

# **APPENDIX E**

*Preliminary Water Quality Management Plan  
(WQMP) and Infiltration Report*



September 21, 2017

Lumar Development Company 2, LLC  
3835 Birch Street  
Newport Beach, California 92660



**SOUTHERN  
CALIFORNIA  
GEOTECHNICAL**  
*A California Corporation*

Attention: Mr. J. Scott Fawcett

Project No.: **17G178-2**

Subject: **Results of Infiltration Testing**  
Proposed Retail Development  
SEC Pepper Avenue and West Valley Boulevard  
Colton, California

Reference: Geotechnical Investigation, Proposed Retail Development, SEC Pepper Avenue and West Valley Boulevard, Colton, California, prepared by Southern California Geotechnical, Inc. (SCG) for Lumar Development Company 2, LLC, SCG Project No. 17G178-1.

Gentlemen:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

### **Scope of Services**

The scope of services performed for this project was in general accordance with our Proposal No. 17P330, dated August 23, 2017. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with the Technical Guidance Document for Water Quality Management Plans prepared for the County of San Bernardino Areawide Stormwater Program dated June 7, 2013. The San Bernardino County standards defer to guidelines published by Riverside County Department of Environmental Health (RCDEH).

### **Site and Project Description**

The subject site is located at the southeast corner of Pepper Avenue and West Valley Boulevard in Colton, California. The site is bounded to the north and east by West Valley Boulevard, to the west by Pepper Avenue, and to the south by the westbound Interstate 10 off-ramp. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of an irregular-shaped parcel, 2.99± acres in size. The northern portion of the site is presently developed as a used car dealership. A single-story office building is located in the northern portion of the site. The ground surface cover surrounding the building consists of asphaltic concrete pavements with landscape planters present along Pepper Avenue and West

Valley Boulevard. The pavements are in fair condition with minor to moderate cracking throughout.

Based on a review of readily available historical aerial photographs from the internet, the central portion of the site appears to have been a previous alignment of Valley Boulevard. The ground surface in this portion of the site consists of weathered asphaltic concrete pavements, which are in poor condition with severe cracking throughout.

The southern portion of the site is vacant and undeveloped. The ground surface cover in this area consists of exposed soil with sparse to moderate native grass and weed growth. Several large trees are present along the southern property line.

Detailed topographic information was not available at the time of this report. However, based on topographic information obtained from Google Earth, the site topography ranges from 1069± feet mean sea level (msl) in the northwestern area of the site to 1049± feet msl in the southeastern area. With the exception of some local variations, the site topography slopes gently downward to the southeast at a gradient of approximately 2± percent.

### **Proposed Development**

A site plan for the proposed development, prepared by RED Architectural Group, was provided to our office by the client. This plan indicates that the proposed development will consist of three (3) retail buildings. Pad A will be located in the northwest corner of the site and will be 3,000± ft<sup>2</sup> in size. Pad B will be located in the south-central area of the site and will be 7,700± ft<sup>2</sup> in size. Pad B will consist of three (3) suites ranging from 2,000 to 2,900± ft<sup>2</sup> in size and will be utilized for either restaurants or retail stores. Pad C will be located in the southeast corner of the site and will be 2,500± ft<sup>2</sup> in size. The buildings will be surrounded by asphaltic concrete pavements for automobile parking and drive lanes, with areas of concrete flatwork and landscape planters.

We understand that the proposed development will include on-site infiltration to dispose of storm water. Based on an infiltration test exhibit and conversations with representatives of Tait & Associates, Inc., the project civil engineer, the proposed infiltration system will consist of two (2) infiltration basins located in the north-central and eastern areas of the subject site. The bottoms of the proposed infiltration basins will extend to depths of 8 to 10± feet.

### **Concurrent Study**

Southern California Geotechnical, Inc. (SCG) concurrently conducted a geotechnical investigation at the subject site. As a part of this study, seven (7) borings were advanced to depths of 5 to 20± feet below existing site grades. Asphaltic concrete pavements were encountered at the ground surface at one of the boring locations. The pavements at this location consists of 2± inches of asphaltic concrete with no discernable layer of aggregate base. Artificial fill soils were encountered directly beneath the pavements at one of the boring locations, extending to a depth of 4½± feet below the existing site grades. The fill soils consist of loose fine sands with trace to little silt content. Native alluvial soils were encountered beneath the fill soils, or at the ground surface at all of the boring locations, extending to at least the maximum depth explored of 20± feet below the existing site grades. The alluvium generally consists of loose to medium dense

fine sands and fine to medium sands. One of the borings encountered medium dense silty fine sands at a depth of 17± feet below the existing site grades.

### Groundwater

Free water was not encountered during the drilling of any of the borings. Based on the lack of any water within the borings, and the moisture contents of the recovered soil samples, the static groundwater is considered to have existed at a depth in excess of 20± feet at the time of the subsurface exploration. As part of our research, we reviewed available groundwater data in order to determine the historic high groundwater level for the site. The primary reference used to determine the groundwater depths in this area is the California Department of Water Resources website, <http://www.water.ca.gov/waterdatalibrary/>. The nearest monitoring well in this database is located approximately 730 feet northeast of the site. Water level readings within this monitoring well indicate high groundwater levels of 148± feet (May 1986) below the ground surface.

### **Subsurface Exploration**

#### Scope of Exploration

The subsurface exploration conducted for this project consisted of four (4) infiltration test borings, advanced to depths of 8 to 10± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration borings (identified as I-1 through I-4) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

#### Geotechnical Conditions

Asphaltic concrete pavements were encountered at the ground surface at Infiltration Boring Nos. I-1 and I-2. At these locations, the pavements consist of 3± inches of asphaltic concrete with 4± inches of underlying aggregate base. Native alluvial soils were encountered beneath the pavements and at the ground surface at the remaining infiltration boring locations, extending to depths of at least 10± feet below existing site grades. The alluvial soils consist of very loose to medium dense fine sands and fine to medium sands with varying silt content. Free water was not encountered during the drilling of any of the infiltration borings. The Boring Logs, which illustrate the conditions encountered at the boring locations, are included with this report.

### **Infiltration Testing**

We understand that the results of the testing will be used to prepare a preliminary design for the proposed storm water infiltration system that will be used to dispose of storm water at the

subject site. As previously stated, the infiltration testing was performed in general accordance with Technical Guidance Document for Water Quality Management Plans, prepared for the County of San Bernardino Areawide Stormwater Program, dated June 7, 2013.

### Pre-soaking

In accordance with the county infiltration standards for sandy soils, the infiltration test borings were pre-soaked 2 hours prior to infiltration testing or until all of the water had percolated through each test hole. The pre-soaking process consisted of filling each test boring by inverting a full 5-gallon bottle of clear water supported over the hole so that the water flow into the hole holds constant at a level at least 5 times the hole's radius above the gravel at the bottom of the hole. Pre-soaking was completed after all of the water had percolated through each test hole.

### Infiltration Testing

Following the pre-soaking process of the infiltration test borings, SCG performed the infiltration testing. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of the test hole. In accordance with the San Bernardino County guidelines, since "sandy soils" were encountered at the bottom of all four of the infiltration test borings (where 6 inches of water infiltrated into the surrounding soils for two consecutive 25-minute readings), readings were taken at 10 minute intervals for a total of 1 hour at each test location. After each reading, water was added to each boring so that the depth of the water was at least 5 times the radius of the hole. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates for the tests are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

<u>Infiltration Test No.</u>	<u>Depth (feet)</u>	<u>Soil Description</u>	<u>Infiltration Rate (inches/hour)</u>
I-1	8	Fine to medium Sand	18.9
I-2	10	Fine to medium Sand	19.0
I-3	8	Fine to medium Sand, trace Silt	18.1
I-4	10	Fine to medium Sand	18.5

### Laboratory Testing

#### Grain Size Analysis

The grain size distribution of selected soils taken from the base of each infiltration test boring has been determined using a range of wire mesh screens. The analysis was performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the

sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of the analysis are presented at the end of this report.

### **Design Recommendations**

A total of four (4) infiltration tests were performed at the subject site. As noted above, the infiltration rates at these locations range from 18.1 to 19.0 inches per hour. **Based on the infiltration test results, we recommend a design infiltration rate of 18 inches per hour be used for both of the proposed infiltration basins at the subject site.**

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration systems to identify the soil classification at the base of each system. It should be confirmed that the soils at the base of each proposed infiltration basin correspond with those presented in this report to ensure that the performance of each system will be consistent with the rates reported herein.

The design of the storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Colton and/or County of San Bernardino guidelines. It is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the systems. The presence of such materials would decrease the effective infiltration rates. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rates recommended above are based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rates.** It should be noted that the recommended infiltration rates are based on infiltration testing at four (4) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

### **Infiltration versus Permeability**

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rate presented herein was determined in accordance with the San Bernardino County guidelines, and is considered valid for the time and place of the actual test. Changes in soil moisture content will affect the infiltration rate. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

### **Location of Infiltration System**

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering

properties. Overlying structures and pavements in the infiltration area could potentially be damaged due to saturation of subgrade soils. **If possible, the proposed infiltration system for this site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration system at least 25 feet from the buildings, it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

### **General Comments**

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

**Closure**

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.



Scott McCann  
Staff Scientist

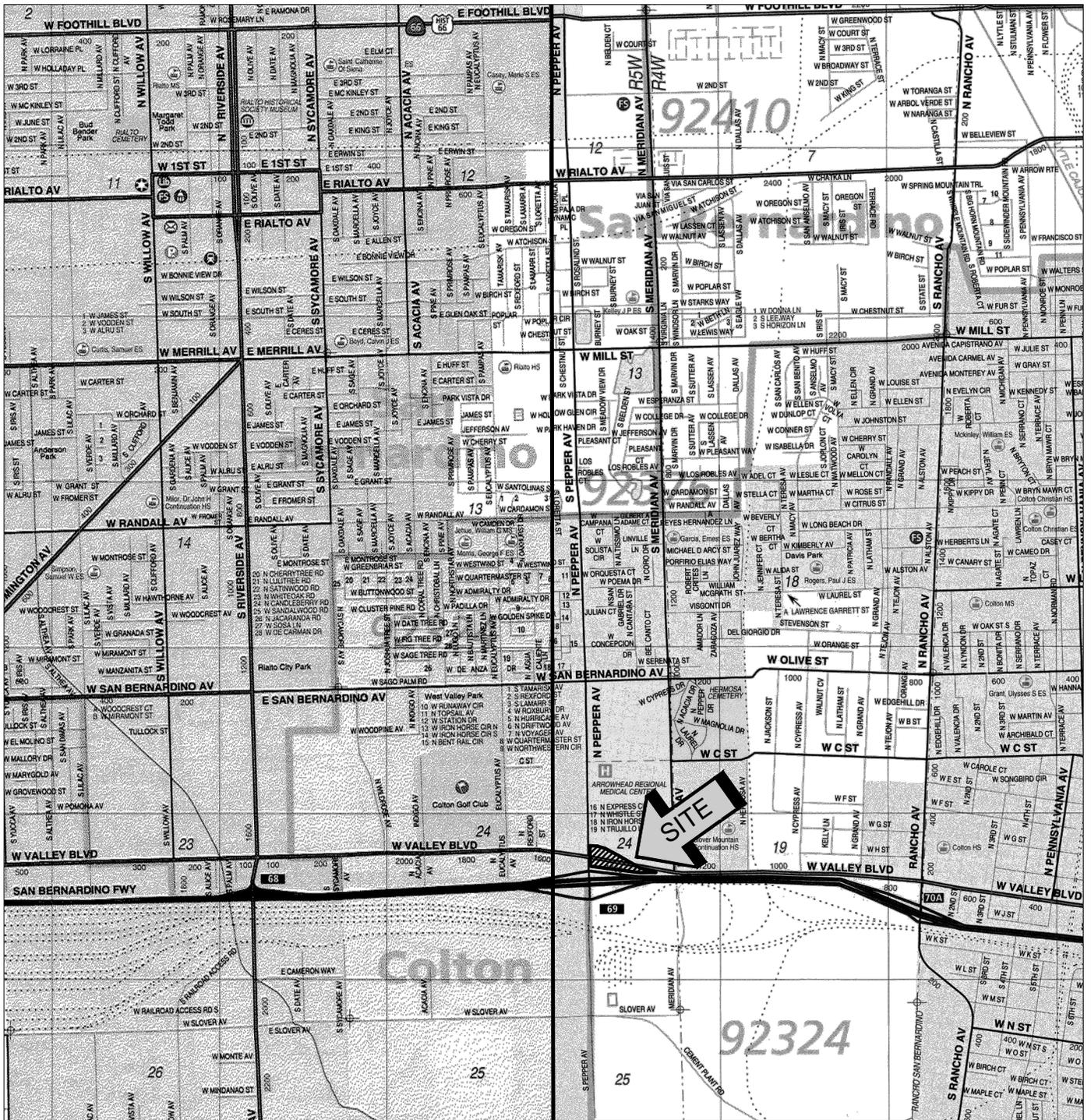


Gregory K. Mitchell, GE 2364  
Principal Engineer



Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map  
Plate 2 - Infiltration Test Location Plan  
Boring Log Legend and Logs (6 pages)  
Infiltration Test Results Spreadsheets (4 pages)  
Grain Size Distribution Graphs (4 pages)



SOURCE: SAN BERNARDINO COUNTY  
THOMAS GUIDE, 2013



**SITE LOCATION MAP**  
**PROPOSED RETAIL DEVELOPMENT**  
**COLTON, CALIFORNIA**

SCALE: 1" = 2400'

DRAWN: JLH

CHKD: GKM

SCG PROJECT  
17G178-2

PLATE 1

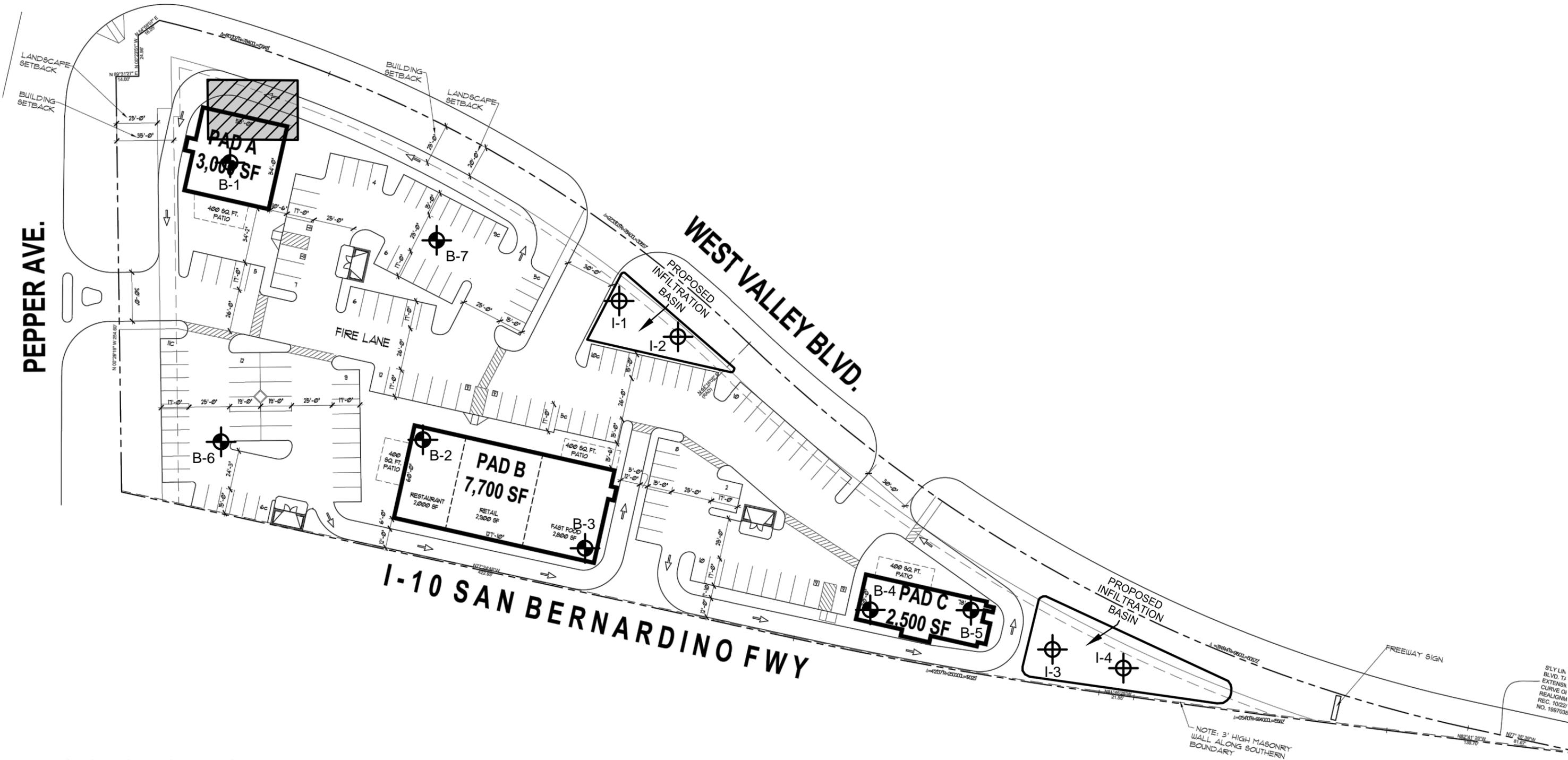


**SOUTHERN  
CALIFORNIA  
GEOTECHNICAL**

PEPPER AVE.

WEST VALLEY BLVD.

I-10 SAN BERNARDINO FWY



**GEOTECHNICAL LEGEND**

-  APPROXIMATE INFILTRATION TEST LOCATION
-  APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY (SCG PROJECT NO. 17G178-1)
-  EXISTING BUILDING TO BE DEMOLISHED

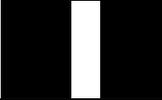
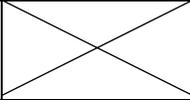


NOTE: SITE PLAN PREPARED BY RED ARCHITECTURAL GROUP.

<b>INFILTRATION TEST LOCATION PLAN</b>	
PROPOSED RETAIL DEVELOPMENT	
COLTON, CALIFORNIA	
SCALE: 1" = 60'	 <b>SOUTHERN CALIFORNIA GEOTECHNICAL</b>
DRAWN: JLH	
CHKD: GKM	
SCG PROJECT 17G178-2	
<b>PLATE 2</b>	



# BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

## COLUMN DESCRIPTIONS

### DEPTH:

Distance in feet below the ground surface.

### SAMPLE:

Sample Type as depicted above.

### BLOW COUNT:

Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

### POCKET PEN.:

Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

### GRAPHIC LOG:

Graphic Soil Symbol as depicted on the following page.

### DRY DENSITY:

Dry density of an undisturbed or relatively undisturbed sample in lbs/ft<sup>3</sup>.

### MOISTURE CONTENT:

Moisture content of a soil sample, expressed as a percentage of the dry weight.

### LIQUID LIMIT:

The moisture content above which a soil behaves as a liquid.

### PLASTIC LIMIT:

The moisture content above which a soil behaves as a plastic.

### PASSING #200 SIEVE:

The percentage of the sample finer than the #200 standard sieve.

### UNCONFINED SHEAR:

The shear strength of a cohesive soil sample, as measured in the unconfined state.

# SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
<p><b>COARSE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</p>	<p><b>GRAVEL AND GRAVELLY SOILS</b></p>	<p>CLEAN GRAVELS</p> <p>(LITTLE OR NO FINES)</p>		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
		<p>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</p>	<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>		<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES	
	<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES		
	<p><b>FINE GRAINED SOILS</b></p> <p>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</p>	<p><b>SILTS AND CLAYS</b></p> <p>LIQUID LIMIT LESS THAN 50</p>		<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
				<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
<p><b>SILTS AND CLAYS</b></p> <p>LIQUID LIMIT GREATER THAN 50</p>			<b>MH</b>	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
			<b>CH</b>	INORGANIC CLAYS OF HIGH PLASTICITY		
			<b>OH</b>	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
<p><b>HIGHLY ORGANIC SOILS</b></p>				<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS



JOB NO.: 17G178-2	DRILLING DATE: 9/1/17	WATER DEPTH: Dry
PROJECT: Proposed Retail Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Colton, California	LOGGED BY: Jason Hiskey	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	
SURFACE ELEVATION: --- MSL												
					3± inches Asphaltic concrete, 4± inches Aggregate base							
	X	11			<u>ALLUVIUM</u> : Brown fine Sand, trace medium Sand, loose to medium dense-dry to damp		2					
5	X	10					2					
	X	15			Brown fine to medium Sand, medium dense-dry to damp		2					
Boring Terminated at 8'												

TBL\_17G178-2.GPJ\_SOCALGEO.GDT\_9/21/17



JOB NO.: 17G178-2	DRILLING DATE: 9/1/17	WATER DEPTH: Dry
PROJECT: Proposed Retail Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Colton, California	LOGGED BY: Jason Hiskey	READING TAKEN: At Completion

FIELD RESULTS				DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)		GRAPHIC LOG	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	
SURFACE ELEVATION: --- MSL											
					3± inches Asphaltic concrete, 4± inches Aggregate base						
	X	10			ALLUVIUM: Brown fine Sand, little medium Sand, loose to medium dense-dry to damp		2				
5	X	12					3				
	X	14			Brown fine to medium Sand, medium dense-dry to damp		3				
	X	16					3				
10											
					Boring Terminated at 10'						

TBL\_17G178-2.GPJ\_SOCALGEO.GDT\_9/21/17



JOB NO.: 17G178-2	DRILLING DATE: 9/1/17	WATER DEPTH: Dry
PROJECT: Proposed Retail Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Colton, California	LOGGED BY: Jason Hiskey	READING TAKEN: At Completion

FIELD RESULTS				DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)		GRAPHIC LOG	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	
SURFACE ELEVATION: --- MSL											
	X	10		•••••	ALLUVIUM: Brown fine Sand, little medium Sand, trace Silt, loose to medium dense-dry to damp		1				
5	X	11		•••••			2				
	X	10		•••••	Brown fine to medium Sand, trace Silt, loose to medium dense-dry to damp		2				
Boring Terminated at 8'											

TBL\_17G178-2.GPJ\_SOCALGEO.GDT\_9/21/17



JOB NO.: 17G178-2	DRILLING DATE: 9/1/17	WATER DEPTH: Dry
PROJECT: Proposed Retail Development	DRILLING METHOD: Hollow Stem Auger	CAVE DEPTH: ---
LOCATION: Colton, California	LOGGED BY: Jason Hiskey	READING TAKEN: At Completion

FIELD RESULTS				GRAPHIC LOG	DESCRIPTION	LABORATORY RESULTS						COMMENTS
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)			DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	
SURFACE ELEVATION: --- MSL												
4	X	4			ALLUVIUM: Brown fine Sand, trace medium Sand, very loose to loose-dry to damp		2					
9	X	9					2					
7	X	7					2					
16	X	16				Brown fine to medium Sand, medium dense-dry to damp		2				
10	X				Boring Terminated at 10'							

TBL\_17G178-2.GPJ\_SOCALGEO.GDT\_9/21/17

## INFILTRATION CALCULATIONS

Project Name	Proposed Retail Development
Project Location	Colton, CA
Project Number	17G178-2
Engineer	Scott McCann

Test Hole Radius	4 (in)
Test Depth	8 (ft)

Infiltration Test Hole	I-1
------------------------	-----

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	8:30 AM	10.0	6.00	2.00	1.00	20.57	Pre-Sat
	Final	8:40 AM		8.00				
P2	Initial	8:41 AM	10.0	6.00	1.94	1.03	19.45	
	Final	8:51 AM		7.94				
1	Initial	8:52 AM	10.0	6.00	1.93	1.04	19.27	Infiltration Testing
	Final	9:02 AM		7.93				
2	Initial	9:03 AM	10.0	6.00	1.91	1.05	18.92	
	Final	9:13 AM		7.91				
3	Initial	9:14 AM	10.0	6.00	1.91	1.05	18.92	
	Final	9:24 AM		7.91				
4	Initial	9:25 AM	10.0	6.00	1.91	1.05	18.92	
	Final	9:35 AM		7.91				
5	Initial	9:36 AM	10.0	6.00	1.89	1.06	18.56	
	Final	9:46 AM		7.89				
6	Initial	9:47 AM	10.0	6.00	1.91	1.05	18.92	
	Final	9:57 AM		7.91				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

- Where:
- Q = Infiltration Rate (in inches per hour)
  - $\Delta H$  = Change in Height (Water Level) over the time interval
  - r = Test Hole (Borehole) Radius
  - $\Delta t$  = Time Interval
  - H above GS= 2
  - $H_{avg}$  = Average Head Height over the time interval

## INFILTRATION CALCULATIONS

Project Name	Proposed Retail Development
Project Location	Colton, CA
Project Number	17G178-2
Engineer	Scott McCann

Test Hole Radius	4 (in)
Test Depth	9.8 (ft)

Infiltration Test Hole	I-2
------------------------	-----

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	9:30 AM	10.0	6.80	2.94	1.53	20.79	Pre-Sat
	Final	9:40 AM		9.74				
P2	Initial	9:41 AM	10.0	6.80	2.87	1.57	19.89	
	Final	9:51 AM		9.67				
1	Initial	9:52 AM	10.0	6.80	2.85	1.58	19.64	Infiltration Testing
	Final	10:02 AM		9.65				
2	Initial	10:03 AM	10.0	6.80	2.83	1.59	19.39	
	Final	10:13 AM		9.63				
3	Initial	10:14 AM	10.0	6.80	2.82	1.59	19.26	
	Final	10:24 AM		9.62				
4	Initial	10:25 AM	10.0	6.80	2.81	1.60	19.14	
	Final	10:35 AM		9.61				
5	Initial	10:36 AM	10.0	6.80	2.80	1.60	19.02	
	Final	10:46 AM		9.60				
6	Initial	10:47 AM	10.0	6.80	2.80	1.60	19.02	
	Final	10:57 AM		9.60				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

- Where:
- Q = Infiltration Rate (in inches per hour)
  - $\Delta H$  = Change in Height (Water Level) over the time interval
  - r = Test Hole (Borehole) Radius
  - $\Delta t$  = Time Interval                      H above GS= 0.2
  - $H_{avg}$  = Average Head Height over the time interval

**INFILTRATION CALCULATIONS**

Project Name	Proposed Retail Development
Project Location	Colton, CA
Project Number	17G178-2
Engineer	Scott McCann

Test Hole Radius	4 (in)
Test Depth	7.9 (ft)

Infiltration Test Hole	I-3
------------------------	-----

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	12:00 PM	10.0	5.90	2.00	1.00	20.57	Pre-Sat
	Final	12:10 PM		7.90				
P2	Initial	12:11 PM	10.0	5.90	2.00	1.00	20.57	
	Final	12:21 PM		7.90				
1	Initial	12:22 PM	10.0	5.90	1.96	1.02	19.82	Infiltration Testing
	Final	12:32 PM		7.86				
2	Initial	12:33 PM	10.0	5.90	1.89	1.06	18.56	
	Final	12:43 PM		7.79				
3	Initial	12:44 PM	10.0	5.90	1.87	1.07	18.22	
	Final	12:54 PM		7.77				
4	Initial	12:55 PM	10.0	5.90	1.86	1.07	18.05	
	Final	1:05 PM		7.76				
5	Initial	1:06 PM	10.0	5.90	1.86	1.07	18.05	
	Final	1:16 PM		7.76				
6	Initial	1:17 PM	10.0	5.90	1.86	1.07	18.05	
	Final	1:27 PM		7.76				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

- Where:
- Q = Infiltration Rate (in inches per hour)
  - ΔH = Change in Height (Water Level) over the time interval
  - r = Test Hole (Borehole) Radius
  - Δt = Time Interval                      H above GS= 2.1
  - H<sub>avg</sub> = Average Head Height over the time interval

## INFILTRATION CALCULATIONS

Project Name	Proposed Retail Development
Project Location	Colton, CA
Project Number	17G178-2
Engineer	Scott McCann

Test Hole Radius	4 (in)
Test Depth	10 (ft)

Infiltration Test Hole	I-4
------------------------	-----

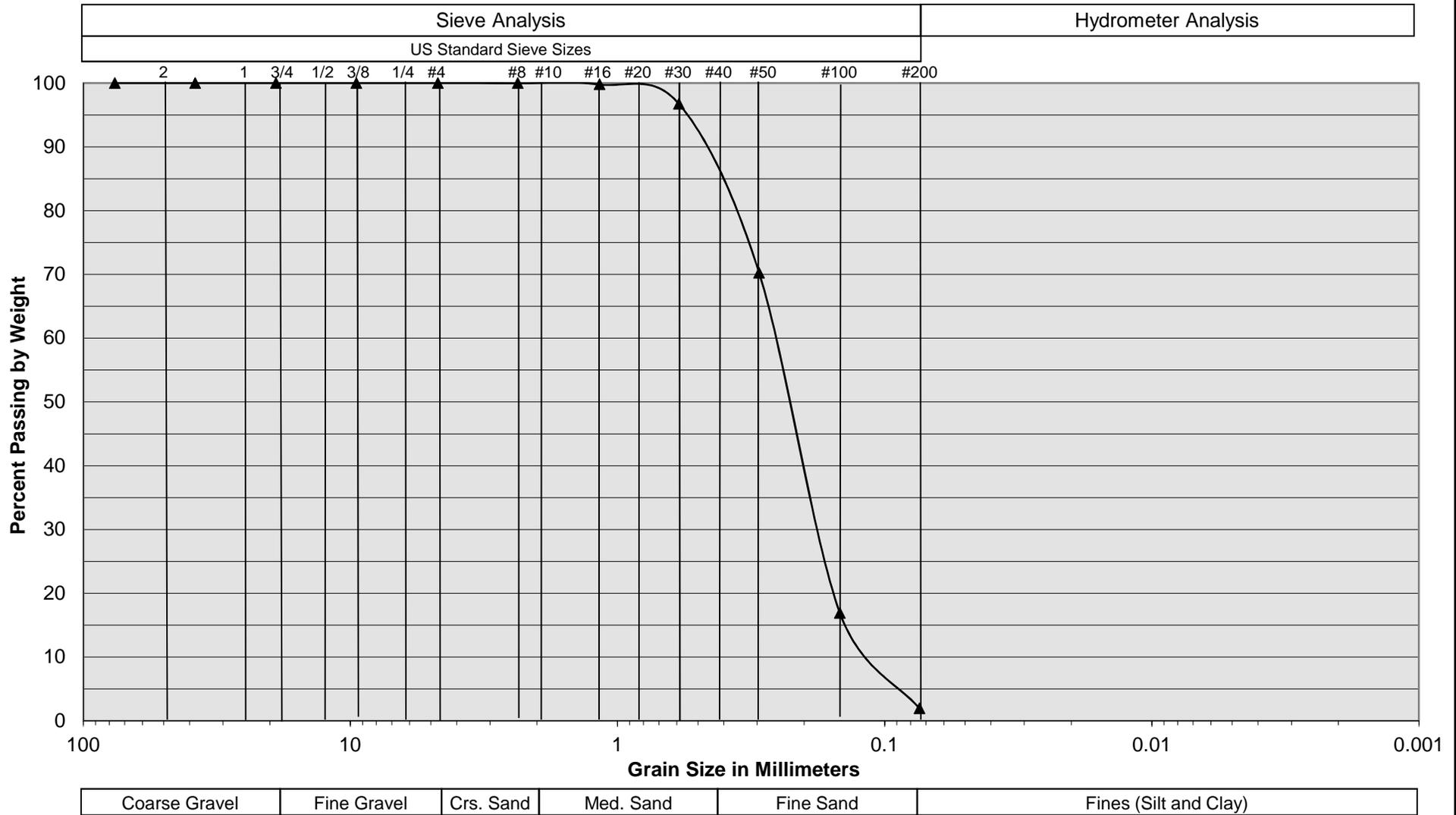
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
P1	Initial	11:00 AM	10.0	7.45	2.55	1.28	21.23	Pre-Sat
	Final	11:10 AM		10.00				
P2	Initial	11:11 AM	10.0	7.50	2.50	1.25	21.18	
	Final	11:21 AM		10.00				
1	Initial	11:22 AM	10.0	7.60	2.40	1.20	21.07	Infiltration Testing
	Final	11:32 AM		10.00				
2	Initial	11:33 AM	10.0	7.60	2.33	1.24	19.95	
	Final	11:43 AM		9.93				
3	Initial	11:44 AM	10.0	7.60	2.25	1.28	18.73	
	Final	11:54 AM		9.85				
4	Initial	11:55 AM	10.0	7.80	2.13	1.14	19.64	
	Final	12:05 PM		9.93				
5	Initial	12:06 PM	10.0	7.80	2.09	1.16	18.98	
	Final	12:16 PM		9.89				
6	Initial	12:17 PM	10.0	7.80	2.06	1.17	18.49	
	Final	12:27 PM		9.86				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

- Where:
- Q = Infiltration Rate (in inches per hour)
  - $\Delta H$  = Change in Height (Water Level) over the time interval
  - r = Test Hole (Borehole) Radius
  - $\Delta t$  = Time Interval                      H above GS= 0
  - $H_{avg}$  = Average Head Height over the time interval

# Grain Size Distribution



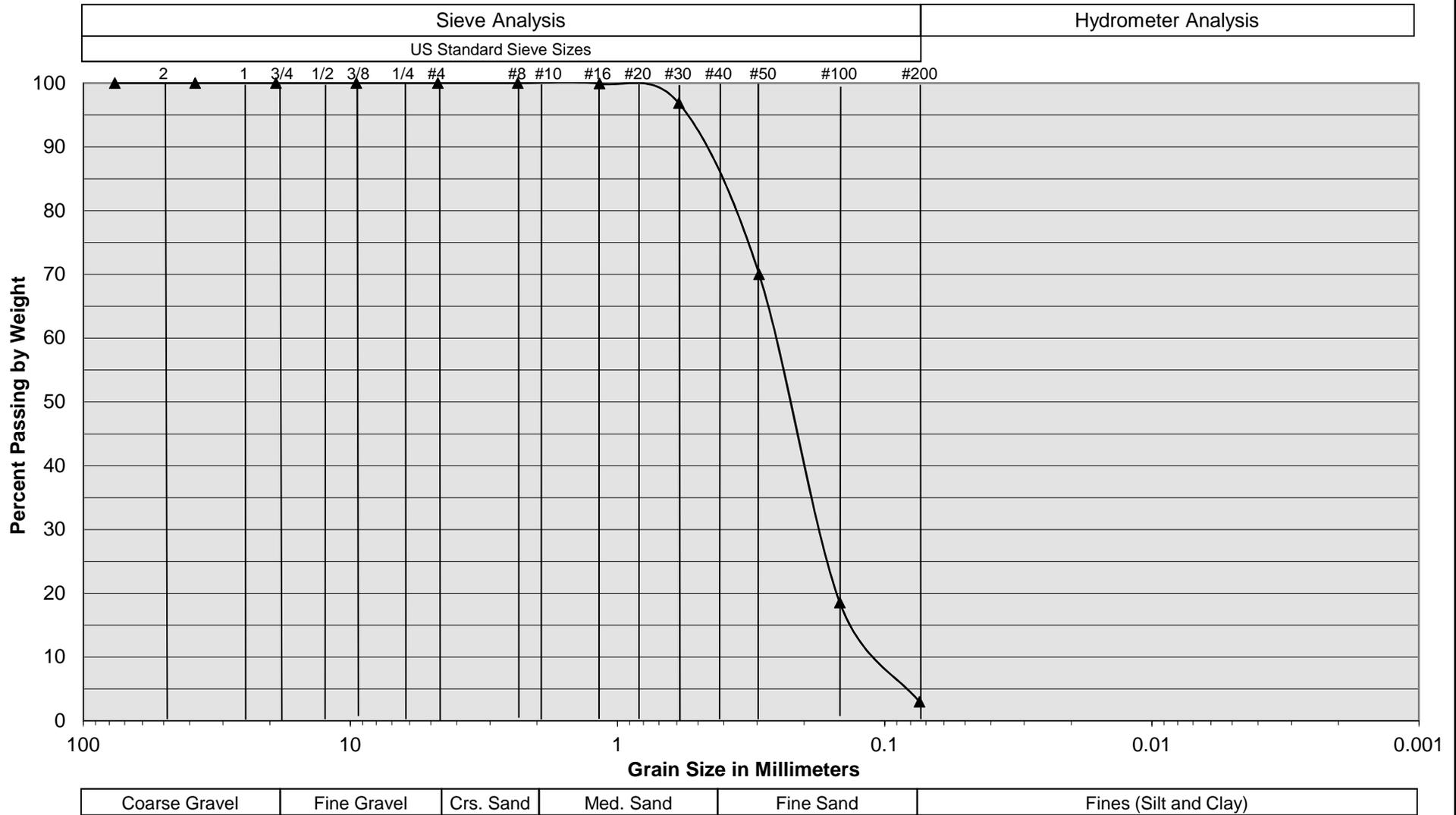
Sample Description	I-1 @ 6.5 feet
Soil Classification	Brown fine to medium Sand

Proposed Retail Development  
 Colton, California  
 Project No. 17G178-2  
**PLATE C-1**



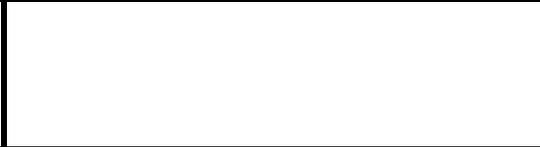
**SOUTHERN CALIFORNIA GEOTECHNICAL**  
A California Corporation

# Grain Size Distribution



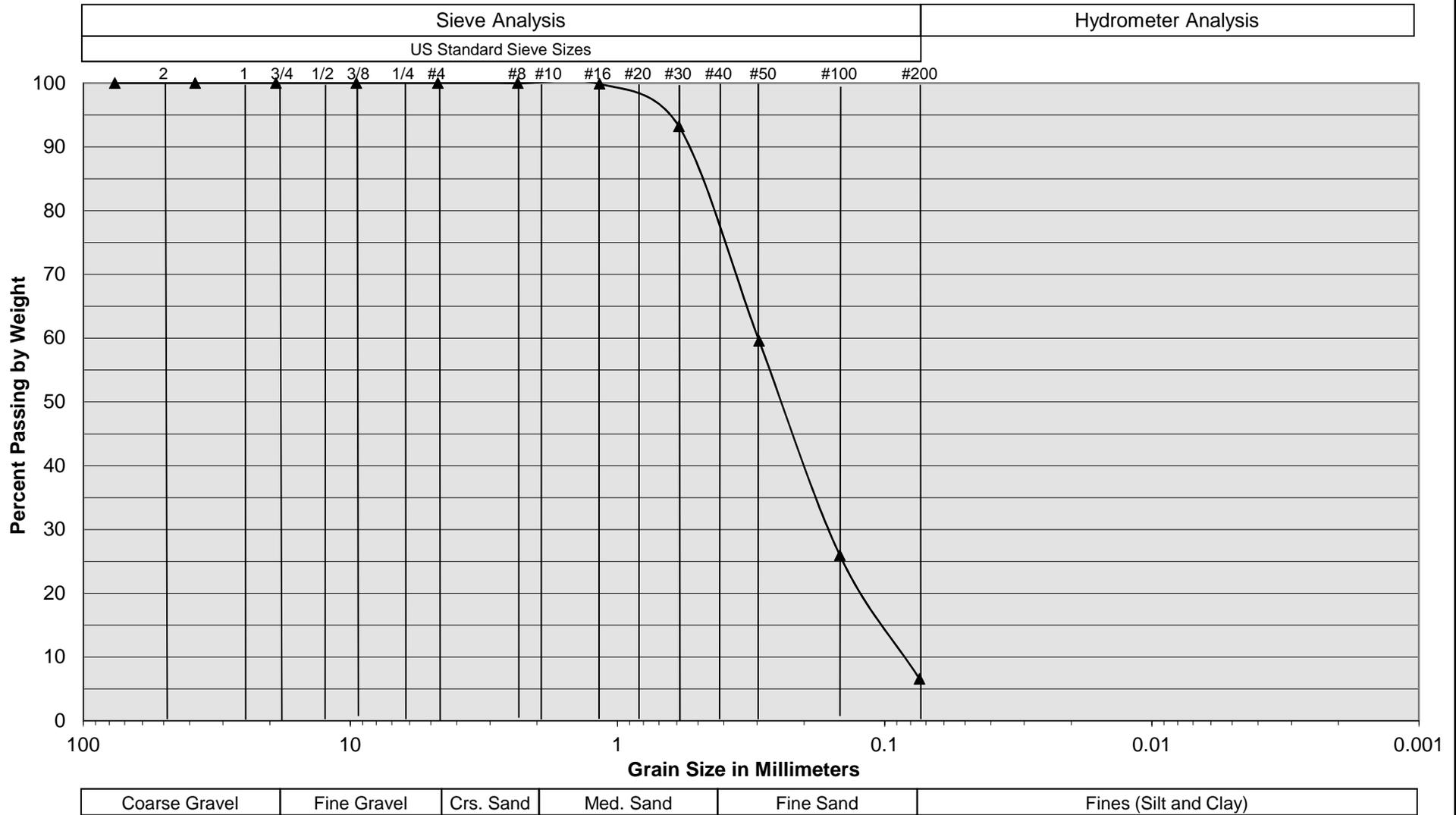
Sample Description	I-2 @ 8.5 feet
Soil Classification	Brown fine to medium Sand

Proposed Retail Development  
 Colton, California  
 Project No. 17G178-2  
**PLATE C-2**



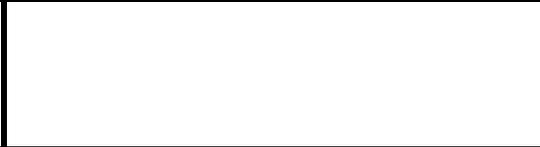
**SOUTHERN CALIFORNIA GEOTECHNICAL**  
A California Corporation

# Grain Size Distribution



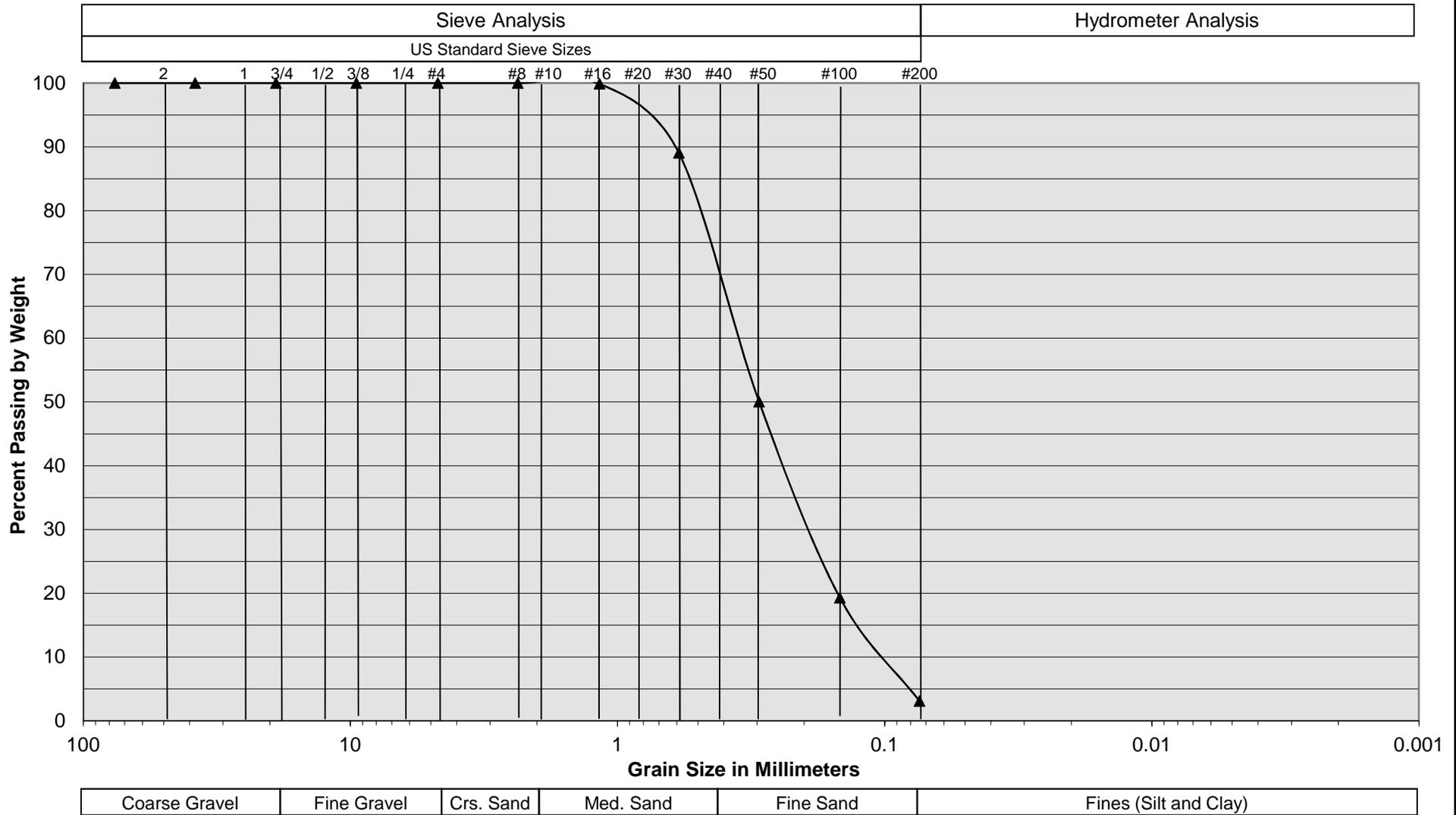
Sample Description	I-3 @ 6.5 feet
Soil Classification	Brown fine to medium Sand, trace Silt

Proposed Retail Development  
 Colton, California  
 Project No. 17G178-2  
**PLATE C-3**



**SOUTHERN CALIFORNIA GEOTECHNICAL**  
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# Grain Size Distribution



Sample Description	I-4 @ 8.5 feet
Soil Classification	Brown fine to medium Sand

Proposed Retail Development  
 Colton, California  
 Project No. 17G178-2  
**PLATE C-4**





**SOUTHERN CALIFORNIA GEOTECHNICAL**  
A California Corporation



# San Bernardino County Stormwater Program

# WATER QUALITY MANAGEMENT PLAN TEMPLATE

11

WATER QUALITY MANAGEMENT PLAN  
(WQMP)

For compliance with Santa Ana Regional Water Quality Control Board

Order Number R8-2002-0012 (NPDES Permit No. CAS618036)

**for**

**1595 W. Valley Blvd  
Index: DAP-001-450**

Prepared for:  
**Marinita Development &  
Lundin Development Co.  
1595 W. Valley Blvd  
Colton, CA 92324**

WQMP Preparation Date  
**10/12/2017**

# WATER QUALITY MANAGEMENT PLAN (WQMP)

## PROJECT SITE INFORMATION

Name of Project: 1595 W. Valley Blvd

Project Location: Colton, California

Size of Significant Re-Development on an Already Developed Site (in feet<sup>2</sup>): 129939

Size of New Development (in feet<sup>2</sup>): N/A

Number of Home Subdivisions: N/A

SIC Codes: \_\_\_\_\_

Erosive Site Conditions?: N/A

Natural Slope More Than 25%?: No

## WATER QUALITY MANAGEMENT PLAN (WQMP)

Check the appropriate project category below:

**Check  
below**

### Project Categories

√	1. All significant re-development projects. Significant re-development is defined as the addition or creation of 5,000 or more square feet of impervious surface on an already developed site. This includes, but is not limited to, additional buildings and/or structures, extension of existing footprint of a building, construction of parking lots, etc. Where redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to SUSMPs, the design standards apply only to the addition, and not the entire development. When the redevelopment results in an increase of more than fifty percent of the impervious surfaces, then a WQMP is required for the entire development (new and existing).
	2. Home subdivisions of 10 units or more. This includes single family residences, multi-family residence, condominiums, apartments, etc.
	3. Industrial/commercial developments of 100,000 square feet or more. Commercial developments include non-residential developments such as hospitals, educational institutions, recreational facilities, mini-malls, hotels, office buildings, warehouses, and light industrial facilities.
	4. Automotive repair shops (with SIC codes 5013, 5014, 5541, 7532- 7534, 7536-7539).
	5. Restaurants where the land area of development is 5,000 square feet or more.
	6. Hillside developments of 10,000 square feet or more which are located on areas with known erosive soil conditions or where the natural slope is twenty-five percent or more.
	7. Developments of 2,500 square feet of impervious surface or more adjacent to (within 200 feet) or discharging directly into environmentally sensitive areas such as areas designated in the Ocean Plan as areas of special biological significance or waterbodies listed on the CWA Section 303(d) list of impaired waters.
	8. Parking lots of 5,000 square feet or more exposed to storm water. Parking lot is defined as land area or facility for the temporary storage of motor vehicles.
	The project does not fall into any of the categories described above. (If the project requires a precise plan of development [e.g. all commercial or industrial projects, residential projects of less than 10 dwelling units, and all other land development projects with potential for significant adverse water quality impacts] or subdivision of land, it is defined as a Non-Category Project.)

## Section 1 Introduction And Project Description

### 1.1 Project Information

- Marinita Development Comapny
- 3835 Birch St Newport Beach, CA 92660
- (949) 756-8677
- Lundin Development Co.
- 16400 Pacific Coast Highway Huntington Beach, CA 92649
- (562) 592-6020
- 1595 W Valley Blvd Colton, CA 92324

### 1.2 Permits

- WDID:

### 1.3 Project Description

This Project Report addresses the proposed development of 2.99 Acres located at 1595 W Valley Blvd Colton, CA 92324. The proposed commercial development will provide services to the adjacent industrial, commercial and residential areas. The site is bound by W Valley Blvd to the North and East, N Pepper Ave to the west, and Interstate 10 to the south. North of the site is Arrowhead Regional Medical Center and residential development. East of the site is residential development and Colton High School. West of the site is industrial development. South of the site is industrial development, including a rail yard and mining facilities.

The proposed commercial development will include:

- Landscaping in setback areas
- Parking spaces
- Retail, fast food and restaurants
- Stormwater quality treatment
- Utilities: Storm drain, water, fire line, and sewer

Off-site Improvements include:

- Sidewalk

### 1.4 Site Description

This project lies within the Santa Ana Region. Runoff from the site ultimately discharges to Reach 4 of the Santa Ana River upstream of Prado Dam. Prado Dam discharges to the lower reaches of the Santa Ana River. Final discharge of the Santa Ana River is the Pacific Ocean located between the cities of Huntington Beach and Newport Beach.

## Section 2

## Pollutants of concern and hydrologic conditions of concern

### 2.1 Pollutants of Concern (NOT REQUIRED FOR NON-CATEGORY PROJECTS)

Use Table 2-1 in the WQMP Guidance to identify the potential pollutants expected to be generated by the development. List all expected pollutants of concern for the project site as directed below:

- List all expected and potential pollutants using Table 2-1.
- List any other pollutants of concern from the project site not listed in Tables 2-1 and B-1.
- Identify pollutants of concern in the receiving waters as follows:
  1. For each of the proposed project discharge points, identify the proximate receiving water for each point of discharge and all downstream receiving waters, using hydrologic unit basin numbers as identified in the most recent version of the Water Quality Control Plan for the Santa Ana Basin prepared by the RWQCB.
  2. Identify each proximate and downstream receiving water identified above that is listed on the most recent list of Clean Water Act Section 303(d) (CWA 303(d) list) impaired water bodies (Attachment B, Table B-1). List any and all pollutants for which the receiving waters are impaired.
  3. Compare the list of pollutants for which the receiving waters are impaired with the pollutants expected to be generated by the project (and listed above).
  4. List all pollutants that are expected or potential from the project site, and for which the receiving waters are impaired.
  5. Summarize identified pollutants of concern by checking the applicable boxes in the following table. (For identified pollutants of concern that are causing an impairment in receiving waters, the project WQMP shall incorporate one or more Treatment Control BMPs of medium or high effectiveness in reducing those pollutants.)

**Pollutant of Concern Summary Table**

Pollutant Type	Expected	Potential	Listed for Receiving Water
Bacteria/Virus	√		
Heavy Metals	√		√

<b>Nutrients</b>		√	√
<b>Pesticides</b>		√	
<b>Organic Compounds</b>	√		
<b>Sediments</b>		√	
<b>Trash &amp; Debris</b>	√		
<b>Oxygen Demanding Substances</b>	√		
<b>Oil &amp; Grease</b>	√		
<b>Other—specify pollutant(s): Pathogens</b>			√

## 2.2 HYDROLOGIC CONDITIONS OF CONCERN (NOT REQUIRED FOR NON-CATEGORY PROJECTS)

All Category projects must identify any hydrologic condition of concern (HCOC) that will be caused by the project, and implement Site Design, Source Control, and/or Treatment Control BMPs to address identified impacts. Project proponents must follow the procedure for identifying HCOCs specified in Section 2.3 of the Model WQMP. Use the following Table and instructions as a guide.

1. (from Section 2.3, Part 2):	Yes	No
<p>Determine if the project will create a Hydrologic Condition of Concern. Check “yes” or “no” as applicable and proceed to the appropriate section as outlined below.</p> <p><b>A.</b> All downstream conveyance channels, that will receive runoff from the project, are engineered, hardened (concrete, riprap or other), and regularly maintained to ensure design flow capacity, and no sensitive stream habitat areas will be affected. Engineered, hardened, and maintained channels include channel reaches that have been fully and properly approved (including CEQA review, and permitting by USACOE, RWQCB and California Dept. of Fish &amp; Game) by June 1, 2004 for construction and hardening to achieve design capacity, whether construction of the channels is complete. Discharge from the project will be in full compliance with Agency requirements for connections and discharges to the MS4, including both quality and quantity requirements, and the project will be permitted by the Agency for the connection or discharge to the MS4.</p>		
<p><b>B.</b> Project runoff rates, volumes, velocities, and flow duration for the post-development condition will not exceed those of the pre-development condition for 1-year, 2-year and 5-year frequency storm events. This condition will be substantiated with hydrologic modeling methods that are acceptable to the Agency, to the U.S. Army Corps of Engineers (USACOE), and to local watershed authorities. See method described below in Parts B1- B3.</p>		
<p><b>C.</b> Can the conditions in part A or B above be demonstrated for the project?</p>		
<ul style="list-style-type: none"> <li>▪ If the answer for A, B, and/or C above is yes, then the project does not create a HCOC—in this case go to Section 3 (page A-12).</li> <li>▪ If the answer for C above is no, the go to section 2.3. Part 3, below.</li> </ul>		

B1. To determine the projects’ drainage characteristics, County of San Bernardino HCOC policy requires the project engineer to use the following guidelines:

- a. The Design Storms to be considered include, as a minimum, the 5-year, 2 year, and 1-year return frequency storms, using the methods contained in the San Bernardino County Hydrology Manual (1986).

Project sites from 0-10 acres in size should use the Small Area Runoff Hydrograph method, found in Section J of the San Bernardino County Hydrology Manual (1986); sites greater than 10 acres should use the Unit Hydrograph Method, found in Section E of the San Bernardino County Hydrology Manual (1986). For each return frequency considered, and for both pre- and post-development conditions, determine the total runoff volume, the peak flow rate, and the time of duration, of runoff hydrograph flow rates that exceed the following flow rates: 90% of peak flow rate, 80% of peak flow rate, 70% of peak flow rate, 60% of peak flow rate, 50% of peak flow rate, 40% of peak flow rate, 30% of peak flow rate, 20% of peak flow rate, and 10% of peak flow rate (see Table B2-2, "Pre- and Post-development Hydrology Comparison Worksheet.")

b. Sediment supply is to be estimated for pre-and post-development conditions for the land altered by the subject project using Table 2-3, "Pre- and Post-development Hydrology Comparison Worksheet" or equivalent. The Universal Soil Loss Equation published by the USDA-Natural Resources Conservation Service may be considered as an estimate of changes in sediment yield due to development, if applicable. Flow velocities are to be estimated for the several return frequency design storms noted above, as a minimum, with flow velocities estimated for each percentage of the peak flow rate value listed above. Normal depth hydraulic estimates may be used unless significant backwater effects exist such that deposition of sediment is anticipated, in which case a standard backwater analysis is to be conducted.

c. Based upon the preceding task results, the project engineer shall evaluate the Project and its impact downstream and recommend other design storm return frequencies to be considered in order to satisfy the goals and intent of the HCOC document.

**Table B2-2: Pre- and Post-development Hydrology Comparison Worksheet**

Return Period	Total Volume		Peak Flow		Flow Time Duration			Sediment Transport	
	Pre	Post	Pre	Post	% of Peak	Pre	Post	Pre	Post
1-year					90				
					80				
					70				
					60				
					50				
					40				
					30				
					20				
					10				
2-year					90				
					80				
					70				
					60				
					50				
					40				
					30				
					20				
					10				
5-year					90				
					80				
					70				
					60				
					50				
					40				
					30				
					20				
					10				

<p><b>2. (from Section 2.3, Part 3):</b> The WQMP for projects that create a HCOC must include an evaluation of whether the project will adversely impact downstream erosion, sedimentation or stream habitat. The Agency may require that the evaluation be conducted by a registered civil engineer in the State of California, with experience in fluvial geomorphology. Perform the required evaluation as specified in A – F below. Check the boxes “yes” or “no” to verify a complete report and proceed to appropriate section based on results.</p>		
<b>Does the evaluation include:</b>	<b>Yes</b>	<b>No</b>
<b>A.</b> An evaluation of potential impacts to all downstream channel reaches.		
<b>B.</b> Consideration of the hydrology of the entire watershed. Review all applicable drainage area master plans to the extent available, to identify BMP requirements for new development that address cumulative inputs from development in the watershed.		
<b>C.</b> Consultation with all applicable agencies including the USACOE; local watershed authorities (e.g. San Timoteo Watershed Management Authority and SAWPA [Santa Ana Watershed Project Authority]); U.S. Geological Survey (USGS); California Dept. of Fish & Game (CDFG); and the San Bernardino County Flood Control District; to determine any areas of potential hydrologic impact.		
<b>D.</b> An evaluation of any available hydrologic modeling results. Modeling may have been performed by USGS, USACOE, local watershed authorities, the San Bernardino County Flood Control District, or other local jurisdiction.		
<b>E.</b> A field reconnaissance to evaluate any natural or partially natural downstream reaches, or other sensitive habitat. The field reconnaissance must evaluate representative downstream conditions, including undercutting erosion, slope/bank stability, vegetative stress (due to flooding, erosion, water quality degradation, or loss of water supplies), and the area’s susceptibility to adverse impacts resulting from an altered flow regime or change in sediment supply and/or sediment transport .		
<b>F.</b> A report that summarizes the findings of evaluation components A through E above, and that considers the project’s location, topography, soil and vegetation conditions, proportion of impervious surfaces, natural and infrastructure drainage features, and any other relevant hydrologic and environmental factors to be protected specific to the project’s watershed. The report must provide a determination of whether the project will adversely impact any downstream erosion, sedimentation or stream habitat, and identify any areas where adverse impacts are expected.		
<ul style="list-style-type: none"> <li>▪ Is the report required by 2.3, Part 3.f complete? (Attach the report) If not, perform the required evaluation and add to the report.</li> <li>▪ Does the report determine that the project will have an adverse downstream impact?</li> <li>▪ If yes, then go to Section 2.3, Part 4, below.</li> <li>▪ If no, then go to Section 3.</li> </ul>		

3. (from Section 2.3, Part 4): If the evaluation specified in (3) above, determines that adverse impacts to downstream erosion, sedimentation or stream habitat will occur, then the project proponent must perform the requirements specified in A, B, and C, below. Check the boxes "yes" or "no" to verify all requirements have been completed.	<b>YES</b>	<b>NO</b>
<b>A.</b> Conduct hydrologic modeling of the project and the potentially impacted areas, according to modeling standards recommended by the Agency or local watershed authority, for the 1-year, 2-year, and 5-year frequency storm events, at a minimum. Hydrologic modeling results must include determination of peak flow rate, flow velocity, runoff volume, time of concentration, and retention volume for the project area.		
<b>B.</b> Ensure that the project will be consistent with any approved master plans of drainage or analogous plans or programs.		
<b>C.</b> Implement Site Design BMPs as specified in Section 2.5.1, and recommend any additional BMPs that will be implemented to mitigate the adverse impacts identified in (3.F) above.		
<ul style="list-style-type: none"> <li>▪ Are the requirements for Section 2.3 Part 4 adequate? (Attach report/results)</li> <li>▪ Has the project proponent recommended BMPs to mitigate any impacts based on the modeling?</li> <li>▪ If yes, then list/describe BMPs:</li> <li>▪ If no, then explain how mitigation will be achieved:</li> <li>▪ Will the BMPs be effective?</li> <li>▪ Does the Agency have any additional requirements?</li> <li>▪ Verify with Agency before submitting the project WQMP.</li> </ul>		

### 2.3 WATERSHED IMPACT OF PROJECT

The project proponent must include in the project WQMP:

- An evaluation of the pollutants of concern and/or hydrologic conditions of concern associated with the project, and a determination of whether the project will cause any significant impact(s) to any downstream receiving waters, alone or in conjunction with other projects in the watershed.
- A description of how any adverse impacts will effectively be mitigated through the incorporation and implementation of BMPs.

## **SECTION 3 BEST MANAGEMENT PRACTICE SELECTION PROCESS**

### **3.1 SITE DESIGN BMPS**

For listed Site Design BMPs, indicate in the following table whether it will be used (yes/no) and describe how used, or, if not used, provide justification/alternative. Provide detailed descriptions of planned Site Design BMPs, if applicable.

<b>1. Minimize Stormwater Runoff, Minimize Project's Impervious Footprint, and Conserve Natural Areas</b>		
Maximize the permeable area. This can be achieved in various ways, including but not limited to, increasing building density (number of stories above or below ground) and developing land use regulations seeking to limit impervious surfaces.		
Yes	<input checked="" type="checkbox"/>	No
The proposed project is 76% impervious. All impervious areas will drain to the BMPs for water quality treatment. Site landscaping has been maximized.		
Runoff from developed areas may be reduced by using alternative materials or surfaces with a lower Coefficient of Runoff, or "C-Factor".		
Yes	<input checked="" type="checkbox"/>	No
All impervious areas drain to BMPs for water quality treatment. BMPs are located to maintain existing condition drainage patterns. Runoff from the site is through an earthen swale with a low runoff coefficient and maintains the same characteristics as existing conditions		
Conserve natural areas. This can be achieved by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition.		
Yes	<input checked="" type="checkbox"/>	No
BMPs and swales are located in the site's existing low points to maintain the sites natural conditions		
Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials.		
Yes	No	<input checked="" type="checkbox"/>
Permeable pavement is not utilized on this site. Water quality is being addressed with proprietary pre-treatment devices, vegetated swales, and infiltration basins.		

Construct streets, sidewalks, and parking lot aisles to the minimum widths necessary, provided that public safety and a pedestrian friendly environment are not compromised <sup>1</sup> . Incorporate landscaped buffer areas between sidewalks and streets.		
Yes	<input checked="" type="checkbox"/>	No
A large landscape buffer zone has been provided between the site and streets. Drive aisle widths are being kept to a minimum while meeting fire access requirements.		
Reduce widths of street where off-street parking is available <sup>2</sup> .		
Yes	<input type="checkbox"/>	No
<input checked="" type="checkbox"/>		
Streets adjacent to the site are existing and design is by others		
Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.		
Yes	<input checked="" type="checkbox"/>	No
Canopy interception is being maximized. Existing established trees south of the site are being preserved and additional native landscaping including trees and shrubs is being provided		

<sup>1</sup> Sidewalk widths must still comply with Americans with Disabilities Act regulations and other life safety requirements.

<sup>2</sup> However, street widths must still comply with life safety requirements for fire and emergency vehicle access.

Other comparable site design options that are equally effective.		
Describe actions taken _or justification/alternative:		
Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.		
Yes	<input checked="" type="checkbox"/>	No
The site provides a large landscape buffer with minimal impervious surfaces.		
Use natural drainage systems.		
Yes	<input checked="" type="checkbox"/>	No
BMPs and swales are located in the site's existing low points to maintain the sites natural conditions. Runoff from the site is through an earthen swale following the sites natural drainage pattern.		
Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration <sup>3</sup> .		
Yes	No	<input checked="" type="checkbox"/>
Gravel filtration pits are not being utilized on this site. Water quality treatment is being done using vegetated swales and infiltration basins.		
Construct onsite ponding areas, rain gardens, or retention facilities to increase opportunities for infiltration, while being cognizant of the need to prevent the development of vector breeding areas.		
Yes	<input checked="" type="checkbox"/>	No
Infiltration Basins are being utilized for water quality treatment on this site. Basin design is compliant with the 48 hour draw down requirement which deters vector breeding.		

<sup>3</sup>However, projects must still comply with hillside grading ordinances that limit or restrict infiltration of runoff. Infiltration areas may be subject to regulation as Class V injection wells and may require a report to the USEPA. Consult the Agency for more information on use of this type of facility.

<b>2. Minimize Directly Connected Impervious Areas</b>		
Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm drain.		
Yes	No	
Describe actions taken or justification/alternative:		
Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.		
Yes	<input checked="" type="checkbox"/>	No
Where applicable impervious areas are drained to adjacent landscaped areas		
Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.		
Yes	<input checked="" type="checkbox"/>	No
Where applicable earthen drainage swales are utilized in lieu of underground piping		
<b>Use one or more of the following:</b>		
<b>Yes</b>	<b>No</b>	<b>Design Feature</b>
	<input checked="" type="checkbox"/>	Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings
<input checked="" type="checkbox"/>		Urban curb/swale system; street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.
<input checked="" type="checkbox"/>		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to municipal storm drain systems.
<input checked="" type="checkbox"/>		Other comparable design concepts that are equally effective.
In locations where sheet flow to the vegetated swale or infiltration basins is not possible, flows are captured by catch basins then routed through the on-site storm drain system to a vortex separator before being directed to an infiltration basin.		

Use one or more of the following features for design of driveways and private residential parking areas:		
Yes	No	Design Feature
		<ul style="list-style-type: none"> <li>Design driveways with shared access, flared (single lane at street) or wheel strips (paving only under tires); or, drain into landscaping prior to discharging to the municipal storm drain system.</li> </ul>
		<ul style="list-style-type: none"> <li>Uncovered temporary or guest parking on private residential lots may be paved with a permeable surface; or designed to drain into landscaping prior to discharging to the municipal storm drain system.</li> </ul>
		<ul style="list-style-type: none"> <li>Other comparable design concepts that are equally effective.</li> </ul>
Describe actions taken_or justification/alternative:		

Use one or more of the following design concepts for the design of parking areas:		
Yes	No	Design Feature
X		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.
	X	Overflow parking (parking stalls provided in excess of the Agency's minimum parking requirements) may be constructed with permeable paving.
	X	Other comparable design concepts that are equally effective.
Describe actions taken_or justification/alternative:		

### 3.2 SOURCE CONTROL BMPS

Complete the following selection table for Source Control BMPs, by checking boxes that are applicable. All listed BMPs shall be implemented for the project. Where a required Source Control BMP is not applicable to the project due to project characteristics, justification and/or alternative practices for preventing pollutants must be provided. In addition to completing the following tables, provide detailed descriptions on the implementation of planned Source Control BMPs.

Source Control BMP Selection Matrix\*

Project Category	Source Control BMPs																									
	Education of Property Owners	Activity Restrictions	Spill Contingency Plan	Employee Training/Education Program	Street Sweeping Private Street and Parking Lots	Common Areas Catch Basin Inspection	Landscape Planning (SD-10)	Hillside Landscaping	Roof Runoff Controls (SD-11)	Efficient Irrigation (SD-12)	Protect Slopes and Channels	Storm Drain Signage (SD-13)	Inlet Trash Racks	Energy Dissipaters	Trash Storage Areas (SD-32) and Litter Control	Fueling Areas (SD-30)	Air/Water Supply Area Drainage	Maintenance Bays and Docks (SD-31)	Vehicle Washing Areas (SD-33)	Outdoor Material Storage Areas (SD-34)	Outdoor Work Areas (SD-35)	Outdoor Processing Areas (SD-36)	Wash Water Controls for Food Preparation Areas	Pervious Pavement (SD-20)	Alternative Building Materials (SD-21)	
Significant Re-development	X	X	X	X	X	X	X		X	X	X	X	X	X	X									X		
Home subdivisions of 10 or more units																										
Commercial/Industrial Development >100,000 ft <sup>2</sup>																										
Automotive Repair Shop																										
Restaurants	X	X	X	X																						
Hillside Development >10,000 ft <sup>2</sup>																								X		
Development of impervious surface >2,500 ft <sup>2</sup>																										
Parking Lots >5,000 ft <sup>2</sup> of exposed storm water	X	X	X	X	X	X	X		X	X	X	X	X	X	X											
* Provide justification of each Source Control BMP that will not be incorporated in the project WQMP, or explanation of proposed equally effective alternatives in the following table.																										

Justification for Source Control BMPs not incorporated into the project WQMP			
Source Control BMP	Used in Project (yes/no)?	Justification/Alternative*	Implementation Description
Education of Property Owners	YES		
Activity Restrictions	YES		
Spill Contingency Plan	YES		
Employee Training/Education Program	YES		
Street Sweeping Private Street and Parking Lots	YES		
Common Areas Catch Basin Inspection	YES		
Landscape Planning (SD-10)	YES		
Hillside Landscaping	NO	NO HILLSIDES WITHIN PROJECT LOCATION	
Roof Runoff Controls (SD-11)	YES		
Efficient Irrigation (SD-12)	YES		
Protect Slopes and Channels	YES		
Storm Drain Signage (SD-13)	YES		
Inlet Trash Racks	YES		
Energy Dissipaters	YES		
Trash Storage Areas (SD-32) and Litter Control	YES		
Fueling Areas (SD-30)	NO	NO FUELING AREAS WITIN PROJECT LOCATION	
Air/Water Supply Area Drainage	NO	NO AIR/WATER SUPPLY AREA WITHIN PROJECT LOCATION	
Maintenance Bays and Docks (SD-31)	NO	NO MAINTENANCE BAYS WITHIN PROJECT AREA	
Vehicle Washing Areas (SD-33)	NO	NO VEHICLE WASHING AREAS WITIN PROJECT AREA	
Outdoor Material Storage Areas (SD-34)	NO	NO OUTDOOR MATERIAL STORAGE AREAS WITHIN PROJECT AREA	
Outdoor Work Areas (SD-35)	NO	NO OUTDOOR WORK AREAS WITHIN PROJECT AREA	
Outdoor Processing Areas (SD-36)	NO	NO OUTDOOR PROCESSING AREAS WITHIN PROJECT AREA	
Wash Water Controls for Food Preparation Areas	YES		
Pervious Pavement (SD-20)	NO	NO PERVIOUS PAVEMENT UTILIZED ON THIS PROJECT	
Alternative Building Materials (SD-21)	NO	NO ALTERNATIVE MATERIALS UTILIZED ON THIS PROJECT	



### 3.3 TREATMENT CONTROL BMPS (Not required for Non-Category projects)

- Complete the following Treatment Control BMPs Selection Matrix. For each pollutant of concern enter “yes” if identified in Section 2.1, above, or “no” if not identified for the project. Check the boxes of selected BMPs that will be implemented for the project to address each pollutant of concern from the project as listed above in section 2.1. Treatment Control BMPs must be selected and installed with respect to identified pollutant characteristics and concentrations that will be discharged from the site. For any identified pollutants of concern not listed in the Treatment Control BMP Selection Matrix, provide an explanation of how they will be addressed by Treatment Control BMPs. For identified pollutants of concern that are causing an impairment in receiving waters (as identified in Section 2.1, above), the project WQMP shall incorporate one or more Treatment Control BMPs of medium or high effectiveness in reducing those pollutants. It is the responsibility of the project proponent to demonstrate, and document in the project WQMP, that all pollutants of concern will be fully addressed. The Agency may require information beyond the minimum requirements of this WQMP to demonstrate that adequate pollutant treatment is being accomplished.
- In addition to completing the Selection Matrix, provide detailed descriptions on the location, implementation, installation, and long-term O&M of planned Treatment Control BMPs.



**Treatment Control BMP Selection Matrix**

Pollutant of Concern	Treatment Control BMP Categories							
	Biofilters	Detention Basins <sup>(2)</sup>	Infiltration Basins <sup>(3)</sup>	Wet Ponds or Wetlands	Filtration	Water Quality Inlets	Hydrodynamic Separator Systems <sup>(4)</sup>	Manufactured/ Proprietary Devices
<b>Sediment/Turbidity</b>	H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Yes/No?			YES				YES	YES
<b>Nutrients</b>	L	M	H/M	H/M	L/M	L	L	U
Yes/No?			YES				YES	YES
<b>Organic Compounds</b>	U	U	U	U	H/M	L	L	U
Yes/No?			YES				YES	YES
<b>Trash &amp; Debris</b>	L	M	U	U	H/M	M	H/M	U
Yes/No?			YES				YES	YES
<b>Oxygen Demanding Substances</b>	L	M	H/M	H/M	H/M	L	L	U
Yes/No?			YES				YES	YES
<b>Bacteria &amp; Viruses</b>	U	U	H/M	U	H/M	L	L	U
Yes/No?			YES				YES	YES
<b>Oils &amp; Grease</b>	H/M	M	U	U	H/M	M	L/M	U
Yes/No?			YES				YES	YES
<b>Pesticides (non-soil bound)</b>	U	U	U	U	U	L	L	U
Yes/No?			YES				YES	YES
<b>Metals</b>	H/M	M	H	H	H	L	L	U
Yes/No?			YES				YES	YES

### 3.4 BMP DESIGN CRITERIA

- The following Treatment Control BMP(s) (Flow Based or Volume Based) will be implemented for this project (**check “Implemented” box, if used**):

***Design Basis of Treatment Control BMPs***

Implemented	Treatment Control BMP	Design Basis
	Vegetated Buffer Strips	Flow Based
√	Vegetated Swale	
	Multiple Systems	
√	Manufactured/Proprietary	Volume Based
	Bioretention	
	Wet Pond	
	Constructed Wetland	
	Extended Detention Basin	
	Water Quality Inlet	
	Retention/Irrigation	
√	Infiltration Basin	
	Infiltration Trench	
	Media Filter	
	Manufactured/Proprietary	

#### 3.4.1 Flow Based Design Criteria

- Calculate the BMP design flow by using the method described in Attachment D, Section A. Show calculations in detail—attach a separate sheet of calculations.

#### 3.4.2 Volume-Based Design Criteria

- Calculate the required capture volume of the BMP using the method described in Attachment D, Section B. Show calculations in detail—attach a separate sheet of calculations.

## **Section 4 Operation and Maintenance**

### **4.1 Operations and Maintenance**

Operation and maintenance (O&M) requirements for all Source Control, Site Design, and Treatment Control BMPs shall be identified within the WQMP. The WQMP shall include the following:

#### **4.1.1 O&M DESCRIPTION AND SCHEDULE THAT MUST:**

- List and identify each BMP that requires O&M.
- Provide a thorough description of O&M activities (include the O&M process, and the handling and placement of any wastes).
- Include BMP start-up dates.
- Provide a schedule of the frequency of O&M for each BMP.

#### **4.1.2 INSPECTION & MONITORING REQUIREMENTS THAT MUST:**

- Provide thorough descriptions of water quality monitoring (if locally required).
- Provide self-inspections and record keeping requirements for BMPs (review local specific requirements regarding self-inspections and/or annual reporting), including identification of responsible parties for inspection and record keeping.
- 

#### **4.1.3 IDENTIFICATION OF RESPONSIBLE PARTIES THAT MUST:**

- Provide the party or parties that will be responsible for each BMP O&M. For each responsible party, include the party's name, address, contact name and telephone number.

## **SECTION 5 FUNDING**

### **5.1 Funding**

The Permit requires that for all Treatment Control BMPs, a funding source or sources for operation and maintenance of each BMP be identified within the WQMP. Project proponents must:

- Indicate funding sources or sources for O&M for this project. For each funding source, include the responsible party's name, address, contact name and telephone number.

**SECTION 6**  
**WQMP Certification**

**6.1 Certification**

- The applicant is required to sign and certify that the WQMP is in conformance with Santa Ana Regional Water Quality Control Board Order Number R8-2002-0012 (NPDES Permit No. CAS618036).
- The applicant is required to sign and date the following statement ‘word-for-word’ certifying that the provisions of the WQMP have been accepted by the applicant and that the applicant will have the plan transferred to future successors (transferability statement). The certification must be signed by the property owner, unless a written designation by the owner allows a designee to sign on the owner’s behalf.

“This Water Quality Management Plan has been prepared for (Marinita Development Company & Lundin Development Company) by (TAIT and Associates). It is intended to comply with the requirements of the City of (Colton) for Tract/Parcel Map No. 0254-191-09 & 0254-191-11, Condition Number(s) \_\_\_\_\_ requiring the preparation of a Water Quality Management Plan (WQMP). The undersigned is aware that Best Management Practices (BMPs) are enforceable pursuant to the City’s/County’s Water Quality Ordinance No. \_\_\_\_\_. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County’s Municipal Stormwater Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity. “

“I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors.”

\_\_\_\_\_  
Applicant’s Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Applicant’s Name

\_\_\_\_\_  
Applicant’s Telephone Number

# Attachment A-1

## Maintenance Mechanisms

**A-1.1** The Agency shall not accept stormwater structural BMPs as meeting the WQMP requirements standard, unless an O&M Plan is prepared (see WQMP Section 2.6) and a mechanism is in place that will ensure ongoing long-term maintenance of all structural and non-structural BMPs. This mechanism can be provided by the Agency or by the project proponent. As part of project review, if a project proponent is required to include interim or permanent structural and non-structural BMPs in project plans, and if the Agency does not provide a mechanism for BMP maintenance, the Agency shall require that the applicant provide verification of maintenance requirements through such means as may be appropriate, at the discretion of the Agency, including, but not limited to covenants, legal agreements, maintenance agreements, conditional use permits and/or funding arrangements (OC 2003)

### **A-1.2 Maintenance Mechanisms**

1. **Public entity maintenance:** The Agency may approve a public or acceptable quasi-public entity (e.g., the County Flood Control District, or annex to an existing assessment district, an existing utility district, a state or federal resource agency, or a conservation conservancy) to assume responsibility for operation, maintenance, repair and replacement of the BMP. Unless otherwise acceptable to individual Agencies, public entity maintenance agreements shall ensure estimated costs are front-funded or reliably guaranteed, (e.g., through a trust fund, assessment district fees, bond, letter of credit or similar means). In addition, the Permittees may seek protection from liability by appropriate releases and indemnities.

The Agency shall have the authority to approve stormwater BMPs proposed for transfer to any other public entity within its jurisdiction before installation. The Permittee shall be involved in the negotiation of maintenance requirements with any other public entities accepting maintenance responsibilities within their respective jurisdictions; and in negotiations with the resource agencies responsible for issuing permits for the construction and/or maintenance of the facilities. The Agency must be identified as a third party beneficiary empowered to enforce any such maintenance agreement within their respective jurisdictions.

2. **Project proponent agreement to maintain stormwater BMPs:** The Agency may enter into a contract with the project proponent obliging the project proponent to maintain, repair and replace the stormwater BMP as necessary into perpetuity. Security or a funding mechanism with a “no sunset” clause may be required.
3. **Assessment districts:** The Agency may approve an Assessment District or other funding mechanism created by the project proponent to provide funds for stormwater

BMP maintenance, repair and replacement on an ongoing basis. Any agreement with such a District shall be subject to the Public Entity Maintenance Provisions above.

4. **Lease provisions:** In those cases where the Agency holds title to the land in question, and the land is being leased to another party for private or public use, the Agency may assure stormwater BMP maintenance, repair and replacement through conditions in the lease.
5. **Conditional use permits:** For discretionary projects only, the Agency may assure maintenance of stormwater BMPs through the inclusion of maintenance conditions in the conditional use permit. Security may be required.
6. **Alternative mechanisms:** The Agency may accept alternative maintenance mechanisms if such mechanisms are as protective as those listed above.

# Attachment A-2

## **Water Quality Management Plan and Stormwater BMP Transfer, Access and Maintenance Agreement (adapted from documents from the Ventura County Stormwater Management Program)**

Recorded at the request of:

City of Colton\_\_\_\_\_

After recording, return to:

City of Colton\_\_\_\_\_

City Clerk Carolina R. Padilla\_\_\_\_\_

### **Water Quality Management Plan and Stormwater BMP Transfer, Access and Maintenance Agreement**

**OWNER:** Marinita Development Company & Lundin Development Company\_\_\_\_\_

**PROPERTY ADDRESS:** 1595 W. Valley Blvd\_\_\_\_\_

Colton, CA 92324\_\_\_\_\_

**APN:** 0254-191-09 & 0254-191-11\_\_\_\_\_

**THIS AGREEMENT** is made and entered into in

\_\_\_\_\_, California, this \_\_\_\_\_ day of

\_\_\_\_\_, by and between

\_\_\_\_\_, herein after

referred to as "Owner" and the CITY OF Colton, a municipal corporation, located in the County of San Bernardino, State of California hereinafter referred to as "CITY";

**WHEREAS**, the Owner owns real property ("Property") in the City of

Colton, County of San Bernardino, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

**WHEREAS**, at the time of initial approval of development project known as

\_\_\_\_\_ within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff;

**WHEREAS**, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP", to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

**WHEREAS**, said WQMP has been certified by the Owner and reviewed and approved by the City;

**WHEREAS**, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement, therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

**WHEREAS**, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

**NOW THEREFORE**, it is mutually stipulated and agreed as follows:

1. Owner hereby provides the City of City's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works no advance notice, for the purpose of inspection, sampling, testing of the Device, and in case of emergency, to undertake all necessary repairs or other preventative measures at owner's expense as provided in paragraph 3 below. City shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2. Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.
3. In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.
4. The City may require the owner to post security in form and for a time period satisfactory to the city to guarantee the performance of the obligations state herein. Should the Owner fail to perform the obligations under the Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement. As an additional remedy, the Director may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as Owner repays to City its reasonable costs incurred in accordance with paragraph 3 above.
5. This agreement shall be recorded in the Office of the Recorder of San Bernardino County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.
6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.
7. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

8. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.
9. Time is of the essence in the performance of this Agreement.
10. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

**IF TO CITY:**

**IF TO OWNER:**

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**IN WITNESS THEREOF**, the parties hereto have affixed their signatures as of the date first written above.

**APPROVED AS TO FORM:**

**OWNER:**

\_\_\_\_\_  
City Attorney

\_\_\_\_\_  
Name

\_\_\_\_\_  
CITY OF

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

**OWNER:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

**ATTEST:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Date

**NOTARIES ON FOLLOWING PAGE**

**EXHIBIT A**  
**(Legal Description)**

**EXHIBIT B**  
**(Map/Illustration)**



**Location Map**  
 1595 W Valley Blvd  
 Colton, CA 92324

# **Attachment B Tables**

<b>Table B-1 303(d) List of Impaired Water Bodies</b>						
<b>Waterbody</b>	<b>Pollutant</b>					
	<b>Bacteria Indicators/ Pathogens</b>	<b>Metals</b>	<b>Nutrients</b>	<b>Organic Enrichment</b>	<b>Sedimentation/Siltation</b>	<b>Suspended Solids</b>
Big Bear Lake		X	X		X	
Canyon Lake (Railroad Canyon Reservoir)	X		X			
Chino Creek Reach 1	X		X			
Chino Creek Reach 2	X					
Cucamonga Creek, Valley Reach	X					
Grout Creek		X	X			
Knickerbocker Creek	X	X				
Lytle Creek	X					
Mill Creek (Prado Area)	X		X			X
Mill Creek Reach 1	X					
Mill Creek Reach 2	X					
Mountain Home Creek	X					
Mountain Home Creek, East Fork	X					
Prado Park Lake	X		X			
Rathbone (Rathbun Creek)			X		X	
Santa Ana River, Reach 3	X					
Santa Ana River, Reach 4	X					
Summit Creek			X			
<b>NOTES:</b>						
1) Summary of the 2002 303(d) Listed Water Bodies and Associated Pollutants of Concern from RWQCB Region 8. Check for updated lists from the RWQCB.						
2) Chlorides, pesticides, salinity, total dissolved solids (TDS), toxicity, and trash are listed impairments within the 303(d) table, however, they are not impairments in the above waterbodies.						

<b>Table B-2</b> <b>C Values Based on Impervious/Pervious Area Ratios</b>		
% Impervious	% Pervious	C
0	100	0.15
5	95	0.19
10	90	0.23
15	85	0.26
20	80	0.30
25	75	0.34
30	70	0.38
35	65	0.41
40	60	0.45
45	55	0.49
50	50	0.53
55	45	0.56
60	40	0.60
65	35	0.64
70	30	0.68
75	25	0.71
80	20	0.75
85	15	0.79
90	10	0.83
95	5	0.86
100	0	0.90

**NOTE:**

Obtain individual runoff coefficient C-Factors from the local agency or from the local flood control district.

If C-Factors are not available locally, obtain factors from hydrology text books or estimate using this table.

Composite the individual C-Factors using area-weighted averages to calculate the Composite C Factor for the area draining to a treatment control BMP.

Do not use the C-Factors in this table for flood control design or related work.

# **Attachment C Pollutants of Concern**

### **Pollutants of Concern**

- **Bacteria and Viruses** – Bacteria and Viruses are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses, can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.
- **Metals** – The primary source of metal pollution in stormwater is typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. Metals are also raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. At low concentrations naturally occurring in soil, metals may not be toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications (OC 2003).
- **Nutrients** – Nutrients are inorganic substances, such as nitrogen and phosphorus. Excessive discharge of nutrients to water bodies and streams causes eutrophication, where aquatic plants and algae growth can lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms. Primary sources of nutrients in urban runoff are fertilizers and eroded soils.
- **Pesticides** -- Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Relatively low levels of the active component of pesticides can result in conditions of aquatic toxicity. Excessive or improper application of a pesticide may result in runoff containing toxic levels of its active ingredient (OC 2003).
- **Organic Compounds** – Organic compounds are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life (OC 2003).
- **Sediments** – Sediments are solid materials that are eroded from the land surface. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.
- **Trash and Debris** – Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash and debris may

have a significant impact on the recreational value of a water body and aquatic habitat. Trash impacts water quality by increasing biochemical oxygen demand.

- *Oxygen-Demanding Substances* – This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds. Compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions. A reduction of dissolved oxygen is detrimental to aquatic life and can generate hazardous compounds such as hydrogen sulfides.
- *Oil and Grease* – Oil and grease in water bodies decreases the aesthetic value of the water body, as well as the water quality. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids.



## WQMP Project Report

### County of San Bernardino Stormwater Program

Santa Ana River Watershed Geodatabase

Wednesday, August 30, 2017

Note: The information provided in this report and on the Stormwater Geodatabase for the County of San Bernardino Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

<b>Project Site Parcel Number(s):</b>	025419111, 025419109
<b>Project Site Acreage:</b>	2.972
<b>HCOC Exempt Area:</b>	Yes. Verify that the project is completely within the HCOC exemption area.
<b>Closest Receiving Waters:</b>	<b>System Number</b> - 114
<small>(Applicant to verify based on local drainage facilities and topography.)</small>	<b>Facility Name</b> - Randall Storm Drain (Project 3-5)
	<b>Owner</b> - OTHERS
<b>Closest channel segment's susceptibility to Hydromodification:</b>	EHM
<b>Highest downstream hydromodification susceptibility:</b>	High
<b>Is this drainage segment subject to TMDLs?</b>	No
<b>Are there downstream drainage segments subject to TMDLs?</b>	No
<b>Is this drainage segment a 303d listed stream?</b>	No
<b>Are there 303d listed streams downstream?</b>	Yes
<b>Are there unlined downstream waterbodies?</b>	No
<b>Project Site Onsite Soil Group(s):</b>	A
<b>Environmentally Sensitive Areas within 200':</b>	DELHI SANDS
<b>Groundwater Depth (FT):</b>	-224
<b>Parcels with potential septic tanks within 1000':</b>	No
<b>Known Groundwater Contamination Plumes within 1000':</b>	Yes
<b>Studies and Reports Related to Project Site:</b>	<a href="#">Cactus Basin</a> <a href="#">CSDP 3-5 Area Drainage Plan</a> <a href="#">CSDP 3-5 Engineers Report</a> <a href="#">CSDP 3 CALC SHEET FOR HYDRO</a> <a href="#">Upper Lytle Creek Drainage Investigation</a> <a href="#">SBVMWD High Groundwater / Pressure Zone Area</a>

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## Impaired Water Bodies

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Listing a water body as impaired in California is governed by the [Water Quality Control Policy for developing California's Clean Water Act Section 303 \(d\) Listing Policy](#). The State and Regional Water Boards assess water quality data for California's waters every two years to determine if they contain pollutants at levels that exceed protective water quality criteria and standards. This biennial assessment is required under Section 303(d) of the [Federal Clean Water Act](#).

· [Fact Sheet](#) - "2010 Integrated Report on Water Quality with Web-Based Interactive Map," April 2010

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- 303(d) List
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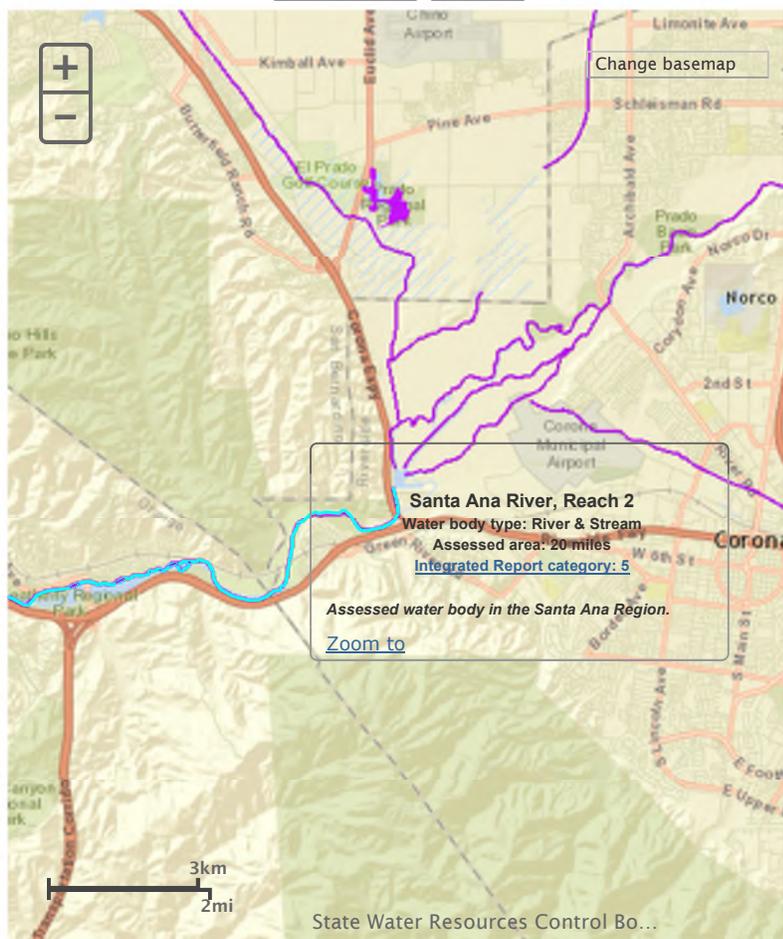
Zoom to county:  Zoom to Regional Board:

Show county  Show Regional Board

Map Help

Zoom to water body: (Filter: All)

Filter list by:  Reset list



Santa Ana River, Reach 2	
Pollutant assessments	
<input checked="" type="radio"/> Show all assessed waters	
<input type="radio"/> Show only impaired ("303(d) listed") waters	
<b>Pollutants</b>	<b>Listing Decision</b>
<b>Show water bodies by pollutant:</b>	<b>Report Link</b>
<b>Pollutant category:</b>	<b>Potential Sources</b>
All	<b>Schedule</b>
All	<b>Comments</b>
Alachlor   Atrazine	Do Not List on 303
Azinphos-methyl	(d) list (TMDL
(Guthion)   Carbaryl	required list)
Carbofuran	
Chlorpyrifos   DDE	25228
Dichlorodiphenyldic	
chloroethylene)	
Diazinon   Dieldrin	n/a
Disulfoton	
Malathion   Methyl	
Parathion   Molinate	
Simazine	
Thiobencarb/Bolero	
Cadmium	Do Not List on 303
	(d) list (TMDL
	required list)
	30317
	n/a
Copper	Do Not List on 303
	(d) list (TMDL
	required list)
	29691
	n/a
Indicator Bacteria	List on 303(d) list
	(TMDL required list)
	29936
	n/a

This Webinar walks the user through the Integrated Report and its geospatial information system.

- Geographical Information Systems (GIS) Files  
 Update 12/23/11: The information presented on this map reflects the final USEPA-approved 2010 303(d) list. If you have any questions regarding the Integrated Report data and information, please email [Lisa Holmes](mailto:Lisa.Holmes@waterboards.ca.gov) or call 916-341-5557. For any GIS-related questions, please email [Stephanie Bucknam](mailto:Stephanie.Bucknam@waterboards.ca.gov) or call 916-558-1708.

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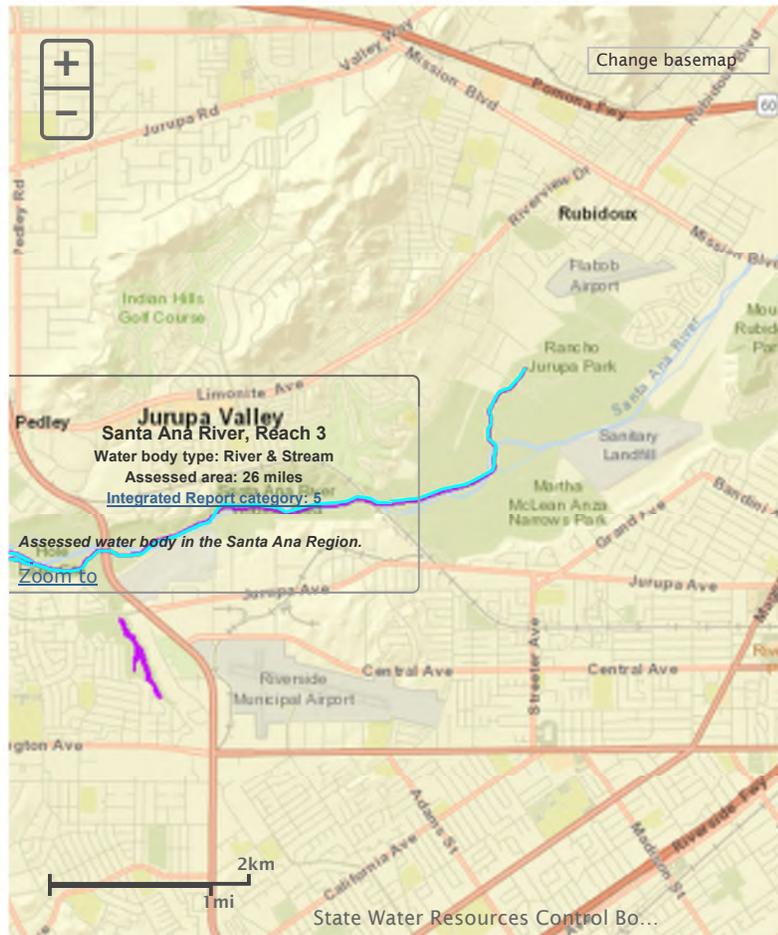
Zoom to county:  Zoom to Regional Board:

Show county  Show Regional Board

Map Help

Zoom to water body: (Filter: All)

Filter list by:  Reset list



Santa Ana River, Reach 3		Close
Pollutant assessments		
<input checked="" type="radio"/> Show all assessed waters <input type="radio"/> Show only impaired ("303(d) listed") waters		
	Listing Decision	Report Link
Pollutants	Potential Sources	
Show water bodies by	pollutant:	Schedule
Pollutant category:	Comments	
All	Do Not List on 303 (d) list (TMDL required list)	
All	Alachlor   Atrazine   Azinphos-methyl (Guthion)   Carbaryl   Chlorpyrifos   Dieldrin   Disulfoton   Methyl Parathion   Simazine	25466
All		n/a
Reset filters		
Aluminum	Do Not List on 303 (d) list (TMDL required list)	
	28649	n/a
Arsenic	Do Not List on 303 (d) list (TMDL required list)	
	25422	n/a
Cadmium	Do Not List on 303 (d) list (TMDL required list)	
	30427	n/a
	Do Not List on 303	

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Geographical Information Systems (GIS) Files

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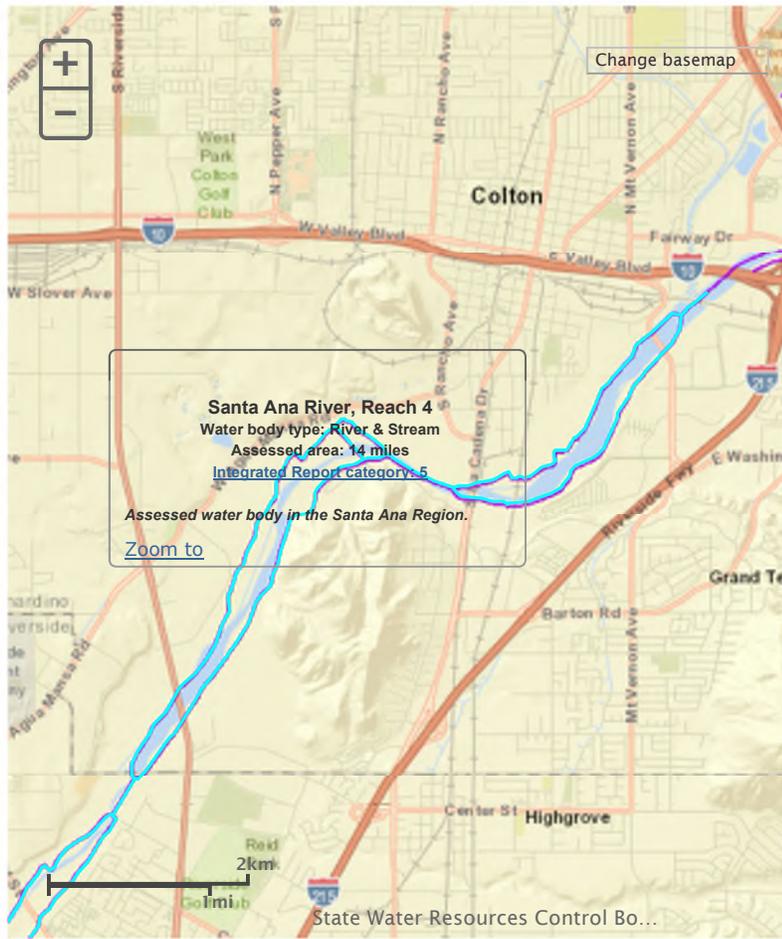
Zoom to county:  Zoom to Regional Board:

Show county  Show Regional Board

Zoom to water body: (Filter: All)

Filter list by:  Reset list

[Map Help](#)



**Santa Ana River, Reach 4**  
 Water body type: River & Stream  
 Assessed area: 14 miles  
 Integrated Report category: 5  
 Assessed water body in the Santa Ana Region.  
[Zoom to](#)

**Santa Ana River, Reach 4** [Close](#)

**Pollutant assessments**

Show all assessed waters  
 Show only impaired ("303(d) listed") waters

Pollutants	Potential Sources
Show water bodies by pollutant:	Schedule
Pollutant category:	Comments
All	List on 303(d) list (TMDL required list)
All	20514
Pollutogens	n/a
All	Est. TMDL completion: 2019

[Reset filters](#)

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# **Attachment D Flow- and Volume-Based BMP Design Calculations**

## INSTRUCTIONS FOR ESTIMATING VOLUME- AND FLOW-BASED BMP DESIGN RUNOFF QUANTITIES<sup>4</sup>

- 1) Identify the “BMP Drainage Area” that drains to the proposed BMP element. This includes all areas that will drain to the proposed BMP element, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP element. Calculate the BMP Drainage Area (A) in acres.
- 2) Outline the Drainage Area on the NOAA Atlas 14 Precipitation Depths (2-year 1-hour Rainfall) map (Figure D-1).
- 3) Determine the area-averaged 2-year 1-hour rainfall value for the Drainage Area outlined above.

### A. Flow-Based BMP Design

- 1) Calculate the composite runoff coefficient,  $C_{BMP}$ , as defined in part A.2, above.
- 2) Determine which Region the BMP Drainage Area is located in (Valley, Mountain or Desert).
- 3) Determine BMP design rainfall intensity,  $I_{BMP}$ , by multiplying the area-averaged 2-year 1-hour value from the NOAA Atlas 14 map by the appropriate regression coefficient from Table D-1 (“I”), and then multiplying by the safety factor specified in the criteria – usually a factor of 2.

---

<sup>4</sup> Rainfall analysis to develop regression coefficients in Table D-1 and modifications to the NOAA Atlas 14 map were conducted by:

Hromadka II, T.V., Professor Emeritus, Department of Mathematics, California State University, Fullerton, and Adjunct Professor, Department of Mathematical Sciences, United States Military Academy, West Point, NY

Laton, W.R., Assistant Professor, Department of Geological Sciences, California State University, Fullerton

Picciuto J.A., Assistant Professor, Department of Mathematical Sciences, United States Military Academy, West Point, NY

With assistance from:

Rene Perez, M.S. Candidate, Department of Geological Sciences, California State University, Fullerton, and

Jim Friel, Ph.D. Professor Emeritus, Department of Mathematics, California State University, Fullerton

Reported as follows:

1. Hromadka II, T.V., Laton, W.R., and Picciuto J.A., 2005. Estimating Runoff Quantities for Flow and Volume-based BMP Design. Final Report to the San Bernardino County Flood Control District.
2. Laton, W.R., Hromadka II, T.V., and Picciuto J.A., 2005. Estimating Runoff Quantities for Flow and Volume-based BMP Design (submitted). Journal of the American Water Resources Association.

4) Calculate the target BMP flow rate, Q, by using the following formula (see Table D-2 below for limitations on the use of this formula):

$$Q = C_{BMP} \cdot I_{BMP} \cdot A$$

where:      Q = flow in ft<sup>3</sup>/s  
               I<sub>BMP</sub> = BMP design rainfall intensity, in inches/hour  
               A = Drainage Area in acres  
               C<sub>BMP</sub> = composite runoff coefficient

**Table D-1:** Regression Coefficients for Intensity (I) and 6-hour mean storm rainfall (P<sub>6</sub>).

Quantity	Valley 85% upper confidence limit	Mountain 85% upper confidence limit	Desert 85% upper confidence limit
I	0.2787	0.3614	0.3250
P <sub>6</sub>	1.4807	1.9090	1.2371

**Table D-2:** Use of the flow-based formula for BMP Design (CASQA 2003).

	Composite Runoff Coefficient, "C"			
BMP Drainage Area (Acres)	0.00 to 0.25	0.26 to 0.50	0.51 to 0.75	0.76 to 1.00
0 to 25	Caution	Yes	Yes	Yes
26 to 50	High Caution	Caution	Yes	Yes
51 to 75	Not Recommended	High Caution	Caution	Yes
76 to 100	Not Recommended	High Caution	Caution	Yes

If the flow-based BMP formula use case, as determined by Table D-2, shows "Caution," "High Caution," or "Not Recommended," considering the project's characteristics, then the project proponent must calculate the BMP design flow using the unit hydrograph method, as specified in the most current version of the San Bernardino County Hydrology Manual, using the design storm pattern with rainfall return frequency such that the peak one hour rainfall depth equals the 85th-percentile 1-hour rainfall multiplied by two.

## B. Volume-Based BMP Design

- 1) Calculate the “Watershed Imperviousness Ratio”,  $i$ , which is equal to the percent of impervious area in the BMP Drainage Area divided by 100.
- 2) Calculate the composite runoff coefficient  $C_{BMP}$  for the Drainage Area above using the following equation:

$$C_{BMP} = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

where:  $C_{BMP}$  = composite runoff coefficient; and,  
 $i$  = watershed imperviousness ratio.

- 3) Determine which Region the Drainage Area is located in (Valley, Mountain or Desert).
- 4) Determine the area-averaged “6-hour Mean Storm Rainfall”,  $P_6$ , for the Drainage Area. This is calculated by multiplying the area averaged 2-year 1-hour value by the appropriate regression coefficient from Table 1.
- 5) Determine the appropriate drawdown time. Use the regression constant  $a = 1.582$  for 24 hours and  $a = 1.963$  for 48 hours. *Note: Regression constants are provided for both 24 hour and 48 hour drawdown times; however, 48 hour drawdown times should be used in most areas of California. Drawdown times in excess of 48 hours should be used with caution as vector breeding can be a problem after water has stood in excess of 72 hours. (Use of the 24 hour drawdown time should be limited to drainage areas with coarse soils that readily settle and to watersheds where warming may be detrimental to downstream fisheries.)*
- 6) Calculate the “Maximized Detention Volume”,  $P_0$ , using the following equation:

$$P_0 = a \cdot C_{BMP} \cdot P_6$$

where:  $P_0$  = Maximized Detention Volume, in inches  
 $a = 1.582$  for 24 hour and  $a = 1.963$  for 48 hour drawdown,  
 $C_{BMP}$  = composite runoff coefficient; and,  
 $P_6$  = 6-hour Mean Storm Rainfall, in inches

- 7) Calculate the “Target Capture Volume”,  $V_0$ , using the following equation:

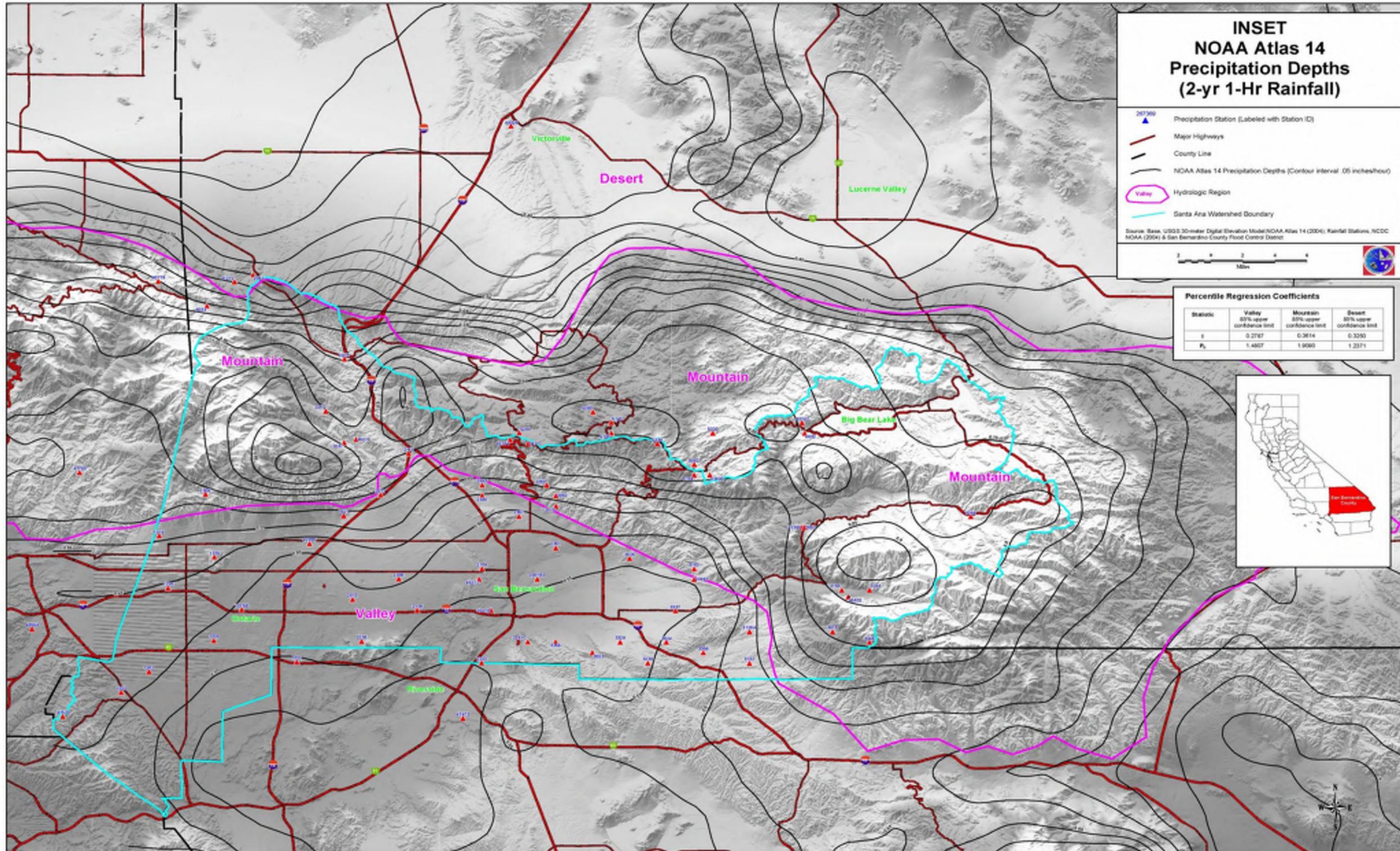
$$V_0 = (P_0 \cdot A) / 12$$

where:

$V_0$  = Target Capture Volume, in acre-feet  
 $P_0$  = Maximized Detention Volume, in inches; and,  
 $A$  = BMP Drainage Area, in acres



Figure D-1: NOAA Atlas 14 Inset Map.







**NOAA Atlas 14, Volume 6, Version 2**  
**Location name: Colton, California, USA\***  
**Latitude: 34.0707°, Longitude: -117.352°**  
**Elevation: 1066.89 ft\*\***  
 \* source: ESRI Maps  
 \*\* source: USGS



**POINT PRECIPITATION FREQUENCY ESTIMATES**

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

NOAA, National Weather Service, Silver Spring, Maryland

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

**PF tabular**

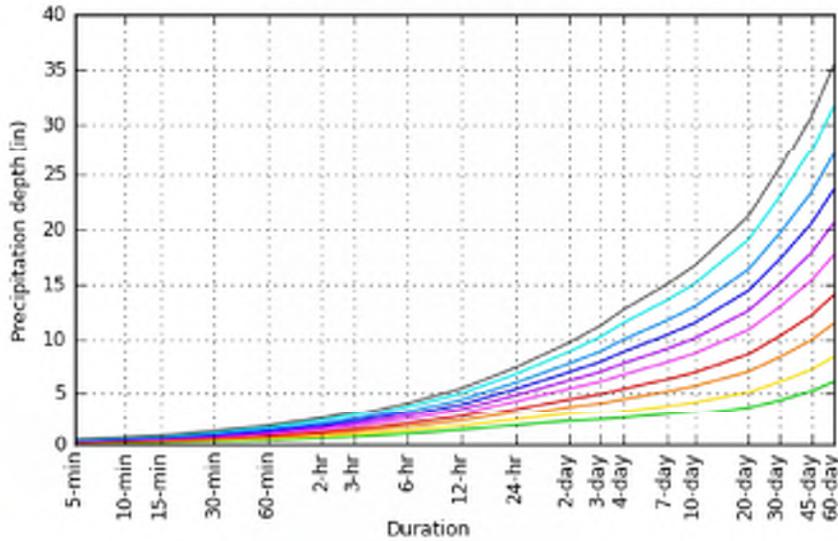
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
<b>5-min</b>	<b>0.110</b> (0.092-0.134)	<b>0.142</b> (0.118-0.173)	<b>0.185</b> (0.153-0.225)	<b>0.220</b> (0.181-0.270)	<b>0.268</b> (0.213-0.341)	<b>0.306</b> (0.238-0.398)	<b>0.345</b> (0.262-0.460)	<b>0.386</b> (0.284-0.529)	<b>0.442</b> (0.312-0.632)	<b>0.486</b> (0.331-0.721)
<b>10-min</b>	<b>0.158</b> (0.132-0.192)	<b>0.204</b> (0.170-0.248)	<b>0.265</b> (0.220-0.323)	<b>0.316</b> (0.260-0.388)	<b>0.385</b> (0.306-0.489)	<b>0.439</b> (0.341-0.570)	<b>0.495</b> (0.375-0.659)	<b>0.553</b> (0.407-0.758)	<b>0.633</b> (0.447-0.906)	<b>0.697</b> (0.475-1.03)
<b>15-min</b>	<b>0.191</b> (0.159-0.232)	<b>0.247</b> (0.205-0.300)	<b>0.321</b> (0.266-0.390)	<b>0.382</b> (0.314-0.469)	<b>0.465</b> (0.370-0.592)	<b>0.531</b> (0.413-0.689)	<b>0.598</b> (0.454-0.797)	<b>0.669</b> (0.493-0.917)	<b>0.766</b> (0.541-1.10)	<b>0.843</b> (0.574-1.25)
<b>30-min</b>	<b>0.284</b> (0.236-0.344)	<b>0.366</b> (0.305-0.445)	<b>0.476</b> (0.395-0.580)	<b>0.567</b> (0.466-0.696)	<b>0.691</b> (0.549-0.878)	<b>0.788</b> (0.613-1.02)	<b>0.888</b> (0.673-1.18)	<b>0.993</b> (0.731-1.36)	<b>1.14</b> (0.803-1.63)	<b>1.25</b> (0.853-1.86)
<b>60-min</b>	<b>0.404</b> (0.337-0.490)	<b>0.522</b> (0.435-0.634)	<b>0.679</b> (0.563-0.826)	<b>0.808</b> (0.664-0.992)	<b>0.985</b> (0.783-1.25)	<b>1.12</b> (0.874-1.46)	<b>1.27</b> (0.960-1.69)	<b>1.42</b> (1.04-1.94)	<b>1.62</b> (1.14-2.32)	<b>1.78</b> (1.22-2.65)
<b>2-hr</b>	<b>0.583</b> (0.486-0.707)	<b>0.747</b> (0.622-0.908)	<b>0.964</b> (0.800-1.17)	<b>1.14</b> (0.940-1.40)	<b>1.39</b> (1.10-1.76)	<b>1.57</b> (1.22-2.05)	<b>1.77</b> (1.34-2.35)	<b>1.97</b> (1.45-2.70)	<b>2.25</b> (1.59-3.21)	<b>2.46</b> (1.68-3.65)
<b>3-hr</b>	<b>0.722</b> (0.601-0.875)	<b>0.923</b> (0.768-1.12)	<b>1.19</b> (0.986-1.45)	<b>1.41</b> (1.16-1.73)	<b>1.70</b> (1.35-2.16)	<b>1.93</b> (1.50-2.51)	<b>2.16</b> (1.64-2.88)	<b>2.40</b> (1.77-3.30)	<b>2.74</b> (1.93-3.92)	<b>3.00</b> (2.04-4.45)
<b>6-hr</b>	<b>1.01</b> (0.841-1.23)	<b>1.29</b> (1.07-1.57)	<b>1.66</b> (1.38-2.02)	<b>1.96</b> (1.61-2.40)	<b>2.37</b> (1.88-3.01)	<b>2.68</b> (2.08-3.48)	<b>3.00</b> (2.27-3.99)	<b>3.33</b> (2.45-4.56)	<b>3.78</b> (2.67-5.40)	<b>4.13</b> (2.81-6.12)
<b>12-hr</b>	<b>1.35</b> (1.12-1.64)	<b>1.73</b> (1.44-2.10)	<b>2.22</b> (1.85-2.71)	<b>2.63</b> (2.16-3.22)	<b>3.17</b> (2.52-4.03)	<b>3.58</b> (2.79-4.65)	<b>4.00</b> (3.04-5.33)	<b>4.44</b> (3.27-6.08)	<b>5.02</b> (3.55-7.19)	<b>5.48</b> (3.73-8.12)
<b>24-hr</b>	<b>1.80</b> (1.59-2.07)	<b>2.32</b> (2.05-2.68)	<b>3.00</b> (2.65-3.47)	<b>3.55</b> (3.10-4.14)	<b>4.29</b> (3.63-5.16)	<b>4.85</b> (4.02-5.96)	<b>5.42</b> (4.39-6.82)	<b>6.00</b> (4.73-7.77)	<b>6.78</b> (5.13-9.15)	<b>7.39</b> (5.41-10.3)
<b>2-day</b>	<b>2.18</b> (1.93-2.52)	<b>2.86</b> (2.53-3.30)	<b>3.75</b> (3.31-4.34)	<b>4.47</b> (3.92-5.22)	<b>5.46</b> (4.62-6.58)	<b>6.21</b> (5.16-7.64)	<b>6.98</b> (5.65-8.79)	<b>7.77</b> (6.12-10.1)	<b>8.84</b> (6.69-11.9)	<b>9.68</b> (7.08-13.5)
<b>3-day</b>	<b>2.32</b> (2.05-2.67)	<b>3.09</b> (2.74-3.57)	<b>4.12</b> (3.63-4.76)	<b>4.96</b> (4.34-5.78)	<b>6.11</b> (5.18-7.37)	<b>7.01</b> (5.82-8.62)	<b>7.93</b> (6.43-9.99)	<b>8.89</b> (7.01-11.5)	<b>10.2</b> (7.73-13.8)	<b>11.2</b> (8.23-15.7)
<b>4-day</b>	<b>2.48</b> (2.19-2.86)	<b>3.34</b> (2.95-3.86)	<b>4.49</b> (3.96-5.19)	<b>5.43</b> (4.75-6.34)	<b>6.74</b> (5.71-8.13)	<b>7.77</b> (6.45-9.56)	<b>8.83</b> (7.15-11.1)	<b>9.94</b> (7.83-12.9)	<b>11.5</b> (8.68-15.5)	<b>12.7</b> (9.27-17.7)
<b>7-day</b>	<b>2.82</b> (2.50-3.25)	<b>3.84</b> (3.39-4.43)	<b>5.19</b> (4.58-6.01)	<b>6.31</b> (5.52-7.37)	<b>7.87</b> (6.67-9.49)	<b>9.10</b> (7.55-11.2)	<b>10.4</b> (8.39-13.1)	<b>11.7</b> (9.21-15.1)	<b>13.5</b> (10.2-18.2)	<b>15.0</b> (11.0-20.9)
<b>10-day</b>	<b>3.06</b> (2.71-3.52)	<b>4.18</b> (3.70-4.83)	<b>5.69</b> (5.02-6.59)	<b>6.94</b> (6.08-8.10)	<b>8.68</b> (7.35-10.5)	<b>10.1</b> (8.34-12.4)	<b>11.5</b> (9.29-14.5)	<b>13.0</b> (10.2-16.8)	<b>15.0</b> (11.4-20.3)	<b>16.7</b> (12.2-23.3)
<b>20-day</b>	<b>3.71</b> (3.28-4.27)	<b>5.12</b> (4.53-5.91)	<b>7.03</b> (6.20-8.13)	<b>8.61</b> (7.54-10.0)	<b>10.8</b> (9.17-13.1)	<b>12.6</b> (10.4-15.5)	<b>14.4</b> (11.7-18.2)	<b>16.4</b> (12.9-21.2)	<b>19.1</b> (14.4-25.7)	<b>21.2</b> (15.5-29.6)
<b>30-day</b>	<b>4.40</b> (3.89-5.07)	<b>6.09</b> (5.38-7.03)	<b>8.37</b> (7.38-9.68)	<b>10.3</b> (8.99-12.0)	<b>13.0</b> (11.0-15.6)	<b>15.1</b> (12.5-18.6)	<b>17.3</b> (14.0-21.8)	<b>19.7</b> (15.5-25.5)	<b>23.0</b> (17.4-31.0)	<b>25.7</b> (18.8-35.8)
<b>45-day</b>	<b>5.23</b> (4.63-6.03)	<b>7.22</b> (6.38-8.33)	<b>9.91</b> (8.74-11.5)	<b>12.2</b> (10.6-14.2)	<b>15.4</b> (13.0-18.5)	<b>17.9</b> (14.8-22.0)	<b>20.6</b> (16.7-25.9)	<b>23.4</b> (18.4-30.3)	<b>27.4</b> (20.8-37.0)	<b>30.7</b> (22.4-42.8)
<b>60-day</b>	<b>6.10</b> (5.40-7.04)	<b>8.37</b> (7.40-9.65)	<b>11.4</b> (10.1-13.2)	<b>14.0</b> (12.3-16.4)	<b>17.7</b> (15.0-21.3)	<b>20.6</b> (17.1-25.3)	<b>23.7</b> (19.2-29.8)	<b>26.9</b> (21.2-34.9)	<b>31.6</b> (23.9-42.6)	<b>35.4</b> (25.9-49.3)

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

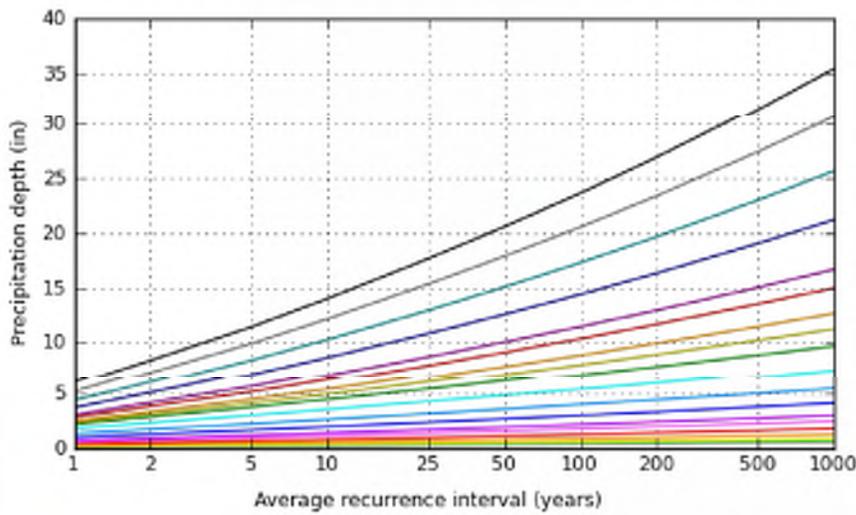
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### PF graphical

PDS-based depth-duration-frequency (DDF) curves  
 Latitude: 34.0707°, Longitude: -117.3520°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



Duration
5-min
10-min
15-min
30-min
60-min
2-hr
3-hr
6-hr
12-hr
24-hr
2-day
3-day
4-day
7-day
10-day
20-day
30-day
45-day
60-day

### Maps & aeri

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

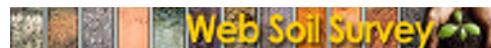


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AOI Information

Name

Map Unit Symbols
Use Soil Survey Area Map Unit Symbols
Use National Map Unit Symbols

Area (acres) 3.70

Soil Data Available from Web Soil Survey

San Bernardino County Southwestern Part, California (CA677)

Data Availability Tabular and Spatial, complete
Tabular Data Version 8, Sep 30, 2016
Spatial Data Version 3, Sep 30, 2016

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Show location marker [checked]

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State and County

Soil Survey Area

Latitude and Longitude

PLSS (Section, Township, Range)

Bureau of Land Management

Department of Defense

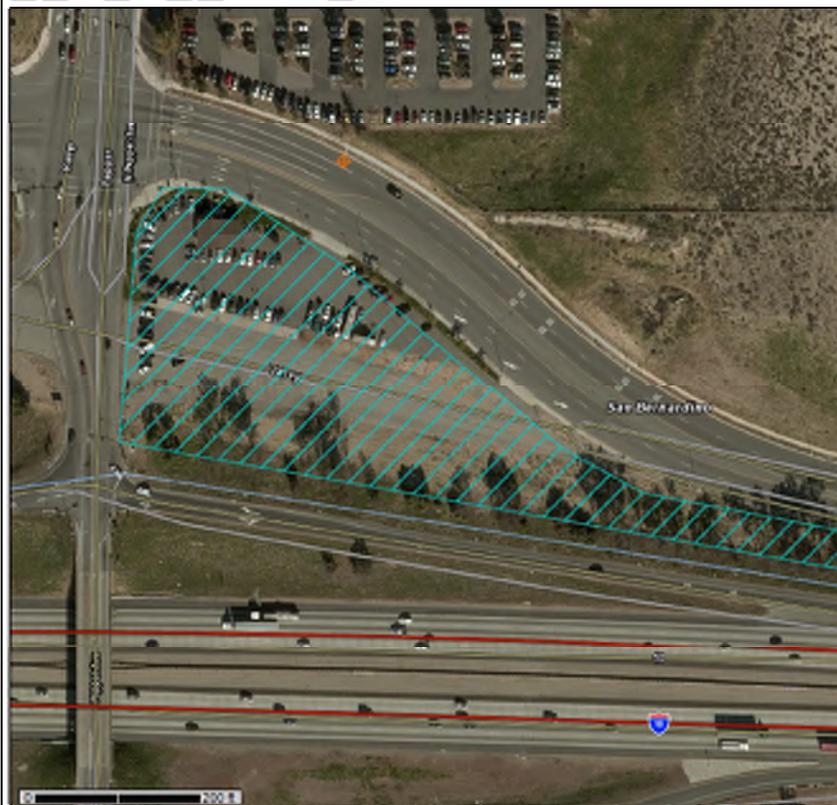
Forest Service

National Park Service

Hydrologic Unit

Area of Interest Interactive Map

View Extent Contiguous U.S. Scale



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## San Bernardino County Southwestern Part, California

### Db—Delhi fine sand

#### Map Unit Setting

*National map unit symbol:* hcjq  
*Elevation:* 30 to 1,400 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Mean annual air temperature:* 59 to 64 degrees F  
*Frost-free period:* 225 to 310 days  
*Farmland classification:* Prime farmland if irrigated

#### Map Unit Composition

*Delhi and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Delhi

##### Setting

*Landform:* Alluvial fans  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Sandy alluvium derived from granite

##### Typical profile

*H1 - 0 to 18 inches:* fine sand  
*H2 - 18 to 60 inches:* sand

##### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Somewhat excessively drained  
*Runoff class:* Negligible  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 4.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 3e  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Unnamed

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

#### Tujunga, loamy sand

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Unnamed

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: San Bernardino County Southwestern Part, California

Survey Area Data: Version 8, Sep 30, 2016



DMA	Land Use	Impervious %	DA (ft <sup>2</sup> )	DA (ac)	Impervious Area: Total
-----	----------	--------------	-----------------------	---------	------------------------

DCV Calculations
------------------

Biotreated Volume	
Bottom SA (ac)	0.06
Bottom SA (ft <sup>2</sup> )	2613.6
Percolation P <sub>design</sub> (in/hr)	3
T <sub>drawdown</sub> (hr)	48
T <sub>fill</sub> (hr)	3
d <sub>ponded</sub> (ft)	0.5
d <sub>soil</sub> (ft)	3
d <sub>gravel</sub> (ft)	2
Porosity (n <sub>amended soil</sub> )	0.25
Porosity (n <sub>gravel</sub> )	0.33
V <sub>biotreated</sub> (ac-ft)	0.14

201.6

DMA	Land Use	Impervious %	DA (ft <sup>2</sup> )	DA (ac)	Impervious Area: Total
-----	----------	--------------	-----------------------	---------	------------------------

DCV Calculations	
------------------	--

Flow into Basin (Figure 5-2 TGD)	
% of LID BMP Volume (cfs/impervious acre)	100
Impervious Area (ac)	0.138
Flow Capacity (cfs)	1.09

Infiltration Basin	
Bottom SA (ac)	0.02
Bottom SA (ft <sup>2</sup> )	871.2
Percolation P <sub>design</sub> (in/hr)	4.2
T <sub>drawdown</sub> (hr)	48
T <sub>fill</sub> (hr)	3
d <sub>ponded</sub> (ft)	18



DMA	Land Use	Impervious %	DA (ft <sup>2</sup> )	DA (ac)	Impervious Area: Total
-----	----------	--------------	-----------------------	---------	------------------------

DCV Calculations
------------------

Biotreated Volume	
Bottom SA (ac)	0.06
Bottom SA (ft <sup>2</sup> )	2613.6
Percolation P <sub>design</sub> (in/hr)	3
T <sub>drawdown</sub> (hr)	48
T <sub>fill</sub> (hr)	3
d <sub>ponded</sub> (ft)	0.5
d <sub>soil</sub> (ft)	3
d <sub>gravel</sub> (ft)	2
Porosity (n <sub>amended soil</sub> )	0.25
Porosity (n <sub>gravel</sub> )	0.33
V <sub>biotreated</sub> (ac-ft)	0.14

201.6

DMA	Land Use	Impervious %	DA (ft <sup>2</sup> )	DA (ac)	Impervious Area: Total
-----	----------	--------------	-----------------------	---------	------------------------

DCV Calculations	
------------------	--

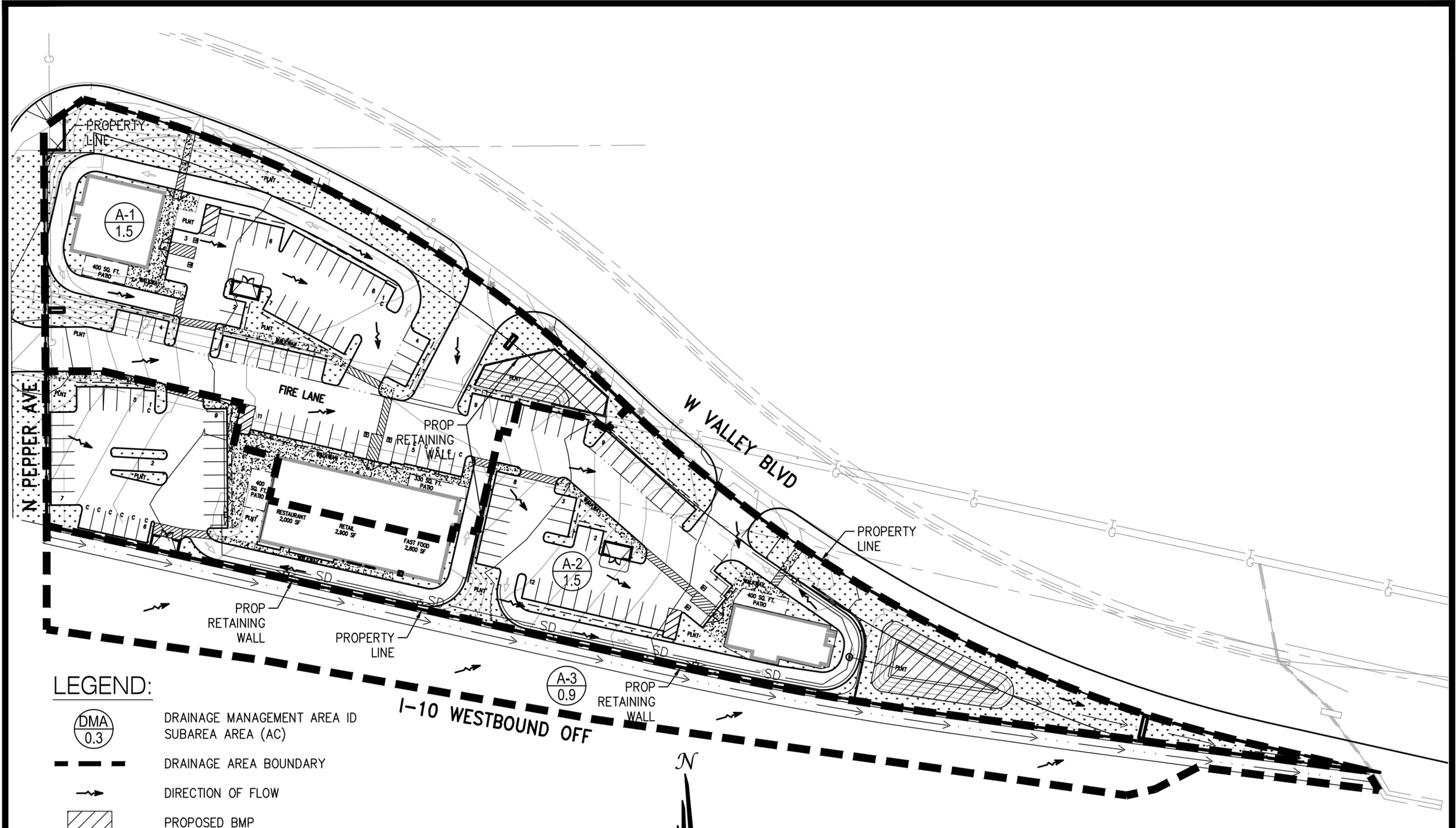
Flow into Basin (Figure 5-2 TGD)	
% of LID BMP Volume (cfs/impervious acre)	100
Impervious Area (ac)	0.138
Flow Capacity (cfs)	1.17

Infiltration Basin	
Bottom SA (ac)	0.16
Bottom SA (ft <sup>2</sup> )	790.0
Percolation P <sub>design</sub> (in/hr)	4.2
T <sub>drawdown</sub> (hr)	48
T <sub>fill</sub> (hr)	3
d <sub>ponded</sub> (ft)	3

Land Use	Average Percent Impervious
Barren	0
Public Park	0.15
School	0.4
Row Crops (P)	0
1 DU	0.2
2 DU	0.3
3-4 DU	0.4
5-7 DU	0.5
8-10 DU	0.6
11+ DU	0.8
Condominiums	0.65
Apartments	0.8
Mobile Home Park	0.75
Commercial	0.9

Project Area	53400
Landscape Areas	16986
Impervious Percentage	68.2%

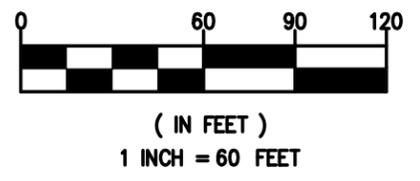
Climatic Region	Coefficient
Valley	1.4807
Mountain	1.909
Desert	1.2371



**LEGEND:**

- 
 DRAINAGE MANAGEMENT AREA ID  
 SUBAREA AREA (AC)
- 
 DRAINAGE AREA BOUNDARY
- 
 DIRECTION OF FLOW
- 
 PROPOSED BMP
- 
 PROPOSED LANDSCAPE
- 
 PROPOSED CONCRETE

A-3  
0.9  
I-10 WESTBOUND OFF



**WQMP SITE PLAN**

1595 W VALLEY BLVD  
COLTON, CA 92324

10/12/2017

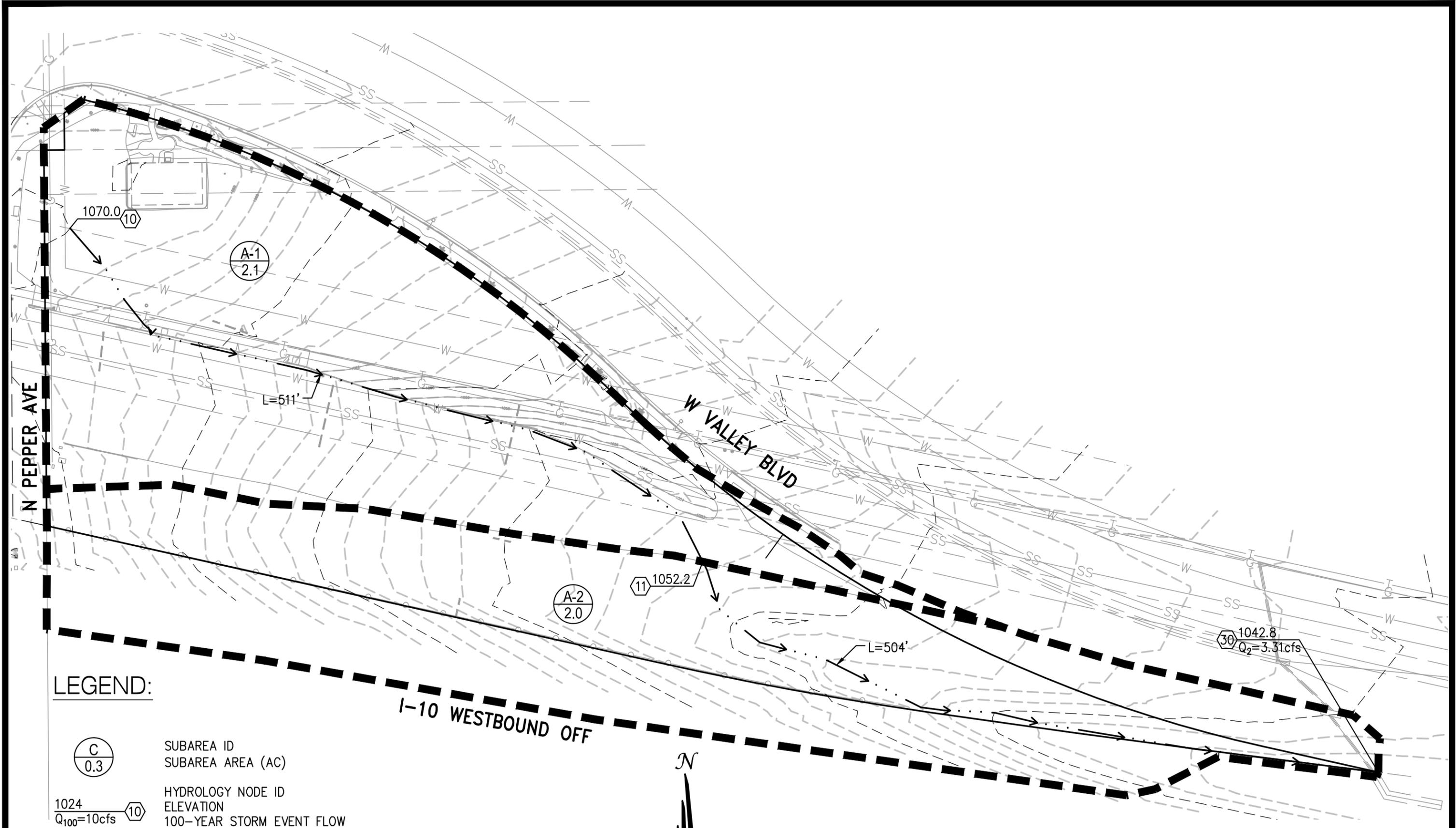

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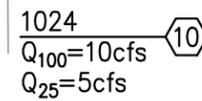
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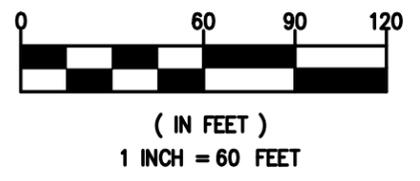
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 Dallas  
 Denver  
 North Dakota





**LEGEND:**

-  SUBAREA ID  
 SUBAREA AREA (AC)
-  HYDROLOGY NODE ID  
 ELEVATION  
 100-YEAR STORM EVENT FLOW  
 25-YEAR STORM EVENT FLOW
-  DRAINAGE AREA BOUNDARY
-  FLOWPATH



**EXHIBIT A EXISTING CONDITION HYDROLOGY MAP**

1595 W VALLEY BLVD  
 COLTON, CA 92324

10/12/2017

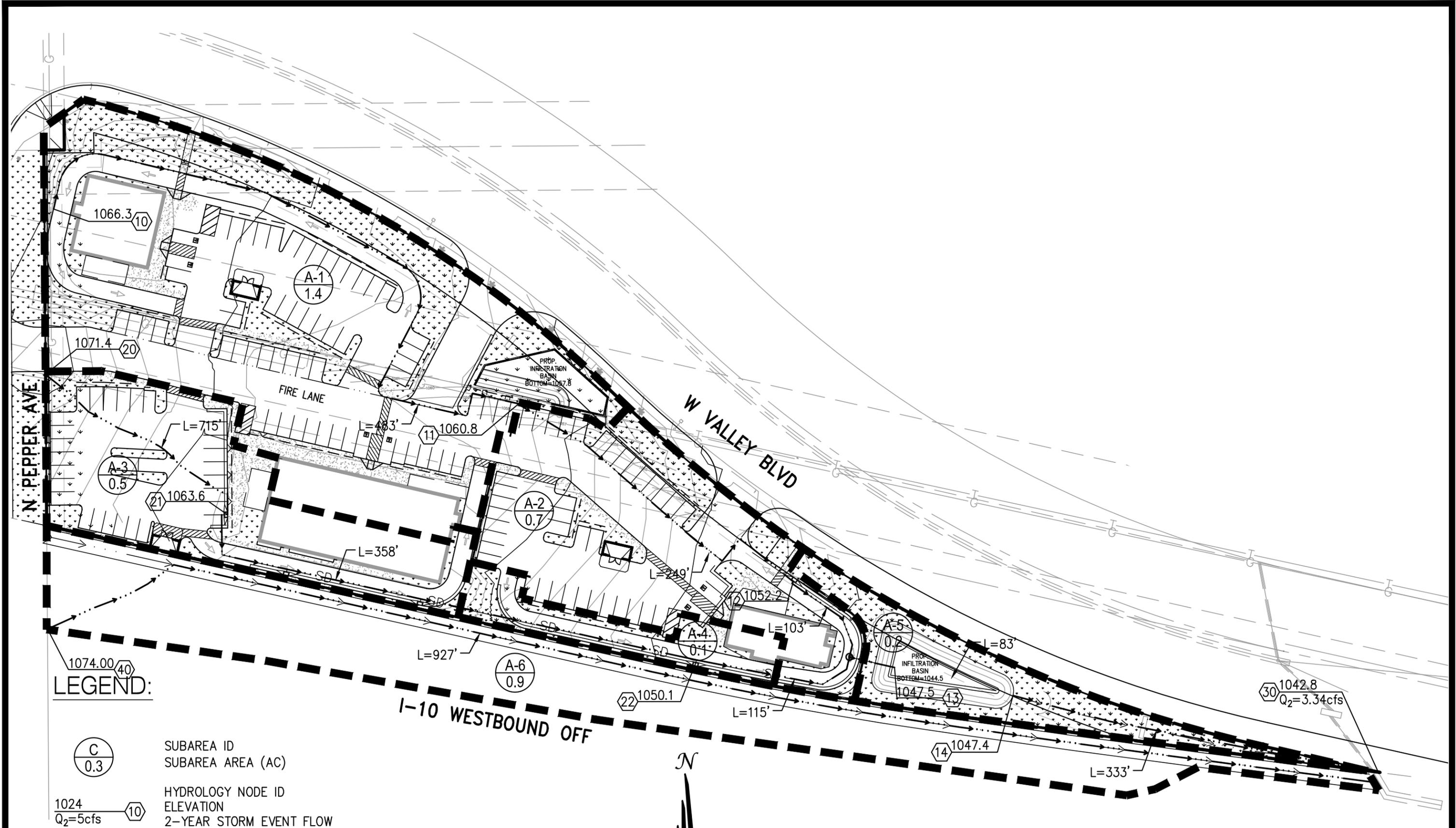


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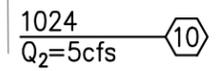
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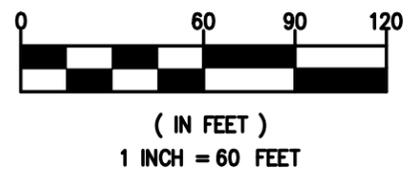
Boise  
 Dallas  
 Denver  
 North Dakota





**LEGEND:**

- 
 SUBAREA ID  
 SUBAREA AREA (AC)
- 
 HYDROLOGY NODE ID  
 ELEVATION  
 2-YEAR STORM EVENT FLOW
- 
 DRAINAGE AREA BOUNDARY
- 
 FLOWPATH



**EXHIBIT B PROPOSED CONDITION HYDROLOGY MAP**

1595 W VALLEY BLVD  
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