.80 30.86 47.52
 984 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
 985 SE 5.00 5.50 6.00 6.50
 986 ZW A=SERENO C=FLOW F=CALC
 *

987 KK SBW11A BASIN
 988 KM SBW11A Basin Runoff
 989 BA 0.001
 990 LG 0.30 0.25 6.00 0.18 5
 991 UC 0.072 0.062
 992 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 993 UA 100
 994 ZW A=SERENO C=FLOW F=CALC
 *

995 KK CLEAR COMBINE
 996 KM Clear Hydrograph Stack
 997 HC 5
 998 ZW A=SERENO C=FLOW F=CALC
 *

999 KK SBW10C BASIN
 1000 KM SBW10C Basin Runoff
 1001 BA 0.015
 1002 LG 0.25 0.25 6.00 0.22 30
 1003 UC 0.170 0.163
 1004 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
 1005 UA 100
 1006 ZW A=SERENO C=FLOW F=CALC
 *

1007 KK DBW10C STORAGE
 1008 KM Retention Basin Storage/Outflow rating curve for Basin DBW10C
 1009 RS 1 STOR 0
 1010 SV 0.01 0.06 0.12 0.18 0.26 0.34 0.43 0.52 0.63 0.75
 1011 SV 0.87 1.01 1.16 1.33 1.52 1.72 1.94
 1012 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1015	SE	5.00	5.50	6.00	6.50	7.00	7.50	8.00				
1016	ZW	A=SERENO C=FLOW F=CALC										
	*											
1017	KK	RW10C ROUTE										
1018	KM	Route flow from SBW10C through Basin SBW10B										
1019	RS	2	FLOW									
1020	RC	0.060	0.060	0.060	952	0.0310	2757.80					
1021	RX	0.00	34.00	47.00	62.00	62.10	68.00	73.00	78.00			
1022	RY	2757.8	2754.40	2754.00	2752.10	2752.00	2753.70	2755.70	2757.50			
1023	ZW	A=SERENO C=FLOW F=CALC										
	*											
1024	KK	SBW10B BASIN										
1025	KM	SBW10B Basin Runoff										
1026	BA	0.012										
1027	LG	0.25	0.25	6.00	0.20	33						
1028	UC	0.188	0.237									
1029	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
1030	UA	100										
1031	ZW	A=SERENO C=FLOW F=CALC										
	*											
1032	KK	CW10B COMBINE										
1033	KM	Combine flow from RW10C and SBW10B										
1034	HC	2										
1035	ZW	A=SERENO C=FLOW F=CALC										
	*											
1036	KK	DBW10B STORAGE										
1037	KM	Retention Basin Storage/Outflow rating curve for Basin DBW10B										
1038	RS	1	STOR									
1039	SV	0.01	0.06	0.13	0.20	0.27	0.35	0.44	0.53	0.62	0.73	
1040	SV	0.84	0.95	1.08	1.22	1.30						
1041	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
1042	SQ	0.01	0.01	0.01	2.27	12.37						
1043	SE	0.10	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	
1044	SE	6.00	6.60	7.20	7.80	8.20						
1045	ZW	A=SERENO C=FLOW F=CALC										
	*											
1046	KK	RW10B ROUTE										
1047	KM	Route flow from CE10WB through Basin SBW10A										
1048	RS	1	FLOW									
1049	RC	0.060	0.060	0.060	653	0.0276	2732.00					
1050	RX	0.00	68.00	75.00	79.00	86.00	92.00	106.00	150.00			
1051	RY	2732.0	2728.10	2721.10	2726.10	2726.60	2727.00	2732.00				
1052	ZW	A=SERENO C=FLOW F=CALC										
	*											
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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10											
1053	KK	SBW10A BASIN										
1054	KM	SBW10A Basin Runoff										
1055	BA	0.033										
1056	LG	0.26	0.25	6.00	0.19	27						
1057	UC	0.220	0.203									
1058	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
1059	UA	100										
1060	ZW	A=SERENO C=FLOW F=CALC										
	*											
1061	KK	CW10A COMBINE										
1062	KM	Combine flow from RW10B and SBW10A										
1063	HC	2										
1064	ZW	A=SERENO C=FLOW F=CALC										
	*											
1065	KK	DBW10A STORAGE										
1066	KM	Retention Basin Storage/Outflow rating curve for Basin DBW10A										
1067	RS	1	STOR									
1068	SV	0.01	0.20	0.41	0.63	0.87	1.12	1.40	1.69	2.00	2.33	
1069	SV	2.68	3.07	3.50	3.98	4.15						
1070	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	14.68	
1071	SQ	56.00	113.58	182.88	189.00	189.00						
1072	SE	0.10	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	
1073	SE	6.00	6.60	7.20	7.80	8.00						
1074	ZW	A=SERENO C=FLOW F=CALC										
	*											
1075	KK	SBW09E BASIN										
1076	KM	SBW09E Basin Runoff										
1077	BA	0.006										
1078	LG	0.15	0.25	6.00	0.26	11						
1079	UC	0.293	0.463									
1080	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0	
1081	UA	100										
1082	ZW	A=SERENO C=FLOW F=CALC										
	*											

1085	RS	1	STOR	0							
1086	SV	0.01	0.02	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.18
1087	SV	0.20	0.23	0.26	0.29	0.31					
1088	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1089	SQ	1.43	4.26	7.93	12.33	15.43					
1090	SE	0.10	0.30	0.70	1.00	1.30	1.70	2.00	2.30	2.60	3.00
1091	SE	3.30	3.60	4.00	4.30	4.50					
1092	ZW	A=SERENO C=FLOW F=CALC									

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LINE	ID	1	2	3	4	5	6	7	8	9	10
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1093	KK	RW09E ROUTE									
1094	KM	Route flow from SBW09E through Basin SBW09D									
1095	RS	1	FLOW								
1096	RC	0.060	0.060	0.060	985	0.0442	2805.10				
1097	RK	0.00	10.00	12.00	14.00	17.00	23.00	29.00	48.00		
1098	RY	2805.3	2803.10	2802.10	2800.70	2800.70	2802.00	2802.90	2805.10		
1099	ZW	A=SERENO C=FLOW F=CALC									

1100	KK	SBW09D BASIN									
1101	KM	SBW09D Basin Runoff									
1102	BA	0.008									
1103	LG	0.24	0.25	6.00	0.21	34					
1104	UC	0.161	0.202								
1105	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1106	UA	100									
1107	ZW	A=SERENO C=FLOW F=CALC									

1108	KK	CW09DI COMBINE									
1109	HC	2									
1110	ZW	A=SERENO C=FLOW F=CALC									

1111	KK	SBW09C BASIN									
1112	KM	SBW09C Basin Runoff									
1113	BA	0.044									
1114	LG	0.15	0.25	6.00	0.26	11					
1115	UC	0.463	0.562								
1116	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1117	UA	100									
1118	ZW	A=SERENO C=FLOW F=CALC									

1119	KK	CW09D COMBINE									
1120	KM	Combine flow from CW09DI and SBW09C									
1121	HC	2									
1122	ZW	A=SERENO C=FLOW F=CALC									

1123	KK	DBW09C STORAGE									
1124	KM	Retention Basin Storage/Outflow rating curve for Basin DBW09C									
1125	RS	1	STOR 0								
1126	SV	0.01	0.21	0.43	0.66	0.90	1.16	1.44	1.73	2.05	2.41
1127	SV	2.79									
1128	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	19.80	56.00
1129	SQ	102.88									
1130	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
1131	SE	5.00									
1132	ZW	A=SERENO C=FLOW F=CALC									

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LINE	ID	1	2	3	4	5	6	7	8	9	10
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1133	KK	RW09D ROUTE									
1134	KM	Route flow from CW09D through Basin SBW09B									
1135	RS	1	FLOW								
1136	RC	0.060	0.060	0.060	367	0.0368	2782.10				
1137	RK	0.00	11.00	27.00	31.00	38.00	42.00	73.00	90.00		
1138	RY	2782.1	2780.10	2780.00	2779.00	2779.00	2779.50	2780.90	2781.30		
1139	ZW	A=SERENO C=FLOW F=CALC									

1140	KK	SBW09B BASIN									
1141	KM	SBW09B Basin Runoff									
1142	BA	0.005									
1143	LG	0.27	0.25	6.00	0.20	29					
1144	UC	0.125	0.129								
1145	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1146	UA	100									
1147	ZW	A=SERENO C=FLOW F=CALC									

1148	KK	CW09B COMBINE									
1149	KM	Combine flow from RW09D and SBW09B									


```

1152 KK DBW09B STORAGE
1153 KM Retention Basin Storage/Outflow rating curve for Basin DBW09B
1154 RS 1 STOR 0
1155 SV 0.01 0.05 0.10 0.15 0.21 0.27 0.34 0.40 0.48 0.55
1156 SV 0.63 0.72
1157 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 20.79
1158 SQ 58.80 108.02
1159 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1160 SE 5.00 5.50
1161 ZW A=SERENO C=FLOW F=CALC

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1162 KK RW09B ROUTE
1163 KM Route flow from CW09B through Basin SBW09A
1164 RS 1 FLOW
1165 RC 0.060 0.060 0.060 1036 0.0415 2765.60
1166 RX 0.00 8.00 49.00 58.00 67.00 72.00 85.00 104.00
1167 RY 2764.9 2764.80 2764.00 2763.00 2763.00 2764.00 2765.10 2765.60
1168 ZW A=SERENO C=FLOW F=CALC

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1169 KK SBW09A BASIN
1170 KM SBW09A Basin Runoff
1171 BA 0.008
1172 LG 0.27 0.25 6.00 0.20 24
1173 UC 0.185 0.266
1174 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1175 UA 100
1176 ZW A=SERENO C=FLOW F=CALC

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PAGE 29

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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1177 KK CW09A COMBINE
1178 KM Combine flow from RW09B and SBW09A
1179 HC 2
1180 ZW A=SERENO C=FLOW F=CALC

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1181 KK DBW09A STORAGE
1182 KM Retention Basin Storage/Outflow rating curve for Basin DBW09A
1183 RS 1 STOR 0
1184 SV 0.01 0.04 0.08 0.12 0.17 0.21 0.26 0.32 0.37 0.43
1185 SV 0.50 0.57 0.64
1186 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1187 SQ 22.77 64.40 118.31
1188 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1189 SE 5.00 5.50 6.00
1190 ZW A=SERENO C=FLOW F=CALC

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1191 KK SBW08A BASIN
1192 KM SBW08A Basin Runoff
1193 BA 0.009
1194 LG 0.27 0.25 6.00 0.18 21
1195 UC 0.150 0.160
1196 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1197 UA 100
1198 ZW A=SERENO C=FLOW F=CALC

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1199 KK DBW08A STORAGE
1200 KM Retention Basin Storage/Outflow rating curve for Basin DBW08A
1201 RS 1 STOR 0
1202 SV 0.01 0.04 0.09 0.14 0.18 0.24 0.29 0.34 0.40 0.46
1203 SV 0.52 0.58 0.65 0.71 0.79 0.86 0.87
1204 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1205 SQ 0.01 1.09 5.33 11.85 20.01 29.39 30.86
1206 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1207 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1208 ZW A=SERENO C=FLOW F=CALC

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1209 KK SBW07C BASIN
1210 KM SBW07C Basin Runoff
1211 BA 0.005
1212 LG 0.21 0.25 6.00 0.23 3
1213 UC 0.248 0.372
1214 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1215 UA 100
1216 ZW A=SERENO C=FLOW F=CALC

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

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1217 KK DBW07C STORAGE

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1221 SV 0.12 0.14 0.16 0.18 0.20 0.22 0.22
1222 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1223 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
1224 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1225 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1226 ZW A=SERENO C=FLOW F=CALC
*

1227 KK SBW07B BASIN
1228 KM SBW07B Basin Runoff
1229 BA 0.007
1230 LG 0.17 0.25 6.00 0.25 6
1231 UC 0.306 0.501
1232 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1233 UA 100
1234 ZW A=SERENO C=FLOW F=CALC
*

1235 KK DBW07B STORAGE
1236 KM Retention Basin Storage/Outflow rating curve for Basin DBW07B
1237 RS 1 STOR 0
1238 SV 0.01 0.01 0.03 0.04 0.05 0.07 0.09 0.10 0.12 0.14
1239 SV 0.17 0.19 0.21 0.24 0.27 0.29 0.30
1240 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
1241 SQ 0.01 0.55 2.66 5.93 10.00 14.69 15.43
1242 SE 0.10 0.30 0.70 1.00 1.30 1.70 2.00 2.30 2.60 3.00
1243 SE 3.30 3.60 4.00 4.30 4.60 5.00 5.00
1244 ZW A=SERENO C=FLOW F=CALC
*

1245 KK CW07BC COMBINE
1246 KM Combine flow from SBW07C and SBW07B
1247 HC 2
1248 ZW A=SERENO C=FLOW F=CALC
*

1249 KK RW07BC ROUTE
1250 KM Route flow from CW07BC through SBW07A
1251 RS 1 FLOW
1252 RC 0.060 0.060 0.060 1452 0.0465 2800.10
1253 RX 0.00 6.00 20.00 26.00 29.00 38.00 50.00 68.00
1254 RY 2800.1 2799.00 2796.00 2793.00 2793.00 2796.00 2797.00 2798.40
1255 ZW A=SERENO C=FLOW F=CALC
*

1256 KK SBW07A BASIN
1257 KM SBW07A Basin Runoff
1258 BA 0.013
1259 LG 0.28 0.25 6.00 0.20 22
1260 UC 0.207 0.293
1261 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1262 UA 100
1263 ZW A=SERENO C=FLOW F=CALC
*

1264 KK CW07A COMBINE
1265 KM Combine flow from RW07BC and SBW07A
1266 HC 2
1267 ZW A=SERENO C=FLOW F=CALC
*

1268 KK DBW07A STORAGE
1269 KM Retention Basin Storage/Outflow rating curve for Basin DBW07A
1270 RS 1 STOR 0
1271 SV 0.01 0.09 0.18 0.28 0.39 0.50 0.62 0.74 0.88 1.01
1272 SV 1.16 1.32
1273 SQ 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 10.89
1274 SQ 30.80 56.58
1275 SE 0.10 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
1276 SE 5.00 5.50
1277 ZW A=SERENO C=FLOW F=CALC
*

1278 KK CLEAR COMBINE
1279 HC 5
1280 ZW A=SERENO C=FLOW F=CALC
*

1281 KK SBW06A BASIN
1282 KM SBW06A Basin Runoff
1283 BA 0.004
1284 LG 0.29 0.25 6.00 0.18 11
1285 UC 0.136 0.173
1286 UA 0 5.0 16.0 30.0 65.0 77.0 84.0 90.0 94.0 97.0
1287 UA 100
1288 ZW A=SERENO C=FLOW F=CALC
*

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1291	RS	1	STOR	0							
1292	SV	0.01	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.16	0.19
1293	SV	0.21	0.24	0.28	0.31	0.34	0.38	0.39			
1294	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1295	SQ	0.01	0.55	2.66	5.93	10.00	14.69	15.43			
1296	SE	0.10	0.30	0.70	1.00	1.30	1.70	2.00	2.30	2.60	3.00
1297	SE	3.30	3.60	4.00	4.30	4.60	5.00	5.00			
1298	ZW	A=SERENO C=FLOW F=CALC									
	*										

1

HEC-1 INPUT

PAGE 32

LINE	ID	1	2	3	4	5	6	7	8	9	10
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1299	KK	SBW05A	BASIN								
1300	KM	SBW05A Basin Runoff									
1301	BA	0.010									
1302	LG	0.29	0.25	6.00	0.19	11					
1303	UC	0.172	0.200								
1304	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1305	UA	100									
1306	ZW	A=SERENO C=FLOW F=CALC									
	*										

1307	KK	DBW05A	STORAGE								
1308	KM	Retention Basin Storage/Outflow rating curve for Basin DBW05A									
1309	RS	1	STOR	0							
1310	SV	0.01	0.05	0.09	0.15	0.20	0.26	0.32	0.38	0.45	0.52
1311	SV	0.59	0.67	0.76							
1312	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1313	SQ	5.94	16.80	30.86							
1314	SE	0.10	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
1315	SE	5.00	5.50	6.00							
1316	ZW	A=SERENO C=FLOW F=CALC									
	*										

1317	KK	SBW04A	BASIN								
1318	KM	SBW04A Basin Runoff									
1319	BA	0.002									
1320	LG	0.30	0.25	6.00	0.18	5					
1321	UC	0.108	0.128								
1322	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1323	UA	100									
1324	ZW	A=SERENO C=FLOW F=CALC									
	*										

1325	KK	SBW02A	BASIN								
1326	KM	SBW02A Basin Runoff									
1327	BA	0.007									
1328	LG	0.18	0.25	6.00	0.24	2					
1329	UC	0.281	0.387								
1330	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1331	UA	100									
1332	ZW	A=SERENO C=FLOW F=CALC									
	*										

1333	KK	DBW02A	STORAGE								
1334	KM	Retention Basin Storage/Outflow rating curve for Basin DBW02A									
1335	RS	1	STOR	0							
1336	SV	0.01	0.01	0.03	0.05	0.06	0.08	0.10	0.12	0.14	0.16
1337	SV	0.18	0.20	0.22	0.25	0.27					
1338	SQ	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1339	SQ	0.01	2.20	6.04	11.07	15.43					
1340	SE	0.10	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
1341	SE	4.00	4.40	4.80	5.20	5.50					
1342	ZW	A=SERENO C=FLOW F=CALC									
	*										

1

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PAGE 33

LINE	ID	1	2	3	4	5	6	7	8	9	10
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1343	KK	SBW01A	BASIN								
1344	KM	SBW01A Basin Runoff									
1345	BA	0.002									
1346	LG	0.14	0.25	6.00	0.26	1					
1347	UC	0.220	0.316								
1348	UA	0	5.0	16.0	30.0	65.0	77.0	84.0	90.0	94.0	97.0
1349	UA	100									
1350	ZW	A=SERENO C=FLOW F=CALC									
	*										

1351	KK	CLEAR COMBINE									
1352	KM	Clear Hydrograph Stack									
1353	HC	6									
	*										
1354	ZZ										

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

27	SBE29A				
	V				
	V				
35	DBE29A				
	.				
45	.	SBE28A			
	.	V			
	.	V			
53	.	DBE28A			
	.	.			
63	.	.	SBE27A		
	.	.	V		
	.	.	V		
71	.	.	DBE27A		
	.	.	.		
81	.	.	.	SBE26A	
	.	.	.	V	
	.	.	.	V	
89	.	.	.	DBE26A	
	.	.	.	.	
99	.	.	.	.	SBE25C
	.	.	.	.	V
	.	.	.	.	V
107	.	.	.	.	DBE25C
	.	.	.	.	V
	.	.	.	.	V
117	.	.	.	.	RE25C
	.	.	.	.	.
124	.	.	.	.	SBE25B
	.	.	.	.	.
132	.	.	.	.	CE25B.....
	.	.	.	.	V
	.	.	.	.	V
136	.	.	.	.	DBE25B
	.	.	.	.	V
	.	.	.	.	V
146	.	.	.	.	RE25B
	.	.	.	.	.
153	.	.	.	.	SBE25A
	.	.	.	.	.
161	.	.	.	.	CE25A.....
	.	.	.	.	V
	.	.	.	.	V
165	.	.	.	.	DBE25A
	.	.	.	.	.
175	CLEAR.....	.	.	.	.
	.	.	.	.	.
179	.	SBE24D			
	.	V			
	.	V			
187	.	DBE24D			
	.	V			
	.	V			
197	.	RE24D			
	.	.			
204	.	.	SBE24C		
	.	.	.		
212	.	.	CE24C.....		
	.	.	V		
	.	.	V		
216	.	DBE24C			
	.	V			
	.	V			
226	.	RE24C			
	.	.			
233	.	.	SBE24B		
	.	.	.		
241	.	.	CE24B.....		
	.	.	V		
	.	.	V		
245	.	DBE24B			
	.	V			
	.	V			
255	.	RE24B			
	.	.			
262	.	.	SBE24A		

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Serenó Amend II 2yr 6hr.out

	V				
	V				
274	DBE24A				
		SBE23D			
284		V			
		V			
292	DBE23D				
		V			
		V			
302	RE23D				
			SBE23E		
309			V		
			V		
317			DBE23E		
			V		
			V		
327			RE23E		
334				SBE23C	
342			CE23C		
			V		
			V		
346			DBE23C		
			V		
			V		
356			RE23C		
363				SBE23B	
371			CE23B		
			V		
			V		
375			RE23B		
382			CE23AI		
			V		
			V		
386			RE23BD		
393			SBE23A		
401			CE23A		
			V		
			V		
405			DBE23A		
415	CLEAR				
418	SBE22A				
	V				
	V				
426	DBE22A				
436		SBE21A			
444			SBE20A		
452				SBE19A	
460					SBE18A
					V
					V
468					DBE18A
478	CLEAR				
482	SBE17B				
	V				
	V				
490	DBE17B				
	V				

507	.	.	SBE17A	.	.	.
515	.	CE17A.....	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
519	.	DBE17A	.	.	.	.
529	.	.	SBE16A	.	.	.
537	.	.	.	SBE13A	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
545	.	.	DBE13A	.	.	.
555	.	.	.	SBE12A	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
563	.	.	DBE12A	.	.	.
573	.	.	.	.	SBE11B	.
	.	.	.	.	V	.
	.	.	.	.	V	.
581	.	.	.	DBE11B	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
591	.	.	.	RE11B	.	.
	.	.	.	.	.	.
598	.	.	.	.	SBE11A	.
	.	.	.	.	.	.
606	.	.	.	CE11A.....	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
610	.	.	.	DBE11A	.	.
	.	.	.	.	.	.
620	CLEAR.....	.	.	.	.	.
624	.	SBE10A	.	.	.	.
632	.	.	SBE09A	.	.	.
640	.	.	.	SBE08A	.	.
648	CLEAR.....	.	.	.	.	.
652	.	SBE06D	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
660	.	DBE06D	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
670	.	RE06D	.	.	.	.
677	.	.	SBE06C	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
685	.	.	DBE06C	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
695	.	.	RE06C	.	.	.
702	.	.	.	SBE06B	.	.
710	.	CE06B.....	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
714	.	RE06B	.	.	.	.
721	.	.	SBE06A	.	.	.
729	.	CE06A.....	.	.	.	.

741	.	.	DBE05B	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
751	.	.	RE05B	.	.	.
	.	.	.	.	.	.
758	.	.	.	SBE05A	.	.
	.	.	.	.	.	.
766	.	.	CE05A	.	.	.
	.	.	.	.	.	.
770	.	CE065A	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
774	.	DBE06A	.	.	.	.
	.	.	.	.	.	.
784	.	.	SBE04C	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
792	.	.	DBE04C	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
802	.	.	RE04C	.	.	.
	.	.	.	.	.	.
809	.	.	.	SBE04B	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
817	.	.	.	DBE04B	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
827	.	.	.	RE04B	.	.
	.	.	.	.	.	.
834	.	.	CE04AJ	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
838	.	.	RE04CB	.	.	.
	.	.	.	.	.	.
845	.	.	.	SBE04A	.	.
	.	.	.	.	.	.
853	.	.	CE04A	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
857	.	.	DBE04A	.	.	.
	.	.	.	.	.	.
867	.	.	.	SBE03A	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
875	.	.	.	DBE03A	.	.
	.	.	.	.	.	.
885	.	.	.	SBE02A	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
893	.	.	.	DBE02A	.	.
	.	.	.	.	.	.
903	.	.	.	.	SBE01B	.
	.	.	.	.	V	.
	.	.	.	.	V	.
911	.	.	.	.	RE01B	.
	.	.	.	.	.	.
918	.	.	.	.	.	SBE01A
	.	.	.	.	.	.
926	.	.	.	.	CE01A	.
	.	.	.	.	V	.
	.	.	.	.	V	.
929	.	.	.	.	DBE01A	.
	.	.	.	.	.	.
939	CLEAR	.	.	.	.	.
	.	.	.	.	.	.
943	.	SBW14A	.	.	.	.
	.	V	.	.	.	.
	.	V	.	.	.	.
951	.	DBW14A	.	.	.	.
	.	.	.	.	.	.
961	.	.	SBW13A	.	.	.
	.	.	.	.	.	.
969	.	.	.	SBW12A	.	.

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Sereno Amend II 2yr 6hr.out

987				SBW11A
995	CLEAR			
999		SBW10C		
		V		
		V		
1007		DBW10C		
		V		
		V		
1017		RW10C		
1024			SBW10B	
1032		CW10B		
		V		
		V		
1036		DBW10B		
		V		
		V		
1046		RW10B		
1053			SBW10A	
1061		CW10A		
		V		
		V		
1065		DBW10A		
1075			SBW09E	
			V	
			V	
1083			DBW09E	
			V	
			V	
1093			RW09E	
1100				SBW09D
1108			CW09DI	
1111				SBW09C
1119			CW09D	
			V	
			V	
1123			DBW09C	
			V	
			V	
1133			RW09D	
1140				SBW09B
1148			CW09B	
			V	
			V	
1152			DBW09B	
			V	
			V	
1162			RW09B	
1169				SBW09A
1177			CW09A	
			V	
			V	
1181			DBW09A	
1191				SBW08A
				V
				V
1199				DBW08A

11:55:24

Sereno Amend II 2yr 6hr.out



1217	.	.	.	.	V	DBW07C
1227	.	.	.	.	.	SBW07B
1235	.	.	.	.	V	DBW07B
1245	.	.	.	.	V	CW07BC
1249	.	.	.	.	V	RW07BC
1256	.	.	.	.	.	SBW07A
1264	.	.	.	.	V	CW07A
1268	.	.	.	.	V	DBW07A
1278	CLEAR	.	.	.	.	.
1281	.	SBW06A	.	.	V	.
1289	.	DBW06A	.	.	V	.
1299	.	.	SBW05A	.	V	.
1307	.	.	DBW05A	.	V	.
1317	.	.	.	SBW04A	.	.
1325	.	.	.	.	V	SBW02A
1333	.	.	.	.	V	DBW02A
1343	.	.	.	.	.	SBW01A
1351	CLEAR	.	.	.	.	.

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 18SEP12 TIME 11:18:54 *
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*****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
*****

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Flood Control District of Maricopa County
 Sereno Canyon Developed Conditions
 2 YEAR
 6 Hour Storm
 Unit Hydrograph: Clark
 09/18/2012
 Sereno Canyon-Developed Conditions
 100-Year, 6-Hour Storm Event
 Prepared By: JE Fuller Hydrology and Geomorphology
 Modeled By: Brian Schalk P.E., CFM and Nathan Logan P.E., CFM
 Submitted To: City of Scottsdale

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14 IO      OUTPUT CONTROL VARIABLES
          IPRNT      5  PRINT CONTROL
          IPLOT      0  PLOT CONTROL
          QSCAL      0.  HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA
          NMIN       1  MINUTES IN COMPUTATION INTERVAL
          IDATE      1DEC11 STARTING DATE
          ITIME      0000 STARTING TIME
          NQ         2000 NUMBER OF HYDROGRAPH ORDINATES

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COMPUTATION INTERVAL 0.02 HOURS
TOTAL TIME BASE 33.32 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-Feet
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

15 JD	INDEX STORM NO. 1		
	STRM	1.42	PRECIPITATION DEPTH
	TRDA	0.00	TRANSPOSITION DRAINAGE AREA

[illegible]

19 JD	INDEX STORM NO. 2		
	STRM	1.41	PRECIPITATION DEPTH
	TRDA	0.50	TRANSPOSITION DRAINAGE AREA

[illegible]

[illegible]

[illegible]

[illegible]

DOO UNITED 11 11 11

[illegible]

11:55:24

Serenno Amend II 2yr 6hr.out

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-----DSS---ZWRITE Unit 71; Vers. 16: /SERENO/DBW02A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 16: /SERENO/DBW02A/FLOW/02DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 16: /SERENO/SBW01A/FLOW/30NOV1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 16: /SERENO/SBW01A/FLOW/01DEC1911/1MIN/CALC/
-----DSS---ZWRITE Unit 71; Vers. 16: /SERENO/SBW01A/FLOW/02DEC1911/1MIN/CALC/

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1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SBE29A	8.	4.12	1.	0.	0.	0.01		
ROUTED TO	DBE29A	0.	0.00	0.	0.	0.	0.01		
HYDROGRAPH AT	SBE28A	10.	4.07	1.	0.	0.	0.01		
ROUTED TO	DBE28A	0.	0.00	0.	0.	0.	0.01		
HYDROGRAPH AT	SBE27A	2.	4.03	0.	0.	0.	0.00		
ROUTED TO	DBE27A	0.	0.00	0.	0.	0.	0.00		
HYDROGRAPH AT	SBE26A	7.	4.07	1.	0.	0.	0.01		
ROUTED TO	DBE26A	0.	0.00	0.	0.	0.	0.01		
HYDROGRAPH AT	SBE25C	5.	4.03	0.	0.	0.	0.00		
ROUTED TO	DBE25C	0.	0.00	0.	0.	0.	0.00		
ROUTED TO	RE25C	0.	0.25	0.	0.	0.	0.00		
HYDROGRAPH AT	SBE25B	4.	4.07	0.	0.	0.	0.01		
2 COMBINED AT	CE25B	4.	4.07	0.	0.	0.	0.01		
ROUTED TO	DBE25B	0.	0.00	0.	0.	0.	0.01		
ROUTED TO	RE25B	0.	0.65	0.	0.	0.	0.01		
HYDROGRAPH AT	SBE25A	3.	4.03	0.	0.	0.	0.00		
2 COMBINED AT	CE25A	3.	4.03	0.	0.	0.	0.01		
ROUTED TO	DBE25A	0.	0.00	0.	0.	0.	0.01		
5 COMBINED AT	CLEAR	0.	0.00	0.	0.	0.	0.05		
HYDROGRAPH AT	SBE24D	8.	4.05	0.	0.	0.	0.01		
ROUTED TO	DBE24D	0.	0.00	0.	0.	0.	0.01		
ROUTED TO	RE24D	0.	0.47	0.	0.	0.	0.01		
HYDROGRAPH AT	SBE24C	10.	4.08	1.	0.	0.	0.01		
2 COMBINED AT	CE24C	10.	4.08	1.	0.	0.	0.02		
ROUTED TO	DBE24C	0.	0.00	0.	0.	0.	0.02		
ROUTED TO	RE24C	0.	0.42	0.	0.	0.	0.02		

+	2 COMBINED AT	CE24B	3.	4.07	0.	0.	0	0.03
+	ROUTED TO	DBE24B	0.	0.00	0.	0.	0.	0.03
+	ROUTED TO	RE24B	0.	0.65	0.	0.	0.	0.03
+	HYDROGRAPH AT	SBE24A	5.	4.07	1.	0.	0.	0.01
+	2 COMBINED AT	CE24A	5.	4.07	1.	0.	0.	0.04
+	ROUTED TO	DBE24A	0.	0.00	0.	0.	0.	0.04
+	HYDROGRAPH AT	SBE23D	23.	4.12	2.	1.	0.	0.04
+	ROUTED TO	DBE23D	0.	0.00	0.	0.	0.	0.04
+	ROUTED TO	RE23D	0.	0.25	0.	0.	0.	0.04
+	HYDROGRAPH AT	SBE23E	4.	4.05	0.	0.	0.	0.00
+	ROUTED TO	DBE23E	0.	0.00	0.	0.	0.	0.00
+	ROUTED TO	RE23E	0.	0.42	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE23C	31.	4.12	3.	1.	1.	0.05
+	2 COMBINED AT	CE23C	31.	4.12	3.	1.	1.	0.06
+	ROUTED TO	DBE23C	0.	0.00	0.	0.	0.	0.06
+	ROUTED TO	RE23C	0.	0.73	0.	0.	0.	0.06
+	HYDROGRAPH AT	SBE23B	4.	4.03	0.	0.	0.	0.00
+	2 COMBINED AT	CE23B	4.	4.03	0.	0.	0.	0.06
+	ROUTED TO	RE23B	4.	4.05	0.	0.	0.	0.06
+	2 COMBINED AT	CE23AI	4.	4.05	0.	0.	0.	0.10
+	ROUTED TO	RE23BD	3.	4.08	0.	0.	0.	0.10
+	HYDROGRAPH AT	SBE23A	5.	4.05	0.	0.	0.	0.01
+	2 COMBINED AT	CE23A	8.	4.07	1.	0.	0.	0.11
+	ROUTED TO	DBE23A	0.	0.00	0.	0.	0.	0.11
+	3 COMBINED AT	CLEAR	0.	0.00	0.	0.	0.	0.20
+	HYDROGRAPH AT	SBE22A	5.	4.07	0.	0.	0.	0.01
+	ROUTED TO	DBE22A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE21A	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE20A	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE19A	1.	4.02	0.	0.	0.	0.00

+	ROUTED TO	DBE18A	0.	0.00	0.	0.	0.	0.00
+	6 COMBINED AT	CLEAR	3.	4.02	0.	0.	0.	0.21
+	HYDROGRAPH AT	SBE17B	14.	4.05	1.	0.	0.	0.02
+	ROUTED TO	DBE17B	0.	0.00	0.	0.	0.	0.02
+	ROUTED TO	RE17B	0.	0.57	0.	0.	0.	0.02
+	HYDROGRAPH AT	SBE17A	14.	4.07	1.	0.	0.	0.02
+	2 COMBINED AT	CE17A	14.	4.07	1.	0.	0.	0.03
+	ROUTED TO	DBE17A	0.	0.00	0.	0.	0.	0.03
+	HYDROGRAPH AT	SBE16A	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE13A	3.	4.03	0.	0.	0.	0.00
+	ROUTED TO	DBE13A	0.	0.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE12A	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DBE12A	0.	0.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE11B	11.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBE11B	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RE11B	0.	0.53	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE11A	13.	4.07	1.	0.	0.	0.02
+	2 COMBINED AT	CE11A	13.	4.07	1.	0.	0.	0.03
+	ROUTED TO	DBE11A	0.	0.00	0.	0.	0.	0.03
+	6 COMBINED AT	CLEAR	4.	4.02	0.	0.	0.	0.28
+	HYDROGRAPH AT	SBE10A	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE09A	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBE08A	1.	4.02	0.	0.	0.	0.00
+	4 COMBINED AT	CLEAR	8.	4.02	1.	0.	0.	0.28
+	HYDROGRAPH AT	SBE06D	8.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBE06D	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RE06D	0.	0.50	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBE06C	10.	4.10	1.	0.	0.	0.02
+	ROUTED TO	DBE06C	0.	0.00	0.	0.	0.	0.02
+	ROUTED TO	RE06C	0.	0.50	0.	0.	0.	0.02

+		CE06B	8.	4.03	1.	0.	0.	0.03
	ROUTED TO							
+		RE06B	6.	4.10	1.	0.	0.	0.03
	HYDROGRAPH AT							
+		SBE06A	11.	4.07	1.	0.	0.	0.01
	2 COMBINED AT							
+		CE06A	17.	4.08	2.	1.	0.	0.05
	HYDROGRAPH AT							
+		SBE05B	6.	4.25	1.	0.	0.	0.02
	ROUTED TO							
+		DBE05B	0.	0.00	0.	0.	0.	0.02
	ROUTED TO							
+		RE05B	0.	0.60	0.	0.	0.	0.02
	HYDROGRAPH AT							
+		SBE05A	5.	4.05	1.	0.	0.	0.01
	2 COMBINED AT							
+		CE05A	5.	4.05	1.	0.	0.	0.03
	2 COMBINED AT							
+		CE065A	22.	4.08	2.	1.	0.	0.08
	ROUTED TO							
+		DBE06A	0.	0.00	0.	0.	0.	0.08
	HYDROGRAPH AT							
+		SBE04C	7.	4.13	1.	0.	0.	0.01
	ROUTED TO							
+		DBE04C	0.	0.00	0.	0.	0.	0.01
	ROUTED TO							
+		RE04C	0.	0.27	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBE04B	9.	4.12	1.	0.	0.	0.01
	ROUTED TO							
+		DBE04B	0.	0.00	0.	0.	0.	0.01
	ROUTED TO							
+		RE04B	0.	0.25	0.	0.	0.	0.01
	2 COMBINED AT							
+		CE04AI	0.	0.30	0.	0.	0.	0.03
	ROUTED TO							
+		RE04CB	0.	0.45	0.	0.	0.	0.03
	HYDROGRAPH AT							
+		SBE04A	5.	4.05	0.	0.	0.	0.01
	2 COMBINED AT							
+		CE04A	5.	4.05	0.	0.	0.	0.04
	ROUTED TO							
+		DBE04A	0.	0.00	0.	0.	0.	0.04
	HYDROGRAPH AT							
+		SBE03A	7.	4.03	1.	0.	0.	0.01
	ROUTED TO							
+		DBE03A	0.	0.00	0.	0.	0.	0.01
	HYDROGRAPH AT							
+		SBE02A	15.	4.33	4.	1.	1.	0.07
	ROUTED TO							
+		DBE02A	3.	6.03	1.	0.	0.	0.07
	HYDROGRAPH AT							
+		SBE01B	16.	4.12	2.	0.	0.	0.02
	ROUTED TO							
+		RE01B	10.	4.42	2.	0.	0.	0.02
	HYDROGRAPH AT							
+		SBE01A	25.	4.33	5.	1.	1.	0.12
	2 COMBINED AT							
+		CE01A	35.	4.38	7.	2.	1.	0.14
	ROUTED TO							

+	HYDROGRAPH AT	SBW14A	8.	4.05	0.	0.	0.	0.01
+	ROUTED TO	DBW14A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW13A	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW12A	15.	4.05	1.	0.	0.	0.02
+	ROUTED TO	DBW12A	0.	0.00	0.	0.	0.	0.02
+	HYDROGRAPH AT	SBW11A	1.	4.00	0.	0.	0.	0.00
+	5 COMBINED AT	CLEAR	33.	4.38	8.	2.	2.	0.64
+	HYDROGRAPH AT	SBW10C	14.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBW10C	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RW10C	0.	0.65	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW10B	10.	4.07	1.	0.	0.	0.01
+	2 COMBINED AT	CW10B	10.	4.07	1.	0.	0.	0.03
+	ROUTED TO	DBW10B	0.	0.00	0.	0.	0.	0.03
+	ROUTED TO	RW10B	0.	0.47	0.	0.	0.	0.03
+	HYDROGRAPH AT	SBW10A	27.	4.07	2.	1.	0.	0.03
+	2 COMBINED AT	CW10A	27.	4.07	2.	1.	0.	0.06
+	ROUTED TO	DBW10A	0.	0.00	0.	0.	0.	0.06
+	HYDROGRAPH AT	SBW09E	3.	4.12	0.	0.	0.	0.01
+	ROUTED TO	DBW09E	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RW09E	0.	0.62	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW09D	7.	4.05	1.	0.	0.	0.01
+	2 COMBINED AT	CW09DI	7.	4.05	1.	0.	0.	0.01
+	HYDROGRAPH AT	SBW09C	15.	4.20	2.	1.	0.	0.04
+	2 COMBINED AT	CW09D	20.	4.15	3.	1.	1.	0.06
+	ROUTED TO	DBW09C	0.	0.00	0.	0.	0.	0.06
+	ROUTED TO	RW09D	0.	0.25	0.	0.	0.	0.06
+	HYDROGRAPH AT	SBW09B	5.	4.03	0.	0.	0.	0.00
+	2 COMBINED AT	CW09B	5.	4.03	0.	0.	0.	0.06
+	ROUTED TO	DBW09B	0.	0.00	0.	0.	0.	0.06
+	ROUTED TO	RW09B	0.	0.53	0.	0.	0.	0.06

+	2 COMBINED AT	CW09A	6.	4.07	1.	0.	0.	0.07
+	ROUTED TO	DBW09A	0.	0.00	0.	0.	0.	0.07
+	HYDROGRAPH AT	SBW08A	8.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DBW08A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW07C	2.	4.10	0.	0.	0.	0.00
+	ROUTED TO	DBW07C	0.	0.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW07B	3.	4.13	0.	0.	0.	0.01
+	ROUTED TO	DBW07B	0.	0.00	0.	0.	0.	0.01
+	2 COMBINED AT	CW07BC	0.	0.00	0.	0.	0.	0.01
+	ROUTED TO	RW07BC	0.	0.98	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW07A	8.	4.07	1.	0.	0.	0.01
+	2 COMBINED AT	CW07A	8.	4.07	1.	0.	0.	0.03
+	ROUTED TO	DBW07A	0.	0.00	0.	0.	0.	0.03
+	5 COMBINED AT	CLEAR	33.	4.38	8.	2.	2.	0.81
+	HYDROGRAPH AT	SBW06A	3.	4.03	0.	0.	0.	0.00
+	ROUTED TO	DBW06A	0.	0.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW05A	8.	4.05	1.	0.	0.	0.01
+	ROUTED TO	DBW05A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW04A	2.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	SBW02A	3.	4.12	0.	0.	0.	0.01
+	ROUTED TO	DBW02A	0.	0.00	0.	0.	0.	0.01
+	HYDROGRAPH AT	SBW01A	1.	4.08	0.	0.	0.	0.00
+	6 COMBINED AT	CLEAR	33.	4.38	8.	2.	2.	0.83

*** NORMAL END OF HEC-1 ***

-----PSS---ZCLOSE Unit: 71, File: C:\FCDMC\ST\Modelo\K.DSS
 Pointer Utilization: 2.67
 Number of Records: 2505
 File Size: 71653 Kbytes
 Percent Inactive: 0.0

DDMS Output Tables

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: SERENO AMEND II DEV

Page 1

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Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2	3	4	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RE01B	0.060	0.060	0.060	5,189.00	0.0788	2,910.00	X:	-	23.00	87.00	103.00	111.00	119.00	158.00	178.00
							Y:	2,910.00	2,908.00	2,906.00	2,905.50	2,904.40	2,905.50	2,907.00	2,910.00
RE04B	0.060	0.060	0.060	449.00	0.0367	2,755.00	X:	-	15.00	24.00	28.00	30.00	33.00	46.00	62.00
							Y:	2,754.90	2,752.60	2,750.80	2,750.00	2,750.00	2,751.00	2,752.90	2,755.00
RE04C	0.060	0.060	0.060	455.00	0.0363	2,755.00	X:	-	17.00	22.00	27.00	32.00	44.00	61.00	88.00
							Y:	2,755.00	2,753.00	2,751.80	2,750.00	2,750.00	2,751.90	2,753.20	2,754.90
RE04C B	0.060	0.060	0.060	247.00	0.0344	2,744.90	X:	-	11.00	21.00	31.00	34.00	50.00	69.00	88.00
							Y:	2,744.90	2,742.70	2,741.40	2,740.00	2,740.00	2,741.80	2,743.00	2,743.90
RE05B	0.060	0.060	0.060	907.00	0.0435	2,760.30	X:	-	11.00	28.00	40.00	47.00	56.00	76.00	89.00
							Y:	2,760.10	2,759.00	2,757.70	2,757.00	2,757.00	2,757.40	2,758.80	2,760.30
RE06B	0.060	0.060	0.060	814.00	0.0319	2,761.00	X:	-	21.00	55.00	63.00	82.00	92.00	104.00	113.00
							Y:	2,761.00	2,758.90	2,758.50	2,758.00	2,758.00	2,758.50	2,759.70	2,760.80
RE06C	0.060	0.060	0.060	591.00	0.0431	2,786.60	X:	-	6.00	18.00	26.00	36.00	40.00	41.00	44.00
							Y:	2,786.60	2,786.00	2,785.00	2,784.00	2,784.00	2,785.00	2,785.50	2,786.40
RE06D	0.060	0.060	0.060	677.00	0.0369	2,785.90	X:	-	15.00	27.00	34.00	41.00	45.00	52.00	59.00
							Y:	2,785.80	2,784.00	2,783.00	2,782.00	2,782.00	2,782.70	2,784.20	2,785.90
RE11B	0.060	0.060	0.060	914.00	0.0334	2,770.20	X:	-	10.00	16.00	23.00	25.00	34.00	48.00	64.00
							Y:	2,770.20	2,767.10	2,765.30	2,762.00	2,762.00	2,765.00	2,766.60	2,768.30
RE17B	0.060	0.060	0.060	1,169.00	0.0265	2,740.10	X:	-	9.00	22.00	33.00	44.00	54.00	62.00	69.00
							Y:	2,740.10	2,738.60	2,737.00	2,736.10	2,736.00	2,737.00	2,738.40	2,740.10
RE23B	0.060	0.060	0.060	112.00	0.0267	2,685.90	X:	-	8.00	12.00	14.00	24.00	30.00	32.00	49.00
							Y:	2,685.60	2,684.80	2,684.20	2,684.00	2,684.00	2,684.70	2,685.00	2,685.90
RE23B D	0.060	0.060	0.060	238.00	0.0242	2,685.00	X:	-	21.00	62.00	74.00	82.00	86.00	101.00	141.00
							Y:	2,684.90	2,682.70	2,681.00	2,679.00	2,679.00	2,680.10	2,681.90	2,685.00
RE23C	0.060	0.060	0.060	457.00	0.0235	2,693.90	X:	-	15.00	28.00	35.00	35.10	45.00	86.00	114.00
							Y:	2,693.80	2,692.20	2,691.00	2,690.00	2,690.00	2,690.90	2,692.90	2,693.90
RE23D	0.060	0.060	0.060	465.00	0.0269	2,688.30	X:	-	14.00	27.00	32.00	40.00	44.00	55.00	68.00
							Y:	2,688.30	2,687.30	2,685.00	2,684.10	2,684.00	2,685.00	2,686.10	2,688.70
RE23E	0.060	0.060	0.060	1,112.00	0.0261	2,720.00	X:	-	20.00	57.00	64.00	65.00	70.00	90.00	114.00
							Y:	2,720.00	2,716.50	2,712.10	2,711.00	2,711.00	2,713.20	2,716.60	2,719.90
RE24B	0.060	0.060	0.060	873.00	0.0229	2,689.20	X:	-	10.00	16.00	23.00	27.00	35.00	49.00	67.00
							Y:	2,689.80	2,688.70	2,687.90	2,687.00	2,687.00	2,687.90	2,688.80	2,690.20

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Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
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Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RE24C	0.060	0.060	0.060	624.00	0.0232	2,706.80	X:	10.00	25.00	45.00	49.00	55.00	62.00	75.00	103.00
							Y:	2,706.80	2,705.20	2,702.10	2,701.00	2,701.00	2,702.00	2,703.30	2,706.70
RE24D	0.060	0.060	0.060	634.00	0.0252	2,725.50	X:	-	16.00	24.00	27.00	31.00	34.00	44.00	60.00
							Y:	2,725.50	2,723.20	2,721.80	2,721.00	2,721.00	2,722.00	2,723.00	2,726.10
RE25B	0.060	0.060	0.060	412.00	0.0279	2,680.70	X:	-	16.00	29.00	32.00	32.10	36.00	47.00	67.00
							Y:	2,680.30	2,678.70	2,677.10	2,676.00	2,676.00	2,676.90	2,678.00	2,680.70
RE25C	0.060	0.060	0.060	709.00	0.0268	2,694.40	X:	-	21.00	53.00	58.00	63.00	70.00	90.00	99.00
							Y:	2,694.30	2,691.90	2,688.00	2,687.00	2,687.00	2,689.00	2,693.30	2,694.40
RW07B C	0.060	0.060	0.060	1,452.00	0.0465	2,800.10	X:	-	6.00	20.00	26.00	29.00	38.00	50.00	68.00
							Y:	2,800.10	2,799.00	2,796.00	2,793.00	2,793.00	2,796.00	2,797.00	2,798.40
RW09B	0.060	0.060	0.060	1,036.00	0.0415	2,765.60	X:	-	8.00	49.00	58.00	67.00	72.00	85.00	104.00
							Y:	2,764.90	2,764.80	2,764.00	2,763.00	2,763.00	2,764.00	2,765.10	2,765.60
RW09D	0.060	0.060	0.060	367.00	0.0368	2,782.10	X:	-	11.00	27.00	31.00	38.00	42.00	73.00	90.00
							Y:	2,782.10	2,780.10	2,780.00	2,779.00	2,779.00	2,779.50	2,780.90	2,781.30
RW09E	0.060	0.060	0.060	985.00	0.0442	2,805.10	X:	-	10.00	12.00	14.00	17.00	23.00	29.00	48.00
							Y:	2,805.30	2,803.10	2,802.10	2,800.70	2,800.70	2,802.00	2,802.90	2,805.10
RW10B	0.060	0.060	0.060	653.00	0.0276	2,732.00	X:	-	68.00	75.00	79.00	86.00	92.00	106.00	150.00
							Y:	2,732.00	2,728.10	2,721.10	2,726.10	2,726.00	2,726.60	2,727.00	2,732.00
RW10C	0.060	0.060	0.060	952.00	0.0310	2,757.80	X:	-	34.00	47.00	62.00	62.10	68.00	73.00	78.00
							Y:	2,757.80	2,754.40	2,754.00	2,752.10	2,752.00	2,753.70	2,755.70	2,757.50

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
SBE01A	140	0.001	0.4	0.25	30	50.0	NORMAL	0.028
	510	0.002	1.3	0.10	80	75.0	NORMAL	0.028
	730	0.117	98.2	0.10	0	90.0	NORMAL	0.103
		0.119	99.9					
SBE01B	730	0.025	100.0	0.10	0	90.0	NORMAL	0.120
		0.025	100.0					
SBE02A	140	0.001	0.7	0.25	30	50.0	NORMAL	0.030
	510	0.009	13.4	0.10	80	75.0	NORMAL	0.030
	730	0.058	85.8	0.10	0	90.0	NORMAL	0.109
		0.068	99.9					
SBE03A	140	0.005	80.3	0.25	30	50.0	NORMAL	0.036
	510	0.001	19.7	0.10	80	75.0	NORMAL	0.036
		0.007	100.0					
SBE04A	140	0.006	100.0	0.25	30	50.0	NORMAL	0.036
		0.006	100.0					
SBE04B	140	0.001	4.0	0.25	30	50.0	NORMAL	0.034
	510	0.009	60.7	0.10	80	75.0	NORMAL	0.034
	730	0.005	35.3	0.10	0	90.0	NORMAL	0.125
		0.015	100.0					
SBE04C	140	0.001	7.6	0.25	30	50.0	NORMAL	0.034
	510	0.008	53.1	0.10	80	75.0	NORMAL	0.034
	730	0.006	39.3	0.10	0	90.0	NORMAL	0.126
		0.015	100.0					
SBE05A	140	0.006	95.5	0.25	30	50.0	NORMAL	0.036
	510	0.000	4.5	0.10	80	75.0	NORMAL	0.036
		0.007	100.0					
SBE05B	140	0.000	0.4	0.25	30	50.0	NORMAL	0.033
	510	0.007	29.9	0.10	80	75.0	NORMAL	0.033
	730	0.016	69.6	0.10	0	90.0	NORMAL	0.121
		0.022	99.9					
SBE06A	140	0.010	70.6	0.25	30	50.0	NORMAL	0.034
	510	0.004	29.4	0.10	80	75.0	NORMAL	0.034
		0.014	100.0					
SBE06B	140	0.007	89.6	0.25	30	50.0	NORMAL	0.038
	510	0.001	9.1	0.10	80	75.0	NORMAL	0.036
	605	0.000	1.3	0.10	100	0.0	NORMAL	0.036
		0.008	100.0					
SBE06C	140	0.008	48.4	0.25	30	50.0	NORMAL	0.034
	510	0.003	20.5	0.10	80	75.0	NORMAL	0.034
	730	0.005	31.1	0.10	0	90.0	NORMAL	0.125
		0.016	100.0					
SBE06D	140	0.010	98.0	0.25	30	50.0	NORMAL	0.035
	730	0.000	2.0	0.10	0	90.0	NORMAL	0.130
		0.010	100.0					
SBE08A	140	0.001	100.0	0.25	30	50.0	NORMAL	0.041
		0.001	100.0					
SBE09A	140	0.002	100.0	0.25	30	50.0	NORMAL	0.039

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
		0.002	100.0					
SBE10A	140	0.001	100.0	0.25	30	50.0	NORMAL	0.041
		0.001	100.0					
SBE11A	140	0.015	93.2	0.25	30	50.0	NORMAL	0.034
	605	0.001	6.8	0.10	100	0.0	NORMAL	0.034
		0.016	100.0					
SBE11B	140	0.013	100.0	0.25	30	50.0	NORMAL	0.034
		0.013	100.0					
SBE12A	140	0.002	85.7	0.25	30	50.0	NORMAL	0.039
	605	0.000	14.3	0.10	100	0.0	NORMAL	0.039
		0.002	100.0					
SBE13A	140	0.003	100.0	0.25	30	50.0	NORMAL	0.038
		0.003	100.0					
SBE16A	130	0.001	100.0	0.30	15	50.0	NORMAL	0.041
		0.001	100.0					
SBE17A	120	0.000	2.2	0.30	5	30.0	NORMAL	0.033
	130	0.011	58.0	0.30	15	50.0	NORMAL	0.033
	140	0.005	28.2	0.25	30	50.0	NORMAL	0.033
	605	0.002	11.6	0.10	100	0.0	NORMAL	0.033
		0.016	100.0					
SBE17B	120	0.005	31.4	0.30	5	30.0	NORMAL	0.034
	130	0.001	3.8	0.30	15	50.0	NORMAL	0.034
	140	0.008	52.2	0.25	30	50.0	NORMAL	0.034
	605	0.002	12.6	0.10	100	0.0	NORMAL	0.034
		0.016	100.0					
SBE18A	130	0.001	100.0	0.30	15	50.0	NORMAL	0.041
		0.001	100.0					
SBE19A	130	0.001	100.0	0.30	15	50.0	NORMAL	0.041
		0.001	100.0					
SBE20A	130	0.001	100.0	0.30	15	50.0	NORMAL	0.041
		0.001	100.0					
SBE21A	130	0.001	100.0	0.30	15	50.0	NORMAL	0.041
		0.001	100.0					
SBE22A	130	0.007	100.0	0.30	15	50.0	NORMAL	0.036
		0.007	100.0					
SBE23A	130	0.006	93.5	0.30	15	50.0	NORMAL	0.036
	605	0.000	6.5	0.10	100	0.0	NORMAL	0.036
		0.006	100.0					
SBE23B	130	0.003	84.6	0.30	15	50.0	NORMAL	0.037
	605	0.001	15.4	0.10	100	0.0	NORMAL	0.037
		0.004	100.0					
SBE23C	120	0.042	80.2	0.30	5	30.0	NORMAL	0.030
	130	0.006	10.5	0.30	15	50.0	NORMAL	0.030
	140	0.001	2.1	0.25	30	50.0	NORMAL	0.030
	605	0.004	7.2	0.10	100	0.0	NORMAL	0.030

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
SBE23D		0.053	100.0					
	120	0.027	65.4	0.30	5	30.0	NORMAL	0.031
	130	0.011	26.8	0.30	15	50.0	NORMAL	0.031
	605	0.003	7.8	0.10	100	0.0	NORMAL	0.031
SBE23E		0.041	100.0					
	120	0.001	18.5	0.30	5	30.0	NORMAL	0.037
	130	0.004	74.1	0.30	15	50.0	NORMAL	0.037
	605	0.000	7.4	0.10	100	0.0	NORMAL	0.037
SBE24A		0.005	100.0					
	130	0.006	83.1	0.30	15	50.0	NORMAL	0.036
	605	0.001	16.9	0.10	100	0.0	NORMAL	0.036
SBE24B		0.007	100.0					
	120	0.004	89.8	0.30	5	30.0	NORMAL	0.037
	605	0.001	10.2	0.10	100	0.0	NORMAL	0.037
SBE24C		0.005	100.0					
	120	0.010	64.2	0.30	5	30.0	NORMAL	0.034
	130	0.004	25.7	0.30	15	50.0	NORMAL	0.034
	605	0.002	10.1	0.10	100	0.0	NORMAL	0.034
SBE24D		0.015	100.0					
	120	0.009	93.7	0.30	5	30.0	NORMAL	0.035
	130	0.001	6.3	0.30	15	50.0	NORMAL	0.035
SBE25A		0.010	100.0					
	130	0.003	73.5	0.30	15	50.0	NORMAL	0.038
	605	0.001	26.5	0.10	100	0.0	NORMAL	0.038
SBE25B		0.003	100.0					
	130	0.006	93.8	0.30	15	50.0	NORMAL	0.036
	605	0.000	6.3	0.10	100	0.0	NORMAL	0.036
SBE25C		0.006	100.1					
	120	0.004	87.0	0.30	5	30.0	NORMAL	0.037
	605	0.001	13.0	0.10	100	0.0	NORMAL	0.037
SBE26A		0.005	100.0					
	120	0.001	4.8	0.30	5	30.0	NORMAL	0.035
	130	0.008	76.2	0.30	15	50.0	NORMAL	0.035
	605	0.002	19.0	0.10	100	0.0	NORMAL	0.035
SBE27A		0.011	100.0					
	130	0.002	100.0	0.30	15	50.0	NORMAL	0.039
SBE28A		0.002	100.0					
	120	0.005	36.2	0.30	5	30.0	NORMAL	0.034
	130	0.007	57.5	0.30	15	50.0	NORMAL	0.034
	605	0.001	6.3	0.10	100	0.0	NORMAL	0.034
SBE29A		0.013	100.0					
	120	0.006	39.2	0.30	5	30.0	NORMAL	0.034
	130	0.001	8.5	0.30	15	50.0	NORMAL	0.034
	605	0.001	7.2	0.10	100	0.0	NORMAL	0.034
	730	0.007	45.1	0.10	0	90.0	NORMAL	0.125
SBW01A	120	0.015	100.0	0.30	5	30.0	NORMAL	0.039

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
SBW01A	730	0.001	81.3	0.10	0	90.0	NORMAL	0.147
		0.002	100.1					
SBW02A	120	0.003	40.3	0.30	5	30.0	NORMAL	0.038
	730	0.004	59.7	0.10	0	90.0	NORMAL	0.134
		0.007	100.0					
SBW04A	120	0.002	100.0	0.30	5	30.0	NORMAL	0.039
		0.002	100.0					
SBW05A	120	0.007	68.3	0.30	5	30.0	NORMAL	0.035
	130	0.003	27.9	0.30	15	50.0	NORMAL	0.035
	605	0.000	3.8	0.10	100	0.0	NORMAL	0.035
		0.010	100.0					
SBW06A	120	0.003	82.1	0.30	5	30.0	NORMAL	0.037
	130	0.001	12.8	0.30	15	50.0	NORMAL	0.037
	605	0.000	5.1	0.10	100	0.0	NORMAL	0.037
		0.004	100.0					
SBW07A	120	0.005	38.0	0.30	5	30.0	NORMAL	0.034
	130	0.006	44.2	0.30	15	50.0	NORMAL	0.034
	140	0.001	7.0	0.25	30	50.0	NORMAL	0.034
	605	0.001	10.9	0.10	100	0.0	NORMAL	0.034
		0.013	100.1					
SBW07B	120	0.002	24.3	0.30	5	30.0	NORMAL	0.036
	140	0.001	16.2	0.25	30	50.0	NORMAL	0.036
	730	0.004	59.5	0.10	0	90.0	NORMAL	0.134
		0.007	100.0					
SBW07C	120	0.003	53.1	0.30	5	30.0	NORMAL	0.037
	730	0.002	46.9	0.10	0	90.0	NORMAL	0.137
		0.005	100.0					
SBW08A	120	0.006	62.6	0.30	5	30.0	NORMAL	0.035
	130	0.002	23.1	0.30	15	50.0	NORMAL	0.035
	605	0.001	14.3	0.10	100	0.0	NORMAL	0.035
		0.009	100.0					
SBW09A	120	0.002	28.0	0.30	5	30.0	NORMAL	0.036
	130	0.005	58.5	0.30	15	50.0	NORMAL	0.036
	605	0.001	13.4	0.10	100	0.0	NORMAL	0.036
		0.008	99.9					
SBW09B	130	0.004	84.0	0.30	15	50.0	NORMAL	0.037
	605	0.001	16.0	0.10	100	0.0	NORMAL	0.037
		0.005	100.0					
SBW09C	140	0.015	33.1	0.25	30	50.0	NORMAL	0.031
	605	0.001	1.1	0.10	100	0.0	NORMAL	0.031
	730	0.029	85.8	0.10	0	90.0	NORMAL	0.114
		0.044	100.0					
SBW09D	140	0.008	94.1	0.25	30	50.0	NORMAL	0.036
	605	0.001	5.9	0.10	100	0.0	NORMAL	0.036
		0.009	100.0					
SBW09E	140	0.002	36.5	0.25	30	50.0	NORMAL	0.036
	730	0.004	63.5	0.10	0	90.0	NORMAL	0.135

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb
Major Basin ID: 01								
		0.006	100.0					
SBW10A	120	0.011	34.8	0.30	5	30.0	NORMAL	0.032
	130	0.012	37.8	0.30	15	50.0	NORMAL	0.032
	140	0.004	11.7	0.25	30	50.0	NORMAL	0.032
	605	0.005	15.7	0.10	100	0.0	NORMAL	0.032
		0.033	100.0					
SBW10B	120	0.000	3.4	0.30	5	30.0	NORMAL	0.034
	130	0.006	52.6	0.30	15	50.0	NORMAL	0.034
	140	0.003	26.7	0.25	30	50.0	NORMAL	0.034
	605	0.002	17.2	0.10	100	0.0	NORMAL	0.034
		0.012	99.9					
SBW10C	140	0.015	100.0	0.25	30	50.0	NORMAL	0.034
		0.015	100.0					
SBW11A	120	0.001	100.0	0.30	5	30.0	NORMAL	0.041
		0.001	100.0					
SBW12A	120	0.011	63.7	0.30	5	30.0	NORMAL	0.034
	130	0.005	31.0	0.30	15	50.0	NORMAL	0.034
	605	0.001	5.4	0.10	100	0.0	NORMAL	0.034
		0.017	100.1					
SBW13A	120	0.001	100.0	0.30	5	30.0	NORMAL	0.041
		0.001	100.0					
SBW14A	120	0.008	87.5	0.30	5	30.0	NORMAL	0.035
	730	0.001	12.5	0.10	0	90.0	NORMAL	0.131
		0.009	100.0					

ID	Type	Area (sq mi)	Discharge cfs					
			2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin 01								
SBE29A	Hydrograph	0.010	8		18			36
DBE29A	Routed	0.010			4			21
SBE28A	Hydrograph	0.010	10		19			37
DBE28A	Routed	0.010						17
SBE27A	Hydrograph		2		3			6
DBE27A	Routed							2
SBE26A	Hydrograph	0.010	7		14			26
DBE26A	Routed	0.010						8
SBE25C	Hydrograph		5		9			16
DBE25C	Routed				1			11
RE25C	Routed				1			9
SBE25B	Hydrograph	0.010	4		8			16
CE25B	Combined	0.010	4		8			20
DBE25B	Routed	0.010						13
RE25B	Routed	0.010						13
SBE25A	Hydrograph		3		6			9
CE25A	Combined	0.010	3		6			15
DBE25A	Routed	0.010						14
CLEAR	Combined	0.050			4			58
SBE24D	Hydrograph	0.010	8		17			31
DBE24D	Routed	0.010			1			17
RE24D	Routed	0.010			1			15
SBE24C	Hydrograph	0.010	10		21			40
CE24C	Combined	0.020	10		21			45
DBE24C	Routed	0.020			5			35
RE24C	Routed	0.020			4			34
SBE24B	Hydrograph		3		7			13
CE24B	Combined	0.030	3		7			39
DBE24B	Routed	0.030			1			33
RE24B	Routed	0.030			1			30
SBE24A	Hydrograph	0.010	5		10			19
CE24A	Combined	0.040	5		10			33
DBE24A	Routed	0.040			1			30
SBE23D	Hydrograph	0.040	23		49			97
DBE23D	Routed	0.040						74
RE23D	Routed	0.040						59
SBE23E	Hydrograph		4		7			14
DBE23E	Routed							4
RE23E	Routed							3
SBE23C	Hydrograph	0.050	31		64			128
CE23C	Combined	0.060	31		64			128
DBE23C	Routed	0.060			16			93
RE23C	Routed	0.060			16			90
SBE23B	Hydrograph		4		7			12
CE23B	Combined	0.080	4		16			94
RE23B	Routed	0.060	4		16			94
CE23AJ	Combined	0.100	4		16			153
RE23BD	Routed	0.100	3		16			152
SBE23A	Hydrograph	0.010	5		9			17
CE23A	Combined	0.110	8		16			158
DBE23A	Routed	0.110						135
CLEAR	Combined	0.200			4			204
SBE22A	Hydrograph	0.010	5		10			19
DBE22A	Routed	0.010						7

ID	Type	Area (sq mi)	Discharge cfs					
			2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
SBE21A	Hydrograph		1		2			3
SBE20A	Hydrograph		1		2			3
SBE19A	Hydrograph		1		2			3
SBE18A	Hydrograph		1		2			3
DBE18A	Routed							
CLEAR	Combined	0.210	3		6			211
SBE17B	Hydrograph	0.020	14		27			48
DBE17B	Routed	0.020						17
RE17B	Routed	0.020						13
SBE17A	Hydrograph	0.020	14		26			49
CE17A	Combined	0.030	14		28			49
DBE17A	Routed	0.030						23
SBE16A	Hydrograph		1		2			3
SBE13A	Hydrograph		3		6			10
DBE13A	Routed							2
SBE12A	Hydrograph		2		4			6
DBE12A	Routed							2
SBE11B	Hydrograph	0.010	11		21			38
DBE11B	Routed	0.010						15
RE11B	Routed	0.010						13
SBE11A	Hydrograph	0.020	13		24			44
CE11A	Combined	0.030	13		24			44
DBE11A	Routed	0.030						27
CLEAR	Combined	0.280	4		7			262
SBE10A	Hydrograph		1		2			3
SBE09A	Hydrograph		2		4			7
SBE08A	Hydrograph		1		2			3
CLEAR	Combined	0.280	8		15			263
SBE06D	Hydrograph	0.010	8		16			29
DBE06D	Routed	0.010						12
RE06D	Routed	0.010						11
SBE06C	Hydrograph	0.020	10		20			39
DBE06C	Routed	0.020			2			19
RE06C	Routed	0.020			1			19
SBE06B	Hydrograph	0.010	8		15			26
CE06B	Combined	0.030	8		15			33
RE06B	Routed	0.030	8		12			30
SBE06A	Hydrograph	0.010	11		20			36
CE06A	Combined	0.050	17		32			59
SBE05B	Hydrograph	0.020	6		13			28
DBE05B	Routed	0.020			3			17
RE05B	Routed	0.020			3			16
SBE05A	Hydrograph	0.010	5		10			19
CE05A	Combined	0.030	5		10			19
CE05A	Combined	0.080	22		42			77
DBE05A	Routed	0.080			2			48
SBE04C	Hydrograph	0.010	7		14			26
DBE04C	Routed	0.010			1			10
RE04C	Routed	0.010			1			10
SBE04B	Hydrograph	0.010	9		16			30
DBE04B	Routed	0.010			4			17
RE04B	Routed	0.010			4			17
CE04A	Combined	0.030			4			25
RE04CB	Routed	0.030			4			25
SBE04A	Hydrograph	0.010	5		10			18
CE04A	Combined	0.040	5		10			26

ID	Type	Area (sq mi)	Discharge cfs					
			2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
DBE04A	Routed	0.040						19
SBE03A	Hydrograph	0.010	7		12			22
DBE03A	Routed	0.010						6
SBE02A	Hydrograph	0.070	15		34			79
DBE02A	Routed	0.070	3		16			74
SBE01B	Hydrograph	0.020	16		32			61
RE01B	Routed	0.020	10		21			41
SBE01A	Hydrograph	0.120	25		60			146
CE01A	Combined	0.140	35		80			185
DBE01A	Routed	0.140	35		80			185
CLEAR	Combined	0.610	33		79			517
SBW14	Hydrograph	0.010	8		16			28
DBW14	Routed	0.010			2			14
SBW13	Hydrograph		1		2			3
SBW12	Hydrograph	0.020	15		30			53
DBW12	Routed	0.020			1			26
SBW11	Hydrograph		1		2			3
CLEAR	Combined	0.640	33		80			531
SBW10	Hydrograph	0.010	14		26			46
DBW10	Routed	0.010						7
RW10C	Routed	0.010						7
SBW10	Hydrograph	0.010	10		18			33
CW10B	Combined	0.030	10		18			33
DBW10	Routed	0.030						10
RW10B	Routed	0.030						10
SBW10	Hydrograph	0.030	27		52			95
CW10A	Combined	0.080	27		52			95
DBW10	Routed	0.060			1			45
SBW09	Hydrograph	0.010	3		5			12
DBW09	Routed	0.010			2			8
RW09E	Routed	0.010			2			7
SBW09	Hydrograph	0.010	7		13			23
CW09DI	Combined	0.010	7		13			23
SBW09	Hydrograph	0.040	15		33			73
CW09D	Combined	0.060	20		42			91
DBW09	Routed	0.060			15			67
RW09D	Routed	0.060			15			67
SBW09	Hydrograph		5		9			16
CW09B	Combined	0.060	5		15			68
DBW09	Routed	0.060			14			68
RW09B	Routed	0.060			13			65
SBW09	Hydrograph	0.010	6		11			21
CW09A	Combined	0.070	6		13			69
DBW09	Routed	0.070			13			69
SBW08	Hydrograph	0.010	8		16			28
DBW08	Routed	0.010						12
SBW07	Hydrograph		2		5			11
DBW07	Routed				2			9
SBW07	Hydrograph	0.010	3		6			13
DBW07	Routed	0.010			2			10
CW07B	Combined	0.010			4			18
RW07B	Routed	0.010			3			15
SBW07	Hydrograph	0.010	8		17			33
CW07A	Combined	0.030	8		17			34
DBW07	Routed	0.030			2			26
CLEAR	Combined	0.810	33		80			588

ID	Type	Area (sq mi)	Discharge cfs					
			2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
SBW08	Hydrograph		3		7			12
DBW06	Routed							5
SBW05	Hydrograph	0.010	8		15			29
DBW05	Routed	0.010						16
SBW04	Hydrograph		2		4			6
SBW02	Hydrograph	0.010	3		7			15
DBW02	Routed	0.010			3			12
SBW01	Hydrograph		1		2			5
CLEAR	Combined	0.830	33		81			603

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS

Area ID	Sub Basin Parameters						Rainfall Losses					Return Period Parameters						
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
SBE01A	0.119	0.97	410.1	290.3	Urban	0.102	0.10	0.25	6.00	0.28	3	Tc (Hrs)	0.697 *	0.657 *	0.592*	0.525*	0.486*	0.452*
												Vel (f/s)	2.04	2.17	2.40	2.71	2.93	
												R (Hrs)	0.814	0.762	0.679	0.595	0.545	
SBE01B	0.024	0.22	2672.8	313.0	Urban	0.120	0.10	0.23	6.20	0.26	25	Tc (Hrs)	0.318 *	0.303 *	0.277*	0.250*	0.234	0.219
												Vel (f/s)	1.01	1.06	1.16	1.29	1.38	
												R (Hrs)	0.259	0.245	0.222	0.199	0.184	
SBE02A	0.068	0.87	396.6	287.9	Urban	0.098	0.10	0.25	6.00	0.28	11	Tc (Hrs)	0.625 *	0.591 *	0.536*	0.480*	0.445*	0.411*
												Vel (f/s)	2.04	2.16	2.38	2.66	2.87	
												R (Hrs)	0.910	0.855	0.767	0.678	0.624	
SBE03A	0.007	0.16	322.1	270.5	Urban	0.036	0.22	0.25	6.00	0.23	40	Tc (Hrs)	0.145	0.139	0.128	0.117	0.110	0.103
												Vel (f/s)	1.62	1.69	1.83	2.01	2.13	
												R (Hrs)	0.170	0.162	0.148	0.133	0.124	
SBE04A	0.006	0.15	269.0	250.3	Urban	0.036	0.25	0.25	6.00	0.22	30	Tc (Hrs)	0.149	0.142	0.130	0.118	0.110	0.103
												Vel (f/s)	1.48	1.55	1.69	1.86	2.00	
												R (Hrs)	0.181	0.172	0.156	0.139	0.129	
SBE04B	0.015	0.38	602.9	313.0	Urban	0.066	0.11	0.25	6.00	0.27	50	Tc (Hrs)	0.285 *	0.273 *	0.253*	0.232	0.219	0.206
												Vel (f/s)	1.96	2.04	2.20	2.40	2.54	
												R (Hrs)	0.464	0.442	0.407	0.369	0.346	
SBE04C	0.014	0.39	596.6	312.6	Urban	0.070	0.11	0.25	6.00	0.27	45	Tc (Hrs)	0.302 *	0.289 *	0.268*	0.245	0.230	0.217
												Vel (f/s)	1.89	1.98	2.13	2.33	2.49	
												R (Hrs)	0.526	0.501	0.459	0.416	0.389	
SBE05A	0.007	0.20	257.6	244.3	Urban	0.036	0.24	0.25	6.00	0.22	32	Tc (Hrs)	0.172	0.164	0.151	0.136	0.128	0.120
												Vel (f/s)	1.71	1.79	1.94	2.16	2.29	
												R (Hrs)	0.245	0.232	0.211	0.189	0.176	
SBE05B	0.022	0.55	321.1	270.2	Urban	0.094	0.10	0.25	6.00	0.28	24	Tc (Hrs)	0.471 *	0.448 *	0.410*	0.370*	0.345*	0.321*
												Vel (f/s)	1.71	1.80	1.97	2.18	2.34	
												R (Hrs)	0.875	0.828	0.750	0.670	0.620	

* Non default value or value out of range

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Basin ID	Sub Basin Parameters						Rainfall Losses					Return Period Parameters						
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
BE12A	0.002	0.08	353.3	278.7	Urban	0.039	0.23	0.25	6.00	0.21	40	Tc (Hrs)	0.106	0.101	0.093	0.085	0.080	0.075
												Vel (f/s)	1.11	1.16	1.26	1.38	1.47	1.57
												R (Hrs)	0.140	0.133	0.121	0.109	0.102	0.095
BE13A	0.003	0.09	379.3	284.5	Urban	0.038	0.25	0.25	6.00	0.22	30	Tc (Hrs)	0.114	0.109	0.100	0.090	0.084	0.080
												Vel (f/s)	1.16	1.21	1.32	1.47	1.57	1.67
												R (Hrs)	0.133	0.126	0.114	0.102	0.095	0.090
BE16A	0.001	0.06	428.6	293.3	Urban	0.041	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.102	0.097	0.088	0.079	0.073	0.069
												Vel (f/s)	0.86	0.91	1.00	1.11	1.21	1.31
												R (Hrs)	0.159	0.150	0.135	0.119	0.109	0.102
BE17A	0.018	0.31	296.2	262.0	Urban	0.033	0.26	0.25	6.00	0.21	29	Tc (Hrs)	0.202	0.193	0.176	0.159	0.149	0.140
												Vel (f/s)	2.25	2.36	2.58	2.86	3.05	3.25
												R (Hrs)	0.243	0.230	0.209	0.186	0.173	0.165
BE17B	0.016	0.23	237.1	231.4	Urban	0.034	0.25	0.25	6.00	0.20	30	Tc (Hrs)	0.182	0.174	0.159	0.144	0.135	0.127
												Vel (f/s)	1.85	1.94	2.12	2.34	2.50	2.67
												R (Hrs)	0.182	0.173	0.157	0.140	0.130	0.122
BE18A	0.001	0.05	293.5	261.0	Urban	0.041	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.097	0.092	0.083	0.074	0.069	0.065
												Vel (f/s)	0.76	0.80	0.88	0.99	1.06	1.13
												R (Hrs)	0.130	0.122	0.110	0.097	0.089	0.083
BE19A	0.001	0.04	385.7	285.8	Urban	0.041	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.084	0.080	0.073	0.065	0.060	0.057
												Vel (f/s)	0.70	0.73	0.80	0.90	0.98	1.06
												R (Hrs)	0.093	0.087	0.079	0.069	0.064	0.060
BE20A	0.001	0.04	425.0	292.8	Urban	0.041	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.084	0.079	0.072	0.064	0.060	0.057
												Vel (f/s)	0.70	0.74	0.81	0.92	0.98	1.06
												R (Hrs)	0.092	0.087	0.078	0.069	0.063	0.060
BE21A	0.001	0.05	397.9	288.1	Urban	0.041	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.094	0.089	0.081	0.072	0.067	0.063
												Vel (f/s)	0.78	0.82	0.91	1.02	1.09	1.17
												R (Hrs)	0.125	0.118	0.106	0.093	0.086	0.081

* Non default value or value out of range

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Flood Control District of Maricopa County Drainage Design Management System SUB BASINS																						
Project Reference: SERENO AMEND II DEV																			9/18/2023			
Sub Basin ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters									
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Major Basin ID: 01																						
E24D	0.010	0.15	198.6	198.6	Urban	0.035	0.30	0.25	6.00	0.19	6	Tc (Hrs)	0.172	0.162	0.146	0.129	0.120	0.100				
												Vel (ft/s)	1.28	1.36	1.51	1.71	1.83	1.95				
												R (Hrs)	0.159	0.149	0.132	0.116	0.106	0.090				
E25A	0.003	0.10	252.5	241.4	Urban	0.038	0.25	0.25	6.00	0.20	38	Tc (Hrs)	0.122	0.117	0.108	0.098	0.092	0.080				
												Vel (ft/s)	1.20	1.25	1.36	1.50	1.59	1.70				
												R (Hrs)	0.156	0.149	0.135	0.122	0.114	0.100				
E25B	0.006	0.17	178.4	178.4	Urban	0.036	0.29	0.25	6.00	0.21	20	Tc (Hrs)	0.183	0.174	0.158	0.142	0.132	0.100				
												Vel (ft/s)	1.36	1.43	1.58	1.76	1.89	1.95				
												R (Hrs)	0.252	0.238	0.214	0.190	0.175	0.100				
E25C	0.005	0.12	229.5	225.8	Urban	0.037	0.27	0.25	6.00	0.18	17	Tc (Hrs)	0.144	0.137	0.124	0.111	0.104	0.080				
												Vel (ft/s)	1.22	1.28	1.42	1.59	1.69	1.70				
												R (Hrs)	0.162	0.153	0.137	0.121	0.112	0.100				
E26A	0.010	0.24	205.5	205.2	Urban	0.035	0.26	0.25	6.00	0.20	31	Tc (Hrs)	0.196	0.187	0.171	0.155	0.145	0.100				
												Vel (ft/s)	1.80	1.88	2.06	2.27	2.43	2.43				
												R (Hrs)	0.267	0.253	0.230	0.205	0.191	0.100				
E27A	0.002	0.08	275.6	253.5	Urban	0.039	0.30	0.25	6.00	0.22	15	Tc (Hrs)	0.121	0.114	0.104	0.093	0.086	0.080				
												Vel (ft/s)	0.97	1.03	1.13	1.26	1.36	1.36				
												R (Hrs)	0.162	0.153	0.137	0.121	0.111	0.100				
E28A	0.013	0.22	194.4	194.4	Urban	0.034	0.29	0.25	6.00	0.20	17	Tc (Hrs)	0.198	0.188	0.171	0.153	0.142	0.100				
												Vel (ft/s)	1.63	1.72	1.89	2.11	2.27	2.27				
												R (Hrs)	0.217	0.205	0.184	0.163	0.150	0.100				
E29A	0.015	0.21	195.1	195.1	Urban	0.075	0.20	0.25	6.00	0.23	10	Tc (Hrs)	0.300*	0.284*	0.257*	0.229	0.213	0.200				
												Vel (ft/s)	1.03	1.08	1.20	1.34	1.45	1.45				
												R (Hrs)	0.306	0.287	0.257	0.226	0.209	0.100				
W01	0.002	0.08	1020.0	313.0	Urban	0.127	0.14	0.25	6.00	0.26	1	Tc (Hrs)	0.220	0.207	0.186	0.165	0.152	0.100				
												Vel (ft/s)	0.53	0.57	0.63	0.71	0.77	0.77				
												R (Hrs)	0.316	0.295	0.262	0.229	0.210	0.100				

* Non default value or value out of range

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Flood Control District of Maricopa County Drainage Design Management System SUB BASINS																		
Project Reference: SERENO AMEND II DEV																		
9/18/2024																		
Area ID	Sub Basin Parameters						Rainfall Losses					Return Period Parameters						
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr	
Major Basin ID: 01																		
BW09	0.005	0.11	367.0	281.9	Urban	0.037	0.27	0.25	6.00	0.20	29	Tc (Hrs)	0.125	0.119	0.109	0.098	0.092	0.087
												Vel (f/s)	1.29	1.36	1.48	1.65	1.75	1.84
												R (Hrs)	0.129	0.122	0.110	0.099	0.092	0.087
BW09	0.044	0.53	311.1	267.1	Urban	0.085	0.15	0.25	6.00	0.26	11	Tc (Hrs)	0.463 *	0.438 *	0.397*	0.354*	0.329*	0.308
												Vel (f/s)	1.68	1.77	1.96	2.20	2.36	2.52
												R (Hrs)	0.562	0.528	0.474	0.418	0.385	0.355
BW09	0.008	0.19	322.0	270.5	Urban	0.036	0.24	0.25	6.00	0.21	34	Tc (Hrs)	0.161	0.153	0.141	0.128	0.120	0.113
												Vel (f/s)	1.73	1.82	1.98	2.18	2.32	2.47
												R (Hrs)	0.202	0.192	0.175	0.157	0.146	0.136
BW09	0.006	0.19	402.1	288.9	Urban	0.099	0.15	0.25	6.00	0.26	11	Tc (Hrs)	0.293 *	0.277 *	0.251*	0.224	0.208	0.193
												Vel (f/s)	0.95	1.01	1.11	1.24	1.34	1.45
												R (Hrs)	0.463	0.435	0.390	0.344	0.317	0.292
BW10	0.033	0.34	220.9	219.0	Urban	0.032	0.26	0.25	6.00	0.19	27	Tc (Hrs)	0.220	0.209	0.191	0.173	0.162	0.152
												Vel (f/s)	2.27	2.39	2.61	2.88	3.08	3.28
												R (Hrs)	0.203	0.192	0.174	0.155	0.144	0.135
BW10	0.012	0.25	240.8	233.9	Urban	0.034	0.25	0.25	6.00	0.20	33	Tc (Hrs)	0.188	0.179	0.164	0.149	0.139	0.130
												Vel (f/s)	1.95	2.05	2.24	2.46	2.64	2.82
												R (Hrs)	0.237	0.225	0.204	0.183	0.171	0.160
BW10	0.015	0.21	282.7	256.6	Urban	0.034	0.25	0.25	6.00	0.22	30	Tc (Hrs)	0.170	0.162	0.148	0.134	0.126	0.118
												Vel (f/s)	1.81	1.90	2.08	2.30	2.44	2.60
												R (Hrs)	0.163	0.154	0.140	0.125	0.116	0.108
BW11	0.001	0.03	741.9	313.0	Urban	0.041	0.30	0.25	6.00	0.18	5	Tc (Hrs)	0.072	0.068	0.061	0.054	0.050	0.046
												Vel (f/s)	0.61	0.65	0.72	0.81	0.88	0.95
												R (Hrs)	0.062	0.058	0.052	0.045	0.042	0.039
BW12	0.017	0.19	275.1	253.3	Urban	0.034	0.29	0.25	6.00	0.19	13	Tc (Hrs)	0.172	0.162	0.147	0.131	0.122	0.114
												Vel (f/s)	1.62	1.72	1.90	2.13	2.28	2.44
												R (Hrs)	0.141	0.133	0.119	0.105	0.097	0.090
* Non default value or value out of range																		
(stSubBasC																		

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: SERENO AMEND II DEV

Sub Basin ID	Sub Basin Parameters						Rainfall Losses					Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																	
BW13	0.001	0.04	607.1	313.0	Urban	0.041	0.30	0.25	6.00	0.18	5	Tc (Hrs)	0.084	0.079	0.071	0.063	0.058
												Vel (f/s)	0.70	0.74	0.83	0.93	1.01
												R (Hrs)	0.092	0.086	0.076	0.067	0.062
BW14	0.009	0.12	286.3	258.1	Urban	0.047	0.28	0.25	6.00	0.20	4	Tc (Hrs)	0.167	0.157	0.141	0.125	0.116
												Vel (f/s)	1.05	1.12	1.25	1.41	1.52
												R (Hrs)	0.137	0.128	0.113	0.099	0.091

* Non default value or value out of range

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)
Major Basin ID: 01								
SBE01A	645	61	64561	0.112	94.20	0.15	-	100
	645	63	64563	0.007	5.80	0.14	25.00	100
SBE01B	645	63	64563	0.025	100.00	0.14	25.00	100
SBE02A	645	61	64561	0.068	100.00	0.15	-	100
SBE03A	645	61	64561	0.007	100.00	0.15	-	100
SBE04A	645	61	64561	0.006	100.00	0.15	-	100
SBE04B	645	61	64561	0.015	100.00	0.15	-	100
SBE04C	645	61	64561	0.015	100.00	0.15	-	100
SBE05A	645	61	64561	0.007	100.00	0.15	-	100
SBE05B	645	61	64561	0.022	100.00	0.15	-	100
SBE06A	645	61	64561	0.014	100.00	0.15	-	100
SBE06B	645	61	64561	0.008	100.00	0.15	-	100
SBE06C	645	61	64561	0.016	100.00	0.15	-	100
SBE06D	645	61	64561	0.010	100.00	0.15	-	100
SBE08A	645	61	64561	0.001	100.00	0.15	-	100
SBE09A	645	61	64561	0.002	100.00	0.15	-	100
SBE10A	645	61	64561	0.001	100.00	0.15	-	100
SBE11A	645	61	64561	0.016	100.00	0.15	-	100
SBE11B	645	61	64561	0.013	100.00	0.15	-	100
SBE12A	645	61	64561	0.002	100.00	0.15	-	100
SBE13A	645	61	64561	0.003	100.00	0.15	-	100
SBE16A	645	61	64561	0.001	100.00	0.15	-	100
SBE17A	645	61	64561	0.018	100.00	0.15	-	100
SBE17B	645	61	64561	0.016	100.00	0.15	-	100
SBE18A	645	61	64561	0.001	100.00	0.15	-	100
SBE19A	645	61	64561	0.001	100.00	0.15	-	100
SBE20A	645	61	64561	0.001	100.00	0.15	-	100
SBE21A	645	61	64561	0.001	100.00	0.15	-	100
SBE22A	645	61	64561	0.007	100.00	0.15	-	100
SBE23A	645	61	64561	0.006	100.00	0.15	-	100
SBE23B	645	61	64561	0.004	100.00	0.15	-	100
SBE23C	645	61	64561	0.053	100.00	0.15	-	100
SBE23D	645	61	64561	0.041	100.00	0.15	-	100
SBE23E	645	61	64561	0.005	100.00	0.15	-	100
SBE24A	645	61	64561	0.007	100.00	0.15	-	100
SBE24B	645	61	64561	0.005	100.00	0.15	-	100
SBE24C	645	61	64561	0.015	100.00	0.15	-	100
SBE24D	645	61	64561	0.010	100.00	0.15	-	100
SBE25A	645	61	64561	0.003	100.00	0.15	-	100
SBE25B	645	61	64561	0.006	100.00	0.15	-	100
SBE25C	645	61	64561	0.005	100.00	0.15	-	100
SBE26A	645	61	64561	0.011	100.00	0.15	-	100
SBE27A	645	61	64561	0.002	100.00	0.15	-	100
SBE28A	645	61	64561	0.013	100.00	0.15	-	100
SBE29A	645	61	64561	0.015	100.00	0.15	-	100
SBW01	645	61	64561	0.002	100.00	0.15	-	100

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)
Major Basin ID: 01								
SBW02 A	645	61	64561	0.007	100.00	0.15	-	100
SBW04 A	645	61	64561	0.002	100.00	0.15	-	100
SBW05 A	645	61	64561	0.010	100.00	0.15	-	100
SBW06 A	645	61	64561	0.004	100.00	0.15	-	100
SBW07 A	645	61	64561	0.013	100.00	0.15	-	100
SBW07 B	645	61	64561	0.007	100.00	0.15	-	100
SBW07 C	645	61	64561	0.005	100.00	0.15	-	100
SBW08 A	645	61	64561	0.009	100.00	0.15	-	100
SBW09 A	645	61	64561	0.008	100.00	0.15	-	100
SBW09 B	645	61	64561	0.005	100.00	0.15	-	100
SBW09 C	645	61	64561	0.044	100.00	0.15	-	100
SBW09 D	645	61	64561	0.008	100.00	0.15	-	100
SBW09 E	645	61	64561	0.006	100.00	0.15	-	100
SBW10 A	645	61	64561	0.033	100.00	0.15	-	100
SBW10 B	645	61	64561	0.012	100.00	0.15	-	100
SBW10 C	645	61	64561	0.015	100.00	0.15	-	100
SBW11 A	645	61	64561	0.001	100.00	0.15	-	100
SBW12 A	645	61	64561	0.017	100.00	0.15	-	100
SBW13 A	645	61	64561	0.001	100.00	0.15	-	100
SBW14 A	645	61	64561	0.009	100.00	0.15	-	100

Basin	SBE29A
Route	DBE29A
Basin	SBE28A
Route	DBE28A
Basin	SBE27A
Route	DBE27A
Basin	SBE26A
Route	DBE26A
Basin	SBE25C
Route	DBE25C
Route	RE25C
Basin	SBE25B
Combine	CE25B
Route	DBE25B
Route	RE25B
Basin	SBE25A
Combine	CE25A
Route	DBE25A
Combine	CLEAR
Basin	SBE24D
Route	DBE24D
Route	RE24D
Basin	SBE24C
Combine	CE24C
Route	DBE24C
Route	RE24C
Basin	SBE24B
Combine	CE24B
Route	DBE24B
Route	RE24B
Basin	SBE24A
Combine	CE24A
Route	DBE24A
Basin	SBE23D
Route	DBE23D
Route	RE23D
Basin	SBE23E
Route	DBE23E
Route	RE23E
Basin	SBE23C
Combine	CE23C
Route	DBE23C
Route	RE23C
Basin	SBE23B
Combine	CE23B
Route	RE23B
Combine	CE23AI
Route	RE23BD
Basin	SBE23A
Combine	CE23A
Route	DBE23A
Combine	CLEAR
Basin	SBE22A
Route	DBE22A
Basin	SBE21A
Basin	SBE20A
Basin	SBE19A
Basin	SBE18A
Route	DBE18A
Combine	CLEAR
Basin	SBE17B

Route	DBE17B
Route	RE17B
Basin	SBE17A
Combine	CE17A
Route	DBE17A
Basin	SBE16A
Basin	SBE13A
Route	DBE13A
Basin	SBE12A
Route	DBE12A
Basin	SBE11B
Route	DBE11B
Route	RE11B
Basin	SBE11A
Combine	CE11A
Route	DBE11A
Combine	CLEAR
Basin	SBE10A
Basin	SBE08A
Basin	SBE08A
Combine	CLEAR
Basin	SBE06D
Route	DBE06D
Route	RE06D
Basin	SBE06C
Route	DBE06C
Route	RE06C
Basin	SBE06B
Combine	CE06B
Route	RE06B
Basin	SBE06A
Combine	CE06A
Basin	SBE05B
Route	DBE05B
Route	RE05B
Basin	SBE05A
Combine	CE05A
Combine	CE065A
Route	DBE06A
Basin	SBE04C
Route	DBE04C
Route	RE04C
Basin	SBE04B
Route	DBE04B
Route	RE04B
Combine	CE04A1
Route	RE04CB
Basin	SBE04A
Combine	CE04A
Route	DBE04A
Basin	SBE03A
Route	DBE03A
Basin	SBE02A
Route	DBE02A
Basin	SBE01B
Route	RE01B
Basin	SBE01A
Combine	CE01A
Route	DBE01A
Combine	CLEAR
Basin	SBW14A
Route	DBW14A

Basin	SBW13A
Basin	SBW12A
Route	DBW12A
Basin	SBW11A
Combine	CLEAR
Basin	SBW10C
Route	DBW10C
Route	RW10C
Basin	SBW10B
Combine	CW10B
Route	DBW10B
Route	RW10B
Basin	SBW10A
Combine	CW10A
Route	DBW10A
Basin	SBW09E
Route	DBW09E
Route	RW09E
Basin	SBW09D
Combine	CW09DI
Basin	SBW09C
Combine	CW09D
Route	DBW09C
Route	RW09D
Basin	SBW09B
Combine	CW09B
Route	DBW09B
Route	RW09B
Basin	SBW09A
Combine	CW09A
Route	DBW09A
Basin	SBW08A
Route	DBW08A
Basin	SBW07C
Route	DBW07C
Basin	SBW07B
Route	DBW07B
Combine	CW07BC
Route	RW07BC
Basin	SBW07A
Combine	CW07A
Route	DBW07A
Combine	CLEAR
Basin	SBW06A
Route	DBW06A
Basin	SBW05A
Route	DBW05A
Basin	SBW04A
Basin	SBW02A
Route	DBW02A
Basin	SBW01A
Combine	CLEAR