FINAL SITE PLAN OF DEVELOPMENT
TRACT NO. 36497
IN THE CITY OF WILDOMAR

ASSESSOR'S PARCEL NUMBERS
380-280-004, 009 THROUGH 012

OWNER/APPLICANT/DEVELOPER
LENNAR HOMES OF CALIFORNIA, INC.
980 MONTECITO DRIVE, SUITE 302
CORONA, CA. 92879
PHONE: 951-817-3567
FAX: 951-817-3650
CONTACT: JARNNE VALDEZ, SENIOR PROJECT MANAGER

LEGAL DESCRIPTION
PARCEL 2 AND 4 OF PARCEL MAP 11793, FILED IN BOOK 61 OF PARCEL MAPS, PAGE 38 THEREOF, TOGETHER WITH PARCELS 1 AND 2 OF PARCEL MAP 17667, FILED IN THE BOOK 119 OF PARCEL MAPS, PAGE 92 THEREOF, AND TOGETHER WITH PARCEL 3 OF PARCEL MAP 12214, FILED IN BOOK 67 OF PARCEL MAPS, PAGE 44 THEREOF, ALL OF RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA.

ACREAGE
TOTAL GROSS AREA: 24.00 AC.
TOTAL NET AREA: 11.58 AC. (MINUS STREETS AND LETTERED LOTS).
AVERAGE RESIDENTIAL LOT AREA: 7,529 S.F.

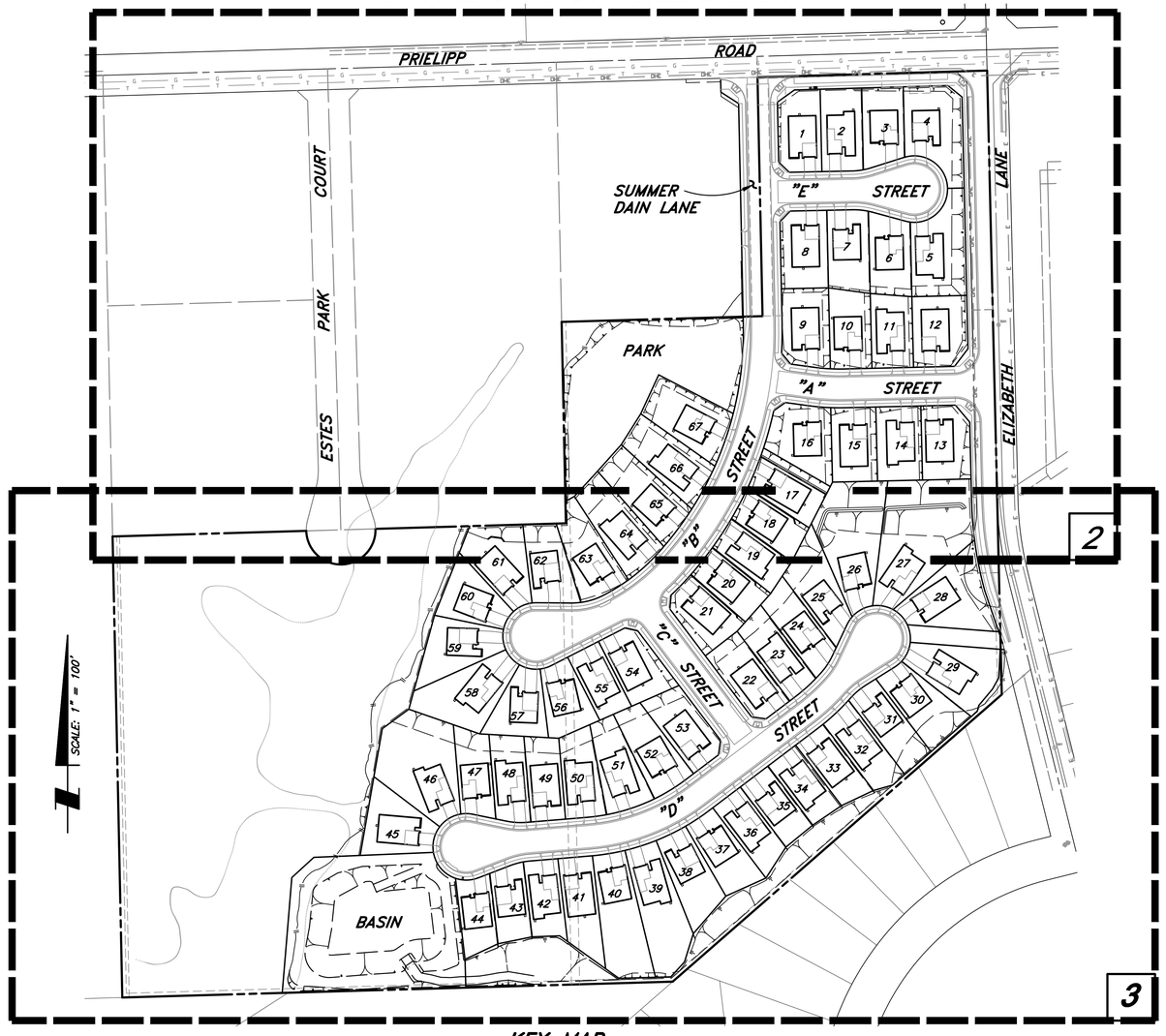
ZONING
EXISTING ZONE: RESIDENTIAL (R-R)
PROPOSED ZONE: PLANNED RESIDENTIAL (R-4)

UTILITIES
SEWER & WATER: ELSINORE VALLEY MUNICIPAL WATER DISTRICT (EVMWD)
31315 CHANEY STREET
LAKE ELSINORE, CA. 92530
PHONE:951-674-3146
TELEPHONE: VERIZON, PHONE:951-674-3146
ELECTRICITY: SOUTHERN CALIFORNIA EDISON, PHONE:800-655-4555
GAS: THE GAS COMPANY, PHONE:800-427-2200
CABLE T.V.: VERIZON, PHONE:951-672-4583
TIME WARNER, PHONE 888-255-5789
TRASH: WASTE MANAGEMENT, PHONE 800-423-9986

SCHOOL DISTRICT
LAKE ELSINORE UNIFIED SCHOOL DISTRICT
545 CHANEY STREET
LAKE ELSINORE, CA. 92530
PHONE: 951-253-7000

THOMAS BROTHERS MAP
THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2

LEGEND
- LOT LINE
- CURB & GUTTER
- STREET CENTERLINE
- TRACT BOUNDARY
- SLOPE
- DRIVEWAY & SIDEWALK
- PROPOSED HOME
- "SEE SHEET" REFERENCE FOR INDEX MAP (2)
- RETAINING WALL
- 5'-6" SPLIT FACE BLOCK WALL
- 6' SPLIT FACE BLOCK PILASTER
- 5'-6" WOOD FENCE
- WOOD GATE AND FENCE RETURN
- 5'-6" TUBULAR STEEL FENCE
- STREET LIGHT
- BLOW-OFF VALVE
- FIRE HYDRANT
- GATE VALVE
- ELECTRICAL TRANSFORMER (E)
- EDISON PULLBOX
- VERIZON PULLBOX (V)
- PHONE RISER
- ENHANCED ELEVATION



KEY MAP
1" = 100'

SHEET INDEX

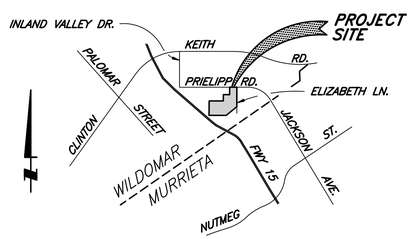
SHEET NO.	DESCRIPTION
1	TITLESHEET
2	HOUSE PLOTTING
3	HOUSE PLOTTING
4	WALL AND FENCE PLAN
5	PARK SITE PLAN

SETBACK TABLE

FRONT:	20' MINIMUM
SIDE YARD:	
INTERIOR:	5' MINIMUM
STREET SIDE:	10' MINIMUM
REAR YARD	10' MINIMUM
LOT WIDTH:	40' MINIMUM
LOT DEPTH:	80' MINIMUM

THE FOLLOWING DEVIATIONS FROM RESIDENTIAL DESIGN GUIDELINES ARE BEING REQUESTED PER THIS TENTATIVE TRACT MAP AND FINAL SITE PLAN OF DEVELOPMENT:

A) MINIMUM LOT FRONTAGE IN CUL-DE-SACS AND KNUCKLES. GUIDELINE IS 40'. DEVIATIONS REQUESTED ON LOTS 58-61 (30'), LOT 57 (31'), LOT 46 (36'), LOT 45 (39'), LOT 29 (31'), LOTS 27-28 (31'), AND LOT 26 (34').



VICINITY MAP
NOT TO SCALE
THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2

PLOTTING LEGEND
PLAN 1 (1,921 S.F.) (1) STORY = ⬡
PLAN 2 (2,389 S.F.) (2) STORY = △
PLAN 3 (2,809 S.F.) (2) STORY = ○
PLAN 4 (3,153 S.F.) (2) STORY = □

ELEVATION A =
ELEVATION B =
ELEVATION C =

LOT TABLE (TRACT NO. 36497)

Lot No.	Minimum Lot Area(SF)	Proposed Lot Area(SF)	Plan Type	Floor Area Ratio (%)	1st Floor Area (SF)	2nd Floor Area (SF)	Coverage (%)
1	5,000	7,037	1AR	27.30%	1,528	0	21.71%
2	5,000	7,142	4B	44.15%	1,732	873	24.25%
3	5,000	6,605	3CR	42.53%	1,422	934	21.53%
4	5,000	9,960	3A	28.20%	1,422	934	14.28%
5	5,000	10,129	4CR	31.13%	1,732	873	17.10%
6	5,000	6,786	3B	41.40%	1,422	934	20.96%
7	5,000	6,977	2AR	34.24%	1,202	638	17.23%
8	5,000	7,493	1C	25.64%	1,528	0	20.39%
9	5,000	7,624	1AR	25.20%	1,528	0	20.04%
10	5,000	6,764	3AR	41.53%	1,422	934	21.02%
11	5,000	6,299	4BR	50.06%	1,732	873	27.50%
12	5,000	7,830	1C	24.53%	1,528	0	19.51%
13	5,000	7,240	1AR	26.53%	1,528	0	21.10%
14	5,000	6,955	4C	45.33%	1,732	873	24.90%
15	5,000	6,959	1B	27.60%	1,528	0	21.96%
16	5,000	7,244	3A	38.78%	1,422	934	19.63%
17	5,000	6,893	1C	27.87%	1,528	0	22.17%
18	5,000	5,518	3B	50.91%	1,422	934	25.77%
19	5,000	5,580	4A	56.51%	1,732	873	31.04%
20	5,000	5,519	3C	50.90%	1,422	934	25.77%
21	5,000	6,547	1B	29.34%	1,528	0	23.34%
22	5,000	7,180	1AR	26.75%	1,528	0	21.28%
23	5,000	7,181	4C	43.91%	1,732	873	24.12%
24	5,000	6,598	3BR	42.57%	1,422	934	21.55%
25	5,000	7,848	2AR	30.44%	1,202	638	15.32%
26	5,000	14,014	3C	20.04%	1,422	934	10.15%
27	5,000	19,198	4CR	16.42%	1,732	873	9.02%
28	5,000	10,466	1A	18.35%	1,528	0	14.60%
29	5,000	9,160	4BR	34.42%	1,732	873	18.91%
30	5,000	7,810	3AR	35.97%	1,422	934	18.21%
31	5,000	6,733	2BR	35.48%	1,202	638	17.85%
32	5,000	6,477	4A	48.68%	1,732	873	26.74%
33	5,000	5,738	1BR	33.48%	1,528	0	26.63%
34	5,000	5,415	4C	58.23%	1,732	873	31.99%
35	5,000	5,407	2AR	44.19%	1,202	638	22.23%
36	5,000	5,903	4C	53.42%	1,732	873	29.34%
37	5,000	6,666	3BR	42.14%	1,422	934	21.33%
38	5,000	7,322	2A	32.63%	1,202	638	16.42%
39	5,000	10,704	4CR	29.46%	1,732	873	16.18%
40	5,000	10,574	3B	26.57%	1,422	934	13.45%
41	5,000	7,118	1BR	26.99%	1,528	0	21.47%
42	5,000	5,573	4A	56.58%	1,732	873	31.08%
43	5,000	5,318	2BR	44.93%	1,202	638	22.60%
44	5,000	5,336	3C	52.64%	1,422	934	26.65%
45	5,000	7,951	1C	24.16%	1,528	0	19.22%
46	5,000	14,522	4AR	21.71%	1,732	873	11.93%
47	5,000	6,164	3A	45.57%	1,422	934	23.07%
48	5,000	6,246	4BR	50.48%	1,732	873	27.73%
49	5,000	6,028	1A	31.87%	1,528	0	25.35%
50	5,000	6,690	4CR	47.13%	1,732	873	25.89%
51	5,000	7,379	4AR	42.73%	1,732	873	23.47%
52	5,000	7,220	3AR	38.91%	1,422	934	19.70%
53	5,000	7,166	1B	26.81%	1,528	0	21.32%
54	5,000	6,881	1CR	27.92%	1,528	0	22.21%
55	5,000	5,184	4A	60.83%	1,732	873	33.41%
56	5,000	6,187	3BR	45.40%	1,422	934	22.98%
57	5,000	6,505	2A	36.73%	1,202	638	18.48%
58	5,000	9,985	4C	31.58%	1,732	873	17.35%
59	5,000	7,751	2BR	30.82%	1,202	638	15.51%
60	5,000	6,440	3C	43.62%	1,422	934	22.08%
61	5,000	8,477	1BR	22.66%	1,528	0	18.02%
62	5,000	6,772	2CR	35.28%	1,202	638	17.75%
63	5,000	7,794	3B	36.04%	1,422	934	18.25%
64	5,000	8,592	4AR	36.70%	1,732	873	20.16%
65	5,000	8,385	3CR	33.50%	1,422	934	16.96%
66	5,000	8,207	4BR	38.42%	1,732	873	21.10%
67	5,000	8,914	3AR	31.51%	1,422	934	15.95%

NOTE: AVERAGE LOT AREA = 7,586 S.F.

CITY #12-0364

DATE PREPARED: 1/28/2014

MARK	BY	DATE	REVISIONS	APPR.	DATE
	SB&O				

ENGINEER | COUNTY

SEAL-COUNTY

BENCHMARK:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 120
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

FINAL SITE PLAN OF DEVELOPMENT
TITLE SHEET
TRACT NO. 36497
IN THE CITY OF WILDOMAR

SHEET NO. OF 1
SHEETS OF 5 SHTS

FOR: LENNAR HOMES | W.O. | COUNTY FILE NO.

PLOTTING LEGEND

PLAN 1 (1,921 S.F.) (1) STORY = ⬡
PLAN 2 (2,389 S.F.) (2) STORY = △
PLAN 3 (2,809 S.F.) (2) STORY = ○
PLAN 4 (3,153 S.F.) (2) STORY = □

ELEVATION A = ▭
ELEVATION B = ▭
ELEVATION C = ▭
ENHANCED ELEVATION = *

SEE SHEET 3

CITY #12-0364

MARK	BY	DATE	REVISIONS	APPR.	DATE
	SB&O				

ENGINEER — COUNTY

SEAL–COUNTY

BENCHMARK:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

FINAL SITE PLAN OF DEVELOPMENT

HOUSE PLOTTING
TRACT NO. 36497
IN THE CITY OF WILDOMAR

SHEET NO. 2
OF 5 SHTS

FOR: LENNAR HOMES
W.O.
COUNTY FILE NO.

SEE SHEET 2

ESTES PARK COURT

LOT "L" OPEN SPACE

LOT "I" DETENTION / WATER QUALITY BASIN

LOT "J"

LOT "K"

ELIZABETH LANE

STREET "B"

STREET "C"

STREET "D"

STREET

19	SG=1327.1 PLAN 4A	37	SG=1312.4 PLAN 3BR
20	SG=1324.7 PLAN 3C	38	SG=1312.1 PLAN 2A
21	SG=1323.1 PLAN 1B	39	SG=1311.8 PLAN 4CR
22	SG=1314.1 PLAN 1AR	40	SG=1311.5 PLAN 3B
23	SG=1314.7 PLAN 4C	41	SG=1311.3 PLAN 1BR
24	SG=1315.2 PLAN 3BR	42	SG=1310.9 PLAN 4A
25	SG=1315.7 PLAN 2AR	43	SG=1310.5 PLAN 2BR
26	SG=1315.9 PLAN 3C	44	SG=1310.0 PLAN 3C
27	SG=1316.2 PLAN 4CR	45	SG=1309.8 PLAN 1C
28	SG=1316.2 PLAN 1A	46	SG=1310.2 PLAN 4AR
29	SG=1315.9 PLAN 4BR	47	SG=1310.3 PLAN 3A
30	SG=1315.5 PLAN 3AR	48	SG=1310.7 PLAN 4BR
31	SG=1315.2 PLAN 2BR	49	SG=1311.1 PLAN 1A
32	SG=1314.8 PLAN 4A	50	SG=1313.9 PLAN 4CR
33	SG=1314.2 PLAN 1BR	51	SG=1312.0 PLAN 4A
34	SG=1313.7 PLAN 4C	52	SG=1312.5 PLAN 3AR
35	SG=1313.1 PLAN 2AR	53	SG=1312.8 PLAN 1B
36	SG=1312.7 PLAN 4C	54	SG=1321.7 PLAN 1CR
		55	SG=1322.0 PLAN 4A
		56	SG=1322.2 PLAN 3BR
		57	SG=1322.4 PLAN 2A
		58	SG=1322.6 PLAN 4C
		59	SG=1322.6 PLAN 2BR
		60	SG=1322.5 PLAN 3C
		61	SG=1322.4 PLAN 1BR
		62	SG=1322.5 PLAN 2CR
		63	SG=1321.7 PLAN 3B
		64	SG=1323.2 PLAN 4AR

PLOTTING LEGEND

PLAN 1 (1,921 S.F.) (1) STORY = ⬡

PLAN 2 (2,389 S.F.) (2) STORY = △

PLAN 3 (2,809 S.F.) (2) STORY = ○

PLAN 4 (3,153 S.F.) (2) STORY = □

ELEVATION A =

ELEVATION B =

ELEVATION C =

ENHANCED ELEVATION *

SCALE: 1" = 40'

GRAPHIC SCALE

40 0 40 80 120

CITY #12-0364

MARK	BY	DATE	REVISIONS	APPR.	DATE
	SB&O				
ENGINEER				COUNTY	

SEAL—COUNTY

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

BENCHMARK:

FINAL SITE PLAN OF DEVELOPMENT

HOUSE PLOTTING
TRACT NO. 36497
IN THE CITY OF WILDOMAR

SHEET NO. 3 OF 5 SHTS

FOR: LENNAR HOMES

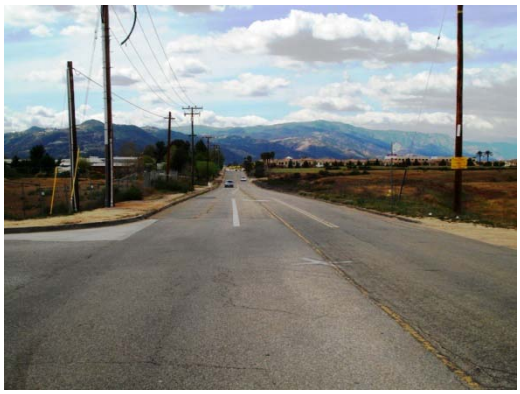
W.O.

COUNTY FILE NO.

Appendix 1a Existing Conditions / Site Photos
Wildomar 23 Residential Development (Project No. 12-0364)

Intersection of Prielipp Road and Elizabeth Lane looking east along Prielipp Road

Intersection of Prielipp Road and Elizabeth Lane looking north from the end of Elizabeth Lane



Intersection of Prielipp Road and Elizabeth Lane looking west along Prielipp Road

Intersection of Prielipp Road and Elizabeth Lane looking south along Elizabeth Lane

Elizabeth Lane entrance to Gables Oak Creek Apartments

Southern boundary of project site from Elizabeth Lane

Appendix 1a Existing Conditions / Site Photos
Wildomar 23 Residential Development (Project No. 12-0364)

West side of Elizabeth Lane looking north

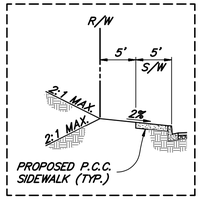
Approximate center of project site looking southwest

Drainage Feature 2 seen from project site

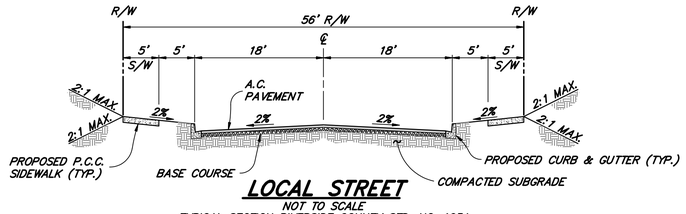
Western portion of project site looking southwest

Project site as seen from the Northeast corner of project site

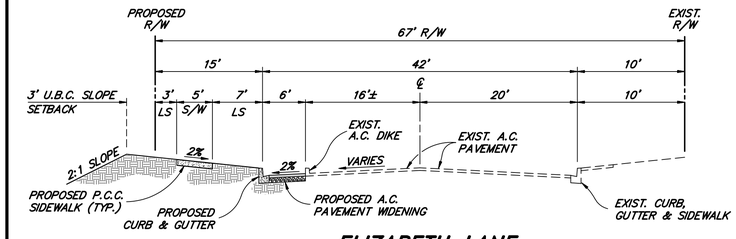
TENTATIVE TRACT MAP NO. 36497
IN THE CITY OF WILDOMAR
COUNTY OF RIVERSIDE, CA.



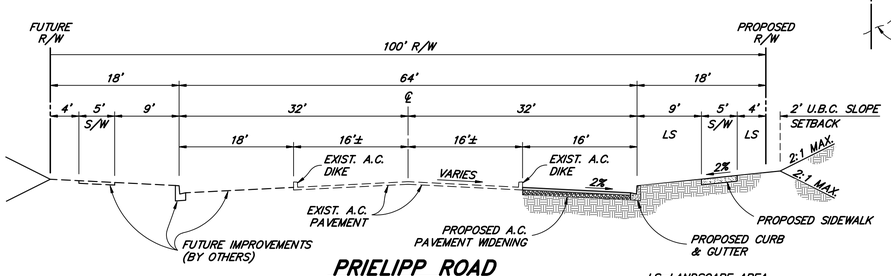
"B" STREET – STA. 16+20.41 TO 19+27.94



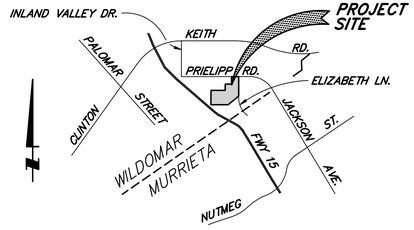
LOCAL STREET
NOT TO SCALE
TYPICAL SECTION RIVERSIDE COUNTY STD. NO. 105A
T.I.=5.5



ELIZABETH LANE
LS=LANDSCAPE AREA
NOT TO SCALE
TYPICAL SECTION RIVERSIDE COUNTY STD. NO. 103A
T.I.=7.0

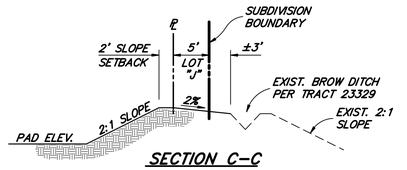


PRIELIPP ROAD
LS=LANDSCAPE AREA
NOT TO SCALE
TYPICAL SECTION RIVERSIDE COUNTY STD. NO. 94
T.I.=8.5

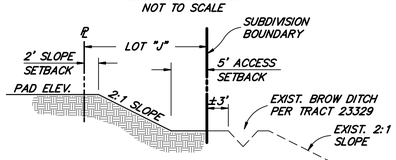


VICINITY MAP
NOT TO SCALE

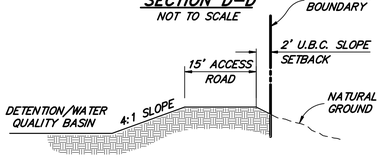
THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2



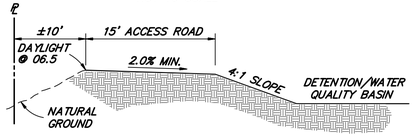
SECTION C-C
NOT TO SCALE



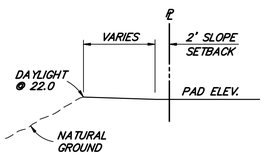
SECTION D-D
NOT TO SCALE



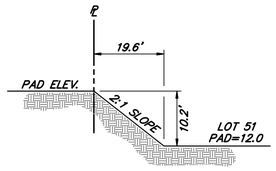
SECTION E-E
NOT TO SCALE



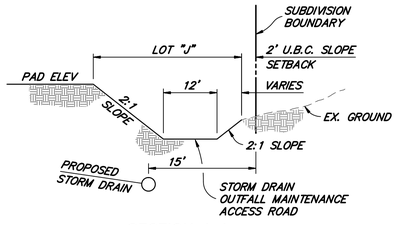
SECTION F-F
NOT TO SCALE



SECTION G-G
NOT TO SCALE



SECTION H-H
NOT TO SCALE



SECTION I-I
NOT TO SCALE

LEGEND

CURB & GUTTER	
LOT LINE	
STREET CENTERLINE	
TRACT BOUNDARY	
SIDEWALK	
SLOPE	
DIRECTION OF DRAINAGE	
INDICATES LOCATION OF EXISTING WELL (4 TOTAL)	
DAYLIGHT LINE	CUT / FILL
SEWER LINE	S
WATER LINE	W
STORM DRAIN	
CURB INLET	
EXISTING CONTOUR	1310
EXISTING WATER LINE	W
EXISTING SEWER LINE	S
EXISTING STORM DRAIN	
EXISTING CURB & GUTTER	
EXISTING GAS LINE	G

UTILITIES

SEWER & WATER:	ELSINORE VALLEY MUNICIPAL WATER DISTRICT (EVMWD) 31315 CHANEY STREET LAKE ELSINORE, CA. 92530 PHONE: 951-674-3146
TELEPHONE:	VERIZON, PHONE: 951-674-3146
ELECTRICITY:	SOUTHERN CALIFORNIA EDISON, PHONE: 800-655-4555
GAS:	THE GAS COMPANY, PHONE: 800-427-2200
CABLE T.V.:	VERIZON, PHONE: 951-672-4583 TIME WARNER, PHONE 888-255-5789
TRASH:	WASTE MANAGEMENT, PHONE 800-423-9986

SCHOOL DISTRICT
LAKE ELSINORE UNIFIED SCHOOL DISTRICT
545 CHANEY STREET
LAKE ELSINORE, CA. 92530
PHONE: 951-253-7000

LETTERED LOT	PURPOSE
"A" THROUGH "G"	PUBLIC STREET
"H"	PUBLIC PARK
"I"	DETENTION/WATER QUALITY BASIN
"J"	SLOPES
"K"	PASEO AND SEWER
"L"	OPEN SPACE

GENERAL NOTES
1. THIS PROJECT HAS UNDERGONE A PRE-APPLICATION REVIEW, P.A.R. 12-0058, DATED APRIL 4, 2012.
2. THIS TENTATIVE TRACT MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER.
3. EXISTING ZONE: R-R (RURAL RESIDENTIAL)
   PROPOSED ZONE: R-4 (PLANNED RESIDENTIAL)
4. GENERAL PLAN DESIGNATION: MHDR (MEDIUM HIGH DENSITY RESIDENTIAL)
5. EXISTING LAND USE: RESIDENTIAL (VACANT)
   PROPOSED LAND USE: RESIDENTIAL
6. TOTAL GROSS AREA: 24.00 AC.
   TOTAL NET AREA: 11.67 AC. (MINUS STREETS AND LETTERED LOTS)
   AVERAGE RESIDENTIAL LOT AREA: 7,586 S.F.
   TOTAL DISTURBED AREA: 18.5 AC.
7. THE SITE IS NOT WITHIN AN ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE, NOR IS IT WITHIN A LIQUEFACTION ZONE ESTABLISHED BY THE COUNTY OF RIVERSIDE/STATE OF CALIFORNIA.
8. GRADED PORTION OF LAND IS NOT SUBJECT TO OVERFLOW, INUNDATION OR FLOOD HAZARDS.
9. THE FOLLOWING DEVIATIONS FROM RESIDENTIAL DESIGN GUIDELINES ARE BEING REQUESTED PER THIS TENTATIVE TRACT MAP:
   A) MINIMUM LOT FRONTAGE IN CUL-DE-SACS AND KNUCKLES. GUIDELINE IS 40'. DEVIATIONS REQUESTED ON LOTS 58-61 (30'), LOT 57 (31'), LOT 46 (36'), LOT 45 (39'), LOT 29 (31'), LOTS 27-28 (31'), AND LOT 26 (34').
10. WATER QUALITY MEASURES CONSIST OF INFILTRATION BASIN IN LOT "I".
11. LETTERED LOTS A,B,C,D,E,F & G ARE TO BE DEDICATED AS PUBLIC STREETS.
12. LETTERED LOTS H, I, J & K ARE TO BE MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
13. THERE ARE NO EXISTING STRUCTURES ONSITE. A TOTAL OF (5) FIVE CONCRETE SLABS EXIST ONSITE, (2) TWO OF WHICH APPEAR TO BE PREVIOUS DWELLING UNITS.
14. LANDSCAPING WITHIN R/W FOR ELIZABETH LANE & PRIELIPP ROAD TO BE MAINTAINED BY CITY OF WILDOMAR, LLMD 89-1C.

OWNER/APPLICANT/DEVELOPER
LENNAR HOMES OF CALIFORNIA, INC.
980 MONTECITO DRIVE, SUITE 302
CORONA, CA. 92879
PHONE: 951-817-3567
FAX.: 951-817-3650
CONTACT: JARNNE VALDEZ, SENIOR PROJECT MANAGER

CIVIL ENGINEER
SB&O, INC.
41689 ENTERPRISE CIRCLE NORTH, SUITE 126
TEMECULA, CA. 92590
PHONE: 951-695-8900
FAX.: 951-695-8901
CONTACT: DON BROOKS, P.E.

INDEX OF SHEETS

1. TITLE SHEET
2. CONCEPTUAL GRADING AND UTILITY PLAN
3. CONCEPTUAL GRADING AND UTILITY PLAN
4. TENTATIVE MAP
5. TENTATIVE MAP

LEGAL DESCRIPTION
PARCEL 2 AND 4 OF PARCEL MAP 11793, FILED IN BOOK 61 OF PARCEL MAPS, PAGE 38 THEREOF, TOGETHER WITH PARCELS 1 AND 2 OF PARCEL MAP 17667, FILED IN THE BOOK 119 OF PARCEL MAPS, PAGE 92 THEREOF, AND TOGETHER WITH PARCEL 3 OF PARCEL MAP 12214, FILED IN BOOK 67 OF PARCEL MAPS, PAGE 44 THEREOF, ALL OF RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBERS
380-280-004, 009 THROUGH 012

SOURCE OF TOPOGRAPHY
COMPILED FROM AERIAL TOPOGRAPHY DATED 07/30/2012 BY INLAND AERIAL SURVEYS, PROJECT NO. 12-8910.

BASIS OF BEARINGS
THE NORTHWESTERLY LINE OF THE TEMECULA RANCHO- AS SHOWN BY MAP OF TRACT 23329, ON FILE IN BOOK 233 OF MAPS, PAGES 8 THROUGH 13, INCLUSIVE, RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA, BEING NORTH 48°53'06" EAST.

BENCHMARK
RIVERSIDE COUNTY BENCHMARK T-58-81, ELEVATION 1215.467 FEET, BEING A 3" ALUMINUM DISK IN CONCRETE CULVERT WALL. FROM THE INTERSECTION OF IVY STREET AND WASHINGTON STREET 3.6 MILES NW ON WASHINGTON STREET – PALOMAR STREET TO THE INTERSECTION OF PALOMAR AND CLINTON KEITH ROAD; 0.1 MILE NW OF THE INTERSECTION ON THE NE END OF A CONCRETE BOX CULVERT HEADWALL, 18.7' NE OF THE C/L PALOMAR STREET, 51.6' N. OF P.P. #X11524E, 81' NW OF P.P. #6T43563. DATUM = NGVD '29.

EARTHWORK QUANTITIES

RAW CUT:	143,090 C.Y.
REMEDIAL SHRINKAGE:	-10,790 C.Y.
SUBSIDENCE:	-1,500 C.Y.
SUBTOTAL:	130,800 C.Y.
RAW FILL:	-130,800 C.Y.
IMPORT/EXPORT:	0 C.Y.

BALANCED SITE

SCHEDULE "A" SUBDIVISION

INDEX OF SHEETS:

SHEET No.	DESCRIPTION
1	TITLE SHEET, NOTES, DETAILS, QUANTITIES
2&3	CONCEPTUAL GRADING AND UTILITY PLAN
4&5	TENTATIVE MAP

DATE PREPARED: 1/28/2014

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MARK	BY	DATE
ENGINEER		

REVISIONS

APPR.	DATE
CITY	

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, City Engineer/
Director of Public Works
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax
PREPARED BY:
L.S. No. 6152 EXP. 3/31/14

BENCHMARK:
Elevation = 1215.467
Datum = NGVD '29
BENCHMARK # T-58-81

SCALE:
H: As Noted V: -

TM
City Project #12-0364
CITY OF WILDOMAR
Tentative Tract No. 36497
Title Sheet

SHEET No. 1
OF 5 SHTS

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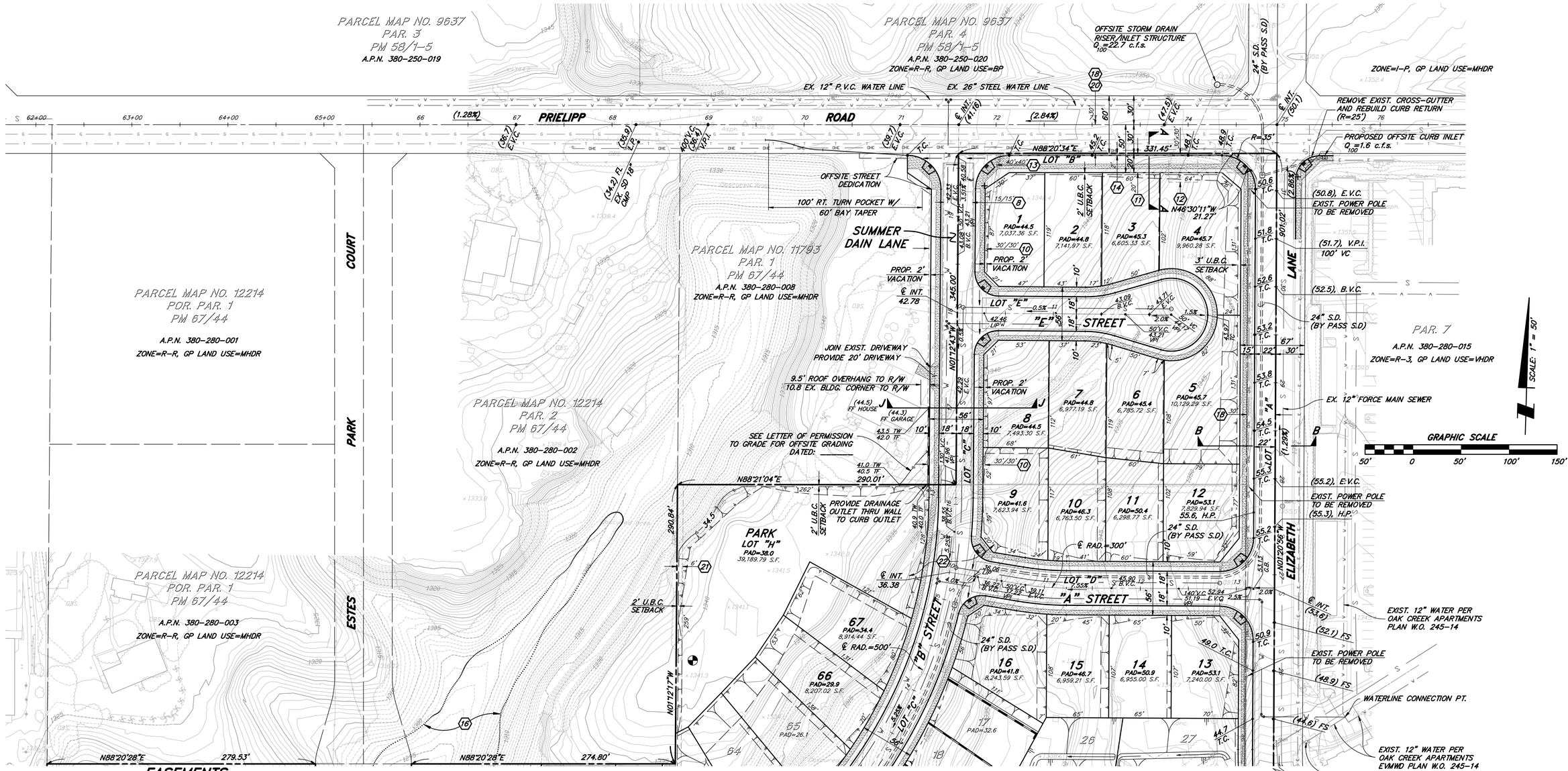

SEE SHEET NO. 3

EASEMENTS

⬡ INDICATES PLOTTED EASEMENT

ESMT #	DOCUMENT	IN FAVOR OF	PURPOSE	Disposition
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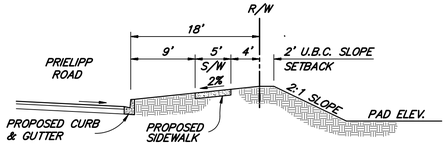
22	PM 17667	PUBLIC ROAD & UTILITY	DEDICATION OF SUMMER DAIN LANE	TO BE ABANDONED ON FINAL MAP



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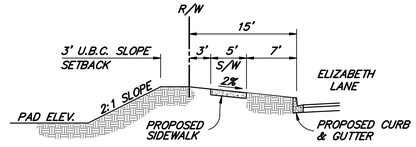
NOT TO SCALE



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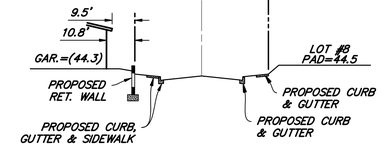

SECTION J-J
NOT TO SCALE

DIGALERT
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MARK	BY	DATE	REVISIONS	APPR.	DATE
	ENGINEER			CITY	

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, City Engineer/
Director of Public Works
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY: ____
L.S. No. 6152 EXP. 3/31/14

BENCHMARK:
Elevation = 1215.467
Datum = NGVD '29
BENCHMARK # T-58-81

SCALE:
H: ____ V: -

TM
City Project #12-0364
CITY OF WILDOMAR
Tentative Tract No. 36497
Conceptual Grading and Utility Plan

SHEET No. 2
OF 5 SHTS

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SEE SHEET NO. 2

PARCEL MAP NO. 12214
PAR. 1
PM 67/44
A.P.N. 380-280-003
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 12214
PAR. 2
PM 67/44
A.P.N. 380-280-002
ZONE=R-R, GP LAND USE=MHDR

RECORD OF SURVEY 25/62
PAR. 7
A.P.N. 380-280-015
ZONE=R-3, GP LAND USE=VHDR

WENTWORTH'S SUBDIVISION
M.B. 14/664
S.D. CO.
LOT 9
A.P.N. 380-280-008
ZONE=I-P, GP LAND USE=L.I.

PARCEL MAP 11793
PM 61/38
PAR. 1
A.P.N. 380-280-005
ZONE=R-R, GP LAND USE=L.I.

PARCEL MAP 11793
PM 61/38
PAR. 2
A.P.N. 380-280-006
ZONE=R-R, GP LAND USE=L.I.

TRACT NO. 25329
MB 233/8-13
EXISTING ZONE = RESIDENTIAL

CITY OF WILDOMAR
CITY OF MURRIETA

ESTES PARK CT.
ELIZABETH LANE
PRIELIPP ROAD
STREET "A"
STREET "B"
STREET "C"
STREET "D"
STREET "E"
STREET "F"
STREET "G"
STREET "H"
LOT "I"
LOT "J"
LOT "K"
LOT "L"

LOT "L" OPEN SPACE
242,552.49 S.F.

LOT "I" DETENTION/WATER QUALITY BASIN
1298.5' BOTTOM
47,419.16 S.F.±

LOT "J"
29,359.56 S.F.

LOT "K"
3,282.80 S.F.

OUTLET STRUCTURE
Q_{100}=19.5 c.f.s.

Q_{100}=43.8 c.f.s. FROM BYPASS SD.

Q_{100}=14.8 c.f.s. DISCHARGE

EX. 12" FORCE MAIN SEWER

EXIST. POWER POLE TO BE REMOVED

EX. 8" V.C.P. SEWER

JOIN EXIST. CURB & GUTTER @ 20' LT., (14.3) T.C.

CONNECT TO EX. SEWER M.H.

EX. 12" P.V.C. WATER

GRAPHIC SCALE
50' 0 50' 100' 150'

SCALE: 1" = 50'

EASEMENTS

⬡ INDICATES PLOTTED EASEMENT

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NOTE:
* DEVIATION FROM ZONING/DESIGN GUIDELINES REQUESTED PER NOTE #9 ON TITLE SHEET.

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MARK	BY	DATE	REVISIONS	APPR.	DATE
	ENGINEER			CITY	

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, City Engineer/
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ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-6900
951-695-6901 Fax

PREPARED BY:
L.S. No. 6182 EXP. 3/31/14

BENCHMARK:
Elevation = 1215.467
Datum = NGVD 29
BENCHMARK # 1-58-81

SCALE:
H: 1"=50' V: -

TM
City Project #12-0364
CITY OF WILDOMAR
Tentative Tract No. 36497
Conceptual Grading and Utility Plan

SHEET No. 3
OF 5 SHTS

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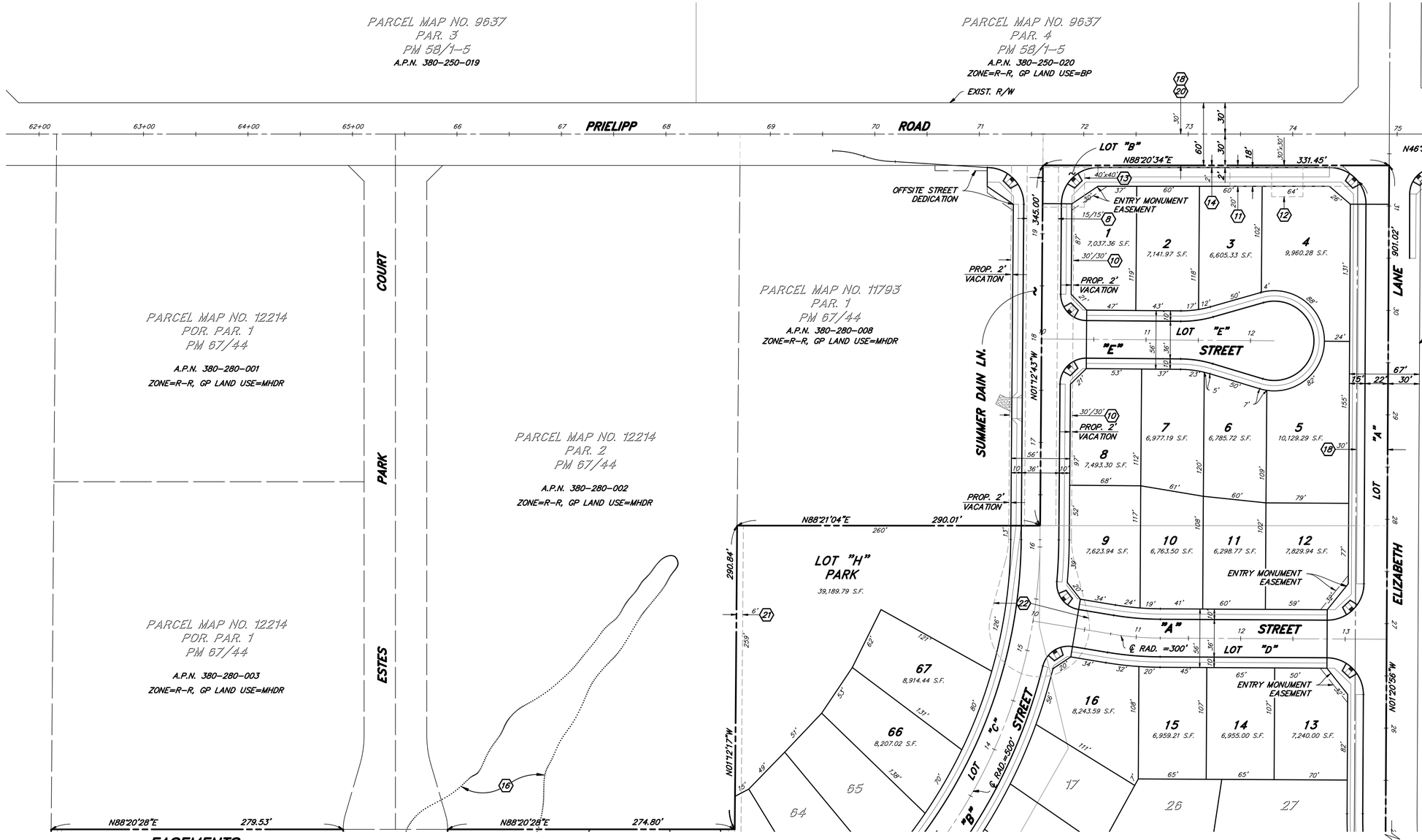

SEE SHEET NO. 5

LOT TABLE (TRACT NO. 36497)

Lot No.	Minimum Lot Area(SF)	Proposed Lot Area(SF)
1	5,000	7,037
2	5,000	7,142
3	5,000	6,605
4	5,000	9,960
5	5,000	10,129
6	5,000	6,786
7	5,000	6,977
8	5,000	7,493
9	5,000	7,624
10	5,000	6,764
11	5,000	6,299
12	5,000	7,830
13	5,000	7,240
14	5,000	6,955
15	5,000	6,959
16	5,000	7,244
17	5,000	6,893
18	5,000	5,518
19	5,000	5,580
20	5,000	5,519
21	5,000	6,547
22	5,000	7,180
23	5,000	7,181
24	5,000	6,598
25	5,000	7,848
26	5,000	14,014
27	5,000	19,198
28	5,000	10,466
29	5,000	9,160
30	5,000	7,810
31	5,000	6,733
32	5,000	6,477
33	5,000	5,738
34	5,000	5,415
35	5,000	5,407
36	5,000	5,903
37	5,000	6,666
38	5,000	7,322
39	5,000	10,704
40	5,000	10,574
41	5,000	7,118
42	5,000	5,573
43	5,000	5,318
44	5,000	5,336
45	5,000	7,951
46	5,000	14,522
47	5,000	6,164
48	5,000	6,246
49	5,000	6,028
50	5,000	6,690
51	5,000	7,379
52	5,000	7,220
53	5,000	7,166
54	5,000	6,881
55	5,000	5,184
56	5,000	6,187
57	5,000	6,505
58	5,000	9,985
59	5,000	7,751
60	5,000	6,440
61	5,000	8,477
62	5,000	6,772
63	5,000	7,794
64	5,000	8,592
65	5,000	8,385
66	5,000	8,207
67	5,000	8,914

NOTE: AVERAGE LOT AREA = 7,586 S.F.

EASEMENTS

⬡ INDICATES PLOTTED EASEMENT

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EASEMENT STATEMENT

I HEREBY STATE THAT ALL EASEMENTS AS INDICATED IN FIRST AMERICAN TITLE COMPANY PRELIMINARY TITLE REPORT NO. OSA-4071700 DATED AS OF 6-7-12 HAVE BEEN SHOWN HEREON AND/OR HAVE BEEN ACCOUNTED FOR IN NOTE PLACED HEREON. ALL EASEMENTS PROPOSED TO BE ABANDONED OR QUITCLAIMED AND/OR ALL EASEMENTS THAT CANNOT BE LOCATED ARE NOTED HEREON.

MARISSA CROWTHER, P.L.S. 6152

DATE

3-31-14
LICENSE REGISTRATION EXPIRES

SCALE: 1" = 50'

GRAPHIC SCALE
50' 0 50' 100' 150'

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CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, City Engineer/
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ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:

SB&O INC.
PLANNING ENGINEERING SURVEYING
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951-695-8901 Fax

PREPARED BY:
L.S. No. 6152 EXP. 3/31/14

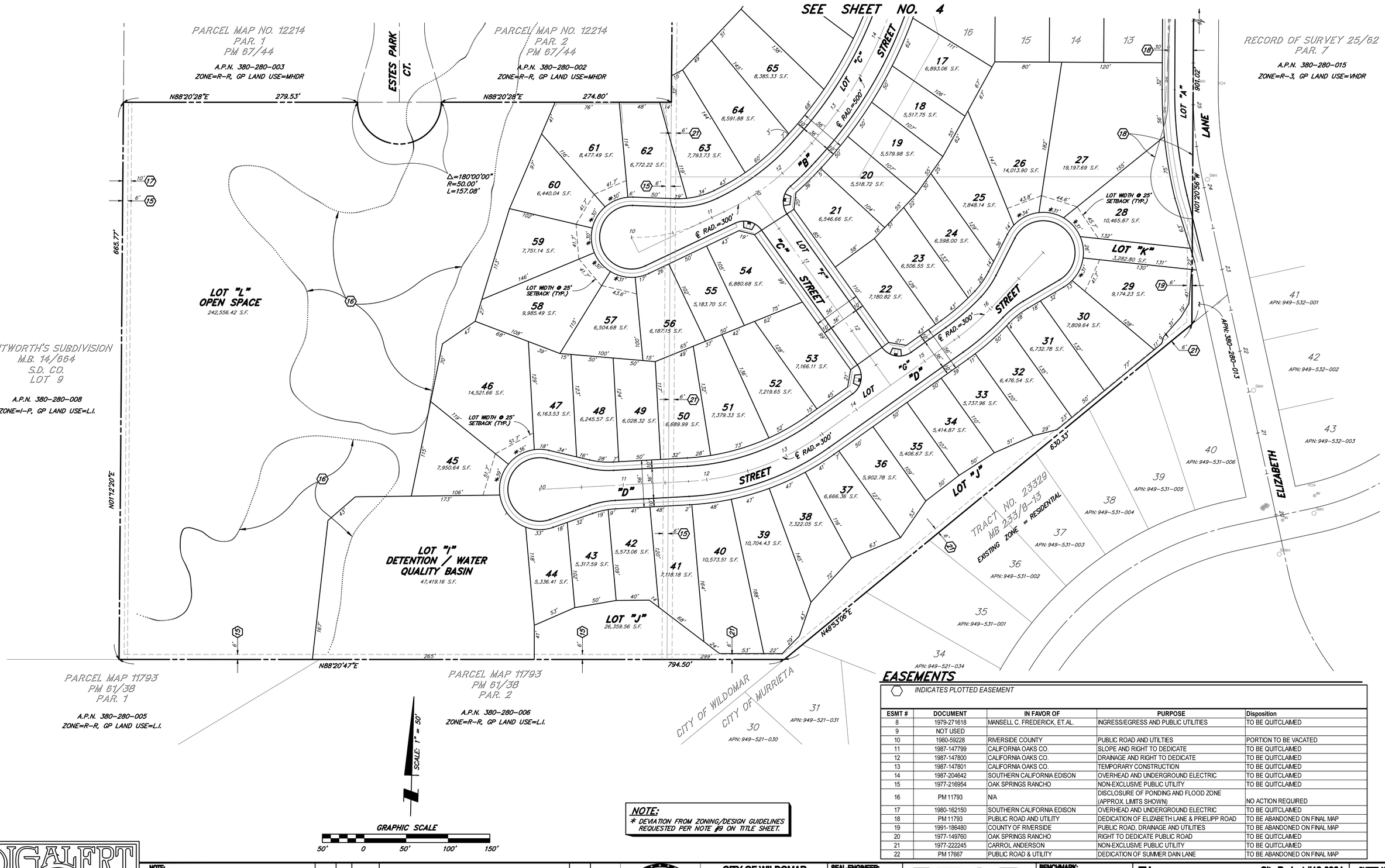
BENCHMARK:
Elevation = 1215.467
Datum = NGVD '29
BENCHMARK # T-58-81

SCALE:
H: V: -

TM
City Project #12-0364
CITY OF WILDOMAR
Tentative Tract No. 36497
Tentative Map

SHEET No. 4
OF 5 SHTS

I:\69552 WILDOMAR 23\DWG\TM\69552TM04.DWG WED 01/29/2014 13:52:12



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13	1987-147801	CALIFORNIA OAKS CO.	TEMPORARY CONSTRUCTION	TO BE QUITCLAIMED
14	1987-204642	SOUTHERN CALIFORNIA EDISON	OVERHEAD AND UNDERGROUND ELECTRIC	TO BE QUITCLAIMED
15	1977-216954	OAK SPRINGS RANCHO	NON-EXCLUSIVE PUBLIC UTILITY	TO BE QUITCLAIMED
16	PM 11793	N/A	DISCLOSURE OF PONDING AND FLOOD ZONE (APPROX. LIMITS SHOWN)	NO ACTION REQUIRED
17	1980-162150	SOUTHERN CALIFORNIA EDISON	OVERHEAD AND UNDERGROUND ELECTRIC	TO BE QUITCLAIMED
18	PM 11793	PUBLIC ROAD AND UTILITY	DEDICATION OF ELIZABETH LANE & PRIELIPP ROAD	TO BE ABANDONED ON FINAL MAP
19	1991-186480	COUNTY OF RIVERSIDE	PUBLIC ROAD, DRAINAGE AND UTILITIES	TO BE ABANDONED ON FINAL MAP
20	1977-149760	OAK SPRINGS RANCHO	RIGHT TO DEDICATE PUBLIC ROAD	TO BE QUITCLAIMED
21	1977-222245	CARROL ANDERSON	NON-EXCLUSIVE PUBLIC UTILITY	TO BE QUITCLAIMED
22	PM 17667	PUBLIC ROAD & UTILITY	DEDICATION OF SUMMER DAIN LANE	TO BE ABANDONED ON FINAL MAP

NOTE:
* DEVIATION FROM ZONING/DESIGN GUIDELINES REQUESTED PER NOTE #9 ON TITLE SHEET.

DIGALERT
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TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE:
WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

The private engineer signing these plans is responsible for assuring the accuracy and acceptability of the design hereon. In the event of discrepancies arising after city acceptance or during construction, the private engineer shall be responsible for determining an acceptable solution and revising the plans for acceptance by the city.

MARK	BY	DATE	REVISIONS	APPR.	DATE
	ENGINEER			CITY	

CITY OF WILDOMAR
ACCEPTED BY:
Date:
Daniel A. York, City Engineer/
Director of Public Works
ACCEPTANCE AS TO CONFORMANCE WITH APPLICABLE CITY STANDARDS AND PRACTICES

SEAL-ENGINEER:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

PREPARED BY:
L.S. No. 6182 EXP. 3/31/14

BENCHMARK:
Elevation = 1215.467
Datum = NGVD 29
BENCHMARK # T-58-81

SCALE: H: 1"=50' V: -

TM
CITY OF WILDOMAR
Tentative Tract No. 36497
Tentative Map

City Project #12-0364

SHEET No. 5
OF 5 SHTS

I:\69552 WILDOMAR 2.1\DWG\TM\69552TM05.DWG WED 01/29/2014 13:52:32

LENNAR®

"PARKSIDE"

Wildomar, CA

TRACT# 36497

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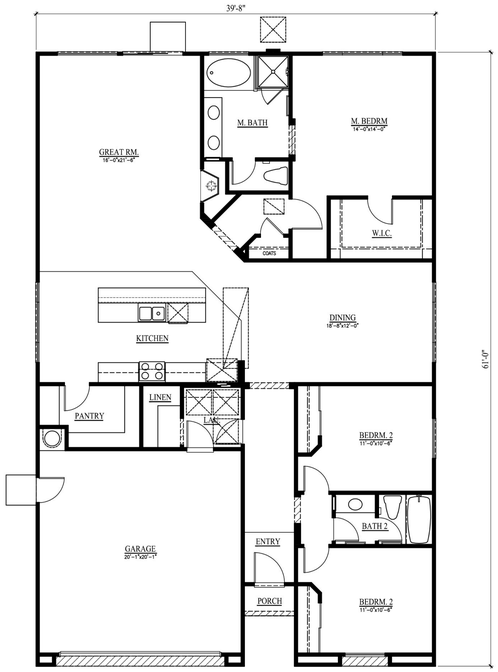


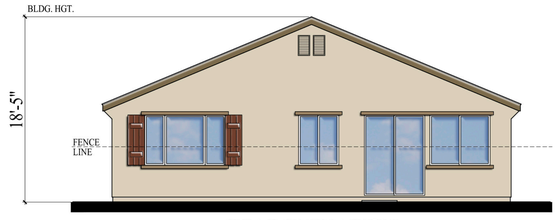
FIRST FLOOR PLAN

AREA TABULATION

CONDITIONED SPACE	
FLOOR AREA	1920 SQ. FT.
TOTAL DWELLING	1920 SQ. FT.
UNCONDITIONED SPACE	
GARAGE	424 SQ. FT.
PORCH	15 SQ. FT.

FRONT ELEVATION

LEFT ELEVATION



REAR ELEVATION

RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
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PLAN 1A - SPANISH
PLAN 1921A - SPANISH
"PARKSIDE"
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A1.1

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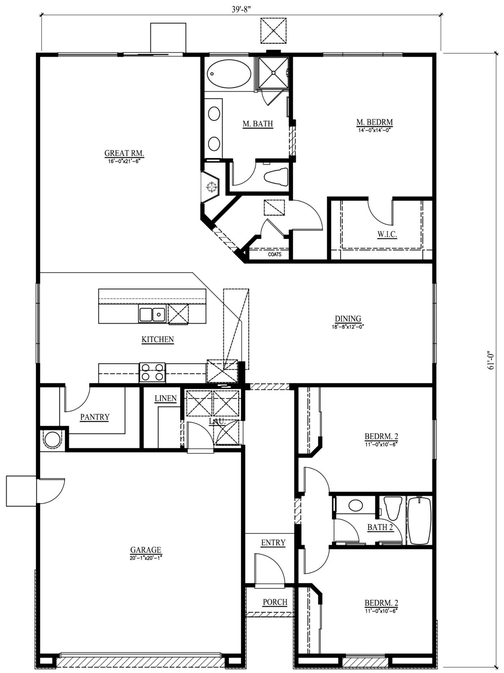
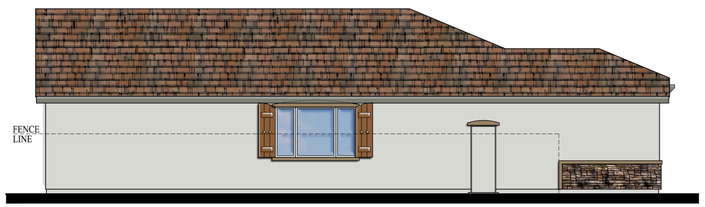


FIRST FLOOR PLAN

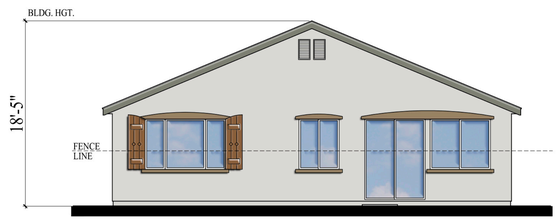
AREA TABULATION

CONDITIONED SPACE	
FLOOR AREA	1920 SQ. FT.
TOTAL DWELLING	1920 SQ. FT.
UNCONDITIONED SPACE	
GARAGE	424 SQ. FT.
PORCH	15 SQ. FT.

FRONT ELEVATION



LEFT ELEVATION



REAR ELEVATION

RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
P:\Project\12064_Lennar - Wildomar 23\xref\D1921_2 - Color.dwg

PLAN 1B - COTTAGE
PLAN 1921B - COTTAGE
"PARKSIDE"
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES.
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS.
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A1.2

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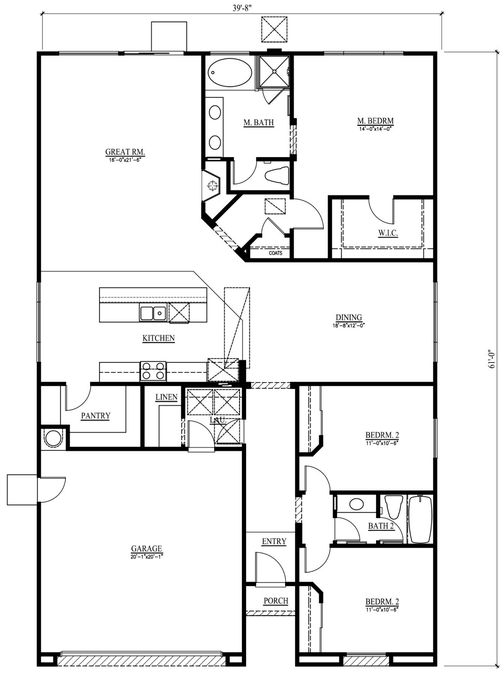
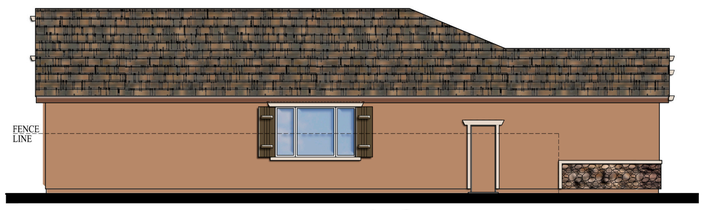


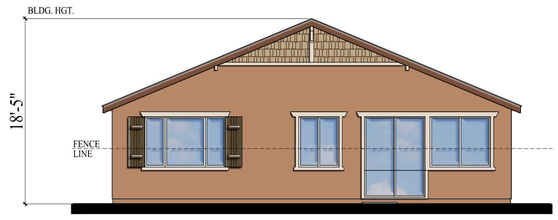
FIRST FLOOR PLAN

AREA TABULATION

CONDITIONED SPACE	
FLOOR AREA	1920 SQ. FT.
TOTAL DWELLING	1920 SQ. FT.
UNCONDITIONED SPACE	
GARAGE	424 SQ. FT.
PORCH	15 SQ. FT.



LEFT ELEVATION



REAR ELEVATION

RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

PLAN 1C - CRAFTSMAN
PLAN 1921C - CRAFTSMAN
"PARKSIDE"
Wildomar, CA

NOTE:
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2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A1.3

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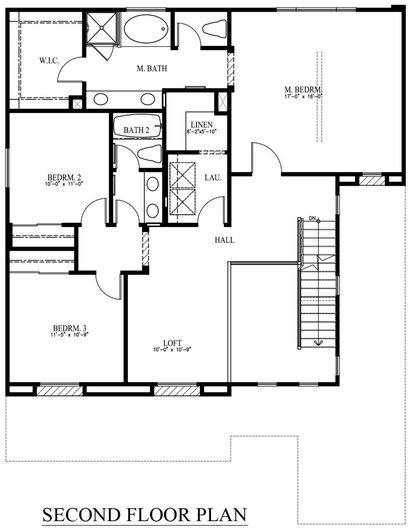
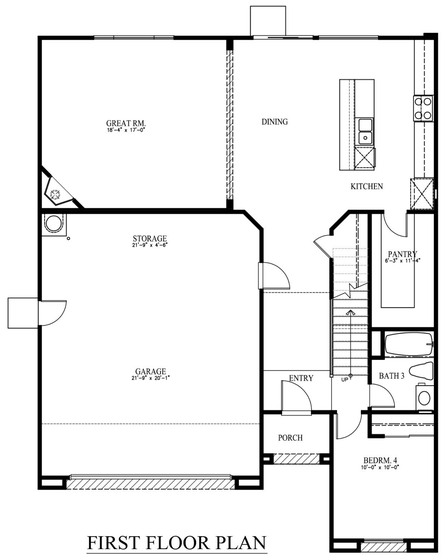


SECOND FLOOR PLAN

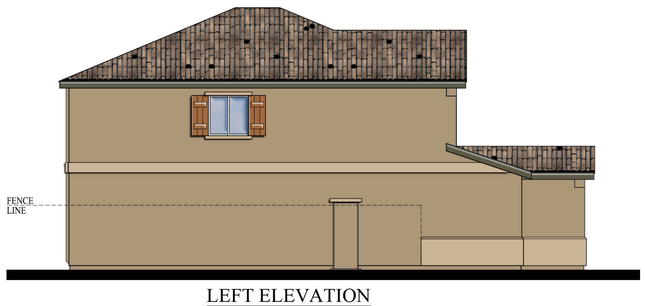


FIRST FLOOR PLAN

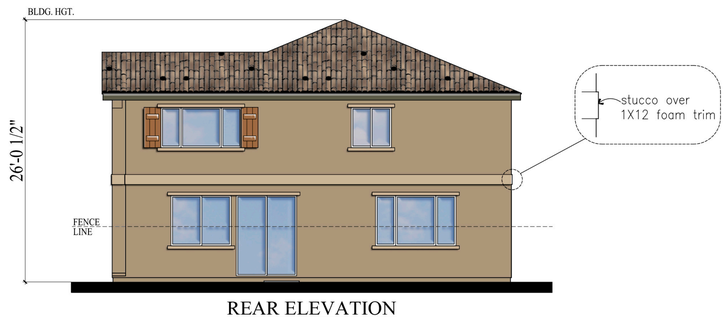
FRONT ELEVATION

AREA TABULATION

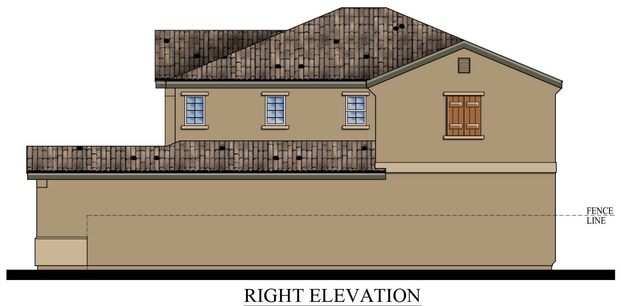
CONDITIONED SPACE	
FIRST FLOOR AREA	1185 SQ. FT.
SECOND FLOOR AREA	1204 SQ. FT.
TOTAL DWELLING	2389 SQ. FT.
UNCONDITIONED SPACE	
GARAGE	582 SQ. FT.
PORCH	31 SQ. FT.



LEFT ELEVATION



REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

PLAN 2A - SPANISH
PLAN 2389A - SPANISH
"PARKSIDE"
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A2.1

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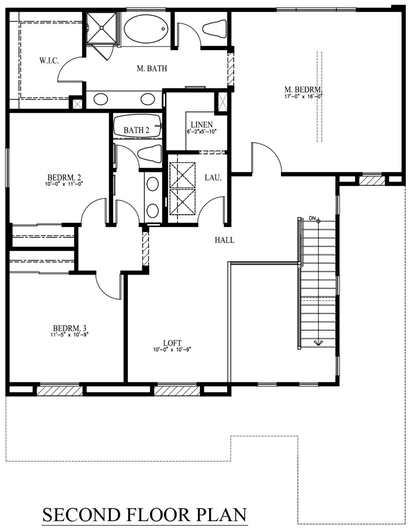
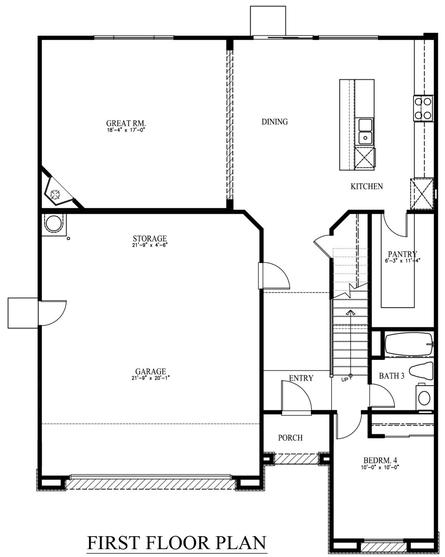
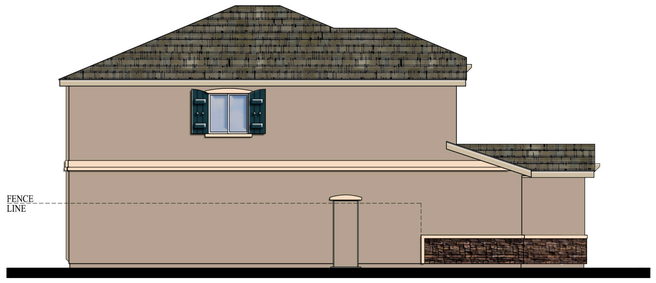


SECOND FLOOR PLAN



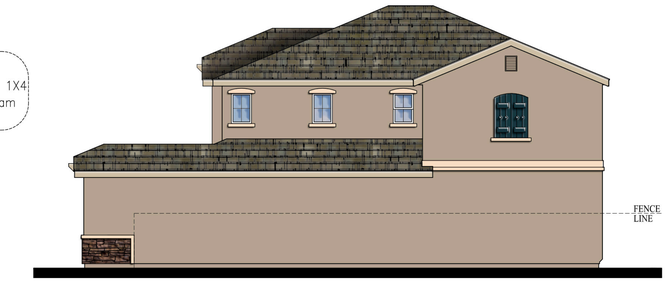
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
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PLAN 2B - COTTAGE
PLAN 2389B - COTTAGE
" PARKSIDE "
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A2.2

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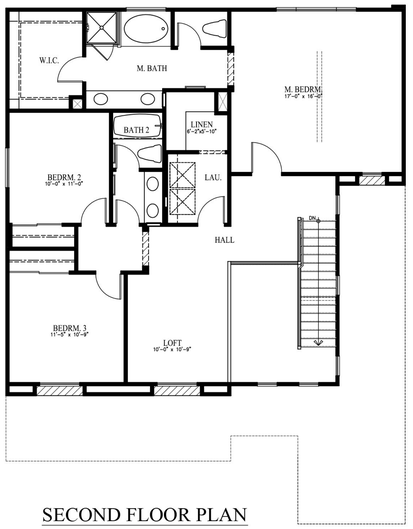

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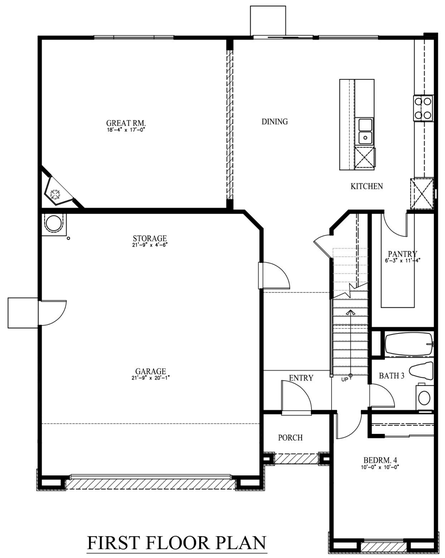
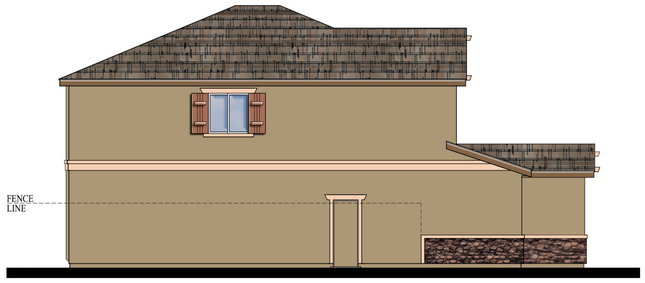


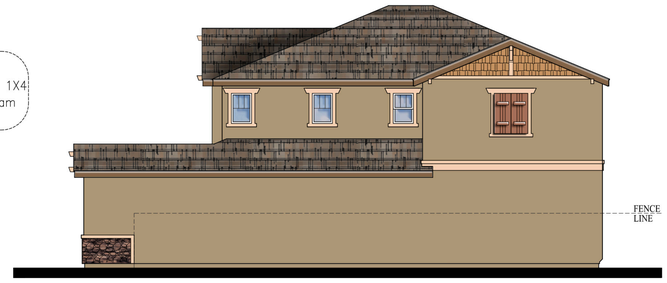
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
P:\Project\12064_Lennar - Wildomar 23\xref\D2389_3 - Color.dwg

PLAN 2C - CRAFTSMAN
PLAN 2389C - CRAFTSMAN
" PARKSIDE "
Wildomar, CA

NOTE:
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2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
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A2.3

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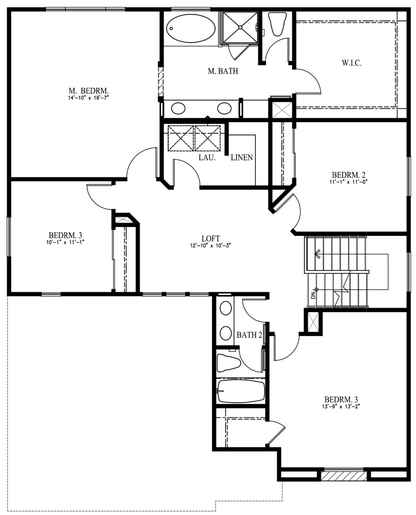
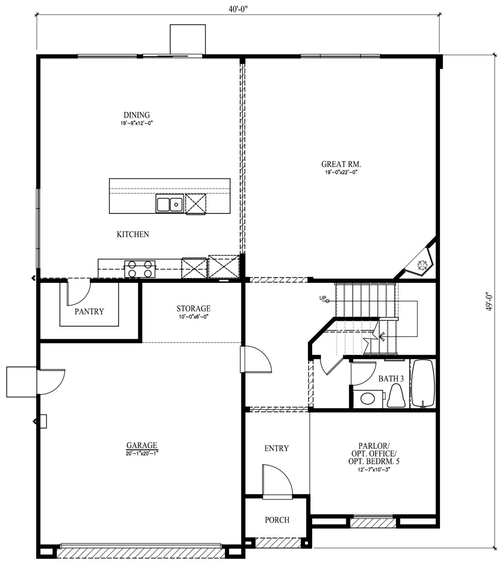


SECOND FLOOR PLAN

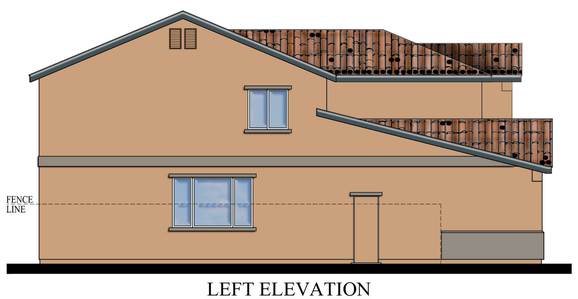


FIRST FLOOR PLAN

FRONT ELEVATION

AREA TABULATION

CONDITIONED SPACE	
FIRST FLOOR AREA	1412 SQ. FT.
SECOND FLOOR AREA	1397 SQ. FT.
TOTAL DWELLING	2809 SQ. FT.
UNCONDITIONED SPACE	
GARAGE	477 SQ. FT.
PORCH	32 SQ. FT.



LEFT ELEVATION

REAR ELEVATION

RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

PLAN 3A - SPANISH
PLAN 2809A - SPANISH
" PARKSIDE "
Wildomar, CA

NOTE:
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2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A3.1

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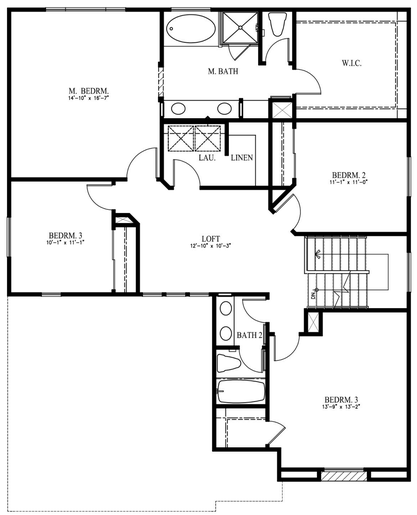

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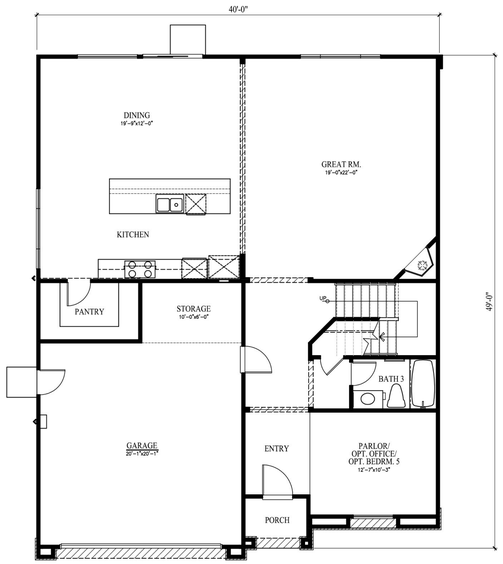
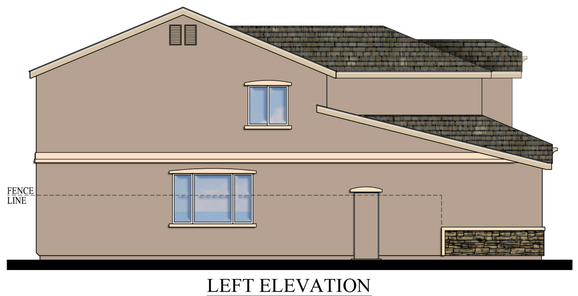


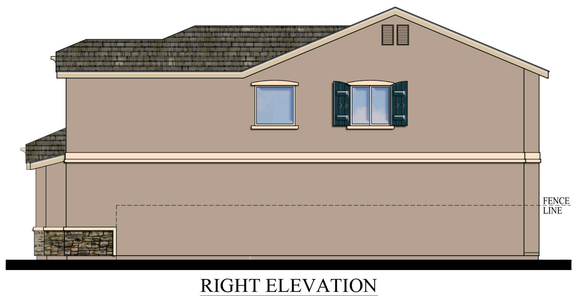
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
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PLAN 3B - COTTAGE
PLAN 2809B - COTTAGE
" PARKSIDE "
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
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A3.2

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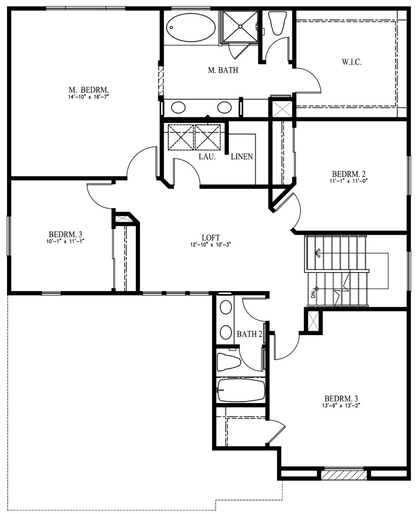
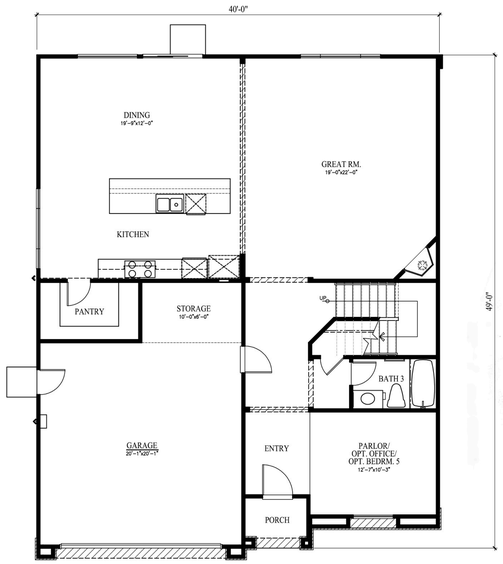
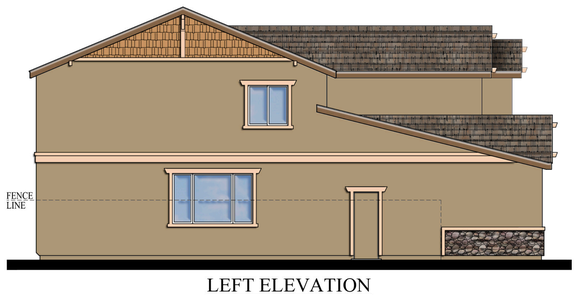


SECOND FLOOR PLAN



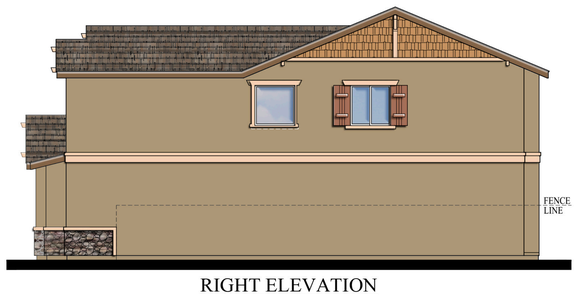
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 21, 2014
P:\Project\12064_Lennar - Wildomar 23\xref\D2809_3 - Color.dwg

PLAN 3C - CRAFTSMAN
PLAN 2809C - CRAFTSMAN
" PARKSIDE "
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A3.3

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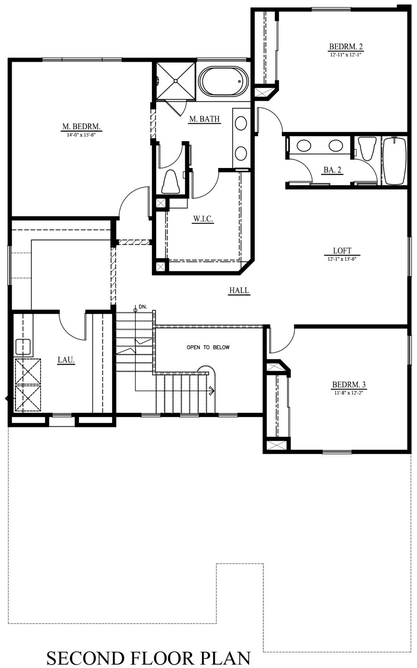
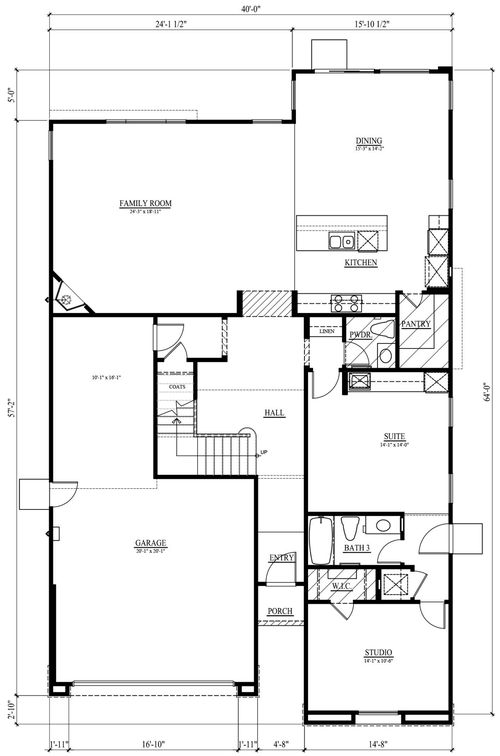


SECOND FLOOR PLAN



FIRST FLOOR PLAN

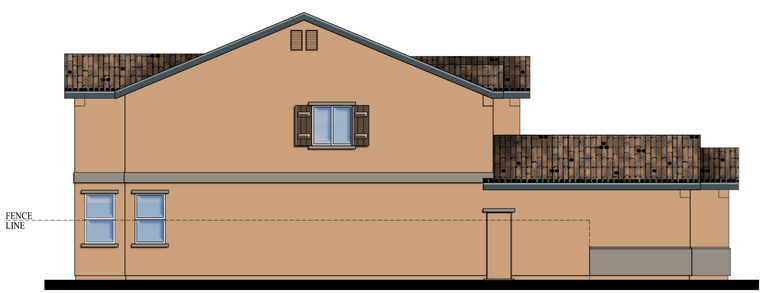
FRONT ELEVATION

AREA TABULATION

	MAIN RESIDENCE		STUDIO		TOTAL
FIRST FLOOR AREA	1,238	+	493	=	1,731 SQ. FT.
SECOND FLOOR AREA	1,422	+	0	=	1,422 SQ. FT.
TOTAL DWELLING	2,660	+	493	=	3,153 SQ. FT.

UNCONDITIONED SPACE

GARAGE	589 SQ. FT.
PORCH	18 SQ. FT.



LEFT ELEVATION

REAR ELEVATION

RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

PLAN 4A - SPANISH
PLAN 3153A - SPANISH
"PARKSIDE"
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
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A4.1

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Plot Date: Jan 20, 2014
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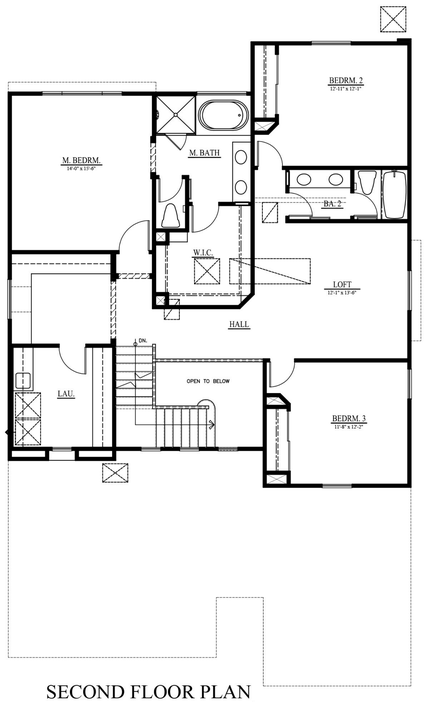
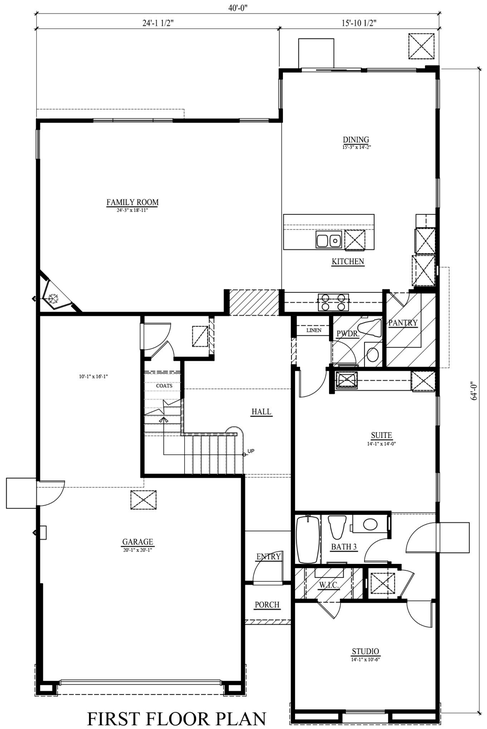
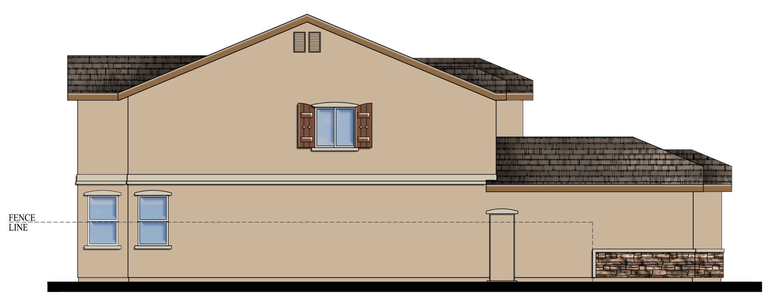


SECOND FLOOR PLAN



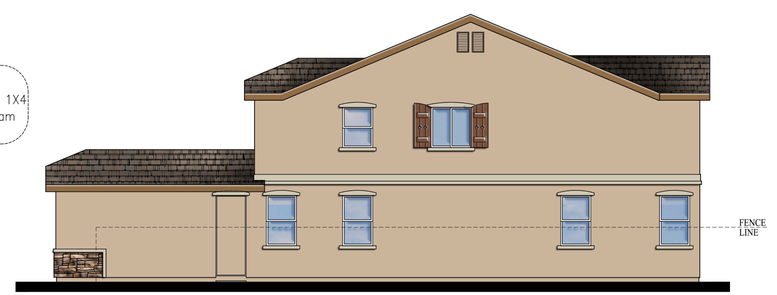
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
P:\Project\12064_Lennar - Wildomar 23\xref\D3153_2 - Color.dwg

PLAN 4B - COTTAGE
PLAN 3153B - COTTAGE
"PARKSIDE"
Wildomar, CA

NOTE:
1. ALL 4 ELEVATIONS REQUIRE ENHANCED DETAIL TRIM PER CITY OF WILDOMAR DESIGN GUIDELINES
2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A4.2

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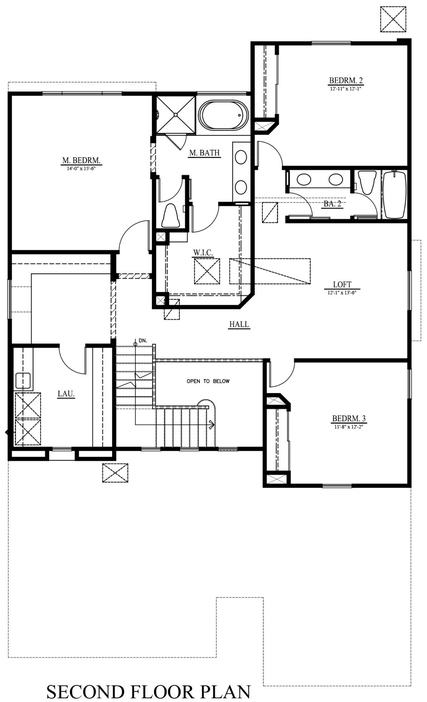
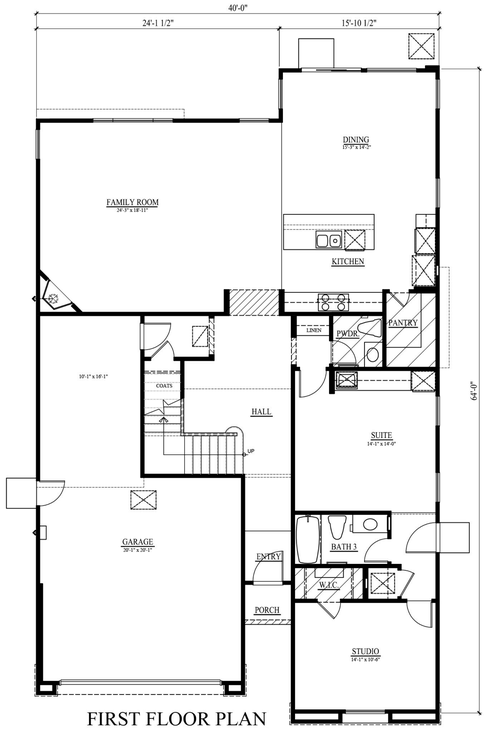
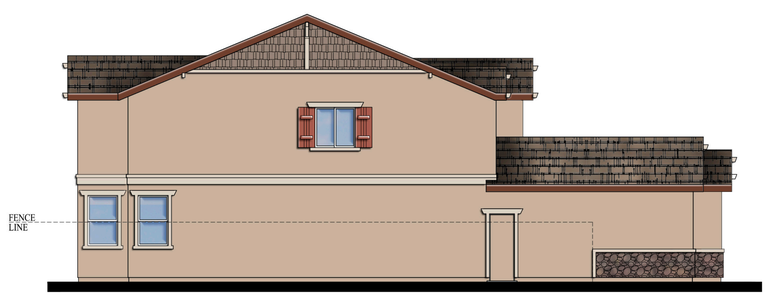


SECOND FLOOR PLAN



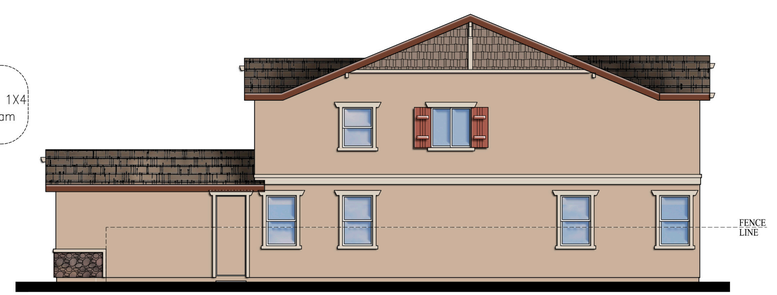
FIRST FLOOR PLAN

FRONT ELEVATION



LEFT ELEVATION

REAR ELEVATION



RIGHT ELEVATION

LENNAR

Job #: 12064
Date: January 17, 2014
Date: March 25, 2012
Date: December 4, 2012
Date: October 25, 2012

Plot Date: Jan 20, 2014
P:\Project\12064_Lennar - Wildomar 23\xref\D3153_3 - Color.dwg

PLAN 4C - CRAFTSMAN
PLAN 3153C - CRAFTSMAN
" PARKSIDE "
Wildomar, CA

NOTE:
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2. STUCCO WAINSCOT AND STONE VENEER TO EXTEND ON THE SIDES OF THE HOME TO WHERE IT WILL MEET THE RETURN WALLS
3. STUCCO WAINSCOT AND STONE VENEER TO EXTEND FRONT DOOR

A4.3

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CONCEPTUAL PLANT LEGEND

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	WUCOLS WATER USAGE	SPACING
PRIELIPP ROAD					
	QUERCUS VIRGINIANA	SOUTHERN LIVE OAK	24" BOX	MEDIUM	40' O.C.
ELIZABETH LANE					
	KOELRUETERIA BIPPINATA	CHINESE FLAME TREE	24" BOX	MEDIUM	40' O.C.
INTERNAL STREET TREES					
	CINNAMOMUM CAMPHORA	CAMPHOR TREE	24" BOX	MEDIUM	1 PER LOT
	MAGNOLIA 'ST. MARY'S'	SOUTHERN MAGNOLIA	24" BOX	MEDIUM	1 PER LOT
	PISTACIA CHINENSIS	CHINESE PISTACHE	24" BOX	MEDIUM	1 PER LOT
	PLATANUS A. 'BLOODGOOD'	LONDON PLANE TREE	24" BOX	MEDIUM	1 PER LOT
	PODOCARPUS GRACILIOR	FERN PINE	24" BOX	MEDIUM	1 PER LOT
	QUERCUS ILEX	HOLLY OAK	24" BOX	LOW	1 PER LOT
	PYRUS CALLERYANA "BRADFORD"	BRADFORD PEAR	24" BOX	MEDIUM	1 PER LOT
	ULMUS PARVIFOLIA "DRAKE"	EVERGREEN ELM	24" BOX	MEDIUM	1 PER LOT

NOTE: ALL INTERNAL STREET TREES TO BE PLANTED OUTSIDE OF RIGHT-OF-WAY. IF CONDITIONS REQUIRE PLACEMENT WITHIN R.O.W. APPROVED 20' ROOT BARRIERS ARE REQUIRED.

FOCAL / ENTRY / ACCENT TREES					
	LAGERSTROEMIA INDICA	CRAPE MYRTLE	24" BOX	MEDIUM	AS SHOWN
	OLEA EUROPAEA	OLIVE	36" BOX	LOW	AS SHOWN
	PRUNUS C. 'ATROPURPUREA'	PURPLE LEAF PLUM	36" BOX	MEDIUM	AS SHOWN
	QUERCUS AGRIFOLIA	COAST LIVE OAK	36" BOX	LOW	AS SHOWN
LANDSCAPE AND SLOPE TREES					
	GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	15 GALLON	MEDIUM	AS SHOWN
	LIQUIDAMBER STYRACIFLUA	SWEET GUM	15 GALLON	MEDIUM	AS SHOWN
	PISTACIA CHINENSIS	CHINESE PISTACHE	15 GALLON	MEDIUM	AS SHOWN
	PLATANUS A. 'BLOODGOOD'	LONDON PLANE TREE	15 GALLON	MEDIUM	AS SHOWN
	PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	15 GALLON	MEDIUM	AS SHOWN
	QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GALLON	LOW	AS SHOWN
	QUERCUS ENGELMANNII	ENGELMANN OAK	15 GALLON	LOW	AS SHOWN
	RHUS LANCEA	AFRICAN SUMAC	15 GALLON	LOW	AS SHOWN
SHRUBS					
	ANIGOZANTHOS FLAVIDUS	KANGAROO PAW	1 GALLON	LOW	2' O.C.
	CISTUS PURPUREUS	ROCKROSE	5 GALLON	LOW	4' O.C.
	GREVILLEA NOELII	GREVILLEA	5 GALLON	LOW	4' O.C.
	RHUS OVATA	SUGAR BUSH	5 GALLON	LOW	6' O.C.
	ROSMARINUS OFFICINALIS	ROSEMARY	5 GALLON	LOW	4' O.C.
	SALVIA LEUCANTHA	MEXICAN SAGE	5 GALLON	LOW	4' O.C.
VINES					
	GELSEMIUM SEMPERVIRENS	CAROLINA JESSAMINE	5 GALLON	MEDIUM	10' O.C.
	PARTHENOCISSUS TRICUSPIDATA	BOSTON IVY	5 GALLON	MEDIUM	10' O.C.
	TRACHELOSPERMUM JASMINOIDES	STAR JASMINE	5 GALLON	MEDIUM	10' O.C.
GROUNDCOVERS					
	BACCHARIS P. 'PIGEON POINT'	DWARF COYOTE BRUSH	1 GALLON	LOW	36" O.C.
	CEANOTHUS G HORIZONTALIS	CARMEL CREEPER	1 GALLON	LOW	36" O.C.
	CISTUS SALVIFOLIUS	SAGELEAF ROCKROSE	1 GALLON	LOW	36" O.C.
	GAZANIA SP.	GAZANIA	FLATS	MEDIUM	12" O.C.
	LONICERA JAPONICA 'HALLIANA'	HALL'S HONEYSUCKLE	FLATS	LOW	12" O.C.
	MYOPORUM PARVIFOLIUM	MYOPORUM	1 GALLON	LOW	24" O.C.
	ROSMARINUS O. 'PROSTRATUS'	PROSTRATE ROSEMARY	1 GALLON	LOW	24" O.C.
	TALL FESCUE (TURF SEED MIX SHALL BE "TEAM CREST" AVAILABLE THROUGH CREATIVE HYDROSEED (951) 461-9745	TURF (FUNCTIONAL USE)	SEED	80% OF Eto	15 LBS / 1000 S.F.

WATER QUALITY SWALE / BOTTOM OF BASIN

HYDRO-SEED MIX	LBS/ACRE
DISTICHLIS SPICATA	9
JUNCUS MEXICANA	3
LEYMUS TRITICOIDES	6
MELICA IMPERFECTA	3
MUHLENBERGIA RIGENS	6

NO LANDSCAPE AREAS MY BE HYDRO-SEEDED AND WATERED WITH TEMPORARY IRRIGATION. ALL GRADED AREAS AND SLOPES SHALL BE HAND-PLANTED WITH APPROVED CALIFORNIA NATIVE PLANTS AND A PERMANENT AUTOMATIC DRIP OR LOW FLOW IRRIGATION SYSTEM.

BASIN PLANT LEGEND

	BOTANICAL NAME	COMMON NAME	SIZE	WUCOLS WATER USAGE	SPACING
TREES					
	PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	15 GALLON	MEDIUM	AS SHOWN
	QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GALLON	LOW	AS SHOWN
SHRUBS					
	CEANOTHUS SPP.	CALIFORNIA LILAC	5 GALLON	LOW	4' O.C.
	HETEROMELES ARBUTIFOLIA	TOYON	5 GALLON	LOW	6' O.C.
	RHUS INTEGRIFOLIA	LEMONADE BERRY	5 GALLON	LOW	6' O.C.
	SALVIA SPP.	SAGE	5 GALLON	LOW	4' O.C.
GROUNDCOVERS					
	BACCHARIS PILULARIS	COYOTE BRUSH	1 GALLON	LOW	36" O.C.
	CEANOTHUS 'JOYCE COULTER'	CEANOTHUS JOYCE COULTER	1 GALLON	LOW	36" O.C.

LANDSCAPE MASTER PLAN

PARKSIDE - TRACT 36497

LENNAR HOMES

LANDSCAPE MASTER PLAN
SHEET 1 OF 4

0 50' 100' 200'

Scale: 1"= 50' NORTH

City of Wildomar

LICENSED LANDSCAPE ARCHITECT — DAVID S. NEAULT — No. 2894 — 06-30-2014 — STATE OF CALIFORNIA

David NEAULT ASSOCIATES Inc.
951 | 296 | 3430
www.dnassociates.com

1.27.14

30' x 30' SHADE STRUCTURE

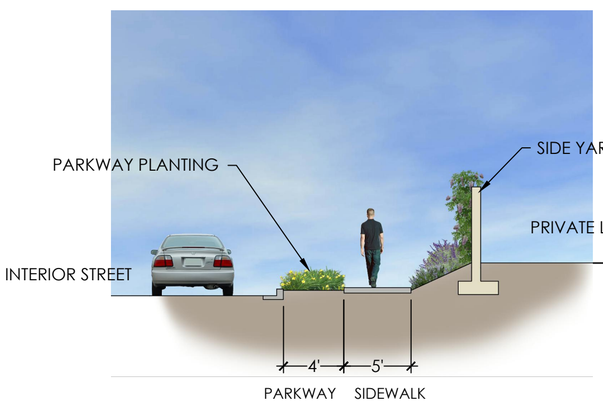
PARK ENLARGEMENT 1/16"=1'-0"

SECTION "A" 1/8" = 1'-0"

ELIZABETH LANE

STREET SECTION "B" 1/8" = 1'-0"

PRIELIPP ROAD



SECTION "C" 1/8" = 1'-0"

TYPICAL INTERIOR SIDE YARD CONDITION

ENTRY MONUMENT - TYPICAL

LANDSCAPE MASTER PLAN

PARKSIDE - TRACT 36497

LENNAR HOMES

ENLARGEMENTS / SECTIONS

SHEET 2 OF 4

City of Wildomar

LICENSED LANDSCAPE ARCHITECT David S. T. Neault No. 3886 06-30-2014 Renewal Date STATE OF CALIFORNIA

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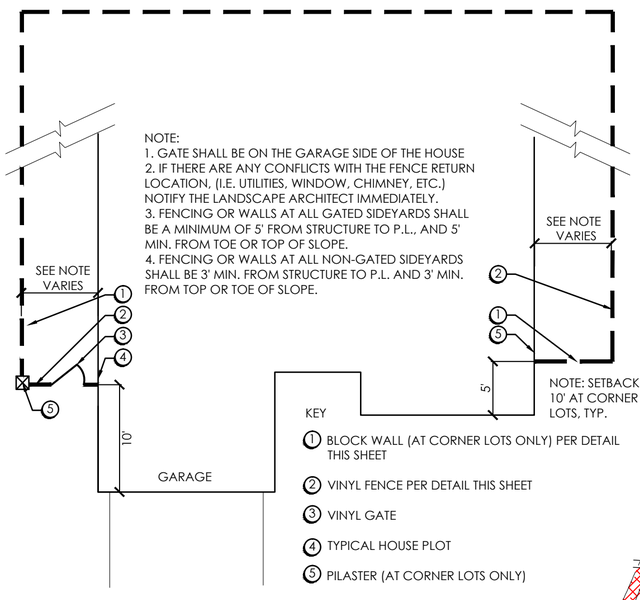
WALL AND FENCE LEGEND

SYMBOL	DESCRIPTION
------	6' HIGH BLOCK WALL - SPLITFACE BLOCK, WITH PRECISION CAP
— - - —	6' BLOCK WALL- SPLITFACE BLOCK, WITH PRECISION CAP (MINIMUM HEIGHT TO BE 6' REFER TO SOUND ATTENUATION STUDY)
—o—	6' HIGH TUBULAR STEEL FENCE
———	6' HIGH BLOCK WALL - PRECISION BLOCK, WITH PRECISION CAP
++++++	6' HIGH FUEL MODIFICATION WALL - SPLITFACE BLOCK, PRECISION CAP
☒	6'-6" HIGH SPLITFACE BLOCK PILASTER WITH PRECISION CAP

NOTE: ALL HOME RETURNS SHALL BE SPLITFACE BLOCK WITH VINYL GATE.

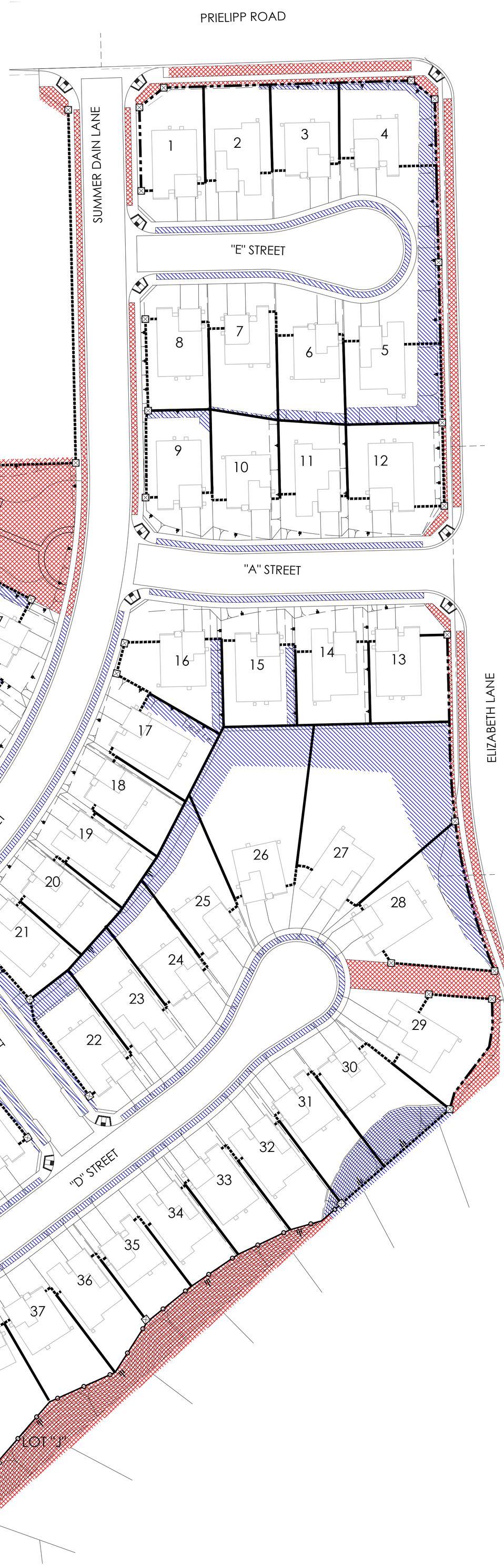
MAINTENANCE LEGEND

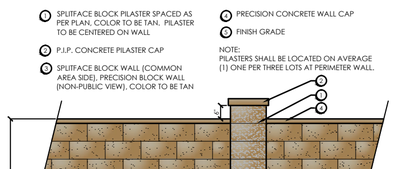
SYMBOL	DESCRIPTION
	HOA MAINTAINED LANDSCAPE 126,343 S.F. / 2.9 ACRES
	HOA MAINTAINED LANDSCAPE (PRUNE AND THIN ONLY) 14,765 S.F. / .34 ACRES
	PRIVATE MAINTAINED LANDSCAPE 126,343 S.F. / 2.9 ACRES



FRONT YARD TYPICAL FENCE LAYOUT

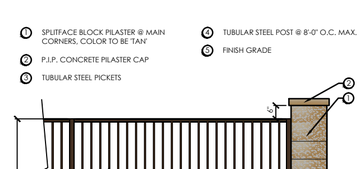
Scale: 1/8" = 1'-0"





BLOCK WALL

Scale: 1/4"= 1'-0"



TUBULAR STEEL VIEW FENCE

Scale: 1/4"= 1'-0"

LANDSCAPE MASTER PLAN

PARKSIDE - TRACT 36497

LENNAR HOMES

WALL AND FENCE / MAINTENANCE EXHIBIT

SHEET 3 OF 4

0 50' 100' 200'

Scale: 1"= 50' NORTH

City of Wildomar

LICENSED LANDSCAPE ARCHITECT David S. Yadon No. 2984 EXPIRATION 06-30-2014 STATE OF CALIFORNIA

David NEAULT ASSOCIATES Inc.
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1.27.14

EXISTING TREES TO BE REMOVED

1	(16)	9"-12" CALIPER	CUPRESSUS SEMPERVIRENS	ITALIAN CYPRESS
2	(1)	12" CALIPER	PINUS SPECIES	PINE
3	(15)	9"-12" CALIPER	CUPRESSUS SEMPERVIRENS	ITALIAN CYPRESS
4	(1)	24" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
5	(1)	20" CALIPER	SCHINUS TEREBINTHIFOLIUS	BRAZILIAN PEPPER
6	(6)	12"'-14" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
7	(2)	20" CALIPER	OLEA EUROPEA	OLIVE
8	(1)	24" CALIPER	MELIA AZEDARACH	CHINABERRY
9	(1)	10" CALIPER	PINUS SPECIES	PINE
10	(1)	24" CALIPER	WASHINGTONIA ROBUSTA	MEXICAN FAN PALM
11	(11)	12"-16" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
12	(1)	14" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
13	(1)	10" CALIPER	FRAXINUS UHDEI	SHAMEL ASH
14	(1)	12" CALIPER	FRAXINUS UHDEI	SHAMEL ASH
15	(1)	14" CALIPER	POPULUS FREMONTII	COTTONWOOD
16	(2)	10" CALIPER	POPULUS FREMONTII	COTTONWOOD
17	(1)	10" CALIPER	NECTARINE	
18	(1)	12" CALIPER	POMEGRANATE	
19	(1)	10" CALIPER	MORUS ALBA	MULBERRY
20	(2)	18"-20" CALIPER	POPULUS FREMONTII	COTTONWOOD
21	(12)	10"-16" CALIPER	SALIX LASIANDRA	WESTERN BLACK WILLOW
22	(7)	10"-20" CALIPER	POPULUS FREMONTII	COTTONWOOD
23	(1)	30" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
24	(1)	30" CALIPER	EUCALYPTUS POLYANTHEMOS	SILVER DOLLAR GUM
25	(4)	30" CALIPER	EUCALYPTUS SPECIES	EUCALYPTUS
26	(2)	12" CALIPER	EUCALYPTUS SPECIES	EUCALYPTUS
27	(1)	36" CALIPER	SCHINUS MOLLE	CALIFORNIA PEPPER
28	(1)	10" CALIPER	ALBIZIA JULIBRISSIN	MIMOSA
29	(1)	24" CALIPER	FRAXINUS UHDEI	SHAMEL ASH

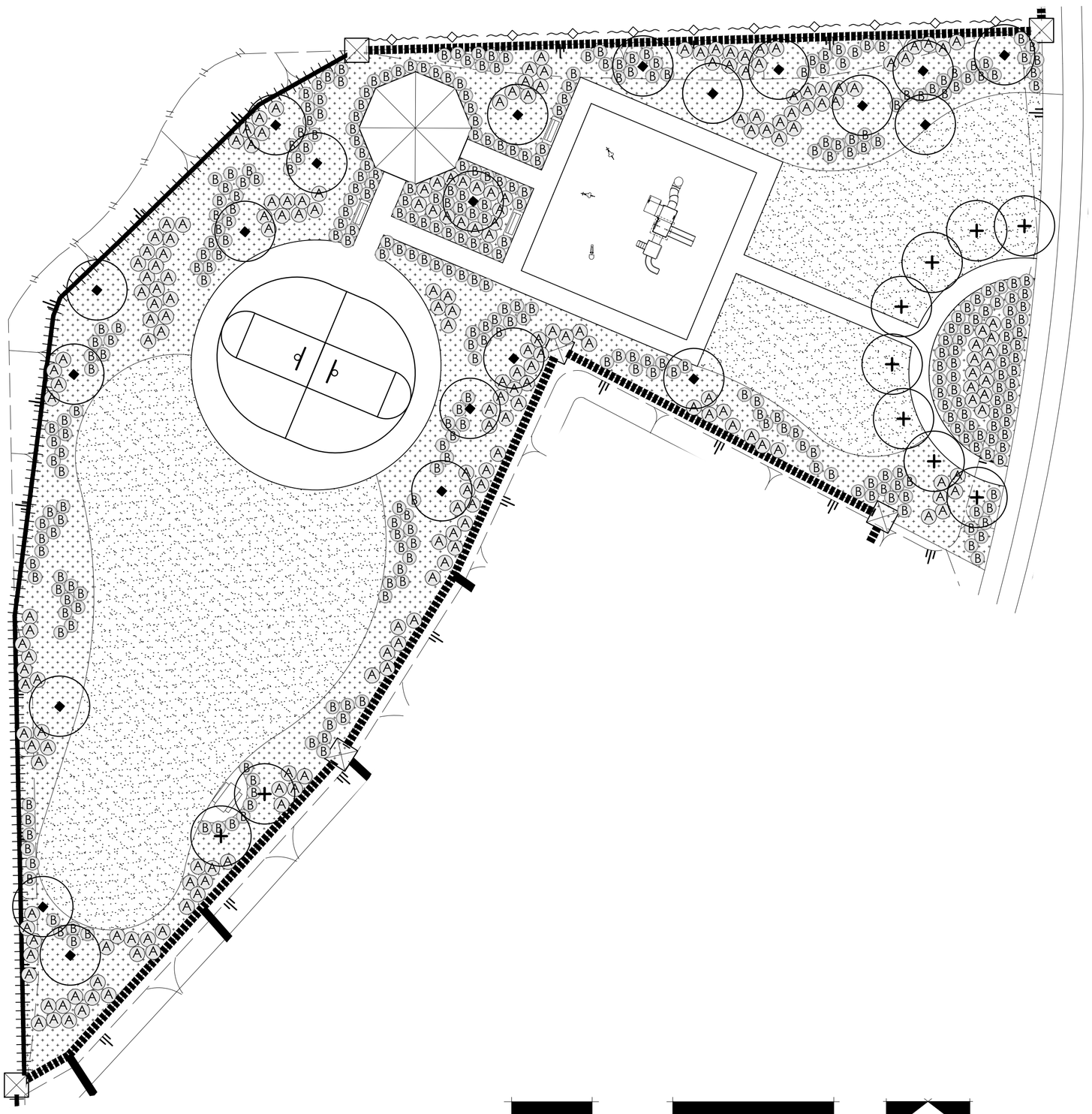
EXISTING TREES TO BE PRESERVED

A	(15)	12"-24" CALIPER	SALIX LASIANDRA	WESTERN BLACK WILLOW
B	(10)	18"-30" CALIPER	POPULUS FREMONTII	COTTONWOOD
C	(2)	36" CALIPER	QUERCUS AGRIFOLIA	COAST LIVE OAK

0 100' 200' 400'

Scale: 1"= 100' NORTH

EXISTING TREE PLAN



0 20' 40' 80'

Scale: 1"= 20' NORTH

TYPICAL PARK PLANTING

CONCEPTUAL PLANT LEGEND - TYPICAL PARK / OPEN SPACE PLANTING

BOTANICAL NAME	COMMON NAME	MIN. SIZE	PLANT FACTOR
STREET TREES			
CINNAMOMUM CAMPHORA	CAMPHOR TREE	24" BOX	MEDIUM
MAGNOLIA 'ST. MARY'S'	SOUTHERN MAGNOLIA	24" BOX	MEDIUM
PISTACIA CHINENSIS	CHINESE PISTACHE	24" BOX	MEDIUM
PLATANUS A. 'BLOODGOOD'	LONDON PLANE TREE	24" BOX	MEDIUM
PODOCARPUS GRACILIOR	FERN PINE	24" BOX	MEDIUM
QUERCUS ILEX	HOLLY OAK	24" BOX	LOW
PYRUS CALLERYANA "BRADFORD"	BRADFORD PEAR	24" BOX	MEDIUM
ULMUS PARVIFOLIA "DRAKE"	EVERGREEN ELM	24" BOX	MEDIUM
SLOPE AND LANDSCAPE TREES			
GEIJERA PARVIFLORA	AUSTRALIAN WILLOW	15 GALLON	MEDIUM
LIQUIDAMBER STYRACIFLUA	SWEET GUM	15 GALLON	MEDIUM
PISTACIA CHINENSIS	CHINESE PISTACHE	15 GALLON	MEDIUM
PLATANUS A. 'BLOODGOOD'	LONDON PLANE TREE	15 GALLON	MEDIUM
PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	15 GALLON	MEDIUM
QUERCUS AGRIFOLIA	COAST LIVE OAK	15 GALLON	LOW
QUERCUS ENGELMANNII	ENGELMANN OAK	15 GALLON	LOW
RHUS LANCEA	AFRICAN SUMAC	15 GALLON	LOW
ACCENT TREES			
LAGERSTROEMIA INDICA	CRAPE MYRTLE	24" BOX	MEDIUM
PRUNUS C. 'ATROPURPUREA'	PURPLE LEAF PLUM	24" BOX	MEDIUM
PYRUS CALLERYANA "BRADFORD"	BRADFORD PEAR	24" BOX	MEDIUM
FOUNDATION SHRUBS			
ARBUTUS UNEDO	STRAWBERRY TREE	5 GALLON	LOW
BUXUS JAPONICA	JAPANESE BOXWOOD	5 GALLON	LOW
DODONEA V. 'PURPUREA'	PURPLE HOPSEED	5 GALLON	LOW
ELEAGNUS PUNGENS	SILVERBERRY	5 GALLON	LOW
FEIJOA SELLOWIANA	PINEAPPLE GUAVA	5 GALLON	LOW
GREVILLEA NOELII	GREVILLEA	5 GALLON	LOW
LIGUSTRUM J. 'TEXANUM'	TEXAS PRIVET	5 GALLON	LOW
PHORMIUM TENAX	NEW ZEALAND FLAX	5 GALLON	MEDIUM
PHOTINIA FRASERI	RED-TIP PHOTINIA	5 GALLON	MEDIUM
PITTOSPORUM TOBIRA	WHEELER'S DWARF	5 GALLON	MEDIUM
RHAPHIOLEPIS INDICA	INDIA HAWTHORN	5 GALLON	MEDIUM
ROSMARINUS OFFICINALIS	ROSEMARY	5 GALLON	LOW
FOREGROUND SHRUBS / PERENNIALS			
CISTUS PURPUREUS	ROCKROSE	1 GALLON	LOW
SALVIA LEUCANTHA	MEXICAN BUSH SAGE	1 GALLON	LOW
DIETES VEGETA	FORTNIGHT LILY	1 GALLON	MEDIUM
HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS	1 GALLON	LOW
HEMEROCALLIS HYBRID	DAYLILY	1 GALLON	MEDIUM
PENNISETUM ORIENTALE	ORIENTAL FOUNTAIN GRASS	1 GALLON	MEDIUM
JUNIPERUS SPECIES	JUNIPER	1 GALLON	MEDIUM
ROSA "RED RIBBONS"	GROUNDCOVER ROSE	1 GALLON	MEDIUM
LOW AND MEDIUM HEIGHT GROUNDCOVERS			
BACCHARIS P. 'PIGEON POINT'	DWARF COYOTE BRUSH	1 GALLON @ 36" O.C.	LOW
CEANOTHUS G. HORIZONTALIS	CARMEL CREEPER	1 GALLON @ 36" O.C.	LOW
CISTUS SALVIFOLIUS	SAGELEAF ROCKROSE	1 GALLON @ 36" O.C.	LOW
COTONEASTER D. "LOWFAST"	LOWFAST COTONEASTER	1 GALLON @ 36" O.C.	LOW
MYOPORUM "PINK"	PINK MYOPORUM	1 GALLON @ 24" O.C.	LOW
ROSMARINUS O. 'PROSTRATUS'	PROSTRATE ROSEMARY	1 GALLON @ 24" O.C.	LOW
VINES			
DISTICTUS BUCCINATORIA	RED TRUMPET VINE	5 GALLON	MEDIUM
MACFADYENA UNGUIS-CATI	CAT'S CLAW VINE	5 GALLON	MEDIUM
PARTHENOCISSUS TRICUSPIDATA	BOSTON IVY	5 GALLON	MEDIUM
TURF			
MARATHON III (OR EQUAL)	DWARF TALL FESCUE	SODDED	HIGH

NOTE: ALL PLANTS MUST BE HYDROZONED ON EACH IRRIGATION VALVE. USE ONLY LOW WATER USE PLANTS TOGETHER OR MEDIUM WATER USE PLANTS TOGETHER. DON NOT MIX THE TWO ON A SINGLE IRRIGATION VALVE. STRICT WATER CONSERVATION IS REQUIRED BY EVMWD.

LICENSED LANDSCAPE ARCHITECT DAVID S. NEAULT No. 3589 06-30-2014 STATE OF CALIFORNIA

EXISTING TREE PLAN AND
TYPICAL PARK PLANTING

SHEET 4 OF 4

LANDSCAPE MASTER PLAN

PARKSIDE - TRACT 36497

LENNAR HOMES

City of Wildomar

David NEAULT ASSOCIATES Inc.
951 | 296 | 3430
www.dnassociates.com

1.27.14

23 Lennar

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Single Family Housing	67	Dwelling Unit
City Park	5	Acre

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Southern California Edison
Climate Zone	10		2.2		
		Precipitation Freq (Days)			
			31		

1.3 User Entered Comments

Off-road Equipment - Diesel-fueled construciton load factors reduced 33% to account for offroad emission overestimation. Source - California Air Resources Board. 2010. "Staff Report: Proposed Amendments to the Regulation for In-Use Off Road Diesel-Fueled Fleets and the OFFROAD Large Spark-Ignition Fleet Requirements. October 2010.

Architectural Coating - SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - SCAQMD Rule 403

Area Mitigation - SCAQMD Rule 445

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	8.09	65.68	36.90	0.07	18.30	3.10	20.97	9.93	3.10	12.60	0.00	7,518.06	0.00	0.73	0.00	7,533.29
2014	41.19	26.41	20.96	0.04	0.38	1.86	2.06	0.01	1.86	1.86	0.00	3,672.32	0.00	0.36	0.00	3,679.89
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	8.09	65.68	36.90	0.07	8.36	3.10	11.03	4.47	3.10	7.14	0.00	7,518.06	0.00	0.73	0.00	7,533.29
2014	41.19	26.41	20.96	0.04	0.38	1.86	2.06	0.01	1.86	1.86	0.00	3,672.32	0.00	0.36	0.00	3,679.89
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	9.96	0.39	27.91	0.05		0.00	3.57		0.00	3.57	472.80	1,216.07		1.88	0.03	1,737.37
Energy	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Mobile	3.48	8.23	35.01	0.06	6.41	0.37	6.78	0.09	0.32	0.41		6,037.66		0.23		6,042.47
Total	**13.52**	**9.31**	**63.21**	**0.11**	**6.41**	**0.37**	**10.41**	**0.09**	**0.32**	**4.04**	**472.80**	**8,128.88**		**2.13**	**0.05**	**8,660.32**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.95	0.07	5.74	0.00		0.00	0.11		0.00	0.11	0.00	1,287.02		0.04	0.02	1,295.01
Energy	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Mobile	3.48	8.23	35.01	0.06	6.41	0.37	6.78	0.09	0.32	0.41		6,037.66		0.23		6,042.47
Total	**6.51**	**8.99**	**41.04**	**0.06**	**6.41**	**0.37**	**6.95**	**0.09**	**0.32**	**0.58**	**0.00**	**8,199.83**		**0.29**	**0.04**	**8,217.96**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.07	0.00	18.07	9.93	0.00	9.93						0.00
Off-Road	6.70	54.15	30.68	0.05		2.66	2.66		2.66	2.66		5,413.51		0.60		5,426.15
Total	**6.70**	**54.15**	**30.68**	**0.05**	**18.07**	**2.66**	**20.73**	**9.93**	**2.66**	**12.59**		**5,413.51**		**0.60**		**5,426.15**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.16	0.00	0.23	0.01	0.24	0.00	0.01	0.01		193.08		0.01		193.31
Total	**0.10**	**0.10**	**1.16**	**0.00**	**0.23**	**0.01**	**0.24**	**0.00**	**0.01**	**0.01**		**193.08**		**0.01**		**193.31**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.13	0.00	8.13	4.47	0.00	4.47						0.00
Off-Road	6.70	54.15	30.68	0.05		2.66	2.66		2.66	2.66	0.00	5,413.51		0.60		5,426.15
Total	**6.70**	**54.15**	**30.68**	**0.05**	**8.13**	**2.66**	**10.79**	**4.47**	**2.66**	**7.13**	**0.00**	**5,413.51**		**0.60**		**5,426.15**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.10	0.10	1.16	0.00	0.23	0.01	0.24	0.00	0.01	0.01		193.08		0.01		193.31
Total	**0.10**	**0.10**	**1.16**	**0.00**	**0.23**	**0.01**	**0.24**	**0.00**	**0.01**	**0.01**		**193.08**		**0.01**		**193.31**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.73	0.00	6.73	3.31	0.00	3.31						0.00
Off-Road	7.98	65.57	35.61	0.07		3.09	3.09		3.09	3.09		7,303.53		0.71		7,318.50
Total	**7.98**	**65.57**	**35.61**	**0.07**	**6.73**	**3.09**	**9.82**	**3.31**	**3.09**	**6.40**		**7,303.53**		**0.71**		**7,318.50**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.11	0.11	1.29	0.00	0.26	0.01	0.27	0.00	0.01	0.01		214.53		0.01		214.79
Total	**0.11**	**0.11**	**1.29**	**0.00**	**0.26**	**0.01**	**0.27**	**0.00**	**0.01**	**0.01**		**214.53**		**0.01**		**214.79**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.03	0.00	3.03	1.49	0.00	1.49						0.00
Off-Road	7.98	65.57	35.61	0.07		3.09	3.09		3.09	3.09	0.00	7,303.53		0.71		7,318.50
Total	**7.98**	**65.57**	**35.61**	**0.07**	**3.03**	**3.09**	**6.12**	**1.49**	**3.09**	**4.58**	**0.00**	**7,303.53**		**0.71**		**7,318.50**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.11	0.11	1.29	0.00	0.26	0.01	0.27	0.00	0.01	0.01		214.53		0.01		214.79
Total	**0.11**	**0.11**	**1.29**	**0.00**	**0.26**	**0.01**	**0.27**	**0.00**	**0.01**	**0.01**		**214.53**		**0.01**		**214.79**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.18	27.32	19.09	0.03		1.79	1.79		1.79	1.79		3,228.71		0.37		3,236.55
Total	**4.18**	**27.32**	**19.09**	**0.03**		**1.79**	**1.79**		**1.79**	**1.79**		**3,228.71**		**0.37**		**3,236.55**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.15	0.69	0.00	0.06	0.04	0.10	0.00	0.04	0.04		190.17		0.01		190.28
Worker	0.13	0.13	1.55	0.00	0.31	0.01	0.32	0.00	0.01	0.01		257.43		0.01		257.75
Total	**0.23**	**1.28**	**2.24**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.05**	**0.05**		**447.60**		**0.02**		**448.03**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.18	27.32	19.09	0.03		1.79	1.79		1.79	1.79	0.00	3,228.71		0.37		3,236.55
Total	**4.18**	**27.32**	**19.09**	**0.03**		**1.79**	**1.79**		**1.79**	**1.79**	**0.00**	**3,228.71**		**0.37**		**3,236.55**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.15	0.69	0.00	0.06	0.04	0.10	0.00	0.04	0.04		190.17		0.01		190.28
Worker	0.13	0.13	1.55	0.00	0.31	0.01	0.32	0.00	0.01	0.01		257.43		0.01		257.75
Total	**0.23**	**1.28**	**2.24**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.05**	**0.05**		**447.60**		**0.02**		**448.03**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.82	25.25	18.90	0.03		1.59	1.59		1.59	1.59		3,228.71		0.34		3,235.90
Total	**3.82**	**25.25**	**18.90**	**0.03**		**1.59**	**1.59**		**1.59**	**1.59**		**3,228.71**		**0.34**		**3,235.90**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.09	1.04	0.63	0.00	0.06	0.04	0.10	0.00	0.03	0.03		190.64		0.00		190.74
Worker	0.12	0.12	1.43	0.00	0.31	0.01	0.32	0.00	0.01	0.01		252.96		0.01		253.26
Total	**0.21**	**1.16**	**2.06**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.04**	**0.04**		**443.60**		**0.01**		**444.00**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.82	25.25	18.90	0.03		1.59	1.59		1.59	1.59	0.00	3,228.71		0.34		3,235.90
Total	**3.82**	**25.25**	**18.90**	**0.03**		**1.59**	**1.59**		**1.59**	**1.59**	**0.00**	**3,228.71**		**0.34**		**3,235.90**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.09	1.04	0.63	0.00	0.06	0.04	0.10	0.00	0.03	0.03		190.64		0.00		190.74
Worker	0.12	0.12	1.43	0.00	0.31	0.01	0.32	0.00	0.01	0.01		252.96		0.01		253.26
Total	**0.21**	**1.16**	**2.06**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.04**	**0.04**		**443.60**		**0.01**		**444.00**

3.5 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.53	21.77	14.04	0.02		1.86	1.86		1.86	1.86		1,979.15		0.32		1,985.82
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**3.53**	**21.77**	**14.04**	**0.02**		**1.86**	**1.86**		**1.86**	**1.86**		**1,979.15**		**0.32**		**1,985.82**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.08	0.89	0.00	0.20	0.01	0.20	0.00	0.01	0.01		158.10		0.01		158.29
Total	**0.08**	**0.08**	**0.89**	**0.00**	**0.20**	**0.01**	**0.20**	**0.00**	**0.01**	**0.01**		**158.10**		**0.01**		**158.29**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.53	21.77	14.04	0.02		1.86	1.86		1.86	1.86	0.00	1,979.15		0.32		1,985.82
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**3.53**	**21.77**	**14.04**	**0.02**		**1.86**	**1.86**		**1.86**	**1.86**	**0.00**	**1,979.15**		**0.32**		**1,985.82**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.08	0.89	0.00	0.20	0.01	0.20	0.00	0.01	0.01		158.10		0.01		158.29
Total	**0.08**	**0.08**	**0.89**	**0.00**	**0.20**	**0.01**	**0.20**	**0.00**	**0.01**	**0.01**		**158.10**		**0.01**		**158.29**

3.6 Architectural Coating - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.71					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24		281.19		0.04		282.03
Total	**41.16**	**2.77**	**1.92**	**0.00**		**0.24**	**0.24**		**0.24**	**0.24**		**281.19**		**0.04**		**282.03**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00

Worker	0.03	0.03	0.30	0.00	0.07	0.00	0.07	0.00	0.00	0.00		52.70		0.00		52.76
Total	**0.03**	**0.03**	**0.30**	**0.00**	**0.07**	**0.00**	**0.07**	**0.00**	**0.00**	**0.00**		**52.70**		**0.00**		**52.76**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.71					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24	0.00	281.19		0.04		282.03
Total	**41.16**	**2.77**	**1.92**	**0.00**		**0.24**	**0.24**		**0.24**	**0.24**	**0.00**	**281.19**		**0.04**		**282.03**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.03	0.03	0.30	0.00	0.07	0.00	0.07	0.00	0.00	0.00		52.70		0.00		52.76
Total	**0.03**	**0.03**	**0.30**	**0.00**	**0.07**	**0.00**	**0.07**	**0.00**	**0.00**	**0.00**		**52.70**		**0.00**		**52.76**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.48	8.23	35.01	0.06	6.41	0.37	6.78	0.09	0.32	0.41		6,037.66		0.23		6,042.47
Unmitigated	3.48	8.23	35.01	0.06	6.41	0.37	6.78	0.09	0.32	0.41		6,037.66		0.23		6,042.47
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	7.95	7.95	7.95	16,972	16,972
Single Family Housing	641.19	675.36	587.59	1,813,173	1,813,173
Total	649.14	683.31	595.54	1,830,145	1,830,145

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
City Park	9.50	7.30	7.30	33.00	48.00	19.00
Single Family Housing	10.80	7.30	7.50	40.20	19.20	40.60

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
NaturalGas Unmitigated	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Single Family Housing	7438.8	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total		**0.08**	**0.69**	**0.29**	**0.00**		**0.00**	**0.06**		**0.00**	**0.06**		**875.15**		**0.02**	**0.02**	**880.48**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Single Family Housing	7.4388	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total		**0.08**	**0.69**	**0.29**	**0.00**		**0.00**	**0.06**		**0.00**	**0.06**		**875.15**		**0.02**	**0.02**	**880.48**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.95	0.07	5.74	0.00		0.00	0.11		0.00	0.11	0.00	1,287.02		0.04	0.02	1,295.01
Unmitigated	9.96	0.39	27.91	0.05		0.00	3.57		0.00	3.57	472.80	1,216.07		1.88	0.03	1,737.37
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.26					0.00	0.00		0.00	0.00						0.00
Consumer Products	2.39					0.00	0.00		0.00	0.00						0.00
Hearth	7.13	0.33	22.18	0.05		0.00	3.54		0.00	3.54	472.80	1,206.00		1.87	0.03	1,727.08
Landscaping	0.19	0.07	5.73	0.00		0.00	0.03		0.00	0.03		10.07		0.01		10.30
Total	**9.97**	**0.40**	**27.91**	**0.05**		**0.00**	**3.57**		**0.00**	**3.57**	**472.80**	**1,216.07**		**1.88**	**0.03**	**1,737.38**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.26					0.00	0.00		0.00	0.00						0.00
Consumer Products	2.39					0.00	0.00		0.00	0.00						0.00
Hearth	0.12	0.00	0.01	0.00		0.00	0.08		0.00	0.08	0.00	1,276.94		0.02	0.02	1,284.71
Landscaping	0.19	0.07	5.73	0.00		0.00	0.03		0.00	0.03		10.07		0.01		10.30
Total	**2.96**	**0.07**	**5.74**	**0.00**		**0.00**	**0.11**		**0.00**	**0.11**	**0.00**	**1,287.01**		**0.03**	**0.02**	**1,295.01**

23 Lennar

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Single Family Housing	67	Dwelling Unit
City Park	5	Acre

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Southern California Edison
Climate Zone	10		2.2		
		Precipitation Freq (Days)			
			31		

1.3 User Entered Comments

Off-road Equipment - Diesel-fueled construciton load factors reduced 33% to account for offroad emission overestimation. Source - California Air Resources Board. 2010. "Staff Report: Proposed Amendments to the Regulation for In-Use Off Road Diesel-Fueled Fleets and the OFFROAD Large Spark-Ignition Fleet Requirements. October 2010.

Architectural Coating - SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - SCAQMD Rule 403

Area Mitigation - SCAQMD Rule 445

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	8.10	65.70	36.82	0.07	18.30	3.10	20.97	9.93	3.10	12.60	0.00	7,500.11	0.00	0.72	0.00	7,515.33
2014	41.19	26.47	20.95	0.04	0.38	1.86	2.06	0.01	1.86	1.86	0.00	3,649.66	0.00	0.36	0.00	3,657.23
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2013	8.10	65.70	36.82	0.07	8.36	3.10	11.03	4.47	3.10	7.14	0.00	7,500.11	0.00	0.72	0.00	7,515.33
2014	41.19	26.47	20.95	0.04	0.38	1.86	2.06	0.01	1.86	1.86	0.00	3,649.66	0.00	0.36	0.00	3,657.23
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	9.96	0.39	27.91	0.05		0.00	3.57		0.00	3.57	472.80	1,216.07		1.88	0.03	1,737.37
Energy	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Mobile	3.68	8.88	34.18	0.06	6.41	0.37	6.78	0.09	0.32	0.41		5,618.40		0.24		5,623.35
Total	**13.72**	**9.96**	**62.38**	**0.11**	**6.41**	**0.37**	**10.41**	**0.09**	**0.32**	**4.04**	**472.80**	**7,709.62**		**2.14**	**0.05**	**8,241.20**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.95	0.07	5.74	0.00		0.00	0.11		0.00	0.11	0.00	1,287.02		0.04	0.02	1,295.01
Energy	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Mobile	3.68	8.88	34.18	0.06	6.41	0.37	6.78	0.09	0.32	0.41		5,618.40		0.24		5,623.35
Total	**6.71**	**9.64**	**40.21**	**0.06**	**6.41**	**0.37**	**6.95**	**0.09**	**0.32**	**0.58**	**0.00**	**7,780.57**		**0.30**	**0.04**	**7,798.84**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.07	0.00	18.07	9.93	0.00	9.93						0.00
Off-Road	6.70	54.15	30.68	0.05		2.66	2.66		2.66	2.66		5,413.51		0.60		5,426.15
Total	**6.70**	**54.15**	**30.68**	**0.05**	**18.07**	**2.66**	**20.73**	**9.93**	**2.66**	**12.59**		**5,413.51**		**0.60**		**5,426.15**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.11	0.11	1.08	0.00	0.23	0.01	0.24	0.00	0.01	0.01		176.92		0.01		177.14
Total	**0.11**	**0.11**	**1.08**	**0.00**	**0.23**	**0.01**	**0.24**	**0.00**	**0.01**	**0.01**		**176.92**		**0.01**		**177.14**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.13	0.00	8.13	4.47	0.00	4.47						0.00
Off-Road	6.70	54.15	30.68	0.05		2.66	2.66		2.66	2.66	0.00	5,413.51		0.60		5,426.15
Total	**6.70**	**54.15**	**30.68**	**0.05**	**8.13**	**2.66**	**10.79**	**4.47**	**2.66**	**7.13**	**0.00**	**5,413.51**		**0.60**		**5,426.15**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.11	0.11	1.08	0.00	0.23	0.01	0.24	0.00	0.01	0.01		176.92		0.01		177.14
Total	**0.11**	**0.11**	**1.08**	**0.00**	**0.23**	**0.01**	**0.24**	**0.00**	**0.01**	**0.01**		**176.92**		**0.01**		**177.14**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.73	0.00	6.73	3.31	0.00	3.31						0.00
Off-Road	7.98	65.57	35.61	0.07		3.09	3.09		3.09	3.09		7,303.53		0.71		7,318.50
Total	**7.98**	**65.57**	**35.61**	**0.07**	**6.73**	**3.09**	**9.82**	**3.31**	**3.09**	**6.40**		**7,303.53**		**0.71**		**7,318.50**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.12	0.13	1.21	0.00	0.26	0.01	0.27	0.00	0.01	0.01		196.57		0.01		196.82
Total	**0.12**	**0.13**	**1.21**	**0.00**	**0.26**	**0.01**	**0.27**	**0.00**	**0.01**	**0.01**		**196.57**		**0.01**		**196.82**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.03	0.00	3.03	1.49	0.00	1.49						0.00
Off-Road	7.98	65.57	35.61	0.07		3.09	3.09		3.09	3.09	0.00	7,303.53		0.71		7,318.50
Total	**7.98**	**65.57**	**35.61**	**0.07**	**3.03**	**3.09**	**6.12**	**1.49**	**3.09**	**4.58**	**0.00**	**7,303.53**		**0.71**		**7,318.50**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.12	0.13	1.21	0.00	0.26	0.01	0.27	0.00	0.01	0.01		196.57		0.01		196.82
Total	**0.12**	**0.13**	**1.21**	**0.00**	**0.26**	**0.01**	**0.27**	**0.00**	**0.01**	**0.01**		**196.57**		**0.01**		**196.82**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.18	27.32	19.09	0.03		1.79	1.79		1.79	1.79		3,228.71		0.37		3,236.55
Total	**4.18**	**27.32**	**19.09**	**0.03**		**1.79**	**1.79**		**1.79**	**1.79**		**3,228.71**		**0.37**		**3,236.55**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.11	1.20	0.78	0.00	0.06	0.04	0.11	0.00	0.04	0.04		188.76		0.01		188.88
Worker	0.14	0.15	1.45	0.00	0.31	0.01	0.32	0.00	0.01	0.01		235.89		0.01		236.19
Total	**0.25**	**1.35**	**2.23**	**0.00**	**0.37**	**0.05**	**0.43**	**0.00**	**0.05**	**0.05**		**424.65**		**0.02**		**425.07**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.18	27.32	19.09	0.03		1.79	1.79		1.79	1.79	0.00	3,228.71		0.37		3,236.55
Total	**4.18**	**27.32**	**19.09**	**0.03**		**1.79**	**1.79**		**1.79**	**1.79**	**0.00**	**3,228.71**		**0.37**		**3,236.55**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.11	1.20	0.78	0.00	0.06	0.04	0.11	0.00	0.04	0.04		188.76		0.01		188.88
Worker	0.14	0.15	1.45	0.00	0.31	0.01	0.32	0.00	0.01	0.01		235.89		0.01		236.19
Total	**0.25**	**1.35**	**2.23**	**0.00**	**0.37**	**0.05**	**0.43**	**0.00**	**0.05**	**0.05**		**424.65**		**0.02**		**425.07**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.82	25.25	18.90	0.03		1.59	1.59		1.59	1.59		3,228.71		0.34		3,235.90
Total	**3.82**	**25.25**	**18.90**	**0.03**		**1.59**	**1.59**		**1.59**	**1.59**		**3,228.71**		**0.34**		**3,235.90**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.09	0.72	0.00	0.06	0.04	0.10	0.00	0.03	0.04		189.19		0.00		189.30
Worker	0.13	0.14	1.33	0.00	0.31	0.01	0.32	0.00	0.01	0.01		231.75		0.01		232.03
Total	**0.23**	**1.23**	**2.05**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.04**	**0.05**		**420.94**		**0.01**		**421.33**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.82	25.25	18.90	0.03		1.59	1.59		1.59	1.59	0.00	3,228.71		0.34		3,235.90
Total	**3.82**	**25.25**	**18.90**	**0.03**		**1.59**	**1.59**		**1.59**	**1.59**	**0.00**	**3,228.71**		**0.34**		**3,235.90**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.10	1.09	0.72	0.00	0.06	0.04	0.10	0.00	0.03	0.04		189.19		0.00		189.30
Worker	0.13	0.14	1.33	0.00	0.31	0.01	0.32	0.00	0.01	0.01		231.75		0.01		232.03
Total	**0.23**	**1.23**	**2.05**	**0.00**	**0.37**	**0.05**	**0.42**	**0.00**	**0.04**	**0.05**		**420.94**		**0.01**		**421.33**

3.5 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.53	21.77	14.04	0.02		1.86	1.86		1.86	1.86		1,979.15		0.32		1,985.82
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**3.53**	**21.77**	**14.04**	**0.02**		**1.86**	**1.86**		**1.86**	**1.86**		**1,979.15**		**0.32**		**1,985.82**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.09	0.83	0.00	0.20	0.01	0.20	0.00	0.01	0.01		144.85		0.01		145.02
Total	**0.08**	**0.09**	**0.83**	**0.00**	**0.20**	**0.01**	**0.20**	**0.00**	**0.01**	**0.01**		**144.85**		**0.01**		**145.02**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.53	21.77	14.04	0.02		1.86	1.86		1.86	1.86	0.00	1,979.15		0.32		1,985.82
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**3.53**	**21.77**	**14.04**	**0.02**		**1.86**	**1.86**		**1.86**	**1.86**	**0.00**	**1,979.15**		**0.32**		**1,985.82**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.08	0.09	0.83	0.00	0.20	0.01	0.20	0.00	0.01	0.01		144.85		0.01		145.02
Total	**0.08**	**0.09**	**0.83**	**0.00**	**0.20**	**0.01**	**0.20**	**0.00**	**0.01**	**0.01**		**144.85**		**0.01**		**145.02**

3.6 Architectural Coating - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.71					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24		281.19		0.04		282.03
Total	**41.16**	**2.77**	**1.92**	**0.00**		**0.24**	**0.24**		**0.24**	**0.24**		**281.19**		**0.04**		**282.03**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.03	0.03	0.28	0.00	0.07	0.00	0.07	0.00	0.00	0.00		48.28		0.00		48.34
Total	**0.03**	**0.03**	**0.28**	**0.00**	**0.07**	**0.00**	**0.07**	**0.00**	**0.00**	**0.00**		**48.28**		**0.00**		**48.34**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.71					0.00	0.00		0.00	0.00						0.00
Off-Road	0.45	2.77	1.92	0.00		0.24	0.24		0.24	0.24	0.00	281.19		0.04		282.03
Total	**41.16**	**2.77**	**1.92**	**0.00**		**0.24**	**0.24**		**0.24**	**0.24**	**0.00**	**281.19**		**0.04**		**282.03**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00		0.00
Worker	0.03	0.03	0.28	0.00	0.07	0.00	0.07	0.00	0.00	0.00		48.28		0.00		48.34
Total	**0.03**	**0.03**	**0.28**	**0.00**	**0.07**	**0.00**	**0.07**	**0.00**	**0.00**	**0.00**		**48.28**		**0.00**		**48.34**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.68	8.88	34.18	0.06	6.41	0.37	6.78	0.09	0.32	0.41		5,618.40		0.24		5,623.35
Unmitigated	3.68	8.88	34.18	0.06	6.41	0.37	6.78	0.09	0.32	0.41		5,618.40		0.24		5,623.35
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	7.95	7.95	7.95	16,972	16,972
Single Family Housing	641.19	675.36	587.59	1,813,173	1,813,173
Total	649.14	683.31	595.54	1,830,145	1,830,145

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
City Park	9.50	7.30	7.30	33.00	48.00	19.00
Single Family Housing	10.80	7.30	7.50	40.20	19.20	40.60

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
NaturalGas Unmitigated	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Single Family Housing	7438.8	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total		**0.08**	**0.69**	**0.29**	**0.00**		**0.00**	**0.06**		**0.00**	**0.06**		**875.15**		**0.02**	**0.02**	**880.48**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	lb/day										lb/day					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00	0.00	0.00
Single Family Housing	7.4388	0.08	0.69	0.29	0.00		0.00	0.06		0.00	0.06		875.15		0.02	0.02	880.48
Total		**0.08**	**0.69**	**0.29**	**0.00**		**0.00**	**0.06**		**0.00**	**0.06**		**875.15**		**0.02**	**0.02**	**880.48**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.95	0.07	5.74	0.00		0.00	0.11		0.00	0.11	0.00	1,287.02		0.04	0.02	1,295.01
Unmitigated	9.96	0.39	27.91	0.05		0.00	3.57		0.00	3.57	472.80	1,216.07		1.88	0.03	1,737.37
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.26					0.00	0.00		0.00	0.00						0.00
Consumer Products	2.39					0.00	0.00		0.00	0.00						0.00
Hearth	7.13	0.33	22.18	0.05		0.00	3.54		0.00	3.54	472.80	1,206.00		1.87	0.03	1,727.08
Landscaping	0.19	0.07	5.73	0.00		0.00	0.03		0.00	0.03		10.07		0.01		10.30
Total	**9.97**	**0.40**	**27.91**	**0.05**		**0.00**	**3.57**		**0.00**	**3.57**	**472.80**	**1,216.07**		**1.88**	**0.03**	**1,737.38**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.26					0.00	0.00		0.00	0.00						0.00
Consumer Products	2.39					0.00	0.00		0.00	0.00						0.00
Hearth	0.12	0.00	0.01	0.00		0.00	0.08		0.00	0.08	0.00	1,276.94		0.02	0.02	1,284.71
Landscaping	0.19	0.07	5.73	0.00		0.00	0.03		0.00	0.03		10.07		0.01		10.30
Total	**2.96**	**0.07**	**5.74**	**0.00**		**0.00**	**0.11**		**0.00**	**0.11**	**0.00**	**1,287.01**		**0.03**	**0.02**	**1,295.01**

Habitat Assessment
(Burrowing Owl, Narrow Endemic Plants, and Criteria Area Species) and MSHCP Consistency Analysis for the Parkside Project
City of Wildomar, Riverside County, California

Murrieta, California, USGS 7.5-minute Topographic Quadrangle Map
Section 6, Township 7 South, Range 3 West
APNs: 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012

Prepared for:

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Michael Brandman Associates

Survey Conducted By: Scott Crawford
Survey Conducted On: September 6, 2012
Report Date: November 15, 2012
Revised Date: May 22, 2014

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SUMMARY

This report contains the results of a habitat assessment and Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Consistency Analysis conducted by Michael Brandman Associates (MBA) on a 24-acre property, the Parkside Project, located in the City of Wildomar, Riverside County, California. The project site is within the Elsinore Area Plan of the MSHCP but is not located within any Criteria Cells.

The project site is located in the southern portion of the City of Wildomar, east of Interstate (I) 15, and west of I-215. The project site previously contained several rural residences. All structures have recently been removed and the majority of the project site is significantly disturbed and is characterized by weedy vegetation with patches of coastal sage scrub and a single drainage feature with significant riparian habitat.

The project site occurs within an MSHCP-designated habitat assessment survey area for burrowing owl (*Athene cunicularia*). It was determined that burrowing owl has the potential to occur on and in the immediate vicinity of the site. A focused survey effort for burrowing owl should be completed in accordance with survey instructions developed by Riverside County's Environmental Programs Department for the MSHCP.

The project site contains two drainage features. The main drainage feature (Feature 1) is located in the western portion of the project site. This drainage feature is under the jurisdiction of the United States Army Corps of Engineers (USACE), the California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board (RWQCB). Feature 1 will be completely undisturbed and remain as undeveloped open-space. A small tributary in the eastern portion of the project site (Feature 2) will be completely removed during project construction. This drainage feature is under the regulatory jurisdiction of the CDFW and the RWQCB. A Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code (CDFG Code) will required for impacts to Feature 1. In addition, Waste Discharge Requirements will be required from the RWQCB for impacts to Feature 1.

Based upon a field visit with CDFW and USFWS representatives, it has been determined that Features 2 is also A Riparian/Riverine area under the MSHCP. The total amount of Riparian/Riverine area that will be impacted by project-related activities will be 0.159 acre. Lennar Homes has agreed to a combination of avoidance, enhancement, and purchase of offsite land (0.419 acre) for preservation as part of the mitigation for impacts to the Riparian/Riverine area. Further details concerning Feature 2 and this mitigation are discussed in the revised Determination of Biologically Equivalent or Superior Preservation (DBESP) analysis.

The project site contains occupied coastal California gnatcatcher (*Polioptila californica californica*) habitat. The MSHCP provides take authority for this species, provided the project site is consistent

with the MSHCP. Payment of the appropriate MSHCP fee as well as appropriate avoidance measures would reduce the impacts to this species to a level less than significant under the CEQA process.

Portions of the project site and immediate vicinity contain suitable nesting habitat for tree- and ground-nesting avian species. If construction activities on the project site commence during the avian breeding season (February through August) a pre-construction clearance survey for nesting birds would be required for adherence to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (CFG Code) § 3503.

SECTION 1: INTRODUCTION

At the request of Lennar Homes, Inc., MBA conducted a Habitat Assessment and MSHCP Consistency Analysis for the Parkside project. The proposed project consists of a residential development, hereafter referred to as project site or site, located in the City of Wildomar, Riverside County, California. The purpose of the MSHCP Consistency Analysis is to assess the existing site conditions to determine if any sensitive plant community, plants, or wildlife species potentially occur within the project site and to analyze the results to determine if the proposed project is consisted with the requirements in the MSHCP.

1.1 - Project Location

The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, in the southern portion of the City of Wildomar, Riverside County, California (Exhibit 1). The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kennadine Drive, and west of Elizabeth Lane (Exhibit 3).

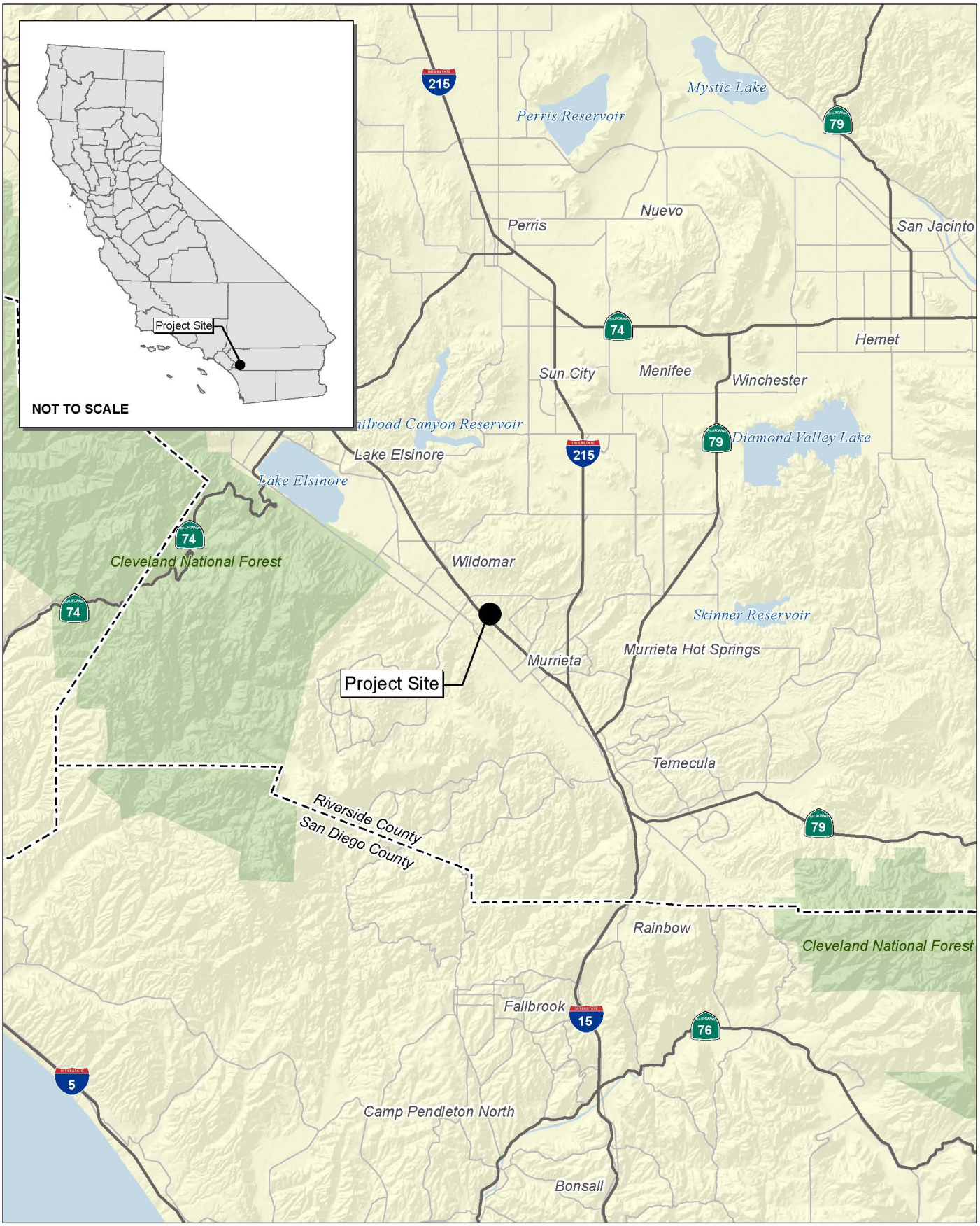
The project site can be accessed from SR-15 by exiting on Clinton Keith Road and traveling east, turning right onto Indian Valley Drive, then left onto Prielipp Road, and then right onto Elizabeth Lane. The project site is located on the west side of Elizabeth Lane.

The following Assessor's Parcel Numbers (APNs) are included in the project area, which contains all proposed facilities:

- 380-280-004
- 380-280-009
- 380-280-010
- 380-280-011
- 380-280-012

1.2 - Project Description

The proposed Parkside Project consists of the development of single-family detached homes. The project design incorporates approximately 17 acres of residential development and 17 acres of undeveloped open-space. The proposed project includes 67 dwelling units on 5,000 square foot (sq ft) lots. The proposed project would also include the necessary infrastructure for the proposed development including streets, sewer, and utility lines.



Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

Michael Brandman Associates

NORTH

5 2.5 0 5

Miles

Exhibit 1
Regional Location Map

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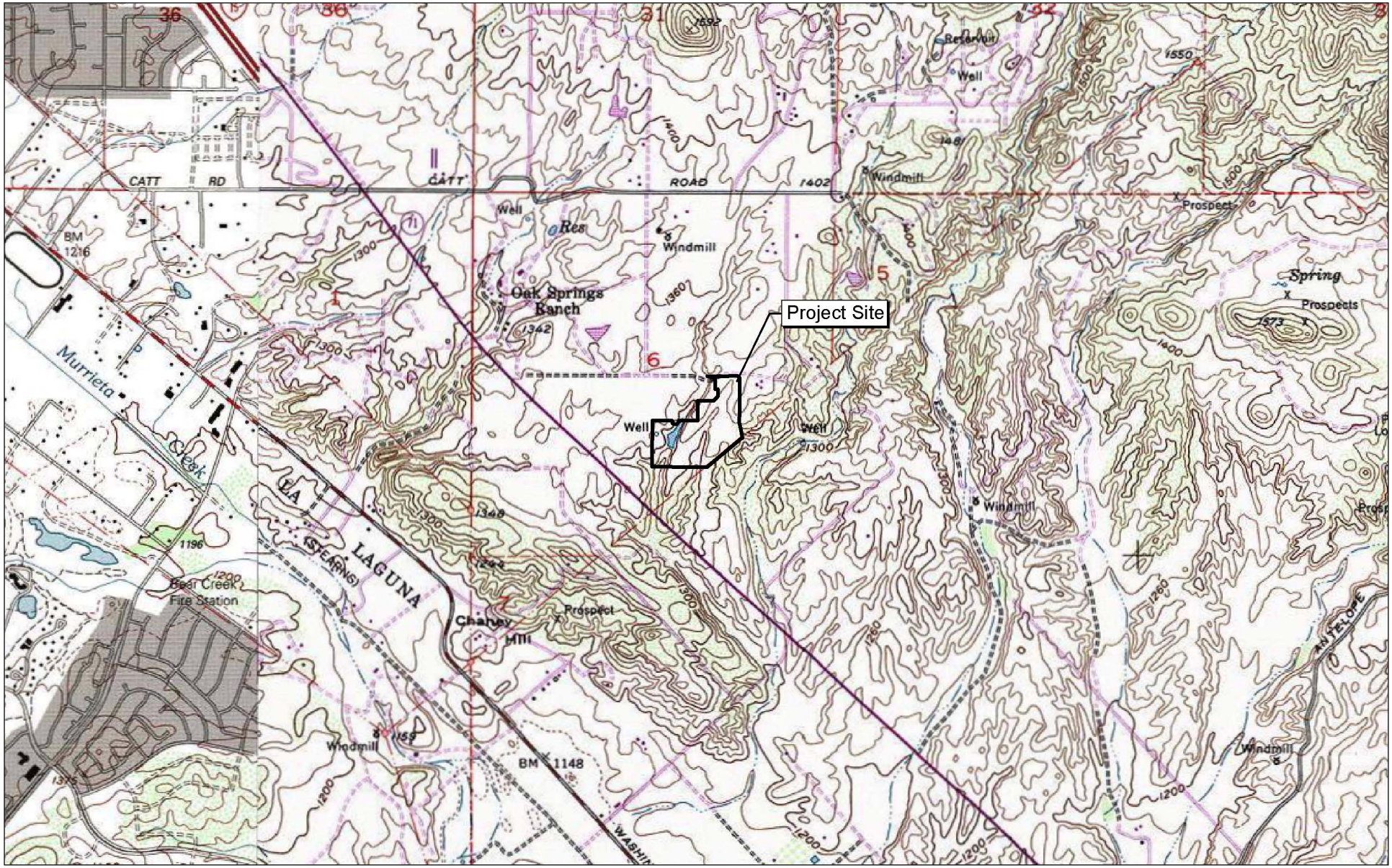
LENNAR HOMES, INC. • PARKSIDE PROJECT
MSHCP CONSISTENCY ANALYSIS



Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

NORTH

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Feet

Michael Brandman Associates

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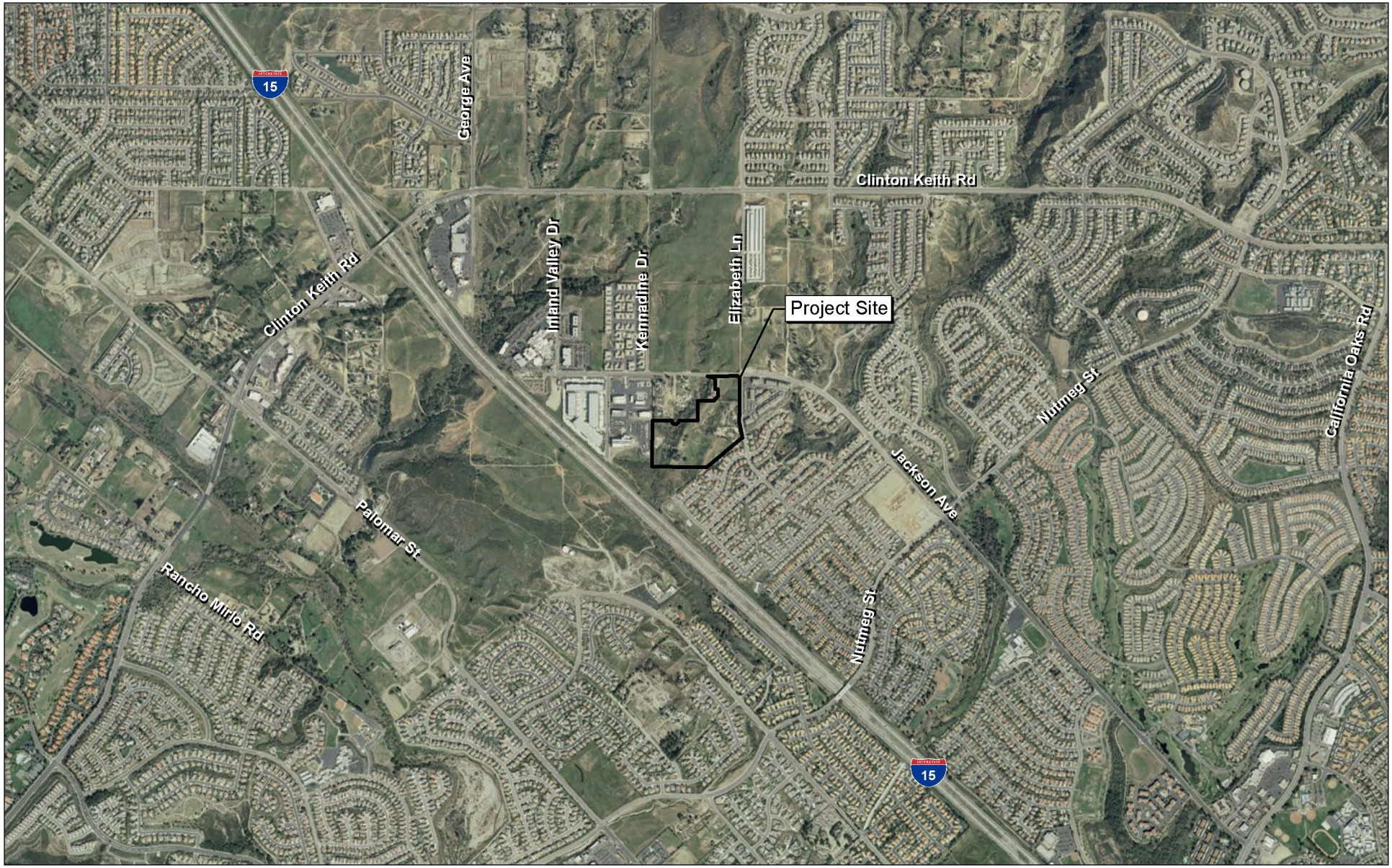
Exhibit 2
Local Vicinity Map
Topographic Base



Source: ESRI Aerial Imagery.

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560078 • 12/2012 | 3_local_aerial.mxd

Exhibit 3
Local Vicinity Map
Aerial Base

SECTION 2: METHODOLOGY

2.1 - Western Riverside County MSHCP Consistency Analysis

The project site was reviewed to determine consistency with the MSHCP. Geographic Information System (GIS) software was used to map the project site in relation to MSHCP areas including Criteria Cells (core habitat and wildlife movement corridors) and areas proposed for conservation. The Riverside County Integrated Project (RCIP) Conservation Summary Report Generator at the Riverside County Transportation and Land Management Agency website was queried to determine habitat assessment and potential survey requirements for the project site (Appendix A, MSHCP (RCIP) Conservation Summary Report).

The MSHCP also requires that an assessment be completed of the potentially significant effects of the project on riparian/riverine areas, and vernal pools. According to the MSHCP, the documentation for the assessment shall include mapping and a description of the functions and values of the mapped areas with respect to the species listed in the MSHCP's Section 6.1.2, protection of species associated with riparian/riverine areas and vernal pools.

2.2 - Literature Review

Prior to the field visit, a literature review was conducted of the environmental setting of the project site. Literature reviewed includes the United States Department of Agriculture Soil Survey of Western Riverside County (USDA 1971) for the project site, the California Natural Diversity Database (CNDDB 2012), and literature detailing the habitat requirements of the burrowing owl.

The nearest recorded location of burrowing owl was determined through a 5-mile radius query of the CNDDB (Appendix E, CNDDB List). The CNDDB ArcGIS database was used, together with ArcGIS software, to locate the nearest occurrence and determine the distance from the project site.

2.3 - Plant Communities

Plant communities were mapped using 7.5-minute USGS topographic base maps and aerial photography. The plant communities within the project site were classified according to California Department of Fish and Game's (CDFG's) List of Terrestrial Natural Communities (2010), and cross-referenced to descriptions provided in Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (1995). The CDFG does not currently have a narrative description of the vegetation communities; therefore, the descriptions provided are according to Holland. In addition, the CDFG does not have a classification system for non-native or disturbed habitats. These plants communities are provided by Holland as well.

2.4 - Riparian/Riverine Habitat and Jurisdictional Areas

A jurisdictional delineation report was previously prepared for a portion of the project site. This report was reviewed prior to conducting the site visit. Aerial photography was reviewed prior to conducting general surveys. The photographs were used to locate and inspect any potential natural drainage features and water bodies that may be considered riparian/riverine habitat or under the jurisdiction of US Army Corps of Engineers (USACE) and/or CDFG, that were not covered by the previous delineation. In general, surface drainage features indicated as blue-line streams on USGS maps that are observed or expected to exhibit evidence of flow are considered potentially riparian/riverine habitat and subject to state and federal regulatory authority as "waters."

2.5 - Field Investigation

Qualified MBA biologist Scott Crawford conducted a habitat assessment of the project site on September 6, 2012 from 0800 to 1100 hours. Weather conditions during the survey included a temperature range from 72 to 78 degrees Fahrenheit (°F), winds from 1 to 2 miles per hour, and clear skies. The entire project site was assessed to determine the extent of plant communities, to assess the presence of suitable habitat for burrowing owl to assess the possible presence of vernal pools, jurisdictional features, and riparian/riverine habitat. Parameters assessed included soil conditions, presence of indicator species, slope, aspect, and hydrology. Existing conditions were also mapped in the field to document the habitat onsite.

2.6 - Plants

Common plant species observed during the field survey were identified by visual characteristics and morphology in the field, and recorded in a field notebook. Unusual and less familiar plants were identified offsite using taxonomical guides. A list of all species observed on the project site was compiled from the survey data (Appendix B, Floral and Faunal Compendia). Taxonomic nomenclature used in this study follows the California Native Plant Society (CNPS 2012). In this report, scientific names are provided immediately following common names of plant species (first reference only).

2.7 - Wildlife

Wildlife species detected during the reconnaissance-level survey by sight, calls, tracks, scat, or other signs were recorded in a field notebook. Notations were made regarding general habitats for sensitive species potentially occurring on the project site based on our preliminary assessment of the cited literature. Field guides were used to assist with species identification during surveys and included Stebbins (2003) for amphibians and reptiles, National Geographic Society (1987) for birds, and Burt and Grossenheider (1980) for mammals. Common names of wildlife species are standard; however, scientific names are provided immediately following common names for the first reference only. Appendix B, Floral and Faunal Compendia, lists all wildlife species observed or detected on the project site during the survey.

SECTION 3: EXISTING CONDITIONS

3.1 - Environmental Setting

The project site is located in the southern portion of the City of Wildomar, within Riverside County, California. The site has a gentle slope from northeast to southwest with an elevation of approximately 1,300 feet above mean sea level (AMSL). The project area contains previously developed rural residences that have been recently torn down (2011) as required by the City of Wildomar. Based on historic aerial photographs (1938, 1967, 1978, and 2005), the project site has been significantly altered since the 1960s (HistoricAerials.com).

Due to previous disturbance from weed abatement activities, the project site generally consists of disturbed areas with patches of native vegetation. The vegetation is generally comprised of a mosaic of various non-native ruderal (weedy) species. The dominant vegetation throughout the site is short-podded mustard (*Hirschfeldia incana*) and yellow-star thistle (*Centaurea solstitialis*). Habitat on the project site is low in quality. There are areas within the project site that contain Riversidean sage scrub and southern cottonwood-willow riparian forest. These areas contain moderate to high quality habitat.

There is residential development to the southeast of the project area. Commercial and industrial development occurs to the west and northwest of the project site. The remainder of the project area is surrounded by natural open space with a several dirt access roads to the north and south. The project area is not located within any United States Fish and Wildlife Service (USFWS) designated critical habitat areas.

3.2 - Soils

Based on the USDA Soil Survey, the project area contains 5 soil mapping units, including Arlington and Greenfield fine sandy loams, Gullied Land, Placentia fine sandy loam, Ramona and Buren loams, and San Timoteo loam (Exhibit 4). The majority of the site consists of San Timoteo loam with small inclusions of the other four soils.

Arlington and Greenfield fine sandy loam are an undifferentiated group of soils on top of convex terraces, on ridges, and in concave areas where dissected terraces and alluvial fans merge.

Gullied Land consists of acid igneous alluvium on older fans and terraces. This alluvial material has been severely eroded and dissected by drainage-ways. The original landform has been destroyed and only remnants remain. This land is made up chiefly of material from granite, granodiorite, gneiss, and mica-schist. It is slightly acid to moderately alkaline and is intermittently effervescent.

Placentia fine sandy loam is a nearly level to gently sloping soils that occurs on terraces and alluvial fans. The soil contains medium acid to slightly acid in the upper layers and neutral to moderately alkaline in the lower levels.

Ramona and Buren loams are undifferentiated groups of soils on convex rolling, and dissected terraces. Approximately 55 percent of the soil is Ramona and 35 percent is Buren. The remaining 10 percent consists of included small areas of less eroded Ramona and Buren soils, and of Hanford soils in the drainage areas.

San Timoteo loam occurs on rolling to hilly soils on dissected marine deposits. These are typically considered highly eroded soils, are well drained, and are developed on calcareous marine sediment and weak sandstone.

3.3 - Plant Communities

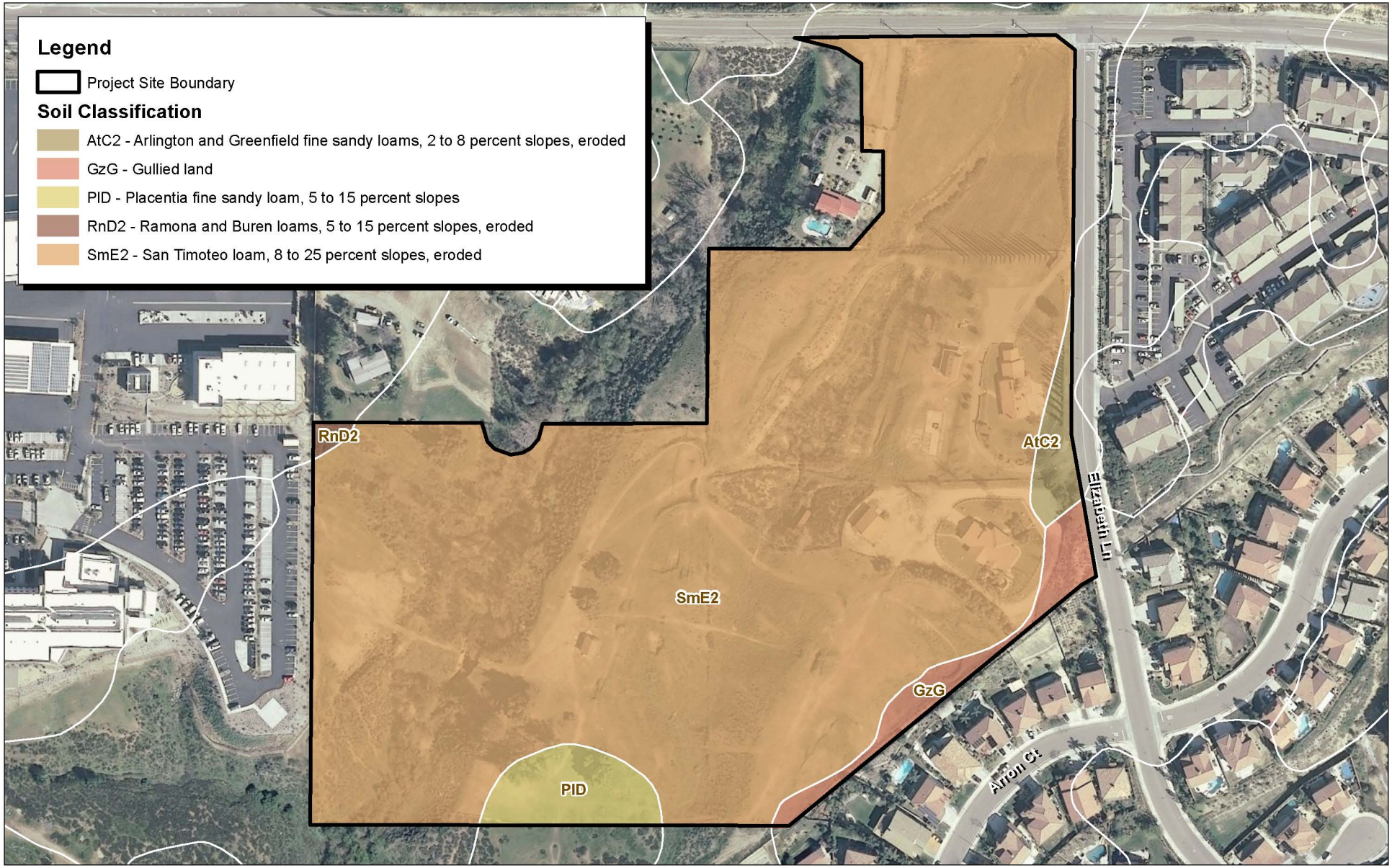
The dominant plant community observed within the project site is Disturbed Land (Exhibit 5). Small isolated patches of Riversidean Sage Scrub (California buckwheat scrub) and Developed land occur throughout the site. A large drainage features with dense Southern Cottonwood-Willow Riparian Forest occurs along the western portion of the project site. The project site has been subject to previous disturbances associated with weed abatement, as such, the majority of the site consists of disturbed habitat with weedy species. Several ornamental trees occur on the project site; however, several native trees also occur within and immediately adjacent to the existing drainage feature onsite.

3.3.1 - Disturbed Land (17.23 Acres)

Disturbed habitat includes areas in which the vegetative cover comprises less than 10 percent of the surface area (disregarding natural rock outcrops). These areas often contain evidence of soil surface disturbance and compaction from previous legal human activity. Where the vegetative cover is greater than 10 percent, there is often soil surface compaction associated with the disturbed nature of the site. Vegetation commonly observed within disturbed habitat would have a high predominance of weedy species that are indicators of soil disturbance. Common species observed include short-podded mustard, yellow-star thistle, Russian thistle (*Salsola tragus*), telegraphweed (*Heterotheca grandiflora*), horehound (*Marrubium vulgare*), and sow thistle (*Sonchus oleraceus*). There is little to no non-native grasses in this vegetation community.

The Disturbed Land occurs throughout the project site and is associated with the previous residential development and subsequent weed abatement vegetation removal. The project site contains 17.23 acres of Disturbed Land.

A complete list of all plant and wildlife species observed during the habitat assessment for the project site is included in Appendix B.



Source: ESRI Aerial Imagery. USDA Soils Data.

Michael Brandman Associates

NORTH

230 115 0 230

Feet

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Exhibit 4
USDA Soils Map

LENNAR HOMES, INC. • PARKSIDE PROJECT
MSHCP CONSISTENCY ANALYSIS

Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

NORTH

230 115 0 230 Feet

Michael Brandman Associates

21560078 • 12/2012 | 5_Vegetation_Map.mxd

Exhibit 5
Vegetation Communities Map

LENNAR HOMES, INC. • PARKSIDE PROJECT
MSHCP CONSISTENCY ANALYSIS

3.3.2 - Urban/Developed Land (1.21 Acres)

Developed land includes areas that have been constructed upon or otherwise covered with a permanent unnatural surface. Areas where no natural land is evident due to a large amount of debris or other materials being places upon it may also be considered under this category. The presence of building foundations, ornamental vegetation, and debris (e.g., irrigation piping, fencing, old wells, abandoned farming or mining equipment) resulting from legal activities (as opposed to illegal dumping) are also a part of this land type.

The eastern portion of the project site contains scattered urban/developed land characterized by concrete and surrounded by a variety of fences and block walls. No vegetation was observed within the developed land onsite, and no suitable habitat for any plant or wildlife species occurs in this area. A total of 1.21 acres of Urban/Developed land occurs within the project site.

3.3.3 - Riversidean Sage Scrub (California Buckwheat Scrub) (3.72 Acres)

This vegetation community is the most xeric expression of coastal sage scrub south of Point Conception. Typical stands are fairly open and dominated by California buckwheat (*Eriogonum fasciculatum);* with scattered coastal sagebrush (*Artemisia californica)* and deer weed (*Lotus scoparia)* each attaining at least 20 percent cover.

Typically, this vegetation community occurs on xeric sites—such as steep slopes, severely drained soils or clays that release stored soil moisture only slowly. Other common species observed onsite include coastal goldenbush (*Isocoma menziesii),* white sage (*Salvia apiana*), and California aster *(Corethrogyne filaginifolia).*

This plant community is commonly found along the margins of the main drainage feature on the east side of the project site and the upland swale on the west side of the site. The project site contains 3.72 acres of Riversidean Sage Scrub.

3.3.4 - Southern Cottonwood-Willow Riparian Forest (2.01 Acres)

This vegetation community is a tall, open, broad-leafed winter-deciduous riparian forest dominated by Fremont's cottonwood (*Populus fremontii),* arroyo willow *(Salix lasiolepis),* Goodding's willow *(Salix gooddingii),* and red willow *(Salix laevigata).* There are also a few scattered coast live oaks (*Quercus agrifolia*). Understories usually are shrubby willows.

The plant community is often found in sub-irrigated and frequently overflowed lands along rivers and streams. The dominant species require moist, bare mineral soil for germination and establishment. This is provided after flood waters recede, leading to uniform-aged stands in this seral type.

This vegetation is found within the main drainage feature that runs along the western portion of the project site. There are 2.01 acres of Southern Cottonwood-Willow Riparian Forest. There is also a small isolated patch of the habitat within Feature 2, which is associated with an isolated ponded area.

3.4 - Wildlife

The project site provides suitable habitat for wildlife species that commonly occur in disturbed, urban settings. The following commonly occurring species were observed throughout the project site during the habitat assessment:

- Common raven (*Corvus corax*)
- House sparrow (*Passer domesticus*)
- Mourning dove (*Zenaida macroura*)
- Lesser goldfinch (*Carduelis psaltria*)
- Side-blotched lizard (*Uta stansburiana*)
- California ground squirrel (*Spermophilus beecheyi*)

A more detailed list of all species identified within the project site is in Appendix B, Floral and Faunal Compendia.

A single female coastal California gnatcatcher was observed foraging along the perimeter of the project site along the western property boundary. This portion of the project site has moderate quality coastal sage scrub habitat. Higher quality habitat occurs further to the north and south of the project. It is highly likely that coastal California gnatcatchers use the project site for foraging, but the habitat is not suitable for nesting. Typically, coastal California gnatcatcher nest in dense, high quality, coastal sage scrub habitat. The Riversidean sage scrub onsite is dominated by a single species (California buckwheat) and is extremely sparse throughout the project site because of frequent disturbance.

SECTION 4: WESTERN RIVERSIDE COUNTY MSHCP CONSISTENCY ANALYSIS

4.1 - MSHCP Requirements

The proposed project site is located in the Elsinore Area Plan but is not located within any Criteria Cells. The project site is located to the 1.3 miles northeast of Existing Core F, 1.5 miles southeast of proposed Linkage 8, and 0.5 miles south of Criteria Cell 5558 (Exhibit 6). The MSHCP also establishes habitat assessment requirements for certain plant, bird, mammal, and amphibian species.

This habitat assessment addresses the potential for sensitive biological resources defined by the Conservation Summary Report (Appendix A), to occur within the project site. Based on the report, a habitat assessment is required for burrowing owl. There are no habitat assessment requirements for any of the Narrow Endemic Plants or Criteria Area Plant Species. This habitat assessment also addresses the presence/absence of riparian/riverine areas and vernal pools on the site, includes an urban/wildlands interface analysis, and identifies any migratory corridors and linkages located on or in the vicinity of the site.

Of the 146 species covered by the MSHCP, there are 106 of the covered species that public and private project applicants would not be required to survey. Covered species for which surveys may be required include 4 birds, 3 mammals, 3 amphibians, 3 crustaceans, 14 Narrow Endemic Plants, and 13 other sensitive plants within the Criteria Area. Of these 40 species, survey area maps are provided for 34 species, and surveys would be undertaken within suitable habitat areas in locations identified on these maps in the MSHCP Plan. Based on the location of the proposed project, none of these 34 species require surveys.

The remaining 6 species are associated with riparian/riverine areas and vernal pools and include least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), western yellow-billed cuckoo (*Coccyzus americanus*), Riverside fairy shrimp (*Streptocephalus woottoni*), Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), and vernal pool fairy shrimp (*Branchinecta lynchi*). Although there are no survey area maps for these 6 species, surveys, if necessary, would be undertaken as described below. Suitable habitat for least Bell's vireo and Riverside fairy shrimp occur within the project site.

4.2 - Habitat Assessment

4.2.1 - Burrowing Owl

The project site is included in the MSHCP habitat assessment area for burrowing owl. The burrowing owl is a state species of concern because of their population decline in the state of California in the past 30 years. Burrowing owl occurs in short-grass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), prairies, coastal dunes, and desert floors. The burrowing owl may

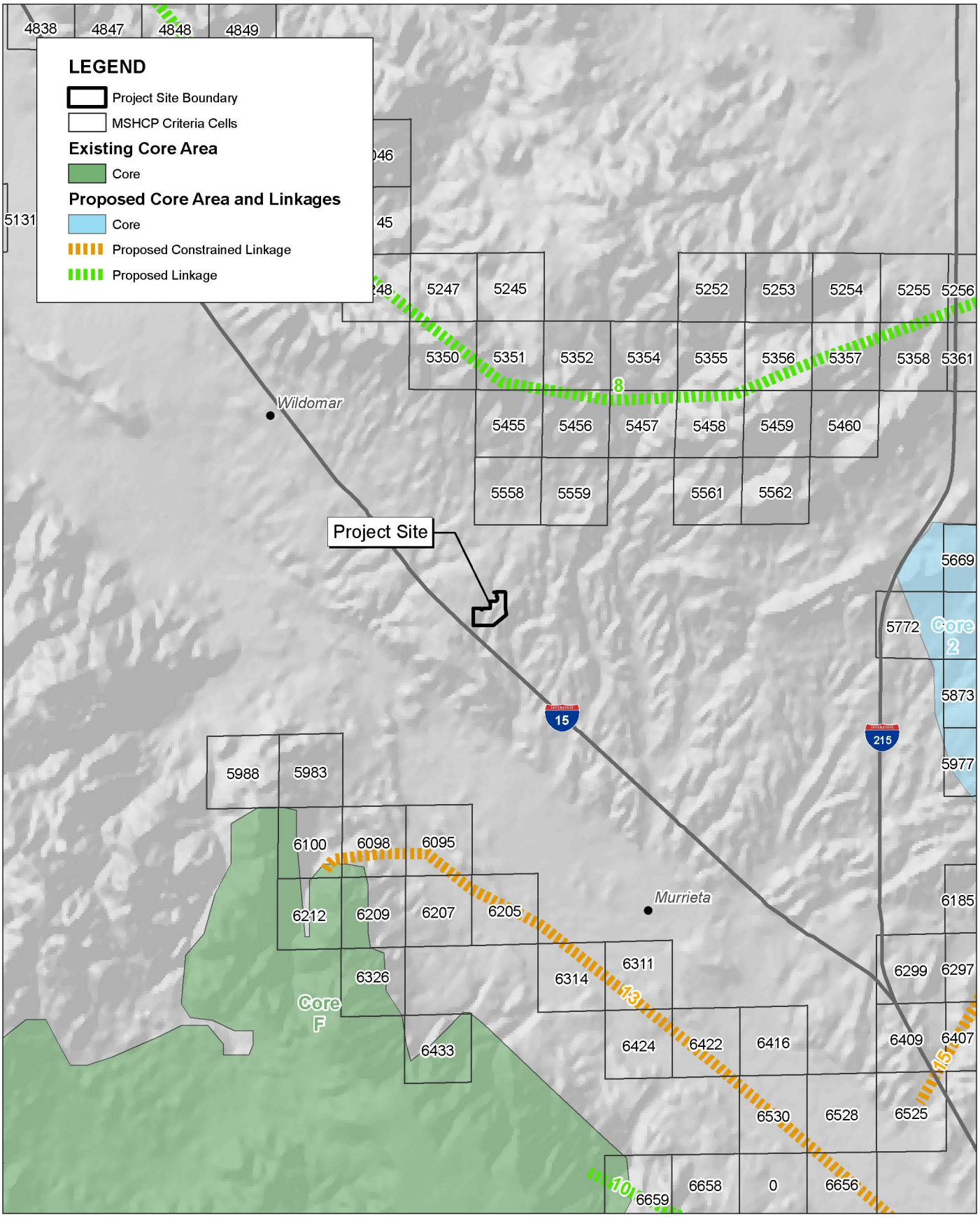
also use golf courses, cemeteries, road allowances within cities, airports, vacant lots in residential areas, university campuses, fairgrounds, abandoned buildings, and irrigation ditches. The presence of recently excavated burrows is the primary habitat requirement for nesting. They may also use pipes, culverts, and nest boxes where burrows are scarce. One burrow is typically selected for use as the nest; however, satellite burrows are usually found within the immediate vicinity of the nest burrow within the defended territory of the owl. Burrowing owls are generally considered to be monogamous although new mates often appear when one of the pair dies or when the pair divorces. Although open areas with short vegetation are critical for nesting, there is some evidence that burrowing owls prefer a vegetation mosaic with nesting habitat interspersed within taller vegetation for hunting. However, the primary requirement for suitable burrowing owl foraging habitat appears to be low vegetation cover that allows visibility and access to prey.

The CNDDB (2012) has several records of burrowing owl occurring in the general vicinity (5 miles) of the project site. The project site contains marginally suitable nesting and foraging habitat for burrowing owl. The project site contains large areas of disturbed habitat with small patches of native vegetation. Low-growing ruderal (weedy) species dominate the vegetation onsite. The site was surveyed extensively to search for suitable burrows and areas with enough low or sparse vegetation for burrowing owl to occur. Even in dense or tall vegetation, burrowing owl may occur where there are gaps in the vegetation or when a suitable burrow occurs in an area with low vegetation.

Several (at least 3) suitable California ground squirrel burrows occur within the central portion of the project site. There are a few areas within the project site that are excluded from burrowing owl surveys. These areas are specifically related to the previous residential development. Although the likelihood of this species to occur onsite is extremely low, it cannot be completely ruled out. Therefore, there is a potential for this species to occur onsite.

4.2.2 - Riparian/Riverine Areas and Vernal Pools

Western Riverside County MSHCP Section 6.1.2 describes the process to protect species associated with riparian/riverine areas and vernal pools. The purpose is to ensure that the biological functions and values of these areas throughout the MSHCP Plan Area are maintained such that habitat values for species inside the MSHCP Conservation Area are maintained. This assessment is independent from considerations given to waters of the US and waters of the State under the Clean Water Act (CWA) and the CFG Code.



Source: USGS NED, Riverside County MSHCP, Census 2000 data.

NORTH

1 0.5 0 1 Miles

Michael Brandman Associates

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Exhibit 6
MSHCP Criteria Areas Map

LENNAR HOMES, INC. • PARKSIDE PROJECT
MSHCP CONSISTENCY ANALYSIS

As defined in the MSHCP, riparian/riverine areas are lands that contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, occur close to or depend upon a nearby freshwater source, or areas with fresh water flow during all or a portion of the year. These habitats support one or more of the species listed in MSHCP Section 6.1.2. Vernal pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters, soils, vegetation, and hydrology, during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season.

Fairy shrimp habitat can be both human-made (e.g., road ruts, stock ponds, depressional areas) and natural (e.g., vernal pools, ephemeral pools). If suitable habitat is present, focused surveys must be undertaken as determined appropriate by a qualified biologist (for Riverside fairy shrimp, vernal pool fairy shrimp, and Santa Rosa Plateau fairy shrimp). Fairy shrimp habitat may be natural or artificially created—it is up to the consulting biologist to determine if suitable habitat is present regardless of whether it relates to an artificially or naturally created area.

With regard to fairy shrimp habitat, the isolated ponded area supports a sufficient amount of water long enough to provide appropriate habitat for fairy shrimp. The ponded area is not located within the species range for Santa Rosa fairy shrimp. The ponded area is of very poor quality and contains a 100 percent tree canopy with dense leaf litter. This is not considered suitable habitat for San Diego fairy shrimp, which typically requires high quality vernal pool habitat. The Riverside fairy shrimp has very narrow habitat requirements. This species is only found in deep, cool lowland vernal pools that retain water through the warmer weather of late spring. Minimum habitat size is 750 square meters, with a minimum depth of 30 centimeters at maximum filling. Total dissolved solids, alkalinity, and chloride are very low, conditions corroborated by pH at neutral or just below. This species does not appear until later in the rain season (typically from March to May), so it is considered a warm water species. The closest recorded occurrence of Riverside fairy shrimp is 0.5 mile northeast of the project site. Since the ponded area within the project site retains water for most of the rain season, this species has a potential to occur within the project site.

MBA conducted a dry-season fairy shrimp survey in October 2012 to determine presence/absence of listed fairy shrimp. Based on the survey results, no evidence of listed or common fairy shrimp occur within the project site. The absence of listed fairy shrimp is likely contributed to the dense stand of riparian habitat and the fact that the ponded area is within an existing drainage system.

MBA conducted a riparian/riverine habitat assessment of the project site concurrent with the habitat assessment. The riparian/riverine habitat assessment focused on all drainage features on the project site that were considered to meet the minimum criteria to be considered riparian/riverine habitat, consistent with the definition provided within the MSHCP. All targeted drainage features were carefully inspected for the presence of riparian habitat characteristics and suitability to support associated species, including a dominance of hydrophytic vegetation, suitable topography and hydrology, and suitable soil substrate where necessary.

Two features occur on or in the immediate vicinity of the project site. The main drainage feature, Feature 1, occurs along the western portion of the project site and contains a dense canopy of riparian vegetation, as well as patches of wetlands. The second feature, Feature 2, is an upland swale that occurs within the eastern portion of the project site. Both of the drainage features have been artificially blocked by human-made earthen berms to create artificial ponded areas. The berm associated with Feature 1 has been breached and no longer blocks the water flow. However, Feature 2 still contains an earthen berm and it still creates an artificial ponded area. This area has a dense stand of cottonwoods and willow similar to the main channel to the west, but this vegetation is completely isolated. No vernal pools occur on or in the immediate vicinity of the project site. Although Feature 1 will not be impacted by the project, Feature 2 will be completely removed as part of the proposed project.

Function and Value of Surveyed Area:

Functions of wetlands can be defined broadly as all processes and manifestations of processes that occur in wetlands. Most functions fall into three broad categories including 1) hydrologic, 2) biogeochemical, and 3) maintenance of habitat food webs. These functions can also be related to certain defined societal values. These functions and values are set forth in Table 1, which also denotes whether indicators of wetland function are present on site.

Table 1: Functions and Values of Wetlands

Function	Effects	Societal Value	Indicator	Indicator Present?
Hydrologic				
Short-term surface water storage	Reduced downstream flood peaks	Reduced damage from floodwaters	Presence of floodplain along river corridor (or Estuarine area)	Yes
Long term surface water storage	Maintenance of base flows, seasonal flow distribution	Maintenance of fish Habitat during dry periods	Topographic relief on floodplain (or estuarine area)	No
Maintenance of high water table	Maintenance of hydrophytic community	Maintenance of biodiversity	Presence of Hydrophytes	Yes
Biogeochemical				
Transformation, cycling of elements	Maintenance of nutrient stocks within wetland	Wood production	Tree growth	Yes
Biogeochemical				
Retentions, removal of dissolved substances	Reduced transport of nutrients downstream	Maintenance of water quality	Nutrient outflow lower than inflow	Yes

Table 1 (cont.): Functions and Values of Wetlands

Function	Effects	Societal Value	Indicator	Indicator Present?
Accumulation of peat	Retention of nutrients. Metals, other substances	Maintenance of water quality	Increase in depth of peat	No
Accumulation of inorganic sediments	Retention of sediments, some nutrients	Maintenance of water quality	Increase in depth of sediment	Yes
Habitat and Food Web Support				
Maintenance of characteristic plant communities	Food, nesting, cover for animals	Support for furbearers, waterfowl	Mature wetland vegetation	Yes
Maintenance of characteristic energy flow	Support for populations of vertebrates	Maintenance of biodiversity	High diversity of vertebrates	No

The main drainage feature onsite contains a moderate to high quality riparian habitat with a functional wetland and a complex layer of vegetation canopy that provides suitable habitat for a number of wildlife species.

The small stand of dense trees with little to no emergent understory vegetation provides a low value for hydrologic or biogeochemical processes, but does provide marginal habitat for food webs. The small stand of dense trees associated with the ponded area is completely isolated from downstream flows and therefore is not part of a hydrologic unit that provides any benefit to downstream water quality. Although this area only provides for marginally suitable habitat, a DBESP was required to address whether this area is required for long-term conservation; this DBESP has been approved by the City and forwarded to the wildlife agencies, which have concurred with the DBESP findings and proposed mitigation measures.

4.2.3 - Migratory Corridors/Linkages

The project site is located in the MSHCP Elsinore Area Plan, but is not located within any Criteria Cells. The project site is heavily disturbed and is adjacent to existing development. Additionally, no proposed or existing core areas, linkages, or habitat blocks are located near the project site. The closest existing core area (Existing Core F) is located approximately 3 miles southwest of the project site, and the closest existing linkage area (Linkage 8) is located approximately 2 miles north of the project site. No habitat would be fragmented or interrupted as a result of the proposed project.

4.2.4 - Urban/Wildlands Interface Guidelines

According to the MSHCP, the Urban/Wildlands Interface Guidelines are intended to address indirect effects associated with locating development in proximity to the MSHCP Conservation Area

(MSHCP, Section 6.1.4). Project-related impacts to avoid or minimize in the vicinity of conservation areas pertaining to the Urban/Wildlife Interface Guidelines include, drainage, toxics, lighting, noise, invasive plant species, barriers, and grading/land development.

The proposed project site is more than approximately three miles from Existing Core F and approximately 0.5 mile south of Criteria Cell 5558 (Exhibit 6). Undeveloped land occurs to the north and southwest of the project site, but does not provide connectivity to Existing Core F, due to current land use, and the disturbed nature of the site and adjacent parcels.

The project site is not within the vicinity of a conservation area (Exhibit 6) and the Urban/Wildlife Interface Guidelines to mitigate impacts resulting from drainage, toxins, lighting noise, invasive plant species, barriers and grading/land development are not applicable.

4.2.5 - Jurisdictional Drainages

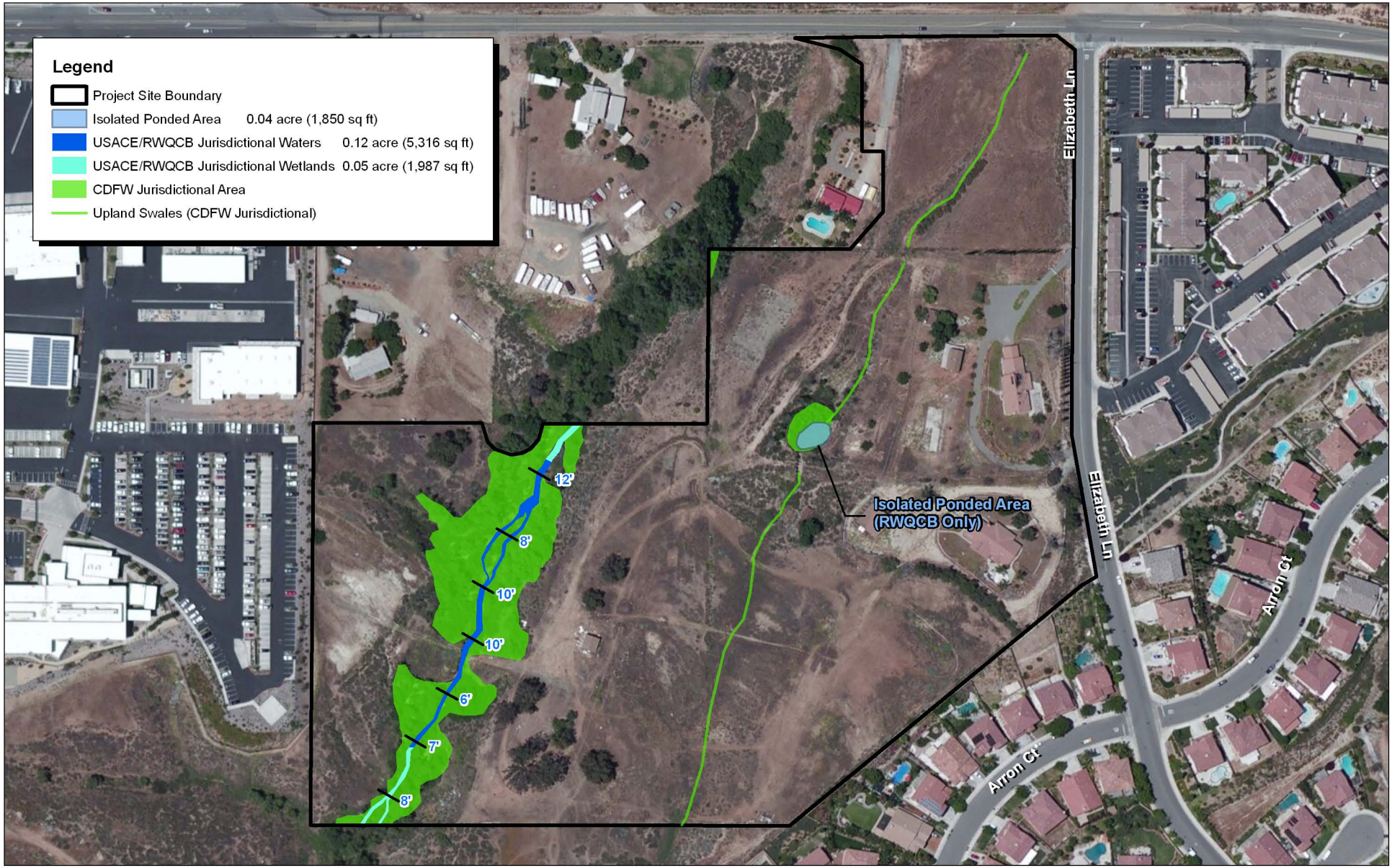
The project site contains two drainages: Feature 1 is under the jurisdiction of the USACE, CDFW, and the Regional Water Quality Control Board (RWQCB) (Exhibit 7); Feature 2 is under the jurisdiction of CDFW and RWQCB. Feature 1 includes a total of 0.17 acre of waters subject to the jurisdiction of the USACE, 0.17 acre of waters subject to the jurisdiction of the RWQCB, and a total of 1.88 acres of waters of the state subject to the jurisdiction of the CDFG, which includes 0.17 acre of unvegetated streambed and an additional 1.71 acre of adjacent riparian habitat.

Feature 2 includes a total of 0.159 acre of water of the state subject to CDFW jurisdiction and a 0.04-acre isolated ponded area that is subject to RWQCB jurisdiction.

Feature 1 is completely avoided as part of the proposed project design. Feature 2 will be completely removed as part of the proposed project, resulting in permanent impacts to 0.159 acre under CDFW jurisdiction and 0.04 acre under RWQCB jurisdiction.

4.2.6 - Nesting Birds

The project site contains marginally suitable nesting habitat for a number of common ground-nesting, tree-nesting, and shrub-nesting avian species. The riparian habitat and ornamental trees provides suitable habitat for a number of common tree-nesting avian species, such as red-tailed hawk (*Buteo jamaicensis*), cooper's hawk (*Accipiter cooperii*), western kingbird (*Tyrannus verticalis*), and common raven (*Corvus corax*). Common avian species that could potentially use the shrub cover for nesting include California towhee (*Pipilo crissalis*), Bewick's wren (*Thryomanes bewickii*), and bushtit (*Psaltriparus minimus*). The project site may provide marginally suitable habitat for ground-nesting species such as western meadowlark (*Sturnella neglecta*) and horned lark (*Eremophila alpestris*). Therefore, development of the project site may result in potential impacts to nesting birds if construction activities commence during the avian breeding season (February through August).



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012. Jurisdicitonal Delineation (MBA 2012)
Measurements are associated with USACE jurisdictional Limits.

NORTH

230 115 0 230

Feet

Michael Brandman Associates

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Exhibit 7
Drainage Location Map

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MSHCP CONSISTENCY ANALYSIS

4.2.7 - Stephens' Kangaroo Rat (SKR) HCP

The project site contains low-quality habitat for Stephens' kangaroo rate (SKR); however, the site is located within the boundaries of the Stephens' kangaroo rat HCP Fee Area. The project site is not located within a core conservation area.

SECTION 5: RECOMMENDATIONS

5.1 - Coastal California Gnatcatcher

The coastal California gnatcatcher is a covered species under the MSHCP. Therefore, take authorization is permitted under the MSHCP as long as the proposed project is considered consistent with the requirements of the plan. In order to reduce the potential impact coastal California gnatcatchers during construction activities, avoidance and minimization measures, such as avoiding the nesting season, having a biological monitor present during vegetation removal, and similar measures would be included as project design features to reduce impacts to this species to a level considered less than significant under the CEQA process.

5.2 - Burrowing Owl

The project site contains low-growing non-native ruderal (weedy) vegetation with scattered California ground squirrel burrows. Therefore, the project site provides moderately suitable habitat for burrowing owl and there is a potential for burrowing owl to occur on the project site. Focused surveys for burrowing owl should be conducted according to survey instructions for the MSHCP. If survey findings are negative but suitable habitat still occurs within the project site prior to construction, a, pre-construction survey is required according to survey instructions for the MSHCP and should be conducted within 30 days prior to any ground disturbance to avoid direct take of this species. If burrowing owl is observed onsite during the focus surveys or during the pre-construction surveys, passive relocation would be required to remove the owls either before or after the nesting season. Burrowing owls cannot be relocated during the nesting season.

5.3 - Riparian/Riverine Areas

The project site contains a single drainage feature that would be completely avoided during project construction. However, a small isolated patch of riparian habitat associated with an upland swale would be impacted as part of the proposed project. Based on the MSHCP guidelines, a DBESP shall be undertaken to ensure replacement of any lost functions and values of habitat as it relates to covered species. Therefore, development of the project site would result in impacts to riparian/riverine areas and a DBESP is required.

Compensatory mitigation for impacts to Riparian/Riverine areas include (1) preservation of 1.88 acres of southern cottonwood-willow riparian forest through a deed restriction, (2) enhancement of the onsite Riparian/Riverine habitat, (3) offsite purchase of 0.419 acre of mitigation credits from the Elsinore Murrieta Anza Resource Conservation District, (4) and the creation of a 0.30-acre detention basin that would result in superior preservation and an increase in habitat function and value compared with pre-project conditions. A Habitat Management Plan (HMP) will be prepared by a

qualified biologist to provide guidance to the Home Owners Association with regard to enhancing and maintaining the property for long-term preservation.

5.4 - Urban/Wildlands Interface Guidelines

The proposed project would not result in any impacts to the Urban/Wildlands Interface, and no further mitigation is required.

5.5 - Vernal Pools/Fairy Shrimp Habitat

No vernal pools habitat occurs onsite, however, the isolated ponded area does provide marginally suitable habitat for Riverside fairy shrimp. Based on MSHCP requirements, a fairy shrimp survey must be completed to determine presence/absence of Riverside fairy shrimp. Fairy shrimp surveys are typically completed by conducting 2 wet-season samples or a wet-season and a dry-season sample. However, under the MSHCP guidelines, a single sample, either wet or dry is acceptable for presence/absence determination.

5.6 - Jurisdictional Waters

The project site will not impact Feature 1 or any drainage features that are under USACE jurisdiction. However, the isolated ponded area associated with Feature 2 is under RWQCB and CDFW jurisdiction. In addition, the two upland swales associated with Feature 2 area are under CDFW jurisdiction. Therefore, development of the project site would impact potentially jurisdictional waters of the State, and a report of waste discharge and a Streambed Alteration Agreement will be required. Compensatory mitigation for impacts to waters of state includes offsite purchase of 0.419 acre of mitigation credits from the Elsinore Murrieta Anza Resource Conservation District, or similar conservation agency as approved by CDFW.

5.7 - Nesting Birds

The project site contains suitable nesting habitat for many common avian species. As such, ground-disturbing activities should be avoided during the nesting season (February through August). If ground-disturbing activities must be conducted during this time, a nesting bird survey should be conducted for the site prior to any construction-related disturbance. The nesting bird survey should occur as close to the grading date as possible and must be conducted within 30 days prior to ground-disturbing activities.

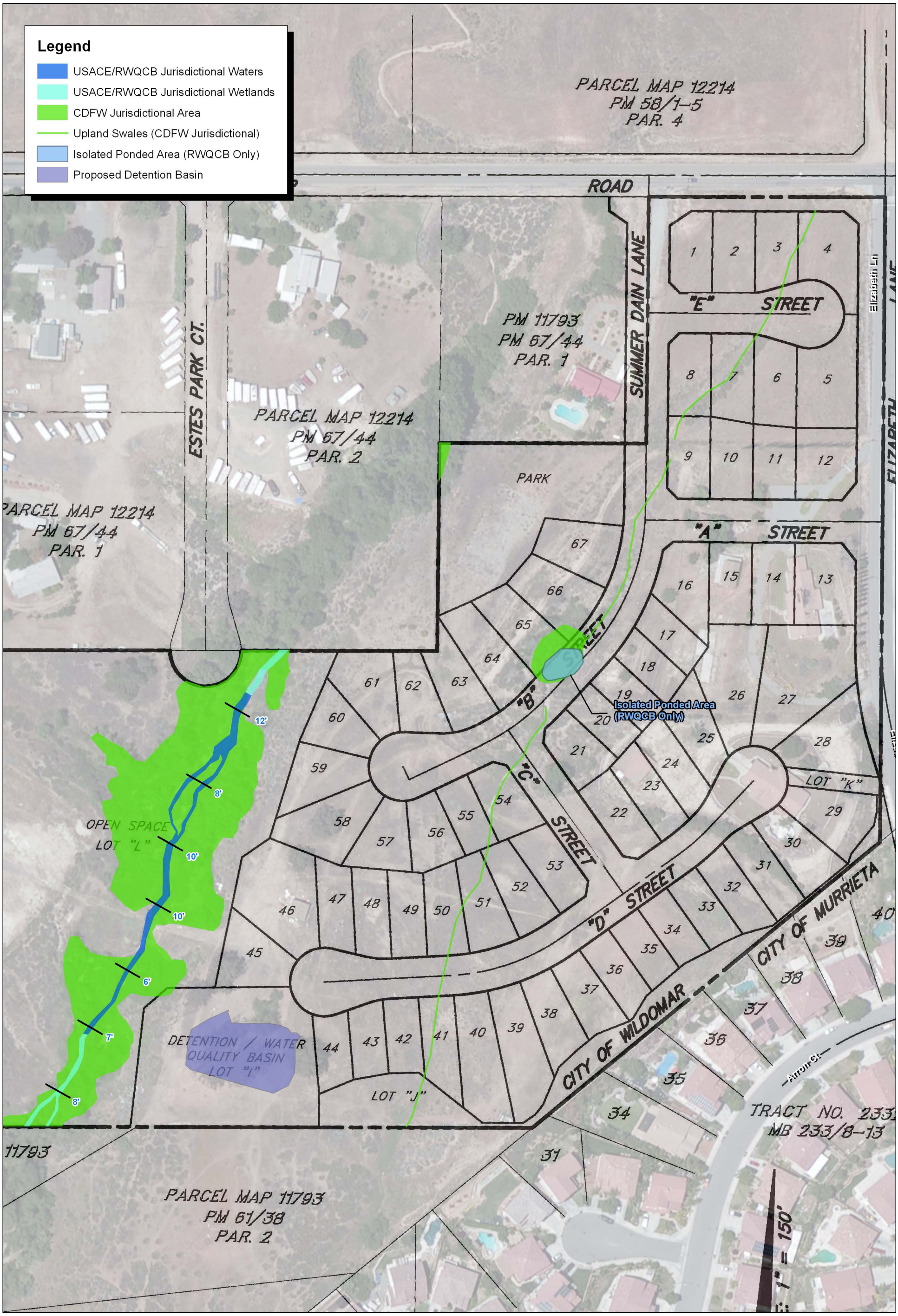
5.8 - Other MSHCP Species

The proposed project contains suitable habitat for least Bell's vireo. Based on the preliminary project design, the riparian habitat associated with the main drainage feature would be completely avoided during construction. However, a small patch of southern cottonwood-willow riparian forest associated with the isolated ponded area would be removed as part of the proposed project.

Therefore, it is recommended that a focused survey for least Bell's vireo be conducted within all suitable riparian habitat onsite.

5.9 - Stephens' Kangaroo Rat (SKR) HCP

The project site is located within the Fee Area for Stephens' kangaroo rat (SKR). The County of Riverside, other participating cities, and resource agencies have developed a Habitat Conservation Plan (HCP) for the incidental take of Stephens' kangaroo rat. The project site is not located within a Core Conservation Area for this species, therefore with adherence to this HCP's Implementing Agreement and payment of the per-acre mitigation fee, potential impacts to the species are covered, and no further action is required.



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.
Jurisdicitonal Delineation (MBA 2012). Lennar Homes 2012 Site Plan

NORTH

100 50 0 100

Feet

Michael Brandman Associates

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Exhibit 8
Project Site Plan Map

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MSHCP CONSISTENCY ANALYSIS

SECTION 6: CONCLUSION

A habitat assessment and MSHCP consistency analysis was conducted for a 24-acre project site, Parkside, located in the southern portion of the City of Wildomar, Riverside County, California. The project site occurs within the Elsinore Area Plan of the MSHCP but is not located within any Criteria Cells. The project site is located within an MSHCP-designated habitat assessment survey area for burrowing owl. The project site provides some suitable habitat for burrowing owl, but does not provide suitable habitat for any Narrow Endemic Plants or Criteria Area Species.

Suitable burrows were observed onsite, so a full protocol survey would be required. A burrow assessment would be required to record the occurrence of suitable burrows prior to conducting a focused survey for burrowing owl, although the burrow assessment can be conducted at the same time as the first burrowing owl survey. If no burrowing owls are observed onsite, but suitable habitat remains on site, then a 30-day preconstruction survey is required prior to any construction activities that occur within suitable habitat areas for this species. If burrowing owl is observed onsite, passive relocation may be used to remove the burrowing owls from the project site prior to or immediately following the nesting season. Burrowing owls may not be relocated during the active nesting season, if burrowing owls are actively nesting.

In addition, the site contains suitable nesting habitat for a variety of common ground-nesting avian species. A 30-day preconstruction survey for nesting birds should be conducted prior to ground-disturbing activities if construction activities commence during the nesting season (February through August).

No vernal pools occur within the project site. The site does contain a single drainage feature that is under the jurisdiction of the USACE, CDFG, and RWQCB and contains a dense canopy of riparian habitat. This drainage would be completely avoided during construction activities. A small isolated ponded area of Feature 2 would be impacted, and is under the jurisdiction of the CDFW and RWQCB. The two upland swales of Feature 2 are subject to CDFW jurisdiction. Therefore, consultation with the CDFW and RWQCB and appropriate permit authorization would be required. The small ponded area and upland swales are also Riparian/Riverine areas under the MSHCP. Therefore, a project level DBESP for impacts to the riparian/riverine habitat is required, and has been completed under separate cover.

The proposed project site contains marginally suitable habitat for both least Bell's vireo and Riverside fairy shrimp. Protocol surveys would be required to document the presence/absence of Riverside fairy shrimp because the proposed project would impact marginally suitable habitat. Dry-season fairy shrimp surveys were conducted and no evidence of any fairy shrimp occurs within the ponded areas. The marginally suitable habitat for least Bell's vireo would be completely avoided during project construction activities, and protocol surveys are not necessary.

Adherence with the above recommendations, and resulting additional actions, if required, and acceptance of the proposed project by the City of Wildomar would fulfill requirements for biological resources pursuant to CEQA, Federal Endangered Species Act, California Endangered Species Act, and the MSHCP. Therefore, as currently designed, the proposed project site is considered consistent with the goals and provisions of the Western Riverside County MSHCP, with incorporated avoidance/minimization measures.

SECTION 7: CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: December 17, 2012 Signed:

Scott Crawford,
Senior Biologist
Michael Brandman Associates
Irvine, CA

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Appendix A:
MSHCP (RCIP) Conservation Summary Report

Riverside County Transporation and Land Management Agency - TLMA

Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)

APN	Cell	Cell Group	Acres	Area Plan	Sub Unit
380280004	Not A Part	Independent	9.94	Elsinore	Not a Part
380280009	Not A Part	Independent	2.39	Elsinore	Not a Part
380280010	Not A Part	Independent	2.38	Elsinore	Not a Part
380280011	Not A Part	Independent	2.5	Elsinore	Not a Part
380280012	Not A Part	Independent	6.07	Elsinore	Not a Part

HABITAT ASSESSMENTS

Habitat assessment shall be required and should address at a minimum potential habitat for the following species:

APN	Amphibia Species	Burrowing Owl	Criteria Area Species	Mammalian Species	Narrow Endemic Plant Species	Special Linkage Area
380280004	NO	**YES**	NO	NO	NO	NO
380280009	NO	**YES**	NO	NO	NO	NO
380280010	NO	**YES**	NO	NO	NO	NO
380280011	NO	**YES**	NO	NO	NO	NO
380280012	NO	**YES**	NO	NO	NO	NO

Burrowing Owl

Burrowing owl.

If potential habitat for these species is determined to be located on the property, focused surveys may be required during the appropriate season.

Background

The final MSHCP was approved by the County Board of Supervisors on June 17, 2003. The federal and state permits were issued on June 22, 2004 and implementation of the MSHCP began on June 23,

2004.

For more information concerning the MSHCP, contact your local city or the County of Riverside for the unincorporated areas. Additionally, the Western Riverside County Regional Conservation Authority (RCA), which oversees all the cities and County implementation of the MSHCP, can be reached at:

Western Riverside County Regional Conservation Authority
3403 10th Street, Suite 320
Riverside, CA 92501

Phone: 951-955-9700
Fax: 951-955-8873

www.wrc-rca.org

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Appendix B:
Floral and Faunal Compendia

Flora Compendium

Cupressaceae		**Cypress Family**
Cupressus	*sempervirens*	Italian cypress
Pinaceae		**Pine Family**
Pinus	*sp.*	Unknown pine species
Adoxaceae		**Honeysuckle Family**
Sambucus	*mexicana*	blue elderberry
Aizoaceae		**Fig-Marigold Family**
Carpobrotus	*edulis*	hottentot-fig
Anacardiaceae		**Sumac or Cashew Family**
Schinus	*molle*	Peruvian pepper tree
Schinus	*terebinthifolius*	Brazilian pepper tree
Toxicodendron	*diversilobum*	poison oak
Asteraceae		**Sunflower Family**
Ambrosia	*psilostachya*	western ragweed
Artemisia	*californica*	California sagebrush
Baccharis	*salicifolia*	mule fat
Centaurea	*solstitialis*	yellow star-thistle
Conyza	*canadensis*	horseweed
Corethrogyne	*filaginifolia*	California aster
Helianthus	*annuus*	common sunflower
Heterotheca	*grandiflora*	telegraphweed
Heterotheca	*grandiflora*	telegraphweed
Isocoma	*menziesii*	coastal goldenbush
Pseudognaphalium	*canescens*	everlasting cudweed
Sonchus	*asper*	sow thistle
Boraginaceae		**Borage Family**
Amsinckia	*menziesii*	Menzies' fiddleneck
Heliotropium	*curassivicum*	saltmarsh heliotrope
Brassicaceae		**Mustard Family**
Hirschfeldia	*incana*	short-podded mustard
Nasturtium	*aquaticum*	water-cress
Cactaceae		**Cactus Family**
Cylindropuntia	*california var. parkeri*	cane cholla
Caprifoliaceae		**Honeysuckle Family**
Lonicera	*japonica*	Japanese honeysuckle
Chenopodiaceae		**Goosefoot Family**
Salsola	*tragus*	Russian thistle
Cistaceae		**Rock-Rose Family**
Helianthemum	*scoparium*	peak rush-rose

Flora Compendium

Cucurbitaceae		**Gourd Family**
Cucurbita	*foetidissima*	calabazilla
Marah	*macrocarpus*	wild cucumber
Euphorbiaceae		**Spurge Family**
Chamaesyce	*albomarginata*	rattlesnake weed
Croton	*setigerus*	dove weed
Fabaceae		**Legume Family**
Albizia	*julibrissin*	silk tree
Lotus	*scoparius*	common deerweed
Fagaceae		**Oak Family**
Quercus	*agrifolia*	coast live oak
Lamiaceae		**Mint Family**
Lepechinia	*cardiophylla*	heart-leaved pitcher sage
Marrubium	*vulgare*	horehound
Salvia	*apiana*	white sage
Trichostema	*lanceolatum*	vinegar weed
Moraceae		**Mulberry Family**
Morus	*alba*	white mulberry
Myrtaceae		**Myrtle Family**
Eucalyptus	*globulus*	blue gum
Eucalyptus	*polyanthemos*	red box
Oleaceae		**Olive Family**
Fraxinus	*latifolia*	Oregon ash
Olea	*europaea*	olive
Onagraceae		**Evening Primrose Family**
Epilobium	*campestre*	willow herb
Polygonaceae		**Buckwheat Family**
Eriogonum	*fasciculatum*	California buckwheat
Rosaceae		**Rose Family**
Adenostoma	*fasciculatum*	chamise
Rutaceae		**Rue Family**
Citrus	*limonia*	lemon
Salicaceae		**Willow Family**
Populus	*fremontii*	Fremont cottonwood
Salix	*gooddingii*	Goodding's willow
Salix	*laevigata*	red willow
Salix	*lasiolepis*	arroyo willow
Scrophulariaceae		**Figwort Family**
Mimulus	*guttatus*	seep monkeyflower

Flora Compendium

Myoporum	*laetum*	myoporum
Solanaceae		**Nightshade Family**
Datura	*wrightii*	jimson weed
Nicotiana	*glauca*	tree tobacco
Tamaricaceae		**Tamarisk Family**
Tamarix	*ramosissima*	Mediterranean tamarisk
Agavaceae		**Agave Family**
Yucca	*elephantipes*	yucca tree
Agavaceae		**Agave Family**
Agave	*americana variegata*	century plant
Arecaceae		**Palm Family**
Washingtonia	*robusta*	Mexican fan palm
Cyperaceae		**Sedge Family**
Cyperus	*involucratus*	umbrella plant
Poaceae		**Grass Family**
Bromus	*rubens*	red brome
Cortaderia	*selloana*	Uruguayan pampas grass
Typhaceae		**Cattail Family**
Typha	*latifolia*	broad leaf cattail

Fauna Compendium

Hesperiidae		**Skippers**
Hylephila	*phyleus*	fiery skipper
Sarcophagidae		**Flesh Flies**
Sarcophaga	*sp.*	flesh fly
Formicidae		**Ants**
Pogonomyrmex	*californicus*	harvester ants
Hylidae		**Treefrogs**
Pseudacris	*regilla*	Pacific treefrog
Phrynosomatidae		**Lizards**
Uta	*stansburiana*	side-blotched lizard
Accipitridae		**Hawks**
Accipiter	*cooperii*	cooper's hawk
Buteo	*jamaicensis*	red-tailed hawk
Columbidae		**Pigeons/Doves**
Zenaida	*macroura*	mourning dove
Cuculidae		**Cuckoos/Roadrunners/Anis**
Geococcyx	*californianus*	greater roadrunner
Trochilidae		**Hummingbirds**
Calypte	*anna*	Anna's hummingbird
Corvidae		**Jays/Crows**
Aphelocoma	*californica*	western scrub-jay
Corvus	*corax*	common raven
Aegithalidae		**Bushtits**
Psaltriparus	*minimus*	bushtit
Troglodytidae		**Wrens**
Thryomanes	*bewickii*	Bewick's wren
Sylviidae		**Old world warblers**
Polioptila	*californica*	California gnatcatcher
Mimidae		**Mockingbirds/Thrashers**
Mimus	*polyglottos*	northern mockingbird
Emberizidae		**Warblers, sparrow, etc.**
Pipilo	*crissalis*	California towhee
Melospiza	*melodia*	song sparrow
Fringillidae		**Finches**
Carpodacus	*mexicanus*	house finch
Carduelis	*psaltria*	lesser goldfinch
Passeridae		**True sparrows**
Passer	*domesticus*	house sparrow
Leporidae		**Hares and Rabbits**

Fauna Compendium

Sylvilagus	*audubonii*	desert cottontail
Sciuridae		**Squirrels**
Spermophilus	*beecheyi*	California ground squirrel
Muridae		**Mice, Rats, and Voles**
Neotoma	*lepida*	desert woodrat
Canidae		**Wolves and Foxes**
Canis	*familiaris*	domestic dog
Canis	*latrans*	coyote

Appendix C:
Site Photographs

Photograph 1: Looking northwest at the northern portion of the project site. Marginal quality Riversidean sage scrub occurs along the upland swale, located in the central portion of the photograph. Disturbed habitat occurs in the foreground.

Photograph 2: Looking south from the northeastern portion of the project site. Disturbed habitat occurs in the foreground. Urban/Developed habitat occurs in the background along with landscape vegetation.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix C
Site Photographs 1 and 2

Photograph 3: Looking south from the northern portion of the project site. Looking downstream at the isolated ponded area within an upland swale. Riparian habitat is located in the background. Disturbed habitat occurs within the upland swale with a few scattered California buckwheat.

Photograph 4: Looking west from the southern portion of the project site. Moderate quality coastal sage scrub occurs along the western property boundary. Southern cottonwood-willow riparian forest occurs in the foreground.

Source: Michael Brandman Associates, 2012.

Photograph 5: Looking southwest at the southern portion of the project site. Southern cottonwood-willow riparian forest occurs within the main drainage as it flows from right to left in the photographs. Moderate quality Riversidean sage scrub occurs on the side slopes along the margins of the drainage.

Photograph 6: Looking southwest from the southwestern portion of the project site. Dense southern cottonwood-willow riparian forest occurs in the background. At this location, the active channel is contained within a low-flow channel and does not meet all three USACE wetland criteria.

Source: Michael Brandman Associates, 2012.

Appendix D:
Regulatory Background

REGULATORY BACKGROUND

Special status species are native species that have been afforded special legal or management protection because of concern for their continued existence. There are several categories of protection at both federal and state levels, depending on the magnitude of threat to continued existence and existing knowledge of population levels.

Federal Endangered Species Act

The US Fish and Wildlife Service (USFWS) administers the federal Endangered Species Act (FESA) that provides a process for listing species as either threatened or endangered, and methods of protecting listed species. The FESA defines as "endangered" any plant or animal species that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is a species that is likely to become endangered in the foreseeable future. A "proposed" species is one that has been officially proposed by USFWS for addition to the federal threatened and endangered species list.

Section 9 of the FESA prohibits "take" of threatened or endangered species. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The presence of any federally threatened or endangered species that are in a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the FESA, the USFWS may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

California Endangered Species Act

The California Department of Fish and Game (CDFG) administers the California Endangered Species Act (CESA). The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is considered as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management. A rare species is one that is considered present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are fully protected against take, as defined above.

Section 3503 and 3511 of California Fish and Game Code

The CDFG administers the California Fish and Game Code. There are particular sections of the Code that are applicable to natural resource management. For example, section 3503 of the Code states it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3511 of the Code lists fully protected bird species, where the CDFG is unable to authorize the issuance of permits

or licenses to take these species. Pertinent species that are state fully protected include golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, capture, kill, or possess or attempt to do the same to any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and the countries of the former Soviet Union.

Section 404 of the Federal Clean Water Act

Section 404 of the federal Clean Water Act, which is administered by the US Army Corps of Engineers (USACE), regulates the discharge of dredge and fill material into waters of the United States (US). USACE has established a series of nationwide permits that authorize certain activities in waters of the US, provided that a proposed activity can demonstrate compliance with standard conditions. Normally, USACE requires an individual permit for an activity that will affect an area equal to or in excess of 0.5 acre of waters of the US projects that result in impacts to less than 0.5 acre can normally be conducted pursuant to one of the nationwide permits, if consistent with the standard permit conditions. Use of any nationwide permit is contingent on the activities having no impacts to endangered species.

Section 1600 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California are subject to the regulatory authority of the CDFG pursuant to sections 1600 through 1603 of the Code, requiring preparation of a Streambed Alteration Agreement. Under the Code, a stream is defined as a body of water that flows at least periodically, or intermittently, through a bed or channel having banks and supporting fish or other aquatic life. Included are watercourses with surface or subsurface flows that support or have supported riparian vegetation. CDFG also has jurisdiction within altered or artificial waterways based on the value of those waterways to fish and wildlife, and also has jurisdiction over dry washes that carry water ephemerally during storm events.

Section 401 of the Clean Water Act

Section 401 of the Clean Water Act requires that, ". . . any applicant for a federal permit for activities that involve a discharge to waters of the State, shall provide the federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge would comply with the applicable provisions under the federal Clean Water Act." Therefore, before the

USACE would issue a Section 404 permit, applicants must apply for and receive a Section 401 water quality certification from the Regional Water Quality Control Board (RWQCB).

Porter Cologne Act

The RWQCB regulates actions that would involve "discharging waste, or proposing to discharge waste, with any region that could affect the water of the state" (water code 13260(a)), pursuant to provisions of the State Porter-Cologne Water Quality Act. "Waters of the State" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (water code 13050 (e)).

Western Riverside County MSHCP

The MSHCP is a comprehensive, multi-jurisdictional HCP focusing on conservation of species and their associated habitats in western Riverside County. The goal of the MSHCP is to maintain biological and ecological diversity within a rapidly urbanizing region.

The approval of the MSHCP and execution of the Implementing Agreement (IA) by the wildlife agencies allows signatories of the IA to issue "take" authorizations for all species covered by the MSHCP, including state- and federal-listed species as well as other identified sensitive species and/or their habitats. Each city or local jurisdiction would impose a Development Mitigation Fee for projects within their jurisdiction. With payment of the mitigation fee to the County and compliance with the survey requirements of the MSHCP where required, full mitigation in compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), CESA, and FESA would be granted. The Development Mitigation Fee varies according to project size and project description. The fee for residential development ranges from approximately $800 per unit to $1,600 per unit depending on development density (County Ordinance 810.2). Payment of the mitigation fee and compliance with the requirements of Section 6.0 of the MSHCP are intended to provide full mitigation under CEQA, NEPA, CESA, and FESA for impacts to the species and habitats covered by the MSHCP pursuant to agreements with the USFWS, the CDFG, and/or any other appropriate participating regulatory agencies and as set forth in the IA for the MSHCP.

Appendix E:
CNDDB List

DEPARTMENT OF FISH AND GAME

Quad is (Murrieta (3311752) or Romoland (3311762) or Lake Elsinore (3311763) or Wildomar (3311753))

CNDDB Element Query Results

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
Abronia villosa var. aurita	chaparral sand-verbena	PDNYC010P1	75	G5T3T4	S2	None	None	1B.1	BLM_S-Sensitive | USFS_S-Sensitive	
Accipiter cooperii	Cooper's hawk	ABNKC12040	102	G5	S3	None	None		DFG_WL-Watch List | IUCN_LC-Least Concern	Cismontane woodland | Riparian forest | Riparian woodland | Upper montane coniferous forest
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	ABPBX91091	185	G5T2T4	S2S3	None	None		DFG_WL-Watch List	Chaparral | Coastal scrub
Allium munzii	Munz's onion	PMLIL022Z0	21	G1	S1	Endangered	Threatened	1B.1	USFS_S-Sensitive	Chaparral | Cismontane woodland | Coastal scrub | Pinon and juniper woodlands | Valley and foothill grassland
Ambrosia pumila	San Diego ambrosia	PDAST0C0M0	55	G1	S1	Endangered	None	1B.1		Chaparral | Coastal scrub | Valley and foothill grassland
Amphispiza belli belli	Bell's sage sparrow	ABPBX97021	57	G5T2T4	S2?	None	None		ABC_WLBCC-Watch List of Birds of Conservation Concern | DFG_WL-Watch List | USFWS_BCC-Birds of Conservation Concern	Chaparral | Coastal scrub
Anaxyrus californicus	arroyo toad	AAABB01230	123	G2G3	S2S3	Endangered	None		DFG_SSC-Species of Special Concern | IUCN_EN-Endangered	Desert wash | Riparian scrub | Riparian woodland | South coast flowing waters | South coast standing waters
Aquila chrysaetos	golden eagle	ABNKC22010	141	G5	S3	None	None		BLM_S-Sensitive | CDF_S-Sensitive | DFG_FP-Fully Protected | DFG_WL-Watch List | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest | Cismontane woodland | Coastal prairie | Great Basin grassland | Great Basin scrub | Lower montane coniferous forest | Pinon and juniper woodlands | Upper montane coniferous forest | Valley and foothill grassland
Arctostaphylos rainbowensis	Rainbow manzanita	PDERI042T0	63	G2	S2.1	None	None	1B.1	USFS_S-Sensitive	Chaparral | Ultramafic
Aspidoscelis hyperythra	orangethroat whiptail	ARACJ02060	346	G5	S2	None	None		DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern	Chaparral | Cismontane woodland | Coastal scrub
Aspidoscelis tigris stejnegeri	coastal whiptail	ARACJ02143	112	G5T3T4	S2S3	None	None			
Athene cunicularia	burrowing owl	ABNSB10010	1808	G4	S2	None	None		BLM_S-Sensitive | DFG_SSC-Species of	Coastal prairie | Coastal scrub | Great Basin grassland |

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
									Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley and foothill grassland
Atriplex coronata var. notatior	San Jacinto Valley crownscale	PDCHE040C2	16	G4T1	S1	Endangered	None	1B.1		Alkali playa | Chenopod scrub | Valley and foothill grassland | Vernal pool | Wetland
Atriplex serenana var. davidsonii	Davidson's saltscale	PDCHE041T1	23	G5T2?	S2?	None	None	1B.2		Coastal bluff scrub | Coastal scrub
Ayenia compacta	California ayenia	PDSTE01020	49	G4	S3?	None	None	2.3		Desert wash | Mojavean desert scrub | Sonoran desert scrub
Brodiaea filifolia	thread-leaved brodiaea	PMLIL0C050	79	G1	S1	Threatened	Endangered	1B.1	USFS_S-Sensitive	Chaparral | Cismontane woodland | Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Brodiaea orcuttii	Orcutt's brodiaea	PMLIL0C0B0	105	G1	S1	None	None	1B.1	BLM_S-Sensitive | USFS_S-Sensitive	Chaparral | Cismontane woodland | Closed-cone coniferous forest | Meadow and seep | Ultramafic | Valley and foothill grassland | Vernal pool | Wetland
Buteo regalis	ferruginous hawk	ABNKC19120	96	G4	S3S4	None	None		DFG_WL-Watch List | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin grassland | Great Basin scrub | Pinon and juniper woodlands | Valley and foothill grassland
California macrophylla	round-leaved filaree	PDGER01070	155	G2	S2	None	None	1B.1	BLM_S-Sensitive	Cismontane woodland | Valley and foothill grassland
Calochortus weedii var. intermedius	intermediate mariposa-lily	PMLIL0D1J1	96	G3G4T2	S2.2	None	None	1B.2	USFS_S-Sensitive	Chaparral | Coastal scrub | Valley and foothill grassland
Centromadia pungens ssp. laevis	smooth tarplant	PDAST4R0R4	104	G3G4T2	S2.1	None	None	1B.1		Alkali playa | Chenopod scrub | Meadow and seep | Riparian woodland | Valley and foothill grassland | Wetland
Chaetodipus californicus femoralis	Dulzura pocket mouse	AMAFD05021	55	G5T3	S2?	None	None		DFG_SSC-Species of Special Concern	Chaparral | Coastal scrub | Valley and foothill grassland
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	AMAFD05031	94	G5T3	S2S3	None	None		DFG_SSC-Species of Special Concern	Chaparral | Coastal scrub
Charadrius alexandrinus nivosus	western snowy plover	ABNNB03031	116	G4T3	S2	Threatened	None		ABC_WLBCC-Watch List of Birds of Conservation Concern | DFG_SSC-Species of Special Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin standing waters | Sand shore | Wetland
Charina trivirgata	rosy boa	ARADA01020	48	G4G5	S3S4	None	None		IUCN_LC-Least	Chaparral | Mojavean desert

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
									Concern | USFS_S-Sensitive	scrub | Sonoran desert scrub
Chorizanthe parryi var. parryi	Parry's spineflower	PDPGN040J2	94	G2T2	S2	None	None	1B.1	BLM_S-Sensitive | USFS_S-Sensitive	Chaparral | Coastal scrub
Chorizanthe polygonoides var. longispina	long-spined spineflower	PDPGN040K1	99	G5T3	S3	None	None	1B.2	USFS_S-Sensitive	Chaparral | Coastal scrub | Meadow and seep | Ultramafic | Valley and foothill grassland
Cicindela senilis frosti	senile tiger beetle	IICOL02121	9	G4T1	S1	None	None			Mud shore/flats | Wetland
Clinopodium chandleri	San Miguel savory	PDLAM08030	21	G2	S2	None	None	1B.2	USFS_S-Sensitive	Chaparral | Cismontane woodland | Coastal scrub | Riparian woodland | Ultramafic | Valley and foothill grassland
Crotalus ruber	red-diamond rattlesnake	ARADE02090	148	G4	S2?	None	None		DFG_SSC-Species of Special Concern	Chaparral | Mojavean desert scrub | Sonoran desert scrub
Dipodomys stephensi	Stephens' kangaroo rat	AMAFD03100	214	G2	S2	Endangered	Threatened		IUCN_EN-Endangered	Coastal scrub | Valley and foothill grassland
Dodecahema leptoceras	slender-horned spineflower	PDPGN0V010	35	G1	S1	Endangered	Endangered	1B.1	USFS_S-Sensitive	Chaparral | Coastal scrub
Dudleya multicaulis	many-stemmed dudleya	PDCRA040H0	116	G2	S2	None	None	1B.2	BLM_S-Sensitive | USFS_S-Sensitive	Chaparral | Coastal scrub | Valley and foothill grassland
Elanus leucurus	white-tailed kite	ABNKC06010	157	G5	S3	None	None		BLM_S-Sensitive | DFG_FP-Fully Protected | IUCN_LC-Least Concern	Cismontane woodland | Marsh and swamp | Riparian woodland | Valley and foothill grassland | Wetland
Emys marmorata	western pond turtle	ARAAD02030	1134	G3G4	S3	None	None		BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh and swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Eremophila alpestris actia	California horned lark	ABPAT02011	77	G5T3Q	S3	None	None		DFG_WL-Watch List | IUCN_LC-Least Concern	Marine intertidal and splash zone communities | Meadow and seep
Eryngium aristulatum var. parishii	San Diego button-celery	PDAPI0Z042	57	G5T1	S1	Endangered	Endangered	1B.1		Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Eumops perotis californicus	western mastiff bat	AMACD02011	293	G5T4	S3?	None	None		BLM_S-Sensitive | DFG_SSC-Species of Special Concern | WBWG_H-High Priority	Chaparral | Cismontane woodland | Coastal scrub | Valley and foothill grassland
Euphydryas editha quino	quino checkerspot butterfly	IILEPK405L	95	G5T1	S1	Endangered	None		XERCES_CI-Critically Imperiled	Chaparral | Coastal scrub

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
Geothallus tuberosus	Campbell's liverwort	NBHEP1C010	4	G1	S1	None	None	1B.1	USFS_S-Sensitive	Chaparral | Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Gila orcuttii	arroyo chub	AFCJB13120	49	G2	S2	None	None		AFS_VU-Vulnerable | DFG_SSC-Species of Special Concern | USFS_S-Sensitive	Aquatic | South coast flowing waters
Harpagonella palmeri	Palmer's grapplinghook	PDBOR0H010	57	G4	S3.2	None	None	4.2		Chaparral | Coastal scrub | Valley and foothill grassland
Hesperocyparis forbesii	Tecate cypress	PGCUP040C0	25	G2	S1.1	None	None	1B.1	BLM_S-Sensitive | USFS_S-Sensitive	Chaparral | Closed-cone coniferous forest
Horkelia cuneata var. puberula	mesa horkelia	PDROS0W045	58	G4T2	S2.1	None	None	1B.1	USFS_S-Sensitive	Chaparral | Cismontane woodland | Coastal scrub
Juncus luciensis	Santa Lucia dwarf rush	PMJUN013J0	26	G2G3	S2S3	None	None	1B.2		Chaparral | Great Basin scrub | Lower montane coniferous forest | Meadow and seep | Vernal pool | Wetland
Lanius ludovicianus	loggerhead shrike	ABPBR01030	80	G4	S4	None	None		DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest | Desert wash | Joshua tree woodland | Mojavean desert scrub | Pinon and juniper woodlands | Riparian woodland | Sonoran desert scrub
Lasiurus xanthinus	western yellow bat	AMACC05070	57	G5	S3	None	None		DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern | WBWG_H-High Priority	Desert wash
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	PDAST5L0A1	87	G4T3	S2.1	None	None	1B.1	BLM_S-Sensitive	Alkali playa | Marsh and swamp | Salt marsh | Valley and foothill grassland | Vernal pool | Wetland
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	PDBRA1M114	134	G5T3	S3	None	None	1B.2		Chaparral | Coastal scrub
Lepus californicus bennettii	San Diego black-tailed jackrabbit	AMAEB03051	96	G5T3?	S3?	None	None		DFG_SSC-Species of Special Concern	Coastal scrub
Lilium parryi	lemon lily	PMLIL1A0J0	138	G3	S2	None	None	1B.2	USFS_S-Sensitive	Lower montane coniferous forest | Meadow and seep | Riparian forest | Upper montane coniferous forest | Wetland
Limnanthes alba ssp. parishii	Parish's meadowfoam	PDLIM02052	32	G3T2T3	S2S3	None	Endangered	1B.2	BLM_S-Sensitive | USFS_S-Sensitive	Meadow and seep | Vernal pool | Wetland
Linderiella santarosae	Santa Rosa Plateau fairy shrimp	ICBRA06020	1	G1G2	S1	None	None			Vernal pool
Myosurus minimus ssp. apus	little mousetail	PDRAN0H031	24	G5T2Q	S2.2	None	None	3.1		Vernal pool | Wetland

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
Navarretia fossalis	spreading navarretia	PDPLM0C080	65	G1	S1	Threatened	None	1B.1		Alkali playa | Chenopod scrub | Marsh and swamp | Vernal pool | Wetland
Navarretia prostrata	prostrate vernal pool navarretia	PDPLM0C0Q0	60	G2	S2	None	None	1B.1		Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Onychomys torridus ramona	southern grasshopper mouse	AMAFF06022	26	G5T3?	S3?	None	None		DFG_SSC-Species of Special Concern	Chenopod scrub
Orcuttia californica	California Orcutt grass	PMPOA4G010	37	G1	S1	Endangered	Endangered	1B.1		Vernal pool | Wetland
Perognathus longimembris brevinasus	Los Angeles pocket mouse	AMAFD01041	49	G5T1T2	S1S2	None	None		DFG_SSC-Species of Special Concern | USFS_S-Sensitive	Coastal scrub
Phrynosoma blainvillii	coast horned lizard	ARACF12100	660	G4G5	S3S4	None	None		BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive	Chaparral | Cismontane woodland | Coastal bluff scrub | Coastal scrub | Desert wash | Pinon and juniper woodlands | Riparian scrub | Riparian woodland | Valley and foothill grassland
Plegadis chihi	white-faced ibis	ABNGE02020	20	G5	S1	None	None		DFG_WL-Watch List | IUCN_LC-Least Concern	Marsh and swamp | Wetland
Polioptila californica californica	coastal California gnatcatcher	ABPBJ08081	804	G3T2	S2	Threatened	None		ABC_WLBCC-Watch List of Birds of Conservation Concern | DFG_SSC-Species of Special Concern	Coastal bluff scrub | Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	PDAST440C0	15	G4	S2S3.2	None	None	2.2		Chaparral | Cismontane woodland | Coastal scrub | Riparian woodland
Rana draytonii	California red-legged frog	AAABH01022	1327	G4T2T3	S2S3	Threatened	None		DFG_SSC-Species of Special Concern | IUCN_VU-Vulnerable	Aquatic | Artificial flowing waters | Artificial standing waters | Freshwater marsh | Marsh and swamp | Riparian forest | Riparian scrub | Riparian woodland | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Salvadora hexalepis virgultea	coast patch-nosed snake	ARADB30033	22	G5T3	S2S3	None	None		DFG_SSC-Species of Special Concern	Coastal scrub
Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	PDLAM1U0A1	32	G4T2	S2	None	None	1B.2	USFS_S-Sensitive	Chaparral | Cismontane woodland | Lower montane coniferous forest
Sibaropsis hammittii	Hammitt's clay-cress	PDBRA32010	5	G2	S2.2	None	None	1B.2	USFS_S-Sensitive	Chaparral | Valley and foothill grassland

ScientificName	CommonName	ElementCode	OccurrenceTotal	GlobalRank	StateRank	FederalStatus	StateStatus	RarePlantRank	OtherStatus	Habitat
Southern Coast Live Oak Riparian Forest	Southern Coast Live Oak Riparian Forest	CTT61310CA	246	G4	S4	None	None			Riparian forest
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	CTT61330CA	111	G3	S3.2	None	None			Riparian forest
Southern Interior Basalt Flow Vernal Pool	Southern Interior Basalt Flow Vernal Pool	CTT44310CA	9	G1	S1.2	None	None			Vernal pool | Wetland
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	CTT62400CA	230	G4	S4	None	None			Riparian woodland
Spea hammondii	western spadefoot	AAABF02020	422	G3	S3	None	None		BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_NT-Near Threatened	Cismontane woodland | Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Sphaerocarpos drewei	bottle liverwort	NBHEP35030	3	G1	S1	None	None	1B.1	USFS_S-Sensitive	Chaparral | Coastal scrub
Streptocephalus woottoni	Riverside fairy shrimp	ICBRA07010	25	G1	S1	Endangered	None		IUCN_EN-Endangered	Coastal scrub | Valley and foothill grassland | Vernal pool | Wetland
Symphyotrichum defoliatum	San Bernardino aster	PDASTE80C0	76	G2	S2	None	None	1B.2	BLM_S-Sensitive | USFS_S-Sensitive	Cismontane woodland | Coastal scrub | Lower montane coniferous forest | Marsh and swamp | Meadow and seep | Valley and foothill grassland | Wetland
Taricha torosa	Coast Range newt	AAAAF02032	62	G5T4	S4	None	None		DFG_SSC-Species of Special Concern	
Thamnophis hammondii	two-striped garter snake	ARADB36160	143	G3	S2	None	None		BLM_S-Sensitive | DFG_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive	Marsh and swamp | Riparian scrub | Riparian woodland | Wetland
Valley Needlegrass Grassland	Valley Needlegrass Grassland	CTT42110CA	45	G3	S3.1	None	None			Valley and foothill grassland
Vireo bellii pusillus	least Bell's vireo	ABPBW01114	248	G5T2	S2	Endangered	Endangered		ABC_WLBCC-Watch List of Birds of Conservation Concern | IUCN_NT-Near Threatened	Riparian forest | Riparian scrub | Riparian woodland

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Dry Season Focused Fairy Shrimp Survey Report
24-Acre Amberwood Project
City of Wildomar, Riverside County, California

Murrieta, CA USGS 7.5-minute Topographic Quadrangle,
Section 6, Township 7 South, Range 3 West
APNs: 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012

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Report Date: December 17, 2012

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SECTION 1: INTRODUCTION

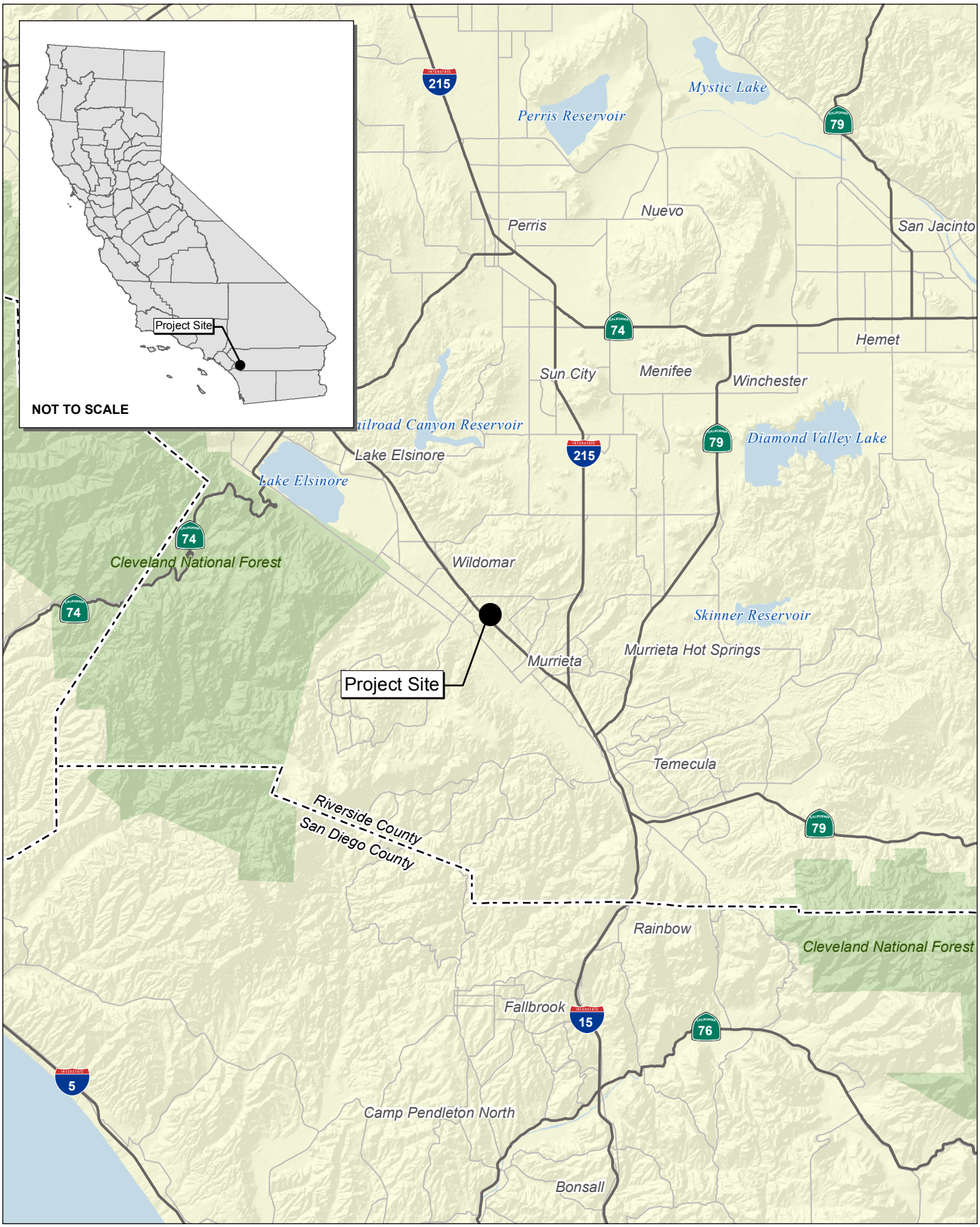
1.1 - Survey Purpose

This report describes the findings of the focused U.S. Fish and Wildlife Service (USFWS) protocol dry season survey performed by Michael Brandman Associates (MBA) for Riverside fairy shrimp (*Streptocephalus woottonii*), vernal pool fairy shrimp (*Branchinecta lynchii*), and San Diego fairy shrimp (*Branchinecta sandiegonensis*). Riverside fairy shrimp and San Diego fairy shrimp are listed as endangered, and vernal pool fairy shrimp are listed as threatened under the Federal Endangered Species Act of 1973 (FESA). The 24-acre Amberwood property (project site or site) contains a single ponded area containing marginal quality fairy shrimp habitat. The ponded area was created by the installation of an earthen berm across an upland swale. This ponded area was artificially created by the previous property owner for personal use. The purpose of this focused dry season survey is to identify the presence or absence of any sensitive fairy shrimp species within the ponded area on the project site.

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on conservation of species and their associated habitats in western Riverside County. Of the 146 Covered Species within the MSHCP, 118 species are considered to be "adequately conserved." The remaining 28 Covered Species would be considered to be adequately conserved when certain landmark conservation requirements are met during the course of future development. The general goal of the MSHCP is to maintain biological and ecological diversity within a rapidly urbanizing region. In compliance with the MSHCP and FESA, focused protocol surveys are required for Riverside fairy shrimp, vernal pool fairy shrimp, and San Diego fairy shrimp for projects that may potentially impact any habitat for these species in western Riverside County.

1.2 - Project Site Location

The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, in the southern portion of the City of Wildomar, Riverside County, California (Exhibit 1). The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kennadine Drive, and west of Elizabeth Lane (Exhibit 3).



Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

Michael Brandman Associates

NORTH

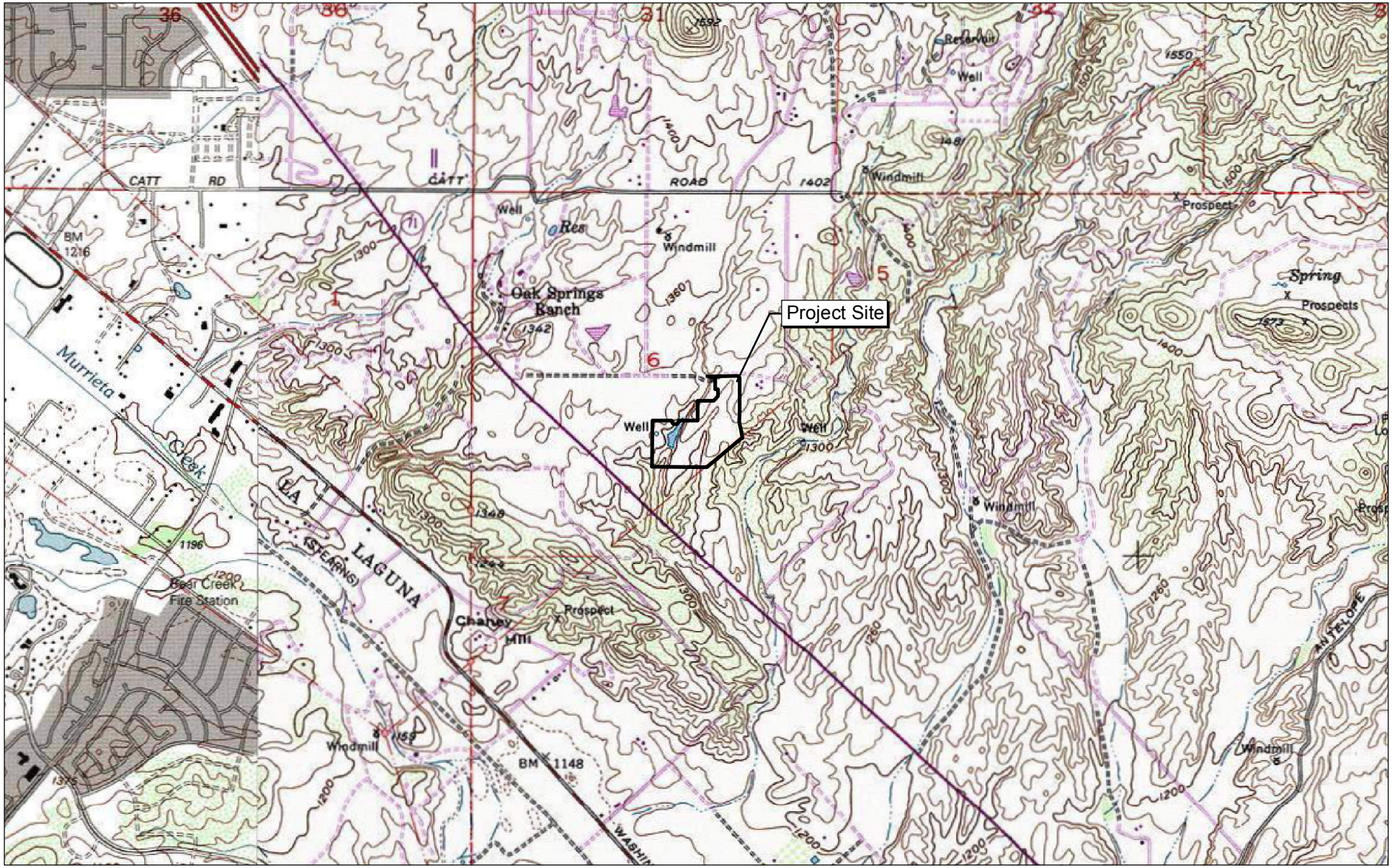
5 2.5 0 5

Miles

Exhibit 1
Regional Location Map

21560078 •12/2012 | 1_regional.mxd

LENNAR HOMES, INC. • AMBERWOOD PROJECT
DRY SEASON FAIRY SHRIMP SURVEY



Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

NORTH

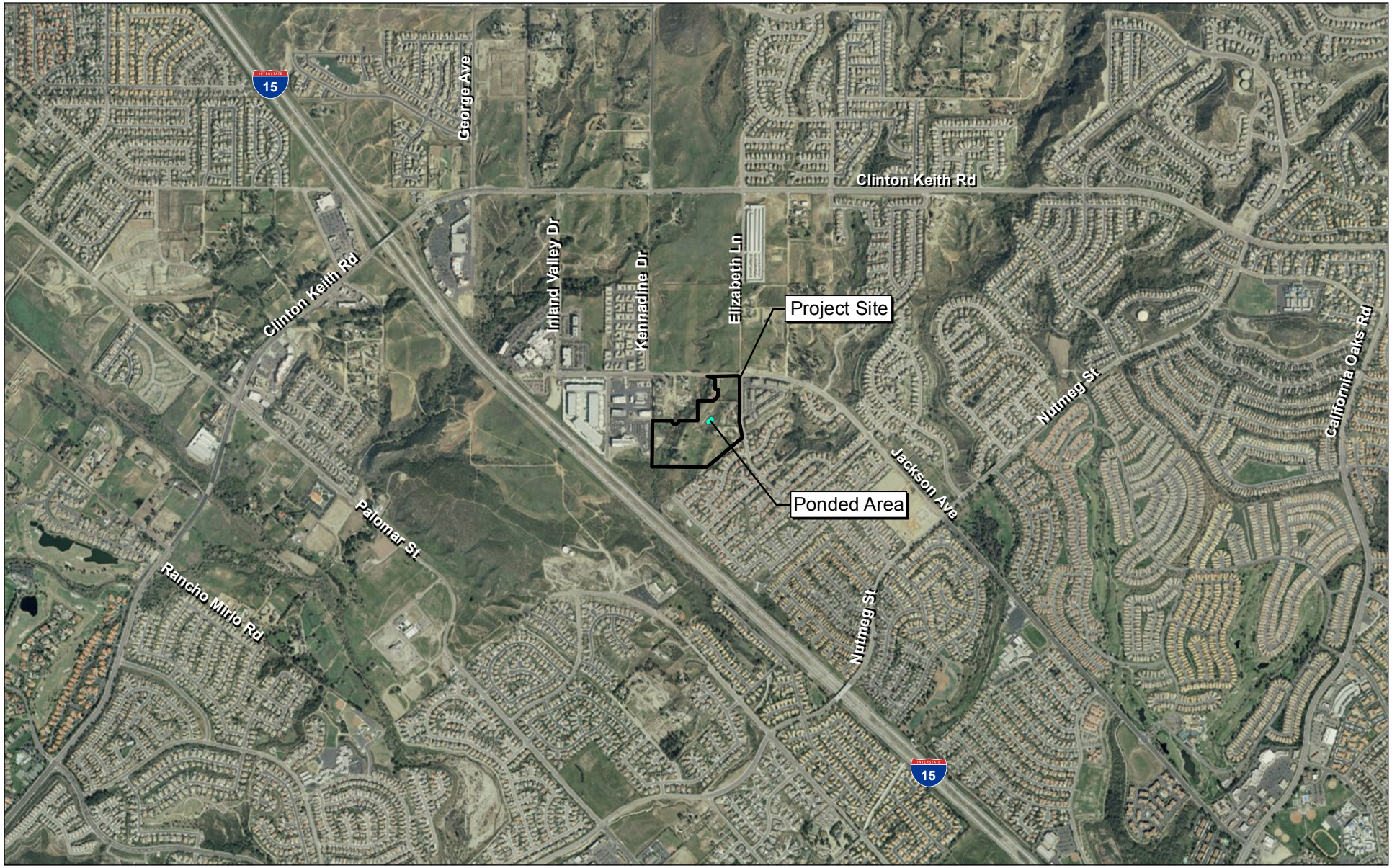
2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560078 • 12/2012 | 2_local_topo.mxd

Exhibit 2
Local Vicinity Map
Topographic Base



Source: ESRI Aerial Imagery.

Exhibit 3
Local Vicinity Map
Aerial Base

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560078 • 12/2012 | 3_local_aerial.mxd

LENNAR HOMES, INC. • AMBERWOOD PROJECT
DRY SEASON FAIRY SHRIMP SURVEY

SECTION 2: METHODOLOGY

A dry season survey for the federally listed Riverside fairy shrimp, vernal pool fairy shrimp, and San Diego fairy shrimp was conducted by MBA biologist Scott Crawford, MA, USFWS permit number TE 019947-4. Methods employed were in conformance with USFWS Vernal Pool Branchiopods Presence/Absence Survey Guidelines, issued April 19, 1996. The survey was conducted once the soils in the ponded area had completely dried, which was approximately 10 weeks after the ponded area no longer contained standing water. This survey report documents results of a dry season survey for Riverside fairy shrimp and vernal pool fairy shrimp conducted on October 5, 2012.

2.1 - Field Survey

The field surveyor sampled 10, 100-milliliter (ml) soil samples for a 1-liter total soil sample from the top 1 to 3 centimeters of pool sediment in the ponded area. Two linear transects were marked along the widest and longest portions of the ponded area. Four samples were taken equidistant from each other along the transect to obtain a general sample of the entire ponded area. Samples were taken for each pool starting with four soil samples taken from the edge of the ponded area and four soil samples taken from the middle of the ponded area. Two additional soil samples were taken from the deepest part of the ponded area. Soil samples from the ponded area were individually stored in labeled bags prior to processing.

2.2 - Procedures

Each sample was first washed through a 2-millimeter sieve to remove the larger organic material. Next, a 300-micron sieve was used to remove smaller particles and the sieve's size is larger than a typical fairy shrimp cyst and, therefore, would allow the cyst to pass through the screen. Finally, a 150-micron sieve was used to collect particles of similar size to fairy shrimp cysts. The average size of a fairy shrimp cyst is between 200 and 250 microns. The soils were gently washed through the sieves and soil fractions from both the 150-micron sieve and 300-micron sieve were examined under a dissecting microscope for the presence of fairy shrimp cysts. All fairy shrimp cysts were identified according to exterior morphology (Hill and Shepard 1997), removed from the soil, and separated by cyst type.

SECTION 3: EXISTING CONDITIONS

3.1 - Project Site Description

Based on the USDA Soil Survey, the project site contains 5 soil mapping units, including Arlington and Greenfield fine sandy loams, Gullied Land, Placentia fine sandy loam, Ramona and Buren loams, and San Timoteo loam (USDA 1971). The ponded area occurs in San Timeteo loam.

Topographically, the project site resides within gently rolling hills in the northern portion of Temecula Valley. Elevations onsite range from 1,260 to 1,350 feet above sea level.

Due to previous disturbance from weed abatement activities, the project site generally consists of disturbed areas with patches of native vegetation. The vegetation is generally comprised of a mosaic of various non-native ruderal (weedy) species. The dominant vegetation throughout the site is short-podded mustard (*Hirschfeldia incana*) and yellow-star thistle (*Centaurea solstitialis*). Habitat on the project site is low in quality. There are areas within the project site that contain Riversidean sage scrub and southern cottonwood-willow riparian forest. These areas contain moderate to high quality habitat.

There is a residential development to the southeast of the project area. Commercial and industrial development occurs to the west and northwest of the project site. The remainder of the project area is surrounded by natural open space with a several dirt access roads to the north and south. The project area is not located within any USFWS designated critical habitat areas.

The ponded area is located in the central portion of the project site along the central portion of the project site. This ponded area contained standing water for a long period of time, which provided suitable habitat for Riverside fairy shrimp and vernal pool shrimp. San Diego fairy shrimp typically occur in short-lived cooler water ponds. Wet season fairy shrimp surveys were not conducted because the ponded area was discovered too late in the season to conform to the existing protocol.

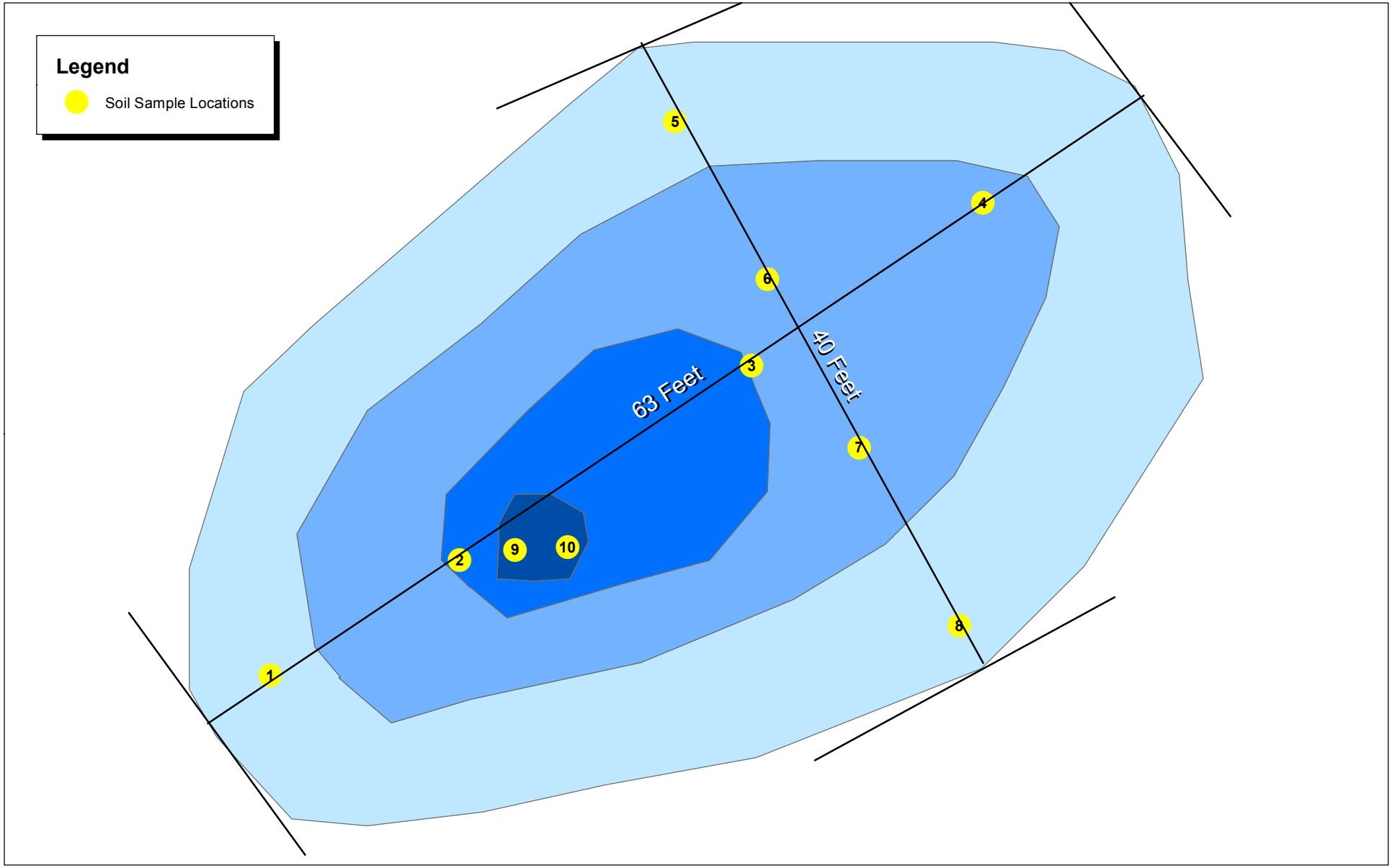
Data for survey findings were recorded on USFWS Vernal Pool Data Sheets (Appendix A). The weather conditions during the survey included an air temperature of 62 degrees Fahrenheit and winds ranging from 1 to 2 miles per hour, with 100 percent cloud cover.

3.1.1 - Ponded Area Description

The ponded area within the project site was created by a man-made berm several feet long that runs along the southern portion of an upland swale. Currently, water moves from the adjacent open space areas, continues onto the site as sheet flow, then ponds behind the bermed area (Exhibit 3). Estimated maximum dimensions for the ponded area is approximately 63 feet long at its longest point, and 40 feet wide at its widest point (Exhibit 4). On average, the ponded area has an approximate surface area of 862 square feet and likely fills to a depth of 48 inches. The ponded area contains no understory

vegetation, but is covered by red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), and Fremont's cottonwood (*Populus fremontii*).

There is a dense layer of leaf litter, which is typically associated with poor quality fairy shrimp habitat. Within this area is evidence of major soil cracking typically associated with clay soils. The clay soils within the project site may not naturally occur onsite, and may have been added to the ponded area to help retain moisture. The ponded area also contains a dense coverage of vegetation.



Source: MBA Field Survey and GIS Data 2012.

Michael Brandman Associates

NORTH

21560078 • 12/2012 | 4_Soil_Sample_Locations.mxd

Exhibit 4
Soil Sample Locations

LENNAR HOMES, INC. • AMBERWOOD PROJECT
DRY SEASON FAIRY SHRIMP SURVEY

SECTION 4: RESULTS

A total of 10 soil samples were taken at the ponded area (Exhibit 4). No fairy shrimp cysts were identified within the soil samples taken from the Project Site. Based on the nature of the ponded area, it is highly unlikely that it provides suitable habitat for any listed fairy shrimp.

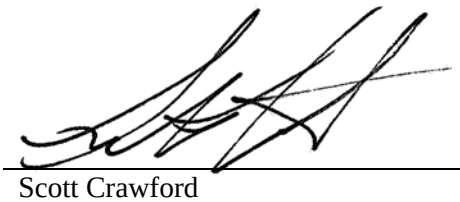
SECTION 5: CONCLUSIONS

Based on MBA's dry season survey, it was determined that special-status or sensitive fairy shrimp species, including Riverside fairy shrimp and vernal pool fairy shrimp are considered absent from the Project Site. One full dry season survey was successfully completed and concluded that no evidence of the presence of any special-status or sensitive fairy shrimp species was observed within the property.

No fairy shrimp cysts were identified during the dry season surveys. Based on the MSHCP requirements, no further surveys are required. Additional consultation with the City of Wildomar would be required in order to confirm the city's position regarding the appropriate protocol. Under the standard USFWS protocol, an additional wet season sample is required to complete a full fairy shrimp protocol survey. An additional wet season survey may be required if suitable habitat occurs within the Project Site during the 2012/2013 rainy season at the discretion of the applicant and city staff.

SECTION 6: CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: December 17, 2012 Signed: 

Scott Crawford
Senior Biologist
Michael Brandman Associates
Irvine, California

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Appendix A:
Field Data Sheets

U.S. Fish and Wildlife Service Vernal Pool Data Sheet Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no ✓ yes

Required color slides and/or photographs for the project site are included: _____ no ✓ yes

Date: 10 / 5 / 2012 Time: 7:00 AM County: Riverside Quad: Murrieta

Collector(s): S Crawford Permit #: TE 019947-4

Site/Project Name: Amberwood Project Pool #: 1

Township: 7 S. Range: 3 W Section: 6 33° 35' 19" lat. 117° 15' 46" long.

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing

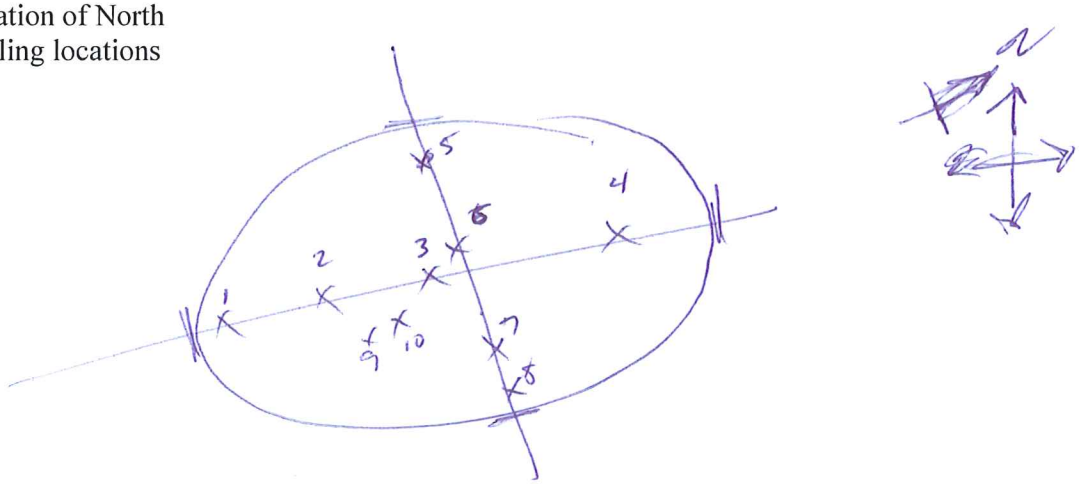
- ungrazed grazed: cattle horses sheep other_____
light moderate heavy

- predominant land use (e.g., pasture, crop):

Pool Bottom Surface: (circle where appropriate)
hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: _____cm (estimated maximum) Surface Area: _____m^2 (estimated maximum)

Sketch of pool and transects showing: (See document Exhibit 1)
- scale
- indication of North
- sampling locations



U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey Soil Analysis

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)
1	100	NONE		
2	100	NONE		
3	100	NONE		
4	100	NONE		
5	100	NONE		
6	100	NONE		
7	100	NONE		
8	100	NONE		
9	100	NONE		
10	100	NONE		

Voucher Specimens
Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)	# Cysts	Catalog/Accession #	Pool #

Appendix B:
Site Photographs

Photograph 1: Looking northeast at the ponded area following winter rains in 2011. Willows and mule fat surround the ponded area with no understory vegetation coverage.

Photograph 2: Looking south at the upland swale that provides the hydrology to fill the ponded area. Cottonwoods and willows in the background surround the ponded area.

Source: Michael Brandman Associates, 2012

Photograph 3: Looking southwest at the downstream portion of the swale that fills the ponded area. The earthen berm has been partially eroded at this location.

Photograph 4: Looking west at the existing earthen berm that has allowed the ponded area to form. Riparian vegetation on the right side of the photo indicates the ponds location.

Source: Michael Brandman Associates, 2012

Michael Brandman Associates

Appendix B
Site Photographs 3 and 4

DRAFT
MSHCP Burrowing Owl Focused Survey Report
Amberwood Project
City of Wildomar, Riverside County, California

Murrieta, California, USGS 7.5-minute Topographic Quadrangle Map
Section 6, Township 7 South, Range 3 West
APNs: 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012

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Contact: Scott Crawford, Senior Biologist
Report Prepared by: Tommy Molioo, Biologist
Surveys Conducted: July 25, 30, August 8 and 14, 2013

Date: September 10, 2013

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SECTION 1: SUMMARY

FirstCarbon Solutions | Michael Brandman Associates (FCS-MBA) conducted a focused burrow and burrowing owl survey on a 24-acre property, located in the City of Wildomar, Riverside County, California. The proposed Amberwood Project site consists of the development of single-family detached homes.

Burrowing owl focused surveys are part of the survey requirements for Western Riverside Multiple Species Habitat Conservation Plan (MSHCP), and consistency and compliance with the Migratory Bird Treaty Act (MBTA) and California Fish and Wildlife Code (CFW Code) Section 3503. The surveys were conducted according to standard protocols set forth by the Burrowing Owl Consortium, California Department of Fish and Wildlife (CDFW), and the MSHCP to determine the presence of potential burrows, burrowing owls, and evaluate burrowing owl use of the project site. The focused burrowing owl surveys were recommended in the Habitat Assessment and MSHCP Consistency Analysis Report for the proposed project (MBA 2012a).

Neither burrowing owls nor evidence of burrowing owls were observed in the survey area during the focused surveys. The Amberwood project site currently does not contain burrowing owls. However, there is a possibility of burrowing owl presence in the adjacent properties, and therefore, there is still potential for burrowing owls to be present in the future. Due to the possibility of burrowing owls and suitable habitat onsite, a 30-day pre-construction clearance survey will be required prior to ground disturbance activity onsite. A biological monitor will be required during construction activities if burrowing owls are observed onsite or within a 500-foot buffer during the pre-construction clearance survey.

SECTION 2: INTRODUCTION

At the request of Lennar Homes, Inc., FCS-MBA conducted burrowing owl focused surveys to document the current use by burrowing owl within the 24-acre property, hereafter referred to as project site or site. The proposed project consists of a new residential housing development, located in the City of Wildomar, Riverside County, California. The project site is located within an MSHCP-designated habitat assessment area for burrowing owl.

2.1 - Survey Purpose

The surveys were conducted to determine the presence / absence of burrowing owls within a MSHCP-designated burrowing owl survey area associated with the Plan Area. Before any form of construction can occur, the site must be clear of all species of special concern. This includes the burrowing owl. Due to the potential of burrowing owls to occur onsite this survey was conducted to confirm or rule out the presence of burrowing owls.

2.2 - Project Description

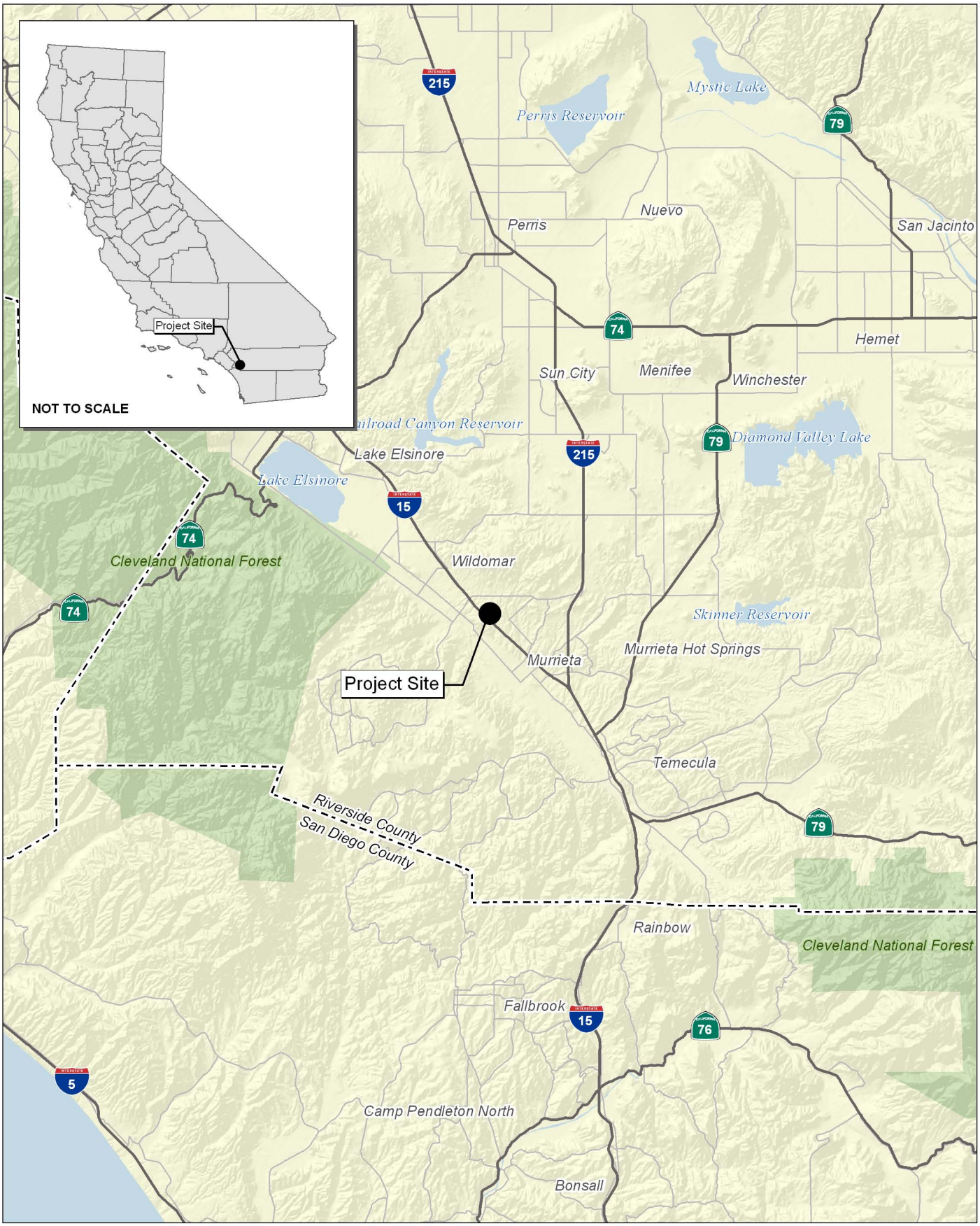
The Amberwood project area consists of 24 acres of land located in the southern portion of Wildomar. The project consists of the development of new, single-family, detached homes. The project design incorporates approximately 17 acres of residential development and 17 acres of undeveloped open-space. The proposed project includes 67 dwelling units on 5,000 square foot (sq ft) lots. The proposed project would also include the necessary infrastructure for the proposed development including streets, sewer, and utility lines

2.3 - Project Location and Survey Area

The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, in the southern portion of the City of Wildomar, Riverside County, California (Exhibit 1). The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kevin Rd, and west of Elizabeth Lane (Exhibit 3). The survey area consists of a total of 24 acres.

The survey area consists of the Assessor's Parcel Numbers (APNs):

- 380-280-004
- 380-280-009
- 380-280-010
- 380-280-011
- 380-280-012

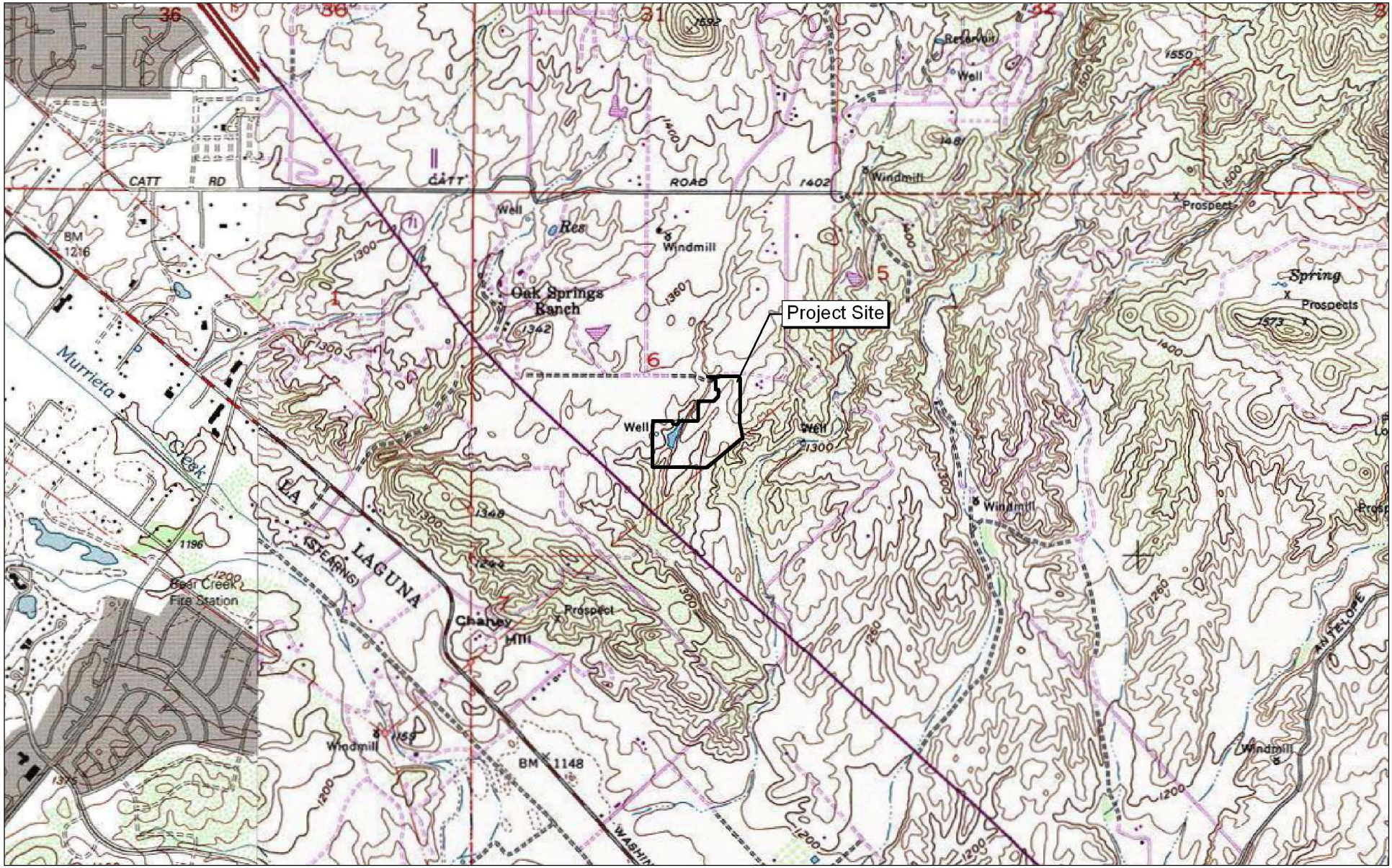


Source: Census 2000 Data, The CaSIL, MBA GIS 2013.

FirstCarbon® SOLUTIONS
MICHAEL BRANDMAN ASSOCIATES

5 2.5 0 5 Miles

Exhibit 1
Regional Location Map



Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

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MICHAEL BRANDMAN ASSOCIATES

2,000 1,000 0 2,000
Feet

Exhibit 2
Local Vicinity Map
Topographic Base

Source: ESRI Aerial Imagery.

FirstCarbon® SOLUTIONS
MICHAEL BRANDMAN ASSOCIATES

2,000 1,000 0 2,000
Feet

Exhibit 3
Local Vicinity Map
Aerial Base

SECTION 3: BACKGROUND

3.1 - Burrowing Owl

The burrowing owl is designated as a California species of concern due to its great decrease in numbers in the State over the past 30 years. These owls require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal burrows. Typical habitat associated with burrowing owls includes short-grass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), prairies, coastal dunes, desert floors, and some artificial, open areas. Burrowing owls also use golf courses, cemeteries, road allowances within cities, airports, vacant lots in residential areas, and irrigation ditches. Although open areas with short vegetation are critical for nesting, there is some evidence that the owls prefer a vegetation mosaic with nesting habitat interspersed with taller vegetation for hunting. However, the primary requirement for suitable burrowing owl foraging habitat appears to be low vegetation cover that allows visibility and access to prey.

Burrowing owls are unable to construct their own burrows; as a result they often require the use of existing rodent burrows or other burrows for roosting and nesting cover. Burrowing owls may also use pipes, culverts, and nest boxes where burrows are scarce. One burrow is typically selected for use as the nest; however, satellite burrows are usually found within the immediate vicinity of the nest burrow within the defended territory of the owl. If left undisturbed, they will use the same burrow year after year for nesting. Typically, a clutch of 7 to 9 eggs are laid between March and July. Burrowing owls are generally considered a monogamous species. Both parents take part in incubation for about 28 days. The young emerge from the nest and spend daylight hours at the burrow entrance with one or both adults.

Burrowing owls are crepuscular owls, being most active during the early morning and evening hours. Their diet is predominantly large insects and small rodents, but they will also consume small birds, reptiles, amphibians, fish, scorpions, and other available prey. They are often observed perched on fence posts or utility wires. Reasons for the decline in their numbers include habitat destruction, insecticide poisoning, rodenticide (particularly squirrel eradication), and shooting.

3.2 - Western Riverside County MSHCP

The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan focusing on conservation of species and their associated habitats in western Riverside County. According to the MSHCP, surveys for the burrowing owl are to be conducted as part of the environmental review process. The MSHCP Additional Surveys Needs and Procedures (Section 6.3.2) identify a specific burrowing owl survey area within the MSHCP Plan Area (Burrowing Owl Survey Area Map, Figure 6-4 of the MSHCP, Volume I). The MSHCP also identifies species-specific objectives for the burrowing owl surveys if suitable habitat occurs on a proposed project site.

Under the MSHCP, "if a site (including adjacent buffer areas) supports three or more pairs of burrowing owls, supports greater than 35 acres of suitable habitat, and is non-contiguous with

MSHCP Conservation Area lands, at least 90 percent of the area with long-term conservation value and burrowing owl pairs will be conserved onsite." If it is determined that the 90 percent threshold cannot be met, the Permittee(s) must submit a Determination of Biologically Equivalent or Superior Preservation (DBESP) to provide information on how the proposed plan would protect the nesting owls.

SECTION 4: METHODS

4.1 - Literature Review

FCS-MBA reviewed available documents and graphics regarding burrowing owl biology, habitat requirements, and previously mapped distribution within the Plan Area. The literature review included a review of field guides, web sites, and Geographic Information Systems (GIS) data. Section 9, References, lists the material reviewed for this report.

4.2 - Focused Surveys

Qualified FCS-MBA biologists Tommy Molioo and Scott Crawford conducted focused burrow and burrowing owl surveys on the project site, within a 500-foot buffer surrounding the site, and within all areas containing suitable habitat. The project site plus the 500-foot buffer are referred to as the survey area. Focused surveys were conducted in accordance with survey protocols developed by the California Burrowing Owl Consortium (CBOC 1993) and the "Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area" (Riverside County 2006) per the Riverside County survey requirements. The area was surveyed to determine the suitable habitat areas consisting of low-growing vegetation, open areas for foraging, and availability of small mammal burrows.

4.2.1 - Focused Burrow Survey

The survey for potential burrows and burrowing owl sign was conducted by walking through suitable habitat throughout the survey area by qualified FCS-MBA biologist Tommy Molioo on July 25, 2013. The 500-foot buffer included in the survey area is to account for adjacent burrows and foraging habitat outside the project site and impacts from factors such as noise and vibration due to heavy equipment, which could indirectly affect burrowing owl during project construction. Pedestrian survey transects were spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines were no more than 100 feet and when necessary were reduced to account for differences in terrain, vegetation density, and ground surface visibility.

All suitable burrows were thoroughly examined for presence of sign and suitable perches were inspected for burrowing owl pellets and whitewash. If occupied burrows or individual owls were observed during the survey, a minimum distance of 50 meters was maintained between owls or occupied burrows and the observer, to minimize any potential harassment or disturbance.

4.2.2 - Focused Burrowing Owl Survey

Following the results of the focused burrow survey, three additional focused burrowing owl surveys were conducted within the suitable habitat areas. FCS-MBA biologists Tommy Molioo and Scott Crawford conducted the focused burrowing owl surveys on July 25, 30, August 8, and 14, 2013. The initial burrowing owl survey was conducted concurrently with the focused burrow survey. Only areas identified in the initial survey as having potential burrows and adjacent foraging habitat for owls

were surveyed during the remaining three surveys (Exhibit 4). The areas surveyed contained moderately suitable burrow habitat and were located generally in the eastern portion of the site.

Source: ESRI Aerial Imagery. FCS-MBA Field Survey and GIS Data, 2013.

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500 250 0 500
Feet

Exhibit 4
Burrowing Owl Map

SECTION 5: EXISTING CONDITIONS

5.1 - General Conditions

The project site is located in the southern portion of the City of Wildomar, within Riverside County, California. The site has a gentle slope descending from northeast to south with an elevation of approximately 1,300 feet above mean sea level. The project area contains previously developed rural residences that have been recently torn down (2011) as required by the City of Wildomar. Based on historic aerial photographs (1938, 1967, 1978, and 2005), the project site has been significantly altered since the 1960s (HistoricAerials.com).

Due to previous disturbance from weed abatement activities, the project site generally consists of disturbed areas with patches of native vegetation. The vegetation is generally comprised of a mosaic of various non-native ruderal (weedy) species. The dominant vegetation throughout the site is short-podded mustard (*Hirschfeldia incana*) and yellow-star thistle (*Centaurea solstitialis*). Habitat on the project site is low in quality. There are areas within the project site that contain Riversidean sage scrub and southern cottonwood-willow riparian forest. These areas contain moderate to high quality habitat.

There is residential development to the southeast of the project area. Commercial and industrial development occurs to the west and northwest of the project site. The remainder of the project area is surrounded by natural open space with a several dirt access roads to the north and south.

5.2 - Plant Communities

The dominant plant community observed within the project site is Disturbed Land. Small isolated patches of Riversidean Sage Scrub (California buckwheat scrub) and Developed land occur throughout the site. A large drainage feature with dense Southern Cottonwood-Willow Riparian Forest occurs along the western portion of the project site. The project site has been subject to previous disturbances associated with weed abatement, as such, the majority of the site consists of disturbed habitat with weedy species. Several ornamental trees occur on the project site; however, several native trees also occur within and immediately adjacent to the existing drainage feature onsite.

5.3 - General Wildlife

The project site provides habitat for wildlife species that occur in extensive agriculture and disturbed/developed plant communities. No amphibian species were observed within the survey area during the focused surveys. Common wildlife species observed or detected include:

- Anna's hummingbird (*Calypte anna*)
- Western scrub-jay (*Aphelocoma californica*)
- Bushtit (*Psaltriparus minimus*)
- Common raven (*Corvus corax*)
- California thrasher (*Toxostoma redivium*)

- Lark sparrow (*Chondestes grammacus*)
- California towhee (*Melozone crassalis*)
- American kestrel (*Falco sparverius*)
- House finch (*Carpodacus mexicanus*)
- Lesser goldfinch (*Carduelis psaltria*)
- Coyote (*Canis latrans*)
- California ground squirrel (*Spermophilus beecheyi*)
- Desert cottontail (*Sylvilagus audubonii*)

A complete list of wildlife species observed is located in Appendix A, Faunal Compendium.

SECTION 6: SURVEY RESULTS

6.1 - Focused Burrow Survey

FCS-MBA biologist Tommy Molioo conducted the initial focused burrow survey in conjunction with the first focused burrowing owl survey on July 25, 2013. The survey was conducted between 0715 and 0830 hours. Weather conditions during the survey included clear skies with an average temperature of 68 degrees Fahrenheit and winds of 1 to 3 miles per hour. There had been no recorded rain in the region for a minimum of 7 days prior to initiating the burrowing owl surveys. Several desert cottontail and California ground squirrel burrows were observed scattered throughout the survey area. No burrowing owl was observed within the survey area.

6.2 - Focused Burrowing Owl Survey

FCS-MBA's biologists focused on portions of the survey area identified during the focused burrow survey that contain moderate potential habitat. The three focused burrowing owl surveys were conducted on July 25, 30, August 8, and 14, 2013. No burrowing owls, or evidence of burrowing owls, were observed during the burrowing owl survey. The weather data and results of each focused burrowing owl survey are summarized in Table 1 below.

Table 1: 2013 Survey Results for Burrowing Owl

Survey Number	Date	Time	Temperature (Fahrenheit)	Skies	Results (# of owls observed)
1	July 25, 2013	0715 to 0830	68	Clear	Absent (0)
2	July 30, 2013	0550 to 0650	60	Clear	Absent (0)
3	August 8, 2013	0700 to 0800	63	Clear	Absent (0)
4	August 14, 2013	0645 to 0745	65	Clear	Absent (0)

6.3 - Nesting Birds

The project site contains two riparian forest areas, as well as landscaped trees along the surrounding residential developments. The riparian forests consist mostly of cottonwoods and willows, and the landscaped areas contain non-native ornamental tree species. These areas provide suitable nesting habitat for several tree-nesting avian species. No evidence of nesting activity was observed within the survey area during the burrowing owl focused surveys. However, due to suitable nesting habitat within the survey area, a 30-day nesting bird pre-construction survey will be needed if operations occur within the months of February through August.

SECTION 7: CONCLUSIONS AND RECOMMENDATIONS

No burrowing owls or sign of burrowing owl was observed within the survey area during the focused burrowing owl surveys. Therefore, burrowing owls are currently considered absent from the project site and buffer area. However, due to suitable habitat within the project site, and the potential for burrowing owl to move onto the site during winter migration or during the next nesting season, a 30-day pre-construction clearance survey is recommended to ensure burrowing owls have not moved onto the site prior to ground disturbing activities.

If burrowing owls are located within the project site during the 30-day pre-construction clearance survey, direct impacts to burrowing owls must be avoided. Consultation with CDFW, the City of Wildomar, and / or the County of Riverside will be required to determine the best course of action to avoid any impacts to burrowing owls. Potential avoidance measures will include setting up a suitable buffer around the burrowing owl(s) and active nest, and placing a biological monitor onsite to ensure no direct take occurs. No project activities may encroach into the buffer area without the consent of the biological monitor or until the nestlings have fledged.

Additionally, due to the presence of suitable nesting habitat for avian species known to occur in the region, a 30-day pre-construction clearance survey will be required if construction activities commence during the avian nesting season of February through August.

SECTION 8: CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: September 10, 2013 Signed:

Tommy Molioo, Biologist
FirstCarbon Solutions | Michael Brandman Associates
220 Commerce, Suite 200
Irvine, California 92602

SECTION 9: REFERENCES

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Appendix A: Faunal Compendium

Fauna Compendia

Falconidae		**Falcons**
Falco	*sparverius*	American kestrel
Columbidae		**Pigeons/Doves**
Zenaida	*macroura*	mourning dove
Trochilidae		**Hummingbirds**
Calypte	*anna*	Anna's hummingbird
Corvidae		**Jays/Crows**
Aphelocoma	*californica*	western scrub-jay
Corvus	*corax*	common raven
Aegithalidae		**Bushtits**
Psaltriparus	*minimus*	bushtit
Mimidae		**Mockingbirds/Thrashers**
Toxostoma	*redivivum*	California thrasher
Emberizidae		**Warblers, sparrow, etc.**
Pipilo	*crissalis*	California towhee
Chondestes	*grammacus*	lark sparrow
Fringillidae		**Finches**
Carpodacus	*mexicanus*	house finch
Carduelis	*psaltria*	lesser goldfinch
Leporidae		**Hares and Rabbits**
Sylvilagus	*audubonii*	desert cottontail
Sciuridae		**Squirrels**
Spermophilus	*beecheyi*	California ground squirrel
Canidae		**Wolves and Foxes**
Canis	*latrans*	coyote

Appendix B:
Site Photographs

Photograph 1: Looking northwest at the northern portion of the project site. Marginal quality Riversidean sage scrub occurs along the upland swale, located in the central portion of the photograph. Disturbed habitat occurs in the foreground.

Photograph 2: Looking south from the northeastern portion of the project site. Disturbed habitat occurs in the foreground. Urban/Developed habitat occurs in the background along with landscape vegetation.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2012.

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Appendix B
Site Photographs 1 and 2

Photograph 3: Looking south from the northern portion of the project site. Looking downstream at the isolated ponded area within an upland swale. Riparian habitat is located in the background. Disturbed habitat occurs within the upland swale with a few scattered California buckwheat.

Photograph 4: Looking west from the southern portion of the project site. Moderate quality coastal sage scrub occurs along the western property boundary. Southern cottonwood-willow riparian forest occurs in the foreground.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2012.

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Appendix B
Site Photographs 3 and 4

Photograph 5: Looking southwest at the southern portion of the project site. Southern cottonwood-willow riparian forest occurs within the main drainage as it flows from right to left in the photographs. Moderate quality Riversidean sage scrub occurs on the side slopes along the margins of the drainage.

Photograph 6: Looking southwest from the southwestern portion of the project site. Dense southern cottonwood-willow riparian forest occurs in the background. At this location, the active channel is contained within a low-flow channel and does not meet all three USACE wetland criteria.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2012.

Preliminary Jurisdictional Delineation Report
Amberwood Project
Riverside County, California

Murrieta, California, USGS 7.5-minute Topographic Quadrangle Map
Section 6 of Township 7 South, Range 3 West
APNs: 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012

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Michael Brandman Associates

Report Date: December 17, 2012
Revised Date: May 23, 2014

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SECTION 1: INTRODUCTION

Applicant Name:

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At the request of Lennar Homes, Inc., Michael Brandman Associates (MBA) conducted a jurisdictional delineation for the Amberwood residential development project. The proposed project consists of a residential development, hereafter referred to as project site or site, located in Riverside County, California. The jurisdictional delineation was conducted on the biological resource survey area, a 24-acre area that encompasses the grading footprint and open-space areas associated with the project site. The purpose of the jurisdictional delineation was to determine the location and extent of waters and/or wetlands within the biological resource survey area potentially subject to the jurisdiction of the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or the California Department of Fish and Wildlife (CDFW). The regulatory framework for management of waters and wetlands within the project area is provided in Appendix A.

1.1 - Project Location

The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, between the City of Wildomar and the City of Murrieta in the southwestern portion of Riverside County, California (Exhibit 1). The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kennadine Drive, and west of Elizabeth Lane (Exhibit 3).

The project site can be accessed from SR-15 by exiting on Clinton Keith Road and traveling east, turning right onto Indian Valley Drive, then left onto Prielipp Road, and then right onto Elizabeth Lane. The project site is located on the west side of Elizabeth Lane.

The following Assessor's Parcel Numbers are included in the project area, which contains all proposed facilities:

- 380-280-004
- 380-280-009
- 380-280-010
- 380-280-011
- 380-280-012

1.2 - Project Description

The proposed Amberwood Project consists of the development of single-family detached homes. The project design incorporates approximately 17 acres of residential development and 17 acres of undeveloped open-space. The proposed project includes 67 dwelling units on 5,000-square-foot (sq ft) lots. The proposed project would also include the necessary infrastructure for the proposed development including streets, sewer, and utility lines.

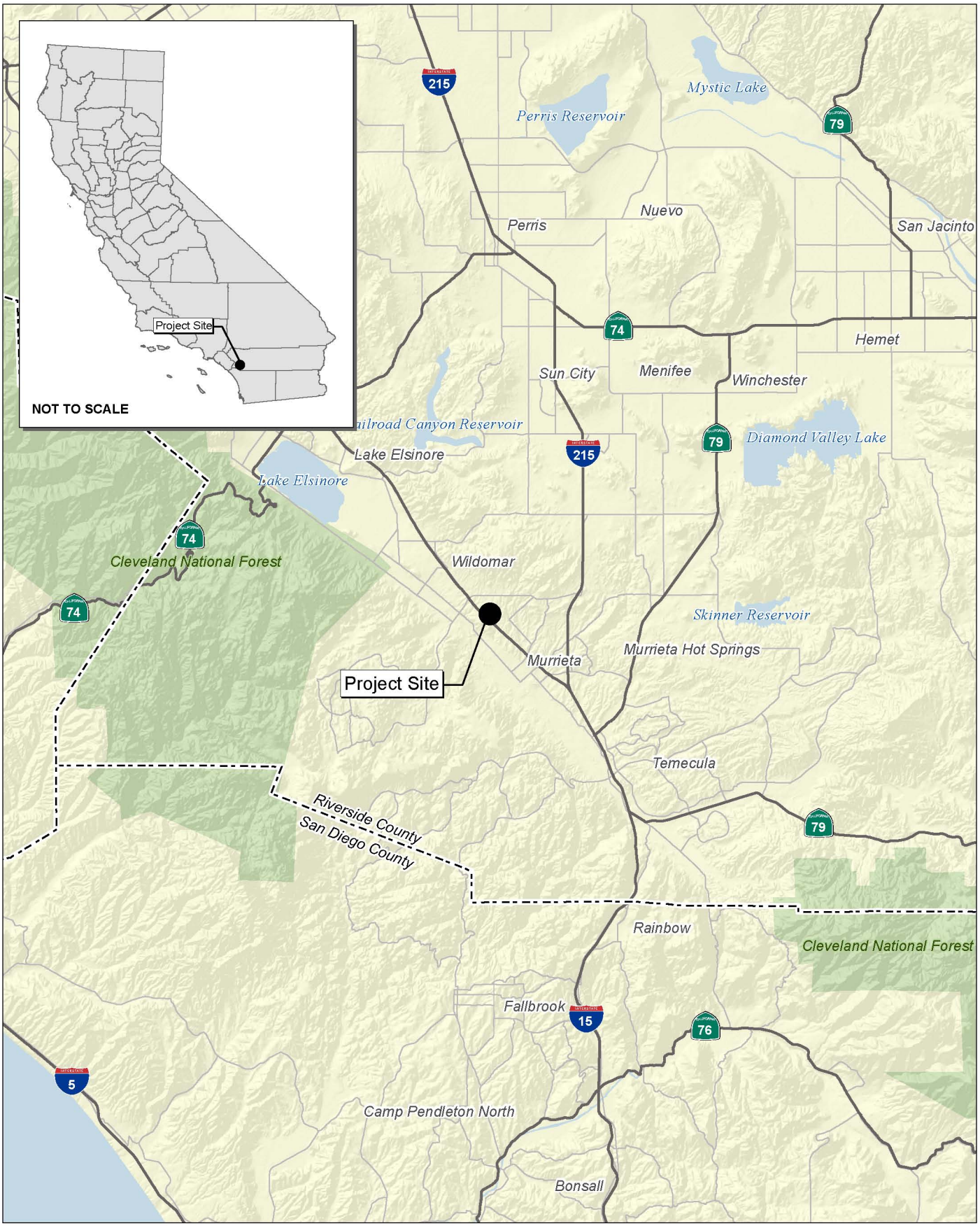
1.3 - Summary

The project area contains two features. The main drainage feature onsite, Feature 1, displays well-defined ordinary high water marks (OHWMs) and/or a defined bed and banks. Vegetation in the drainage feature gradually changes from an emergent freshwater marsh in the north to a southern willow scrub habitat to the south. A small wetland area occurs within the OHWM of Feature 1 at both the upstream and downstream portion of the drainage feature within the project site. The middle portion of the channel does not meet all three wetland criteria and is therefore not considered a wetland.

A total 0.17 acre, of which 0.05 acre is wetland, is subject to USACE and RWQCB jurisdiction, while 2.039 acres of streambed are subject to CDFW jurisdiction. Feature 1 is associated with an unnamed drainage feature that eventually flows into Murrieta Creek and eventually connects to the Santa Margarita River, a relatively permanent water, at an offsite location (approximately 12 miles to the south). Based on the findings of this jurisdictional delineation, the main drainage feature onsite contains the minimum requirements to be considered jurisdictional by the USACE, RWQCB, and/or CDFW. However, because the project will not disturb Feature 1, there will be no need for permits or clearances to be issued by the USACE, RWQCB or CDFW.

Feature 2, is within the eastern portion of the project site, and consists of two components, an upland swale and an isolated, artificially created ponded area. The upland swale has no defined bed and bank feature, but it was determined to be under CDFW jurisdiction by CDFW representative Heather Pert. The upland swale above the ponded area consists of 0.022 acre, while the upland swale below the ponded area consists of 0.007 acre for a total of 0.029 acre of upland swale. These swales are subject to CDFW jurisdiction but are not under RWQCB jurisdiction.

The artificially created ponded area is a human-made earthen dam near the central portion of the project site that prohibits flows to downstream areas, rendering a 0.04-acre ponded area subject to both CDFG and RWQCB jurisdiction. The ponded area is surrounded by 0.09 acre of riparian vegetation for a total of 0.13 acre under CDFW jurisdiction. Feature 2 contains a total of 0.159 acre subject to CDFW jurisdiction and 0.04 acre subject to RWQCB jurisdiction.



Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

NORTH

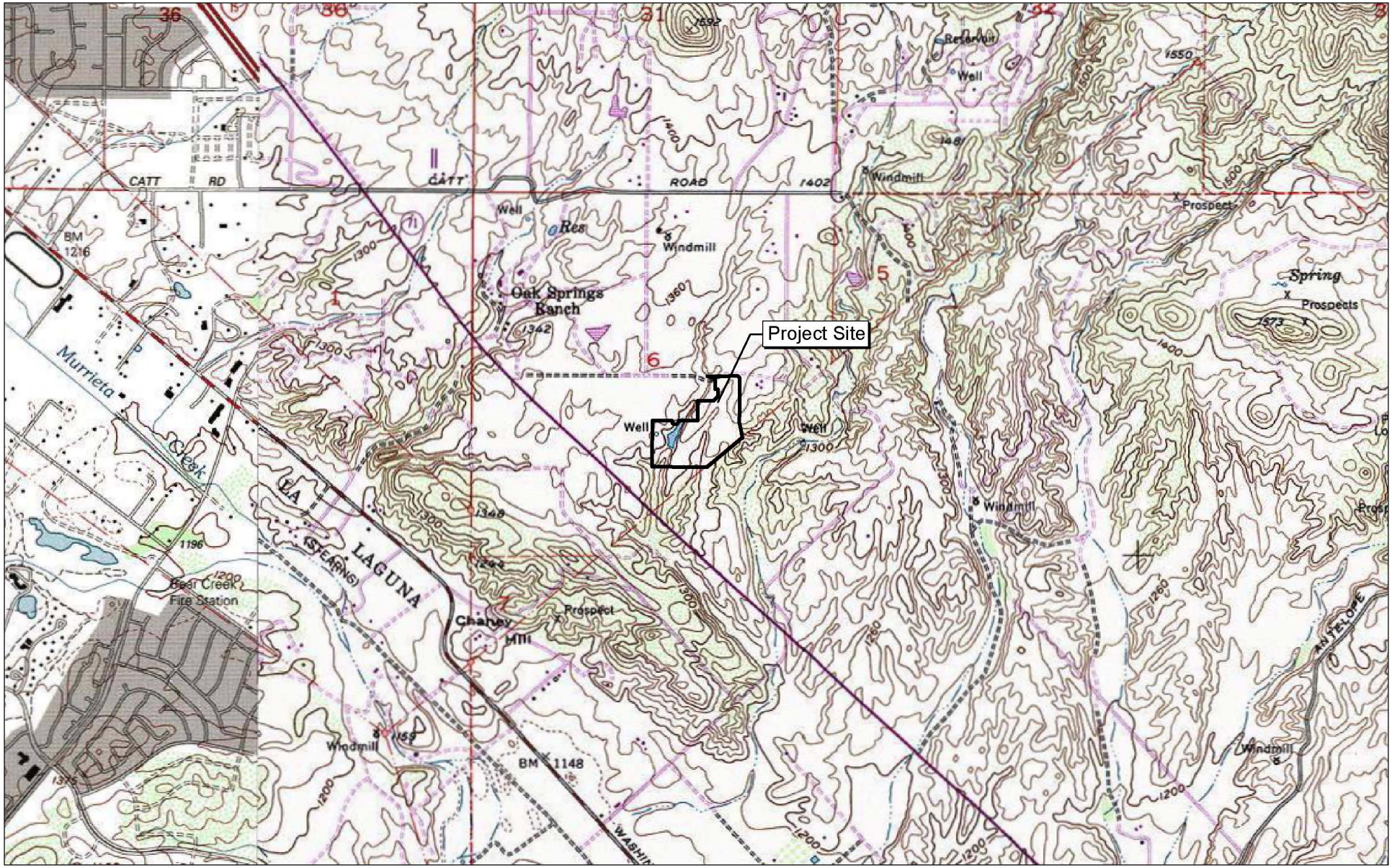
5 2.5 0 5 Miles

Michael Brandman Associates

21560074 • 12/2012 | 1_regional.mxd

Exhibit 1
Regional Location Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION



Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

NORTH

2,000 1,000 0 2,000

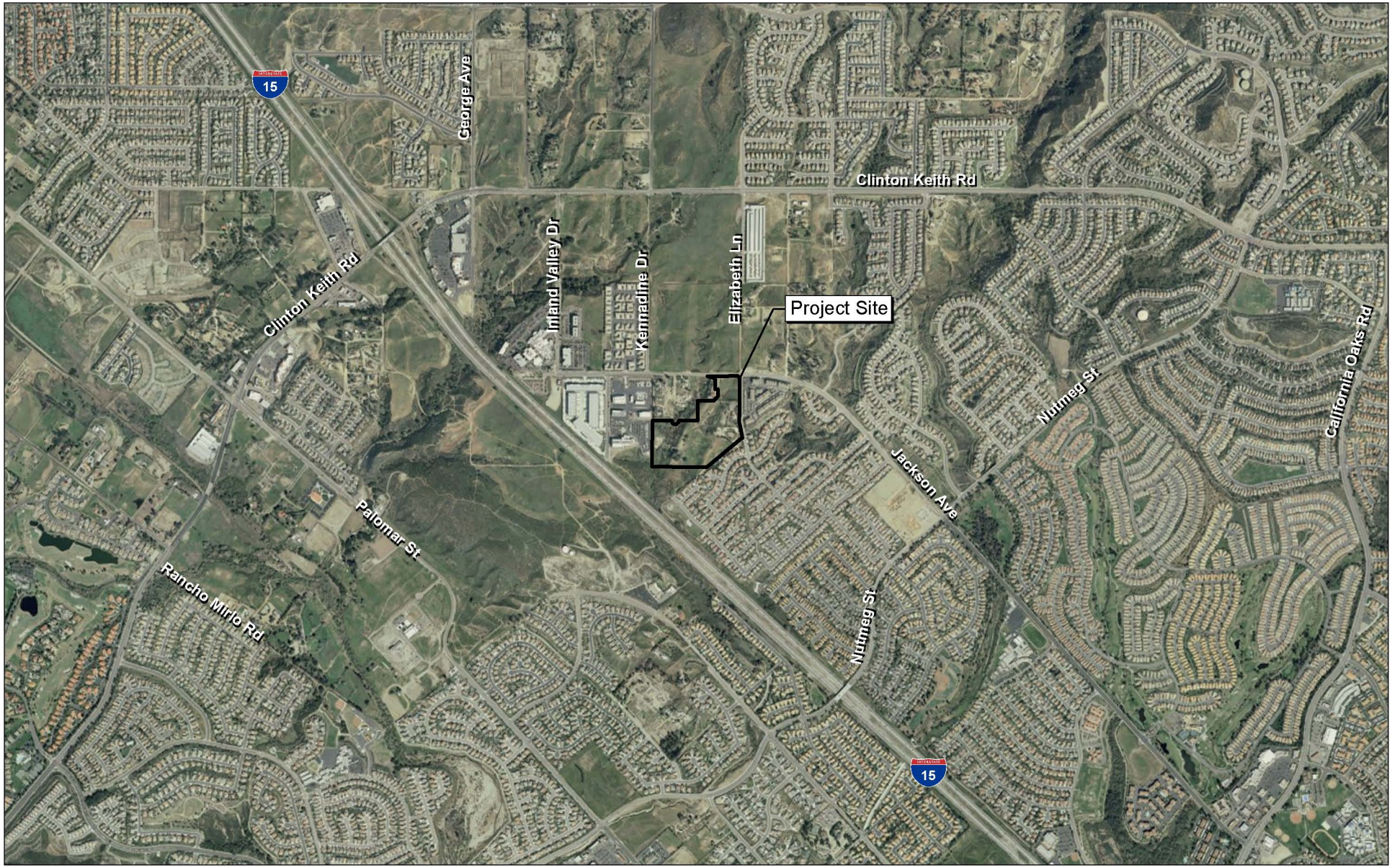
Feet

Michael Brandman Associates

21560074 • 12/2012 | 2_local_topo.mxd

Exhibit 2
Local Vicinity Map
Topographic Base

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION



Source: ESRI Aerial Imagery.

Exhibit 3
Local Vicinity Map
Aerial Base

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560074 • 12/2012 | 3_local_aerial.mxd

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION

Based on current USACE guidelines, Feature 2 is not under the USACE jurisdiction because it is considered an isolated feature within no direct connectivity to any downstream navigable waters of the U.S.

Based upon a site visit by the CDFW and the U.S. Fish & Wildlife Service and discussions with these agencies, it has been determined that Feature 2 is subject to the Riparian/Riverine Policies found in Section 6.1.2 of the Western Riverside County Multiple Species Habitat Conservation Plan, even though the ponded feature is artificially created. Because this area is to be disturbed in connection with development of the project, under separate cover, a Determination of Biologically Equivalent or Superior Preservation analysis (DBESP) has been prepared. Feature 2 also is further discussed in the Habitat Assessment and MSHCP Consistency Analysis (MBA 2012).

SECTION 2: METHODOLOGY

The following section describes the methods used to conduct the Preliminary Jurisdictional Delineation (PJD) in accordance with regulations set forth in 33 CFR part 328 and the USACE guidance documents referenced below:

- USACE Wetlands Research Program Technical Report Y-87-1 (online edition), Wetlands Delineation Manual, Environmental Laboratory, 1987.
- USACE Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest, 2001 (Arid Southwest Guidelines).
- USACE Minimum Standards for Acceptance of Preliminary Wetlands Delineations, November 30, 2001 (Minimum Standards).
- USACE Jurisdictional Determination Form Instructional Guidebook, May 30, 2007 (JD Form Guidebook).
- USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, September 2008 (Arid West Supplement).
- USACE A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States A Delineation Manual, August 2008.

2.1 - Pre-Survey Investigation

Prior to the field visit, a 200-scale (1 inch = 200 feet) aerial photograph of the site was compared with the Murrieta, California, United States Geological Service (USGS) 7.5-minute topographic quadrangle map to identify potentially jurisdictional features within the project area as indicated from topographic changes or visible drainage patterns. The National Wetland Inventory was also reviewed to determine whether any wetland areas had been documented within the vicinity of the project area. The United States Department of Agriculture (USDA) Soil Survey Map was reviewed to identify the soil series that occur on the project area.

2.2 - Field Investigation

A field investigation was performed by MBA senior biologist, Scott Crawford[1] on February 7, 2012. Field surveys were conducted on foot. Field activities included width measurement of relevant drainage systems and the identification and mapping of any wetlands. Data regarding locations of drainage features were mapped on recent aerial photographs. Materials used included a tape measure, shovel, and Munsell soil color chart.

[1] See Appendix F, Biologist Resume.

All potential jurisdictional features within the project area were systematically inspected to record existing conditions and to determine potential jurisdictional limits. Width measurements for potential USACE and RWQCB jurisdiction were taken from bank to bank within the active floodplain of the channel. Associated riparian vegetation coverage previously indicated on aerial photographs was verified during the visit.

Potential CDFW jurisdiction was based on the presence of a bed and bank, and the presence of riparian vegetation and/or wildlife resources. The lateral extent of potential CDFW jurisdiction was measured from bank to bank at the top of the channel, or to the drip-line of the riparian vegetation rooted within the banks, where it extends beyond the bank of the channel.

A subsequent site visit was recently conducted by Riverside County Regional Conservation Authority (RCA) on April 22, 2014 to verify existing conditions. RCA members in attendance were representatives from the U.S. Fish and Wildlife Service (USFWS) (Christopher Allen) and the CDFW (Heather Pert). Also in attendance were representatives from Lennar Homes and the City of Wildomar.

The Preliminary Jurisdictional Determination Form is included in Appendix B. Information regarding drainage characteristics such as an identifiable OHWM, bed and bank or changes in soils or vegetation were recorded and then transferred to standardized wetland data sheets and OHWM delineation data sheets (Appendix C) for clarity and consistency. In addition, representative photographs were taken throughout the site (Appendix D).

Width and length measurements were entered into Geographical Information System (GIS) ArcView software to identify the location and dimensions of jurisdictional areas. The ArcView application was then used to compute potential federal and state jurisdiction. Computations were verified using a 200-scale aerial photograph and field data.

SECTION 3: ENVIRONMENTAL SETTING

3.1 - Existing Conditions and Surrounding Land Uses

The project area contains previously developed rural residences that have been recently torn down as required by the County of Riverside. Based on historic aerial photographs (1938, 1967, 1978, and 2005), the project site has been significantly altered since the 1960s (HistoricAerials.com).

The plant communities observed in the project area include disturbed land, urban/developed land, Riversidean sage scrub, and southern cottonwood-willow riparian forest. There is a residential development to the southeast of the project area. Commercial and industrial development occurs to the west and northwest of the project site. The remainder of the project area is surrounded by natural open space with a several dirt access roads to the north and south. The project area is not located within any designated critical habitat areas.

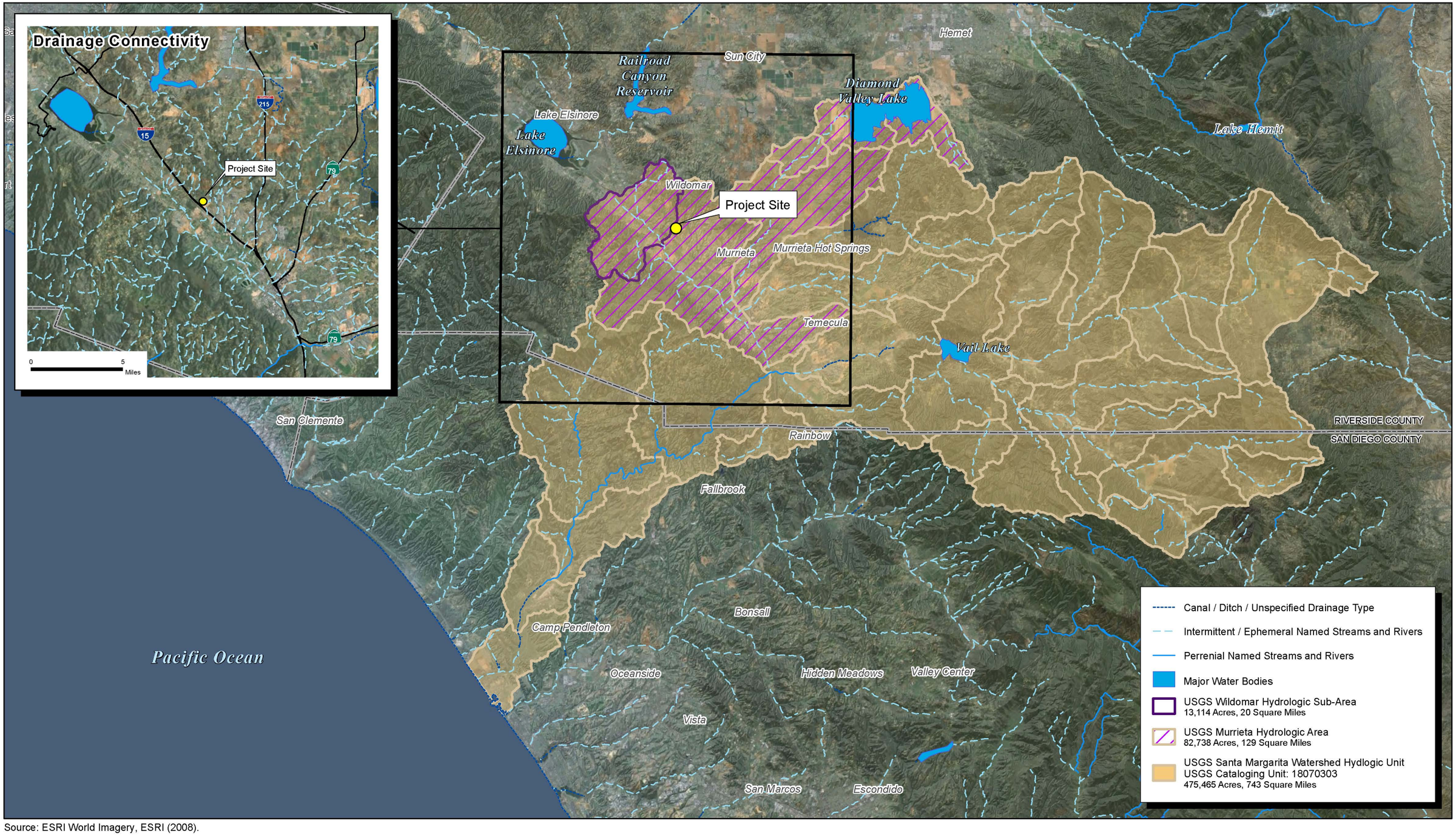
The project area is located on gently rolling hills east of the City of Wildomar. The proposed residential development would occur along the eastern side of the drainage feature with the potential of some development on the west side of the channel. The elevation within the project area ranges from 1,285 feet to 1,357 feet above mean sea level. No blue-line streams are depicted within the site on the Murrieta, California, USGS 7.5-minute topographic quadrangle map. However, a perennial ponded area is recorded within the western portion of the project site and is associated with the main channel within the project site.

The last recorded significant rainfall (0.32 inches) occurred on January 24, 2011 (Weather Underground). Flowing water was observed within the main channel throughout the project site. The isolated ponded area was full of water to a depth of approximately 4 feet on February 7, 2011.

The project site is located within the Murrieta Hydrologic Area, which constitutes approximately 82,738 acres (129 square miles). More specifically, the site is located within the Wildomar Hydrologic Sub-Area, which constitutes approximately 13,114 acres (20 square miles). The closest significant water body is Lake Elsinore to the north, Diamond Valley Lake to the northeast, and Vail Lake to the southeast (Exhibit 4). The project site is not located within any FEMA flood zones (Exhibit 5).

3.2 - Soils

Based on the USDA Soil Survey, the project area contains 5 soil mapping units, including Arlington and Greenfield fine sandy loams, Gullied Land, Placentia fine sandy loam, Ramona and Buren loams, and San Timoteo loam (Exhibit 6). The majority of the site consists of San Timoteo loam with small inclusions of the other four soils. None of the soil types within the site are listed as hydric soils.



Source: ESRI World Imagery, ESRI (2008).

NORTH

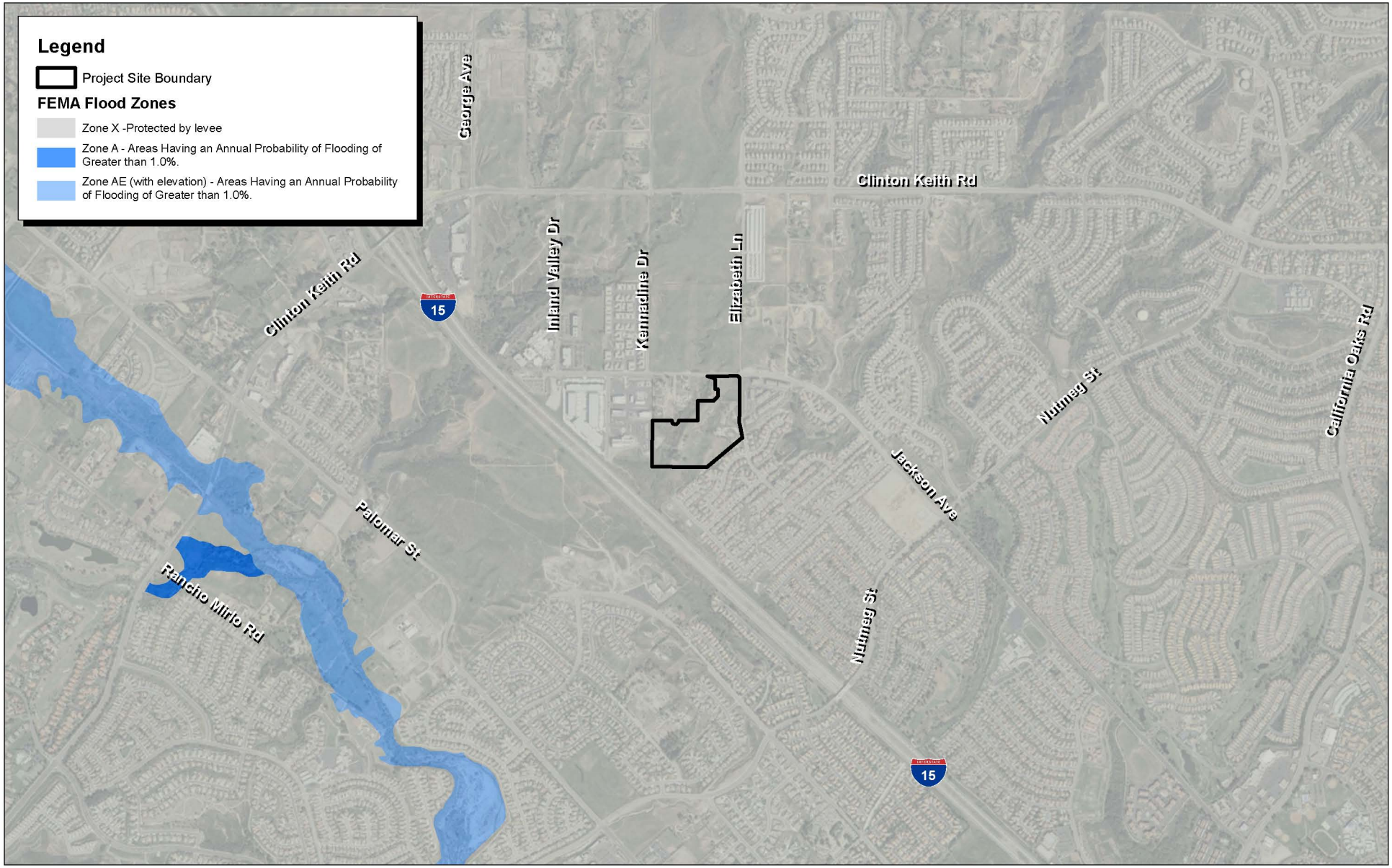
5 2.5 0 5 Miles

Michael Brandman Associates

21560074 •12/2012 | 4_Watershed_Drainage.mxd

Exhibit 4
Watershed / Drainage Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION



Source: ESRI Aerial Imagery. FEMA Flood Data (2011).

NORTH

2,000 1,000 0 2,000

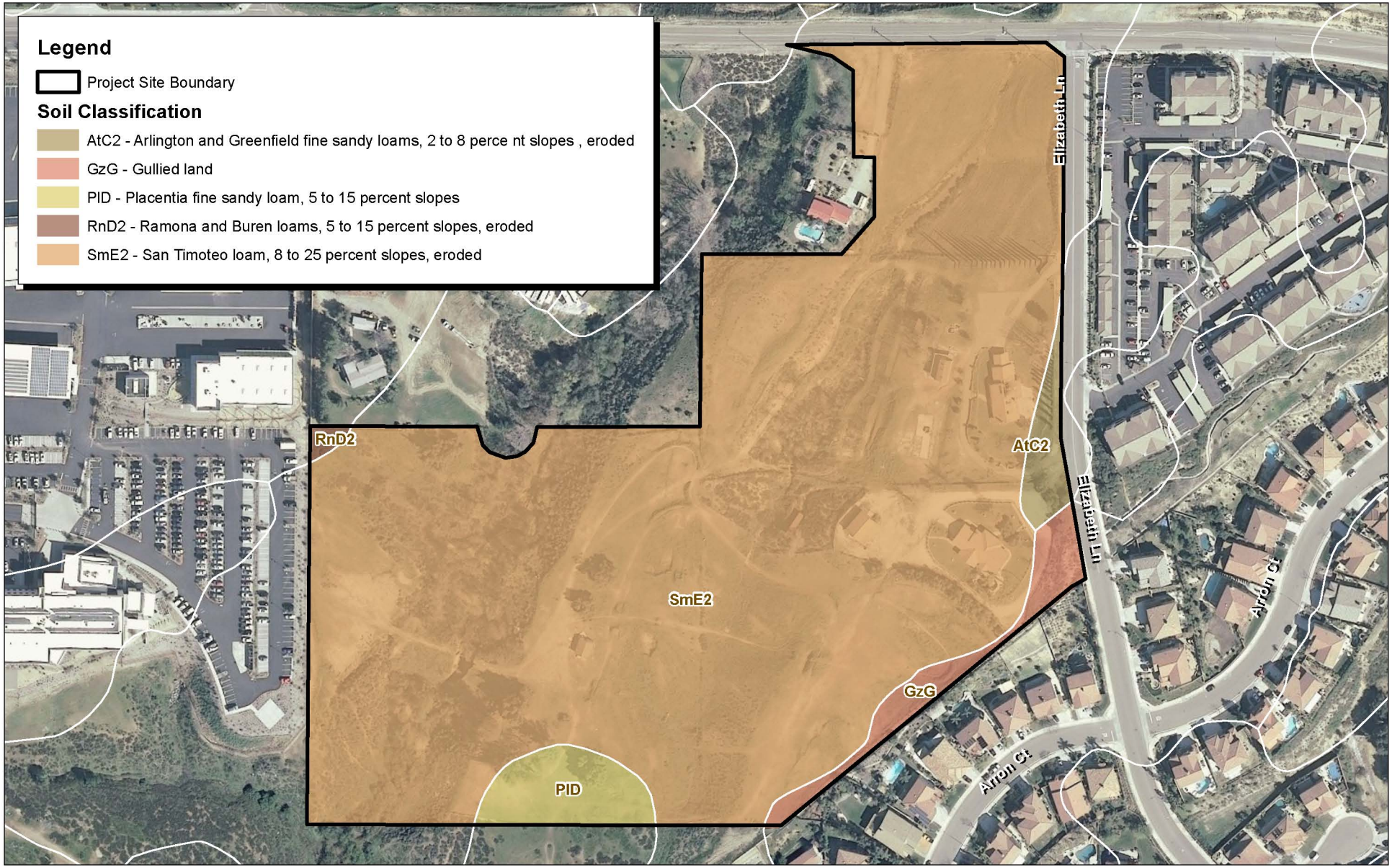
Feet

Michael Brandman Associates

21560074 • 12/2012 | 5_flood.mxd

Exhibit 5
FEMA Flood Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION



Source: ESRI Aerial Imagery. USDA Soils Data.

Michael Brandman Associates

NORTH

180 90 0 180

Feet

21560074 • 12/2012 | 6_soils.mxd

Exhibit 6
USDA Soils Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION

SECTION 4: RESULTS

This section describes the results of MBA's jurisdictional delineation, including findings related to vegetation communities, topography and soils, and hydrology. However, the regulatory agencies (USACE, CDFW, and RWQCB) make the ultimate determination as to whether a feature is under their jurisdiction.

4.1 - Feature Descriptions

Based on the findings of MBA's preliminary jurisdictional delineation, two potentially jurisdictional features occur within the biological survey area and are depicted on Exhibit 7 and Exhibit 8. Feature 1 is a perennial stream that flows all year. Feature 2 is located in the northeast portion of the project area and is considered an upland swale, and includes an artificially created ponded area. The flows from this swale are collected in an underground storm drain beneath the existing residential development and is completely isolated from Feature 1. A summary of findings for Features 1 and 2 are provided in Table 1.

Natural runoff from the adjacent hills to the north is conveyed within drainage Features 1 and 2, which are tributary to Murrieta Creek, which flows into the Santa Margarita River, which is considered a Traditional Navigable Water (TNW) (definition and regulatory framework provided in Appendix A). The potentially jurisdictional features are not designated as blue-line streams on the Murrieta, California, USGS 7.5-minute topographic quadrangle map, however, there is a ponded area designated on the map within the main drainage channel.

Two small portions of Feature 1 meet all three wetland criteria. The wetland features are approximately 10 feet wide and are located in the most upstream and downstream portions of the survey area. In addition, an isolated wetland occurs within Feature 2 (Exhibit 7).

The jurisdictional delineation surveys began two weeks following a significant rain event, allowing observation of connection between various swales and culvert outlets.

Table 1: Existing Jurisdictional Areas for Features 1 and 2

Feature	USACE		RWQCB	CDFW		Linear Feet
	Non-Wetland Waters (acres)	Wetland Waters (acres)	State Waters (acres)	Un-vegetated Streambed (acres)	Riparian Streambed (acres)	
Feature 1	0.12	0.05	0.17	0.17	1.71	736
Feature 2	—	—	0.04	0..04	0..119	1,270
Total	0.120	0.050	0.208	0.199	0.820	2,006

4.1.1 - Feature 1

Feature 1 is located in the southwestern portion of the project site and enters the site from the north through an undisturbed natural drainage. The drainage feature continues downstream in a vegetated channel with intermittent defined bed and bank features. Feature 1 flows offsite within an undisturbed natural channel and eventually flows into Murrieta Creek.

Wetland Determination

The majority of the low-flow portion of Feature 1 is unvegetated within the exception of the two wetland areas. The following information is specifically related to Feature 1.

Hydrophytic Vegetation

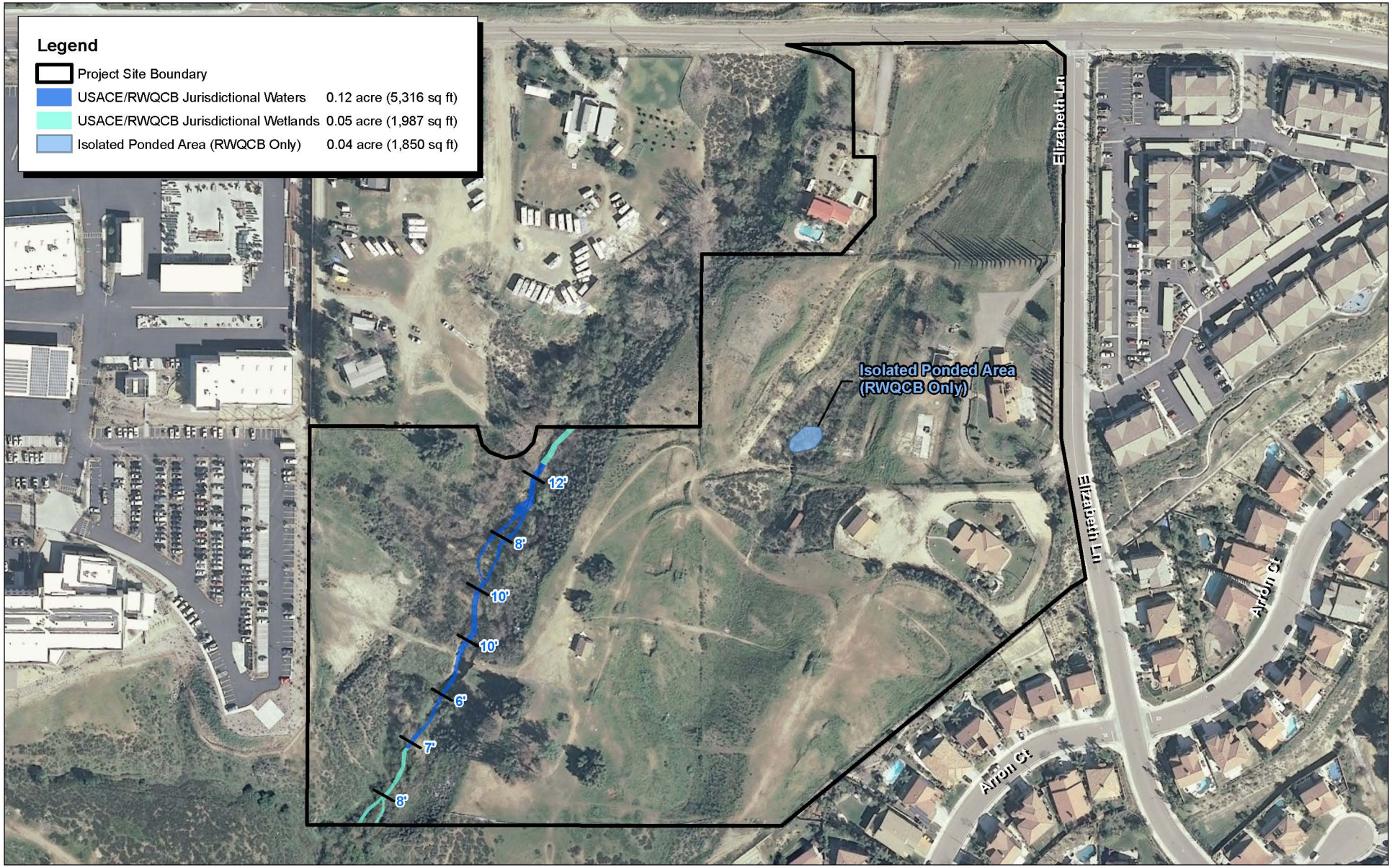
Vegetation within Feature 1 consists of an herbaceous layer dominated by umbrella sedge (*Cyperus involucratus*), narrow-leaf cattails (*Typha domingensis*), and watercress (*Nasturtium aquaticum*). All of these species are obligate wetland plants (OBL).

Hydric Soils

Soils within Feature 1 are dominated by sand. The soil is designated as San Timoteo Loam on the USDA Soil Survey and the central portion of the drainage does not exhibit hydric soil indicators. The sandy soil contains no organic streaking or other reducing indicators. The upstream portion of the drainage contains a more loamy soil with clear hydric soil indicators including Depleted Matrix. The downstream portion of the drainage contains a more sandy soil with Sandy Redox features.

Wetland Hydrology

Feature 1 contains intermittent flows from upstream portions of the feature, runoff from the adjacent uplands, and natural precipitation. Wetland hydrology indicators observed within Feature 1 include surface water to a depth of 6 inches, saturated soils immediately adjacent to flowing water, and oxidized rhizospheres on living roots.



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

180 90 0 180

Feet

21560074 • 12/2012 | 7_USACE.mxd

Exhibit 7
USACE/RWQCB Jurisdictional Areas

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION

Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

NORTH

180 90 0 180

Feet

Michael Brandman Associates

21560074 • 06/2014 | 8_CDFW.mxd

Exhibit 8
CDFW Jurisdictional Areas

LENNAR HOMES, INC. • AMBERWOOD PROJECT
PRELIMINARY JURISDICTIONAL DELINEATION

Significant Nexus Evaluation

Hydrological Factors

The presence of a discernible OHWM indicates that this channel serves as a conduit for ephemeral flows. Feature 1 is not classified as a blue-line stream in the USGS 7.5-minute Murrieta quadrangle map. However, there is a historic ponded feature indicated on the topographic map that no longer occurs onsite. The current and historical aerials indicate that Feature 1 conveys perennial flows from rain events and nuisance flows to Murrieta Creek. The OHWM width measured in the field varies from 6 to 10 feet with and average OHWM of 8 feet.

Ecological Factors

Feature 1 has a sandy streambed and during peak flows, it is unlikely to contribute a significant amount of sediment and pollutants (such as those originating from anthropogenic sources, such as asphalt driveways and roadside trash). Storm flows from adjacent open space areas limits the amount of pollution during storm events because the land is undeveloped with insignificant pollution sources. The channel conveys flows for approximately eleven miles before emptying into a TNW (Santa Margarita River).

Significant Nexus Determination

Based on factors discussed above, it is reasonable to assume that flows within Feature 1 flush only a minimal amount of sediment, organic compounds, and/or nutrients downstream to Santa Margarita River (TNW). Such substances will, therefore, have a more than insubstantial or speculative effect on the chemical, physical, and biological integrity of a TNW. Therefore, a significant nexus appears to be established between Feature 1 and the nearest TNW, and therefore the feature falls under the jurisdiction of the USACE. However, the USACE will make the final significant nexus determination.

Jurisdictional Determination

USACE Jurisdiction

Feature 1 is a non-relatively permanent water (non-RPW) that exhibits hydrologic connectivity to waters of the United States (Appendix A); therefore, 0.12 acre of non-wetland waters and 0.05 acre of wetland waters, for a total of 0.17 acre, are subject to USACE jurisdiction.

RWQCB Jurisdiction

RWQCB may exert jurisdiction over 0.17 acre of waters of the U.S. onsite because Feature 1 supports beneficial uses within the region including groundwater recharge and nutrient and sediment transport.

CDFW Jurisdiction

Feature 1 exhibits a defined bed and bank (0.17 acre) with associated riparian vegetation (1.71 acres); therefore, Feature 1 is subject to 1.88 acres of CDFW jurisdiction.

4.1.2 - Feature 2

Feature 2 is located in the northeastern portion of the project site and enters the site from the north through an upland swale with no evidence of any OHWMs and no evidence of a clearly defined bed and bank features. Feature 2 consists of vegetated upland swales with no defined bed and bank features. The upland swale above the ponded area consists of 0.022 acre, and the upland swale downstream from the ponded area consists of 0.007 acre. The ponded area associated with Feature 2 is isolated from any downstream flows by an artificially created earthen berm used for a road crossing. The flows are completely detained behind an earthen berm with no evidence of any downstream flows. A small ponded area occurs at the base of the earthen berm. The ponded area is approximately 30 feet wide and 40 feet long and likely fluctuates depending on the amount of rainfall. Surrounding the ponded area is a moderately dense stand of cottonwoods and willows with no understory. The water is stagnant and of poor water quality. The ponded area totals 0.04 acre and is surrounded by 0.09 acre of riparian vegetation for a total of 0.13 acre.

Wetland Determination

The majority of Feature 2 is vegetated with upland non-native grasslands with the exception of the ponded area that contains riparian vegetation along the margins. The following information is specifically related to Feature 2.

Hydrophytic Vegetation

Vegetation within the upland swale of Feature 2 consists of an herbaceous layer dominated by red brome (*Bromus rubens*), short-podded mustard (*Hirschfeldia incana*), and yellow start thistle (*Centaurea melitensis*). All of these species are Upland species (UPL). The ponded area of Feature 2 is dominated by Fremont's cottonwoods (*Populus fremontii*), and willow (*Salix* sp.). Both of these plants are Facultative wetland plants (FACW).

Hydric Soils

Soils within Feature 2 are dominated by sand. The soil is designated as San Timoteo Loam on the USDA Soil Survey and the upland swales do not exhibit hydric soil indicators. The sandy soil contains no organic streaking or other reducing indicators. The ponded portion of Feature 2 contains a thick organic layer with clear hydric soil indicators including Depleted Matrix. The downstream portion of the upland swale of Feature 2 contains more sandy soil with no hydric soil indicators, similar to the upstream portion of the upland swale.

Wetland Hydrology

Feature 2 contains ephemeral flows from upstream portions of the feature, runoff from the adjacent uplands, and natural precipitation. Wetland hydrology indicators, including soil inundation, were only observed around the ponded area of Feature 2. No other wetland hydrology indicators were observed.

Significant Nexus Evaluation

Hydrological Factors

The absence of a discernible OHWM indicates that the upland swales of Feature 2 serve only as a conduit for localized flows. Feature 2 is not classified as a blue-line stream in the USGS 7.5-minute Murrieta quadrangle map. In addition, historical aerial photographs indicate that Feature 2 previously conveyed ephemeral flows from rain events to Murrieta Creek prior to 1960s. However, following the residential development in the 1980s within the project site and adjacent lands, this feature no longer conveys a significant amount of flows. The upland swales do not have a noticeable OHWM or clearly defined bed and bank features. The ponded area of Feature 2 is not hydrologically connected to Feature 1 or the upland swale downstream of the ponded area within Feature 2.

Ecological Factors

The vegetated upland swales of Feature 2 show no evidence of erosion often associated with a clearly defined OHWM or bed and bank feature and are unlikely to contribute a significant amount of sediment and pollutants (such as those originating from anthropogenic sources, such as asphalt driveways and roadside trash). Storm flows from adjacent open space areas limits the amount of pollution during storm events because the land is undeveloped with insignificant pollution sources.

Significant Nexus Determination

Based on factors discussed above, it is reasonable to assume that flows within the upland swales of Feature 2 are not likely to flush a significant amount of sediment, organic compounds, and/or nutrients downstream to Murrieta Creek. Therefore, flows within Feature 2 would have an insubstantial or speculative effect on the chemical, physical, and biological integrity of a TNW. Further, the ponded area of Feature 2 is isolated, with no connection to any downstream TNW. Thus, there is no significant nexus established between Feature 2 and the nearest TNW, and therefore the feature is not under the jurisdiction of the USACE. However, the RWQCB will likely exert their jurisdiction over the isolated ponded feature..

Jurisdictional Determination

USACE Jurisdiction

Feature 2 consists of two upland swales and a small human-made ponded area with no OHWM and is best described as an isolated feature. Therefore, this drainage feature is not subject to USACE jurisdiction.

RWQCB Jurisdiction

RWQCB may exert jurisdiction over 0.04 acre of isolated ponded area because the ponded area may support beneficial uses within the region including groundwater recharge as waters of the State. The upland swales likely do not fall under the jurisdiction of the RWQCB, because they do not have any evidence of hydrologic connection to any downstream flows, and because the swales do not support beneficial uses within the region. However, RWQCB reserves the right to make the final decision on jurisdictional limits.

CDFW Jurisdiction

The upland swales of Feature 2 do not exhibit a clearly defined bed and bank feature, however, based on a recent site visit by CDFW representative Heath Pert (April 2014), CDFG will exert jurisdiction over the 0.04 acre ponded area, adjacent riparian habitat (0.09 acres), and the upland swales (0.029 acres) for a total of 0.159 acre.

SECTION 5: CONCLUSION AND RECOMMENDATIONS

The survey area includes a total of 0.17 acre of waters subject to the jurisdiction of the USACE, 0.21 acre of waters subject to the jurisdiction of the RWQCB, and a total of 2.039 acres of streambed features subject to the jurisdiction of the CDFW, which includes 0.21 acre of unvegetated streambed and an additional 1.829 acres of adjacent riparian habitat.

The current project design avoids all impacts to USACE, RWQCB, and CDFW jurisdictional areas within Feature 1, and thus no permits or clearances should be required for the project, with respect to Feature 1.

Feature 2 consists of two upland vegetated swales and an isolated, human-made ponded area. The upland swales total 0.029 acre, while the pond consists of 0.04 acre with an additional 0.09 adjacent riparian habitat, totaling 0.13 acre. It is likely that the 0.04-acre ponded area under RWQCB jurisdiction would be impacted by project construction and will need Waster Discharge Requirements. The proposed project will impact 0.159 acre of waters of the State, subject to CDFW jurisdiction associated with Feature 2. This impact will require a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code. The authorization from USACE for impacts to waters and wetlands of the U.S. is not likely required for impacts of Feature 2, since it is not under USACE jurisdiction.

Compensatory mitigation for impacts to waters of the State subject to CDFW and RWQCB jurisdiction will likely include offsite purchase of 0.419 acre of mitigation credits from the Elsinore Murrieta Anza Regional Conservation District or a similar mitigation bank, as approved by CDFW, but will be determined during the regulatory permitting process.

SECTION 6: REFERENCES

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Appendix A:
Regulatory Framework

REGULATORY FRAMEWORK

Regulatory permitting for dredge and fill activities involves a compliance framework requiring interaction with federal, state and local agencies, often involving several statutes and regulations.

Federal Statutes and Regulations - USACE

Clean Water Act Section 404

Pursuant to Section 404 of the Clean Water Act (CWA), the USACE regulates the discharge of dredged or fill material into "Waters of the United States" (waters of the U.S.). Regulated activities include but are not limited to, grading, installation of riprap, concrete, and sod, or stockpiling excavated material. In general, any activity, which will temporarily or permanently affect areas delineated as waters of the U.S., including wetlands, typically requires prior authorization from the USACE, pursuant to Section 404 of the CWA. Successful applications propose projects with a valid purpose that comply with the avoidance, minimization, and mitigation ("no net loss") goals of the USACE.

Federal Jurisdiction over Waters and Wetlands

The USACE will assert jurisdiction over "waters of the U.S." as set forth in the Code of Federal Regulations (CFR) 328.3. The term "waters of the U.S." means:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters, which are subject to the ebb and flow of the tide;
(2) All interstate waters including interstate wetlands;
(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
  (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
  (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; and
  (iii) Which are used or could be used for industrial purpose by industries in interstate commerce.
(4) All impoundments of waters otherwise defined as waters of the United States under the definition;
(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;
(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section. (Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States), and

(8) Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the [Environmental Protection Agency].

Subsequent to the U.S. Supreme Court decision in *Rapanos, et al v. United States* (2006) (Rapanos) the Environmental Protection Agency (EPA) and the USACE (collectively, the agencies) issued a joint memorandum (Clean Water Act Jurisdiction Following *Rapanos v. United States*, [June 5, 2007]), which integrates the Rapanos standards with the process presented in 33 CFR 328.3(a).

Pursuant to the memorandum, federal jurisdiction will be asserted over the following categories of water bodies:

- (TNWs): TNW, including territorial seas;
- Wetlands adjacent to TNWs;
- (RPWS): Non- navigable tributaries to TNWs with relatively permanent water flow that flow directly or indirectly to TNWs; "relatively permanent" means water flowing for at least three months of the year (usually, perennial streams and some intermittent streams); and
- Wetlands directly abutting RPWs that flow directly or indirectly into TNWs.

In addition, the agencies will assert jurisdiction over the following categories of water bodies only if, based on fact-specific analysis, the water body is determined to have a significant nexus with a TNW:

- (Non-RPWs): Non-navigable tributaries that do not have relatively permanent water flow that flow directly or indirectly into TNWs (Usually ephemeral and some intermittent streams);
- Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs; and
- Wetlands adjacent to, but not directly abutting RPWs that flow directly or indirectly into TNWs.

"A significant nexus exists if the tributary, in combination with all of its adjacent wetlands has more than a speculative or an insubstantial effect on the chemical, physical, and/or biological integrity of a TNW." (USACE 2008c.)

The agencies will not assert jurisdiction over the following geomorphic features:

- "Swales or erosional features (e.g., gullies small washes characterized by low volume, infrequent or short duration flows)," and
- "Ditches (including roadsides ditches) excavated wholly in and draining only uplands that do not carry relatively permanent water flows."

The agencies now require that all determinations for non-navigable waters, isolated waters, and/or wetlands be evaluated by the agencies before making a final jurisdictional determination.

Subject to Rapanos limitations (Appendix A), Federal Jurisdiction will extend to "adjacent" wetlands. "Adjacent" means "bordering, contiguous, or neighboring." According to the USACE Wetlands Delineation Manual, Technical Report (1987), three criteria must be satisfied to classify an area as a jurisdictional wetland:

1. A predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation);
2. Soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils); and
3. Permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).

The USACE has established regional guidance to address specific regional variations in wetlands determinations. These regional guidance documents supplement the 1987 manual. The "Interim Regional Supplement for the Arid West" was published in December 2006. Similarly, "Draft guidance for Western Mountains, Valleys and Coast Regions" was published in April 2007. In performing its delineations, MBA applies this supplemental guidance as appropriate.

Delineation of Non-Wetland Waters and the OHWM

In the absence of wetlands, the lateral extent of federal jurisdiction over non-tidal waters of the U.S. is defined by the ordinary high water mark (OHWM). The OHWM is defined in 33 CFR 328.3, as:

> that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

In August 2008, the USACE issued A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States A Delineation Manual. The purpose of this document was to aid delineators in identifying the location of the OHWM, which is the indicator used to delineate the lateral limits of non-wetland waters. Five major ephemeral/intermittent channel forms occur within the Arid West: (1) alluvial fans, (2) compound

channels, (3) discontinuous ephemeral channels, (4) single-thread channels with associated floodplains, and (5) anastomosing channels. Each channel form may transition from one to another through space and time, making these the most problematic channel forms for ordinary high water (OHW) delineations. This method for delineating the OHWM includes a literature review and a field visit that assess stream geomorphology and vegetation response to the dominant stream discharge to determine the OHWM.

Literature Review

The literature review begins with interpretation of aerial photographs and topographic maps for the area of interest. The aerial photographs are studied for contrasting patterns of vegetation and geomorphic features that might indicate the active floodplain and low terrace zones. Textural changes associated with the active floodplain may be inferred from variability in color or brightness. Vegetation density, breaks in slope, and texture associated with reworked materials, are mapped to indicate the approximate limit of the floodplain for the field study. Other maps such as geologic and vegetation maps may also be useful.

Rainfall data and stream gauge data are used when available. Available rainfall data should be analyzed prior to the aerial photographs to infer the timing of low to moderate flow events, and thus help determine the dates of aerial photographs that should be obtained. Available stream gage data should be obtained to determine recent discharge history. In addition, these data may be plugged into the Hydrologic Engineering Center -Statistical Software Package (HEC-SSP) developed by the software package provided on the USACE website, to calculate the amount of discharge (in cubic feet per second [cfs]) at 2, 5, 10, and 25-year events.

Field Study

The field verification of the preliminary office delineation is conducted using a series of steps (USACE 2008c) involving walking within a portion of the drainage, or observing changes across portions of the drainage as follows:

Step 1: Observe the channel by walking on one side of it to note 1) the distribution and variation of vegetation, 2) geomorphic features such as breaks in slope, and 3) to note the surrounding upland land use and any hydrologic alterations and structures. This step results in a general overview of the site and its characteristics.

Step 2: Characterize the low flow channel(s), if present. The observer walks within the low flow channel(s) and notes the percent vegetation cover by strata, species composition, and approximate stand age (early successional to mature), and notes the dominant particle size of the sediment.

Step 3: Identify the lateral limits of the low-flow channel(s) by locating the transition area between the low-flow channel(s) and the active floodplain. The observer walks

perpendicular to and away from the low flow channel(s) and notes changes in vegetation cover, species composition, and stand age, sediment texture, slope and the presence of organic debris deposits.

Step 4: Characterize the active floodplain. The observer walks perpendicular to and away from the low-flow channel within the floodplain only, and notes vegetation cover, species composition, and stand age and the dominant particle size in the sediment.

Step 5: Locate the transition area between the active floodplain and the low terrace. The observer walks perpendicular to and away from the transition area between the low-flow channel and the active floodplain and records changes in vegetation cover, species composition, and stand age, and notes changes in the dominant sediment texture. Once the observer identifies the approximate location of the transition area, other indicators are also noted such as a break in slope and organic debris deposits.

Step 6: Verify the transition area between the active floodplain and low terrace by walking along the outer edge of the predominant vegetative and textural characteristics noted for the active floodplain in step five. The goal of this step is to verify that the primary indicators used to identify the transition at the initial observation point, are consistent both upstream and downstream of that point.

Step 7: Map the transition area between the active floodplain and the low terrace. Once the transition area is verified, it is mapped in the field. This line is ultimately used to identify the extent of USACE jurisdiction.

Step 8: Characterize the low terrace. The observer walks perpendicular to and away from the active floodplain, and notes vegetation cover, species composition, and stand age and the dominant particle size in the sediment.

If stream gage data is available, a final step is added that aids in verification of the low terrace limits. However, since stream gage data is often not available, that step will not be detailed here. This exercise results in a clear delineation of the OHWM, often located at the low-terrace lateral limits, on an aerial photograph, through mapping the limits while in the field, immediately after verification of the indicators initially deduced from the aerial.

Limits on USACE Jurisdiction under the Clean Water Act

Beginning with the 2001 U.S. Supreme Court in Solid Waste Agency of North Cook County v. USACE (SWANCC) case, federal jurisdiction over waters has been reduced. Subsequent to the SWANCC decision, federal jurisdiction does not reach wholly intra-state wetlands, which are not "adjacent" to a jurisdictional stream course. The SWANCC decision also eliminated the USACE's

ability to regulate isolated waters based solely on the presence of migratory birds and federally listed species.

Similarly, the 2006 U.S. Supreme Court Decision in Rapanos v. United States, 547 U.S. 715 (Rapanos), requires that non-relatively permanent waters (n-RPWs) and their adjacent wetlands have a significant chemical, physical and biological nexus to downstream navigable waters. This requirement may limit USACE jurisdiction over some ephemeral and intermittent waters that connect directly or indirectly to downstream navigable waters. Details on "significant nexus" analysis are provided in Appendix A.

Preliminary vs. Approved Jurisdictional Determinations:

In August 2008, the USACE issued a Regulatory Guidance Letter 08-02 (RGL 08-02) that provides for the use of "Preliminary Jurisdictional Determination" (PJD) in place of an "Approved Jurisdictional Determination" (AJD). RGL 08-02 alleviates some of the timing and documentation hurdles (and costs), which would be realized in preparing a "significant nexus" analysis under an AJD. By opting to prepare a PJD, the applicant has made an informed decision to assume all features that "could" be jurisdictional are treated as if they "are" jurisdictional. All features treated as jurisdictional will be considered so when calculating impacts, no-net loss compliance, and in calculating appropriate mitigation. As such, PJDs allow for maximum protection of the environment without the need for establishing a "significant nexus," (in essence, significant nexus is assumed).

Unlike AJDs, PJDs are not considered final administrative decisions and as such are not subject to appeal. However, an applicant can always decide to subsequently process an AJD for submittal.

Nationwide Permits v. Individual Permits

Nationwide permits (NWPs) are a type of general permit issued by the Chief of the USACE and are designed to expedite the regulatory process for those types of projects/activities expected to have minimal impacts on jurisdictional areas.

The NWP program is reauthorized every five years. The current NWP program became effective on March 19, 2007 and includes 49 nationwide permit categories including "Linear Transportation Projects" (NWP 14), "Residential Developments" (NWP 29), "Commercial and Institutional Developments" (NWP 39) and "Stormwater Management Facilities" (NWP 43) among others. Each NWP establishes thresholds, which trigger the need for submitting a pre-construction notification (PCN) to the USACE and, which set upper limits to impacts based on the total acreage and/or linear feet of impacts that result from the project. Exceeding these limits will require processing an Individual Permit (IP), which usually involves a significantly longer processing time. On average, an IP can take between 12 and 18 months to process. A NWP is designed to be streamlined and generally takes between three and six months to process.

Primary General Conditions (GC) of 404 Permits

GC # 4: Migratory Bird Breeding Areas - Compliance with the Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects all common wild birds found in the U.S. except the house sparrow, starling, feral pigeon, and resident game birds such as pheasant, grouse, quail, and wild turkey. Resident game birds are managed separately by each state. The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird including feathers, parts, nests, or eggs.

The primary responsibility for complying with the MBTA is that of the project proponent (permittee) and is independent of USACE CWA Section 404 permitting processes. It should be noted, however, that the NWP program (General Condition 4) does require that breeding areas for migratory birds in waters of the U.S. must be avoided to the maximum extent practicable.

GC # 17: Compliance with Federal Endangered Species Act

In administering the CWA Section 404 permitting program, the USACE is required to abide by Section 7(a) (2) of the Federal Endangered Species Act (ESA), which requires federal agencies to consult with the United States Fish and Wildlife Service (USFWS) "to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat." As a result, the presence of federally listed species must be determined prior to submittal of the Section 404 application. In the NWP program, compliance with the ESA is set forth in general condition (GC 17).

The USFWS administers the ESA, which provides a process for listing species as either threatened or endangered, and methods of protecting listed species. The ESA defines as "endangered" any plant or animal species that is in danger of extinction throughout all or a significant portion of its known geographic range. A "threatened" species is a species that is likely to become endangered. A "candidate" species is one that is actively being considered for listing as threatened or endangered. A "proposed" species is one that has been officially proposed by the USFWS for addition to the federal threatened and endangered species list.

Section 9 of the ESA prohibits "take" of threatened or endangered species. The term "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct." Take can include disturbance to habitats used by a threatened or endangered species during any portion of its life history. The presence of any federally threatened or endangered species in a project area generally imposes severe constraints on development, particularly if development would result in take of the species or its habitat. Under the regulations of the ESA, the USFWS may authorize take when it is incidental to, but not the purpose of, an otherwise lawful act.

GC # 18: Compliance with National Historic Preservation Act

In processing a Section 404 permit, the USACE is required to comply with Section 106 of the National Historic Preservation Act (NHPA). Section 106 consultation is triggered when historic or archaeological sites are potentially affected by the proposed project. In the NWP program,

compliance with the NHPA is set forth in general condition (GC 18). The USACE will initiate Section 106 consultation with the appropriate state agency (the State Historic Preservation Office [SHPO] in California) with federal oversight (from the Advisory Council of Historic Preservation [ACHP]). The process usually requires one month from the date the USACE triggers consultation with the SHPO.

GC # 21: Compliance with Section 401 of the Clean Water Act

In connection with notification to the USACE under Section 404 of the CWA, pursuant to 33 CFR Part 330, a written request for Section 401 water quality certification must be submitted to the RWQCB to ensure that no degradation of water quality will result from the proposed project. Subject to CWA Section 401(a)(1), the USACE cannot issue a Section 404 dredge/fill permit until such time as a CWA Section 401 Water Quality Certification (WQC) has been approved by the applicable RWQCB. In the NWP program, compliance with the Section 401 is set forth in general condition (GC 21).

In order to meet the requirements of the RWQCB for issuance of a Section 401 WQC, the project proponent must provide assurances that the project will not adversely affect the water quality of receiving water bodies. A written request for 401 Water Quality Certification must be prepared and submitted to the RWQCB for review. The request will include a detailed project description, a description of proposed impacts, identification and discussion of beneficial uses of affected receiving waters (as described within the appropriate Basin Plan), a water quality plan identifying project-specific Best Management practices (BMPs), whether the water is a 303 (d) listed water, discussion of other approvals and certifications being obtained, a conceptual mitigation plan, and a completed notification form.

CEQA Compliance: Pursuant to Title 23, Section 3856(f) of the California Code of Regulations (CCR), the RWQCB may not issue a CWA Section 401WQC for a project before being provided with (and having had ample time to review) a copy of the final CEQA documentation prepared for the project. Upon formal request for certification, water quality certification should be forthcoming within 90-120 days of completion of the CEQA process.

Fee Structure: Subject to CCR Title 23, §3833, a Section 401 application must be accompanied by an initial deposit of not less than $640.00. If the initial deposit does not cover the agency's application review costs, the RWQCB may require an additional (one-time) amount using the calculations in section 2200(e), Title 23, of the CCR.

GC # 22: Compliance with the Coastal Zone Management Act

In administering the Section 404 permitting program, the USACE is required to abide by Section 307(c)(1) of the Coastal Zone Management Act (CZMA). This requirement is set forth in General Condition No. 22 of the NWP program and detailed in 33 CFR 330.4(d). This condition requires the

USACE to provide a consistency determination and receive state agreement prior to the authorization of activities affecting land, water, or natural resources within the coastal zone.

The California "coastal zone" means that land and water area within the State extending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards. The coastal zone does not include the area of jurisdiction of the San Francisco Bay Conservation and Development Commission, established pursuant to Title 7.2 (commencing with Section 66600) of the Government Code, nor any area contiguous thereto, including any river, stream, tributary, creek, or flood control or drainage channel flowing into such area.

State Statutes and Regulations – RWQCB

The State of California has concurrent jurisdiction with the Federal government over Section 401 WQCs over jurisdictional waters and wetlands of the U.S. Where isolated waters and wetlands (not subject to federal jurisdiction) are involved, the State will exert independent jurisdiction via the Porter Cologne Water Quality Act.

Porter-Cologne Water Quality Act

Section 13260(a) of the California Water Code (Porter Cologne Act) requires that any person discharging waste or proposing to discharge waste within any region, other than to a community sewer system, which could affect the quality of the waters of the State, file a report of waste discharge (ROWD). The discharge of dredged or fill material may constitute a discharge of waste that could affect the quality of waters of the State (Defined in Porter Cologne Act §13050(e)).

Typically, the State of California relies upon its authority under Section 401 of the CWA to regulate discharges of dredged or fill material to California waters that are also within the jurisdiction of the USACE. Given the WQC process employed under Section 401, waste discharge requirements under the Porter Cologne Act are typically waived for those projects requiring a water quality certification. In 2001, the U.S. Supreme Court SWANCC decision invalidated the USACE's use of the "Migratory Bird Rule" to establish federal jurisdiction over isolated waters. Since 2001, the State of California has reasserted its authority under state law to assert jurisdiction over isolated waters for water quality purposes by requiring a ROWD.

Regulation of Isolated Waters

Dredging, filling, or excavation of "isolated" waters constitutes a discharge of waste to waters of the State, and prospective dischargers are required to submit a report of waste discharge to the RWQCB and comply with other requirements of the Porter Cologne Act.

Scope of Regulation: Discharges to and/or dredging of wetlands, active channels or beds of waterbodies are regulated. Discharges to riparian areas or areas in proximity to a waterbody are regulated when such activity will directly or indirectly result a change to water quality. Such changes may include discharge of stormwater pollutants and runoff; change in the nature of vegetation that could affect water quality (e.g., affecting pollutant removal, stream shading or bank stability); or change to the hydrological or geomorphic characteristics of the waterbody.

Application of Regulation: Whenever the USACE issues a jurisdictional disclaimer (concurs with a finding of no federal jurisdiction), the respective RWQCB is notified of the disclaimer. Typically, the RWQCB will issue a letter notifying the project proponent that a ROWD must be filed. A ROWD must be submitted in one of two forms, depending on the anticipated impacts.

(1) General Waste Discharge Requirement (GWDR): The GWDR program is substantively set forth in State Water Resources Control Board (SWRCB) Water Quality Order No. 2004-0004-DWQ. GWDRs are generally prescribed for a category of discharges (either temporary or permanent) involving earth, rock, or similar solid materials if the discharge will not be greater than 0.2 acre and 400 linear feet (for fill or excavation) or 50 cubic yards (for dredging). The type of projects that may be covered under these General WDRs include land development, detention basins, disposal of dredged material, bank stabilization, revetment, channelization, and other similar projects. GWDRs do not apply to discharges that adversely impact, either directly or through habitat modification, any plants or animals identified as candidate, sensitive, or special status species in local or regional plans, or by the CDFW (including Natural Community Conservation Plans), or USFWS (including Habitat Conservation Plans). Similarly, GWDRs do not apply to discharges impacting significant historical, archaeological or paleontological resources.

Requirements: The GWDR typically requires submittal of the following items: (1) A Notice of Intent (NOI), (2) Any CEQA documents that have been prepared for the project, (3) A fee pursuant to Title 23, section 2200 of the CCR, (4) A Mitigation Plan demonstrating that the discharger will sequentially avoid, minimize, and compensate for the adverse impacts to the affected water bodies, and beneficial uses (as set forth in the applicable Basin Plan), and (5) Any other relevant information requested by the SWRCB or RWQCB. A copy of the application must be submitted to both the applicable RWQCB and to the SWANCC-ROWD, Water Quality Certification Unit in Sacramento.

Timing: Pursuant to the California Permit Streamlining Act, RWQCB has 30 days to deem the application complete. Upon receipt of a complete submittal, the RWQCB has 45 days in which to issue a Notice of Applicability (NOA) (authorizing the activity) or a Notice of Exclusion (NOE) (denying authorization). The discharge activity is operationally authorized if no NOE is issued within the 45-day evaluation period, provided that the proposed activity is not a prohibited activity.

(2) Individual Waste Discharge Requirements (IWDR): Projects not qualifying for the GWDRs will need to satisfy Individual Waste Discharge Requirements (IWDRs), typically requiring submittal

of Section 401 WQC forms and supporting documentation as set forth by the respective RWQCB. Such submittals are subject to fees as set forth in California Code of Regulations Title 23 Section 2200(a)(2). Pursuant to the Water Code the project proponent is required to file with the appropriate RWQCB a Report of Waste Discharge describing the proposed discharge at least 140 days before it occurs (Water Code §§13260, 13264).

State Statutes and Regulations - CDFW

Section 1600/1602 of the California Fish and Game Code

In the public interest of protection and conservation of fish and wildlife resources of the state (Section 1600 of the Fish and Game Code), Fish and Game Code Section 1602 requires any person, state or local governmental agency, or public utility to notify the CDFW before beginning any activity that will do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. CDFW's jurisdiction includes ephemeral, intermittent, and perennial watercourses, including dry washes, characterized by:

1. The presence of hydrophytic vegetation.
2. The location of definable bed and banks.
3. The presence of existing fish or wildlife resources.

Furthermore, CDFW jurisdiction is often extended to habitats adjacent to watercourses, such as oak woodlands in canyon bottoms or willow woodlands that function as part of the riparian system. Historic court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear, but re-emerge elsewhere. Under the CDFW definition, a watercourse need not exhibit evidence of an OHWM to be claimed as jurisdictional. However, CDFW does not regulate isolated wetlands; that is, those that are not associated with a river, stream, or lake.

CDFW Regulated Activities

The CDFW regulates activities that involve diversions, obstruction, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife resources. When a project requires such activities, a Section 1602 Streambed Alteration Notification must be submitted to the CDFW for review. The notification includes a detailed project description, a description of proposed impacts, a conceptual mitigation plan, and completed notification forms. Typically, CDFW completes the agreement within 60-90 days of the completion of the CEQA process.

CEQA Compliance: The CDFW must comply with CEQA (Pub. Resources Code, §21000, et seq.) before it may issue a final Lake or Streambed Alteration Agreement (LSAA). Often, the CDFW will receive a draft LSAA from an applicant before the lead agency has fully complied with CEQA.

When this occurs, the CDFW must wait for the lead agency to comply fully with CEQA before it issues a final LSAA.

Fee Structure: Pursuant to CCR, Title 14 §699.3, CDFW assesses a fee to cover the cost of reviewing §1602 applications. The fee calculations are based on the sum cost of the proposed activities within the streambed or riparian community.

Sensitive Plant and Wildlife Species

Sensitive species are native species that have been accorded special legal or management protection because of concern for their continued existence. Several categories of protection exist at both federal and state levels, depending on the magnitude of threat to continued existence and current knowledge of population levels.

California Endangered Species Act

The CDFW administers the California Endangered Species Act (CESA). The State of California considers an "endangered" species one whose prospects of survival and reproduction are in immediate jeopardy. A "threatened" species is one present in such small numbers throughout its range that it is likely to become endangered in the near future in the absence of special protection or management. A "rare" species is one present in such small numbers throughout its range that it may become endangered if its present environment worsens; this designation only applies to California native plants. State threatened and endangered species are fully protected against take, as defined above. The term "species of special concern" is an informal designation used by CDFW for some declining species that are not state candidates for listing. This designation does not provide legal protection under CESA, but signifies that these species are recognized as sensitive by CDFW.

California Native Plant Society

The California Native Plant Society (CNPS) is a California resource conservation organization that has developed an inventory of California's sensitive plant species. This inventory summarizes information on the distribution, rarity, and endangerment of California's native plants. The inventory is divided into four lists based on the rarity of the species. In addition, the CNPS provides an inventory of plant communities that are considered sensitive by the state and federal resource agencies, academic institutions, and various conservation groups. Determination of the level of sensitivity is based on the number and size of remaining occurrences as well as recognized threats.

Section 3503 and 3511 of the California Fish and Game Code

The CDFW administers the California Fish and Game Code. Code 3503 makes it illegal to destroy any birds' nest or any birds' eggs that are protected under the MBTA. Code 3503.5 further protects all birds in the orders Falconiformes and Strigiformes (birds of prey, such as hawks and owls) and their eggs and nests from any form of take. Section 3511 of the Code lists fully protected bird species, where the CDFW is unable to authorize the issuance of permits or licenses to take these species.

Appendix B:
Preliminary Jurisdictional Determination Form

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Los Angeles District | File/ORM #: | PJD Date: Feb 7, 2012

State: CA | City/County: Riverside County

Nearest Waterbody: Lake Skinner -East/Murrieta Creek -West

Location: TRS, LatLong or UTM: 33º15'15.37" N 117º13'53.27" W

Name/ Address of Person Requesting PJD:
Michael Brandman Associates (MBA)
220 Commerce, Suite 200
Irvine, CA 92602
Phone: 714.508.4100
Contact: Scott Crawford

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 776 linear ft | 10 width | 0.17 acres | Stream Flow: Per. (seasonal)

Wetlands: 0.05 acre(s) | Cowardin Class: Riverine

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: | Non-Tidal:

☐ Office (Desk) Determination
☑ Field Determination: Date of Field Trip: Feb 7, 2012

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☐ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: Murrieta and Wildomar
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: Riverside County
- ☑ National wetlands inventory map(s). Cite name:
- ☐ State/Local wetland inventory map(s):
- ☑ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is:
- ☐ Photographs: ☑ Aerial (Name & Date): Google 2010
  - ☐ Other (Name & Date): NAIP 2010
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and Date of Regulatory Project Manager (REQUIRED)

Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office	Los Angeles District	File/ORM #		PJD Date:	Feb 7, 2012
State	CA	City/County	Riverside County	Person Requestinq PJD	Scott Crawford

Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource

Notes:

Appendix C:
Wetland and OHWM Data Sheets

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1A**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º35'19.05" N** Long: **117º13'51.40" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☑	**No** ☐
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☑ **No** ☐

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. **Fuirena scirpoidea**	60		OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

SOIL

Sampling Point: **1A**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
3"	10yr 3/2							loamy sand	
3"-12"	10yr3/1							silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

All three criteria are met at this location. OHWM is approximately 10 feet at the northern edge of the project site.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1B**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º15'18.23" N** Long: **117º13'51.83" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			

Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1B**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 12 feet at the soil pit location.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1C**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): Slope (%)

Subregion (LRR): Lat: **33º15'17.08" N** Long: **117º13'52.56" W** Datum:

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			

Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: % Cover of Biotic Crust:

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: (A)

Total Number of Dominant Species Across all Strata: (B)

Percent of Dominant Species That are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicatore:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1C**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	10 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 8 feet at the soil pit location. Water flow is deeper at this location.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1D**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º15'16.46" N** Long: **117º13'52.84" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			

Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1D**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					Texture	Remarks
(Inches)	Color (moist)	%	Color (moist)	%	Type	Loc	%		
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 10 feet at the soil pit location. Water flow contains orange algae growth.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1B**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º15'15.62" N** Long: **117º13'52.99" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			

Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1B**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 10 feet at the soil pit location. Water flow contains orange algae growth.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1F**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º15'14.36" N** Long: **117º13'53.91" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			

Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			

Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			

Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1F**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 6 feet at the soil pit location. Orange algae growth is no longer present.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1G**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): Slope (%)

Subregion (LRR): Lat: **33º15'13.67" N** Long: **117º13'54.27" W** Datum:

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☐	**No** ☑
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: % Cover of Biotic Crust:

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: (A)

Total Number of Dominant Species Across all Strata: (B)

Percent of Dominant Species That are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicatore:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1G**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-12"	10yr 4/2							loamy sand	
								silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks

Sandy soils, no organic streaking or other hydric soil indicators. Flows are likely sufficient to keep the soil oxygenized.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 7 feet at the soil pit location. O

WETLAND DETERMINATION DATA FORM - Arid West Region

Project Site: **Wildomar 23** City/County: **County of Riverside** Sampling Date: **2/7/2012**

Applicant/Owner: **Lennar Homes** State: **CA** Sampling Point: **1H**

Investigator(s): **Scott Crawford** Section, Township, Range: **Section 6 of T 7 South, R 3 West**

Landform (hillslope, terrace,etc): **Rolling Hills** Local relief (concave, conves, none): _____ Slope (%) _____

Subregion (LRR): _____ Lat: **33º15'13.26" N** Long: **117º13'54.55" W** Datum: _____

Soil Map Unit Name: **San Timoteo Loam** NWI Classification: **NA**

Are Climatic / hydrological conditions on the site typical this time of Year? Yes: ☑ No: ☐ (If no, explain in Remarks.)

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are: Vegetation: ☐ Soil: ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ☑	**No** ☐
Hydric Soil Present?	**Yes** ☑	**No** ☐
Wetland Hydrology Present?	**Yes** ☑	**No** ☐

Is the Sampled Area within a Wetland? **Yes** ☑ **No** ☐

Remarks:

VEGETATION

Tree Stratum (Use scientific names)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix lasiolepis**	20		FACW
2. **Salix goodingii**	40		FACW
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. **Fuirena scirpoidea**			OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: _____ % Cover of Biotic Crust: _____

Dominance Test worksheet:

Number of Dominant Species That are OBL FACW, or FAC: _____ (A)

Total Number of Dominant Species Across all Strata: _____ (B)

Percent of Dominant Species That are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicatore:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicator if hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

Vegetation is limited to the canopy cover only. The low flow channel is unvegetated.

SOIL

Sampling Point: **1H**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type	Redox Features Loc	Redox Features %	Texture	Remarks
1-3"	10yr 4/2							loamy sand	
3-12"	10YR3-1								models

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix

[2] Location: PL=Pore Lining, RC=Root Channel, M=Matrixc

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depresssions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks

Sandy soils with dark organic streaking at the surface. Dark chroma color beneath the surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☑ Inundation on Aerial Imagery (B7)
- ☐ Water-stained Leaves (B8)
- ☐ Biotic Crust (B10)
- ☐ Aquatic Invertebrates (B11)
- ☐ Crayfish Burows (B12)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C2)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soil (C6)
- ☐ Muck Surface (C7)
- ☐ Saturation on Aerial Imagery (C8)
- ☐ Shallow Aquitard (D4)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more is required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B9)
- ☐ Dry Season Water Table (C3)
- ☐ Salt Depostis (C5)
- ☐ Mud Casts (C9)
- ☐ FAC-Neutral Test (D7)

Field Observations:

Surface Water Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Water Table Present?	Yes	☑	No	☐	Depth (inches):	6 inches
Saturation Present? (includes capillary fringe)	Yes	☑	No	☐	Depth (inches):	3 inches

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soils do not meet wetland criteria and therefore this area is not a wetland. OHWM is approximately 8 feet at the soil pit location. The drainage splits at this location into two main channels.

Project: Wildomar 23	**Date**: February 7, 2012	**Time**: 0700
Project Number:	**Town**: County of Riverside	**State**: CA
Stream: Tributary to Murrieta Creek	**Photo begin file#**: 1	**Photo end file#**: 11
Investigator(s): Scott Crawford		

Y ☒ N ☐ Do normal circumstances exist on the site?	**Location Details**: Interstate 15/South of Clinton Keith Road.
Y ☐ N ☒ Is the site significantly disturbed?	**Projection**: UTM **Datum**: NAD 83
Type: N/A	**Coordinates**: 33°15'15.37" N / 117°13'53.27" W

Notes: The project site contains two distinct features. One is jurisdictional, the other is not. But does contain an isolated ponded area.

Brief site description: The site contains gently rolling hills with previous residential development that has subsequently been removed. One intermittent drainage and one upland swale occur on site.

Checklist of resources (if available):

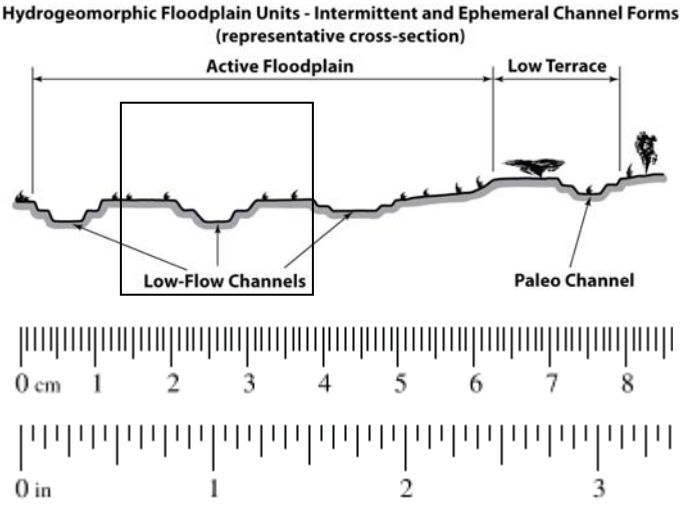
- ☒ Aerial Photography: (Dates: 2010)
- ☒ Topographic maps: (Scale: 1997)
- ☐ Geologic Maps
- ☐ Vegetation maps
- ☒ Soil Maps
- ☐ Rainfall/precipitation maps
- ☐ Existing Delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other Studies
- ☐ Stream gage data
  - Gage number:
  - Period of record:
- ☐ Clinometer / level
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2- ,5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

The dominant Wentworth size class that imparts a characteristic texture to each of a channel cross-section is recorded in the average sediment texture filed under the characteristics section for the zone of interest.

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
2.56	64	Cobble	Gravel
0.157	4	Pebble	
0.079	2.00	Granule	
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	
0.0025	0.0625	Very fine sand	
1/16 0.0012	0.031	Coarse silt	
1/32 0.00061	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud

Top 3”

Below 3”



☐	Walk the channel and floodplain within the study area to get an impression of the vegetation and geomorphology present at the site. Record any potential anthropogenic influences on the channel system in "Notes" above.
☐	Locate the low-flow channel (lowest part of the channel). Record observations. Characteristics of the low-flow channel: Average sediment texture: Sandy Total veg cover: 100 % Tree: 20 % Shrub: 20 % Herb: 90% Community successional stage: ☐ NA ☐ Mid (herbaceous, shrubs, saplings) ☐ Early (herbaceous & seedlings) ☒ Late (herbaceous, shrubs, mature trees) Dominant species present: sedge/willow Other: ☐ Umbrella Sedge ☐ Arroyo Willow ☐ _____ ☐ _____
☐	Walk away from the low-flow channel along cross-section. Record characteristics of the lowflow/ active floodplain boundary. Characteristics used to delineate the low-flow/active floodplain boundary: ☒ Change in total veg cover ☐ Tree ☒ Shrub ☒ Herb ☒ Change in overall vegetation maturity ☐ Change in dominant species present ☐ Other ☒ Presence of bed and bank ☐ Drift and/or debris ☐ Other: _____ ☐ Other: _____
☐	Continue walking the channel cross-section. Record observations below. Characteristics of the active floodplain: Average sediment texture: silty/clay Total veg cover: 100 % Tree: 40 % Shrub: 20% Herb: 20% Community successional stage: ☐ NA ☐ Mid (herbaceous, shrubs, saplings) ☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees) Dominant species present: black willow/sedge Other: ☐ _____ ☐ _____ ☐ _____ ☐ _____

☐ **Continue walking the channel cross-section. Record indicators of the active floodplain/low terrace boundary.**

Characteristics used to delineate the active floodplain/ low terrace boundary:

- ☒ Change in average sediment texture
- ☒ Change in total veg cover ☐ Tree ☒ Shrub ☒ Herb
- ☒ Change in overall vegetation maturity
- ☒ Change in dominant species present
- ☐ Other ☐ Presence of bed and bank
  - ☐ Drift and/or debris
  - ☐ Other: _____
  - ☐ Other: _____

☐ **Walk the active floodplain/low terrace boundary both upstream and downstream of the crosssection to verify that the indicators used to identify the transition are consistently associated the transition in both directions.**

Consistency of indicators used to delineate the active floodplain/low terrace boundary:

- Y ☒ N ☐ Change in average sediment texture
- Y ☒ N ☐ Change in total veg cover ☐ Tree ☒ Shrub ☒ Herb
- Y ☒ N ☐ Change in overall vegetation maturity
- Y ☒ N ☐ Change in dominant species present
- Y ☐ N ☐ Other: Y ☐ N ☐ Presence of bed and bank
  - Y ☐ N ☐ Drift and/or debris
  - Y ☐ N ☐ Other: _____
  - Y ☐ N ☐ Other: _____

☐ **If the characteristics used to delineate the active floodplain/low terrace boundary were NOT consistently associated with the transition in both the upstream and downstream directions, repeat all steps above.**

☐ **Continue walking the channel cross-section. Record characteristics of the low terrace.**

Characteristics of the low terrace:

Average sediment texture: sand

Total veg cover: 60% Tree: 0% Shrub: 50 % Herb: 10%

Community successional stage:

- ☐ NA ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Early (herbaceous & seedlings) ☒ Late (herbaceous, shrubs, mature trees)

Dominant species present: _____

Other:

- ☐ Buckwheat
- ☐ tree tobacco
- ☐ star thistle
- ☐ Prickly pear cactus

☐ **If characteristics used to delineate the active floodplain/low terrace boundary were deemed reliable, acquire boundary.**

Active floodplain/low terrace boundary acquired via:

- ☒ Mapping on aerial photograph ☒ GPS
- ☐ Digitized on computer ☐ Other: _____

Appendix D:
Site Photographs

Photograph 1: Looking north at the northern property boundary as Feature 1 enters the project site. Note hydrophytic vegetation in the foreground and existing fence line (Property Boundary) in the background.

Photograph 2: Looking east at a soil sample location in the central portion of the drainage feature within the project site. At this location, there is limited vegetative cover. The soils at this location where sandy with no organic streaking.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix D
Site Photographs 1 and 2

Photograph 3: Looking west at the earthen berm that previously blocked downstream flows. This area has eroded away and no longer retains water. Note the abandoned water and electric lines in the site of the berm.

Photograph 4: Looking north at the southernmost portion of the project site from the southern property boundary. The riparian vegetation associated with the drainage feature transitions into coastal sage scrub at this location.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix D
Site Photographs 3 and 4

Photograph 5: Looking south at the area immediately upstream of the project site in an offsite location. At this location, the drainage is ephemeral and contains no associated riparian habitat. The project site starts south of the large tree in the background.

Photograph 6: Looking south at the underground culvert that conveys flows beneath Interstate 15. Flowing water continues at this location; however, the riparian habitat has significantly reduced in tree canopy cover.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix D
Site Photographs 5 and 6

Photograph 7: Looking southwest at Feature 2 from the northern project site boundary. At this location the drainage is considered an upland swale with no evidence of any noticeable ordinary high water mark or clearly defined bed and bank feature.

Photograph 8: Looking south at the upland swale onsite. The soils within the upland swale are considered sandy with gravel and cobbles. There is no evidence of flows within this portion of the project site.

Source: Michael Brandman Associates, 2012.

Photograph 9: Looking east at the ponded area within Feature 2. This ponded area was artificially created when the earthen dam was installed just downstream of this location. The ponded area contains a dense stand of cottonwoods and arroyo willows.

Photograph 10: Looking north at the upstream portion of Feature 2 before it enters the project site. This portion of the drainage also contains an upland swale and no change in soils or vegetative cover.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix D
Site Photographs 9 and 10

Photograph 11: Looking northeast at the existing storm drain inlet located at the western side of an existing housing tract. The upland swale associated with Feature 2, continues from the project site until it reaches this storm drain.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Appendix D
Site Photograph 11

Appendix E:
Determination of Jurisdictional Wetlands and Waters

DETERMINATION OF JURISDICTIONAL WETLANDS AND WATERS

JURISDICTIONAL CRITERIA

The Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1987) sets forth three mandatory criteria and a number of non-mandatory field indicators to use in evaluating whether or not an area is a jurisdictional wetland. The three mandatory criteria are hydrophytic vegetation, hydric soils, and wetland hydrology. The following paragraphs discuss the mandatory criteria, the field indicators, and other reference materials used to determine if each criterion has been met at the Project Site.

Hydrophytic Vegetation

Hydrophytic vegetation is defined as plant life growing in water, soil, or substrate that is at least periodically deficient in oxygen because of excessive water content. The United States Fish and Wildlife Service (USFWS) has published the National List of Plant Species That Occur in Wetlands, and divided plants into four groups based on their "wetland indicator status:"

1. Obligate wetland plants (OBL) that occur almost always in wetlands under natural conditions
2. Facultative wetland plants (FACW) that usually occur in wetlands but occasionally are found in upland areas
3. Facultative plants (FAC) that are equally likely to occur in wetlands as well as upland
4. Facultative upland plants (FACU) that usually occur in upland areas but occasionally are found in wetlands

An area has hydrophytic vegetation when, under normal circumstances, more than 50 percent of the composition of dominant plant species from all strata are obligate wetland (OBL), facultative wetland (FACW) and/or facultative species (FAC).

Hydric Soils

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. "Long enough" generally means 1 week during the growing season and soils that are saturated for this period usually support hydrophytic vegetation. The criteria for establishing the presence of hydric soils vary among different types of soils and between normal circumstances, disturbed areas, and problem areas. Due to their wetness during the growing season, hydric soils usually develop certain morphological properties that can be readily observed in the field. Prolonged anaerobic soil conditions typically lower the soil redox potential, causing a chemical reduction of some soil components, mainly iron oxides and manganese oxides. This reduction is typically reflected by the presence of iron or manganese concretions, gleying, or mottling. Other field indicators of hydric soils include the

presence of sulfidic material, an aquic or peraquic moisture regime, or a spodic horizon. All organic soils, with the exception of Folists, are classified as hydric soils.

Wetland Hydrology

Wetland hydrology is permanent or periodic inundation, or soil saturation for a significant period during the growing season. Numerous factors influence the wetness of an area, including precipitation, stratigraphy, topography, soil permeability, and plant cover. At certain times of the year in most wetlands, and in certain types of wetlands at most times, wetland hydrology is quite evident, since surface water or saturated soils may be observed. Yet, in many instances, especially along the uppermost boundary of wetlands, hydrology is not readily apparent. Despite this limitation, hydrologic indicators can be useful for confirming that a site with hydrophytic vegetation and hydric soils still exhibits wetland hydrology. While hydrologic indicators are sometimes diagnostic of the presence of wetlands, they are generally either operationally impracticable, as in the case of recorded data, or technically inaccurate, as in the case of some field indicators, for delineating wetland boundaries.

The following hydrologic indicators, while not necessarily indicative of hydrologic events during the growing season or in wetlands alone, do provide evidence that inundation or soil saturation has occurred at some time:

- Visual observation of inundation
- Visual observation of soil saturation
- Oxidized channels (rhizospheres) associated with living roots and rhizomes
- Water marks
- Drift lines
- Waterborne sediment deposits
- Water-stained leaves
- Surface scoured areas
- Morphological plant adaptations
- Hydric soil characteristics

Appendix F:
Biologist Resume

CORPORATE RESUME

Scott Crawford, MA

Senior Project Manager

Overview

- 14 Years Experience
- Master's degree, Biological Science – California State University, Fullerton
- Bachelor's degree, Environmental Biology – California State University, Northridge

Scott Crawford, MA, senior biologist, has over 14 years experience conducting herpetological, mammalian and avian surveys and ten years experience preparing jurisdictional delineation for regulatory permits. Scott's expertise includes conducting focused surveys for sensitive wildlife species including fairy shrimp, California gnatcatcher, Red-Legged Frog, Arroyo Toad, Least Bell's Vireo, Western Spadefoot, Western Pond Turtle and Burrowing Owl. He is also well versed in documenting biological resources and drainage systems using Geographic Information Systems.

Related Experience

Commercial and Industrial Projects

Morger Property Biological Resources Assessment, Century American Development Company. A biological resources assessment was conducted on a 425-acre project site. The existing conditions were documented in order to assist in the development of a future commercial development.

Gatlin Development Company Biological Resources Assessment. A biological resources assessment was conducted on a 32-acre project site. The existing conditions were documented in order to assist in the development of a future Wal-Mart Super-center. 2005

Hemet Auto Mall Biological Resources Assessment, City of Hemet. Conducted a general biological resources assessment for the 15-acre property in the western portion of the City of Hemet. The existing conditions were documented in order to assist in the expansion of the existing auto mall.

California Gnatcatcher Focused Surveys, Rose Hills Cemetery. Conducted a focused survey for California Gnatcatchers on a proposed construction footprint required to repair a landslide within the Cemetery Property. Suitable habitat was observed and focused surveys were conducted. No Gnatcatchers was observed during the surveys.

California Gnatcatcher Protocol Surveys, Quest Diagnostics, Orange County. Conducted protocol surveys for the California gnatcatcher. A single coastal California gnatcatcher was observed during the surveys.

San Bernardino Kangaroo Rat, Calmat, City of Etiwanda. Conducted a preliminary habitat survey for occurrence of suitable habitat on site for the San Bernardino kangaroo rat. The 80-acre project site was determined to have marginal habitat for this species, and the focused trapping effort was stopped during the second night due to lack of significant trap success. It was determined that the species was not present onsite.

Western Brass Biological Resources Assessment, City of Calimesa. Conducted a general biological resources assessment for the 60-acre property in the eastern portion of the City of Calimesa. The existing conditions were documented in order to assist in the development of a residential community.

Rose Hills Cemetery Biological Resources Assessment. Conducted a biological resources assessment to

document the existing conditions within the proposed expansion and maintenance areas that required site disturbance. Suitable gnatcatcher habitat and drainage feature were documented within the Project Site.

J. Edwards Company Biological Resources Assessment, City of Corona. Conducted a biological resources assessment for a 120-acre parcel within the sphere of influence of the City of Corona at the base of the Cleveland National Forest. Suitable habitat was observed for California gnatcatcher. A single red-diamond rattlesnake, a California species of special concern, was identified onsite.

California Gnatcatcher Focused Surveys, Citrus Valley Health Partners, City of Diamond Bar. Conducted a focused survey for California Gnatcatchers for a proposed commercial development. Suitable habitat was observed and focused surveys were conducted. No Gnatcatchers were observed during the surveys.

Upper Newport Backbay Slope Stabilization Project Construction Monitoring. Under contract to CBD Contractors, conducted construction monitoring to minimize impacts to California gnatcatchers for a slope stabilization project at Upper Newport Backbay in the City of Newport Beach, Orange County, California.

Rose Hills Cemetery Construction Monitoring, City of Industry. Monitored construction activity to prohibit fill from entering the drainage feature during excavation activities as part of the ongoing maintenance of the drainage features downstream of the cemetery property.

Construction Monitoring, Gave technical and biological support during soil boring operations, which included installation, drilling, and removal. Conducted erosion control monitoring of nine drilling locations. Conducted biological monitoring of southwestern pond turtles and southwestern pond turtle burrows prior to and during sampling,

Desert Tortoise Surveys, Garlock Mine, Kern County, California. Conducted a desert tortoise protocol survey on a large mining operation outside of the City of Johannesburg, California. Two desert tortoises were observed within the project site and two were observed in the Zone of Influence area.

Construction monitoring. Wind Fence Construction. City of Cathedral City, Riverside County, California. Conducted construction monitoring to minimize impacts to Coachella Valley Milkvetch, fridge-toed lizards, and Palm Springs pocket mouse for a wind fence in Riverside County, California.

Energy Projects

Lake Elsinore Advance Pump Storage (LEAPS), Lake Elsinore and Surrounding Areas. Conducted biological resources assessment and focused species surveys for thirty-seven miles of proposed transmission lines for the LEAPS project near Lake Elsinore and surrounding areas. Surveys included general reconnaissance-level surveys as well as focused surveys for Quino checkerspot butterfly, California gnatcatcher, least bell's vireo, arroyo toad, red-legged frog, spotted owl, and sensitive plants. Also participated in informal consultation with USFWS, USFS, and CDFG.

Daggett Ridge Wind-Farm Biological Resources Assessment, SeaWest WindPower, Inc. Conducted a biological resources assessment on a 4,500-acre property for a proposed wind-farm along Daggett ridge, east of the City of Barstow. The survey was conducted to determine suitable habitat for sensitive plant and wildlife species such as Mojave monkey flower (Mimulus mohavensis), Barstow woolly sunflower (Eriophyllum mohavense), Mohave tui chub (Gila bicolor mohavensis), desert tortoise (Gopherus agassizii), yellow-breasted chat (Icteria virens), LeConte's thrasher (Toxostoma lecontei), and Mohave ground squirrel (Spermophilus mohavensis). The site was also assessed as a raptor use area as part of a preliminary bird strike study.

Christensen/Lazar Project Biological Resources Assessment, Unincorporated Riverside County. Conducted a biological resources assessment for a proposed wind energy project (Commercial WECS Permit No. 99) near Palm Springs for Environ Wind Development Corporation.

Federal Projects

Endangered Species Management Plan, Prepared for Fort Irwin. Information was gathered on all endangered, threatened, or sensitive species observed or potentially occurring within the project area to be included in the Endangered Species Management Plan for Fort Irwin. Conservation measures were developed in order to manage these sensitive species within Fort Irwin.

General Plan Updates

General Plan/Environmental Update Draft EIR, Hogle-Ireland, Laguna Woods. Conducted a biological resources assessment and assisted in the preparation of the biological section for the draft EIR for the General Plan/Environmental Update.

General Plan Update Biological Resources Document, City of Perris. Prepared the biological resources section, conducted a complete survey and evaluation of all property within the City limits.

General Plan Update Biological Resources Document, City of Rancho Santa Margarita. Prepared the biological resources section, conducted a complete survey and evaluation of all property within the City limits.

Subarea 2 General Plan Biological Resources Document, City of Chino. Assisted in the preparation of the biological resources section, conducted a complete vegetation map and jurisdictional delineation over the entire General Plan area.

Native American Lands Projects

Flat-tailed Horned Lizard Focused Surveys, Agua Caliente Band of Cahuilla Indians, Coachella Valley. Conducted focused surveys for the presence/absence of flat-tailed horned lizards within all suitable habitat associated with the Indian Reservation lands. A single horned lizard was observed during the surveys.

Agua Caliente Band of Cahuilla Indian Lands Biological Resources Assessment, Riverside County. Conducted a general biological assessment on thirty two square miles of Agua Caliente band of Cahuilla Indians lands in the Palm Springs Area. The survey consisted of walking the existing trails and mapping the vegetation and other biological features present within the Indian lands. The information obtained from the biological resources assessment was used to prepare a Habitat Conservation Plan for the area.

Torres Martinez Desert Cahuilla Indian Lands Biological Resources Assessment, Torres Martinez Indian Reservation. Conducted a biological resources assessment to assist in the development of a multiple species habitat conservation plan.

Residential and Mixed Use Projects

Winokur Residential Property Biological Resources Assessment/ESHA Assessment, City of Malibu. Conducted a biological resources assessment for a single family residence in the City of Malibu. The survey was conducted to delineate the limits of the Environmentally Sensitive Habitat Are (ESHA). Survey was conducted to determine if a more detailed assessment was needed, but was not required. 2008

Green Park Ranch Wetlands Delineation, City of Simi Valley. Conducted a wetland delineation on a 1600-acre site in the City of Simi Valley. The survey was conducted to delineate the jurisdictional limits of United States Army Corps of Engineers waters of the U.S. and California Department of Fish and Game waters of the state. Assisted in preparing the Runkle Canyon Specific Plan and reviewed the EIR prepared by Impact Sciences. Participated in public hearings and coordination with City Staff to reduce environmental impacts.

Central Capital Corporation Biological Resources Assessment, City of La Habra. A biological resources assessment was conducted on a 4-acre project site. The existing conditions were documented in order to assist in the development of a future residential development.

Searless Company Biological Resources Assessment, City of Orange. A biological resources assessment was conducted on a 10-acre project site. The existing conditions were documented in order to assist in the development of a future residential development.

Granite Equities Biological Resources Assessment, French Valley Property. A biological resources assessment was conducted on a 30-acre project site. The existing conditions were documented in order to assist in the development of a future residential development.

Courdures North Property Biological Resources Assessment, Courdures LLC, City of Perris. Conducted a general biological resources assessment for the Courdures North property. The existing conditions were documented in order to assist in the development of a single-family residential development.

Knowleton Communities Biological Resources Assessment, City of Corona. Conducted a biological resources assessment for a 120-acre parcel within the sphere of influence of the City of Corona at the base of the Cleveland National Forest. Suitable habitat was observed for California gnatcatcher.

California Gnatcatcher Focused Survey, Orange County. Assisted in conducting a focused survey to determine the presence and location of any individual or pair of gnatcatchers within a 595-acre parcel located in Cypress Canyon. Four pairs of gnatcatchers were identified during the survey.

California Gnatcatcher Focused Survey, City of Beaumont. Assisted in conducting a survey to determine the presence and location of any individual or pair of gnatcatchers within a 536-acre parcel. No gnatcatchers were identified during the survey.

Palm Springs Pocket Mouse Trapping, Country Club Estates. Conducted a 5 days trapping effort for the Palm Springs pocket mouse.. A total of 1,035 trap-nights were set and checked. No Palm Springs Pocket Mouse individuals were captured during the trapping effort. The site contained marginal and mostly unsuitable habitat for this species.

Flat-tailed Horned Lizards Focused Survey, Country Club Estates. Assisted Marie Barrett in conducting a focused scat survey for the flat-tailed horned lizard in desert scrub habitat. It was determined that the project site contained limited suitable habitat and this species was determined to be absent from the project site.

California Gnatcatcher Protocol Surveys, Urban Environs, Community of East Highlands. Conducted protocol surveys for the California gnatcatcher. No coastal California gnatcatchers were observed during the surveys. Blue-Gray gnatcatchers were observed within the project site.

California Gnatcatcher Protocol Surveys, Nuevo Development, City of Nuevo. Conducted protocol surveys for the California gnatcatcher. No coastal California gnatcatchers were observed during the surveys.

Saddleback Meadows Western Spade Foot Toad Focused Survey, Irvine. Conducted a focused survey for the presence of western spade-foot toad. The survey was conducted within suitable ephemeral ponds located on the Saddleback Meadows property in Irvine. The survey was used to update a previous study on spade-foot occurrences within the project site. Western spade-foot toad tadpoles were observed at the site. Vocalizations were heard at four of the ponds.

Quino Checkerspot Butterfly Habitat Assessment and Protocol Surveys, Century Crowell Communities. Assisted with conducting habitat assessment and protocol surveys for a project site in the Gavilan Plateau area. Suitable habitat was observed and focused surveys were conducted. No butterflies were observed during the surveys.

Quino Checkerspot Butterfly Surveys, Winchester Area. Assisted in conducting the first protocol survey for two parcels in the Winchester area for the Quino Checkerspot Butterfly.

Habitat Assessment for Quino Checkerspot Butterfly, City of Yucaipa. Conducted preliminary habitat assessment for the Quino checkerspot butterfly. Suitable Quino habitat was observed on the 450-acre site during the second day of surveys, therefore adult surveys were recommended.

Habitat Assessment for Quino Checkerspot Butterfly, City of Ontario. Conducted preliminary habitat assessment for the Quino checkerspot butterfly. The survey was conducted on a total of four parcels of land that encompassed approximately one thousand acres. The habitat consisted of active cow pastures and agricultural land. It was determine that no suitable Quino checkerspot butterfly habitat occurred within either of the four project sites.

Armada LLC Biological Resources Assessment, Riverside County. Conducted a general biological resources assessment for the 640-acre property just south of the City of Corona. The existing conditions were documented in order to assist in the development of a residential community.

Boyd Property Biological Resources Assessment, City of Corona. Conducted a general biological resources assessment for the 4-acre Boyd property in the City of Corona just south of the 91 freeway. The existing conditions were documented in order to assist in the development of a residential community.

Riverside Fairy Shrimp Protocol Survey, Courdures LLC, City of Perris. Conducted protocol dry season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on a single large ponded area. Branchinecta cysts were observed.

Riverside Fairy Shrimp Protocol Survey, Classic Pacific, City of Beaumont. Conducted protocol wet season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on two natural occurring ponded areas. Common versatile fairy shrimp were observed.

Riverside Fairy Shrimp Protocol Survey, Classic Pacific, City of Beaumont. Conducted protocol dry season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on two natural occurring ponded areas. Branchinecta cysts were observed.

Nevin's Barberry Focused Survey, Spring Brook Estates, Riverside County. Conducted focused surveys for Nevin's barberry within a 5-acre survey area. The area was part of a much larger 200-acre proposed residential development. No sensitive plants were observed during the survey.

Burrowing Owl Focused Survey, Spring Mountain Ranch, Riverside County. Conducted focused surveys for burrowing owl within a proposed residential development. No burrowing owls were observed during the survey.

California Gnatcatcher Surveys, Van Daele Development, Menifee Area. Conducted protocol surveys in the Menifee area. The surveys were conducted on a 60-acre parcel of land that contained suitable coastal sage scrub habitat. Three pairs of gnatcatchers were observed during the survey.

Juniper Flats Biological Resources Assessment, Nuevo Development. Conducted a general biological resources assessment for the Juniper Flats property. The existing conditions were documented in order to assist in the development of a residential community.2003

Tonner Canyo Biological Resources Assessment n, City of Industry. Conducted a general biological resources assessment for the Tonner Canyon property. The existing conditions were documented in order to assist the City of Industry develop the property as well as maintain its biological integrity.

College Park Biological Resources Assessment, City of Upland. Conducted a biological resources assessment for a proposed residential development.

Century Vintage Homes Biological Resources Assessment, City of Yucaipa. Conducted a biological resources assessment for a proposed residential development.

Blue Stone Development Biological Resources Assessment, Community of Menifee, Riverside County. Conducted a biological resources assessment for a proposed residential development.

East Highland Ranch Property Biological Resources Assessment, Spring Pacific Properties, LLC. Conducted a biological resources assessment for a proposed residential development.

Arlington Heights Property Biological Resources Assessment, Hawarden Development Corporation, Riverside County. Conducted a biological resources assessment on the 70-acre project site for the Alessandro Arroyo for a proposed residential development.

Delhi Sands Flower-Loving Fly Habitat Assessment, LD King, City of Ontario. Conducted a habitat assessment for the Delhi sands flower-loving fly on a 25-acre parcel. The site was located in Delhi sands; however, due to the active cultivation of pasture lands, suitable habitat no longer exists at the site.

Riverside Fairy Shrimp Protocol Survey, Oliver Cagle, Riverside County. Conducted protocol wet season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on an old stock pond. No fairy shrimp were observed.

Riverside Fairy Shrimp Protocol Survey, Granite Homes, Riverside County. Conducted protocol dry season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on an old stock pond. Branchinecta and Streptocephalus cysts were observed.

Nevin's Barberry and Vail Lake Ceanothus Focused Survey, Realty Trust, Riverside County. Conducted focused surveys for Nevin's barberry and Vail Lake Ceanothus. No sensitive plants were observed during the survey.

Focused Burrowing Owl Survey, Granite Equities, French Valley Property. A focused survey was conducted on a 30-acre project site. Two pairs of burrowing owl were observed onsite and an additional two were observed off-site.

Agua Bella Property Burrowing Owl Focused Survey, Highland Fairview Properties, Riverside County. Conducted focused surveys for burrowing owl within a proposed residential development. No burrowing owls

were observed during the survey.

Bel Lago Property Burrowing Owl Focused Survey, Highland Fairview Properties, Riverside County. Conducted focused surveys for burrowing owl within a proposed residential development. A single pair of burrowing owls was observed during the survey.

Morgan Ranch Project Construction Monitoring for Pulte Homes, City of Temecula, Riverside County, California. Conducted construction monitoring to minimize impacts to drainage features for a residential development in Riverside County, California. Provided erosion control consultation for problem areas.

Lockmoor Development Project Construction Monitoring, Riverside County, California. Conducted construction monitoring to minimize impacts to drainage features for a residential development in Riverside County, California.

Arroyo Toad Surveys, Rio Santiago, Orange County, California. Conducted protocol surveys for arroyo toad at the Rio Santiago project site in the City of Orange. The surveys were conducted within Santiago Creek. No arroyo toads were observed on site.

Irvine Company Santiago Hills Estates Project Construction Monitoring. Conducted construction monitoring to minimize impacts to California gnatcatchers for a proposed residential development just south of Irvine Regional Park. Orange County, California.

Romoland South Site Burrowing Owl Focused Survey, Classic Pacific, Riverside County. Conducted focused surveys for burrowing owl within a proposed residential development. No burrowing owls were observed during the survey.

Romoland North Site Burrowing Owl Focused Survey, Classic Pacific, Riverside County. Conducted focused surveys for burrowing owl within a proposed residential development. No burrowing owls were observed during the survey.

Least Bell's Vireo Surveys, Armada LLC. Conducted a focused survey for Least Bell's Vireo for a proposed residential development just south of the City of Corona along Cajalco Road. Suitable habitat was observed and focused surveys were conducted. No Least Bell's Vireo were observed during the surveys.

California Gnatcatcher Surveys, City of Anaheim. Conducted protocol surveys in the Anaheim Hills area. The **Runkle Canyon Property Western Spade-foot Toad Focused Survey, California Greenpark Group, LLC.** Conducted a focused survey for the presence of western spade-foot toad. The survey was conducted at all suitable ponded areas located on the property. Western spade-foot tadpoles and adults were identified during the survey.

East Highland Ranch Property California Gnatcatcher Focused Surveys, Spring Pacific Properties, LLC. Conducted a focused survey for California Gnatcatchers on the property. Suitable habitat was observed and focused surveys were conducted. No Gnatcatchers was observed during the surveys.

Scale Broom Focused Survey, Lennar Homes. Conducted scale broom surveys to identify and assist in vegetation removal of scale broom, which is known to damage the foundations of new home construction. 400 to 500 plants were observed during the survey and herbicide application and vegetation removal was monitored for six months.

Riverside Fairy Shrimp Protocol Survey and Vegetation Monitoring, Rancho Diamante, Riverside County. Conducted protocol wet season surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on previous agricultural lands. Common fairy shrimp were observed. Also conducted vegetation monitoring on the restoration site associated with mitigation requirements on the site. Monitoring included a site visit and plant recordation.

Nesting Bird Survey, Brandywine Development, City of Orange. Conducted a nesting bird survey to determine if construction activity would affect any active bird nests protected under the migratory bird treaty act. A total of three active nests were observed during the survey.

California Gnatcatcher Focused Survey, Lewis Homes, City of Fontana. Conducted focused California gnatcatcher surveys on a 700-acre parcel proposed for residential development in the northeastern portion of the City of Fontana. No California gnatcatchers were observed during the survey.

Fagan Property Sensitive Plant Species Focused Survey, Shea Homes, Ventura County. Conducted a focused survey for listed plant species. No sensitive plant species were observed during the survey.

Broad-leaved Crownbeard Focused Plant Survey, Khalda Development, City of Laguna Beach. Conducted a 100% coverage survey for Broad-leaved Crownbeard (Verbesina dissita). Several plants were observed onsite and mapped. The project site was redesigned to avoid all impacts to the plant.

surveys were conducted on a 100-acre parcel of land that contained suitable coastal sage scrub habitat. One pair of gnatcatchers was observed during the survey.

California Gnatcatcher Surveys, Community of Three-Arch-Bay. Conducted protocol surveys for California gnatcatcher. The surveys were conducted on a 5-acre parcel of land that contained suitable coastal sage scrub habitat. The proposed project includes the expansion of an existing detention basin. No gnatcatchers were observed during the survey.

Quino Checkerspot Butterfly Habitat Assessment and Protocol Surveys, Armada LLC. Conducted a habitat assessment for a proposed residential development just south of the City of Corona along Cajalco Road. Suitable habitat was observed and focused surveys were conducted. No butterflies were observed during the surveys.

California Gnatcatcher Focused Surveys, Armada LLC. Conducted a focused survey for California Gnatcatchers for a proposed residential development just south of the City of Corona along Cajalco Road. Suitable habitat was observed and focused surveys were conducted. A single pair of Gnatcatchers was observed during the surveys.

Riverside Fairy Shrimp Protocol Survey, Greenpark Runkle Canyon LLC. Conducted protocol surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on one natural occurring vernal pool and two man-made vernal pools in order to determine presence/absence. The common Branchinecta lindahli was the only species of fairy shrimp observed in the sampling.

Cagney Property Site Sensitive Plants Focused Survey, Pulte Homes. Conducted focused surveys to identify any sensitive plant species within the site. No sensitive plant species were identified during the site visit.

California Gnatcatcher Surveys, Nuevo Development. Conducted protocol surveys in the unincorporated community of Nuevo. The surveys were conducted on a 250-acre parcel of land that contained suitable coastal sage scrub habitat. No gnatcatchers were observed during the survey.

Quino Checkerspot Butterfly Protocol Surveys (QCB), Century Crowell Communities, Riverside County. Conducted protocol surveys for the endangered QCB. The surveys were conducted in the Gavilan Plateau area that was once known to contain a large population of QCB.

School Projects

University of California Biological Resources Assessment, Irvine. Conducted a Biological Resources Assessment update for UC Irvine's Long Range Development Plan. The surveys were conducted to document existing conditions and to evaluate the remaining open space with respect to future development opportunities and constraints.

University of California Biological Resources Assessment, Irvine. Conducted three Biological Resources Assessments/Focused Species Surveys/Wetland Delineations for projects at UC Irvine involving the extension of a roadway in the east campus, and the expansion of student housing. The surveys were conducted to delineate the jurisdictional limits of United States Army Corps of Engineers waters of the U.S. and California Department of Fish and Game waters of the state.

Islander Park Biological Resources Assessment, University of California, Riverside. Conducted a biological resources assessment for the proposed expansion of the University of California, Riverside. The proposed project contains disturbed non-native vegetation. Several jurisdictional drainage features occurred onsite.

Radio Telemetry Gray Fox Surveys, California State University Fullerton. Used Radio Telemetry to track the local Gray Fox Population in Cleveland National Forest. Activity times and locations were entered into a GIS system to analyze home ranges and activity patterns.

Telecommunications Projects

NEPA Compliance/Telecommunication Facilities Biological Services, Various Sites in Southern and Central California. Served as a project biologist for a variety of telecommunication providers throughout southern and central California. Assisted compliance with the National Environmental Policy Act (NEPA) for the implementation of cellular communication facilities. This project included the preparation of NEPA compliance documents in accordance with the Federal Communication Commissions regulations pertaining to telecommunication facilities, in particular, biological surveys, including focused, sensitive species surveys and wetland delineations and permitting, construction monitoring, and arborist surveys.

Millwood Property California Gnatcatcher Focused Survey, Cingular, Orange County. Conducted focused surveys for California gnatcatcher within a proposed cellular communication facility in the City of Lake Forest. Two pairs of gnatcatchers were observed during the survey.

Sprint PCS Construction Monitoring at Laguna Canyon Cell Site. Conducted construction monitoring to minimize impacts to California gnatcatchers for a Cellular communications facility in the Laguna Canyon. Orange County, California.

Sprint PCS Construction Monitoring at Avila Beach Cell Site. Conducted construction monitoring to minimize impacts to strait-awned spineflower and Brewer's spineflower for a Cellular communications facility in Avila Beach. San Lois Obispo County, California.

Laguna Canyon California Gnatcatcher Focused Survey, AT&T, Orange County. Conducted focused surveys for California gnatcatcher within a proposed cellular communication facility west of State Highway 133. Two pairs of gnatcatchers were observed during the survey.

California Gnatcatcher Surveys, Sprint, City of Camarillo. Conducted protocol surveys for California gnatcatcher. The surveys were conducted on a 10-acre site adjacent to an orchard that contained suitable coastal sage scrub habitat. No gnatcatchers were observed during the survey.

California Gnatcatcher Surveys, Cingular, City of Glendale. Conducted protocol surveys for California gnatcatcher. The surveys were conducted on a 10-acre water tank site that contained suitable coastal sage scrub habitat. No gnatcatchers were observed during the survey.

Tonner Canyon California Gnatcatcher Focused Survey, Sprint PCS. Conducted focused surveys for California gnatcatcher within a proposed cellular communication facility along the southern portion of Tonner Canyon. No gnatcatchers were observed during the survey.

La Tuna Canyon California Gnatcatcher Focused Survey, Cingular, Los Angeles County. Conducted focused surveys for California gnatcatcher within a proposed cellular communication facility north of State Highway 210, Los Angeles County. No gnatcatchers were observed during the survey.

Laguna Canyon California Gnatcatcher Focused Survey, Cingular, Orange County. Conducted focused surveys for California gnatcatcher within a proposed cellular communication facility west of State Highway 133. Two pairs of gnatcatchers were observed during the survey.

Desert Tortoise Protocol Survey, Cellular Site, City of Mojave. Conducted a zone of influence survey to determine possible impacts to desert tortoise populations with regard to the development of a cellular-phone utility pole site near the city of Mojave. No tortoises or sign of tortoises were observed during the survey.

Desert Tortoise Protocol Survey, Cellular Site, Antelope Valley. A zone of influence survey was conducted to determine possible impacts to desert tortoise populations with regard to the development of a cellular-phone utility pole site in Antelope Valley. No tortoises or sign of tortoises were observed during the survey.

Trails and Recreation Projects

Biological Resources Assessment for an IS/MND for a Trails Project in Los Angeles County. Conducted a biological resources assessment on a 3-mile trail system in the unincorporated community of Avocado Heights, Los Angeles County. The information was used to prepare a IS/MND CEQA document. 2008

Quail Lake Spring Surveys Project. Conducted spring surveys for a proposed project with SEA #58 south of Quail Lake. Prepared the final Constraints analysis for submittal to the SEATAC for review and recommendation. Coordinated project design to reduce amount of potentially significant impacts. (2002-2005)

Glen Helen Specific Plan Biological Services, San Bernardino County. Assisted in the preparation of a Specific Plan for Glen Helen in the Community of Devore. Prepared biological resources assessment incorporating several years of biological surveys.

Seal Beach Multi-Use Trail Biological and Jurisdictional Assessment, W.G. Zimmerman Engineering. Conducted a wetland delineation and biological resources assessment for the installation of a multi-use trail system.

Wildlife Movement Corridor Study, Los Angeles and Orange Counties. Conducted a year-long study of wildlife movement within the Tonner Canyon property in the Los Angeles and Orange Counties. Surveys included spot counts for birds, scent stations for tracks, and photo stations for active wildlife movement photographs. The survey was conducted for a 5-day period once a month for an entire year. 2007 to 2008.

Native Plant Collection, City of Anaheim. Collected, identified and mounted all observed plant in the 60-acre nature center. The plants were collected in coastal sage scrub, chaparral, and oak woodland habitats. This collection will be used as a reference for the general public.

Deer Canyon Project Construction Monitoring, City of Anaheim. Completed a pre-construction walk-over the proposed impact area. No California gnatcatchers were observed during the survey.

O'Neal Park Arroyo Toad Focused Surveys, County of Orange. Conducted focused surveys for Arroyo Toad for a proposed sewer line within the campground portion of O'Neal Park.

Riverside Fairy Shrimp Habitat Assessment, Enviro-recycling, City of Hemet. Conducted a habitat assessment for Riverside Fairy Shrimp. The ponded area onsite was created by continual off-road vehicle use on an existing dirt access road. The ponded area did not support any fairy shrimp species.

Southwestern Pond Turtle Habitat Assessment, Los Angeles Department of Public Works. Assisted in habitat assessment for the southwestern pond turtle in five locations within the upper west fork and east fork of the San Gabriel River system. The surveys consisted of walking the stream course and evaluating suitable aquatic habitat as well suitable refugia and basking sites.

Southwestern Pond Turtle Trapping/Telemetry, Los Angeles County Department of Public Works. Assisted in trapping southwestern pond turtles in the San Gabriel water shed prior to the sluicing of Morris Dam. A total of twelve turtles were captured, processed, fitted with a radio telemetry transmitter, and relocated in the upper west fork of the San Gabriel River. Turtles were then monitored bi-monthly for movement and recaptured to determine health and status of each individual.

Southwestern Pond Turtle Trapping, Los Angeles County Department of Public Works. Assisted in trapping southwestern pond turtles in the Aliso Creek Channel, a tributary to Aliso Creek. A total of thirty nine turtles were captured, measured, and relocated further downstream in the Aliso Creek system. Also assisted in surveying for hatchling turtles in the upland portion of the study site and construction monitoring near the edge of the undrained pond. Assisted in surveying the drained pond for juvenile pond turtles.

Transportation Projects

Pala Road Biological Resources Assessment, City of Temecula. A biological resources assessment was conducted on portion of Pala Road in the City of Temecula. The existing conditions were documented as part of the Pala Road expansion Project.

Needles Highway Expansion Biological Resources Assessment, San Bernardino County. Conducted a biological resources assessment for the proposed expansion and realignment of Needles Highway between the City of Needles and the City of Laughlin, California for the San Bernardino County Department of Public Works. The survey was conducted to determine suitable habitat for Arizona vireo, Vermillion flycatcher, brown flycatcher, summer tanager, elf owl, and gila woodpecker.

Focused Surveys for Desert Tortoise, WZI Engineering. Conducted a focused survey for desert tortoise for the proposed expansion of Ridgecrest Road in the northern portion of the City of Ridgecrest. No desert tortoise or desert tortoise sign was observed during the survey.

Santa Ana River Channel Bat Species Focused Survey, City of Santa Ana. Conducted focused surveys for bat species within four proposed bridge expansion projects within the Santa Ana River Channel. No bats were observed during the survey.

Riverside Fairy Shrimp Protocol Survey, County of Orange. Conducted protocol surveys for the federally endangered Riverside Fairy Shrimp. The surveys were conducted on two natural occurring and one man-made vernal pool as part of a mitigation site for the Antonio Parkway extension.

El Segundo Blue Butterfly (ESB) Protocol Surveys, Los Angeles World Airport. Conducted block-count surveys for the endangered ESB. These surveys were conducted to determine the status of the existing ESB population in the dune system west of the airport. Thousands of butterflies were identified during the survey.

California Gnatcatcher Focused Survey, County of Orange. Conducted focused surveys for California gnatcatcher within a proposed bridge expansion project site for the widening of an Antonio Parkway bridge. No gnatcatchers were observed during the survey.

Antonio Expansion Endangered Riverside Fairy Shrimp Protocol Surveys, County of Orange. The surveys were conducted at the vernal pool mitigation site. The pool had been previously inoculated from a vernal pool that had known populations of fairy shrimp.

Pacific Pocket Mouse Focused Surveys, Transportation Corridor Authority. Assisted in trapping for pacific pocket mouse along the north side of Camp Pendleton in known pacific pocket mouse habitat. The trapping effort consisted of approximately 6,900 trap-nights. A total of 8 individuals were trapped, processed, and released during the three weeks of trapping.

El Segundo Blue Butterfly Block Counts, Los Angeles World Airport. Assisted in the block counts for the El Segundo Blue Butterfly. Each block was systematically surveyed and all butterflies observed were counted. Field experience gained during the survey allowed Mr. Crawford to obtain an individual 10A(1)a permit.

BNSF Railroad ROW Construction Monitoring at the Orange and Riverside County Boundary. Conducted construction monitoring within occupied California gnatcatcher habitat along the gnatcatchers were flushed out of the brush during drilling efforts. The gnatcatchers were monitored to determine presence and location throughout the day. Several gnatcatchers were observed during construction.

Water, Wastewater, and Stormwater Projects

Bauer Environmental Services, San Bernardino County. Updated Biological Opportunities and Constraints Analysis for the Master Plans of water supply and water distribution for the City of Chino Hills in San Bernardino County, California.

Storm Drain Repair Project Biological Resources Assessment, City of San Clemente. Conducted a biological resources assessment for a storm drain repair project located in the City of San Clemente. The proposed project contains disturbed ruderal and landscape vegetation. No jurisdictional drainage features occurred onsite.

Los Virgenes Water District Feasibility Studies and Surveys. Conducted feasibility studies and reconnaissance-level surveys on several project alternatives within Ventura and Los Angeles County, Las Virgenes water District. Aided in developing the impacts and recommended mitigation measures in the biological section for the EIR.

Two-stripe Garter Snake Surveys, Los Angeles County Department of Public Works. Assisted in surveying for the two-stripe garter snake in the San Gabriel water shed prior to the sluicing of Morris Dam. Los Angeles Department of Public Works. Surveys were conducted by walking along the banks of the stream course and surveying in suitable garter snake habitat.

Arroyo Toad Surveys, Los Angeles County Department of Public Works. Assisted in surveying for Arroyo Toad in the Big Tujunga wash as part of a habitat comparison study for potential mitigation measures for impacts associated with the sluicing of Morris and San Gabriel Dams along the San Gabriel River Channel. No arroyo toads were observed.

Santa Susana Tarplant Focused Plant Survey, Sprint PCS, City of Chatsworth. Conducted a 100% coverage survey for the Santa Susana tarplant *(Hemizonia minthornii).* The site was located within an existing water tank facility that has previously mitigated for impacts to the species. The plants were mapped and project redesign was recommended to avoid impacts to the species.

Southwestern Pond Turtle Trapping, Los Angeles County Department of Public Works. Assisted in trapping southwestern pond turtles at Sawpit Dam. Due to the rough terrain of the site, traps were set using a boat to get to the remote portions of the reservoir. No pond turtles were observed during the trapping session.

Hollywood Underground Reservoir Restoration Monitoring. Conducted restoration monitoring for the Hollywood reservoir underground storage facility. Assisted in erosion control installation and conducted annual transects to determine percent coverage of the restoration sties.

Pipeline Compliance Inspections, Federal Energy Regulatory Commission, Western US. Conducted site inspections of natural gas pipeline right-of-ways throughout the western United States. The purpose of these inspections is to evaluate natural gas pipeline companies' compliance with the environmental conditions of the Commission's order for the subject project. Inspection reports are prepared to describe existing conditions and to offer recommendations to correct any problem areas or areas of non-compliance observed during the inspection.

Garden Grove Channel Construction Monitoring, Huntington Beach. Conducted construction monitoring to minimize impacts to drainage feature and adjacent wetlands for a levee reinforcement project along the East Garden Grove Wintersburg Channel, in California.

Wetland Delineations

- **Yaqui Pass Project Site, AMG & Associates LLC, San Diego County.** 33-acre property.
- **Palm Canyon Project Site, AMG & Associates LLC, San Diego County.** 5.24-acre property.
- **Eagle Valley Ranch Project Site, Eagle Valley Ranch Developers LLC, Riverside County.** 780-acre property.
- **Morgan Ranch Project Site, Sage Communities Inc, Tehama County.** 130-acre property.
- **Wildomar Project Site, South Coast Communities, Riverside County.** 80-acre property.
- **Randal Street Bridge, County of Orange, Orange County.** Proposed bridge replacement over an unnamed drainage feature.
- **Fullerton Ranch, Dunmore Homes, Placer County.** Proposed residential development.
- **City of Bakersfield, Kern County.** Off-road vehicle use park.
- **Nevada Hydro, Riverside County.** Conducted wetland delineation for two proposed reservoir locations in the Cleveland national Forest.
- **Classic Pacific, City of Lake Elsinore**. Conducted wetland delineation for a proposed residential development east of Interstate 5.

- **Vineyard Property, Pacific First Capital Group, Riverside County.** Conducted wetland delineation for a proposed residential development in Riverside County California.
- **Fahrens Creek Property, D.R. Horton, Merced County.** Conducted wetland delineation for a proposed residential development in the City of Merced, Merced County California.
- **Bolsa Chica Wash, Riverside County.** Conducted wetland delineation for the reinforcement of Bolsa Chica Channel within an existing golf course.
- **Jefferson Plaza, Real Estate Affiliates Inc, Riverside County.** Conducted wetland delineation for a proposed commercial development adjacent to the White Water River in the City of La Quinta.
- **De Anza Property, Northwest Pipe Company, Riverside County.** Conducted wetland delineation for a proposed residential development.
- **Mead Valley Property, Granite Equities.** A jurisdictional delineation was conducted on a 60-acre project site. The existing conditions were documented in order to assist in the development of a future residential development.
- **S & D Dairy Wetland Delineation, Shea Homes, Riverside County.** Conducted wetland delineation for a proposed residential development.
- **Calimesa Property, Kehl Group LLC, Riverside County.** Conducted wetland delineation for a proposed residential development.
- **Bel Lago Property, Highland Fairview Properties, Riverside County.** Conducted wetland delineation for a proposed mixed use community.
- **Rancho Diamante Project, City of Hemet, Riverside County.** Conducted wetland delineation for a proposed residential development.
- **Pala Road Expansion, City of Temecula.** Conducted a jurisdictional delineation as part of the Pala Road expansion Project.
- **Oak Hills Project, Alpine Real Property Equity Group Inc, San Bernardino County**. Conducted wetland delineation for a proposed residential development.
- **Salt Creek Extension Realignment Project, Arcon Homes, Riverside County.** Conducted wetland delineation for a proposed road extension project.
- **Tri-Lake Consultants, Riverside County.** Conducted wetland delineation for a proposed road expansion project.
- **Sunrise Communities, City of Fullerton.** Conducted wetland delineation for a proposed retirement facility development.
- **Chandler Street, KB Homes, Riverside County.** Conducted wetland delineation for a proposed residential development.
- **Courdures LLC, City of Perris.** Conducted wetland delineation for a proposed residential community.
- **Armada LLC, City of Cabazon.** Conducted wetland delineation for a proposed residential community.
- **Aware Property, City of Hesperia.** Conducted wetland delineation for a proposed commercial facility.
- **Wal-Mart, City of Hesperia.** Conducted wetland delineation for a proposed Wal-Mart facility.
- **Etiwanda School District, City of Rancho Cucamonga.** Conducted wetland delineation for a proposed school facility north of Interstate 10.

- **Classic Pacific, City of Beaumont.** Conducted wetland delineation for a proposed residential development south of State Route 60.
- **O'Neal Park, County of Orange.** Conducted wetland delineation for a proposed sewer line within the campground portion of O'Neal Park.
- **Palm Meadows, Riverside County.** Conducted wetland delineation for a proposed residential development adjacent to the Santa Ana River Channel.
- **Knowleton Communities, City of Corona.** Conducted wetland delineation for a proposed residential development.
- **Fairfield Residential LLC, City of Redlands.** Conducted wetland delineation for a proposed residential development.
- **Hawarden Development Corporation, Riverside County.** Conducted a jurisdictional delineation for Tentative Tract 31799, a proposed residential development.
- **Hawarden Development Corporation.** Tentative Tract 32270. Riverside County. Conducted a jurisdictional delineation for a proposed residential development.
- **Lennar Homes, City of Norco, California.** Conducted wetland delineation for a proposed residential development.
- **Century Vintage Crowell, Rolling Hills Ranch. City of Devore. California.** Conducted wetland delineation for a proposed residential development.
- **Armada LLC, Cajalco Road, Riverside County, California.** Conducted wetland delineation for a proposed residential development.
- **City of Industry, Brea Wash, California.** Conducted wetland delineation for a proposed commercial development in the City of Industry, just south of Grand Avenue.
- **City of Industry, San Jose Creek Tributary, California.** Conducted wetland delineation for a proposed commercial development in the City of Industry, just south of Grand Avenue and east of Valley Boulevard.
- **Prologis Trust, City of Moreno Valley. California.** Conducted a wetland delineation on a 74.81-acre property located the City of Moreno Valley, Riverside County. The proposed project included a single-family residential development.
- **Pulte Homes, Cagney Property, California.** Conducted wetland delineation for a proposed residential development in an unincorporated portion of Riverside County.
- **County of Orange, California.** Conducted wetland delineation for a proposed bridge expansion project site for the widening of an Antonio Parkway bridge.
- **Century Vintage Crowell, Gavilan Hills, California.** Conducted wetland delineation for a proposed residential development.
- **LaCadena Construction. California.** Conducted wetland delineation for a proposed residential development.
- **Century Crowell Communities. City of Banning, Riverside County.** Conducted a wetland delineation for a 450-acre Project Site for a proposed residential development.
- **Guthrie Development. Tentative Tract 27824. Riverside County.** Conducted a wetland delineation for a 250-acre Project Site for a proposed residential development.

- **Spring Pacific Properties, LLC.** Conducted wetland delineation on the East Highland Ranch Property for a proposed residential development.
- **Environ Wind Development Corporation.** Commercial WECS Permit No. 99 Christensen/Lazar Project. Unincorporated Riverside County. Conducted wetland delineation for a proposed wind energy project near Palm Springs.
- **Hawarden Development Corporation. 70-acre Arlington Heights Property. Riverside County.** Conducted a jurisdictional delineation of the Alessandro Arroyo for a proposed residential development.
- **Blackmon Homes, Inc. Tentative Tract Map 29507. Lake Elsinore, Riverside County, California.** Conducted a jurisdictional delineation for a proposed 90-acre residential development.
- **Van Daele Development. City of Riverside,** Conducted a wetland delineation for the 60-acre project site. Assisted in 404 and 1601 permit process.
- **VTN Development. City of Menifee.** Conducted a wetland delineation for the 80-acre project site. Assisted in 404 and 1601 permit process.
- **Palo Comado Ranch Partnership. City of Agoura Hills.** Conducted a wetland delineation for Tentative Tract Map 52396. Assisted in 404 and 1601 permit process, 2000.
- **Ascension Cemetery Expansion in Lake Forest.** Conducted Wetland Delineation for proposed expansion and assisted in the permit process.
- **Century Crowell Communities. Gavilan Hills, Riverside County.** Conducted a wetland delineation for the 300-acre project site. Assisted in 404 and 1601 permit process.
- **Imperial Highway Expansion Project - City of Yorba Linda.** Conducted a wetland delineation and habitat assessment for the 4 miles expansion project. Assisted in 404 and 1601 permit process.
- **Greenpark Runkle Canyon LLC.** Conducted wetland delineation on a 580-acre site in the City of Simi Valley (Greenpark Ranch). The survey was conducted to reevaluate a delineation completed in 1990. The delineation was mapped with the aid of the GS50 backpack GPS unit and GIS software.
- **Spring Mountain Ranch.** Conducted wetland delineation on a 800-acre site near the City of Riverside. The survey was conducted to evaluate the jurisdictional areas within the project site. The information was used to support the submitted EIR. The delineation was mapped with the aid of GIS software.
- **Level 3.** Conducted wetland determinations for all drainages within the vicinity of a proposed fiber-optic cable right-of-way. The determination was conducted from the City of Tehachapi to Bakersfield along farm roads and railroad right-of-ways. The information was used by the project engineers to determine exact location of the right-of-way.
- **City of Santa Ana.** Conducted a wetland delineation for Bristol Street Bridge Crossing Expansion project. Assisted in 404 and 1601 permit process.
- **City of Santa Ana.** Conducted a wetland delineation for the Memory Lane Bridge Expansion project. Assisted in 404 and 1601 permit process.
- **P&F Investment Company, Limited,** Conducted a jurisdictional delineation for the proposed residential development on the Woodcrest Property. The information was used by the project engineers to determine exact location of the individual residential pads.

Professional Affiliations

- The Wildlife Society

Research and Publications

Masters Thesis, Social Behavior of the Zebra-tailed Lizard, California State University, Fullerton. Was responsible for the creation of an independent thesis study. The study was done on the zebra-tailed lizard, which lives in a desert wash community. This study will help in the conservation of this lizard in the event of massive habitat destruction due to off-road vehicles.

Tree Survey Report
for the Amberwood Project
City of Wildomar, Riverside County, California

Prepared for:

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Contact: Diana Lloyd, Certified Arborist, Biologist

Michael Brandman Associates

Report Date: December 17, 2012

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SECTION 1: INTRODUCTION

This report presents the results of a tree inventory survey conducted by First Carbon Solutions-Michael Brandman Associates (MBA) for the Amberwood Project located in the City of Wildomar, County of Riverside, California. The arborist survey is consistent with scientific and professional standards accepted by the International Society of Arboriculture (ISA). This report provides identification, location, and size of trees within the project impact area. This tree survey is required for activities associated with development of the site. The survey and report adhere to all applicable standards of the International Society of Arboriculture (ISA) and is in accordance with the City of Wildomar's request for the tree survey.

1.1 - SURVEY AREA LOCATION

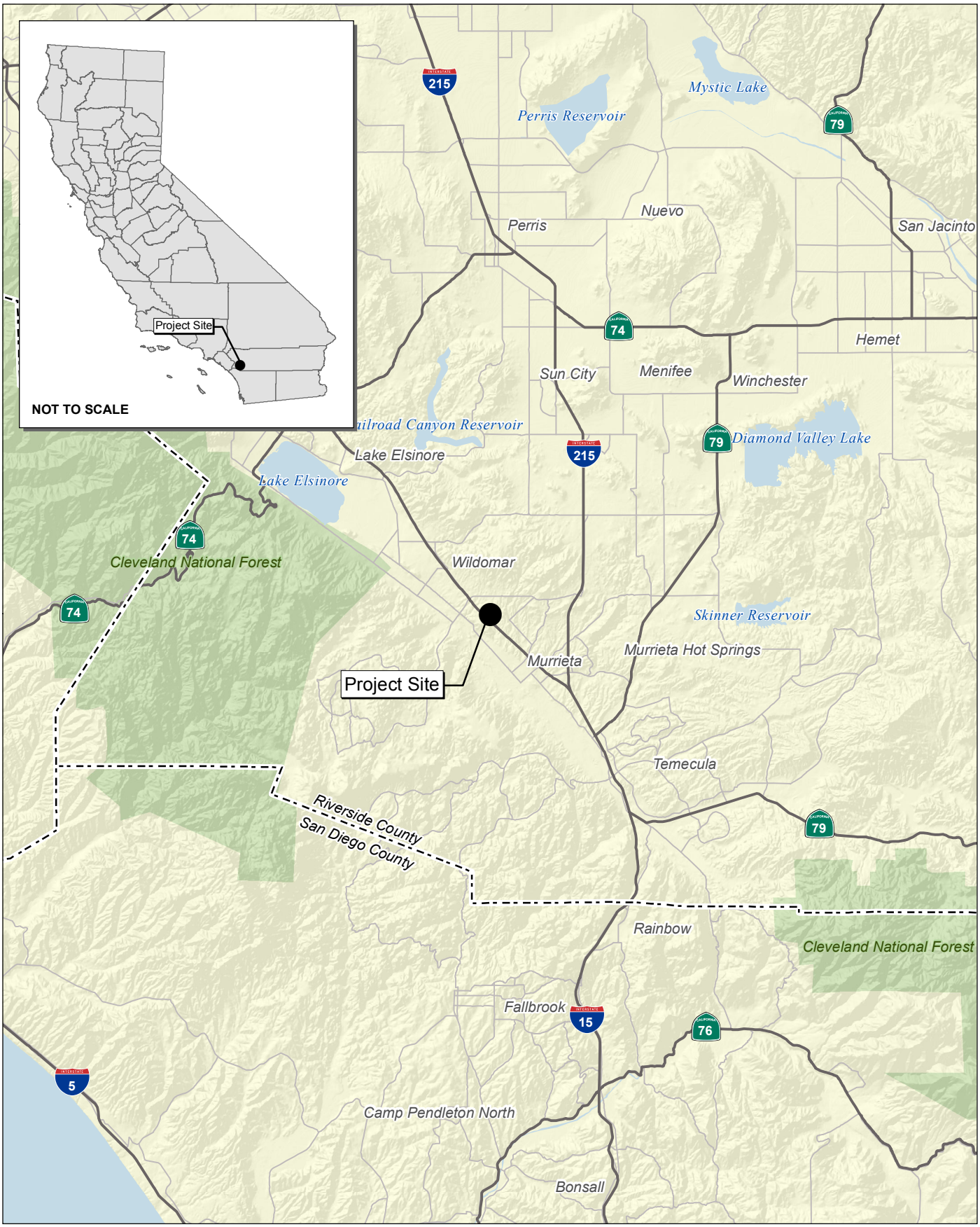
The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, in the southern portion of the City of Wildomar, Riverside County, California (Exhibit 1). The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kennadine Drive, and west of Elizabeth Lane (Exhibit 3).

The survey area within the project site includes trees planted within grading areas and within 50 feet of grading areas.

1.2 - ENVIRONMENTAL SETTING

The project site covers 24 acres and is situated on a disturbed rural slope with an elevation of approximately 1,300 feet above mean sea level (MSL). Portions of the project site contain previously developed rural residences that have been recently torn down (2011) as required by the City of Wildomar. Some of the trees surveyed are non-native ornamental or fruit trees that were part of the landscaping around the previously existing residences. Other trees on the site are associated with southern cottonwood-willow riparian forest in a drainage feature.

The project site is bounded by residential development to the southeast, commercial and industrial development to the west and northwest, and natural open space with several dirt access roads to the north and south.



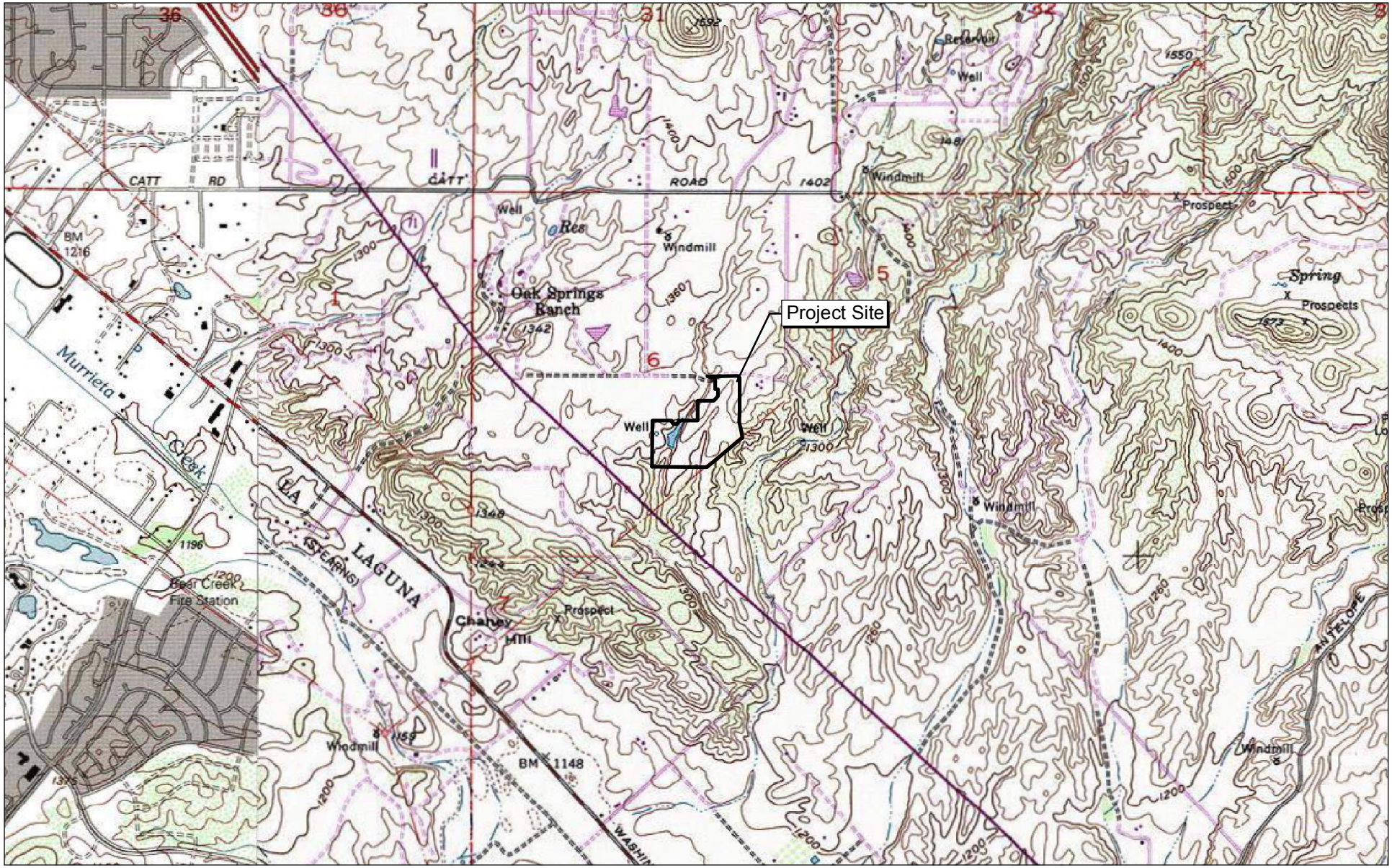
Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

NORTH

5 2.5 0 5 Miles

Michael Brandman Associates

Exhibit 1
Regional Location Map



Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

NORTH

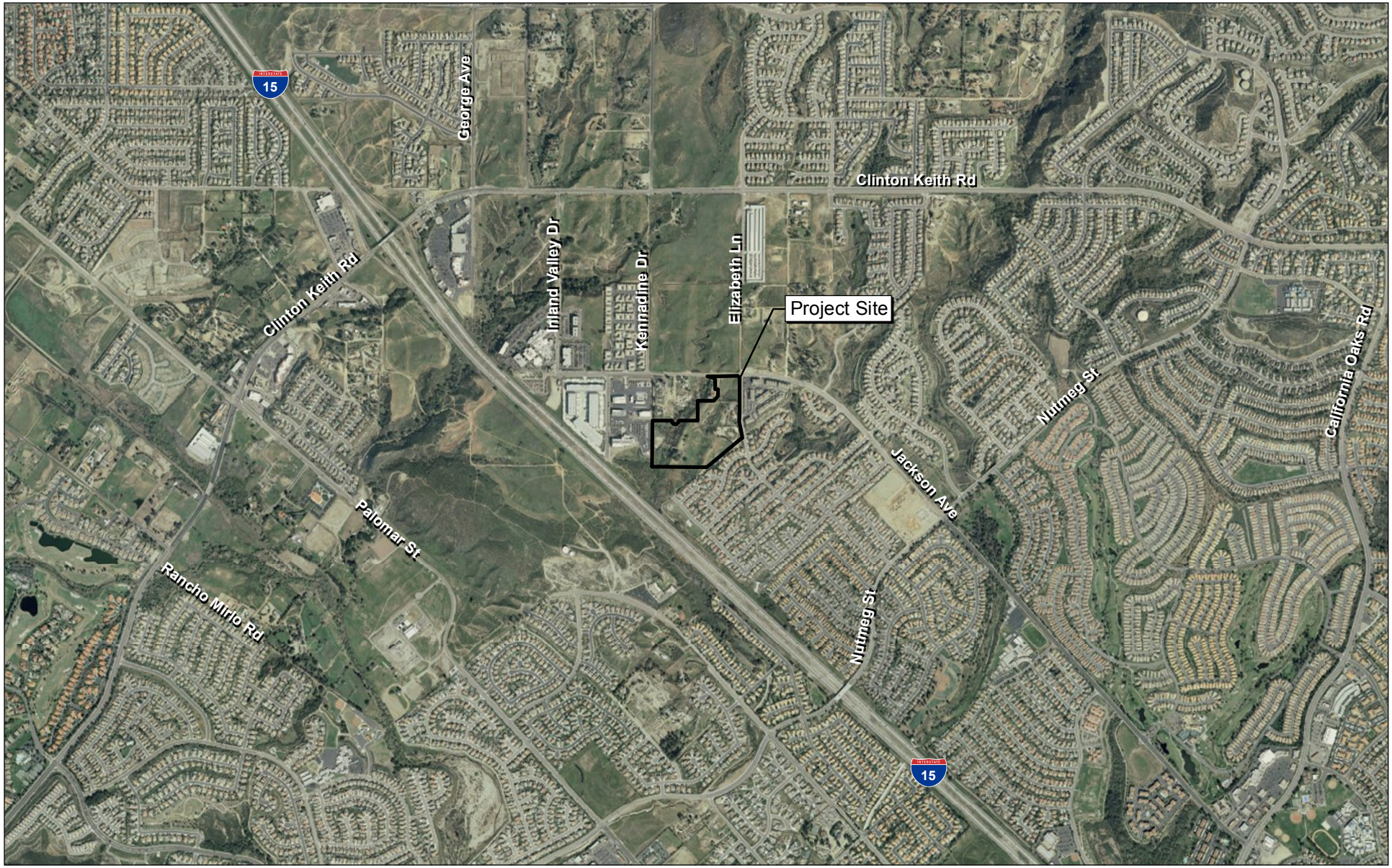
2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560078 • 122012 | 2_local_topo.mxd

Exhibit 2
Local Vicinity Map
Topographic Base



Source: ESRI Aerial Imagery.

Exhibit 3
Local Vicinity Map
Aerial Base

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

21560078 • 12/2012 | 3_local_aerial.mxd

SECTION 2: METHODOLOGY

Prior to the tree survey in the field, reference materials such as aerial photography, the Murrieta USGS topographic map, and applicable local policies regarding tree protection were reviewed.

The tree survey was conducted by MBA biologist Scott Crawford and certified arborist Diana Lloyd (ISA No. WE-8790A) on December 11 and 12, 2012.

The survey was conducted on foot to survey all trees in the survey area. The survey area includes the project development footprint, which includes all grading areas and any offsite disturbance, as well as a 50-foot buffer surrounding the development footprint. For the purpose of this report, "tree" is defined as: a woody perennial plant, typically having a single trunk and bearing lateral branches at some distance from the ground. Trees with a trunk greater than 4 inches in Diameter at Breast Height (DBH; 1.3 meters or 4.5 feet from the ground) were surveyed, however, trees with a trunk less than 4 inches in DBH and shrubs were not surveyed. Shrubs include plants that are greatly branched from the base with none of the stems reaching 4 inches in DBH. For woody trees having multiple trunks, the DBH of each trunk was recorded and summed, per standard arborist practice. The Italian cypress trees (*Cupressus sempervirens*) on the site had foliage very low on the trunk, therefore, the trunk diameter of these trees could only be measured beneath the green foliage near the base of the trunk.

The City of Wildomar is particularly interested in impacts to any mature trees and oak trees. The City of Wildomar defines a "mature tree" as having a DBH of greater than 9.5 inches.

For identification, a round, numbered aluminum tag was nailed at the base of each tree on the north side; if the north side of the tree was inaccessible, the most accessible direction was tagged. Tree numbers used during the survey include 298 to 347, and 401 to 479; three trees do not have a tag due to inaccessibility beyond a fence, but were mapped.

The location of each tree was mapped using a Trimble GeoXT Global Positioning System (GPS) hand-held unit. This unit provides sub-meter accuracy in real-time. The tree location map was prepared using the digital data collected in the field (Exhibit 4).

The following data was recorded for each tree during the field survey:

- Tag number
- Tree species
- DBH
- Trunk location

Source: ESRI Aerial Imagery. MBA 2012

115 57.5 0 115 Feet

NORTH

Michael Brandman Associates

21560078 • 12/2012 | 4_Tree_LocationI.mxd

Exhibit 4
Tree Location Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
ARBORIST REPORT

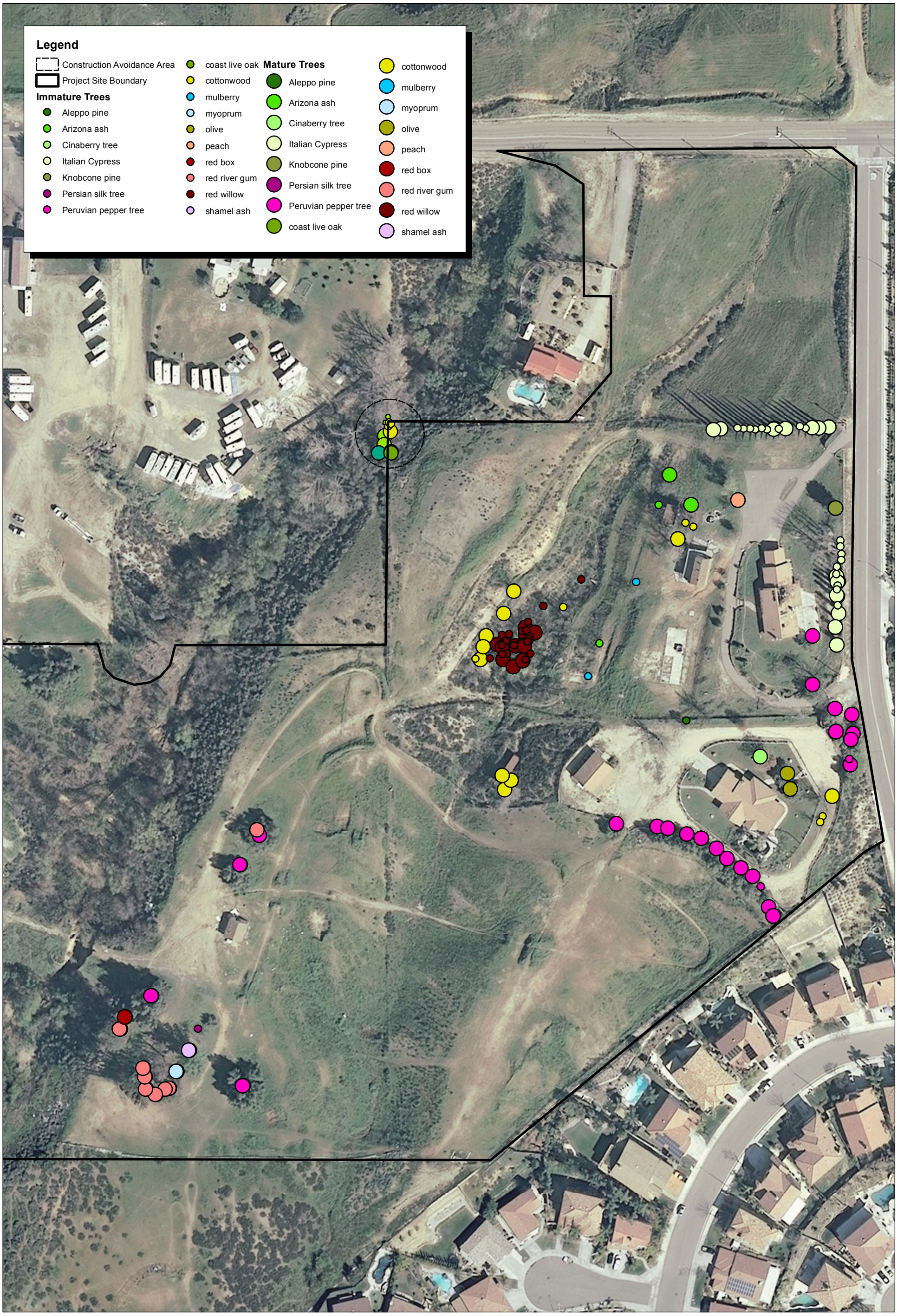
SECTION 3: RESULTS

The project site was previously used as a residential development, but has recently been abandoned. The houses have been demolished, however, many of the mature landscaped trees remain. Weed abatement activities has also caused recent disturbance to the project site. A total of 133 trees were mapped on the site, of which 78 are classified as "mature trees" (greater than 9.5" DBH). One Coast live oak overhangs onto the project site, but would be preserved.

Appendix A provides the tree survey data table with details on all of the trees surveyed within the survey area including which would be preserved and which would be removed. Appendix B provides more detailed maps depicting each tree's location and tag number. Table 1 below, summarizes the total quantity of each species of tree surveyed within the project site, including whether the tree is considered a mature tree by the City of Wildomar, and is shown in Exhibit 5.

Table 1: Summary of Tree Species in the Survey Area

Common Name	Botanic Name	Quantity Observed	Quantity of Mature Trees by Species
Albizia julibrissin	Persian silk tree	1	0
Cupressus sempervirens	Italian cypress	31	13
Eucalyptus camaldulensis	Red river gum	8	8
Eucalyptus polyanthemus	Red box	1	1
Fraxinus velutina	Arizona ash	4	2
Fraxinus uhdei	Shamel ash	1	1
Melia azedarach	Chinaberry	1	1
Morus alba	White mulberry	2	1
Myoporum laetum	Ngaio	1	1
Olea europa	Olive	2	2
Pinus attenuata	Knobcone pine	1	1
Pinus halapensis	Aleppo pine	1	0
Populus fremontii	Freemont cottonwood	22	12
Prunus persica	Peach	1	1
Quercus agrifolia	Coast live oak	1	1
Salix laevigata	Red willow	30	10
Schinus molle	Peruvian pepper	25	23
Total		**133**	**78**



Source: ESRI Aerial Imagery. MBA 2012

Michael Brandman Associates

NORTH

115 57.5 0 115 Feet

21560078 • 12/2012 | 5_Species_Location_Map.mxd

Exhibit 5
Species Location Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
ARBORIST REPORT

SECTION 4: REGULATORY FRAMEWORK

The City of Wildomar only regulates the trimming or removal of trees on public rights-of-way, not on private property. However, in the City's revised letter (November 28, 2012) regarding the planning application for this development, the City specifically requested the following:

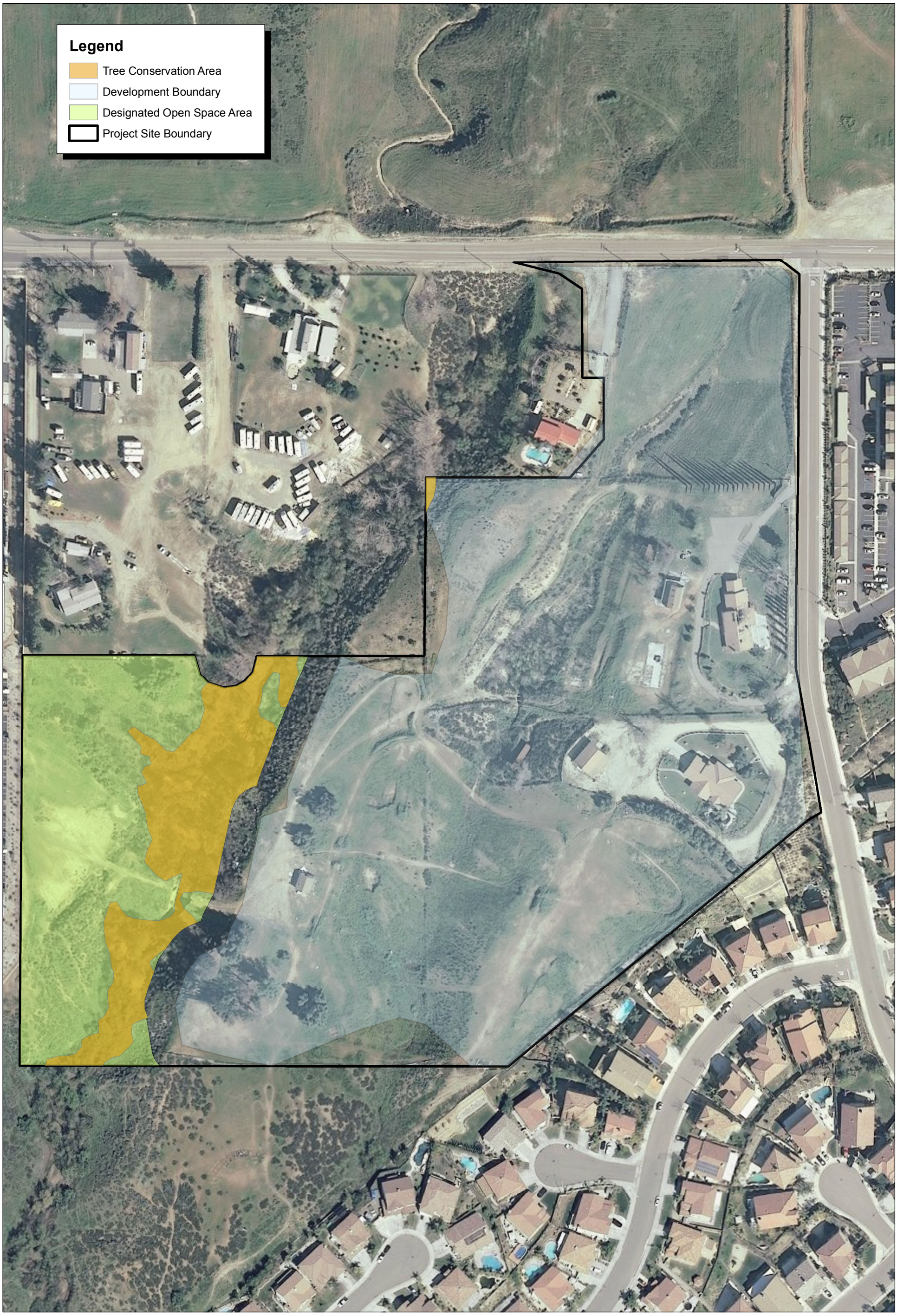
1. Specify whether there are any existing mature trees with a trunk caliper over 9.5 inches or whether there are any *Quercus agrifolia* (coast live oak) on the property. If any are existing, label their locations, trunk caliper, species, whether they will be removed or preserved. If none exist, specify it.
2. Please provide a tree preservation plan that identifies all trees within the project boundary and indicates trees that will be saved and incorporated into the project design.
3. Label all existing tree species, and trunk caliper for all trees within 50 feet of and within the off-site grading areas.

SECTION 5: FINDINGS

There are no coast live oaks within the project site. There is one coast live oak tree located within the 50-foot buffer area (Appendix B-1). The canopy of this oak tree overhangs onto the project site in the northwest corner of the site immediately south of the adjacent property owner. This oak tree would not be removed during project construction, but would be preserved in the designed open-space area west of the project site.

All of the native and non-native trees within the development boundary would be removed, except for the small group of trees in the northwestern corner of the project site, immediately north of the coast live oak. These trees are also located within the 50-foot buffer area. Five Freemont cottonwood trees would also be avoided during construction and preserved in the designated open-space area.

The remaining trees within the project site would be conserved within the designated open-space (Exhibit 6). At the direction of the City of Wildomar staff, the trees within the conservation area were not included in this tree report. Based on the previous surveys of the project site, the estimated number of trees within the conservation area is well over 230 individuals. The riparian habitat associated with the conservation area contains a mix of mature trees and immature saplings. Tree species include Fremont cottonwood, red willow, arroyo willow, black willow, and coast live oak.



Source: ESRI Aerial Imagery. MBA 2012

Michael Brandman Associates

NORTH

200 100 0 200

Feet

Exhibit 6
Tree Conservation Area

SECTION 6: REFERENCES

Bassi, M.C. on behalf of the City of Wildomar. 2012. Letter to Ms. Jarnne' Valdez, regarding Planning Application No. 12-0364 (Lennar Residential Project). November 15; revised November 28.

U.S. Geological Survey. 1975. 7.5' Murrieta, Quadrangle California [map]. 1:24,000. 7.5-minute Series. Washington D.C.

Appendix A:
Tree Survey Data Table

Appendix B:
Detailed Inset Maps

Source: ESRI Aerial Imagery. MBA 2012

Michael Brandman Associates

NORTH

120 60 0 120

Feet

21560078 • 12/2012 | Appendix_Graphics.mxd

Appendix B
Tree Location Index Map

Source: ESRI Aerial Imagery. MBA 2012

Michael Brandman Associates

NORTH

50 25 0 50

Feet

21560078 • 12/2012 | Appendix_B-1.mxd

Appendix B-1
Tree Location Map

LENNAR HOMES, INC. • AMBERWOOD PROJECT
ARBORIST REPORT

Source: ESRI Aerial Imagery. MBA 2012

Michael Brandman Associates

NORTH

50 25 0 50 Feet

Appendix B-2
Tree Location Map

Source: ESRI Aerial Imagery. MBA 2012

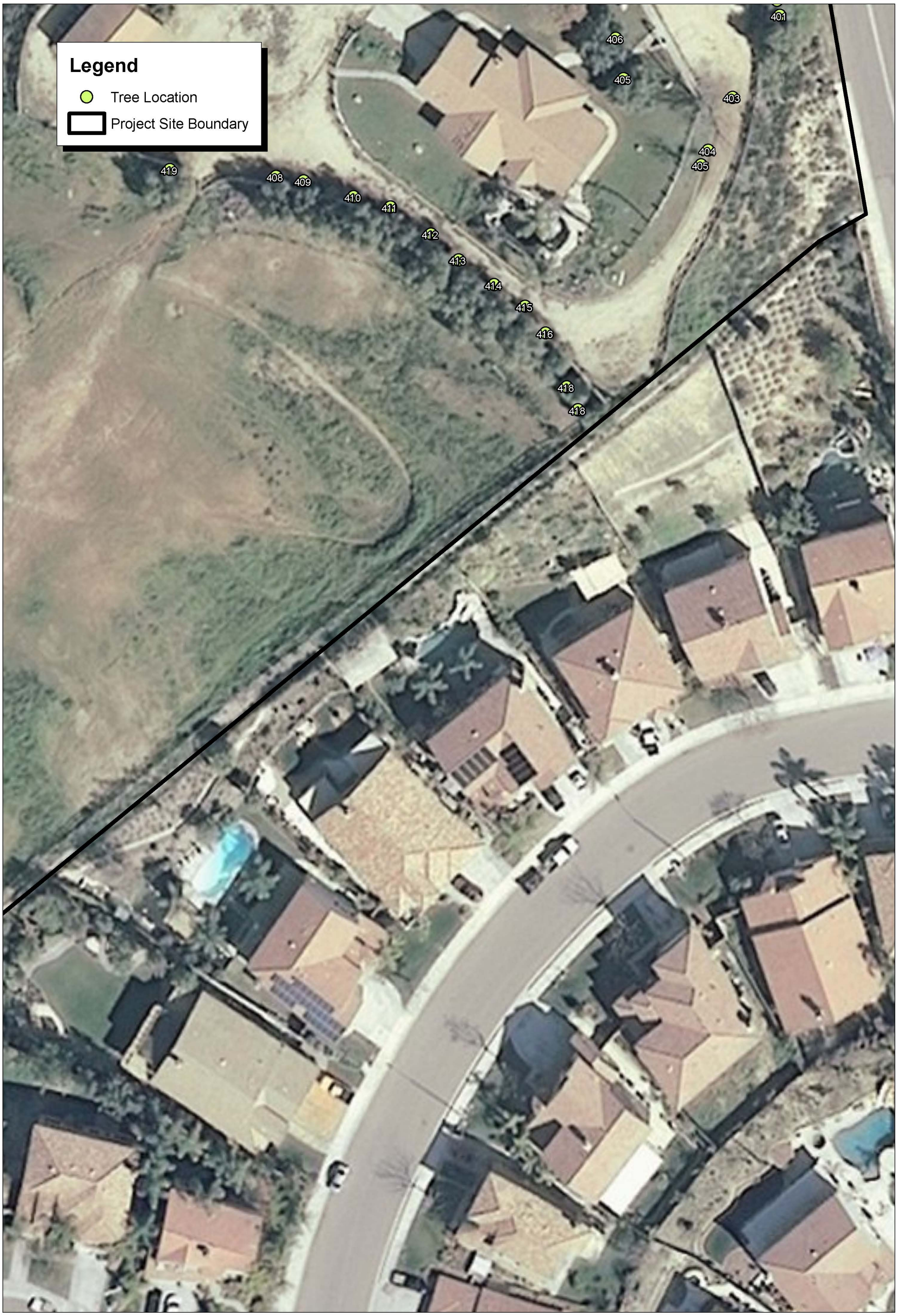
Michael Brandman Associates

NORTH

50 25 0 50

Feet

Appendix B-3
Tree Location Map



Source: ESRI Aerial Imagery. MBA 2012

NORTH

50 25 0 50 Feet

Michael Brandman Associates

21560078 • 12/2012 | Appendix B-4.mxd

Appendix B-4
Tree Location Map

Appendix C: Disclaimer

DISCLAIMER

Arborists are tree specialists who use their education, knowledge, training, experience, and research to examine trees and woodlands. Arborists recommend measures to enhance the beauty and health of trees and forests, while attempting to reduce the risk of living near them. Clients may choose to accept or disregard the recommendations of the arborist or seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms subject to attack by disease, insects, fungi and other forces of nature. There are some inherent risks with trees that cannot be predicted with any degree of certainty, even by a skilled and experienced arborist. Arborists cannot predict acts of nature including, without limitation, storms of sufficient strength, which can cause even a healthy tree to fail. Any entity that develops land and builds structures with a tree in the vicinity should be aware and inform future residents of the risks of living with trees and this arborist's disclaimer.

Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medical care, cannot be guaranteed. In addition, construction activities are hazardous to trees and cause many short and long-term injuries, which can cause trees to die or topple either in the short term or over many years or decades.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the arborists services, such as property boundaries, property ownership, disputes between neighbors, and other issues. Consulting arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist by the client. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Neither the author nor Michael Brandman Associates has assumed any responsibility for liability associated with the trees on or adjacent to this project site, their future demise and/or any damage, which may result from them. To live near trees is to accept some degree of risk.

Updated Determination of Biological Equivalent or Superior Preservation (DBESP) Analysis for Riparian/Riverine Habitat Parkside Project City of Wildomar, Riverside County, California

Murrieta, California, USGS 7.5-minute Topographic Quadrangle Map
Section 6, Township 7 South, Range 3 West

APNs 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012

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Contact: Scott A. Crawford, Senior Biologist

Michael Brandman Associates

Report Date: December 17, 2012
Report Updated: June 2, 2014

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SECTION 1: SUMMARY

This updated report contains the results of a Determination of Biological Equivalent or Superior Preservation (DBESP) Analysis for impacts to Riparian/Riverine habitat as required under the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) on an approximately 34-acre property located in the City of Wildomar, Riverside County, California. The report was updated based on comments received from the California Department of Fish & Wildlife, the U.S. Fish & Wildlife Service (collectively, the "wildlife agencies") and the Western Riverside County Regional Conservation Authority (RCA). The Parkside Project (formerly the Amberwood Project) includes 26 acres of residential development and 8 acres of undeveloped open space. The proposed project includes 67 dwelling units on 5,000 square foot (sq ft) lots. The proposed project would also include the necessary infrastructure for the development including streets, sewer, and utility lines.

On July 23, 2013, a letter report was submitted to the City of Wildomar, which concluded that a portion of the project site did not qualify as a Riparian/Riverine feature under the MSHCP guidelines. Based on comments from the U.S. Fish & Wildlife Service ((USFWS), December 23, 2013) and personal communication with Joyce Hunting, a wildlife biologist representing the City of Wildomar (January 31, 2014), in an abundance of caution, we are submitting this updated DBESP report. A site visit was conducted on April 22, 2014, with representatives of the wildlife agencies to discuss the Riparian/Riverine limits.

Based on the recent site visit, a revised amount of Riparian/Riverine Areas pursuant to MSHCP Section 6.2.1was determined. This area was previously discussed in the Initial Study for the Parkside Project. The site supports one main drainage feature (Feature 1) and one small tributary (Feature 2). Feature 2 contains an isolated ponded feature with adjacent southern cottonwood-willow riparian forest habitat, and both upstream and downstream swales within upland vegetation.

Riparian/Riverine habitat occurs within both features. Feature 1 covers a 1.88-acre area, characterized by southern cottonwood-willow riparian forest along the western project site. This feature will not be impacted by project development and is not included in the impact assessment of the DBESP. However, this feature is included in a portion of the recommended mitigation to offset project related impacts.

This DBESP covers impacts associated with the impacts to Feature 2. This feature includes an isolated human-made ponded area, adjacent southern cottonwood-willow riparian forest habitat, and upstream and downstream upland swales. The downstream portion of this upland swale does not receive aboveground flows from the area upstream of the ponded area. Therefore, the downstream portion of this upland swale is considered isolated. For the purposes of this DBESP, both of the upland swales will be included as part of the Riparian/Riverine habitat The proposed residential development would displace , the ponded area, the southern cottonwood-willow riparian forest

adjacent to the ponded area and both upland swales.. Unavoidable project-related impacts to Riparian/Riverine habitat includes disturbance of the 0.04-acre ponded area and the 0.9-acre southern cottonwood-willow riparian forest, totaling 0.13 acre, and a 0.029-acre area associated with the two upland swales. The total amount of Riparian/Riverine area that will be impacted by project related activities will be 0.159 acre.

As required by the MSHCP, a DBESP Analysis must be conducted to address any impacts to Riparian/Riverine and/or vernal pool habitat, and must include an evaluation of whether the proposed project is biologically equivalent or superior to the baseline condition. The subject DBESP analysis includes a detailed discussion of the Riparian/Riverine habitat onsite that is proposed to be impacted, and incorporates avoidance, minimization, and mitigation measures adequate to offset these impacts and bring them to a level of less than significant.

The project would be biologically equivalent or superior to the baseline condition because a deed restriction would be placed over an 5.57 -acre area, which includes the 1.88 acres of southern cottonwood-willow riparian forest habitat in the main drainage and will be managed by the Home Owners Association (HOA) and the surrounding 3.69 acres of upland habitat. Lennar Homes has agreed to a combination of avoidance, enhancement, and purchase of offsite land for preservation as part of the mitigation for impacts to the 0.159 acres of Riparian/Riverine areas.

As discussed below in section 4.2.2 of this report, mitigation will begin with the preservation of the 1.88-acre main drainage feature. The drainage plus adjacent uplands will be placed in a separate lot, totaling approximately 5.57 acres. The entire 5.57-acre lot will have an open-space designation and a deed restriction that will prohibit future development. The open-space area will be enhanced by removal of trash, debris, and non-native invasive species. Maintenance of the open-space area will be managed by the HOA. A Habitat Management Plan (HMP) will be prepared by a qualified biologist to provide guidance to the HOA with regard to enhancing and maintaining the property for long-term preservation. The HMP will require frequent monitoring and maintenance activities that will be funded through the HOA fees. As required under state law, Lennar will provide initial adequate start-up funding to establish and operate the HOA, including the activities specified in this DBESP, until the HOA becomes self-sufficient. In addition, a qualified biologist will monitor the first two years of maintenance activities to ensure enhancement and maintenance activities are adequate. In addition, because the project is consistent with the MSHCP, and as such, the project will comply with the Urban/Wildlands Interface Guidelines of section 6.1.4 of the MSHCP. These performance standards shall be incorporated in the HMP.

The total area of offsite preservation was calculated based on the habitat function and value of the affected drainage feature. The upland swale portions of the drainage are of low function and habitat value and will be replaced at a 1:1 mitigation ratio. The area of impact to both upstream and downstream upland swales is 0.029 acre; therefore, the total preservation area required for these impacts is 0.029 acre. The ponded area and associated southern cottonwood-willow riparian forest

will be mitigated at a 3:1 mitigation ratio. This ratio was determined based on the artificial nature of the existing ponded area combined with the enhancement effort and preservation of the onsite drainage feature. The area of impact to the ponded area and adjacent riparian habitat is 0.13 acre. Total preservation area required for these impacts is 0.39 acre. The total amount of mitigation required for impacts to both the upland swale and the ponded area with adjacent riparian habitat is 0.419 acre. The offsite preservation will be completed by the purchase of 0.419 acre of mitigation credits through the Elsinore-Murrieta-Anza Resource Conservation District (RCD), or similar conservation agency. Further detail concerning the purchase of these mitigation credits is discussed in section 4.2.2 of this report.

SECTION 2: INTRODUCTION

2.1 - Project Location

The project is generally located north of State Route (SR) 79, south of SR-74, east of Interstate (I) 15, and west of I-215, in the southern portion of the City of Wildomar, Riverside County, California (Exhibit 1).

The site occurs on Assessor's Parcel Numbers (APNs):

- 380-280-004
- 380-280-009
- 380-280-010
- 380-280-011
- 380-280-012

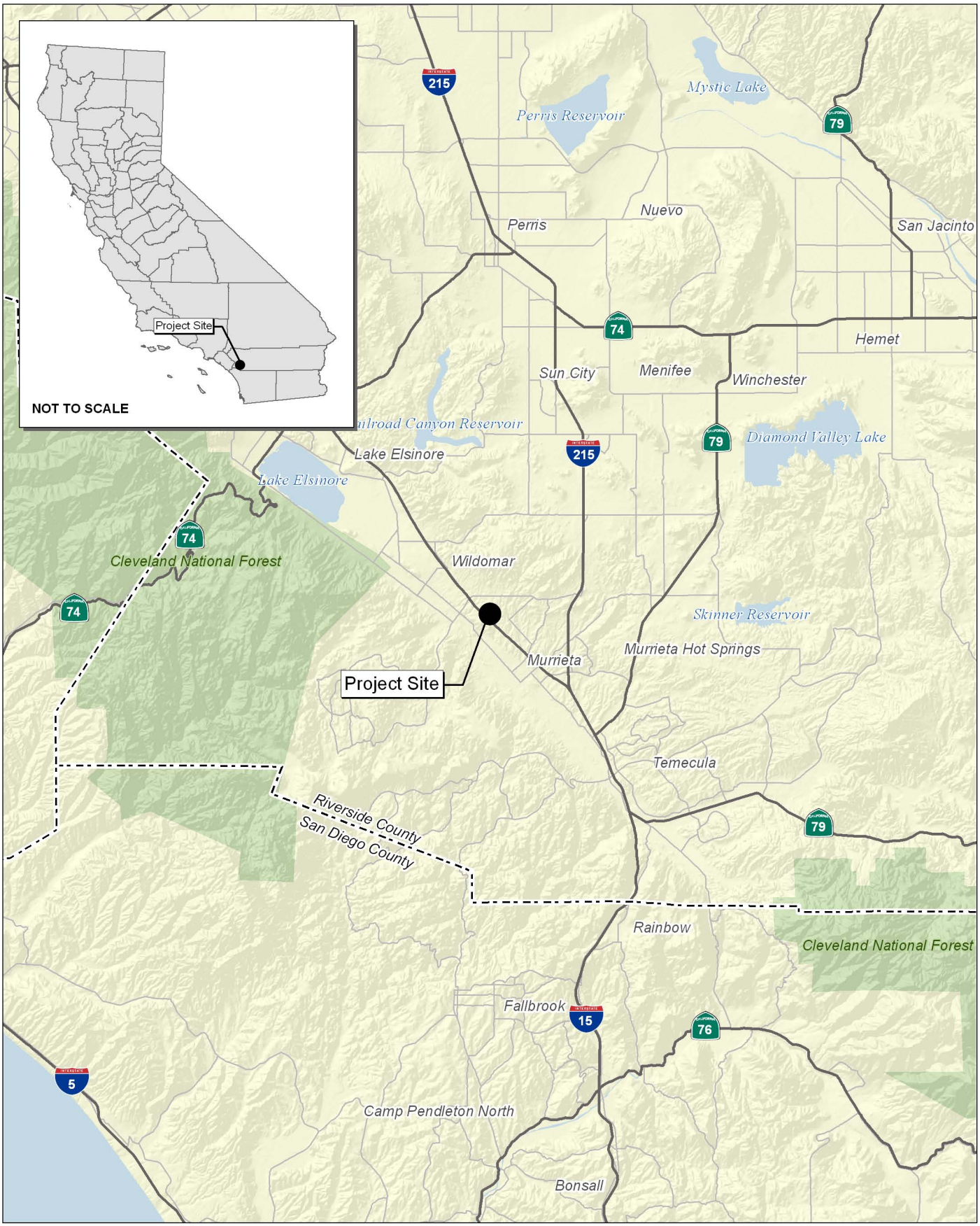
The project site is located within Section 6 of Township 7 South and Range 3 West of the Murrieta, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map (Exhibit 2). The project area is specifically located north of I-15, south of Clinton Keith Road, east of Kennadine Drive, and west of Elizabeth Lane (Exhibit 3).

The proposed project site is located in the Elsinore Area Plan but is not located within any Criteria Cells. The project site is located 1.3 miles northeast of Existing Core F, 1.5 miles southeast of proposed Linkage 8, and 0.5 miles south of Criteria Cell 5558. The area surrounding the property includes undeveloped land to the north and south, residential development to the east, and commercial development to the west.

The project site can be accessed from I-15 by exiting on Clinton Keith Road and traveling east, turning right onto Indian Valley Drive, then left onto Prielipp Road, and then right onto Elizabeth Lane. The project site is located on the west side of Elizabeth Lane.

2.2 - Project Description

The Parkside Project consists of the development of single-family detached homes. The project design incorporates approximately 17 acres of residential development and 17 acres of undeveloped open space. The proposed project includes 67 dwelling units on 5,000 sq ft lots. The proposed project would also include the necessary infrastructure for the proposed development including streets, sewer, and utility lines.



Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

NORTH

5 2.5 0 5 Miles

Michael Brandman Associates

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Exhibit 1
Regional Location Map

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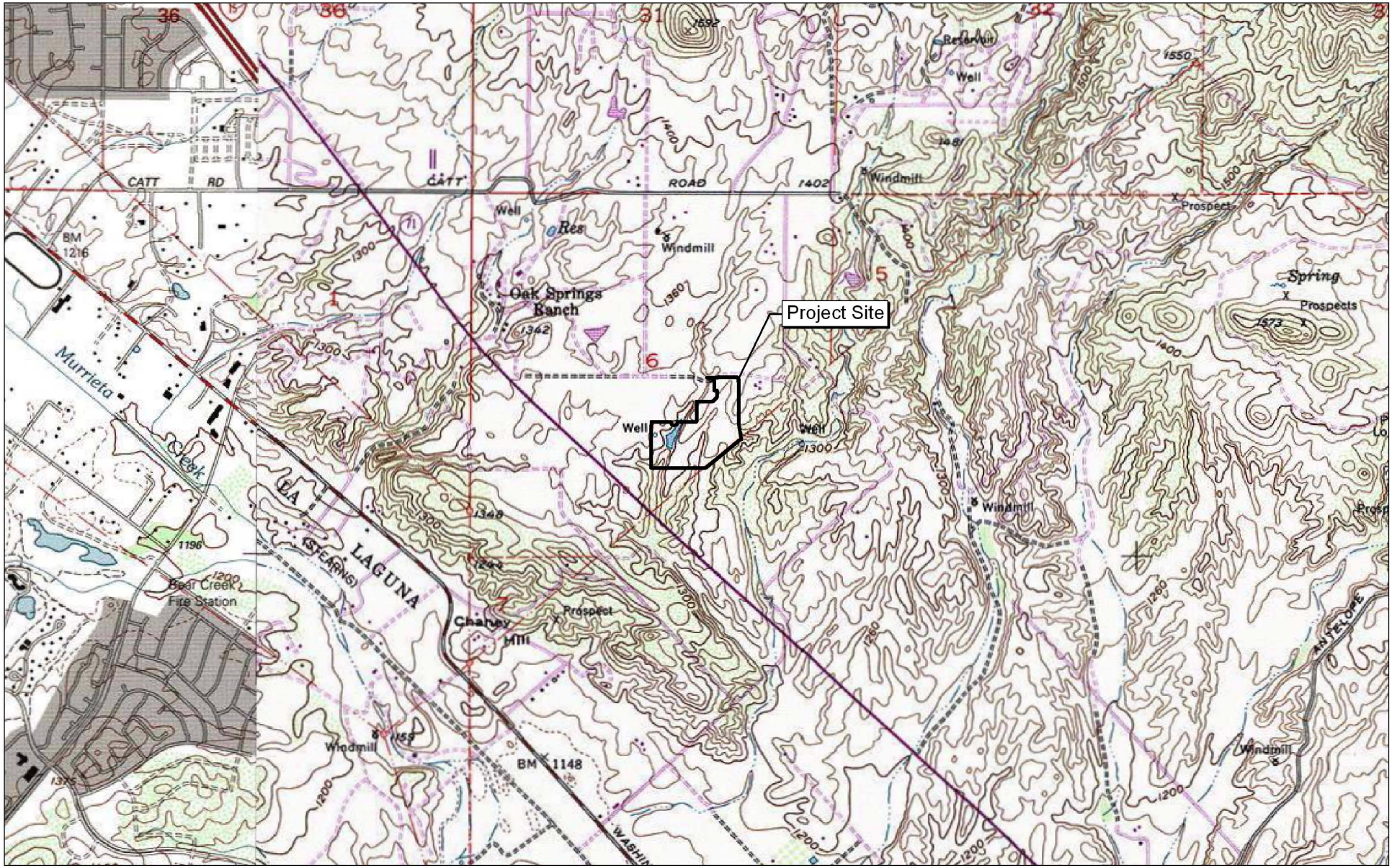

Source: TOPO! USGS Murrieta, CA (1976) and Wildomar, CA (1997) 7.5' DRG.

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

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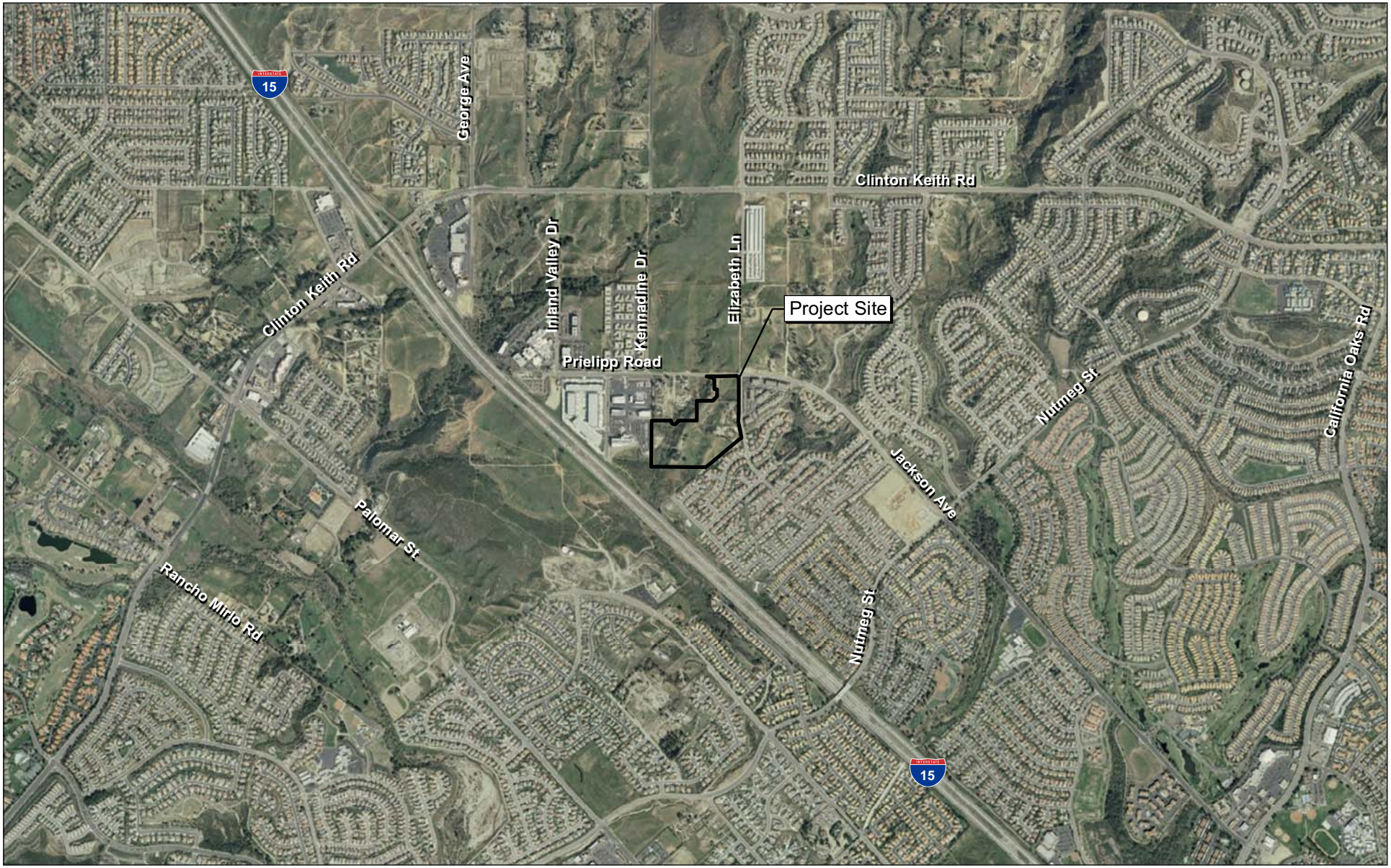
Exhibit 2
Local Vicinity Map
Topographic Base



Source: ESRI Aerial Imagery.

Exhibit 3
Local Vicinity Map
Aerial Base

NORTH

2,000 1,000 0 2,000

Feet

Michael Brandman Associates

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SECTION 3: METHODOLOGY

3.1 - Literature Review

MBA conducted a review of existing documents for the Parkside Project and other relevant reference material prior to the subject analysis. Previous documentation for the proposed project reviewed for the preparation of the subject DBESP includes the following:

- Habitat Assessment (Burrowing Owl, Narrow Endemic Plants, and Criteria Area Species) and MSHCP Consistency Analysis for the Amberwood Project (MBA 2012a).
- Preliminary Jurisdictional Delineation Report Amberwood Project (MBA 2012b).
- Dry Season Focused Fairy Shrimp Survey Report 24-Acre Amberwood Project (MBA 2012c).
- Tree Survey Report for the Amberwood Project (MBA 2012d).

The National Wetland Inventory (Reed 1988) was reviewed to determine whether any wetland areas had been documented within the vicinity of the site. Additionally, the United States Department of Agriculture (USDA) Soil Survey Map for the area was reviewed to identify the soil series that occur onsite.

3.2 - Field Investigation

The habitat assessment component of the subject DBESP report is based primarily on the findings of the MSHCP consistency analysis and the jurisdictional delineation for the proposed project. These included field surveys of the Riparian/Riverine habitat during the MSHCP Consistency Analysis on September 6, 2012 and a field jurisdictional assessment on February 7, 2012. Methodology followed during these surveys is contained within their respective source documents (MBA 2012a and MBA 2012b).

A list of all species observed on the project site was compiled from the survey data; this list is provided in Appendix A, Floral and Faunal Compendium.

A subsequent site visit was recently conducted by the wildlife agencies to verify existing conditions. Also in attendance were representatives from Lennar Homes and the City of Wildomar.

The site supports one main drainage feature (Feature 1) and one isolated ponded feature with both upstream and downstream upland swales (Feature 2). Feature 1 enters the project boundary approximately 780 feet south of Prielipp Road via a soft-bottom drainage channel. The drainage is a narrow, earthen channel that conveys urban nuisance flows and stormwater runoff south to Murrieta Creek. This feature supports southern cottonwood-willow riparian forest habitat.

Feature 2 is a secondary tributary to Murrieta Creek. For the purposes of this document, the upland swales were considered Riparian/Riverine habitat based on surface flow hydrologic connection to Murrieta Creek. The ponded area and adjacent riparian habitat supports southern cottonwood-willow riparian forest habitat. The upstream upland swale supports a combination of disturbed Riversidean sage scrub and chamise chaparral. The downstream upland swale supports non-native grasslands.

SECTION 4: DETERMINATION OF BIOLOGICAL EQUIVALENT OR SUPERIOR PRESERVATION (DBESP) ANALYSIS

4.1 - Description of the Pre-Project Riparian/Riverine Functions and Values

The Western Riverside MSHCP defines Riparian/Riverine Areas as, "…lands which contain Habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year."

Riparian/Riverine habitat as defined by the MSHCP occurs within Features 1 and 2 for a total of 2.039 acres.

Feature 1 consists of an earthen channel that traverses the site from northeast to southwest along the western site of the project site and flows into Murrieta Creek. The drainage feature conveys urban nuisance and natural runoff from the watershed northeast of the project site. Flowing water was observed within the drainage during the February and September 2012 site visits. This feature has a clearly defined bed and bank and conveys flows all year round. Therefore, the drainage feature is considered a perennial drainage. The drainage feature appears stable and widens slightly just before a pinch-point in the southwestern portion of the project. A previous earthen berm created a large ponded area (approximately 5 acres), which expanded the upstream riparian area. Within the last few years, the central portion of the bermed area was eroded allowing flows to continue downstream in a more natural state. Under current natural conditions, the riparian area will reduce in size due to the reduction in available moisture, and will return to a stabilized habitat based on the current site conditions. Feature 1 has moderate to high quality riparian habitat with regard to function and value, but will not be directly impacted by the proposed project development.

The ponded area, associated riparian habitat, and upland swale associated with Feature 2 originates in the northeastern corner of the project site. The ponded area receives sheet flows from the property located northeast of the intersection of Prielipp Road and Elizabeth Lane (approximately 5-acre watershed). Flows are conveyed onto the site through an underground storm drain beneath Prielipp Road. The drainage is contained within an upland swale that was recently scoured due to a large storm event in February of 2014. Previously, this area contained no evidence of flows, which typically include but are not limited to a definable bed and bank, sedimentation, and/or debris racks. The sheet flow is ponded by a human-made earthen berm that was created for the purposes of creating a water feature for the adjacent residences. The water feature, or ponded area, was artificially filled with water from a pump. All flows within Feature 1 are contained onsite and there are no downstream flow indicators. Therefore, the isolated ponded area is not associated with an independent drainage feature, and under the definition of Riparian/Riverine areas in the MSHCP, because the feature was artificially created and not currently used for the purposes of creating wetlands habitat or open water, the ponded area does not qualify as a Riparian/Riverine feature.

However, in an abundance of caution, and due to the comments of the USFWS, for purposes of this DBESP, it is assumed that this ponded area and associated upland swales are considered Riparian/Riverine habitat based on a hydrologic connection of surface flows to Murrieta Creek.

Due to the southern cottonwood-willow riparian forest community, suitable nesting habitat for many tree-nesting bird species is present within the Riparian/Riverine drainage.

This DBESP Analysis focuses on the hydrological functions and values of the Riparian/Riverine drainage onsite. The following is a complete description of the portions of the project site that were determined to meet the minimum criteria requirements to be considered Riparian/Riverine, based on definitions provided in the MSHCP, Section 6.1.2. These onsite Riparian/Riverine areas are depicted on Exhibit 4.

The MSHCP report findings determined that all of the 1.88 acres of Riparian/Riverine habitat associated with Feature 1 will be completely avoided. The 0.04 acre ponded area and adjacent southern cottonwood-willow riparian forest habitat (0.09 acre) will be permanently impacted by project development. In addition, the upland swale both upstream and downstream of the ponded area will also be impacted. The upland swale upstream of the ponded area is approximately 650 linear feet in length with an average width of 1.5 feet. The amount of Riparian/Riverine area for the upstream portion of the upland swale is 0.022 acre. The upland swale downstream of the ponded area is approximately 620 linear feet in length and has an average width 0.5 feet. The amount of Riparian/Riverine area associated with the downstream portion of the upland swale is 0.007 acre. The total amount of Riparian/Riverine area that will be impacted by project related activities will be 0.159 acre.

4.1.1 - Southern Cottonwood-Willow Riparian Forest Habitat

The onsite portion of Feature 1, from the outlet at Prielipp Road to the southern project boundary, is vegetated with southern cottonwood-willow riparian forest habitat. This habitat is described by Holland (1986) as a tall, moderately closed to open, broadleafed winter-deciduous riparian forest dominated by cottonwoods (*Populus* spp.), and various tree willows (*Salix* spp.). The understory generally consists of shrubby willows, mule fat (*Baccharis salicifolia),* and/or giant creek nettle (*Urtica urens).*

Habitat on the site fits this description and is intermittently vegetated. Vegetation includes a stand of Fremont cottonwoods (*Populus fremontii*) mixed with both Goodding's willow (*Salix gooddingii*) and red willow (*Salix laevigata*), and a dense thicket of arroyo willow (*Salix lasiolepis*) and/or mulefat.

This area provides potentially suitable nesting and/or foraging habitat for one Riparian/Riverine bird conservation species listed in MSHCP Section 6.1.2:

- Least Bell's vireo (*Vireo bellii pusillus*) - federal and state listed as endangered.

The Riparian/Riverine habitat on the site is potentially suitable for least Bell's vireo. A record search in the California Natural Diversity Database (CNDDB) revealed this species has been recorded in the general vicinity; the USFWS recorded an individual in 2006 at the eastern edge the Murrieta Creek watershed (CNDDB element code number ABPBW01114; Occurrence number 54).

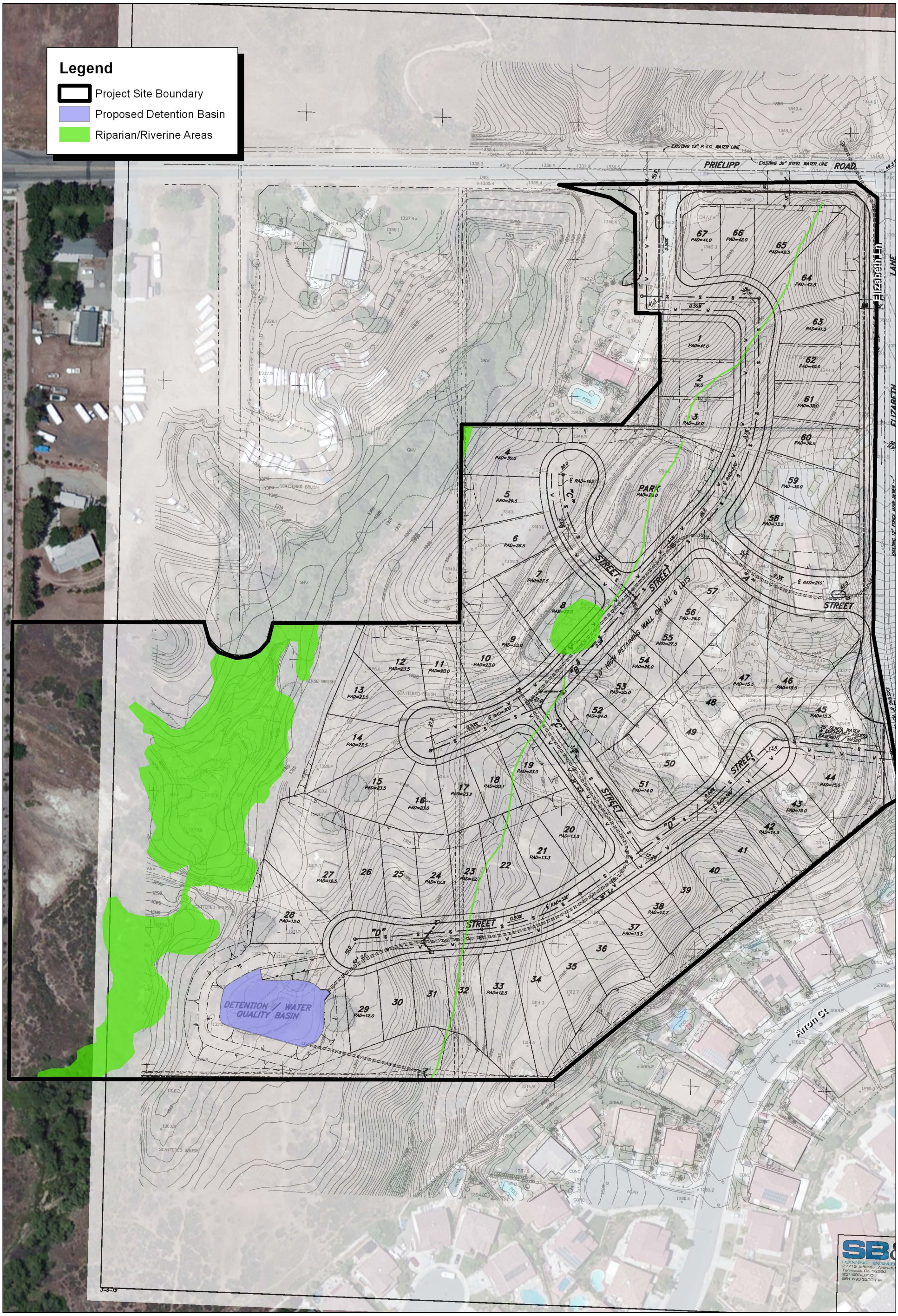
Feature 1 contains habitat that is narrow, small, and adjacent to urban areas, making it only marginally suitable foraging habitat for southwestern willow flycatcher and western yellow-billed cuckoo. These species tend to prefer large expanses of riparian forest that are not immediately adjacent to urban areas. While focused surveys are required for areas with potentially suitable habitat, the proposed project would not directly impact any contiguous high-quality habitat.

Feature 2 contains a small isolated patch of southern cottonwood-willow riparian forest habitat. This area is not part of a contiguous band of habitat and is not considered suitable to support a population of any sensitive riparian bird species.

However, a pre-construction nesting bird survey would be required prior to vegetation removal or ground-disturbing activities within 250 feet of the riparian vegetation.

This Riparian/Riverine habitat on the project site does not provide suitable habitat for any other animal or plant species targeted for conservation and listed in MSHCP Section 6.1.2. A dry season fairy shrimp survey was conducted in 2012 (MBA 2012c) and no listed fairy shrimp species were found to occur within the ponded area.

None of these "other" bird species have been recorded within the project boundary or within a 3-mile radius of the project center.



Source: ESRI Aerial Imagery. Lennar Homes, Inc. MBA Data 2012

Michael Brandman Associates

NORTH

100 50 0 100 Feet

Exhibit 4
Riverine/Riparian Area Map

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LENNAR HOMES, INC. • PARKSIDE PROJECT
DBESP ANALYSIS

4.2 - Project Design Features (Riparian/Riverine Impact Avoidance and Minimization)

4.2.1 - Avoidance and Alternatives

The first method of mitigating for impacts to Riparian/Riverine areas is avoidance. The proposed project design provides for the establishment of a 5.57-acre open-space area for the permanent avoidance of the large drainage feature (1.88 acres) and 3.69 acres of upland habitat along the western property boundary. The Riparian/Riverine habitat on site is marginally suitable for least Bell's vireo and avoidance of this area will result in preservation of the existing drainage and a reduction of the likelihood of impacts to riparian species. The 1.88-acre riparian area and the 3.69 acres of upland habitat will be protected by a deed restriction and maintained by the local Home Owners Association.

4.2.2 - Mitigation Measures to Reduce/Minimize Direct Impacts

Direct permanent unavoidable impacts would occur on a total of 0.159 acre of MSHCP-defined Riparian/Riverine areas contained within the southern cottonwood-willow riparian forest habitat and adjacent upland swales.

In order to meet the DBESP requirement of an equivalent or superior preservation, the riparian habitat within Feature 1 will be enhanced. This enhancement area will be contained within the entire 1.88 acres riparian habitat onsite. Habitat enhancement will require the removal of non-native invasive species such as pampas grass (*Cortaderia selloana*), broad leaf cattail (*Typha latifolia*), and Mediterranean tamarisk (*Tamarix ramosissima*).

Habitat Management Plan

In addition, trash, debris, and previous construction elements will be removed from the riparian habitat. An HMP will be prepared by a qualified biologist to provide guidance to the HOA with regard to enhancing and maintaining the property for long-term preservation. The plan will require frequent monitoring and maintenance activities that will be funded through the HOA fees. In addition, a qualified biologist will monitor the first 2 years of maintenance activities to ensure enhancement and maintenance activities are adequate. The project is consistent with the MSHCP, and, as such, the project will comply with the Urban/Wildlands Interface Guidelines and performance standards of Section 6.1.4 of the MSHCP. These performance standards shall be incorporated into of the HMP. Debris and trash removal may take place during project construction. A qualified biologist should meet with the landscape crew that will be responsible for the maintenance of the channel to discuss the plants that require removal.

Once the HOA has been established and the mechanism for maintaining the channel has been completed, the first year of habitat management will begin. The riparian habitat will be visited on four separate occasions throughout the first year to remove all non-native weedy species. Many weedy species emerge during different times of the year. Multiple site visits will ensure that all invasive plant species will be targeted. An annual monitoring survey and report should be prepared to

qualitatively assess the main drainage feature and estimate the amount of remaining non-native species. Following the first year of maintenance, non-native invasive plants should not exceed 5 percent vegetative cover.

The second year of habitat management will require two separate site visits. Once the majority of the non-native invasive species have been removed, the likelihood of reoccurrence will be minimized and therefore, then number of necessary surveys is reduced. A second annual monitoring survey will be conducted in a similar fashion to the first year, documenting the estimated percent of non-native invasive species coverage. Following the first year of maintenance, non-native invasive plants should not exceed 2 percent vegetative cover.

A final report of findings will be established to document the performance of the HOA in managing the open-space area. This will be assessed on the performance standards as well as through a qualitative assessment of the drainage feature with regard to improving existing site conditions.

Offsite Mitigation Credits

In addition to onsite preservation, offsite purchase of mitigation credits from an approved mitigation bank will be used to complete the necessary mitigation. Purchasing credits at an approved mitigation bank is often less time consuming since a conservation easement is already included as part of the cost for the mitigation credits. Lennar Homes will purchase a total of 0.419 acre of offsite mitigation credits from the Elsinore-Murrieta-Anza Resource Conservation District (EMA-RCD). The mitigation credits will be associated with willow riparian habitat and will be located within the Murrieta Creek watershed. Vicki Long, an EMA-RCD representative, was contacted to verify available credits were available. Ms. Long confirmed that credits were available and in-kind habitat was also available.

Detention Basin

As part of the proposed project to improve downstream water quality, a 0.30-acre detention basin would be created at the southwestern corner of the project site. The detention basin would receive all nuisance flows from within the proposed residential development prior to flowing offsite. This would greatly improve water quality leaving the project site as well as creating a new 0.30-acre ponded area, similar to the one being removed. The detention basin would be designed for sediment capture as well as collection of trash and debris to improve downstream water quality from upstream flows.

Species Avoidance Measures

To ensure avoidance of impacts to riparian avian species, ground-disturbing activities should be avoided from January 15 to August 31. If project construction cannot be avoided during this time, a qualified biologist shall conduct a nesting bird survey of all potential nesting vegetation prior to commencing project activities.

Prior to the initiation of any ground-disturbing project activities, a qualified biologist shall conduct a burrowing owl habitat assessment per the MSHCP requirements.

4.2.3 - Urban/Wildland Interface Guidelines

Urban/Wildlife Interface Guidelines are incorporated into the project design to ensure indirect project-related impacts to the onsite preserved Riparian/Riverine habitat are avoided or minimized to the greatest extent feasible. These guidelines will be incorporated in the HMP and subsequently managed by the HOA.

Drainage

The project shall not create additional flows offsite. Measures should be taken to assure that the project stormwater discharges are no greater in volume and velocity than current undeveloped conditions and that the water leaving the site complies with all applicable water quality standards.

Toxics

In concert with drainage requirements, the project is subject to Riverside County Water Quality Management Plan (WQMP) for Urban Runoff, Santa Ana Region, Santa Margarita Region, adopted September 17, 2004 and the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) Water Quality Order 99-08-DWQ. Implementation of both the WQMP and the general permit would reduce potential impacts of toxics to the MSHCP conservation area (Santa Ana River) to a level of less than significant.

Lighting

Night lighting shall be directed away from the MSHCP conservation area (Santa Ana River).

Noise

The project site is located in an area already subject to fairly high ambient noise levels due to street traffic. The completed project would not subject a MSHCP Conservation Area to noise above the existing ambient noise level. The construction site should be far enough away from the MSHCP Conservation Area that temporary construction-related noise impacts would not negatively impact resources within the Conservation Area.

Invasive Plant Species

No invasive species from MSHCP Table 6.2 shall be included in any landscaping for the project.

Barriers

As needed, the project should include the incorporation of rocks/boulders, fencing, walls, signage, and or other appropriate measures to minimize unauthorized public access, domestic animal predation, and illegal trespass and dumping into the MSHCP Conservation Area (Santa Ana River). Any barriers shall be outside of the MSHCP Conservation Area.

Grading/Land Development

Project-related grading would be outside of the project conservation area and the MSHCP Conservation Area.

Fuels Management

No fuel management would be necessary for this project.

4.3 - Determination of Biologically Equivalent or Superior Preservation

Implementation of the proposed project with the recommended avoidance, minimization, and mitigation measures would:

- Preserve a greater quantity of Riparian/Riverine habitat than previously preserved through a deed restriction placed over Feature 1, totaling 1.88 acres. This preservation area is located outside of any Western Riverside MSHCP Conservation Area, but is within 0.5 mile of a cell criteria area and provides suitable habitat for both nesting and foraging Riparian/Riverine bird species. This area contains southern cottonwood-willow riparian forest habitat, which provides suitable habitat for least Bell's vireo. The southern cottonwood-willow riparian forest habitat present within the proposed mitigation area is of higher quality than the habitat that would be impacted through implementation of the project; therefore, it provides in-kind mitigation.
- The preparation of a HMP will ensure that the HOA will have specific guidelines to follow to enhance the southern cottonwood-willow riparian habitat within the main drainage feature.
- Offsite preservation of in-kind habitat through the purchase of mitigation credits through the EMA-RCD will preserve additional Riparian/Riverine habitat.
- Creation of a 0.30-acre detention basin will improve downstream water quality.
- The HMP will also include Urban/Wildlands Interface Guidelines to ensure that all indirect project-related impacts to Riparian/Riverine habitat would be avoided or minimized to the greatest extent feasible.
- Although not riparian/riverine mitigation, the placing of a deed restriction on the 3.69 acres of upland habitat further enhances the biological quality of the project area.
- Lennar will provide initial adequate start-up funding to establish and operate the HOA, including the activities specified in this DBESP, until the HOA becomes self-sufficient.

These measures would allow for long-term sustainability of Riparian/Riverine resources within the onsite preservation area resulting in an equivalent habitat area and superior preservation alternative to that which exists in pre-project conditions.

4.4 - Demonstration of Increase in Post-Project Riparian/Riverine Functions and Values

The following discussion demonstrates how the post-project conditions of the onsite Riparian/Riverine habitat to be preserved would be functionally superior to the pre-project conditions.

Pre-project conditions consist of an isolated southern cottonwood-willow riparian forest associated with an isolated ponded area and associated upland swales in the central portion of the project site. The onsite preservation area proposed for mitigation is not currently protected to ensure preservation. However, this portion of the project site (1.88 acres) plus the surrounding upland habitat (an additional 3.69 acres) will be placed in an open-space lot with a deed restriction to ensure that no future development will occur within the lot.

In addition, a new detention basin would be created along the southern project boundary to treat all nuisance flows from the proposed development resulting in a net gain in water quality through removal of excess sediment and pollutants prior to entering into the storm drain system. The removal of the upland swale resulting from construction of the project will reduce the amount of seed dispersal of non-native weedy species to downstream features.

The aforementioned preservation area would contribute to the long-term conservation and enhancement of Riparian/Riverine habitat in the region, which would in turn ensure preservation of suitable habitat for riparian wildlife species such as least Bell's vireo and other passerine birds associated with Riparian/Riverine habitat.

Finally, this area would ensure the preservation of suitable habitat for plant species that have potential to occur within the Murrieta Creek Floodplain, such as smooth tarplant (*Centromadia pungens* ssp. *laevis*).

Based on this analysis, the proposed mitigation consisting of preservation of 1.88 acres of southern cottonwood-willow riparian forest, enhancement of the onsite Riparian/Riverine habitat, offsite purchase of 0.419 acre, and the creation of a 0.30-acre detention basin would result in superior preservation and an increase in habitat function and value compared with pre-project conditions.

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Appendix A:
Floral and Faunal Compendia

Flora Compendium

Cupressaceae		**Cypress Family**
Cupressus	*sempervirens*	Italian cypress
Pinaceae		**Pine Family**
Pinus	*attenuata*	knobcone pine
Pinus	*sp.*	Unknown pine species
Adoxaceae		**Honeysuckle Family**
Sambucus	*mexicana*	blue elderberry
Aizoaceae		**Fig-Marigold Family**
Carpobrotus	*edulis*	hottentot-fig
Anacardiaceae		**Sumac or Cashew Family**
Schinus	*molle*	Peruvian pepper tree
Schinus	*terebinthifolius*	Brazilian pepper tree
Toxicodendron	*diversilobum*	poison oak
Asteraceae		**Sunflower Family**
Ambrosia	*psilostachya*	western ragweed
Artemisia	*californica*	California sagebrush
Baccharis	*salicifolia*	mule fat
Centaurea	*solstitialis*	yellow star-thistle
Conyza	*canadensis*	horseweed
Corethrogyne	*filaginifolia*	California aster
Helianthus	*annuus*	common sunflower
Heterotheca	*grandiflora*	telegraphweed
Isocoma	*menziesii*	coastal goldenbush
Pseudognaphalium	*canescens*	everlasting cudweed
Sonchus	*asper*	sow thistle
Boraginaceae		**Borage Family**
Amsinckia	*menziesii*	Menzies' fiddleneck
Heliotropium	*curassivicum*	saltmarsh heliotrope
Brassicaceae		**Mustard Family**
Hirschfeldia	*incana*	short-podded mustard
Nasturtium	*aquaticum*	water-cress
Cactaceae		**Cactus Family**
Cylindropuntia	*california var. parkeri*	cane cholla
Caprifoliaceae		**Honeysuckle Family**
Lonicera	*japonica*	Japanese honeysuckle
Chenopodiaceae		**Goosefoot Family**
Salsola	*tragus*	Russian thistle
Cistaceae		**Rock-Rose Family**
Helianthemum	*scoparium*	peak rush-rose

Flora Compendium

Cucurbitaceae		**Gourd Family**
Cucurbita	*foetidissima*	calabazilla
Marah	*macrocarpus*	wild cucumber
Euphorbiaceae		**Spurge Family**
Chamaesyce	*albomarginata*	rattlesnake weed
Croton	*setigerus*	dove weed
Fabaceae		**Legume Family**
Albizia	*julibrissin*	silk tree
Lotus	*scoparius*	common deerweed
Fagaceae		**Oak Family**
Quercus	*agrifolia*	coast live oak
Lamiaceae		**Mint Family**
Lepechinia	*cardiophylla*	heart-leaved pitcher sage
Marrubium	*vulgare*	horehound
Salvia	*apiana*	white sage
Trichostema	*lanceolatum*	vinegar weed
Moraceae		**Mulberry Family**
Morus	*alba*	white mulberry
Myrtaceae		**Myrtle Family**
Eucalyptus	*globulus*	blue gum
Eucalyptus	*polyanthemos*	red box
Oleaceae		**Olive Family**
Fraxinus	*latifolia*	Oregon ash
Olea	*europaea*	olive
Onagraceae		**Evening Primrose Family**
Epilobium	*campestre*	willow herb
Polygonaceae		**Buckwheat Family**
Eriogonum	*fasciculatum*	California buckwheat
Rosaceae		**Rose Family**
Adenostoma	*fasciculatum*	chamise
Prunus	*sp.*	unknown chockcherry
Rutaceae		**Rue Family**
Citrus	*limonia*	lemon
Salicaceae		**Willow Family**
Populus	*fremontii*	Freemont cottonwood
Salix	*gooddingii*	Goodding's willow
Salix	*laevigata*	red willow
Salix	*lasiolepis*	arroyo willow
Scrophulariaceae		**Figwort Family**

Flora Compendium

Mimulus	*guttatus*	seep monkeyflower
Myoporum	*laetum*	myoporum
Solanaceae		**Nightshade Family**
Datura	*wrightii*	jimson weed
Nicotiana	*glauca*	tree tobacco
Tamaricaceae		**Tamarisk Family**
Tamarix	*ramosissima*	Mediterranean tamarisk
Agavaceae		**Agave Family**
Yucca	*elephantipes*	yucca tree
Agavaceae		**Agave Family**
Agave	*americana variegata*	century plant
Arecaceae		**Palm Family**
Washingtonia	*robusta*	Mexican fan palm
Cyperaceae		**Sedge Family**
Cyperus	*involucratus*	umbrella plant
Poaceae		**Grass Family**
Bromus	*rubens*	red brome
Cortaderia	*selloana*	Uruguayan pampas grass
Typhaceae		**Cattail Family**
Typha	*latifolia*	broad leaf cattail

Fauna Compendium

Nymphalidae		**Brush-Footed Butterflies**
Vanessa	*cardui*	painted lady
Hesperiidae		**Skippers**
Hylephila	*phyleus*	fiery skipper
Sarcophagidae		**Flesh Flies**
Sarcophaga	*sp.*	flesh fly
Formicidae		**Ants**
Pogonomyrmex	*californicus*	harvester ants
Hylidae		**Treefrogs**
Pseudacris	*regilla*	Pacific treefrog
Phrynosomatidae		**Lizards**
Uta	*stansburiana*	side-blotched lizard
Accipitridae		**Hawks**
Accipiter	*cooperii*	cooper's hawk
Buteo	*jamaicensis*	red-tailed hawk
Columbidae		**Pigeons/Doves**
Zenaida	*macroura*	mourning dove
Cuculidae		**Cuckoos/Roadrunners/Anis**
Geococcyx	*californianus*	greater roadrunner
Trochilidae		**Hummingbirds**
Calypte	*anna*	Anna's hummingbird
Corvidae		**Jays/Crows**
Aphelocoma	*californica*	western scrub-jay
Corvus	*brachyrhynchos*	American crow
Corvus	*corax*	common raven
Aegithalidae		**Bushtits**
Psaltriparus	*minimus*	bushtit
Troglodytidae		**Wrens**
Thryomanes	*bewickii*	Bewick's wren
Sylviidae		**Old world warblers**
Polioptila	*californica*	California gnatcatcher
Mimidae		**Mockingbirds/Thrashers**
Mimus	*polyglottos*	northern mockingbird
Emberizidae		**Warblers, sparrow, etc.**
Pipilo	*crissalis*	California towhee
Melospiza	*melodia*	song sparrow
Fringillidae		**Finches**
Carpodacus	*mexicanus*	house finch
Carduelis	*psaltria*	lesser goldfinch

Fauna Compendium

Passeridae		**True sparrows**
Passer	*domesticus*	house sparrow
Leporidae		**Hares and Rabbits**
Sylvilagus	*audubonii*	desert cottontail
Sciuridae		**Squirrels**
Otospermophilus	*beecheyi*	California ground squirrel
Muridae		**Mice, Rats, and Voles**
Neotoma	*lepida*	desert woodrat
Canidae		**Wolves and Foxes**
Canis	*familiaris*	domestic dog
Canis	*latrans*	coyote

FirstCarbon® SOLUTIONS
MICHAEL BRANDMAN ASSOCIATES

October 3, 2013

Jarnne' Valdez
Lennar Homes, Inc.
391 N. Main Street, Suite 300
Corona, CA 92880

Subject: Biological Resources Update Letter Report for the Amberwood Project City of Wildomar, Riverside County, California

Dear Ms. Valdez:

This letter report serves as an update to the existing Habitat Assessment (Burrowing Owl, Narrow Endemic Plants, and Criteria Area Species) and MSHCP Consistency Analysis for the Amberwood Project in the City of Wildomar, Riverside County, California. Based on a review of Section 6.1.2 of the Western Riverside County Multiple Species Habitat Conservation plan, First Carbon Solutions | Michael Brandman Associates (FCS-MBA) has determined that revisions to the Habitat Assessment (Burrowing Owl, Narrow Endemic Plants, and Criteria Area Species) and MSHCP Consistency Analysis for the Amberwood Project are warranted to more accurately evaluate the potential impacts associated with the proposed project.

This letter report specifically addresses two issues, Riparian/Riverine Habitat as addressed in the MSHCP and surveys for the least Bell's vireo.

MSHCP Section 6.1.2 describes the process through which protection of riparian/riverine areas and vernal pools are to occur within the MSHCP Planning Area. This section thoroughly describes how features within a project site should be evaluated to determine if they meet the requirements for protection under the MSHCP. As stated in the MSHCP, Riparian/Riverine Areas are lands which contain habitat dominated by tress, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

The project site contains two potential Riparian/Riverine features. One large drainage feature flows along the western side of the project site and contains a dense riparian habitat and flowing water within an active channel. The other feature is an upland swale that only conveys flows during a storm event, but not enough flows to create an active channel.

Based upon a review of aerial photos, historically (approximately 1970s) two areas within the project site were dammed up to create ponded areas for recreational purposes. At one point, the larger drainage feature contained a 1-acre ponded feature, which included a boat dock. Portions of the boat dock are still present along what used to be the edge of the ponded area. The earthen dam was breached and the drainage has reverted to a natural feature. This feature will be avoided during construction activities associated with the proposed development.

The dam associated with the smaller upland swale remains in place and therefore the area upstream of the earthen dam still ponds. The artificially created dam insures that this pond is isolated, and has no biological, chemical, physical, or hydrological influence on any downstream portions of the project site. In the MSHCP Consistency Analysis document, this feature was considered to meet the minimum requirements for riparian/riverine areas under the plan. However, upon further review of the MSHCP, it clearly states, "With the exception of wetlands created for the purpose of providing wetlands Habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions."

Because this small area (consisting of only 0.04 acre) was artificially created, was not created to provide wetlands and was not formerly a natural stream course before the dam was built, this area does not quality as a Riparian/Riverine area under the MSHCP.

Because this small area is not a Riparian/Riverine feature, the area need not be avoided, and thus there is no need for a Determination of Biologically Equivalent or Superior Preservation (DBESP). Further, because the main drainage feature onsite is going to be avoided, no DBESP is required for this project.

In the existing Habitat Assessment (Burrowing Owl, Narrow Endemic Plants, and Criteria Area Species) and MSHCP Consistency Analysis report, protocol surveys for least Bell's vireo (LBV) were recommended due to the presence of suitable habitat within the main drainage feature. The suitable habitat within the project site will be completely avoided during project construction. Therefore, there is no potential for direct take for this species. The small ponded area does contain riparian habitat, but is not sufficient to be considered suitable for nesting and is completely isolated from the main drainage feature. It is highly unlikely that the small ponded area (approximately 0.1 acre, including the area of the pond and the associated riparian vegetation) provides suitable habitat for LBV.

In an attempt to gather species information, the MSHCP requires protocol surveys for a select number of species due to a lack of data regarding species information; LBV is one of those species. In the event that project grading is approved prior to completing protocol surveys for LBV, a 250- to 300-foot buffer should be placed around the suitable habitat areas. No construction related activities should occur within the buffer area during the nesting season, which is typically from mid-February to the end of August. If construction activities must be conducted during the nesting season, a biological monitor will be required to monitor construction activities until construction activities are completed or a protocol survey has been completed. If a protocol survey is completed with negative findings, then no further monitoring will be required. If LBV are observed during the protocol survey, a biological monitor will be required until construction activities were completed to ensure that no direct or indirect impacts to this species occur.

If you have any further questions, please feel free to give me a call at 714.742.5316 or email me at Scrawford@brandman.com

Sincerely,

Scott A. Crawford, M.A.
FirstCarbon Solutions | Michael Brandman Associates
Senior Scientist / Biologist
220 Commerce, Suite 200
Irvine, CA 92602

PHASE I CULTURAL RESOURCES SURVEY FOR THE WILDOMAR 23 PROJECT
CITY OF WILDOMAR, COUNTY OF RIVERSIDE

EDITED *Confidential Appendix*

Assessor's Parcel Numbers: 380-280-004 and 380-280-008 through -012

Project Site Location: Section 6, Township 7 South, Range 3 West of the *Murrieta* USGS Quadrangle Topographic Map

Prepared for:
Lennar
980 Montecito Drive Suite 302
Corona, California 92879

Prepared by:

Tracy A. Stropes and Brian F. Smith
Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

September 25, 2012

Fieldwork dates: September 3, 2012
Key words: Negative Survey; City of Wildomar; 33 Acres; Murrieta Quadrangle

APPENDIX B

Archaeological Record Search Results

Brian F. Smith & Associates
Archaeological/Biological/Historical/Paleontological/Air/Traffic/Noise Consulting

August 30, 2012

For: Eastern Information Center
c/o Dept. of Anthropology
University of California Riverside
Riverside, CA 92521-0418

Re: Request for an archaeological records search for the Wildomar 23 Project, Riverside County, California.

Ms. Kay White,

I would like to request an archaeological records search for the following project: The Wildomar 23 Project: The location of this project is within the County of Riverside. The project area can be found immediately southwest of the intersection of Prielipp Road and Elizabeth Lane in Temecula. The project location may be found in Section 6 of the USGS 7.5 minute *Murrieta*, California topographic map, Townships 7 south, Range 3 west. A copy of the project map, with the project area and one-mile search radius buffer depicted thereon, has been included for your records.

Please provide the recorded cultural resource data, including locations of registered sites or historic structures, copies of relevant site forms, and bibliographic information for archaeological studies, for the area within a ***one-mile*** **radius** of the project. Please bill us at the listed billing address (or by email) for the fee to perform this search. Thank you very much for your assistance.

Sincerely,

Tracy A. Stropes, M.A., RPA
Senior Archaeologist
Billing: 14678 Ibex Court, San Diego, CA 92129
Phone: 858-484-0915
Email: tstropes@bfsa-ca.com

California Historical Resources Information System

ACCESS AGREEMENT

Number: _____

I, the undersigned, have been granted access to historical resources information on file at the Eastern Information Center Information Center of the California Historical Resources Information System.

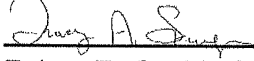
I understand that any CHRIS Confidential Information I receive shall not be disclosed to individuals who do not qualify for access to such information, as specified in Section III(A-E) of the CHRIS Information Center Rules of Operation Manual, or in publicly distributed documents without written consent of the Information Center Coordinator.

I agree to submit historical Resource Records and Reports based in part on the CHRIS information released under this Access Agreement to the Information Center within sixty (60) calendar days of completion.

I agree to pay for CHRIS services provided under this Access Agreement within sixty (60) calendar days of receipt of billing.

I understand that failure to comply with this Access Agreement shall be grounds for denial of access to CHRIS Information.

Print Name: Tracy A. Stropes, M.A., RPA Date: 8/30/2012

Signature: 

Affiliation: Brian F. Smith & Associates Inc.

Address: 14010 Poway Road Suite A City/State/Zip: Poway/CA/92064

Billing Address (if different from above): 14678 Ibex Court, San Diego, CA 92129

Telephone: 858-484-0915 Fax: 858-679-9896 Email: tstropes@bfsa-ca.com

Purpose of Access: Phase I Study for Wildomar 23 Project

Reference (project name or number, title of study, and street address if applicable): Wildoma 23 12-092

County: Riverside Township/Range/Section or UTMs: T7S/R3W/Section 6

USGS 7.5' Quad: Murrieta

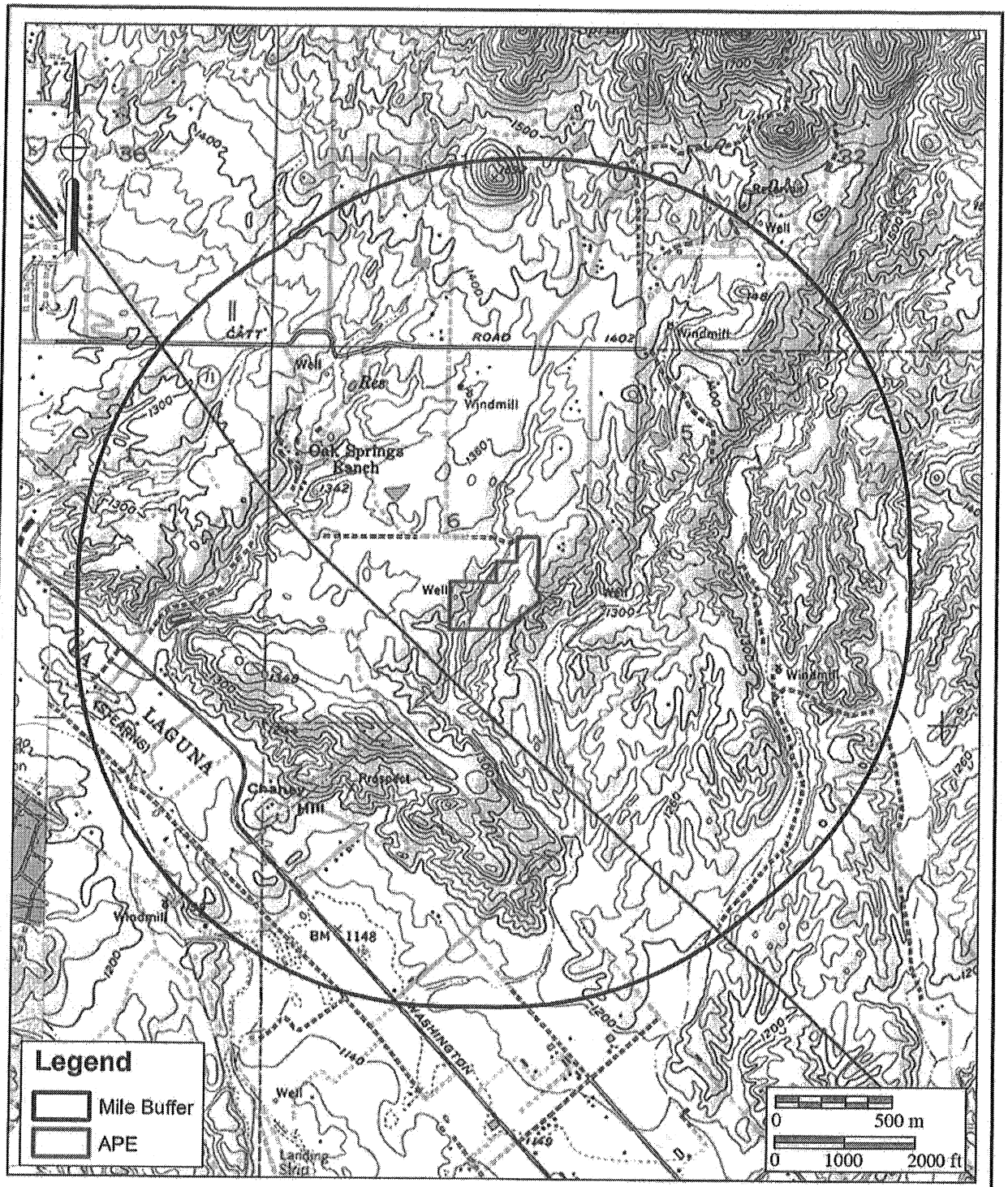


Figure 1

Record Search Location Map

The Wildomar 23 Project

USGS Murrieta (1:24,000 series)

EASTERN INFORMATION CENTER

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

Department of Anthropology, University of California, Riverside, CA 92521-0418

(951) 827-5745 - Fax (951) 827-5409 - eickw@ucr.edu

Inyo, Mono, and Riverside Counties

September 18, 2012
EIC- RIV-ST-1958

Tracy A. Stropes
Brian F. Smith & Associates
14010 Poway Road, Suite A
Poway, CA 92064

Re: Cultural Resources Records Search for the Wildomar 23 Project

Dear Mr. Stropes:

We received your request on August 30, 2012, for a cultural resources records search for the Wildomar 23 project located in Section 6, T.7S, R.3W, SBBM, in the Wildomar area of Riverside County. We have reviewed our site records, maps, and manuscripts against the location map you provided.

Our records indicate that 83 cultural resources studies have been conducted within a one-mile radius of your project area. Two of these studies involved the project area. Two additional studies provide overviews of cultural resources in the general project vicinity. All of these reports are listed on the attachment entitled "Eastern Information Center Report Listing" and are available upon request at 15¢/page plus $40/hour.

Our records indicate that 14 cultural resources properties have been conducted within a one-mile radius of your project area. None of these properties involved the project area. PDF copies of the records are included for your reference on the enclosed CD. All of these resources are listed on the attachment entitled "Eastern Information Center Resource Listing".

The above information is reflected on the enclosed maps. Areas that have been surveyed are highlighted in yellow. Numbers marked in blue ink refer to the report number (RI #). Cultural resources properties are marked in red and green; numbers with trinomial designations are marked in red with a green number, those marked in green with a green number have only a Primary Number designation.

Additional sources of information consulted are identified below.

National Register of Historic Places: no listed properties are located within the boundaries of the project area.

Office of Historic Preservation (OHP), Archaeological Determinations of Eligibility (ADOE): no listed properties are located within the boundaries of the project area.

Office of Historic Preservation (OHP), Directory of Properties in the Historic Property Data File (HPD): two properties (33-007804 Schwartz House and 33-007812) are listed as not eligible but may be of local interest for inclusion on the National Register of Historic Places. The applicable portion of this directory is enclosed for your study needs.

Note: not all properties in the California Historical Resources Information System are listed in the OHP ADOE and HPD; the ADOE and HPD comprise lists of properties submitted to the OHP for review.

A copy of the relevant portion of the 1901 USGS Elsinore 30' topographic map is included for your reference.

As the Information Center for Riverside County, it is necessary that we receive a copy of all cultural resources reports and site information pertaining to this county in order to maintain our map and manuscript files. Confidential information provided with this records search regarding the location of cultural resources outside the boundaries of your project area should not be included in reports addressing the project area.

Sincerely,

Michael P. Loyd
Information Officer

Enclosures

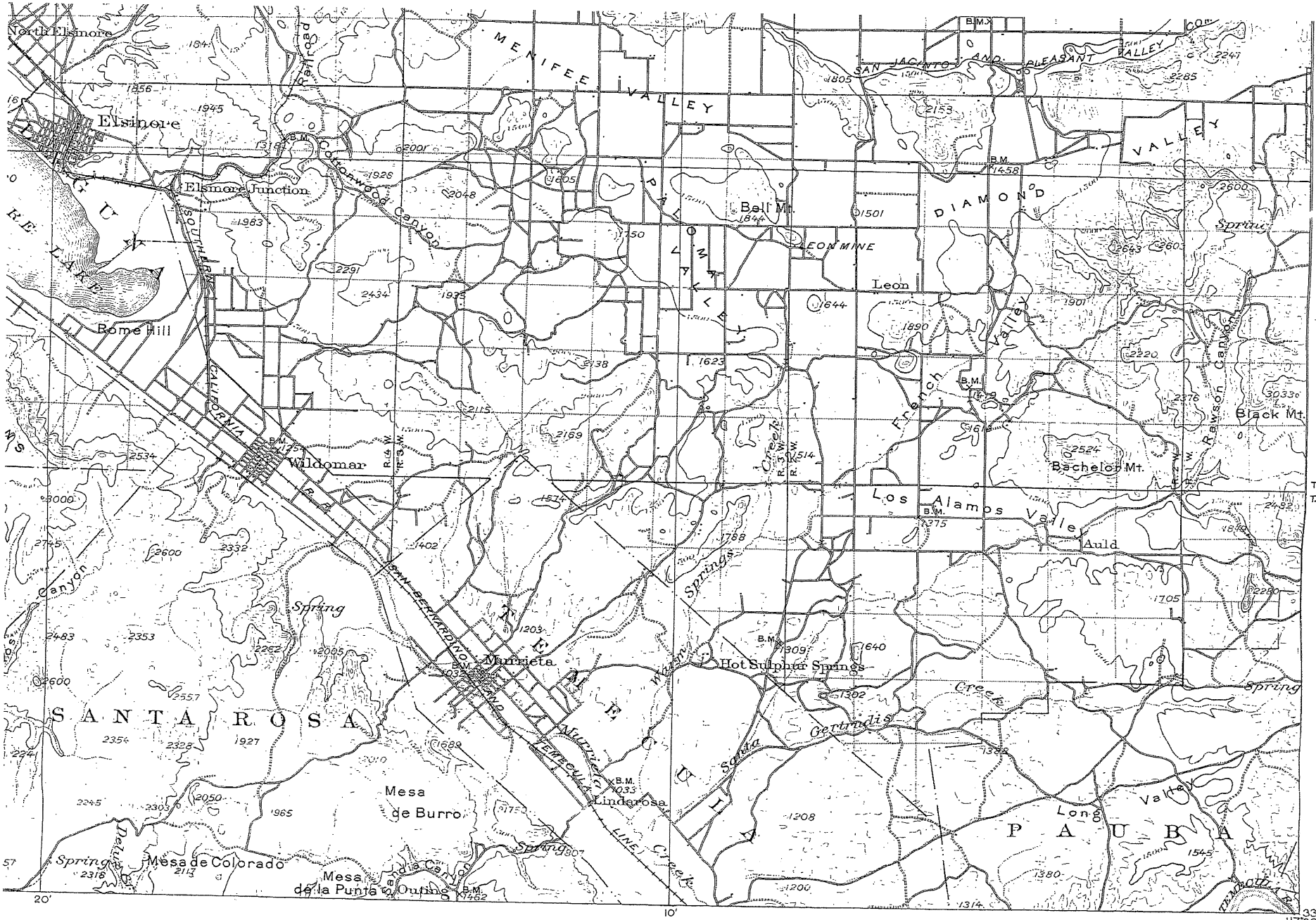
CONTACT THE CITY

OF WILDOMAR

PLANNING DEPARTMENT

FOR THIS

MAP



Scale 1/125000

1 ½ 0 1 2 3 4 5 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 100 feet.

Datum is mean sea level.

Edition of Feb 1901.

ELSINORE
30'

CONTACT THE
CITY OF WILDOMAR
PLANNING DEPARTMENT
FOR THIS MAP

CONTACT THE CITY OF WILDOMAR PLANNING DEPARTMENT FOR THIS MAP

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ----- Survey	Acreage ----- Monitoring
RI-00509	1978	Stan Wilmoth	Environmental Impact Evaluation: Archaeological Assessment of Tentative Parcel Map 12198, Murrieta Area of Riverside County, California	Archaeological Research Unit, U.C. Riverside	6	0	20.09	0.00
RI-00701	1979	Roger J. Desautels	Archaelogical Survey Report on Farm Lot 24, in Black "B" of the Murrieta Eucalyptus Company's Tract, As Shown by Map in the File in Book 6, Page 73 of Maps, Riverside County Records, State of California	Scientific Resource Surveys, Inc., Santa Ana, CA	6	0	40.00	0.00
RI-00702	1979	Roger J. Desautels	Archaeological Survey Report on a Portion of Farm Lot 27, in Block "B" of the Murrieta Eucalptus Company's Tract, As Shown By Map in the File in Book 6, Page 73 of Maps, Riverside County Records, State of California	Scientific Resource Surveys, Inc., Santa Ana, CA	7	0	10.00	0.00
RI-00703	1979	Roger J. Desautels	Archaeological Survey Report on Lot 25 in Block "B" of Murrieta Eucalyptus Company's Tract as Shown by Map on File in Book 6, Page 73 of Maps, Riverside County Records, in Temecula Rancho	Scientific Resource Surveys, Inc., Santa Ana, CA	7	0	40.00	0.00
RI-00829	1980	Alan Davis	Enivornmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 16945, Northwest of Murrieta in Riverside County, California	Archaeological Research Unit, U.C. Riverside	7	0	6.10	0.00
RI-01246	1981	Alan Davis	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 17625, Northwest of Murrieta in Riverside County, California	Archaeological Reseach Unit, U.C. Riverside	7	0	19.64	0.00
RI-01327	1981	SCIENTIFIC RESOURCE SURVEYS, INC.	Cultural Resources Report on the "California Oaks" Property Located in the Murrieta Area of the County of Riverside	Scientific Resource Surveys, Inc., Santa Ana, CA	36	7	1790.00	0.00
RI-01500	1982	DEL CHARIO, KATHLEEN	ARCHAEOLOGICAL ASSESSMENT OF TENTATIVE PARCEL 18417, NEAR WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESOURCES MANAGEMENT CORPORATION	13	0	20.00	0.00
RI-01656	1983	COOK, J.R.	ARCHAEOLOGICAL ASSESSMENT OF PM 19059	ARCHAEOLOGICAL SYSTEMS MANAGMENT	7	0	30.80	0.00
RI-02028	1986	DEL CHARIO, K.C.	ARCHAEOLOGICAL RESOURCE ASSESSMENT OF TENTATIVE TRACT MAP 21691, NEAR MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESOURCE MANAGEMENT CORPORATION	10	0	60.00	0.00
RI-02114	1987	KELLER, JEAN SALPAS	AN ARCHAEOLOGICAL ASSESSMENT OF TT MAP 22346, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR(S)	18	0	26.98	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ----- Survey	Acreage ----- Monitoring
RI-02121	1987	SCIENTIFIC RESOURCES SURVEYS, INC.	ARCHAEOLOGICAL ASSESSMENT FORM: TP 22611	AUTHOR(S)	6	0	38.00	0.00
RI-02215	1988	GOODMAN, JOHN D.	AN ARCHAEOLOGICAL ASSESSMENT OF TENTATIVE PARCEL 23087, LOCATED NORTH OF MURRIETA IN SOUTHWESTERN RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	8	0	50.00	0.00
RI-02221	1988	KELLER, JEAN SALPAS	AN ARCHAEOLOGICAL ASSESSMENT OF VESTING TENTATIVE TRACT MAP NO. 23051, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR(S)	21	0	40.50	0.00
RI-02233	1971	KELLY, JAMES and THOMAS KING	ARCHAEOLOGICAL RESOURCE PLANNING IN THE PALM HILLS AREA - FINAL FIELD REPORT AND RECOMMENDATIONS.	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	17	11	0.00	0.00
RI-02235	1987	DROVER, C.E.	AN ARCHAEOLOGICAL ASSESSMENT OF THE ALSON RANCH, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR(S)	10	0	93.00	0.00
RI-02283	1988	DROVER, C.E.	AN ARCHAEOLOGICAL ASSESSMENT OF THE FARM-SECONDARY HIGHWAY ACCESS STUDY	AUTHOR(S)	11	1	2.25	0.00
RI-02317	1988	KELLER, JEAN SALPAS	AN ARCHAEOLOGICAL ASSESSMENT OF VESTING TTM # 23187, RIVERSIDE COUNTY, CALIFORNIA	Consulting Archaeologist, Rancho California, CA	26	0	128.00	0.00
RI-02319	1988	SCIENTIFIC RESOURCE SURVEYS, INC.	ARCHAEOLOGICAL ASSESSMENT FORM: TTM # 22625	SCIENTIFIC RESOURCE SURVEYS, INC.	3	0	28.54	0.00
RI-02344	1988	Christopher E. Drover and Daniel McCarthy	Rancho California Masterplan: A Cultural Respurces Overview- Rancho California Development Company, The Bedford Group	Consulting Archaeologists, Tustin, CA	12	0	~44800.00	0.00
RI-02382	1989	PARR, ROBERT E.	AN ARCHAEOLOGICAL ASSESSMENT OF T.P. 23508 LOCATED NORTH OF MURRIETA IN SOUTHWESTERN RIVERSIDE COUNTY, CALIFORNIA	ARCHAELOGICAL RESEARCH UNIT, UNIVERSITY OF CALIF, RIVERSIDE	6	0	20.00	0.00
RI-02508	1989	KELLER, JEAN S.	AN ARCHAEOLOGICAL ASSESSMENT OF TENTATIVE PARCEL MAP NO. 24469, RIVERSIDE COUNTY, CALIFORNIA.	AUTHOR(S)	20	0	22.00	0.00
RI-02510	1989	KELLER, JEAN S.	AN ARCHAEOLOGICAL ASSESSMENT OF TENTATIVE TRACT MAP NO. 23435, RIVERSIDE COUNTY, CALIFORNIA.	AUTHOR(S)	22	0	131.00	0.00
RI-02610	1989	KELLER, JEAN S.	AN ARCHAEOLOGICAL ASSESSMENT OF VESTING TENTATIVE TRACT MAP 25362, RIVERSIDE COUNTY, CALIFORNIA.	AUTHOR(S)	21	0	54.75	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ---- Survey	Acreage ---- Monitoring
RI-02684	1989	SCIENTIFIC RESOURCE SURVEYS	ARCHAEOLOGICAL AND PALEONTOLOGICAL ASSESSMENT OF A 3+ ACRE PORTION OF TPM 25065 ADJACENT TO INLAND VALLEY REGIONAL MEDICAL CENTER, RIVERSIDE COUNTY, CALIFORNIA.	SRS, INC.	8	0	7.00	0.00
RI-03171	1990	KELLER, JEAN A.	AN ARCHAEOLOGICAL ASSESSMENT OF TENTATIVE PARCEL MAP 26184, RIVERSIDE COUNTY, CALIFORNIA	Consulting Archaeologist, Temecula, CA	26	0	16.20	0.00
RI-03340	1988	KELLER, JEAN SALPAS	AN ARCHAEOLOGICAL ASSESSMENT OF CHANGE OF ZONE 5231, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR	20	0	27.82	0.00
RI-03341	1998	LOVE, BRUCE	CULTURAL RESOURCES REPORT: SENIOR LIFESTYLE PERSPECTIVES PROJECT, APNS 369-050-040, -041, AND -042, NEAR THE COMMUNITY OF WILDOMAR, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA	CRM TECH	25	1	28.00	0.00
RI-03376	1989	WADE, SUE A. and SUSAN M. HECTOR	A CULTURAL RESOURCE SURVEY OF THE PROPOSED RANCHO-TEMECULA EFFLUENT PIPELINE FROM TEMECULA TO WARM SPRINGS IN THE ELSINORE VALLEY WITH ADDITIONAL CONSIDERATION OF THE SURFACE WATER DISCHARGE INTO TEMESCAL WASH	RECON	23	5	0.00	0.00
RI-03496	1992	JONES & STOKES ASSOCIATES, INC.	ARCHAEOLOGICAL SURVEY REPORT FOR RIVERSIDE COUNTY MURRIETA CREEK FLOOD CONTROL PROJECT	JONES & STOKES ASSOCIATES, INC.	21	1	25.00	0.00
RI-03604	1992	JONES, CARLETON S.	THE DEVELOPMENT OF CULTURAL COMPLEXITY AMONG THE LUISENO.		144	0	0.00	0.00
RI-03699	1993	WHITE, ROBERT S.	AN ARCHAEOLOGICAL ASSESSMENT OF MURRIETA LINE G, A 1200 FOOT DAYLIGHT CHANNEL AND CULVERT SITUATED AT THE INTERSECTION OF WASHINGTON AVENUE AND NUTMEG IN MURRIETA, RIVERSIDE COUNTY	ARCHAEOLOGICAL ASSOCIATES	9	0	2.75	0.00
RI-04065	1997	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF THE CHURCH OF THE NAZARENE SITE 11.23 ACRES OF LAND LOCATED IN MURRIETA, RIVERSIDE COUNTY, CALIFORNIA USGS MURRIETA, CALIFORNIA QUADRANGLE, 7.5' SERIES	AUTHOR	28	0	11.23	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ----- Survey	Acreage ----- Monitoring
RI-04070	1998	LOVE, BRUCE and BAI "TOM" TANG	CULTURAL RESOURCES REPORT WATER AND SEWER PIPELINE RIGHTS-OF-WAY AND ASSOCIATED FACILITIES IN COMMUNITY FACILITIES DISTRICT NO. 97-1, NEAR WILDOMAR ELSINORE VALLEY MUNICIPAL WATER DISTRICT RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	22	0	0.00	0.00
RI-04257	2000	LOVE, BRUCE, BAI "TOM" TANG, and DANIEL BALLESTER	CULTURAL RESOURCES REPORT: TENTATIVE TRACT NO. 29403, CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA.	CRM TECH	20	0	38.60	0.00
RI-04297	1998	WADE, SUE A.	CULTURAL RESOURCES SURVEY AND ARCHAEOLOGICAL EVALUATIONS FOR THE CLINTON KEITH ROAD AND RESIDENTIAL PROJECT (TRACT MAP 29039 AND PARCEL MAP 29040), COUNTY OF RIVERSIDE, CALIFORNIA.	HERITAGE RESOURCES	64	2	76.00	0.00
RI-04350	1999	BROWN, JOAN C.	A CULTURAL RESOURCES RECONNAISSANCE FOR THE MACARTHUR PROPERTIES, LOCATED IN RIVERSIDE COUNTY, CALIFORNIA.	RMW PALEO ASSOCIATES	19	1	32.00	0.00
RI-04390	2000	KELLER, JEAN A.	A PHASE 1 CULTURAL RESOURCES ASSESSMENT OF GENERAL PLAN AMENDMENT 540/CHANGE OF ZONE 6536 LOCATED NEAR MURRIETA, RIVERSIDE COUNTY CALIFORNIA	JEAN A. KELLER	32	6	~3.86	0.00
RI-04470	2002	ROBINSON, MARK C.	CULTURAL RESOURCES SURVEY AND ASSESSMENT OF APPROXIMATELY 10.73 ACRES: OAK CREEK APARTMENT COMPLEX PROJECT, ELIZABETH LANE AND PRIELIPP ROAD, WILDOMAR, RIVERSIDE COUNTY, CALIFORIA	GREAT LAKES RESEARCH	25	3	10.73	0.00
RI-04510	2001	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF TENTATIVE TRACT NO. 29836, GPA 549/CZ6559, 16.07 ACRES OF LAND NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR	33	0	16.07	0.00
RI-04641	2001	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF CHANGE OF ZONE 6618, 29.10 ACRES OF LAND LOCATED NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR	34	0	0.00	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage Survey	Acreage Monitoring
RI-04698	2003	TETRA TECH, INC.	A PHASE I ARCHAEOLOGICAL SURVEY OF APPROX. 3.5-ACRES FOR THE STONEBRIDGE MEDICAL OFFICE BUILDING, WILDOMAR, RIVERSIDE COOUNTY, CALIFORNIA	TETRA TECH, INC.	57	0	~3.50	0.00
RI-04877	2003	PEAK & ASSOCIATES, INC.	CULTURAL RESOURCES ASSESSMENT OF THE PROPOSED TEMECULA VALLEY REGIONAL WATER RECLAMATION FACILITY EFFLUENT PIPELINE, RIVERSIDE COUNTY, CALIFORNIA	PEAK & ASSOCIATES, INC.	18	1	169.70	0.00
RI-04937	2003	MCKENNA, JEANETTE A.	A PHASE I CULTURAL REOURCES SURVEY OF THE DEPASQUALE FAMILY PARTNERSHIP PROPOERTY (TRACT 30155) IN THE OAK SPRINGS AREA OF RIVERSIDE COUNTY, CALIFORNIA.	MCKENNA ET AL.	82	0	75.00	0.00
RI-05216	2002	ROBINSON, MARK C.	PHASE II TESTING AND EVALUATION OF 33-11434 (CA-RIV-6821)	GREAT LAKES RESEARCH	33	1	0.00	0.00
RI-05366	2003	KELLER, JEAN	A OHASE I CULTURAL RESOURCE ASSESSMENT OF CONDITIONAL USE PERMIT 02-401	JEAN KELLER	35	0	15.00	0.00
RI-05371	2003	KELLER, JEAN	A PHASE I CULTURAL RESOURCES ASSESSMENT OF APN 958-040-021, -022	JEAN KELLER	31	0	40.00	0.00
RI-05415	2001	LOVE, BRUCE, BAI TOM TANG, DANIEL BALLESTER, and MELISSA HERNANDEZ	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, CROWE FLORY PROPERTY, CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	17	0	2.50	0.00
RI-05536	2005	KELLER, JEAN A.	A PHASE I CULTURAL RESORUCES ASSESSMENT OF HIDDEN SPRINGS RANCH APN 380-290-029, +/-9.5 ACRES OF LAND NEAR WILDOMAR, RIVERSIDE COUNTY, CA	JENA KELLER	34	0	9.50	0.00
RI-05611	2000	DROVER, CHRISTOPHER E.	A CULTURAL RESOURCE INVENTORY: AN ARCHAEOLOGICAL ASSESSMENT OF CLYATON RANCH, APN'S 369-260-003/ 369-260-005, NEAR WILDOMAR, CLINTON KEITH ROAD, RIVERSIDE COUNTY, CA	CHRISTOPHER DROVER	12	0	60.00	0.00
RI-05750	2003	DAHDUL, MARIAM and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT: BEAR CREEK VILLAGE CENTER, NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	19	0	9.88	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	----- Acreage ----- Survey	Monitoring
RI-05849	2001	LOVE, BRUCE, BAI TANG, DANIEL BALLESTER, and VICTORIA AVALOS	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, MURRIETA RANCHOS II TENTATIVE TRACTS 30273 AND 30303, CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	20	1	85.00	0.00
RI-05920	2002	LOVE, BRUCE, BAI TANG, TERESA WOODARD, MARIAM DAHDUL, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, TENTATIVE TRACT MAP NO. 30656, APNS 362-180-029 TO -032, WILDOMAR AREA, RIVERSIDE COUNTY, CA	CRM TECH	21	0	26.00	0.00
RI-05921	2002	LOVE, BRUCE, BAI TANG, TERESA WOODARD, MARIAM DAHDUL, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, TENTATIVE TRACT MAP NO. 30734, CLINTON KEITH ROAD AND SMITH RANCH ROAD, WILDOMAR AREA, RIVERSIDE COUNTY, CA	CRM TECH	22	2	40.00	0.00
RI-05970	2003	TANG, BAI, MICHAEL HOGAN, CASEY TIBBET, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, TENTATIVE TRACT MAP NO. 31479, NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	17	0	10.00	0.00
RI-05981	2003	TANG, BAI and MICHAEL HOGAN	HISTORICAL/ARCHAEOLOGICAL RESORUCES SURVEY REPORT, APNS 507-183-003 AND -006 (THE SPANISH INN), 640 NORTH INDIAN CANYON DRIVE, CITY OF PALM SPRINGS, RIVERSIDE COUNTY, CA	CRM TECH	32	1	~1.00	0.00
RI-06030	2004	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF TENTATIVE TRACT MAP 31896 AMENDED NO. 1, +/-4.88 ACRES OF LAND IN WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA	JEAN A. KELLER	33	0	4.88	0.00
RI-06033	2004	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF VESTING TENTATIVE PARCEL MAP 32166, +/-20.20 ACRES OF LAND IN WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA	JEAN A. KELLER	33	0	20.20	0.00
RI-06035	2004	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF PLOT PLAN 19064, +/-10 ACRES OF LAND NEAR MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	JEAN A. KELLER	33	0	10.00	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	----- Acreage ----- Survey	Monitoring
RI-06286	2004	HOGAN, MICHAEL	LETTER REPORT: PALEONTOLOGICAL MONITORING, BEAR CREEK VILLAGE CENTER, C.U.P NO. 3390, ASSESSORS PARCEL NUMBERS 369-390-002,-010,-012,-018, IN AN UNINCORPORATED AREA NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA, CRM TECH CONTRACT NO. 1191	CRM TECH	4	0	0.00	21.00
RI-06369	2005	TANG, BAI, MICHAEL HOGAN, DEIRDRE ENCARNACION, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL REOSURCES SURVEY REPORT: MURRIETA TENNIS CLUB PROJECT, NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	18	0	5.00	0.00
RI-06398	2005	TANG, BAI, MICHAEL HOGAN, MATTHEW WETHERBEE, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT: GRIZZLY RIDGE RESERVOIR NO. 2, NEAR THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	19	0	0.78	0.00
RI-06457	2004	HOGAN, MICHAEL, BAI TANG, CASEY TIBBET, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, MURRIETA WASTEWATER PLANNING AND CONSTRUCTION PROJECT, IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	41	0	~1.00	0.00
RI-06827	2006	Williams, Audry	Archaeological Survey Report for the Southern California Edison Company, Wildomar Service Center Project	Southern California Edison Company, Natural and Cultural Resources Group	9	2	19.10	0.00
RI-06909	2006	Jordan, Stacey C. and Joshua D. Patterson	Archaeological Survey Report for the So CA Edison Company, Syborne, Dominic C&D Land Co, Hemet Nazaren, Sunset Vista Homes, and Iodine Springs Projects, Riverside County, CA, (WO#6279-2326, 6377-1377, 6677-7101, 6577-1957, 6277-7164, AI# 6-2063, -1259 etc	Mooney, Jones & Stokes	15	0	~9.40	0.00
RI-07044	2006	Anna M. Hoover and Kristie R. Blevins	A Phase I Archaeological Survey Report for APN 380-170-019, 3.5 Acres, Murrieta, County of Riverside, California	L & L Environmental, Inc., Corona, CA	55	0	~3.50	0.00
RI-07227	2007	Moreno, Adrian Sanchez	Archaeological Survey Report for Southern California Edison Company clinton Keith Reconductor Project Overhead Section Riverisde County, California	Jones & Stokes	18	0	~2.50	0.00
RI-07228	2007	Moreno, Adrian Sanchez	Archeaological Survey Report for Southern California Edison Company: Clinton Keith Reconductor Project Underground Section in Riverside County, California	Jones & Stokes	19	0	~0.70	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ---- Survey	Acreage ---- Monitoring
RI-07408	2006	Keller, Jean A.	A Phase I Cultural Resources Assessment of PAR #788 Crossroads Apartments, +- 23.19 Acres of Land in Wildomar, Riverside County, California, USGS Murrieta, California Quadrangle, 7.5' Series	Author	35	0	~23.19	0.00
RI-07525	2008	Crull, Scott	A Archaeological Mitigation-Monitoring Report for PM 32159, with APNS: 380-170-019 & -20- A +_ 13.11-Acre Parcel Located in the Murrieta Area, Riverside County, California	L&L Environmental, Inc., Corona, CA	33	0	0.00	~13.00
RI-07593	2008	Tsunoda, Koji and Joshua D. Patterson	Archaeological Survey Report for Southern California Edison Company O&M -- Wildomar Service Center Fiber Optic Cables Project, on the Nutmeg 12 kV Circuit Riverside County, California	Jones and Stokes	19	0	22.30	0.00
RI-07597	2008	Smith, Brian F.	Letter Report: Addendum to the Bear Creek Plaza, Wildomar Square cultural resources report; CUP 03504R1-FTA 2007-28; APNs 380-110-023, -024, -027, -028, and 380-230-001.	Brian F. Smith and Associates	4	0	5.27	0.00
RI-07598	2007	Clowery-Moreno, Sara and Brian F. Smith	A Phase I Archaeological Assessment for the Wildomar Square Project, Riverside County, California, APN 380-230-001	Brian F. Smith and Associates	32	0	1.85	0.00
RI-07600	2008	Tang, Bai "Tom", Clarence Bodmer, Daniel Ballester, and Laura Shaker	Phase I Archaeological Assessment: Assessor's Parcel No. 380-290-003, 36125 Jana Lane, Wildomar Area, Riverside County, California	CRM Tech	33	0	4.50	0.00
RI-07608	2005	MCGINNIS, P and BAKSH, M.	CULTURAL RESOURCE SURVEY REPORT FOR THE 2.35 ACRE RIDGE MOUNTAIN 9 PROJECT RIVERSIDE COUNTY, CALIFORNIA	TIERRA ENVIRONMENTAL SERVICES, INC.	31	0	2.35	0.00
RI-07677	2008	Tsunoda, Koji	ARCHAEOLOGICAL SURVEY REPORT FOR SOUTHERN CALIFORNIA EDISON COMPANY O&M-NEXUS RESIDENTIAL PROJECT ON THE NUTMEG 12kV CIRCUIT, RIVERSIDE COUNTY, CALIFORNIA (WO#6277-6784, AI#K-6757)	Jones & Stokes, San Diego, CA	23	1	11.30	0.00
RI-07680	2006	Rosenberg, Seth A. and Brian F. Smith	A PHASE I ARCHAEOLOGICAL ASSESSMENT FOR THE BEAR CREEK PLAZA PHASE II PROJECT, RIVERSIDE COUNTY, CALIFORNIA.	Brian F. Smith and Associates	43	0	3.42	0.00
RI-07793	2008	Encarnacion, Dierdre, Daniel Ballester, and Laura H. Shaker	PHASE I ARCHAEOLOGICAL ASSESSMENT: SAN CRISTOBAL MIGRANT AGRICULTURAL WORKERS HOUSING, ASSESSORS PARCEL NO. 729-050-002, NEAR THE COMMUNITY OF MECCA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	31	0	~25.00	0.00

Eastern Information Center Report Listing

Report No.	Year	Author(s)	Title	Affiliation	Pages	Resources	Acreage ----- Survey	Acreage ----- Monitoring
RI-07983	2008	Sara Clowery-Moreno and Brian F. Smith	A Phase I Archaeological Assessment for the Hayes Avenue Pipeline Project, Riverside County, California	Brian F. Smith and Associates	59	0	16.00	0.00
RI-08056	2008	Wayne Bonner	Letter Report: Cultural Resource Records Search and Site Visit Results for Royal Street Communications California, LLC	Michael Brandman Associates, Irvine, California	14	0	0.00	0.00
RI-08172	2003	Riordan Goodwin	Letter Report: Results of the Cultural Resource Management Compliance Review and Paleontological Resources Assessment for the Oak Creek Apartments Parcel Riverside County, California		8	3	~10.00	0.00

Eastern Information Center Resource Listing

Primary No.	Trinomial	Other IDs	Reports
P-33-007804			RI-05921, RI-06245
P-33-007812			RI-05921, RI-06245
P-33-008654		Other CK-3	RI-04297
P-33-008948			RI-05181
P-33-008949	CA-RIV-6350		RI-04350, RI-04390, RI-05181
P-33-010986			RI-04877
P-33-011434	CA-RIV-6821		RI-04470, RI-05216, RI-08172
P-33-011435			RI-04470, RI-08172
P-33-011436			RI-04470, RI-08172
P-33-015304			RI-06827
P-33-015305			RI-06827
P-33-016988	CA-RIV-8848	Other 2007CWA93-01	RI-07677
P-33-017366	CA-RIV-9024	Other Temp 1 20370013, Other APN's 380-250-011	
P-33-020991			

California Register of Historical Resources

This listing contains all resources in the selected region that are listed in the California Register of Historical Resources, in addition to other resources that are not presently listed. In order to determine which resources are currently listed in the California Register, refer to the columns labeled CHL# and NRS.

If there is a number listed under CHL# **and** if that number is 770 or higher . . .

OR

If there is a derivative of the rankings 1 **or** 2 under the NRS column . . .

then that resource has automatically been listed in the California Register.

Those resources with a derivative of the rankings 3, 4 and 5 in the NRS column may be eligible for the California Register and should be evaluated against the California Register criteria below to determine if they should be taken into consideration under the California Environmental Quality Act and are therefore subject to environmental review.

California Register Criteria

An historical resource must be significant at the local, state, or national level, under one or more of the following four criteria:

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

(2) It is associated with the lives of persons important to local, California, or national history;

(3) It embodies the distinctive characteristics of a type, period, region, or method or construction, or represents the work of a master, or possesses high artistic values; or

(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

California Historical Resource Status Codes

1 Properties listed in the National Register (NR) or the California Register (CR)

1D Contributor to a district or multiple resource property listed in NR by the Keeper. Listed in the CR.
1S Individual property listed in NR by the Keeper. Listed in the CR.

1CD Listed in the CR as a contributor to a district or multiple resource property by the SHRC
1CS Listed in the CR as individual property by the SHRC.
1CL Automatically listed in the California Register – Includes State Historical Landmarks 770 and above and Points of Historical Interest nominated after December 1997 and recommended for listing by the SHRC.

2 Properties determined eligible for listing in the National Register (NR) or the California Register (CR)

2B Determined eligible for NR as an individual property and as a contributor to an eligible district in a federal regulatory process. Listed in the CR.
2D Contributor to a district determined eligible for NR by the Keeper. Listed in the CR.
2D2 Contributor to a district determined eligible for NR by consensus through Section 106 process. Listed in the CR.
2D3 Contributor to a district determined eligible for NR by Part I Tax Certification. Listed in the CR.
2D4 Contributor to a district determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.
2S Individual property determined eligible for NR by the Keeper. Listed in the CR.
2S2 Individual property determined eligible for NR by a consensus through Section 106 process. Listed in the CR.
2S3 Individual property determined eligible for NR by Part I Tax Certification. Listed in the CR.
2S4 Individual property determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.

2CB Determined eligible for CR as an individual property and as a contributor to an eligible district by the SHRC.
2CD Contributor to a district determined eligible for listing in the CR by the SHRC.
2CS Individual property determined eligible for listing in the CR by the SHRC.

3 Appears eligible for National Register (NR) or California Register (CR) through Survey Evaluation

3B Appears eligible for NR both individually and as a contributor to a NR eligible district through survey evaluation.
3D Appears eligible for NR as a contributor to a NR eligible district through survey evaluation.
3S Appears eligible for NR as an individual property through survey evaluation.

3CB Appears eligible for CR both individually and as a contributor to a CR eligible district through a survey evaluation.
3CD Appears eligible for CR as a contributor to a CR eligible district through a survey evaluation.
3CS Appears eligible for CR as an individual property through survey evaluation.

4 Appears eligible for National Register (NR) or California Register (CR) through other evaluation

4CM Master List - State Owned Properties – PRC §5024.

5 Properties Recognized as Historically Significant by Local Government

5D1 Contributor to a district that is listed or designated locally.
5D2 Contributor to a district that is eligible for local listing or designation.
5D3 Appears to be a contributor to a district that appears eligible for local listing or designation through survey evaluation.

5S1 Individual property that is listed or designated locally.
5S2 Individual property that is eligible for local listing or designation.
5S3 Appears to be individually eligible for local listing or designation through survey evaluation.

5B Locally significant both individually (listed, eligible, or appears eligible) and as a contributor to a district that is locally listed, designated, determined eligible or appears eligible through survey evaluation.

6 Not Eligible for Listing or Designation as specified

6C Determined ineligible for or removed from California Register by SHRC.
6J Landmarks or Points of Interest found ineligible for designation by SHRC.
6L Determined ineligible for local listing or designation through local government review process; may warrant special consideration in local planning.
6T Determined ineligible for NR through Part I Tax Certification process.
6U Determined ineligible for NR pursuant to Section 106 without review by SHPO.
6W Removed from NR by the Keeper.
6X Determined ineligible for the NR by SHRC or Keeper.
6Y Determined ineligible for NR by consensus through Section 106 process – Not evaluated for CR or Local Listing.
6Z Found ineligible for NR, CR or Local designation through survey evaluation.

7 Not Evaluated for National Register (NR) or California Register (CR) or Needs Revaluation

7J Received by OHP for evaluation or action but not yet evaluated.
7K Resubmitted to OHP for action but not reevaluated.
7L State Historical Landmarks 1-769 and Points of Historical Interest designated prior to January 1998 – Needs to be reevaluated using current standards.
7M Submitted to OHP but not evaluated - referred to NPS.
7N Needs to be reevaluated (Formerly NR Status Code 4)
7N1 Needs to be reevaluated (Formerly NR SC4) – may become eligible for NR w/restoration or when meets other specific conditions.
7R Identified in Reconnaissance Level Survey: Not evaluated.
7W Submitted to OHP for action – withdrawn.

CONTACT THE
CITY OF NILOOMAL
PLANNING DEPARTMENT
FOR ALLESS TO
THIS INFORMATION

APPENDIX C

Native American Correspondence
Sacred Lands File Search

Brian F. Smith and Associates, Inc.
Archaeology / Biology / History / Paleontology / Air Quality / Traffic / Acoustics

August 30, 2012

For: Mr. Dave Singleton, Program Analyst
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, California 95814

From: Tracy A Stropes, M.A., RPA
Brian F. Smith and Associates
14010 Poway Rd. Suite A
Poway, CA 92064

Re: Request for a Sacred Lands File records search for Wildomar 23 Project in the County of Riverside, California.

I am writing to request a record search of the Sacred Lands File and a list of appropriate Native American contacts for the Wildomar Project. The location of this project is within the County of Riverside. The project area can be found immediately southwest of the intersection of Prielipp Road and Elizabeth Lane near the City of Temecula. The project location may be found in Section 6 of the USGS 7.5 minute *Murrieta,* California topographic map, Townships 7 south, Range 3 west. A copy of the project map, with the project location has been attached for your records.

Sincerely,

Tracy A. Stropes, M.A., RPA
Senior Project Archaeologist
Phone: 858-484-0915
Email: tstropes@bfsa-ca.com

Attachments:
USGS 7.5 minute *Murrieta,* California topographic maps with project area delineated.

Sacred Lands File & Native American Contacts List Request
NATIVE AMERICAN HERITAGE COMMISSION
□915 Capitol Mall, RM 364 □Sacramento, CA 95814□(916) 653-4082 □
(916) 657-5390 – Fax□
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: The Wildomar 23 Project

County: Riverside

USGS Quadrangle Name: Corona North

Township: 7S Range: 3W

Company/Firm/Agency: Brian F. Smith & Associates

Contact Person: Tracy A. Stropes, RPA

Street Address: 14010 Poway Road, Suite A

City: Poway Zip: 92064

Phone: 858-484-0915

Fax: 858-679-9896

Email: tstropes@bfsa-ca.com

Project Description:

The project is a Phase I archaeological survey for the Wildomar 23 Project property located in the County of Riverside, California. The location of this project is within the County of Riverside. The project area can be found immediately southwest of the intersection of Prielipp Road and Elizabeth Lane near the City of Temecula. The project location may be found in Section 6 of the USGS 7.5 minute *Murrieta*, California topographic map, Townships 7 south, Range 3 west. A copy of the project map, with the project location has been attached for your records.

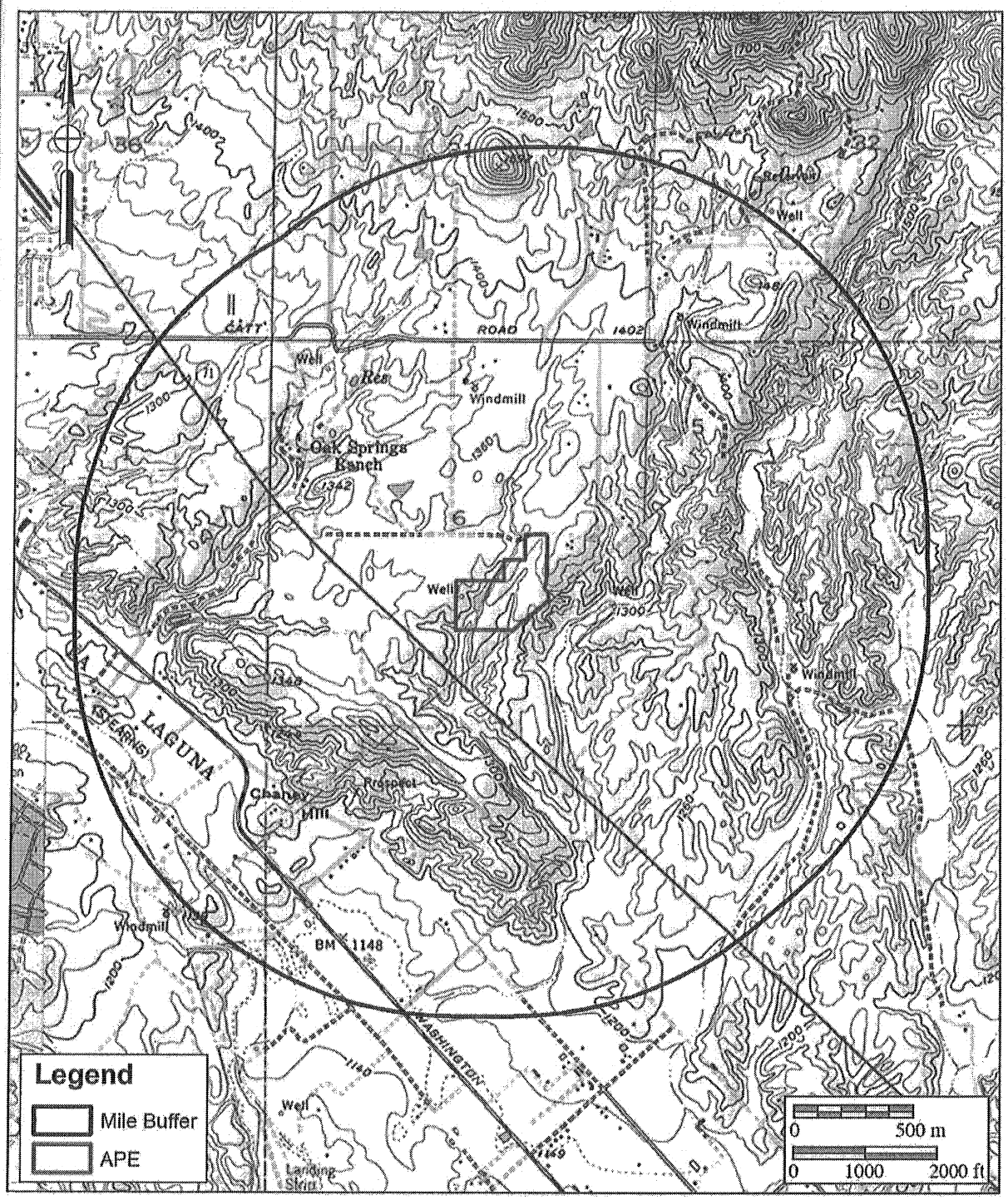


Figure 1

SLF Search Location Map

The Wildomar 23 Project

USGS Murrieta (1:24,000 series)

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

August 30, 2012

Mr. Tracy Stropes, M.A., RPA, Senior Project Archaeologist
Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, CA 92064

Sent by FAX to:: 858-679-9896
No. of Pages: 5

Re: Sacred Lands File Search and Native American Contacts list for the proposed Sacred Lands File Search and Native American Contacts list for the proposed **"Wildomar 23 Project ;"** located on the City of Temeculat; Riverside County, California

Dear Mr. Stropes:

The Native American Heritage Commission (NAHC) conducted a Sacred Lands search based on the data provided and **Native American cultural resources were not identified** within one-half mile of the project site, the 'area of potential effect' (e.g. APE); you specified.. Also, please note; the NAHC Sacred Lands Inventory is not exhaustive and does not preclude the discovery of cultural resources during any project groundbreaking activity..

California Public Resources Code §§5097.94 (a) and 5097.96 authorize the NAHC to establish a Sacred Land Inventory to record Native American sacred sites and burial sites. These records are exempt from the provisions of the California Public Records Act pursuant to. California Government Code §6254 (r). The purpose of this code is to protect such sites from vandalism, theft and destruction.

In the 1985 Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list that the NAHC has provided in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources.

The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 4(f), Section 110 and (k) of the federal NHPA (16 U.S.C. 470 *et seq*), Section 4(f) of the Department of Transportation Act of 1966 (23 CFR 774); 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The NAHC remains concerned about the limitations and methods employed for NHPA Section 106 Consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be

advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Attachment: Native American Contact List

Native American Contacts
Riverside County
August 30, 2012

Los Coyotes Band of Mission Indians
Shane Chapparosa, Chairman
P.O. Box 189 Cahuilla
Warner , CA 92086
(760) 782-0711
(760) 782-2701 - FAX

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairman
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Pala Band of Mission Indians
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(760) 742-3422 Fax

Santa Rosa Band of Mission Indians
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(951) 659-2228 Fax

Pechanga Band of Mission Indians
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Morongo Band of Mission Indians
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This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed Wildomar 23 Project; located in the City of Temecula; southwestern Riverside County, California for which a Sacred Lands File search and Native American Contacts were requested.

Native American Contacts
Riverside County
August 30, 2012

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Cahuilla Band of Indians
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(951) 654-5544, ext 4137

William J. Pink
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Temecula , CA 92592
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(909) 936-1216
Prefers e-mail contact

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed Wildomar 23 Project; located in the City of Temecula; southwestern Riverside County, California for which a Sacred Lands File search and Native American Contacts were requested.

30 August 2012

Ms. Jarnne' J. Valdez
Inland North Homebuilding
Lennar Associates Management LLC
391 N. Main Street, # 300
Corona, California 92880

Subject: Paleontological resource assessment, Wildomar 23 project, City of Wildomar, Riverside County, California (APNs 380-280-004 and 380-280-008 through -012)

Dear Ms. Valdez:

A paleontological resource assessment has been completed for the Wildomar 23 project area (APNs 380-280-004, 380-280-008 through 380-280-012), located in the southeastern part of the City of Wildomar adjacent to the City of Murrieta, Riverside County, California. On the U. S. Geological Survey 1:24,000 scale, 7.5 minute Murrieta, California topographic quadrangle, the project site is located in the northwest quarter of the southeast quarter of Section 6, Township 7 South, Range 3 West, San Bernardino Base and Meridian (Attachment 1).

Geologically, the project area lies to the east of the main strands of the Elsinore fault zone in areas of Pliocene and Pleistocene sedimentary units of terrestrial origin (M. P. Kennedy, 1977, California Division of Mines and Geology Special Report 131; D. M. Morton, 2004, Preliminary digital geologic map of the Santa Ana 30' x 60' quadrangle, southern California: U. S. Geological Survey Open-File Report 99-172, version 2.0). A detailed geologic map of the project area has been published by M. P. Kennedy and D. M. Morton (2003, Preliminary geologic map of the Murrieta 7.5' quadrangle, Riverside County, California: U. S. Geological Survey Open-File Report 03-189, version 1.0), a part of which is appended to this report (see Attachment 2).

As mapped by Kennedy and Morton (2003), the project area is underlain by two geologic formations, the middle Pleistocene (late Irvingtonian and early Rancholabrean) sandstone member of the Pauba Formation (Qpfs on Attachment 2) and the underlying upper Pliocene (late Blancan) and lower Pleistocene (Irvingtonian) sandstone unit of the Sandstone and Conglomerate of Wildomar area (informal unit, QTsw on Attachment 2). More than 400 fossil localities are known from the Pauba Formation and underlying units in the greater Murrieta and Temecula areas. Because of the abundance of terrestrial vertebrate fossils that have been recorded from these two formations throughout this area, both of the formations have been assigned a high paleontological resource sensitivity by the San Bernardino County Museum and

the Riverside County Land Information System. Based on a Riverside County Land Information System Paleontologic Sensitivity Report generated on August 30, 2012 (Attachment 3), the subject property is located within an area that is assigned a High Paleontological Sensitivity (High A), *i.e.*, it is within an area of exposed "geologic formations or mappable rock units that contain fossilized body elements, and trace fossils ... on or below the surface." As such, the area will require paleontological monitoring of any construction activities (mass grading, excavation, trenching, etc.) to mitigate against the potential loss of undiscovered fossils and/or fossil deposits.

A museum collections and record search report has been requested from the Division of Geological Sciences at the San Bernardino County Museum (SBCM), which has extensive holdings of fossil materials from this area of Riverside County. Previous record search reports from the SBCM for nearby areas document the high paleontological sensitivity of the locally exposed formations, and outline the monitoring and mitigation measures that should be implemented for a project in this area. The abundance of terrestrial vertebrate fossil localities known from the Pauba Formation (Qpfs) and the underlying Sandstone of the Wildomar area (QTsw) supports the necessity of paleontological monitoring during all earthmoving and excavation activities during project construction. Vertebrate fossils previously recovered from the Pauba Formation include mammoths, mastodons, ground sloths, sabre-toothed cats, tapirs, horses, camels and llamas and abundant small vertebrates and invertebrates (see references in Kennedy and Morton (2003)). Previously recorded vertebrate fossils from the sandstone facies of the Sandstone of Wildomar include mammoths, mastodons, ground sloths, dire wolves, short-faced bears, tapirs, horses, camels and llamas and temporally diagnostic small vertebrates and invertebrates (see references in Kennedy and Morton (2003)).

Because of the documented high paleontological sensitivity (High A) of the sandstone member of the Pauba Formation and the sandstone member of the Sandstone and Conglomerate of Wildomar, paleontological monitoring of mass grading and excavation activities, including utility trenching, in areas so mapped should be required to mitigate impacts to nonrenewable paleontological resources (*i.e.*, fossils). A mitigation program consistent with the provisions of the California Environmental Quality Act (CEQA), regulations currently implemented by the City of Wildomar, and proposed guidelines of the Society of Vertebrate Paleontology should be implemented for this project. At a minimum, mitigation requirements should include those on the attached page.

Thank you for the opportunity to provide paleontological services on this project. If you have any questions, please feel free to contact us at our Poway address.

Sincerely,

George L. Kennedy, Ph.D.
Senior Paleontologist

Attachments: Index map, geologic map, paleo sensitivity map

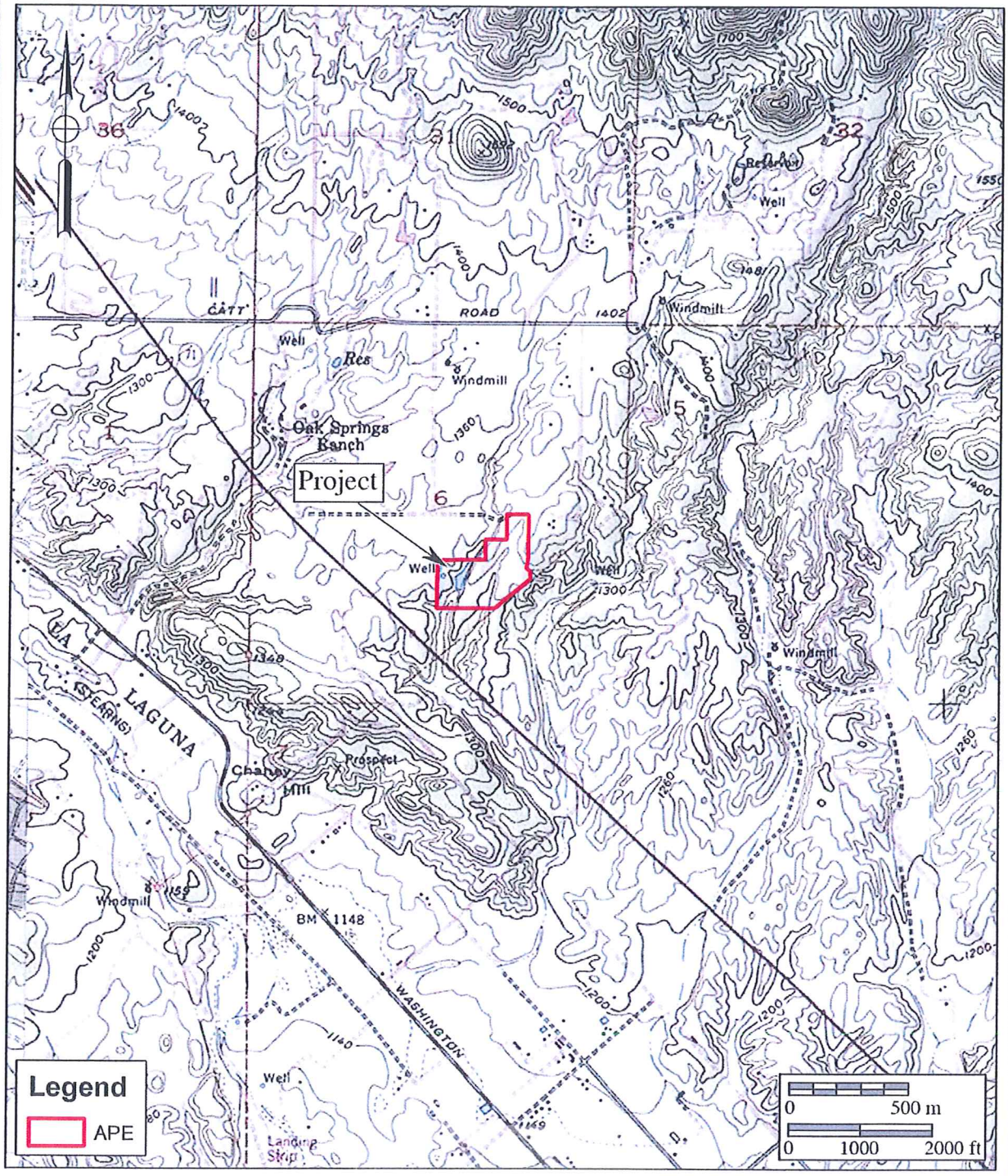
Proposed Paleontological
Mitigation, Monitoring and Reporting Program (MMRP)
Wildomar 23, City of Wildomar

1. Monitoring of mass grading and excavation activities in areas identified as likely to contain paleontological resources by a qualified paleontologist or paleontological monitor. Monitoring will be conducted in areas of grading or excavation in undisturbed formational sediments of the sandstone member of the Pauba Formation (Qpfs) and the sandstone member of the Sandstone and Conglomerate of Wildomar (QTsw), of late Pliocene to middle Pleistocene age, as well as where over-excavation of surficial alluvial sediments will encounter these formations in the subsurface. Paleontological monitors will be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediment that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens in a timely manner. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface, or if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including screen-washing of sediments to recover small invertebrates and vertebrates if necessary. Preparation of individual vertebrate fossils is often more time consuming than for accumulations of invertebrate fossils.

3. Identification and curation of specimens into a professional, accredited public museum repository with a commitment to archival conservation and permanent retrievable storage (*e.g.*, the Western Center for Archaeology and Paleontology Museum on Searl Road in Hemet, Riverside County, California). The paleontological program should include a written repository agreement prior to the initiation of mitigation activities.

4. Preparation of a final monitoring and mitigation report of findings and significance, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location. The report, when submitted to, and accepted by, the appropriate Lead Agency, will signify satisfactory completion of the project program to mitigate impacts to any potential nornrenewable paleontological resources (*i.e.*, fossils) that might have been lost or otherwise adversely affected without such a program in place.

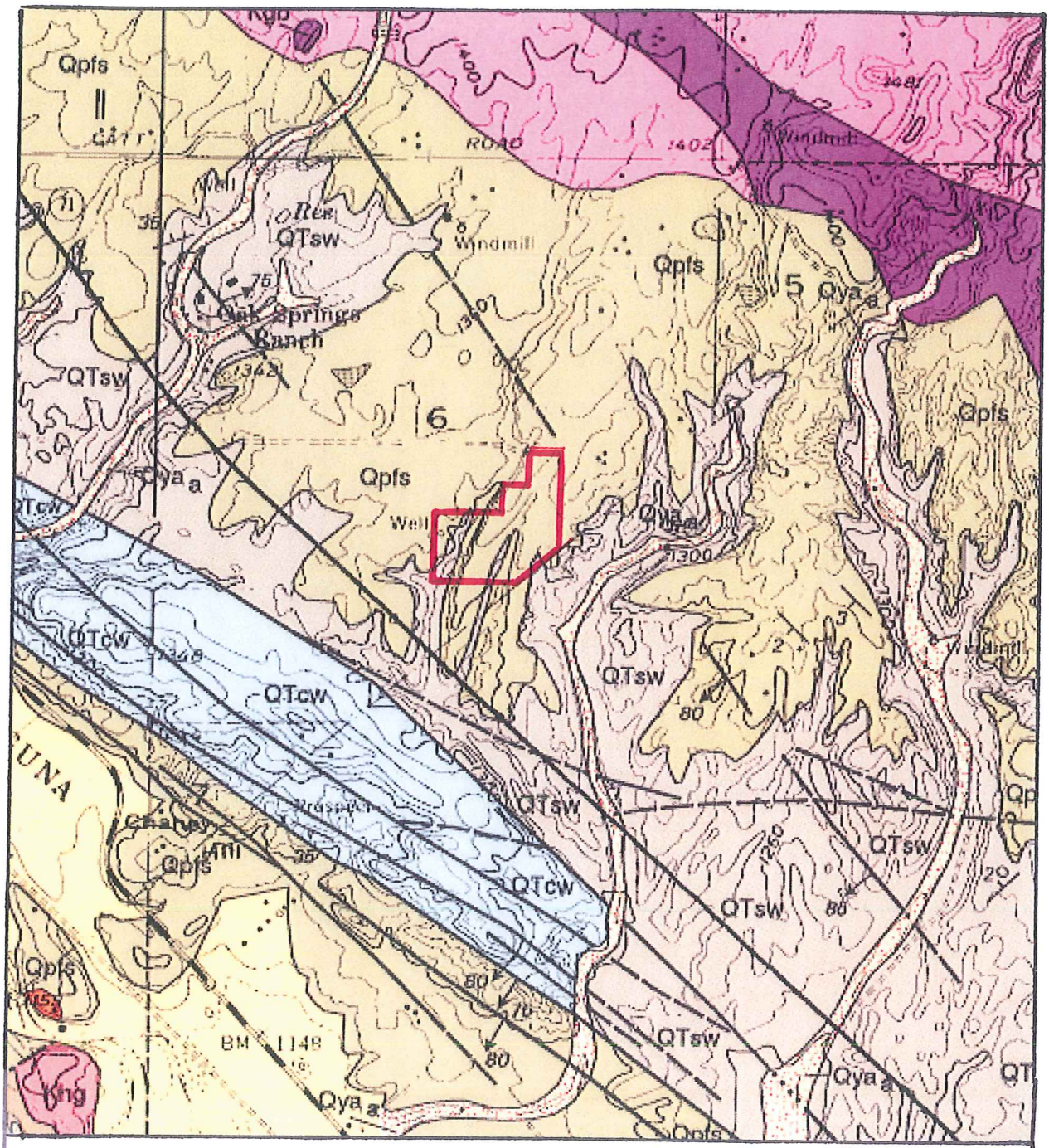


Attachment 1

Project Location Map

Wildomar 23 Project

USGS Murrieta Quadrangle (7.5 Minute Series)



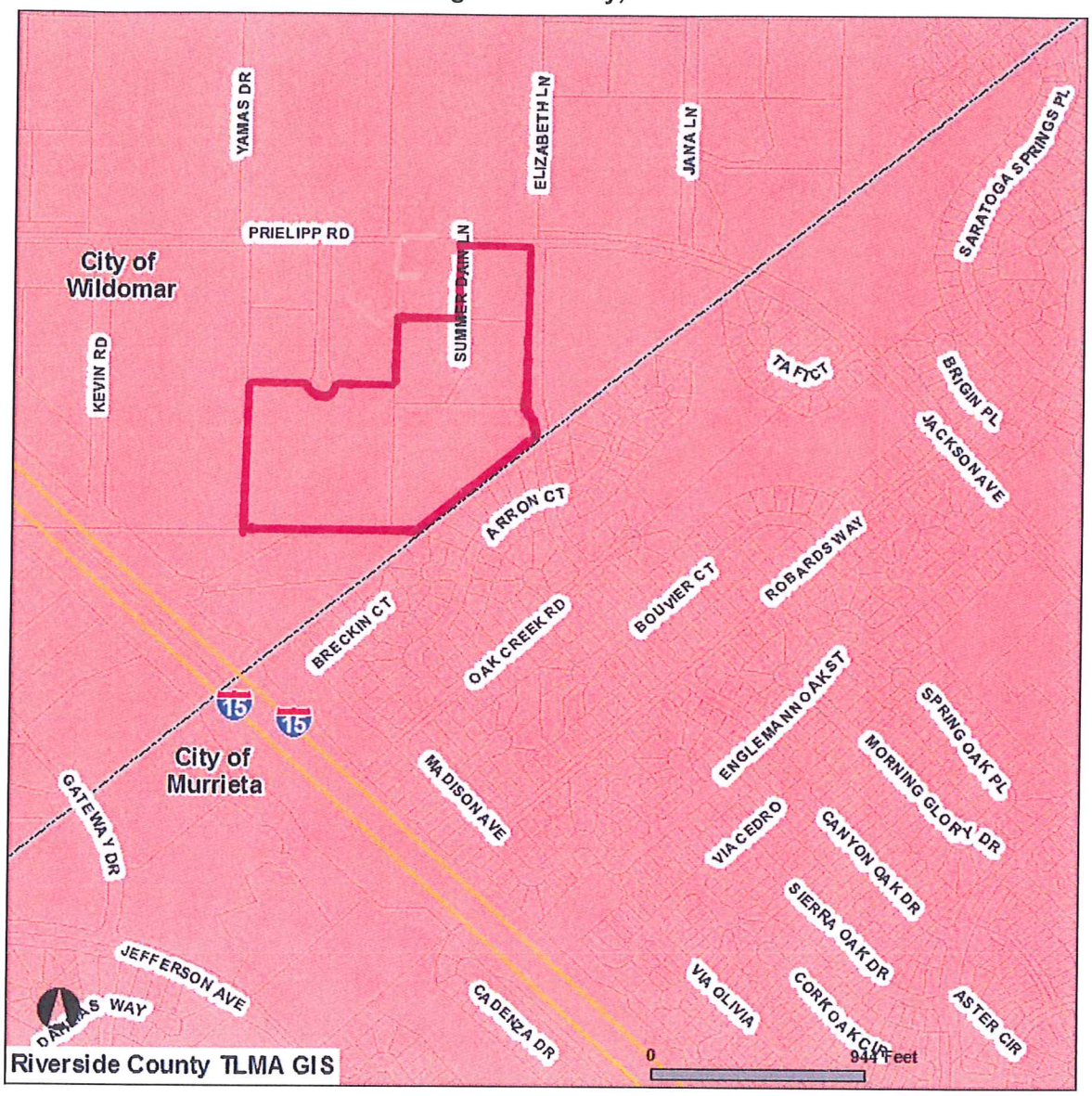
Attachment 2

Geologic Map

Wildomar 23 Project

Geology after Kennedy and Morton (2003)

Paleontologic Sensitivity, Wildomar 23



PALEONTOLOGICAL SENSITIVITY

INTERSTATES
HIGHWAYS
CITY
PARCELS
HIGH POTENTIAL/SENSITIVITY (HIGH A)

REPORT PRINTED ON...Thu Aug 30 2012 09:41:56 GMT-0700 (PDT)
Version 120712

Attachment 3
Paleontologic Sensitivity Map
Wildomar 23 Project
Source: Riverside County Land Information System

UPDATE PRELIMINARY GEOTECHNICAL INVESTIGATION
TENTATIVE TRACT 36497, WILDOMAR 23 PROJECT
CITY OF WILDOMAR, RIVERSIDE COUNTY, CALIFORNIA

FOR

LENNAR HOMES - INLAND DIVISION
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879

W.O. 6451-A-SC OCTOBER 12, 2012

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301 • www.geosoilsinc.com

October 12, 2012

W.O. 6451-A-SC

Lennar Homes - Inland Division
980 Montecito Drive, Suite 302
Corona, California 92879

Attention: Ms. Jarnne Valdez

Subject: Update Preliminary Geotechnical Investigation, Tentative Tract 36497, Wildomar 23 Project, City of Wildomar, Riverside County, California

Dear Ms. Valdez:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) is presenting the results of our update preliminary geotechnical investigation of the subject site in Wildomar, Riverside County, California. The purpose of the study was to re-evaluate the onsite soils and geologic conditions and their effects on the revised site development plans from a geotechnical point of view. In particular, the primary purpose of our study was to evaluate potential remedial removal depths in previously unexplored areas (i.e., areas of prior structures), preform onsite percolation/infiltration testing (provided under separate cover [GSI, 2012]), evaluate current groundwater conditions, and update site seismic design parameters based on current standards of practice. A secondary purpose of this study was to provide updated geotechnical foundation design parameters, and general earthwork and grading guidelines, in light of site geotechnical conditions.

EXECUTIVE SUMMARY

Based on our review of the previous geotechnocal investigation for the site by GSI (2005a) and readily available data (Appendix A), supplemental field exploration, laboratory testing, and geologic and engineering analyses, the proposed project appears suitable for its intended residential use from a geotechnical viewpoint, provided the recommendations presented in the text of this report are implemented. The primary developmental considerations are summarized below:

- Removal of all undocumented artificial fill, colluvium/topsoil deposits, alluvial deposits and near surface weathered bedrock materials will be necessary prior to fill placement, in areas proposed for settlement sensitive improvements. Approximate depths of removals are outlined in the conclusions and recommendations section of this report. For preliminary planning purposes, these

depths are estimated to be on the order of ±2 to ±4 feet across a majority of the site (excluding stockpiled artificial fills) if not removed by proposed excavation, with localized deeper removals, up to ±8 feet deep or deeper, within the minor canyon area.

- Based on previous and current field sampling, laboratory testing, and our previous slope stability analysis (GSI, 2005a), planned 2:1 (horizontal to vertical [h:v]) cut and fill slopes are considered grossly and surficially stable, provided they are regularly and periodically maintained, under normal rainfall conditions. Any fill slopes proposed should be designed at a 2:1 (h:v) gradients or flatter and should not exceed about 30 feet in height, without a specific slope stability evaluation. Fill slopes should be properly built and compacted to a minimum relative compaction of 90 percent throughout, including the slope surfaces. Any cut slopes proposed should be designed at gradients of 2:1 and should not exceed 30 feet in height, without a specific slope stability evaluation. While stabilization of such cut slopes is not currently anticipated, locally adverse geologic conditions (e.g., adverse joints/fractures, daylighted sandy lenses, etc.) may be encountered which may require remedial grading or laying back of the slope to an angle flatter than the adverse geologic condition. In addition, existing natural slopes that remain outside areas of proposed development, may be prone surficial instability, as was noted during our initial preliminary investigation of the property (GSI, 2005a). These natural slopes should have drainage directed away from their tops and bottoms, and will also require regular and periodic maintenance. General guidelines for slope construction are presented in Appendix E.

- Based upon the newly proposed development plans and our field exploration, sedimentary bedrock assigned to the Quaternary-aged Pauba Formation in the site area is generally considered relatively easily to locally moderately rippable.

- Due to the nature of the site materials, it is unlikely that oversized rock materials will be generated during grading.

- The expansion potential of tested onsite soils range from very low to medium. Therefore, preliminary foundation recommendations for both conventional and post-tension design are provided herein. Post-tension foundations should perform better under the design seismic event.

- Typical samples of the site materials have been previously analyzed for soluble sulfate/corrosion potential (GSI, 2005a). Based on testing, the use of sulfate resistant concrete is currently not anticipated at this time. However, based on the test results, the onsite soils are generally considered moderately to strongly alkaline and are considered corrosive to moderately corrosive to ferrous metals in a saturated state. It is our understanding that standard concrete cover is sufficient mitigation; however, consideration may be given to consulting with a corrosion engineer to provide specific recommendations.

- In general and based upon the available data to date, groundwater is not expected to be a factor in the development of the site. However, due to the nature of the site materials, seepage may be encountered along alluvial soils and bedrock contacts or throughout the site along with seasonal perched water within existing drainage areas, and also may be encountered in "daylighted" joint systems within the Pauba Formation. An 8-inch subdrainage system should be installed within the minor canyon area onsite. Additionally, localized subdrainage systems for the control of groundwater seepage should be anticipated, should such conditions develop during or after grading.

- Our review indicates no known active faults are crossing the site, and the site is not within an Alquist-Priolo Earthquake Fault Zone, nor is it within a liquefaction zone established by the County of Riverside or State of California.

- Our evaluation and general liquefaction screening process (pursuant to Special Publication 117 [SP117]) indicates that the potential for liquefaction and associated adverse effects within the site is considered low.

- Adverse geologic features that would preclude project feasibility (e.g., landslides, shallow groundwater, liquefiable soils, etc.) were not encountered.

- The recommendations presented in this report should be incorporated into the planning, design, and construction considerations of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

Todd A. Greer
Engineering Geologist, CEG 2377

David W. Skelly
Civil Engineer, RCE 47857

TAG/JPF/DWS/jh/tg

Distribution: (3) Addressee (2 wet signed)
(1) SB&O, Inc., Attention: Mr. Don Brookes

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SCOPE OF SERVICES

The scope of our services has included the following:

1. Review of available soils and geologic data for the site area, including previous geotechnical reports in the subject area and adjoining tracts (Appendix A).

2. Geologic site reconnaissance and geologic mapping of significant geologic structures and mapping of surficial deposits.

3. Subsurface exploration consisting of the advancement of 11 exploratory test pits, penetrating into bedrock, for geotechnical logging, sampling, and/or percolation/infiltration testing (Appendix B).

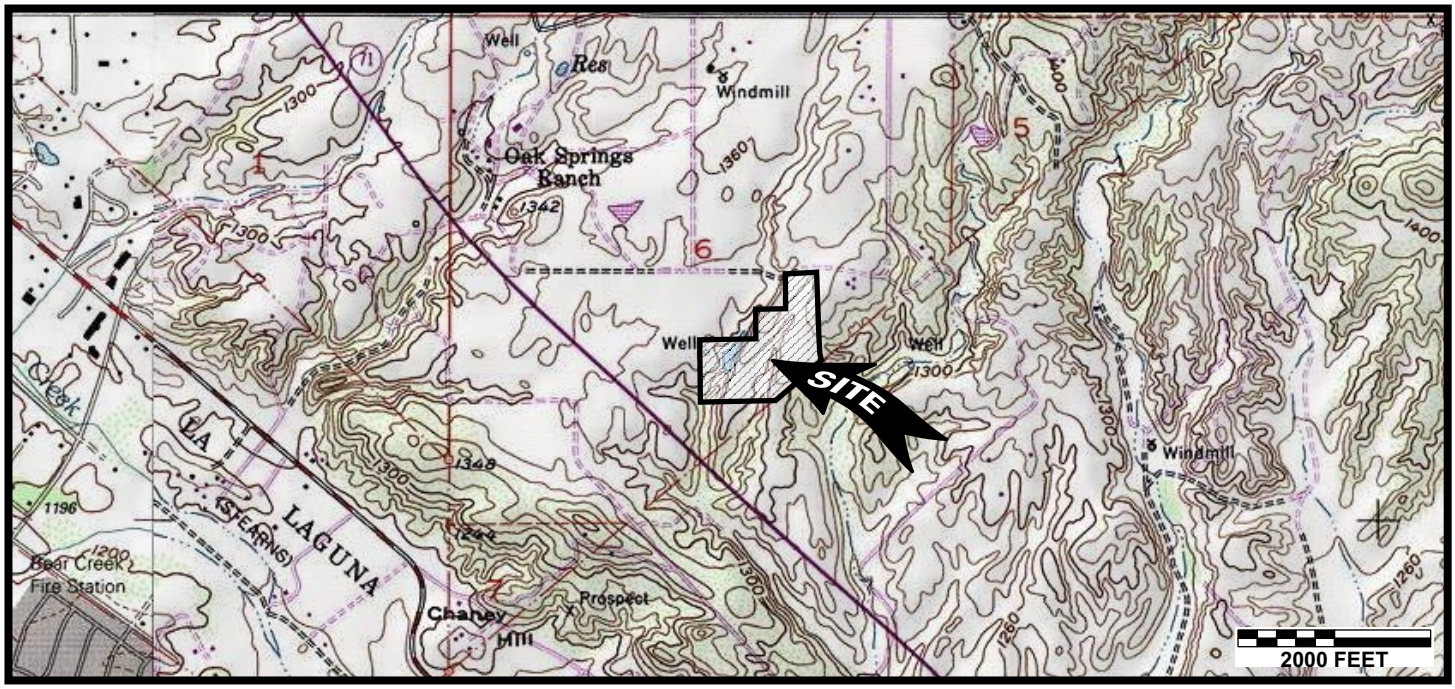
4. Updated general areal seismicity evaluation (Appendix C).

5. Pertinent laboratory testing of representative soil samples collected during our subsurface exploration program. Testing included in-situ moisture and density, maximum density testing, expansion index, and plasticity testing of the materials encountered during our field studies. Results of our laboratory testing are provided in Appendix D.

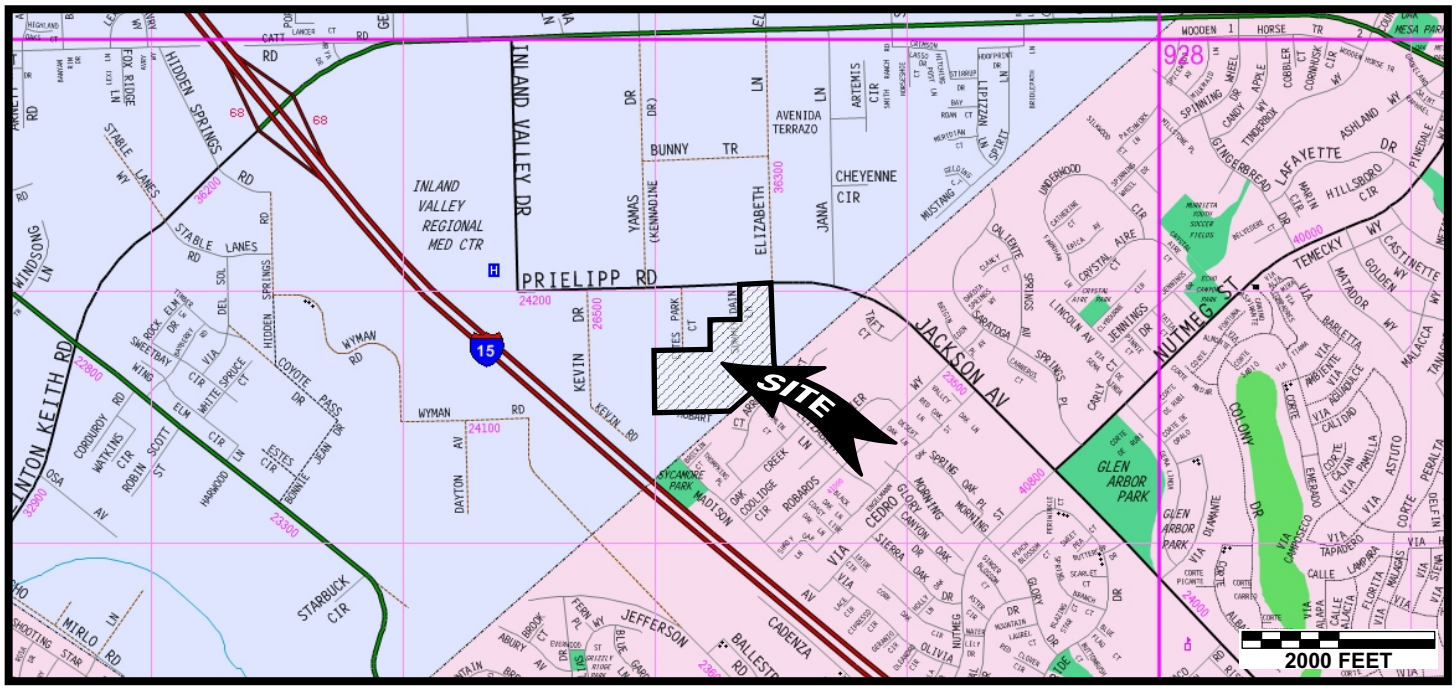
6. Appropriate engineering and geologic analyses of data collected and preparation of this report and accompaniments.

SITE DESCRIPTION

The project area consists of roughly ±23.2 acres of relatively gently rolling hillside terrain located at 36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane, in the City of Wildomar, Riverside County, California (see Figure 1, Site Location Map). The irregular-shaped property consists of several combined rural residential parcels. Based on our review, some grading/earthwork was previously performed to create the building pads for the former onsite structures, roadways, and ponds. However, the nature of any such old earthwork is not readily apparent as the previous residences have been demolished and the remaining "improvements" generally consist of old foundations, concrete slabs, fence lines, block walls, and trees/vegetation. Topographically the site is dominated by gently rolling hillside terrain with elevations generally decreasing from north to south-southwest, ranging from ±1,347 feet Mean Sea Level (MSL) to ±1,282 feet (in areas proposed for development), for a total relief of approximately ±65 feet. Drainage



Base Map: TOPO!® ©2007 National Geographic, U.S.G.S. Wildomar and Murrieta Quadrangles, California, Orange Co., 7.5 Minute, dated 1997 and 1976, respectively, photorevised 1979 (Murrieta).



Base Map: The Thomas Guide, Riverside & San Bernardino Counties, Digital Street Guide and Directory, 2008 Edition, by Thomas Bros. Maps, pages 927 and 928.

ALL LOCATIONS APPROXIMATE

N

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SITE LOCATION MAP

Figure 1

Wildomar 23

APNs 380-280-004, -009, -010, -011, -012

W.O. 6451-A-SC	DATE 10/12	SCALE: 1" = 2,000

is generally to the southwest and is accommodated by two (2) relatively thin and gentle- to steep-sided drainage channels. Onsite vegetation generally consists of chaparral and other native shrubs and grasses, with scattered trees within the drainage channels and associated with previous dwellings onsite.

PROPOSED DEVELOPMENT

Based on our review (GSI, 2005a and 2005b), previous development plans for the project included at least 16 three-story multi-family apartment building pads. Based on our review of current site development plans by SB&O (2012), GSI understands that the project is now proposed for single-family residential construction of 67 building pads, a detention/infiltration basin, a park site, along with associated interior roadways, and underground utility improvements. We further understand that the buildings are proposed as one- and/or two-story structures, with slab-on-grade/continuous footings, utilizing typical wood frame-type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system.

FIELD STUDIES

As indicated above, field studies conducted during our evaluation of the property for this investigation consisted of geologic reconnaissance mapping, excavation of eleven exploratory test pits throughout the site for evaluation of near-surface soil and geologic conditions and percolation/infiltration testing. As indicated previously, the onsite percolation/infiltration testing report was provided under separate cover (GSI, 2012). Field exploration and subsequent percolation/infiltration testing were performed on September 19 and 20, 2012, respectively. The test pits were logged by an engineering geologist from our firm who collected representative bulk and undisturbed soil samples for appropriate laboratory testing. The logs of the test pits are presented in Appendix B. Locations of the test pits are presented on Plate 1 (Geotechnical Map).

REGIONAL GEOLOGY

The property is situated within the Perris Block, a portion of a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. The Perris Block is a stable structural block bounded on the west by the Elsinore fault zone and on the east by the San Jacinto fault zone. The Peninsular Ranges is characterized by steep, elongated ranges and valleys that trend northwesterly. This province is typified by plutonic and metamorphic rocks (bedrock) which comprise the majority of the mountain masses, with relatively thin volcanic and sedimentary deposits discontinuously overlying the bedrock, and with Plio/Pleistocene-age (Quaternary-age) alluvial fan deposits filling in

the valleys and younger alluvium filling in the incised drainages. The alluvial deposits are derived from the water borne deposition of the products of weathering and erosion of the bedrock. The site regional geology map is shown on Figure 2.

Local Geology

The site may be characterized as being underlain by bedrock assigned to Pleistocene-age sediments termed the Pauba Formation (Kennedy and Morton, 2003). The bedrock is locally mantled by relatively thin layers of artificial fill, colluvium/topsoil, and younger alluvial deposits within the minor canyon areas. As described by Kennedy and Morton (2003), the Pauba Formation is generally well-indurated, and comprised of cross-bedded sandstones and siltstones containing sparse cobble- to boulder-sized conglomerate beds.

GEOLOGIC UNITS

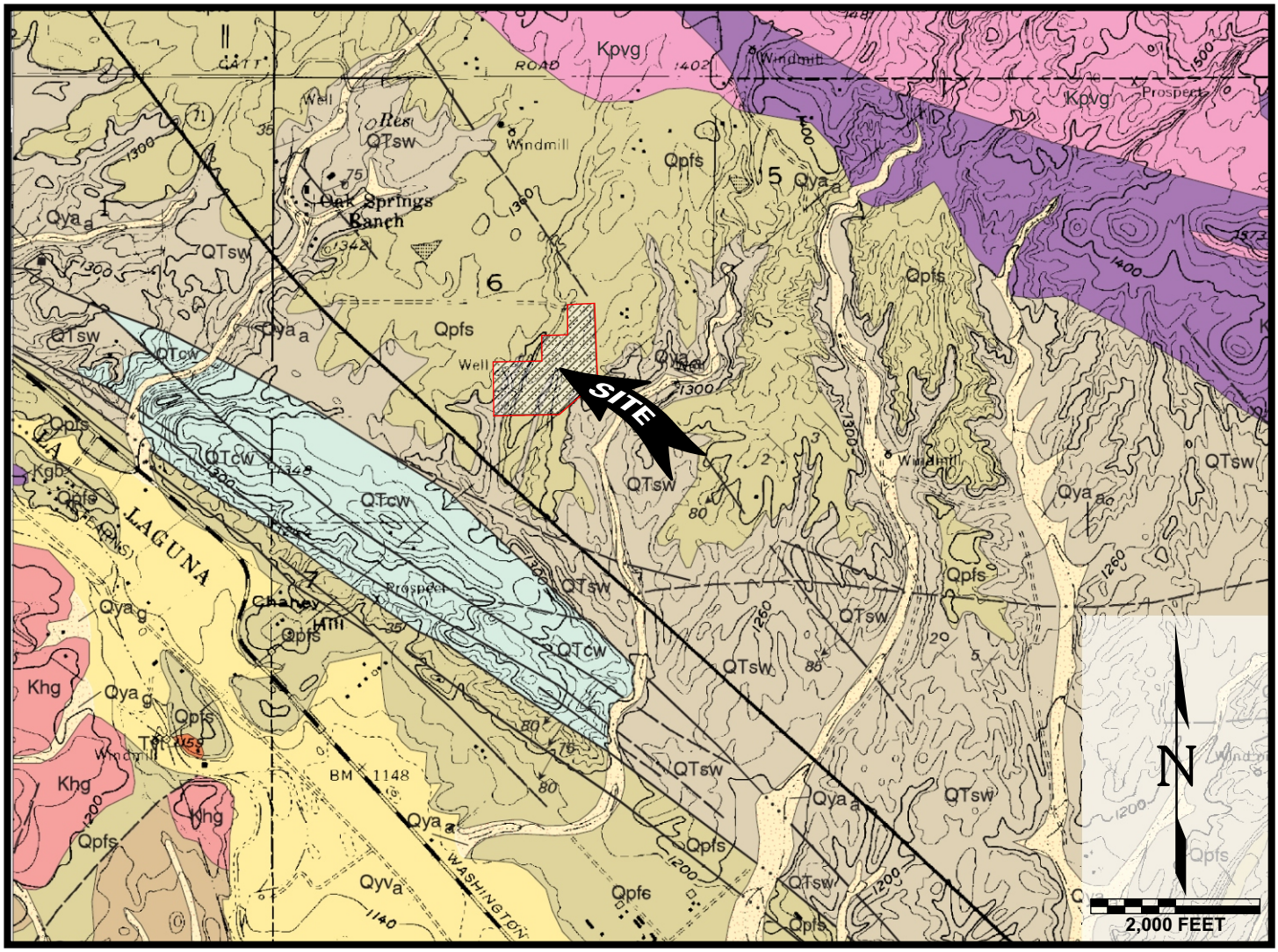
The geologic units encountered during this, and our previous investigation (GSI, 2005a) within the project site consist of undocumented artificial fill, colluvium/topsoil, alluvium, and Quaternary-aged Pauba Formation (i.e., sandstone and siltstone bedrock). The approximate limits of the mappable units are presented on Plate 1 (Geotechnical Map). These units are described, from youngest to oldest, as follows:

Artificial Fill - Undocumented (Map Symbol - Afu)

Locally observed in many locations across the site, were areas of undocumented artificial fill. The undocumented fill, locally up to ±1 to 11+ feet in thickness, has been placed during the grading of previous building pads, channel crossing areas for site access, landscaped yard areas throughout portions of the site, and as stockpiles. The undocumented fill is typically loose to moderately dense, and locally contains moderate amounts of trash and construction debris. The undocumented fill is deemed unsuitable for the support of new structures or additional fill placement, and will require removal and recompaction during rough grading. Undocumented fill materials may be reused for compacted fills, provided that they have been cleaned of deleterious materials (i.e., trash and construction debris) and approved by the geotechnical consultant prior to onsite placement.

Surficial Slope Failure (Map Symbol - →)

One surficial slope failure was previously observed (GSI, 2005a) in the southwesterly portion of the site, near the margin of the stream crossing within this area (see Plate 1). The surficial failure appeared to involve both undocumented artificial fills placed for the stream crossing, and natural soils (colluvium/topsoil) adjoining the stream crossing. While this surficial slope failure exists outside the areas of currently proposed development (i.e., habitat area), the potential for surficial instability of existing natural slopes cannot be precluded.



Base Map: Kennedy, M.P., and Morton, D. M., (2003)

EXPLANATION

Qya	Young Alluvial Channel Deposits (Holocene and late Pleistocene)
Qyv	Young Alluvial Valley Deposits (Holocene and late Pleistocene)
Qpfs	Pauba Formation (Pleistocene) - Sandstone Member
Qpff	Pauba Formation (Pleistocene) - Fanglomerate Member
QTsw	Sandstone and Conglomerate of Wildomar Area (Pleistocene and late Pliocene) - Sandstone Unit
QTcw	Sandstone and Conglomerate of Wildomar Area (Pleistocene and late Pliocene) - Conglomerate Unit
Tvt	Basalt of Temecula Area (Miocene)
Kpvg	Monzogranite to Granodiorite (Cretaceous)
Kgb	Gabbro (Cretaceous)
Khg	Heterogeneous Granitic Rocks (Cretaceous)

	Contact
70	Fault
70	Inclined Bedding
70	Inclined Igneous Foliation
70	Inclined Metamorphic Foliation
	Vertical Joints in Sedimentary Rocks

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REGIONAL GEOLOGIC MAP

Figure 2

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Colluvium/Topsoil (Unmapped)

Colluvium/topsoil was observed in our subsurface investigation mantling the Pauba Formation sediments throughout the site. These soils were generally observed to range from 1 to 3 feet in thickness. They varied from brown to dark brown, silty and clayey fine- to coarse-grained sands. The colluvium/topsoil was generally dry and loose to medium dense. These soils typically have a low expansion potential; however, some clayey factions may have a medium expansion potential. Due to the potentially compressible nature of these soils, they are considered unsuitable for support of structures and/or improvements in their existing state and therefore, will be need to be removed and recompacted if not removed during planned excavation.

Alluvium - Younger (Map Symbol - Qal)

Relatively younger alluvial sediments were encountered or observed within the incised drainage channels onsite. These sediments were generally observed to be predominantly light to dark brown, silty, fine- to coarse-grained sands. The alluvial sediments varied from dry to moist, and were generally loose to medium dense with depth. Where encountered, these sediments generally ranged from ±2 to ±8 feet in thickness. The alluvium typically has a very low expansion potential. Due to the potentially compressible and collapsible nature of these soils, they are considered unsuitable for support of structures and/or improvements in their existing state and therefore, will be need to be removed and recompacted.

Bedrock - Quaternary-age Pauba Formation (Map Symbol - Qp)

Sedimentary bedrock deposits assigned to the Quaternary-age Pauba Formation were encountered near the surface underlying the undocumented artificial fill, colluvium/topsoil, and alluvial sediments on the project site. The Pauba Formation in the site area consists of very light to grayish brown to reddish brown, silty and clayey fine- to coarse-grained sandstones with minor interbedded clayey and sandy siltstones, and occasional discontinuous layers or lenses of cobble to boulder-sized clasts. The bedrock varied from damp to wet, and is generally medium dense to dense with depth. Due to the potential for settlement, the near surface weathered bedrock (approximately the upper ±1 foot), should be removed prior to compacted fill placement.

GROUNDWATER

Based upon field measurements taken from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at depths ranging between ±26 and ±43 feet below the ground surface. Minor water seepage was encountered in some of the excavations along the alluvium/bedrock contact within drainage areas during our previous geotechnical study (GSI, 2005a). Groundwater may also be encountered at shallow depths in the form of

perched water on resistant strata or sedimentary bedrock. No surface water was observed onsite; however, cat-tail reeds, willows, and other wetlands plants and vegetation were noted within the drainage areas onsite. These observations reflect site conditions at the time of our investigation and do not preclude changes in local groundwater conditions in the future from heavy irrigation, precipitation, or other factors not obvious at the time of our field work. Groundwater conditions should be further evaluated during site grading. Additional discussions of groundwater are presented within the conclusions section of this report.

FAULTING AND REGIONAL SEISMICITY

The possibility of ground shaking at the site may be considered similar to the southern California region as a whole. The site is situated in an area of active as well as potentially-active faults. The nearby Elsinore fault zone, design fault for the site, is considered active and is included within an Alquist-Priolo Earthquake Fault Zone. Our review indicates that there are no known active faults crossing the site, and the site is not within a Fault-Rupture Hazard Zone (Bryant and Hart, 2007). A list of the major faults and fault zones in southern California that could have a significant effect on the site, should they experience activity, is provided in Appendix C. The relationship of the location of the project area to these major mapped faults is indicated on the California Fault Map (Appendix C).

The acceleration-attenuation relations of Bozorgnia, Campbell, and Niazi (1999), have been incorporated into EQFAULT (Blake, 2000a). For this study, peak horizontal ground accelerations anticipated at the site were determined based on the mean plus 1 - sigma attenuation curves developed by those authors. These acceleration-attenuation relations have been incorporated in EQFAULT, a computer program by Thomas F. Blake (Blake, 2000a), which performs deterministic seismic hazard analyses using digitized California faults as earthquake sources. The program estimates the closest distance between each fault and a given site. If a fault is found to be within a user-selected radius, the program estimates peak horizontal ground acceleration that may occur at the site from an upper bound ("maximum credible") earthquake on that fault. Site acceleration (g) is computed by user-selected acceleration-attenuation relations that are contained in EQFAULT. Based on the EQFAULT program, peak horizontal ground accelerations (deterministic acceleration values) from an upper bound event at the site may be on the order of 0.84g.

Historical site seismicity was evaluated with the acceleration-attenuation relations of Bozorgnia, Campbell, and Niazi (1999) and the computer program EQSEARCH (Blake, 2000b). This program was utilized to perform a search of historical earthquake records for magnitude 5.0 to 9.0 seismic events within a 100-mile radius, between the years 1800 to December, 2011. Based on the selected acceleration-attenuation relation, a peak horizontal ground acceleration has been estimated, which may have affected the site during the specific seismic events in the past. Based on the available data and

attenuation relationship used, the estimated maximum (peak) site acceleration during the period 1800 to December, 2011, was 0.20g. In addition, a seismic recurrence curve is also estimated/generated from the historical data (see Appendix C).

A probabilistic seismic hazards analysis was performed using the 2008 Interactive Deaggregations (Beta [2012 update]) Seismic Hazard Analysis tool available at the USGS website (https://geohazards.usgs.gov/deaggnit/2008/) which evaluates the site specific probabilities of exceedance for selected spectral periods. Based on a review of these data, and considering the relative seismic activity of the southern California region, a probabilistic horizontal ground acceleration (PHGA) of 0.86 g and 0.47 g were calculated. The calculated values are within the range typical for the southern California region. These values were chosen as they correspond to a 2 and 10 percent probability of exceedence in 50 years, respectively. Probabilistic vertical ground acceleration may be assumed as 50 percent of the PHGA. Printouts from this analysis are also included in Appendix C.

Seismic Shaking Parameters

Based on the site conditions, the following table summarizes the site-specific design criteria obtained from the 2010 CBC (CBSC, 2010), Chapter 16 Structural Design, Section 1613, Earthquake Loads. The computer program Seismic Hazard Curves and Uniform Hazard Response Spectra, provided by the United States Geologic Survey (U.S.G.S.) was utilized for seismic design values. The short spectral response utilizes a period of 0.2 seconds. This application also produces seismic hazard curves, and uniform hazard response spectra.

CBC SEISMIC DESIGN PARAMETERS		
PARAMETER	**VALUE**	**2010 CBC REFERENCE**
Site Class	D	Table 1613.5.2
Spectral Response - (0.2 sec), S_s	1.72g	Figure 1613.5(1)
Spectral Response - (1 sec), S_1	0.61g	Figure 1613.5(2)
Site Coefficient, F_a	1.00	Table 1613.5.3(1)
Site Coefficient, F_v	1.50	Table 1613.5.3(2)
Maximum Considered Earthquake Spectral Response Acceleration (0.2 sec), S_{MS}	1.72g	Section 1613.5.3 (Eqn 16-36)
Maximum Considered Earthquake Spectral Response Acceleration (1 sec), S_{M1}	0.92g	Section 1613.5.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (0.2 sec), S_{DS}	1.15g	Section 1613.5.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.61g	Section 1613.5.4 (Eqn 16-39)

GENERAL SEISMIC DESIGN PARAMETERS	
Distance to Seismic Source (A fault**)	0.3 mi (0.5 km)
Upper Bound Earthquake (Elsinore - Temecula Segment)	M_W 6.8*
Probabilistic Horizontal Site Acceleration ([PHSA], 10% probability of exceedance in 50 years)	0.47g
PHSA (2% probability of exceedance in 50 years)	0.86g
* International Conference of Building Officials (ICBO, 1998) ** Cao, et al (2003)	

Conformance to the criteria above for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a significant earthquake that may affect the site. The primary goal of seismic design is to protect life, not to eliminate all damage, since such design may be economically prohibitive. Cumulative effects of low order or non-design level seismic events can increase damage of the existing and proposed onsite improvements, if mitigation and repairs are not made after each significant local seismic event (M_w>5.0).

It is important to keep in perspective that in the event of a maximum probable or credible earthquake occurring on any of the nearby major faults, strong ground shaking would occur in the subject site's general area. Potential damage to any structure(s) would likely be greatest from the vibrations and impelling force caused by the inertia of a structure's mass. This potential would be no greater than that for other existing structures and improvements in the immediate vicinity.

Airphoto Lineament Analysis

In order to identify possible unmapped faults, identify possible fissures, and to evaluate topographic expressions of nearby published fault and lineament traces, a lineament analysis was performed. As indicated previously, stereoscopic "false-color" infrared aerial photographs (United State Department of Agriculture, 1980) at a scale of approximately 1:40,000 were utilized in our lineament analysis. Lineaments are classified according to their development as strong, moderate, or weak. A strong lineament is a well defined feature that can be continuously traced several hundred feet to a few thousand feet. A moderate lineament is less well defined, somewhat discontinuous, and can be traced for only a few hundred feet. A weak lineament is discontinuous, poorly defined, and can be traced for a few hundred feet or less. Lineaments found on the site ranged from weak to moderate. Lineaments found near the site generally ranged from weak to strong. One trace found south of the site (i.e., Temecula splay of the Elsinore fault zone), trending north-west, was very strong and appeared to offset a nearby stream channel.

Our review indicates the lineaments onsite may be related to pre-Holocene faulting and/or erosion and deposition channels. Other lineaments may represent traces of man made roads, fence lines, pathways, abandoned graded sites or drain lines, old utility trenches, etc. Therefore, the potential for active faulting to cross the site is considered low.

Fault Report Review

In addition to aerial photographs, geologic investigation reports on file at the County of Riverside were previously reviewed (GSI, 2005a), including Riverside County Geologic Report File Nos. GEO00555, GEO01268, GEO01315, and GEO01318. Studies performed northwesterly of the site found and documented several inactive fault traces. Also, near the intersection of Interstate 15 (I-15) and Clinton Keith Road, an active fault was reported and appears to be included within a County of Riverside fault zone. However, this reported fault was not present on a nearby site to the southwest. It is not uncommon for surface rupture along fault traces in this area to die out completely, or to step right or left and continue, after having died out in one area. Accordingly, the potential for active faulting to cross the site from the northwest to the southeast is considered low for the following reasons:

- Faults found on nearby sites to the northwest are inactive or die-out prior to reaching the site.

- Other sites explored northwest of the property tend to completely shadow planned development areas.

- Offset bedrock feature previously identified onsite (GSI, 2005a) was determined to be shear based upon the lack of displacement of the pre-Holocene soil horizons overlying the bedrock.

LIQUEFACTION POTENTIAL

Seismically-induced liquefaction is a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in soils. The soils may thereby acquire a high degree of mobility, and lead to lateral movement, sliding, sand boils, consolidation and settlement of loose sediments, and other damaging deformations. This phenomenon occurs only below the water table; but after liquefaction has developed, it can propagate upward into overlying, non-saturated soil as excess pore water dissipates. Typically, liquefaction has a relatively low potential at depths greater than 45 feet and is virtually unknown below a depth of 60 feet.

Liquefaction susceptibility is related to numerous factors and the following conditions should be concurrently present for liquefaction to occur: 1) sediments must be relatively young in age and not have developed a large amount of cementation; 2) sediments

generally consist of medium- to fine-grained relatively cohesionless sands; 3) the sediments must have low relative density; 4) free groundwater must be present in the sediment; and, 5) the site must experience a seismic event of a sufficient duration and magnitude, to induce straining of soil particles.

The condition of liquefaction has two principal effects. One is the consolidation of loose sediments with resultant settlement of the ground surface. The other effect is lateral sliding. Significant permanent lateral movement generally occurs only when there is significant differential loading, such as fill or natural ground slopes within susceptible materials. No such loading conditions exist on the site. Based on our previous investigations in the site's vicinity, we found there is a potential for seismic activity; however, because of the relatively dense nature of the underlying bedrock materials (i.e., Pauba Formation), and limited amounts of colluvial and younger alluvial deposits, which will be removed and replaced with properly compacted fill during grading operations, it is our opinion that the potential for liquefaction or seismically-induced dynamic settlement is considered low in the areas proposed for development at the site.

SUBSIDENCE

Our review of readily available data did not indicate that the site area is subsiding due to down-faulting along bordering fault zones, groundwater withdrawal, or hydroconsolidation. The scope of this potential for affecting the subject site is beyond the scope of this current study; however, since the site is not transected by active faults, and is underlain by bedrock, and if proper remedial removals of potentially compressible or collapsible materials is attained during grading operations, areal subsidence in the site area is considered unlikely, but may not be totally precluded. It should not be any greater at the site than for nearby and existing already developed properties.

OTHER GEOLOGIC HAZARDS

Mass wasting refers to the various processes by which earth materials are moved down slope in response to the force of gravity. Examples of these processes include slope creep, surficial failures, and deep-seated landslides. Creep is the slowest form of mass wasting and generally involves the outer 5 to 10 feet of a slope surface. During heavy rains, such as those in El Niño years, creep-affected materials may become saturated, resulting in a more rapid form of downslope movement (i.e., landslides and/or surficial failures). One surficial slope failure was observed at the channel crossing in the southwesterly portion of the site (GSI, 2005a), outside current areas of development. It appears that this feature involves loose undocumented fill for the roadway crossing, and colluvium/topsoil materials along the channels edge. Although the slopes adjacent to the existing stream channel are considered prone to surficial slope failures caused by erosion at the toe of slope, indications of deep-seated landsliding or significant slope creep, were

not observed during our site investigation. Furthermore, based on our review of the Landslide Inventory Map of the 7.5-Minute Murrieta Quadrangle (Hernandez and Tan, 2011), no landslides are documented within the site vicinity. This does not preclude surficial erosion and instability of granular fill or natural soils if unplanted slopes and pads are exposed to storms of sufficient intensity and duration. The conditions mentioned above should not adversely affect the site, provided our recommendations are appropriately implemented in the design and construction of the project.

Due to the non-cohesive materials that may exist on portions of the site, caving and sloughing should be anticipated in all subsurface excavations and trenching. Appropriate safety considerations for potential caving and sloughing, such as shoring or sloping layback cuts, should be incorporated into the construction design details.

LABORATORY TESTING

Classification

Soils were classified visually according to the Unified Soils Classification System. The soil classifications are shown on the Test Pit Logs, Appendix B; and the laboratory test results are presented in Appendix D.

Moisture Density

The field moisture contents and dry unit weights were determined for undisturbed ring and chunk samples for the soils encountered in the exploratory test pits. The dry unit weight was determined in pounds per cubic foot and the field moisture content was determined as a percentage of the dry unit weight. The results of these tests are shown on the Test Pit Logs (Appendix B).

Laboratory Standard

The maximum density and optimum moisture content was determined for the major soil types encountered in the exploratory test pits. The laboratory standard used was ASTM D 1557. The moisture-density relationship obtained for the site soils are shown below:

SOIL TYPE	LOCATION & DEPTH (ft.)	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
Sandy SILT, Grayish Brown	TP-5 @ 2-3	103.5	19.5
Silty SAND, Reddish Brown	TP-7 @ 3-4	127.0	10.0

SOIL TYPE	LOCATION & DEPTH (ft.)	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
Silty SAND, Yellowish Brown	TP-102 @ 12-14	140.5	7.5
Clayey Sand, Dark Grayish Brown	P-3 @ 2½-4	131.0	9.5

Shear Testing

Shear testing was previously performed (GSI, 2005a) on relatively undisturbed samples of site soil in general accordance with ASTM test method D 3080. The tests were performed on natural samples of the near-surface and weathered bedrock materials. The shear testing results are presented in Appendix D.

Expansion Potential

Expansion Index (E.I.) tests were performed on representative samples of site earth materials. The E.I. testing was performed in general accordance with ASTM Standard D 4829, and was classified according to Table 18-I-B, as outlined in Section 1803 of the 2001 California Building Code ([2001 CBC], International Conference of Building Officials [ICBO], 2001). Please note the current 2010 CBC (CBSC, 2010) does not classify an expansion potential, and as such we have utilized these previous standards only to classify this material. Expansion index test results ranging from 0 to 64 indicate that site soils are generally very low to medium in expansion potential.

Plasticity Index Testing/Atterberg Limits

For preliminary foundation planning purposes, plasticity Index testing was performed. Testing was performed to evaluate the liquid limit, plastic limit and plasticity index in general accordance with ASTM D 4318. The test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System. The test results and classification are presented in the following table:

TEST PIT NUMBER	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
P-1	36	31	5
P-3	35	16	19

Soluble Sulfates/Corrosion

Typical samples of the site materials were previously analyzed (GSI, 2005a) for soluble sulfates, chloride, pH, and resistivity. The soluble sulfate and corrosion potential results are shown as follows:

LOCATION AND DEPTH (FT.)	SOLUBLE SULFATES PERCENTAGE BY WEIGHT	CHLORIDE (PPM)	P H	RESISTIVITY (OHMS-CM)
TP-5 @ 2-3'	0.0125	87	8.77	1,050
TP-7 @ 3-4'	0.0240	77	7.92	2,100

For preliminary planning purposes, and based upon the soluble sulfate test results and the latest edition of the 2010 CBC (CBSC, 2010), the soluble sulfate content is classified as "not applicable" or negligible (0.00 to 0.10 soil percentage by weight is considered negligible), and sulfate-resistant concrete should not be necessary. Additionally, a modified cement to water ratio and modified concrete compressive strength should not be necessary. Based on the results of the resistivity and pH testing, the onsite soils are generally considered moderately to strongly alkaline (a pH of 7.9 to 8.4 is considered moderately alkaline and a pH of 8.5 to 9.0 is considered strongly alkaline) and are considered corrosive to moderately corrosive (1,000 to 2,000 ohm-cm is considered corrosive and 2,000 to 10,000 ohm-cm is considered moderately corrosive) to ferrous metals in a saturated state.

Although the site soils are categorized as being corrosive to moderately corrosive toward ferrous metals, it is our understanding that ferrous metals embedded in properly poured and formed concrete with the proper mix should be adequately protected from these conditions. As stated above, the soluble sulfate content on the subject lots is considered "not applicable" or negligible. Based upon the laboratory test results obtained, a consulting corrosion engineer should be retained to provide specific recommendations for foundations, utility piping, etc, as warranted.

SLOPE STABILITY ANALYSIS

Analyses were previously performed (GSI, 2005a) utilizing the two dimensional slope stability computer program "GSTABL7 v.2." The program calculates the factor of safety for specified circles or searches for the circular, block, or irregular slip surface having the minimum factor of safety using the simplified Bishop Method, Janbu or general limit equilibrium (Spencer). The stability analyses were performed on the highest existing natural slopes affecting the site. For detailed information on the stability analyses the reader is referred to GSI (2005a).

Gross Stability Analysis

Based on the available data, the constraints outlined above, and our previous stability calculations (GSI, 2005a), a calculated factor-of-safety greater than 1.5 or 1.15 has been obtained for the exposed natural slopes when analyzed from a static or pseudo-static (seismic) viewpoint, respectively. Fill slopes should be designed and constructed at a 2:1 (horizontal to vertical) gradient or flatter and should not exceed 30 feet in height, without a specific slope stability evaluation. Cut slopes should be designed at gradients of 2:1 or flatter and should not exceed 30 feet in height, without a specific slope stability evaluation. While stabilization of such slopes is not anticipated, locally adverse geologic conditions (i.e., daylighted joints/fractures, severely weathered bedrock, or sandy lenses) may be encountered which may require remedial grading, stabilization, or laying back of the slope to an angle flatter than the adverse geologic condition.

Surficial Slope Stability

The surficial stability of cut and fill slopes have been previously analyzed (GSI, 2005a), and indicate a static surficial safety factor greater than 1.5 for the fill and cut slopes currently proposed.

PRELIMINARY EARTHWORK FACTORS

Preliminary earthwork factors (shrinkage and bulking) for the subject property have been estimated based upon our field and laboratory testing, visual site observations, and experience in the site area. It is apparent that shrinkage would vary with depth and with areal extent over the site based on previous site use. Variables include vegetation, weed control, discing, and previous filling or exploring. However, all these factors are difficult to define in a three-dimensional fashion.

Therefore, the information presented below represents average shrinkage/bulking values:

Artificial fill. . . . . 15% to 20% shrinkage
Colluvium. . . . . 5% bulking to 15% shrinkage
Alluvium. . . . . 12-18% shrinkage
Bedrock - Quaternary Pauba Formation.. . . . . 6% bulking to 4% shrinkage

An additional shrinkage factor item would include the removal of root systems of individual large plants or trees. These plants and trees vary in size but, when pulled, they may generally result in a loss of ½ to 1½ cubic yards, to locally greater than 1½ cubic yards of volume, respectively. The above facts indicate that earthwork balance for the site would be difficult to define and flexibility in design is essential to achieve a balanced end product. Subsidence due to equipment loadings (dynamic compaction) may be on the order of up to 0.05 feet, but will depend on haul routes, etc.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on our previous and current field exploration, laboratory testing, and our engineering and geologic analyses, it is our opinion that the project site appears suited for the proposed residential use from a soils engineering and geologic viewpoint. The recommendations presented below should be incorporated in the design, grading, and construction considerations.

General

1. Soils engineering and compaction testing services should be provided during grading operations to assist the contractor in removing unsuitable soils and in his effort to compact the fill.

2. Geologic observations should be performed during grading to verify and/or further evaluate geologic conditions. Although unlikely, if adverse geologic structures are encountered, supplemental recommendations and earthwork may be warranted.

3. In general and based upon the available data to date, groundwater is not expected to be a major factor in development of the site. However, due to the nature of the site materials, seepage may be encountered throughout the site along with seasonal perched water within the drainage areas. In addition, seepage may be encountered in "daylighted" joint systems or sandy lenses within the Pauba Formation. Thus, subdrain systems are recommended within canyon areas, where filled. In addition, subdrainage systems for the control of localized groundwater seepage should be anticipated. Preliminary subdrain locations are provided on Plate 1 (Geotechnical Map).

4. Based upon our field explorations bedrock throughout the site should be rippable to the depths proposed.

5. Due to the noncohesive nature of some of the onsite materials, some caving and sloughing may be anticipated to be a factor in subsurface excavations and trenching. Therefore, current local and state/federal safety ordinances for subsurface trenching should be enforced.

6. General Earthwork and Grading Guidelines are provided at the end of this report as Appendix E. Specific recommendations are provided below.

Demolition/Grubbing

1. Any existing surficial/subsurface structures (i.e., wells, septic systems, etc.), major vegetation, tree remains, and any miscellaneous debris should be removed from the areas of proposed grading.

2. The project soils engineer should be notified of any previous foundation, irrigation lines, cesspools, septic tanks, leach fields, or other subsurface structures that are uncovered during the recommended removals, so that appropriate remedial recommendations can be provided.

3. Cavities or loose soils (including all previous exploratory test pits) remaining after demolition and site clearance should be cleaned out, observed by the soils engineer, processed, and replaced with fill that has been moisture conditioned to at least optimum moisture content and compacted to at least 90 percent of the laboratory standard, if not removed by proposed cuts.

Treatment of Existing Ground

1. All undocumented artificial fill, colluvium, alluvium, and weathered bedrock should be removed to competent bedrock materials (i.e., greater than or equal to 85 percent saturation, and/or greater than or equal to 105 pcf for in-place native materials) of the Pauba Formation, if not removed by proposed excavation within areas proposed for settlement-sensitive improvements. Thicknesses of colluvium, and younger alluvium are discussed in earlier sections of this report. Variations from the previously discussed remedial removal thicknesses (i.e., ±2 to ±4 feet across a majority of the site [excluding stockpiled artificial fills], with localized deeper removals up to ±8 feet deep or deeper, within the minor canyon area) should be anticipated. Actual depths of removals will be evaluated in the field during grading by the geotechnical consultant.

2. Subsequent to the above removals, the upper 6 inches of the exposed subsoils/bedrock should be scarified, brought to at least optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard.

3. The existing, artificial fill, colluvium/topsoil, alluvium, etc., may be reused as compacted fill provided that major concentrations of vegetation and miscellaneous trash and debris are removed prior to or during fill placement.

4. Localized deeper removal may be necessary due to buried drainage channel meanders or dry porous materials. The project geotechnical consultant/geologist should observe all removal areas during the grading.

Fill Placement

1. Fill materials should be cleansed of major vegetation and debris prior to placement.

2. Fill materials should be brought to at least optimum moisture, placed in thin 6- to 8-inch lifts and mechanically compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557).

3. Although unlikely, if encountered, any oversized rock materials greater than 12 inches in diameter should be placed under the observation of the soils engineer.

4. Any import materials should be observed and determined suitable by the soils engineer prior to placement on the site. Foundation designs may be altered if import materials have a greater sulfate and/or expansion values than the onsite materials encountered during our investigations.

Slope Considerations and Slope Design

Any proposed cut and fill slopes constructed using onsite materials, should be grossly and surficially stable provided the recommendations contained herein are implemented during site development.

All slopes should be designed and constructed in accordance with the minimum requirements of the 2010 CBC (CBSC, 2010), the City of Wildomar and/or County of Riverside, and the recommendations contained in the General Earthwork and Grading Guidelines section of this report (Appendix E), and the following:

1. Fill slopes should be designed and constructed at a 2:1 (horizontal to vertical) gradient or flatter and should not exceed 30 feet in height, without a specific slope stability evaluation. Fill slopes should be properly built and compacted to a minimum relative compaction of 90 percent throughout, including the slope surfaces. Guidelines for slope construction are presented in Appendix E.

2. Cut slopes should be designed at gradients of 2:1 or flatter and should not exceed 30 feet in height, without a specific slope stability evaluation. While stabilization of such slopes is not anticipated, locally adverse geologic conditions (i.e., daylighted joints/fractures, severely weathered bedrock, or sandy lenses) may be encountered which may require remedial grading, stabilization, or laying back of the slope to an angle flatter than the adverse geologic condition.

3. Local areas of highly to severely weathered bedrock may be present. Should these materials be exposed in cut slopes, the potential for long term maintenance or possible slope failure exists. Evaluation of cut slopes during grading would be necessary in order to identify any areas of severely weathered rock or non-cohesive sands. Should any of these materials be exposed during construction, the geoetchnical engineer/geologist, would assess the magnitude and extent of the materials and their potential affect on long-term maintenance or possible slope failures. Recommendations would then be made at the time of the field observations.

4. Loose rock debris and fines remaining on the face of the cut slopes should be removed during grading. This can be accomplished by the use of a dozer mounted slope board or by hand scaling, as warranted.

5. Where loose materials are exposed on the cut slopes, the project's engineering geologist would require that the slope be cleaned as described above prior to making their final observations. Final approval of the cut slope can only be made subsequent to the slope being fully cut and cleaned.

6. Irrigation of natural (ungraded) slope areas is not recommended. Site drainage should be directed away from the top and bottom (toe) of natural slope areas, and such slopes will also require regular and periodic maintenance.

Transition and Overexcavation Areas

In order to reduce the potential for differential settlements between cut and fill materials, materials of differing expansion potentials, or dense bedrock, the entire cut portion of cut/fill transitions should be overexcavated to a minimum depth of 3 feet below finish grade, or a maximum ratio of fill thickness of 3:1 (maximum to minimum), and replaced with compacted fill. In addition building pad located entirely in cut areas, if any should be overexcavated and capped with at least 3 feet of fill. The bottom of the overexcavation area should be sloped toward the street (minimum of 2 percent) to reduce the potential for perched groundwater.

Subdrains

Local seepage along the contact between the bedrock and overburden materials or along jointing patterns of the bedrock is anticipated. Thus, subdrain systems are recommended within canyon areas, where filled. In addition, subdrainage systems for the control of localized groundwater seepage should be anticipated. Preliminary subdrain locations are provided on Plate 1 (Geotechnical Map). Where removals are below the anticipated subdrain flowline, the removal materials may be reused as compacted fill provided they are granular, and at a moisture content of at least 2 percent over optimum moisture content (or 1.2 times optimum moisture content, whichever is greater). If required, subdrainage for slopes and embankments should adhere to the specifications in Appendix E, which should be incorporated into the project plans and construction documents.

RECOMMENDATIONS - FOUNDATIONS

The proposed foundation systems should be designed and constructed in accordance with current standards of practice, the guidelines contained within the 2010 CBC, the ACI (2008), and the differential settlement and expansion potential values anticipated. The onsite soils expansion potentials for the project have been evaluated to be in the very low

to medium range (E.I. of 0 to 90), as defined in the Table 18-I-B of the 2001 California Building Code ([2001 CBC], International Conference of Building Officials [ICBO], 2001). Please note, the 2007 and 2010 CBC does not provide an index of the expansion levels, as such, GSI only used the 2001 CBC to classify the expansive level of the site soils. Post-tension foundations are specifically recommended for lots with a medium expansion potential (i.e, expansion index > 50), or lots with a fill thickness greater than 30 feet.

For the purpose of our geotechnical review and analyses, the residential wall loads for one- and two-story structures are anticipated to be 1 to 2 kips per lineal foot of wall and 20 to 50 pounds per square foot (psf) of concrete floor load. Isolated column loads are anticipated to be in the range of 10 to 30 kips. All footings are recommended to be embeded into compacted fill as indicated in this report. When the final foundation loads are completed, GSI should be provided with this information for comment and/or review, as necessary.

General recommendations for foundations using either conventional or post-tension systems are provided in the following sections, and are not intended to preclude the transmission of water or water vapor through the foundations or slabs. Further discussion and recommendations are provided within the soil moisture transmission considerations section of this report. Unless specifically superceded in this report, all findings, conclusions and recommendations in previous referenced reports (see Appendix A) remain pertinent and applicable, and should be incorporated into project plans and construction.

General Foundation Design

1. Geotechnical evaluations of these soils indicate that an allowable bearing value of 1,500 psf for very low to medium expansive soils. These soils should be compacted to a minimum of 90 percent (ASTM D 1557) relative compaction and footings should maintain a minimum width of 12 inches (continuous) and 24 inches square (isolated), and a minimum depth of at least 12 inches into properly compacted fill. Isolated, square footings should extend a minimum of 18 inches into the compacted fill. The bearing value may be increased by one-third for seismic or other temporary loads. This value may be increased by 20 percent for each additional 12 inches in depth to a maximum of 2,000 psf. No increase in bearing should be used for increases in footing width.

2. In accordance with 2010 CBC, Section 1803.5.3, the expansive nature of the soils shall be evaluated based on Expansion Index (E.I.), if E.I. > 20 or Plasticity Index (PI) > 15, and -200 (Passing No. 200 Sieve) > 10 percent and -5µm > 10 percent. For various expansion category and foundation recommendations see the following report sections.

3. For lateral sliding resistance, a 0.35 coefficient of friction may be utilized for a concrete to soil contact (compacted, documented, very low to low expansive, artificial fill) when multiplied by the dead load.

4. Passive earth pressure on documented fill may be computed as an equivalent fluid having a density of 250 pounds per cubic foot (pcf) with a maximum lateral earth pressure of 2,500 psf.

5. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

6. All footings should maintain a minimum 7-foot horizontal distance between the base of the footing and any adjacent descending slope, and minimally comply with the guidelines in Section 1808.7 as well as Figure 1808.7.1 of the 2010 CBC.

7. A grade beam reinforced as above and at least 12 inches by 12 inches in cross section should be provided across the garage entrances. If feasible, the base of the grade beam should be at the same elevation as the adjoining footings.

8. All concrete slabs-on-grade are to be a minimum of 5 inches in thickness, unless otherwise noted herein. To improve soil moisture transmission performance (reduce), the slab thickness may be increased as discussed in the "Soil Moisture Transmission" section.

9. Additional recommendations regarding moisture protection from the project structural engineer and project architect should be provided.

The following foundation construction recommendations assume that the soils in the top 7 feet from finish grade will have a very low to medium expansion potential (E.I. = 0 to 90), a plasticity index of greater than 15, and/or have more than 30 feet of compacted fill over bedrock. Recommendations by the project's structural engineer or architect, which may exceed the soils engineer's recommendations, should take precedence over the following minimum recommendations.

POST-TENSIONED FOUNDATIONS

The following foundation construction recommendations assume that soils in the upper 7 feet are very low to medium expansive in accordance with 2010 CBC, Section 1802.3.2 and/or have more than 30 feet of compacted fill over bedrock. The post-tension foundation designer may exceed these minimal recommendation to increase slab stiffness performance.

The information and recommendations presented in this section are not meant to supercede design by a registered structural engineer or civil engineer qualified to perform post-tensioned design. Post-tensioned foundations should be designed using sound engineering practice and be in accordance with local and 2010 CBC requirements. Upon request, GSI can provide additional data/consultation regarding soil parameters as related to post-tensioned foundation design.

From a soil expansion/shrinkage standpoint, a common contributing factor to distress of structures using post-tensioned slabs is a "dishing" or "arching" of the slabs. This is caused by the fluctuation of moisture content in the soils below the perimeter of the slab primarily due to homeowner irrigation, climatic and seasonal changes, and the presence of expansive soils. When the outside soil environment surrounding the slab has a higher moisture content than the area beneath the slab, moisture tends to migrate underneath the slab edges to a distance beyond the slab edges known as a moisture variation distance, and cause the slab edges to lift. Conversely, when the outside soil environment is drier, the moisture regime is reversed and the soils underneath the slab edges lose their moisture and shrink. This process leads to dropping of the slab at the edges, which leads to what is commonly referred to as the center lift condition. Therefore, post-tensioned slabs should have sufficient stiffness and rigidity to resist excessive bending due to non-uniform swell and shrinkage of subgrade soils, particularly within the moisture variation distance, near the slab edges.

To mitigate this possible phenomenon, a combination of soil presaturation and construction of a perimeter "cut-off" wall grade beam should be employed. Perimeter cut-off walls should be a minimum of 12 inches deep for very low to low expansive soils and 18 inches for medium expansive soils. The cut-off walls may be integrated into the slab design or independent of the slab. The cut-off walls should be a minimum of 6 inches in width. Post-tensioned concrete slabs should be a minimum of 5 inches thick. A vapor retarder should be utilized and be of sufficient thickness to provide a durable separation of foundation from soils. For additional recommendations see the “Soil Moisture Transmission Considerations” section of this report. The vapor retarder should be sealed to provide a continuous retarder under the entire slab, per the 2010 CBC.

The following recommendations for design of post-tensioned slabs have been prepared in general compliance with the requirements of the recent Post-Tensioning Institute’s (PTI’s) publication titled “Design of Post-Tensioned Slabs on Ground, Third Edition” (PTI, 2004), together with it’s subsequent addendums (PTI, 2008).

Soil Moisture

Pre-moistening of the slab subgrade soil is recommended for these soil conditions. The moisture content of the subgrade soils should be equal to or greater than optimum moisture to a depth equivalent to the exterior footing depth in the slab areas (typically 12 and 18 inches for very low to low, and medium expansive soils, respectively). Pre-moistening and/or pre-soaking should be evaluated by the soils engineer 72 hours prior to vapor retarder placement. In summary:

EXPANSION INDEX	PAD SOIL MOISTURE	CONSTRUCTION METHOD	SOIL MOISTURE RETENTION
Very Low (0-20)	Upper 12 inches of pad at or above soil optimum moisture	Wetting and/or reprocessing	Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete.
Low (21-50)	Upper 12 inches of pad soil moisture 2 percent over optimum (or 1.2 x optimum, whichever is greater)	Wetting and/or reprocessing	Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete.
Medium (51-90)	Upper 18 inches of pad soil moisture 2 percent over optimum (or 1.2 x optimum, whichever is greater)	Berm and flood or wetting and reprocessing	Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete.

Soil Support Parameters

The recommendations for soil support parameters have been provided based on the typical soil index properties for soils that are very low to medium in expansion potential. The soil index properties are typically the upper bound values based on our experience and practice in the southern California area. The following table presents suggested minimum coefficients to be used in the Post-Tensioning Institute design method.

Thornthwaite Moisture Index	-20 inches/year
Correction Factor for Irrigation	20 inches/year
Depth to Constant Soil Suction	7 feet or overexcavation depth to bedrock overexcavation surface, whichever is greater
Constant soil Suction (pf)	3.6
Moisture Velocity	0.7 inches/month
Plasticity Index (P.I.)	15-50

Based on the above, the recommended soil support parameters are tabulated below:

PARAMETERS	VERY LOW TO LOW EXPANSION POTENTIAL (E.I. = 0-50)	MEDIUM EXPANSION POTENTIAL (E.I. = 51-90)
e_m center lift	9.0 feet	8.7 feet
e_m edge lift	4.75 feet	4.5 feet
y_m center lift	0.50 inch	0.80 inch
y_m edge lift	0.70 inch	1.30 inch
Bearing Value [1]	1,500 psf	1,000 psf

PARAMETERS	VERY LOW TO LOW EXPANSION POTENTIAL (E.I. = 0-50)	MEDIUM EXPANSION POTENTIAL (E.I. = 51-90)
Lateral Bearing Pressure	250 psf	175 psf
Modulus of Subgrade Reaction (k)	100 pci/inch	70 pci/inch
Minimum Perimeter Footing Embedment [2]	12 to 18 inches	18 inches

[1] For very low to low expansive soils internal bearing value within the perimeter of the post-tension slab may be increased to 2,000 psf and 1,500 psf for medium, for a minimum embedment of 12 inches, then by 20 percent for each additional foot of embedment to a maximum of 2,000 psf. No increase in bearing for footing width should be used
[2] As measured below the lowest adjacent compacted subgrade surface without the inclusion of any landscape layer or underslab granular (sand) layers. Very low 12 inches, low 18 inches.
[3] Maximum lateral bearing should be limited to 1,750 psf for medium expansive soils and 2,000 psf for very low to low expansive soils.
Note: The use of open-bottom raised planters or extensive landscaping adjacent to foundations will require more onerous design parameters.

Deepened footings/edges around the slab perimeter must be used to minimize non-uniform surface moisture migration (from an outside source) beneath the slab. An edge depth of 12 inches should be considered a minimum. The bottom of the deepened footing/edge should be designed to resist tension, using cable or reinforcement per the structural engineer.

The parameters are considered minimums and may not be adequate to represent "worst case" conditions such as adverse drainage and/or improper landscaping and maintenance. The above parameters are applicable provided the structure has positive drainage that is maintained away from the structure. In addition, no trees with significant root systems are to be planted within 15 feet of the perimeter of foundations. Therefore, it is important that information regarding drainage, site maintenance, trees, settlements, and effects of expansive soils be passed on to future homeowners. The values tabulated above may not be appropriate to account for possible differential settlement of the slab due to other factors, such as excessive settlements. If a stiffer slab is desired, alternative Post-Tensioning Institute ([PTI] third edition) parameters may be recommended.

ALTERNATIVE FOUNDATION DESIGN

Post-tensioned foundation designs are typically performed using the parameters provided by the geotechnical consultant including the potential static and seismic settlements in conformance with the 2010 CBC. Post-tension (PTI) design may be either ribbed or mat-type. The latter is also referred to as a uniform thickness foundation (UTF). The use of a UTF is an alternative to the traditional ribbed-type. The UTF offers a reduction in grade beams (i.e., that method typically uses a single perimeter grade beam and possible "shovel" footings), but has a thicker slab than the ribbed-type.

In lieu of the post-tension, the developer may consider a mat type foundation with steel bar reinforcement and without post-tensioned cables. These alternative foundations and slabs are typically evaluated for the similar expansive soil conditions using alternative methods as indicated in the Section 1808.6 of the 2010 CBC. Alternatives to conventional and PTI methodology (i.e., mat foundations) may be used if equivalent systems can be proposed which accommodate the angular distortions, expansion parameters, and settlements noted for the subject lots. If non-post-tension slabs/foundations are to be used onsite, parameters can be provided upon request.

FOUNDATION AND IMPROVEMENT SETTLEMENTS

Designing residential foundations for the existing soil conditions, the estimated settlement and angular distortion values that an individual structure could be subjected to should be evaluated by a qualified structural engineer. In addition, homeowner generated, significant site improvements such as retaining walls, sound walls, spas, pools, or other settlement-sensitive improvements should be evaluated by a structural engineer given the site conditions and geotechnical parameters expressed in this report as well as previous geotechnical documents (see Appendix A). Site specific geotechnical evaluations by a qualified consultant should also be performed for these significant homeowner generated improvements. The levels of angular distortion were evaluated on a 40-foot length assumed as the minimum dimension of buildings; if, from a structural standpoint, a decreased or increased length over which the differential settlement is assumed to occur is justified, this change should be incorporated into the design. This also applies to the other site improvements previously discussed. It should be noted that the tolerance that pools/spas have for differential settlement is typically less than ¼ inch.

Based on our review of previous geotechnical reports (Appendix A), as well as additional evaluation by GSI, the proposed residential structures, foundations, and improvements should be designed for a differential settlement of 2 inches in 40 lateral feet to account for the potential effects of long term static and seismic settlement.

These settlement estimates indicated above have been based on our review and analyses, and do not preclude top of slope deformation (within code setback zones) and settlement due to fills that have been saturated from utility leaks, pool leaks, or excessive landscape irrigation.

Post-construction settlement of the fill should be mitigated by proper foundation design, provided the design parameters, provided herein, are properly utilized in final design of the residential foundation systems and improvements. In addition to the above, the structural engineer should also consider estimated settlements due to short duration seismic loading and applicable load combinations, as required by the City/County and/or the 2010 CBC.

SOIL MOISTURE TRANSMISSION CONSIDERATIONS

GSI has evaluated the potential for vapor or water transmission through the slabs, in light of typical residential floor coverings and improvements. Please note that typical slab moisture emission rates range from about 2 to 27 lbs/ 24 hours/1,000 square feet from a normal slab (Kanare, 2005), while floor covering manufacturers generally recommend about 3 lbs/24 hours as an upper limit. The recommendations in this section are not intended to preclude the transmission of water or vapor through the foundation or slabs. Foundation systems and slabs shall not allow water or water vapor to enter into the structure so as to cause damage to another building component or to limit the installation of the type of flooring materials typically used for the particular application (State of California, 2012). These recommendations may be exceeded or supplemented by a water "proofing" specialist, project architect, or structural consultant. Thus, the client will need to evaluate the following in light of a cost vs. benefit analysis (owner expectations and repairs/replacement), along with disclosure to all interested/affected parties.

Considering the E.I. test results, the anticipated typical water vapor transmission rates, floor coverings, and improvements (to be chosen by the homeowner) that can tolerate vapor transmission rates without significant distress, the following alternatives are provided:

- Concrete slabs should be a minimum of 5 inches thick.

- Concrete slab underlayment should consist of a 15-mil vapor retarder, or equivalent, with all laps sealed per the 2010 CBC and the manufacturer's recommendation. The vapor retarder should comply with the ASTM E 1745 - Class A or B criteria, and be installed in accordance with ACI 302.1R-04.

- The 15-mil vapor retarder (ASTM E 1745 - Class A or B) shall be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.).

- Concrete slabs, including garages, shall be underlain by 2 inches of clean, washed sand (SE≥30) above a 15 mil vapor retarder (ASTM E 1745 - Class A or Class B, per Engineering Bulletin 119 [Kanare, 2005]). The vapor retarder shall in-turn, be underlain by 2 inches of sand (SE≥30) placed directly on the prepared, moisture conditioned, subgrade. The vapor retarder should be sealed to provide a continuous retarder under the entire slab and should be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.). The manufacturer shall provide instructions for lap sealing, including minimum width of lap, method of sealing, and either supply or specify suitable products for lap sealing (ASTM E 1745), and per code. The layer of import sand may be eliminated below the vapor retarder, provided the geotechnical consultant has approved the elimination of the additional sand layer, based on the granular nature of exposed pad soils that have been appropriately tested (i.e., sand equivalent [SE≥30] and sieve analysis).

ACI 302.1R-04 (2004) states "If a cushion or sand layer is desired between the vapor retarder and the slab, care must be taken to protect the sand layer from taking on additional water from a source such as rain, curing, cutting, or cleaning. Wet cushion or sand layer has been directly linked in the past to significant lengthening of time required for a slab to reach an acceptable level of dryness for floor covering applications." Therefore, additional observation and/or testing will be necessary for the cushion or sand layer for moisture content, and relatively uniform thicknesses, prior to the placement of concrete.

- Concrete should have a maximum water/cement ratio of 0.50. This does not supercede Table 4.3.1 of Chapter 4 the ACI (2008) for corrosion or other corrosive requirements. Additional concrete mix design recommendations should be provided by the structural consultant and/or waterproofing specialist. Concrete finishing and workablity should be addressed by the structural consultant and a waterproofing specialist.

- Where slab water/cement ratios are as indicated herein, and/or admixtures used, the structural consultant should also make changes to the concrete in the grade beams and footings in kind, so that the concrete used in the foundation and slabs are designed and/or treated for more uniform moisture protection.

- The owner(s) should be specifically advised which areas are suitable for tile flooring, vinyl flooring, or other types of water/vapor-sensitive flooring and which are not suitable. In all planned floor areas, flooring shall be installed per the manufactures recommendations.

- Additional recommendations regarding water or vapor transmission should be provided by the architect/structural engineer/slab or foundation designer and should be consistent with the specified floor coverings indicated by the architect.

Regardless of the mitigation, some limited moisture/moisture vapor transmission through the slab should be anticipated. Construction crews may require special training for installation of certain product(s), as well as concrete finishing techniques. The use of specialized product(s) should be approved by the slab designer and water-proofing consultant. A technical representative of the flooring contractor should review the slab and moisture retarder plans and provide comment prior to the construction of the foundations or improvements. The vapor retarder contractor should have representatives onsite during the initial installation.

PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

General

The governing agency may retain the authority to approve the final structural design sections after subgrade elevations and actual resistance values (R-values) have been obtained at the conclusion of earthwork. Based on an assumed R-value of 30, general review of pavement designs for other nearby projects, and for estimation and bidding purposes, the pavement sections provided herein should be considered for preliminary design. Typically actual pavement sections will likely vary, therefore final pavement sections should be based on actual R-value testing performed during, or shortly after, roadway grading for any proposed street improvements.

The preliminary pavement sections presented in the following table are based on general Traffic Indices (T.I.'s), utilized by the controlling authorities for an interior/local street, a collector street, a secondary highway, and the guidelines presented in the latest revision to the California Department of Transportation "Highway Design Manual" fifth edition. It is our understanding that the minimum pavement section required by the controlling authorities for an interior/local street is 3 inches of AC (asphaltic concrete) on 6 inches of Class 2 aggregate base for a traffic index of 5.5. Based on an assumed R-value (i.e., R=30), the following preliminary pavement designs are presented. Applicable sections of City/County ordinances should be followed during design of public roads, fire access lanes, etc.

STREET CLASSIFICATION	TRAFFIC INDEX (T.I.)[1]	STANDARD PAVEMENT DESIGNS		
		R-VALUE	AC INCHES	CLASS 2 BASE ROCK[2] INCHES
Interior/Local Streets	5.5	30	3.0	7.0
Collector Street	7.0	30	4.0*	9.5
Secondary Highway	8.5	30	5.2*	12.0

[1] T.I.s are selected by the civil consultants evaluation of traffic patterns and type.
[2] Assumed R-values for base rock R=78 - Cal-Trans standard Class 2 base rock.
* Denotes County minimum asphaltic concrete and/or crushed aggregate base requirements.

The preliminary pavement sections provided above are intended as a minimum guideline. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. If the ADT (average daily traffic) or ADTT (average daily truck traffic) increases beyond that intended, as reflected by the T.I. used for design, increased maintenance and repair could be required for the pavement section. Consideration should be given to the increased potential for distress from overuse of paved street areas by heavy equipment and/or construction related heavy traffic

(e.g., concrete trucks, loaded supply trucks, etc.), particularly when the final section is not in place (i.e., topcoat). Best management construction practices should be followed at all times, especially during inclement weather.

PAVEMENT GRADING RECOMMENDATIONS

General

All section changes should be properly transitioned. If adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. A GSI representative should be present for the preparation of subgrade, base rock, and asphalt concrete.

Subgrade

Within street and parking areas, all surficial deposits of loose soil material should be removed and recompacted as recommended. After the loose soils are removed, the bottom is to be scarified to a depth of at least 6 inches, moisture conditioned as necessary and compacted to 95 percent of the maximum laboratory density or the City of Temecula minimum, as determined by ASTM test designation D 1557.

Deleterious material, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable materials encountered during grading should be removed. The compacted fill material should then be brought to the elevation of the proposed subgrade for the pavement. The subgrade should be proof-rolled in order to promote a uniform firm and unyielding surface. All grading and fill placement should be observed by the project geotechnical consultant.

Crushed Aggregate Base Rock

Compaction tests are required for the recommended base section. Minimum relative compaction required will be 95 percent of the laboratory maximum density as determined by ASTM test method D 1557 and/or Caltrans Test Method Number California 216. Base aggregate should be in accordance to the "Greenbook" crushed aggregate base rock (minimum R-value=80).

Paving

Prime coat may be omitted if all of the following conditions are met:

1. The asphalt pavement layer is placed within two weeks of completion of base and/or subbase course.

2. Traffic is not routed over completed base before paving

3. Construction is completed during the dry season of May through October.

4. The base is kept free of debris prior to placement of asphaltic concrete.

If construction is performed during the wet season of November through April, prime coat may be omitted if no rain occurs between completion of base course and paving and the time between completion of base and paving is reduced to three days, provided the base is free of loose soil or debris. Where prime coat has been omitted and rain occurs, traffic is routed over base course, or paving is delayed, measures shall be taken to restore base course, and subgrade to conditions that will meet specifications as directed by the geotechnical consultant.

Drainage

Positive drainage should be provided for all surface water to drain towards the area swale, curb and gutter, or to an approved drainage channel. Positive site drainage should be maintained at all times. Water should not be allowed to pond or seep into the ground, such as from behind unprotected curbs, both during and after grading. If planters or landscaping are adjacent to paved areas, measures should be taken to minimize the potential for water to enter the pavement section, such as thickened edges, enclosed planters, etc. Also, best management construction practices should be strictly adhered to at all times to minimize the potential for distress during construction and roadway improvements.

Additional Considerations

To mitigate perched groundwater, consideration should be given to installation of subgrade separators (cut-offs) between pavement subgrade and landscape areas, although this is not a requirement from a geotechnical standpoint. Cut-offs, if used, should be 6 inches wide and at least 12 inches below the pavement subgrade contact or 12 inches below the crushed aggregate base rock, if utilized.

WALL DESIGN PARAMETERS

Conventional Retaining Walls

The design parameters provided below assume that either non expansive soils (typically Class 2 permeable filter material or Class 3 aggregate base) or native onsite materials (up to and including an E.I. of 20) are used to backfill any retaining walls. The type of backfill (i.e., select or native), should be specified by the wall designer, and clearly shown on the plans. Building walls, below grade, should be water-proofed. The foundation system for

the proposed retaining walls should be designed in accordance with the recommendations presented in this and preceding sections of this report, as appropriate. If piers are not utilized, distress to the walls will likely occur. Footings should be embedded a minimum of 18 inches below adjacent grade (excluding landscape layer, 6 inches) and should be 24 inches in width. There should be no increase in bearing for footing width. The footing recommendations should be incorporated into a pier-supported wall design. Recommendations for specialty walls (i.e., crib, earthstone, geogrid, etc.) can be provided upon request, and would be based on site specific conditions.

Restrained Walls

Any retaining walls that will be restrained prior to placing and compacting backfill material or that have re-entrant or male corners, should be designed for an at-rest equivalent fluid pressure (EFP) of 65 pcf, plus any applicable surcharge loading. For areas of male or re-entrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall (2H) laterally from the corner.

Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to 10 feet high. Design parameters for walls less than 3 feet in height may be superceded by City and/or County standard design. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions due to traffic, structures, seismic events or adverse geologic conditions. When wall configurations are finalized, the appropriate loading conditions for superimposed loads can be provided upon request.

SURFACE SLOPE OF RETAINED MATERIAL (HORIZONTAL:VERTICAL)	EQUIVALENT FLUID WEIGHT P.C.F. (SELECT PRE-APPROVED BACKFILL)**	EQUIVALENT FLUID WEIGHT P.C.F. (NATIVE BEACH SAND BACKFILL)***
Level*	35	45
2 to 1	50	60

* Level backfill behind a retaining wall is defined as compacted earth materials, properly drained, without a slope for a distance of 2H behind the wall.
** E.I. $\leq$20, P.I. $<$15, SE $\geq$30, with $<$10% passing No. 200 sieve.
*** E.I. $<$50, P.I. $<$15, SE $>$25, with 15% passing No. 200 sieve.

Once retaining wall locations are known with respect to property lines, these preliminary design parameters should be reviewed by the geotechnical consultant, in light of the potential for expansive soils that may influence design.

Retaining Wall Backfill and Drainage

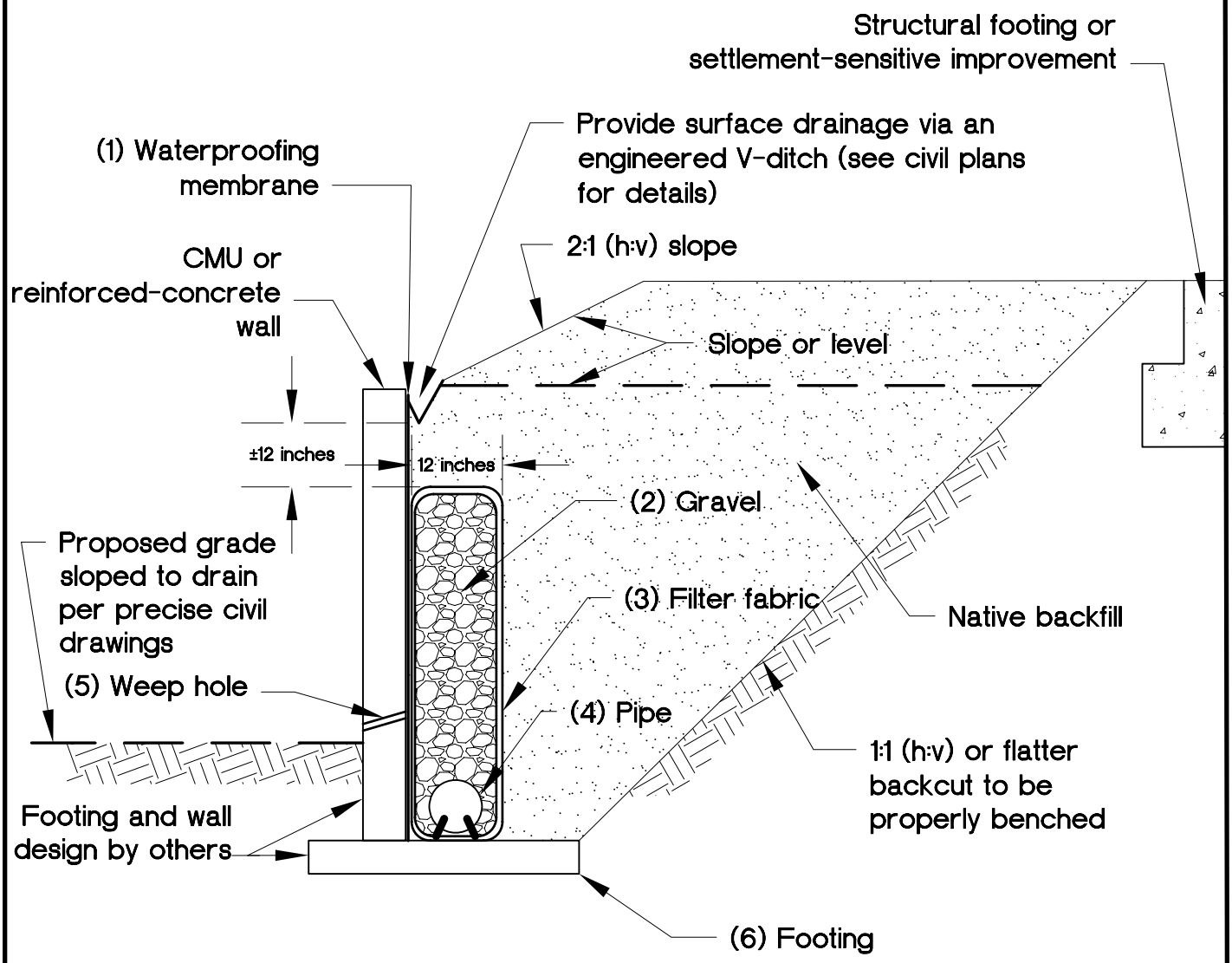
Positive drainage must be provided behind all retaining walls in the form of gravel wrapped in geofabric and outlets. A backdrain system is considered necessary for retaining walls that are 2 feet or greater in height. Details 1, 2, and 3, present the back drainage options discussed below. Backdrains should consist of a 4-inch diameter perforated PVC or ABS pipe encased in either Class 2 permeable filter material or ¾-inch to 1½-inch gravel wrapped in approved filter fabric (Mirafi 140 or equivalent). For low expansive backfill, the filter material should extend a minimum of 1 horizontal foot behind the base of the walls and upward at least 1 foot. For native backfill that has up to medium expansion potential, continuous Class 2 permeable drain materials should be used behind the wall. This material should be continuous (i.e., full height) behind the wall, and it should be constructed in accordance with the enclosed Detail 1 (Typical Retaining Wall Backfill and Drainage Detail). For limited access and confined areas, (panel) drainage behind the wall may be constructed in accordance with Detail 2 (Retaining Wall Backfill and Subdrain Detail Geotextile Drain). Materials with an E.I. potential of greater than 50 should not be used as backfill for retaining walls. For more onerous expansive situations, backfill and drainage behind the retaining wall should conform with Detail 3 (Retaining Wall And Subdrain Detail Clean Sand Backfill).

Outlets should consist of a 4-inch diameter solid PVC or ABS pipe spaced no greater than ±100 feet apart, with a minimum of two outlets, one on each end. The use of weep holes, only, in walls higher than 2 feet, is not recommended. The surface of the backfill should be sealed by pavement or the top 18 inches compacted with native soil (E.I. $\leq$50). Proper surface drainage should also be provided. For additional mitigation, consideration should be given to applying a water-proof membrane to the back of all retaining structures. The use of a waterstop should be considered for all concrete and masonry joints.

Wall/Retaining Wall Footing Transitions

Site walls are anticipated to be founded on footings designed in accordance with the recommendations in this report. Although not anticipated, should wall footings transition from cut to fill, the civil designer may specify either:

a) A minimum of a 2-foot overexcavation and recompaction of cut materials for a distance of 2H, from the point of transition.



(1) Waterproofing membrane.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

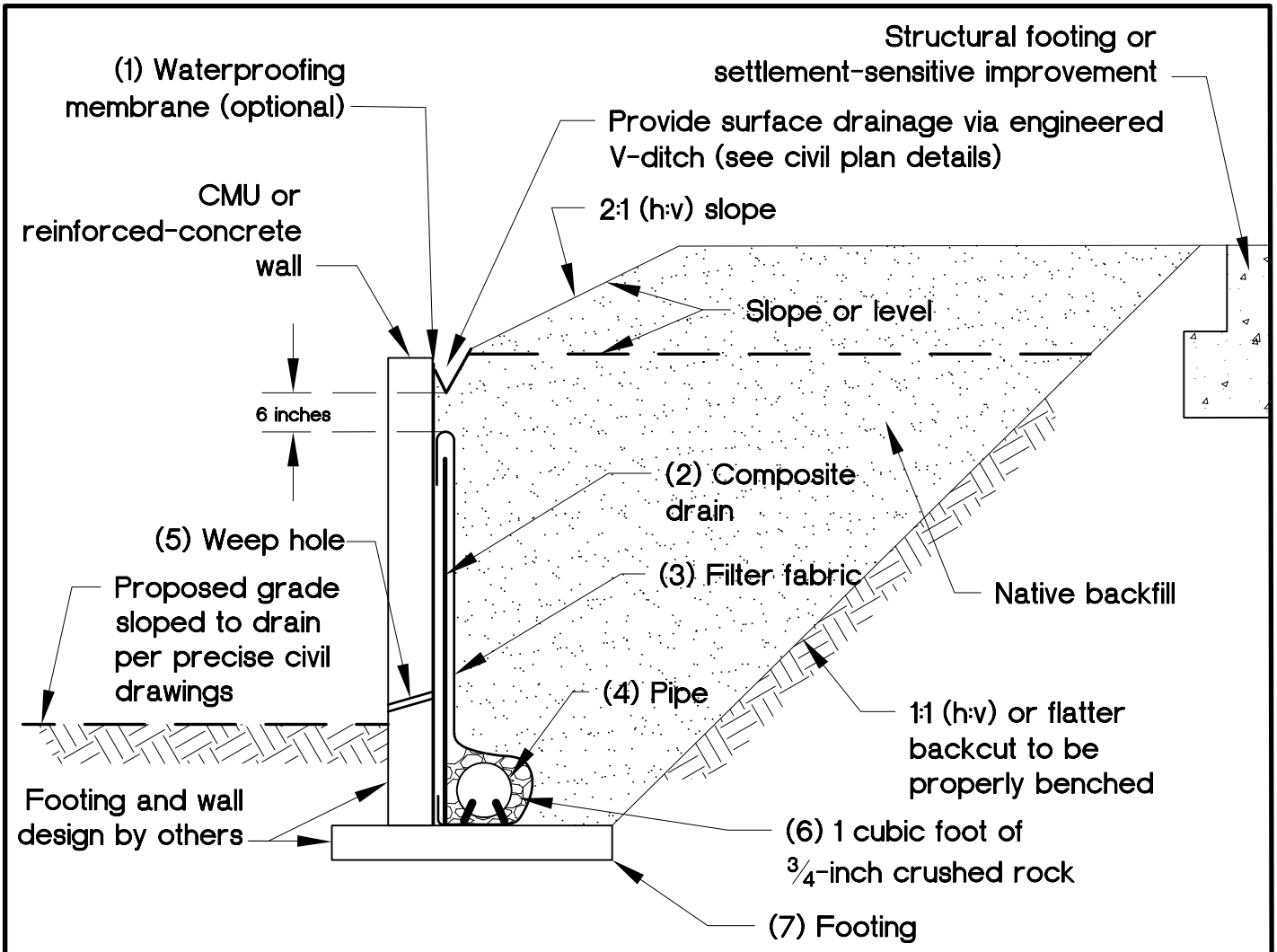
(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient sloped to suitable, approved outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

GeoSoils, Inc.	RETAINING WALL DETAIL – ALTERNATIVE A	Detail 1



(1) Waterproofing membrane (optional): Liquid boot or approved mastic equivalent.

(2) Drain: Miradrain 6000 or J-drain 200 or equivalent for non-waterproofed walls; Miradrain 6200 or J-drain 200 or equivalent for waterproofed walls (all perforations down).

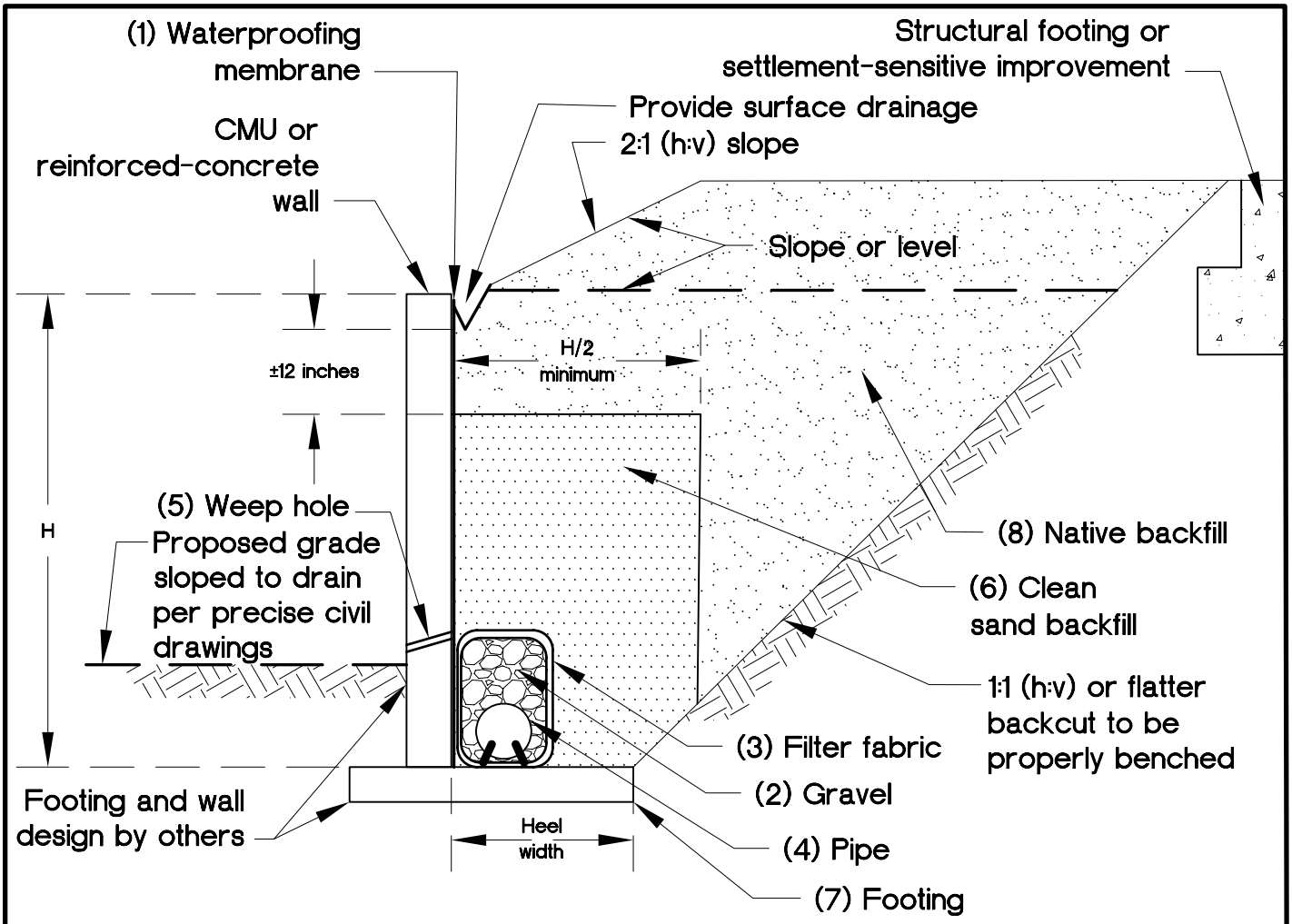
(3) Filter fabric: Mirafi 140N or approved equivalent; place fabric flap behind core.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Gravel: Clean, crushed, ¾ to 1½ inch.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.



(1) Waterproofing membrane: Liquid boot or approved masticequivalent.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Clean sand backfill: Must have sand equivalent value (S.E.) of 35 or greater; can be densified by water jetting upon approval by geotechnical engineer.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

(8) Native backfill: If E.I. <21 and S.E. ≥ 35 then all sand requirements also may not be required and will be reviewed by the geotechnical consultant.

b) Increase of the amount of reinforcing steel and wall detailing (i.e., expansion joints or crack control joints) such that a angular distortion of 1/360 for a distance of 2H on either side of the transition may be accommodated. Expansion joints should be placed no greater than 20 feet on-center, in accordance with the structural engineer's/wall designer's recommendations, regardless of whether or not transition conditions exist. Expansion joints should be sealed with a flexible, non-shrink grout.

c) Embed the footings entirely into native formational material (i.e., deepened footings).

If transitions from cut to fill transect the wall footing alignment at an angle of less than 45 degrees (plan view), then the designer should follow recommendation "a" (above) and until such transition is between 45 and 90 degrees to the wall alignment.

TOP-OF-SLOPE WALLS/FENCES/IMPROVEMENTS

Slope Creep

Soils at the site may be expansive and therefore, may become desiccated when allowed to dry. Such soils are susceptible to surficial slope creep, especially with seasonal changes in moisture content. Typically in southern California, during the hot and dry summer period, these soils become desiccated and shrink, thereby developing surface cracks. The extent and depth of these shrinkage cracks depend on many factors such as the nature and expansivity of the soils, temperature and humidity, and extraction of moisture from surface soils by plants and roots. When seasonal rains occur, water percolates into the cracks and fissures, causing slope surfaces to expand, with a corresponding loss in soil density and shear strength near the slope surface. With the passage of time and several moisture cycles, the outer 3 to 5 feet of slope materials experience a very slow, but progressive, outward and downward movement, known as slope creep. For slope heights greater than 10 feet, this creep related soil movement will typically impact all rear yard flatwork and other secondary improvements that are located within about 15 feet from the top of slopes, such as swimming pools, concrete flatwork, etc., and in particular top of slope fences/walls. This influence is normally in the form of detrimental settlement, and tilting of the proposed improvements. The dessication/swelling and creep discussed above continues over the life of the improvements, and generally becomes progressively worse. Accordingly, the developer should provide this information to any homeowners and homeowners association.

Top of Slope Walls/Fences

Due to the potential for slope creep for slopes higher than about 10 feet, some settlement and tilting of the walls/fence with the corresponding distresses, should be expected. To mitigate the tilting of top of slope walls/fences, we recommend that the walls/fences be

constructed on deepened foundations without any consideration for creep forces, where the expansion index of the materials comprising the outer 15 feet of the slope is less than 50, or a combination of grade beam and caisson foundations, for expansion indices greater than 50 comprising the slope, with creep forces taken into account. The grade beam should be at a minimum of 12 inches by 12 inches in cross section, supported by drilled caissons, 12 inches minimum in diameter, placed at a maximum spacing of 6 feet on center, and with a minimum embedment length of 7 feet below the bottom of the grade beam. The strength of the concrete and grout should be evaluated by the structural engineer of record. The proper ASTM tests for the concrete and mortar should be provided along with the slump quantities. The concrete used should be appropriate to mitigate sulfate corrosion, as warranted. The design of the grade beam and caissons should be in accordance with the recommendations of the project structural engineer, and include the utilization of the following geotechnical parameters:

Creep Zone: 5-foot vertical zone below the slope face and projected upward parallel to the slope face.

Creep Load: The creep load projected on the area of the grade beam should be taken as an equivalent fluid approach, having a density of 60 pcf. For the caisson, it should be taken as a uniform 900 pounds per linear foot of caisson's depth, located above the creep zone.

Point of Fixity: Located a distance of 1.5 times the caisson's diameter, below the creep zone.

Passive Resistance: Passive earth pressure of 300 psf per foot of depth per foot of caisson diameter, to a maximum value of 4,500 psf may be used to determine caisson depth and spacing, provided that they meet or exceed the minimum requirements stated above. To determine the total lateral resistance, the contribution of the creep prone zone above the point of fixity, to passive resistance, should be disregarded.

Allowable Axial Capacity:

Shaft capacity: 350 psf applied below the point of fixity over the surface area of the shaft.

Tip capacity: 4,500 psf.

DRIVEWAY, FLATWORK, AND OTHER IMPROVEMENTS

Some of the site soil materials on site may be expansive. The effects of expansive soils are cumulative, and typically occur over the lifetime of any improvements. On relatively level areas, when the soils are allowed to dry, the dessication and swelling process tends to cause heaving and distress to flatwork and other improvements. The resulting potential for distress to improvements may be reduced, but not totally eliminated. To reduce the likelihood of distress, the following recommendations are presented for all exterior flatwork:

1. The subgrade area for exterior concrete slabs should be compacted to achieve a minimum 90 percent relative compaction, and then be presoaked to 2 to 3 percentage points above (or 125 percent of) the soils' optimum moisture content, to a depth of 18 inches below subgrade elevation. If very low expansive soils are present, only optimum moisture content, or greater, is required and specific presoaking is not warranted. The moisture content of the subgrade should be proof tested within 72 hours prior to pouring concrete.

2. Exterior concrete slabs should be cast over a non-yielding surface, consisting of a 4-inch layer of crushed rock, gravel, or clean sand, that should be compacted and level prior to pouring concrete. If very low expansive soils are present, the rock or gravel or sand may be deleted. The layer or subgrade should be wet-down completely prior to pouring concrete, to minimize loss of concrete moisture to the surrounding earth materials.

3. Exterior slabs should be a minimum of 4 inches thick. Driveway slabs and approaches should additionally have a thickened edge (12 inches) adjacent to all landscape areas, to help impede infiltration of landscape water under the slab.

4. The use of transverse and longitudinal control joints are recommended to help control slab cracking due to concrete shrinkage or expansion. Two ways to mitigate such cracking are: a) add a sufficient amount of reinforcing steel, increasing tensile strength of the slab; and, b) provide an adequate amount of control and/or expansion joints to accommodate anticipated concrete shrinkage and expansion.

   In order to reduce the potential for unsightly cracks, slabs should be reinforced at mid-height with a minimum of No. 3 bars placed at 18 inches on center, in each direction. If subgrade soils within the top 7 feet from finish grade are very low expansive soils (i.e., E.I. $\leq$20), then 6x6-W1.4xW1.4 welded-wire mesh may be substituted for the rebar, provided the reinforcement is placed on chairs, at slab mid-height. The exterior slabs should be scored or saw cut, ½ to ⅜ inches deep, often enough so that no section is greater than 10 feet by 10 feet. For sidewalks or narrow slabs, control joints should be provided at intervals of every 6 feet. The slabs should be separated from the foundations and sidewalks with expansion joint filler material.

5. No traffic should be allowed upon the newly poured concrete slabs until they have been properly cured to within 75 percent of design strength. Concrete compression strength should be a minimum of 2,500 psi.

6. Driveways, sidewalks, and patio slabs adjacent to the house should be separated from the house with thick expansion joint filler material. In areas directly adjacent to a continuous source of moisture (i.e., irrigation, planters, etc.), all joints should be additionally sealed with flexible mastic.

7. Planters and walls should not be tied to the house.

8. Overhang structures should be supported on the slabs, or structurally designed with continuous footings tied in at least two directions. If very low expansion soils are present, footings need only be tied in one direction.

9. Any masonry landscape walls that are to be constructed throughout the property should be grouted and articulated in segments no more than 20 feet long. These segments should be keyed or doweled together.

10. Utilities should be enclosed within a closed utilidor (vault) or designed with flexible connections to accommodate differential settlement and expansive soil conditions.

11. Positive site drainage should be maintained at all times. Finish grade on the lots should provide a minimum of 1 to 2 percent fall to the street, as indicated herein. It should be kept in mind that drainage reversals could occur, including post-construction settlement, if relatively flat yard drainage gradients are not periodically maintained by the owner.

12. Air conditioning (A/C) units should be supported by slabs that are incorporated into the building foundation or constructed on a rigid slab with flexible couplings for plumbing and electrical lines. A/C waste water lines should be drained to a suitable non-erosive outlet.

13. Shrinkage cracks could become excessive if proper finishing and curing practices are not followed. Finishing and curing practices should be performed per the Portland Cement Association Guidelines. Mix design should incorporate rate of curing for climate and time of year, sulfate content of soils, corrosion potential of soils, and fertilizers used on site.

ONSITE INFILTRATION-RUNOFF RETENTION SYSTEMS

It is our understanding that onsite infiltration-runoff retention systems (OIRRS) are planned for Best Management Practices (BMP's) or Low Impact Development (LID) principles for

the project. Recently, GSI (2012) has completed onsite percolation/infiltration testing, and provided the testing results to the Client and design civil engineer. As such, some guidelines should/must be followed in the planning, design, and construction of such systems. Such facilities, if improperly designed or implemented without consideration of the geotechnical aspects of site conditions, can contribute to flooding, saturation of bearing materials beneath site improvements, slope instability, and possible concentration and contribution of pollutants into the groundwater or storm drain and/or utility trench systems.

A key factor in these systems is the infiltration rate (often referred to as the percolation rate) which can be ascribed to, or determined for, the earth materials within which these systems are installed. Additionally, the infiltration rate of the designed system (which may include gravel, sand, mulch/topsoil, or other amendments, etc.) will need to be considered. The project infiltration testing is very site specific, any changes to the location of the proposed OIRRS and/or estimated size of the OIRRS, may require additional infiltration testing. Locally, relatively impermeable formations include: terrace deposits, claystone, siltstone, cemented sandstone, igneous and metamorphic bedrock, as well as expansive fill soils.

Some of the methods which are utilized for onsite infiltration include percolation basins, dry wells, bio-swale/bio-retention, permeable pavers/pavement, infiltration trenches, filter boxes and subsurface infiltration galleries/chambers. Some of these systems are constructed using native and import soils, perforated piping, and filter fabrics while others employ structural components such as stormwater infiltration chambers and filters/separators. Every site will have characteristics which should lend themselves to one or more of these methods; but, not every site is suitable for OIRRS. In practice, OIRRS are usually initially designed by the project design civil engineer. Selection of methods should include (but should not be limited to) review by licensed professionals including the geotechnical engineer, hydrogeologist, engineering geologist, project civil engineer, landscape architect, environmental professional, and industrial hygienist. Applicable governing agency requirements should be reviewed and included in design considerations.

The following geotechnical guidelines should be considered when designing onsite infiltration-runoff retention systems:

- It is not good engineering practice to allow water to saturate soils, especially near slopes or improvements; however, the controlling agency/authority is now requiring this for OIRRS purposes on many projects.

- Where possible, infiltration system design should be based on actual infiltration testing results/data, preferably utilizing double-ring infiltrometer testing (ASTM D 3385) to determine the infiltration rate of the earth materials being contemplated for infiltration.

- Wherever possible, infiltration systems should not be installed within ±50 feet of the tops of slopes steeper than 15 percent or within H/3 from the tops of slopes (where H equals the height of slope).

- Wherever possible, infiltrations systems should not be placed within a distance of H/2 from the toes of slopes (where H equals the height of slope).

- The landscape architect should be notified of the location of the proposed OIRRS. If landscaping is proposed within the OIRRS, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems). Over-watering landscape areas above, or adjacent to, the proposed OIRRS could adversely affect performance of the system.

- Areas adjacent to, or within, the OIRRS that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- If subsurface infiltration galleries/chambers are proposed, the appropriate size, depth interval, and ultimate placement of the detention/infiltration system should be evaluated by the design engineer, and be of sufficient width/depth to achieve optimum performance, based on the infiltration rates provided. In addition, proper debris filter systems will need to be utilized for the infiltration galleries/chambers. Debris filter systems will need to be self cleaning and periodically and regularly maintained on a regular basis. Provisions for the regular and periodic maintenance of any debris filter system is recommended and this condition should be disclosed to all interested/affected parties.

- Infiltrations systems should not be installed within ±8 feet of building foundations utility trenches, and walls, or a 1:1 (horizontal to vertical [h:v]) slope (down and away) from the bottom elements of these improvements. Alternatively, deepened foundations and/or pile/pier supported improvements may be used.

- Infiltrations systems should not be installed adjacent to pavement and/or hardscape improvements. Alternatively, deepened/thickened edges and curbs and/or impermeable liners may be utilized in areas adjoining the OIRRS.

- As with any OIRRS, localized ponding and groundwater seepage should be anticipated. The potential for seepage and/or perched groundwater to occur after site development should be disclosed to all interested/affected parties.

- Installation of infiltrations systems should avoid expansive soils (Expansion Index [E.I.] ≥51) or soils with a relatively high plasticity index (P.I. > 20).

- Infiltration systems should not be installed where the vertical separation of the groundwater level is less than ±10 feet from the base of the system.

- Where permeable pavements are planned as part of the system, the site Traffic Index (T.I.) Should be less than 25,000 Average Daily Traffic (ADT), as recommended in Allen, et al. (2011).

- Infiltration systems should be designed using a suitable factor of safety (FOS) to account for uncertainties in the known infiltration rates (as generally required by the controlling authorities), and reduction in performance over time.

- As with any OIRRS, proper care will need to provided. Best management practices should be followed at all times, especially during inclement weather. Provisions for the management of any siltation, debris within the OIRRS, and/or overgrown vegetation (including root systems) should be considered. An appropriate inspection schedule will need to adopted and provided to all interested/affected parties.

- Any designed system will require regular and periodic maintenance, which may include rehabilitation and/or complete replacement of the filter media (e.g., sand, gravel, filter fabrics, topsoils, mulch, etc.) or other components utilized in construction, so that the design life exceeds 15 years. Due to the potential for piping and adverse seepage conditions, a burrowing rodent control program should also be implemented onsite.

- All or portions of these systems may be considered attractive nuisances. Thus, consideration of the effects of, or potential for, vandalism should be addressed.

- Newly established vegetation/landscaping (including phreatophytes) may have root systems that will influence the performance of the OIRRS or nearby LID systems.

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.

- Any proposed utility backfill materials (i.e., inlet/outlet piping and/or other subsurface utilities) located within or near the proposed area of the OIRRS may become saturated. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. If utility trenches cross and/or are proposed near the OIRRS, cut-off walls or other water barriers will need to be installed to mitigate the potential for piping and excess water entering the utility backfill materials. Planned or existing utilities may also be subject to piping of fines into open-graded gravel backfill layers unless separated from overlying or adjoining OIRRS by geotextiles and/or slurry backfill.

- The use of OIRRS above existing utilities that might degrade/corrode with the introduction of water/seepage and should be avoided.

DEVELOPMENT CRITERIA

Slope Deformation

Compacted fill slopes designed using customary factors of safety for gross or surficial stability and constructed in general accordance with the design specifications should be expected to undergo some differential vertical heave or settlement in combination with differential lateral movement in the out-of-slope direction, after grading. This post-construction movement occurs in two forms: slope creep, and lateral fill extension (LFE). Slope creep is caused by alternate wetting and drying of the fill soils which results in slow downslope movement. This type of movement is expected to occur throughout the life of the slope, and is anticipated to potentially affect improvements or structures (e.g., separations and/or cracking), placed near the top-of-slope, up to a maximum distance of approximately 15 feet from the top-of-slope, depending on the slope height. This movement generally results in rotation and differential settlement of improvements located within the creep zone. LFE occurs due to deep wetting from irrigation and rainfall on slopes comprised of expansive materials. Although some movement should be expected, long-term movement from this source may be minimized, but not eliminated, by placing the fill throughout the slope region, wet of the fill's optimum moisture content.

It is generally not practical to attempt to eliminate the effects of either slope creep or LFE. Suitable mitigative measures to reduce the potential of lateral deformation typically include: setback of improvements from the slope faces (per the 1997 UBC and/or adopted California Building Code), positive structural separations (i.e., joints) between improvements, and stiffening and deepening of foundations. Expansion joints in walls should be placed no greater than 20 feet on-center, and in accordance with the structural engineer's recommendations. All of these measures are recommended for design of structures and improvements. The ramifications of the above conditions, and recommendations for mitigation, should be provided to each homeowner and/or any homeowners association.

Slope Maintenance and Planting

Water has been shown to weaken the inherent strength of all earth materials. Slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Over-watering should be avoided as it adversely affects site improvements, and causes perched groundwater conditions. Graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable

vegetation cover soon after construction. Compaction to the face of fill slopes would tend to minimize short-term erosion until vegetation is established. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers may aid in allowing the establishment of a sparse plant cover. Utilizing plants other than those recommended above will increase the potential for perched water, staining, mold, etc., to develop. A rodent control program to prevent burrowing should be implemented. Irrigation of natural (ungraded) slope areas is generally not recommended. These recommendations regarding plant type, irrigation practices, and rodent control should be provided to each homeowner. Over-steepening of slopes should be avoided during building construction activities and landscaping.

Drainage

Adequate lot surface drainage is a very important factor in reducing the likelihood of adverse performance of foundations, hardscape, and slopes. Surface drainage should be sufficient to prevent ponding of water anywhere on a lot, and especially near structures and tops of slopes. Lot surface drainage should be carefully taken into consideration during fine grading, landscaping, and building construction. Therefore, care should be taken that future landscaping or construction activities do not create adverse drainage conditions. Positive site drainage within lots and common areas should be provided and maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond and/or seep into the ground. In general, the area within 5 feet around a structure should slope away from the structure. We recommend that unpaved lawn and landscape areas have a minimum gradient of 1 percent sloping away from structures, and whenever possible, should be above adjacent paved areas. Consideration should be given to avoiding construction of planters adjacent to structures (buildings, pools, spas, etc.). Pad drainage should be directed toward the street or other approved area(s). Although not a geotechnical requirement, roof gutters, downspouts, or other appropriate, means may be utilized to control roof drainage. Downspouts, or drainage devices, should outlet a minimum of 5 feet from structures or into a subsurface drainage system. Areas of seepage may develop due to irrigation or heavy rainfall, and should be anticipated. Minimizing irrigation will lessen this potential. If areas of seepage develop, recommendations for minimizing this effect could be provided upon request.

Toe of Slope Drains/Toe Drains

Where significant slopes intersect pad areas, surface drainage down the slope allows for some seepage into the subsurface materials, sometimes creating conditions causing or contributing to perched and/or ponded water. Toe of slope/toe drains may be beneficial in the mitigation of this condition due to surface drainage. The general criteria to be utilized by the design engineer for evaluating the need for this type of drain is as follows:

- Is there a source of irrigation above or on the slope that could contribute to saturation of soil at the base of the slope?

- Are the slopes hard rock and/or impermeable, or relatively permeable, or; do the slopes already have or are they proposed to have subdrains (i.e., stabilization fills, etc.)?

- Are there cut-fill transitions (i.e., fill over bedrock), within the slope?

- Was the lot at the base of the slope overexcavated or is it proposed to be overexcavated? Overexcavated lots located at the base of a slope could accumulate subsurface water along the base of the fill cap.

- Are the slopes north facing? North facing slopes tend to receive less sunlight (less evaporation) relative to south facing slopes and are more exposed to the currently prevailing seasonal storm tracks.

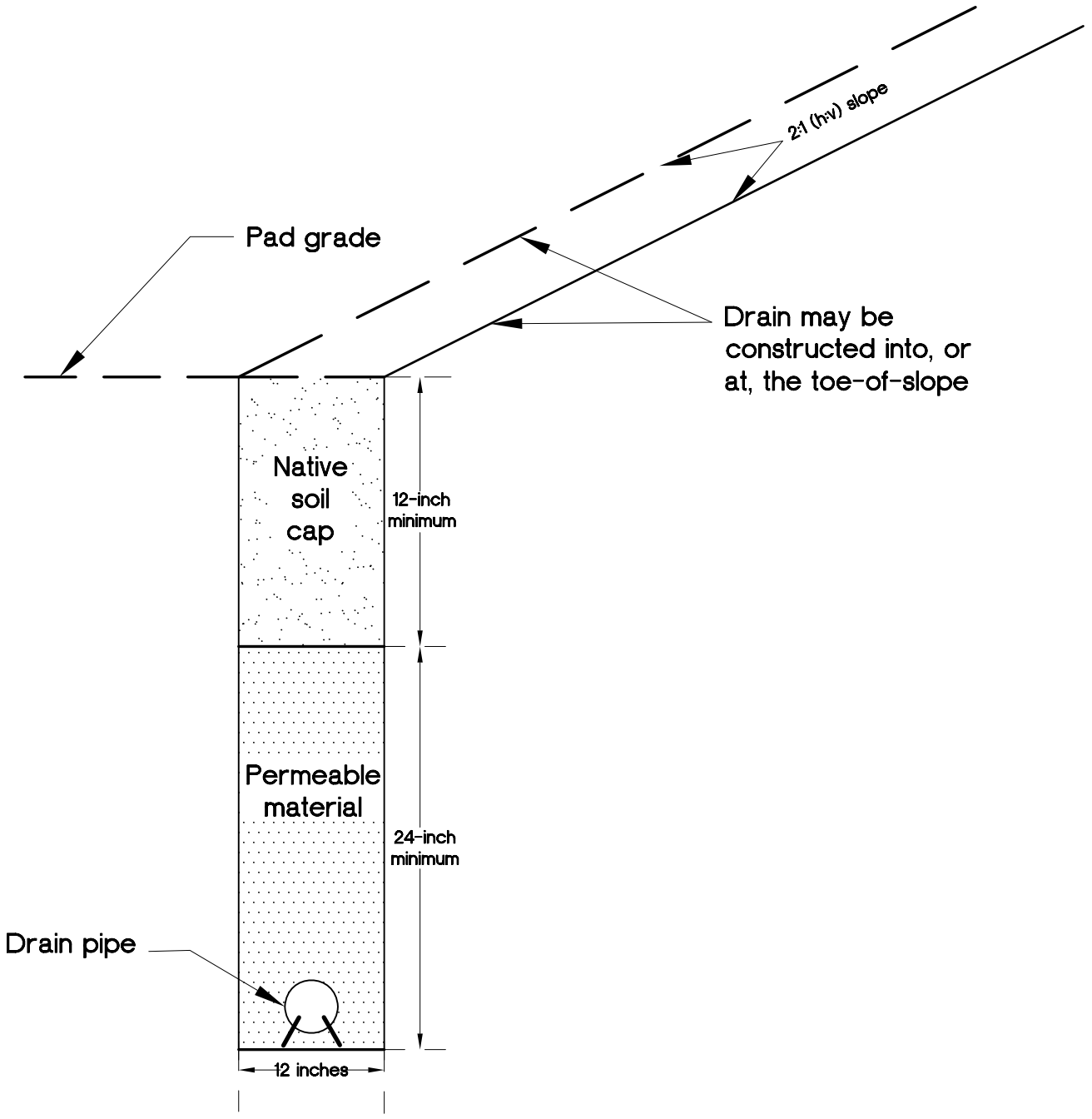
- What is the slope height? It has been our experience that slopes with heights in excess of approximately 10 feet tend to have more problems due to storm runoff and irrigation than slopes of a lesser height.

- Do the slopes "toe out" into a residential lot or a lot where perched or ponded water may adversely impact its proposed use?

Based on these general criteria, the construction of toe drains may be considered by the design engineer along the toe of slopes, or at retaining walls in slopes, descending to the rear of such lots. Following are Detail 4 (Schematic Toe Drain Detail) and Detail 5 (Subdrain Along Retaining Wall Detail). Other drains may be warranted due to unforeseen conditions, homeowner irrigation, or other circumstances. Where drains are constructed during grading, including subdrains, the locations/elevations of such drains should be surveyed, and recorded on the final as-built grading plans by the design engineer. It is recommended that the above be disclosed to all interested parties, including homeowners and any homeowners association.

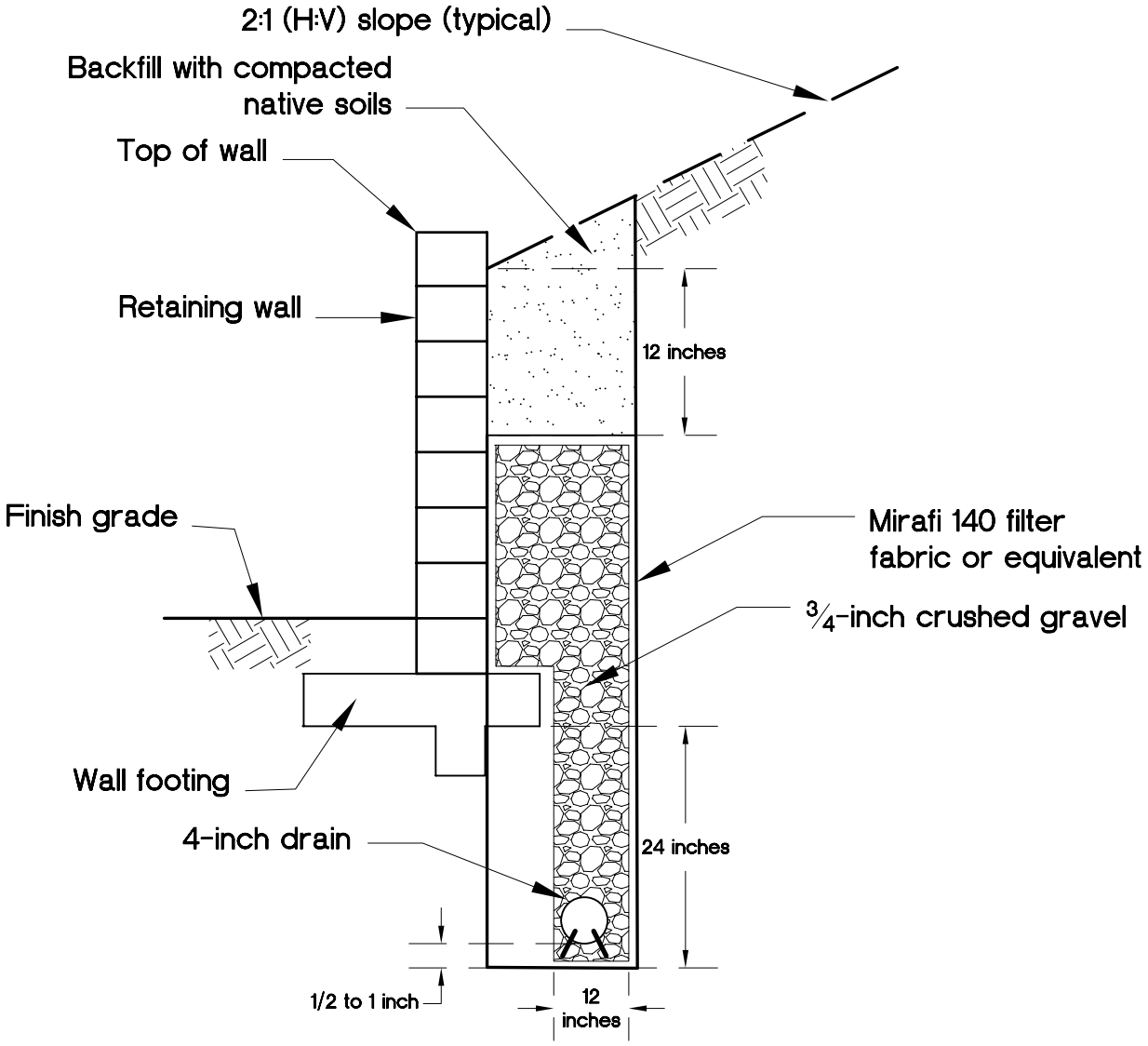
Erosion Control

Cut and fill slopes will be subject to surficial erosion during and after grading. Onsite earth materials have a moderate to high erosion potential. Consideration should be given to providing hay bales and silt fences for the temporary control of surface water, from a geotechnical viewpoint.



1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.

GeoSoils, Inc.	SCHEMATIC TOE DRAIN DETAIL	Detail 4



NOTES:

1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.
8. Effort to compact should be applied to drain rock.

Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Over-watering the landscape areas will adversely affect proposed site improvements. We would recommend that any proposed open-bottom planters adjacent to proposed structures be eliminated for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized. An outlet placed in the bottom of the planter, could be installed to direct drainage away from structures or any exterior concrete flatwork. If planters are constructed adjacent to structures, the sides and bottom of the planter should be provided with a moisture barrier to prevent penetration of irrigation water into the subgrade. Provisions should be made to drain the excess irrigation water from the planters without saturating the subgrade below or adjacent to the planters. Graded slope areas should be planted with drought resistant vegetation. Consideration should be given to the type of vegetation chosen and their potential effect upon surface improvements (i.e., some trees will have an effect on concrete flatwork with their extensive root systems). From a geotechnical standpoint leaching is not recommended for establishing landscaping. If the surface soils are processed for the purpose of adding amendments, they should be recompacted to 90 percent minimum relative compaction.

Gutters and Downspouts

As previously discussed in the drainage section, the installation of gutters and downspouts should be considered to collect roof water that may otherwise infiltrate the soils adjacent to the structures. If utilized, the downspouts should be drained into PVC collector pipes or other non-erosive devices (e.g., paved swales or ditches; below grade, solid tight-lined PVC pipes; etc.), that will carry the water away from the house, to an appropriate outlet, in accordance with the recommendations of the design civil engineer. Downspouts and gutters are not a requirement; however, from a geotechnical viewpoint, provided that positive drainage is incorporated into project design (as discussed previously).

Subsurface and Surface Water

Subsurface and surface water are not anticipated to affect site development, provided that the recommendations contained in this report are incorporated into final design and construction and that prudent surface and subsurface drainage practices are incorporated into the construction plans. Perched groundwater conditions along zones of contrasting permeabilities may not be precluded from occurring in the future due to site irrigation, poor drainage conditions, or damaged utilities, and should be anticipated. Should perched groundwater conditions develop, this office could assess the affected area(s) and provide the appropriate recommendations to mitigate the observed groundwater conditions. Groundwater conditions may change with the introduction of irrigation, rainfall, or other factors.

Site Improvements

If in the future, any additional improvements (e.g., pools, spas, etc.) are planned for the site, recommendations concerning the geological or geotechnical aspects of design and construction of said improvements could be provided upon request. Pools and/or spas should not be constructed without specific design and construction recommendations from GSI, and this construction recommendation should be provided to the homeowners, any homeowners association, and/or other interested parties. This office should be notified in advance of any fill placement, grading of the site, or trench backfilling after rough grading has been completed. This includes any grading, utility trench and retaining wall backfills, flatwork, etc.

Tile Flooring

Tile flooring can crack, reflecting cracks in the concrete slab below the tile, although small cracks in a conventional slab may not be significant. Therefore, the designer should consider additional steel reinforcement for concrete slabs-on-grade where tile will be placed. The tile installer should consider installation methods that reduce possible cracking of the tile such as slipsheets. Slipsheets or a vinyl crack isolation membrane (approved by the Tile Council of America/Ceramic Tile Institute) are recommended between tile and concrete slabs on grade.

Additional Grading

This office should be notified in advance of any fill placement, supplemental regrading of the site, or trench backfilling after rough grading has been completed. This includes completion of grading in the street, driveway approaches, driveways, parking areas, and utility trench and retaining wall backfills.

Footing Trench Excavation

All footing excavations should be observed by a representative of this firm subsequent to trenching and prior to concrete form and reinforcement placement. The purpose of the observations is to evaluate that the excavations have been made into the recommended bearing material and to the minimum widths and depths recommended for construction. If loose or compressible materials are exposed within the footing excavation, a deeper footing or removal and recompaction of the subgrade materials would be recommended at that time. Footing trench spoil and any excess soils generated from utility trench excavations should be compacted to a minimum relative compaction of 90 percent, if not removed from the site.

Trenching/Temporary Construction Backcuts

Considering the nature of the onsite earth materials, it should be anticipated that caving or sloughing could be a factor in subsurface excavations and trenching. Shoring or excavating the trench walls/backcuts at the angle of repose (typically 25 to 45 degrees [except as specifically superceded within the text of this report]), should be anticipated. All excavations should be observed by an engineering geologist or soil engineer from GSI, prior to workers entering the excavation or trench, and minimally conform to CAL-OSHA, state, and local safety codes. Should adverse conditions exist, appropriate recommendations would be offered at that time. The above recommendations should be provided to any contractors and/or subcontractors, or homeowners, etc., that may perform such work.

Utility Trench Backfill

1. All interior utility trench backfill should be brought to at least 2 percent above optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. As an alternative for shallow (12-inch to 18-inch) under-slab trenches, sand having a sand equivalent value of 30 or greater may be utilized and jetted or flooded into place. Observation, probing and testing should be provided to evaluate the desired results.

2. Exterior trenches adjacent to, and within areas extending below a 1:1 plane projected from the outside bottom edge of the footing, and all trenches beneath hardscape features and in slopes, should be compacted to at least 90 percent of the laboratory standard. Sand backfill, unless excavated from the trench, should not be used in these backfill areas. Compaction testing and observations, along with probing, should be accomplished to evaluate the desired results.

3. All trench excavations should conform to CAL-OSHA, state, and local safety codes.

4. Utilities crossing grade beams, perimeter beams, or footings should either pass below the footing or grade beam utilizing a hardened collar or foam spacer, or pass through the footing or grade beam in accordance with the recommendations of the structural engineer.

SUMMARY OF RECOMMENDATIONS REGARDING GEOTECHNICAL OBSERVATION AND TESTING

We recommend that observation and/or testing be performed by GSI at each of the following construction stages:

- During grading/recertification.

- During excavation.

- During placement of subdrains, toe drains, or other subdrainage devices, prior to placing fill and/or backfill.

- After excavation of building footings, retaining wall footings, and free standing walls footings, prior to the placement of reinforcing steel or concrete.

- Prior to pouring any slabs or flatwork, after presoaking/presaturation of building pads and other flatwork subgrade, before the placement of concrete, reinforcing steel, capillary break (i.e., sand, pea-gravel, etc.), or vapor barriers (i.e., visqueen, etc.).

- During retaining wall subdrain installation, prior to backfill placement.

- During placement of backfill for area drain, interior plumbing, utility line trenches, and retaining wall backfill.

- During slope construction/repair.

- When any unusual soil conditions are encountered during any construction operations, subsequent to the issuance of this report.

- When any developer or homeowner improvements, such as flatwork, spas, pools, walls, etc., are constructed, prior to construction.

- A report of geotechnical observation and testing should be provided at the conclusion of each of the above stages, in order to provide concise and clear documentation of site work, and/or to comply with code requirements.

- GSI should review project sales documents to homeowners/homeowners associations for geotechnical aspects, including irrigation practices, the conditions outlined above, etc., prior to any sales. At that stage, GSI will provide homeowners maintenance guidelines which should be incorporated into such documents.

OTHER DESIGN PROFESSIONALS/CONSULTANTS

The design civil engineer, structural engineer, post-tension designer, architect, landscape architect, wall designer, etc., should review the recommendations provided herein, incorporate those recommendations into all their respective plans, and by explicit reference, make this report part of their project plans. This report presents minimum

design criteria for the design of slabs, foundations and other elements possibly applicable to the project. These criteria should not be considered as substitutes for actual designs by the structural engineer/designer. Please note that the recommendations contained herein are not intended to preclude the transmission of water or vapor through the slab or foundation. The structural engineer/foundation and/or slab designer should provide recommendations to not allow water or vapor to enter into the structure so as to cause damage to another building component, or so as to limit the installation of the type of flooring materials typically used for the particular application.

The structural engineer/designer should analyze actual soil-structure interaction and consider, as needed, bearing, expansive soil influence, and strength, stiffness and deflections in the various slab, foundation, and other elements in order to develop appropriate, design-specific details. As conditions dictate, it is possible that other influences will also have to be considered. The structural engineer/designer should consider all applicable codes and authoritative sources where needed. If analyses by the structural engineer/designer result in less critical details than are provided herein as minimums, the minimums presented herein should be adopted. It is considered likely that some, more restrictive details will be required.

If the structural engineer/designer has any questions or requires further assistance, they should not hesitate to call or otherwise transmit their requests to GSI. In order to mitigate potential distress, the foundation and/or improvement's designer should confirm to GSI and the governing agency, in writing, that the proposed foundations and/or improvements can tolerate the amount of differential settlement and/or expansion characteristics and other design criteria specified herein.

PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and laboratory data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project. All samples will be disposed of after 30 days, unless specifically requested by the client, in writing.

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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APPENDIX B

TEST PIT LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with	GM	Silty gravels gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands more than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, mucic, and other highly organic soils

CONSISTENCY OR RELATIVE DENSITY

CRITERIA

Standard Penetration Test

Penetration Resistance N (blows/ft)	Relative Density
0 - 4	Very loose
5 - 10	Loose
11 - 30	Medium
31 - 50	Dense
> 50	Very dense

Standard Penetration Test

Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (tons/ft^2)
<2	Very Soft	<0.25
2 - 4	Soft	0.25 - .050
5 - 8	Medium	0.50 - 1.00
9 - 16	Stiff	1.00 - 2.00
17 - 32	Very Stiff	2.00 - 4.00
>32	Hard	>4.00

3" 3/4" #4 #10 #40 #200 U.S. Standard Sieve

Unified Soil Classification	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS

Dry	Absence of moisture: dusty, dry to the touch
Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content
Wet	Above optimum moisture content
Saturated	Visible free water; below water table

MATERIAL QUANTITY

trace	0 - 5 %
few	5 - 10 %
little	10 - 25 %
some	25 - 45 %

OTHER SYMBOLS

C Core Sample
S SPT Sample
B Bulk Sample
▼ Groundwater
Qp Pocket Penetrometer

BASIC LOG FORMAT:
Group name, Group symbol, color, moisture, consistency or relative density. Additional comments: grain size, odor, presence of roots, mica, gypsum, coarse grained particles, etc.

EXAMPLE:
Sand (SP), brown, moist, loose; fine to medium grained, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

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PLATE B-1

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	SATURATION (%)	DESCRIPTION
TP-101	1,349	0-1½	SM					**COLLUVIUM/TOPSOIL**: Silty SAND, dark grayish brown, dry, medium dense.
		1½-5	ML	Ring @ 3' Chunk @ 6'	2.9 4.8	21.1 110.9	21.1 26.0	**BEDROCK-QUATERNARY PAUBA FORMATION**: SILTSTONE, pale yellow brown, dry, dense; practical refusal with backhoe @ 5' on well cemented bedrock.
								Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-19-12
TP-102	1,351	0-2	SC					**COLLUVIUM/TOPSOIL**: Clayey SAND, reddish brown, dry, medium dense.
		2-14	SM	Chunk @ 6' Chunk @ 12'-14'	2.6 7.8	130.2 126.4	25.6 67.3	**BEDROCK-QUATERNARY PAUBA FORMATION**: SANDSTONE, grayish to reddish brown, damp, dense; becomes sandy @ 6', moderately indurated.
								Total Depth = 14' No Groundwater or Caving Encountered Backfilled 9-19-12

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	SATURATION (%)	DESCRIPTION
TP-103	1,344	0-2½	SM					**ARTIFICIAL FILL-UNDOCUMENTED**: Silty SAND, grayish brown, dry, loose; porous.
		2½-4	SC					**COLLUVIUM/TOPSOIL**: Clayey SAND, reddish brown, damp, medium dense.
		4-5	SC					**BEDROCK-QUATERNARY PAUBA FORMATION** SANDSTONE with clay, reddish brown, damp, dense; fine to coarse grained sands, indurated.
								Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-19-12
TP-104	1,341	0-1	SC					**COLLUVIUM/TOPSOIL**: Clayey SAND, reddish brown, dry, medium dense.
		1-8	SM					**BEDROCK-QUATERNARY PAUBA FORMATION**: SANDSTONE, reddish brown, damp, dense, hard pan @ 8'.
		8-15	SM	Bulk @ 9'				SANDSTONE, pale yellowish to reddish brown, damp to moist, dense; becomes sandy, moderately indurated.
								Total Depth = 15' No Groundwater or Caving Encountered Backfilled 9-19-12

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	SATURATION (%)	DESCRIPTION
TP-105	1,334	0-6"	SM					**ARTIFICIAL FILL: UNDOCUMENTED**: Silty SAND, light gray, dry, loose.
		6"-6'	SM	Chunk @ 6'	4.9 5.1	118.8 124.2	33.3 40.7	**BEDROCK-QUATERNARY PAUBA FORMATION**: SANDSTONE, reddish brown, dry, dense; few to some cobble sized clasts, fine to coarse grained sands.
								Total Depth = 6' No Groundwater or Caving Encountered Backfilled 9-19-12
TP-106	1,340	0-2	SC					**ARTIFICIAL FILL-UNDOCUMENTED**: Clayey SAND, dark brown, dry, loose to medium dense.
		2-4	SM					**BEDROCK-QUATERNARY PAUBA FORMATION**: SANDSTONE, reddish brown, dry to damp, dense; fine to coarse grained sands.
								Total Depth = 4' No Groundwater or Caving Encountered Backfilled 9-19-12
TP-107	1,316	0-2	SC					**COLLUVIUM/TOPSOIL**: Clayey SAND, dark reddish brown, dry, loose; porous.
		2-5	ML					**BEDROCK-QUATERNARY PAUBA FORMATION**: SILTSTONE, very pale brown to while, dry, dense; fine grained.
								Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-19-12

PLATE B-4

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-1	1,306	0-2	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry, medium dense; blocky angular structure.
		2-4	ML				**BEDROCK - QUATERNARY PAUBA FORMATION:** SILTSTONE, pale yellow brown, damp, dense; indurated, few to some roots and rootlets, Stage II carbonate layer noted on stratigraphic top of unit.
							Total Depth = 4' No Groundwater or Caving Encountered Backfilled 9-21-12
P-2	1,310	0-2½	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry to damp, medium dense; blocky angular structure.
		2½-4½	SM/SC				**BEDROCK - QUATERNARY PAUBA FORMATION:** Clayey SANDSTONE, dark reddish brown, damp, dense; few to some roots and rootlets.
		4½-6	ML				SILTSTONE, very light gray, dry to damp, dense; indurated.
							Total Depth = 6' No Groundwater or Caving Encountered Backfilled 9-21-12

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-3	1,310	0-6"	SM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark grayish brown, dry, medium dense.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; fine to coarse grain sands, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12
P-4	1,310	0-6"	GM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark reddish brown, dry, loose.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; gravel/cobble lens noted between 3 and 4½ feet, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12

APPENDIX C

SEISMICITY DATA

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*        *
*  E Q F A U L T  *
*        *
*  Version 3.00  *
*        *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6451-A-SC

DATE: 10-10-2012

JOB NAME: Wildomar 23

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 33.5878
SITE LONGITUDE: 117.2299

SEARCH RADIUS: 62.14 mi

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): S Number of Sigmas: 1.0
DISTANCE MEASURE: cdist
SCOND: 1
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT		
		MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
ELSINORE (TEMECULA)	0.3(0.5)	6.8	0.842	XI
ELSINORE (GLEN IVY)	8.0(12.9)	6.8	0.397	X
ELSINORE (JULIAN)	19.3(31.0)	7.1	0.214	VIII
SAN JACINTO-SAN JACINTO VALLEY	20.4(32.8)	6.9	0.178	VIII
SAN JACINTO-ANZA	20.9(33.7)	7.2	0.211	VIII
CHINO-CENTRAL AVE. (Elsinore)	25.8(41.6)	6.7	0.172	VIII
SAN JOAQUIN HILLS	26.7(42.9)	6.6	0.157	VIII
NEWPORT-INGLEWOOD (Offshore)	28.8(46.3)	7.1	0.143	VIII
SAN JACINTO-SAN BERNARDINO	29.7(47.8)	6.7	0.106	VII
WHITTIER	30.0(48.3)	6.8	0.112	VII
ROSE CANYON	34.1(54.8)	7.2	0.129	VIII
SAN ANDREAS - SB-Coach. M-1b-2	35.8(57.6)	7.7	0.175	VIII
SAN ANDREAS - SB-Coach. M-2b	35.8(57.6)	7.7	0.175	VIII
SAN ANDREAS - San Bernardino M-1	35.8(57.6)	7.5	0.152	VIII
SAN ANDREAS - Whole M-1a	35.8(57.6)	8.0	0.217	VIII
NEWPORT-INGLEWOOD (L.A.Basin)	40.1(64.5)	7.1	0.102	VII
SAN JACINTO-COYOTE CREEK	42.6(68.5)	6.6	0.068	VI
PUENTE HILLS BLIND THRUST	43.6(70.2)	7.1	0.132	VIII
PINTO MOUNTAIN	43.7(70.3)	7.2	0.100	VII
CUCAMONGA	44.4(71.5)	6.9	0.112	VII
NORTH FRONTAL FAULT ZONE (West)	44.9(72.2)	7.2	0.137	VIII
CORONADO BANK	45.0(72.4)	7.6	0.129	VIII
SAN JOSE	45.4(73.0)	6.4	0.078	VII
PALOS VERDES	46.0(74.0)	7.3	0.101	VII
EARTHQUAKE VALLEY	46.7(75.2)	6.5	0.057	VI
CLEGHORN	47.5(76.5)	6.5	0.056	VI
SIERRA MADRE	48.3(77.7)	7.2	0.127	VIII
SAN ANDREAS - Coachella M-1c-5	49.5(79.7)	7.2	0.087	VII
NORTH FRONTAL FAULT ZONE (East)	50.6(81.4)	6.7	0.085	VII
SAN ANDREAS - Mojave M-1c-3	50.9(81.9)	7.4	0.098	VII
SAN ANDREAS - Cho-Moj M-1b-1	50.9(81.9)	7.8	0.131	VIII
SAN ANDREAS - 1857 Rupture M-2a	50.9(81.9)	7.8	0.131	VIII
BURNT MTN.	54.0(86.9)	6.5	0.049	VI
EUREKA PEAK	57.2(92.1)	6.4	0.043	VI
HELENDALE - S. LOCKHARDT	58.0(93.3)	7.3	0.080	VII
CLAMSHELL-SAWPIT	59.2(95.3)	6.5	0.063	VI
RAYMOND	59.5(95.8)	6.5	0.063	VI
UPPER ELYSIAN PARK BLIND THRUST	60.1(96.7)	6.4	0.059	VI
LANDERS	61.0(98.1)	7.3	0.076	VII

-END OF SEARCH- 39 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ELSINORE (TEMECULA) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 0.3 MILES (0.5 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.8424 g

CALIFORNIA FAULT MAP

Wildomar 23

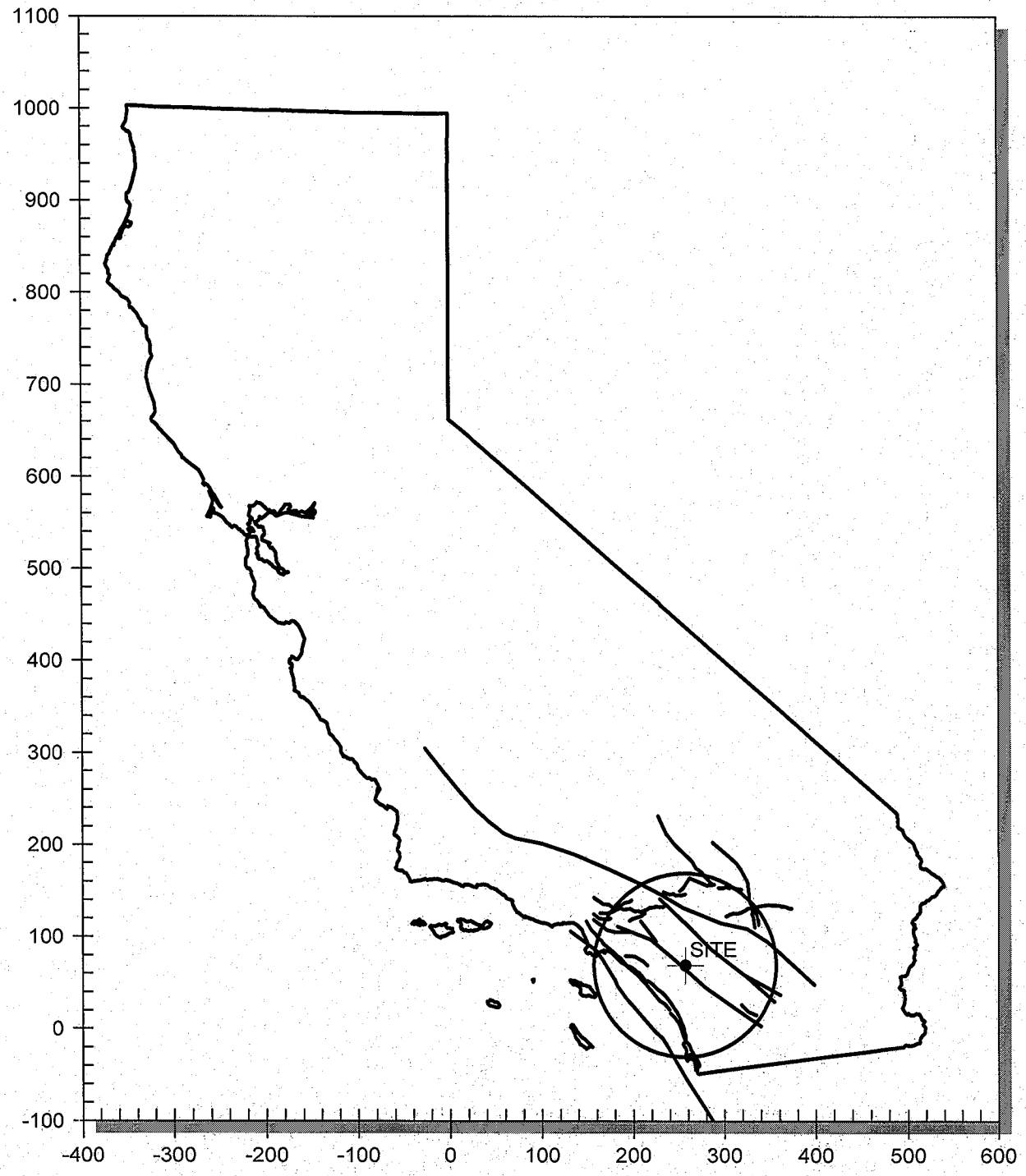

Plate C-3

MAXIMUM EARTHQUAKES

Wildomar 23

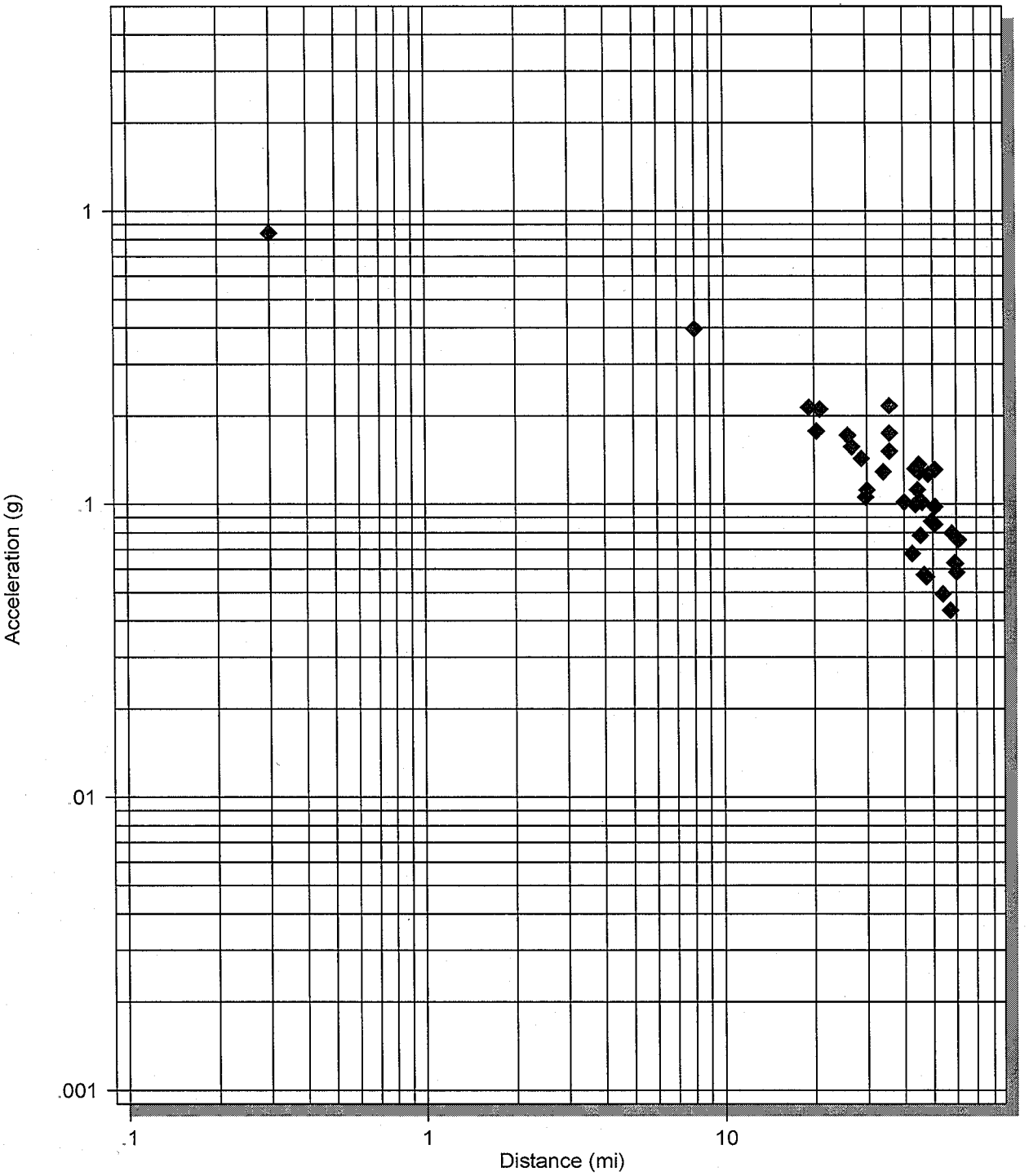

Plate C-4

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*                        *
*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
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        ESTIMATION OF
     PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: W.O 6451-A-SC
                                                DATE: 10-10-2012

JOB NAME: Wildomar 23

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT


MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  33.5878
   SITE LONGITUDE:  117.2299

SEARCH DATES:
           START DATE:   1800
           END DATE:   2012

SEARCH RADIUS:
           62.1 mi
           100.0 km

ATTENUATION RELATION:  11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  SS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   1  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0
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EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.163	VIII	12.5(20.1)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.087	VII	12.5(20.1)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.087	VII	12.5(20.1)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.063	VI	17.3(27.9)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.195	VIII	17.3(27.9)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.083	VII	17.9(28.8)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.056	VI	19.4(31.3)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.132	VIII	19.7(31.7)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.093	VII	21.6(34.8)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.042	VI	25.8(41.5)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.082	VII	28.5(45.8)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.118	VII	32.4(52.1)
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.033	V	33.2(53.4)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.036	V	35.6(57.3)
GSP	33.5290	116.5720	06/12/2005	154146.5	14.0	5.20	0.032	V	38.1(61.3)
GSG	33.9530	117.7610	07/29/2008	184215.7	14.0	5.30	0.032	V	39.6(63.7)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.029	V	39.6(63.8)
DMG	33.2000	116.7000	01/01/1920	235 0.0	0.0	5.00	0.026	V	40.6(65.4)
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.066	VI	40.8(65.6)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.031	V	40.9(65.8)
GSP	33.5080	116.5140	10/31/2001	075616.6	15.0	5.10	0.027	V	41.6(66.9)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.034	V	41.7(67.1)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.056	VI	42.4(68.3)
DMG	33.5000	116.5000	09/30/1916	211 0.0	0.0	5.00	0.025	V	42.4(68.3)
MGI	33.0000	117.0000	09/21/1856	730 0.0	0.0	5.00	0.025	V	42.7(68.7)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.045	VI	42.9(69.1)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.026	V	43.1(69.4)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.028	V	43.3(69.7)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.033	V	43.4(69.8)
GSG	33.4200	116.4890	07/07/2010	235333.5	14.0	5.50	0.032	V	44.2(71.1)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.025	V	44.6(71.7)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.027	V	44.6(71.7)
MGI	33.2000	116.6000	10/12/1920	1748 0.0	0.0	5.30	0.028	V	45.1(72.6)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.028	V	45.2(72.7)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.025	V	45.3(72.9)
PAS	33.9980	116.6060	07/08/1986	92044.5	11.7	5.60	0.033	V	45.6(73.5)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.027	V	46.6(75.0)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.026	V	46.7(75.1)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.027	V	46.9(75.5)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.030	V	47.6(76.6)
GSN	34.2030	116.8270	06/28/1992	150530.7	5.0	6.70	0.063	VI	48.3(77.8)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.023	IV	48.7(78.4)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.023	IV	48.7(78.4)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.029	V	49.3(79.3)
GSP	34.2390	116.8370	07/09/1992	014357.6	0.0	5.30	0.025	V	50.3(80.9)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.025	V	50.3(80.9)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.022	IV	50.3(80.9)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.021	IV	50.3(80.9)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.021	IV	50.3(80.9)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.022	IV	50.3(80.9)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.027	V	50.3(81.0)
GSP	34.2900	116.9460	02/10/2001	210505.8	9.0	5.10	0.022	IV	51.1(82.3)
DMG	34.0170	116.5000	07/24/1947	221046.0	0.0	5.50	0.028	V	51.3(82.6)
DMG	34.0170	116.5000	07/25/1947	04631.0	0.0	5.00	0.021	IV	51.3(82.6)
DMG	34.0170	116.5000	07/25/1947	61949.0	0.0	5.20	0.023	IV	51.3(82.6)
DMG	34.0170	116.5000	07/26/1947	24941.0	0.0	5.10	0.022	IV	51.3(82.6)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.052	VI	51.5(83.0)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.020	IV	52.6(84.6)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.036	V	53.5(86.2)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.025	V	53.6(86.3)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.3430	116.3460	04/28/1969	232042.9	20.0	5.80	0.032	V	53.6(86.3)
DMG	33.9330	116.3830	12/04/1948	234317.0	0.0	6.50	0.049	VI	54.1(87.1)
GSG	34.3100	116.8480	02/22/2003	121910.6	1.0	5.20	0.022	IV	54.4(87.6)
MGI	32.8000	117.1000	05/25/1803	0 0 0.0	0.0	5.00	0.019	IV	54.9(88.4)
DMG	33.4000	116.3000	02/09/1890	12 6 0.0	0.0	6.30	0.042	VI	55.1(88.6)
GSP	34.3400	116.9000	11/27/1992	160057.5	1.0	5.30	0.023	IV	55.3(88.9)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.022	IV	56.4(90.7)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.025	V	57.1(91.9)
DMG	33.4080	116.2610	03/25/1937	1649 1.8	10.0	6.00	0.034	V	57.1(92.0)
GSP	34.3690	116.8970	12/04/1992	020857.5	3.0	5.30	0.022	IV	57.2(92.1)
GSP	33.9610	116.3180	04/23/1992	045023.0	12.0	6.10	0.035	V	58.3(93.9)
GSP	33.9020	116.2840	07/24/1992	181436.2	9.0	5.00	0.018	IV	58.5(94.1)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.031	V	58.6(94.4)
GSP	33.8760	116.2670	06/29/1992	160142.8	1.0	5.20	0.020	IV	58.8(94.6)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.063	VI	59.1(95.1)
GSP	34.1080	116.4040	06/29/1992	141338.8	9.0	5.40	0.022	IV	59.4(95.6)
GSP	34.1390	116.4310	06/28/1992	123640.6	10.0	5.10	0.019	IV	59.5(95.8)
GSP	34.0640	116.3610	09/15/1992	084711.3	9.0	5.20	0.020	IV	59.7(96.1)
DMG	32.8000	116.8000	10/23/1894	23 3 0.0	0.0	5.70	0.027	V	59.8(96.2)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.021	IV	60.0(96.6)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.022	IV	60.1(96.8)
GSP	34.0290	116.3210	08/21/1993	014638.4	9.0	5.00	0.017	IV	60.4(97.2)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.038	V	61.2(98.4)
DMG	34.0670	116.3330	05/18/1940	72132.7	0.0	5.00	0.017	IV	61.2(98.4)
DMG	34.0670	116.3330	05/18/1940	55120.2	0.0	5.20	0.019	IV	61.2(98.4)
DMG	32.7000	117.2000	05/27/1862	20 0 0.0	0.0	5.90	0.029	V	61.3(98.7)
DMG	33.0000	116.4330	06/04/1940	1035 8.3	0.0	5.10	0.018	IV	61.3(98.7)

****

-END OF SEARCH- 87 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2012

LENGTH OF SEARCH TIME: 213 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 12.5 MILES (20.1 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.195 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.201
b-value= 0.363
beta-value= 0.837

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	87	0.40845
4.5	87	0.40845
5.0	87	0.40845
5.5	31	0.14554
6.0	18	0.08451
6.5	7	0.03286
7.0	2	0.00939

EARTHQUAKE EPICENTER MAP

Wildomar 23

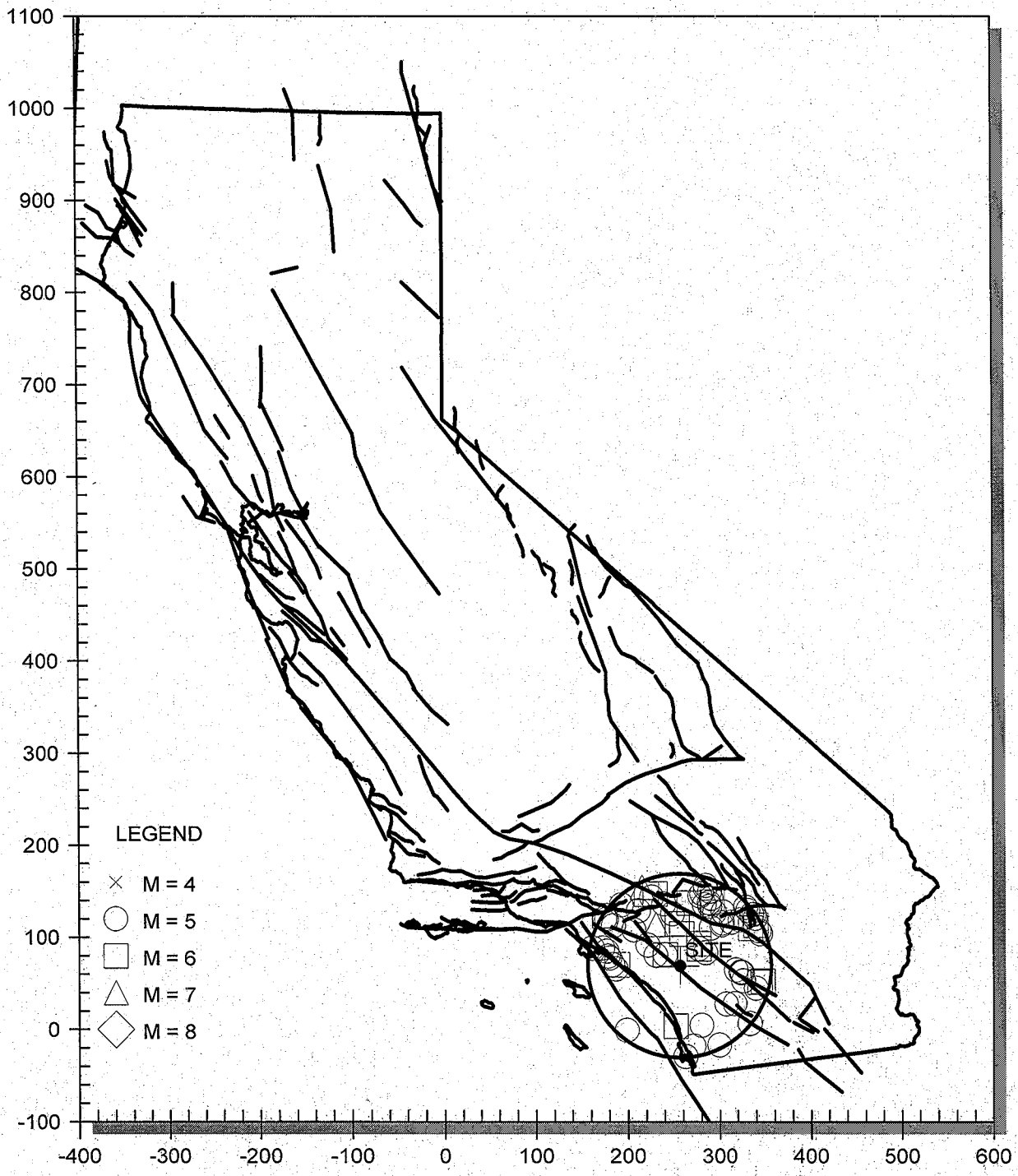


Plate C-8

EARTHQUAKE RECURRENCE CURVE

Wildomar 23`

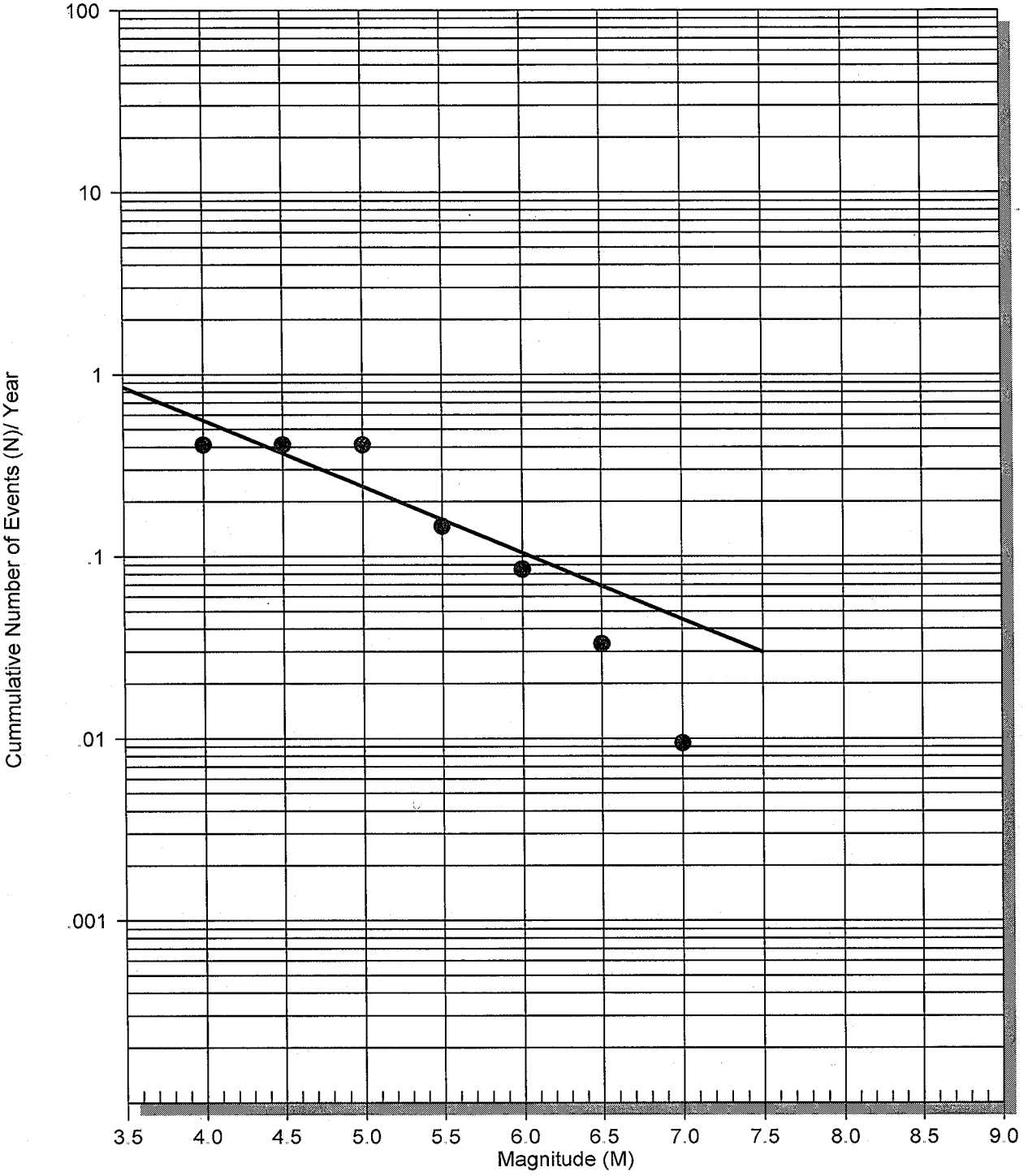
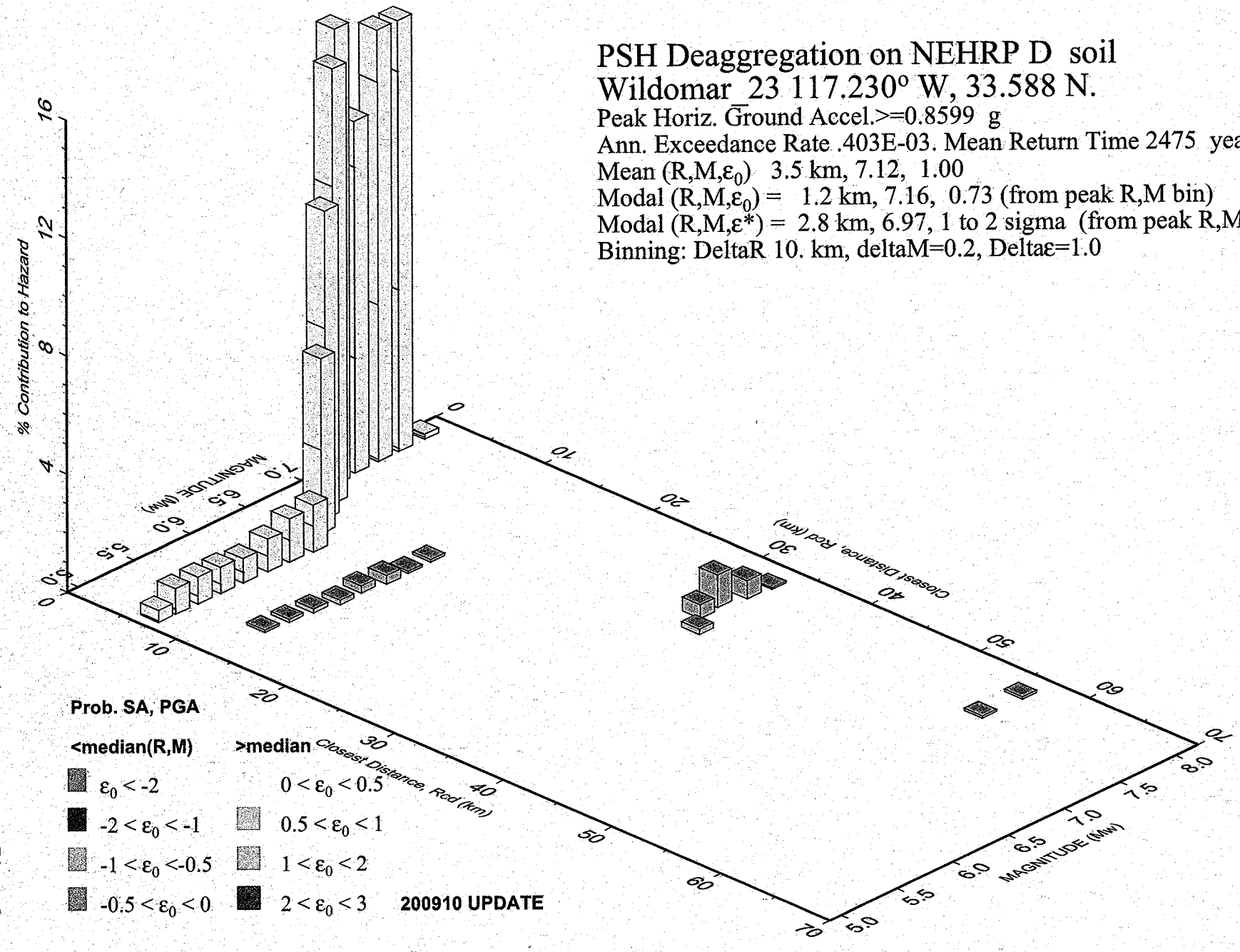


Plate C-9



PSH Deaggregation on NEHRP D soil
Wildomar_23 117.230° W, 33.588 N.

Peak Horiz. Ground Accel.>=0.8599 g
Ann. Exceedance Rate .403E-03. Mean Return Time 2475 years
Mean (R,M,ε_0) 3.5 km, 7.12, 1.00
Modal (R,M,ε_0) = 1.2 km, 7.16, 0.73 (from peak R,M bin)
Modal (R,M,ε^*) = 2.8 km, 6.97, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0

Plate C-10

GMT 2012 Sep 21 15:27:54 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 275. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

PSH Deaggregation on NEHRP D soil
Wildomar_23 117.230° W, 33.588 N.

Peak Horiz. Ground Accel.>=0.4729 g
Ann. Exceedance Rate .211E-02. Mean Return Time 475 years
Mean (R,M,ε_0) 9.2 km, 6.96, 0.42
Modal (R,M,ε_0) = 3.8 km, 6.96, 0.17 (from peak R,M bin)
Modal (R,M,ε^*) = 3.6 km, 6.96, 0 to 1 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0

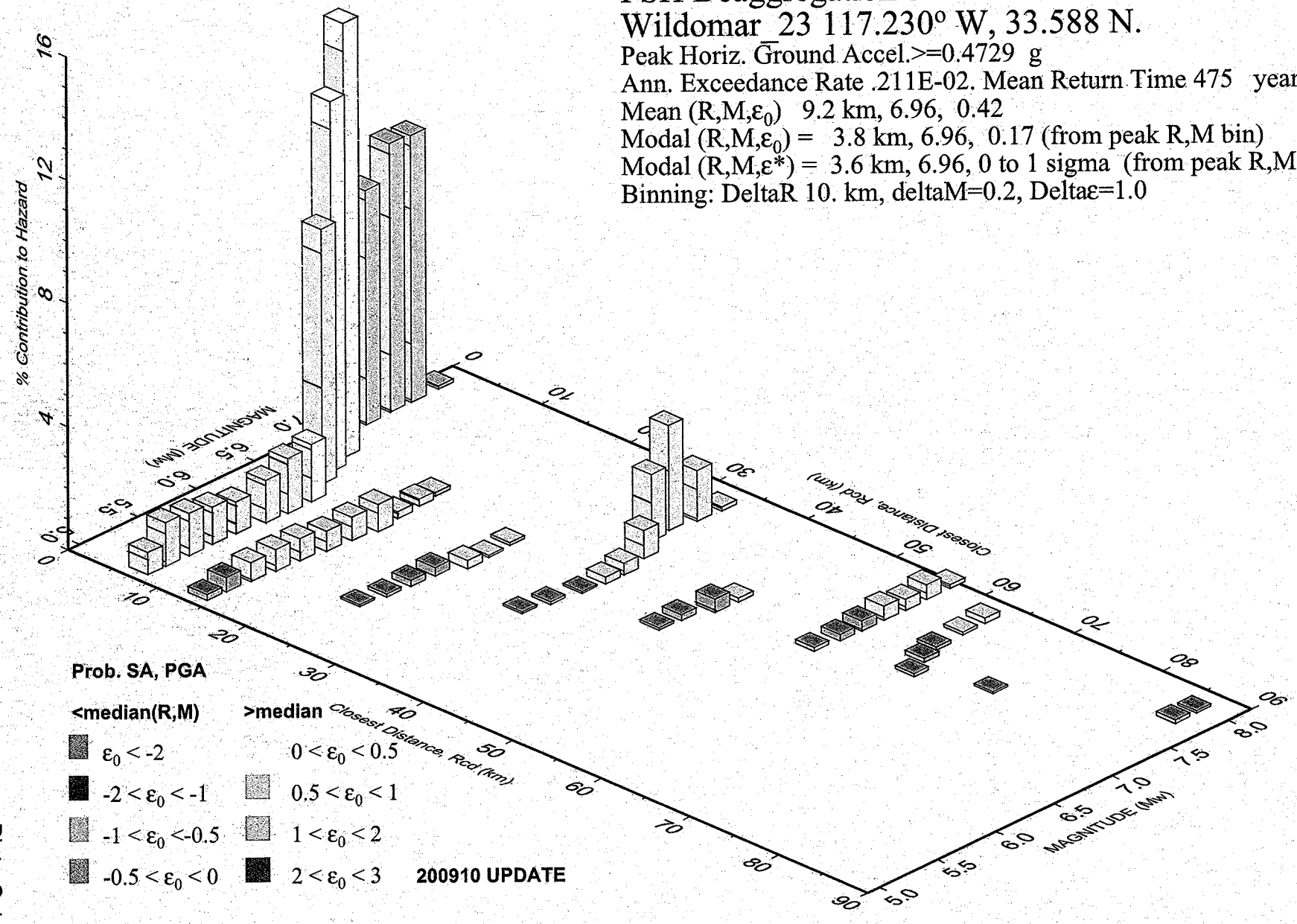
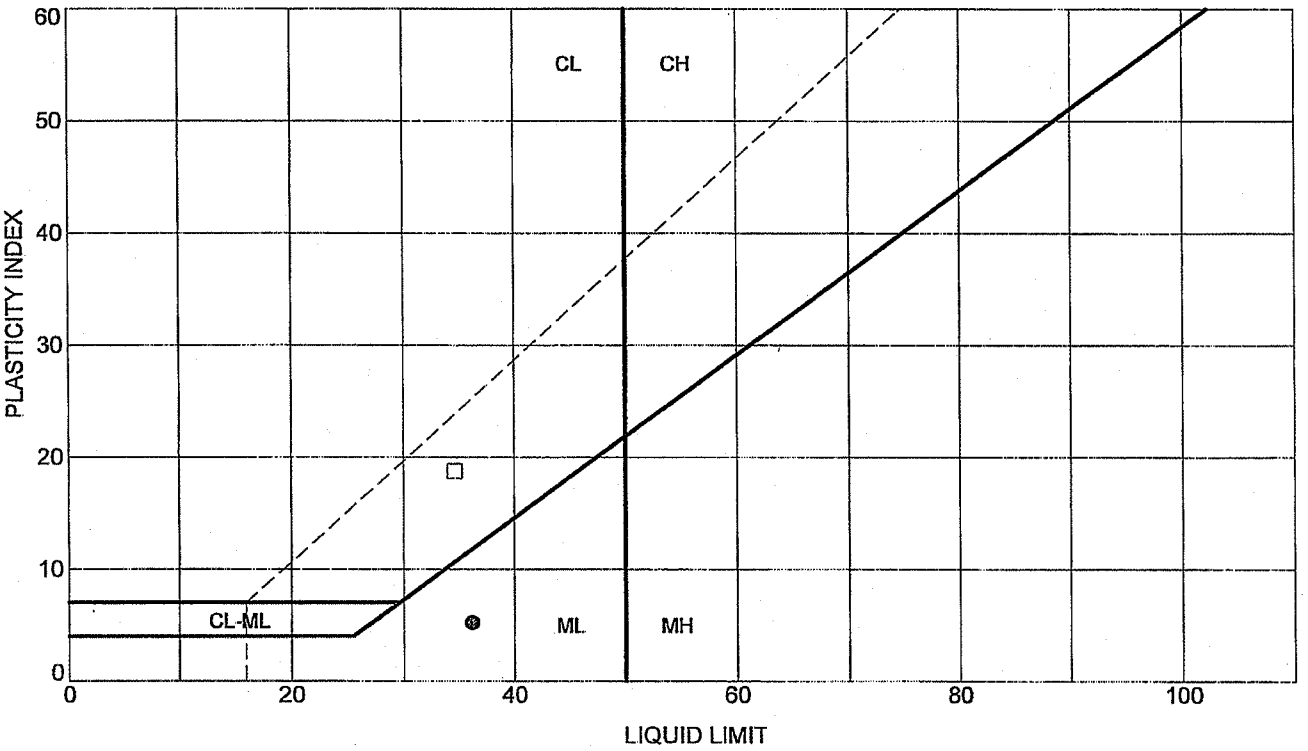


Plate C-11

APPENDIX D

LABORATORY TEST RESULTS



Sample	Depth/El.	LL	PL	PI	Fines	USCS CLASSIFICATION
● P-1	4.0	36	31	5		
□ P-3	2.5	35	16	19		

GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

ATTERBERG LIMITS' RESULTS

Project: LENNAR HOMES

Number: 6451-A-SC

Date: September 2012

Plate: D - 1

US ATTERBERG LIMITS 6451.GPJ US_LAB.GDT 9/26/12

Cal Land Engineering, Inc.
dba Quartech Consultant
Geotechnical, Environmental, and Civil Engineering

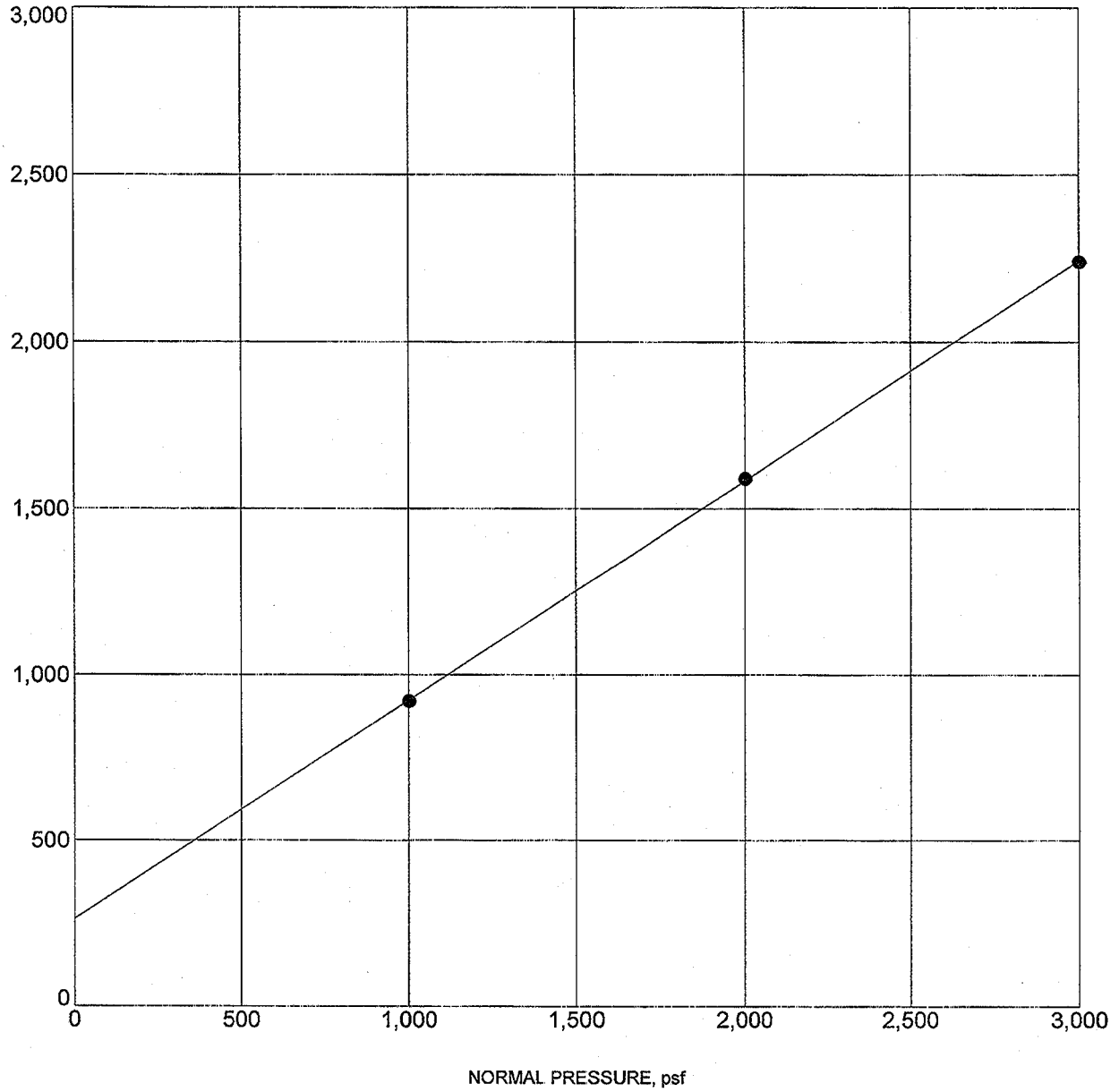
SUMMARY OF LABORATORY TEST DATA

Client Name: GeoSoils, Inc.
Project Name: Cameo Homes-Cross Rds.
Project No.: W.O. 4898-A1-OC

QCI Project No.: 05-029-008b
Date: August 18, 2005
Summarized by: ABK

Lot Number	Sample Depth (Feet)	pH CT-532 (643)	Chloride CT-422 (ppm)	Sulfate CT-417 (% By Weight)	Resistivity CT-532 (643) (ohm-cm)
TP-5	2.0	8.77	87	0.0125	1,050
TP-7	3.0	7.92	77	0.0240	2,100

576 East Lambert Road, Brea, California 92821; Tel: 626-512-0945, 714-671-1050; Fax: 714-671-1090



Specimen Identification		Classification	γ_d	MC%	c	ϕ
● TP-6	3.0		97	26	263	33

US DIRECT SHEAR 4898.GPJ US LAB.GDT 8/20/05

GSI

GEOSOILS, INC.
1446 East Chestnut Avenue
Santa Ana, California
Telephone: 714-647-0277
Fax: 714-647-0745

DIRECT SHEAR TEST

Project: CAMEO HOMES

Location:

Number: 4898-A1-OC

PLATE

D-3

APPENDIX E

GENERAL EARTHWORK, GRADING GUIDELINES AND PRELIMINARY CRITERIA

GENERAL EARTHWORK, GRADING GUIDELINES, AND PRELIMINARY CRITERIA

General

These guidelines present general procedures and requirements for earthwork and grading as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installation of subdrains, excavations, and appurtenant structures or flatwork. The recommendations contained in the geotechnical report are part of these earthwork and grading guidelines and would supercede the provisions contained hereafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new or revised recommendations which could supercede these guidelines or the recommendations contained in the geotechnical report. Generalized details follow this text.

The contractor is responsible for the satisfactory completion of all earthwork in accordance with provisions of the project plans and specifications and latest adopted code. In the case of conflict, the most onerous provisions shall prevail. The project geotechnical engineer and engineering geologist (geotechnical consultant), and/or their representatives, should provide observation and testing services, and geotechnical consultation during the duration of the project.

EARTHWORK OBSERVATIONS AND TESTING

Geotechnical Consultant

Prior to the commencement of grading, a qualified geotechnical consultant (soil engineer and engineering geologist) should be employed for the purpose of observing earthwork procedures and testing the fills for general conformance with the recommendations of the geotechnical report(s), the approved grading plans, and applicable grading codes and ordinances.

The geotechnical consultant should provide testing and observation so that an evaluation may be made that the work is being accomplished as specified. It is the responsibility of the contractor to assist the consultants and keep them apprised of anticipated work schedules and changes, so that they may schedule their personnel accordingly.

All remedial removals, clean-outs, prepared ground to receive fill, key excavations, and subdrain installation should be observed and documented by the geotechnical consultant prior to placing any fill. It is the contractor's responsibility to notify the geotechnical consultant when such areas are ready for observation.

Laboratory and Field Tests

Maximum dry density tests to determine the degree of compaction should be performed in accordance with American Standard Testing Materials test method ASTM designation D-1557. Random or representative field compaction tests should be performed in accordance with test methods ASTM designation D-1556, D-2937 or D-2922, and D-3017, at intervals of approximately ±2 feet of fill height or approximately every 1,000 cubic yards placed. These criteria would vary depending on the soil conditions and the size of the project. The location and frequency of testing would be at the discretion of the geotechnical consultant.

Contractor's Responsibility

All clearing, site preparation, and earthwork performed on the project should be conducted by the contractor, with observation by a geotechnical consultant, and staged approval by the governing agencies, as applicable. It is the contractor's responsibility to prepare the ground surface to receive the fill, to the satisfaction of the geotechnical consultant, and to place, spread, moisture condition, mix, and compact the fill in accordance with the recommendations of the geotechnical consultant. The contractor should also remove all non-earth material considered unsatisfactory by the geotechnical consultant.

Notwithstanding the services provided by the geotechnical consultant, it is the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the earthwork in strict accordance with applicable grading guidelines, latest adopted codes or agency ordinances, geotechnical report(s), and approved grading plans. Sufficient watering apparatus and compaction equipment should be provided by the contractor with due consideration for the fill material, rate of placement, and climatic conditions. If, in the opinion of the geotechnical consultant, unsatisfactory conditions such as questionable weather, excessive oversized rock or deleterious material, insufficient support equipment, etc., are resulting in a quality of work that is not acceptable, the consultant will inform the contractor, and the contractor is expected to rectify the conditions, and if necessary, stop work until conditions are satisfactory.

During construction, the contractor shall properly grade all surfaces to maintain good drainage and prevent ponding of water. The contractor shall take remedial measures to control surface water and to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed.

SITE PREPARATION

All major vegetation, including brush, trees, thick grasses, organic debris, and other deleterious material, should be removed and disposed of off-site. These removals must be concluded prior to placing fill. In-place existing fill, soil, alluvium, colluvium, or rock materials, as evaluated by the geotechnical consultant as being unsuitable, should be

removed prior to any fill placement. Depending upon the soil conditions, these materials may be reused as compacted fills. Any materials incorporated as part of the compacted fills should be approved by the geotechnical consultant.

Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or other structures not located prior to grading, are to be removed or treated in a manner recommended by the geotechnical consultant. Soft, dry, spongy, highly fractured, or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, should be overexcavated down to firm ground and approved by the geotechnical consultant before compaction and filling operations continue. Overexcavated and processed soils, which have been properly mixed and moisture conditioned, should be re-compacted to the minimum relative compaction as specified in these guidelines.

Existing ground, which is determined to be satisfactory for support of the fills, should be scarified (ripped) to a minimum depth of 6 to 8 inches, or as directed by the geotechnical consultant. After the scarified ground is brought to optimum moisture content, or greater and mixed, the materials should be compacted as specified herein. If the scarified zone is greater than 6 to 8 inches in depth, it may be necessary to remove the excess and place the material in lifts restricted to about 6 to 8 inches in compacted thickness.

Existing ground which is not satisfactory to support compacted fill should be overexcavated as required in the geotechnical report, or by the on-site geotechnical consultant. Scarification, disc harrowing, or other acceptable forms of mixing should continue until the soils are broken down and free of large lumps or clods, until the working surface is reasonably uniform and free from ruts, hollows, hummocks, mounds, or other uneven features, which would inhibit compaction as described previously.

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical [h:v]), the ground should be stepped or benched. The lowest bench, which will act as a key, should be a minimum of 15 feet wide and should be at least 2 feet deep into firm material, and approved by the geotechnical consultant. In fill-over-cut slope conditions, the recommended minimum width of the lowest bench or key is also 15 feet, with the key founded on firm material, as designated by the geotechnical consultant. As a general rule, unless specifically recommended otherwise by the geotechnical consultant, the minimum width of fill keys should be equal to ½ the height of the slope.

Standard benching is generally 4 feet (minimum) vertically, exposing firm, acceptable material. Benching may be used to remove unsuitable materials, although it is understood that the vertical height of the bench may exceed 4 feet. Pre-stripping may be considered for unsuitable materials in excess of 4 feet in thickness.

All areas to receive fill, including processed areas, removal areas, and the toes of fill benches, should be observed and approved by the geotechnical consultant prior to placement of fill. Fills may then be properly placed and compacted until design grades (elevations) are attained.

COMPACTED FILLS

Any earth materials imported or excavated on the property may be utilized in the fill provided that each material has been evaluated to be suitable by the geotechnical consultant. These materials should be free of roots, tree branches, other organic matter, or other deleterious materials. All unsuitable materials should be removed from the fill as directed by the geotechnical consultant. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated by the consultant as unsuitable and may require blending with other soils to serve as a satisfactory fill material.

Fill materials derived from benching operations should be dispersed throughout the fill area and blended with other approved material. Benching operations should not result in the benched material being placed only within a single equipment width away from the fill/bedrock contact.

Oversized materials defined as rock, or other irreducible materials, with a maximum dimension greater than 12 inches, should not be buried or placed in fills unless the location of materials and disposal methods are specifically approved by the geotechnical consultant. Oversized material should be taken offsite, or placed in accordance with recommendations of the geotechnical consultant in areas designated as suitable for rock disposal. GSI anticipates that soils to be utilized as fill material for the subject project may contain some rock. Appropriately, the need for rock disposal may be necessary during grading operations on the site. From a geotechnical standpoint, the depth of any rocks, rock fills, or rock blankets, should be a sufficient distance from finish grade. This depth is generally the same as any overexcavation due to cut-fill transitions in hard rock areas, and generally facilitates the excavation of structural footings and substructures. Should deeper excavations be proposed (i.e., deepened footings, utility trenching, swimming pools, spas, etc.), the developer may consider increasing the hold-down depth of any rocky fills to be placed, as appropriate. In addition, some agencies/jurisdictions mandate a specific hold-down depth for oversize materials placed in fills. The hold-down depth, and potential to encounter oversize rock, both within fills, and occurring in cut or natural areas, would need to be disclosed to all interested/affected parties. Once approved by the governing agency, the hold-down depth for oversized rock (i.e., greater than 12 inches) in fills on this project is provided as 10 feet, unless specified differently in the text of this report. The governing agency may require that these materials need to be deeper, crushed, or reduced to less than 12 inches in maximum dimension, at their discretion.

To facilitate future trenching, rock (or oversized material), should not be placed within the hold-down depth feet from finish grade, the range of foundation excavations, future utilities,

or underground construction unless specifically approved by the governing agency, the geotechnical consultant, and/or the developer's representative.

If import material is required for grading, representative samples of the materials to be utilized as compacted fill should be analyzed in the laboratory by the geotechnical consultant to evaluate it's physical properties and suitability for use onsite. Such testing should be performed three (3) days prior to importation. If any material other than that previously tested is encountered during grading, an appropriate analysis of this material should be conducted by the geotechnical consultant as soon as possible.

Approved fill material should be placed in areas prepared to receive fill in near horizontal layers, that when compacted, should not exceed about 6 to 8 inches in thickness. The geotechnical consultant may approve thick lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer should be spread evenly and blended to attain uniformity of material and moisture suitable for compaction.

Fill layers at a moisture content less than optimum should be watered and mixed, and wet fill layers should be aerated by scarification, or should be blended with drier material. Moisture conditioning, blending, and mixing of the fill layer should continue until the fill materials have a uniform moisture content at, or above, optimum moisture.

After each layer has been evenly spread, moisture conditioned, and mixed, it should be uniformly compacted to a minimum of 90 percent of the maximum density as evaluated by ASTM test designation D-1557, or as otherwise recommended by the geotechnical consultant. Compaction equipment should be adequately sized and should be specifically designed for soil compaction, or of proven reliability to efficiently achieve the specified degree of compaction.

Where tests indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction, or improper moisture is in evidence, the particular layer or portion shall be re-worked until the required density and/or moisture content has been attained. No additional fill shall be placed in an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements, and is approved by the geotechnical consultant.

In general, per the 1997 UBC and/or latest adopted version of the California Building Code (CBC), fill slopes should be designed and constructed at a gradient of 2:1 (h:v), or flatter. Compaction of slopes should be accomplished by over-building a minimum of 3 feet horizontally, and subsequently trimming back to the design slope configuration. Testing shall be performed as the fill is elevated to evaluate compaction as the fill core is being developed. Special efforts may be necessary to attain the specified compaction in the fill slope zone. Final slope shaping should be performed by trimming and removing loose materials with appropriate equipment. A final evaluation of fill slope compaction should be based on observation and/or testing of the finished slope face. Where compacted fill

slopes are designed steeper than 2:1 (h:v), prior approval from the governing agency, specific material types, a higher minimum relative compaction, special reinforcement, and special grading procedures will be recommended.

If an alternative to over-building and cutting back the compacted fill slopes is selected, then special effort should be made to achieve the required compaction in the outer 10 feet of each lift of fill by undertaking the following:

6. An extra piece of equipment consisting of a heavy, short-shanked sheepsfoot should be used to roll (horizontal) parallel to the slopes continuously as fill is placed. The sheepsfoot roller should also be used to roll perpendicular to the slopes, and extend out over the slope to provide adequate compaction to the face of the slope.

2. Loose fill should not be spilled out over the face of the slope as each lift is compacted. Any loose fill spilled over a previously completed slope face should be trimmed off or be subject to re-rolling.

3. Field compaction tests will be made in the outer (horizontal) ±2 to ±8 feet of the slope at appropriate vertical intervals, subsequent to compaction operations.

4. After completion of the slope, the slope face should be shaped with a small tractor and then re-rolled with a sheepsfoot to achieve compaction to near the slope face. Subsequent to testing to evaluate compaction, the slopes should be grid-rolled to achieve compaction to the slope face. Final testing should be used to evaluate compaction after grid rolling.

5. Where testing indicates less than adequate compaction, the contractor will be responsible to rip, water, mix, and recompact the slope material as necessary to achieve compaction. Additional testing should be performed to evaluate compaction.

SUBDRAIN INSTALLATION

Subdrains should be installed in approved ground in accordance with the approximate alignment and details indicated by the geotechnical consultant. Subdrain locations or materials should not be changed or modified without approval of the geotechnical consultant. The geotechnical consultant may recommend and direct changes in subdrain line, grade, and drain material in the field, pending exposed conditions. The location of constructed subdrains, especially the outlets, should be recorded/surveyed by the project civil engineer. Drainage at the subdrain outlets should be provided by the project civil engineer.

EXCAVATIONS

Excavations and cut slopes should be examined during grading by the geotechnical consultant. If directed by the geotechnical consultant, further excavations or overexcavation and refilling of cut areas should be performed, and/or remedial grading of cut slopes should be performed. When fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope should be observed by the geotechnical consultant prior to placement of materials for construction of the fill portion of the slope. The geotechnical consultant should observe all cut slopes, and should be notified by the contractor when excavation of cut slopes commence.

If, during the course of grading, unforeseen adverse or potentially adverse geologic conditions are encountered, the geotechnical consultant should investigate, evaluate, and make appropriate recommendations for mitigation of these conditions. The need for cut slope buttressing or stabilizing should be based on in-grading evaluation by the geotechnical consultant, whether anticipated or not.

Unless otherwise specified in geotechnical and geological report(s), no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies. Additionally, short-term stability of temporary cut slopes is the contractor's responsibility.

Erosion control and drainage devices should be designed by the project civil engineer and should be constructed in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the geotechnical consultant.

COMPLETION

Observation, testing, and consultation by the geotechnical consultant should be conducted during the grading operations in order to state an opinion that all cut and fill areas are graded in accordance with the approved project specifications. After completion of grading, and after the geotechnical consultant has finished observations of the work, final reports should be submitted, and may be subject to review by the controlling governmental agencies. No further excavation or filling should be undertaken without prior notification of the geotechnical consultant or approved plans.

All finished cut and fill slopes should be protected from erosion and/or be planted in accordance with the project specifications and/or as recommended by a landscape architect. Such protection and/or planning should be undertaken as soon as practical after completion of grading.

PRELIMINARY OUTDOOR POOL/SPA DESIGN RECOMMENDATIONS

The following preliminary recommendations are provided for consideration in pool/spa design and planning. Actual recommendations should be provided by a qualified geotechnical consultant, based on site specific geotechnical conditions, including a subsurface investigation, differential settlement potential, expansive and corrosive soil potential, proximity of the proposed pool/spa to any slopes with regard to slope creep and lateral fill extension, as well as slope setbacks per code, and geometry of the proposed improvements. Recommendations for pools/spas and/or deck flatwork underlain by expansive soils, or for areas with differential settlement greater than ¼-inch over 40 feet horizontally, will be more onerous than the preliminary recommendations presented below.

The 1:1 (h:v) influence zone of any nearby retaining wall site structures should be delineated on the project civil drawings with the pool/spa. This 1:1 (h:v) zone is defined as a plane up from the lower-most heel of the retaining structure, to the daylight grade of the nearby building pad or slope. If pools/spas or associated pool/spa improvements are constructed within this zone, they should be re-positioned (horizontally or vertically) so that they are supported by earth materials that are outside or below this 1:1 plane. If this is not possible given the area of the building pad, the owner should consider eliminating these improvements or allow for increased potential for lateral/vertical deformations and associated distress that may render these improvements unusable in the future, unless they are periodically repaired and maintained. The conditions and recommendations presented herein should be disclosed to all homeowners and any interested/affected parties.

General

1. The equivalent fluid pressure to be used for the pool/spa design should be 60 pounds per cubic foot (pcf) for pool/spa walls with level backfill, and 75 pcf for a 2:1 sloped backfill condition. In addition, backdrains should be provided behind pool/spa walls subjacent to slopes.

2. Passive earth pressure may be computed as an equivalent fluid having a density of 150 pcf, to a maximum lateral earth pressure of 1,000 pounds per square foot (psf).

3. An allowable coefficient of friction between soil and concrete of 0.30 may be used with the dead load forces.

4. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

5. Where pools/spas are planned near structures, appropriate surcharge loads need to be incorporated into design and construction by the pool/spa designer. This includes, but is not limited to landscape berms, decorative walls, footings, built-in barbeques, utility poles, etc.

6. All pool/spa walls should be designed as “free standing” and be capable of supporting the water in the pool/spa without soil support. The shape of pool/spa in cross section and plan view may affect the performance of the pool, from a geotechnical standpoint. Pools and spas should also be designed in accordance with Section 1806.5 of the 1997 UBC. Minimally, the bottoms of the pools/spas, should maintain a distance H/3, where H is the height of the slope (in feet), from the slope face. This distance should not be less than 7 feet, nor need not be greater than 40 feet.

7. The soil beneath the pool/spa bottom should be uniformly moist with the same stiffness throughout. If a fill/cut transition occurs beneath the pool/spa bottom, the cut portion should be overexcavated to a minimum depth of 48 inches, and replaced with compacted fill, such that there is a uniform blanket that is a minimum of 48 inches below the pool/spa shell. If very low expansive soil is used for fill, the fill should be placed at a minimum of 95 percent relative compaction, at optimum moisture conditions. This requirement should be 90 percent relative compaction at over optimum moisture if the pool/spa is constructed within or near expansive soils. The potential for grading and/or re-grading of the pool/spa bottom, and attendant potential for shoring and/or slot excavation, needs to be considered during all aspects of pool/spa planning, design, and construction.

8. If the pool/spa is founded entirely in compacted fill placed during rough grading, the deepest portion of the pool/spa should correspond with the thickest fill on the lot.

9. Hydrostatic pressure relief valves should be incorporated into the pool and spa designs. A pool/spa under-drain system is also recommended, with an appropriate outlet for discharge.

10. All fittings and pipe joints, particularly fittings in the side of the pool or spa, should be properly sealed to prevent water from leaking into the adjacent soils materials, and be fitted with slip or expandible joints between connections transecting varying soil conditions.

11. An elastic expansion joint (flexible waterproof sealant) should be installed to prevent water from seeping into the soil at all deck joints.

12. A reinforced grade beam should be placed around skimmer inlets to provide support and mitigate cracking around the skimmer face.

13. In order to reduce unsightly cracking, deck slabs should minimally be 4 inches thick, and reinforced with No. 3 reinforcing bars at 18 inches on-center. All slab reinforcement should be supported to ensure proper mid-slab positioning during the placement of concrete. Wire mesh reinforcing is specifically not recommended. Deck slabs should not be tied to the pool/spa structure. Pre-moistening and/or pre-soaking of the slab subgrade is recommended, to a depth of 12 inches

(optimum moisture content), or 18 inches (120 percent of the soil's optimum moisture content, or 3 percent over optimum moisture content, whichever is greater), for very low to low, and medium expansive soils, respectively. This moisture content should be maintained in the subgrade soils during concrete placement to promote uniform curing of the concrete and minimize the development of unsightly shrinkage cracks. Slab underlayment should consist of a 1- to 2-inch leveling course of sand (S.E.>30) and a minimum of 4 to 6 inches of Class 2 base compacted to 90 percent. Deck slabs within the H/3 zone, where H is the height of the slope (in feet), will have an increased potential for distress relative to other areas outside of the H/3 zone. If distress is undesirable, improvements, deck slabs or flatwork should not be constructed closer than H/3 or 7 feet (whichever is greater) from the slope face, in order to reduce, but not eliminate, this potential.

14. Pool/spa bottom or deck slabs should be founded entirely on competent bedrock, or properly compacted fill. Fill should be compacted to achieve a minimum 90 percent relative compaction, as discussed above. Prior to pouring concrete, subgrade soils below the pool/spa decking should be throughly watered to achieve a moisture content that is at least 2 percent above optimum moisture content, to a depth of at least 18 inches below the bottom of slabs. This moisture content should be maintained in the subgrade soils during concrete placement to promote uniform curing of the concrete and minimize the development of unsightly shrinkage cracks.

15. In order to reduce unsightly cracking, the outer edges of pool/spa decking to be bordered by landscaping, and the edges immediately adjacent to the pool/spa, should be underlain by an 8-inch wide concrete cutoff shoulder (thickened edge) extending to a depth of at least 12 inches below the bottoms of the slabs to mitigate excessive infiltration of water under the pool/spa deck. These thickened edges should be reinforced with two No. 4 bars, one at the top and one at the bottom. Deck slabs may be minimally reinforced with No. 3 reinforcing bars placed at 18 inches on-center, in both directions. All slab reinforcement should be supported on chairs to ensure proper mid-slab positioning during the placement of concrete.

16. Surface and shrinkage cracking of the finish slab may be reduced if a low slump and water-cement ratio are maintained during concrete placement. Concrete utilized should have a minimum compressive strength of 4,000 psi. Excessive water added to concrete prior to placement is likely to cause shrinkage cracking, and should be avoided. Some concrete shrinkage cracking, however, is unavoidable.

17. Joint and sawcut locations for the pool/spa deck should be determined by the design engineer and/or contractor. However, spacings should not exceed 6 feet on center.

18. Considering the nature of the onsite earth materials, it should be anticipated that caving or sloughing could be a factor in subsurface excavations and trenching. Shoring or excavating the trench walls/backcuts at the angle of repose (typically 25 to 45 degrees), should be anticipated. All excavations should be observed by a representative of the geotechnical consultant, including the project geologist and/or geotechnical engineer, prior to workers entering the excavation or trench, and minimally conform to Cal/OSHA ("Type C" soils may be assumed), state, and local safety codes. Should adverse conditions exist, appropriate recommendations should be offered at that time by the geotechnical consultant. GSI does not consult in the area of safety engineering and the safety of the construction crew is the responsibility of the pool/spa builder.

19. It is imperative that adequate provisions for surface drainage are incorporated by the homeowners into their overall improvement scheme. Ponding water, ground saturation and flow over slope faces, are all situations which must be avoided to enhance long term performance of the pool/spa and associated improvements, and reduce the likelihood of distress.

20. Regardless of the methods employed, once the pool/spa is filled with water, should it be emptied, there exists some potential that if emptied, significant distress may occur. Accordingly, once filled, the pool/spa should not be emptied unless evaluated by the geotechnical consultant and the pool/spa builder.

21. For pools/spas built within (all or part) of the 1997 Uniform Building Code (UBC) setback and/or geotechnical setback, as indicated in the site geotechnical documents, special foundations are recommended to mitigate the affects of creep, lateral fill extension, expansive soils and settlement on the proposed pool/spa. Most municipalities or County reviewers do not consider these effects in pool/spa plan approvals. As such, where pools/spas are proposed on 20 feet or more of fill, medium or highly expansive soils, or rock fill with limited "cap soils" and built within 1997 UBC setbacks, or within the influence of the creep zone, or lateral fill extension, the following should be considered during design and construction:

    OPTION A: Shallow foundations with or without overexcavation of the pool/spa "shell," such that the pool/spa is surrounded by 5 feet of very low to low expansive soils (without irreducible particles greater that 6 inches), and the pool/spa walls closer to the slope(s) are designed to be free standing. GSI recommends a pool/spa under-drain or blanket system (see attached Typical Pool/Spa Detail). The pool/spa builders and owner in this optional construction technique should be generally satisfied with pool/spa performance under this scenario; however, some settlement, tilting, cracking, and leakage of the pool/spa is likely over the life of the project.

OPTION B: Pier supported pool/spa foundations with or without overexcavation of the pool/spa shell such that the pool/spa is surrounded by 5 feet of very low to low expansive soils (without irreducible particles greater than 6 inches), and the pool/spa walls closer to the slope(s) are designed to be free standing. The need for a pool/spa under-drain system may be installed for leak detection purposes. Piers that support the pool/spa should be a minimum of 12 inches in diameter and at a spacing to provide vertical and lateral support of the pool/spa, in accordance with the pool/spa designers recommendations, local code, and the 1997 UBC. The pool/spa builder and owner in this second scenario construction technique should be more satisfied with pool/spa performance. This construction will reduce settlement and creep effects on the pool/spa; however, it will not eliminate these potentials, nor make the pool/spa "leak-free."

22. The temperature of the water lines for spas and pools may affect the corrosion properties of site soils, thus, a corrosion specialist should be retained to review all spa and pool plans, and provide mitigative recommendations, as warranted. Concrete mix design should be reviewed by a qualified corrosion consultant and materials engineer.

23. All pool/spa utility trenches should be compacted to 90 percent of the laboratory standard, under the full-time observation and testing of a qualified geotechnical consultant. Utility trench bottoms should be sloped away from the primary structure on the property (typically the residence).

24. Pool and spa utility lines should not cross the primary structure's utility lines (i.e., not stacked, or sharing of trenches, etc.).

25. The pool/spa or associated utilities should not intercept, interrupt, or otherwise adversely impact any area drain, roof drain, or other drainage conveyances. If it is necessary to modify, move, or disrupt existing area drains, subdrains, or tightlines, then the design civil engineer should be consulted, and mitigative measures provided. Such measures should be further reviewed and approved by the geotechnical consultant, prior to proceeding with any further construction.

26. The geotechnical consultant should review and approve all aspects of pool/spa and flatwork design prior to construction. A design civil engineer should review all aspects of such design, including drainage and setback conditions. Prior to acceptance of the pool/spa construction, the project builder, geotechnical consultant and civil designer should evaluate the performance of the area drains and other site drainage pipes, following pool/spa construction.

27. All aspects of construction should be reviewed and approved by the geotechnical consultant, including during excavation, prior to the placement of any additional fill, prior to the placement of any reinforcement or pouring of any concrete.

28. Any changes in design or location of the pool/spa should be reviewed and approved by the geotechnical and design civil engineer prior to construction. Field adjustments should not be allowed until written approval of the proposed field changes are obtained from the geotechnical and design civil engineer.

29. Disclosure should be made to homeowners and builders, contractors, and any interested/affected parties, that pools/spas built within about 15 feet of the top of a slope, and/or H/3, where H is the height of the slope (in feet), will experience some movement or tilting. While the pool/spa shell or coping may not necessarily crack, the levelness of the pool/spa will likely tilt toward the slope, and may not be esthetically pleasing. The same is true with decking, flatwork and other improvements in this zone.

30. Failure to adhere to the above recommendations will significantly increase the potential for distress to the pool/spa, flatwork, etc.

31. Local seismicity and/or the design earthquake will cause some distress to the pool/spa and decking or flatwork, possibly including total functional and economic loss.

32. The information and recommendations discussed above should be provided to any contractors and/or subcontractors, or homeowners, interested/affected parties, etc., that may perform or may be affected by such work.

JOB SAFETY

General

At GSI, getting the job done safely is of primary concern. The following is the company's safety considerations for use by all employees on multi-employer construction sites. On-ground personnel are at highest risk of injury, and possible fatality, on grading and construction projects. GSI recognizes that construction activities will vary on each site, and that site safety is the prime responsibility of the contractor; however, everyone must be safety conscious and responsible at all times. To achieve our goal of avoiding accidents, cooperation between the client, the contractor, and GSI personnel must be maintained.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of field personnel on grading and construction projects:

Safety Meetings: GSI field personnel are directed to attend contractor's regularly scheduled and documented safety meetings.

Safety Vests: Safety vests are provided for, and are to be worn by GSI personnel, at all times, when they are working in the field.

Safety Flags: Two safety flags are provided to GSI field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

Flashing Lights: All vehicles stationary in the grading area shall use rotating or flashing amber beacons, or strobe lights, on the vehicle during all field testing. While operating a vehicle in the grading area, the emergency flasher on the vehicle shall be activated.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

Test Pits Location, Orientation, and Clearance

The technician is responsible for selecting test pit locations. A primary concern should be the technician's safety. Efforts will be made to coordinate locations with the grading contractor's authorized representative, and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractor's authorized representative (supervisor, grade checker, dump man, operator, etc.) should direct excavation of the pit and safety during the test period. Of paramount concern should be the soil technician's safety, and obtaining enough tests to represent the fill.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic, whenever possible. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates the fill be maintained in a driveable condition. Alternatively, the contractor may wish to park a piece of equipment in front of the test holes, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits. No grading equipment should enter this zone during the testing procedure. The zone should extend approximately 50 feet outward from the center of the test pit. This zone is established for safety and to avoid excessive ground vibration, which typically decreases test results.

When taking slope tests, the technician should park the vehicle directly above or below the test location. If this is not possible, a prominent flag should be placed at the top of the slope. The contractor's representative should effectively keep all equipment at a safe operational distance (e.g., 50 feet) away from the slope during this testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location, well away from the equipment traffic pattern. The contractor should inform our personnel of all changes to haul roads, cut and fill areas or other factors that may affect site access and site safety.

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is required, by company policy, to immediately withdraw and notify his/her supervisor. The grading contractor's representative will be contacted in an effort to affect a solution. However, in the interim, no further testing will be performed until the situation is rectified. Any fill placed can be considered unacceptable and subject to reprocessing, recompaction, or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to the technician's attention and notify this office. Effective communication and coordination between the contractor's representative and the soil technician is strongly encouraged in order to implement the above safety plan.

Trench and Vertical Excavation

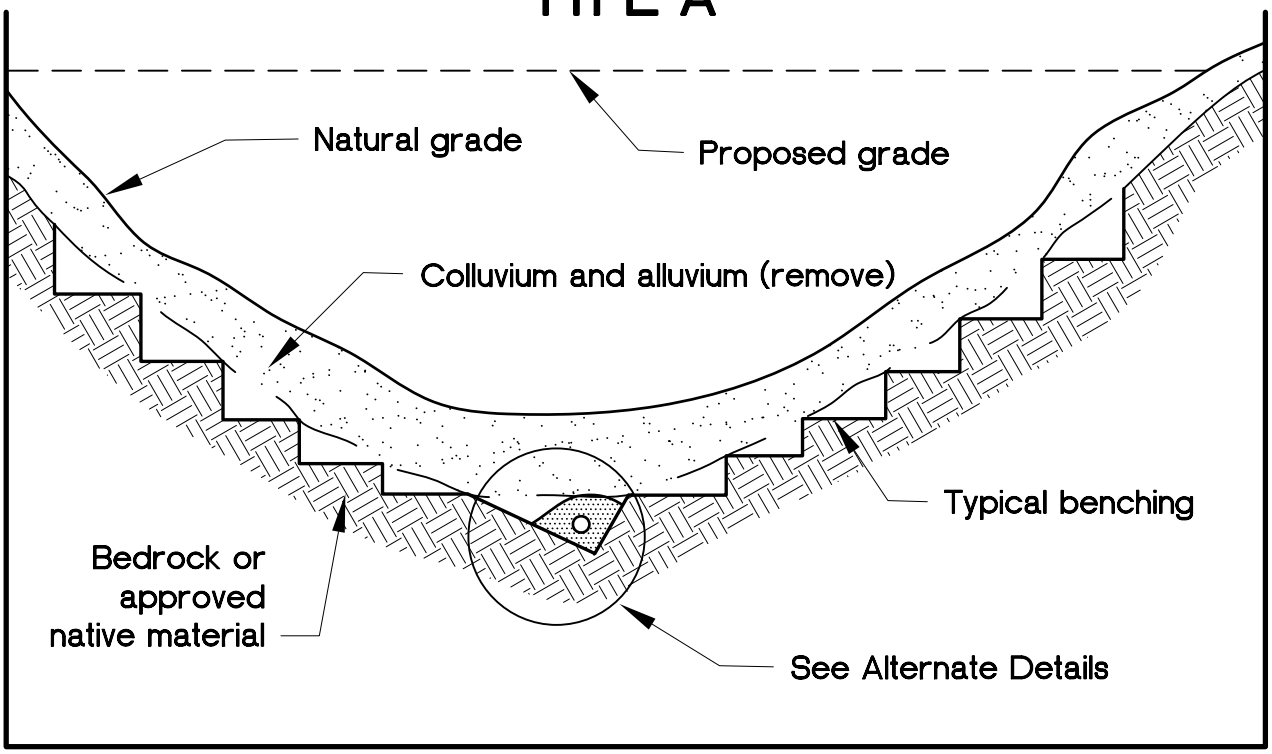
It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Our personnel are directed not to enter any excavation or vertical cut which: 1) is 5 feet or deeper unless shored or laid back; 2) displays any evidence of instability, has any loose rock or other debris which could fall into the trench; or 3) displays any other evidence of any unsafe conditions regardless of depth.

All trench excavations or vertical cuts in excess of 5 feet deep, which any person enters, should be shored or laid back. Trench access should be provided in accordance with Cal/OSHA and/or state and local standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

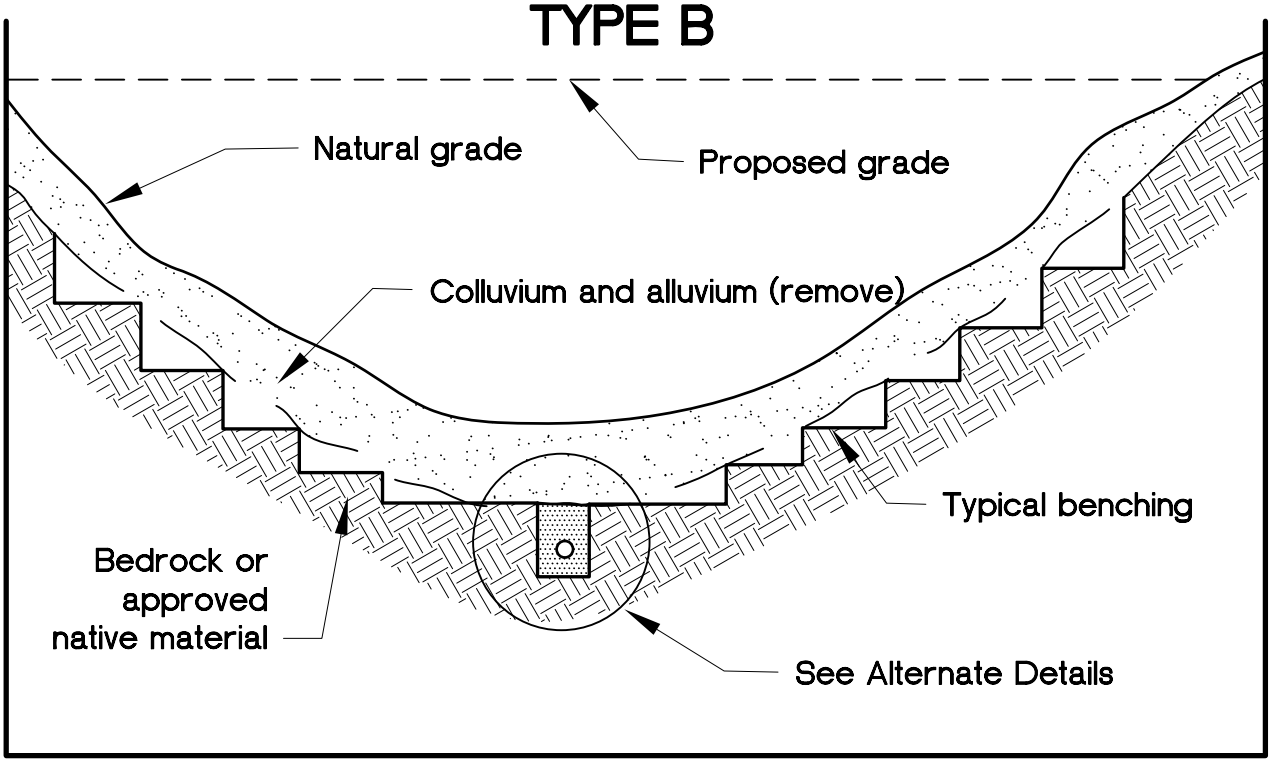
If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraw and notify his/her supervisor. The contractor's representative will be contacted in an effort to affect a solution. All backfill not tested due to safety concerns or other reasons could be subject to reprocessing and/or removal.

If GSI personnel become aware of anyone working beneath an unsafe trench wall or vertical excavation, we have a legal obligation to put the contractor and owner/developer on notice to immediately correct the situation. If corrective steps are not taken, GSI then has an obligation to notify Cal/OSHA and/or the proper controlling authorities.

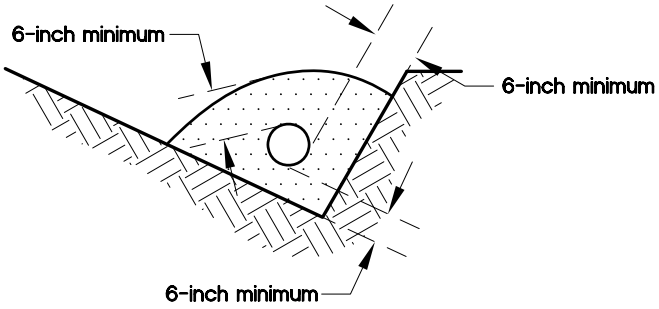
TYPE A



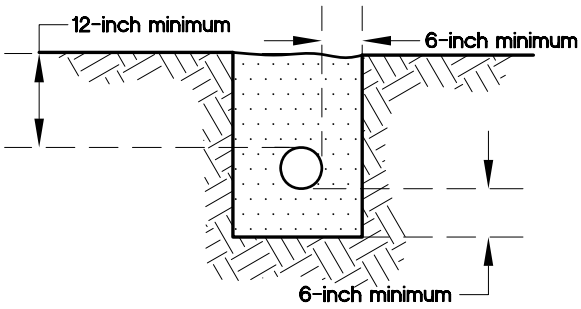
TYPE B



Selection of alternate subdrain details, location, and extent of subdrains should be evaluated by the geotechnical consultant during grading.



A-1



B-1

Filter material: Minimum volume of 9 cubic feet per lineal foot of pipe.

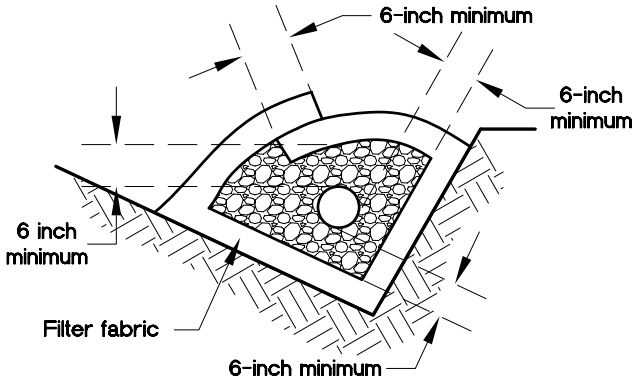
Perforated pipe: 6-inch-diameter ABS or PVC pipe or approved substitute with minimum 8 perforations (¼-inch diameter) per lineal foot in bottom half of pipe (ASTM D-2751, SDR-35, or ASTM D-1527, Schd. 40).

For continuous run in excess of 500 feet, use 8-inch-diameter pipe (ASTM D-3034, SDR-35, or ASTM D-1785, Schd. 40).

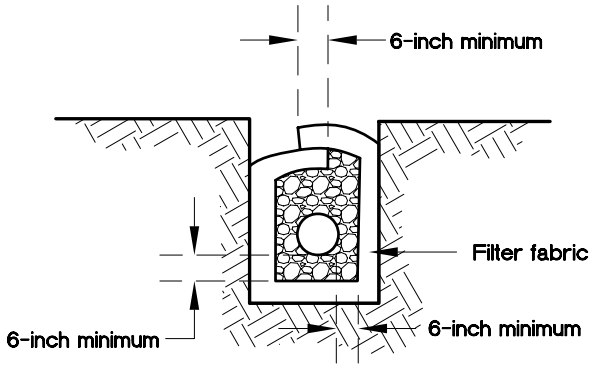
FILTER MATERIAL

Sieve Size	Percent Passing
1 inch	100
¾ inch	90-100
⅜ inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

ALTERNATE 1: PERFORATED PIPE AND FILTER MATERIAL



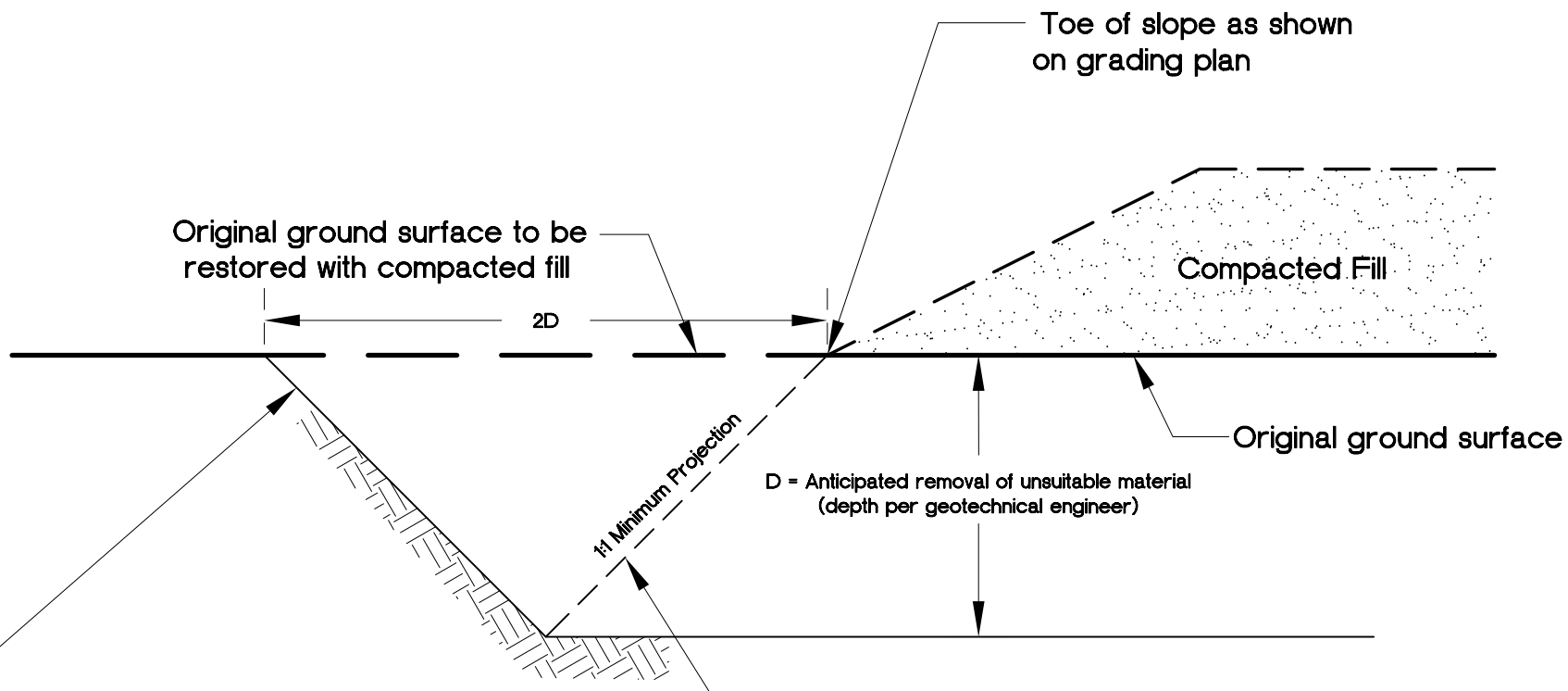
A-2



B-2

Gravel Material: 9 cubic feet per lineal foot.
Perforated Pipe: See Alternate 1
Gravel: Clean ¾-inch rock or approved substitute.
Filter Fabric: Mirafi 140 or approved substitute.

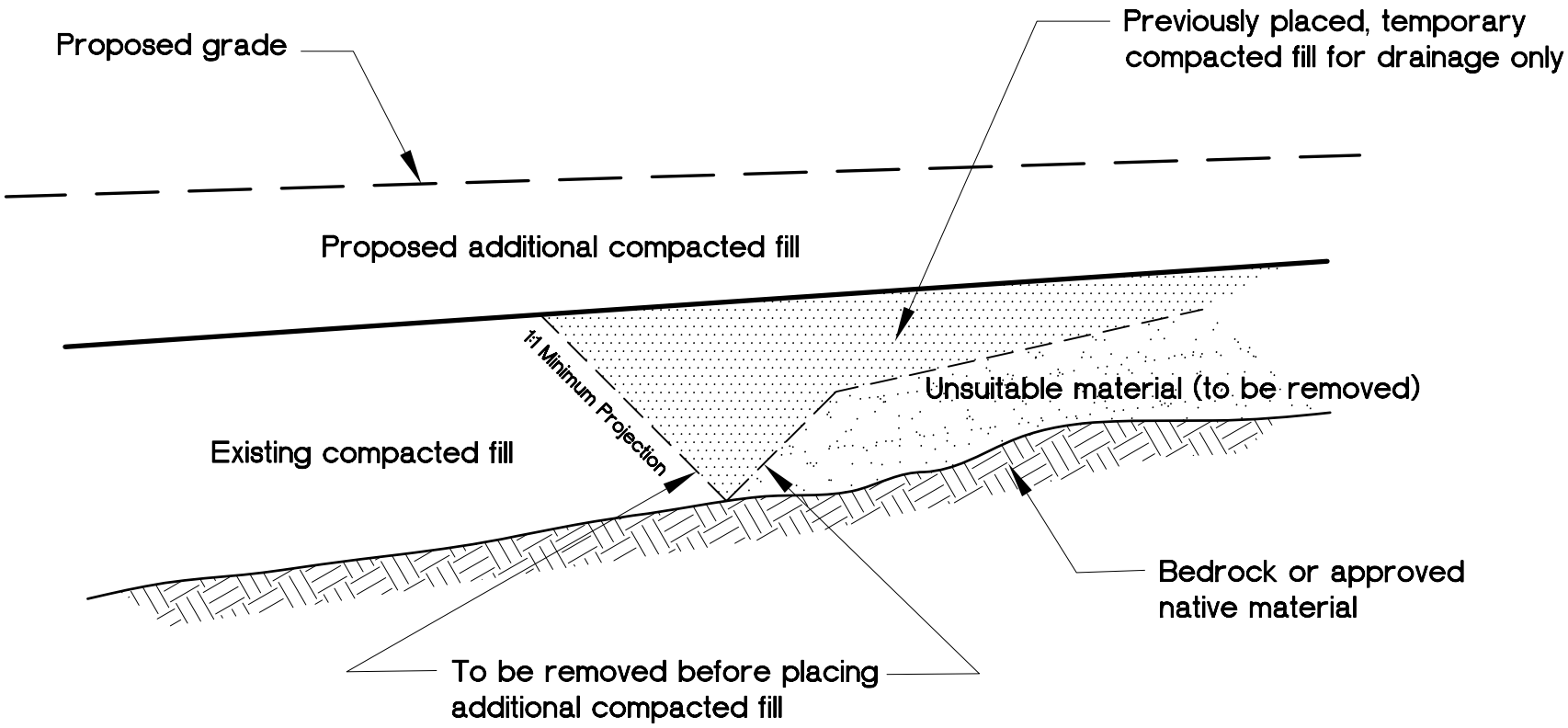
ALTERNATE 2: PERFORATED PIPE, GRAVEL, AND FILTER FABRIC



GeoSoils, Inc.

FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON DETAIL

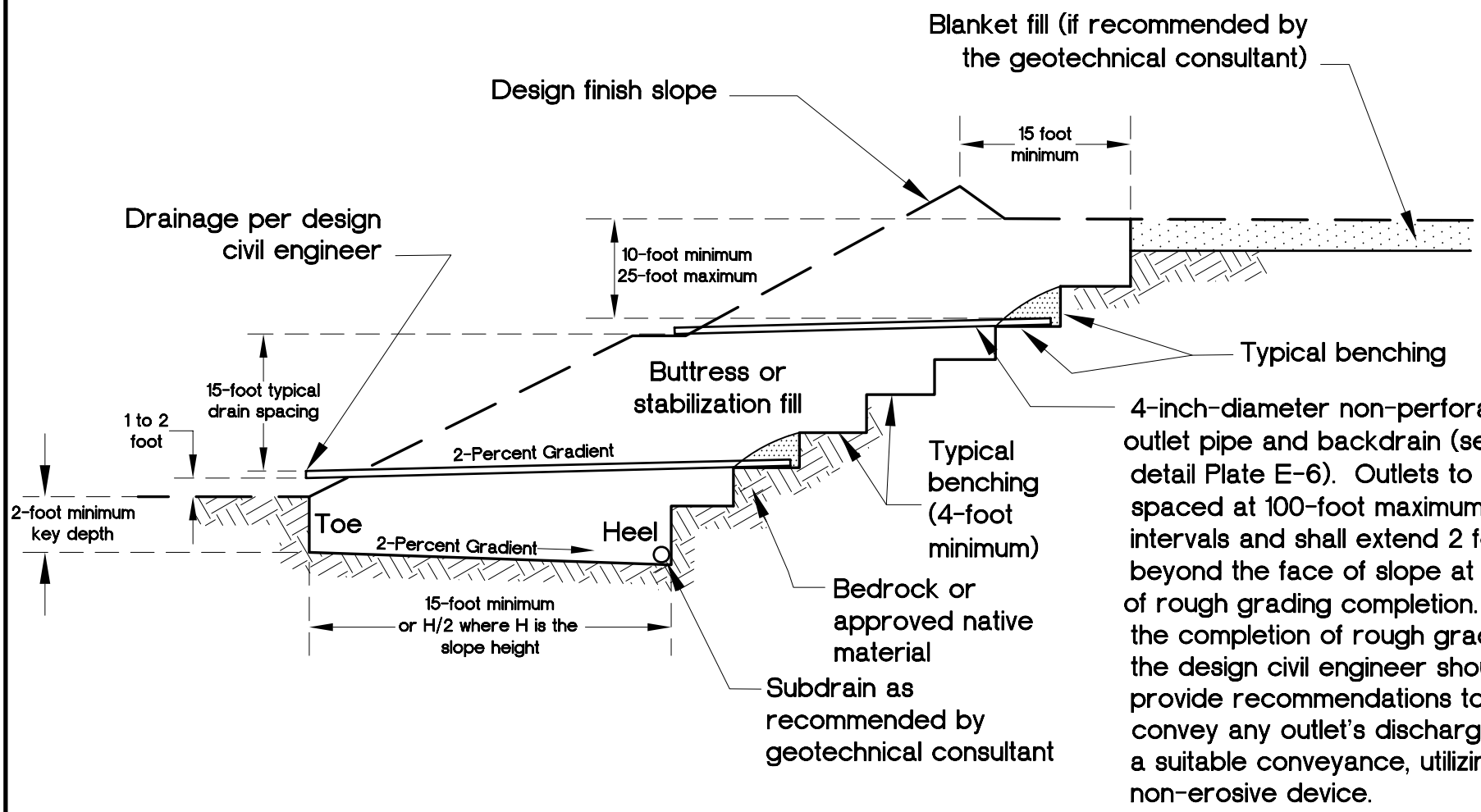
Plate E-3



GeoSoils, Inc.

REMOVAL ADJACENT TO EXISTING FILL ADJOINING CANYON FILL DETAIL

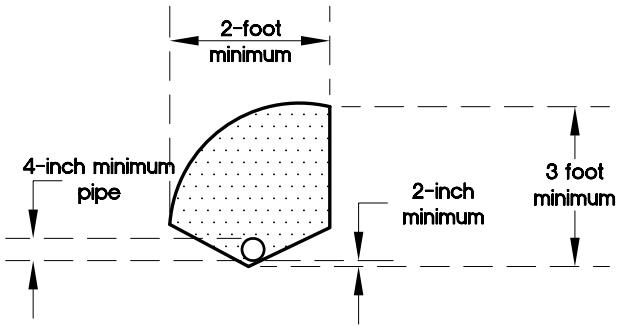
Plate E-4

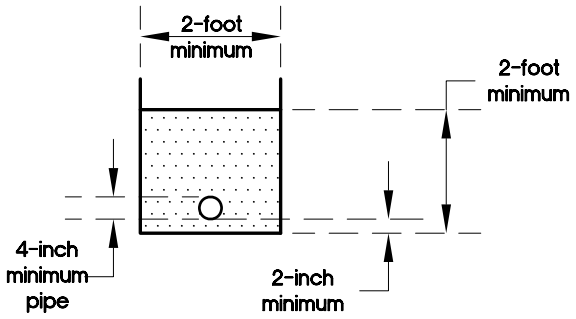


GeoSoils, Inc.

TYPICAL STABILIZATION / BUTTRESS FILL DETAIL

Plate E-5





Filter Material: Minimum of 5 cubic feet per lineal foot of pipe or 4 cubic feet per lineal feet of pipe when placed in square cut trench.

Alternative in Lieu of Filter Material: Gravel may be encased in approved filter fabric. Filter fabric shall be Mirafi 140 or equivalent. Filter fabric shall be lapped a minimum of 12 inches in all joints.

Minimum 4-Inch-Diameter Pipe: ABS-ASTM D-2751, SDR 35; or ASTM D-1527 Schedule 40, PVC-ASTM D-3034, SDR 35; or ASTM D-1785 Schedule 40 with a crushing strength of 1,000 pounds minimum, and a minimum of 8 uniformly-spaced perforations per foot of pipe. Must be installed with perforations down at bottom of pipe. Provide cap at upstream end of pipe. Slope at 2 percent to outlet pipe. Outlet pipe to be connected to subdrain pipe with tee or elbow.

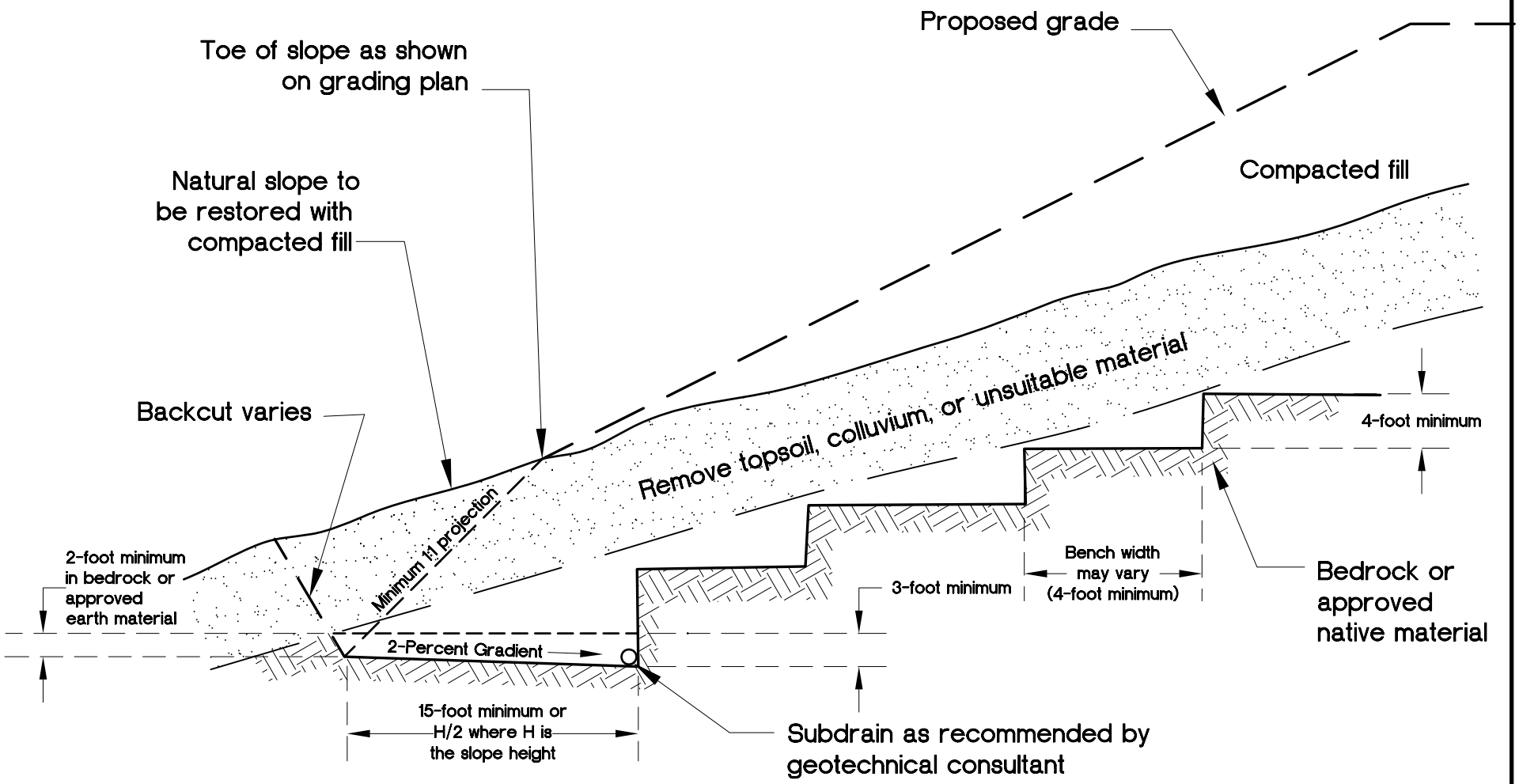
Notes:
1. Trench for outlet pipes to be backfilled and compacted with onsite soil.
2. Backdrains and lateral drains shall be located at elevation of every bench drain. First drain located at elevation just above lower lot grade. Additional drains may be required at the discretion of the geotechnical consultant.

Filter Material shall be of the following specification or an approved equivalent.

Sieve Size	Percent Passing
1 inch	100
¾ inch	90-100
⅜ inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Gravel shall be of the following specification or an approved equivalent.

Sieve Size	Percent Passing
1½ inch	100
No. 4	50
No. 200	8



NOTES:

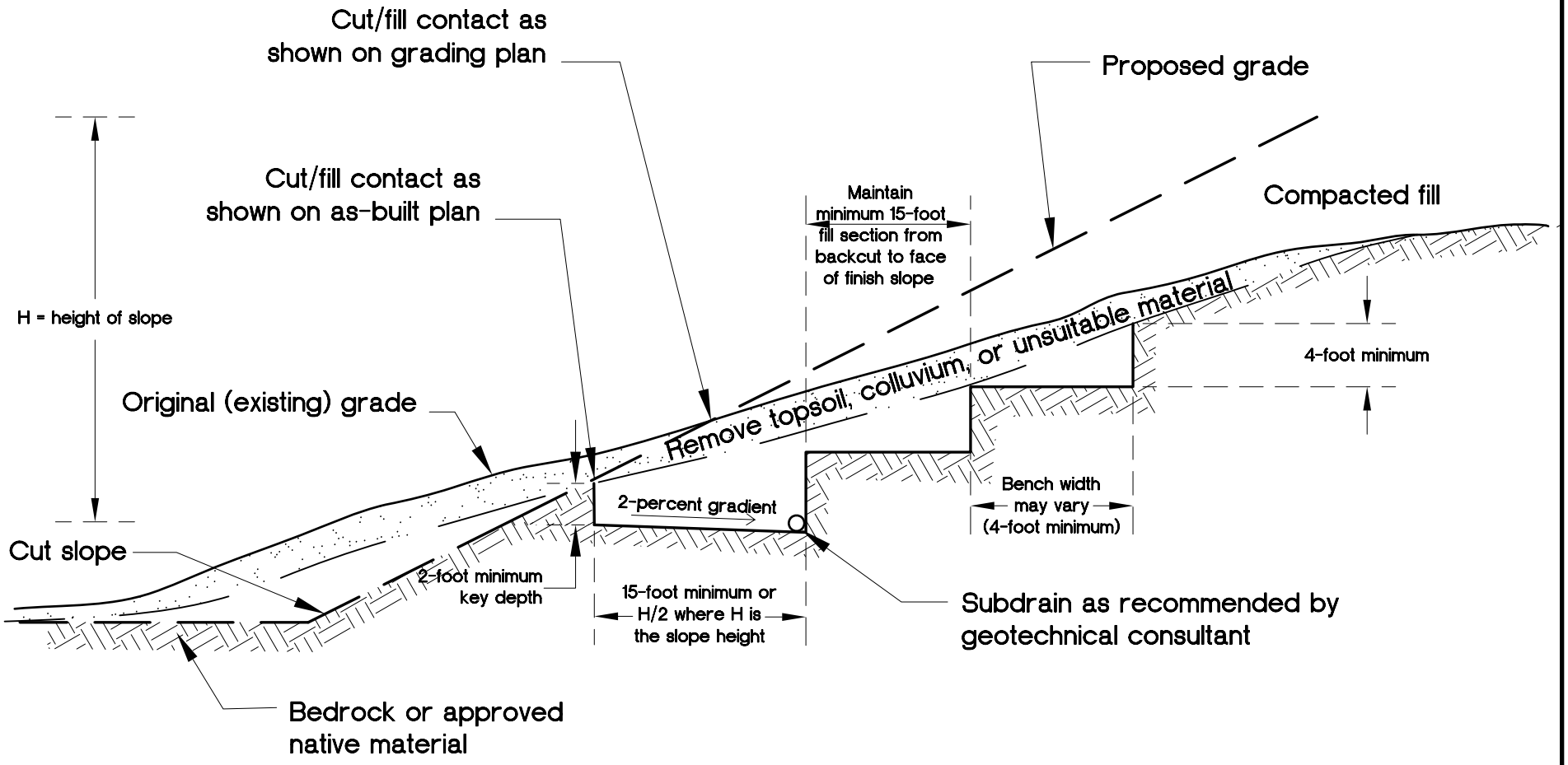
1. Where the natural slope approaches or exceeds the design slope ratio, special recommendations would be provided by the geotechnical consultant.

2. The need for and disposition of drains should be evaluated by the geotechnical consultant, based upon exposed conditions.

GeoSoils, Inc.

FILL OVER NATURAL (SIDEHILL FILL) DETAIL

Plate E-7

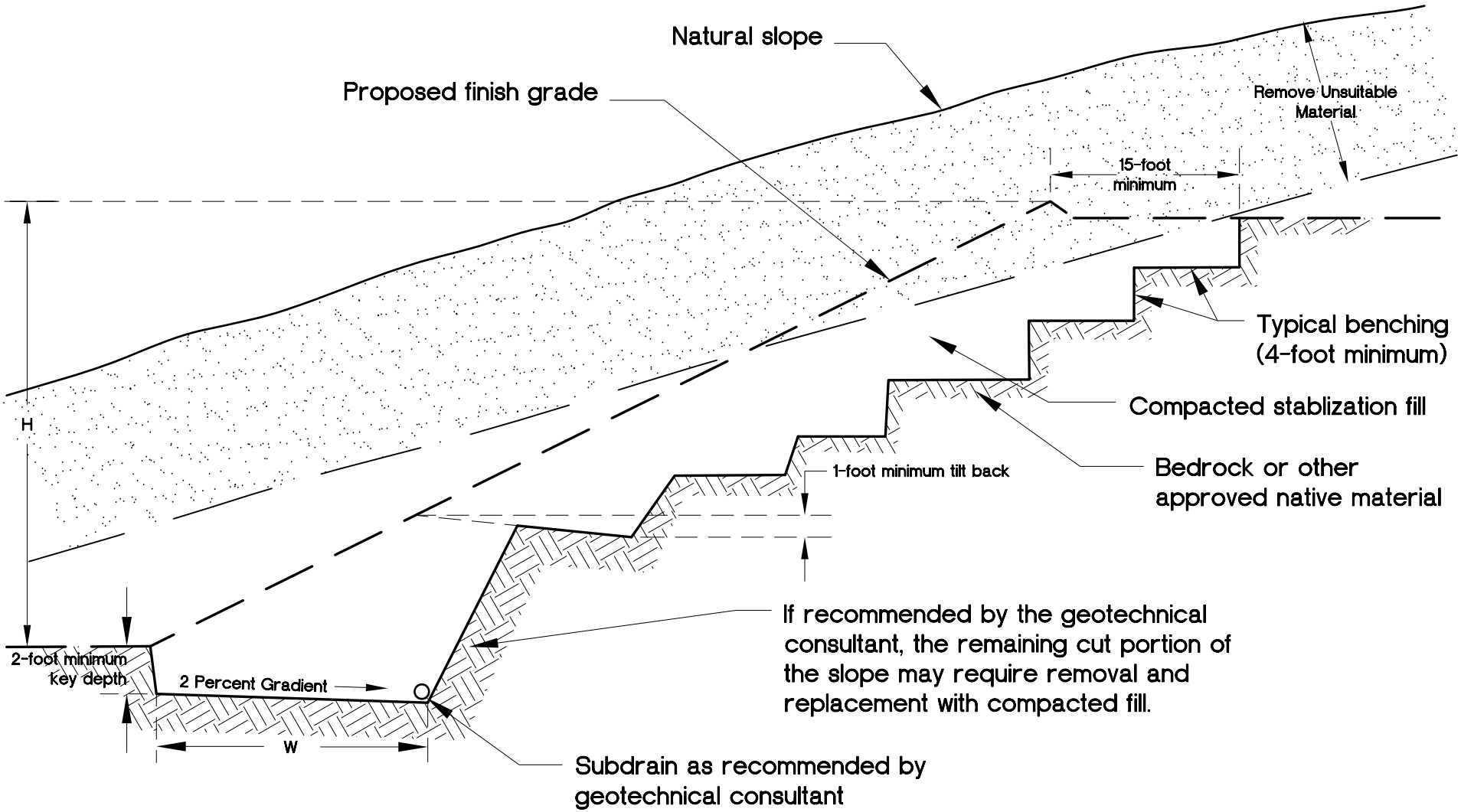


NOTE: The cut portion of the slope should be excavated and evaluated by the geotechnical consultant prior to construction of the fill portion.

GeoSoils, Inc.

FILL OVER CUT DETAIL

Plate E-8

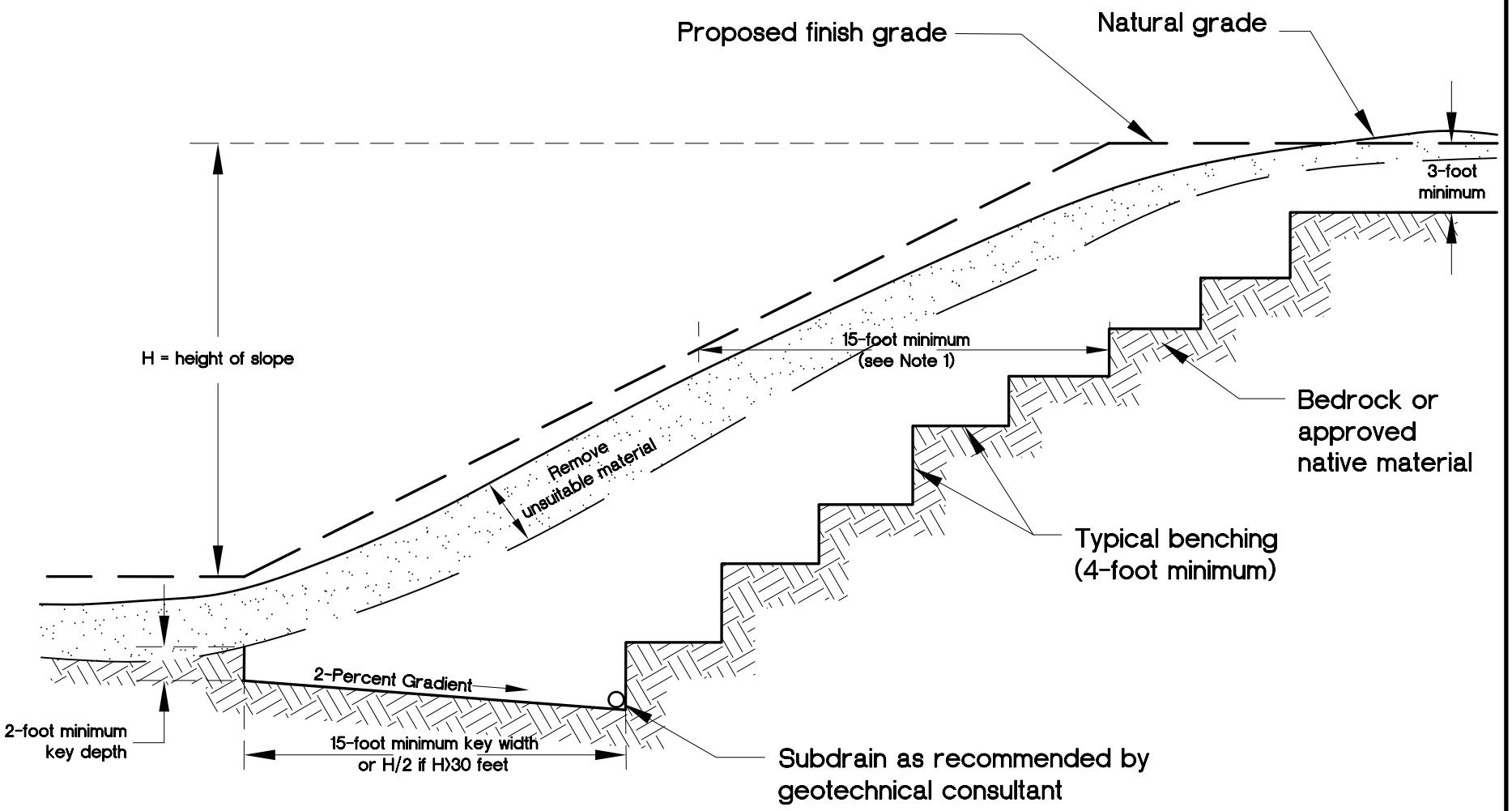


NOTES:

1. Subdrains may be required as specified by the geotechnical consultant.

2. W shall be equipment width (15 feet) for slope heights less than 25 feet. For slopes greater than 25 feet, W shall be evaluated by the geotechnical consultant. At no time, shall W be less than H/2, where H is the height of the slope.

GeoSoils, Inc.	STABLIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN CUT SLOPE DETAIL	Plate E-9



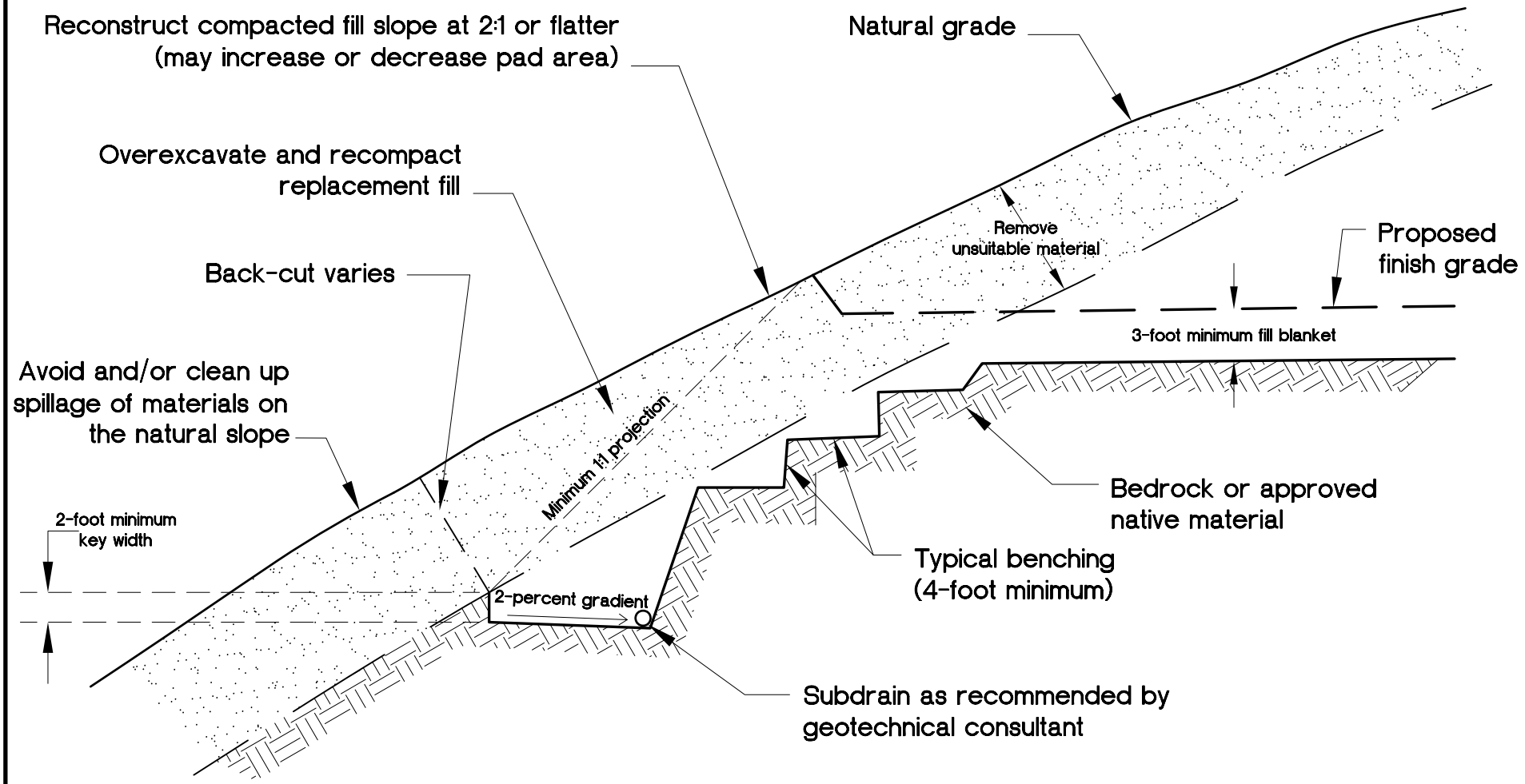
NOTES:

1. 15-foot minimum to be maintained from proposed finish slope face to backcut.
2. The need and disposition of drains will be evaluated by the geotechnical consultant based on field conditions.
3. Pad overexcavation and recompaction should be performed if evaluated to be necessary by the geotechnical consultant.

GeoSoils, Inc.

SKIN FILL OF NATURAL GROUND DETAIL

Plate E-10



NOTES:

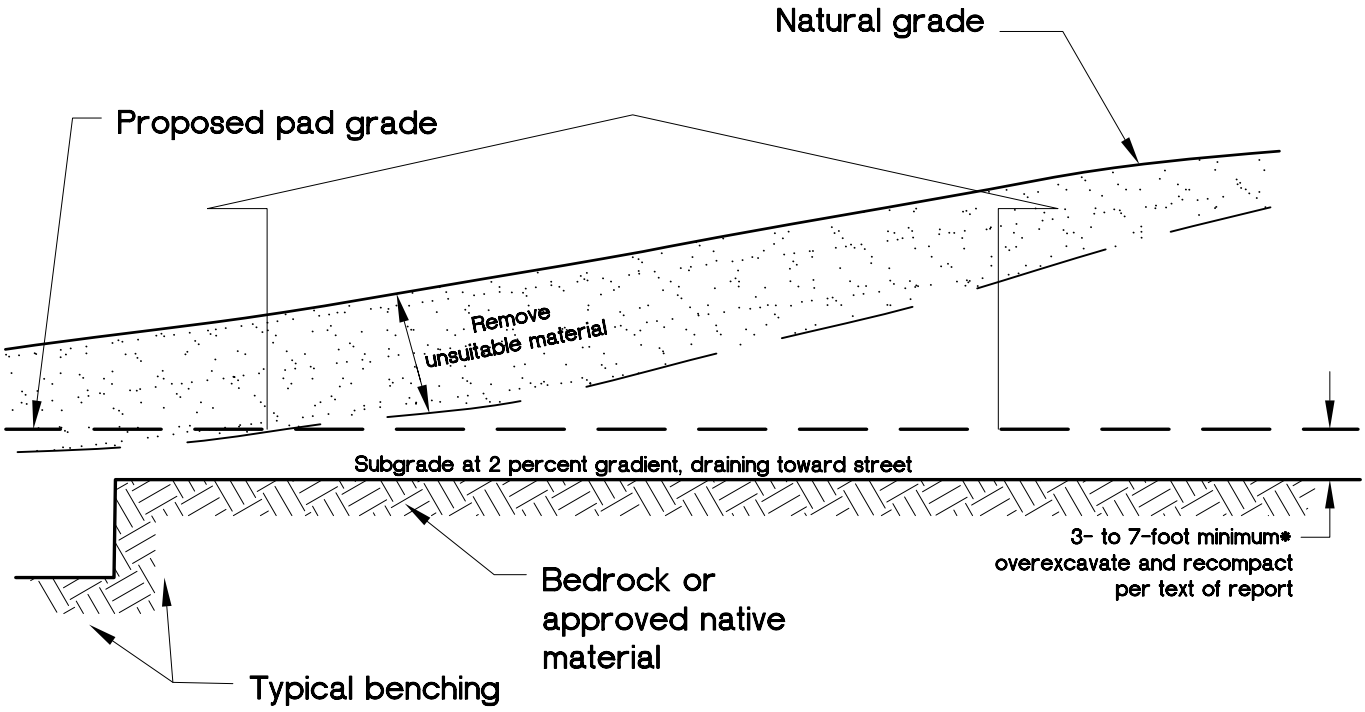
1. Subdrain and key width requirements will be evaluated based on exposed subsurface conditions and thickness of overburden.

2. Pad overexcavation and recompaction should be performed if evaluated necessary by the geotechnical consultant.

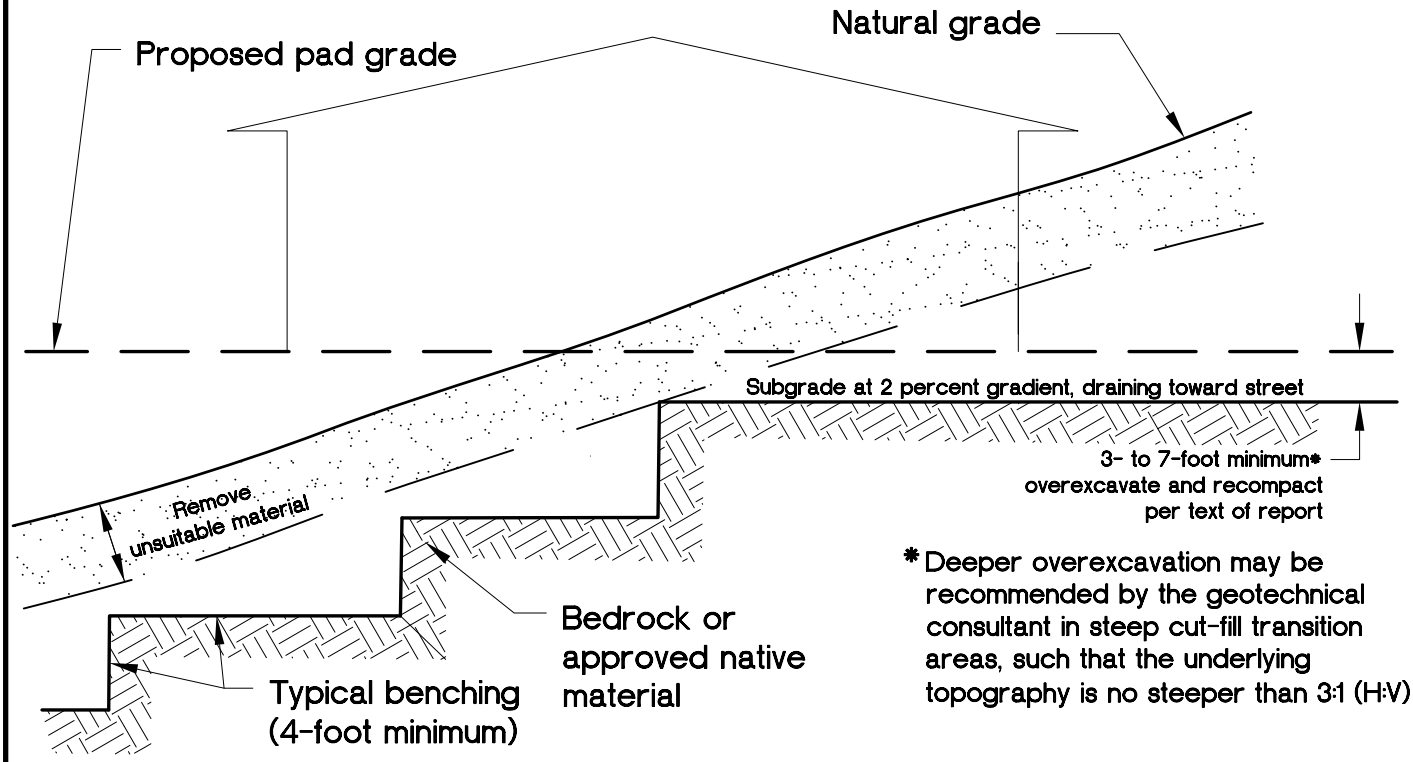
GeoSoils, Inc.

DAYLIGHT CUT LOT DETAIL

Plate E-11



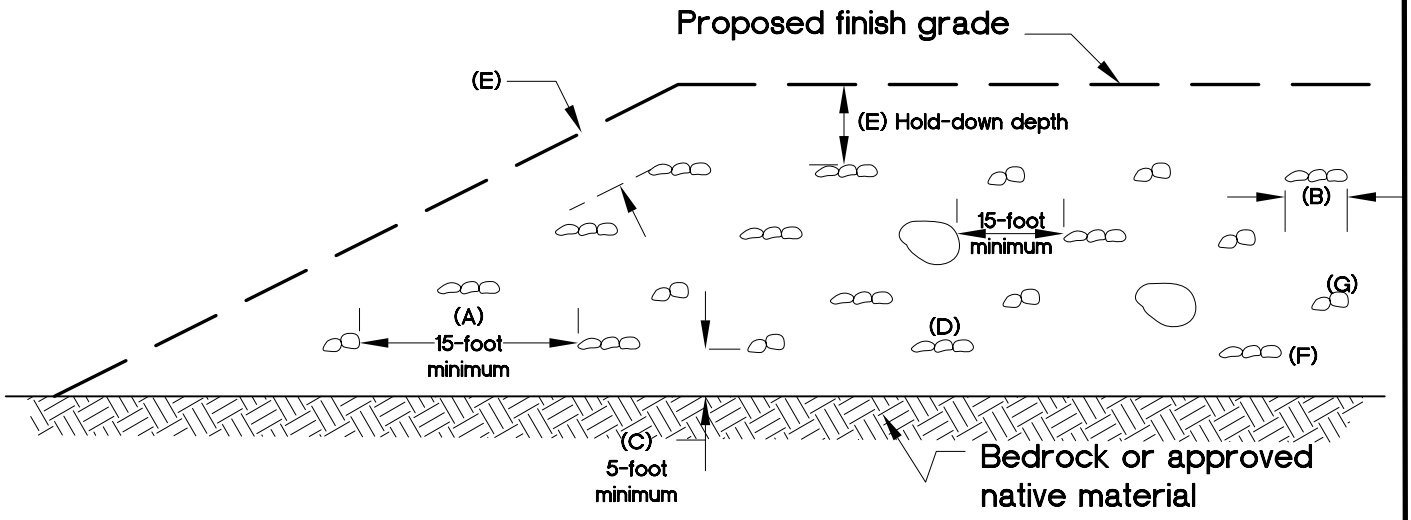
CUT LOT OR MATERIAL-TYPE TRANSITION



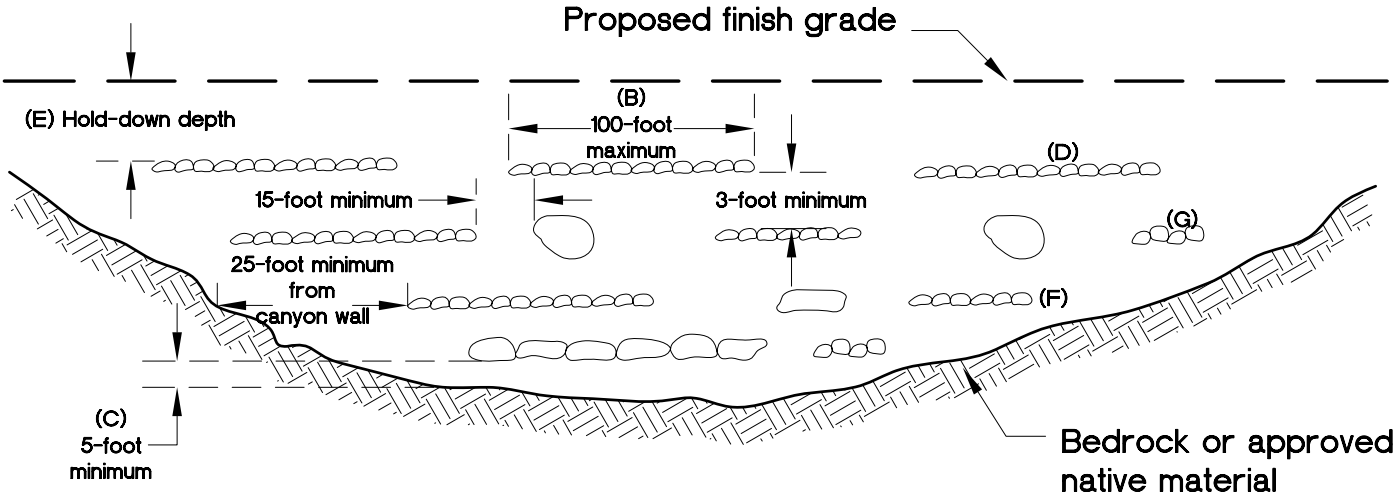
CUT-FILL LOT (DAYLIGHT TRANSITION)

GeoSoils, Inc.	TRANSITION LOT DETAILS	Plate E-12

VIEW NORMAL TO SLOPE FACE



VIEW PARALLEL TO SLOPE FACE



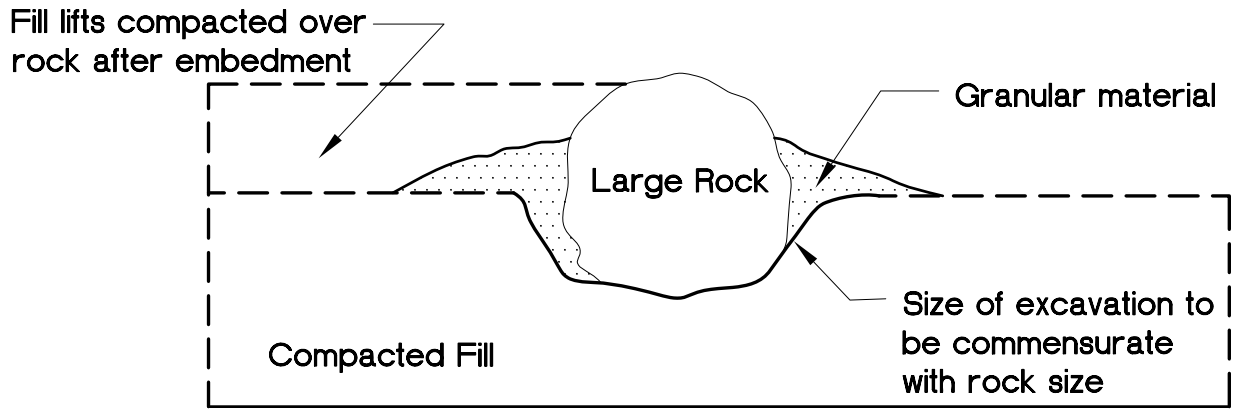
NOTES:

A. One equipment width or a minimum of 15 feet between rows (or windrows).
B. Height and width may vary depending on rock size and type of equipment. Length of windrow shall be no greater than 100 feet.
C. If approved by the geotechnical consultant, windrows may be placed directly on competent material or bedrock, provided adequate space is available for compaction.
D. Orientation of windrows may vary but should be as recommended by the geotechnical engineer and/or engineering geologist. Staggering of windrows is not necessary unless recommended.
E. Clear area for utility trenches, foundations, and swimming pools; Hold-down depth as specified in text of report, subject to governing agency approval.
F. All fill over and around rock windrow shall be compacted to at least 90 percent relative compaction or as recommended.
G. After fill between windrows is placed and compacted, with the lift of fill covering windrow, windrow should be proof rolled with a D-9 dozer or equivalent.

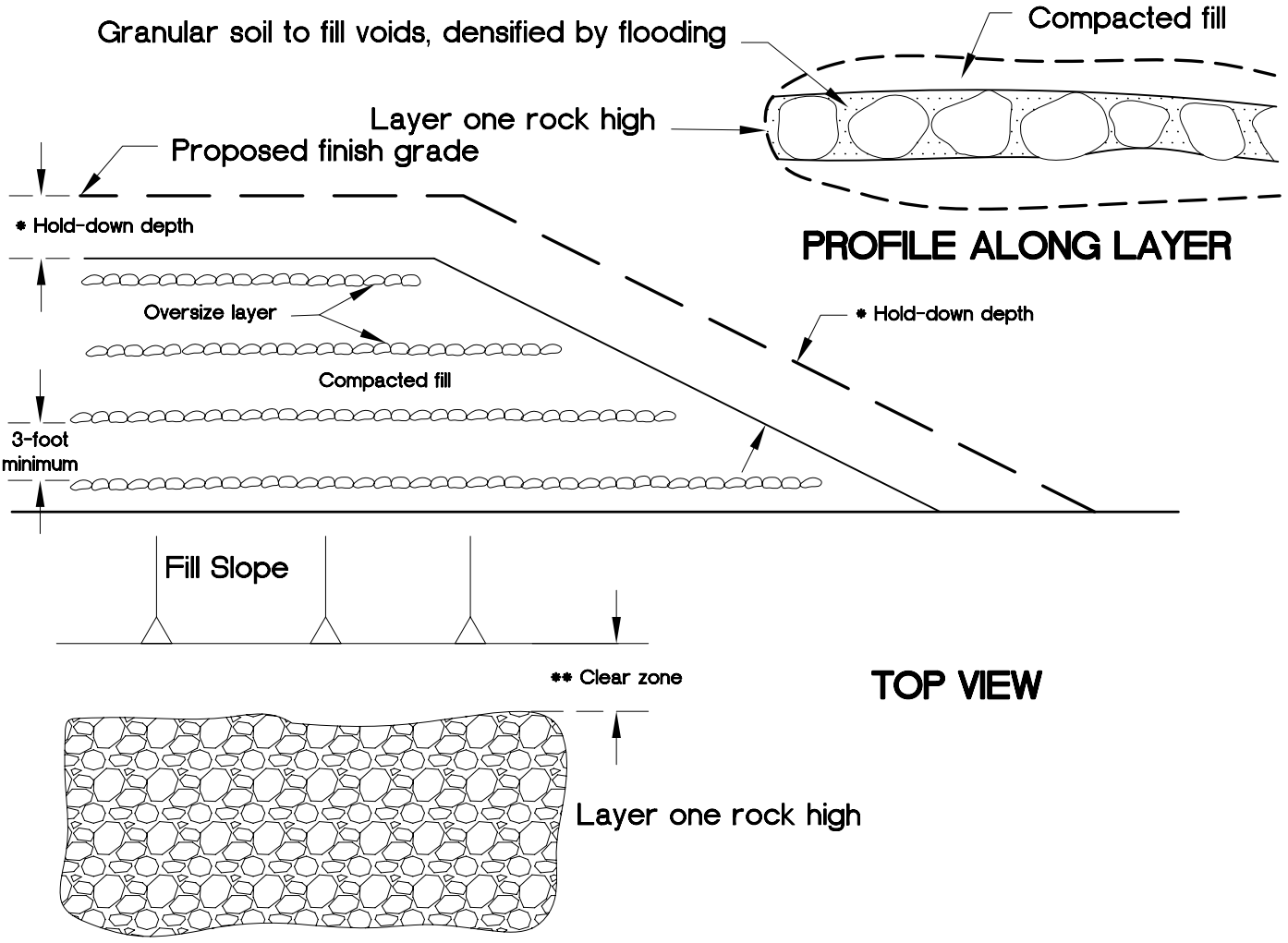
VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE
ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED

GeoSoils, Inc.	OVERSIZE ROCK DISPOSAL DETAIL	Plate E-13

ROCK DISPOSAL PITS



ROCK DISPOSAL LAYERS

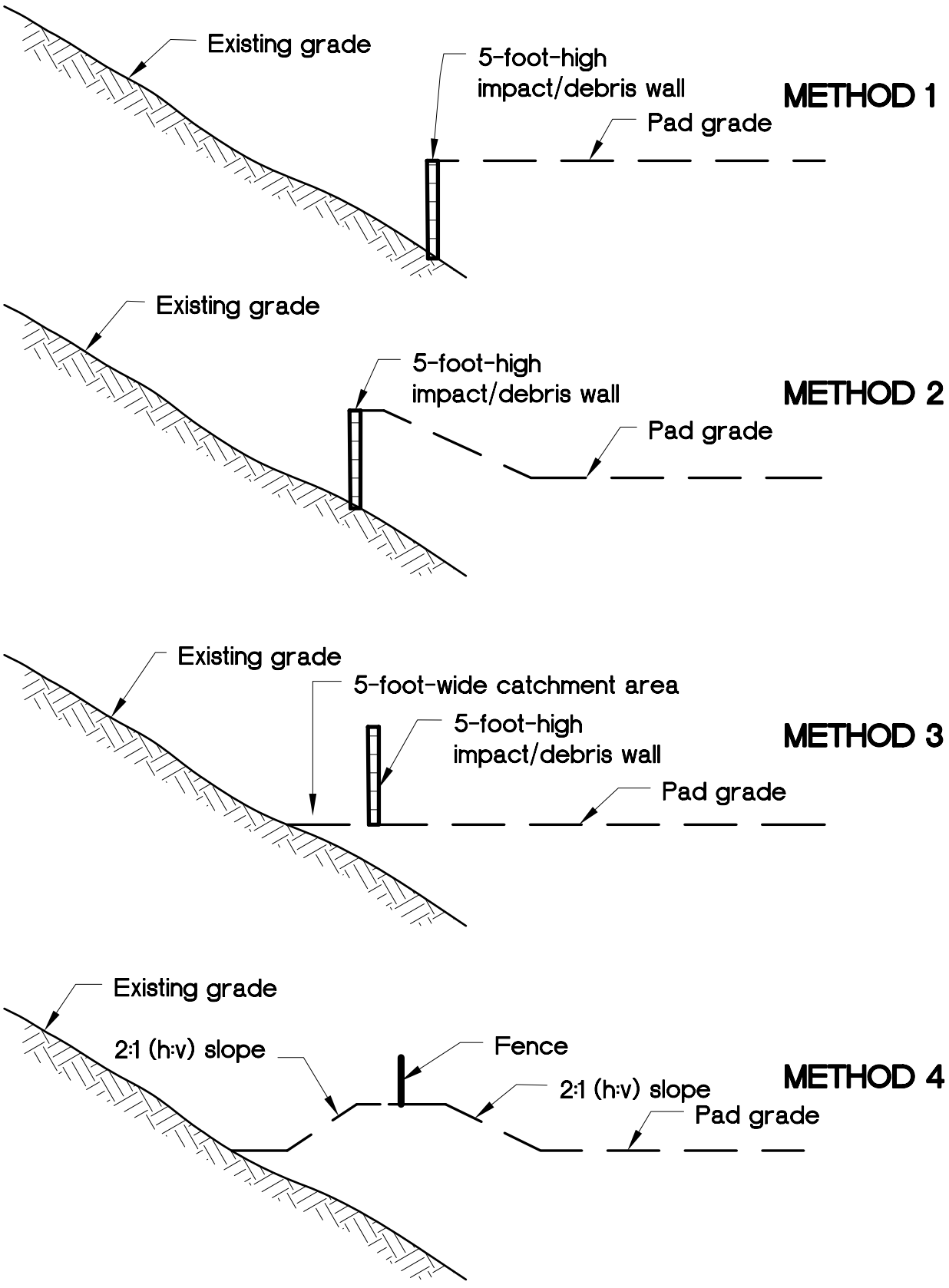


* Hold-down depth or below lowest utility as specified in text of report, subject to governing agency approval.

** Clear zone for utility trenches, foundations, and swimming pools, as specified in text of report.

VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE

ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED IN

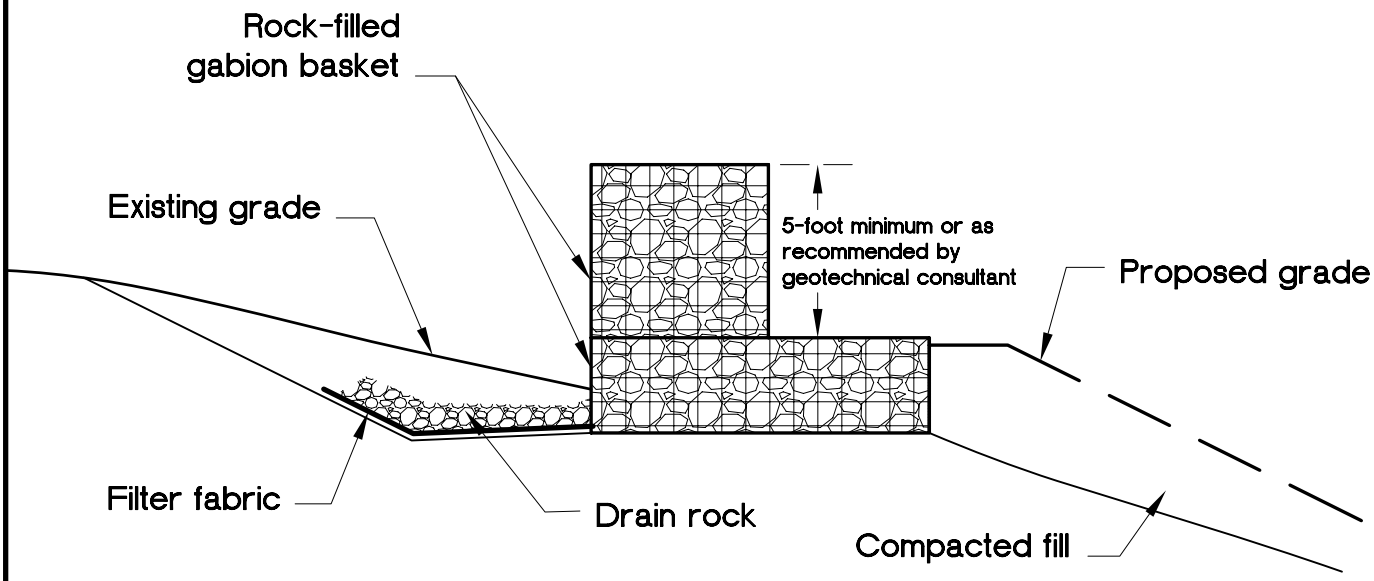


NOT TO SCALE

GeoSoils, Inc.

DEBRIS DEVICE CONTROL METHODS DETAIL

Plate E-15

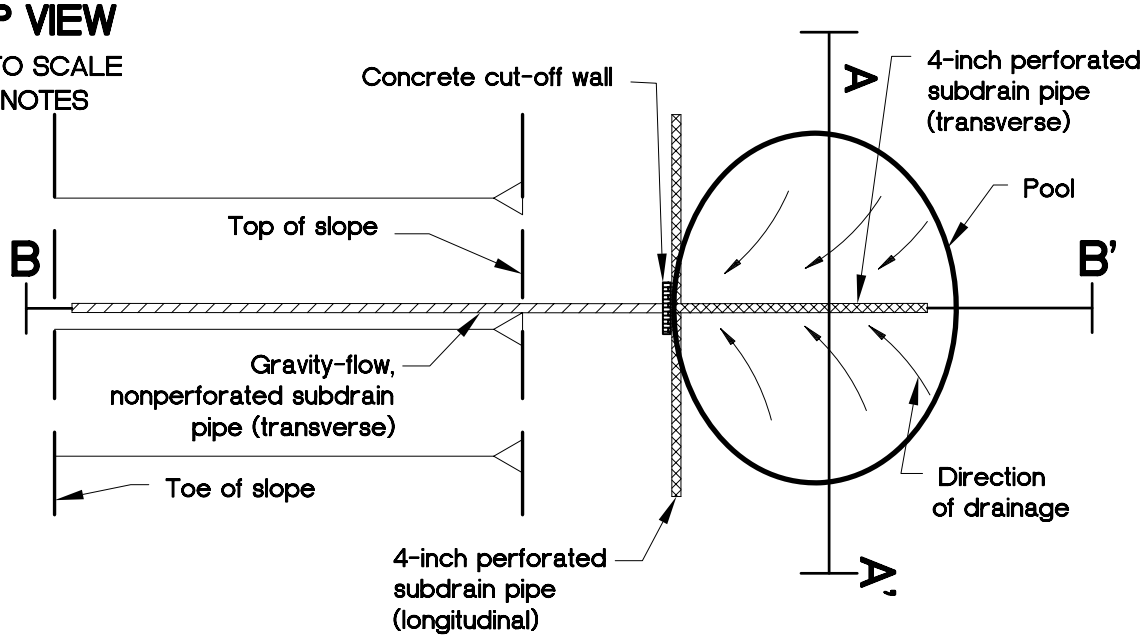


Gabion impact or diversion wall should be constructed at the base of the ascending slope subject to rock fall. Walls need to be constructed with high segments that sustain impact and mitigate potential for overtopping, and low segment that provides channelization of sediments and debris to desired depositional area for subsequent clean-out. Additional subdrain may be recommended by geotechnical consultant.

From GSA, 1987

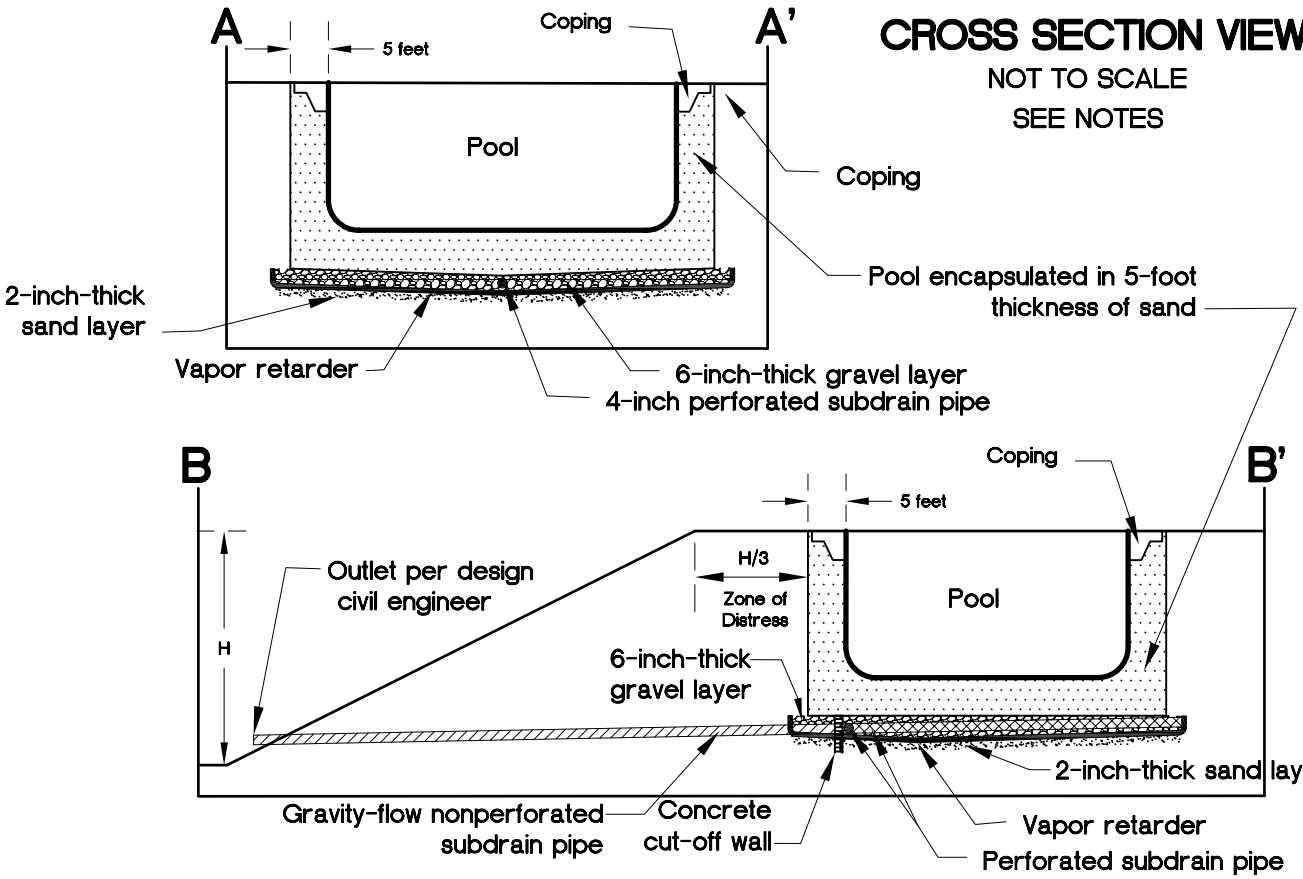
MAP VIEW

NOT TO SCALE
SEE NOTES



CROSS SECTION VIEW

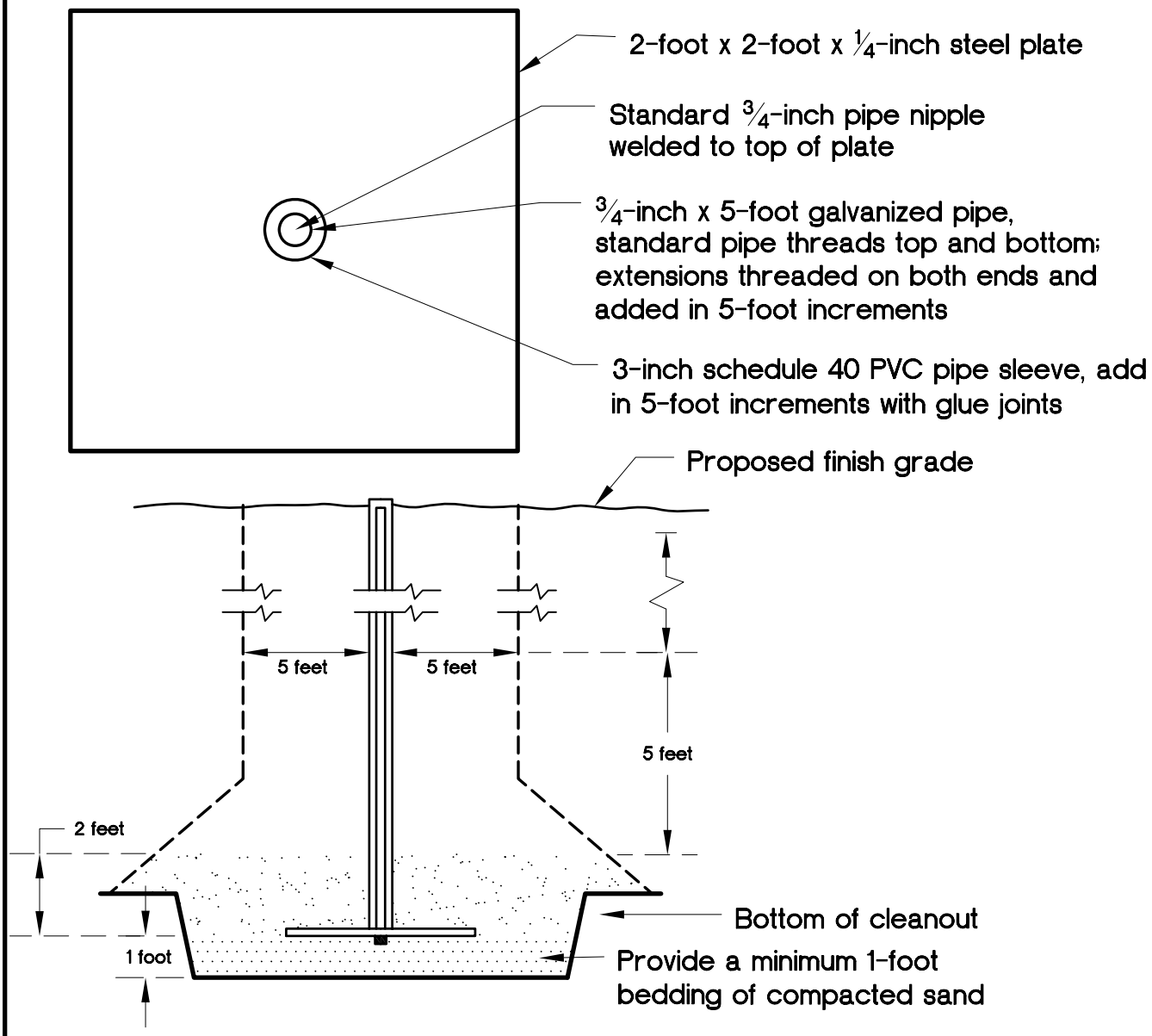
NOT TO SCALE
SEE NOTES



NOTES:

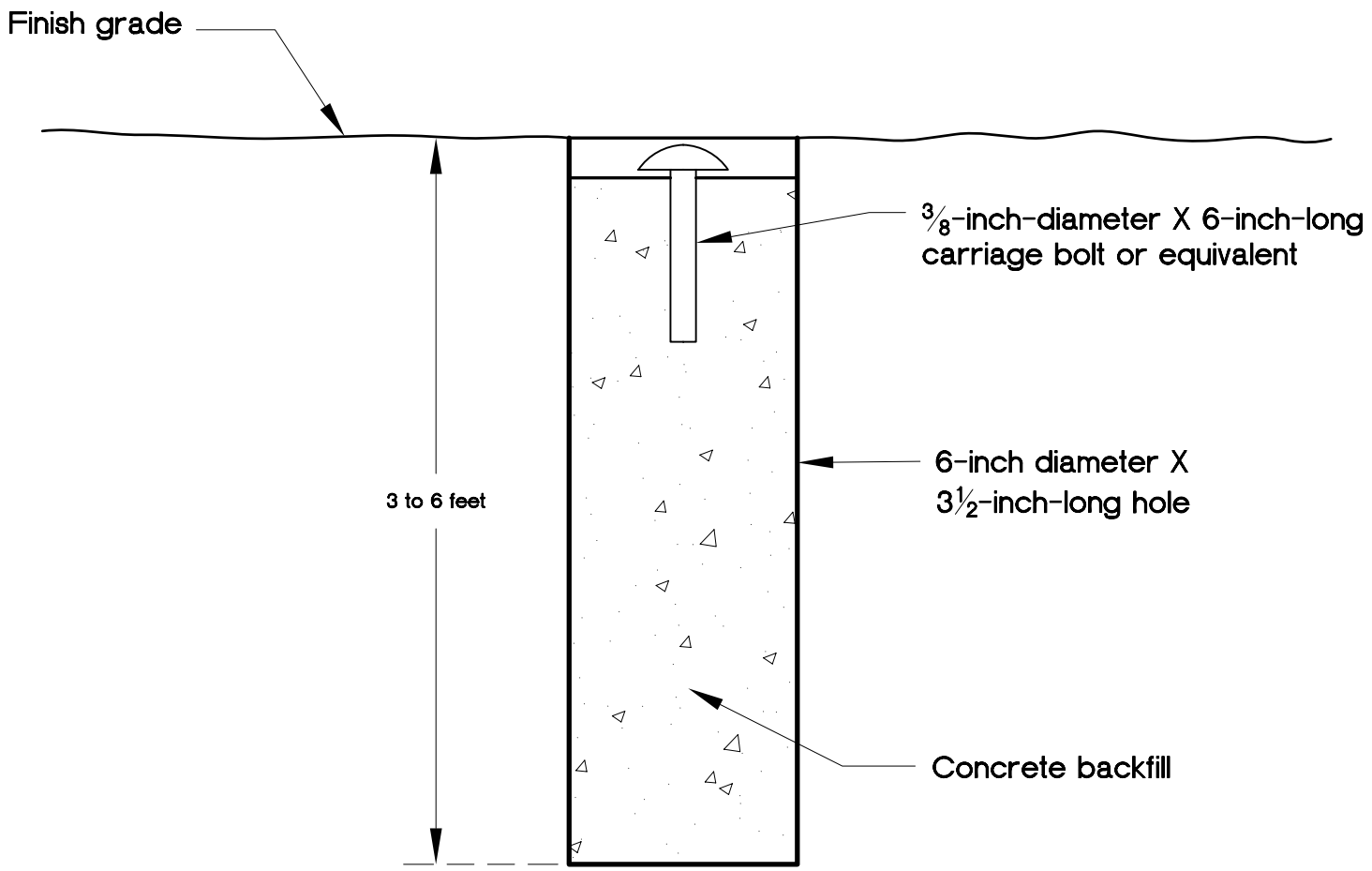
1. 6-inch-thick, clean gravel (¾ to 1½ inch) sub-base encapsulated in Mirafi 140N or equivalent, underlain by a 15-mil vapor retarder, with 4-inch-diameter perforated pipe longitudinal connected to 4-inch-diameter perforated pipe transverse. Connect transverse pipe to 4-inch-diameter nonperforated pipe at low point and outlet or to sump pump area.
2. Pools on fills thicker than 20 feet should be constructed on deep foundations; otherwise, distress (tilting, cracking, etc.) should be expected.
3. Design does not apply to infinity-edge pools/spas.

GeoSoils, Inc.	TYPICAL POOL/SPA DETAIL	Plate E–17



NOTES:

1. Locations of settlement plates should be clearly marked and readily visible (red flagged) to equipment operators.
2. Contractor should maintain clearance of a 5-foot radius of plate base and withiin 5 feet (vertical) for heavy equipment. Fill within clearance area should be hand compacted to project specifications or compacted by alternative approved method by the geotechnical consultant (in writing, prior to construction).
3. After 5 feet (vertical) of fill is in place, contractor should maintain a 5-foot radius equipment clearance from riser.
4. Place and mechanically hand compact initial 2 feet of fill prior to establishing the initial reading.
5. In the event of damage to the settlement plate or extension resulting from equipment operating within the specified clearance area, contractor should immediately notify the geotechnical consultant and should be responsible for restoring the settlement plates to working order.
6. An alternate design and method of installation may be provided at the discretion of the geotechnical consultant.

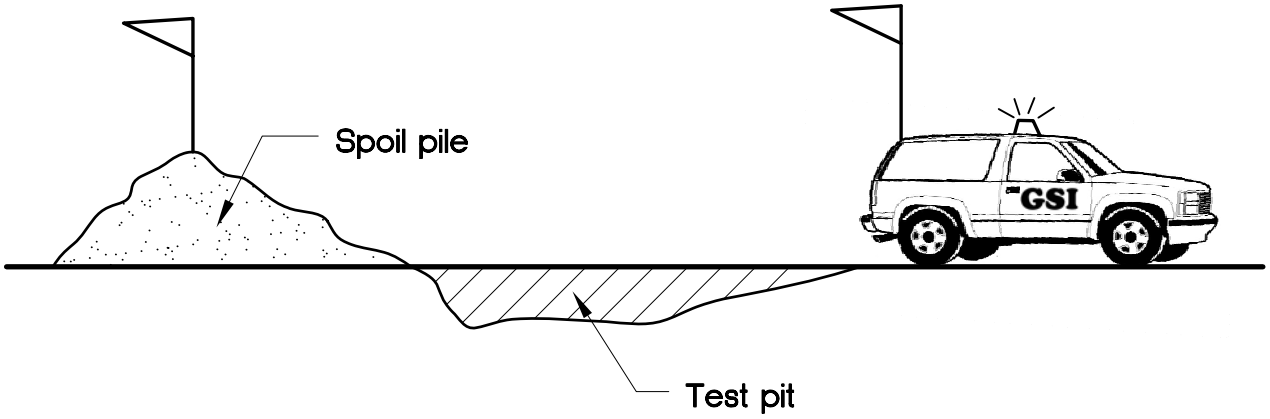


GeoSoils, Inc.

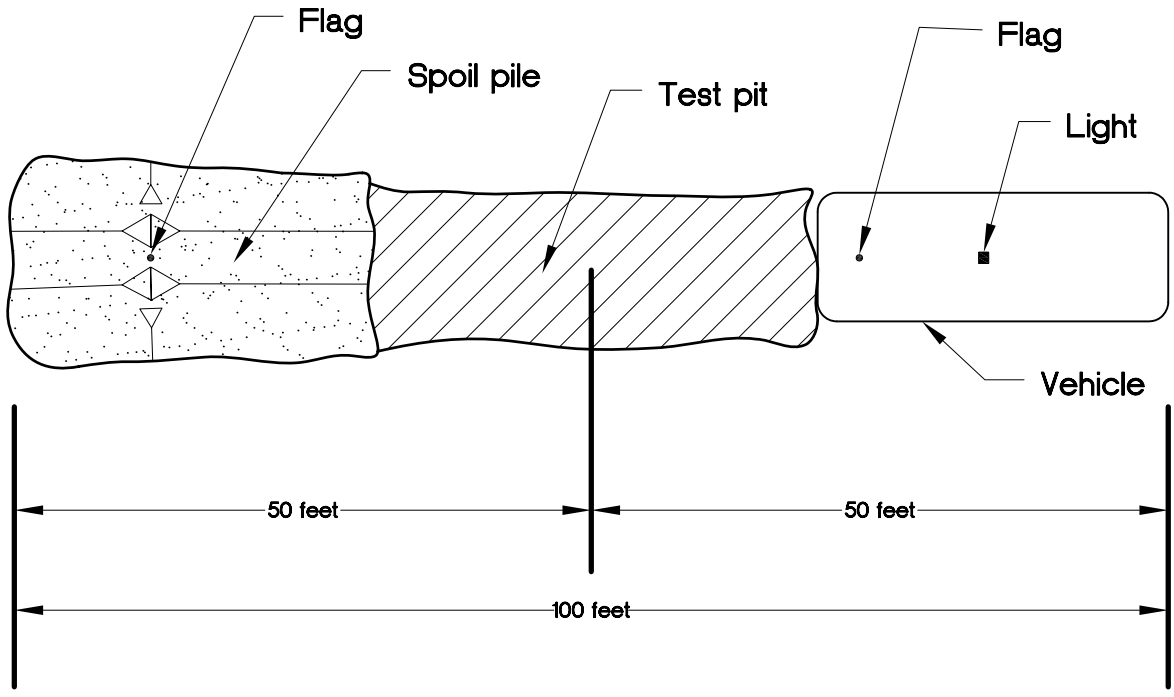
TYPICAL SURFACE SETTLEMENT MONUMENT

Plate E–19

SIDE VIEW



TOP VIEW



GeoSoils, Inc.	TEST PIT SAFETY DIAGRAM	Plate E-20

This document or efile is not part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

EXPLANATION

afu	Artificial Fill - Undocumented	TP-13	Location of Test Pit (GSI, 2005a)
Qal	Quaternary Alluvium	TP-107	Location of Test Pit (Current Investigation)
Qp	Bedrock - Quaternary Pauba Formation	P-4	Location of Percolation/Infiltration Test
	Geologic Contact		Location of Well
20	Attitude of Bedding (GSI, 2005a)		Project Boundary
55	Attitude of Joint Set (GSI, 2005a)		Surficial Slope Failure
	Attitude of Vertical Joint Set (GSI, 2005a)		Recommended 8" Subdrain System

PRIELIPP ROAD

EXISTING 12" P.V.C. WATER LINE

EXISTING 36" STEEL WATER LINE

ELIZABETH LANE

EXISTING 12" FORCE MAIN SEWER

EXISTING 8" VCP SEWER

STREET "A"

STREET "B"

STREET "C"

STREET "D"

HIGH RETAINING WALL ON ALL 6 LOTS

DETENTION / WATER QUALITY BASIN

25' SEWER, WATER & EMERGENCY ACCESS EASEMENT / PASEO

CONNECT TO EXIST. 8" SEWER

CONNECT TO EXIST. 12" WATER

TP-1 TP-2 TP-3 TP-4 TP-5 TP-6 TP-7 TP-8 TP-9 TP-10 TP-11 TP-12 TP-13 TP-101 TP-102 TP-103 TP-104 TP-105 TP-106 TP-107

P-1 P-2 P-3 P-4

Scale: 1" = 40'

ALL LOCATIONS APPROXIMATE

GeoSoils, Inc.

GEOTECHNICAL MAP

Plate 1 of 1

W.O. 6451-A-SC | DATE 10/12 | SCALE: 1" = 40'

SB&O INC.
PLANNING ENGINEERING SURVEYING
27715 Jefferson Avenue, Suite 201
Temecula, Ca. 92590
951-693-3310
951-693-3320 Fax

PRELIMINARY GRADING PLAN FOR:

WILDOMAR 23

DESIGN: D.R.B.
DRAWN: R.L.F.
PRELIM. DATE 6-13-12

SHEET 1 / 1

69550.00

FEASIBILITY LEVEL PERCOLATION/INFILTRATION TESTING
WILDOMAR 23 PROJECT, CITY OF WILDOMAR
RIVERSIDE COUNTY, CALIFORNIA

FOR

LENNAR HOMES - INLAND DIVISION
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879

W.O. 6451-A-SC SEPTEMBER 24, 2012

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301

September 24, 2012

W.O. 6451-A-SC

Lennar Homes - Inland Division
980 Montecito Drive, Suite 302
Corona, California 92879

Attention: Ms. Jarnne Valdez

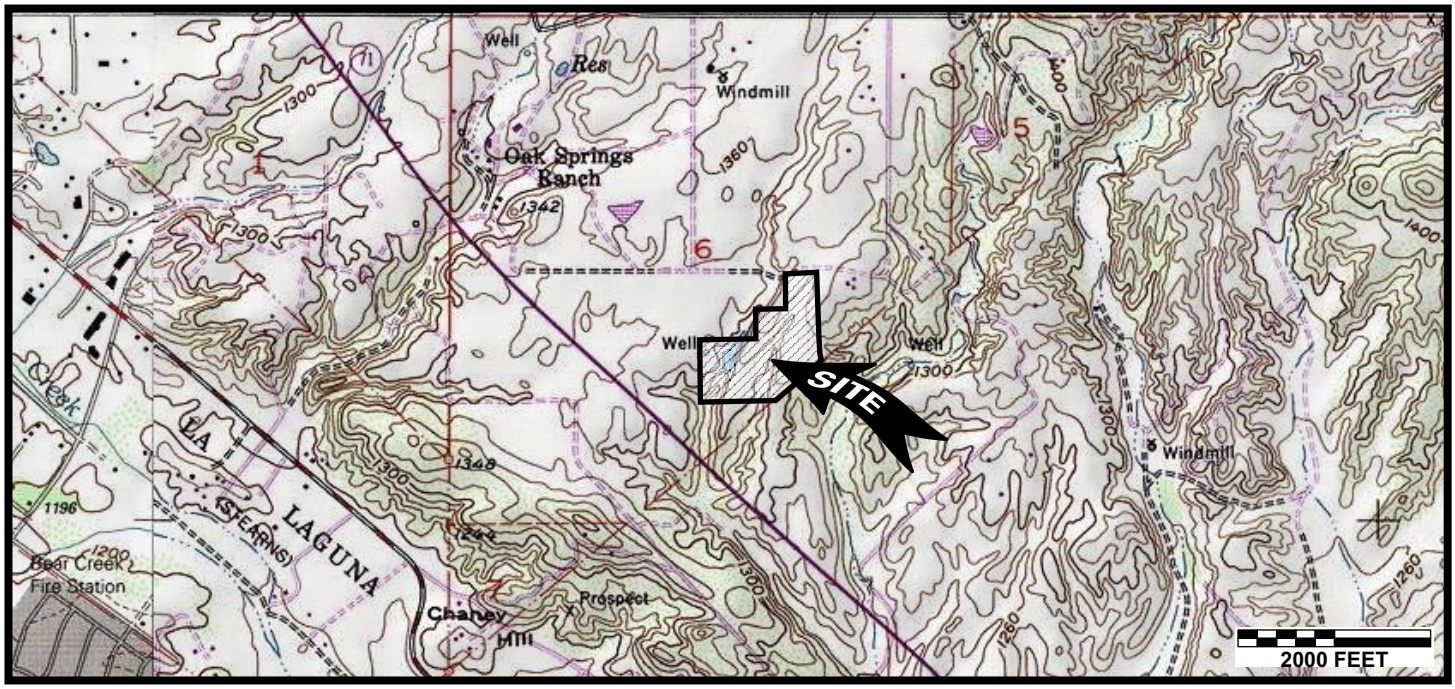
Subject: Feasibility Level Percolation/Infiltration Testing, Wildomar 23 Project, City of Wildomar, Riverside County, California

Dear Ms. Valdez:

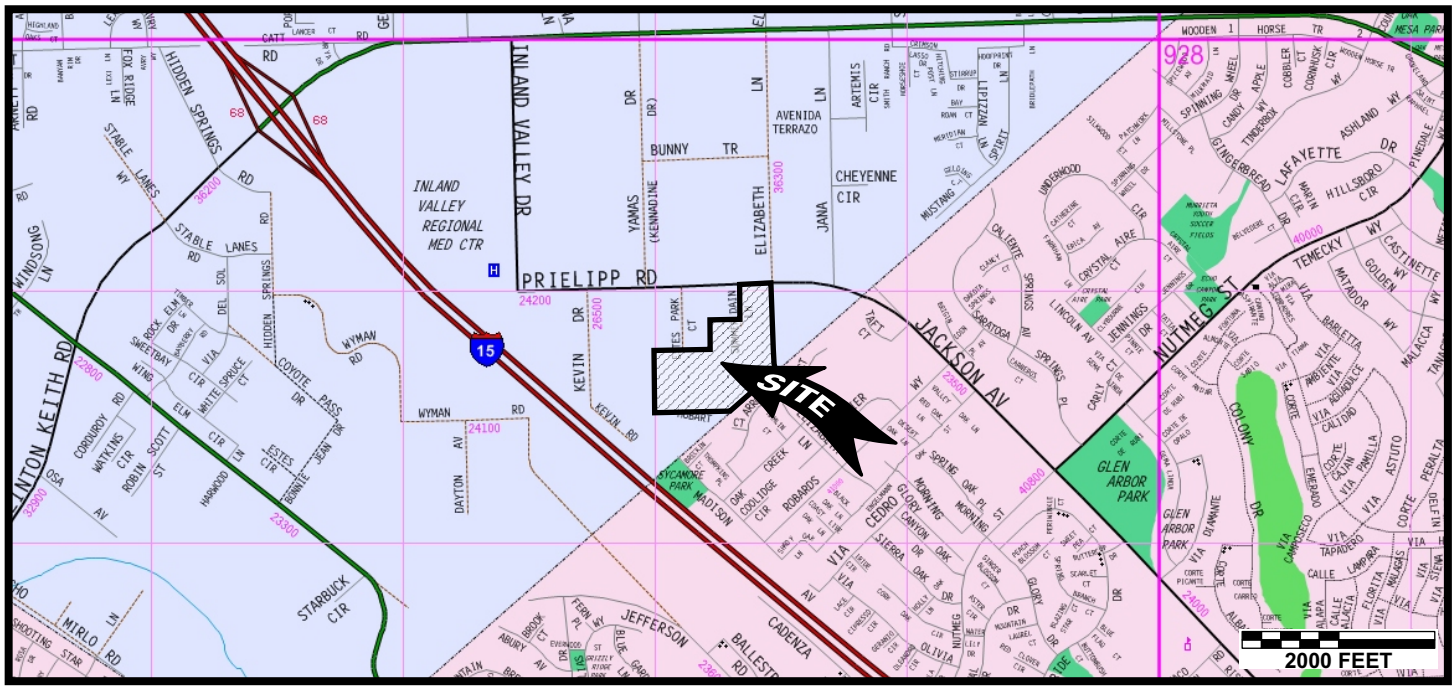
In accordance with your request and per the requirements of the controlling authorities, GeoSoils, Inc. (GSI) is providing the results of our feasibility level percolation/infiltration testing for the proposed Wildomar 23 project generally located at 36605 and 36625 Elizabeth Lane (see Figure 1, Site Location Map), in the City of Wildomar, Riverside County, California. The scope of our services has included a review of the referenced reports and plans (Appendix A), advancement of four (4) exploratory test pits for geologic logging and subsequent percolation/infiltration testing (Appendix B), analysis of field test data (Appendix C), and preparation of this summary report. Based on the above, it is our opinion that the proposed site development and basin construction is feasible from a geotechnical viewpoint, provided the recommendations presented herein, and in other applicable reports for the site by GSI (see Appendix A) are implemented during project planning, design, and construction, as appropriate.

PROPOSED DEVELOPMENT

Based upon the preliminary development plans by SB&O, Inc. (SB&O, 2012), and conversations with the Client, the project is proposed for single-family residential construction of 67 building pads, a detention/infiltration basin, a park site, along with associated interior roadways, and underground utility improvements. We further understand that the buildings are proposed as one- and/or two-story structures, with slab-on-grade/continuous footings, utilizing typical wood frame-type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system.



Base Map: TOPO!® ©2007 National Geographic, U.S.G.S. Wildomar and Murrieta Quadrangles, California, Orange Co., 7.5 Minute, dated 1997 and 1976, respectively, photorevised 1979 (Murrieta).



Base Map: The Thomas Guide, Riverside & San Bernardino Counties, Digital Street Guide and Directory, 2008 Edition, by Thomas Bros. Maps, pages 927 and 928.

ALL LOCATIONS APPROXIMATE

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GeoSoils, Inc.

SITE LOCATION MAP

Figure 1

Wildomar 23

APNs 380-280-004, -009, -010, -011, -012

W.O. 6451-A-SC	DATE 09/12	SCALE: 1" = 2,000

It is our understanding that the controlling authorities generally require Best Management Practices (BMP's) to clarify onsite storm water run-off within newly developed residential projects. Remedial grading for the project is anticipated to consist of the removal and recompaction of the near surface artificial fill, colluvium/topsoil, alluvial deposits, and weathered bedrock deposits. Removals are estimated to be an average of approximately ±1 to ±3 feet in depth across a majority of the site, with localized deeper removals, up to 7.5± feet deep or deeper, within the minor canyon areas. Due to the consistency, structural composition, and relative density of the bedrock deposits encountered at depth, landslide or other associated geologic hazzards are not currently anticipated onsite. However, it should be noted that graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover soon after construction. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers should be utilized to improve surficial stability. A rodent control program to prevent burrowing should be implemented. Other methods for improving surficial slope stability may also be considered.

SITE GEOLOGY

The site may be characterized as being underlain by Pleistocene-age sedimentary bedrock deposits assigned to the Pauba Formation (Kennedy and Morton, 2003). The bedrock deposits onsite are locally mantled by relatively thin layers of artificial fill, colluvium/topsoil, and younger alluvial deposits within the minor canyon areas. As described by Kennedy and Morton (2003), the bedrock deposits are generally well-indurated, cross-bedded sandstones and siltstones containing sparse cobble- to boulder-sized conglomerate beds. At depth, the sedimentary bedrock deposits encountered during this study were generally observed to be varying hues of reddish brown silty sands and sandy silts, with locally occasional discontinuous layers or lenses of cobble- to boulder-sized clasts (see Appendix B).

GROUNDWATER

These observations reflect site conditions at the time of our investigations and do not preclude changes in local groundwater conditions in the future from heavy irrigation, precipitation, or other factors not obvious at the time of our field work. Based upon field measurements from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. However, this does not preclude the possibility localized perched groundwater within drainage areas and/or along bedding or fractures within the sedimentary bedrock. Seepage may also occur locally (due to heavy precipitation or irrigation) in areas where

fill soils overlie less permeable bedrock materials. Thus, perched groundwater conditions may occur in the future, and should be anticipated.

FIELD PERCOLATION/INFILTRATION TESTING

Four (4) percolation/infiltration tests were conducted within the site, at a depth of between ±4 and ±6 feet to approximate the anticipated depth of proposed detention/infiltration basin within the project. The test pits advanced for this study were excavated utilizing a rubber-tired backhoe. The percolation/infiltration tests were conducted within the underlying native sedimentary bedrock deposits. Percolation/infiltration testing was performed to evaluate site conditions with respect to proposed onsite BMP construction to retain and filter onsite storm water. Onsite testing was performed in general conformance with the County of Riverside Department of Environmental Health (CRDEH, 2009) and the 2009 Uniform Plumbing Code ([2009 UPC], International Association of Plumbing & Mechanical Officials, 2009) guidelines for percolation testing. Testing was performed by an engineering geologist from our firm. The percolation test rates (minutes/inch) were then converted to infiltration rates (inches/hour) per the Porchet Method (RCFCWCD, 2011). The approximate locations of the test pits are provided on Figure 2. The field test data is provided in Appendix C. Procedures for testing are outlined briefly below:

Procedures

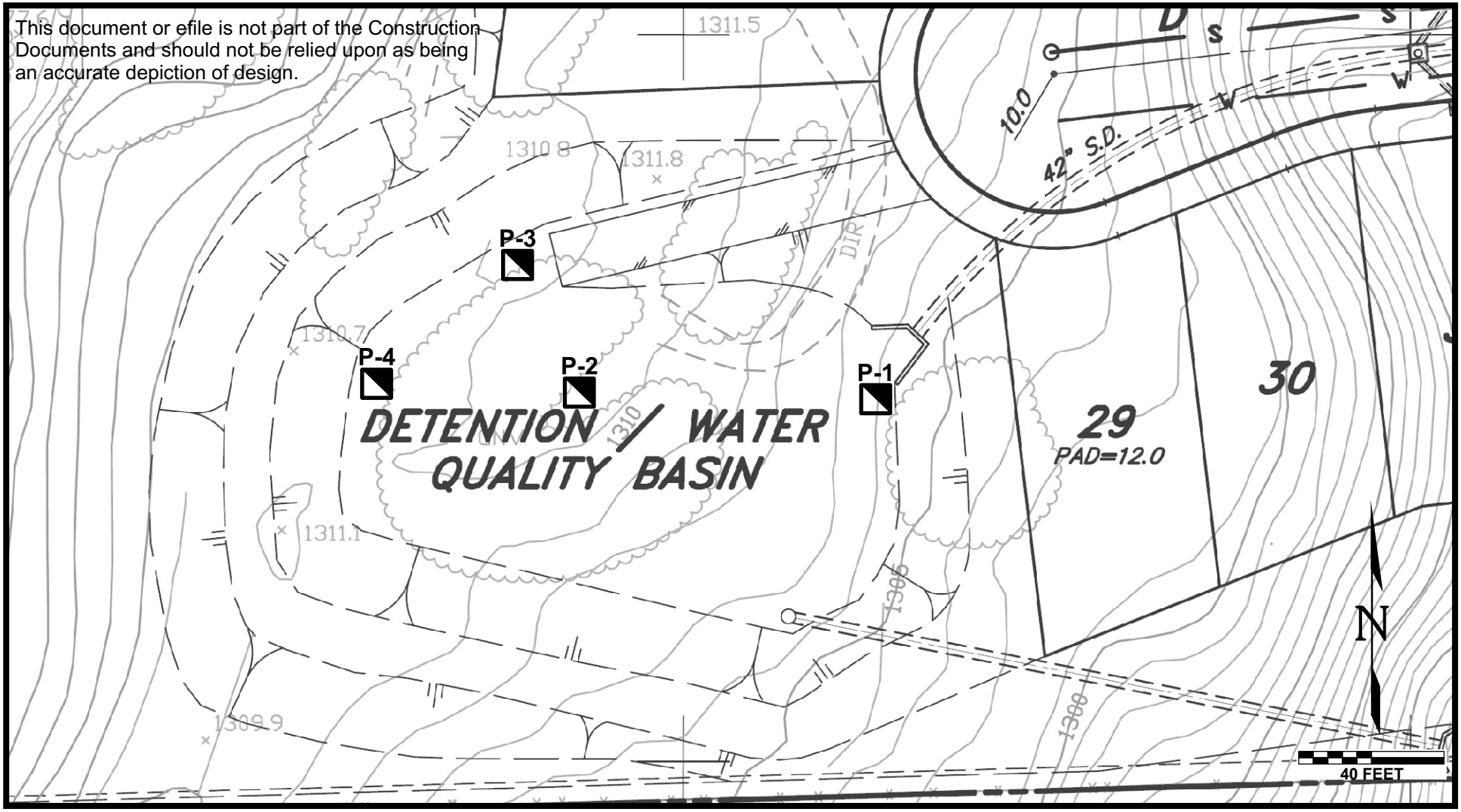
Test Holes:

1. Backhoe excavated to a depth of between 4 and 6 feet.
2. Percolation cup diameter - 8 inches.
3. After the removal of all loose material, approximately 2 inches of gravel was placed on the bottom of the excavation.
4. A perforated pipe was then installed within the percolation cup to facilitate accurate field measurements and prevent caving during testing and the pre-soak period.

Sandy Soil Test: After the installation of the perforated pipe, the percolation cup was filled to approximately ±8 inches over the gravel. Two (2) consecutive measurements were conducted at intervals of approximately 25 minutes. Less than 6 inches of water seeped away during each of the two (2) measurement intervals, therefore the pre-soak period was initiated.

Pre-Soaking: A full 5-gallon bottle of clear water was inverted over each test hole, so the test hole was filled continuously to approximately 8 inches over the gravel. The pre-soak period continued overnight, as the water did not seep away while the tester was present.

This document or efile is not part of the Construction Documents and should not be relied upon as being an accurate depiction of design.



Base Map: SB&O (2012)

ALL LOCATIONS APPROXIMATE

EXPLANATION

P-4 Location of Percolation/Infiltration Test

Property Line

GeoSoils, Inc.

TEST PIT LOCATION MAP

Figure 2

W.O. 6451-A-SC	DATE 09/12	SCALE: 1" = 40'

Testing: Percolation testing measurements were made the following day after required minimum 15-hour pre-soak period. After removal of the empty 5-gallon bottles, the drop in water level was measured from a fixed reference point, refilling to ±6 inches over the gravel after each measurement. The series of measurements were taken for a minimum of six (6) hours, at time intervals of 30 minutes. The field test results and calculated rates are provided in Appendix C.

Locations: The locations of the percolation/infiltration tests performed were chosen to correspond with anticipated location of the basin as indicated on the plans by SB&O (2012). The locations of test areas were easily identified by measurements to bounding fencing and onsite topography.

Accuracy: All test measurements were read to the nearest ¼-inch.

Test Results: Calculations from our field tests indicate percolation rates (P-1 through P-4), at a depth of between 4 and 6 feet, varying from 20 to 60 minutes/inch. As discussed previously, the percolation rates obtained were then converted to infiltration rates utilizing the Porchet Method (CRFCWCD, 2011). The converted infiltration rates obtained varied between 0.25 and 0.83 inches/hour. The converted infiltration rates for each of the test locations, along with the formulas utilized, are provided in Appendix C. For ease of review the following table also presents the percolation test results and infiltration rate conversions.

LOCATION AND DEPTH (ft.)	PERCOLATION RATE (Min./In.)	INFILTRATION RATE (In./Hr.)
P-1 @ 4'	60	0.26
P-2 @ 5'	60	0.25
P-3 @ 6'	60	0.26
P-4 @ 5'	20	0.83

CONCLUSIONS AND RECOMMENDATIONS

The above infiltration rates, may be utilized for design of the proposed BMP's, provided the bottom area of the BMP is founded entirely in native sedimentary bedrock deposits. In addition to the above, an appropriate factor of safety, per the controlling authorities requirements, should also be incorporated into the design calculations. The following comments and/or recommendations should also be considered during design (structural and civil) and implementation of any BMP system onsite:

- As with any BMP, localized ponding and groundwater seepage should be anticipated.

- Similarly, as with any BMP, proper maintenance and care will need to provided. Best management maintenance practices should be followed at all times, especially during inclement weather. Should regular inspection and/or maintenance not be performed, the potential for malfunctioning of the BMP system will increase.

- Provisions for the maintenance of any siltation, debris within the BMP, and/or overgrown vegetation (i.e., root systems) should be considered. An appropriate inspection and maintenance schedule will need to adopted and provided to all interested/affected parties.

- Any proposed utility backfill materials located within the proposed area of the BMP may become saturated. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. If utility trenches enter, cross, and/or are proposed near the BMP system, cut-off walls or other water barriers will likely need to be installed to mitigate the potential for piping and excess water entering the utility backfill materials.

- Any proposed footings and/or foundations should maintain a minimum of 1:1 horizontal to vertical (h:v) distance from the base of the footing and/or foundation to any adjacent BMP system. If a 1:1 (h:v) distance cannot be maintained, a deepened footing and/or foundation will be required.

- The landscape architect should be notified of the location of the proposed BMP system. If landscaping is proposed within the BMP, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems).

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.

- As the infiltration/percolation testing conducted for this study is very site specific, any changes to the location of the proposed BMP and/or estimated size of the BMP, should be reviewed by this office. Depending upon the nature of any changes, and the requirements of the reviewing entity, additional infiltration/percolation testing may be considered warranted.

- Final grading and improvement plans, as well as structural foundation plans, should be submitted to this office for review and comment, as they become available, to minimize any misunderstandings between the preliminary plans currently reviewed and preliminary recommendations presented herein. If project designs are found to differ substantially from those stated herein, appropriate recommendations would be offered at that time.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and field test data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

Todd A. Greer
Engineering Geologist, CEG 2377

David W. Skelly
Civil Engineer, RCE 47857

TAG/PLM/DWS/jh/tg

Enclosure: Appendix A - References
Appendix B - Test Pit Logs
Appendix C - Infiltration/Percolation Data Sheets

Distribution: (4) Addressee (2 wet signed)
(1) SB&O, Inc., Attention: Mr. Don Brookes (E-mail pdf copy)

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

Allen, V., Connerton, A., and Carlson, C., 2011, Introduction to infiltration best management practices (BMP), Contech Construction Products, Inc., professional development series, dated December.

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_____, 2005b, Supplement to phase I environmental site assessment by Ninyo & Moore, ±2.39 acres, southwest corner of Prielipp Road and Elizabeth Lane, Riverside County, California 92595, W.O. E4898-SC, dated August 5.

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SB&O, Inc., 2012, Preliminary grading plan for: Wildomar 23, scale 1"=40', dated June 13.

APPENDIX B

TEST PIT LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with	GM	Silty gravels gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands more than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, mucic, and other highly organic soils

CONSISTENCY OR RELATIVE DENSITY

CRITERIA

Standard Penetration Test

Penetration Resistance N (blows/ft)	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium
30 - 50	Dense
> 50	Very dense

Standard Penetration Test

Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (tons/ft^2)
<2	Very Soft	<0.25
2 - 4	Soft	0.25 - .050
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
>30	Hard	>4.00

3" 3/4" #4 #10 #40 #200 U.S. Standard Sieve

Unified Soil Classification	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS

Dry	Absence of moisture: dusty, dry to the touch
Slightly Moist	Below optimum moisture content for compaction
Moist	Near optimum moisture content
Very Moist	Above optimum moisture content
Wet	Visible free water; below water table

MATERIAL QUANTITY

trace	0 - 5 %
few	5 - 10 %
little	10 - 25 %
some	25 - 45 %

OTHER SYMBOLS

C Core Sample
S SPT Sample
B Bulk Sample
▼ Groundwater
Qp Pocket Penetrometer

BASIC LOG FORMAT:
Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse grained particles, etc.

EXAMPLE:
Sand (SP), fine to medium grained, brown, moist, loose, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

File:Mgr: c;\SoilClassif.wpd

PLATE B-1

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-1	1,306	0-2	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry, medium dense; blocky angular structure.
		2-4	ML				**BEDROCK - QUATERNARY PAUBA FORMATION:** SILTSTONE, pale yellow brown, damp, dense; indurated, few to some roots and rootlets, Stage II carbonate layer noted on stratigraphic top of unit.
							Total Depth = 4' No Groundwater or Caving Encountered Backfilled 9-21-12
P-2	1,310	0-2½	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry to damp, medium dense; blocky angular structure.
		2½-4½	SM/SC				**BEDROCK - QUATERNARY PAUBA FORMATION:** Clayey SANDSTONE, dark reddish brown, damp, dense; few to some roots and rootlets.
		4½-6	ML				SILTSTONE, very light gray, dry to damp, dense; indurated.
							Total Depth = 6' No Groundwater or Caving Encountered Backfilled 9-21-12

PLATE B-2

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-3	1,310	0-6"	SM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark grayish brown, dry, medium dense.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; fine to coarse grain sands, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12
P-4	1,310	0-6"	GM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark reddish brown, dry, loose.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; gravel/cobble lens noted between 3 and 4½ feet, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12

PLATE B-3

APPENDIX C

PERCOLATION/INFILTRATION DATA SHEETS

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A&C	
Test Hole No.: P-1		Date Excavated: 9/19/12	
Depth of Test Hole: 4'		Soil Classification: ML	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 9:30 AM
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	8:50 9:15	25	6"	5 1/2	1/2"
2	9:15 9:40	25	6"	5 1/2	1/2"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:40 ✓ 10:10	30 ✓	30	6 1/4"	5 3/4"	1/2"	60
	10:10 ✓ 10:40	30 ✓	60	6"	5 1/2"	1/2"	60
Second Hour	10:40 ✓ 11:10	30 ✓	90	6 1/4"	5 3/4"	1/2"	60
	11:10 ✓ 11:40	30 ✓	120	6 1/4"	5 3/4"	1/2"	60
Third Hour	11:40 12:10 ✓	30 ✓	150	6"	5 1/2"	1/2"	60
	12:10 12:40 ✓	30 ✓	180	6"	5 1/2"	1/2"	60
Fourth Hour	12:40 1:10 ✓	30 ✓	210	6"	5 1/2"	1/2"	60
	1:10 1:40 ✓	30 ✓	240	6 1/4"	5 3/4"	1/2"	60
Fifth Hour	1:40 2:10 ✓	30 ✓	270	6"	5 1/2"	1/2"	60
	2:10 2:40 ✓	30 ✓	300	6"	5 1/2"	1/2"	60
Sixth Hour	2:48 3:10	30	330	6"	5 1/2"	1/2"	60
	3:10 3:40	30	360	6"	5 1/2"	1/2"	60

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A-SC	
Test Hole No.: P-2		Date Excavated: 9/19/12	
Depth of Test Hole: 5'		Soil Classification: SM	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 10:10
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	8:55 9:20	25	6"	5 1/4	3/4"
2	9:20 9:45	25	6"	5 1/2	1/2"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:45 10:15	30	30	6"	5 1/2"	1/2"	60
	10:15 10:45	30	60	6"	5 1/2"	1/2"	60
Second Hour	10:45 11:15	30	90	6 1/4"	5 3/4	1/2"	60
	11:15 11:45	30	120	6"	5 1/2"	1/2"	60
Third Hour	11:45 12:15	30	150	6"	5 1/2"	1/2"	60
	12:15 12:45	30	180	6"	5 1/2"	1/2"	60
Fourth Hour	12:45 1:15	30	210	6 1/4"	5 3/4"	1/2"	60
	1:15 1:45	30	240	6"	5 1/2"	1/2"	60
Fifth Hour	1:45 2:15	30	270	6 1/4"	5 3/4"	1/2"	60
	2:15 2:45	30	300	6"	5 1/2"	1/2"	60
Sixth Hour	2:45 3:15	30	330	6"	5 1/2"	1/2"	60
	3:15 3:45	30	360	6 1/4"	5 3/4"	1/2"	60

Plate No. C-2

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A-SC	
Test Hole No.: P-3		Date Excavated: 9/19/12	
Depth of Test Hole: 6'		Soil Classification: ML	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 10:35AM
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	9:00 9:25	25	6½"	6"	½"
2	9:25 9:50	25	6"	5¾	¼"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:50 10:20	30	30	6"	5¾"	¼"	120
	10:20 10:50	30	60	6¼"	6"	¼"	120
Second Hour	10:50 11:20	30	90	6½"	6"	½"	60
	11:20 11:50	30	120	6¼"	5¾"	½"	60
Third Hour	11:50 12:20	30	150	6"	5½"	½"	60
	12:20 12:50	30	180	6"	5½"	½"	60
Fourth Hour	12:50 1:20	30	210	6"	5½"	½"	60
	1:20 1:50	30	240	6"	5½"	½"	60
Fifth Hour	1:50 2:20	30	270	6"	5½"	½"	60
	2:20 2:50	30	300	6¼"	5¾"	½"	60
Sixth Hour	2:50 3:20	30	330	6"	5½"	½"	60
	3:20 3:50	30	360	6"	5½"	½"	60

Leach Line Percolation Data Sheet

Project:	Lennar - Wildomar 23	W.O. Number:	6451-A-SC
Test Hole No.:	P-4	Date Excavated:	9/19/12
Depth of Test Hole:	5'	Soil Classification:	SM
Check for Sandy Soil Criteria Tested by:	TAG	Date: 9/19/12	Presoak: @ 1:15 PM
Actual Percolation Tested by:	TAG	Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	9:05 9:30	25	6"	4"	2"
2	9:30 9:55	25	6"	4 1/4"	1 3/4"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:55 10:25	30	30	6"	4 1/4"	1 3/4"	17
	10:25 10:55	30	60	6"	4 1/4"	1 3/4"	17
Second Hour	10:55 11:25	30	90	6 1/4"	4 1/2"	1 3/4	17
	11:25 11:55	30	120	6"	4 1/2"	1 1/2"	20
Third Hour	11:55 12:25	30	150	6"	4 1/2"	1 1/2"	20
	12:25 12:55	30	180	6 1/2"	4 1/2"	1 1/2"	20
Fourth Hour	12:55 1:25	30	210	6"	4 1/2"	1 1/2"	20
	1:25 1:55	30	240	6"	4 1/2"	1 1/2"	20
Fifth Hour	1:55 2:25	30	270	6"	4 1/2"	1 1/2"	20
	2:25 2:55	30	300	6 1/4"	4 3/4"	1 1/2"	20
Sixth Hour	2:55 3:25	30	330	6"	4 1/2"	1 1/2"	20
	3:25 3:55	30	360	6"	4 1/2"	1 1/2"	20

Percolation Rate to Infiltration Rate Conversion

* Infiltration Rate (I_t) = $\dfrac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \dfrac{\Delta H\ 60\ r}{\Delta t(r+H_{avg})}$

Where: I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

		Δt	Init Level	Fnl Level	ΔH	H_{avg}	I_t	
Percolation Test Numbers	P-1 @ 4 ft.	30	6	5 1/2	1/2	5 3/4	0.26	
	P-2 @ 5 ft.	30	6 1/4	5 3/4	1/2	6	0.25	Low = 0.25
	P-3 @ 6 ft.	30	6	5 1/2	1/2	5 3/4	0.26	Average = 0.40
	P-4 @ 5 ft.	30	6	4 1/2	1 1/2	5 1/4	0.83	

* Conversion per the "Porchet Method" (RCFWCD, 2010)

Plate No. C-5

23 Lennar

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Single Family Housing	67	Dwelling Unit
City Park	5	Acre

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Southern California Edison
Climate Zone	10		2.2		
		Precipitation Freq (Days)			
			31		

1.3 User Entered Comments

Off-road Equipment - Diesel-fueled construciton load factors reduced 33% to account for offroad emission overestimation. Source - California Air Resources Board. 2010. "Staff Report: Proposed Amendments to the Regulation for In-Use Off Road Diesel-Fueled Fleets and the OFFROAD Large Spark-Ignition Fleet Requirements". October 2010.

Architectural Coating - SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - SCAQMD Rule 403

Area Mitigation - SCAQMD Rule 445

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.61	4.22	2.89	0.01	0.25	0.25	0.49	0.11	0.25	0.36	0.00	469.87	469.87	0.05	0.00	470.91
2014	0.80	2.54	1.99	0.00	0.03	0.16	0.20	0.00	0.16	0.16	0.00	310.86	310.86	0.03	0.00	311.52
Total	**1.41**	**6.76**	**4.88**	**0.01**	**0.28**	**0.41**	**0.69**	**0.11**	**0.41**	**0.52**	**0.00**	**780.73**	**780.73**	**0.08**	**0.00**	**782.43**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2013	0.61	4.22	2.89	0.01	0.13	0.25	0.38	0.05	0.25	0.30	0.00	469.87	469.87	0.05	0.00	470.91
2014	0.80	2.54	1.99	0.00	0.03	0.16	0.20	0.00	0.16	0.16	0.00	310.86	310.86	0.03	0.00	311.52
Total	**1.41**	**6.76**	**4.88**	**0.01**	**0.16**	**0.41**	**0.58**	**0.05**	**0.41**	**0.46**	**0.00**	**780.73**	**780.73**	**0.08**	**0.00**	**782.43**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.74	0.02	1.47	0.00		0.00	0.07		0.00	0.07	7.12	42.69	49.81	0.02	0.00	50.61
Energy	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	285.20	285.20	0.01	0.01	286.97
Mobile	0.59	1.44	5.96	0.01	0.99	0.06	1.06	0.02	0.06	0.07	0.00	897.25	897.25	0.04	0.00	898.02
Waste						0.00	0.00		0.00	0.00	16.07	0.00	16.07	0.95	0.00	36.01
Water						0.00	0.00		0.00	0.00	0.00	44.73	44.73	0.14	0.00	48.83
Total	**1.34**	**1.59**	**7.48**	**0.01**	**0.99**	**0.06**	**1.14**	**0.02**	**0.06**	**0.15**	**23.19**	**1,269.87**	**1,293.06**	**1.16**	**0.01**	**1,320.44**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.52	0.01	1.05	0.00		0.00	0.01		0.00	0.01	0.00	45.11	45.11	0.00	0.00	45.41
Energy	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	285.20	285.20	0.01	0.01	286.97
Mobile	0.59	1.44	5.96	0.01	0.99	0.06	1.06	0.02	0.06	0.07	0.00	897.25	897.25	0.04	0.00	898.02
Waste						0.00	0.00		0.00	0.00	16.07	0.00	16.07	0.95	0.00	36.01
Water						0.00	0.00		0.00	0.00	0.00	44.73	44.73	0.14	0.00	48.83
Total	**1.12**	**1.58**	**7.06**	**0.01**	**0.99**	**0.06**	**1.08**	**0.02**	**0.06**	**0.09**	**16.07**	**1,272.29**	**1,288.36**	**1.14**	**0.01**	**1,315.24**

3.0 Construction Detail

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.09	0.00	0.09	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.03	0.27	0.15	0.00		0.01	0.01		0.01	0.01	0.00	24.55	24.55	0.00	0.00	24.61
Total	**0.03**	**0.27**	**0.15**	**0.00**	**0.09**	**0.01**	**0.10**	**0.05**	**0.01**	**0.06**	**0.00**	**24.55**	**24.55**	**0.00**	**0.00**	**24.61**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.82	0.00	0.00	0.83
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.82**	**0.82**	**0.00**	**0.00**	**0.83**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.04	0.00	0.04	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.03	0.27	0.15	0.00		0.01	0.01		0.01	0.01	0.00	24.55	24.55	0.00	0.00	24.61
Total	**0.03**	**0.27**	**0.15**	**0.00**	**0.04**	**0.01**	**0.05**	**0.02**	**0.01**	**0.03**	**0.00**	**24.55**	**24.55**	**0.00**	**0.00**	**24.61**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.82	0.00	0.00	0.83
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.82**	**0.82**	**0.00**	**0.00**	**0.83**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.12	0.00	0.12	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.14	1.15	0.62	0.00		0.05	0.05		0.05	0.05	0.00	115.92	115.92	0.01	0.00	116.15
Total	**0.14**	**1.15**	**0.62**	**0.00**	**0.12**	**0.05**	**0.17**	**0.06**	**0.05**	**0.11**	**0.00**	**115.92**	**115.92**	**0.01**	**0.00**	**116.15**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.21	3.21	0.00	0.00	3.21
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.21**	**3.21**	**0.00**	**0.00**	**3.21**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.05	0.00	0.05	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.14	1.15	0.62	0.00		0.05	0.05		0.05	0.05	0.00	115.92	115.92	0.01	0.00	116.15
Total	**0.14**	**1.15**	**0.62**	**0.00**	**0.05**	**0.05**	**0.10**	**0.03**	**0.05**	**0.08**	**0.00**	**115.92**	**115.92**	**0.01**	**0.00**	**116.15**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.21	3.21	0.00	0.00	3.21
Total	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.21**	**3.21**	**0.00**	**0.00**	**3.21**

3.4 Building Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.41	2.68	1.87	0.00		0.18	0.18		0.18	0.18	0.00	286.97	286.97	0.03	0.00	287.66
Total	**0.41**	**2.68**	**1.87**	**0.00**		**0.18**	**0.18**		**0.18**	**0.18**	**0.00**	**286.97**	**286.97**	**0.03**	**0.00**	**287.66**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.11	0.07	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	16.85	16.85	0.00	0.00	16.86
Worker	0.01	0.01	0.15	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	21.55	21.55	0.00	0.00	21.58
Total	**0.02**	**0.12**	**0.22**	**0.00**	**0.04**	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**38.40**	**38.40**	**0.00**	**0.00**	**38.44**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.41	2.68	1.87	0.00		0.18	0.18		0.18	0.18	0.00	286.97	286.97	0.03	0.00	287.66
Total	**0.41**	**2.68**	**1.87**	**0.00**		**0.18**	**0.18**		**0.18**	**0.18**	**0.00**	**286.97**	**286.97**	**0.03**	**0.00**	**287.66**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.11	0.07	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	16.85	16.85	0.00	0.00	16.86
Worker	0.01	0.01	0.15	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	21.55	21.55	0.00	0.00	21.58
Total	**0.02**	**0.12**	**0.22**	**0.00**	**0.04**	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**38.40**	**38.40**	**0.00**	**0.00**	**38.44**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.33	2.20	1.64	0.00		0.14	0.14		0.14	0.14	0.00	254.76	254.76	0.03	0.00	255.32
Total	**0.33**	**2.20**	**1.64**	**0.00**		**0.14**	**0.14**		**0.14**	**0.14**	**0.00**	**254.76**	**254.76**	**0.03**	**0.00**	**255.32**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.09	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	15.00	15.00	0.00	0.00	15.01
Worker	0.01	0.01	0.12	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.00	18.80	18.80	0.00	0.00	18.82
Total	**0.02**	**0.10**	**0.18**	**0.00**	**0.03**	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**33.80**	**33.80**	**0.00**	**0.00**	**33.83**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.33	2.20	1.64	0.00		0.14	0.14		0.14	0.14	0.00	254.76	254.76	0.03	0.00	255.32
Total	**0.33**	**2.20**	**1.64**	**0.00**		**0.14**	**0.14**		**0.14**	**0.14**	**0.00**	**254.76**	**254.76**	**0.03**	**0.00**	**255.32**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.01	0.09	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	15.00	15.00	0.00	0.00	15.01
Worker	0.01	0.01	0.12	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.00	18.80	18.80	0.00	0.00	18.82
Total	**0.02**	**0.10**	**0.18**	**0.00**	**0.03**	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**	**0.00**	**33.80**	**33.80**	**0.00**	**0.00**	**33.83**

3.5 Paving - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.04	0.22	0.14	0.00		0.02	0.02		0.02	0.02	0.00	17.95	17.95	0.00	0.00	18.01
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.04**	**0.22**	**0.14**	**0.00**		**0.02**	**0.02**		**0.02**	**0.02**	**0.00**	**17.95**	**17.95**	**0.00**	**0.00**	**18.01**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	1.35	0.00	0.00	1.35
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.35**	**1.35**	**0.00**	**0.00**	**1.35**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.04	0.22	0.14	0.00		0.02	0.02		0.02	0.02	0.00	17.95	17.95	0.00	0.00	18.01
Paving	0.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.04**	**0.22**	**0.14**	**0.00**		**0.02**	**0.02**		**0.02**	**0.02**	**0.00**	**17.95**	**17.95**	**0.00**	**0.00**	**18.01**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	1.35	0.00	0.00	1.35
Total	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.35**	**1.35**	**0.00**	**0.00**	**1.35**

3.6 Architectural Coating - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.41					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56

Total	**0.41**	**0.03**	**0.02**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**2.55**	**2.55**	**0.00**	**0.00**	**2.56**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.00	0.00	0.45
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.45**	**0.45**	**0.00**	**0.00**	**0.45**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.41					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.03	0.02	0.00		0.00	0.00		0.00	0.00	0.00	2.55	2.55	0.00	0.00	2.56
Total	**0.41**	**0.03**	**0.02**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**2.55**	**2.55**	**0.00**	**0.00**	**2.56**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.00	0.00	0.45
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.45**	**0.45**	**0.00**	**0.00**	**0.45**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.59	1.44	5.96	0.01	0.99	0.06	1.06	0.02	0.06	0.07	0.00	897.25	897.25	0.04	0.00	898.02
Unmitigated	0.59	1.44	5.96	0.01	0.99	0.06	1.06	0.02	0.06	0.07	0.00	897.25	897.25	0.04	0.00	898.02
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	7.95	7.95	7.95	16,972	16,972
Single Family Housing	641.19	675.36	587.59	1,813,173	1,813,173
Total	649.14	683.31	595.54	1,830,145	1,830,145

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
City Park	9.50	7.30	7.30	33.00	48.00	19.00
Single Family Housing	10.80	7.30	7.50	40.20	19.20	40.60

5.0 Energy Detail

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	140.31	140.31	0.01	0.00	141.19
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	140.31	140.31	0.01	0.00	141.19
NaturalGas Mitigated	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	144.89	144.89	0.00	0.00	145.77
NaturalGas Unmitigated	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	144.89	144.89	0.00	0.00	145.77
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family Housing	2.71516e+006	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	144.89	144.89	0.00	0.00	145.77
Total		**0.01**	**0.13**	**0.05**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**144.89**	**144.89**	**0.00**	**0.00**	**145.77**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
City Park	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family Housing	2.71516e+006	0.01	0.13	0.05	0.00		0.00	0.01		0.00	0.01	0.00	144.89	144.89	0.00	0.00	145.77
Total		**0.01**	**0.13**	**0.05**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**144.89**	**144.89**	**0.00**	**0.00**	**145.77**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
City Park	0					0.00	0.00	0.00	0.00
Single Family Housing	482388					140.31	0.01	0.00	141.19
Total						**140.31**	**0.01**	**0.00**	**141.19**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
City Park	0					0.00	0.00	0.00	0.00
Single Family Housing	482388					140.31	0.01	0.00	141.19
Total						**140.31**	**0.01**	**0.00**	**141.19**

6.0 Area Detail

6.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.52	0.01	1.05	0.00		0.00	0.01		0.00	0.01	0.00	45.11	45.11	0.00	0.00	45.41
Unmitigated	0.74	0.02	1.47	0.00		0.00	0.07		0.00	0.07	7.12	42.69	49.81	0.02	0.00	50.61
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.05					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.22	0.01	0.42	0.00		0.00	0.07		0.00	0.07	7.12	41.03	48.14	0.02	0.00	48.91
Landscaping	0.03	0.01	1.05	0.00		0.00	0.01		0.00	0.01	0.00	1.67	1.67	0.00	0.00	1.70
Total	**0.74**	**0.02**	**1.47**	**0.00**		**0.00**	**0.08**		**0.00**	**0.08**	**7.12**	**42.70**	**49.81**	**0.02**	**0.00**	**50.61**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.05					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	43.44	43.44	0.00	0.00	43.71
Landscaping	0.03	0.01	1.05	0.00		0.00	0.01		0.00	0.01	0.00	1.67	1.67	0.00	0.00	1.70
Total	**0.52**	**0.01**	**1.05**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**45.11**	**45.11**	**0.00**	**0.00**	**45.41**

7.0 Water Detail

7.1 Mitigation Measures Water

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					44.73	0.14	0.00	48.83
Unmitigated					44.73	0.14	0.00	48.83

Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
City Park	0 / 5.95741					19.25	0.00	0.00	19.37
Single Family Housing	4.36532 / 2.75205					25.48	0.13	0.00	29.46
Total						**44.73**	**0.13**	**0.00**	**48.83**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
City Park	0 / 5.95741					19.25	0.00	0.00	19.37
Single Family Housing	4.36532 / 2.75205					25.48	0.13	0.00	29.46
Total						**44.73**	**0.13**	**0.00**	**48.83**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					16.07	0.95	0.00	36.01

Unmitigated					16.07	0.95	0.00	36.01
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
City Park	0.43					0.09	0.01	0.00	0.20
Single Family Housing	78.72					15.98	0.94	0.00	35.81
Total						**16.07**	**0.95**	**0.00**	**36.01**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
City Park	0.43					0.09	0.01	0.00	0.20
Single Family Housing	78.72					15.98	0.94	0.00	35.81
Total						**16.07**	**0.95**	**0.00**	**36.01**

UPDATE PHASE I ENVIRONMENTAL SITE ASSESSMENT
AREAS CURRENTLY PROPOSED TO BE DEVELOPED AT
36630 ESTES PARK COURT
AND 36605 AND 36625 ELIZABETH LANE
APNS 380-280-004, 380-280-009, 380-280-010
380-280-011, AND 380-280-012
RIVERSIDE COUNTY, CALIFORNIA 92595

FOR

LENNAR HOMES OF CALIFORNIA, INC.
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879

W.O. E6451-SC SEPTEMBER 28, 2012

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301 • www.geosoilsinc.com

September 28, 2012

W.O. E6451-SC

Lennar Homes - Inland Division
980 Montecito Drive, Suite 302
Corona, California 92879

Attention: Ms. Jarnne Valdez

Subject: Update Phase I Environmental Site Assessment, Areas Currently Proposed to Be Developed at 36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane, APNs 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012, Riverside County, California 92595

Dear Ms. Valdez:

Pursuant to your request and authorization, GeoSoils, Inc. (GSI) is pleased to present the results of our update Phase I Environmental Site Assessment (ESA) for the subject property areas currently proposed to be developed. At your request, GSI has updated the previous referenced ESA report for the site area by Ninyo & Moore ([NM] 2004) and supplement report by GSI (2005b [see Appendix A]), as it pertains to the proposed residential development of the site in the City of Wildomar, Riverside County, California 92595. This study was conducted for the purpose of reassessing, to the extent practical, the potential for the presence of hazardous materials/waste and/or petroleum contamination at the subject site.

Please note that GSI has performed this update Phase I ESA in general conformance with the scope and limitations of ASTM Practice E 1527-05. This practice is intended, by the ASTM Committee E 50, to be a general guideline standard and utilized on a voluntary basis. Any major exceptions to, or deletions from, this practice are described in the relevant sections of this report. Unless specifically superceded herein, the conclusions and recommendations contained in GSI's previous reports for the site (see Appendix A), remain pertinent and applicable, and should be appropriately implemented.

SUMMARY

Based upon the information obtained during the course of this evaluation, GSI presents the following summary of our findings:

- Based upon our review of historic land use utilizing readily available maps and historical aerial photographs, a review of the referenced ESA reports and geotechnical report for the site area by NM (2004) and GSI (2005a and 2005b), and our recent site reconnaissance, the subject site appears to have been generally vacant and undeveloped from at least 1938 until at least 1980. According to our review (NM, 2004), three (3) residential structures were built sometime in the early- to mid-1980's and two (2) water wells and an associated above ground storage tank (AST) were previously observed onsite. During this time period the residential structures utilized septic systems (NM, 2004). Based on their review, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) and lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review. During our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance.

- Minor trash and demolition debris (i.e., residential debris, concrete, and lumber) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. NM (2004) indicated that two (2) transformers were located onsite, based on our recent reconnaissance of the site, the two (2) transformers indicated by NM (2004) have been subsequently removed from the site. The previous septic systems may still exist in the locations of the former structures.

- There was no significant visible surficial staining on the property; however, the trash/demolition debris was not disturbed. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination. With the exception of the potential for septic tank (systems) to remain in the location(s) of the demolished structures, there was no evidence of underground storage tanks (UST's) observed and no AST's were observed on the subject property at the time of our recent site reconnaissance.

- Properties adjacent to, and surrounding, the site currently consist of vacant undeveloped land to the north, the Gables Oak Creek Apartments to the east,

residential development (Tract 23051) to the south-southeast, and rural residential properties to the west of the project site. These properties are not anticipated to represent a significant environmental concern to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are and have been followed.

- Based upon field measurements taken from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. Minor water seepage was encountered in some of the excavations along the alluvium/bedrock contact within drainage areas during our previous geotechnical study (GSI, 2005a). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction generally following site drainage patterns and topography.

- Based upon our updated review of agency database records search, there are no listings of permitted above-ground and/or underground tanks on the subject property. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste for the subject site.

  There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i.e., generates more than 1,000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

  There is one (1) unmapped risk site reported in the database search, due to insufficient information. The unmapped site, Bureau of Indian Affairs-Tribal Land with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location.

- There does not appear to be a documented and/or reported commercial or industrial facility, or a municipal landfill, within a 1-mile radius of the site that represents a significant environmental concern to the subject site.

- No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

- This assessment has revealed no evidence of significant recognized environmental conditions in connection with the property.

Based upon the scope of work completed, GSI concludes that the overall potential for significant amounts of hazardous materials/waste and/or petroleum contamination onsite is low: the uncertainty of potential environmental concerns cannot be eliminated. This assessment has revealed no visual evidence of recognized environmental conditions associated with the subject site other than the aforementioned. Based upon the information obtained during the course of our recent assessment, pursuant to the limitations set forth in the text of this report, the site is considered acceptable for the proposed residential use, provided the following mitigation measures are properly implemented during planning, design, and construction.

- Based on the historic property use, septic tanks (systems) may exist on the property. Although not considered a hazardous waste, any buried septic systems should be properly removed or abandoned following health department guidelines.

- Any remaining trash, debris, and waste materials should be disposed of offsite, in accordance with current local, state, and federal disposal regulations. Any materials containing petroleum residues encountered during property improvements should be evaluated prior to removal and disposal, following proper procedures. Any buried trash/debris encountered should be evaluated by an experienced environmental consultant prior to removal.

- Due to the demolition and removal of previous onsite structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- The three (3) wells located within areas of proposed development should be properly abandoned following City, County, and State guidelines.

- Based upon the information collected by GSI during this update environmental site assessment, further studies or action, other than the above, are not proposed from an environmental viewpoint, at this time.

Please note, we have performed this update Phase I Environmental Site Assessment for the subject property in general conformance with the scope and limitations of ASTM Practice E 1527-05. This practice is intended, by the ASTM Committee E 50, to be a general guideline standard and used on a voluntary basis. Any major exceptions to, or deletions from, this practice are described in the relevant sections of this report.

GSI declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. We have developed and performed all the appropriate inquiries in general conformance with the standards and practices set forth in 40 CFR Part 312. Resumes of GSI personnel who worked on this project are included in Appendix D.

If you have any questions pertaining to this report or any other matter, please do not hesitate to call us at (951) 677-9651. We appreciate the opportunity to be of service to you.

Respectfully submitted,

GeoSoils, Inc.

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ATTACHMENTS:

Appendix A - References. . . . . Rear of Text
Appendix B - Site Photographs. . . . . Rear of Text
Appendix C - Agency Records Search, Interview, Aerial Photographs, and Pertinent GSI Reports (Provided as CD Data Disc). . . . . Rear of Text
Appendix D - Resumes of GSI Personnel. . . . . Rear of Text

UPDATE PHASE I ENVIRONMENTAL SITE ASSESSMENT
AREAS CURRENTLY PROPOSED TO BE DEVELOPED AT
36630 ESTES PARK COURT
AND 36605 AND 36625 ELIZABETH LANE
APNS 380-280-004, 380-280-009, 380-280-010
380-280-011, AND 380-280-012
RIVERSIDE COUNTY, CALIFORNIA 92595

INTRODUCTION

Purpose and Scope

In accordance with our proposal and Client's authorization, GeoSoils, Inc. (GSI) has completed this update Phase I Environmental Site Assessment (ESA) covering the subject site areas proposed for development, the location of which is generally illustrated on Figure 1 (Site Location Map). The subject property (including areas not proposed for development) is described as:

36630 Estes Park Court, and 36605 and
36625 Elizabeth Lane, APNS 380-280-004
380-280-009, 380-280-010, 380-280-011, and
380-280-012, Riverside County, California 92595

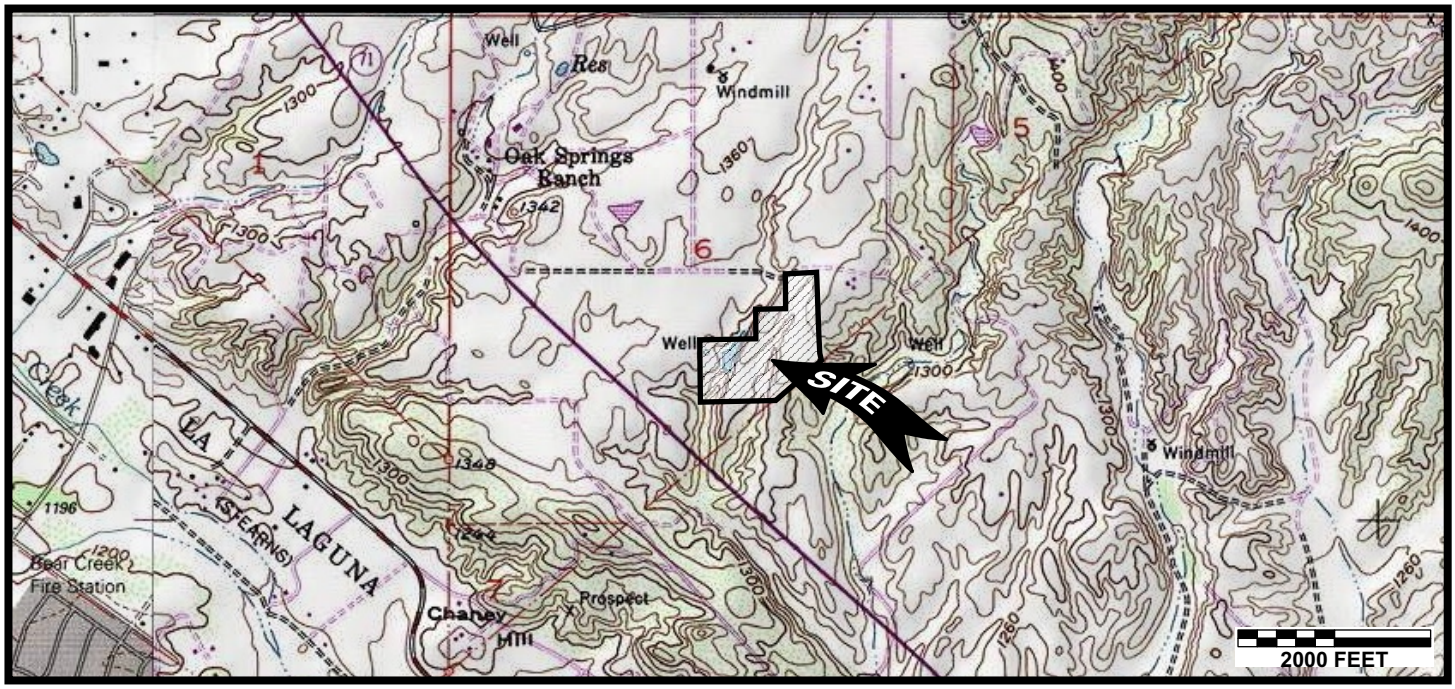
This update ESA was prepared for the purpose of assessing, to the extent practical, the potential for *recognized environmental conditions* from past or present uses at the subject property. A *recognized environmental condition* is defined by ASTM Standard E 1527-05 as:

> *The presence or likely presence, of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include "de minimis" conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.*

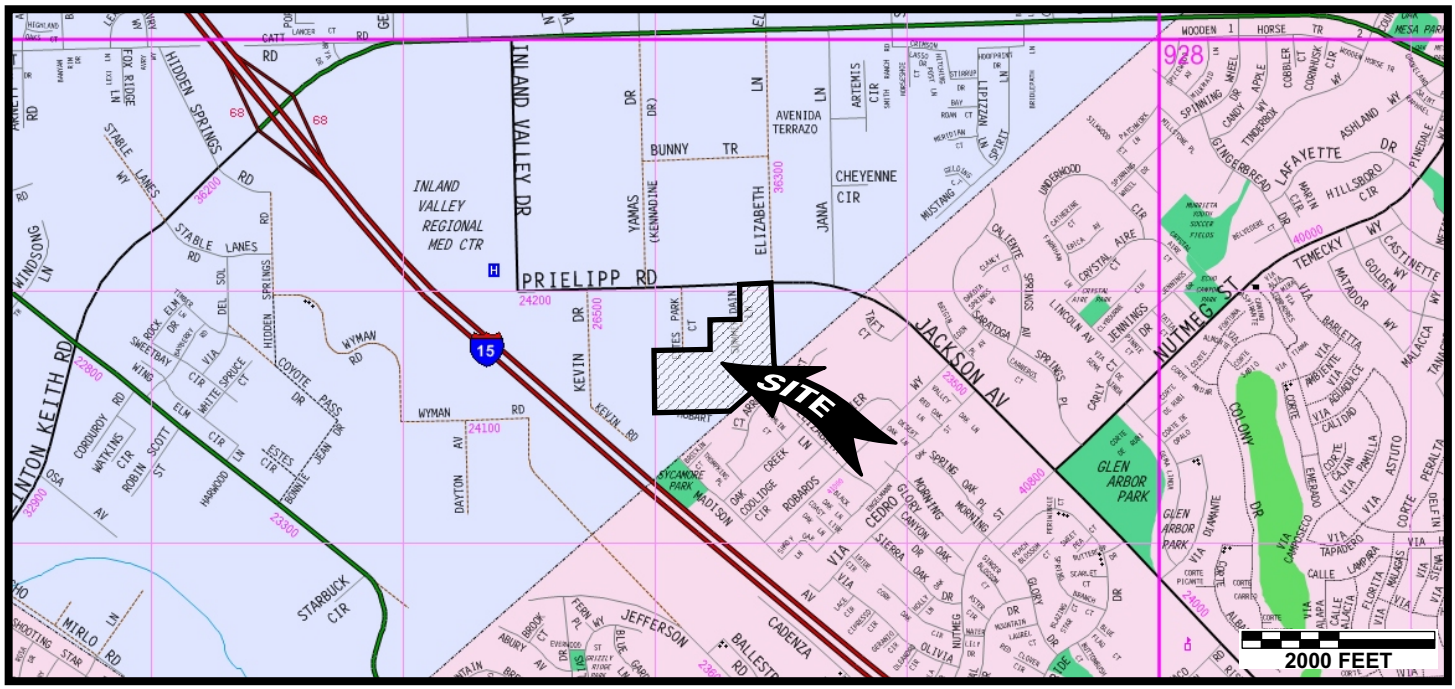
The scope of work included:

1. A review of previous environmental and geotechnical reports for the site, and available geologic and environmental documents (see Appendix A [listing]);

2. A reconnaissance of the subject property and surrounding areas to visually assess current utilization, and for indications of potential surface contamination (see Appendix B);



Base Map: TOPO!® ©2007 National Geographic, U.S.G.S. Wildomar and Murrieta Quadrangles, California, Orange Co., 7.5 Minute, dated 1997 and 1976, respectively, photorevised 1979 (Murrieta).



Base Map: The Thomas Guide, Riverside & San Bernardino Counties, Digital Street Guide and Directory, 2008 Edition, by Thomas Bros. Maps, pages 927 and 928.

ALL LOCATIONS APPROXIMATE

N

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GeoSoils, Inc.

SITE LOCATION MAP

Figure 1

Wildomar 23

APNs 380-280-004, -009, -010, -011, -012

W.O. E6451-SC	DATE 09/12	SCALE: 1" = 2,000

3. A review of government database documents (see Appendix C, in PDF on disc only [pertinent reports are also included in Appendix C as PDF]) concerning available environmental information for the subject property; and,

4. Preparation of this report, which presents the findings of this study and presents GSI's conclusions and recommendations.

Limitations and Exceptions

This study does not include any of the following:

- Geotechnical evaluation of the subject property;
- Direct interviews with Governmental Agencies;
- Water and/or soil sampling and analyses;
- Identification or evaluation of wetlands or inaccessible areas;
- Consideration of possible future contamination of the subject property from adjacent or surrounding facilities or properties; and,
- Asbestos, radon gas, mold, lead paint, methane, electromagnetic, sludge, or biologic evaluation(s).

Special Terms and Conditions

This report is intended for the use of the Client (Lennar Homes). This report is based upon field conditions observed during our reconnaissance of the site on September 18, 2012. Site conditions may change from time to time, in response to natural and human-made conditions. The contents should not be relied upon by any party other than the aforementioned without the express written consent of GSI.

This report does not consider possible future contamination of the subject property from adjacent or surrounding facilities or properties or additional unauthorized dumped debris. All judgments concerning adjoining properties apply only to conditions observed during the time of the on-site reconnaissance.

SITE DESCRIPTION AND RECONNAISSANCE OBSERVATIONS

Site/Project Description

The project area consists of roughly ±23.2 acres of relatively gently rolling hillside terrain located at 36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane, APNs 380-280-004, -009, -010, -011, and -012, Riverside County, California 92595 (see Figure 1, Site Location Map); however, this Phase I ESA only covers the area currently proposed for development. The irregular-shaped property consists of several combined rural residential parcels. Based on our review, some grading/earthwork was previously

performed to create the building pads for the previous onsite structures, roadways, and ponds. However, the exact nature of any such old earthwork is not readily apparent, as the previous residences have been demolished and the remaining "improvements" generally consist of old foundations, concrete slabs, fence lines, block walls, and trees/vegetation. Topographically the site is dominated by gently rolling hillside terrain with elevations generally decreasing from north to south-southwest, ranging from ±1,347 feet Mean Sea Level (MSL) to ±1,282 feet (in areas proposed for development), for a total relief of approximately ±65 feet. Drainage is generally to the southwest and is accommodated by two (2) relatively thin and gentle- to steep-sided drainage channels. Vegetation consists of chaparral and other native shrubs and grasses, with scattered trees within the drainage channels and associated with previous dwellings onsite.

Proposed Development

Based on our review (NM, 2004; and GSI, 2005a and 2005b), previous development plans for the project included at least 16 three-story multi-family apartment building pads. Based on our cursory review of current site development plans by SB&O (2012), GSI understands that the project is now proposed for single-family residential construction of 67 building pads, a detention/infiltration basin, a park site, along with associated interior roadways, and underground utility improvements. We further understand that the buildings are proposed as slab-on-grade one- and/or two-story structures, with typical foundations, utilizing wood frame-type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system.

Observational Reconnaissance

Onsite Reconnaissance

On September 18, 2012, a GSI representative (Mr. Greer) visited the subject property to assess current site utilization and observe for signs of possible surface contamination. Pertinent features observed during the site reconnaissance are described below and illustrated on the Site Map (see Figure 2). Photographs of the subject property are presented in Appendix B.

Overall, general site conditions, as observed on September 18, 2012, were found to be quite different to that described in the previous Phase I ESA report by NM (2004) and supplement report by GSI (2005b). Based upon our most recent site reconnaissance, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Minor trash and demolition materials (i.e., residential debris, concrete, lumber, etc.) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site

TRACT 36497

IN THE CITY OF WILDOMAR, COUNTY OF RIVERSIDE, CA.

PARCEL MAP 9637
PM 58/1-5
PAR. 3

PARCEL MAP 12214
PM 58/1-5
PAR. 4

YAMAS DR.

Power Lines

PRIELIPP ROAD

ESTES PARK CT.

PM 11793
PM 67/44
PAR. 1

N.A.P.

SUMMER DAIN LANE

ELIZABETH LANE

RECORD OF SURVEY 25/62 PAR. 7

GABLE OAK CREEK APARTMENTS

1 2 3 4

"E" STREET

8 7 6 5

Trash/Debris

9 10 11 12

PARCEL MAP 12214
PM 67/44
PAR. 2

PARK

RURAL RESIDENTIAL

"A" STREET

67

Concrete Foundation/Slabs

16 15 14 13

17

18

19

20

21

22

23

24

25

26 27

Lumber/Debris

28

LOT "K"

29

Backfilled Pool

30

31

32

33

34

35

36

37

38

39

40

CITY OF MURRIETA

CITY OF WILDOMAR

PARCEL MAP 12214
PM 67/44
PAR. 1

N.A.P.

PARCEL MAP 12214
PM 67/44
PAR. 2

N.A.P.

WENTWORTHS SUBDIVISION
MB 14/864
LOT 9

INACCESSIBLE / HEAVY BRUSH

OPEN SPACE LOT "L"

"B" STREET

"C" STREET

"D" STREET

61 62 63

Lumber/Debris

60

59

58

57

56

54

Clay Roofing Tile

53

52

51

50

49

48

47

46

Concrete Foundation/Slabs

Old Boat Dock

45

44

43

42

41

40

39

38

37

36

35

34

31

Trash/Debris

DETENTION / WATER QUALITY BASIN
LOT "I"

Trash/Debris

LOT "J"

TRACT NO. 23329
MB 233/8-13

SINGLE FAMILY RESIDENTIAL
TRACT 23051

PARCEL MAP 11793
PM 61/38
PAR. 1

VACANT LAND

N.A.P.

PARCEL MAP 11793
PM 61/38
PAR. 2

GSI LEGEND

- Project Boundary
- Location of Well (Identified this Study)
- Location of Well (Ninyo & Moore [NM, 2004])
- N.A.P. – Not a Part of This Study

ALL LOCATIONS ARE APPROXIMATE

This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

SCALE: 1" = 150'

GRAPHIC SCALE

150' 0 150' 300' 450'

GeoSoils, Inc.

SITE MAP

Figure 2

W.O. E6451-SC	DATE: 10/13	SCALE: 1" = 150'

FILE NAME: Z:\AUTOCAD FILES\6400\E6451 LENNAR WILDOMAR 23\E6451-SC – SITE MAP – FIGURE 2 – 11X17 (2).DWG, PLOTTED BY: AUTO ON 10/2/2013 5:34 PM

(Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. Septic systems may exist in the locations of the former structures. There was no significant visible surficial staining on the property. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination; however, the trash/debris, etc., was not disturbed.

- **Buildings on Property and General Usage -** No buildings or other temporary structures were observed onsite; however, remnants of former residential concrete slabs were observed, as indicated previously. The subject ±23.2 acre site is currently vacant and generally unimproved. Unusual activity was not noted onsite.

- **Storage Tanks -** There were no "Underground Storage Tank" (UST) or "Aboveground Storage Tank" (AST) listings onsite referenced in our agency records review (see Appendix C [provided on the CD data disc as PDF]). With the exception of the potential for septic tank (systems) in the location(s) of the demolished structures, our field observations indicated that there are no obvious signs of under- or aboveground storage tanks.

- **Chemical Storage -** There were no indications of chemical storage areas onsite.

- **Potential Sources of Polychlorinated Biphenyls (PCBs) -** As discussed previously, power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. Previous discussions with representatives of Southern California Edison (SCE) has indicated that the likelihood of transformers containing high concentrations of PCBs is extremely low, and should any leaks develop, it should be their responsibility to clean up the area. Other than those items mentioned above, observation of the property does not yield any equipment onsite that would be considered a significant source of PCBs.

- **Electromagnetic Evaluation -** As discussed above, power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site. An evaluation of electric and magnetic fields (EMF) onsite is beyond this current scope of work. However, based upon a public information booklet by a southern California power company, the magnetic field from transmission lines get weaker with distance. Magnetic fields are reported to vary from 1 to 300 milliGauss (mG) at the edge of a right-of-way. For comparison purposes, magnetic fields range from 0.1 mG to 8 mG on microwave ovens or televisions at a distance of 39 inches. Although there is some speculation that EMFs represent a risk to human health, medical and scientific research has yet to determine exposure levels related to health risks. Studies (to date) have been inconclusive as to the possible dangers from EMFs. Additional information is available from Southern California Edison

(SCE), the United States Environmental Protection Agency, The National Academy of Sciences and/or the American Medical Association.

- **Utility Structures, Roads, Disposal Systems, Water Wells -** Access to the site is by Elizabeth Lane. A paved interior driveway leads to the remains of the foundations/slabs from the demolished structures. Several dirt roadways transect the site. Underground utilities were not noted onsite. As indicated above, our field observations indicated that there are no other obvious signs of structures onsite. Septic systems may exist in the locations of the former structures. It is our understanding that after construction, the site will be served by municipal storm drain, water, and sewer service. As indicated previously, during our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance. The locations of wells observed, are illustrated on the Site Map (see Figure 2).

- **Environmental Releases and Spills -** Unusual or significant surface staining (i.e., spills and/or releases) were not noted on the subject property by GSI during our site reconnaissance.

- **Asbestos -** Evaluation of the presence of asbestos onsite is beyond the scope of this current study. Previously, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site by representatives of US Bank, ostensibly following proper protocol. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- **Lead Paint -** Evaluation of the presence of lead paint on the site is beyond the scope of this current study. Previously, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site by representatives of US Bank, again ostensibly following proper protocol. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of

residual LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- **Radon -** A detailed radon survey was not a part of this update ESA; however, the potential for radon gas accumulation is generally low in southern California. A recent publication by the American Society of Testing and Materials (ASTM) suggests that the pacific coastal range areas are expected to have a low to moderate radon potential. In addition, a study reported by the Los Angeles Times (Nagda, 1994) and California Environmental Protection Agency (CEPA) suggested a very localized geographic radon problem within the state. California school officials found virtually no elevated radon levels in public schools (Nagda, 1994). Because of this, and due to the generally mild climate in southern California and the nature of standard building industry construction techniques in southern California (i.e., vapor barriers under slabs), the potential for radon gas accumulation is not considered a significant environmental threat to the planned development.

  In 1990, the State of California (1990) conducted a radon survey in the state. The results of the survey indicate that for the 182 samples obtained in Region 9, which included Los Angeles, Riverside, San Bernardino, Orange, San Diego and Imperial Counties, the arithmetic mean radon levels were 0.6 pCi/l. This average total is below the radon action level of 4 pCi/l.

Border Zone Reconnaissance

Adjacent property use is as follows:

- The property to the north side of the project consists of vacant land.

- The property to the east side of the project consists of the Gables Oak Creek Apartments.

- The property to the south-southeast side of the project consists of single-family residential housing (Tract 23051).

- The property to the west of the project consists of vacant land and rural residential properties.

There are no adverse uses observed on properties surrounding the subject site that appear to be contributing significant hazardous waste/materials and/or petroleum contamination to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are, and have been followed.

Photographic Record

Representative color photographs have been taken of the current site conditions observed during our reconnaissance. These photographs are presented in Appendix B.

LOCAL GEOLOGIC AND HYDROGEOLOGIC SETTING

Geology

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges (Weber, 1977). It is characterized by steep, elongated mountain ranges and valleys that trend northwestward. The mountain ranges are underlain by basement rocks consisting of pre-Cretaceous metasedimentary rocks, Jurassic metavolcanic rocks, and Cretaceous plutonic rocks of the southern California batholith.

Bedrock in the region has been faulted and fractured by both strike-slip and compressional northwest-trending faults, which are related to the San Andreas transform-fault system. Some of these fault zones have remained active to the present time, including the nearby Elsinore and San Jacinto fault zones. Our review of published maps (Bryant and Hart, 2007) and the Riverside County Land Information System (RCLIS, 2012), indicate no known active faults are located onsite.

Site Geology

The site may be characterized as being underlain by Pleistocene-age sedimentary bedrock deposits assigned to the Pauba Formation (Kennedy and Morton, 2003). The bedrock deposits onsite are locally mantled by relatively thin layers of artificial fill, colluvium/topsoil, and younger alluvial deposits within the minor canyon areas. As described by Kennedy and Morton (2003), the bedrock deposits are generally well-indurated, cross-bedded sandstones and siltstones containing sparse cobble- to boulder-sized conglomerate beds. At depth, the sedimentary bedrock deposits encountered during this study were generally observed to be varying hues of reddish brown silty sands and sandy silts, with locally occasional discontinuous layers or lenses of cobble- to boulder-sized clasts.

Hydrogeology

The subject property is located within the Wildomar Subarea (HSA 2.31) of the Murrieta Hydrologic Area (HA 2.30) of the Santa Margarita Hydrologic Unit (California Regional Water Quality Control Board - San Diego Region, 1994). The Santa Margarita Hydrologic Unit falls within Region 9 (San Diego Region) of the State of California Regional Water Quality Control Board (CRWQCB) Hydrologic Basin Planning Area (SA 9.00). Groundwater within this subarea is designated as having beneficial uses for municipal and domestic

supply, agricultural supply, and industrial process supply (CRWQCB, 1994). As discussed previously, three (3) wells were observed within areas proposed for development.

Based upon field measurements taken from onsite wells and a review of the CDWR, Water Data Library (2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction, generally following site drainage patterns and topography (see Figure 3, Groundwater Gradient Map). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock, especially during the rainy season.

RESULTS OF SITE HISTORICAL REVIEW

Discussions with Persons Familiar with Site

Ms. Jarnne Valdez (current property owners representative) was interviewed on September 25, 2012, by a representative of GSI. The interview included the Transaction Screen Questionnaire in accordance with ASTM excerpt of E1528-96: *Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process*. A copy of the interview is included in Appendix C and highlights of the interview are summarized below. According to Ms. Valdez, and based on previous reports for the project (NM, 2004; and GSI, 2005a and 2005b) the property was previously owned by Cameo Homes. It is currently unknown when Cameo Homes purchased the property. Ms. Valdez did not have any knowledge about environmental liens against the property. In addition, to the best of Ms. Valdez's knowledge, there have never been environmental site assessments of the property that indicated the presence of hazardous substances or petroleum product contamination of the property, other than the conditions provided in the previous Phase I ESA for the property by NM (2004) and supplement by GSI (2005a).

Summary of Historical Maps and Aerial Photographs Review

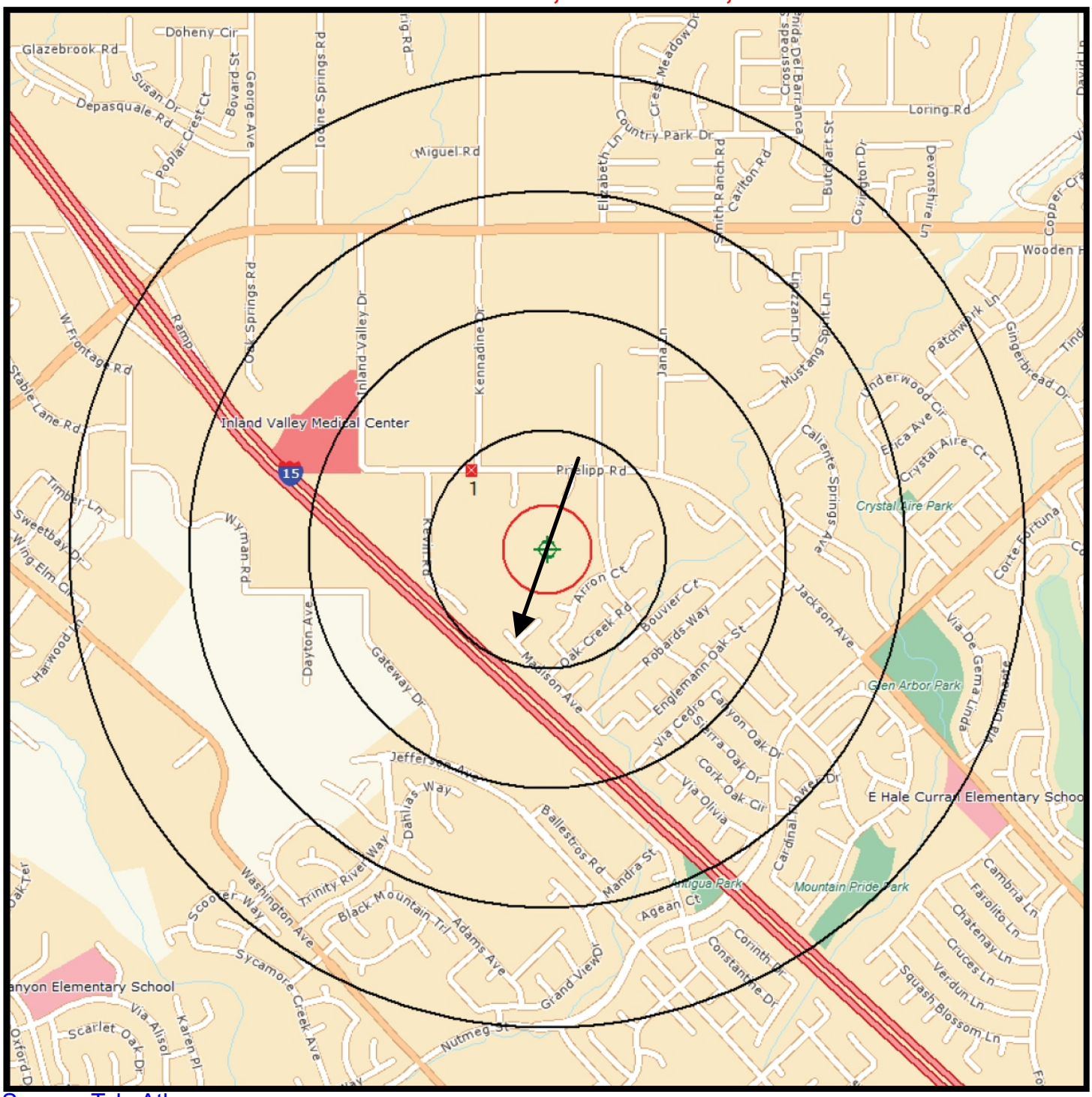
Historical aerial photographs were reviewed as a part of this update assessment for indications of historical land utilization, and for signs of potential hazardous materials/waste and/or petroleum storage, usage, contamination, or disposal areas. Readily available historical photographs were provided by Track Info Services, LLC, and included the years of 1938, 1953, 1967, 1976, 1980, 1994, and 2002. In addition, historic Google Earth Imagery (2012) was reviewed which included the years of 2006, 2009, and 2012. A summary of our review is provided in Table 1. The Track Info Services historical aerial photos are included in Appendix C (provided on the CD data disc as PDF).

Environmental FirstSearch

1 Mile Radius
Single Map:

FIRSTSEARCH

36605 ELIZABETH LANE, WILDOMAR, CA 92595



Source: Tele Atlas

EXPLANATION

- Target Site (Latitude: 34.1020, Longitude: -117.5176)
- Identified Site, Multiple Sites, Receptor
- NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste
- Triballand
- Groundwater Gradient

Black Rings Represent 1/4 Mile Radius;
Red Ring Represents 500 ft. Radius

ALL LOCATIONS APPROXIMATE

GeoSoils, Inc.

GROUNDWATER GRADIENT MAP

Figure 3

W.O. E6451-SC	DATE 09/12	SCALE: N.T.S.

In our historical photograph review, there was no surficial evidence of site improvements noted that represent a significant potential source of petroleum contamination and/or hazardous waste observed immediately adjacent to or within the subject property.

Table 1 - Historic Aerial Photograph Review Summary

DATE	SUMMARY	SCALE
1938	The site is generally vacant and undeveloped. The property appears brushed for fire control.	1"=340'
1953	The site and vicinity are generally similar to the 1938 photograph. A pond is now visible in the drainage course on the western side of the property. The adjacent property to the east- northeast appears to be utilized for dry farming.	1"=340'
1967	The site and vicinity are generally similar to 1953 photograph. A residence is now visible on the adjacent property to the east- northeast of the site. Highway 395 (now Interstate I-15) is now visible southwest of the project site.	1"=340'
1976	The site and vicinity are generally similar to 1967 photograph. Two (2) access roads are now visible onsite.	1"=340'
1980	A residence is now visible on the property eastern central portion of the site. An earthen roadway (Prielipp Road) is visible north of the site. Several rural residences are now visible west of the property. Interstate I-15 southwest of the property has been widened to four (4) lanes.	1"=340'
1994	The other two (2) residences are now visible onsite. Another pond is now visible in the small drainage course in the central portion of the site. Several other access roadways are now visible on the property. It appears the grubbing/brushing for the residential tract to the south of the property has began. Prielipp Road now appears to be paved.	1"=340'
2002	The site is generally similar to 1994 photograph. The residential tract housing to the south of the property is now visible. Elizabeth Lane has been constructed and is now paved.	1"=340'
2006	Google Earth Imagery: The site and vicinity is generally similar to 2002 photo. The Gables Oak Creek Apartments to the east of the project have been constructed. The structures located at 36630 Estes Park Court have been removed.	various
2009	Google Earth Imagery: The site and vicinity is generally similar to 2006 photo.	various
2012	Google Earth Imagery: The site appears similar to our recent site reconnaissance. The property appears vacant and the structures previously located onsite are visibly absent.	various

No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

Historical Topographic Maps

Historical topographic maps were reviewed during this update ESA. According to the contour lines on the topographic maps, the property is located at approximately 1,340 to 1,290 feet MSL. The contour lines in the area of the property indicate the area is sloping to the south-southwest, generally coincidental with the local topographic gradient (USGS). The property is generally depicted as rural residential development. The maps reviewed are included in Appendix C (provided on the CD data disc as PDF).

Fire Insurance Maps

GSI requested historical Sanborn Fire Insurance maps for the property from Environmental FirstSearch, and was subsequently informed that no maps are available for the subject location. A copy of the Fire Insurance Map Coverage notification (i.e., "NO" Maps Available) is included in the FirstSearch Report Appendix C (provided on the CD data disc as PDF).

City Directories

Historical City directories, published by Haines, Ducy's, and Luskey's, provided from Track Info Services, LLC, were reviewed for past names of business that were listed for the Property and adjoining properties. The findings are presented in the following table:

YEAR	ON-SITE	ADJOINING PROPERTIES
1995	36605 - 36625 Elizabeth Lane Street Not Listed	Street Not Listed Street Not Listed
2002	36605 - 36625 Elizabeth Lane 36605 - Carlson, Stanley 36625 - XXXX	Lowest listing on the street is 36605 Highest listing on the street is 36625
2004 - 2005	36605 - 36625 Elizabeth Lane 36605 - Williams, Roger 36625 - Bachelor, William; Healing Rooms of the Temecula Valley	25825 Elizabeth Lane - Gonzales, Lorenzo Highest listing on the street is 36625
2009 - 2010	36605 - 36625 Elizabeth Lane 36605 - XXXX 36625 - Healing Rooms of the Temecula Valley	35815 Elizabeth Lane - Dissi, Kamal Highest listing on the street is 36625

Addresses of *Potential Concern*: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, or within the vicinity of the target address was also provided by Track Info Services,

LLC. No addresses of concern are reported. Our review of adjoining and/or nearby properties indicate this area appears to be predominantly single-family rural residential, with the exception of the Healing Rooms of the Temecula Valley indicated in the 2004-2005 and 2009-2010 listings. Thus, it is GSI's opinion that these sites pose a low potential to environmentally impact the subject property. The City Directory Report is included in Appendix C (provided on the CD data disc as PDF).

Review of Previous Reports

The previous Phase I ESA report by NM (2004) and supplement by GSI (2005a), the previous preliminary geotechnical investigation by GSI (2005b [see Appendix A]), aided in the preparation of this update Phase I ESA.

Chain-of-Title Documents

No chain-of-title search was made by GSI as Client did not furnish or request any documents, and such a search was beyond the scope of this report.

RESULTS OF GOVERNMENT AGENCY/DOCUMENTS REVIEW

List of Government Agencies and Databases Reviewed

In compliance with ASTM Standard of Practice E 1527-05, a search of selected federal and state government databases was conducted for GSI, by TrackInfo Services, LLC. Following is a list of the agency databases reviewed for this report. Search distances are per the ASTM standard. Building Department or Zoning Land Use records were not readily available, and thus were not reviewed for this report.

LIST OF DATABASES SEARCHED	
FEDERAL AND STATE ASTM STANDARD	**ASTM SUPPLEMENTAL**
NPL	PERMITS
CERCLIS	OTHER
NFRAP	
RCRA TSD	
RCRA COR	
RCRA GEN	
ERNS	
STATE SITES	
SPILLS - 1990	
SWL	

LIST OF DATABASES SEARCHED	
FEDERAL AND STATE ASTM STANDARD	ASTM SUPPLEMENTAL
REG UST/AST	
LEAKING UST	

*Details and descriptions of these databases can be found in Appendix C.

Results of Government Agency/Document Review

A review of the Government Records Database search report dated September 14, 2012, indicated There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i,e., generates more than 1000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

GSI also reviewed the location of the unmapped risk sites, one (1) unmapped risk site is reported in the database search. The unmapped site, Bureau of Indian Affairs-Tribal Land, with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location. Complete details for the database search may be found in Appendix C in PDF format on disc only.

Based upon review of our agency database records search (Appendix C, provided as a CD data disc), there are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste on the property, nor listings of UST's or AST's on the site. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste on the site.

Solid Waste Landfills (SWLF)

There are no solid waste landfills reported within the study area.

Oil and Gas Well Activity

Oil and gas wells were not observed on the subject property during our site reconnaissance on September 18, 2012. An in-house review of the Munger Map Book for oil and gas fields in California and Alaska (Munger, 2003) indicated no oil or gas wells are located on the property; however, three (3) wells were noted in the general vicinity during our review. The Eddie Fisher "Stuart" No. 54-2604 (located ±2.75 miles northwest of the

site), the Murrietta Oil Company No. 23-1120 (located ±4.0 miles southeast of the site), and the Petroleum Production Engineers "Vernard" No. 51-3106 (located ±3.75 miles southeast of the site). Based on their relative age, the local groundwater gradient, and proximity to the site, they are considered to have a low environmental risk potential to the subject property.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based upon the information obtained during the course of this evaluation, GSI presents the following summary of our findings:

- Based upon our review of historic land use utilizing readily available maps and historical aerial photographs, a review of the referenced ESA reports and geotechnical report for the site area by NM (2004) and GSI (2005a and 2005b), and our recent site reconnaissance, the subject site appears to have been generally vacant and undeveloped from at least 1938 until at least 1980. According to our review (NM, 2004), three (3) residential structures were built sometime in the early- to mid-1980's and two (2) water wells and an associated above ground storage tank (AST) were previously observed onsite. During this time period the residential structures utilized septic systems (NM, 2004). Based on their review, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) and lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review. During our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance.

- Minor trash and demolition debris (i.e., residential debris, concrete, and lumber) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. NM (2004) indicated that two (2)

transformers were located onsite, based on our recent reconnaissance of the site, the two (2) transformers indicated by NM (2004) have been subsequently removed from the site. The previous septic systems may still exist in the locations of the former structures.

- There was no significant visible surficial staining on the property; however, the trash/demolition debris was not disturbed. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination. With the exception of the potential for septic tank (systems) to remain in the location(s) of the demolished structures, there was no evidence of underground storage tanks (UST's) observed and no AST's were observed on the subject property at the time of our recent site reconnaissance.

- Properties adjacent to, and surrounding, the site currently consist of vacant undeveloped land to the north, the Gables Oak Creek Apartments to the east, residential development (Tract 23051) to the south- southeast, and rural residential properties to the west of the project site. These properties are not anticipated to represent a significant environmental concern to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are and have been followed.

- Based upon field measurements taken from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. Minor water seepage was encountered in some of the excavations along the alluvium/bedrock contact within drainage areas during our previous geotechnical study (GSI, 2005a). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction generally following site drainage patterns and topography.

- Based upon our updated review of agency database records search, there are no listings of permitted above-ground and/or underground tanks on the subject property. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste for the subject site.

  There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i.e., generates more than 1,000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk

site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

There is one (1) unmapped risk site reported in the database search, due to insufficient information. The unmapped site, Bureau of Indian Affairs-Tribal Land with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location.

- There does not appear to be a documented and/or reported commercial or industrial facility, or a municipal landfill, within a 1-mile radius of the site that represents a significant environmental concern to the subject site.

- No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

- This assessment has revealed no evidence of significant recognized environmental conditions in connection with the property.

Recommendations

Based upon the scope of work completed, GSI concludes that the overall potential for significant amounts of hazardous materials/waste and/or petroleum contamination onsite is low: the uncertainty of potential environmental concerns cannot be eliminated. This assessment has revealed no visual evidence of recognized environmental conditions associated with the subject site other than the aforementioned. Based upon the information obtained during the course of our recent assessment, pursuant to the limitations set forth in the text of this report, the site is considered acceptable for the proposed residential use, provided the following mitigation measures are properly implemented during planning, design, and construction.

- Based on the historic property use, septic tanks (systems) may exist on the property. Although not considered a hazardous waste, any buried septic systems should be properly removed or abandoned following health department guidelines.

- Any remaining trash, debris, and waste materials should be disposed of offsite, in accordance with current local, state, and federal disposal regulations. Any materials containing petroleum residues encountered during property improvements should be evaluated prior to removal and disposal, following proper procedures. Any

buried trash/debris encountered should be evaluated by an experienced environmental consultant prior to removal.

- Due to the demolition and removal of previous onsite structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- The three (3) wells located within areas of proposed development should be properly abandoned following City, County, and State guidelines.

- Based upon the information collected by GSI during this update environmental site assessment, further studies or action, other than the above, are not proposed from an environmental viewpoint, at this time.

LIMITATIONS

GSI has performed the services for this project in accordance with the terms of a contract between GSI and Client and in accordance with current professional standards for investigations of this type. The conclusions presented in this report are based on the information collected during the study, the present understanding of the site conditions, and professional judgment.

Please note, subsurface and hazardous waste/toxic substance conditions may vary from those provided in historical documents reviewed by GSI. The interpretations and recommendations of GSI are based solely on such information and/or information supplied by Client. Findings of this investigation based on data provided by others carries no warranty, expressed or implied, as a result of the usage of such data.

It is possible that future investigations may reveal additional data or variations of the current data which may require the current conclusions and recommendations to be reevaluated. As a result, GSI makes no warranty, either express or implied, as to its findings, opinions, recommendations, specifications, or professional advice except that they were promulgated after being prepared in accordance with generally accepted standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature.

The information in this report is relevant to the date of the site work and should not be relied on to represent conditions at any later date. Facts, conditions, and acceptable risk factors change with time, accordingly, this report should be viewed within this context.

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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APPENDIX B

SITE PHOTOGRAPHS

1. Northeast corner of site looking west, at intersection of Prielipp Road and Elizabeth Lane. Note power lines on south side of Prielipp Road and transformer on far pole (northwest corner of property).

2. Southwestern portion of site looking east. Note household trash and debris.

GeoSoils, Inc.

SITE PHOTOGRAPHS

Plate B-1

DATE 9/12 **W.O. NO.** E6451-SC

Geotechnical · Geologic · Coastal · Environmental

3. Northern-central portion of site looking northwest. Note well casing and stockpiled lumber and debris in foreground.

4. Eastern-central portion of site (adjacent to Elizabeth Lane) looking south. Note concrete foundations from removed aboveground storage tank (AST) in foreground.

GeoSoils, Inc.

SITE PHOTOGRAPHS

Plate B-2

DATE 9/12 W.O. NO. E6451-SC

Geotechnical · Geologic · Coastal · Environmental

APPENDIX C

AGENCY RECORDS SEARCH, INTERVIEW, AERIAL PHOTOGRAPHS, AND REPORT COPIES OF PERTINENT REPORTS AND DOCUMENTS (PROVIDED AS CD DATA DISC)

FIRSTSEARCH

ENVIRONMENTAL FIRSTSEARCH REPORT

TARGET PROPERTY:

WILDOMAR 23

36605 ELIZABETH LN

WILDOMAR, CA 92595

JOB NUMBER: E6451-SC

PREPARED FOR:

GeoSoils, Inc

5741 Palmer Way

Carlsbad, Ca. 92010

September 14, 2012

Environmental FirstSearch
Search Summary Report

Target Site: 36605 ELIZABETH LN
WILDOMAR, CA 92595

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	07-09-12	1.00	0	0	0	0	0	0	0
NPL Delisted	Y	07-09-12	0.50	0	0	0	0	-	0	0
CERCLIS	Y	08-01-12	0.50	0	0	0	0	-	0	0
NFRAP	Y	08-01-12	0.50	0	0	0	0	-	0	0
RCRA COR ACT	Y	07-10-12	1.00	0	0	0	0	0	0	0
RCRA TSD	Y	07-10-12	0.50	0	0	0	0	-	0	0
RCRA GEN	Y	07-10-12	0.25	0	0	1	-	-	0	1
RCRA NLR	Y	07-10-12	0.12	0	0	-	-	-	0	0
Federal Brownfield	Y	07-15-12	0.50	0	0	0	0	-	0	0
ERNS	Y	07-05-12	0.12	0	0	-	-	-	0	0
Tribal Lands	Y	12-15-08	1.00	0	0	0	0	0	1	1
State/Tribal Sites	Y	08-13-12	1.00	0	0	0	0	0	0	0
State Spills 90	Y	06-06-12	0.12	0	0	-	-	-	0	0
State/Tribal SWL	Y	07-09-12	0.50	0	0	0	0	-	0	0
State/Tribal LUST	Y	06-06-12	0.50	0	0	0	0	-	0	0
State/Tribal UST/AST	Y	06-01-12	0.25	0	0	0	-	-	0	0
State/Tribal EC	Y	NA	0.25	0	0	0	-	-	0	0
State/Tribal IC	Y	07-11-12	0.25	0	0	0	-	-	0	0
State/Tribal VCP	Y	08-13-12	0.50	0	0	0	0	-	0	0
State/Tribal Brownfields	Y	NA	0.50	0	0	0	0	-	0	0
State Permits	Y	06-06-12	0.12	0	0	-	-	-	0	0
State Other	Y	08-13-12	0.25	0	0	0	-	-	0	0
Federal IC/EC	Y	06-13-12	0.25	0	0	0	-	-	0	0
HW Manifest	Y	08-02-10	0.12	0	0	-	-	-	0	0
-TOTALS-				0	0	1	0	0	1	2

Notice of Disclaimer

Due to the limitations, constraints, and inaccuracies and incompleteness of government information and computer mapping data currently available to FirstSearch Technology Corp., certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in FirstSearch Technology Corp.'s databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although FirstSearch Technology Corp. uses its best efforts to research the actual location of each site, FirstSearch Technology Corp. does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of FirstSearch Technology Corp.'s services proceeding are signifying an understanding of FirstSeaarch Technology Corp.'s searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

Environmental FirstSearch
Site Information Report

Request Date:	09-14-12	**Search Type:**	COORD
Requestor Name:	Todd Greer	**Job Number:**	E6451-SC
Standard:	ASTM-05	Filtered Report	

Target Site: 36605 ELIZABETH LN
WILDOMAR, CA 92595

Demographics

Sites: 2 **Non-Geocoded:** 1 **Population:** NA

Radon: NA

Fire Insurance Map Coverage: No (>350 Ft. From Coverage)

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	-117.230000	-117:13:48	**Easting:**	478657.519
Latitude:	33.588046	33:35:17	**Northing:**	3716311.452
Elevation:	1309		**Zone:**	11

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes:

ZIP Code	City Name	ST	Dist/Dir	Sel

Services:

	Requested?	Date
Fire Insurance Maps	Yes	09-14-12
Aerial Photographs	Yes	09-14-12
Historical Topos	Yes	09-14-12
City Directories	Yes	09-14-12
Title Search	No	
Municipal Reports	No	
Liens	No	
Historic Map Works	No	
Online Topos	Yes	09-14-12

Environmental FirstSearch
Target Site Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL:	2	GEOCODED:	1	NON GEOCODED:	1	SELECTED:	0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Environmental FirstSearch
Sites Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
1	RCRAGN	SCE WILDOMAR SVC CTR CAR000196659/LGN	24487 PRIELIPP RD WILDOMAR CA 92595	0.23 NW	+ 29	1

Environmental FirstSearch
Sites Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
	TRIBALLA	BUREAU OF INDIAN AFFAIRS CONTACT I BIA-92595/	UNKNOWN CA 92595	NON GC	N/A	3

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

RCRAGN

SEARCH ID: 2 **DIST/DIR:** 0.23 NW **ELEVATION:** 1338 **MAP ID:** 1

NAME: SCE WILDOMAR SVC CTR
ADDRESS: 24487 PRIELIPP RD
WILDOMAR CA 92595
RIVERSIDE
CONTACT:
SOURCE: EPA

REV: 7/10/12
ID1: CAR000196659
ID2:
STATUS: LGN
PHONE:

SITE INFORMATION

CONTACT INFORMATION: SARA M DUVALL
PO BOX 800
ROSEMEAD CA 91770

PHONE: 626-302-4187

OWNER NAME:SOUTHERN CALIFORNIA EDISON
OWNER TYPE:P-PRIVATE
OPERATOR:SOUTHERN CALIFORNIA EDISON
OPERATOR_TYPE:P-PRIVATE
MAILING ADDRESS: PO BOX 800 ATTN SARA DUVAL
UNIVERSE INFORMATION:

RECEIVED DATE:12/07/2010

SUBJECT TO CORRECTIVE ACTION (SUBJCA)

SUBJCA:N - NO
SUBJCA TSD 3004:N - NO
SUBJCA NON TSD:N - NO
SIGNIFICANT NON-COMPLIANCE(SNC):N - NO
BEGINNING OF THE YEAR SNC:
PERMIT WORKLOAD:-----
CLOSURE WORKLOAD:-----
POST CLOSURE WORKLOAD:-----
PERMITTING /CLOSURE/POST-CLOSURE PROGRESS:-----
CORRECTIVE ACTION WORKLOAD:N - NO
GENERATOR STATUS:LQG - LARGE QUANTITY GENERATORS: GENERATES MORE THAN 1000 KG/MONTH OF HAZARDOUS WASTE

INSTITUTIONAL CONTROL:N-NOENGINEERING CONTROL:N
HUMAN EXPOSURE:N-NOGW CONTROLS:N- NO
LAND TYPE:P-PRIVATESHORT TERM GEN:N
TRANS FACILITY:NREC WASTE FROM OFF SITE:N

IMPORTER ACTIVITY:N - NOMIXED WASTE GEN:N - NO
TRANS ACTIVITY:N - NOTSD ACTIVITY:N - NO
RECYCLER ACTIVITY:N - NOONSITE BURNER EXEMPT:N - NO
FURNACE EXEMPTION:N - NOUNDER INJECT ACTIVITY:N - NO
REC WASTE FROM OFF SITE:N - NOUNIV WASTE DEST FAC:N
USED OIL TRANS:N - NOUSED OIL PROCESSOR:N - NO
USED OIL REFINER:N - NOUSED OIL FUEL BURNER:N - NO
UO FUEL MARKETER TO BURNER:NUSED OIL SPEC MARKETER:N - NO

NAIC INFORMATION

221122 - ELECTRIC POWER DISTRIBUTION

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

RCRAGN

SEARCH ID: 2 **DIST/DIR:** 0.23 NW **ELEVATION:** 1338 **MAP ID:** 1

NAME: SCE WILDOMAR SVC CTR
ADDRESS: 24487 PRIELIPP RD
WILDOMAR CA 92595
RIVERSIDE
CONTACT:
SOURCE: EPA

REV: 7/10/12
ID1: CAR000196659
ID2:
STATUS: LGN
PHONE:

ENFORCEMENT INFORMATION:

VIOLATION INFORMATION:

HAZARDOUS WASTE INFORMATION:

133
151
181
211
213
214
221
223
261
272
291
331
343
352
461
512
513
541
551
731
D001 - IGNITABLE WASTE
D002 - CORROSIVE WASTE
D008 - LEAD
D018 - BENZENE
D039 - TETRACHLOROETHYLENE
F001 - THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F002 - THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F003 - THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/ BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON- HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TRIBALLAND

SEARCH ID: 1 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME: BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION
ADDRESS: UNKNOWN
CA 92595
RIVERSIDE
CONTACT:
SOURCE: BIA

REV: 01/15/08
ID1: BIA-92595
ID2:
STATUS:
PHONE:

BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION

OFFICE: Pacific Regional Office
CONTACT: CLAY GREGORY,REGIONAL DIRECTOR

OFFICE ADDRESS: 2800 Cottage Way
Sacramento CA 95825
OFFICE PHONE: Phone: 916-978-6000
OFFICE FAX: Fax: 916-978-6099

The Native American Consultation Database (NACD) is a tool for identifying consultation contacts for Indian tribes, Alaska Native villages and corporations, and Native Hawaiian organizations. The database is not a comprehensive source of information, but it does provide a starting point for the consultation process by identifying tribal leaders and NAGPRA contacts. This database can be accessed online at the following web address http://home.nps.gov/nacd/

Environmental FirstSearch Descriptions

NPL: EPA NATIONAL PRIORITY LIST - The National Priorities List is a list of the worst hazardous waste sites that have been identified by Superfund. Sites are only put on the list after they have been scored using the Hazard Ranking System (HRS), and have been subjected to public comment. Any site on the NPL is eligible for cleanup using Superfund Trust money. A Superfund site is any land in the United States that has been contaminated by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment.FINAL - Currently on the Final NPLPROPOSED - Proposed for NPL

NPL DELISTED: EPA NATIONAL PRIORITY LIST Subset - Database of delisted NPL sites. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.DELISTED - Deleted from the Final NPL

CERCLIS: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM (CERCLIS)- CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL.PART OF NPL- Site is part of NPL siteDELETED - Deleted from the Final NPLFINAL - Currently on the Final NPLNOT PROPOSED - Not on the NPLNOT VALID - Not Valid Site or IncidentPROPOSED - Proposed for NPLREMOVED - Removed from Proposed NPLSCAN PLAN - Pre-proposal SiteWITHDRAWN - Withdrawn

NFRAP: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM ARCHIVED SITES - database of Archive designated CERCLA sites that, to the best of EPA's knowledge, assessment has been completed and has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.NFRAP – No Further Remedial Action PlanP - Site is part of NPL siteD - Deleted from the Final NPLF - Currently on the Final NPLN - Not on the NPLO - Not Valid Site or IncidentP - Proposed for NPLR - Removed from Proposed NPLS - Pre-proposal SiteW – Withdrawn

RCRA COR ACT: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.RCRAInfo facilities that have reported violations and subject to corrective actions.

RCRA TSD: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM TREATMENT, STORAGE, and DISPOSAL FACILITIES. - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.Facilities that treat, store, dispose, or incinerate hazardous waste.

RCRA GEN: EPA/MA DEP/CT DEP RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM GENERATORS - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.Facilities that generate or transport hazardous waste or meet other RCRA requirements.LGN - Large Quantity GeneratorsSGN - Small Quantity GeneratorsVGN – Conditionally Exempt Generator.Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List) facilities. CONNECTICUT HAZARDOUS WASTE MANIFEST – Database of all shipments of hazardous waste within, into or from Connecticut. The data includes date of shipment, transporter and TSD info, and material shipped and quantity. This data is appended to the details of existing generator records. MASSACHUSETTES HAZARDOUS WASTE GENERATOR – database of generators that are regulated under the MA DEP. VQN-MA = generates less than 220 pounds or 27 gallons per month of hazardous waste or waste oil.SQN-MA = generates 220 to 2,200 pounds or 27 to 270 gallons per month of waste oil.LQG-MA = generates greater than 2,200 lbs of hazardous waste or waste oil per month.

RCRA NLR: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.not currently classified by the EPA but are still included in the RCRAInfo database. Reasons for non classification: Failure to report in a timely matter. No longer in business. No longer in business at the listed address. No longer generating hazardous waste materials in quantities which require reporting.

Fed Brownfield: EPA BROWNFIELD MANAGEMENT SYSTEM (BMS) - database designed to assist EPA in collecting, tracking, and updating information, as well as reporting on the major activities and accomplishments of the various Brownfield grant Programs./n CLEANUPS IN MY COMMUNITY (subset) - Sites, facilities and properties that have been contaminated by hazardous materials and are being, or have been, cleaned up under EPA's brownfield's program.

ERNS: EPA/NRC EMERGENCY RESPONSE NOTIFICATION SYSTEM (ERNS) - Database of incidents reported to the National Response Center. These incidents include chemical spills, accidents involving chemicals (such as fires or explosions), oil spills, transportation accidents that involve oil or chemicals, releases of radioactive materials, sightings of oil sheens on bodies of water, terrorist incidents involving chemicals, incidents where illegally dumped chemicals have been found, and drills intended to prepare responders to handle these kinds of incidents. Data since January 2001 has been received from the National Response System database as the EPA no longer maintains this data.

Tribal Lands: DOI/BIA INDIAN LANDS OF THE UNITED STATES - Database of areas with boundaries established by treaty, statute, and (or) executive or court order, recognized by the Federal Government as territory in which American Indian tribes have primary governmental authority. The Indian Lands of the United States map layer shows areas of 640 acres or more, administered by the Bureau of Indian Affairs. Included are Federally-administered lands within a reservation which may or may not be considered part of the reservation.BUREAU OF INDIAN AFFIARS CONTACT - Regional contact information for the Bureau of Indian Affairs offices.

State/Tribal Sites: CA EPA SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be

contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC's staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The SMBRPD displays information in six categories, two of which are found in ST. The categories listed under ST are: 1. State Response Sites. 2. School Property Evaluation Program Properties (SCH) Please Note: Our reports list the above sites as DB Type (STATE). Other categories found in the SMBRPD are listed in our reports in the DB Types OT and VC. Each Category contains information on properties based upon the type of work taking place at the site. State Response Sites contains only known and potential hazardous substance release sites considered as posing the greatest threat to the public. School sites included in ST will be found within the SMBRPD's School Property Evaluation Program. CORTESE LIST-Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by Cal/EPA, Hazardous Materials Data Management Program to provide information about the location of hazardous materials release sites. Cortese List sites that fall under DTSC's guidelines for State Response sites are included in our reports in the ST category as are qualifying sites from the Annual Work Plan (formerly Bond Expenditure Plan) and the historic ASPIS databases.

State Spills 90: CA EPA SLIC REGIONS 1 - 9- The California Regional Water Quality Control Boards maintain report of sites that have records of spills, leaks, investigation, and cleanups.

State/Tribal SWL: CA IWMB/SWRCB/COUNTY SWIS SOLID WASTE INFORMATION SYSTEM-The California Integrated Waste Management Board maintains a database on solid waste facilities, operations, and disposal sites throughout the state of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites. For more information on individual sites call the number listed in the source field.. Please Note: This database contains poor site location information for many sites in our reports; therefore, it may not be possible to locate or plot some sites in our reports. WMUDS-The State Water Resources Control Board maintained the Waste Management Unit Database System (WMUDS). It is no longer updated. It tracked management units for several regulatory programs related to waste management and its potential impact on groundwater. Two of these programs (SWAT & TPCA) are no longer on-going regulatory programs as described below. Chapter 15 (SC15) is still an on-going regulatory program and information is updated periodically but not to the WMUDS database. The WMUDS System contains information from the following agency databases: Facility, Waste Management Unit (WMU), Waste Discharger System (WDS), SWAT, Chapter 15, TPCA, RCRA, Inspections, Violations, and Enforcement's. Note: This database contains poor site location information for many sites in our reports; therefore, it may not be possible to locate or plot some sites in reports. ORANGE COUNTY LANDFILLS LIST- A list maintained by the Orange County Health Department.

State/Tribal LUST: CA SWRCB/COUNTY LUSTIS- The State Water Resources Control Board maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks. Information for this database is collected from the states regional boards quarterly and integrated with this database. SAN DIEGO COUNTY LEAKING TANKS- The San Diego County Department of Environmental Health maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks within its HE17/58 database. For more information on a specific file call the HazMat Duty Specialist at phone number listed in the source information field.

State/Tribal UST/AST: CA EPA/COUNTY/CITY ABOVEGROUND STORAGE TANKS LISTING-The Above Ground Petroleum Storage Act became State Law effective January 1, 1990. In general, the law requires owners or operators of AST's with petroleum products to file a storage statement and pay a fee by July 1, 1990 and every two years thereafter, take specific action to prevent spills, and in certain instances implement a groundwater monitoring program. This law does not apply to that portion of a tank facility associated with the production oil and regulated by the State Division of Oil and Gas of the Dept. of Conservation. SWEEPS / FIDS STATE REGISTERED UNDEGROUND STORAGE TANKS- Until 1994 the State Water Resources Control Board maintained a database of registered underground storage tanks statewide referred

to as the SWEEPS System. The SWEEPS UST information was integrated with the CAL EPA's Facility Index System database (FIDS) which is a master index of information from numerous California agency environmental databases. That was last updated in 1994. We have included the UST information from the FIDS database in our reports for historical purposes to help our clients identify where tanks may possibly have existed. For more information on specific sites from individual paper files archived at the State Water Resources Control Board call the number listed with the source information. INDIAN LANDS UNDERGROUND STORAGE TANKS LIST- A listing of underground storage tanks currently on Indian Lands under federal jurisdiction. California Indian Land USTS are administered by US EPA Region 9.CUPA DATABASES & SOURCES- Definition of a CUPA: A Certified Unified Program Agency (CUPA) is a local agency that has been certified by the CAL EPA to implement six state environmental programs within the local agency's jurisdiction. These can be a county, city, or JPA (Joint Powers Authority). This program was established under the amendments to the California Health and Safety Code made by SB 1082 in 1994. A Participating Agency (PA) is a local agency that has been designated by the local CUPA to administer one or more Unified Programs within their jurisdiction on behalf of the CUPA. A Designated Agency (DA) is an agency that has not been certified by the CUPA but is the responsible local agency that would implement the six unified programs until they are certified. Please Note: We collect and maintains information regarding Underground Storage Tanks from the majority of the CUPAS and Participating Agencies in the State of California. These agencies typically do not maintain nor release such information on a uniform or consistent schedule; therefore, currency of the data may vary. Please look at the details on a specific site with a UST record in the First Search Report to determine the actual currency date of the record as provided by the relevant agency. Numerous efforts are made on a regular basis to obtain updated records.

State/Tribal IC: CA EPA DEED-RESTRICTED SITES LISTING- The California EPA’s Department of Toxic Substances Control Board maintains a list of deed-restricted sites, properties where the DTSC has placed limits or requirements on the future use of the property due to varying levels of cleanup possible, practical or necessary at the site.

State/Tribal VCP: CA EPA SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC’s staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The Voluntary Cleanup Program (VCP) category contains only those properties undergoing voluntary investigation and/or cleanup and which are listed in the Voluntary Cleanup Program.Please Note: Our reports list the above sites as DB Type VC.

State Permits: CA EPA/COUNTY SAN DIEGO COUNTY HE17 PERMITS- The HE17/58 database tracks establishments issued permits and the status of their permits in relation to compliance with federal, state, and local regulations that the County oversees. It tracks if a site is a hazardous waste generator, TSD, gas station, has underground tanks, violations, or unauthorized releases. For more information on a specific file call the HazMat Duty Specialist at the phone number listed in the source information field. SAN BERNARDINO COUNTY HAZARDOUS MATERIALS PERMITS- Handlers and Generators Permit Information Maintained by the Hazardous Materials Division.

State Other: CA EPA/COUNTY SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC’s staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The SMBRPD displays information in six categories, two of which are found in ST. The categories listed under OT are: 1. Unconfirmed Properties Referred to Another Local or State Agency (REF) 2. Properties where a No Further Action Determination has been made (NFA) Please Note: Our reports list the

above sites as DB Type (OTHER). Other categories found in the SMBRPD are listed in our reports in the DB Types ST and VC.LA COUNTY SITE MITIGATION COMPLAINT CONTROL LOG- The County of Los Angeles Public Health Investigation Compliant Control Log. ORANGE COUNTY INDUSTRIAL SITE CLEANUPS- List maintained by the Orange County Environmental Health Agency. RIVERSIDE COUNTY WASTE GENERATORS-A list of facilities in Riverside County which generate hazardous waste. SACRAMENTO COUNTY MASTER HAZMAT LIST-Master list of facilities within Sacramento County with potentially hazardous materials. SACRAMENTO COUNTY TOXIC SITE CLEANUPS-A list of sites where unauthorized releases of potentially hazardous materials have occurred.

Federal IC / EC: EPA FEDERAL ENGINEERING AND INSTITUTIONAL CONTROLS- Superfund sites that have either an engineering or an institutional control. The data includes the control and the media contaminated. RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES (RCRA) – RCRA site the have institutional controls.

State/Tribal HW: CA EPA DEPARTMENT OF TOXIC SUBSTANCES CONTROL HAZARDOUS WASTE MANIFEST INVENTORY-Records maintained by the CA DTSC of Hazardous Waste Manifests used to track and document the transport of hazardous waste from a generator's site to the site of its final disposition.

Environmental FirstSearch Database Sources

NPL: EPA Environmental Protection Agency

Updated quarterly

NPL DELISTED: EPA Environmental Protection Agency

Updated quarterly

CERCLIS: EPA Environmental Protection Agency

Updated quarterly

NFRAP: EPA Environmental Protection Agency.

Updated quarterly

RCRA COR ACT: EPA Environmental Protection Agency.

Updated quarterly

RCRA TSD: EPA Environmental Protection Agency.

Updated quarterly

RCRA GEN: EPA/MA DEP/CT DEP Environmental Protection Agency, Massachusetts Department of Environmental Protection, Connecticut Department of Environmental Protection

Updated quarterly

RCRA NLR: EPA Environmental Protection Agency

Updated quarterly

Fed Brownfield: EPA Environmental Protection Agency

Updated quarterly

ERNS: EPA/NRC Environmental Protection AgencyNational Response Center.

Updated annually

Tribal Lands: DOI/BIA United States Department of the InteriorBureau of Indian Affairs

Updated annually

State/Tribal Sites: CA EPA The CAL EPA, Depart. Of Toxic Substances Control Phone: (916) 323-3400 For Cortese List information contact The CAL EPA, Department of Toxic Substances Control at (916) 445-6532

Updated quarterly/when available

State Spills 90: CA EPA The California State Water Resources Control Board For phone number listings of departments within each region visit their web sites at: http://www.swrcb.ca.gov/regions.html

Updated when available

State/Tribal SWL: CA IWMB/SWRCB/COUNTY The California Integrated Waste Management Board
Phone:(916) 255-2331
The State Water Resources Control Board
Phone:(916) 227-4365
Orange County Health Department
Phone:(714) 834-3536

Updated quarterly/when available

State/Tribal LUST: CA SWRCB/COUNTY The California State Water Resources Control Board Phone:(916) 227-4416 San Diego County Department of Environmental Health Phone:(619) 338-2242

Updated quarterly/when available

State/Tribal UST/AST: CA EPA/COUNTY/CITY The State Water Resources Control Board
Phone:(916) 227-4364
CAL EPA Department of Toxic Substances Control
Phone:(916)227-4404
US EPA Region 9 Underground Storage Tank Program
Phone: (415) 972-3372
ALAMEDA COUNTY CUPAS:
* County of Alameda Department of Environmental Health
* Cities of Berkeley, Fremont, Hayward, Livermore / Pleasanton, Newark, Oakland, San Leandro, Union
ALPINE COUNTY CUPA:
* Health Department (Only updated by agency sporadically)
AMADOR COUNTY CUPA:
* County of Amador Environmental Health Department
BUTTE COUNTY CUPA
* County of Butte Environmental Health Division (Only updated by agency biannually)
CALAVERAS COUNTY CUPA:
* County of Calaveras Environmental Health Department
COLUSA COUNTY CUPA:
* Environmental Health Dept.
CONTRA COSTA COUNTY CUPA:
* Hazardous Materials Program
DEL NORTE COUNTY CUPA:
* Department of Health and Social Services

EL DORADO COUNTY CUPAS:
* County of El Dorado Environmental Health - Solid Waste Div (Only updated by agency annually)
* County of El Dorado EMD Tahoe Division (Only updated by agency annually)
FRESNO COUNTY CUPA:
* Haz. Mat and Solid Waste Programs
GLENN COUNTY CUPA:
* Air Pollution Control District
HUMBOLDT COUNTY CUPA:
* Environmental Health Division
IMPERIAL COUNTY CUPA:
* Department of Planning and Building
INYO COUNTY CUPA:
* Environmental Health Department
KERN COUNTY CUPA:
* County of Kern Environmental Health Department
* City of Bakersfield Fire Department
KINGS COUNTY CUPA:
* Environmental Health Services
LAKE COUNTY CUPA:
* Division of Environmental Health
LASSEN COUNTY CUPA:
* Department of Agriculture
LOS ANGELES COUNTY CUPAS:
* County of Los Angeles Fire Department CUPA Data as maintained by the Los Angeles County Department of Public Works
* County of Los Angeles Environmental Programs Division
* Cities of Burbank, El Segundo, Glendale, Long Beach/Signal Hill, Los Angeles,Pasadena, Santa Fe Springs, Santa Monica, Torrance, Vernon
MADERA COUNTY CUPA:
* Environmental Health Department
MARIN COUNTY CUPA:
* County of Marin Office of Waste Management
* City of San Rafael Fire Department
MARIPOSA COUNTY CUPA:
* Health Department
MENDOCINO COUNTY CUPA:
* Environmental Health Department
MERCED COUNTY CUPA:
* Division of Environmental Health
MODOC COUNTY CUPA:
* Department of Agriculture
MONO COUNTY CUPA:
* Health Department
MONTEREY COUNTY CUPA:
* Environmental Health Division
NAPA COUNTY CUPA:
* Hazardous Materials Section
NEVADA COUNTY CUPA:

* Environmental Health Department
ORANGE COUNTY CUPAS:
* County of Orange Environmental Health Department
* Cities of Anaheim, Fullerton, Orange, Santa Ana
* County of Orange Environmental Health Department
PLACER COUNTY CUPAS:
* County of Placer Division of Environmental Health Field Office
* Tahoe City
* City of Roseville Roseville Fire Department
PLUMAS COUNTY CUPA:
* Environmental Health Department
RIVERSIDE COUNTY CUPA:
* Environmental Health Department
SACRAMENTO COUNTY CUPA:
* County Environmental Mgmt Dept, Haz. Mat. Div.
SAN BENITO COUNTY CUPA:
* City of Hollister Environmental Service Department
SAN BERNARDINO COUNTY CUPAS:
* County of San Bernardino Fire Department, Haz. Mat. Div.
* City of Hesperia Hesperia Fire Prevention Department
*City of Victorville Victorville Fire Department
SAN DIEGO COUNTY CUPA:
* The San Diego County Dept. of Environmental Health HE 17/58
SAN FRANCISCO COUNTY CUPA:
* Department of Public Health
SAN JOAQUIN COUNTY CUPA:
* Environmental Health Division
SAN LUIS OBISPO COUNTY CUPAS:
* County of San Luis Obispo Environmental Health Division
* City of San Luis Obispo City Fire Department
SAN MATEO COUNTY CUPA:
* Environmental Health Department
SANTA BARBARA COUNTY CUPA:
* County Fire Dept Protective Services Division
SANTA CLARA COUNTY CUPAS:
* County of Santa Clara Hazardous Materials Compliance Division
* Santa Clara County Central Fire Protection District (Covers Campbell, Cupertino, Los Gatos, & Morgan Hill)
* Cities of Gilroy, Milpitas, Mountain View, Palo Alto, San Jose Fire, Santa Clara, Sunnyvale
SANTA CRUZ COUNTY CUPA:
* Environmental Health Department
SHASTA COUNTY CUPA:
* Environmental Health Department
SIERRA COUNTY CUPA:
* Health Department
SISKIYOU COUNTY CUPA:
* Environmental Health Department
SONOMA COUNTY CUPAS:
* County of Sonoma Department Of Environmental Health

* Cities of Healdsburg / Sebastopol, Petaluma, Santa Rosa
STANISLAUS COUNTY CUPA:
* Department of Environmental Resources Haz. Mat. Division
SUTTER COUNTY CUPA:
* Department of Agriculture
TEHAMA COUNTY CUPA:
* Department of Environmental Health
TRINITY COUNTY CUPA:
* Department of Health
TULARE COUNTY CUPA:
* Environmental Health Department
TUOLUMNE COUNTY CUPA:
* Environmental Health
VENTURA COUNTY CUPAS:
* County of Ventura Environmental Health Division
* Cities of Oxnard, Ventura
YOLO COUNTY CUPA:
* Environmental Health Department
YUBA COUNTY CUPA:
* Yuba County of Emergency Services

Updated quarterly/annually/when available

State/Tribal IC: CA EPA The California EPA Department of Toxic Substances Control.Phone:(916) 255-3745

Updated Updated quarterly/annually/when available

State/Tribal VCP: CA EPA The California EPA Department of Toxic Substances Control.Phone:(916) 255-3745

Updated Updated quarterly/annually/when available

State Permits: CA EPA/COUNTY The San Diego County Depart. Of Environmental Health Phone:(619) 338-2211 San Bernardino County Fire Department Phone:(909) 387-3080

Updated quarterly/when available

State Other: CA EPA/COUNTY The CAL EPA, Depart. Of Toxic Substances Control Phone: (916) 323-3400 The Los Angeles County Hazardous Materials Division Phone: (323) 890-7806 Orange County Environmental Health Agency Phone: (714) 834-3536 Riverside County Department of Environmental Health, Hazardous Materials Management Division Phone:(951) 358-5055 Sacramento County Environmental Management Department Phone: (916) 875-8550

Updated quarterly/when available

Federal IC / EC: EPA Environmental Protection Agency

Updated quarterly

State/Tribal HW: CA EPA CAL EPA, Department of Toxic Substances Control Phone:(916) 255-087

Updated annually/when available

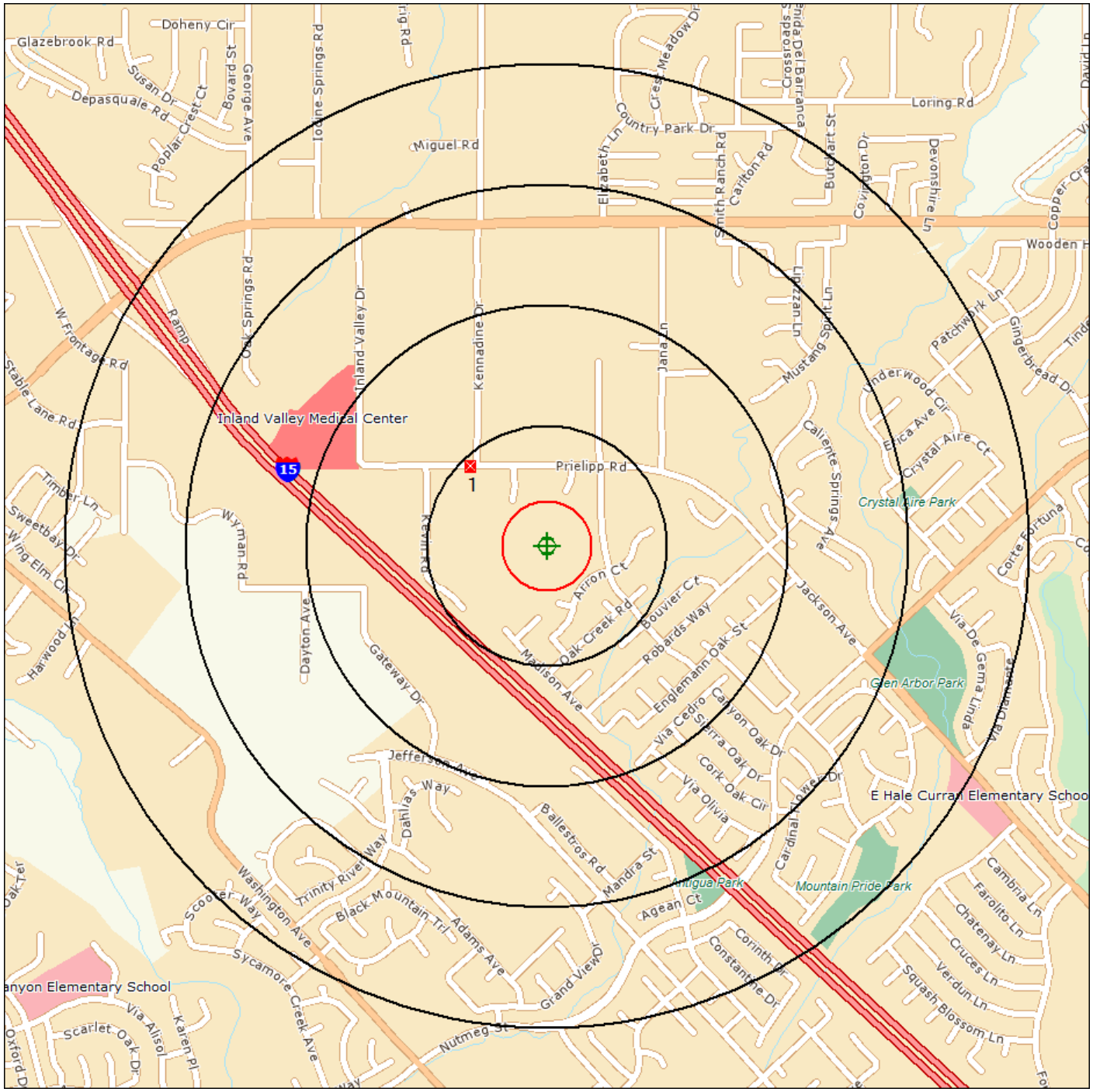
Environmental FirstSearch

1 Mile Radius

Single Map:

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

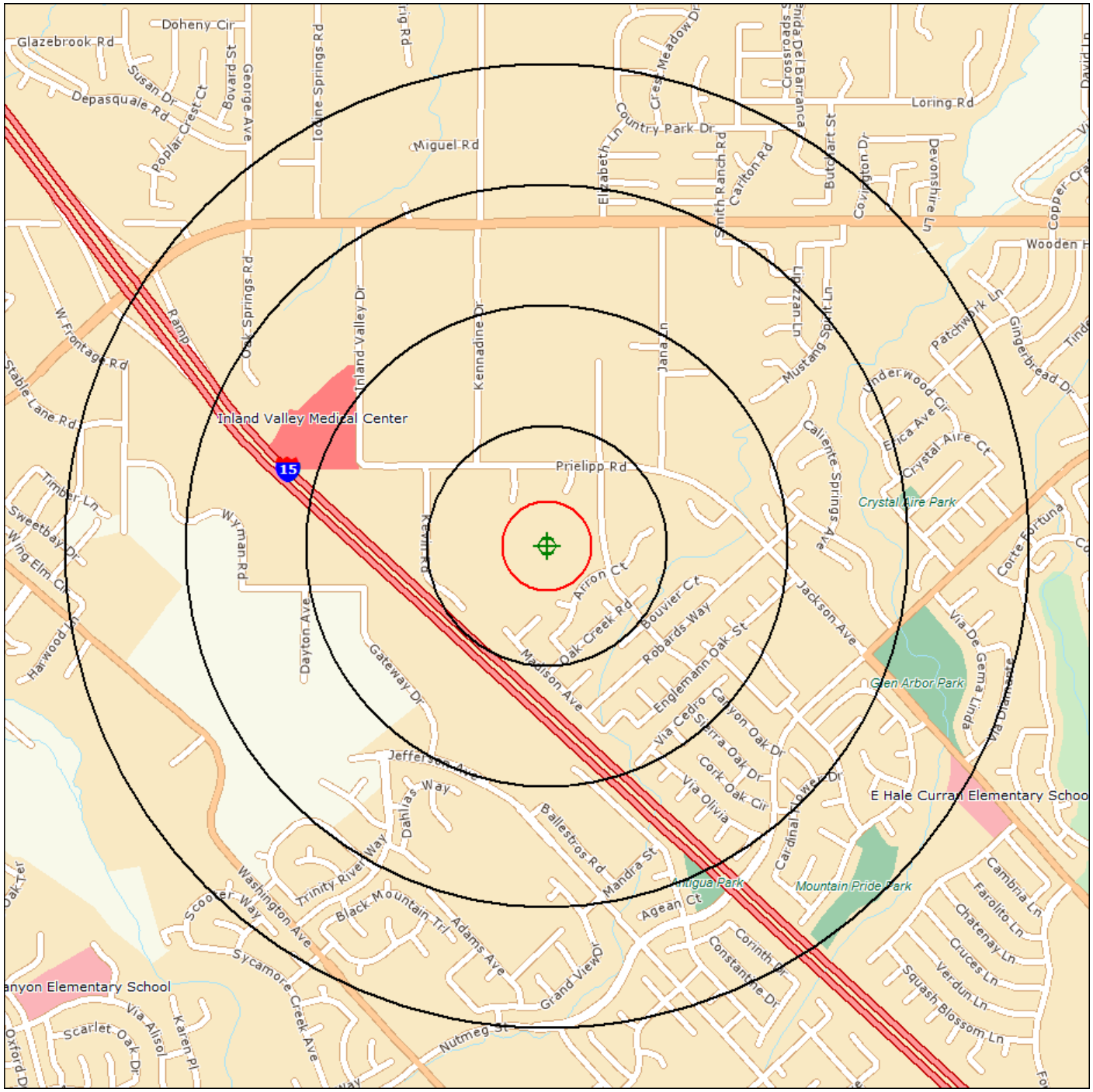
Environmental FirstSearch

1 Mile Radius

ASTM-05: NPL, RCRACOR, STATE

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

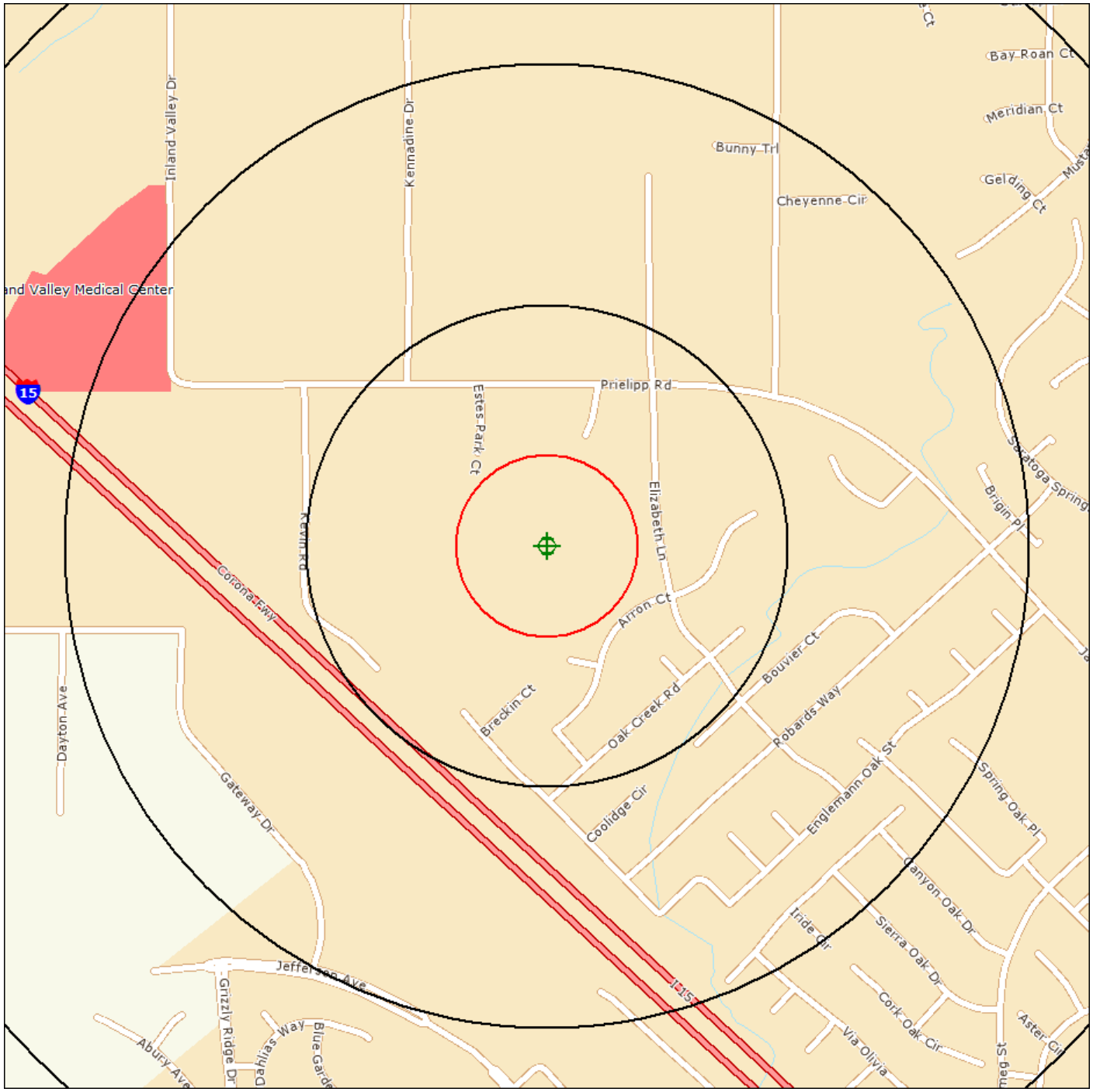
Environmental FirstSearch

.5 Mile Radius

ASTM-05: Multiple Databases

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

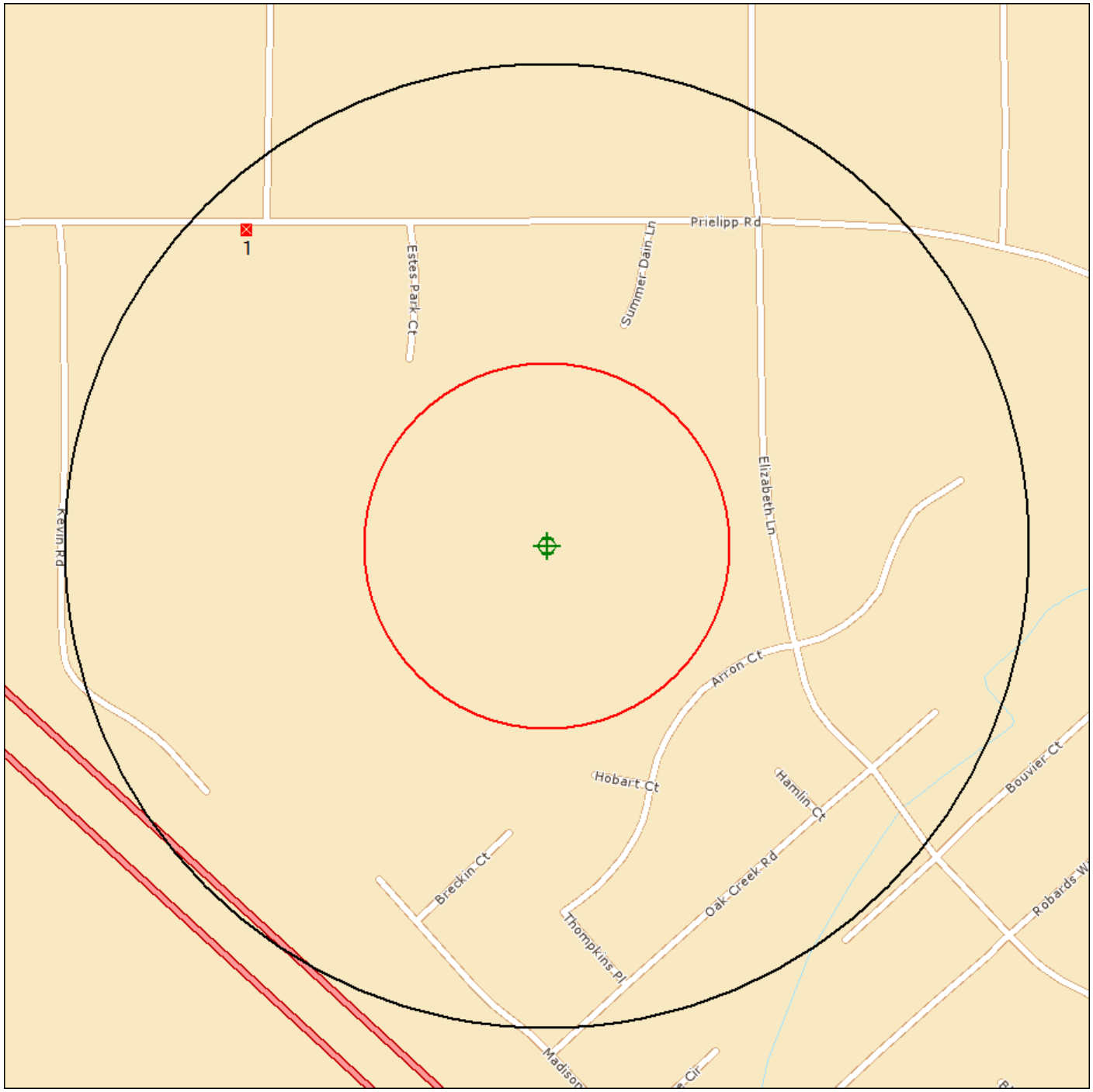
Environmental FirstSearch

.25 Mile Radius

ASTM-05: RCRAGEN, UST, OTHER, FEDIC/EC

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

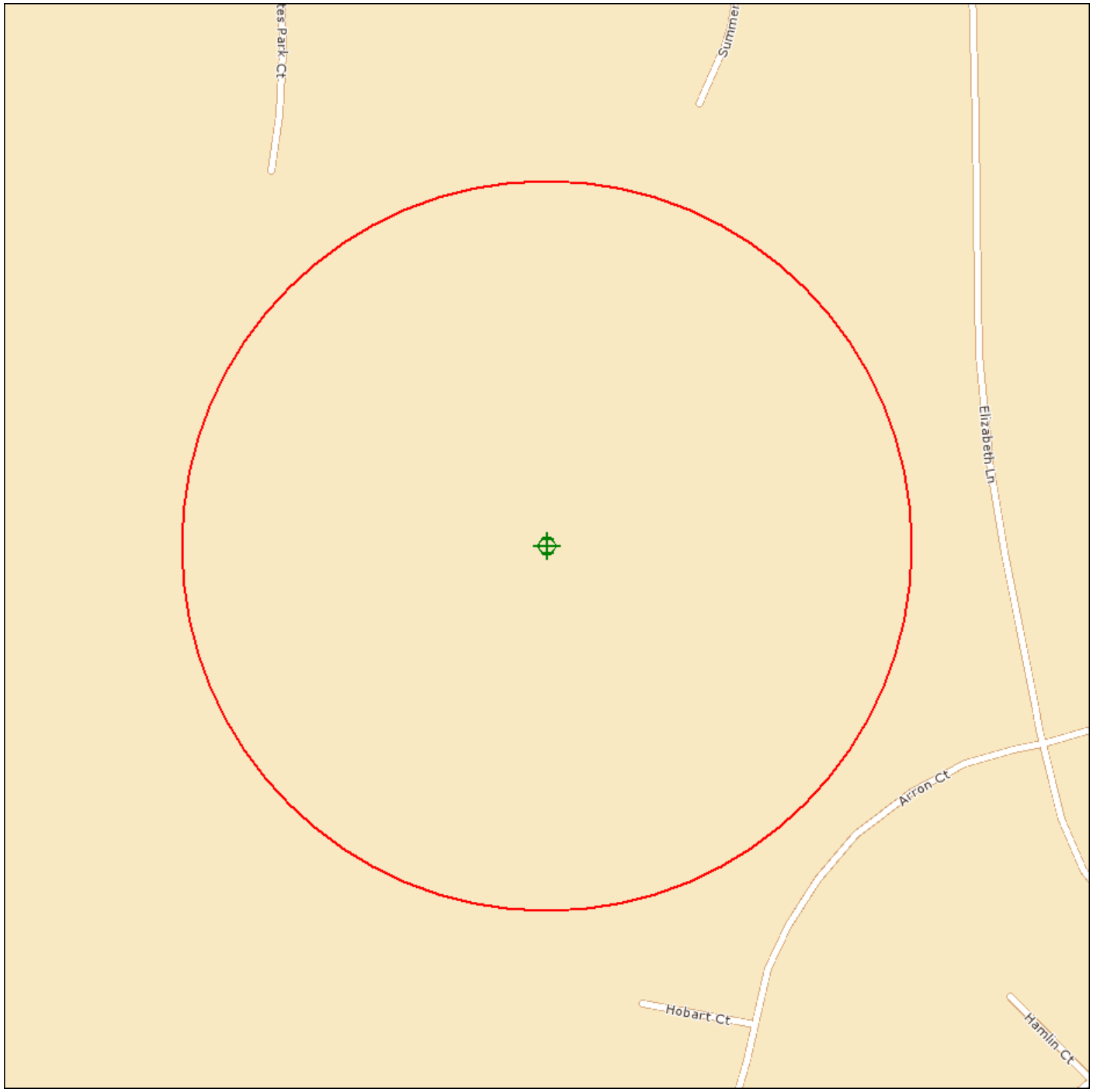
Environmental FirstSearch

.12 Mile Radius

ASTM-05: Multiple Databases

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

Site Location Map

Topo : 0.75 Mile Radius

36605 ELIZABETH LN, WILDOMAR, CA 92595

FIRSTSEARCH

SOURCE: SCANNED USGS TOPOGRAPHIC QUADRANGLES
SCANNED BY MAPTECH AND USGS
DISTRIBUTED AUGUST, 2005.

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

0 495 990 1,980 2,970 3,960 Feet

FIRSTSEARCH	Data Supplied by: MAPTECH	Prepared by FirstSearch Technology Corporation		JOB NO.
		Map Name: MURRIETA	Date Created: 1953--	Date Revised: 1979--
		Map Reference Code: 33117-E2-TF-024	Contour Interval: 20 feet	Elevation:
				FIGURE NO. 1

FIRSTSEARCH

HISTORICAL FIRE INSURANCE MAPS

NO MAPS AVAILABLE

Report Date: 9/14/2012
Client Job Number: E6451-SC
FirstSearch Index Number: 339103
Site Address(es): 36605 36625 ELIZABETH LN
WILDOMAR, CA 92595

A search of FirstSearch Environmental Information's proprietary database of historical fire insurance map availability confirmed that there are NO MAPS AVAILABLE for the Subject Location as shown above.

FirstSearch Environmental Information's proprietary database of historical fire insurance map availability represents abstracted information from the Sanborn® Map Company LLC obtained through online access to the Library of Congress as well as the result of a review of the other fire insurance map microfilm collections available via various local libraries.

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FirstSearch Environmental Information *10 Cottage Street, Norwood, MA 02062*
Tel: 781-551-0470 Fax: 781-551-0471

ENVIRONMENTAL SITE ASSESSMENT TRANSACTION SCREEN QUESTIONNAIRE

This document is an excerpt of Practice E1528-06: Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessment as is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. COPYRIGHT@ 2006 ASTM INTERNATIONAL, West Conshohocken, PA. Prior edition copyrighted 2000. Stock # ADJE152806. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer service at (610) 832-9585

5. Introduction to Transaction Screen Questionnaire

5.1 *Process*--The *transaction screen process* consists of asking questions contained within the *transaction screen questionnaire* of *owners* and *occupants* of the *property*, observing site conditions at the property with direction provided by the *transaction screen questionnaire*, and, to the extent *reasonably ascertainable*, conducting limited research regarding certain government records and certain standard historical sources. The questions asked of *owners* are the same questions as those asked of *occupants*.

5.2 *Guide*--The *transaction screen questionnaire* is followed by a guide designed to assist the person completing the *transaction screen questionnaire*. The guide to the *transaction screen questionnaire* is set out in Sections 7-10 of this practice. The guide is divided into three sections: Guide for Owner/Occupant Inquiry, Guide to Site Visit, and Guide to Government Records/Historical Sources Inquiry.

5.2.1 To assist the *user*, its employee or agent, or the preparer in preparing a report, the guide repeats each of the questions set out in the *transaction screen questionnaire* in both the guide for *owner/occupant* inquiry and the guide to *site visit*. The questions regarding government records/historical sources inquiry are also repeated in the guide to that section.

5.2.2 The guide also describes the procedures to be followed to determine if reliance upon the information in a prior *transaction screen* is appropriate under this practice.

5.2.3 A *user*, his employee or agent, or *preparer* conducting the *transaction screen process* should not use the *transaction screen questionnaire* without reference to or without familiarity with the guide based on prior use of the guide.

5.3 The *user* may either conduct the *transaction screen process*, or delegate it to an employee or agent or may contract with a third party to prepare the questionnaire on behalf of the *user*. No matter who prepares the questionnaire, the *user* remains responsible for the decision to conduct limited environmental *due diligence* and the impact of that decision on risk management.

5.4 The *preparer* conducting the *transaction screen* process should use good faith efforts in determining answers to the questions set forth in the *transaction screen questionnaire*. The *user* should take time and care to check whatever records are in the *user's* possession and forward relevant information or specialized knowledge to the *preparer*.

5.5 *Knowledge*--All answers should be given to the best of the *owner's* or *occupant's* knowledge. The most knowledgeable person available should be chosen to answer the questions.

5.5.1 While the person conducting the *transaction screen* has an obligation to ask the questions in the *transaction screen questionnaire*, others may have no obligation to answer them.

5.5.2 The *transaction screen questionnaire* and the *transaction screen guide* sometimes include the phrase "to the best of your knowledge." This phrase does not impose a constructive knowledge standard. It is intended as an assurance to the person being questioned that he or she is not obligated to search out information he or she does not currently have in order to answer the particular question.

5.6 *Conclusions Regarding Affirmative* or *Unknown Answers*--Once a *transaction screen questionnaire* has been completed, it shall be presented to the user. Subject to 5.6 through 5.7, an affirmative, unknown, or no response is presumed to be a *potential environmental concern*. If any of the questions set forth in the *transaction screen questionnaire* are answered in the affirmative, the *preparer* must document the reason for the affirmative answer. If any of the questions are not answered or the answer is unknown, the *user* should document such nonresponse or answer of unknown and evaluate it in light of the other information obtained in the *transaction screen process*, including, in particular, the site visit and the government records/historical sources inquiry. If the *user* decides no further inquiry is warranted after receiving no response, an answer of unknown, or an affirmative answer, the *user* must document the reasons for any such conclusion.

5.6.1 Upon obtaining an affirmative answer, an answer of unknown or no response, the *user* should first refer to the guide. The guide may provide sufficient explanation to allow a *user* to conclude that no further inquiry is appropriate with respect to the particular question.

5.6.2 If the guide to a particular question does not, in itself, permit a user to conclude that no further inquiry is appropriate, then the user should consider other information obtained from the *transaction screen process* relating to this question. For example, while on the site performing a *site visit*, a person may find a storage tank on the *property* and therefore answer Question 10 of the *transaction screen questionnaire* in the affirmative. However, during or subsequent to the *owner/occupant* inquiry, the *owner* may establish that substances now or historically contained in the tank (for example, water) are not likely to cause contamination.

5.6.3 If either the guide to the question or other information obtained during the *transaction screen process* does not permit a *user* to conclude no further inquiry is appropriate with respect to such question, then the user must determine, in the exercise of the *user's* reasonable business judgment, based upon the totality of unresolved affirmative answers or answers of unknown received during the *transaction screen process*, whether further inquiry may be limited to those specific issues identified as of concern.

5.7 *Presumption*--A presumption exists that further inquiry is necessary if an affirmative answer is given to a question or because the answer was unknown or no response was given. In rebutting this presumption, the *user* should evaluate information obtained from each component of the *transaction screen* process and consider whether sufficient information has been obtained to conclude that no further inquiry is necessary. The *user* must determine, in the exercise of the *user's* reasonable business judgment, the scope of such further inquiry.

5.8 *Further Inquiry*--Upon completing the *transaction screen questionnaire*, if the *user* concludes that further inquiry or action is needed (for example, consult with an environmental consultant, contractor, governmental authority, or perform additional governmental and/or historical records review), the *user* should proceed with such inquiry. (Note that if the *user* determines to proceed with a Phase I Environment Site Assessment, the *user* may apply the current Practice E 1527 or alternatively the provisions of EPA's regulation "Standards and Practices for All Appropriate Inquiries," 40 C.F.R. Part 312.)

5.9 *Signature*--The user and the *preparer* of the *transaction screen questionnaire* must complete and sign the questionnaire as provided at the end of the questionnaire.

6. Transaction Screen Questionnaire

6.1 *Persons to Be Questioned*-The following questions should be asked of *(1)* the current owner of the *property*, *(2)* any major occupant of the *property* or, if the property does not have any *major occupants*, at least 10 % of the occupants of the *property*, and *(3)* in addition to the current owner and the occupants identified in *(2)*, any *occupant* likely to be using, treating, generating, storing, or disposing of *hazardous substances* or *petroleum products* on or from the *property* A major occupant is any *occupant* using at least 40 % of the leasable area of the *property* or any anchor tenant when the *property* is a shopping center. In a multifamily *property* containing both residential and commercial uses, the *preparer* does not need to ask questions of the residential *occupants*. The *preparer* should ask each person to answer all questions to the best of the respondent's *actual knowledge* and in good faith When completing the *site visit* column, the *preparer* should be sure to observe the *property* and any buildings and other structures on the *property* The guide to this *transaction screen questionnaire* (see Sections 7-10) provides further details on the appropriate use of this questionnaire (See Note 2.)
NOTE 2-Unk = "unknown" or "no response "

Description of Site Address:

36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane
APN's 380-280-004, 009, 010, 011, and 012, City of Wildomar
Riverside County, California, 92595

Question	Owner			Occupants (if applicable)			Observed During Site Visit		If yes, provide description
	Yes	No	Unk	Yes	No	Unk	Yes	No	
1a Is the property used for an industrial use?	○	●	○	○	○	○	○	●	
1b Is any adjoining property used for an industrial use?	○	●	○	○	○	○	○	●	
2a Did you observe evidence or do you have any prior knowledge that the property has been used for an industrial use in the past?	○	●	○	○	○	○	○	●	
2b Did you observe evidence or do you have any prior knowledge that any adjoining property has been used for an industrial use in the past?	○	●	○	○	○	○	○	●	
3a Is the property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	○	●	○	○	○	○	○	●	
3b Is any adjoining property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	○	●	○	○	○	○	○	●	
4a Did you observe evidence or do you have any prior knowledge that the property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	○	●	○	○	○	○	○	●	
4b Did you observe evidence or do you have any prior knowledge that any adjoining property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	○	●	○	○	○	○	○	●	
5a Are there currently any damaged or discarded automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	○	●	○	○	○	○	○	●	
5b Did you observe evidence or do you have any prior knowledge that there have been previously any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	○	●	○	○	○	○	○	●	
6a Are there currently any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	○	●	○	○	○	○	○	●	
6b Did you observe evidence or do you have any prior knowledge that there have been previously any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	○	●	○	○	○	○	○	●	
7a Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that originated from a contaminated site?	○	●	○	○	○	○	○	●	

'Unk = "unknown" or "no response"

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This document is an excerpt of E 1528-06; Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessments and is the direct responsibility of Subcommittee E50 02 on Commercial Real Estate Transactions This questionaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionaire For the complete standard, or to order additional copies of this questionaire, contact ASTM Customer Service at (610) 832-9585

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
7b. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that is of an unknown origin?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
8a. Are there currently any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
8b. Did you observe evidence or do you have any prior knowledge that there have been previously, any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
9a. Is there currently any stained soil on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
9b. Did you observe evidence or do you have any prior knowledge that there has been previously, any stained soil on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
10a. Are there currently any registered or unregistered storage tanks (above or underground) located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	Note: AST-water Tank (NM, 2004) Has been removed from site
10b. Did you observe evidence or do you have any prior knowledge that there have been previously, any registered or unregistered storage tanks (above or underground) located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	Note: Potential for Septic Tanks in locations of previous structures
11a. Are there currently any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
11b. Did you observe evidence or do you have any prior knowledge that there have been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
12a. Is there currently evidence of leaks, spills or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
12b. Did you observe evidence or do you have any prior knowledge that there have been previously any leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring drains, walls, ceilings or exposed grounds on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
13a. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
13b. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that the well has been designated as contaminated by any government environment health agency?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
14. Does the owner or occupant of the property have any knowledge of environmental liens or governmental notification relating to past or recurrent violations of environmental laws with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15a. Has the owner or occupant of the property been informed of the past existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15b. Has the owner or occupant of the property been informed of the current existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15c. Has the owner or occupant of the property been informed of the past existence of environmental violations with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15d. Has the owner or occupant of the property been informed of the current existence of environmental violations with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		

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Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
16. Does the owner or occupant of the property have any knowledge of any environmental site assessment of the property or facility that indicated the presence of hazardous substances or petroleum products on, or contamination of, the property or recommended further assessment of the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
17. Does the owner or occupant of the property know of any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any hazardous substance or petroleum products involving the property by any owner or occupant of the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
18a. Does the property discharge waste-water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a storm water system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
18b. Does the property discharge waste water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a sanitary sewer system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
19. Did you observe evidence or do you have any prior knowledge that any hazardous substances or petroleum products, unidentified waste materials, tires, automotive or industrial batteries, or any other waste materials have been dumped above grade, buried and/or burned on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
20. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	

Government Records/Historical Sources Inquiry

(See guide, Section 10)

21. Do any of the following federal, state, or tribal government record systems list the property or any property within the search distance noted below (where available):	Approximate Minimum Search Distance, miles (kilometres)		
Federal NPL site	1.0	Yes ○	No ○
Federal Delisted NPL site	0.5	Yes ○	No ○
Federal CERCLIS	0.5	Yes ○	No ○
Federal CERCLIS NFRAP site	0.5	Yes ○	No ○
Federal RCRA CORRACTS facilities	1.0	Yes ○	No ○
Federal RCRA non-CORRACTS TSD	0.5	Yes ○	No ○
Federal RCRA generators	property and adjoining properties	Yes ○	No ○
Federal institutional control/engineering control registries	property only		
Federal ERNS	property only	Yes ○	No ○

See Report

State and tribal lists of hazardous waste sites identified for investigation or remediation:

State-and tribal-equivalent NPL	1.0	Yes ○	No ○
State-and tribal-equivalent	0.5	Yes ○	No ○
State-and tribal-landfill andlor solid waste disposal site lists	0.5	Yes ○	No ○
State-and tribal-leaking storage tank lists	0.5	Yes ○	No ○
State and tribal registered storage tank lists	property and adjoiningproperties	Yes ○	No ○
State and tribal institutional controllengineering control registries	property only	Yes ○	No ○
State and tribal voluntary cleanup sites	0.5	Yes ○	No ○
State and tribal Brownfield sites	0.5	Yes ○	No ○

22. Based upon a review of fire insurance maps (10.2.3) or local street directories (10.2.3), all as specified in the guide, are any buildings or other improvements on the property or on an adjoiningproperty identified as having been used for an industrial use or uses likely to lead to contamination of the property? Yes ○ No ○ Unavailable ○

Result _____

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The Owner questionnaire answers were provided was completed by:

Name: Ms. Jarnne Valdez
Title: Property Representative
Firm: Lennar Homes - Inland Empire
Address: 980 Montecito Drive, Suite 302
Corona, California 92879
Phone Number: 951-817-3567
Date: 9/28/12
Role (s) at the site: Project Manager
Number of years at the site: < 1 yr.
Relationship to use (e g principal, employee, agent, consultant): employee

The Occupant questionnaire answers were provided by:

Name:
Title:
Firm:
Address: N/A
Phone Number:
Date:
Role (s) at the site:
Number of years at the site:
Realationship to use (e g principal, employee, agent, consultant):

The Site Visit questionnaire was completed by:

Name: Todd A. Greer
Title: Engineering Geologist
Firm: Geo Soils, Inc.
Address: 26590 Madison Avenue
Murrieta, California 92562
Phone Number: 951-677-9651
Date: 9/28/12
Role (s) at the site: Update Phase I ESA
Number of years at the site:
Realationship to use (e g principal, employee, agent, consultant): Consultant

It is the user's responsibility to draw conclusions regarding affirmative or unknown answers

The Government Records and Historical Sources Inquiry questionnaire was completed by:

Name: See Report
Title:
Firm:
Address:
Phone Number:
Date:
Role (s) at the site:
Number of years at the site:
Relationship to use (e g principal, employee, agent, consultant):

User's relationship to the site (for example, owner, prospective purchaser, lender, etc.)

If the preparer (s) is different from the user, complete the following:

Name of User:
User's Address:
User's Phone Number:

Copies of the completed questionnaires have been filed at:

Copies of the completed questionnaires have been mailed or delivered to:

Preparer represents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature: Todd A. Greer
Date: 9/28/12
Signature: Jarnne Valdez
Date: 9/28/12
Signature:
Date:

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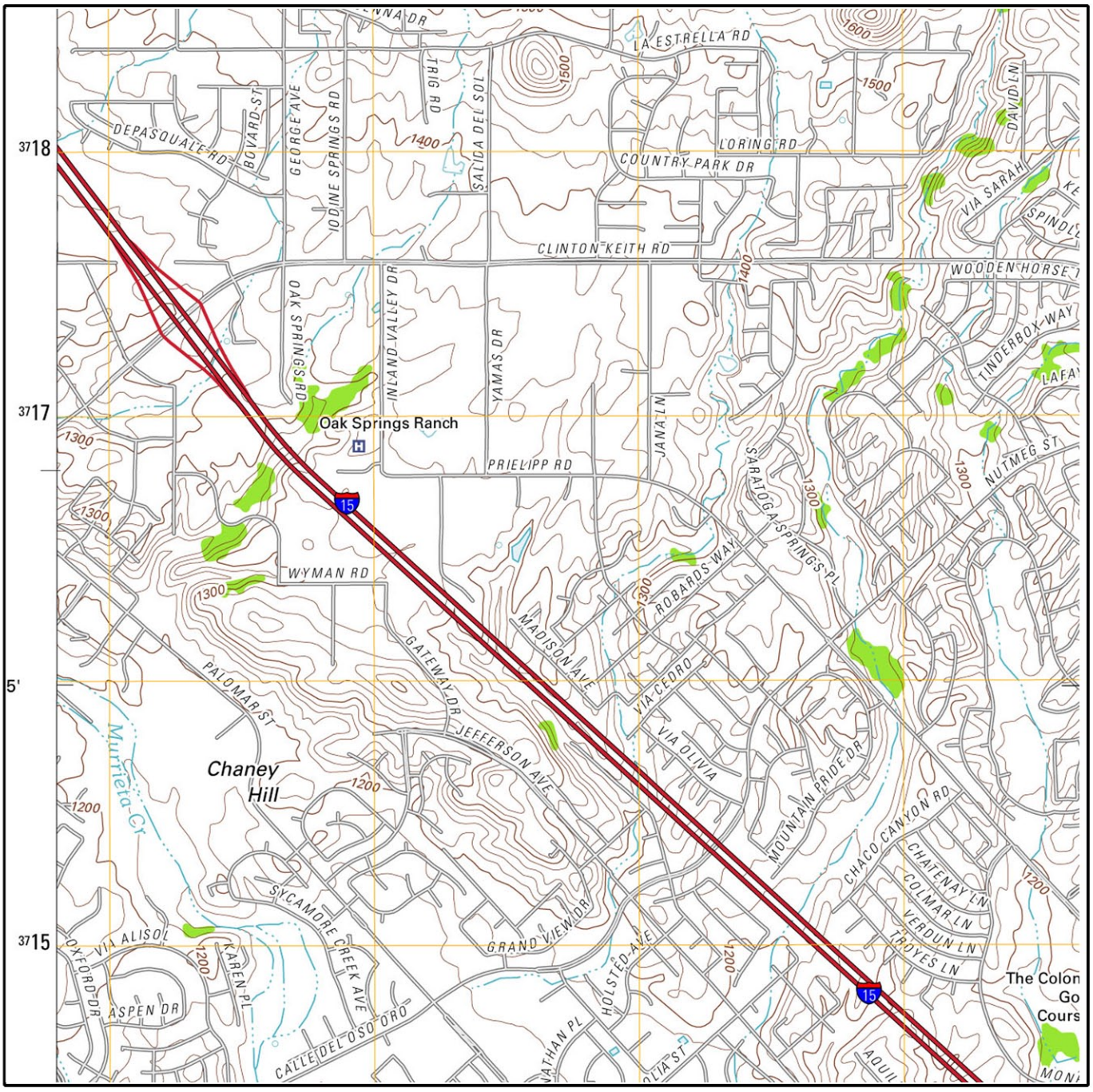
FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 2012 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1979 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595

Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1973 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595

Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

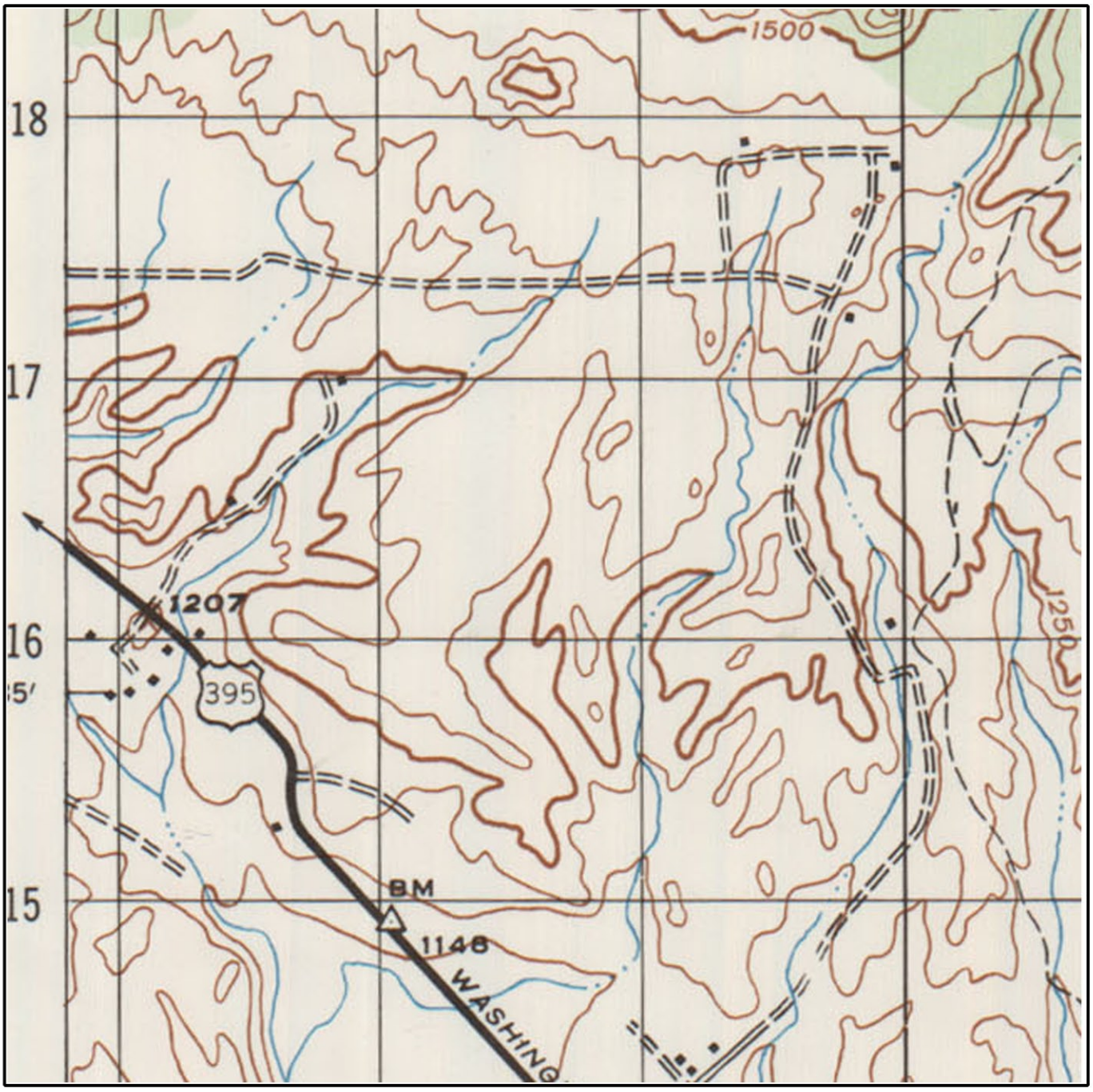
Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1960 Original Map Scale: 1:50,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

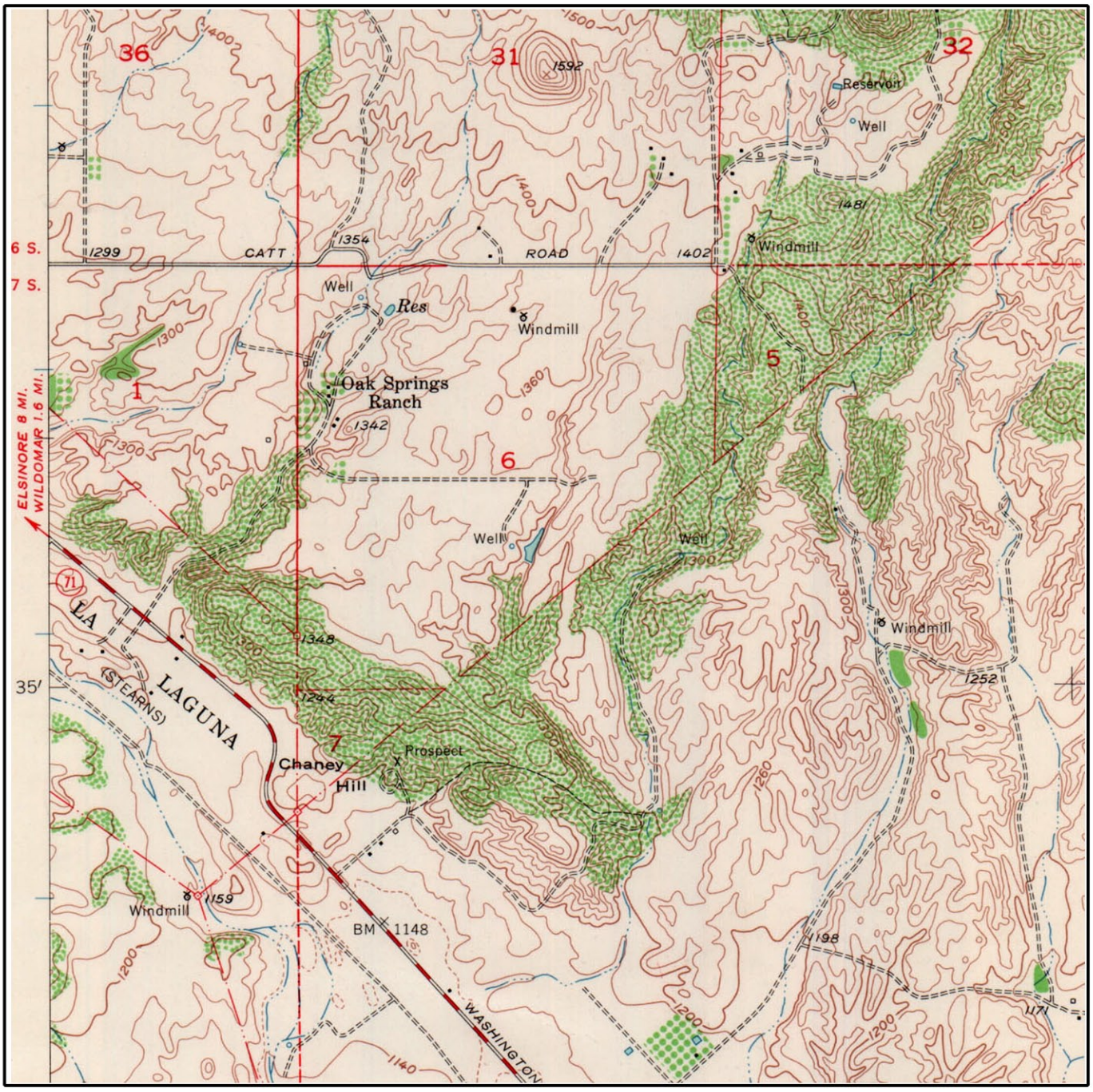
Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1953 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

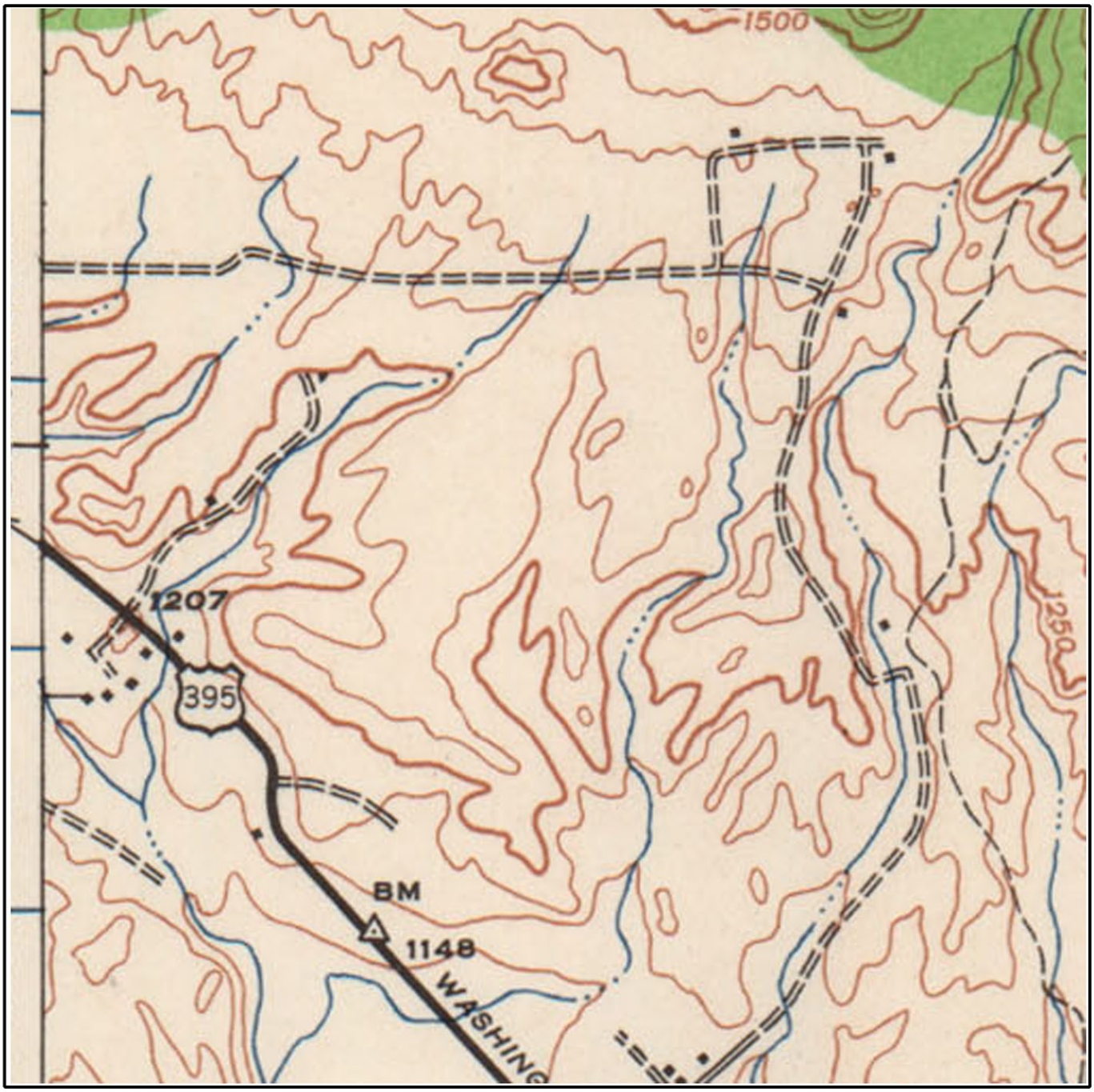
Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1942 Original Map Scale: 1:62,500

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

Historical Aerial Photo

2002

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N

W E

S

1 inch equals 340 feet

Historical Aerial Photo

1994

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N W E S

1 inch equals 340 feet

Historical Aerial Photo

1980

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N W E S

1 inch equals 340 feet

Historical Aerial Photo

1976

36605 36625 ELIZABETH LN

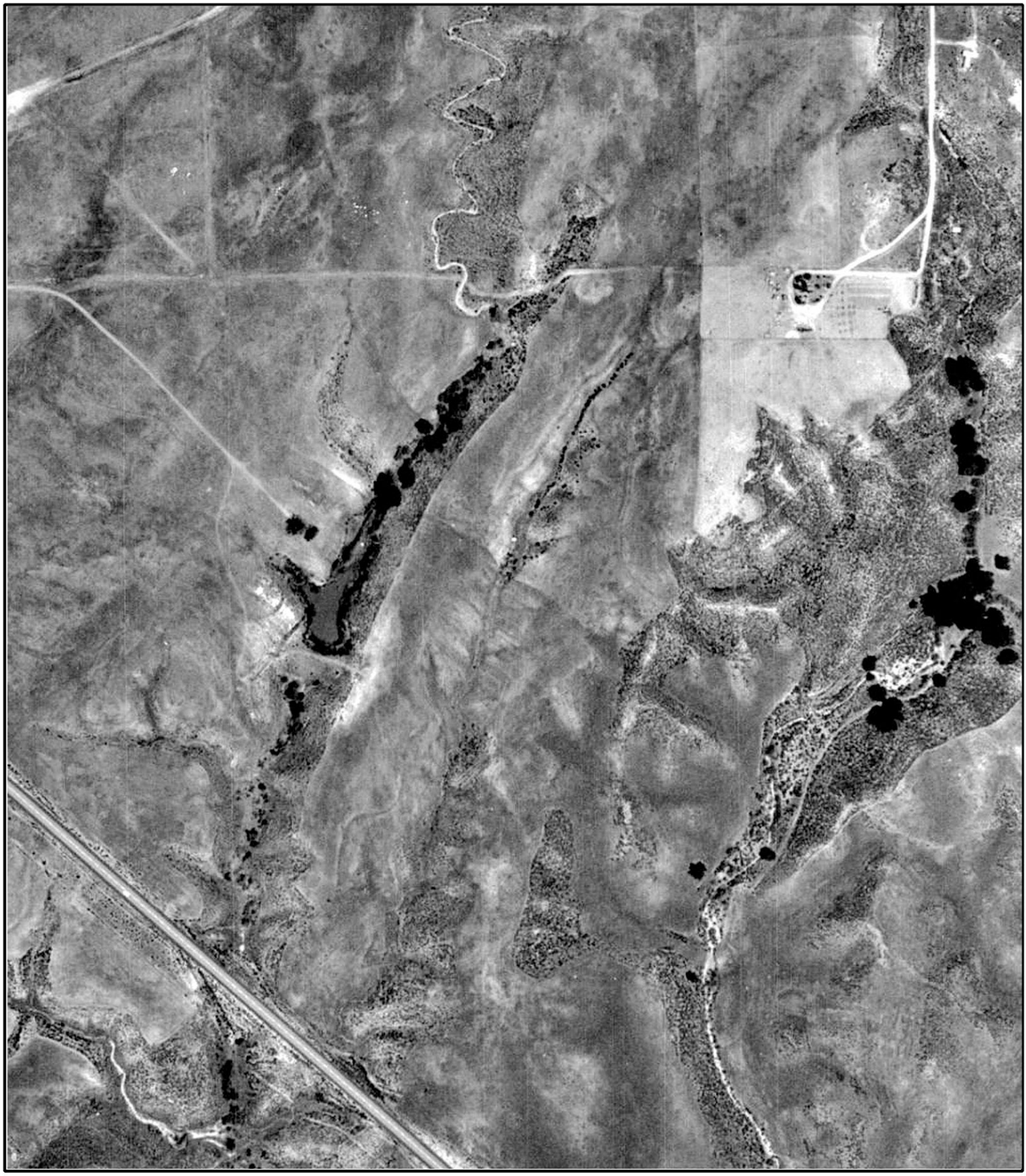
WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N W E S

1 inch equals 340 feet



Historical Aerial Photo

1967

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N W E S

1 inch equals 340 feet

Historical Aerial Photo

1953

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

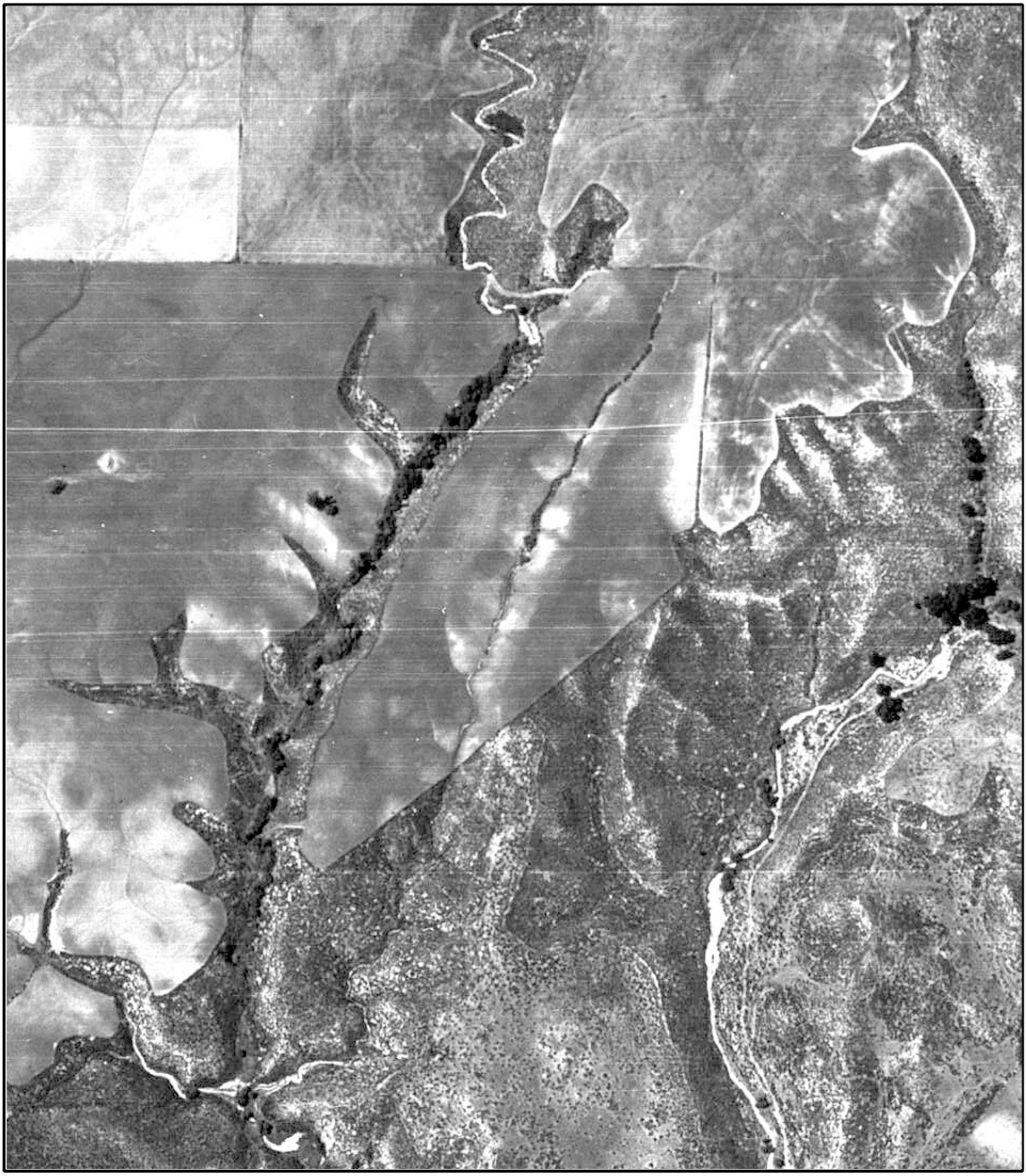
FIRSTSEARCH

N

W E

S

1 inch equals 340 feet



Historical Aerial Photo

1938

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

FIRSTSEARCH

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

N W E S

1 inch equals 340 feet

CITY DIRECTORY REPORT

Prepared For:
Todd Greer – GeoSoils

Client Job No/Name: E6451-SC

FirstSearch Log No: 76465

Subject Property: 36605-36625 Elizabeth Ln Wildomar, CA 92595

September 20, 2012

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2009-10 Haines: Riverside Pg. 285		
35815 Elizabeth Ln Dissi Kamal	**36605 – 36625 Elizabeth Ln** 36605 – XXXX 36625 – Healing Rooms of Tmcla Vly, Howard Lynette	Highest listing on the street is 36625
2004-05 Haines: Riverside Pg. 250		
35825 Elizabeth Ln Gonzales Lorenz	**36605 – 36625 Elizabeth Ln** 36605 – Williams Roger 36625 – Bachelor Willam; Healing Rooms of The Tmcla Vly	Highest listing on the street is 36625
2002 Haines: Riverside Pg. 224		
Lowest listing on street 36605	**36605 – 36625 Elizabeth Ln** 36605 – Carlson Stanley 36625 – XXXX	Highest listing on the street is 36625
1995 ProPhone: Pacific Database Query		
Street Not Listed	**36605 – 36625 Elizabeth Ln** Street Not Listed	Street Not Listed
No further search results found.		

FirstSearch Environmental Information - City Directory Report

Addresses of Potential Concern: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, within the vicinity of the target address. The addresses listed are included in the body of the report.

Addresses of Potential Concern		
YEAR	**ADDRESS**	**OCCUPANT**
No Addresses of Potential Concern identified on the subject street, within vicinity of the Target address.		

Notes:

- The Subject Property is in bold.
- The addresses on the left and right of the subject property are the closest listings found on the same side of the street,in the referenced directory.The listing to the left and right of the subject property represents the closest address found in the directories searched to the subject property, and on the same side of the street. They may or may not be adjacent properties.
- Occupant names and statements such as “Vacant, “No Info” and “Under constr” are listed in this report verbatim to the original listing in the relevant city directory. Any listing with an “XXXX” is verbatim and signifies the publisher did not receive any information for that address.
- Listings of occupant's names in directories occasionally contain multiple acronyms describing the property name, type or description. The enclosed City Directory Report lists the name once per address and does not decode any acronyms.
- A forward slash between names indicates multiple companies are listed under same main company listing.
- Occasional research notes (for example: aka - PCH, different city name, street appears to be renumbered, etc.) will be in Italics.
- Addresses of Potential Concern: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, within the vicinity of the target address. The addresses listed are included in the body of the report.

APPENDIX D

RESUMES OF GSI PERSONNEL

JOHN P. FRANKLIN
PRESIDENT/PRINCIPAL GEOLOGIST

EDUCATION

B. S. in Geology, 1975, University of Southern California, Los Angeles

REGISTRATION AND CERTIFICATIONS

State of California, Professional Geologist, No. 4100
State of California, Certified Engineering Geologist, No. 1340
State of California, Certified Hydrogeologist, No. 532
State of California, Registered Environmental Assessor, No. 1675
State of Arizona, Registered Geologist, No. 27157
State of Oregon, Registered Engineering Geologist, No. E1411
40-Hour/8-Hour Refresher Health and Safety Training for Hazardous Waste Operations

EXPERIENCE

Principal Geologist, GeoSoils, Inc., California
Senior Project Geologist, Owen Geotechnical, San Diego, California
Staff to Project Geologist, Leighton and Associates, San Diego, California
Staff Geologist, R. F. Smith Corporation, Long Beach, California
Staff Geologist, Petro-Tec, Anchorage, Alaska
Staff Geologist, Geological Engineering Service, Inc., Gardena, California

Mr. Franklin has extensive experience in geologic and geophysical investigations in such diverse areas as California, Utah, Nevada, Alaska, Baja California, and mainland Mexico, as well as offshore areas of California. He has performed detailed geotechnical work throughout southern California, including Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego, and Imperial counties, as well as Kern County, and Mono County in northeastern California, and Mexico. This experience includes using soil stratigraphy and erosion/sedimentation rates for evaluating active and potentially active fault investigations on the San Andreas, San Jacinto, Elsinore, Chino, Cucamonga, Indio Hills, Rose Canyon - Newport-Inglewood, La Nacion, Camarillo, Pinto Mountain, Mesquite Lake, Walker Lake, and Mono Lake faults; debris flow, landslide and slope stability investigations; stability investigations for mines and open-pit mines; seismicity studies; subsidence and fissuring investigations; rippability/rock hardness evaluations; solar projects in the Mojave Desert; DEIR studies; forensic investigations throughout southern California; and expert witness services. He has been involved with geotechnical studies in soft-rock and hard-rock sites for proposed residential, commercial and industrial developments, oilfield drill rig and production facilities, dams and retention basins, feasibility studies, coastal bluff stability, septic, infiltration, hazardous waste, and groundwater projects in southern California and Mexico. Mr. Franklin has been the project manager and principal investigator on geotechnical studies and grading for several large residential projects throughout San Diego, Riverside, San Bernardino and Kern counties, several high-rise commercial and residential projects in downtown San Diego, custom single-family residences throughout southern California and Los Angeles County, including beach and hillside areas, and military bases at Camp Pendleton and Twentynine Palms. Many projects included water tanks and reservoirs, park sites and other amenities such as clubhouses, lakes, golf courses, etc., as well as flood control channels, bridges, and cut and cover tunnels.

Mr. Franklin also has performed numerous Phase I and Phase II Environmental Site Assessments, and Site Characterizations for developers, real estate transfers, and bank loan requirements. Project sites have included existing gas stations, mines, shooting ranges, clandestine explosive manufacturing, nurseries, groves, schools, commercial and industrial complexes, and residential properties.

PROFESSIONAL AFFILIATIONS AND HONORS

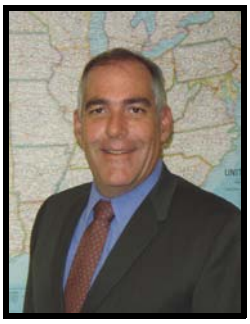
Association of Engineering Geologists
Seismological Society of America
Inland Geological Society
National Water Well Association
Roy J. Shlemon Distinguished Mentor in Applied Geosciences Program, GSA, 2005
Geological Society of America
Past-President, San Diego Association of Geologists
American Association of Petroleum Geologists
Sigma Gamma Epsilon (National Honorary Earth Science Fraternity)

PUBLICATIONS

Paleoseismic Features Exposed by Trenching the Lowest Coastal Terrace at Carlsbad, California, *in* AAPG Pacific Section Guidebook, June 19-22, 2002, Long Beach, California.

Paleoseismology of Blind and Offshore Faults, North Coast San Diego County, California USA, *in* Proceedings, The 11th ICSDEE and 3rd ICEGE, 7th-9th January, 2004, University of California, Berkeley.

TODD A. GREER
ENGINEERING GEOLOGIST, CEG 2377



EDUCATION

B. S. in Geology, 1998, San Diego State University, San Diego, California.

PROFESSIONAL CERTIFICATES

Engineering Geologist, CEG 2377, Board for Geologists and Geophysicists, California, 2005
Professional Geologist, PG 7739, Board for Geologists and Geophysicists, California, 2004
Professional Certificate in Hazardous Materials Management, 1994,
University of California San Diego, San Diego, California.
Hazardous Waste Operations and Emergency Response (HAZWOPER), 40-hour OSHA Training,
Environmental Training and Compliance (ETAC), Orange County, California.
HAZWOPER, 8-hour Refresher OSHA Training, Safety Unlimited, Inc., Angora Hills, California.
Nuclear Densometer Certified, San Diego, California.

RESPONSIBILITIES

Mr. Greer directs and supervises Phase I and II Environmental Site Assessments (ESA's) and toxicity screening review of lands slated for future development and laboratory analyses and remediation/mitigation of hazardous materials. This includes site reconnaissance and inspection, aerial photography review and analysis, background document research and review, consultation with local and federal environmental and hazardous waste agencies, report writing and review, including findings, conclusions, and recommendations for project permitting and development.

Mr. Greer also directs and supervises preliminary geotechnical/geologic field investigations, subsurface drilling operations (large and small diameter), rough grading and hillside grading operations, geologic fault finding and landslide investigations, pavement design investigations, and pavement rehabilitation projects involving Cal-Trans "right-of-ways", and research and report preparation for geotechnical/geologic projects in the Riverside and San Bernardino County areas.

PROFESSIONAL EXPERIENCE

Engineering Geologist, CEG 2377, GeoSoils, Inc., Murrieta, California, 2004 to Present.
Project Geologist, GeoSoils, Inc., Murrieta, California, 1998 to 2004.
Geologic and structural mapping, Agua Amarga, 1997, Bahia de Los Angeles, Baja California Mexico, Senior Thesis Project under the direct supervision of Professor David Kimbrough, Ph.D., San Diego State University.

Mr. Greer also has extensive experience with land use planning, hillside subdivisions, landslide investigations, liquefaction analyses, and geologic/fault investigations as they pertain to future commercial, residential, and roadway/highway development. This includes an extensive background in geologic research and review, aerial photography review and analyses, surface and subsurface geological mapping and cross-sectional illustration and analyses, rotary-wash, hollow-stem, and percussion drilling and sampling in the field to ascertain soil, bedrock, and groundwater conditions pertinent to development of the site. In addition, the evaluation and analysis of soil, bedrock, and lithologic test data, report writing and review, including findings, conclusions, and recommendations of a geotechnical/geologic nature.

PROFESSIONAL AFFILIATIONS

Member, Association of Engineering Geologists and Environmental Engineers (AEG)
Member, Inland Geological Society (IGS)

Fire Behavior Report
Conceptual Fuel Modification Plan

Wildomar 23 Development
Tract 36497
City of Wildomar

Amended Site Plan October 13, 2013

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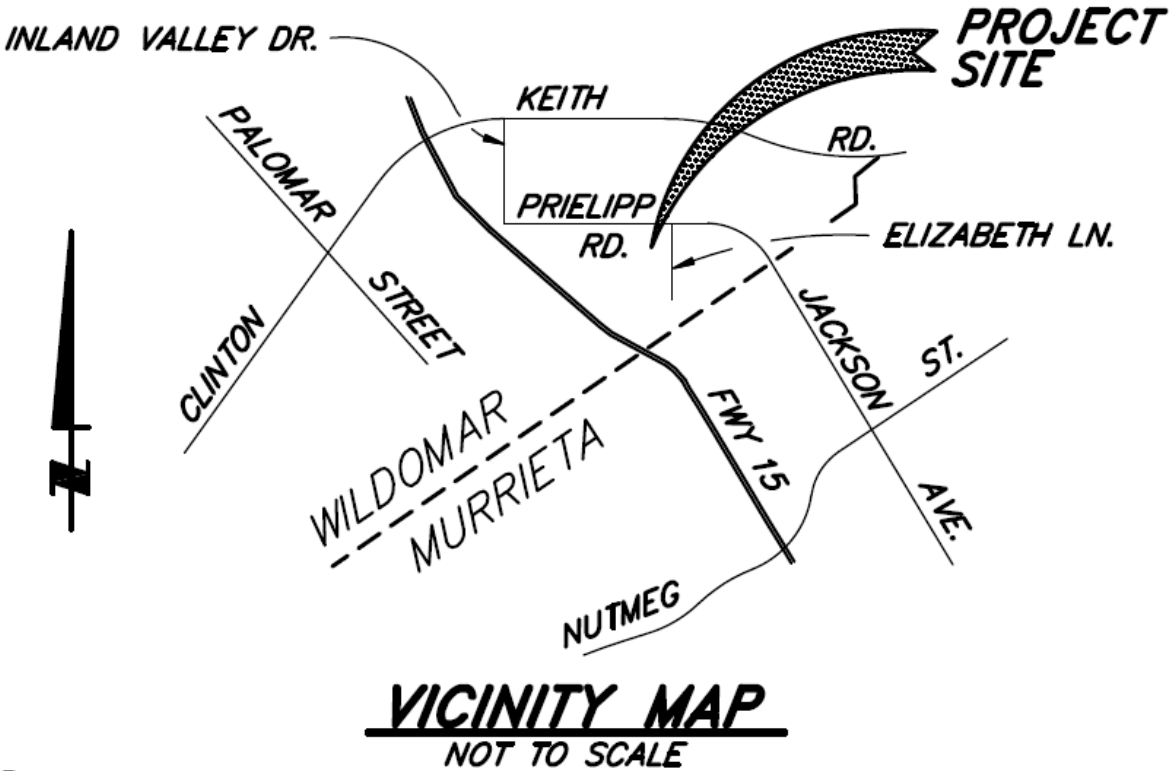
Purpose of Report

Firesafe Planning Solutions performed an assessment of the risks related wildland fire and to establish the appropriate criteria for a defensible space installation and maintenance program that will reduce the intensity of a wildfire approaching the Wildomar Tract 36497 residential community. This report will provide the results of the assessment and provide objective support of the defensible space installation and maintenance program for this community that is equal to or greater than the risk which would be encountered in a worst case scenario. The study takes into consideration existing/future vegetative interface fuels, topography, and weather conditions during a fire. The report provides results of computer calculations that measured the fire intensity from a worst case scenario wildfire in both the extreme (Santa Ana- NE wind) and the predominate (Onshore – South wind) conditions. The results of fire behavior calculations have been incorporated into the fire protection design built into the Wildomar Tract 36497 development.

Geographic Description

The Wildomar Tract 36497 site is located in a Fire Hazard Severity Zone in Riverside County within the City of Wildomar.

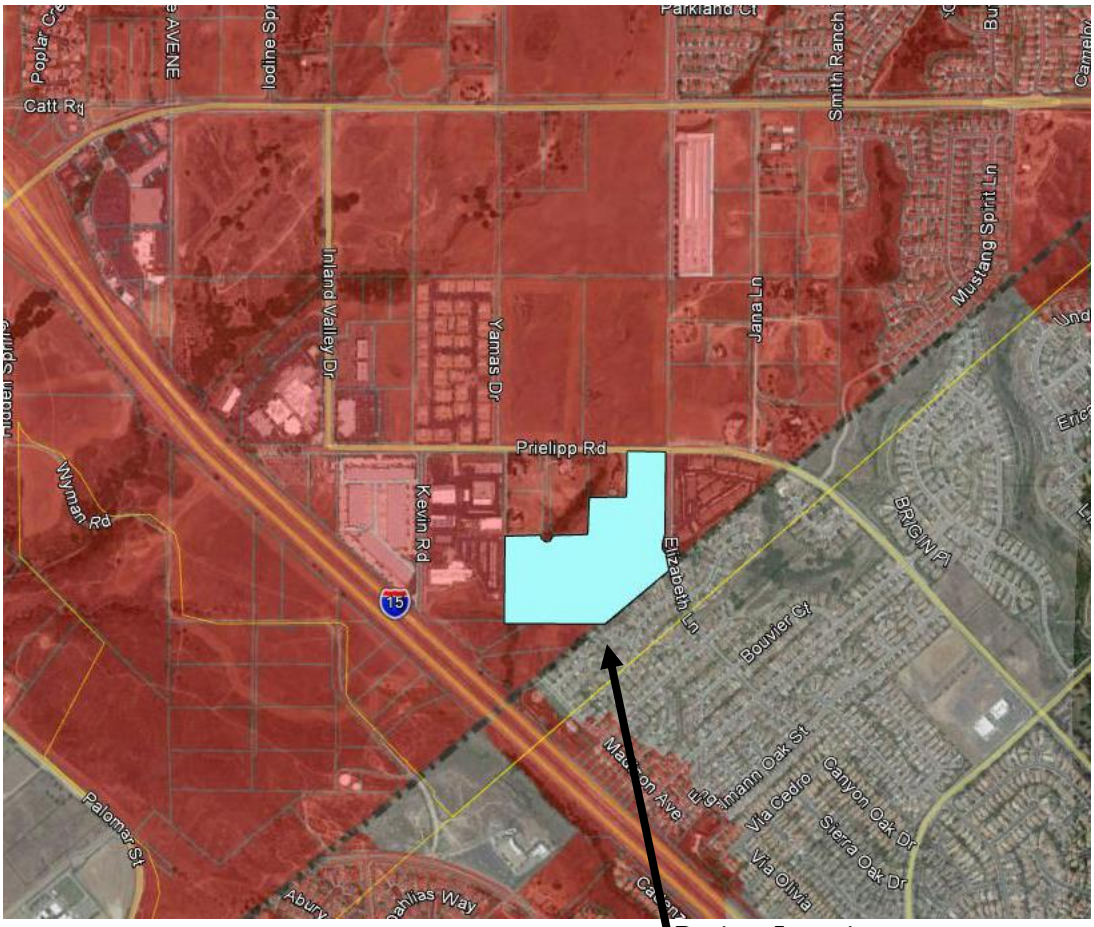


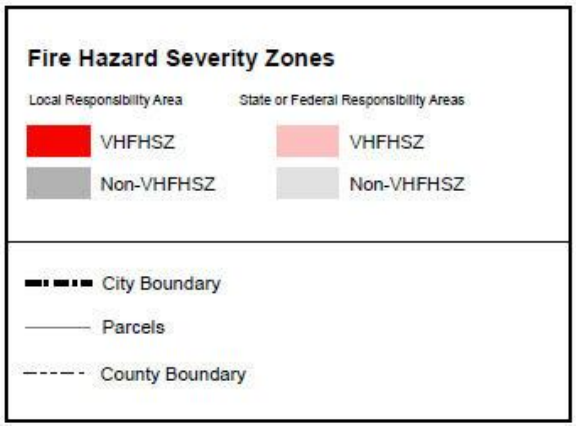
The proposed project is bordered by existing development to the west, east and south. The west side of TRACT 36497 has interface area which is will continue to be a habitat area and beyond

that is an industrial area that is fully developed. The east and south sides of the proposed community is bounded by existing homes. The only part of the development with a true wildland interface is the interior drainage.

As shown in the graphic below, the project site (shown in light blue) is bounded on all sides by roads and/or development. The area to the north of Prielipp Road is undeveloped but maintained in a manner that limits its growth of native fuels (weed abatement).

CAL FIRE Local Responsibility Area Very High Fire Hazard Severity Zone Map





As shown above, the project site is in the Local Responsibility Area (LRA) as identified by CAL FIRE per state law and is completely within Very High Fire Hazard Severity Zone of that map.

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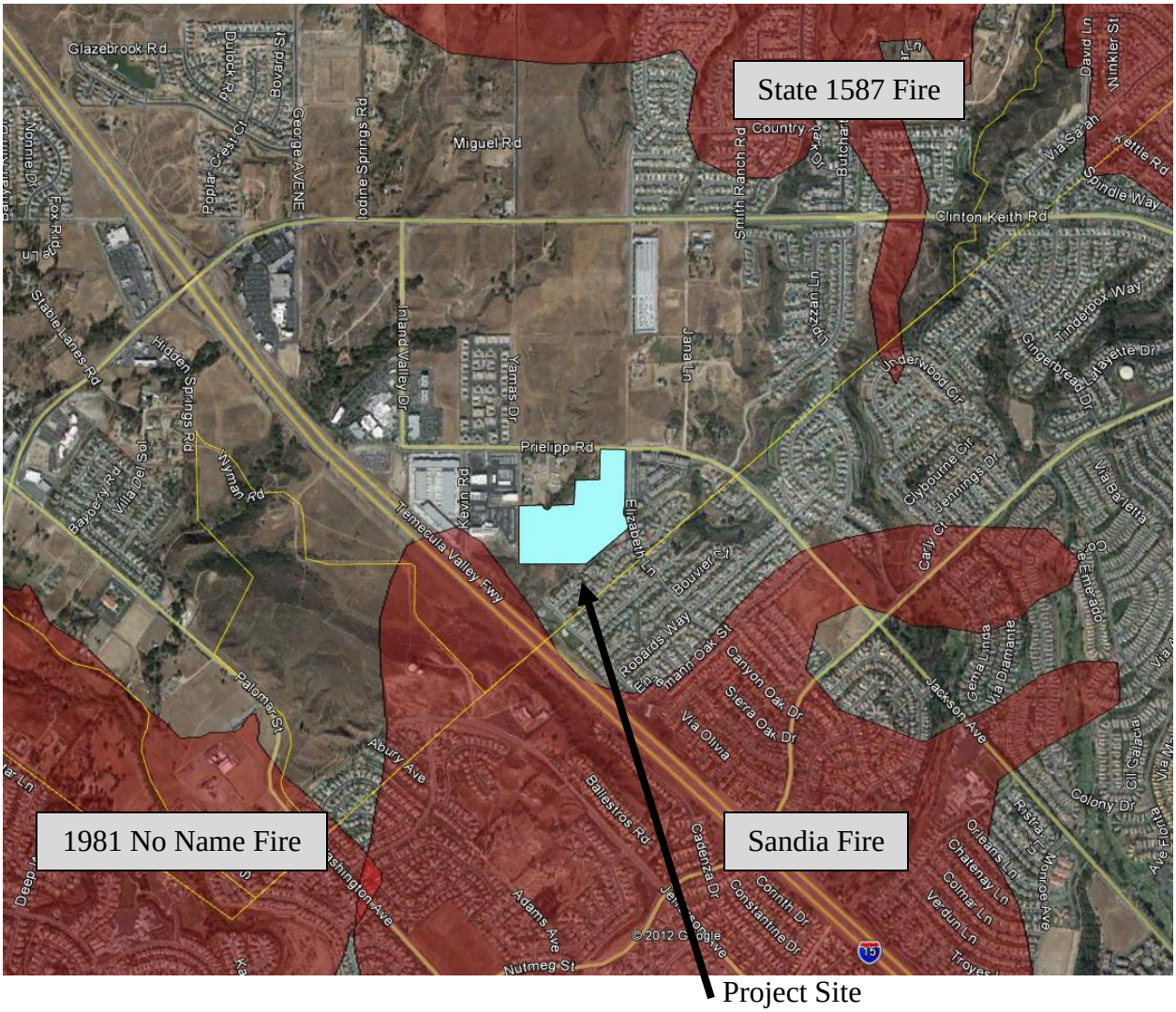


The wild land interface areas in the interior of the community have probably experienced small fires in the past but have no recorded history of large fires on the project site. The closest fire (Sandia Fire) was in 1956 (south and west of project site). This fire started on 9/12/56 and burned 2,053 acres in a areas that was practically undeveloped. Two other fires are within a few miles of the project site. To the north the State 1587 fire burned 3,276 acres, starting on 10/3/87. Finally in 1981, a fire with no name occurred on 6/15/81 and burned 9,182 acres. None of these fires entered the project site and only the Sandia Fire would have even posed a threat. Since development has occurred in the area, the area around the project site has not experience a large fire in over 25 years. This is likely due to a combination of early discovery, quick suppression efforts and man-made barriers (roads, parks, housing development and parking lots) that prevent the fire from spreading unchecked in the absence of fire suppression efforts.

Defensible Space Program

Defensible space is land that is designated for the purpose of providing an interface between the native vegetation and development that does not allow fire to transition from the wildland into the structures. This is accomplished through the installation of fire resistive plant species and land with selectively removed native vegetation. A defensible space program starts when the local governmental planning department places development construction conditions requiring a defensible space program. Any new development occurring within or adjacent to lands containing combustible native vegetation needs modification of the vegetation at the urban interface in order to protect structures. Native plants are replaced with drought-tolerant, fire-resistant species in order to slow the speed and intensity of an approaching wildfire. Defensible space programs vary in complexity and designs are dependent upon the type and spacing of vegetation as well as topography, weather conditions, and the placement of structures. Irrigated and non-irrigated plant thinning defensible space zones help to reduce the products of wildfire before the products of fire spreads to homes. The lack of available native fuels and the new plant fuel types installed will cause a reduction in the intensity of the fire when it is approaching the structures.

Defensible space needs to be thought of as an on-going maintenance program though because the program requires zones to be maintained indefinitely. Installing new plants works great initially and maintenance is easy, but proper long-term maintenance is difficult and experienced techniques can assist in extending the longest possible life span for the plants. Funds need to be an expected expense in the annual budget of association dues. Proper and consistent maintenance can save on the total long-term cost of maintenance over long periods of time.

The Defensible space Maintenance Program (DSMP) described in this report meets or is at least equivalent to the minimum code requirements at specific locations. The defensible space codes enforced by The County of Riverside Fire Department were developed to handle the type of wildland fuels that are interfacing with TRACT 36497.

The DSMP ultimately requires regular maintenance activities to be done indefinitely by the future Homeowners Association (HOA). The defensible space zones will be originally installed and maintained by the developer until the on-going maintenance responsibility is turned over to the HOA. The maintenance requirements will be copied on the defensible space plans. The developer will distribute the approved plans with maintenance requirements directly to the Homeowners Association at a required DSMP maintenance turnover meeting. The program requires The County of Riverside Fire Department to be present at the maintenance turnover.

This report uses a scientific approach to describe a wildland fire hazard assessment and expected wildland fire behavior outside of the defensible space zones. Computer projections simulate a fire burning within the native vegetative fuels directly outside the boundaries of the DSMP zones. This report will demonstrate why code-conforming defensible space zones will help protect the community.

Defensible Space Landscape Plan Criteria:

The landscape plant installation drawings designed by the Landscape Architect, should be the same drawings reviewed by The County of Riverside Fire Department for defensible space approval. Plan information should include a minimum of the following:

- A delineation of each zone size and type.
- The entities responsible for maintenance of each zone.
- The approved plant species that will be installed.
- Shrub and tree spacing
- The location of access easements.
- Location of zone markers.
- The location of building footprints.
- Sufficient maintenance notes and diagrams.

Defensible Space Zones

Irrigated Zone "A"

- The Zone is located at between the structures and the Zone B. The formal Zone A starts at the end of the private lots and is contained within a lettered lot under the control of the HOA. Zone A is cleared of all natural vegetation from the and replanted with only approved plants listed on the approved plans (Appendix A) and in accordance with the spacing requirements of the same appendix. HOA CC and R documents will have language prohibiting the construction of combustible structures within Zone A. Home buyers are required to sign a disclosure indicating they are aware of the defensible space zone. Zone A area will be irrigated to keep the vegetation in a state of high fuel moisture year round.

No/Low Fuel/Thinning Zone "B"

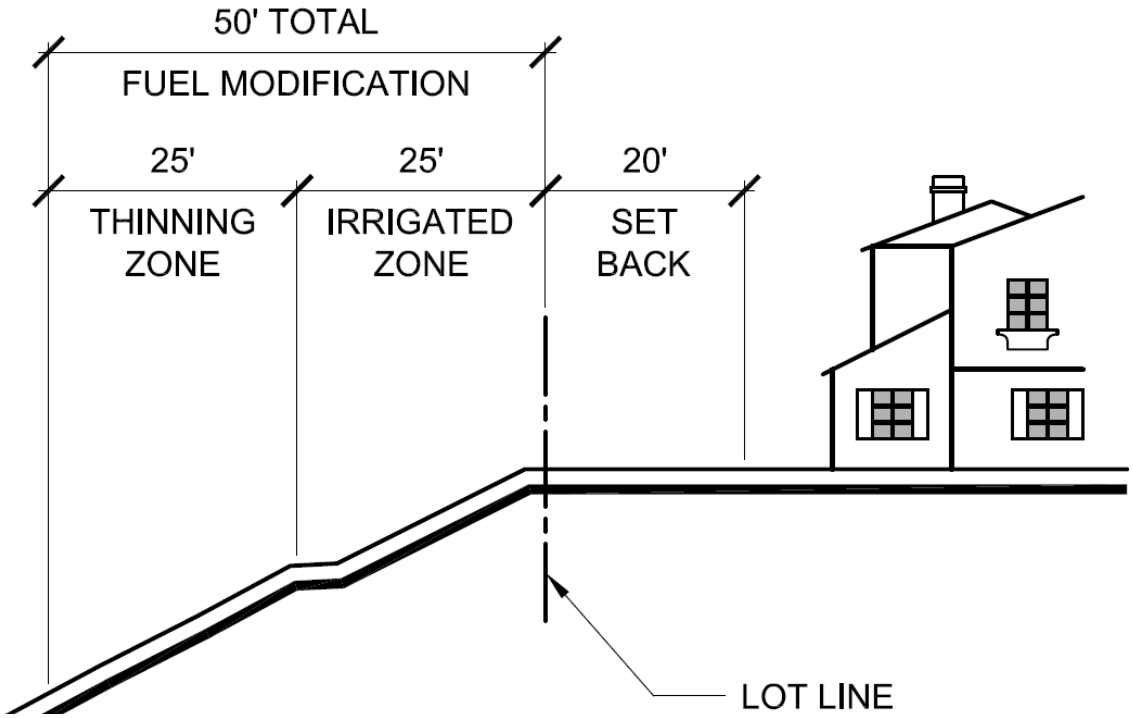
- Zone B starts at the end of Zone A and moves outward away from the structures towards the native vegetation. Zone B can be developed in one of three methods:

    1. Cleared, permanently and replaced with a noncombustible cover such as a boulder blanket or rock outcropping to prevent erosion. Any vegetation that establishes in this area would need to be removed.

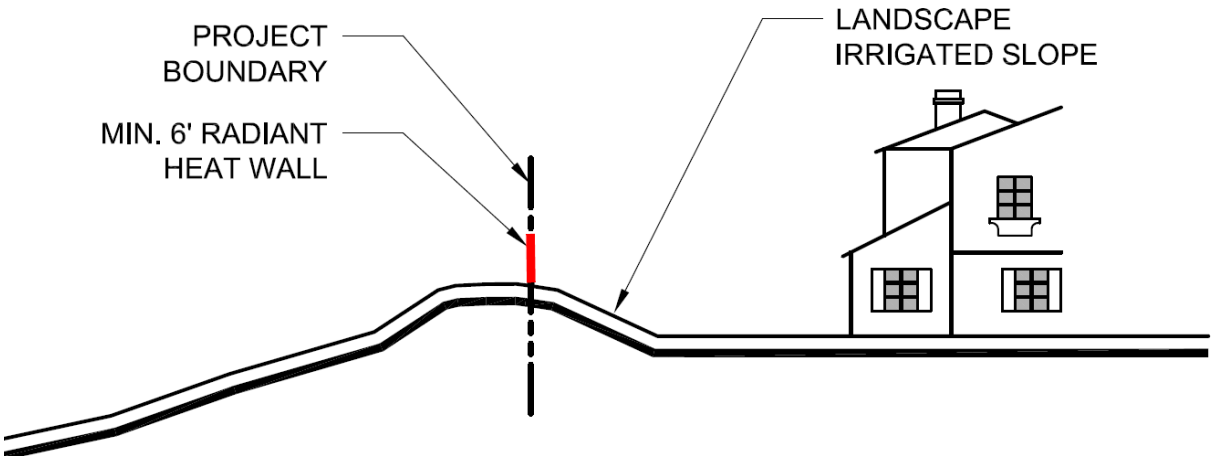
    2. Vegation replaced with suface covering such a wood chips, base or gravel. This area would be maintained free of vegetation.

    3. Selective thinning of natural vegetation to ground coverage of 50% or less with all of the dead and downed materials removed annually. All seasonal grasses will be cut to a height of no greater than four inches (4") prior to the start of fire season but in no case could the height exceed eighteen inches (18") even when the plants are growing and still not capable of burining. No highly combustible plants will be allow. This are designated on the plans approved by The County of Riverside Fire Department. The highly combustible plants will be removed from the zone during the regular maintenance activities before they seed into the area. Native shrubs shall be maintained at a height no greater than twenty four inches (24") in height.

A typical section of the fuel modification zone is shown below.



Below is a section of the alternative radiant heat wall section



Fire Behavior

Firesafe Planning Solutions used a computer software program titled, "BehavePlus Fire Modeling System 5.0.4" to predict the level of wildfire intensity for a fire approaching Wildomar Tract 36497 . BehavePlus, is a fire behavior prediction and fuel modeling system and is one of the most accurate methods for predicting wildland fire behavior. The BehavePlus fire behavior computer modeling system is utilized by wildland fire experts nationwide. Vegetative fuels are recognized as fuel models within the BehavePlus program. The fuel models in the computer program, are also referenced from the book titled, "Aids to Determining Fuel Models for Estimating Fire Behavior". The fuel models were designed to aid in determining fuel types and are used in calculating and estimating fire behavior. We used BehavePlus to measure the intensity of a fire moving towards this development.

The fire model describes the fire behavior only within the flaming front of the fire. The primary moving force in the fire is dead fuel less than ¼" in diameter. These are the finest fuels that carry the fire. Fuels larger than ¼" contribute to fire intensity, but not necessarily to fire spread as much as the fine fuels. The BehavePlus fire model describes a wildfire spreading through surface fuels, which are the burnable materials within 6' of the ground and contiguous to the ground.

This type of modeling will demonstrate that the DSMP is the best fire defense system for Wildomar Tract 36497 . The Modeling will show that the structures are significantly further away than the most extreme flame lengths and intensity that would be produced. Instead of estimating with the exact fuel models for calculating fire behavior, we will input worst case scenario factors and fuel models to ensure a further safety cushion in the computer fire behavior calculations and results analysis.

BehavePlus Related References:

1. Aids to Determining Fuel Models for Estimating Fire Behavior, Hal E. Anderson. General Technical Report INT-122 April 1982.United States Department of Agriculture - Forest Service, Intermountain Station, Ogden, Utah 84401.

2. BehavePlus: Fire Behavior Prediction and Fuel Modeling System - BURN Subsystem. General Technical Report INT-194. Patricia L. Andrews, United States Department of Agriculture - Forest Service, Intermountain Station, Ogden, Utah 84401

Wildland Interface Fuel Types

For the purposes of modeling in the plan, Fuel Models gr2, gs2, and tu5 were used:

Model GR2 is moderately coarse continuous grass, average depth about 1 foot. Spread rate high; flame length moderate.
Model GS2 is shrubs are 1 to 3 feet high, moderate grass load. Spread rate high; flame length moderate.
Model TU5 refers to fuel beds that are heavy litter load with shrub component. Spread rate moderate; flame length moderate.

The map below shows the site overlaid on Google Earth. Darker green areas in the bottom of the drainages are Cottonwood-willows and sycamores. Brown areas are small pockets of sage and other native shrubs.

Fuels Summary

The predominate fuels in the project site are grasses, grass/scrub mixtures and willow-cottonwood riparian forest. The creek bed has full growth willows and cottonwoods with a moderate shrub understory. Small pocket of sage and coastal scrub exist but most of them are on the slopes leading to the major drainage.

On the following pages, a series of photos are used to show the predominate vegetation on the site. More detailed photos are contained in Appendix B of this report. While all of it will be removed in the development areas, the drainages and areas adjacent to the creek will be maintained as habitat areas with little to no management of these areas except for the possible removal of invasive species. Creek bottoms are a mixture of willows and cottonwoods but has a brush/shrub understory so the TU5 was used (See Photo 1 on following page). The slopes are Sage Scrub but the .fuel bed depth is too shallow to use a SCAL18 so a sh2 was used and finally, the flatter areas are even less scrub and more seasonal grasses so a the gs2 was used for this area (See Photos 2 and 3).

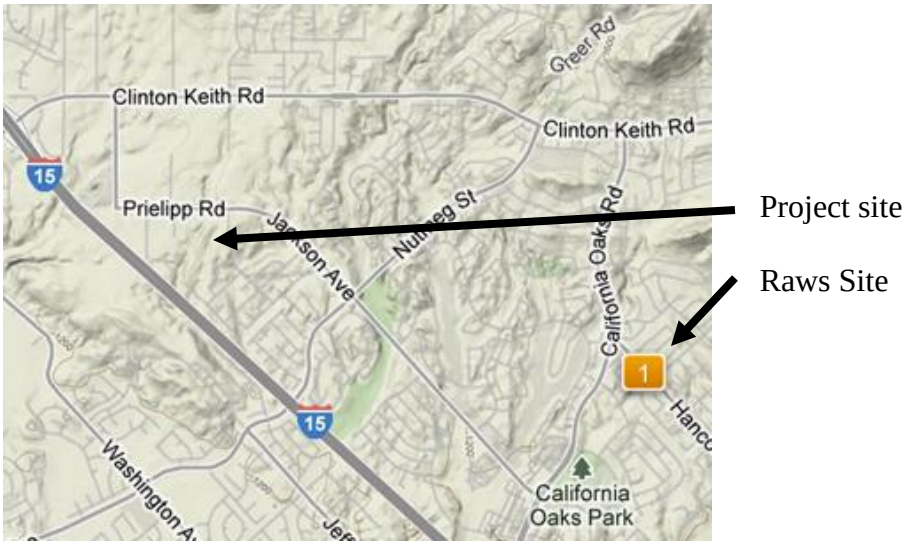
Photo 1 - Typical slope shrubs in foreground and Willow-Cottonwood Forest in the background

Photo 2 – Typical flat area shrubs

Photo 3 – Typical interface on south end of project to undeveloped land between site and freeway

Wind Patterns and Weather Inputs

After a review of the local RAWS (Remote Access Weather Station) data, the most extreme wind patterns and speeds relating to wildfires were enter into the modeling programs (BEHAVE and Wind Ninja). All other lesser wind patterns and wind speeds normally produce less fire intensity based on a fire in wildland fuels. Several RAWS are available in the area of the project but the one closest only has two years of data so one a few miles away has been used.



A summary graph below shows that the predominate wind direction is from the south. Storm come in from the northwest and the occasionally Santa Ana Wind event brings a north or northeast wind. The strongest wind gust measured 30 mph at this site and 40 mph at an adjoining site.

History for KCAMURRI9

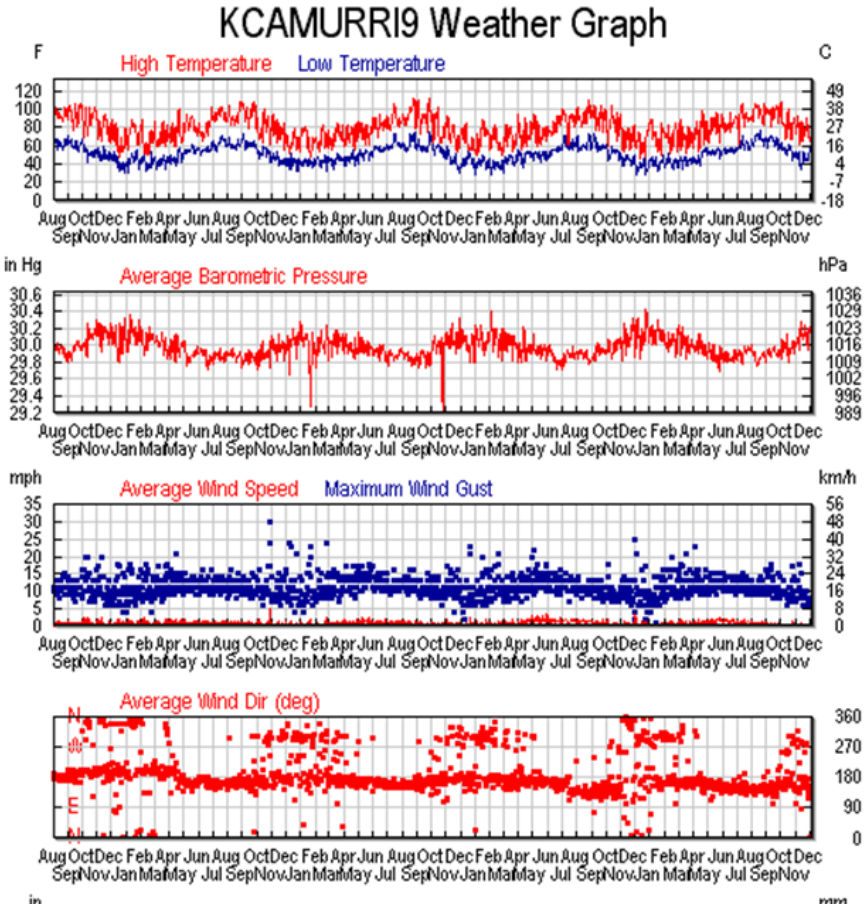
Murrieta Neighbourhood Weather Watcher, Murrieta, CA — Current Conditions

Daily Summary for August 1, 2008 - December 4, 2012

August 1 2008 - TO - December 4 2012 Go

Daily | Weekly | Monthly | Yearly | **Custom**

	High:	Low:	Average:
Temperature:	**112.7** °F	**0.0** °F	**64.7** °F
Dew Point:	**75.2** °F	**-99.9** °F	**45.5** °F
Humidity:	100.0%	3.0%	57.2%
Wind Speed:	**25.0**mph from the ESE	-	**0.7**mph
Wind Gust:	**30.0**mph from the WNW	-	-
Wind:	-	-	South



The three most extreme wind patterns/wildland fuel alignments are:

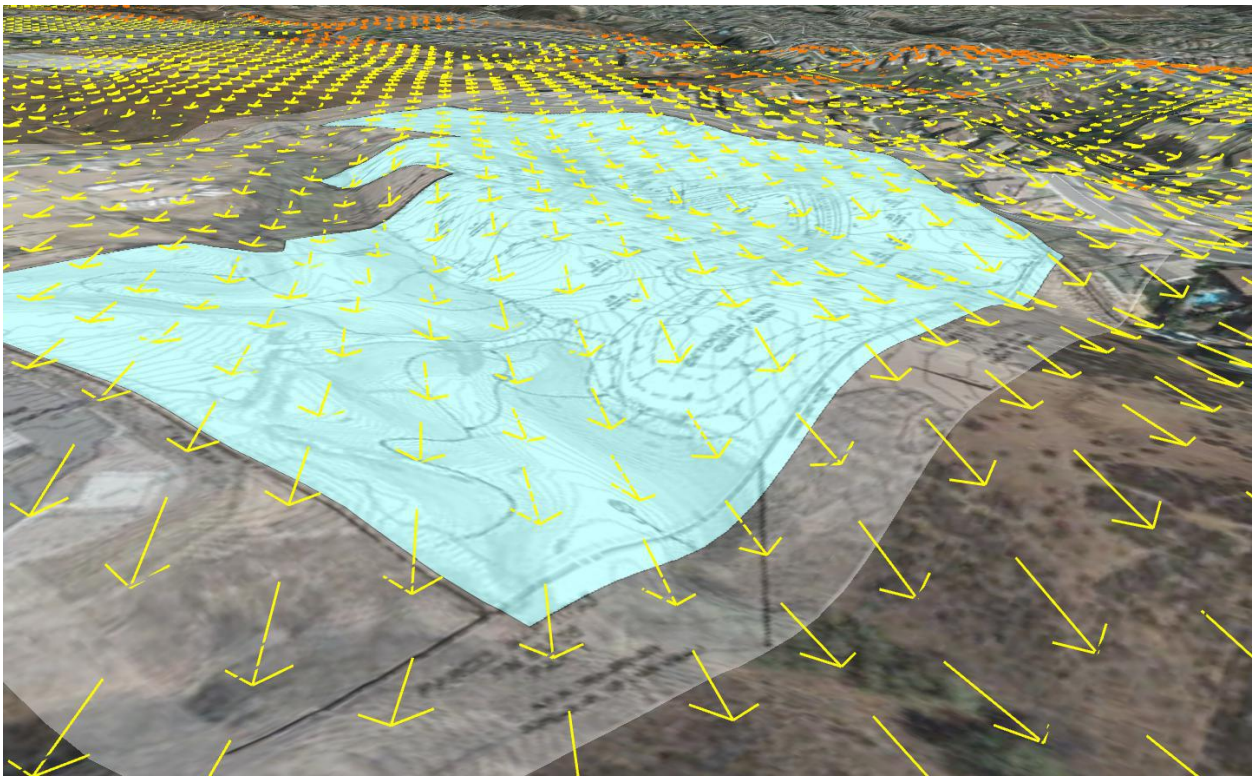
- A 40 mph northeast Santa Ana wind.
- A rare 30 mph dry southerly on-shore, for the normal prevailing wind.
- A WNW wind in front of a winter storm

Temperature and relative humidity max/min are also taken from the RAWS data.

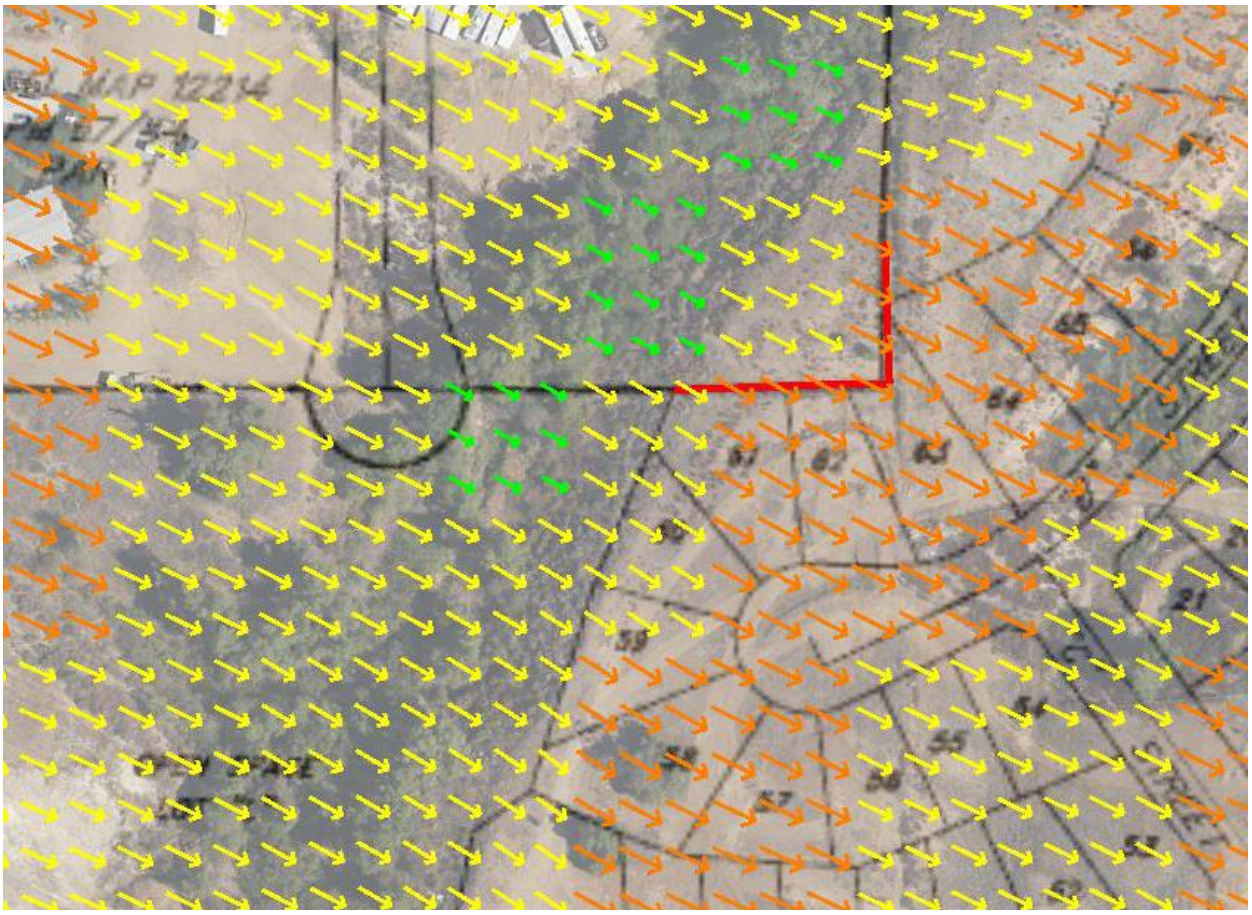
Using the Wind Ninja software, the wind and the relationship to the topography has been determined to NOT be a factor with this development. Little to no wind channeling is achieved on any wind pattern. The changes in topography are simply too minor to overcome the wind in any scenario. The predominate wind (from the south) intersection the project boundaries at a pie shaped undeveloped lot between the project site and the freeway. The majority of the southern section of the project site intersects with existing development and has no wildland interface. The graphic below shows a wind from the south as it intersects the six lots on the southern end of the project site adjacent to open space or existing wildland.

Note: no wind acceleration or wind channeling on the site.

A NE wind will take any fire in the drainage (only wildland fuels on the site) away from the structures. As can be seen by the orange arrows, some offsite ridgeline acceleration occurs but has not effect on the project site.



It should be noted that the wind does not align with the slope in areas were the vegetation is also aligned with the wind. In the few areas where the wind would be running upslope, the vegetation is perpendicular to the wind making the fuel bed small as the wind travels across it rather than down it. The graphic on the previous page and below shows this relationship more clearly.



While the graphic above shows ridge top acceleration on the project site, the grading of the site will eliminate these ridges when completed leaving only those shown are the project boundary. The green arrows indicate wind sheltering (slower) and the orange wind acceleration (faster) from the average wind speed in the area.

BehavePlus Fire Behavior Inputs and Results:

Inputs for the Behave Plus Fire Behavior Model were as follows:

Moisture scenarios used are extreme. One-hour fuels at 3%, ten-hour at 4% and hundred-hour at 5%. Herbaceous live fuels are modeled at fully cured (30%) and woody fuels at 50%. Model runs have been completed for various aspects on the two wind scenarios and a no wind scenario. Above shows the NE aspect with the 40 miles per hours general wind (16 mph midflame using a .4 adjustment factor for unsheltered fuels). All scenarios assumed a 50% (2:1 slope) as the worst case. Aspects are shown on the model scenario and the spread direction is shown in 15 degree increments to show the slope effect and when and/or if it over powers the wind.

Behave runs have been completed for both the NE Santa Ana wind and the onshore S wind. The moisture scenario are unchanged to simulate the rear dry onshore that can occur when the Santa Ana winds break down and on shore flow is resumed but the air immediately offshore is the dry air that has been pushed out to see by the NE wind event. This condition is rare and only last for a short period of time as the air further out to sea, will have increased moisture level when then return to the land by the onshore breeze. A no wind scenario has been modeled to show the effects of fuel and slope alone and to get a better idea of how the fire will behave in the wind sheltered areas.

The Behave outputs are attached in the appendixes but have been summarized here for discussion purposes. The fire that has been modeled here is a fast running wind driven fire that burns in an elliptical pattern shown below by the red arrows. To the right are the calculated flame lengths for each of the directions of spread for the worst case scenarios modeled. We find that a maximum flame length of 15.5 feet is possible at the head of the fire, when the fire is running directly upslope with a continuous fuel bed that is consistent enough to produce a self-sustaining, self propagating fire. It is important to note that flames only 15 degrees out of the perfect alignment of all the factors are about one-half the size if the flaming point of the fire. Another 15 degrees drops the flame lengths to 1/3 of the flaming point. Fire to the flanks and backing fire are small enough to extinguished using hand tools.

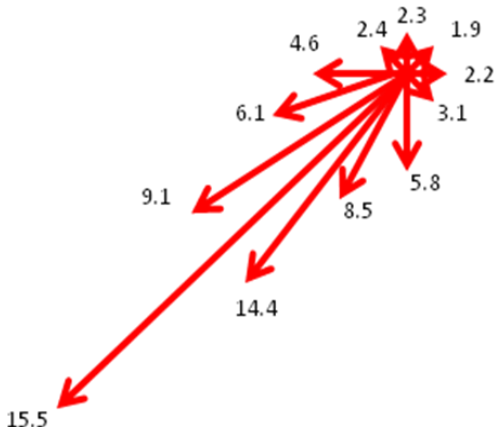
Wildomar23 - NE wind 40 mph
Flame Length (ft)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	2.1	1.7	2.3
15	2.0	1.7	2.2
30	2.0	1.6	2.2
45	2.0	1.6	2.2
60	2.0	1.7	2.2
75	2.0	1.7	2.3
90	2.1	1.8	2.4
105	2.3	1.9	2.6
120	2.5	2.1	2.8
135	2.8	2.3	3.1
150	3.2	2.7	3.7
165	3.9	3.3	4.5
180	5.0	4.2	5.8
195	7.1	6.1	8.5
210	11.9	10.2	14.4
225	15.3	12.4	15.5
240	9.0	7.3	9.1
255	5.8	4.8	6.1
270	4.3	3.6	4.6
285	3.5	2.9	3.8
300	3.0	2.5	3.2
315	2.6	2.2	2.8
330	2.4	2.0	2.6
345	2.2	1.8	2.4
360	2.1	1.7	2.3

Wildomar23 - South wind 30 mph
Flame Length (ft)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	12.3	10.0	12.9
15	11.6	10.0	14.3
30	7.4	6.5	9.4
45	5.2	4.5	6.4
60	4.0	3.5	4.9
75	3.3	2.9	4.0
90	2.9	2.5	3.4
105	2.6	2.2	3.0
120	2.4	2.0	2.8
135	2.2	1.9	2.6
150	2.1	1.8	2.4
165	2.0	1.7	2.4
180	2.0	1.7	2.3
195	2.0	1.7	2.3
210	2.0	1.7	2.3
225	2.1	1.8	2.4
240	2.2	1.9	2.5
255	2.4	2.0	2.7
270	2.6	2.2	2.9
285	2.9	2.5	3.3
300	3.4	2.9	3.8
315	4.2	3.5	4.6
330	5.5	4.5	5.9
345	8.0	6.5	8.3
360	12.3	10.0	12.9

The fire that has been modeled here is a fast running wind driven fire that burns in an elliptical pattern shown below by the red arrows.



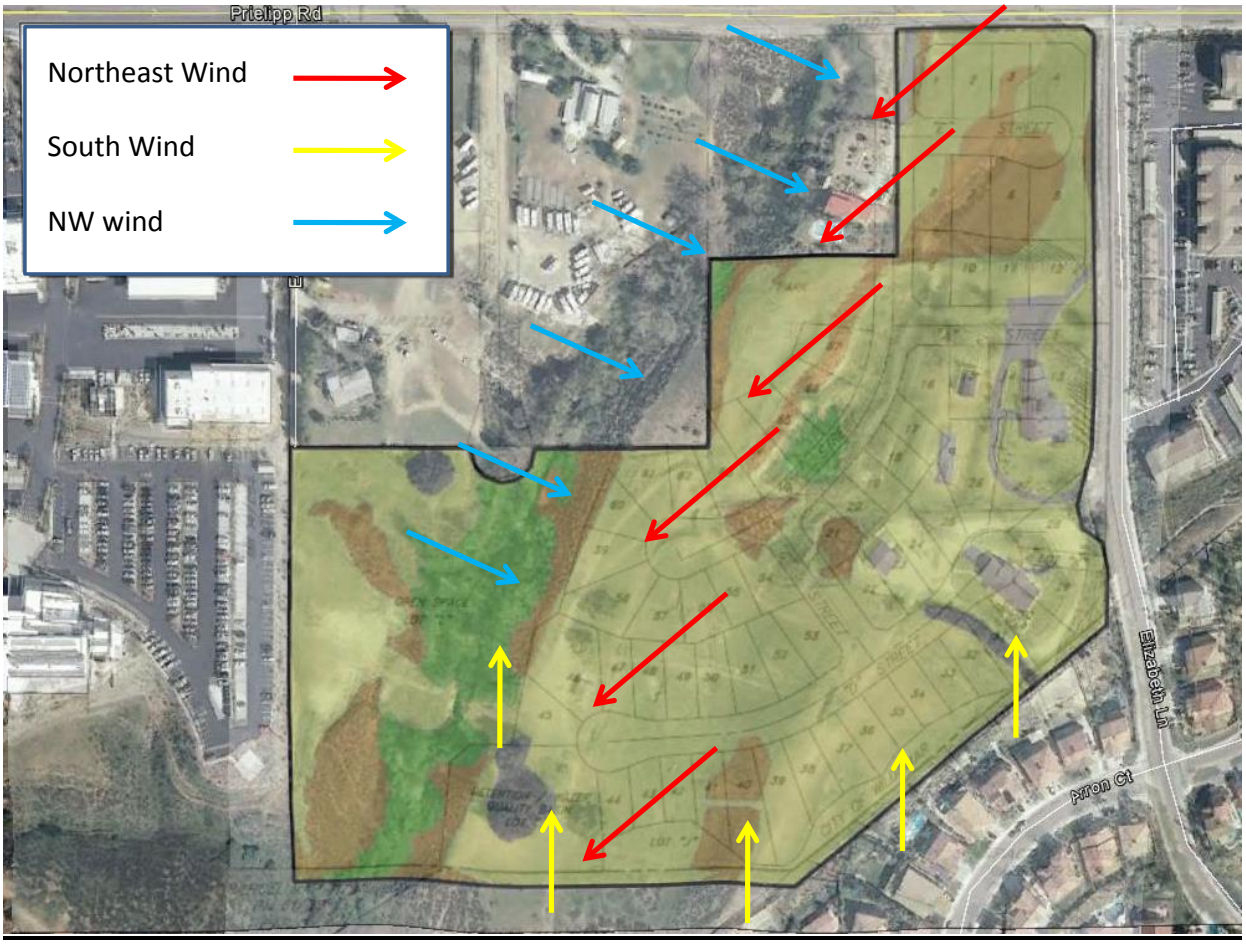
Results for the 30 mph west wind (onshore) are similar but flame lengths are less (14.4 foot as opposed to 15.5 foot). For this reason, the defensible space requirements have been based on the 15.5 foot maximum NE wind and NW aspect.

The final factor in the determination of adequate protection for this project is to analyze how fire would enter the vegetation adjacent to the structures in this project. This is an important factor. Due to development and a lack of continuous fuels, it is unlikely that the fire would burn into the proposed project as a "line of fire". This is simply not supported by the topography and fuels that are present. But what is likely to occur is the fire will spot from an upwind fire into the vegetation within the project site. This is important because the fire will need to have both time and fuel to accelerate to the levels indicated in the Behave modeling results.

Fire acceleration is fuel dependent but independent of fire behavior. Fire acceleration is defined as the rate of increase in spread rate from the current rate to an equilibrium spread rate under constant environmental conditions. The incorporation of acceleration means that fire spread rates will not immediately adjust to the equilibrium spread rates when conditions change.

The rate of fire acceleration is dependent on a rate factor. The default rate for acceleration to 90% of equilibrium rates after 20 minutes from a point source fire. As shown next page, 20 minutes of fuel, which are upwind and down slope from the structure proposed, are not available within the project boundary.

Yellow arrows are the South wind. Red arrows are the NE wind and the blue arrows the NW. Brown areas are the sage fuel and the green are the willows and cottonwoods in the bottom of the drainage/ creek channel.

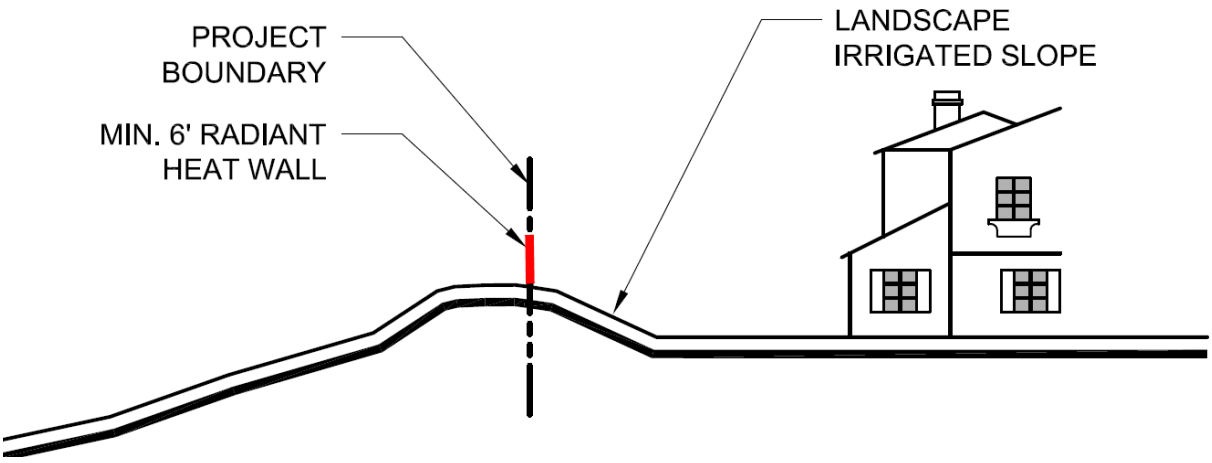


Fire Behavoir Summary

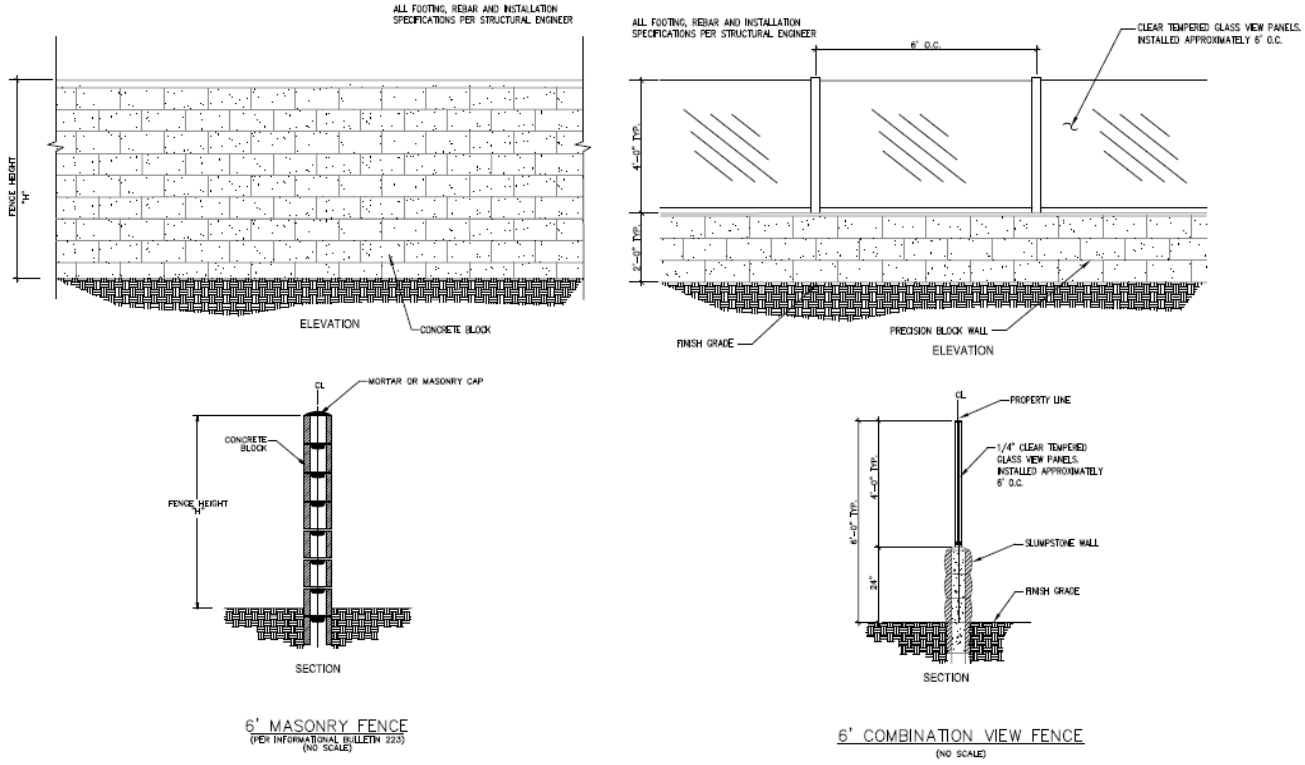
While the modeling indicates that flame lengths of 15.5 feet are possible under perfect conditions, this is unlikely due to predominate winds that drive wildland fires. The fuels are not aligned with the slope and wind and fuels are not continueous enough to drive fire behavior to the level of the equilibrium spread rates used in the modeling. Flanking fire of six to eight feet maximum is expected at the property line of the lots within the development or at the base of the fuel modification zones or radiant heat walls.

Additional Fire Protection Features

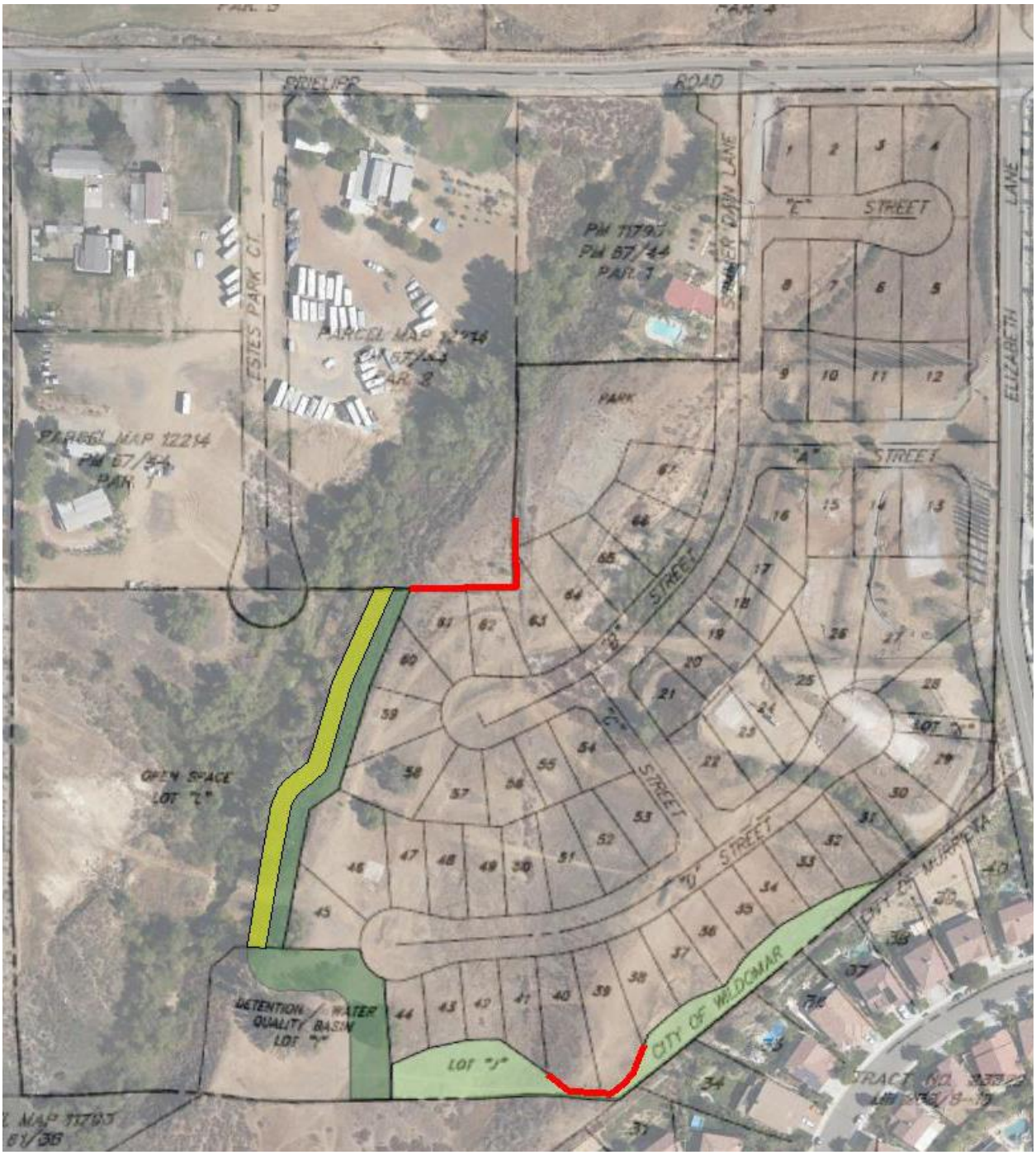
As indicated in the defensible space design, a block wall/radiant heat wall will be constructed when a fuel modification zone is not possible without offsite improvements. In all cases, the wall has been placed where the fuels below the structure is not of a continuous nature, not in alignment with the Santa Ana winds or the predominate wind (S).



These walls will be either block or tempered glass over block similar to those shown below.



These types of walls are extremely effective when used at the top of the slope in light to moderate fuels. The extreme fire behavior that can be produced by high winds also bends the fire over making it travel more parallel to the ground. The harder the wind, the more the flame angle will be and the more effective the radiant heat wall will become. The locations are shown below in red. Note: The irrigated zone (dark green below) can be replaced with a dry zone of equal size, if a radiant heat fence is provided at the top of the slope (This is an equal alternative)

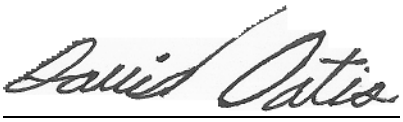


Report Summary

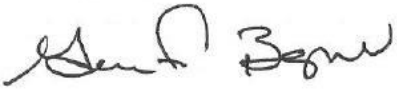
The Wildomar Tract 36497 Project is has been designed and protected by the most recently adopted codes and practices. Firesafe has used the BEHAVE modelto measure the intensity of a fire moving towards this development to design a protection system that will ensure that the project will be safe from wildland fires even without fire department suppression activities . Flame lengths and fire intensity are ultimately reduced by the installation and maintenance of the fuel modification plan through the use of the irrigated Zone A, the removal of fuels in the Zone B and the radiant head walls surrounding the homes on the perimeter.

Based on the scientific fire bahavior analysis, exterior portions of future structures or attic spaces will not ignite from the exterior fire exposure from a wildland vegetation fire. This is primarily because the greatest fire energy is too far away from the structures due to the low plant densities within the defensible space zones and the construction feature requirements.

The codes enforced by the County of Riverside Fire Department for defensible space were developed to handle the exact type of fuels that are interfacing with this future development. We recommend approval of this Fire Protection Plan and Defensible Space Maintenance Program.



Principal
Fire Safe Planning Solutions



Fire Protection Analyst
Fire Safe Planning Solutions

Appendix A

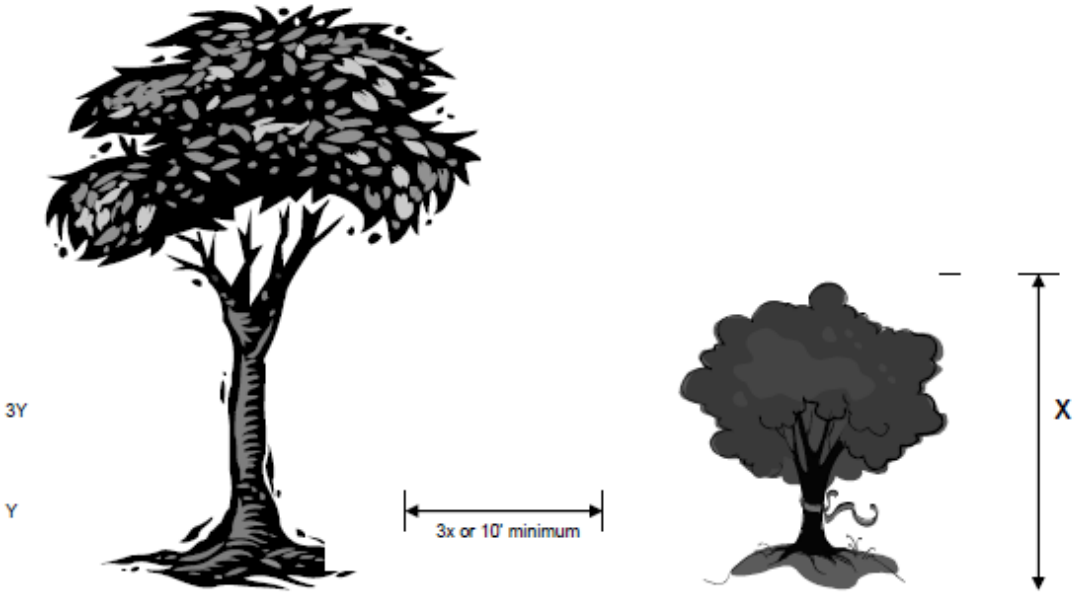
Approved Plant Palette

Planting Guidelines and Maintenance Guidelines:

1. Create a defensible space around all structures.
2. In the "Green Zone" (within 30' of any structure), plant only fire resistant and drought resistant plants.
3. Space native trees and shrubs at least 10' apart.
4. For trees taller than 18', remove lower branches within 6' of the ground.
5. Trees and tree-form shrubs should be maintained to provide clearance of three times the height of the understory plants or 10', whichever is greater. See Figure 1 – below.

Diagram for Plant Spacing:

FIGURE 1-



6. Perform routine maintenance to remove dead branches, twigs and leaves.
7. Do NOT completely remove all vegetation and leave bare ground unless covered with boulders or rock to prohibit erosion and habitat disturbance.

The following is a list of plants NOT recommended in defensible space zones per the Riverside County Fire Department.

Ornamental Grasses:

Green Fountain Grass- *Pennisetum Setaceum*
This plant grows in dense stands and alters native habitats. It is an extreme fire hazard.
Pampas Grass- *Cortaderia Selloana, Cortaderia Jubata*
This plant accumulates large amounts of litter and harbors vermin. It is a serious fire hazard.

Shrubs:

Broom (Bridal, French, Portuguese, Scotch, and Spanish)- *Retama Monopserma, Genista Monspessulana, Cytisus Striatus, Cytisus Scoparius* and *Spartium Junceum*
This plant grows rapidly, creating an extreme increase in fuel accumulation and fire danger.

Native Shrubs/Target Fuels: These plants contain high oils and resins and retain low moisture. They are highly flammable and emit toxic gasses when burned. It is recommended to clear this brush from around structures and not to plant these shrubs if they are not already present.

Chamise- *Adenostoma Fasciculatum*
California Sagebrush- *Artemisia Californica*
Juniper Bush- *Juniperus communis*
Common Buckwheat- *Ergonum Fasciculatum*

Trees:

Palms: Although palms are extremely prevalent in Riverside County they are considered a fire hazard when they are not pruned and maintained properly. They create dead fronds and harbor vermin.

Desert Fan Palm- *Washingtonia Filifera*
Canary Island Palm- *Phoenix Canariensis*
Mexican Fan Palm- *Washingtonia Robusta*

Italian Cypress- *Cypressus Sempervirens*
Heavy litter from this tree creates a serious fire hazard. This tree also harbors extreme vertical fire spread hazards.

Eucalyptus (Blue Gum, Common Eucalyptus, Red Gum)- *Euclyptus Globulus*
This tree creates abundant litter and creates a thick covering of duff. The debris is extremely flammable. Also, when ignited, the stringy bark has a potential to be carried away into unburned fuels and cause spot fires.

Approved Plant Palette

	Code	Botanical Name	Common Name	Plant Form
1.	W	Abelia x grandiflora	Glossy Abelia	Shrub
2.	n	Acacia redolens desert carpet	Desert Carpet	Shrub
3.	o	Acer macrophyllum	Big Leaf Maple	Tree
4.	X	Achillea millefolium	Common Yarrow	Low Shrub
5.	W	Achillea tomentosa	Woolly Yarrow	Low Shrub
6.	X	Aeonium decorum	Aeonium	Ground cover
7.	X	Aeonium simsii	no common name	Ground cover
8.	W	Agave attenuata	Century Plant	Succulent
9.	W	Agave shawii	Shaw's Century Plant	Succulent
10.	N	Agave victoriae-reginae	no common name	Ground Cover
11.	X	Ajuga reptans	Carpet Bugle	Ground Cover
12.	W	Alnus cordata	Italian Alder	Tree
13.	o	Alnus rhombifolia	White Alder	Tree
14.	N	Aloe arborescens	Tree Aloe	Shrub
15.	N	Aloe aristata	no common name	Ground Cover
16.	N	Aloe brevifoli	no common name	Ground Cover
17.	W	Aloe Vera	Medicinal Aloe	Succulent
18.	W	Alogyne huegeii	Blue Hibiscus	Shrub
19.	o	Ambrosia chammissonis	Beach Bur-Sage	Perennial
20.	o	Amorpha fruticosa	Western False Indigobush	Shrub
21.	W	Anigozanthus flavidus	Kangaroo Paw	Perennial/accent
22.	o	Antirrhinum nuttalianum ssp.	no common name	Subshrub
23.	X	Aptenia cordifolia x 'Red Apple'	Red Apple Aptenia	Ground cover
24.	W	Arbutus unedo	Strawberry Tree	Tree
25.	W	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	Ground Cover
26.	W	Arctostaphylos edmundsii	Little Sur Manzanita	Ground Cover

27.	o	Arctostaphylos glandulosa ssp.	Eastwood Manzanita	Shrub
28.	W	Arctostaphylos hookeri 'Monterey Carpet'	Monterey Carpet Manzanita	Low Shrub
29.	N	Arctostaphylos pungens	no common name	Shrub
30.	N	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31.	W	Arctostaphylos uva-ursi	Bearberry	Ground Cover
32.	W	Arctostaphylos x 'Greensphere'	Greensphere Manzanita	Shrub
33.	N	Artemisia caucasica	Caucasian Artesmisia	Ground Cover
34.	X	Artemisia pycnocephala	Beach Sagewort	Perennial
35.	X	Atriplex canescens	Four-Wing Saltbush	Shrub
36.	X	Atriplex lentiformis ssp. breweri	Brewer Saltbush	Shrub
37.	o	Baccharis emoyi	Emory Baccharis	Shrub
38.	W o	Bacharis pilularis ssp. Consanguinea	Chaparral Bloom	Shrub
39.	X	Baccharis pilularis var. pilularis	Twin Peaks #2'	Ground Cover
40.	o	Baccharis salicifolia	Mulefat	Shrub
41.	N	Baileya Multiradiata	Desert Marigold	Ground Cover
42.	W	Beaucarnea recurvata	Bottle Palm	Shrub/Small Tree
43.	N n	Bougainvillea spectabilis	Bougainvillea	Shrub
44.	N n	Brahea armata	Mexican Blue Palm/Blue Hesper Palm	Palm
45.	N n	Brahea brandegeei	San Jose Hesper Palm	Palm
46.	N n	Brahea edulis	Guadalupe Palm	Palm
47.	o	Brickellia californica	no common name	Subshrub
48.	W o	Bromus carinatus	California Brome	Grass
49.	o	Camissonia cheiranthifiloa	Beach Evening Primrose	Perennial Shrub
50.	N	Carissa macrocarpa	Green Carpet Natal Plum	Ground Cover/Shrub
51.	X	Carpobrotus chilensis	Sea Fig Ice Plant	Ground Cover
52.	W	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub
53.	W	Ceanothus griseus 'Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
54.	W	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
55.	W	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
56.	W	Ceanothus griseus var. horizontalis	Yankee Point Ceanothus	Shrub
57.	o	Ceanothus megarcarpus	Big Pod Ceanothus	Shrub
58.	W	Ceanothus prostratus	Squaw Carpet Ceanothus	Shrub
59.	o	Ceanothus spinosus	Green Bark Ceanothus	Shrub

60.	W	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
61.	W	Cerastium tomentosum	Snow-in-Summer	Ground cover/Shrub
62.	W	Ceratonia siliqua	Carob	Tree
63.	W	Cercis occidentalis	Western Redbud	Shrub/Tree
64.	X	Chrysanthemum leucanthemum	Oxeye Daisy	Ground Cover
65.	W	Cistus Crispus	no common name	Ground Cover
66.	W	Cistus hybridus	White Rockrose	Shrub
67.	W	Cistus incanus	no common name	Shrub
68.	W	Cistus incanus ssp. Corsicus	no common name	Shrub
69.	W	Cistus salviifolius	Sageleaf Rockrose	Shrub
70.	W	Cistus x purpureus	Orchid Rockrose	Shrub
71.	W	Citrus species	Citrus	Tree
72.	o	Clarkia bottae	Showy Fairwell to Spring	Annual
73.	o	Cneoridium dumosum	Bushrue	Shrub
74.	o	Collinsia heterophyllia	Chinese Houses	Annual
75.	W o	Comarostaphylis diversifolia	Summer Holly	Shrub
76.	N	Convolvulus cneorum	Bush Morning Glory	Shrub
77.	W	Coprosma kirkii	Creeping Coprosma	Ground Cover/Shrub
78.	W	Coprosma pumila	Prostrate Coprosma	Low shrub
79.	o	Coreopsis californica	Califiornia Coreopsis	Annual
80.	W	Coreopsis lanceolata	Coreopsis	Ground Cover
81.	N	Corea pulchella	Australian Fuscia	Ground Cover
82.	W	Cotoneaster buxifolius	no common name	Shrub
83.	W	Cotoneaster congestus 'Likiang'	Likiang Cotoneaster	Ground Cover/Vine
84.	W	Cotoneaster aprneyi	no common name	Shrub
85.	X	Crassula lactea	no common name	Ground Cover
86.	X	Crassula multicava	no common name	Ground Cover
87.	X	Crassula ovata	Jade Tree	Shrub
88.	X	Crassula tetragona	no common name	Ground Cover
89.	W o	Croton californicus	California Croton	Ground Cover
90.	X	Delosperma 'alba'	White trailing Ice Plant	Ground Cover
91.	o	Dendromecon rigida	Bush Poppy	Shrub
92.	o	Dichelostemma capitatum	Blue Dicks	Herb
93.	N	Distinctis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
94.	N	Dodonaea viscosa	Hopseed Bush	Shrub
95.	X	Drosanthemum floribundum	Rosea Ice Plant	Ground Cover
96.	X	Drosanthemum hispidum	no common name	Ground Cover

97.	X	Drosanthemum speciosus	Dewflower	Ground Cover
98.	o	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
99.	o	Dudleya pulverulenta	Chalk Dudleya	Succulent
100.	W	Elaeagnus pungens	Silverberry	Shrub
101.	o	Encelia californica	California Encelia	Small Shrub
102.	o *	Epilobium canum [Zauschneria californica]	Hoary California Fuschia	Shrub
103.	o	Eriastrum Sapphirinum	Mojave Woolly Star	Annual
104.	N	Eriobotrya japonica	Loquat	Tree
105.	o	Eriodictycon crassifolium	Thick Leaf Yerba Santa	Shrub
106.	o	Eriodictycon trichocalyx	Yerba Santa	Shrub
107.	W o	Eriophyllum confertiflorum	no common name	Shrub
108.	W	Erythrina species	Coral Tree	Tree
109.	N	Escallonia species	Several varieties	Shrub
110.	W o	Eschscholzia californica	California Poppy	Flower
111.	X	Eschscholzia mexicana	Mexican Poppy	Herb
112.	N	Euonymus fortunei	Winter Creeper Euonymus	Ground Cover
113.	N	Feijoa sellowiana	Pineapple Guava	Shrub/Tree
114.	N	Fragaria chiloensis	Wild Strawberry/Sand Strawberry	Ground Cover
115.	o	Frankenia salina	Alkali Heath	Ground Cover
116.	W	Fremontondendron californicum	California Flannelbush	Shrub
117.	X	Gaillardia x grandiflora	Blanketflower	Ground Cover
118.	W	Galvezia speciosa	Bush Snapdragon	Shrub
119.	W	Garrya ellipta	Silktassel	Shrub
120.	X	Gazania hybrids	South African Daisy	Ground Cover
121.	X	Gazania rigens leucolaena	Training Gazania	Ground Cover
122.	o	Gillia capitata	Globe Gilia	Perrenial
123.	W	Gilia leptantha	Showy Gilia	Perrenial
124.	W	Gilia tricolor	Bird's Eyes	Perrenial
125.	W	Ginkgo biloba	Maidenhair Tree	Tree
126.	o	Gnaphalium californicum	California Everlasting	Annual
127.	W	Grewia occidentalis	Starflower	Shrub
128.	o	Grindelia stricta	Gum Plant	Ground Cover
129.	N n	Hakea suaveolens	Sweet Hakea	Shrub
130.	W	Hardenbergia comptoniana	Lilac Vine	Shrub
131.	N	Heliathemum muutabile	Sunrose	Ground Cover/Shrub
132.	o	Helianthemum scoparium	Rush Rose	Shrub
133.	o	Heliotropium curassavicum	Salt Heliotrope	Ground Cover

134.	X	Helix Canariensis	English Ivy	Ground Cover
135.	W	Hesperaloe parviflora	Red Yucca	Perennial
136.	o n	Heteromeles arbutifolia	Toyon	Shrub
137.	X	Hypericum calycimum	Aaron's Beard	Shrub
138.	N	Iberis sempervirens	Edging Candytuft	Ground Cover
139.	N	Iberis umbellatum	Globe Candytuft	Ground Cover
140.	o	Isocoma menziesii	Coastal Goldenbush	Small Shrub
141.	o	Isomeris arborea	Bladderpod	Shrub
142.	W	Iva hayesiana	Poverty Weed	Ground Cover
143.	N	Juglans californica	California Black Walnut	Tree
144.	o	Juncus acutus	Spiny Rush	Perrenial
145.	o	Keckiella antirrhinoides	Yellow Bush Penstemon	Subshrub
146.	o	Keckiella cordifolia	Heart Leaved Penstemon	Subshrub
147.	o	Keckiella ternata	Blue Stemmed Bush Penstemon	Subshrub
148.	W	Kniphofia uvaria	Red Hot Poker	Perennial
149.	W	Lagerstroemia indica	Crape Myrtle	Tree
150.	W	Lagunaria patersonii	Primrose Tree	Tree
151.	X	Lamprathus aurantiacus	Bush Ice Plant	Ground Cover
152.	X	Lampranthus filicaulis	Redondo Creeper	Ground Cover
153.	X	Lampranthus spectabilis	Trailing Ice Plant	Ground Cover
154.	W	Lantana camara cultivars	Yellow Sage	Shrub
155.	W	Lantana montevidensis	Trailing Lantana	Shrub
156.	o	Lasthenia californica	Dwarf Goldfields	Annual
157.	W	Lavandula dentata	French Lavender	Shrub
158.	W	Leptospermum laevigatum	Australian Tea Tree	Shrub
159.	W	Leucophyllum frutescens	Texas Ranger	Shrub
160.	o	Leymus condensatus	Giant Wild Rye	Large Grass
161.	N	Ligustrum japonicum	Texas privet	Shrub
162.	X	Limonium pectinatum	no common name	Ground Cover
163.	X	Limonium perezii	Sea Lavender	Shrub
164.	W n	Liquidambar styraciflua	American Sweet Gum	Tree
165.	W	Liriodendron tulipfera	Tulip Tree	Tree
166.	X	Lonicera japonica 'Halliana'	Hall's Japanese Honeysuckle	Vining Shrub
167.	o	Lonicera subspicata	Wild Honeysuckle	Vining Shrub
168.	X	Lotus corniculatus	Bird's Foot Trefoil	Ground Cover
169.	o	Lotus hermannii	Northern Woolly Lotus	Perennial
170.	o	Lotus scoparius	Deerweed	Shrub

171.	W	Lupinus arizonicus	Desert Lupine	Annual
172.	W	Lupinus benthamii	Spider Lupine	Annual
173.	o	Lupinus bicolor	Sky Lupine	Flowering annual
174.	o	Lupinus sparsiflorus	Loosely Flowered Annual Lupine/Coulter's Lupine	Annual
175.	W	Lyonothamnus floribundus ssp. Asplenifolius	Fernleaf Ironwood	Tree
176.	W	Macadamia integrifolia	Macadamia Nut	Tree
177.	W	Mahonia aquifolium 'Golden Abundance'	Golden Abundance Oregon Grape	Shrub
178.	W	Mahonia nevenii	Nevin Mahonia	Shrub
179.	o	Malacothamnus fasciculatus	Chapparal Mallow	Shrub
180.	X	Malephora luteola	Training Ice Plant	Ground Cover
181.	W	Maytenus boaria	Mayten Tree	Tree
182.	W	Melaleuca nesophila	Pink Melaleuca	Shrub
183.	N	Metrosideros excelsus	New Zealand Christmas Tree	Tree
184.	o *	Mimulus species	Monkeyflower	Flower
185.	o	Mirabilis californica	Wishbone Bush	Perrenial
186.	N	Myoporum debile	no common name	Shrub
187.	W	Myoporum insulare	Boobyalla	Shrub
188.	W	Myoporum parvilfolium	no common name	Ground Cover
189.	W	Myoporum 'Pacificum'	no common name	Ground Cover
190.	o	Nassella (stipa) lepidra	Foothill Needlegrass	Ground Cover
191.	o	Nassella (stipa) pulchra	Purple Needlegrass	Ground Cover
192.	o	Nemophilia menziesii	Baby Blue Eyes	Annual
193.	X	Nerium Oleander	Oleander	Shrub
194.	o	Nolina cismontana	Chapparal Nolina	Shrub
195.	N	Nolina species	Mexican Grasstree	Shrub
196.	W	Oenothera belandieri	Mexican Evening Primrose	Ground Cover
197.	N	Oenothera hookeri	California Evening Primrose	Flower
198.	W	Oenothera speciosa	Show Evening Primrose	Perrenial
199.	X	Ophiopogon japonicus	Mondo Grass	Ground Cover
200.	o *	Opuntia littoralis	Prickly Pear	Cactus
201.	o *	Opuntia oricola	Oracle Cactus	Cactus
202.	o *	Opuntia prolifera	Coast Cholla	Cactus
203.	W	Osmanthus fragrans	Sweet Olive	Shrub
204.	X	Osteospermum fruticosum	Training African Daisy	Ground Cover
205.	X	Parkinsonia aculeata	Mexican Palo Verde	Tree
206.	W	Pelargonium peltatum	Ivy Geranium	Ground Cover
207.	X	Penstemon species	Beard Tongue	Shrub

208.	W	Photinia fraseria	no common name	Shrub
209.	W	Pistacia chinesis	Chinese Pistache	Tree
210.	X	Pittosporum undulatum	Victorian Box	Tree
211.	o	Plantago erecta	California Plantain	Annual
212.	**	Plantago insularis	Woolly Plantain	Annual
213.	X	Plantago sempervirens	Evergreen Plantain	Ground Cover
214.	W	Plantanus racemosa	California Sycamore	Tree
215.	W	Plumbago auritulata	Plumbago Cape	Shrub
216.	o	Popolus fremontii	Western Cottonwood	Tree
217.	X	Portulacaria afra	Elephant's Food	Shrub
218.	o	Potentilla glandulosa	Sticky Cinquefoil	Subshrub
219.	X	Potentilla tabernaemontanii	Spring Cinquefoil	Ground Cover
220.	X	Prunus caroliniana	Carolina Cherry Laurel	Shrub/Tree
221.	o	Prunus ilicifolia ssp. Ilicifolia	Holly Leafed Cherry	Shrub
222.	X	Prunus lyonii	Catalina Cherry	Shrub/Tree
223.	N	Punica granatum	Pomegranate	Shrub/Tree
224.	W	Puya species	Puya	Succulent/Shrub
225.	W	Pyracantha species	Firethorn	Shrub
226.	o	Quercus agrifolia	Coast Live Oak	Tree
227.	o n *	Quercus berberdifolia	California Scrub Oak	Shrub
228.	o n *	Quercus dumosa	Coastal Scrub Oak	Shrub
229.	X	Quercus engelmannii	Engelmann Oak	Tree
230.	X	Quercus suber	Cork Oak	Tree
231.	X	Rhamnus alaternus	Italian Buckthorn	Shrub
232.	o	Rhamnus californica	California Coffee Berry	Shrub
233.	o	Rhamnus crocea	Redberry	Shrub
234.	o	Rhamnus crocea ssp. Ilicifolia	Hollyleaf Redberry	Shrub
235.	N	Rhaphiolepis species	Indian Hawthorne	Shrub
236.	o	Rhus integrifolia	Lemonade Berry	Shrub
237.	N	Rhus lancea	African Sumac	Tree
238.	o n	Rhus ovata	Sugarbush	Shrub
239.	o	Ribes aureum	Golden Currant	Shrub
240.	o	Ribes indecorum	White Flowering Currant	Shrub
241.	o	Ribes speciosum	Fuschia Flowering Goosebberry	Shrub
242.	W	Ribes viburnifolium	Evergreen currant	Shrub
243.	o *	Romneya coulteri	Matilija Poppy	Shrub
244.	X	Romneya coulteri 'White Cloud'	White Cloud Matilija Poppy	Shrub

245.	W n	Rosmarinus officinalis	Rosemary	Shrub
246.	W n	Salvia greggii	Autums Sage	Shrub
247.	W n	Salvia sonomensis	Creeping Sage	Ground Cover
248.	o	Sambucus mexicana	Mexican Elderberry	Tree
249.	W	Santolina chamaecyparissus	Lavender Cotton	Ground Cover
250.	W	Santolina virens	Green Lavender Cotton	Shrub
251.	o	Satureja chandleri	San Miguel Savory	Perennial
252.	o	Scirpis scutus	Hard Stem Bulrush	Perennial
253.	o	Scirpus californicus	California Bulrush	Perennial
254.	X	Sedum acre	Goldmoss Sedum	Ground Cover
255.	X	Sedum album	Green Stonecrop	Ground Cover
256.	X	Sedum confusum	no common name	Ground Cover
257.	X	Sedum lineare	no common name	Ground Cover
258.	X	Sedum x rubrotinctum	Pork and Beans	Ground Cover
259.	X	Senecio serpens	no common name	Ground Cover
260.	o	Sisyrinchium bellum	Blue Eyed Grass	Ground Cover
261.	o	Solanum douglasii	Douglas Nightshade	Shrub
262.	o	Solanum xantii	Purple Nightshade	Perennial
263.	W	Stenicarpus sinuatus	Firewheel Tree	Tree
264.	W	Strelitzia nicolai	Giant Bird of Paradise	Perennial
265.	W	Strelitzia reginae	Bird of Paradise	Perennial
266.	o	Symphoricarpos mollis	Creeping Snowberry	Shrub
267.	W	Tecoma stans (Stenolobium stans)	Yellow Bells	Shrub/Small Tree
268.	X	Tecomaria capensis	Cape Honeysuckle	Ground Cover
269.	N	Teucarium chamedrys	Germander	Ground Cover
270.	N	Thymus serpyllum	Lemon Thyme	Ground Cover
271.	N	Trachelospermum jasminoides	Star Jasmine	Shrub
272.	o	Trichosstems lanatum	Woolly Blue Curls	Shrub
273.	X	Trifolium hirtum 'Hyron'	Hyron Rose Clover	Ground Cover
274.	X	Trifolium fragerum 'O'Connor's'	O'Connor's Legume	Ground Cover
275.	o	Umbellularia californica	California Laurel	Tree
276.	o	Verbena lasiostachys	Western Vervain	Perennial
277.	N	Verbena peruviana	no common name	Ground Cover
278.	X	Verbena species	Verbena	Ground Cover
279.	X	Vinca minor	Dwarf Periwinkle	Ground Cover
280.	o	Vitis girdiana	Desert Wild Grape	Vine
281.	X	Vulpia myuros 'Zorro'	Zorro Annual Fescue	Grass

282.	W	Westringia fruticosa	no common name	Shrub
283.	W	Xannithorrhoea species	Grass Tree	Perennial accent/shrub
284.	W	Xylosma congestum	Shiny Xylosma	Shrub
285.	X	Yucca Species	Yucca	Shrub
286.	o	Yucca whipplei	Yucca	Shrub

Legend:

X = Plant species prohibited in wet and dry fuel modification zones adjacent to wildlands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet fuel modification zones adjacent to wildlands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

o = Plant species native to local area. Acceptable in all fuel modification wet and dry zones in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area) in wet fuel modification zones *adjacent to wild lands*. Acceptable on all other fuel modification zones.

***** = If locally collected.

****** = Not native but can be used in all zones.

n = Plant species acceptable on a limited use basis. Refer to qualification requirements following plant palette.

Appendix B

Site Photos

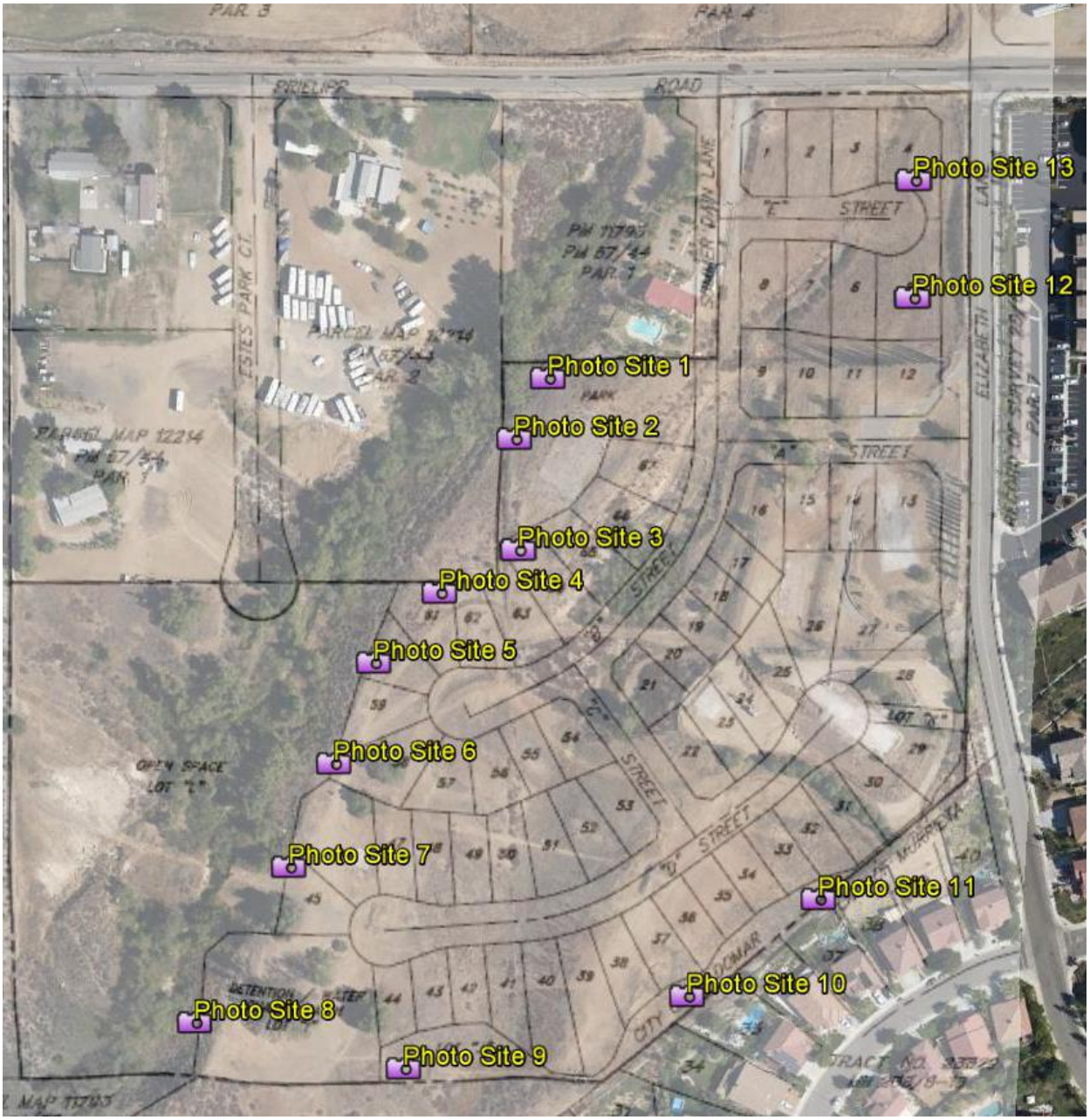


Photo locations are shown above for the following pages.

Photo Site 1

Photo above taken to the north and below to the west. This is the interface at Lot 4.

Photo Site 1 (cont)

Also Site 1. Above looking north, red line shows the top of slope after grading is completed. Below looking south with same red line shown.

Photo Site 2

Site 2 show the interface at the property line (looking west) where the radiant heat fence will be. Below is Site 3 looking south on same interface.

Photo Site 3

Photo Site 4

At Site 4 (same interface, the area to the west is flat and vegetation even more sparse. Below in Site 5, the photo is looking west back into the drainage. This is the point at which the 50 fuel modification zone begins and extends south.

Photo Site 5

Photo Site 5 (cont)

Photo above is Site 5 looking south. This is the slope that will be used as the fuel modification zone. Below in the Site 6 photo, the same slope, also looking south from a point south of Site 5.

Photo Site 6

Photo Site 6 (cont)

Above, Site 6 looking west shows the narrow nature of the drainage (development on the other side shown) and the understory of the willow-cottonwood vegetation in the bottom of the drainage. Below is a similar phone (Site 7) looking north across the future fuel modification zone slope.

Photo Site 7

Photo Site 7 (cont)

Above is Site 7 looking southwest, where a old roadway crosses the drainage and below Site 8 looking south towards the freeway in the distance. This slope is also future fuel modification zone.

Photo Site 8

Photo Site 8 (cont)

Above is Site 8 looking to the north and below Site 9 looking to the east.

Photo Site9

Photo Site9 (cont)

Both photos (above Site 9 and below Site 10) are looking east at the interface between the future development and the existing homes in the City of Murietta

Photo Site 10

Photo Site 11

Above in the Site 11 photo the area between the existing development (top of slope) and the future development (bottom of slope) is shown. These two areas will be joined with a maintenance pathway and not natural vegetation to remain. Site 12 below and Site 13 on the next page show areas that will be completely developed with no remaining natural vegetation.

Photo Site 12

Photo Site 12 (cont)

Photo Site 13

Photo Site 13 (cont)

Appendix C

Behave Reports

Inputs: SURFACE

Description		Wildomar23 - South wind 30 mph

Fuel/Vegetation, Surface/Understory

Fuel Model		gs2, sh2, tu5

Fuel Moisture

1-h Moisture	%	3
10-h Moisture	%	4
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

Weather

20-ft Wind Speed	mi/h	30
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	180

Terrain

Slope Steepness	%	50
Aspect	deg	285

Fire

Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 1

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (ft/min) [SURFACE]

Fireline Intensity (Btu/ft/s) [SURFACE]

Flame Length (ft) [SURFACE]

Flame Residence Time (min) [SURFACE]

(continued on next page)

Input Worksheet (continued)

Notes

Wildomar23 - South wind 30 mph

Surface Rate of Spread (ft/min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	138.4	34.5	28.8
15	121.3	34.5	36.4
30	46.4	13.3	14.5
45	21.6	6.1	6.4
60	12.4	3.4	3.5
75	8.2	2.2	2.3
90	5.9	1.6	1.6
105	4.6	1.3	1.2
120	3.8	1.0	1.0
135	3.3	0.9	0.9
150	3.0	0.8	0.8
165	2.8	0.7	0.7
180	2.7	0.7	0.7
195	2.7	0.7	0.7
210	2.8	0.7	0.7
225	3.0	0.8	0.8
240	3.4	0.9	0.8
255	3.9	1.0	1.0
270	4.8	1.3	1.2
285	6.2	1.6	1.5
300	8.7	2.2	2.0
315	13.4	3.4	3.1
330	24.1	6.1	5.3
345	53.9	13.3	11.1
360	138.4	34.5	28.8

Wildomar23 - South wind 30 mph

Fireline Intensity (Btu/ft/s)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	1322	851	1461
15	1159	852	1848
30	443	328	738
45	207	150	326
60	118	85	180
75	78	55	115
90	57	40	82
105	44	31	63
120	36	25	51
135	32	22	44
150	28	20	39
165	27	18	37
180	26	18	35
195	26	18	35
210	27	18	36
225	29	20	38
240	32	22	42
255	38	25	49
270	46	31	59
285	59	40	75
300	83	55	103
315	128	85	155
330	230	150	268
345	515	328	564
360	1322	851	1461

Wildomar23 - South wind 30 mph

Flame Length (ft)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	12.3	10.0	12.9
15	11.6	10.0	14.3
30	7.4	6.5	9.4
45	5.2	4.5	6.4
60	4.0	3.5	4.9
75	3.3	2.9	4.0
90	2.9	2.5	3.4
105	2.6	2.2	3.0
120	2.4	2.0	2.8
135	2.2	1.9	2.6
150	2.1	1.8	2.4
165	2.0	1.7	2.4
180	2.0	1.7	2.3
195	2.0	1.7	2.3
210	2.0	1.7	2.3
225	2.1	1.8	2.4
240	2.2	1.9	2.5
255	2.4	2.0	2.7
270	2.6	2.2	2.9
285	2.9	2.5	3.3
300	3.4	2.9	3.8
315	4.2	3.5	4.6
330	5.5	4.5	5.9
345	8.0	6.5	8.3
360	12.3	10.0	12.9

Wildomar23 - South wind 30 mph

Flame Residence Time (min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	0.21	0.23	0.31
15	0.21	0.23	0.31
30	0.21	0.23	0.31
45	0.21	0.23	0.31
60	0.21	0.23	0.31
75	0.21	0.23	0.31
90	0.21	0.23	0.31
105	0.21	0.23	0.31
120	0.21	0.23	0.31
135	0.21	0.23	0.31
150	0.21	0.23	0.31
165	0.21	0.23	0.31
180	0.21	0.23	0.31
195	0.21	0.23	0.31
210	0.21	0.23	0.31
225	0.21	0.23	0.31
240	0.21	0.23	0.31
255	0.21	0.23	0.31
270	0.21	0.23	0.31
285	0.21	0.23	0.31
300	0.21	0.23	0.31
315	0.21	0.23	0.31
330	0.21	0.23	0.31
345	0.21	0.23	0.31
360	0.21	0.23	0.31

Discrete Variable Codes Used
Wildomar23 - South wind 30 mph

Fuel Model

gs2	Moderate load, dry climate grass-shrub (D) (122)
sh2	Moderate load, dry climate shrub (S) (142)
tu5	Very high load, dry climate timber-shrub (S) (165)

Inputs: SURFACE

Description		Wildomar23 - No wind

Fuel/Vegetation, Surface/Understory

Fuel Model		gs2, sh2, tu5

Fuel Moisture

1-h Moisture	%	3
10-h Moisture	%	4
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

Weather

20-ft Wind Speed	mi/h	0
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45

Terrain

Slope Steepness	%	50
Aspect	deg	285

Fire

Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 1

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (ft/min) [SURFACE]

Fireline Intensity (Btu/ft/s) [SURFACE]

Flame Length (ft) [SURFACE]

Flame Residence Time (min) [SURFACE]

(continued on next page)

Input Worksheet (continued)

Notes

Wildomar23 - No wind

Surface Rate of Spread (ft/min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	3.4	1.1	1.4
15	4.1	1.3	1.7
30	5.2	1.7	2.2
45	6.9	2.2	2.8
60	9.5	3.1	3.9
75	13.4	4.4	5.5
90	18.0	6.0	7.5
105	20.5	6.8	8.5
120	18.0	6.0	7.5
135	13.4	4.4	5.5
150	9.5	3.1	3.9
165	6.9	2.2	2.8
180	5.2	1.7	2.2
195	4.1	1.3	1.7
210	3.4	1.1	1.4
225	2.9	0.9	1.2
240	2.6	0.8	1.1
255	2.4	0.8	1.0
270	2.3	0.7	1.0
285	2.3	0.7	0.9
300	2.3	0.7	1.0
315	2.4	0.8	1.0
330	2.6	0.8	1.1
345	2.9	0.9	1.2
360	3.4	1.1	1.4

Wildomar23 - No wind

Fireline Intensity (Btu/ft/s)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	33	27	72
15	39	32	87
30	50	41	109
45	65	54	144
60	90	76	199
75	128	108	281
90	172	148	380
105	196	169	431
120	172	148	380
135	128	108	281
150	90	76	199
165	65	54	144
180	50	41	109
195	39	32	87
210	33	27	72
225	28	23	62
240	25	21	55
255	23	19	51
270	22	18	49
285	22	18	48
300	22	18	49
315	23	19	51
330	25	21	55
345	28	23	62
360	33	27	72

Wildomar23 - No wind

Flame Length (ft)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	2.2	2.0	3.2
15	2.4	2.2	3.5
30	2.7	2.5	3.9
45	3.1	2.8	4.4
60	3.6	3.3	5.1
75	4.2	3.9	6.0
90	4.8	4.5	6.9
105	5.1	4.8	7.3
120	4.8	4.5	6.9
135	4.2	3.9	6.0
150	3.6	3.3	5.1
165	3.1	2.8	4.4
180	2.7	2.5	3.9
195	2.4	2.2	3.5
210	2.2	2.0	3.2
225	2.1	1.9	3.0
240	2.0	1.8	2.9
255	1.9	1.7	2.8
270	1.9	1.7	2.7
285	1.9	1.7	2.7
300	1.9	1.7	2.7
315	1.9	1.7	2.8
330	2.0	1.8	2.9
345	2.1	1.9	3.0
360	2.2	2.0	3.2

Wildomar23 - No wind

Flame Residence Time (min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	0.21	0.23	0.31
15	0.21	0.23	0.31
30	0.21	0.23	0.31
45	0.21	0.23	0.31
60	0.21	0.23	0.31
75	0.21	0.23	0.31
90	0.21	0.23	0.31
105	0.21	0.23	0.31
120	0.21	0.23	0.31
135	0.21	0.23	0.31
150	0.21	0.23	0.31
165	0.21	0.23	0.31
180	0.21	0.23	0.31
195	0.21	0.23	0.31
210	0.21	0.23	0.31
225	0.21	0.23	0.31
240	0.21	0.23	0.31
255	0.21	0.23	0.31
270	0.21	0.23	0.31
285	0.21	0.23	0.31
300	0.21	0.23	0.31
315	0.21	0.23	0.31
330	0.21	0.23	0.31
345	0.21	0.23	0.31
360	0.21	0.23	0.31

Discrete Variable Codes Used
Wildomar23 - No wind

Fuel Model

gs2	Moderate load, dry climate grass-shrub (D) (122)
sh2	Moderate load, dry climate shrub (S) (142)
tu5	Very high load, dry climate timber-shrub (S) (165)

Inputs: SURFACE

Description		Wildomar23 - NE wind 40 mph

Fuel/Vegetation, Surface/Understory

Fuel Model		gs2, sh2, tu5

Fuel Moisture

1-h Moisture	%	3
10-h Moisture	%	4
100-h Moisture	%	5
Live Herbaceous Moisture	%	30
Live Woody Moisture	%	50

Weather

20-ft Wind Speed	mi/h	40
Wind Adjustment Factor		0.4
Wind Direction (from north)	deg	45

Terrain

Slope Steepness	%	50
Aspect	deg	285

Fire

Spread Direction (from north)	deg	0, 15, 30, 45, 60, 75, 90, 105, 1

Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are for the specified spread directions [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Output Variables

Surface Rate of Spread (ft/min) [SURFACE]

Fireline Intensity (Btu/ft/s) [SURFACE]

Flame Length (ft) [SURFACE]

Flame Residence Time (min) [SURFACE]

(continued on next page)

Input Worksheet (continued)

Notes

Wildomar23 - NE wind 40 mph

Surface Rate of Spread (ft/min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	3.0	0.8	0.7
15	2.7	0.7	0.6
30	2.6	0.7	0.6
45	2.6	0.7	0.6
60	2.7	0.7	0.6
75	2.8	0.7	0.7
90	3.1	0.8	0.7
105	3.6	0.9	0.9
120	4.3	1.1	1.1
135	5.5	1.4	1.4
150	7.5	2.0	1.9
165	11.2	3.0	2.9
180	19.4	5.2	5.1
195	42.0	11.5	11.6
210	128.6	35.7	36.6
225	222.0	54.9	43.3
240	70.3	17.2	13.5
255	27.6	6.9	5.7
270	14.5	3.7	3.1
285	9.0	2.3	2.0
300	6.3	1.6	1.4
315	4.8	1.2	1.1
330	3.9	1.0	0.9
345	3.3	0.9	0.8
360	3.0	0.8	0.7

Wildomar23 - NE wind 40 mph

Fireline Intensity (Btu/ft/s)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	28	19	35
15	26	17	32
30	25	17	31
45	25	17	31
60	25	17	32
75	27	18	34
90	30	20	38
105	34	23	44
120	41	28	53
135	52	36	69
150	71	49	95
165	107	74	146
180	185	129	260
195	401	284	590
210	1228	882	1862
225	2121	1354	2199
240	672	424	688
255	263	170	288
270	138	90	157
285	86	57	101
300	61	40	72
315	46	31	55
330	37	25	45
345	32	21	39
360	28	19	35

Wildomar23 - NE wind 40 mph

Flame Length (ft)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	2.1	1.7	2.3
15	2.0	1.7	2.2
30	2.0	1.6	2.2
45	2.0	1.6	2.2
60	2.0	1.7	2.2
75	2.0	1.7	2.3
90	2.1	1.8	2.4
105	2.3	1.9	2.6
120	2.5	2.1	2.8
135	2.8	2.3	3.1
150	3.2	2.7	3.7
165	3.9	3.3	4.5
180	5.0	4.2	5.8
195	7.1	6.1	8.5
210	11.9	10.2	14.4
225	15.3	12.4	15.5
240	9.0	7.3	9.1
255	5.8	4.8	6.1
270	4.3	3.6	4.6
285	3.5	2.9	3.8
300	3.0	2.5	3.2
315	2.6	2.2	2.8
330	2.4	2.0	2.6
345	2.2	1.8	2.4
360	2.1	1.7	2.3

Wildomar23 - NE wind 40 mph

Flame Residence Time (min)

Spread Dir	Fuel Model		
deg	gs2	sh2	tu5
0	0.21	0.23	0.31
15	0.21	0.23	0.31
30	0.21	0.23	0.31
45	0.21	0.23	0.31
60	0.21	0.23	0.31
75	0.21	0.23	0.31
90	0.21	0.23	0.31
105	0.21	0.23	0.31
120	0.21	0.23	0.31
135	0.21	0.23	0.31
150	0.21	0.23	0.31
165	0.21	0.23	0.31
180	0.21	0.23	0.31
195	0.21	0.23	0.31
210	0.21	0.23	0.31
225	0.21	0.23	0.31
240	0.21	0.23	0.31
255	0.21	0.23	0.31
270	0.21	0.23	0.31
285	0.21	0.23	0.31
300	0.21	0.23	0.31
315	0.21	0.23	0.31
330	0.21	0.23	0.31
345	0.21	0.23	0.31
360	0.21	0.23	0.31

Discrete Variable Codes Used
Wildomar23 - NE wind 40 mph

Fuel Model

gs2	Moderate load, dry climate grass-shrub (D) (122)
sh2	Moderate load, dry climate shrub (S) (142)
tu5	Very high load, dry climate timber-shrub (S) (165)

Project Specific
Preliminary Water Quality Management Plan

For: **Wildomar 23**

SW Corner of Elizabeth Lane & Prielipp Road

DEVELOPMENT NO. **TRACT MAP 36497**
DESIGN REVIEW NO. **12-0364**

Prepared for:

Lennar Homes of California, Inc.
890 Montecito Drive, Suite 302
Corona, CA 92879
Telephone: (951) 817-3567

Prepared by:

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

Aaron W. Parker, PE
SB&O Inc.
41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
Telephone: (951) 695-8900

WQMP Preparation/Revision Date: 12-21-2012

Project Specific
Preliminary Water Quality Management Plan

For: **Wildomar 23**

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41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
Telephone: (951) 695-8900

WQMP Preparation/Revision Date: 12-21-2012

OWNER'S CERTIFICATION

This project-specific Preliminary Water Quality Management Plan (WQMP) has been prepared for:

Lennar Homes of California, Inc.

by

SB&O Inc. for the project known as **Wildomar 23** at **SW Corner of Elizabeth Lane & Prielipp Road**.

This WQMP is intended to comply with the requirements of City of Wildomar for **TRACT MAP 36497**, which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Wildomar Water Quality Ordinance (Municipal Code Section).

If the undersigned transfers its interest in the subject property/project, its successor in interest the undersigned shall notify the successor in interest of its responsibility to implement this WQMP.

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

890 Montecito Drive, Suite 302
Corona, CA 92879
(951) 817-3567

Contents

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APPENDICES

A. CONDITIONS OF APPROVAL

B. VICINITY MAP, WQMP SITE PLAN, AND RECEIVING WATERS MAP

C. SUPPORTING DETAIL RELATED TO HYDRAULIC CONDITIONS OF CONCERN: DETENTION & DRAINAGE REPORT

D. EDUCATIONAL MATERIALS

E. SOILS REPORT & INFILTRATION REPORT

F. TREATMENT CONTROL BMP SIZING CALCULATIONS AND DESIGN DETAILS

G. AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

H. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

I. Project Description

Project Owner: Lennar Homes of California, Inc.
890 Montecito Drive, Suite 302
Corona, CA 92879
Telephone: (951) 817-3567

WQMP Preparer:

Aaron W. Parker, PE
41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
Telephone: (951) 695-8900

Project Site Address: SW Corner of Elizabeth Lane & Prielipp Road
Wildomar, CA 92595

Planning Area/ Community Name/ Development Name: Not Applicable

APN Number(s): 380-280-004 THRU 012

Thomas Bros. Map: Pg. 927 H-2

Project Watershed: Santa Margarita

Sub-watershed: 902.31, Murrieta HA, Wildomar HSA

Project Site Size:

Gross=24.0 ac.

Net (gross-open space)=18.4 ac

Standard Industrial Classification (SIC) Code: N/A

Formation of Home Owners' Association (HOA) or Property Owners Association (POA):

Y ☒ N ☐

Additional Permits/Approvals required for the Project

AGENCY	Permit required
State Department of Fish and Game, 1601 Streambed Alteration Agreement	Y ☐ N ☒
State Water Resources Control Board, Clean Water Act (CWA) section 401 Water Quality Certification	Y ☐ N ☒
US Army Corps of Engineers, CWA section 404 permit	Y ☐ N ☒
US Fish and Wildlife, Endangered Species Act section 7 biological opinion	Y ☐ N ☒
Other *(please list in the space below as required)*	

The existing site is located at the southwest corner of Prielipp Road and Elizabeth Lane. The site is generally vacant with a few single family homes along Elizabeth Lane. Topography is moderately steep, with a deep canyon/drainage course sloping southwesterly along the westerly limits of the project. A secondary canyon traverses the site from the northeast corner trending southwest. The majority of the developed portion of the site is tributary to this canyon, along with a small offsite drainage area north of the intersection.

The proposed *Wildomar 23* project is a medium density (5,000 sf) single family residential subdivision (67 lots on public streets). The gross site area is located on approximately 24 acres, with a net development area of 18.1 acres. A conventional underground storm drain system will be utilized to convey runoff to the existing secondary canyon at the southerly boundary. Site runoff will be treated and peak flow rates attenuated using an extended detention basin located west of the secondary canyon.

See Site Map Exhibit for lot layout, storm drain alignments and the location of the detention basin.

Appendix A of this project-specific WQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific WQMP shall include:

1. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail to allow the project site to be plotted on Co-Permittee base mapping; and
2. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:
   - Location and identification of all structural BMPs, including Treatment Control BMPs.
   - Landscaped areas.
   - Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
   - Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
   - Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
   - Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
   - Location(s) of Receiving Waters to which the project directly or indirectly discharges.
   - Location of points where onsite (or tributary offsite) flows exit the property/project site.
   - Proposed drainage areas boundaries, including tributary offsite areas, for each location where flows exits the property/project site. Each tributary area should be clearly denoted.
   - Pre- and post-project topography.

Appendix G of this project-specific WQMP shall include copies of CC&Rs, Covenant and Agreements, and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

II. Site Characterization

Land Use Designation or Zoning: Existing R-R Rurual Residential, Proposed R-4 Planned Residential

Current Property Use: Residential (Vacant)

Proposed Property Use: Residential

Availability of Soils Report: Y ☒ N ☐ *Note: A soils report is required if infiltration BMPs are utilized. Attach report in Appendix E.*

Phase 1 Site Assessment: Y ☒ N ☐ *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Murrieta Creek 902.31 & 902.32	none	MUN, AGR, IND, PROC, REC2, WARM, WILD	N/A
Murrieta Creek 902.52	Pesticides, Metals, Nutrients, Toxicity	MUN, AGR, IND, PROC, GWR, REC2, WARM, WILD	N/A
Santa Margarita River (upper) 902.22	Nutrients, Toxicity	MUN, AGR,, PROC, REC1, REC2, WARM, WILD, COLD, RARE	6.5 MILES
Santa Margarita River (lower) 902.21	Pathogens, Nutrients	MUN, AGR,, IND, REC1, REC2, WARM, COLD, WILD, RARE,	14 MILES
Santa Margarita Lagoon 902.11	Nutrients	REC1, REC2, EST, WILD, RARE, MAR, MIGR, SPWN	25 MILES
Oceanside Harbor 902.11	Metals	N/A	N/A

III. Pollutants of Concern

Potential pollutants associated with Urban Runoff from the proposed project must be identified. Exhibit B of the WQMP provides brief descriptions of typical pollutants associated with Urban Runoff and a table that associates typical potential pollutants with types of development (land use). It should be noted that at the Co-Permittees discretion, the Co-Permittees may also accept updated studies from the California Association of Stormwater Quality Agencies (CASQA), USEPA, SWRCB and/or other commonly accepted agencies/associations acceptable to the Co-Permittee for determination of Pollutants of Concern associated with given land use. Additionally, in identifying Pollutants of Concern, the presence of legacy pesticides, nutrients, or hazardous substances in the site's soils as a result of past uses and their potential for exposure to Urban Runoff must be addressed in project-specific WQMPs. The Co-Permittee may also require specific pollutants commonly associated with urban runoff to be addressed based on known problems in the watershed. The list of potential Urban Runoff pollutants identified for the project must be compared with the pollutants identified as causing an impairment of Receiving Waters, if any. To identify pollutants impairing proximate Receiving Waters, each project proponent preparing a project-specific WQMP shall, at a minimum, do the following:

1. For each of the proposed project discharge points, identify the proximate Receiving Water for each discharge point, using hydrologic unit basin numbers as identified in the most recent version of the Water Quality Control Plan for the Santa Ana River Basin or the San Diego Region.
2. Identify each proximate identified above that is listed on the most recent list of Clean Water Act Section 303(d) list of impaired water bodies, which can be found at website www.swrcb.ca.gov/tmdl/303d_lists.html. List all pollutants for which the proximate Receiving Waters are impaired.
3. Compare the list of pollutants for which the proximate Receiving Waters are impaired with the pollutants expected to be generated by the project.

Urban Runoff Pollutants:

Project categories:

Detached Residential Development	

Potential Project Pollutants from Riverside County WQMP Exhibit B:

Sediment/Turbidity	*Nutrients*
Trash & Debris	*Oxygen Demanding Substances*
Bacteria & Viruses	*Oil & Grease*
Pesticides	

Pollutants of Concern:

Sediment/Turbidity	*Nutrients*
Pesticides	*Bacteria & Viruses*

The project site does not contain any known legacy pollutants or hazardous substances.

IV. Hydrologic Conditions of Concern

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. Under certain circumstances, changes could also result in the reduction in the amount of available sediment for transport; storm flows could fill this sediment-carrying capacity by eroding the downstream channel. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to the hydrologic regime of a Project's site would be considered a hydrologic condition of concern if the change would have a significant impact on downstream erosion compared to the pre-development condition or have significant impacts on stream habitat, alone or as part of a cumulative impact from development in the watershed.

This project-specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- **Condition A:** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.
- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development.
- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee.

  This Project meets the following condition: CONDITION C

  Supporting engineering studies, calculations, and reports are included in Appendix C.

V. Best Management Practices

V.1 Site Design BMPs

Project proponents shall implement Site Design concepts that achieve each of the following:

1) Minimize Urban Runoff
2) Minimize Impervious Footprint
3) Conserve Natural Areas
4) Minimize Directly Connected Impervious Areas (DCIAs)

The project proponent should identify the specific BMPs implemented to achieve each Site Design concept and provide a brief explanation for those Site Design concepts considered not applicable.

This project is a single-family residential development. Impervious areas have been minimized to promote natural infiltration. All roof drains shall discharge directly to landscape areas and will not be directly connected to the storm drain system.

Table 1. Site Design BMPs

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 1	*Minimize Urban Runoff*	Maximize the permeable area (See Section 4.5.1 of the WQMP).	☒	☐	☐
		Incorporate landscaped buffer areas between sidewalks and streets.	☒	☐	☐
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☒	☐	☐
		Use natural drainage systems. - **The developed area will not contain any natural drainage areas. All natural drainage courses within the undeveloped portion of the property shall be preserved.**	☐	☐	☒
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration. - **Soil on this property is not suitable for infiltration**	☐	☐	☒
		Construct onsite ponding areas or retention facilities to increase opportunities for infiltration consistent with vector control objectives.	☒	☐	☐
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required to describe BMP and how it addresses Site Design concept).	☐	☐	☒

Table 1. Site Design BMPs (Cont.)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 2	*Minimize Impervious Footprint*	Maximize the permeable area (See Section 4.5.1 of the WQMP).	☒	☐	☐
		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. - **Open joined pavement is not suitable for sidewalks adjacent to streets.**	☐	☐	☒
		Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walk able environment for pedestrians are not compromised.	☒	☐	☐
		Reduce widths of street where off-street parking is available. - **No offsite parking is available on this project.**	☐	☐	☒
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☐	☐	☐
Site Design Concept 3	*Conserve Natural Areas*	Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☐	☒
		Conserve natural areas (See WQMP Section 4.5.1).	☒	☐	☐
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☒	☐	☐
		Use natural drainage systems.. - **The developed area will not contain any natural drainage areas. All natural drainage courses within the undeveloped portion of the property shall be preserved.**	☐	☐	☒
		Other comparable and equally effective site design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☐	☒

Table 1. Site Design BMPs (Cont.)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A
Site Design Concept 4	*Minimize Directly Connected Impervious Areas (DCIAs)*	Residential and commercial sites must be designed to contain and infiltrate roof runoff, or direct roof runoff to vegetative swales or buffer areas, where feasible.	☒	☐	☐
		Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☒	☐	☐
		Increase the use of vegetated drainage swales in lieu of underground piping or imperviously lined swales.	☒	☐	☐
		Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings. - **This is not considered a rural project.**	☐	☐	☒
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter. - **All storm water runoff shall drain to a central detention basin with a sand filter system.**	☐	☒	☐
		Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to MS4s. - **All storm water runoff shall drain to a central detention basin with a sand filter system.**	☐	☒	☐
		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 MS4. - **This project does not contain shared access driveways**	☐	☐	☒
		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 MS4. - **Guest parking is located on street where permeable pavement is not suitable**	☐	☒	☐
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design. - **This site does not contain parking lots**	☐	☐	☒
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving. - **This site does not contain parking lots**	☐	☐	☒
		Other comparable and equally effective design concepts as approved by the Co-Permittee (Note: Additional narrative required describing BMP and how it addresses Site Design concept).	☐	☐	☒

Non-applicable Site Design BMPs:

Explanations provided in bold under Site Design BMP items in the table above.

Project Site Design BMPs:

Paving areas shall be kept to minimum standards required by the city. All roof runoff shall be discharged to landscape areas prior to inlets. With the exception of some perimeter slopes, all site runoff shall be intercepted and directed to a central detention basin with an infiltration sand filter sized per Appendix C of the Riverside County Low Impact Development BMP Design Handbook.

V.2 SOURCE CONTROL BMPS

Table 2. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☐	☒	No pvt streets or parking
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
MS4 Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	No common areas
Properly Design:	☐	☐	
Fueling Areas	☐	☒	
Air/Water Supply Area Drainage	☐	☒	
Trash Storage Areas	☐	☒	
Loading Docks	☐	☒	
Maintenance Bays	☐	☒	
Vehicle and Equipment Wash Areas	☐	☒	
Outdoor Material Storage Areas	☐	☒	
Outdoor Work Areas or Processing Areas	☐	☒	
Provide Wash Water Controls for Food Preparation Areas	☐	☒	

BMP	O&M REQUIREMENTS	START-UP DATES	O&M FREQUENCY	RESPONSIBLE PARTIES	INSPECTIONS & RECORDS
Education for Property Owners, Operators, Tenants, Occupants, or Employees	Material shall be distributed to buyers upon purchase. No O&M required.	Post Construction	Upon first occupancy	Developer/Seller	Record receipt of material by buyers.
Activity Restrictions	Project CC&Rs shall prohibit activities such as vehicle fueling and non-permit construction.	Post Construction	None	HOA	None
Irrigation System and Landscape Maintenance	Common areas shall be mowed and trimmed regularly. Common irrigation systems shall be designed to minimize nuisance flow.	Post Construction	Bi-monthly	HOA	5-years
Common Areas litter control	Remove trash from common areas	Post Construction	Bi-monthly	HOA	5-years
Drainage Facility Inspection and Maintenance	Remove trash, debris & sediment. Trim and maintain vegetation.	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years
MS4 Stenciling and Signage	Maintain legibility	Post Construction	Annually	HOA	5-years
Landscape and Irrigation System Design	Repair irrigation leaks and damage	Post Construction	As-needed	HOA	5-years
Protect Slopes and Channels	Repair erosion areas and control pests	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years

Appendix D includes copies of the educational materials that will be used in implementing this project-specific WQMP.

V.3 TREATMENT CONTROL BMPS

With the exception of some perimeter slopes, all site runoff shall be intercepted and directed to a central detention basin with an infiltration sand filter sized per Appendix C of the Riverside County Low Impact Development BMP Design Handbook. The detention basin is located SW corner of the project (see site map) and is designed to mitigate for both flood control and water quality. The basin is a Volume based BMP. All sizing calculations are provided in Appendix F. See section VI for O&M.

BMP	O&M REQUIREMENTS	START-UP DATES	O&M FREQUENCY	RESPONSIBLE PARTIES	INSPECTIONS & RECORDS
Detention Basin	Remove Sediment, Trash & Debris	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years
Detention Basin	Maintain vegetation. Remove dead and dispose of clippings	Post Construction	Bi-monthly	HOA	5-years
Detention Basin	Control Pests	Post Construction	As Needed	HOA	5-years
Detention Basin	Repair erosion areas.	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years

Table 3: Treatment Control BMP Selection Matrix [1]

Pollutant of Concern	Treatment Control BMP Categories[2]							
	Veg. Swale & Veg. Filter Strips[3]	Detention Basins[4]	Infiltration Basins, Infiltration Trenches, & Porous Pavement[5]	Wet Ponds or Wetlands[6]	Sand Filter or Media Filters	Water Quality Inlets	Hydrodynamic Separator Systems [7]	Manufactured / Proprietary Devices[8]
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for turbidity)	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Organic Compounds	U	U	U	U	H/M	L	L	U
Y ☐ N ☒	☐	☐	☐	☐	☐	☐	☐	☐
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Y ☐ N ☒	☐	☐	☐	☐	☐	☐	☐	☐
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
Y ☐ N ☒	☐	☐	☐	☐	☐	☐	☐	☐
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Oils & Grease	H/M	M	U	U	H/M	M	L/M	U
Y ☐ N ☒	☐	☐	☐	☐	☐	☐	☐	☐
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Y ☒ N ☐	☐	☒	☐	☐	☐	☐	☐	☐
Metals	H/M	M	H	H	H	L	L	U
Y ☐ N ☐	☐	☐	☐	☐	☐	☐	☐	☐

Abbreviations:

L: Low removal efficiency H/M: High or medium removal efficiency U: Unknown removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Project applicants should base BMP designs on the Riverside County Stormwater Quality Best Management Practice Design Handbook. However, project applicants may also wish to reference the California Stormwater BMP Handbook – New Development and Redevelopment (www.cabmphandbooks.com). The Handbook contains additional information on BMP operation and maintenance.

(3) Includes grass swales, grass strips, wetland vegetation swales, and bioretention.

(4) Includes extended/dry detention basins with grass lining and extended/dry detention basins with impervious lining. Effectiveness based upon minimum 36-48-hour drawdown time.

(5) Projects that will utilize infiltration-based Treatment Control BMPs (e.g., Infiltration Basins, Infiltration Trenches, Porous Pavement, etc.) must include a copy of the property/project soils report as Appendix E to the project-specific WQMP. The selection of a Treatment Control BMP (or BMPs) for the project must specifically consider the effectiveness of the Treatment Control BMP for pollutants identified as causing an impairment of Receiving Waters to which the project will discharge Urban Runoff.

(6) Includes permanent pool wet ponds and constructed wetlands.

(7) Also known as hydrodynamic devices, baffle boxes, swirl concentrators, or cyclone separators.

(8) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP, or newly developed/emerging stormwater treatment technologies.

V.4 EQUIVALENT TREATMENT CONTROL ALTERNATIVES

Not Applicable

V.5 REGIONALLY-BASED TREATMENT CONTROL BMPS

Not Applicable

VI. Operation and Maintenance Responsibility for Treatment Control BMPs

BMP	O&M REQUIREMENTS	START-UP DATES	O&M FREQUENCY	RESPONSIBLE PARTIES	INSPECTIONS & RECORDS
Detention Basin	Remove Sediment, Trash & Debris	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years
Detention Basin	Maintain vegetation. Remove dead and dispose of clippings	Post Construction	Bi-monthly	HOA	5-years
Detention Basin	Control Pests	Post Construction	As Needed	HOA	5-years
Detention Basin	Repair erosion areas.	Post Construction	As Needed. Before & After the rainy season (Oct 1 to May 1). After large storm events.	HOA	5-years

VII. Funding

A funding source or sources for the O&M of each Treatment Control BMP identified in the project-specific WQMP must be identified. By certifying the project-specific WQMP, the Project applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners. One example of how to adhere to the requirement to transfer O&M responsibilities is to record the project-specific WQMP against the title to the property.

Funding for the project BMPs shall be provided by the project HOA.

Appendix A

Conditions of Approval – Not Applicable.

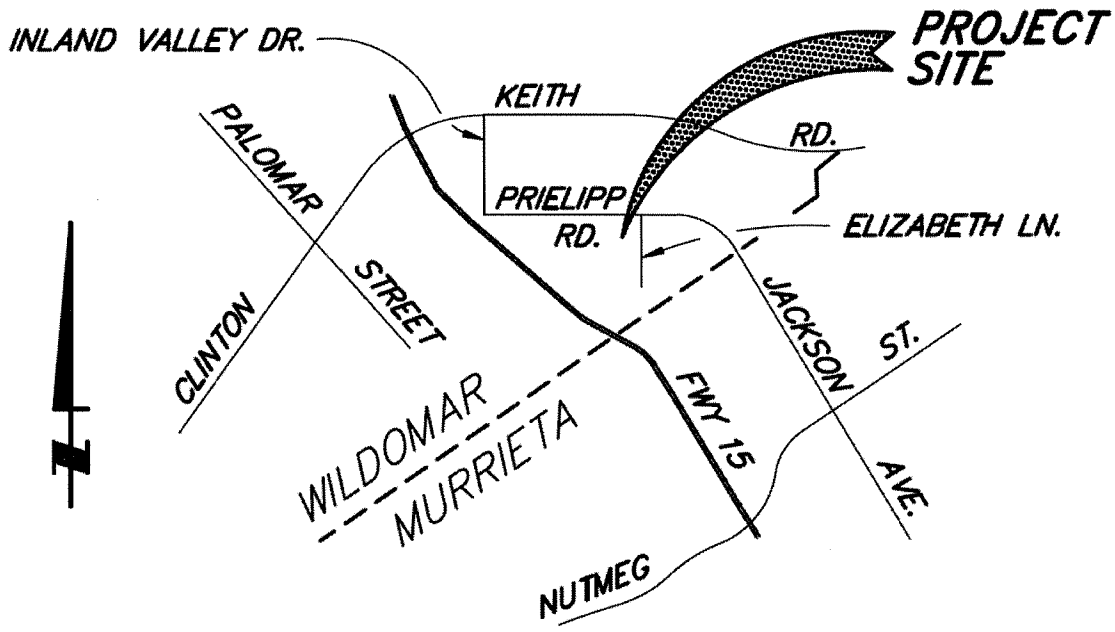
(This report is preliminary and has not received COA.)

Planning Commission Resolution _____

Dated _____

Appendix B

Vicinity Map
WQMP Site Plan, and Receiving Waters Map (see map pocket)



VICINITY MAP
NOT TO SCALE

THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H–2

Appendix C

Supporting Detail Related to Hydraulic Conditions of Concern

SB&O INC.
PLANNING ENGINEERING SURVEYING

PRELIMINARY DRAINAGE & DETENTION BASIN DESIGN REPORT

FOR

WILDOMAR 23
SW Corner of Elizabeth Lane & Prielipp Road

IN

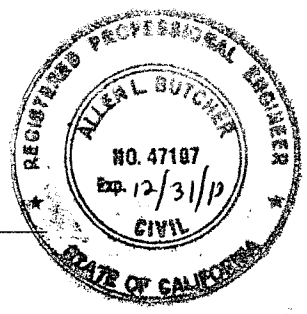
WILDOMAR, CALIFORNIA
COUNTY OF RIVERSIDE

Prepared for:

Lennar Homes of California, Inc.
890 Montecito Drive, Suite 302
Corona, CA 92879
Telephone: (951) 817-3567

Prepared by:

SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
(951) 695-8900 (951) 695-8901 Fax
SB&O Job number: 69550.60



Allen L. Butcher PE 47107
EXP. 12/31/2013

December 21, 2012

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Post-Development Onsite Rational Method Calculations ..... B

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Post-Development Hydrographs ..... D

Water Quality Volume ..... E

Detention Basin Table & Rating Curves ..... F

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Site Map & Offsite Drainage Exhibit ..... Map Pocket

APPENDIX

Selected RCFC&WCD Plates

SCOPE OF REPORT

The purpose of this preliminary study is to size proposed storm drain systems and determine the storage volume required to attenuate post development peak discharge. A single detention basin (including a water quality component in the bottom 18" of the basin) will be used. Details related to water quality treatment are contained in a separate preliminary WQMP for the project.

DESCRIPTION OF WATERSHED

Existing Conditions

The existing site is located at the southwest corner of Prielipp Road and Elizabeth Lane. The site is generally vacant with a few single family homes along Elizabeth Lane. Topography is moderately steep, with a deep canyon/drainage course sloping southwesterly along the westerly limits of the project. A secondary canyon traverses the site near the northeast corner trending southwest. The majority of the developed portion of the site is tributary to this canyon, along with a small offsite drainage area north of the intersection. A small offsite drainage basin (6.6 acres) located at the northwest corner of the intersection of the Elizabeth Lane and Prielipp Road, is tributary to this secondary canyon.

Developed Condition

The proposed *Wildomar 23* project is a medium density (5,000 sf) single family residential subdivision (67 lots on public streets). The gross site area is located on approximately 23 acres, with a net development area of approximately 18 acres. Runoff generated onsite will be captured by a public storm drain system and routed through a private onsite detention/water quality basin.

In order to avoid treating the offsite flows, runoff from Prielipp Road, Elizabeth Lane, and the small northerly basin (6.6 acres) will be intercepted and conveyed in an independent public "bypass" storm drain system. This system will bypass the basin and be discharged along with the basin storm drain into the secondary canyon at the southerly boundary.

See Site Map Exhibit for lot layout, storm drain alignments and the location of the detention basin.

METHODOLOGY

In order to mitigate impacts to the downstream watershed, the project proposes to use detention basin, which provides a storage volume to attenuate peak flows. In order to determine the required storage volume and outflow rates, an inflow hydrograph is required. The Unit Hydrograph methodology provides time based flow rates. However, unit hydrograph methodology is based upon assumptions for tributary areas of 1/2 square mile (320 acres) or more. The Rational Method typically provides conservative peak flow rate estimates for small drainage areas, but does not provide a time based hydrograph.

One approach is overcome these problems is to generate a Rational Method peak flow rate and then "adjust" the corresponding unit hydrograph input values in order arrive at the same peak flow rate. In order to maintain continuity, rainfall totals need to remain unchanged. In this instance the lag time was adjusted to provide a consistent peak flow rate.

Rational Method Hydrology

In accordance with the Riverside County Flood Control Hydrology Manual, the rational method was used to estimate peak flow rates for the 100-year storm. The CivilD© hydrology program was used to perform a node-to-node analysis of the on-site storm drain system. See attached project hydrology maps and Exhibits A thru C for calculations. Inlet calculations inlet sizing and water surface grades will be provided in the final project drainage report.

Exhibit A contains an Existing Conditions analysis to determine the current peak discharge flow rate to the southerly boundary for the site and the upstream area. Exhibit B is the Post Development analysis of the upstream area tributary to the site (Bypass Storm Drain). The difference between the 2 analyses is the maximum allowable combined discharge from the detention basin and the bypass storm drain.

Condition	Tributary Area	Q peak
A Existing	Current Site + Upstream	61.28 cfs
B Bypass	Upstream	25.12
Allowable	Detention Basin	36.16
C Proposed Site	Site Area	57.36

Unit Hydrograph

The Rational Method hydrology is based upon extreme rainfall events of short duration, and uses a 100-year, 1-hour rainfall event, with a 10-minute peak rainfall period. These types of storms are conservative for extremely small basins. Rainfall intensities decrease over larger areas and longer durations.

A range of storm is typically considered for unit hydrograph methodology. This multi-storm approach (1, 3, 6 & 24-hour events) considers a range of rainfall events that should be considered for volume based calculations. The controlling design case is often a function of the lag time or time of concentration of the tributary basin.

A 100-year 1-hour Unit Hydrograph (post construction site) was prepared for comparison to the rational method results. As expected, the Unit Hydrograph was significantly less than the Rational Method peak flow. Reducing the lag time (shorter time of concentration) provided an adjusted hydrograph with the same peak flow rate.

The adjusted lag time was used to calculate the range of storms (1, 3, 6 & 24 hour duration) and routed through the detention basin. See Exhibit D for these adjusted Post-Construction hydrographs.

Water Quality Volume

The project proposes to address water quality using an extended combination infiltration / detention basin. The bottom 18" of the basin was reserved for water quality. See Exhibit E for calculations.

DETENTION ANALYSES

An elevation-storage-discharge rating table was prepared to reflect the incremental storage volumes and corresponding outflows. Outflow values were estimated using weir and orifice flow equations. The bottom 18" of the basin are reserved for water quality purposes, to be drained using a subdrain system.

Time-based simulations were run for each storm to determine required the storage volume and verify peak outflows. Flood hydrographs were routed through the detention basins using Storage Indication Methodology (Modified Puls). An iterative process was utilized to determine the shape, number, size and elevation of the discharge control openings.

The detention storage has a floor elevation of 1301.0 with a top at 1309.0. The storage indication table may be found in Exhibit F. The control openings are as follows;

Elevation	Width	Height
1301.0	Subdrain only	
1302.5	6"	3"
1304.0	24"	4"
1305.0	36"	6"
1307.5	Overflow Weir (4' x 4' grated opening)	

The peak outflow is 17.32 cfs, which occurs during a 100-year 6-hour duration storm. The maximum storage depth is 6.3 feet (elevation 1307.3), which corresponds to a storage volume of 2.6 ac-ft (includes 0.47 ac-ft for water quality). The available storage volume is 3.0 ac-ft (Elevation 1308.0 which provides 1' freeboard).

A summary of the detention basin routing are available in Exhibit G. The individual detention analyses and the routing of the individual storms are provided in Exhibit H.

CONCLUSIONS

This study and the calculations presented herein demonstrate the adequacy of the proposed detention basin to attenuate peak runoff from the development of the site.

The peak outflow is 17.32 cfs, which occurs during a 100-year 6-hour duration storm. The maximum storage depth is 6.3 feet (elevation 1307.3), which corresponds to a storage volume of 2.6 ac-ft (includes 0.47 ac-ft for water quality). The available storage volume is 3.0 ac-ft (Elevation 1308.0 which provides 1' freeboard).

The site currently receives runoff from a small drainage area north of the site. The project will construct a separate bypass storm drain system to intercept and convey these flows through the site and discharge to the existing canyon/drainage curse along the southerly boundary.

EXHIBIT A

PRE-DEVELOPMENT RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/13/12 File:69552E.out

WILDOMAR - 69552.60
EXISTING 100-YEAR

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 50.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1372.000(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.02000 s(percent)= 2.00
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.542 min.
Rainfall intensity = 4.706(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.417(CFS)
Total initial stream area = 0.100(Ac.)
Pervious area fraction = 1.000

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1372.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   850.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.954(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0376
Corrected/adjusted channel slope =  0.0376
Travel time =    2.68 min.     TC =    8.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =     3.894(In/Hr) for a   100.0 year storm
Subarea runoff =     22.326(CFS) for      6.500(Ac.)19.9
Total runoff =     22.742(CFS)      Total area =      6.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1340.000(Ft.)
Downstream point/station elevation =  1337.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.742(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    22.742(CFS)
Normal flow depth in pipe =   13.41(In.)
Flow top width inside pipe =   23.83(In.)
Critical Depth =   20.38(In.)
Pipe flow velocity =     12.61(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     8.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of natural channel elevation =   1337.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =  1443.000(Ft.)
Estimated mean flow rate at midpoint of channel =     45.657(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.36(Ft/s)

Correction to map slope used on extremely rugged channels with
```

```
drops and waterfalls (Plate D-6.2)
      Normal channel slope =  0.0381
Corrected/adjusted channel slope =  0.0381
Travel time =    3.27 min.     TC =   11.63  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.297(In/Hr) for a   100.0 year storm
Subarea runoff =     38.539(CFS) for     13.300(Ac.)
Total runoff =     61.281(CFS)      Total area =      19.900(Ac.)
End of computations, total study area =          19.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  86.0
```

EXHIBIT B

POST-DEVELOPMENT SITE RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/13/12 File:69552p.out

WILDOMAR - 69552.60
PROP 100-YEAR RATIONAL

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 50.000(Ft.)
Top (of initial area) elevation = 43.300(Ft.)
Bottom (of initial area) elevation = 42.300(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.02000 s(percent)= 2.00
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 4.944(In/Hr) for a 100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 0.608(CFS)
Total initial stream area = 0.140(Ac.)
Pervious area fraction = 0.500

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =    41.200(Ft.)
End of street segment elevation =    20.400(Ft.)
Length of street segment  =   755.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =   9.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.055(CFS)
Depth of flow =   0.388(Ft.), Average velocity =   4.209(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.544(Ft.)
Flow velocity =   4.21(Ft/s)
Travel time =    2.99 min.     TC =    7.99  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.948(In/Hr) for a   100.0 year storm
Subarea runoff =     12.830(CFS) for      3.720(Ac.)
Total runoff =     13.438(CFS)      Total area =       3.860(Ac.)
Street flow at end of street =     13.438(CFS)
Half street flow at end of street =     13.438(CFS)
Depth of flow =   0.461(Ft.), Average velocity =   4.920(Ft/s)
Flow width (from curb towards crown)=  16.213(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =    15.000(Ft.)
Downstream point/station elevation =    11.300(Ft.)
Pipe length  =    43.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.438(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    13.438(CFS)
Normal flow depth in pipe =    9.35(In.)
Flow top width inside pipe =   14.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.69(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
```

```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     8.03 min.
Rainfall intensity =      3.938(In/Hr) for a   100.0 year storm
Subarea runoff =     15.410(CFS) for      4.480(Ac.)
Total runoff =     28.848(CFS)      Total area =       8.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =    11.300(Ft.)
Downstream point/station elevation =     3.400(Ft.)
Pipe length  =   252.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.848(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    28.848(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   15.07(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.25(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =     8.35 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station        6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =     3.400(Ft.)
Downstream point/station elevation =     1.200(Ft.)
Pipe length  =   451.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.848(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    28.848(CFS)
Normal flow depth in pipe =   24.80(In.)
Flow top width inside pipe =   22.72(In.)
Critical Depth =   21.96(In.)
Pipe flow velocity =      6.65(Ft/s)
Travel time through pipe =    1.13 min.
Time of concentration (TC) =     9.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     9.48 min.
Rainfall intensity =      3.636(In/Hr) for a   100.0 year storm
Subarea runoff =     26.079(CFS) for      8.230(Ac.)
Total runoff =     54.927(CFS)      Total area =      16.570(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =      1.200(Ft.)
Downstream point/station elevation =      1.000(Ft.)
Pipe length  =    39.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.927(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    54.927(CFS)
Normal flow depth in pipe =   29.72(In.)
Flow top width inside pipe =   33.22(In.)
Critical Depth =   28.40(In.)
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     9.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.4057.6
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     9.56 min.
Rainfall intensity =      3.622(In/Hr) for a   100.0 year storm
Subarea runoff =      2.682(CFS) for      0.850(Ac.)
Total runoff =     57.610(CFS)      Total area =      17.420(Ac.)
End of computations, total study area =           17.42 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  69.0
```

EXHIBIT C

POST-DEVELOPMENT BYPASS RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/19/12 File:69552O.out

69552 - WILDOMAR
BYPASS 100-YEAR

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 301.000 to Point/Station 302.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 3.899(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
User specified values are as follows:
TC = 8.20 min. Rain intensity = 3.90(In/Hr)
Total area = 6.60(Ac.) Total runoff = 22.70(CFS)

++
Process from Point/Station 301.000 to Point/Station 302.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1340.000(Ft.)
Downstream point/station elevation = 1338.000(Ft.)
Pipe length = 103.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =    22.700(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    22.700(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   15.07(In.)
Critical Depth =   19.80(In.)
Pipe flow velocity =     10.44(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     8.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.36 min.
Rainfall intensity =     3.862(In/Hr) for a   100.0 year storm
Subarea runoff =      2.419(CFS) for      0.700(Ac.)
Total runoff =     25.119(CFS)      Total area =       7.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1338.000(Ft.)
Downstream point/station elevation =  1333.000(Ft.)
Pipe length  =   590.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.119(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    25.119(CFS)
Normal flow depth in pipe =   19.69(In.)
Flow top width inside pipe =   24.00(In.)
Critical Depth =   21.03(In.)
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    1.22 min.
Time of concentration (TC) =     9.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1333.000(Ft.)
Downstream point/station elevation =  1295.000(Ft.)
Pipe length  =  1450.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.119(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    25.119(CFS)
Normal flow depth in pipe =   16.83(In.)
Flow top width inside pipe =   16.76(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.16(Ft/s)
Travel time through pipe =    1.99 min.
Time of concentration (TC) =    11.57 min.
End of computations, total study area =            7.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.914
```

Area averaged RI index number = 84.4

EXHIBIT D

POST DEVELOPMENT UNIT HYDROGRPAHS

```
        U n i t   H y d r o g r a p h   A n a l y s i s

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 1999, Version 6.0
                Study date  12/19/12 File: Wildomar1100.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N   714

------------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



------------------------------------------------------------------------
Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK
------------------------------------------------------------------------
Drainage Area =      17.35(Ac.)  =      0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time =    0.034 Hr.
Lag time =     2.06 Min.
25% of lag time =     0.51 Min.
40% of lag time =     0.82 Min.
Unit time =     5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       17.35             0.62                 10.76

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       17.35             1.50                 26.03

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.620(In)
Area Averaged 100-Year Rainfall =    1.500(In)

Point rain (area averaged) =    1.500(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    1.500(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    17.350           69.00          0.500
 Total Area Entered =     17.35(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)       (Dec.)    (In/Hr)
69.0  84.4      0.194     0.500         0.107        1.000      0.107
                                                  Sum (F) =    0.107
Area averaged mean soil loss (F) (In/Hr) =  0.107
Minimum soil loss rate ((In/Hr)) =  0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.500
------------------------------------------------------------------------
Slope of intensity-duration curve for a 1 hour storm =0.4800
------------------------------------------------------------------------
```

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.309	50.009	8.744
2	0.167	486.618	40.472	7.077
3	0.250	729.927	7.241	1.266
4	0.333	973.236	2.278	0.398
			Sum = 100.000	Sum= 17.486

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.792	0.107	---	0.69
2	0.17	4.50	0.810	0.107	---	0.70
3	0.25	5.40	0.972	0.107	---	0.87
4	0.33	5.40	0.972	0.107	---	0.87
5	0.42	5.70	1.026	0.107	---	0.92
6	0.50	6.40	1.152	0.107	---	1.05
7	0.58	7.90	1.422	0.107	---	1.32
8	0.67	9.10	1.638	0.107	---	1.53
9	0.75	12.80	2.304	0.107	---	2.20
10	0.83	25.60	4.607	0.107	---	4.50
11	0.92	7.90	1.422	0.107	---	1.32
12	1.00	4.90	0.882	0.107	---	0.78
Sum =		100.0			Sum =	16.7

Flood volume = Effective rainfall 1.39(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.154(Ac.Ft)
Total rainfall = 1.50(In)
Flood volume = 87741.4 Cubic Feet
Total soil loss = 6714.5 Cubic Feet

Peak flow rate of this hydrograph = 57.395(CFS)

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1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0413	6.00	V Q				
0+10	0.1171	11.00	V Q				
0+15	0.2095	13.42	V Q				
0+20	0.3118	14.86	V Q				
0+25	0.4189	15.54	V Q				
0+30	0.5366	17.09	VQ				
0+35	0.6772	20.42	Q				
0+40	0.8452	24.40	Q				
0+45	1.0666	32.14	Q				
0+50	1.4619	57.40	V			Q	
0+55	1.7840	46.77	Q V				
1+ 0	1.9401	22.67	Q			V	
1+ 5	2.0018	8.95	Q			V	
1+10	2.0121	1.51	Q			V	
1+15	2.0143	0.31	Q			V	

U n i t H y d r o g r a p h A n a l y s i s

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	1.05	18.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	2.60	45.11

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.050(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 2.600(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000	Sum= 17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.406	0.107	---	0.30
2	0.17	1.30	0.406	0.107	---	0.30
3	0.25	1.10	0.343	0.107	---	0.24
4	0.33	1.50	0.468	0.107	---	0.36
5	0.42	1.50	0.468	0.107	---	0.36
6	0.50	1.80	0.562	0.107	---	0.45
7	0.58	1.50	0.468	0.107	---	0.36
8	0.67	1.80	0.562	0.107	---	0.45
9	0.75	1.80	0.562	0.107	---	0.45
10	0.83	1.50	0.468	0.107	---	0.36
11	0.92	1.60	0.499	0.107	---	0.39
12	1.00	1.80	0.562	0.107	---	0.45
13	1.08	2.20	0.686	0.107	---	0.58
14	1.17	2.20	0.686	0.107	---	0.58
15	1.25	2.20	0.686	0.107	---	0.58
16	1.33	2.00	0.624	0.107	---	0.52
17	1.42	2.60	0.811	0.107	---	0.70
18	1.50	2.70	0.842	0.107	---	0.74
19	1.58	2.40	0.749	0.107	---	0.64
20	1.67	2.70	0.842	0.107	---	0.74
1	1.75	3.30	1.030	0.107	---	0.92
22	1.83	3.10	0.967	0.107	---	0.86
23	1.92	2.90	0.905	0.107	---	0.80
24	2.00	3.00	0.936	0.107	---	0.83
25	2.08	3.10	0.967	0.107	---	0.86
26	2.17	4.20	1.310	0.107	---	1.20
27	2.25	5.00	1.560	0.107	---	1.45
28	2.33	3.50	1.092	0.107	---	0.99
29	2.42	6.80	2.121	0.107	---	2.01
30	2.50	7.30	2.277	0.107	---	2.17
31	2.58	8.20	2.558	0.107	---	2.45
32	2.67	5.90	1.841	0.107	---	1.73
33	2.75	2.00	0.624	0.107	---	0.52
34	2.83	1.80	0.562	0.107	---	0.45
35	2.92	1.80	0.562	0.107	---	0.45
36	3.00	0.60	0.187	0.107	---	0.08
Sum =		100.0			Sum =	27.4

Flood volume = Effective rainfall 2.28(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 3.3(Ac.Ft)
Total soil loss = 0.32(In)
Total soil loss = 0.462(Ac.Ft)
Total rainfall = 2.60(In)
Flood volume = 143593.4 Cubic Feet
Total soil loss = 20143.4 Cubic Feet

Peak flow rate of this hydrograph = 39.761(CFS)

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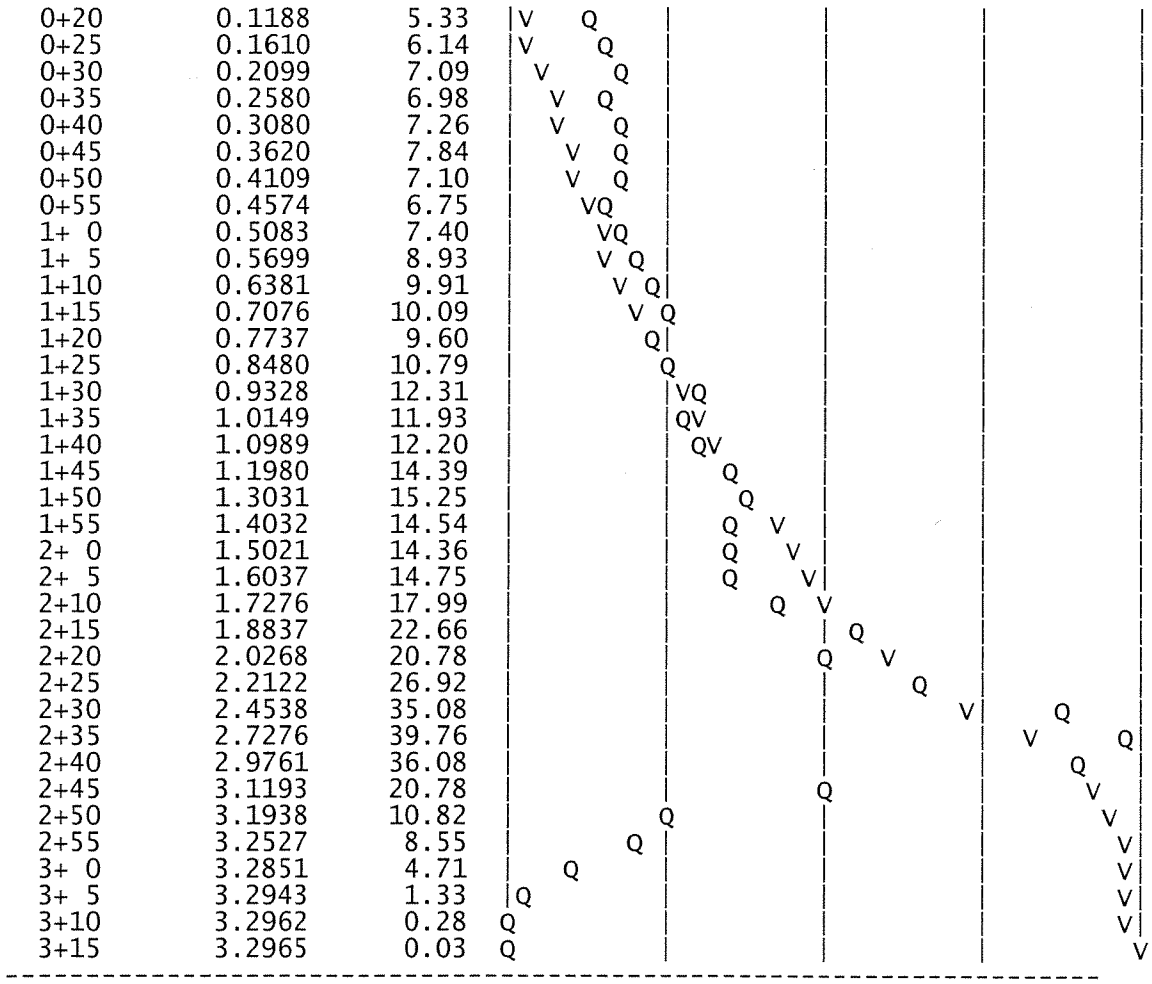
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0180	2.61	V Q	|	|	|	|
0+10	0.0506	4.73	V Q	|	|	|	|
0+15	0.0820	4.56	V Q	|	|	|	|



U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/19/12 File: Wildomar6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	1.50	26.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	3.70	64.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.500(In)
Area Averaged 100-Year Rainfall = 3.700(In)

Point rain (area averaged) = 3.700(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000	Sum= 17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.222	0.107	---	0.12
2	0.17	0.60	0.266	0.107	---	0.16
3	0.25	0.60	0.266	0.107	---	0.16
4	0.33	0.60	0.266	0.107	---	0.16
5	0.42	0.60	0.266	0.107	---	0.16
6	0.50	0.70	0.311	0.107	---	0.20
7	0.58	0.70	0.311	0.107	---	0.20
8	0.67	0.70	0.311	0.107	---	0.20
9	0.75	0.70	0.311	0.107	---	0.20
10	0.83	0.70	0.311	0.107	---	0.20
11	0.92	0.70	0.311	0.107	---	0.20
12	1.00	0.80	0.355	0.107	---	0.25
13	1.08	0.80	0.355	0.107	---	0.25
14	1.17	0.80	0.355	0.107	---	0.25
15	1.25	0.80	0.355	0.107	---	0.25
16	1.33	0.80	0.355	0.107	---	0.25
17	1.42	0.80	0.355	0.107	---	0.25
18	1.50	0.80	0.355	0.107	---	0.25
19	1.58	0.80	0.355	0.107	---	0.25
20	1.67	0.80	0.355	0.107	---	0.25
1	1.75	0.80	0.355	0.107	---	0.25
22	1.83	0.80	0.355	0.107	---	0.25
23	1.92	0.80	0.355	0.107	---	0.25
24	2.00	0.90	0.400	0.107	---	0.29
25	2.08	0.80	0.355	0.107	---	0.25
26	2.17	0.90	0.400	0.107	---	0.29
27	2.25	0.90	0.400	0.107	---	0.29
28	2.33	0.90	0.400	0.107	---	0.29
29	2.42	0.90	0.400	0.107	---	0.29
30	2.50	0.90	0.400	0.107	---	0.29
31	2.58	0.90	0.400	0.107	---	0.29
32	2.67	0.90	0.400	0.107	---	0.29
33	2.75	1.00	0.444	0.107	---	0.34
34	2.83	1.00	0.444	0.107	---	0.34
35	2.92	1.00	0.444	0.107	---	0.34
36	3.00	1.00	0.444	0.107	---	0.34
37	3.08	1.00	0.444	0.107	---	0.34
38	3.17	1.10	0.488	0.107	---	0.38
39	3.25	1.10	0.488	0.107	---	0.38
40	3.33	1.10	0.488	0.107	---	0.38
41	3.42	1.20	0.533	0.107	---	0.43
42	3.50	1.30	0.577	0.107	---	0.47
43	3.58	1.40	0.622	0.107	---	0.51
44	3.67	1.40	0.622	0.107	---	0.51
45	3.75	1.50	0.666	0.107	---	0.56
46	3.83	1.50	0.666	0.107	---	0.56
47	3.92	1.60	0.710	0.107	---	0.60
48	4.00	1.60	0.710	0.107	---	0.60
49	4.08	1.70	0.755	0.107	---	0.65
50	4.17	1.80	0.799	0.107	---	0.69
51	4.25	1.90	0.844	0.107	---	0.74
2	4.33	2.00	0.888	0.107	---	0.78
53	4.42	2.10	0.932	0.107	---	0.83
54	4.50	2.10	0.932	0.107	---	0.83
55	4.58	2.20	0.977	0.107	---	0.87
56	4.67	2.30	1.021	0.107	---	0.91
57	4.75	2.40	1.066	0.107	---	0.96
58	4.83	2.40	1.066	0.107	---	0.96
59	4.92	2.50	1.110	0.107	---	1.00

60	5.00	2.60	1.154	0.107	---	1.05
61	5.08	3.10	1.376	0.107	---	1.27
62	5.17	3.60	1.598	0.107	---	1.49
63	5.25	3.90	1.731	0.107	---	1.62
64	5.33	4.20	1.865	0.107	---	1.76
65	5.42	4.70	2.087	0.107	---	1.98
66	5.50	5.60	2.486	0.107	---	2.38
67	5.58	1.90	0.844	0.107	---	0.74
68	5.67	0.90	0.400	0.107	---	0.29
69	5.75	0.60	0.266	0.107	---	0.16
70	5.83	0.50	0.222	0.107	---	0.12
71	5.92	0.30	0.133	0.107	---	0.03
72	6.00	0.20	0.089	0.107	0.044	0.04
Sum =		100.0			Sum =	36.8

Flood volume = Effective rainfall 3.07(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 4.4(Ac.Ft)
Total soil loss = 0.63(In)
Total soil loss = 0.917(Ac.Ft)
Total rainfall = 3.70(In)
Flood volume = 193053.6 Cubic Feet
Total soil loss = 39960.3 Cubic Feet

Peak flow rate of this hydrograph = 37.711(CFS)

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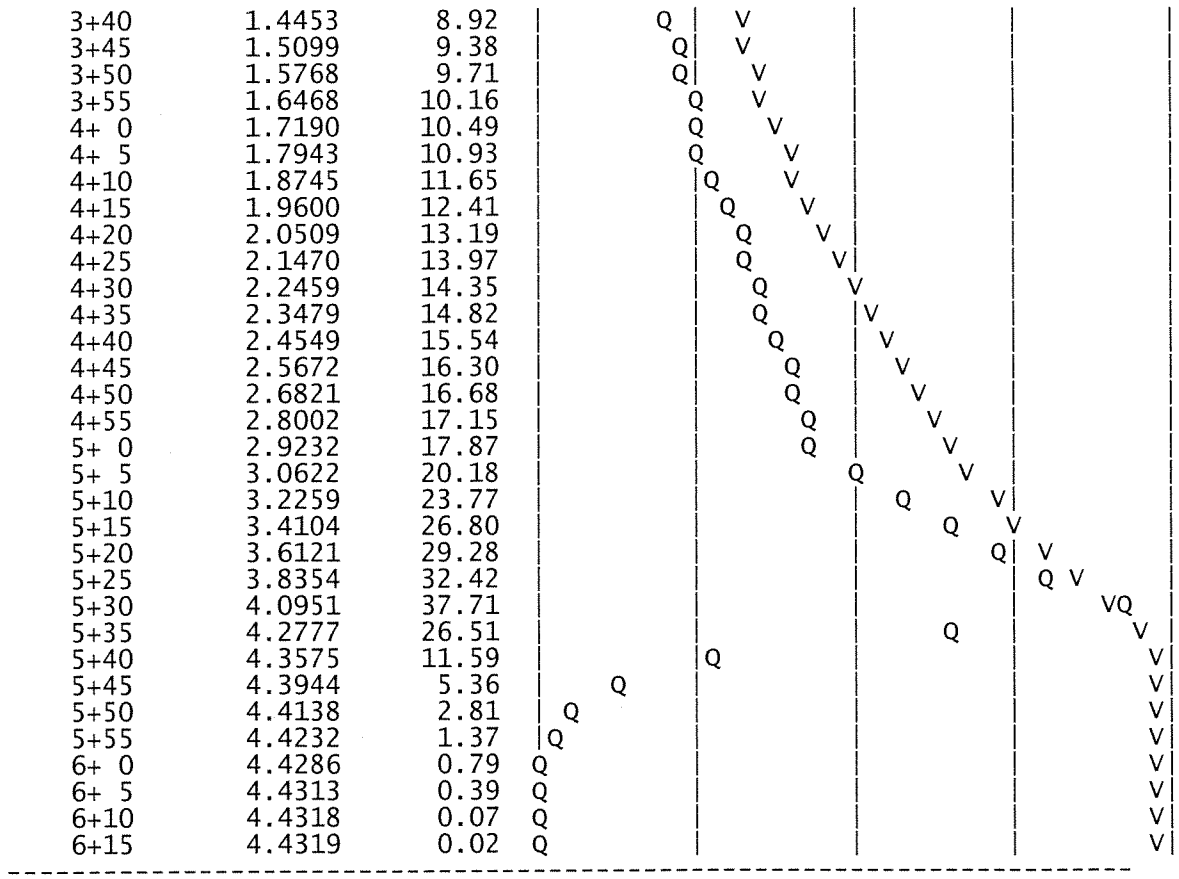
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0069	1.01	VQ	|	|	|	|
0+10	0.0222	2.21	V Q	|	|	|	|
0+15	0.0406	2.67	V Q	|	|	|	|
0+20	0.0597	2.78	V Q	|	|	|	|
0+25	0.0790	2.80	V Q	|	|	|	|
0+30	0.1009	3.18	V Q	|	|	|	|
0+35	0.1250	3.50	|V Q	|	|	|	|
0+40	0.1495	3.55	|V Q	|	|	|	|
0+45	0.1741	3.57	|V Q	|	|	|	|
0+50	0.1987	3.57	|V Q	|	|	|	|
0+55	0.2233	3.57	| VQ	|	|	|	|
1+ 0	0.2506	3.96	| VQ	|	|	|	|
1+ 5	0.2800	4.27	| V Q	|	|	|	|
1+10	0.3098	4.33	| V Q	|	|	|	|
1+15	0.3398	4.35	| VQ	|	|	|	|
1+20	0.3697	4.35	| VQ	|	|	|	|
1+25	0.3997	4.35	| VQ	|	|	|	|
1+30	0.4296	4.35	| VQ	|	|	|	|
1+35	0.4596	4.35	| Q	|	|	|	|
1+40	0.4895	4.35	| Q	|	|	|	|
1+45	0.5195	4.35	| Q	|	|	|	|
1+50	0.5494	4.35	| Q	|	|	|	|
1+55	0.5794	4.35	| QV	|	|	|	|
2+ 0	0.6120	4.74	| QV	|	|	|	|
2+ 5	0.6441	4.66	| QV	|	|	|	|
2+10	0.6771	4.79	| Q V	|	|	|	|
2+15	0.7120	5.07	| QV	|	|	|	|
2+20	0.7472	5.11	| QV	|	|	|	|
2+25	0.7825	5.13	| Q V	|	|	|	|
2+30	0.8178	5.13	| Q V	|	|	|	|
2+35	0.8531	5.13	| Q V	|	|	|	|
2+40	0.8884	5.13	| Q V	|	|	|	|
2+45	0.9264	5.51	| Q V	|	|	|	|
2+50	0.9665	5.83	| Q V	|	|	|	|
2+55	1.0070	5.88	| Q V	|	|	|	|
3+ 0	1.0477	5.90	| Q V	|	|	|	|
3+ 5	1.0883	5.90	| Q V	|	|	|	|
3+10	1.1316	6.29	| Q V	|	|	|	|
3+15	1.1771	6.60	| Q V	|	|	|	|
3+20	1.2230	6.66	| Q |V	|	|	|	|
3+25	1.2717	7.07	| Q |V	|	|	|	|
3+30	1.3252	7.77	| Q |V	|	|	|	|
3+35	1.3839	8.53	| Q | V	|	|	|	|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3+55 1.6468 10.16
4+ 0 1.7190 10.49
4+ 5 1.7943 10.93
4+10 1.8745 11.65
4+15 1.9600 12.41
4+20 2.0509 13.19
4+25 2.1470 13.97
4+30 2.2459 14.35
4+35 2.3479 14.82
4+40 2.4549 15.54
4+45 2.5672 16.30
4+50 2.6821 16.68
4+55 2.8002 17.15
5+ 0 2.9232 17.87
5+ 5 3.0622 20.18
5+10 3.2259 23.77
5+15 3.4104 26.80
5+20 3.6121 29.28
5+25 3.8354 32.42
5+30 4.0951 37.71
5+35 4.2777 26.51
5+40 4.3575 11.59
5+45 4.3944 5.36
5+50 4.4138 2.81
5+55 4.4232 1.37
6+ 0 4.4286 0.79
6+ 5 4.4313 0.39
6+10 4.4318 0.07
6+15 4.4319 0.02

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/19/12 File: Wildomar24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	2.75	47.71

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	7.50	130.13

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.750(In)
Area Averaged 100-Year Rainfall = 7.500(In)

Point rain (area averaged) = 7.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 7.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000	Sum= 17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.060	0.189	0.030	0.03
2	0.17	0.07	0.060	0.188	0.030	0.03
3	0.25	0.07	0.060	0.188	0.030	0.03
4	0.33	0.10	0.090	0.187	0.045	0.04
5	0.42	0.10	0.090	0.186	0.045	0.04
6	0.50	0.10	0.090	0.185	0.045	0.04
7	0.58	0.10	0.090	0.185	0.045	0.04
8	0.67	0.10	0.090	0.184	0.045	0.04
9	0.75	0.10	0.090	0.183	0.045	0.04
10	0.83	0.13	0.120	0.182	0.060	0.06
11	0.92	0.13	0.120	0.182	0.060	0.06
12	1.00	0.13	0.120	0.181	0.060	0.06
13	1.08	0.10	0.090	0.180	0.045	0.04
14	1.17	0.10	0.090	0.180	0.045	0.04
15	1.25	0.10	0.090	0.179	0.045	0.04
16	1.33	0.10	0.090	0.178	0.045	0.04
17	1.42	0.10	0.090	0.177	0.045	0.04
18	1.50	0.10	0.090	0.177	0.045	0.04
19	1.58	0.10	0.090	0.176	0.045	0.04
20	1.67	0.10	0.090	0.175	0.045	0.04
21	1.75	0.10	0.090	0.175	0.045	0.04
22	1.83	0.13	0.120	0.174	0.060	0.06
23	1.92	0.13	0.120	0.173	0.060	0.06
24	2.00	0.13	0.120	0.173	0.060	0.06
25	2.08	0.13	0.120	0.172	0.060	0.06
26	2.17	0.13	0.120	0.171	0.060	0.06
27	2.25	0.13	0.120	0.170	0.060	0.06
28	2.33	0.13	0.120	0.170	0.060	0.06
29	2.42	0.13	0.120	0.169	0.060	0.06
30	2.50	0.13	0.120	0.168	0.060	0.06
31	2.58	0.17	0.150	0.168	0.075	0.07
32	2.67	0.17	0.150	0.167	0.075	0.07
33	2.75	0.17	0.150	0.166	0.075	0.07
34	2.83	0.17	0.150	0.166	0.075	0.07
35	2.92	0.17	0.150	0.165	0.075	0.07
36	3.00	0.17	0.150	0.164	0.075	0.07
37	3.08	0.17	0.150	0.164	0.075	0.07
38	3.17	0.17	0.150	0.163	0.075	0.07
39	3.25	0.17	0.150	0.162	0.075	0.07
40	3.33	0.17	0.150	0.162	0.075	0.07
41	3.42	0.17	0.150	0.161	0.075	0.07
42	3.50	0.17	0.150	0.160	0.075	0.07
43	3.58	0.17	0.150	0.160	0.075	0.07
44	3.67	0.17	0.150	0.159	0.075	0.07
45	3.75	0.17	0.150	0.158	0.075	0.07
46	3.83	0.20	0.180	0.158	---	0.02
47	3.92	0.20	0.180	0.157	---	0.02
48	4.00	0.20	0.180	0.156	---	0.02
49	4.08	0.20	0.180	0.156	---	0.02
50	4.17	0.20	0.180	0.155	---	0.03
51	4.25	0.20	0.180	0.154	---	0.03
52	4.33	0.23	0.210	0.154	---	0.06
53	4.42	0.23	0.210	0.153	---	0.06
54	4.50	0.23	0.210	0.152	---	0.06
55	4.58	0.23	0.210	0.152	---	0.06
56	4.67	0.23	0.210	0.151	---	0.06
57	4.75	0.23	0.210	0.150	---	0.06
58	4.83	0.27	0.240	0.150	---	0.09
59	4.92	0.27	0.240	0.149	---	0.09

60	5.00	0.27	0.240	0.148	---	0.09
61	5.08	0.20	0.180	0.148	---	0.03
62	5.17	0.20	0.180	0.147	---	0.03
63	5.25	0.20	0.180	0.146	---	0.03
64	5.33	0.23	0.210	0.146	---	0.06
65	5.42	0.23	0.210	0.145	---	0.06
66	5.50	0.23	0.210	0.145	---	0.07
67	5.58	0.27	0.240	0.144	---	0.10
68	5.67	0.27	0.240	0.143	---	0.10
69	5.75	0.27	0.240	0.143	---	0.10
70	5.83	0.27	0.240	0.142	---	0.10
71	5.92	0.27	0.240	0.141	---	0.10
72	6.00	0.27	0.240	0.141	---	0.10
73	6.08	0.30	0.270	0.140	---	0.13
74	6.17	0.30	0.270	0.139	---	0.13
75	6.25	0.30	0.270	0.139	---	0.13
76	6.33	0.30	0.270	0.138	---	0.13
77	6.42	0.30	0.270	0.138	---	0.13
78	6.50	0.30	0.270	0.137	---	0.13
79	6.58	0.33	0.300	0.136	---	0.16
80	6.67	0.33	0.300	0.136	---	0.16
81	6.75	0.33	0.300	0.135	---	0.16
82	6.83	0.33	0.300	0.135	---	0.17
83	6.92	0.33	0.300	0.134	---	0.17
84	7.00	0.33	0.300	0.133	---	0.17
85	7.08	0.33	0.300	0.133	---	0.17
86	7.17	0.33	0.300	0.132	---	0.17
87	7.25	0.33	0.300	0.132	---	0.17
88	7.33	0.37	0.330	0.131	---	0.20
89	7.42	0.37	0.330	0.130	---	0.20
90	7.50	0.37	0.330	0.130	---	0.20
91	7.58	0.40	0.360	0.129	---	0.23
92	7.67	0.40	0.360	0.129	---	0.23
93	7.75	0.40	0.360	0.128	---	0.23
94	7.83	0.43	0.390	0.127	---	0.26
95	7.92	0.43	0.390	0.127	---	0.26
96	8.00	0.43	0.390	0.126	---	0.26
97	8.08	0.50	0.450	0.126	---	0.32
98	8.17	0.50	0.450	0.125	---	0.32
99	8.25	0.50	0.450	0.124	---	0.33
100	8.33	0.50	0.450	0.124	---	0.33
101	8.42	0.50	0.450	0.123	---	0.33
102	8.50	0.50	0.450	0.123	---	0.33
103	8.58	0.53	0.480	0.122	---	0.36
104	8.67	0.53	0.480	0.122	---	0.36
105	8.75	0.53	0.480	0.121	---	0.36
106	8.83	0.57	0.510	0.120	---	0.39
107	8.92	0.57	0.510	0.120	---	0.39
108	9.00	0.57	0.510	0.119	---	0.39
109	9.08	0.63	0.570	0.119	---	0.45
110	9.17	0.63	0.570	0.118	---	0.45
111	9.25	0.63	0.570	0.118	---	0.45
112	9.33	0.67	0.600	0.117	---	0.48
113	9.42	0.67	0.600	0.116	---	0.48
114	9.50	0.67	0.600	0.116	---	0.48
115	9.58	0.70	0.630	0.115	---	0.51
116	9.67	0.70	0.630	0.115	---	0.52
117	9.75	0.70	0.630	0.114	---	0.52
118	9.83	0.73	0.660	0.114	---	0.55
119	9.92	0.73	0.660	0.113	---	0.55
120	10.00	0.73	0.660	0.113	---	0.55
121	10.08	0.50	0.450	0.112	---	0.34
122	10.17	0.50	0.450	0.111	---	0.34
123	10.25	0.50	0.450	0.111	---	0.34
124	10.33	0.50	0.450	0.110	---	0.34
125	10.42	0.50	0.450	0.110	---	0.34
126	10.50	0.50	0.450	0.109	---	0.34
127	10.58	0.67	0.600	0.109	---	0.49
128	10.67	0.67	0.600	0.108	---	0.49
129	10.75	0.67	0.600	0.108	---	0.49
130	10.83	0.67	0.600	0.107	---	0.49
131	10.92	0.67	0.600	0.107	---	0.49
132	11.00	0.67	0.600	0.106	---	0.49
133	11.08	0.63	0.570	0.106	---	0.46
134	11.17	0.63	0.570	0.105	---	0.46
135	11.25	0.63	0.570	0.105	---	0.47

136	11.33	0.63	0.570	0.104	---	0.47
137	11.42	0.63	0.570	0.104	---	0.47
138	11.50	0.63	0.570	0.103	---	0.47
139	11.58	0.57	0.510	0.103	---	0.41
140	11.67	0.57	0.510	0.102	---	0.41
141	11.75	0.57	0.510	0.102	---	0.41
2	11.83	0.60	0.540	0.101	---	0.44
143	11.92	0.60	0.540	0.101	---	0.44
144	12.00	0.60	0.540	0.100	---	0.44
145	12.08	0.83	0.750	0.100	---	0.65
146	12.17	0.83	0.750	0.099	---	0.65
147	12.25	0.83	0.750	0.099	---	0.65
148	12.33	0.87	0.780	0.098	---	0.68
149	12.42	0.87	0.780	0.098	---	0.68
150	12.50	0.87	0.780	0.097	---	0.68
151	12.58	0.93	0.840	0.097	---	0.74
152	12.67	0.93	0.840	0.096	---	0.74
153	12.75	0.93	0.840	0.096	---	0.74
154	12.83	0.97	0.870	0.095	---	0.77
155	12.92	0.97	0.870	0.095	---	0.78
156	13.00	0.97	0.870	0.094	---	0.78
157	13.08	1.13	1.020	0.094	---	0.93
158	13.17	1.13	1.020	0.093	---	0.93
159	13.25	1.13	1.020	0.093	---	0.93
160	13.33	1.13	1.020	0.092	---	0.93
161	13.42	1.13	1.020	0.092	---	0.93
162	13.50	1.13	1.020	0.091	---	0.93
163	13.58	0.77	0.690	0.091	---	0.60
164	13.67	0.77	0.690	0.090	---	0.60
165	13.75	0.77	0.690	0.090	---	0.60
166	13.83	0.77	0.690	0.089	---	0.60
167	13.92	0.77	0.690	0.089	---	0.60
168	14.00	0.77	0.690	0.089	---	0.60
169	14.08	0.90	0.810	0.088	---	0.72
170	14.17	0.90	0.810	0.088	---	0.72
171	14.25	0.90	0.810	0.087	---	0.72
172	14.33	0.87	0.780	0.087	---	0.69
3	14.42	0.87	0.780	0.086	---	0.69
174	14.50	0.87	0.780	0.086	---	0.69
175	14.58	0.87	0.780	0.085	---	0.69
176	14.67	0.87	0.780	0.085	---	0.69
177	14.75	0.87	0.780	0.085	---	0.70
178	14.83	0.83	0.750	0.084	---	0.67
179	14.92	0.83	0.750	0.084	---	0.67
180	15.00	0.83	0.750	0.083	---	0.67
181	15.08	0.80	0.720	0.083	---	0.64
182	15.17	0.80	0.720	0.082	---	0.64
183	15.25	0.80	0.720	0.082	---	0.64
184	15.33	0.77	0.690	0.082	---	0.61
185	15.42	0.77	0.690	0.081	---	0.61
186	15.50	0.77	0.690	0.081	---	0.61
187	15.58	0.63	0.570	0.080	---	0.49
188	15.67	0.63	0.570	0.080	---	0.49
189	15.75	0.63	0.570	0.080	---	0.49
190	15.83	0.63	0.570	0.079	---	0.49
191	15.92	0.63	0.570	0.079	---	0.49
192	16.00	0.63	0.570	0.078	---	0.49
193	16.08	0.13	0.120	0.078	---	0.04
194	16.17	0.13	0.120	0.077	---	0.04
195	16.25	0.13	0.120	0.077	---	0.04
196	16.33	0.13	0.120	0.077	---	0.04
197	16.42	0.13	0.120	0.076	---	0.04
198	16.50	0.13	0.120	0.076	---	0.04
199	16.58	0.10	0.090	0.076	---	0.01
200	16.67	0.10	0.090	0.075	---	0.01
201	16.75	0.10	0.090	0.075	---	0.02
202	16.83	0.10	0.090	0.074	---	0.02
203	16.92	0.10	0.090	0.074	---	0.02
4	17.00	0.10	0.090	0.074	---	0.02
205	17.08	0.17	0.150	0.073	---	0.08
206	17.17	0.17	0.150	0.073	---	0.08
207	17.25	0.17	0.150	0.073	---	0.08
208	17.33	0.17	0.150	0.072	---	0.08
209	17.42	0.17	0.150	0.072	---	0.08
210	17.50	0.17	0.150	0.071	---	0.08
211	17.58	0.17	0.150	0.071	---	0.08

212	17.67	0.17	0.150	0.071	---	0.08
213	17.75	0.17	0.150	0.070	---	0.08
214	17.83	0.13	0.120	0.070	---	0.05
215	17.92	0.13	0.120	0.070	---	0.05
216	18.00	0.13	0.120	0.069	---	0.05
217	18.08	0.13	0.120	0.069	---	0.05
8	18.17	0.13	0.120	0.069	---	0.05
219	18.25	0.13	0.120	0.068	---	0.05
220	18.33	0.13	0.120	0.068	---	0.05
221	18.42	0.13	0.120	0.068	---	0.05
222	18.50	0.13	0.120	0.067	---	0.05
223	18.58	0.10	0.090	0.067	---	0.02
224	18.67	0.10	0.090	0.067	---	0.02
225	18.75	0.10	0.090	0.066	---	0.02
226	18.83	0.07	0.060	0.066	0.030	0.03
227	18.92	0.07	0.060	0.066	0.030	0.03
228	19.00	0.07	0.060	0.065	0.030	0.03
229	19.08	0.10	0.090	0.065	---	0.02
230	19.17	0.10	0.090	0.065	---	0.03
231	19.25	0.10	0.090	0.065	---	0.03
232	19.33	0.13	0.120	0.064	---	0.06
233	19.42	0.13	0.120	0.064	---	0.06
234	19.50	0.13	0.120	0.064	---	0.06
235	19.58	0.10	0.090	0.063	---	0.03
236	19.67	0.10	0.090	0.063	---	0.03
237	19.75	0.10	0.090	0.063	---	0.03
238	19.83	0.07	0.060	0.062	0.030	0.03
239	19.92	0.07	0.060	0.062	0.030	0.03
240	20.00	0.07	0.060	0.062	0.030	0.03
241	20.08	0.10	0.090	0.062	---	0.03
242	20.17	0.10	0.090	0.061	---	0.03
243	20.25	0.10	0.090	0.061	---	0.03
244	20.33	0.10	0.090	0.061	---	0.03
245	20.42	0.10	0.090	0.061	---	0.03
246	20.50	0.10	0.090	0.060	---	0.03
247	20.58	0.10	0.090	0.060	---	0.03
248	20.67	0.10	0.090	0.060	---	0.03
9	20.75	0.10	0.090	0.060	---	0.03
250	20.83	0.07	0.060	0.059	---	0.00
251	20.92	0.07	0.060	0.059	---	0.00
252	21.00	0.07	0.060	0.059	---	0.00
253	21.08	0.10	0.090	0.059	---	0.03
254	21.17	0.10	0.090	0.058	---	0.03
255	21.25	0.10	0.090	0.058	---	0.03
256	21.33	0.07	0.060	0.058	---	0.00
257	21.42	0.07	0.060	0.058	---	0.00
258	21.50	0.07	0.060	0.057	---	0.00
259	21.58	0.10	0.090	0.057	---	0.03
260	21.67	0.10	0.090	0.057	---	0.03
261	21.75	0.10	0.090	0.057	---	0.03
262	21.83	0.07	0.060	0.057	---	0.00
263	21.92	0.07	0.060	0.056	---	0.00
264	22.00	0.07	0.060	0.056	---	0.00
265	22.08	0.10	0.090	0.056	---	0.03
266	22.17	0.10	0.090	0.056	---	0.03
267	22.25	0.10	0.090	0.056	---	0.03
268	22.33	0.07	0.060	0.056	---	0.00
269	22.42	0.07	0.060	0.055	---	0.00
270	22.50	0.07	0.060	0.055	---	0.00
271	22.58	0.07	0.060	0.055	---	0.00
272	22.67	0.07	0.060	0.055	---	0.01
273	22.75	0.07	0.060	0.055	---	0.01
274	22.83	0.07	0.060	0.055	---	0.01
275	22.92	0.07	0.060	0.054	---	0.01
276	23.00	0.07	0.060	0.054	---	0.01
277	23.08	0.07	0.060	0.054	---	0.01
278	23.17	0.07	0.060	0.054	---	0.01
279	23.25	0.07	0.060	0.054	---	0.01
0	23.33	0.07	0.060	0.054	---	0.01
281	23.42	0.07	0.060	0.054	---	0.01
282	23.50	0.07	0.060	0.054	---	0.01
283	23.58	0.07	0.060	0.054	---	0.01
284	23.67	0.07	0.060	0.054	---	0.01
285	23.75	0.07	0.060	0.053	---	0.01
286	23.83	0.07	0.060	0.053	---	0.01
287	23.92	0.07	0.060	0.053	---	0.01

288 24.00 0.07 0.060 0.053 --- 0.01
Sum = 100.0 Sum = 64.7

Flood volume = Effective rainfall 5.39(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 7.8(Ac.Ft)
Total soil loss = 2.11(In)
Total soil loss = 3.051(Ac.Ft)
Total rainfall = 7.50(In)
Flood volume = 339433.8 Cubic Feet
Total soil loss = 132903.9 Cubic Feet

Peak flow rate of this hydrograph = 16.241(CFS)

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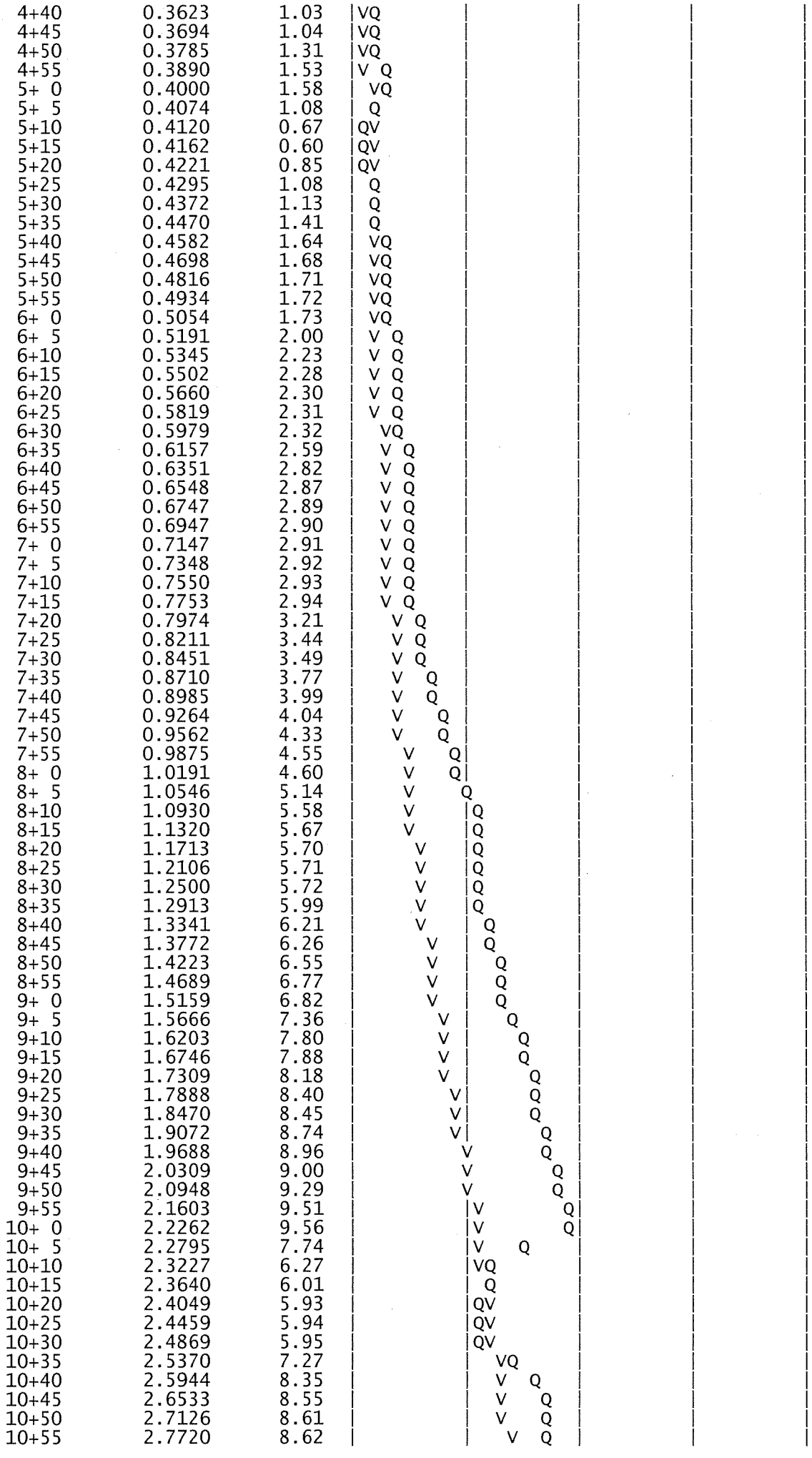
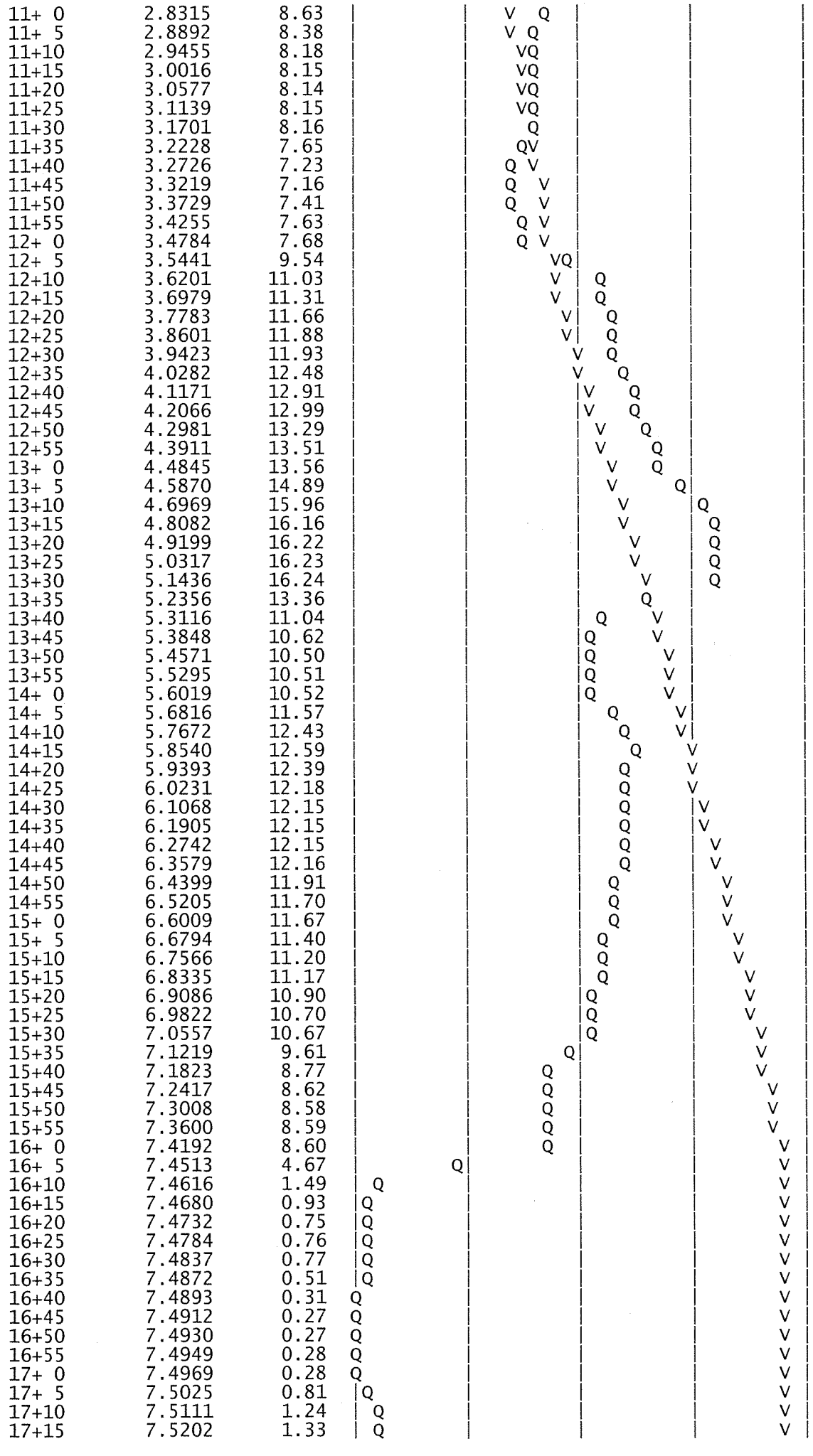
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0018	0.26	Q				
0+10	0.0051	0.47	Q				
0+15	0.0086	0.51	VQ				
0+20	0.0131	0.66	VQ				
0+25	0.0184	0.76	VQ				
0+30	0.0238	0.78	VQ				
0+35	0.0292	0.79	VQ				
0+40	0.0346	0.79	VQ				
0+45	0.0400	0.79	VQ				
0+50	0.0463	0.92	VQ				
0+55	0.0534	1.02	V Q				
1+ 0	0.0606	1.04	V Q				
1+ 5	0.0669	0.92	VQ				
1+10	0.0725	0.81	VQ				
1+15	0.0780	0.79	VQ				
1+20	0.0834	0.79	VQ				
1+25	0.0888	0.79	VQ				
1+30	0.0942	0.79	VQ				
1+35	0.0997	0.79	VQ				
1+40	0.1051	0.79	VQ				
1+45	0.1105	0.79	VQ				
1+50	0.1168	0.92	VQ				
1+55	0.1239	1.02	V Q				
2+ 0	0.1311	1.04	V Q				
2+ 5	0.1383	1.05	V Q				
2+10	0.1455	1.05	V Q				
2+15	0.1528	1.05	V Q				
2+20	0.1600	1.05	V Q				
2+25	0.1672	1.05	V Q				
2+30	0.1744	1.05	V Q				
2+35	0.1826	1.18	V Q				
2+40	0.1914	1.29	V Q				
2+45	0.2004	1.31	|VQ				
2+50	0.2095	1.31	|VQ				
2+55	0.2185	1.31	|VQ				
3+ 0	0.2275	1.31	|VQ				
3+ 5	0.2366	1.31	|VQ				
3+10	0.2456	1.31	|VQ				
3+15	0.2547	1.31	|VQ				
3+20	0.2637	1.31	|VQ				
3+25	0.2727	1.31	|VQ				
3+30	0.2818	1.31	|VQ				
3+35	0.2908	1.31	|VQ				
3+40	0.2998	1.31	|VQ				
3+45	0.3089	1.31	|VQ				
3+50	0.3147	0.85	|Q				
3+55	0.3181	0.49	QV				
4+ 0	0.3211	0.43	QV				
4+ 5	0.3240	0.42	QV				
4+10	0.3269	0.43	QV				
4+15	0.3300	0.44	QV				
4+20	0.3349	0.72	|Q				
4+25	0.3414	0.94	|Q				
4+30	0.3482	0.99	|Q				
4+35	0.3552	1.01	|VQ				





17+20	7.5295	1.36	| Q	|	|	|	V |
17+25	7.5389	1.36	| Q	|	|	|	V |
17+30	7.5484	1.37	| Q	|	|	|	V |
17+35	7.5579	1.38	| Q	|	|	|	V |
17+40	7.5674	1.38	| Q	|	|	|	V |
17+45	7.5769	1.39	| Q	|	|	|	V |
17+50	7.5847	1.13	| Q	|	|	|	V |
17+55	7.5911	0.93	|Q	|	|	|	V |
18+ 0	7.5973	0.89	|Q	|	|	|	V |
18+ 5	7.6034	0.89	|Q	|	|	|	V|
18+10	7.6096	0.89	|Q	|	|	|	V|
18+15	7.6158	0.90	|Q	|	|	|	V|
18+20	7.6220	0.91	|Q	|	|	|	V|
18+25	7.6283	0.91	|Q	|	|	|	V|
18+30	7.6346	0.92	|Q	|	|	|	V|
18+35	7.6392	0.66	|Q	|	|	|	V|
18+40	7.6423	0.45	Q	|	|	|	V|
18+45	7.6452	0.42	Q	|	|	|	V|
18+50	7.6484	0.47	Q	|	|	|	V|
18+55	7.6520	0.51	|Q	|	|	|	V|
19+ 0	7.6556	0.52	|Q	|	|	|	V|
19+ 5	7.6589	0.48	Q	|	|	|	V|
19+10	7.6619	0.45	Q	|	|	|	V|
19+15	7.6650	0.44	Q	|	|	|	V|
19+20	7.6699	0.71	|Q	|	|	|	V|
19+25	7.6763	0.93	|Q	|	|	|	V|
19+30	7.6830	0.97	|Q	|	|	|	V|
19+35	7.6880	0.73	|Q	|	|	|	V|
19+40	7.6915	0.52	|Q	|	|	|	V|
19+45	7.6949	0.49	Q	|	|	|	V|
19+50	7.6983	0.50	|Q	|	|	|	V|
19+55	7.7019	0.52	|Q	|	|	|	V|
20+ 0	7.7055	0.52	|Q	|	|	|	V|
20+ 5	7.7090	0.51	|Q	|	|	|	V|
20+10	7.7125	0.50	|Q	|	|	|	V|
20+15	7.7160	0.50	|Q	|	|	|	V|
20+20	7.7195	0.51	|Q	|	|	|	V|
20+25	7.7230	0.51	|Q	|	|	|	V|
20+30	7.7265	0.52	|Q	|	|	|	V|
20+35	7.7301	0.52	|Q	|	|	|	V|
20+40	7.7337	0.53	|Q	|	|	|	V|
20+45	7.7374	0.53	|Q	|	|	|	V|
20+50	7.7393	0.27	Q	|	|	|	V|
20+55	7.7397	0.06	Q	|	|	|	V|
21+ 0	7.7399	0.03	Q	|	|	|	V|
21+ 5	7.7419	0.28	Q	|	|	|	V|
21+10	7.7453	0.50	|Q	|	|	|	V|
21+15	7.7490	0.54	|Q	|	|	|	V|
21+20	7.7511	0.30	Q	|	|	|	V|
21+25	7.7517	0.09	Q	|	|	|	V|
21+30	7.7521	0.05	Q	|	|	|	V|
21+35	7.7542	0.31	Q	|	|	|	V|
21+40	7.7578	0.52	|Q	|	|	|	V|
21+45	7.7617	0.57	|Q	|	|	|	V|
21+50	7.7639	0.32	Q	|	|	|	V|
21+55	7.7646	0.11	Q	|	|	|	V|
22+ 0	7.7651	0.07	Q	|	|	|	V|
22+ 5	7.7674	0.33	Q	|	|	|	V|
22+10	7.7711	0.54	|Q	|	|	|	V|
22+15	7.7752	0.59	|Q	|	|	|	V|
22+20	7.7775	0.34	Q	|	|	|	V|
22+25	7.7784	0.13	Q	|	|	|	V|
22+30	7.7790	0.09	Q	|	|	|	V|
22+35	7.7796	0.08	Q	|	|	|	V|
22+40	7.7802	0.09	Q	|	|	|	V|
22+45	7.7808	0.09	Q	|	|	|	V|
22+50	7.7815	0.09	Q	|	|	|	V|
22+55	7.7821	0.09	Q	|	|	|	V|
23+ 0	7.7828	0.10	Q	|	|	|	V|
23+ 5	7.7835	0.10	Q	|	|	|	V|
23+10	7.7842	0.10	Q	|	|	|	V|
23+15	7.7849	0.10	Q	|	|	|	V|
23+20	7.7856	0.11	Q	|	|	|	V|
23+25	7.7864	0.11	Q	|	|	|	V|
23+30	7.7871	0.11	Q	|	|	|	V|
23+35	7.7879	0.11	Q	|	|	|	V|

23+40	7.7887	0.11	Q	|	|	|	V|
23+45	7.7894	0.11	Q	|	|	|	V|
23+50	7.7902	0.11	Q	|	|	|	V|
23+55	7.7910	0.12	Q	|	|	|	V|
24+ 0	7.7918	0.12	Q	|	|	|	V|
24+ 5	7.7922	0.06	Q	|	|	|	V|
24+10	7.7923	0.01	Q	|	|	|	V|
24+15	7.7923	0.00	Q	|	|	|	V

EXHIBIT E

WATER QUALITY VOLUME

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O INC.	Date	10/12/2012
Designed by	AWSP	County/City Case No	
Company Project Number/Name	WILDOMAR 23 / 69550.60		
Drainage Area Number/Name	ALL ONSITE		

Enter the Area Tributary to this Feature A_T = 17.7 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township

Range

Section

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.65

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.45

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.29 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 18,633 ft^3

Notes:

EXHIBIT F

DETENTION BASIN RATING TABLE

Wildomar 23 Version 2.2 Preliminary Layout 12/20/12 Water Quality Volume = 18,633
Includes Access Road

Basin 1	Top	1,309.00	156,412 cf	
	Storage @ Overflow	1,308.00	130,588 cf	3.00
Basin Storage Volumes		119.78%	dT= 5	dT= 15

Outlet parameters: Flowline Out 1298; Outlet Dia 24

Opening #1: Cd (WEIR) 2.7; Cd (ORIFICE) 0.6; HEIGHT OF BOX 0.250, 3; WIDTH OF BOX 0.5, 6.00

Opening #2: Cd (WEIR) 2.7; Cd (ORIFICE) 0.6; HEIGHT OF BOX 0.333, 4; WIDTH OF BOX 2, 24.00

Opening #3: Cd (WEIR) 2.7; Cd (ORIFICE) 0.6; HEIGHT OF BOX 0.500, 6; WIDTH OF BOX 3, 36.00

4 x 4 grated opening: Grate Factor 50.00%; Cd (WEIR) 2.7; Cd (ORIFICE) 0.6; Area 4 ft; Perimeter 16 ft

DEPTH (FT)	ELEVATION	AREA (SF)	Raw Storage (CF)	Water Quality (CF)	STORAGE (CF)	2S/dT (CFS)	2S/dT + O (CFS)
0.00	1301.00	12,383	0	0	0	0.00	0.00
0.10	1301.10	12,562	1,247	0	1,247	8.32	8.32
0.20	1301.20	12,741	2,512	0	2,512	16.75	16.75
0.30	1301.30	12,921	3,796	0	3,796	25.30	25.30
0.40	1301.40	13,100	5,097	0	5,097	33.98	33.98
0.50	1301.50	13,279	6,416	0	6,416	42.77	42.77
0.60	1301.60	13,458	7,752	0	7,752	51.68	51.68
0.70	1301.70	13,637	9,107	0	9,107	60.71	60.71
0.80	1301.80	13,817	10,480	0	10,480	69.87	69.87
0.90	1301.90	13,996	11,871	0	11,871	79.14	79.14
1.00	1302.00	14,175	13,279	0	13,279	88.53	88.53
1.10	1302.10	14,354	14,706	0	14,706	98.04	98.04
1.20	1302.20	14,534	16,150	0	16,150	107.67	107.67
1.30	1302.30	14,713	17,612	0	17,612	117.41	117.41
1.40	1302.40	14,892	19,092	0	19,092	127.28	127.28
1.50	1302.50	15,071	20,591	0	20,591	137.27	137.27
1.60	1302.60	15,250	22,107	0	22,107	147.38	147.42
1.70	1302.70	15,430	23,641	0	23,641	157.60	157.73
1.80	1302.80	15,609	25,193	0	25,193	167.95	168.17
1.90	1302.90	15,788	26,762	0	26,762	178.42	178.73
2.00	1303.00	15,967	28,350	0	28,350	189.00	189.37
2.10	1303.10	16,146	29,956	0	29,956	199.71	200.12
2.20	1303.20	16,326	31,580	0	31,580	210.53	210.99
2.30	1303.30	16,505	33,221	0	33,221	221.47	221.97
2.40	1303.40	16,684	34,881	0	34,881	232.54	233.07
2.50	1303.50	16,863	36,558	0	36,558	243.72	244.28
2.60	1303.60	17,043	38,253	0	38,253	255.02	255.62
2.70	1303.70	17,222	39,966	0	39,966	266.44	267.07
2.80	1303.80	17,401	41,698	0	41,698	277.98	278.64
2.90	1303.90	17,580	43,447	0	43,447	289.64	290.32
3.00	1304.00	17,759	45,214	0	45,214	301.42	302.13
3.10	1304.10	17,939	46,998	0	46,998	313.32	314.22
3.20	1304.20	18,118	48,801	0	48,801	325.34	326.58
3.30	1304.30	18,297	50,622	0	50,622	337.48	339.15
3.40	1304.40	18,476	52,461	0	52,461	349.74	351.91
3.50	1304.50	18,655	54,317	0	54,317	362.12	364.79
3.60	1304.60	18,835	56,192	0	56,192	374.61	377.57
3.70	1304.70	19,014	58,084	0	58,084	387.23	390.44
3.80	1304.80	19,193	59,995	0	59,995	399.96	403.40
3.90	1304.90	19,372	61,923	0	61,923	412.82	416.47
4.00	1305.00	19,552	63,869	0	63,869	425.79	429.65
4.10	1305.10	19,731	65,833	0	65,833	438.89	443.19
4.20	1305.20	19,910	67,815	0	67,815	452.10	457.05
4.30	1305.30	20,089	69,815	0	69,815	465.43	471.16
4.40	1305.40	20,268	71,833	0	71,833	478.89	485.50
4.50	1305.50	20,448	73,869	0	73,869	492.46	500.05
4.60	1305.60	20,627	75,922	0	75,922	506.15	514.79
4.70	1305.70	20,806	77,994	0	77,994	519.96	529.73
4.80	1305.80	20,985	80,084	0	80,084	533.89	544.42
4.90	1305.90	21,164	82,191	0	82,191	547.94	559.07
5.00	1306.00	21,344	84,317	0	84,317	562.11	573.81
5.10	1306.10	21,523	86,460	0	86,460	576.40	588.64
5.20	1306.20	21,702	88,621	0	88,621	590.81	603.56
5.30	1306.30	21,881	90,800	0	90,800	605.34	618.57
5.40	1306.40	22,060	92,997	0	92,997	619.98	633.69
5.50	1306.50	22,240	95,212	0	95,212	634.75	648.91
5.60	1306.60	22,419	97,445	0	97,445	649.64	664.23
5.70	1306.70	22,598	99,696	0	99,696	664.64	679.66
5.80	1306.80	22,777	101,965	0	101,965	679.77	695.19
5.90	1306.90	22,957	104,252	0	104,252	695.01	710.83
6.00	1307.00	23,136	106,556	0	106,556	710.37	726.58
6.10	1307.10	23,315	108,879	0	108,879	725.86	742.45
6.20	1307.20	23,494	111,219	0	111,219	741.46	758.42
6.30	1307.30	23,673	113,578	0	113,578	757.18	774.50
6.40	1307.40	23,853	115,954	0	115,954	773.03	790.70
6.50	1307.50	24,032	118,348	0	118,348	788.99	807.00
6.60	1307.60	24,211	120,760	0	120,760	805.07	824.11
6.70	1307.70	24,390	123,190	0	123,190	821.27	841.89
6.80	1307.80	24,569	125,638	0	125,638	837.59	860.15
6.90	1307.90	24,749	128,104	0	128,104	854.03	878.83
7.00	1308.00	24,928	130,588	0	130,588	870.59	897.04
7.10	1308.10	25,107	133,090	0	133,090	887.27	914.68
7.20	1308.20	25,286	135,609	0	135,609	904.06	932.38
7.30	1308.30	25,466	138,147	0	138,147	920.98	950.15
7.40	1308.40	25,645	140,703	0	140,703	938.02	968.01
7.50	1308.50	25,824	143,276	0	143,276	955.17	985.95
7.60	1308.60	26,003	145,867	0	145,867	972.45	1,003.98
7.70	1308.70	26,182	148,477	0	148,477	989.84	1,022.11
7.80	1308.80	26,362	151,104	0	151,104	1,007.36	1,040.34
7.90	1308.90	26,541	153,749	0	153,749	1,024.99	1,058.66
8.00	1309.00	26,720	156,412	0	156,412	1,042.75	1,077.09

DEPTH (FT)	2S/dT (CFS)	2S/dT + O (CFS)	OUTFLOW (CFS)	#1 (CFS)	#2 (CFS)	#3 (CFS)	Overflow (CFS)	OUTFLOW Inlet Control	Outlet Control	Head (ft)	HW/DIA Scale 1
0.00	0.00	0.00	0.00					0.00		3.00	1.50
0.10	2.77	2.77	0.00					0.00		3.10	1.55
0.20	5.58	5.58	0.00					0.00		3.20	1.60
0.30	8.43	8.43	0.00					0.00		3.30	1.65
0.40	11.33	11.33	0.00					0.00		3.40	1.70
0.50	14.26	14.26	0.00					0.00		3.50	1.75
0.60	17.23	17.23	0.00					0.00		3.60	1.80
0.70	20.24	20.24	0.00					0.00		3.70	1.85
0.80	23.29	23.29	0.00					0.00		3.80	1.90
0.90	26.38	26.38	0.00					0.00		3.90	1.95
1.00	29.51	29.51	0.00					0.00		4.00	2.00
1.10	32.68	32.68	0.00					0.00		4.10	2.05
1.20	35.89	35.89	0.00					0.00		4.20	2.10
1.30	39.14	39.14	0.00					0.00		4.30	2.15
1.40	42.43	42.43	0.00					0.00		4.40	2.20
1.50	45.76	45.76	0.00	0.00				0.00	27.84	4.50	2.25
1.60	49.13	49.17	0.04	0.04				0.04	28.24	4.60	2.30
1.70	52.53	52.66	0.12	0.12				0.12	28.63	4.70	2.35
1.80	55.98	56.21	0.22	0.22				0.22	29.01	4.80	2.40
1.90	59.47	59.79	0.32	0.32				0.32	29.39	4.90	2.45
2.00	63.00	63.37	0.37	0.37				0.37	29.77	5.00	2.50
2.10	66.57	66.98	0.41	0.41				0.41	30.14	5.10	2.55
2.20	70.18	70.63	0.46	0.46				0.46	30.50	5.20	2.60
2.30	73.82	74.32	0.49	0.49				0.49	30.86	5.30	2.65
2.40	77.51	78.04	0.53	0.53				0.53	31.22	5.40	2.70
2.50	81.24	81.80	0.56	0.56				0.56	31.57	5.50	2.75
2.60	85.01	85.60	0.59	0.59				0.59	31.92	5.60	2.80
2.70	88.81	89.44	0.62	0.62				0.62	32.27	5.70	2.85
2.80	92.66	93.31	0.65	0.65				0.65	32.61	5.80	2.90
2.90	96.55	97.23	0.68	0.68				0.68	32.94	5.90	2.95
3.00	100.47	101.18	0.71	0.71	0.00			0.71	33.28	6.00	3.00
3.10	104.44	105.34	0.90	0.73	0.17			0.90	33.61	6.10	3.05
3.20	108.45	109.69	1.24	0.75	0.48			1.24	33.94	6.20	3.10
3.30	112.49	114.16	1.67	0.78	0.89			1.67	34.26	6.30	3.15
3.40	116.58	118.75	2.17	0.80	1.37			2.17	34.58	6.40	3.20
3.50	120.71	123.38	2.68	0.82	1.85			2.68	34.90	6.50	3.25
3.60	124.87	127.83	2.96	0.85	2.11			2.96	35.22	6.60	3.30
3.70	129.08	132.29	3.21	0.87	2.34			3.21	35.53	6.70	3.35
3.80	133.32	136.76	3.44	0.89	2.55			3.44	35.84	6.80	3.40
3.90	137.61	141.26	3.65	0.91	2.75			3.65	36.15	6.90	3.45
4.00	141.93	145.79	3.86	0.93	2.93	0.00		3.86	36.46	7.00	3.50
4.10	146.30	150.60	4.30	0.95	3.10	0.26		4.30	36.76	7.10	3.55
4.20	150.70	155.65	4.95	0.97	3.26	0.72		4.95	37.06	7.20	3.60
4.30	155.14	160.88	5.73	0.98	3.42	1.33		5.73	37.36	7.30	3.65
4.40	159.63	166.24	6.61	1.00	3.56	2.05		6.61	37.65	7.40	3.70
4.50	164.15	171.74	7.59	1.02	3.70	2.86		7.59	37.94	7.50	3.75
4.60	168.72	177.36	8.64	1.04	3.84	3.76		8.64	38.23	7.60	3.80
4.70	173.32	183.09	9.77	1.05	3.97	4.74		9.77	38.52	7.70	3.85
4.80	177.96	188.49	10.53	1.07	4.10	5.35		10.53	38.81	7.80	3.90
4.90	182.65	193.78	11.13	1.09	4.22	5.82		11.13	39.09	7.90	3.95
5.00	187.37	199.07	11.70	1.11	4.34	6.25		11.70	39.38	8.00	4.00
5.10	192.13	204.37	12.24	1.12	4.46	6.66		12.24	39.66	8.10	4.05
5.20	196.94	209.68	12.75	1.14	4.58	7.04		12.75	39.93	8.20	4.10
5.30	201.78	215.02	13.24	1.15	4.69	7.40		13.24	40.21	8.30	4.15
5.40	206.66	220.37	13.71	1.17	4.79	7.74		13.71	40.49	8.40	4.20
5.50	211.58	225.74	14.16	1.18	4.90	8.07		14.16	40.76	8.50	4.25
5.60	216.55	231.14	14.59	1.20	5.00	8.39		14.59	41.03	8.60	4.30
5.70	221.55	236.56	15.01	1.21	5.11	8.69		15.01	41.30	8.70	4.35
5.80	226.59	242.01	15.42	1.23	5.21	8.99		15.42	41.57	8.80	4.40
5.90	231.67	247.49	15.82	1.24	5.30	9.27		15.82	41.83	8.90	4.45
6.00	236.79	253.00	16.21	1.26	5.40	9.55		16.21	42.09	9.00	4.50
6.10	241.95	258.54	16.59	1.27	5.50	9.82		16.59	42.36	9.10	4.55
6.20	247.15	264.11	16.96	1.29	5.59	10.08		16.96	42.62	9.20	4.60
6.30	252.39	269.71	17.32	1.30	5.68	10.34		17.32	42.88	9.30	4.65
6.40	257.68	275.34	17.67	1.31	5.77	10.59		17.67	43.13	9.40	4.70
6.50	263.00	281.01	18.01	1.33	5.86	10.83	0.00	18.01	43.39	9.50	4.75
6.60	268.36	287.39	19.04	1.34	5.95	11.07	0.68	19.04	43.64	9.60	4.80
6.70	273.76	294.37	20.62	1.36	6.03	11.30	1.93	20.62	43.90	9.70	4.85
6.80	279.20	301.76	22.56	1.37	6.12	11.53	3.55	22.56	44.15	9.80	4.90
6.90	284.68	309.47	24.80	1.38	6.20	11.75	5.46	24.80	44.40	9.90	4.95
7.00	290.20	316.65	26.45	1.39	6.28	11.97	6.81	26.45	44.65	10.00	5.00
7.10	295.76	323.17	27.41	1.41	6.36	12.19	7.46	27.41	44.90	10.10	5.05
7.20	301.35	329.67	28.32	1.42	6.44	12.40	8.05	28.32	45.14	10.20	5.10
7.30	306.99	336.17	29.17	1.43	6.52	12.61	8.61	29.17	45.39	10.30	5.15
7.40	312.67	342.66	29.99	1.45	6.60	12.81	9.13	29.99	45.63	10.40	5.20
7.50	318.39	349.17	30.78	1.46	6.68	13.01	9.63	30.78	45.87	10.50	5.25
7.60	324.15	355.69	31.54	1.47	6.76	13.21	10.10	31.54	46.11	10.60	5.30
7.70	329.95	362.22	32.27	1.48	6.83	13.41	10.54	32.27	46.35	10.70	5.35
7.80	335.79	368.76	32.98	1.49	6.91	13.60	10.98	32.98	46.59	10.80	5.40
7.90	341.66	375.33	33.67	1.51	6.98	13.79	11.39	33.67	46.83	10.90	5.45
8.00	347.58	381.92	34.34	1.52	7.05	13.98	11.79	34.34	47.06	11.00	5.50

Opening #1

DEPTH	WEIR	ORIFICE	Q x 1
0.00	0.00		0.00
0.10	0.04		0.04
0.20	0.12	0.16	0.12
0.30	0.22	0.25	0.22
0.40	0.34	0.32	0.32
0.50	0.48	0.37	0.37
0.60	0.63	0.41	0.41
0.70	0.79	0.46	0.46
0.80	0.97	0.49	0.49
0.90	1.15	0.53	0.53
1.00	1.35	0.56	0.56
1.10	1.56	0.59	0.59
1.20	1.77	0.62	0.62
1.30	2.00	0.65	0.65
1.40	2.24	0.68	0.68
1.50	2.48	0.71	0.71
1.60	2.73	0.73	0.73
1.70	2.99	0.75	0.75
1.80	3.26	0.78	0.78
1.90	3.54	0.80	0.80
2.00	3.82	0.82	0.82
2.10	4.11	0.85	0.85
2.20	4.41	0.87	0.87
2.30	4.71	0.89	0.89
2.40	5.02	0.91	0.91
2.50	5.34	0.93	0.93
2.60	5.66	0.95	0.95
2.70	5.99	0.97	0.97
2.80	6.33	0.98	0.98
2.90	6.67	1.00	1.00
3.00	7.01	1.02	1.02
3.10	7.37	1.04	1.04
3.20	7.73	1.05	1.05
3.30	8.09	1.07	1.07
3.40	8.46	1.09	1.09
3.50	8.84	1.11	1.11
3.60	9.22	1.12	1.12
3.70	9.61	1.14	1.14
3.80	10.00	1.15	1.15
3.90	10.40	1.17	1.17
4.00	10.80	1.18	1.18
4.10	11.21	1.20	1.20
4.20	11.62	1.21	1.21
4.30	12.04	1.23	1.23
4.40	12.46	1.24	1.24
4.50	12.89	1.26	1.26
4.60	13.32	1.27	1.27
4.70	13.76	1.29	1.29
4.80	14.20	1.30	1.30
4.90	14.64	1.31	1.31
5.00	15.09	1.33	1.33
5.10	15.55	1.34	1.34
5.20	16.01	1.36	1.36
5.30	16.47	1.37	1.37
5.40	16.94	1.38	1.38
5.50	17.41	1.39	1.39
5.60	17.89	1.41	1.41
5.70	18.37	1.42	1.42
5.80	18.86	1.43	1.43
5.90	19.35	1.45	1.45
6.00	19.84	1.46	1.46
6.10	20.34	1.47	1.47
6.20	20.84	1.48	1.48
6.30	21.35	1.49	1.49
6.40	21.86	1.51	1.51
6.50	22.37	1.52	1.52
6.60	22.89	1.53	1.53
6.70	23.41	1.54	1.54
6.80	23.94	1.55	1.55
6.90	24.47	1.57	1.57
7.00	25.00	1.58	1.58
7.10	25.54	1.59	1.59
7.20	26.08	1.60	1.60
7.30	26.63	1.61	1.61
7.40	27.18	1.62	1.62
7.50	27.73	1.63	1.63
7.60	28.28	1.64	1.64
7.70	28.84	1.66	1.66
7.80	29.41	1.67	1.67
7.90	29.98	1.68	1.68
8.00	30.55	1.69	1.69

Opening #2

DEPTH	WEIR	ORIFICE	Q x 1
0.00	0.00		0.00
0.10	0.17		0.17
0.20	0.48		0.48
0.30	0.89	1.17	0.89
0.40	1.37	1.55	1.37
0.50	1.91	1.85	1.85
0.60	2.51	2.11	2.11
0.70	3.16	2.34	2.34
0.80	3.86	2.55	2.55
0.90	4.61	2.75	2.75
1.00	5.40	2.93	2.93
1.10	6.23	3.10	3.10
1.20	7.10	3.26	3.26
1.30	8.00	3.42	3.42
1.40	8.95	3.56	3.56
1.50	9.92	3.70	3.70
1.60	10.93	3.84	3.84
1.70	11.97	3.97	3.97
1.80	13.04	4.10	4.10
1.90	14.14	4.22	4.22
2.00	15.27	4.34	4.34
2.10	16.43	4.46	4.46
2.20	17.62	4.58	4.58
2.30	18.84	4.69	4.69
2.40	20.08	4.79	4.79
2.50	21.35	4.90	4.90
2.60	22.64	5.00	5.00
2.70	23.96	5.11	5.11
2.80	25.30	5.21	5.21
2.90	26.67	5.30	5.30
3.00	28.06	5.40	5.40
3.10	29.47	5.50	5.50
3.20	30.91	5.59	5.59
3.30	32.37	5.68	5.68
3.40	33.85	5.77	5.77
3.50	35.36	5.86	5.86
3.60	36.88	5.95	5.95
3.70	38.43	6.03	6.03
3.80	40.00	6.12	6.12
3.90	41.59	6.20	6.20
4.00	43.20	6.28	6.28
4.10	44.83	6.36	6.36
4.20	46.48	6.44	6.44
4.30	48.15	6.52	6.52
4.40	49.84	6.60	6.60
4.50	51.55	6.68	6.68
4.60	53.28	6.76	6.76
4.70	55.02	6.83	6.83
4.80	56.79	6.91	6.91
4.90	58.57	6.98	6.98
5.00	60.37	7.05	7.05
5.10	62.19	7.13	7.13
5.20	64.03	7.20	7.20
5.30	65.89	7.27	7.27
5.40	67.76	7.34	7.34
5.50	69.65	7.41	7.41
5.60	71.56	7.48	7.48
5.70	73.49	7.55	7.55
5.80	75.43	7.62	7.62
5.90	77.39	7.68	7.68
6.00	79.36	7.75	7.75
6.10	81.36	7.82	7.82
6.20	83.36	7.88	7.88
6.30	85.39	7.95	7.95
6.40	87.43	8.01	8.01
6.50	89.49	8.07	8.07
6.60	91.56	8.14	8.14
6.70	93.65	8.20	8.20
6.80	95.75	8.26	8.26
6.90	97.87	8.33	8.33
7.00	100.01	8.39	8.39
7.10	102.16	8.45	8.45
7.20	104.33	8.51	8.51
7.30	106.51	8.57	8.57
7.40	108.70	8.63	8.63
7.50	110.91	8.69	8.69
7.60	113.14	8.75	8.75
7.70	115.38	8.81	8.81
7.80	117.63	8.86	8.86
7.90	119.90	8.92	8.92
8.00	122.19	8.98	8.98

Opening #3

DEPTH	WEIR	ORIFICE	Q x 1
0.00	0.00		0.00
0.10	0.26		0.26
0.20	0.72		0.72
0.30	1.33		1.33
0.40	2.05	2.80	2.05
0.50	2.86	3.61	2.86
0.60	3.76	4.27	3.76
0.70	4.74	4.84	4.74
0.80	5.80	5.35	5.35
0.90	6.92	5.82	5.82
1.00	8.10	6.25	6.25
1.10	9.34	6.66	6.66
1.20	10.65	7.04	7.04
1.30	12.01	7.40	7.40
1.40	13.42	7.74	7.74
1.50	14.88	8.07	8.07
1.60	16.39	8.39	8.39
1.70	17.95	8.69	8.69
1.80	19.56	8.99	8.99
1.90	21.21	9.27	9.27
2.00	22.91	9.55	9.55
2.10	24.65	9.82	9.82
2.20	26.43	10.08	10.08
2.30	28.25	10.34	10.34
2.40	30.12	10.59	10.59
2.50	32.02	10.83	10.83
2.60	33.96	11.07	11.07
2.70	35.94	11.30	11.30
2.80	37.95	11.53	11.53
2.90	40.00	11.75	11.75
3.00	42.09	11.97	11.97
3.10	44.21	12.19	12.19
3.20	46.37	12.40	12.40
3.30	48.56	12.61	12.61
3.40	50.78	12.81	12.81
3.50	53.04	13.01	13.01
3.60	55.33	13.21	13.21
3.70	57.65	13.41	13.41
3.80	60.00	13.60	13.60
3.90	62.39	13.79	13.79
4.00	64.80	13.98	13.98
4.10	67.25	14.16	14.16
4.20	69.72	14.35	14.35
4.30	72.23	14.53	14.53
4.40	74.76	14.71	14.71
4.50	77.32	14.88	14.88
4.60	79.91	15.06	15.06
4.70	82.53	15.23	15.23
4.80	85.18	15.40	15.40
4.90	87.86	15.57	15.57
5.00	90.56	15.73	15.73
5.10	93.29	15.90	15.90
5.20	96.05	16.06	16.06
5.30	98.83	16.22	16.22
5.40	101.64	16.38	16.38
5.50	104.48	16.54	16.54
5.60	107.34	16.70	16.70
5.70	110.23	16.85	16.85
5.80	113.14	17.01	17.01
5.90	116.08	17.16	17.16
6.00	119.05	17.31	17.31
6.10	122.03	17.46	17.46
6.20	125.05	17.61	17.61
6.30	128.08	17.76	17.76
6.40	131.15	17.90	17.90
6.50	134.23	18.05	18.05
6.60	137.34	18.19	18.19
6.70	140.47	18.33	18.33
6.80	143.63	18.48	18.48
6.90	146.81	18.62	18.62
7.00	150.01	18.76	18.76
7.10	153.24	18.89	18.89
7.20	156.49	19.03	19.03
7.30	159.76	19.17	19.17
7.40	163.05	19.30	19.30
7.50	166.37	19.44	19.44
7.60	169.71	19.57	19.57
7.70	173.07	19.70	19.70
7.80	176.45	19.84	19.84
7.90	179.86	19.97	19.97
8.00	183.28	20.10	20.10

4 x 4 grated opening

DEPTH	WEIR	ORIFICE	Q
0.00	0.00		0.00
0.10	0.68		0.68
0.20	1.93		1.93
0.30	3.55		3.55
0.40	5.46	6.09	5.46
0.50	7.64	6.81	6.81
0.60	10.04	7.46	7.46
0.70	12.65	8.05	8.05
0.80	15.46	8.61	8.61
0.90	18.44	9.13	9.13
1.00	21.60	9.63	9.63
1.10	24.92	10.10	10.10
1.20	28.39	10.54	10.54
1.30	32.02	10.98	10.98
1.40	35.78	11.39	11.39
1.50	39.68	11.79	11.79
1.60	43.72	12.18	12.18
1.70	47.88	12.55	12.55
1.80	52.16	12.91	12.91
1.90	56.57	13.27	13.27
2.00	61.09	13.61	13.61
2.10	65.73	13.95	13.95
2.20	70.48	14.28	14.28
2.30	75.34	14.60	14.60
2.40	80.31	14.91	14.91
2.50	85.38	15.22	15.22
2.60	90.56	15.52	15.52
2.70	95.83	15.82	15.82
2.80	101.20	16.11	16.11
2.90	106.67	16.39	16.39
3.00	112.24	16.67	16.67
3.10	117.90	16.95	16.95
3.20	123.65	17.22	17.22
3.30	129.49	17.49	17.49
3.40	135.42	17.75	17.75
3.50	141.43	18.01	18.01
3.60	147.54	18.26	18.26
3.70	153.73	18.52	18.52
3.80	160.00	18.76	18.76
3.90	166.36	19.01	19.01
4.00	172.80	19.25	19.25
4.10	179.32	19.49	19.49
4.20	185.92	19.73	19.73
4.30	192.60	19.96	19.96
4.40	199.36	20.19	20.19
4.50	206.19	20.42	20.42
4.60	213.10	20.65	20.65
4.70	220.09	20.87	20.87
4.80	227.15	21.09	21.09
4.90	234.29	21.31	21.31
5.00	241.50	21.52	21.52
5.10	248.78	21.74	21.74
5.20	256.13	21.95	21.95
5.30	263.55	22.16	22.16
5.40	271.05	22.37	22.37
5.50	278.61	22.58	22.58
5.60	286.24	22.78	22.78
5.70	293.94	22.98	22.98
5.80	301.71	23.18	23.18
5.90	309.55	23.38	23.38
6.00	317.45	23.58	23.58
6.10	325.42	23.77	23.77
6.20	333.46	23.97	23.97
6.30	341.56	24.16	24.16
6.40	349.72	24.35	24.35
6.50	357.95	24.54	24.54
6.60	366.24	24.73	24.73
6.70	374.60	24.92	24.92
6.80	383.02	25.10	25.10
6.90	391.50	25.29	25.29
7.00	400.04	25.47	25.47
7.10	408.64	25.65	25.65
7.20	417.30	25.83	25.83
7.30	426.03	26.01	26.01
7.40	434.81	26.19	26.19
7.50	443.66	26.36	26.36

EXHIBIT G

SUMMARY OF DETENTION BASIN ROUTING

Wildomar 23

Basin 1

Tributary Areas (ac)

Preliminary Design 20-Dec-12

Onsite	17.35
Offsite	0
Total	17.35

	Area (sf)	Elev	Storage (cf)	Storage (ac-ft)
Floor of Basin	12,420	1301.00	0	
Water Quality	15,290	1302.50	20,591	0.47
Overflow	24,928	1308.00	130,588	3.00
Top Of Basin	27,730	1309.00	156,412	3.59

Storm Frequency	Duration	Qexist (cfs)	Qin (cfs)	Qout (cfs)	WSEL (ft)
100 YEAR	24		16.24	12.75	1306.2
	6		37.71	**17.32**	**1307.3**
	3		39.76	15.82	1306.9
	1	**38.58**	57.40	9.77	1305.7

	Length	Width	Area (sf)	Area (ac)
Top of Detention Basin	185	150	26,720	0.61

Outlet Control Structure Use 4' x 4' structure (Inside DImension)

Opening	#1	#2	#3	Overflow - Grate
Elevation	1302.5	1304.0	1305.0	1307.5
Width (in)	6	24	36	4 feet
Height (in)	3	4	6	4 feet

Outlet Dia	24	in
Flowline	1297.0	
Top of Structure	1307.5	

Efficiency Gross (%) 3.54% Storage (per ac) 7,527 cf

EXHIBIT H

DETENTION BASIN ROUTING

Wildomar 23 **DETENTION BASIN ROUTING** 38.58

57.40 9.77

100 YEAR EVENT ~ 1 Hour STORM

5.00 Min 1305.7

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Adjusted Outflow	Basin WSEL
1	0.08	6.000	0.00	0.00	0.00	0.00	1301.00
2	0.17	11.000	17.00	17.00	0.00	0.00	1301.20
3	0.25	13.420	41.42	41.42	0.00	0.00	1301.40
4	0.33	14.860	69.70	69.70	0.00	0.00	1301.70
5	0.42	15.540	100.10	100.10	0.00	0.00	1302.10
6	0.50	17.090	132.73	132.73	0.00	0.00	1302.40
7	0.58	20.420	170.24	169.80	0.22	0.22	1302.80
8	0.67	24.400	214.62	213.70	0.46	0.46	1303.20
9	0.75	32.140	270.24	269.00	0.62	0.62	1303.70
10	0.83	57.400	358.54	354.20	2.17	2.17	1304.40
11	0.92	46.770	458.37	448.47	4.95	4.95	1305.20
12	1.00	22.670	517.91	500.62	8.64	8.64	1305.60
13	1.08	8.950	532.24	512.70	9.77	9.77	1305.70
14	1.17	1.510	523.16	505.87	8.64	8.64	1305.60
15	1.25	0.310	507.69	492.51	7.59	7.59	1305.50
16	1.33	0.000	492.82	479.59	6.61	6.61	1305.40
17	1.42	0.000	479.59	468.13	5.73	5.73	1305.30
18	1.50	0.000	468.13	458.23	4.95	4.95	1305.20
19	1.58	0.000	458.23	448.33	4.95	4.95	1305.20
20	1.67	0.000	448.33	439.72	4.30	4.30	1305.10
21	1.75	0.000	439.72	432.01	3.86	3.86	1305.00
22	1.83	0.000	432.01	424.30	3.86	3.86	1305.00
23	1.92	0.000	424.30	416.99	3.65	3.65	1304.90
24	2.00	0.000	416.99	409.68	3.65	3.65	1304.90
25	2.08	0.000	409.68	402.80	3.44	3.44	1304.80
26	2.17	0.000	402.80	396.38	3.21	3.21	1304.70
27	2.25	0.000	396.38	389.96	3.21	3.21	1304.70
28	2.33	0.000	389.96	384.04	2.96	2.96	1304.60
29	2.42	0.000	384.04	378.13	2.96	2.96	1304.60
30	2.50	0.000	378.13	372.21	2.96	2.96	1304.60
31	2.58	0.000	372.21	366.86	2.68	2.68	1304.50
32	2.67	0.000	366.86	361.51	2.68	2.68	1304.50
33	2.75	0.000	361.51	357.17	2.17	2.17	1304.40
34	2.83	0.000	357.17	352.84	2.17	2.17	1304.40
35	2.92	0.000	352.84	348.50	2.17	2.17	1304.40
36	3.00	0.000	348.50	345.17	1.67	1.67	1304.30
37	3.08	0.000	345.17	341.84	1.67	1.67	1304.30
38	3.17	0.000	341.84	338.51	1.67	1.67	1304.30
39	3.25	0.000	338.51	336.03	1.24	1.24	1304.20
40	3.33	0.000	336.03	333.56	1.24	1.24	1304.20
41	3.42	0.000	333.56	331.08	1.24	1.24	1304.20
42	3.50	0.000	331.08	328.60	1.24	1.24	1304.20
43	3.58	0.000	328.60	326.13	1.24	1.24	1304.20
44	3.67	0.000	326.13	324.33	0.90	0.90	1304.10

45	3.75	0.000	324.33	322.52	0.90	0.90	1304.10
46	3.83	0.000	322.52	320.72	0.90	0.90	1304.10
47	3.92	0.000	320.72	318.92	0.90	0.90	1304.10
48	4.00	0.000	318.92	317.11	0.90	0.90	1304.10
49	4.08	0.000	317.11	315.31	0.90	0.90	1304.10
50	4.17	0.000	315.31	313.51	0.90	0.90	1304.10
51	4.25	0.000	313.51	312.10	0.71	0.71	1304.00
52	4.33	0.000	312.10	310.69	0.71	0.71	1304.00
53	4.42	0.000	310.69	309.28	0.71	0.71	1304.00
54	4.50	0.000	309.28	307.87	0.71	0.71	1304.00
55	4.58	0.000	307.87	306.45	0.71	0.71	1304.00
56	4.67	0.000	306.45	305.04	0.71	0.71	1304.00
57	4.75	0.000	305.04	303.63	0.71	0.71	1304.00
58	4.83	0.000	303.63	302.22	0.71	0.71	1304.00
59	4.92	0.000	302.22	300.81	0.71	0.71	1304.00
60	5.00	0.000	300.81	299.45	0.68	0.68	1303.90
61	5.08	0.000	299.45	298.09	0.68	0.68	1303.90
62	5.17	0.000	298.09	296.74	0.68	**0.68**	1303.90
63	5.25	0.000	296.74	295.38	0.68	0.68	1303.90
64	5.33	0.000	295.38	294.02	0.68	0.68	1303.90

Wildomar 23

DETENTION BASIN ROUTING

33.98

39.76

15.82

100 YEAR EVENT ~ 3 Hour STORM

5.00 Min

1306.9

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)
1	0.08	2.610	0.00	0.00	0.00
2	0.17	4.730	7.34	7.34	0.00
3	0.25	4.560	16.63	16.63	0.00
4	0.33	5.330	26.52	26.52	0.00
5	0.42	6.140	37.99	37.99	0.00
6	0.50	7.090	51.22	51.22	0.00
7	0.58	6.980	65.29	65.29	0.00
8	0.67	7.260	79.53	79.53	0.00
9	0.75	7.840	94.63	94.63	0.00
10	0.83	7.100	109.57	109.57	0.00
11	0.92	6.750	123.42	123.42	0.00
12	1.00	7.400	137.57	137.57	0.00
13	1.08	8.930	153.90	153.81	0.04
14	1.17	9.910	172.65	172.21	0.22
15	1.25	10.090	192.21	191.47	0.37
16	1.33	9.600	211.16	210.25	0.46
17	1.42	10.790	230.64	229.65	0.49
18	1.50	12.310	252.75	251.63	0.56
19	1.58	11.930	275.87	274.62	0.62
20	1.67	12.200	298.75	297.39	0.68
21	1.75	14.390	323.98	322.18	0.90
22	1.83	15.250	351.82	348.49	1.67
23	1.92	14.540	378.28	372.36	2.96
24	2.00	14.360	401.26	394.84	3.21
25	2.08	14.750	423.95	416.64	3.65
26	2.17	17.990	449.38	440.78	4.30
27	2.25	22.660	481.43	469.97	5.73
28	2.33	20.780	513.41	498.23	7.59
29	2.42	26.920	545.93	524.88	10.53
30	2.50	35.080	586.88	563.47	11.70
31	2.58	39.760	638.31	610.90	13.71
32	2.67	36.080	686.74	656.72	15.01
33	2.75	20.780	713.58	681.93	15.82
34	2.83	10.820	713.53	681.89	15.82
35	2.92	8.550	701.26	670.41	15.42
36	3.00	4.710	683.67	653.64	15.01
37	3.08	1.330	659.68	631.37	14.16
38	3.17	0.280	632.98	606.51	13.24
39	3.25	0.030	606.82	581.32	12.75
40	3.33	0.000	581.35	557.95	11.70
41	3.42	0.000	557.95	536.89	10.53
42	3.50	0.000	536.89	517.35	9.77
43	3.58	0.000	517.35	500.06	8.64
44	3.67	0.000	500.06	484.89	7.59
45	3.75	0.000	484.89	473.42	5.73
46	3.83	0.000	473.42	461.96	5.73
47	3.92	0.000	461.96	452.06	4.95
48	4.00	0.000	452.06	443.46	4.30

Wildomar 23

DETENTION BASIN ROUTING

31.33

37.71

17.32 Q Out

100 YEAR EVENT ~ 6 Hour STORM

6.30

5 Min

1307.3 Max WSEL

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Basin WSEL
1	0.08	1.010	0.00	0.00	0.00	1301.00
2	0.17	2.210	3.22	3.22	0.00	1301.00
3	0.25	2.670	8.10	8.10	0.00	1301.00
4	0.33	2.780	13.55	13.55	0.00	1301.10
5	0.42	2.800	19.13	19.13	0.00	1301.20
6	0.50	3.180	25.11	25.11	0.00	1301.20
7	0.58	3.500	31.79	31.79	0.00	1301.30
8	0.67	3.550	38.84	38.84	0.00	1301.40
9	0.75	3.570	45.96	45.96	0.00	1301.50
10	0.83	3.570	53.10	53.10	0.00	1301.60
11	0.92	3.570	60.24	60.24	0.00	1301.60
12	1.00	3.960	67.77	67.77	0.00	1301.70
13	1.08	4.270	76.00	76.00	0.00	1301.80
14	1.17	4.330	84.60	84.60	0.00	1301.90
15	1.25	4.350	93.28	93.28	0.00	1302.00
16	1.33	4.350	101.98	101.98	0.00	1302.10
17	1.42	4.350	110.68	110.68	0.00	1302.20
18	1.50	4.350	119.38	119.38	0.00	1302.30
19	1.58	4.350	128.08	128.08	0.00	1302.40
20	1.67	4.350	136.78	136.78	0.00	1302.40
21	1.75	4.350	145.48	145.48	0.00	1302.50
22	1.83	4.350	154.18	154.09	0.04	1302.60
23	1.92	4.350	162.79	162.55	0.12	1302.70
24	2.00	4.740	171.64	171.20	0.22	1302.80
25	2.08	4.660	180.60	179.97	0.32	1302.90
26	2.17	4.790	189.42	188.68	0.37	1303.00
27	2.25	5.070	198.54	197.80	0.37	1303.00
28	2.33	5.110	207.98	207.16	0.41	1303.10
29	2.42	5.130	217.40	216.48	0.46	1303.20
30	2.50	5.130	226.74	225.75	0.49	1303.30
31	2.58	5.130	236.01	234.96	0.53	1303.40
32	2.67	5.130	245.22	244.09	0.56	1303.50
33	2.75	5.510	254.73	253.60	0.56	1303.50
34	2.83	5.830	264.94	263.76	0.59	1303.60
35	2.92	5.880	275.47	274.22	0.62	1303.70
36	3.00	5.900	286.00	284.69	0.65	1303.80
37	3.08	5.900	296.49	295.14	0.68	1303.90
38	3.17	6.290	307.33	305.92	0.71	1304.00
39	3.25	6.600	318.81	317.00	0.90	1304.10
40	3.33	6.660	330.26	327.79	1.24	1304.20
41	3.42	7.070	341.52	338.18	1.67	1304.30
42	3.50	7.770	353.02	348.69	2.17	1304.40
43	3.58	8.530	364.99	359.64	2.68	1304.50
44	3.67	8.920	377.09	371.73	2.68	1304.50
45	3.75	9.380	390.03	384.12	2.96	1304.60
46	3.83	9.710	403.21	396.79	3.21	1304.70
47	3.92	10.160	416.66	409.35	3.65	1304.90

48	4.00	10.490	430.00	422.29	3.86	1305.00
49	4.08	10.930	443.71	435.10	4.30	1305.10
50	4.17	11.650	457.68	447.78	4.95	1305.20
51	4.25	12.410	471.84	460.38	5.73	1305.30
52	4.33	13.190	485.98	472.75	6.61	1305.40
53	4.42	13.970	499.91	486.68	6.61	1305.40
54	4.50	14.350	515.00	497.71	8.64	1305.60
55	4.58	14.820	526.88	509.60	8.64	1305.60
56	4.67	15.540	539.96	520.41	9.77	1305.70
57	4.75	16.300	552.25	531.20	10.53	1305.80
58	4.83	16.680	564.18	541.92	11.13	1305.90
59	4.92	17.150	575.75	552.34	11.70	1306.00
60	5.00	17.870	587.36	563.96	11.70	1306.00
61	5.08	20.180	602.01	577.53	12.24	1306.10
62	5.17	23.770	621.48	595.01	13.24	1306.30
63	5.25	26.800	645.58	618.17	13.71	1306.40
64	5.33	29.280	674.25	645.06	14.59	1306.60
65	5.42	32.420	706.76	675.92	15.42	1306.80
66	5.50	37.710	746.05	712.87	16.59	1307.10
67	5.58	26.510	777.09	742.46	17.32	1307.30
68	5.67	11.590	780.56	745.93	17.32	1307.30
69	5.75	5.360	762.88	728.97	16.96	1307.20
70	5.83	2.810	737.14	704.72	16.21	1307.00
71	5.92	1.370	708.90	678.05	15.42	1306.80
72	6.00	0.790	680.21	650.18	15.01	1306.70
73	6.08	0.390	651.36	623.05	14.16	1306.50
74	6.17	0.070	623.51	597.04	13.24	1306.30
75	6.25	0.020	597.13	572.65	12.24	1306.10
76	6.33	0.000	572.67	550.40	11.13	1305.90
77	6.42	0.000	550.40	529.35	10.53	1305.80
78	6.50	0.000	529.35	512.06	8.64	1305.60
79	6.58	0.000	512.06	496.89	7.59	1305.50
80	6.67	0.000	496.89	483.66	6.61	1305.40
81	6.75	0.000	483.66	472.20	5.73	1305.30
82	6.83	0.000	472.20	460.74	5.73	1305.30
83	6.92	0.000	460.74	450.83	4.95	1305.20
84	7.00	0.000	450.83	442.23	4.30	1305.10
85	7.08	0.000	442.23	434.52	3.86	1305.00
86	7.17	0.000	434.52	426.80	3.86	1305.00
87	7.25	0.000	426.80	419.49	3.65	1304.90
88	7.33	0.000	419.49	412.18	3.65	1304.90
89	7.42	0.000	412.18	405.30	3.44	1304.80
90	7.50	0.000	405.30	398.42	3.44	1304.80
91	7.58	0.000	398.42	392.00	3.21	1304.70
92	7.67	0.000	392.00	385.58	3.21	1304.70
93	7.75	0.000	385.58	379.67	2.96	1304.60
94	7.83	0.000	379.67	373.75	2.96	1304.60
95	7.92	0.000	373.75	368.40	2.68	1304.50
96	8.00	0.000	368.40	363.05	2.68	1304.50

Wildomar 23

DETENTION BASIN ROUTING

14.76

16.24

12.75

100 YEAR EVENT ~ 24 Hour STORM

1306.2

5 Min

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Basin WSEL
1	0.08	0.260	0.00	0.00	0.00	1301.00
2	0.17	0.470	0.73	0.73	0.00	1301.00
3	0.25	0.510	1.71	1.71	0.00	1301.00
4	0.33	0.660	2.88	2.88	0.00	1301.00
5	0.42	0.760	4.30	4.30	0.00	1301.00
6	0.50	0.780	5.84	5.84	0.00	1301.00
7	0.58	0.790	7.41	7.41	0.00	1301.00
8	0.67	0.790	8.99	8.99	0.00	1301.10
9	0.75	0.790	10.57	10.57	0.00	1301.10
10	0.83	0.920	12.28	12.28	0.00	1301.10
11	0.92	1.020	14.22	14.22	0.00	1301.10
12	1.00	1.040	16.28	16.28	0.00	1301.10
13	1.08	0.920	18.24	18.24	0.00	1301.20
14	1.17	0.810	19.97	19.97	0.00	1301.20
15	1.25	0.790	21.57	21.57	0.00	1301.20
16	1.33	0.790	23.15	23.15	0.00	1301.20
17	1.42	0.790	24.73	24.73	0.00	1301.20
18	1.50	0.790	26.31	26.31	0.00	1301.30
19	1.58	0.790	27.89	27.89	0.00	1301.30
20	1.67	0.790	29.47	29.47	0.00	1301.30
21	1.75	0.790	31.05	31.05	0.00	1301.30
22	1.83	0.920	32.76	32.76	0.00	1301.30
23	1.92	1.020	34.70	34.70	0.00	1301.40
24	2.00	1.040	36.76	36.76	0.00	1301.40
25	2.08	1.050	38.85	38.85	0.00	1301.40
26	2.17	1.050	40.95	40.95	0.00	1301.40
27	2.25	1.050	43.05	43.05	0.00	1301.50
28	2.33	1.050	45.15	45.15	0.00	1301.50
29	2.42	1.050	47.25	47.25	0.00	1301.50
30	2.50	1.050	49.35	49.35	0.00	1301.50
31	2.58	1.180	51.58	51.58	0.00	1301.50
32	2.67	1.290	54.05	54.05	0.00	1301.60
33	2.75	1.310	56.65	56.65	0.00	1301.60
34	2.83	1.310	59.27	59.27	0.00	1301.60
35	2.92	1.310	61.89	61.89	0.00	1301.70
36	3.00	1.310	64.51	64.51	0.00	1301.70
37	3.08	1.310	67.13	67.13	0.00	1301.70
38	3.17	1.310	69.75	69.75	0.00	1301.70
39	3.25	1.310	72.37	72.37	0.00	1301.80
40	3.33	1.310	74.99	74.99	0.00	1301.80
41	3.42	1.310	77.61	77.61	0.00	1301.80
42	3.50	1.310	80.23	80.23	0.00	1301.90
43	3.58	1.310	82.85	82.85	0.00	1301.90
44	3.67	1.310	85.47	85.47	0.00	1301.90

45	3.75	1.310	88.09	88.09	0.00	1301.90
46	3.83	0.850	90.25	90.25	0.00	1302.00
47	3.92	0.490	91.59	91.59	0.00	1302.00
48	4.00	0.430	92.51	92.51	0.00	1302.00
49	4.08	0.420	93.36	93.36	0.00	1302.00
50	4.17	0.430	94.21	94.21	0.00	1302.00
51	4.25	0.440	95.08	95.08	0.00	1302.00
52	4.33	0.720	96.24	96.24	0.00	1302.00
53	4.42	0.940	97.90	97.90	0.00	1302.00
54	4.50	0.990	99.83	99.83	0.00	1302.10
55	4.58	1.010	101.83	101.83	0.00	1302.10
56	4.67	1.030	103.87	103.87	0.00	1302.10
57	4.75	1.040	105.94	105.94	0.00	1302.10
58	4.83	1.310	108.29	108.29	0.00	1302.20
59	4.92	1.530	111.13	111.13	0.00	1302.20
60	5.00	1.580	114.24	114.24	0.00	1302.20
61	5.08	1.080	116.90	116.90	0.00	1302.20
62	5.17	0.670	118.65	118.65	0.00	1302.30
63	5.25	0.600	119.92	119.92	0.00	1302.30
64	5.33	0.850	121.37	121.37	0.00	1302.30
65	5.42	1.080	123.30	123.30	0.00	1302.30
66	5.50	1.130	125.51	125.51	0.00	1302.30
67	5.58	1.410	128.05	128.05	0.00	1302.40
68	5.67	1.640	131.10	131.10	0.00	1302.40
69	5.75	1.680	134.42	134.42	0.00	1302.40
70	5.83	1.710	137.81	137.81	0.00	1302.50
71	5.92	1.720	141.24	141.24	0.00	1302.50
72	6.00	1.730	144.69	144.69	0.00	1302.50
73	6.08	2.000	148.42	148.33	0.04	1302.60
74	6.17	2.230	152.56	152.48	0.04	1302.60
75	6.25	2.280	156.99	156.90	0.04	1302.60
76	6.33	2.300	161.48	161.24	0.12	1302.70
77	6.42	2.310	165.85	165.61	0.12	1302.70
78	6.50	2.320	170.24	169.80	0.22	1302.80
79	6.58	2.590	174.71	174.26	0.22	1302.80
80	6.67	2.820	179.67	179.04	0.32	1302.90
81	6.75	2.870	184.73	184.10	0.32	1302.90
82	6.83	2.890	189.86	189.12	0.37	1303.00
83	6.92	2.900	194.91	194.18	0.37	1303.00
84	7.00	2.910	199.99	199.25	0.37	1303.00
85	7.08	2.920	205.08	204.25	0.41	1303.10
86	7.17	2.930	210.10	209.27	0.41	1303.10
87	7.25	2.940	215.14	214.23	0.46	1303.20
88	7.33	3.210	220.38	219.47	0.46	1303.20
89	7.42	3.440	226.12	225.13	0.49	1303.30
90	7.50	3.490	232.06	231.07	0.49	1303.30
91	7.58	3.770	238.33	237.27	0.53	1303.40
92	7.67	3.990	245.03	243.91	0.56	1303.50
93	7.75	4.040	251.94	250.81	0.56	1303.50
94	7.83	4.330	259.18	257.99	0.59	1303.60
95	7.92	4.550	266.87	265.68	0.59	1303.60
96	8.00	4.600	274.83	273.59	0.62	1303.70

97	8.08	5.140	283.33	282.02	0.65	1303.80
98	8.17	5.580	292.74	291.38	0.68	1303.90
99	8.25	5.670	302.63	301.22	0.71	1304.00
100	8.33	5.700	312.59	311.18	0.71	1304.00
101	8.42	5.710	322.59	320.79	0.90	1304.10
102	8.50	5.720	332.22	329.74	1.24	1304.20
103	8.58	5.990	341.45	338.12	1.67	1304.30
104	8.67	6.210	350.32	346.99	1.67	1304.30
105	8.75	6.260	359.46	355.13	2.17	1304.40
106	8.83	6.550	367.94	362.58	2.68	1304.50
107	8.92	6.770	375.90	370.55	2.68	1304.50
108	9.00	6.820	384.14	378.23	2.96	1304.60
109	9.08	7.360	392.41	385.99	3.21	1304.70
110	9.17	7.800	401.15	394.73	3.21	1304.70
111	9.25	7.880	410.41	403.53	3.44	1304.80
112	9.33	8.180	419.59	412.28	3.65	1304.90
113	9.42	8.400	428.86	421.55	3.65	1304.90
114	9.50	8.450	438.40	430.68	3.86	1305.00
115	9.58	8.740	447.87	439.27	4.30	1305.10
116	9.67	8.960	456.97	448.36	4.30	1305.10
117	9.75	9.000	466.32	456.42	4.95	1305.20
118	9.83	9.290	474.71	463.25	5.73	1305.30
119	9.92	9.510	482.05	470.59	5.73	1305.30
120	10.00	9.560	489.66	476.43	6.61	1305.40
121	10.08	7.740	493.73	480.50	6.61	1305.40
122	10.17	6.270	494.51	481.28	6.61	1305.40
123	10.25	6.010	493.56	480.33	6.61	1305.40
124	10.33	5.930	492.27	479.04	6.61	1305.40
125	10.42	5.940	490.91	477.68	6.61	1305.40
126	10.50	5.950	489.57	476.35	6.61	1305.40
127	10.58	7.270	489.57	476.34	6.61	1305.40
128	10.67	8.350	491.96	478.73	6.61	1305.40
129	10.75	8.550	495.63	482.40	6.61	1305.40
130	10.83	8.610	499.56	486.33	6.61	1305.40
131	10.92	8.620	503.56	488.38	7.59	1305.50
132	11.00	8.630	505.63	490.46	7.59	1305.50
133	11.08	8.380	507.47	492.29	7.59	1305.50
134	11.17	8.180	508.85	493.67	7.59	1305.50
135	11.25	8.150	510.00	494.82	7.59	1305.50
136	11.33	8.140	511.11	495.94	7.59	1305.50
137	11.42	8.150	512.23	497.05	7.59	1305.50
138	11.50	8.160	513.36	498.18	7.59	1305.50
139	11.58	7.650	513.99	498.81	7.59	1305.50
140	11.67	7.230	513.69	498.52	7.59	1305.50
141	11.75	7.160	512.91	497.73	7.59	1305.50
142	11.83	7.410	512.30	497.12	7.59	1305.50
143	11.92	7.630	512.16	496.98	7.59	1305.50
144	12.00	7.680	512.29	497.12	7.59	1305.50
145	12.08	9.540	514.34	499.16	7.59	1305.50
146	12.17	11.030	519.73	502.44	8.64	1305.60
147	12.25	11.310	524.78	507.50	8.64	1305.60
148	12.33	11.660	530.47	510.92	9.77	1305.70

149	12.42	11.880	534.46	514.92	9.77	1305.70
150	12.50	11.930	538.73	519.19	9.77	1305.70
151	12.58	12.480	543.60	524.05	9.77	1305.70
152	12.67	12.910	549.44	528.39	10.53	1305.80
153	12.75	12.990	554.29	533.24	10.53	1305.80
154	12.83	13.290	559.52	537.25	11.13	1305.90
155	12.92	13.510	564.05	541.78	11.13	1305.90
156	13.00	13.560	568.85	546.59	11.13	1305.90
157	13.08	14.890	575.04	551.63	11.70	1306.00
158	13.17	15.960	582.48	559.08	11.70	1306.00
159	13.25	16.160	591.20	566.73	12.24	1306.10
160	13.33	16.220	599.11	574.63	12.24	1306.10
161	13.42	16.230	607.08	581.58	12.75	1306.20
162	13.50	16.240	614.05	588.55	12.75	1306.20
163	13.58	13.360	618.15	592.66	12.75	1306.20
164	13.67	11.040	617.06	591.56	12.75	1306.20
165	13.75	10.620	613.22	587.72	12.75	1306.20
166	13.83	10.500	608.84	583.34	12.75	1306.20
167	13.92	10.510	604.35	578.85	12.75	1306.20
168	14.00	10.520	599.88	575.41	12.24	1306.10
169	14.08	11.570	597.50	573.02	12.24	1306.10
170	14.17	12.430	597.02	572.54	12.24	1306.10
171	14.25	12.590	597.56	573.09	12.24	1306.10
172	14.33	12.390	598.07	573.59	12.24	1306.10
173	14.42	12.180	598.16	573.68	12.24	1306.10
174	14.50	12.150	598.01	573.54	12.24	1306.10
175	14.58	12.150	597.84	573.36	12.24	1306.10
176	14.67	12.150	597.66	573.18	12.24	1306.10
177	14.75	12.160	597.49	573.02	12.24	1306.10
178	14.83	11.910	597.09	572.61	12.24	1306.10
179	14.92	11.700	596.22	571.74	12.24	1306.10
180	15.00	11.670	595.11	570.64	12.24	1306.10
181	15.08	11.400	593.71	569.23	12.24	1306.10
182	15.17	11.200	591.83	567.35	12.24	1306.10
183	15.25	11.170	589.72	565.25	12.24	1306.10
184	15.33	10.900	587.32	563.91	11.70	1306.00
185	15.42	10.700	585.51	562.11	11.70	1306.00
186	15.50	10.670	583.48	560.08	11.70	1306.00
187	15.58	9.610	580.36	556.95	11.70	1306.00
188	15.67	8.770	575.33	551.93	11.70	1306.00
189	15.75	8.620	569.32	547.06	11.13	1305.90
190	15.83	8.580	564.26	541.99	11.13	1305.90
191	15.92	8.590	559.16	536.89	11.13	1305.90
192	16.00	8.600	554.08	533.03	10.53	1305.80
193	16.08	4.670	546.30	525.25	10.53	1305.80
194	16.17	1.490	531.41	511.86	9.77	1305.70
195	16.25	0.930	514.28	499.11	7.59	1305.50
196	16.33	0.750	500.79	485.61	7.59	1305.50
197	16.42	0.760	487.12	473.89	6.61	1305.40
198	16.50	0.770	475.42	463.96	5.73	1305.30
199	16.58	0.510	465.24	455.34	4.95	1305.20
200	16.67	0.310	456.16	447.55	4.30	1305.10

201	16.75	0.270	448.13	439.53	4.30	1305.10
202	16.83	0.270	440.07	432.36	3.86	1305.00
203	16.92	0.280	432.91	425.19	3.86	1305.00
204	17.00	0.280	425.75	418.44	3.65	1304.90
205	17.08	0.810	419.53	412.22	3.65	1304.90
206	17.17	1.240	414.27	407.39	3.44	1304.80
207	17.25	1.330	409.96	403.08	3.44	1304.80
208	17.33	1.360	405.77	398.89	3.44	1304.80
209	17.42	1.360	401.61	395.19	3.21	1304.70
210	17.50	1.370	397.92	391.50	3.21	1304.70
211	17.58	1.380	394.25	387.83	3.21	1304.70
212	17.67	1.380	390.59	384.17	3.21	1304.70
213	17.75	1.390	386.94	381.03	2.96	1304.60
214	17.83	1.130	383.55	377.63	2.96	1304.60
215	17.92	0.930	379.69	373.78	2.96	1304.60
216	18.00	0.890	375.60	370.24	2.68	1304.50
217	18.08	0.890	372.02	366.67	2.68	1304.50
218	18.17	0.890	368.45	363.10	2.68	1304.50
219	18.25	0.900	364.89	359.54	2.68	1304.50
220	18.33	0.910	361.35	357.01	2.17	1304.40
221	18.42	0.910	358.83	354.50	2.17	1304.40
222	18.50	0.920	356.33	351.99	2.17	1304.40
223	18.58	0.660	353.57	349.24	2.17	1304.40
224	18.67	0.450	350.35	347.02	1.67	1304.30
225	18.75	0.420	347.89	344.55	1.67	1304.30
226	18.83	0.470	345.44	342.11	1.67	1304.30
227	18.92	0.510	343.09	339.76	1.67	1304.30
228	19.00	0.520	340.79	337.46	1.67	1304.30
229	19.08	0.480	338.46	335.98	1.24	1304.20
230	19.17	0.450	336.91	334.44	1.24	1304.20
231	19.25	0.440	335.33	332.85	1.24	1304.20
232	19.33	0.710	334.00	331.52	1.24	1304.20
233	19.42	0.930	333.16	330.69	1.24	1304.20
234	19.50	0.970	332.59	330.11	1.24	1304.20
235	19.58	0.730	331.81	329.34	1.24	1304.20
236	19.67	0.520	330.59	328.11	1.24	1304.20
237	19.75	0.490	329.12	326.64	1.24	1304.20
238	19.83	0.500	327.63	325.16	1.24	1304.20
239	19.92	0.520	326.18	324.38	0.90	1304.10
240	20.00	0.520	325.42	323.61	0.90	1304.10
241	20.08	0.510	324.64	322.84	0.90	1304.10
242	20.17	0.500	323.85	322.05	0.90	1304.10
243	20.25	0.500	323.05	321.24	0.90	1304.10
244	20.33	0.510	322.25	320.45	0.90	1304.10
245	20.42	0.510	321.47	319.67	0.90	1304.10
246	20.50	0.520	320.70	318.90	0.90	1304.10
247	20.58	0.520	319.94	318.13	0.90	1304.10
248	20.67	0.530	319.18	317.38	0.90	1304.10
249	20.75	0.530	318.44	316.64	0.90	1304.10
250	20.83	0.270	317.44	315.63	0.90	1304.10
251	20.92	0.060	315.96	314.16	0.90	1304.10
252	21.00	0.030	314.25	312.45	0.90	1304.10

253	21.08	0.280	312.76	311.35	0.71	1304.00
254	21.17	0.500	312.13	310.72	0.71	1304.00
255	21.25	0.540	311.76	310.35	0.71	1304.00
256	21.33	0.300	311.19	309.78	0.71	1304.00
257	21.42	0.090	310.17	308.76	0.71	1304.00
258	21.50	0.050	308.90	307.48	0.71	1304.00
259	21.58	0.310	307.84	306.43	0.71	1304.00
260	21.67	0.520	307.26	305.85	0.71	1304.00
261	21.75	0.570	306.94	305.53	0.71	1304.00
262	21.83	0.320	306.42	305.01	0.71	1304.00
263	21.92	0.110	305.44	304.03	0.71	1304.00
264	22.00	0.070	304.21	302.80	0.71	1304.00
265	22.08	0.330	303.20	301.79	0.71	1304.00
266	22.17	0.540	302.66	301.25	0.71	1304.00
267	22.25	0.590	302.38	300.97	0.71	1304.00
268	22.33	0.340	301.90	300.54	0.68	1303.90
269	22.42	0.130	301.01	299.65	0.68	1303.90
270	22.50	0.090	299.87	298.51	0.68	1303.90
271	22.58	0.080	298.68	297.32	0.68	1303.90
272	22.67	0.090	297.49	296.13	0.68	1303.90
273	22.75	0.090	296.31	294.95	0.68	1303.90
274	22.83	0.090	295.13	293.78	0.68	1303.90
275	22.92	0.090	293.96	292.60	0.68	1303.90
276	23.00	0.100	292.79	291.43	0.68	1303.90
277	23.08	0.100	291.63	290.27	0.68	1303.90
278	23.17	0.100	290.47	289.11	0.68	1303.90
279	23.25	0.100	289.31	288.01	0.65	1303.80
280	23.33	0.110	288.22	286.91	0.65	1303.80
281	23.42	0.110	287.13	285.83	0.65	1303.80
282	23.50	0.110	286.05	284.75	0.65	1303.80
283	23.58	0.110	284.97	283.66	0.65	1303.80
284	23.67	0.110	283.88	282.58	0.65	1303.80
285	23.75	0.110	282.80	281.49	0.65	1303.80
286	23.83	0.110	281.71	280.41	0.65	1303.80
287	23.92	0.120	280.64	279.33	0.65	1303.80
288	24.00	0.120	279.57	278.27	0.65	1303.80
289	24.08	0.060	278.45	277.20	0.62	1303.70
290	24.17	0.010	277.27	276.02	0.62	1303.70
291	24.25	0.000	276.03	274.79	0.62	1303.70
292	24.33	0.000	274.79	273.54	0.62	1303.70
293	24.42	0.000	273.54	272.29	0.62	1303.70
294	24.50	0.000	272.29	271.04	0.62	1303.70
295	24.58	0.000	271.04	269.80	0.62	1303.70
296	24.67	0.000	269.80	268.55	0.62	1303.70
297	24.75	0.000	268.55	267.30	0.62	1303.70
298	24.83	0.000	267.30	266.05	0.62	1303.70
299	24.92	0.000	266.05	264.87	0.59	1303.60
300	25.00	0.000	264.87	263.68	0.59	1303.60

APPENDIX

SELECTED DRAINAGE MANUAL MAPS

TABLES

CHARTS

NOMOGRAPHS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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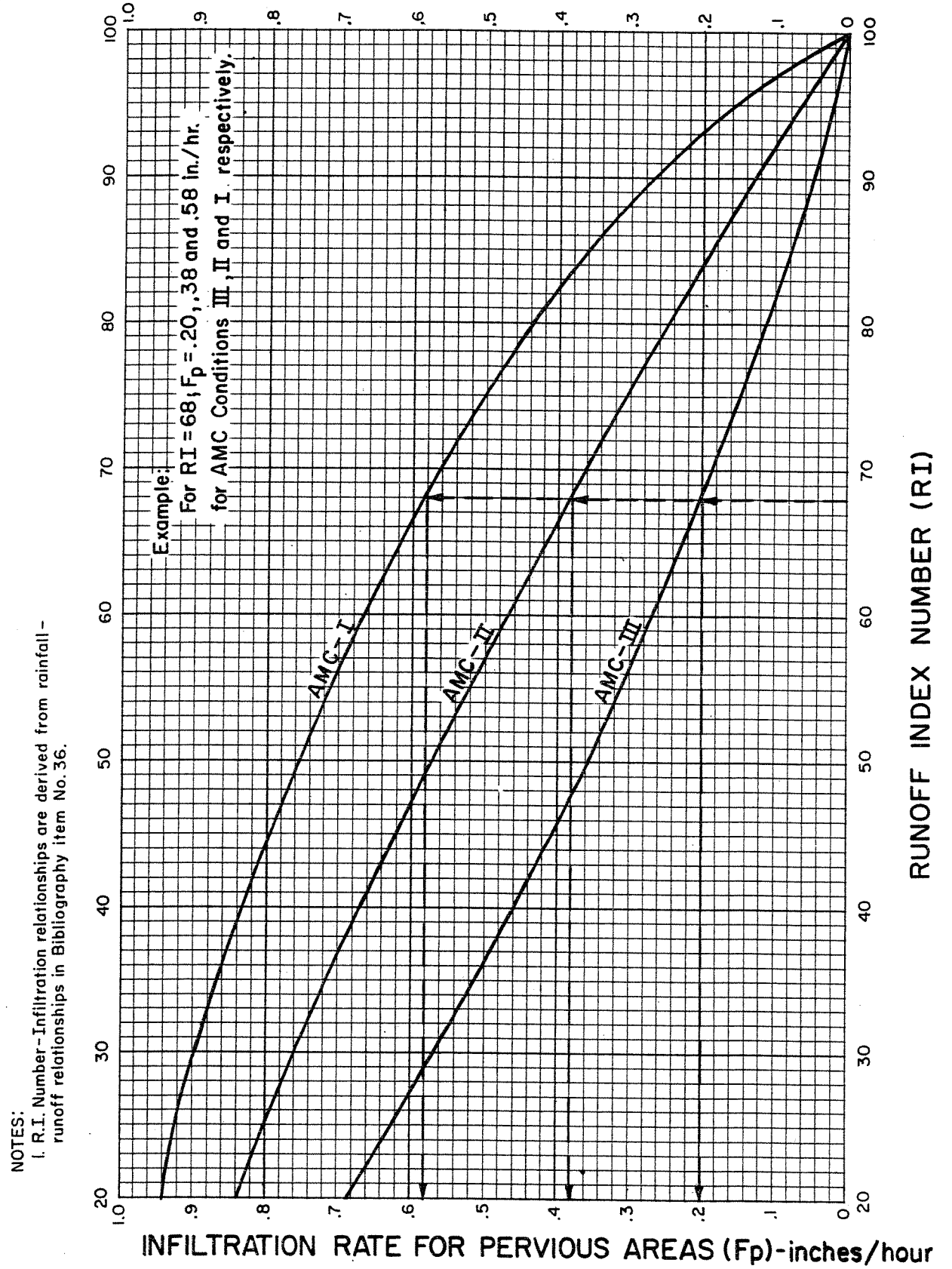
IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3



NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

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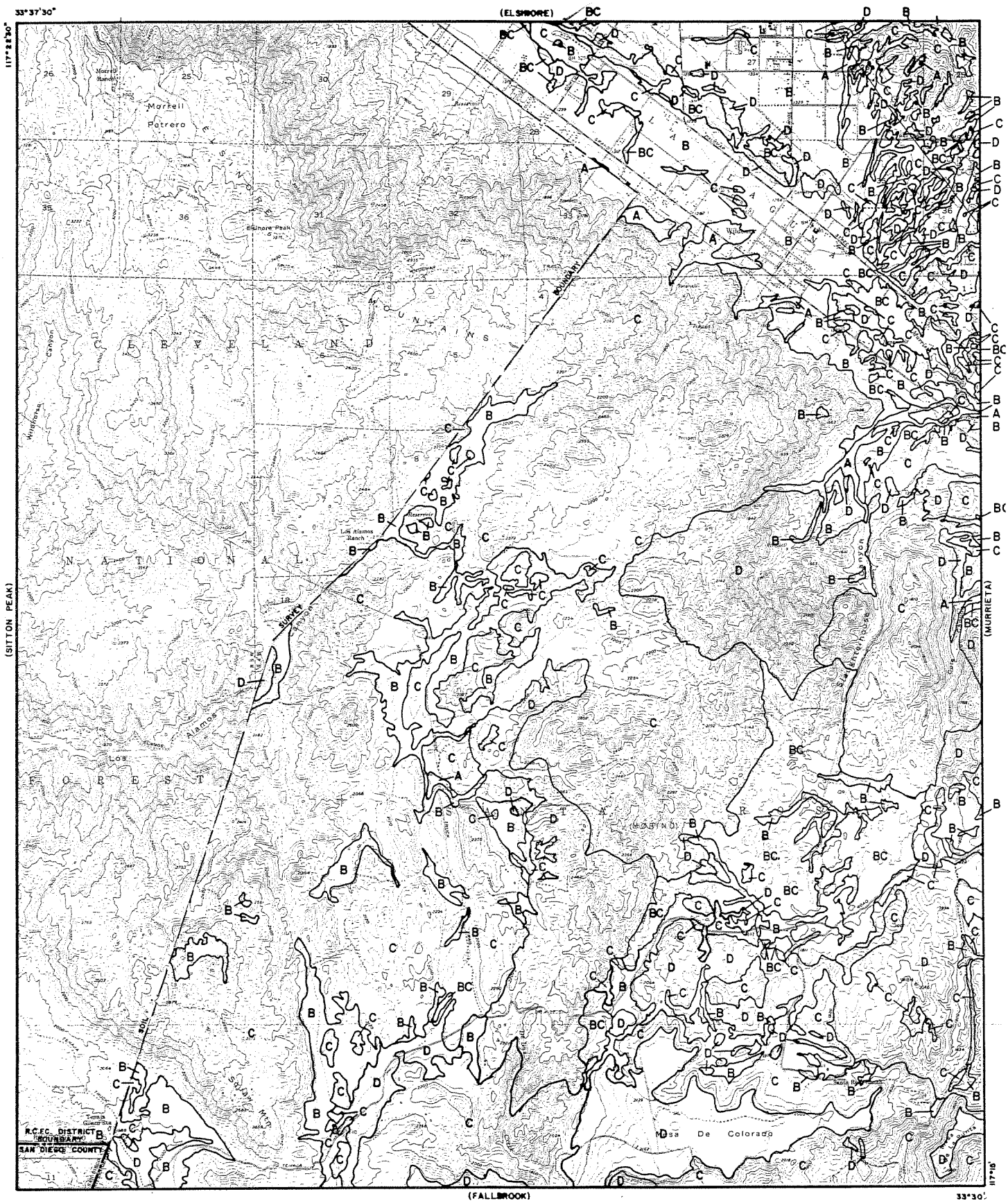
INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

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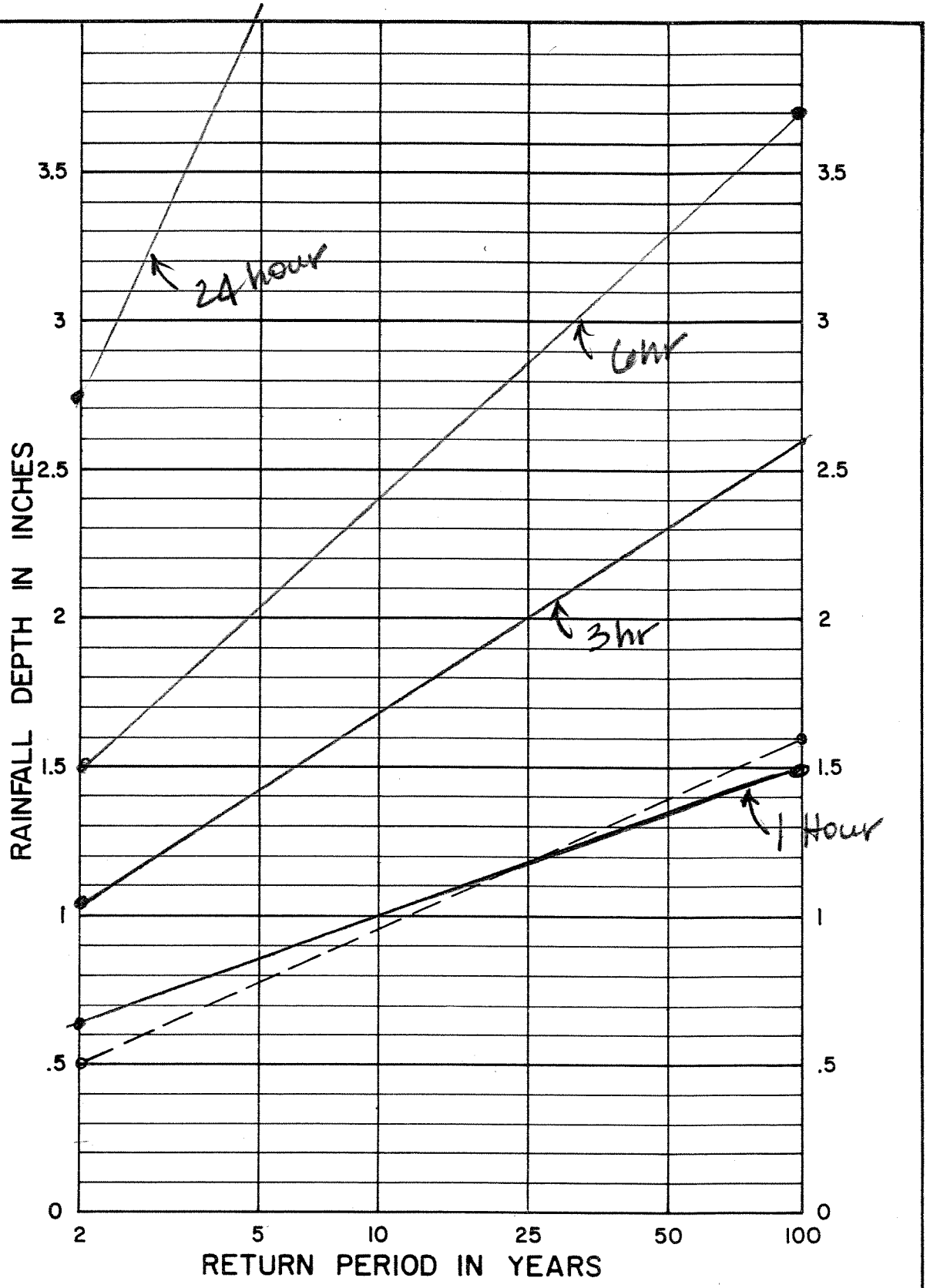
N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR WILDOMAR

PLATE C-1.51



NOTE:

1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

Reference: NOAA Atlas 2, Volume XI - California, 1973.

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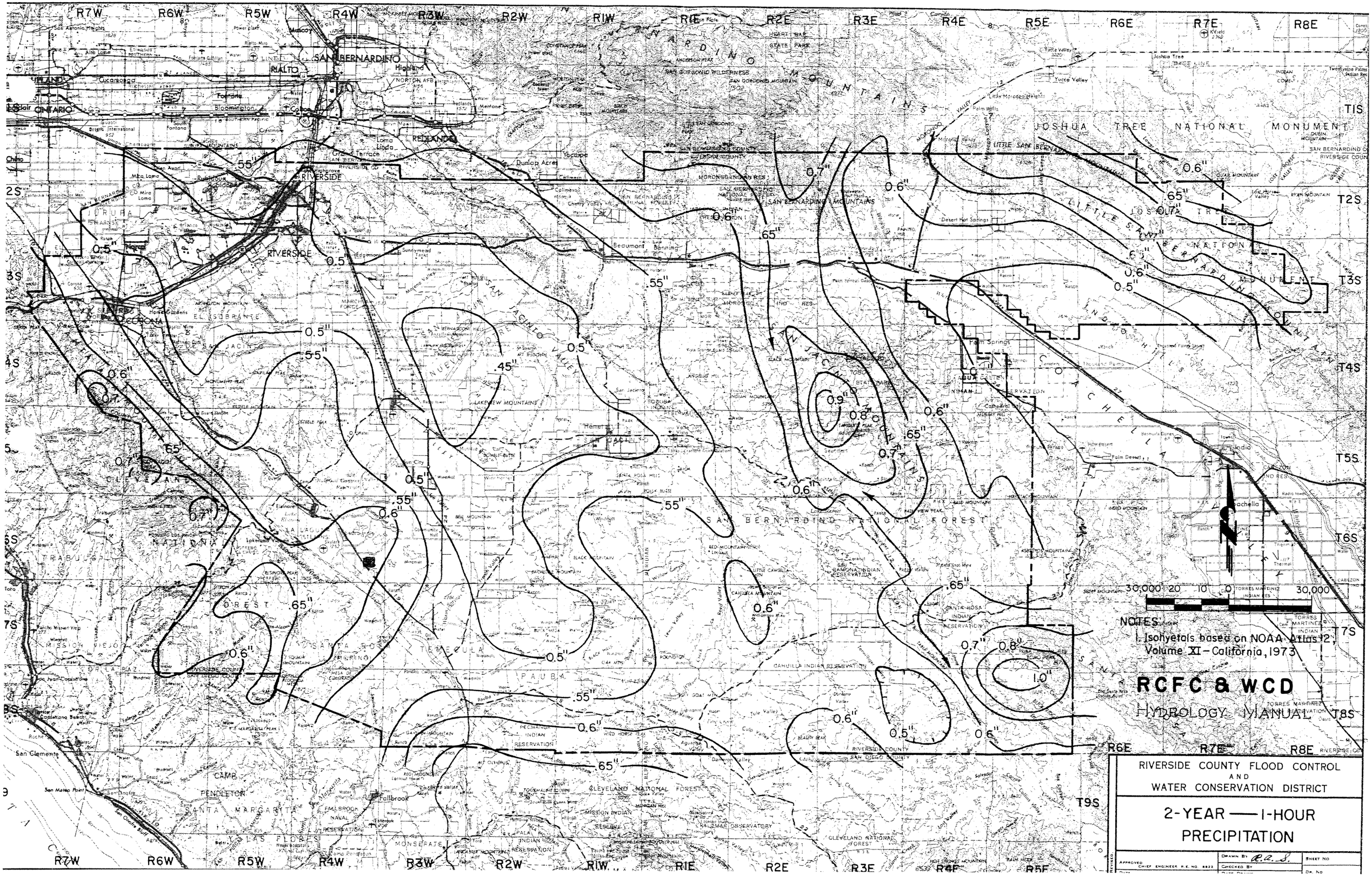
RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

PLATE D-4.5



NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

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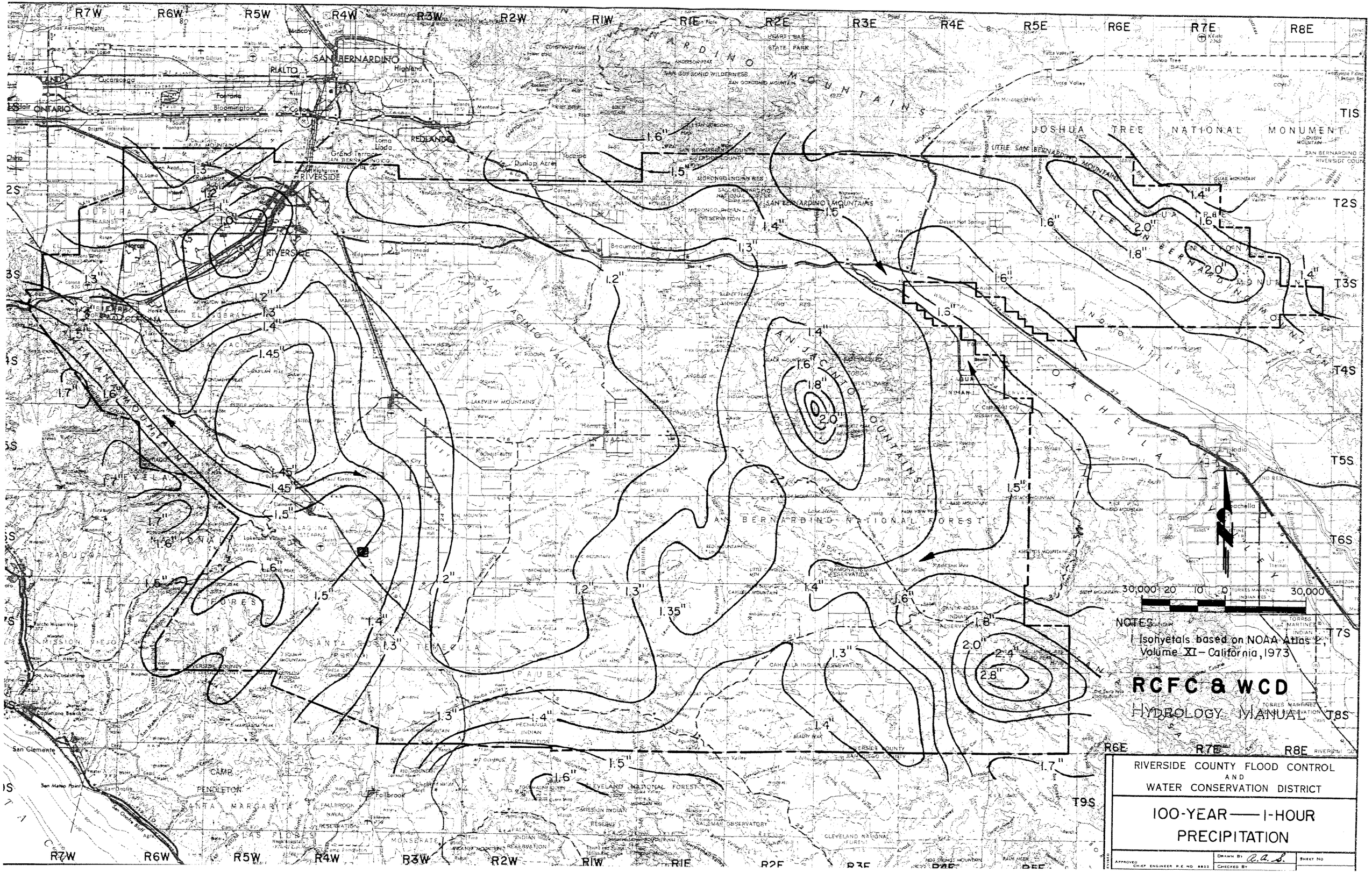
		DR. NO


R7W
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T7S
T8S
T9S
SAN BERNARDINO
RIALTO
REDLANDS
RIVERSIDE
Highland
Loma Linda
Mentone
Yucaipe
Dunlop Acres
Sunnymead
Edgemont
Beaumont
Banning
Desert Hot Springs
Palm Springs
Cathedral City
Indio
Yucca Valley
Joshua Tree
Twentynine Palms
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO MOUNTAINS
SAN JACINTO MOUNTAINS
SAN GORGONIO WILDERNESS
SAN GORGONIO MOUNTAIN
LITTLE SAN BERNARDINO MOUNTAINS
SAN JACINTO WILDERNESS
SAN JACINTO PEAK
SAN JACINTO STATE PARK
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
SANTA ROSA MOUNTAINS
LAKEVIEW MOUNTAINS
SAN JACINTO VALLEY
COACHELLA
MORONGO INDIAN RESERVATION
SAN MANUEL INDIAN RESERVATION
AGUA CALIENTE INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
RAMONA INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
MORONGO-CABAZON INDIAN RESERVATION
MORENO VALLEY
PERRIS
HEMET
SAN JACINTO
TEMECULA
MURRIETA
CAMP PENDLETON
FALLBROOK
1.6"
1.5"
1.4"
1.3"
1.2"
1.7"
1.8"
2.0"
2.4"
2.8"
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NOTES
1 Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973
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100-YEAR — 1-HOUR PRECIPITATION
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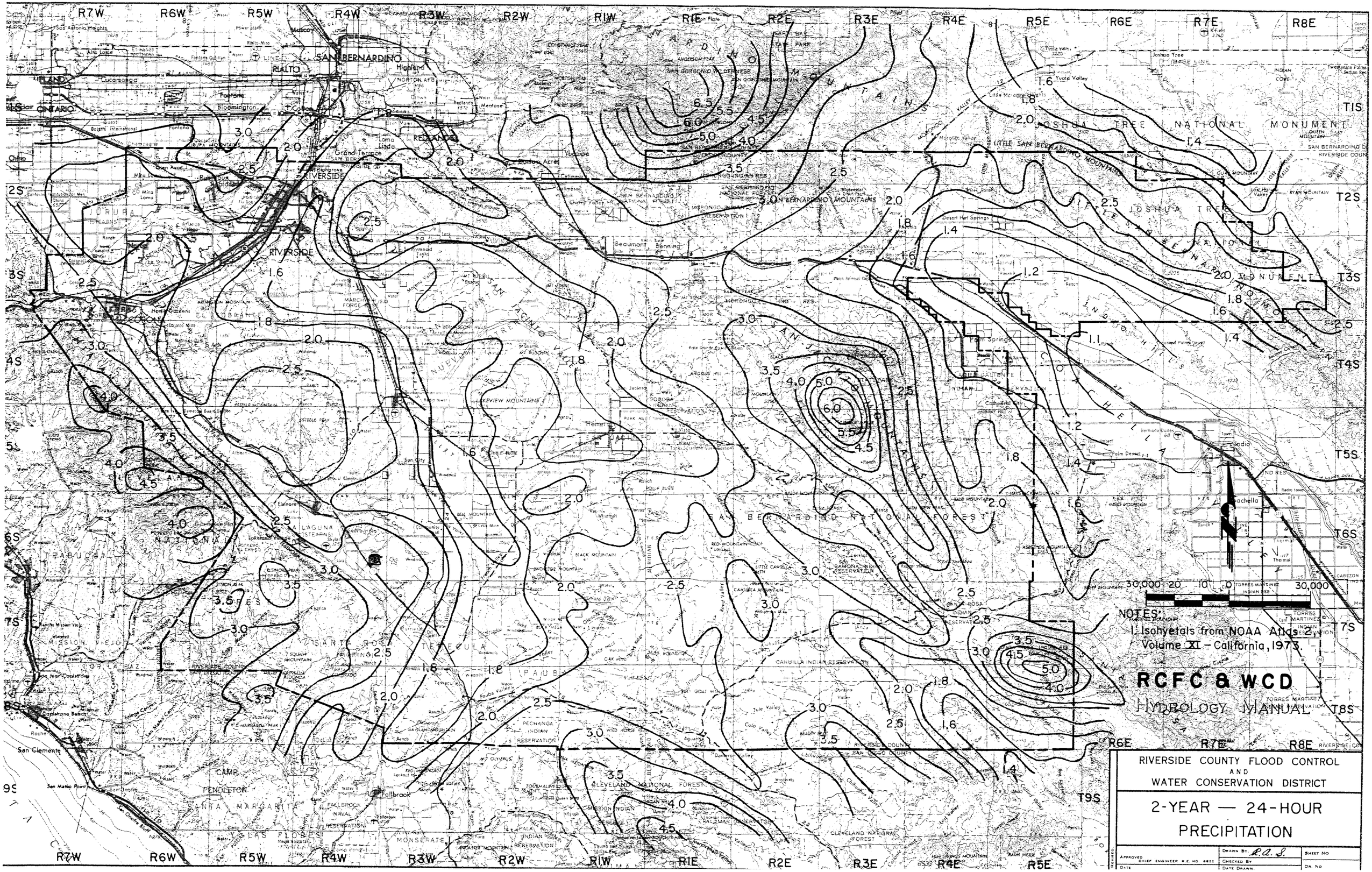

NOTES:

1. Isohyetals from NOAA Atlas 2, Volume XI – California, 1973.

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

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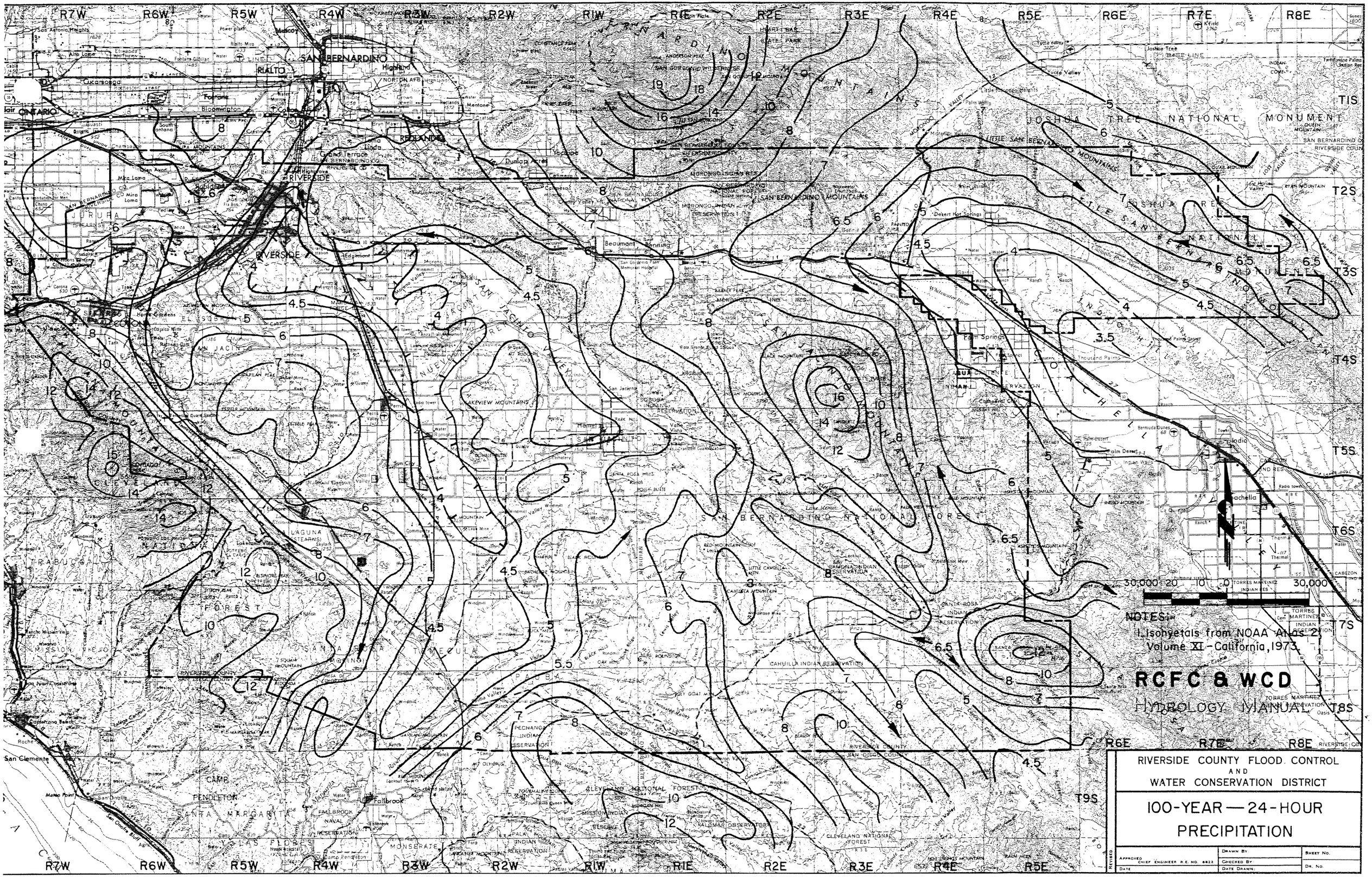

NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 24-HOUR PRECIPITATION

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DATE	CHECKED BY	DR. NO.
REVISED	DATE DRAWN	

Appendix D

Educational Materials
(Not Applicable to Preliminary Report. Materials to be provided in Final WQMP)

Appendix E

Soils Report
Infiltration Report

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED CROSSROADS APARTMENTS
APN # 3870-280-004, 009, 010, 011 AND 012
WILDOMAR AREA, RIVERSIDE COUNTY, CALIFORNIA

FOR
CAMEO HOMES
1105 QUAIL STREET
NEWPORT BEACH, CALIFORNIA 92660
W.O. 4898-A1-OC SEPTEMBER 6, 2005

GeoSoils, Inc.

Geotechnical • Coastal • Geologic • Environmental

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED CROSSROADS APARTMENTS
APN # 3870-280-004, 009, 010, 011 AND 012
WILDOMAR AREA, RIVERSIDE COUNTY, CALIFORNIA

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GeoSoils, Inc.

Geotechnical • Coastal • Geologic • Environmental

1446 E. Chestnut Ave. • Santa Ana, California 92701 • (714) 647-0277 • FAX (714) 647-0745

September 6, 2005

W.O. 4898-A1-OC

Cameo Homes
1105 Quail Street
Newport Beach, California 92660

Attention: Ms. Kim Berry

Subject: Preliminary Geotechnical Investigation for Proposed Crossroads Apartments, APN 3870-280-004, 009, 010, 011 and 012, Wildomar Area, Riverside County, California

Ladies and Gentlemen:

In accordance with your request and authorization, this report presents the results of our preliminary geotechnical investigation of the subject site. The purpose of the study was to evaluate the onsite soils and geologic conditions and their effects on the proposed development from a geotechnical point of view. In particular, the primary purpose of our study was to evaluate potential remedial removal depths, groundwater conditions, proposed slope stability, liquefaction potential, etc. A secondary purpose of this study was to provide preliminary geotechnical foundation design parameters, and general earthwork and grading guidelines.

EXECUTIVE SUMMARY

Based on our review of readily available data (Appendix A), including analysis of stereo paired air photos and review of County of Riverside fault report index maps, field exploration, laboratory testing, and geologic and engineering analyses, the proposed project appears suitable for its intended use from a geotechnical viewpoint, provided the recommendations presented in the text of this report are implemented. The primary developmental considerations are summarized below:

- Removal of any slopewash and colluvial (topsoil) deposits, alluvial deposits and weathered bedrock materials will be necessary prior to fill placement. Approximate depths of removals are outlined in the conclusions and recommendations section of this report. For preliminary planning purposes, these depths are estimated to be on the order of 2± to 3± feet across a majority of the site if not removed by proposed excavation, with localized deeper removals, up to 7.5± feet deep or deeper, in the minor canyon areas.

- Based on the sampling, laboratory testing, and slope stability evaluation by GSI, any planned 2:1 (horizontal to vertical) cut and fill slopes are considered grossly and surficially stable. However, the need for stabilization fills for cohesionless, sandy lenses in the Pauba Formation of south and southeast facing cut slopes may not be precluded.

- Based upon the proposed development and our field exploration, bedrock assigned to the Quaternary-aged Pauba Formation in the site area is considered relatively easily rippable.

- Due to the nature of the site materials, the likelihood that oversized rock materials will be generated during grading, is low.

- The expansion potential of tested onsite soils range from very low to medium.

- Typical samples of the site materials have been analyzed for corrosion/soluble sulfate potential. Based on testing, the use of sulfate resistant concrete is not anticipated at this time. However, based on test results, the onsite soils are moderately corrosive to ferrous metals in a saturated state.

- In general and based upon the available data to date, groundwater is not expected to be a factor in the development of the site. However, due to the nature of the site materials, seepage may be encountered along the alluvial soils and bedrock contacts or throughout the site along with seasonal perched water within existing drainage areas, and also may be encountered in "daylighted" joint systems within the Pauba Formation. Subdrainage systems should be anticipated in the minor canyon areas. Additionally, subdrainage systems for the control of localized groundwater seepage should be anticipated, should such conditions develop during or after grading.

- Our review of several fault investigation reports indicates no known active faults are crossing the site in the dominant northwesterly direction. Further, the site is not within an Alquist-Priolo Earthquake Fault Zone, nor is it within a liquefaction zone established by the County of Riverside/State of California.

- Adverse geologic features that would preclude project feasibility (e.g., landslides, shallow groundwater, liquefiable soils, etc.) were not encountered.

- The recommendations presented in this report should be incorporated into the planning, design, and construction considerations of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

Fred Aflakain
Engineering Geologist, CEG 2051

Reviewed by:

Ben Shahrvini
Geotechnical Engineer, GE 2296

FA/BBS/agw

Distribution: (6) Addressee

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Appendix C - EQFAULT Data . . . . . Rear of Text
Appendix D - Laboratory Test Results . . . . . Rear of Text
Appendix E - Slope Stability Analysis . . . . . Rear of Text
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Plate 1 - Geotechnical Map . . . . . Rear of Text in Pocket

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED CROSSROADS APARTMENTS
APN # 3870-280-004, 009, 010, 011 AND 012
WILDOMAR AREA, RIVERSIDE COUNTY, CALIFORNIA

SCOPE OF SERVICES

The scope of our services has included the following:

1. Review of available soils and geologic data for the site area, including previous geotechnical reports in the subject area and adjoining tracts (Appendix A).

2. Geologic site reconnaissance and geologic mapping of significant geologic structures and mapping of surficial deposits.

3. Subsurface exploration consisting of thirteen exploratory test pits, advanced into bedrock, for geotechnical logging and sampling (Appendix B).

4. General areal seismicity evaluation (Appendix C).

5. Pertinent laboratory testing of representative soil samples collected during our subsurface exploration program. Testing included in-situ moisture and density, maximum density testing, shear, soluble sulfate, corrosion analysis, and expansion index testing of the materials encountered during our field studies. Results of our laboratory testing are provided in Appendix D.

6. Slope stability analysis of the existing natural slopes (Appendix E).

7. Appropriate engineering and geologic analyses of data collected and preparation of this report and accompaniments.

SITE DESCRIPTION

The project site is irregular shaped and located south of Prielipp Road, west of Elizabeth Lane, and northwest of the City of Murrieta boundary, in the Wildomar area in an unincorporated part of County of Riverside, California (see Figure 1, Site Location Map). The site consists of a hilly terrain, with three existing residences, a shed, barn, stable, and a hay shelter. Topographically the site is dominated by gently rolling to moderately steep terrain with elevations generally decreasing from north to south-southeast, ranging from 1340 Mean Sea Level (MSL) to 1300, for a total relief of approximately 40 feet. Drainage is generally to the southeast and is accommodated by relatively two thin and gentle to steep drainage channels. Vegetation consists of chaparral and other native shrubs and grasses, with scattered trees associated with existing dwellings onsite.

SITE LOCATION MAP

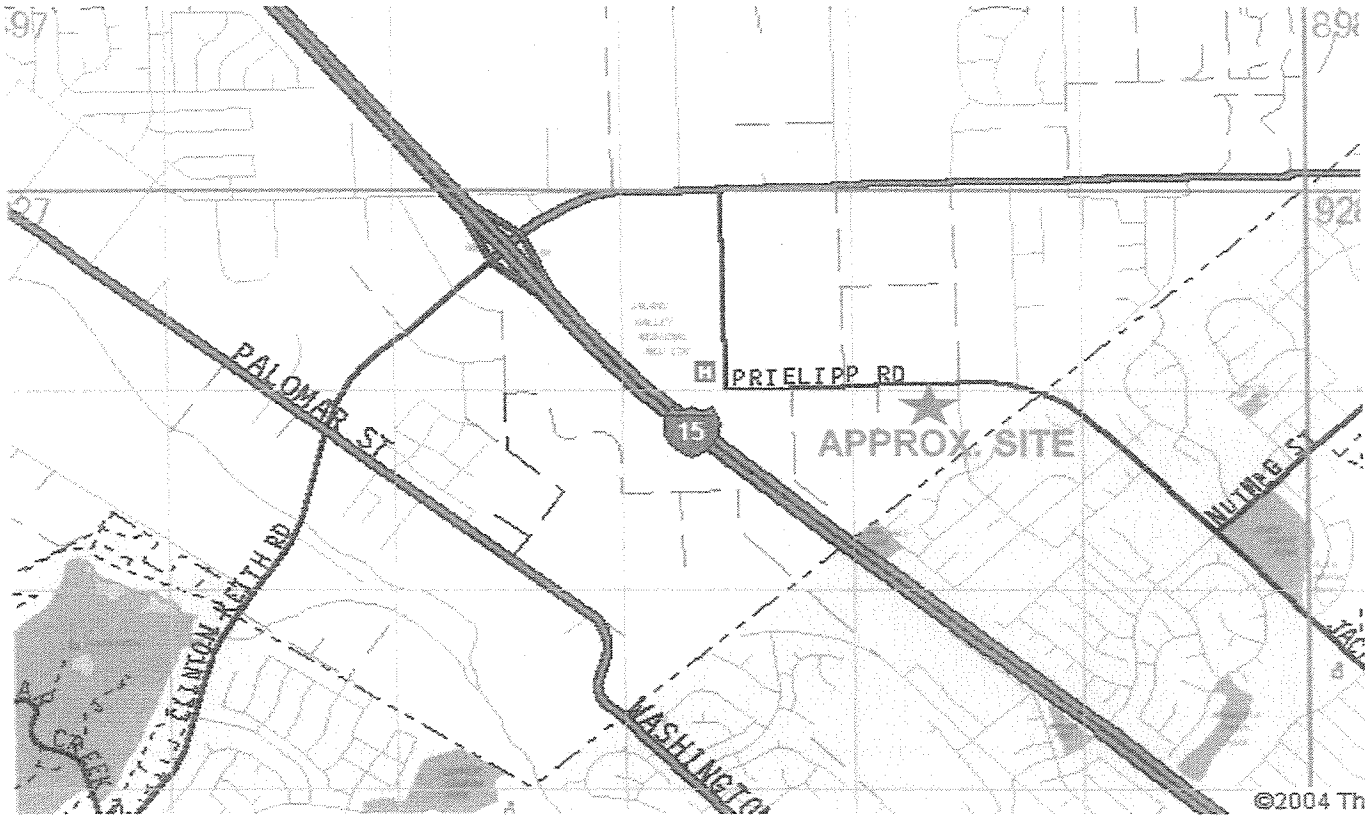

FIGURE 1

GeoSoils, Inc.

SITE LOCATION MAP

CROSSROADS APARTMENTS

City of Murrieta, California

DATE 9/06/05 | W.O. NO. 4898-A1-OC

Geotechnical · Coastal · Geologic · Environmental

PROPOSED DEVELOPMENT

The conceptual development plan for the project indicates that at least 16 three-story residential building pads are proposed, along with interior street and utility improvements. It is our understanding that the residential buildings would be three-story structures, utilizing typical wood/masonry block construction with continuous footings and slabs-on-grade or post tension foundations. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is assumed to be accommodated by tying into the regional municipal system. The need for import soils is unknown.

FIELD STUDIES

As indicated above, field studies conducted during our evaluation of the property for this investigation consisted of geologic reconnaissance mapping, excavation of thirteen exploratory test pits throughout the site for evaluation of near-surface soil and geologic conditions. Field exploration was performed on August 16 and 17, 2005. The test pits were logged by a geologist from our firm who collected representative bulk and undisturbed soil samples for appropriate laboratory testing. The logs of the test pits are presented in Appendix B. Locations of the test pits are presented on Plate 1 (Geologic Map).

REGIONAL GEOLOGY

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. It is characterized by steep, elongated ranges and valleys that trend northwestward. The site area is situated near the western margin of the Perris block, an eroded mass of Cretaceous-age and older rocks.

The Santa Ana Mountains lie along the western side of the Elsinore fault zone, and the Perris Block is located along the eastern side of the fault zone. The mountain ranges are underlain by pre-Cretaceous metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the southern California batholith. Tertiary sediments and volcanics, and Quaternary sediments flank the mountain ranges. The Tertiary and Quaternary rocks are generally comprised of nonmarine sediments consisting of sandstones, mudstones, conglomerates, and scattered volcanic rocks. These older rocks have been eroded, with the resulting detritus deposited as a series of coalescing alluvial fans, filling the valleys with alluvial detritus, in turn being eroding and incised. The site regional geology map is shown on the enclosed figure 2.

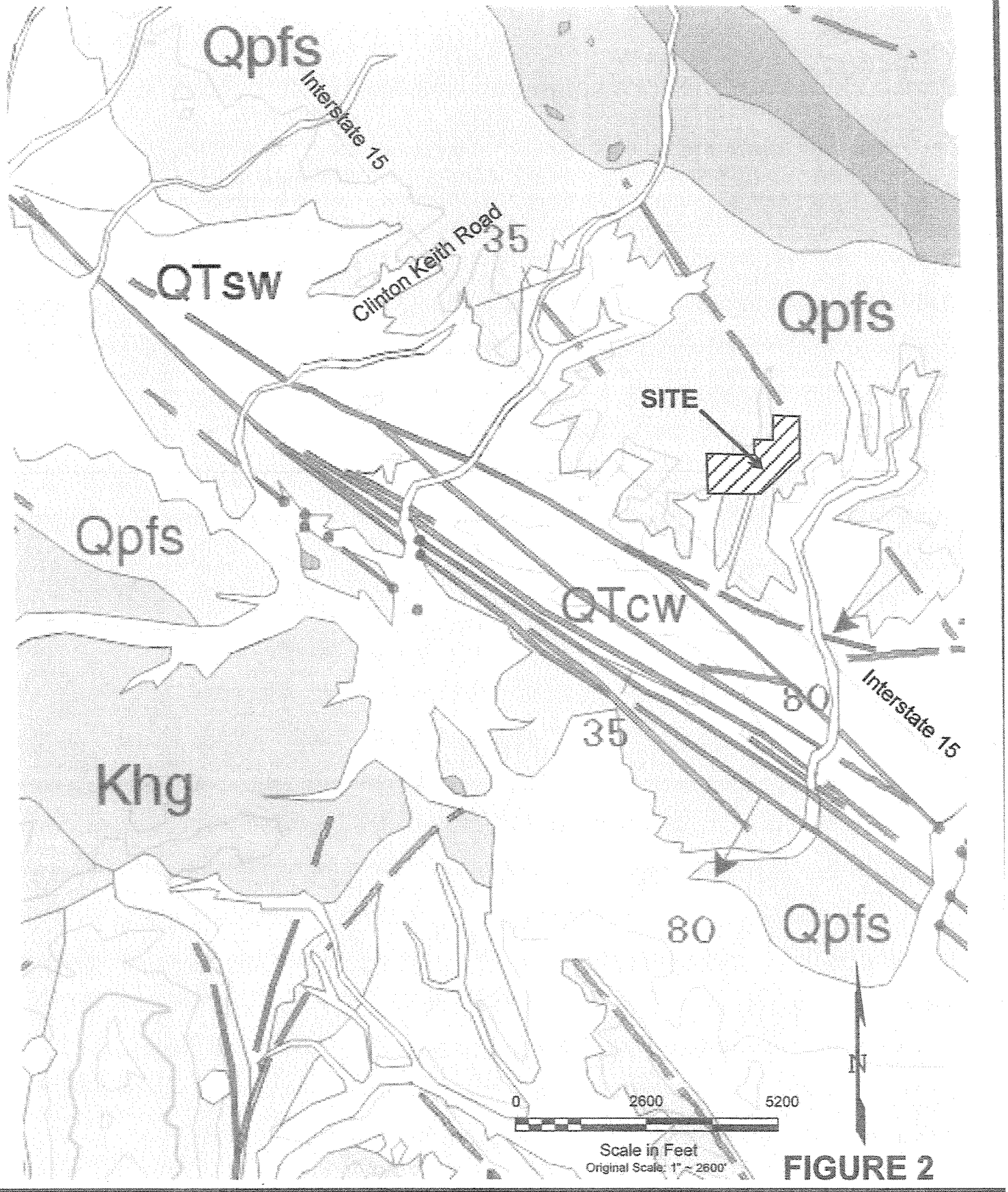

FIGURE 2

GeoSoils, Inc.

Regional Geology of the Site

Date	9/06/05	Project No.	4898-A1-OC

Geotechnical • Coastal • Geologic • Environmental

ENGINEERING GEOLOGY

This site is underlain by sedimentary bedrock assigned to the Pauba Formation. These Quaternary age deposits are mantled by a relatively thin layer of colluvium/topsoil, and younger alluvial sediments in the drainage areas. The Pauba Formation is generally thickly bedded, and is gently inclined to the northwest, southeast or nearly flat lying. These bedrock deposits have been locally incised and are filled with minor amounts of younger alluvial sediments. The Pauba Formation is generally composed of well bedded to massive poorly-graded sandstones, siltstones, and claystones. Interbedded cohesionless sand lenses are commonly encountered. The near surface, upper 2± to 7.5± feet, of the colluvium/topsoil, alluvial deposits, and weathered bedrock are porous and loose, and are considered unsuitable for support of settlement-sensitive improvements or additional fill in their existing state. Generally speaking, bedding within the Pauba where observed in the trenches is relatively flat lying, with dips varying from nearly level to 20 degrees in several directions. Joints are typically northwesterly trending, with dips ranging from 55 to 90 degrees.

GEOLOGIC UNITS

The geologic units encountered during our investigation within the project site consist of artificial fill, slopewash/colluvium, alluvium, and Quaternary-aged Pauba Formation sandstone and siltstone bedrocks. The approximate limits of the mappable units are presented on Plate 1. These units are described, from youngest to oldest, as follows:

Artificial Fill - (Map Symbol - Af)

Fill comprises mainly onsite materials consisting of sand and silt mixtures with scattered gravel and cobble size clasts derived from the slopewash/colluvium and underlying bedrock. Fill is associated with the grading of level building pads and landscaped yards throughout the northerly portions of the site, as well as utility buildings trash disposal areas, and channel crossings for access to several dwellings. Fill is typically loose to moderately dense, and locally contains moderate to large amounts of trash and construction debris. Fill is deemed unsuitable for the support of new structures, and will require removal and recompaction prior to rough grading.

Slope Failure - (Map Symbol - Qs)

One slope failure was observed in the southwesterly portion of the site, at the margin of a stream crossing. The slope failure involved both fill soil for the stream crossing, and natural soil adjoining the stream crossing. The failure may be up to an estimated 10 to 15 feet deep.

Slopewash/Colluvium - (Unmapped)

Slopewash/Colluvium (topsoil) was observed in our subsurface investigation mantling the Pauba Formation materials throughout the site. These soils were generally observed to range from 1 to 3 feet in thickness. They varied from brown to dark brown, silty and clayey fine- to coarse-grained sands. The colluvium was generally dry and loose. These soils typically have a low expansion potential. However, some clayey fractions may have a medium expansion potential. Due to the potentially compressible nature of these soils, they are considered unsuitable for support of structures and/or improvements in their existing state and therefore, will be need to be removed and recompacted if not removed during planned excavation.

Alluvium (Map Symbol - Qal)

Quaternary alluvial sediments were encountered in the drainage channels on the southern portion of the site. These sediments were generally observed to be predominantly light to dark brown, silty, fine- to coarse-grained sands. The alluvial sediments varied from dry to moist, and were generally loose to medium dense with depth. Where encountered, these sediments generally ranged from 2± to 7.5± feet in thickness. The alluvium typically has a very low expansion potential. Due to the potentially compressible and collapsible nature of these soils, they are considered unsuitable for support of structures and/or improvements in their existing state and therefore, will be need to be removed and recompacted.

Quaternary Pauba Formation Bedrock- (Map Symbol - Qp)

Sedimentary deposits assigned to the Quaternary-age Pauba Formation were encountered near the surface underlying slopewash/colluvial and alluvial materials on the project site. The Pauba Formation in the site area consists of very light to grayish brown to reddish brown, silty and clayey fine- to coarse-grained sandstones with minor interbedded clayey and sandy siltstones. The materials varied from damp to wet, and were generally medium dense to dense. Due to the potential for settlement, the near surface weathered bedrock materials (approximately the upper 1± foot) should be removed prior to compacted fill placement.

FAULTING AND REGIONAL SEISMICITY

The site is situated in an area of active as well as potentially-active faults. The nearby northwest trending Wildomar, Elsinore, and San Jacinto fault zones are considered active and are included within Alquist-Priolo Earthquake Fault Zones. The Crossroads Apartments project does not lie within any Alquist-Priolo special studies zone. However, because of the potential for splays and parallel faults to form within close proximity of an active fault such as the nearby Wildomar fault, a thorough study of local faulting is

mandated by the County of Riverside. Fortunately, several investigations within close proximity to the site have been performed by various geotechnical firms over the past several years. Based on our airphoto lineament analysis, and review of fault investigation reports on file at the County of Riverside, the potential for the presence of active onsite faulting is very low. The airphoto lineament study and review of available data are outlined in the following sections.

Airphoto Lineament Analysis

In order to identify possible unmapped faults, identify possible fissures, and to evaluate topographic expressions of published fault and lineament traces, a photolineament analysis was performed. As indicated previously, one set of stereoscopic "false-color" infrared aerial photographs (United State Department of Agriculture, 1980) at a scale of approximately 1:40,000 were utilized in our lineament analysis. Lineaments found on the site ranged from weak to moderate. Moreover, one trace found just south of the site, trending east-west, was very strong and appeared to offset a nearby stream channel.

Airphoto lineaments are typically classified according to their development as strong, moderate, or weak. A strong lineament is a well defined feature that can be continuously traced several hundred feet to a few thousand feet. A moderate lineament is less well defined, somewhat discontinuous, and can be traced for only a few hundred feet. A weak lineament is discontinuous, poorly defined, and can be traced for a few hundred feet or less. Several weak to moderate lineaments were observed on the site.

Our review of aerial photographs revealed several weak and one or two moderate lineaments which may be related to past faulting and/or erosion and deposition channels. Other lineaments may represent traces manmade roads, fence lines, pathways, abandoned graded sites or drain lines, old utility trenches, etc. Moderate lineaments were found on aerial photos in the northeast and near the southwesterly corners of the site. No construction is currently planned in the southwest portion of the site, but the northeast portion of the site contains several planned apartment units. Some lineaments on the site are nearly parallel to the nearby Wildomar trace of the Elsinore fault. Some lineaments trend parallel to known faults on adjoining properties to the northwest. However, the faults encountered during studies performed on nearby sites were not active by current State of California criteria (i.e., younger than approximately 11,000 years).

Fault Report Review

In addition to aerial photographs, recent geologic investigation reports on file at the County of Riverside were reviewed, including Riverside County Geologic Report File Nos. GEO00555, GEO01268, GEO01315, and GEO01318. No nearby studies were on file to the southwest of the site. Studies performed northwesterly of the site found and documented several inactive faults trending approximately N45W to N60W. Also, near the intersection of I-15 and Clinton Keith Road, an active fault was reported, but that fault was not present on a nearby site to the southwest. It is not uncommon for surface rupture along fault traces in this area to die out completely, or to step right or left and continue, after having died out in one area.

It appears that faulting northwest of the site trends at an angle of approximately 30 degrees to the nearby Wildomar fault. Accordingly, these older faults are likely Riedel shears. The potential for active faulting to cross the site from the northwest to the southeast is very low for the following reasons:

- Faults found on our site and nearby sites to the northwest are inactive
- Nearby sites tend to completely shadow the planned Crossroads Apartments site
- Review of aerial photos found primarily northwesterly trending lineaments passing through our site
- One small northwesterly trending fault, with approximately 2 feet of displacement was observed in T-13, and was determined to be inactive based upon the lack of displacement of the pre-holocene weathering profile (soil) overlying the bedrock

The potential for east west trending faults (the other direction in which Riedel shears may occur) is low based on a lack of significant east-west lineaments across the site, and lack of east west trending faults observed on other sites to the northwest. One lineament south of the site appears to displace a stream channel on the set of photos we observed. Review of other photographs is recommended to verify the findings of this report.

The following table lists the major faults and fault zones in southern California that could have a significant effect on the site should they experience activity.

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE MILES (KM)
Casa Loma (San Jacinto)	20 (31)
Chino	23 (37)
Coronado Bank-Agua Blanca	45 (72)
Coyote Creek (San Jacinto)	41 (66)
Cucamonga	43 (69)
Elsinore	2.1(3.3)
Glen Helen-Lytle Creek-Claremont (San Jacinto)	22 (35)
Hot Springs-Buck Ridge (San Jacinto)	23 (37)
Newport-Inglewood - (North) and Offshore	29 (47)
North Frontal Fault Zone	47 (76)
Palos Verdes Hills	47 (76)
Pinto Mountain-Morongo	47 (75)
Rose Canyon	33 (53)
San Andreas (Coachella Valley)	47 (76)

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE MILES (KM)
San Andreas (Mojave)	50 (81)
San Andreas (S. Bernardino)	37 (60)
San Gorgonio-Banning	30 (48)
San Jose	44 (71)
Sierra Madre-San Fernando	46 (74)
Whittier-North Elsinore	28 (46)

Seismicity

The acceleration-attenuation relation of Campbell and Bozorgnia (1997) has been incorporated into EQFAULT (Blake, 2000a). For this study, peak horizontal ground accelerations anticipated at the site were determined based on the random mean plus 1 - sigma attenuation curves developed Campbell and Bozorgnia (1997). These acceleration-attenuation relations have been incorporated in EQFAULT, a computer program by Thomas F. Blake (2000a), which performs deterministic seismic hazard analyses using up to 150 digitized California faults as earthquake sources.

The program estimates the closest distance between each fault and a user-specified file. If a fault is found to be within a user-selected radius, the program estimates peak horizontal ground acceleration that may occur at the site from the "upper bound" (maximum credible) earthquake on that fault. Site acceleration (g) is computed by any of the 15 user-selected acceleration-attenuation relations that are contained in EQFAULT. Based on the above, peak horizontal ground accelerations from an upper bound event may be on the order of 0.8253g, assuming an upper bound (maximum credible) event of magnitude about 6.8, on the Elsinore fault zone, located approximately 2.1 miles from the subject site.

Historical site seismicity was evaluated utilizing the computer program EQSEARCH (Blake, 2000b). This program performs a search of historical earthquake records, for magnitude 5.0 to magnitude 9.0 within a specified radius (e.g., 100 miles), between the years 1800 to 2004. Based on the selected acceleration-attenuation relation, a peak horizontal ground acceleration is estimated, which may have affected the site during the specific seismic event listed. In addition, site specific probability of exceeding various peak horizontal ground accelerations and seismic recurrence curves are also estimated/generated from the historical data. The largest earthquake site acceleration experienced by the site during the period of 1800 to 2004 was found to be about 0.208g corresponding to an earthquake of about M 7.6 approximately 12.5 miles away, that occurred on May 13, 1910.

Repeatable horizontal ground acceleration at the site was evaluated using various methods (Blake, 2000c). Based on our review of the data obtained, a ground acceleration of 0.74g should be used as a parameter for seismic design. This value was considered as it corresponds to a 10 percent probability of exceedance in 50 years (or a 475 year return period). Selection of this design event is important as it is the level of risk assumed by the Uniform Building Code (UBC, 1997) minimum design requirements. This level of ground shaking corresponds to a Richter magnitude event in the range of approximately 7.0. Pertinent printouts from EQSEARCH and FRISKSP are included in Appendix C.

Experience has shown that wood-frame structures designed in accordance with the Uniform Building Code tend to mitigate earthquake effects. Earthquake effects may include lurching and/or localized ground cracking. This effect is similar to other portions of southern California.

Ground lurching or shallow ground rupture due to shaking could occur in the site area from an earthquake originating on other nearby faults. Such lurching could possibly cause cracking of paved areas, with limited damage to structures.

Seismic Shaking Parameters

Based on the site conditions, Chapter 16 of the Uniform Building Code (International Conference of Building Officials, 1997), and Peterson and others (1996), the following seismic parameters are provided:

Seismic zone (per Figure 16-2*)	4
Soil Profile Type (per Table 16-J*)	S_D
Seismic Source Type (per Table 16-U*)	A
Distance to Seismic Source	3.3 km
Upper Bound Earthquake	M_w 6.8
* Figure and table references from Chapter 16 of the Uniform Building Code (1997).	

SUBSURFACE WATER

Minor water seepage was encountered in some excavations along alluvium/bedrock contact during this study. Also, groundwater may occur along fractures and joints due to migration from adjacent hillsides and development and/or during and after periods of above normal or heavy precipitation. These observations reflect site conditions at the time of our investigation and do not preclude changes in local groundwater conditions in the future from heavy irrigation, precipitation, or other factors not obvious at the time of our field work. Groundwater conditions should be further evaluated during site grading. Additional discussions of groundwater are presented within the conclusions section of this report.

LIQUEFACTION POTENTIAL

Liquefaction of cohesionless soils can be caused by a strong, vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils with a certain range of grain size distribution, saturated by a relatively shallow groundwater table are most susceptible to liquefaction.

Because of the relatively dense nature of the underlying Pauba Formation, and limited amounts of colluvial and younger alluvial deposits, which will be removed and replaced with properly compacted fill during grading operations, it is our opinion that the potential for liquefaction or seismically-induced dynamic settlement is low to nil at the site.

SUBSIDENCE

Our review of readily available data did not indicate that the site area is subsiding due to down-faulting along bordering fault zones, groundwater withdrawal, or hydroconsolidation. The scope of this potential for affecting the subject site is beyond the scope of this current study; however, if proper remedial removals of potentially compressible or collapsible materials is attained during grading operations, areal subsidence in the site area is considered unlikely, but may not be totally precluded. It should not be any greater at the site than for nearby and existing already developed properties.

OTHER GEOLOGIC HAZARDS

Mass wasting refers to the various processes by which earth materials are moved down slope in response to the force of gravity. One slope failure was observed at the channel crossing in the southwesterly portion of the site. It appears that this feature involves the loose fill for the roadway, and a portion of the slopewash along the channel. Although the stream channels are prone to failures caused by erosion at the toe of slope, indications of deep-seated landsliding, slope creep, or significant surficial failures were not observed during our site investigation. These conditions should not affect the site, provided our recommendations are implemented in the design and construction of the project.

LABORATORY TESTING

Classification

Soils were classified visually according to the Unified Soils Classification System. The soil classifications are shown on the test pit logs, Appendix B; and the laboratory test results are presented in Appendix D.

Moisture Density

The field moisture contents and dry unit weights were determined for undisturbed ring samples for the soils encountered in the exploratory test pits. The dry unit weight was determined in pounds per cubic foot and the field moisture content was determined as a percentage of the dry unit weight. The results of these tests are shown on the test pit logs (Appendix B).

Laboratory Standard

The maximum density and optimum moisture content was determined for the major soil types encountered in the exploratory test pits. The laboratory standard used was ASTM D-1557. The moisture-density relationship obtained for the site soils are shown below:

SOIL TYPE (Map Unit)	LOCATION & DEPTH (ft.)	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
Clay SILT, grayish brown	TP-5 @ 2-3'	103.5	19.5
Sandy CLAY, reddish brown	TP-7 @ 3-4'	127.0	10.0

Shear Testing

Shear testing was performed in a direct shear machine of the strain-control type. The rate of deformation is approximately 0.05 inches per minute. The sample was sheared under varying confining loads in order to determine the terzaghi-coulomb envelope for establishing the shear strength parameters, namely angle of internal friction and cohesion. The tests were performed on natural samples of the near-surface and weathered bedrock materials. The shear testing results are presented in Appendix D.

Expansion Potential

Expansion index tests were performed on representative samples of site earth materials in general accordance with the Uniform Building Code standard 29-2 and were classified based on Table 18-I-B of the Uniform Building Code. Expansion index test results ranging from 10 to 64 indicate that site soils are generally very low to medium in expansion potential.

Soluble Sulfates/Corrosion

Typical samples of the site materials were analyzed for soluble sulfates, pH, and resistivity. The soluble sulfate and corrosion potential results are shown as follows:

Location and Depth (ft.)	Soluble Sulfates Percentage by Weight	pH	Resistivity (ohms-cm)
TP-5 @ 2-3'	0.0125	8.77	1,050
TP-7 @ 3-4'	0.0240	7.92	2,100

For preliminary planning purposes, based upon the soluble sulfate test results and the latest edition of the Uniform Building Code, the soluble sulfate content is categorized as negligible (0.00-0.10 Water-Soluble Sulfate in Soil, percentage by weight) and sulfate-resistant concrete should not be necessary. Additionally, a modified cement to water ratio and modified concrete compressive strength should not be necessary.

Based on the results of the resistivity and pH testing, the onsite soils are generally neutral (pH of 7.92 to 8.77 is considered slightly alkaline) and are corrosive toward ferrous metals in a saturated state (1,000 to 2,000 ohm-cm is considered corrosive). Based on the laboratory test results, consideration should be given to consulting with a corrosion engineer to provide specific recommendations.

SLOPE STABILITY ANALYSIS

Analyses was performed utilizing the two dimensional slope stability computer program "GSTABL7 v.2." The program calculates the factor of safety for specified circles or searches for the circular, block, or irregular slip surface having the minimum factor of safety using the simplified Bishop Method, Janbu or general limit equilibrium (Spencer). Additional information regrading the methodology utilized in this program are included in Appendix E.

Utilizing data from our current study and the referenced map, a slope stability analysis was performed on the highest existing natural slopes affecting the site based on our bests interpretations of the underlying geology. The presence of adverse geologic structures should be further evaluated during rough grading so that mitigative measures can be provided, if warranted. Sampling of exposed materials to confirm anticipated soil parameters also should be performed during grading.

Geologic cross-sections, computer print-outs of calculations, and shear strength parameters used are provided in Appendix E.

Gross Stability Analysis

Based on the available data, the constraints outlined above, and our stability calculations shown in Appendix E, a calculated factor-of-safety greater than 1.5 or 1.15 has been obtained for the exposed natural slopes when analyzed from a static or pseudo-static (seismic) viewpoint, respectively. This assumes that the slope is designed and constructed

as depicted on the tract map, and in accordance with the GSI Grading Guidelines presented in Appendix F, and provided that the underlying soils exhibit strength parameters equal to or greater than those assumed in our analysis. In addition, we recommend reviewing the final development plans, as they become available, to reevaluate the stability of natural slopes

Surficial Slope Stability

The surficial stability of the existing natural slope has been analyzed utilizing the shear strength parameters in the Appendix. Calculations shown in Appendix E indicate a static surficial safety factor greater than 1.5 for the proposed fill and cut slopes.

PRELIMINARY EARTHWORK FACTORS

Preliminary earthwork factors (shrinkage and bulking) for the subject property have been estimated based upon our field and laboratory testing, visual site observations, and experience in the site area. It is apparent that shrinkage would vary with depth and with areal extent over the site based on previous site use. Variables include vegetation, weed control, discing, and previous filling or exploring. However, all these factors are difficult to define in a three-dimensional fashion.

Therefore, the information presented below represents average shrinkage/bulking values:

Artificial fill	15% to 20% shrinkage
Colluvium	10-15% shrinkage
Alluvium	12-18% shrinkage
Quaternary Pauba Formation	5% bulking

An additional shrinkage factor item would include the removal of root systems of individual large plants or trees. These plants and trees vary in size but, when pulled, they may generally result in a loss of ½ to 1½ cubic yards, to locally greater than 1½ cubic yards of volume, respectively. The above facts indicate that earthwork balance for the site would be difficult to define and flexibility in design is essential to achieve a balanced end product. Subsidence due to equipment loadings (dynamic compaction) may be on the order of up to 0.05 feet, but will depend on haul routes, etc.

CONCLUSIONS AND RECOMMENDATIONS

Based on our field exploration, laboratory testing, and our engineering and geologic analyses, it is our opinion that the project site appears suited for the proposed use from a soils engineering and geologic viewpoint. The recommendations presented below should be incorporated in the design, grading, and construction considerations.

General

1. Because only inactive northwest trending faults were found during fault activity investigations on nearby sites to the northwest; at least one inactive fault was found on the site; and because mainly northwest trending lineaments were observed within the subject site, the potential for active faulting to be encountered at the site is low. The potential for active east west trending faults to be encountered on the site is also low due to the age of the overlying sediments on the upper elevations of the site and because significant east west trending lineaments were not observed on the aerial photographs reviewed.

2. Soils engineering and compaction testing services should be provided during grading operations to assist the contractor in removing unsuitable soils and in his effort to compact the fill.

3. Geologic observations should be performed during grading to verify and/or further evaluate geologic conditions. Although unlikely, if adverse geologic structures are encountered, supplemental recommendations and earthwork may be warranted.

4. In general and based upon the available data to date, groundwater is not expected to be a major factor in development of the site. However, due to the nature of the site materials, seepage may be encountered throughout the site along with seasonal perched water within the drainage areas. In addition, seepage may be encountered in "daylighted" joint systems or sandy lenses within the Pauba Formation. Thus, subdrain systems are recommended within canyon areas, where filled. In addition, subdrainage systems for the control of localized groundwater seepage should be anticipated. Preliminary subdrain locations are provided on Plate 1.

5. Based upon our field explorations bedrock throughout the site should be rippable to the proposed depths.

6. Due to the noncohesive nature of some of the onsite materials, some caving and sloughing may be anticipated to be a factor in subsurface excavations and trenching. Therefore, current local and state/federal safety ordinances for subsurface trenching should be enforced.

7. General Earthwork and Grading Guidelines are provided at the end of this report as Appendix F. Specific recommendations are provided below.

Demolition/Grubbing

1. Any existing surficial/subsurface structures, major vegetation, tree remains, and any miscellaneous debris should be removed from the areas of proposed grading. This includes the dumped debris in the vicinity of test pit No. 2 (TP-2, Plate 1).

2. The project soils engineer should be notified of any previous foundation, irrigation lines, cesspools, septic tanks, leach fields, or other subsurface structures that are uncovered during the recommended removals, so that appropriate remedial recommendations can be provided.

3. Cavities or loose soils (including all previous exploratory test pits) remaining after demolition and site clearance should be cleaned out, observed by the soils engineer, processed, and replaced with fill that has been moisture conditioned to at least optimum moisture content and compacted to at least 90 percent of the laboratory standard, if not removed by proposed cuts.

Treatment of Existing Ground

1. All undocumented artificial fill, colluvium, alluvium, and weathered bedrock should be removed to competent bedrock materials (i.e., greater than or equal to 85 percent saturation, and/or greater than or equal to 105 pcf for in-place native materials) of the Pauba Formation, if not removed by proposed excavation within areas proposed for settlement-sensitive improvements. Thicknesses of colluvium, and younger alluvium are discussed in earlier sections of this report. Variations from the previously discussed remedial removal thicknesses (2± to 3± feet, up to 7.5± in the drainage channels located in the southern portion of the tract) should be anticipated. Actual depths of removals will be evaluated in the field during grading by the soil engineer.

2. Subsequent to the above removals, the upper 12 inches of the exposed subsoils/bedrock should be scarified, brought to at least optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard.

3. Existing slopewash/colluvium, alluvium, etc., may be reused as compacted fill provided that major concentrations of vegetation and miscellaneous debris are removed prior to or during fill placement.

4. Localized deeper removal may be necessary due to buried drainage channel meanders or dry porous materials. The project soils engineer/geologist should observe all removal areas during the grading.

Fill Placement

1. Fill materials should be brought to at least optimum moisture, placed in thin 6- to 8-inch lifts and mechanically compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard.

2. Fill materials should be cleansed of major vegetation and debris prior to placement.

3. Although unlikely, if encountered, any oversized rock materials greater than 12 inches in diameter should be placed under the observation of the soils engineer.

4. Any import materials should be observed and determined suitable by the soils engineer prior to placement on the site. Foundation designs may be altered if import materials have a greater sulfate/expansion values than the onsite materials encountered in this investigation.

Slope Considerations and Slope Design

Any proposed cut and fill slopes constructed using onsite materials, should be grossly and surficially stable provided the recommendations contained herein are implemented during site development.

All slopes should be designed and constructed in accordance with the minimum requirements of the County of Riverside, the recommendations in the General Earthwork and Grading Guidelines section of this report (Appendix F), and the following:

1. Fill slopes should be designed and constructed at a 2:1 (horizontal to vertical) gradient or flatter and should not exceed 50 feet in height. Fill slopes should be properly built and compacted to a minimum relative compaction of 90 percent throughout, including the slope surfaces. Guidelines for slope construction are presented in Appendix F.

2. Cut slopes should be designed at gradients of 2:1 or flatter and should not exceed 15 feet in height. While stabilization of such slopes is not anticipated, locally adverse geologic conditions (i.e., daylighted joints/fractures, severely weathered bedrock, or sandy lenses) may be encountered which may require remedial grading, stabilization, or laying back of the slope to an angle flatter than the adverse geologic condition.

3. Local areas of highly to severely weathered bedrock may be present. Should these materials be exposed in cut slopes, the potential for long term maintenance or possible slope failure exists. Evaluation of cut slopes during grading would be necessary in order to identify any areas of severely weathered rock or non-cohesive sands. Should any of these materials be exposed during construction, the soils engineer/geologist, would assess the magnitude and extent of the materials and their potential affect on long-term maintenance or possible slope failures. Recommendations would then be made at the time of the field inspection.

4. Loose rock debris and fines remaining on the face of the cut slopes should be removed during grading. This can be accomplished by high pressure water washing or by hand scaling, as warranted.

5. Where loose materials are exposed on the cut slopes, the project's engineering geologist would require that the slope be cleaned as described above prior to making their final inspection. Final approval of the cut slope can only be made subsequent to the slope being fully cut and cleaned.

Transition and Overexcavation Areas

In order to reduce the potential for differential settlements between cut and fill materials, materials of differing expansion potentials, or dense bedrock, the entire cut portion of cut/fill transitions should be overexcavated to a minimum depth of 3 feet below finish grade, or a maximum ratio of fill thickness of 3:1 (maximum to minimum), and replaced with compacted fill. In addition building pad located entirely in cut areas, if any should be overexcavated and capped with at least 4 feet of fill.

RECOMMENDATIONS - FOUNDATIONS

General

Recommendations for conventional foundation systems as well as post-tensioned systems are reiterated and/or provided in the following sections. Conventional foundations may be utilized for soils with Expansion Indices (EI) of less than 50 (E.I., very low to low classification). The foundation systems may be used to support the proposed structures, provided they are founded in competent bearing material. The proposed foundation systems should be designed and constructed in accordance with the guidelines contained in the Uniform Building Code, and in accordance with the recommendations of the project structural engineer.

Conventional Foundation Design

1. Conventional spread and continuous footings may be used to support the proposed residential structures provided they are founded entirely in properly compacted fill or other competent bedrock.

2. Analyses indicate that an allowable bearing value of 1,500 pounds per square foot may be used for design of footings which maintain a minimum width of 12 inches (continuous) and 24 inches square (isolated), and a minimum depth of at least 12 inches into the properly compacted fill or bedrock. The bearing value may be increased by one-third for seismic or other temporary loads. This value may be increased by 200 pounds per square foot for each additional 12 inches in depth, to a maximum of 2,500 pounds per square foot. No increase in bearing value for footing width is recommended.

3. For lateral sliding resistance, a 0.35 coefficient of friction may be utilized for a concrete to soil contact when multiplied by the dead load.

4. Passive earth pressure may be computed as an equivalent fluid having a density of 250 pounds per cubic foot with a maximum earth pressure of 2,500 pounds per square foot.

5. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

6. All footings should maintain a minimum 7 foot horizontal distance between the base of the footing and any adjacent descending slope, and minimally comply with the guidelines depicted on Figure No. 18-I-1 of the UBC (1997).

Construction

The following foundation construction recommendations are presented as a minimum criteria from a soils engineering viewpoint. The onsite soils expansion potentials are generally in the very low to low range (Expansion Index 0 to 50). Recommendations by the project's design-structural engineer or architect, which may exceed the soils engineer's recommendations, should take precedence over the following minimum requirements.

Expansion Classification - Very Low to Low (EI 0 to 50)

1. Continuous exterior footings should be founded at minimum depths of 12 , 18, and 24 inches below the lowest adjacent ground surface, for one-, two-, or three-story floor loads, respectively, and in accordance with the minimum requirements of the latest edition of the Uniform Building Code. The project structural engineer should review and approve these recommendations. Continuous interior footings may be founded at a minimum depth of 12 inches below the lowest adjacent ground surface. Footings should be a minimum of 12 inches wide, or as determined by the structural engineer.

2. All footings should have at minimum one No. 4 reinforcing bar placed at the top and one No. 4 reinforcing bar placed at the bottom of the footing. Isolated interior or exterior piers and columns should be founded at a minimum depth of 24 inches below the lowest adjacent ground surface, and in accordance with the structural engineers recommendations.

3. A grade beam, reinforced as above, and at least 12 inches square, should be provided across the garage or any wide entrances. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

4. Concrete slabs in residential and garage areas should be underlain with a vapor barrier consisting of a minimum of 10-mil, polyvinyl-chloride membrane with all laps sealed. This membrane should be underlain by two inches of sand, and be covered with a minimum of two inches of sand to aid in uniform curing of the concrete (four inches of sand total).

5. For pads with very low to low expansion indices (EI 0 to 50), concrete slabs, including garage slabs, should be reinforced with No. 3 reinforcement bars placed on 18-inch centers, in two horizontally perpendicular directions (i.e., long axis and short axis). All slab reinforcement should be supported to ensure proper mid-slab height positioning during placement of the concrete. "Hooking" of reinforcement is not an acceptable method of positioning.

6. Garage slabs should be poured separately from the residence footings and be quartered with expansion joints or saw cuts. A positive separation from the footings should be maintained with expansion joint material to permit relative movement.

7. The residential and garage slabs should have a minimum thickness of 4 inches, and the slab subgrade should be free of loose and uncompacted material prior to placing concrete. The design engineer should determine the actual thickness of concrete slabs based upon proposed loading and use.

8. Presaturation is recommended for these soil conditions. The moisture content of the subgrade soils should be equal to or greater than optimum moisture to a depth of 12 inches below the adjacent ground grade in the slab areas, and verified by this office within 72 hours of the vapor barrier placement.

9. As an alternative, if the structural engineer finds it appropriate, an engineered post-tension foundation system may be used. Engineering parameters for post-tension design are provided in a later section.

10. Soils generated from footing excavations to be used onsite should be compacted to a minimum relative compaction 90 percent of the laboratory standard, whether it is to be placed inside the foundation perimeter or in the yard/right-of-way areas. This material must not alter positive drainage patterns that direct drainage away from the structural areas and toward the street.

11. Design of proposed pools and other appurtenant structures should be reviewed by GSI.

12. Foundations near the top of slope should be deepened to conform to the latest edition of the UBC (1997) and provide a minimum of 7 feet horizontal distance from the slope face. Rigid block wall designs located along the top of slope should be reviewed by a soils engineer.

Expansion Classification - Medium (EI 51 to 90)

1. Exterior footings for one-, two-, and three-story structures should be founded at a minimum depth of 18 or 24 inches below the lowest adjacent ground surface, for one- and two-, or three-story floor loads, respectively, and in accordance with the minimum requirements of the latest edition of the Uniform Building Code. The project structural engineer should review and approve these recommendations.

Interior footings may be founded at a depth of 12 or 18 inches below the lowest adjacent ground surface, for one- and two-, or three-story floor loads, respectively. Footings should have a minimum width of 12 inches, or as determined by the project structural engineer.

2. All footings should be reinforced with a minimum of two No. 4 reinforcing bars at the top and two No. 4 reinforcing bars at the bottom. Isolated interior and/or exterior piers and columns are not recommended.

3. A grade beam, reinforced as above, and at least 12 inches square, should be provided across the garage or wide entrances. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

4. Concrete slabs in residential and garage areas should be underlain by a vapor barrier consisting of a minimum of 10-mil, polyvinyl-chloride membrane with all laps sealed. Two inches of the sand should be placed under, and two inches of the sand should be placed over the membrane (total of four inches) to aid in uniform curing of the concrete.

5. Concrete slabs, including garage areas, should be reinforced with No. 3 reinforcement bars placed on 18-inch centers, in two horizontally perpendicular directions (i.e., long axis and short axis). All slab reinforcement should be supported to ensure proper mid-slab height positioning during placement of the concrete. "Hooking" of reinforcement is not an acceptable method of positioning.

6. Garage slabs should be poured separately from the residence footings and be quartered with expansion joints or saw cuts. A positive separation from the footings should be maintained with expansion joint material to permit relative movement.

7. The residential and garage slabs should have a minimum thickness of 4 inches, and the slab subgrade should be free of loose and uncompacted material prior to placing concrete. The design engineer should determine the actual thickness of concrete slabs based upon proposed loading and use.

8. Presaturation of slab areas is recommended for these soil conditions. The moisture content of each slab area should be at least 120 percent of the optimum and verified by the soil engineer to a depth of 18 inches below adjacent ground grade in the slab areas, within 72 hours of the vapor barrier placement.

9. As an alternative, an engineered post-tension foundation system may be used. Engineering parameters for post-tension design are provided in the following section.

10. Soils generated from footing excavations to be used onsite should be compacted to a minimum relative compaction 90 percent of the laboratory standard, whether it is to be placed inside the foundation perimeter or in the yard/right-of-way areas. This material must not alter positive drainage patterns that direct drainage away from the structural areas and toward the street.

11. In design of any additional concrete, flatwork, pools, or walls, the expansive nature of the soils should be considered. Such designs should be reviewed by GSI.

12. Foundations near the top of slope should be deepened to conform to the latest edition of the UBC (1997) and provide a minimum of 7 feet horizontal distance from the slope face. Rigid block wall designs located along the top of slope should be reviewed by a soils engineer.

POST-TENSIONED SLAB DESIGN

For post-tension designs, the recommendations presented below should be followed in addition to those contained in the previous sections. The information and recommendations presented in this section are not meant to supersede design by a registered structural engineer or civil engineer familiar with post-tensioned slab design or corrosion engineering consultant. Upon request, GSI could provide additional data/consultation regarding soil parameters as related to post-tensioned slab design.

From a soil expansion/shrinkage standpoint, a fairly common contributing factor to distress of structures using post-tensioned slabs is a significant fluctuation in the moisture content of soils underlying the perimeter of the slab, compared to the center, causing a "dishing" or "arching" of the slabs. To mitigate this possible phenomenon, a combination of soil presaturation and construction of a perimeter "cut off" wall grade beam should be employed.

Perimeter foundations should be a minimum of 12 inches deep for very low or low expansive soils and as determined by the post tension designer. The perimeter foundations may be integrated into the slab design or independent of the slab. The cut off walls/grade beam should be a minimum of 12 inches in thickness. In moisture sensitive slab areas, a vapor barrier should be utilized and be of sufficient thickness to provide a durable separation of foundation from soils (10 mils. thick). The vapor barrier should be lapped adequately to provide a continuous water-proof barrier under the entire slab. The vapor barrier may be placed on the slab subgrade with a two (2) inch thick layer of sand (SE>30) place over the barrier to aid in curing of the concrete.

Specific soil presaturation is not required; however, the moisture content of the subgrade soils should be at or above the soils' optimum moisture content to a depth of 24 inches below grade.

Post-tensioned slabs, if utilized, should be designed in accordance with the recommendations of the Post-Tensioning Institute Method. Based on review of laboratory data for the onsite materials, the average soil modulus subgrade reaction K, to be used for design, is 100 pounds per cubic inch. This is equivalent to a surface bearing value of 1,000 pounds per square foot.

Post-Tensioning Institute Method

Post-tensioned slabs should have sufficient stiffness to resist excessive bending due to non-uniform swell and shrinkage of subgrade soils. The differential movement can occur at the corner, edge, or center of slab. The potential for differential uplift can be evaluated using the 1997 Uniform Building Code Section 1816, based on design specifications of the Post-Tensioning Institute. The following table presents suggested minimum coefficients to be used in the Post-Tensioning Institute design method.

Thornthwaite Moisture Index	-20 inches/year
Correction Factor for Irrigation	20 inches/year
Depth to Constant Soil Suction	7 feet
Constant Soil Suction (pf)	3.6
Modulus of Subgrade Reaction (pci)	75
Moisture Velocity	0.7 inches/month

The coefficients are considered minimums and may not be adequate to represent worst case conditions such as adverse drainage and/or improper landscaping and maintenance. The above parameters are applicable provided structures have gutters and downspouts and positive drainage is maintained away from structures. Therefore, it is important that information regarding drainage, site maintenance, settlements, and effects of expansive soils be passed on to future owners.

Based on the above parameters, the following values were obtained from figures or tables of the 1997 Uniform Building Code Section 1816. The values may not be appropriate to account for possible differential settlement of the slab due to other factors. If a stiffer slab is desired, higher values of y_m may be warranted.

EXPANSION INDEX OF SOIL SUBGRADE	VERY LOW EXPANSION (E.I. = 0-20)	LOW EXPANSION (E.I. = 21-50)	MEDIUM EXPANSION (E.I. = 51-90)
e_m center lift	5.0 feet	5.0 feet	5.5 feet
e_m edge lift	2.5 feet	3.5 feet	4.0 feet
y_m center lift	1.0 inch	1.7 inches	2.7 inches
y_m edge lift	0.3 inch	0.75 inch	0.75 inch

Deepened footings/edges around the slab perimeter must be used to minimize non-uniform surface moisture migration (from an outside source) beneath the slab. An edge depth of 12 inches should be considered a minimum. The bottom of the deepened footing/edge should be designed to resist tension, using cable or reinforcement per the structural engineer. Other applicable recommendations presented under conventional foundation and the California Foundation Slab Method should be adhered to during the design and construction phase of the project.

Foundation Settlements

In addition to designing slab systems (PT or other) for the soil conditions described herein, the estimated settlement and angular distortion values that an individual structure could be subjected to should be evaluated by a structural engineer. The levels of angular distortion (1/480) were evaluated on a 40-foot length assumed as minimum dimension of buildings; if, from a structural standpoint, a decreased or increased length over which the differential is assumed to occur is justified, this change should be incorporated into the design. The structures should be evaluated and designed for the combination of the soil parameters presented above, and the estimated total settlement, differential settlement and angular distortions provided herein. The footings and/or slabs should be designed to accommodate a total settlement of 1.5 inches and a differential settlement of 1 inch (i.e., at least 1 inch in a 40-foot span).

PRELIMINARY PAVEMENT THICKNESS DESIGN

The pavement design is presented for street areas on the subject site. Based on an assumed "R"-Value of 30 and assumed traffic indices, the following pavement sections are recommended:

Assumed Traffic Index	Subgrade "R"-Value	Required Gravel Equivalent Thickness (ft.)	AC/AB (Inches)
5.0	30	1.200	4/6
6.0	30	1.440	4/8
7.0	30	1.680	6/10

All pavement installation, including preparation and compaction of subgrade, compaction of base material, and placement and rolling of asphaltic concrete should be done in accordance with the governing agencies specifications, and under the observation and testing of the project geotechnical engineer and/or the governing agencies. Minimum compaction requirements should be 90 percent for subgrade and 95 percent for aggregate base as per ASTM D-1557-00 (modified proctor). The final design shall be based on "R"-Values tested during grading.

WALL DESIGN PARAMETERS

Conventional Retaining Walls

The design parameters provided below assume that either non expansive soils (typically Class 2 permeable filter material or Class 3 aggregate base) or native onsite materials (up to and including an Expansion Index [E.I.] of 65) are used to backfill any retaining walls. The type of backfill (i.e., select or native), should be specified by the wall designer, and clearly shown on the plans. Building walls, below grade, should be water-proofed or damp-proofed, depending on the degree of moisture protection desired. The foundation system for the proposed retaining walls should be designed in accordance with the recommendations presented in this and preceding sections of this report, as appropriate. Footings should be embedded a minimum of 18 inches below adjacent grade (excluding landscape layer, 6 inches) and should be 24 inches in width. There should be no increase in bearing for footing width. Recommendations for specialty walls (i.e., crib, earthstone, geogrid, etc.) can be provided upon request, and would be based on site specific conditions.

Restrained Walls

Any retaining walls that will be restrained prior to placing and compacting backfill material or that have re-entrant or male corners, should be designed for an at-rest equivalent fluid pressure (EFP) of 65 pounds per cubic foot (pcf), plus any applicable surcharge loading. For areas of male or re-entrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall (2H) laterally from the corner.

Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to 10 feet high. Design parameters for walls less than 3 feet in height may be superceded by City and/or County standard design. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions due to traffic, structures, seismic events or adverse geologic conditions. When wall configurations are finalized, the appropriate loading conditions for superimposed loads can be provided upon request.

SURFACE SLOPE OF RETAINED MATERIAL (HORIZONTAL:VERTICAL)	EQUIVALENT FLUID WEIGHT P.C.F. (SELECT BACKFILL)	EQUIVALENT FLUID WEIGHT P.C.F. (NATIVE BACKFILL)
Level*	35	45
2 to 1	50	60
* Level backfill behind a retaining wall is defined as compacted earth materials, properly drained, without a slope for a distance of 2H behind the wall.		

Retaining Wall Backfill and Drainage

Positive drainage must be provided behind all retaining walls in the form of gravel wrapped in geofabric and outlets. A backdrain system is considered necessary for retaining walls that are 2 feet or greater in height. Details 1, 2, and 3, present the back drainage options discussed below. Backdrains should consist of a 4-inch diameter perforated PVC or ABS pipe encased in either Class 2 permeable filter material or ¾-inch to 1½-inch gravel wrapped in approved filter fabric (Mirafi 140 or equivalent). For low expansive backfill, the filter material should extend a minimum of 1 horizontal foot behind the base of the walls and upward at least 1 foot. For native backfill that has up to medium expansion potential, continuous Class 2 permeable drain materials should be used behind the wall. This material should be continuous (i.e., full height) behind the wall, and it should be constructed in accordance with the enclosed Detail 1 (Typical Retaining Wall Backfill and Drainage Detail). For limited access and confined areas, (panel) drainage behind the wall may be constructed in accordance with Detail 2 (Retaining Wall Backfill and Subdrain Detail Geotextile Drain). Materials with an E.I. potential of greater than 65 should not be used as backfill for retaining walls. For more onerous expansive situations, backfill and drainage behind the retaining wall should conform with Detail 3 (Retaining Wall And Subdrain Detail Clean Sand Backfill).

DETAILS

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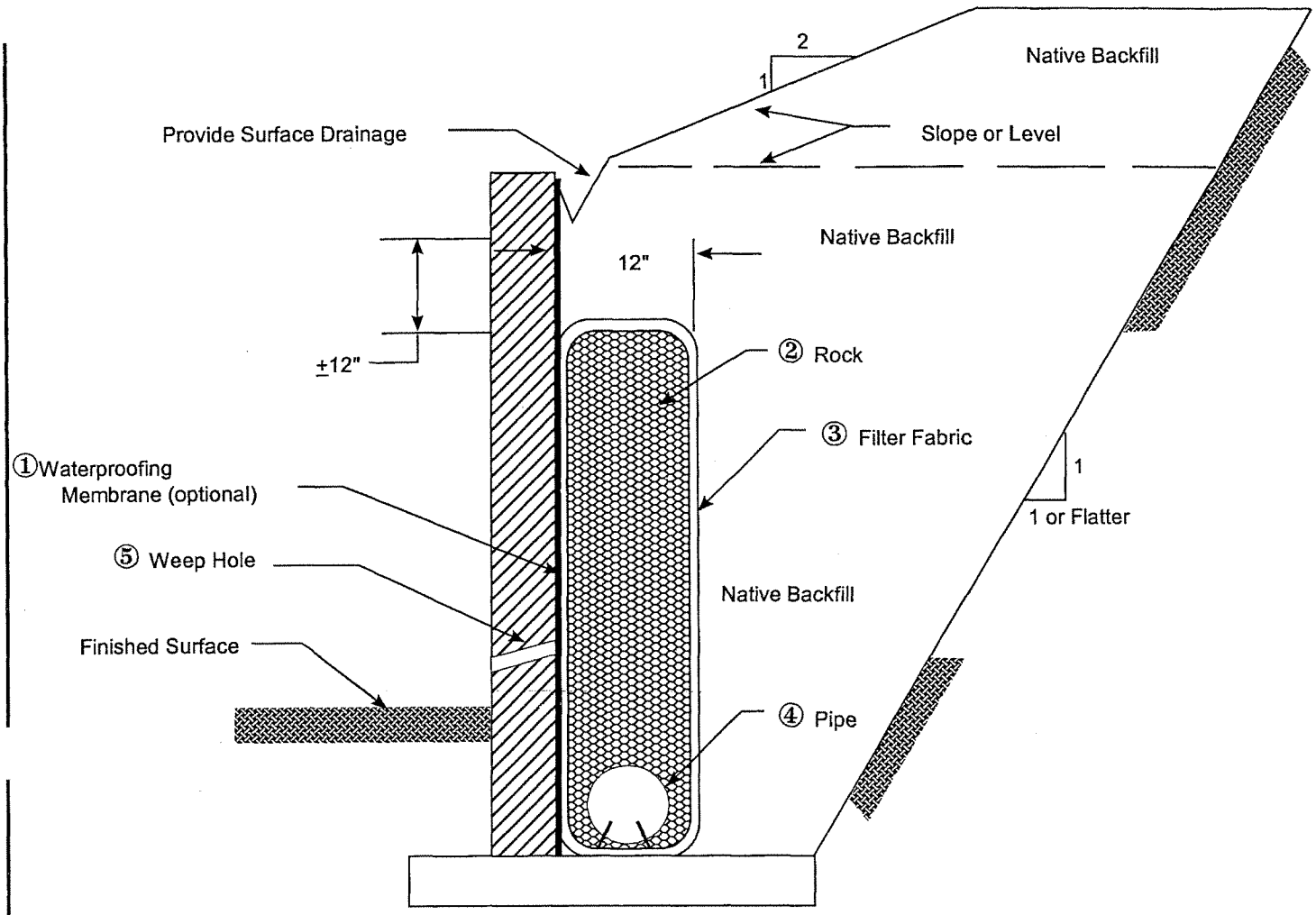

① WATERPROOFING MEMBRANE (optional):
Liquid boot or approved equivalent.

② ROCK:
3/4 to 1-1/2" (inches) rock.

③ FILTER FABRIC:
Mirafi 140N or approved equivalent; place fabric flap behind core.

④ PIPE:
4" (inches) diameter perforated PVC. schedule 40 or approved alternative with minimum of 1% gradient to proper outlet point (Perforations down).

⑤ WEEP HOLE:
Minimum 2" (inches) diameter placed at 20' (feet) on centers along the wall, and 3" (inches) above finished surface (No weep holes for basement walls.).

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TYPICAL RETAINING WALL BACKFILL AND DRAINAGE DETAIL

DETAIL 1

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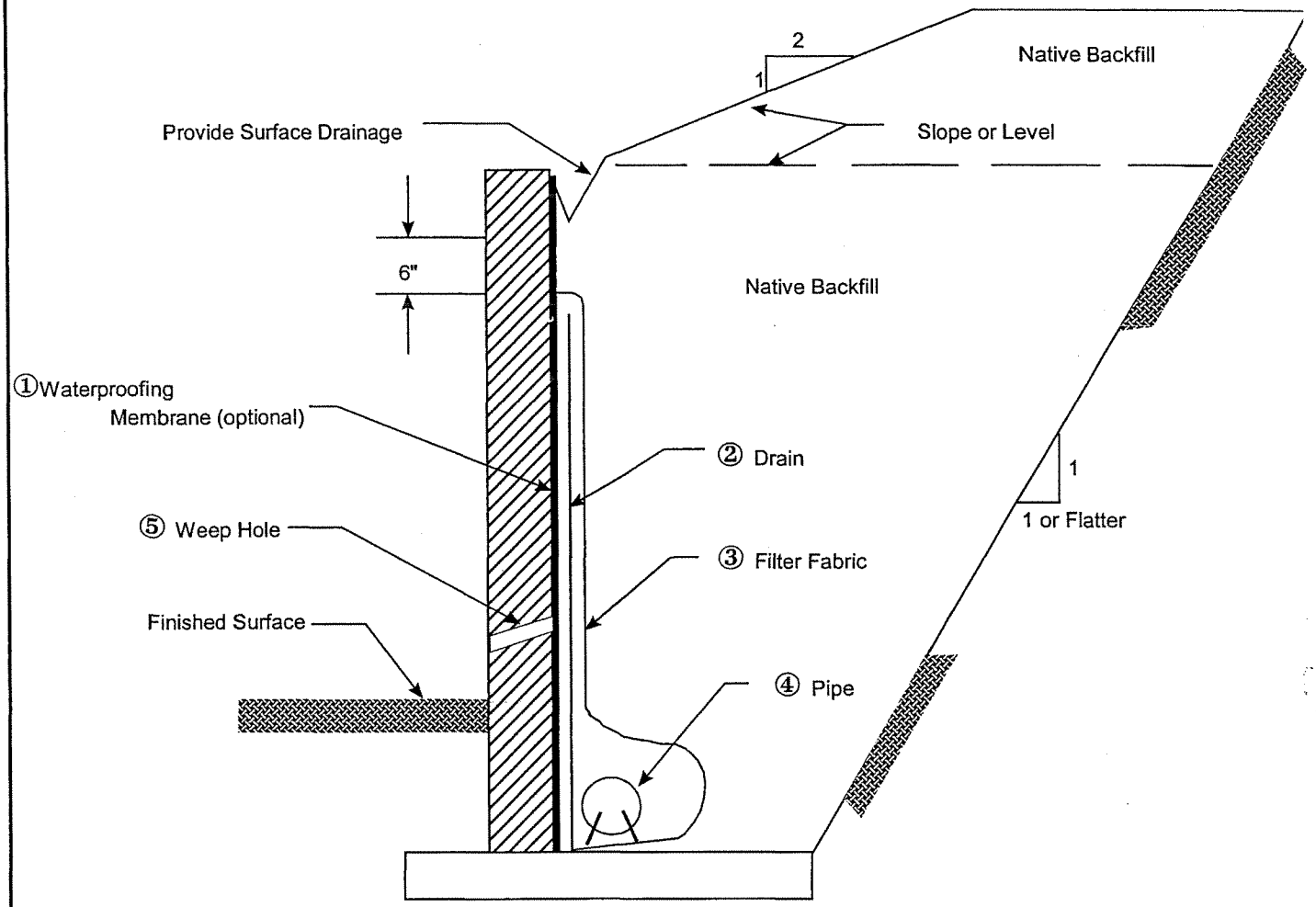

① WATERPROOFING MEMBRANE (optional):
Liquid boot or approved equivalent.

② DRAIN:
Miradrain 6000 or J-drain 200 or equivalent for non-waterproofed walls.
Miradrain 6200 or J-drain 200 or equivalent for waterproofed walls (All Perforations down).

③ FILTER FABRIC:
Mirafi 140N or approved equivalent; place fabric flap behind core.

④ PIPE:
4" (inches) diameter perforated PVC. schedule 40 or approved alternative with minimum of 1% gradient to proper outlet point.

⑤ WEEP HOLE:
Minimum 2" (inches) diameter placed at 20' (feet) on centers along the wall, and 3" (inches) above finished surface. (No weep holes for basement walls.)

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RETAINING WALL BACKFILL AND SUBDRAIN DETAIL GEOTEXTILE DRAIN

DETAIL 2

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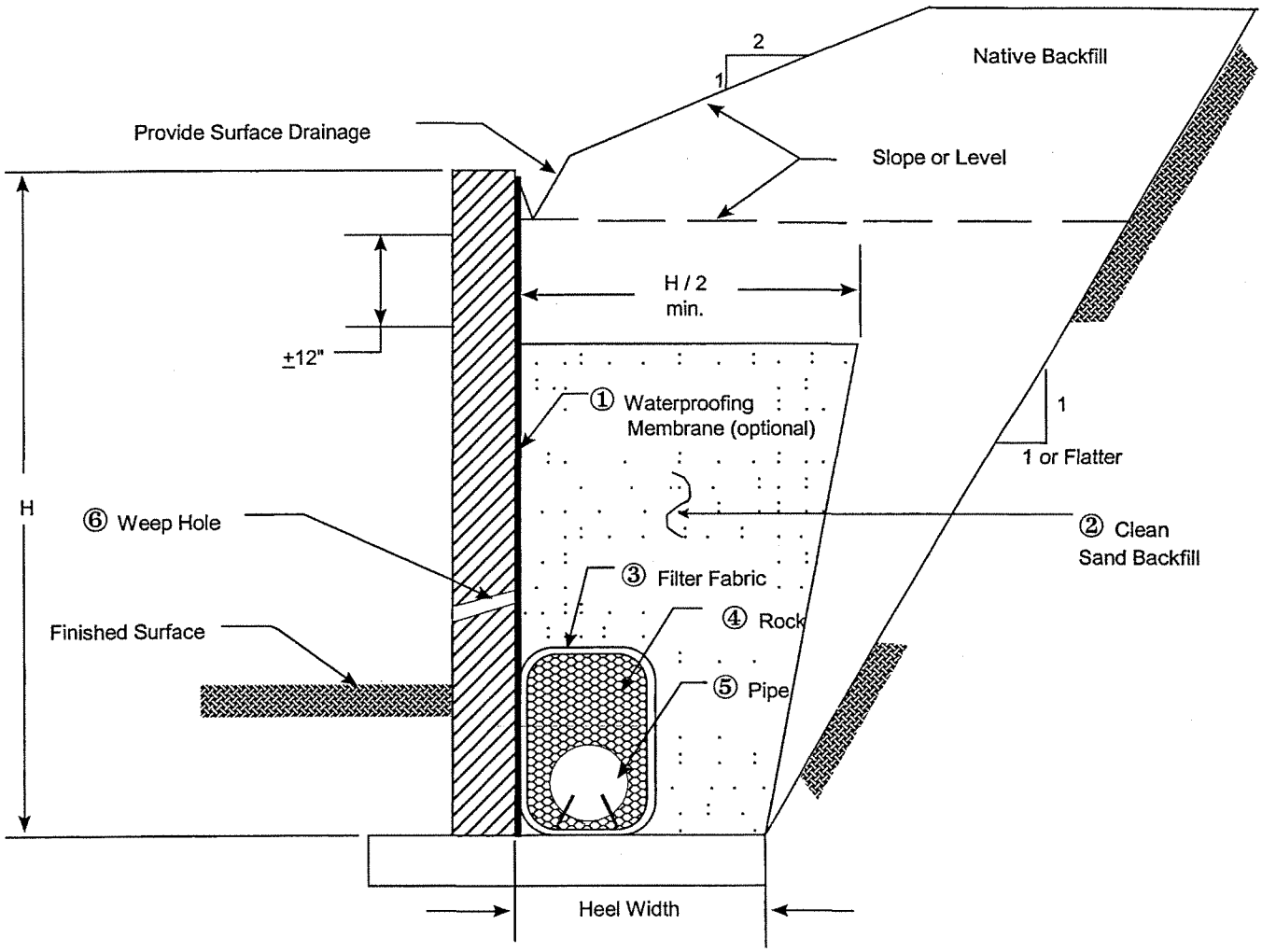

① WATERPROOFING MEMBRANE (optional):
Liquid boot or approved equivalent.

② CLEAN SAND BACKFILL:
Must have sand equivalent value of 30 or greater; can be densified by water jetting.

③ FILTER FABRIC:
Mirafi 140N or approved equivalent.

④ ROCK:
1 cubic foot per linear feet of pipe or 3/4 to 1-1/2" (inches) rock.

⑤ PIPE:
4" (inches) diameter perforated PVC. schedule 40 or approved alternative with minimum of 1% gradient to proper outlet point (Perforations down).

⑥ WEEP HOLE:
Minimum 2" (inches) diameter placed at 20' (feet) on centers along the wall, and 3" (inches) above finished surface. (No weep holes for basement walls.)

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RETAINING WALL AND SUBDRAIN DETAIL CLEAN SAND BACKFILL

DETAIL 3

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Outlets should consist of a 4-inch diameter solid PVC or ABS pipe spaced no greater than ±100 feet apart, with a minimum of two outlets, one on each end. The use of weep holes, only, in walls higher than 2 feet, is not recommended. The surface of the backfill should be sealed by pavement or the top 18 inches compacted with native soil (E.I. ≤90). Proper surface drainage should also be provided. For additional mitigation, consideration should be given to applying a water-proof membrane to the back of all retaining structures. The use of a waterstop should be considered for all concrete and masonry joints.

Wall/Retaining Wall Footing Transitions

Site walls are anticipated to be founded on footings designed in accordance with the recommendations in this report. Should wall footings transition from cut to fill, the civil designer may specify either:

a) A minimum of a 2-foot overexcavation and recompaction of cut materials for a distance of 2H, from the point of transition.

b) Increase of the amount of reinforcing steel and wall detailing (i.e., expansion joints or crack control joints) such that a angular distortion of 1/360 for a distance of 2H on either side of the transition may be accommodated. Expansion joints should be placed no greater than 20 feet on-center, in accordance with the structural engineer's/wall designer's recommendations, regardless of whether or not transition conditions exist. Expansion joints should be sealed with a flexible, non-shrink grout.

c) Embed the footings entirely into native formational material (i.e., deepened footings).

If transitions from cut to fill transect the wall footing alignment at an angle of less than 45 degrees (plan view), then the designer should follow recommendation "a" (above) and until such transition is between 45 and 90 degrees to the wall alignment.

TOP-OF-SLOPE WALLS/FENCES/IMPROVEMENTS

Slope Creep

Soils at the site may be expansive and therefore, may become desiccated when allowed to dry. Such soils are susceptible to surficial slope creep, especially with seasonal changes in moisture content. Typically in southern California, during the hot and dry summer period, these soils become desiccated and shrink, thereby developing surface cracks. The extent and depth of these shrinkage cracks depend on many factors such as the nature and expansivity of the soils, temperature and humidity, and extraction of moisture from surface soils by plants and roots. When seasonal rains occur, water percolates into the cracks and fissures, causing slope surfaces to expand, with a corresponding loss in soil density and shear strength near the slope surface. With the passage of time and several moisture cycles, the outer 3 to 5 feet of slope materials experience a very slow, but progressive,

outward and downward movement, known as slope creep. For slope heights greater than 10 feet, this creep related soil movement will typically impact all rear yard flatwork and other secondary improvements that are located within about 15 feet from the top of slopes, such as swimming pools, concrete flatwork, etc., and in particular top of slope fences/walls. This influence is normally in the form of detrimental settlement, and tilting of the proposed improvements. The dessication/swelling and creep discussed above continues over the life of the improvements, and generally becomes progressively worse. Accordingly, the developer should provide this information to any homeowners and homeowners association.

Top of Slope Walls/Fences

Due to the potential for slope creep for slopes higher than about 10 feet, some settlement and tilting of the walls/fence with the corresponding distresses, should be expected. To mitigate the tilting of top of slope walls/fences, we recommend that the walls/fences be constructed on deepened foundations without any consideration for creep forces, where the expansion index of the materials comprising the outer 15 feet of the slope is less than 50, or a combination of grade beam and caisson foundations, for expansion indices greater than 50 comprising the slope, with creep forces taken into account. The grade beam should be at a minimum of 12 inches by 12 inches in cross section, supported by drilled caissons, 12 inches minimum in diameter, placed at a maximum spacing of 6 feet on center, and with a minimum embedment length of 7 feet below the bottom of the grade beam. The strength of the concrete and grout should be evaluated by the structural engineer of record. The proper ASTM tests for the concrete and mortar should be provided along with the slump quantities. The concrete used should be appropriate to mitigate sulfate corrosion, as warranted. The design of the grade beam and caissons should be in accordance with the recommendations of the project structural engineer, and include the utilization of the following geotechnical parameters:

Creep Zone: 5-foot vertical zone below the slope face and projected upward parallel to the slope face.

Creep Load: The creep load projected on the area of the grade beam should be taken as an equivalent fluid approach, having a density of 60 pcf. For the caisson, it should be taken as a uniform 900 pounds per linear foot of caisson's depth, located above the creep zone.

Point of Fixity: Located a distance of 1.5 times the caisson's diameter, below the creep zone.

Passive Resistance: Passive earth pressure of 300 psf per foot of depth per foot of caisson diameter, to a maximum value of 4,500 psf may be used to determine caisson depth and spacing, provided that they meet or exceed the minimum requirements stated above. To determine the total lateral resistance, the contribution of the creep prone zone above the point of fixity, to passive resistance, should be disregarded.

Allowable Axial Capacity:

Shaft capacity: 350 psf applied below the point of fixity over the surface area of the shaft.

Tip capacity: 4,500 psf.

DRIVEWAY, FLATWORK, AND OTHER IMPROVEMENTS

The soil materials on site may be expansive. The effects of expansive soils are cumulative, and typically occur over the lifetime of any improvements. On relatively level areas, when the soils are allowed to dry, the dessication and swelling process tends to cause heaving and distress to flatwork and other improvements. The resulting potential for distress to improvements may be reduced, but not totally eliminated. To that end, it is recommended that the developer should notify any homeowners or homeowners association of this long-term potential for distress. To reduce the likelihood of distress, the following recommendations are presented for all exterior flatwork:

1. The subgrade area for concrete slabs should be compacted to achieve a minimum 90 percent relative compaction, and then be presoaked to 2 to 3 percentage points above (or 125 percent of) the soils' optimum moisture content, to a depth of 18 inches below subgrade elevation. If very low expansive soils are present, only optimum moisture content, or greater, is required and specific presoaking is not warranted. The moisture content of the subgrade should be proof tested within 72 hours prior to pouring concrete.

2. Concrete slabs should be cast over a non-yielding surface, consisting of a 4-inch layer of crushed rock, gravel, or clean sand, that should be compacted and level prior to pouring concrete. If very low expansive soils are present, the rock or gravel or sand may be deleted. The layer or subgrade should be wet-down completely prior to pouring concrete, to minimize loss of concrete moisture to the surrounding earth materials.

3. Exterior slabs should be a minimum of 4 inches thick. Driveway slabs and approaches should additionally have a thickened edge (12 inches) adjacent to all landscape areas, to help impede infiltration of landscape water under the slab.

4. The use of transverse and longitudinal control joints are recommended to help control slab cracking due to concrete shrinkage or expansion. Two ways to mitigate such cracking are: a) add a sufficient amount of reinforcing steel, increasing tensile strength of the slab; and, b) provide an adequate amount of control and/or expansion joints to accommodate anticipated concrete shrinkage and expansion.

   In order to reduce the potential for unsightly cracks, slabs should be reinforced at mid-height with a minimum of No. 3 bars placed at 18 inches on center, in each direction. If subgrade soils within the top 7 feet from finish grade are very low expansive soils (i.e., E.I. ≤20), then 6x6-W1.4xW1.4 welded-wire mesh may be substituted for the rebar, provided the reinforcement is placed on chairs, at slab mid-height. The exterior slabs should be scored or saw cut, ½ to ⅜ inches deep, often enough so that no section is greater than 10 feet by 10 feet. For sidewalks or narrow slabs, control joints should be provided at intervals of every 6 feet. The slabs should be separated from the foundations and sidewalks with expansion joint filler material.

5. No traffic should be allowed upon the newly poured concrete slabs until they have been properly cured to within 75 percent of design strength. Concrete compression strength should be a minimum of 2,500 psi.

6. Driveways, sidewalks, and patio slabs adjacent to the house should be separated from the house with thick expansion joint filler material. In areas directly adjacent to a continuous source of moisture (i.e., irrigation, planters, etc.), all joints should be additionally sealed with flexible mastic.

7. Planters and walls should not be tied to the house.

8. Overhang structures should be supported on the slabs, or structurally designed with continuous footings tied in at least two directions. If very low expansion soils are present, footings need only be tied in one direction.

9. Any masonry landscape walls that are to be constructed throughout the property should be grouted and articulated in segments no more than 20 feet long. These segments should be keyed or doweled together.

10. Utilities should be enclosed within a closed utilidor (vault) or designed with flexible connections to accommodate differential settlement and expansive soil conditions.

11. Positive site drainage should be maintained at all times. Finish grade on the lots should provide a minimum of 1 to 2 percent fall to the street, as indicated herein. It should be kept in mind that drainage reversals could occur, including post-construction settlement, if relatively flat yard drainage gradients are not periodically maintained by the homeowner or homeowners association.

12. Air conditioning (A/C) units should be supported by slabs that are incorporated into the building foundation or constructed on a rigid slab with flexible couplings for plumbing and electrical lines. A/C waste water lines should be drained to a suitable non-erosive outlet.

13. Shrinkage cracks could become excessive if proper finishing and curing practices are not followed. Finishing and curing practices should be performed per the Portland Cement Association Guidelines. Mix design should incorporate rate of curing for climate and time of year, sulfate content of soils, corrosion potential of soils, and fertilizers used on site.

DEVELOPMENT CRITERIA

Slope Deformation

Compacted fill slopes designed using customary factors of safety for gross or surficial stability and constructed in general accordance with the design specifications should be expected to undergo some differential vertical heave or settlement in combination with differential lateral movement in the out-of-slope direction, after grading. This post-construction movement occurs in two forms: slope creep, and lateral fill extension (LFE). Slope creep is caused by alternate wetting and drying of the fill soils which results in slow downslope movement. This type of movement is expected to occur throughout the life of the slope, and is anticipated to potentially affect improvements or structures (e.g., separations and/or cracking), placed near the top-of-slope, up to a maximum distance of approximately 15 feet from the top-of-slope, depending on the slope height. This movement generally results in rotation and differential settlement of improvements located within the creep zone. LFE occurs due to deep wetting from irrigation and rainfall on slopes comprised of expansive materials. Although some movement should be expected, long-term movement from this source may be minimized, but not eliminated, by placing the fill throughout the slope region, wet of the fill's optimum moisture content.

It is generally not practical to attempt to eliminate the effects of either slope creep or LFE. Suitable mitigative measures to reduce the potential of lateral deformation typically include: setback of improvements from the slope faces (per the 1997 UBC and/or adopted California Building Code), positive structural separations (i.e., joints) between improvements, and stiffening and deepening of foundations. Expansion joints in walls should be placed no greater than 20 feet on-center, and in accordance with the structural engineer's recommendations. All of these measures are recommended for design of structures and improvements. The ramifications of the above conditions, and recommendations for mitigation, should be provided to each homeowner and/or any homeowners association.

Slope Maintenance and Planting

Water has been shown to weaken the inherent strength of all earth materials. Slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Over-watering should be avoided as it adversely affects site improvements, and causes perched groundwater conditions. Graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover soon after construction. Compaction to the face of fill slopes would tend to minimize short-term erosion until vegetation is established. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers may aid in allowing the establishment of a sparse plant cover. Utilizing plants other than those recommended above will increase the potential for perched water, staining, mold, etc., to develop. A rodent control program to prevent burrowing should be implemented. Irrigation of natural (ungraded) slope areas is generally not recommended. These recommendations regarding plant type, irrigation practices, and rodent control should be provided to each homeowner. Over-steepening of slopes should be avoided during building construction activities and landscaping.

Drainage

Adequate lot surface drainage is a very important factor in reducing the likelihood of adverse performance of foundations, hardscape, and slopes. Surface drainage should be sufficient to prevent ponding of water anywhere on a lot, and especially near structures and tops of slopes. Lot surface drainage should be carefully taken into consideration during fine grading, landscaping, and building construction. Therefore, care should be taken that future landscaping or construction activities do not create adverse drainage conditions. Positive site drainage within lots and common areas should be provided and maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond and/or seep into the ground. In general, the area within 5 feet around a structure should slope away from the structure. We recommend that unpaved lawn and landscape areas have a minimum gradient of 1 percent sloping away from structures, and whenever possible, should be above adjacent paved areas. Consideration should be given to avoiding construction of planters adjacent to structures (buildings, pools, spas, etc.). Pad drainage should be directed toward the street or other approved area(s). Although not a geotechnical requirement, roof gutters, downspouts, or other appropriate, means may be utilized to control roof drainage. Downspouts, or drainage devices, should outlet a minimum of 5 feet from structures or into a subsurface drainage system. Areas of seepage may develop due to irrigation or heavy rainfall, and should be anticipated. Minimizing irrigation will lessen this potential. If areas of seepage develop, recommendations for minimizing this effect could be provided upon request.

Toe of Slope Drains/Toe Drains

Where significant slopes intersect pad areas, surface drainage down the slope allows for some seepage into the subsurface materials, sometimes creating conditions causing or contributing to perched and/or ponded water. Toe of slope/toe drains may be beneficial in the mitigation of this condition due to surface drainage. The general criteria to be utilized by the design engineer for evaluating the need for this type of drain is as follows:

- Is there a source of irrigation above or on the slope that could contribute to saturation of soil at the base of the slope?

- Are the slopes hard rock and/or impermeable, or relatively permeable, or; do the slopes already have or are they proposed to have subdrains (i.e., stabilization fills, etc.)?

- Are there cut-fill transitions (i.e., fill over bedrock), within the slope?

- Was the lot at the base of the slope overexcavated or is it proposed to be overexcavated? Overexcavated lots located at the base of a slope could accumulate subsurface water along the base of the fill cap.

- Are the slopes north facing? North facing slopes tend to receive less sunlight (less evaporation) relative to south facing slopes and are more exposed to the currently prevailing seasonal storm tracks.

- What is the slope height? It has been our experience that slopes with heights in excess of approximately 10 feet tend to have more problems due to storm runoff and irrigation than slopes of a lesser height.

- Do the slopes "toe out" into a residential lot or a lot where perched or ponded water may adversely impact its proposed use?

Based on these general criteria, the construction of toe drains may be considered by the design engineer along the toe of slopes, or at retaining walls in slopes, descending to the rear of such lots. Following are Detail 4 (Schematic Toe Drain Detail) and Detail 5 (Subdrain Along Retaining Wall Detail). Other drains may be warranted due to unforeseen conditions, homeowner irrigation, or other circumstances. Where drains are constructed during grading, including subdrains, the locations/elevations of such drains should be surveyed, and recorded on the final as-built grading plans by the design engineer. It is recommended that the above be disclosed to all interested parties, including homeowners and any homeowners association.

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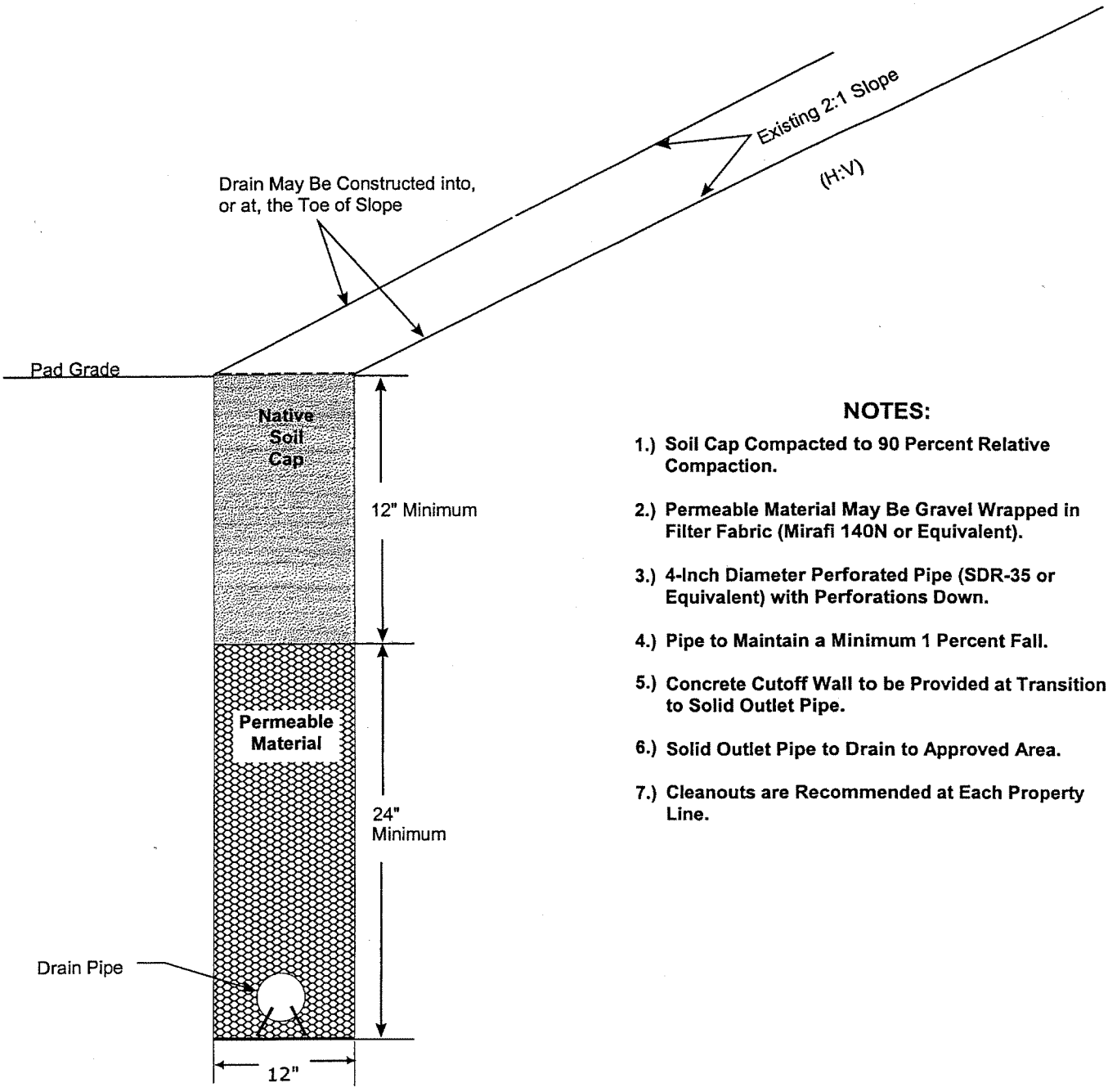
SCHEMATIC TOE DRAIN DETAIL



NOTES:

1.) **Soil Cap Compacted to 90 Percent Relative Compaction.**

2.) **Permeable Material May Be Gravel Wrapped in Filter Fabric (Mirafi 140N or Equivalent).**

3.) **4-Inch Diameter Perforated Pipe (SDR-35 or Equivalent) with Perforations Down.**

4.) **Pipe to Maintain a Minimum 1 Percent Fall.**

5.) **Concrete Cutoff Wall to be Provided at Transition to Solid Outlet Pipe.**

6.) **Solid Outlet Pipe to Drain to Approved Area.**

7.) **Cleanouts are Recommended at Each Property Line.**

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SCHEMATIC TOE DRAIN DETAIL

DETAIL 4

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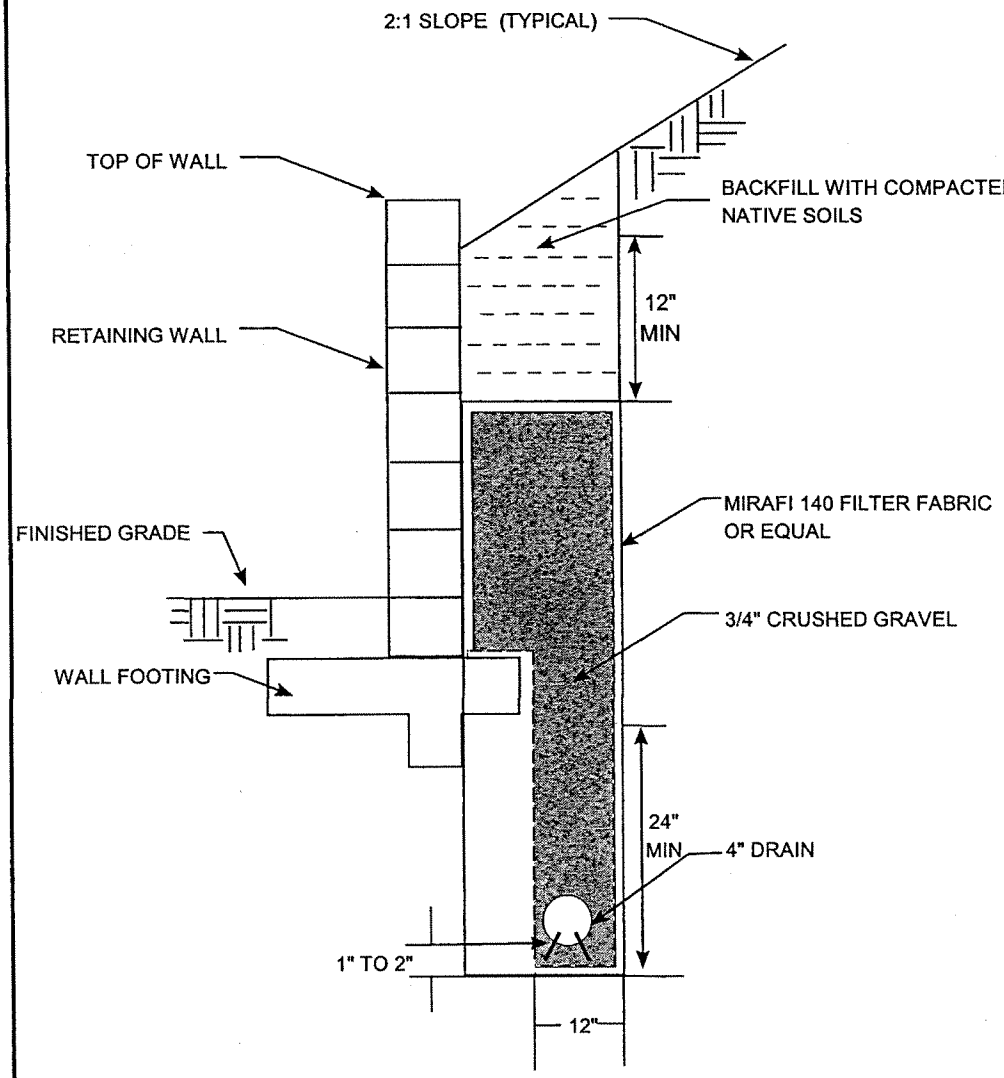

NOTES:

1.) **Soil Cap Compacted to 90 Percent Relative Compaction.**

2.) **Permeable Material May Be Gravel Wrapped in Filter Fabric (Mirafi 140N or Equivalent).**

3.) **4-Inch Diameter Perforated Pipe (SDR-35 or Equivalent) with Perforations Down.**

4.) **Pipe to Maintain a Minimum 1 Percent Fall.**

5.) **Concrete Cutoff Wall to be Provided at Transition to Solid Outlet Pipe.**

6.) **Solid Outlet Pipe to Drain to Approved Area.**

7.) **Cleanouts are Recommended at Each Property Line.**

8.) **Compacted Effort Should Be Applied to Drain Rock.**

SUBDRAIN ALONG RETAINING WALL DETAIL
NOT TO SCALE

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SUBDRAIN ALONG RETAINING WALL DETAIL

DETAIL 5

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Erosion Control

Cut and fill slopes will be subject to surficial erosion during and after grading. Onsite earth materials have a moderate to high erosion potential. Consideration should be given to providing hay bales and silt fences for the temporary control of surface water, from a geotechnical viewpoint.

Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Over-watering the landscape areas will adversely affect proposed site improvements. We would recommend that any proposed open-bottom planters adjacent to proposed structures be eliminated for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized. An outlet placed in the bottom of the planter, could be installed to direct drainage away from structures or any exterior concrete flatwork. If planters are constructed adjacent to structures, the sides and bottom of the planter should be provided with a moisture barrier to prevent penetration of irrigation water into the subgrade. Provisions should be made to drain the excess irrigation water from the planters without saturating the subgrade below or adjacent to the planters. Graded slope areas should be planted with drought resistant vegetation. Consideration should be given to the type of vegetation chosen and their potential effect upon surface improvements (i.e., some trees will have an effect on concrete flatwork with their extensive root systems). From a geotechnical standpoint leaching is not recommended for establishing landscaping. If the surface soils are processed for the purpose of adding amendments, they should be recompacted to 90 percent minimum relative compaction.

Gutters and Downspouts

As previously discussed in the drainage section, the installation of gutters and downspouts should be considered to collect roof water that may otherwise infiltrate the soils adjacent to the structures. If utilized, the downspouts should be drained into PVC collector pipes or other non-erosive devices (e.g., paved swales or ditches; below grade, solid tight-lined PVC pipes; etc.), that will carry the water away from the house, to an appropriate outlet, in accordance with the recommendations of the design civil engineer. Downspouts and gutters are not a requirement; however, from a geotechnical viewpoint, provided that positive drainage is incorporated into project design (as discussed previously).

Subsurface and Surface Water

Subsurface and surface water are not anticipated to affect site development, provided that the recommendations contained in this report are incorporated into final design and construction and that prudent surface and subsurface drainage practices are incorporated into the construction plans. Perched groundwater conditions along zones of contrasting permeabilities may not be precluded from occurring in the future due to site irrigation, poor drainage conditions, or damaged utilities, and should be anticipated. Should perched

groundwater conditions develop, this office could assess the affected area(s) and provide the appropriate recommendations to mitigate the observed groundwater conditions. Groundwater conditions may change with the introduction of irrigation, rainfall, or other factors.

Site Improvements

If in the future, any additional improvements (e.g., pools, spas, etc.) are planned for the site, recommendations concerning the geological or geotechnical aspects of design and construction of said improvements could be provided upon request. Pools and/or spas should not be constructed without specific design and construction recommendations from GSI, and this construction recommendation should be provided to the homeowners, any homeowners association, and/or other interested parties. This office should be notified in advance of any fill placement, grading of the site, or trench backfilling after rough grading has been completed. This includes any grading, utility trench and retaining wall backfills, flatwork, etc.

Tile Flooring

Tile flooring can crack, reflecting cracks in the concrete slab below the tile, although small cracks in a conventional slab may not be significant. Therefore, the designer should consider additional steel reinforcement for concrete slabs-on-grade where tile will be placed. The tile installer should consider installation methods that reduce possible cracking of the tile such as slipsheets. Slipsheets or a vinyl crack isolation membrane (approved by the Tile Council of America/Ceramic Tile Institute) are recommended between tile and concrete slabs on grade.

Additional Grading

This office should be notified in advance of any fill placement, supplemental regrading of the site, or trench backfilling after rough grading has been completed. This includes completion of grading in the street, driveway approaches, driveways, parking areas, and utility trench and retaining wall backfills.

Footing Trench Excavation

All footing excavations should be observed by a representative of this firm subsequent to trenching and prior to concrete form and reinforcement placement. The purpose of the observations is to evaluate that the excavations have been made into the recommended bearing material and to the minimum widths and depths recommended for construction. If loose or compressible materials are exposed within the footing excavation, a deeper footing or removal and recompaction of the subgrade materials would be recommended at that time. Footing trench spoil and any excess soils generated from utility trench excavations should be compacted to a minimum relative compaction of 90 percent, if not removed from the site.

Trenching/Temporary Construction Backcuts

Considering the nature of the onsite earth materials, it should be anticipated that caving or sloughing could be a factor in subsurface excavations and trenching. Shoring or excavating the trench walls/backcuts at the angle of repose (typically 25 to 45 degrees [except as specifically superceded within the text of this report]), should be anticipated. All excavations should be observed by an engineering geologist or soil engineer from GSI, prior to workers entering the excavation or trench, and minimally conform to CAL-OSHA, state, and local safety codes. Should adverse conditions exist, appropriate recommendations would be offered at that time. The above recommendations should be provided to any contractors and/or subcontractors, or homeowners, etc., that may perform such work.

Utility Trench Backfill

1. All interior utility trench backfill should be brought to at least 2 percent above optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. As an alternative for shallow (12-inch to 18-inch) under-slab trenches, sand having a sand equivalent value of 30 or greater may be utilized and jetted or flooded into place. Observation, probing and testing should be provided to evaluate the desired results.

2. Exterior trenches adjacent to, and within areas extending below a 1:1 plane projected from the outside bottom edge of the footing, and all trenches beneath hardscape features and in slopes, should be compacted to at least 90 percent of the laboratory standard. Sand backfill, unless excavated from the trench, should not be used in these backfill areas. Compaction testing and observations, along with probing, should be accomplished to evaluate the desired results.

3. All trench excavations should conform to CAL-OSHA, state, and local safety codes.

4. Utilities crossing grade beams, perimeter beams, or footings should either pass below the footing or grade beam utilizing a hardened collar or foam spacer, or pass through the footing or grade beam in accordance with the recommendations of the structural engineer.

SUMMARY OF RECOMMENDATIONS REGARDING GEOTECHNICAL OBSERVATION AND TESTING

We recommend that observation and/or testing be performed by GSI at each of the following construction stages:

- During grading/recertification.

- During excavation.
- During placement of subdrains, toe drains, or other subdrainage devices, prior to placing fill and/or backfill.
- After excavation of building footings, retaining wall footings, and free standing walls footings, prior to the placement of reinforcing steel or concrete.
- Prior to pouring any slabs or flatwork, after presoaking/presaturation of building pads and other flatwork subgrade, before the placement of concrete, reinforcing steel, capillary break (i.e., sand, pea-gravel, etc.), or vapor barriers (i.e., visqueen, etc.).
- During retaining wall subdrain installation, prior to backfill placement.
- During placement of backfill for area drain, interior plumbing, utility line trenches, and retaining wall backfill.
- During slope construction/repair.
- When any unusual soil conditions are encountered during any construction operations, subsequent to the issuance of this report.
- When any developer or homeowner improvements, such as flatwork, spas, pools, walls, etc., are constructed, prior to construction.
- A report of geotechnical observation and testing should be provided at the conclusion of each of the above stages, in order to provide concise and clear documentation of site work, and/or to comply with code requirements.
- GSI should review project sales documents to homeowners/homeowners associations for geotechnical aspects, including irrigation practices, the conditions outlined above, etc., prior to any sales. At that stage, GSI will provide homeowners maintenance guidelines which should be incorporated into such documents.

OTHER DESIGN PROFESSIONALS/CONSULTANTS

The design civil engineer, structural engineer, post-tension designer, architect, landscape architect, wall designer, etc., should review the recommendations provided herein, incorporate those recommendations into all their respective plans, and by explicit reference, make this report part of their project plans. This report presents minimum design criteria for the design of slabs, foundations and other elements possibly applicable to the project. These criteria should not be considered as substitutes for actual designs by the structural engineer/designer. Please note that the recommendations contained herein are not intended to preclude the transmission of water or vapor through the slab or foundation. The

structural engineer/foundation and/or slab designer should provide recommendations to not allow water or vapor to enter into the structure so as to cause damage to another building component, or so as to limit the installation of the type of flooring materials typically used for the particular application.

The structural engineer/designer should analyze actual soil-structure interaction and consider, as needed, bearing, expansive soil influence, and strength, stiffness and deflections in the various slab, foundation, and other elements in order to develop appropriate, design-specific details. As conditions dictate, it is possible that other influences will also have to be considered. The structural engineer/designer should consider all applicable codes and authoritative sources where needed. If analyses by the structural engineer/designer result in less critical details than are provided herein as minimums, the minimums presented herein should be adopted. It is considered likely that some, more restrictive details will be required.

If the structural engineer/designer has any questions or requires further assistance, they should not hesitate to call or otherwise transmit their requests to GSI. In order to mitigate potential distress, the foundation and/or improvement's designer should confirm to GSI and the governing agency, in writing, that the proposed foundations and/or improvements can tolerate the amount of differential settlement and/or expansion characteristics and other design criteria specified herein.

PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and laboratory data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an

agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project. All samples will be disposed of after 30 days, unless specifically requested by the client, in writing.

AMB ✓
AP ✓

FEASIBILITY LEVEL PERCOLATION/INFILTRATION TESTING
WILDOMAR 23 PROJECT, CITY OF WILDOMAR
RIVERSIDE COUNTY, CALIFORNIA

FOR

LENNAR HOMES - INLAND DIVISION
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879

W.O. 6451-A-SC SEPTEMBER 24, 2012

See Rg. 6
Infiltration rates based upon conversion for Perc Tests.
4 Tests - 3 @ 0.25"/hr (60 MPS)
1 @ 0.83"/hr (20 MPS)
All 4 w/i the limits of Prelim Det/Infil Basin

69550.65

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301

September 24, 2012

W.O. 6451-A-SC

Lennar Homes - Inland Division
980 Montecito Drive, Suite 302
Corona, California 92879

Attention: Ms. Jarnne Valdez

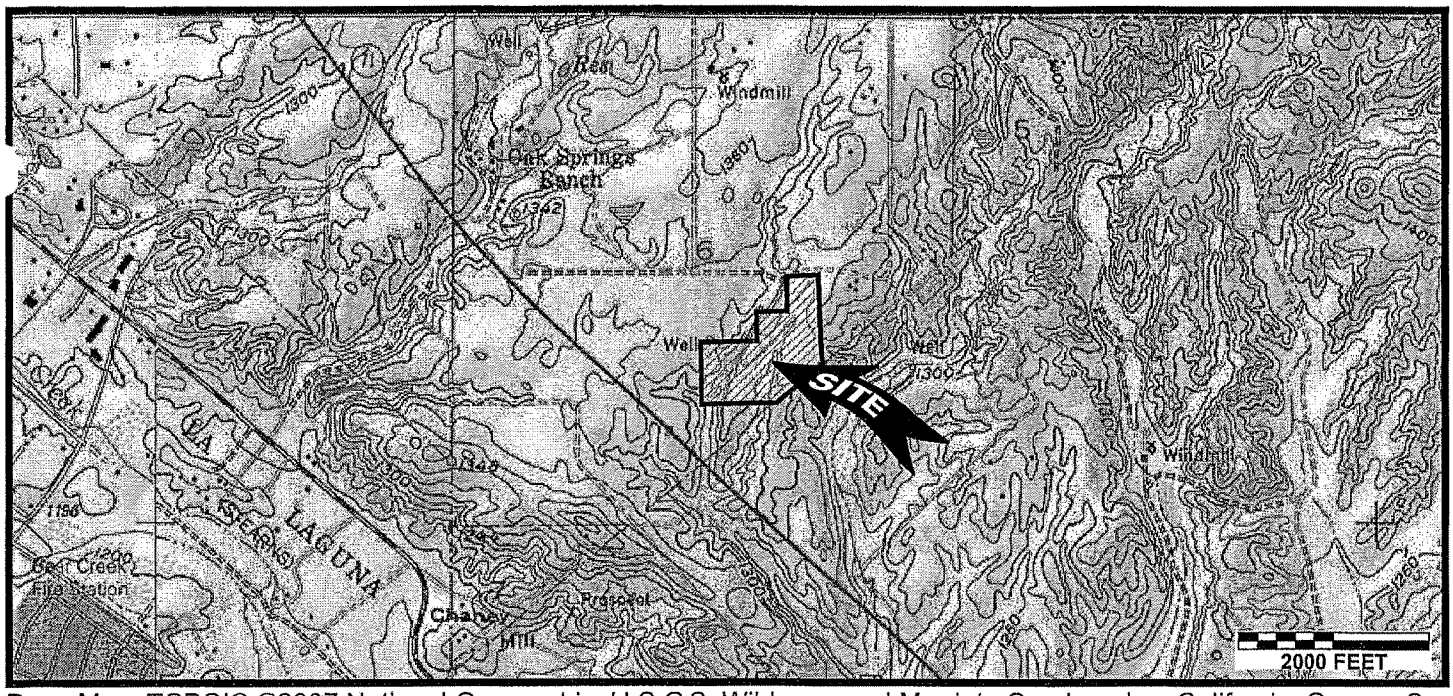
Subject: Feasibility Level Percolation/Infiltration Testing, Wildomar 23 Project, City of Wildomar, Riverside County, California

Dear Ms. Valdez:

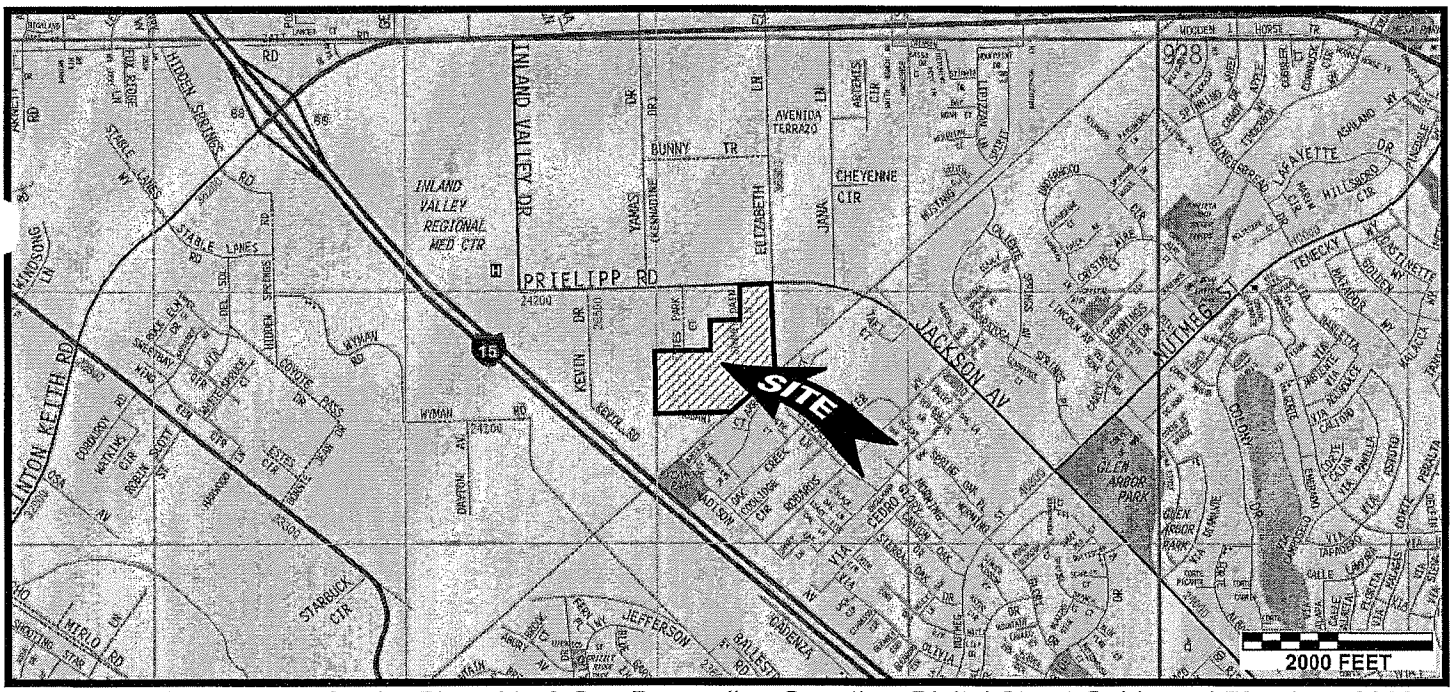
In accordance with your request and per the requirements of the controlling authorities, GeoSoils, Inc. (GSI) is providing the results of our feasibility level percolation/infiltration testing for the proposed Wildomar 23 project generally located at 36605 and 36625 Elizabeth Lane (see Figure 1, Site Location Map), in the City of Wildomar, Riverside County, California. The scope of our services has included a review of the referenced reports and plans (Appendix A), advancement of four (4) exploratory test pits for geologic logging and subsequent percolation/infiltration testing (Appendix B), analysis of field test data (Appendix C), and preparation of this summary report. Based on the above, it is our opinion that the proposed site development and basin construction is feasible from a geotechnical viewpoint, provided the recommendations presented herein, and in other applicable reports for the site by GSI (see Appendix A) are implemented during project planning, design, and construction, as appropriate.

PROPOSED DEVELOPMENT

Based upon the preliminary development plans by SB&O, Inc. (SB&O, 2012), and conversations with the Client, the project is proposed for single-family residential construction of 67 building pads, a detention/infiltration basin, a park site, along with associated interior roadways, and underground utility improvements. We further understand that the buildings are proposed as one- and/or two-story structures, with slab-on-grade/continuous footings, utilizing typical wood frame-type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system.



Base Map: TOPO!® ©2007 National Geographic, U.S.G.S. Wildomar and Murrieta Quadrangles, California, Orange Co., 7.5 Minute, dated 1997 and 1976, respectively, photorevised 1979 (Murrieta).



Base Map: The Thomas Guide, Riverside & San Bernardino Counties, Digital Street Guide and Directory, 2008 Edition, by Thomas Bros. Maps, pages 927 and 928.

ALL LOCATIONS APPROXIMATE

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GeoSoils, Inc.

SITE LOCATION MAP

Figure 1

Wildomar 23

APNs 380-280-004, -009, -010, -011, -012

W.O. 6451-A-SC	DATE 09/12	SCALE: 1" = 2,000

It is our understanding that the controlling authorities generally require Best Management Practices (BMP's) to clarify onsite storm water run-off within newly developed residential projects. Remedial grading for the project is anticipated to consist of the removal and recompaction of the near surface artificial fill, colluvium/topsoil, alluvial deposits, and weathered bedrock deposits. Removals are estimated to be an average of approximately ±1 to ±3 feet in depth across a majority of the site, with localized deeper removals, up to 7.5± feet deep or deeper, within the minor canyon areas. Due to the consistency, structural composition, and relative density of the bedrock deposits encountered at depth, landslide or other associated geologic hazzards are not currently anticipated onsite. However, it should be noted that graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover soon after construction. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers should be utilized to improve surficial stability. A rodent control program to prevent burrowing should be implemented. Other methods for improving surficial slope stability may also be considered.

SITE GEOLOGY

The site may be characterized as being underlain by Pleistocene-age sedimentary bedrock deposits assigned to the Pauba Formation (Kennedy and Morton, 2003). The bedrock deposits onsite are locally mantled by relatively thin layers of artificial fill, colluvium/topsoil, and younger alluvial deposits within the minor canyon areas. As described by Kennedy and Morton (2003), the bedrock deposits are generally well-indurated, cross-bedded sandstones and siltstones containing sparse cobble- to boulder-sized conglomerate beds. At depth, the sedimentary bedrock deposits encountered during this study were generally observed to be varying hues of reddish brown silty sands and sandy silts, with locally occasional discontinuous layers or lenses of cobble- to boulder-sized clasts (see Appendix B).

GROUNDWATER

These observations reflect site conditions at the time of our investigations and do not preclude changes in local groundwater conditions in the future from heavy irrigation, precipitation, or other factors not obvious at the time of our field work. Based upon field measurements from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. However, this does not preclude the possibility localized perched groundwater within drainage areas and/or along bedding or fractures within the sedimentary bedrock. Seepage may also occur locally (due to heavy precipitation or irrigation) in areas where

fill soils overlie less permeable bedrock materials. Thus, perched groundwater conditions may occur in the future, and should be anticipated.

FIELD PERCOLATION/INFILTRATION TESTING

Four (4) percolation/infiltration tests were conducted within the site, at a depth of between ±4 and ±6 feet to approximate the anticipated depth of proposed detention/infiltration basin within the project. The test pits advanced for this study were excavated utilizing a rubber-tired backhoe. The percolation/infiltration tests were conducted within the underlying native sedimentary bedrock deposits. Percolation/infiltration testing was performed to evaluate site conditions with respect to proposed onsite BMP construction to retain and filter onsite storm water. Onsite testing was performed in general conformance with the County of Riverside Department of Environmental Health (CRDEH, 2009) and the 2009 Uniform Plumbing Code ([2009 UPC], International Association of Plumbing & Mechanical Officials, 2009) guidelines for percolation testing. Testing was performed by an engineering geologist from our firm. The percolation test rates (minutes/inch) were then converted to infiltration rates (inches/hour) per the Porchet Method (RCFCWCD, 2011). The approximate locations of the test pits are provided on Figure 2. The field test data is provided in Appendix C. Procedures for testing are outlined briefly below:

Procedures

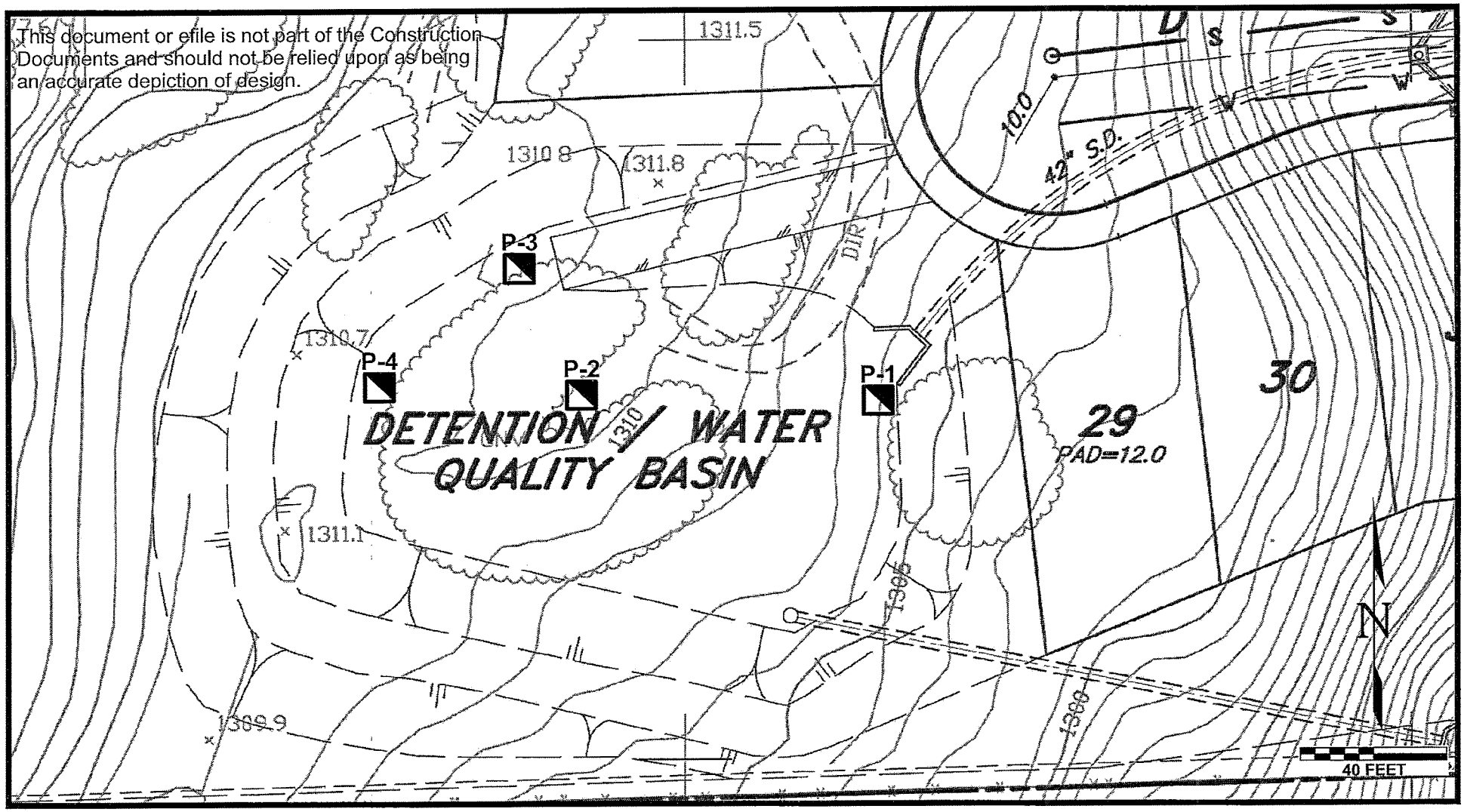
Test Holes:

1. Backhoe excavated to a depth of between 4 and 6 feet.
2. Percolation cup diameter - 8 inches.
3. After the removal of all loose material, approximately 2 inches of gravel was placed on the bottom of the excavation.
4. A perforated pipe was then installed within the percolation cup to facilitate accurate field measurements and prevent caving during testing and the pre-soak period.

Sandy Soil Test: After the installation of the perforated pipe, the percolation cup was filled to approximately ±8 inches over the gravel. Two (2) consecutive measurements were conducted at intervals of approximately 25 minutes. Less than 6 inches of water seeped away during each of the two (2) measurement intervals, therefore the pre-soak period was initiated.

Pre-Soaking: A full 5-gallon bottle of clear water was inverted over each test hole, so the test hole was filled continuously to approximately 8 inches over the gravel. The pre-soak period continued overnight, as the water did not seep away while the tester was present.

This document or efile is not part of the Construction Documents and should not be relied upon as being an accurate depiction of design.



Base Map: SB&O (2012)

ALL LOCATIONS APPROXIMATE

EXPLANATION

P-4 — Location of Percolation/Infiltration Test

Property Line

GeoSoils, Inc.

TEST PIT LOCATION MAP

Figure 2

W.O. 6451-A-SC	DATE 09/12	SC	: 1" = 40'

Testing: Percolation testing measurements were made the following day after required minimum 15-hour pre-soak period. After removal of the empty 5-gallon bottles, the drop in water level was measured from a fixed reference point, refilling to ±6 inches over the gravel after each measurement. The series of measurements were taken for a minimum of six (6) hours, at time intervals of 30 minutes. The field test results and calculated rates are provided in Appendix C.

Locations: The locations of the percolation/infiltration tests performed were chosen to correspond with anticipated location of the basin as indicated on the plans by SB&O (2012). The locations of test areas were easily identified by measurements to bounding fencing and onsite topography.

Accuracy: All test measurements were read to the nearest ¼-inch.

Test Results: Calculations from our field tests indicate percolation rates (P-1 through P-4), at a depth of between 4 and 6 feet, varying from 20 to 60 minutes/inch. As discussed previously, the percolation rates obtained were then converted to infiltration rates utilizing the Porchet Method (CRFCWCD, 2011). The converted infiltration rates obtained varied between 0.25 and 0.83 inches/hour. The converted infiltration rates for each of the test locations, along with the formulas utilized, are provided in Appendix C. For ease of review the following table also presents the percolation test results and infiltration rate conversions.

LOCATION AND DEPTH (ft.)	PERCOLATION RATE (Min./In.)	INFILTRATION RATE (In./Hr.) *
P-1 @ 4'	60	0.26
P-2 @ 5'	60	0.25
P-3 @ 6'	60	0.26
P-4 @ 5'	20	0.83

CONCLUSIONS AND RECOMMENDATIONS

The above infiltration rates, may be utilized for design of the proposed BMP's, provided the bottom area of the BMP is founded entirely in native sedimentary bedrock deposits. In addition to the above, an appropriate factor of safety, per the controlling authorities requirements, should also be incorporated into the design calculations. The following comments and/or recommendations should also be considered during design (structural and civil) and implementation of any BMP system onsite:

- As with any BMP, localized ponding and groundwater seepage should be anticipated.

- Similarly, as with any BMP, proper maintenance and care will need to provided. Best management maintenance practices should be followed at all times, especially during inclement weather. Should regular inspection and/or maintenance not be performed, the potential for malfunctioning of the BMP system will increase.

- Provisions for the maintenance of any siltation, debris within the BMP, and/or overgrown vegetation (i.e., root systems) should be considered. An appropriate inspection and maintenance schedule will need to adopted and provided to all interested/affected parties.

- Any proposed utility backfill materials located within the proposed area of the BMP may become saturated. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. If utility trenches enter, cross, and/or are proposed near the BMP system, cut-off walls or other water barriers will likely need to be installed to mitigate the potential for piping and excess water entering the utility backfill materials.

- Any proposed footings and/or foundations should maintain a minimum of 1:1 horizontal to vertical (h:v) distance from the base of the footing and/or foundation to any adjacent BMP system. If a 1:1 (h:v) distance cannot be maintained, a deepened footing and/or foundation will be required.

- The landscape architect should be notified of the location of the proposed BMP system. If landscaping is proposed within the BMP, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems).

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.

- As the infiltration/percolation testing conducted for this study is very site specific, any changes to the location of the proposed BMP and/or estimated size of the BMP, should be reviewed by this office. Depending upon the nature of any changes, and the requirements of the reviewing entity, additional infiltration/percolation testing may be considered warranted.

- Final grading and improvement plans, as well as structural foundation plans, should be submitted to this office for review and comment, as they become available, to minimize any misunderstandings between the preliminary plans currently reviewed and preliminary recommendations presented herein. If project designs are found to differ substantially from those stated herein, appropriate recommendations would be offered at that time.

LIMITATIONS

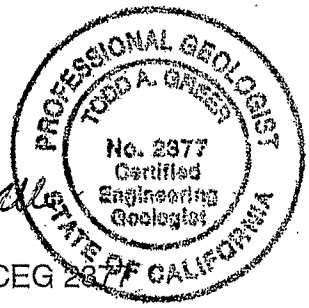
The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

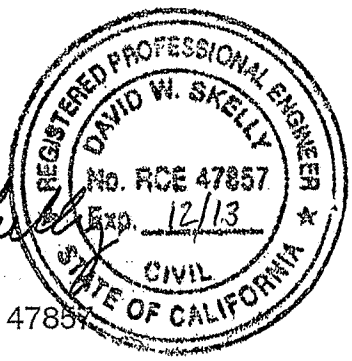
Inasmuch as our study is based upon our review and engineering analyses and field test data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.





Todd A. Greer
Engineering Geologist, CEG 2377

David W. Skelly
Civil Engineer, RCE 47857

TAG/PLM/DWS/jh/tg

Enclosure: Appendix A - References
Appendix B - Test Pit Logs
Appendix C - Infiltration/Percolation Data Sheets

Distribution: (4) Addressee (2 wet signed)
(1) SB&O, Inc., Attention: Mr. Don Brookes (E-mail pdf copy)

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

Allen, V., Connerton, A., and Carlson, C., 2011, Introduction to infiltration best management practices (BMP), Contech Construction Products, Inc., professional development series, dated December.

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APPENDIX B

TEST PIT LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with	GM	Silty gravels gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands more than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, mucic, and other highly organic soils

CONSISTENCY OR RELATIVE DENSITY

CRITERIA

Standard Penetration Test

Penetration Resistance N (blows/ft)	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium
30 - 50	Dense
> 50	Very dense

Standard Penetration Test

Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (tons/ft²)
<2	Very Soft	<0.25
2 - 4	Soft	0.25 - .050
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
>30	Hard	>4.00

	3"	3/4"	#4	#10	#40	#200 U.S. Standard Sieve

Unified Soil Classification	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS

Dry	Absence of moisture: dusty, dry to the touch
Slightly Moist	Below optimum moisture content for compaction
Moist	Near optimum moisture content
Very Moist	Above optimum moisture content
Wet	Visible free water; below water table

MATERIAL QUANTITY

trace	0 - 5 %
few	5 - 10 %
little	10 - 25 %
some	25 - 45 %

OTHER SYMBOLS

C Core Sample
S SPT Sample
B Bulk Sample
▼ Groundwater
Qp Pocket Penetrometer

BASIC LOG FORMAT:
Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse grained particles, etc.

EXAMPLE:
Sand (SP), fine to medium grained, brown, moist, loose, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO.	ELEV (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-1	1,306	0-2	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry, medium dense; blocky angular structure.
		2-4	ML				**BEDROCK - QUATERNARY PAUBA FORMATION:** SILTSTONE, pale yellow brown, damp, dense; indurated, few to some roots and rootlets, Stage II carbonate layer noted on stratigraphic top of unit.
							Total Depth = 4' No Groundwater or Caving Encountered Backfilled 9-21-12
P-2	1,310	0-2½	SC				**COLLUVIUM/TOPSOIL:** Clayey SAND, dark brown, dry to damp, medium dense; blocky angular structure.
		2½-4½	SM/SC				**BEDROCK - QUATERNARY PAUBA FORMATION:** Clayey SANDSTONE, dark reddish brown, damp, dense; few to some roots and rootlets.
		4½-6	ML				SILTSTONE, very light gray, dry to damp, dense; indurated.
							Total Depth = 6' No Groundwater or Caving Encountered Backfilled 9-21-12

PLATE B-2

GeoSoils, Inc.

W.O. 6451-A-SC
Lennar Homes Inland Region
Wildomar 23 Project, City of Wildomar
Logged By: TAG
September 19, 2012

LOG OF EXPLORATORY TEST PITS

TEST PIT NO	ELEV. (ft.)	DEPTH (ft.)	GROUP SYMBOL	SAMPLE DEPTH (ft.)	MOISTURE (%)	FIELD DRY DENSITY (pcf)	DESCRIPTION
P-3	1,310	0-6"	SM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark grayish brown, dry, medium dense.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; fine to coarse grain sands, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12
P-4	1,310	0-6"	GM				**ARTIFICIAL FILL - UNDOCUMENTED:** SILTY SAND, dark reddish brown, dry, loose.
		6"-5	SM				**BEDROCK - QUATERNARY PAUBA FORMATION:** SANDSTONE, reddish brown, dry, dense; gravel/cobble lens noted between 3 and 4½ feet, cross-bedding common.
							Total Depth = 5' No Groundwater or Caving Encountered Backfilled 9-21-12

APPENDIX C

PERCOLATION/INFILTRATION DATA SHEETS

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A&C	
Test Hole No.: P-1		Date Excavated: 9/19/12	
Depth of Test Hole: 4'		Soil Classification: ML	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 9:30 AM
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	8:50 9:15	25	6"	5½	½"
2	9:15 9:40	25	6"	5½	½"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:40 ✓ 10:10	30 ✓	30	6¼"	5¾"	½"	60
	10:10 ✓ 10:40	30 ✓	60	6"	5½"	½"	60
Second Hour	10:40 ✓ 11:10	30 ✓	90	6¼"	5¾"	½"	60
	11:10 ✓ 11:40	30 ✓	120	6¼"	5¾"	½"	60
Third Hour	11:40 12:10 ✓	30 ✓	150	6"	5½"	½"	60
	12:10 12:40 ✓	30 ✓	180	6"	5½"	½"	60
Fourth Hour	12:40 1:10 ✓	30 ✓	210	6"	5½"	½"	60
	1:10 1:40 ✓	30 ✓	240	6¼"	5¾"	½"	60
Fifth Hour	1:40 2:10 ✓	30 ✓	270	6"	5½"	½"	60
	2:10 2:40 ✓	30 ✓	300	6"	5½"	½"	60
Sixth Hour	2:40 3:10	30	330	6"	5½"	½"	60
	3:10 3:40	30	360	6"	5½"	½"	60

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A-SC	
Test Hole No.: P-2		Date Excavated: 9/19/12	
Depth of Test Hole: 5'		Soil Classification: SM	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 10:10
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	8:55 9:20	25	6"	5 1/4	3/4"
2	9:20 9:45	25	6"	5 1/2	1/2"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:45 10:15	30	30	6"	5 1/2"	1/2"	60
	10:15 10:45	30	60	6"	5 1/2"	1/2"	60
Second Hour	10:45 11:15	30	90	6 1/4"	5 3/4"	1/2"	60
	11:15 11:45	30	120	6"	5 1/2"	1/2"	60
Third Hour	11:45 12:15	30	150	6"	5 1/2"	1/2"	60
	12:15 12:45	30	180	6"	5 1/2"	1/2"	60
Fourth Hour	12:45 1:15	30	210	6 1/4"	5 3/4"	1/2"	60
	1:15 1:45	30	240	6"	5 1/2"	1/2"	60
Fifth Hour	1:45 2:15	30	270	6 1/4"	5 3/4"	1/2"	60
	2:15 2:45	30	300	6"	5 1/2"	1/2"	60
Sixth Hour	2:45 3:15	30	330	6"	5 1/2"	1/2"	60
	3:15 3:45	30	360	6 1/4"	5 3/4"	1/2"	60

Plate No. C-2

Leach Line Percolation Data Sheet

Project: Lennar - Wildomar 23		W.O. Number: 6451-A-SC	
Test Hole No.: P-3		Date Excavated: 9/19/12	
Depth of Test Hole: 6'		Soil Classification: ML	
Check for Sandy Soil Criteria Tested by: TAG		Date: 9/19/12	Presoak: @ 10:35AM
Actual Percolation Tested by: TAG		Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	9:00 9:25	25	6 1/2"	6"	1/2"
2	9:25 9:50	25	6"	5 3/4	1/4"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:50 10:20	30	30	6"	5 3/4"	1/4"	120
	10:20 10:50	30	60	6 1/4"	6"	1/4"	120
Second Hour	10:50 11:20	30	90	6 1/2"	6"	1/2"	60
	11:20 11:50	30	120	6 1/4"	5 3/4"	1/2"	60
Third Hour	11:50 12:20	30	150	6"	5 1/2"	1/2"	60
	12:20 12:50	30	180	6"	5 1/2"	1/2"	60
Fourth Hour	12:50 1:20	30	210	6"	5 1/2"	1/2"	60
	1:20 1:50	30	240	6"	5 1/2"	1/2"	60
Fifth Hour	1:50 2:20	30	270	6"	5 1/2"	1/2"	60
	2:20 2:50	30	300	6 1/4"	5 3/4"	1/2"	60
Sixth Hour	2:50 3:20	30	330	6"	5 1/2"	1/2"	60
	3:20 3:50	30	360	6"	5 1/2"	1/2"	60

Leach Line Percolation Data Sheet

Project:	Lennar - Wildomar 23	W.O. Number:	6451-A-SC
Test Hole No.:	P-4	Date Excavated:	9/19/12
Depth of Test Hole:	5'	Soil Classification:	SM
Check for Sandy Soil Criteria Tested by:	TAG	Date: 9/19/12	Presoak: @ 1:15 PM
Actual Percolation Tested by:	TAG	Date: 9/20/12	5gal. used

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)
1	9:05 9:30	25	6"	4"	2"
2	9:30 9:55	25	6"	4 1/4"	1 3/4"

Use: Normal Sandy (Circle One) Soil Criteria

	Time	Time Interval (min)	Total Elapsed Time (Min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ in Water Level (Inches)	Percolation Rate (min/inch)
First Hour	9:05 10:25	30	30	6"	4 1/4"	1 3/4"	17
	10:25 10:55	30	60	6"	4 1/4"	1 3/4"	17
Second Hour	10:55 11:25	30	90	6 1/4"	4 1/2"	1 3/4	17
	11:25 11:55	30	120	6"	4 1/2"	1 1/2"	20
Third Hour	11:55 12:25	30	150	6"	4 1/2"	1 1/2"	20
	12:25 12:55	30	180	6 1/2"	4 1/2"	1 1/2"	20
Fourth Hour	12:55 1:25	30	210	6"	4 1/2"	1 1/2"	20
	1:25 1:55	30	240	6"	4 1/2"	1 1/2"	20
Fifth Hour	1:55 2:25	30	270	6"	4 1/2"	1 1/2"	20
	2:25 2:55	30	300	6 1/4"	4 3/4"	1 1/2"	20
Sixth Hour	2:55 3:25	30	330	6"	4 1/2"	1 1/2"	20
	3:25 3:55	30	360	6"	4 1/2"	1 1/2"	20

Percolation Rate to Infiltration Rate Conversion

* Infiltration Rate (I_t) = $\frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r+H_{avg})}$

Where:
I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

		Δt	Init Level	Fnl Level	ΔH	H_{avg}	I_t	
Percolation Test Numbers	P-1 @ 4 ft.	30	6	5 1/2	1/2	5 3/4	0.26	
	P-2 @ 5 ft.	30	6 1/4	5 3/4	1/2	6	0.25	Low = 0.25
	P-3 @ 6 ft.	30	6	5 1/2	1/2	5 3/4	0.26	Average = 0.40
	P-4 @ 5 ft.	30	6	4 1/2	1 1/2	5 1/4	0.83	

* Conversion per the "Porchet Method" (RCFWCD, 2010)

Plate No. C-5

Appendix F

Treatment Control BMP Sizing Calculations and Design Details

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O INC.	Date	10/12/2012
Designed by	AWSP	County/City Case No	
Company Project Number/Name	WILDOMAR 23 / 69550.60		
Drainage Area Number/Name	ALL ONSITE		

Enter the Area Tributary to this Feature A_T = 17.7 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township

Range

Section

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.65

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.45

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.29 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 18,633 ft^3

Notes:

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

(This report is preliminary only. This appendix shall be completed with the final report)

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

UPDATE PHASE I ENVIRONMENTAL SITE ASSESSMENT
AREAS CURRENTLY PROPOSED TO BE DEVELOPED AT
36630 ESTES PARK COURT
AND 36605 AND 36625 ELIZABETH LANE
APNS 380-280-004, 380-280-009, 380-280-010
380-280-011, AND 380-280-012
RIVERSIDE COUNTY, CALIFORNIA 92595

FOR

LENNAR HOMES OF CALIFORNIA, INC.
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879

W.O. E6451-SC SEPTEMBER 28, 2012

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

26590 Madison Avenue • Murrieta, California 92562 • (951) 677-9651 • FAX (951) 677-9301 • www.geosoilsinc.com

September 28, 2012

W.O. E6451-SC

Lennar Homes - Inland Division
980 Montecito Drive, Suite 302
Corona, California 92879

Attention: Ms. Jarnne Valdez

Subject: Update Phase I Environmental Site Assessment, Areas Currently Proposed to Be Developed at 36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane, APNs 380-280-004, 380-280-009, 380-280-010, 380-280-011, and 380-280-012, Riverside County, California 92595

Dear Ms. Valdez:

Pursuant to your request and authorization, GeoSoils, Inc. (GSI) is pleased to present the results of our update Phase I Environmental Site Assessment (ESA) for the subject property areas currently proposed to be developed. At your request, GSI has updated the previous referenced ESA report for the site area by Ninyo & Moore ([NM] 2004) and supplement report by GSI (2005b [see Appendix A]), as it pertains to the proposed residential development of the site in the City of Wildomar, Riverside County, California 92595. This study was conducted for the purpose of reassessing, to the extent practical, the potential for the presence of hazardous materials/waste and/or petroleum contamination at the subject site.

Please note that GSI has performed this update Phase I ESA in general conformance with the scope and limitations of ASTM Practice E 1527-05. This practice is intended, by the ASTM Committee E 50, to be a general guideline standard and utilized on a voluntary basis. Any major exceptions to, or deletions from, this practice are described in the relevant sections of this report. Unless specifically superceded herein, the conclusions and recommendations contained in GSI's previous reports for the site (see Appendix A), remain pertinent and applicable, and should be appropriately implemented.

SUMMARY

Based upon the information obtained during the course of this evaluation, GSI presents the following summary of our findings:

- Based upon our review of historic land use utilizing readily available maps and historical aerial photographs, a review of the referenced ESA reports and geotechnical report for the site area by NM (2004) and GSI (2005a and 2005b), and our recent site reconnaissance, the subject site appears to have been generally vacant and undeveloped from at least 1938 until at least 1980. According to our review (NM, 2004), three (3) residential structures were built sometime in the early- to mid-1980's and two (2) water wells and an associated above ground storage tank (AST) were previously observed onsite. During this time period the residential structures utilized septic systems (NM, 2004). Based on their review, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) and lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review. During our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance.

- Minor trash and demolition debris (i.e., residential debris, concrete, and lumber) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. NM (2004) indicated that two (2) transformers were located onsite, based on our recent reconnaissance of the site, the two (2) transformers indicated by NM (2004) have been subsequently removed from the site. The previous septic systems may still exist in the locations of the former structures.

- There was no significant visible surficial staining on the property; however, the trash/demolition debris was not disturbed. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination. With the exception of the potential for septic tank (systems) to remain in the location(s) of the demolished structures, there was no evidence of underground storage tanks (UST's) observed and no AST's were observed on the subject property at the time of our recent site reconnaissance.

- Properties adjacent to, and surrounding, the site currently consist of vacant undeveloped land to the north, the Gables Oak Creek Apartments to the east,

residential development (Tract 23051) to the south-southeast, and rural residential properties to the west of the project site. These properties are not anticipated to represent a significant environmental concern to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are and have been followed.

- Based upon field measurements taken from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. Minor water seepage was encountered in some of the excavations along the alluvium/bedrock contact within drainage areas during our previous geotechnical study (GSI, 2005a). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction generally following site drainage patterns and topography.

- Based upon our updated review of agency database records search, there are no listings of permitted above-ground and/or underground tanks on the subject property. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste for the subject site.

  There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i.e., generates more than 1,000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

  There is one (1) unmapped risk site reported in the database search, due to insufficient information. The unmapped site, Bureau of Indian Affairs-Tribal Land with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location.

- There does not appear to be a documented and/or reported commercial or industrial facility, or a municipal landfill, within a 1-mile radius of the site that represents a significant environmental concern to the subject site.

- No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

- This assessment has revealed no evidence of significant recognized environmental conditions in connection with the property.

Based upon the scope of work completed, GSI concludes that the overall potential for significant amounts of hazardous materials/waste and/or petroleum contamination onsite is low: the uncertainty of potential environmental concerns cannot be eliminated. This assessment has revealed no visual evidence of recognized environmental conditions associated with the subject site other than the aforementioned. Based upon the information obtained during the course of our recent assessment, pursuant to the limitations set forth in the text of this report, the site is considered acceptable for the proposed residential use, provided the following mitigation measures are properly implemented during planning, design, and construction.

- Based on the historic property use, septic tanks (systems) may exist on the property. Although not considered a hazardous waste, any buried septic systems should be properly removed or abandoned following health department guidelines.

- Any remaining trash, debris, and waste materials should be disposed of offsite, in accordance with current local, state, and federal disposal regulations. Any materials containing petroleum residues encountered during property improvements should be evaluated prior to removal and disposal, following proper procedures. Any buried trash/debris encountered should be evaluated by an experienced environmental consultant prior to removal.

- Due to the demolition and removal of previous onsite structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- The three (3) wells located within areas of proposed development should be properly abandoned following City, County, and State guidelines.

- Based upon the information collected by GSI during this update environmental site assessment, further studies or action, other than the above, are not proposed from an environmental viewpoint, at this time.

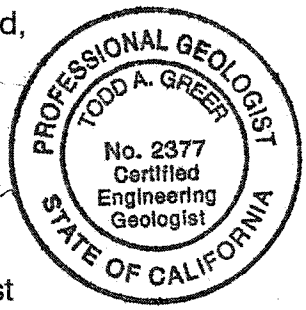
Please note, we have performed this update Phase I Environmental Site Assessment for the subject property in general conformance with the scope and limitations of ASTM Practice E 1527-05. This practice is intended, by the ASTM Committee E 50, to be a general guideline standard and used on a voluntary basis. Any major exceptions to, or deletions from, this practice are described in the relevant sections of this report.

GSI declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental professional* as defined in §312.10 of 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a *property* of the nature, history, and setting of the subject *property*. We have developed and performed all the appropriate inquiries in general conformance with the standards and practices set forth in 40 CFR Part 312. Resumes of GSI personnel who worked on this project are included in Appendix D.

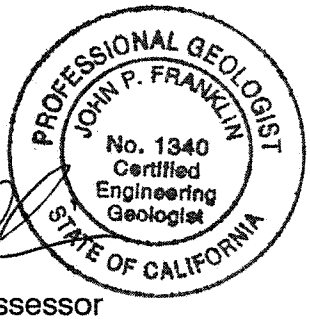
If you have any questions pertaining to this report or any other matter, please do not hesitate to call us at (951) 677-9651. We appreciate the opportunity to be of service to you.

Respectfully submitted,

GeoSoils, Inc.



Todd A. Greer
Engineering Geologist
CEG 2377



John P. Franklin
Environmental Assessor
CEG 1340, CHG 532
(Former CA REA-1 1675)

TAG/JPF/jh

Distribution: (3) Addressee
(1) SB&O, Inc., Attention: Don Brooks

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ATTACHMENTS:

Appendix A - References. . . . . Rear of Text
Appendix B - Site Photographs. . . . . Rear of Text
Appendix C - Agency Records Search, Interview, Aerial Photographs, and Pertinent GSI Reports (Provided as CD Data Disc). . . . . Rear of Text
Appendix D - Resumes of GSI Personnel. . . . . Rear of Text

UPDATE PHASE I ENVIRONMENTAL SITE ASSESSMENT
AREAS CURRENTLY PROPOSED TO BE DEVELOPED AT
36630 ESTES PARK COURT
AND 36605 AND 36625 ELIZABETH LANE
APNS 380-280-004, 380-280-009, 380-280-010
380-280-011, AND 380-280-012
RIVERSIDE COUNTY, CALIFORNIA 92595

INTRODUCTION

Purpose and Scope

In accordance with our proposal and Client's authorization, GeoSoils, Inc. (GSI) has completed this update Phase I Environmental Site Assessment (ESA) covering the subject site areas proposed for development, the location of which is generally illustrated on Figure 1 (Site Location Map). The subject property (including areas not proposed for development) is described as:

36630 Estes Park Court, and 36605 and
36625 Elizabeth Lane, APNS 380-280-004
380-280-009, 380-280-010, 380-280-011, and
380-280-012, Riverside County, California 92595

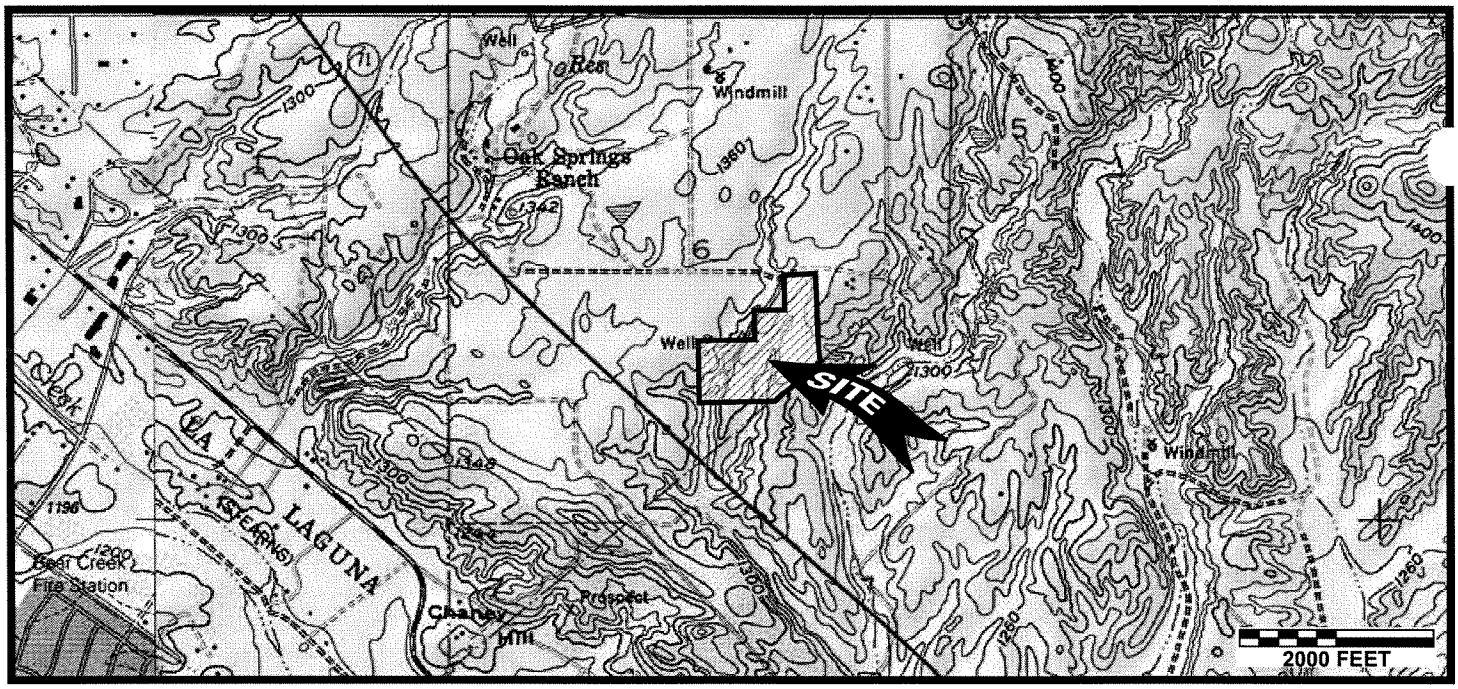
This update ESA was prepared for the purpose of assessing, to the extent practical, the potential for *recognized environmental conditions* from past or present uses at the subject property. A *recognized environmental condition* is defined by ASTM Standard E 1527-05 as:

> *The presence or likely presence, of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include "de minimis" conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.*

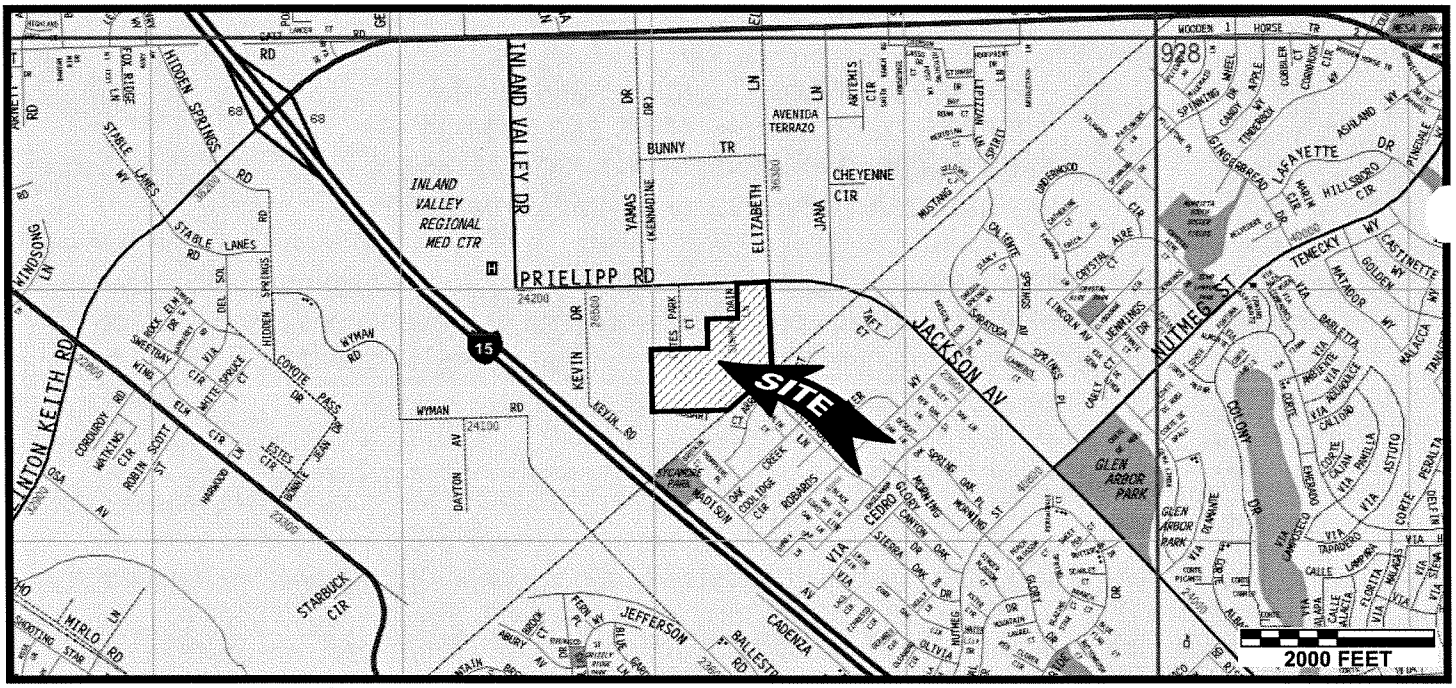
The scope of work included:

1. A review of previous environmental and geotechnical reports for the site, and available geologic and environmental documents (see Appendix A [listing]);

2. A reconnaissance of the subject property and surrounding areas to visually assess current utilization, and for indications of potential surface contamination (see Appendix B);



Base Map: TOPO!® ©2007 National Geographic, U.S.G.S. Wildomar and Murrieta Quadrangles, California, Orange Co., 7.5 Minute, dated 1997 and 1976, respectively, photorevised 1979 (Murrieta).



Base Map: The Thomas Guide, Riverside & San Bernardino Counties, Digital Street Guide and Directory, 2008 Edition, by Thomas Bros. Maps, pages 927 and 928.

ALL LOCATIONS APPROXIMATE

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GeoSoils, Inc.

SITE LOCATION MAP

Figure 1

Wildomar 23

APNs 380-280-004, -009, -010, -011, -012

W.O. E6451-SC	DATE 09/12	SCALE: 1" = 2,000

3. A review of government database documents (see Appendix C, in PDF on disc only [pertinent reports are also included in Appendix C as PDF]) concerning available environmental information for the subject property; and,

4. Preparation of this report, which presents the findings of this study and presents GSI's conclusions and recommendations.

Limitations and Exceptions

This study does not include any of the following:

- Geotechnical evaluation of the subject property;
- Direct interviews with Governmental Agencies;
- Water and/or soil sampling and analyses;
- Identification or evaluation of wetlands or inaccessible areas;
- Consideration of possible future contamination of the subject property from adjacent or surrounding facilities or properties; and,
- Asbestos, radon gas, mold, lead paint, methane, electromagnetic, sludge, or biologic evaluation(s).

Special Terms and Conditions

This report is intended for the use of the Client (Lennar Homes). This report is based upon field conditions observed during our reconnaissance of the site on September 18, 2012. Site conditions may change from time to time, in response to natural and human-made conditions. The contents should not be relied upon by any party other than the aforementioned without the express written consent of GSI.

This report does not consider possible future contamination of the subject property from adjacent or surrounding facilities or properties or additional unauthorized dumped debris. All judgments concerning adjoining properties apply only to conditions observed during the time of the on-site reconnaissance.

SITE DESCRIPTION AND RECONNAISSANCE OBSERVATIONS

Site/Project Description

The project area consists of roughly ±23.2 acres of relatively gently rolling hillside terrain located at 36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane, APNs 380-280-004, -009, -010, -011, and -012, Riverside County, California 92595 (see Figure 1, Site Location Map); however, this Phase I ESA only covers the area currently proposed for development. The irregular-shaped property consists of several combined rural residential parcels. Based on our review, some grading/earthwork was previously

performed to create the building pads for the previous onsite structures, roadways, and ponds. However, the exact nature of any such old earthwork is not readily apparent, as the previous residences have been demolished and the remaining "improvements" generally consist of old foundations, concrete slabs, fence lines, block walls, and trees/vegetation. Topographically the site is dominated by gently rolling hillside terrain with elevations generally decreasing from north to south-southwest, ranging from ±1,347 feet Mean Sea Level (MSL) to ±1,282 feet (in areas proposed for development), for a total relief of approximately ±65 feet. Drainage is generally to the southwest and is accommodated by two (2) relatively thin and gentle- to steep-sided drainage channels. Vegetation consists of chaparral and other native shrubs and grasses, with scattered trees within the drainage channels and associated with previous dwellings onsite.

Proposed Development

Based on our review (NM, 2004; and GSI, 2005a and 2005b), previous development plans for the project included at least 16 three-story multi-family apartment building pads. Based on our cursory review of current site development plans by SB&O (2012), GSI understands that the project is now proposed for single-family residential construction of 67 building pads, a detention/infiltration basin, a park site, along with associated interior roadways, and underground utility improvements. We further understand that the buildings are proposed as slab-on-grade one- and/or two-story structures, with typical foundations, utilizing wood frame-type construction. Building loads are assumed to be typical for this type of relatively light construction. Sewage disposal is anticipated to be accommodated by tying into the regional system.

Observational Reconnaissance

Onsite Reconnaissance

On September 18, 2012, a GSI representative (Mr. Greer) visited the subject property to assess current site utilization and observe for signs of possible surface contamination. Pertinent features observed during the site reconnaissance are described below and illustrated on the Site Map (see Figure 2). Photographs of the subject property are presented in Appendix B.

Overall, general site conditions, as observed on September 18, 2012, were found to be quite different to that described in the previous Phase I ESA report by NM (2004) and supplement report by GSI (2005b). Based upon our most recent site reconnaissance, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Minor trash and demolition materials (i.e., residential debris, concrete, lumber, etc.) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site

EXPLA

Project Bou

Location of

Location of

PRIELIPP

EXISTING 12" P.V.C. WATER LINE

EXISTING 36" STEEL WATER LINE

RURAL RESIDENTIAL

PARK

STREET

"D"

3.0' HIGH RETAINING WALL ON ALL 6 LOTS

25' SEWER, WATER & EMERGENCY ACCESS EASEMENT / PASEO

Trash/Debris

Lumber/Debris

Old Boat Dock

Clay Roofing Tile

Concrete Foundations/Slabs

Backfilled Pool

(Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. Septic systems may exist in the locations of the former structures. There was no significant visible surficial staining on the property. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination; however, the trash/debris, etc., was not disturbed.

- **Buildings on Property and General Usage -** No buildings or other temporary structures were observed onsite; however, remnants of former residential concrete slabs were observed, as indicated previously. The subject ±23.2 acre site is currently vacant and generally unimproved. Unusual activity was not noted onsite.

- **Storage Tanks -** There were no "Underground Storage Tank" (UST) or "Aboveground Storage Tank" (AST) listings onsite referenced in our agency records review (see Appendix C [provided on the CD data disc as PDF]). With the exception of the potential for septic tank (systems) in the location(s) of the demolished structures, our field observations indicated that there are no obvious signs of under- or aboveground storage tanks.

- **Chemical Storage -** There were no indications of chemical storage areas onsite.

- **Potential Sources of Polychlorinated Biphenyls (PCBs) -** As discussed previously, power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. Previous discussions with representatives of Southern California Edison (SCE) has indicated that the likelihood of transformers containing high concentrations of PCBs is extremely low, and should any leaks develop, it should be their responsibility to clean up the area. Other than those items mentioned above, observation of the property does not yield any equipment onsite that would be considered a significant source of PCBs.

- **Electromagnetic Evaluation -** As discussed above, power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site. An evaluation of electric and magnetic fields (EMF) onsite is beyond this current scope of work. However, based upon a public information booklet by a southern California power company, the magnetic field from transmission lines get weaker with distance. Magnetic fields are reported to vary from 1 to 300 milliGauss (mG) at the edge of a right-of-way. For comparison purposes, magnetic fields range from 0.1 mG to 8 mG on microwave ovens or televisions at a distance of 39 inches. Although there is some speculation that EMFs represent a risk to human health, medical and scientific research has yet to determine exposure levels related to health risks. Studies (to date) have been inconclusive as to the possible dangers from EMFs. Additional information is available from Southern California Edison

(SCE), the United States Environmental Protection Agency, The National Academy of Sciences and/or the American Medical Association.

- **Utility Structures, Roads, Disposal Systems, Water Wells -** Access to the site is by Elizabeth Lane. A paved interior driveway leads to the remains of the foundations/slabs from the demolished structures. Several dirt roadways transect the site. Underground utilities were not noted onsite. As indicated above, our field observations indicated that there are no other obvious signs of structures onsite. Septic systems may exist in the locations of the former structures. It is our understanding that after construction, the site will be served by municipal storm drain, water, and sewer service. As indicated previously, during our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance. The locations of wells observed, are illustrated on the Site Map (see Figure 2).

- **Environmental Releases and Spills -** Unusual or significant surface staining (i.e., spills and/or releases) were not noted on the subject property by GSI during our site reconnaissance.

- **Asbestos -** Evaluation of the presence of asbestos onsite is beyond the scope of this current study. Previously, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site by representatives of US Bank, ostensibly following proper protocol. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- **Lead Paint -** Evaluation of the presence of lead paint on the site is beyond the scope of this current study. Previously, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site by representatives of US Bank, again ostensibly following proper protocol. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of

residual LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- **Radon -** A detailed radon survey was not a part of this update ESA; however, the potential for radon gas accumulation is generally low in southern California. A recent publication by the American Society of Testing and Materials (ASTM) suggests that the pacific coastal range areas are expected to have a low to moderate radon potential. In addition, a study reported by the Los Angeles Times (Nagda, 1994) and California Environmental Protection Agency (CEPA) suggested a very localized geographic radon problem within the state. California school officials found virtually no elevated radon levels in public schools (Nagda, 1994). Because of this, and due to the generally mild climate in southern California and the nature of standard building industry construction techniques in southern California (i.e., vapor barriers under slabs), the potential for radon gas accumulation is not considered a significant environmental threat to the planned development.

  In 1990, the State of California (1990) conducted a radon survey in the state. The results of the survey indicate that for the 182 samples obtained in Region 9, which included Los Angeles, Riverside, San Bernardino, Orange, San Diego and Imperial Counties, the arithmetic mean radon levels were 0.6 pCi/l. This average total is below the radon action level of 4 pCi/l.

Border Zone Reconnaissance

Adjacent property use is as follows:

- The property to the north side of the project consists of vacant land.
- The property to the east side of the project consists of the Gables Oak Creek Apartments.
- The property to the south-southeast side of the project consists of single-family residential housing (Tract 23051).
- The property to the west of the project consists of vacant land and rural residential properties.

There are no adverse uses observed on properties surrounding the subject site that appear to be contributing significant hazardous waste/materials and/or petroleum contamination to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are, and have been followed.

Photographic Record

Representative color photographs have been taken of the current site conditions observed during our reconnaissance. These photographs are presented in Appendix B.

LOCAL GEOLOGIC AND HYDROGEOLOGIC SETTING

Geology

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges (Weber, 1977). It is characterized by steep, elongated mountain ranges and valleys that trend northwestward. The mountain ranges are underlain by basement rocks consisting of pre-Cretaceous metasedimentary rocks, Jurassic metavolcanic rocks, and Cretaceous plutonic rocks of the southern California batholith.

Bedrock in the region has been faulted and fractured by both strike-slip and compressional northwest-trending faults, which are related to the San Andreas transform-fault system. Some of these fault zones have remained active to the present time, including the nearby Elsinore and San Jacinto fault zones. Our review of published maps (Bryant and Hart, 2007) and the Riverside County Land Information System (RCLIS, 2012), indicate no known active faults are located onsite.

Site Geology

The site may be characterized as being underlain by Pleistocene-age sedimentary bedrock deposits assigned to the Pauba Formation (Kennedy and Morton, 2003). The bedrock deposits onsite are locally mantled by relatively thin layers of artificial fill, colluvium/topsoil, and younger alluvial deposits within the minor canyon areas. As described by Kennedy and Morton (2003), the bedrock deposits are generally well-indurated, cross-bedded sandstones and siltstones containing sparse cobble- to boulder-sized conglomerate beds. At depth, the sedimentary bedrock deposits encountered during this study were generally observed to be varying hues of reddish brown silty sands and sandy silts, with locally occasional discontinuous layers or lenses of cobble- to boulder-sized clasts.

Hydrogeology

The subject property is located within the Wildomar Subarea (HSA 2.31) of the Murrieta Hydrologic Area (HA 2.30) of the Santa Margarita Hydrologic Unit (California Regional Water Quality Control Board - San Diego Region, 1994). The Santa Margarita Hydrologic Unit falls within Region 9 (San Diego Region) of the State of California Regional Water Quality Control Board (CRWQCB) Hydrologic Basin Planning Area (SA 9.00). Groundwater within this subarea is designated as having beneficial uses for municipal and domestic

supply, agricultural supply, and industrial process supply (CRWQCB, 1994). As discussed previously, three (3) wells were observed within areas proposed for development.

Based upon field measurements taken from onsite wells and a review of the CDWR, Water Data Library (2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction, generally following site drainage patterns and topography (see Figure 3, Groundwater Gradient Map). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock, especially during the rainy season.

RESULTS OF SITE HISTORICAL REVIEW

Discussions with Persons Familiar with Site

Ms. Jarnne Valdez (current property owners representative) was interviewed on September 25, 2012, by a representative of GSI. The interview included the Transaction Screen Questionnaire in accordance with ASTM excerpt of E1528-96: *Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process*. A copy of the interview is included in Appendix C and highlights of the interview are summarized below. According to Ms. Valdez, and based on previous reports for the project (NM, 2004; and GSI, 2005a and 2005b) the property was previously owned by Cameo Homes. It is currently unknown when Cameo Homes purchased the property. Ms. Valdez did not have any knowledge about environmental liens against the property. In addition, to the best of Ms. Valdez's knowledge, there have never been environmental site assessments of the property that indicated the presence of hazardous substances or petroleum product contamination of the property, other than the conditions provided in the previous Phase I ESA for the property by NM (2004) and supplement by GSI (2005a).

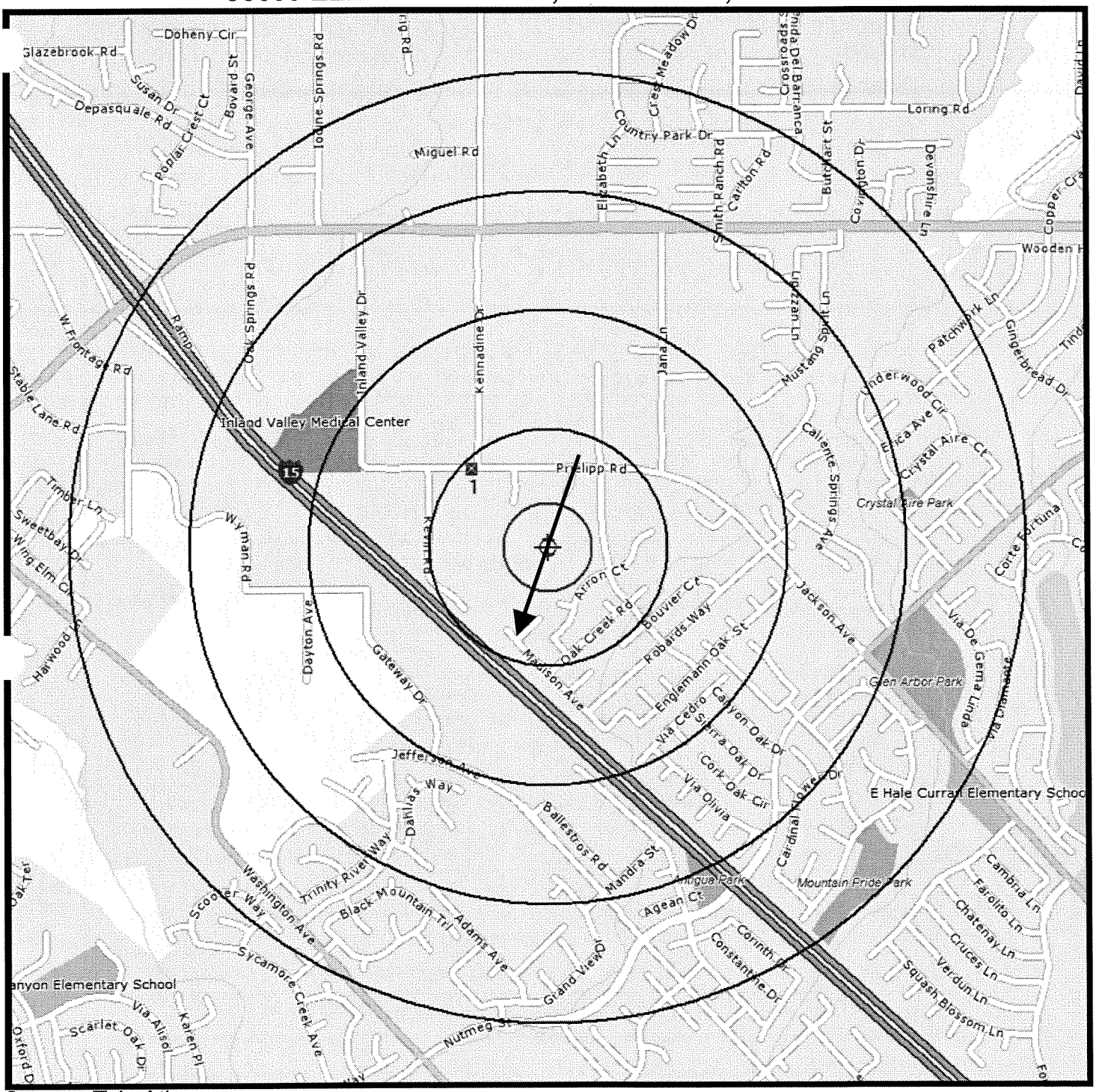
Summary of Historical Maps and Aerial Photographs Review

Historical aerial photographs were reviewed as a part of this update assessment for indications of historical land utilization, and for signs of potential hazardous materials/waste and/or petroleum storage, usage, contamination, or disposal areas. Readily available historical photographs were provided by Track Info Services, LLC, and included the years of 1938, 1953, 1967, 1976, 1980, 1994, and 2002. In addition, historic Google Earth Imagery (2012) was reviewed which included the years of 2006, 2009, and 2012. A summary of our review is provided in Table 1. The Track Info Services historical aerial photos are included in Appendix C (provided on the CD data disc as PDF).

1 Mile Radius
Single Map:

FIRSTSEARCH

36605 ELIZABETH LANE, WILDOMAR, CA 92595



Source: Tele Atlas

EXPLANATION

- Target Site (Latitude: 34.1020, Longitude: -117.5176)
- Identified Site, Multiple Sites, Receptor
- NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste
- Triballand
- Groundwater Gradient

Black Rings Represent 1/4 Mile Radius;
Red Ring Represents 500 ft. Radius

ALL LOCATIONS APPROXIMATE

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GROUNDWATER GRADIENT MAP

Figure 3

W.O. E6451-SC	DATE 09/12	SCALE: N.T.S.

In our historical photograph review, there was no surficial evidence of site improvements noted that represent a significant potential source of petroleum contamination and/or hazardous waste observed immediately adjacent to or within the subject property.

Table 1 - Historic Aerial Photograph Review Summary

DATE	SUMMARY	SCALE
1938	The site is generally vacant and undeveloped. The property appears brushed for fire control.	1"=340'
1953	The site and vicinity are generally similar to the 1938 photograph. A pond is now visible in the drainage course on the western side of the property. The adjacent property to the east- northeast appears to be utilized for dry farming.	1"=340'
1967	The site and vicinity are generally similar to 1953 photograph. A residence is now visible on the adjacent property to the east- northeast of the site. Highway 395 (now Interstate I-15) is now visible southwest of the project site.	1"=340'
1976	The site and vicinity are generally similar to 1967 photograph. Two (2) access roads are now visible onsite.	1"=340'
1980	A residence is now visible on the property eastern central portion of the site. An earthen roadway (Prielipp Road) is visible north of the site. Several rural residences are now visible west of the property. Interstate I-15 southwest of the property has been widened to four (4) lanes.	1"=340'
1994	The other two (2) residences are now visible onsite. Another pond is now visible in the small drainage course in the central portion of the site. Several other access roadways are now visible on the property. It appears the grubbing/brushing for the residential tract to the south of the property has began. Prielipp Road now appears to be paved.	1"=340'
2002	The site is generally similar to 1994 photograph. The residential tract housing to the south of the property is now visible. Elizabeth Lane has been constructed and is now paved.	1"=340'
2006	Google Earth Imagery: The site and vicinity is generally similar to 2002 photo. The Gables Oak Creek Apartments to the east of the project have been constructed. The structures located at 36630 Estes Park Court have been removed.	various
2009	Google Earth Imagery: The site and vicinity is generally similar to 2006 photo.	various
2012	Google Earth Imagery: The site appears similar to our recent site reconnaissance. The property appears vacant and the structures previously located onsite are visibly absent.	various

No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

Historical Topographic Maps

Historical topographic maps were reviewed during this update ESA. According to the contour lines on the topographic maps, the property is located at approximately 1,340 to 1,290 feet MSL. The contour lines in the area of the property indicate the area is sloping to the south-southwest, generally coincidental with the local topographic gradient (USGS). The property is generally depicted as rural residential development. The maps reviewed are included in Appendix C (provided on the CD data disc as PDF).

Fire Insurance Maps

GSI requested historical Sanborn Fire Insurance maps for the property from Environmental FirstSearch, and was subsequently informed that no maps are available for the subject location. A copy of the Fire Insurance Map Coverage notification (i.e., "NO" Maps Available) is included in the FirstSearch Report Appendix C (provided on the CD data disc as PDF).

City Directories

Historical City directories, published by Haines, Ducy's, and Luskey's, provided from Track Info Services, LLC, were reviewed for past names of business that were listed for the Property and adjoining properties. The findings are presented in the following table:

YEAR	ON-SITE	ADJOINING PROPERTIES
1995	36605 - 36625 Elizabeth Lane Street Not Listed	Street Not Listed Street Not Listed
2002	36605 - 36625 Elizabeth Lane 36605 - Carlson, Stanley 36625 - XXXX	Lowest listing on the street is 36605 Highest listing on the street is 36625
2004 - 2005	36605 - 36625 Elizabeth Lane 36605 - Williams, Roger 36625 - Bachelor, William; Healing Rooms of the Temecula Valley	25825 Elizabeth Lane - Gonzales, Lorenzo Highest listing on the street is 36625
2009 - 2010	36605 - 36625 Elizabeth Lane 36605 - XXXX 36625 - Healing Rooms of the Temecula Valley	35815 Elizabeth Lane - Dissi, Kamal Highest listing on the street is 36625

Addresses of *Potential Concern*: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, or within the vicinity of the target address was also provided by Track Info Services,

LLC. No addresses of concern are reported. Our review of adjoining and/or nearby properties indicate this area appears to be predominantly single-family rural residential, with the exception of the Healing Rooms of the Temecula Valley indicated in the 2004-2005 and 2009-2010 listings. Thus, it is GSI's opinion that these sites pose a low potential to environmentally impact the subject property. The City Directory Report is included in Appendix C (provided on the CD data disc as PDF).

Review of Previous Reports

The previous Phase I ESA report by NM (2004) and supplement by GSI (2005a), the previous preliminary geotechnical investigation by GSI (2005b [see Appendix A]), aided in the preparation of this update Phase I ESA.

Chain-of-Title Documents

No chain-of-title search was made by GSI as Client did not furnish or request any documents, and such a search was beyond the scope of this report.

RESULTS OF GOVERNMENT AGENCY/DOCUMENTS REVIEW

List of Government Agencies and Databases Reviewed

In compliance with ASTM Standard of Practice E 1527-05, a search of selected federal and state government databases was conducted for GSI, by TrackInfo Services, LLC. Following is a list of the agency databases reviewed for this report. Search distances are per the ASTM standard. Building Department or Zoning Land Use records were not readily available, and thus were not reviewed for this report.

LIST OF DATABASES SEARCHED	
FEDERAL AND STATE ASTM STANDARD	ASTM SUPPLEMENTAL
NPL	PERMITS
CERCLIS	OTHER
NFRAP	
RCRA TSD	
RCRA COR	
RCRA GEN	
ERNS	
STATE SITES	
SPILLS - 1990	
SWL	

LIST OF DATABASES SEARCHED	
FEDERAL AND STATE ASTM STANDARD	ASTM SUPPLEMENTAL
REG UST/AST	
LEAKING UST	

*Details and descriptions of these databases can be found in Appendix C.

Results of Government Agency/Document Review

A review of the Government Records Database search report dated September 14, 2012, indicated There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i,e., generates more than 1000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

GSI also reviewed the location of the unmapped risk sites, one (1) unmapped risk site is reported in the database search. The unmapped site, Bureau of Indian Affairs-Tribal Land, with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location. Complete details for the database search may be found in Appendix C in PDF format on disc only.

Based upon review of our agency database records search (Appendix C, provided as a CD data disc), there are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste on the property, nor listings of UST's or AST's on the site. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste on the site.

Solid Waste Landfills (SWLF)

There are no solid waste landfills reported within the study area.

Oil and Gas Well Activity

Oil and gas wells were not observed on the subject property during our site reconnaissance on September 18, 2012. An in-house review of the Munger Map Book for oil and gas fields in California and Alaska (Munger, 2003) indicated no oil or gas wells are located on the property; however, three (3) wells were noted in the general vicinity during our review. The Eddie Fisher "Stuart" No. 54-2604 (located ±2.75 miles northwest of the

site), the Murrietta Oil Company No. 23-1120 (located ±4.0 miles southeast of the site), and the Petroleum Production Engineers "Vernard" No. 51-3106 (located ±3.75 miles southeast of the site). Based on their relative age, the local groundwater gradient, and proximity to the site, they are considered to have a low environmental risk potential to the subject property.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based upon the information obtained during the course of this evaluation, GSI presents the following summary of our findings:

- Based upon our review of historic land use utilizing readily available maps and historical aerial photographs, a review of the referenced ESA reports and geotechnical report for the site area by NM (2004) and GSI (2005a and 2005b), and our recent site reconnaissance, the subject site appears to have been generally vacant and undeveloped from at least 1938 until at least 1980. According to our review (NM, 2004), three (3) residential structures were built sometime in the early- to mid-1980's and two (2) water wells and an associated above ground storage tank (AST) were previously observed onsite. During this time period the residential structures utilized septic systems (NM, 2004). Based on their review, NM (2004) concluded that due to the age of some of the onsite structures built between 1981 and 1983, asbestos containing materials (ACM's) and lead containing paint (LCP) may be present within onsite structures. However, based upon our most recent site reconnaissance conducted on September 18, 2012, the property is currently vacant and the previous residential structures, barns, and AST noted during NM's initial Phase I ESA (NM, 2004) have been subsequently demolished and removed from the site. However, the foundations, concrete slabs, fence lines, block walls, and trees/vegetation remain onsite. Due to the demolition and removal of the structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review. During our field reconnaissance of the site, GSI located one (1) of the water wells indicated by NM (2004), the other well noted by NM could not be located and appears to lie outside the areas of proposed development. In addition, two (2) other water wells were observed during our recent onsite reconnaissance.

- Minor trash and demolition debris (i.e., residential debris, concrete, and lumber) was observed across portions of the site. Power lines were noted on the perimeter of the site, located on the eastern and northern margins of the site (Elizabeth Lane and Prielipp Road, respectively). One (1) transformer was noted on the power lines near the northwestern corner of the site. NM (2004) indicated that two (2)

transformers were located onsite, based on our recent reconnaissance of the site, the two (2) transformers indicated by NM (2004) have been subsequently removed from the site. The previous septic systems may still exist in the locations of the former structures.

- There was no significant visible surficial staining on the property; however, the trash/demolition debris was not disturbed. There does not appear to be significant surficial evidence of onsite hazardous materials/waste and/or petroleum contamination. With the exception of the potential for septic tank (systems) to remain in the location(s) of the demolished structures, there was no evidence of underground storage tanks (UST's) observed and no AST's were observed on the subject property at the time of our recent site reconnaissance.

- Properties adjacent to, and surrounding, the site currently consist of vacant undeveloped land to the north, the Gables Oak Creek Apartments to the east, residential development (Tract 23051) to the south- southeast, and rural residential properties to the west of the project site. These properties are not anticipated to represent a significant environmental concern to the subject site, provided lawful procedures for petroleum products and restricted household/agricultural chemical use and storage are and have been followed.

- Based upon field measurements taken from onsite wells and a review of the California Department of Water Resources, Water Data Library (CDWR, 2012), groundwater onsite and in the site vicinity is reported at a depth ranging between ±26 and ±43 feet below the ground surface. Minor water seepage was encountered in some of the excavations along the alluvium/bedrock contact within drainage areas during our previous geotechnical study (GSI, 2005a). Groundwater may also be encountered at shallow depths in the form of perched water on resistant strata or sedimentary bedrock. No surface water was observed onsite; however, cat-tail reeds, Willows, and other plants and vegetation were noted within the drainage areas onsite. The local groundwater gradient is estimated to be in a southwesterly direction generally following site drainage patterns and topography.

- Based upon our updated review of agency database records search, there are no listings of permitted above-ground and/or underground tanks on the subject property. There are no database listings regarding the handling, storage, use, or disposal of hazardous materials/waste for the subject site.

  There is a total of one (1) mapped risk site reported in the agency database records search. The mapped risk site, Southern California Edison, 24487 Prielipp Road, is located 0.23 miles northwest (cross groundwater gradient) is reported as a Resource Conservation and Recovery Act (RCRA) "Large Quantity Generator," (i.e., generates more than 1,000 kilograms per month of hazardous waste), with no reported releases nor violations. Based upon the status and location of this risk

site, it is GSI's opinion that this site is considered to have a low environmental risk potential to the subject site.

There is one (1) unmapped risk site reported in the database search, due to insufficient information. The unmapped site, Bureau of Indian Affairs-Tribal Land with unknown address, has no specific information provided in the data base records. Based on the available data, it is GSI's opinion that this unmapped risk site does not represent a significant potential to environmentally impact the subject property based upon its status and/or location.

- There does not appear to be a documented and/or reported commercial or industrial facility, or a municipal landfill, within a 1-mile radius of the site that represents a significant environmental concern to the subject site.

- No significant data gaps were encountered in preparation of this update ESA. Three data gaps, from 1940 to 1953, 1953 to 1967, and 1980 to 1994 were due to the limited records, which are reasonably ascertainable in this rural area at the time. However, it is our opinion that additional historic information, if it were to become available, is not likely to significantly change the conclusions and recommendations of this assessment.

- This assessment has revealed no evidence of significant recognized environmental conditions in connection with the property.

Recommendations

Based upon the scope of work completed, GSI concludes that the overall potential for significant amounts of hazardous materials/waste and/or petroleum contamination onsite is low: the uncertainty of potential environmental concerns cannot be eliminated. This assessment has revealed no visual evidence of recognized environmental conditions associated with the subject site other than the aforementioned. Based upon the information obtained during the course of our recent assessment, pursuant to the limitations set forth in the text of this report, the site is considered acceptable for the proposed residential use, provided the following mitigation measures are properly implemented during planning, design, and construction.

- Based on the historic property use, septic tanks (systems) may exist on the property. Although not considered a hazardous waste, any buried septic systems should be properly removed or abandoned following health department guidelines.

- Any remaining trash, debris, and waste materials should be disposed of offsite, in accordance with current local, state, and federal disposal regulations. Any materials containing petroleum residues encountered during property improvements should be evaluated prior to removal and disposal, following proper procedures. Any

buried trash/debris encountered should be evaluated by an experienced environmental consultant prior to removal.

- Due to the demolition and removal of previous onsite structures, and associated building materials from the site, the potential for very small amounts of residual ACM's or LCP's to exist onsite is considered very low, however, cannot be entirely precluded based on our review.

- The three (3) wells located within areas of proposed development should be properly abandoned following City, County, and State guidelines.

- Based upon the information collected by GSI during this update environmental site assessment, further studies or action, other than the above, are not proposed from an environmental viewpoint, at this time.

LIMITATIONS

GSI has performed the services for this project in accordance with the terms of a contract between GSI and Client and in accordance with current professional standards for investigations of this type. The conclusions presented in this report are based on the information collected during the study, the present understanding of the site conditions, and professional judgment.

Please note, subsurface and hazardous waste/toxic substance conditions may vary from those provided in historical documents reviewed by GSI. The interpretations and recommendations of GSI are based solely on such information and/or information supplied by Client. Findings of this investigation based on data provided by others carries no warranty, expressed or implied, as a result of the usage of such data.

It is possible that future investigations may reveal additional data or variations of the current data which may require the current conclusions and recommendations to be reevaluated. As a result, GSI makes no warranty, either express or implied, as to its findings, opinions, recommendations, specifications, or professional advice except that they were promulgated after being prepared in accordance with generally accepted standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature.

The information in this report is relevant to the date of the site work and should not be relied on to represent conditions at any later date. Facts, conditions, and acceptable risk factors change with time, accordingly, this report should be viewed within this context.

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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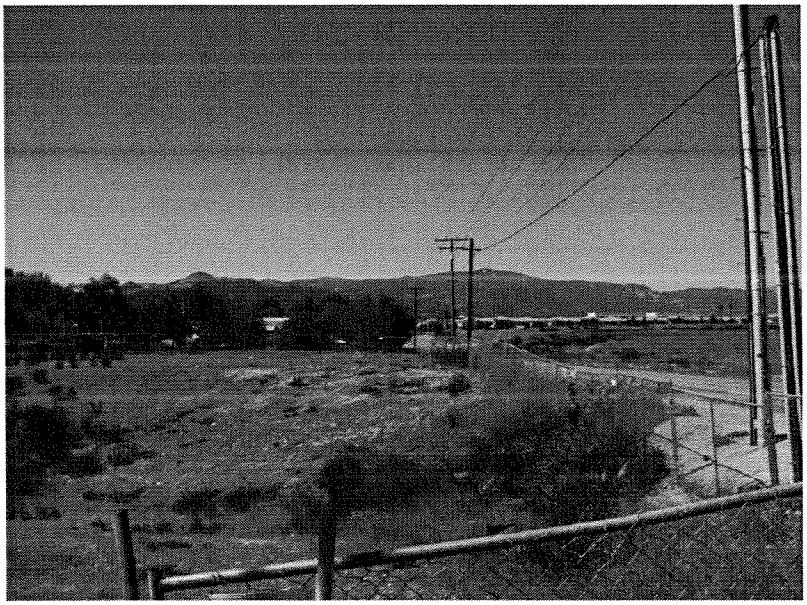
APPENDIX B

SITE PHOTOGRAPHS



1. Northeast corner of site looking west, at intersection of Prielipp Road and Elizabeth Lane. Note power lines on south side of Prielipp Road and transformer on far pole (northwest corner of property).

2. Southwestern portion of site looking east. Note household trash and debris.

GeoSoils, Inc.

SITE PHOTOGRAPHS

Plate B-1

DATE 9/12 | W.O. NO. E6451-SC

Geotechnical · Geologic · Coastal · Environmental

3. Northern-central portion of site looking northwest. Note well casing and stockpiled lumber and debris in foreground.

4. Eastern-central portion of site (adjacent to Elizabeth Lane) looking south. Note concrete foundations from removed aboveground storage tank (AST) in foreground.

GeoSoils, Inc.

SITE PHOTOGRAPHS

Plate B-2

DATE 9/12 | W.O. NO. E6451-SC

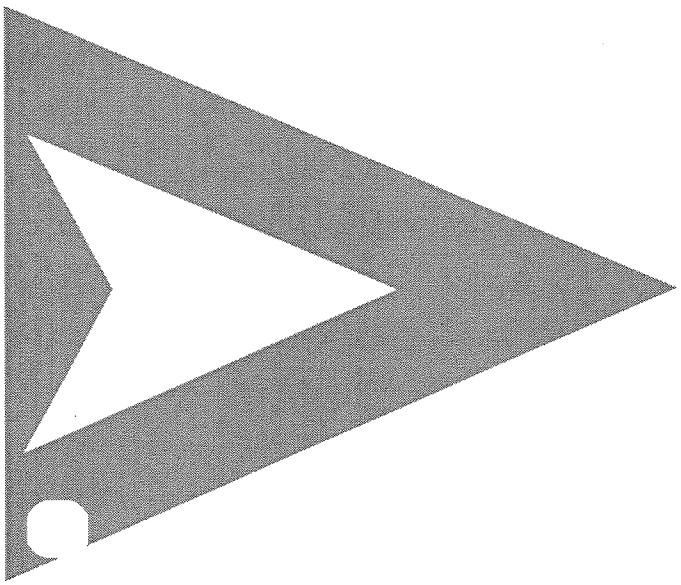
Geotechnical · Geologic · Coastal · Environmental

APPENDIX C

AGENCY RECORDS SEARCH, INTERVIEW, AERIAL PHOTOGRAPHS, AND REPORT COPIES OF PERTINENT REPORTS AND DOCUMENTS (PROVIDED AS CD DATA DISC)

FIRSTSEARCH

ENVIRONMENTAL FIRSTSEARCH REPORT



TARGET PROPERTY:

WILDOMAR 23

36605 ELIZABETH LN

WILDOMAR, CA 92595

JOB NUMBER: E6451-SC

PREPARED FOR:

GeoSoils, Inc

5741 Palmer Way

Carlsbad, Ca. 92010

September 14, 2012

Environmental FirstSearch
Search Summary Report

Target Site: 36605 ELIZABETH LN
WILDOMAR, CA 92595

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	07-09-12	1.00	0	0	0	0	0	0	0
NPL Delisted	Y	07-09-12	0.50	0	0	0	0	-	0	0
CERCLIS	Y	08-01-12	0.50	0	0	0	0	-	0	0
NFRAP	Y	08-01-12	0.50	0	0	0	0	-	0	0
RCRA COR ACT	Y	07-10-12	1.00	0	0	0	0	0	0	0
RCRA TSD	Y	07-10-12	0.50	0	0	0	0	-	0	0
RCRA GEN	Y	07-10-12	0.25	0	0	1	-	-	0	1
RCRA NLR	Y	07-10-12	0.12	0	0	-	-	-	0	0
Federal Brownfield	Y	07-15-12	0.50	0	0	0	0	-	0	0
ERNS	Y	07-05-12	0.12	0	0	-	-	-	0	0
Tribal Lands	Y	12-15-08	1.00	0	0	0	0	0	1	1
State/Tribal Sites	Y	08-13-12	1.00	0	0	0	0	0	0	0
State Spills 90	Y	06-06-12	0.12	0	0	-	-	-	0	0
State/Tribal SWL	Y	07-09-12	0.50	0	0	0	0	-	0	0
State/Tribal LUST	Y	06-06-12	0.50	0	0	0	0	-	0	0
State/Tribal UST/AST	Y	06-01-12	0.25	0	0	0	-	-	0	0
State/Tribal EC	Y	NA	0.25	0	0	0	-	-	0	0
State/Tribal IC	Y	07-11-12	0.25	0	0	0	-	-	0	0
State/Tribal VCP	Y	08-13-12	0.50	0	0	0	0	-	0	0
State/Tribal Brownfields	Y	NA	0.50	0	0	0	0	-	0	0
State Permits	Y	06-06-12	0.12	0	0	-	-	-	0	0
State Other	Y	08-13-12	0.25	0	0	0	-	-	0	0
Federal IC/EC	Y	06-13-12	0.25	0	0	0	-	-	0	0
HW Manifest	Y	08-02-10	0.12	0	0	-	-	-	0	0
-TOTALS-				0	0	1	0	0	1	2

Notice of Disclaimer

Due to the limitations, constraints, and inaccuracies and incompleteness of government information and computer mapping data currently available to FirstSearch Technology Corp., certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in FirstSearch Technology Corp.'s databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although FirstSearch Technology Corp. uses its best efforts to research the actual location of each site, FirstSearch Technology Corp. does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of FirstSearch Technology Corp.'s services proceeding are signifying an understanding of FirstSeaarch Technology Corp.'s searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

Environmental FirstSearch
Site Information Report

Request Date: 09-14-12
Requestor Name: Todd Greer
Standard: ASTM-05

Search Type: COORD
Job Number: E6451-SC
Filtered Report

Target Site: 36605 ELIZABETH LN
WILDOMAR, CA 92595

Demographics

Sites: 2 **Non-Geocoded:** 1 **Population:** NA

Radon: NA

Fire Insurance Map Coverage: No (>350 Ft. From Coverage)

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	-117.230000	-117:13:48	**Easting:**	478657.519
Latitude:	33.588046	33:35:17	**Northing:**	3716311.452
Elevation:	1309		**Zone:**	11

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes:

ZIP Code	City Name	ST	Dist/Dir	Sel

Services:

	Requested?	Date
Fire Insurance Maps	Yes	09-14-12
Aerial Photographs	Yes	09-14-12
Historical Topos	Yes	09-14-12
City Directories	Yes	09-14-12
Title Search	No	
Municipal Reports	No	
Liens	No	
Historic Map Works	No	
Online Topos	Yes	09-14-12

Environmental FirstSearch
Target Site Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL:	2	GEOCODED:	1	NON GEOCODED:	1	SELECTED:	0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Environmental FirstSearch
Sites Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
1	RCRAGN	SCE WILDOMAR SVC CTR CAR000196659/LGN	24487 PRIELIPP RD WILDOMAR CA 92595	0.23 NW	+ 29	1

Environmental FirstSearch
Sites Summary Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TOTAL: 2 **GEOCODED:** 1 **NON GEOCODED:** 1 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	ElevDiff	Page No.
	TRIBALLA	BUREAU OF INDIAN AFFAIRS CONTACT I BIA-92595/	UNKNOWN CA 92595	NON GC	N/A	3

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

RCRAGN

SEARCH ID: 2 **DIST/DIR:** 0.23 NW **ELEVATION:** 1338 **MAP ID:** 1

NAME: SCE WILDOMAR SVC CTR
ADDRESS: 24487 PRIELIPP RD
WILDOMAR CA 92595
RIVERSIDE
CONTACT:
SOURCE: EPA

REV: 7/10/12
ID1: CAR000196659
ID2:
STATUS: LGN
PHONE:

SITE INFORMATION

CONTACT INFORMATION: SARA M DUVALL
PO BOX 800
ROSEMEAD CA 91770

PHONE: 626-302-4187

OWNER NAME:SOUTHERN CALIFORNIA EDISON
OWNER TYPE:P-PRIVATE
OPERATOR:SOUTHERN CALIFORNIA EDISON
OPERATOR_TYPE:P-PRIVATE
MAILING ADDRESS: PO BOX 800 ATTN SARA DUVAL
UNIVERSE INFORMATION:

RECEIVED DATE:12/07/2010

SUBJECT TO CORRECTIVE ACTION (SUBJCA)

SUBJCA:N - NO
SUBJCA TSD 3004:N - NO
SUBJCA NON TSD:N - NO
SIGNIFICANT NON-COMPLIANCE(SNC):N - NO
BEGINNING OF THE YEAR SNC:
PERMIT WORKLOAD:-----
CLOSURE WORKLOAD:-----
POST CLOSURE WORKLOAD:-----
PERMITTING /CLOSURE/POST-CLOSURE PROGRESS:-----
CORRECTIVE ACTION WORKLOAD:N - NO
GENERATOR STATUS:LQG - LARGE QUANTITY GENERATORS: GENERATES MORE THAN 1000 KG/MONTH OF HAZARDOUS WASTE

INSTITUTIONAL CONTROL:N-NOENGINEERING CONTROL:N
HUMAN EXPOSURE:N-NOGW CONTROLS:N- NO
LAND TYPE:P-PRIVATESHORT TERM GEN:N
TRANS FACILITY:NREC WASTE FROM OFF SITE:N

IMPORTER ACTIVITY:N - NOMIXED WASTE GEN:N - NO
TRANS ACTIVITY:N - NOTSD ACTIVITY:N - NO
RECYCLER ACTIVITY:N - NOONSITE BURNER EXEMPT:N - NO
FURNACE EXEMPTION:N - NOUNDER INJECT ACTIVITY:N - NO
REC WASTE FROM OFF SITE:N - NOUNIV WASTE DEST FAC:N
USED OIL TRANS:N - NOUSED OIL PROCESSOR:N - NO
USED OIL REFINER:N - NOUSED OIL FUEL BURNER:N - NO
UO FUEL MARKETER TO BURNER:NUSED OIL SPEC MARKETER:N - NO

NAIC INFORMATION

221122 - ELECTRIC POWER DISTRIBUTION

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

RCRAGN

SEARCH ID: 2 **DIST/DIR:** 0.23 NW **ELEVATION:** 1338 **MAP ID:** 1

NAME: SCE WILDOMAR SVC CTR
ADDRESS: 24487 PRIELIPP RD
WILDOMAR CA 92595
RIVERSIDE
CONTACT:
SOURCE: EPA

REV: 7/10/12
ID1: CAR000196659
ID2:
STATUS: LGN
PHONE:

ENFORCEMENT INFORMATION:

VIOLATION INFORMATION:

HAZARDOUS WASTE INFORMATION:

133
151
181
211
213
214
221
223
261
272
291
331
343
352
461
512
513
541
551
731
D001 - IGNITABLE WASTE
D002 - CORROSIVE WASTE
D008 - LEAD
D018 - BENZENE
D039 - TETRACHLOROETHYLENE
F001 - THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F002 - THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F003 - THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/ BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON- HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Environmental FirstSearch
Site Detail Report

Target Property: 36605 ELIZABETH LN
WILDOMAR, CA 92595

JOB: E6451-SC

TRIBALLAND

SEARCH ID: 1 **DIST/DIR:** NON GC **ELEVATION:** **MAP ID:**

NAME:	BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION	**REV:**	01/15/08
ADDRESS:	UNKNOWN	**ID1:**	BIA-92595
	CA 92595	**ID2:**	
	RIVERSIDE	**STATUS:**	
CONTACT:		**PHONE:**	
SOURCE:	BIA		

BUREAU OF INDIAN AFFAIRS CONTACT INFORMATION

OFFICE: Pacific Regional Office
CONTACT: CLAY GREGORY,REGIONAL DIRECTOR

OFFICE ADDRESS: 2800 Cottage Way
Sacramento CA 95825
OFFICE PHONE: Phone: 916-978-6000
OFFICE FAX: Fax: 916-978-6099

The Native American Consultation Database (NACD) is a tool for identifying consultation contacts for Indian tribes, Alaska Native villages and corporations, and Native Hawaiian organizations. The database is not a comprehensive source of information, but it does provide a starting point for the consultation process by identifying tribal leaders and NAGPRA contacts. This database can be accessed online at the following web address http://home.nps.gov/nacd/

Environmental FirstSearch Descriptions

NPL: EPA NATIONAL PRIORITY LIST - The National Priorities List is a list of the worst hazardous waste sites that have been identified by Superfund. Sites are only put on the list after they have been scored using the Hazard Ranking System (HRS), and have been subjected to public comment. Any site on the NPL is eligible for cleanup using Superfund Trust money. A Superfund site is any land in the United States that has been contaminated by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment.FINAL - Currently on the Final NPLPROPOSED - Proposed for NPL

NPL DELISTED: EPA NATIONAL PRIORITY LIST Subset - Database of delisted NPL sites. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.DELISTED - Deleted from the Final NPL

CERCLIS: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM (CERCLIS)- CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL.PART OF NPL- Site is part of NPL siteDELETED - Deleted from the Final NPLFINAL - Currently on the Final NPLNOT PROPOSED - Not on the NPLNOT VALID - Not Valid Site or IncidentPROPOSED - Proposed for NPLREMOVED - Removed from Proposed NPLSCAN PLAN - Pre-proposal SiteWITHDRAWN - Withdrawn

NFRAP: EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY INFORMATION SYSTEM ARCHIVED SITES - database of Archive designated CERCLA sites that, to the best of EPA's knowledge, assessment has been completed and has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.NFRAP – No Further Remedial Action PlanP - Site is part of NPL siteD - Deleted from the Final NPLF - Currently on the Final NPLN - Not on the NPLO - Not Valid Site or IncidentP - Proposed for NPLR - Removed from Proposed NPLS - Pre-proposal SiteW – Withdrawn

RCRA COR ACT: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.RCRAInfo facilities that have reported violations and subject to corrective actions.

RCRA TSD: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM TREATMENT, STORAGE, and DISPOSAL FACILITIES. - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.Facilities that treat, store, dispose, or incinerate hazardous waste.

RCRA GEN: EPA/MA DEP/CT DEP RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM GENERATORS - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.Facilities that generate or transport hazardous waste or meet other RCRA requirements.LGN - Large Quantity GeneratorsSGN - Small Quantity GeneratorsVGN – Conditionally Exempt Generator.Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List) facilities. CONNECTICUT HAZARDOUS WASTE MANIFEST – Database of all shipments of hazardous waste within, into or from Connecticut. The data includes date of shipment, transporter and TSD info, and material shipped and quantity. This data is appended to the details of existing generator records. MASSACHUSETTES HAZARDOUS WASTE GENERATOR – database of generators that are regulated under the MA DEP. VQN-MA = generates less than 220 pounds or 27 gallons per month of hazardous waste or waste oil.SQN-MA = generates 220 to 2,200 pounds or 27 to 270 gallons per month of waste oil.LQG-MA = generates greater than 2,200 lbs of hazardous waste or waste oil per month.

RCRA NLR: EPA RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES - Database of hazardous waste information contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies, in turn pass on the information to regional and national EPA offices. This regulation is governed by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984.not currently classified by the EPA but are still included in the RCRAInfo database. Reasons for non classification: Failure to report in a timely matter. No longer in business. No longer in business at the listed address. No longer generating hazardous waste materials in quantities which require reporting.

Fed Brownfield: EPA BROWNFIELD MANAGEMENT SYSTEM (BMS) - database designed to assist EPA in collecting, tracking, and updating information, as well as reporting on the major activities and accomplishments of the various Brownfield grant Programs./n CLEANUPS IN MY COMMUNITY (subset) - Sites, facilities and properties that have been contaminated by hazardous materials and are being, or have been, cleaned up under EPA's brownfield's program.

ERNS: EPA/NRC EMERGENCY RESPONSE NOTIFICATION SYSTEM (ERNS) - Database of incidents reported to the National Response Center. These incidents include chemical spills, accidents involving chemicals (such as fires or explosions), oil spills, transportation accidents that involve oil or chemicals, releases of radioactive materials, sightings of oil sheens on bodies of water, terrorist incidents involving chemicals, incidents where illegally dumped chemicals have been found, and drills intended to prepare responders to handle these kinds of incidents. Data since January 2001 has been received from the National Response System database as the EPA no longer maintains this data.

Tribal Lands: DOI/BIA INDIAN LANDS OF THE UNITED STATES - Database of areas with boundaries established by treaty, statute, and (or) executive or court order, recognized by the Federal Government as territory in which American Indian tribes have primary governmental authority. The Indian Lands of the United States map layer shows areas of 640 acres or more, administered by the Bureau of Indian Affairs. Included are Federally-administered lands within a reservation which may or may not be considered part of the reservation.BUREAU OF INDIAN AFFIARS CONTACT - Regional contact information for the Bureau of Indian Affairs offices.

State/Tribal Sites: CA EPA SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be

contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC's staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The SMBRPD displays information in six categories, two of which are found in ST. The categories listed under ST are: 1. State Response Sites. 2. School Property Evaluation Program Properties (SCH) Please Note: Our reports list the above sites as DB Type (STATE). Other categories found in the SMBRPD are listed in our reports in the DB Types OT and VC. Each Category contains information on properties based upon the type of work taking place at the site. State Response Sites contains only known and potential hazardous substance release sites considered as posing the greatest threat to the public. School sites included in ST will be found within the SMBRPD's School Property Evaluation Program. CORTESE LIST-Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by Cal/EPA, Hazardous Materials Data Management Program to provide information about the location of hazardous materials release sites. Cortese List sites that fall under DTSC's guidelines for State Response sites are included in our reports in the ST category as are qualifying sites from the Annual Work Plan (formerly Bond Expenditure Plan) and the historic ASPIS databases.

State Spills 90: CA EPA SLIC REGIONS 1 - 9- The California Regional Water Quality Control Boards maintain report of sites that have records of spills, leaks, investigation, and cleanups.

State/Tribal SWL: CA IWMB/SWRCB/COUNTY SWIS SOLID WASTE INFORMATION SYSTEM-The California Integrated Waste Management Board maintains a database on solid waste facilities, operations, and disposal sites throughout the state of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites. For more information on individual sites call the number listed in the source field.. Please Note: This database contains poor site location information for many sites in our reports; therefore, it may not be possible to locate or plot some sites in our reports. WMUDS-The State Water Resources Control Board maintained the Waste Management Unit Database System (WMUDS). It is no longer updated. It tracked management units for several regulatory programs related to waste management and its potential impact on groundwater. Two of these programs (SWAT & TPCA) are no longer on-going regulatory programs as described below. Chapter 15 (SC15) is still an on-going regulatory program and information is updated periodically but not to the WMUDS database. The WMUDS System contains information from the following agency databases: Facility, Waste Management Unit (WMU), Waste Discharger System (WDS), SWAT, Chapter 15, TPCA, RCRA, Inspections, Violations, and Enforcement's. Note: This database contains poor site location information for many sites in our reports; therefore, it may not be possible to locate or plot some sites in reports. ORANGE COUNTY LANDFILLS LIST- A list maintained by the Orange County Health Department.

State/Tribal LUST: CA SWRCB/COUNTY LUSTIS- The State Water Resources Control Board maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks. Information for this database is collected from the states regional boards quarterly and integrated with this database. SAN DIEGO COUNTY LEAKING TANKS- The San Diego County Department of Environmental Health maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks within its HE17/58 database. For more information on a specific file call the HazMat Duty Specialist at phone number listed in the source information field.

State/Tribal UST/AST: CA EPA/COUNTY/CITY ABOVEGROUND STORAGE TANKS LISTING-The Above Ground Petroleum Storage Act became State Law effective January 1, 1990. In general, the law requires owners or operators of AST's with petroleum products to file a storage statement and pay a fee by July 1, 1990 and every two years thereafter, take specific action to prevent spills, and in certain instances implement a groundwater monitoring program. This law does not apply to that portion of a tank facility associated with the production oil and regulated by the State Division of Oil and Gas of the Dept. of Conservation. SWEEPS / FIDS STATE REGISTERED UNDEGROUND STORAGE TANKS- Until 1994 the State Water Resources Control Board maintained a database of registered underground storage tanks statewide referred

to as the SWEEPS System. The SWEEPS UST information was integrated with the CAL EPA's Facility Index System database (FIDS) which is a master index of information from numerous California agency environmental databases. That was last updated in 1994. We have included the UST information from the FIDS database in our reports for historical purposes to help our clients identify where tanks may possibly have existed. For more information on specific sites from individual paper files archived at the State Water Resources Control Board call the number listed with the source information. INDIAN LANDS UNDERGROUND STORAGE TANKS LIST- A listing of underground storage tanks currently on Indian Lands under federal jurisdiction. California Indian Land USTS are administered by US EPA Region 9.CUPA DATABASES & SOURCES- Definition of a CUPA: A Certified Unified Program Agency (CUPA) is a local agency that has been certified by the CAL EPA to implement six state environmental programs within the local agency's jurisdiction. These can be a county, city, or JPA (Joint Powers Authority). This program was established under the amendments to the California Health and Safety Code made by SB 1082 in 1994. A Participating Agency (PA) is a local agency that has been designated by the local CUPA to administer one or more Unified Programs within their jurisdiction on behalf of the CUPA. A Designated Agency (DA) is an agency that has not been certified by the CUPA but is the responsible local agency that would implement the six unified programs until they are certified. Please Note: We collect and maintains information regarding Underground Storage Tanks from the majority of the CUPAS and Participating Agencies in the State of California. These agencies typically do not maintain nor release such information on a uniform or consistent schedule; therefore, currency of the data may vary. Please look at the details on a specific site with a UST record in the First Search Report to determine the actual currency date of the record as provided by the relevant agency. Numerous efforts are made on a regular basis to obtain updated records.

State/Tribal IC: CA EPA DEED-RESTRICTED SITES LISTING- The California EPA's Department of Toxic Substances Control Board maintains a list of deed-restricted sites, properties where the DTSC has placed limits or requirements on the future use of the property due to varying levels of cleanup possible, practical or necessary at the site.

State/Tribal VCP: CA EPA SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC's staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The Voluntary Cleanup Program (VCP) category contains only those properties undergoing voluntary investigation and/or cleanup and which are listed in the Voluntary Cleanup Program.Please Note: Our reports list the above sites as DB Type VC.

State Permits: CA EPA/COUNTY SAN DIEGO COUNTY HE17 PERMITS- The HE17/58 database tracks establishments issued permits and the status of their permits in relation to compliance with federal, state, and local regulations that the County oversees. It tracks if a site is a hazardous waste generator, TSD, gas station, has underground tanks, violations, or unauthorized releases. For more information on a specific file call the HazMat Duty Specialist at the phone number listed in the source information field. SAN BERNARDINO COUNTY HAZARDOUS MATERIALS PERMITS- Handlers and Generators Permit Information Maintained by the Hazardous Materials Division.

State Other: CA EPA/COUNTY SMBRPD / CAL SITES- The California Department of Toxic Substances Control (DTSC) has developed an electronic database system called Envirostor with information about sites that are known to be contaminated with hazardous substances as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database (SMBRPD), formerly known as CalSites, is used primarily by DTSC's staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. The SMBRPD displays information in six categories, two of which are found in ST. The categories listed under OT are: 1. Unconfirmed Properties Referred to Another Local or State Agency (REF) 2. Properties where a No Further Action Determination has been made (NFA) Please Note: Our reports list the

above sites as DB Type (OTHER). Other categories found in the SMBRPD are listed in our reports in the DB Types ST and VC.LA COUNTY SITE MITIGATION COMPLAINT CONTROL LOG- The County of Los Angeles Public Health Investigation Compliant Control Log. ORANGE COUNTY INDUSTRIAL SITE CLEANUPS- List maintained by the Orange County Environmental Health Agency. RIVERSIDE COUNTY WASTE GENERATORS-A list of facilities in Riverside County which generate hazardous waste. SACRAMENTO COUNTY MASTER HAZMAT LIST-Master list of facilities within Sacramento County with potentially hazardous materials. SACRAMENTO COUNTY TOXIC SITE CLEANUPS-A list of sites where unauthorized releases of potentially hazardous materials have occurred.

Federal IC / EC: EPA FEDERAL ENGINEERING AND INSTITUTIONAL CONTROLS- Superfund sites that have either an engineering or an institutional control. The data includes the control and the media contaminated. RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM SITES (RCRA) – RCRA site the have institutional controls.

State/Tribal HW: CA EPA DEPARTMENT OF TOXIC SUBSTANCES CONTROL HAZARDOUS WASTE MANIFEST INVENTORY-Records maintained by the CA DTSC of Hazardous Waste Manifests used to track and document the transport of hazardous waste from a generator's site to the site of its final disposition.

Environmental FirstSearch Database Sources

NPL: EPA Environmental Protection Agency

Updated quarterly

NPL DELISTED: EPA Environmental Protection Agency

Updated quarterly

CERCLIS: EPA Environmental Protection Agency

Updated quarterly

NFRAP: EPA Environmental Protection Agency.

Updated quarterly

RCRA COR ACT: EPA Environmental Protection Agency.

Updated quarterly

RCRA TSD: EPA Environmental Protection Agency.

Updated quarterly

RCRA GEN: EPA/MA DEP/CT DEP Environmental Protection Agency, Massachusetts Department of Environmental Protection, Connecticut Department of Environmental Protection

Updated quarterly

RCRA NLR: EPA Environmental Protection Agency

Updated quarterly

Fed Brownfield: EPA Environmental Protection Agency

Updated quarterly

ERNS: EPA/NRC Environmental Protection AgencyNational Response Center.

Updated annually

Tribal Lands: DOI/BIA United States Department of the InteriorBureau of Indian Affairs

Updated annually

State/Tribal Sites: CA EPA The CAL EPA, Depart. Of Toxic Substances Control Phone: (916) 323-3400 For Cortese List information contact The CAL EPA, Department of Toxic Substances Control at (916) 445-6532

Updated quarterly/when available

State Spills 90: CA EPA The California State Water Resources Control Board For phone number listings of departments within each region visit their web sites at: http://www.swrcb.ca.gov/regions.html

Updated when available

State/Tribal SWL: CA IWMB/SWRCB/COUNTY The California Integrated Waste Management Board
Phone:(916) 255-2331
The State Water Resources Control Board
Phone:(916) 227-4365
Orange County Health Department
Phone:(714) 834-3536

Updated quarterly/when available

State/Tribal LUST: CA SWRCB/COUNTY The California State Water Resources Control Board Phone:(916) 227-4416 San Diego County Department of Environmental Health Phone:(619) 338-2242

Updated quarterly/when available

State/Tribal UST/AST: CA EPA/COUNTY/CITY The State Water Resources Control Board
Phone:(916) 227-4364
CAL EPA Department of Toxic Substances Control
Phone:(916)227-4404
US EPA Region 9 Underground Storage Tank Program
Phone: (415) 972-3372
ALAMEDA COUNTY CUPAS:
* County of Alameda Department of Environmental Health
* Cities of Berkeley, Fremont, Hayward, Livermore / Pleasanton, Newark, Oakland, San Leandro, Union
ALPINE COUNTY CUPA:
* Health Department (Only updated by agency sporadically)
AMADOR COUNTY CUPA:
* County of Amador Environmental Health Department
BUTTE COUNTY CUPA
* County of Butte Environmental Health Division (Only updated by agency biannually)
CALAVERAS COUNTY CUPA:
* County of Calaveras Environmental Health Department
COLUSA COUNTY CUPA:
* Environmental Health Dept.
CONTRA COSTA COUNTY CUPA:
* Hazardous Materials Program
DEL NORTE COUNTY CUPA:
* Department of Health and Social Services

EL DORADO COUNTY CUPAS:
* County of El Dorado Environmental Health - Solid Waste Div (Only updated by agency annually)
* County of El Dorado EMD Tahoe Division (Only updated by agency annually)
FRESNO COUNTY CUPA:
* Haz. Mat and Solid Waste Programs
GLENN COUNTY CUPA:
* Air Pollution Control District
HUMBOLDT COUNTY CUPA:
* Environmental Health Division
IMPERIAL COUNTY CUPA:
* Department of Planning and Building
INYO COUNTY CUPA:
* Environmental Health Department
KERN COUNTY CUPA:
* County of Kern Environmental Health Department
* City of Bakersfield Fire Department
KINGS COUNTY CUPA:
* Environmental Health Services
LAKE COUNTY CUPA:
* Division of Environmental Health
LASSEN COUNTY CUPA:
* Department of Agriculture
LOS ANGELES COUNTY CUPAS:
* County of Los Angeles Fire Department CUPA Data as maintained by the Los Angeles County Department of Public Works
* County of Los Angeles Environmental Programs Division
* Cities of Burbank, El Segundo, Glendale, Long Beach/Signal Hill, Los Angeles,Pasadena, Santa Fe Springs, Santa Monica, Torrance, Vernon
MADERA COUNTY CUPA:
* Environmental Health Department
MARIN COUNTY CUPA:
* County of Marin Office of Waste Management
* City of San Rafael Fire Department
MARIPOSA COUNTY CUPA:
* Health Department
MENDOCINO COUNTY CUPA:
* Environmental Health Department
MERCED COUNTY CUPA:
* Division of Environmental Health
MODOC COUNTY CUPA:
* Department of Agriculture
MONO COUNTY CUPA:
* Health Department
MONTEREY COUNTY CUPA:
* Environmental Health Division
NAPA COUNTY CUPA:
* Hazardous Materials Section
NEVADA COUNTY CUPA:

* Environmental Health Department
ORANGE COUNTY CUPAS:
* County of Orange Environmental Health Department
* Cities of Anaheim, Fullerton, Orange, Santa Ana
* County of Orange Environmental Health Department
PLACER COUNTY CUPAS:
* County of Placer Division of Environmental Health Field Office
* Tahoe City
* City of Roseville Roseville Fire Department
PLUMAS COUNTY CUPA:
* Environmental Health Department
RIVERSIDE COUNTY CUPA:
* Environmental Health Department
SACRAMENTO COUNTY CUPA:
* County Environmental Mgmt Dept, Haz. Mat. Div.
SAN BENITO COUNTY CUPA:
* City of Hollister Environmental Service Department
SAN BERNARDINO COUNTY CUPAS:
* County of San Bernardino Fire Department, Haz. Mat. Div.
* City of Hesperia Hesperia Fire Prevention Department
*City of Victorville Victorville Fire Department
SAN DIEGO COUNTY CUPA:
* The San Diego County Dept. of Environmental Health HE 17/58
SAN FRANCISCO COUNTY CUPA:
* Department of Public Health
SAN JOAQUIN COUNTY CUPA:
* Environmental Health Division
SAN LUIS OBISPO COUNTY CUPAS:
* County of San Luis Obispo Environmental Health Division
* City of San Luis Obispo City Fire Department
SAN MATEO COUNTY CUPA:
* Environmental Health Department
SANTA BARBARA COUNTY CUPA:
* County Fire Dept Protective Services Division
SANTA CLARA COUNTY CUPAS:
* County of Santa Clara Hazardous Materials Compliance Division
* Santa Clara County Central Fire Protection District (Covers Campbell, Cupertino, Los Gatos, & Morgan Hill)
* Cities of Gilroy, Milpitas, Mountain View, Palo Alto, San Jose Fire, Santa Clara, Sunnyvale
SANTA CRUZ COUNTY CUPA:
* Environmental Health Department
SHASTA COUNTY CUPA:
* Environmental Health Department
SIERRA COUNTY CUPA:
* Health Department
SISKIYOU COUNTY CUPA:
* Environmental Health Department
SONOMA COUNTY CUPAS:
* County of Sonoma Department Of Environmental Health

* Cities of Healdsburg / Sebastopol, Petaluma, Santa Rosa
STANISLAUS COUNTY CUPA:
* Department of Environmental Resources Haz. Mat. Division
SUTTER COUNTY CUPA:
* Department of Agriculture
TEHAMA COUNTY CUPA:
* Department of Environmental Health
TRINITY COUNTY CUPA:
* Department of Health
TULARE COUNTY CUPA:
* Environmental Health Department
TUOLUMNE COUNTY CUPA:
* Environmental Health
VENTURA COUNTY CUPAS:
* County of Ventura Environmental Health Division
* Cities of Oxnard, Ventura
YOLO COUNTY CUPA:
* Environmental Health Department
YUBA COUNTY CUPA:
* Yuba County of Emergency Services

Updated quarterly/annually/when available

State/Tribal IC: CA EPA The California EPA Department of Toxic Substances Control.Phone:(916) 255-3745

Updated Updated quarterly/annually/when available

State/Tribal VCP: CA EPA The California EPA Department of Toxic Substances Control.Phone:(916) 255-3745

Updated Updated quarterly/annually/when available

State Permits: CA EPA/COUNTY The San Diego County Depart. Of Environmental Health Phone:(619) 338-2211 San Bernardino County Fire Department Phone:(909) 387-3080

Updated quarterly/when available

State Other: CA EPA/COUNTY The CAL EPA, Depart. Of Toxic Substances Control Phone: (916) 323-3400 The Los Angeles County Hazardous Materials Division Phone: (323) 890-7806 Orange County Environmental Health Agency Phone: (714) 834-3536 Riverside County Department of Environmental Health, Hazardous Materials Management Division Phone:(951) 358-5055 Sacramento County Environmental Management Department Phone: (916) 875-8550

Updated quarterly/when available

Federal IC / EC: EPA Environmental Protection Agency

Updated quarterly

State/Tribal HW: CA EPA CAL EPA, Department of Toxic Substances Control Phone:(916) 255-087

Updated annually/when available

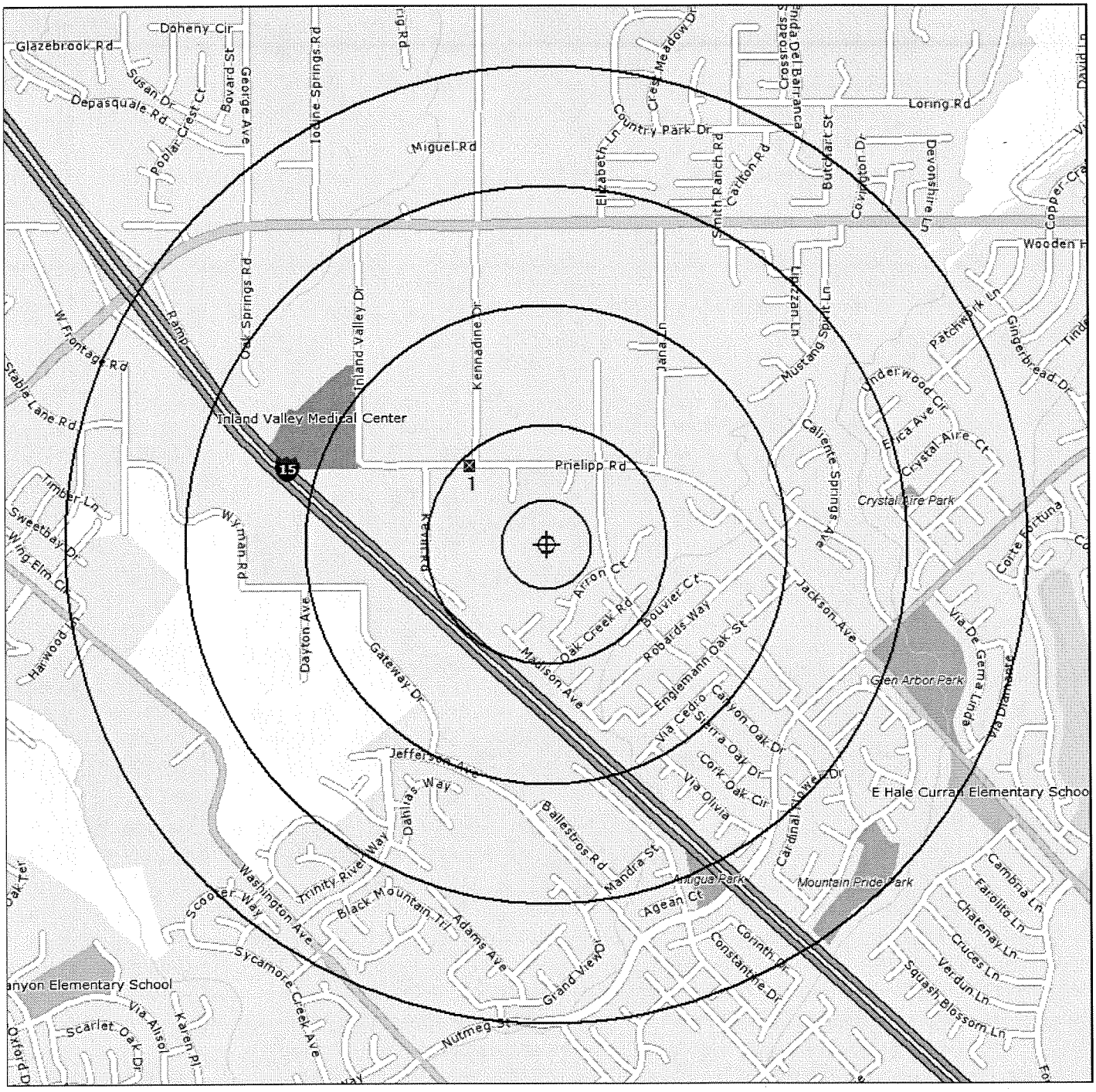
Environmental FirstSearch

1 Mile Radius

Single Map:

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

ELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

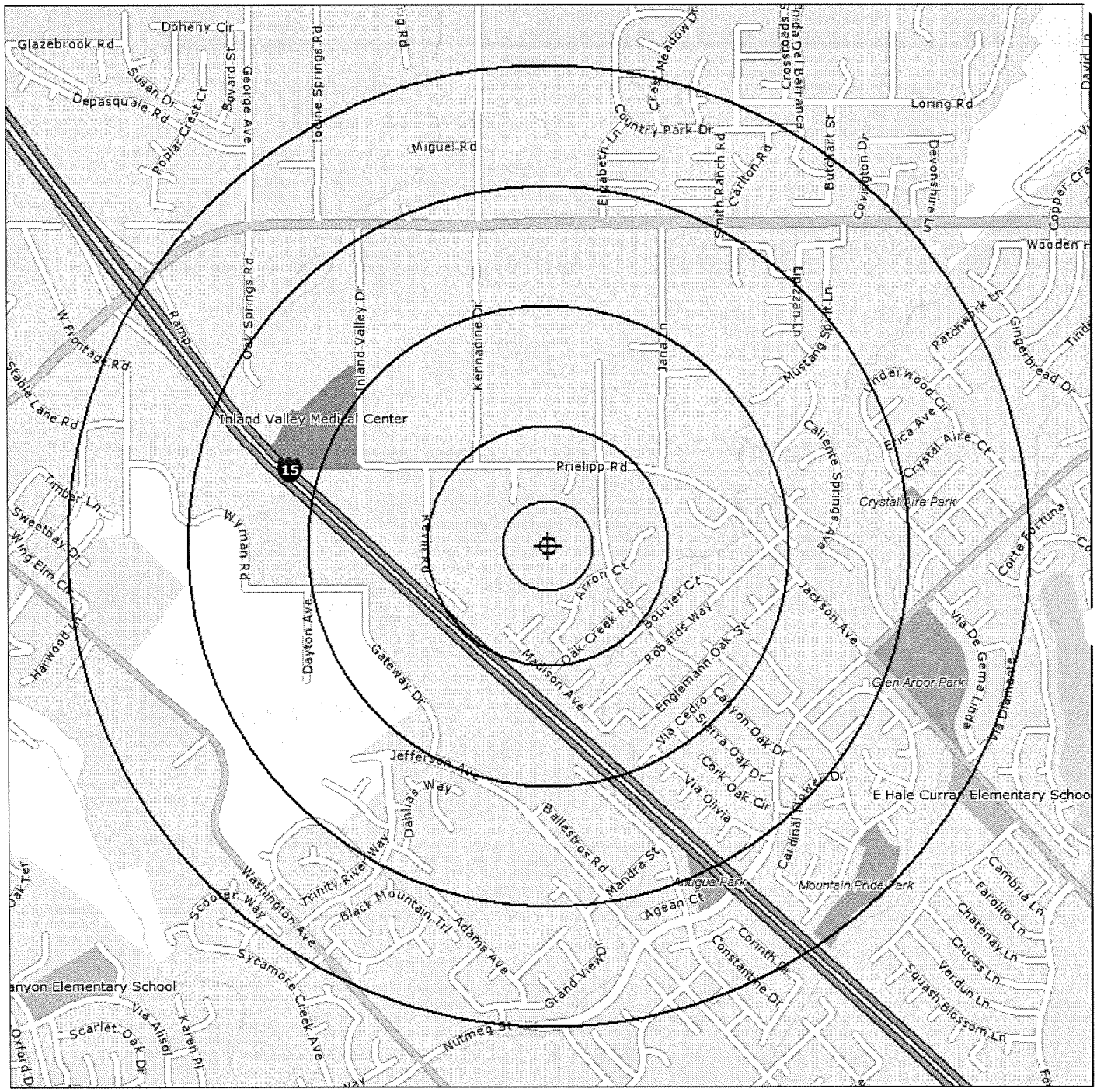
Environmental FirstSearch

1 Mile Radius

ASTM-05: NPL, RCRACOR, STATE

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.5 Mile Radius

ASTM-05: Multiple Databases

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595

Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

ELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.25 Mile Radius

ASTM-05: RCRAGEN, UST, OTHER, FEDIC/EC

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595

Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

NPL, DELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

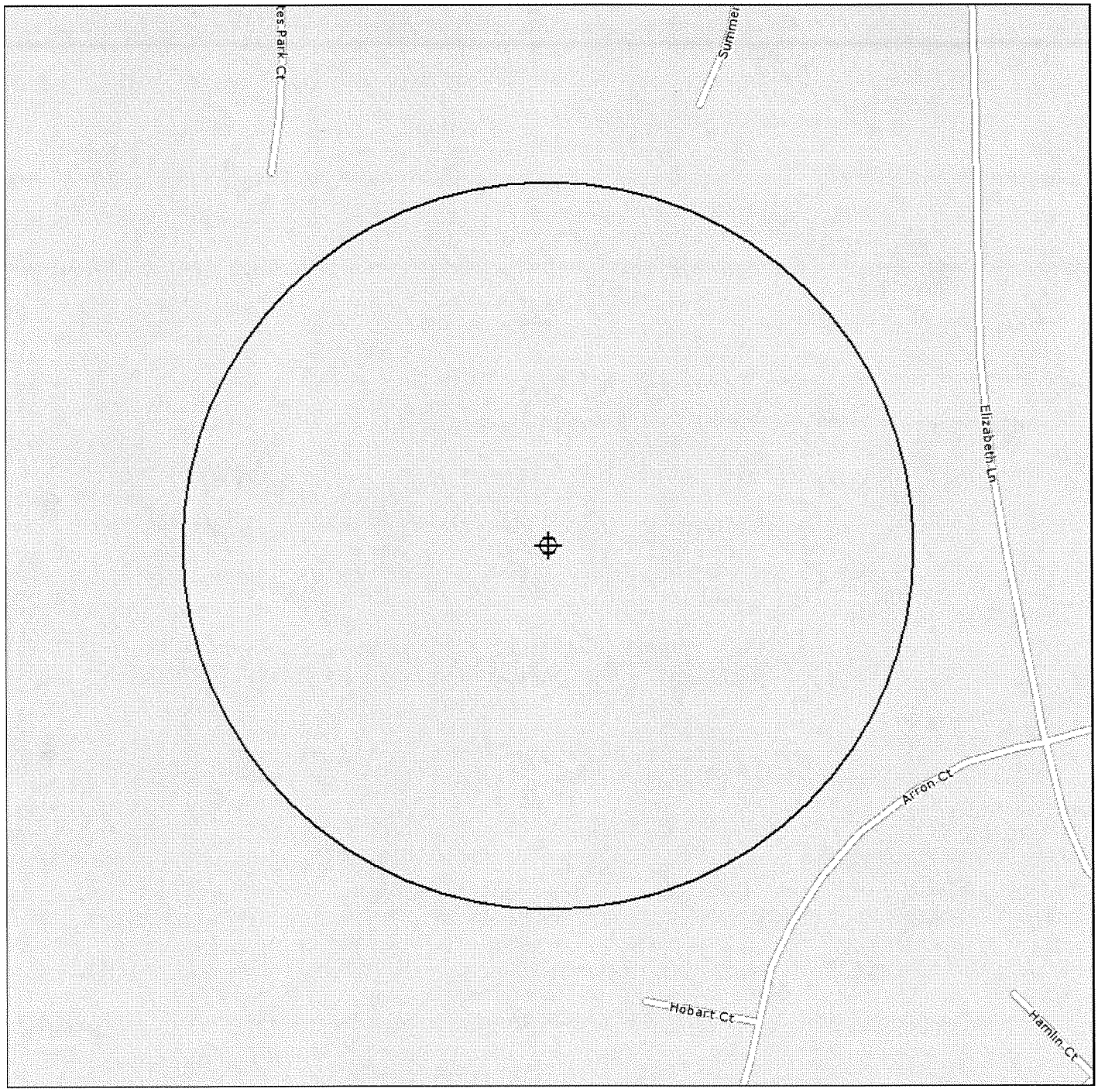
Environmental FirstSearch

.12 Mile Radius

ASTM-05: Multiple Databases

FIRSTSEARCH

36605 ELIZABETH LN, WILDOMAR, CA 92595



Source: Tele Atlas

Target Site (Latitude: 33.588046 Longitude: -117.230000) .....

Identified Site, Multiple Sites, Receptor .....

ELNPL, Brownfield, Solid Waste Landfill (SWL), Hazardous Waste

Triballand.....

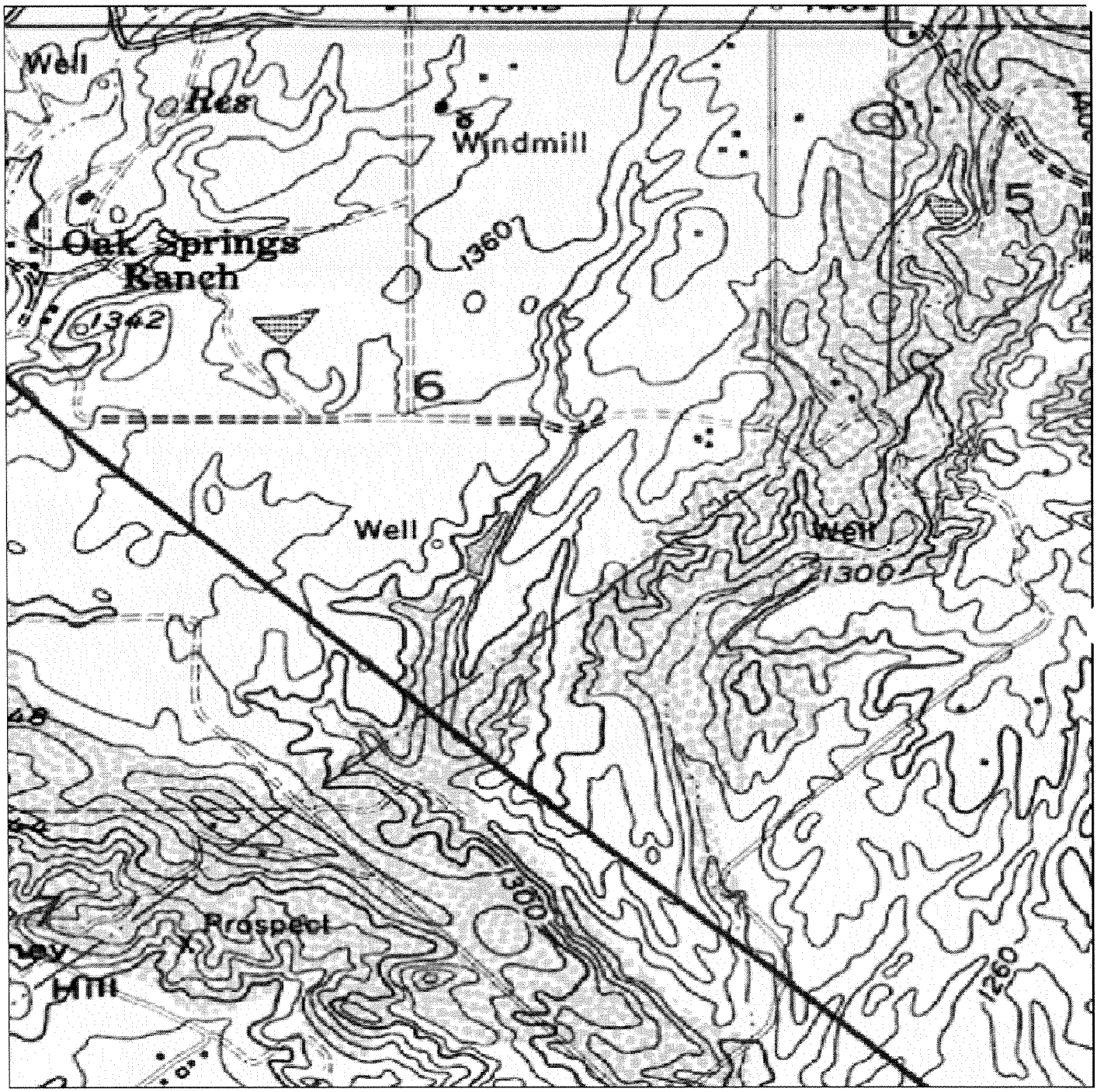
Black Rings Represent 1/4 Mile Radius; Red Ring Represents 500 ft. Radius

Site Location Map

Topo : 0.75 Mile Radius

36605 ELIZABETH LN, WILDOMAR, CA 92595

FIRSTSEARCH



SOURCE: SCANNED USGS TOPOGRAPHIC QUADRANGLES
SCANNED BY MAPTECH AND USGS
DISTRIBUTED AUGUST, 2005.

Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

0 495 990 1,980 2,970 3,960 Feet

FIRSTSEARCH	Data Supplied by: MAPTECH	Prepared by FirstSearch Technology Corporation		JOB NO.
		Map Name: MURRIETA	Date Created: 1953--	Date Revised: 1979--
		Map Reference Code: 33117-E2-TF-024	Contour Interval: 20 feet	Elevation:
				FIGURE NO. 1

FIRSTSEARCH

HISTORICAL FIRE INSURANCE MAPS

NO MAPS AVAILABLE

Report Date: 9/14/2012
Client Job Number: E6451-SC
FirstSearch Index Number: 339103
Site Address(es): 36605 36625 ELIZABETH LN
WILDOMAR, CA 92595

A search of FirstSearch Environmental Information's proprietary database of historical fire insurance map availability confirmed that there are NO MAPS AVAILABLE for the Subject Location as shown above.

FirstSearch Environmental Information's proprietary database of historical fire insurance map availability represents abstracted information from the Sanborn® Map Company LLC obtained through online access to the Library of Congress as well as the result of a review of the other fire insurance map microfilm collections available via various local libraries.

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FirstSearch Environmental Information

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ENVIRONMENTAL SITE ASSESSMENT
TRANSACTION SCREEN QUESTIONNAIRE

This document is an excerpt of Practice E1528-06: Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessment as is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. COPYRIGHT@ 2006 ASTM INTERNATIONAL, West Conshohocken, PA. Prior edition copyrighted 2000. Stock # ADJE152806. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer service at (610) 832-9585

5. Introduction to Transaction Screen Questionnaire

5.1 *Process*--The *transaction screen process* consists of asking questions contained within the *transaction screen questionnaire* of *owners* and *occupants* of the *property*, observing site conditions at the property with direction provided by the *transaction screen questionnaire*, and, to the extent *reasonably ascertainable*, conducting limited research regarding certain government records and certain standard historical sources. The questions asked of *owners* are the same questions as those asked of *occupants*.

5.2 *Guide*--The *transaction screen questionnaire* is followed by a guide designed to assist the person completing the *transaction screen questionnaire*. The guide to the *transaction screen questionnaire* is set out in Sections 7-10 of this practice. The guide is divided into three sections: Guide for Owner/Occupant Inquiry, Guide to Site Visit, and Guide to Government Records/Historical Sources Inquiry.

5.2.1 To assist the *user*, its employee or agent, or the preparer in preparing a report, the guide repeats each of the questions set out in the *transaction screen questionnaire* in both the guide for *owner/occupant* inquiry and the guide to *site visit*. The questions regarding government records/historical sources inquiry are also repeated in the guide to that section.

5.2.2 The guide also describes the procedures to be followed to determine if reliance upon the information in a prior *transaction screen* is appropriate under this practice.

5.2.3 A *user*, his employee or agent, or *preparer* conducting the *transaction screen process* should not use the *transaction screen questionnaire* without reference to or without familiarity with the guide based on prior use of the guide.

5.3 The *user* may either conduct the *transaction screen process*, or delegate it to an employee or agent or may contract with a third party to prepare the questionnaire on behalf of the *user*. No matter who prepares the questionnaire, the *user* remains responsible for the decision to conduct limited environmental *due diligence* and the impact of that decision on risk management.

5.4 The *preparer* conducting the *transaction screen* process should use good faith efforts in determining answers to the questions set forth in the *transaction screen questionnaire*. The *user* should take time and care to check whatever records are in the *user's* possession and forward relevant information or specialized knowledge to the *preparer*.

5.5 *Knowledge*--All answers should be given to the best of the *owner's* or *occupant's* knowledge. The most knowledgeable person available should be chosen to answer the questions.

5.5.1 While the person conducting the *transaction screen* has an obligation to ask the questions in the *transaction screen questionnaire*, others may have no obligation to answer them.

5.5.2 The *transaction screen questionnaire* and the *transaction screen guide* sometimes include the phrase "to the best of your knowledge." This phrase does not impose a constructive knowledge standard. It is intended as an assurance to the person being questioned that he or she is not obligated to search out information he or she does not currently have in order to answer the particular question.

5.6 *Conclusions Regarding Affirmative* or *Unknown Answers*--Once a *transaction screen questionnaire* has been completed, it shall be presented to the user. Subject to 5.6 through 5.7, an affirmative, unknown, or no response is presumed to be a *potential environmental concern*. If any of the questions set forth in the *transaction screen questionnaire* are answered in the affirmative, the *preparer* must document the reason for the affirmative answer. If any of the questions are not answered or the answer is unknown, the *user* should document such nonresponse or answer of unknown and evaluate it in light of the other information obtained in the *transaction screen process*, including, in particular, the site visit and the government records/historical sources inquiry. If the *user* decides no further inquiry is warranted after receiving no response, an answer of unknown, or an affirmative answer, the *user* must document the reasons for any such conclusion.

5.6.1 Upon obtaining an affirmative answer, an answer of unknown or no response, the *user* should first refer to the guide. The guide may provide sufficient explanation to allow a *user* to conclude that no further inquiry is appropriate with respect to the particular question.

5.6.2 If the guide to a particular question does not, in itself, permit a user to conclude that no further inquiry is appropriate, then the user should consider other information obtained from the *transaction screen process* relating to this question. For example, while on the site performing a *site visit*, a person may find a storage tank on the *property* and therefore answer Question 10 of the *transaction screen questionnaire* in the affirmative. However, during or subsequent to the *owner/occupant* inquiry, the *owner* may establish that substances now or historically contained in the tank (for example, water) are not likely to cause contamination.

5.6.3 If either the guide to the question or other information obtained during the *transaction screen process* does not permit a *user* to conclude no further inquiry is appropriate with respect to such question, then the user must determine, in the exercise of the *user's* reasonable business judgment, based upon the totality of unresolved affirmative answers or answers of unknown received during the *transaction screen process*, whether further inquiry may be limited to those specific issues identified as of concern.

5.7 *Presumption*--A presumption exists that further inquiry is necessary if an affirmative answer is given to a question or because the answer was unknown or no response was given. In rebutting this presumption, the *user* should evaluate information obtained from each component of the *transaction screen* process and consider whether sufficient information has been obtained to conclude that no further inquiry is necessary. The *user* must determine, in the exercise of the *user's* reasonable business judgment, the scope of such further inquiry.

5.8 *Further Inquiry*--Upon completing the *transaction screen questionnaire*, if the *user* concludes that further inquiry or action is needed (for example, consult with an environmental consultant, contractor, governmental authority, or perform additional governmental and/or historical records review), the *user* should proceed with such inquiry. (Note that if the *user* determines to proceed with a Phase I Environment Site Assessment, the *user* may apply the current Practice E 1527 or alternatively the provisions of EPA's regulation "Standards and Practices for All Appropriate Inquiries," 40 C.F.R. Part 312.)

5.9 *Signature*--The user and the *preparer* of the *transaction screen questionnaire* must complete and sign the questionnaire as provided at the end of the questionnaire.

6. Transaction Screen Questionnaire

6.1 *Persons to Be Questioned*-The following questions should be asked of *(1)* the current owner of the *property*, *(2)* any major occupant of the *property* or, if the property does not have any *major occupants*, at least 10 % of the occupants of the *property*, and *(3)* in addition to the current owner and the occupants identified in *(2)*, any *occupant* likely to be using, treating, generating, storing, or disposing of *hazardous substances* or *petroleum products* on or from the *property* A major occupant is any *occupant* using at least 40 % of the leasable area of the *property* or any anchor tenant when the *property* is a shopping center. In a multifamily *property* containing both residential and commercial uses, the *preparer* does not need to ask questions of the residential *occupants*. The *preparer* should ask each person to answer all questions to the best of the respondent's *actual knowledge* and in good faith When completing the *site visit* column, the *preparer* should be sure to observe the *property* and any buildings and other structures on the *property* The guide to this *transaction screen questionnaire* (see Sections 7-10) provides further details on the appropriate use of this questionnaire (See Note 2.)
NOTE 2-Unk = "unknown" or "no response "

Description of Site Address:

36630 Estes Park Court, and 36605 and 36625 Elizabeth Lane
APN's 380-280-004, 009, 010, 011, and 012, City of Wildomar
Riverside County, California, 92595

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
1a Is the property used for an industrial use?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
1b Is any adjoining property used for an industrial use?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
2a Did you observe evidence or do you have any prior knowledge that the property has been used for an industrial use in the past?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
2b Did you observe evidence or do you have any prior knowledge that any adjoining property has been used for an industrial use in the past?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
3a Is the property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
3b Is any adjoining property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
4a Did you observe evidence or do you have any prior knowledge that the property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
4b Did you observe evidence or do you have any prior knowledge that any adjoining property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
5a Are there currently any damaged or discarded automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
5b Did you observe evidence or do you have any prior knowledge that there have been previously any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
6a Are there currently any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
6b Did you observe evidence or do you have any prior knowledge that there have been previously any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
7a Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that originated from a contaminated site?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	

'Unk = "unknown" or "no response"

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Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
7b. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that is of an unknown origin?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
8a. Are there currently any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
8b. Did you observe evidence or do you have any prior knowledge that there have been previously, any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
9a. Is there currently any stained soil on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
9b. Did you observe evidence or do you have any prior knowledge that there has been previously, any stained soil on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
10a. Are there currently any registered or unregistered storage tanks (above or underground) located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	Note: AST-water Tank (NM, 2004) Has been removed from site
10b. Did you observe evidence or do you have any prior knowledge that there have been previously, any registered or unregistered storage tanks (above or underground) located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	Note: Potential for Septic Tanks in locations of previous structures
11a. Are there currently any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
11b. Did you observe evidence or do you have any prior knowledge that there have been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
12a. Is there currently evidence of leaks, spills or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
12b. Did you observe evidence or do you have any prior knowledge that there have been previously any leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring drains, walls, ceilings or exposed grounds on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
13a. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
13b. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that the well has been designated as contaminated by any government environment health agency?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
14. Does the owner or occupant of the property have any knowledge of environmental liens or governmental notification relating to past or recurrent violations of environmental laws with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15a. Has the owner or occupant of the property been informed of the past existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15b. Has the owner or occupant of the property been informed of the current existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15c. Has the owner or occupant of the property been informed of the past existence of environmental violations with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
15d. Has the owner or occupant of the property been informed of the current existence of environmental violations with respect to the property or any facility located on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		

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Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
16. Does the owner or occupant of the property have any knowledge of any environmental site assessment of the property or facility that indicated the presence of hazardous substances or petroleum products on, or contamination of, the property or recommended further assessment of the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
17. Does the owner or occupant of the property know of any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any hazardous substance or petroleum products involving the property by any owner or occupant of the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○		
18a. Does the property discharge waste-water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a storm water system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
18b. Does the property discharge waste water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a sanitary sewer system?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
19. Did you observe evidence or do you have any prior knowledge that any hazardous substances or petroleum products, unidentified waste materials, tires, automotive or industrial batteries, or any other waste materials have been dumped above grade, buried and/or burned on the property?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	
20. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	Yes ○ No ● Unk ○	Yes ○ No ○ Unk ○	Yes ○ No ●	

Government Records/Historical Sources Inquiry

(See guide, Section 10)

21. Do any of the following federal, state, or tribal government record systems list the property or any property within the search distance noted below (where available):	Approximate Minimum Search Distance, miles (kilometres)	
Federal NPL site	1.0	Yes ○ No ○
Federal Delisted NPL site	0.5	Yes ○ No ○
Federal CERCLIS	0.5	Yes ○ No ○
Federal CERCLIS NFRAP site	0.5	Yes ○ No ○
Federal RCRA CORRACTS facilities	1.0	Yes ○ No ○
Federal RCRA non-CORRACTS TSD	0.5	Yes ○ No ○
Federal RCRA generators	property and adjoining properties	Yes ○ No ○
Federal institutional control/engineering control registries	property only	
Federal ERNS	property only	Yes ○ No ○

See Report

State and tribal lists of hazardous waste sites identified for investigation or remediation:

State-and tribal-equivalent NPL	1.0	Yes ○ No ○
State-and tribal-equivalent	0.5	Yes ○ No ○
State-and tribal-landfill andlor solid waste disposal site lists	0.5	Yes ○ No ○
State-and tribal-leaking storage tank lists	0.5	Yes ○ No ○
State and tribal registered storage tank lists	property and adjoiningproperties	Yes ○ No ○
State and tribal institutional controllengineering control registries	property only	Yes ○ No ○
State and tribal voluntary cleanup sites	0.5	Yes ○ No ○
State and tribal Brownfield sites	0.5	Yes ○ No ○

22. Based upon a review of fire insurance maps (10.2.3) or local street directories (10.2.3), all as specified in the guide, are any buildings or other improvements on the property or on an adjoiningproperty identified as having been used for an industrial use or uses likely to lead to contamination of the property? Yes ○ No ○ Unavailable ○

Result _____

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The Owner questionnaire answers were provided was completed by:

Name: Ms. Jarnne Valdez
Title: Property Representative
Firm: Lenar Homes - Inland Empire
Address: 980 Montecito Drive, Suite 302
Corona, California 92879
Phone Number: 951-817-3567
Date: 9/28/12
Role (s) at the site: Project Manager
Number of years at the site: < 1 yr.
Relationship to use (e g principal, employee, agent, consultant): employee

The Occupant questionnaire answers were provided by:

Name:
Title:
Firm:
Address: N/A
Phone Number:
Date:
Role (s) at the site:
Number of years at the site:
Realationship to use (e.g. principal, employee, agent, consultant):

The Site Visit questionnaire was completed by:

Name: Todd A. Greer
Title: Engineering Geologist
Firm: Geo Soils, Inc.
Address: 26590 Madison Avenue
Murrieta, California 92562
Phone Number: 951-677-9651
Date: 9/28/12
Role (s) at the site: Update Phase I ESA
Number of years at the site:
Realationship to use (e.g. principal, employee, agent, consultant): Consultant

It is the user's responsibility to draw conclusions regarding afirmative or unknown answers.

The Government Records and Historical Sources Inquiry questionnaire was completed by:

Name: See Report
Title:
Firm:
Address:
Phone Number:
Date:
Role (s) at the site:
Number of years at the site:
Relationship to use (e g principal, employee, agent, consultant):

User's relationship to the site (for example, owner, prospective purchaser, lender, etc.)

If the preparer (s) is different from the user, complete the following:

Name of User:
User's Address:
User's Phone Number:

Copies of the completed questionnaires have been filed at:

Copies of the completed questionnaires have been mailed or delivered to:

Preparer represents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature: Todd A. Greer
Date: 9/28/12
Signature: Jarnne J. Valdez
Date: 9/28/12
Signature:
Date:

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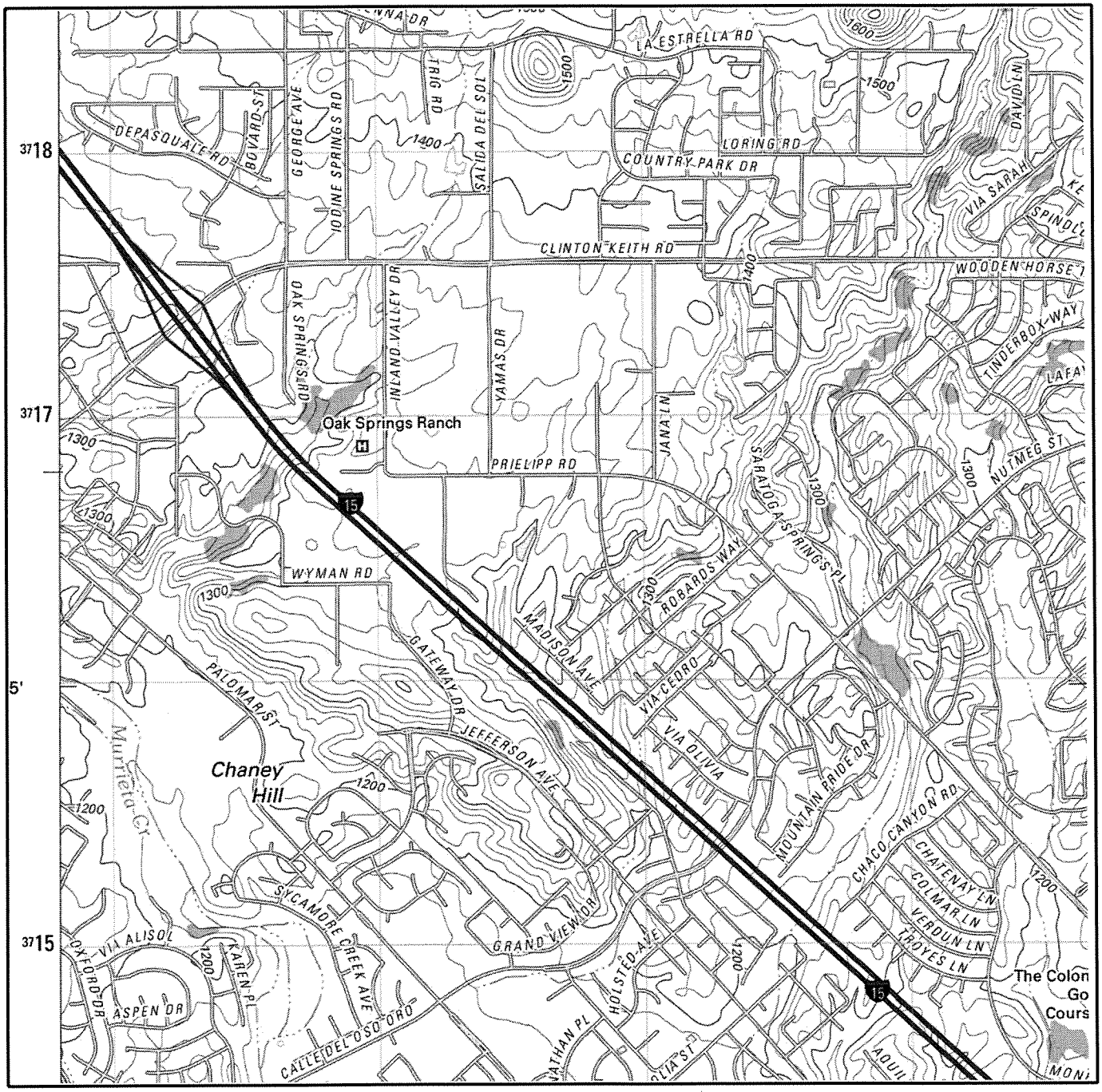
FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 2012 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

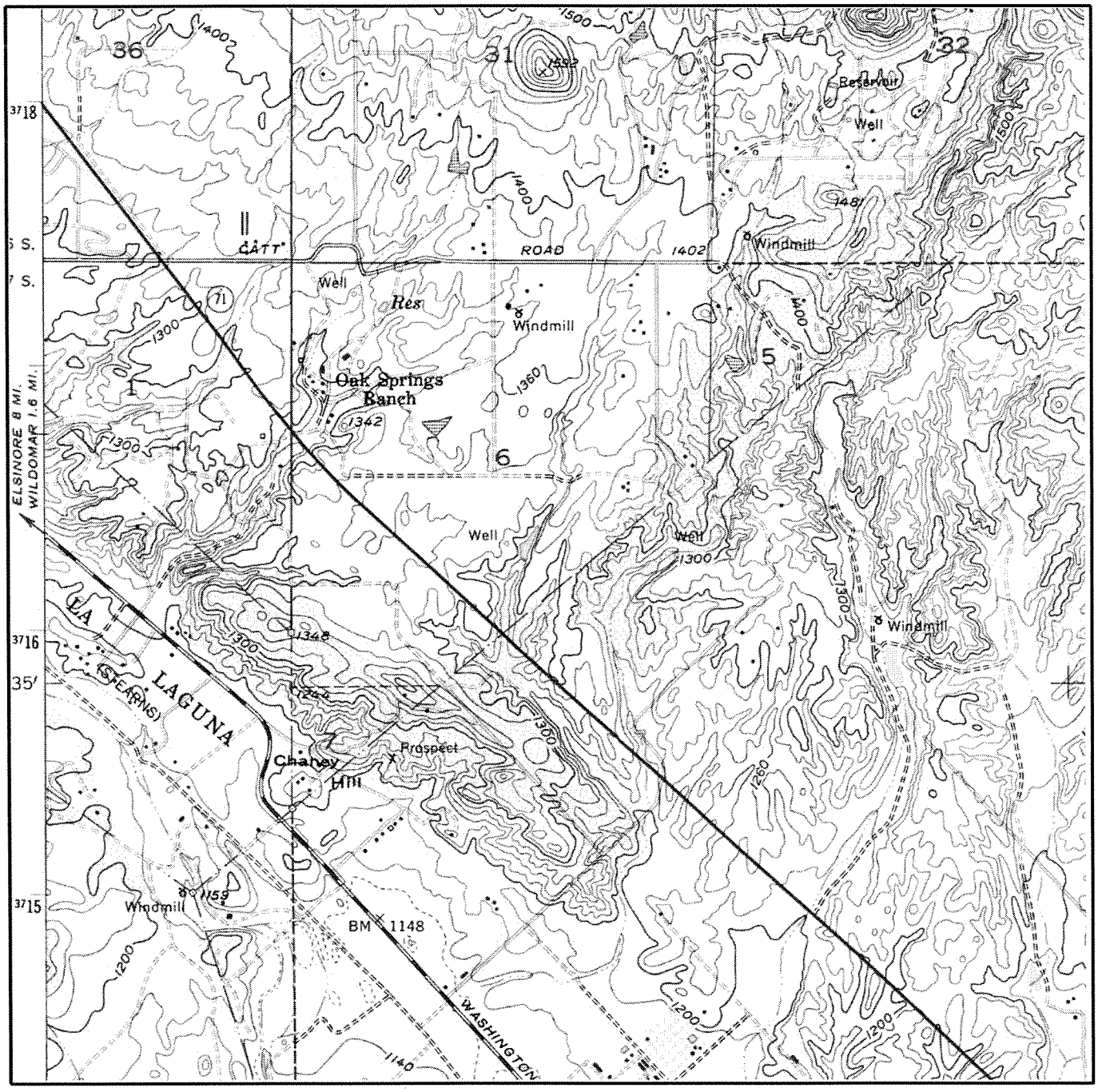
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1979 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

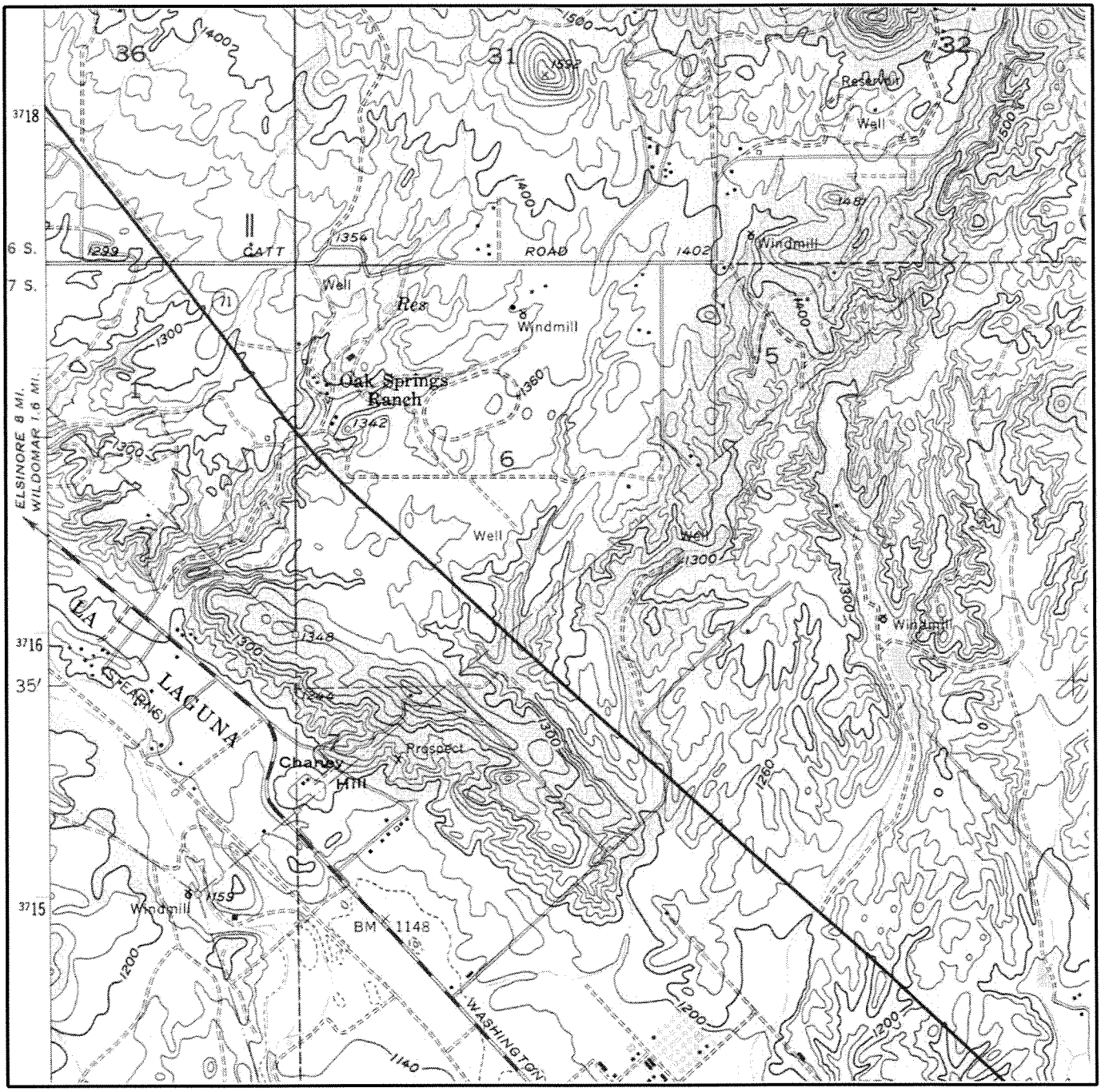
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1973 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

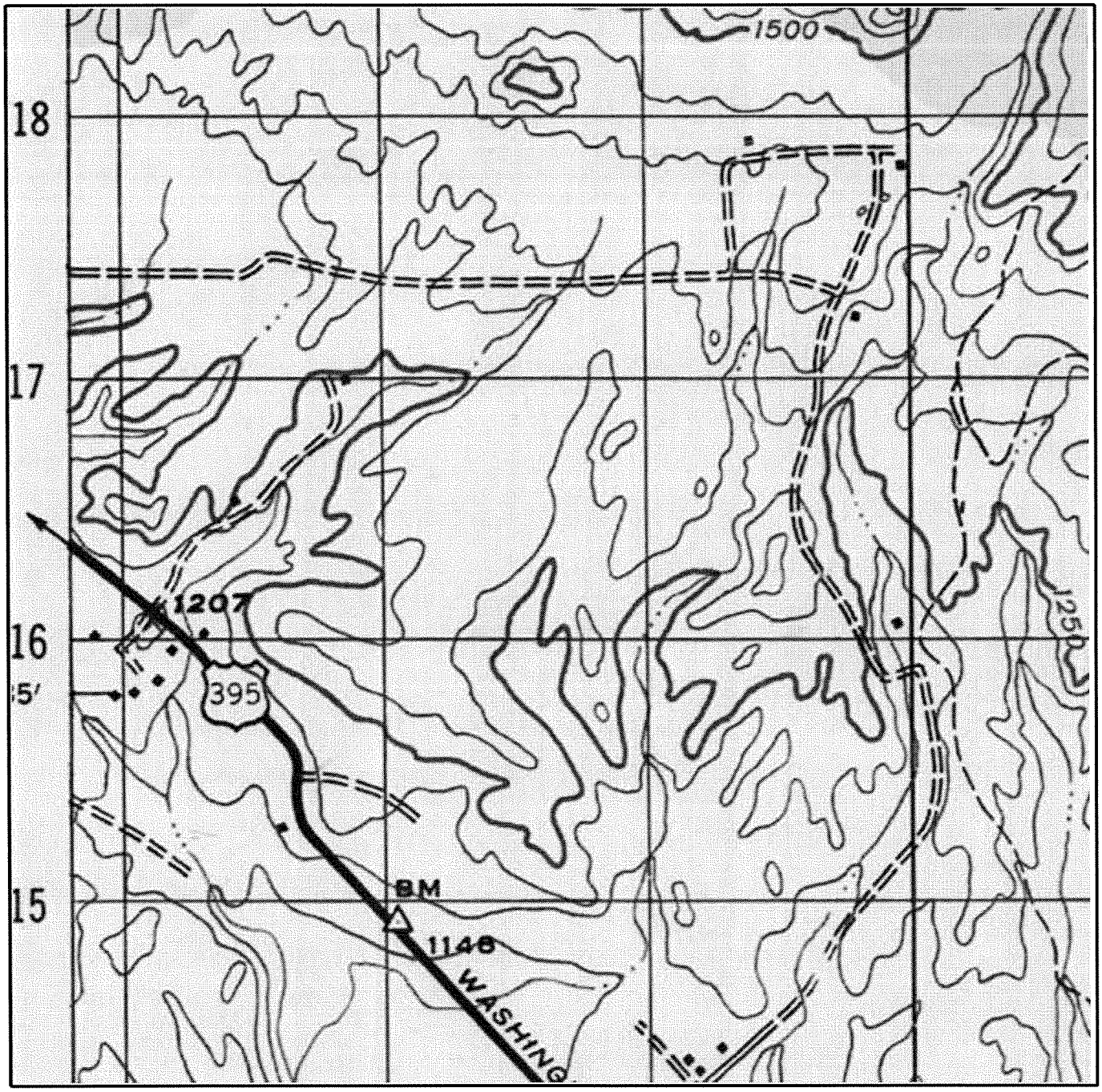
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1960 Original Map Scale: 1:50,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

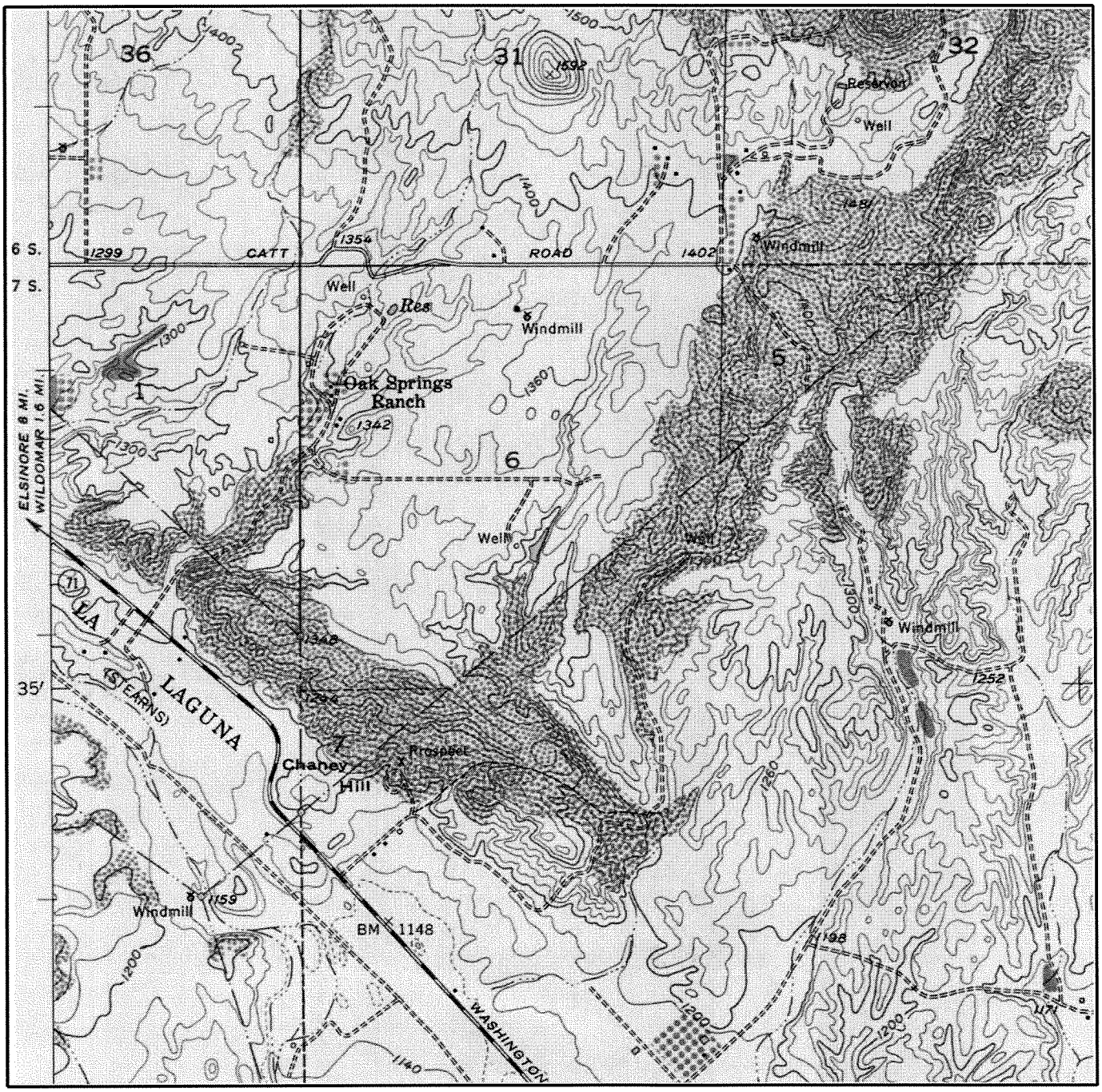
Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1953 Original Map Scale: 1:24,000

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

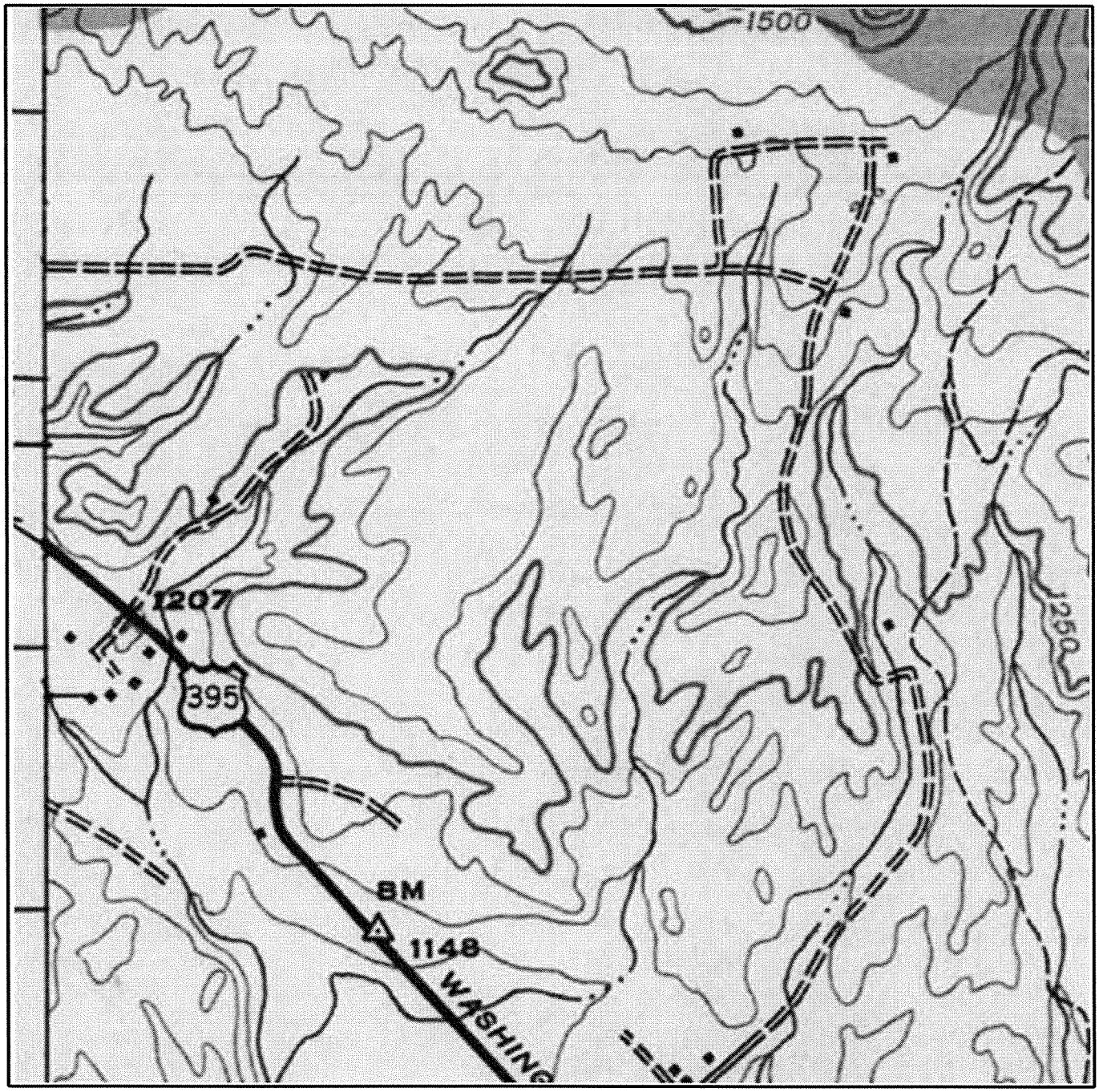
Building
Topo Contour
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

FIRSTSEARCH

Historical Topographic Map

Quad Name: Murrieta, CA
Year: 1942 Original Map Scale: 1:62,500

36605 36625 Elizabeth Ln, Wildomar, CA 92595



Job Number: E6451-SC
Target Site: 33.588046, -117.230000

0 miles 0.5 1

Building
Topo Contour 6000
Depression
Quarry or Open Pit Mine
Railroad
Tanks
Primary Highway
Trail

Historical Aerial Photo

2002

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N

W E

S

1 inch equals 340 feet

Historical Aerial Photo

1994

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N

W E

S

1 inch equals 340 feet

Historical Aerial Photo

1980

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

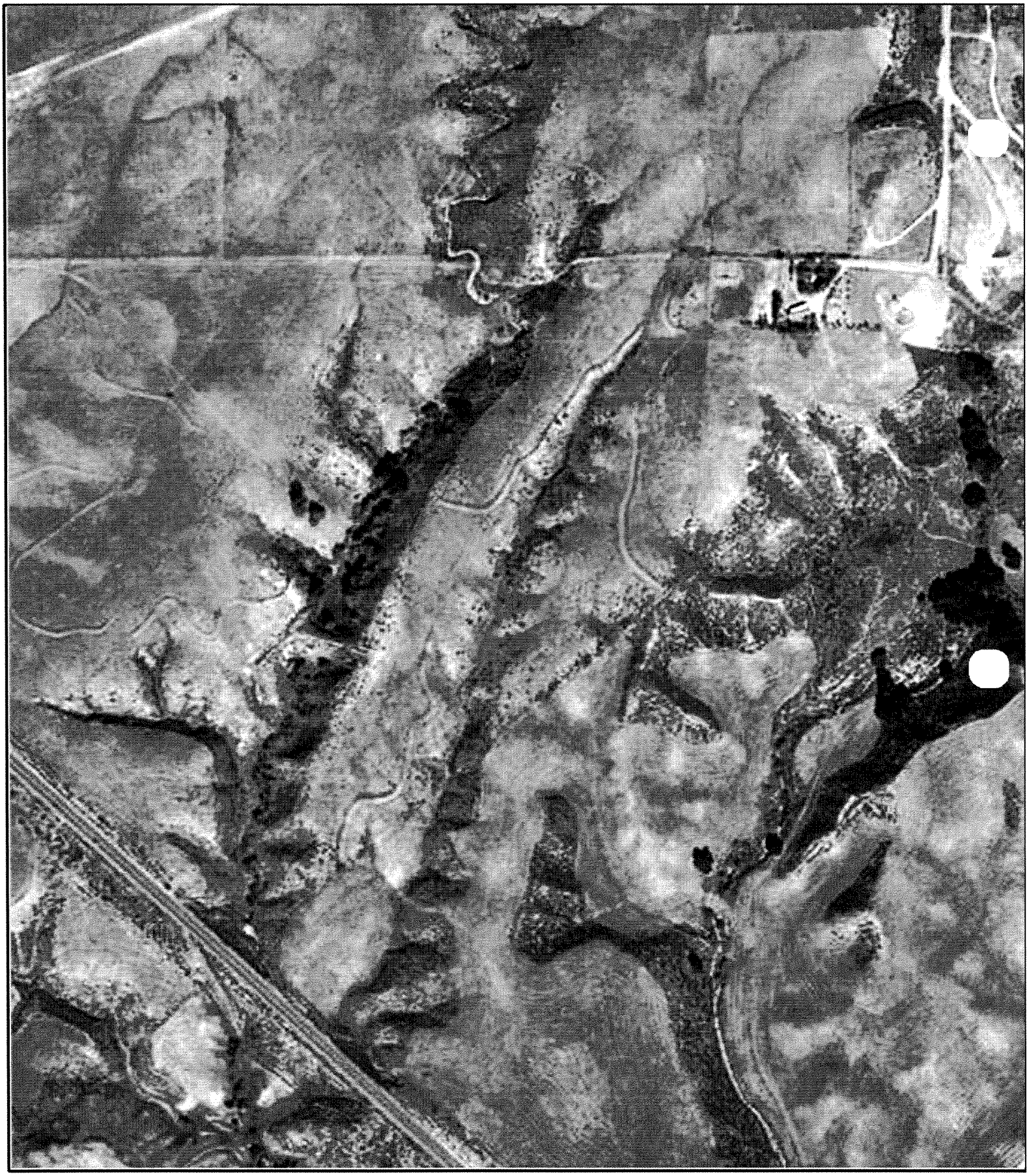
FIRSTSEARCH

N

W E

S

1 inch equals 340 feet



Historical Aerial Photo

1976

36605 36625 ELIZABETH LN

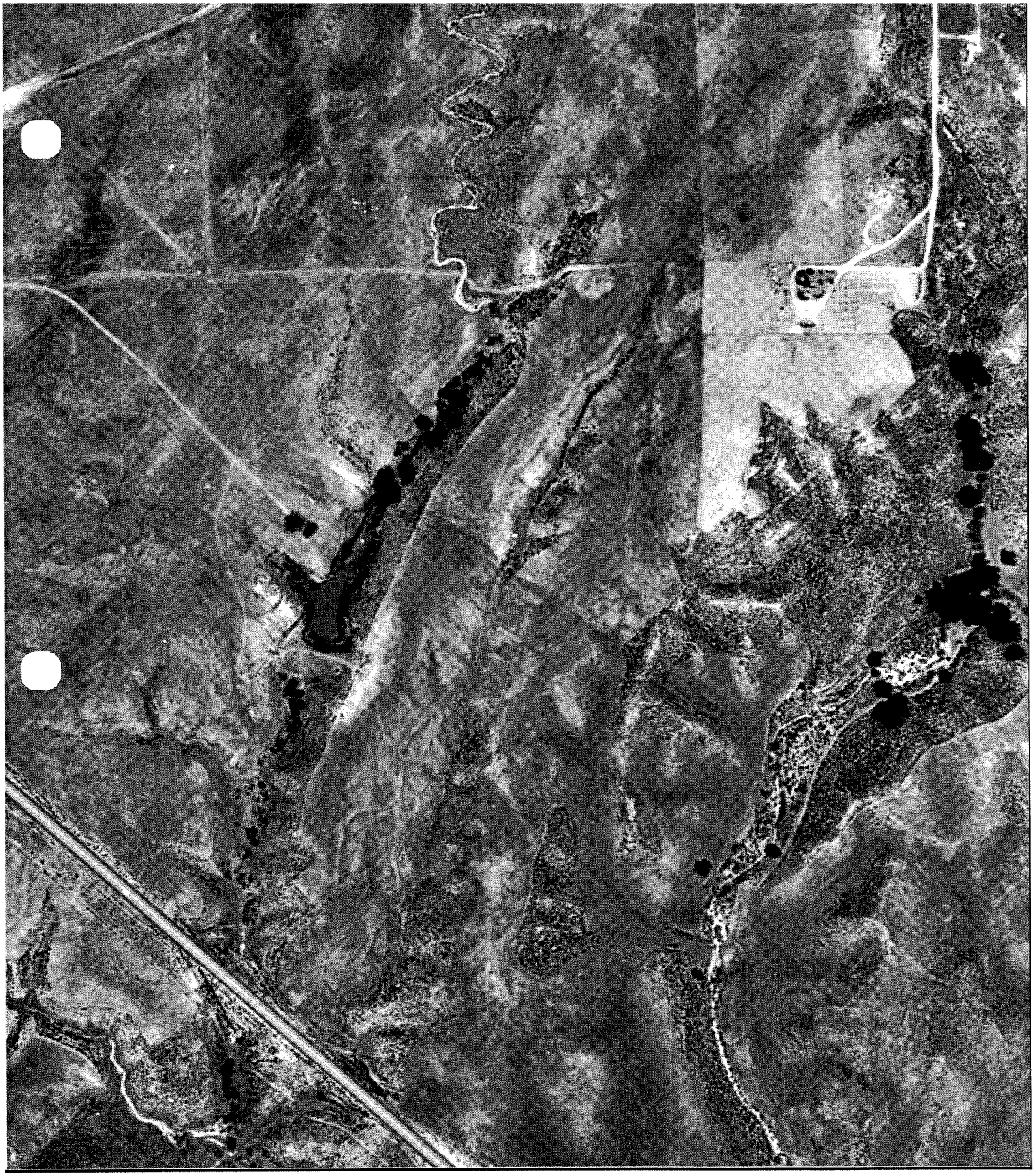
WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N W E S

1 inch equals 340 feet



Historical Aerial Photo

1967

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

FIRSTSEARCH

N

W E

S

1 inch equals 340 feet

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

Historical Aerial Photo

1953

36605 36625 ELIZABETH LN

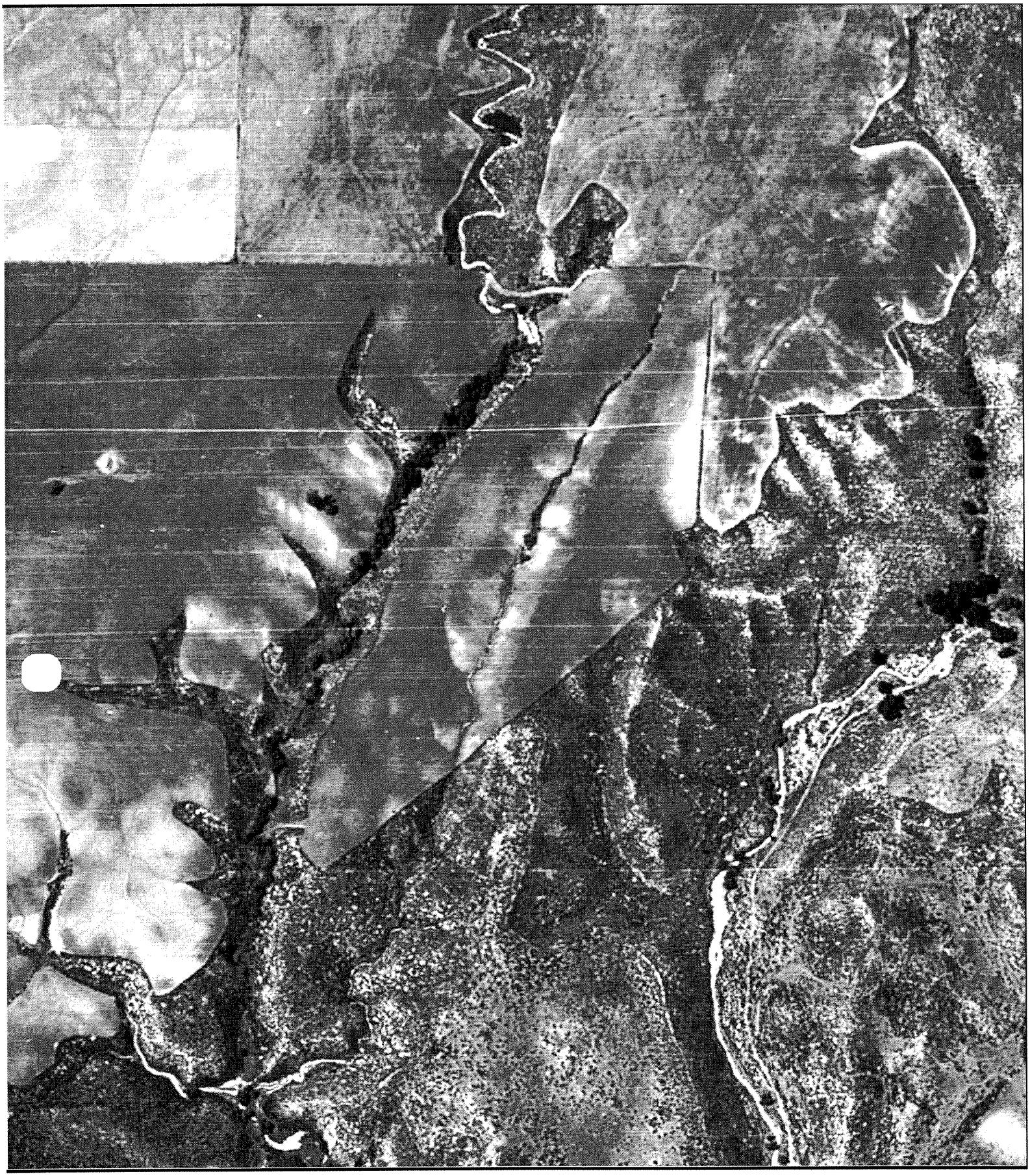
WILDOMAR, CA 92595

FIRSTSEARCH

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

N W E S

1 inch equals 340 feet



Historical Aerial Photo

1938

36605 36625 ELIZABETH LN

WILDOMAR, CA 92595

Target Site: 33.588046, -117.230000 Job Number: E6451-SC

FIRSTSEARCH

N

W E

S

1 inch equals 340 feet

FIRSTSEARCH

CITY DIRECTORY REPORT

Prepared For:
Todd Greer – GeoSoils

Client Job No/Name: E6451-SC

FirstSearch Log No: 76465

Subject Property: 36605-36625 Elizabeth Ln Wildomar, CA 92595

September 20, 2012

DISCLAIMER
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2009-10 Haines: Riverside Pg. 285		
35815 Elizabeth Ln Dissi Kamal	**36605 – 36625 Elizabeth Ln** 36605 – XXXX 36625 – Healing Rooms of Tmcla Vly, Howard Lynette	Highest listing on the street is 36625
2004-05 Haines: Riverside Pg. 250		
35825 Elizabeth Ln Gonzales Lorenz	**36605 – 36625 Elizabeth Ln** 36605 – Williams Roger 36625 – Bachelor Willam; Healing Rooms of The Tmcla Vly	Highest listing on the street is 36625
2002 Haines: Riverside Pg. 224		
Lowest listing on street 36605	**36605 – 36625 Elizabeth Ln** 36605 – Carlson Stanley 36625 – XXXX	Highest listing on the street is 36625
1995 ProPhone: Pacific Database Query		
Street Not Listed	**36605 – 36625 Elizabeth Ln** Street Not Listed	Street Not Listed
No further search results found.		

FirstSearch Environmental Information - City Directory Report

Addresses of Potential Concern: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, within the vicinity of the target address. The addresses listed are included in the body of the report.

Addresses of Potential Concern		
YEAR	**ADDRESS**	**OCCUPANT**
No Addresses of Potential Concern identified on the subject street, within vicinity of the Target address.		

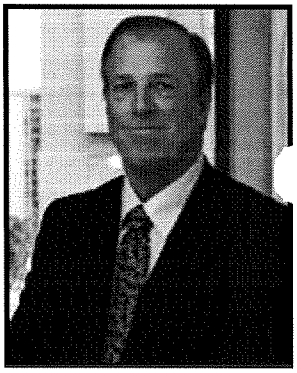
Notes:

- The Subject Property is in bold.
- The addresses on the left and right of the subject property are the closest listings found on the same side of the street,in the referenced directory.The listing to the left and right of the subject property represents the closest address found in the directories searched to the subject property, and on the same side of the street. They may or may not be adjacent properties.
- Occupant names and statements such as "Vacant, "No Info" and "Under constr" are listed in this report verbatim to the original listing in the relevant city directory. Any listing with an "XXXX" is verbatim and signifies the publisher did not receive any information for that address.
- Listings of occupant's names in directories occasionally contain multiple acronyms describing the property name, type or description. The enclosed City Directory Report lists the name once per address and does not decode any acronyms.
- A forward slash between names indicates multiple companies are listed under same main company listing.
- Occasional research notes (for example: aka - PCH, different city name, street appears to be renumbered, etc.) will be in Italics.
- Addresses of Potential Concern: A summary of gas stations, cleaners, automotive shops, and other address occupants of potential environmental concern located on the subject street, within the vicinity of the target address. The addresses listed are included in the body of the report.

APPENDIX D

RESUMES OF GSI PERSONNEL

JOHN P. FRANKLIN
PRESIDENT/PRINCIPAL GEOLOGIST



EDUCATION

B. S. in Geology, 1975, University of Southern California, Los Angeles

REGISTRATION AND CERTIFICATIONS

State of California, Professional Geologist, No. 4100
State of California, Certified Engineering Geologist, No. 1340
State of California, Certified Hydrogeologist, No. 532
State of California, Registered Environmental Assessor, No. 1675
State of Arizona, Registered Geologist, No. 27157
State of Oregon, Registered Engineering Geologist, No. E1411
40-Hour/8-Hour Refresher Health and Safety Training for Hazardous Waste Operations

EXPERIENCE

Principal Geologist, GeoSoils, Inc., California
Senior Project Geologist, Owen Geotechnical, San Diego, California
Staff to Project Geologist, Leighton and Associates, San Diego, California
Staff Geologist, R. F. Smith Corporation, Long Beach, California
Staff Geologist, Petro-Tec, Anchorage, Alaska
Staff Geologist, Geological Engineering Service, Inc., Gardena, California

Mr. Franklin has extensive experience in geologic and geophysical investigations in such diverse areas as California, Utah, Nevada, Alaska, Baja California, and mainland Mexico, as well as offshore areas of California. He has performed detailed geotechnical work throughout southern California, including Los Angeles, Orange, Ventura, San Bernardino, Riverside, San Diego, and Imperial counties, as well as Kern County, and Mono County in northeastern California, and Mexico. This experience includes using soil stratigraphy and erosion/sedimentation rates for evaluating active and potentially active fault investigations on the San Andreas, San Jacinto, Elsinore, Chino, Cucamonga, Indio Hills, Rose Canyon - Newport-Inglewoo La Nacion, Camarillo, Pinto Mountain, Mesquite Lake, Walker Lake, and Mono Lake faults; debris flow, landslide and slop stability investigations; stability investigations for mines and open-pit mines; seismicity studies; subsidence and fissuring investigations; rippability/rock hardness evaluations; solar projects in the Mojave Desert; DEIR studies; forensic investigations throughout southern California; and expert witness services. He has been involved with geotechnical studies in soft-rock and hard-rock sites for proposed residential, commercial and industrial developments, oilfield drill rig and production facilities, dams and retention basins, feasibility studies, coastal bluff stability, septic, infiltration, hazardous waste, and groundwater projects in southern California and Mexico. Mr. Franklin has been the project manager and principal investigator on geotechnical studies and grading for several large residential projects throughout San Diego, Riverside, San Bernardino and Kern counties, several high-rise commercial and residential projects in downtown San Diego, custom single-family residences throughout southern California and Los Angeles County, including beach and hillside areas, and military bases at Camp Pendleton and Twentynine Palms. Many projects included water tanks and reservoirs, park sites and other amenities such as clubhouses, lakes, golf courses, etc., as well as flood control channels, bridges, and cut and cover tunnels.

Mr. Franklin also has performed numerous Phase I and Phase II Environmental Site Assessments, and Site Characterizations for developers, real estate transfers, and bank loan requirements. Project sites have included existing gas stations, mines, shooting ranges, clandestine explosive manufacturing, nurseries, groves, schools, commercial and industrial complexes, and residential properties.

PROFESSIONAL AFFILIATIONS AND HONORS

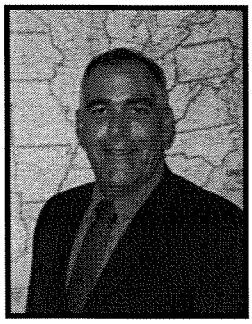
Association of Engineering Geologists
Seismological Society of America
Inland Geological Society
National Water Well Association
Roy J. Shlemon Distinguished Mentor in Applied Geosciences Program, GSA, 2005
Geological Society of America
Past-President, San Diego Association of Geologists
American Association of Petroleum Geologists
Sigma Gamma Epsilon (National Honorary Earth Science Fraternity)

PUBLICATIONS

Paleoseismic Features Exposed by Trenching the Lowest Coastal Terrace at Carlsbad, California, *in* AAPG Pacific Section Guidebook, June 19-22, 2002, Long Beach, California.

Paleoseismology of Blind and Offshore Faults, North Coast San Diego County, California USA, *in* Proceedings, The 11th ICSDEE and 3rd ICEGE, 7th-9th January, 2004, University of California, Berkeley.

TODD A. GREER
ENGINEERING GEOLOGIST, CEG 2377



EDUCATION

B. S. in Geology, 1998, San Diego State University, San Diego, California.

PROFESSIONAL CERTIFICATES

Engineering Geologist, CEG 2377, Board for Geologists and Geophysicists, California, 2005
Professional Geologist, PG 7739, Board for Geologists and Geophysicists, California, 2004
Professional Certificate in Hazardous Materials Management, 1994,
University of California San Diego, San Diego, California.
Hazardous Waste Operations and Emergency Response (HAZWOPER), 40-hour OSHA Training,
Environmental Training and Compliance (ETAC), Orange County, California.
HAZWOPER, 8-hour Refresher OSHA Training, Safety Unlimited, Inc., Angora Hills, California.
Nuclear Densometer Certified, San Diego, California.

RESPONSIBILITIES

Mr. Greer directs and supervises Phase I and II Environmental Site Assessments (ESA's) and toxicity screening review of lands slated for future development and laboratory analyses and remediation/mitigation of hazardous materials. This includes site reconnaissance and inspection, aerial photography review and analysis, background document research and review, consultation with local and federal environmental and hazardous waste agencies, report writing and review, including findings, conclusions, and recommendations for project permitting and development.

Mr. Greer also directs and supervises preliminary geotechnical/geologic field investigations, subsurface drilling operations (large and small diameter), rough grading and hillside grading operations, geologic fault finding and landslide investigations, pavement design investigations, and pavement rehabilitation projects involving Cal-Trans "right-of-ways", and research and report preparation for geotechnical/geologic projects in the Riverside and San Bernardino County areas.

PROFESSIONAL EXPERIENCE

Engineering Geologist, CEG 2377, GeoSoils, Inc., Murrieta, California, 2004 to Present.
Project Geologist, GeoSoils, Inc., Murrieta, California, 1998 to 2004.
Geologic and structural mapping, Agua Amarga, 1997, Bahia de Los Angeles, Baja California Mexico, Senior Thesis Project under the direct supervision of Professor David Kimbrough, Ph.D., San Diego State University.

Mr. Greer also has extensive experience with land use planning, hillside subdivisions, landslide investigations, liquefaction analyses, and geologic/fault investigations as they pertain to future commercial, residential, and roadway/highway development. This includes an extensive background in geologic research and review, aerial photography review and analyses, surface and subsurface geological mapping and cross-sectional illustration and analyses, rotary-wash, hollow-stem, and percussion drilling and sampling in the field to ascertain soil, bedrock, and groundwater conditions pertinent to development of the site. In addition, the evaluation and analysis of soil, bedrock, and lithologic test data, report writing and review, including findings, conclusions, and recommendations of a geotechnical/geologic nature.

PROFESSIONAL AFFILIATIONS

Member, Association of Engineering Geologists and Environmental Engineers (AEG)
Member, Inland Geological Society (IGS)

PRELIMINARY WATER QUALITY MANAGEMENT PLAN MAP FOR:
WILDOMAR 23
TRACT NO. 36497, D.R. NO. 12-0364

PARCEL MAP NO. 9637
PAR. 3
PM 58/1-5
A.P.N. 380-250-019

PARCEL MAP NO. 9637
PAR. 4
PM 58/1-5
A.P.N. 380-250-020

PRIELIPP ROAD

INLET (PUBLIC)

PROJECT BOUNDARY

C.O. (PUBLIC)

LANE

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-001
ZONE=R-R, GP LAND USE=MHDR

COURT

PARK

PARCEL MAP NO. 11795
PAR. 1
PM 67/44
A.P.N. 380-280-008
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 12214
PAR. 2
PM 67/44
A.P.N. 380-280-002
ZONE=R-R, GP LAND USE=MHDR

LIMITS OF WATER QUALITY BASIN

"B" STREET

"E" STREET

"A" STREET

"C" STREET

"D" STREET

CURB (TYP.)

LOT "H" PARK

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-003
ZONE=R-R, GP LAND USE=MHDR

ESTES

ELIZABETH

PUBLIC STORM DRAIN (BYPASS)

PUBLIC STORM DRAIN SYSTEM (ON-SITE)

CURB & GUTTER (TYP.)

HEADWALL (PUBLIC)

DETENTION/WATER QUALITY BASIN

OUTLET CONTROL STRUCTURE (PUBLIC)

DISCHARGE LOCATION

Obscured Area

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67

SCALE: 1" = 40'

GRAPHIC SCALE
40 0 40 80 120

INLAND VALLEY DR.
PROJECT SITE
KEITH
RD.
PRIELIPP RD.
ELIZABETH LN.
PALOMAR
STREET
CLINTON
WILDOMAR
MURRIETA
FWY 15
JACKSON
ST.
AVE.
NUTMEG

VICINITY MAP
NOT TO SCALE

THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2

OWNER

LENNAR HOMES OF CALIFORNIA, INC.
980 MONTECITO DRIVE, SUITE 302
CORONA, CALIFORNIA 92879
(951) 817-6567

NOTES

1. A.P.N.: 380-280-004, 009 THROUGH 012.
2. RECEIVING WATERS: 902.31, MURRIETA HA, WILDOMAR HSA.
3. EFFECTIVE IMPERVIOUS FRACTION: 0.63

LEGEND

- PROJECT BOUNDARY
- BMP BASIN LIMITS
- STORM DRAIN
- A.C. PAVING
- SIDEWALK

PRELIMINARY WATER QUALITY MANAGEMENT PLAN SITE MAP
WILDOMAR 23
TRACT NO. 36497
D.R. NO. 12-0364

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

69532 Prelim WQMP Site Map.dwg plotted: Oct 04, 2013-11:48am by bhatch

SB&O INC.
PLANNING ENGINEERING SURVEYING

PRELIMINARY DRAINAGE & DETENTION BASIN DESIGN REPORT

FOR

WILDOMAR 23
SW Corner of Elizabeth Lane & Prielipp Road

IN

WILDOMAR, CALIFORNIA
COUNTY OF RIVERSIDE

Prepared for:

Lennar Homes of California, Inc.
890 Montecito Drive, Suite 302
Corona, CA 92879
Telephone: (951) 817-3567

Prepared by:

SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
(951) 695-8900 (951) 695-8901 Fax
SB&O Job number: 69550.60

REGISTERED PROFESSIONAL ENGINEER
ALLEN L. BUTCHER
NO. 47107
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

Allen L. Butcher PE 47107
EXP. 12/31/2013

December 21, 2012

SB&O INC.
PLANNING ENGINEERING SURVEYING

PRELIMINARY DRAINAGE & DETENTION BASIN DESIGN REPORT

FOR

WILDOMAR 23
SW Corner of Elizabeth Lane & Prielipp Road

IN

WILDOMAR, CALIFORNIA
COUNTY OF RIVERSIDE

Prepared for:

Lennar Homes of California, Inc.
890 Montecito Drive, Suite 302
Corona, CA 92879
Telephone: (951) 817-3567

Prepared by:

SB&O, Inc.
41689 Enterprise Circle North, Suite 126
Temecula, CA 92590
(951) 695-8900 (951) 695-8901 Fax
SB&O Job number: 69550.60

REGISTERED PROFESSIONAL ENGINEER
ALLEN L. BUTCHER
NO. 47107
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

Allen L. Butcher PE 47107
EXP. 12/31/2013

December 21, 2012

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Scope of Report 1
Description of Watershed 1
    Existing Condition 1
    Developed Condition 1
Methodology 1-2
    Rational Method Hydrology 2
    Unit Hydrograph Hydrology 2
    Water Quality Volume 2
Detention Basin Analyses 2
Conclusions 3

EXHIBITS

Pre-Development Rational Method Calculations ..... A

Post-Development Onsite Rational Method Calculations ..... B

Post-Development "Bypass" Rational Method Calculations C

Post-Development Hydrographs ..... D

Water Quality Volume ..... E

Detention Basin Table & Rating Curves ..... F

Detention Basin Routing Summary ..... G

Detention Basin Storm Routings ..... H

Site Map & Offsite Drainage Exhibit ..... Map Pocket

APPENDIX

Selected RCFC&WCD Plates

SCOPE OF REPORT

The purpose of this preliminary study is to size proposed storm drain systems and determine the storage volume required to attenuate post development peak discharge. A single detention basin (including a water quality component in the bottom 18" of the basin) will be used. Details related to water quality treatment are contained in a separate preliminary WQMP for the project.

DESCRIPTION OF WATERSHED

Existing Conditions

The existing site is located at the southwest corner of Prielipp Road and Elizabeth Lane. The site is generally vacant with a few single family homes along Elizabeth Lane. Topography is moderately steep, with a deep canyon/drainage course sloping southwesterly along the westerly limits of the project. A secondary canyon traverses the site near the northeast corner trending southwest. The majority of the developed portion of the site is tributary to this canyon, along with a small offsite drainage area north of the intersection. A small offsite drainage basin (6.6 acres) located at the northwest corner of the intersection of the Elizabeth Lane and Prielipp Road, is tributary to this secondary canyon.

Developed Condition

The proposed *Wildomar 23* project is a medium density (5,000 sf) single family residential subdivision (67 lots on public streets). The gross site area is located on approximately 23 acres, with a net development area of approximately 18 acres. Runoff generated onsite will be captured by a public storm drain system and routed through a private onsite detention/water quality basin.

In order to avoid treating the offsite flows, runoff from Prielipp Road, Elizabeth Lane, and the small northerly basin (6.6 acres) will be intercepted and conveyed in an independent public "bypass" storm drain system. This system will bypass the basin and be discharged along with the basin storm drain into the secondary canyon at the southerly boundary.

See Site Map Exhibit for lot layout, storm drain alignments and the location of the detention basin.

METHODOLOGY

In order to mitigate impacts to the downstream watershed, the project proposes to use detention basin, which provides a storage volume to attenuate peak flows. In order to determine the required storage volume and outflow rates, an inflow hydrograph is required. The Unit Hydrograph methodology provides time based flow rates. However, unit hydrograph methodology is based upon assumptions for tributary areas of 1/2 square mile (320 acres) or more. The Rational Method typically provides conservative peak flow rate estimates for small drainage areas, but does not provide a time based hydrograph.

One approach is overcome these problems is to generate a Rational Method peak flow rate and then "adjust" the corresponding unit hydrograph input values in order arrive at the same peak flow rate. In order to maintain continuity, rainfall totals need to remain unchanged. In this instance the lag time was adjusted to provide a consistent peak flow rate.

Rational Method Hydrology

In accordance with the Riverside County Flood Control Hydrology Manual, the rational method was used to estimate peak flow rates for the 100-year storm. The CivilD© hydrology program was used to perform a node-to-node analysis of the on-site storm drain system. See attached project hydrology maps and Exhibits A thru C for calculations. Inlet calculations inlet sizing and water surface grades will be provided in the final project drainage report.

Exhibit A contains an Existing Conditions analysis to determine the current peak discharge flow rate to the southerly boundary for the site and the upstream area. Exhibit B is the Post Development analysis of the upstream area tributary to the site (Bypass Storm Drain). The difference between the 2 analyses is the maximum allowable combined discharge from the detention basin and the bypass storm drain.

Condition	Tributary Area	Q peak
A Existing	Current Site + Upstream	61.28 cfs
B Bypass	Upstream	25.12
Allowable	Detention Basin	36.16
C Proposed Site	Site Area	57.36

Unit Hydrograph

The Rational Method hydrology is based upon extreme rainfall events of short duration, and uses a 100-year, 1-hour rainfall event, with a 10-minute peak rainfall period. These types of storms are conservative for extremely small basins. Rainfall intensities decrease over larger areas and longer durations.

A range of storm is typically considered for unit hydrograph methodology. This multi-storm approach (1, 3, 6 & 24-hour events) considers a range of rainfall events that should be considered for volume based calculations. The controlling design case is often a function of the lag time or time of concentration of the tributary basin.

A 100-year 1-hour Unit Hydrograph (post construction site) was prepared for comparison to the rational method results. As expected, the Unit Hydrograph was significantly less than the Rational Method peak flow. Reducing the lag time (shorter time of concentration) provided an adjusted hydrograph with the same peak flow rate.

The adjusted lag time was used to calculate the range of storms (1, 3, 6 & 24 hour duration) and routed through the detention basin. See Exhibit D for these adjusted Post-Construction hydrographs.

Water Quality Volume

The project proposes to address water quality using an extended combination infiltration / detention basin. The bottom 18" of the basin was reserved for water quality. See Exhibit E for calculations.

DETENTION ANALYSES

An elevation-storage-discharge rating table was prepared to reflect the incremental storage volumes and corresponding outflows. Outflow values were estimated using weir and orifice flow equations. The bottom 18" of the basin are reserved for water quality purposes, to be drained using a subdrain system.

Time-based simulations were run for each storm to determine required the storage volume and verify peak outflows. Flood hydrographs were routed through the detention basins using Storage Indication Methodology (Modified Puls). An iterative process was utilized to determine the shape, number, size and elevation of the discharge control openings.

The detention storage has a floor elevation of 1301.0 with a top at 1309.0. The storage indication table may be found in Exhibit F. The control openings are as follows;

Elevation	Width	Height
1301.0	Subdrain only	
1302.5	6"	3"
1304.0	24"	4"
1305.0	36"	6"
1307.5	Overflow Weir (4' x 4' grated opening)	

The peak outflow is 17.32 cfs, which occurs during a 100-year 6-hour duration storm. The maximum storage depth is 6.3 feet (elevation 1307.3), which corresponds to a storage volume of 2.6 ac-ft (includes 0.47 ac-ft for water quality). The available storage volume is 3.0 ac-ft (Elevation 1308.0 which provides 1' freeboard).

A summary of the detention basin routing are available in Exhibit G. The individual detention analyses and the routing of the individual storms are provided in Exhibit H.

CONCLUSIONS

This study and the calculations presented herein demonstrate the adequacy of the proposed detention basin to attenuate peak runoff from the development of the site.

The peak outflow is 17.32 cfs, which occurs during a 100-year 6-hour duration storm. The maximum storage depth is 6.3 feet (elevation 1307.3), which corresponds to a storage volume of 2.6 ac-ft (includes 0.47 ac-ft for water quality). The available storage volume is 3.0 ac-ft (Elevation 1308.0 which provides 1' freeboard).

The site currently receives runoff from a small drainage area north of the site. The project will construct a separate bypass storm drain system to intercept and convey these flows through the site and discharge to the existing canyon/drainage curse along the southerly boundary.

EXHIBIT A

PRE-DEVELOPMENT RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/13/12 File:69552E.out

WILDOMAR - 69552.60
EXISTING 100-YEAR

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 50.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1372.000(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.02000 s(percent)= 2.00
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.542 min.
Rainfall intensity = 4.706(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.417(CFS)
Total initial stream area = 0.100(Ac.)
Pervious area fraction = 1.000

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Top of natural channel elevation =   1372.000(Ft.)
End of natural channel elevation =   1340.000(Ft.)
Length of natural channel  =   850.000(Ft.)
Estimated mean flow rate at midpoint of channel =     13.954(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   5.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
     Normal channel slope =  0.0376
Corrected/adjusted channel slope =  0.0376
Travel time =    2.68 min.     TC =    8.22  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  94.40
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.894(In/Hr) for a   100.0 year storm
Subarea runoff =     22.326(CFS) for      6.500(Ac.)19.9
Total runoff =     22.742(CFS)      Total area =       6.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
-------------------------------------------------------------------------------
Upstream point/station elevation =  1340.000(Ft.)
Downstream point/station elevation =  1337.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.742(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    22.742(CFS)
Normal flow depth in pipe =   13.41(In.)
Flow top width inside pipe =   23.83(In.)
Critical Depth =   20.38(In.)
Pipe flow velocity =     12.61(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     8.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
-------------------------------------------------------------------------------
Top of natural channel elevation =   1337.000(Ft.)
End of natural channel elevation =   1282.000(Ft.)
Length of natural channel  =  1443.000(Ft.)
Estimated mean flow rate at midpoint of channel =     45.657(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   7.36(Ft/s)

Correction to map slope used on extremely rugged channels with
```

drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0381
Corrected/adjusted channel slope = 0.0381
Travel time = 3.27 min. TC = 11.63 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.297(In/Hr) for a 100.0 year storm
Subarea runoff = 38.539(CFS) for 13.300(Ac.)
Total runoff = 61.281(CFS) Total area = 19.900(Ac.)
End of computations, total study area = 19.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 86.0

EXHIBIT B

POST-DEVELOPMENT SITE RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/13/12 File:69552p.out

WILDOMAR - 69552.60
PROP 100-YEAR RATIONAL

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 50.000(Ft.)
Top (of initial area) elevation = 43.300(Ft.)
Bottom (of initial area) elevation = 42.300(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.02000 s(percent)= 2.00
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 4.944(In/Hr) for a 100.0 year storm
USER INPUT of soil data for subarea
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 0.608(CFS)
Total initial stream area = 0.140(Ac.)
Pervious area fraction = 0.500

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =    41.200(Ft.)
End of street segment elevation =    20.400(Ft.)
Length of street segment  =   755.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =   9.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.055(CFS)
Depth of flow =   0.388(Ft.), Average velocity =   4.209(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.544(Ft.)
Flow velocity =   4.21(Ft/s)
Travel time =    2.99 min.     TC =    7.99  min.
 Adding area flow to street
USER INPUT of soil data for subarea
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.948(In/Hr) for a   100.0 year storm
Subarea runoff =     12.830(CFS) for      3.720(Ac.)
Total runoff =     13.438(CFS)      Total area =       3.860(Ac.)
Street flow at end of street =     13.438(CFS)
Half street flow at end of street =     13.438(CFS)
Depth of flow =   0.461(Ft.), Average velocity =   4.920(Ft/s)
Flow width (from curb towards crown)=  16.213(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =    15.000(Ft.)
Downstream point/station elevation =    11.300(Ft.)
Pipe length  =    43.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.438(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    13.438(CFS)
Normal flow depth in pipe =    9.35(In.)
Flow top width inside pipe =   14.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.69(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
```

```
USER INPUT of soil data for subarea
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     8.03 min.
Rainfall intensity =      3.938(In/Hr) for a   100.0 year storm
Subarea runoff =     15.410(CFS) for      4.480(Ac.)
Total runoff =     28.848(CFS)      Total area =       8.340(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =    11.300(Ft.)
Downstream point/station elevation =     3.400(Ft.)
Pipe length  =   252.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.848(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    28.848(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   15.07(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.25(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =     8.35 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station        6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =     3.400(Ft.)
Downstream point/station elevation =     1.200(Ft.)
Pipe length  =   451.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.848(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    28.848(CFS)
Normal flow depth in pipe =   24.80(In.)
Flow top width inside pipe =   22.72(In.)
Critical Depth =   21.96(In.)
Pipe flow velocity =      6.65(Ft/s)
Travel time through pipe =    1.13 min.
Time of concentration (TC) =     9.48 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     9.48 min.
Rainfall intensity =      3.636(In/Hr) for a   100.0 year storm
Subarea runoff =     26.079(CFS) for      8.230(Ac.)
Total runoff =     54.927(CFS)      Total area =      16.570(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =      1.200(Ft.)
Downstream point/station elevation =      1.000(Ft.)
Pipe length  =    39.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.927(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    54.927(CFS)
Normal flow depth in pipe =   29.72(In.)
Flow top width inside pipe =   33.22(In.)
Critical Depth =   28.40(In.)
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     9.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
USER INPUT of soil data for subarea
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.4057.6
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =     9.56 min.
Rainfall intensity =      3.622(In/Hr) for a   100.0 year storm
Subarea runoff =      2.682(CFS) for      0.850(Ac.)
Total runoff =     57.610(CFS)      Total area =      17.420(Ac.)
End of computations, total study area =           17.42 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.500
Area averaged RI index number =  69.0
```

EXHIBIT C

POST-DEVELOPMENT BYPASS RATIONAL METHOD

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 12/19/12 File:69552O.out

69552 - WILDOMAR
BYPASS 100-YEAR

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

English (in-lb) Units used in input data file

Program License Serial Number 6269

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [Elsinore-Wildomar] area used.
10 year storm 10 minute intensity = 2.320(In/Hr)
10 year storm 60 minute intensity = 0.980(In/Hr)
100 year storm 10 minute intensity = 3.540(In/Hr)
100 year storm 60 minute intensity = 1.500(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.500(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 301.000 to Point/Station 302.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Rainfall intensity = 3.899(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 94.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
User specified values are as follows:
TC = 8.20 min. Rain intensity = 3.90(In/Hr)
Total area = 6.60(Ac.) Total runoff = 22.70(CFS)

++
Process from Point/Station 301.000 to Point/Station 302.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1340.000(Ft.)
Downstream point/station elevation = 1338.000(Ft.)
Pipe length = 103.00(Ft.) Manning's N = 0.013

```
No. of pipes = 1  Required pipe flow  =    22.700(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    22.700(CFS)
Normal flow depth in pipe =   17.81(In.)
Flow top width inside pipe =   15.07(In.)
Critical Depth =   19.80(In.)
Pipe flow velocity =     10.44(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     8.36 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     8.36 min.
Rainfall intensity =      3.862(In/Hr) for a   100.0 year storm
Subarea runoff =      2.419(CFS) for      0.700(Ac.)
Total runoff =     25.119(CFS)      Total area =       7.300(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1338.000(Ft.)
Downstream point/station elevation =  1333.000(Ft.)
Pipe length  =   590.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.119(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    25.119(CFS)
Normal flow depth in pipe =   19.69(In.)
Flow top width inside pipe =   24.00(In.)
Critical Depth =   21.03(In.)
Pipe flow velocity =      8.09(Ft/s)
Travel time through pipe =    1.22 min.
Time of concentration (TC) =     9.58 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1333.000(Ft.)
Downstream point/station elevation =  1295.000(Ft.)
Pipe length  =  1450.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.119(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    25.119(CFS)
Normal flow depth in pipe =   16.83(In.)
Flow top width inside pipe =   16.76(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.16(Ft/s)
Travel time through pipe =    1.99 min.
Time of concentration (TC) =    11.57 min.
End of computations, total study area =            7.30 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.914
```

Area averaged RI index number = 84.4

EXHIBIT D

POST DEVELOPMENT UNIT HYDROGRPAHS

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 1999, Version 6.0
Study date 12/19/12 File: Wildomar1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	0.62	10.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	1.50	26.03

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.620(In)
Area Averaged 100-Year Rainfall = 1.500(In)

Point rain (area averaged) = 1.500(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

Slope of intensity-duration curve for a 1 hour storm =0.4800

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.309	50.009	8.744
2	0.167	486.618	40.472	7.077
3	0.250	729.927	7.241	1.266
4	0.333	973.236	2.278	0.398
			Sum = 100.000	Sum= 17.486

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.40	0.792	0.107	---	0.69
2	0.17	4.50	0.810	0.107	---	0.70
3	0.25	5.40	0.972	0.107	---	0.87
4	0.33	5.40	0.972	0.107	---	0.87
5	0.42	5.70	1.026	0.107	---	0.92
6	0.50	6.40	1.152	0.107	---	1.05
7	0.58	7.90	1.422	0.107	---	1.32
8	0.67	9.10	1.638	0.107	---	1.53
9	0.75	12.80	2.304	0.107	---	2.20
10	0.83	25.60	4.607	0.107	---	4.50
11	0.92	7.90	1.422	0.107	---	1.32
12	1.00	4.90	0.882	0.107	---	0.78
Sum =		100.0			Sum =	16.7

Flood volume = Effective rainfall 1.39(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.154(Ac.Ft)
Total rainfall = 1.50(In)
Flood volume = 87741.4 Cubic Feet
Total soil loss = 6714.5 Cubic Feet

Peak flow rate of this hydrograph = 57.395(CFS)

++

1 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0413	6.00	V Q				
0+10	0.1171	11.00	V Q				
0+15	0.2095	13.42	V Q				
0+20	0.3118	14.86	V Q				
0+25	0.4189	15.54	V Q				
0+30	0.5366	17.09	VQ				
0+35	0.6772	20.42	Q				
0+40	0.8452	24.40	Q				
0+45	1.0666	32.14	Q				
0+50	1.4619	57.40	V			Q	
0+55	1.7840	46.77	Q V				
1+ 0	1.9401	22.67	Q			V	
1+ 5	2.0018	8.95	Q			V	
1+10	2.0121	1.51	Q			V	
1+15	2.0143	0.31	Q			V	

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/19/12 File: Wildomar3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	1.05	18.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	2.60	45.11

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.050(In)
Area Averaged 100-Year Rainfall = 2.600(In)

Point rain (area averaged) = 2.600(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.600(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000 Sum=	17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.406	0.107	---	0.30
2	0.17	1.30	0.406	0.107	---	0.30
3	0.25	1.10	0.343	0.107	---	0.24
4	0.33	1.50	0.468	0.107	---	0.36
5	0.42	1.50	0.468	0.107	---	0.36
6	0.50	1.80	0.562	0.107	---	0.45
7	0.58	1.50	0.468	0.107	---	0.36
8	0.67	1.80	0.562	0.107	---	0.45
9	0.75	1.80	0.562	0.107	---	0.45
10	0.83	1.50	0.468	0.107	---	0.36
11	0.92	1.60	0.499	0.107	---	0.39
12	1.00	1.80	0.562	0.107	---	0.45
13	1.08	2.20	0.686	0.107	---	0.58
14	1.17	2.20	0.686	0.107	---	0.58
15	1.25	2.20	0.686	0.107	---	0.58
16	1.33	2.00	0.624	0.107	---	0.52
17	1.42	2.60	0.811	0.107	---	0.70
18	1.50	2.70	0.842	0.107	---	0.74
19	1.58	2.40	0.749	0.107	---	0.64
20	1.67	2.70	0.842	0.107	---	0.74
1	1.75	3.30	1.030	0.107	---	0.92
22	1.83	3.10	0.967	0.107	---	0.86
23	1.92	2.90	0.905	0.107	---	0.80
24	2.00	3.00	0.936	0.107	---	0.83
25	2.08	3.10	0.967	0.107	---	0.86
26	2.17	4.20	1.310	0.107	---	1.20
27	2.25	5.00	1.560	0.107	---	1.45
28	2.33	3.50	1.092	0.107	---	0.99
29	2.42	6.80	2.121	0.107	---	2.01
30	2.50	7.30	2.277	0.107	---	2.17
31	2.58	8.20	2.558	0.107	---	2.45
32	2.67	5.90	1.841	0.107	---	1.73
33	2.75	2.00	0.624	0.107	---	0.52
34	2.83	1.80	0.562	0.107	---	0.45
35	2.92	1.80	0.562	0.107	---	0.45
36	3.00	0.60	0.187	0.107	---	0.08
Sum =		100.0			Sum =	27.4

Flood volume = Effective rainfall 2.28(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 3.3(Ac.Ft)
Total soil loss = 0.32(In)
Total soil loss = 0.462(Ac.Ft)
Total rainfall = 2.60(In)
Flood volume = 143593.4 Cubic Feet
Total soil loss = 20143.4 Cubic Feet

Peak flow rate of this hydrograph = 39.761(CFS)

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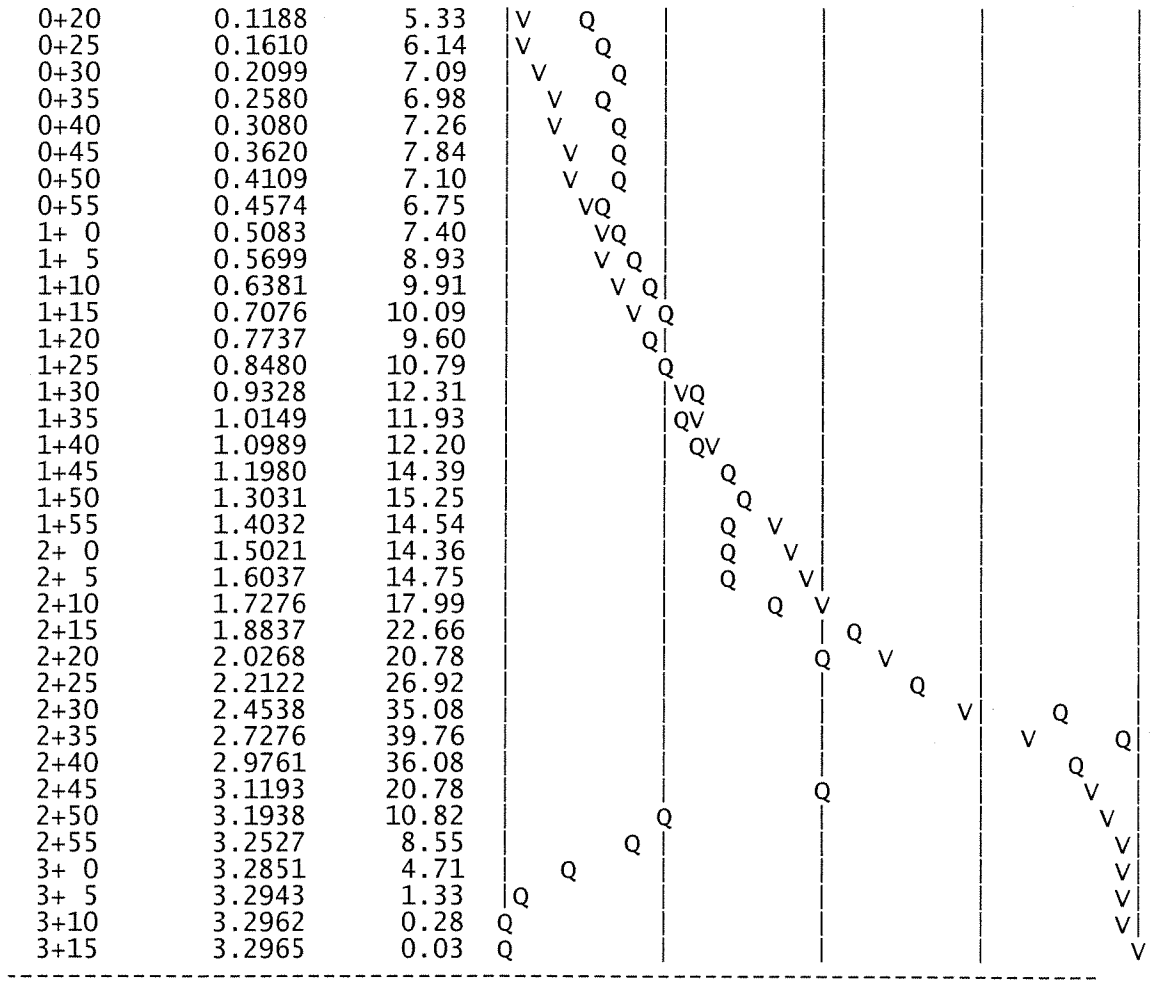
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0180	2.61	V Q	|	|	|	|
0+10	0.0506	4.73	V Q	|	|	|	|
0+15	0.0820	4.56	V Q	|	|	|	|


0+20 0.1188 5.33
0+25 0.1610 6.14
0+30 0.2099 7.09
0+35 0.2580 6.98
0+40 0.3080 7.26
0+45 0.3620 7.84
0+50 0.4109 7.10
0+55 0.4574 6.75
1+ 0 0.5083 7.40
1+ 5 0.5699 8.93
1+10 0.6381 9.91
1+15 0.7076 10.09
1+20 0.7737 9.60
1+25 0.8480 10.79
1+30 0.9328 12.31
1+35 1.0149 11.93
1+40 1.0989 12.20
1+45 1.1980 14.39
1+50 1.3031 15.25
1+55 1.4032 14.54
2+ 0 1.5021 14.36
2+ 5 1.6037 14.75
2+10 1.7276 17.99
2+15 1.8837 22.66
2+20 2.0268 20.78
2+25 2.2122 26.92
2+30 2.4538 35.08
2+35 2.7276 39.76
2+40 2.9761 36.08
2+45 3.1193 20.78
2+50 3.1938 10.82
2+55 3.2527 8.55
3+ 0 3.2851 4.71
3+ 5 3.2943 1.33
3+10 3.2962 0.28
3+15 3.2965 0.03

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/19/12 File: Wildomar6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	1.50	26.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	3.70	64.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.500(In)
Area Averaged 100-Year Rainfall = 3.700(In)

Point rain (area averaged) = 3.700(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 3.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000	Sum= 17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.222	0.107	---	0.12
2	0.17	0.60	0.266	0.107	---	0.16
3	0.25	0.60	0.266	0.107	---	0.16
4	0.33	0.60	0.266	0.107	---	0.16
5	0.42	0.60	0.266	0.107	---	0.16
6	0.50	0.70	0.311	0.107	---	0.20
7	0.58	0.70	0.311	0.107	---	0.20
8	0.67	0.70	0.311	0.107	---	0.20
9	0.75	0.70	0.311	0.107	---	0.20
10	0.83	0.70	0.311	0.107	---	0.20
11	0.92	0.70	0.311	0.107	---	0.20
12	1.00	0.80	0.355	0.107	---	0.25
13	1.08	0.80	0.355	0.107	---	0.25
14	1.17	0.80	0.355	0.107	---	0.25
15	1.25	0.80	0.355	0.107	---	0.25
16	1.33	0.80	0.355	0.107	---	0.25
17	1.42	0.80	0.355	0.107	---	0.25
18	1.50	0.80	0.355	0.107	---	0.25
19	1.58	0.80	0.355	0.107	---	0.25
20	1.67	0.80	0.355	0.107	---	0.25
21	1.75	0.80	0.355	0.107	---	0.25
22	1.83	0.80	0.355	0.107	---	0.25
23	1.92	0.80	0.355	0.107	---	0.25
24	2.00	0.90	0.400	0.107	---	0.29
25	2.08	0.80	0.355	0.107	---	0.25
26	2.17	0.90	0.400	0.107	---	0.29
27	2.25	0.90	0.400	0.107	---	0.29
28	2.33	0.90	0.400	0.107	---	0.29
29	2.42	0.90	0.400	0.107	---	0.29
30	2.50	0.90	0.400	0.107	---	0.29
31	2.58	0.90	0.400	0.107	---	0.29
32	2.67	0.90	0.400	0.107	---	0.29
33	2.75	1.00	0.444	0.107	---	0.34
34	2.83	1.00	0.444	0.107	---	0.34
35	2.92	1.00	0.444	0.107	---	0.34
36	3.00	1.00	0.444	0.107	---	0.34
37	3.08	1.00	0.444	0.107	---	0.34
38	3.17	1.10	0.488	0.107	---	0.38
39	3.25	1.10	0.488	0.107	---	0.38
40	3.33	1.10	0.488	0.107	---	0.38
41	3.42	1.20	0.533	0.107	---	0.43
42	3.50	1.30	0.577	0.107	---	0.47
43	3.58	1.40	0.622	0.107	---	0.51
44	3.67	1.40	0.622	0.107	---	0.51
45	3.75	1.50	0.666	0.107	---	0.56
46	3.83	1.50	0.666	0.107	---	0.56
47	3.92	1.60	0.710	0.107	---	0.60
48	4.00	1.60	0.710	0.107	---	0.60
49	4.08	1.70	0.755	0.107	---	0.65
50	4.17	1.80	0.799	0.107	---	0.69
51	4.25	1.90	0.844	0.107	---	0.74
52	4.33	2.00	0.888	0.107	---	0.78
53	4.42	2.10	0.932	0.107	---	0.83
54	4.50	2.10	0.932	0.107	---	0.83
55	4.58	2.20	0.977	0.107	---	0.87
56	4.67	2.30	1.021	0.107	---	0.91
57	4.75	2.40	1.066	0.107	---	0.96
58	4.83	2.40	1.066	0.107	---	0.96
59	4.92	2.50	1.110	0.107	---	1.00

60	5.00	2.60	1.154	0.107	---	1.05
61	5.08	3.10	1.376	0.107	---	1.27
62	5.17	3.60	1.598	0.107	---	1.49
63	5.25	3.90	1.731	0.107	---	1.62
64	5.33	4.20	1.865	0.107	---	1.76
65	5.42	4.70	2.087	0.107	---	1.98
66	5.50	5.60	2.486	0.107	---	2.38
67	5.58	1.90	0.844	0.107	---	0.74
68	5.67	0.90	0.400	0.107	---	0.29
69	5.75	0.60	0.266	0.107	---	0.16
70	5.83	0.50	0.222	0.107	---	0.12
71	5.92	0.30	0.133	0.107	---	0.03
72	6.00	0.20	0.089	0.107	0.044	0.04
Sum =		100.0			Sum =	36.8

Flood volume = Effective rainfall 3.07(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 4.4(Ac.Ft)
Total soil loss = 0.63(In)
Total soil loss = 0.917(Ac.Ft)
Total rainfall = 3.70(In)
Flood volume = 193053.6 Cubic Feet
Total soil loss = 39960.3 Cubic Feet

Peak flow rate of this hydrograph = 37.711(CFS)

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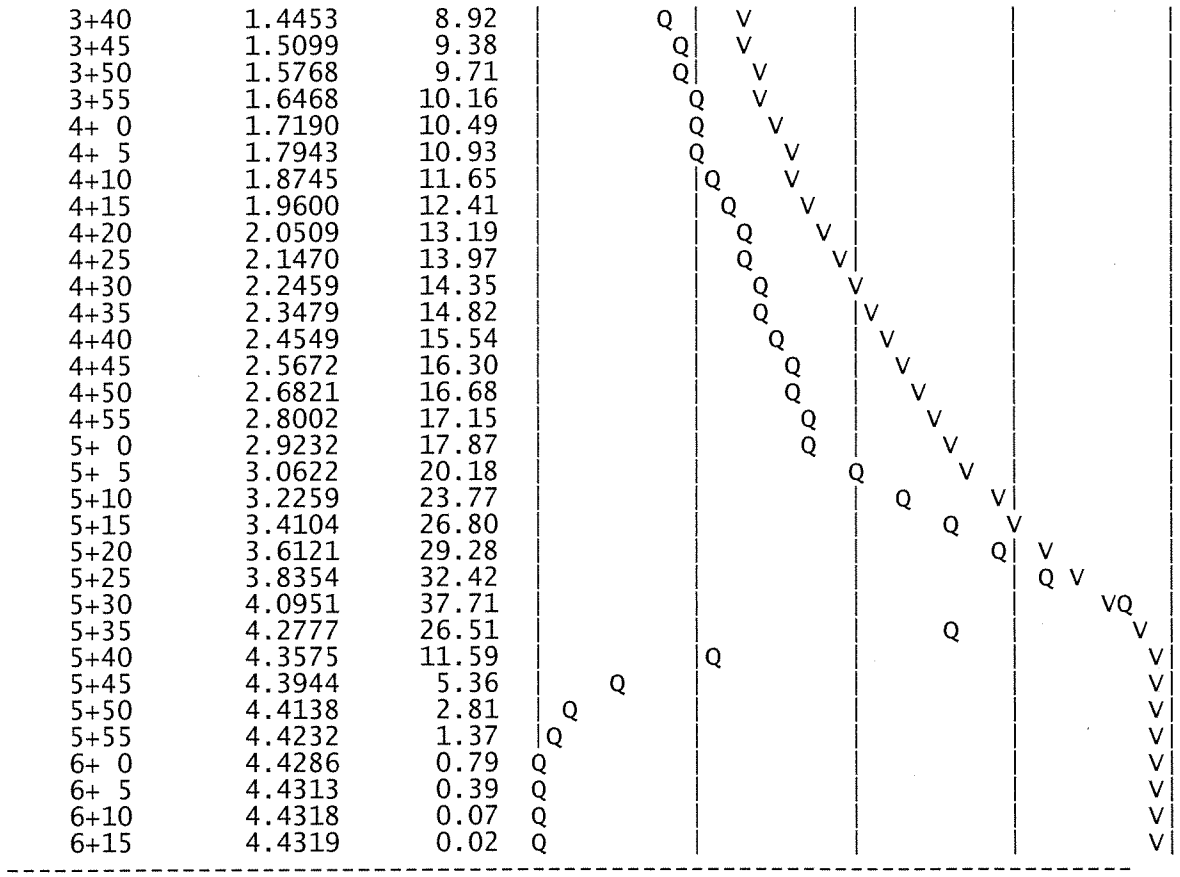
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0069	1.01	VQ
0+10	0.0222	2.21	V Q
0+15	0.0406	2.67	V Q
0+20	0.0597	2.78	V Q
0+25	0.0790	2.80	V Q
0+30	0.1009	3.18	V Q
0+35	0.1250	3.50	|V Q
0+40	0.1495	3.55	|V Q
0+45	0.1741	3.57	|V Q
0+50	0.1987	3.57	|V Q
0+55	0.2233	3.57	| VQ
1+ 0	0.2506	3.96	| VQ
1+ 5	0.2800	4.27	| V Q
1+10	0.3098	4.33	| V Q
1+15	0.3398	4.35	| VQ
1+20	0.3697	4.35	| VQ
1+25	0.3997	4.35	| VQ
1+30	0.4296	4.35	| VQ
1+35	0.4596	4.35	| Q
1+40	0.4895	4.35	| Q
1+45	0.5195	4.35	| Q
1+50	0.5494	4.35	| Q
1+55	0.5794	4.35	| QV
2+ 0	0.6120	4.74	| QV
2+ 5	0.6441	4.66	| QV
2+10	0.6771	4.79	| Q V
2+15	0.7120	5.07	| QV
2+20	0.7472	5.11	| QV
2+25	0.7825	5.13	| Q V
2+30	0.8178	5.13	| Q V
2+35	0.8531	5.13	| Q V
2+40	0.8884	5.13	| Q V
2+45	0.9264	5.51	| Q V
2+50	0.9665	5.83	| Q V
2+55	1.0070	5.88	| Q V
3+ 0	1.0477	5.90	| Q V
3+ 5	1.0883	5.90	| Q V
3+10	1.1316	6.29	| Q V
3+15	1.1771	6.60	| Q V
3+20	1.2230	6.66	| Q |V
3+25	1.2717	7.07	| Q |V
3+30	1.3252	7.77	| Q |V
3+35	1.3839	8.53	| Q | V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3+45 1.5099 9.38
3+50 1.5768 9.71
3+55 1.6468 10.16
4+ 0 1.7190 10.49
4+ 5 1.7943 10.93
4+10 1.8745 11.65
4+15 1.9600 12.41
4+20 2.0509 13.19
4+25 2.1470 13.97
4+30 2.2459 14.35
4+35 2.3479 14.82
4+40 2.4549 15.54
4+45 2.5672 16.30
4+50 2.6821 16.68
4+55 2.8002 17.15
5+ 0 2.9232 17.87
5+ 5 3.0622 20.18
5+10 3.2259 23.77
5+15 3.4104 26.80
5+20 3.6121 29.28
5+25 3.8354 32.42
5+30 4.0951 37.71
5+35 4.2777 26.51
5+40 4.3575 11.59
5+45 4.3944 5.36
5+50 4.4138 2.81
5+55 4.4232 1.37
6+ 0 4.4286 0.79
6+ 5 4.4313 0.39
6+10 4.4318 0.07
6+15 4.4319 0.02

U n i t H y d r o g r a p h A n a l y s i s

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Study date 12/19/12 File: Wildomar24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

SB&O, Inc., Rancho Cucamonga, California - S/N 714

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Wildomar 23
Post Development
JN 69552.25
MATCH RATIONAL METHOD PEAK

Drainage Area = 17.35(Ac.) = 0.027 Sq. Mi.
USER Entry of lag time in hours
Lag time = 0.034 Hr.
Lag time = 2.06 Min.
25% of lag time = 0.51 Min.
40% of lag time = 0.82 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	2.75	47.71

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
17.35	7.50	130.13

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.750(In)
Area Averaged 100-Year Rainfall = 7.500(In)

Point rain (area averaged) = 7.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 7.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
17.350	69.00	0.500

Total Area Entered = 17.35(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.500	0.107	1.000	0.107
					Sum (F) =	0.107

Area averaged mean soil loss (F) (In/Hr) = 0.107
Minimum soil loss rate ((In/Hr)) = 0.053
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.500

U n i t H y d r o g r a p h

VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	243.096	49.980	8.739
2	0.167	486.192	40.485	7.079
3	0.250	729.288	7.249	1.267
4	0.333	972.384	2.287	0.400
			Sum = 100.000	Sum= 17.486

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.060	0.189	0.030	0.03
2	0.17	0.07	0.060	0.188	0.030	0.03
3	0.25	0.07	0.060	0.188	0.030	0.03
4	0.33	0.10	0.090	0.187	0.045	0.04
5	0.42	0.10	0.090	0.186	0.045	0.04
6	0.50	0.10	0.090	0.185	0.045	0.04
7	0.58	0.10	0.090	0.185	0.045	0.04
8	0.67	0.10	0.090	0.184	0.045	0.04
9	0.75	0.10	0.090	0.183	0.045	0.04
10	0.83	0.13	0.120	0.182	0.060	0.06
11	0.92	0.13	0.120	0.182	0.060	0.06
12	1.00	0.13	0.120	0.181	0.060	0.06
13	1.08	0.10	0.090	0.180	0.045	0.04
14	1.17	0.10	0.090	0.180	0.045	0.04
15	1.25	0.10	0.090	0.179	0.045	0.04
16	1.33	0.10	0.090	0.178	0.045	0.04
17	1.42	0.10	0.090	0.177	0.045	0.04
18	1.50	0.10	0.090	0.177	0.045	0.04
19	1.58	0.10	0.090	0.176	0.045	0.04
20	1.67	0.10	0.090	0.175	0.045	0.04
21	1.75	0.10	0.090	0.175	0.045	0.04
22	1.83	0.13	0.120	0.174	0.060	0.06
23	1.92	0.13	0.120	0.173	0.060	0.06
24	2.00	0.13	0.120	0.173	0.060	0.06
25	2.08	0.13	0.120	0.172	0.060	0.06
26	2.17	0.13	0.120	0.171	0.060	0.06
27	2.25	0.13	0.120	0.170	0.060	0.06
28	2.33	0.13	0.120	0.170	0.060	0.06
29	2.42	0.13	0.120	0.169	0.060	0.06
30	2.50	0.13	0.120	0.168	0.060	0.06
31	2.58	0.17	0.150	0.168	0.075	0.07
32	2.67	0.17	0.150	0.167	0.075	0.07
33	2.75	0.17	0.150	0.166	0.075	0.07
34	2.83	0.17	0.150	0.166	0.075	0.07
35	2.92	0.17	0.150	0.165	0.075	0.07
36	3.00	0.17	0.150	0.164	0.075	0.07
37	3.08	0.17	0.150	0.164	0.075	0.07
38	3.17	0.17	0.150	0.163	0.075	0.07
39	3.25	0.17	0.150	0.162	0.075	0.07
40	3.33	0.17	0.150	0.162	0.075	0.07
41	3.42	0.17	0.150	0.161	0.075	0.07
42	3.50	0.17	0.150	0.160	0.075	0.07
43	3.58	0.17	0.150	0.160	0.075	0.07
44	3.67	0.17	0.150	0.159	0.075	0.07
45	3.75	0.17	0.150	0.158	0.075	0.07
46	3.83	0.20	0.180	0.158	---	0.02
47	3.92	0.20	0.180	0.157	---	0.02
48	4.00	0.20	0.180	0.156	---	0.02
49	4.08	0.20	0.180	0.156	---	0.02
50	4.17	0.20	0.180	0.155	---	0.03
51	4.25	0.20	0.180	0.154	---	0.03
52	4.33	0.23	0.210	0.154	---	0.06
53	4.42	0.23	0.210	0.153	---	0.06
54	4.50	0.23	0.210	0.152	---	0.06
55	4.58	0.23	0.210	0.152	---	0.06
56	4.67	0.23	0.210	0.151	---	0.06
57	4.75	0.23	0.210	0.150	---	0.06
58	4.83	0.27	0.240	0.150	---	0.09
59	4.92	0.27	0.240	0.149	---	0.09

60	5.00	0.27	0.240	0.148	---	0.09
61	5.08	0.20	0.180	0.148	---	0.03
62	5.17	0.20	0.180	0.147	---	0.03
63	5.25	0.20	0.180	0.146	---	0.03
64	5.33	0.23	0.210	0.146	---	0.06
65	5.42	0.23	0.210	0.145	---	0.06
66	5.50	0.23	0.210	0.145	---	0.07
67	5.58	0.27	0.240	0.144	---	0.10
68	5.67	0.27	0.240	0.143	---	0.10
69	5.75	0.27	0.240	0.143	---	0.10
70	5.83	0.27	0.240	0.142	---	0.10
71	5.92	0.27	0.240	0.141	---	0.10
72	6.00	0.27	0.240	0.141	---	0.10
73	6.08	0.30	0.270	0.140	---	0.13
74	6.17	0.30	0.270	0.139	---	0.13
75	6.25	0.30	0.270	0.139	---	0.13
76	6.33	0.30	0.270	0.138	---	0.13
77	6.42	0.30	0.270	0.138	---	0.13
78	6.50	0.30	0.270	0.137	---	0.13
79	6.58	0.33	0.300	0.136	---	0.16
80	6.67	0.33	0.300	0.136	---	0.16
81	6.75	0.33	0.300	0.135	---	0.16
82	6.83	0.33	0.300	0.135	---	0.17
83	6.92	0.33	0.300	0.134	---	0.17
84	7.00	0.33	0.300	0.133	---	0.17
85	7.08	0.33	0.300	0.133	---	0.17
86	7.17	0.33	0.300	0.132	---	0.17
87	7.25	0.33	0.300	0.132	---	0.17
88	7.33	0.37	0.330	0.131	---	0.20
89	7.42	0.37	0.330	0.130	---	0.20
90	7.50	0.37	0.330	0.130	---	0.20
91	7.58	0.40	0.360	0.129	---	0.23
92	7.67	0.40	0.360	0.129	---	0.23
93	7.75	0.40	0.360	0.128	---	0.23
94	7.83	0.43	0.390	0.127	---	0.26
95	7.92	0.43	0.390	0.127	---	0.26
96	8.00	0.43	0.390	0.126	---	0.26
97	8.08	0.50	0.450	0.126	---	0.32
98	8.17	0.50	0.450	0.125	---	0.32
99	8.25	0.50	0.450	0.124	---	0.33
100	8.33	0.50	0.450	0.124	---	0.33
101	8.42	0.50	0.450	0.123	---	0.33
102	8.50	0.50	0.450	0.123	---	0.33
103	8.58	0.53	0.480	0.122	---	0.36
104	8.67	0.53	0.480	0.122	---	0.36
105	8.75	0.53	0.480	0.121	---	0.36
106	8.83	0.57	0.510	0.120	---	0.39
107	8.92	0.57	0.510	0.120	---	0.39
108	9.00	0.57	0.510	0.119	---	0.39
109	9.08	0.63	0.570	0.119	---	0.45
110	9.17	0.63	0.570	0.118	---	0.45
111	9.25	0.63	0.570	0.118	---	0.45
112	9.33	0.67	0.600	0.117	---	0.48
113	9.42	0.67	0.600	0.116	---	0.48
114	9.50	0.67	0.600	0.116	---	0.48
115	9.58	0.70	0.630	0.115	---	0.51
116	9.67	0.70	0.630	0.115	---	0.52
117	9.75	0.70	0.630	0.114	---	0.52
118	9.83	0.73	0.660	0.114	---	0.55
119	9.92	0.73	0.660	0.113	---	0.55
120	10.00	0.73	0.660	0.113	---	0.55
121	10.08	0.50	0.450	0.112	---	0.34
122	10.17	0.50	0.450	0.111	---	0.34
123	10.25	0.50	0.450	0.111	---	0.34
124	10.33	0.50	0.450	0.110	---	0.34
125	10.42	0.50	0.450	0.110	---	0.34
126	10.50	0.50	0.450	0.109	---	0.34
127	10.58	0.67	0.600	0.109	---	0.49
128	10.67	0.67	0.600	0.108	---	0.49
129	10.75	0.67	0.600	0.108	---	0.49
130	10.83	0.67	0.600	0.107	---	0.49
131	10.92	0.67	0.600	0.107	---	0.49
132	11.00	0.67	0.600	0.106	---	0.49
133	11.08	0.63	0.570	0.106	---	0.46
134	11.17	0.63	0.570	0.105	---	0.46
135	11.25	0.63	0.570	0.105	---	0.47

136	11.33	0.63	0.570	0.104	---	0.47
137	11.42	0.63	0.570	0.104	---	0.47
138	11.50	0.63	0.570	0.103	---	0.47
139	11.58	0.57	0.510	0.103	---	0.41
140	11.67	0.57	0.510	0.102	---	0.41
141	11.75	0.57	0.510	0.102	---	0.41
2	11.83	0.60	0.540	0.101	---	0.44
3	11.92	0.60	0.540	0.101	---	0.44
144	12.00	0.60	0.540	0.100	---	0.44
145	12.08	0.83	0.750	0.100	---	0.65
146	12.17	0.83	0.750	0.099	---	0.65
147	12.25	0.83	0.750	0.099	---	0.65
148	12.33	0.87	0.780	0.098	---	0.68
149	12.42	0.87	0.780	0.098	---	0.68
150	12.50	0.87	0.780	0.097	---	0.68
151	12.58	0.93	0.840	0.097	---	0.74
152	12.67	0.93	0.840	0.096	---	0.74
153	12.75	0.93	0.840	0.096	---	0.74
154	12.83	0.97	0.870	0.095	---	0.77
155	12.92	0.97	0.870	0.095	---	0.78
156	13.00	0.97	0.870	0.094	---	0.78
157	13.08	1.13	1.020	0.094	---	0.93
158	13.17	1.13	1.020	0.093	---	0.93
159	13.25	1.13	1.020	0.093	---	0.93
160	13.33	1.13	1.020	0.092	---	0.93
161	13.42	1.13	1.020	0.092	---	0.93
162	13.50	1.13	1.020	0.091	---	0.93
163	13.58	0.77	0.690	0.091	---	0.60
164	13.67	0.77	0.690	0.090	---	0.60
165	13.75	0.77	0.690	0.090	---	0.60
166	13.83	0.77	0.690	0.089	---	0.60
167	13.92	0.77	0.690	0.089	---	0.60
168	14.00	0.77	0.690	0.089	---	0.60
169	14.08	0.90	0.810	0.088	---	0.72
170	14.17	0.90	0.810	0.088	---	0.72
171	14.25	0.90	0.810	0.087	---	0.72
172	14.33	0.87	0.780	0.087	---	0.69
3	14.42	0.87	0.780	0.086	---	0.69
174	14.50	0.87	0.780	0.086	---	0.69
175	14.58	0.87	0.780	0.085	---	0.69
176	14.67	0.87	0.780	0.085	---	0.69
177	14.75	0.87	0.780	0.085	---	0.70
178	14.83	0.83	0.750	0.084	---	0.67
179	14.92	0.83	0.750	0.084	---	0.67
180	15.00	0.83	0.750	0.083	---	0.67
181	15.08	0.80	0.720	0.083	---	0.64
182	15.17	0.80	0.720	0.082	---	0.64
183	15.25	0.80	0.720	0.082	---	0.64
184	15.33	0.77	0.690	0.082	---	0.61
185	15.42	0.77	0.690	0.081	---	0.61
186	15.50	0.77	0.690	0.081	---	0.61
187	15.58	0.63	0.570	0.080	---	0.49
188	15.67	0.63	0.570	0.080	---	0.49
189	15.75	0.63	0.570	0.080	---	0.49
190	15.83	0.63	0.570	0.079	---	0.49
191	15.92	0.63	0.570	0.079	---	0.49
192	16.00	0.63	0.570	0.078	---	0.49
193	16.08	0.13	0.120	0.078	---	0.04
194	16.17	0.13	0.120	0.077	---	0.04
195	16.25	0.13	0.120	0.077	---	0.04
196	16.33	0.13	0.120	0.077	---	0.04
197	16.42	0.13	0.120	0.076	---	0.04
198	16.50	0.13	0.120	0.076	---	0.04
199	16.58	0.10	0.090	0.076	---	0.01
200	16.67	0.10	0.090	0.075	---	0.01
201	16.75	0.10	0.090	0.075	---	0.02
202	16.83	0.10	0.090	0.074	---	0.02
203	16.92	0.10	0.090	0.074	---	0.02
4	17.00	0.10	0.090	0.074	---	0.02
205	17.08	0.17	0.150	0.073	---	0.08
206	17.17	0.17	0.150	0.073	---	0.08
207	17.25	0.17	0.150	0.073	---	0.08
208	17.33	0.17	0.150	0.072	---	0.08
209	17.42	0.17	0.150	0.072	---	0.08
210	17.50	0.17	0.150	0.071	---	0.08
211	17.58	0.17	0.150	0.071	---	0.08

212	17.67	0.17	0.150	0.071	---	0.08
213	17.75	0.17	0.150	0.070	---	0.08
214	17.83	0.13	0.120	0.070	---	0.05
215	17.92	0.13	0.120	0.070	---	0.05
216	18.00	0.13	0.120	0.069	---	0.05
?17	18.08	0.13	0.120	0.069	---	0.05
8	18.17	0.13	0.120	0.069	---	0.05
₄9	18.25	0.13	0.120	0.068	---	0.05
220	18.33	0.13	0.120	0.068	---	0.05
221	18.42	0.13	0.120	0.068	---	0.05
222	18.50	0.13	0.120	0.067	---	0.05
223	18.58	0.10	0.090	0.067	---	0.02
224	18.67	0.10	0.090	0.067	---	0.02
225	18.75	0.10	0.090	0.066	---	0.02
226	18.83	0.07	0.060	0.066	0.030	0.03
227	18.92	0.07	0.060	0.066	0.030	0.03
228	19.00	0.07	0.060	0.065	0.030	0.03
229	19.08	0.10	0.090	0.065	---	0.02
230	19.17	0.10	0.090	0.065	---	0.03
231	19.25	0.10	0.090	0.065	---	0.03
232	19.33	0.13	0.120	0.064	---	0.06
233	19.42	0.13	0.120	0.064	---	0.06
234	19.50	0.13	0.120	0.064	---	0.06
235	19.58	0.10	0.090	0.063	---	0.03
236	19.67	0.10	0.090	0.063	---	0.03
237	19.75	0.10	0.090	0.063	---	0.03
238	19.83	0.07	0.060	0.062	0.030	0.03
239	19.92	0.07	0.060	0.062	0.030	0.03
240	20.00	0.07	0.060	0.062	0.030	0.03
241	20.08	0.10	0.090	0.062	---	0.03
242	20.17	0.10	0.090	0.061	---	0.03
243	20.25	0.10	0.090	0.061	---	0.03
244	20.33	0.10	0.090	0.061	---	0.03
245	20.42	0.10	0.090	0.061	---	0.03
246	20.50	0.10	0.090	0.060	---	0.03
247	20.58	0.10	0.090	0.060	---	0.03
?48	20.67	0.10	0.090	0.060	---	0.03
9	20.75	0.10	0.090	0.060	---	0.03
₂50	20.83	0.07	0.060	0.059	---	0.00
251	20.92	0.07	0.060	0.059	---	0.00
252	21.00	0.07	0.060	0.059	---	0.00
253	21.08	0.10	0.090	0.059	---	0.03
254	21.17	0.10	0.090	0.058	---	0.03
255	21.25	0.10	0.090	0.058	---	0.03
256	21.33	0.07	0.060	0.058	---	0.00
257	21.42	0.07	0.060	0.058	---	0.00
258	21.50	0.07	0.060	0.057	---	0.00
259	21.58	0.10	0.090	0.057	---	0.03
260	21.67	0.10	0.090	0.057	---	0.03
261	21.75	0.10	0.090	0.057	---	0.03
262	21.83	0.07	0.060	0.057	---	0.00
263	21.92	0.07	0.060	0.056	---	0.00
264	22.00	0.07	0.060	0.056	---	0.00
265	22.08	0.10	0.090	0.056	---	0.03
266	22.17	0.10	0.090	0.056	---	0.03
267	22.25	0.10	0.090	0.056	---	0.03
268	22.33	0.07	0.060	0.056	---	0.00
269	22.42	0.07	0.060	0.055	---	0.00
270	22.50	0.07	0.060	0.055	---	0.00
271	22.58	0.07	0.060	0.055	---	0.00
272	22.67	0.07	0.060	0.055	---	0.01
273	22.75	0.07	0.060	0.055	---	0.01
274	22.83	0.07	0.060	0.055	---	0.01
275	22.92	0.07	0.060	0.054	---	0.01
276	23.00	0.07	0.060	0.054	---	0.01
277	23.08	0.07	0.060	0.054	---	0.01
278	23.17	0.07	0.060	0.054	---	0.01
?79	23.25	0.07	0.060	0.054	---	0.01
30	23.33	0.07	0.060	0.054	---	0.01
₂81	23.42	0.07	0.060	0.054	---	0.01
282	23.50	0.07	0.060	0.054	---	0.01
283	23.58	0.07	0.060	0.054	---	0.01
284	23.67	0.07	0.060	0.054	---	0.01
285	23.75	0.07	0.060	0.053	---	0.01
286	23.83	0.07	0.060	0.053	---	0.01
287	23.92	0.07	0.060	0.053	---	0.01

288 24.00 0.07 0.060 0.053 --- 0.01
Sum = 100.0 Sum = 64.7

Flood volume = Effective rainfall 5.39(In)
times area 17.4(Ac.)/[(In)/(Ft.)] = 7.8(Ac.Ft)
Total soil loss = 2.11(In)
Total soil loss = 3.051(Ac.Ft)
Total rainfall = 7.50(In)
Flood volume = 339433.8 Cubic Feet
Total soil loss = 132903.9 Cubic Feet

Peak flow rate of this hydrograph = 16.241(CFS)

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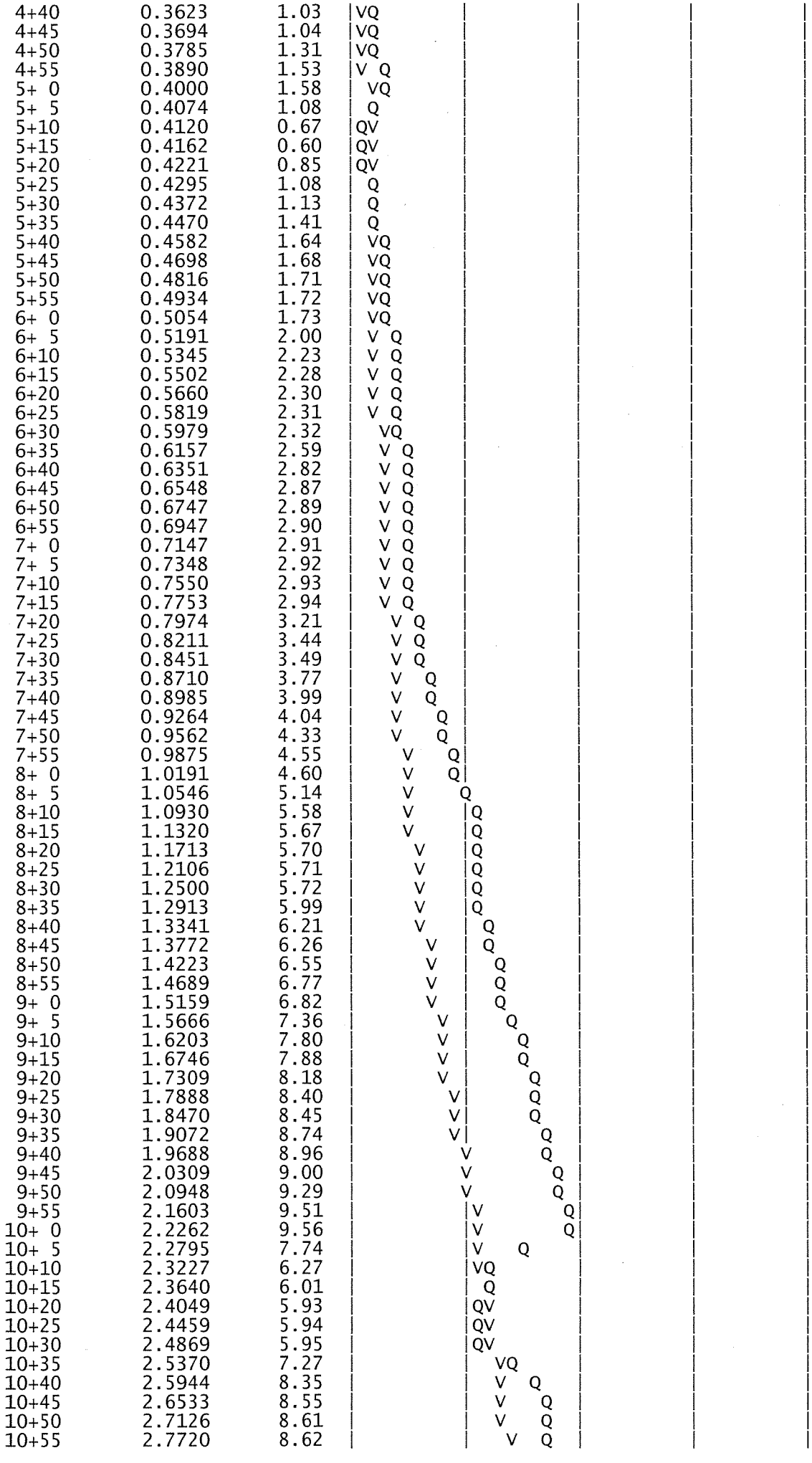
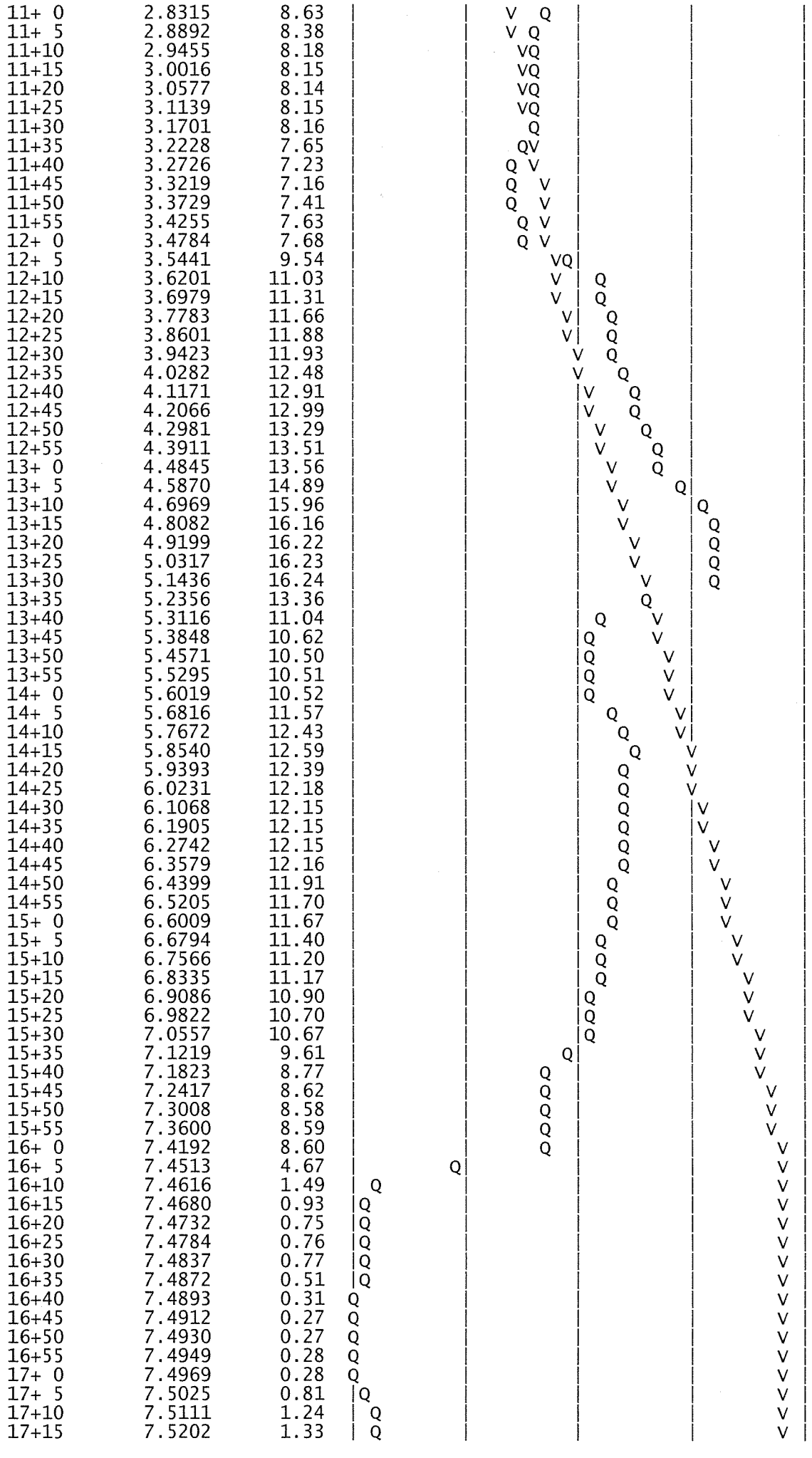
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0018	0.26	Q				
0+10	0.0051	0.47	Q				
0+15	0.0086	0.51	VQ				
0+20	0.0131	0.66	VQ				
0+25	0.0184	0.76	VQ				
0+30	0.0238	0.78	VQ				
0+35	0.0292	0.79	VQ				
0+40	0.0346	0.79	VQ				
0+45	0.0400	0.79	VQ				
0+50	0.0463	0.92	VQ				
0+55	0.0534	1.02	V Q				
1+ 0	0.0606	1.04	V Q				
1+ 5	0.0669	0.92	VQ				
1+10	0.0725	0.81	VQ				
1+15	0.0780	0.79	VQ				
1+20	0.0834	0.79	VQ				
1+25	0.0888	0.79	VQ				
1+30	0.0942	0.79	VQ				
1+35	0.0997	0.79	VQ				
1+40	0.1051	0.79	VQ				
1+45	0.1105	0.79	VQ				
1+50	0.1168	0.92	VQ				
1+55	0.1239	1.02	V Q				
2+ 0	0.1311	1.04	V Q				
2+ 5	0.1383	1.05	V Q				
2+10	0.1455	1.05	V Q				
2+15	0.1528	1.05	V Q				
2+20	0.1600	1.05	V Q				
2+25	0.1672	1.05	V Q				
2+30	0.1744	1.05	V Q				
2+35	0.1826	1.18	V Q				
2+40	0.1914	1.29	V Q				
2+45	0.2004	1.31	|VQ				
2+50	0.2095	1.31	|VQ				
2+55	0.2185	1.31	|VQ				
3+ 0	0.2275	1.31	|VQ				
3+ 5	0.2366	1.31	|VQ				
3+10	0.2456	1.31	|VQ				
3+15	0.2547	1.31	|VQ				
3+20	0.2637	1.31	|VQ				
3+25	0.2727	1.31	|VQ				
3+30	0.2818	1.31	|VQ				
3+35	0.2908	1.31	|VQ				
3+40	0.2998	1.31	|VQ				
3+45	0.3089	1.31	|VQ				
3+50	0.3147	0.85	|Q				
3+55	0.3181	0.49	QV				
4+ 0	0.3211	0.43	QV				
4+ 5	0.3240	0.42	QV				
4+10	0.3269	0.43	QV				
4+15	0.3300	0.44	QV				
4+20	0.3349	0.72	|Q				
4+25	0.3414	0.94	|Q				
4+30	0.3482	0.99	|Q				
4+35	0.3552	1.01	|VQ				


4+40 0.3623 1.03
4+45 0.3694 1.04
4+50 0.3785 1.31
4+55 0.3890 1.53
5+ 0 0.4000 1.58
5+ 5 0.4074 1.08
5+10 0.4120 0.67
5+15 0.4162 0.60
5+20 0.4221 0.85
5+25 0.4295 1.08
5+30 0.4372 1.13
5+35 0.4470 1.41
5+40 0.4582 1.64
5+45 0.4698 1.68
5+50 0.4816 1.71
5+55 0.4934 1.72
6+ 0 0.5054 1.73
6+ 5 0.5191 2.00
6+10 0.5345 2.23
6+15 0.5502 2.28
6+20 0.5660 2.30
6+25 0.5819 2.31
6+30 0.5979 2.32
6+35 0.6157 2.59
6+40 0.6351 2.82
6+45 0.6548 2.87
6+50 0.6747 2.89
6+55 0.6947 2.90
7+ 0 0.7147 2.91
7+ 5 0.7348 2.92
7+10 0.7550 2.93
7+15 0.7753 2.94
7+20 0.7974 3.21
7+25 0.8211 3.44
7+30 0.8451 3.49
7+35 0.8710 3.77
7+40 0.8985 3.99
7+45 0.9264 4.04
7+50 0.9562 4.33
7+55 0.9875 4.55
8+ 0 1.0191 4.60
8+ 5 1.0546 5.14
8+10 1.0930 5.58
8+15 1.1320 5.67
8+20 1.1713 5.70
8+25 1.2106 5.71
8+30 1.2500 5.72
8+35 1.2913 5.99
8+40 1.3341 6.21
8+45 1.3772 6.26
8+50 1.4223 6.55
8+55 1.4689 6.77
9+ 0 1.5159 6.82
9+ 5 1.5666 7.36
9+10 1.6203 7.80
9+15 1.6746 7.88
9+20 1.7309 8.18
9+25 1.7888 8.40
9+30 1.8470 8.45
9+35 1.9072 8.74
9+40 1.9688 8.96
9+45 2.0309 9.00
9+50 2.0948 9.29
9+55 2.1603 9.51
10+ 0 2.2262 9.56
10+ 5 2.2795 7.74
10+10 2.3227 6.27
10+15 2.3640 6.01
10+20 2.4049 5.93
10+25 2.4459 5.94
10+30 2.4869 5.95
10+35 2.5370 7.27
10+40 2.5944 8.35
10+45 2.6533 8.55
10+50 2.7126 8.61
10+55 2.7720 8.62



17+20	7.5295	1.36	| Q	|	|	|	V |
17+25	7.5389	1.36	| Q	|	|	|	V |
17+30	7.5484	1.37	| Q	|	|	|	V |
17+35	7.5579	1.38	| Q	|	|	|	V |
17+40	7.5674	1.38	| Q	|	|	|	V |
17+45	7.5769	1.39	| Q	|	|	|	V |
17+50	7.5847	1.13	| Q	|	|	|	V |
17+55	7.5911	0.93	|Q	|	|	|	V |
18+ 0	7.5973	0.89	|Q	|	|	|	V |
18+ 5	7.6034	0.89	|Q	|	|	|	V|
18+10	7.6096	0.89	|Q	|	|	|	V|
18+15	7.6158	0.90	|Q	|	|	|	V|
18+20	7.6220	0.91	|Q	|	|	|	V|
18+25	7.6283	0.91	|Q	|	|	|	V|
18+30	7.6346	0.92	|Q	|	|	|	V|
18+35	7.6392	0.66	|Q	|	|	|	V|
18+40	7.6423	0.45	Q	|	|	|	V|
18+45	7.6452	0.42	Q	|	|	|	V|
18+50	7.6484	0.47	Q	|	|	|	V|
18+55	7.6520	0.51	|Q	|	|	|	V|
19+ 0	7.6556	0.52	|Q	|	|	|	V|
19+ 5	7.6589	0.48	Q	|	|	|	V|
19+10	7.6619	0.45	Q	|	|	|	V|
19+15	7.6650	0.44	Q	|	|	|	V|
19+20	7.6699	0.71	|Q	|	|	|	V|
19+25	7.6763	0.93	|Q	|	|	|	V|
19+30	7.6830	0.97	|Q	|	|	|	V|
19+35	7.6880	0.73	|Q	|	|	|	V|
19+40	7.6915	0.52	|Q	|	|	|	V|
19+45	7.6949	0.49	Q	|	|	|	V|
19+50	7.6983	0.50	|Q	|	|	|	V|
19+55	7.7019	0.52	|Q	|	|	|	V|
20+ 0	7.7055	0.52	|Q	|	|	|	V|
20+ 5	7.7090	0.51	|Q	|	|	|	V|
20+10	7.7125	0.50	|Q	|	|	|	V|
20+15	7.7160	0.50	|Q	|	|	|	V|
20+20	7.7195	0.51	|Q	|	|	|	V|
20+25	7.7230	0.51	|Q	|	|	|	V|
20+30	7.7265	0.52	|Q	|	|	|	V|
20+35	7.7301	0.52	|Q	|	|	|	V|
20+40	7.7337	0.53	|Q	|	|	|	V|
20+45	7.7374	0.53	|Q	|	|	|	V|
20+50	7.7393	0.27	Q	|	|	|	V|
20+55	7.7397	0.06	Q	|	|	|	V|
21+ 0	7.7399	0.03	Q	|	|	|	V|
21+ 5	7.7419	0.28	Q	|	|	|	V|
21+10	7.7453	0.50	|Q	|	|	|	V|
21+15	7.7490	0.54	|Q	|	|	|	V|
21+20	7.7511	0.30	Q	|	|	|	V|
21+25	7.7517	0.09	Q	|	|	|	V|
21+30	7.7521	0.05	Q	|	|	|	V|
21+35	7.7542	0.31	Q	|	|	|	V|
21+40	7.7578	0.52	|Q	|	|	|	V|
21+45	7.7617	0.57	|Q	|	|	|	V|
21+50	7.7639	0.32	Q	|	|	|	V|
21+55	7.7646	0.11	Q	|	|	|	V|
22+ 0	7.7651	0.07	Q	|	|	|	V|
22+ 5	7.7674	0.33	Q	|	|	|	V|
22+10	7.7711	0.54	|Q	|	|	|	V|
22+15	7.7752	0.59	|Q	|	|	|	V|
22+20	7.7775	0.34	Q	|	|	|	V|
22+25	7.7784	0.13	Q	|	|	|	V|
22+30	7.7790	0.09	Q	|	|	|	V|
22+35	7.7796	0.08	Q	|	|	|	V|
22+40	7.7802	0.09	Q	|	|	|	V|
22+45	7.7808	0.09	Q	|	|	|	V|
22+50	7.7815	0.09	Q	|	|	|	V|
22+55	7.7821	0.09	Q	|	|	|	V|
23+ 0	7.7828	0.10	Q	|	|	|	V|
23+ 5	7.7835	0.10	Q	|	|	|	V|
23+10	7.7842	0.10	Q	|	|	|	V|
23+15	7.7849	0.10	Q	|	|	|	V|
23+20	7.7856	0.11	Q	|	|	|	V|
23+25	7.7864	0.11	Q	|	|	|	V|
23+30	7.7871	0.11	Q	|	|	|	V|
23+35	7.7879	0.11	Q	|	|	|	V|

23+40	7.7887	0.11	Q	|	|	|	V|
23+45	7.7894	0.11	Q	|	|	|	V|
23+50	7.7902	0.11	Q	|	|	|	V|
23+55	7.7910	0.12	Q	|	|	|	V|
24+ 0	7.7918	0.12	Q	|	|	|	V|
24+ 5	7.7922	0.06	Q	|	|	|	V|
24+10	7.7923	0.01	Q	|	|	|	V|
24+15	7.7923	0.00	Q	|	|	|	V

EXHIBIT E

WATER QUALITY VOLUME

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	SB&O INC.	Date	10/12/2012
Designed by	AWSP	County/City Case No	
Company Project Number/Name	WILDOMAR 23 / 69550.60		
Drainage Area Number/Name	ALL ONSITE		

Enter the Area Tributary to this Feature A_T = 17.7 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township

Range

Section

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.65

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.45

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.29 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 18,633 ft^3

Notes:

EXHIBIT F

DETENTION BASIN RATING TABLE

Wildomar 23

Version 2.2 Preliminary Layout 12/20/12

Water Quality Volume = 18,633
Includes Access Road

Basin 1

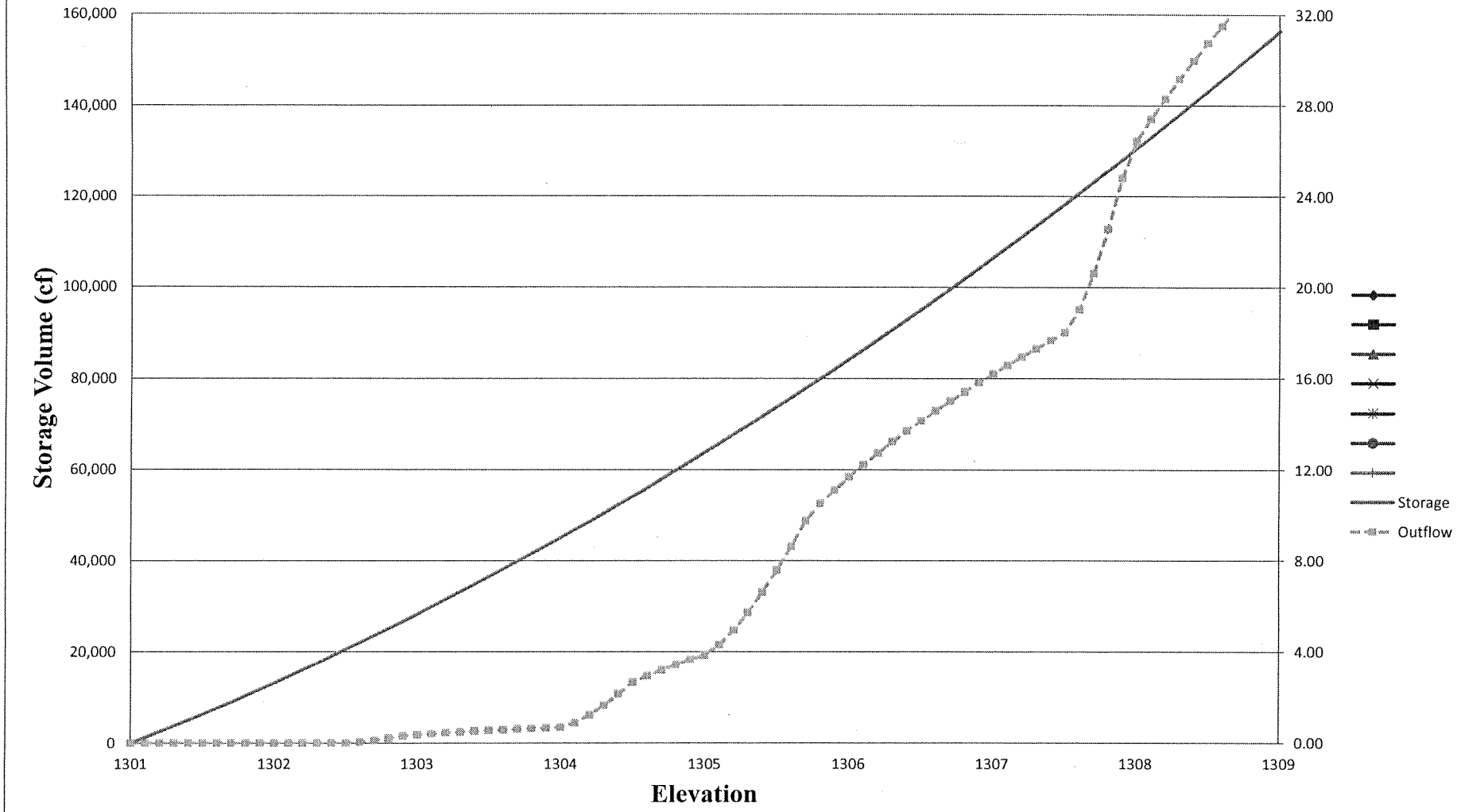
Top 1,309.00 156,412 cf

Storage @ Overflow 1,308.00 130,588 cf 3.00

Basin Storage Volumes 119.78% dT= 5 dT= 15

DEPTH (FT)	ELEVATION	AREA (SF)	Raw Storage (CF)	Water Quality (CF)	STORAGE (CF)	2S/dT (CFS)	2S/dT + O (CFS)	2S/dT (CFS)	2S/dT + O (CFS)	OUTFLOW (CFS)	#1 (CFS)	#2 (CFS)	#3 (CFS)	Overflow (CFS)
0.00	1301.00	**12,383**	0	0	0	0.00	0.00	0.00	0.00	0.00				
0.10	1301.10	12,562	1,247	0	1,247	8.32	8.32	2.77	2.77	0.00				
0.20	1301.20	12,741	2,512	0	2,512	16.75	16.75	5.58	5.58	0.00				
0.30	1301.30	12,921	3,796	0	3,796	25.30	25.30	8.43	8.43	0.00				
0.40	1301.40	13,100	5,097	0	5,097	33.98	33.98	11.33	11.33	0.00				
0.50	1301.50	13,279	6,416	0	6,416	42.77	42.77	14.26	14.26	0.00				
0.60	1301.60	13,458	7,752	0	7,752	51.68	51.68	17.23	17.23	0.00				
0.70	1301.70	13,637	9,107	0	9,107	60.71	60.71	20.24	20.24	0.00				
0.80	1301.80	13,817	10,480	0	10,480	69.87	69.87	23.29	23.29	0.00				
0.90	1301.90	13,996	11,871	0	11,871	79.14	79.14	26.38	26.38	0.00				
1.00	1302.00	14,175	13,279	0	13,279	88.53	88.53	29.51	29.51	0.00				
1.10	1302.10	14,354	14,706	0	14,706	98.04	98.04	32.68	32.68	0.00				
1.20	1302.20	14,534	16,150	0	16,150	107.67	107.67	35.89	35.89	0.00				
1.30	1302.30	14,713	17,612	0	17,612	117.41	117.41	39.14	39.14	0.00				
1.40	1302.40	14,892	19,092	0	19,092	127.28	127.28	42.43	42.43	0.00				
1.50	1302.50	15,071	20,591	0	**20,591**	137.27	137.27	45.76	45.76	0.00	0.00			
1.60	1302.60	15,250	22,107	0	22,107	147.38	147.42	49.13	49.17	0.04	0.04			
1.70	1302.70	15,430	23,641	0	23,641	157.60	157.73	52.53	52.66	0.12	0.12			
1.80	1302.80	15,609	25,193	0	25,193	167.95	168.17	55.98	56.21	0.22	0.22			
1.90	1302.90	15,788	26,762	0	26,762	178.42	178.73	59.47	59.79	0.32	0.32			
2.00	1303.00	15,967	28,350	0	28,350	189.00	189.37	63.00	63.37	0.37	0.37			
2.10	1303.10	16,146	29,956	0	29,956	199.71	200.12	66.57	66.98	0.41	0.41			
2.20	1303.20	16,326	31,580	0	31,580	210.53	210.99	70.18	70.63	0.46	0.46			
2.30	1303.30	16,505	33,221	0	33,221	221.47	221.97	73.82	74.32	0.49	0.49			
2.40	1303.40	16,684	34,881	0	34,881	232.54	233.07	77.51	78.04	0.53	0.53			
2.50	1303.50	16,863	36,558	0	36,558	243.72	244.28	81.24	81.80	0.56	0.56			
2.60	1303.60	17,043	38,253	0	38,253	255.02	255.62	85.01	85.60	0.59	0.59			
2.70	1303.70	17,222	39,966	0	39,966	266.44	267.07	88.81	89.44	0.62	0.62			
2.80	1303.80	17,401	41,698	0	41,698	277.98	278.64	92.66	93.31	0.65	0.65			
2.90	1303.90	17,580	43,447	0	43,447	289.64	290.32	96.55	97.23	0.68	0.68			
3.00	1304.00	17,759	45,214	0	45,214	301.42	302.13	100.47	101.18	0.71	0.71	0.00		
3.10	1304.10	17,939	46,998	0	46,998	313.32	314.22	104.44	105.34	0.90	0.73	0.17		
3.20	1304.20	18,118	48,801	0	48,801	325.34	326.58	108.45	109.69	1.24	0.75	0.48		
3.30	1304.30	18,297	50,622	0	50,622	337.48	339.15	112.49	114.16	1.67	0.78	0.89		
3.40	1304.40	18,476	52,461	0	52,461	349.74	351.91	116.58	118.75	2.17	0.80	1.37		
3.50	1304.50	18,655	54,317	0	54,317	362.12	364.79	120.71	123.38	2.68	0.82	1.85		
3.60	1304.60	18,835	56,192	0	56,192	374.61	377.57	124.87	127.83	2.96	0.85	2.11		
3.70	1304.70	19,014	58,084	0	58,084	387.23	390.44	129.08	132.29	3.21	0.87	2.34		
3.80	1304.80	19,193	59,995	0	59,995	399.96	403.40	133.32	136.76	3.44	0.89	2.55		
3.90	1304.90	19,372	61,923	0	61,923	412.82	416.47	137.61	141.26	3.65	0.91	2.75		
4.00	1305.00	19,552	63,869	0	63,869	425.79	429.65	141.93	145.79	3.86	0.93	2.93	0.00	
4.10	1305.10	19,731	65,833	0	65,833	438.89	443.19	146.30	150.60	4.30	0.95	3.10	0.26	
4.20	1305.20	19,910	67,815	0	67,815	452.10	457.05	150.70	155.65	4.95	0.97	3.26	0.72	
4.30	1305.30	20,089	69,815	0	69,815	465.43	471.16	155.14	160.88	5.73	0.98	3.42	1.33	
4.40	1305.40	20,268	71,833	0	71,833	478.89	485.50	159.63	166.24	6.61	1.00	3.56	2.05	
4.50	1305.50	20,448	73,869	0	73,869	492.46	500.05	164.15	171.74	7.59	1.02	3.70	2.86	
4.60	1305.60	20,627	75,922	0	75,922	506.15	514.79	168.72	177.36	8.64	1.04	3.84	3.76	
4.70	1305.70	20,806	77,994	0	77,994	519.96	529.73	173.32	183.09	9.77	1.05	3.97	4.74	
4.80	1305.80	20,985	80,084	0	80,084	533.89	544.42	177.96	188.49	10.53	1.07	4.10	5.35	
4.90	1305.90	21,164	82,191	0	82,191	547.94	559.07	182.65	193.78	11.13	1.09	4.22	5.82	
5.00	1306.00	21,344	84,317	0	84,317	562.11	573.81	187.37	199.07	11.70	1.11	4.34	6.25	
5.10	1306.10	21,523	86,460	0	86,460	576.40	588.64	192.13	204.37	12.24	1.12	4.46	6.66	
5.20	1306.20	21,702	88,621	0	88,621	590.81	603.56	196.94	209.68	12.75	1.14	4.58	7.04	
5.30	1306.30	21,881	90,800	0	90,800	605.34	618.57	201.78	215.02	13.24	1.15	4.69	7.40	
5.40	1306.40	22,060	92,997	0	92,997	619.98	633.69	206.66	220.37	13.71	1.17	4.79	7.74	
5.50	1306.50	22,240	95,212	0	95,212	634.75	648.91	211.58	225.74	14.16	1.18	4.90	8.07	
5.60	1306.60	22,419	97,445	0	97,445	649.64	664.23	216.55	231.14	14.59	1.20	5.00	8.39	
5.70	1306.70	22,598	99,696	0	99,696	664.64	679.66	221.55	236.56	15.01	1.21	5.11	8.69	
5.80	1306.80	22,777	101,965	0	101,965	679.77	695.19	226.59	242.01	15.42	1.23	5.21	8.99	
5.90	1306.90	22,957	104,252	0	104,252	695.01	710.83	231.67	247.49	15.82	1.24	5.30	9.27	
6.00	1307.00	23,136	106,556	0	106,556	710.37	726.58	236.79	253.00	16.21	1.26	5.40	9.55	
6.10	1307.10	23,315	108,879	0	108,879	725.86	742.45	241.95	258.54	16.59	1.27	5.50	9.82	
6.20	1307.20	23,494	111,219	0	111,219	741.46	758.42	247.15	264.11	16.96	1.29	5.59	10.08	
6.30	1307.30	23,673	113,578	0	113,578	757.18	774.50	252.39	269.71	17.32	1.30	5.68	10.34	
6.40	1307.40	23,853	115,954	0	115,954	773.03	790.70	257.68	275.34	17.67	1.31	5.77	10.59	
6.50	1307.50	24,032	118,348	0	118,348	788.99	807.00	263.00	281.01	18.01	1.33	5.86	10.83	0.00
6.60	1307.60	24,211	120,760	0	120,760	805.07	824.11	268.36	287.39	19.04	1.34	5.95	11.07	0.68
6.70	1307.70	24,390	123,190	0	123,190	821.27	841.89	273.76	294.37	20.62	1.36	6.03	11.30	1.93
6.80	1307.80	24,569	125,638	0	125,638	837.59	860.15	279.20	301.76	22.56	1.37	6.12	11.53	3.55
6.90	1307.90	24,749	128,104	0	128,104	854.03	878.83	284.68	309.47	24.80	1.38	6.20	11.75	5.46
7.00	1308.00	24,928	130,588	0	130,588	870.59	897.04	290.20	316.65	26.45	1.39	6.28	11.97	6.81
7.10	1308.10	25,107	133,090	0	133,090	887.27	914.68	295.76	323.17	27.41	1.41	6.36	12.19	7.46
7.20	1308.20	25,286	135,609	0	135,609	904.06	932.38	301.35	329.67	28.32	1.42	6.44	12.40	8.05
7.30	1308.30	25,466	138,147	0	138,147	920.98	950.15	306.99	336.17	29.17	1.43	6.52	12.61	8.61
7.40	1308.40	25,645	140,703	0	140,703	938.02	968.01	312.67	342.66	29.99	1.45	6.60	12.81	9.13
7.50	1308.50	25,824	143,276	0	143,276	955.17	985.95	318.39	349.17	30.78	1.46	6.68	13.01	9.63
7.60	1308.60	26,003	145,867	0	145,867	972.45	1,003.98	324.15	355.69	31.54	1.47	6.76	13.21	10.10
7.70	1308.70	26,182	148,477	0	148,477	989.84	1,022.11	329.95	362.22	32.27	1.48	6.83	13.41	10.54
7.80	1308.80	26,362	151,104	0	151,104	1,007.36	1,040.34	335.79	368.76	32.98	1.49	6.91	13.60	10.98
7.90	1308.90	26,541	153,749	0	153,749	1,024.99	1,058.66	341.66	375.33	33.67	1.51	6.98	13.79	11.39
8.00	1309.00	26,720	156,412	0	156,412	1,042.75	1,077.09	347.58	381.92	34.34	1.52	7.05	13.98	11.79

Wildomar 23
Preliminary Detention Basin December 2012



Wildomar 23

Version 2.2 Preliminary Layout 12/20/12

Water Quality Volume = 18,633
Includes Access Road

Basin 1

	Top	1,309.00	156,412 cf
	Storage @ Overflow	1,308.00	130,588 cf
Basin Storage Volumes		119.78%	dT= 5

3.00
dT= 15

Flowline Out 1298; Outlet Dia 24

DEPTH (FT)	ELEVATION	AREA (SF)	Raw Storage (CF)	Water Quality (CF)	STORAGE (CF)	2S/dT (CFS)	2S/dT + O (CFS)	2S/dT (CFS)	2S/dT + O (CFS)	OUTFLOW (CFS)	#1 (CFS)	#2 (CFS)	#3 (CFS)	Overflow (CFS)	OUTFLOW Inlet Control	Outlet Control	Head (ft)	HW/DIA Scale 1
0.00	1301.00	**12,383**	0	0	0	0.00	0.00	0.00	0.00	0.00					0.00		3.00	1.50
0.10	1301.10	12,562	1,247	0	1,247	8.32	8.32	2.77	2.77	0.00					0.00		3.10	1.55
0.20	1301.20	12,741	2,512	0	2,512	16.75	16.75	5.58	5.58	0.00					0.00		3.20	1.60
0.30	1301.30	12,921	3,796	0	3,796	25.30	25.30	8.43	8.43	0.00					0.00		3.30	1.65
0.40	1301.40	13,100	5,097	0	5,097	33.98	33.98	11.33	11.33	0.00					0.00		3.40	1.70
0.50	1301.50	13,279	6,416	0	6,416	42.77	42.77	14.26	14.26	0.00					0.00		3.50	1.75
0.60	1301.60	13,458	7,752	0	7,752	51.68	51.68	17.23	17.23	0.00					0.00		3.60	1.80
0.70	1301.70	13,637	9,107	0	9,107	60.71	60.71	20.24	20.24	0.00					0.00		3.70	1.85
0.80	1301.80	13,817	10,480	0	10,480	69.87	69.87	23.29	23.29	0.00					0.00		3.80	1.90
0.90	1301.90	13,996	11,871	0	11,871	79.14	79.14	26.38	26.38	0.00					0.00		3.90	1.95
1.00	1302.00	14,175	13,279	0	13,279	88.53	88.53	29.51	29.51	0.00					0.00		4.00	2.00
1.10	1302.10	14,354	14,706	0	14,706	98.04	98.04	32.68	32.68	0.00					0.00		4.10	2.05
1.20	1302.20	14,534	16,150	0	16,150	107.67	107.67	35.89	35.89	0.00					0.00		4.20	2.10
1.30	1302.30	14,713	17,612	0	17,612	117.41	117.41	39.14	39.14	0.00					0.00		4.30	2.15
1.40	1302.40	14,892	19,092	0	19,092	127.28	127.28	42.43	42.43	0.00					0.00		4.40	2.20
1.50	1302.50	15,071	20,591	0	**20,591**	137.27	137.27	45.76	45.76	0.00	0.00				0.00	27.84	4.50	2.25
1.60	1302.60	15,250	22,107	0	22,107	147.38	147.42	49.13	49.17	0.04	0.04				0.04	28.24	4.60	2.30
1.70	1302.70	15,430	23,641	0	23,641	157.60	157.73	52.53	52.66	0.12	0.12				0.12	28.63	4.70	2.35
1.80	1302.80	15,609	25,193	0	25,193	167.95	168.17	55.98	56.21	0.22	0.22				0.22	29.01	4.80	2.40
1.90	1302.90	15,788	26,762	0	26,762	178.42	178.73	59.47	59.79	0.32	0.32				0.32	29.39	4.90	2.45
2.00	1303.00	15,967	28,350	0	28,350	189.00	189.37	63.00	63.37	0.37	0.37				0.37	29.77	5.00	2.50
2.10	1303.10	16,146	29,956	0	29,956	199.71	200.12	66.57	66.98	0.41	0.41				0.41	30.14	5.10	2.55
2.20	1303.20	16,326	31,580	0	31,580	210.53	210.99	70.18	70.63	0.46	0.46				0.46	30.50	5.20	2.60
2.30	1303.30	16,505	33,221	0	33,221	221.47	221.97	73.82	74.32	0.49	0.49				0.49	30.86	5.30	2.65
2.40	1303.40	16,684	34,881	0	34,881	232.54	233.07	77.51	78.04	0.53	0.53				0.53	31.22	5.40	2.70
2.50	1303.50	16,863	36,558	0	36,558	243.72	244.28	81.24	81.80	0.56	0.56				0.56	31.57	5.50	2.75
2.60	1303.60	17,043	38,253	0	38,253	255.02	255.62	85.01	85.60	0.59	0.59				0.59	31.92	5.60	2.80
2.70	1303.70	17,222	39,966	0	39,966	266.44	267.07	88.81	89.44	0.62	0.62				0.62	32.27	5.70	2.85
2.80	1303.80	17,401	41,698	0	41,698	277.98	278.64	92.66	93.31	0.65	0.65				0.65	32.61	5.80	2.90
2.90	1303.90	17,580	43,447	0	43,447	289.64	290.32	96.55	97.23	0.68	0.68				0.68	32.94	5.90	2.95
3.00	1304.00	17,759	45,214	0	45,214	301.42	302.13	100.47	101.18	0.71	0.71	0.00			0.71	33.28	6.00	3.00
3.10	1304.10	17,939	46,998	0	46,998	313.32	314.22	104.44	105.34	0.90	0.73	0.17			0.90	33.61	6.10	3.05
3.20	1304.20	18,118	48,801	0	48,801	325.34	326.58	108.45	109.69	1.24	0.75	0.48			1.24	33.94	6.20	3.10
3.30	1304.30	18,297	50,622	0	50,622	337.48	339.15	112.49	114.16	1.67	0.78	0.89			1.67	34.26	6.30	3.15
3.40	1304.40	18,476	52,461	0	52,461	349.74	351.91	116.58	118.75	2.17	0.80	1.37			2.17	34.58	6.40	3.20
3.50	1304.50	18,655	54,317	0	54,317	362.12	364.79	120.71	123.38	2.68	0.82	1.85			2.68	34.90	6.50	3.25
3.60	1304.60	18,835	56,192	0	56,192	374.61	377.57	124.87	127.83	2.96	0.85	2.11			2.96	35.22	6.60	3.30
3.70	1304.70	19,014	58,084	0	58,084	387.23	390.44	129.08	132.29	3.21	0.87	2.34			3.21	35.53	6.70	3.35
3.80	1304.80	19,193	59,995	0	59,995	399.96	403.40	133.32	136.76	3.44	0.89	2.55			3.44	35.84	6.80	3.40
3.90	1304.90	19,372	61,923	0	61,923	412.82	416.47	137.61	141.26	3.65	0.91	2.75			3.65	36.15	6.90	3.45
4.00	1305.00	19,552	63,869	0	63,869	425.79	429.65	141.93	145.79	3.86	0.93	2.93	0.00		3.86	36.46	7.00	3.50
4.10	1305.10	19,731	65,833	0	65,833	438.89	443.19	146.30	150.60	4.30	0.95	3.10	0.26		4.30	36.76	7.10	3.55
4.20	1305.20	19,910	67,815	0	67,815	452.10	457.05	150.70	155.65	4.95	0.97	3.26	0.72		4.95	37.06	7.20	3.60
4.30	1305.30	20,089	69,815	0	69,815	465.43	471.16	155.14	160.88	5.73	0.98	3.42	1.33		5.73	37.36	7.30	3.65
4.40	1305.40	20,268	71,833	0	71,833	478.89	485.50	159.63	166.24	6.61	1.00	3.56	2.05		6.61	37.65	7.40	3.70
4.50	1305.50	20,448	73,869	0	73,869	492.46	500.05	164.15	171.74	7.59	1.02	3.70	2.86		7.59	37.94	7.50	3.75
4.60	1305.60	20,627	75,922	0	75,922	506.15	514.79	168.72	177.36	8.64	1.04	3.84	3.76		8.64	38.23	7.60	3.80
4.70	1305.70	20,806	77,994	0	77,994	519.96	529.73	173.32	183.09	9.77	1.05	3.97	4.74		9.77	38.52	7.70	3.85
4.80	1305.80	20,985	80,084	0	80,084	533.89	544.42	177.96	188.49	10.53	1.07	4.10	5.35		10.53	38.81	7.80	3.90
4.90	1305.90	21,164	82,191	0	82,191	547.94	559.07	182.65	193.78	11.13	1.09	4.22	5.82		11.13	39.09	7.90	3.95
5.00	1306.00	21,344	84,317	0	84,317	562.11	573.81	187.37	199.07	11.70	1.11	4.34	6.25		11.70	39.38	8.00	4.00
5.10	1306.10	21,523	86,460	0	86,460	576.40	588.64	192.13	204.37	12.24	1.12	4.46	6.66		12.24	39.66	8.10	4.05
5.20	1306.20	21,702	88,621	0	88,621	590.81	603.56	196.94	209.68	12.75	1.14	4.58	7.04		12.75	39.93	8.20	4.10
5.30	1306.30	21,881	90,800	0	90,800	605.34	618.57	201.78	215.02	13.24	1.15	4.69	7.40		13.24	40.21	8.30	4.15
5.40	1306.40	22,060	92,997	0	92,997	619.98	633.69	206.66	220.37	13.71	1.17	4.79	7.74		13.71	40.49	8.40	4.20
5.50	1306.50	22,240	95,212	0	95,212	634.75	648.91	211.58	225.74	14.16	1.18	4.90	8.07		14.16	40.76	8.50	4.25
5.60	1306.60	22,419	97,445	0	97,445	649.64	664.23	216.55	231.14	14.59	1.20	5.00	8.39		14.59	41.03	8.60	4.30
5.70	1306.70	22,598	99,696	0	99,696	664.64	679.66	221.55	236.56	15.01	1.21	5.11	8.69		15.01	41.30	8.70	4.35
5.80	1306.80	22,777	101,965	0	101,965	679.77	695.19	226.59	242.01	15.42	1.23	5.21	8.99		15.42	41.57	8.80	4.40
5.90	1306.90	22,957	104,252	0	104,252	695.01	710.83	231.67	247.49	15.82	1.24	5.30	9.27		15.82	41.83	8.90	4.45
6.00	1307.00	23,136	106,556	0	106,556	710.37	726.58	236.79	253.00	16.21	1.26	5.40	9.55		16.21	42.09	9.00	4.50
6.10	1307.10	23,315	108,879	0	108,879	725.86	742.45	241.95	258.54	16.59	1.27	5.50	9.82		16.59	42.36	9.10	4.55
6.20	1307.20	23,494	111,219	0	111,219	741.46	758.42	247.15	264.11	16.96	1.29	5.59	10.08		16.96	42.62	9.20	4.60
6.30	1307.30	23,673	113,578	0	113,578	757.18	774.50	252.39	269.71	17.32	1.30	5.68	10.34		17.32	42.88	9.30	4.65
6.40	1307.40	23,853	115,954	0	115,954	773.03	790.70	257.68	275.34	17.67	1.31	5.77	10.59		17.67	43.13	9.40	4.70
6.50	1307.50	24,032	118,348	0	118,348	788.99	807.00	263.00	281.01	18.01	1.33	5.86	10.83	0.00	18.01	43.39	9.50	4.75
6.60	1307.60	24,211	120,760	0	120,760	805.07	824.11	268.36	287.39	19.04	1.34	5.95	11.07	0.68	19.04	43.64	9.60	4.80
6.70	1307.70	24,390	123,190	0	123,190	821.27	841.89	273.76	294.37	20.62	1.36	6.03	11.30	1.93	20.62	43.90	9.70	4.85
6.80	1307.80	24,569	125,638	0	125,638	837.59	860.15	279.20	301.76	22.56	1.37	6.12	11.53	3.55	22.56	44.15	9.80	4.90
6.90	1307.90	24,749	128,104	0	128,104	854.03	878.83	284.68	309.47	24.80	1.38	6.20	11.75	5.46	24.80	44.40	9.90	4.95
7.00	1308.00	24,928	130,588	0	130,588	870.59	897.04	290.20	316.65	26.45	1.39	6.28	11.97	6.81	26.45	44.65	10.00	5.00
7.10	1308.10	25,107	133,090	0	133,090	887.27	914.68	295.76	323.17	27.41	1.41	6.36	12.19	7.46	27.41	44.90	10.10	5.05
7.20	1308.20	25,286	135,609	0	135,609	904.06	932.38	301.35	329.67	28.32	1.42	6.44	12.40	8.05	28.32	45.14	10.20	5.10
7.30	1308.30	25,466	138,147	0	138,147	920.98	950.15	306.99	336.17	29.17	1.43	6.52	12.61	8.61	29.17	45.39	10.30	5.15
7.40	1308.40	25,645	140,703	0	140,703	938.02	968.01	312.67	342.66	29.99	1.45	6.60	12.81	9.13	29.99	45.63	10.40	5.20
7.50	1308.50	25,824	143,276	0	143,276	955.17	985.95	318.39	349.17	30.78	1.46	6.68	13.01	9.63	30.78	45.87	10.50	5.25
7.60	1308.60	26,003	145,867	0	145,867	972.45	1,003.98	324.15	355.69	31.54	1.47	6.76	13.21	10.10	31.54	46.11	10.60	5.30
7.70	1308.70	26,182	148,477	0	148,477	989.84	1,022.11	329.95	362.22	32.27	1.48	6.83	13.41	10.54	32.27	46.35	10.70	5.35
7.80	1308.80	26,362	151,104	0	151,104	1,007.36	1,040.34	335.79	368.76	32.98	1.49	6.91	13.60	10.98	32.98	46.59	10.80	5.40
7.90	1308.90	26,541	153,749	0	153,749	1,024.99	1,058.66	341.66	375.33	33.67	1.51	6.98	13.79	11.39	33.67	46.83	10.90	5.45
8.00	1309.00	26,720	156,412	0	156,412	1,042.75	1,077.09	347.58	381.92	34.34	1.52	7.05	13.98	11.79	34.34	47.06	11.00	5.50

	Opening #1				Opening #2				Opening #3				4 x 4 grated opening		
													Grate Factor	50.00%	
	Cd (WEIR)	2.7			Cd (WEIR)	2.7			Cd (WEIR)	2.7			Cd (WEIR)	2.7	
	Cd (ORIFICE)	0.6			Cd (ORIFICE)	0.6			Cd (ORIFICE)	0.6			Cd (ORIFICE)	0.6	
	HEIGHT OF BOX	0.250	3		HEIGHT OF BOX	0.333	4		HEIGHT OF BOX	0.500	6		Area	4	ft
	WIDTH OF BOX	0.5	6.00		WIDTH OF BOX	2	24.00		WIDTH OF BOX	3	36.00		Perimeter	16	ft

DEPTH	WEIR		Q x 1	DEPTH	WEIR		Q x 1	DEPTH	WEIR	ORIFICE	Q x 1	DEPTH	WEIR	ORIFICE	Q
0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00		0.00
0.10	0.04		0.04	0.10	0.17		0.17	0.10	0.26		0.26	0.10	0.68		0.68
0.20	0.12	0.16	0.12	0.20	0.48		0.48	0.20	0.72		0.72	0.20	1.93		1.93
0.30	0.22	0.25	0.22	0.30	0.89	1.17	0.89	0.30	1.33		1.33	0.30	3.55		3.55
0.40	0.34	0.32	0.32	0.40	1.37	1.55	1.37	0.40	2.05	2.80	2.05	0.40	5.46	6.09	5.46
0.50	0.48	0.37	0.37	0.50	1.91	1.85	1.85	0.50	2.86	3.61	2.86	0.50	7.64	6.81	6.81
0.60	0.63	0.41	0.41	0.60	2.51	2.11	2.11	0.60	3.76	4.27	3.76	0.60	10.04	7.46	7.46
0.70	0.79	0.46	0.46	0.70	3.16	2.34	2.34	0.70	4.74	4.84	4.74	0.70	12.65	8.05	8.05
0.80	0.97	0.49	0.49	0.80	3.86	2.55	2.55	0.80	5.80	5.35	5.35	0.80	15.46	8.61	8.61
0.90	1.15	0.53	0.53	0.90	4.61	2.75	2.75	0.90	6.92	5.82	5.82	0.90	18.44	9.13	9.13
1.00	1.35	0.56	0.56	1.00	5.40	2.93	2.93	1.00	8.10	6.25	6.25	1.00	21.60	9.63	9.63
1.10	1.56	0.59	0.59	1.10	6.23	3.10	3.10	1.10	9.34	6.66	6.66	1.10	24.92	10.10	10.10
1.20	1.77	0.62	0.62	1.20	7.10	3.26	3.26	1.20	10.65	7.04	7.04	1.20	28.39	10.54	10.54
1.30	2.00	0.65	0.65	1.30	8.00	3.42	3.42	1.30	12.01	7.40	7.40	1.30	32.02	10.98	10.98
1.40	2.24	0.68	0.68	1.40	8.95	3.56	3.56	1.40	13.42	7.74	7.74	1.40	35.78	11.39	11.39
1.50	2.48	0.71	0.71	1.50	9.92	3.70	3.70	1.50	14.88	8.07	8.07	1.50	39.68	11.79	11.79
1.60	2.73	0.73	0.73	1.60	10.93	3.84	3.84	1.60	16.39	8.39	8.39	1.60	43.72	12.18	12.18
1.70	2.99	0.75	0.75	1.70	11.97	3.97	3.97	1.70	17.95	8.69	8.69	1.70	47.88	12.55	12.55
1.80	3.26	0.78	0.78	1.80	13.04	4.10	4.10	1.80	19.56	8.99	8.99	1.80	52.16	12.91	12.91
1.90	3.54	0.80	0.80	1.90	14.14	4.22	4.22	1.90	21.21	9.27	9.27	1.90	56.57	13.27	13.27
2.00	3.82	0.82	0.82	2.00	15.27	4.34	4.34	2.00	22.91	9.55	9.55	2.00	61.09	13.61	13.61
2.10	4.11	0.85	0.85	2.10	16.43	4.46	4.46	2.10	24.65	9.82	9.82	2.10	65.73	13.95	13.95
2.20	4.41	0.87	0.87	2.20	17.62	4.58	4.58	2.20	26.43	10.08	10.08	2.20	70.48	14.28	14.28
2.30	4.71	0.89	**0.89**	2.30	18.84	4.69	4.69	2.30	28.25	10.34	10.34	2.30	75.34	14.60	14.60
2.40	5.02	0.91	0.91	2.40	20.08	4.79	4.79	2.40	30.12	10.59	10.59	2.40	80.31	14.91	14.91
2.50	5.34	0.93	0.93	2.50	21.35	4.90	4.90	2.50	32.02	10.83	10.83	2.50	85.38	15.22	15.22
2.60	5.66	0.95	0.95	2.60	22.64	5.00	5.00	2.60	33.96	11.07	11.07	2.60	90.56	15.52	15.52
2.70	5.99	0.97	0.97	2.70	23.96	5.11	5.11	2.70	35.94	11.30	11.30	2.70	95.83	15.82	15.82
2.80	6.33	0.98	0.98	2.80	25.30	5.21	5.21	2.80	37.95	11.53	11.53	2.80	101.20	16.11	16.11
2.90	6.67	1.00	1.00	2.90	26.67	5.30	5.30	2.90	40.00	11.75	11.75	2.90	106.67	16.39	16.39
3.00	7.01	1.02	1.02	3.00	28.06	5.40	5.40	3.00	42.09	11.97	11.97	3.00	112.24	16.67	16.67
3.10	7.37	1.04	1.04	3.10	29.47	5.50	5.50	3.10	44.21	12.19	12.19	3.10	117.90	16.95	16.95
3.20	7.73	1.05	1.05	3.20	30.91	5.59	5.59	3.20	46.37	12.40	12.40	3.20	123.65	17.22	17.22
3.30	8.09	1.07	1.07	3.30	32.37	5.68	5.68	3.30	48.56	12.61	12.61	3.30	129.49	17.49	17.49
3.40	8.46	1.09	1.09	3.40	33.85	5.77	5.77	3.40	50.78	12.81	12.81	3.40	135.42	17.75	17.75
3.50	8.84	1.11	1.11	3.50	35.36	5.86	5.86	3.50	53.04	13.01	13.01	3.50	141.43	18.01	18.01
3.60	9.22	1.12	1.12	3.60	36.88	5.95	5.95	3.60	55.33	13.21	13.21	3.60	147.54	18.26	18.26
3.70	9.61	1.14	1.14	3.70	38.43	6.03	6.03	3.70	57.65	13.41	13.41	3.70	153.73	18.52	18.52
3.80	10.00	1.15	1.15	3.80	40.00	6.12	6.12	3.80	60.00	13.60	13.60	3.80	160.00	18.76	18.76
3.90	10.40	1.17	1.17	3.90	41.59	6.20	6.20	3.90	62.39	13.79	13.79	3.90	166.36	19.01	19.01
4.00	10.80	1.18	1.18	4.00	43.20	6.28	6.28	4.00	64.80	13.98	13.98	4.00	172.80	19.25	19.25
4.10	11.21	1.20	1.20	4.10	44.83	6.36	6.36	4.10	67.25	14.16	14.16	4.10	179.32	19.49	19.49
4.20	11.62	1.21	1.21	4.20	46.48	6.44	6.44	4.20	69.72	14.35	14.35	4.20	185.92	19.73	19.73
4.30	12.04	1.23	1.23	4.30	48.15	6.52	6.52	4.30	72.23	14.53	14.53	4.30	192.60	19.96	19.96
4.40	12.46	1.24	1.24	4.40	49.84	6.60	6.60	4.40	74.76	14.71	14.71	4.40	199.36	20.19	20.19
4.50	12.89	1.26	1.26	4.50	51.55	6.68	6.68	4.50	77.32	14.88	14.88	4.50	206.19	20.42	20.42
4.60	13.32	1.27	1.27	4.60	53.28	6.76	6.76	4.60	79.91	15.06	15.06	4.60	213.10	20.65	20.65
4.70	13.76	1.29	1.29	4.70	55.02	6.83	6.83	4.70	82.53	15.23	15.23	4.70	220.09	20.87	20.87
4.80	14.20	1.30	1.30	4.80	56.79	6.91	6.91	4.80	85.18	15.40	15.40	4.80	227.15	21.09	21.09
4.90	14.64	1.31	1.31	4.90	58.57	6.98	6.98	4.90	87.86	15.57	15.57	4.90	234.29	21.31	21.31
5.00	15.09	1.33	1.33	5.00	60.37	7.05	7.05	5.00	90.56	15.73	15.73	5.00	241.50	21.52	21.52
5.10	15.55	1.34	1.34	5.10	62.19	7.13	7.13	5.10	93.29	15.90	15.90	5.10	248.78	21.74	21.74
5.20	16.01	1.36	1.36	5.20	64.03	7.20	7.20	5.20	96.05	16.06	16.06	5.20	256.13	21.95	21.95
5.30	16.47	1.37	1.37	5.30	65.89	7.27	7.27	5.30	98.83	16.22	16.22	5.30	263.55	22.16	22.16
5.40	16.94	1.38	1.38	5.40	67.76	7.34	7.34	5.40	101.64	16.38	16.38	5.40	271.05	22.37	22.37
5.50	17.41	1.39	1.39	5.50	69.65	7.41	7.41	5.50	104.48	16.54	16.54	5.50	278.61	22.58	22.58
5.60	17.89	1.41	1.41	5.60	71.56	7.48	7.48	5.60	107.34	16.70	16.70	5.60	286.24	22.78	22.78
5.70	18.37	1.42	1.42	5.70	73.49	7.55	7.55	5.70	110.23	16.85	16.85	5.70	293.94	22.98	22.98
5.80	18.86	1.43	1.43	5.80	75.43	7.62	7.62	5.80	113.14	17.01	17.01	5.80	301.71	23.18	23.18
5.90	19.35	1.45	1.45	5.90	77.39	7.68	7.68	5.90	116.08	17.16	17.16	5.90	309.55	23.38	23.38
6.00	19.84	1.46	1.46	6.00	79.36	7.75	7.75	6.00	119.05	17.31	17.31	6.00	317.45	23.58	23.58
6.10	20.34	1.47	1.47	6.10	81.36	7.82	7.82	6.10	122.03	17.46	17.46	6.10	325.42	23.77	23.77
6.20	20.84	1.48	1.48	6.20	83.36	7.88	7.88	6.20	125.05	17.61	17.61	6.20	333.46	23.97	23.97
6.30	21.35	1.49	1.49	6.30	85.39	7.95	7.95	6.30	128.08	17.76	17.76	6.30	341.56	24.16	24.16
6.40	21.86	1.51	1.51	6.40	87.43	8.01	8.01	6.40	131.15	17.90	17.90	6.40	349.72	24.35	24.35
6.50	22.37	1.52	1.52	6.50	89.49	8.07	8.07	6.50	134.23	18.05	18.05	6.50	357.95	24.54	24.54
6.60	22.89	1.53	1.53	6.60	91.56	8.14	8.14	6.60	137.34	18.19	18.19	6.60	366.24	24.73	24.73
6.70	23.41	1.54	1.54	6.70	93.65	8.20	8.20	6.70	140.47	18.33	18.33	6.70	374.60	24.92	24.92
6.80	23.94	1.55	1.55	6.80	95.75	8.26	8.26	6.80	143.63	18.48	18.48	6.80	383.02	25.10	25.10
6.90	24.47	1.57	1.57	6.90	97.87	8.33	8.33	6.90	146.81	18.62	18.62	6.90	391.50	25.29	25.29
7.00	25.00	1.58	1.58	7.00	100.01	8.39	8.39	7.00	150.01	18.76	18.76	7.00	400.04	25.47	25.47
7.10	25.54	1.59	1.59	7.10	102.16	8.45	8.45	7.10	153.24	18.89	18.89	7.10	408.64	25.65	25.65
7.20	26.08	1.60	1.60	7.20	104.33	8.51	8.51	7.20	156.49	19.03	19.03	7.20	417.30	25.83	25.83
7.30	26.63	1.61	1.61	7.30	106.51	8.57	8.57	7.30	159.76	19.17	19.17	7.30	426.03	26.01	26.01
7.40	27.18	1.62	1.62	7.40	108.70	8.63	8.63	7.40	163.05	19.30	19.30	7.40	434.81	26.19	26.19
7.50	27.73	1.63	1.63	7.50	110.91	8.69	8.69	7.50	166.37	19.44	19.44	7.50	443.66	26.36	26.36
7.60	28.28	1.64	1.64	7.60	113.14	8.75	8.75	7.60	169.71	19.57	19.57				
7.70	28.84	1.66	1.66	7.70	115.38	8.81	8.81	7.70	173.07	19.70	19.70				
7.80	29.41	1.67	1.67	7.80	117.63	8.86	8.86	7.80	176.45	19.84	19.84				
7.90	29.98	1.68	1.68	7.90	119.90	8.92	8.92	7.90	179.86	19.97	19.97				
8.00	30.55	1.69	1.69	8.00	122.19	8.98	8.98	8.00	183.28	20.10	20.10				

EXHIBIT G

SUMMARY OF DETENTION BASIN ROUTING

Wildomar 23

Basin 1

Tributary Areas (ac)

Preliminary Design 20-Dec-12

Onsite	17.35
Offsite	0
Total	17.35

	Area (sf)	Elev	Storage (cf)	Storage (ac-ft)
Floor of Basin	12,420	1301.00	0	
Water Quality	15,290	1302.50	20,591	0.47
Overflow	24,928	1308.00	130,588	3.00
Top Of Basin	27,730	1309.00	156,412	3.59

Storm Frequency	Duration	Qexist (cfs)	Qin (cfs)	Qout (cfs)	WSEL (ft)
100 YEAR	24		16.24	12.75	1306.2
	6		37.71	**17.32**	**1307.3**
	3		39.76	15.82	1306.9
	1	**38.58**	57.40	9.77	1305.7

	Length	Width	Area (sf)	Area (ac)
Top of Detention Basin	185	150	26,720	0.61

Outlet Control Structure Use 4' x 4' structure (Inside DImension)

Opening	#1	#2	#3	Overflow - Grate
Elevation	1302.5	1304.0	1305.0	1307.5
Width (in)	6	24	36	4 feet
Height (in)	3	4	6	4 feet

Outlet Dia	24	in
Flowline	1297.0	
Top of Structure	1307.5	

Efficiency Gross (%) 3.54% Storage (per ac) 7,527 cf

EXHIBIT H

DETENTION BASIN ROUTING

Wildomar 23 **DETENTION BASIN ROUTING** 38.58

57.40 9.77

100 YEAR EVENT ~ 1 Hour STORM

5.00 Min 1305.7

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Adjusted Outflow	Basin WSEL
1	0.08	6.000	0.00	0.00	0.00	0.00	1301.00
2	0.17	11.000	17.00	17.00	0.00	0.00	1301.20
3	0.25	13.420	41.42	41.42	0.00	0.00	1301.40
4	0.33	14.860	69.70	69.70	0.00	0.00	1301.70
5	0.42	15.540	100.10	100.10	0.00	0.00	1302.10
6	0.50	17.090	132.73	132.73	0.00	0.00	1302.40
7	0.58	20.420	170.24	169.80	0.22	0.22	1302.80
8	0.67	24.400	214.62	213.70	0.46	0.46	1303.20
9	0.75	32.140	270.24	269.00	0.62	0.62	1303.70
10	0.83	57.400	358.54	354.20	2.17	2.17	1304.40
11	0.92	46.770	458.37	448.47	4.95	4.95	1305.20
12	1.00	22.670	517.91	500.62	8.64	8.64	1305.60
13	1.08	8.950	532.24	512.70	9.77	9.77	1305.70
14	1.17	1.510	523.16	505.87	8.64	8.64	1305.60
15	1.25	0.310	507.69	492.51	7.59	7.59	1305.50
16	1.33	0.000	492.82	479.59	6.61	6.61	1305.40
17	1.42	0.000	479.59	468.13	5.73	5.73	1305.30
18	1.50	0.000	468.13	458.23	4.95	4.95	1305.20
19	1.58	0.000	458.23	448.33	4.95	4.95	1305.20
20	1.67	0.000	448.33	439.72	4.30	4.30	1305.10
21	1.75	0.000	439.72	432.01	3.86	3.86	1305.00
22	1.83	0.000	432.01	424.30	3.86	3.86	1305.00
23	1.92	0.000	424.30	416.99	3.65	3.65	1304.90
24	2.00	0.000	416.99	409.68	3.65	3.65	1304.90
25	2.08	0.000	409.68	402.80	3.44	3.44	1304.80
26	2.17	0.000	402.80	396.38	3.21	3.21	1304.70
27	2.25	0.000	396.38	389.96	3.21	3.21	1304.70
28	2.33	0.000	389.96	384.04	2.96	2.96	1304.60
29	2.42	0.000	384.04	378.13	2.96	2.96	1304.60
30	2.50	0.000	378.13	372.21	2.96	2.96	1304.60
31	2.58	0.000	372.21	366.86	2.68	2.68	1304.50
32	2.67	0.000	366.86	361.51	2.68	2.68	1304.50
33	2.75	0.000	361.51	357.17	2.17	2.17	1304.40
34	2.83	0.000	357.17	352.84	2.17	2.17	1304.40
35	2.92	0.000	352.84	348.50	2.17	2.17	1304.40
36	3.00	0.000	348.50	345.17	1.67	1.67	1304.30
37	3.08	0.000	345.17	341.84	1.67	1.67	1304.30
38	3.17	0.000	341.84	338.51	1.67	1.67	1304.30
39	3.25	0.000	338.51	336.03	1.24	1.24	1304.20
40	3.33	0.000	336.03	333.56	1.24	1.24	1304.20
41	3.42	0.000	333.56	331.08	1.24	1.24	1304.20
42	3.50	0.000	331.08	328.60	1.24	1.24	1304.20
43	3.58	0.000	328.60	326.13	1.24	1.24	1304.20
44	3.67	0.000	326.13	324.33	0.90	0.90	1304.10

45	3.75	0.000	324.33	322.52	0.90	0.90	1304.10
46	3.83	0.000	322.52	320.72	0.90	0.90	1304.10
47	3.92	0.000	320.72	318.92	0.90	0.90	1304.10
48	4.00	0.000	318.92	317.11	0.90	0.90	1304.10
49	4.08	0.000	317.11	315.31	0.90	0.90	1304.10
50	4.17	0.000	315.31	313.51	0.90	0.90	1304.10
51	4.25	0.000	313.51	312.10	0.71	0.71	1304.00
52	4.33	0.000	312.10	310.69	0.71	0.71	1304.00
53	4.42	0.000	310.69	309.28	0.71	0.71	1304.00
54	4.50	0.000	309.28	307.87	0.71	0.71	1304.00
55	4.58	0.000	307.87	306.45	0.71	0.71	1304.00
56	4.67	0.000	306.45	305.04	0.71	0.71	1304.00
57	4.75	0.000	305.04	303.63	0.71	0.71	1304.00
58	4.83	0.000	303.63	302.22	0.71	0.71	1304.00
59	4.92	0.000	302.22	300.81	0.71	0.71	1304.00
60	5.00	0.000	300.81	299.45	0.68	0.68	1303.90
61	5.08	0.000	299.45	298.09	0.68	0.68	1303.90
62	5.17	0.000	298.09	296.74	0.68	**0.68**	1303.90
63	5.25	0.000	296.74	295.38	0.68	0.68	1303.90
64	5.33	0.000	295.38	294.02	0.68	0.68	1303.90

Wildomar 23

DETENTION BASIN ROUTING

33.98

39.76

15.82

100 YEAR EVENT ~ 3 Hour STORM

5.00 Min

1306.9

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)
1	0.08	2.610	0.00	0.00	0.00
2	0.17	4.730	7.34	7.34	0.00
3	0.25	4.560	16.63	16.63	0.00
4	0.33	5.330	26.52	26.52	0.00
5	0.42	6.140	37.99	37.99	0.00
6	0.50	7.090	51.22	51.22	0.00
7	0.58	6.980	65.29	65.29	0.00
8	0.67	7.260	79.53	79.53	0.00
9	0.75	7.840	94.63	94.63	0.00
10	0.83	7.100	109.57	109.57	0.00
11	0.92	6.750	123.42	123.42	0.00
12	1.00	7.400	137.57	137.57	0.00
13	1.08	8.930	153.90	153.81	0.04
14	1.17	9.910	172.65	172.21	0.22
15	1.25	10.090	192.21	191.47	0.37
16	1.33	9.600	211.16	210.25	0.46
17	1.42	10.790	230.64	229.65	0.49
18	1.50	12.310	252.75	251.63	0.56
19	1.58	11.930	275.87	274.62	0.62
20	1.67	12.200	298.75	297.39	0.68
21	1.75	14.390	323.98	322.18	0.90
22	1.83	15.250	351.82	348.49	1.67
23	1.92	14.540	378.28	372.36	2.96
24	2.00	14.360	401.26	394.84	3.21
25	2.08	14.750	423.95	416.64	3.65
26	2.17	17.990	449.38	440.78	4.30
27	2.25	22.660	481.43	469.97	5.73
28	2.33	20.780	513.41	498.23	7.59
29	2.42	26.920	545.93	524.88	10.53
30	2.50	35.080	586.88	563.47	11.70
31	2.58	39.760	638.31	610.90	13.71
32	2.67	36.080	686.74	656.72	15.01
33	2.75	20.780	713.58	681.93	15.82
34	2.83	10.820	713.53	681.89	15.82
35	2.92	8.550	701.26	670.41	15.42
36	3.00	4.710	683.67	653.64	15.01
37	3.08	1.330	659.68	631.37	14.16
38	3.17	0.280	632.98	606.51	13.24
39	3.25	0.030	606.82	581.32	12.75
40	3.33	0.000	581.35	557.95	11.70
41	3.42	0.000	557.95	536.89	10.53
42	3.50	0.000	536.89	517.35	9.77
43	3.58	0.000	517.35	500.06	8.64
44	3.67	0.000	500.06	484.89	7.59
45	3.75	0.000	484.89	473.42	5.73
46	3.83	0.000	473.42	461.96	5.73
47	3.92	0.000	461.96	452.06	4.95
48	4.00	0.000	452.06	443.46	4.30

Wildomar 23

DETENTION BASIN ROUTING

31.33

37.71

17.32 Q Out

100 YEAR EVENT ~ 6 Hour STORM

6.30

5 Min

1307.3 Max WSEL

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Basin WSEL
1	0.08	1.010	0.00	0.00	0.00	1301.00
2	0.17	2.210	3.22	3.22	0.00	1301.00
3	0.25	2.670	8.10	8.10	0.00	1301.00
4	0.33	2.780	13.55	13.55	0.00	1301.10
5	0.42	2.800	19.13	19.13	0.00	1301.20
6	0.50	3.180	25.11	25.11	0.00	1301.20
7	0.58	3.500	31.79	31.79	0.00	1301.30
8	0.67	3.550	38.84	38.84	0.00	1301.40
9	0.75	3.570	45.96	45.96	0.00	1301.50
10	0.83	3.570	53.10	53.10	0.00	1301.60
11	0.92	3.570	60.24	60.24	0.00	1301.60
12	1.00	3.960	67.77	67.77	0.00	1301.70
13	1.08	4.270	76.00	76.00	0.00	1301.80
14	1.17	4.330	84.60	84.60	0.00	1301.90
15	1.25	4.350	93.28	93.28	0.00	1302.00
16	1.33	4.350	101.98	101.98	0.00	1302.10
17	1.42	4.350	110.68	110.68	0.00	1302.20
18	1.50	4.350	119.38	119.38	0.00	1302.30
19	1.58	4.350	128.08	128.08	0.00	1302.40
20	1.67	4.350	136.78	136.78	0.00	1302.40
21	1.75	4.350	145.48	145.48	0.00	1302.50
22	1.83	4.350	154.18	154.09	0.04	1302.60
23	1.92	4.350	162.79	162.55	0.12	1302.70
24	2.00	4.740	171.64	171.20	0.22	1302.80
25	2.08	4.660	180.60	179.97	0.32	1302.90
26	2.17	4.790	189.42	188.68	0.37	1303.00
27	2.25	5.070	198.54	197.80	0.37	1303.00
28	2.33	5.110	207.98	207.16	0.41	1303.10
29	2.42	5.130	217.40	216.48	0.46	1303.20
30	2.50	5.130	226.74	225.75	0.49	1303.30
31	2.58	5.130	236.01	234.96	0.53	1303.40
32	2.67	5.130	245.22	244.09	0.56	1303.50
33	2.75	5.510	254.73	253.60	0.56	1303.50
34	2.83	5.830	264.94	263.76	0.59	1303.60
35	2.92	5.880	275.47	274.22	0.62	1303.70
36	3.00	5.900	286.00	284.69	0.65	1303.80
37	3.08	5.900	296.49	295.14	0.68	1303.90
38	3.17	6.290	307.33	305.92	0.71	1304.00
39	3.25	6.600	318.81	317.00	0.90	1304.10
40	3.33	6.660	330.26	327.79	1.24	1304.20
41	3.42	7.070	341.52	338.18	1.67	1304.30
42	3.50	7.770	353.02	348.69	2.17	1304.40
43	3.58	8.530	364.99	359.64	2.68	1304.50
44	3.67	8.920	377.09	371.73	2.68	1304.50
45	3.75	9.380	390.03	384.12	2.96	1304.60
46	3.83	9.710	403.21	396.79	3.21	1304.70
47	3.92	10.160	416.66	409.35	3.65	1304.90

48	4.00	10.490	430.00	422.29	3.86	1305.00
49	4.08	10.930	443.71	435.10	4.30	1305.10
50	4.17	11.650	457.68	447.78	4.95	1305.20
51	4.25	12.410	471.84	460.38	5.73	1305.30
52	4.33	13.190	485.98	472.75	6.61	1305.40
53	4.42	13.970	499.91	486.68	6.61	1305.40
54	4.50	14.350	515.00	497.71	8.64	1305.60
55	4.58	14.820	526.88	509.60	8.64	1305.60
56	4.67	15.540	539.96	520.41	9.77	1305.70
57	4.75	16.300	552.25	531.20	10.53	1305.80
58	4.83	16.680	564.18	541.92	11.13	1305.90
59	4.92	17.150	575.75	552.34	11.70	1306.00
60	5.00	17.870	587.36	563.96	11.70	1306.00
61	5.08	20.180	602.01	577.53	12.24	1306.10
62	5.17	23.770	621.48	595.01	13.24	1306.30
63	5.25	26.800	645.58	618.17	13.71	1306.40
64	5.33	29.280	674.25	645.06	14.59	1306.60
65	5.42	32.420	706.76	675.92	15.42	1306.80
66	5.50	37.710	746.05	712.87	16.59	1307.10
67	5.58	26.510	777.09	742.46	17.32	1307.30
68	5.67	11.590	780.56	745.93	17.32	1307.30
69	5.75	5.360	762.88	728.97	16.96	1307.20
70	5.83	2.810	737.14	704.72	16.21	1307.00
71	5.92	1.370	708.90	678.05	15.42	1306.80
72	6.00	0.790	680.21	650.18	15.01	1306.70
73	6.08	0.390	651.36	623.05	14.16	1306.50
74	6.17	0.070	623.51	597.04	13.24	1306.30
75	6.25	0.020	597.13	572.65	12.24	1306.10
76	6.33	0.000	572.67	550.40	11.13	1305.90
77	6.42	0.000	550.40	529.35	10.53	1305.80
78	6.50	0.000	529.35	512.06	8.64	1305.60
79	6.58	0.000	512.06	496.89	7.59	1305.50
80	6.67	0.000	496.89	483.66	6.61	1305.40
81	6.75	0.000	483.66	472.20	5.73	1305.30
82	6.83	0.000	472.20	460.74	5.73	1305.30
83	6.92	0.000	460.74	450.83	4.95	1305.20
84	7.00	0.000	450.83	442.23	4.30	1305.10
85	7.08	0.000	442.23	434.52	3.86	1305.00
86	7.17	0.000	434.52	426.80	3.86	1305.00
87	7.25	0.000	426.80	419.49	3.65	1304.90
88	7.33	0.000	419.49	412.18	3.65	1304.90
89	7.42	0.000	412.18	405.30	3.44	1304.80
90	7.50	0.000	405.30	398.42	3.44	1304.80
91	7.58	0.000	398.42	392.00	3.21	1304.70
92	7.67	0.000	392.00	385.58	3.21	1304.70
93	7.75	0.000	385.58	379.67	2.96	1304.60
94	7.83	0.000	379.67	373.75	2.96	1304.60
95	7.92	0.000	373.75	368.40	2.68	1304.50
96	8.00	0.000	368.40	363.05	2.68	1304.50

Wildomar 23 **DETENTION BASIN ROUTING** 14.76

16.24 12.75

100 YEAR EVENT ~ 24 Hour STORM

5 Min 1306.2

Interval	T (HRS)	Q IN (CFS)	2S/dT+O	2S/dT-O (CFS)	O (CFS)	Basin WSEL
1	0.08	0.260	0.00	0.00	0.00	1301.00
2	0.17	0.470	0.73	0.73	0.00	1301.00
3	0.25	0.510	1.71	1.71	0.00	1301.00
4	0.33	0.660	2.88	2.88	0.00	1301.00
5	0.42	0.760	4.30	4.30	0.00	1301.00
6	0.50	0.780	5.84	5.84	0.00	1301.00
7	0.58	0.790	7.41	7.41	0.00	1301.00
8	0.67	0.790	8.99	8.99	0.00	1301.10
9	0.75	0.790	10.57	10.57	0.00	1301.10
10	0.83	0.920	12.28	12.28	0.00	1301.10
11	0.92	1.020	14.22	14.22	0.00	1301.10
12	1.00	1.040	16.28	16.28	0.00	1301.10
13	1.08	0.920	18.24	18.24	0.00	1301.20
14	1.17	0.810	19.97	19.97	0.00	1301.20
15	1.25	0.790	21.57	21.57	0.00	1301.20
16	1.33	0.790	23.15	23.15	0.00	1301.20
17	1.42	0.790	24.73	24.73	0.00	1301.20
18	1.50	0.790	26.31	26.31	0.00	1301.30
19	1.58	0.790	27.89	27.89	0.00	1301.30
20	1.67	0.790	29.47	29.47	0.00	1301.30
21	1.75	0.790	31.05	31.05	0.00	1301.30
22	1.83	0.920	32.76	32.76	0.00	1301.30
23	1.92	1.020	34.70	34.70	0.00	1301.40
24	2.00	1.040	36.76	36.76	0.00	1301.40
25	2.08	1.050	38.85	38.85	0.00	1301.40
26	2.17	1.050	40.95	40.95	0.00	1301.40
27	2.25	1.050	43.05	43.05	0.00	1301.50
28	2.33	1.050	45.15	45.15	0.00	1301.50
29	2.42	1.050	47.25	47.25	0.00	1301.50
30	2.50	1.050	49.35	49.35	0.00	1301.50
31	2.58	1.180	51.58	51.58	0.00	1301.50
32	2.67	1.290	54.05	54.05	0.00	1301.60
33	2.75	1.310	56.65	56.65	0.00	1301.60
34	2.83	1.310	59.27	59.27	0.00	1301.60
35	2.92	1.310	61.89	61.89	0.00	1301.70
36	3.00	1.310	64.51	64.51	0.00	1301.70
37	3.08	1.310	67.13	67.13	0.00	1301.70
38	3.17	1.310	69.75	69.75	0.00	1301.70
39	3.25	1.310	72.37	72.37	0.00	1301.80
40	3.33	1.310	74.99	74.99	0.00	1301.80
41	3.42	1.310	77.61	77.61	0.00	1301.80
42	3.50	1.310	80.23	80.23	0.00	1301.90
43	3.58	1.310	82.85	82.85	0.00	1301.90
44	3.67	1.310	85.47	85.47	0.00	1301.90

45	3.75	1.310	88.09	88.09	0.00	1301.90
46	3.83	0.850	90.25	90.25	0.00	1302.00
47	3.92	0.490	91.59	91.59	0.00	1302.00
48	4.00	0.430	92.51	92.51	0.00	1302.00
49	4.08	0.420	93.36	93.36	0.00	1302.00
50	4.17	0.430	94.21	94.21	0.00	1302.00
51	4.25	0.440	95.08	95.08	0.00	1302.00
52	4.33	0.720	96.24	96.24	0.00	1302.00
53	4.42	0.940	97.90	97.90	0.00	1302.00
54	4.50	0.990	99.83	99.83	0.00	1302.10
55	4.58	1.010	101.83	101.83	0.00	1302.10
56	4.67	1.030	103.87	103.87	0.00	1302.10
57	4.75	1.040	105.94	105.94	0.00	1302.10
58	4.83	1.310	108.29	108.29	0.00	1302.20
59	4.92	1.530	111.13	111.13	0.00	1302.20
60	5.00	1.580	114.24	114.24	0.00	1302.20
61	5.08	1.080	116.90	116.90	0.00	1302.20
62	5.17	0.670	118.65	118.65	0.00	1302.30
63	5.25	0.600	119.92	119.92	0.00	1302.30
64	5.33	0.850	121.37	121.37	0.00	1302.30
65	5.42	1.080	123.30	123.30	0.00	1302.30
66	5.50	1.130	125.51	125.51	0.00	1302.30
67	5.58	1.410	128.05	128.05	0.00	1302.40
68	5.67	1.640	131.10	131.10	0.00	1302.40
69	5.75	1.680	134.42	134.42	0.00	1302.40
70	5.83	1.710	137.81	137.81	0.00	1302.50
71	5.92	1.720	141.24	141.24	0.00	1302.50
72	6.00	1.730	144.69	144.69	0.00	1302.50
73	6.08	2.000	148.42	148.33	0.04	1302.60
74	6.17	2.230	152.56	152.48	0.04	1302.60
75	6.25	2.280	156.99	156.90	0.04	1302.60
76	6.33	2.300	161.48	161.24	0.12	1302.70
77	6.42	2.310	165.85	165.61	0.12	1302.70
78	6.50	2.320	170.24	169.80	0.22	1302.80
79	6.58	2.590	174.71	174.26	0.22	1302.80
80	6.67	2.820	179.67	179.04	0.32	1302.90
81	6.75	2.870	184.73	184.10	0.32	1302.90
82	6.83	2.890	189.86	189.12	0.37	1303.00
83	6.92	2.900	194.91	194.18	0.37	1303.00
84	7.00	2.910	199.99	199.25	0.37	1303.00
85	7.08	2.920	205.08	204.25	0.41	1303.10
86	7.17	2.930	210.10	209.27	0.41	1303.10
87	7.25	2.940	215.14	214.23	0.46	1303.20
88	7.33	3.210	220.38	219.47	0.46	1303.20
89	7.42	3.440	226.12	225.13	0.49	1303.30
90	7.50	3.490	232.06	231.07	0.49	1303.30
91	7.58	3.770	238.33	237.27	0.53	1303.40
92	7.67	3.990	245.03	243.91	0.56	1303.50
93	7.75	4.040	251.94	250.81	0.56	1303.50
94	7.83	4.330	259.18	257.99	0.59	1303.60
95	7.92	4.550	266.87	265.68	0.59	1303.60
96	8.00	4.600	274.83	273.59	0.62	1303.70

97	8.08	5.140	283.33	282.02	0.65	1303.80
98	8.17	5.580	292.74	291.38	0.68	1303.90
99	8.25	5.670	302.63	301.22	0.71	1304.00
100	8.33	5.700	312.59	311.18	0.71	1304.00
101	8.42	5.710	322.59	320.79	0.90	1304.10
102	8.50	5.720	332.22	329.74	1.24	1304.20
103	8.58	5.990	341.45	338.12	1.67	1304.30
104	8.67	6.210	350.32	346.99	1.67	1304.30
105	8.75	6.260	359.46	355.13	2.17	1304.40
106	8.83	6.550	367.94	362.58	2.68	1304.50
107	8.92	6.770	375.90	370.55	2.68	1304.50
108	9.00	6.820	384.14	378.23	2.96	1304.60
109	9.08	7.360	392.41	385.99	3.21	1304.70
110	9.17	7.800	401.15	394.73	3.21	1304.70
111	9.25	7.880	410.41	403.53	3.44	1304.80
112	9.33	8.180	419.59	412.28	3.65	1304.90
113	9.42	8.400	428.86	421.55	3.65	1304.90
114	9.50	8.450	438.40	430.68	3.86	1305.00
115	9.58	8.740	447.87	439.27	4.30	1305.10
116	9.67	8.960	456.97	448.36	4.30	1305.10
117	9.75	9.000	466.32	456.42	4.95	1305.20
118	9.83	9.290	474.71	463.25	5.73	1305.30
119	9.92	9.510	482.05	470.59	5.73	1305.30
120	10.00	9.560	489.66	476.43	6.61	1305.40
121	10.08	7.740	493.73	480.50	6.61	1305.40
122	10.17	6.270	494.51	481.28	6.61	1305.40
123	10.25	6.010	493.56	480.33	6.61	1305.40
124	10.33	5.930	492.27	479.04	6.61	1305.40
125	10.42	5.940	490.91	477.68	6.61	1305.40
126	10.50	5.950	489.57	476.35	6.61	1305.40
127	10.58	7.270	489.57	476.34	6.61	1305.40
128	10.67	8.350	491.96	478.73	6.61	1305.40
129	10.75	8.550	495.63	482.40	6.61	1305.40
130	10.83	8.610	499.56	486.33	6.61	1305.40
131	10.92	8.620	503.56	488.38	7.59	1305.50
132	11.00	8.630	505.63	490.46	7.59	1305.50
133	11.08	8.380	507.47	492.29	7.59	1305.50
134	11.17	8.180	508.85	493.67	7.59	1305.50
135	11.25	8.150	510.00	494.82	7.59	1305.50
136	11.33	8.140	511.11	495.94	7.59	1305.50
137	11.42	8.150	512.23	497.05	7.59	1305.50
138	11.50	8.160	513.36	498.18	7.59	1305.50
139	11.58	7.650	513.99	498.81	7.59	1305.50
140	11.67	7.230	513.69	498.52	7.59	1305.50
141	11.75	7.160	512.91	497.73	7.59	1305.50
142	11.83	7.410	512.30	497.12	7.59	1305.50
143	11.92	7.630	512.16	496.98	7.59	1305.50
144	12.00	7.680	512.29	497.12	7.59	1305.50
145	12.08	9.540	514.34	499.16	7.59	1305.50
146	12.17	11.030	519.73	502.44	8.64	1305.60
147	12.25	11.310	524.78	507.50	8.64	1305.60
148	12.33	11.660	530.47	510.92	9.77	1305.70

149	12.42	11.880	534.46	514.92	9.77	1305.70
150	12.50	11.930	538.73	519.19	9.77	1305.70
151	12.58	12.480	543.60	524.05	9.77	1305.70
152	12.67	12.910	549.44	528.39	10.53	1305.80
153	12.75	12.990	554.29	533.24	10.53	1305.80
154	12.83	13.290	559.52	537.25	11.13	1305.90
155	12.92	13.510	564.05	541.78	11.13	1305.90
156	13.00	13.560	568.85	546.59	11.13	1305.90
157	13.08	14.890	575.04	551.63	11.70	1306.00
158	13.17	15.960	582.48	559.08	11.70	1306.00
159	13.25	16.160	591.20	566.73	12.24	1306.10
160	13.33	16.220	599.11	574.63	12.24	1306.10
161	13.42	16.230	607.08	581.58	12.75	1306.20
162	13.50	16.240	614.05	588.55	12.75	1306.20
163	13.58	13.360	618.15	592.66	12.75	1306.20
164	13.67	11.040	617.06	591.56	12.75	1306.20
165	13.75	10.620	613.22	587.72	12.75	1306.20
166	13.83	10.500	608.84	583.34	12.75	1306.20
167	13.92	10.510	604.35	578.85	12.75	1306.20
168	14.00	10.520	599.88	575.41	12.24	1306.10
169	14.08	11.570	597.50	573.02	12.24	1306.10
170	14.17	12.430	597.02	572.54	12.24	1306.10
171	14.25	12.590	597.56	573.09	12.24	1306.10
172	14.33	12.390	598.07	573.59	12.24	1306.10
173	14.42	12.180	598.16	573.68	12.24	1306.10
174	14.50	12.150	598.01	573.54	12.24	1306.10
175	14.58	12.150	597.84	573.36	12.24	1306.10
176	14.67	12.150	597.66	573.18	12.24	1306.10
177	14.75	12.160	597.49	573.02	12.24	1306.10
178	14.83	11.910	597.09	572.61	12.24	1306.10
179	14.92	11.700	596.22	571.74	12.24	1306.10
180	15.00	11.670	595.11	570.64	12.24	1306.10
181	15.08	11.400	593.71	569.23	12.24	1306.10
182	15.17	11.200	591.83	567.35	12.24	1306.10
183	15.25	11.170	589.72	565.25	12.24	1306.10
184	15.33	10.900	587.32	563.91	11.70	1306.00
185	15.42	10.700	585.51	562.11	11.70	1306.00
186	15.50	10.670	583.48	560.08	11.70	1306.00
187	15.58	9.610	580.36	556.95	11.70	1306.00
188	15.67	8.770	575.33	551.93	11.70	1306.00
189	15.75	8.620	569.32	547.06	11.13	1305.90
190	15.83	8.580	564.26	541.99	11.13	1305.90
191	15.92	8.590	559.16	536.89	11.13	1305.90
192	16.00	8.600	554.08	533.03	10.53	1305.80
193	16.08	4.670	546.30	525.25	10.53	1305.80
194	16.17	1.490	531.41	511.86	9.77	1305.70
195	16.25	0.930	514.28	499.11	7.59	1305.50
196	16.33	0.750	500.79	485.61	7.59	1305.50
197	16.42	0.760	487.12	473.89	6.61	1305.40
198	16.50	0.770	475.42	463.96	5.73	1305.30
199	16.58	0.510	465.24	455.34	4.95	1305.20
200	16.67	0.310	456.16	447.55	4.30	1305.10

201	16.75	0.270	448.13	439.53	4.30	1305.10
202	16.83	0.270	440.07	432.36	3.86	1305.00
203	16.92	0.280	432.91	425.19	3.86	1305.00
204	17.00	0.280	425.75	418.44	3.65	1304.90
205	17.08	0.810	419.53	412.22	3.65	1304.90
206	17.17	1.240	414.27	407.39	3.44	1304.80
207	17.25	1.330	409.96	403.08	3.44	1304.80
208	17.33	1.360	405.77	398.89	3.44	1304.80
209	17.42	1.360	401.61	395.19	3.21	1304.70
210	17.50	1.370	397.92	391.50	3.21	1304.70
211	17.58	1.380	394.25	387.83	3.21	1304.70
212	17.67	1.380	390.59	384.17	3.21	1304.70
213	17.75	1.390	386.94	381.03	2.96	1304.60
214	17.83	1.130	383.55	377.63	2.96	1304.60
215	17.92	0.930	379.69	373.78	2.96	1304.60
216	18.00	0.890	375.60	370.24	2.68	1304.50
217	18.08	0.890	372.02	366.67	2.68	1304.50
218	18.17	0.890	368.45	363.10	2.68	1304.50
219	18.25	0.900	364.89	359.54	2.68	1304.50
220	18.33	0.910	361.35	357.01	2.17	1304.40
221	18.42	0.910	358.83	354.50	2.17	1304.40
222	18.50	0.920	356.33	351.99	2.17	1304.40
223	18.58	0.660	353.57	349.24	2.17	1304.40
224	18.67	0.450	350.35	347.02	1.67	1304.30
225	18.75	0.420	347.89	344.55	1.67	1304.30
226	18.83	0.470	345.44	342.11	1.67	1304.30
227	18.92	0.510	343.09	339.76	1.67	1304.30
228	19.00	0.520	340.79	337.46	1.67	1304.30
229	19.08	0.480	338.46	335.98	1.24	1304.20
230	19.17	0.450	336.91	334.44	1.24	1304.20
231	19.25	0.440	335.33	332.85	1.24	1304.20
232	19.33	0.710	334.00	331.52	1.24	1304.20
233	19.42	0.930	333.16	330.69	1.24	1304.20
234	19.50	0.970	332.59	330.11	1.24	1304.20
235	19.58	0.730	331.81	329.34	1.24	1304.20
236	19.67	0.520	330.59	328.11	1.24	1304.20
237	19.75	0.490	329.12	326.64	1.24	1304.20
238	19.83	0.500	327.63	325.16	1.24	1304.20
239	19.92	0.520	326.18	324.38	0.90	1304.10
240	20.00	0.520	325.42	323.61	0.90	1304.10
241	20.08	0.510	324.64	322.84	0.90	1304.10
242	20.17	0.500	323.85	322.05	0.90	1304.10
243	20.25	0.500	323.05	321.24	0.90	1304.10
244	20.33	0.510	322.25	320.45	0.90	1304.10
245	20.42	0.510	321.47	319.67	0.90	1304.10
246	20.50	0.520	320.70	318.90	0.90	1304.10
247	20.58	0.520	319.94	318.13	0.90	1304.10
248	20.67	0.530	319.18	317.38	0.90	1304.10
249	20.75	0.530	318.44	316.64	0.90	1304.10
250	20.83	0.270	317.44	315.63	0.90	1304.10
251	20.92	0.060	315.96	314.16	0.90	1304.10
252	21.00	0.030	314.25	312.45	0.90	1304.10

253	21.08	0.280	312.76	311.35	0.71	1304.00
254	21.17	0.500	312.13	310.72	0.71	1304.00
255	21.25	0.540	311.76	310.35	0.71	1304.00
256	21.33	0.300	311.19	309.78	0.71	1304.00
257	21.42	0.090	310.17	308.76	0.71	1304.00
258	21.50	0.050	308.90	307.48	0.71	1304.00
259	21.58	0.310	307.84	306.43	0.71	1304.00
260	21.67	0.520	307.26	305.85	0.71	1304.00
261	21.75	0.570	306.94	305.53	0.71	1304.00
262	21.83	0.320	306.42	305.01	0.71	1304.00
263	21.92	0.110	305.44	304.03	0.71	1304.00
264	22.00	0.070	304.21	302.80	0.71	1304.00
265	22.08	0.330	303.20	301.79	0.71	1304.00
266	22.17	0.540	302.66	301.25	0.71	1304.00
267	22.25	0.590	302.38	300.97	0.71	1304.00
268	22.33	0.340	301.90	300.54	0.68	1303.90
269	22.42	0.130	301.01	299.65	0.68	1303.90
270	22.50	0.090	299.87	298.51	0.68	1303.90
271	22.58	0.080	298.68	297.32	0.68	1303.90
272	22.67	0.090	297.49	296.13	0.68	1303.90
273	22.75	0.090	296.31	294.95	0.68	1303.90
274	22.83	0.090	295.13	293.78	0.68	1303.90
275	22.92	0.090	293.96	292.60	0.68	1303.90
276	23.00	0.100	292.79	291.43	0.68	1303.90
277	23.08	0.100	291.63	290.27	0.68	1303.90
278	23.17	0.100	290.47	289.11	0.68	1303.90
279	23.25	0.100	289.31	288.01	0.65	1303.80
280	23.33	0.110	288.22	286.91	0.65	1303.80
281	23.42	0.110	287.13	285.83	0.65	1303.80
282	23.50	0.110	286.05	284.75	0.65	1303.80
283	23.58	0.110	284.97	283.66	0.65	1303.80
284	23.67	0.110	283.88	282.58	0.65	1303.80
285	23.75	0.110	282.80	281.49	0.65	1303.80
286	23.83	0.110	281.71	280.41	0.65	1303.80
287	23.92	0.120	280.64	279.33	0.65	1303.80
288	24.00	0.120	279.57	278.27	0.65	1303.80
289	24.08	0.060	278.45	277.20	0.62	1303.70
290	24.17	0.010	277.27	276.02	0.62	1303.70
291	24.25	0.000	276.03	274.79	0.62	1303.70
292	24.33	0.000	274.79	273.54	0.62	1303.70
293	24.42	0.000	273.54	272.29	0.62	1303.70
294	24.50	0.000	272.29	271.04	0.62	1303.70
295	24.58	0.000	271.04	269.80	0.62	1303.70
296	24.67	0.000	269.80	268.55	0.62	1303.70
297	24.75	0.000	268.55	267.30	0.62	1303.70
298	24.83	0.000	267.30	266.05	0.62	1303.70
299	24.92	0.000	266.05	264.87	0.59	1303.60
300	25.00	0.000	264.87	263.68	0.59	1303.60

APPENDIX

SELECTED DRAINAGE MANUAL MAPS

TABLES

CHARTS

NOMOGRAPHS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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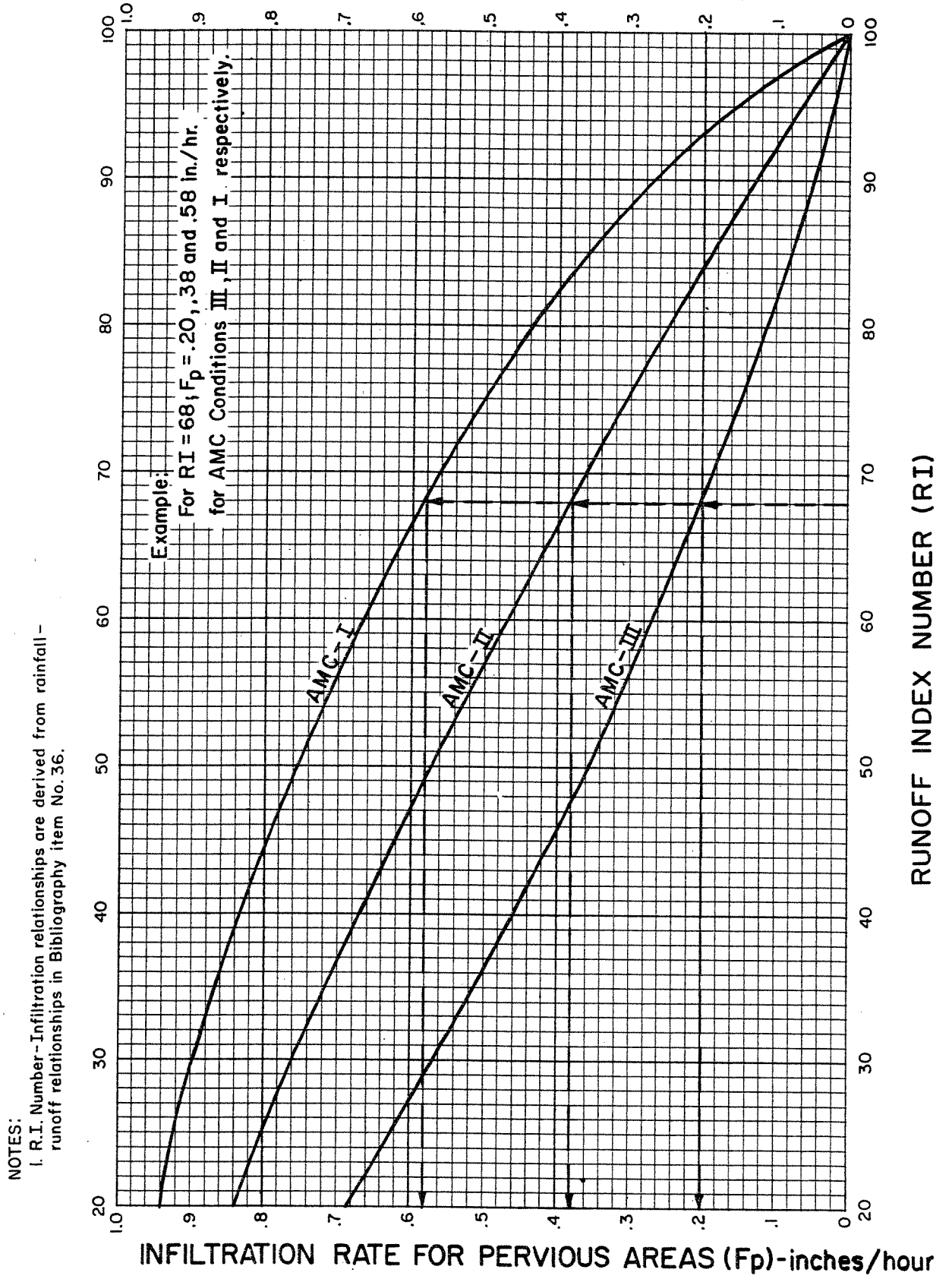
IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3



NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

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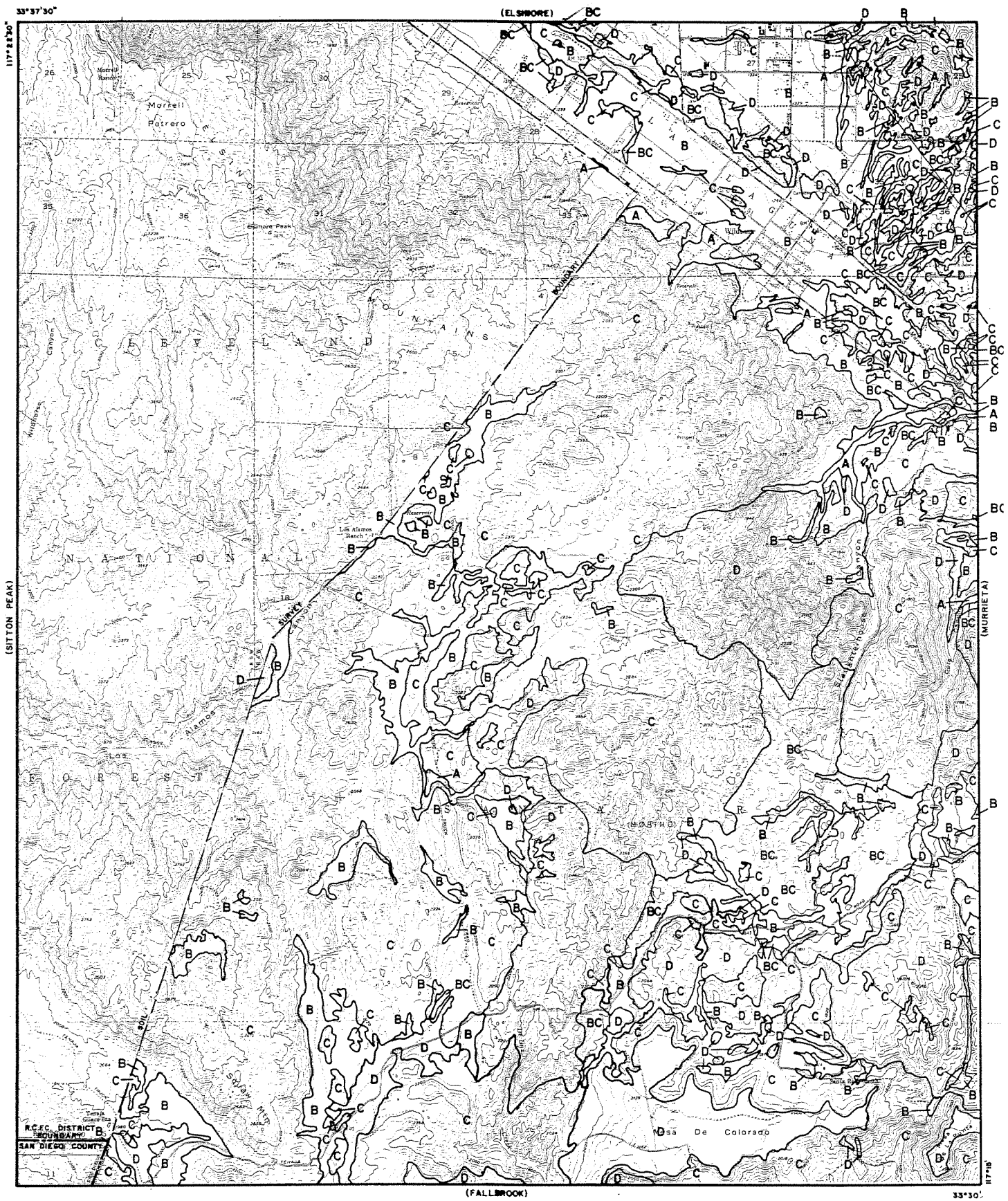
HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

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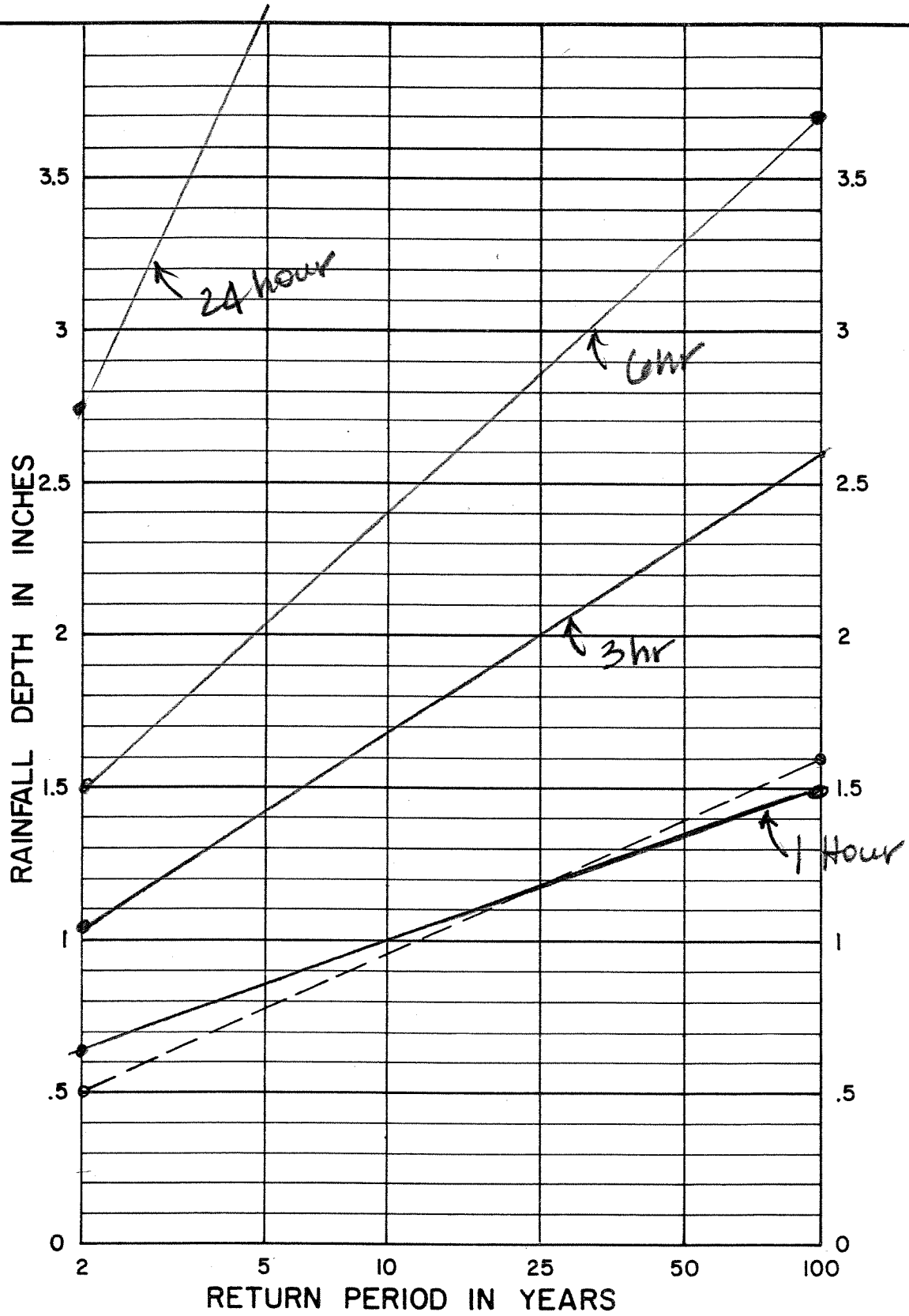
HYDROLOGIC SOILS GROUP MAP FOR WILDOMAR

PLATE C-1.5



NOTE:

1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

Reference: NOAA Atlas 2, Volume XI - California, 1973.

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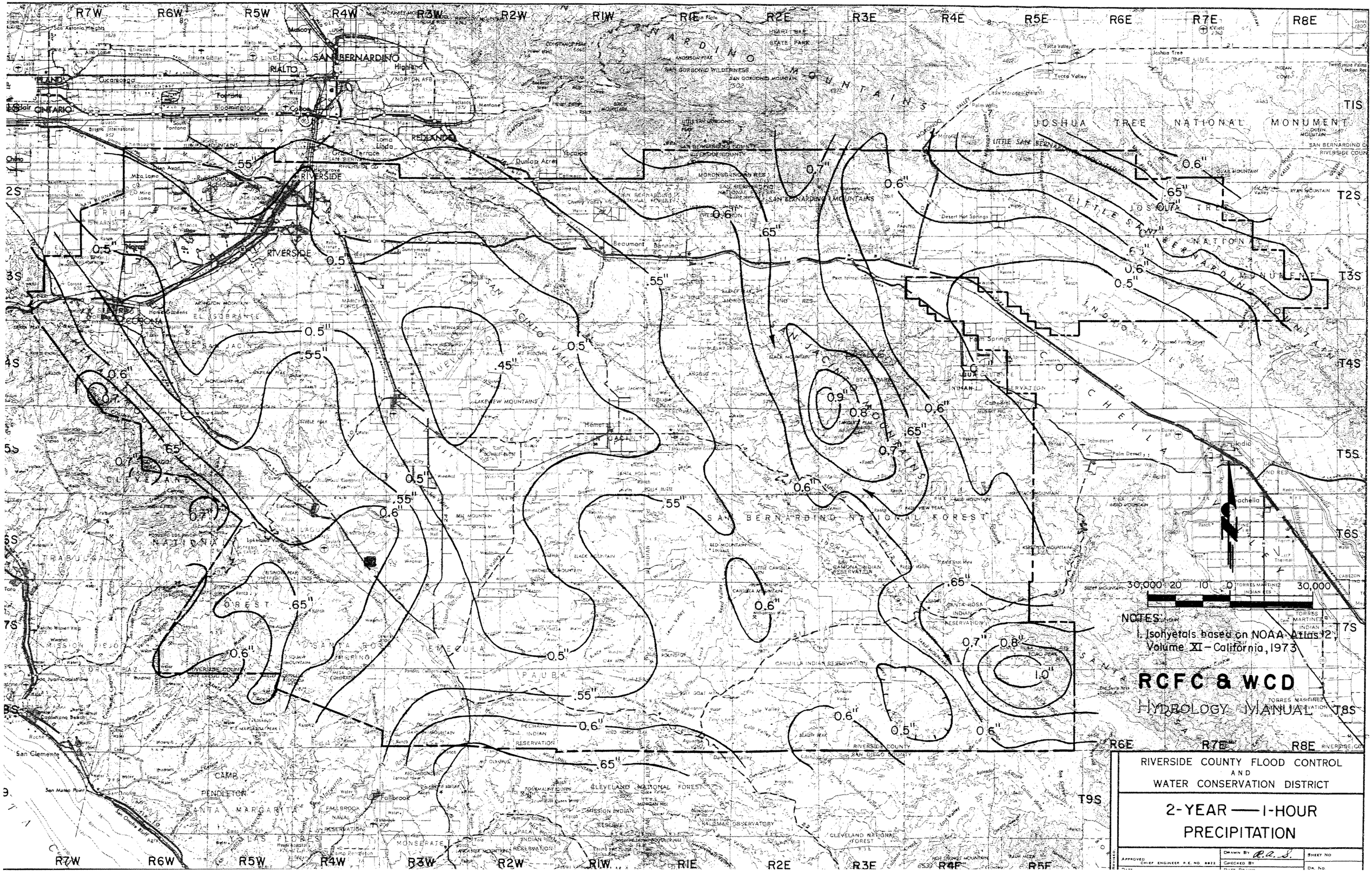
RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

PLATE D-4.5



NOTES:

1. Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973

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HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8822	DRAWN BY A.A.S.	SHEET NO
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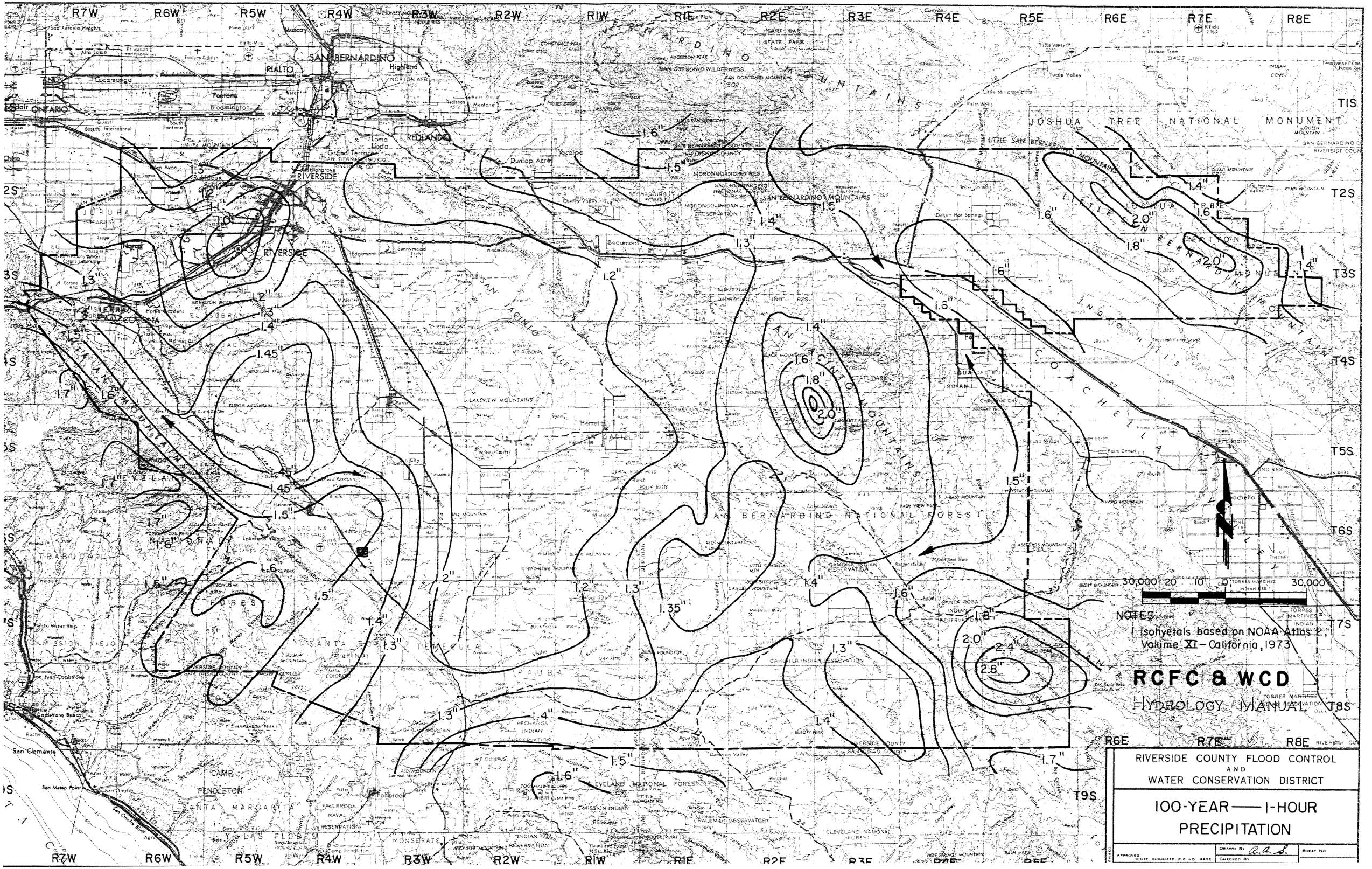
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LITTLE SAN BERNARDINO MOUNTAINS
SAN JACINTO PEAK
SAN GABRIEL PEAK
SAN ANTONIO HEIGHTS
SAN BERNARDINO
RIALTO
Highland
NORTON AFB
Cucamonga
Fontana
Bloomington
ONTARIO
Colton
REDLANDS
Mentone
Loma Linda
Grand Terrace
Highgrove
RIVERSIDE
Riverside
Arlington
Jurupa
Edgemont
Sunnymead
Moreno Valley
Beaumont
Banning
Cherry Valley
Calimesa
Yucaipa
Dunlop Acres
Morongo Indian Res.
Desert Hot Springs
Yucca Valley
Joshua Tree
Twentynine Palms
Indian Res.
Little Morongo Valley
Palm Springs
Cathedral City
Indio
Coachella
Thermal
Mecca
Oasis
Torres Martinez Indian Res.
Lake Elsinore
Elsinore
Lakeland Village
Temescal Canyon
Corona
Norco
Eastvale
Jurupa Valley
Mira Loma
Pedley
Home Gardens
El Cerrito
Glen Ivy Hot Springs
Horsethief Canyon
Santa Rosa Plateau
Murrieta
Temecula
Pauba
Aguanga
Anza
Hemet
San Jacinto
Lakeview Mountains
Perris Valley
Perris
March AFB
Sycamore Canyon
Box Spring Mountains
Badlands
Potrero Mountain
Reche Canyon
Live Oak Canyon
Yucaipa Ridge
Oak Glen
Wildwood Canyon
Whitewater Canyon
Morongo Valley
Little San Gorgonio Mtn.
Big Morongo Canyon
Mission Creek
Dry Morongo Wash
Indian Canyons
Palm Wells
Lost Horse Valley
Queen Valley
Pleasant Valley
Ryan Mountain
Quail Mountain
Lost Horse Mountain
Eagle Mountain
Iron Mountain
Pinto Mountain
Orocopia Mountains
Chuckwalla Mountains
Chuckwalla Valley
Salton Sea
Salton Trough
Coachella Valley
Whitewater Valley
Thousand Palms Canyon
Painted Canyon
Mecca Hills
Indio Hills
Martinez Canyon
Box Canyon
Dillon Road
Cabazon
Banning Canyon
Cottonwood Canyon
Long Canyon
Lower Cottonwood Canyon
Pass Creek
Snow Creek
Whitewater
Desert Hot Springs
Painted Hills
Mission Indian Reservation
Agua Caliente Indian Reservation
Cahuilla Indian Reservation
Santa Rosa Indian Reservation
Morongo Indian Reservation
Pechanga Indian Reservation
Soboba Indian Reservation
Los Coyotes Indian Reservation
Santa Ysabel Indian Reservation
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Las Flores
Monserate
Trabuco
Mission Viejo
Rancho Mission Viejo
San Juan Capistrano
Capistrano Beach
San Clemente
San Mateo Point
San Onofre Bluff
Camp Pendleton
Fallbrook
Fallbrook Naval Reservation
Mission Indian Reservation
Palomar Observatory
Hot Springs Mountain
Palm Desert
Rancho Mirage
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RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
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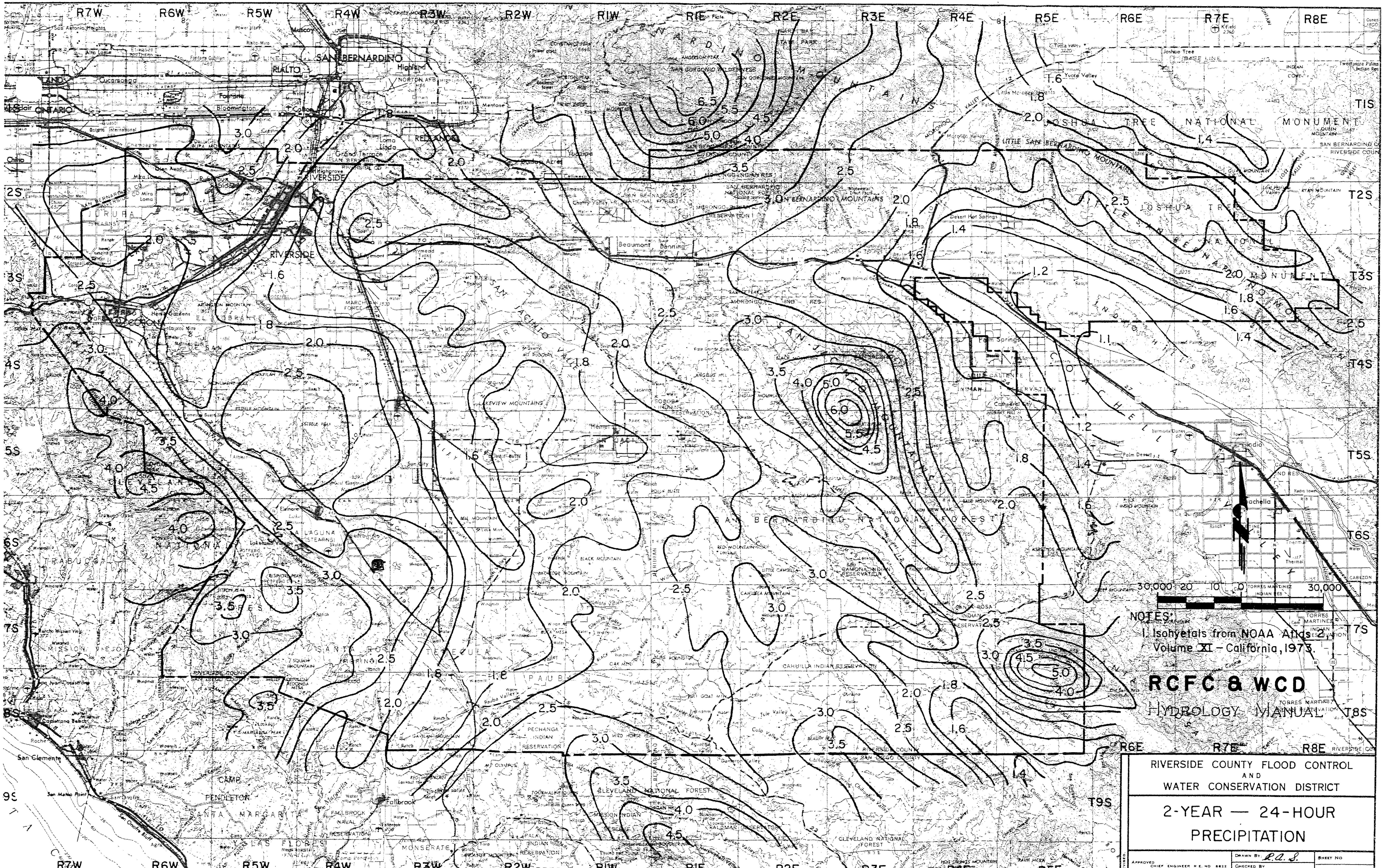
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SAN JACINTO MOUNTAINS
SAN JACINTO VALLEY
COACHELLA VALLEY
INDIO HILLS
CAMP PENDLETON
SANTA MARGARITA
FALLBROOK NAVAL RESERVATION
PECHANGA INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
MORONGO INDIAN RESERVATION
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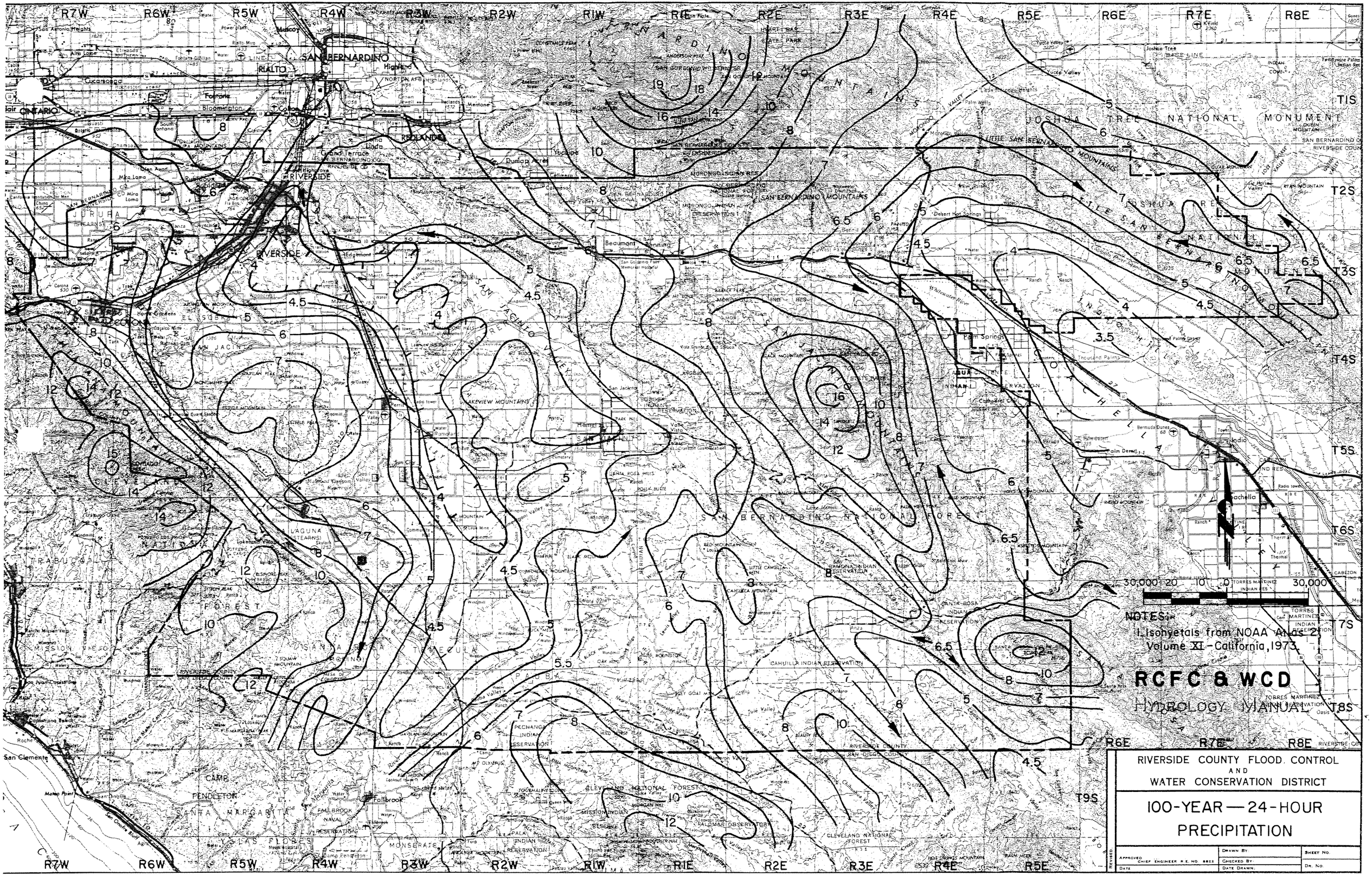
TEMECULA
REVIEW MOUNTAINS
MISSION VIEJO
TRABUCO
SAN BERNARDINO CO
RIVERSIDE CO
SAN DIEGO COUNTY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AGUA CALIENTE INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
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MARCH AFB
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1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
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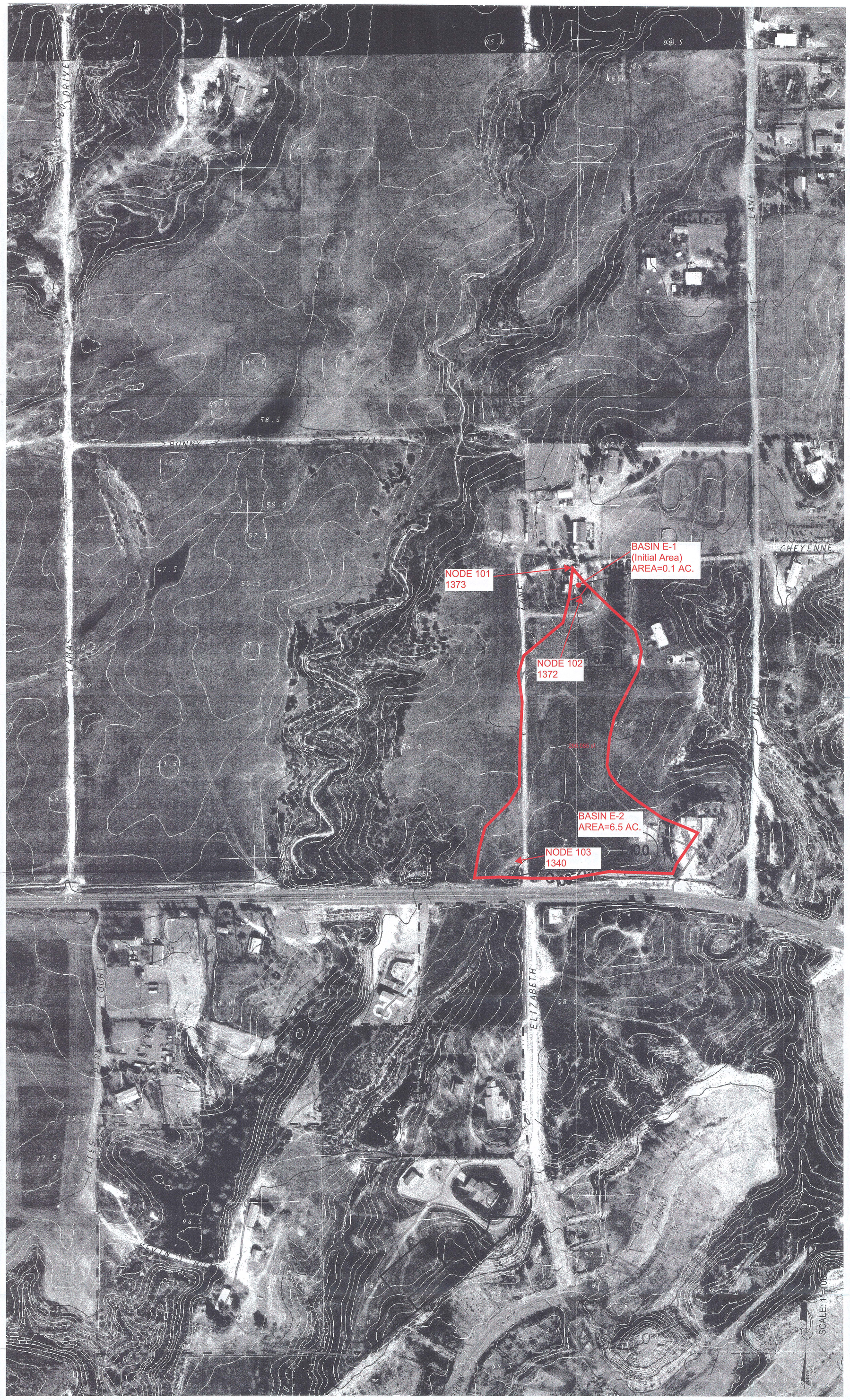


EXHIBIT "A"

GRAPHIC SCALE 1"=100'
0 100' 200' 300'

"AS BUILT"

THE RECEIPT OF AS-BUILT PLANS AND COUNTY'S ACCEPTANCE THEREOF DOES NOT ABSOLVE THE SUBDIVIDER/DEVELOPER OF ANY RESPONSIBILITY FOR THEIR ACCURACY.

ENGINEER OF WORK: _____ DATE: _____

RCE NO. _____ EXP. DATE: _____

RECOMMEND APPROVAL

_____ _____
* DATE

R.C.E. NO. *
EXP. DATE: *

SEAL:

REGISTERED PROFESSIONAL ENGINEER
CHARLES D. FAVREAU JR.
NO. 28489
EXP. 3-31-08
CIVIL
STATE OF CALIFORNIA

SCALE
HORIZONTAL
AS NOTED
VERTICAL
N/A

favreau Engineering, Inc.
CONSULTING CIVIL ENGINEERS
3434 VIA LIDO, SUITE 250
NEWPORT BEACH, CA. 92663
TEL: 949-675-8030 FAX: 949-675-1823

PREPARED BY

CHARLES D. FAVREAU, JR. DATE
RCE NO. 28489 EXP. DATE: 03-31-08

DATE	INITIAL	ENGINEER OF WORK

REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL

CITY APPROVAL

SHEET . | COUNTY OF RIVERSIDE | SHEETS .

CROSSROADS APARTMENTS
RIVERSIDE COUNTY, CALIFORNIA
PRELIMINARY HYDROLOGY ANALYSIS
PRE-DEVELOPMENT TRIBUTARY AREA

APPROVED
* DATE
COUNTY ENGINEER RCE # EXP. DATE *

DWN BY:
CHKD BY:
FIELD BK:

PROJECT NO. *

DRAWING NO.

F:\autocad current projects\crossroads\melonal\hydrology\DETENTION BASIN HYDRO PRE.DWG 1/22/2007 10:22:24 AM PST

PROPOSED DRAINAGE MAP FOR:
WILDOMAR 23
TRACT NO. 36497

PARCEL MAP NO. 9637
PAR. 3
PM 58/1-5
A.P.N. 380-250-019

PARCEL MAP NO. 9637
PAR. 4
PM 58/1-5
A.P.N. 380-250-020

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-001
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 12214
PAR. 2
PM 67/44
A.P.N. 380-280-002
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-003
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 11793
PAR. 1
PM 67/44
A.P.N. 380-280-008
ZONE=R-R, GP LAND USE=MHDR

PRIELIPP ROAD

PARK COURT

ESTES LANE

ELIZABETH LANE

"A" STREET

"B" STREET

"C" STREET

"D" STREET

"E" STREET

PARK

Obscured Area

PROJECT BOUNDARY (TYP.)

CURB (TYP.)

BASIN P-1
(INITIAL AREA)
AREA=0.14 AC.

BASIN P-2
AREA=3.70 AC.

BASIN P-3
AREA=4.43 AC.

BASIN P-4
AREA=8.23 AC.

BASIN P-5
AREA=0.85 AC.

BASIN P-6
AREA=0.7 AC.

INLET (PUBLIC)
NODE 301 (SEE EXIST. CALCS)
(1340.0), Q100 = 22.7
A=6.6, Tc=5.2

INLET (PUBLIC)
Q100 = 15.2

INLET (PUBLIC)
NODE 203
20.4 GTR., 15.0 ℄
Q100 = 13.4

INLET (PUBLIC)
Q100 = 26.1

C.O. (PUBLIC)
NODE 302

C.O. (PUBLIC)
NODE 303
1333.0
Q100 = 25.1

C.O. (PUBLIC)
11.3 ℄
Q100 = 28.6

C.O. (PUBLIC)
NODE 205
03.4 ℄

C.O. (PUBLIC)
NODE 206
01.2 ℄
Q100 = 54.9

C.O. (PUBLIC)

C.O. PUBLIC

HEADWALL (PUBLIC)
NODE 207 01.0 ℄
Q100 = 54.7, Tc = 9.5

OUTLET CONTROL STRUCTURE
(PUBLIC), Q100 = 17.3

C.O. (PUBLIC) ~ CONFLUENCE
NODE 304, 1295.0
Q100 = 22.7, Tc = 11.6

DISCHARGE LOCATION
Q100 = 42.4

NODE 201
43.3

NODE 202
41.2

24" R.C.P. STORM DRAIN (PUBLIC)
(BYPASS)

18" RCP
STORM DRAIN

24" RCP
STORM DRAIN
(PUBLIC)

30" RCP
STORM DRAIN

42" RCP
STORM DRAIN

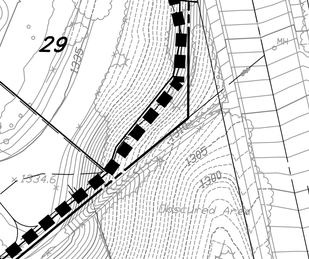
PUBLIC STORM
DRAIN (BYPASS)

PUBLIC STORM
DRAIN SYSTEM
(ON-SITE)

CURB &
GUTTER (TYP.)

SCALE: 1" = 40'

GRAPHIC SCALE
40 0 40 80 120



VICINITY MAP
NOT TO SCALE

THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2

PROPOSED DRAINAGE MAP FOR:
WILDOMAR 23
TRACT NO. 36497

SB&O INC.
PLANNING ENGINEERING SURVEYING
41889 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

69552.25

EXISTING HYDROLOGY MAP FOR:
WILDOMAR 23
TRACT NO. 36497

PARCEL MAP NO. 9637
PAR. 3
PM 58/1-5
A.P.N. 380-250-019

PARCEL MAP NO. 9637
PAR. 4
PM 58/1-5
A.P.N. 380-250-020

SEE OFFSITE MAP
NODE 103, 24" CULVERT INLET
(1340.0), Q_{100} = 22.7
A=6.6, T_c =8.2

PRIELIPP ROAD

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-001
ZONE=R-R, GP LAND USE=MHDR

COURT

PARK

PARCEL MAP NO. 11795
PAR. 1
PM 67/44
A.P.N. 380-280-006
ZONE=R-R, GP LAND USE=MHDR

PARCEL MAP NO. 12214
PAR. 2
PM 67/44
A.P.N. 380-280-002
ZONE=R-R, GP LAND USE=MHDR

NODE 104
24" CULVERT OUTLET
(1337.0)

LANE

PARCEL MAP NO. 12214
POR. PAR. 1
PM 67/44
A.P.N. 380-280-003
ZONE=R-R, GP LAND USE=MHDR

ESTES

ELIZABETH

PROJECT BOUNDARY (TYP.)

BASIN E-3
AREA=13.3 AC.

CURB OUTLET

H.P.

L.P.

PROJECT BOUNDARY (TYP.)

BROW DITCH

PROJECT DISCHARGE
NODE 105, (1282.0)
Q_{100}= 61.3, A=12.9, T_c =11.6

SCALE: 1" = 40'

GRAPHIC SCALE
40 0 40 80 120

INLAND VALLEY DR.
PALOMAR STREET
CLINTON
KEITH
RD.
PRIELIPP RD.
PROJECT SITE
ELIZABETH LN.
JACKSON ST.
AVE.
FWY 15
WILDOMAR
MURRIETA
NUTMEG

VICINITY MAP
NOT TO SCALE

THOMAS BROTHERS MAP: SAN BERNARDINO AND RIVERSIDE COUNTIES, 38TH EDITION
PAGE 927, H-2

EXISTING HYDROLOGY MAP FOR:
WILDOMAR 23
TRACT NO. 36497

SB&O INC.
PLANNING ENGINEERING SURVEYING
41689 Enterprise Circle North, Suite 126
Temecula, Ca. 92590
951-695-8900
951-695-8901 Fax

12-20-12

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RK engineering group, inc.

transportation planning • traffic engineering
acoustical engineering • parking studies

LETTER OF TRANSMITTAL

TO:	LENNAR HOMES OF CALIFORNIA, INC. 980 Montecito Drive, Suite 302 Corona, CA 92879	DATE:	October 4, 2013
		JOB NO.:	0807-2012-02
		SUBJECT:	Parkside Residential Development Preliminary Acoustical Study, City of Wildomar
ATTN:	Ms. Jarnne Valdez		

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	Signature	X	Revised		Additions
X	Use		Approved		Omissions
	File		Released		Corrections

REMARKS:

Attached is the Parkside Residential Development Preliminary Acoustical Study, City of Wildomar.

Please call our office at (949) 474-0809 if you have any questions.

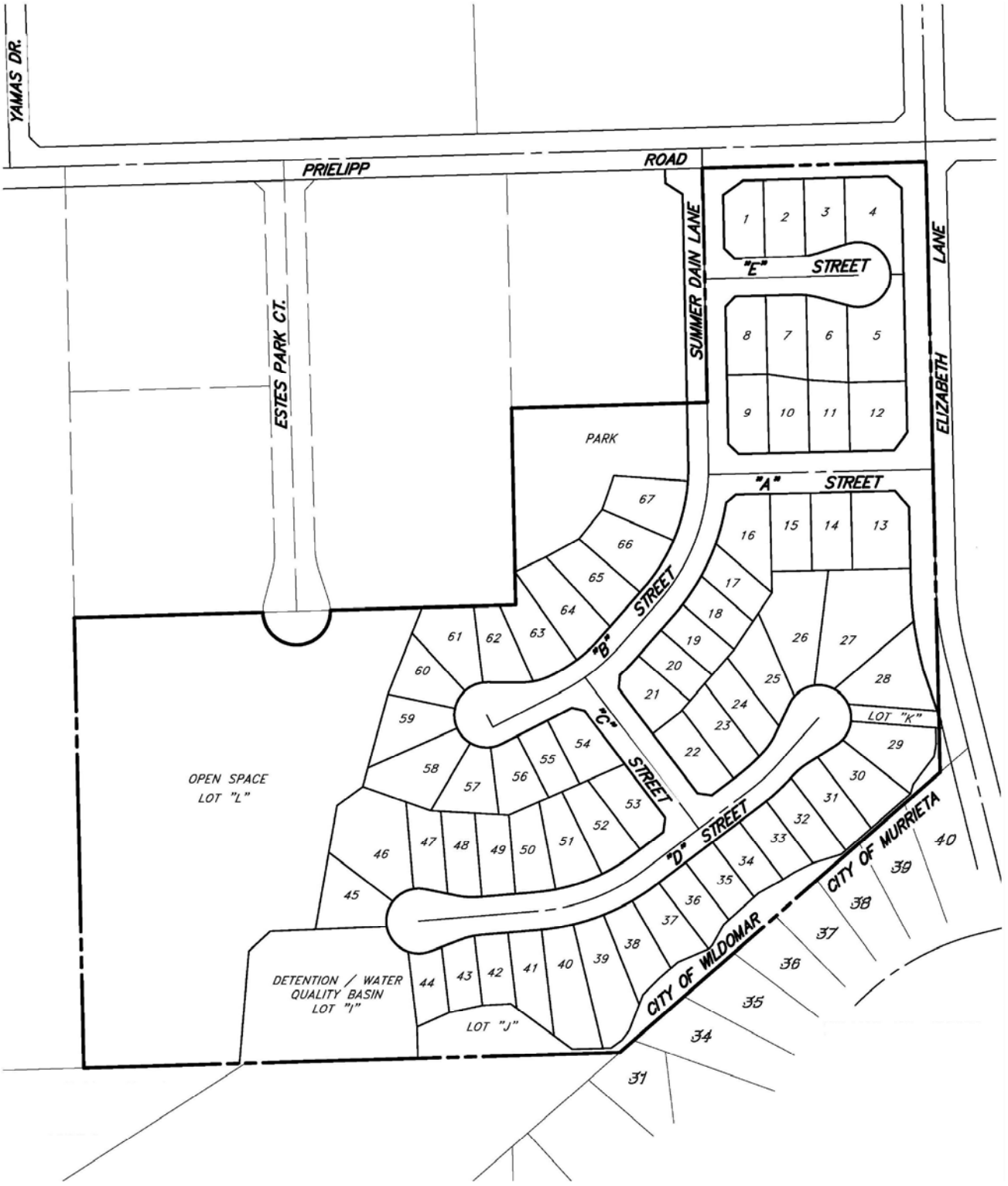
BY: Mike Dickerson

Mike Dickerson, INCE
Acoustical Engineer

COPIES TO:

4000 westerly place, suite 280
newport beach, california 92660
tel 949.474.0809 fax 949.474.0902
http://www.rkengineer.com

PARKSIDE RESIDENTIAL DEVELOPMENT
PRELIMINARY ACOUSTICAL STUDY
City of Wildomar, California



RK engineering group, inc.

transportation planning • traffic engineering
acoustical engineering • parking studies

October 4, 2013

Ms. Jarnne Valdez
LENNAR HOMES OF CALIFORNIA, INC.
980 Montecito Drive, Suite 302
Corona, CA 92879

Subject: Parkside Residential Development Preliminary Acoustical Study, City of Wildomar

Dear Ms. Valdez:

RK ENGINEERING GROUP, INC. (RK) has completed a preliminary acoustical analysis for the Parkside Residential Development project to address acoustical requirements. The proposed project is located at the southwest corner of Prielipp Road and Elizabeth Lane, in the City of Wildomar, as indicated on Exhibit A. The proposed project's site plan is shown in Exhibit B. The City of Wildomar's noise standards follow the Riverside County standards. The acoustical parameters, including the County's Noise Standards, are included in Appendix A.

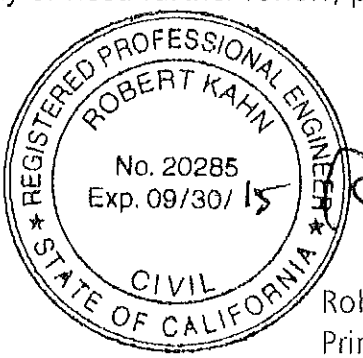
The proposed project was assessed with respect to off-site generated noise impacts to the proposed project. Roadway noise impacts propagating from Prielipp Road, Elizabeth Lane, and Interstate 15 Freeway to the project site were assessed and compared to the County's guidelines for residential land use. Specifically, the County has an exterior noise standard of 65 decibel A-weighted (dBA) Community Noise (Day/Night) Equivalent Level (CNEL) and a 45 dBA CNEL interior noise level for the project site.

With the implementation of the required and recommended mitigation measures in this report, the Parkside Residential Development project is expected to meet the required exterior/interior noise standards, as specified by the County of Riverside noise requirements. Exterior noise control will include noise control barriers (walls) at some lots and interior noise control will require a "windows closed" condition (necessitating mechanical ventilation). Prior to issuing building permits a final noise study is recommended to determine precise interior noise levels. By utilizing a more precise grading plan in conjunction with detailed building design and construction information, the final noise study will be used to confirm the recommendations made in this preliminary study and determine precise interior noise levels and possible mitigation.

4000 westerly place, suite 280
newport beach, california 92660
tel 949.474.0809 fax 949.474.0902
http://www.rkengineer.com

RK ENGINEERING GROUP, INC. is pleased to provide LENNAR HOMES OF CALIFORNIA, INC. with this acoustical analysis for the Parkside Residential Development project. If you have any questions regarding this study or need further review, please call us at (949) 474-0809.

Sincerely,
RK ENGINEERING GROUP, INC.



Mike Dickerson, INCE
Noise/Air Specialist

Robert Kahn, P.E.
Principal

Attachments

MD:mn/RK10114.doc
JN:0807-2012-02

Parkside Residential Development
PRELIMINARY ACOUSTICAL STUDY
City of Wildomar, California

Prepared for:

LENNAR HOMES OF CALIFORNIA, INC.
980 Montecito Drive, Suite 302
Corona, CA 92879

Prepared by:

RK ENGINEERING GROUP, INC.
4000 Westerly Place, Suite 280
Newport Beach, CA 92660

Mike Dickerson
Robert Kahn, P.E.

October 04, 2013

RK:mn/RK10114.doc
JN:0807-2012-02

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Site Plan ..... B

Recommendations C

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1.0 Executive Summary

This acoustical analysis and design evaluates the potential noise impacts and necessary mitigation measures for the Parkside Residential Development project. The project is located at the southwest corner of Prielipp Road and Elizabeth Lane north in the City of Wildomar, as indicated in Exhibit A. The site plan used for this analysis, provided by SB&O, INC., is presented in Exhibit B. The noise regulations for the project site are listed in the *Noise Standard* section of the study.

A detailed list of required and recommended noise control measures is presented in the Summary of Mitigation Requirements section of this study (also graphically illustrated on Exhibit C). The noise control analysis and recommendations in this study are intended to satisfy the County of Riverside's Conditions of Approval, with respect to this project.

1.1 Roadway Noise Analysis

A roadway noise level assessment was conducted based on Level of Service (LOS) C design capacity and anticipated future Average Traffic Volumes (ADT) along the subject roadways. The County's standard indicates that a significant impact is considered to be a noise level exceeding the normally acceptable 65 dBA CNEL exterior standard (i.e. back and side yards) and 45 dBA CNEL interior standard for residential land use.

RK utilized the County's traffic volumes (LOS C) and Year 2035 traffic volumes (I-15 Freeway) to calculate the roadway noise levels. Table 1 indicates the anticipated first floor exterior roadway noise impacts to the project site. The result of the roadway analysis indicates that the backyards of the dwelling units at the project site will experience exterior noise levels ranging from 54.7 to 66.2 dBA CNEL, with the recommended mitigation measures implemented (as illustrated in Exhibit C). The noise levels are considered conservative, because the existing traffic

volumes on Prielipp Road, Elizabeth Lane and Interstate 15 Freeway are significantly lower than the County's LOS C (buildout) design.

1.2 Interior Noise Analysis

An interior noise analysis was performed to calculate the projected interior noise levels. The County has a residential interior noise standard of 45 dBA CNEL. The interior noise projection is the difference between the exterior noise levels and the attenuating effects of the building construction shell. Typical California residential building construction will provide a minimum of 12 dBA noise reduction under a "windows open" condition and a minimum of 20 dBA noise reduction under a "windows closed" condition. To obtain an interior noise level of 45 dBA CNEL, the dwelling units nearest Prielipp Road, Elizabeth Lane and Interstate 15 Freeway will require "windows closed" conditions, necessitating mechanical fresh-air ventilation.

2.0 Summary of Mitigation Requirements

Roadway noise impacts propagating from Prielipp Road, Elizabeth Lane and Interstate 15 Freeway to the project site were assessed and compared to the City/County's guidelines for residential land use. The results of the CNEL analysis include future build-out ADT volumes along the analyzed roadway, as detailed in Table 1. The results of the interior analysis are indicated in Tables 2 and 3. A summary of all noise requirements, recommendations and locations are shown on Exhibit C.

The proposed project is expected to meet the County's noise requirements for residential land use with the implementation of the required mitigation measures. To ensure noise levels remain low there are several recommendations which should be followed to help reduce noise impacts the surrounding environment and the project site.

2.1 Noise Reduction Measures

2.1.1 Exterior Area Noise Exposure Control

The County of Riverside noise standards for residential developments require that outdoor living areas have a CNEL no greater than 65 dBA. The findings of this study indicate that maximum future unmitigated noise impacts to this site exceed the 65 dBA CNEL exposure limit for some of the residential dwelling units.

To meet the County of Riverside exterior noise standard of 65 dBA CNEL, noise control barriers with a height of 6 feet is required for lots that are adjacent to Prielipp Road, Elizabeth Lane and Interstate 15 Freeway. Table 1 and Exhibit C indicate the height and location of the individual noise control barriers necessary for the project.

The data in Table 1 is based upon barrier locations at the boundary line of the subject lots, at the top of slope, between the adjacent roadway and exterior living area(s). It is important to note that the barriers' attenuation will be accomplished only if the referenced minimum height is based from the pad or roadway elevation, whichever is greater of the two. If the barrier is being constructed at a position where the starting elevation is lesser than the pad or adjacent roadway, the barrier's ultimate height will need to be adjusted to fit the aforementioned criteria. Where applicable, the barriers should wrap around the ends of the dwelling units to prevent flanking of noise into the site. Required barrier heights and locations are graphically illustrated on Exhibit C.

2.1.2 Interior Area Noise Exposure Control

The interior noise projection is the difference between the exterior noise levels and the attenuating effects of the building construction shell. The projected first and second story interior noise impacts to the Parkside Residential Development project will have a range of approximately 42.7 to 53.6 dBA CNEL, when the windows are open. Therefore, the interior County noise standard will be met with a "windows closed" condition and upgraded windows and sliding glass doors. The "windows closed" condition will require mechanical fresh air ventilation (i.e. air conditioning).

2.1.3 Unit Interiors

Tables 2 and 3 utilize the projected noise exterior noise levels and account for the amount of noise reduction due to the building shell design. With the windows closed, the anticipated first and second floor interior noise levels will range from 34.7 to 45.6 dBA CNEL. The project will require upgraded windows (STC $\geq$ 25) for units facing the Prielipp Road, Elizabeth Lane and Interstate 15 Freeway. All residential units will properly be mitigated through the implementation of a "windows closed" condition which will necessitate mechanical ventilation (i.e. air

conditioning), which meet UBC (Uniform Building Code) fresh air ventilation standards. Required mitigation measures are shown on Exhibit C.

2.1.4 Unit Ventilation

Based upon this preliminary study, when windows and operable doors are open, it is expected that the interior 45 dBA CNEL residential threshold will be exceeded at lots directly adjacent to the subject roadways. Therefore, the "windows closed" condition is applicable to those residential units in order to meet the interior noise standards. These units are indicated in Exhibit C. Under a "windows closed" condition, a means of mechanical ventilation is required. The mechanical ventilation system shall be capable of providing two (2) air changes per hour in habitable rooms with a minimum of 15 cubic feet per minute (7 L/s) of outside air per occupant. The fresh air inlet duct shall be of sound attenuating construction and shall consist of a minimum of ten feet of straight or curved duct or six (6) feet plus one (1) sharp 90° bend. Attic vents facing adjacent roadways, if applicable, should include an acoustical baffle, or the attic floor (including the access panel) should be fully insulated to prevent vehicle noise intrusion. Exhibit D illustrates the attic vent acoustical baffle detail.

2.1.5 Building Shell Design

A "windows closed" condition will be required to meet interior noise exposure standards for residential units facing the analyzed subject roadways. To implement the "windows closed" condition, a means of mechanical ventilation is required to insure satisfactory sound control and ventilation. For proper acoustical performance, all exterior windows, doors and sliding glass doors must have a positive seal and leaks/cracks must be kept at a minimum.

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3.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

3.1 Sound, Noise and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic, or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

3.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

3.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines it loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measure in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in

logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB.

3.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB the higher sound level is the predominant sound.

3.5 Human Response to Changes in Noise Levels

In general the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically the human ear can barely perceive the change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

3.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns other are random. Some noise levels are constant while others are

sporadic. Noise descriptors were created to describe the different time-varying noise levels. Appendix B indicates the most commonly used noise descriptors and gives a brief definition.

3.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, and (3) auto, medium truck (2 – 6 wheels) and heavy truck percentage (3 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise.

A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

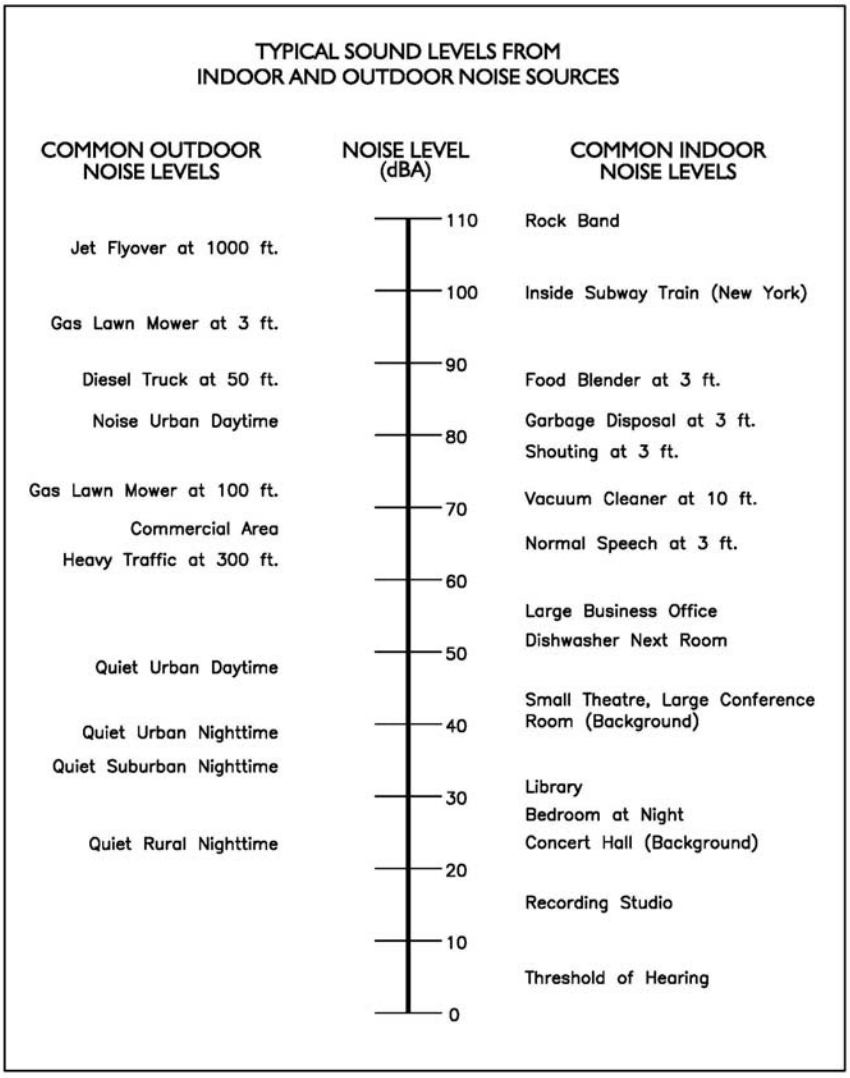
3.8 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive

ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity and turbulence can further impact have far sound can travel.



4.0 Introduction

This preliminary acoustical study evaluates the off-site noise impacts and predicts the exterior/interior noise levels for Parkside Residential Development project by assessing the roadway noise impacts generated by local traffic from Prielipp Road, Elizabeth Lane, and Interstate 15 Freeway. The project is located at the southwest corner of Prielipp Road and Elizabeth Lane North in the City of Wildomar.

The general location of the project is shown in the Location Map, Exhibit A. The site plan used for this analysis, provided by LENNAR HOMES OF CALIFORNIA, INC., is presented on Exhibit B.

The following sections outline the expected noise levels within the planned site and compare these noise levels to the applicable noise regulations. The design requirements and recommendations, as outlined in the *Summary of Mitigation Requirements* section of this study, are intended to satisfy the County of Riverside noise regulations.

4.1 Noise Standards

The City of Wildomar follows Riverside County's noise standards. The acoustical parameters include the Noise Standards from the County of Riverside's Office of Industrial Hygiene, included in Appendix A. The noise regulations outline proper calculation procedures for roadway noise impacts.

4.1.1 Roadway Noise Regulations

Typically roadway noise impacts, as defined by the County's General Plan at the normally acceptable level should be below the 65 dBA CNEL exterior residential and 45 dBA CNEL interior threshold.

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5.0 Study Method and Procedure

In order to predict the future exterior/interior noise levels, traffic noise levels were modeled and a building design review was performed. A glossary of acoustical terms is included in Appendix B.

5.1 CNEL Noise Modeling

The CNEL noise analysis uses a version of the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108), together with several key roadway and site parameters. Key inputs include roadway classification (e.g. Urban Arterial, Arterial Highway, Major Highway, Secondary Highway and Collector), roadway active width (the distance between the center of the outer most travel lanes on each side of the roadway), Build-out Average Daily Traffic (ADT), travel speed, percentages of automobiles, medium trucks and heavy trucks in the roadway volume, roadway grade, angle of view, site conditions ("hard" or "soft"), and percentage of total ADT which flows each hour throughout a 24-hour period. Vehicle mix distribution and average daily traffic volumes are located in Table 4.

The key input data for these barrier performance equations include: performance equations relative to source-barrier-receiver horizontal separations, relative source-barrier-receiver vertical separations, typical noise source spectra, and barrier transmission loss. Some of the general assumptions used in determining the source and receiver geometry are listed below:

Receiver Geometry

Horizontal Geometry: Distance behind top-of-slope barrier: (varies)

Vertical Geometry: Height above pad for ground level receivers:

Exterior:	5 feet above ground
1st Floor Interior:	5 feet above finished floor
2nd Floor Interior:	15 feet above finished floor

Source Assumptions

Horizontal Geometry: Raodway noise source distance based upon building locations and adjacent land sensitive use receivers.

Vertical Geometry: Height above pad grade for each industrial source.

These assumptions and the site plan (Exhibit B) were used to fix the horizontal and vertical geometry used in the barrier analysis.

The CNEL model calculates the noise impacts produced by the adjacent roadway. The output of the model was compared to the Residential land Use Noise Standard found in the Noise Element. The County has a 45 dBA CNEL interior residential land use threshold. The predicted worst-case exterior noise levels at the facades will range from 54.7 to 66.2 dBA CNEL. Tables 2 and 3 indicate the predicted interior noise levels for Floors 1 and 2 facing the subject analyzed roadways. Appendix C illustrates the traffic noise output files for the project. Sight distances are located in Appendix D.

5.2 Interior Noise Modeling

The interior noise exposure level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself (including but not limited to the exterior and interior building and finishing materials). Typical building construction will provide a conservative 12 dBA

noise level reduction with "windows open" and a very conservative 20 dBA noise level reduction with "windows closed."

An interior noise analysis was performed to calculate the predicted interior noise levels within the project site, taking into account the building shell design and the structures attenuation effects.

5.3 Noise Measurements

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

RK conducted the sound level measurements in accordance to Caltrans technical noise specifications. All measurements equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed five (5) feet above the ground for all measurements

- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of equipment, a wind screen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements any noise contaminations such as barking dogs, local traffic, lawn mowers, or aircraft fly-overs were noted.
- Temperature and sky conditions were observed and documented

5.3.1 Existing Noise Environment

The primary source of off-site generated noise is roadway noise impacts propagating from Prielipp Road, Elizabeth Lane, and Interstate 15 Freeway. In this case, noise meters were placed along the eastern property line of the project site and represent the existing ambient noise levels propagated by the roadway. Short-term noise monitoring location (ST-1) is located approximately 75 feet west of the centerline of Prielipp Road and 75 feet south of the centerline of Elizabeth Lane. ST-2 is located approximately 75 feet west of the centerline of Elizabeth Lane and 435 feet south of the centerline of Prielipp Road. ST-3 is located approximately 50 feet west of the end of Madison Avenue and 400 feet north of the Temecula Valley Freeway. Appendix E includes photos, field sheets and measured noise data. Exhibit E illustrates the location of the measurements. Table 5 indicates the existing noise levels at the project site.

6.0 Future Noise Environment and Impacts

6.1 Future Exterior Noise

The future exterior noise levels analyze the potential noise impacts from the subject roadways to the project sites exterior/interior areas. The project site location is outside the French Valley Airport 55 dBA CNEL noise contour. No impact is expected from the airport noise levels.

6.1.1 Traffic Noise Data

It is expected that roadway traffic along Prielipp Road, Elizabeth Lane, and Interstate 15 Freeway will be the main source of off-site noise impacting the project site. A noise wall with a height of six (6) feet is recommended for certain lots and will shield all first floor exterior areas, resulting in noise levels at the first floor level to be below the County's 65 dBA CNEL standard. The roadway design LOS C County ADT volumes for the indicated roadways were used to predict the exterior noise levels to the facades of the residential units. The projected noise levels at the facades will range from 54.7 to 66.2 dBA CNEL, for Floors 1 and 2. Appendix C demonstrates the roadway noise calculations.

The project will have a less than significant impact to the surrounding area. The project is anticipated to generate a small amount of traffic when compared to the existing ADT volumes.

6.1.2 Off-site Noise Impact

Table 6 indicates the estimated future noise impact to the existing residential unit to the northwest of the project site. The buildout roadway noise level to the project site will be 61.7 dBA CNEL. The noise level will be below the City's 65 dBA CNEL

standard. Also, the project's local street impacts to this off-site home will be minimal. The project's impact to the existing residential unit is minimal and considered not significant.

6.2 Future Interior Noise

Tables 2 and 3 indicate the anticipated interior noise level for Floors 1 and 2. The residential units will require a CNEL noise reduction ranging from 9.7 to 20.6 (depending on unit location and acoustical parameters) dBA CNEL, requiring a "windows closed" condition. A "windows closed" condition requires a means of mechanical ventilation per the Uniform Building Code. In the final acoustical study, in-depth and precise interior noise reduction calculations will be calculated based on detailed floor and elevation plans. The calculations will be used to project precise interior noise levels.

7.0 Conclusions

RK Engineering Group, Inc. has completed an acoustical analysis of the Parkside Residential Development project, located in the City of Wildomar. The project was assessed with respect to off-site generated noise impacts. The noise study indicates that traffic noise from Prielipp Road, Elizabeth Lane, and Interstate 15 Freeway will be the main source of off-site noise impacting the project. The interior noise levels are expected to be below the County's regulation of 45 dBA CNEL with the implementation of the "windows closed" condition and potentially upgraded windows as indicated in Exhibit C. Refer to Summary of Mitigation Requirements and Exhibit C.

The following conclusions for the Parkside Residential Development project are listed below:

- The future exterior roadway noise levels and required wall heights at the backyards are indicated in Table 1 and Exhibit C.
- The projected interior noise levels within the project site are listed in Tables 2 and 3. The projected interior noise levels are expected to be below the County's standard with the implementation of a "windows closed" condition and potentially upgraded windows (STC$\geq$25) for units facing Prielipp Road, Elizabeth Lane and Interstate 15 Freeway. Exhibit C indicates recommended mitigation.
- The existing noise environment is indicated in Table 5.
- The project's off-site noise impact is indicated in Table 6.

A number of noise reduction measures are recommended in the report. A summary of these recommendations can be found in *Section 2.0 (pages 2-1 to 2-2)* of this report. The analysis and design presented in this study comply with applicable County of Riverside requirements for control of community noise impacts to exterior/interior residential land use.

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Exhibits

Exhibit A

Location Map

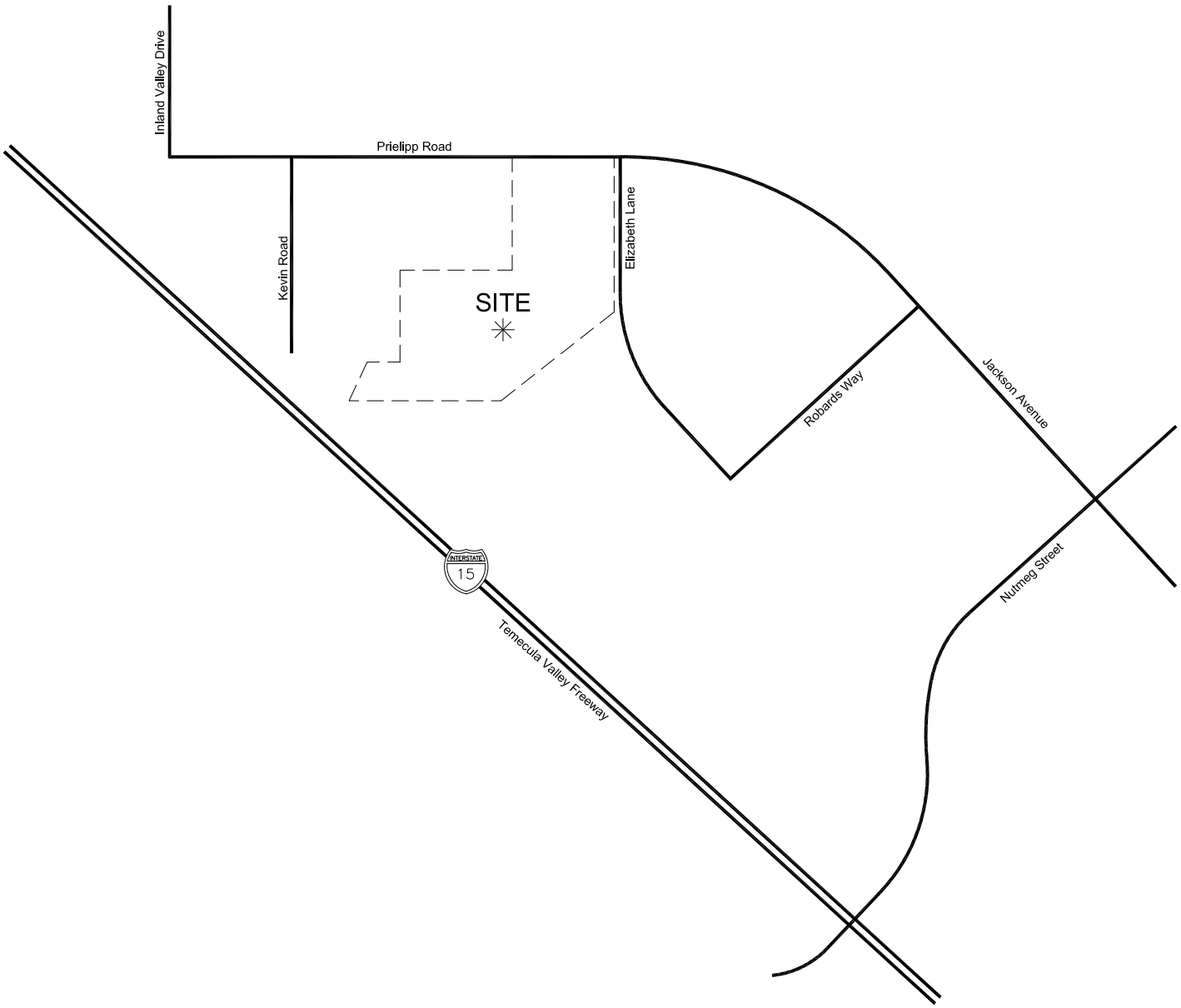

Exhibit B

Site Plan

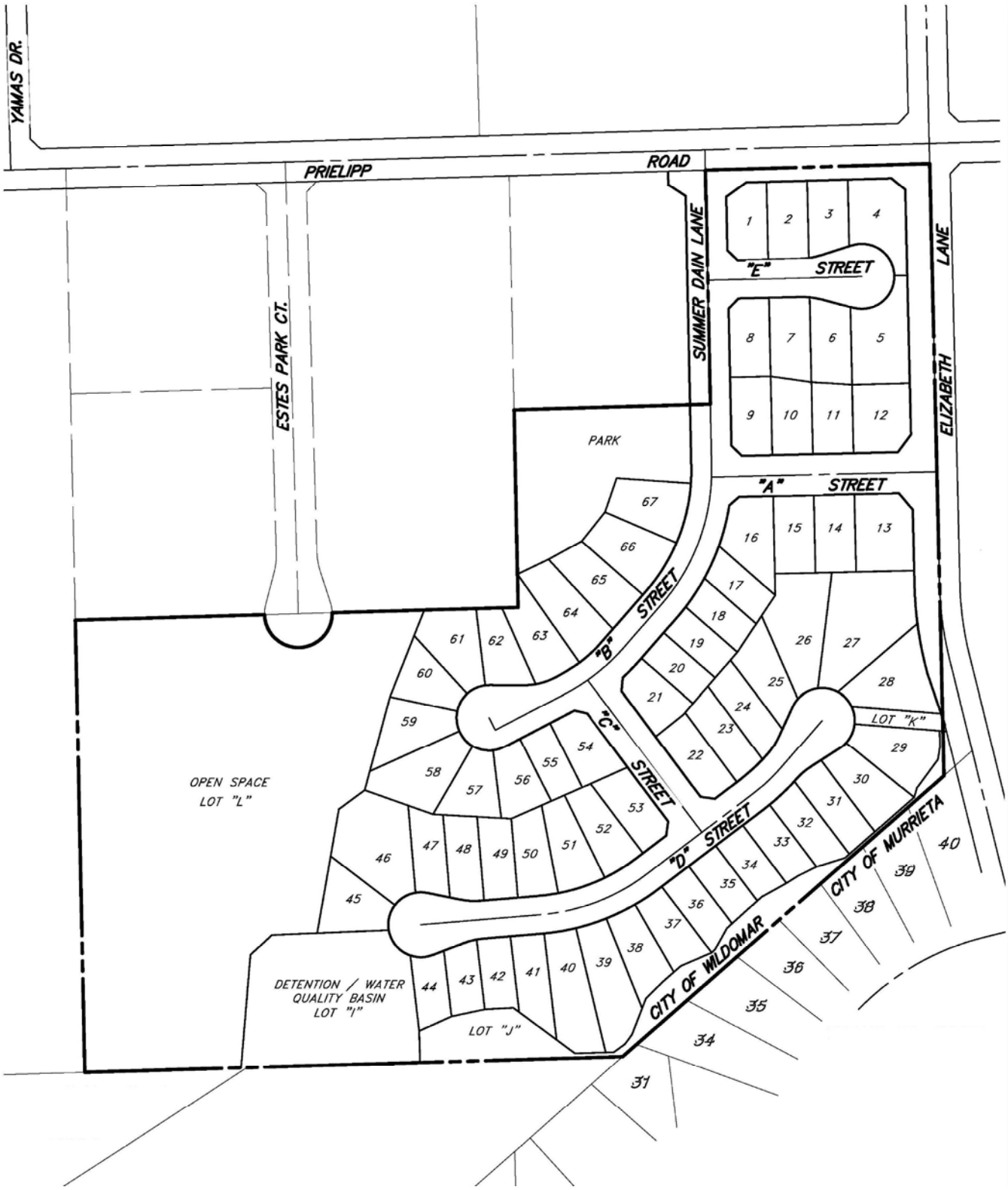

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Exhibit C
Recommendations

Legend:

15 = Reference Lot Location

● = "Windows Closed" condition for all floor necessitation a means of mechanical ventilation for UBC Requirements

X.X' = Minimum Noise Barrier Height (In Feet)

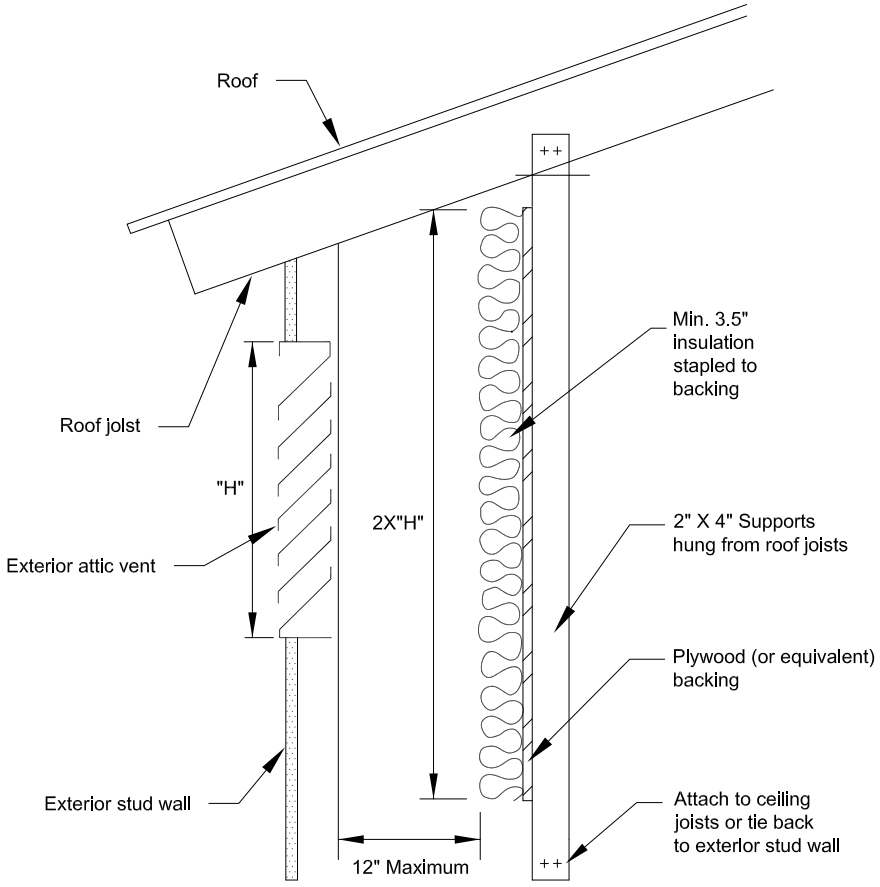
= Noise Barrier

N

Exhibit D

Attic Vent Acoustical Baffle Detail

SECTION



PLAN VIEW

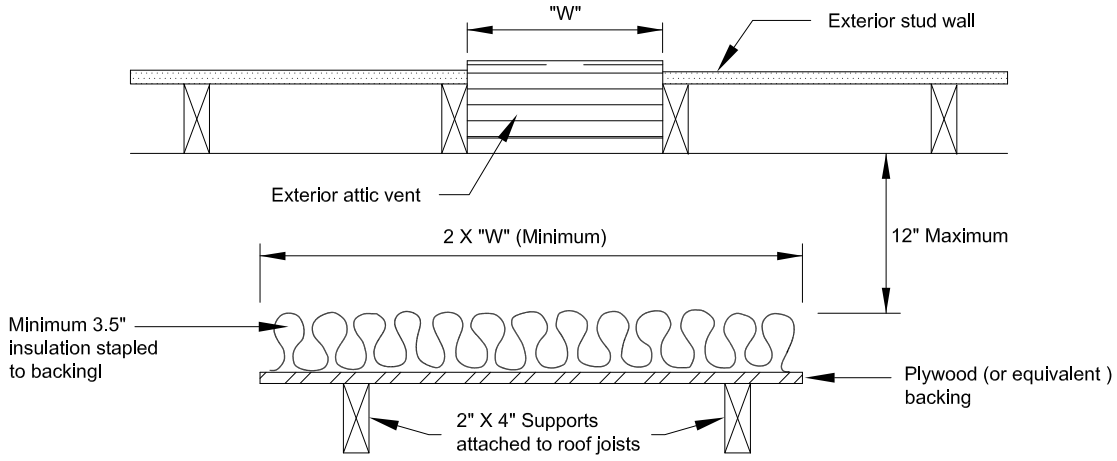


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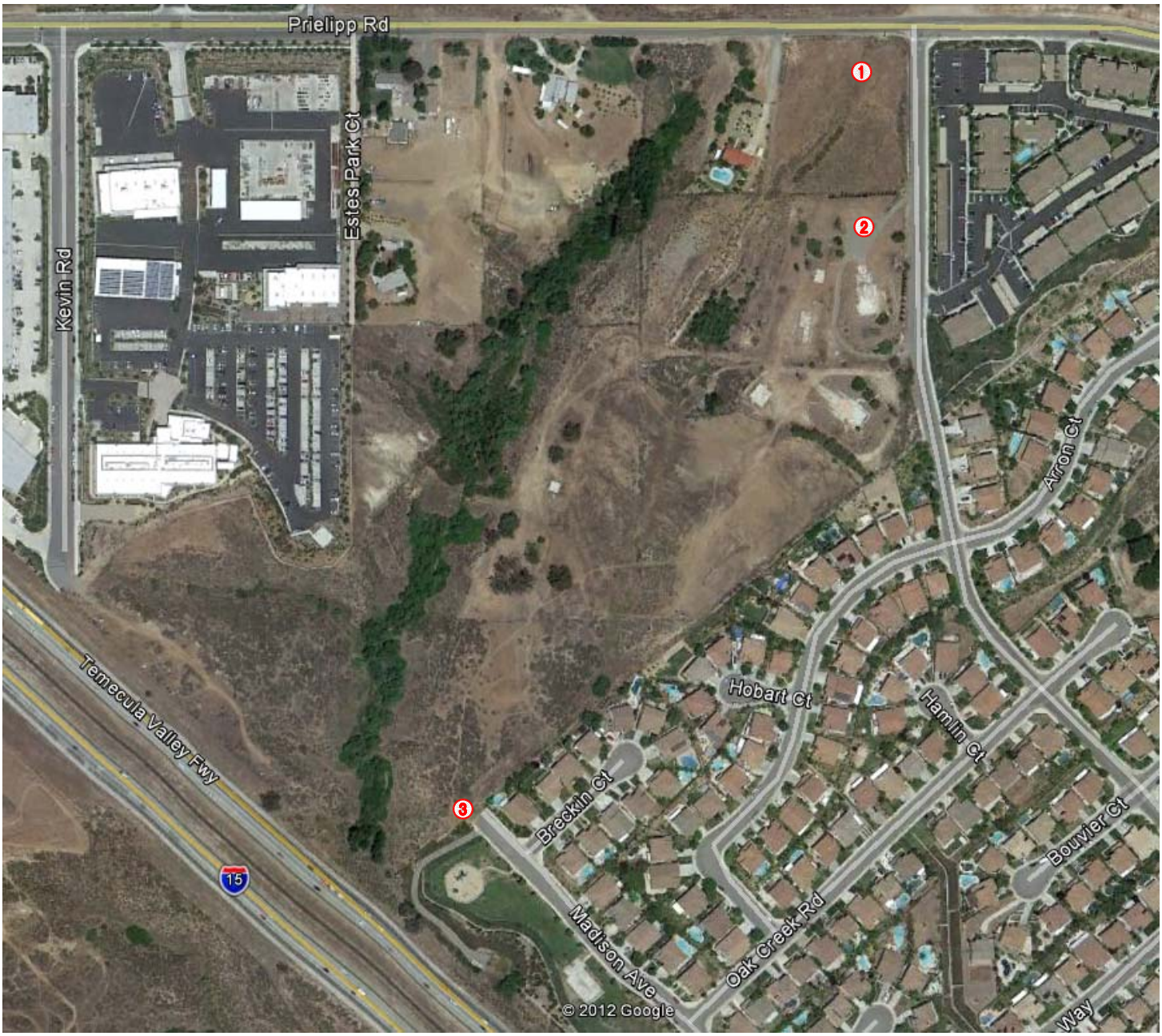
Exhibit E

Noise Monitoring Locations



Legend:

① = Noise Monitoring Locations

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Tables

TABLE 1

Future First Floor Exterior Noise Levels (dBA CNEL)[1]

Exterior (Ground Level) Study Locations	Unmitigated Exterior Noise Impacts From			Total (Combined) Exterior Noise Level	Noise Barrier Height (in feet)[2,3]	Final Projected Exterior Noise Level
	Elizabeth Lane	Prielipp Road	State Route 15 Freeway			
Lot 44	- -	- -	65.7	65.7	- -	61.4
Lot 40	- -	- -	66.1	66.1	- -	58.1
Lot 29	66.2	- -	- -	66.2	6.0	57.3
Lot 5	54.7	- -	- -	54.7	- -	54.7
Lot 2	- -	65.9	- -	65.9	6.0	54.0

[1] Exterior noise levels calculated to backyard.

[2] Barrier height (in feet) is to be above pad or roadway elevation, whichever is greater of the two.

[3] "- -" indicates noise levels from adjacent roadways are below County standard and therefore no mitigation is required

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TABLE 2

Future First Floor Interior Noise Levels (dBA CNEL)

Receiver Location	Noise Impacts at First Floor Building Façade[1]	Interior Noise Reduction Required to Meet Interior Noise Standard of 45 dBA CNEL	First Floor Interior Noise Level w/ Standard Windows (STC $\geq$ 25)	
			Windows Open[2]	Windows Closed[3]
Lot 44	55.3	10.3	43.3	35.3
Lot 40	61.2	16.2	49.2	41.2
Lot 29	54.7	9.7	42.7	34.7
Lot 5	59.2	14.2	47.2	39.2
Lot 2	55.1	10.1	43.1	35.1

[1] Indicated noise level includes noise attenuation provided by either sound wall.

[2] A minimum of 12 dBA noise reduction is assumed with a "windows open" condition.

[3] A minimum of 20 dBA noise reduction is assumed with a "windows closed" condition.

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TABLE 3

Future Second Floor Interior Noise Levels (dBA CNEL)

Receiver Location	Noise Impacts at Second Floor Building Façade[1]	Interior Noise Reduction Required to Meet Interior Noise Standard of 45 dBA CNEL	Second Floor Interior Noise Level w/ Standard Windows (STC $\geq$ 25)	
			Windows Open[2]	Windows Closed[3]
Lot 44	65.6	20.6	53.6	45.6
Lot 40	65.6	20.6	53.6	45.6
Lot 29	60.6	15.6	48.6	40.6
Lot 5	64.7	19.7	52.7	44.7
Lot 2	64.9	19.9	52.9	44.9

[1] Indicated noise level includes noise attenuation provided by either sound wall.

[2] A minimum of 12 dBA noise reduction is assumed with a "windows open" condition.

[3] A minimum of 20 dBA noise reduction is assumed with a "windows closed" condition.

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TABLE 4

Roadway Parameters and Vehicle Distribution

Roadway	Classification	Lanes	Buildout (ADT)[1]	Speed (MPH)	Site Conditions
Interstate 15 Freeway	Freeway	8	199,724	65	Soft
Elizabeth Lane	Collector	2	10,400	40	Hard
Prielipp Road	Collector	2	10,400	40	Hard

Interstate 15 Vehicle Distribution (Truck Mix)[2]

Motor-Vehicle Type	Daytime % (7 AM to 7 PM)	Evening % (7 PM to 10 PM)	Night % (10 PM to 7 AM)	Total % of Traffic Flow
Automobiles	75.5	14.0	10.5	91.30
Medium Trucks	48.0	2.0	50.0	4.60
Heavy Trucks	48.0	2.0	50.0	4.10

Prielipp Road Vehicle Distribution (Truck Mix)[2]

Motor-Vehicle Type	Daytime % (7 AM to 7 PM)	Evening % (7 PM to 10 PM)	Night % (10 PM to 7 AM)	Total % of Traffic Flow
Automobiles	77.5	12.9	9.6	97.42
Medium Trucks	84.8	4.9	10.3	1.84
Heavy Trucks	86.5	2.7	10.8	0.74

[1] Source: County of Riverside General Plan. Year 2035 I-15 Freeway volumes referenced from RCTC, Kevin Tsang (see Appendix A).

[2] Vehicle percentages utilized from County of Riverside General Plan. I-15 vehicle mix is based on Caltrans 2010 Annual Average Daily Traffic Volumes (Appendix A).

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TABLE 5

Noise Level Measurements

Measured Noise Level (dBA)

	Site No.	Time Started[1]	Leq	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}	Estimated CNEL	Comments
Daytime	1	10:05 AM	63.8	67.9	56.9	67.1	66.2	64.9	63.5	68.5	Measurement taken 75ft south from centerline of Prielipp Road and 75ft west from centerline of Elizabeth Lane. Ambient noise = local traffic.
	2	10:20 AM	47.6	70.3	43.1	50.8	48.4	46.9	46.1	62.3	Measurement taken was 75ft west from centerline of Elizabeth Lane. Ambient noise = local traffic.
	3	10:35 AM	54.2	79.2	39.3	60.9	57.4	52.5	45.5	63.4	Measurement taken was 50ft west of the end of Madison Avenue and 400 ft north of I-215 Freeway. Ambient noise = I-215 Freeway.

[1] Noise measurements were taken for ten minutes.

[2] Noise measurements were taken on December 6, 2012.

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TABLE 6

Northwestern Property Offsite Noise Level Impact (dBA CNEL)[1]

Exterior (Ground Level) Study Locations	Unmitigated Exterior Noise Impacts From			Total (Combined) Exterior Noise Level	Noise Barrier Height (in feet)[2,3]	Final Projected Exterior Noise Level
	Elizabeth Lane	Prielipp Road	State Route 15 Freeway			
Northwestern Lot	- -	61.7	- -	61.7	--	61.7

[1] Exterior noise levels calculated to backyard.

[2] Barrier height (in feet) is to be above pad or roadway elevation, whichever is greater of the two.

[3] "- -" indicates noise levels from adjacent roadways are below County standard and therefore no mitigation is required

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Appendices

Appendix A

County of Riverside
Acoustical Parameters

Chapter 7: Noise Element

Definitions

Following is a list of commonly used terms and abbreviations that may be found within this element or when discussing the topic of noise. This is an abbreviated glossary to be reviewed prior to reading the element. It is important to become familiar with the definitions listed in order to better understand the importance of the Noise Element within the County of Riverside General Plan. Since the disbanding of the State Office of Noise Control in the mid-1990, the State of California Office of Planning and Research General Plan Guidelines can offer further information on other noise-related resources.

Ambient Noise: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL (Community Noise Equivalent Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

dB (Decibel): The unit of measure that denotes the ratio between two quantities that are proportional to power; the number of decibels corresponding to the ratio of the two amounts of power is based on a logarithmic scale.

dBA (A-weighted decibel): The A-weighted decibel scale discriminates upper and lower frequencies in a manner approximating the sensitivity of the human ear. The scale is based on a reference pressure level of 20 micropascals.

Intrusive Noise: That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, and tonal or informational content as well as the prevailing noise level.

L_{10}: The A-weighted sound level exceeded ten percent of the sample time. Similarly, L_{50}, L_{90}, etc.

L_{eq} (Equivalent energy level): The average acoustic energy content of noise during the time it lasts. The L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure, no matter what time of day they occur. The County of Riverside uses a 10-minute L_{eq} measurement.

L_{dn} (Day-Night Average Level): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m. Note: CNEL and Ldn represent daily levels of noise exposure averaged on an annual or daily basis, while Leq represents the equivalent energy noise exposure for a shorter time period, typically one hour.

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The level of sound that impacts a property varies greatly during the day. As an example, the sound near an airport may be relatively quiet when no airplane is taking off or landing, but will be extremely loud as a plane takes off. In order to deal with these variations, several noise indices have been developed, which measure how loud each sound is, how long it lasts, and how often the sound occurs. The indices express all the sound occurring during the day as a single average level, which if it occurred all day would convey the same sound energy to the site.

Micropascal: The international unit for pressure, similar to pounds per square inch. 20 micropascals is the human hearing threshold. The scale ranges from zero for the average least perceptible sound to about 130 for the average pain level

Noise Contours: Lines drawn around a noise source indicating equal levels of noise exposure. CNEL and Ldn are the metrics used in this document to describe annoyance due to noise and to establish land use planning criteria for noise.

Introduction

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It is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare.

-Noise Control Act of 1972

Before the alarm clock sounds, the lawn mower next door begins to roar. Then, while listening to the morning news on the radio, an airplane flies overhead and deadens all sound in the neighborhood. Once outside, the neighbor's stereo can be heard a block away. And during the morning commute, car horns, rumbling mufflers, and whirring motorcycles serenade motorists on the highway. Even in the most rural areas of Riverside County, the eternal battle between the efficiency of technology, and the noise it can create cannot be avoided.

As modern transportation systems continue to develop and human dependence upon machines continues to increase, the general level of noise in our day to day living environment rises. In Riverside County, residential areas near airports, freeways, and railroads are being adversely affected by annoying or hazardous noise levels. Other activities such as construction, operation of household power tools and appliances, and industry, also contribute to increasing background noise.

Sound refers to anything that is or may be perceived by the ear. Noise is defined as "unwanted sound" because of its potential to disrupt sleep, rest, work, communication, and recreation, to interfere with speech communication, to produce physiological or psychological damage, and to damage hearing.

ADDRESSING NOISE ISSUES

The Noise Element is a mandatory component of the General Plan pursuant to the California Planning and Zoning Law, Section 65302(f). The element must recognize the guidelines adopted by the Office of Planning and Research pursuant to Section 46050.1 of the Health and Safety Code. It also can be utilized as a tool for compliance with the state's noise insulation standards.

The General Plan Noise Element provides a systematic approach to identifying and appraising noise problems in the community; quantifying existing and projected noise levels; addressing excessive noise exposure; and community planning for the regulation of noise. This element includes policies, standards, criteria, programs, diagrams, a reference to action items, and maps related to protecting public health and welfare from noise.

SETTING

Tinnitus: The perception of ringing, hissing, or other sound in the ears or head when no external sound is present. For some people, tinnitus is just a nuisance. For others, it is a life-altering condition. In the United States, an estimated 12 million people have tinnitus to a distressing degree.

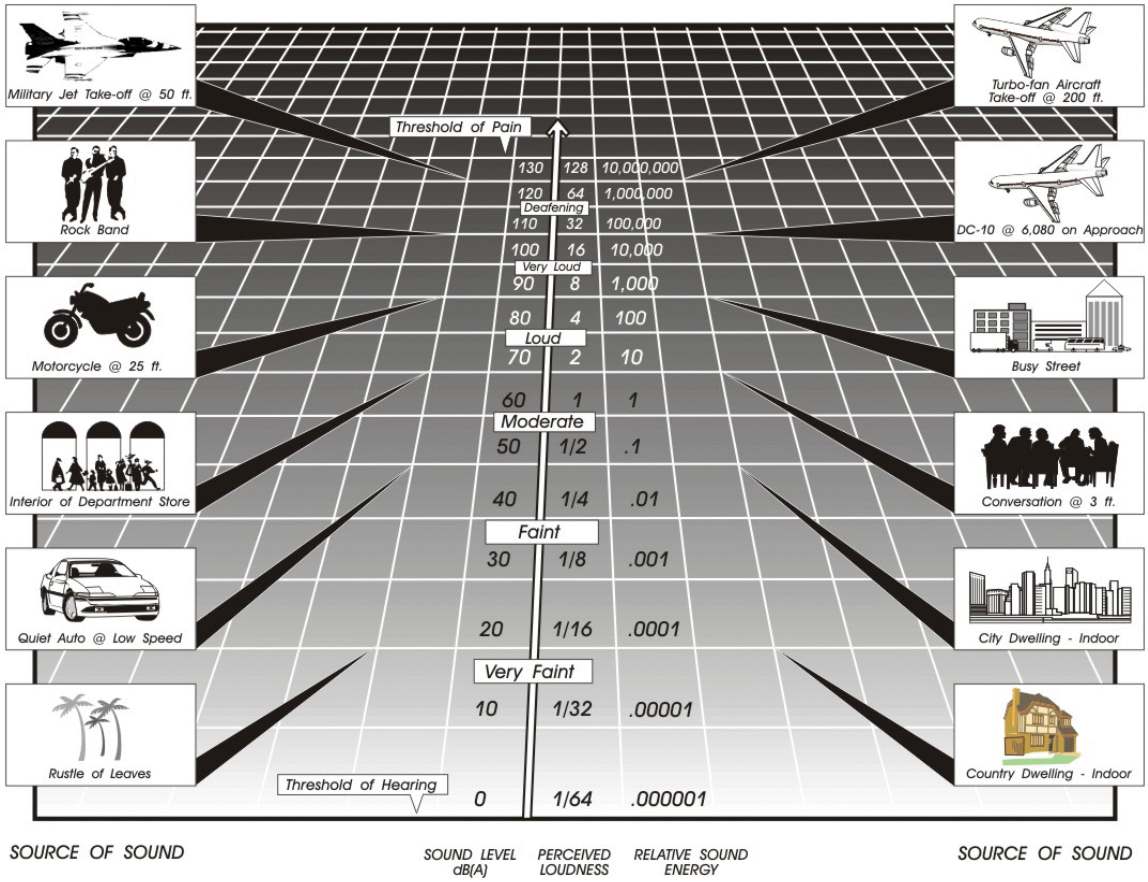
Riverside County is a continuously evolving group of communities that relies heavily upon the modern technological conveniences of American society to thrive and succeed as a pleasant and desirable place to live and work. Without such necessities as air-conditioning, heating, generators, and cars, living in an urban, suburban, rural, desert, or mountainous environment becomes difficult, if not impossible. Fortunately, these amenities are available to the residents of Riverside County and are used everyday, often all day long. Unfortunately, these technological advances can come at a high price to residents' and visitors' ears.

The philosophical view commonly held by Riverside County staff and residents is that noise, which may be perceived by some to be annoying, may not be noticed at all by others. It is also important to note that people who move into an area where a noise source already exists (such as near an existing highway) are often more tolerant of that noise source than when a new noise generator locates

itself in an established area that may be noise-sensitive (such as a stadium that is constructed near an established community).

Noise within Riverside County is generated by numerous sources found near places where people live and work. These sources are of particular concern when the noise they generate reaches levels above the prevailing background noise. There are many different types of noise, including mobile, stationary, and construction-related, that affect noise-sensitive receptors such as residences, schools, and hospitals. Figure 1, Common Noise Sources and Noise Levels, illustrates some noise producers that can be found within Riverside County, as well as their corresponding noise measurement. The following sections contain policies that address the issues of noise producers and their effects on noise-sensitive land uses.

Figure N-1: Common Noise Sources and Noise Levels



Noise Sensitive Land Uses

A series of land uses have been deemed sensitive by the State of California. These land uses require a serene environment as part of the overall facility or residential experience. Many of these facilities depend on low levels of sound to promote the well being of the occupants. These uses include, but are not necessarily limited to; schools, hospitals, rest homes, long term care facilities, mental care facilities, residential uses, places of worship, libraries, and passive recreation areas. Activities conducted in proximity to these facilities must consider the noise output, and ensure that they don't create unacceptable noise levels that may unduly affect the noise-sensitive uses. The following policies address issues related to noise-sensitive land uses.

NOISE COMPATIBILITY

The Noise Element of the General Plan is closely related to the Land Use Element because of the effects that noise has on sensitive land uses. Noise-producing land uses must be compatible with adjacent land uses in order for the Land Use Plan to be successful. Land uses that emit noise are measured in A-weighted decibels (dBA) or Community Noise Equivalent Level (CNEL). If existing land uses emit noise above a certain level, they are not compatible with one another, and therefore noise attenuation devices must be used to mitigate the noise to acceptable levels indoors and outdoors. In cases of new development, the placement of noise-sensitive land uses is integral to a successful community. Table 1, Land Use Compatibility for Community Noise Exposure, reveals the noise acceptability levels for different land uses. Areas around airports may have different or more restrictive noise standards than those cited in Table 1 (See Policy N 1.3 below).The following policies protect noise-sensitive land uses from noise emitted by outside sources, and prevent new projects from generating adverse noise levels on adjacent properties.

The General Plan policy and implementation item reference system:

Identifies which element contains the Policy, in this case the Land Use Element, and the sequential number.

LU 1.3
Neighborhood commercial uses should be located near residential uses.
(AI 1 and AI 4)

Reference to the relevant Action Items contained in the Implementation Program.

Policies:

N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or blockwalls shall be used. (AI 107)

N 1.2 Guide noise-tolerant land uses into areas irrevocably committed to land uses that are noise-producing, such as transportation corridors or within the projected noise contours of any adjacent airports. (AI 107)

N 1.3 Consider the following uses noise-sensitive and discourage these uses in areas in excess of 65 CNEL:

- Schools;
- Hospitals;
- Rest Homes;
- Long Term Care Facilities;
- Mental Care Facilities;
- Residential Uses;
- Libraries;
- Passive Recreation Uses; and

- Places of worship

Unregulated noise sources such as household power tools often emit more noise than regulated noise producers.

According to the State of California Office of Planning and Research General Plan Guidelines, an acoustical study may be required in cases where these noise-sensitive land uses are located in an area of 60 CNEL or greater. Any land use that is exposed to levels higher than 65 CNEL will require noise attenuation measures.

Areas around airports may have different noise standards than those cited above. Each Area Plan affected by a public-use airport includes one or more Airport Influence Areas, one for each airport. The applicable noise compatibility criteria are fully set forth in Appendix L and summarized in the Policy Area section of the affected Area Plan. (AI 105)

N 1.4 Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys**.** (AI 106, 109)

N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County. (AI 105, 106, 108)

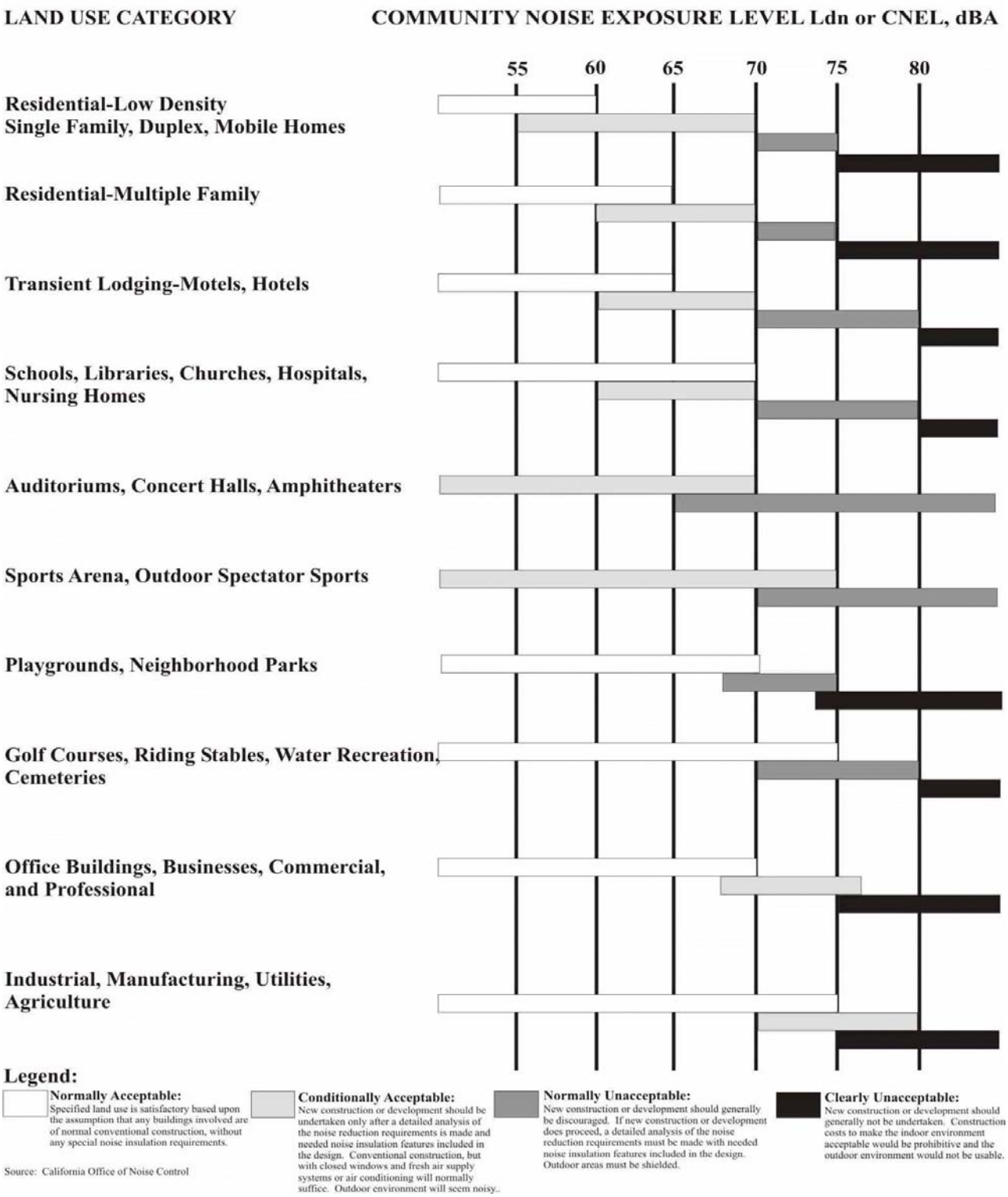
N 1.6 Minimize noise spillover or encroachment from commercial and industrial land uses into adjoining residential neighborhoods or noise-sensitive uses. (AI 107)

N 1.7 Require proposed land uses, affected by unacceptably high noise levels, to have an acoustical specialist prepare a study of the noise problems and recommend structural and site design features that will adequately mitigate the noise problem. (AI 106, 107)

N 1.8 Limit the maximum permitted noise levels that cross property lines and impact adjacent land uses, except when dealing with noise emissions from wind turbines. Please see the Wind Energy Conversion Systems section for more information. (AI 108)

Please contact the Office of Industrial Hygiene for more information on acoustical specialists.

Table N-1:
Land Use Compatibility for Community Noise Exposure



NOISE MITIGATION STRATEGIES

Many land uses emit noise above state-mandated acceptable levels. The noise emitted from a land use must be mitigated to acceptable levels indoors and outdoors in order for other, more noise-sensitive land uses to locate in proximity to these noise producers. There are a number of ways to mitigate noise and the following policies suggest some possible solutions to noise problems.

Policies:

N 2.1 Create a County Noise Inventory to identify major noise generators and noise-sensitive land uses, and to establish appropriate noise mitigation strategies. (AI 105)

N 2.2 Require a qualified acoustical specialist to prepare acoustical studies for proposed noise-sensitive projects within noise impacted areas to mitigate existing noise. (AI 105, 107)

N 2.3 Mitigate exterior and interior noises to the levels listed in the table below to the extent feasible, for stationary sources: (AI 105)

Table N-2:
Stationary Source Land Use Noise Standards [1]

Land Use	Interior Standards	Exterior Standards
Residential		
10:00 p.m. to 7:00 a.m.	40 L_{eq} (10 minute)	45 L_{eq} (10 minute)
7:00 a.m. to 10:00 p.m.	55 L_{eq} (10 minute)	65 L_{eq} (10 minute)

[1]These are only preferred standards; final decision will be made by the Riverside County Planning Department and Office of Public Health.

Noise Producers

LOCATION OF NOISE PRODUCERS

Good neighbors keep their noise to themselves.

The communities of Riverside County need a variety of land uses in order to thrive and succeed. These land uses may provide jobs, clean water, ensure safety, ship goods, and ease transportation woes. But they may also emit high levels of noise throughout the day. These noise-producing land uses can complement a community when the noise they emit is properly mitigated. The following policies suggest a series of surveys and analyses to correctly identify the proper noise mitigating procedures in order to promote the continued success of the communities of Riverside County.

Agriculture

One of the major economic thrusts of Riverside County is the agricultural industry. The Riverside County Right-to-Farm Ordinance conserves, protects, and encourages the development, improvement, and continued viability of agricultural land and industries for the long-term production of food and other agricultural products, and for the economic well-being of the County's residents. The Right-to-Farm Ordinance also attempts to balance the rights of farmers to produce food and other agricultural products with the rights of non-farmers who own, occupy, or use land within or adjacent to agricultural areas. The Riverside County Right-to-Farm Ordinance also works to reduce the burden of the County's agricultural resources by limiting the circumstances under which agricultural operations may be deemed a nuisance. Policies within this section address the potential noise issues that may be raised in regards to agricultural production.

Policies:

N 3.1 Protect Riverside County's agricultural resources from noise complaints that may result from routine farming practices, through the enforcement of the Riverside County Right-to-Farm Ordinance. (AI 105, 107)

N 3.2 Require acoustical studies and subsequent approval by the Planning Department and the Office of Industrial Hygiene, to help determine effective noise mitigation strategies in noise-producing areas. (AI 105)

N 3.3 Ensure compatibility between industrial development and adjacent land uses. To achieve compatibility, industrial development projects may be required to include noise mitigation measures to avoid or minimize project impacts on adjacent uses. (AI 107)

N 3.4 Identify point-source noise producers such as manufacturing plants, truck transfer stations, and commercial development by conducting a survey of individual sites. (AI 106)

N 3.5 Require that a noise analysis be conducted by an acoustical specialist for all proposed projects that are noise producers. Include

recommendations for design mitigation if the project is to be located either within proximity of a noise-sensitive land use, or land designated for noise-sensitive land uses. (AI 109)

N 3.6 Discourage projects that are incapable of successfully mitigating excessive noise. (AI 107)

N 3.7 Encourage noise-tolerant land uses such as commercial or industrial, to locate in areas already committed to land uses that are noise-producing. (AI 107)

STATIONARY NOISE

A stationary noise producer is any entity in a fixed location that emits noise. Stationary noise producers are common in many noise-sensitive areas. Motors, appliances, air conditioners, lawn and garden equipment, power tools, and generators are often found in residential neighborhoods, as well as on or near the properties of schools, hospitals, and parks. These structures are often a permanent fixture and are required for the particular land use. Industrial and manufacturing facilities are also stationary noise producers that may affect sensitive land uses. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, the County considers the use of these vehicles to be a stationary noise source when operated on private property such as at a truck terminal or warehousing facility. The emitted noise from the producer can be mitigated to acceptable levels either at the source or on the adjacent property through the use of proper planning, setbacks, blockwalls, acoustic-rated windows, dense landscaping, or by changing the location of the noise producer. The following policies identify mechanisms to measure and mitigate the noise emitted from stationary noise producers.

Community Noise Inventory

The cumulative noise created by truck transfer stations can reach excessive levels when noise sensitive uses are located nearby.

There are a series of noise producers within Riverside County that bear special recognition. These uses may be important parts of the economic health of the County, but they still emit noise from time to time. Some of the special noise producers within the County include, but are not limited to the Riverside Raceway, surface mining, truck transfer stations in the Mira Loma area, manufacturing facilities, and natural gas transmission pipelines.

Three high pressure natural gas transmission pipelines are located in the community of Cabazon (within the Pass Area Plan), and a series of valve stations are placed along the pipeline throughout the community. The pipelines supply a major portion of the non-transportation energy supply for southern California. The depressurization of mainline valves at the valve stations for emergency or maintenance reasons can result in noise levels exceeding 140 dB L_{eq} at a distance of 50 feet from the source for more than an hour at a time. The pipelines are not located in heavily populated areas; however, should higher-intensity uses be approved in the area in the future, possible relocation of one or more pipelines or valves may be necessary.

Policies:

N 4.1 Prohibit facility-related noise, received by any sensitive use, from exceeding the following worst-case noise levels: (AI 105)
a. 45 dBA-10-minute L_{eq} between 10:00 p.m. and 7:00 a.m.
b. 65 dBA-10-minute L_{eq} between 7:00 a.m. and 10:00 p.m.

N 4.2 Develop measures to control non-transportation noise impacts. (AI 105)

N 4.3 Ensure any use determined to be a potential generator of significant stationary noise impacts be properly analyzed, and ensure that the recommended mitigation measures are implemented. (AI 105, 106, 109)

N 4.4 Require that detailed and independent acoustical studies be conducted for any new or renovated land uses or structures determined to be potential major stationary noise sources. (AI 105)

N 4.5 Encourage major stationary noise-generating sources throughout the County of Riverside to install additional noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest extent practicable prior to the renewal of Conditional Use Permits or business licenses or prior to the approval and/or issuance of new Conditional Use Permits for said facilities. (AI 105, 107)

N 4.6 Establish acceptable standards for residential noise sources such as, but not limited to, leaf blowers, mobile vendors, mobile stereos and stationary noise sources such as home appliances, air conditioners, and swimming pool equipment. (AI 105)

A pure tone is a single frequency tone with no harmonic content (e.g. hum).

N 4.7 Evaluate noise producers for the possibility of pure-tone producing noises. Mitigate any pure tones that may be emitted from a noise source. (AI 106, 107)

N 4.8 Require that the parking structures, terminals, and loading docks of commercial or industrial land uses be designed to minimize the potential noise impacts of vehicles on the site as well as on adjacent land uses. (AI 106, 107)

Wind Energy Conversion Systems (WECS)

Wind energy is a unique resource found only in a portion of Riverside County. Wind Energy Conversion Systems (WECS) are used to harness the energy found in strong gusts of wind. In order to fully capitalize on this special commodity, a large number of wind turbines have been placed in a portion of the Coachella Valley and San Gorgonio Pass within Riverside County. There are some residential areas spread throughout the County that may also capitalize on wind-generated power. Though there is minimal residential development in the immediate areas where these windmills are located, the potential for noise and ground-borne vibration in neighboring developed areas may occur. The Wind Implementation Monitoring Program, designed and implemented by Riverside County, guides the policy direction for this area.

Policies:

N 5.1 Enforce the Wind Implementation Monitoring Program (WIMP).

N 5.2 Encourage the replacement of outdated technology with more efficient technology with less noise impacts. (AI 105)

MOBILE NOISE

Please see the Circulation Element for further policies regarding transportation and noise related issues.

Mobile noise sources may be one of the most annoying noise producers in a community because they are louder than background noises and more intense than many acceptable stationary noise sources. Though the noise emitted from mobile sources is temporary, it is often more disturbing because of its abruptness, especially single noise-producing events such as vehicle backfires. Common mobile noise sources include on-road vehicles, aircraft, and trains. The policies in this section identify common mobile noise sources, and suggest mitigation techniques to reduce the annoyance and burden of mobile noise sources on noise-sensitive receptors.

Policies:

N 6.1 Consider noise reduction as a factor in the purchase of County maintenance equipment and their use by County contractors and permittees. (AI 108)

N 6.2 Investigate the feasibility of retrofitting current County-owned vehicles and mechanical equipment to comply with noise performance standards consistent with the best available noise reduction technology. (AI 108)

Commercial Airliners are mobile noise sources that contribute to noise pollution.

N 6.3 Require commercial or industrial truck delivery hours be limited when adjacent to noise-sensitive land uses unless there is no feasible alternative or there are overriding transportation benefits. (AI 105, 107)

N 6.4 Restrict the use of motorized trail bikes, mini-bikes, and other off-road vehicles in areas of the County except where designated for that purpose. Enforce strict operating hours for these vehicles in order to minimize noise impacts on sensitive land uses adjacent to public trails and parks. (AI 105, 108)

Transportation

The most common mobile noise sources in the County are transportation-related. Motor vehicle noise is of concern because it is characterized by a high number of individual events, which often create a higher sustained noise level in proximity to areas sensitive to noise exposure. Rail and aircraft operations, though less frequent, may generate extremely high noise levels that can be disruptive to daily activities. Though mass transit has not yet been developed within Riverside County, it is important to consider the noise that may be generated from transit service.

The following airports are located within or have a direct effect on Riverside County. Please see Appendix I for a map with each airport's noise contours. Also see the area plans and airport land use plans for more specific airport-related policies:

- *Banning Municipal Airport*
- *Bermuda Dunes Airport*
- *Blythe Airport*
- *Chino Airport*
- *Corona Municipal Airport*
- *Chiriaco Summit Airport*
- *Desert Center Airport*
- *Desert Resorts Regional Airport*
- *Flabob Airport*
- *French Valley Airport*
- *Hemet-Ryan Airport*
- *March Inland Port*
- *Palm Springs Regional Airport*
- *Perris Valley Airport*
- *Riverside Municipal Airport*
- *Skylark Airport*

Airports

With the dynamic growth in aviation, aircraft noise will remain a challenging environmental problem and one that will affect an increasing number people as air traffic routes and procedures change in the future. Aircraft noise appears to produce the greatest community anti-noise response, although the duration of the noise from a single airplane is much less, for example, than that from a freight train. There is great economic benefit to gain from airports of any size, although living in proximity to an airport may bring about expected aircraft noise.

There are 15 (fifteen) airports that are located within or have a direct effect on Riverside County. The land under the flight paths of each airport was monitored to determine the amount of noise emitted by common aircraft taking-off and landing at any given airport. Noise contours were created based on the measurements from the monitoring program. The CNEL noise contour(s) for the following airports have been depicted in the applicable Area Plan's Airport Influence Area section:

- Banning Municipal Airport
- Bermuda Dunes Airport
- Blythe Airport
- Chino Airport
- Chiriaco Summit Airport
- Corona Municipal Airport
- Desert Center Airport
- Desert Resorts Regional Airport
- Flabob Airport
- French Valley Airport
- Hemet Ryan Airport
- Riverside Municipal Airport

An Airport Land Use Plan has been created for each airport within Riverside County, and it should be referenced for further information regarding airports. Helicopters and heliports are also potential sources of noise, but due to the relatively low frequency and short duration of their operation in most circumstances, these operations do not significantly affect average noise levels within the County. The following general policies address the noise that comes from airports and the aircraft they service.

Policies:

N 7.1 New land use development within Airport Influence Areas shall comply with airport land use noise compatibility criteria contained in the corresponding airport land use compatibility plan for the area. Each Area Plan affected by a public-use airport includes one or more Airport Influence Areas, one for each airport. The applicable noise compatibility criteria are fully set forth in Appendix L and summarized in the Policy Area section of the affected Area Plan.

N 7.2 Adhere to applicable noise compatibility criteria when making decisions regarding land uses adjacent to airports. Refer to the Airports section of the Land Use Element (Page LU-32) and the Airport Influence Area sections of the corresponding Area Plans.

N 7.3 Prohibit new residential land uses, except construction of a single-family dwelling on a legal residential lot of record, within the current 60 dB CNEL contours of any currently operating public-use, or military airports. The applicable noise contours are as defined by the Riverside County Airport Land Use Commission and depicted in Appendix L, as well as in the applicable Area Plan's Airport Influence Area section.

N 7.4 Check each development proposal to determine if it is located within an airport noise impact area as depicted in the applicable Area Plan's Policy Area section regarding Airport Influence Areas. Development proposals within a noise impact area shall comply with applicable airport land use noise compatibility criteria.

N 7.5 Revise the Riverside County Zoning Code to reflect aircraft noise-impacted areas around the County's major airports. (AI 109)

Vehicular

Please see the Circulation Element for more in-depth information regarding Level of Service Standards, Average Daily Trips, and other information related to vehicular circulation.

Roadway traffic is one of the most pervasive sources of noise within Riverside County. Traffic noise varies in how it affects land uses depending upon the type of roadway, and the distance of the land use from that roadway. Some variables that affect the amount of noise emitted from a road are speed of traffic, flow of traffic, and type of traffic (e.g. tractor trailers versus cars). Another variable affecting the overall measure of noise is a perceived increase in sensitivity to vehicular noise at night. Appendix I contains tables and figures that illustrate existing and forecasted noise from roadways throughout the County. The existing noise measurements were obtained by measuring noise at different points adjacent to the roadway. The future noise contours along freeways and major highways, also located in Appendix I, were created from the results of traffic modeling to project the noise of major roadways in the future. The following policies address the issues of roadway traffic noise, and suggest methods to reduce the noise impact of roads on adjacent and nearby land uses.

Policies:

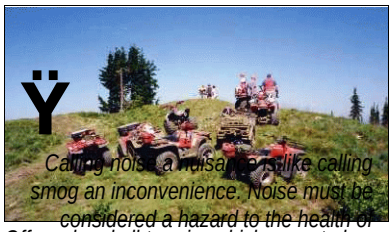
N 8.1 Enforce all noise sections of the State Motor Vehicle Code.

N 8.2 Ensure the inclusion of noise mitigation measures in the design of new roadway projects in the County. (AI 105)

N 8.3 Require development that generates increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses to provide for appropriate mitigation measures. (AI 106)

N 8.4 Require that the loading and shipping facilities of commercial and industrial land uses, which abut residential parcels be located and designed to minimize the potential noise impacts upon residential parcels. (AI 105)

N 8.5 Employ noise mitigation practices when designing all future streets and highways, and when improvements occur along existing highway segments. These mitigation measures will emphasize the



Calling noise a nuisance is like calling smog an inconvenience. Noise must be considered a hazard to the health of people everywhere.

Off-road and all-terrain vehicles must obey strict operating hours when noise-sensitive land uses are nearby or adjacent to trails and open space.

-The Surgeon General

establishment of natural buffers or setbacks between the arterial roadways and adjoining noise-sensitive areas. (AI 105)

N 8.6 Require that all future exterior noise forecasts use Level of Service C, and be based on designed road capacity or 20-year projection of development (whichever is less) for future noise forecasts. (AI 106)

N 8.7 Require that field noise monitoring be performed prior to siting to any sensitive land uses along arterial roadways. Noise level measurements should be of at least 10 minutes in duration and should include simultaneous vehicle counts so that more accurate vehicle ratios may be used in modeling ambient noise levels. (AI 106)

Mass Transit

Currently, the County does not participate in or provide any rail transit services though public transportation is becoming a more desirable option for many travelers and commuters in Riverside County. Transit can be an alternative to driving a car through congested Riverside County freeways. Currently, the noise generated by public transportation within Riverside County affects only a very small percentage of the total residential population. As years pass, and the need for public transportation increases, there will be a greater number of residents affected by the noise that buses, transit oases shuttles, light rail, and trains will produce. The following policies address the issues of noise related to public transit.

Please see the Circulation Element for additional policies related to transit development and rail systems.

Policies:

N 9.1 Encourage local and regional public transit providers to ensure that the equipment they operate and purchase is state-of-the-art and does not generate excessive noise impacts on the community. (AI 108)

N 9.2 Encourage the use of quieter electric-powered vehicles. (AI 108)

N 9.3 Encourage the development and use of alternative transportation modes including bicycle paths and pedestrian walkways to minimize vehicular noise within sensitive receptor areas.

N 9.4 Actively participate in the development of noise abatement plans for freeways and rapid transit. (AI 108)

Rail

The rail system within Riverside County criss-crosses its way through communities, industrial areas, rural areas, and urban centers. Trains carry passengers, freight, and cargo to local and regional destinations day and night. Rail transportation may become more popular in the future if a mass public transportation system is implemented within Riverside County. Currently, daily train traffic produces noise that may disrupt activities in proximity to railroad tracks. For instance, trains are required to sound their horns at all at-grade crossings, and they may also be required to slow their speed through residential areas. These types of noise disturbances can interfere with activities conducted on noise-sensitive land uses. Exhibits showing existing railroad noise contours can be found in Appendix I. These exhibits provide purely illustrative contours

An at-grade railroad crossing is one where the street and the rail line form an intersection, and physically cross one-another.

along rail lines throughout the County. The following policies suggest actions that could minimize the impacts of train noise on noise-sensitive land uses.

Policies:

N 10.1 Check all proposed projects for possible location within railroad noise contours using typical noise contour diagrams. (AI 106, 109)

N 10.2 Minimize the noise effect of rail transit (freight and passenger) on residential uses and other sensitive land uses through the land use planning process. (AI 106, 109)

N 10.3 Locate light rail and fixed rail routes and design rail stations in areas that are accessible to both residential and commercial areas, but also minimize noise impacts on surrounding residential and sensitive land uses. (AI 106, 109)

N 10.4 Install noise mitigation features where rail operations impact existing adjacent residential or other noise-sensitive uses. (AI 108)

N 10.5 Restrict the development of new sensitive land uses to beyond the 65 decibel CNEL contour along railroad rights-of-way. (AI 106, 109)

Building and Design

One of the most effective means of reducing noise in a sensitive area is to construct and design buildings in such a way that the noise is deflected in such a way that it does not affect the occupants. If the building has already been constructed, then landscaping and design techniques can be used to tastefully absorb the noise emitted from mobile or stationary sources. These building and design techniques should serve two purposes; to mitigate noise to acceptable indoor and outdoor levels, and to enhance the community character rather than detract from its surroundings. The following policies have been included in the Noise Element to ensure that the character of each community within Riverside County is preserved while minimizing noise to acceptable levels.

Natural Barriers and Landscaping

Policies:

N 11.1 Utilize natural barriers such as hills, berms, boulders, and dense vegetation to assist in noise reduction. (AI 108)

N 11.2 Utilize dense landscaping to effectively reduce noise. However, when there is a long initial period where the immaturity of new landscaping makes this approach only marginally effective, utilize a large number of highly dense species planted in a fairly mature state, at close intervals, in conjunction with earthen berms, setbacks, or block walls. (AI 108)

Temporary Construction

Policies:

N 12.1 Minimize the impacts of construction noise on adjacent uses within acceptable practices. (AI 105, 108)

N 12.2 Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas. (AI 105, 108)

N 12.3 Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses (see policy N 1.3) by requiring the developer to submit a construction-related noise mitigation plan to the County for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as

a. Temporary noise attenuation fences;
b. Preferential location of equipment; and
c. Use of current noise suppression technology and equipment. (AI 107)

N 12.4 Require that all construction equipment utilizes noise reduction features (e.g. mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer. (AI 105, 108)

Building and Design Techniques

Policies:

N 13.1 Enforce the California Building Standards that sets standards for building construction to mitigate interior noise levels to the tolerable 45 CNEL limit. These standards are utilized in conjunction with the Uniform Building Code by the County's Building Department to ensure that noise protection is provided to the public. Some design features may include extra-dense insulation, double-paned windows, and dense construction materials.

,

Non-habitable areas within a home include:
- *kitchens*
- *bathrooms*
- *hallways*
- *garages*
- *closets*
- *utility rooms*
- *laundry rooms*

N 13.2 Continue to develop effective strategies and mitigation measures for the abatement of noise hazards reflecting effective site design approaches and state-of-the-art building technologies. (AI 108)

N 13.3 Incorporate acoustic site planning into the design of new development, particularly large scale, mixed-use, or master-planned development, through measures which may include:
- separation of noise-sensitive buildings from noise-generating sources;
- use of natural topography and intervening structure to shield noise-sensitive land uses; and
- adequate sound proofing within the receiving structure. (AI 106)

N 13.4 Consider and, when necessary to lower noise to acceptable limits, require noise barriers and landscaped berms. (AI 108)

N 13.5 Consider the issue of adjacent residential land uses when designing and configuring all new, non-residential development. Design and configure on-site ingress and egress points that divert traffic away from nearby noise-sensitive land uses to the greatest degree practicable. (AI 106, 107)

N 13.6 Prevent the transmission of excessive and unacceptable noise levels between individual tenants and businesses in commercial structures and between individual dwelling units in multi-family residential structures. (AI 105, 108)

N 13.7 Assist the efforts of local homeowners living in high noise areas to noise attenuate their homes through funding assistance and retrofitting program development, as feasible. (AI 105, 108)

N 13.8 Review all development applications for consistency with the standards and policies of the Noise Element of the General Plan.

N 13.9 Mitigate 600 square feet of exterior space to 65 dB CNEL when new development is proposed on residential parcels of 1 acre or greater.

Mixed Use

Policies:

N 14.1 Minimize the potential adverse noise impacts associated with the development of mixed-use structures where residential units are located above or adjacent to commercial uses. (AI 106, 107, 108)

N 14.2 Require that commercial and residential mixed-use structures minimize the transfer or transmission of noise and vibration from the commercial land use to the residential land use. (AI 105)

N 14.3 Minimize the generation of excessive noise level impacts from entertainment and restaurant/bar establishments into adjacent residential or noise-sensitive uses. (AI 105, 107)

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Vibration

Amplitude-the distance that a vibrating particle travels from a fixed point.

Frequency-the number of wave cycles that occur in 1 second.

Hertz (Hz)-the unit by which frequency is measured.

Displacement-a measure of the distance that a vibrated particle travels from its original position.

Velocity-the rate of speed at which particles move in inches per second or millimeters per second.

Acceleration-the rate of change in velocity with respect to time.

Another community annoyance related to noise is vibration. As with noise, vibration can be described by both its amplitude and frequency. Amplitude may be characterized by displacement, velocity, and/or acceleration. Typically, particle velocity (measured in inches or millimeters per second) and/or acceleration (measured in gravities) are used to describe vibration.

Vibration can be felt outdoors, but the perceived intensity of vibration impacts are much greater indoors, due to the shaking of the structure. Some of the most common sources of vibration come from trains and/or transit vehicles, construction equipment, airplanes, and large vehicles. Several land uses are especially sensitive to vibration, and therefore have a lower vibration threshold. These uses include, but are not limited to, concert halls, hospitals, libraries, vibration-sensitive research operations, residential areas, schools, and offices.

Table 3, Human Reaction to Typical Vibration Levels, presents the human reaction to various levels of peak particle velocity. Typical construction vibrations fall in the 10 to 30 Hz range and usually occur around 15 Hz. Traffic vibrations exhibit a similar range of frequencies. However, due to their suspension systems, city buses often generate frequencies around 30 Hz at high vehicle speeds. It is more uncommon, but possible, to measure traffic frequencies above 30 Hz.

Table N-3:
Human Reaction to Typical Vibration Levels

Vibration Level Peak Particle Velocity (inches/second)	Human Reaction
0.0059-0.0188	Threshold of perception, possibility of intrusion
0.0787	Vibrations readily perceptible
0.0984	Continuous vibration begins to annoy people
0.1968	Vibrations annoying to people in buildings
0.3937-0.5905	Vibrations considered unpleasant when continuously subjected and unacceptable by some walking on bridges.

Source: Caltrans, 1992

Policies:

N 15.1 Restrict the placement of sensitive land uses in proximity to vibration-producing land uses. (AI 105)

N 15.2 Consider the following land uses sensitive to vibration:
- Hospitals;
- Residential Areas;
- Concert Halls;

- Libraries;
- Sensitive Research Operations;
- Schools; and
- Offices

N 15.3 Prohibit exposure of residential dwellings to perceptible ground vibration from passing trains as perceived at the ground or second floor. Perceptible motion shall be presumed to be a motion velocity of 0.01 inches/second over a range of 1 to 100 Hz.

Noise Information Management

Current and projected noise data and maps for Riverside County require constant updating and review in order for the information to remain correct as well as accurate. Currently, there is no central noise information database available for the County staff or residents to reference when noise inquiries arise. This information is necessary and should be easily accessible when reviewing potential development plans, building a new home, siting an industrial area, evaluating circulation routes, or conducting other advanced planning activities. The following policies guide the County to create a database, or central location, where up-to-date information can be accessed by County Staff or residents.

Please see Table N-1 for more information in order to determine a noise threshold necessary for creating a noise database.

Mapping

Policies:

N 16.1 Identify, quantify, and map noise producers and provide noise contour diagrams as is practical. (AI 109)

N 16.2 Identify and map noise-sensitive land uses throughout the County. (AI 109)

N 16.3 Identify and map point-source noise producers such as surface mines, wind turbines, manufacturing plants, truck transfer stations, active recreational facilities, and amphitheaters. (AI 109)

Noise Data Management

Policies:

N 17.1 Maintain baseline information, on an ongoing basis, regarding ambient and stationary noise sources. (AI 105)

N 17.2 Monitor and update available data regarding the community's existing and projected ambient stationary noise levels.

N 17.3 Assure that areas subject to noise hazards are identified, quantified, and mapped in a form that is available to decisionmakers. (AI 109)

N 17.4 Develop and maintain a detailed, comprehensive noise data base. (AI 106)

N 17.5 Develop and update County Noise Inventories using the following steps.

a. Identify Noise Sources and Noise-sensitive Land Uses
b. Continue to identify various agency responsibilities; review noise complaint files; and conduct noise surveys and monitoring as needed.

N 17.6 Identify those areas of the County affected by high noise levels. (AI 106, 107, 109)

N 17.7 Evaluate current land uses to identify potential noise conflict areas. (AI 106, 107, 109)

N 17.8 Gather activity operations' data of noise sources; prepare analytical noise exposure models to develop existing and projected noise contours around major noise sources down to 50 CNEL. (AI 109)

N 17.9 Encourage greater involvement of other County departments in the identification, measurement, and reduction of noise hazards throughout the County, including: Building and Safety Department, Aviation Department, and the Department of Public Health-Office of Industrial Hygiene.

Public Noise Information

Policies:

N 18.1 Provide information to the public regarding the health effects of high noise levels and means of mitigating such levels. (AI 109)

N 18.2 Cooperate with industry to develop public information programs on noise abatement. (AI 108)

N 18.3 Condition that prospective purchasers or end users of property be notified of overflight, sight, and sound of routine aircraft operations by all effective means, including:

a. requiring new residential subdivisions that are located within the 60 CNEL contour or are subject to overflight, sight, and sound of aircraft from any airport, to have such information included in the State of California Final Subdivision Public Report.
b. requiring that Declaration and Notification of Aircraft Noise and Environmental Impacts be recorded and made available to prospective purchasers or end users of property located within the 60 CNEL noise contour for any airport or air station or is subject to routine aircraft overflight. (AI 109)

N 18.4 Promote increased awareness concerning the effects of noise and suggest methods by which the public can be of assistance in reducing noise.

N 18.5 Require new developments that have the potential to generate significant noise impacts to inform impacted users on the effects of these impacts during the environmental review process. (AI 106, 107)

Appendix B

Glossary of Acoustical Terms

A-Weighted Sound Level
The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level
The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (LDN)
The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB)
A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A)
A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ)
The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

Habitable Room
Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

L(n)
The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90 and L99, etc.

Noise
Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area
Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other
noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels
See L(n).

Sound Level (Noise Level)
The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

Sound Level Meter
An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL)
The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

Appendix C

Roadway Noise Calculations (CNEL)

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	2-Oct-13
LOCATION:	LOT 44 - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1312.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		960
DIST C/L TO WALL =		950
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1312.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	1	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1314.0	957.66	- -
MEDIUM TRUCKS	1316.0	957.66	- -
HEAVY TRUCKS	1320.0	957.66	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.5	54.5	63.1	63.7
MEDIUM TRUCKS	57.4	55.9	49.5	48.0	56.4	56.7
HEAVY TRUCKS	60.4	58.9	49.9	51.2	59.5	59.6
NOISE LEVELS (dBA)	66.3	64.6	61.2	56.7	65.3	65.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.5	54.5	63.1	63.7
MEDIUM TRUCKS	57.4	55.9	49.5	48.0	56.4	56.7
HEAVY TRUCKS	60.4	58.9	49.9	51.2	59.5	59.6
NOISE LEVELS (dBA)	66.3	64.6	61.2	56.7	65.3	65.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2305	4966
LDN	464	1001	2156	4645

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT: PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY
ROADWAY: INTERSTATE 15 (FREEWAY)
LOCATION: LOT 44 - BACKYARD (WALL)
JOB #: 0807-2012-02
DATE: 2-Oct-13
ENGINEER: M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724
SPEED =	65
PK HR % =	10
NEAR LANE/FAR LANE DIST	134
ROAD ELEVATION =	1307.0
GRADE =	1.0 %
PK HR VOL =	19,972

RECEIVER INPUT DATA

RECEIVER DISTANCE =		960
DIST C/L TO WALL =		950
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1312.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1309.0	957.73	- -
MEDIUM TRUCKS	1311.0	957.71	- -
HEAVY TRUCKS	1315.0	957.69	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.5	54.5	63.1	63.7
MEDIUM TRUCKS	57.4	55.9	49.5	48.0	56.4	56.6
HEAVY TRUCKS	60.4	58.9	49.9	51.2	59.5	59.6
NOISE LEVELS (dBA)	66.3	64.6	61.2	56.7	65.3	65.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	58.7	56.8	55.0	48.9	57.6	58.2
MEDIUM TRUCKS	51.9	50.4	44.0	42.4	50.9	51.1
HEAVY TRUCKS	54.9	53.4	44.4	45.7	54.0	54.1
NOISE LEVELS (dBA)	60.8	59.1	55.7	51.2	59.8	60.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2305	4965
LDN	464	1001	2156	4645

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	2-Oct-13
LOCATION:	LOT 44 - 1ST FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1312.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		980
DIST C/L TO WALL =		895
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		85
PAD ELEVATION =		1312.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	5.0	
AMBIENT=	0.0	
BARRIER =	1	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1314.0	977.49	- -
MEDIUM TRUCKS	1316.0	977.49	- -
HEAVY TRUCKS	1320.0	977.71	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.4	54.3	62.9	63.6
MEDIUM TRUCKS	57.2	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	60.2	58.8	49.8	51.0	59.4	59.5
NOISE LEVELS (dBA)	66.2	64.4	61.0	56.6	65.1	65.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	56.1	54.2	52.4	46.4	55.0	55.6
MEDIUM TRUCKS	49.3	47.8	41.4	39.9	48.3	48.6
HEAVY TRUCKS	60.2	58.8	49.8	51.0	59.4	59.5
NOISE LEVELS (dBA)	61.8	60.1	56.7	52.3	60.8	61.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2305	4966
LDN	465	1001	2156	4645

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	2-Oct-13
LOCATION:	LOT 44- 2ND FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1312.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		980
DIST C/L TO WALL =		895
RECEIVER HEIGHT =		15.0
WALL DISTANCE FROM RECEIVER =		85
PAD ELEVATION =		1312.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	5.0	
AMBIENT=	0.0	
BARRIER =	1	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1314.0	977.79	- -
MEDIUM TRUCKS	1316.0	977.77	- -
HEAVY TRUCKS	1320.0	977.73	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.4	54.3	62.9	63.6
MEDIUM TRUCKS	57.2	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	60.2	58.8	49.8	51.0	59.4	59.5
NOISE LEVELS (dBA)	66.2	64.4	61.0	56.6	65.1	65.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.4	54.3	62.9	63.6
MEDIUM TRUCKS	57.2	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	60.2	58.8	49.8	51.0	59.4	59.5
NOISE LEVELS (dBA)	66.2	64.4	61.0	56.6	65.1	65.6

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	496	1070	2305	4965
LDN	464	1001	2156	4644

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	2-Oct-13
LOCATION:	LOT 40 - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1307.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		910
DIST C/L TO WALL =		840
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		70
PAD ELEVATION =		1312.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	5.0	
AMBIENT=	0.0	
BARRIER =	1	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1309.0	907.37	- -
MEDIUM TRUCKS	1311.0	907.35	- -
HEAVY TRUCKS	1315.0	907.33	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.5	62.6	60.9	54.8	63.4	64.0
MEDIUM TRUCKS	57.7	56.2	49.9	48.3	56.8	57.0
HEAVY TRUCKS	60.7	59.3	50.3	51.5	59.9	60.0
NOISE LEVELS (dBA)	66.6	64.9	61.5	57.1	65.6	66.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	56.6	54.7	52.9	46.9	55.5	56.1
MEDIUM TRUCKS	49.8	48.3	41.9	40.3	48.8	49.0
HEAVY TRUCKS	52.8	51.3	42.3	43.6	51.9	52.0
NOISE LEVELS (dBA)	58.7	57.0	53.6	49.1	57.7	58.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2306	4968
LDN	465	1001	2157	4647

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	3-Oct-13
LOCATION:	LOT 40 - BACKYARD (WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1317.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		910
DIST C/L TO WALL =		900
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1312.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1319.0	907.55	- -
MEDIUM TRUCKS	1321.0	907.56	- -
HEAVY TRUCKS	1325.0	907.58	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.5	62.6	60.9	54.8	63.4	64.0
MEDIUM TRUCKS	57.7	56.2	49.9	48.3	56.8	57.0
HEAVY TRUCKS	60.7	59.3	50.3	51.5	59.9	60.0
NOISE LEVELS (dBA)	66.6	64.9	61.5	57.1	65.6	66.1

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	51.7	49.8	48.1	42.0	50.6	51.2
MEDIUM TRUCKS	44.9	43.4	37.1	35.5	44.0	44.2
HEAVY TRUCKS	47.9	46.5	37.5	38.7	47.1	47.2
NOISE LEVELS (dBA)	53.8	52.1	48.7	44.3	52.8	53.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2305	4967
LDN	465	1001	2156	4646

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	INTERSTATE 15 (FREEWAY)	DATE:	3-Oct-13
LOCATION:	LOT 40 - 1ST FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724	
SPEED =	65	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	134	
ROAD ELEVATION =	1307.0	
GRADE =	1.0	%
PK HR VOL =	19,972	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		930
DIST C/L TO WALL =		840
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		90
PAD ELEVATION =		1312.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	5.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1309.0	927.37	- -
MEDIUM TRUCKS	1311.0	927.35	- -
HEAVY TRUCKS	1315.0	927.33	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.4	62.5	60.7	54.7	63.3	63.9
MEDIUM TRUCKS	57.6	56.1	49.7	48.2	56.6	56.9
HEAVY TRUCKS	60.6	59.2	50.1	51.4	59.7	59.9
NOISE LEVELS (dBA)	66.5	64.8	61.4	57.0	65.5	65.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	59.4	57.5	55.8	49.7	58.3	58.9
MEDIUM TRUCKS	52.6	51.1	44.8	43.2	51.7	51.9
HEAVY TRUCKS	55.6	54.2	45.2	46.4	54.8	54.9
NOISE LEVELS (dBA)	61.5	59.8	56.4	52.0	60.5	61.0

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2306	4968
LDN	465	1001	2157	4647

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT: PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY
ROADWAY: INTERSTATE 15 (FREEWAY)
LOCATION: LOT 40- 2ND FLOOR
JOB #: 0807-2012-02
DATE: 3-Oct-13
ENGINEER: M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	199,724
SPEED =	65
PK HR % =	10
NEAR LANE/FAR LANE DIST	134
ROAD ELEVATION =	1307.0
GRADE =	1.0 %
PK HR VOL =	19,972

RECEIVER INPUT DATA

RECEIVER DISTANCE =		930
DIST C/L TO WALL =		840
RECEIVER HEIGHT =		15.0
WALL DISTANCE FROM RECEIVER =		90
PAD ELEVATION =		1312.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	15	
MEDIUM TRUCKS =	15	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	15	

WALL INFORMATION

HTH WALL=	5.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9130
MEDIUM TRUCKS	0.848	0.049	0.103	0.0460
HEAVY TRUCKS	0.865	0.027	0.108	0.0410

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1309.0	927.77	- -
MEDIUM TRUCKS	1311.0	927.73	- -
HEAVY TRUCKS	1315.0	927.67	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.4	62.5	60.7	54.7	63.3	63.9
MEDIUM TRUCKS	57.6	56.1	49.7	48.2	56.6	56.9
HEAVY TRUCKS	60.6	59.2	50.1	51.4	59.7	59.8
NOISE LEVELS (dBA)	66.5	64.8	61.4	56.9	65.5	65.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.4	62.5	60.7	54.7	63.3	63.9
MEDIUM TRUCKS	57.6	56.1	49.7	48.2	56.6	56.9
HEAVY TRUCKS	60.6	59.2	50.1	51.4	59.7	59.8
NOISE LEVELS (dBA)	66.5	64.8	61.4	56.9	65.5	65.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	497	1070	2305	4966
LDN	464	1001	2156	4645

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 29 - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1305.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		55
DIST C/L TO WALL =		45
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1315.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1307.0	56.31	- -
MEDIUM TRUCKS	1309.0	55.87	- -
HEAVY TRUCKS	1313.0	55.18	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.5	63.6	61.8	55.8	64.4	65.0
MEDIUM TRUCKS	57.3	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	58.2	56.8	47.7	49.0	57.3	57.5
NOISE LEVELS (dBA)	66.8	65.0	62.2	57.2	65.7	66.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.5	63.6	61.8	55.8	64.4	65.0
MEDIUM TRUCKS	57.3	55.7	49.4	47.8	56.3	56.5
HEAVY TRUCKS	58.2	56.8	47.7	49.0	57.3	57.5
NOISE LEVELS (dBA)	66.8	65.0	62.2	57.2	65.7	66.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	73	230	727
LDN	21	65	205	648

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 29 - BACKYARD (WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1305.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		55
DIST C/L TO WALL =		45
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1315.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1307.0	56.95	- -
MEDIUM TRUCKS	1309.0	56.37	- -
HEAVY TRUCKS	1313.0	55.45	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.5	63.6	61.8	55.7	64.4	65.0
MEDIUM TRUCKS	57.2	55.7	49.3	47.8	56.3	56.5
HEAVY TRUCKS	58.2	56.8	47.7	49.0	57.3	57.5
NOISE LEVELS (dBA)	66.7	64.9	62.2	57.1	65.7	66.2

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	56.3	54.4	52.6	46.5	55.2	55.8
MEDIUM TRUCKS	48.5	47.0	40.6	39.1	47.6	47.8
HEAVY TRUCKS	50.6	49.2	40.1	41.4	49.7	49.9
NOISE LEVELS (dBA)	57.8	56.0	53.3	48.2	56.8	57.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	72	228	720
LDN	20	64	203	642

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 29 - 1ST FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST	12
ROAD ELEVATION =	1305.0
GRADE =	1.0 %
PK HR VOL =	1,040

RECEIVER INPUT DATA

RECEIVER DISTANCE =		78
DIST C/L TO WALL =		45
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		33
PAD ELEVATION =		1315.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1307.0	79.91	- -
MEDIUM TRUCKS	1309.0	79.33	- -
HEAVY TRUCKS	1313.0	78.42	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.3	54.3	62.9	63.5
MEDIUM TRUCKS	55.7	54.2	47.9	46.3	54.8	55.0
HEAVY TRUCKS	56.7	55.3	46.2	47.5	55.8	55.9
NOISE LEVELS (dBA)	65.2	63.5	60.7	55.6	64.2	64.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	53.6	51.7	49.9	43.9	52.5	53.1
MEDIUM TRUCKS	45.9	44.4	38.1	36.5	45.0	45.2
HEAVY TRUCKS	48.5	47.1	38.0	39.3	47.6	47.7
NOISE LEVELS (dBA)	55.3	53.5	50.7	45.7	54.2	54.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	73	230	727
LDN	20	65	205	648

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 29 - 2ND FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1305.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		78
DIST C/L TO WALL =		45
RECEIVER HEIGHT =		15.0
WALL DISTANCE FROM RECEIVER =		33
PAD ELEVATION =		1315.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1307.0	81.10	- -
MEDIUM TRUCKS	1309.0	80.52	- -
HEAVY TRUCKS	1313.0	79.71	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	63.9	62.0	60.3	54.2	62.8	63.4
MEDIUM TRUCKS	55.7	54.2	47.8	46.3	54.7	54.9
HEAVY TRUCKS	56.6	55.2	46.1	47.4	55.7	55.9
NOISE LEVELS (dBA)	65.2	63.4	60.7	55.6	64.1	64.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	58.7	56.8	55.1	49.0	57.6	58.2
MEDIUM TRUCKS	50.7	49.2	42.8	41.3	49.8	50.0
HEAVY TRUCKS	56.6	55.2	46.1	47.4	55.7	55.9
NOISE LEVELS (dBA)	61.2	59.4	56.6	51.6	60.1	60.6

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	72	226	716
LDN	20	64	202	638

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 5 - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST	12
ROAD ELEVATION =	1352.5
GRADE =	1.0 %
PK HR VOL =	1,040

RECEIVER INPUT DATA

RECEIVER DISTANCE =		47
DIST C/L TO WALL =		37
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1341.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1354.5	49.94	- -
MEDIUM TRUCKS	1356.5	50.65	- -
HEAVY TRUCKS	1360.5	52.34	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	66.0	64.1	62.4	56.3	64.9	65.5
MEDIUM TRUCKS	57.7	56.2	49.8	48.3	56.7	57.0
HEAVY TRUCKS	58.4	57.0	48.0	49.2	57.6	57.7
NOISE LEVELS (dBA)	67.2	65.4	62.7	57.6	66.2	66.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	53.7	51.8	50.1	44.0	52.6	53.2
MEDIUM TRUCKS	45.9	44.4	38.0	36.5	44.9	45.2
HEAVY TRUCKS	47.7	46.3	37.3	38.5	46.9	47.0
NOISE LEVELS (dBA)	55.2	53.4	50.7	45.6	54.2	54.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	22	69	219	693
LDN	20	62	195	617

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 5 - 1ST FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1352.5	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		80
DIST C/L TO WALL =		37
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		43
PAD ELEVATION =		1341.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1354.5	82.05	- -
MEDIUM TRUCKS	1356.5	82.76	- -
HEAVY TRUCKS	1360.5	80.99	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	63.9	62.0	60.2	54.2	62.8	63.4
MEDIUM TRUCKS	55.5	54.0	47.7	46.1	54.6	54.8
HEAVY TRUCKS	56.5	55.1	46.1	47.3	55.7	55.8
NOISE LEVELS (dBA)	65.1	63.3	60.6	55.5	64.1	64.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	56.3	54.4	52.6	46.6	55.2	55.8
MEDIUM TRUCKS	49.0	47.5	41.2	39.6	48.1	48.3
HEAVY TRUCKS	56.5	55.1	46.1	47.3	55.7	55.8
NOISE LEVELS (dBA)	59.7	57.9	55.2	50.1	58.7	59.2

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	72	229	724
LDN	20	65	204	646

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	ELIZABETH LANE (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 5 - 2ND FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST	12
ROAD ELEVATION =	1352.5
GRADE =	1.0 %
PK HR VOL =	1,040

RECEIVER INPUT DATA

RECEIVER DISTANCE =		80
DIST C/L TO WALL =		37
RECEIVER HEIGHT =		15.0
WALL DISTANCE FROM RECEIVER =		43
PAD ELEVATION =		1341.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1354.5	79.80	- -
MEDIUM TRUCKS	1356.5	79.77	- -
HEAVY TRUCKS	1360.5	79.88	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.3	54.3	62.9	63.5
MEDIUM TRUCKS	55.7	54.2	47.8	46.3	54.8	55.0
HEAVY TRUCKS	56.6	55.2	46.1	47.4	55.7	55.9
NOISE LEVELS (dBA)	65.2	63.4	60.7	55.6	64.2	64.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.0	62.1	60.3	54.3	62.9	63.5
MEDIUM TRUCKS	55.7	54.2	47.8	46.3	54.8	55.0
HEAVY TRUCKS	56.6	55.2	46.1	47.4	55.7	55.9
NOISE LEVELS (dBA)	65.2	63.4	60.7	55.6	64.2	64.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	24	74	235	744
LDN	21	66	210	663

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	PRIELIPP ROAD (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 2 - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1345.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		60
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1342.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1347.0	59.70	- -
MEDIUM TRUCKS	1349.0	59.73	- -
HEAVY TRUCKS	1353.0	60.00	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.3	63.4	61.6	55.5	64.2	64.8
MEDIUM TRUCKS	57.0	55.5	49.1	47.5	56.0	56.2
HEAVY TRUCKS	57.8	56.4	47.4	48.6	57.0	57.1
NOISE LEVELS (dBA)	66.5	64.7	62.0	56.9	65.4	65.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.3	63.4	61.6	55.5	64.2	64.8
MEDIUM TRUCKS	57.0	55.5	49.1	47.5	56.0	56.2
HEAVY TRUCKS	57.8	56.4	47.4	48.6	57.0	57.1
NOISE LEVELS (dBA)	66.5	64.7	62.0	56.9	65.4	65.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	24	75	236	745
LDN	21	66	210	664

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	PRIELIPP ROAD (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 2 - BACKYARD (WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1345.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		60
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1342.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1347.0	59.70	- -
MEDIUM TRUCKS	1349.0	59.70	- -
HEAVY TRUCKS	1353.0	59.94	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	65.3	63.4	61.6	55.5	64.2	64.8
MEDIUM TRUCKS	57.0	55.5	49.1	47.6	56.0	56.2
HEAVY TRUCKS	57.8	56.4	47.4	48.6	57.0	57.1
NOISE LEVELS (dBA)	66.5	64.7	62.0	56.9	65.4	65.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	53.1	51.2	49.4	43.3	52.0	52.6
MEDIUM TRUCKS	45.2	43.7	37.3	35.8	44.2	44.4
HEAVY TRUCKS	46.8	45.4	36.4	37.6	46.0	46.1
NOISE LEVELS (dBA)	54.5	52.7	50.0	44.9	53.5	54.0

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	24	75	236	745
LDN	21	66	210	664

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	PRIELIPP ROAD (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 2 - 1ST FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1345.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		76
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		26
PAD ELEVATION =		1342.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1347.0	75.67	- -
MEDIUM TRUCKS	1349.0	75.67	- -
HEAVY TRUCKS	1353.0	75.91	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.6	54.5	63.1	63.7
MEDIUM TRUCKS	55.9	54.4	48.1	46.5	55.0	55.2
HEAVY TRUCKS	56.8	55.4	46.4	47.6	56.0	56.1
NOISE LEVELS (dBA)	65.5	63.7	60.9	55.8	64.4	64.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	54.0	52.1	50.4	44.3	52.9	53.5
MEDIUM TRUCKS	46.3	44.8	38.5	36.9	45.4	45.6
HEAVY TRUCKS	48.7	47.3	38.3	39.5	47.9	48.0
NOISE LEVELS (dBA)	55.7	53.9	51.2	46.1	54.6	55.1

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	24	74	236	745
LDN	21	66	210	664

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	PRIELIPP ROAD (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	LOT 2 - 2ND FLOOR	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1345.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		76
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		15.0
WALL DISTANCE FROM RECEIVER =		26
PAD ELEVATION =		1342.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1347.0	76.42	- -
MEDIUM TRUCKS	1349.0	76.18	- -
HEAVY TRUCKS	1353.0	75.87	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.5	54.5	63.1	63.7
MEDIUM TRUCKS	55.9	54.4	48.0	46.5	55.0	55.2
HEAVY TRUCKS	56.8	55.4	46.4	47.6	56.0	56.1
NOISE LEVELS (dBA)	65.4	63.6	60.9	55.8	64.4	64.9

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	64.2	62.3	60.5	54.5	63.1	63.7
MEDIUM TRUCKS	55.9	54.4	48.0	46.5	55.0	55.2
HEAVY TRUCKS	56.8	55.4	46.4	47.6	56.0	56.1
NOISE LEVELS (dBA)	65.4	63.6	60.9	55.8	64.4	64.9

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	74	234	739
LDN	21	66	208	659

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

PROJECT:	PARKSIDE RESIDENTIAL DEVELOPMENT PRELIMINARY ACOUSTICAL STUDY	JOB #:	0807-2012-02
ROADWAY:	PRIELIPP ROAD (68' COLLECTOR)	DATE:	3-Oct-13
LOCATION:	NORTHWESTERN LOT (OFFSITE) - BACKYARD (NO WALL)	ENGINEER:	M. Dickerson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	10,400	
SPEED =	40	
PK HR % =	10	
NEAR LANE/FAR LANE DIST	12	
ROAD ELEVATION =	1345.0	
GRADE =	1.0	%
PK HR VOL =	1,040	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		160
DIST C/L TO WALL =		150
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER =		10
PAD ELEVATION =		1342.0
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL=	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCKS	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	1347.0	159.89	- -
MEDIUM TRUCKS	1349.0	159.90	- -
HEAVY TRUCKS	1353.0	160.00	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	61.0	59.1	57.3	51.3	59.9	60.5
MEDIUM TRUCKS	52.7	51.2	44.8	43.3	51.7	52.0
HEAVY TRUCKS	53.6	52.2	43.1	44.4	52.7	52.8
NOISE LEVELS (dBA)	62.2	60.4	57.7	52.6	61.2	61.7

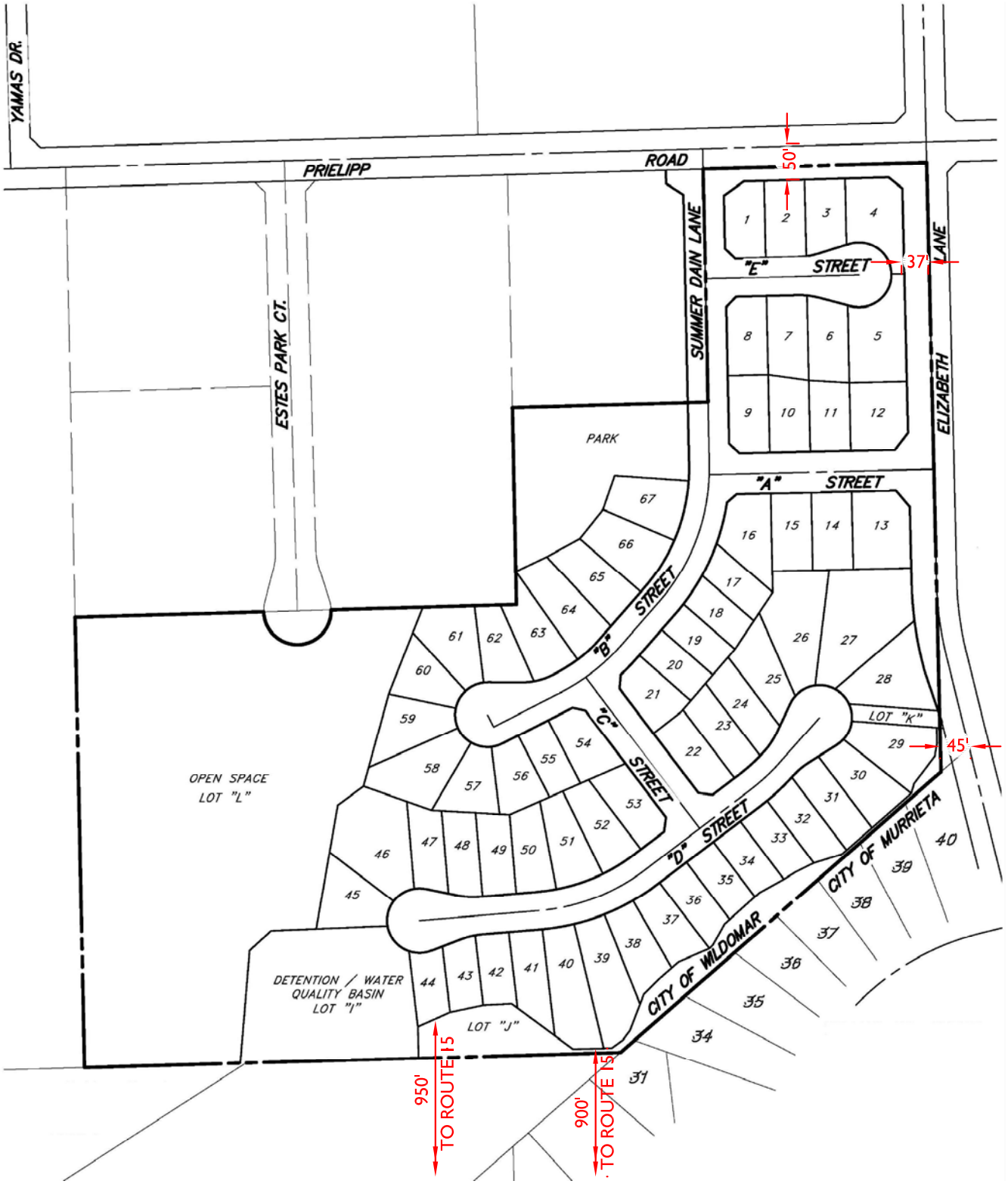
NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	61.0	59.1	57.3	51.3	59.9	60.5
MEDIUM TRUCKS	52.7	51.2	44.8	43.3	51.7	52.0
HEAVY TRUCKS	53.6	52.2	43.1	44.4	52.7	52.8
NOISE LEVELS (dBA)	62.2	60.4	57.7	52.6	61.2	61.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	23	74	235	742
LDN	21	66	209	662

Appendix D

Sight Distances


YAMAS DR.
PRIELIPP
ROAD
ESTES PARK CT.
SUMMER DAIN LANE
ELIZABETH LANE
50'
37'
45'
"E" STREET
"A" STREET
"B" STREET
"C" STREET
"D" STREET
PARK
OPEN SPACE
LOT "L"
LOT "K"
LOT "J"
DETENTION / WATER
QUALITY BASIN
LOT "I"
CITY OF MURRIETA
CITY OF WILDOMAR
950' TO ROUTE 15
900' TO ROUTE 15
N

Appendix E

Field Data and Photos

Field Sheet

Project: Wildomar Acoustical Study	**Engineer:** Mario Gutierrez	**Date:**	12/6/2012
		JN:	0807-2012-02
Measurement Address:	**City:** Wildomar	**Site No.:**	1

Sound Level Meter:
LD-712
Serial # A0520

Calibrator:
LD-250 250
Serial # 1322

Calibration Record:

	Input, dB/	Reading, dB/	Offset, dB/	Time
Before	114.0/	114.0/	26.9/	10:00 AM
After	114.0/	114.0/	26.3/	10:55 AM
Before	/	/	/	
After	/	/	/	

Notes:

Temp:	57
Windspeed:	2 MPH
Direction:	NW
Skies:	Cloudy
Camera:	
Photo Nos.	

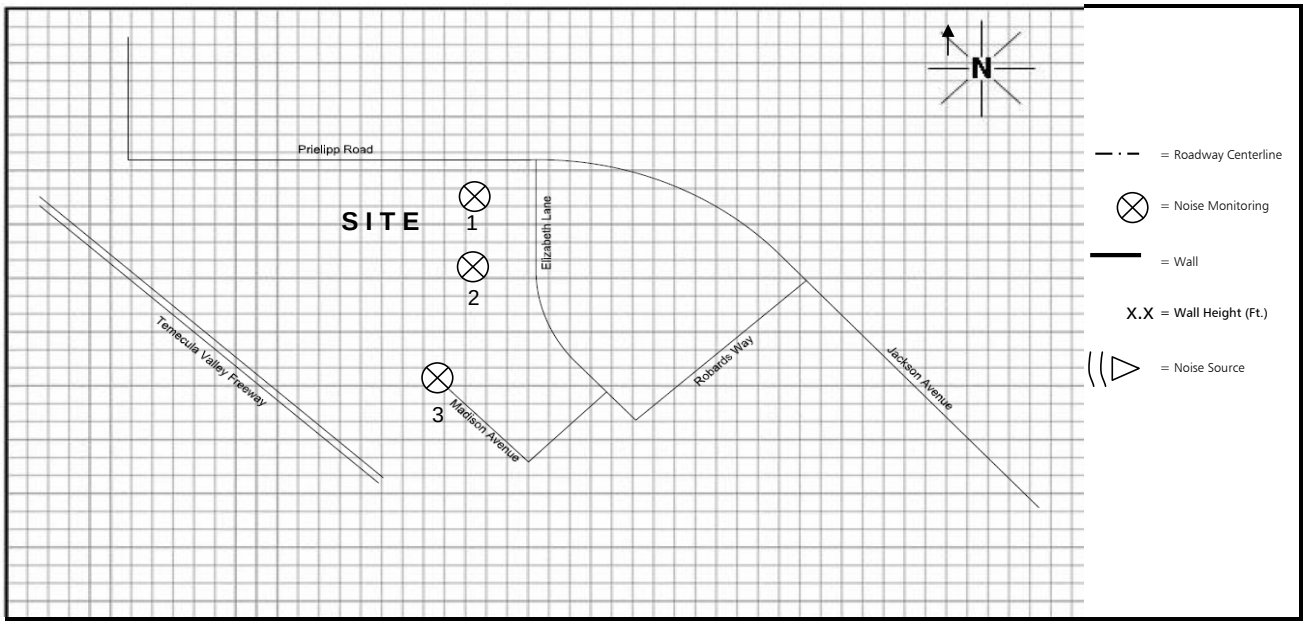
Meter Settings:

☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS ___10____ - MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ L_N PERCENTILE VALUES

Notes:

Measurement Type:
Long-term
Short-term X

		Start Time	Stop Time	Leq	Lmin	Lmax	L2	L8	L25	L50
Locations	1	10:05 AM	10:15 AM	63.8	56.9	67.9	67.1	66.2	64.9	63.5
		Comments: Temecula Valley Freeway (215) traffic.								
	2	10:20 AM	10:30 AM	47.6	43.1	70.3	50.8	48.4	46.9	46.1
		Comments: Local traffic.								
	3	10:35 AM	10:45 AM	54.2	39.3	79.2	60.9	57.4	52.5	45.5
		Comments: Local traffic.								
	4									
		Comments:								
	5									
		Comments:								



RK engineering group, inc.

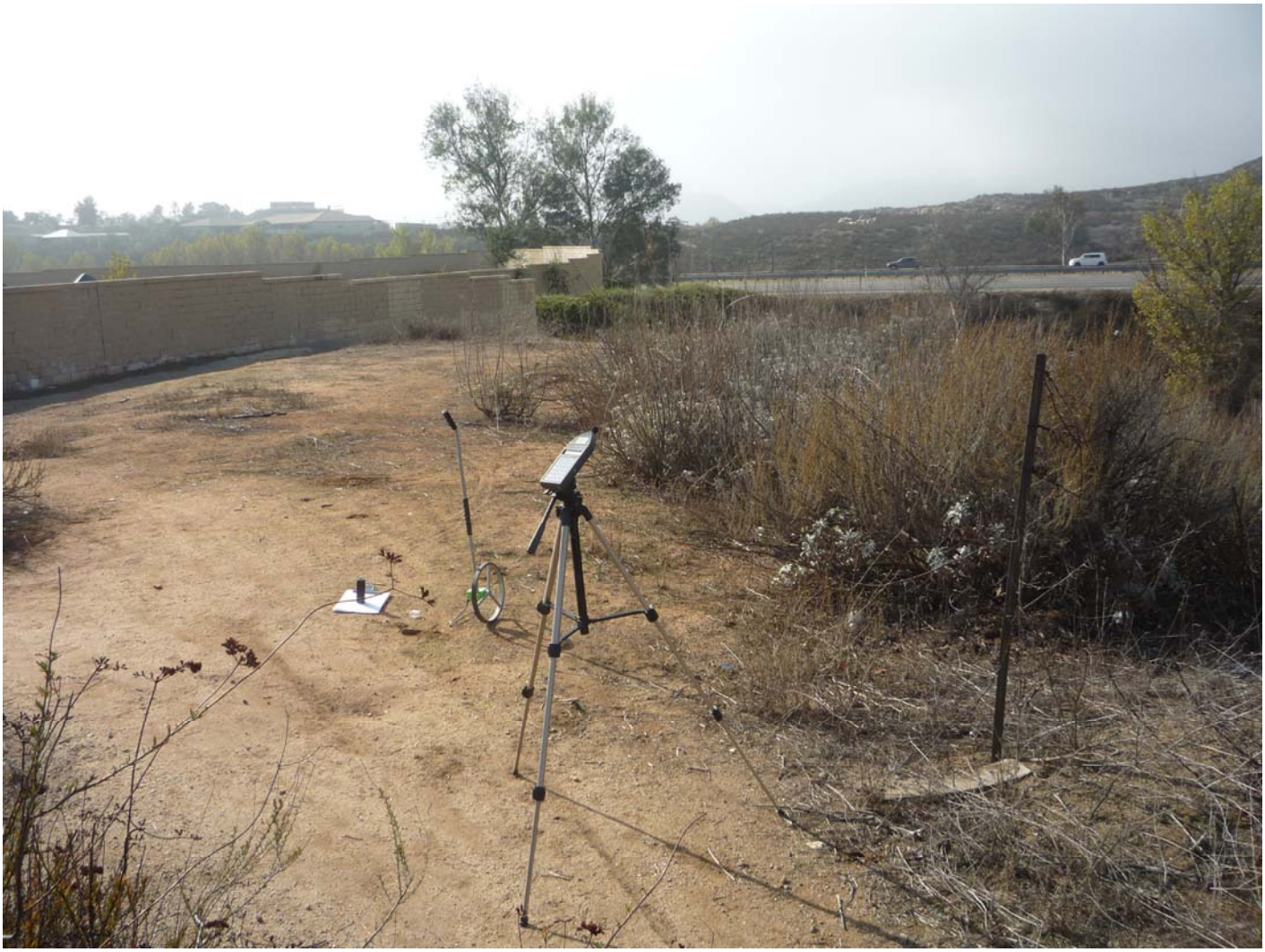
Short-Term Noise Monitoring Location 1 (ST-1)

N

Short-Term Noise Monitoring Location 2 (ST-2)

N

Short-Term Noise Monitoring Location 3 (ST-3)



N

PARKSIDE (TM 36497)
TRAFFIC IMPACT ANALYSIS
CITY OF WILDOMAR, CALIFORNIA

OCTOBER 4, 2013 (REVISED)

Prepared for:

Mr. Daniel O'Rourke, P.E.
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Temecula, CA 92590

Prepared by:

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100 E. San Marcos Boulevard, Suite 400
San Marcos, CA 92069

TRAMES SOLUTIONS INC.

(0068-0001_04 Report)

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1.0 INTRODUCTION AND SUMMARY

A. Purpose of the TIA and Study Objectives

The purpose of this traffic impact analysis (TIA) is to evaluate the traffic impacts of the proposed Parkside (TM 36497). The project is proposed to be developed with approximately 67 single family residential units. The site is located south of Prielipp Road and west of Elizabeth Lane in the City of Wildomar.

Study objectives include the following:

Existing Traffic. Existing traffic will be counted to determine current conditions. This constitutes the environmental setting for a CEQA analysis at the time that the hearing body reviews the project. Traffic count data shall be new or recent. In some cases, data up to one year old may be acceptable with the approval of the City of Wildomar Engineering Department. Any exception to this must be requested prior to approval of the scoping agreement

Cumulative (existing + ambient +cumulative). Traffic conditions prior to the time that the proposed development is completed will be estimated by increasing the existing traffic counts by an appropriate growth rate to be provided by City of Wildomar Engineering Department staff, projected to the year that the project is estimated to be completed. Traffic generated by other approved projects in the study area shall be identified. This may also include projects that are proposed and in the review process, but not yet fully approved. The Cumulative traffic will then be added on to existing traffic counts with the appropriate growth rate applied. This will be the basis for determining cumulative-specific impacts, mitigation, and conditions of approval. This scenario will be analyzed, and a determination made if improvements funded through an approved funding mechanism (TUMF, DIF, CFD, etc.) can accommodate the cumulative traffic at the target Level of Service (LOS) identified in the General Plan. If the "funded" improvements can provide the target LOS, payment into the fee program will be considered as cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) should be identified as such.

Project Completion (existing + ambient + cumulative + project). Traffic generated by the proposed project will then be added to the Cumulative traffic identified in Scenario 2, and the impacts on the circulation system will be analyzed. This will be the basis for determining project-specific impacts, mitigation, and conditions of approval.

It should be noted that during severe storm events when Inland Valley Drive is impassable, all of the project traffic is expected to have a different travel pattern. Therefore, an alternative project trip distribution is presented and analyzed in addition to the normal travel conditions pattern.

B. Site Location and Study Area

The project site is generally located south of Prielipp Road and west of Elizabeth Lane in the City of Wildomar. Figure 1-A illustrates the site location and the traffic analysis study area.

In general, the study area shall include any intersection of Collector or higher classification street with another Collector roadway or higher classification street, at which the proposed project will add 50 or more peak hour trips, not exceeding a 5-mile radius from the project site. Pursuant to the attached scoping agreement (see Appendix "A") and discussions with City of Wildomar staff, the study area includes the following existing and future intersections:

ID	STUDY AREA INTERSECTIONS
1	Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)
2	Inland Valley Dr. (NS) / Prielipp Rd. (EW)
3	Dwy. 1 (NS) / Prielipp Rd. (EW)
4	Elizabeth Ln. (NS) / Prielipp Rd. (EW)
5	Elizabeth Ln. (NS) / Dwy. 2 (EW)
6	Jackson Ave. (NS) / Nutmeg St. (EW)

NOTE: NS = North-South Roadway; EW = East-West Roadway

C. Project Development Description

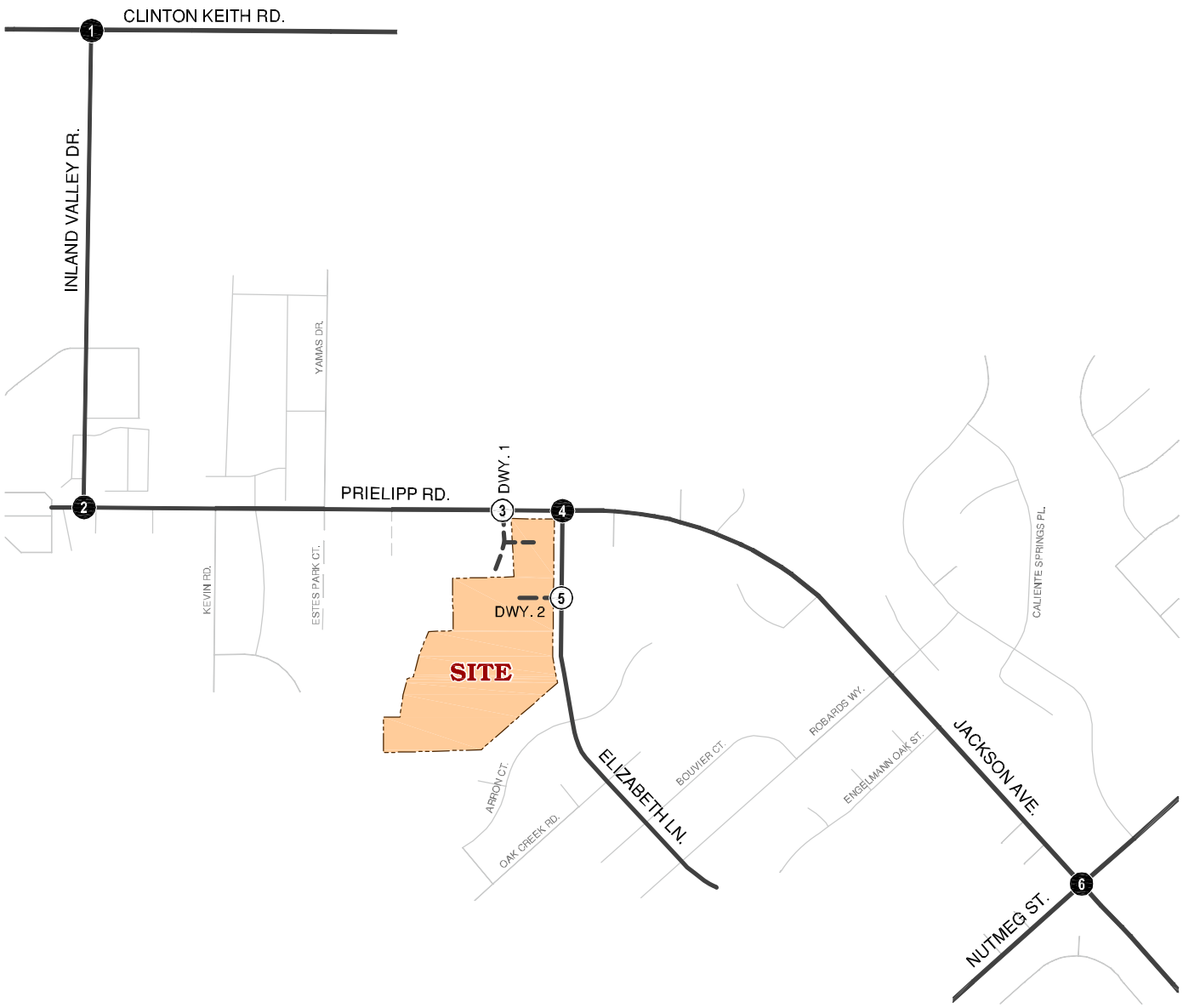
1. Project Size and Description

The Parkside (TM 36497) Project is proposed to be developed with approximately 67 single family residential units. It is anticipated that the project will be built by 2015.

2. Existing Land Use and Zoning

The site is currently vacant and does not generate significant traffic. Adjacent uses include the following:

FIGURE 1-A
STUDY AREA



LEGEND:

- 5 = EXISTING INTERSECTION ANALYSIS LOCATION
- (1) = FUTURE INTERSECTION ANALYSIS LOCATION
- = FUTURE ROADWAY

N

Parkside (Tract 36497) Traffic Impact Analysis
City of Wildomar, CA (JN0068-0001: 01.dwg)

TRAMES SOLUTIONS INC.

- North – Vacant
- South – Vacant/Residential
- East – Residential
- West – Residential / Vacant

3. Proposed Land Use and Zoning

Proposed Zoning: Residential
Proposed Land Use: Residential

4. Site Plan

Figure 1-B illustrates the project site plan. This site plan is subject to refinement and revision, based on planning, engineering, and environmental considerations.

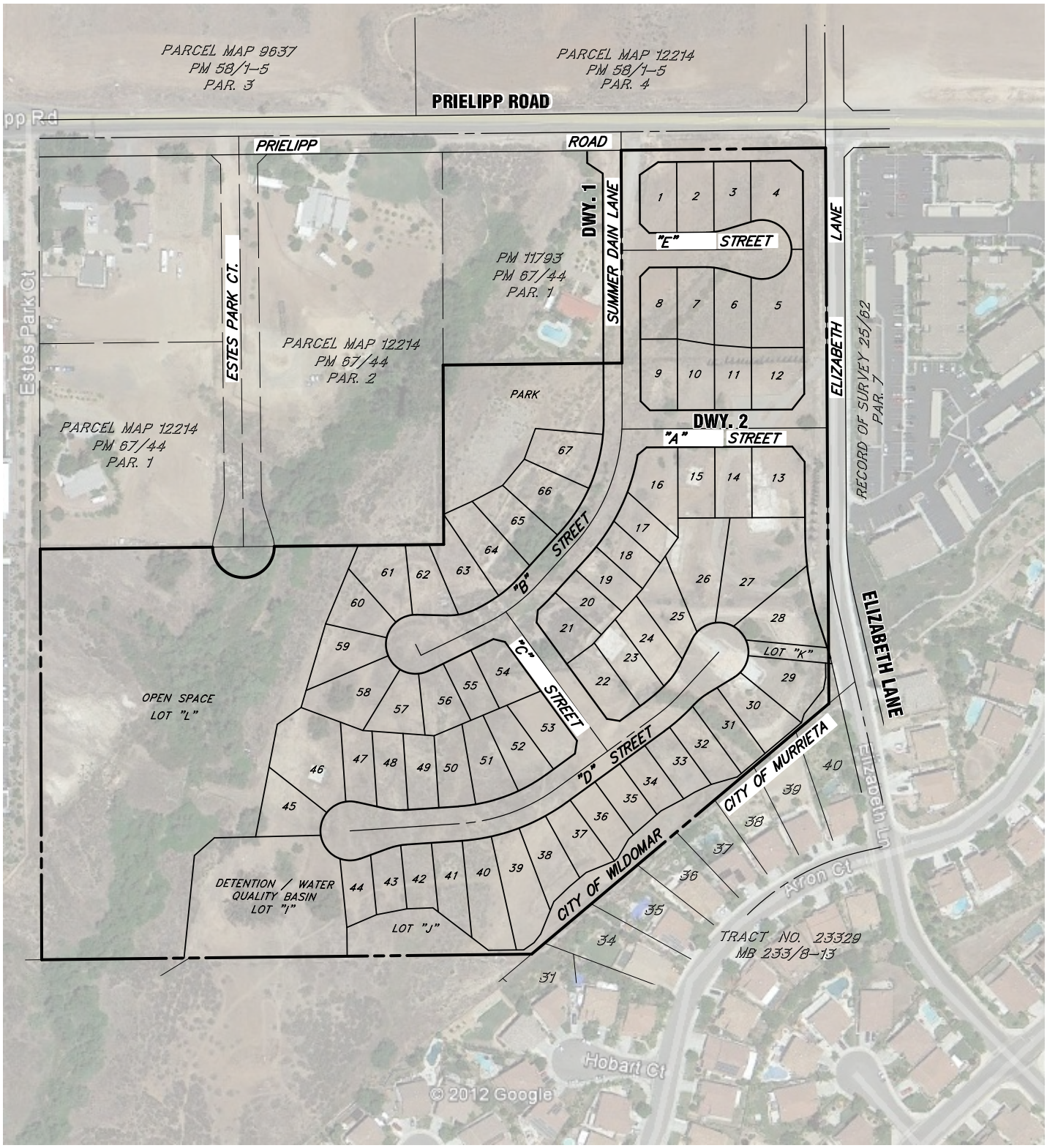
The project is planned to have one full access driveway on Prielipp Road and one full access driveway on Elizabeth Lane.

5. Proposed Project Opening Year

The proposed project is anticipated to be completed in 2015. Future traffic analysis has been based upon three (3) years of background (ambient) growth, at 2% per year, along with traffic generated by other future developments in the surrounding area. The total ambient growth rate is 6% for 2015 conditions.

FIGURE 1-B

SITE PLAN



2.0 TRAFFIC ANALYSIS METHODOLOGIES

Traffic operations are quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an infrastructure facility (intersection) representing progressively worsening traffic conditions. This section presents the LOS definition, LOS criteria and methodologies for the Intersection Operations, Roadway Capacity, and Traffic Signal Warrant analyses.

A. Level of Service Definition

The definitions of Level of Service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A": Completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and by driver preferences. Maneuverability within the traffic stream is good. Minor disruptions to flow are easily absorbed without a change in travel speed.

- LOS "B": Free flow conditions, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS "A", but drivers have slightly less freedom to maneuver. Minor disruptions are still easily absorbed, although local deterioration in LOS will be more obvious.

- LOS "C": The influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles. Minor disruptions can cause serious local deterioration in service, and queues will form behind any significant traffic disruption.

- LOS "D": The ability to maneuver is restricted due to traffic congestion. Travel speed is reduced by the increasing volume. Only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.

- LOS "E": Operations at or near capacity, an unstable level. Vehicles are operating with the minimum spacing for maintaining uniform flow.

- LOS "F": Forced or breakdown flow. It occurs either when vehicles arrive at a rate greater than the rate at which they are discharged or when the forecast demand exceeds the computed capacity of a planned facility. Although operations at these points – and on sections immediately downstream – appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

B. City of Wildomar Level of Service Criteria

The City of Wildomar has established Level of Service (LOS) “D” as the maximum allowable threshold for the intersection operations. Therefore, LOS “E” or “F” is considered unacceptable and requires improvements measures.

C. Intersection Operations Analysis Methodology

The current technical guide to the evaluation of traffic operations is the 2000 Highway Capacity Manual (HCM) (Transportation Research Board Special Report 209). The HCM defines level of service as a qualitative measure, which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate Level of Service (LOS) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The Levels of Service results in this study are determined using the HCM methodology.

For signalized intersections, average total delay per vehicle for the overall intersection is used to determine level of service. Levels of service at the signalized study area intersections have been evaluated using an HCM intersection analysis program.

The study area intersections which are stop sign controlled with stop control on the minor street only have been analyzed using the unsignalized intersection methodology of the HCM. For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. Using data collected describing the intersection configuration and traffic volumes at the study area locations; the level of service has been calculated. The level of service criteria for this type of intersection analysis is based on average total delay per vehicle for the worst minor street movement(s).

For all way stop (AWS) controlled intersections, the ability of vehicles to enter the intersection is not controlled by the occurrence of gaps in the flow of the main street. The AWS controlled intersections have been evaluated using the HCM methodology for this type of multi-way stop controlled intersection configuration. The level of service criteria for this type of intersection analysis is based on average total delay per vehicle.

The levels of service are defined for the various analysis methodologies as follows:

LEVEL OF SERVICE	AVERAGE TOTAL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	0 to 10.00	0 to 10.00
B	10.01 to 20.00	10.01 to 15.00
C	20.01 to 35.00	15.01 to 25.00
D	35.01 to 55.00	25.01 to 35.00
E	55.01 to 80.00	35.01 to 50.00
F	80.01 and up	50.01 and up

The LOS analysis for signalized intersections has been performed using optimized signal timing. Peak hour factors (PHF), where known from existing traffic counts, have been used to assess intersection operations. A PHF of 0.95 is used for new intersections.

3.0 AREA CONDITIONS

A. Study Area

In general, the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips, not exceeding a 5-mile radius from the project site. The City of Wildomar Engineering Department may require deviation from these requirements based on area conditions. The study area includes the following existing intersections (shown previously on Figure 1-A):

ID	STUDY AREA INTERSECTIONS
1	Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)
2	Inland Valley Dr. (NS) / Prielipp Rd. (EW)
3	Dwy. 1 (NS) / Prielipp Rd. (EW)
4	Elizabeth Ln. (NS) / Prielipp Rd. (EW)
5	Elizabeth Ln. (NS) / Dwy. 2 (EW)
6	Jackson Ave. (NS) / Nutmeg St. (EW)

NOTE: NS = North-South Roadway; EW = East-West Roadway

B. Area Roadway System

Figure 3-A identifies the existing roadway conditions for study area roadways. The number of through traffic lanes for existing roadways and the existing intersection controls are identified.

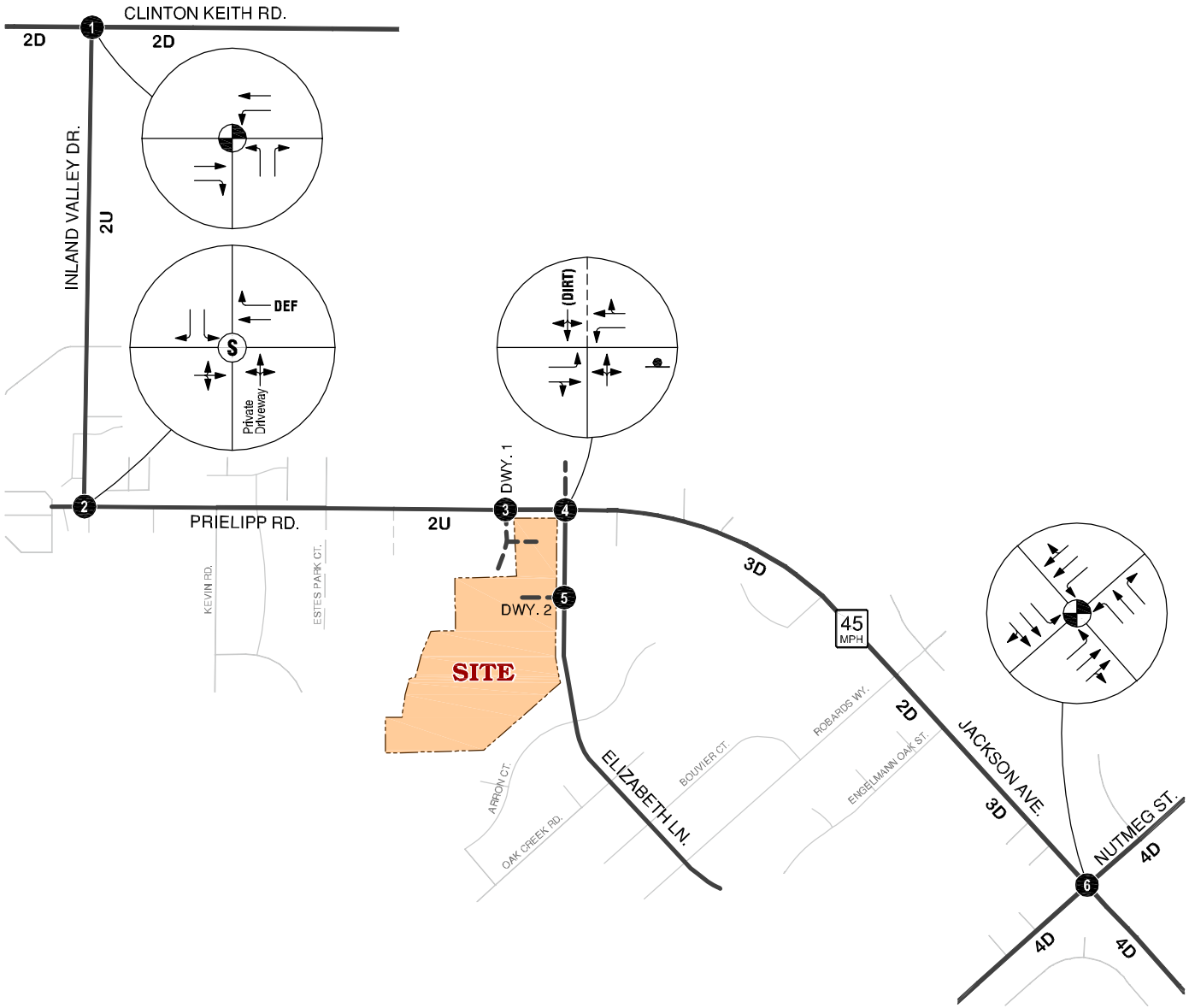
The City of Wildomar Circulation Element is depicted on Figure 3-B. Figure 3-C illustrates the City of Wildomar Roadway Cross-Sections.

C. Existing Traffic Volumes

Existing intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts made for Trames Solutions, Inc. in October 2012. Existing AM and PM peak hour intersection turning movements are shown on Figure3-D. The traffic count worksheets are included in Appendix "B".

FIGURE 3-A

EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



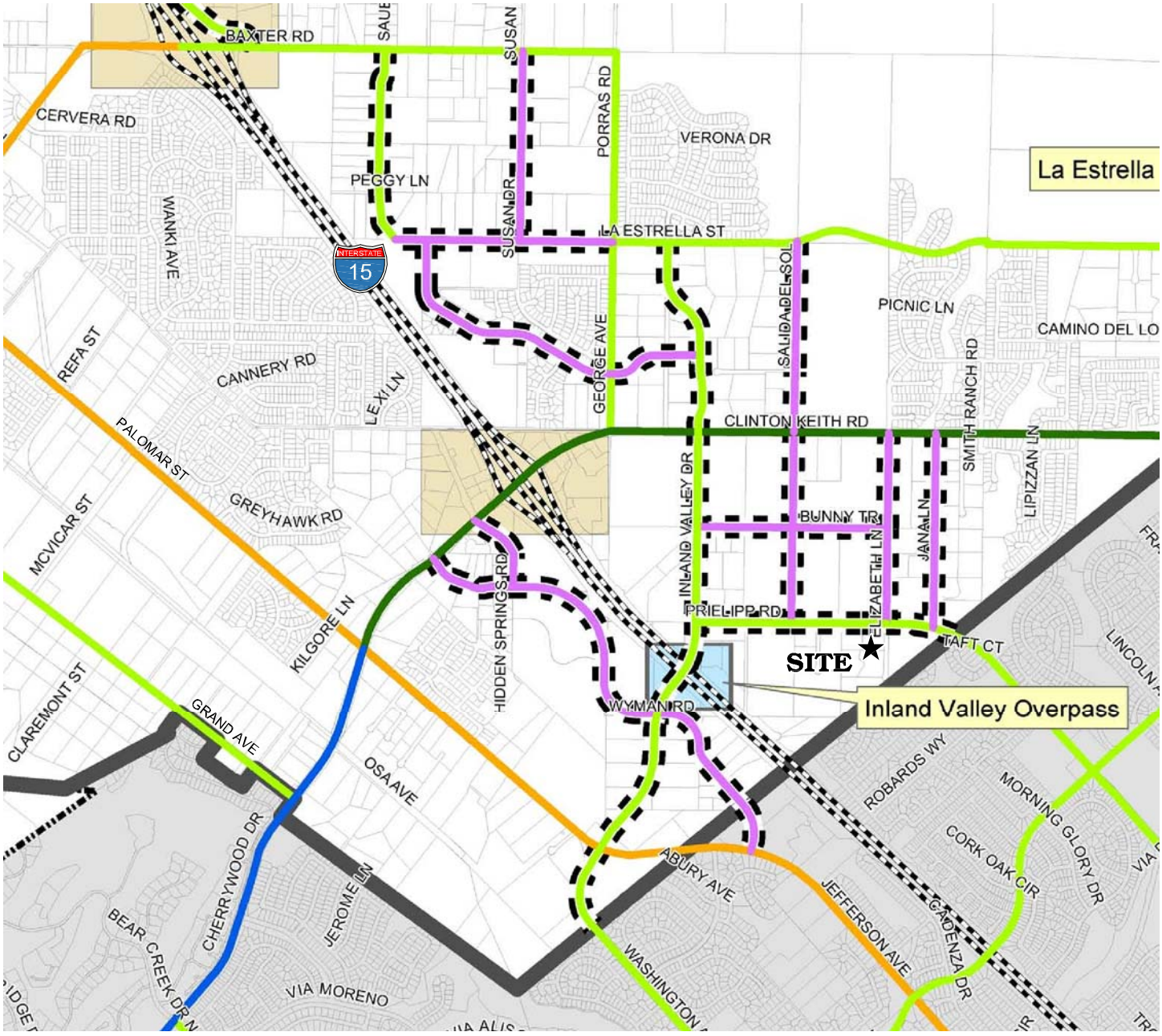
LEGEND:

- = TRAFFIC SIGNAL
- = STOP SIGN
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- # = INTERSECTION ANALYSIS ID
- = FUTURE ROADWAY/DIRT ROAD

N

FIGURE 3-B

CITY OF WILDOMAR
GENERAL PLAN CIRCULATION ELEMENT



NOTE: THE CITY OF WILDOMAR HAS ADOPTED THE COUNTY'S GENERAL PLAN AND STANDARDS

LEGEND:

- Proposed Wildomar Circulation Changes
- URBAN ARTERIAL
- ARTERIAL
- MAJOR
- SECONDARY
- COLLECTOR
- Highways
- Parcels
- Proposed Wildomar Incorporation
- Cities
- Existing Interchanges

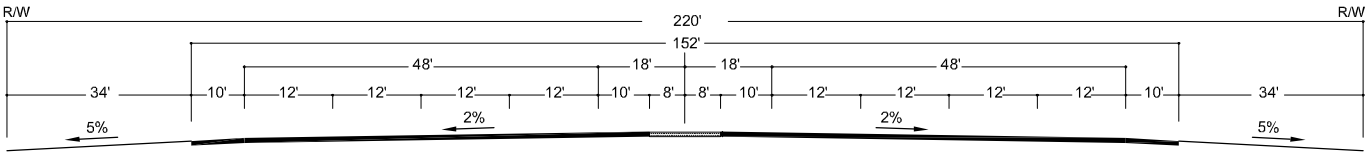
N

Parkside (Tract 36497) Traffic Impact Analysis
City of Wildomar, CA (JN0068-0001: 07.dwg)

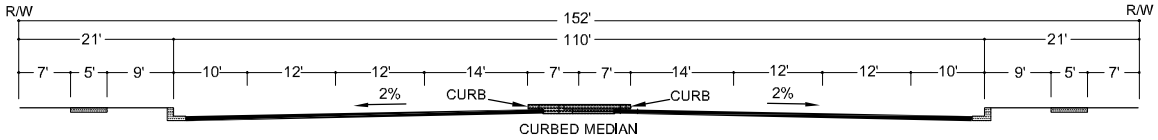
TRAMES SOLUTIONS INC.

FIGURE 3-C

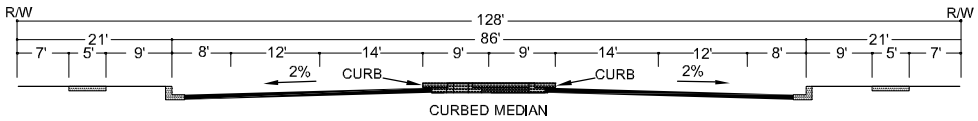
CITY OF WILDOMAR
GENERAL PLAN ROADWAY CROSS-SECTIONS



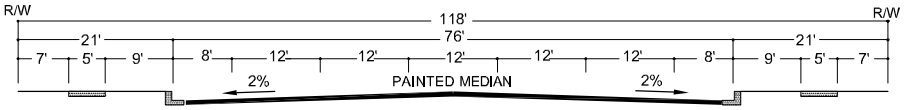
EXPRESSWAY - 8 LANES



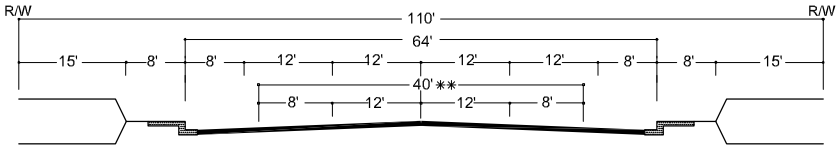
URBAN ARTERIAL HIGHWAY *



ARTERIAL HIGHWAY *

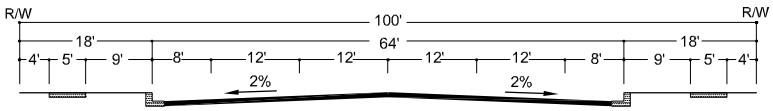


MAJOR HIGHWAY - 4 LANES

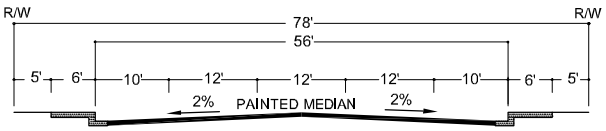


MOUNTAIN ARTERIAL - 2 TO 4 LANES

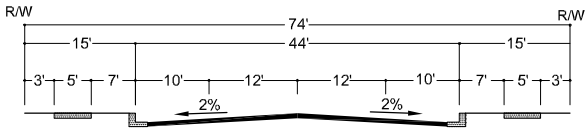
** 2 LANE SECTION



SECONDARY HIGHWAY



INDUSTRIAL COLLECTOR



COLLECTOR

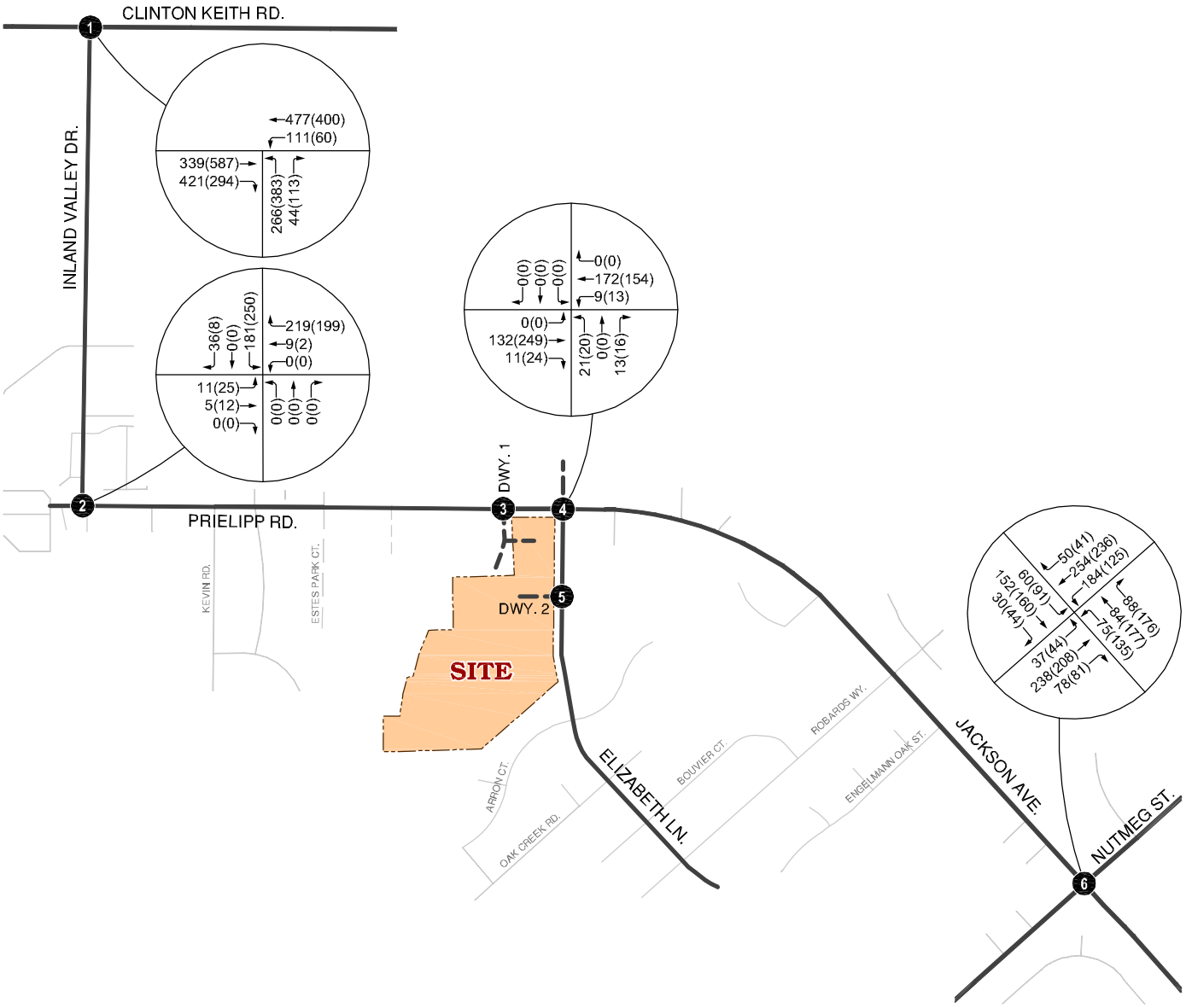
* IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.

NOTE: THE CITY OF WILDOMAR HAS ADOPTED THE COUNTY'S GENERAL PLAN AND STANDARDS

NOT TO SCALE

FIGURE 3-D

EXISTING (2012) PEAK HOUR VOLUMES



LEGEND:

10(10) = AM(PM) PEAK HOUR VOLUMES

N

D. Existing Delay and Level of Service

The City of Wildomar has established Level of Service (LOS) “D” as the maximum allowable threshold for the intersection operations. Therefore, LOS “E” or “F” is considered unacceptable and requires improvements measures.

The results of the existing conditions intersection analysis are summarized in Table 3-1. The existing condition operations analysis worksheets are provided in Appendix "C". The study area intersections are currently operating at an acceptable level of service (LOS “D” or better) during the peak hours with the existing geometry and traffic controls.

E. Transit Service

The Riverside Transit Agency (RTA) Route 23 passes by Inland Valley Drive connects to Prielipp Road, Jackson Avenue, and Nutmeg St. within the study area.

TABLE 3-1

INTERSECTION ANALYSIS FOR EXISTING CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												DELAY [3] (SECS.)		LEVEL OF SERVICE	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Inland Valley Dr. / Clinton Keith Rd.	TS	1	0	1	0	0	0	0	1	1	1	1	0	21.4	24.7	C	C
2	Inland Valley Dr. / Prielipp Rd.	AWS	0	1!	0	1	0	1	0	1!	0	0	1	1	9.2	10.3	A	B
3	Dwy. 1 / Prielipp Rd.	--	-	-	-	-	-	-	0	1	0	0	1	0	Future Intersection			
4	Elizabeth Ln. / Prielipp Rd.	CSS	0	1!	0	0	1!	0	1	1	0	1	1	0	10.1	10.9	B	B
5	Elizabeth Ln. / Dwy. 2	-	0	1	0	0	1	0	-	-	-	-	-	-	Future Intersection			
6	Jackson Ave. / Nutmeg St.	TS	1	1	1	1	2	0	1	2	0	1	2	0	30.7	32.1	C	C

[1] TS = Traffic Signal; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane

[3] Delay and level of service calculated using the following analysis software: Traffix 8.0 R1

4.0 PROJECTED FUTURE TRAFFIC

This section of the report quantifies the number of trips generated by the proposed project and other known developments in the area.

A. Project Traffic

1. Ambient Growth Rate

Some traffic volume increases on roadways can be attributed to vehicles originating outside of the study area. These types of trips either end up within the study area or pass-through onto an outside destination. Therefore, to account for these trips (termed "ambient growth"), a growth rate can be applied to existing traffic volumes.

Future traffic volumes have been calculated based on a two (2) percent annual growth rate of existing (2012) traffic volumes for a total of six (6) percent for 2012 conditions has been used in this study to account for traffic not attributed to the project or other planned developments within the study area. The City of Wildomar Transportation Department staff has previously reviewed and approved this rate.

2. Project Trip Generation

Trip generation represents the amount of traffic which is attracted and produced by a development. The trip generation for the project is based upon the specific land use which have been planned for this development. For the purpose of this analysis, the following land use assumption is evaluated:

- 67 single family detached residential units

Trip generation rates for the proposed development are shown in Table 4-1. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE).

Daily and peak hour trip generations for the proposed project are shown in Table 4-2. The proposed development is projected to generate a total of approximately 641 trip-ends per day with 51 vehicles per hour during the AM peak hour and 68 vehicles per hour during the PM peak hour.

TABLE 4-1

PROJECT TRIP GENERATION RATES[1]

LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR TRIP RATES						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
Single Fam. Detached	210	67	DU	0.19	0.56	0.75	0.64	0.37	1.01	9.57

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 8th Edition, 2008.

[2] DU = Dwelling Units

TABLE 4-2

PROJECT TRIP GENERATION SUMMARY

LAND USE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
			AM			PM			
			IN	OUT	TOTAL	IN	OUT	TOTAL	
Single Fam. Detached	67	DU	13	38	51	43	25	68	641
TOTAL			13	38	51	43	25	68	641

[1] DU = Dwelling Units

3. Project Trip Distribution

Trip distribution represents the directional orientation of traffic to and from the project site. The project's trip distribution patterns are based on the proximity of the residential units to the proposed driveway locations, the surrounding trip attractors (employment bases, commercial opportunities, schools, recreation centers, etc.), and the regional freeway interchanges. The normal trip distribution pattern for the project is illustrated on Figure 4-A. An alternative distribution is shown on Figure 4-B to illustrate the project traffic pattern during severe storm events when Inland Valley Drive is impassable.

4. Other Trip Generation Factors

The project consists of residential units that do not generate a significant amount of pass-by trips. Furthermore, it is unlikely that trips will be reduced to/from the site by non-motorized modes of travel due to the lack of; 1) convenient transit opportunities, 2) bike lanes, and 3) pedestrian trails.

5. Project Peak Hour Turning Movement Traffic

The assignment of traffic from the site to the adjoining roadway system has been based upon the site's trip generation, trip distribution, proposed arterial highway and local street systems, which would be in place by the time of initial occupancy of the site. Based on the identified project traffic generation and distribution, project traffic volumes under normal traffic conditions are shown on Figure 4-C. Alternative project traffic volumes is shown on Figure 4-D.

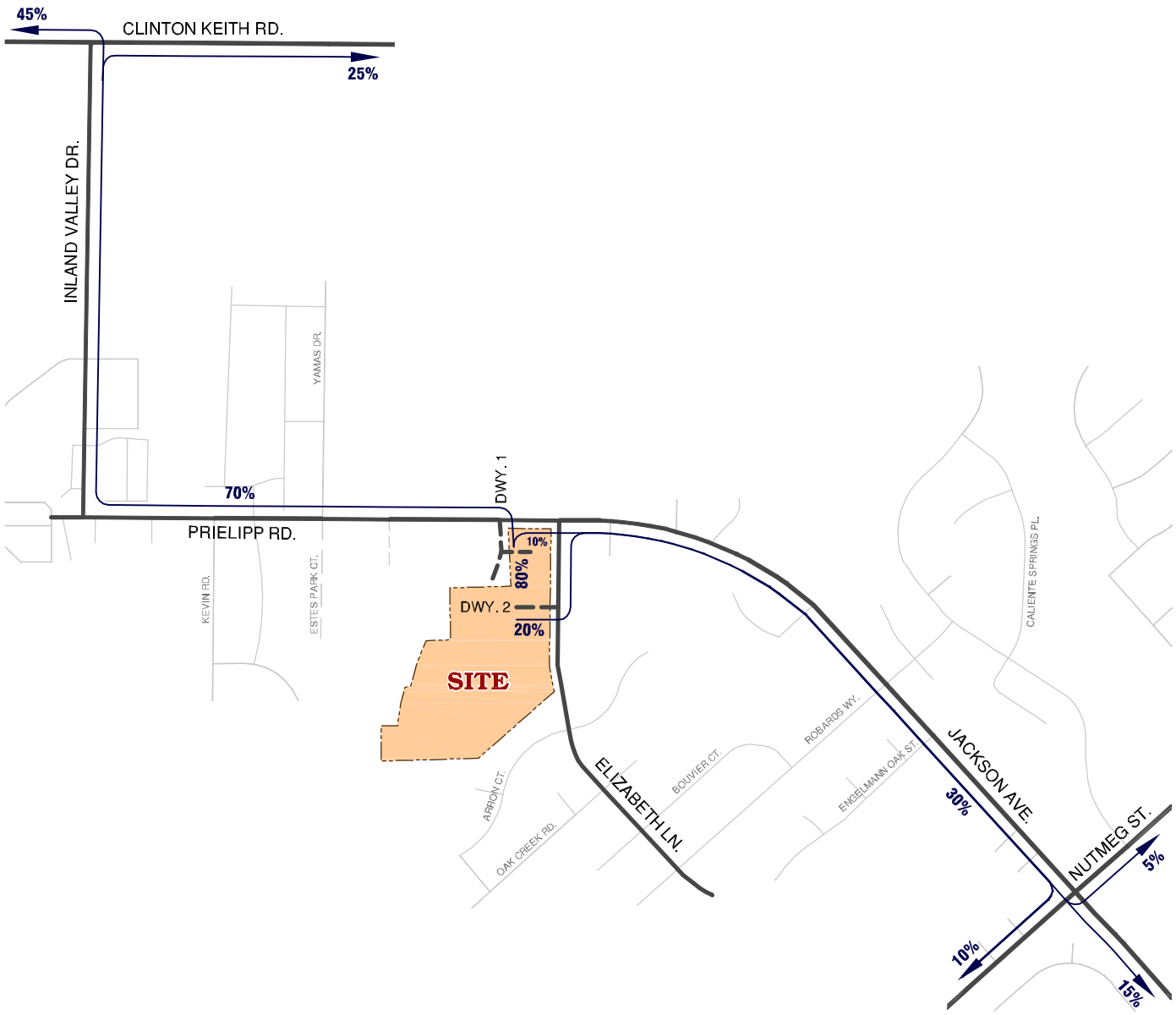
B. Cumulative Development Traffic (Background)

1. Method of Projection

To assess existing plus ambient plus cumulative plus project traffic conditions, project traffic is combined with existing traffic, area-wide growth and other future developments which are approved or being processed concurrently in the study area. Developments which are being processed concurrently in the study area have been provided by the City of Wildomar staff.

FIGURE 4-A

PROJECT TRIP DISTRIBUTION



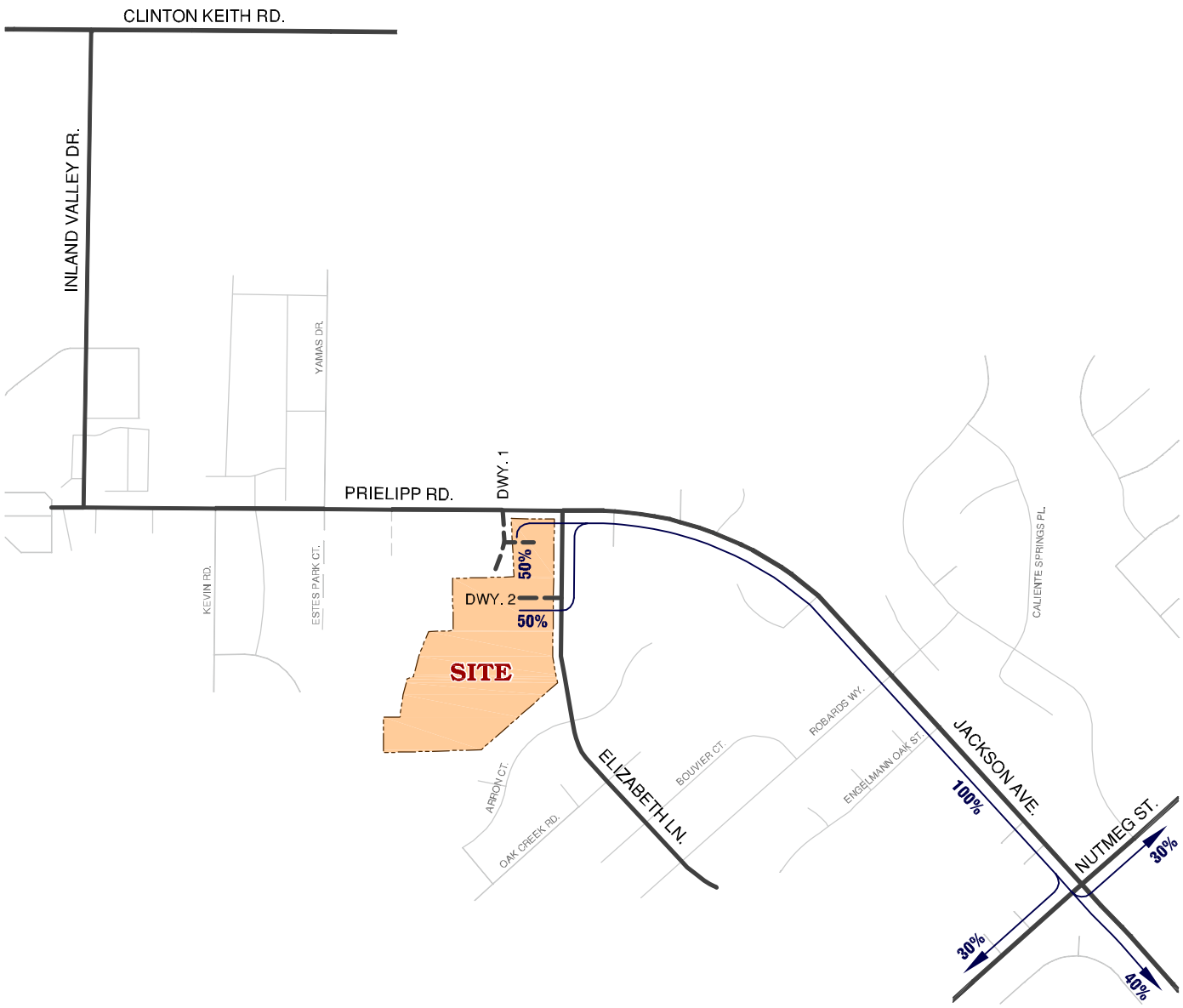
LEGEND:

10% = PERCENT TO/FROM PROJECT

N

FIGURE 4-B

ALTERNATIVE PROJECT TRIP DISTRIBUTION



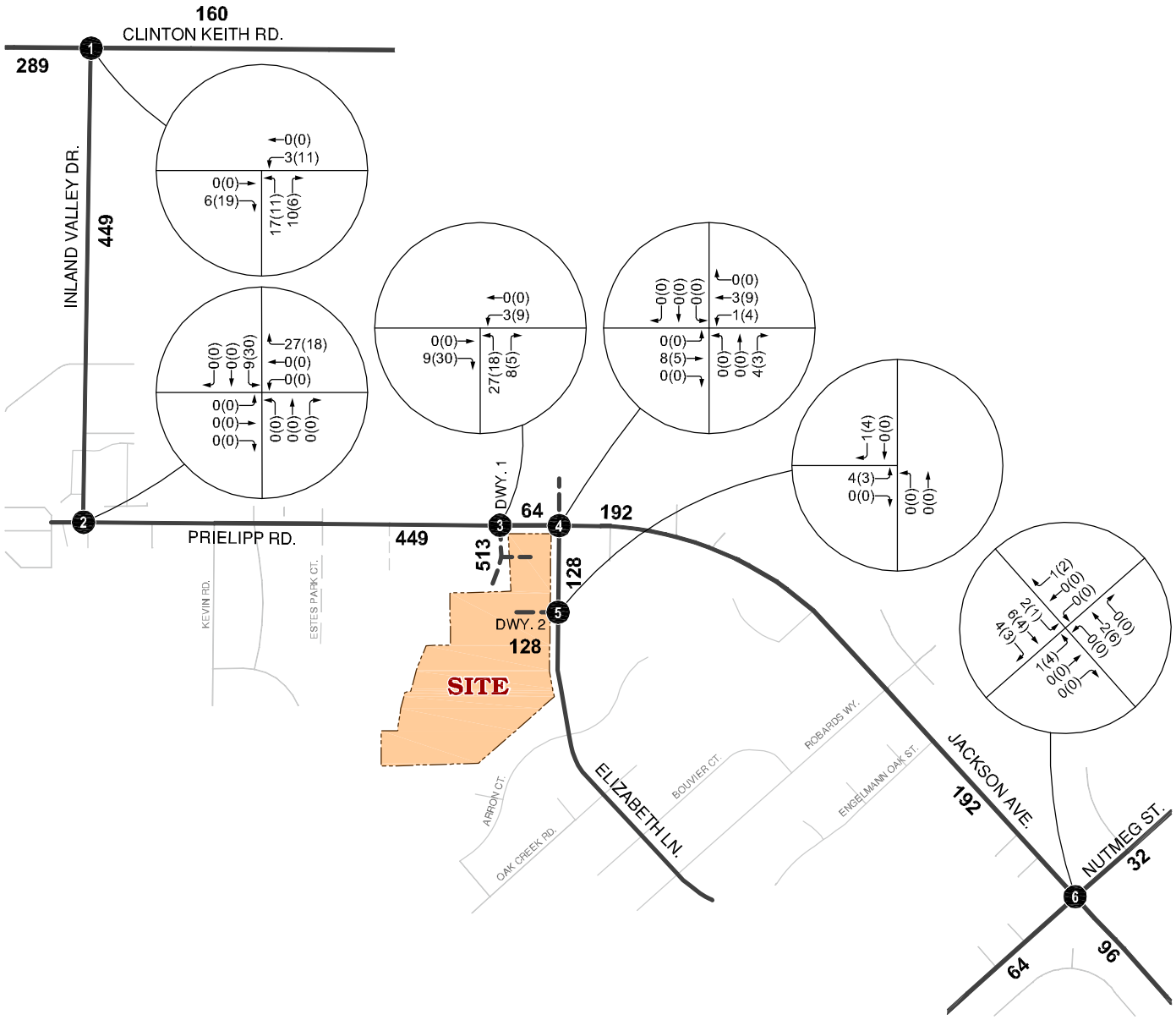
LEGEND:

10% = PERCENT TO/FROM PROJECT

N

FIGURE 4-C

PROJECT ONLY PEAK HOUR VOLUMES



LEGEND:

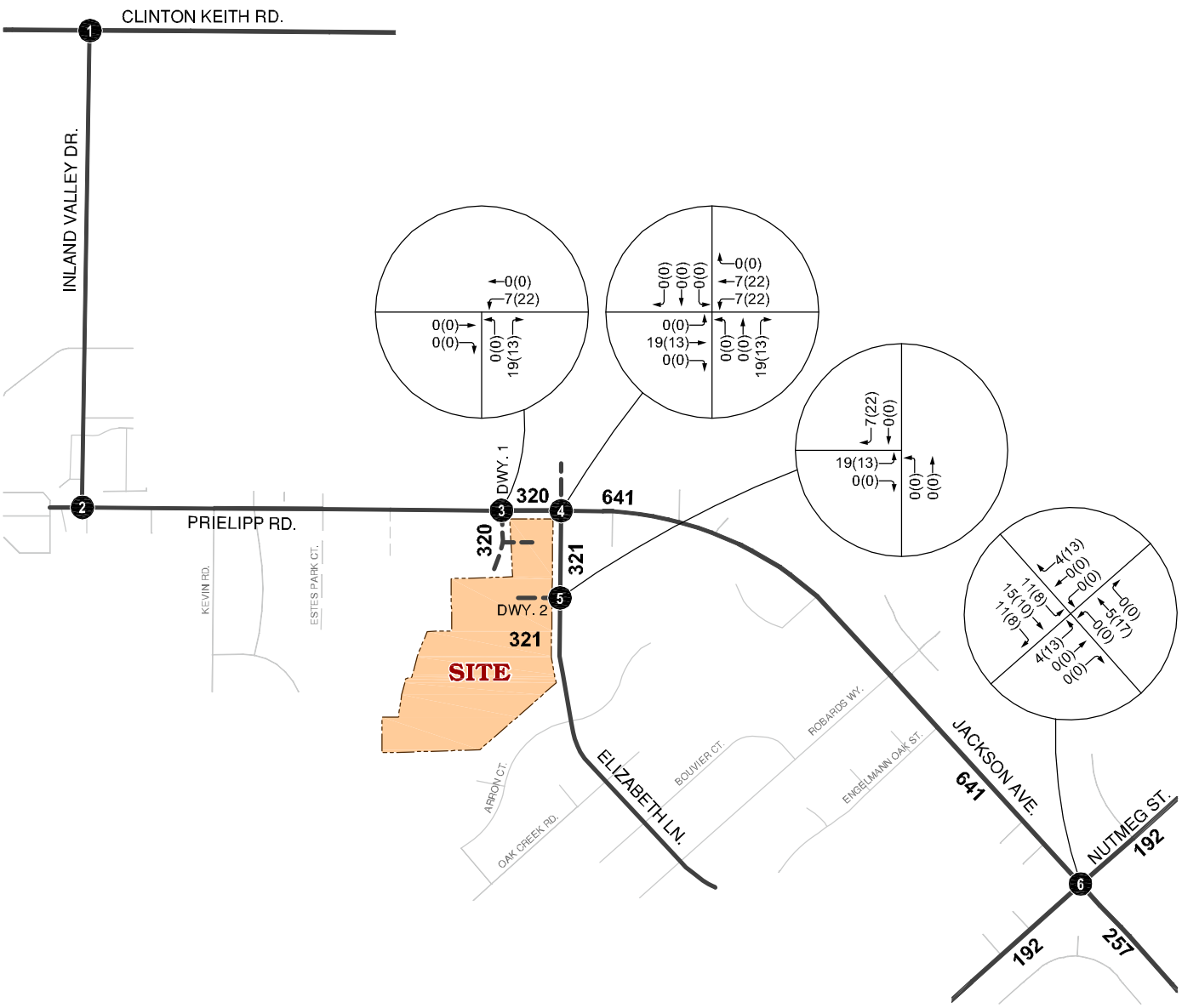
10(10) = AM(PM) PEAK HOUR VOLUMES

1,000 = VEHICLES PER DAY

N

FIGURE 4-D

ALTERNATIVE PROJECT ONLY PEAK HOUR VOLUMES



LEGEND:

10(10) = AM(PM) PEAK HOUR VOLUMES

1,000 = VEHICLES PER DAY

N

2. Other Approved or Proposed Development Projects

The cumulative developments have been included along with the land use associated with each project. The location of the cumulative projects provided by the City are shown on Figure 4-E.

3. Other Approved Projects Trip Generation

For cumulative projects, ITE Trip Generation Rates (8th Edition) were used. Table 4-3 presents the cumulative trip generation rates. Table 4-4 presents the cumulative development land uses and trip generation summary. As presented in Table 4-4 Cumulative developments are projected to generate a total of approximately 6,868 trip-ends per day with 464 vehicles per hour during the AM peak hour and 615 vehicles per hour during the PM peak hour.

4. Other Approved Development Trip Distribution and Assignments

Figure 4-F and Figure 4-G contains the directional distribution and assignment of the cumulative development traffic.

C. Total Background Peak Hour Turning Movement Volumes

Based on the identified trip distribution for the cumulative development on arterial highways throughout the study area, cumulative development peak hour turning movement volumes is shown on Figure 4-H.

Existing plus Ambient plus Project (E+A+P) AM and PM peak hour intersection turning movement volumes are shown on Figures 4-I.

Existing plus Ambient plus Project plus Cumulative (E+A+P+C) AM and PM peak hour intersection turning movement volumes are shown on Figures 4-J. Figure 4-K

FIGURE 4-E

CUMULATIVE DEVELOPMENT LOCATION MAP

LEGEND:

1 = OAK SPRINGS APARTMENT

2 = RANCON PROJECT
(MEDICAL OFFICE/RETAIL)

TABLE 4-3

CUMULATIVE TRIP GENERATION RATES[1]

LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR TRIP RATES					
				AM			PM		
				IN	OUT	TOTAL	IN	OUT	TOTAL
Apartment	220	315	OCCUPIED DU	0.1	0.41	0.51	0.4	0.22	0.62
Single Fam. Detached	210	70	DU	0.19	0.56	0.75	0.64	0.37	1.01
Medical-Dental Office	720	36.70	TSF	1.82	0.48	2.3	0.93	2.53	3.46
Shopping Center	820	19.25	TSF	1.85	1.18	3.03	5.37	5.59	10.96
Fast Food w/ Drive Thru	934	3.0	TSF	25.17	24.18	49.35	17.6	16.24	33.84

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 8th Edition, 2008.

[2] DU = Dwelling Units

TABLE 4-4

CUMULATIVE TRIP GENERATION SUMMARY

ID	PROJECT NAME	LAND USE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
					AM			PM			
					IN	OUT	TOTAL	IN	OUT	TOTAL	
1	Oak Springs Apartment Project	Apartment	315	OCCUPIED DU	32	129	161	126	69	195	2,095
		Single Fam. Detached	70	DU	13	39	52	45	26	71	670
		Total Oak Springs Apartment Net Trips			45	168	213	171	95	266	2,765
2	Rancon (Medical Office; Commercial; Restaurant)	Medical-Dental Office	36.7	TSF	67	18	85	34	93	127	1,326
		Shopping Center	19.25	TSF	36	23	59	103	108	211	2,327
		Fast Food w/ Drive Thru	3	TSF	76	73	149	53	49	102	1,488
		Internal Capture			-18	-11	-29	-19	-25	-44	-514
		Pass-by Trips (25% - Shopping Center Only)			-8	-5	-13	-23	-24	-47	-524
		Total Rancon Net Trips			153	98	251	148	201	349	4,103
TOTAL CUMULATIVE TRIPS					198	266	464	319	296	615	6,868

[1] TSF = Thousand Square Feet; DU = Dwelling Units

FIGURE 4-F

OAK SPRINGS APARTMENT TRIP DISTRIBUTION

LEGEND:

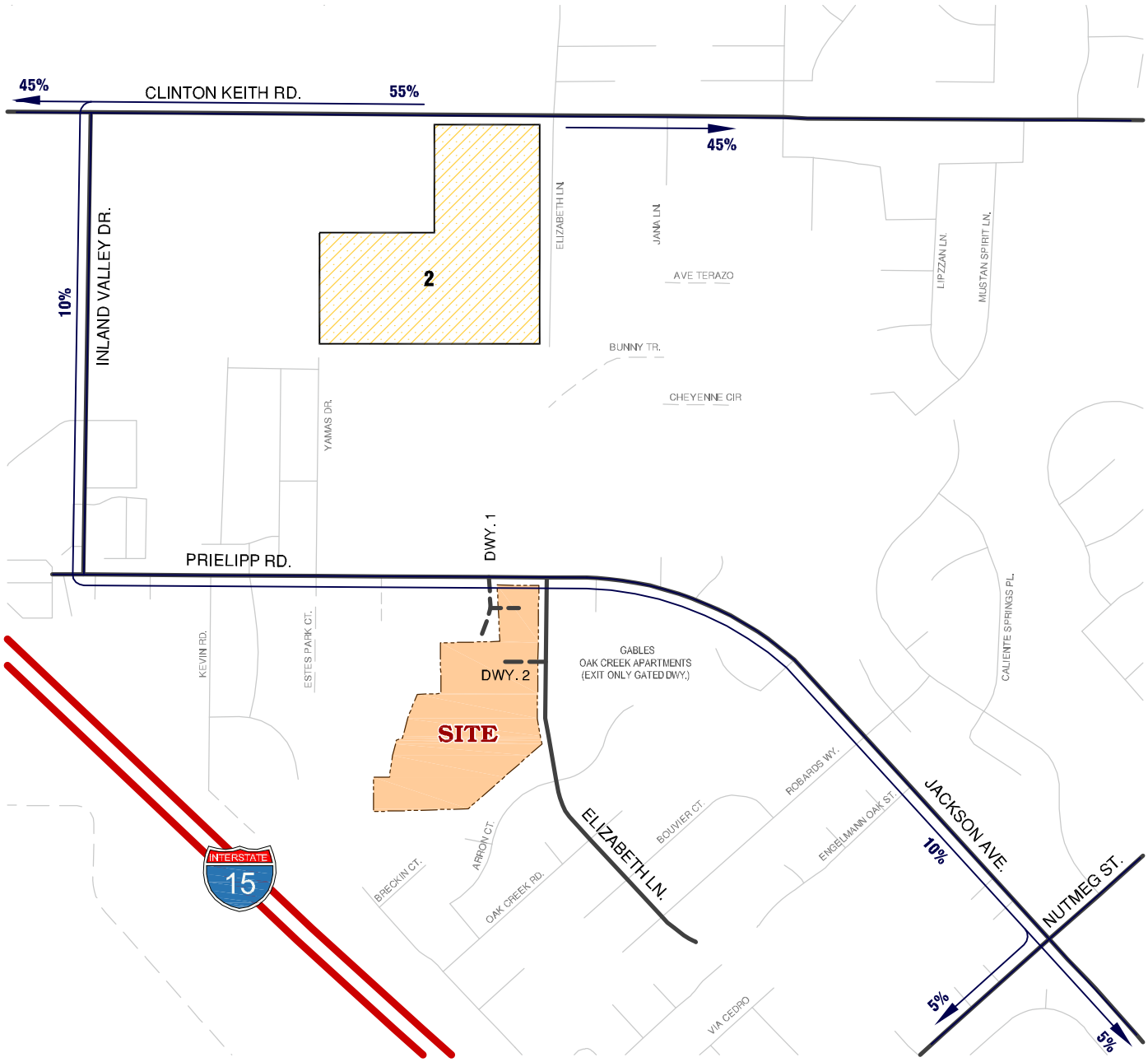
10% = PERCENT TO/FROM PROJECT

1 = OAK SPRINGS APARTMENT

N

FIGURE 4-G

RANCON PROJECT TRIP DISTRIBUTION



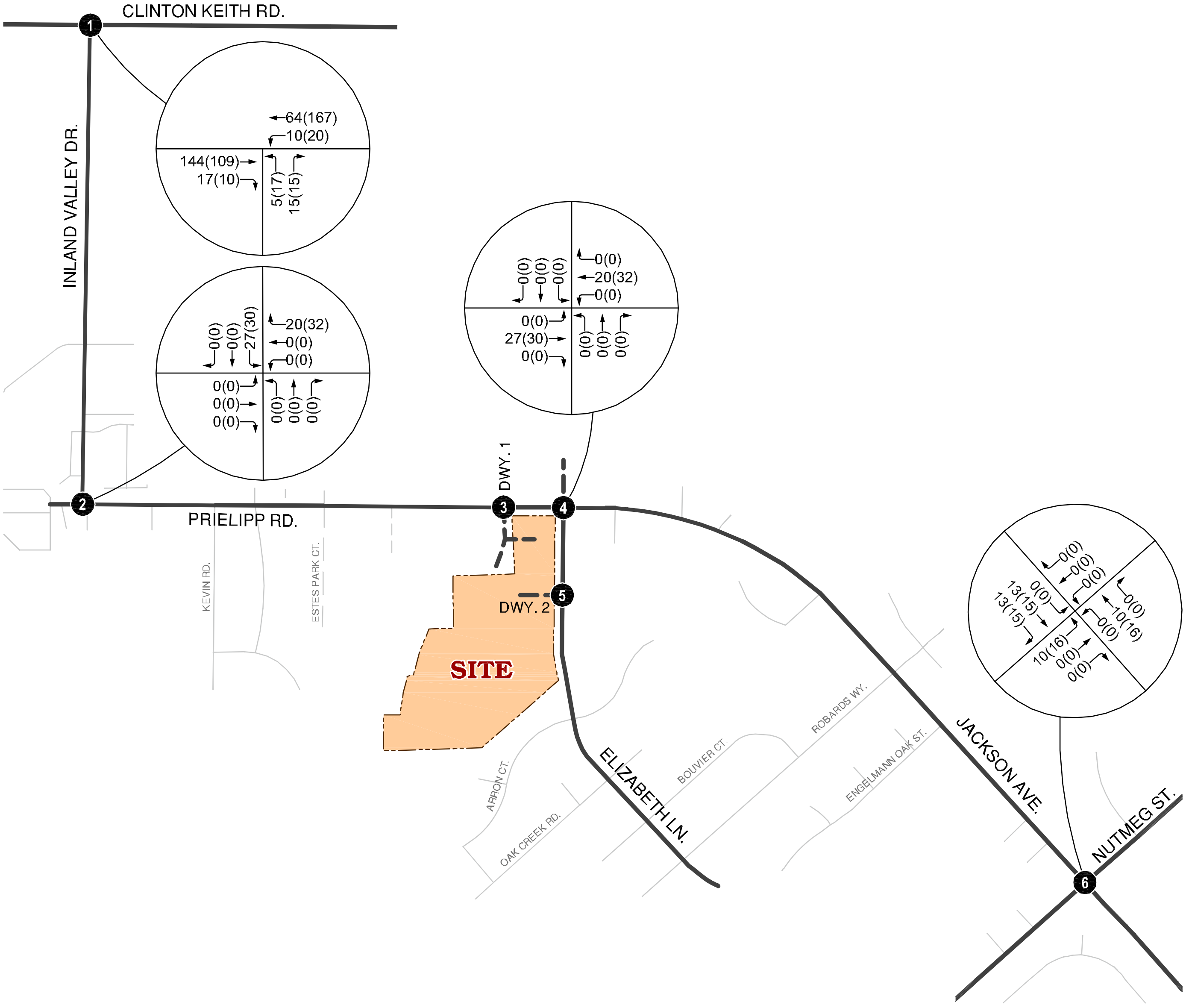
LEGEND:

10% = PERCENT TO/FROM PROJECT

2 = RANCON PROJECT
(MEDICAL OFFICE/RETAIL)

N

FIGURE 4-H
CUMULATIVE ONLY PEAK HOUR VOLUMES

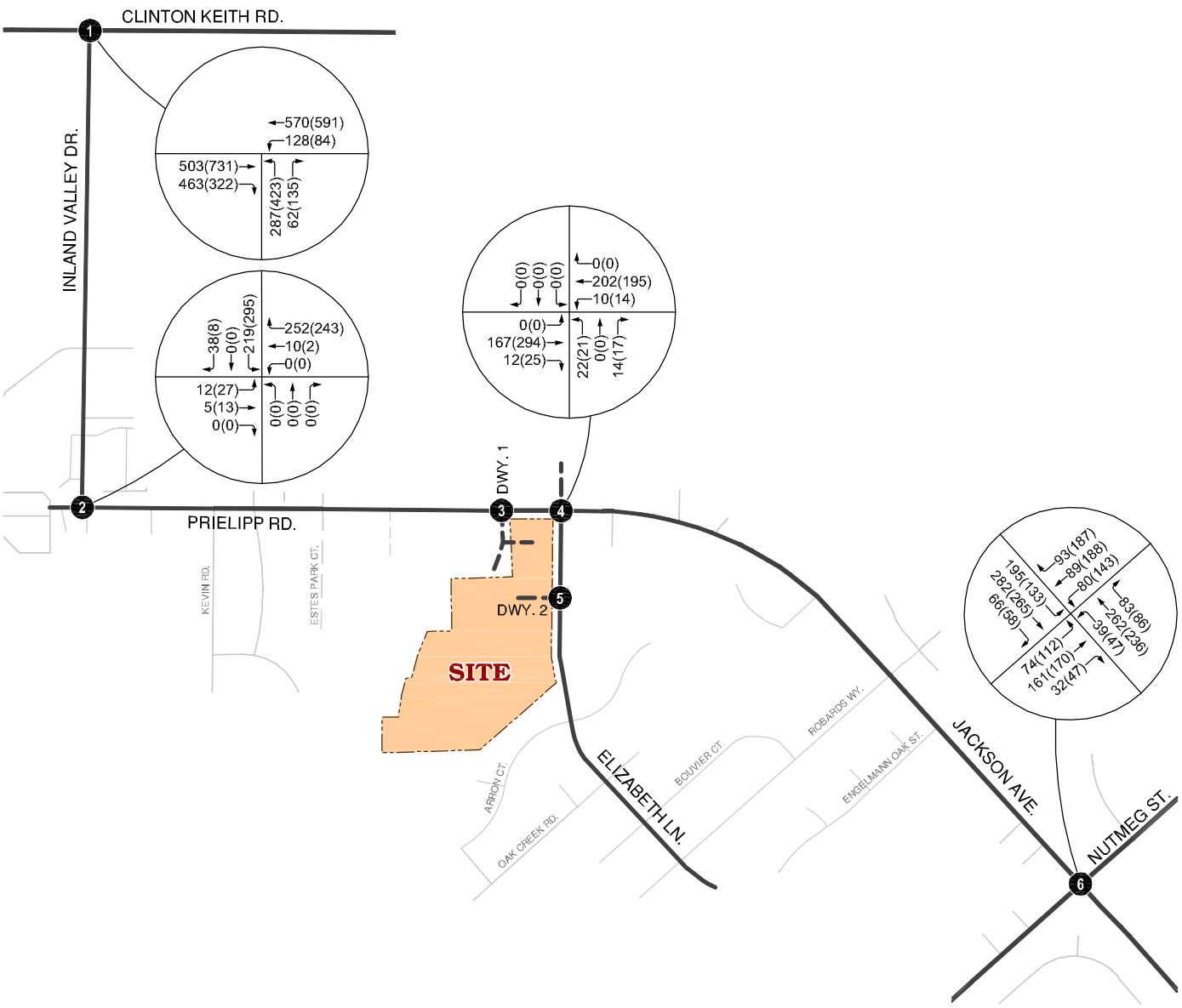


Parkside (Tract 36497) Traffic Impact Analysis
City of Wildomar, CA (JN0068-0001: 05.dwg)

TRAMES SOLUTIONS INC.

FIGURE 4-I

EXISTING PLUS AMBIENT PLUS CUMULATIVE PEAK HOUR VOLUMES



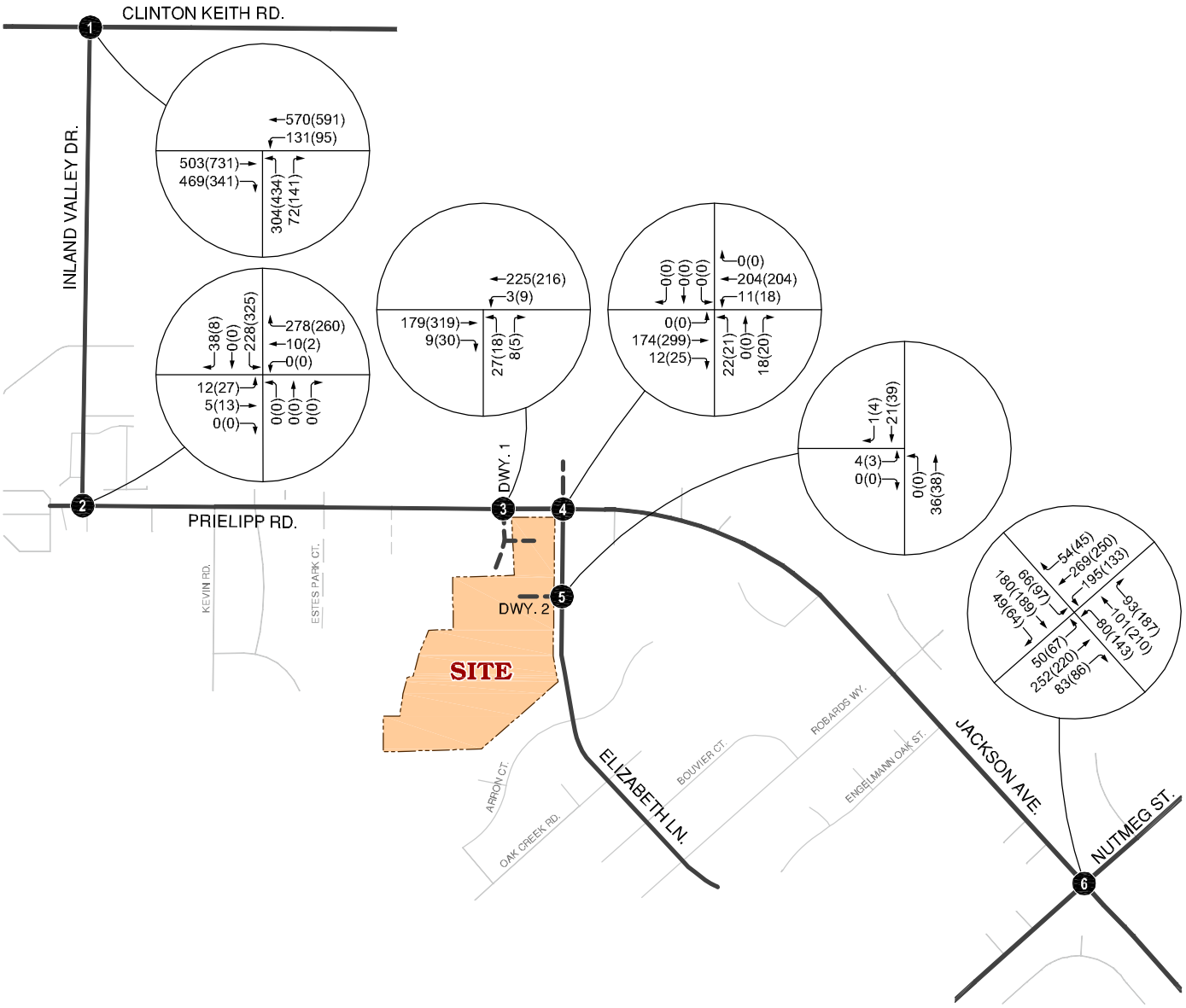
LEGEND:

10(10) = AM(PM) PEAK HOUR VOLUMES

N

FIGURE 4-J

EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT PEAK HOUR VOLUMES



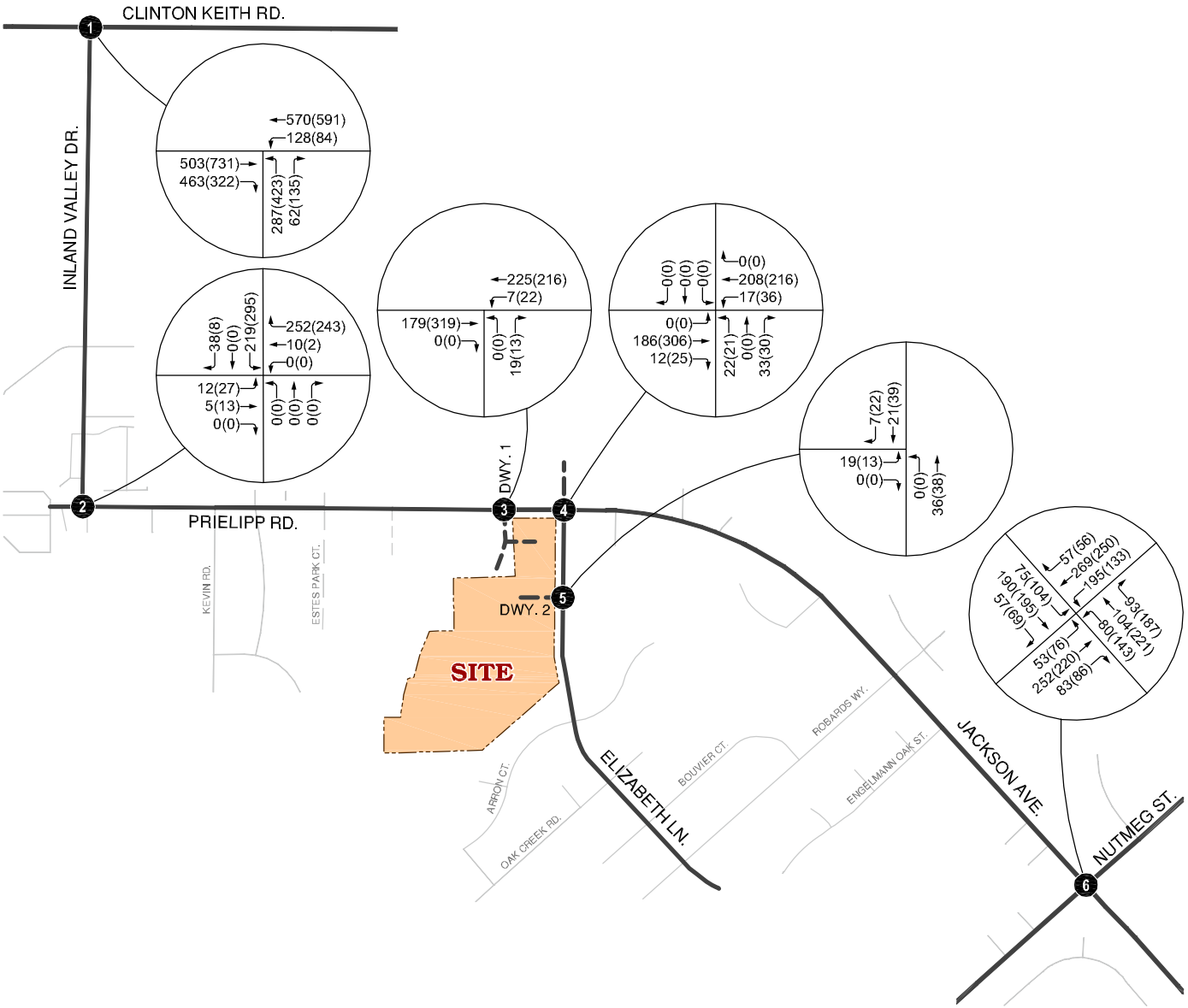
LEGEND:

10(10) = AM(PM) PEAK HOUR VOLUMES

N

FIGURE 4-K

EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT (ALTERNATIVE) PEAK HOUR VOLUMES



LEGEND:

10(10) = AM(PM) PEAK HOUR VOLUMES

N

5.0 TRAFFIC ANALYSIS

Peak hour intersection analysis has been performed at the study area intersections for each of the project scenarios and for projected future conditions. Improvements are recommended to satisfy the level of service requirements of the City of Wildomar and if the following impacts are identified:

1) When existing traffic conditions (Analysis Scenario 1) exceed the General Plan target LOS.

2) When cumulative traffic, when added to existing traffic (Analysis Scenario 2) will deteriorate the LOS to below the target LOS, and impacts cannot be mitigated through existing infrastructure funding mechanisms.

3) When project traffic (Analysis Scenario 3) exceeds the target LOS, and impacts cannot be mitigated through project conditions of approval.

A. Delay and Level of Service for Existing plus Ambient plus Cumulative (E+A+C) Conditions

Intersection levels of service for the E+A+C traffic conditions are shown in Table 5-1. Table 5-1 shows HCM calculations based on the geometrics at the study area intersections. The operation analysis worksheets for E+A+C traffic conditions are provided in Appendix “D”.

For E+A+C traffic conditions, the study area intersections are projected to operate at an acceptable levels of service during the peak hours with existing geometry.

B. Delay and Level of Service Analysis for Existing plus Ambient plus Cumulative plus Project (E+A+C+P) during Normal Traffic Conditions

Intersection levels of service for the E+A+C+P are shown in Table 5-2. Table 5-2 shows HCM calculations based on the geometrics at the study area intersections. The operation analysis worksheets for E+A+C+P during normal traffic conditions are provided in Appendix “E”.

For E+A+C+P during normal traffic conditions, the study area intersections are projected to continue to operate at an acceptable levels of service during the peak hours with existing geometry.

TABLE 5-1

INTERSECTION ANALYSIS FOR
EXISTING PLUS AMBIENT PLUS CUMULATIVE CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												DELAY [3] (SECS.)		LEVEL OF SERVICE	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Inland Valley Dr. / Clinton Keith Rd.	TS	1	0	1	0	0	0	0	1	1	1	1	0	22.6	28.0	C	C
2	Inland Valley Dr. / Prielipp Rd.	AWS	0	1!	0	1	0	1	0	1!	0	0	1	1	9.9	11.4	A	B
3	Dwy. 1 / Prielipp Rd.	--	-	-	-	-	-	-	0	1	0	0	1	0	Future Intersection			
4	Elizabeth Ln. / Prielipp Rd.	CSS	0	1!	0	0	1!	0	1	1	0	1	1	0	10.5	11.5	B	B
5	Elizabeth Ln. / Dwy. 2	-	0	1	0	0	1	0	-	-	-	-	-	-	Future Intersection			
6	Jackson Ave. / Nutmeg St.	TS	1	1	1	1	2	0	1	2	0	1	2	0	31.0	32.7	C	C

[1] TS = Traffic Signal; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane

[3] Delay and level of service calculated using the following analysis software: Traffix 8.0 R1

TABLE 5-2

INTERSECTION ANALYSIS FOR
EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT CONDITIONS
(NORMAL TRAFFIC CONDITIONS)

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												DELAY [3] (SECS.)		LEVEL OF SERVICE	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Inland Valley Dr. / Clinton Keith Rd.	TS	1	0	1	0	0	0	0	1	1	1	1	0	23.3	28.7	C	C
2	Inland Valley Dr. / Prielipp Rd.	AWS	0	1!	0	1	0	1	0	1!	0	0	1	1	10.3	12.2	B	B
3	Dwy. 1 / Prielipp Rd.	CSS	0	1!	0	0	0	0	0	1	0	0	1	0	10.9	12.2	B	B
4	Elizabeth Ln. / Prielipp Rd.	CSS	0	1!	0	0	1!	0	1	1	0	1	1	0	10.5	11.6	B	B
5	Elizabeth Ln. / Dwy. 2	CSS	0	1	0	0	1	0	0	1!	0	0	0	0	8.8	8.9	A	A
6	Jackson Ave. / Nutmeg St.	TS	1	1	1	1	2	0	1	2	0	1	2	0	31.0	32.7	C	C

[1] TS = Traffic Signal; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 1 = Improvement

[3] Delay and level of service calculated using the following analysis software: Traffix 8.0 R1

C. Delay and Level of Service Analysis for Existing plus Ambient plus Cumulative plus Project (E+A+C+P) (Alternative) during Severe Storm Traffic Conditions

Intersection levels of service for the E+A+C+P (alternative) are shown in Table 5-3. Table 5-3 shows HCM calculations based on the geometrics at the study area intersections. The operation analysis worksheets for E+A+C+P with normal traffic conditions are provided in Appendix "F".

For E+A+C+P (alternative) during severe storm traffic conditions, the study area intersections are projected to continue to operate at an acceptable levels of service during the peak hours with existing geometry.

TABLE 5-3

INTERSECTION ANALYSIS FOR
EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT (ALTERNATIVE) CONDITIONS
(SEVERE STORM TRAFFIC CONDITIONS)

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes [2]												DELAY 3 (SECS.)		LEVEL OF SERVICE	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Inland Valley Dr. / Clinton Keith Rd.	TS	1	0	1	0	0	0	0	1	1	1	1	0	22.6	28.0	C	C
2	Inland Valley Dr. / Prielipp Rd.	AWS	0	1!	0	1	0	1	0	1!	0	0	1	1	9.9	11.4	A	B
3	Dwy. 1 / Prielipp Rd.	CSS	0	1!	0	0	0	0	0	1	0	0	1	0	9.2	10.0	A	B
4	Elizabeth Ln. / Prielipp Rd.	CSS	0	1!	0	0	1!	0	1	1	0	1	1	0	10.4	11.8	B	B
5	Elizabeth Ln. / Dwy. 2	CSS	0	1	0	0	1	0	0	1!	0	0	0	0	8.9	9.0	A	A
6	Jackson Ave. / Nutmeg St.	TS	1	1	1	1	2	0	1	2	0	1	2	0	31.1	32.7	C	C

[1] TS = Traffic Signal; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 1 = Improvement

[3] Delay and level of service calculated using the following analysis software: Traffix 8.0 R1

6.0 FINDINGS

A. Traffic Impacts and Level of Service

1. Existing Conditions

For Existing traffic conditions, the study area intersections are currently operating at an acceptable level of service during the peak hours with existing geometry.

2. Existing + Ambient + Cumulative Conditions

For E+A+C traffic conditions, the study area intersections are projected to operate at an acceptable levels of service during the peak hours with existing geometry.

3. Existing + Ambient + Project + Cumulative during Normal Traffic Conditions

For E+A+P+C traffic conditions, the study area intersections are projected to operate at an acceptable levels of service during the peak hours with existing geometry.

4. Existing + Ambient + Project + Cumulative (Alternative) during Severe Storm Traffic Conditions

For E+A+P+C (Alternative) traffic conditions, the study area intersections are projected to operate at an acceptable levels of service during the peak hours with existing geometry.

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APPENDIX A

SCOPING AGREEMENT

TRAMES SOLUTIONS INC.

100 E San Marcos Blvd. Ste 400
San Marcos, CA 92069
(760) 291 - 1400

September 18, 2012

Mr. Steve Palmer
23873 Clinton Keith Rd., Ste 201
Wildomar, CA 92595

Subject: Wildomar 23 PAR No. 12-0058 Traffic Study Scoping Letter

Dear Mr. Palmer:

Trames Solutions is pleased to submit the following traffic study scoping letter for PAR No. 12-0058. It is our understanding that the project consists of 67 single family residential units (See Figure A) and will be constructed by 2015. The site is located south of Prielipp Road and west of Elizabeth lane in the City of Wildomar.

Key Assumptions

A supplemental analysis will be conducted to evaluate the impacts of the project traffic heading south on Elizabeth Lane due to storm events rendering Inland Valley Road impassable.

Intersection Locations:

The project is anticipated to travel through the following locations and is proposed to be analyzed in the traffic study. Figure B illustrates the study area.

1. Prielipp Road/N. Project Driveway
2. Elizabeth Lane/E. Project Driveway
3. Elizabeth Lane/Prielipp Road
4. Inland Valley Dr./Prielipp Road
5. Inland Valley Dr./Clinton Keith Road
6. Nutmeg St./Jackson Ave.

Trip Generation:

Based on the 67 single family residential development, the project is expected to generate 641 trips per day with 51 trips during the AM peak hour and 68 trips during the PM peak hour. These estimates are based on the 8th edition of the ITE Trip Generation Manual.

Trip Distribution:

It is anticipated that 30% of the project traffic will head west on Clinton Keith Road, 20% will head east on Clinton Keith Road, 20% will head west on Nutmeg St., 10% will head

east on Nutmeg St., and 20% will head south on Jackson Ave. The attached Figure C illustrates the expected project travel patterns under normal conditions.

During severe storm events when Inland Valley Drive is impassable, all of the project traffic is expected to be diverted to the south. Figure D illustrates the alternative project travel patterns.

Ambient Growth

A two percent annual ambient growth rate will be used.

Analysis Timeframe:

Weekday (7-9 AM & 4-6 PM)

1. Existing
2. Existing + Ambient + Cumulative
3. Existing + Ambient + Cumulative + Project + Prielipp Road Project

Please review the traffic assumptions identified above and let me know if you have any questions.

Respectfully submitted,

Trames Solutions Inc.

Scott Sato, P.E.

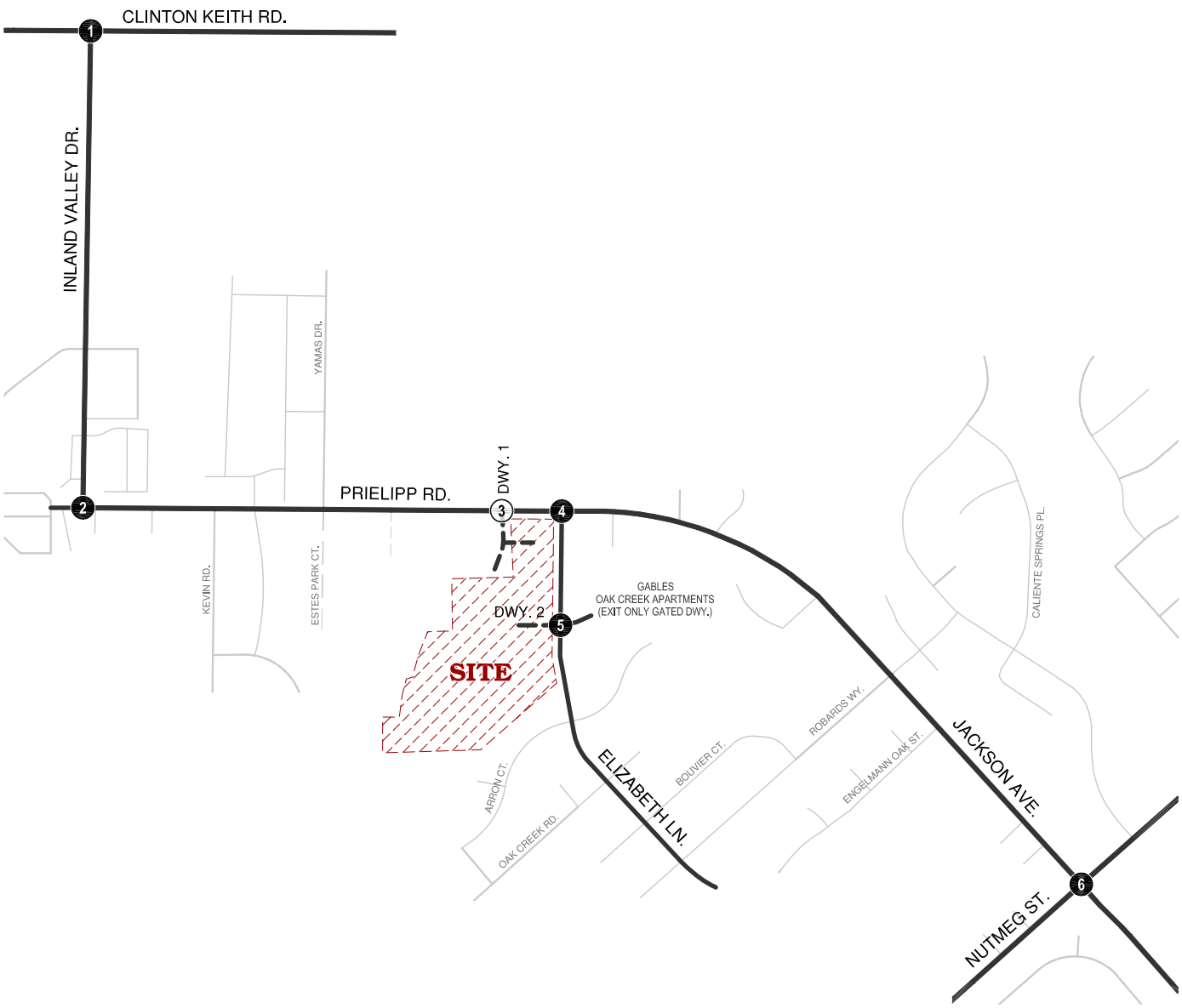
Senior Associate
scott@tramessolutions.com
(949) 244-2436

FIGURE A

SITE PLAN

N

FIGURE B
STUDY AREA



LEGEND:

- 5 = EXISTING INTERSECTION ANALYSIS LOCATION
- (1) = FUTURE INTERSECTION ANALYSIS LOCATION
- = FUTURE ROADWAY

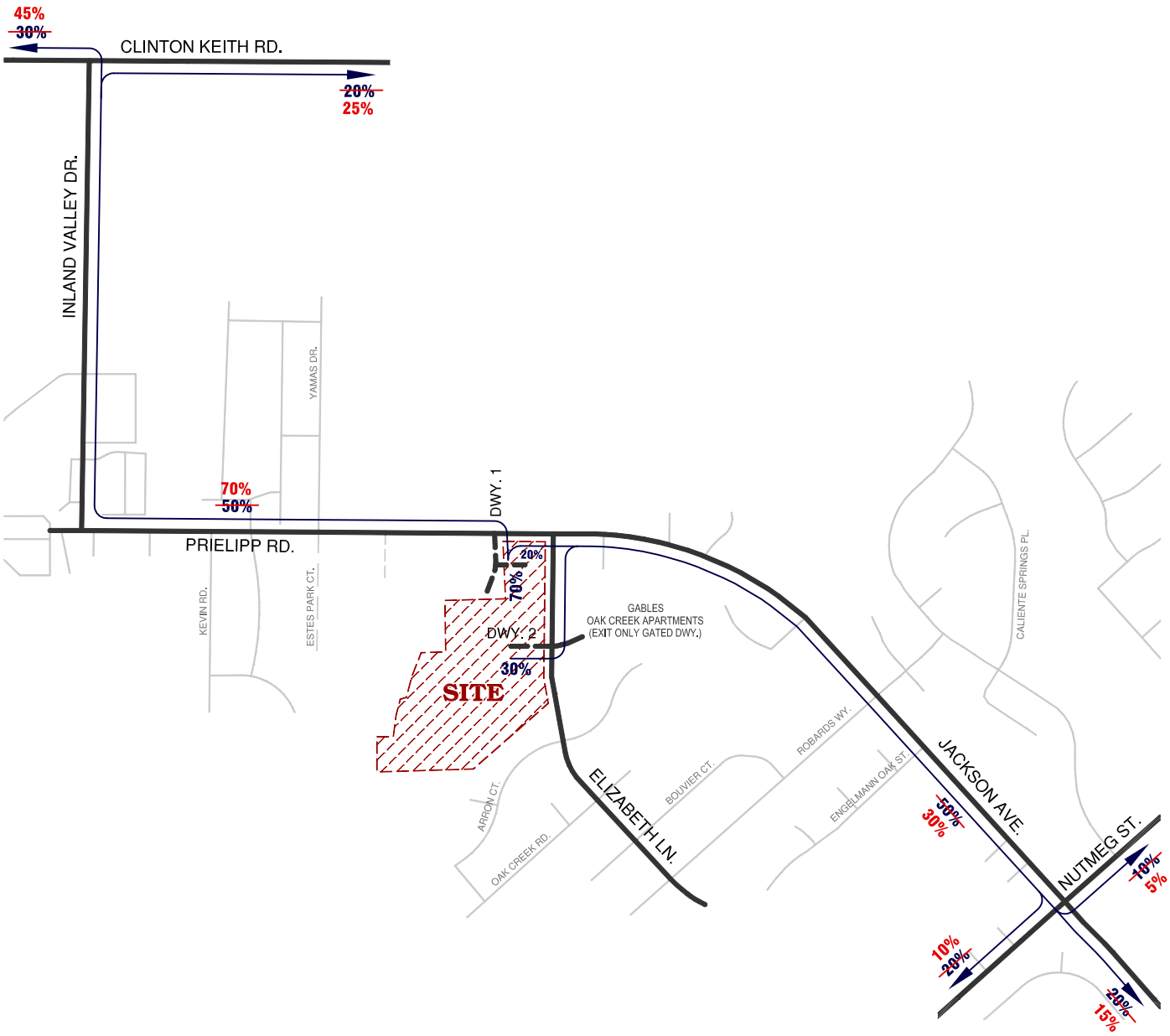
N

Wildomar 23 PAR No. 12-0058 Traffic Study
City of Wildomar, CA (JN0068-0001:01.dwg)

TRAMES SOLUTIONS INC.

FIGURE C

PROJECT TRIP DISTRIBUTION



LEGEND:

10% = PERCENT TO/FROM PROJECT

10% = CITY COMMENTS (09/18/2012)

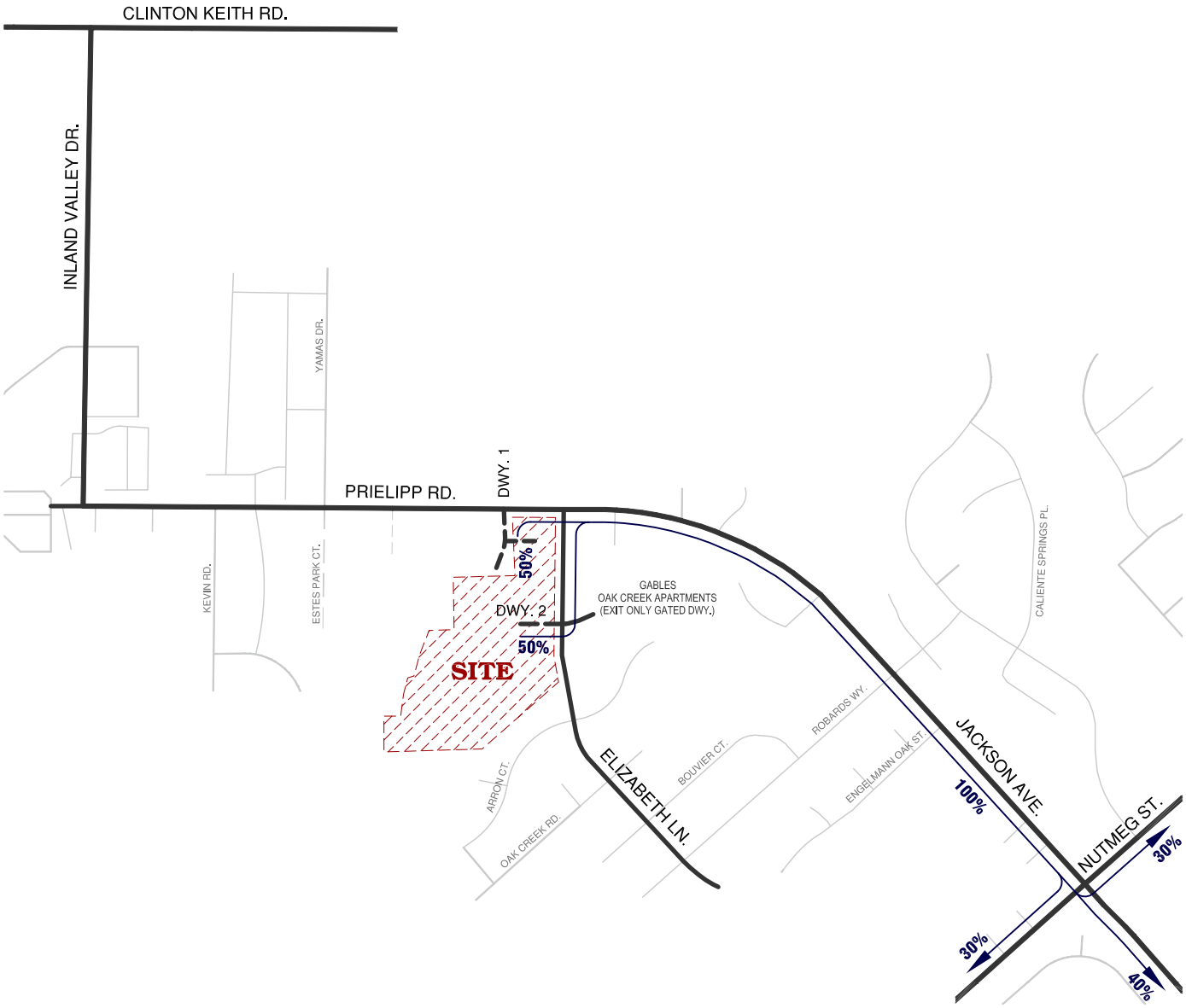
N

Wildomar 23 PAR No. 12-0058 Traffic Study
City of Wildomar, CA (JN0068-0001:03.dwg)

TRAMES SOLUTIONS INC.

FIGURE D

ALTERNATIVE PROJECT TRIP DISTRIBUTION



City of Wildomar Comments

From: "Warren Repke" <wrepke@cityofwildomar.org>
Date: October 1, 2012, 4:31:51 PM PDT
To: <scott@tramessolutions.com>
Subject: Wildomar 23 PAR No. 12-0058 Traffic Study Scope

Hi scott
I have reviewed the scoping letter dated 9-18-12 for the subject project traffic study and have the following comments:

1. I believe the trip distribution percentages shown should be more waited toward the west and the 15 Fwy. Something like 70% on Prielipp and 30% on Jackson with 45% on west Clinton Keith, 25% on east Clinton Kieth, 10% on west Nutmeg, 5% east on Nutmeg and 15% on south Jackson. These are my thoughts only for your consideration.
2. The impacts of the Oak Creek development currently under construction at the SE corner of Clinton Keith and Inland Valley should be addressed in the study.

Warren Repke PE
City of Wildomar
951-677-7751 x208

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APPENDIX B

TRAFFIC COUNT WORKSHEETS

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Wildomar
N/S: Inland Valley Drive
E/W: Clinton Keith Road
Weather: Sunny

File Name : MURIVCLAM
Site Code : 00000036
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

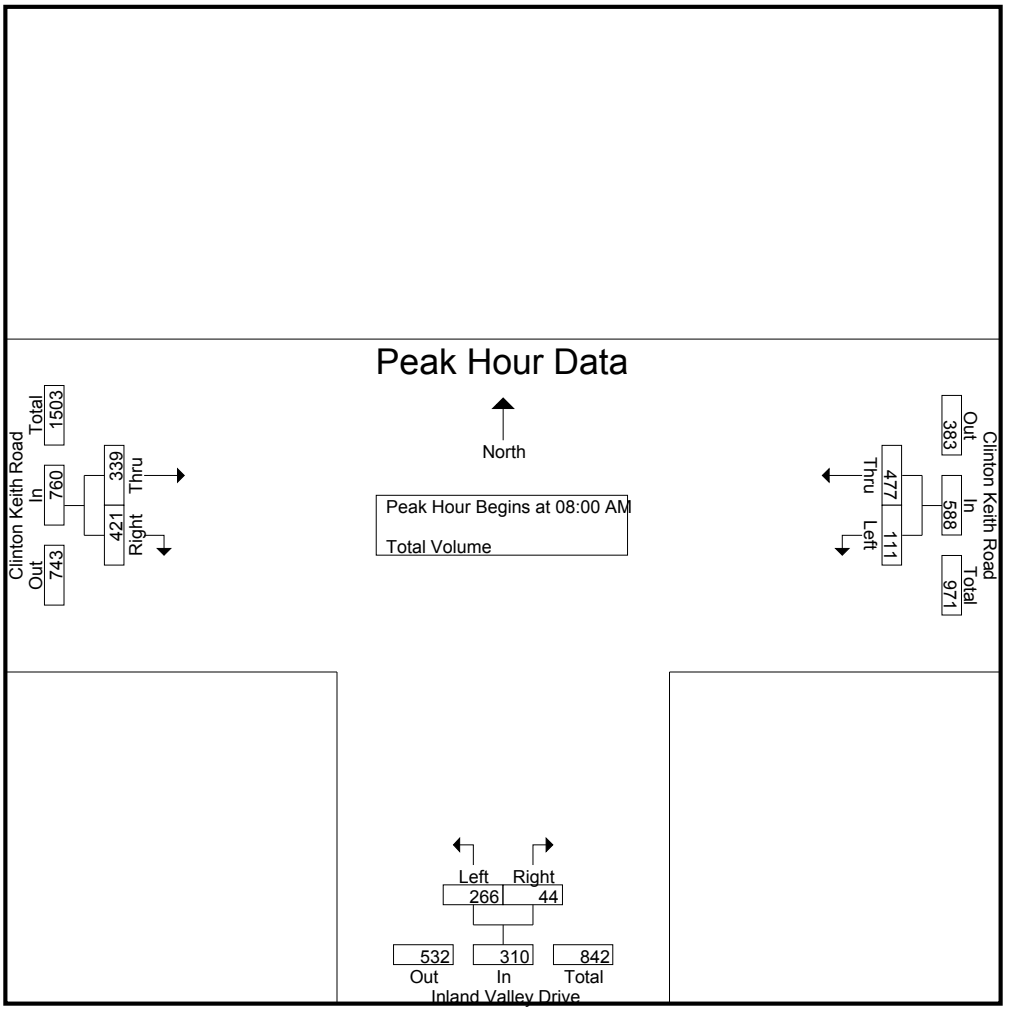
	Clinton Keith Road Westbound			Inland Valley Drive Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	12	160	172	47	3	50	75	46	121	343
07:15 AM	9	137	146	47	3	50	62	63	125	321
07:30 AM	23	169	192	49	11	60	79	69	148	400
07:45 AM	33	109	142	55	12	67	91	89	180	389
Total	77	575	652	198	29	227	307	267	574	1453
08:00 AM	24	102	126	54	14	68	92	91	183	377
08:15 AM	35	135	170	64	11	75	68	122	190	435
08:30 AM	22	129	151	70	5	75	83	92	175	401
08:45 AM	30	111	141	78	14	92	96	116	212	445
Total	111	477	588	266	44	310	339	421	760	1658
Grand Total	188	1052	1240	464	73	537	646	688	1334	3111
Apprch %	15.2	84.8		86.4	13.6		48.4	51.6		
Total %	6	33.8	39.9	14.9	2.3	17.3	20.8	22.1	42.9	

	Clinton Keith Road Westbound			Inland Valley Drive Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	24	102	126	54	**14**	68	92	91	183	377
08:15 AM	**35**	**135**	**170**	64	11	75	68	**122**	190	435
08:30 AM	22	129	151	70	5	75	83	92	175	401
08:45 AM	30	111	141	**78**	14	**92**	**96**	116	**212**	**445**
Total Volume	111	477	588	266	44	310	339	421	760	1658
% App. Total	18.9	81.1		85.8	14.2		44.6	55.4		
PHF	.793	.883	.865	.853	.786	.842	.883	.863	.896	.931

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Wildomar
N/S: Inland Valley Drive
E/W: Clinton Keith Road
Weather: Sunny

File Name : MURIVCLAM
Site Code : 00000036
Start Date : 10/4/2012
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM			08:00 AM			08:00 AM		
+0 mins.	12	160	172	54	**14**	68	92	91	183
+15 mins.	9	137	146	64	11	75	68	**122**	190
+30 mins.	23	**169**	**192**	70	5	75	83	92	175
+45 mins.	**33**	109	142	**78**	14	**92**	**96**	116	**212**
Total Volume	77	575	652	266	44	310	339	421	760
% App. Total	11.8	88.2		85.8	14.2		44.6	55.4	
PHF	.583	.851	.849	.853	.786	.842	.883	.863	.896

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Wildomar
N/S: Inland Valley Drive
E/W: Clinton Keith Road
Weather: Sunny

File Name : MURIVCLPM
Site Code : 00000036
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

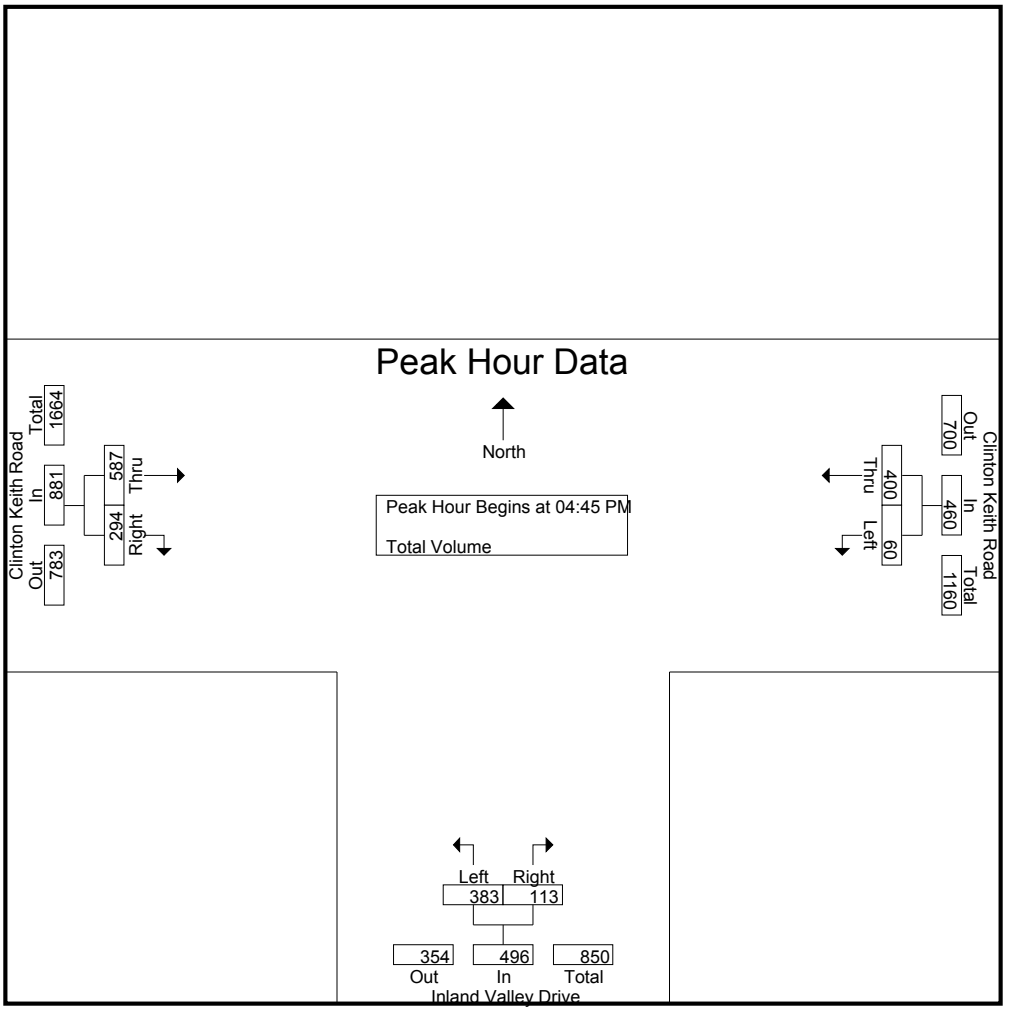
	Clinton Keith Road Westbound			Inland Valley Drive Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	20	85	105	96	24	120	148	75	223	448
04:15 PM	12	92	104	87	23	110	144	76	220	434
04:30 PM	12	86	98	66	35	101	141	64	205	404
04:45 PM	12	103	115	100	19	119	138	76	214	448
Total	56	366	422	349	101	450	571	291	862	1734
05:00 PM	14	97	111	113	43	156	132	84	216	483
05:15 PM	22	99	121	78	21	99	157	73	230	450
05:30 PM	12	101	113	92	30	122	160	61	221	456
05:45 PM	9	103	112	94	22	116	147	72	219	447
Total	57	400	457	377	116	493	596	290	886	1836
Grand Total	113	766	879	726	217	943	1167	581	1748	3570
Apprch %	12.9	87.1		77	23		66.8	33.2		
Total %	3.2	21.5	24.6	20.3	6.1	26.4	32.7	16.3	49	

	Clinton Keith Road Westbound			Inland Valley Drive Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	12	**103**	115	100	19	119	138	76	214	448
05:00 PM	14	97	111	**113**	**43**	**156**	132	**84**	216	**483**
05:15 PM	**22**	99	**121**	78	21	99	157	73	**230**	450
05:30 PM	12	101	113	92	30	122	**160**	61	221	456
Total Volume	60	400	460	383	113	496	587	294	881	1837
% App. Total	13	87		77.2	22.8		66.6	33.4		
PHF	.682	.971	.950	.847	.657	.795	.917	.875	.958	.951

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Wildomar
N/S: Inland Valley Drive
E/W: Clinton Keith Road
Weather: Sunny

File Name : MURIVCLPM
Site Code : 00000036
Start Date : 10/4/2012
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM			04:45 PM			05:00 PM		
+0 mins.	12	**103**	115	100	19	119	132	**84**	216
+15 mins.	14	97	111	**113**	**43**	**156**	157	73	**230**
+30 mins.	**22**	99	**121**	78	21	99	**160**	61	221
+45 mins.	12	101	113	92	30	122	147	72	219
Total Volume	60	400	460	383	113	496	596	290	886
% App. Total	13	87		77.2	22.8		67.3	32.7	
PHF	.682	.971	.950	.847	.657	.795	.931	.863	.963

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Wildomar
N/S: Inland Valley Drive
E/W: Prielipp Road
Weather: Sunny

File Name : WDOIVPRAM
Site Code : 00000005
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

	Inland Valley Drive Southbound			Prielipp Road Westbound			Prielipp Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	27	9	36	7	44	51	2	3	5	92
07:15 AM	19	4	23	0	18	18	1	2	3	44
07:30 AM	13	0	13	1	16	17	2	0	2	32
07:45 AM	42	13	55	1	45	46	4	1	5	106
Total	101	26	127	9	123	132	9	6	15	274
08:00 AM	41	15	56	4	52	56	6	3	9	121
08:15 AM	44	9	53	3	50	53	3	0	3	109
08:30 AM	51	8	59	2	56	58	1	2	3	120
08:45 AM	45	4	49	0	61	61	1	0	1	111
Total	181	36	217	9	219	228	11	5	16	461
Grand Total	282	62	344	18	342	360	20	11	31	735
Apprch %	82	18		5	95		64.5	35.5		
Total %	38.4	8.4	46.8	2.4	46.5	49	2.7	1.5	4.2	

	Inland Valley Drive Southbound			Prielipp Road Westbound			Prielipp Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	41	**15**	56	**4**	52	56	**6**	**3**	**9**	**121**
08:15 AM	44	9	53	3	50	53	3	0	3	109
08:30 AM	**51**	8	**59**	2	56	58	1	2	3	120
08:45 AM	45	4	49	0	**61**	**61**	1	0	1	111
Total Volume	181	36	217	9	219	228	11	5	16	461
% App. Total	83.4	16.6		3.9	96.1		68.8	31.2		
PHF	.887	.600	.919	.563	.898	.934	.458	.417	.444	.952

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City of Wildomar
N/S: Inland Valley Drive
E/W: Prielipp Road
Weather: Sunny

File Name : WDOIVPRAM
Site Code : 00000005
Start Date : 10/4/2012
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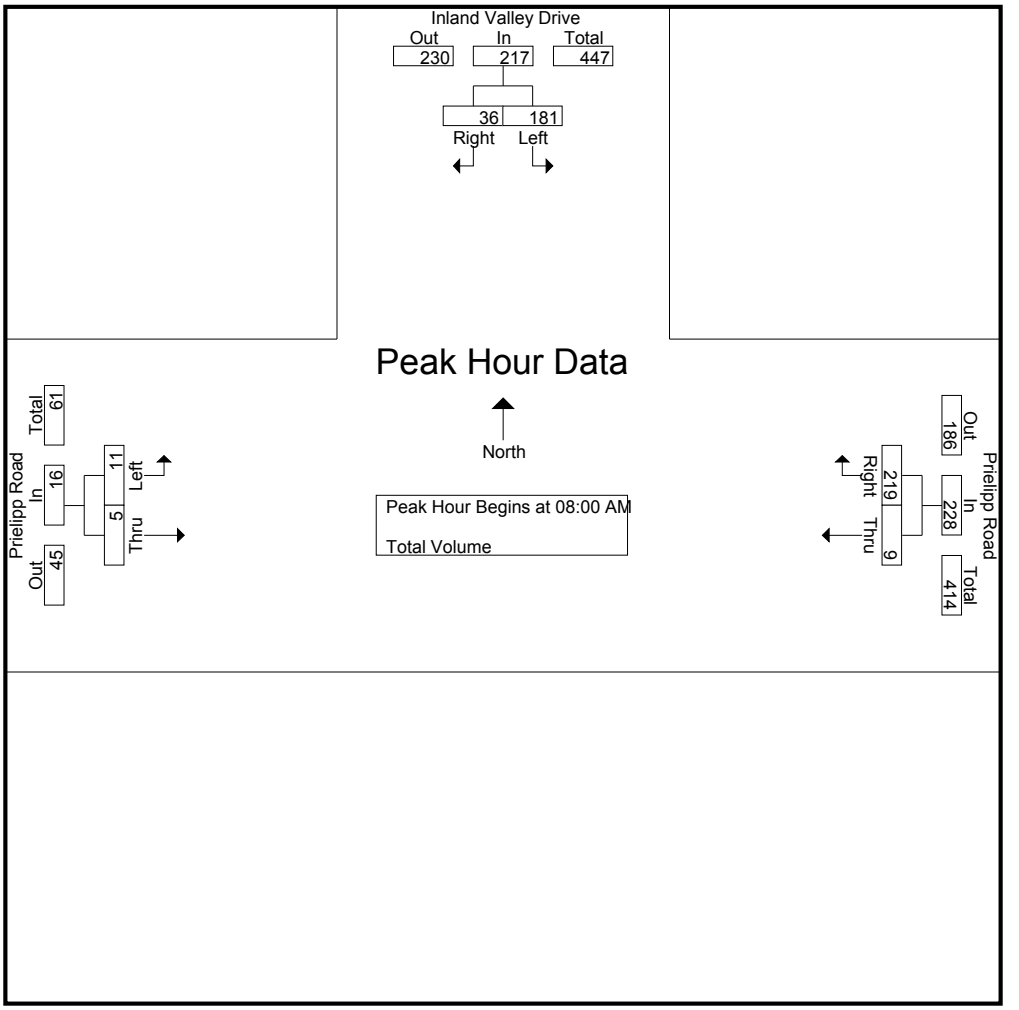

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM			08:00 AM			07:45 AM		
+0 mins.	42	13	55	**4**	52	56	4	1	5
+15 mins.	41	**15**	56	3	50	53	**6**	**3**	**9**
+30 mins.	44	9	53	2	56	58	3	0	3
+45 mins.	**51**	8	**59**	0	**61**	**61**	1	2	3
Total Volume	178	45	223	9	219	228	14	6	20
% App. Total	79.8	20.2		3.9	96.1		70	30	
PHF	.873	.750	.945	.563	.898	.934	.583	.500	.556

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City of Wildomar
N/S: Inland Valley Drive
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File Name : WDOIVPRPM
Site Code : 00000005
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Groups Printed- Total Volume

	Inland Valley Drive Southbound			Prielipp Road Westbound			Prielipp Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	40	2	42	2	61	63	9	4	13	118
04:15 PM	48	2	50	1	49	50	5	2	7	107
04:30 PM	55	2	57	0	39	39	7	3	10	106
04:45 PM	64	2	66	0	41	41	8	4	12	119
Total	207	8	215	3	190	193	29	13	42	450
05:00 PM	82	3	85	1	57	58	8	2	10	153
05:15 PM	55	3	58	0	41	41	6	2	8	107
05:30 PM	48	2	50	0	46	46	6	4	10	106
05:45 PM	65	0	65	1	55	56	5	4	9	130
Total	250	8	258	2	199	201	25	12	37	496
Grand Total	457	16	473	5	389	394	54	25	79	946
Apprch %	96.6	3.4		1.3	98.7		68.4	31.6		
Total %	48.3	1.7	50	0.5	41.1	41.6	5.7	2.6	8.4	

	Inland Valley Drive Southbound			Prielipp Road Westbound			Prielipp Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	**82**	**3**	**85**	**1**	**57**	**58**	**8**	2	**10**	**153**
05:15 PM	55	3	58	0	41	41	6	2	8	107
05:30 PM	48	2	50	0	46	46	6	**4**	10	106
05:45 PM	65	0	65	1	55	56	5	4	9	130
Total Volume	250	8	258	2	199	201	25	12	37	496
% App. Total	96.9	3.1		1	99		67.6	32.4		
PHF	.762	.667	.759	.500	.873	.866	.781	.750	.925	.810

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File Name : WDOIVPRPM
Site Code : 00000005
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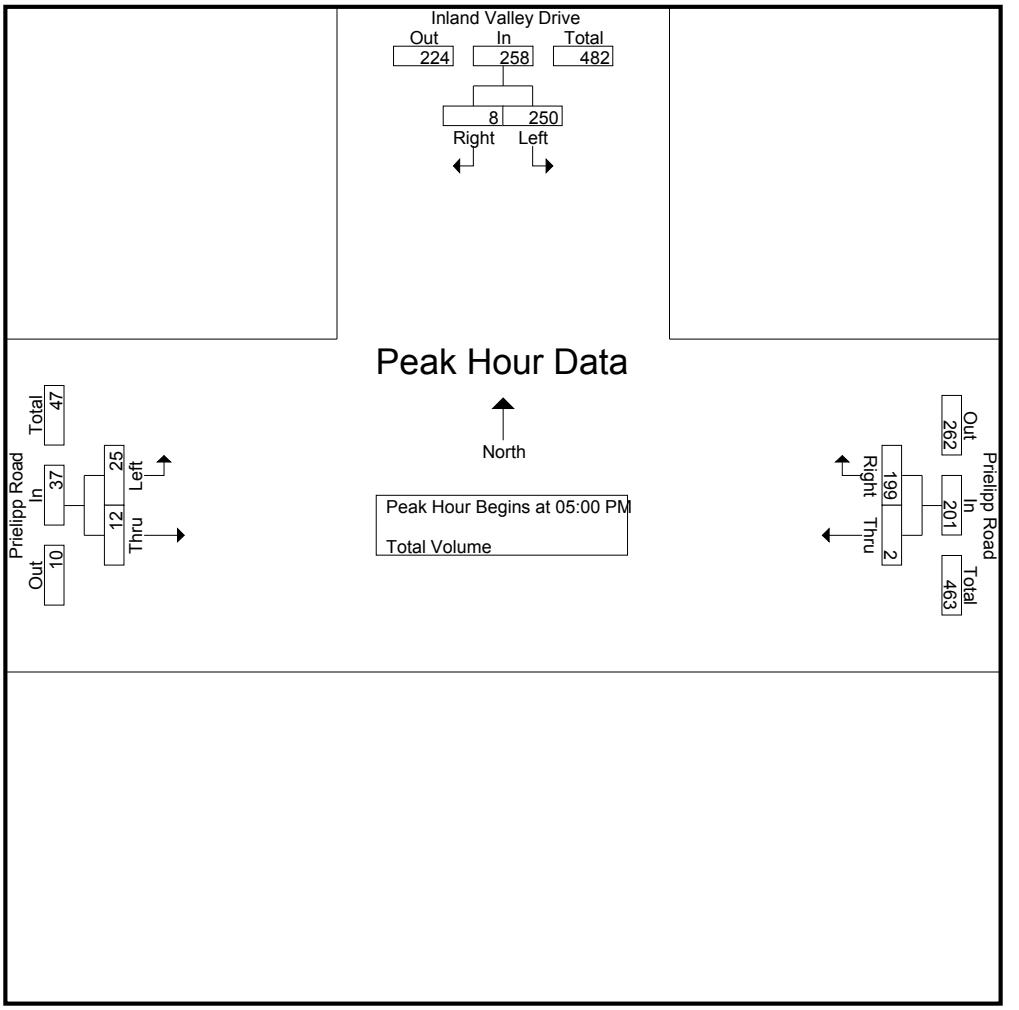

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			05:00 PM			04:00 PM		
+0 mins.	55	2	57	**1**	**57**	**58**	**9**	**4**	**13**
+15 mins.	64	2	66	0	41	41	5	2	7
+30 mins.	**82**	**3**	**85**	0	46	46	7	3	10
+45 mins.	55	3	58	1	55	56	8	4	12
Total Volume	256	10	266	2	199	201	29	13	42
% App. Total	96.2	3.8		1	99		69	31	
PHF	.780	.833	.782	.500	.873	.866	.806	.813	.808

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City of Wildomar
N/S: Elizabeth Lane
E/W: Prielipp Road
Weather: Sunny

File Name : WDOELPRAM
Site Code : 00000001
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

	Prielipp Road Westbound			Elizabeth Lane Northbound			Prielipp Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	1	36	37	9	3	12	31	4	35	84
07:15 AM	0	39	39	3	7	10	26	1	27	76
07:30 AM	2	45	47	7	9	16	24	1	25	88
07:45 AM	1	44	45	6	3	9	26	2	28	82
Total	4	164	168	25	22	47	107	8	115	330
08:00 AM	3	33	36	2	8	10	30	0	30	76
08:15 AM	2	47	49	9	2	11	32	0	32	92
08:30 AM	2	52	54	6	2	8	35	7	42	104
08:45 AM	2	40	42	4	1	5	35	4	39	86
Total	9	172	181	21	13	34	132	11	143	358
Grand Total	13	336	349	46	35	81	239	19	258	688
Apprch %	3.7	96.3		56.8	43.2		92.6	7.4		
Total %	1.9	48.8	50.7	6.7	5.1	11.8	34.7	2.8	37.5	

	Prielipp Road Westbound			Elizabeth Lane Northbound			Prielipp Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**3**	33	36	2	**8**	10	30	0	30	76
08:15 AM	2	47	49	**9**	2	**11**	32	0	32	92
08:30 AM	2	**52**	**54**	6	2	8	**35**	**7**	**42**	**104**
08:45 AM	2	40	42	4	1	5	35	4	39	86
Total Volume	9	172	181	21	13	34	132	11	143	358
% App. Total	5	95		61.8	38.2		92.3	7.7		
PHF	.750	.827	.838	.583	.406	.773	.943	.393	.851	.861

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City of Wildomar
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File Name : WDOELPRAM
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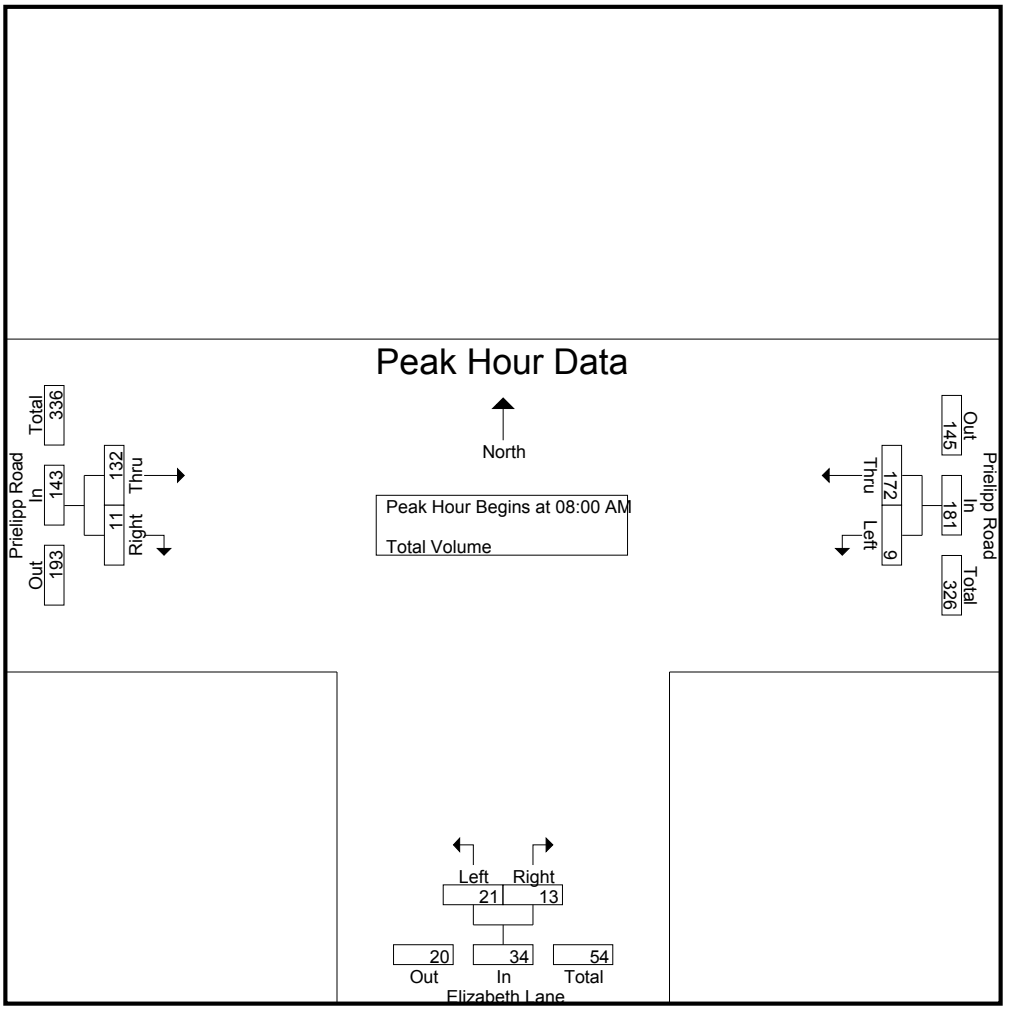

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45 AM			07:00 AM			08:00 AM		
+0 mins.	1	44	45	**9**	3	12	30	0	30
+15 mins.	**3**	33	36	3	7	10	32	0	32
+30 mins.	2	47	49	7	**9**	**16**	**35**	**7**	**42**
+45 mins.	2	**52**	**54**	6	3	9	35	4	39
Total Volume	8	176	184	25	22	47	132	11	143
% App. Total	4.3	95.7		53.2	46.8		92.3	7.7	
PHF	.667	.846	.852	.694	.611	.734	.943	.393	.851

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City of Wildomar
N/S: Elizabeth Lane
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Weather: Sunny

File Name : WDOELPRPM
Site Code : 00000001
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

	Prielipp Road Westbound			Elizabeth Lane Northbound			Prielipp Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	2	41	43	4	3	7	61	3	64	114
04:15 PM	2	31	33	2	4	6	64	3	67	106
04:30 PM	2	33	35	5	4	9	55	4	59	103
04:45 PM	2	32	34	5	3	8	66	6	72	114
Total	8	137	145	16	14	30	246	16	262	437
05:00 PM	4	34	38	4	4	8	86	6	92	138
05:15 PM	1	38	39	9	4	13	51	3	54	106
05:30 PM	4	37	41	4	3	7	62	7	69	117
05:45 PM	4	45	49	3	5	8	50	8	58	115
Total	13	154	167	20	16	36	249	24	273	476
Grand Total	21	291	312	36	30	66	495	40	535	913
Apprch %	6.7	93.3		54.5	45.5		92.5	7.5		
Total %	2.3	31.9	34.2	3.9	3.3	7.2	54.2	4.4	58.6	

	Prielipp Road Westbound			Elizabeth Lane Northbound			Prielipp Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	**4**	34	38	4	4	8	**86**	6	**92**	**138**
05:15 PM	1	38	39	**9**	4	**13**	51	3	54	106
05:30 PM	4	37	41	4	3	7	62	7	69	117
05:45 PM	4	**45**	**49**	3	**5**	8	50	**8**	58	115
Total Volume	13	154	167	20	16	36	249	24	273	476
% App. Total	7.8	92.2		55.6	44.4		91.2	8.8		
PHF	.813	.856	.852	.556	.800	.692	.724	.750	.742	.862

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City of Wildomar
N/S: Elizabeth Lane
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Weather: Sunny

File Name : WDOELPRPM
Site Code : 00000001
Start Date : 10/4/2012

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM			04:30 PM			04:15 PM		
+0 mins.	**4**	34	38	5	**4**	9	64	3	67
+15 mins.	1	38	39	5	3	8	55	4	59
+30 mins.	4	37	41	4	4	8	66	**6**	72
+45 mins.	4	**45**	**49**	**9**	4	**13**	**86**	6	**92**
Total Volume	13	154	167	23	15	38	271	19	290
% App. Total	7.8	92.2		60.5	39.5		93.4	6.6	
PHF	.813	.856	.852	.639	.938	.731	.788	.792	.788

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City of Wildomar
N/S: Nutmeg Street
E/W: Jackson Avenue
Weather: Sunny

File Name : WDONUJAAM
Site Code : 00000037
Start Date : 10/4/2012
Page No : 1

Groups Printed- Total Volume

	Nutmeg Street Southbound				Jackson Avenue Westbound				Nutmeg Street Northbound				Jackson Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	43	131	7	181	6	8	15	29	8	61	11	80	10	33	7	50	340
07:15 AM	51	76	5	132	10	16	19	45	9	69	9	87	9	39	11	59	323
07:30 AM	65	44	5	114	17	21	22	60	9	73	14	96	13	32	8	53	323
07:45 AM	43	51	9	103	19	20	25	64	10	60	17	87	15	34	4	53	307
Total	202	302	26	530	52	65	81	198	36	263	51	350	47	138	30	215	1293
08:00 AM	51	43	11	105	17	17	18	52	7	57	22	86	21	41	9	71	314
08:15 AM	46	81	17	144	20	23	24	67	12	62	21	95	16	37	10	63	369
08:30 AM	44	79	13	136	19	24	21	64	8	59	18	85	8	40	7	55	340
08:45 AM	41	62	9	112	20	19	17	56	11	55	19	85	10	32	6	48	301
Total	182	265	50	497	76	83	80	239	38	233	80	351	55	150	32	237	1324
Grand Total	384	567	76	1027	128	148	161	437	74	496	131	701	102	288	62	452	2617
Apprch %	37.4	55.2	7.4		29.3	33.9	36.8		10.6	70.8	18.7		22.6	63.7	13.7		
Total %	14.7	21.7	2.9	39.2	4.9	5.7	6.2	16.7	2.8	19	5	26.8	3.9	11	2.4	17.3	

	Nutmeg Street Southbound				Jackson Avenue Westbound				Nutmeg Street Northbound				Jackson Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	43	51	9	103	19	20	**25**	64	10	60	17	87	15	34	4	53	307
08:00 AM	**51**	43	11	105	17	17	18	52	7	57	**22**	86	**21**	**41**	9	**71**	314
08:15 AM	46	**81**	**17**	**144**	**20**	23	24	**67**	**12**	**62**	21	**95**	16	37	**10**	63	**369**
08:30 AM	44	79	13	136	19	**24**	21	64	8	59	18	85	8	40	7	55	340
Total Volume	184	254	50	488	75	84	88	247	37	238	78	353	60	152	30	242	1330
% App. Total	37.7	52	10.2		30.4	34	35.6		10.5	67.4	22.1		24.8	62.8	12.4		
PHF	.902	.784	.735	.847	.938	.875	.880	.922	.771	.960	.886	.929	.714	.927	.750	.852	.901

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City of Wildomar
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File Name : WDONUJAAM
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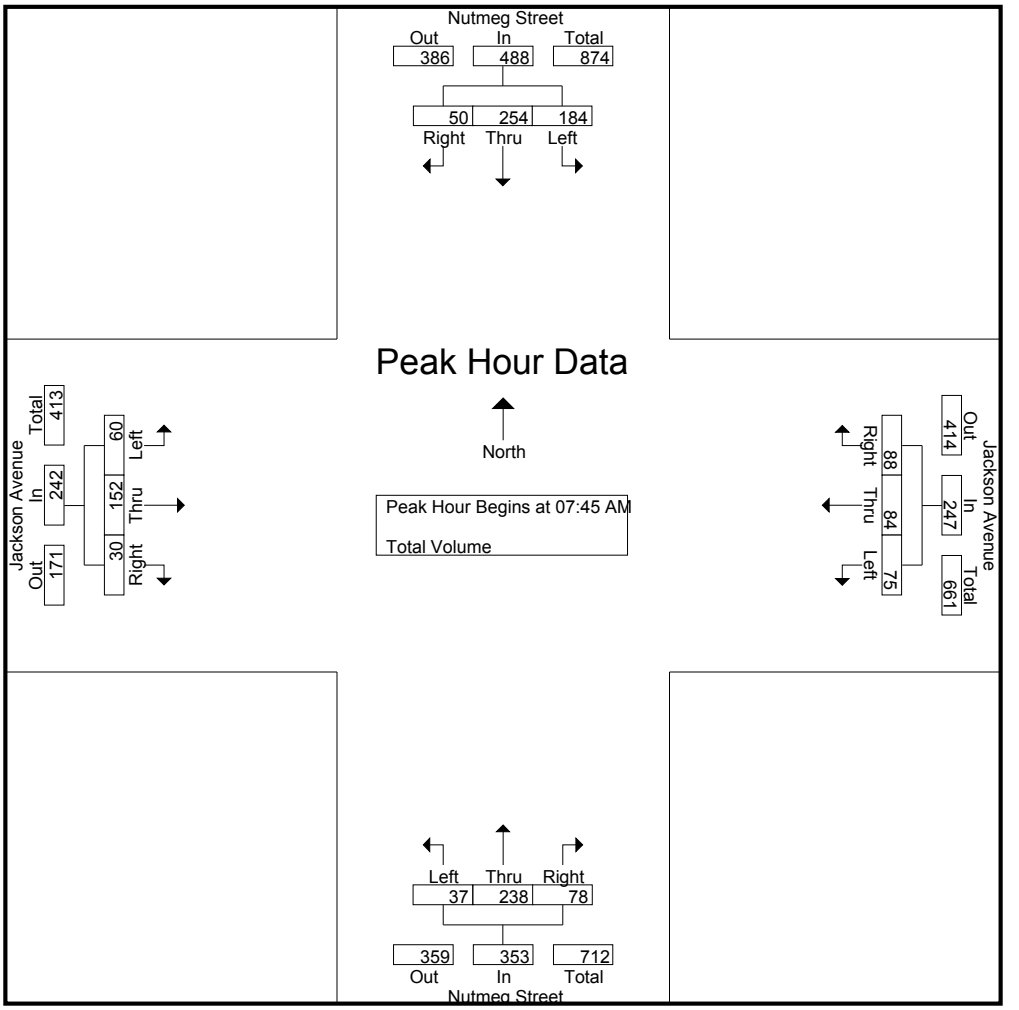

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:30 AM				07:45 AM			
+0 mins.	43	**131**	7	**181**	19	20	**25**	64	9	**73**	14	**96**	15	34	4	53
+15 mins.	51	76	5	132	17	17	18	52	10	60	17	87	**21**	**41**	9	**71**
+30 mins.	**65**	44	5	114	**20**	23	24	**67**	7	57	**22**	86	16	37	**10**	63
+45 mins.	43	51	**9**	103	19	**24**	21	64	**12**	62	21	95	8	40	7	55
Total Volume	202	302	26	530	75	84	88	247	38	252	74	364	60	152	30	242
% App. Total	38.1	57	4.9		30.4	34	35.6		10.4	69.2	20.3		24.8	62.8	12.4	
PHF	.777	.576	.722	.732	.938	.875	.880	.922	.792	.863	.841	.948	.714	.927	.750	.852

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City of Wildomar
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Groups Printed- Total Volume

	Nutmeg Street Southbound				Jackson Avenue Westbound				Nutmeg Street Northbound				Jackson Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	21	64	7	92	33	51	37	121	7	44	13	64	15	41	13	69	346
04:15 PM	23	69	6	98	36	49	35	120	9	45	19	73	19	45	10	74	365
04:30 PM	35	61	9	105	31	43	40	114	9	39	20	68	13	39	7	59	346
04:45 PM	37	63	10	110	28	47	49	124	12	51	21	84	22	46	10	78	396
Total	116	257	32	405	128	190	161	479	37	179	73	289	69	171	40	280	1453
05:00 PM	31	58	13	102	35	44	46	125	10	55	16	81	27	36	13	76	384
05:15 PM	26	55	10	91	36	45	43	124	13	49	20	82	19	39	10	68	365
05:30 PM	31	60	8	99	36	41	38	115	9	53	24	86	23	39	11	73	373
05:45 PM	25	49	12	86	40	35	44	119	8	58	15	81	18	31	9	58	344
Total	113	222	43	378	147	165	171	483	40	215	75	330	87	145	43	275	1466
Grand Total	229	479	75	783	275	355	332	962	77	394	148	619	156	316	83	555	2919
Apprch %	29.2	61.2	9.6		28.6	36.9	34.5		12.4	63.7	23.9		28.1	56.9	15		
Total %	7.8	16.4	2.6	26.8	9.4	12.2	11.4	33	2.6	13.5	5.1	21.2	5.3	10.8	2.8	19	

	Nutmeg Street Southbound				Jackson Avenue Westbound				Nutmeg Street Northbound				Jackson Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**37**	**63**	10	**110**	28	**47**	**49**	124	12	51	21	84	22	**46**	10	**78**	**396**
05:00 PM	31	58	**13**	102	35	44	46	**125**	10	**55**	16	81	**27**	36	**13**	76	384
05:15 PM	26	55	10	91	**36**	45	43	124	**13**	49	20	82	19	39	10	68	365
05:30 PM	31	60	8	99	36	41	38	115	9	53	**24**	**86**	23	39	11	73	373
Total Volume	125	236	41	402	135	177	176	488	44	208	81	333	91	160	44	295	1518
% App. Total	31.1	58.7	10.2		27.7	36.3	36.1		13.2	62.5	24.3		30.8	54.2	14.9		
PHF	.845	.937	.788	.914	.938	.941	.898	.976	.846	.945	.844	.968	.843	.870	.846	.946	.958

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Start Date : 10/4/2012
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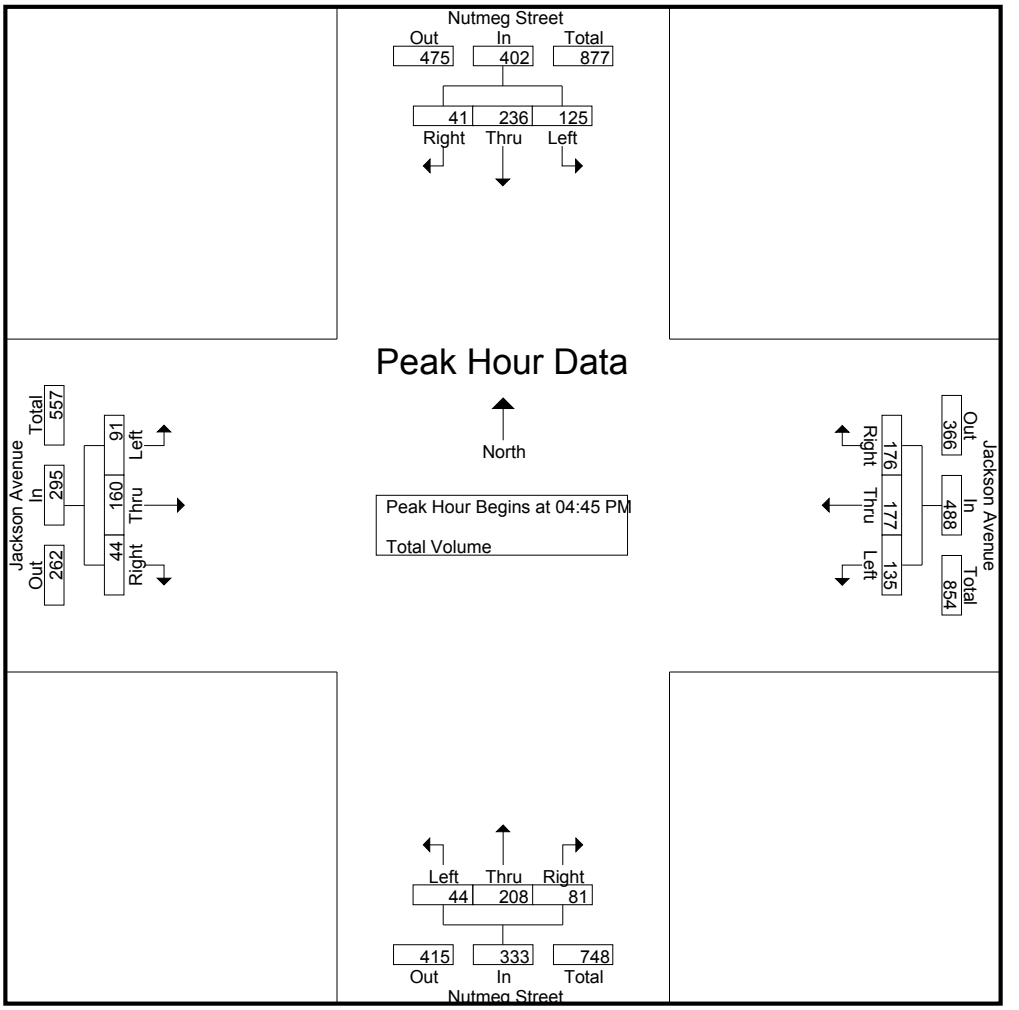

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	23	**69**	6	98	28	**47**	**49**	124	12	51	21	84	22	**46**	10	**78**
+15 mins.	35	61	9	105	35	44	46	**125**	10	**55**	16	81	**27**	36	**13**	76
+30 mins.	**37**	63	10	**110**	**36**	45	43	124	**13**	49	20	82	19	39	10	68
+45 mins.	31	58	**13**	102	36	41	38	115	9	53	**24**	**86**	23	39	11	73
Total Volume	126	251	38	415	135	177	176	488	44	208	81	333	91	160	44	295
% App. Total	30.4	60.5	9.2		27.7	36.3	36.1		13.2	62.5	24.3		30.8	54.2	14.9	
PHF	.851	.909	.731	.943	.938	.941	.898	.976	.846	.945	.844	.968	.843	.870	.846	.946

APPENDIX C

EXISTING CONDITIONS
INTERSECTION ANALYSIS CALCULATION WORKSHEETS

Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.559
Loss Time (sec):	16	Average Delay (sec/veh):	21.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	0
Volume Module:																
Base Vol:	266	0	44		0	0	0		0	339	421		111	477	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	266	0	44		0	0	0		0	339	421		111	477	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	266	0	44		0	0	0		0	339	421		111	477	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	266	0	44		0	0	0		0	339	421		111	477	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	266	0	44		0	0	0		0	339	421		111	477	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.15	0.00	0.03		0.00	0.00	0.00		0.00	0.18	0.26		0.06	0.25	0.00	
Crit Moves:	****										****		****			
Green/Cycle:	0.26	0.00	0.26		0.00	0.00	0.00		0.00	0.47	0.47		0.11	0.58	0.00	
Volume/Cap:	0.56	0.00	0.10		0.00	0.00	0.00		0.00	0.38	0.56		0.56	0.44	0.00	
Delay/Veh:	33.3	0.0	28.0		0.0	0.0	0.0		0.0	17.6	20.2		45.7	12.3	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	33.3	0.0	28.0		0.0	0.0	0.0		0.0	17.6	20.2		45.7	12.3	0.0	
LOS by Move:	C	A	C		A	A	A		A	B	C		D	B	A	
HCM2kAvgQ:	8	0	1		0	0	0		0	7	10		4	8	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.287
Loss Time (sec):	0	Average Delay (sec/veh):	9.2
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0	0 0	1	0	0 0	1	0	1 0	0	1
Volume Module:												
Base Vol:	0	0	0	181	0	36	11	5	0	0	9	219
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	181	0	36	11	5	0	0	9	219
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	181	0	36	11	5	0	0	9	219
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	181	0	36	11	5	0	0	9	219
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	181	0	36	11	5	0	0	9	219
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.69	0.31	0.00	0.00	1.00	1.00
Final Sat.:	0	644	0	630	0	795	435	198	0	0	684	793
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.29	xxxx	0.05	0.03	0.03	xxxx	xxxx	0.01	0.28
Crit Moves:		****		****				****				****
Delay/Veh:	0.0	0.0	0.0	10.4	0.0	7.2	8.6	8.6	0.0	0.0	7.9	8.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	10.4	0.0	7.2	8.6	8.6	0.0	0.0	7.9	8.7
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			9.9			8.6			8.7		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			9.9			8.6			8.7		
LOS by Appr:	*			A			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.1 Worst Case Level Of Service: B[10.1]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0 0	1	0	1 0 0	1	0
Volume Module:												
Base Vol:	21	0	13	0	0	0	0	132	11	9	172	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	0	13	0	0	0	0	132	11	9	172	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	0	13	0	0	0	0	132	11	9	172	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	0	13	0	0	0	0	132	11	9	172	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	328	328	138	334	333	172	xxxx	xxxx	xxxxx	143	xxxx	xxxxx
Potent Cap.:	671	594	916	623	590	877	xxxx	xxxx	xxxxx	1452	xxxx	xxxxx
Move Cap.:	668	591	916	612	587	877	xxxx	xxxx	xxxxx	1452	xxxx	xxxxx
Volume/Cap:	0.03	0.00	0.01	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	745	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	10.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	10.1			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.341
Loss Time (sec):	16	Average Delay (sec/veh):	30.7
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	75	84	88		60	152	30		37	238	78		184	254	50	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	75	84	88		60	152	30		37	238	78		184	254	50	
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	75	84	88		60	152	30		37	238	78		184	254	50	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	75	84	88		60	152	30		37	238	78		184	254	50	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	75	84	88		60	152	30		37	238	78		184	254	50	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	75	84	88		60	152	30		37	238	78		184	254	50	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.93	0.93		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.67	0.33		1.00	1.51	0.49		1.00	1.67	0.33	
Final Sat.:	1805	1900	1615		1805	2940	580		1805	2618	858		1805	2941	579	
Capacity Analysis Module:																
Vol/Sat:	0.04	0.04	0.05		0.03	0.05	0.05		0.02	0.09	0.09		0.10	0.09	0.09	
Crit Moves:	****					****				****			****			
Green/Cycle:	0.10	0.28	0.28		0.10	0.28	0.28		0.12	0.29	0.29		0.17	0.34	0.34	
Volume/Cap:	0.42	0.16	0.19		0.33	0.18	0.18		0.17	0.31	0.31		0.60	0.25	0.25	
Delay/Veh:	43.8	27.3	27.6		43.0	27.4	27.4		40.1	27.9	27.9		41.6	23.8	23.8	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	43.8	27.3	27.6		43.0	27.4	27.4		40.1	27.9	27.9		41.6	23.8	23.8	
LOS by Move:	D	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	3	2	2		2	2	2		1	4	4		6	4	4	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.660
Loss Time (sec):	16	Average Delay (sec/veh):	24.7
Optimal Cycle:	64	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	10	10	10	10	27	27	10	24	24	10	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0	0	0 0 0	0	0	1 0 1	1	0	1 0 0
Volume Module:												
Base Vol:	383	0	113	0	0	0	0	587	294	60	400	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	383	0	113	0	0	0	0	587	294	60	400	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	383	0	113	0	0	0	0	587	294	60	400	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	383	0	113	0	0	0	0	587	294	60	400	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	383	0	113	0	0	0	0	587	294	60	400	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	0.95	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1900	1615	1805	1900	0
Capacity Analysis Module:												
Vol/Sat:	0.21	0.00	0.07	0.00	0.00	0.00	0.00	0.31	0.18	0.03	0.21	0.00
Crit Moves:	****							****		****		
Green/Cycle:	0.30	0.00	0.30	0.00	0.00	0.00	0.00	0.44	0.44	0.10	0.54	0.00
Volume/Cap:	0.70	0.00	0.23	0.00	0.00	0.00	0.00	0.70	0.41	0.33	0.39	0.00
Delay/Veh:	35.2	0.0	26.5	0.0	0.0	0.0	0.0	25.5	19.7	43.0	13.7	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	35.2	0.0	26.5	0.0	0.0	0.0	0.0	25.5	19.7	43.0	13.7	0.0
LOS by Move:	D	A	C	A	A	A	A	C	B	D	B	A
HCM2kAvgQ:	12	0	3	0	0	0	0	15	6	2	7	0

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.396
Loss Time (sec):	0	Average Delay (sec/veh):	10.3
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0	0 0	1	0	0 0	1	0	1 0	0	1
Volume Module:												
Base Vol:	0	0	0	250	0	8	25	12	0	0	2	199
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	250	0	8	25	12	0	0	2	199
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	250	0	8	25	12	0	0	2	199
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	250	0	8	25	12	0	0	2	199
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	250	0	8	25	12	0	0	2	199
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.68	0.32	0.00	0.00	1.00	1.00
Final Sat.:	0	632	0	632	0	795	415	199	0	0	657	757
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.40	xxxx	0.01	0.06	0.06	xxxx	xxxx	0.00	0.26
Crit Moves:		****		****				****				****
Delay/Veh:	0.0	0.0	0.0	11.7	0.0	7.1	8.9	8.9	0.0	0.0	8.0	8.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	11.7	0.0	7.1	8.9	8.9	0.0	0.0	8.0	8.8
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			11.6			8.9			8.8		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			11.6			8.9			8.8		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.6	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.3

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: B[10.9]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	20	0	16	0	0	0	0	249	24	13	154	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	0	16	0	0	0	0	249	24	13	154	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	0	16	0	0	0	0	249	24	13	154	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	20	0	16	0	0	0	0	249	24	13	154	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	441	441	261	449	453	154	xxxx	xxxx	xxxxx	273	xxxx	xxxxx
Potent Cap.:	577	513	783	524	506	897	xxxx	xxxx	xxxxx	1302	xxxx	xxxxx
Move Cap.:	573	508	783	509	500	897	xxxx	xxxx	xxxxx	1302	xxxx	xxxxx
Volume/Cap:	0.03	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.8	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	650	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	10.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	10.9			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.372
Loss Time (sec):	16	Average Delay (sec/veh):	32.1
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	135	177	176		91	160	44		44	208	81		125	236	41	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	135	177	176		91	160	44		44	208	81		125	236	41	
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	135	177	176		91	160	44		44	208	81		125	236	41	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	135	177	176		91	160	44		44	208	81		125	236	41	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	135	177	176		91	160	44		44	208	81		125	236	41	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	135	177	176		91	160	44		44	208	81		125	236	41	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.92	0.92		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.57	0.43		1.00	1.44	0.56		1.00	1.70	0.30	
Final Sat.:	1805	1900	1615		1805	2741	754		1805	2489	969		1805	3008	523	
Capacity Analysis Module:																
Vol/Sat:	0.07	0.09	0.11		0.05	0.06	0.06		0.02	0.08	0.08		0.07	0.08	0.08	
Crit Moves:			****		****					****			****			
Green/Cycle:	0.10	0.28	0.28		0.11	0.29	0.29		0.11	0.29	0.29		0.16	0.33	0.33	
Volume/Cap:	0.72	0.33	0.39		0.44	0.20	0.20		0.21	0.29	0.29		0.44	0.24	0.24	
Delay/Veh:	56.3	29.0	29.6		42.9	26.9	26.9		40.7	27.7	27.7		39.4	24.3	24.3	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	56.3	29.0	29.6		42.9	26.9	26.9		40.7	27.7	27.7		39.4	24.3	24.3	
LOS by Move:	E	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	6	4	5		3	2	2		1	4	4		4	3	3	

Note: Queue reported is the number of cars per lane.

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APPENDIX D

EXISTING PLUS AMBIENT PLUS CUMULATIVE
INTERSECTION ANALYSIS CALCULATION WORKSHEETS

Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.615
Loss Time (sec):	16	Average Delay (sec/veh):	22.6
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0
Volume Module:																
Base Vol:	266	0	44		0	0	0		0	339	421		111	477	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	282	0	47		0	0	0		0	359	446		118	506	0	
Added Vol:	5	0	15		0	0	0		0	144	17		10	64	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	287	0	62		0	0	0		0	503	463		128	570	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	287	0	62		0	0	0		0	503	463		128	570	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	287	0	62		0	0	0		0	503	463		128	570	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	287	0	62		0	0	0		0	503	463		128	570	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.16	0.00	0.04		0.00	0.00	0.00		0.00	0.26	0.29		0.07	0.30	0.00	
Crit Moves:	****										****		****			
Green/Cycle:	0.26	0.00	0.26		0.00	0.00	0.00		0.00	0.47	0.47		0.12	0.58	0.00	
Volume/Cap:	0.61	0.00	0.15		0.00	0.00	0.00		0.00	0.57	0.61		0.61	0.52	0.00	
Delay/Veh:	35.1	0.0	28.7		0.0	0.0	0.0		0.0	20.2	21.5		47.6	12.9	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	35.1	0.0	28.7		0.0	0.0	0.0		0.0	20.2	21.5		47.6	12.9	0.0	
LOS by Move:	D	A	C		A	A	A		A	C	C		D	B	A	
HCM2kAvgQ:	9	0	1		0	0	0		0	11	11		5	11	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.353
Loss Time (sec):	0	Average Delay (sec/veh):	9.9
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0	0 0	1	0	0 0	1	0	1 0	0	1
Volume Module:												
Base Vol:	0	0	0	181	0	36	11	5	0	0	9	219
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	192	0	38	12	5	0	0	10	232
Added Vol:	0	0	0	27	0	0	0	0	0	0	0	20
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	219	0	38	12	5	0	0	10	252
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	219	0	38	12	5	0	0	10	252
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	219	0	38	12	5	0	0	10	252
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	219	0	38	12	5	0	0	10	252
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.69	0.31	0.00	0.00	1.00	1.00
Final Sat.:	0	622	0	620	0	775	420	191	0	0	666	770
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.35	xxxx	0.05	0.03	0.03	xxxx	xxxx	0.01	0.33
Crit Moves:		****		****				****				****
Delay/Veh:	0.0	0.0	0.0	11.3	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	11.3	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.3
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			10.7			8.8			9.3		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			10.7			8.8			9.3		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.1 Worst Case Level Of Service: B[10.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	21	0	13	0	0	0	0	132	11	9	172	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	22	0	14	0	0	0	0	140	12	10	182	0
Added Vol:	0	0	0	0	0	0	0	27	0	0	20	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	22	0	14	0	0	0	0	167	12	10	202	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	22	0	14	0	0	0	0	167	12	10	202	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	22	0	14	0	0	0	0	167	12	10	202	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	394	394	173	401	400	202	xxxx	xxxx	xxxxx	179	xxxx	xxxxx
Potent Cap.:	614	546	876	563	541	844	xxxx	xxxx	xxxxx	1409	xxxx	xxxxx
Move Cap.:	611	542	876	551	538	844	xxxx	xxxx	xxxxx	1409	xxxx	xxxxx
Volume/Cap:	0.04	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	691	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	10.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	10.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.370
Loss Time (sec):	16	Average Delay (sec/veh):	31.0
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	75	84	88		60	152	30		37	238	78		184	254	50	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	80	89	93		64	161	32		39	252	83		195	269	53	
Added Vol:	0	10	0		0	13	13		10	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	80	99	93		64	174	45		49	252	83		195	269	53	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	80	99	93		64	174	45		49	252	83		195	269	53	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	80	99	93		64	174	45		49	252	83		195	269	53	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	80	99	93		64	174	45		49	252	83		195	269	53	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.92	0.92		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.59	0.41		1.00	1.51	0.49		1.00	1.67	0.33	
Final Sat.:	1805	1900	1615		1805	2782	716		1805	2618	858		1805	2941	579	
Capacity Analysis Module:																
Vol/Sat:	0.04	0.05	0.06		0.04	0.06	0.06		0.03	0.10	0.10		0.11	0.09	0.09	
Crit Moves:	****					****				****				****		
Green/Cycle:	0.10	0.28	0.28		0.10	0.28	0.28		0.12	0.29	0.29		0.17	0.34	0.34	
Volume/Cap:	0.44	0.19	0.21		0.35	0.22	0.22		0.23	0.33	0.33		0.64	0.27	0.27	
Delay/Veh:	44.1	27.5	27.7		43.2	27.8	27.8		40.5	28.1	28.1		43.0	23.9	23.9	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	44.1	27.5	27.7		43.2	27.8	27.8		40.5	28.1	28.1		43.0	23.9	23.9	
LOS by Move:	D	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	3	2	2		2	3	3		2	4	4		7	4	4	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.792
Loss Time (sec):	16	Average Delay (sec/veh):	28.0
Optimal Cycle:	85	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 0	0	1	0	0 0	0	0	0	0 1	0	1	1	0 1	0	0
Volume Module:																
Base Vol:	383	0	113		0	0	0		0	587	294		60	400	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	406	0	120		0	0	0		0	622	312		64	424	0	
Added Vol:	17	0	15		0	0	0		0	109	10		20	167	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	423	0	135		0	0	0		0	731	322		84	591	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	423	0	135		0	0	0		0	731	322		84	591	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	423	0	135		0	0	0		0	731	322		84	591	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	423	0	135		0	0	0		0	731	322		84	591	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.23	0.00	0.08		0.00	0.00	0.00		0.00	0.38	0.20		0.05	0.31	0.00	
Crit Moves:	****									****			****			
Green/Cycle:	0.28	0.00	0.28		0.00	0.00	0.00		0.00	0.46	0.46		0.10	0.56	0.00	
Volume/Cap:	0.84	0.00	0.30		0.00	0.00	0.00		0.00	0.84	0.43		0.46	0.56	0.00	
Delay/Veh:	45.5	0.0	28.6		0.0	0.0	0.0		0.0	30.8	18.6		44.3	14.7	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	45.5	0.0	28.6		0.0	0.0	0.0		0.0	30.8	18.6		44.3	14.7	0.0	
LOS by Move:	D	A	C		A	A	A		A	C	B		D	B	A	
HCM2kAvgQ:	15	0	3		0	0	0		0	22	7		3	12	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.478
Loss Time (sec):	0	Average Delay (sec/veh):	11.4
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	1 0	0 0	1	0 1	0 0	0	0 0	1 0	1
Volume Module:												
Base Vol:	0	0	0	250	0	8	25	12	0	0	2	199
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	265	0	8	27	13	0	0	2	211
Added Vol:	0	0	0	30	0	0	0	0	0	0	0	32
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	295	0	8	27	13	0	0	2	243
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	295	0	8	27	13	0	0	2	243
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	295	0	8	27	13	0	0	2	243
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	295	0	8	27	13	0	0	2	243
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.68	0.32	0.00	0.00	1.00	1.00
Final Sat.:	0	602	0	617	0	770	396	190	0	0	635	732
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.48	xxxx	0.01	0.07	0.07	xxxx	xxxx	0.00	0.33
Crit Moves:		****		****			****					****
Delay/Veh:	0.0	0.0	0.0	13.3	0.0	7.2	9.2	9.2	0.0	0.0	8.1	9.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	13.3	0.0	7.2	9.2	9.2	0.0	0.0	8.1	9.6
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			13.1			9.2			9.6		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			13.1			9.2			9.6		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.8	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: B[11.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	20	0	16	0	0	0	0	249	24	13	154	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	21	0	17	0	0	0	0	264	25	14	163	0
Added Vol:	0	0	0	0	0	0	0	30	0	0	32	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	0	17	0	0	0	0	294	25	14	195	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	0	17	0	0	0	0	294	25	14	195	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	0	17	0	0	0	0	294	25	14	195	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	529	529	307	538	542	195	xxxx	xxxx	xxxxx	319	xxxx	xxxxx
Potent Cap.:	513	458	738	457	450	851	xxxx	xxxx	xxxxx	1252	xxxx	xxxxx
Move Cap.:	509	453	738	443	445	851	xxxx	xxxx	xxxxx	1252	xxxx	xxxxx
Volume/Cap:	0.04	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.9	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR		- RT	LT - LTR		- RT	LT - LTR		- RT	LT - LTR		- RT
Shared Cap.:	xxxx	590	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	11.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	11.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Cumulative Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.394
Loss Time (sec):	16	Average Delay (sec/veh):	32.7
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	135	177	176		91	160	44		44	208	81		125	236	41	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	143	188	187		96	170	47		47	220	86		133	250	43	
Added Vol:	0	16	0		0	15	15		16	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	143	204	187		96	185	62		63	220	86		133	250	43	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	143	204	187		96	185	62		63	220	86		133	250	43	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	143	204	187		96	185	62		63	220	86		133	250	43	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	143	204	187		96	185	62		63	220	86		133	250	43	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.91	0.91		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.50	0.50		1.00	1.44	0.56		1.00	1.70	0.30	
Final Sat.:	1805	1900	1615		1805	2606	870		1805	2489	969		1805	3008	523	
Capacity Analysis Module:																
Vol/Sat:	0.08	0.11	0.12		0.05	0.07	0.07		0.03	0.09	0.09		0.07	0.08	0.08	
Crit Moves:			****		****					****			****			
Green/Cycle:	0.10	0.28	0.28		0.11	0.29	0.29		0.11	0.29	0.29		0.16	0.33	0.33	
Volume/Cap:	0.77	0.38	0.41		0.47	0.24	0.24		0.30	0.31	0.31		0.47	0.25	0.25	
Delay/Veh:	60.7	29.5	29.9		43.2	27.2	27.2		41.5	27.8	27.8		39.7	24.5	24.5	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	60.7	29.5	29.9		43.2	27.2	27.2		41.5	27.8	27.8		39.7	24.5	24.5	
LOS by Move:	E	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	6	5	5		3	3	3		2	4	4		4	3	3	

Note: Queue reported is the number of cars per lane.

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APPENDIX E

EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT
INTERSECTION ANALYSIS CALCULATION WORKSHEETS

Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.633
Loss Time (sec):	16	Average Delay (sec/veh):	23.3
Optimal Cycle:	61	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 0	0	1	0	0 0	0	0	0	0	1	0 1	1	0	1	0 0
Volume Module:																
Base Vol:	266	0	44		0	0	0		0	339	421		111	477	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	282	0	47		0	0	0		0	359	446		118	506	0	
Added Vol:	22	0	25		0	0	0		0	144	23		13	64	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	304	0	72		0	0	0		0	503	469		131	570	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	304	0	72		0	0	0		0	503	469		131	570	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	304	0	72		0	0	0		0	503	469		131	570	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	304	0	72		0	0	0		0	503	469		131	570	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.17	0.00	0.04		0.00	0.00	0.00		0.00	0.26	0.29		0.07	0.30	0.00	
Crit Moves:	****										****		****			
Green/Cycle:	0.27	0.00	0.27		0.00	0.00	0.00		0.00	0.46	0.46		0.11	0.57	0.00	
Volume/Cap:	0.63	0.00	0.17		0.00	0.00	0.00		0.00	0.58	0.63		0.63	0.52	0.00	
Delay/Veh:	35.1	0.0	28.4		0.0	0.0	0.0		0.0	20.8	22.4		48.5	13.4	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	35.1	0.0	28.4		0.0	0.0	0.0		0.0	20.8	22.4		48.5	13.4	0.0	
LOS by Move:	D	A	C		A	A	A		A	C	C		D	B	A	
HCM2kAvgQ:	9	0	2		0	0	0		0	12	12		5	11	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.373
Loss Time (sec):	0	Average Delay (sec/veh):	10.3
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	1 0	0 0	1	0 1	0 0	0	0 0	1 0	1
Volume Module:												
Base Vol:	0	0	0	181	0	36	11	5	0	0	9	219
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	192	0	38	12	5	0	0	10	232
Added Vol:	0	0	0	36	0	0	0	0	0	0	0	46
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	228	0	38	12	5	0	0	10	278
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	228	0	38	12	5	0	0	10	278
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	228	0	38	12	5	0	0	10	278
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	228	0	38	12	5	0	0	10	278
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.69	0.31	0.00	0.00	1.00	1.00
Final Sat.:	0	610	0	612	0	763	414	188	0	0	661	764
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.37	xxxx	0.05	0.03	0.03	xxxx	xxxx	0.01	0.36
Crit Moves:		****		****			****					****
Delay/Veh:	0.0	0.0	0.0	11.6	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	11.6	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.7
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			11.0			8.8			9.7		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			11.0			8.8			9.7		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Driveway 1 (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 0.9 Worst Case Level Of Service: B[10.9]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0	0	0	0 0	0	1 0	1 0	1	0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	143	0	0	193	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	0	0	0	0	152	0	0	205	0
Added Vol:	27	0	8	0	0	0	0	27	9	3	20	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	27	0	8	0	0	0	0	179	9	3	225	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	0	8	0	0	0	0	179	9	3	225	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	27	0	8	0	0	0	0	179	9	3	225	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	414	414	183	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	188	xxxx	xxxxx
Potent Cap.:	599	532	865	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1399	xxxx	xxxxx
Move Cap.:	598	531	865	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1399	xxxx	xxxxx
Volume/Cap:	0.05	0.00	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	643	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	10.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	10.9			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.1 Worst Case Level Of Service: B[10.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	21	0	13	0	0	0	0	132	11	9	172	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	22	0	14	0	0	0	0	140	12	10	182	0
Added Vol:	0	0	4	0	0	0	0	34	0	1	22	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	22	0	18	0	0	0	0	174	12	11	204	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	22	0	18	0	0	0	0	174	12	11	204	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	22	0	18	0	0	0	0	174	12	11	204	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	405	405	180	414	411	204	xxxx	xxxx	xxxxx	186	xxxx	xxxxx
Potent Cap.:	606	538	868	552	534	841	xxxx	xxxx	xxxxx	1401	xxxx	xxxxx
Move Cap.:	602	534	868	538	530	841	xxxx	xxxx	xxxxx	1401	xxxx	xxxxx
Volume/Cap:	0.04	0.00	0.02	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	697	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	10.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	10.5			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #5 Elizabeth Ln. (NS) / Driveway 2 (EW)

Average Delay (sec/veh): 0.6 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0	0	0 0 0	1	0	1 0 0	0	0	0 0 0	0	0
Volume Module:												
Base Vol:	0	34	0	0	20	0	0	0	0	0	0	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	36	0	0	21	0	0	0	0	0	0	0
Added Vol:	0	0	0	0	0	1	4	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	36	0	0	21	1	4	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	36	0	0	21	1	4	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	36	0	0	21	1	4	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	58	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	955	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	955	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT	LT - LTR		RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.8			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.374
Loss Time (sec):	16	Average Delay (sec/veh):	31.0
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	75	84	88		60	152	30		37	238	78		184	254	50	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	80	89	93		64	161	32		39	252	83		195	269	53	
Added Vol:	0	12	0		2	19	17		11	0	0		0	0	1	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	80	101	93		66	180	49		50	252	83		195	269	54	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	80	101	93		66	180	49		50	252	83		195	269	54	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	80	101	93		66	180	49		50	252	83		195	269	54	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	80	101	93		66	180	49		50	252	83		195	269	54	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.92	0.92		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.57	0.43		1.00	1.51	0.49		1.00	1.67	0.33	
Final Sat.:	1805	1900	1615		1805	2750	745		1805	2618	858		1805	2932	588	
Capacity Analysis Module:																
Vol/Sat:	0.04	0.05	0.06		0.04	0.07	0.07		0.03	0.10	0.10		0.11	0.09	0.09	
Crit Moves:	****					****				****				****		
Green/Cycle:	0.10	0.28	0.28		0.10	0.28	0.28		0.12	0.29	0.29		0.17	0.34	0.34	
Volume/Cap:	0.44	0.19	0.21		0.36	0.23	0.23		0.24	0.33	0.33		0.64	0.27	0.27	
Delay/Veh:	44.1	27.6	27.7		43.3	27.9	27.9		40.6	28.1	28.1		43.0	24.0	24.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	44.1	27.6	27.7		43.3	27.9	27.9		40.6	28.1	28.1		43.0	24.0	24.0	
LOS by Move:	D	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	3	2	2		2	3	3		2	4	4		7	4	4	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.807
Loss Time (sec):	16	Average Delay (sec/veh):	28.7
Optimal Cycle:	88	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0
Volume Module:																
Base Vol:	383	0	113		0	0	0		0	587	294		60	400	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	406	0	120		0	0	0		0	622	312		64	424	0	
Added Vol:	28	0	21		0	0	0		0	109	29		31	167	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	434	0	141		0	0	0		0	731	341		95	591	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	434	0	141		0	0	0		0	731	341		95	591	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	434	0	141		0	0	0		0	731	341		95	591	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	434	0	141		0	0	0		0	731	341		95	591	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.24	0.00	0.09		0.00	0.00	0.00		0.00	0.38	0.21		0.05	0.31	0.00	
Crit Moves:	****									****			****			
Green/Cycle:	0.28	0.00	0.28		0.00	0.00	0.00		0.00	0.46	0.46		0.10	0.56	0.00	
Volume/Cap:	0.84	0.00	0.31		0.00	0.00	0.00		0.00	0.84	0.46		0.52	0.56	0.00	
Delay/Veh:	45.9	0.0	28.4		0.0	0.0	0.0		0.0	31.8	19.3		45.5	15.0	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	45.9	0.0	28.4		0.0	0.0	0.0		0.0	31.8	19.3		45.5	15.0	0.0	
LOS by Move:	D	A	C		A	A	A		A	C	B		D	B	A	
HCM2kAvgQ:	15	0	4		0	0	0		0	22	7		4	12	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.531
Loss Time (sec):	0	Average Delay (sec/veh):	12.2
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	1 0	0 0	1	0 1	0 0	0	0 0	1 0	1
Volume Module:												
Base Vol:	0	0	0	250	0	8	25	12	0	0	2	199
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	265	0	8	27	13	0	0	2	211
Added Vol:	0	0	0	60	0	0	0	0	0	0	0	49
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	325	0	8	27	13	0	0	2	260
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	325	0	8	27	13	0	0	2	260
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	325	0	8	27	13	0	0	2	260
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	325	0	8	27	13	0	0	2	260
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.68	0.32	0.00	0.00	1.00	1.00
Final Sat.:	0	588	0	612	0	761	386	185	0	0	623	715
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.53	xxxx	0.01	0.07	0.07	xxxx	xxxx	0.00	0.36
Crit Moves:		****		****				****				****
Delay/Veh:	0.0	0.0	0.0	14.5	0.0	7.3	9.3	9.3	0.0	0.0	8.2	10.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	14.5	0.0	7.3	9.3	9.3	0.0	0.0	8.2	10.1
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	B
ApproachDel:	xxxxxx			14.3			9.3			10.1		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			14.3			9.3			10.1		
LOS by Appr:	*			B			A			B		
AllWayAvgQ:	0.0	0.0	0.0	1.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.5

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Driveway 1 (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 0.6 Worst Case Level Of Service: B[12.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 0	0	0	0 0 0	1	0	1 0 1	0	0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	273	0	0	174	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	0	0	0	0	289	0	0	184	0
Added Vol:	18	0	5	0	0	0	0	30	30	9	32	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	18	0	5	0	0	0	0	319	30	9	216	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	18	0	5	0	0	0	0	319	30	9	216	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	18	0	5	0	0	0	0	319	30	9	216	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	569	569	334	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	349	xxxx	xxxxx
Potent Cap.:	487	435	712	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1221	xxxx	xxxxx
Move Cap.:	484	432	712	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1221	xxxx	xxxxx
Volume/Cap:	0.04	0.00	0.01	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.0	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	521	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	12.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	12.2			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.1 Worst Case Level Of Service: B[11.6]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	20	0	16	0	0	0	0	249	24	13	154	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	21	0	17	0	0	0	0	264	25	14	163	0
Added Vol:	0	0	3	0	0	0	0	35	0	4	41	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	0	20	0	0	0	0	299	25	18	204	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	0	20	0	0	0	0	299	25	18	204	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	0	20	0	0	0	0	299	25	18	204	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	551	551	312	561	564	204	xxxx	xxxx	xxxxx	324	xxxx	xxxxx
Potent Cap.:	499	445	733	441	437	841	xxxx	xxxx	xxxxx	1247	xxxx	xxxxx
Move Cap.:	493	438	733	424	431	841	xxxx	xxxx	xxxxx	1247	xxxx	xxxxx
Volume/Cap:	0.04	0.00	0.03	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.9	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR		- RT	LT - LTR		- RT	LT - LTR		- RT	LT - LTR		- RT
Shared Cap.:	xxxx	586	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	11.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	11.6			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

****

Intersection #5 Elizabeth Ln. (NS) / Driveway 2 (EW)

****

Average Delay (sec/veh): 0.3 Worst Case Level Of Service: A[8.9]

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0	0	0 0 0	1	0	1 0 0	0	0	0 0 0	0	0
Volume Module:												
Base Vol:	0	36	0	0	37	0	0	0	0	0	0	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	38	0	0	39	0	0	0	0	0	0	0
Added Vol:	0	0	0	0	0	4	3	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	38	0	0	39	4	3	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	38	0	0	39	4	3	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	38	0	0	39	4	3	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	79	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	928	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	928	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

****

Note: Queue reported is the number of cars per lane.

****

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project + Other Development Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.395
Loss Time (sec):	16	Average Delay (sec/veh):	32.7
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	135	177	176		91	160	44		44	208	81		125	236	41	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	143	188	187		96	170	47		47	220	86		133	250	43	
Added Vol:	0	22	0		1	19	17		20	0	0		0	0	2	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	143	210	187		97	189	64		67	220	86		133	250	45	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	143	210	187		97	189	64		67	220	86		133	250	45	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	143	210	187		97	189	64		67	220	86		133	250	45	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	143	210	187		97	189	64		67	220	86		133	250	45	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.91	0.91		0.95	0.91	0.91		0.95	0.93	0.93	
Lanes:	1.00	1.00	1.00		1.00	1.50	0.50		1.00	1.44	0.56		1.00	1.69	0.31	
Final Sat.:	1805	1900	1615		1805	2597	876		1805	2489	969		1805	2985	542	
Capacity Analysis Module:																
Vol/Sat:	0.08	0.11	0.12		0.05	0.07	0.07		0.04	0.09	0.09		0.07	0.08	0.08	
Crit Moves:			****		****					****			****			
Green/Cycle:	0.10	0.28	0.28		0.11	0.29	0.29		0.11	0.29	0.29		0.16	0.33	0.33	
Volume/Cap:	0.76	0.39	0.41		0.47	0.25	0.25		0.32	0.31	0.31		0.47	0.25	0.25	
Delay/Veh:	60.5	29.6	29.9		43.2	27.3	27.3		41.6	27.8	27.8		39.7	24.5	24.5	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	60.5	29.6	29.9		43.2	27.3	27.3		41.6	27.8	27.8		39.7	24.5	24.5	
LOS by Move:	E	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	6	5	5		3	3	3		2	4	4		4	3	3	

Note: Queue reported is the number of cars per lane.

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APPENDIX F

EXISTING PLUS AMBIENT PLUS CUMULATIVE
PLUS PROJECT (ALTERNATIVE)
INTERSECTION ANALYSIS CALCULATION WORKSHEETS

Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.615
Loss Time (sec):	16	Average Delay (sec/veh):	22.6
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	10	10		10	27	27		10	24	24		10	10	10	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 0	0	1	0	0 0	0	0	0	0 0	1	0 1	1	0 1	0	0
Volume Module:																
Base Vol:	266	0	44		0	0	0		0	339	421		111	477	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	282	0	47		0	0	0		0	359	446		118	506	0	
Added Vol:	5	0	15		0	0	0		0	144	17		10	64	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	287	0	62		0	0	0		0	503	463		128	570	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	287	0	62		0	0	0		0	503	463		128	570	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	287	0	62		0	0	0		0	503	463		128	570	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	287	0	62		0	0	0		0	503	463		128	570	0	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		1.00	1.00	1.00		1.00	1.00	0.85		0.95	1.00	1.00	
Lanes:	1.00	0.00	1.00		0.00	0.00	0.00		0.00	1.00	1.00		1.00	1.00	0.00	
Final Sat.:	1805	0	1615		0	0	0		0	1900	1615		1805	1900	0	
Capacity Analysis Module:																
Vol/Sat:	0.16	0.00	0.04		0.00	0.00	0.00		0.00	0.26	0.29		0.07	0.30	0.00	
Crit Moves:	****										****		****			
Green/Cycle:	0.26	0.00	0.26		0.00	0.00	0.00		0.00	0.47	0.47		0.12	0.58	0.00	
Volume/Cap:	0.61	0.00	0.15		0.00	0.00	0.00		0.00	0.57	0.61		0.61	0.52	0.00	
Delay/Veh:	35.1	0.0	28.7		0.0	0.0	0.0		0.0	20.2	21.5		47.6	12.9	0.0	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	35.1	0.0	28.7		0.0	0.0	0.0		0.0	20.2	21.5		47.6	12.9	0.0	
LOS by Move:	D	A	C		A	A	A		A	C	C		D	B	A	
HCM2kAvgQ:	9	0	1		0	0	0		0	11	11		5	11	0	

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.353
Loss Time (sec):	0	Average Delay (sec/veh):	9.9
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0	0 0	1	0	0 0	1	0	1 0	0	1
Volume Module:												
Base Vol:	0	0	0	181	0	36	11	5	0	0	9	219
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	192	0	38	12	5	0	0	10	232
Added Vol:	0	0	0	27	0	0	0	0	0	0	0	20
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	219	0	38	12	5	0	0	10	252
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	219	0	38	12	5	0	0	10	252
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	219	0	38	12	5	0	0	10	252
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	219	0	38	12	5	0	0	10	252
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.69	0.31	0.00	0.00	1.00	1.00
Final Sat.:	0	622	0	620	0	775	420	191	0	0	666	770
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.35	xxxx	0.05	0.03	0.03	xxxx	xxxx	0.01	0.33
Crit Moves:		****		****				****				****
Delay/Veh:	0.0	0.0	0.0	11.3	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	11.3	0.0	7.4	8.8	8.8	0.0	0.0	8.0	9.3
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			10.7			8.8			9.3		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			10.7			8.8			9.3		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Driveway 1 (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: A[9.2]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0 0 0 0 1				0 0 0 0 0				0 0 1 0 0				1 0 1 0 0			
Volume Module:																
Base Vol:	0	0	0		0	0	0		0	143	0		0	193	0	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	0	0	0		0	0	0		0	152	0		0	205	0	
Added Vol:	0	0	19		0	0	0		0	27	0		7	20	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	0	0	19		0	0	0		0	179	0		7	225	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	0	19		0	0	0		0	179	0		7	225	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	0	0	19		0	0	0		0	179	0		7	225	0	
Critical Gap Module:																
Critical Gp:	xxxxx	xxxx	6.2		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	xxxxx	xxxx	3.3		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	xxxx	xxxx	179		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		179	xxxx	xxxxx	
Potent Cap.:	xxxx	xxxx	870		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		1409	xxxx	xxxxx	
Move Cap.:	xxxx	xxxx	870		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		1409	xxxx	xxxxx	
Volume/Cap:	xxxx	xxxx	0.02		xxxx	xxxx	xxxx		xxxx	xxxx	xxxx		0.00	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	0.1		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		0.0	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	9.2		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		7.6	xxxx	xxxxx	
LOS by Move:	*	*	A		*	*	*		*	*	*		A	*	*	
Movement:	LT	LTR	RT		LT	LTR	RT		LT	LTR	RT		LT	LTR	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	*		*	*	*		*	*	*		*	*	*	
ApproachDel:	9.2				xxxxxx				xxxxxx				xxxxxx			
ApproachLOS:	A				*				*				*			

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: B[10.4]

Approach:	North Bound			South Bound			East Bound				West Bound			
Movement:	L	- T	- R	L	- T	- R	L	- T	- R		L	- T	- R	
Control:	Stop Sign			Stop Sign			Uncontrolled				Uncontrolled			
Rights:	Include			Include			Include				Include			
Lanes:	0 0	1! 0	0	0 0	1! 0	0	1 0	0	1	0	1 0	0	1	0
Volume Module:														
Base Vol:	21	0	13	0	0	0	0	132	11		9	172	0	
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	22	0	14	0	0	0	0	140	12		10	182	0	
Added Vol:	0	0	19	0	0	0	0	46	0		7	26	0	
PasserByVol:	0	0	0	0	0	0	0	0	0		0	0	0	
Initial Fut:	22	0	33	0	0	0	0	186	12		17	208	0	
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	22	0	33	0	0	0	0	186	12		17	208	0	
Reduct Vol:	0	0	0	0	0	0	0	0	0		0	0	0	
FinalVolume:	22	0	33	0	0	0	0	186	12		17	208	0	
Critical Gap Module:														
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:														
Cnflict Vol:	433	433	192	450	439	208	xxxx	xxxx	xxxxx		198	xxxx	xxxxx	
Potent Cap.:	584	519	855	523	515	837	xxxx	xxxx	xxxxx		1387	xxxx	xxxxx	
Move Cap.:	578	513	855	499	509	837	xxxx	xxxx	xxxxx		1387	xxxx	xxxxx	
Volume/Cap:	0.04	0.00	0.04	0.00	0.00	0.00	xxxx	xxxx	xxxx		0.01	xxxx	xxxx	
Level Of Service Module:														
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx		0.0	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx		7.6	xxxx	xxxxx	
LOS by Move:	*	*	*	*	*	*	*	*	*		A	*	*	
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT		LT -	LTR -	RT	
Shared Cap.:	xxxx	716	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	10.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	B	*	*	*	*	*	*	*		*	*	*	
ApproachDel:	10.4			xxxxxx			xxxxxx				xxxxxx			
ApproachLOS:	B			*			*				*			

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #5 Elizabeth Ln. (NS) / Driveway 2 (EW)

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: A[8.9]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0	0	0 0 0	1	0	1 0 0	0	0	0 0 0	0	0
Volume Module:												
Base Vol:	0	34	0	0	20	0	0	0	0	0	0	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	36	0	0	21	0	0	0	0	0	0	0
Added Vol:	0	0	0	0	0	7	19	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	36	0	0	21	7	19	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	36	0	0	21	7	19	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	36	0	0	21	7	19	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	61	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	951	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	951	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.380
Loss Time (sec):	16	Average Delay (sec/veh):	31.1
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	10	28	28	10	28	28	10	29	29	10	29	29
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	75	84	88	60	152	30	37	238	78	184	254	50
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	80	89	93	64	161	32	39	252	83	195	269	53
Added Vol:	0	15	0	11	29	25	14	0	0	0	0	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	104	93	75	190	57	53	252	83	195	269	57
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	80	104	93	75	190	57	53	252	83	195	269	57
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	104	93	75	190	57	53	252	83	195	269	57
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	80	104	93	75	190	57	53	252	83	195	269	57
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	0.95	0.92	0.92	0.95	0.91	0.91	0.95	0.93	0.93
Lanes:	1.00	1.00	1.00	1.00	1.54	0.46	1.00	1.51	0.49	1.00	1.65	0.35
Final Sat.:	1805	1900	1615	1805	2685	802	1805	2618	858	1805	2902	614
Capacity Analysis Module:												
Vol/Sat:	0.04	0.05	0.06	0.04	0.07	0.07	0.03	0.10	0.10	0.11	0.09	0.09
Crit Moves:	****			****			****			****		
Green/Cycle:	0.10	0.28	0.28	0.10	0.28	0.28	0.12	0.29	0.29	0.17	0.34	0.34
Volume/Cap:	0.44	0.20	0.21	0.41	0.25	0.25	0.25	0.33	0.33	0.64	0.27	0.27
Delay/Veh:	44.1	27.6	27.7	43.8	28.0	28.0	40.7	28.1	28.1	43.0	24.0	24.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	44.1	27.6	27.7	43.8	28.0	28.0	40.7	28.1	28.1	43.0	24.0	24.0
LOS by Move:	D	C	C	D	C	C	D	C	C	D	C	C
HCM2kAvgQ:	3	2	2	3	3	3	2	4	4	7	4	4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Inland Valley Dr. (NS) / Clinton Keith Rd. (EW)

Cycle (sec): 100 Critical Vol./Cap.(X): 0.792
Loss Time (sec): 16 Average Delay (sec/veh): 28.0
Optimal Cycle: 85 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	10	10	10	10	27	27	10	24	24	10	10	10
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	1 0	1	0 0
Volume Module:												
Base Vol:	383	0	113	0	0	0	0	587	294	60	400	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	406	0	120	0	0	0	0	622	312	64	424	0
Added Vol:	17	0	15	0	0	0	0	109	10	20	167	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	423	0	135	0	0	0	0	731	322	84	591	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	423	0	135	0	0	0	0	731	322	84	591	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	423	0	135	0	0	0	0	731	322	84	591	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	423	0	135	0	0	0	0	731	322	84	591	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	1.00	0.85	0.95	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1900	1615	1805	1900	0
Capacity Analysis Module:												
Vol/Sat:	0.23	0.00	0.08	0.00	0.00	0.00	0.00	0.38	0.20	0.05	0.31	0.00
Crit Moves:	****							****		****		
Green/Cycle:	0.28	0.00	0.28	0.00	0.00	0.00	0.00	0.46	0.46	0.10	0.56	0.00
Volume/Cap:	0.84	0.00	0.30	0.00	0.00	0.00	0.00	0.84	0.43	0.46	0.56	0.00
Delay/Veh:	45.5	0.0	28.6	0.0	0.0	0.0	0.0	30.8	18.6	44.3	14.7	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	0.0	28.6	0.0	0.0	0.0	0.0	30.8	18.6	44.3	14.7	0.0
LOS by Move:	D	A	C	A	A	A	A	C	B	D	B	A
HCM2kAvgQ:	15	0	3	0	0	0	0	22	7	3	12	0

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Inland Valley Dr. (NS) / Prielipp Rd. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.478
Loss Time (sec):	0	Average Delay (sec/veh):	11.4
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	1 0	0 0	1	0 1	0 0	0	0 0	1 0	1
Volume Module:												
Base Vol:	0	0	0	250	0	8	25	12	0	0	2	199
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	265	0	8	27	13	0	0	2	211
Added Vol:	0	0	0	30	0	0	0	0	0	0	0	32
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	295	0	8	27	13	0	0	2	243
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	295	0	8	27	13	0	0	2	243
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	295	0	8	27	13	0	0	2	243
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	295	0	8	27	13	0	0	2	243
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.00	1.00	0.68	0.32	0.00	0.00	1.00	1.00
Final Sat.:	0	602	0	617	0	770	396	190	0	0	635	732
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.00	xxxx	0.48	xxxx	0.01	0.07	0.07	xxxx	xxxx	0.00	0.33
Crit Moves:		****		****			****					****
Delay/Veh:	0.0	0.0	0.0	13.3	0.0	7.2	9.2	9.2	0.0	0.0	8.1	9.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	13.3	0.0	7.2	9.2	9.2	0.0	0.0	8.1	9.6
LOS by Move:	*	*	*	B	*	A	A	A	*	*	A	A
ApproachDel:	xxxxxx			13.1			9.2			9.6		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			13.1			9.2			9.6		
LOS by Appr:	*			B			A			A		
AllWayAvgQ:	0.0	0.0	0.0	0.8	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.4

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Driveway 1 (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: B[10.0]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	0	1		0	0	0	0	0		0	0	1	0	0		1	0	1	0	0	
Volume Module:																								
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0	0	273	0	0	0	0	0	174	0	0	0	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0	0	289	0	0	0	0	0	184	0	0	0	0
Added Vol:	0	0	13	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	22	32	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	13	0	0	0	0	0	0	0	0	0	0	319	0	0	0	0	22	216	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	13	0	0	0	0	0	0	0	0	0	0	319	0	0	0	0	22	216	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	13	0	0	0	0	0	0	0	0	0	0	319	0	0	0	0	22	216	0	0	0	0
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx									
FollowUpTim:	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx									
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx	319	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	319	xxxx	xxxxx									
Potent Cap.:	xxxx	xxxx	726	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1252	xxxx	xxxxx									
Move Cap.:	xxxx	xxxx	726	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1252	xxxx	xxxxx									
Volume/Cap:	xxxx	xxxx	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx									
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx									
Control Del:	xxxxx	xxxx	10.0	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.9	xxxx	xxxxx									
LOS by Move:	*	*	B	*	*	*	*	*	*	*	*	*	A	*	*									
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx									
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx									
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx									
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
ApproachDel:	10.0			xxxxxx			xxxxxx			xxxxxx														
ApproachLOS:	B			*			*			*														

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Elizabeth Ln. (NS) / Prielipp Rd. (EW)

Average Delay (sec/veh): 1.4 Worst Case Level Of Service: B[11.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	20	0	16	0	0	0	0	249	24	13	154	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	21	0	17	0	0	0	0	264	25	14	163	0
Added Vol:	0	0	13	0	0	0	0	42	0	22	53	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	0	30	0	0	0	0	306	25	36	216	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	0	30	0	0	0	0	306	25	36	216	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	21	0	30	0	0	0	0	306	25	36	216	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	7.1	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	606	606	319	621	619	216	xxxx	xxxx	xxxxx	331	xxxx	xxxxx
Potent Cap.:	463	414	727	402	407	829	xxxx	xxxx	xxxxx	1239	xxxx	xxxxx
Move Cap.:	453	402	727	377	395	829	xxxx	xxxx	xxxxx	1239	xxxx	xxxxx
Volume/Cap:	0.05	0.00	0.04	0.00	0.00	0.00	xxxx	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.0	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	581	xxxxx	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	11.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*
ApproachDel:	11.8			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #5 Elizabeth Ln. (NS) / Driveway 2 (EW)

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: A[9.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0	0	0 0 0	1	0	1 0 0	0	0	0 0 0	0	0
Volume Module:												
Base Vol:	0	36	0	0	37	0	0	0	0	0	0	0
Growth Adj:	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Initial Bse:	0	38	0	0	39	0	0	0	0	0	0	0
Added Vol:	0	0	0	0	0	22	13	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	38	0	0	39	22	13	0	0	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	38	0	0	39	22	13	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	38	0	0	39	22	13	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	88	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	917	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	917	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.0			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Wildomar 23 PAR No. 12-0058 Traffic Study (JN:0068-0001)
Existing + Ambient + Project (Alternative) + Cumulative
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Jackson Av. (NS) / Nutmeg St. (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.400
Loss Time (sec):	16	Average Delay (sec/veh):	32.7
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	10	28	28		10	28	28		10	29	29		10	29	29	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0 1	0	1	1	0 1	1	0	1	0 1	1	0	1	0 1	1	0
Volume Module:																
Base Vol:	135	177	176		91	160	44		44	208	81		125	236	41	
Growth Adj:	1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06		1.06	1.06	1.06	
Initial Bse:	143	188	187		96	170	47		47	220	86		133	250	43	
Added Vol:	0	33	0		8	25	22		29	0	0		0	0	13	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	143	221	187		104	195	69		76	220	86		133	250	56	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	143	221	187		104	195	69		76	220	86		133	250	56	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	143	221	187		104	195	69		76	220	86		133	250	56	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	143	221	187		104	195	69		76	220	86		133	250	56	
Saturation Flow Module:																
Sat/Lane:	1900	1900	1900		1900	1900	1900		1900	1900	1900		1900	1900	1900	
Adjustment:	0.95	1.00	0.85		0.95	0.91	0.91		0.95	0.91	0.91		0.95	0.92	0.92	
Lanes:	1.00	1.00	1.00		1.00	1.48	0.52		1.00	1.44	0.56		1.00	1.63	0.37	
Final Sat.:	1805	1900	1615		1805	2565	905		1805	2489	969		1805	2863	646	
Capacity Analysis Module:																
Vol/Sat:	0.08	0.12	0.12		0.06	0.08	0.08		0.04	0.09	0.09		0.07	0.09	0.09	
Crit Moves:		****				****				****				****		
Green/Cycle:	0.11	0.28	0.28		0.12	0.29	0.29		0.11	0.29	0.29		0.15	0.33	0.33	
Volume/Cap:	0.75	0.41	0.41		0.49	0.26	0.26		0.37	0.31	0.31		0.49	0.27	0.27	
Delay/Veh:	59.3	29.9	29.9		42.9	27.1	27.1		42.2	27.8	27.8		40.3	24.9	24.9	
User DelAdj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	59.3	29.9	29.9		42.9	27.1	27.1		42.2	27.8	27.8		40.3	24.9	24.9	
LOS by Move:	E	C	C		D	C	C		D	C	C		D	C	C	
HCM2kAvgQ:	6	6	5		4	3	3		3	4	4		4	4	4	

Note: Queue reported is the number of cars per lane.

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