

County of Ventura
Planning Commission Hearing
Case No. PL18-0052
Exhibit 4 (MND), Attachment 12 - Lewis Engineering Drainage Report,
dated November 9, 2018



1143 E. MAIN STREET
VENTURA, CALIFORNIA 93001
PHONE: (805) - 648 - 1353

TABLE OF CONTENTS

SECTION 1 - PROJECT DESCRIPTION

SECTION 2 - SITE CONDITIONS

Figure 1: Site Location Map

SECTION 3 - EXISTING AND PROPOSED CONDITIONS

3.1: Existing Site Conditions

Figure 2: Site Location Detail

3.2: Proposed Site Layout

Figure 3: Proposed Site Plan

SECTION 4 - MITIGATION CRITERIA

SECTION 5 - PEAK FLOW ANALYSIS

5.1: Existing Condition

Table 5.1: Existing Undeveloped Conditions Peak Flows

5.2: Proposed Condition

Table 5.2: Proposed Developed Conditions Peak Flows

SECTION 6 – DEVELOPED PEAK MITIGATION CRITERIA

Table 6.1: Volume Detention Calculations Summary

Figure 4: Camp Ramah Master Plan

SECTION 7 – STORMWATER QUALITY

SECTION 8 – SUMMARY & CONCLUSION

SECTION 9 - APPENDICES

Lewis Engineering

CIVIL - MUNICIPAL

1143 EAST MAIN STREET
VENTURA, CALIFORNIA 93001

(805) 648-1353

November 9, 2018

Jane Carroll Design
206 N. Signal Street, R
Ojai, CA 93023

RE: PRELIMINARY STORMWATER MANAGEMENT LETTER-REPORT FOR CAMP RAMAH NEW
MACHON AND CABINS IN ASSOCIATION WITH CONDITIONAL USE PERMIT APPLICATION

Dear Jane:

This Letter-Report is prepared to address the Stormwater Management requirements associated with the proposed improvement project consisting of the construction of the New Machon meeting space and six cabins (Project). The project is located at 385 FAIRVIEW ROAD, OJAI.

Section 1: Project Description

The Project consists of constructing a New Machon meeting space of 6,289 square feet along with six cabins totaling 4,320 square feet for a total floor space of 10,609 square feet. The total footprint area is 7,130 square feet. Construction of walks, paths and retaining walls are proposed.

Section 2: Site Conditions

The site lies at the northerly extension of the existing Camp Ramah campus. The area is gently sloping open space with increasing slope gradient to the northwest behind the proposed Machon, and gentler slopes in the cabin area. The site is dotted with oak trees and a small wash on the easterly side.

Adjacent to the site on the west is open space and to the north and east is the Los Padres National Forest. The Project is bordered on the south by Camp Ramah's play field and the director's house and the rest of the Camp Ramah facilities beyond.



Figure 1: Site Location Map

Section 3: Existing and Proposed Conditions

Section 3 presents the existing site conditions and an overview of the proposed site development.

3.1 Existing Site Conditions

The site flows naturally via overland flow to a small open wash east of the new buildings. This wash continues through the Camp Ramah site, turning westerly and continuing as an open channel along the southerly side of Barnard Ranch, then discharging into a culvert at Fairview Road.



Figure 2: Site Location Detail

The existing site is currently vacant land, with all pervious area, as shown in Figure 2.

3.2 Proposed Site Layout

Figure 3 presents the proposed configuration of the developed area and the sport field area directly south (to remain).

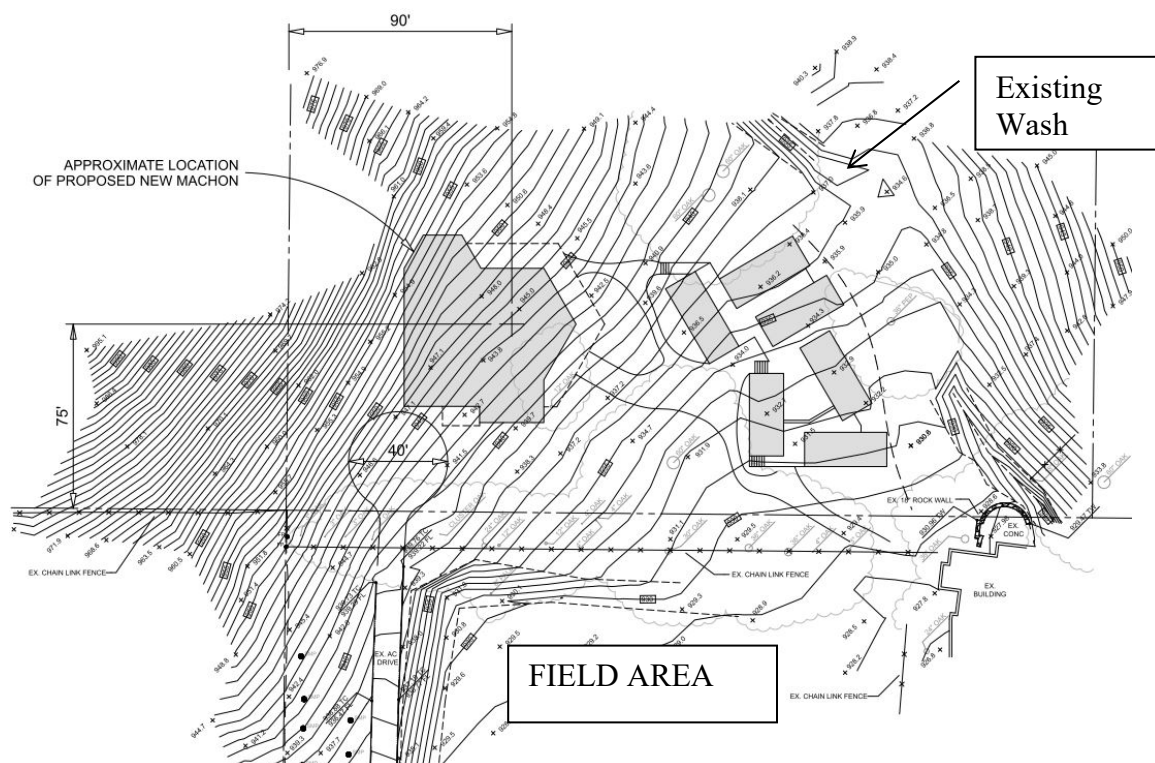


Figure 3: Proposed Site Plan

Section 4: Mitigation Criteria

Mitigation criteria for small projects, i.e. less than 5-acres in size, dictates reduction of the 100-Year Developed condition to 10-year developed condition.

Section 5: Peak Runoff Evaluation

The site lies in VCWPD Zone 1 Ventura River Watershed. The site has a 24-hr, 50-year isohyetal of 11" and lies in NOAA Rainfall Zone Vta3 – Ojai. Site statistics and hydrology reference data exhibits are included as Attachment A.

Initial calculations using the VC Time of Concentration (Tc) spreadsheet resulted in error values as the overland flow length and channelized flow are minimal in this evaluation. See Attachment B – Watershed Exhibit, Site Development Area. A minimum Tc was assumed at 5 minutes, a conservative estimate yielding highest intensity values for pre- and post-developed conditions assessments. A summary of Existing and Proposed Conditions follows.

5.1 Existing Conditions

Rainfall intensities based on a Tc of 5 minutes are presented in Table 5.1. Based on Soil No. 1 – NRCS Soil D, Exhibit 5A the corresponding C values were obtained. Resultant peak runoff for each storm event is summarized based on the drainage area of 1.39 acres (refer to Attachment B for delineation). Upstream area to the development is approximately 0.75 acres with the remaining 0.64 acres the approximate developed site area.

Table 5.1: Existing Undeveloped Conditions Peak Flows

Intensity (based on Tc = 5 min)	Intensity (Exhibit 4A)	C (Imp = 0%) (Exhibit 5A – Soil 1)	Q_{peak} Calculated (CFS)
100-Year	6.612	0.56	5.147
50-Year	5.784	0.55	4.422
25-Year	4.992	0.54	3.747
10-Year	3.996	0.53	2.944

5.2 Proposed Conditions

Using site plan and assuming a 1' overhang for the roof area, the impervious areas of the New Machon Building and Cabins 1-6, including ADA ramps, patio and 1 parking spot = 9213.72 which is approximately 15% of the "site" drainage area. Using Impervious curve of 20% on Exhibit 5A the runoff coefficients for the developed condition are shown in Table 2, as well as the resulting peak flows for each storm event.

Table 5.2: Proposed Developed Conditions Peak Flows

Intensity (based on Tc = 5 min)	Intensity (Exhibit 4A)	C (Imp = 20%) (Exhibit 5A – Soil 1)	Q_{peak} Calculated (CFS)
100-Year	6.612	0.64	5.88
50-Year	5.784	0.63	5.07
25-Year	4.992	0.62	4.30
10-Year	3.996	0.62	3.44

Drainage features should be sized to convey the peak runoff of the developed condition. The New Machon developed site runoff enters the existing ball field to the south of the development area and continues as sheet flow across the field.

Section 6: Developed Peak Mitigation Criteria

The developed condition results in minor increase in impervious area exists at less than 2% of the existing Camp Ramah development (see **Figure 4: Camp Ramah Master Plan**). Stormwater runoff will continue to flow overland in a southerly direction to the sports field directly to the south where it will be detained in the grassy field as in the current condition.

Small projects mitigate from 100-year developed down to 10-year developed peak condition. Table 6.1 provides the required volume summary.

Table 6.1: Volume Detention Calculation Summary – Small Projects Less than 5-acres

Volume Calculation	100-year, 24-Hour Depth	10-Year, 24-Hour Depth
Rainfall (in)	12.50	7.75
Yield (in)		4.75
Depression Storage (in)		0.5
Net Yield (in)		4.25
Impervious Area (ac)	9,213.72 (SF)	0.211 ac
Volume Increase – Max Basin Size	= (4.75/12)*0.211	0.0835 ac-ft 3,638.16 CF

Approximate field area to the south is 33,922 SF. An inch and a half of storage depth provided in the ball field is 4,240 CF, which exceeds the detention criteria.

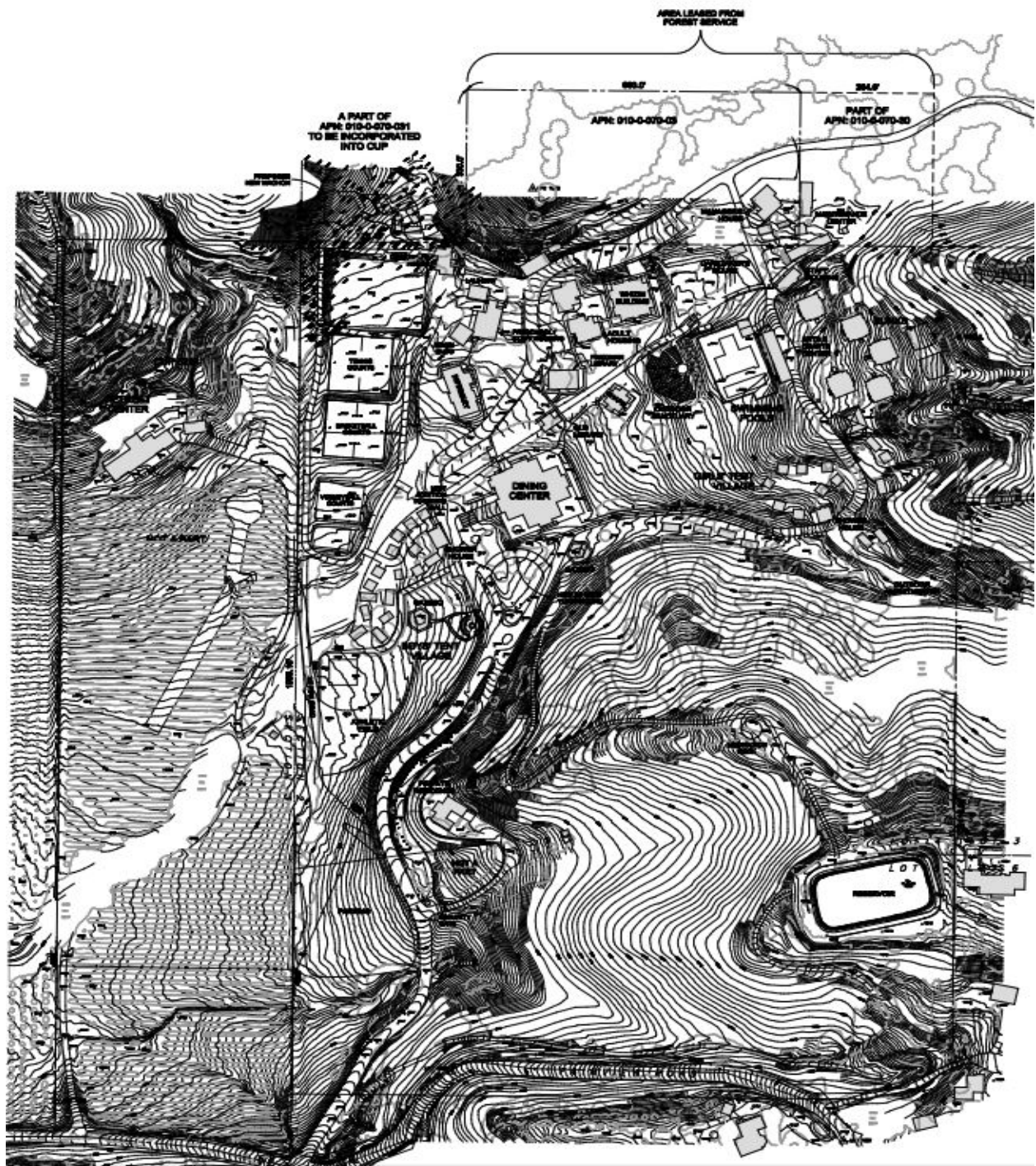


Figure 4: Camp Ramah Master Plan

Section 7: Stormwater Quality Considerations

A small increase in impervious area is proposed with the addition of approximately 9,213 square feet of roof area and a parking area. The project is defined as a Redevelopment Project with land disturbing activity that results in the creation of addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site per the Technical Guidance Manual Section 1.5, Applicability. The project's redevelopment results in an alteration of less than 50 percent of impervious surfaces of a previously existing development and therefore must mitigate only the altered portion of the redevelopment project area. The total disturbed area is 16,939 square feet. The project is therefore not subject to the requirements of the Los Angeles Regional Water Quality Control Board for the preparation of a Stormwater Pollution Prevention Plan. The project will be subject to construction BMPs per the County Stormwater High Risk (SW-HR) BMP list.

Section 8: Summary & Conclusion

Local drainage patterns are preserved, and no storm water diversions are generated. No erosion concerns are anticipated. The improvements will not adversely impact downstream property owners.

Post-construction stormwater management requirements will be met and construction BMPs will be prescribed by Form SW-HR at the time of grading permit application.

Sincerely,

LEWIS ENGINEERING

A handwritten signature in black ink, reading "Jane Lewis Montague". The signature is fluid and cursive, with the first name "Jane" being the most prominent.

Jane Lewis Montague, P.E., CFM
RCE 40877

SECTION 9: SUMMARY OF ATTACHMENTS/REFERENCES

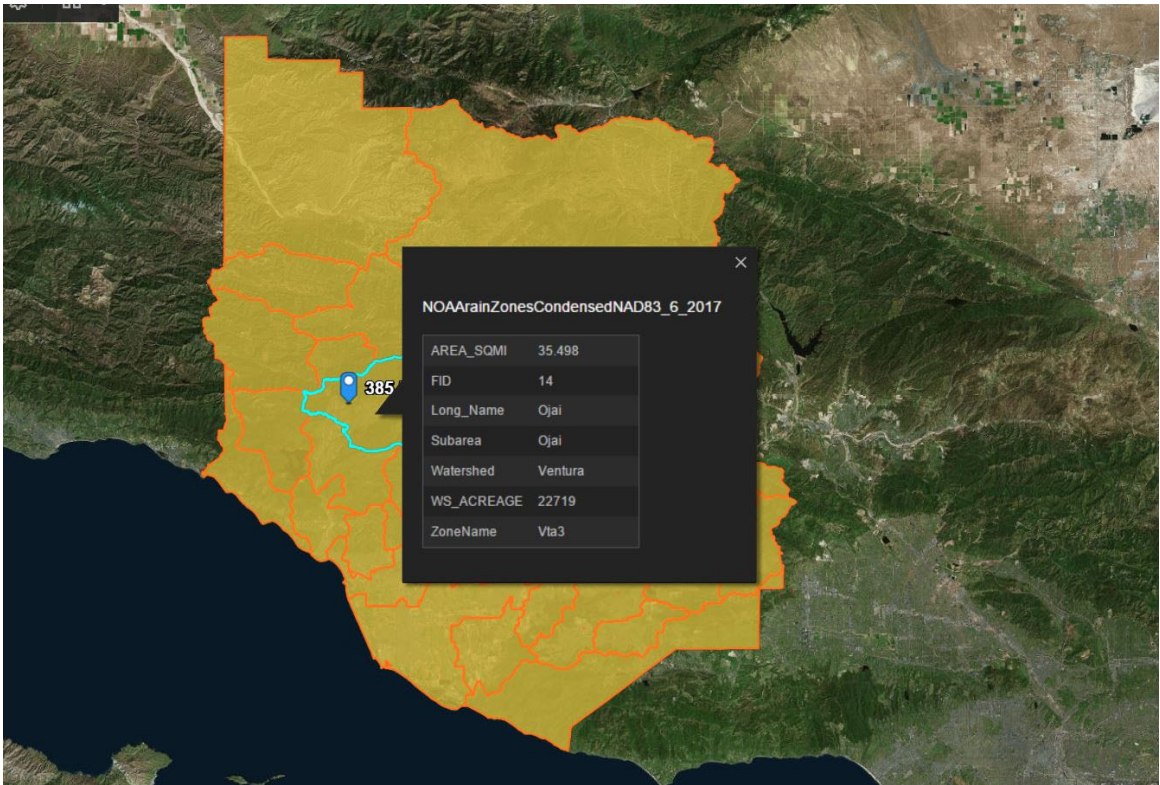
ATTACHMENT A – SITE STATISTICS AND HYDROLOGY REFERENCE DATA

- NOAA Rainfall Zone Map and WPD Zone Map
- Soil Number
- Redline Proximity
- Contour Maps (10-year to 100-year)
- NOAA Time of Concentration and Intensities for Sub-Areas
- Runoff Coefficient Curve for Soil #1

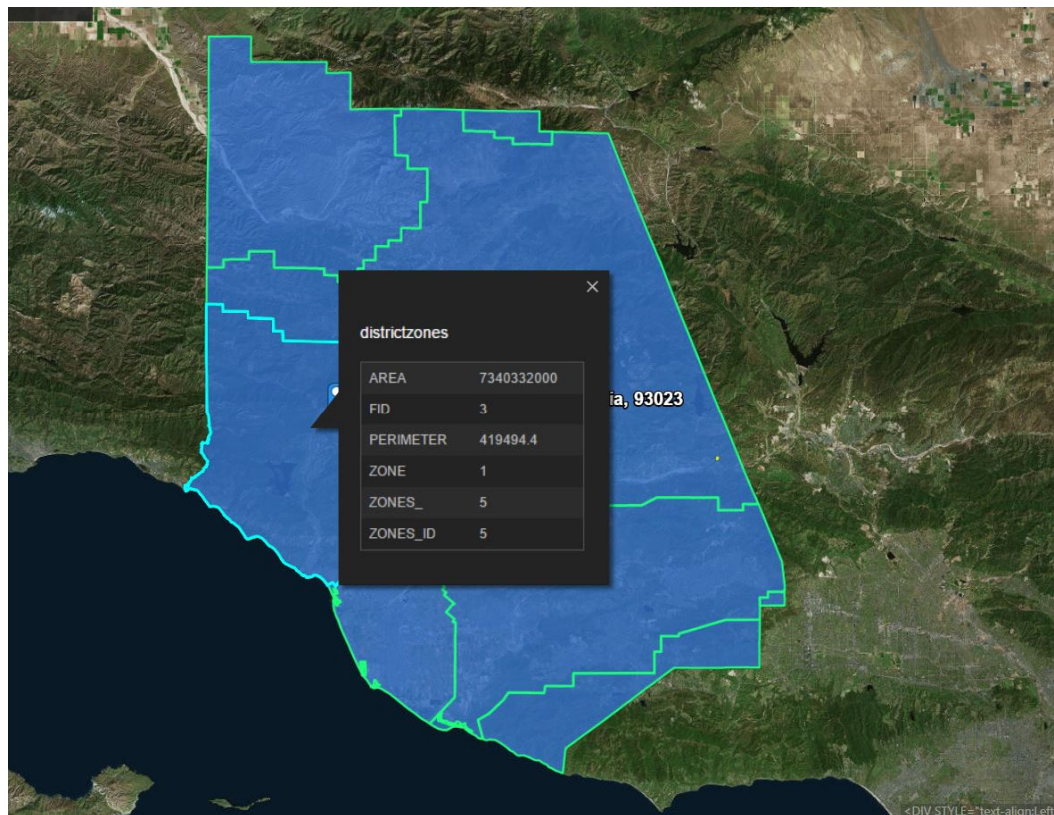
ATTACHMENT B - WATERSHED EXHIBIT, SITE DEVELOPMENT AREA

ATTACHMENT A – SITE STATISTICS AND HYDROLOGY REFERENCE DATA

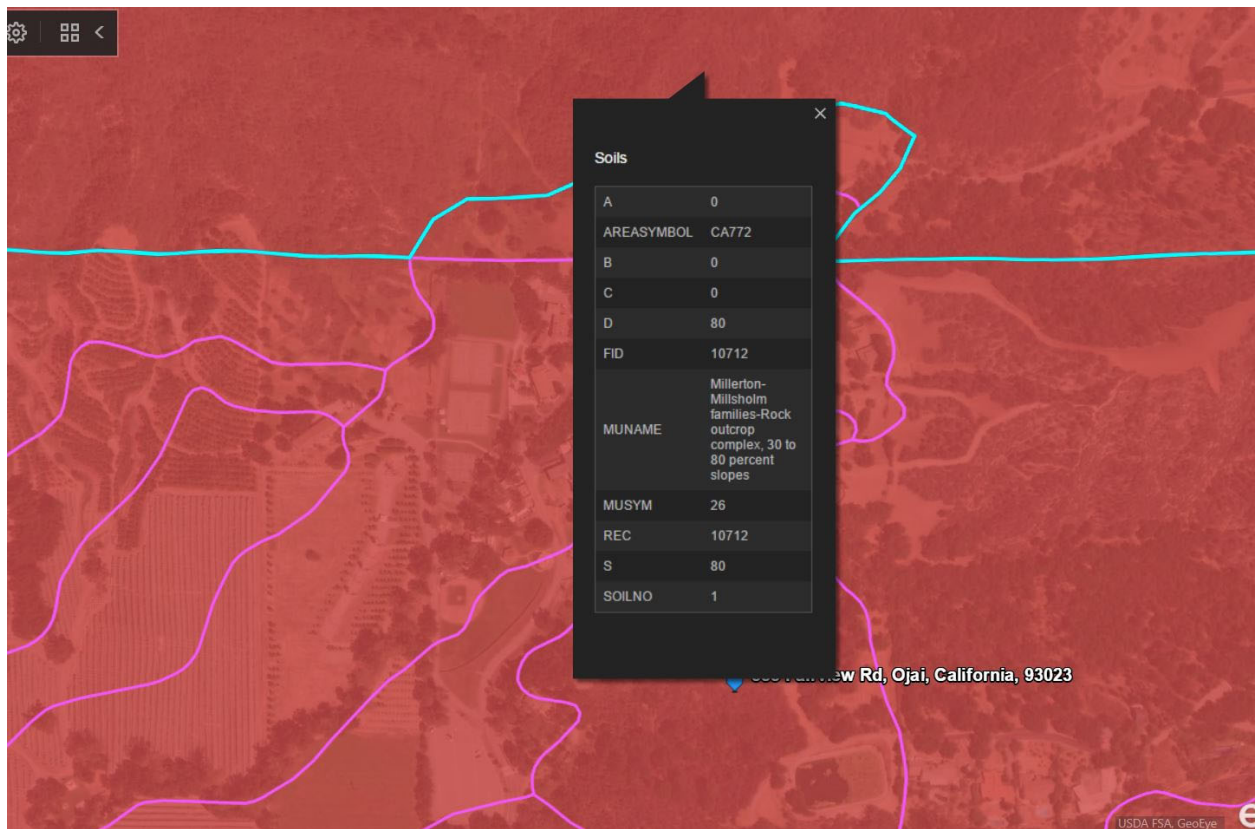
Site Statistics				
Site Area	1.39	acres		
Upstream	0.75	acres		
Development Site	0.64	acres		
Buildings Proposed	FOOTPRINT + 1' ROOF OVERHANG			
New Machon	4173.63			
Cabin 1	583.89			
Cabin 2	572.46			
Cabin 3	556.72			
Cabin 4	556.74			
Cabin 5	567.94			
Cabin 6	556.74			
TOTAL ROOF AREA	7568.12			
Impervious Surface				
ADA Ramps	549.98			
Patio	976.91			
ADA Parking	118.71			
TOTAL IMP SURFACE	1645.6			
Total Impervious Area	9213.72	0.211517906		
Percent of Total	0.15	*Use 20% Curve on Exhibit 5a		
Hydrology				
	Intensity	C _{imp} Undeveloped Exhibit 5a-Soil 1	Drainage Area (Acres)	Q _{peak} (CFS)
Based on Tc = 5 min	(in/hr)			
100-Year	6.612	0.56	1.39	5.147
50-Year	5.784	0.55	1.39	4.422
25-Year	4.992	0.54	1.39	3.747
10-Year	3.996	0.53	1.39	2.944
Drainage Area (SF)			60548.4	
Developed Condition				
	Intensity	C _{imp} Developed Exhibit 5a-Soil 1*	Drainage Area (Acres)	Q _{peak} (CFS)
Based on Tc = 5min	(in/hr)			
100-Year	6.612	0.64	1.39	5.88
50-Year	5.784	0.63	1.39	5.07
25-Year	4.992	0.62	1.39	4.30
10-Year	3.996	0.62	1.39	3.44



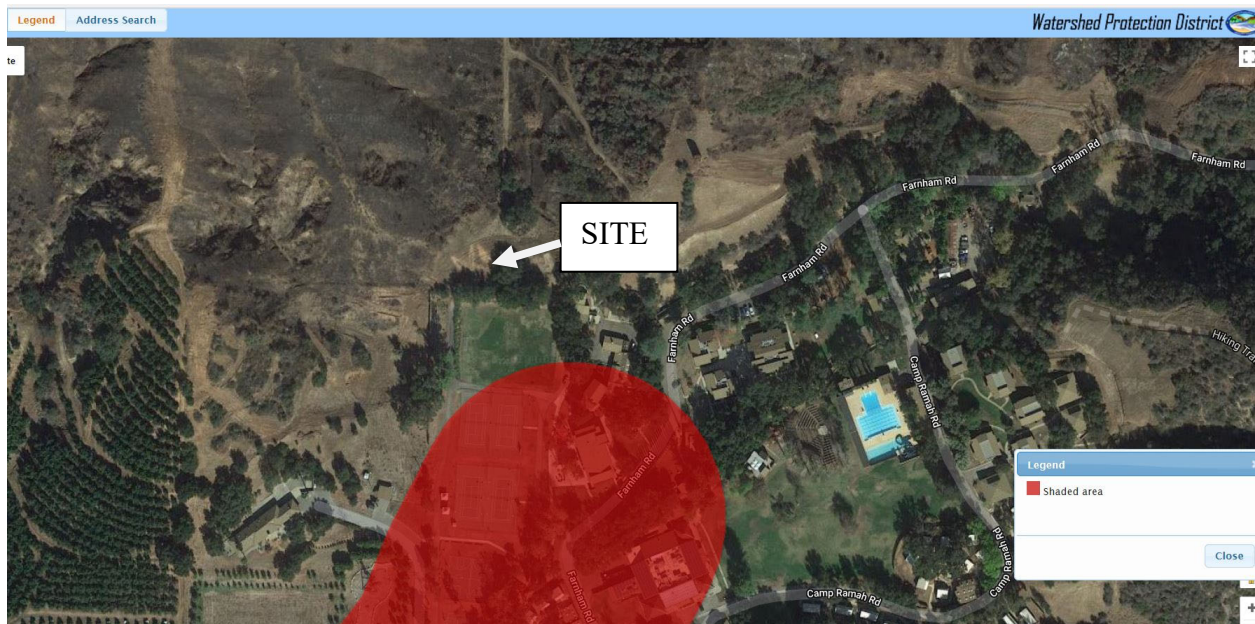
NOAA RAINFALL ZONE



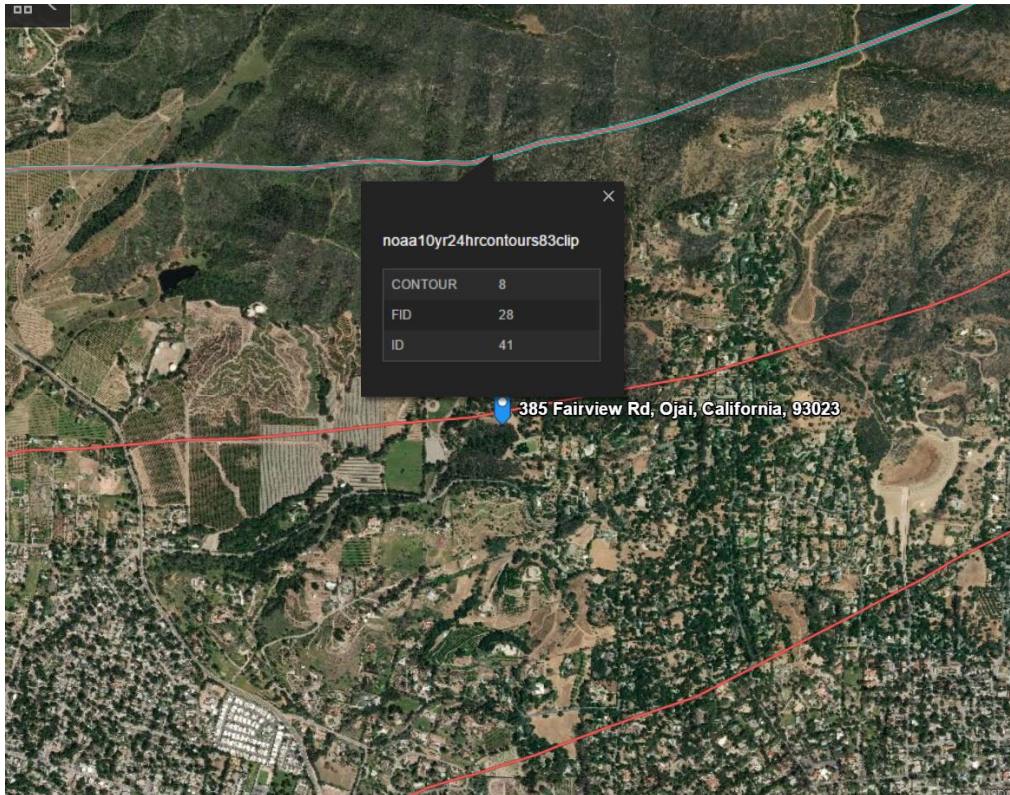
WATERSHED PROTECTION DISTRICT ZONE 1



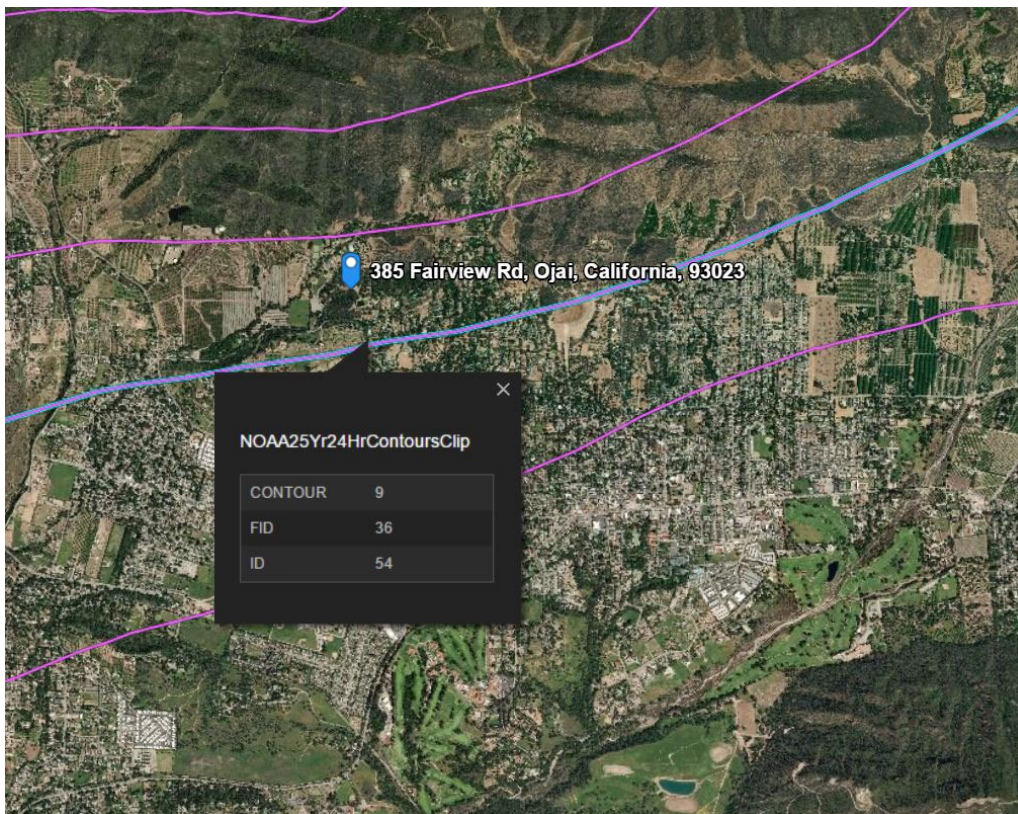
VENTURA COUNTY SOIL NO.



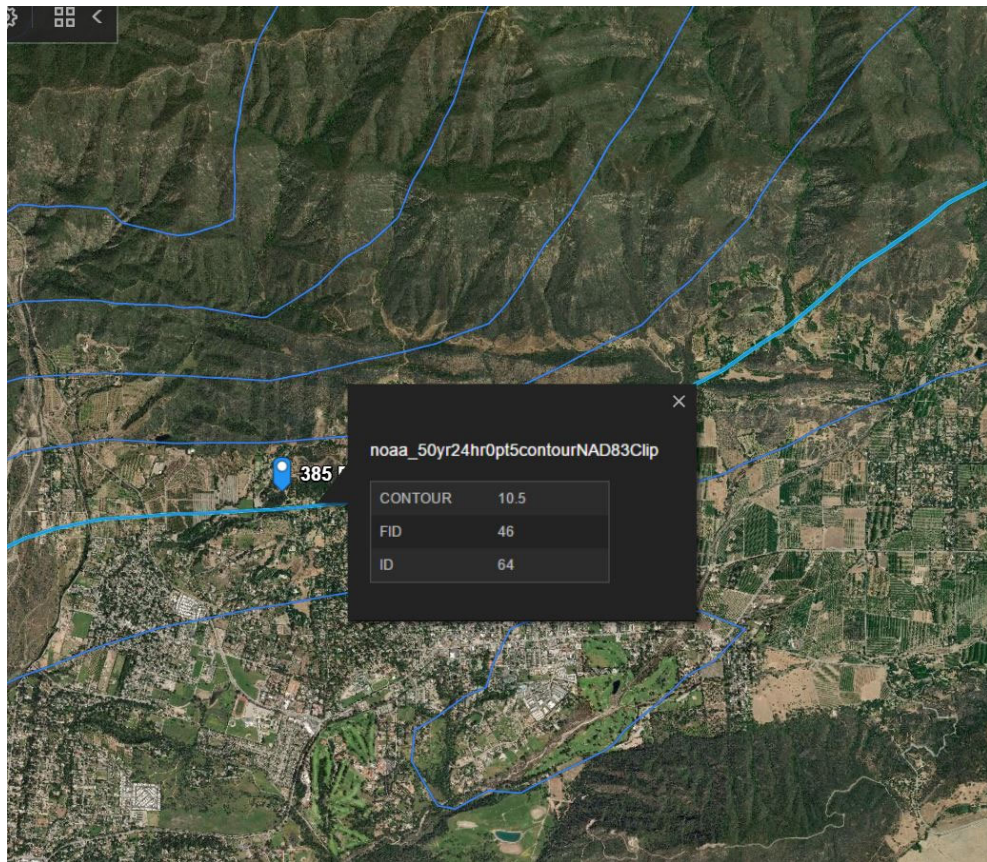
COUNTY REDLINE DOWNSTREAM OF DEVELOPMENT AREA



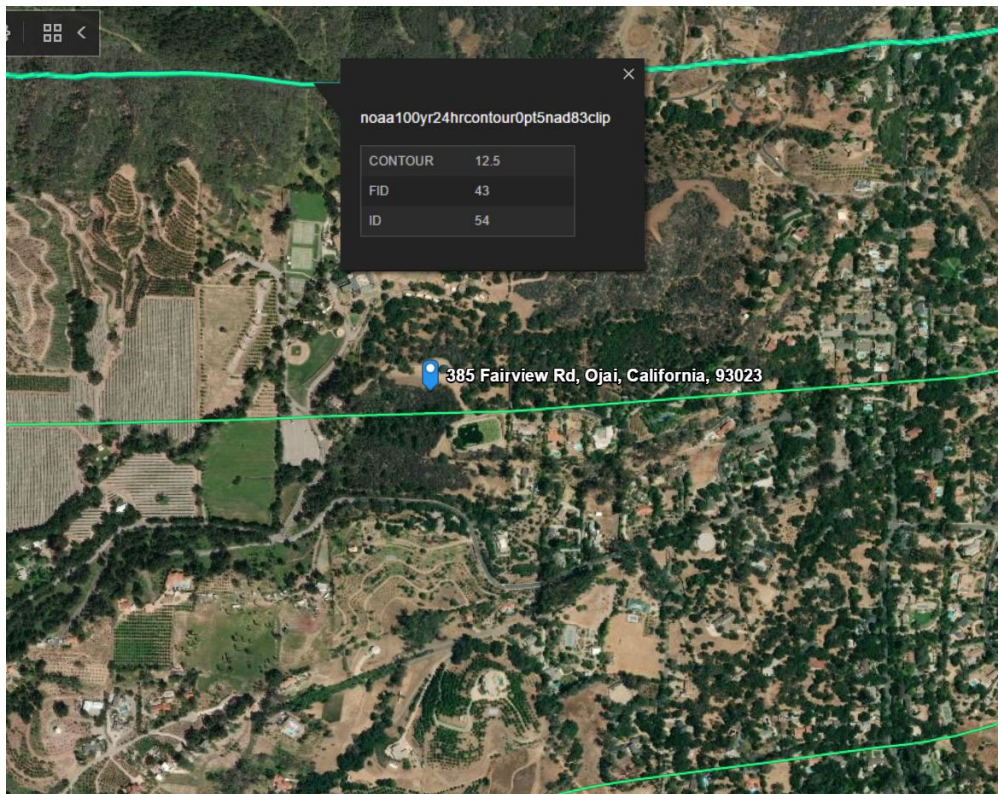
10-YEAR EVENT ~7.75"



25-YEAR CONTOUR ~9.5"



50-YEAR CONTOUR ~11"



100-YEAR CONTOUR - ~12.5"

RAINFALL INTENSITY TABLES

APPENDIX A

EXHIBITS

EXHIBIT 4A. NOAA Tc RAINFALL INTENSITIES- 100-Yr

NOAA Zone Name		ID	Tc (min) / Intensities (in/hr)																													
			5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
N&S Br. Arroyo	Con2	4.524	4.096	3.790	3.561	3.383	3.240	3.069	2.926	2.805	2.702	2.612	2.518	2.435	2.361	2.295	2.236	2.182	2.133	2.089	2.048	2.010	1.976	1.944	1.914	1.885	1.859					
Arroyo Las Posas	ALP1	4.404	3.969	3.644	3.426	3.256	3.089	2.926	2.782	2.661	2.558	2.464	2.371	2.288	2.214	2.149	2.092	2.040	1.992	1.947	1.905	1.865	1.827	1.791	1.757	1.725	1.694					
Carpenteria Coast	Carp1	6.228	5.640	5.220	4.905	4.665	4.444	4.228	4.032	3.866	3.723	3.600	3.472	3.359	3.259	3.169	3.088	3.015	2.948	2.888	2.833	2.781	2.734	2.690	2.649	2.608	2.569					
Conejo Creek	Con3	4.176	3.780	3.497	3.285	3.120	2.968	2.830	2.698	2.586	2.491	2.408	2.325	2.252	2.187	2.129	2.077	2.029	1.987	1.947	1.911	1.878	1.848	1.819	1.793	1.768	1.745					
Cuyama	Cuy1	5.556	5.032	4.658	4.377	4.159	3.984	3.773	3.598	3.450	3.322	3.212	3.102	3.004	2.918	2.841	2.771	2.708	2.651	2.598	2.551	2.506	2.466	2.428	2.393	2.356	2.322					
Hopper	Hop1	5.580	5.052	4.675	4.392	4.172	3.996	3.785	3.614	3.468	3.344	3.233	3.136	3.050	2.976	2.911	2.851	2.798	2.749	2.704	2.663	2.624	2.589	2.557	2.526	2.496	2.467					
Lake Casitas	Vta4	7.140	6.464	5.981	5.619	5.337	5.112	4.843	4.618	4.428	4.265	4.124	3.984	3.860	3.750	3.652	3.563	3.483	3.410	3.343	3.283	3.226	3.175	3.127	3.082	3.038	2.998					
Lower Sespe Pole	Sespe4	5.856	5.302	4.906	4.610	4.379	4.194	3.972	3.790	3.635	3.503	3.386	3.284	3.194	3.116	3.046	2.983	2.926	2.874	2.826	2.783	2.742	2.705	2.671	2.639	2.608	2.580					
Lower Ventura	Vta6	5.448	4.932	4.563	4.287	4.072	3.900	3.694	3.522	3.377	3.252	3.144	3.039	2.947	2.865	2.792	2.726	2.666	2.612	2.562	2.517	2.475	2.437	2.401	2.368	2.335	2.304					
Malibu Coastal	Malbu1	5.136	4.652	4.306	4.047	3.845	3.684	3.489	3.326	3.188	3.070	2.968	2.862	2.769	2.687	2.613	2.546	2.486	2.431	2.381	2.335	2.293	2.254	2.218	2.184	2.151	2.121					
N Fl Matilija	Vta2	7.212	6.530	6.043	5.678	5.393	5.166	4.893	4.665	4.472	4.307	4.164	4.038	3.926	3.827	3.738	3.658	3.586	3.520	3.460	3.405	3.354	3.308	3.264	3.224	3.185	3.148					
Arroyo Conejo	Con1	4.932	4.468	4.137	3.888	3.695	3.540	3.352	3.196	3.064	2.950	2.852	2.749	2.658	2.577	2.504	2.439	2.380	2.326	2.277	2.233	2.191	2.153	2.118	2.085	2.053	2.024					
Ojai	Vta3	6.612	5.988	5.542	5.208	4.948	4.740	4.490	4.282	4.106	3.955	3.824	3.703	3.597	3.502	3.421	3.347	3.281	3.221	3.165	3.115	3.066	3.021	2.979	2.940	2.904	2.870					
Oxnard-Niyeland	Rev2	4.104	3.716	3.439	3.231	3.069	2.940	2.785	2.656	2.547	2.453	2.372	2.293	2.223	2.161	2.106	2.056	2.011	1.970	1.932	1.898	1.866	1.837	1.810	1.785	1.758	1.733					
Prince-Arundell	Prin1	4.932	4.466	4.133	3.884	3.689	3.534	3.347	3.191	3.059	2.946	2.848	2.765	2.692	2.599	2.533	2.474	2.421	2.372	2.328	2.287	2.250	2.215	2.183	2.153	2.124	2.096					
Revlon-Calleguas	Rev3	3.816	3.454	3.195	3.001	2.851	2.730	2.587	2.467	2.366	2.279	2.204	2.129	2.063	2.005	1.952	1.905	1.862	1.823	1.788	1.756	1.726	1.698	1.672	1.649	1.625	1.603					
San Anton-CLarga	Vta5	6.108	5.532	5.121	4.812	4.572	4.380	4.149	3.956	3.793	3.653	3.532	3.427	3.315	3.225	3.144	3.071	3.008	2.946	2.891	2.841	2.795	2.753	2.713	2.677	2.643	2.611					
SCR to Freeman	SCR2	5.064	4.586	4.245	3.985	3.789	3.630	3.437	3.277	3.141	3.025	2.924	2.831	2.748	2.675	2.610	2.551	2.496	2.449	2.405	2.365	2.327	2.293	2.261	2.231	2.202	2.174					
SCR to Ocean	SCR3	4.416	4.000	3.703	3.480	3.307	3.168	3.000	2.860	2.742	2.640	2.552	2.469	2.396	2.331	2.273	2.221	2.174	2.131	2.091	2.056	2.022	1.992	1.964	1.937	1.908	1.881					
SCR-Lower Piru	SCR1	5.540	4.836	4.476	4.206	3.996	3.828	3.625	3.456	3.313	3.190	3.084	2.985	2.898	2.820	2.751	2.688	2.631	2.580	2.533	2.490	2.450	2.414	2.380	2.349	2.317	2.287					
Sespe Abv Bear	Sespe2	6.732	6.096	5.642	5.301	5.036	4.824	4.569	4.356	4.176	4.022	3.888	3.763	3.653	3.555	3.469	3.392	3.322	3.258	3.200	3.147	3.097	3.050	3.007	2.967	2.930	2.895					
Sespe Abv Grand	Sespe3	6.180	5.596	5.179	4.866	4.623	4.428	4.193	3.998	3.833	3.691	3.588	3.495	3.402	3.326	3.261	3.199	3.130	3.067	3.011	2.959	2.911	2.867	2.827	2.789	2.755	2.722	2.691				
Sespe Abv Wheeler	Sespe1	7.380	6.684	6.187	5.814	5.524	5.292	5.012	4.778	4.580	4.411	4.264	4.106	3.966	3.841	3.735	3.640	3.553	3.475	3.403	3.338	3.273	3.214	3.159	3.108	3.060	3.016					
Simi Valley	Simi2	5.076	4.596	4.253	3.996	3.796	3.636	3.444	3.284	3.149	3.033	2.932	2.824	2.728	2.643	2.567	2.498	2.436	2.380	2.328	2.281	2.238	2.198	2.160	2.126	2.092	2.060					
So Mtn to Mpk	Rev1	4.788	4.334	4.010	3.767	3.577	3.426	3.245	3.095	2.968	2.859	2.764	2.672	2.591	2.519	2.459	2.405	2.356	2.312	2.271	2.234	2.196	2.162	2.129	2.099	2.072	2.046					
Todd to Timber	Todd1	6.228	5.640	5.220	4.905	4.665	4.444	4.228	4.032	3.866	3.723	3.600	3.472	3.359	3.259	3.169	3.088	3.015	2.948	2.888	2.833	2.781	2.734	2.690	2.649	2.608	2.569					
Upper Arroyo Simi	Simi1	5.388	4.880	4.517	4.245	4.033	3.864	3.660	3.490	3.346	3.223	3.116	2.992	2.882	2.785	2.697	2.619	2.548	2.483	2.425	2.371	2.321	2.275	2.232	2.193	2.154	2.117					
Upper Harmon	Har1	5.340	4.836	4.476	4.206	3.996	3.828	3.626	3.458	3.316	3.194	3.088	2.988	2.900	2.821	2.751	2.688	2.631	2.579	2.531	2.488	2.448	2.411	2.377	2.345	2.315	2.287					
Upper Matilija	Vta1	8.244	7.466	6.910	6.494	6.169	5.910	5.599	5.339	5.119	4.948	4.768	4.592	4.436	4.297	4.174	4.063	3.962	3.871	3.787	3.711	3.640	3.575	3.515	3.459	3.406	3.358					
Upper Piru	Piru1	5.760	5.216	4.827	4.536	4.309	4.128	3.910	3.728	3.574	3.442	3.328	3.212	3.110	3.019	2.937	2.864	2.798	2.737	2.682	2.632	2.586	2.543	2.503	2.466	2.426	2.389					
Upper Sta Paula	StPaul1	6.948	6.294	5.827	5.477	5.204	4.986	4.721	4.501	4.314	4.155	4.016	3.885	3.770	3.668	3.583	3.506	3.437	3.374	3.317	3.264	3.211	3.161	3.116	3.073	3.034	2.997					

APPENDIX A

EXHIBITS

EXHIBIT 4B. NOAA Tc RAINFALL INTENSITIES- 50-Yr

NOAA Zone Name	ID	Tc (min) / Intensities (in/hr)																													
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
N&S Br Arroyo Conejo-ASR	Con2	4.044	3.660	3.386	3.180	3.020	2.892	2.739	2.612	2.504	2.412	2.332	2.249	2.175	2.109	2.051	1.998	1.950	1.907	1.867	1.831	1.798	1.767	1.738	1.712	1.686	1.663				
Arroyo Las Posas	ALP1	3.980	3.586	3.319	3.119	2.963	2.838	2.688	2.563	2.457	2.367	2.288	2.205	2.131	2.065	2.007	1.954	1.906	1.863	1.823	1.787	1.754	1.723	1.694	1.668	1.643	1.619				
Carpenteria Coastal	Carp1	5.640	5.108	4.728	4.443	4.221	4.044	3.830	3.652	3.501	3.372	3.260	3.144	3.042	2.951	2.870	2.797	2.731	2.671	2.616	2.566	2.519	2.476	2.437	2.400	2.363	2.328				
Conejo Creek	Con3	3.720	3.368	3.117	2.928	2.781	2.664	2.523	2.406	2.307	2.222	2.148	2.074	2.008	1.950	1.899	1.852	1.810	1.772	1.737	1.706	1.676	1.648	1.623	1.599	1.577	1.556				
Cuyama	Cuy1	4.788	4.336	4.013	3.771	3.583	3.432	3.250	3.098	2.970	2.859	2.764	2.669	2.586	2.511	2.445	2.385	2.331	2.282	2.237	2.196	2.158	2.123	2.090	2.060	2.029	1.999				
Hopper	Hop1	4.992	4.520	4.183	3.930	3.733	3.576	3.387	3.234	3.105	2.994	2.894	2.807	2.730	2.665	2.606	2.554	2.506	2.463	2.423	2.387	2.351	2.320	2.292	2.266	2.238	2.212				
Lake Casitas	Vta4	6.324	5.728	5.302	4.983	4.735	4.536	4.296	4.096	3.927	3.782	3.656	3.532	3.423	3.325	3.238	3.160	3.089	3.025	2.966	2.912	2.862	2.817	2.774	2.735	2.696	2.660				
Lower Sespe Pole	Sespe4	1.596	1.476	1.366	1.405	1.389	1.376	1.329	1.366	1.329	1.311	1.307	1.297	1.337	1.267	1.270	1.274	1.264	1.257	1.250	1.250	1.246	1.243	1.240	1.236	1.234	1.238				
Lower Ventura	Vta4	4.824	4.368	4.042	3.798	3.608	3.456	3.274	3.122	2.994	2.883	2.788	2.695	2.613	2.540	2.475	2.414	2.363	2.315	2.270	2.230	2.193	2.158	2.127	2.097	2.068	2.040				
Malibu Coastal	Malbu1	4.536	4.108	3.802	3.573	3.395	3.252	3.080	2.936	2.814	2.710	2.620	2.527	2.445	2.372	2.307	2.248	2.195	2.147	2.102	2.062	2.026	1.990	1.959	1.929	1.900	1.873				
N. Malibu	NMal1	3.395	3.065	2.800	2.595	2.442	2.316	2.169	2.046	1.940	1.849	1.770	1.699	1.635	1.576	1.522	1.471	1.422	1.375	1.331	1.289	1.249	1.211	1.175	1.141	1.108	1.076				
Arroyo Conejo	Con1	3.890	3.564	3.667	3.444	3.271	3.132	2.967	2.830	2.717	2.614	2.528	2.447	2.356	2.284	2.220	2.162	2.110	2.062	2.019	1.979	1.942	1.908	1.877	1.848	1.819	1.792				
Ojai	Vta3	5.784	5.238	4.848	4.556	4.328	4.146	3.926	3.743	3.588	3.455	3.340	3.235	3.141	3.059	2.988	2.924	2.866	2.814	2.766	2.722	2.679	2.640	2.603	2.569	2.538	2.508				
Oxnard Pin-Nyeland	Rev2	3.308	3.356	3.015	2.916	2.769	2.652	2.512	2.396	2.298	2.213	2.140	2.069	2.006	1.951	1.901	1.856	1.815	1.779	1.745	1.714	1.686	1.659	1.635	1.613	1.588	1.565				
Prince-Arundelli	Prin1	4.452	4.032	3.732	3.507	3.32	3.192	3.024	2.884	2.766	2.664	2.576	2.491	2.416	2.350	2.291	2.237	2.189	2.145	2.104	2.067	2.034	2.002	1.973	1.946	1.919	1.894				
Revlon-Calexico	Rev3	3.420	3.098	2.868	2.668	2.561	2.445	2.325	2.217	2.126	2.048	1.980	1.913	1.854	1.801	1.754	1.712	1.674	1.639	1.607	1.578	1.551	1.526	1.504	1.482	1.461	1.441				
San Antonio-Clarga	Vta5	5.400	4.888	4.522	4.248	4.035	3.864	3.660	3.490	3.346	3.223	3.116	3.015	2.925	2.846	2.775	2.712	2.653	2.601	2.553	2.508	2.468	2.431	2.396	2.364	2.334	2.306				
SCR abv Freeman	SCR2	4.000	4.130	3.823	3.593	3.413	3.270	3.097	2.953	2.831	2.727	2.636	2.552	2.477	2.411	2.351	2.298	2.250	2.206	2.166	2.129	2.095	2.064	2.035	2.008	1.982	1.957				
SCR-Lower Pin	SCR1	4.044	3.662	3.389	3.188	3.028	2.898	2.745	2.617	2.509	2.416	2.333	2.250	2.173	2.103	2.040	1.980	1.924	1.872	1.824	1.779	1.736	1.695	1.656	1.619	1.583	1.548				
SCR-Lower Pin	SCR1	4.728	4.282	3.953	3.725	3.539	3.390	3.211	3.061	2.934	2.826	2.733	2.645	2.567	2.499	2.437	2.382	2.332	2.287	2.245	2.207	2.172	2.140	2.110	2.082	2.054	2.028				
Sespe Abv Bear	Sespe2	5.880	5.326	4.930	4.634	4.403	4.218	3.995	3.809	3.652	3.513	3.400	3.291	3.194	3.109	3.034	2.966	2.905	2.850	2.799	2.753	2.708	2.668	2.630	2.595	2.563	2.532				
Sespe Abv Grand	Sespe3	5.420	4.912	4.546	4.272	4.059	3.886	3.683	3.512	3.367	3.243	3.136	3.039	2.954	2.878	2.810	2.749	2.694	2.643	2.598	2.556	2.517	2.481	2.448	2.417	2.389	2.362				
Sespe Abv Wheeler	Sespe4	6.588	5.986	5.522	5.159	4.929	4.742	4.473	4.265	4.089	3.939	3.808	3.686	3.541	3.430	3.335	3.250	3.173	3.103	3.039	2.981	2.923	2.870	2.820	2.775	2.732	2.692				
Simi Valley	Sim2	4.548	4.118	3.811	3.581	3.401	3.258	3.085	2.941	2.819	2.715	2.624	2.527	2.442	2.366	2.298	2.237	2.182	2.131	2.086	2.044	2.005	1.969	1.936	1.905	1.875	1.847				
So Mtn to Moorpark	Rev1	4.260	3.852	3.571	3.356	3.188	3.054	2.892	2.757	2.643	2.545	2.460	2.378	2.306	2.242	2.189	2.146	2.107	2.058	2.022	1.989	1.956	1.925	1.896	1.869	1.845	1.822				
Toad Toad	Toad1	4.536	4.352	4.555	4.280	4.065	3.894	3.688	3.517	3.372	3.248	3.140	3.039	2.950	2.871	2.806	2.746	2.693	2.644	2.600	2.559	2.518	2.480	2.444	2.412	2.381	2.353				
Upper Arroyo Simi	UAr1	4.776	4.320	4.000	3.750	3.560	3.390	3.240	3.100	2.980	2.870	2.770	2.670	2.580	2.500	2.430	2.360	2.300	2.240	2.180	2.120	2.060	2.000	1.940	1.880	1.820	1.760				
Upper Harmon	Har1	4.824	4.370	4.046	3.803	3.613	3.462	3.279	3.132	2.998	2.888	2.792	2.702	2.622	2.551	2.487	2.430	2.378	2.331	2.288	2.246	2.207	2.171	2.148	2.120	2.099	2.088				
Upper Malibu	Vta1	7.828	6.726	6.225	5.849	5.556	5.322	5.040	4.805	4.606	4.438	4.298	4.180	4.091	3.967	3.757	3.657	3.567	3.486	3.411	3.343	3.279	3.219	3.167	3.117	3.070	3.027				
Upper Pinu	Pin1	4.980	4.510	4.174	3.923	3.737	3.572	3.382	3.225	3.092	2.979	2.880	2.779	2.690	2.611	2.541	2.477	2.419	2.367	2.319	2.276	2.235	2.198	2.164	2.132	2.097	2.065				
Upper Sta Paula Ck	StPaul1	6.480	5.476	5.067	4.761	4.523	4.330	4.103	3.912	3.750	3.612	3.492	3.378	3.278	3.189	3.115	3.048	2.987	2.933	2.882	2.837	2.790	2.747	2.707	2.670	2.636	2.606				

APPENDIX A

EXHIBITS

EXHIBIT 4C. NOAA Tc RAINFALL INTENSITIES- 25-YR

NOAA Zone Name	ID	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
		Tc (mm) / Intensities (m/hr)																													
N&S Br. Arroyo Consejo-ASR	Con2	3.576	3.238	2.997	2.816	2.675	2.562	2.427	2.315	2.220	2.139	2.068	1.994	1.928	1.870	1.818	1.771	1.729	1.690	1.655	1.623	1.593	1.565	1.540	1.516	1.494	1.473				
Arroyo Las Posas	ALP1	3.528	3.196	2.959	2.781	2.643	2.532	2.398	2.286	2.191	2.110	2.040	1.966	1.900	1.841	1.789	1.742	1.699	1.661	1.625	1.593	1.563	1.536	1.510	1.487	1.464	1.443				
Carpenteria	Carp1	5.004	4.530	4.191	3.938	3.740	3.582	3.393	3.235	3.102	2.987	2.888	2.785	2.695	2.614	2.542	2.477	2.418	2.365	2.316	2.272	2.230	2.192	2.157	2.125	2.092	2.061				
Consejo Creek	Con3	3.288	2.978	2.750	2.580	2.461	2.358	2.233	2.129	2.041	1.965	1.900	1.834	1.776	1.725	1.679	1.638	1.601	1.567	1.537	1.509	1.482	1.458	1.435	1.414	1.395	1.376				
Cuyama	Cuy1	4.068	3.684	3.410	3.204	3.044	2.916	2.762	2.634	2.526	2.433	2.352	2.271	2.200	2.137	2.080	2.029	1.983	1.941	1.903	1.868	1.835	1.805	1.778	1.752	1.725	1.700				
Hopper	Hop1	4.368	3.966	3.682	3.441	3.269	3.132	2.986	2.832	2.719	2.622	2.534	2.458	2.390	2.333	2.282	2.236	2.194	2.156	2.121	2.090	2.058	2.032	2.007	1.984	1.959	1.937				
Lake Castitas	Vta4	5.580	5.052	4.675	4.392	4.172	3.996	3.785	3.610	3.462	3.334	3.224	3.115	3.018	2.932	2.855	2.786	2.723	2.667	2.615	2.567	2.523	2.483	2.445	2.411	2.377	2.345				
Lower Sespe Pole	Sespe4	4.548	4.118	3.811	3.581	3.401	3.258	3.085	2.943	2.823	2.720	2.629	2.549	2.479	2.418	2.363	2.314	2.270	2.229	2.192	2.159	2.127	2.098	2.071	2.046	2.023	2.001				
Lower Ventura	Vta6	4.284	3.880	3.591	3.375	3.207	3.072	2.909	2.774	2.659	2.561	2.476	2.394	2.321	2.257	2.199	2.147	2.100	2.057	2.018	1.982	1.950	1.919	1.891	1.865	1.839	1.815				
Malibu Coastal	Malbu1	3.984	3.608	3.339	3.138	2.981	2.856	2.705	2.580	2.474	2.383	2.304	2.222	2.150	2.085	2.028	1.976	1.929	1.887	1.848	1.812	1.779	1.749	1.721	1.695	1.669	1.646				
N Fk Matilija	Vta2	5.616	5.084	4.704	4.419	4.197	4.020	3.808	3.632	3.483	3.355	3.244	3.145	3.058	2.981	2.911	2.849	2.793	2.741	2.694	2.652	2.612	2.576	2.542	2.510	2.480	2.451				
Arroyo Consejo	Con1	3.840	3.476	3.216	3.021	2.869	2.748	2.603	2.482	2.380	2.292	2.216	2.136	2.065	2.002	1.946	1.895	1.849	1.807	1.769	1.735	1.702	1.673	1.645	1.620	1.595	1.572				
Ojai	Vta3	4.992	4.520	4.183	3.930	3.733	3.576	3.387	3.230	3.097	2.983	2.884	2.793	2.712	2.641	2.579	2.524	2.475	2.429	2.388	2.350	2.313	2.279	2.247	2.218	2.190	2.165				
Oxnard-Nyeland	Rev2	3.312	3.000	2.777	2.610	2.480	2.376	2.251	2.146	2.058	1.982	1.916	1.852	1.796	1.746	1.701	1.661	1.625	1.591	1.561	1.534	1.508	1.484	1.463	1.442	1.420	1.404				
Prince-Arundell	Prin1	4.008	3.630	3.360	3.158	3.000	2.874	2.722	2.595	2.488	2.396	2.316	2.240	2.173	2.113	2.060	2.012	1.969	1.929	1.893	1.860	1.830	1.802	1.776	1.751	1.727	1.704				
Revoluton-Caleguas	Rev3	3.048	2.762	2.558	2.405	2.285	2.190	2.074	1.977	1.895	1.825	1.764	1.704	1.652	1.605	1.563	1.525	1.491	1.460	1.431	1.406	1.382	1.360	1.339	1.320	1.301	1.284				
San Anton-Clarga	Vta5	4.704	4.260	3.943	3.705	3.520	3.372	3.194	3.046	2.921	2.813	2.720	2.632	2.553	2.484	2.422	2.366	2.315	2.269	2.227	2.189	2.154	2.121	2.091	2.063	2.036	2.012				
SCR abv Freeman	SCR2	4.044	3.652	3.389	3.185	3.025	2.898	2.745	2.617	2.509	2.416	2.336	2.261	2.195	2.137	2.084	2.037	1.994	1.955	1.920	1.888	1.858	1.830	1.804	1.781	1.757	1.735				
SCR to Ocean	SCR3	3.648	3.304	3.058	2.874	2.731	2.616	2.479	2.364	2.267	2.184	2.112	2.043	1.983	1.929	1.881	1.838	1.799	1.763	1.731	1.701	1.674	1.648	1.625	1.603	1.579	1.556				
SCR-Lower Piru	SCR1	4.128	3.738	3.459	3.251	3.088	2.958	2.801	2.671	2.561	2.466	2.384	2.308	2.240	2.181	2.127	2.079	2.035	1.996	1.960	1.927	1.896	1.868	1.842	1.818	1.793	1.770				
Sespe Abv Bear	Sespe2	5.088	4.608	4.265	4.008	3.808	3.648	3.455	3.294	3.158	3.041	2.940	2.846	2.762	2.688	2.623	2.565	2.512	2.464	2.421	2.380	2.342	2.307	2.275	2.244	2.216	2.190				
Sespe Abv Grand	Sespe3	4.680	4.238	3.922	3.686	3.501	3.354	3.177	3.029	2.904	2.797	2.704	2.621	2.547	2.482	2.424	2.371	2.323	2.280	2.241	2.205	2.171	2.140	2.112	2.086	2.061	2.038				
Sespe Abv Wheeler	Sespe1	5.796	5.248	4.857	4.563	4.335	4.152	3.933	3.750	3.595	3.463	3.348	3.244	3.114	3.016	2.933	2.858	2.790	2.729	2.673	2.621	2.570	2.524	2.480	2.440	2.403	2.368				
Simi Valley	Simi2	4.020	3.640	3.369	3.165	3.007	2.880	2.728	2.602	2.495	2.403	2.324	2.238	2.163	2.095	2.035	1.981	1.932	1.887	1.847	1.810	1.775	1.744	1.714	1.687	1.660	1.635				
So Mtn to Moorpark	Rev1	3.756	3.402	3.149	2.960	2.812	2.694	2.551	2.431	2.330	2.243	2.168	2.096	2.032	1.976	1.929	1.887	1.849	1.814	1.782	1.753	1.724	1.696	1.671	1.648	1.626	1.606				
Todd to Timber	Todd1	4.692	4.250	3.934	3.698	3.513	3.366	3.188	3.039	2.913	2.805	2.712	2.625	2.549	2.481	2.424	2.373	2.327	2.285	2.246	2.211	2.176	2.143	2.112	2.084	2.058	2.034				
Upper Arroyo Simi	Simi1	4.224	3.824	3.538	3.324	3.157	3.024	2.865	2.732	2.620	2.524	2.440	2.343	2.257	2.181	2.113	2.052	1.997	1.946	1.899	1.857	1.819	1.783	1.750	1.719	1.689	1.660				
Upper Harmon	Har1	4.320	3.912	3.621	3.402	3.232	3.096	2.933	2.798	2.683	2.585	2.500	2.419	2.348	2.284	2.227	2.176	2.130	2.088	2.049	2.014	1.982	1.952	1.924	1.898	1.874	1.851				
Upper Matilija	Vta1	6.624	5.998	5.551	5.216	4.895	4.746	4.496	4.287	4.110	3.959	3.828	3.687	3.563	3.453	3.354	3.265	3.185	3.112	3.045	2.984	2.928	2.876	2.828	2.783	2.741	2.702				
Upper Piru	Piru1	3.560	3.288	3.062	2.888	2.748	2.631	2.524	2.426	2.336	2.254	2.180	2.112	2.049	1.991	1.937	1.887	1.841	1.797	1.756	1.719	1.684	1.651	1.619	1.590	1.562	1.536				
Upper Sta Paula	StPaul1	5.172	4.684	4.335	4.074	3.871	3.708	3.513	3.350	3.212	3.094	2.992	2.895	2.808	2.732	2.667	2.611	2.559	2.512	2.469	2.430	2.390	2.353	2.319	2.287	2.258	2.230				

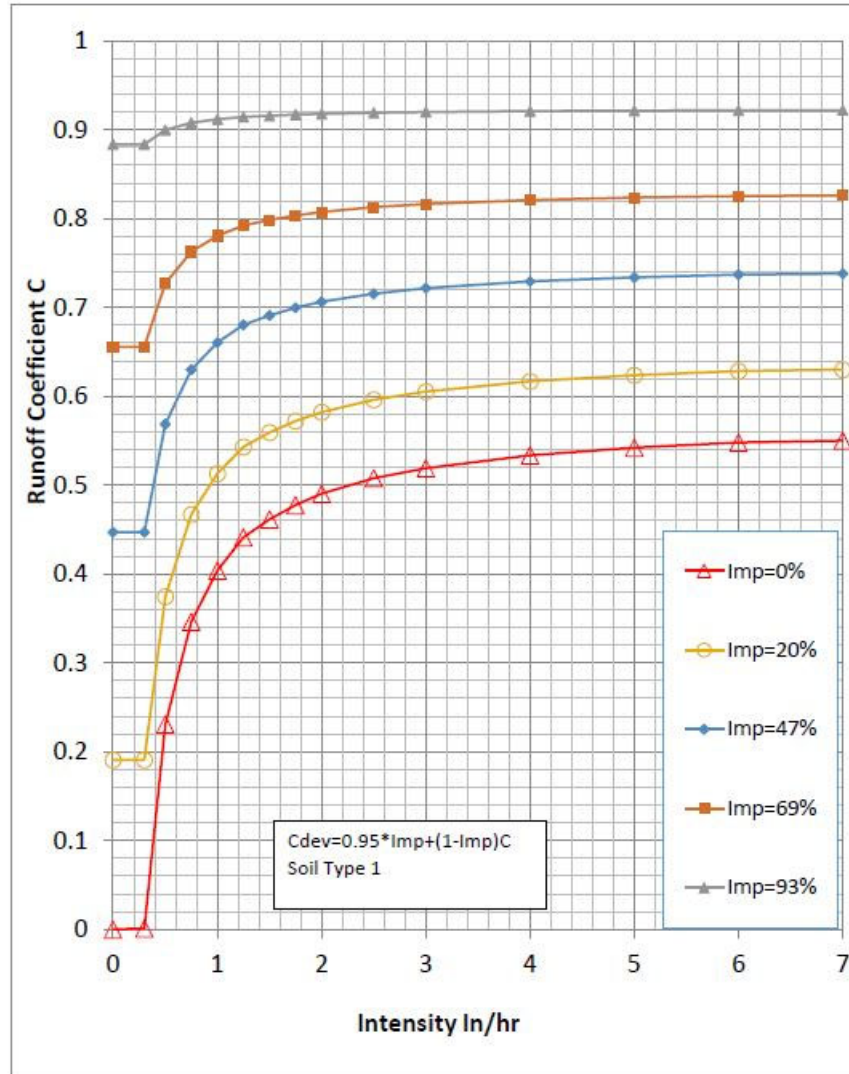
APPENDIX A

EXHIBITS

EXHIBIT 4D. NOAA Tc RAINFALL INTENSITIES- 10-YR

NOAA Zone Name	ID	Tc (min) / Intensities (in/hr)																												
		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
N&S Br. Arroyo																														
Consejo-ASR	Con2	2.952	2.674	2.475	2.327	2.211	2.118	2.006	1.913	1.834	1.767	1.708	1.647	1.593	1.545	1.502	1.463	1.428	1.396	1.367	1.341	1.316	1.293	1.272	1.253	1.234	1.217			
Arroyo Las Posas	ALP1	2.940	2.662	2.463	2.315	2.199	2.106	1.994	1.901	1.822	1.755	1.696	1.634	1.579	1.531	1.487	1.448	1.413	1.380	1.351	1.324	1.299	1.276	1.255	1.235	1.217	1.200			
Carpenteria Coastal	Carp1	4.128	3.740	3.463	3.255	3.093	2.964	2.807	2.676	2.565	2.470	2.388	2.303	2.228	2.161	2.102	2.048	1.999	1.955	1.915	1.878	1.844	1.813	1.784	1.757	1.729	1.704			
Consejo Creek	Con3	2.712	2.456	2.273	2.136	2.029	1.944	1.841	1.756	1.684	1.622	1.568	1.514	1.466	1.424	1.386	1.352	1.322	1.294	1.268	1.245	1.223	1.203	1.185	1.168	1.152	1.137			
Cuyama	Cuy1	3.180	2.880	2.666	2.505	2.380	2.280	2.159	2.058	1.973	1.899	1.836	1.773	1.717	1.668	1.624	1.584	1.548	1.515	1.485	1.458	1.433	1.410	1.388	1.368	1.347	1.328			
Hopper	Hop1	3.552	3.216	2.976	2.796	2.656	2.544	2.410	2.301	2.209	2.130	2.059	1.997	1.943	1.896	1.854	1.817	1.783	1.752	1.724	1.698	1.673	1.651	1.631	1.612	1.592	1.574			
Lake Castitas	Vta4	4.584	4.150	3.840	3.608	3.427	3.282	3.109	2.965	2.843	2.739	2.648	2.558	2.479	2.409	2.346	2.289	2.238	2.191	2.149	2.110	2.074	2.040	2.010	1.981	1.953	1.926			
Lower Sespe Pole	Sespe2d	3.684	3.336	3.087	2.901	2.756	2.640	2.500	2.385	2.288	2.205	2.131	2.067	2.010	1.961	1.917	1.877	1.841	1.808	1.778	1.751	1.725	1.702	1.680	1.660	1.641	1.622			
Lower Ventura	Vta6	3.564	3.228	2.985	2.804	2.663	2.550	2.416	2.305	2.211	2.130	2.060	1.991	1.931	1.877	1.828	1.785	1.746	1.710	1.677	1.648	1.620	1.595	1.571	1.549	1.528	1.508			
Matitas Coastal	Matbu1	3.276	2.965	2.745	2.579	2.449	2.346	2.222	2.119	2.032	1.957	1.892	1.825	1.765	1.713	1.665	1.623	1.585	1.550	1.518	1.489	1.462	1.437	1.414	3.942	3.726	3.520			
Matitas Coastal	Vta1	4.584	4.150	3.840	3.608	3.427	3.282	3.109	2.965	2.843	2.739	2.648	2.558	2.479	2.409	2.346	2.289	2.238	2.191	2.149	2.110	2.074	2.040	2.010	1.981	1.953	1.926			
Marina Consejo	Con1	3.132	2.836	2.625	2.465	2.343	2.244	2.126	2.028	1.945	1.874	1.812	1.746	1.688	1.637	1.591	1.549	1.511	1.477	1.446	1.418	1.391	1.367	1.344	1.324	1.303	1.283			
Ojai	Vta3	3.996	3.618	3.348	3.146	2.988	2.852	2.711	2.585	2.478	2.387	2.308	2.235	2.171	2.113	2.064	2.020	1.980	1.944	1.911	1.880	1.851	1.824	1.798	1.775	1.753	1.733			
Oxnard Pin-Nyeland	Rev2	2.784	2.520	2.331	2.190	2.080	1.992	1.887	1.800	1.726	1.663	1.608	1.555	1.507	1.465	1.428	1.394	1.363	1.336	1.310	1.287	1.266	1.246	1.228	1.211	1.192	1.174			
Pinna-Andruell	Prm1	3.384	3.066	2.839	2.668	2.536	2.430	2.301	2.193	2.102	2.024	1.956	1.892	1.836	1.785	1.740	1.700	1.663	1.630	1.600	1.572	1.546	1.523	1.501	1.481	1.460	1.444			
Revolution-Castles	Rev3	2.544	2.304	2.133	2.004	1.904	1.824	1.728	1.648	1.580	1.523	1.472	1.422	1.378	1.339	1.304	1.273	1.245	1.219	1.195	1.174	1.154	1.135	1.118	1.102	1.087	1.071			
San Antonio-Clarga	Vta5	3.816	3.456	3.199	3.006	2.856	2.736	2.592	2.472	2.370	2.282	2.216	2.152	2.078	2.016	1.965	1.920	1.879	1.840	1.803	1.767	1.732	1.699	1.667	1.635	1.603	1.573			
San Juan Freeman	SCR3	3.360	3.042	2.815	2.645	2.512	2.408	2.279	2.165	2.063	1.973	1.900	1.830	1.763	1.704	1.650	1.599	1.552	1.507	1.467	1.430	1.395	1.362	1.331	1.301	1.272	1.244			
SCR-Lower Pinna	SCR1	3.108	2.814	2.604	2.434	2.226	2.108	2.006	1.926	1.854	1.792	1.734	1.680	1.629	1.580	1.532	1.487	1.449	1.414	1.382	1.352	1.324	1.298	1.273	1.249	1.226	1.204			
SCR-Lower Pinna	SCR3	3.390	3.042	2.815	2.645	2.512	2.408	2.279	2.165	2.063	1.973	1.900	1.830	1.763	1.704	1.650	1.599	1.552	1.507	1.467	1.430	1.395	1.362	1.331	1.301	1.272	1.244			
Sespe Abio Bear	Sespe2d	4.080	3.696	3.422	3.164	3.056	2.928	2.773	2.644	2.535	2.441	2.360	2.284	2.212	2.157	2.105	2.059	2.016	1.978	1.943	1.911	1.880	1.852	1.825	1.801	1.778	1.755			
Sespe Abio Grand	Sespe3	3.744	3.390	3.137	2.948	2.800	2.682	2.540	2.421	2.321	2.235	2.160	2.094	2.035	1.983	1.937	1.895	1.857	1.823	1.791	1.763	1.736	1.712	1.689	1.668	1.648	1.63			
Sespe Abio Wheeler	Sespe1	4.740	4.292	3.972	3.732	3.545	3.396	3.164	3.066	2.939	2.830	2.736	2.653	2.545	2.465	2.397	2.336	2.281	2.230	2.184	2.142	2.101	2.063	2.028	1.995	1.964	1.933			
Simi Valley	Simi2	3.324	3.010	2.786	2.618	2.487	2.382	2.256	2.151	2.062	1.986	1.920	1.849	1.786	1.731	1.681	1.636	1.595	1.559	1.525	1.494	1.466	1.439	1.415	3.930	3.700	3.490			
So Mtn to Moorpark	Rev1	3.084	2.794	2.587	2.432	2.311	2.214	2.097	1.999	1.916	1.845	1.784	1.725	1.672	1.625	1.587	1.552	1.520	1.492	1.465	1.442	1.417	1.395	1.374	3.54	3.36	3.2			
Toad to Timber	Toad1	3.768	3.414	3.161	2.927	2.824	2.706	2.563	2.443	2.342	2.255	2.180	2.110	2.048	1.993	1.946	1.907	1.869	1.835	1.805	1.776	1.748	1.721	1.697	1.674	1.653	1.633			
Upper Simi	Simi1	3.480	3.196	2.972	2.784	2.653	2.548	2.429	2.328	2.236	2.153	2.084	2.019	1.958	1.902	1.851	1.802	1.756	1.713	1.673	1.635	1.600	1.567	1.537	1.509	1.483	1.458			
Upper Harmon	Har1	3.636	3.292	3.044	2.862	2.719	2.604	2.467	2.352	2.255	2.172	2.100	2.032	1.972	1.919	1.871	1.828	1.789	1.754	1.722	1.692	1.665	1.640	1.616	1.595	1.575	1.555			
Upper Matilla	Vta1	5.532	5.010	4.637	4.358	4.140	3.966	3.757	3.583	3.436	3.309	3.200	3.082	2.978	2.886	2.804	2.729	2.662	2.601	2.546	2.495	2.447	2.404	2.364	2.326	2.291	2.258			
Upper Pinna	Pin1	3.348	3.032	2.806	2.637	2.505	2.400	2.272	2.166	2.076	1.999	1.932	1.865	1.805	1.753	1.705	1.663	1.625	1.590	1.558	1.529	1.502	1.477	1.454	1.432	1.409	1.388			
Upper Sta Paula Ck	StPaul1	4.104	3.716	3.439	3.231	3.069	2.940	2.785	2.656	2.547	2.453	2.372	2.295	2.227	2.166	2.116	2.070	2.029	1.992	1.958	1.926	1.895	1.866	1.839	1.814	1.790	1.768			

EXHIBIT 5A. UPDATED RUNOFF COEFFICIENT CURVE- SOIL 1 (NRCS TYPE D)



ATTACHMENT B – WATERSHED EXHIBIT, SITE DEVELOPMENT AREA

