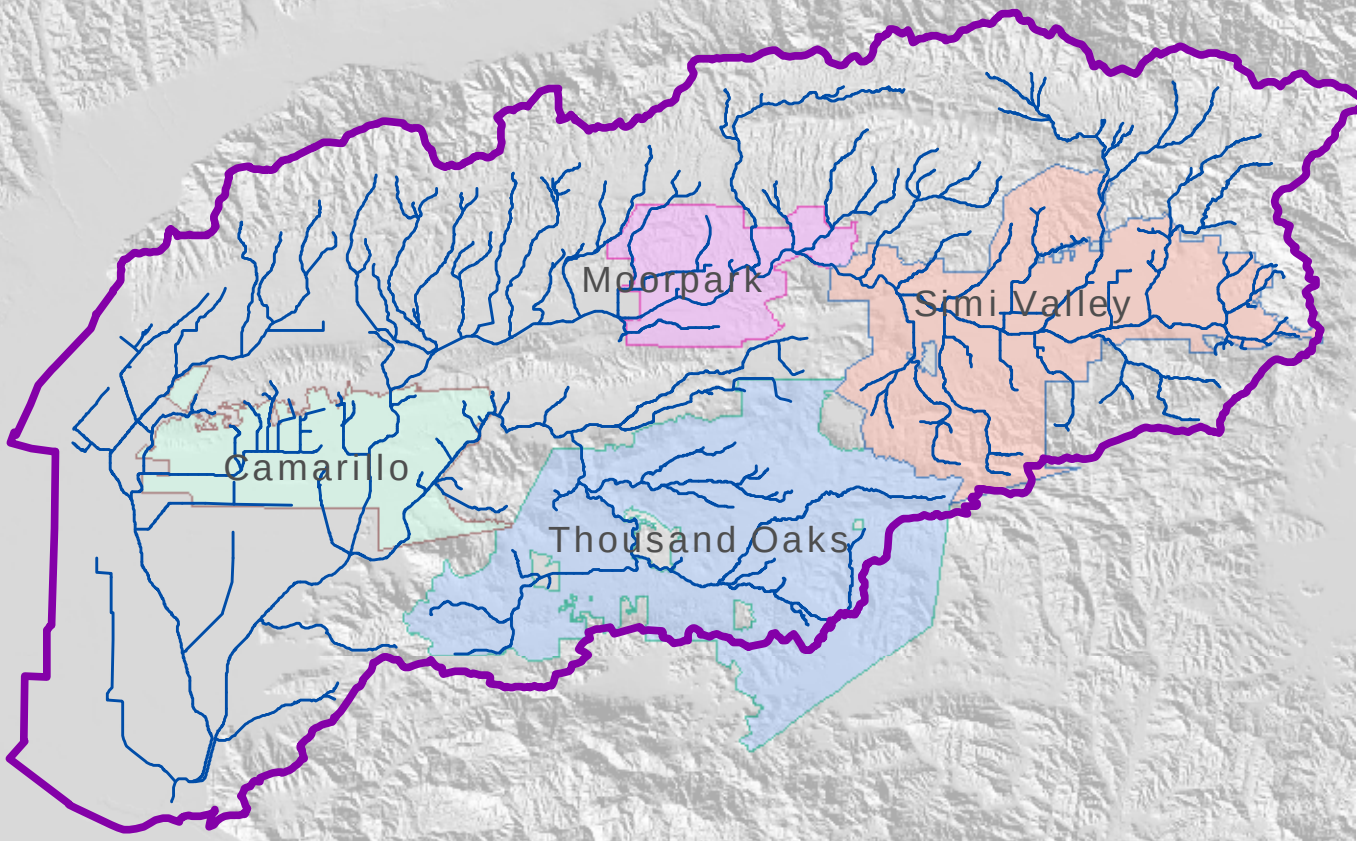
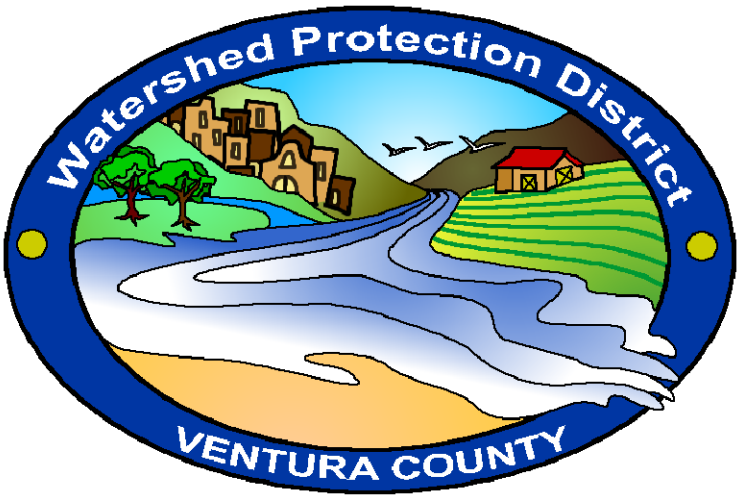
CALLEGUAS CREEK WATERSHED HYDROLOGY STUDY PRESENT CONDITION



Ventura County Public Works Agency
Watershed Protection District
March 2003

CALLEGUAS CREEK WATERSHED

HYDROLOGY STUDY
PRESENT CONDITION



Ventura County Public Works Agency
Watershed Protection District

March 2003

ACKNOWLEDGEMENTS

This report represents the combined effort of a large number of agencies and individuals whose contributions are hereby gratefully acknowledged.

Supervisor Judy Mikels
Calleguas Municipal Water District
US Army Corps Of Engineers, Los Angeles District
City of Camarillo
City of Moorpark
City of Simi Valley
City of Thousand Oaks
Calleguas Creek Watershed Management Plan Participants

The following members of the Ventura County Watershed Protection District staff have been instrumental in the creation of this hydrologic report:

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CALLEGUAS CREEK HYDROLOGY REPORT

TABLE OF CONTENTS

FINAL

CALLEGUAS CREEK HYDROLOGY REPORT

SECTION I

INTRODUCTION/HISTORY

Calleguas Creek drains an area of approximately 343 square miles, predominantly in southern Ventura County and outlets into the Pacific Ocean at Mugu Lagoon. The watershed includes Arroyo Conejo, Conejo Creek, Arroyo Santa Rosa, Arroyo Simi, Arroyo Las Posas, and Calleguas Creek, as well as Revolon Slough and Mugu Lagoon. The Santa Susana Mountains, South Mountain, and Oak Ridge Mountains form the northern boundary of the watershed. The Simi Hills and Santa Monica Mountains distinguish the southern boundary (See Fig. 1).

HISTORICAL MODELS

The Calleguas Creek Watershed has been modeled several times since the early 1960's. The first study by Boyle Engineering used the older Soil Conservation Service (SCS) method which was limited by the allowable rainfall intensities. Typically, the maximum intensity was about 2-inches per hour. Recording raingage records for Ventura County indicated much higher values, which were as high as 5-inches per hour for short duration times. Because valuable background information on each sub-watershed had been calculated which included weighted CN value, 12-hours design precipitation, and aerial reduced rainfall, the report was used by Ventura County Flood Control District (DISTRICT) staff for rural watersheds until 1985.

MODIFIED RATIONAL HYDROLOGY METHOD ADOPTION

Beginning in 1970, when a comparison of DISTRICT flowrates with Los Angeles Public Works (LAPW) design flows indicated much lower values at the border between us, the DISTRICT adopted the Modified Rational Method for all Design Hydrology. Hydrologists from LAPW trained DISTRICT hydrologists in the computer model developed by them. Using the newest Soil Survey Report completed by the SCS for Ventura County in 1970, the soils of Ventura County were carefully divided into seven hydrologic soils with loss rates varying from one-quarter of an inch per hour to over two inches per hour in beach sand. Staff, working closely with consultants such as Koebig and Koebig and Toups Corporation (now called Hawks and Associates) jointly developed Master Drainage Plans. Included for the City of Thousand Oaks were all major and minor tributaries to Arroyo Conejo from the headwaters in Lang Ranch to the final junction of North Fork Arroyo Conejo at Hill Canyon where the channel changes name to Conejo Creek prior to junction with Arroyo Santa Rosa. In Simi Valley the entire watershed was modeled from the headwaters by Rocky Peak to Alamos Canyon junction on the Arroyo Simi downstream of Madera Road. For City of


Calleguas Creek
Watershed Boundary
Santa Barbara Co.
Los Angeles Co.
Ojai
Fillmore
Santa Paula
Moorpark
Simi Valley
Thousand Oaks
Camarillo
Oxnard
San Buenaventura
Port Hueneme
Pacific Ocean
SANTA CLARA RIVER
CALLEGUAS CREEK
ARROYO SIMI
ARROYO CONEJO
NORTH FORK ARROYO CONEJO
CONEJO CREEK
LONG CREEK
CAMARILLO HILLS DRAIN
LAS POSAS DRAIN
RICE ROAD DRAIN
STREET DRAIN
DORIS DRAIN
BEARDSLEY
SANTA ROSA
HUNT WASH
MAHAN BARRANCA
FOX BARRANCA
MILLIGAN BARRANCA
CLARK BARRANCA
BARROW BARRANCA
ELLSWORTH BARRANCA
ADAMS BARRANCA
PAGAN CANYON
HALL CANYON
MANUEL CANYON
COYOTE CREEK
VENTURA FW
MATILIJA CREEK
CUYAMA RIVER
DRY CANYON
ALAMOS CANYON
BEARTRAP CREEK
NORTH FORK LOCKWOOD CREEK
LOCKWOOD CREEK
AMARGOSA CREEK
EAST FORK SEYMOUR CREEK
ST AUBER CREEK
HOLSER CANYON
POLECREEK
SESPE CREEK
BOULDER CREEK
BEAR CREEK
OLEARY CREEK
BASOLO DITCH
HAPPY CAMP CANYON
TRIPAS CANYON
WINDMILL CANYON
CHIVO CANYON
LAS LLAJAS CANYON
ERRINGER DRAIN
MEIER CANYON
PCH
COAST HWY
Calleguas Creek
Vicinity Map
N
0
3.5
7 Miles
VCFCD Redline Channels
Major Roads
Cities
Calleguas Creek Watershed Boundary
Figure 1

Camarillo, their entire Sphere of Influence was included. All of these Master Drainage Plans include maps of existing facilities at the time of the study as well as proposed improvements to the drainage system for each area. DISTRICT engineers and hydrologists modeled many other areas within the Calleguas Watershed.

NWS-SACRAMENTO MODEL IN REAL-TIME

As a result of damages to Point Mugu Naval Air Station, caused by the Calleguas Creek Levee failure in February 1980, the Navy signed an agreement with the DISTRICT and the National Weather Service (NWS) to provide flood-warning to the base from both Calleguas Creek and Revolon Slough. The DISTRICT installed rain and streamgages purchased by the Navy and Real-time models using streamgage records from the gage at Camarillo State Hospital (now California State University at Channel Islands) were calibrated by the NWS. These models, with minor calibration, have been running for 20 years with varying results depending on the saturation of the watershed. The wetter the ground, the better the prediction of flood peaks will be when applying the forecast rain. As a result of this earlier in the storm season, the results are not as accurate. Another compounding factor at the beginning of each water year is that upstream waste water treatment plant effluent keeps the low flow channel of the stream wet while the surrounding area can be very dry.

In the El Nino year 1983, record peaks were recorded at each of the Calleguas Creek Watershed streamgages. For the twenty years prior to these record-breaking peak discharges, urbanization with accompanying channelization concentrated flows much quicker and with considerably more volume of flow.

Another factor affecting the volume of runoff occurred with the availability of better quality water imported from northern California. Distributed by the Calleguas Municipal Water District, widespread use of the better tasting water meant that local wells no longer were pumped. Within a relative short time of average to above average water years, a rising ground water problem impacted industry within the Easy Street neighborhood of the City of Simi Valley, causing concern. The City responded by drilling five de-watering wells to relieve the pressure and discharged into tributary channels. Consequently, the Arroyo Simi, which used to be dry most of the year, now has perennial flow that encourages growth of plants.

COE HEC-1 MODEL UPDATE

Because of the damages experienced along the Calleguas Creek, DISTRICT staff convinced the Army Corps of Engineers (COE) to restudy the Hydrology to supercede their earlier work of the 1970's. In several cases, the future percent imperviousness used in the earlier study had been exceeded. The result of that re-study which included evaluation of streamgage records and regional skew study was published in 1987. The peak discharges published were the values used for project design, whether developer funded or government projects.

In 1989, Simons-Li, requested Present and Future Design Flowrates for many points along Calleguas Creek for use in sediment transport study. The 1987 COE study furnished fewer locations and no hydrographs since the values were impacted by the frequency curves of streamgages within the watershed. DISTRICT staff adopted the COE parameters including the routing parameters but applied Modified Rational Design Rainfall to aid in hydrograph timing with Master Drainage Plan flows junctioning with the main channel. The results at common points of concentration were amazingly close to the adopted COE values. A report was never published but copies of the model output and summary sheets were widely distributed to cities, developers, and flood control designers.

HSPF CALIBRATION MODEL

The DISTRICT, in an effort to improve and expand it's technical procedures, is exploring the use of continuous watershed simulation as a tool for fulfilling its flood control, water resource management, and water quality management obligations. A pilot study to evaluate the use of the U.S. EPA Hydrologic Simulation Program -FORTRAN (HSPF) (Bicknell et al., 1997; 2001) as a management tool for comprehensive watershed assessment within the climatic, physiographic, and topographic conditions of Ventura County was initiated in 2001 by Aqua Terra Consultants. The objective of the pilot study is to setup, calibrate, and validate HSPF to the Arroyo Simi watershed within the Calleguas Creek basin of Ventura County for 'current/recent' hydrologic conditions, and then evaluate the use of the information available from the model on flow-duration, flood-peak analysis, flow velocity distributions, bed/bank shear stress calculations, etc. for assessing flood control facilities and streambed/bank protection efforts. Ultimately, the model may be extended and expanded to assess erosion and flooding issues within the entire Calleguas Creek basin to help evaluate potential remediation alternatives for Mugu Lagoon.

HSPF is a comprehensive watershed model of hydrology and water quality, that includes modeling of both land surface and subsurface hydrologic and water quality processes, linked and closely integrated with corresponding stream and reservoir processes. It is the premier model currently available for comprehensive watershed assessments. HSPF has enjoyed widespread usage and acceptance, since its initial release in 1980, as demonstrated through hundreds of applications across the U.S. and abroad. HSPF is jointly supported and maintained by both the U.S. EPA and the USGS, a rare occurrence where two federal agencies agree on support of a single modeling system. In addition, HSPF is the primary watershed model included in the EPA BASINS modeling system and it has recently been incorporated into the U.S. Army Corps of Engineers Watershed Modeling System (WMS). This widespread usage and support has helped to ensure the continuing availability and maintenance of the code for two decades, in spite of varying federal priorities and budget restrictions. HSPF is currently being used for watershed studies in Minnesota, Washington State, Oregon, Australia, Kentucky, South Carolina, Nevada, and Florida.

FINAL

SECTION II

METHODS AND TECHNIQUES

MODIFIED RATIONAL HYDROLOGY MODEL -VCRAT COMPUTER MODEL

In 1997, it was decided to develop a complete watershed model of the Calleguas, including Revolon Slough, using the Modified Rational Method. Sub-watersheds were carefully digitized; while the imperviousness was compared to the latest aerial photos, and routing reaches were measured from Rocky Peak to Mugu Lagoon. Wherever improvements existed, the as-built slope and channel configuration was coded into the model. The majority of the sub-areas are less than 100 acres, but in some rural areas, larger sub-areas seemed appropriate. For each subarea, the input has the following parameters:

- area in acres,
- time of concentration in minutes,
- percent effective imperviousness,
- hydrologic soil type, and
- Rainfall zone with storm frequency.

The Ventura County Modified Rational Method (VCRAT) version 2.2 was utilized for the study analysis. This method was originally developed by the Los Angeles County Flood Control District (LACFCD) and was adopted by the Ventura County Flood Control District (VCFCD) in 1975 with some modifications to reflect the local runoff conditions. For example, the collector street for Ventura County is a 40-feet wide street with eight inch curbs whereas the County of Los Angles uses a 36 feet wide street with wider gutter and 8-inch curbs. The two methods differ also in that the VCFCD version was based upon a family of soil types using loss rates from 0.25-inches per hour to 2-inches per hour; whereas the LACFCD model was based on infiltration tests. A more detailed description of the VCRAT model is furnished in an excerpt from the 1991 VCFCD Hydrology Manual included in Appendix 1.

The computer program produces a 200-point hydrograph for each sub-area, which it adds to the next area downstream. In this way it accounts for changes in Times of Concentration between subareas. Channel storage from routing point to routing point also is accounted for, treating each reach as if it were a reservoir. Timing at junctions between two laterals or the main channel and a lateral can be requested to help in doing hydraulic analysis.

In the current hydrology study update, the VCRAT runoff simulation model (with detention basins included) was used to determine 100-year peak discharges. The detention basins were designed to attenuate the 100-year peak flows to a value that closely matched the pre-development condition or to reduce flows to values that would not exceed the capacity of the downstream improvements where possible. Computer input and output and calculation results for Calleguas Creek and its tributaries are included in Appendix 2a and 2b. The

computer input and output for Revolon Slough and its tributaries are included in Appendix 3a and 3b.

MODEL APPLICATIONS

The study area is divided into two separate watersheds for modeling purposes. Model 1 represents all tributaries to and including Calleguas Creek. Model 2 represents all tributaries to and including Revolon Slough. The latter has complete hydrology for 10-yr, 50-yr and 100-yr storms compared to only 100-year for the Calleguas. For the former, actual multipliers from real stream gage records analysis produced 2, 5, 10, 50, and 500-year present condition flowrates. Table 1 lists every important concentration point to accurately determine cumulative flows along every tributary and main channel. For individual subarea flows, the actual Modified Rational output printouts contained in Appendix 2b and 3b should be used.

Research of available data from previous studies, GIS analysis, and field inspections were used as the main data sources to determine site parameters, street flow configuration, and drainage patterns.

AREAL REDUCTION

One of the most important factors in completing such a large-scale model is to account for the decreased intensity over such a large area. The COE, SCS, and other hydrologic modelers have long recognized the difference between Point Rainfall and Areal Precipitation. Examination of recording rain gage charts for a given storm shows a pattern of shifted high intensity with time to reflect the passage of bands of rain across or up the valley of a watershed for most severe winter storms. In August 1966, the DISTRICT adopted the first HYDROLOGY MANUAL, which included an aerial reduction curve for Calleguas Creek indicating decrease in rainfall intensity for watershed area. This same curve is contained in the Ventura County Modified Rational Method computer model. To develop a curve of reduced design flowrates for larger areas, the computer was instructed to recycle at various points along the main channel and each major tributary. The resulting values of reduced peak outflow at these recycling points were divided by the unaerial-reduced peak flows to produce an Aerial Reduction Factor (ARF). Each of these values was plotted along major tributaries as well as along the main channel with area in thousands of acres as the abscissa and the ARF or peak reduction factor as ordinates. See Figures 6 – 9 or ARF curves.

USER FRIENDLY TABLES

To aid the user of this complex model, a matrix of flowrates versus key points is included in Table 1. For any location, the cumulative drainage area is listed, the model ID number and letter, the present condition 100-year flow without aerial reduction, the aerial reduction factor from the curve, and the reduced flowrate. In addition, peak flows for other frequencies are listed. 50-year, 10-year, 5-year and 2-year peaks are from multipliers derived from streamgage frequency analysis of annual peaks.

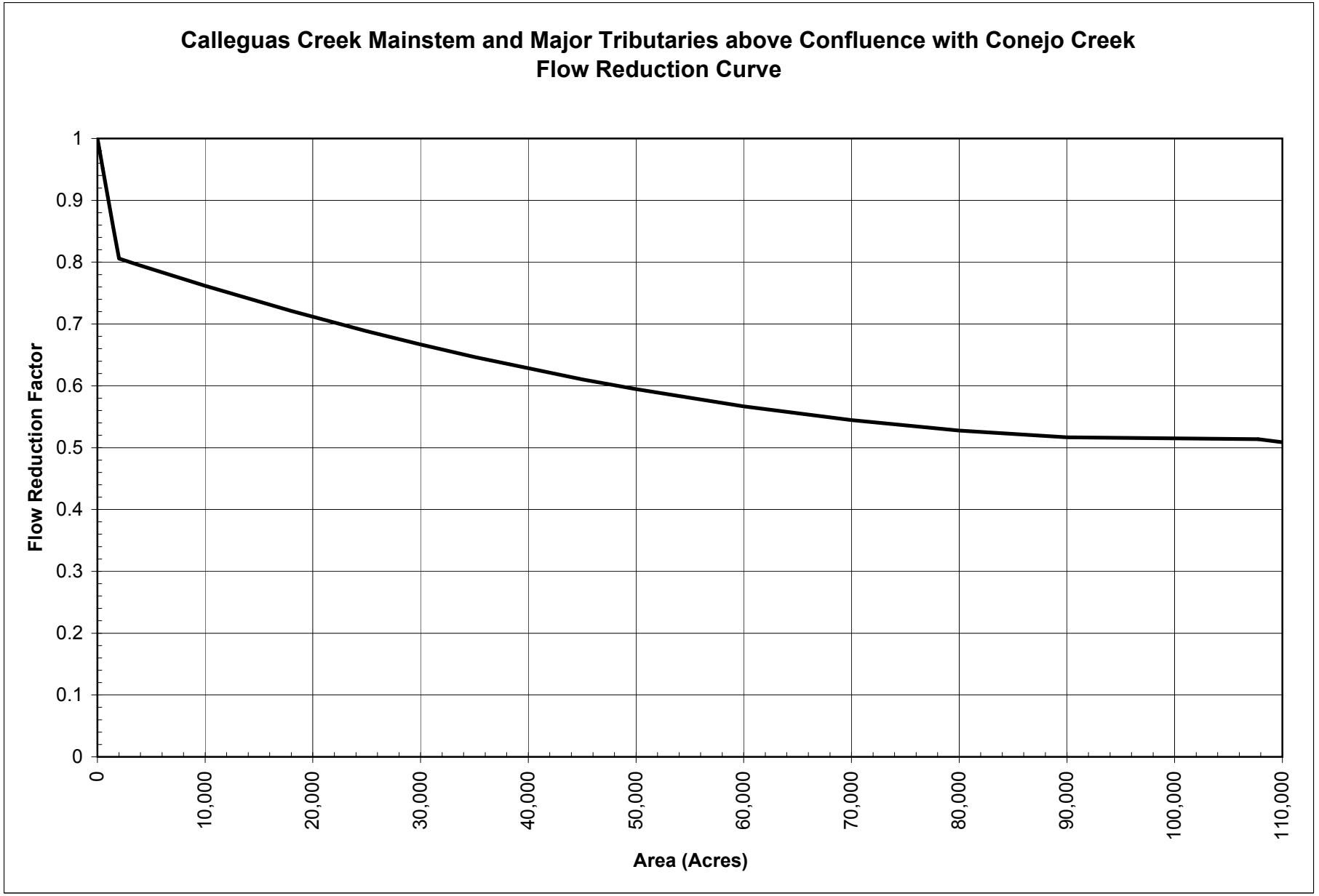

Calleguas Creek Mainstem and Major Tributaries above Confluence with Conejo Creek
Flow Reduction Curve
Flow Reduction Factor
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
110,000
Area (Acres)

Figure 6

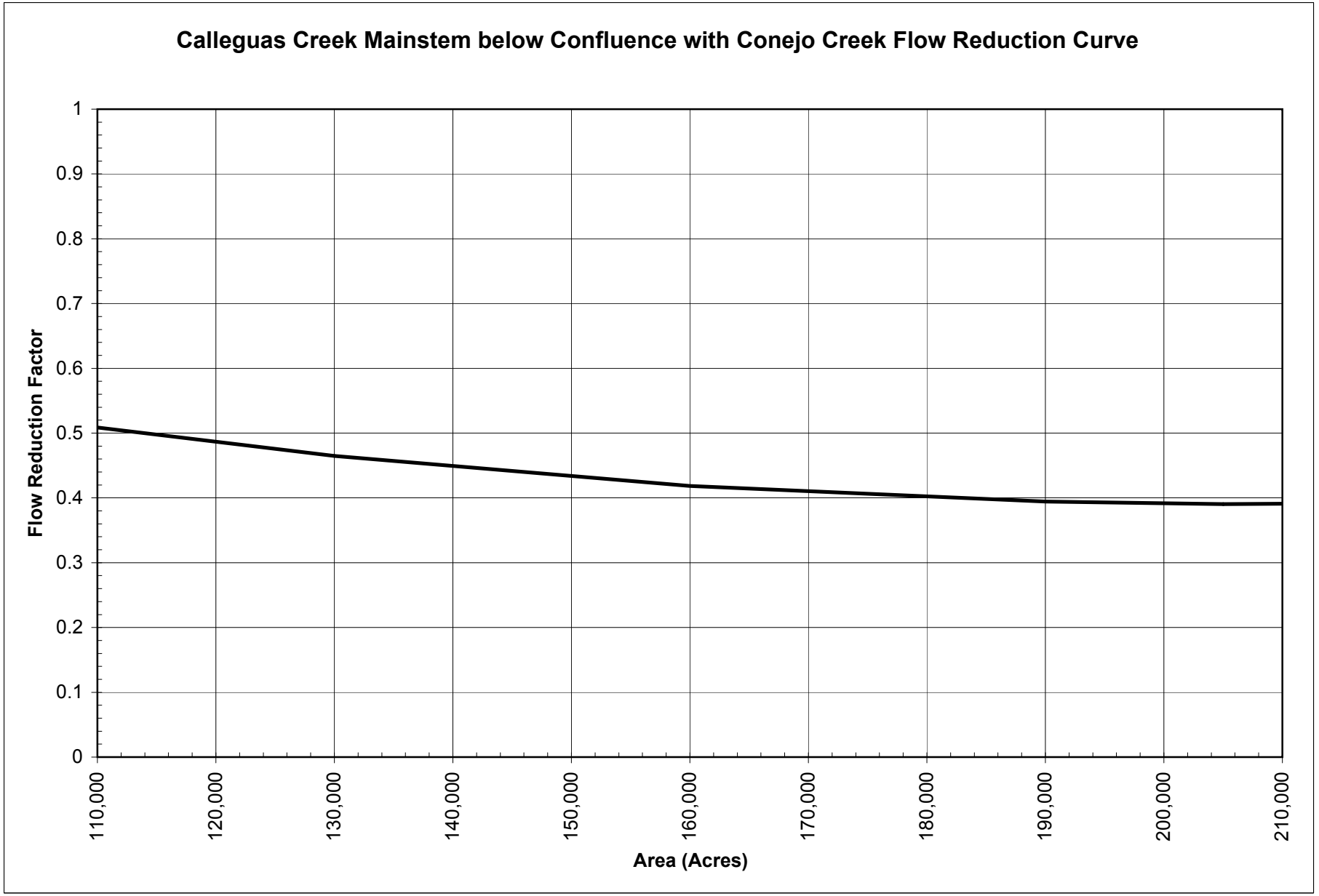

Calleguas Creek Mainstem below Confluence with Conejo Creek Flow Reduction Curve
Flow Reduction Factor
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
110,000
120,000
130,000
140,000
150,000
160,000
170,000
180,000
190,000
200,000
210,000
Area (Acres)

Figure 7

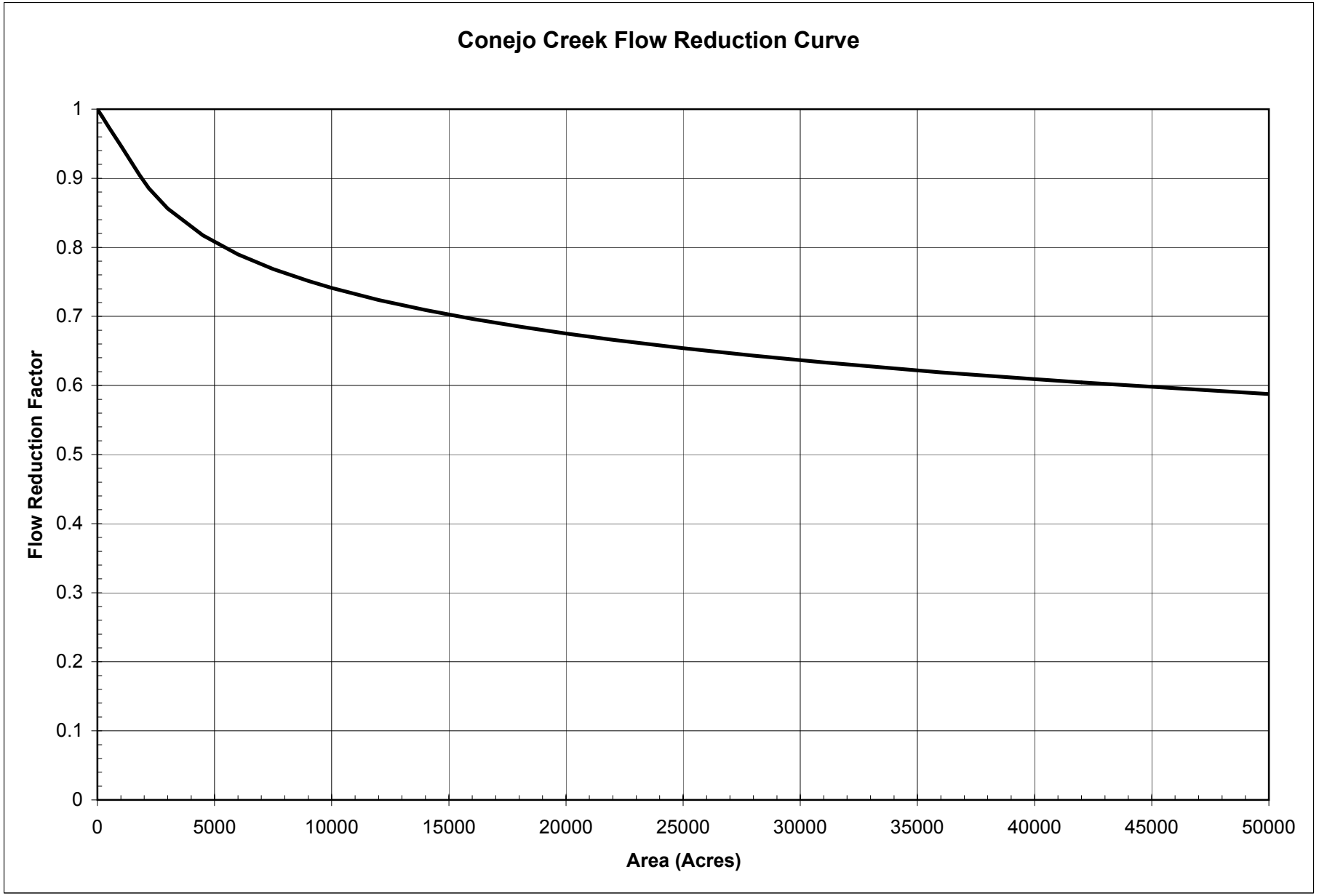

Conejo Creek Flow Reduction Curve
Flow Reduction Factor
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000
Area (Acres)

Figure 8

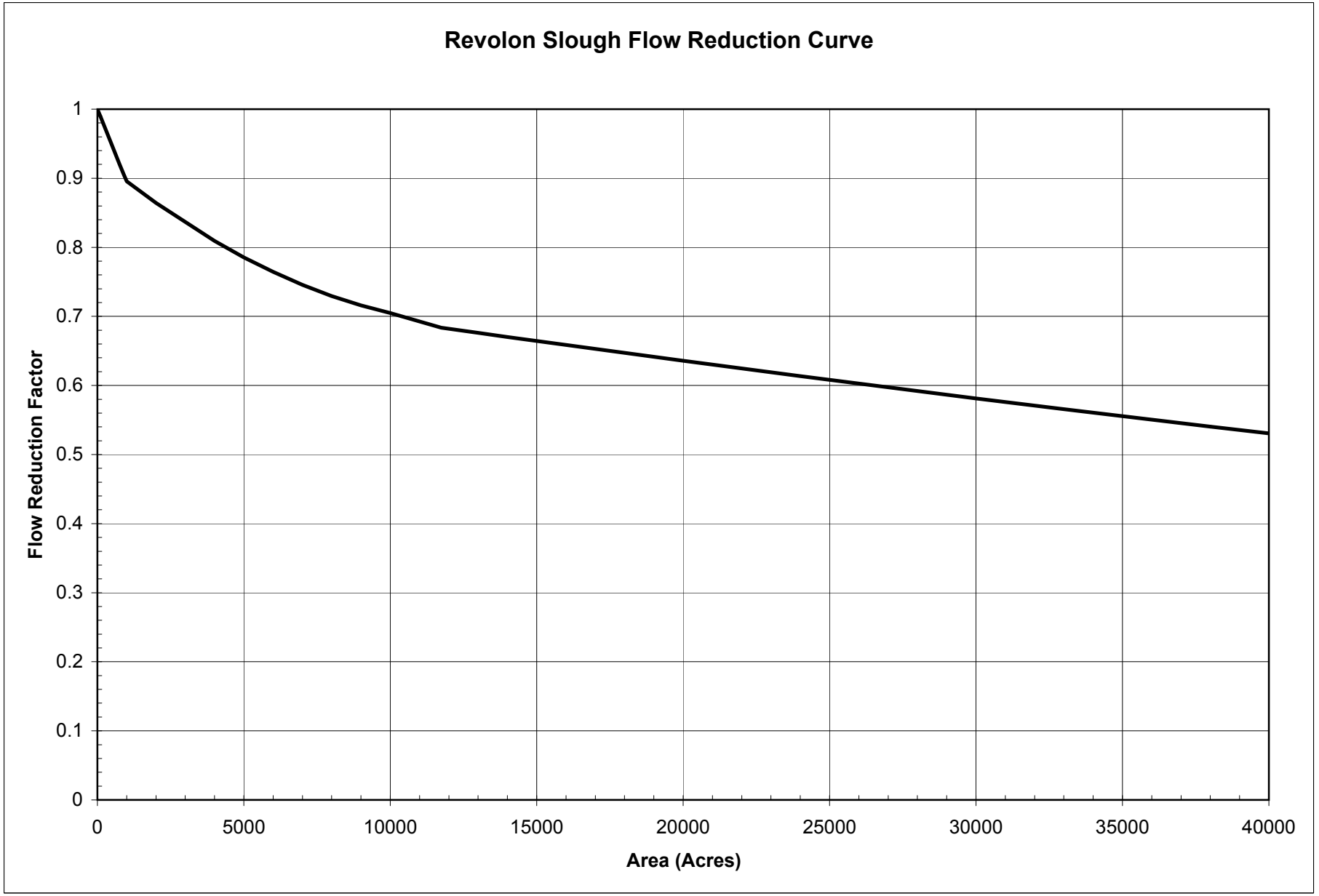

Revolon Slough Flow Reduction Curve
Flow Reduction Factor
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5000
10000
15000
20000
25000
30000
35000
40000
Area (Acres)

Figure 9

FINAL

GIS AND THE CALLEGUAS CREEK HYDROLOGY MODEL

The current hydrologic study of the Calleguas Creek Watershed has been significantly aided by the use of a Geographic Information System (GIS). The County of Ventura and the Flood Control Department have a very sophisticated GIS set up that allows desktop access to a wide array of geographic data.

A GIS is mapping software that links information about “where things are” with information about “what things are like”. Unlike with a paper map, where "what you see is what you get," a GIS map can combine many layers of information.

For this particular study the GIS layers that were utilized included: Hydrologic soils type, 3-D topography, streams and rivers, Flood Control facilities, aerial photography, parcel lot lines, major hydrologic drainage areas and very detailed subarea boundaries matching or correcting those of the VCRAT input model.

GIS helped to accurately and quickly populate the VCRAT hydrologic model input parameters for each subarea. The April 2000 detailed aerial photography was used to determine proper percent imperviousness factors, and for locating drainage patterns and current land use.

Topographic contour data was used to calculate accurate slopes of the main flowpaths. The streams and rivers layer helped in verifying channel location and routing order while the existing Flood Control facilities layer was used to verify proper channel type designation and the physical dimensions of all channels in the study area.

To determine the proper soil type for each subarea, a simple “cookie cutting” process was used. This resulted in a very accurate percentage of each soil type contained in each subarea. A weighted average was then input into the model.

The parcel lot line layer and street centerline layer were used as guides when adjusting subarea boundaries that happened to fall on housing tracts or developments.
GIS was a perfect tool for this hydrologic study. From instantaneous and extremely accurate subarea acreage calculations, to quick and easy subarea boundary editing, to presentation quality map production, it proved to be invaluable.

SECTION III

DESCRIPTION OF STUDY AREA

For Detailed Aerial Photos of Entire Watershed see Fig.2A-2D

LOCATION

SIMI VALLEY

The City of Simi Valley is located in the southeastern portion of Ventura County immediately adjacent to Los Angeles County. The developed portions of the City of Simi Valley are situated primarily on the valley floor with many proposed developments extending up the alluvial fans coming out of canyons. The valley is defined by the Santa Susanna Mountains on the north and east and by the Simi Hills on the south. The Santa Susanna Mountains separate the Simi Valley from the Santa Clara River Valley and Towns of Fillmore and Piru to the north. The Simi Hills separate the valley from the city of Thousand Oaks to the southwest, and Moorpark Sphere of Influence separates the western limit.

The major drainage course through the valley is the Arroyo Simi. This major channel drains from the extreme limits of the watershed in the east and northeast, then westerly through the Las Posas Valley (as Arroyo Las Posas) to the Oxnard Plain (as Calleguas Creek) and the Pacific Ocean.

Tributaries to Arroyo Simi from the Santa Susanna Mountains on the north are, from west to east, Alamos Canyon, Brea Canyon, North Simi Drain, Dry Canyon, Tapo Canyon, Chivo Canyon and Las Llajas Canyon. Canyons draining the Simi Hills from the south are Sycamore Canyon, Bus Canyon, Erringer Road Drain, Runkle Canyon, Meier Canyon and finally Black Canyon in Santa Susanna area.

MOORPARK

Moorpark Sphere of Influence comprises the drainage area tributary to Arroyo Simi from the junction with Canyon Number 2 on the east and Walnut-Gabbert Canyon on the west. It includes Peach Hill Wash, Castro Williams Drain, Happy Camp Canyon, Strathearn Canyon and other smaller unnamed watersheds.

In the urbanized area of the City of Moorpark, Gabbert and Walnut Canyon contain several reaches of improved concrete flood control channels that provide some flood protection for the City of Moorpark. While some reaches and crossings are undersized for today's modern

Design Flowrates, these facilities collect and convey storm runoff to the Arroyo Simi. Currently, a large portion of the Walnut-Gabbert watershed is not developed; however, there are planning efforts for private development on a significant portion of this area. The channel systems provide some flood protection benefit through an east to west channel alignment, which results in intercepting the drainage from the mouth of several large tributary canyons.

Existing stormwater detention facilities within Peach Hill Wash and Gabbert Canyon are the principal elements in a detention oriented approach for flood control, providing peak flow reduction based on temporary storage of the runoff volume. There are several basin sites have been selected for detailed evaluation at various locations within the watershed after performing feasibility screening of numerous alternatives.

CAMARILLO

The City of Camarillo is situated at the northeastern corner of the Oxnard Plain. The watershed of the city expanded on two major drainage courses: Calleguas Creek and Revolon Slough. The study area that drains to Calleguas Creek includes the easterly portion of the Camarillo Hills, south facing slopes of the Las Posas Hills, and Conejo Mountain and contains slopes ranging from five percent to 30 percent. Somis Drain, Saint John's Drain, and Lewis Road Drain under DISTRICT jurisdiction all drain to Calleguas Creek. Regular maintenance is performed on St. John's Debris Basin east of the St. John Seminary.

The majority of the Camarillo Hills south facing slopes drains to tributaries of Camarillo Hills Drain that eventually junctions with Revolon Slough to the west. There are several networks of regional facilities under the jurisdiction of the DISTRICT. Most of these consist of open channels, both lined and unlined, except collector drains in closed conduits. Moving from west to east tributaries to Camarillo Hills Drain includes Crestview Drain, Edgemore Drain, West Camarillo Hills Drain, Mission Drain, and Ponderosa Drain. Coming from the Las Posas Estates area and Spanish Hill's drainage are Ramona Place Drain and Las Posas Estates Drain which is split 60 percent of runoff going to Beardsley Wash and the other 40 percent of the flow goes to Camarillo Hills Drain west of the Camarillo Airport. To prevent hillside slope erosion entering the improved channels and lowering flow capacity, several debris basins are constructed in the upstream canyons. Regular maintenance is done on West Camarillo Hills West Branch Debris Basin, West Camarillo Hills East Branch Debris Basin, and Edgemore Debris Basin.

THOUSAND OAKS

Thousand Oaks study area is situated primarily within the watershed of the Arroyo Conejo, including Newbury Park, portions of Westlake Village, and nearly the entire city of Thousand Oaks. The developed portions of the city are situated primarily on the Conejo Valley floor and on slopes less than 25%.

The major drainage course through the City is the Arroyo Conejo. Major tributaries going from west to east includes South Branch Arroyo Conejo and North Fork Arroyo Conejo.

Each of these main tributaries contains large sub-watersheds. Included in South Branch Arroyo Conejo is Conejo Mountain Creek, Newbury Park Drain Numbers One and Newbury Park Drain Number Two. The South Branch Arroyo Conejo is a large part of the city, and the many studies on the watershed and its tributaries were done to update the 1990 FEMA hydrology. The DISTRICT requires that all new developments in the watershed provide flood detention to reduce downstream the 100-year flood peaks. The numerous detention basins that have been required by the VCFCD resulted in substantially reduced peak flows and reduction of areas subject to the 100-year flooding. Several detention dams and debris basins receive regular maintenance on this important rapidly developing watershed. They include Arroyo Conejo South Branch West Tributary Debris/Detention Basin, Conejo Mountain Creek Upper Debris Basin and Conejo Mountain Creek at Baseline Debris/Detention Basin, and South Branch Arroyo Conejo Debris Basin.

Major Tributaries to North Fork Arroyo Conejo, from west to east are Olsen Channel, Waverly Channel, Castano Channel and Castano Tributary. All of this area upstream is very developed but much of the impact of that urbanization is mitigated when all the improved drains join to meander through Wildwood Park. Draining directly to Arroyo Conejo are Lang Creek, Thousand Oaks North Drain, Erbes Road Drain, and Skeleton Canyon. Lang Creek Detention/Debris Dam is under construction and will mitigate the increased flows from Lang Ranch developments.

Not included in Conejo Creek drainage are south and eastern portions of the City including the Westlake Village that drain into Los Angeles County via Potrero Creek and Schoolhouse Canyon.

SANTA ROSA VALLEY

The Santa Rosa Valley is located approximately 6 miles east of the City of Camarillo. It is limited on the north by Las Posas Hills; on the south by the Mountclef Ridge; on the east by the Tierra Rejada Valley upstream of Highway 23 and on the west by the original grant line of Rancho Calleguas.

The Arroyo Santa Rosa headwaters begins in the Tierra Rejada Valley upstream of Highway 23 where the natural channel is called Tierra Rejada Creek. At the mouth of the Tierra Rejada Valley, the channel is called Arroyo Santa Rosa that traverses in a general east to west direction to its confluence with Conejo Creek. A large tributary coming from Norwegian Grade and east of Moorpark Road is Arroyo Santa Rosa Tributary that runs parallel to Santa Rosa Road and crosses it twice. Increased flows due to development are somewhat mitigated by the Santa Rosa Road Debris Basin constructed in 1957 by the Soil Conservation Service, however the lack of an adequate improved channel downstream of the basin results in the generation of a large floodplain. The Tributary junctions to Arroyo Santa Rosa downstream of Honey Hill Drive. Steep slopes descending from the hills north and south, and moderate prevailing slope from east to west characterize the area. Considerable urbanization has occurred in past ten years of very large single family homes; many with horses, tennis courts, and swimming pools.

SOILS CLASSIFICATION

The characteristics of the soils in the study area are another major factor affecting the rate of runoff and subsequent planning of storm drain facilities. The 1970 Soil Conservation Service Soil Survey of Ventura Area, California delineated many distinct soil types that were carefully divided into seven hydrologic soils from a set of maps covering the south half of Ventura County. Based on several soil properties, especially loss rate, the runoff potential is calculated as a function of applied rainfall intensity minus loss. Since the Design Storms assume three prior days of wetting with lesser storms followed by a fourth day with maximum design intensities, the loss rate is considered constant.

Group A (Soil Type 6 and 7): Soils have a high infiltration rate (1.5 to 2.0 inches per hours respectively) when thoroughly wetted; chiefly deep, well drained to excessively drained sand, gravel or both. Rate of water transmission is high; thus, runoff potential is low.
Group B (Soil Type 4 and 5): Soils have moderate infiltration rate (0.75 to 1.0 inches per hours respectively) when thoroughly wetted; chiefly soils that are moderately deep to deep, moderately well drained to well drained, and moderately coarse textured. Rate of water transmission is moderate.

Group C (Soil Type 2 and 3): Soils have slow infiltration rate (0.4 to 0.5 inches per hour respectively) when thoroughly wetted; chiefly soils that have a layer impeding downward movement of water, or moderately fine textured soils that have slow infiltration when dry. Rate of water transmission is low.

Group D (Soil Type 1): Soils have a very low infiltration rate (0.25 inches per hour) when wetted. They are chiefly clays that have a high shrink-swell potential, soils that have a high permanent water table, soils that have a claypan clay layer at or near the surface, or soils that are shallow over nearly impervious material. Rate of transmission is very slow; thus, runoff potential is very high.

Figures 3A-3D depict the distribution of various soil types within the study area.

LAND USE

Land use is a significant factor in the study since Time of Concentration and Percent Effective Imperviousness are most important parameters for developing a runoff model. "Existing" land use (including recently as-built developments or projects under construction) is considered in this study. (See Figure 4A-4D) For the future land use assumptions the model will incorporate the following: The specific cities General Plans, previous smaller scale hydrologic studies, Ventura County Land Use GIS coverage from the Southern California Association of Governments (1997) and any updates. The Present Condition Model completed in this report is governed by careful analysis of Year 2000 aerial photography. However, a Future Condition Model has been hampered by the inability thus

far for city planners to agree on a simple set of land uses to which effective imperviousness can be applied. Once agreement is reached, a Future Condition Model can be produced in less than one year.

CLIMATOLOGY

The Calleguas Creek watershed is a temperate Mediterranean Climate regime with mild temperatures with little variation in temperature extremes. For example, wintertime temperatures in a normal January would show the Average Maximum Temperature within Calleguas Watershed ranges from the low 60's to the high 60's degrees Fahrenheit. For Average Minimum Temperature most areas range from the low 40's inland to the upper 40's near the coast. Freezing temperatures (below 32 degrees Fahrenheit) usually occurs between December and February but only for a few hours and mainly in the Eastern part of the watershed. In summertime there is more variation between the Eastern part of the watershed especially for Average Maximum Temperature in July. Where the coastal area averages highs in the low 70's degrees Fahrenheit, Thousand Oaks and Simi Valley are upper 80's degrees Fahrenheit. It is not uncommon for "Santa Ana" wind events to have maximum temperatures within the watershed in the mid 90's or higher at any time of year, but most often occur during late September through December.

The summers are generally long and dry, with rain seldom occurring in May through August. Quite often if the fall months are wet, the winter following will be drier than normal. A normal year (Base Period of 1957 to 1992) has 73% of the annual rainfall between December and March. Snowfall is very rare. Mean annual precipitation is between 12 inches on the Oxnard Plain near Point Mugu to 21 inches in the higher elevations of Tapo Canyon with a weighted average of 15 inches per year (See Table 2, 36-Year Mean Annual Precipitation Table). Major winter storms generally originate over the Pacific Ocean as a result of the interaction between Polar Pacific and Tropical Pacific air masses that move eastward across the basin. These storms often last several days, and are accompanied by heavy precipitation. The other type storms that can cause damage are "Pineapple Connection" storms where a cold Winter Upper Level Low pressure center collides with a warm and very wet Subtropical Jet Stream originating out of the Hawaiian Islands area. Both types of storms create a Southwesterly flow that enhances the orographic effect of rainfall on the watershed.

RUNOFF CHARACTERISTICS

Undeveloped areas of Calleguas Creek Watershed comprise approximately 39 percent of the total area where some of the rainfall is intercepted by vegetation and evaporates, and some percolates into the ground resulting in relatively minor amounts of storm runoff except in very large storms. Other open areas, such as agricultural operations, parks, and golf courses contain some imperviousness for haul roads, parking lots, and associated buildings but rainfall has a chance to run across the cultivated furrows or grass in the fairway to percolate. The result is low to moderate runoff depending on the intensity of the rainfall. As

Table 2

Rain Gage #	Gage Name	Lat/Long	Monthly Average Rainfall (in.) Based on data from WY 1957-1992												Yearly Average Rainfall (in.) WY 1957-1992
			Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
3	Camarillo-Springfield Ranch	34:12:17 119:04:04	0.30	1.81	1.66	2.68	2.97	2.37	0.77	0.09	0.03	0.01	0.06	0.25	12.98
49	Santa Rosa Valley-Worthington Ranch	34:14:54 118:56:25	0.38	1.97	1.81	2.87	2.93	2.54	0.94	0.11	0.02	0.01	0.06	0.26	13.9
128	Thousand Oaks - County Fire Station	34:13:06 118:51:56	0.34	2.14	2.01	3.08	3.41	2.87	1.15	0.12	0.03	0.03	0.09	0.23	15.48
141	Moorpark - County Fire Station	34:17:14 118:52:52	0.39	1.95	1.88	2.83	2.98	2.83	0.98	0.16	0.03	0.02	0.10	0.24	14.38
154	Simi - County Fire Station	34:17:38 118:42:29	0.37	1.92	1.96	2.81	3.18	2.91	1.02	0.16	0.03	0.02	0.14	0.27	14.79
169	Thousand Oaks-Weather Station	34:10:44 118:51:01	0.33	2.16	2.10	3.07	3.50	2.88	1.13	0.11	0.03	0.02	0.09	0.22	15.64
187	Susana Knolls-County Fire Station	34:15:44 118:40:10	0.36	2.30	2.25	3.22	3.75	3.11	1.29	0.19	0.03	0.01	0.11	0.26	16.87
188	Newbury Park-County Fire Station	34:11:10 118:55:45	0.33	1.93	1.97	3.06	3.21	2.87	0.90	0.12	0.02	0.01	0.06	0.22	14.71
189	Somis-Deboni	34:17:05 119:04:20	0.37	1.95	2.06	3.15	3.49	2.94	1.04	0.12	0.03	0.01	0.06	0.28	15.5
190	Somis-Bard	34:16:58 119:00:25	0.39	1.98	2.05	2.91	3.08	2.81	0.98	0.12	0.02	0.01	0.07	0.24	14.69
191	Moorpark-Downing Ranch	34:19:34 118:53:42	0.48	2.33	2.26	3.43	3.68	3.21	1.11	0.18	0.04	0.02	0.11	0.26	17.11
192	Moorpark-Everett	34:15:02 118:50:36	0.34	1.85	1.70	2.66	2.85	2.64	0.93	0.13	0.02	0.02	0.09	0.21	13.43
193	Santa Susana	34:16:05 118:42:32	0.32	1.69	1.92	2.68	2.98	2.87	0.99	0.14	0.03	0.02	0.13	0.24	13.99
194	Camarillo-Adohr	34:12:17 119:00:45	0.30	1.61	1.66	2.53	2.65	2.43	0.80	0.09	0.03	0.01	0.07	0.22	12.39
196	Tapo Canyon	34:19:33 118:43:06	0.45	2.42	2.63	3.76	4.15	3.52	1.35	0.20	0.04	0.02	0.14	0.29	18.97
223	Point Mugu-USN	34:06:46 119:07:10	0.26	1.59	1.51	2.50	2.82	2.12	0.79	0.08	0.03	0.01	0.07	0.34	12.11

urbanization occurs, roofs and paved surfaces cover substantial portions of the surface area, significant increases occur in the storm runoff with even small storms. Therefore, as the density of development increases the resultant increase in storm runoff creates the need for drainage facilities to protect the valuable property from harm.

SECTION V

STUDY RESULTS

This report is intended to be used as a baseline condition for all communities within the Calleguas Creek Watershed for planning purposes. The information included in this report was derived from a model of present conditions and should not be used for design of future channels or improvements. Flowrates can be used to update Flood Insurance Rate Maps, to evaluate the need for detention from impact of new project flows, and to perform deficiency studies of existing facilities. Since the modified rational computer program computes a hydrograph for each subarea, junction analysis for every lateral drain, and performs storage routing within each reach, the output reflects a complex model not a simple peak producing calculation. Input can be modified to evaluate the impact of any channelization, detention basin or diversion prior to final design of a project. The second volume of this report will be to produce a design condition hydrology applying proposed future development and proposed improvement projects.

CALCULATED AND ESTIMATED PEAK FLOWS

Peak discharges for the 100-year frequency storm event were determined with the Calleguas Creek Watershed VCRAT model. Calculated peak discharges at specific points for Calleguas Creek and its tributaries are tabulated in Table 1a. Calculated peak discharges at specific points for Revolon Slough and its tributaries are tabulated in Table 1b. Hydrology maps are included as Figures 5a – 5d.

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.079	0.200	0.325	0.748	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.787
11B	ARROYO SIMI AT HWY. 118.(HEADWATERS)	256	56	141	229	527	704	1258
22A	ARROYO SIMI AT KUEHNER DR.	1053	169	427	694	1597	2135	3815
40AB	ARROYO SIMI PRIOR TO JCT. W/ WHITE OAK	1736	243	616	1001	2303	3079	5501
57B	WHITE OAK AT RONALD REAGAN FWY W/ MT. SINAI BASIN	975	74	186	303	697	932	1666
58B	WHITE OAK CHL.PRIOR TO JCT.W/HUMMINGBIRD W/BASIN	1009	74	187	304	699	934	1669
79C	HUMMINGBIRD CREEK DOWNSTREAM OF RONALD REAGAN FWY	1000	158	400	651	1497	2002	3577
82CD	HUMMINGBIRD CREEK AT KUEHNER DR.	1120	170	430	698	1607	2148	3839
85CD	HUMMINGBIRD CREEK AT ALSCOT AVENUE	1236	181	459	745	1716	2294	4099
87BC	WHITE OAK CHL.AFTER JCT.W/HUMMINGBIRD	2319	223	563	916	2107	2817	5035
88B	WHITE OAK PRIOR JCT.W/ARROYO SIMI	2361	222	562	914	2103	2812	5025
96AB	ARROYO SIMI AFTER JCT.W/WHITE OAK CHANNEL W/BASIN AT MT.SINAI	4426	467	1181	1920	4419	5907	10556
108AB	ARROYO SIMI AT STOW STREET (NEW STREAMGAGE SITE)	5004	506	1281	2081	4790	6404	11443
124A	ARROYO SIMI PRIOR TO JCT W/STEARNS ST.DRN.	5653	522	1321	2147	4941	6606	11805
134B	STEARNS ST.DRN.AT HWY 118	432	66	168	272	627	838	1498
145B	STEARNS ST.DRN.PRIOR JCT W/ARROYO SIMI	920	132	333	542	1247	1667	2978
146AB	ARROYO SIMI AFTER JCT.W/STEARNS ST. DRN.	6573	584	1479	2403	5530	7393	13211
147A	ARROYO SIMI UPSTREAM OF LAS LLAJAS CANYON CHANNEL	6636	585	1481	2406	5538	7404	13230
159BC	LAS LLAJAS DAM INFLOW	4327	363	920	1494	3439	4598	8216
160B	LAS LLAJAS DAM OUTFLOW Q100 FR VCRAT RUN,6/97,Y=3.97"LS	4327	43	109	176	406	543	970
173C	CHIVO CYN W/NO DAM PRIOR TO JCT.W/LAS LLAJAS	2528	230	583	947	2180	2915	5208
174BC	LAS LLAJAS CHL AFTER JCT.W/CHIVO CYN(NO DAM ON CHIVO)	6855	260	658	1069	2460	3289	5877
182C	MARR DIVERSION PRIOR TO JCT.W/LAS LLAJAS	381	72	181	294	677	905	1618
183BC	LAS LLAJAS AFTER JCT.W/MARR DIVERSION	7294	280	709	1152	2651	3544	6334
192C	KADOTA FIG CHL PRIOR TO JCT W/LAS LLAJAS	322	72	181	295	678	907	1620
193BC	LAS LLAJAS AFTER JCT.W/KADOTA FIG AT ALAMO ST.	7764	304	771	1252	2882	3853	6885
194B	LAS LLAJAS AT HWY 118 W/DAM ON LAS LLAJAS	7836	304	770	1251	2878	3848	6876
196B	LAS LLAJAS PRIOR TO JCT.W/ARROYO SIMI (NO DAM ON CHIVO)	7953	310	785	1275	2934	3923	7010
197AB	ARROYO SIMI AFTER JCT.W/LAS LLAJAS (ONE DAM) NO A.R.	14589	822	2081	3382	7785	10407	18598
217A	ARROYO SIMI PRIOR TO JCT W/TAPO ST.DRN.	15200	815	2064	3354	7720	10321	18444
233BC	TAPO ST. DRN.AT LOS ANGELES AVENUE	489	79	201	326	751	1004	1794
236AB	ARROYO SIMI AFTER JCT.W/TAPO ST. DRN.	15819	822	2080	3380	7780	10401	18586
270C	MEIER CYN.EAST FK.NR.BRANDIS CAMP	2104	213	538	875	2013	2691	4810
294D	MEIER CYN.WEST FK.PRIOR JCT.W/EAST FK.	1284	173	438	712	1638	2190	3914
296CD	MEIER CYN AFTER JCT.EAST & WEST FKS.	3388	346	875	1422	3273	4376	7819
303C	MEIER CYN PRIOR TO JCT.W/ARROYO SIMI	3744	342	867	1409	3243	4335	7747
306AC	ARROYO SIMI AFTER JCT.W/MEIER CANYON	19765	1085	2746	4463	10271	13731	24538
325A	ARROYO SIMI PRIOR TO JCT W/TAPO CYN CHL.	20687	1080	2733	4442	10222	13666	24422
343B	TRIPAS CYN PRIOR TO JCT.W/TAPO CYN	5556	474	1201	1952	4493	6006	10733
347BC	TAPO CANYON AFTER JCT.W/ TRIPAS CYN	6888	612	1548	2516	5791	7742	13835
355C	GILDEBRAND CANYON PRIOR TO JCT.W/TAPO CANYON	3142	299	758	1231	2834	3788	6770
356BC	TAPO CANYON AFTER JCT.W/GILDEBRAND CYN.	10536	872	2207	3587	8256	11037	19723
358B	TAPO CYN CHAL. AT TAPO CANYON ROAD (NO DAM)	11356	882	2234	3630	8355	11170	19960
359B	TAPO CANYON AT CANYON MOUTH W/LS SUBAREAS RUN,6/97,DDT/LS	11425	883	2235	3632	8360	11176	19972
390B	TAPO CYN AT HWY 118 W/SPLITS OF CAPACITY AT XINGS	12231	544	1378	2239	5153	6888	12310
	TAPO CANYON W/ SPLITS AT COCHRAN STREET	12327	239	606	985	2267	3031	5417
418B	TAPO CYN PRIOR TO JCT W/ARROYO SIMI W/LS SUBAREAS	13182	274	694	1127	2595	3469	6199
419AB	ARROYO SIMI AFTER JCT W/TAPO CYN CHL	33869	1190	3014	4897	11271	15068	26926
423BC	RUNKLE CANYON HEADWATERS ABOVE DAM	722	137	347	564	1299	1736	3103
424B	RUNKLE CANYON DAM INFLOW Q100,AR=0.92,Y=3.6,VVM/DDT/LS,6/97	954	106	269	437	1006	1345	2403
437B	RUNKLE CANYON AT FITZGERALD ST.	1632	160	405	658	1514	2024	3616
440B	RUNKLE CANYON PRIOR TO JCT. W/ARROYO SIMI	1782	163	413	671	1544	2065	3690
441AB	ARROYO SIMI AFTER JCT. W/RUNKLE CANYON	35651	1239	3138	5099	11736	15689	28037
452B	TAPO HILLS DIVERSION NO.2 INFLOW TO DAM	140	30	75	122	282	377	673
453B	TAPO HILLS DIVERSION NO. 2 OUTFLOW FROM DAM	140	6	14	23	53	71	127
460C	TAPO HILLS DIVERSION NO. 1 INFLOW TO DAM	110	23	59	95	220	294	525
460C	TAPO HILLS DIVERSION NO. 1 OUTFLOW FROM DAM	110	4	11	18	42	56	100
466B	DITCH ROAD DRAIN PRIOR TO JCT.W/DRY CANYON	385	30	75	122	280	374	669
488C	DRY CANYON CHANNEL PRIOR TO JCT.W/DITCH RD.DRN.	787	102	257	418	962	1286	2298
489BC	DRY CANYON CHANNEL AFTER JCT.W/DITCH RD.DRN.	1172	123	312	507	1167	1561	2789
500B	DRY CANYON CHANNEL AT HWY 118	1476	137	348	565	1300	1738	3105
509B	DRY CANYON CHANNEL AT RR PRIOR TO JCT W/LATERAL	1786	171	433	704	1621	2167	3872
513C	DRY CYN.LATERAL PRIOR TO JCT W/DRY CYN AB.RR	213	34	86	140	323	432	772
514BC	DRY CYN.CHL.AFTER JCT.W/LATERAL DRN.AB.RR	1999	193	488	794	1827	2442	4365
519B	DRY CANYON AT HEYWOOD STREET	2216	213	538	874	2012	2690	4807
520B	DRY CYN.CHL.PRIOR TO JCT.W/ARROYO SIMI	2234	212	537	873	2008	2685	4798

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.079	0.200	0.325	0.748	AERIAL RED.	AERIAL RED.
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.787
528AB	ARROYO SIMI AFTER JCT.W/DRY CYN DRAIN	38152	1262	3195	5192	11949	15974	28546
534B	ERRINGER ROAD LATERAL AT FITZGERALD PRIOR TO JCT.	228	42	105	171	394	527	942
542CD	EXISTING ERRINGER DEBRIS BASIN INFLOW	333	59	148	241	555	742	1326
548BC	ERRINGER RD. DRN. AFTER JCT.W/LATERAL	751	78	197	320	736	984	1759
550B	ERRINGER DRAIN AT ARCANE STREET	804	82	207	336	773	1034	1847
552B	ERRINGER RD. DRN. PRIOR TO JCT. W/ARROYO SIMI	874	83	210	341	785	1049	1874
553AB	ARROYO SIMI AFTER JCT.W/ERRINGER RD.DRN.	39026	1265	3204	5206	11982	16018	28625
563AB	ARROYO SIMI UPSTREAM OF BUS CANYON DRAIN	39334	1263	3198	5197	11961	15990	28575
568AB	ARROYO SIMI AT FIRST STREET	39538	1261	3192	5187	11939	15961	28523
596BC	BUS CANYON AT CYN.MOUTH AB.BRIDAL PATH HOMES	1657	208	526	855	1967	2630	4700
600B	BUS CANYON AT FIRST STREET	1913	198	500	813	1871	2502	4471
605C	BUS CANYON INFLOW TO DETENTION AREA	146	21	52	85	195	260	465
606C	BUS CANYON TRIBUTARY, OUTFLOW THRU DAM	146	10	25	40	92	123	220
609B	BUS CANYON BEFORE JNC W/BUS CAN. TRIB.	2257	198	500	813	1872	2502	4471
630C	BUS CANYON DRAIN TRIBUTARY AT FITZGERALD ROAD	590	89	225	366	841	1125	2010
633C	BUS CANYON DRAIN TRIBUTARY AT FIRST STREET	698	99	252	409	941	1259	2249
637C	BUS CANYON TRIBUTARY PRIOR TO JCT. W/BUS AT ROYAL	780	108	273	443	1020	1363	2436
638BC	BUS CANYON AFTER JCT.W/TRIBUTARY AT ROYAL AVE.	3037	220	558	906	2086	2789	4983
648B	BUS CANYON AT ARROYO SIMI PRIOR TO JCT.	3202	222	563	915	2106	2816	5032
649AB	ARROYO SIMI AFTER JCT.W/BUS CYN,EXISTING DAMS ONLY	42740	1346	3408	5537	12744	17038	30446
665B	NORTH SIMI DRAIN INFLOW TO PROPOSED DETENTION DAM	699	80	203	331	761	1017	1817
671BC	NORTH SIMI DRN AFTER JCT W/LATL ABOVE HWY 118 ROUTED TO CALDWELL	874	83	211	343	789	1054	1884
684BD	NORTH SIMI DRN W/COCHRAN ST LATERAL LIMITED TO 150 CFS	1183	97	245	399	918	1227	2193
686BC	NORTH SIMI DRN AFTER JCT. W/NORTH LATERAL AT FIRST STREET	1217	98	248	402	926	1238	2213
693BC	NORTH SIMI DRN AT FIRST STREET WITH 10-YEAR LIMITED PIPES	1443	108	274	445	1024	1369	2447
707AB	ARROYO SIMI AFTER JCT. W/NO SIMI DRN. W/NO DAM & NO LATL.	44451	1362	3448	5603	12895	17240	30808
722AB	ARROYO SIMI AT MADERA ROAD W/EXISTING DAMS	45013	1360	3444	5597	12881	17221	30774
739B	OAK CYN. AT LONG CANYON RD.	1477	176	446	724	1666	2228	3981
743B	OAK CYN .AT SYCAMORE DAM PRIOR TO JCT.W/OTHER TRIBS.	1831	165	419	681	1567	2095	3743
763CD	SYCAMORE CYN. AFTER JCT. W/TRIBUTARY NR.LAKE PK.DR.	755	95	241	392	902	1206	2155
785D	WEST FK. SYCAMORE CYN. PRIOR TO JCT. W/SYCAMORE	1461	163	412	670	1542	2062	3684
786CD	SYCAMORE CYN. AFTER JCT. W/ WEST FK. INFLOW TO DAM	2250	229	580	942	2168	2899	5180
795BC	SYCAMORE CYN. DAM TOTAL INFLOW	4390	399	1011	1642	3780	5053	9030
796B	SYCAMORE CANYON DETENT. DAM OUTFLOW, DBT/LS,7/97,Y=3.74"	4390	99	250	406	934	1249	2232
799C	SINALOA LAKE OUTFLOW	197	33	84	136	314	420	750
809B	SYCAMORE CYN CHL AT MADERA RD XING W/BONITA DR.	5114	136	345	561	1291	1726	3084
812B	SYCAMORE CYN CHL. PRIOR TO JCT. W/ARR. SIMI W/DAM	5276	153	386	628	1445	1932	3453
813AB	ARROYO SIMI AFTER JCT.W/ SYCAMORE CYN. W/ EXISTING DAMS	50289	1351	3420	5558	12791	17100	30558
837B	BREA CYN. AT CITY BOUNDARY	907	149	376	611	1407	1881	3361
847BC	BREA CYN. AT HIGHWAY 118	1181	154	391	635	1462	1954	3492
851B	BREA CYN PRIOR TO JCT. W/ ARROYO SIMI	1333	158	399	649	1493	1996	3566
852AB	ARROYO SIMI AFTER JCT. W/BREA CYN.	51622	1354	3428	5571	12822	17141	30632
871B	OUTLET FROM SIMI VLY SANITARY LANDFILL AB. HWY 118	192	36	91	148	341	455	814
990B	ALAMOS CYN AT CITY BOUNDARY	3496	290	735	1195	2750	3676	6569
998B	ALAMOS CYN. AT HWY. 118	3753	309	782	1271	2924	3910	6987
1000B	ALAMOS CYN.PRIOR TO JCT. W/ ARROYO SIMI (@railroad)	3804	310	784	1274	2932	3920	7005
1002AB	ARROYO SIMI AFTER JCT. W/ALAMOS CYN. Q-100P W/ EXISTING DAMS '97	56751	1379	3491	5673	13057	17455	31192
1031AB	ARROYO SIMI DOWNSTREAM OF ALAMOS CYN. MDP LIMIT LINE	57696	1376	3485	5662	13032	17423	31135

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.107	0.244	0.374	0.775	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.653
	CANYON NO.2 - EXIST.COND.Q100, W/J',DT/WF/LS 7/97,FN=CYN20797.HI							
1071B	OIL FIELD CYN PRIOR TO JCT W/ NO. 2 CANYON	964	137	313	479	993	1281	2117
1086E	NUMBER 2 CYN. PRIOR TO JCT. W/ OIL FIELD CYN.	710	123	281	430	891	1150	1901
1087BE	NUMBER 2 CANYON AFTER JCT. W/ OIL FIELD CYN.	1674	237	540	828	1715	2213	3658
1114D	CAMPUS ROAD CYN PRIOR TO JCT. W/ NO. 2 CANYON	877	139	318	487	1009	1302	2152
1115BD	NUMBER 2 CYN. AFTER JCT W/ CAMPUS RD CYN AT CITY BOUNDARY	3050	385	878	1346	2790	3600	5950
1125BF	CANYON NO.2 AT HWY 118 XING PRIOR TO JCT. W/ARR.SIMI	3321	386	880	1349	2796	3607	5963
1126AB	ARROYO SIMI AFTER JCT. W/ NUMBER 2 CYN.	61379	2062	4702	7208	14936	19272	31857
1128B	STRATHEARN CYN TR3963 Q100FW/RAMSEYER PROJ.W/J' DDT/GKC/LS,7/97	42	10	24	37	76	98	161
1138B	INLET Q AT TERMINUS 16TH CIRCLE & 17TH CIRCLE	440	71	163	249	516	666	1101
1139B	Q @ PRIVATE RECREATION AREA, PARCEL R-3	488	72	163	250	518	669	1105
1143B	Q @ [STL STRS. [STVR; P-2	519	72	163	250	519	670	1107
1145D	INLET Q AT TERMINUS C STREET	26	9	21	32	66	85	140
1148E	INLET Q AT 7TH CIRCLE	59	15	34	52	109	140	232
1161C	INLET Q AT PECAN AVENUE	414	63	144	221	457	590	976
1163BC	STRATHEARN CYN EAST FK.W/PECAN ST.PIPE INCL	1157	150	343	526	1089	1405	2323
1193D	STRATHEARN CANYON PRIOR TO CONFLUENCE WITH 111B	1452	181	413	633	1312	1693	2799
1194BD	STRATHERN CANYON AT TRACT BOUNDARY	2618	292	667	1022	2117	2732	4516
1197B	STRATHEARN CANYON AT ARROYO SIMI, W/ TR.3963	2675	292	666	1021	2116	2730	4513
1198AB	ARROYO SIMI AFTER JCT. W/ STRATHERN CYN.	64050	2152	4907	7521	15585	20110	33242
1277B	HAPPY CAMP CYN.AT REG. PK.UPSTREAM BOUNDARY	3920	349	796	1220	2529	3263	5393
1301B	HAPPY CAMP CYN AT DAM SITE #1A	5389	367	838	1284	2661	3434	5676
1316CE	HAPPY CAMP CYN AT DAM SITE #1B	891	105	239	366	758	978	1616
1317C	NO. FK. HAPPY CAMP CYN PRIOR TO W/ HAPPY CAMP MAIN CHL.	947	102	232	355	735	949	1569
1318BC	HAPPY CAMP CYN. AFTER JCT. W/ NO. FK. HCC	6408	431	982	1505	3118	4024	6651
1322BE	HAPPY CAMP CYN AT DAM SITE #2	6582	434	990	1517	3144	4057	6706
1329B	HAPPY CAMP CYN AT DAM SITE #3	7041	428	977	1497	3103	4003	6618
1330B	HAPPY CAMP CYN. AT CITY LIMIT BOUNDARY	7119	426	971	1489	3085	3981	6581
1337B	HAPPY CAMP CANYON AT HWY 118	7481	432	985	1510	3129	4038	6674
1343B	HAPPY CAMP CYN AT ARROYO SIMI	7589	433	986	1512	3133	4042	6682
1344AB	ARROYO SIMI AFTER JCT. W/HAPPY CAMP CYN. AT VA COLONY	72423	2374	5413	8297	17193	22185	36672
1350B	CASTRO WILLIAMS SPILLWAY WITH ROUTED FLOW FROM WEST, DDT/BJ	62	16	38	58	119	154	255
1361B	CASTRO WILLIAMS NEAR LOS ANGELES AVE.IN MOORPARK	357	61	140	215	445	574	949
1401AC	ARROYO SIMI AT NEW LOS ANGELES AVE. NEAR SCIENCE DR.	72906	2374	5413	8297	17193	22184	36670
1417B	CASTRO WILLIAMS SPILLWAY NEAR LOS ANGELES AVE.	928	164	375	574	1190	1536	2539
1427AB	ARROYO SIMI AT SPRING STREET- SITE OF GAGE 801	74000	2373	5412	8295	17190	22180	36664
1450AB	ARROYO SIMI AT LIBERTY BELL RD. (LETA YANCY)	74311	2372	5408	8290	17179	22166	36640
1463B	SHASTA DRAIN PRIOR TO JCT. W/ARR.SIMI	179	24	56	86	177	229	378
1464AB	ARROYO SIMI AFTER JCT.W/SHASTA DRAIN	74490	2371	5407	8288	17174	22160	36630
1472AB	ARROYO SIMI AT TIERRA REJADA ROAD.	74711	2368	5399	8275	17148	22127	36575
1490A	ARROYO LAS POSAS PRIOR JCT WITH PEACH HILL	74905	2364	5390	8262	17120	22091	36516
1491B	PEACH HILL UPDATE W/AS-BUILT PLANS & DEV.(NEW MAP) DT/BA/89	0	6	14	21	44	57	94
1501BC	PEACH HILL AT UPSTREAM END OF HAWKES FEMA STUDY	276	70	159	244	506	653	1079
1508D	PIPE IN TIERRA REJADA PRIOR TO JCT.W/PEACH HILL	172	43	98	151	312	403	666
1511E	PEACH HILL TRIBUTARY FRON NO.PRIOR TO JCT.W/MAIN CH.	154	35	81	124	257	331	547
1512BE	PEACH HILL WASH AFTER JCT.W/NO TRIBUTARY 1989 UPDAT	552	118	268	411	852	1099	1816
1513BD	PEACH HILL WASH AFTER JCT.W/PIPE IN TIERRA REJ. UPDT	724	152	346	531	1100	1420	2347
1520D	EAST BRANCH OF PIPE LATERAL PRIOR TO JCT.W/WEST BRCH.	234	49	113	173	358	462	764
1525E	WEST BRANCH OF PIPE LATERAL PRIOR TO JCT.W/EAST BRCH.	255	56	127	194	403	520	859
1526DE	102 INCH PIPE IN MT.MEADOW PRIOR TO JCT.W/MAIN BRCH.	489	102	232	356	738	952	1573
1527BD	PEACH HILL WASH AFTER JCT.W/102 IN PIPE UPDATE 89	1344	250	571	875	1814	2340	3868
1530C	PEACH HILL TRIBUTARY PRIOR TO JCT.W/MAIN UPDATE 89	37	10	22	34	69	90	148
1535BD	PEACH HILL WASH-TOTAL INFLOW INTO RETENTION BASIN	1619	228	519	796	1650	2128	3518
1536B	PEACH HILL WASH-OUTFLOW FRM RETENT.BSN.'89,Y=3.9W/125%DBR	1619	159	363	556	1152	1486	2456
1540B	PEACH HILL WASH-RTED.THRU BSN.PRIOR TO JCT.W/HOME ACRES	1664	159	361	554	1148	1482	2449
1555D	HOMEACRES DRN.PRR TO JCT.W/PEACH HILL RTED.THRU BASIN UPD	785	100	229	351	727	938	1550
1556BD	PEACH HILL WASH-AFTER JCT.W/HOMEACRES,INC.BSN.RTE. 89 UPD.	2449	231	526	806	1671	2156	3564
1557B	PEACH HILL WASH-AT ARR. SIMI W/RTED.BSN & HOMEACRES UPD	2527	227	518	795	1647	2125	3512
1558AB	ARROYO LAS POSAS AFTER JT.W/PEACH HILL WASH & HOMEACRES	77432	2421	5521	8463	17537	22629	37405
1561B	WALNUT-GABBERT CYN,ULT.LNDUSE, J&K ZONE RAIN DDT/DKT 5/96	94	24	55	84	175	226	373
1566B	WALNUT CANYON ROAD	390	88	201	308	638	823	1360
1567B	DOWNSTREAM OF WALNUT CANYON	439	96	220	337	697	900	1488
1574BC	WALNUT CYN JCT.W/WEST LATL.ULTIMATE LANDUSE NO DETN.	709	146	334	512	1060	1368	2261
1586E	MOORPARK DRN. NO. 1 PRIOR TO WALNUT CYN JCT.	27	8	18	28	58	75	124
1587DE	MOORPARK DRAIN NO. 1 PER '95 MDP W/ULTIMATE CONDITION	144	31	71	109	226	292	482
1588BD	WALNUT CYN DRN.JCT W/MPK DRN.NO.1 W/ULTIMATE LANDUSE	853	169	385	591	1224	1580	2611
1589B	WALNUT CYN . CHL. AFTER JCT. W/ MPK. DRN. NO. 1	853	168	383	588	1218	1571	2597

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.107	0.244	0.374	0.775	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.653
1595BC	WALNUT CYN DRN.JCT W/LATL.BEFORE GABBERT RD. ULTIMATE	1048	191	436	669	1385	1788	2955
1606CE	WALNUT TRIBUTARY AT FUTURE FREEWAY XING, ULTIMATE	468	98	223	342	708	914	1510
1608BC	WALNUT CYN. AFTER JCT. W/LATERALS ADJACENT TO GABBERT RD.	1546	198	453	694	1437	1855	3066
1609B	WALNUT CYN. CHL. PRIOR TO JCT. W/ GABBERT CYN. DRN.	1616	199	453	695	1440	1859	3072
1610B	WALNUT CANYON AT HWY 118 PRIOR JCT. ULTIMATE CONDITION	1616	199	453	694	1438	1855	3067
1621D	DRAIN FROM EAST ALONG HWY 118 PRIOR TO JCT. W/WALNUT	173	40	90	138	287	370	611
1622BD	WALNUT CYN AT HWY 118 AFTER JCT. W/HWY DRAIN FROM EAST	1789	203	464	711	1473	1901	3142
1640DF	EPWORTH DRAIN AT BROADWAY; ULTIMATE LANDUSE	538	79	179	275	569	735	1214
1655DE	EPWORTH DRN AT JCT.W/GABBERT NR.MPK CITY LMTS. ULTIMATE	1177	160	365	560	1161	1498	2476
1664CD	GABBERT CYN AFTER JCT W/MPK.COUNTRY CLUB ESTAT.ULTIMATE	2151	205	467	716	1483	1914	3163
1669C	GABBERT DEBRIS BASIN INFLOW ULTIMATE, NO DETENTION	2441	203	462	709	1468	1894	3132
1673C	GABBERT CYN PRIOR JCT. W/WALNUT CYN, ULTIMATE LAND USE	2571	204	465	712	1476	1905	3149
1674BC	WALNUT-GABBERT AT JCT.ABOVE HWY 118 ULTIMATE LAND USE	4360	394	899	1378	2855	3684	6090
1678BD	GABBERT CYN AT ARROYO SIMI, ULTIMATE, NO RETENTION	4424	395	901	1382	2863	3694	6106
1679AB	ARROYO LAS POSAS AFTER JCT.W/GABBERT CYN NR. HITCH BLVD.	81856	2501	5702	8741	18112	23371	38632
1683A	ARROYO LAS POSAS PRIOR TO GRIMES CANYON Q-100P (@HITCH BLVD.-CS9)	82396	2496	5692	8725	18081	23330	38564
1700BC	SOUTH GRIMES WITH TRIBUTARY	2996	215	491	752	1559	2011	3324
1705AB	ARROYO LAS POSAS WITH SOUTH GRIMES CANYON WASH	86257	2581	5885	9020	18691	24118	39867
1713AB	ARROYO LAS POSAS AFTER JCT. W/HUNT WASH CYN.	87925	2597	5922	9078	18810	24271	40121
1717A	LAS POSAS HILLS PRIOR JUNC. W/ARROYO LAS POSAS	88364	2594	5915	9067	18788	24242	40072
1744B	LONG CANYON PRIOR TO JCT W/ ARROYO LAS POSAS	3240	271	617	946	1960	2529	4181
1746AB	ARROYO LAS POSAS AFTER JCT. W/LONG CYN	91743	2686	6125	9388	19455	25103	41495
1753B	MAHAN BARRANCA AT HWY 118 PRIOR TO JCT.W/ARR. LAS POSAS	1385	103	234	359	745	961	1588
1755AB	ARROYO LAS POSAS AFTER JCT. W/ MAHAN BARR.	93613	2720	6203	9507	19701	25420	42020
1764B	SAND CANYON PRIOR TO JCT W/ ARROYO LAS POSAS	1630	207	471	722	1497	1931	3192
1766AB	ARROYO LAS POSAS AFTER JCT. W/SAND CANYON	95297	2742	6253	9585	19862	25629	42364
	VCRAT MODEL-COYOTE & FOX CYNS,PRESENT COND.,DDT/LS,12/97							
1799B	PUERTA ZUELA PRIOR TO JCT.W/DONLON DRN.	1970	186	423	649	1344	1734	2867
1804C	DONLON DRN. PRIOR TO JCT.W/PUERTA ZUELA	252	34	78	119	247	319	527
1805BC	PUERTA ZUELA AFTER JCT. W/ DONLON DRAIN	2222	204	465	713	1477	1905	3150
1828CD	COYOTE CYN AT BRADLEY RD CROSSING	1555	201	457	701	1453	1875	3099
1838C	COYOTE CYN PRIOR TO JCT. W/PUERTA ZUELA	2253	194	443	679	1407	1816	3001
1839BC	COYOTE CYN AFTER JCT. W/ PUERTA ZUELA	4475	373	851	1305	2703	3488	5766
1845B	COYOTE CANYON PRIOR CONFLUCENCE WITH FOX CANYON	5015	384	875	1342	2781	3588	5931
1879CD	FOX CANYON AFTER JCT. W/BOONE CYN	2234	262	598	917	1899	2451	4051
1883C	FOX CYN NORTH OF HWY 118 PRIOR TO JCT W/ BERYLWOOD CYN	2484	262	597	915	1896	2446	4044
1891D	BERYLWOOD CYN. AT HWY 118 PRIOR TO JCT W/ FOX CYN.	589	87	199	305	632	816	1348
1892CD	DOWNSTREAM OF FOX CANYON CONFL. W/BERYLWOOD CANYON	3073	285	649	995	2062	2660	4397
1894C	FOX CANYON DEBRIS BASIN	3170	284	648	993	2057	2654	4388
1897C	FOX CANYON PRIOR CONFLUENCE WITH COYOTE CANYON	3279	285	650	996	2064	2663	4401
1898BC	COYOTE CYN AFTER JCT W/ FOX CYN BARRANCA	8294	644	1469	2252	4667	6022	9954
1899AB	ARROYO LAS POSAS W/COYOTE AND FOX CANYONS	104015	2959	6748	10343	21432	27655	45713
1900A	ARROYO LAS POSAS AT SOMIS AFTER JCT.W/FOX & COYOTE	104098	2958	6745	10338	21422	27642	45692
1944B	GROVES PLACE DRAIN AT LEWIS RD. PRIOR TO JCT.W/ARR.LAS POSAS	262	39	88	135	280	362	598
1945AB	CALLEGUAS CK. AT SEMINARY BEND	105509	2962	6754	10353	21454	27682	45759
1959B	ST. JOHN'S DRAIN PRIOR TO JCT. W/ CALLEGUAS	369	73	167	256	530	684	1130
1960AB	CALLEGUAS CK. AFTER JCT. W/ ST. JOHN'S DRAIN (@UPLAND RD.)	105897	2964	6758	10359	21467	27699	45786
1981A	CALLEGUAS CRK. AT ADOLFO ROAD	106543	2963	6758	10358	21464	27696	45782
1986D	SOMIS DRAIN	82	24	55	85	176	227	376
2007D	SOMIS DRAIN AT E.LOOP-LAS POSAS RD	292	71	162	248	514	664	1097
2014BE	SOMIS DRAIN DOWN TO SHEPERD DRIVE AND DARA STREET	655	110	252	386	800	1032	1706
2019BD	WEST DRAIN TRIBUTARY WITH SOUTHERN PACIFIC (LEWIS RD.-DURKIN)	745	121	275	422	875	1129	1866
2023B	SOMIS DR. PRIOR TO JCT W/CALLEGUAS CREEK	886	123	280	429	890	1148	1898
2024AB	CALLEGUAS CREEK AFTER JCT.W/SOMIS DRAIN	107447	2972	6778	10390	21529	27780	45920
2038AD	CALLEGUAS CREEK AFTER JCT W/FLYNN ROAD DRAIN (CS5)	107746	2974	6782	10395	21541	27795	45945
2046AB	CALLEGUAS CREEK AT PLEASANT VALLEY ROAD	107941	2980	6796	10417	21587	27854	46043
2050A	CALLEGUAS CREEK BEFORE JCT W/CONEJO CREEK & LEWIS DRAIN	107995	2972	6776	10387	21523	27772	45907
2051B	LEWIS ROAD DRAIN AT DURKIN STREET	36	8	18	27	56	73	120
2086AB	CALLEGUAS CREEK WITH LEWIS ROAD DRAIN	109256	2960	6749	10345	21436	27659	45721

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.142	0.287	0.416	0.796	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.587
	CONEJO CREEK W/T.O. MDP SUBAREAS RENUMBERED							
	SO.BR & CMT Q100 LG/SV/DH/DT FROM SBR-1-93 NEW FN=SBAC997.HI							
2112BC	SO.BR.ARR.CON.TRIBUTARY FROM SO.FK.STATE PARK AREA PRR TO JCT.	632	106	214	310	592	744	1181
2220C	SO.BR.ARROYO CONEJO INFLOW TO DETENTION BASIN-TR. 4831	244	122	246	356	682	857	1360
2246CE	SO. BR. ARR. CONEJO TRIB. FROM TR.4831	307	143	290	420	804	1010	1603
2275C	SO.BR.ARR.CON.POTRERO INFLOW TO BASIN AREA	358	168	340	493	944	1186	1882
2277F	SO.BR.ARR.CON. OUTFLOW HYDROGRAPH FROM POTRERO BASIN(AR=0.974,YIELD=6.2")	0	46	93	135	259	325	516
2299C	SO.BR.ARR.CON.EAST TRIBUTARY PRIOR TO JCT.W/MAIN CHAL.	927	117	237	344	658	827	1313
2300BC	SO.BR.ARR.CON-EAST AND WEST COMBINE 50% YIELD 5.25" & AR	1611	195	393	570	1091	1370	2174
2301BF	SO.BR.ARR.CON.-EAST, WEST AND POTRERO BASIN COMBINED	1611	238	481	697	1334	1676	2660
2305B	SO BR.ARR.CON.ALONG REINO RD.PRIOR TO KIMBER BASIN(64A)	1611	238	480	696	1332	1673	2655
2332C	NEWBURY PK DRN # 3 PRIOR TO JCT.W/SO. BR. ARR. CONEJO	867	314	634	919	1759	2210	3507
2334BC	SO.BR.ARR.CON. PRIOR TO PROPOSED 2000 CFS SPLIT ,W/NO R.F.	2544	519	1048	1519	2907	3652	5796
2336BF	SO. BR. ARR. CON. 2200 CFS SPLIT FLOW AT REINO RD BYPASS	2544	312	631	915	1751	2200	3491
2340B	SO. BR. ARR. CON. BEFORE CONFL. WITH CONEJO MOUNTAIN CR.	2567	334	674	977	1870	2349	3728
2500CE	CON. MT. CK. INPUT HYDROGRAPH BEFORE BYPASS BASIN	1049	318	643	932	1784	2241	3557
2510C	CMC BYPASS LOW FLOW ROUTING W/BYPASS CUTOFF 940 CFS	1537	5	10	14	27	34	54
2524CD	CONEJO MT CK. BYPASS W/LOCAL AREA DOWNSTREAM OF DAM	1657	182	368	534	1022	1284	2037
2528BC	SO.BR.ARR.CON.-INFLOW HYDROGRAPH AT MAURICE ("A") ST. FLOW THROUGH BASIN	4224	507	1024	1484	2840	3568	5662
2539B	SO.BR. ARR. CON. OUTFLOW HYDRO. FROM MAURICE ST. ROUTED TO U/S HWY 101	4224	491	993	1440	2755	3461	5493
2545B	SO.BR. ARR. CON. OUTFLOW HYDROGRAPH AT COHEN'S PROPERTY KIMBER/REINO	4363	497	1005	1457	2788	3503	5559
2549B	SO.BR.ARR.CON. ALONG REINO PRIOR TO BORCHARD INTERSECTION W/DAMS UPS.	4408	498	1006	1458	2791	3506	5564
2559BC	SO.BR.ARR.CON. AT REINO & BORCHARD RD. W/UPSTREAM DAMS AND AREA RED.	4737	571	1153	1672	3199	4019	6378
2611BC	SO. BR.ARR.CON. INFLOW HYDRO. TO EXISTING FLOWAGE EASMT. U/STM. OF HWY101	6529	934	1887	2735	5233	6574	10433
2612BF	SO.BR.ARR.CON.AFTER SPLIT TO CHUTE AT HWY.101 & BORCHARD RD.	6529	639	1292	1872	3582	4500	7142
2613F	SO.BR.ARR.CON. BYPASS BASIN ABOVE HWY. 101 W/ ADJUSTED VOLUME & ROUTING	0	295	595	863	1651	2074	3291
2615B	SO.BR.ARR.CON. AT HWY.101 & BORCHARD RD FLOW INTO CHUTE	6529	639	1292	1872	3582	4500	7142
2647D	SO.BR.ARR. CONEJO. POSSIBLE FUTURE BASIN SITE	523	175	354	512	981	1232	1955
2689C	LATERAL FLOW TO SO. BR. NEAR VENTU PARK ROAD PRIOR TO JCT. W/SO. BR. ARR. CON.	2108	562	1136	1646	3150	3957	6280
2690BC	SO.BR. ARR.CON. AFTER JCT. W/LATERAL BELOW VENTU PARK. RD.W/CHUTE UPSTREAM	8637	1182	2388	3462	6624	8322	13207
2704B	SO.BR. ARR. CON. PRIOR TO CONF W/ARR CONEJO W/DAMS & CHUTE UPSREAM	8637	1182	2388	3462	6624	8322	13207
	LANG CK.W/OUT RBF BSN-VCFCD RTG.TO ARR.CON.JCT. DBT 1/99							
2764CE	LANG CREEK AT WESTLAKE BLVD DEBRIS BSN SITE.YIELD=3.8	2158	403	814	1180	2258	2836	4501
2768CD	LANG CK.W/OUT DETENTION DAM	2245	403	814	1180	2258	2836	4501
2782CD	LANG CREEK AT ERBES W/OUT DETENTION DAM	2875	418	845	1225	2345	2946	4675
2785C	LANG CREEK AT EL MONTE W/OUT DETENTION DAM	3038	421	851	1234	2360	2965	4706
2791C	LANG CREEK UPSTREAM OF HWY 23 W/OUT DETENTION DAM	3260	427	862	1250	2391	3004	4767
2802CD	LANG CREEK AT SPALDING W/OUT DETENTION DAM	3676	460	930	1348	2580	3241	5144
2804C	LANG CREEK DOWN TO COMBES AVE. AND PAIGE LN.	3768	466	942	1366	2614	3284	5211
2805C	LANG CRK DOWNSTREAM OF WILBUR RD. W/OUT DETENT. DAM	3839	474	958	1389	2657	3338	5298
2807C	LANG CRK PRIOR TO JCT. W/ARR.CONEJO W/OUT DETENT. DAM	3892	476	962	1394	2668	3351	5319
2842D	SKELETON CYN. AT CRESTHAVEN CROSSING	1179	293	593	860	1645	2066	3279
2852D	SKELETON CYN. AT HILLCREST W/VCFCD ROUTING 1/99	1594	337	681	986	1887	2371	3763
2879E	LOS ROBLES DRAIN AT HWY. 101 NEAR HAMPSHIRE ROAD XING	129	61	123	178	342	429	681
2890E	LOS ROBLES DRAIN AT OAK VIEW DRIVE	474	200	403	585	1119	1406	2231
2891E	LOS ROBLES DRN.PRIOR JCT.W/ARR.CON. W/VCFCD RTG.	523	214	432	627	1199	1506	2390
2895DE	ARR.CON.AFTER JCT.W/ROBLES DRN. W/VCFCD ROUTING	2904	623	1260	1826	3494	4389	6966
2898D	ARROYO CONEJO PRIOR TO JCT. W/ ERBES ROAD DRAN.	2954	637	1288	1866	3571	4486	7120
2907E	ERBES RD.DRN.PRIOR JCT.W/ARR.CON. DEV W/VCFCD RTG.	255	97	196	284	543	682	1082
2908DE	ARROYO CONEJO AFTER JCT. W/ ERBES ROAD DRAIN	3209	699	1412	2047	3918	4922	7811
2927DE	ARROYO CONEJO AT HODENCAMP RD. PRIOR TO JCT. W/ T.O. NO. DRAIN	3621	754	1523	2208	4225	5308	8424
2967E	THOUSAND OAKS NO. DRAIN AT LA JOLLA DRIVE	579	217	438	634	1214	1525	2420
2970E	THOUSAND OAKS NO. DRAIN AT HWY. 23 (DOWN TO HOUSTON-GREENWICH)	726	253	511	741	1417	1781	2826
2972E	THOUSAND OAKS NO.DRN.PRIOR JCT.W/ARR.CON. W/VCFCD RTG	805	266	537	779	1490	1872	2970
2973DE	ARROYO CONEJO AFTER JCT. W/ T.O. NO. DRN. W/VCFCD RTG.	5044	1114	2252	3264	6246	7847	12453
2974D	ARROYO CONEJO DOWN TO BOARDWALK AV.	5111	1117	2258	3274	6264	7869	12488
2976CD	ARR.CON.AFTER JCT.W/LANG CRK W/NO DAM UPS. W/VC.RTG.	9003	1459	2948	4274	8177	10273	16303
2977C	ARROYO CONEJO AT MOORPARK RD. W/NO DAM ON LANG CK.	9003	1457	2946	4269	8169	10263	16288
3019CD	ARROYO CONEJO DOWN TO W.THOUSAND OAKS BL.	10188	1589	3211	4654	8905	11188	17755
3029C	ARROYO CONEJO W. OF LYNN RD. PRIOR TO JCT. W/ PARK DRAIN	10488	1592	3218	4664	8925	11212	17793
3045D	PARK DRAIN PRIOR TO JCT. W/ ARROYO CONEJO AT LYNN RD.	742	153	310	450	860	1081	1715
3046CD	ARROYO CONEJO AFTER JCT. W/ PARK DRAIN WEST OF LYNN RD.	11230	1684	3403	4933	9439	11858	18818
3076D	HAIGH ROAD DRAIN AT HWY. 101	201	78	158	229	439	551	875
3079C	ARROYO CONEJO JUST PRIOR TO JCT.W/SO.BR.ARR.CON.(T.O. MPD #379A)	12311	1731	3499	5071	9704	12191	19347
3080BC	AR.CONEJO AFTER JCT.W/ SO.BR.ARROYO CONEJO (TO MPD #579AB)	20948	2408	4867	7055	13499	16958	26912
3087C	AMGEM DRAIN PRIOR TO JCT. W/ ARROYO CONEJO	124	33	66	95	183	229	364
3088BC	ARROYO CONEJO AFTER JCT. W/ DRAIN FROM AMGEM DEVELOPMENT	21259	2409	4868	7057	13503	16963	26921

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.142	0.287	0.416	0.796	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.587
3167D	NO.FK.ARR. CONEJO TRIBUTARY AT HWY. 23 AND AVENIDA DE LOS ARBOLES	120	49	98	142	272	342	542
3181D	CASTANO CHL.TRIBUTARY PRIOR TO JCT.W/CASTANO CHL. NO. OF LOS ARBOLES	232	89	181	262	501	629	998
3188E	CASTANO CHL.PRIOR TO JCT.W/CASTANO TRIBUTARY	190	78	157	228	437	548	870
3189DE	CASTANO CHL. AFTER JCT. W/ CASTANO TRIBUTARY	422	156	315	457	875	1099	1744
3190D	CASTANO CHANNEL PRIOR TO JCT. W/ NO.FK. ARR. CONEJO	505	173	350	508	971	1220	1937
3204C	NO. FK. ARROYO CONEJO WEST OF LYNN ROAD	1754	373	754	1093	2092	2629	4172
3205C	NO. FK. ARROYO CONEJO PRIOR TO JCT. W/ WAVERLY CHANNEL	1813	379	767	1111	2126	2671	4239
3211DE	WAVERLY CHANNEL DOWN TO MOORPARK ROAD	157	63	128	185	354	444	705
3221D	WAVERLY CHANNEL AT LYNN ROAD	644	196	396	573	1097	1378	2187
3233D	WAVERLY CHANNEL PRIOR TO JCT. W/ NO.FK. ARR. CONEJO	1070	306	619	898	1718	2158	3425
3234CD	NO. FK. ARROYO CONEJO W/WAWERLY CHNL.	2883	638	1290	1870	3579	4496	7135
3250D	OLSEN CHANNEL AT MOORPARK ROAD	251	123	249	360	690	866	1375
3258D	OLSEN CHANNEL WEST OF CAL LUTHERAN COLLEGE AT MEMORIAL PARKWAY	580	193	389	564	1080	1357	2154
3276D	OLSEN CHANNEL AT AVENIDA DE LOS ARBOLES	1400	302	610	884	1692	2126	3373
3280CD	NO. FK. ARR. CONEJO AFTER JCT. W/ OLSEN CHANNEL	4773	884	1786	2588	4953	6222	9874
3292C	NO. FK. ARROYO CONEJO PRIIOR TO JCT W/ ARROYO CONEJO	5312	862	1742	2525	4832	6071	9634
3293BC	CONEJO CREEK AFTER JCT. W/ NO. FK. ARROYO CONEJO	28725	3214	6496	9415	18016	22633	35918
3300B	CONEJO CREEK BEFORE JCT. W/ ARROYO SANTA ROSA (TO MPD #800A)	29033	3205	6478	9390	17968	22573	35823
3332C	SOUTH FORK TIERRA REJADA CK(EVERETT RANCH W/J'RAIN	1196	275	555	805	1540	1934	3069
3387DE	TIERRA REJADA VLY AT U/S FACE OF 23 FREEWAY	1397	258	522	756	1447	1818	2885
3388D	TIERRA REJADA VLY AT D/S FACE OF 23 FREEWAY	1397	258	521	755	1444	1814	2879
3395CD	TIERRA REJADA VLY AT MOORPARK RD(W.OF 23 FREEWAY)	3643	619	1251	1813	3469	4358	6917
3398CE	TIERRA REJADA VLY AT W OF MRPARK RD,W/ MRPARK HIGHLANDS	3719	629	1272	1844	3528	4432	7033
3424D	TIERRA REJADA VLY, SO. CHNL AT SANTA ROSA MOUTH (J'100)	374	63	127	184	352	442	702
3428CD	TIERRA REJADA VLY AT ARR STA ROSA MOUTH,W/O PC-4,(J'ZN)	4516	667	1348	1953	3737	4695	7451
3430C	ARROYO SANTA ROSA AT CONCRETE ARCH DAM (J'100)	4648	654	1322	1917	3668	4608	7313
3449CD	ARR.STA.ROSA AT E.LAS POSAS RD.JCT.W/PENFIELD&SMITH UPDAT	5329	635	1284	1861	3561	4473	7099
3452CD	ARR.STA.ROSA DWNSTRM.OF LOS POSAS RD (D/S OF FLOOD WALL)	5426	635	1284	1861	3560	4472	7098
3454C	ARR.STA.ROSA @ THE BRIDGE @ SANTA ROSA RD.	5510	603	1218	1765	3378	4243	6734
3466CD	ARR.STA.ROSA AFTER JCT.W/DUVAL RD.DRN,PRIOR TO JCT.W/TRIB.	5945	596	1205	1747	3342	4199	6664
3473DE	STA.ROSA TRIB.AT MOUTH OF McRAE RANCH	344	89	180	261	500	628	997
3480DE	STA.ROSA TRIB.AT INTERSECTION OF MOORPARK RD & SANTA ROSA RD.	509	122	247	358	685	860	1365
3503DE	STA.ROSA TRIB.AT VISTA ARROYO DR.	1109	189	382	553	1059	1330	2111
3513DE	STA.ROSA TRIB.AT STA.ROSA RD.BELOW DEBRIS DAM,P&S UPDATE	1379	216	436	632	1209	1519	2411
3535D	STA.ROSA TRIB.PRIOR TO JCT.W/ARR.STA.ROSA, P&S UPDATE	2398	325	657	952	1821	2288	3631
3536CD	ARR.STA.ROSA @JCT.W/SAT.ROSA TRIB, PENFIELD &SMITH UPDATE	8343	677	1369	1984	3796	4769	7568
3568CD	ARR.STA.ROSA PRIOR JCT.W/CONJ. CK.W/PENFIELD&SMITH UPDATE	9186	672	1359	1970	3769	4735	7514
3570BC	CONEJO CREEK AFTER JCT. W/ARR.STA.ROSA PRESENT	38437	3299	6667	9664	18492	23231	36867
3597BC	CONEJO CREEK AFTER JCT. W/ BARBARA DRIVE DRAIN	39701	2953	5969	8652	16556	20799	33008
3621C	CAMROSA DRAIN PRIOR TO JCT. W/CONEJO CREEK	409	107	216	314	600	754	1197
3630BD	CONEJO CREEK AT GAGE VC800	41370	3136	6339	9188	17581	22087	35051
3647C	UPLAND RD.DRN.PRIOR TO JCT. W/CONEJO CK.	592	203	409	594	1136	1427	2264
3648BC	CONEJO CREEK AFTER JCT.W/ UPLAND RD. DRN.	42174	3298	6665	9661	18486	23223	36855
3677D	MISSION OAKS DRN. PRIOR TO JCT.W/CONEJO CR.	448	136	274	397	760	955	1515
3680BD	CONEJO CREEK AFTER JCT.W/MISSION OAKS DRN.	43668	3305	6680	9682	18527	23275	36937
3705DE	OAK GROVE CHANNEL PRIOR TO JCT.W/CONEJO CR.	1210	380	768	1113	2129	2675	4245
3706BD	CONEJO CREEK AFTER JCT. W/OAK GROVE CHL.	45092	3283	6635	9618	18403	23120	36691
3724C	EAST CAMARILLO DRN.PRIOR TO JCT. W/ CONEJO CR.	844	205	415	602	1151	1446	2295
3725BC	CONEJO CREEK AFTER JCT.W/ EAST CAMARILLO DRN.	45936	3276	6621	9597	18363	23070	36611
3727B	CONEJO CREEK AT HWY 101 W/SO BR.ARR.CON. BASINS	46018	3264	6597	9563	18298	22987	36481
3755BC	CONEJO CR. AT RIDGE VIEWS ST. (NEXT TO ADOHR LANE)	47517	3263	6595	9560	18292	22980	36469
3788BC	CONEJO CREEK AT HOWARD ROAD	48878	3185	6436	9329	17852	22427	35591
3800BC	CONEJO CREEK AT PANCHO ROAD	49164	3178	6422	9309	17813	22378	35514
3811BE	CONEJO CREEK PRIOR TO JCT.W/CALLEGUAS CK.	49677	3173	6412	9295	17785	22343	35458
3812AB	CALLEGUAS CK. AFTER JCT.W/CONEJO CREEK	158933	5461	11037	15998	30611	38456	61029
3850AC	CALLEGUAS CK. AT CSUCI ACCESS RD.(GAGE 805) (CS3)	159771	5456	11026	15982	30582	38419	60971

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT	500 YR PRESENT
	CALLEGUAS CRK.W/EXISTG. DAMS & INC CONEJO PRESENT CONDITION HYDROLOGY	(ACRES)	0.079	0.200	0.325	0.748	AERIAL RED.	100 yr.AERIAL RED.x
			(m+u+n)	(m+u+n)	(m+u+n)	(m+u+n)		1.787
	LONG GRADE CANYON PRESENT DDT/LG 6/99(FN=LONGGRDE.99I)							
3884B	LONG GRADE CANYON Q100 PRESENT NEAR OLD DEBRIS DAM SITE	1372	180	455	740	1702	2276	4067
3888B	LONG GRADE CANYON Q100 PRESENT AT RINCON DR.CROSSING	1531	176	444	722	1662	2222	3970
3889B	LONG GRADE CANYON Q100 PRESENT-CAMARILLO DR. & STA.BARB. AVE	1578	175	442	718	1653	2210	3950
3893D	CAMARILLO DR. DRN. PRIOR TO JCT. W/LONGGRADE PRESENT	354	34	87	142	326	436	778
3894BD	LONG GRADE CYN.AFTER JCT.W/CAMARILLO DR. DRN.PRESENT	1932	195	494	803	1847	2469	4413
3899B	LONG GRADE CYN. AT LEWIS ROAD - JCT. W/CALLEGUAS CK.	2526	157	398	646	1488	1989	3554
3900AB	CALLEGUAS CREEK AFTER CONFLUENCE W/LONG GRADE CYN.	162297	3007	7614	12372	28475	38068	68028
3938BC	BROOME RANCH DRAIN PRIOR TO JCT W/CALLEGUAS CK.	1319	38	96	156	359	480	857
3943AB	CALLEGUAS CREEK AFTER JCT. W/ BROOME DRAIN	164032	2990	7570	12302	28312	37851	67640
4015BD	GUADALASCA DRAIN PRIOR TO JCT W/CALLEGUAS CK.	3093	239	605	983	2263	3026	5408
4029A	CALLEGUAS CK.AT HWY. 1 PRIOR TO JCT W/ REVOLON SLOUGH	167708	2972	7525	12228	28144	37626	67237

Table 1a

FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA	2 YR WITH AR	5 YR WITH AR	10 YR WITH AR	50 YR WITH AR	100 YR PRESENT
	REVOLON SL. WATERSHED - CALLEGUAS CK. PRESENT CONDITION HYDROLOGY	(ACRES)	0.126	0.254	0.373	0.762	AERIAL RED.
			(MXD+URBAN)	(MXD+URBAN)	(MXD+URBAN)	(MXD+URBAN)	
5001A	REVOLON SLOUGH-CALLEG. MODEL OR/DBT 10/2002 FN=RVLN5000.99I	141	47	95	139	284	373
5007A	HONDA BARR. WEST FORK AT BERYLWOOD ROAD	817	122	247	362	741	973
5016AB	HONDA BARR CONFLUENCE W/BERYLWOOD DITCH (EAST FK)	1428	190	384	563	1150	1511
5019A	HONDA BARR. AT PRICE ROAD CROSSING	1779	191	386	566	1158	1521
5035C	ARROYO COLORADO AT BERYLWOOD ROAD	1185	222	449	659	1347	1768
5037C	ARROYO COLORADO PRIOR TO JCT. W/DITCH FROM PRICE RD	1253	203	410	602	1230	1615
5042E	PRICE ROAD DRAIN AT BERYLWOOD ROAD	345	46	92	135	277	363
5043CE	ARROYO COLORADO AFTER JCT.W/ PRICE ROAD DRN.	1598	241	488	716	1464	1922
5049A	HONDA BARR. AFTER CONFLUENCE WITH ARROYO COLORADO	3878	400	809	1186	2424	3183
5057BE	AGGEN RD DRN. JCT. W/NATURAL CHANNEL	540	131	265	388	794	1042
5072BC	LOS ANGELES AVE. DRN.W/ AGGEN RD DRN.JCT.	1523	261	528	775	1584	2080
5079B	LOS ANGELES AVE. DITCH PRIOR TO JCT.W/ HONDA BARR	1896	292	590	866	1769	2324
5083AB	HONDA BARR. AT CENTER SCHOOL RD.XING	5925	551	1116	1637	3346	4394
5100DE	MILLIGAN BARRANCA AT LA LOMA ROAD XING	1126	160	324	475	971	1276
5105D	MILLIGAN BARRANCA AT LA AVE.(HWY 118)CROSSING	1669	189	382	560	1144	1502
5107AD	HONDA BARR.CONFLUENCE W/MILLIGAN BARR.	8006	697	1410	2067	4226	5550
5111AB	BEARDSLEY WASH AT CONFLUENCE WITH LAS POSAS DRN	8195	701	1418	2080	4252	5584
5119BC	LAS POSAS DRN.PRIOR TO JCT.W/BEARDSLEY	180	55	111	163	334	439
5121AB	BEARDSLEY WASH AFTER JCT. W/ LAS POSAS DRAIN	8634	707	1432	2100	4292	5637
5145CE	DITCH FROM WALNUT AVE PRIOR TO CROSSING LA AVE.	904	170	345	506	1035	1359
5149C	MESA SCHOOL DRAIN PRIOR TO JCT.W/ BEARDSLEY WASH	1138	184	371	545	1113	1462
5167B	RAMONA DBRIS/DETNT. BASIN ROUTED & FATTENED HYDROGRAPH (Qout=130)	254	16	33	48	99	130
5174D	LAS POSAS DEBRIS/DETENTION BASIN RTED FAT HYDROGRAPH (Qout=62)	168	8	16	23	47	62
5182BC	LAS POSAS ESTATES DRN. OVERLAND FLOW @ TR.BNDRY W/RTN.BOX	613	84	170	250	511	671
5185D	SPANISH HILLS DRN.Q10F INTO LAKE (LOT99) FROM ARACENE CT.	57	23	46	68	139	182
5196D	SPANISH HILLS DRN-50 AC INTO LAKE LOT 101	50	16	32	46	95	124
5203BD	LAS POSAS ESTATES DRN. AFTER JCT.W/TR.4227 MR LAKES	946	135	273	401	819	1075
5204E	TRACT 4948 OUTFLOW HYDRGRPH W/DKT APPRV. BSN 2A RAT	95	3	7	10	20	26
5205E	LAS POSAS EST.DRN-NORTH TRB. INC. BASIN IN TR 4948 PRIOR TO JCT W/CHNL	122	14	29	43	87	115
5206BE	LAS POS.EST.DRN, WITHPOST-TR 4227&4948 W/RTN.	1068	136	276	404	826	1085
5208D	TRACT 4948 OUTFLOW HYDROGRAPH W/DKT APPROVED BASIN	36	5	10	15	30	40
5209D	TRIB.TO LAS POSAS EST.DRN,POST TR.4948 W/RTN.PRR.TO JCT W/MAIN	56	13	26	37	76	100
5212BD	LAS POSAS ESTATES DRN.,POST TR 4227 &4948 W/RTN	1156	146	295	432	884	1160
5216BF	LAS POSAS ESTATES DRN. W/60% SPLIT TO BEARDSLEY	1279	97	197	289	591	776
5219B	LAS POSAS ESTATES DIVERSION PRIOR TO JCT W/BEARDSLEY(60%)	1371	94	191	280	572	751
5220AB	BEARDSLEY WASH AFTER JCT. W/ LAS POSAS ESTATES DRAIN (60%)	11738	849	1719	2521	5154	6768
5234CD	LA VISTA DRN & UPPER PART OF LA AVE.W/S.CLR	666	127	256	376	768	1008
5242E	LA VISTA DRAIN TRIBUTARY PRIOR TO JCT W/LA VISTA DRN.	361	75	153	224	458	601
5243CE	LA VISTA DRN @ LA VISTA RD.AFTER JCT W/ TRIBUTARY	1115	199	403	590	1207	1585
5262D	WRIGHT RD. DRN. W/ DITCH PRIOR TO SANTA CLARA DRN. JCT.	433	97	197	288	589	774
5263CD	SANTA CLARA DRAIN AFTER JCT. W/ WRIGHT ROAD DRN.	1787	278	563	826	1688	2217
5268C	SANTA CLARA DRAIN DIVERSION PRIOR TO JCT. W/ BEARDSLEY WASH	2103	275	557	817	1670	2192
5272AC	BEARDSLEY WASH AFTER JCT. W/ SANTA CLARA DRN. DIVERSION	13841	1048	2121	3111	6360	8352
5275AC	BEARDSLEY WASH AT CENTRAL AVE. BRIDGE (GAGE SITE)	13919	1049	2123	3113	6364	8357
5279A	BEARDSLEY WASH PRIOR TO JCT. W/ NYELAND DRAIN ABOVE HWY 101	14056	1048	2121	3110	6357	8349
5284B	UPPER NYELAND DRN. NEAR SATICOY COUNTRY CLUB	334	62	126	184	377	495
5293BC	UPPER NYELAND OVERFLOW-CLUBHOUSE DR. INTO DITCH	849	127	257	376	769	1010
5297BD	UPPER NYELAND DRN.AT CLUBHOUSE DR. PRIOR TO XING LA AVE.	1111	147	298	437	894	1174
5299B	UPPER NYELAND DRN. PRIOR TO JCT. W/FERRO DITCH	1131	147	297	435	890	1168
5305D	FERRO CANYON CHL. AT LA AVE.PRIOR JCT.W/UPPER NYELAND DRN.	544	102	206	302	617	811
5306BD	NYELAND DRAIN AFTER JCT. W/ FERRO CHANNEL BELOW HWY 118 (LA AVE)	1675	227	459	674	1377	1809
5334BC	NYELAND DRAIN AT CENTRAL AVE.W/UPPER NYELAND NOT DIVERTED	2829	286	578	848	1734	2277
5375C	NYELAND DRN.TRIB.(ROSE RD-CENTRAL-101-STA.CLARA) W/BOYER	886	117	236	347	709	931
5376BC	NYELAND DRN. AFTER JCT.OF TRIB. W/BOYER PROJ.(AUTO CTR.)	4119	351	711	1043	2132	2800
5378B	NYELAND DRN. @ SANTA CLR & FRIEDRICH W/ BOYER(AUTO CTR.)	4119	350	708	1038	2122	2786
5380BE	NYELAND DRN AFTER JCT. W/ NYELAND ACRES SIDE DRN. W/ BOYER	4181	350	709	1040	2125	2791
5391D	LATERAL A AFTER JCT. W/LOCAL AREA	145	36	73	106	217	286
5392BD	NYELAND DRN.AFTER JCT W/LATERAL A	4482	352	713	1046	2139	2809
5400CE	NYELAND DRN.TRIB. TO NO.PRIOR TO JCT. W/NYELAND	373	38	77	113	232	305
5401BC	NYELAND DRN AFTER JCT. W/NORTH LATERALS-INC 477B W/BOYER	4855	377	764	1120	2290	3008
5406AB	NYELAND DRN. JUNCTION W/BEARDSLEY WASH	19003	1255	2541	3726	7618	10003

Table 1b

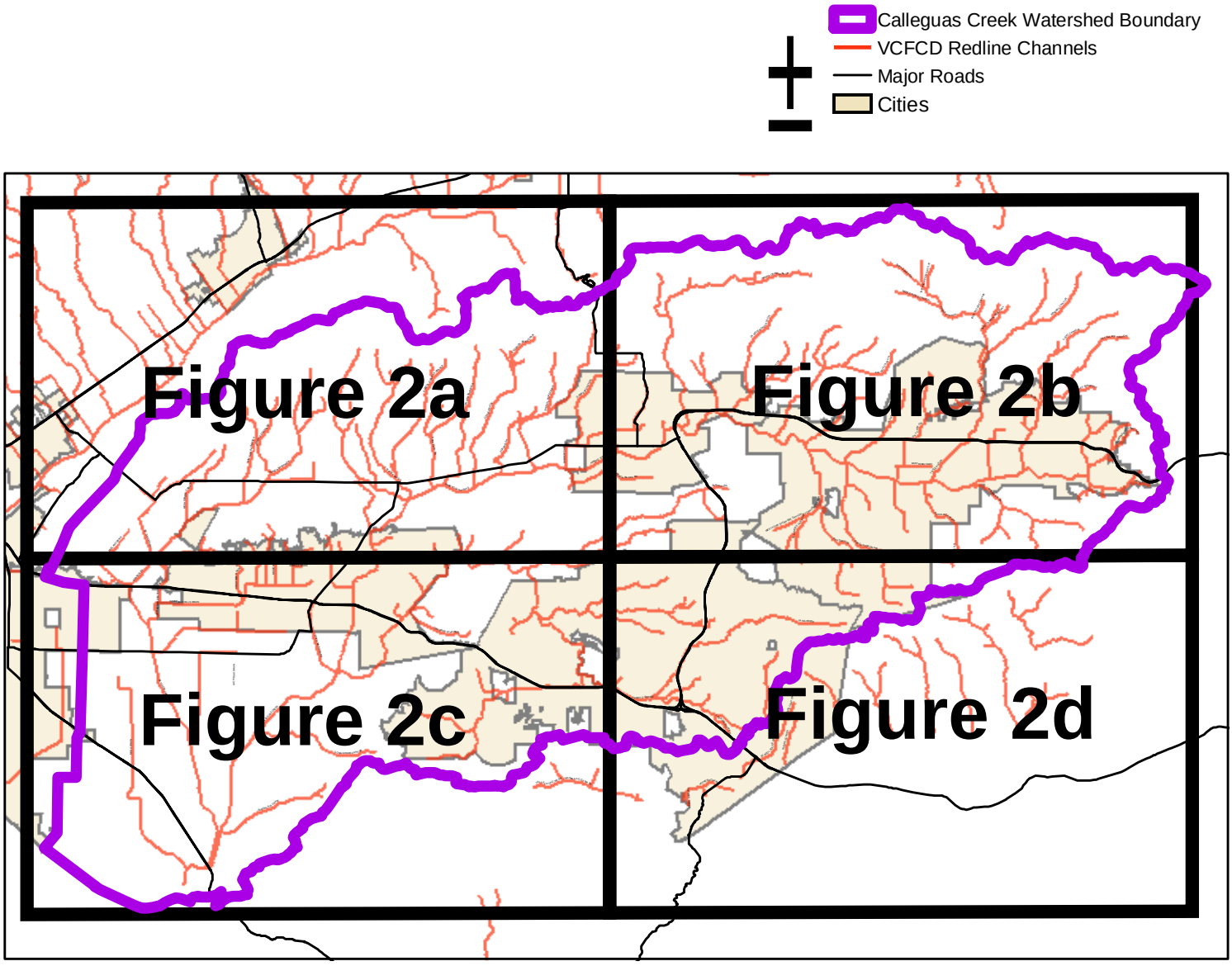
FINAL

RAT ID NO	LOCATION POINT FOR FLOWRATE VALUES LISTED	AREA (ACRES)	2 YR WITH AR 0.126 (MXD+URBAN)	5 YR WITH AR 0.254 (MXD+URBAN)	10 YR WITH AR 0.373 (MXD+URBAN)	50 YR WITH AR 0.762 (MXD+URBAN)	100 YR PRESENT AERIAL RED.
	REVOLON SL. WATERSHED - CALLEGUAS CK. PRESENT CONDITION HYDROLOGY						
	WITH AREA AND IMPERVIOUSNESS BY GIS DL/DBT 2/02						
5439C	CAMARILLO HILLS DRN PRIOR TO JCT. W/ PONDEROSA DRN.	742	152	307	450	921	1209
5450CD	CAMARILLO HILLS DRN. AFTER JCT. W/ PONDEROSA DRAIN	1106	212	430	630	1288	1691
5471DE	MISSION DRAIN PRIOR TO JCT. W/ CAM. HILLS DRAIN	519	128	260	381	778	1022
5472CD	CAMARILLO HILLS DRN. AFTER JCT. W/ MISSION DRAIN	1776	330	669	981	2005	2633
5485D	WEST CAMARILLO HILLS DRN. PRIOR TO JCT. W/ CAM. HILLS DRN.	467	117	237	348	710	933
5487CD	CAMARILLO HILLS DRN. AFTER JCT. W/ WEST CAM. HILLS DRN.	2287	422	854	1252	2560	3362
5499D	EDGEMORE DRN. PRIOR TO JCT. W/ CAM. HILLS DRAIN	363	93	189	277	565	743
5501CD	CAMARILLO HILLS DRN. AFTER JCT. W/ EDGEMORE DRN.	2650	482	975	1430	2923	3839
5504C	CAMARILLO HILLS DRN. AT PONDEROSA DR. AND REDWOOD AVE.	2704	484	979	1435	2934	3853
5507CD	CAMARILLO HILLS DRN. AT POINT WHERE CHL. CURVES TO SOUTH	2777	488	987	1448	2960	3888
5513C	CAMARILLO HILLS DRN. PRIOR TO JCT. WITH CRESTVIEW DRN.	3013	504	1020	1495	3057	4014
5517D	LEONARD PROJECT DIVERSION FROM PLEASANT VLY RD. DRN. PRIOR JCT.	157	49	99	145	297	390
5518CD	CAMARILLO HILLS DRN. AFTER JCT. W/ LEONARD PIPE NR. LAS POSAS RD.	3170	533	1079	1582	3234	4246
5527D	CRESTVIEW DRN. PRIOR TO JCT. W/ CAMARILLO HILLS DRN.	385	115	233	342	699	917
5528CD	CAMARILLO HILLS DRN. AFTER JCT. W/ CRESTVIEW DRN.	3555	601	1216	1783	3644	4786
5529C	CAMARILLO HILLS DRN AT LAS POSAS RD. BELOW HWY. 101	3555	599	1211	1777	3632	4769
5577C	CAMARILLO HILLS DRN. PRIOR TO JCT. W/ LAS POSAS ESTATES DRN. (40%)	4776	563	1140	1672	3417	4487
5584D	LAS POSAS ESTATES DRN. AT SR 101 W/60% DIVRS.TO BEARDSLEY	189	93	188	276	564	741
5586D	LAS POS. EST. DRN. PRIOR JCT. W/CAM. HILLS DRN. W/DIVR.	235	88	178	262	535	702
5590CD	CAM. HILLS DRN. AFTER JCT. W/ LAS POSAS ESTATES DRN. 40%	5011	595	1204	1766	3610	4741
5601CD	CAMARILLO HILLS DRAIN AFTER JCT. W/ LARGE AG. AREA WEST	5550	579	1171	1717	3511	4610
5602AC	REVOLON SLOUGH AT CONFL. W/ CAMARILLO HILLS DRAIN	24818	1617	3272	4798	9809	12881
5617BC	REVOLON TRIB. AT DEL NORTE BLVD. (PRTY. LINE SAKIOKA)	467	55	112	164	336	441
5618B	REVOLON TRIB. PRESENT CONDITION W/ NO DETN. OR DIVERSION	467	55	111	163	334	438
5623D	PROCTOR AND GAMBLE SITE W/ NO RUNOFF LEAVING SITE	60	17	35	52	106	139
5627B	REVOLON TRIB. AT SAKIOKA DIVERSION (EXC. PROC-GAMBLE)	730	89	179	263	538	706
5638E	REVOLON TRIB AT STURGIS, W/ SAKIOKA RTN. AND DIVERSION (EXC. P&G)	219	43	87	128	261	343
5640E	REVOLON TRIB. AT STURGIS PRIOR TO JCT. W/ SAKIOKA DITCH	287	36	73	107	218	286
5642B	SAKIOKA DITCH PRIOR TO JCT. W/ STURGIS RD. DRAIN	843	97	197	289	590	775
5644AB	REVOLON SLOUGH AFTER JCT. W/ REVOLON TRIB. INC. SAKIOKA DITCH	26018	1653	3346	4907	10030	13172
5649AB	REVOLON SLOUGH AT STURGIS W/O PLEASANT VALLEY DRAIN	26232	1654	3349	4911	10039	13183
5650A	REVOLON SLOUGH AT FIFTH STREET	26249	1653	3345	4906	10029	13170
5654C	FIFTH STREET DRAIN AT POSSIBLE RETN.SITE FOR ASSMT.DIST.	183	24	48	70	143	188
5663C	FLOW N-SIDE OF RR WEST OF REVOLON SLOUGH	383	29	58	85	175	229
5684C	INFLOW TO LEONARD TRACT Q10F W/VTA BLVD. DIVERSION TO CAM. HILLS	86	29	58	85	174	229
5685CD	OUTFLOW FROM LEONARD TRACT RETEN. BASIN Q10 F, W/ VTA BLVD. DIVERSION	86	6	11	17	34	45
5686D	SUMP IN LEONARD TRACT W/45 CFS OUTLET Q10F W/VTA BLVD DIVERSION	0	23	47	69	142	186
5693C	FIFTH STREET DRAIN AT POSSIBLE RETN.SITE FOR ASSMT.DIST,	55	16	32	47	96	126
5709AB	REV.SL. AFTER JCT W/PLEAST.VLY.RD.DRN.W/ SAK.DIVR.& RETN.	28115	1714	3468	5086	10398	13654
5739A	REVOLON. SL. AT WOOD RD.BELOW LAGUNA W/TRIB.W/ SAK DIVR.& RTN	29126	1701	3442	5048	10319	13551
5750AB	REVOLON SL. AT WOOD RD. BELOW LAGUNA RD. W/ LAGUNA TRIB	29602	1699	3438	5042	10306	13534
5781CD	CAWELTI RD. DRAIN UPPER REACH	453	107	217	318	650	853
5796B	LAS POSAS RD.DRN.AT LAGUNA RD.	2527	295	597	875	1789	2349
5822BC	REVOLON SLOUGH TRIBUTARY ABOVE LAGUNA RD(LARGE FARM DRN.)	3585	423	857	1257	2569	3373
5849AB	REVOLON SL. AFTER CONFLUENCE WITH LARGE FARM DRN. TRIB.	34238	1756	3553	5211	10653	13990
5869AC	REVOLON SL. AT JCT.W/ HUENEME RD. DRAIN	35065	1747	3536	5185	10600	13920
5916AB	REVOLON SL. AT LAS POSAS RD.	37087	1746	3534	5182	10594	13912
5935AB	REVOLON SLOUGH PRIOR TO CONFLUENCE W/ CALLEGUAS CREEK	37911	1726	3494	5124	10475	13755

Table 1b

FINAL

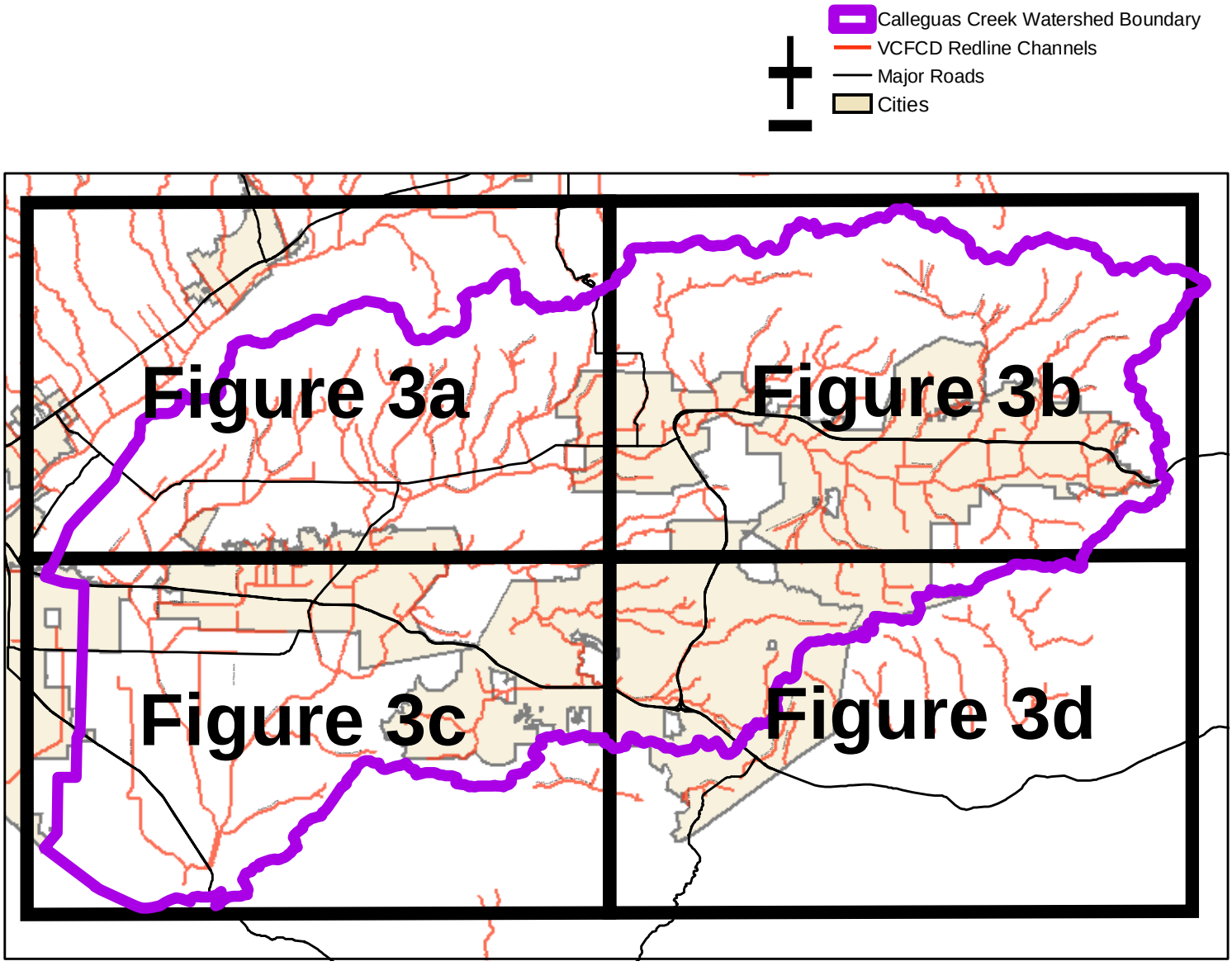
Aerial Photo
Map Index



Please see enclosed CD, "Calleguas Creek Watershed Present Condition PDF Maps"

Filenames: Aerial-NW.pdf, Aerial-NE.pdf, Aerial-SW.pdf, Aerial-SE.pdf

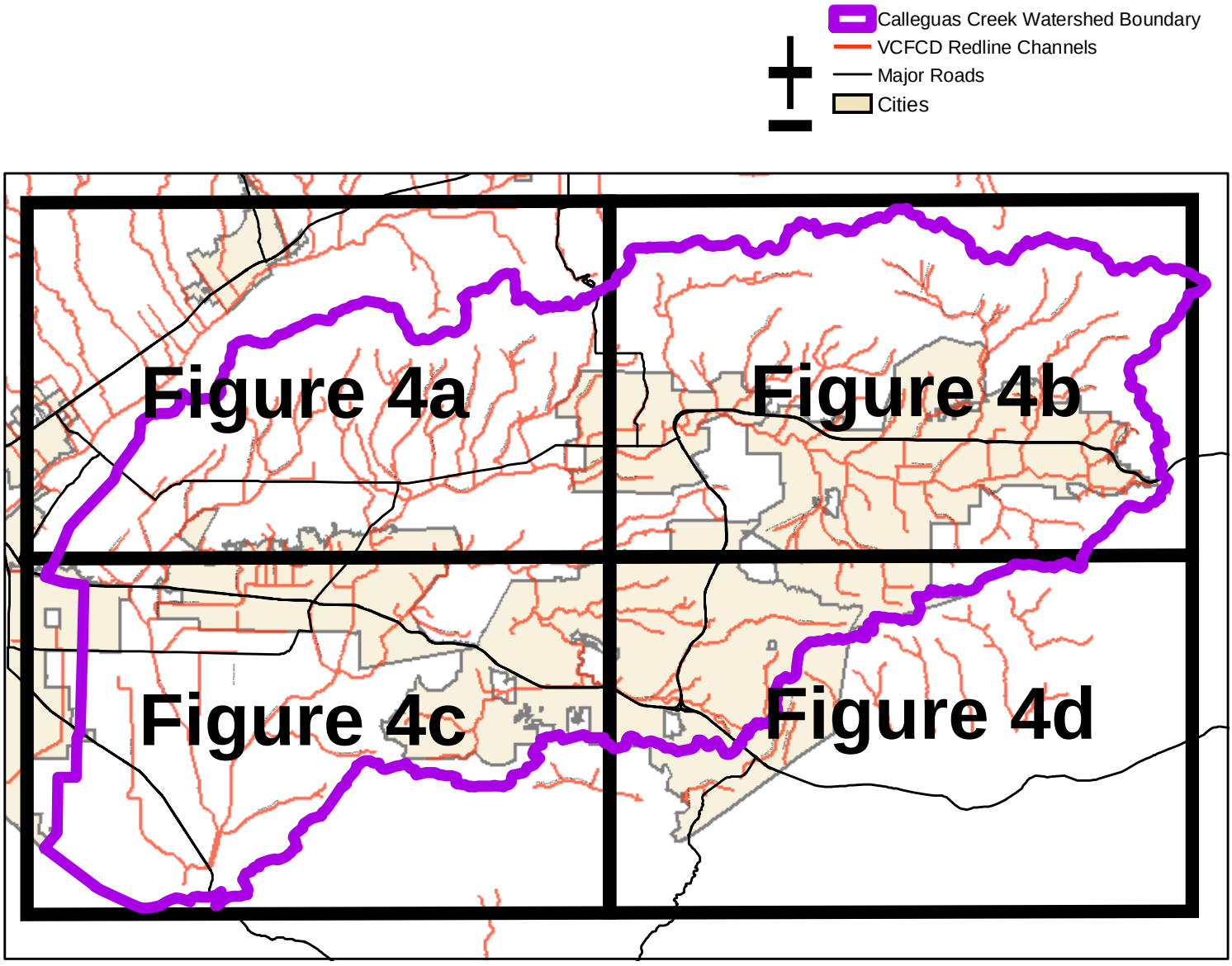
General Soil Map Index



Please see enclosed CD, "Calleguas Creek Watershed Present Condition PDF Maps"

Filenames: Gensoilmap-NW.pdf, Gensoilmap-NE.pdf, Gensoilmap-SW.pdf, Gensoilmap-SE.pdf

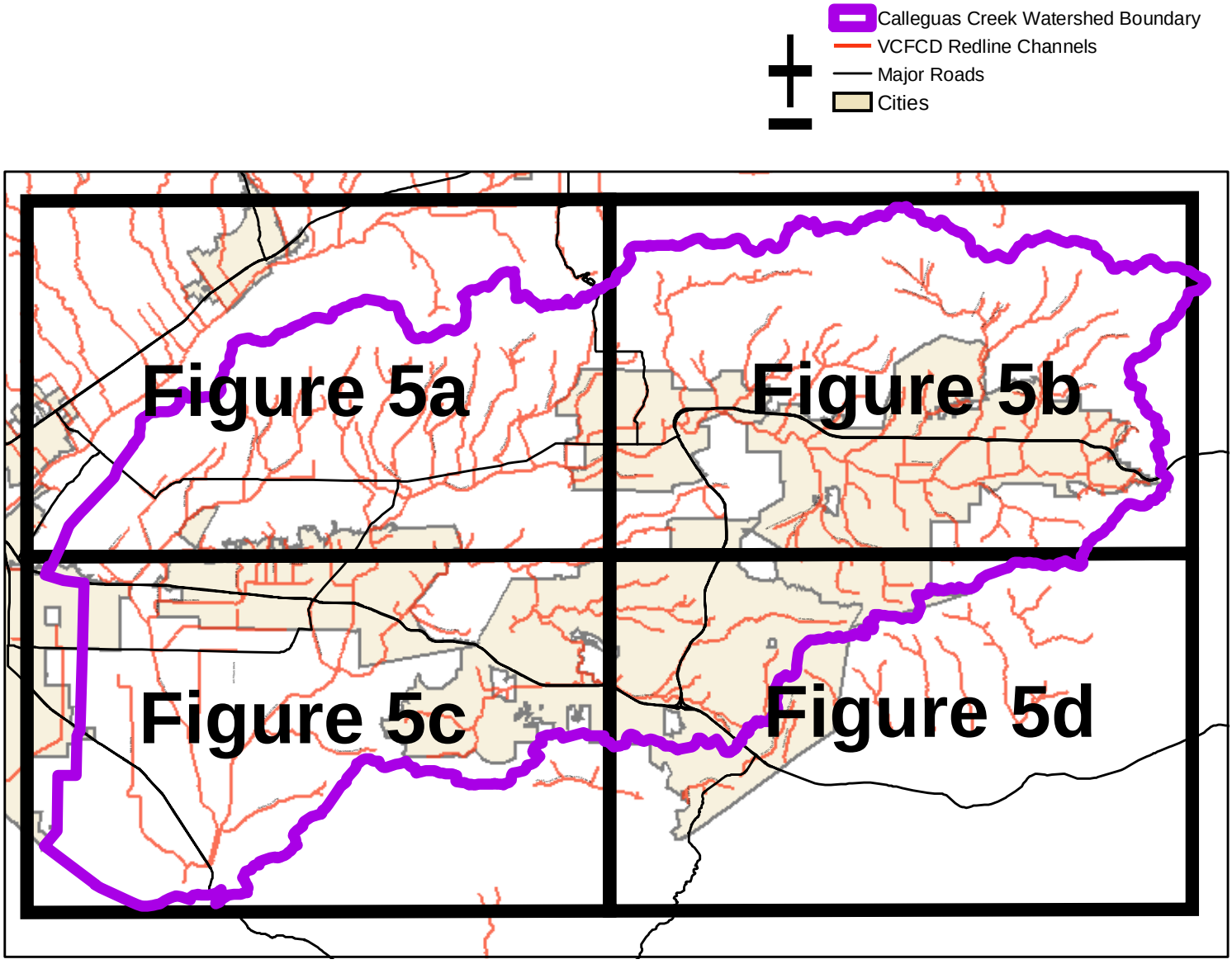
Present Land Use
Map Index



Please see enclosed CD, "Calleguas Creek Watershed Present Condition PDF Maps"

Filenames: landuse-NW.pdf, landuse-NE.pdf, landuse-SW.pdf, landuse-SE.pdf

Hydrology Map
Map Index



Please see enclosed CD, "Calleguas Creek Watershed Present Condition PDF Maps"

Filenames: hydromap-NW.pdf, hydromap-NE.pdf, hydromap-SW.pdf, hydromap-SE.pdf