PRELIMINARY DRAINAGE STUDY

JVR Energy Park

San Diego County, California

PREPARED FOR

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1 DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the Civil Engineer of work for this report, that I have exercised responsible charge over the preparation of this report as defined in section 6703 of the business and professions code, and that the report is consistent with current project concept.

I understand that the check of this report by the County of San Diego is confined to review only and does not relieve me, as engineer of work, of my responsibilities for the report.

2 INTRODUCTION

JVR Energy Park, LLC is currently developing a Solar photovoltaic (PV) facility, JVR Energy Park, in the south of San Diego county. This report will be a part of a larger Environmental Impact Report (EIR) prepared for the project. The report has been prepared in accordance with the San Diego County (SDC) Hydrology Manual guidelines.

This preliminary Drainage Study (the report), will work to analysis the existing watershed for its hydrologic characteristics and the proposed PV facilities hydrologic and hydraulic impact on the watershed. The watershed hydrologic and hydraulic characteristics for the pre-developed condition was assessed using FLO-2D. FLO-2D is a combined hydrologic and hydraulic 2D modeling program.

Model inputs and results are discussed throughout this report. The goal of the report will be to deliver a comprehensive study of the watershed which features its existing and post-development hydrologic characteristics.

3 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The proposed site is located within the Jacumba Valley; An unincorporated area in south-east San Diego County, near the US-Mexico Border. The project abuts the US-Mexico border on its southern side and is 3.8 miles west of the San Diego/ Imperial County border, located at Latitude 32°37'30" N, Longitude 116°10'33" W. See Figure 1 in Appendix A for Vicinity Map.

The sites developed area will span approximately 691 acres and lies at the near end of an approximate 90 square-mile (60,200 acre) watershed. The watershed contributing to the site, flows from south to north, with approximately two-thirds (2/3) of the watershed being located in Mexico.

3.2 SITE DESCRIPTION

The proposed site spans approximately 691 acres within south-east San Diego. The project will consist of a 90MW Solar generation facility. This facility will provide electricity that will be utilized in the public utility grid.

Onsite improvements will consist of inverter skids, all weather access roads, and photovoltaic (PV) modules. General impervious area for solar facilities is very low. Generally, the only impervious area will come from the addition of PV piles, inverter skids, battery skids, and additional substation area.

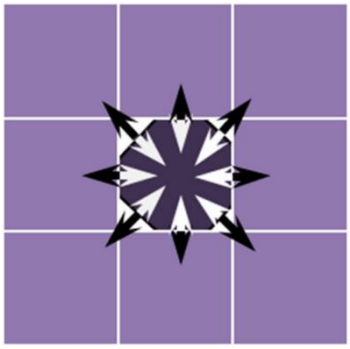
The solar facility will utilize PV modules to convert energy in the form of light, into electricity by way of the "photovoltaic effect". These modules will be mounted on a tracker mounting system. Tracker mounting systems have the ability to dynamically track the sun as it moves across the sky during the day. The racking systems are generally mounted 5-ft to 7-ft above finished grade. However, this range can vary dependent on the expected depth of the 100-year flood. Maximum mounting height is typically 8-ft. The tracker systems are supported by steel piles that are driven into the surrounding ground. These piles make up a very small percentage of the total area the modules will encompass. The PV modules require a few key supporting pieces of infrastructure, including combiner boxes, inverters, gen-tie lines, and substation. These structures will be detailed in the accompanying construction documents and are designed to handle the 100-year flood as outlined in this report. The hydrologic conditions that will be influenced by said improvements will be outlined in the following sections.

4 METHODOLOGY

4.1 INTRODUCTION

As illustrated in Figure 2, the project is located within a flat valley bordered by neighboring hills. Due to the lack of the defined channels, unpredictable flow paths, and relatively flat plain, a two-dimensional hydrologic model was created to complete the off-site hydrology.

The hydrology for off-site areas were modeled using FLO-2D Pro (FLO-2D Software, Inc). FLO-2D is a finite difference, finite element model using uniform square grid elements. FLO-2D is



FLO-2D Grid Elements

essentially a finite volume model that tracks the volume distribution to represent the floodwave movement. USGS Digital Elevation Model (DEM) topography data and the Grid Developer System (GDS) was used to create a gridded network of the floodplain and other obstruction data, as well as interpolate ground elevation values for each grid. The DEM consists of a 1 arc second ASCII Grid format with 30-meter grid spacing. The model computes the discharge flux and velocity in eight (8) directions for each cell; the model was comprised of 100-ft x 100-ft grid elements (263,416 total grid elements). An illustration of the FLO-2D grid is shown below.

The FLO-2D model computational limits are shown on Figure 2. The model includes the 90 square-miles of watershed that contributes. The FLO-2D model will allow runoff to leave the model computational domain if existing topography dictates that the runoff will flow away from the site.

FLO-2D calculates runoff for each grid element, based on a given rainfall depth and rainfall distribution. The flow direction, depth, and velocity are based on several factors, including topography, surface roughness (Manning's "n"), and infiltration characteristics (SCS Runoff Curve Numbers).

4.2 RAINFALL

Rainfall data for the proposed project were based on data from NOAA Atlas 14. NOAA Atlas 14 contains a database of rain gages throughout the continental United States, which are continually being updated. NOAA is recognized as having the most up to date rainfall data within the US.

Given the extent and magnitude of the watershed contributing to the proposed site, a singular rainfall data point could not be used. Rainfall precipitation depths from NOAA, spaced at ½ mile spacing, were used to create a composite rainfall depth, using the 100-year, 24-hour design storm event. Rainfall depths for this event ranged from approximately 5.5-in onsite within the valley, to 7.5-in within the hills. A weighted average of the data produced a rainfall depth of 6.5-in. This rainfall data was applied to the site based on the Natural Reserve Conservation Service (NRCS) Type I rainfall distribution.

Rainfall data on the Mexican side of the border was not obtainable. Rainfall precipitation depth patterns on the Mexican side of the border, were created visually, using land cover and topographic aerials as guidance, mimicking the patterns for data found north of the border.

5 EXISTING DRAINAGE (PRE-DEVELOPMENT CONDITION)

5.1 EXISTING TOPOGRAPHY

The proposed site is located in the south-eastern portion of unincorporated San Diego county. The site will reside in a large valley, bordered by hills to the west and east. On-site elevations range from 2750-ft to 2800-ft. Elevations of the contributing watershed range from 2710-ft to 4500-ft. Site drainage flows from south to north. An existing topographic map is shown on Figure 2.

The site lies at the end of a 90 square-mile watershed, with two-thirds (2/3) of the watershed residing south of the border in Mexico. Flows from storm event are shallowly concentrated within the valley that our site will reside in, and then further concentrated into a steam to the north of our site. This stream terminates into the Salton Sea.

5.2 EXISTING HYDROLOGIC SOIL GROUPS

Existing hydrologic soil groups across the site and watershed are used to determine the expected amount of runoff for the given storm event. Hydrologic soil groups are categorized by A, B, C, and D. Each group is representative of a soils potential for run-off. The hydrologic soil groups for the proposed site were determined using Web Soil Survey (WSS). WSS is a national public data base for soils data. Soils data was not available in the most remote eastern area of the watershed, as well as those areas located within Mexico. Hydrologic soil groups (HSG) were assigned to these areas using information from the adjacent hydrologic soil groups that were provided, as well as the use of aerial photography. Aerial photography provides general marks on shifts in landscape. Coupled with HSG from adjacent areas, reasonable assumptions can be made on the HSG for the unknown areas. See Figure 3 for watershed HSG's. A breakdown of the watershed HSG values is provided below.

Table 1

Watershed Hydrologic Soil Groups

Hydrologic Soil Group	Area (Square-Miles)	Percentage of Area
A	33.36	37.0%
B	0.97	1.1%
C	0.72	0.8%
D	55.09	61.1%
Total	**90.14**	**100.0%**

5.3 EXISTING LAND USE AND LAND COVER

Existing Land use areas were based on Geographic Information System (GIS) Shapefiles provided by San Diego Counties *SanGIS* website. In conjunction with the land use areas, land cover data was used from the National Land Cover Database (NLCD). See Figures 5 and 6 for existing land cover and land use maps respectively.

Major existing land cover types onsite include desert shrub/scrub, field crops, herbaceous grassland, and woody wetlands to the north. land cover data for areas in Mexico were not available and were assumed as shrub/scrub.

Major existing land usage consists of field crops, spaced rural residential, and vacant undeveloped land. The proposed site is bordered by single family detached units to the west, site retail and commercial to the north-east, and the Jacumba Valley Airport to the east. The majority of surrounding land consists of vacant undeveloped land, open space, and barren land. While data within the Mexican Border is not available, based on aerial photography, land use and land cover remain similar; consisting of small rural residential lots and barren undeveloped land.

5.4 EXISTING RUNOFF

The proposed site lies at the end of a 90 square-mile watershed. The site is bordered by lowland hills to the east and west, the US-Mexico border to south, and mountainous canyons to the north. Approximately two-thirds (2/3) of the watershed resides within Mexico. Much of the watersheds existing land consists of rural undeveloped land scattered through lowland hills in the south and north. The watershed was delineated using the *Streamstats Application.* Streamstats is an online interactive program developed by the United States Geologic Survey (USGS). It utilizes current stream gauges to record examined flows. The program uses regression equations pinned to this data, to automatically derive an estimate of watershed run-off for a variety of storm events. Using this program, the estimated 100-year runoff for the watershed would be approximately 13,000 cfs. The model produced in this report, shows an estimated runoff of 14,663 cfs for the same study point. See Table 2(Cross Section 3) and Figure 7.

Given that the site lies at the end of a 90 square-mile watershed, the entirety of the watershed was modeled using FLO-2D Pro to determine on-site flows and on-site flood depths. Because Flo-2D is a 2D hydraulics and hydrology modeling program, there was no need to break the watershed into subareas. The model is capable of producing runoff simulations using only the watershed input characteristics like an elevation DEM, curve numbers, Mannings n, precipitation depth, andrainfall distribution.

Peak flows were analyzed in the predevelopment condition using Flo-2D and the 100-year, 24-hour design storm. Peak flow can be analyzed in Flo-2D using cross section locations specified within the program. Outputs include the peak discharge experienced through that cross section and the Time to peak discharge. Onsite peak flows are summarized in the table below. Peak flow depths for the 100-year – 24-hour storm event are shown on Figure 8.

Table 2

Existing Condition Peak Flows; 100-Year 24-Hour Storm (Figure 7)

Cross Section	Time to Peak (hours)	Peak Q_{100} (cfs)
1	12.90	12,471
2	13.28	13,957
3	13.51	14,663

6 PROPOSED DRAINAGE (POST-DEVELOPMENT CONDITION)

On-site grading will be minimal in scale and will not change any of the existing flow patterns. See preliminary grading plan for proposed grading.

The impacts of solar facilities on the hydrologic process and methods to quantify any impact have not been widely documented in the civil engineering industry. A study published in the Journal of Hydrologic Engineering researched the hydrologic impacts of utility scale solar generating facilities. The study utilized a model to simulate runoff from pre- and post-solar panel conditions. The study showed that the solar panels themselves have very little impact on runoff volumes or rates (Cook and McCuen, 2013). Increases in runoff were found from other well-documented causes such as increased imperviousness or significant reduction in vegetal cover.

Increases in imperviousness for the project will be minimal. Onsite access roads will be compacted native or gravel similar to existing conditions. The site has very little vegetation and only minor grading is expected with no changes to the existing site drainage patterns. Therefore, no impact to onsite drainage is expected as a result of the proposed project.

7 HYDROLOGIC IMPACTS AND MITIGATION

The proposed project will produce approximately 1.0 acres (0.00156 square-miles) of impervious area. This impervious area is added to existing barren/crop land that is pervious. For the purpose of this calculation, impervious areas were assumed to be the PV Tracker pile area, inverter skids, battery skids, and additional substation pads. The proposed all weather access roads were assumed be pervious. Proposed hydraulic obstructions include fencing, tracker piles, and landscaping.

The additional impervious area represents 0.0017% of the watershed that is contributing to the stream passing through the proposed site. This increase in impervious area constitutes a small enough area to confidently assume that the additional impervious area for the solar site will have minimal to no impact on the existing watershed hydrologically.

It is expected that proposed site features that could potentially obstruct the flow of runoff through the site will produce very little impact (Cook and McCuen, 2013). Trackers piles and fencing comprise a small enough cross-sectional area as to expect they would not obstruct flow in any significant manner.

Because on-site features will be elevated off the ground, storm water runoff will be conveyed through the site as it was in the existing condition. The proposed site will not utilize channels or underground piping to convey runoff. Proposed equipment will be constructed above the 100-year flood plain, allowing runoff to sheet flow across the site. Current tracker design will utilize flood sensors to automatically switch modules into “stow” mode in the case of severe site flooding. This “stow” mode rotates the modules to a more horizontal position, lifting their leading edge to a higher position.

8 100-YEAR FLOOD INUNDATION

The existing flood zone designation of the proposed site was characterized as *Zone D,* per the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) 06073C2350F. This designation is considered "Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk". An analysis of the flood plain for the proposed site will be used to both inform the county of the changes to an existing watershed, as well as provide professional guidance on the potential risks to the proposed site features located within the floodplain.

The 100-year-24-hour storm event was analyzed for the proposed site using the watershed limits that contribute to the stream running through the proposed site and into a concentrated stream to the north. The analysis was run with Flo-2D Pro using publicly available data. The inundation depths and max velocities for the 100-year storm are shown in Figure 8 and 9, respectively. Flo-2D produces max velocity and flood inundation depths for every grid element that is modeled. The grid element sizing for the proposed project was set at 100' x 100' grids. The pre-development condition was the only condition that was analyzed for this report. Given the reasoning explained in section 5, solar farms have little effect on existing hydrology and there will be minimal site grading, therefore the 100-year inundation limit produced for the pre-development condition will still accurately model the post-development condition.

FLO-2D RESULTS

A review of the Flo-2D results shows that the proposed site can expect 3-ft to 4-ft max flood depths, with and average flood depth of 1-ft to 2-ft across the site. The average flow velocity across the site ranges from 3 feet per second to 4 feet per second, with a maximum velocity of 5 feet per second onsite. Just north of the site, the model displays, and is confirmed with aerial photography, that flow from the watershed will concentrate into a much deeper and faster flowing stream. This flow will be conveyed under Highway 8 through one of two existing under passages. Depths of flow in this zone are expected to surpass 7-ft in depth.

Measures will need to be taken to elevate proposed site features above the expected inundation level. Protective measures will also need to be in place to protect the site from potential erosion and pile scour. Enhanced gravel roads and rock-lined areas within places of concentrated flow will protect against erosion. Pier embedment depths will need to be increased across the site to adequately deal with the potential effects pile scour.

9 CONCLUSIONS

1) Existing flow patterns and depths will be preserved onsite. Runoff is affected by rainfall intensity, soil type, land cover, site imperviousness, and site topography.

    a. Rainfall intensity, duration, and distribution are not affected by onsite improvements and therefore will remain constant for pre and post-conditions.
    b. Soils within the watershed and within the site will not be changed as a result of any onsite work. Therefore, hydrologic conditions will not vary with such.
    c. Current land cover for the proposed site consists of field crops and barren undeveloped land. As a result of the proposed site, much of the underlaying soil will remain undisturbed, with the exception of minimal changes due to onsite construction.
    d. Solar farms naturally add very little impervious area due to their design. The only impervious area onsite will include tracker piles, inverter skids, battery skids, and additional substation area. Even with the addition of various impervious elements, those said elements tend to be spaced out across the site at large intervals. This results in an imperviousness value that is not much different than that of the pre-developed condition.
    e. There will be minimal onsite grading for the proposed project. Therefore, current drainage patterns will maintain their current courses.

2) There will not be any proposed onsite improvements to convey the 100-year storm. Stormwater runoff will flow overland across the proposed site just as it does in the pre-developed state. PV panels will be elevated above the 100-year inundation flood limit, eliminating the need to concentrate onsite flow into specially design channels to handle large flood events.

3) Onsite flood depths will reach a maximum of 3-ft to 4-ft onsite with an average depth of 1-ft to 2-ft across the site. Maximum onsite flow velocities will reach 5 feet per second onsite, with average velocity around 3 feet per second to 4 feet per second. These depths and velocities will increase downstream of the site as the valley that the proposed site resides in, constricts into a narrow canyon stream. It is expected that flows within this stream will reach more that 7-ft in depth.

4) Onsite erosion will be contained by rock lining areas vulnerable to higher flood depths and velocities. Pre-construction erosion control will be implemented to reduce erosion caused during construction while soils are less stable. Local scour at individual piles will need to be addressed by increasing the minimum embedment depth of piles based on their placement with the inundation zone.

5) Using the results and conclusion within this report, proper precautions will need to be taken to taken to protect the PV arrays and onsite improvements from the potential of flooding. Onsite electrical equipment within the 100-year inundation limits will need to be constructed above or outside the 100-year inundation depth.

10 REFERENCES

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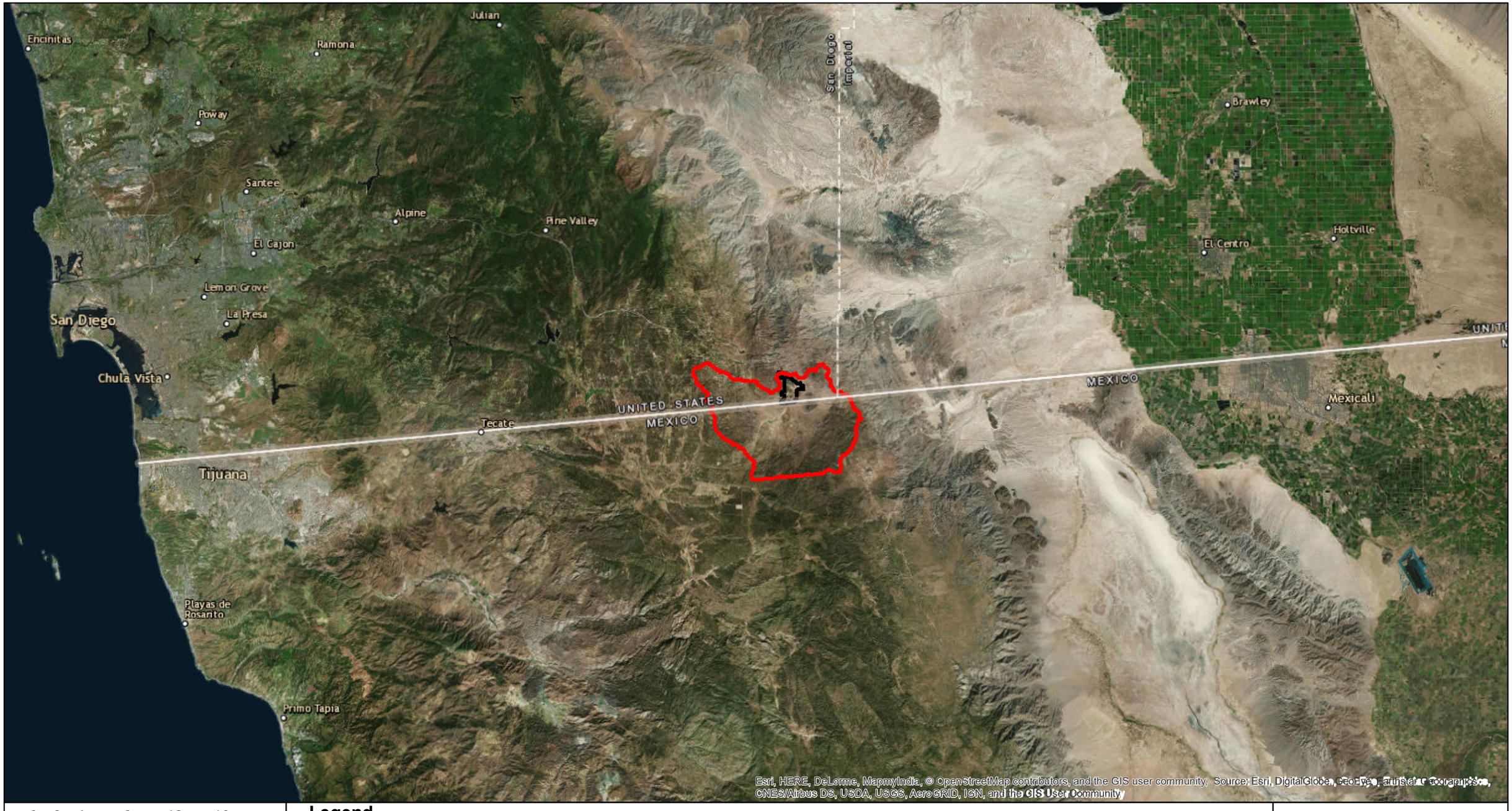
Appendix A – Exhibits



0 2 4 8 12 16 Miles

N

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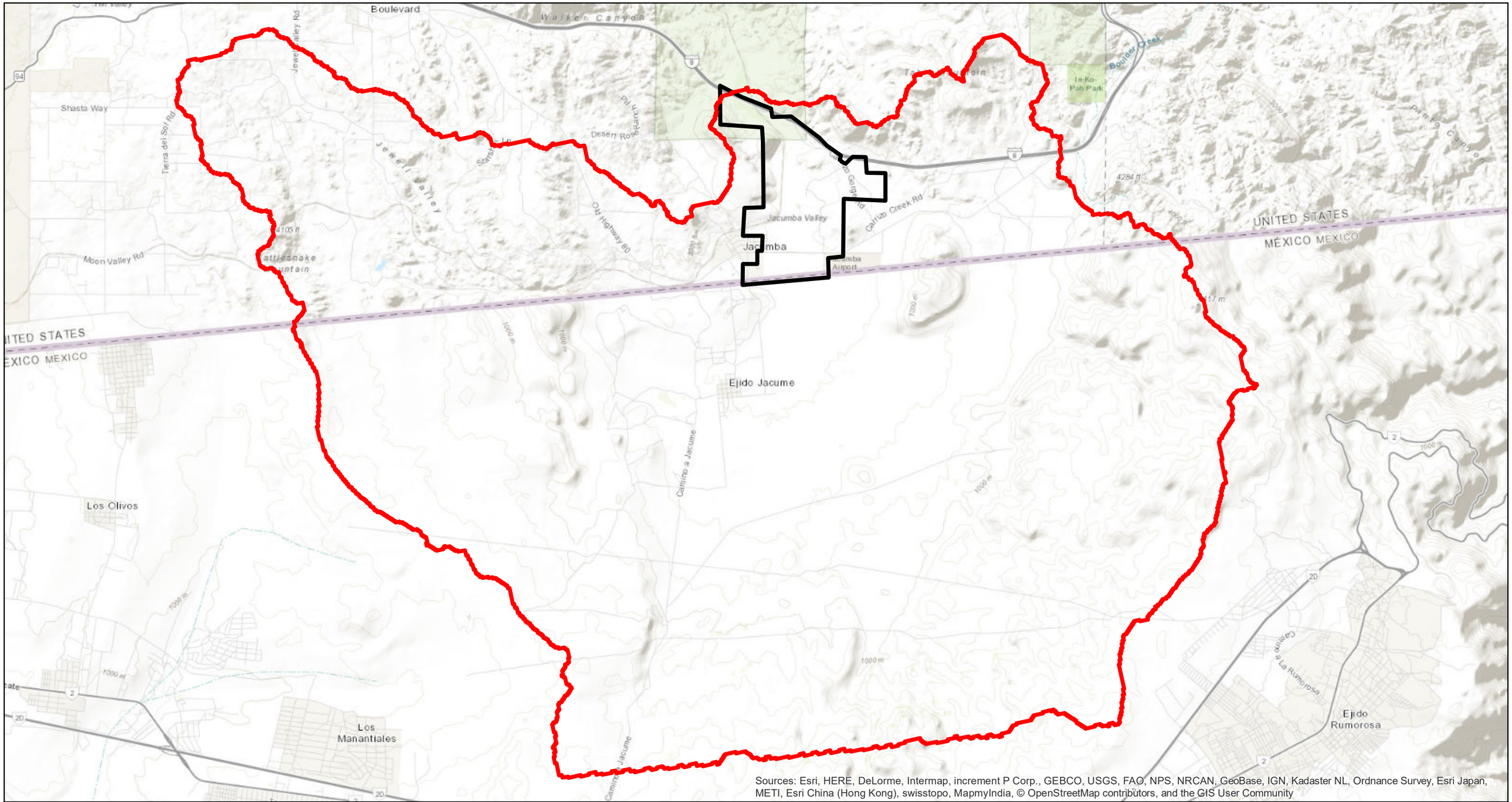
Legend

FLO-2D Model Boundary

On-Site Boundary

Figure 1

JVR Energy Park
Vicinity Map
San Diego County, California



0 0.6 1.2 1.8 2.4 Miles

N

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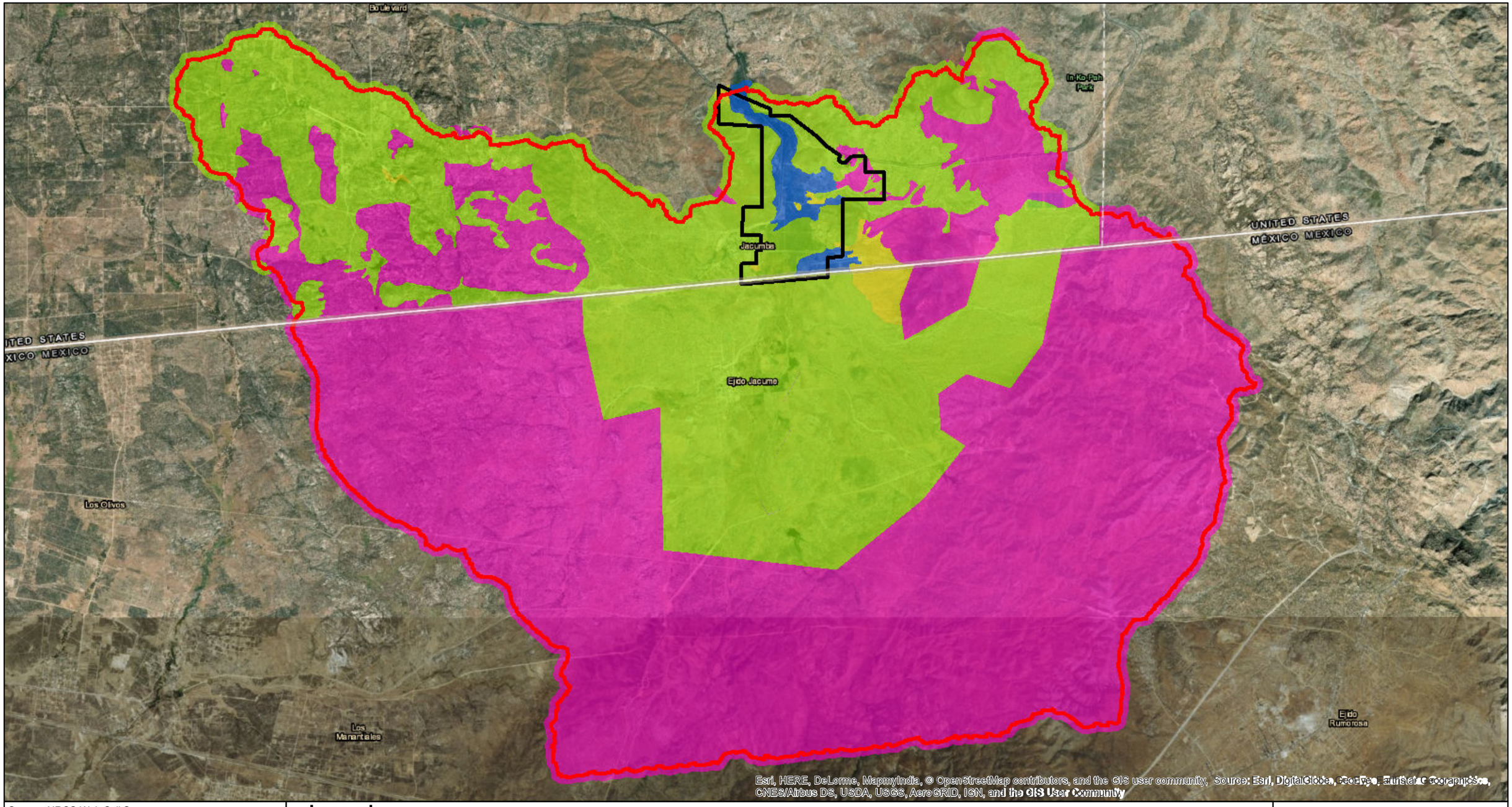
Legend

- FLO-2D Model Boundary
- On-Site Boundary

Figure 2

JVR Energy Park
Topographic Map
San Diego County, California



Source: NRCS Web Soil Survey

0 0.6 1.2 1.8 2.4 Miles

N

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Legend

FLO-2D Model Boundary

On-Site Boundary

Hydrologic Soil Group

A

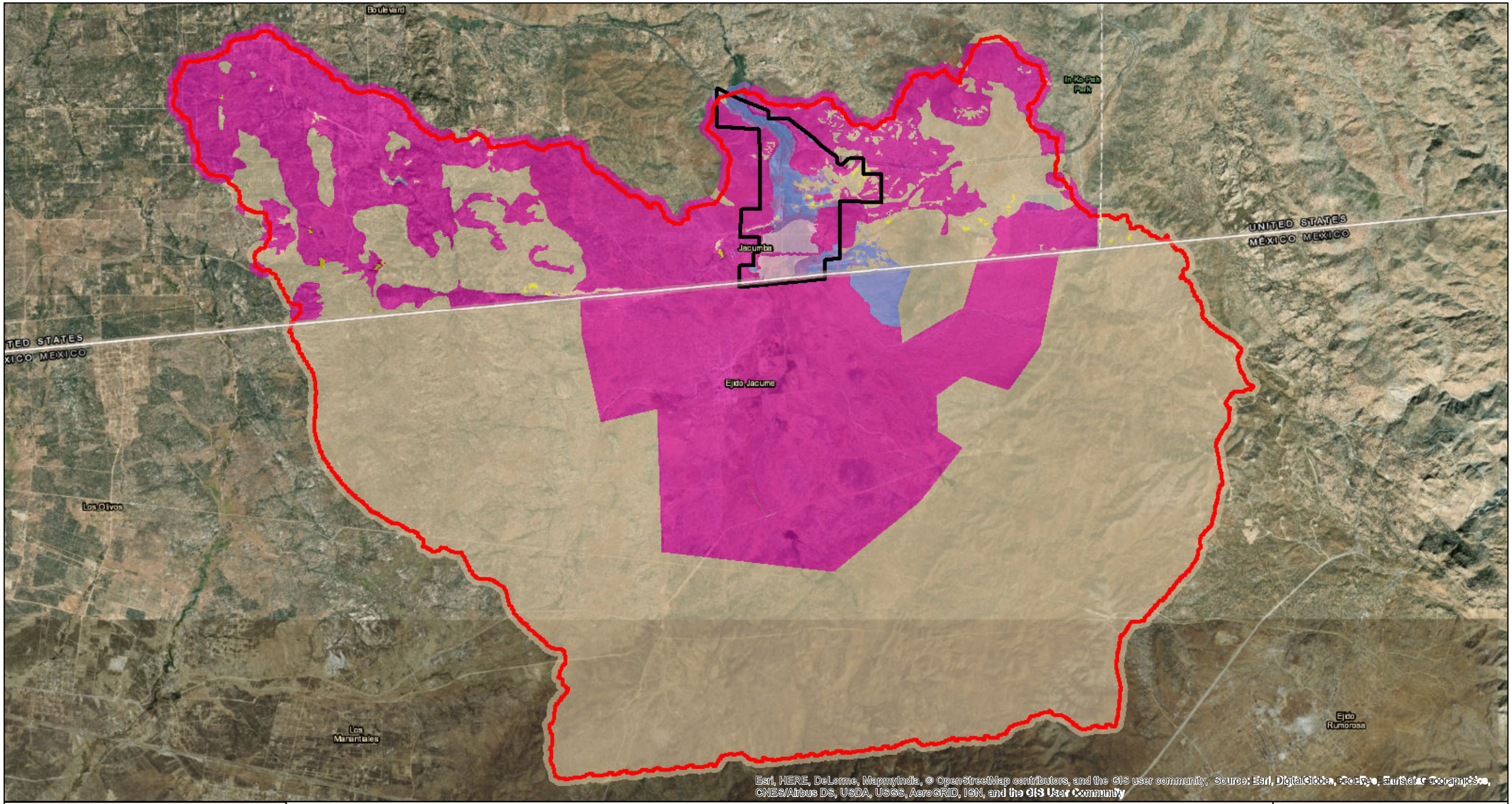
B

C

D

Figure 3

JVR Energy Park
Hydrologic Soil Group
San Diego County, California



Sources: NRCS Web Soil Survey, USDA Urban Hydrology

0 0.6 1.2 1.8 2.4 Miles

N

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Legend

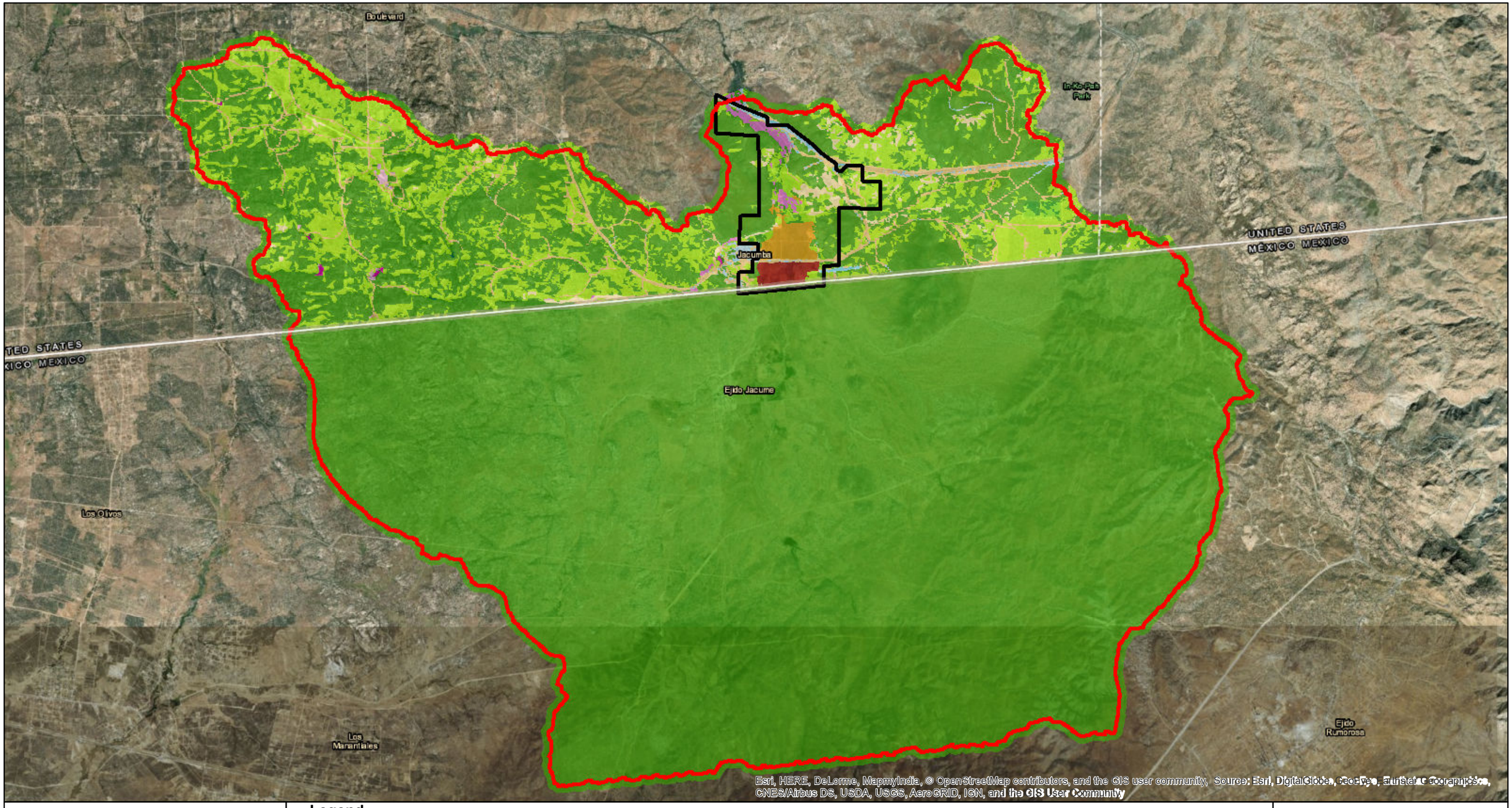
- FLO-2D Model Boundary
- On-Site Boundary

Curve Number

- 40 - 49
- 50 - 59
- 60 - 69
- 70 - 79
- 80 - 89
- 90 - 98

Figure 4

JVR Energy Park
Curve Number
San Diego County, California



0 0.6 1.2 1.8 2.4 Miles

N

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Legend

- FLO-2D Model Boundary
- On-Site Boundary

Land Cover Type

- Barren Land
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Pasture / Hay
- Cultivated Crops
- Grassland / Herbaceous
- Shrub
- Mixed Forest
- Emergent Herbaceous Wetlands
- Woody Wetlands
- Open Water

Figure 5

JVR Energy Park
Land Cover Map
San Diego County, California

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Sources: San Diego County, SanGIS

0 1.5 3 4.5 6 Miles

N

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Legend

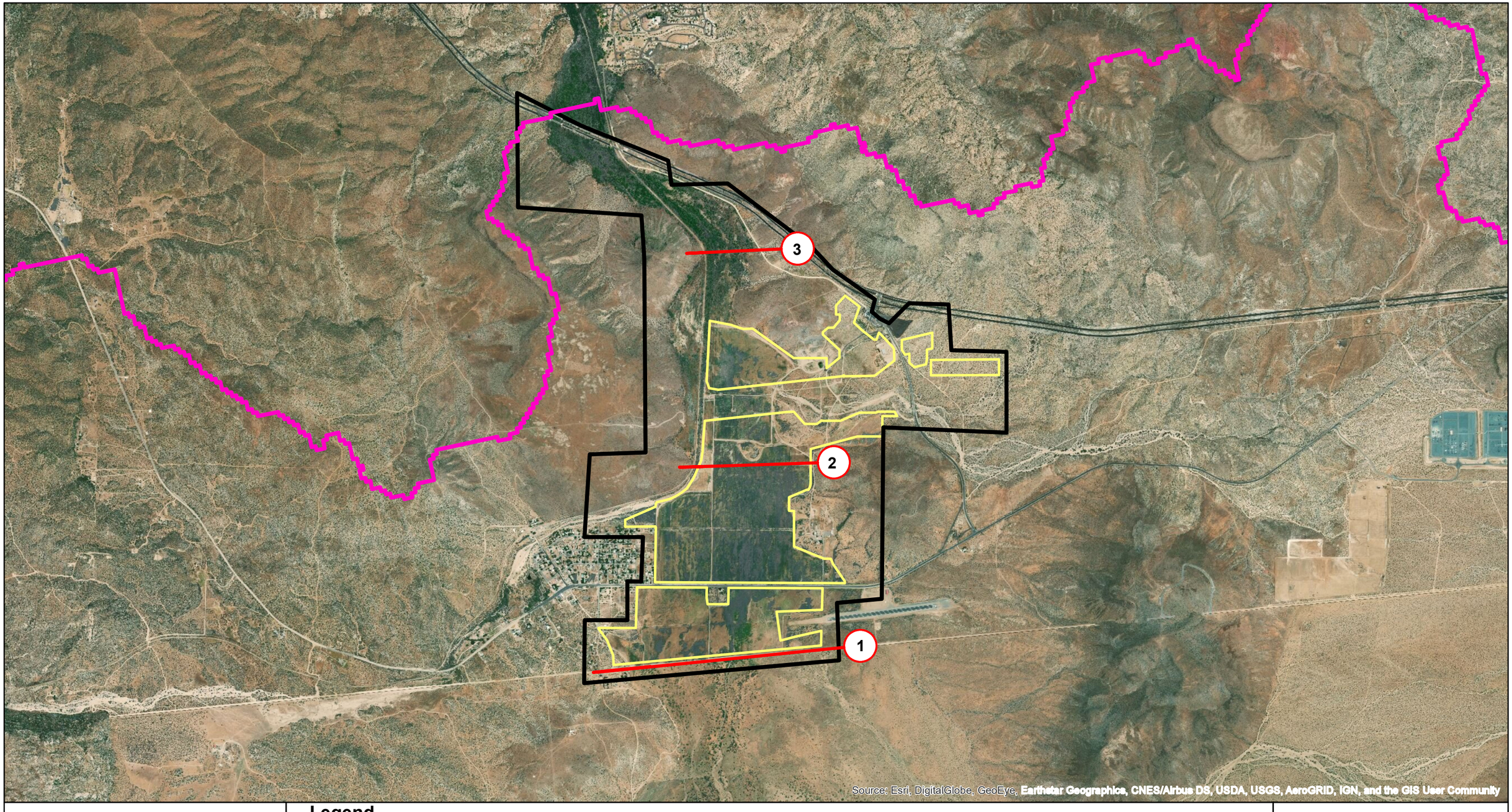
- FLO-2D Model Boundary
- On-Site Boundary
- On-Site Fenceline

LANDUSE

- Airstrip
- Communications and Utilities
- Field Crops
- Freeway
- Library
- Mobile Home Park
- Open Space Park or Preserve
- Other Retail Trade and Strip Commercial
- Railroad Right of Way
- Road Right of Way
- Single Family Detached
- Single Family Multiple-Units
- Single Family Residential Without Units
- Spaced Rural Residential
- Spaced Rural Residential Without Units
- Vacant and Undeveloped Land

Figure 6

JVR Energy Park
Land Use Map
San Diego County, California



0 1.5 3 4.5 6 Miles

N

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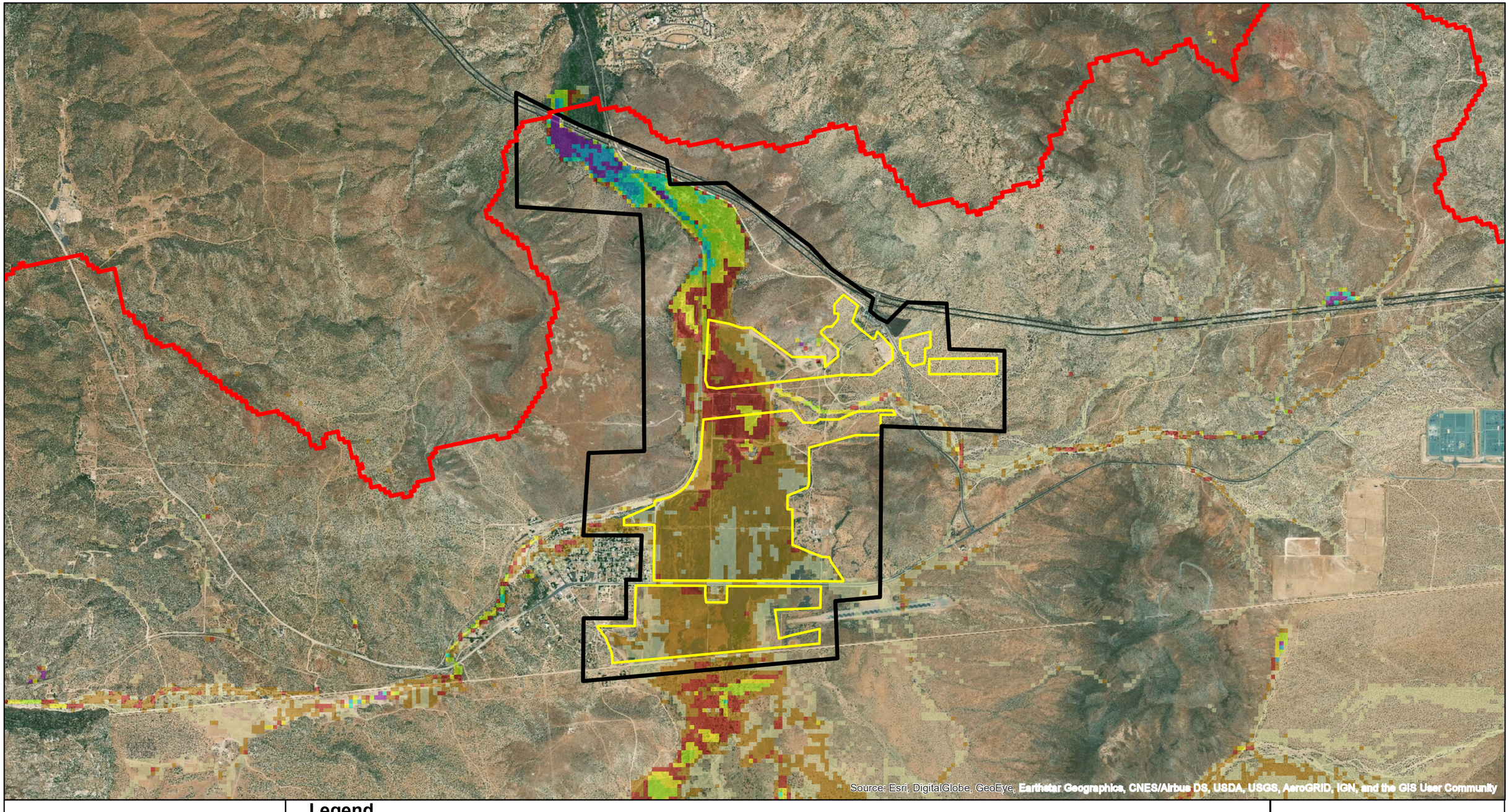
Legend

- FLO-2D Model Boundary
- On-Site Boundary
- On-Site Fenceline
- X — FLO-2D Cross-Section

Figure 7

JVR Energy Park
Cross-Section Locations
San Diego County, California



0 1.5 3 4.5 6 Miles

N

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Legend

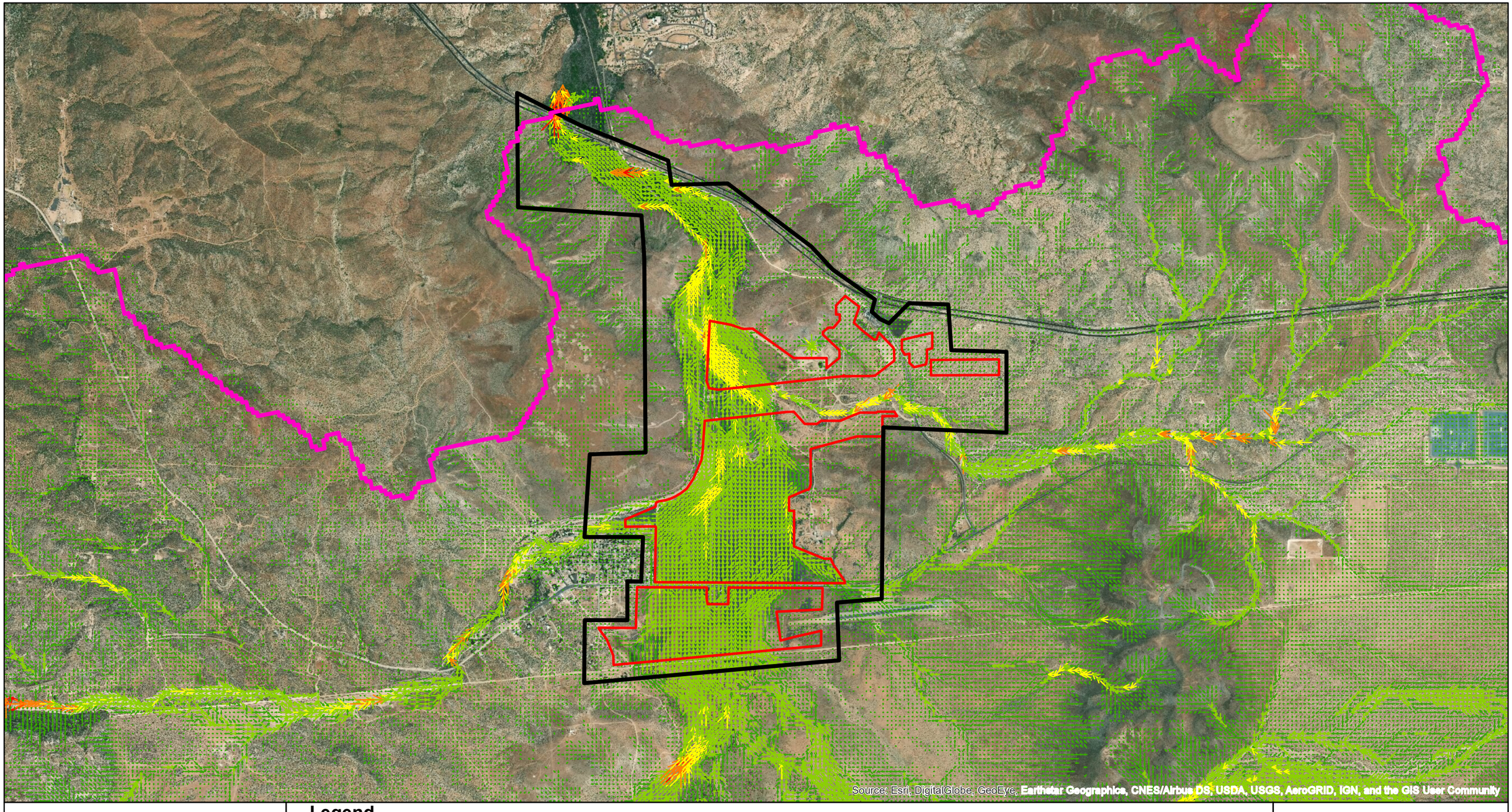
- FLO-2D Model Boundary
- On-Site Boundary
- On-Site Fenceline

On-Site Inundation Depth

- 0.1- 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- 4.0 - 5.0
- 5.0 - 6.0
- 6.0 - 7.0
- 7.0- 10.0

Figure 8

JVR Energy Park
Flood Inundation Map
100-Year, 24-Hour Storm
San Diego County, California



0 1.5 3 4.5 6 Miles

N

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Legend

- FLO-2D Model Boundary
- On-Site Boundary
- On-Site Fenceline

Max On-Site Velocity

- 0.0 - 2.0
- 2.0 - 5.0
- 5.0 - 7.0
- 7.0 - 10.0
- 10.0 - 20.0

Figure 9

JVR Energy Park
Max Velocity Map
100-Year, 24-Hour Storm
San Diego County, California

Appendix B – Flo-2D Output Summary Report

FLO2-D CALCULATION SUMMARY OUTPUT REPORT

NEGATIVE VOLUME CONSERVATION (ACRE FEET)

INDICATES EXCESS VOLUME (OUTFLOW + STORAGE > INFLOW)

SIMULATION TIME (HOURS)	AVERAGE TIMESTEP (SECONDS)	VOLUME CONSERVATION (ACRE FEET)	PERCENT OF INFLOW
	SUMMARY.OUT FILE		
	Pro Model - Build No. 17.08.17		
0.101	5.029	-0.000000	0.000000
0.201	5.086	0.000000	0.000000
0.301	5.139	-0.000000	0.000000
0.400	5.187	0.000000	0.000000
0.501	5.233	0.000000	0.000000
0.600	5.276	0.000000	0.000000
0.701	5.317	0.000000	0.000000
0.800	5.356	0.000000	0.000000
0.901	5.392	0.000000	0.000000
1.000	5.427	0.000000	0.000000
1.100	5.460	0.000000	0.000000
1.201	5.493	-0.000000	0.000000
1.301	5.523	-0.000000	0.000000
1.401	5.552	-0.000000	0.000000
1.500	5.581	-0.000000	0.000000
1.601	5.608	-0.000000	0.000000
1.700	5.634	-0.000000	0.000000
1.801	5.659	-0.000000	0.000000
1.900	5.684	-0.000000	0.000000
2.002	5.708	0.000000	0.000000

2.100	5.730	0.000000	0.000000
2.201	5.753	-0.000000	0.000000
2.300	5.774	-0.000000	0.000000
2.400	5.795	0.000000	0.000000
2.500	5.816	0.000000	0.000000
2.601	5.836	0.000000	0.000000
2.700	5.855	-0.000000	0.000000
2.801	5.874	0.000000	0.000000
2.901	5.892	-0.000000	0.000000
3.001	5.910	0.000000	0.000000
3.102	5.928	0.000000	0.000000
3.201	5.945	0.000000	0.000000
3.300	5.962	0.000000	0.000000
3.401	5.978	0.000000	0.000000
3.501	5.994	0.000000	0.000000
3.601	6.010	0.000000	0.000000
3.700	6.025	-0.000000	0.000000
3.801	6.040	0.000000	0.000000
3.900	6.055	0.000001	0.000000
4.001	6.069	0.000001	0.000000
4.101	6.084	0.000001	0.000000
4.201	6.097	0.000001	0.000000
4.301	6.111	0.000001	0.000000
4.401	6.125	0.000001	0.000000
4.500	6.138	0.000001	0.000000
4.601	6.151	0.000001	0.000000
4.700	6.163	0.000002	0.000000
4.802	6.176	0.000002	0.000000
4.901	6.188	0.000002	0.000000

5.001	6.200	0.000001	0.000000
5.101	6.212	0.000001	0.000000
5.202	6.224	0.000001	0.000000
5.300	6.236	0.000000	0.000000
5.401	6.247	0.000000	0.000000
5.500	6.258	0.000000	0.000000
5.601	6.269	-0.000000	0.000000
5.700	6.280	-0.000000	0.000000
5.800	6.291	-0.000000	0.000000
5.902	6.301	-0.000001	0.000000
6.002	6.312	-0.000001	0.000000
6.102	6.322	-0.000001	0.000000
6.200	6.332	-0.000000	0.000000
6.301	6.342	0.000000	0.000000
6.401	6.352	-0.000000	0.000000
6.500	6.362	-0.000000	0.000000
6.601	6.371	0.000000	0.000000
6.700	6.381	0.000001	0.000000
6.801	6.390	0.000001	0.000000
6.901	6.400	0.000001	0.000000
7.001	6.409	0.000000	0.000000
7.100	6.418	0.000000	0.000000
7.200	6.427	0.000001	0.000000
7.301	6.436	0.000001	0.000000
7.401	6.444	0.000001	0.000000
7.501	6.453	0.000001	0.000000
7.602	6.461	0.000002	0.000000
7.701	6.470	0.000001	0.000000
7.801	6.478	0.000001	0.000000

7.900	6.486	0.000001	0.000000
8.001	6.495	0.000001	0.000000
8.101	6.503	0.000001	0.000000
8.200	6.511	0.000001	0.000000
8.302	6.519	0.000001	0.000000
8.401	6.526	0.000000	0.000000
8.501	6.534	0.000000	0.000000
8.601	6.542	0.000000	0.000000
8.701	6.549	-0.000000	0.000000
8.801	6.557	-0.000000	0.000000
8.902	6.564	-0.000001	0.000000
9.000	6.572	-0.000001	0.000000
9.101	6.579	-0.000001	0.000000
9.201	6.586	-0.000000	0.000000
9.300	6.593	0.000000	0.000000
9.401	6.600	0.000002	0.000000
9.500	6.607	0.000001	0.000000
9.601	6.614	-0.000001	0.000000
9.701	6.621	-0.000001	0.000000
9.802	6.628	-0.000002	0.000000
9.901	5.412	-0.000005	0.000000
10.000	3.338	-0.000004	0.000000
10.100	2.560	-0.000006	0.000000
10.200	2.396	-0.000004	0.000000
10.300	2.236	0.000001	0.000000
10.400	2.183	0.000004	0.000000
10.500	2.136	0.000000	0.000000
10.600	2.117	0.000005	0.000000
10.700	2.113	0.000004	0.000000

10.800	2.177	0.000005	0.000000
10.900	2.159	0.000006	0.000000
11.000	2.108	0.000005	0.000000
11.101	2.119	0.000005	0.000000
11.200	2.147	0.000005	0.000000
11.300	2.182	0.000006	0.000000
11.400	2.221	0.000002	0.000000
11.500	2.259	0.000006	0.000000
11.600	2.297	0.000006	0.000000
11.700	2.333	0.000007	0.000000
11.800	2.367	0.000012	0.000000
11.900	2.398	0.000011	0.000000
12.000	2.426	0.000010	0.000000
12.100	2.452	0.000014	0.000000
12.201	2.476	0.000014	0.000000
12.300	2.497	0.000016	0.000000
12.400	2.517	0.000012	0.000000
12.500	2.535	0.000013	0.000000
12.600	2.551	0.000018	0.000000
12.700	2.566	0.000018	0.000000
12.801	2.581	0.000022	0.000000
12.900	2.597	0.000017	0.000000
13.000	2.611	0.000007	0.000000
13.100	2.626	0.000008	0.000000
13.201	2.639	0.000009	0.000000
13.301	2.652	0.000010	0.000000
13.401	2.662	0.000013	0.000000
13.500	2.674	0.000015	0.000000
13.600	2.573	0.000020	0.000000

13.700	2.359	0.000017	0.000000
13.800	2.302	0.000019	0.000000
13.901	2.288	0.000022	0.000000
14.000	2.290	0.000019	0.000000
14.101	2.297	0.000016	0.000000
14.201	2.308	0.000015	0.000000
14.300	2.321	0.000019	0.000000
14.400	2.334	0.000020	0.000000
14.500	2.346	0.000022	0.000000
14.600	2.358	0.000019	0.000000
14.700	2.371	0.000018	0.000000
14.800	2.383	0.000016	0.000000
14.900	2.395	0.000013	0.000000
15.000	2.408	0.000012	0.000000
15.101	2.420	0.000015	0.000000
15.201	2.432	0.000011	0.000000
15.300	2.444	0.000007	0.000000
15.401	2.457	0.000009	0.000000
15.500	2.469	0.000009	0.000000
15.600	2.482	0.000005	0.000000
15.701	2.495	0.000001	0.000000
15.800	2.506	0.000003	0.000000
15.900	2.519	0.000006	0.000000
16.000	2.531	0.000006	0.000000
16.100	2.544	0.000008	0.000000
16.201	2.557	0.000011	0.000000
16.300	2.569	0.000009	0.000000
16.400	2.581	0.000008	0.000000
16.500	2.594	0.000014	0.000000

16.600	2.606	0.000008	0.000000
16.701	2.618	0.000014	0.000000
16.801	2.631	0.000015	0.000000
16.900	2.642	0.000011	0.000000
17.000	2.641	0.000013	0.000000
17.100	2.662	0.000019	0.000000
17.200	2.637	0.000013	0.000000
17.300	2.687	0.000010	0.000000
17.401	2.617	0.000008	0.000000
17.500	2.675	0.000012	0.000000
17.600	2.621	0.000014	0.000000
17.700	2.596	0.000013	0.000000
17.800	2.651	0.000017	0.000000
17.900	2.626	0.000010	0.000000
18.001	2.674	0.000011	0.000000
18.100	2.641	0.000008	0.000000
18.200	2.593	0.000007	0.000000
18.300	2.583	0.000001	0.000000
18.400	2.681	0.000005	0.000000
18.500	2.580	0.000002	0.000000
18.601	2.618	0.000003	0.000000
18.700	2.596	-0.000000	0.000000
18.801	2.679	0.000002	0.000000
18.900	2.559	0.000008	0.000000
19.000	2.625	0.000012	0.000000
19.100	2.565	0.000015	0.000000
19.200	2.620	0.000016	0.000000
19.300	2.560	0.000015	0.000000
19.400	2.661	0.000014	0.000000

19.500	2.747	0.000013	0.000000
19.601	2.821	0.000011	0.000000
19.701	2.843	0.000014	0.000000
19.800	2.848	0.000013	0.000000
19.900	2.851	0.000018	0.000000
20.000	2.856	0.000016	0.000000
20.100	2.861	0.000017	0.000000
20.201	2.866	0.000021	0.000000
20.300	2.869	0.000016	0.000000
20.400	2.874	0.000017	0.000000
20.501	2.875	0.000022	0.000000
20.601	2.880	0.000028	0.000000
20.701	2.881	0.000028	0.000000
20.800	2.887	0.000028	0.000000
20.900	2.890	0.000025	0.000000
21.000	2.893	0.000028	0.000000
21.101	2.898	0.000028	0.000000
21.201	2.901	0.000031	0.000000
21.301	2.906	0.000029	0.000000
21.400	2.911	0.000026	0.000000
21.501	2.913	0.000025	0.000000
21.600	2.917	0.000029	0.000000
21.700	2.921	0.000028	0.000000
21.801	2.922	0.000028	0.000000
21.901	2.926	0.000026	0.000000
22.001	2.929	0.000023	0.000000
22.101	2.931	0.000022	0.000000
22.200	2.935	0.000023	0.000000
22.301	2.939	0.000018	0.000000

22.400	2.942	0.000018	0.000000
22.500	2.946	0.000020	0.000000
22.600	2.950	0.000027	0.000000
22.700	2.954	0.000022	0.000000
22.801	2.956	0.000024	0.000000
22.900	2.960	0.000022	0.000000
23.000	2.965	0.000027	0.000000
23.100	2.968	0.000026	0.000000
23.200	2.970	0.000028	0.000000
23.300	2.974	0.000029	0.000000
23.400	2.977	0.000028	0.000000
23.500	2.982	0.000024	0.000000
23.601	2.985	0.000020	0.000000
23.700	2.988	0.000016	0.000000
23.801	2.992	0.000020	0.000000
23.901	2.997	0.000020	0.000000
24.001	3.001	0.000023	0.000000
24.100	3.005	0.000024	0.000000
24.200	3.010	0.000023	0.000000
24.300	3.016	0.000023	0.000000
24.401	3.022	0.000023	0.000000
24.500	3.028	0.000024	0.000000
24.600	3.035	0.000024	0.000000
24.700	3.042	0.000024	0.000000
24.800	3.050	0.000023	0.000000
24.900	3.059	0.000024	0.000000
25.000	3.068	0.000023	0.000000
25.100	3.078	0.000023	0.000000
25.200	3.089	0.000023	0.000000

25.300	3.098	0.000023	0.000000
25.401	3.110	0.000023	0.000000
25.500	3.123	0.000023	0.000000
25.600	3.132	0.000023	0.000000
25.701	3.145	0.000023	0.000000
25.801	3.157	0.000023	0.000000
25.900	3.169	0.000023	0.000000
26.000	3.183	0.000023	0.000000
26.100	3.195	0.000023	0.000000
26.200	3.211	0.000023	0.000000
26.301	3.226	0.000023	0.000000
26.401	3.238	0.000023	0.000000
26.501	3.253	0.000023	0.000000
26.601	3.266	0.000023	0.000000
26.701	3.281	0.000023	0.000000
26.801	3.297	0.000023	0.000000
26.900	3.313	0.000023	0.000000
27.001	3.326	0.000023	0.000000
27.100	3.342	0.000023	0.000000
27.201	3.359	0.000023	0.000000
27.300	3.377	0.000023	0.000000
27.400	3.394	0.000023	0.000000
27.501	3.412	0.000023	0.000000
27.601	3.431	0.000023	0.000000
27.701	3.451	0.000023	0.000000
27.801	3.470	0.000023	0.000000
27.901	3.491	0.000023	0.000000
28.000	3.510	0.000023	0.000000
28.100	3.527	0.000023	0.000000

28.201	3.548	0.000023	0.000000
28.301	3.567	0.000023	0.000000
28.400	3.584	0.000023	0.000000
28.500	3.598	0.000023	0.000000
28.601	3.614	0.000023	0.000000
28.700	3.633	0.000023	0.000000
28.801	3.653	0.000023	0.000000
28.901	3.672	0.000023	0.000000
29.000	3.686	0.000023	0.000000
29.100	3.710	0.000023	0.000000
29.201	3.729	0.000023	0.000000
29.301	3.752	0.000023	0.000000
29.400	3.771	0.000023	0.000000
29.500	3.794	0.000023	0.000000
29.601	3.815	0.000023	0.000000
29.700	3.842	0.000023	0.000000
29.801	3.858	0.000023	0.000000
29.900	3.885	0.000023	0.000000
30.000	3.908	0.000023	0.000000
30.100	3.925	0.000023	0.000000
30.200	3.951	0.000023	0.000000
30.301	3.974	0.000023	0.000000
30.401	3.992	0.000023	0.000000
30.501	4.017	0.000023	0.000000
30.601	4.042	0.000023	0.000000
30.700	4.064	0.000023	0.000000
30.800	4.081	0.000023	0.000000
30.900	4.105	0.000023	0.000000
31.000	4.127	0.000023	0.000000

31.100	4.151	0.000023	0.000000
31.200	4.169	0.000023	0.000000
31.300	4.187	0.000023	0.000000
31.401	4.207	0.000023	0.000000
31.500	4.228	0.000023	0.000000
31.601	4.247	0.000023	0.000000
31.700	4.261	0.000023	0.000000
31.801	4.277	0.000023	0.000000
31.900	4.296	0.000023	0.000000
32.001	4.317	0.000023	0.000000
32.101	4.338	0.000023	0.000000
32.200	4.364	0.000023	0.000000
32.300	4.386	0.000023	0.000000
32.401	4.407	0.000023	0.000000
32.500	4.432	0.000023	0.000000
32.601	4.456	0.000023	0.000000
32.701	4.476	0.000023	0.000000
32.801	4.496	0.000023	0.000000
32.900	4.518	0.000023	0.000000
33.001	4.539	0.000023	0.000000
33.100	4.565	0.000023	0.000000
33.201	4.587	0.000023	0.000000
33.301	4.605	0.000023	0.000000
33.401	4.623	0.000023	0.000000
33.501	4.643	0.000023	0.000000
33.601	4.659	0.000023	0.000000
33.701	4.682	0.000023	0.000000
33.800	4.708	0.000023	0.000000
33.900	4.728	0.000023	0.000000

34.000	4.746	0.000023	0.000000
34.101	4.766	0.000023	0.000000
34.201	4.785	0.000023	0.000000
34.301	4.799	0.000023	0.000000
34.401	4.823	0.000023	0.000000
34.501	4.849	0.000023	0.000000
34.601	4.876	0.000023	0.000000
34.700	4.893	0.000023	0.000000
34.800	4.920	0.000023	0.000000
34.900	4.943	0.000023	0.000000
35.001	4.963	0.000023	0.000000
35.101	4.979	0.000023	0.000000
35.200	4.988	0.000023	0.000000
35.301	5.008	0.000023	0.000000
35.401	5.043	0.000023	0.000000
35.501	5.061	0.000023	0.000000
35.600	5.085	0.000023	0.000000
35.701	5.111	0.000023	0.000000
35.801	5.129	0.000023	0.000000
35.901	5.138	0.000023	0.000000
36.001	5.186	0.000023	0.000000
36.101	5.193	0.000023	0.000000
36.201	5.220	0.000023	0.000000
36.300	5.251	0.000023	0.000000
36.401	5.258	0.000023	0.000000
36.501	5.291	0.000023	0.000000
36.601	5.309	0.000023	0.000000
36.701	5.312	0.000023	0.000000
36.801	5.335	0.000023	0.000000

36.900	5.355	0.000023	0.000000
37.000	5.368	0.000023	0.000000
37.101	5.395	0.000023	0.000000
37.200	5.421	0.000023	0.000000
37.300	5.453	0.000023	0.000000
37.400	5.470	0.000023	0.000000
37.501	5.498	0.000023	0.000000
37.601	5.520	0.000023	0.000000
37.701	5.542	0.000023	0.000000
37.801	5.568	0.000023	0.000000
37.901	5.583	0.000023	0.000000
38.001	5.615	0.000023	0.000000
38.101	5.664	0.000023	0.000000
38.201	5.682	0.000023	0.000000
38.300	5.705	0.000023	0.000000
38.401	5.732	0.000023	0.000000
38.501	5.747	0.000023	0.000000
38.601	5.757	0.000023	0.000000
38.700	5.790	0.000023	0.000000
38.800	5.794	0.000023	0.000000
38.901	5.613	0.000023	0.000000
39.001	5.426	0.000023	0.000000
39.101	5.477	0.000023	0.000000
39.201	5.525	0.000023	0.000000
39.300	5.570	0.000023	0.000000
39.401	5.612	0.000023	0.000000
39.500	5.653	0.000023	0.000000
39.601	5.691	0.000023	0.000000
39.700	5.727	0.000023	0.000000

39.801	5.761	0.000023	0.000000
39.901	5.794	0.000023	0.000000
40.001	5.826	0.000023	0.000000
40.101	5.394	0.000023	0.000000
40.201	5.447	0.000023	0.000000
40.301	5.496	0.000023	0.000000
40.401	5.542	0.000023	0.000000
40.501	5.586	0.000023	0.000000
40.601	5.627	0.000023	0.000000
40.701	5.666	0.000023	0.000000
40.800	5.703	0.000023	0.000000
40.901	5.738	0.000023	0.000000
41.000	5.772	0.000023	0.000000
41.100	5.804	0.000023	0.000000
41.201	5.745	0.000023	0.000000
41.301	5.444	0.000023	0.000000
41.401	5.496	0.000023	0.000000
41.501	5.545	0.000023	0.000000
41.601	5.590	0.000023	0.000000
41.701	5.633	0.000023	0.000000
41.800	5.673	0.000023	0.000000
41.900	5.711	0.000023	0.000000
42.001	5.748	0.000023	0.000000
42.100	5.783	0.000023	0.000000
42.201	5.816	0.000023	0.000000
42.301	5.643	0.000023	0.000000
42.401	5.485	0.000023	0.000000
42.501	5.535	0.000023	0.000000
42.601	5.583	0.000023	0.000000

42.701	5.627	0.000023	0.000000
42.801	5.669	0.000023	0.000000
42.901	5.709	0.000023	0.000000
43.000	5.746	0.000023	0.000000
43.101	5.782	0.000023	0.000000
43.200	5.816	0.000023	0.000000
43.301	3.591	0.000023	0.000000
43.401	3.180	0.000023	0.000000
43.500	3.259	0.000023	0.000000
43.600	3.330	0.000023	0.000000
43.700	3.395	0.000023	0.000000
43.801	3.454	0.000023	0.000000
43.900	3.508	0.000023	0.000000
44.001	3.558	0.000023	0.000000
44.100	3.605	0.000023	0.000000
44.200	3.649	0.000023	0.000000
44.301	3.690	0.000023	0.000000
44.400	3.729	0.000023	0.000000
44.501	3.766	0.000023	0.000000
44.600	3.800	0.000023	0.000000
44.700	3.834	0.000023	0.000000
44.801	3.865	0.000023	0.000000
44.901	3.896	0.000023	0.000000
45.001	3.925	0.000023	0.000000
45.101	3.953	0.000023	0.000000
45.200	3.980	0.000023	0.000000
45.300	4.006	0.000023	0.000000
45.400	4.030	0.000023	0.000000
45.500	4.055	0.000023	0.000000

45.600	4.078	0.000023	0.000000
45.700	4.100	0.000023	0.000000
45.801	4.122	0.000023	0.000000
45.901	4.144	0.000023	0.000000
46.001	4.164	0.000023	0.000000
46.101	4.184	0.000023	0.000000
46.201	4.203	0.000023	0.000000
46.301	4.222	0.000023	0.000000
46.401	4.241	0.000023	0.000000
46.500	4.259	0.000023	0.000000
46.601	4.276	0.000023	0.000000
46.700	4.293	0.000023	0.000000
46.801	4.310	0.000023	0.000000
46.900	4.326	0.000023	0.000000
47.001	4.342	0.000023	0.000000
47.101	4.358	0.000023	0.000000
47.201	4.373	0.000023	0.000000
47.301	4.388	0.000023	0.000000
47.401	4.403	0.000023	0.000000
47.500	4.417	0.000023	0.000000
47.601	4.431	0.000023	0.000000
47.701	4.445	0.000023	0.000000
47.800	4.458	0.000023	0.000000
47.901	4.472	0.000023	0.000000
48.001	4.485	0.000023	0.000000

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MASS BALANCE INFLOW - OUTFLOW VOLUME

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*** INFLOW (ACRE-FEET) ***

TOTAL POINT RAINFALL: 6.5000 INCHES

	WATER
RAINFALL VOLUME	32558.524
SURFACE WATER INFLOW HYDROGRAPH	0.000
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INFLOW HYDROGRAPHS + RAINFALL	32558.524

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*** SURFACE OUTFLOW (ACRE-FT) ***

OVERLAND INFILTRATED AND INTERCEPTED WATER 2.963 INCHES

OVERLAND FLOW	WATER
WATER LOST TO INFILTRATION & INTERCEPTION	14818.611

FLOODPLAIN STORAGE 7055.462

FLOODPLAIN OUTFLOW HYDROGRAPH 10684.451

FLOODPLAIN OUTFLOW, INFILTRATION & STORAGE 32558.523

TOL FLOODPLAIN STORAGE 5947.393

TOTAL SURFACE OUTFLOW AND STORAGE 32558.523

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*** TOTALS ***

TOTAL OUTFLOW FROM GRID SYSTEM 10684.451

TOTAL VOLUME OF OUTFLOW AND STORAGE 32558.523

SURFACE AREA OF INUNDATION REGARDLESS OF THE TIME OF OCCURRENCE:

(FOR FLOW DEPTHS GREATER THAN THE "TOL" VALUE TYPICALLY 0.1 FT OR 0.03 M)

THE MAXIMUM INUNDATED AREA IS: 60472.222 ACRES

THE MAXIMUM INUNDATED AREA (DEPTH > 0.5 FT) IS: 6204.545 ACRES

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AVERAGE GRID ELEMENT FLOW DIRECTION FLOODPLAIN HYDRAULICS:

DISCHARGE (CFS OR CMS): 17.438

VELOCITY (FPS OR CMS): 0.572

FLOW AREA (FT^2 OR M^2): 15.750

FLOW DEPTH (FT OR M): 0.379

FLOW WIDTH (FT OR M): 41.449

TOTAL COMPUTATIONS: 2198161907.

COMPUTER RUN TIME IS : 1.08447 HRS

THIS OUTPUT FILE WAS TERMINATED ON: 10/10/2018 AT: 11:28:10

FLO2-D CALCULATION OUTPUT FOR CROSS-SECTION 1

CROSSMAX.OUT

THE MAXIMUM DISCHARGE FROM CROSS SECTION 1 IS: 12471.38 CFS AT TIME: 12.90 HOURS

THE MAXIMUM DISCHARGE FROM NODE 123750 IS: 5.43 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 124227 IS: 4.62 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 124705 IS: 5.32 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.03 AF

THE MAXIMUM DISCHARGE FROM NODE 125184 IS: 5.14 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.03 AF

THE MAXIMUM DISCHARGE FROM NODE 125663 IS: 4.79 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 126142 IS: 3.42 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 126620 IS: 3.33 CFS AT TIME 20.44 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 127098 IS: 2.80 CFS AT TIME 20.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.04 AF

THE MAXIMUM DISCHARGE FROM NODE 127576 IS: 3.01 CFS AT TIME 20.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.06 AF

THE MAXIMUM DISCHARGE FROM NODE 128054 IS: 3.00 CFS AT TIME 20.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.07 AF

THE MAXIMUM DISCHARGE FROM NODE 128532 IS: 2.99 CFS AT TIME 20.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.10 AF

THE MAXIMUM DISCHARGE FROM NODE 129010 IS: 3.42 CFS AT TIME 23.03 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.06 AF

THE MAXIMUM DISCHARGE FROM NODE 129488 IS: 3.04 CFS AT TIME 23.15 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.06 AF

THE MAXIMUM DISCHARGE FROM NODE 129966 IS: 7.33 CFS AT TIME 13.07 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.35 FEET AND A MAXIMUM VOLUME OF: 1.49 AF

THE MAXIMUM DISCHARGE FROM NODE 130443 IS: 51.04 CFS AT TIME 13.00 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.84 FEET AND A MAXIMUM VOLUME OF: 25.53 AF

THE MAXIMUM DISCHARGE FROM NODE 130919 IS: 104.18 CFS AT TIME 13.00 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.30 FEET AND A MAXIMUM VOLUME OF: 70.23 AF

THE MAXIMUM DISCHARGE FROM NODE 131394 IS: 169.65 CFS AT TIME 13.02 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.48 FEET AND A MAXIMUM VOLUME OF: 114.40 AF

THE MAXIMUM DISCHARGE FROM NODE 131869 IS: 212.53 CFS AT TIME 12.97 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.58 FEET AND A MAXIMUM VOLUME OF: 150.26 AF

THE MAXIMUM DISCHARGE FROM NODE 132342 IS: 239.90 CFS AT TIME 12.96 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.64 FEET AND A MAXIMUM VOLUME OF: 147.81 AF

THE MAXIMUM DISCHARGE FROM NODE 132814 IS: 284.96 CFS AT TIME 12.96 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.74 FEET AND A MAXIMUM VOLUME OF: 167.12 AF

THE MAXIMUM DISCHARGE FROM NODE 133284 IS: 299.29 CFS AT TIME 12.94 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.83 FEET AND A MAXIMUM VOLUME OF: 170.91 AF

THE MAXIMUM DISCHARGE FROM NODE 133754 IS: 288.71 CFS AT TIME 12.93 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.89 FEET AND A MAXIMUM VOLUME OF: 167.11 AF

THE MAXIMUM DISCHARGE FROM NODE 134225 IS: 345.45 CFS AT TIME 12.93 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.01 FEET AND A MAXIMUM VOLUME OF: 210.94 AF

THE MAXIMUM DISCHARGE FROM NODE 134695 IS: 456.86 CFS AT TIME 12.92 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.17 FEET AND A MAXIMUM VOLUME OF: 307.99 AF

THE MAXIMUM DISCHARGE FROM NODE 135164 IS: 545.22 CFS AT TIME 12.92 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.28 FEET AND A MAXIMUM VOLUME OF: 355.86 AF

THE MAXIMUM DISCHARGE FROM NODE 135633 IS: 645.11 CFS AT TIME 12.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.39 FEET AND A MAXIMUM VOLUME OF: 425.42 AF

THE MAXIMUM DISCHARGE FROM NODE 136102 IS: 662.37 CFS AT TIME 12.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.40 FEET AND A MAXIMUM VOLUME OF: 424.25 AF

THE MAXIMUM DISCHARGE FROM NODE 136571 IS: 703.25 CFS AT TIME 12.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.44 FEET AND A MAXIMUM VOLUME OF: 511.50 AF

THE MAXIMUM DISCHARGE FROM NODE 137039 IS: 587.79 CFS AT TIME 12.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.88 FEET AND A MAXIMUM VOLUME OF: 401.54 AF

THE MAXIMUM DISCHARGE FROM NODE 137507 IS: 636.66 CFS AT TIME 12.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.93 FEET AND A MAXIMUM VOLUME OF: 454.62 AF

THE MAXIMUM DISCHARGE FROM NODE 137976 IS: 581.32 CFS AT TIME 12.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.84 FEET AND A MAXIMUM VOLUME OF: 388.15 AF

THE MAXIMUM DISCHARGE FROM NODE 138446 IS: 713.22 CFS AT TIME 12.88 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.19 FEET AND A MAXIMUM VOLUME OF: 558.67 AF

THE MAXIMUM DISCHARGE FROM NODE 138915 IS: 701.76 CFS AT TIME 12.88 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.83 FEET AND A MAXIMUM VOLUME OF: 541.15 AF

THE MAXIMUM DISCHARGE FROM NODE 139383 IS: 548.44 CFS AT TIME 12.87 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 3.51 FEET AND A MAXIMUM VOLUME OF: 372.70 AF

THE MAXIMUM DISCHARGE FROM NODE 139851 IS: 497.58 CFS AT TIME 12.87 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.04 FEET AND A MAXIMUM VOLUME OF: 322.14 AF

THE MAXIMUM DISCHARGE FROM NODE 140318 IS: 477.61 CFS AT TIME 12.87 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.19 FEET AND A MAXIMUM VOLUME OF: 309.42 AF

THE MAXIMUM DISCHARGE FROM NODE 140785 IS: 443.96 CFS AT TIME 12.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.29 FEET AND A MAXIMUM VOLUME OF: 297.36 AF

THE MAXIMUM DISCHARGE FROM NODE 141251 IS: 352.94 CFS AT TIME 12.78 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.37 FEET AND A MAXIMUM VOLUME OF: 213.32 AF

THE MAXIMUM DISCHARGE FROM NODE 141717 IS: 327.73 CFS AT TIME 12.80 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.49 FEET AND A MAXIMUM VOLUME OF: 163.86 AF

THE MAXIMUM DISCHARGE FROM NODE 142183 IS: 284.16 CFS AT TIME 12.80 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.61 FEET AND A MAXIMUM VOLUME OF: 111.82 AF

THE MAXIMUM DISCHARGE FROM NODE 142650 IS: 226.98 CFS AT TIME 12.88 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.65 FEET AND A MAXIMUM VOLUME OF: 92.73 AF

THE MAXIMUM DISCHARGE FROM NODE 143117 IS: 195.73 CFS AT TIME 13.01 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.70 FEET AND A MAXIMUM VOLUME OF: 62.80 AF

THE MAXIMUM DISCHARGE FROM NODE 143584 IS: 194.71 CFS AT TIME 12.86 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.06 FEET AND A MAXIMUM VOLUME OF: 98.45 AF

THE MAXIMUM DISCHARGE FROM NODE 144051 IS: 185.88 CFS AT TIME 12.72 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.83 FEET AND A MAXIMUM VOLUME OF: 138.82 AF

THE MAXIMUM DISCHARGE FROM NODE 144518 IS: 189.92 CFS AT TIME 12.72 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.71 FEET AND A MAXIMUM VOLUME OF: 136.13 AF

THE MAXIMUM DISCHARGE FROM NODE 144985 IS: 174.02 CFS AT TIME 12.73 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.75 FEET AND A MAXIMUM VOLUME OF: 112.24 AF

THE MAXIMUM DISCHARGE FROM NODE 145450 IS: 104.91 CFS AT TIME 12.79 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.76 FEET AND A MAXIMUM VOLUME OF: 61.10 AF

THE MAXIMUM DISCHARGE FROM NODE 145915 IS: 15.97 CFS AT TIME 12.14 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.33 FEET AND A MAXIMUM VOLUME OF: 7.08 AF

THE MAXIMUM DISCHARGE FROM NODE 146380 IS: 32.54 CFS AT TIME 12.13 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.63 FEET AND A MAXIMUM VOLUME OF: 11.94 AF

THE MAXIMUM DISCHARGE FROM NODE 146846 IS: 20.89 CFS AT TIME 12.15 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.52 FEET AND A MAXIMUM VOLUME OF: 9.76 AF

THE MAXIMUM DISCHARGE FROM NODE 147312 IS: 18.50 CFS AT TIME 12.14 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.41 FEET AND A MAXIMUM VOLUME OF: 8.10 AF

THE MAXIMUM DISCHARGE FROM NODE 147779 IS: 18.84 CFS AT TIME 12.17 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.52 FEET AND A MAXIMUM VOLUME OF: 8.76 AF

THE MAXIMUM DISCHARGE FROM NODE 148247 IS: 10.51 CFS AT TIME 12.19 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.56 FEET AND A MAXIMUM VOLUME OF: 5.78 AF

THE MAXIMUM DISCHARGE FROM NODE 148715 IS: 1.28 CFS AT TIME 27.07 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 149184 IS: 0.68 CFS AT TIME 21.81 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.05 AF

THE MAXIMUM DISCHARGE FROM NODE 149653 IS: 0.47 CFS AT TIME 22.88 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.05 AF

THE MAXIMUM DISCHARGE FROM NODE 150122 IS: 1.58 CFS AT TIME 21.29 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.04 AF

FLO2-D CALCULATION OUTPUT FOR CROSS-SECTION 2

THE MAXIMUM DISCHARGE FROM CROSS SECTION 2 IS: 13956.90 CFS AT TIME: 13.28 HOURS

THE MAXIMUM DISCHARGE FROM NODE 135687 IS: 107.14 CFS AT TIME 13.40 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.72 FEET AND A MAXIMUM VOLUME OF: 54.22 AF

THE MAXIMUM DISCHARGE FROM NODE 136156 IS: 198.82 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.81 FEET AND A MAXIMUM VOLUME OF: 119.38 AF

THE MAXIMUM DISCHARGE FROM NODE 136625 IS: 418.46 CFS AT TIME 13.39 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.24 FEET AND A MAXIMUM VOLUME OF: 287.00 AF

THE MAXIMUM DISCHARGE FROM NODE 137093 IS: 440.71 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.10 FEET AND A MAXIMUM VOLUME OF: 262.96 AF

THE MAXIMUM DISCHARGE FROM NODE 137561 IS: 555.33 CFS AT TIME 13.37 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.27 FEET AND A MAXIMUM VOLUME OF: 329.60 AF

THE MAXIMUM DISCHARGE FROM NODE 138030 IS: 1027.30 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.91 FEET AND A MAXIMUM VOLUME OF: 830.80 AF

THE MAXIMUM DISCHARGE FROM NODE 138500 IS: 1091.95 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.90 FEET AND A MAXIMUM VOLUME OF: 941.77 AF

THE MAXIMUM DISCHARGE FROM NODE 138969 IS: 983.81 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.80 FEET AND A MAXIMUM VOLUME OF: 785.80 AF

THE MAXIMUM DISCHARGE FROM NODE 139437 IS: 1064.31 CFS AT TIME 13.38 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.94 FEET AND A MAXIMUM VOLUME OF: 828.01 AF

THE MAXIMUM DISCHARGE FROM NODE 139905 IS: 1128.70 CFS AT TIME 13.28 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.02 FEET AND A MAXIMUM VOLUME OF: 818.99 AF

THE MAXIMUM DISCHARGE FROM NODE 140372 IS: 1366.16 CFS AT TIME 13.28 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.37 FEET AND A MAXIMUM VOLUME OF: 1021.75 AF

THE MAXIMUM DISCHARGE FROM NODE 140839 IS: 934.33 CFS AT TIME 13.27 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.36 FEET AND A MAXIMUM VOLUME OF: 660.16 AF

THE MAXIMUM DISCHARGE FROM NODE 141305 IS: 313.11 CFS AT TIME 13.27 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.81 FEET AND A MAXIMUM VOLUME OF: 170.72 AF

THE MAXIMUM DISCHARGE FROM NODE 141771 IS: 2.01 CFS AT TIME 9.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 142237 IS: 153.91 CFS AT TIME 13.24 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.40 FEET AND A MAXIMUM VOLUME OF: 60.41 AF

THE MAXIMUM DISCHARGE FROM NODE 142704 IS: 704.38 CFS AT TIME 13.24 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.43 FEET AND A MAXIMUM VOLUME OF: 476.46 AF

THE MAXIMUM DISCHARGE FROM NODE 143171 IS: 572.39 CFS AT TIME 13.23 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.85 FEET AND A MAXIMUM VOLUME OF: 318.81 AF

THE MAXIMUM DISCHARGE FROM NODE 143638 IS: 639.19 CFS AT TIME 13.23 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.97 FEET AND A MAXIMUM VOLUME OF: 398.70 AF

THE MAXIMUM DISCHARGE FROM NODE 144105 IS: 706.75 CFS AT TIME 13.22 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.94 FEET AND A MAXIMUM VOLUME OF: 433.91 AF

THE MAXIMUM DISCHARGE FROM NODE 144572 IS: 577.51 CFS AT TIME 13.23 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.77 FEET AND A MAXIMUM VOLUME OF: 341.38 AF

THE MAXIMUM DISCHARGE FROM NODE 145039 IS: 446.08 CFS AT TIME 13.23 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.57 FEET AND A MAXIMUM VOLUME OF: 254.85 AF

THE MAXIMUM DISCHARGE FROM NODE 145504 IS: 333.29 CFS AT TIME 13.22 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.46 FEET AND A MAXIMUM VOLUME OF: 190.20 AF

THE MAXIMUM DISCHARGE FROM NODE 145969 IS: 193.24 CFS AT TIME 13.24 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.19 FEET AND A MAXIMUM VOLUME OF: 87.92 AF

THE MAXIMUM DISCHARGE FROM NODE 146434 IS: 33.96 CFS AT TIME 13.25 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.56 FEET AND A MAXIMUM VOLUME OF: 6.51 AF

THE MAXIMUM DISCHARGE FROM NODE 146900 IS: 1.29 CFS AT TIME 19.80 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.24 AF

THE MAXIMUM DISCHARGE FROM NODE 147366 IS: 1.70 CFS AT TIME 21.31 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.24 AF

THE MAXIMUM DISCHARGE FROM NODE 147833 IS: 1.88 CFS AT TIME 21.55 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.17 AF

THE MAXIMUM DISCHARGE FROM NODE 148301 IS: 2.06 CFS AT TIME 21.54 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.10 AF

THE MAXIMUM DISCHARGE FROM NODE 148769 IS: 2.78 CFS AT TIME 22.43 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.14 AF

THE MAXIMUM DISCHARGE FROM NODE 149238 IS: 1.36 CFS AT TIME 23.90 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.14 AF

FLO2-D CALCULATION OUTPUT FOR CROSS-SECTION 3

THE MAXIMUM DISCHARGE FROM CROSS SECTION 3 IS: 14662.82 CFS AT TIME: 13.51 HOURS

THE MAXIMUM DISCHARGE FROM NODE 131493 IS: 5.15 CFS AT TIME 23.09 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.01 AF

THE MAXIMUM DISCHARGE FROM NODE 131968 IS: 8.11 CFS AT TIME 17.79 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.02 AF

THE MAXIMUM DISCHARGE FROM NODE 132441 IS: 7.48 CFS AT TIME 16.05 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.04 AF

THE MAXIMUM DISCHARGE FROM NODE 132913 IS: 8.96 CFS AT TIME 18.59 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.06 AF

THE MAXIMUM DISCHARGE FROM NODE 133383 IS: 8.96 CFS AT TIME 20.56 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.06 AF

THE MAXIMUM DISCHARGE FROM NODE 133853 IS: 8.36 CFS AT TIME 19.79 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.07 AF

THE MAXIMUM DISCHARGE FROM NODE 134324 IS: 7.88 CFS AT TIME 20.79 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.10 AF

THE MAXIMUM DISCHARGE FROM NODE 134794 IS: 7.21 CFS AT TIME 18.36 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.15 AF

THE MAXIMUM DISCHARGE FROM NODE 135263 IS: 6.14 CFS AT TIME 23.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.19 AF

THE MAXIMUM DISCHARGE FROM NODE 135732 IS: 1509.63 CFS AT TIME 13.51 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 5.38 FEET AND A MAXIMUM VOLUME OF: 1354.09 AF

THE MAXIMUM DISCHARGE FROM NODE 136201 IS: 2678.77 CFS AT TIME 13.48 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 5.42 FEET AND A MAXIMUM VOLUME OF: 2441.37 AF

THE MAXIMUM DISCHARGE FROM NODE 136670 IS: 1686.59 CFS AT TIME 13.48 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 3.53 FEET AND A MAXIMUM VOLUME OF: 931.94 AF

THE MAXIMUM DISCHARGE FROM NODE 137138 IS: 2116.39 CFS AT TIME 13.49 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 5.55 FEET AND A MAXIMUM VOLUME OF: 1766.42 AF

THE MAXIMUM DISCHARGE FROM NODE 137606 IS: 1247.53 CFS AT TIME 13.49 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 4.60 FEET AND A MAXIMUM VOLUME OF: 947.16 AF

THE MAXIMUM DISCHARGE FROM NODE 138075 IS: 879.70 CFS AT TIME 13.49 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 3.80 FEET AND A MAXIMUM VOLUME OF: 582.82 AF

THE MAXIMUM DISCHARGE FROM NODE 138545 IS: 864.97 CFS AT TIME 13.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 3.22 FEET AND A MAXIMUM VOLUME OF: 500.72 AF

THE MAXIMUM DISCHARGE FROM NODE 139014 IS: 1154.44 CFS AT TIME 13.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.95 FEET AND A MAXIMUM VOLUME OF: 648.41 AF

THE MAXIMUM DISCHARGE FROM NODE 139482 IS: 964.39 CFS AT TIME 13.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.71 FEET AND A MAXIMUM VOLUME OF: 508.53 AF

THE MAXIMUM DISCHARGE FROM NODE 139950 IS: 866.20 CFS AT TIME 13.51 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.68 FEET AND A MAXIMUM VOLUME OF: 434.82 AF

THE MAXIMUM DISCHARGE FROM NODE 140417 IS: 496.70 CFS AT TIME 13.54 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 2.31 FEET AND A MAXIMUM VOLUME OF: 210.16 AF

THE MAXIMUM DISCHARGE FROM NODE 140884 IS: 201.42 CFS AT TIME 13.54 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 1.33 FEET AND A MAXIMUM VOLUME OF: 36.77 AF

THE MAXIMUM DISCHARGE FROM NODE 141350 IS: 1.72 CFS AT TIME 11.89 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.23 AF

THE MAXIMUM DISCHARGE FROM NODE 141816 IS: 2.86 CFS AT TIME 20.94 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.01 AF

THE MAXIMUM DISCHARGE FROM NODE 142282 IS: 3.48 CFS AT TIME 20.93 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.01 AF

THE MAXIMUM DISCHARGE FROM NODE 142749 IS: 4.12 CFS AT TIME 21.26 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.00 AF

THE MAXIMUM DISCHARGE FROM NODE 143216 IS: 2.74 CFS AT TIME 21.78 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.00 AF

THE MAXIMUM DISCHARGE FROM NODE 143683 IS: 1.79 CFS AT TIME 23.46 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.00 AF

THE MAXIMUM DISCHARGE FROM NODE 144150 IS: 1.47 CFS AT TIME 20.24 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.00 AF

THE MAXIMUM DISCHARGE FROM NODE 144617 IS: 2.08 CFS AT TIME 20.24 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.00 AF

THE MAXIMUM DISCHARGE FROM NODE 145084 IS: 2.64 CFS AT TIME 22.60 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.10 FEET AND A MAXIMUM VOLUME OF: 0.01 AF

THE MAXIMUM DISCHARGE FROM NODE 145549 IS: 3.78 CFS AT TIME 21.48 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.12 FEET AND A MAXIMUM VOLUME OF: 0.93 AF

THE MAXIMUM DISCHARGE FROM NODE 146014 IS: 3.98 CFS AT TIME 20.55 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.23 FEET AND A MAXIMUM VOLUME OF: 1.90 AF

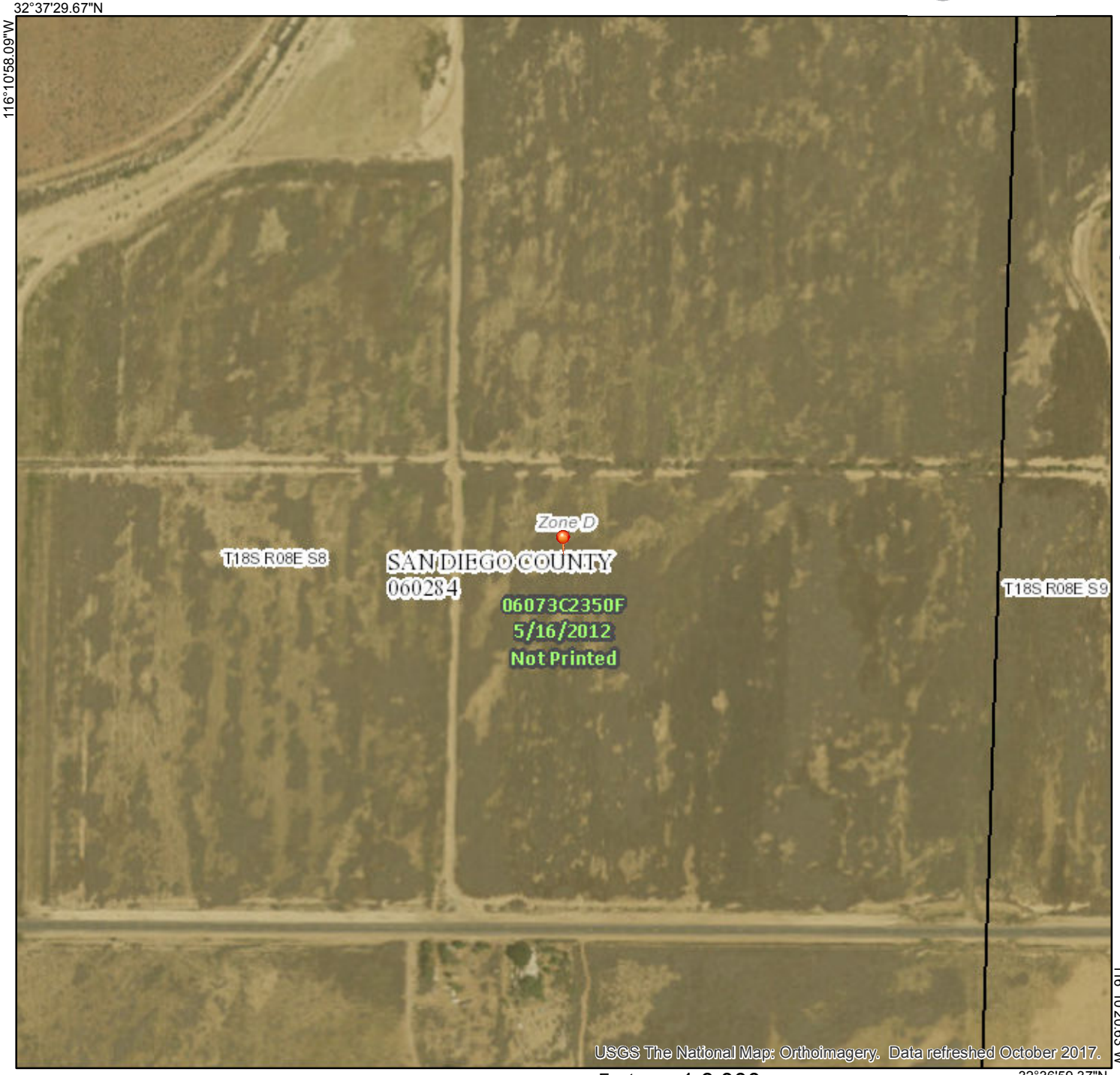
THE MAXIMUM DISCHARGE FROM NODE 146479 IS: 1.83 CFS AT TIME 14.82 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.18 FEET AND A MAXIMUM VOLUME OF: 0.45 AF

THE MAXIMUM DISCHARGE FROM NODE 146945 IS: 1.69 CFS AT TIME 18.11 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF: 0.26 FEET AND A MAXIMUM VOLUME OF: 0.36 AF

Appendix C – Hydrologic Data Sources

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/25/2018 at 10:58:31 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

High Risk - Coastal Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones.

ZONE	DESCRIPTION
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1 - 30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

From FEMA Map Service Center:
http://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations

Appendix B Synthetic Rainfall Distributions and Rainfall Data Sources

The highest peak discharges from small watersheds in the United States are usually caused by intense, brief rainfalls that may occur as distinct events or as part of a longer storm. These intense rainstorms do not usually extended over a large area and intensities vary greatly. One common practice in rainfall-runoff analysis is to develop a synthetic rainfall distribution to use in lieu of actual storm events. This distribution includes maximum rainfall intensities for the selected design frequency arranged in a sequence that is critical for producing peak runoff.

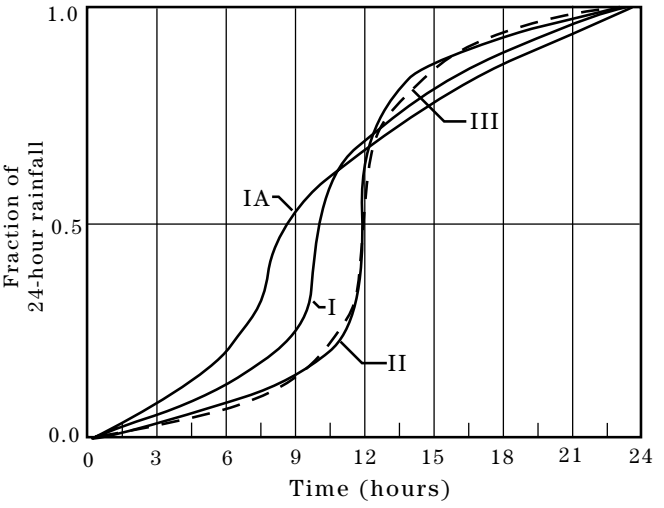
Synthetic rainfall distributions

The length of the most intense rainfall period contributing to the peak runoff rate is related to the time of concentration (T_c) for the watershed. In a hydrograph created with NRCS procedures, the duration of rainfall that directly contributes to the peak is about 170 percent of the T_c. For example, the most intense 8.5-minute rainfall period would contribute to the peak discharge for a watershed with a T_c of 5 minutes. The most intense 8.5-hour period would contribute to the peak for a watershed with a 5-hour T_c.

Different rainfall distributions can be developed for each of these watersheds to emphasize the critical rainfall duration for the peak discharges. However, to avoid the use of a different set of rainfall intensities for each drainage area size, a set of synthetic rainfall distributions having "nested" rainfall intensities was developed. The set "maximizes" the rainfall intensities by incorporating selected short duration intensities within those needed for longer durations at the same probability level.

For the size of the drainage areas for which NRCS usually provides assistance, a storm period of 24 hours was chosen the synthetic rainfall distributions. The 24-hour storm, while longer than that needed to determine peaks for these drainage areas, is appropriate for determining runoff volumes. Therefore, a single storm duration and associated synthetic rainfall distribution can be used to represent not only the peak discharges but also the runoff volumes for a range of drainage area sizes.

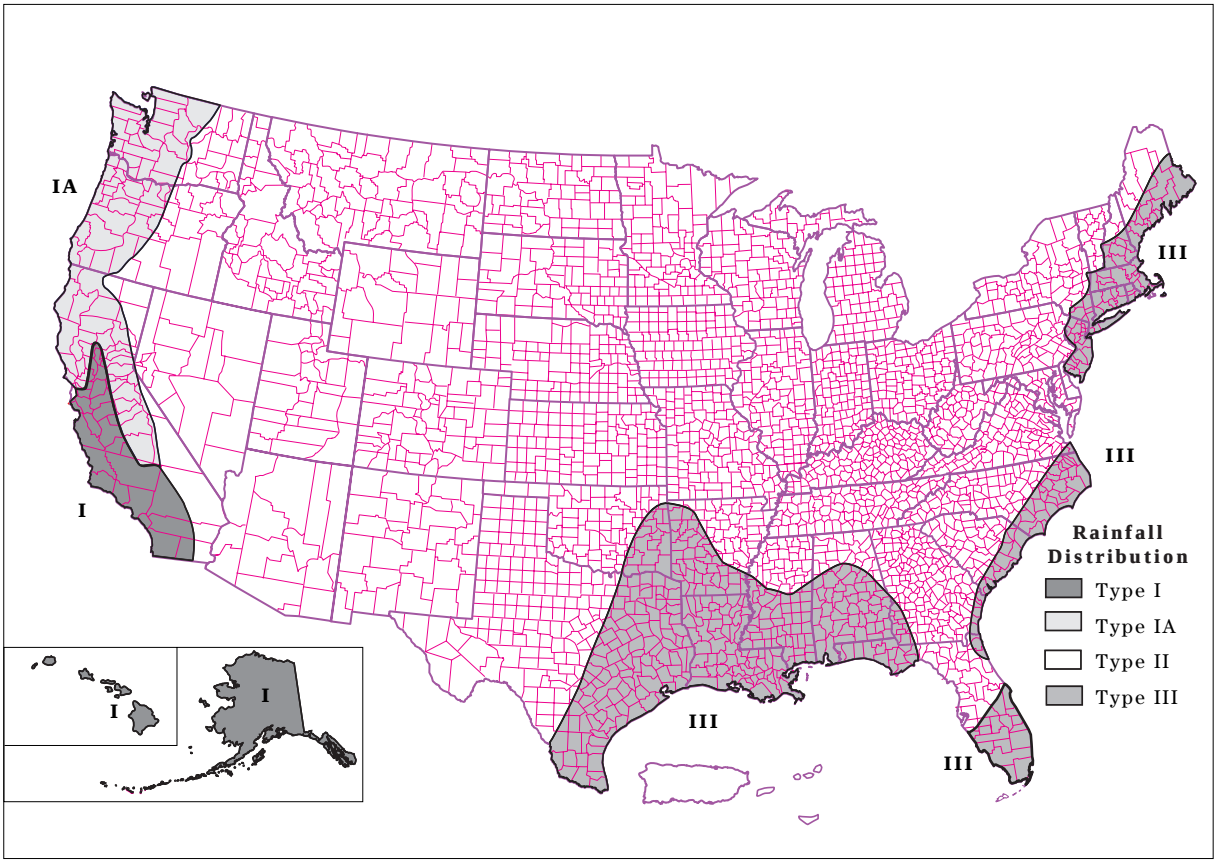
Figure B-1 SCS 24-hour rainfall distributions



The intensity of rainfall varies considerably during a storm as well as geographic regions. To represent various regions of the United States, NRCS developed four synthetic 24-hour rainfall distributions (I, IA, II, and III) from available National Weather Service (NWS) duration-frequency data (Hershfield 1061; Frederick et al., 1977) or local storm data. Type IA is the least intense and type II the most intense short duration rainfall. The four distributions are shown in figure B-1, and figure B-2 shows their approximate geographic boundaries.

Types I and IA represent the Pacific maritime climate with wet winters and dry summers. Type III represents Gulf of Mexico and Atlantic coastal areas where tropical storms bring large 24-hour rainfall amounts. Type II represents the rest of the country. For more precise distribution boundaries in a state having more than one type, contact the NRCS State Conservation Engineer.

Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

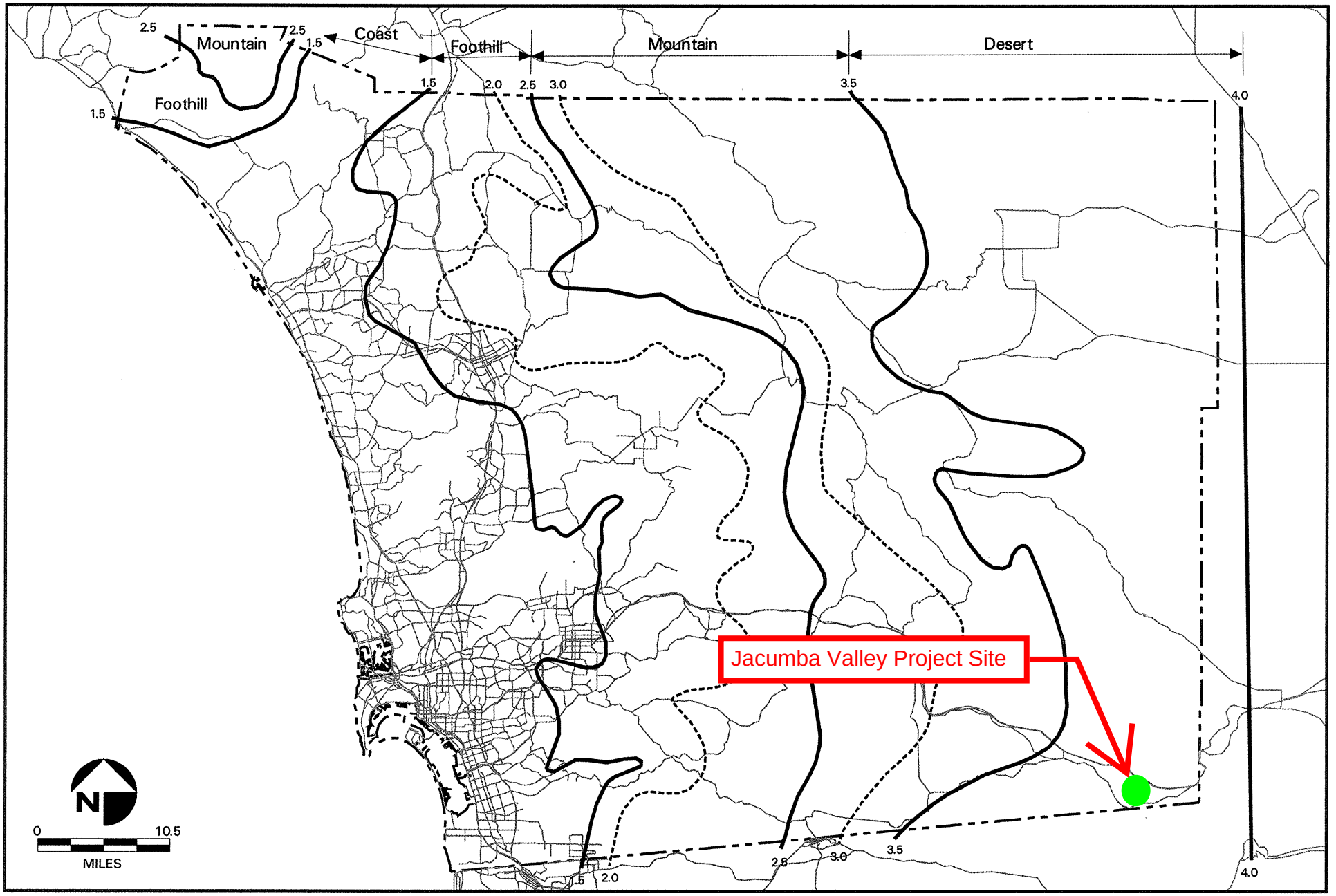
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.



County of San Diego Hydrology Manual

Precipitation Zone Numbers (PZN)

FIGURE

C-1

4.2.4 PZN Condition

The CNs provided in Table 4-2 are for PZN Condition 2.0 (PZN adjustment factor = 2.0). After the CN has been calculated for the study area, it must be adjusted for PZN Condition. This adjustment is required for NRCS hydrologic method studies. The PZN adjustment factors (described in Section 4.1.3 and provided in Table 4-6) are based on the storm frequency and the precipitation zone that the watershed is located in. To adjust the CN for PZN Condition, first determine the appropriate PZN adjustment factor for the combination of storm duration and precipitation zone for the study. For precipitation zone numbers not equal to 1.0, 2.0, 3.0, and 4.0 (Coast, Foothills, Mountains, and Desert), interpolate the PZN adjustment factor between the zones. Interpolation, if necessary, is linear. For example, for a 100-year storm duration for a study area with a PZN of 1.5, the PZN adjustment factor interpolated from the values in Table 4-6 is 2.5. After determining the appropriate PZN adjustment factor, use Table 4-10 to determine the adjusted CN for the study area for the appropriate PZN Condition. If the appropriate PZN Condition for the study area based on the storm duration and PZN is 2.0 (PZN adjustment factor = 2.0), no adjustment is necessary because the CNs provided in Table 4-2 are for PZN Condition 2.0. For PZN adjsutment factor equal to 1.0 or 3.0, locate the CN value for PZN Condition 2.0 and read the adjusted CN value for PZN Condition 1.0 or 3.0 from the same row of the table. For PZN adjsutment factor not equal to 1.0, 2.0, or 3.0, interpolate the CN between the value for PZN Condition 2.0 and the value for the appropriate PZN Condition in the same row of the table. Interpolation, if necessary, is linear.

Table 4-10

RUNOFF CURVE NUMBERS FOR PZN CONDITIONS 1.0, 2.0, AND 3.0

CN For:			CN For:		
PZN Condition = 1.0	PZN Condition = 2.0	PZN Condition = 3.0	PZN Condition = 1.0	PZN Condition = 2.0	PZN Condition = 3.0
100	100	100	40	60	78
97	99	100	39	59	77
94	98	99	38	58	76
91	97	99	37	57	75
89	96	99	37	56	75
87	95	98	34	55	73
85	94	98	34	54	73
83	93	98	33	53	72
81	92	97	32	52	71
80	91	97	31	51	70
78	90	96	31	50	70
76	89	96	30	49	69
75	88	95	29	48	68
73	87	95	28	47	67
72	86	94	27	46	66
70	85	94	26	45	65
68	84	93	25	44	64
67	83	93	25	43	63
66	82	92	24	42	62
64	81	92	23	41	61
63	80	91	22	40	60
62	79	91	21	39	59
60	78	90	21	38	58
59	77	89	20	37	57
58	76	89	19	36	56
57	75	88	18	35	55
55	74	88	18	34	54
54	73	87	17	33	53
53	72	86	16	32	52
52	71	86	16	31	51
51	70	85	15	30	50
50	69	84			
48	68	84	12	25	43
47	67	83	9	20	37
46	66	82	6	15	30
45	65	82	4	10	22
44	64	81	2	5	13
43	63	80	0	0	0
42	62	79			
41	61	78			