



HYDROLOGY REPORT

PREPARE FOR:

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FOR THE PROJECT:

SEC of Cassia Rd and Daisy Rd Development
Adelanto, CA
County of San Bernardino

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INTRODUCTION

1.1 PURPOSE OF STUDY

The project is located within the City of Adelanto, California due West from the Adelanto Converter Station at 16401 Aster Rd, Adelanto, CA. The purpose of this study is to hydrologically model the project's onsite tributary area watersheds and to determine the pre-development peak runoffs in order to analyze stormwater mitigation. The hydrologic analysis was prepared using the Rational Method as specified in the San Bernardino County Hydrology Manual. The flows were used to estimate the proposed above and below ground drainage facilities to support the project.

1.2 PROJECT DESCRIPTION

The projects is comprised of approximately 9.11 gross acres of vacant land located at the intersection of Daisy Road and Cassia Road in the City of Adelanto, County of San Bernardino. The site is approximately 2 miles West of the 395 Highway. The immediate surrounding area consists of Vacant Industrial Zoning within the City of Adelanto. The site is currently undeveloped with an estimate elevation difference of roughly 13 feet flowing from South to North. The project hydrology and storm drain system will be designed in accordance with recent City of Adelanto and San Bernardino County design requirements. The onsite storm drain, and inlet and outlet structures are to be privately maintained by the proposed Property Owners. Other drainage facilities offsite of the project site will be publicly maintained by the City of Adelanto. **Appendix A** contains the Vicinity Map.

1.3 FLOODPLAIN MAPPING

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for floodplain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency which administers the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1% chance of flooding within a given year. This is also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community. According to the Flood Insurance Rate Map (FIRM) catalog, there are FIRMs produced by FEMA for the project site:

MAP Number: 06071C5795H

MAP Revised: August 28, 2008.

Appendix H contains the FIRM panels which identifies the flood zones designated for the project area. The project site is located on a Zone X area which has a less than 1% chance of flooding.

1.4 DESIGN CRITERIA

The following are design criteria for this project, based on the San Bernardino County Hydrology Manual.

Protection Levels

1. The 100-year flood shall be contained with the street R/W limits.
2. The 10-year flood shall be contained within the Top of Curbs.
3. Initiate a storm drain or channel when either condition is exceeded.

HYDROLOGIC DATA AND MODEL DEVELOPMENT

2.1 PRE-DEVELOPMENT MODEL

The project site is one drainage area that drain from South to North with an approximate elevation difference of 13 feet. Refer to the Pre-Development Hydrology Key Map in **Appendix C** for locations of the drainage areas, and peak flows at each area. The San Bernardino County Rational Method Hydrologic calculations (as described in the San Bernardino Hydrology Manual) were performed using the CivilDesign Hydrology / Hydraulics computer program. The existing condition watershed boundaries were delineated using surveyed topography. The soil type in this area is Type "C". Soil type "C" was used for calculating the rational method hydrology analysis. Refer to **Appendix B** for the NRCS Custom Soil Resource. Results of the pre-development hydrologic analysis are summarized in this section **Table 1 below**.

TABLE 1 - PRE-DEVELOPMENT CONDITION PEAK FLOW

Sub-Drainage Area	Node	Area (acres)	Q10 (cfs)	Q100 (cfs)
A	102	6.62	8.99	18.9

2.2 POST-DEVELOPMENT MODEL

The site will be developed into 9 separate commercial lots with a total of 10 buildings. The project site will generally maintain the existing drainage patters in the post-development condition of flowing from South to North. The project is one drainage area, the same as the existing, with each individual lot will be responsible for mitigating the increase runoff generated on their lots. Refer to the Post-Development Hydrology Key Map in **Appendix E** for locations of the drainage areas, and peak flows at each area. The soil type in this area is Type "C". Soil type "C" was used for calculating the rational method hydrology analysis. Results of the post-development hydrologic analysis are summarized in this section **Table 2 below**.

TABLE 2 - POST-DEVELOPMENT CONDITION PEAK FLOW

Sub-Drainage Area	Node	Area (acres)	Q10 (cfs)	Q100 (cfs)
A	102	9.89	13.9	24.4

TABLE 3 - PEAK FLOW COMPARISON

Sub-Drainage Area	Pre-Dev Q10 (cfs)	Post-Dev Q10 (cfs)	Difference Q10 (cfs)	Pre-Dev Q100 (cfs)	Post-Dev Q100 (cfs)	Difference Q100 (cfs)
A	8.99	13.9	4.91	18.9	24.4	5.5

2.3 UNIT HYDROGRAPH MODEL

The rational method analysis provided Q100 on the post-development condition that is significantly higher than the pre-development condition for the proposed Area. therefore, unit hydrographs are required since detention is required onsite for the Q100 storm event. Unit Hydrograph analysis will be provided in final engineering.

2.4 BASIN ANALYSIS

Basin analysis will be provided in final engineering.

2.5 ONSITE STORM DRAIN SYSTEM

The onsite runoff will be sheet flowing and directed into basins using the general grading of the parking layout with a curb cutout at the low points.

CONCLUSIONS

This preliminary drainage report has evaluated the potential effects of runoff for the proposed project. In addition, this report has addressed the methodology used to analyze the existing and proposed conditions, which was based on the San Bernardino County Hydrology Manual. This section provides a summary discussion that evaluates the potential effects of the proposed project.

- ❖ The proposed project will not significantly alter drainage patterns on the site.
- ❖ The Rational Method results illustrates that there is a slight increase in peak flowrate for project site. And increase runoff mitigation is proposed in the form of detention basins.
- ❖ The proposed onsite storm drain mainlines will be privately owned and maintained by the Property Owners Association.
- ❖ Proposed storm drain alignment, inlets, and discharge points are shown on the hydrology key maps.

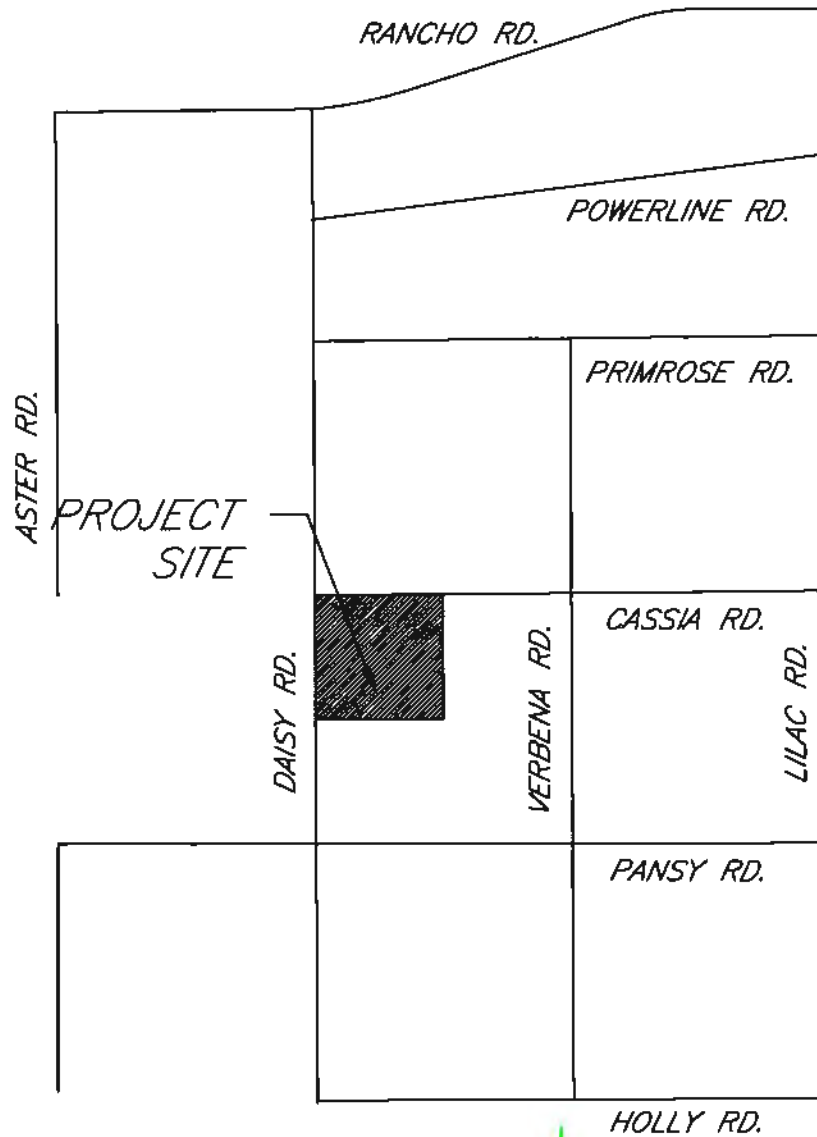
The computed 10-year storm event is contained below the top of curb and the computed 100-year storm event is contained within the street right-of-way.

REFERENCES

San Bernardino County Flood Control and Water Conservation District. *Hydrology Manual*. August 1986.

A

VICINITY MAP



VICINITY MAP
N.T.S.



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B

HYDROLOGIC CLASSIFICATION OF SOILS & PRECIPITATION MAPS



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for San Bernardino County, California, Mojave River Area



January 17, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

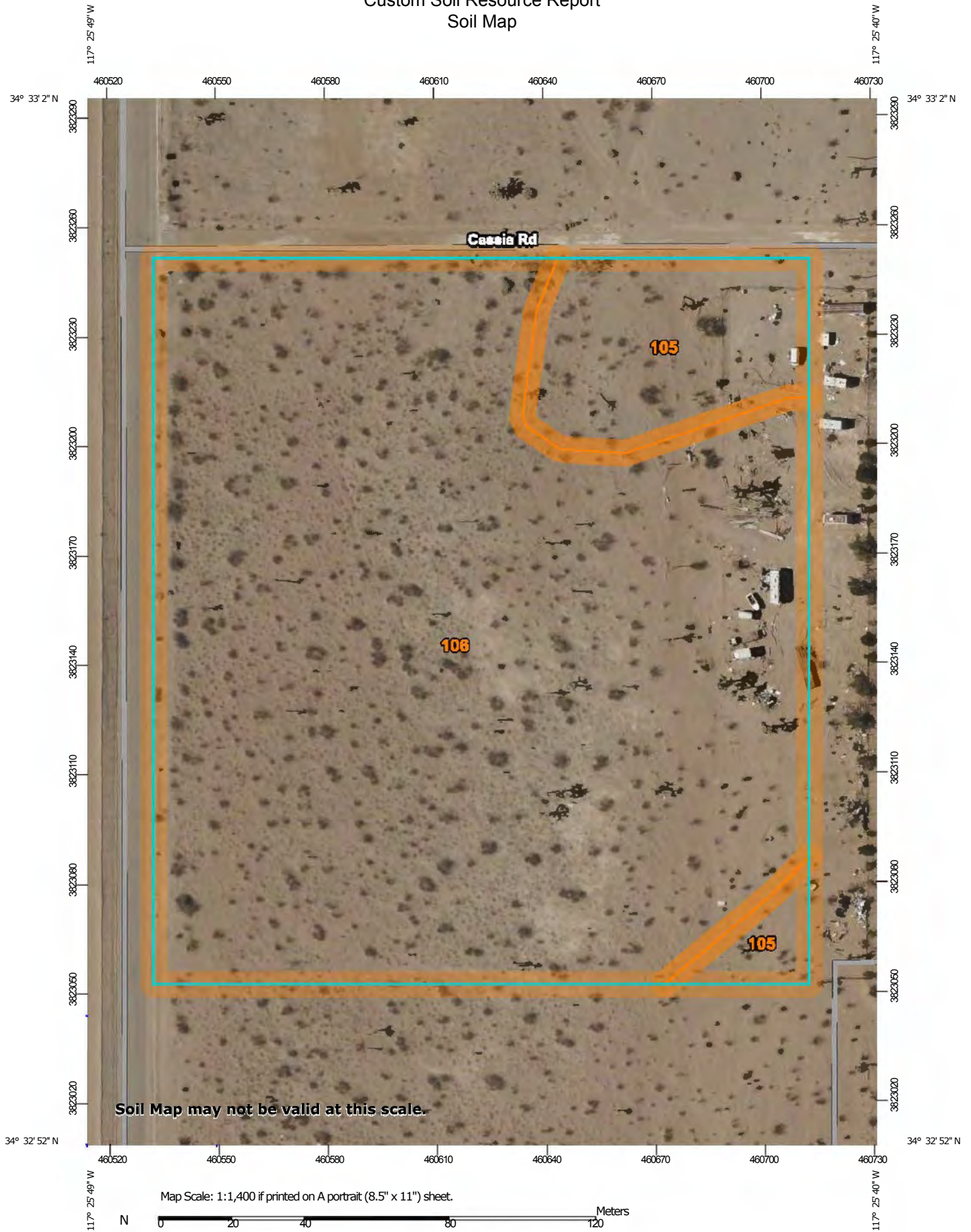
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.

Map Scale: 1:1,400 if printed on A portrait (8.5" x 11") sheet.

0 20 40 80 120 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County, California, Mojave River Area

Survey Area Data: Version 14, Sep 1, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
105	BRYMAN LOAMY FINE SAND, 0 TO 2 PERCENT SLOPES	1.1	11.9%
106	BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	7.9	88.1%
Totals for Area of Interest		8.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino County, California, Mojave River Area

105—BRYMAN LOAMY FINE SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkr9
Elevation: 2,800 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bryman and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bryman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 12 inches: sandy loam
H3 - 12 to 32 inches: sandy clay loam
H4 - 32 to 46 inches: sandy loam
H5 - 46 to 99 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Cajon

Percent of map unit: 5 percent

Hydric soil rating: No

Helendale

Percent of map unit: 5 percent

Hydric soil rating: No

Mohave variant

Percent of map unit: 5 percent

Hydric soil rating: No

Bryman, gravelly surface

Percent of map unit: 5 percent

Hydric soil rating: No

106—BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkrb

Elevation: 3,000 to 3,400 feet

Mean annual precipitation: 3 to 6 inches

Mean annual air temperature: 59 to 63 degrees F

Frost-free period: 180 to 280 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bryman and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bryman

Setting

Landform: Fan remnants

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand

H2 - 9 to 43 inches: sandy clay loam

H3 - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Ecological site: R030XF012CA - Sandy

Hydric soil rating: No

Minor Components

Cajon, loamy surface

Percent of map unit: 5 percent

Hydric soil rating: No

Mohave variant

Percent of map unit: 5 percent

Hydric soil rating: No

Helendale

Percent of map unit: 5 percent

Hydric soil rating: No

Bryman, gravelly surface

Percent of map unit: 5 percent

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NOAA Atlas 14, Volume 6, Version 2
Location name: Adelanto, California, USA*
Latitude: 34.5488°, Longitude: -117.4295°
Elevation: 2979.12 ft**

* source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeries](#)

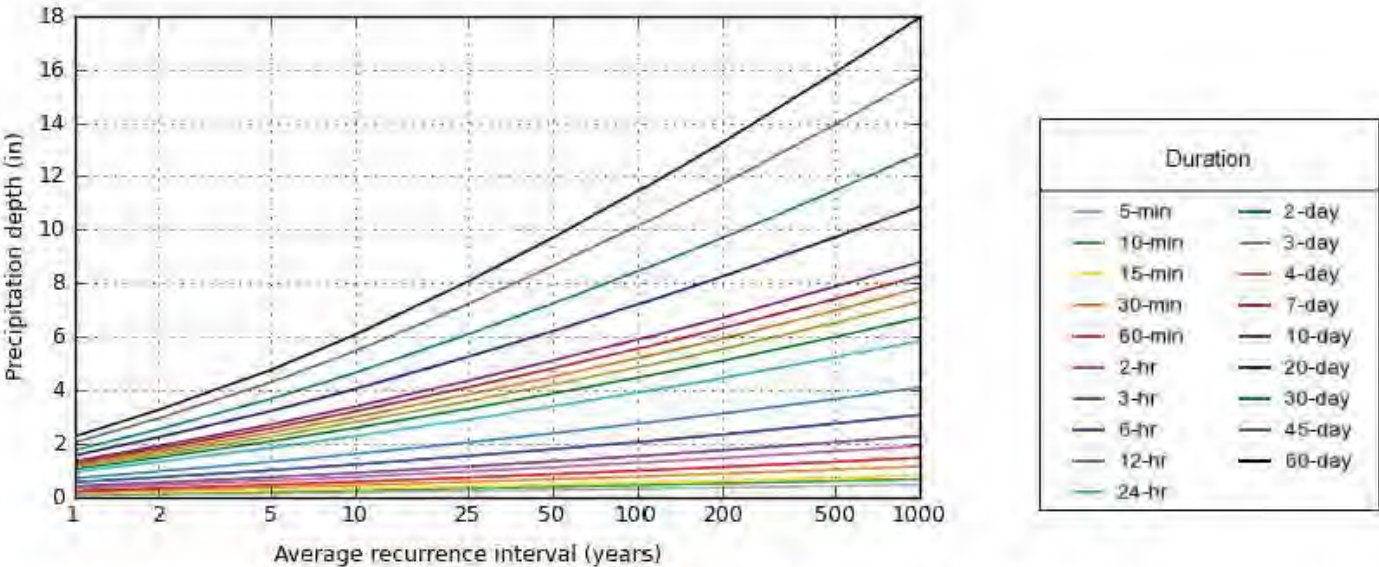
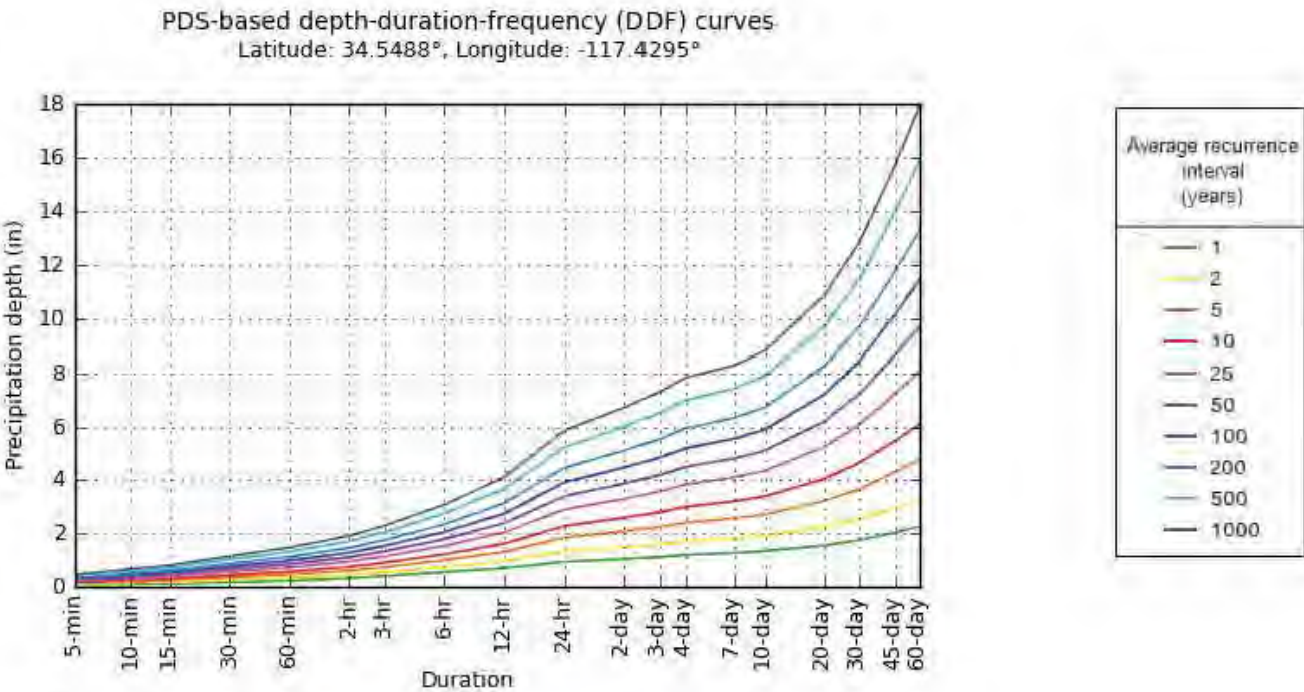
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.078 (0.064-0.095)	0.109 (0.090-0.133)	0.151 (0.124-0.185)	0.187 (0.152-0.231)	0.237 (0.187-0.303)	0.277 (0.214-0.362)	0.319 (0.241-0.427)	0.364 (0.267-0.501)	0.426 (0.300-0.611)	0.475 (0.323-0.705)
10-min	0.111 (0.092-0.136)	0.156 (0.128-0.191)	0.216 (0.178-0.266)	0.268 (0.218-0.331)	0.340 (0.268-0.435)	0.397 (0.307-0.519)	0.458 (0.345-0.613)	0.521 (0.382-0.717)	0.610 (0.430-0.875)	0.681 (0.463-1.01)
15-min	0.134 (0.111-0.164)	0.188 (0.155-0.231)	0.262 (0.215-0.322)	0.324 (0.264-0.401)	0.411 (0.324-0.526)	0.480 (0.371-0.628)	0.553 (0.417-0.741)	0.630 (0.462-0.868)	0.738 (0.520-1.06)	0.823 (0.560-1.22)
30-min	0.189 (0.156-0.231)	0.265 (0.218-0.324)	0.368 (0.303-0.452)	0.455 (0.371-0.563)	0.578 (0.456-0.739)	0.676 (0.522-0.883)	0.778 (0.587-1.04)	0.886 (0.650-1.22)	1.04 (0.731-1.49)	1.16 (0.788-1.72)
60-min	0.242 (0.200-0.296)	0.339 (0.280-0.415)	0.471 (0.388-0.579)	0.582 (0.475-0.721)	0.739 (0.584-0.946)	0.865 (0.668-1.13)	0.996 (0.751-1.33)	1.14 (0.832-1.56)	1.33 (0.935-1.91)	1.48 (1.01-2.20)
2-hr	0.340 (0.280-0.415)	0.459 (0.379-0.563)	0.624 (0.514-0.767)	0.764 (0.623-0.946)	0.963 (0.760-1.23)	1.12 (0.868-1.47)	1.29 (0.974-1.73)	1.47 (1.08-2.02)	1.72 (1.21-2.47)	1.92 (1.31-2.85)
3-hr	0.416 (0.344-0.509)	0.557 (0.460-0.682)	0.751 (0.618-0.922)	0.916 (0.747-1.13)	1.15 (0.909-1.48)	1.34 (1.04-1.76)	1.54 (1.16-2.07)	1.76 (1.29-2.42)	2.06 (1.45-2.95)	2.30 (1.56-3.41)
6-hr	0.566 (0.468-0.693)	0.753 (0.621-0.922)	1.01 (0.830-1.24)	1.23 (1.00-1.52)	1.54 (1.22-1.98)	1.80 (1.39-2.35)	2.06 (1.56-2.76)	2.35 (1.73-3.24)	2.76 (1.94-3.96)	3.08 (2.10-4.58)
12-hr	0.714 (0.590-0.874)	0.971 (0.801-1.19)	1.33 (1.09-1.63)	1.62 (1.33-2.01)	2.05 (1.62-2.62)	2.39 (1.85-3.13)	2.75 (2.08-3.68)	3.13 (2.30-4.32)	3.67 (2.59-5.27)	4.11 (2.79-6.10)
24-hr	0.951 (0.844-1.10)	1.33 (1.18-1.54)	1.85 (1.64-2.14)	2.29 (2.00-2.67)	2.90 (2.46-3.50)	3.40 (2.82-4.18)	3.91 (3.17-4.93)	4.46 (3.51-5.78)	5.23 (3.95-7.06)	5.85 (4.27-8.18)
2-day	1.06 (0.936-1.21)	1.49 (1.32-1.72)	2.09 (1.85-2.42)	2.60 (2.27-3.02)	3.31 (2.80-3.98)	3.87 (3.21-4.76)	4.47 (3.62-5.63)	5.10 (4.02-6.61)	5.99 (4.53-8.09)	6.71 (4.90-9.37)
3-day	1.13 (1.00-1.30)	1.61 (1.42-1.85)	2.26 (2.00-2.61)	2.81 (2.46-3.28)	3.59 (3.04-4.32)	4.20 (3.49-5.17)	4.85 (3.93-6.11)	5.55 (4.37-7.18)	6.52 (4.93-8.81)	7.31 (5.34-10.2)
4-day	1.20 (1.07-1.39)	1.71 (1.52-1.97)	2.42 (2.13-2.79)	3.01 (2.63-3.50)	3.84 (3.25-4.62)	4.50 (3.73-5.53)	5.19 (4.21-6.54)	5.93 (4.67-7.69)	6.98 (5.27-9.42)	7.82 (5.71-10.9)
7-day	1.28 (1.14-1.48)	1.82 (1.62-2.10)	2.58 (2.28-2.98)	3.21 (2.81-3.74)	4.11 (3.48-4.94)	4.81 (3.99-5.92)	5.55 (4.49-6.99)	6.33 (4.98-8.20)	7.41 (5.60-10.0)	8.27 (6.04-11.6)
10-day	1.35 (1.20-1.55)	1.92 (1.70-2.21)	2.72 (2.40-3.14)	3.39 (2.97-3.95)	4.35 (3.69-5.24)	5.10 (4.24-6.28)	5.89 (4.77-7.42)	6.72 (5.29-8.70)	7.88 (5.95-10.6)	8.79 (6.42-12.3)
20-day	1.56 (1.39-1.80)	2.25 (1.99-2.59)	3.22 (2.85-3.72)	4.05 (3.55-4.72)	5.25 (4.45-6.32)	6.20 (5.15-7.63)	7.20 (5.83-9.07)	8.26 (6.51-10.7)	9.72 (7.34-13.1)	10.9 (7.93-15.2)
30-day	1.76 (1.56-2.03)	2.55 (2.25-2.93)	3.68 (3.25-4.25)	4.66 (4.08-5.43)	6.08 (5.16-7.33)	7.23 (6.00-8.89)	8.43 (6.83-10.6)	9.70 (7.64-12.6)	11.5 (8.67-15.5)	12.8 (9.38-17.9)
45-day	2.04 (1.81-2.35)	2.96 (2.62-3.41)	4.29 (3.79-4.96)	5.47 (4.79-6.37)	7.21 (6.11-8.68)	8.64 (7.17-10.6)	10.1 (8.21-12.8)	11.7 (9.23-15.2)	13.9 (10.5-18.8)	15.7 (11.4-21.9)
60-day	2.27 (2.01-2.61)	3.27 (2.90-3.77)	4.76 (4.20-5.50)	6.08 (5.33-7.09)	8.05 (6.82-9.69)	9.69 (8.04-11.9)	11.4 (9.26-14.4)	13.3 (10.5-17.2)	15.9 (12.0-21.4)	17.9 (13.1-25.1)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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PF graphical



Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

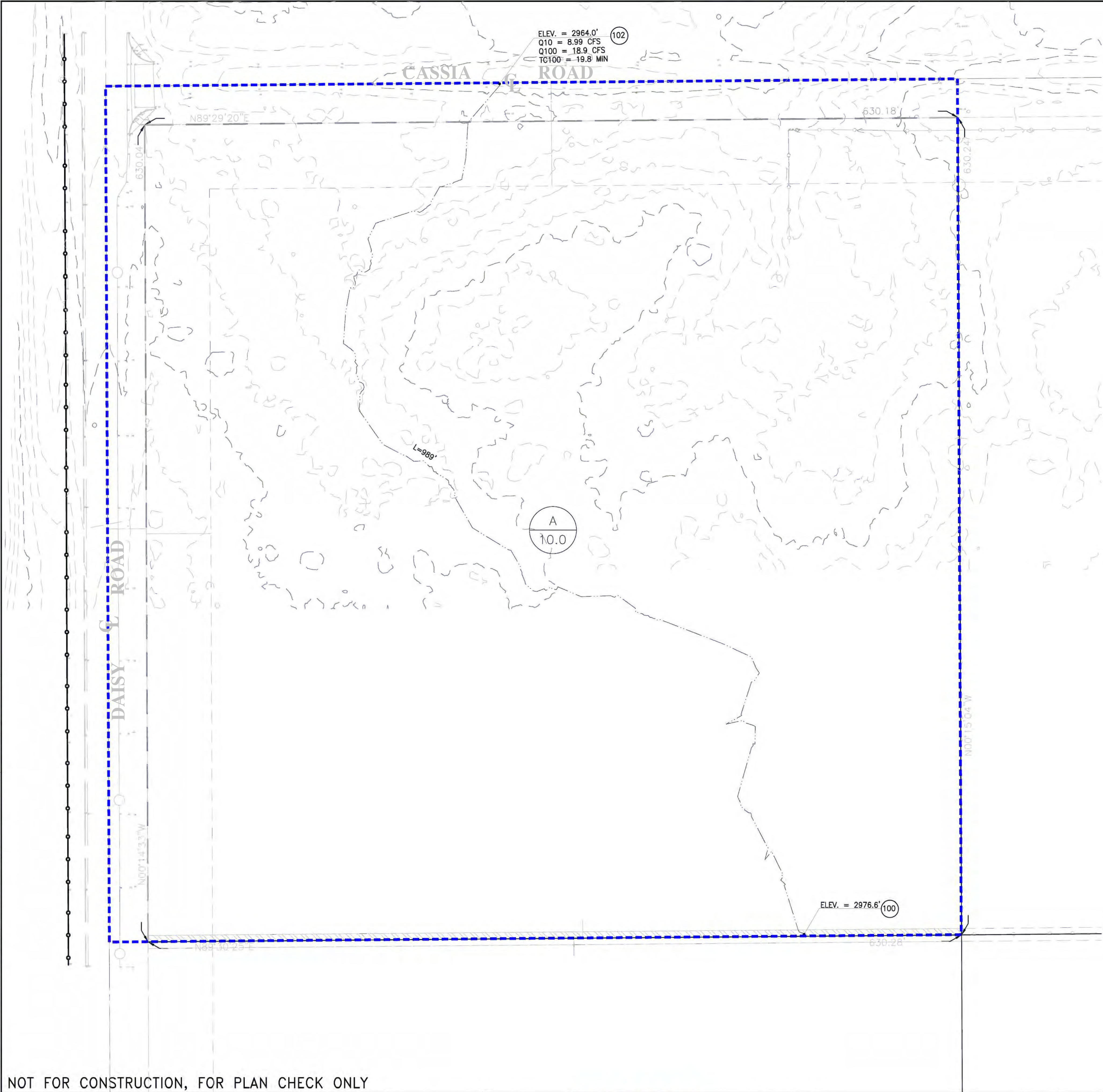
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
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[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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C

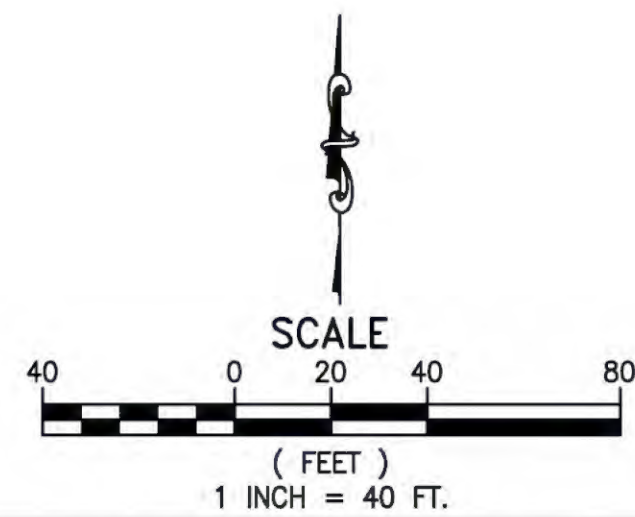
PRE-DEVELOPMENT CONDITION HYDROLOGY KEY MAP

Z:\Shared\Blue\2022210 - Daisy and Cassie - Mr Shams\Plan Set\Entitlement Package\2022210 - PRE.dwg Jan 17, 2023 - 4:19pm



LEGEND

- DRAINAGE AREA DESIGNATION
- AREA IN ACRES
- NODE DESIGNATION
- MAJOR WATERSHED BOUNDARY
- FLOW PATH
- LENGTH OF FLOW PATH
- CALCULATED 100-YEAR STORM RUNOFF



NOT FOR CONSTRUCTION, FOR PLAN CHECK ONLY

	BENCH MARK NAME: BM#558 ELEVATION: 3001.806' DATUM: CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE 5, NAD1983.(2010.0000 EPOCH) DESCRIPTION: SOUTH EAST OF HOLLY ROAD AND ASTER ROAD	DESIGNED BY: <u>HC</u>			9320 BASELINE ROAD, SUITE D - RANCHO CUCAMONGA, CA 91701 PHONE: 909-294-5022 E-MAIL: INFO@BLUECVLENG.COM WEBSITE: WWW.BLUECVLENG.COM	CITY OF ADELANTO 11600 AIR EXPRESSWAY ADELANTO, 92301				CASSIE RD AND DAISY RD DEVELOPMENT		WDID: _____
	BASIS OF BEARING THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN N.G.S. CONTROL STATION NO. EV2895 AND STATION NO. EV2896 BEING N16°44'01"W PER RECORDS ON FILE IN NATIONAL GEODETIC SURVEY.	DRAWN BY: <u>VL</u>				CHECKED BY: <u>AC</u>	PLANS PREPARED UNDER THE SUPERVISION OF: ANGEL CESAR, P.E. 87222	DATE	REVIEWED BY: _____	DATE	PRE-DEVELOPMENT HYDROLOGY KEY MAP	DATE: January 17, 2023
						REVISION	REVISION	DESCRIPTION	BY	DATE	SABA ENGINEER P.E. NO. C-55518	SHEET 1 OF 7 PROJECT NUMBER: 2022210

D

PRE-DEVELOPMENT CONDITION RATIONAL METHOD

10-YEAR PRE-DEVELOPMENT CONDITION

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 01/17/23

10 YEAR STORM EVENT HYDROLOGY ANALYSIS
ADELANTO PROJECT SITE
PRE-DEVELOPEMENT CONDITION
DRAINAGE AREA "A"

Program License Serial Number 6481

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.582 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 100.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.265(In/Hr)
Initial subarea data:
Initial area flow distance = 989.000(Ft.)
Top (of initial area) elevation = 2976.600(Ft.)
Bottom (of initial area) elevation = 2964.000(Ft.)
Difference in elevation = 12.600(Ft.)
Slope = 0.01274 s(%)= 1.27
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.825 min.
Rainfall intensity = 1.264(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.711
Subarea runoff = 8.986(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.265(In/Hr)
End of computations, Total Study Area = 10.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 86.0

100-YEAR PRE-DEVELOPMENT CONDITION

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 01/17/23

100 YEAR STORM EVENT HYDROLOGY ANALYSIS
ADELANTO PROJECT SITE
PRE-DEVELOPEMENT CONDITION
DRAINAGE AREA "A"

Program License Serial Number 6481

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.582(In.)
100 Year storm 1 hour rainfall = 0.996(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 0.996 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 100.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 3 = 97.20
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.055(In/Hr)
Initial subarea data:
Initial area flow distance = 989.000(Ft.)
Top (of initial area) elevation = 2976.600(Ft.)
Bottom (of initial area) elevation = 2964.000(Ft.)
Difference in elevation = 12.600(Ft.)
Slope = 0.01274 s(%)= 1.27
 $TC = k(0.525)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 19.825 min.
Rainfall intensity = 2.162(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.877
Subarea runoff = 18.962(CFS)
Total initial stream area = 10.000(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.055(In/Hr)
End of computations, Total Study Area = 10.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

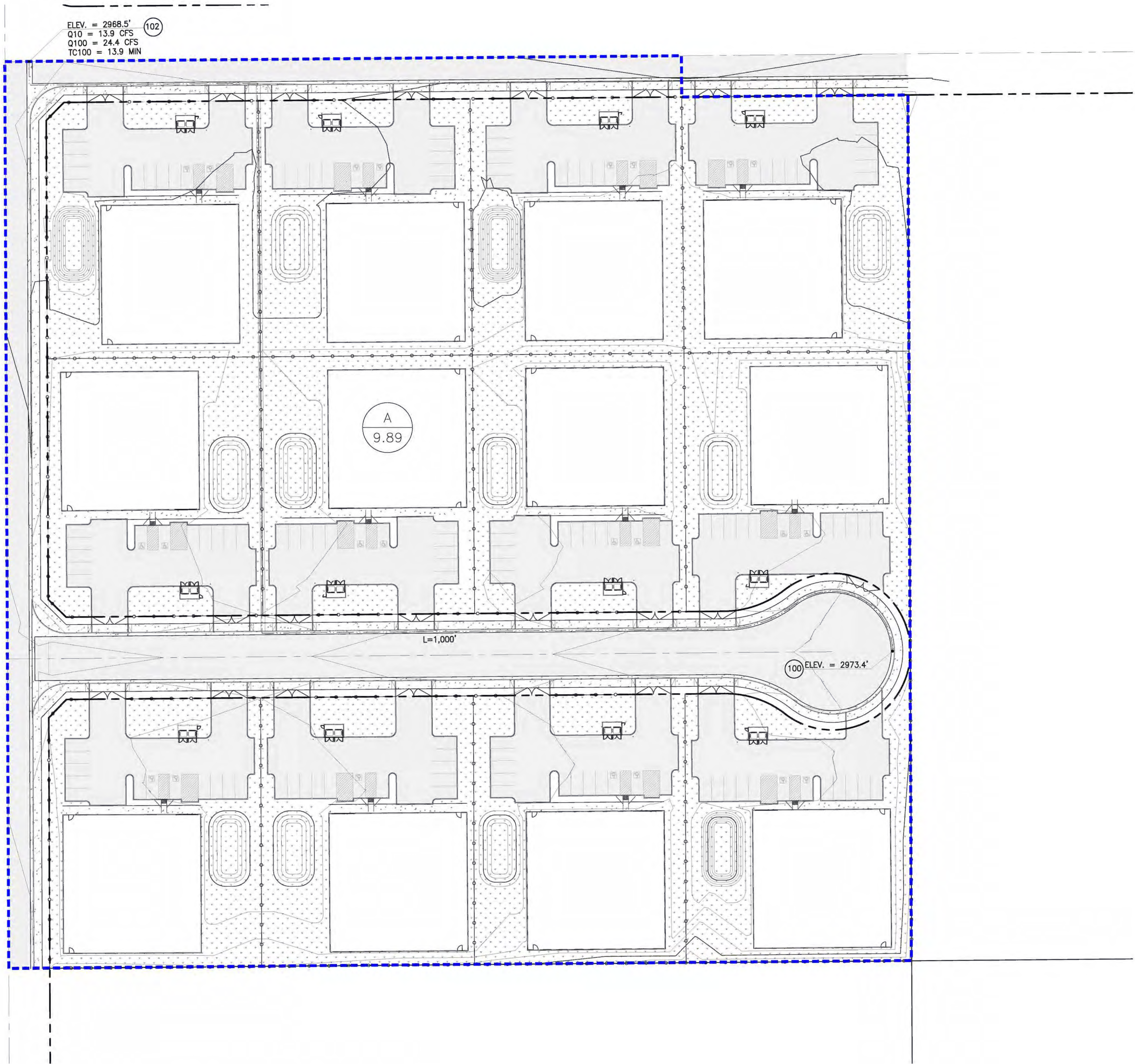
Area averaged pervious area fraction(Ap) = 1.000

Area averaged SCS curve number = 86.0

E

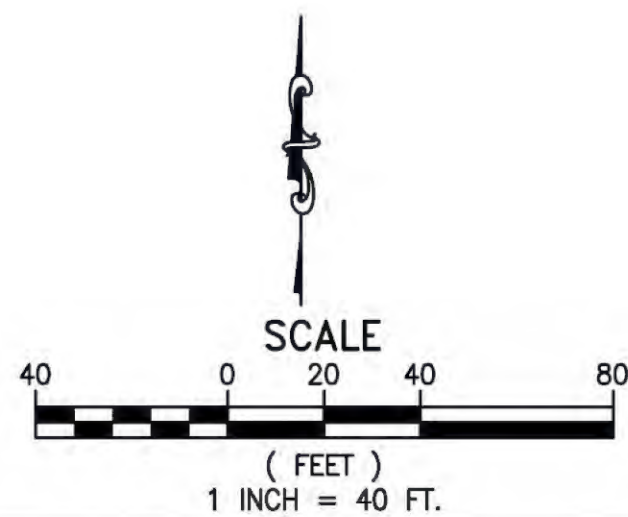
POST-DEVELOPMENT CONDITION HYDROLOGY KEY MAP

Z:\Shared\Blue\2022210 - Daisy and Cassie - Mr Shams\Plan Set\Entitlement Package\2022210 - POST.dwg Jan 17, 2023 - 4:19pm



ELEV. = 2968.5'
Q10 = 13.9 CFS
Q100 = 24.4 CFS
TC100 = 13.9 MIN

- LEGEND
- C17 — DRAINAGE AREA DESIGNATION
 - 70.21 — AREA IN ACRES
 - 102 — NODE DESIGNATION
 - MAJOR WATERSHED BOUNDARY
 - FLOW PATH
 - L=100' — LENGTH OF FLOW PATH
 - Q100 — CALCULATED 100-YEAR STORM RUNOFF



NOT FOR CONSTRUCTION, FOR PLAN CHECK ONLY

	BENCH MARK NAME: BM#558 ELEVATION: 3001.806' DATUM: CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE 5, NAD1983 (2010.0000 EPOCH) DESCRIPTION: SOUTH EAST OF HOLLY ROAD AND ASTER ROAD	DESIGNED BY: HC			CITY OF ADELANTO 11600 AIR EXPRESSWAY ADELANTO, 92301				CASSIE RD AND DAISY RD DEVELOPMENT		WDID:
	BASIS OF BEARING THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN N.G.S. CONTROL STATION NO. EV2895 AND STATION NO. EV2896 BEING N16°44'01"W PER RECORDS ON FILE IN NATIONAL GEODETIC SURVEY.	DRAWN BY: VL			CHECKED BY: AC	REVIEWED BY:				POST-DEVELOPMENT HYDROLOGY KEY MAP	
PLANS PREPARED UNDER THE SUPERVISION OF: ANGEL CESAR, P.E. 87222					REV.	REVISION	DESCRIPTION	BY	DATE	DATE:	
										January 17, 2023	
										SHEET 2 OF 7	
										PROJECT NUMBER: 2022210	

F

POST-DEVELOPMENT CONDITION RATIONAL METHOD

10-YEAR POST-DEVELOPMENT CONDITION

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 01/17/23

10 YEAR STORM EVENT HYDROLOGY ANALYSIS
ADELANTO PROJECT SITE
POST-DEVELOPEMENT CONDITION
DRAINAGE AREA "A"

Program License Serial Number 6481

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.582 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 2

+++++
Process from Point/Station 100.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.055(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2973.420(Ft.)
Bottom (of initial area) elevation = 2968.500(Ft.)
Difference in elevation = 4.920(Ft.)
Slope = 0.00492 s(%)= 0.49
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.947 min.
Rainfall intensity = 1.616(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.869
Subarea runoff = 13.898(CFS)
Total initial stream area = 9.890(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.055(In/Hr)
End of computations, Total Study Area = 9.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 69.0

100-YEAR POST-DEVELOPMENT CONDITION

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2019 Version 9.1
Rational Hydrology Study Date: 01/17/23

100 YEAR STORM EVENT HYDROLOGY ANALYSIS
ADELANTO PROJECT SITE
POST-DEVELOPEMENT CONDITION
DRAINAGE AREA "A"

Program License Serial Number 6481

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.582(In.)
100 Year storm 1 hour rainfall = 0.996(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 0.996 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 3

Process from Point/Station 100.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.026(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2973.420(Ft.)
Bottom (of initial area) elevation = 2968.500(Ft.)
Difference in elevation = 4.920(Ft.)
Slope = 0.00492 s(%)= 0.49
 $TC = k(0.304)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.947 min.
Rainfall intensity = 2.766(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.891
Subarea runoff = 24.386(CFS)
Total initial stream area = 9.890(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.026(In/Hr)
End of computations, Total Study Area = 9.89 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100

Area averaged SCS curve number = 69.0

G

UNIT HYDROGRAPH ANALYSIS

(WILL BE PROVIDED IN FINAL ENGINEERING)

H

FEMA FIRM PANELS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11 North. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2005 and was produced with a 1-meter ground sample distance.

This map may reflect more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to confirm to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://msc.fema.gov/>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently derelict. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

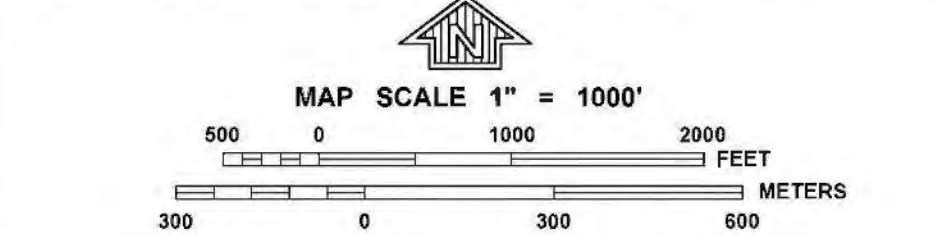
* Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid values, zone 11N
- 5000-foot grid ticks; California State Plane coordinate system, zone V (FIPS ZONE 0405), Lambert Conformal Conic projection
- Bench mark (See explanation in Notes to Users section of this FIRM panel)
- River Mile

- MAP REPOSITORY**
Refer to listing of Map Repositories on Map Index.
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**
March 18, 1998
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**
August 28, 2008 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

PANEL 5795H

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 5795 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ADELANTO, CITY OF	060639	5795	H
SAN BERNARDINO COUNTY	060270	5795	H
VICTORVILLE, CITY OF	065068	5795	H

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

06071C5795H

MAP REVISED

AUGUST 28, 2008

Federal Emergency Management Agency