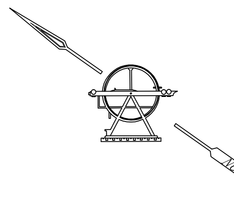
APPENDICES

APPENDIX 1: TENTATIVE TRACT MAP NO. 33840

TENTATIVE TRACT MAP NO. 33840
AMENDMENT NO. 4
IN THE CITY OF WILDOMAR, COUNTY OF RIVERSIDE
APN: 376-043-027

ALL OF BLOCK 17, BEING IN THE TOWN OF WILDOMAR, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA. ACCORDING TO THE MAP ON FILE IN BOOK 6, PAGE 294 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA.



40' 0 20' 40' 80' 160'

GRAPHIC SCALE
1"=40'

IMPROVEMENT NOTES

1. 0.25' ASPHALT CONCRETE OVER 0.50' AGGREGATE BASE PAVEMENT SECTION
2. PAVEMENT SECTION TO MATCH EXISTING
3. TYPE 'C' CURB PER CITY OF WILDOMAR STD. 202
4. TYPE "A-6" CURB AND GUTTER PER CITY OF WILDOMAR STD. 200
5. CONCRETE SIDEWALK PER CITY OF WILDOMAR STD. 401
6. 4' CROSS GUTTER
8. 10' CURB TRANSITION FROM TYPE "C" CURB TO TYPE "A-6" CURB AND GUTTER
9. UNDERSIDEWALK DRAIN PER CITY OF WILDOMAR STD. 309 (MODIFIED TO FLOW AT 2% IN REVERSE)
10. CATCH BASIN AND INLET PER CITY OF WILDOMAR STD. 301 WITH GUTTER DEPRESSION CASE "B" PER CITY OF WILDOMAR STD. 311
11. METAL BEAM GUARDRAIL (WOOD POST WITH WOOD BLOCK) PER CALTRANS STD. A77A1 INSTALLED PER CALTRANS STANDARD.
12. INSTALL 4' WIDE RAISED TRAFFIC MEDIAN
13. LANDSCAPE PERIMETER WALL PER LANDSCAPE PLANS

EASEMENT NOTES

1. ABANDONEMENT OF UNKNOWN ALLEYS AND RESERVATION OF EASEMENT FOR EXISTING UTILITIES RECORDED 4/6/78 IN BOOK 1978, PAGE 65718 OF OFFICIAL RECORDS.
2. VACATION OF UNNAMED ALLEY AND RESERVING AND EXCEPTING AN EASEMENT FOR ANY PUBLIC UTILITIES RECORDED 2/26/82 IN BOOK 1982, PAGE 342 OF OFFICIAL RECORDS.
3. AN EASEMENT FOR WATER PIPELINE TO THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT RECORDED 2/16/59 IN BOOK 2375, PAGE 584 OF OFFICIAL RECORDS.

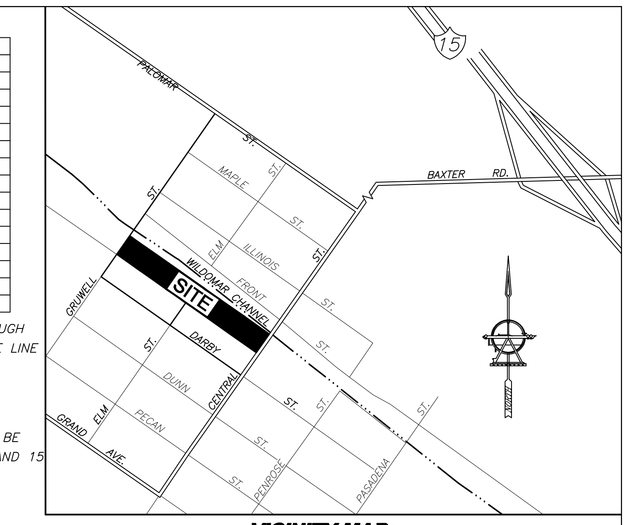
LOT ACREAGE		
LOT NO.	GROSS AC.	NET AC
1	11,603	9,021
2	11,367	8,142
3	11,367	8,142
4	11,367	8,142
5	11,367	8,142
6	11,367	8,142
7	11,367	8,142
8	11,367	8,142
9	11,367	8,142
10	11,367	8,142
11	11,367	8,142
12	11,367	8,142
13	11,367	8,142
14	11,367	8,142
15	15,822	12,007
LOT "A" ST. "A"		37,560
LOT "B"		12,600

SCE POWER POLE SPECIFICATIONS		
NO.	SCE TIN TAG NO.	SIZE PER CIRCUIT
SCE1	4529972E	1 – 33kV 2 – 12kV
SCE2	4554372E	1 – 33kV 2 – 12kV
SCE3	4554373E	1 – 33kV 2 – 12kV
SCE4	4554374E	1 – 33kV 2 – 12kV
SCE5	4554375E	1 – 33kV 2 – 12kV
SCE6	4364257E	1 – 33kV 2 – 12kV
SCE7	4529975E	1 – 33kV 2 – 12kV

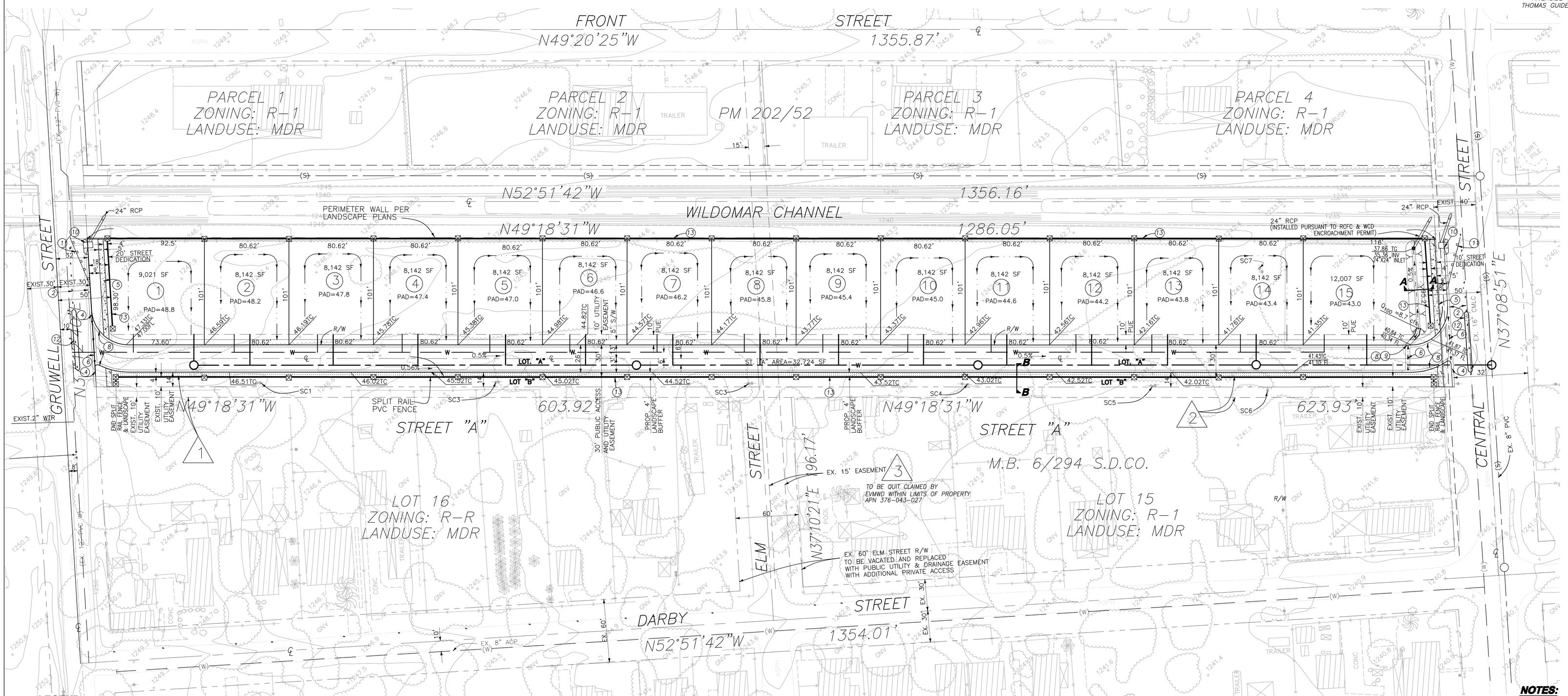
–SCE TO BE CONVERTED UNDERGROUND THROUGH SITE PLANS ALONG WITH VERIZON TELEPHONE LINE AND PROVIDE SERVICE TO TO SITE.

–GAS SERVICE IS AVAILABLE AT UNION AND GRUWELL STREET.

–EVMWD SEWER AND WATER CONNECTIONS TO BE INSTALLED IN STEEL CASING WITHIN LOTS 1 AND 15



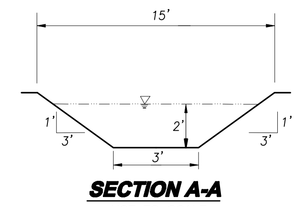
VICINITY MAP:
NO SCALE
RIVERSIDE & ORANGE COUNTY
THOMAS GUIDE 2006 PAGE 897, B-7



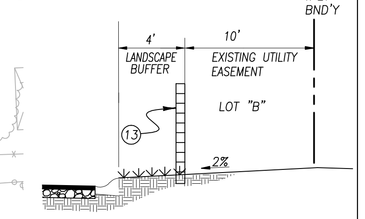
APPLICANT/OWNERS:
ZAREH HOOKASIAN
3173 VERA VALLEY ROAD
FRANKLIN, TN 37064
TEL: (615) 838-4820
FAX: (909) 768-4401

ENGINEER:
RDS AND ASSOCIATES
30519 WAILEA COURT
TEMECULA, CA. 92592
PH.# (951)691-7706

A.P.N:
376-043-027



SECTION A-A
NOT TO SCALE
(VEGETATED SWALE AND DRAINAGE OUTLET MAINTAINED BY CITY CFD)



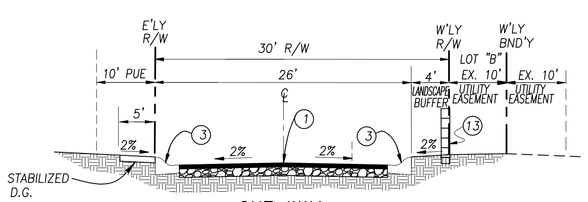
SECTION B-B
NOT TO SCALE

ACREAGE
GROSS – 4.16 AC
NET – 4.07 AC

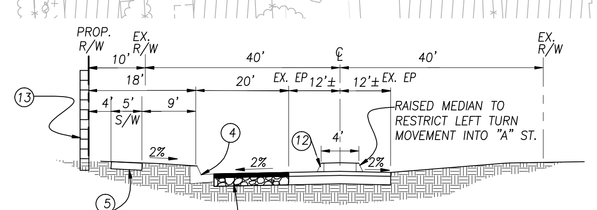
NOTES:
1. NOT WITHIN A SPECIFIC PLAN.
2. FEMA FLOOD ZONE "X".(PARCEL 13 TO PARCEL 15)
3. THIS SITE IS SUBJECT TO MODERATE LIQUEFACTION.
4. THIS IS NOT IN HIGH FIRE AREA.
5. THIS TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER OR ONLY A PORTION THEREOF.
6. SCHEDULE "A" SUBDIVISION
7. THIS SITE IS NOT SUBJECT TO GEOLOGICAL HAZARDS, OR WITHIN A SPECIAL STUDIES ZONE.

LEGEND:

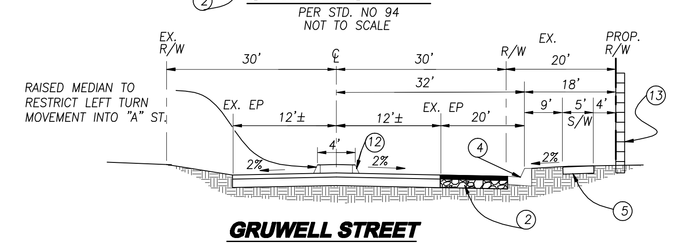
= PROPOSED RIGHT OF WAY
= EXISTING RIGHT OF WAY
= CENTERLINE
= EXISTING FEATURES
= PROPOSED PROPERTY LINE
= EXIST FENCE
= FLOW LINE
(1) = LOT NUMBER
R/W = RIGHT OF WAY
CL = CENTER LINE
Δ 1350.00 = CONTROL
= EX. BUILDING
= FIRE HYDRANT
= TREES
= SINGLE TREE
= PROPOSED PERIMETER WALL AND PILASTERS
= PROPOSED PVC SPLIT RAIL FENCE



ONE-WAY STREET "A"(PUBLIC)
(TYPICAL CROSS SECTION)
NOT TO SCALE



CENTRAL STREET
PER STD. NO 94
NOT TO SCALE



GRUWELL STREET
PER STD. NO 94
NOT TO SCALE

UTILITIES

WATER:	EVMWD
SEWER:	EVMWD
GAS:	SO. CAL. GAS COMPANY
ELECTRIC:	SO. CAL. EDISON
TELEPHONE:	VERIZON (GTE)
CABLE:	ADELPHIA
SCHOOL DISTRICT:	LAKE ELSINORE UNIFIED
COUNTY SERVICE AREA:	152-A

LEGAL DESCRIPTION:

ALL OF BLOCK 17, BEING IN THE TOWN OF WILDOMAR, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA. ACCORDING TO MAP ON FILE IN BOOK 6, PAGE 294 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA.

TOGETHER WITH ANY RIGHT, TITLE AND INTEREST IN THE STREETS AND ALLEYS ADJOINING SAME, AND IN THAT PORTION OF THE ABANDONED 100 FOOT RIGHT OF WAY OF THE ATCHISON, TOPEKA AND SANTA FE RAILROAD COMPANY, LYING BETWEEN THE CENTER LINE OF GRUWELL STREET AND THE CENTER LINE OF PENROSE AVENUE, ALL SAID PROPERTY BEING IN THE TOWN OF WILDOMAR, ACCORDING TO MAP ON FILE IN BOOK 6 PAGE 294 OF MAPS, RECORDS OF SAN DIEGO COUNTY, CALIFORNIA.

EXCEPTING THEREFROM PARCEL MAP NO. 7070-18 AS SHOWN ON RECORD OF SURVEY RECORDED NOVEMBER 5, 1981 IN BOOK 68 PAGE 26 THROUGH 31 OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, AS SET FORTH IN FINAL ORDER OF CONDEMNATION RECORDED MARCH 6, 1986 AS INSTRUMENT NO. 76518 OF OFFICAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ZONING:

EXISTING LANDUSE:	MDR
PROPOSED LANDUSE:	MDR
EXISTING ZONING:	R-R
PROPOSED ZONING:	R-1

DATE	REVISIONS
1 12/03/13	ADDRESS CITY COMMENTS
2 5/1/14	SHIFT PRIVATE STREET 14' EASTERLY AND TRAIL. REMOVE PERIMETER WALL ALONG WESTERLY BOUNDARY. REPLACE CUL-DE-SAC WITH STANDARD HAMMERHEAD.
3 11/4/14	ADD ONE WAY PUBLIC STREET, ELIMINATE W'LY TRAIL
4 3/4/15	ADD MEDIAN TO RESTRICT LEFT TURN MOVEMENT TO "A" STREET

RDS & ASSOCIATES
30519 Wailea Ct.
Temecula, CA. 92592
PH: 951.691.7706

CITY OF WILDOMAR

TENTATIVE TRACT MAP 33840
APN# 376-043-027
MAY 2, 2013

SERV. AREA	
W.O.	1019-01
C.O.	
COORD.	
SHT	1 of 1
	MAY 2013

APPENDIX 2: SITE PHOTOS

NE corner of project site seen from Gruwell Street

Project site seen from Central Street

Project site seen from Elm Street entrance

Darby Street / Elm Street intersection looking to the project site

Project site seen from SE portion looking NW

SE portion of project site looking NW

Appendix 2: Site Photos

Appendix 3:
Air Quality Annual Modeling

Appendix 3a:
Air Quality Summer Modeling

Elm Street Tract Map

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	15.00	Dwelling Unit	4.16	27,000.00	43

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage total = 4.16 acres

Construction Phase - Building construction, paving, and painting assumed of occur simultaneously

Construction Off-road Equipment Mitigation - PM reduction values per SCAQMD CEQA Handbook Tables 11-4, 11-15, A11-9-A

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	40
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblLandUse	LotAcreage	4.87	4.16
tblProjectCharacteristics	OperationalYear	2014	2016

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					
2016	6.6037	54.7138	42.1261	0.0523	18.2675	3.2756	21.2074	9.9840	3.0695	12.6888	0.0000	5,183.7029	5,183.7029	1.2667	0.0000	5,210.3040
Total	**6.6037**	**54.7138**	**42.1261**	**0.0523**	**18.2675**	**3.2756**	**21.2074**	**9.9840**	**3.0695**	**12.6888**	**0.0000**	**5,183.7029**	**5,183.7029**	**1.2667**	**0.0000**	**5,210.3040**

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					
2016	6.6037	54.7138	42.1261	0.0523	7.0416	3.2756	9.9815	3.8347	3.0695	6.5394	0.0000	5,183.7029	5,183.7029	1.2667	0.0000	5,210.3039
Total	**6.6037**	**54.7138**	**42.1261**	**0.0523**	**7.0416**	**3.2756**	**9.9815**	**3.8347**	**3.0695**	**6.5394**	**0.0000**	**5,183.7029**	**5,183.7029**	**1.2667**	**0.0000**	**5,210.3039**

	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**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**61.45**	**0.00**	**52.93**	**61.59**	**0.00**	**48.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Energy	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Mobile	0.5857	1.8476	6.5931	0.0161	1.0947	0.0269	1.1215	0.2921	0.0247	0.3168		1,409.9196	1,409.9196	0.0458		1,410.8814
Total	**5.1632**	**2.0899**	**15.4419**	**0.0290**	**1.0947**	**1.1898**	**2.2844**	**0.2921**	**1.1874**	**1.4796**	**140.5038**	**1,845.4046**	**1,985.9084**	**0.4702**	**0.0125**	**1,999.6668**

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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Energy	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Mobile	0.5857	1.8476	6.5931	0.0161	1.0947	0.0269	1.1215	0.2921	0.0247	0.3168		1,409.9196	1,409.9196	0.0458		1,410.8814
Total	**5.1632**	**2.0899**	**15.4419**	**0.0290**	**1.0947**	**1.1898**	**2.2844**	**0.2921**	**1.1874**	**1.4796**	**140.5038**	**1,845.4046**	**1,985.9084**	**0.4702**	**0.0125**	**1,999.6668**

	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	N20	CO2e
Percent Reduction	**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**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/7/2016	5	5	
2	Grading	Grading	1/8/2016	1/19/2016	5	8	
3	Building Construction	Building Construction	1/20/2016	12/6/2016	5	230	
4	Paving	Paving	1/20/2016	12/6/2016	5	230	
5	Architectural Coating	Architectural Coating	1/20/2016	12/6/2016	5	230	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0

Residential Indoor: 54,675; Residential Outdoor: 18,225; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	2	6.00	130	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2016

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					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0690	0.0814	1.0208	2.4100e-003	0.2012	1.2600e-003	0.2025	0.0534	1.1600e-003	0.0545		199.7247	199.7247	8.6100e-003		199.9056
Total	**0.0690**	**0.0814**	**1.0208**	**2.4100e-003**	**0.2012**	**1.2600e-003**	**0.2025**	**0.0534**	**1.1600e-003**	**0.0545**		**199.7247**	**199.7247**	**8.6100e-003**		**199.9056**

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					6.9103	0.0000	6.9103	3.7985	0.0000	3.7985			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**6.9103**	**2.9387**	**9.8490**	**3.7985**	**2.7036**	**6.5021**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0690	0.0814	1.0208	2.4100e-003	0.1312	1.2600e-003	0.1325	0.0362	1.1600e-003	0.0373		199.7247	199.7247	8.6100e-003		199.9056
Total	**0.0690**	**0.0814**	**1.0208**	**2.4100e-003**	**0.1312**	**1.2600e-003**	**0.1325**	**0.0362**	**1.1600e-003**	**0.0373**		**199.7247**	**199.7247**	**8.6100e-003**		**199.9056**

3.3 Grading - 2016

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					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225		3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**6.5523**	**2.1984**	**8.7507**	**3.3675**	**2.0225**	**5.3900**		**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0575	0.0679	0.8507	2.0100e-003	0.1677	1.0500e-003	0.1687	0.0445	9.6000e-004	0.0454		166.4372	166.4372	7.1800e-003		166.5880
Total	**0.0575**	**0.0679**	**0.8507**	**2.0100e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**166.4372**	**166.4372**	**7.1800e-003**		**166.5880**

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					2.5063	0.0000	2.5063	1.2881	0.0000	1.2881			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225	0.0000	3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**2.5063**	**2.1984**	**4.7047**	**1.2881**	**2.0225**	**3.3106**	**0.0000**	**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0575	0.0679	0.8507	2.0100e-003	0.1094	1.0500e-003	0.1104	0.0302	9.6000e-004	0.0311		166.4372	166.4372	7.1800e-003		166.5880
Total	**0.0575**	**0.0679**	**0.8507**	**2.0100e-003**	**0.1094**	**1.0500e-003**	**0.1104**	**0.0302**	**9.6000e-004**	**0.0311**		**166.4372**	**166.4372**	**7.1800e-003**		**166.5880**

3.4 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0156	0.1678	0.1758	4.2000e-004	0.0126	3.2600e-003	0.0158	3.5900e-003	3.0000e-003	6.5900e-003		42.2560	42.2560	2.7000e-004		42.2618
Worker	0.0192	0.0226	0.2836	6.7000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		55.4791	55.4791	2.3900e-003		55.5293
Total	**0.0347**	**0.1905**	**0.4593**	**1.0900e-003**	**0.0685**	**3.6100e-003**	**0.0721**	**0.0184**	**3.3200e-003**	**0.0217**		**97.7351**	**97.7351**	**2.6600e-003**		**97.7911**

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0156	0.1678	0.1758	4.2000e-004	8.9300e-003	3.2600e-003	0.0122	2.7000e-003	3.0000e-003	5.6900e-003		42.2560	42.2560	2.7000e-004		42.2618
Worker	0.0192	0.0226	0.2836	6.7000e-004	0.0365	3.5000e-004	0.0368	0.0101	3.2000e-004	0.0104		55.4791	55.4791	2.3900e-003		55.5293
Total	**0.0347**	**0.1905**	**0.4593**	**1.0900e-003**	**0.0454**	**3.6100e-003**	**0.0490**	**0.0128**	**3.3200e-003**	**0.0161**		**97.7351**	**97.7351**	**2.6600e-003**		**97.7911**

3.5 Paving - 2016

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	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198		1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7956**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**		**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0766	0.0905	1.1342	2.6800e-003	0.2236	1.4000e-003	0.2250	0.0593	1.2800e-003	0.0606		221.9163	221.9163	9.5700e-003		222.1173
Total	**0.0766**	**0.0905**	**1.1342**	**2.6800e-003**	**0.2236**	**1.4000e-003**	**0.2250**	**0.0593**	**1.2800e-003**	**0.0606**		**221.9163**	**221.9163**	**9.5700e-003**		**222.1173**

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	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198	0.0000	1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7956**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**	**0.0000**	**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0766	0.0905	1.1342	2.6800e-003	0.1458	1.4000e-003	0.1472	0.0402	1.2800e-003	0.0415		221.9163	221.9163	9.5700e-003		222.1173
Total	**0.0766**	**0.0905**	**1.1342**	**2.6800e-003**	**0.1458**	**1.4000e-003**	**0.1472**	**0.0402**	**1.2800e-003**	**0.0415**		**221.9163**	**221.9163**	**9.5700e-003**		**222.1173**

3.6 Architectural Coating - 2016

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	0.9182					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**1.2866**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.8300e-003	4.5200e-003	0.0567	1.3000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	6.0000e-005	3.0300e-003		11.0958	11.0958	4.8000e-004		11.1059
Total	**3.8300e-003**	**4.5200e-003**	**0.0567**	**1.3000e-004**	**0.0112**	**7.0000e-005**	**0.0113**	**2.9600e-003**	**6.0000e-005**	**3.0300e-003**		**11.0958**	**11.0958**	**4.8000e-004**		**11.1059**

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	0.9182					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**1.2866**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.8300e-003	4.5200e-003	0.0567	1.3000e-004	7.2900e-003	7.0000e-005	7.3600e-003	2.0100e-003	6.0000e-005	2.0700e-003		11.0958	11.0958	4.8000e-004		11.1059
Total	**3.8300e-003**	**4.5200e-003**	**0.0567**	**1.3000e-004**	**7.2900e-003**	**7.0000e-005**	**7.3600e-003**	**2.0100e-003**	**6.0000e-005**	**2.0700e-003**		**11.0958**	**11.0958**	**4.8000e-004**		**11.1059**

4.0 Operational Detail - Mobile

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	0.5857	1.8476	6.5931	0.0161	1.0947	0.0269	1.1215	0.2921	0.0247	0.3168		1,409.9196	1,409.9196	0.0458		1,410.8814
Unmitigated	0.5857	1.8476	6.5931	0.0161	1.0947	0.0269	1.1215	0.2921	0.0247	0.3168		1,409.9196	1,409.9196	0.0458		1,410.8814

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	143.55	151.20	131.55	488,409	488,409
Total	143.55	151.20	131.55	488,409	488,409

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
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	Primary	Diverted	Pass-by
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

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	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
NaturalGas Unmitigated	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502

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/yr	lb/day										lb/day					
Single Family Housing	1387.68	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Total		**0.0150**	**0.1279**	**0.0544**	**8.2000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**		**163.2567**	**163.2567**	**3.1300e-003**	**2.9900e-003**	**164.2502**

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/yr	lb/day										lb/day					
Single Family Housing	1.38768	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Total		**0.0150**	**0.1279**	**0.0544**	**8.2000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**		**163.2567**	**163.2567**	**3.1300e-003**	**2.9900e-003**	**164.2502**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Unmitigated	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352

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	0.0579					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.5346					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	3.9305	0.0997	7.5396	0.0120		1.1458	1.1458		1.1456	1.1456	140.5038	270.0000	410.5038	0.4190	9.5400e-003	422.2593
Landscaping	0.0395	0.0147	1.2548	7.0000e-005		6.7700e-003	6.7700e-003		6.7700e-003	6.7700e-003		2.2283	2.2283	2.2700e-003		2.2760
Total	**4.5625**	**0.1144**	**8.7944**	**0.0121**		**1.1526**	**1.1526**		**1.1524**	**1.1524**	**140.5038**	**272.2283**	**412.7321**	**0.4213**	**9.5400e-003**	**424.5352**

6.2 Area by SubCategory

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	0.0579					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.5346					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	3.9305	0.0997	7.5396	0.0120		1.1458	1.1458		1.1456	1.1456	140.5038	270.0000	410.5038	0.4190	9.5400e-003	422.2593
Landscaping	0.0395	0.0147	1.2548	7.0000e-005		6.7700e-003	6.7700e-003		6.7700e-003	6.7700e-003		2.2283	2.2283	2.2700e-003		2.2760
Total	**4.5625**	**0.1144**	**8.7944**	**0.0121**		**1.1526**	**1.1526**		**1.1524**	**1.1524**	**140.5038**	**272.2283**	**412.7321**	**0.4213**	**9.5400e-003**	**424.5352**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix 3b:
Air Quality Winter Modeling

Elm Street Tract Map

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	15.00	Dwelling Unit	4.16	27,000.00	43

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage total = 4.16 acres

Construction Phase - Building construction, paving, and painting assumed of occur simultaneously

Construction Off-road Equipment Mitigation - PM reduction values per SCAQMD CEQA Handbook Tables 11-4, 11-15, A11-9-A

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	40
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblLandUse	LotAcreage	4.87	4.16
tblProjectCharacteristics	OperationalYear	2014	2016

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					
2016	6.6001	54.7191	41.9848	0.0520	18.2675	3.2756	21.2074	9.9840	3.0695	12.6888	0.0000	5,158.4826	5,158.4826	1.2667	0.0000	5,185.0838
Total	**6.6001**	**54.7191**	**41.9848**	**0.0520**	**18.2675**	**3.2756**	**21.2074**	**9.9840**	**3.0695**	**12.6888**	**0.0000**	**5,158.4826**	**5,158.4826**	**1.2667**	**0.0000**	**5,185.0838**

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					
2016	6.6001	54.7191	41.9848	0.0520	7.0416	3.2756	9.9815	3.8347	3.0695	6.5394	0.0000	5,158.4826	5,158.4826	1.2667	0.0000	5,185.0838
Total	**6.6001**	**54.7191**	**41.9848**	**0.0520**	**7.0416**	**3.2756**	**9.9815**	**3.8347**	**3.0695**	**6.5394**	**0.0000**	**5,158.4826**	**5,158.4826**	**1.2667**	**0.0000**	**5,185.0838**

	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**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**61.45**	**0.00**	**52.93**	**61.59**	**0.00**	**48.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Energy	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Mobile	0.5720	1.9267	6.1305	0.0150	1.0947	0.0270	1.1216	0.2921	0.0248	0.3169		1,319.1654	1,319.1654	0.0459		1,320.1282
Total	**5.1495**	**2.1690**	**14.9793**	**0.0279**	**1.0947**	**1.1899**	**2.2845**	**0.2921**	**1.1875**	**1.4797**	**140.5038**	**1,754.6504**	**1,895.1542**	**0.4703**	**0.0125**	**1,908.9137**

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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Energy	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Mobile	0.5720	1.9267	6.1305	0.0150	1.0947	0.0270	1.1216	0.2921	0.0248	0.3169		1,319.1654	1,319.1654	0.0459		1,320.1282
Total	**5.1495**	**2.1690**	**14.9793**	**0.0279**	**1.0947**	**1.1899**	**2.2845**	**0.2921**	**1.1875**	**1.4797**	**140.5038**	**1,754.6504**	**1,895.1542**	**0.4703**	**0.0125**	**1,908.9137**

	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	N20	CO2e
Percent Reduction	**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**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/7/2016	5	5	
2	Grading	Grading	1/8/2016	1/19/2016	5	8	
3	Building Construction	Building Construction	1/20/2016	12/6/2016	5	230	
4	Paving	Paving	1/20/2016	12/6/2016	5	230	
5	Architectural Coating	Architectural Coating	1/20/2016	12/6/2016	5	230	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0

Residential Indoor: 54,675; Residential Outdoor: 18,225; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	2	6.00	130	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2016

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					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0658	0.0868	0.8796	2.2000e-003	0.2012	1.2600e-003	0.2025	0.0534	1.1600e-003	0.0545		182.5176	182.5176	8.6100e-003		182.6986
Total	**0.0658**	**0.0868**	**0.8796**	**2.2000e-003**	**0.2012**	**1.2600e-003**	**0.2025**	**0.0534**	**1.1600e-003**	**0.0545**		**182.5176**	**182.5176**	**8.6100e-003**		**182.6986**

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					6.9103	0.0000	6.9103	3.7985	0.0000	3.7985			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**6.9103**	**2.9387**	**9.8490**	**3.7985**	**2.7036**	**6.5021**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0658	0.0868	0.8796	2.2000e-003	0.1312	1.2600e-003	0.1325	0.0362	1.1600e-003	0.0373		182.5176	182.5176	8.6100e-003		182.6986
Total	**0.0658**	**0.0868**	**0.8796**	**2.2000e-003**	**0.1312**	**1.2600e-003**	**0.1325**	**0.0362**	**1.1600e-003**	**0.0373**		**182.5176**	**182.5176**	**8.6100e-003**		**182.6986**

3.3 Grading - 2016

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					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225		3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**6.5523**	**2.1984**	**8.7507**	**3.3675**	**2.0225**	**5.3900**		**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0548	0.0723	0.7330	1.8400e-003	0.1677	1.0500e-003	0.1687	0.0445	9.6000e-004	0.0454		152.0980	152.0980	7.1800e-003		152.2488
Total	**0.0548**	**0.0723**	**0.7330**	**1.8400e-003**	**0.1677**	**1.0500e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**152.0980**	**152.0980**	**7.1800e-003**		**152.2488**

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					2.5063	0.0000	2.5063	1.2881	0.0000	1.2881			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225	0.0000	3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**2.5063**	**2.1984**	**4.7047**	**1.2881**	**2.0225**	**3.3106**	**0.0000**	**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0548	0.0723	0.7330	1.8400e-003	0.1094	1.0500e-003	0.1104	0.0302	9.6000e-004	0.0311		152.0980	152.0980	7.1800e-003		152.2488
Total	**0.0548**	**0.0723**	**0.7330**	**1.8400e-003**	**0.1094**	**1.0500e-003**	**0.1104**	**0.0302**	**9.6000e-004**	**0.0311**		**152.0980**	**152.0980**	**7.1800e-003**		**152.2488**

3.4 Building Construction - 2016

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0166	0.1721	0.1998	4.2000e-004	0.0126	3.2900e-003	0.0159	3.5900e-003	3.0200e-003	6.6200e-003		41.8903	41.8903	2.8000e-004		41.8963
Worker	0.0183	0.0241	0.2443	6.1000e-004	0.0559	3.5000e-004	0.0562	0.0148	3.2000e-004	0.0151		50.6994	50.6994	2.3900e-003		50.7496
Total	**0.0349**	**0.1962**	**0.4441**	**1.0300e-003**	**0.0685**	**3.6400e-003**	**0.0721**	**0.0184**	**3.3400e-003**	**0.0218**		**92.5897**	**92.5897**	**2.6700e-003**		**92.6459**

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	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0166	0.1721	0.1998	4.2000e-004	8.9300e-003	3.2900e-003	0.0122	2.7000e-003	3.0200e-003	5.7200e-003		41.8903	41.8903	2.8000e-004		41.8963
Worker	0.0183	0.0241	0.2443	6.1000e-004	0.0365	3.5000e-004	0.0368	0.0101	3.2000e-004	0.0104		50.6994	50.6994	2.3900e-003		50.7496
Total	**0.0349**	**0.1962**	**0.4441**	**1.0300e-003**	**0.0454**	**3.6400e-003**	**0.0490**	**0.0128**	**3.3400e-003**	**0.0161**		**92.5897**	**92.5897**	**2.6700e-003**		**92.6459**

3.5 Paving - 2016

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	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198		1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7956**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**		**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0731	0.0964	0.9773	2.4500e-003	0.2236	1.4000e-003	0.2250	0.0593	1.2800e-003	0.0606		202.7974	202.7974	9.5700e-003		202.9984
Total	**0.0731**	**0.0964**	**0.9773**	**2.4500e-003**	**0.2236**	**1.4000e-003**	**0.2250**	**0.0593**	**1.2800e-003**	**0.0606**		**202.7974**	**202.7974**	**9.5700e-003**		**202.9984**

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	1.7956	18.3417	12.5623	0.0186		1.1065	1.1065		1.0198	1.0198	0.0000	1,902.2212	1,902.2212	0.5588		1,913.9557
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7956**	**18.3417**	**12.5623**	**0.0186**		**1.1065**	**1.1065**		**1.0198**	**1.0198**	**0.0000**	**1,902.2212**	**1,902.2212**	**0.5588**		**1,913.9557**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0731	0.0964	0.9773	2.4500e-003	0.1458	1.4000e-003	0.1472	0.0402	1.2800e-003	0.0415		202.7974	202.7974	9.5700e-003		202.9984
Total	**0.0731**	**0.0964**	**0.9773**	**2.4500e-003**	**0.1458**	**1.4000e-003**	**0.1472**	**0.0402**	**1.2800e-003**	**0.0415**		**202.7974**	**202.7974**	**9.5700e-003**		**202.9984**

3.6 Architectural Coating - 2016

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	0.9182					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**1.2866**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6600e-003	4.8200e-003	0.0489	1.2000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	6.0000e-005	3.0300e-003		10.1399	10.1399	4.8000e-004		10.1499
Total	**3.6600e-003**	**4.8200e-003**	**0.0489**	**1.2000e-004**	**0.0112**	**7.0000e-005**	**0.0113**	**2.9600e-003**	**6.0000e-005**	**3.0300e-003**		**10.1399**	**10.1399**	**4.8000e-004**		**10.1499**

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	0.9182					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**1.2866**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	3.6600e-003	4.8200e-003	0.0489	1.2000e-004	7.2900e-003	7.0000e-005	7.3600e-003	2.0100e-003	6.0000e-005	2.0700e-003		10.1399	10.1399	4.8000e-004		10.1499
Total	**3.6600e-003**	**4.8200e-003**	**0.0489**	**1.2000e-004**	**7.2900e-003**	**7.0000e-005**	**7.3600e-003**	**2.0100e-003**	**6.0000e-005**	**2.0700e-003**		**10.1399**	**10.1399**	**4.8000e-004**		**10.1499**

4.0 Operational Detail - Mobile

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	0.5720	1.9267	6.1305	0.0150	1.0947	0.0270	1.1216	0.2921	0.0248	0.3169		1,319.1654	1,319.1654	0.0459		1,320.1282
Unmitigated	0.5720	1.9267	6.1305	0.0150	1.0947	0.0270	1.1216	0.2921	0.0248	0.3169		1,319.1654	1,319.1654	0.0459		1,320.1282

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	143.55	151.20	131.55	488,409	488,409
Total	143.55	151.20	131.55	488,409	488,409

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
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	Primary	Diverted	Pass-by
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

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	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
NaturalGas Unmitigated	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502

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/yr	lb/day										lb/day					
Single Family Housing	1387.68	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Total		**0.0150**	**0.1279**	**0.0544**	**8.2000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**		**163.2567**	**163.2567**	**3.1300e-003**	**2.9900e-003**	**164.2502**

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/yr	lb/day										lb/day					
Single Family Housing	1.38768	0.0150	0.1279	0.0544	8.2000e-004		0.0103	0.0103		0.0103	0.0103		163.2567	163.2567	3.1300e-003	2.9900e-003	164.2502
Total		**0.0150**	**0.1279**	**0.0544**	**8.2000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**		**163.2567**	**163.2567**	**3.1300e-003**	**2.9900e-003**	**164.2502**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352
Unmitigated	4.5625	0.1144	8.7944	0.0121		1.1526	1.1526		1.1524	1.1524	140.5038	272.2283	412.7321	0.4213	9.5400e-003	424.5352

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	0.0579					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.5346					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	3.9305	0.0997	7.5396	0.0120		1.1458	1.1458		1.1456	1.1456	140.5038	270.0000	410.5038	0.4190	9.5400e-003	422.2593
Landscaping	0.0395	0.0147	1.2548	7.0000e-005		6.7700e-003	6.7700e-003		6.7700e-003	6.7700e-003		2.2283	2.2283	2.2700e-003		2.2760
Total	**4.5625**	**0.1144**	**8.7944**	**0.0121**		**1.1526**	**1.1526**		**1.1524**	**1.1524**	**140.5038**	**272.2283**	**412.7321**	**0.4213**	**9.5400e-003**	**424.5352**

6.2 Area by SubCategory

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	0.0579					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.5346					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	3.9305	0.0997	7.5396	0.0120		1.1458	1.1458		1.1456	1.1456	140.5038	270.0000	410.5038	0.4190	9.5400e-003	422.2593
Landscaping	0.0395	0.0147	1.2548	7.0000e-005		6.7700e-003	6.7700e-003		6.7700e-003	6.7700e-003		2.2283	2.2283	2.2700e-003		2.2760
Total	**4.5625**	**0.1144**	**8.7944**	**0.0121**		**1.1526**	**1.1526**		**1.1524**	**1.1524**	**140.5038**	**272.2283**	**412.7321**	**0.4213**	**9.5400e-003**	**424.5352**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix 3c:
Air Quality Model File

Elm Street Tract Map

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	15.00	Dwelling Unit	4.16	27,000.00	43

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage total = 4.16 acres

Construction Phase - Building construction, paving, and painting assumed of occur simultaneously

Construction Off-road Equipment Mitigation - PM reduction values per SCAQMD CEQA Handbook Tables 11-4, 11-15, A11-9-A

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	40
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	NumDays	18.00	230.00
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseEndDate	10/24/2017	12/6/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	1/20/2016
tblLandUse	LotAcreage	4.87	4.16
tblProjectCharacteristics	OperationalYear	2014	2016

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					
2016	0.7861	5.9864	4.1770	6.2200e-003	0.1068	0.3928	0.4997	0.0477	0.3679	0.4156	0.0000	559.9871	559.9871	0.1384	0.0000	562.8928
Total	**0.7861**	**5.9864**	**4.1770**	**6.2200e-003**	**0.1068**	**0.3928**	**0.4997**	**0.0477**	**0.3679**	**0.4156**	**0.0000**	**559.9871**	**559.9871**	**0.1384**	**0.0000**	**562.8928**

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					
2016	0.7861	5.9864	4.1770	6.2200e-003	0.0505	0.3928	0.4434	0.0211	0.3679	0.3889	0.0000	559.9865	559.9865	0.1384	0.0000	562.8922
Total	**0.7861**	**5.9864**	**4.1770**	**6.2200e-003**	**0.0505**	**0.3928**	**0.4434**	**0.0211**	**0.3679**	**0.3889**	**0.0000**	**559.9865**	**559.9865**	**0.1384**	**0.0000**	**562.8922**

	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**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**52.70**	**0.00**	**11.27**	**55.82**	**0.00**	**6.41**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**

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	0.1622	3.0800e-003	0.2511	1.6000e-004		0.0152	0.0152		0.0152	0.0152	1.5933	3.3144	4.9077	5.0100e-003	1.1000e-004	5.0464
Energy	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	59.9939	59.9939	2.0300e-003	8.1000e-004	60.2874
Mobile	0.0941	0.3387	1.0887	2.6100e-003	0.1852	4.6200e-003	0.1899	0.0495	4.2500e-003	0.0538	0.0000	207.7956	207.7956	7.1400e-003	0.0000	207.9456
Waste						0.0000	0.0000		0.0000	0.0000	3.5787	0.0000	3.5787	0.2115	0.0000	8.0202
Water						0.0000	0.0000		0.0000	0.0000	0.3101	5.6005	5.9106	0.0321	8.1000e-004	6.8343
Total	**0.2591**	**0.3651**	**1.3498**	**2.9200e-003**	**0.1852**	**0.0217**	**0.2069**	**0.0495**	**0.0213**	**0.0708**	**5.4821**	**276.7044**	**282.1865**	**0.2578**	**1.7300e-003**	**288.1339**

2.2 Overall Operational

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	0.1622	3.0800e-003	0.2511	1.6000e-004		0.0152	0.0152		0.0152	0.0152	1.5933	3.3144	4.9077	5.0100e-003	1.1000e-004	5.0464
Energy	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	59.9939	59.9939	2.0300e-003	8.1000e-004	60.2874
Mobile	0.0941	0.3387	1.0887	2.6100e-003	0.1852	4.6200e-003	0.1899	0.0495	4.2500e-003	0.0538	0.0000	207.7956	207.7956	7.1400e-003	0.0000	207.9456
Waste						0.0000	0.0000		0.0000	0.0000	3.5787	0.0000	3.5787	0.2115	0.0000	8.0202
Water						0.0000	0.0000		0.0000	0.0000	0.3101	5.6005	5.9106	0.0321	8.0000e-004	6.8339
Total	**0.2591**	**0.3651**	**1.3498**	**2.9200e-003**	**0.1852**	**0.0217**	**0.2069**	**0.0495**	**0.0213**	**0.0708**	**5.4821**	**276.7044**	**282.1865**	**0.2578**	**1.7200e-003**	**288.1334**

	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	N20	CO2e
Percent Reduction	**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**	**0.58**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/7/2016	5	5	
2	Grading	Grading	1/8/2016	1/19/2016	5	8	
3	Building Construction	Building Construction	1/20/2016	12/6/2016	5	230	
4	Paving	Paving	1/20/2016	12/6/2016	5	230	
5	Architectural Coating	Architectural Coating	1/20/2016	12/6/2016	5	230	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 0

Residential Indoor: 54,675; Residential Outdoor: 18,225; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	2	6.00	130	0.36
Paving	Rollers	2	6.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2016

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					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1366	0.1028	1.0000e-004		7.3500e-003	7.3500e-003		6.7600e-003	6.7600e-003	0.0000	9.2193	9.2193	2.7800e-003	0.0000	9.2777
Total	**0.0127**	**0.1366**	**0.1028**	**1.0000e-004**	**0.0452**	**7.3500e-003**	**0.0525**	**0.0248**	**6.7600e-003**	**0.0316**	**0.0000**	**9.2193**	**9.2193**	**2.7800e-003**	**0.0000**	**9.2777**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.3000e-004	2.2800e-003	1.0000e-005	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4196	0.4196	2.0000e-005	0.0000	0.4200
Total	**1.5000e-004**	**2.3000e-004**	**2.2800e-003**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4196**	**0.4196**	**2.0000e-005**	**0.0000**	**0.4200**

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					0.0173	0.0000	0.0173	9.5000e-003	0.0000	9.5000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0127	0.1366	0.1028	1.0000e-004		7.3500e-003	7.3500e-003		6.7600e-003	6.7600e-003	0.0000	9.2193	9.2193	2.7800e-003	0.0000	9.2777
Total	**0.0127**	**0.1366**	**0.1028**	**1.0000e-004**	**0.0173**	**7.3500e-003**	**0.0246**	**9.5000e-003**	**6.7600e-003**	**0.0163**	**0.0000**	**9.2193**	**9.2193**	**2.7800e-003**	**0.0000**	**9.2777**

3.2 Site Preparation - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.3000e-004	2.2800e-003	1.0000e-005	3.2000e-004	0.0000	3.3000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.4196	0.4196	2.0000e-005	0.0000	0.4200
Total	**1.5000e-004**	**2.3000e-004**	**2.2800e-003**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**3.3000e-004**	**9.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.4196**	**0.4196**	**2.0000e-005**	**0.0000**	**0.4200**

3.3 Grading - 2016

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					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0147	0.1538	0.1043	1.2000e-004		8.7900e-003	8.7900e-003		8.0900e-003	8.0900e-003	0.0000	11.2266	11.2266	3.3900e-003	0.0000	11.2977
Total	**0.0147**	**0.1538**	**0.1043**	**1.2000e-004**	**0.0262**	**8.7900e-003**	**0.0350**	**0.0135**	**8.0900e-003**	**0.0216**	**0.0000**	**11.2266**	**11.2266**	**3.3900e-003**	**0.0000**	**11.2977**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	3.0000e-004	3.0400e-003	1.0000e-005	6.6000e-004	0.0000	6.6000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5595	0.5595	3.0000e-005	0.0000	0.5600
Total	**2.1000e-004**	**3.0000e-004**	**3.0400e-003**	**1.0000e-005**	**6.6000e-004**	**0.0000**	**6.6000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.5595**	**0.5595**	**3.0000e-005**	**0.0000**	**0.5600**

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					0.0100	0.0000	0.0100	5.1500e-003	0.0000	5.1500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0147	0.1538	0.1043	1.2000e-004		8.7900e-003	8.7900e-003		8.0900e-003	8.0900e-003	0.0000	11.2265	11.2265	3.3900e-003	0.0000	11.2977
Total	**0.0147**	**0.1538**	**0.1043**	**1.2000e-004**	**0.0100**	**8.7900e-003**	**0.0188**	**5.1500e-003**	**8.0900e-003**	**0.0132**	**0.0000**	**11.2265**	**11.2265**	**3.3900e-003**	**0.0000**	**11.2977**

3.3 Grading - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	3.0000e-004	3.0400e-003	1.0000e-005	4.3000e-004	0.0000	4.3000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.5595	0.5595	3.0000e-005	0.0000	0.5600
Total	**2.1000e-004**	**3.0000e-004**	**3.0400e-003**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**4.3000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.5595**	**0.5595**	**3.0000e-005**	**0.0000**	**0.5600**

3.4 Building Construction - 2016

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	0.3917	3.2782	2.1283	3.0800e-003		0.2263	0.2263		0.2126	0.2126	0.0000	278.4766	278.4766	0.0691	0.0000	279.9270
Total	**0.3917**	**3.2782**	**2.1283**	**3.0800e-003**		**0.2263**	**0.2263**		**0.2126**	**0.2126**	**0.0000**	**278.4766**	**278.4766**	**0.0691**	**0.0000**	**279.9270**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8900e-003	0.0202	0.0236	5.0000e-005	1.4300e-003	3.8000e-004	1.8000e-003	4.1000e-004	3.5000e-004	7.5000e-004	0.0000	4.3924	4.3924	3.0000e-005	0.0000	4.3930
Worker	1.9800e-003	2.8900e-003	0.0291	7.0000e-005	6.3200e-003	4.0000e-005	6.3600e-003	1.6800e-003	4.0000e-005	1.7200e-003	0.0000	5.3614	5.3614	2.5000e-004	0.0000	5.3666
Total	**3.8700e-003**	**0.0231**	**0.0527**	**1.2000e-004**	**7.7500e-003**	**4.2000e-004**	**8.1600e-003**	**2.0900e-003**	**3.9000e-004**	**2.4700e-003**	**0.0000**	**9.7538**	**9.7538**	**2.8000e-004**	**0.0000**	**9.7596**

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	0.3917	3.2782	2.1283	3.0800e-003		0.2263	0.2263		0.2126	0.2126	0.0000	278.4763	278.4763	0.0691	0.0000	279.9267
Total	**0.3917**	**3.2782**	**2.1283**	**3.0800e-003**		**0.2263**	**0.2263**		**0.2126**	**0.2126**	**0.0000**	**278.4763**	**278.4763**	**0.0691**	**0.0000**	**279.9267**

3.4 Building Construction - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8900e-003	0.0202	0.0236	5.0000e-005	1.0200e-003	3.8000e-004	1.3900e-003	3.1000e-004	3.5000e-004	6.5000e-004	0.0000	4.3924	4.3924	3.0000e-005	0.0000	4.3930
Worker	1.9800e-003	2.8900e-003	0.0291	7.0000e-005	4.1300e-003	4.0000e-005	4.1700e-003	1.1400e-003	4.0000e-005	1.1800e-003	0.0000	5.3614	5.3614	2.5000e-004	0.0000	5.3666
Total	**3.8700e-003**	**0.0231**	**0.0527**	**1.2000e-004**	**5.1500e-003**	**4.2000e-004**	**5.5600e-003**	**1.4500e-003**	**3.9000e-004**	**1.8300e-003**	**0.0000**	**9.7538**	**9.7538**	**2.8000e-004**	**0.0000**	**9.7596**

3.5 Paving - 2016

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	0.2065	2.1093	1.4447	2.1400e-003		0.1273	0.1273		0.1173	0.1173	0.0000	198.4516	198.4516	0.0583	0.0000	199.6758
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.2065**	**2.1093**	**1.4447**	**2.1400e-003**		**0.1273**	**0.1273**		**0.1173**	**0.1173**	**0.0000**	**198.4516**	**198.4516**	**0.0583**	**0.0000**	**199.6758**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-003	0.0116	0.1165	2.9000e-004	0.0253	1.6000e-004	0.0254	6.7100e-003	1.5000e-004	6.8600e-003	0.0000	21.4456	21.4456	1.0000e-003	0.0000	21.4665
Total	**7.9000e-003**	**0.0116**	**0.1165**	**2.9000e-004**	**0.0253**	**1.6000e-004**	**0.0254**	**6.7100e-003**	**1.5000e-004**	**6.8600e-003**	**0.0000**	**21.4456**	**21.4456**	**1.0000e-003**	**0.0000**	**21.4665**

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	0.2065	2.1093	1.4447	2.1400e-003		0.1273	0.1273		0.1173	0.1173	0.0000	198.4514	198.4514	0.0583	0.0000	199.6756
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.2065**	**2.1093**	**1.4447**	**2.1400e-003**		**0.1273**	**0.1273**		**0.1173**	**0.1173**	**0.0000**	**198.4514**	**198.4514**	**0.0583**	**0.0000**	**199.6756**

3.5 Paving - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-003	0.0116	0.1165	2.9000e-004	0.0165	1.6000e-004	0.0167	4.5600e-003	1.5000e-004	4.7100e-003	0.0000	21.4456	21.4456	1.0000e-003	0.0000	21.4665
Total	**7.9000e-003**	**0.0116**	**0.1165**	**2.9000e-004**	**0.0165**	**1.6000e-004**	**0.0167**	**4.5600e-003**	**1.5000e-004**	**4.7100e-003**	**0.0000**	**21.4456**	**21.4456**	**1.0000e-003**	**0.0000**	**21.4665**

3.6 Architectural Coating - 2016

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	0.1056					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0424	0.2728	0.2167	3.4000e-004		0.0226	0.0226		0.0226	0.0226	0.0000	29.3624	29.3624	3.4600e-003	0.0000	29.4351
Total	**0.1480**	**0.2728**	**0.2167**	**3.4000e-004**		**0.0226**	**0.0226**		**0.0226**	**0.0226**	**0.0000**	**29.3624**	**29.3624**	**3.4600e-003**	**0.0000**	**29.4351**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-004	5.8000e-004	5.8200e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.4000e-004	0.0000	1.0723	1.0723	5.0000e-005	0.0000	1.0733
Total	**4.0000e-004**	**5.8000e-004**	**5.8200e-003**	**1.0000e-005**	**1.2600e-003**	**1.0000e-005**	**1.2700e-003**	**3.4000e-004**	**1.0000e-005**	**3.4000e-004**	**0.0000**	**1.0723**	**1.0723**	**5.0000e-005**	**0.0000**	**1.0733**

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	0.1056					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0424	0.2728	0.2167	3.4000e-004		0.0226	0.0226		0.0226	0.0226	0.0000	29.3624	29.3624	3.4600e-003	0.0000	29.4351
Total	**0.1480**	**0.2728**	**0.2167**	**3.4000e-004**		**0.0226**	**0.0226**		**0.0226**	**0.0226**	**0.0000**	**29.3624**	**29.3624**	**3.4600e-003**	**0.0000**	**29.4351**

3.6 Architectural Coating - 2016

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-004	5.8000e-004	5.8200e-003	1.0000e-005	8.3000e-004	1.0000e-005	8.3000e-004	2.3000e-004	1.0000e-005	2.4000e-004	0.0000	1.0723	1.0723	5.0000e-005	0.0000	1.0733
Total	**4.0000e-004**	**5.8000e-004**	**5.8200e-003**	**1.0000e-005**	**8.3000e-004**	**1.0000e-005**	**8.3000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**1.0723**	**1.0723**	**5.0000e-005**	**0.0000**	**1.0733**

4.0 Operational Detail - Mobile

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	0.0941	0.3387	1.0887	2.6100e-003	0.1852	4.6200e-003	0.1899	0.0495	4.2500e-003	0.0538	0.0000	207.7956	207.7956	7.1400e-003	0.0000	207.9456
Unmitigated	0.0941	0.3387	1.0887	2.6100e-003	0.1852	4.6200e-003	0.1899	0.0495	4.2500e-003	0.0538	0.0000	207.7956	207.7956	7.1400e-003	0.0000	207.9456

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	143.55	151.20	131.55	488,409	488,409
Total	143.55	151.20	131.55	488,409	488,409

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
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	Primary	Diverted	Pass-by
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462438	0.069856	0.176572	0.170752	0.045136	0.007399	0.012745	0.042494	0.000970	0.001060	0.006446	0.000893	0.003237

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

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						0.0000	0.0000		0.0000	0.0000	0.0000	32.9649	32.9649	1.5200e-003	3.1000e-004	33.0939
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	32.9649	32.9649	1.5200e-003	3.1000e-004	33.0939
NaturalGas Mitigated	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	27.0290	27.0290	5.2000e-004	5.0000e-004	27.1935
NaturalGas Unmitigated	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	27.0290	27.0290	5.2000e-004	5.0000e-004	27.1935

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/yr	tons/yr										MT/yr					
Single Family Housing	506504	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	27.0290	27.0290	5.2000e-004	5.0000e-004	27.1935
Total		**2.7300e-003**	**0.0233**	**9.9300e-003**	**1.5000e-004**		**1.8900e-003**	**1.8900e-003**		**1.8900e-003**	**1.8900e-003**	**0.0000**	**27.0290**	**27.0290**	**5.2000e-004**	**5.0000e-004**	**27.1935**

5.2 Energy by Land Use - NaturalGas

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/yr	tons/yr										MT/yr					
Single Family Housing	506504	2.7300e-003	0.0233	9.9300e-003	1.5000e-004		1.8900e-003	1.8900e-003		1.8900e-003	1.8900e-003	0.0000	27.0290	27.0290	5.2000e-004	5.0000e-004	27.1935
Total		**2.7300e-003**	**0.0233**	**9.9300e-003**	**1.5000e-004**		**1.8900e-003**	**1.8900e-003**		**1.8900e-003**	**1.8900e-003**	**0.0000**	**27.0290**	**27.0290**	**5.2000e-004**	**5.0000e-004**	**27.1935**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	115195	32.9649	1.5200e-003	3.1000e-004	33.0939
Total		**32.9649**	**1.5200e-003**	**3.1000e-004**	**33.0939**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	115195	32.9649	1.5200e-003	3.1000e-004	33.0939
Total		**32.9649**	**1.5200e-003**	**3.1000e-004**	**33.0939**

6.0 Area Detail

6.1 Mitigation Measures Area

	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	0.1622	3.0800e-003	0.2511	1.6000e-004		0.0152	0.0152		0.0152	0.0152	1.5933	3.3144	4.9077	5.0100e-003	1.1000e-004	5.0464
Unmitigated	0.1622	3.0800e-003	0.2511	1.6000e-004		0.0152	0.0152		0.0152	0.0152	1.5933	3.3144	4.9077	5.0100e-003	1.1000e-004	5.0464

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	0.0106					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0491	1.2500e-003	0.0943	1.5000e-004		0.0143	0.0143		0.0143	0.0143	1.5933	3.0618	4.6550	4.7500e-003	1.1000e-004	4.7883
Landscaping	4.9400e-003	1.8400e-003	0.1569	1.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	0.2527	0.2527	2.6000e-004	0.0000	0.2581
Total	**0.1622**	**3.0900e-003**	**0.2511**	**1.6000e-004**		**0.0152**	**0.0152**		**0.0152**	**0.0152**	**1.5933**	**3.3144**	**4.9077**	**5.0100e-003**	**1.1000e-004**	**5.0464**

6.2 Area by SubCategory

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	0.0106					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0491	1.2500e-003	0.0943	1.5000e-004		0.0143	0.0143		0.0143	0.0143	1.5933	3.0618	4.6550	4.7500e-003	1.1000e-004	4.7883
Landscaping	4.9400e-003	1.8400e-003	0.1569	1.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	0.2527	0.2527	2.6000e-004	0.0000	0.2581
Total	**0.1622**	**3.0900e-003**	**0.2511**	**1.6000e-004**		**0.0152**	**0.0152**		**0.0152**	**0.0152**	**1.5933**	**3.3144**	**4.9077**	**5.0100e-003**	**1.1000e-004**	**5.0464**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5.9106	0.0321	8.0000e-004	6.8339
Unmitigated	5.9106	0.0321	8.1000e-004	6.8343

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.97731 / 0.61613	5.9106	0.0321	8.1000e-004	6.8343
Total		**5.9106**	**0.0321**	**8.1000e-004**	**6.8343**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.97731 / 0.61613	5.9106	0.0321	8.0000e-004	6.8339
Total		**5.9106**	**0.0321**	**8.0000e-004**	**6.8339**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	3.5787	0.2115	0.0000	8.0202
Unmitigated	3.5787	0.2115	0.0000	8.0202

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	17.63	3.5787	0.2115	0.0000	8.0202
Total		**3.5787**	**0.2115**	**0.0000**	**8.0202**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	17.63	3.5787	0.2115	0.0000	8.0202
Total		**3.5787**	**0.2115**	**0.0000**	**8.0202**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

APPENDIX 4: HABITAT ASSESSMENT

Ken H. Osborne
Osborne Biological Consulting
6675 Avenue Juan Diaz
Riverside, CA 92509

Attn: Mr. Zareh Hookasian
3173 Vera Valley Rd.
franklin, TN 37064

RE: Pre grading Burrowing Owl follow-up for Case Number TR 33840; APN 376-043-027

To Whom It May Concern:

On Behalf of Mr Zareh Hookasian, Mr. Richard Soltysiak of RDS and Associates has requested my follow-up evaluation of Burrowing Owl status on Tract number 33840. I have previously investigated and reported on this site, finding negative for Burrowing Owl (see Osborne 2007).

Following the Burrowing Owl survey protocol as previously (Osborne 2007), I visited the site on four dates between August 21 and August 25 (table below). I found vegetation conditions on the site to remain unchanged from my previous site investigation. I mapped ground squirrel burrows and burrow complexes and found them essentially unchanged from the distribution previously mapped (Osborne 2007). During the course of this survey, I found no sign of Burrowing Owl (such as pellets, plumage, guano on nearby perches, or tracks). Burrowing Owl was not observed on the site, and I am satisfied that Burrowing Owl remains absent from the site. Additional field notes and/or a formal report on these latest survey results can be prepared if deemed necessary.

Respectfully submitted,

Ken H. Osborne

Table 1. Year 2013 Burrowing Owl Focused Survey Schedule and Site Weather Conditions.

Date and area	Hours (PDT)	Weather Conditions
21 August	0720-0820	Clear, 70° F, calm
23 August	0725-0825	5% cloud cover, 70-75° F, calm
24 August	0649-0749	Clear, 60° F, calm
25 August	0726-0826	Clear, 65-70° F, calm

References:

Osborne K. H. 2007. Habitat Assessment and Breading Season Survey for Burrowing Owl, on a 4.04 acre site (Assessor's Parcel No. 376-043-027), Wildomar, Riverside County, California. Submitted to County of Riverside Environmental Programs Department, December 2007.

1019-01

Information Summary

Report preparation date: December 8, 2007.

Fieldwork performed: August 8 - 16, and December 7, 2007.

Title: Habitat Assessment and Breading Season Survey for Burrowing Owl, on a 4.04 acre site (Assessor's Parcel No. 376-043-027), Wildomar, Riverside County, California.

Project site location: South side of Murrieta Creek, between Grewell St. and Central Ave., Wildomar, Riverside County, California. Wildomar U.S.G.S.-75.' Quadrangle, Township 6 S., Range 4 W., unsectioned area.

Assessor's Parcel Number 376-043-027: Case Number TTM 33840

Owner/Applicant: Zareth Hookasian 4036 Old Hillsboro Rd., Franklin, TN 37064-9546.

Principle Investigator: Ken H. Osborne, Osborne Biological Consulting 6675 Avenue Juan Diaz, Riverside, CA 92509.

Report Summary: Results of biological assessments and surveys:

Habitat for Burrowing Owl is present on the site due to ground squirrel burrows on open lands. Survey results are negative for a Burrowing Owl Survey.

There are no riparian or riverine habitats on the site, and no vernal pools. There are no potential federal or state jurisdictional waters on the site.

Oak trees are present on the site.

Name and contact of Report Preparer: Ken H. Osborne (951) 360-6461

Habitat Assessment and Breading Season Survey for Burrowing Owl, on a 4.04 acre site (Assessor's Parcel No. 376-043-027), Wildomar, Riverside County, California.

Prepared for:

Zareth Hookasian
4036 Old Hillsboro Rd.
Franklin, TN

I hereby certify that the statements furnished above and in the attached exhibits present that 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.

Kendall H. Osborne
6675 Avenue Juan Diaz
Riverside, CA 92509

12/8/2007
Date

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SUMMARY

On behalf of their client, Mr. Hookasian, Prestige Deverlopers, Inc. has requested a habitat assessment and survey for Burrowing Owl (*Athene cunicularia*) on a 4.5-acre site (Assessor's Parcel No. 376-043-027), in Wildomar, Riverside County, California.

In order to assess the subject site for potential as habitat for these species, and conduct the appropriate surveys, field investigations were conducted on four dates from August 8 to August 16, 2007. Notes were taken on vegetation communities and structure, as well as plant and animal species observed on the site, along with photographs of the subject site.

Burrowing Owl: Fields of disturbed annual grassland with a few active ground squirrel burrows found on the subject site is typical Burrowing Owl habitat. Although focused survey effort determined ground squirrel and their burrows to be present, I found no sign of Burrowing Owl (such as pellets, plumage, guano on nearby perches, or tracks at burrow entrances). Burrowing Owl was not found in the course of the survey.

Miscellaneous: There are no wetlands on the subject site. There are no Federal or State jurisdictional waters on the site, however, a canal which carries Murrieta Creek is located near the northern boundary of the site. Oak trees (*Quercus agrifolia*) are present on the subject site.

1.0 INTRODUCTION

This report presents the methods and results of a habitat assessment and survey for Burrowing Owl (*Athene* cunicularia) on a 4.5-acre site (Assessor's Parcel No. 376-043-027), located in Wildomar, Riverside County, California. A residential tract is proposed for the site.

In order to assess the subject site for potential as habitat for Burrowing Owl, an initial field investigation was conducted on August 8, 2007. A focused survey for Burrowing Owl was undertaken from August 8 (beginning immediately after habitat evaluation) through August 16, 2007.

In the conduct of the field work, additional consideration was given to presence or absence of riparian or riverine habitats, vernal pools, or any other potential jurisdictional waters or wetlands. Consideration was also given to presence of absence of any native oak trees on the site (important to compliance with County Oak tree management programs and some local ordinances).

Figure 1 shows the general vicinity of the survey site at 50% scale on the Wildomar, 7.5' USGS quadrangle. Figure 2 shows the site at 200% scale on this quadrangle

2.0 SITE DISPOSITION

The subject site is located at South side of Murrieta Creek, between Grewell St. and Central Ave., Wildomar. Specifically, the site is located on the Wildomar U.S.G.S.-75.' quadrangle, in Township 6 S., Range 5 W, in an unsectioned area.

3.0 METHODS

The initial field investigation of the site was conducted on the evening of August 8, 2007. On this date, evaluation of habitat conditions and potential for Burrowing Owl was undertaken along with documentation of all plants species on the site.

3.1 Burrowing Owl

With respect to Burrowing Owl, open fields on the subject site, along with availability of open burrows from ground squirrel, suggested suitability for Burrowing Owl. Overall, the site was considered to represent potential habitat for the owl. Ground squirrel was found to be present on northern and westen margins of the subject site. A burrow survey was undertaken wherein all potentially suitable burrows or cavities were mapped and checked for owl sign such as pellets (composed of insects and small rodents), plumage, tracks at burrow entrances, and guano deposits on perches near burrow entrances.

Methods for this Burrowing Owl habitat assessment follow the survey protocol recommended by the Burrowing Owl Consortium (www2.ucsc.edu/scpbrg/owls.htm). These methods are published as follows (in relevant part):

> "**Phase I: Habitat Assessment**
>
> The first step in the survey process is to assess the presence of Burrowing Owl habitat on the project site including a 150-meter (approx. 500 ft.) buffer zone around the project boundary (Thomsen 1971, Martin 1973).
>
> **Burrowing Owl Habitat Description**
>
> Burrowing Owl habitat can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of Burrowing Owl habitat: both natural and artificial burrows provide protection, shelter, and nests for Burrowing Owls (Henny and Blus 1981). Burrowing Owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing Owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable Burrowing Owl habitat can be verified at a site by an observation of at least one Burrowing Owl, or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing Owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one Burrowing Owl has been observed occupying a burrow there within the last three years (Rich 1984).

The Phase II burrow survey is required if Burrowing Owl habitat occurs on the site. If Burrowing Owl habitat is not present on the project site and buffer zone, the Phase II burrow survey is not necessary. A written report of the habitat assessment should be prepared (Phase IV), stating the reason(s) why the area is not Burrowing Owl habitat.

Phase II: Burrow Survey

1. A survey for burrows and owls should be conducted by walking through suitable habitat over the entire project site and in areas within 150 meters (approx 500 ft.) of the project impact zone. This 150-meter buffer zone is included to account for adjacent burrows and foraging habitat outside the project area and impacts from factors such as noise and vibration due to heavy equipment which could impact resources outside the project area.

2. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.), and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more surveyors conduct concurrent survey. Surveyors should maintain a minimum distance of 50 meters (approx. 160 ft.) from any owls or occupied burrows. It is important to minimize disturbance near occupied burrows during all seasons.

3. If burrows or Burrowing Owls are recorded on the site, a map should be prepared of the burrow concentration areas. A breeding season survey and census (Phase III) of Burrowing Owls is the next step required.

3.1.1 Phase I: Habitat Assessment

The site visit on August 8, 2007 was conducted to determine the need for an owl survey and to gain an understanding of the scope of any required survey. During this visit, potential Burrowing Owl habitat areas were assessed. No Burrowing Owl was observed in the course of this site visit (which carried over into survey efforts), and no sign of owl (such as pellets, plumage, insect parts, tracks, whitewash) was found at any burrow

entrance. Throughout the course of this habitat assessment and subsequent survey efforts, general notes were taken on vegetation communities and structure, as well as plant and animal species (or their sign) observed on the site, along with photographs of the subject site. Animal burrows and other structures suitable for Burrowing Owl were mapped using GPS.

3.1.2 Phase II: Burrow Survey

A burrow survey was carried out during the initial site investigation. The site was systematically searched for any animal burrows or natural soil cavities that might support Burrowing Owl. During this phase, burrows were carefully inspected for evidence of Burrowing Owl. All burrows and soil cavities were mapped for the purposes of subsequent focused survey work.

3.1.3 Phase III: Burrowing Owl Survey, Census and Mapping

Following identification of animal burrows or erosional cavities suitable for Burrowing Owl, a focused survey was undertaken on four site visits between August 8 and August 16, 2007. These surveys were conducted by Kendall Osborne. This survey was undertaken during the potential nesting season for Burrowing Owl. For the purposes of these survey efforts, sunrise was considered to occur at approximately 0612 hours and sunset at approximately 1945 hours (PDT). Table 1 provides a schedule and site weather conditions during surveys of the subject property and adjacent lands.

Table 1. Year 2007 Burrowing Owl Focused Survey Schedule and Site Weather Conditions.

Date and area	Hours (PDT)	Weather Conditions
8 August	1946-2032	Clear, 74-70° F, calm
13 August	1930-2030	Clear, 83-79° F, calm
15 August	1930-2020	Clear, 91-88° F, calm
16th August	0705-0805	Clear, 75-77° F, calm

3.2 Miscellaneous

In the conduct of the field work, additional consideration was given to presence or absence of riparian or riverine habitats, vernal pools, or any other potential jurisdictional waters or wetlands.

Consideration was also given to presence of absence of any Oak trees on the site (important to compliance with County Oak tree management programs). General notes were taken on vegetation communities and structure, as well as plant and animal species (or their sign) observed on the site, along with photographs of the subject site. Oak trees were mapped by GPS, and measured to Breast-Height diameter on December 7, 2007.

4.0 RESULTS

This investigation determined that the subject site currently supports primarily open and highly disturbed fields of open soil with a history of use for storage of trucks and grading equipment. Figures 3 through 8 are photographs of representative of landscapes and habitats found on the subject property. Figure 9 provides a key as to where on the site these photographs were taken.

4.1 Burrowing Owl

Open disturbed ground with some active ground squirrel burrows found on the subject site is typical Burrowing Owl habitat. The investigation determined ground squirrel and their burrows to be present. Ground squirrel burrows potentially suitable for Burrowing Owl were found along the eastern and northern margins of subject site (Figure 12). GPS locations of ground squirrel burrows are listed in the field notes (appendix). I found no sign of Burrowing Owl (such as pellets, plumage, guano on nearby perches, or tracks at burrow entrances).

4.2 Miscellaneous

There are no wetlands on the subject site

Several Coast Live Oak trees (*Quercus agrifolia*) are present along the southern fence-line on the subject site. The locations and breast-height diameters of these oak trees are given in the appendix.

5.0 EXISTING ENVIRONMENT

5.1 Topography

The site is generally flat. Elevation on the subject property is approximately 1248-1243'.

5.2 Soils

The predominant on-site soils are predominantly Greenfield sandy loams. Pachappa fine sandy loams occur on the western end of the site (Knecht 1971). A soils map adapted from Knecht (1971) is presented in Figure 11.

5.3 Plant Communities

The majority of the site consists of an open field with exotic annual grasses and large areas of bare soil with few plants. Southern margins of the site (along the southern fence-lines) support exotic woodlands with a few native oaks. Conditions on the site are generally shown in Figures 3 through 8. Figure 10 provides a mapped general

distribution of vegetation types on the site. A list of plant species encountered is given in the appendix.

6.0 CONCLUSIONS

Habitat conditions on the subject site were found to be suitable for Burrowing Owl Ground squirrel burrows as well as piles of rubble or debris on the site have potential to support the owl. Survey results are negative for a Burrowing Owl Survey.

There are no riparian or riverine habitats on the site, and no vernal pools. Potential Federal or State jurisdictional waters do not occur on the site. However, the site is adjacent to (and south of) a canal which carries Murrieta Creek.

Oak trees on the subject site may be subject to protection under local ordinance.

7.0 REFERENCES

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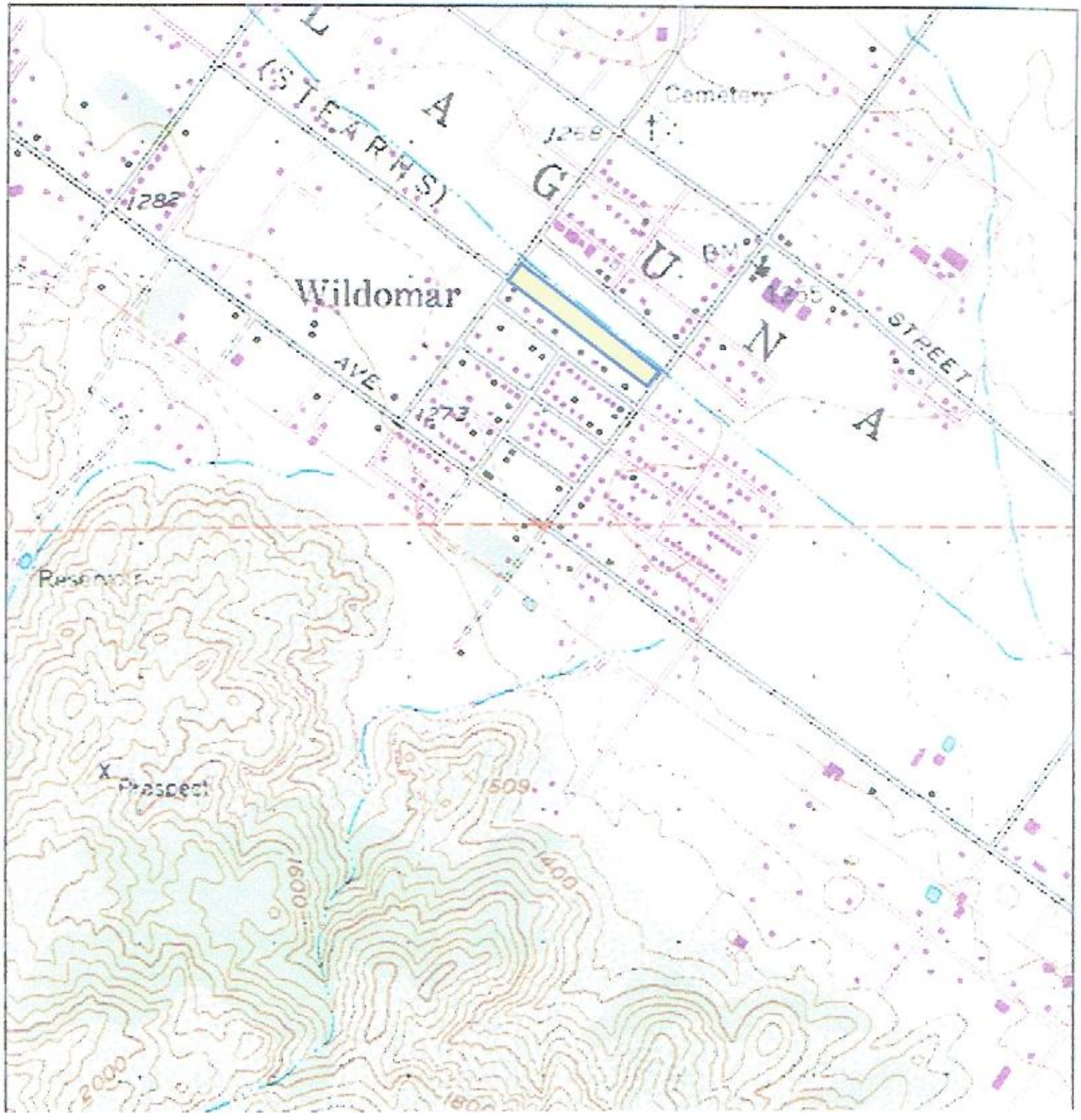
8.0 FIGURES

= 1 mile N

Figure 1. General vicinity of survey site, Wildomar, California USGS 7.5" quadrangle at 50%. 4.5-acre subject site is outlined in blue and highlighted in yellow.



= 100 meters N

Figure 2. General vicinity of survey site, Wildomar, California USGS 7.5" quadrangle at 200%. 4.5-acre subject site is outlined in blue and highlighted in yellow.

Figure 3. Photograph of the western site looking east from near the southwestern corner of the site. Oak tree (dark) at right is shown in figure 8.

Figure 4. Photograph of open grasslands on the western and central site as viewed from the northwestern corner of the site. Fence at left is the northern site boundary. Dark tree at upper right is the oak tree shown in Figure 8.

Figure 5. Photograph of the eastern and central portions of the site as looking west from the eastern site.

Figure 6. Photograph of extensive exotic woodlands along the fence-line on the site southern boundary. View looks west northwest from the eastern portion of the site.

Figure 7. Photograph of refuse (mainly wood) pile on the central western site. View looks to the east.

Figure 8. Photograph of large oak tree on the western site, along the southern fence-line.

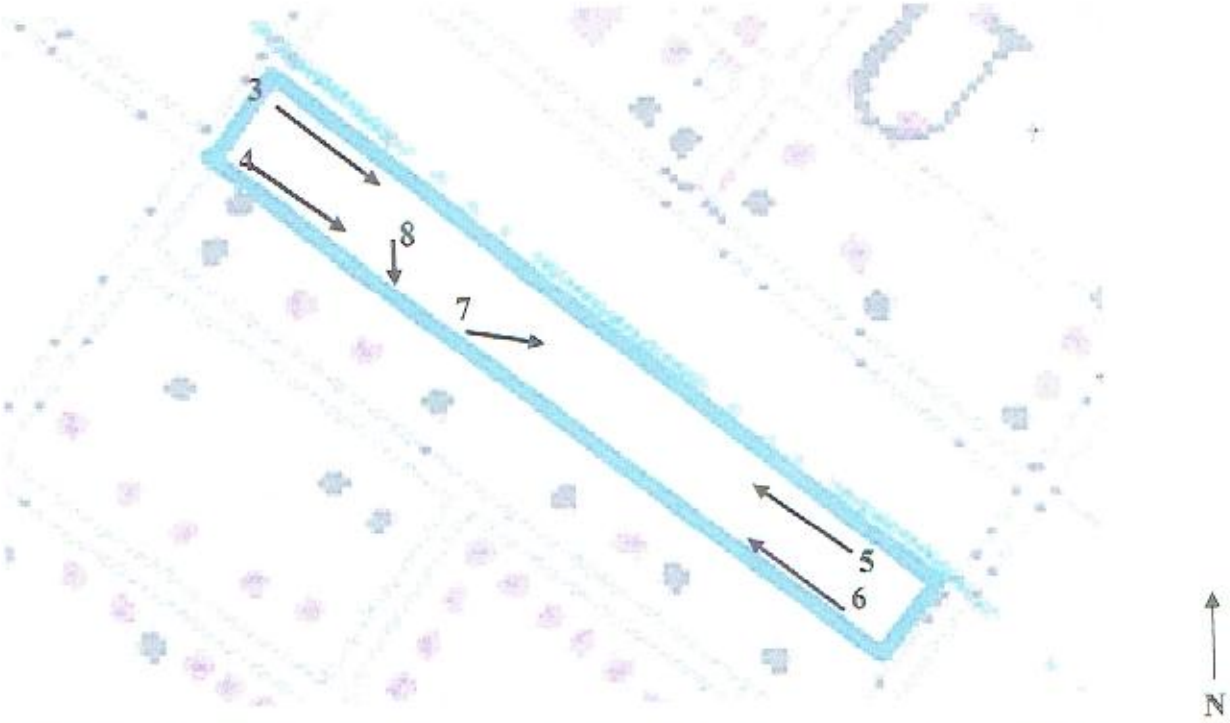


Figure 9. Approximate locations around survey site from which photographs were taken (base of arrows). Arrow indicates the direction a photograph was taken. Numbers next to the arrows indicate figure numbers (Figures 3-8).

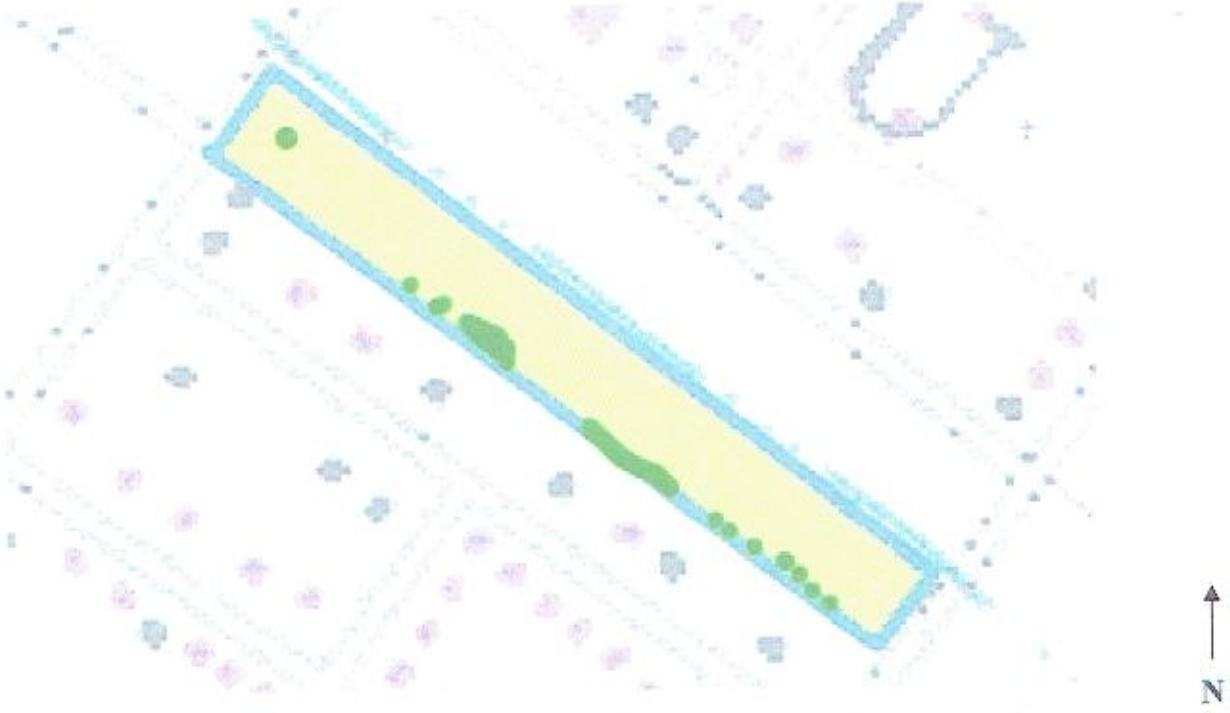


Figure 10. Approximate distribution of vegetation types on aerial depiction of site: Unshaded = Highly disturbed bare soils and annual grassland; Green = exotic woodland (with some native oak); Blue = site boundary.

Figure 11. Soils map showing vicinity around (highlighted) survey site. Soil types, mapped by the U.S. Department of Agriculture, are indicated by letter abbreviations within mapped polygons of soil type. Soils on study site: GyA = Greenfield sandy loams; PaC2 = Pachappa fine sandy loams. Soils are shown over aerial photographs with features shown on USGS topographic maps (Knecht 1971).

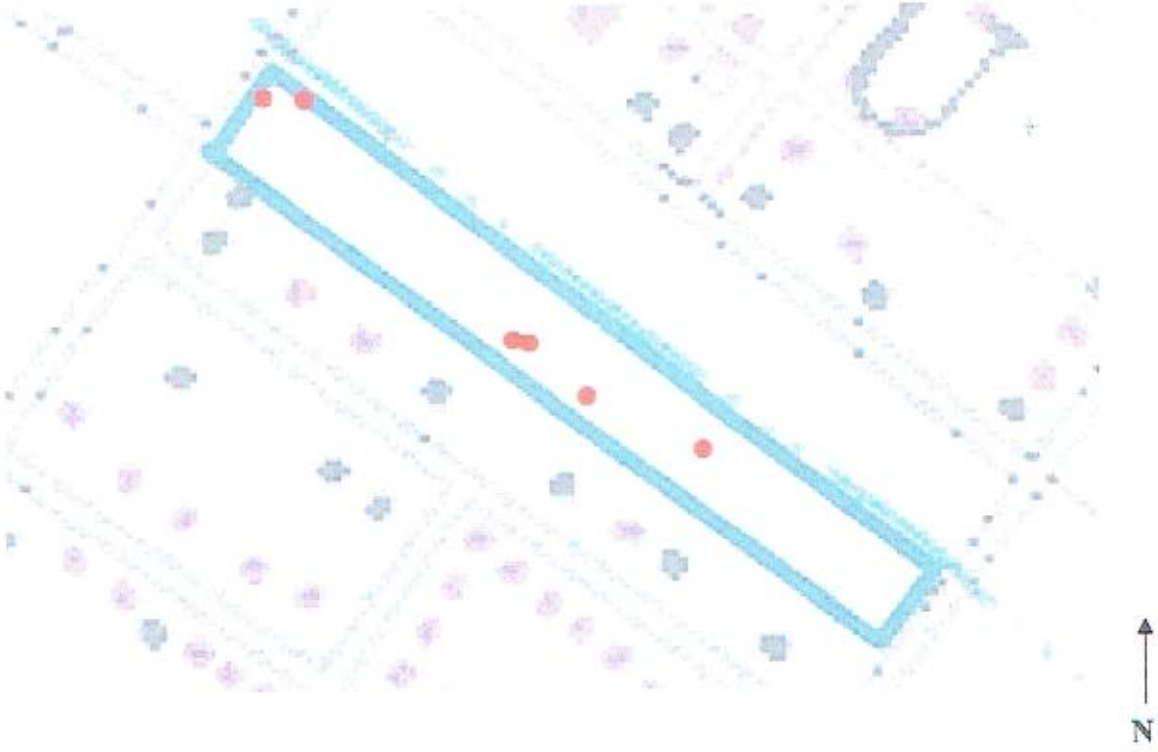


Figure 12. Approximate locations around survey site of ground squirrel burrows and other structures with potential to harbor Burrowing Owl (red dots).

9.0 APPENDIX

Vertebrate species encountered

Plant species encountered

Location of Ground Squirrel burrow complexes, soil cavities, and wood piles found on the subject site

Location and BHD of oak trees found on the site.

Field notes

Maps provided by client

County forms

Vertebrate species (or sign) encountered on the survey site.

Common name	Species
Reptiles	
Side-blotched lizard	*Uta stansburiana*
Western fence lizard	*Scelophorus occidentalis*
Birds	
American crow	*Corvus brachyrhynchos*
Anna's hummingbird	*Calypte anna*
Barn owl	*Tyto alba*
Bushtit	*Psaltriparus minimus*
House finch	*Carpodacus mexicanus*
Morning dove	*Zenaida macroura*
Northern mockingbird	*Mimus polyglottos*
Mammals	
Botta's pocket gopher	*Thomomys bottae*
California ground squirrel	*Spermophilus beecheyi*
Reptiles	
Side-blotched lizard	*Uta stansburiana*

Plant species encountered on the survey site.

FAMILY	Species
ADOXACEAE	
Mexican elderberry	*Sambucus mexicana*
AMERANTHACEAE	
white tumbleweed	*Amaranthus albus*
ANACARDIACEAE	
Peruvian Peppertree	*Schinus molle*
ASTERACEAE	
western ragweed	*Ambrosia psilostachya*
horseweed	*Conyza canadensis*
sunflower	*Helianthus annua*
telegraphweed	*Heterotheca grandiflora*
prickly lettuce	*Lactuca serriola*
BORAGINACEAE	
ranchers fiddleneck	*Amsinkia menziesii*
BRASSICACEAE	
shortpod mustard	*Hirschfeldia incana*
CHENOPODIACEAE	
lamb's quarters	*Chenopodium album*
CUCURBITACEAE	
coyote gourd	*Cucurbita palmata*
EUPHORBIACEAE	
spurge	*Chamaesyce micromeria*
California croton	*Croton californicus*
Dove weed	*Croton setigerus*
FAGACEAE	
coast live oak	*Quercus agrifolia*
SIMAROUBACEAE	
tree of heaven	*Ailanthus altissima*
SIMMONDSIACEAE	
Jojoba	*Simmondsia chinensis*
SOLANACEAE	
Jimson weed	*Datura wrightii*
tree tobacco	*Nicotiana glauca*
ZYGOPHYLLACEAE	
Puncture vine	*Tribulus terrestris*
POACEAE	
wild oats	*Avena fatua*
Foxtail chess/red brome	*Bromus madritensis*
Bermuda grass	*Cynodon dactylon*

Location of Ground Squirrel burrow complexes, soil cavities, and wood piles found on the subject site. Latitude and Longitude for selected burrows is indicated (as "XXX" decimal fractions of the appropriate minute). These location estimates are approximate, usually with at least 16 foot error in each dimension.

Description	Latitude 35° 36.XXX' N	Longitude 117° 16.XXX' W
Wood and rubble pile with burrows	137	645
Wood and rubble pile with burrows	131	637
Pile of rubble and wood	114	626
Burrow in fence-line	195	708
Burrow a roadside	200	719
Pile of rubble and wood	099	999

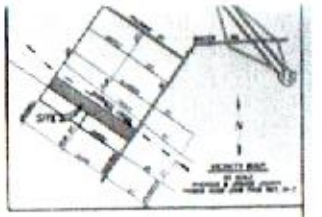
Location of oak trees (*Quercus agrifolia*), with breast-height diameters (BHD) larger than two inches, found on the subject site. Latitude and Longitude for trees is indicated (as "XXX" decimal fractions of the appropriate minute). These location estimates are approximate, usually with at least 16 foot error in each dimension.

BHD (inches)	Latitude 35° 36.XXX' N	Longitude 117° 16.XXX' W
2 (two stems)	121	656
8	136	663
3 (two stems)	137	667
20	149	678
6	150	682
5	061	545

TENTATIVE TRACT MAP NO. 33840

FOR

APN. 376-043-027



PDI

TENTATIVE TRACT MAP 33840

Date 8/8/07 Time 746 to 832 pm Job Hookasian
Miles 192948 Location Wildomar
Biologists [illegible]
Survey for: Burrowing Owl
Habitat Assessment for: Burrowing Owl

Weather: Temp 74- Wind - Cloud cover - Rain -
~~58~~ to 70°

Biological elements:

Vegetative communities:
Open field annual grass.

Soil type

Plant species:

Vertebrates
Coyote Gray Squirrel Black

Arthropods

Oak Woodlands___ Riparian Veg_____ type
Vernal Pools_____

Comments: Sunrise @ 745 pm

Wood/Rubble Pile w/ burrows	33	36.137-.131	117	16.645-.637
Wood/Rubble Pile		36.114		16.626
Burrow in fence line w/ cement		36.195		16.708
Burrows road side		36.200		16.719
Rubble/wood		36.099		16.999

FAMILY	Species	
ADOXACEAE		
Mexican elderberry	*Sambucus mexicana*	✓
AGAVACEAE		
Mojave yucca	*Yucca schidigera*	
Our Lord's candle	*Yucca whipplei*	
AMERANTHACEAE		
white tumbleweed	*Amaranthus albus*	✓
Palmer's amaranth	*Amaranthus palmeri*	
ANACARDIACEAE		
laurel sumac	*Malosma laurina*	
lemonade berry	*Rhus integrifolia*	
sugar bush	*Rhus ovata*	
basketbush	*Rhus trilobata*	
Brazilian Peppertree	*Schinus terebinthifolius*	
Peruvian Peppertree	*Schinus molle*	✓
poison oak	*Toxicodendron diversilobum*	
APIACEAE		
anise	*Foeniculum vulgare*	
woolly-fruit lomatium	*Lomatium dasycarpum*	
southern tauschia	*Tauschia arguta*	
APOCYNACEAE		
oleander	*Nerium oleander*	
ARECACEAE		
fan palm	*Washingtonia*	
ASCLEPIADACEAE		
Narrow-leaved milkweed	*Asclepias fascicularis*	
milkvine	*Funastrum cynanchoides*	
ASTERACEAE		
California yarrow	*Achillea millefolium*	
pineapple weed	*Amblyopappus pusillus*	
Annual bur-weed	*Ambrosia acanthicarpa*	
	Ambrosia dumosa	
western ragweed	*Ambrosia psilostachya*	✓
California sage	*Artemisia californica*	
tarragon	*Artemisia dracunculus*	
great basin sagebrush	*Artemisia tridentata*	
mule fat	*Baccharis salicifolia*	
coyote bush	*Baccharis sarathroides*	
Sweetbush	*Bebbia juncea*	
California brickellbush	*Brickellia californica*	
Tocalote	*Centaurea melitensis*	
smooth tarplant	*Centromadia pungens laevis*	
white pinchushion	*Chaenactis fremontii*	
yellow pinchushion	*Chaenactis glabuluscula*	
common pineapple weed	*Chamomilla suaveolens*	
bull thistle	*Ciricium vulgare*	
flax-leaved horseweed	*Conyza bonariensis*	
horseweed	*Conyza canadensis*	✓
fascicled tarplant	*Deinandra fasciculata*	
Kellogg's tarplant	*Deinandra kelloggii*	
paniculate tarplant	*Deinandra paniculata*	
southern tarweed	*Deinandra parryi (CNPS list)*	
brittlebush	*Encelia farinosa*	

goldenbush	*Ericameria cooperi*	
interior goldenbush	*Ericameria linearifolia*	
Palmer's goldenbush	*Ericameria palmeri*	
California filago	*Filago californica*	
narrow-leaved filago	*Filago gallica*	
California everlasting	*Gnaphalium californicum*	
	Gnaphalium canescens	
matchweed	*Gutierrezia*	
	Haplopappus palmeri	
sunflower	*Helianthus annua*	✓
slender sunflower	*Helianthus gracilentus*	
telegraphweed	*Heterotheca grandiflora*	✓
goldenaster	*Heterotheca sessiliflora*	
goldenbush	*Isocoma menziesii*	
western poverty weed	*Iva axillaris*	
prickly lettuce	*Lactuca serriola*	✓
southern goldfields	*Lasthenia coronaria*	
Scalebroom	*Lepidospartum squamatum*	
cudweed aster	*Lessingia filaginifolia*	
fall vinigar weed	*Lessingia glandulifera*	
chicoree	*Malacothrix california*	
chicoree	*Malacothrix saxatilis*	
woolly marbles	*Psilocarpus brevissimus*	
round wolly marbles	*Psilocarpus tenellus*	
	Rafinesquia neomexicana	
Senicio	*Senicio douglasii*	
prickly sow-thistle	*Sonchus asper*	
common sow-thistle	*Sonchus oleraceus*	
short wreath plnat	*Stephanomeria exigua*	
tall wreath plant	*Stephanomeria virgata*	
dandelion	*Taraxacum officinale*	
cotton-thorn	*Tetradymia comosa*	
golden crownbeard	*Verbesina encelioides*	
spiney cocklebur	*Xanthium spinosum*	
cocklebur	*Xanthium strumarium*	
BORAGINACEAE		
ranchers fiddleneck	*Amsinkia menziesii*	✓
cryptantha	*Cryptantha*	
Cleveland's cryptantha	*Cryptantha clevelandii*	
common cryptantha	*Cryptantha intermedia*	
Guadalupe cryptantha	*Cryptantha maritima*	
heliotrope	*Heliotropium crassavicum*	
slender pectocarya	*Pectocarya linearis*	
wire-stemmed popcorne flow	*Plagiobothrys leptoladus*	
BRASSICACEAE		
elegant rock-cress	*Arabis sparsiflora*	
Sahara mustard	*Brassica tournfortii*	
black mustard	*Brassica nigra*	
shortpod mustard	*Hirschfeldia incana*	✓
peppergrass	*Lepidium nitidum*	
	Lepidium virginicum	
tall tumblemustard	*Sisymbrium altissimum*	
	Sisymbrium erisimoides	
London rocket	*Sisymbrium irio*	
wild radish	*Raphanus sativus*	

CACTACEAE		
California barrel cactus	*Ferocactus cylindraceus*	
common beavertail	*Opuntia basilaris*	
	Opuntia ficus-indica	
prickly pear	*Opuntia littoralis*	
valley cholla	*Opuntia parryi*	
silver cholla	*Opuntia echinocarpa*	
CAPPARACEAE		
bladderpod	*Isomeris arborea*	
CARYOPHYLLACEAE		
windmill pink	*Silene gallica*	
Boccone's sand spurry	*Spergularia bocconei*	
CHENOPODIACEAE		
Saltbush	*Atriplex canescens*	
red saltbush	*Atriplex rosea*	
Australian saltbush	*Atriplex semibaccata*	
bract saltbush	*Atriplex serenana*	
lamb's quarters	*Chenopodium album*	✓
pitseed goosefoot	*Chenopodium berlandieri*	
Kochia	*Kochia scoparia*	
Russian thistle	*Salsola tragus*	
CONVOLVULACEAE		
morning-glory	*Calystegia macrostegia*	
CRASSULACEAE		
sand pygme-stonecrop	*Crassula connata*	
lance-leaved dudleya	*Dudleya lanceolata*	
many-stemed dudleya	*Dudleya multicaulis*	
chalky live-forever	*Dudleya pulverulenta*	
CUCURBITACEAE		
coyote gourd	*Cucurbita palmata*	✓
melon	*Cucurbita*	
wild cucumber	*Marah macrocarpus*	
CUPRESSACEAE		
California juniper	*Juniperus californica*	
CUSCUTACEAE		
Dodder	*Cuscuta californica*	
ERICACEAE		
Adam's manzanita	*Arctostyaphylos glandulosa*	
Summer-holly	*Comarostaphylis diversifolia*	
EUPHORBIACEAE		
spurge	*Chamaesyce micromeria*	✓
California croton	*Croton californicus*	✓
dove weed	*Croton setigerus*	✓
spurge	*Euphorbia peplus*	
castor-bean	*Ricinus communis*	
FABACEAE		
catclaw	*Acacea greggii*	
Pomona milkvetch	*Astragalus pomonensis*	
locoweed	*Astragalus* spp.	
Palo verde	*Cercidium floridum*	
Spanish clover	*Lotus purshianus*	
silverleaf lotus	*Lotus argophyllus*	
deer weed	*Lotus scoparius*	
strigose bird's-foot trefoil	*Lotus strigosus*	
mesquite	*Prosopis glandulosa*	

	Lotus sp.												
	Lupinus sp.												
miniature lupine	*Lupinus bicolor*												
dense-flowered chick lupine	*Lupinus microcarpus*												
arroyo lupine	*Lupinus suculentus*												
bur clover	*Medicago polymorpha*												
alfalfa	*Medicago sativa*												
white sweet-clover	*Medicago albus*												
sourclover	*Medicago indicus*												
tall nasty clover	*Melilotus indica*												
Psorothamnus	*Psorothamnus arborescens*												
clover	*Trifolium*												
common vetch	*Vicia sativa*												
winter vetch	*Vicia villosa*												
FAGACEAE													
coast live oak	*Quercus agrifolia*	✓											
Engelmann	*Quercus engelmannii*												
California scrub	*Quercus berberidifolia*												
GERANIACEAE													
long-beak filaree	*Erodium botrys*												
red-stem filaree	*Erodium cicutarium*												
GROSSULARIACEAE													
hillside gooseberry	*Ribes californicum*												
HYDROPHYLLACEAE													
baby blue-eyes	*Nemophila menziesii*												
thickleaf yerba santa	*Eriodictyon crassifolium*												
hairy yerba santa	*Eriodictyon trichocalyx*												
caterpillar phacelia	*Phacelia cicutaria*												
common phacelia	*Phacelia distans*												
wild canterbury-bell	*Phacelia minor*												
branching phacelia	*Phacelia ramosissima*												
JUGLANDACEAE													
Black Walnut	*Juglans*												
LAMINACEAE													
Horehound	*Marubium vulgare*												
vinegar weed	*Tricostema lanceolatum*												
white sage	*Salvia apiana*												
chia	*Salvia columbariae*												
black sage	*Salvia mellifera*												
LOASACEAE													
sandpaper plant	*Petalonyx linearis*												
sandpaper plant	*Petalonyx thurberi*												
LYTHRACEAE													
grass poly	*Lythrum hyssopifolium*												
MYRTACEAE													
Eucalyptus	*Eucalyptus*												
MALVACEAE													
Chingma velvet leaf	*Abutilon theophrasti*												
bush mallow	*Malacothamnus fasciculatus*												
alkali-mallow	*Malva leprosa*												
cheeseweed	*Malva parviflora*												
checker-bloom	*Sidalcea malvaeflora*												
NYCTAGINACEAE													
California wishbone plant	*Mirabilis californica*												
OLEACEAE													

Ash	*Fraxinus*
Olive	*Olea europa*
ONAGRACEAE	
California sun cup	*Camissonia bistorta*
	Camissonia campestris
	Camissonia claviformis
hairy sun-cups	*Camissonia hirtella*
miniature suncup	*Camissonia micrantha*
four-spot clarkia	*Clarkia purpurea*
California fuchsia	*Epilobium canum*
willow-herb	*Epilobium ciliatum*
California evening primrose	*Oenothera californica*
common evening primrose	*Oenothera elata*
Primrose	*Oenothera deltoides?*
PAPAVERACEAE	
California poppy	*Eschscholzia californica*
PINACEAE	
Pine	*Pinus*
PLANTAGINACEAE	
California plantain	*Plantago erecta*
English plantain	*Plantago lanceolata*
PLATANACEAE	
western sycamore	*Platanus racemosa*
POLEMONIACEAE	
white eriastrum	*Eriastrum densifolium*
Spineflower	*Eriastrum sapphirinum*
holly-leaved skunkweed	*Navarretia atractyloides*
hooked skunkweed	*Navarretia hamata*
Gilia	*Gilia sp.*
POLYGONACEAE	
Spineflower	*Chorizanthe*
	Eriogonum inflatum
slender buchwheat	*Eriogonum gracile*
Cal buckwheat	*Eriogonum fasciculatum*
Thrubers buckwheat	*Eriogonum thruberi*
common knotweed	*Polygonum arenastrum*
curly dock	*Rumex crispus*
California dock	*Rumex salicifolius*
PORTULACACEAE	
red maids	*Calandrinia ciliata*
miner's lettuce	*Claytonia perfoliata*
purslane	*Portulaca oleracea*
PRIMULACEAE	
scarlet pimpernel	*Anagallis arvensis*
RHAMNACEAE	
thick-leaf wild-lilac	*Ceanothus crasifolius*
buck bush	*Ceanothus cuneatus*
chaparral whitethorn	*Ceanothus leucodermis*
holly-leaved redberry	*Rhamnus ilicifolia*
California coffee berry	*Rhamnus californica*
Spiny redberry	*Rhamnus crocea*
ROSACEAE	
Toyon	*Heteromeles arbutifolia*
holly-leaved cherry	*Prunus ilicifolia*
cliff-rose	*Purshia mexicana*

chamise	*Adenostoma fasciculatum*												
red shank	*Adenostoma sparsifolium*												
RUBIACEAE													
phlox-leaved bedstraw	*Galium angustifolium*												
common bedstraw	*Galium aparine*												
SALICACEAE													
cottonwood	*Populus fremontii*												
poplar	*Populus sp.*												
Black willow	*Salix gooddingii*												
arroyo willow	*Salix lasiolepis*												
sandbar willow	*Salix exigua*												
SCROPHULARIACEAE													
coastal paintbrush	*Castilleja affinis*												
purple owl's clover	*Castilleja exserta*												
white snapdraggon	*Antirrhinum coulterianum*												
southern Chinise houses	*Collinsia concolor*												
dark-tipped bird's beak	*Cordylanthus rigidus*												
yellow bush-penstemon	*Keckiella antirrhinoides*												
heart-leaved bush-penstemo	*Keckiella cordifolia*												
bush monkey flower	*Mimulus aurantiacus*												
seep monkey flower	*Mimulus guttatus*												
scarlet bugler	*Penstemon centranthifolius*												
royal penstemon	*Penstemon spectabilis*												
California figwort	*Scrophularia californica*												
SIMAROUBACEAE													
tree of heaven	*Ailanthus altissima*	✓											
SIMMONDSIACEAE													
Jojoba	*Simmondsia chinensis*												
SOLANACEAE													
small firs Jimson	*Datura stramonium*												
Jimson weed	*Datura wrightii*	✓											
Nightshade	*Solanum duglasi*												
white horse-nettle	*Solanum elaeagnifolium*												
chaparral nightshade	*Solanum xanti*												
Wallace's Tobacco	*Nicotiana bigelovii*												
tree tobacco	*Nicotiana glauca*	✓											
tomato	*Lycopersicon esculentum*												
TAMARICACEAE													
Mediterranean tamarisk	*Tamarix ramosissima*												
THEMIDACEAE													
blue-dicks	*Dichelostemma pulchellum*												
URTICACEAE													
Fig	*Ficus*												
hoary nettle	*Urtica dioica*												
VIOLACEAE													
yellow Johnny Jump-ups	*Viola pedunculata*												
VITACEAE													
Grape	*Vitis vinifera*												
ZYGOPHYLLACEAE													
Creosote bush	*Larrea tridentata*												
Puncture vine	*Tribulus terrestris*	✓											
POACEAE													
near Lolium	*Agropyron sp.*												
Giant cane	*Arundo donax*												
slender oat	*Avena barbata*												

wild oats	*Avena fatua*	✓											
purple false=brome	*Brachypodium distachyon*												
rescue grassx	*Bromus catharticus*												
ripgut	*Bromus diandrus*												
Brome	*Bromus hordiaceus*	✓											
Foxtail chess/red brome	*Bromus madritensis*	✓											
Bermuda grass	*Cynodon dactylon*	✓											
salt grass	*Distichlis spicata*												
giant wildrye	*Elymus condensatus*												
jungle-rice	*Echinochloa colona*												
Mediterranean barley	*Hordeum murinum*												
Common Barley	*Hordeum vulgare*												
goldentop	*Lamarckia aurea*												
	Leptochloa sp.												
Ryegrass	*Lolium multiflorum*												
littleseed canary grass	*Phalaris minor*												
paradox canary grass	*Phalaris paradoxa*												
	Polypogon aviculare												
rabits foot grass	*Polypogon monspeliensis*												
Schismus	*Schismus barbatus*												
giant stipa	*Stipa coronata*												
foothill stipa	*Stipa lepida*												
purple stipa	*Stipa pulcra*												
foxtail fescue	*Vulpia myuros*												
TYPHACEAE													
cat-tail	*Typha*												

Date 8/13/2002 Time 7 30 to 8 30 pm Job Hookasian
Miles 193924 Location Wildomar
Biologists KAO
Survey for: Burrowing Owl
Habitat Assessment for:

Weather: Temp 83-74° Wind calm Cloud cover ø Rain ø

Biological elements:

Vegetative communities:

Soil type

Plant species:
See list

Vertebrates
BAOW Gophers

Arthropods

Oak Woodlands___ Riparian Veg_____ type_____
Vernal Pools_____

Comments:
local neighbor comes out to ask what is happening

Date 8/15/07 Time 730 to 830 pm Job Hookasian
Miles/194052 Location Wilcoxon
Biologists KHG
Survey for: Burrowing owl
Habitat Assessment for: _____

Weather: Temp 91° – 88° Wind 0 Cloud cover 0 Rain 0

Biological elements:

Vegetative communities:

Soil type _____

Plant species:

Vertebrates
MOUO NOMO

Arthropods

Oak Woodlands____ Riparian Veg_____ type_____
Vernal Pools_____

Comments:

Date 8/16/2007 Time 705 to 805 AM Job Hookasian
Miles 194-174 on 18 Location Wildomar
Biologists KLTU
Survey for: Burrowing owl
Habitat Assessment for:

Weather: Temp 75 - 77 Wind / Cloud cover / Rain /

Biological elements:

Vegetative communities:

Soil type

Plant species:

Vertebrates
MOBO HOPA AMCR ANHU BUTI NUMO
Gray Squirrel Uta Sceloporus
Domestic Cat

Arthropods

Oak Woodlands___ Riparian Veg_____ type
Vernal Pools_____

Comments:
Sunrise @ 612 am

Date 12/7/07 Time 1045 to _____ Job Hunter assessment 12/7/07
Miles 052609 Location _____
Biologists KOO
Survey for: Measure Oak Trees.
Habitat Assessment for: _____

Weather: Temp_____ Wind _____ Cloud cover _____ Rain_____

Biological elements:

Vegetative communities:

Soil type _____

Plant species:

Vertebrates

Arthropods

Oak Woodlands____ Riparian Veg_____ type_____
Vernal Pools_____

Comments:

33 36.131	117 16.656	3x2"
136	.663	8"
137	667	2x3"
149	678	5'2" = circumference @ 4ft
150	682	6"
.061	545	5"

CHECK SPECIES SURVEYED FOR	SPECIES or ENVIRONMENTAL ISSUE OF CONCERN	(Circle Yes, No or N/A regarding species findings on the referenced site)		
✓	Other Burrowing Owl	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A
	Other	Yes	No	N/A

Species of concern shall be any unique, rare, endangered, or threatened species. It shall include species used to delineate wetlands and riparian corridors. It shall also include any hosts, perching, or food plants used by any animals listed as rare, endangered, threatened or candidate species by either State, or Federal regulations, or for Riverside County as listed by the California Department of Fish and Game Natural Diversity Data Base (NDDB).

I declare under penalty of perjury that the information provided on this summary sheet is in accordance with the information provided in the biological report.

Osborne Biological Consulting 12/8/2007

Signature and Company Name — Report Date

10(a) Permit Number (if applicable) — Permit Expiration Date

County Use Only

Received by: _____ Date: _____

PD-B# _____

BIOLOGICAL REPORT SUMMARY SHEET

(Submit two copies to the County)

Applicant Name: Zareth Hookasian
Assessor's Parcel Number (APN): 376-043-027
APN cont. :
Site Location: Section: Township: 6 S Range: 4 W
Site Address: between Central Ave. and ~~Wildomar~~ Grewell St, Wildomar
Related Case Number(s): TTM 33840 PDB Number:

CHECK SPECIES SURVEYED FOR	SPECIES or ENVIRONMENTAL ISSUE OF CONCERN	(Circle Yes, No or N/A regarding species findings on the referenced site)		
	Arroyo Southwestern Toad	Yes	No	N/A
✓	Blueline Stream(s)	Yes	(No)	N/A
	Coachella Valley Fringed-Toed Lizard	Yes	No	N/A
	Coastal California Gnatcatcher	Yes	No	N/A
	Coastal Sage Scrub	Yes	No	N/A
	Delhi Sands Flower-Loving Fly	Yes	No	N/A
	Desert Pupfish	Yes	No	N/A
	Desert Slender Salamander	Yes	No	N/A
	Desert Tortoise	Yes	No	N/A
	Flat-Tailed Horned Lizard	Yes	No	N/A
	Least Bell's Vireo	Yes	No	N/A
✓	Oak Woodlands	(Yes)	No	N/A
	Quino Checkerspot Butterfly	Yes	No	N/A
	Riverside Fairy Shrimp	Yes	No	N/A
	Santa Ana River Woolystar	Yes	No	N/A
	San Bernardino Kangaroo Rat	Yes	No	N/A
	Slender Horned Spineflower	Yes	No	N/A
	Stephen's Kangaroo Rat	Yes	No	N/A
✓	Vernal Pools	Yes	(No)	N/A
✓	Wetlands	Yes	(No)	N/A

LEVEL OF SIGNIFICANCE CHECKLIST
For Biological Resources
(Submit Two Copies)

Case Number: TTM 33840 **Lot/Parcel No.** 376-043 -027 **EA Number**_____

Wildlife & Vegetation

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

(Check the level of impact the applies to the following questions)

a) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state conservation plan? ✓

b) Have a substantial adverse effect, either directly or through habitat modifications, on any endangered, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12)? ✓

c) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U. S. Wildlife Service? ✓

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites? ✓

e) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U. S. Fish and Wildlife Service? ✓

f) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

g) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ✓

Source: CGP Fig. VI.36-VI.40

Findings of Fact: Burrowing Owl absent from site
One large oak tree present on western site

Proposed Mitigation: Avoidance of oak tree if required by local ordinance.

Monitoring Recommended: None

APPENDIX 4A:
SPECIAL-STATUS SPECIES KNOWN TO OCCUR NEAR PROJECT SITE

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	MSHCP Covered Species	Habitat Present/ Absent	Rationale
Plants								
Allium munzii	Munz's onion	FE	ST	1B.1	Mesic clay soils in chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, as well as valley and foothill grassand. Elev: 980-3531ft. Blooms: Mar-May (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Arctostaphylos rainbowensis	rainbow manzanita	-	-	1B.1	Chaparral. Elev: 675-2210ft. Blooms: Dec-Mar (CNPS 2013).	Yes	A	No effect, Suitable habitat not present.
Ayenia compacta	California ayenia	-	-	2B.3	Rocky soils in Mojavean desert scrub and Sonoran desert scrub. Elev: 495-3610ft. Blooms Mar-Apr (CNPS 2013).	No	A	No effect, Suitable habitat not present.
Brodiaea filifolia	thread-leaved brodiaea	FT	SE	1B.1	Prefers clay soils in chaparral openings, cismontane woodland, coastal scrub, playas, vernal pools, valley and foothill grasslands. Elev: 82.5-3696ft. Blooms: Mar-June (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Brodiaea orcuttii	Orcutt's brodiaea	-	-	1B.1	Mesic clay, sometimes serpentinite soils in closed-cone coniferous forest, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, as well as vernal pools. Elev: 99-5583ft. Blooms: May-Jul (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Brodiaea santarosae	Santa Rosa Basalt brodiaea	-	-	1B.2	Basaltic soils in valley and foothill grassland. Elev: 1864.5-3448.5ft. Blooms: May-Jun (CNPS 2013).	No	A	No effect, Suitable soil not present.
Centromadia pungens ssp. laevis	smooth tarplant	-	-	1B.1	Alkaline soils in meadows, seeps, playas, chenopod scrub, riparian woodland, valley and foothill grassland. Elev: 0-2112ft. Blooms: Apr-Sep (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Chorizanthe parryi var. parryi	Parry's spineflower	-	-	1B.1	Sandy or rocky soils in openings in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. Elev: 907.5-4026ft. Blooms: Apr-Jun (CNPS 2013).	Yes	P	May affect. Suitable soil and habitat present.
Chorizanthe polygonoides var. longispina	long-spined spineflower	-	-	1B.2	Prefers clay soils in chaparral, coastal scrub, meadows, seeps, vernal pools and foothill and valley grassland. Elev: 99-5049ft. Blooms: Apr-Jul (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Clinopodium chandleri	San Miguel savory	-	-	1B.2	Rocky, gabbroic or metavolcanic soils in chaparral, cismontane woodland, coastal scrub, riparian woodland, as well as valley and foothill grassland. Elev: 396-3547.5ft. Blooms: Mar-Jul (CNPS 2013).	Yes	A	No effect, Suitable soil not present.
Dodecahema leptoceras	slender-horned spineflower	FE	SE	1B.1	Sandy soils in chaparral, cismontane woodland, and alluvial fan coastal scrub. Elev: 656-2493ft. Blooms: Apr-Jun (CNPS 2013).	Yes	A	No effect, Suitable habitat not present.
Eryngium aristulatum var. *parishii*	San Diego button-celery	FE	SE	1B.1	Mesic soils in coastal scrub, valley and foothil grassland, as well as vernal pools. Elev: 66-2046ft. Blooms: Apr-June	Yes	A	No effect, Suitable soil not present.
Geothallus tuberosus	Campbell's liverwort	-	-	1B.1	Grows on soil in vernal pools and mesic coastal scrub. Elev: 33-1969ft (CNPS 2013).	No	A	No effect, Suitable habitat not present.
Hesperocyparis forbesii	Tecate cypress	-	-	1B.1	Clay, gabbroic or metavolcanic soil in chaparral and closed-cone conifeorus forest. Elev: 262-4921ft (CNPS 2013).	No	A	No effect, Suitable soil not present.
Juncus luciensis	Santa Lucia dwarf rush	-	-	1B.2	Chaparral, Great Basin scrub, lower montane coniferous forest, meadows and seeps, as well as vernal pools. Elev: 990-6732ft. Blooms: Apr-Jul (CNPS 2013).	No	A	No effect, Suitable habitat not present.
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	-	-	1B.1	Coastal salt marshes and swamps, playas and vernal pools. Elev: 3.3-4026ft. Blooms: Feb-Jun (CNPS 2013).	Yes	A	No effect, Suitable habitat not present.
Lilium parryi	lemon lily	-	-	1B.2	Mesic areas in meadows and seeps, riparian forest, and upper and lower montane coniferous forests. Elev: 4003-9035ft. Blooms: Jul-Aug (CNPS 2013).	Yes	A	No effect, Suitable habitat not present and outside elevation range.
Limnanthes alba ssp. parishii	Parish's meadowfoam	-	SE	1B.2	Vernally mesic areas in lower montane coniferous forest, meadows and seeps, and vernal pools. Elev: 1969-6562ft. Blooms: Apr-Jun (CNPS 2013).	Yes	A	No effect, Suitable habitat not present and outside elevation range.
Monardella hypoleuca ssp. intermedia	intermediate monardella	-	-	1B.3	Usually in the understory of chaparral, cismontane woodland, and sometimes lower montane coniferous forest. Elev: 1312-4101ft. Blooms: Apr-Sep (CNPS 2013).	Yes	A	No effect, Suitable habitat not present and outside elevation range.
Navarretia fossalis	spreading navarretia	FT	-	1B.1	Assorted shallow freshwater marshes and swamps, vernal pools, playas and chenopod scrub. Elev: 99-2161.5ft. Blooms: Apr-Jun (CNPS 2013).	Yes	A	No effect, Suitable habitat not present.
Navarretia prostrata	prostrate vernal pool navarretia	-	-	1B.1	Mesic soils in coastal scrub, vernal pools, meadows and seeps, as well as alkaline valley and foothill grasslands. Elev: 49.5-3993ft. Blooms: Apr-Jul (CNPS 2013).	Yes	A	No effect. Suitable soil not present.
Orcuttia californica	California Orcutt grass	FE	SE	1B.1	Vernal pools. Elev: 49.5-2178ft. Blooms: Apr-Aug (CNPS 2013).	Yes	A	No effect, Suitable habitat not present.
Pseudognaphalim leucocephalum	white rabbit-tobacco	-	-	2B.2	Sandy, gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland. Elev: 0-6930ft. Blooms: Jul-Dec (CNPS 2013).	No	A	No effect, Suitable habitat not present.
Scutellaria bolanderi ssp. *austromontana*	southern mountains skullcap	-	-	1B.2	Mesic soils in chaparral, cismontane woodland, and lower montane coniferous forest. Elev: 1402.5-6600ft. Blooms: Jun-Aug (CNPS 2013).	No	A	No effect, Suitable habitat not present and outside elevation range.
Sibaropsis hammittii	Hammitt's clay-cress	-	-	1B.2	Clay soil in chaparral openings, and valley and foothill grassland. Elev: 2362-3494ft. Blooms: Mar-Apr (CNPS 2013).	Yes	A	No effect, Suitable habitat not present and outside elevation range.
Sphaerocarpos drewei	bottle liverwort	-	-	1B.1	Soil openings in chaparral and coastal scrub. Elev: 297-1980ft (CNPS 2013).	No	A	No effect, Suitable habitat not present.

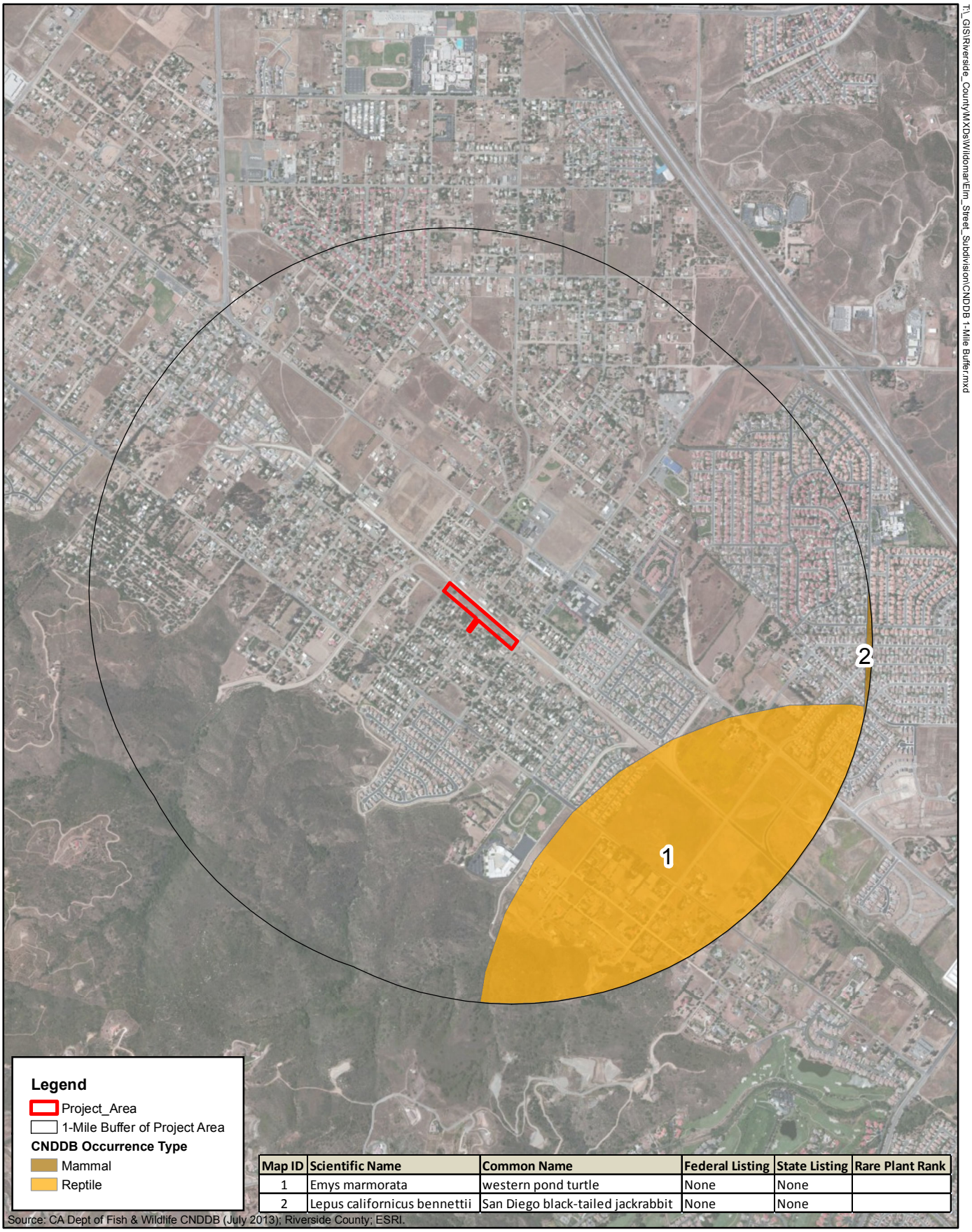
Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	MSHCP Covered Species	Habitat Present/ Absent	Rationale
Symphyotrichum defoliatum	San Bernadino aster	-	-	1B.2	Near ditches, streams and springs in coastal scrub, cismontane woodland, lower montane coniferous forest, marshes, meadows, seeps, swamps, and vernally mesic valley and foothill grasslands. Elev: 6.6-6732ft. Blooms: Jul-Nov (CNPS 2013).	No	A	No effect, Suitable habitat not present.
Invertebrates								
Branchinecta lynchi	vernal pool fairy shrimp	FT			Restricted to vernal pools and vernal pool-like habitats (USFWS 2005).	Yes	A	No effect. Suitable habitat not present.
Euphydryas editha quino	quino checkerspot butterfly	FE	-		Inhabit grasslands, remnant forbland, juniper woodland, and open scrub and chaparral communities. Hostplants include dwarf plantain (*Plantago erecta*) and white snapdragon (*Antirrhinum coulterianum*) (USFWS 2003),	Yes	A	No effect. Hostplants not present.
Streptocephalus woottoni	Riverside fairy shrimp	FE	-		Restricted to vernal pools and non-vegetated ephemeral pools deeper than 12 inches. Inland areas of Riverside, Orange, Ramona and San Diego counties. Coastal areas of San Diego County and Northwestern Baja California (USFWS 2008).	Yes	A	No effect. Suitable habitat not present.
Amphibians								
Anaxyrus californicus	arroyo toad	FE			Breeding habitat = slow moving streams with shallow pools, nearby sandbars and adjacent stream terraces. Often breed in shallow, sandy pools bordered by sand/gravel flood terraces. Inhabit upland habitats when not breeding, such as sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral and grassland (USFWS 2009).	Yes	A	No effect. Suitable habitat not present.
Rana draytonii	California red-legged frog	FT	SSC		Occurs in various aquatic, riparian and upland habitats. They need aquatic habitats to breed, whether they be natural or artificial, such as stock ponds (USFWS 2002a). Ponds/streams in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover in lowlands or foothills. Breeding habitat = permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5000ft (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Spea hammondi	western spadefoot	-	SSC		Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Taricha torosa	Coast Range newt	-	SSC		Found in wet forests, oak forests, chaparral and rolling grasslands. In southern California, drier chaparral, oak woodland and grassland are used (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Reptiles								
Aspidoscelis hyperythra	orangethroat whiptail	-	SSC		Semi-arid brushy areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, and coastal chaparral (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Crotalus ruber	red-diamond rattlesnake	-	SSC		Inhabits chaparral, woodland, and arid desert habitats in rocky areas and dense vegetation (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Emys marmorata	western pond turtle	-	SSC		Found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking (Nafis 2013).	Yes	A	No effect. Suitable habitat not present.
Phrynosoma blainvillii	coast horned lizard	-	SSC		Occurs in valley-foothill hardwood, conifer, pine-cypress, juniper, annual grassland and riparian habitats. Distributed throughout the central and southern California coast, and the Sierra Nevada foothills (CDFW 2013b).	Yes	P	May affect. Suitable habitat present.
Thamnosma hammondii	two-striped garter snake	-	SSC		Found around pools, creeks, cattle tanks, and other water sources, often in rocky areas, in oak woodland, chaparral, brushland and coniferous forest (Nafis 2013).	No	A	No effect. Suitable habitat not present.
Birds								
Aquila chrysaetos	golden eagle	-	FP		Rolling hills and mountain terrain, desert, sag-juniper flates, wide arid plateaus deeply cut by streams and canyons, open mountain slopes and cliffs and rock outcrops. Nests on cliffs of all heights and in large trees in open areas. Ranges from sea level to 12,575 ft (CDFW 2013b).	Yes	A	No effect. Suitable habitat not present.
Athene cunicularia	burrowing owl	-	SSC		Nesting habitat includes open areas with mammal burrows, including rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub, vacant lots and human disturbed lands. Soils must be friable for burrows (Bates 2006).	Yes	P	May affect. Suitable habitat present.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	MSHCP Covered Species	Habitat Present/ Absent	Rationale
Charadrius alexandrinus nivosus	western snowy plover	FT	SSC		Breed on barren to sparsely vegetated flats and along shores of alkaline and saline lakes, reservoirs, ponds, etc (Shuford 2008).	No	A	No effect. Suitable habitat not present.
Empidonax traillii extimus	southwestern willow flycatcher	FE	SE		Breeds in relatively dense riparian tree and shrub communities associated w ith rivers, swamps, and other wetlands, including lakes (e.g., reservoirs). Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known, but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water (USFWS 2002).	Yes	A	No effect. Suitable habitat not present.
Lanius ludovicianus	loggerhead shrike	-	SSC		Breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground. Require tall shrubs, trees, fences or powerlines for hunting perches; open areas for hunting; and large shrubs or trees for nests. Also need impaling sites for prey manipulation (Shuford 2008).	No	A	No effect. Suitable habitat not present.
Polioptila californica californica	coastal California gnatcatcher	FT	SSC		Scrub dominated plant communities, strongly associated with sage scrub. Distribution ranges from southern Ventura County down through Los Angeles, Orange, Riverside, San Bernadino and San Diego counties (USFWS 1997).	Yes	A	No effect. Suitable habitat not present.
Vireo bellii pusillus	Least Bell's vireo	FE	SE		Obligate riparian breeder, preferring structurally diverse riaparian woodlands with a dense understory. Community structures typically utilized include cottonwood-willow woodlands, oak woodlands, and mule fat scrub (Kus 2002).	Yes	A	No effect. Suitable habitat not present.
Mammals								
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	-	SSC		Sandy herbaceous areas in coastal scrub, chaparral, sagebrush, deserts scrub and washes, and annual grassland (CDFW 2013b).	Yes	A	No effect. Suitable habitat not present.
Dipodomys stephensi	Stephens' kangaroo rat	FE	ST		Often found in transition areas between grassland and coastal sage scrub habitat where perennial vegetation is covering less than 50% of the ground, including disturbed areas. Deep, friable soil is needed for burrowing. Plants commonly associated with suitable habitat are chamise, buckwheat, brome grass and filaree (Riverside 2003).	Yes	A	No effect. Suitable habitat not present.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	-	SSC		Herbaceous and desert-shrub areas and open, early stages of forest and chaparral habitats (CDFW 2013b).	Yes	P	May affect. Suitable habitat present.

Key	
Federal & State Status	**CNPS Rare Plant Rank**
(FE) Federal Endangered	*Rareness Ranks*
(FT) Federal Threatened	(1A) Presumed Extinct in California
(FC) Federal Candidate	Elsewhere
(FD) Federally Delisted	(2B) Rare, Threatened, or Endangered in California, But More Common Elsewhere
(SE) State Endangered	*Threat Ranks*
(ST) State Threatened	(0.1) Seriously threatened in California
(SSC) State Species of Special Concern	(0.2) Fairly threatened in California
(FP) Fully Protected	(0.3) Not very threatened in California

Source: CNDDB 2013a, CNPS 2013, USFWS 2013

APPENDIX 4B:
SPECIAL-STATUS SPECIES OCCURRENCES WITHIN 1 MILE



Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
1	Emys marmorata	western pond turtle	None	None	
2	Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	None	

Source: CA Dept of Fish & Wildlife CNDDB (July 2013); Riverside County; ESRI.

T:_GIS\Riverside_County\MXDs\Wildomar\Elm_Street_Subdivision\CNDDB 1-Mile Buffer.mxd

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MILES

Appendix 4b

Previously Recorded Occurrences of Special-Status Species Within 1 Mile of Project Study Area

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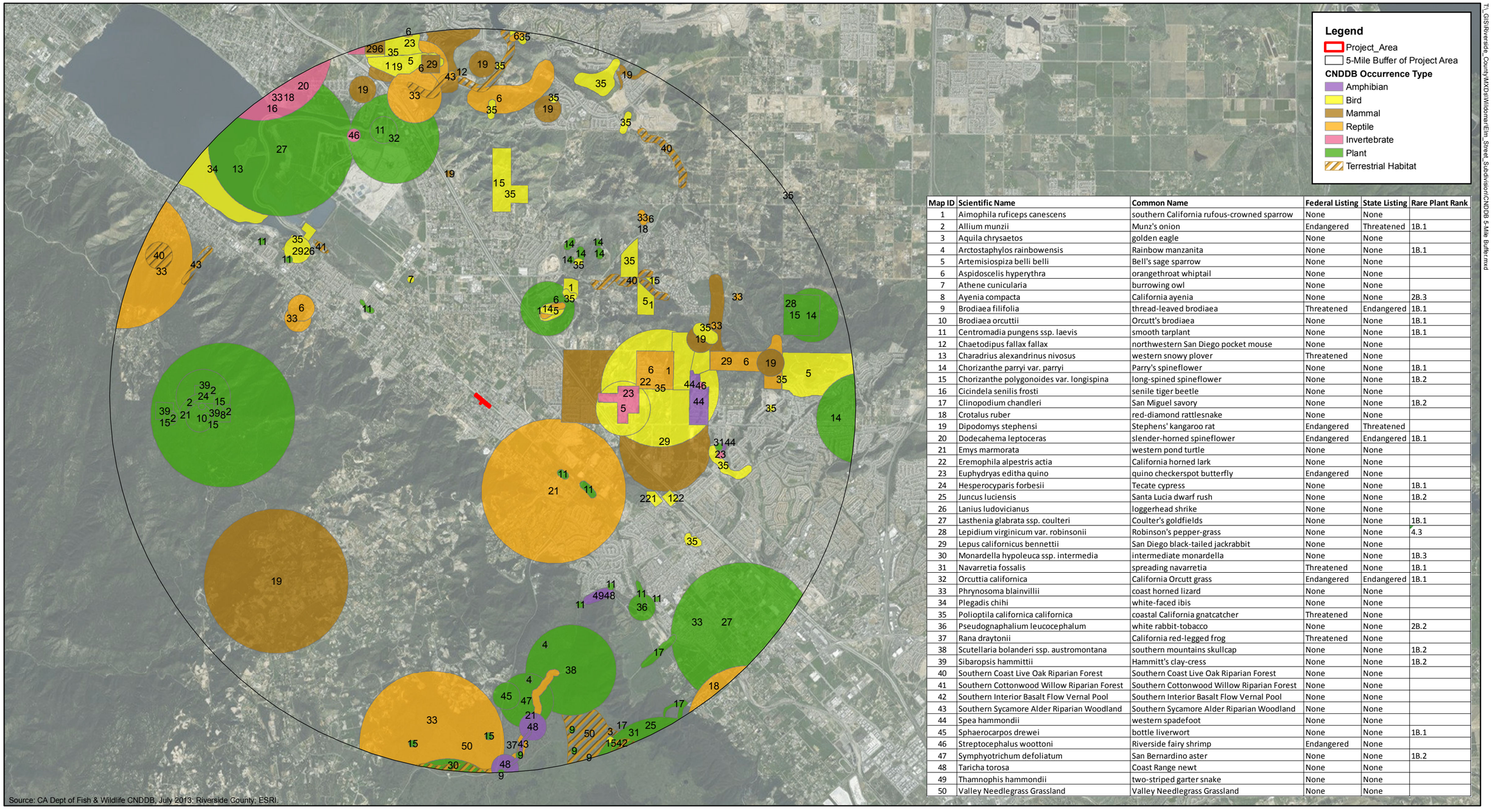
APPENDIX 4C:
SPECIAL-STATUS SPECIES OCCURRENCES WITHIN 5 MILES



Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
1	Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None	None	
2	Allium munzii	Munz's onion	Endangered	Threatened	1B.1
3	Aquila chrysaetos	golden eagle	None	None	
4	Arctostaphylos rainbowensis	Rainbow manzanita	None	None	1B.1
5	Artemisiospiza belli belli	Bell's sage sparrow	None	None	
6	Aspidoscelis hyperythra	orangethroat whiptail	None	None	
7	Athene cunicularia	burrowing owl	None	None	
8	Ayenia compacta	California ayenia	None	None	2B.3
9	Brodiaea filifolia	thread-leaved brodiaea	Threatened	Endangered	1B.1
10	Brodiaea orcuttii	Orcutt's brodiaea	None	None	1B.1
11	Centromadia pungens ssp. laevis	smooth tarplant	None	None	1B.1
12	Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None	None	
13	Charadrius alexandrinus nivosus	western snowy plover	Threatened	None	
14	Chorizanthe parryi var. parryi	Parry's spineflower	None	None	1B.1
15	Chorizanthe polygonoides var. longispina	long-spined spineflower	None	None	1B.2
16	Cicindela senilis frosti	senile tiger beetle	None	None	
17	Clinopodium chandleri	San Miguel savory	None	None	1B.2
18	Crotalus ruber	red-diamond rattlesnake	None	None	
19	Dipodomys stephensi	Stephens' kangaroo rat	Endangered	Threatened	
20	Dodecahema leptoceras	slender-horned spineflower	Endangered	Endangered	1B.1
21	Emys marmorata	western pond turtle	None	None	
22	Eremophila alpestris actia	California horned lark	None	None	
23	Euphydryas editha quino	quino checkerspot butterfly	Endangered	None	
24	Hesperocyparis forbesii	Tecate cypress	None	None	1B.1
25	Juncus luciensis	Santa Lucia dwarf rush	None	None	1B.2
26	Lanius ludovicianus	loggerhead shrike	None	None	
27	Lasthenia glabrata ssp. coulteri	Coulter's goldfields	None	None	1B.1
28	Lepidium virginicum var. robinsonii	Robinson's pepper-grass	None	None	4.3
29	Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	None	
30	Monardella hypoleuca ssp. intermedia	intermediate monardella	None	None	1B.3
31	Navarretia fossalis	spreading navarretia	Threatened	None	1B.1
32	Orcuttia californica	California Orcutt grass	Endangered	Endangered	1B.1
33	Phrynosoma blainvillii	coast horned lizard	None	None	
34	Plegadis chihi	white-faced ibis	None	None	
35	Polioptila californica californica	coastal California gnatcatcher	Threatened	None	
36	Pseudognaphalium leucocephalum	white rabbit-tobacco	None	None	2B.2
37	Rana draytonii	California red-legged frog	Threatened	None	
38	Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	None	None	1B.2
39	Sibaropsis hammittii	Hammitt's clay-cress	None	None	1B.2
40	Southern Coast Live Oak Riparian Forest	Southern Coast Live Oak Riparian Forest	None	None	
41	Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	None	None	
42	Southern Interior Basalt Flow Vernal Pool	Southern Interior Basalt Flow Vernal Pool	None	None	
43	Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	None	None	
44	Spea hammondii	western spadefoot	None	None	
45	Sphaerocarpos drewei	bottle liverwort	None	None	1B.1
46	Streptocephalus woottoni	Riverside fairy shrimp	Endangered	None	
47	Symphyotrichum defoliatum	San Bernardino aster	None	None	1B.2
48	Taricha torosa	Coast Range newt	None	None	
49	Thamnophis hammondii	two-striped garter snake	None	None	
50	Valley Needlegrass Grassland	Valley Needlegrass Grassland	None	None	

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MILES

Appendix 4c

Previously Recorded Occurrences of Special-Status Species Within 5 Miles of Project Study Area

PMC

APPENDIX 5: ARCHEOLOGICAL/HISTORICAL RESOURCES SURVEY

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

August 14, 2013

Zareh Hookasian
3173 Vera Valley Road
Franklin, TN 37064

Re: Update to Historical/Archaeological Resources Survey
Tentative Tract Map 33840; Assessor's Parcel No. 376-043-027
City of Wildomar, Riverside County, California
CRM TECH Contract No. 2730

Dear Mr. Hookasian:

At your request, we have conducted a historical/archaeological resources records search and an archaeological field survey on the property referenced above. The subject property of this study consists of approximately three acres of vacant land located on the southwest side of Murrieta Creek, between Gruwell Street and Central Street, in the City of Wildomar, as depicted in the USGS Wildomar, Calif., 7.5' quadrangle (Fig. 1).

As you know, the project area was previously the subject of a standard Phase I historical/archaeological resources survey that our firm completed in 2007 under provisions of the California Environmental Quality Act (CEQA; copy attached). The scope of that study also included a records search and an archaeological field survey, along with historical background research and Native American consultation. No cultural resources of either prehistoric or historic origin were encountered within or adjacent to the project area during that survey. The present study is intended to be an update to the 2007 survey.

Records Search

The records search for this study was conducted on July 23, 2013, by CRM TECH archaeologist Nina Gallardo, B.A., at the Eastern Information Center (EIC), University of California, Riverside. The results of the records search indicate that four additional cultural resources studies within a one-mile radius of the project area have been reported to the EIC since 2007, including a linear survey along Central Street at the southeastern end of the project area. None of these recent studies covered any portion of the project area, and no additional historical/archaeological sites were recorded within the scope of the records search.

Field Survey

On July 31, 2013, CRM TECH archaeologist Daniel Ballester, B.A., carried out a reconnaissance-level field survey of the entire project area. The survey was conducted on foot along parallel northwest-southeast transects spaced 30 meters (approx. 100 feet) apart. At the time, most of the project area was covered by dense vegetation, although

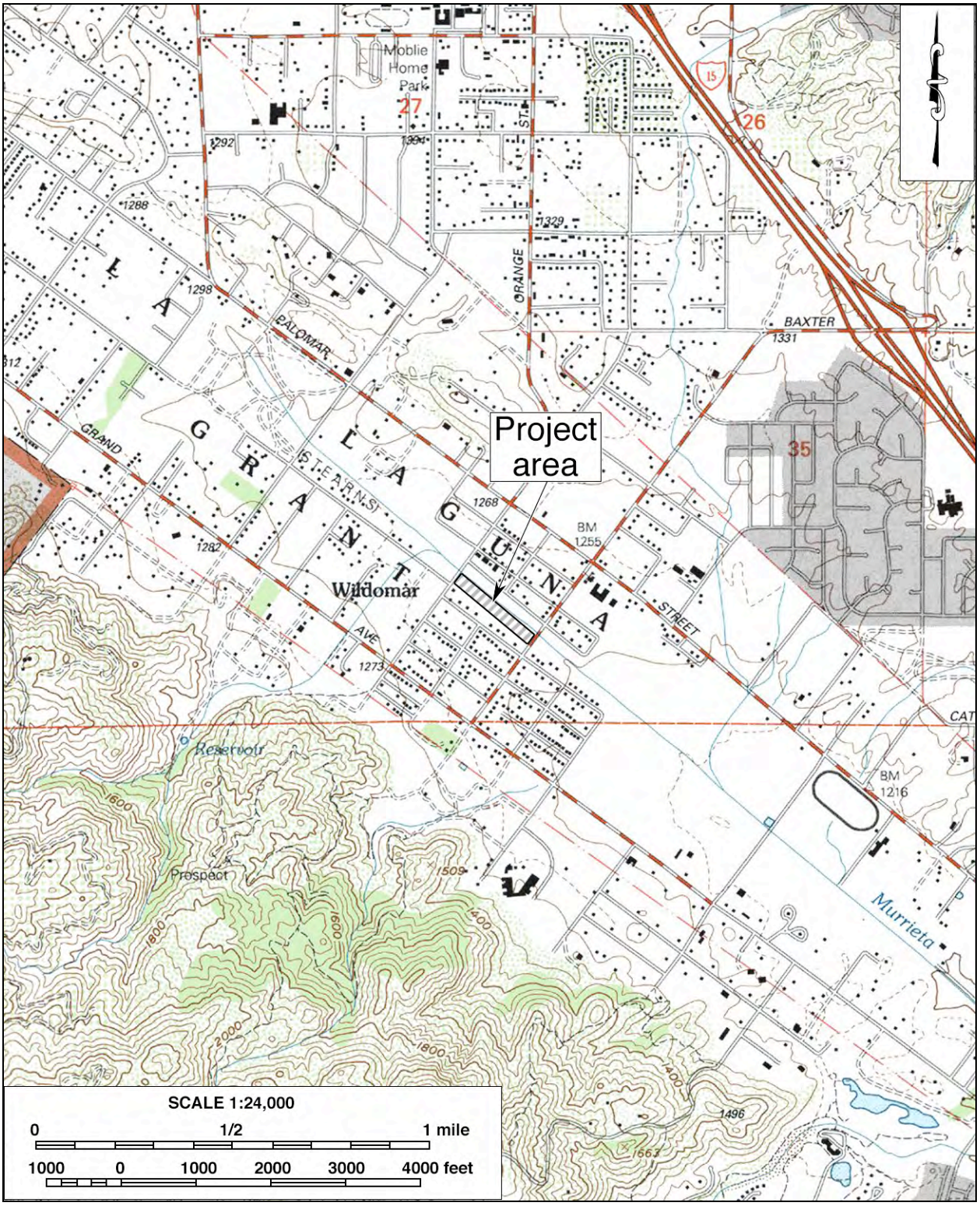

Figure 1. Project area. (Based on USGS Wildomar, Calif., 1:24,000 quadrangle)

Figure 2. Overview of the project area. (Photo taken on July 31, 2013; view to the northwest)

certain portions had been cleared, particularly along the southwestern boundary (Fig. 2). Dictated by the varying density of vegetation growth, ground visibility during the survey ranged from poor (10%) to good (80%).

As in 2007, the field survey produced completely negative results for potential cultural resources, and no buildings, structures, objects, sites, features, or artifacts more than 50 years of age were encountered. Portions of the property had evidently been leveled since 2007, and several large piles of landscaping waste were noted along the southwestern boundary. Scattered modern refuse was also observed in that area, near a residential neighborhood on adjacent land, but none of the items is of any historical/ archaeological interest.

Conclusion

Based on the research results summarized above, we conclude that the original finding of the 2007 study—that no "historical resources," as defined by CEQA, are present within the project area—remains valid and appropriate. No further cultural resources investigation is recommended for this property unless development plans undergo such changes as to include areas not covered by the 2007 study and the present study. If buried cultural materials are discovered during earth-moving operations associated with the project, however, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

Thank you for this opportunity to be of service. If you have any questions regarding this study or need any further information, please feel free to contact our office.

Sincerely,

Bai "Tom" Tang, M.A.
Principal, CRM TECH

ATTACHMENT

2007 CULTURAL RESOURCES SURVEY REPORT

HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT

TENTATIVE TRACT MAP 33840

Near the Community of Wildomar
Riverside County, California

For Submittal to:

Planning Department
County of Riverside
4080 Lemon Street
Riverside, CA 92502-1629

Prepared for:

Zareh Hookasian
4036 Old Hillsboro Road
Franklin, TN 37064-9546

Prepared by:

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

August 15, 2007
CRM TECH Contract No. 2108

NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

Author(s): Bai "Tom" Tang, Principal Investigator/Historian
Deirdre Encarnación, Archaeologist/Report Writer
Daniel Ballester, Archaeologist/Field Director

Consulting Firm: CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: August 15, 2007

Title: Historical/Archaeological Resources Survey Report: Tentative Tract Map 33840, near the Community of Wildomar, Riverside County, California

For Submittal to: Planning Department
County of Riverside
4080 Lemon Street
Riverside, CA 92502-1629
(951) 955-3200

Prepared for: Zareh Hookasian
4036 Old Hillsboro Road
Franklin, TN 37064-9546

USGS Quadrangle: Wildomar, Calif., 7.5' quadrangle; in a portion of the Rancho La Laguna (Stearns) land grant, T6S R4W, San Bernardino Base Meridian

Project Size: Approximately three acres

Keywords: Wildomar area, Riverside County; historical/archaeological resources survey; Assessor's Parcel No. 376-043-027; no "historical resources" found

MANAGEMENT SUMMARY

In July and August 2007, at the request of Zareh Hookasian, CRM TECH performed a cultural resources study on approximately three acres of vacant land in an unincorporated area near the community of Wildomar, Riverside County, California. The subject property of the study, Tentative Tract Map No. 33840, consists of Assessor's Parcel No. 376-043-027 and is located on the southwest side of Murrieta Creek between Gruwell Street and Central Street, in a portion of the Rancho La Laguna (Stearns) land grant lying within T6S R4W, San Bernardino Base Meridian. The study is part of the environmental review process for a proposed development project on the property. The County of Riverside, as Lead Agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA).

The purpose of the study is to provide the County of Riverside with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any historical/ archaeological resources that may exist in or around the project area, as mandated by CEQA. In order to identify and evaluate such resources, CRM TECH conducted a historical/archaeological resources records search, pursued historical background research, contacted Native American representatives, and carried out an intensive-level field survey.

Through the various avenues of research, this study did not encounter any "historical resources," as defined by CEQA, within or adjacent to the project area. Therefore, CRM TECH recommends to the County of Riverside a finding of *No Impact* regarding cultural resources. No further cultural resources investigation is recommended for the project unless development plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

In July and August 2007, at the request of Zareh Hookasian, CRM TECH performed a cultural resources study on approximately three acres of vacant land in an unincorporated area near the community of Wildomar, Riverside County, California (Fig. 1). The subject property of the study, Tentative Tract Map No. 33840, consists of Assessor's Parcel No. 376-043-027 and is located on the southwest side of Murrieta Creek between Gruwell Street and Central Street, in a portion of the Rancho La Laguna (Stearns) land grant lying within T6S R4W, San Bernardino Base Meridian (Fig. 2). The study is part of the environmental review process for a proposed development project on the property. The County of Riverside, as Lead Agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.).

CRM TECH performed the present study to provide the County of Riverside with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to any historical/archaeological resources that may exist in or around the project area, as mandated by CEQA. In order to identify and evaluate such resources, CRM TECH conducted a historical/archaeological resources records search, pursued historical background research, contacted Native American representatives, and carried out an intensive-level field survey. The following report is a complete account of the methods, results, and final conclusion of the study.

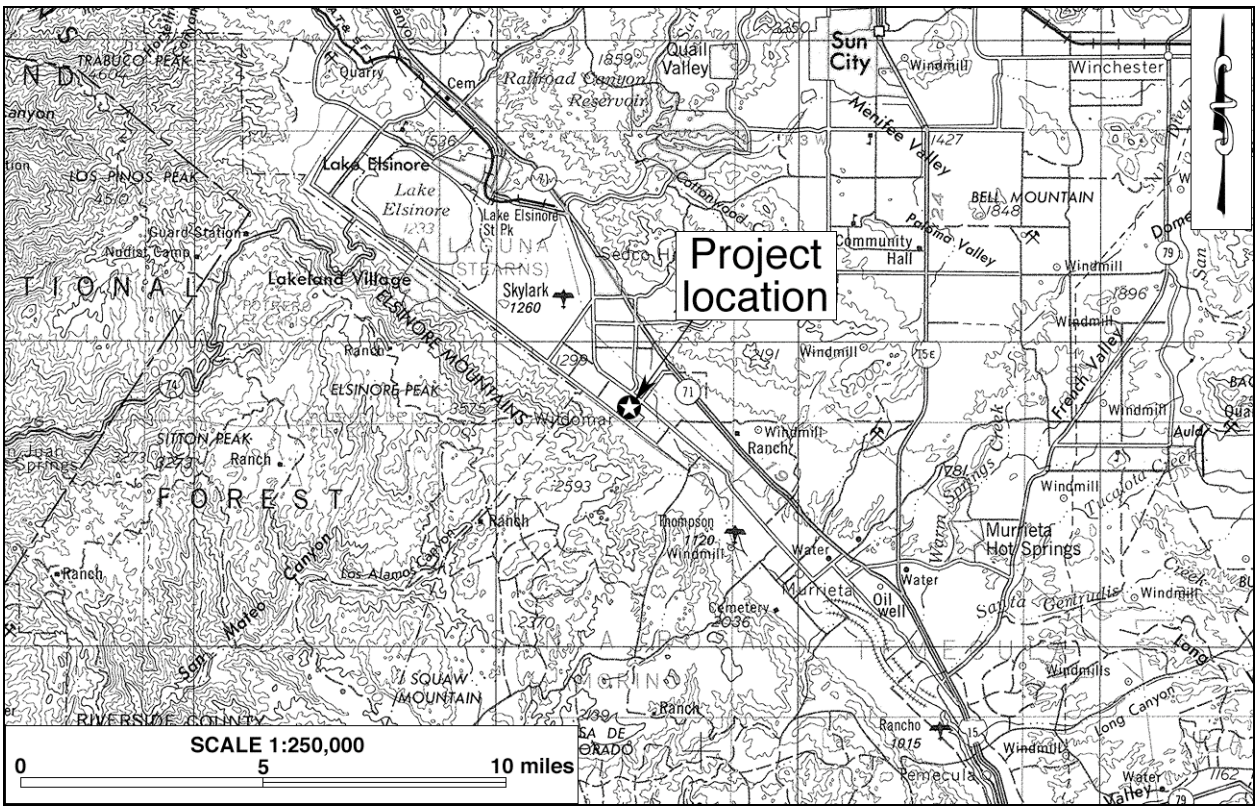


Figure 1. Project vicinity. (Based on USGS Santa Ana, Calif., 1:250,000 quadrangle [USGS 1979])

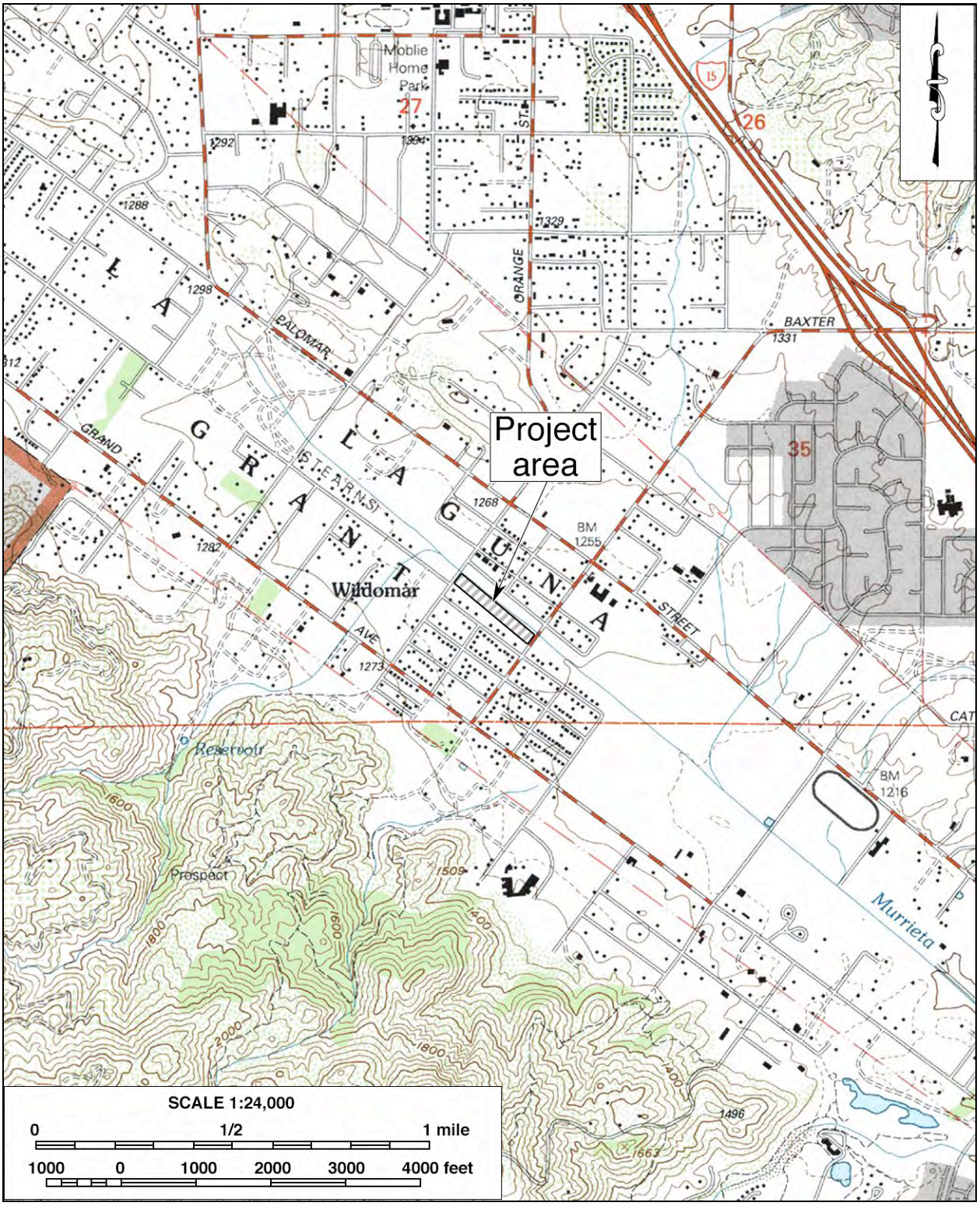


Figure 2. Project area. (Based on USGS Wildomar, Calif., 1:24,000 quadrangle [USGS 1997])

SETTING

CURRENT NATURAL SETTING

The project area is bounded by the Murietta Creek channel on the northeast, Central Avenue on the southeast, Gruwell Street on the northwest, and a residential neighborhood on the southwest. Elevations within the project area range from approximately 1,245 to 1,255 feet above mean sea level, with a fairly level terrain and a slight incline to the west. Soil within the project area consists of coarse sands with silt, clay, gravel, and small rocks. Most of the project area remains relatively undisturbed, although the portion along the southwestern boundary has been cleared in the recent past. Vegetation observed includes foxtails, wild mustard, datura, coyote melons, pepper trees, eucalyptus trees, and other introduced landscaping trees and plants (Fig. 3).

CULTURAL SETTING

Prehistoric Context

The Wildomar area has long been a part of the homeland of the Luiseño Indians, a Takic-speaking people whose territory extended from present-day Riverside to Escondido and Oceanside. Luiseño history, as recorded in traditional songs, tells the creation story from the birth of the first people, the *kaamalam*, to the sickness, death, and cremation of *Wiyoot*, the most powerful and wise one, at Lake Elsinore. In modern anthropological literature, the leading sources on Luiseño culture and history are Kroeber (1925), Strong (1929), and Bean and Shipek (1978).

Archaeological discoveries at Lake Elsinore and Domenigoni Valley place humans in this part of southern California as early as 10,000 years ago. Over the years there have been many sequences and chronologies proposed for the prehistoric cultural history of inland southern California, but at the present time there are not enough archaeological data to

Figure 3. Overview of the current natural setting of the project area. (Photo taken on July 23, 2007; view to the southeast)

fine-tune these sequences into units any smaller than a few, very broadly defined periods. The various existing schemes were summarized by Grenda (1997:16-21), who offered the following basic timeline:

10,550-7,200 years ago	Early Holocene Period/San Dieguito Culture
7,200-3,440 years ago	Middle Holocene Period/La Jolla-Pauma Cultures
3,440-1,500 years ago	Archaic Period/Encinitas Culture
1,500-300 years ago	Late Prehistoric Period/Luiseño Culture

The more recent Native American history in California, beginning with the first European contact, is chronologized by anthropologists and historians as follows:

1500-1770s	Long-distance contact with Europeans
1770s-1830s	Mission Period
1830s-1850s	Rancho Period
1850s-1880s	American Migration to California
1880s-present	Reservation Period

Historic Context

After the beginning of Spanish colonization of Alta California in 1769, what is today the southwestern portion of Riverside County, consisting of Temescal, Elsinore, and Temecula Valleys, became the first region in the county to be settled by non-Indians. In 1818-1819, Leandro José Serrano, a Spanish soldier from San Diego, established a cattle ranch in the Temescal Valley under a temporary occupancy and grazing permit issued by Mission San Luis Rey (Jennings et al. 1993:91). Around the same time, with the Temecula Valley growing into Mission San Luis Rey's principal grain producer, the mission fathers established a granary, a chapel, and a residence for the *majordomo* at the Luiseño village of *Temeeku*, near present-day Temecula (Hudson 1989:19).

Beginning in 1834, during secularization of the mission system, former mission ranchos throughout Alta California were surrendered to the Mexican government, and subsequently divided and granted to various prominent citizens in the province. In the vicinity of the project area, three large land grants were issued during this period, Rancho La Laguna, Rancho Temecula, and Rancho Santa Rosa. As elsewhere in Alta California, cattle raising was the most prevalent economic activity on these and other nearby ranchos, until the influx of American settlers eventually brought an end to this now-romanticized lifestyle in the second half of the 19th century.

In the wake of the massive waves of immigration from the eastern states, a land boom swept through much of southern California in the 1880s. The small community of Wildomar was one of the hundreds of boom towns created during this period. It was founded in 1886 by William Collier and Donald Graham at the site of a minor station on the Santa Fe Railroad (Gunther 1984:572). Initially named Wildon, the town was renamed Wildomar within the same year, a named coined from the first names of the founders and that of Margaret Graham, Collier's sister and Graham's wife (*ibid.*). Since its birth, "Wildomar has remained a quiet farming community, with a scattering of residents who liked living in its restful environment" (Hudson 1978:175). During recent decades, however, Wildomar has experienced a new boom in residential development and, like

many other communities in southwestern Riverside County, has begun to take on more and more the characteristics of a "bedroom community" in support of the fast growing industries in nearby Orange County.

RESEARCH METHODS

RECORDS SEARCH

On July 16, 2007, CRM TECH archaeologist Nina Gallardo (see App. 1 for qualifications) conducted the historical/archaeological resources records search at the Eastern Information Center (EIC), University of California, Riverside. During the records search, Gallardo examined maps and records on file at the EIC for previously identified cultural resources in or near the project area, and existing cultural resources reports pertaining to the vicinity. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resource Information System.

HISTORICAL RESEARCH

Historical background research for this study was conducted by CRM TECH historian Bai "Tom" Tang (see App. 1 for qualifications) on the basis of published literature in local and regional history and historic maps of the Wildomar area. Among maps consulted for this study were the U.S. General Land Office's (GLO) land survey plat map dated 1880 and the U.S. Geological Survey's (USGS) topographic maps dated 1901, 1942, and 1953. These maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley.

NATIVE AMERICAN PARTICIPATION

As part of the research procedures, CRM TECH contacted the State of California's Native American Heritage Commission on July 13, 2007, to request a records search in the commission's sacred lands file. Following the commission's recommendations, CRM TECH further contacted a total of 11 Native American representatives in the region in writing on July 18 to solicit local Native American input regarding any possible cultural resources concerns over the proposed project. The correspondences between CRM TECH and the Native American representatives are attached to this report in Appendix 2.

FIELD SURVEY

On July 23, 2007, CRM TECH archaeologist Daniel Ballester (see App. 1 for qualifications) carried out the intensive-level, on-foot field survey of the project area. During the survey, Ballester walked parallel east-west transects spaced 15 meters (approx. 50 feet) apart. In this way, the ground surface in the entire project area was systematically and carefully examined for any evidence of human activities dating to the prehistoric or historic periods (i.e., 50 years ago or older). Ground visibility ranged from poor (10%) to good (80%) depending upon the density of the vegetation.

RESULTS AND FINDINGS

RECORDS SEARCH

According to records on file at the EIC, the project area may have been partially covered by a linear survey completed in 2006 for a power line project, but no cultural resources were previously recorded on or adjacent to the property. Outside the project boundaries but within a one-mile radius, EIC records show nearly 30 other previous cultural resources studies on various tracts of land and linear features (Fig. 4).

As a result of these and other similar studies in the vicinity, ten archaeological sites, seven historic-period buildings, and one isolate—i.e., a site with fewer than three artifacts— were previously recorded within the scope of the records search, as listed in Table 1. None of these previously recorded resources was located in the immediate vicinity of the project area, and thus none of them requires further consideration during this study.

Table 1. Previously Recorded Cultural Resources within the Scope of the Records Search

Site No.	Recorded by/Date	Description
33-2766	McCarthy 1984	Bedrock milling features, since combined with 33-2767
33-2767	Smallwood 2003; Love and Moffit 1994	Bedrock milling features, groundstone, lithic scatter, and historic-period trash dump
33-2768	McCarthy 1984	Bedrock milling feature
33-2769	McCarthy 1984	Small camp site with bedrock milling features and groundstone
33-4722	Love 1992	Gate valve and pipe from ca. 1930s-1940s water system
33-4725	White 1989	Lithic scatter, groundstone
33-4726	White 1989	Lithic scatter, groundstone
33-7182	Meredith 1982	Single-family residence (Craftsman bungalow)
33-7420	O'Brien 1982	Single-family residence, ca. 1935
33-7783	O'Brien 1982	Single-family residence, ca. 1934
33-7784	O'Brien 1982	Single-family residence, ca. 1910
33-7785	O'Brien 1982	Farmhouse with associated structures, ca. 1888
33-7786	O'Brien 1982	Single-family residence, ca. 1885
33-7811	O'Brien 1982	Monument housing the Wildomar school bell
33-9641	White 2000	Bedrock milling feature
33-12289	Shepard 2002	Single-family residence
33-12815	Love 1992	Electrical insulator, ca. 1900-1920
33-13515	Swope 1988	Quartzite flake with cortex

HISTORICAL RESEARCH

Historic maps consulted for this study suggest that the project area has remained vacant and undeveloped throughout the historic period (Figs. 5-7). In the 1880s, when the U.S. government conducted an official land survey in the Wildomar area, the only man-made features observed in the project vicinity—but not within the project boundaries—were a "Road from Temecula and Temescal" and a "Road to Santa Rosa" (GLO 1880).

A decade later, the surrounding area presented a very different cultural landscape. In 1881-1883, the Atchison, Topeka and Santa Fe Railway Company launched a direct challenge to the Southern Pacific Railway Company's transportation monopoly in California by completing its first subsidiary in the state, the California Southern Railway,

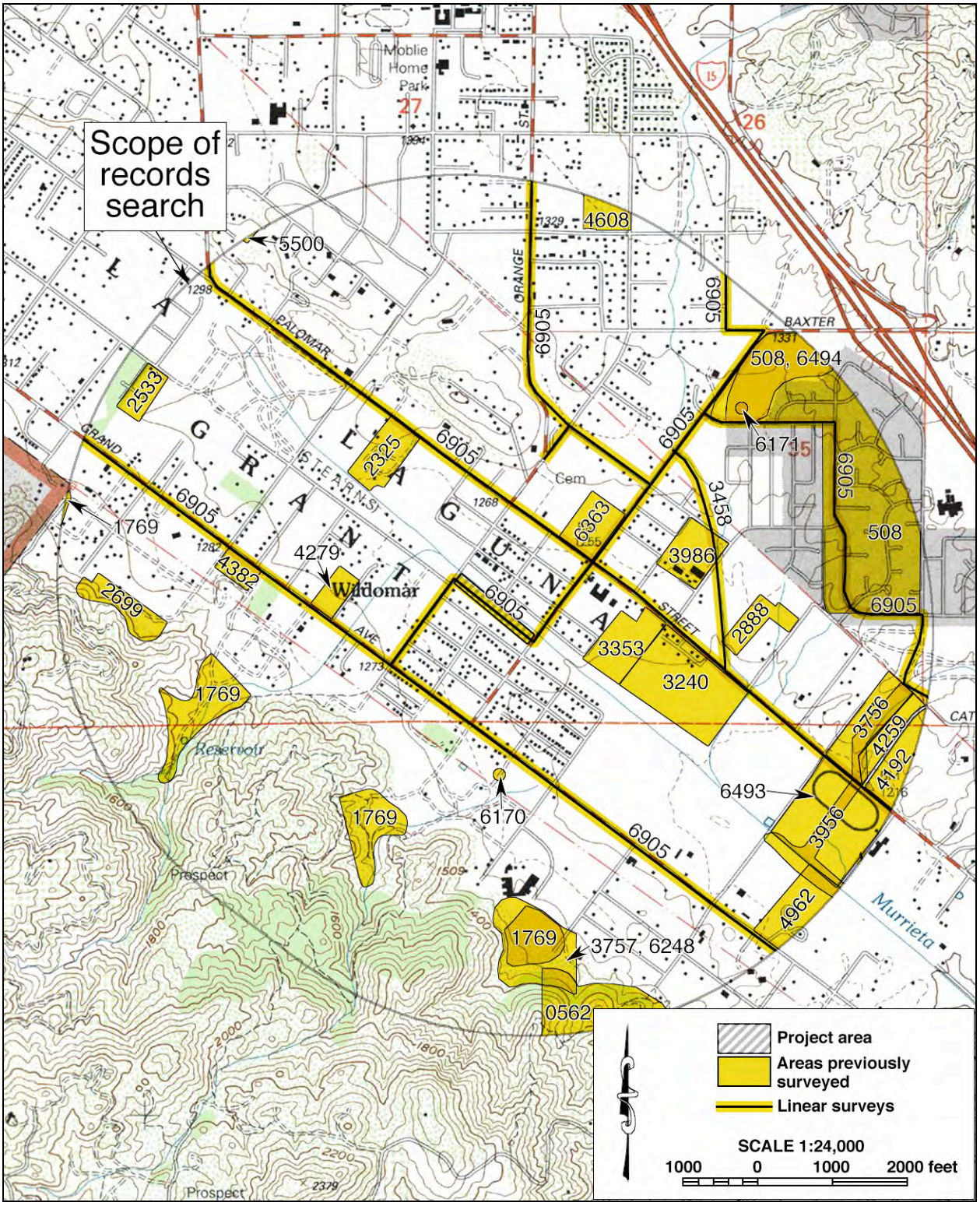


Figure 4. Previous cultural resources studies in the vicinity of the project area, listed by EIC file number. Locations of historical/archaeological sites are not shown as a protective measure.

from the San Diego area to San Bernardino. As Figure 5 shows, the California Southern Railway, later renamed the Southern California Railway, traversed in close proximity to the project area.

The arrival of the Santa Fe and its fierce competition with the Southern Pacific ushered in a phenomenal land boom in southern California during the 1880s, and was a direct factor in the creation of the town of Wildomar, as mentioned above. By the late 1890s, the Wildomar area demonstrated a settlement pattern that was typical in rural southern California, with crisscrossing roads lined by scattered buildings surrounding a more densely populated town center (Fig. 5). The project area was located within the general perimeters of the Wildomar town center, but apparently remained unsettled at the time (Fig. 5).

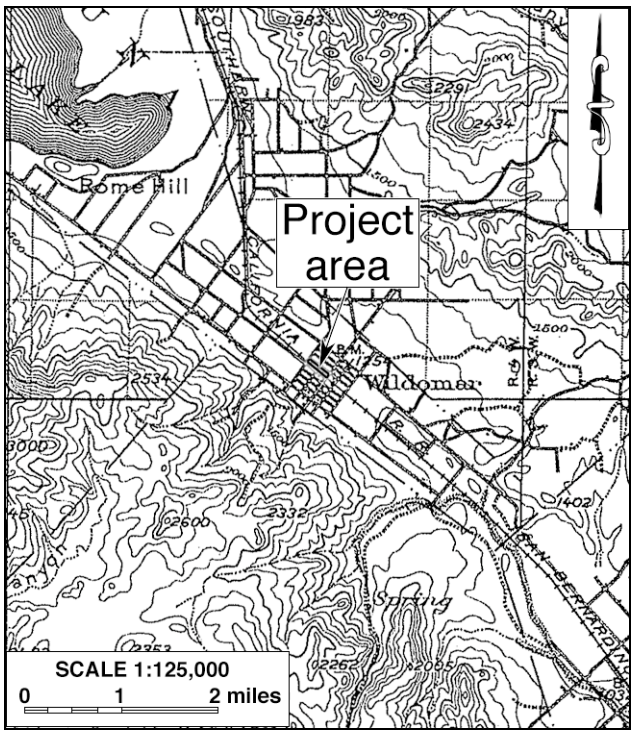


Figure 5. The project area and vicinity in 1897-1898. (Source: USGS 1901)

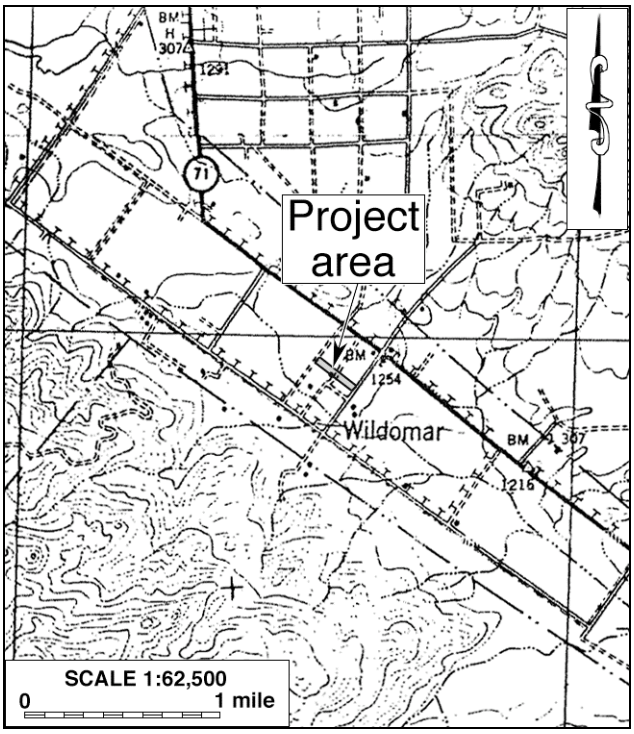


Figure 6. The project area and vicinity in 1939. (Source: USGS 1942)

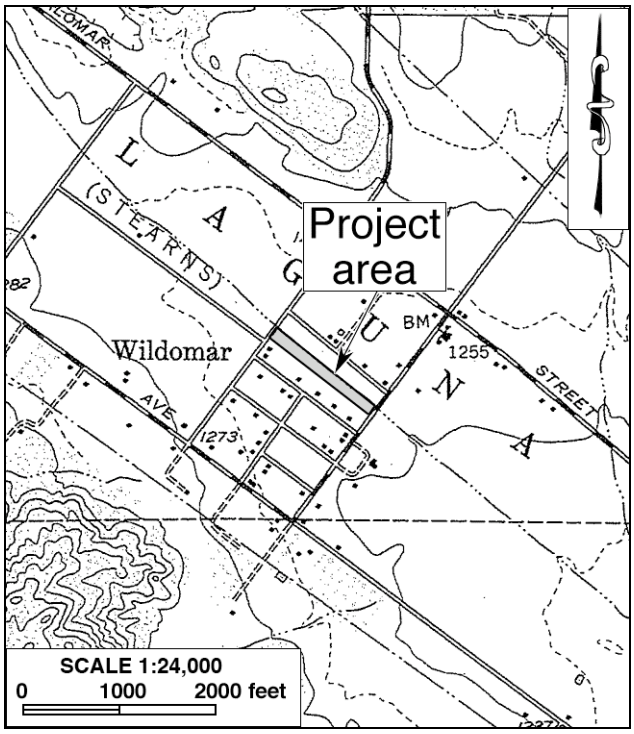


Figure 7. The project area and vicinity in 1951. (Source: USGS 1953)

After the original California Southern Railway was repeated washed out by floods in the Temecula and Railroad Canyons, the Santa Fe eventually abandoned its service between Elsinore and Temecula in 1935, and the rail line through Wildomar was subsequently removed (Hudson 1989:90). After that, the only notable cultural features present in the immediate vicinity of the project area during the historic period were a few roads, including the forerunners of today's Gruwell Street and Central Street (Figs. 6, 7). Based on its depiction in the historic maps, the project area appears to be relatively low in sensitivity for cultural resources from the historic period.

NATIVE AMERICAN PARTICIPATION

In response to CRM TECH's inquiry, the Native American Heritage Commission reported that the sacred lands record search identified no Native American cultural resources in the immediate project area. However, noting that "the absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any 'area of potential effect'," the commission suggested that local Native American representatives be contacted for additional information, and provided a list of potential contacts in the region (see App. 2).

Upon receiving the commission's response, CRM TECH initiated correspondence with all nine individuals on the referral list and the organizations they represent. In addition, John Gomez, Jr., Cultural Resources Coordinator for the Ramona Band of Cahuilla Indians, and Erica Helms, Cultural Resource Administrator for the Soboba Band of Luiseño Indians, were also contacted. As of this time, two responses have been received (see App. 2).

John Gomez, Jr., responded in writing on July 18, 2007. In the letter, Mr. Gomez states that the Ramona Band of Cahuilla Indians is concerned about the protection of cultural resources and the proper treatment of sacred items and/or human remains that may be unearthed during the project. He requests a copy of the cultural resources report for review and reserves the right to comment further in the future.

In a letter dated August 7, 2007, Anna Hoover, Cultural Analyst for the Temecula Band of Luiseño Mission Indians, states that the project area lies within the boundaries of the tribe's ancestral territory. Therefore, the tribe requests copies of all archaeological reports and further consultation with the project proponent and the Lead Agency if subsurface cultural resources are encountered.

If any additional Native American responses over cultural resource issues are received in the future, they will be reported immediately to the project proponent.

FIELD SURVEY

The intensive-level field survey produced completely negative results for potential cultural resources. The entire project area was closely inspected for any evidence of human activities dating to the prehistoric or historic periods, but none was found. Modern trash was observed along the southwestern project boundary, which has been cleared of vegetation, and a tree house of recent origin was observed in the northwestern portion of the property. However, no buildings, structures, objects, sites, features, or artifacts more than 50 years of age were encountered during the field survey.

DISCUSSION

The purpose of this study is to identify any cultural resources within or adjacent to the project area, and to assist the County of Riverside in determining whether such resources meet the official definition of "historical resources," as provided in the California Public Resources Code, in particular CEQA.

According to PRC §5020.1(j), "'historical resource' includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR §15064.5(a)(1)-(3)).

Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate that "a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

As discussed above, no potential "historical resources" were previously recorded within or adjacent to the project area, and none was encountered during the present survey. In addition, Native American input did not identify any sites of traditional cultural value in the vicinity, and historic maps suggest that the project area is relatively low in sensitivity for cultural resources from the historic period. Based on these findings, and in light of the criteria listed above, the present report concludes that *no historical resources exist within or adjacent to the project area*.

RECOMMENDATIONS

CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired."

Since no "historical resources" were encountered during the course of this study, CRM TECH presents the following recommendations to the County of Riverside:

- No historical resources exist within or adjacent to the project area, and thus the project as currently proposed will not cause a substantial adverse change to any known historical resources.
- No further cultural resources investigation is necessary for the proposed project unless development plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are discovered during any earth-moving operations associated with the project, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

CONCLUSION

The foregoing report has provided background information on the project area, outlined the methods used in the current study, and presented the results of the various avenues of research. Throughout the course of the study, no "historical resources," as defined by CEQA, were encountered within or adjacent to the project area. Therefore, the County of Riverside may reach a finding of *No Impact* regarding cultural resources, with the condition that any buried cultural materials unearthed during earth-moving activities be examined and evaluated by a qualified archaeologist prior to further disturbances.

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

DATE:_____ **SIGNED:**_____

REFERENCES

Bean, Lowell John, and Florence C. Shipek
1978 Luiseño. In *Handbook of North American Indians*, Vol. 8: *California*, edited by Robert F. Heizer; pp. 550-563. Smithsonian Institution, Washington, D.C.

GLO (General Land Office, U.S. Department of the Interior)
1880 Plat Map: Township No. 6 South Range No. 4 West, San Bernardino Meridian; surveyed in 1880.

Grenda, Donn
1997 Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore. Statistical Research Technical Series 59. Statistical Research, Inc., Tucson, Arizona.

Gunther, Jane Davies
1984 *Riverside County, California, Place Names: Their Origins and Their Stories*. Jane Davies Gunther, Riverside.

Hudson, Tom
1978 *Lake Elsinore Valley: Its Story, 1776-1977*. Lake Elsinore Downtown Business Association and City of Lake Elsinore Centennial, Lake Elsinore.
1989 *A Thousand Years in Temecula Valley*. Reprinted by Old Town Temecula Museum, Temecula.

Jennings, Bill, Ron Baker, Tom Patterson, and Diana Seider (ed.)
1993 *Guide to the Historic Landmarks of Riverside County, California*. Riverside County Historical Commission Press, Riverside.

Kroeber, Alfred L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. U.S. Government Printing Office, Washington, D.C.

Strong, William Duncan
1929 *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology 26. Reprinted by Malki Museum Press, Banning, California, 1972.

USGS (United States Geological Survey, U.S. Department of the Interior)
1901 Map: Elsinore, Calif. (30', 1:125,000); surveyed in 1897-1898.
1942 Map: Lake Elsinore, Calif. (15', 1:62,500); aerial photographs taken in 1939.
1953 Map: Wildomar, Calif. (7.5', 1:24,000); aerial photographs taken in 1951.
1979 Map: Santa Ana, Calif. (1:250,000); 1959 edition revised.
1997 Map: Wildomar, Calif. (7.5', 1:24,000); imagery taken in 1994.

APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.
2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Honors and Awards

1988-1990	University of California Graduate Fellowship, UC Riverside.
1985-1987	Yale University Fellowship, Yale University Graduate School.
1980, 1981	President's Honor List, Northwestern University, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (With Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

Membership

California Preservation Foundation.

PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.

2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U. C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U. C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists.
Society for American Archaeology.
Society for California Archaeology.
Pacific Coast Archaeological Society.
Coachella Valley Archaeological Society.

PROJECT ARCHAEOLOGIST/REPORT WRITER
Deirdre Encarnación, M.A.

Education

2003	M.A., Anthropology, San Diego State University, California.
2000	B.A., Anthropology, minor in Biology, with honors; San Diego State University, California.
1993	A.A., Communications, Nassau Community College, Garden City, N.Y.
2001	Archaeological Field School, San Diego State University.
2000	Archaeological Field School, San Diego State University.

Professional Experience

2004-	Project Archaeologist/Report Writer, CRM TECH, Riverside, California.
2001-2003	Part-time Lecturer, San Diego State University, California.
2001	Research Assistant for Dr. Lynn Gamble, San Diego State University.
2001	Archaeological Collection Catalog, SDSU Foundation.

PROJECT ARCHAEOLOGIST
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004- Project Archaeologist, CRM TECH, Riverside.

- Surveys, excavations, mapping, and records searches.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

PROJECT ARCHAEOLOGIST/FIELD DIRECTOR
Daniel Ballester, B.A.

Education

1998	B.A., Anthropology, California State University, San Bernardino.
1997	Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994	University of Puerto Rico, Rio Piedras, Puerto Rico.
2002	"Historic Archaeology Workshop," presented by Richard Norwood, Base Archaeologist, Edwards Air Force Base; presented at CRM TECH, Riverside.

Professional Experience

2002- Field Director, CRM TECH, Riverside.
- Report writing, site record preparation, and supervisory responsibilities over all aspects of fieldwork and field crew.

1999-2002 Project Archaeologist, CRM TECH, Riverside.
- Survey, testing, data recovery, monitoring, and mapping.

1998-1999 Field Crew, K.E.A. Environmental, San Diego.
- Two and a half months of excavations on Topomai village site, Marine Corp Air Station, Camp Pendleton.

1998 Field Crew, A.S.M. Affiliates, Encinitas.
- Two weeks of excavations on a site on Red Beach, Camp Pendleton, and two weeks of survey in Camp Pendleton, Otay Mesa, and Encinitas.

1998 Field Crew, Archaeological Research Unit, University of California, Riverside.
- Two weeks of survey in Anza Borrego Desert State Park and Eureka Valley, Death Valley National Park.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* A total of 11 local Native American representatives were contacted; a sample letter is included in this report.

CRM TECH

FAX COVER SHEET

1016 E. Cooley Drive
Suite B
Colton, CA 92324
909·824·6400·Tel
909·824·6405·Fax

To:
Native American
Heritage Commission

Fax:
(916) 657-5390

From:
Nina Gallardo

Date:
July 13, 2007

Number of pages (including this cover sheet):
2

HARDCOPY:

_____ will follow by mail

√ will not follow unless requested

RE: Sacred Land records search

This is to request a Sacred Lands records search

Name of project:
Tentative Tract Map 33840; APN 376-043-027
(Gruwell & Central)
CRM TECH #2108

Location:
In the Community of Wildomar
Riverside County

USGS 7.5' quad sheet data:
Wildomar, Calif.;
La Laguna (Stearns) land grant; T6S R4W, SBBM

Please call if you need more information or have any questions.

Results may be faxed to the number above.

I appreciate your assistance in this matter.

Map included

STATE OF CALIFORNIA Arnold Schwarzenegger, 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
e-mail: ds_nahc@pacbell.net

July 13, 2007

Nina Gallardo
CRM TECH
1016 E. Cooley Drive, Suite B
Colton, CA 92324

Sent by FAX: 909-824-6405
Number of pages: 3

Re: Proposed Tentative Tract Map 33840; APN 376-043-027 (Gruwell & Central PDI) CRM TECH #2108; Riverside County.

Dear Ms. Gallardo:

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area. The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any 'area of potential effect (APE).'

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed are the nearest tribes that may have knowledge of cultural resources in the project area. A List of Native American contacts are attached to assist you. The Commission makes no recommendation of a single individual or group over another. It is advisable to contact the person listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area (APE).

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 5097.98 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. Discussion of these should be included in your environmental documents, as appropriate.

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
Program Analyst

Attachment: Native American Contact List

Native American Contacts
Riverside County
July 13, 2007

Cahuilla Band of Indians
Anthony Madrigal, Jr., Interim-Chairperson
P.O. Box 391760 Cahuilla
Anza , CA 92539
tribalcouncil@cahuilla.net
(951) 763-2631

(951) 763-2632 Fax

Soboba Band of Luiseño Indians
Bennae Calac, Cultural Resource Director
P.O. Box 487 Luiseno
San Jacinto , CA 92581
bcalac@soboba-nsn-gov
(951) 663-8332
(951) 654-4198 - FAX

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resource Center
P.O. Box 1477 Luiseno
Temecula , CA 92593
(951) 308-9295 Ext 8106
(951) 676-2768
(951) 506-9491 Fax

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 Luiseno
Temecula , CA 92593
tbrown@pechanga-nsn.gov
(951) 676-2768
(951) 695-1778 Fax

Ramona Band of Mission Indians
Joseph Hamilton, vice chairman
P.O. Box 391670 Cahuilla
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax

Willie Pink
48310 Pechanga Road Luiseno
Temecula , CA 92592
wjpink@hotmail.com
(909) 936-1216
Prefers e-mail contact

Santa Rosa Band of Mission Indians
John Marcus, Chairman
P.O. Box 609 Cahuilla
Hemet , CA 92546
srtribaloffice@aol.com
(951) 658-5311
(951) 658-6733 Fax

Soboba Band of Luiseno Indians
Harold Arres, Cultural Resources Manager
P.O. Box 487 Luiseno
San Jacinto , CA 92581
harres@soboba-nsn.gov
(951) 654-2765
FAX: (951) 654-4198

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of 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 only applicable for contacting local Native American with regard to cultural resources for the proposed Grunwll & Central PDI, Tentative Tract Map 33840; located in the Community of Wildomar; Riverside County, California for which a Sacred Lands File search was requested.

Native American Contacts
Riverside County
July 13, 2007

Cahuilla Band of Indians
Maurice Chacon, Cultural Resources
P.O. Box 391760 Cahuilla
Anza , CA 92539
cbandodian@aol.com
(951) 763-2631

(951) 763-2632 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of 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 only applicable for contacting local Native American with regard to cultural resources for the proposed Grusell & Central PDI, Tentative Tract Map 33840; located in the Community of Wildomar; Riverside County, California for which a Sacred Lands File search was requested.

July 18, 2007

Bennae Calac, Cultural Resource Director
Soboba Band of Luiseño Indians
P. O. Box 487
San Jacinto, CA 92381

RE: Three Acres in APN 376-043-027
In the Community of Wildomar, Riverside County
CRM TECH Contract #2108

Dear Ms. Calac:

As part of a cultural resources study on the property referenced above, I am writing to request your input on potential Native American cultural resources in or near the project area. Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value within or near the project area. The lead agency for this project is the County of Riverside for CEQA compliance purposes.

The project area is located along Front Street between Gruwell Street and Central Avenue, in the community of Wildomar, Riverside County. The accompanying map, based on the USGS Wildomar, Calif., 7.5' quadrangle, depicts the location of the project area in a portion of the La Laguna (Stearns) land grant, T6S R4W, SBBM.

Any information, concerns or recommendations regarding cultural resources in the vicinity of the project area may be forwarded to CRM TECH by telephone, e-mail, facsimile or standard mail. Thank you for the time and effort in addressing this important matter.

Respectfully,

Melissa Hernandez
CRM TECH

Encl.: Project location map

RAMONA BAND OF CAHUILLA

56310 Highway 371, Suite B
Post Office Box 391670
Anza, California 92539

Tel: (951) 763-4105
Fax: (951) 763-4325
E-mail: admin@ramonatribe.com

"A SOVEREIGN NATION"

July 18, 2007

CRM Tech
Melissa Hernandez
1016 E. Cooley Drive, Suite B
Colton, CA 92324

Re: Three Acres in APN 376-043-027; Wildomar, Riverside County
CRM Tech #2108

Dear Ms. Hernandez:

The Ramona Band of Cahuilla Indians is in receipt of a letter dated July 18, 2007 regarding the above proposed project.

The Ramona Band of Cahuilla Indians is concerned about the protection of unique and irreplaceable cultural resources, such as Cahuilla village and burial sites and archaeological items that may be displaced by ground-disturbing work associated with any project within the aboriginal homelands of the Cahuilla people.

The Ramona Band of Cahuilla Indians is also concerned about the proper and lawful treatment of any cultural or ceremonial items, Native American human remains, or sacred items discovered during planning and/or construction of the project.

The Ramona Band of Cahuilla Indians reserves the right to provide information until such time as it has had an opportunity to review the cultural resource report for the proposed project. Please forward a copy of the cultural resources report to the address listed above.

The Ramona Band of Cahuilla Indians appreciates the opportunity to consult regarding the proposed project and looks forward to working with you to protect and preserve the invaluable resources of the Cahuilla people.

You may contact me at (951)941-4943 or (951)763-4105 if you have any questions or wish to discuss this matter.

Sincerely,

John A. Gomez, Jr.
Cultural Resources Coordinator
Ramona Band of Cahuilla Indians

RECEIVED AUG 02 2007

PECHANGA CULTURAL RESOURCES
Temecula Band of Luiseño Mission Indians

Post Office. Box 2183 • Temecula, CA 92593
Telephone (951) 308-9295 • Fax (951) 506-9491

Chairperson:
Germaine Arenas

Vice Chairperson:
Mary Bear Magee

Committee Members:
Raymond Basquez, Sr.
Evie Gerber
Darlene Miranda
Bridgett Barcello Maxwell

Director:
Gary DuBois

Coordinator:
Paul Macarro

Cultural Analyst:
Stephanie Gordin

Monitor Supervisor:
Aurelia Marruffo

August 7, 2007

VIA FAX and USPS

RE: Request for Information for APN 376-043-027, Three Acres in the Community of Wildomar, CRM Tech Contract # 2108

Dear Ms. Hernandez:

The Tribe appreciates your request for information regarding the above referenced project. After reviewing the provided maps, we have determined that the project area is not within reservation lands although it is within our ancestral territory. At this time, we are not interested in commenting on this project.

However, the Tribe requests the following:

1) Copies of all archaeological reports; and

2) In the event that subsurface cultural resources are identified, the Tribe requests consultation with the project proponent and Lead Agency regarding the treatment and disposition of all artifacts.

As a sovereign governmental entity, the Tribe is entitled to appropriate and adequate government-to-government consultation regarding the proposed project. We would like you and your client to know that the Tribe does not consider initial inquiry letters from project consultants to constitute appropriate government-to-government consultation, but rather tools to obtain further information about the project area. Therefore, the Tribe reserves its rights to participate in the formal environmental review process, including government-to-government consultation with the Lead Agency, and requests to be included in all correspondence regarding this project.

If you have any additional questions or comments, please contact me at ahoover@pechanga-nsn.gov or 951-308-9252.

Sincerely,

Anna M. Hoover
Cultural Analyst

RECEIVED AUG 11 2007

ADDENDUM

CRM TECH

FAX COVER SHEET

1016 E. Cooley Drive, Suite B
Colton, CA 92324
909·824·6400·Tel
909·824·6405·Fax

To:

Karey James

699-3569
Fax

From:

Andrea Stella

September 5, 2007
Date

2 Pages (including this)

HARDCOPY

_____ will follow by mail

√ will not follow unless requested

RE: Native American Consultation,
Assessor's Parcel No. 376-043-027
Wildomar, Riverside County
CRM TECH Contract No. 2108

The following is a Native American response letter that should be included with the report the project referenced above. This formal response from the Soboba Band of Luiseño Indians was received after the completion of the report. It should be noted that even though the project area was not located on the Soboba reservation land, the location was recognized as a part of the Soboba Tribe's traditional use area. Additionally, the tribe requested further consultation and copies of all cultural resource documentation.

Sincerely,

Andrea Stella

Encl: Letter from the Soboba Band of Luiseño Indians

Mission:

Educate and communicate the rich heritage of Soboba peoples; Lead and assist individuals, organizations and communities in understanding the needs and concerns of Native American monitoring of traditional sites; Advocate Native American participation in state agencies and boards; Advocate legislation and enforcement of laws affecting Native American peoples and protecting historical and archaeological resources.

August 27, 2007

Attn: Melissa Hernandez
CRM TECH
1016 E. Cooley Drive, Suite B
Colton, CA 92324

Re: Contract # 2108

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your project. The information provided to us on said project(s) has been assessed through our Cultural Resource Department, where it was concluded that the project area falls within the bounds of our Tribal Traditional Use Area.

Soboba Band of Luiseño Indians is requesting the following:

1. Further consultation with Native American Tribes.

2. Copies of archeological and/or cultural resource documentation.

If you have any questions or concerns please do not hesitate to contact me at the following number 951-487-8268.

[SPECIAL NOTE (for projects other than cell towers): *If* this project is associated with a city or county specific plan or general plan action it is subject to the provisions of SB18-Tradtional Tribal Cultural Places (law became effective January 1, 2005) and will require the city or county to participate in **formal, government-to-government** consultation with the Tribe. If the city or county are your client, you may wish to make them aware of this requirement. By law, they are required to contact the Tribe.]

Sincerely,

Erica Helms
Soboba Cultural Resource Department
Phone 951-487-8268
Cell 951-663-8333
ehelms@soboba-nsn.gov

RECEIVED SEP 05 2007

APPENDIX 6: SOILS INVESTIGATION

John R. Byerly
INCORPORATED

July 1, 2013

Zareh Hookassian
3173 Vera Valley Road
Franklin, Tennessee 37064

Rpt. No.: 1372
File No.: S-10719

Subject: Tentative Tract Map No. 33840, Between Gruwell Street and Central Street, Wildomar, California; Second Update of Geotechnical/Geologic Reports

References:
(a) Soils Investigation, 3.16-Acre Residential Development, John R. Byerly, Inc., Rpt. No. 4512, October 28, 2003

(b) Update of Geotechnical/Geologic Reports, Tentative Tract Map No. 33840, John R. Byerly, Inc., Rpt. No. 3555-a, April 8, 2008

Dear Mr. Hookassian:

We are pleased to present this second update of the referenced geotechnical investigation reports and the associated engineering geology investigation update reports. We have reviewed the referenced documents and have performed a site reconnaissance. The purpose of our review and site reconnaissance was to verify that the conclusions and recommendations presented in the referenced update reports remain generally valid and to present additional recommendations as needed. The second update of the geologic reports was performed by our geologic consultant, AKW Geotechnical. The second geologic update report is enclosed herewith as Enclosure 4. In addition, a Phase 1 environmental site assessment has been performed by our consulting environmental engineer, Hayden Environmental, Inc. The Phase 1 environmental site assessment generally conforms to the protocol outlined in ASTM E 1527-05. The environmental site assessment is described and the findings of that investigation are presented in the Hayden Environmental, Inc. report, included as Enclosure 5.

PROJECT DESCRIPTION

It is our understanding that the site will be developed to receive four single-family residences. The structures are expected to be single-story buildings of wood-frame construction incorporating concrete slab-on-grade floors. The residences will have plan areas of

2,500 square feet and will exert relatively light foundation loads on the underlying soils. A cul-de-sac will be constructed off Elm Street, which will provide access for two residences. Based on the site topography, it is anticipated that minimal cuts and fills will be required for site development, and major slopes and retaining walls are not proposed. The site configuration is illustrated on Enclosure 1.

REVIEW OF GEOTECHNICAL/GEOLOGIC REPORTS

Previous explorations at the subject property are described in the soils investigation report prepared by this firm (Reference a). The subsurface explorations consisted of three test borings drilled with a truck-mounted flight-auger to a maximum depth of 51.5 feet. Artificial fill consisting of loose silty sands with some clay was encountered in all of our test borings to depths ranging from 2.5 feet to 4.5 feet. The underlying natural soils encountered in our boring locations consisted of medium dense to dense silty sands and medium stiff silty clays. Free ground water was encountered in each test boring at a depth of approximately 18 feet. Bedrock was not encountered in our explorations. The boring logs are reproduced herewith on Enclosure 2. Laboratory testing included maximum density determinations and consolidation testing. The expansion potential of the near-surface soil was classified as very low. Chemical testing was comprised of pH, soluble sulfate, sulfide, redox potential, and resistivity. Recommendations were provided for foundation and seismic design parameters and site preparation. Grading recommendations included the overexcavation and recompaction of the existing artificial fill and loose natural soils until competent natural soil was encountered. At that time, it was also recommended that the overexcavation of the loose natural soils should extend from lot line to lot line as required by the County of Riverside.

The second engineering geology update report was performed by our consulting engineering geologist, AKW Geotechnical (Engineering Geology Update, Tentative Tract Map no. 33840, Between Gruwell Street and Central Street, Wildomar, California, AKW Geotechnical, Project No. M1043-01, June 19, 2013). This second geologic update report included the review of available published geologic reports and maps, a study of black and white aerial photographs of

the site area, and a field reconnaissance. The report notes that: "The site is not located within an Alquist-Priolo Earthquake Fault Zone [AP EFZ]." The report also notes: "Northwest-trending tonal and topographic lineaments in the vicinity of the site may be related to faulting." The report concludes: "No evidence for active faulting was observed on the site on the aerial photographs reviewed associated with this update." The entire second geologic update report is presented herewith as Enclosure 4.

SITE CONDITIONS

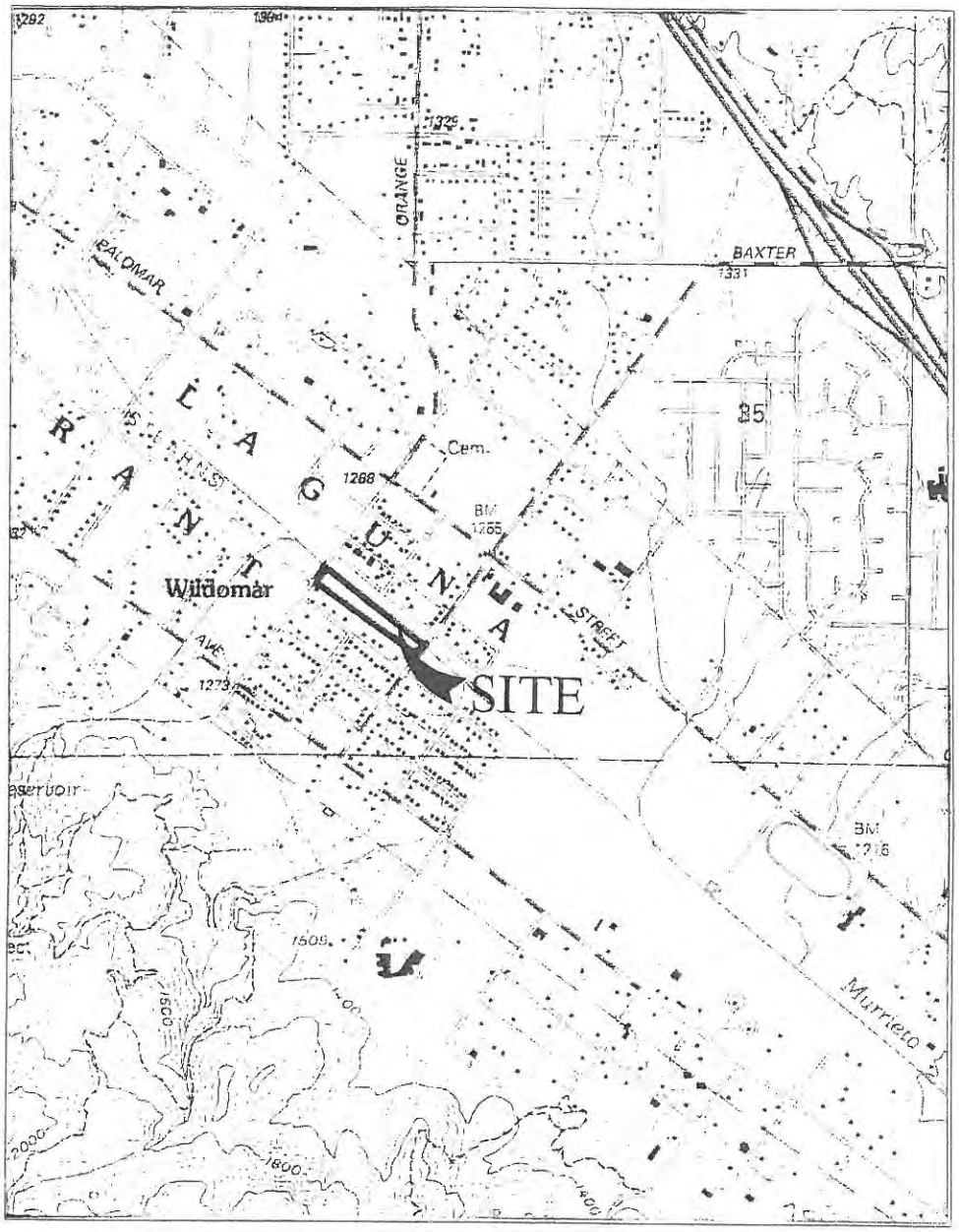
The 3.16-acre property is located southeast of the Murrieta Creek, between Gruwell Street and Central Street, in the Wildomar area of Riverside County. An Index Map showing the general vicinity of the site is presented on the following page. The coordinates of the site are latitude 33.6022° N and longitude 117.2772° W utilizing the North American Datum (NAD) from 1983. During our site inspection in May of 2013, we noted that the ground surface throughout the property was generally covered with a light to moderate growth of weeds and trees. A chain-linked fence enclosure is situated in the southeastern portion of the property, and single-family residences occupy the remaining surrounding areas. Murrieta Creek is a concrete-lined channel located approximately 16 feet to the northeast of the most easterly property boundary. The 9-foot-deep channel was constructed with 1H:1V side slopes and extends in a southeast direction. The site topography is relatively flat and slopes downward towards the southeast at an average gradient of less than 1 percent.

LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction is a phenomenon that occurs when a soil undergoes a transformation from a solid state to a liquefied condition due to the effects of increased pore-water pressure. Loose saturated soils with particle sizes in the medium sand to silt range are particularly susceptible to liquefaction when subjected to seismic groundshaking. Affected soils lose all strength during liquefaction, and foundation failure can occur.

INDEX MAP

SCALE: 1"=2000'



T6S R4W SECTION 34/35
LATITUDE: N33.6022
LONGITUDE: W117.2772

MAP SOURCE: USGS MAP WILDOMAR QUADRANGLE

Rpt. No.: 1372
File No.: S-10719

Free ground water was encountered in each of our earlier test borings at a depth of approximately 18 feet (John R. Byerly, Inc., 2003). Data from the State of California Department of Water Resources indicate that two water wells close to the site (State Well Nos. 6S/4W-34J2 and 6S/4W-34J3) are within one-half mile. At these locations, phreatic ground water was at depths of about 45 feet to 47 feet below the ground surface during March of 1968. The shallow water encountered during our earlier soils investigation (John R. Byerly, Inc., 2003) probably represents a perched water condition with possible recharge from Murrieta Creek. For the purpose of our liquefaction analysis, we have conservatively assumed an historic high ground water level coincident with the ground surface.

It is anticipated that major earthquake groundshaking will occur during the lifetime of the proposed development from the seismically active Wildomar branch of the Elsinore Fault zone located approximately 1,500 feet northeast of the site. This fault would create the most significant earthshaking event. Based on an earthquake magnitude of 7.4 and a review of the California Building Code, a peak horizontal ground acceleration of 0.51g is assigned to the site. To evaluate the potential for liquefaction and seismically induced settlement of the subsoils, the soils were analyzed for relative density. The most effective measurement of relative density of sands with respect to liquefaction potential is standard penetration resistance. Our firm has performed an analysis to evaluate the potential for liquefaction and dynamic settlement based on two borings. Standard penetration testing was performed as Boring 1 was advanced in our earlier soils investigation (John R. Byerly, Inc., 2003). In addition, the California sampler blow count data were evaluated. An equivalent standard penetration test blow count was estimated for Boring 3. To convert the number of blow counts obtained from the California sampler to equivalent standard penetration test blow counts, the California sampler blow counts were multiplied by a factor of 0.7.

The standard penetration data provided input for the LiquefyPro Version 4.3 program for liquefaction potential and seismically induced settlement. As indicated in Special Publication 117A (Revised), "Guidelines for Evaluating and Mitigating Seismic Hazards in California, March 2009," a safety factor of 1.3 was used in this analysis. An analysis of these soils reveals a

potential for liquefaction for the subsoils to a depth of 26 to 31 feet. Our analysis assumed that the existing soil will be subexcavated and recompacted to a depth of 5 feet. The engineered fill was assumed to have an "N" value of 30. Liquefaction of the soils below the recompacted fill will not result in disruption of the foundation soils. The results of this evaluation are shown on Enclosure 3 and reveal a total potential dynamic settlement of 4.25 inches. The total settlement will occur over a large area and will not affect local buried utilities. Within the building area, we would estimate the differential dynamic settlement would be about one-half the total. Based on a minimum building dimension of about 50 feet, a maximum angular distortion of about 1/282 is calculated, which is within tolerable limits. It is our opinion that neither liquefaction nor seismically induced settlement need be a consideration in the design of the proposed single-family residences.

LATERAL SPREAD

The potential for lateral spread was evaluated using the practice recommended by Steven Bartlett and Leslie Youd (ASCE Journal of Geotechnical Engineering, Vol. 121, No. 4, April 1995). Messrs. Bartlett and Youd conclude that lateral spread is not likely when sediments exhibit standard penetration test $(N1)_{60}$ values of 15 or greater. Enclosure 3 shows $(N1)_{60}$ values of 15 to 72 in Boring 1 and 18 to 46 in Boring 3 for soils that are susceptible to liquefaction. Based on the $(N1)_{60}$ values, we conclude that the potential for lateral spread is low.

CONCLUSIONS

Based on our site reconnaissance, it appears that the site conditions have not changed materially from those noted during our earlier soils investigation (John R. Byerly, Inc., 2003). It is our judgment that the conclusions and recommendations presented in the referenced reports remain generally valid. In their present state, the existing artificial fill and portions of the upper natural soils are not considered suitable for structural support due to compressibility considerations. The upper 5 feet of soil should be overexcavated and replaced as engineered fill to provide a

compacted fill mat for foundation support. Subsequent to site preparation, the buildings may be safely founded on conventional continuous and isolated footings. The recommendations presented in this report assume very low expansive soils. Detailed recommendations are presented below.

RECOMMENDATIONS

FOUNDATION DESIGN

The proposed residences may be founded on conventional continuous footings. The building footings should be at least 12 inches wide and should be placed at least 18 inches below the lowest final adjacent grade. These footings should be designed for a maximum safe soil bearing pressure of 2,500 pounds per square foot for dead plus live loads. The bearing capacity value may be increased by one-third for wind and seismic loading.

The continuous footings should be reinforced with at least four No. 4 bars, two placed near the top and two near the bottom of the footings. This recommendation for foundation reinforcement is based on geotechnical considerations. Structural design may require additional foundation reinforcement.

Footings should bear entirely on compacted fill or entirely on dense natural soil. Where final grades would result in footings spanning from cut to fill soil conditions, the undisturbed natural soil should be overexcavated and recompacted to a depth of at least 2 feet below the bottom of the footings.

SEISMIC DESIGN PARAMETERS

To assist the structural engineer in the selection of seismic coefficients to be incorporated into the design of the structures, we have reviewed the 2010 California Building Code. The various coefficients and factors are provided in the following table:

Factor or Coefficient	***Value***
Latitude	33.6022°
Longitude	-117.2772°
Mapped S_S	1.924g
Mapped S_1	0.715g
F_a	1.0
F_v	1.5
Final S_{MS}	1.924g
Final S_{M1}	1.073g
Final S_{DS}	1.283g
Final S_{D1}	0.715g
PGA (Final S_{DS} /2.5)	0.51g
T_L	8 seconds
Site Class	D

LATERAL LOADING

Resistance to lateral loads will be provided by passive earth pressure and basal friction. For footings bearing against compacted fill, passive earth pressure may be considered to develop at a rate of 350 pounds per square foot per foot of depth. Basal friction may be computed at 0.4 times the normal dead load. Basal friction and passive earth pressure may be combined directly without reduction. The allowable lateral resistance may be increased by one-third for wind and seismic loading.

SLAB-ON-GRADE

Concrete slab-on-grade design recommendations are listed below. The slab-on-grade recommendations assume underlying utility trench backfills and building pad subgrade soils have been densified to a relative compaction of at least 90 percent (ASTM D 1557).

1. It is our opinion that the compacted fill mat should provide adequate support for the concrete slab-on-grade. Due to the high ground water observed in our test borings, the interior slab should be underlain by 4 inches of gravel to provide a capillary break. The final pad surface should be rolled to provide a smooth dense surface upon which to place the concrete.

2. The building slab-on-grade floors should be at least 4 inches thick. The slabs should be reinforced with at least 6"x6"-W1.4/W1.4 welded wire fabric or equivalent throughout. All slab reinforcement should be supported by chairs or precast concrete blocks to ensure positioning of the reinforcement within the middle third of the slab. Lifting of unsupported reinforcement during concrete placement should not be allowed.

3. Slabs to receive moisture-sensitive floor coverings should be underlain with a moisture vapor retardant membrane, such as 10-mil Stego Wrap or equivalent. The surface of the gravel underlayment should be rolled with a smooth drum roller immediately before placement of the membrane. The moisture vapor retardant membrane should conform to ASTM E 1745-97 (Standard Specification for Plastic Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs). The moisture vapor retardant membrane should be lapped into the footing excavation to provide full coverage of the subgrade soils. Punctures and/or holes cut for plumbing should be taped to minimize moisture emissions through the membrane. The project superintendent and/or a representative of the geotechnical engineer should inspect the placement of the moisture vapor retardant membrane prior to covering. Installation of the moisture vapor retardant membrane should be performed in accordance with ASTM E 1643-94 (Standard Practice of Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs).

4. A 2-inch layer of clean sand (SE>30, no more than 7 percent passing the No. 200 sieve) should be placed over the moisture vapor retardant membrane to promote uniform setting of the concrete. Concrete should be placed on the sand blanket when the sand is damp. Excess moisture should not be allowed to accumulate within the sand blanket prior to concrete placement. At the time of concrete placement, the moisture content of the sand blanket above the moisture vapor retardant membrane should not exceed 2 percent below the optimum moisture content. Prior to placing the membrane, the slab subgrade soils should be moistened to at least the optimum moisture content. Geotechnical verification of the slab moisture conditioning is not warranted for low expansive soils.

5. In lieu of placing the 2-inch sand blanket above the membrane as described above and to further minimize future moisture vapor emissions through the slabs-on-grade, the concrete may be placed directly on the moisture vapor retardant membrane. Placing concrete directly on the moisture vapor retardant membrane will increase shrinkage and curling forces and make finishing more difficult. To accommodate these concerns, the structural engineer should provide appropriate mix design criteria for concrete placed directly on the moisture vapor retardant membrane.

6. We recommend a maximum water/cement ratio of 0.50 for all slab concrete. Architectural or structural considerations may require the utilization of a lower water/cement ratio. Where slab concrete is placed directly on the vapor moisture retardant membrane without the presence of the absorptive sand layer, a lower water-cement ratio may be needed.

7. Preparation of the concrete floor slab should conform to ASTM F 710-98 (Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring) and the manufacturer's recommendations. Moisture vapor emission tests should be performed to verify acceptable moisture emission rates prior to flooring installation.

SITE PREPARATION

We assume that the site will be prepared in accordance with the California Building Code or the current City of Wildomar Grading Ordinance. The recommendations presented below are to establish additional grading criteria. These recommendations should be considered preliminary and are subject to modification or expansion based on a geotechnical review of the project foundation and grading plans.

- All areas to be graded should be stripped of organic matter, man-made obstructions, and other deleterious materials. Buried structures and utilities that are encountered should be removed. Significant root systems from trees to be removed should be thoroughly grubbed from the soil. Suitable organic matter may be stockpiled for use as topsoil in areas to be planted. All cavities created during site clearing should be cleaned of loose and disturbed soil, shaped to provide access for construction equipment, and backfilled with fill placed and compacted as described below.

- All artificial fill should be removed below areas to receive improvements. This includes the building and hardscape areas.

- Overexcavation

    - Building areas – The soils below the building areas and for a horizontal distance beyond the building areas at least equal to the depth of overexcavation below the final ground surface or 5 feet, whichever distance is greater, should be overexcavated to a depth of at least 5 feet below the natural ground surface or to a depth of at least 5 feet below the final ground surface, whichever is deeper. Should competent natural soil be encountered before a depth of 5 feet is reached, the overexcavation can be terminated at that depth as long as there is at least 24 inches of compacted fill below all footings. Competent natural soil is defined as undisturbed material exhibiting a relative compaction of at least 85 percent (ASTM D 1557). A representative of this firm should observe the

bottom of all excavations. Loose undisturbed soil may be present in the bottom of the overexcavated area once the recommended depth is achieved. Additional overexcavation is not required.

- Cut/fill transition conditions – Where grading would result in cut/fill transition conditions under building areas, the undisturbed natural soils should be overexcavated to a depth of at least 2 feet below the footing base grade. The overexcavation should extend beyond the building footing areas a horizontal distance at least equal to the depth of overexcavation below the final ground surface or 5 feet, whichever distance is greater. The subexcavated surfaces should be evaluated by the representative of the geotechnical engineer.

- Pavement and hardscape areas – Subsequent to removal of any existing artificial fill, the soils below asphalt concrete pavement and portland cement concrete areas should be scarified to a depth of 12 inches below existing grade or 12 inches below proposed finished grade, whichever is deeper. Finished grade is defined as the elevation of the top of the subgrade. The scarified soils should be moistened to at least the optimum moisture content and densified to a minimum relative compaction of 90 percent (ASTM D 1557).

- Subexcavated surfaces and all other surfaces to receive fill should be scarified to a minimum depth of 8 inches, moistened to near the optimum moisture content, and densified to a minimum relative compaction of 90 percent (ASTM D 1557).

- The on-site soils should provide adequate quality fill material provided they are free from organic matter and other deleterious materials. Import fill should be inorganic granular non-expansive soil free from rocks or lumps greater than 8 inches in maximum dimension and should exhibit a very low expansion potential (expansion index less than 21), negligible sulfate content (less than 1,000 ppm soluble sulfate by weight), and low corrosion potential. Prior to bringing import fill to the site, the contractor should

obtain certification required by the State of California Department of Toxic Substance Control (DTSC) to verify that the proposed import meets the environmental standards. Proposed import should be sampled at the source and tested by this firm for expansion index, soluble sulfate content, and corrosion potential.

- All fill should be placed in 8-inch or less lifts, moisture conditioned to near the optimum moisture content, and densified to a minimum relative compaction of 90 percent (ASTM D 1557).

The surface of the site should be graded to provide positive drainage away from the structures. Drainage should be directed to established swales and then to appropriate drainage structures to minimize the possibility of erosion. Water should not be allowed to pond adjacent to footings.

SHRINKAGE AND SUBSIDENCE

Volume change in going from cut to fill conditions is anticipated where near-surface grading will occur. Assuming the fill will be compacted to an average relative compaction of 93 percent, an average cut-fill shrinkage of 15 percent is estimated. Further volume loss will occur through subsidence during preparation of the natural ground surface. Although the contractor's methods and equipment utilized in preparing the natural ground will have a significant effect on the amount of natural ground subsidence that will occur, our experience indicates as much as 0.15 foot of subsidence in areas prepared to receive fill should be anticipated. These values are exclusive of losses due to stripping or removal of subsurface obstructions.

PRELIMINARY ASPHALT CONCRETE PAVEMENT DESIGN

Representative samples of upper soils at the site have been tested for relevant subgrade properties. Based on our test data shown in our earlier soils investigation report (John R. Byerly, Inc., 2003), the preliminary pavement sections presented on the following table are recommended.

Location	TI	"R" Value	Thickness (Feet) Asphalt Concrete	Aggregate Base
Short local streets	5.0	70	0.25	0.50
General local streets	5.5	70	0.25	0.50

The above designs are preliminary and for estimating purposes only. The subgrade soil exposed during grading of the street areas should be evaluated by the geotechnical engineer. Additional sampling and testing of the subgrade soil may be needed at that time. Aggregate base should conform to the requirements for Class 2 Aggregate Base in accordance with the Caltrans Standard Specifications.

CHEMICAL TEST RESULTS

The soil tested from our earlier soils investigation (John R. Byerly, Inc., 2003) exhibited negligible soluble sulfate content; therefore, sulfate-resistant concrete will not be required for this portion of the project. In addition, the results of the corrosivity testing indicate that the soils tested are not detrimentally corrosive to ferrous-metal pipes.

FOUNDATION AND GRADING PLAN REVIEW

The project foundation and grading plans should be reviewed by the geotechnical engineer. Additional recommendations may be required at that time.

CONSTRUCTION OBSERVATION

All grading operations, including ground surface preparation, should be observed and compaction tests performed by this firm. No fill should be placed on any prepared surface until that surface has been evaluated by the representative of the geotechnical engineer. Additional testing should be performed relative to sulfate content and corrosion potential. It is essential

that all footing excavations be observed by the representative of the geotechnical engineer prior to placement of forms or reinforcing steel.

The conclusions and recommendations presented in this report are based upon the field and laboratory investigation described herein and represent our best engineering judgment. Should conditions be encountered in the field that appear different from those described in this report, we should be contacted immediately in order that appropriate recommendations might be prepared.

Respectfully submitted,

JOHN R. BYERLY, INC.

REGISTERED PROFESSIONAL ENGINEER
JOHN R. BYERLY
No. GE000179
Exp. Date 6-30-15
GEOTECHNICAL
STATE OF CALIFORNIA

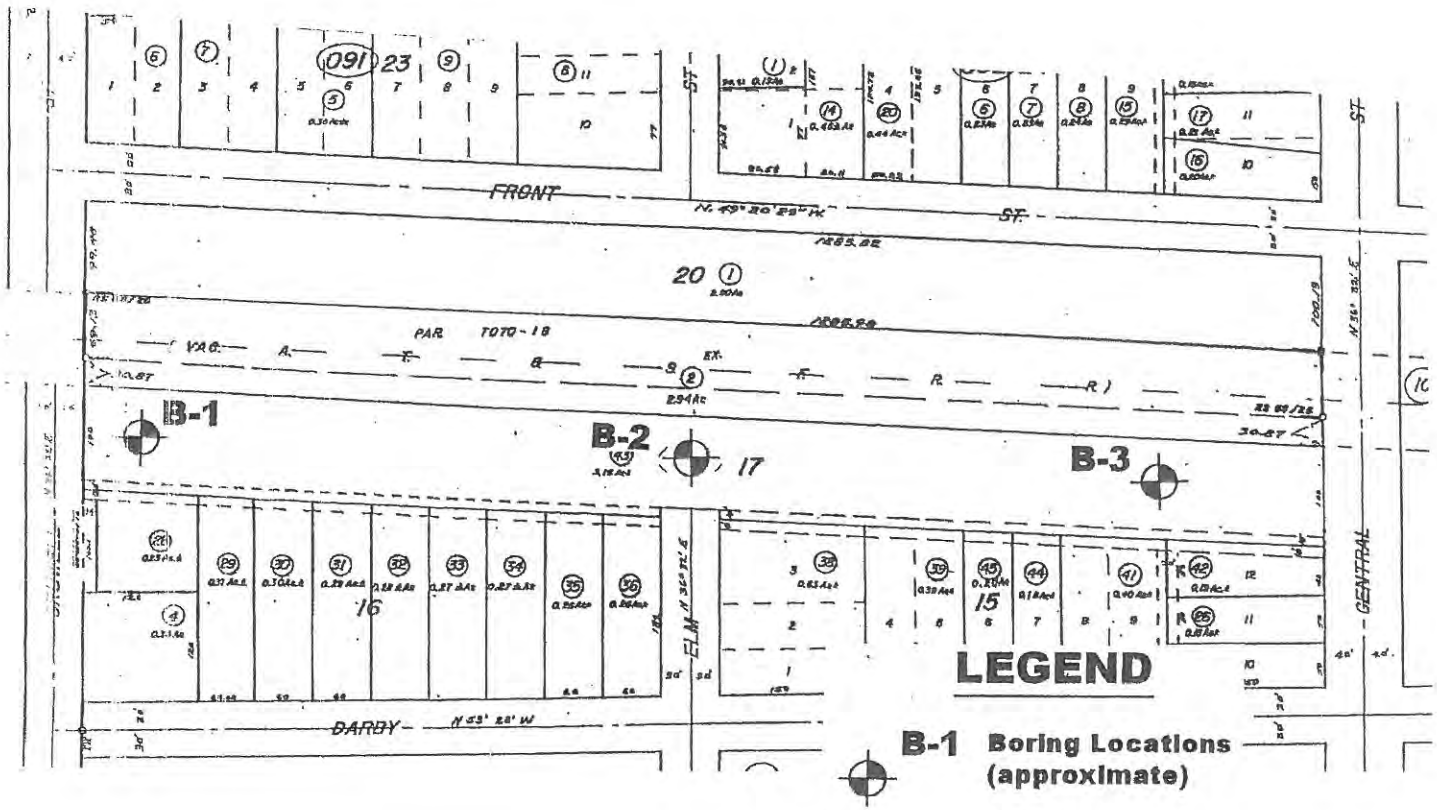
John R. Byerly, Geotechnical Engineer
President

JRB:MLL:mh

Enclosures: (1) Plot Plan
(2) Boring Logs
(3) Liquefaction Analysis
(4) Engineering Geology Investigation Update
(5) Hayden Environmental Inc. Report

Copies: (2) Client
(4) Rich Soltysiak, RDS and Associates

PLOT PLAN



Enclosure 1
Rpt. No.: 1372
File No.: S-10719

Boring 1

Boring Date: 6/4/03
Surface Elevation:
Drilling Method: Flight-Auger

Depth	SPT Blows Per Foot	Driving Energy (k-ft/ft)	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0		6.7	107	10.2	83		SM	Dark brown silty fine sand with some clay, porous, moist and medium dense (FILL)
		6.7	107	7.3	83		SM	Brown silty fine sand with some clay, porous, moist and loose (ORIGINAL GROUND)
	8	6.7	107	4.8	83			- seams of medium sand
10	10	8.1	114	2.3	85		SM	Brown to orange-brown silty fine to coarse sand, dry and medium dense
	16	6.3	111	14.9	83		SM	Dark brown silty fine to medium sand with a trace of clay, moist and medium dense
						▽		- becoming wet at 15.0 feet
20	11	4.2	110	12.9	82			- becoming saturated at 18.0 feet - seams of fine to coarse sand
	19	7.4	114	18.0	85			- becoming wet at 25.0 feet
30	38	14.8	121	14.1	90		SM	Gray silty fine to coarse sand with a trace of clay, wet and dense
	90							- becoming more dense at 30.0 feet
40	45							
50								
60								
70							END	Total Depth at 51.5 Feet Groundwater Encountered at 18.0 Feet

Enclosure 2, Page 1
Rpt. No. 1372
File No.: S-10719

LOG OF BORING

SuperLog V2.6 CivilTech Software, USA www.civiltech.com File: C:\superlog\project\S-10719 (Rpt No. 3555).log Date: 4/8/2008

Boring 2

Boring Date: 6/4/03
Surface Elevation:
Drilling Method: Flight-Auger

Depth	SPT Blows Per Foot	Driving Energy (k-ft/ft)	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0							SM	Light gray-brown silty fine to coarse sand, moist and loose (FILL)
	6.0	113	10.4	84			SM	Dark brown silty fine sand with some clay, moist and loose (FILL)
	5.6	107	9.6	83				
5	16.1	117	8.5	90			SM	Brown silty fine to medium sand with a trace of clay, moist and dense (ORIGINAL GROUND)
	15.1	115	9.8	89				
10	17.6	117	12.1	90				
15	13.7	111	12.7	86			SM	Dark brown silty fine to medium sand with some clay, moist and medium dense to dense
						▽		- becoming saturated at 18.0 feet
20	19.2	117	13.1	90				
25	19.2	117	12.4	90				
30	8.8	110	20.3	85				
35							END	Total Depth at 31.0 Feet Groundwater Encountered at 18.0 Feet

Enclosure 2, Page 2
Rpt. No. 1372
File No.: S-10719

LOG OF BORING

SuperLog V2.6 CivilTech Software, USA www.civiltech.com File: C:\superlog\projects\S-10719 (Rpt No. 3555).log Date: 4/8/2008

Boring 3

Boring Date: 6/4/03
Surface Elevation:
Drilling Method: Flight-Auger

Depth	SPT Blows Per Foot	Driving Energy (k-ft/ft)	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0		5.3	109	14.3	84		SM	Dark brown silty fine sand with some clay, porous, wet and loose (FILL)
		3.2	105	14.3	81			
		4.2	106	10.9	82		SM	Brown silty fine to medium sand with some clay, slightly porous, moist and loose (ORIGINAL GROUND)
		3.9	105	7.1	81			
10		4.9	109	7.4	84			- seams of fine to coarse sand and fine gravel
		8.1	110	10.3	85		SM	Dark brown silty fine to medium sand with some clay, moist and medium dense
20		12.3	110	13.5	85	▽		- becoming saturated at 18.0 feet
								- seams of fine to coarse sand
30								
	18						CL	Gray silty clay with sand, moist and medium stiff
40	28							
	31							
50	40							
							END	Total Depth at 51.5 Feet Groundwater Encountered at 18.0 Feet
60								
70								

SuperLog V2.6 CivilTech Software, USA www.civiltech.com File: C:\superlog\project\S-10719 (Rpt No. 3555).log Date: 4/8/2008

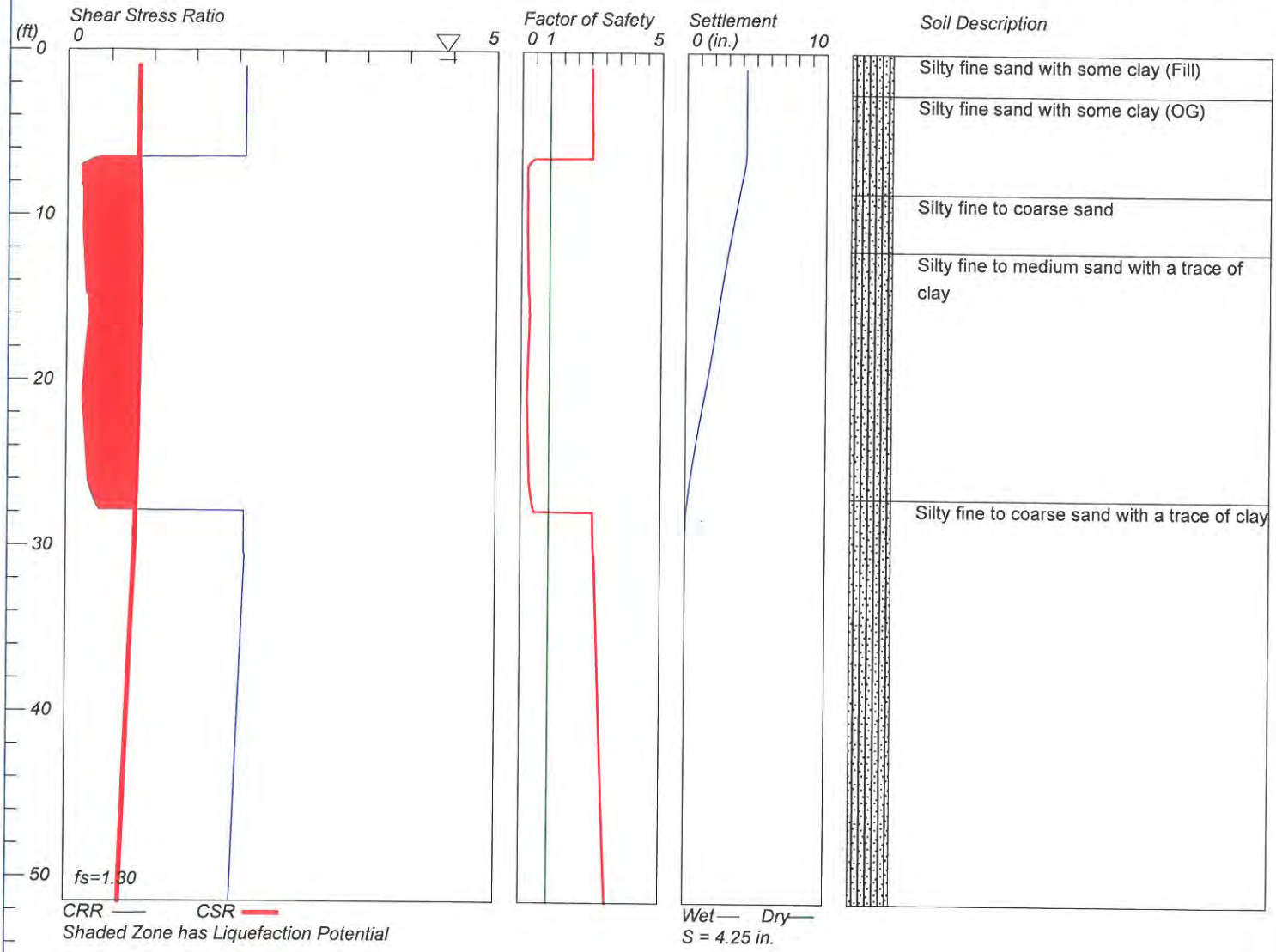
Enclosure 2, Page 3
Rpt. No. 1372
File No.: S-10719

LOG OF BORING

LIQUEFACTION ANALYSIS

Tentative Tract Map No. 33840

Hole No.=B-1 Water Depth=0.0 ft Surface Elev.=1256 feet above MSL Magnitude=7.4
Acceleration=0.51g



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Input File Name: C:\Liquefy4\S-10719.1.liq
Title: Tentative Tract Map No. 33840
Subtitle: S-10719

Surface Elev.=1256 feet above MSL
Hole No.=B-1
Depth of Hole= 51.5 ft
Water Table during Earthquake= 0.0 ft
Water Table during In-Situ Testing= 18.0 ft
Max. Acceleration= 0.51 g
Earthquake Magnitude= 7.4
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1
Sampeling Method, Cs=1
SPT Fines Correction Method: Idriss/Seed (SPT only)
Settlement Analysis Method: Tokimatsu / Seed
Fines Correction for Liquefaction: Idriss/Seed (SPT only)
Fine Correction for Settlement: During Liq. Correction
Average Input Data: Smooth*
* Recommended Options

Input Data:

Depth ft	SPT	Gamma pcf	Fines %
1.0	30.0	130.0	25.0
3.0	30.0	130.0	25.0
6.0	30.0	130.0	25.0
7.0	8.0	112.1	25.0
11.0	10.0	116.6	25.0
16.0	16.0	127.5	30.0
21.0	11.0	124.2	30.0
26.0	19.0	134.5	25.0
30.0	38.0	138.1	25.0
35.0	90.0	138.1	25.0
40.0	45.0	138.1	25.0

Output Results:
Settlement of saturated sands=4.25 in.
Settlement of dry sands=0.00 in.
Total settlement of saturated and dry sands=4.25 in.
Differential Settlement=2.123 to 2.802 in.

Depth ft	CRRm	CSRfs w/fs	F.S.	S_sat. in.	S_dry in.	S_all in.
1.00	2.07	0.83	2.50	4.25	0.00	4.25
6.00	2.07	0.82	2.53	4.25	0.00	4.25
11.00	0.18	0.85	0.21*	3.24	0.00	3.24
16.00	0.25	0.84	0.30*	2.27	0.00	2.27

21.00	0.18	0.83	0.21*	1.30	0.00	1.30
26.00	0.24	0.81	0.30*	0.33	0.00	0.33
31.00	2.08	0.78	2.65	0.00	0.00	0.00
36.00	2.04	0.74	2.76	0.00	0.00	0.00
41.00	2.00	0.70	2.86	0.00	0.00	0.00
46.00	1.96	0.66	2.97	0.00	0.00	0.00
51.00	1.93	0.62	3.09	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

CRRm	Cyclic resistance ratio from soils
CSRfs	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
S_sat	Settlement from saturated sands
S_dry	Settlement from dry sands
S_all	Total settlement from saturated and dry sands
NoLiq	No-Liquefy Soils

****

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Input File Name: C:\Liquefy4\S-10719.1.liq
Title: Tentative Tract Map No. 33840
Subtitle: S-10719

Input Data:

Surface Elev.=1256 feet above MSL
Hole No.=B-1
Depth of Hole=51.5 ft
Water Table during Earthquake= 0.0 ft
Water Table during In-Situ Testing= 18.0 ft
Max. Acceleration=0.51 g
Earthquake Magnitude=7.4
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1
Sampeling Method, Cs=1
SPT Fines Correction Method: Idriss/Seed (SPT only)
Settlement Analysis Method: Tokimatsu / Seed
Fines Correction for Liquefaction: Idriss/Seed (SPT only)
Fine Correction for Settlement: During Liq. Correction
Average Input Data: Smooth*
* Recommended Options

Depth ft	SPT	Gamma pcf	Fines %
1.0	30.0	130.0	25.0
3.0	30.0	130.0	25.0
6.0	30.0	130.0	25.0
7.0	8.0	112.1	25.0
11.0	10.0	116.6	25.0
16.0	16.0	127.5	30.0
21.0	11.0	124.2	30.0
26.0	19.0	134.5	25.0
30.0	38.0	138.1	25.0
35.0	90.0	138.1	25.0
40.0	45.0	138.1	25.0

Output Results: (Interval = 5.00 ft)

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	fs (user)	CSRfs w/fs
1.00	130.0	0.065	67.6	0.034	1.00	0.64	1.3	0.83
6.00	130.0	0.390	67.6	0.203	0.99	0.63	1.3	0.82
11.00	116.6	0.679	54.2	0.336	0.97	0.65	1.3	0.85
16.00	127.5	0.984	65.1	0.485	0.96	0.65	1.3	0.84
21.00	124.2	1.299	61.8	0.644	0.95	0.64	1.3	0.83

26.00	134.5	1.622	72.1	0.811	0.94	0.62	1.3	0.81
31.00	138.1	1.964	75.7	0.997	0.92	0.60	1.3	0.78
36.00	138.1	2.309	75.7	1.186	0.88	0.57	1.3	0.74
41.00	138.1	2.654	75.7	1.375	0.84	0.54	1.3	0.70
46.00	138.1	3.000	75.7	1.564	0.80	0.51	1.3	0.66
51.00	138.1	3.345	75.7	1.754	0.76	0.48	1.3	0.62

CSR is based on water table at 0.0 during earthquake

CRR Calculation from SPT or BPT data:

Depth ft	SPT	Cebs	Cr	sigma'	Cn	(N1)60	Fines %	d(N1)60	(N1)60f	CRR7.5
1.00	30.00	1.00	0.75	0.065	1.70	46.94	25.0	8.69	46.94	2.00
6.00	30.00	1.00	0.75	0.390	1.60	44.46	25.0	8.43	44.46	2.00
11.00	10.00	1.00	0.85	0.679	1.21	15.79	25.0	5.47	15.79	0.17
16.00	16.00	1.00	0.95	0.984	1.01	22.39	30.0	7.07	22.39	0.25
21.00	11.00	1.00	0.95	1.205	0.91	15.69	30.0	6.18	15.69	0.17
26.00	19.00	1.00	0.95	1.373	0.85	21.47	25.0	6.06	21.47	0.23
31.00	48.40	1.00	1.00	1.558	0.80	47.52	25.0	8.75	47.52	2.00
36.00	81.00	1.00	1.00	1.748	0.76	72.61	25.0	11.34	72.61	2.00
41.00	45.00	1.00	1.00	1.937	0.72	40.34	25.0	8.01	40.34	2.00
46.00	45.00	1.00	1.00	2.126	0.69	38.70	25.0	7.84	38.70	2.00
51.00	45.00	1.00	1.00	2.315	0.66	37.26	25.0	7.69	37.26	2.00

CRR is based on water table at 18.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.4:

Depth ft	sigC' tsf	CRR7.5 tsf	Ksigma	CRRv	MSF	CRRm	CSRfs w/fs	F.S. CRRm/CSRfs
1.00	0.04	2.00	1.00	2.00	1.03	2.07	0.83	2.50
6.00	0.25	2.00	1.00	2.00	1.03	2.07	0.82	2.53
11.00	0.44	0.17	1.00	0.17	1.03	0.18	0.85	0.21 *
16.00	0.64	0.25	1.00	0.25	1.03	0.25	0.84	0.30 *
21.00	0.78	0.17	1.00	0.17	1.03	0.18	0.83	0.21 *
26.00	0.89	0.23	1.00	0.23	1.03	0.24	0.81	0.30 *
31.00	1.01	2.00	1.00	2.01	1.03	2.08	0.78	2.65
36.00	1.14	2.00	0.98	1.97	1.03	2.04	0.74	2.76
41.00	1.26	2.00	0.97	1.93	1.03	2.00	0.70	2.86
46.00	1.38	2.00	0.95	1.90	1.03	1.96	0.66	2.97
51.00	1.50	2.00	0.93	1.86	1.03	1.93	0.62	3.09

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
1.00	-	-	-	46.94	25.0	0.00	46.94
6.00	-	-	-	44.46	25.0	0.00	44.46
11.00	-	-	-	15.79	25.0	0.00	15.79
16.00	-	-	-	22.39	30.0	0.00	22.39
21.00	-	-	-	15.69	30.0	0.00	15.69
26.00	-	-	-	21.47	25.0	0.00	21.47
31.00	-	-	-	47.52	25.0	0.00	47.52
36.00	-	-	-	72.61	25.0	0.00	72.61
41.00	-	-	-	40.34	25.0	0.00	40.34
46.00	-	-	-	38.70	25.0	0.00	38.70
51.00	-	-	-	37.26	25.0	0.00	37.26

(N1)60 has been fines corrected in liquefaction analysis

Settlement of Saturated Sands:
Settlement Analysis Method: Tokimatsu / Seed

Depth ft	CSRfs w/fs	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsv in.	S in.
51.45	0.62	3.10	25.0	37.14	100.00	0.000	0.000	0.000	0.000
51.00	0.62	3.09	25.0	37.26	100.00	0.000	0.000	0.000	0.000
46.00	0.66	2.97	25.0	38.70	100.00	0.000	0.000	0.000	0.000
41.00	0.70	2.86	25.0	40.34	100.00	0.000	0.000	0.000	0.000
36.00	0.74	2.76	25.0	72.61	100.00	0.000	0.000	0.000	0.000
31.00	0.78	2.65	25.0	47.52	100.00	0.000	0.000	0.000	0.000
26.00	0.81	0.30	25.0	21.47	73.18	1.410	0.008	0.330	0.330
21.00	0.83	0.21	30.0	15.69	62.62	1.863	0.011	0.970	1.300
16.00	0.84	0.30	30.0	22.39	74.86	1.353	0.008	0.965	2.265
11.00	0.85	0.21	25.0	15.79	62.80	1.855	0.011	0.974	3.240
6.00	0.82	2.53	25.0	44.46	100.00	0.000	0.000	1.006	4.246
1.00	0.83	2.50	25.0	46.94	100.00	0.000	0.000	0.000	4.246

Settlement of Saturated Sands=4.246 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
dsz is per each segment: dz=0.05 ft
dsv is per each print interval: dv=5 ft
S is cumulated settlement at this depth

Settlement of Dry Sands:

Depth ft	sigma' tsf	sigC' tsf	(N1)60s	CSRfs w/fs	Gmax tsf	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsv in.	S in.

Settlement of Dry Sands=0.000 in.
dsz is per each segment: dz=0.05 ft
dsv is per each print interval: dv=5 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Dry Sands=4.246 in.
Differential Settlement=2.123 to 2.802 in.

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fc	Friction from CPT testing
Gamma	Total unit weight of soil
Gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient

CSR	Cyclic stress ratio induced by earthquake
fs	User request factor of safety, apply to CSR
w/fs	With user request factor of safety inside
CSRfs	CSR with User request factor of safety
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksigma
MSF	Magnitude scaling factor for CRR (M=7.5)
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
F.S.	Factor of Safety against liquefaction F.S.=CRRm/CSRfs
Cebs	Energy Ratio, Borehole Dia., and Sample Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after seattlement fines corrections
ec	Volumetric strain for saturated sands
ds	Settlement in each Segment dz
dz	Segment for calculation, dz=0.050 ft
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for dry sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

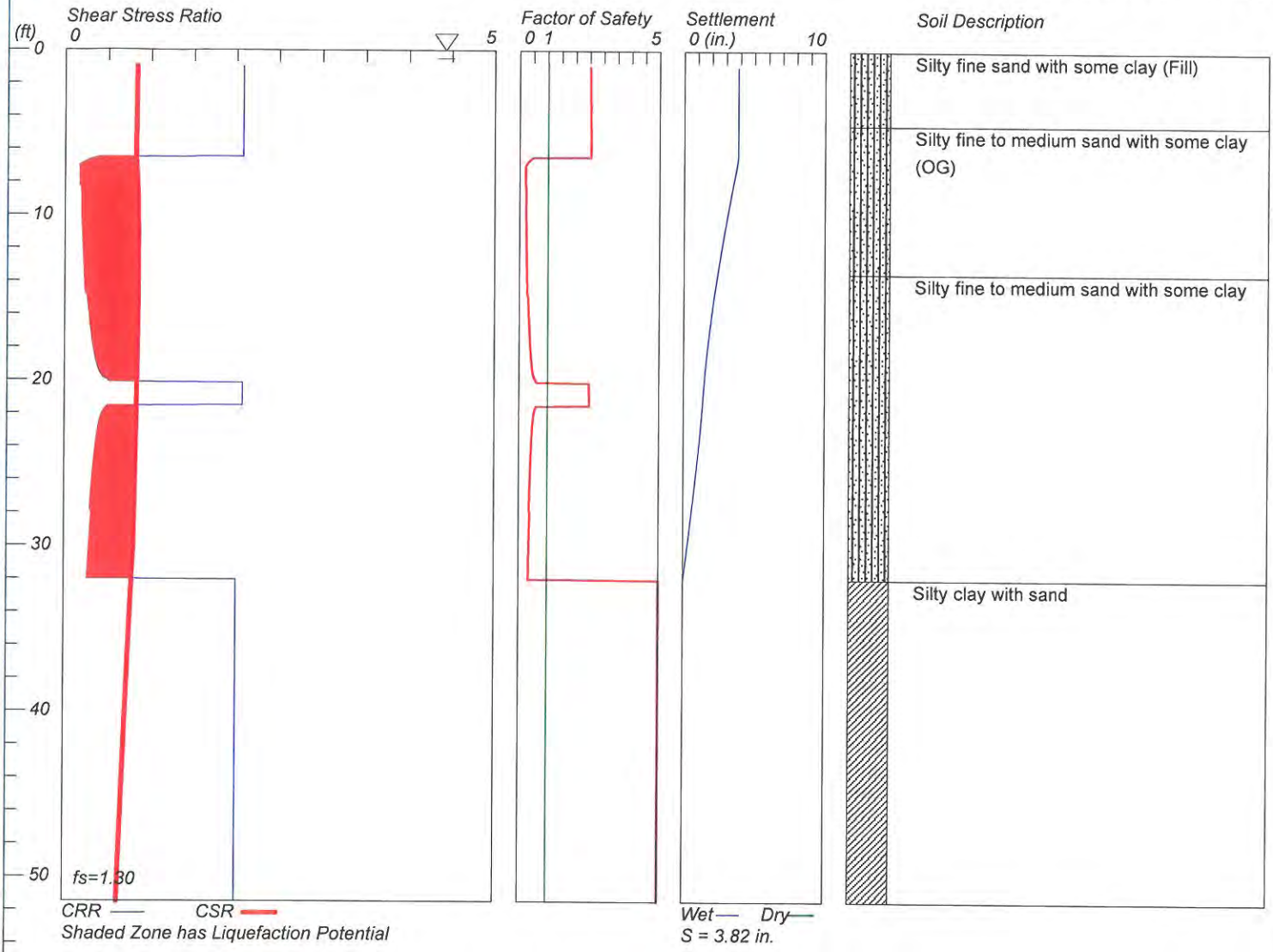
NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

LIQUEFACTION ANALYSIS

Tentative Tract Map No. 33840

Hole No.=B-3 Water Depth=0.0 ft Surface Elev.=1251 feet above MSL Magnitude=7.4
Acceleration=0.51g



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Input File Name: C:\Liquefy4\S-10719.3.liq
Title: Tentative Tract Map No. 33840
Subtitle: S-10719

Surface Elev.=1251 feet above MSL
Hole No.=B-3
Depth of Hole= 51.5 ft
Water Table during Earthquake= 0.0 ft
Water Table during In-Situ Testing= 18.0 ft
Max. Acceleration= 0.51 g
Earthquake Magnitude= 7.4
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1
Sampeling Method, Cs=1
SPT Fines Correction Method: Idriss/Seed (SPT only)
Settlement Analysis Method: Tokimatsu / Seed
Fines Correction for Liquefaction: Idriss/Seed (SPT only)
Fine Correction for Settlement: During Liq. Correction
Average Input Data: Smooth*
* Recommended Options

Input Data:

Depth ft	SPT	Gamma pcf	Fines %
1.0	30.0	130.0	25.0
3.0	30.0	130.0	25.0
6.0	30.0	130.0	25.0
7.0	8.0	112.5	30.0
10.0	10.0	117.1	30.0
15.0	16.0	121.3	30.0
20.0	25.0	124.9	30.0
35.0	18.0	138.1	NoLiq
40.0	28.0	138.1	NoLiq
45.0	31.0	138.1	NoLiq

Output Results:
Settlement of saturated sands=3.82 in.
Settlement of dry sands=0.00 in.
Total settlement of saturated and dry sands=3.82 in.
Differential Settlement=1.910 to 2.521 in.

Depth ft	CRRm	CSRfs w/fs	F.S.	S_sat. in.	S_dry in.	S_all in.
1.00	2.07	0.83	2.50	3.82	0.00	3.82
6.00	2.07	0.82	2.53	3.82	0.00	3.82
11.00	0.20	0.85	0.24*	2.87	0.00	2.87
16.00	0.28	0.84	0.34*	1.98	0.00	1.98
21.00	2.07	0.83	2.49	1.40	0.00	1.40

26.00	0.32	0.82	0.40*	0.85	0.00	0.85
31.00	0.28	0.79	0.35*	0.16	0.00	0.16
36.00	2.00	0.75	5.00	0.00	0.00	0.00
41.00	2.00	0.71	5.00	0.00	0.00	0.00
46.00	2.00	0.67	5.00	0.00	0.00	0.00
51.00	2.00	0.63	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

CRRm	Cyclic resistance ratio from soils
CSRfs	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
S_sat	Settlement from saturated sands
S_dry	Settlement from dry sands
S_all	Total settlement from saturated and dry sands
NoLiq	No-Liquefy Soils

****

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Input File Name: C:\Liquefy4\S-10719.3.liq
Title: Tentative Tract Map No. 33840
Subtitle: S-10719

Input Data:

Surface Elev.=1251 feet above MSL
Hole No.=B-3
Depth of Hole=51.5 ft
Water Table during Earthquake= 0.0 ft
Water Table during In-Situ Testing= 18.0 ft
Max. Acceleration=0.51 g
Earthquake Magnitude=7.4
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1
Sampeling Method, Cs=1
SPT Fines Correction Method: Idriss/Seed (SPT only)
Settlement Analysis Method: Tokimatsu / Seed
Fines Correction for Liquefaction: Idriss/Seed (SPT only)
Fine Correction for Settlement: During Liq. Correction
Average Input Data: Smooth*
* Recommended Options

Depth ft	SPT	Gamma pcf	Fines %
1.0	30.0	130.0	25.0
3.0	30.0	130.0	25.0
6.0	30.0	130.0	25.0
7.0	8.0	112.5	30.0
10.0	10.0	117.1	30.0
15.0	16.0	121.3	30.0
20.0	25.0	124.9	30.0
35.0	18.0	138.1	NoLiq
40.0	28.0	138.1	NoLiq
45.0	31.0	138.1	NoLiq

Output Results: (Interval = 5.00 ft)

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	fs (user)	CSRfs w/fs
1.00	130.0	0.065	67.6	0.034	1.00	0.64	1.3	0.83
6.00	130.0	0.390	67.6	0.203	0.99	0.63	1.3	0.82
11.00	117.9	0.682	55.5	0.339	0.97	0.65	1.3	0.85
16.00	122.0	0.982	59.6	0.483	0.96	0.65	1.3	0.84
21.00	125.8	1.291	63.4	0.636	0.95	0.64	1.3	0.83
26.00	130.2	1.611	67.8	0.800	0.94	0.63	1.3	0.82

31.00	134.6	1.942	72.2	0.975	0.92	0.61	1.3	0.79
36.00	138.1	2.284	75.7	1.161	0.88	0.57	1.3	0.75
41.00	138.1	2.629	75.7	1.350	0.84	0.54	1.3	0.71
46.00	138.1	2.974	75.7	1.539	0.80	0.51	1.3	0.67
51.00	138.1	3.320	75.7	1.728	0.76	0.48	1.3	0.63

CSR is based on water table at 0.0 during earthquake

CRR Calculation from SPT or BPT data:

Depth ft	SPT	Cebs	Cr	sigma'	Cn	(N1)60	Fines %	d(N1)60	(N1)60f	CRR7.5
1.00	30.00	1.00	0.75	0.065	1.70	46.94	25.0	8.69	46.94	2.00
6.00	30.00	1.00	0.75	0.390	1.60	44.46	25.0	8.43	44.46	2.00
11.00	11.20	1.00	0.85	0.682	1.21	18.02	30.0	6.49	18.02	0.19
16.00	17.80	1.00	0.95	0.982	1.01	24.41	30.0	7.34	24.41	0.27
21.00	24.53	1.00	0.95	1.198	0.91	30.41	34.7	9.11	30.41	2.00
26.00	22.20	1.00	0.95	1.362	0.86	26.69	58.4	8.61	26.69	0.31
31.00	19.87	1.00	1.00	1.536	0.81	24.23	82.1	8.21	24.23	0.27
36.00	20.00	1.00	1.00	1.722	0.76	23.29	NoLiq	8.05	23.29	0.26
41.00	28.60	1.00	1.00	1.911	0.72	29.82	NoLiq	9.14	29.82	0.43
46.00	31.00	1.00	1.00	2.101	0.69	30.67	NoLiq	9.28	30.67	2.00
51.00	31.00	1.00	1.00	2.290	0.66	29.58	NoLiq	9.10	29.58	0.41

CRR is based on water table at 18.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.4:

Depth ft	sigC' tsf	CRR7.5 tsf	Ksigma	CRRv	MSF	CRRm	CSRfs w/fs	F.S. CRRm/CSRfs
1.00	0.04	2.00	1.00	2.00	1.03	2.07	0.83	2.50
6.00	0.25	2.00	1.00	2.00	1.03	2.07	0.82	2.53
11.00	0.44	0.19	1.00	0.19	1.03	0.20	0.85	0.24 *
16.00	0.64	0.27	1.00	0.27	1.03	0.28	0.84	0.34 *
21.00	0.78	2.00	1.00	2.00	1.03	2.07	0.83	2.49
26.00	0.89	0.31	1.00	0.31	1.03	0.32	0.82	0.40 *
31.00	1.00	0.27	1.00	0.27	1.03	0.28	0.79	0.35 *
36.00	1.12	0.26	0.99	0.25	1.03	2.00	0.75	5.00
41.00	1.24	0.43	0.97	0.42	1.03	2.00	0.71	5.00
46.00	1.37	2.00	0.95	1.90	1.03	2.00	0.67	5.00
51.00	1.49	0.41	0.93	0.38	1.03	2.00	0.63	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:
Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
1.00	-	-	-	46.94	25.0	0.00	46.94
6.00	-	-	-	44.46	25.0	0.00	44.46
11.00	-	-	-	18.02	30.0	0.00	18.02
16.00	-	-	-	24.41	30.0	0.00	24.41
21.00	-	-	-	30.41	34.7	0.00	30.41
26.00	-	-	-	26.69	58.4	0.00	26.69
31.00	-	-	-	24.23	82.1	0.00	24.23
36.00	-	-	-	23.29	NoLiq	0.00	23.29
41.00	-	-	-	29.82	NoLiq	0.00	29.82
46.00	-	-	-	30.67	NoLiq	0.00	30.67
51.00	-	-	-	29.58	NoLiq	0.00	29.58

(N1)60 has been fines corrected in liquefaction analysis

Settlement of Saturated Sands:
Settlement Analysis Method: Tokimatsu / Seed

Depth ft	CSRfs w/fs	F.S.	Fines %	(N1)60s	Dr %	ec %	dsz in.	dsv in.	S in.
51.45	0.62	5.00	NoLiq	29.49	88.92	0.814	0.000	0.000	0.000
51.00	0.63	5.00	NoLiq	29.58	89.12	0.803	0.000	0.000	0.000
46.00	0.67	5.00	NoLiq	30.67	91.58	0.665	0.000	0.000	0.000
41.00	0.71	5.00	NoLiq	29.82	89.66	0.772	0.000	0.000	0.000
36.00	0.75	5.00	NoLiq	23.29	76.50	1.297	0.000	0.000	0.000
31.00	0.79	0.35	82.1	24.23	78.26	1.238	0.007	0.159	0.159
26.00	0.82	0.40	58.4	26.69	83.02	1.084	0.007	0.692	0.850
21.00	0.83	2.49	34.7	30.41	90.99	0.697	0.004	0.548	1.398
16.00	0.84	0.34	30.0	24.41	78.59	1.227	0.007	0.583	1.980
11.00	0.85	0.24	30.0	18.02	66.95	1.669	0.010	0.890	2.871
6.00	0.82	2.53	25.0	44.46	100.00	0.000	0.000	0.949	3.819
1.00	0.83	2.50	25.0	46.94	100.00	0.000	0.000	0.000	3.819

Settlement of Saturated Sands=3.819 in.
qc1 and (N1)60 is after fines correction in liquefaction analysis
dsz is per each segment: dz=0.05 ft
dsv is per each print interval: dv=5 ft
S is cumulated settlement at this depth

Settlement of Dry Sands:

Depth ft	sigma' tsf	sigC' tsf	(N1)60s	CSRfs w/fs	Gmax tsf	g*Ge/Gm	g_eff	ec7.5 %	Cec	ec %	dsz in.	dsv in.	S in.

Settlement of Dry Sands=0.000 in.
dsz is per each segment: dz=0.05 ft
dsv is per each print interval: dv=5 ft
S is cumulated settlement at this depth

Total Settlement of Saturated and Dry Sands=3.819 in.
Differential Settlement=1.910 to 2.521 in.

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fc	Friction from CPT testing
Gamma	Total unit weight of soil
Gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CSR	Cyclic stress ratio induced by earthquake

fs	User request factor of safety, apply to CSR
w/fs	With user request factor of safety inside
CSRfs	CSR with User request factor of safety
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksigma
MSF	Magnitude scaling factor for CRR (M=7.5)
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
F.S.	Factor of Safety against liquefaction F.S.=CRRm/CSRfs
Cebs	Energy Ratio, Borehole Dia., and Sample Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after seattlement fines corrections
ec	Volumetric strain for saturated sands
ds	Settlement in each Segment dz
dz	Segment for calculation, dz=0.050 ft
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for dry sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

AKW GEOTECHNICAL

GEOTECHNICAL CONSULTANTS

Project No. M1043-01
June 19, 2013

Mr. Glenn Fraser
John R. Byerly, Inc.
2257 South Lilac Avenue.
Bloomington, California 92316

Subject: ENGINEERING GEOLOGY UPDATE
TENTATIVE TRACT MAP NO. 33840
BETWEEN GRUWELL STREET AND CENTRAL STREET
WILDOMAR, CALIFORNIA

Dear Mr. Fraser:

In accordance with your authorization, we have performed an update of the referenced engineering geology investigation for the proposed residential development. The 3.16-acre property is located southeast of the Murrieta Creek, between Gruwell Street and Central Street, in the city of Wildomar, California. The accompanying update presents results of our review and includes conclusions and recommendations pertaining to the geologic aspects of placing the structure on the site as presently proposed. John R. Byerly, Inc. will be presenting the primary geotechnical report for the subject site. It is our understanding that this engineering geology update will be included as an appendix in your report.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

AKW GEOTECHNICAL

PROFESSIONAL GEOLOGIST
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ENGINEERING GEOLOGY UPDATE

1. PURPOSE AND SCOPE

This report presents review and update of the referenced site reports from a geological perspective. We have evaluated the recent geologic, geomorphic, geophysical, and hydrogeologic data, information, and reports that may have been released or issued subsequent to the original geologic investigations (John R Byerly, 2008; Rasmussen, 2003) and are pertinent to the site.

The primary resource of this update was the previous engineering geology report conducted by John R. Byerly, Inc., dated 2008. To prepare this update we conducted a review of readily available published and unpublished reports, maps and documents pertinent to the proposed site addition issued after the date of the original investigation. A geologic field reconnaissance of the site and the surrounding area was recently performed. Our update included review of digital stereoscopic aerial photography available from Google Earth, Bing 3D, and World Wind of the site and surrounding area.

2. SITE AND PROJECT CONDITIONS

2.1. EXISTING SITE CONDITIONS

The 3.16-acre property is located southeast of the Murrieta Creek, between Gruwell Street and Central Street, in the Wildomar area of Riverside County, California (see *Site Location Map*, Enclosure 1). The coordinates of the site are latitude 33.6022° N and longitude 117.2772° W, utilizing the North American Datum (NAD) from 1983. The site is located in Township T6S, Range R4W, Sections 34 and 35 of the San Bernardino Baseline and Meridian in the Wildomar 7.5 Minute Quadrangle. The current topography of the site is flat to slightly sloping (gradient is less than 1%) towards the southeast (USGS, 2012b; Google Earth 2013). The center of the site lies approximately 1,255 feet above Mean Sea Level (MSL). Based on our review of the referenced geotechnical and geologic reports, the site has had minor earthwork in the past. Approximately 2.5 to 4.5 feet of surficial fill overlying natural alluvium deposits. The alluvium consists of medium dense to dense silty sand and medium stiff silty clay to the maximum depths explored (51.5 feet; Byerly, 2008). We estimate the alluvium corresponds to Site Class D.

2.2. PROPOSED DEVELOPMENT

Although specific plans were not available for our review, we understand the site will be developed with single-family residential structures. The structures are expected to be single-story buildings of wood-frame construction incorporating concrete slab-on-grade floors. The residences will have plan

areas of approximately 2,500 square feet and will exert relatively light foundation loads on the underlying soils. Significant cuts, cut slopes, fills, fill slopes, and/or retaining walls are not proposed with the development of the site based on the existing site topography.

2.3. PREVIOUS INVESTIGATIONS

Our current investigation updates the engineering geology portion of a previous geotechnical report issued by John R. Byerly, Inc. (2008) and an engineering geology issued by Gary S. Rasmussen and Associates (2003). The original geologic reports addressed a gymnasium formerly proposed on the campus. The Byerly report utilized the 2006 ASCE Standard [ASCE/SEI 7-05], including Supplement No. 1 and Errata. The Rasmussen report utilized the 1997 Uniform Building Code (International Conference of Building Officials, 1997). Both reports reviewed the Riverside County General Plan (1976, 1989, 2003). Based on our review of the referenced reports and our knowledge of geotechnical and geologic hazards in the approximate site vicinity, the most significant geological hazard to the site is the potential for ground shaking. To a lesser degree, the potential for surface fault rupture has not been ruled out.

2.4. AERIAL PHOTOGRAPH REVIEW

Stereoscopic aerial photographs of the site and vicinity dated 1938, 1962, 1964, 1974, 1978, 1979, 1980, 1983, 1990, 2000 and 2005 were reviewed for the original investigations. As part of our review process, we have also reviewed these photographs and agree with the observations presented in the referenced reports. In addition, three-dimensional computer-aided photography flown between 1994 and 2012 and presented by Google Earth (Google, 2013) was reviewed for this update.

3. GEOLOGIC HAZARDS

3.1. GEOLOGY

The site is located in a northwest-trending graben referred to collectively as the Elsinore Trough. Mann (1955) provided data that the bedrock is down dropped 3,500 feet (1,100 meters) across the basin bounding faults. The Elsinore Trough is made up of several poorly delineated geomorphic sections, including the Temescal, Elsinore, Wildomar, Murrieta, Temecula, and Wolf Valleys. The site is situated in the Wildomar Valley portion of the Trough. The Elsinore Trough forms a transitional zone between the Santa Ana and Elsinore Mountains on the southwest, and the Perris Block on the northeast. The Elsinore Trough may represent a nascent, failed spreading center of a proto-San Andreas transform fault, similar to the Salton Trough. Or the trough may represent older Miocene-age detachment faulting, possibly related to extensional tectonics similar to detachment faults found under the Los Angeles Basin and San Gabriel Mountains, and along the flanks of the

Santa Rosa Mountains. The current transtensional tectonic regime appears to be considerably younger than the trough geomorphology, and may be taking advantage of the pre-existing weakness in the lithospheric crust.

The site was previously mapped as alluvium of Holocene age by Engel (1959), Rogers (1966), Kennedy (1977), Jennings (1977), Greenwood and Morton (1991), and Morton (1999). Weber (1977) mapped the Holocene age alluvium within the incised drainage of Murrieta Creek along the northeast boundary of the site. Weber (1977) chose to combine the alluvium on the remainder of the site, showing it as Quaternary in age (Rasmussen, 2003). More recent geologic mapping of the area by Morton (1999, 2004) and Morton and Miller (2006) determined the alluvium on and around the site to be Holocene in age. Based on exploratory soil test borings previously placed on the site by our firm, surficial materials on the site include artificial fill 2.5 to 4.5 feet thick. Older alluvium underlies the site at depths of 4.5 to 51.5 feet in the previous soil test borings placed on the site. The alluvial soils consisted of medium dense to dense silty sand and medium stiff silty clay. These materials are expected to be Pleistocene in age based on soil development, density, geomorphology, and previous geologic mapping in the area.

The alluvial materials on the site are considered to be medium dense to dense soils to a depth of at least 100 feet (30 meters). The 2010 CBC Table 1613A.5.2 labeled these materials as a "stiff soil profile" equivalent to Site Class D. However, ground water was encountered at a depth of 18 feet below the ground surface; therefore, at least a portion of the soil column may be considered susceptible to liquefaction and dry settlement from a geologic perspective, and would correspond to Site Class F on Table 1613.5.2 of the 2010 California Building Code (California Building Standards Commission, 2010). The density of the older alluvium on the site does suggest that the potential for liquefaction is low.

3.2. FAULTING

Based on our review of the referenced reports and our knowledge of geotechnical and geologic hazards in the site vicinity, the most significant geological hazard to the site is the potential for faulting and ground shaking. The site is not located within an Alquist-Priolo Earthquake Fault Zone [AP EFZ] (Bryant and Hart, 2007). The closest AP EFZ is located approximately 1,000 feet (324 meters) northeast of the site, associated with the Wildomar branch of the Elsinore fault zone (California Division of Mines and Geology, 1980; Bryant and Hart, 2007).

Rasmussen (2003) provided a good description of the seismic setting and seismic history of the site and vicinity. That report indicated that the closest known important faults to the site are the Wildomar, Willard, and Glen Ivy North branches of the Temecula Segment of the Elsinore fault zone. The Wildomar fault is located approximately 1,500 feet (485 meters) northeast of the site (Weber,

1976, 1977; Kennedy, 1977; Jennings, 1975, 1992, 1994). The Willard fault is located approximately 2,000 feet (650 meters) southwest of the site (Weber, 1976, 1977). A subsurface investigation by Rasmussen encountered active faulting northeast of the Temecula Valley Freeway (I-15) and assigned this faulting to the Glen Ivy North fault. Therefore, the Glen Ivy North fault is located approximately 1 mile (1.5 kilometers) northeast of the site.

John R. Byerly, Inc.'s (2008) review of the aerial photographs and computer-aided digital photography identified several northwest trending tonal and topographic lineaments located in the vicinity of the site. Rasmussen (2003) identified two north-northwest-trending tonal lineaments located approximately 200 to 500 feet southeast of the site. They also spotted a northwest-trending lineament south of the site and west of Murrieta Creek. Several east-trending lineaments project out from the alluvial fans at the toe of the Elsinore Mountains, with the closest of these being located approximately 1,000 feet northwest of the site (Rasmussen, 2003). All of the lineaments reported by Rasmussen were considered to represent faulting, with some considered to represent potentially active faulting. None of the lineaments observed were expected to cross the site (Rasmussen, 2003).

The following recommendations were presented in John R. Byerly, Inc.'s (2008) review. "*Northwest-trending tonal and topographic lineaments in the vicinity of the site may be related to faulting. No evidence for active faulting was observed on the site on the aerial photographs reviewed associated with this update. However, Kennedy (1977) and Greenwood and Morton (1991) indicated that Murrieta Creek formerly traversed portions of the site prior to channelization of the natural creek bed into a flood control channel. Although active faulting is not expected to be a potential hazard to the proposed residences on the site during the lifetime of the structures, modification of the former ground surface by grading of the channel and filling on the site may have obscured surficial evidence of faulting on and around the site. Due to the nearby active Wildomar fault and associated AP EFZ, the presence of nearby older faults and suspicious lineaments, location of the site within a fault graben (the Elsinore Trough), and burial of the former natural ground surface by significant quantities of fill, grading of the site should be evaluated by geologic in-grading inspections to verify that active faults do not cross the site.*" We agree with Byerly's assessment and we also recommend that in-grading inspections are necessary to verify that active faults do not cross the site.

3.3. EARTHQUAKE HISTORY

At least two large earthquakes have occurred within 25 miles of the site during historic time. The epicenter of the 1910 MW 6.0 Temescal Valley earthquake is located approximately 15 miles northwest of the site and the epicenter of the 1918 MW 6.9 San Jacinto earthquake is located approximately 19 miles northeast of the site (Goter 1988, 1992; Goter et al., 1994). Both of these earthquakes are expected to have strongly affected the site. Rasmussen (2003) provided a discussion

of the historic earthquakes with respect to the site. No large earthquakes have occurred on or near the site since the date of the Byerly report (U.S. Geological Survey, 2013).

4. GROUND MOTION

At the request of the engineering design team, a ground motion hazard analysis as prescribed by Section 1614A.1.2 (2b) of the 2010 CBC and described in Section 21.2 of ASCE 7-05 (American Society of Civil Engineers, 2006) was conducted for the site. With the recent publication and adoption of ASCE 7-10 (American Society of Civil Engineers, 2011), and the pending publication 2013 California Build Code (scheduled for release on July 1, 2013, pending adoption date: January 1, 2014) imminent building code changes will affect the proposed development. It is the responsibility of the project structural engineer to decide which building standard will be used. The reviewing agency (City of Wildomar) will decide which building standard will be accepted as part of their review process. We recommend that the design team review the proposed construction schedule and use the appropriate building standard. If ASCE 7-10 and CBC 2013 standards are required for project structural design, please contact our office and we can supply the new design parameters.

The site coordinates input to the USGS program are 33.6022°N and 117.2772°W, NAD 1983. The ground motion hazard analysis utilizes the probabilistic Maximum Considered Earthquake (MCE) 5 percent damped acceleration response spectrum having a 2 percent probability of exceedance within a 50 year time period. Our probabilistic ground motion hazard analysis used the U.S. Geological Survey (2011) "Seismic Design Values for Buildings" website and the program "Seismic Hazard Curves and Uniform Hazard Response Spectra, version 5.1.0," to calculate the probabilistic response spectra for the site. The site coordinates used as input to the program are latitude 33.6022° N and longitude 117.2772° W, utilizing the North American Datum (NAD) from 1983.

The mapped MCE ground motion parameter, S_S, is the 5 percent damped spectral response acceleration at a short (0.2 second) period. The mapped MCE ground motion parameter, S_1, is the 5 percent damped spectral response acceleration at the 1.0-second period. The probabilistic S_S, determined from Figure 1613.5 (3) of the 2010 CBC and the U.S. Geological Survey website (2011), yielded a value higher than the deterministic S_S, derived from the attenuation relationships of Boore *et al.* (1997), as compiled by Sewell (2001). Therefore, the deterministically derived value of S_S was used to determine S_{MS}, in accordance with Chapter 21.2.3 of ASCE 7-05 (American Society of Civil Engineers, 2006). The deterministic S_S yielded a spectral acceleration of 1.924 g.

The deterministically generated moderately long period acceleration, S_1, yielded a value <u>greater</u> than the probabilistically determined value for S_1. Therefore, the final S_1 for the site is the

probabilistically determined 0.715 g from Figure 1613.5 (4) of the 2010 CBC, based on site coordinates of Latitude +33.6022° (north) and Longitude -117.2772° (west) using the U.S. Geological Survey website (2011). Therefore, S_1 is less than 0.75 g.

The parameters used to calculate the deterministic S_S included a distance to the Wildomar branch of the Elsinore fault zone of 0.485 km (1,500 feet), an M_{MAX} earthquake of M_W 7.4, a strike-slip type of movement for the Wildomar fault, and a shear wave velocity, V_S, of 620 meters per second for rock materials. The deterministic MCE spectral accelerations were calculated at 0.2 second and 1.0 second periods for the characteristic M_{MAX} earthquake expected for the Elsinore fault. The Wildomar branch of the Elsinore fault zone would be expected to produce the largest ground shaking at the site due to the proximity of the fault to the site and the M_{MAX} earthquake expected for the fault.

S_1 for the site is 0.715 g. The proposed structures on the site are anticipated to belong to Occupancy Category II, as defined by Table 1604.5 of the 2010 CBC. Since S_1 is less than 0.75 g and the anticipated Occupancy Category would be II for the proposed buildings, the proposed structures on the site would be assigned to Seismic Design Category D, per 2010 CBC Section 1613A.5.6.

The adjusted (site-modified or site-specific) MCE 5 percent damped spectral response acceleration parameter for short periods is S_{MS} and for the 1.0 second period is S_{M1} (American Society of Civil Engineers, 2006). To determine the site-modified MCE spectral response acceleration parameters, the MCE ground motion parameters determined above are multiplied by site coefficients, Fa and Fv, derived from the Site Class. Fa is defined as the short-period site coefficient at a period of 0.2 second and Fv is defined as the site coefficient at a period of 1.0 second (American Society of Civil Engineers, 2006). Based on a preliminary determination of Site Class D for the site, Fa = 1.0 and Fv = 1.5 from Tables 1613.5.3 (1) and 1613.5.3 (2) of the 2010 CBC, respectively. Using the S_S for the site of 1.924 g, S_{MS} would be S_S x Fa which equals 1.924 g x 1.0, or 1.924 g. Using the probabilistically determined S_1 for the site of 0.715g, S_{M1} is S_1 x Fv which equals 0.715 g x 1.5, or 1.073 g.

The Design, 5 percent damped, spectral response acceleration parameter at a short period of 0.2 second is labeled S_{DS} and the Design spectral response parameter at a 1.0 second period is referred to as S_{D1}. S_{DS} is defined as 2/3 of S_{MS} and S_{D1} is defined as 2/3 of S_{M1} (American Society of Civil Engineers, 2006). S_{DS} would equal 2/3 x 1.924 g, or 1.283 g. S_{D1} would equal 2/3 x 1.073 g, or 0.715 g.

The Long-period Transition Period, T_L, for the site is 8 seconds, as shown on Figure 22-15 of ASCE 7-05 (American Society of Civil Engineers, 2006).

The probabilistic Maximum Considered Earthquake (MCE) ground motions are the spectral response accelerations at 5 percent critical damping having a 2 percent probability of exceedance within a 50 year time period, as presented on Figures 1613.5 (1), (2), (3), and (4) of the 2010 California Building Code. The MCE ground motions can also be considered to represent a 10 percent probability of exceedance in 250 years, and are expected to occur on average once every 2,500 years. The MCE and site-modified MCE ground motions replace the former Upper Bound Earthquake (UBE) ground motions presented in previous California Building Codes. The former UBE ground motion represented a 10 percent chance of exceedance in a 100 year time period, which was equivalent to a 1,000-year recurrence interval. The probabilistic Design earthquake spectral response accelerations are calculated as two-thirds of the site-modified MCE ground motions per Section 21.3 of ASCE 7-05. The Design earthquake ground motions are considered to be approximately equivalent to the former Design Basis Earthquake (DBE) ground motions used in previous CBCs (Anne Rosinski, California Geological Survey, Presentation to the California Geotechnical Engineers Association, September, 2007 and written communication, December, 2007; David Baska, Terracon, Presentation to the California Geotechnical Engineers Association, June, 2007). The former DBE ground motion represented a 10 percent chance of exceedance in a 50-year time period, or a recurrence interval of 475 years.

The 2010 CBC and CGS Note 48 (California Geological Survey, 2007a) specify that the peak ground acceleration (pga) for the site should be determined by dividing the Design earthquake short period 5 percent damped spectral response acceleration parameter, S_{DS}, by 2.5 based on the 2003 edition of the NEHRP [National Earthquake Hazards Reduction Program] recommended provisions for seismic regulations (Building Seismic Safety Council, 2003). ASCE 7-05, Chapter 11.8.3, incorporated by reference in Section 1802A.2.7 (2) of the 2010 CBC, permits the peak ground acceleration to be generated by dividing the MCE short period 5 percent damped spectral response acceleration parameter, S_S, by 2.5, in lieu of a site-specific study which accounts for soil amplification effects (American Society of Civil Engineers, 2006). Using both of these formulae, the pga for the site is 0.513 g (derived from S_{DS} and Note 48/2010 CBC) or 0.74 g (derived from S_S and ASCE 7-05). Any liquefaction and dry settlement calculations should use a pga of not less than 0.50 g in accordance with the 2010 CBC.

5. GROUNDWATER

The California Geological Survey has not conducted seismic hazards mapping for the Wildomar 7½ minute quadrangle as of the date of this update and, therefore, no Seismic Hazard Liquefaction Zones are shown by the State on the Wildomar quadrangle. Riverside County (1976, 1989) and Toppozada et al. (1993) did not include the site within a potential liquefaction area. However, Riverside County

(2003) did include the site within a Low to Moderate zone of susceptibility for liquefaction due to the presence of shallow ground water.

Ground water measurements for two water wells located within 1/2 mile (3/4 kilometer) of the site (State Well Numbers 6S/4W-34J2 and 34J3) showed the depths to phreatic ground water at those locations as 45 to 47 feet in March 1968 (California Department of Water Resources, 2008). Geotechnical borings excavated by John R. Byerly in (2003) encountered ground water at depths of 18 feet. Rasmussen (2003) commented that the ground water encountered at 18 feet on the site was probably perched. Due to the density of the underlying older alluvium on the site, the potential for liquefaction on the site is considered to be low. Therefore, the soil column on the site would not correspond to Site Class F, even though shallow perched ground water conditions exist on the site. An historic high ground water level coincident with the ground surface on the site should be used if necessary to determine the liquefaction susceptibility of the site.

6. LIQUEFACTION AND LATERAL SPREADING

Lateral spreading occurs when liquefaction affects a confined saturated sand layer at depth beneath a sloping surface. Due to the presence of shallow perched ground water on and near the site, dense natural soils are expected to have a low potential for liquefaction. The northeast boundary of the site is coincident with the southwest edge of Murrieta Creek. Lateral spreading may be a potential hazard to shallow sediments and fill on the site, if these sediments and fill materials are determined to be susceptible to liquefaction. An historic high ground water level coincident with the ground surface on the site should be used if necessary to determine the susceptibility of the site to lateral spread. As a result of changes in the Peak Ground Acceleration values, the liquefaction potential may be affected. The Geotechnical Engineer of Record should confirm whether or not liquefaction settlement potential has changed.

7. LANDSLIDE AND CUT SLOPE STABILITY

The California Geological Survey has not conducted seismic hazards mapping for the Wildomar 7½ minute quadrangle as of the date of this update and, therefore, no Seismic Hazard Earthquake-Induced Landslide Zones are shown by the State on the Wildomar quadrangle. Riverside County (2003) showed the site within an area of slope angles less than 15 percent. The County (2003) did not include the site within an area susceptible to seismically induced landslides or rockfalls. Rasmussen (2003) and John R. Byerly, Inc. (2008) found no evidence for landsliding on or in the immediate vicinity of their site. The current site is relatively flat; therefore, landslides, rockfalls, and rock topples are not considered to be potential hazards to the proposed residences.

8. SUBSIDENCE AND INFLATION

Subsidence refers to the regional topographic lowering of the ground surface. Conversely, inflation refers to the regional topographic rising of the ground surface. Both subsidence and inflation can occur due to tectonic or non-tectonic stress changes. As implied by the name, tectonic subsidence or inflation result from changes in the ground surface due to extension or compression (respectively) associated with tectonic movement of the crust. Non-tectonic subsidence or inflation of the ground surface is commonly associated with the removal or addition (respectively) of fluids from an aquifer (ground water) or a reservoir (oil, gas, steam, etc.). Riverside County (2003) included the site within a Susceptible Area for subsidence and Riverside County (1976, 1989) showed a Subsidence Hazard Management Zone located approximately 6 miles southeast of the site (Rasmussen, 2003).

Subsidence has been a recurring problem in the southwestern U.S. due to the withdrawal of ground water from valley aquifers and the extraction of oil and gas from hydrocarbon reservoirs. Data available from the California Department of Water Resources (1990) and the Western Municipal Water District (2006) suggest that the phreatic ground water level within 0.5 mile of the site has been relatively stable since 1960 (Rasmussen, 2003). However, as municipal growth increases demand for water, ground water levels may decline in the vicinity of the site due to pumping of the ground water for municipal, domestic, industrial, and/or agricultural usage. Future subsidence of the ground surface may be a potential hazard to the proposed residences and to gravity-sensitive infrastructure and utilities during the life of the proposed development.

Tensional and/or differential cracking tends to be concentrated near high-production water wells and along steeply inclined ground water barriers, such as high-angle faults and bedrock contacts. No production water wells are located on or adjacent to the site. Lineaments recognized in the vicinity of the site may represent faults. Although no active faults are known on the site (Rasmussen, 2003), older faults may underlie portions of the site. Therefore, tensional and/or differential cracking of the ground surface may be a potential hazard to the proposed residences if ground water levels decline significantly during the lifetime of the proposed development.

9. FLOODING

The Federal Emergency Management Agency [FEMA] (1996) and Riverside County (2003) indicated that the northeast and southeast portions of the site lie within a 100-year flood plain associated with Murrieta Creek (Rasmussen, 2003). Kennedy (1977) and Greenwood and Morton (1991) mapped a portion of the former drainage of Murrieta Creek crossing portions of the site. The presence of significant quantities of fill found on the site by our soil borings supports this mapping. Channelization of Murrieta Creek is expected to have significantly modified the ground surface and

geomorphology on the site. Rasmussen (2003) recommended that the project engineer evaluate the potential for flooding to affect the site. The site should be evaluated for the potential of flooding by the project engineer.

No water reservoirs were located near or higher than the site at the time of the Rasmussen report (2003). No large water storage tanks were located in the vicinity of the site based on review of Google Earth (Google, 2013), Virtual Earth (2007), and NASA, (2007). The Metropolitan Water District's Diamond Valley Lake (formerly referred to as the Domenigoni or Eastside reservoir) is located approximately 13 miles northeast of, and higher than, the site. Riverside County (2003) identified minimal dam inundation zones below Don Owen, Saddle, and East dams associated with Diamond Valley Lake. The potential dam inundation paths for failure of Don Owen and Saddle dams would follow the existing channel of Salt Creek to Railroad Canyon and Canyon Lake. An evaluation of the potential for seismically induced flooding of the site by failure of Diamond Valley Lake, through Canyon Lake, and into Lake Elsinore falls to the project engineer.

Seasonal flood flows may occasionally emanate from the Sacramento Mountains east of the site during monsoonal events. The incised topography of the piedmont surface in the vicinity of the site suggests that episodic monsoonal flood flows would be intercepted by incised drainages and redirected away from the site. No evidence for flooding was observed on or near the site during the previous field reconnaissance (Byerly, 2010) or on the digital aerial photography reviewed for this investigation. Natural flooding of the site is not expected.

9.1. SEICHES

A seiche is an oscillating body and surface wave that is often generated in open bodies of water, such as lakes and reservoirs, by large earthquakes. Rasmussen (2003) reported that the historic high lake level for Lake Elsinore is located approximately 2 miles northwest of the site. The Metropolitan Water District's Diamond Valley Lake (formerly referred to as the Domenigoni or Eastside reservoir) is located approximately 13 miles northeast of, and higher than, the site. Riverside County (2003) identified minimal dam inundation zones below Don Owen, Saddle, and East dams associated with Diamond Valley Lake. Due to the distances of Lake Elsinore and Diamond Valley Lake from the site, seiche waves that might be generated at either Lake Elsinore or Diamond Valley Lake, as a result of strong ground shaking from a large earthquake, are not expected to affect the site.

9.2. TSUNAMI

A tsunami is a seismically generated ocean wave. Due to the location of the site with respect to the Pacific Ocean, tsunamis are not a hazard to the site.

10. VOLCANIC ACTIVITY

No volcanic rocks are mapped on or near the site. Volcanic activity is not anticipated on or in the vicinity of the site during the lifetime of the proposed residences.

11. CONCLUSIONS AND RECOMMENDATIONS

The 3.16-acre property is located southeast of the Murrieta Creek, between Gruwell Street and Central Street, in the Wildomar area of Riverside County, California. The coordinates of the site are latitude 33.6022° N and longitude 117.2772° W, utilizing the North American Datum (NAD) from 1983. The site is located in Township T6S, Range R4W, Sections 34 and 35 of the San Bernardino Baseline and Meridian in the Wildomar 7.5 Minute Quadrangle.

Approximately 2.5 to 4.5 feet of surficial fill overlying natural alluvium deposits. The alluvium consists of medium dense to dense silty sand and medium stiff silty clay to the maximum depths explored (51.5 feet; Byerly, 2008). We estimate the alluvium corresponds to Site Class D.

The site is not located within an Alquist-Priolo Earthquake Fault Zone [AP EFZ]. The closest AP EFZ is located approximately 1,000 feet (324 meters) northeast of the site, associated with the Wildomar branch of the Elsinore fault zone. The Wildomar fault is located approximately 1,500 feet (485 meters) northeast of the site. The Willard fault is located approximately 2,000 feet (650 meters) southwest of the site. The Glen Ivy North fault is located approximately 1 mile (1.5 kilometers) northeast of the site.

Review of the aerial photographs and computer aided digital photography identified several northwest trending tonal and topographic lineaments located in the vicinity of the site. The previous geologic investigation identified two north-northwest-trending tonal lineaments located approximately 200 to 500 feet southeast of the site, a northwest-trending lineament south of the site and west of Murrieta Creek, and several east-trending lineaments as close as 1,000 feet northwest of the site extending out from the alluvial fans at the toe of the Elsinore Mountains. All of the lineaments reported by Rasmussen were considered to represent faulting, with some considered to represent potentially active faulting. None of the lineaments observed were expected to cross the site (Rasmussen, 2003).

Northwest-trending tonal and topographic lineaments in the vicinity of the site may be related to faulting. No evidence for active faulting was observed on the site on the aerial photographs reviewed

associated with this update. Although active faulting is not expected to be a potential hazard to the proposed residences on the site during the lifetime of the structures, modification of the former ground surface by grading of the channel and filling on the site may have obscured surficial evidence of faulting on and around the site.

Due to the proximity of the site to the active Wildomar and Glen Ivy North branches of the Temecula Segment of the Elsinore fault zone, large and/or damaging earthquakes could occur along these faults during the lifetime of the proposed residences. Cascading rupture of the Temecula Segment of the Elsinore fault zone with adjacent segments (either the Glen Ivy or Julian Segments) may produce an earthquake of M_{MAX} of M_W 7.0 to M_W 7.4.

The mapped MCE ground motion parameter, S_S, is 1.924g. The mapped MCE ground motion parameter, S_1, is 0.715g. The Site Coefficient, Fa, is 1.0, based on S_S greater than 1.25g and Site Class D. The interpolated Site Coefficient, Fv, is 1.5, based on S_1 greater than 0.50g and Site Class D. The Section 11.4.3 Adjusted MCER spectral response acceleration parameter, S_{MS}, is 1.924g. The Section 11.4.3 Adjusted MCER spectral response acceleration parameter, S_{M1}, is 1.073g. Design spectral response acceleration parameter, S_{DS}, is 1.283g and S_{D1}, is 0.715g. The Long-period Transition Period, T_L, is 8 seconds. The Peak Ground Acceleration (PGA) is 0.513g. The proposed structure on the site is expected to belong to Occupancy Category II.

The California Geological Survey has not conducted seismic hazards mapping for the Wildomar 7½ minute quadrangle as of the date of this update and, therefore, no Seismic Hazard Earthquake-Induced Landslide Zones are shown by the State on the Wildomar quadrangle. Riverside County (2003) showed the site within an area of slope angles less than 15 percent. The County (2003) did not include the site within an area susceptible to seismically induced landslides or rockfalls. The site is relatively flat; therefore, landslides, rockfalls, and rock topples are not considered to be potential hazards to the proposed residences.

Ground water measurements for two water wells located within 1/2 mile (3/4 kilometer) of the site showed the depths to phreatic ground water at those locations as 45 to 47 feet in March 1968. Geotechnical borings excavated by John R. Byerly in (2003) encountered ground water at depths of 18 feet. Previous site reports (Rasmussen, 2003; Byerly, 2003) indicated the ground water on the site to be perched. Due to the density of the underlying older alluvium on the site, the potential for liquefaction on the site is considered to be low. Therefore, the soil column on the site would not correspond to Site Class F, even though shallow perched ground water conditions exist on the site.

The northeast boundary of the site is coincident with the southwest edge of Murrieta Creek. Lateral spreading may be a potential hazard to shallow sediments and fill on the site, if these sediments and fill materials are determined to be susceptible to liquefaction.

Riverside County (2003) included the site within a Susceptible Area for subsidence and Riverside County (1976, 1989) showed a Subsidence Hazard Management Zone located approximately 6 miles southeast of the site.

Data suggest that the phreatic ground water level within 0.5 mile of the site has been relatively stable since 1960. However, as municipal growth increases demand for water, ground water levels may decline in the vicinity of the site due to pumping of the ground water for municipal, domestic, industrial, and/or agricultural usage. Future subsidence of the ground surface may be a potential hazard to the proposed residences and to gravity-sensitive infrastructure and utilities during the life of the proposed development.

Lineaments recognized in the vicinity of the site may represent faults. Although no active faults are known on the site, older faults may underlie portions of the site. Therefore, tensional and/or differential cracking of the ground surface may be a potential hazard to the proposed residences if ground water levels decline significantly during the lifetime of the proposed development.

Due to the density of the underlying natural materials, differential and/or tensional cracking of the ground surface is not expected to be a potential hazard to the proposed structure.

The Federal Emergency Management Agency [FEMA] (2008) Flood Insurance Rate Map did not show the site located within a Special Flood Hazard Area Inundated by 100-Year Flood flows. The site is located at an elevation of 585 feet MSL, approximately 45 feet higher than the flood plain of the Colorado River. The river is located about 1,500 feet (757 meters) east and northeast of the site. The closest 100-year flood plain is located approximately 700 feet (215 meters) northwest of the site (FEMA, 2008). Seasonal flood flows may occasionally emanate from the Sacramento Mountains east of the site during monsoonal events. The incised topography of the piedmont surface in the vicinity of the site suggests that episodic monsoonal flood flows would be intercepted by incised drainages and redirected away from the site. No evidence for flooding was observed on or near the site during the previous field reconnaissance (Byerly, 2010) or on the digital aerial photography reviewed for this investigation. Natural flooding of the site is not expected.

Seiches are not considered to be a potential hazard to the proposed development.

Due to the location of the site with respect to the Pacific Ocean, tsunamis are not a hazard to the site.

Volcanic activity is not anticipated on or in the vicinity of the site during the lifetime of the proposed residences.

The grading plan for the proposed residences should be reviewed and approved by the engineering geologist before initiating grading on the site.

The engineering geologist should be included at the pre-grade meeting at the site.

Grading of the site, particularly the exposure of natural materials prior to placing fills, should be observed by the engineering geologist to verify that the actual subsurface conditions concur with the anticipated conditions.

APPENDIX A
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N

NO SCALE

SOURCE: 2012 USGS 7.5 MINUTE SERIES
TOPOGRAPHIC MAP
WILDOMAR QUADRANGLE
RIVERSIDE COUNTY, CALIFORNIA

AKW GEOTECHNICAL

P.O. BOX 891173, TEMECULA, CA 92589
PHONE (951) 265-9849

EWR	DATE 6-19-2013

SITE LOCATION MAP

TENTATIVE TRACT
MAP NO. 33840
WILDOMAR, CALIFORNIA

PROJECT NO. M1043-01	ENCLOSURE 1

HEI Corporation

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Costa Mesa, CA 92627

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May 15, 2013

Mr. Michael L. Lozano
Project Engineer
John R. Byerly Incorporated
2257 South Lilac Avenue
Bloomington, CA 92316

Re: Phase 1 Environmental Site Assessment
3.16 Acre Parcel of Land
Northwest of Central Street and Southeast of Gruwell Street
Wildomar, California

Dear Mr. Lozano:

Enclosed is the Environmental Site Assessment report on the 3.16 acre parcel of land to the northwest of Central Street and to the southeast of Gruwell Street in the unincorporated area Wildomar in Riverside County, California. All of the agencies responded to our requests for information, with the exception of the Riverside County Department of Environmental Health. Information obtained in the process of completing this assessment does not indicate the presence of recognized environmental conditions.

HEI Corporation appreciates this opportunity to be of service to you and to John R. Byerly Incorporated. If you have any questions regarding this report, don't hesitate to contact me at chayden@heicorporation.com or at 949-645-5326.

Sincerely,

Christopher M. Hayden, EP
President

PHASE 1
ENVIRONMENTAL SITE
ASSESSMENT

3.16 Acre Parcel of Land
Northwest of Central Street and Southeast of Gruwell Street
Wildomar, California

Prepared for

Mr. Michael L. Lozano
John R. Byerly Incorporated

May 2013

Prepared by

HEI Corporation
1805 Peninsula Place
Costa Mesa, CA 92627
949-645-5326

Project 13-3751

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PROFESSIONAL CERTIFICATION

This Phase 1 Environmental Site Assessment (ESA) was conducted consistent with generally accepted environmental consulting practices within the limitations included as Appendix A. The site visits and records reviews were performed by Chris Hayden, EP, consistent with the proposal submitted to John R. Byerly Incorporated (Client). The information contained in this ESA was obtained from personal inspection, from sources deemed to be reliable, and from various government agencies.

PHASE 1
ENVIRONMENTAL SITE
ASSESSMENT

3.16 Acre Parcel of Land
Northwest of Central Street and Southeast of Gruwell Street
Wildomar, California

Project 13-3751

I declare that, to the best of my professional knowledge and belief, I meet the definition of **Environmental Professional** as defined in Section 40 C.F.R. § 312.10(b).

I have the specific qualifications based on education, training and experience to assess a property of the nature, history, and setting of the Subject Property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 C.F.R. § 312.

Christopher M. Hayden
Environmental Professional

1 SUMMARY

This ESA was performed on the 3.16 acre parcel of land on the northwest of Central Street and southeast of Gruwell Street in the unincorporated area of Wildomar, California (hereinafter referred to as the "Subject Property").

After inspecting the Subject Property; reviewing its past uses; observing surrounding properties; searching through the Federal Environmental Protection Agency, State of California, Riverside County records, and from interviews with parties having knowledge of the operations on the Subject Property, it can be concluded that there is no evidence of "recognized environmental conditions", as defined by the ASTM, in connection with the Subject Property. No further action is required at this time.

2 INTRODUCTION

2.1 Purpose

The purpose of this ESA is to identify "recognized environmental conditions" in connection with the Subject Property. The ASTM Standard Practice for Environmental Site Assessments E 1527-05 defines "recognized environmental condition" as "the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of an hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water on the property."

2.2 Scope of Work

As agreed to between HEI Corporation and John R. Byerly Incorporated, the scope of work for this ESA included the following:

- Site Inspection
- Surrounding Property Observation
- Interviews With Individuals Having Knowledge of the Operations on the Subject Property
- Inspect and Photocopy City or County Building Permits
- Inspect and Photocopy County Health Care Agency Files
- State and Federal Regulatory Agency Database Search For Posted Properties Within ASTM Designated Radii of the Subject Property
- Inspect and Photocopy City or County Fire Department Records
- Search for Records of Permits for Underground or Aboveground Storage Tanks
- Inspection of Owner/Operator's Books and Records
- Inspection of Historical Aerial Photographs

- Preparation and Presentation of One Report and One pdf Report

2.3 Limitations and Exceptions of Assessments

This ESA is based upon the information available from a variety of sources and on the inspection of the Subject Property. The ESA was performed in accordance with industry standards and using appropriate methods. It is intended to allow a party to make an informed decision regarding the Subject Property.

HEI Corporation is not responsible or liable for the accuracy of the information provided by others. This ESA is not a guaranty that there is no subsurface contamination, nor can it be warranted that those areas of environmental concern herein noted are the only areas of potential contamination at the Subject Property.

There was no sampling or testing for the possible presence or absence of, nor is any statement made in this ESA regarding the possible presence or absence of any of the following:

1) Asbestos Containing Materials

2) Radon

3) Lead Based Paints

4) Lead in the Drinking Water

5) Vapor Encroachment/Intrusion

2.4 Limiting Conditions

There were no limiting conditions with regard to the ability of HEI Corporation to conduct the property inspection portion of this ESA. Access was made available to all parts of the Subject Property.

2.5 Previous Environmental Site Assessments/Investigations

Neither the Client nor HEI Corporation are aware of any previously conducted Phase 1 Environmental Site Assessments or Environmental Investigations. A geotechnical/geologic report, dated April 8, 2008, was prepared by John R. Byerly Incorporated for Prestige Developers, Inc. This 2008 report stated that a soils investigation report, dated October 28, 2003, was prepared by John R. Byerly Incorporated.

2.6 Data Gaps

Data gaps occur in three areas in this report. In the past uses of the Subject Property section, there are gaps of more than 10 years in the aerial photographs obtained. In the records search section, the file from the County of Riverside Department of Environmental Health has not yet been reviewed. In the interview section, the current owner of the Subject Property was not questioned. These data gaps have not hindered the ability of HEI Corporation to form an opinion or to reach a conclusion as to the environmental condition of the Subject Property.

3 SUBJECT PROPERTY DESCRIPTION AND USE HISTORY

3.1 Site and Improvement Description

The Subject Property consists of a more or less rectangularly shaped, approximately 137,650 square foot (3.16 acre), parcel of land. It has frontage on the northwest side of Central Street and southeast of Gruwell Street. It is located to the northeast of Darby Street and to the southwest of Front Street. Illinois Street is to the northeast. Palomar Street is to the northeast and Grand Avenue is to the southwest. Interstate 15 (the Temecula Valley Freeway) is to the northeast. The Subject Property has not been assigned an address or addresses. The assessor's parcel number is 376-043-027.

The topography for the Subject Property is relatively flat, as is this portion of the Temecula Valley. The elevation range is approximately 1,080 to 1,060 feet above sea level. A small, unnamed creek is shown on the Wildomar USGS Map to cross the Subject Property. The Wildomar Creek is adjoining to the southwest and the Santa Gertrudis Creek is to the southeast. The soil beneath the Subject Property consists of alluvium, comprised of clay, silt, sand and gravel. Information regarding groundwater was obtained from the GeoTracker database maintained by the California State Water Resources Control Board. Information was found on a leaking underground storage tank (LUST) site more than a 0.50 miles to the southeast at 22640 North Bear Creek Drive. In a Case Closure Summary, dated March 29, 1994 and prepared by the Riverside County Department of Environmental Health, groundwater was said to be 6 to 8 feet below ground surface. The direction of groundwater flow was said to be to the southwest. A Geotechnical Report, dated April 8, 2008 and prepared by John R. Byerly Incorporated for Prestige Developers, Inc., stated that free groundwater was encountered at approximately 18 feet below ground surface in three (3) borings drilled on the Subject Property.

Structure There are no structures on the Subject Property.

Parking and Landscaping There is no parking surface on the Subject Property. The vegetation on the Subject Property consists of trees, weedy shrubs and weedy groundcover. The plants are in good condition, and no signs of stressed vegetation were observed. No stained soil was observed on the site.

Utilities The utility service to the properties in the area of the Subject Property is provided by a variety of vendors. Gas is provided by Southern California Gas Corp.; electricity by Southern California Edison; water and sewage treatment by the Eastern Municipal Water District; and trash removal by private vendors.

3.2 Subject Property Use History

The Subject Property is an undeveloped parcel of land.

3.2.1 Past Site Uses

Past uses for the Subject Property were determined by examining aerial photographs dating back to 1938 as obtained from NETR Online and from information obtained with the assistance of the County of Riverside Building & Safety Department.

The aerial photographs from 1938 to 2005 showed the Subject Property to be undeveloped with no evidence of activity observed on the site.

The County of Riverside Transportation and Land Management Agency website is the repository for information pertaining to properties in unincorporated areas of the county. A search of the Subject Property's parcel number indicated that no permits have been issued for the Subject Property. A summary of activities attached to the Subject Property's Assessor's Parcel Number included a geologic review, a habitat assessment and subdivision inquiries.

3.3 Adjoining Properties - Use History

A number of properties adjoin the Subject Property. The current uses are as follows:

Northeast To the northeast is the Murietta Creek Flood Control Channel. To the northeast of the channel, are four (4) single family residences at 21431 to 21462 Front Street.

Southeast To the southeast, across Central Street at 32700 Central Street, is a mobile home which appears to be serving as a family residence.

Southwest To the southwest, at 32713 Central Street, is a mobile home which appears to be serving as a family residence. Also to the southwest, along the northeast side of Darby Street, are mostly residential properties from 31530 to 31350 Darby Street. One parcel was being used for what appeared to be storage of scaffolding. On another parcel, it appeared that motor repair work was being done and a drum of what appeared to be waste oil was observed.

Northwest To the northwest, across Gruwell Street, is an undeveloped parcel of land.

Nothing was observed on the adjoining properties that appeared to be of environmental concern to the Subject Property.

3.3.1 Adjoining Properties - Past Uses

Prior uses for the properties discussed above were determined by examining aerial photographs dating back to 1938 as obtained from NETR Online; and from the Wildomar, California USGS Topographic Map. The photos and map are discussed in Section 3.4 below.

3.4 Historic Aerial Photograph and USGS Map Analysis

Historic aerial photographs are examined in order to determine what may have existed on a site prior to the construction of the existing buildings. The photographs for the Subject Property dating back to 1938 were obtained from NETR Online. The photos are described below.

- A photo taken in **1938** showed the Subject Property and most of the adjoining properties to be undeveloped. Evidence of what may have been agricultural activity was observed in the northwestern portion of the Subject Property. What appeared to be an unused railroad right-of-way was observed to be adjoining along the northeastern side of the site. One of the parcels to the southwest on Darby Street appeared to be developed with a small structure. In the area, few structures were observed, and those were small and appeared to be residences. Most of the land was undeveloped, with some agricultural activity observed to the southeast and southwest. A copy of the photo can be seen as Figure C-1 in Appendix C.

- A photo taken in **1967** showed the Subject Property and the adjoining properties to the northeast, southeast and northwest to be undeveloped, with no evidence of activity observed. Several smaller structures were observed in the adjoining area to the southwest, along the northeast side of Darby Street, that appeared to be residential in use. In the area, few structures were observed, and those were small and appeared to be residences. Most of the land was undeveloped, with some agricultural activity observed to the southeast. A copy of the photo can be seen as Figure C-2 in Appendix C.

- A photograph taken in **1982** showed the Subject Property and the adjoining properties to the northeast, southeast and northwest to be undeveloped, with no evidence of activity observed. Several smaller structures were observed in the adjoining area to the southwest, along the northeast side of Darby Street, that appeared to be residential in use. In the area, structures observed were small and appeared to be residences. A copy of the photo can be seen as Figure C-3 in Appendix C.

- A photograph taken in **2005** showed the Subject Property and the adjoining property tom the northwest to be undeveloped, and no evidence of recent activity was observed. A flood control channel was observed along the northeastern side of the Subject Property, with four larger residential properties observed to the north of the channel. The adjoining property to the southeast was shown to be developed with what appeared to be a residence. Several smaller structures were observed in the adjoining area to the southwest, along the northeast side of Darby Street, that appeared to be residential in use. In the area, most of the land was

observed was observed to be developed with small structures that appeared to be residential in use. A copy of the photo can be seen as Figure C-4 in Appendix C.

USGS Map Analysis The 7.5 Minute United States Geological Service Topographic Map for the immediate area of the Subject Property is named the Wildomar, California map. The map, which was originally laid out in 1997, showed no structures on the Subject Property or on the adjoining properties to the northeast, southeast or northwest. A small creek or a flood control channel was shown to cross along the northeastern side of the Subject Property. Small structures were shown in the adjoining area to the southwest. In the area, structures observed were smaller, indicating residences. The map was photorevised (updated based on a review of aerial photographs) in 2000. The revised map showed no newer structures on the Subject Property, on the adjoining properties or in the area (newer structures are shown in a purple tint on the revised map). No newer industrial buildings were shown in the area. A portion of the Wildomar USGS Map is reproduced as Figure B-1 in Appendix B.

4 RECORDS SEARCH

4.1 Regulatory Agencies Database Search

The following Federal, State of California, Tribal and local government agency databases and sources were searched for postings within designated radii of the Subject Property:

FEDERAL SOURCES

- National Priority List (NPL) Within 1.0 Mile
- Proposed National Priority List (PNPL) Within 1.0 Mile
- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) Within 0.5 Miles
- Federal Facility (Fed Fac) Within 0.5 Miles
- CERCLIS No Further Remedial Action Planned (NFRAP) Within 0.5 Miles
- RCRA Corrective Action (CORRACTS) Within 1.0 Mile
- RCRA Treatment Storage and Disposal Facilities (RCRA-TSDF) Within 0.5 Miles
- RCRA Hazardous Waste Generator (RCRA-LQG; RCRA-SQG; RCRA-CESQG) Within 0.25 Miles
- Federal EPA Engineering Controls/ Institutional Controls (Fed SC/IC) Within 0.5 Miles
- Emergency Response Notification System for Spills (ERNS), Target Property Only
- US Brownfields Within 0.5 Miles

STATE OF CALIFORNIA AND LOCAL GOVERERNMENT SOURCES

- Response Within 1.0 Mile
- Envirostor Within 1.0 Mile

- California/Tribal Landfills and/or Solid Waste (SWF/LF) Within 0.5 Miles
- California/Tribal Spills, Leaks, Investigations and Cleanups (SLIC) Within 0.5 Miles
- California/Tribal Leaking Underground Storage Tanks (LUST) Within 0.5 Miles
- California/Tribal Hazardous Substance Storage Containers (UST/AST) Within 0.25 Miles
- California/Tribal EPA Voluntary Cleanup Program (VCP) Within 0.5 Miles
- Local Landfill and Solid Waste Disposal Sites (Debris Region 9, ODI, WMUDS/SWAT, SWRCY) Within 0.5 Miles
- Local Hazardous Waste and Contaminated Sites (US CDL, Historic Cal-Sites, SCH, Toxic Pts, CDL, US Historic CDL) Within Various Radii
- Local Underground Storage Tanks (CA FID UST, Historic UST, SWEEPS UST) Within 0.25 Miles
- Environmental Liens (LIENS) for Subject Property Only
- Deed Restricted Sites (DEED) Within 0.5 Mile
- Emergency Release Reports (HMIRS, CHMIRS, LDS, MCS) for Subject Property Only

A compilation of the databases is included in Appendix D.

SUBJECT PROPERTY The Subject Property is not posted onto any of the databases.

ADJOINING PROPERTIES None of the adjoining properties are posted onto databases.

NEARBY PROPERTIES No sites within 1/8 of a mile are posted onto databases.

OTHER PROPERTIES Given the fact that the Subject Property is located in a residential area, it is to be expected that few sites will be posted onto databases. In this case, no sites are posted onto databases. There is no known regional groundwater impact in the area.

4.1.2 State of California Department of Oil, Gas and Geothermal Resources (DOGGR)

The State of California Department of Oil, Gas and Geothermal Resources (DOGGR) is the agency that tracks the location and status of all oil wells in the state. The information from the DOGGR has been obtained by Munger Map Book and published. The 1999 edition of the Munger Map Book was examined to determine if any oil wells had been located on the Subject

Property. The area of the Subject Property is not included in the Munger Map Book, indicating that no oil wells have been located in the area.

4.1.3 State of California Department of Toxic Substance Control (DTSC)

The State of California Department of Toxic Substance Control (DTSC) is the agency that tracks sites on which there have been placed deed restrictions and land use restrictions. The DTSC web site for deed restricted sites and for land use restriction sites was searched. The Subject Property address was not included on these lists.

4.2 Regional Source

4.2.1 Regional Water Quality Control Board

The Regional Water Quality Control Board, San Diego Region (SDRWQCB), maintains a list of sites with leaking underground storage tanks (LUST) and sites on which there has been spills, leaks, investigations and cleanup (SLIC). The SDRWQCB's GeoTracker database was searched, and the Subject Property was not found on the LUST list or the SLIC list.

4.3 County Sources

4.3.1 Riverside County Department of Environmental Health (RCDEH)

The Riverside County Department of Environmental Health (RCDEH) is the agency responsible for supervising the remediation of sites impacted by hazardous materials or hazardous wastes; for permitting and inspecting USTs; and for inspecting facilities that use and store hazardous materials and generate hazardous waste. A request was submitted to review any files that may exist for the Subject Property. As of the date of this report, RCDEH has not yet responded. When the RCDEH responds, any file that may exist will be reviewed and information of environmental significance will be communicated to the Client. In that the Subject Property address is not posted onto any of the databases included in Section 4.1 above, it is not likely that this agency would have information of environmental significance.

4.3.2 Riverside County Waste Resources Management District

The Waste Resources Management District (WRMD) deals with solid waste management in the County of Riverside. WRMD compiled a map a inactive landfills in the county. The map does not show any of the inactive landfills to be within one mile of the Subject Property.

4.3.3 Riverside County Transportation & Land Management Agency

The Riverside County Transportation and Land Management Agency website is the repository for information pertaining to properties in unincorporated areas of the county. A search of the Subject Property's parcel number indicated that no permits have been issued for the Subject Property. A

summary of activities attached to the Subject Property's APN included a geologic review, a habitat assessment and subdivision inquiries.

5 SUBJECT PROPERTY INSPECTION

The Subject Property was inspected on May 8, 2013 by Chris Hayden, EP. The purpose of the site visits were to seek out and to report on visible environmental concerns, or to note use and storage of hazardous materials which could affect the environment condition of the Subject Property.

5.1 Use and Storage of Hazardous Materials at the Subject Property

The Subject Property consists of an 3.16 acre parcel of land. On the day of the inspection, no use or storage of hazardous materials were observed. Piles of debris were observed on the southwestern portion of the Subject Property at the northeastern terminus of Elm Street, as can be seen in Photograph 3 in Appendix C. No containers of any type were observed on the day of the inspection. No stained soil was observed.

5.2 Indications of PCBs

There is no indication that polychlorinated biphenyls (PCBs) were used or stored at the Subject Property. No transformers were observed on the site. Transformers in the area would be the property of Southern California Edison.

5.3 Indications of Solid Waste Disposal

Solid wastes are not currently generated on the Subject Property. Solid wastes generated in the area are placed into dumpsters which are provided and serviced by private vendors such as CR&R.

5.4 Indications of Hazardous Waste Disposal

Hazardous wastes are not currently generated on the Subject Property. No documentation was found to indicate that hazardous wastes have been generated on the site in the past.

5.5 Indications of Asbestos Containing Materials

As can be seen in Photographs 1 - 4 in Appendix C, there are no structures on the Subject Property.

6 INTERVIEW

An important part of any Phase 1 is interviews with individuals having knowledge of the facilities and the operations at the property being assessed. For this ESA, there are no facilities and there is no operation on the Subject Property.

7 FINDINGS, OPINIONS AND CONCLUSIONS

Prior to arriving at these conclusions, the following tasks were completed:

- The Subject Property was inspected.
- The surrounding properties were observed.
- Historic aerial photographs were examined.
- Information was requested from various governmental and regulatory agencies for environmental information pertaining to the Subject Property.
- The databases from state and federal regulatory agencies were examined.

Findings included the following:

- The Subject Property was shown to be undeveloped in the aerial photos from 1938
- The Subject Property is not posted onto any of the environmental databases searched in Section 4.1.
- No use or storage of hazardous materials were observed on the site on the day of the inspection.

The Environmental Site Assessment on the 3.16 acre parcel of land located at northwest of Central Street and southeast of Gruwell Street in the unincorporated area of Wildomar in Riverside County, was performed in conformance with the scope and limitations of ASTM Standard Practice. In the opinion of HEI Corporation, this assessment has revealed no evidence of "recognized environmental conditions", as defined by the ASTM, in connection with the Subject Property. Therefore, it can be concluded that no further action is required.

APPENDIX A

LIMITATIONS

LIMITATIONS

The services described in this report were performed consistent with generally accepted consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with the Client. This report is solely for the use and information of the Client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

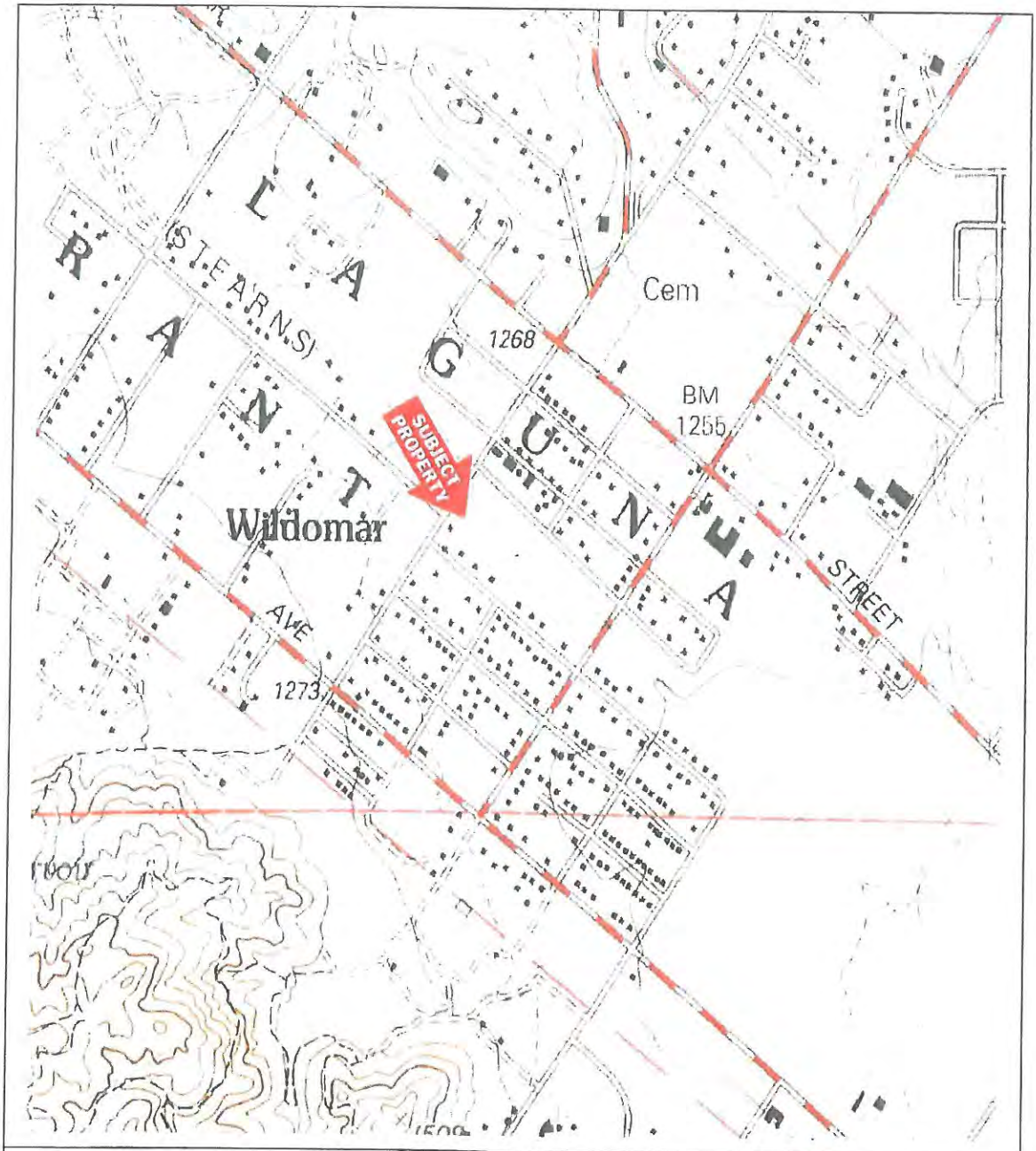
Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the Client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to the performance of services. We do not warrant the accuracy of information supplied by others.

The purpose of an environmental assessment is to reasonable evaluate the potential for or actual impact of past and current practices on the Subject Property. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraph discuss the assumptions and parameters under which such an opinion is rendered.

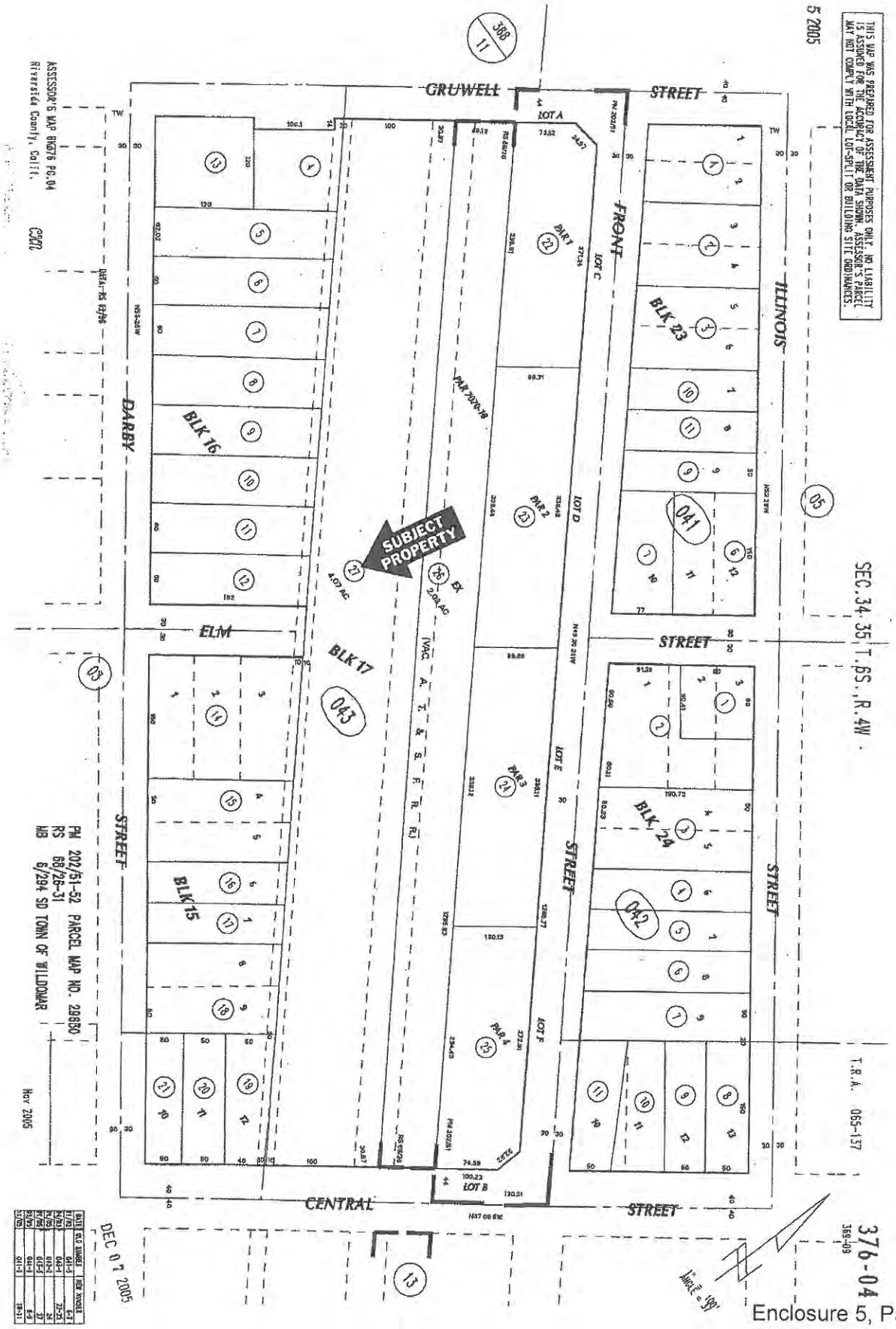
No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the services performed within the scope, limitations, and cost of the work performed. Environmental conditions may exist on the Subject Property that cannot be identified by visual observation.

APPENDIX B

USGS MAP / ASSESSOR'S PARCEL MAP



Hayden Environmental	USGS 7.5 Minute Topographic Map Subject Property: ; Wildomar , California	↑ NORTH
JOB NUMBER: 13-3751	Date: 5/16/13	FIGURE: B-1



Enclosure 5, Page 25
Rpt. No. 1372
File No.: S-10719

APPENDIX C

SUBJECT PROPERTY PHOTOGRAPHS
1938, 1967, 1982 AND 2005 AERIAL PHOTOGRAPHS

PHOTOGRAPHS

1. View of the Subject Property Looking Northwest From Central Street

2. View of the Southeastern Portion of the Subject Property Looking Toward Central Street Showing the Flood Control Channel and Piles of Debris

3. View of the Northwestern Portion of the Subject Property From the Terminus of Elm Street Showing Piles of Debris

4. View of the Subject Property Looking Southeast From Gruwell Street Showing Landscape Debris

Hayden Environmental	1938 AERIAL PHOTOGRAPH Subject Property: 3.19 Acres on Central Street; Wildomar, California	↑ **NORTH**
JOB NUMBER: 13-3751	Date: 5/16/13	FIGURE: C-1

Hayden Environmental	1967 AERIAL PHOTOGRAPH Subject Property: 3.19 Acres on Central Street; Wildomar, California	↑ NORTH
JOB NUMBER: 13-3751	Date: 5/16/13	FIGURE: C-2

Hayden Environmental	1982 AERIAL PHOTOGRAPH Subject Property: 3.19 Acres on Central Street; Wildomar, California	↑ NORTH
JOB NUMBER: 13-3751	Date: 5/16/13	FIGURE: C-3

Hayden Environmental	2005 AERIAL PHOTOGRAPH Subject Property: 3.19 Acres on Central Street; Wildomar, California	↑ NORTH
JOB NUMBER: 13-3751	Date: 5/16/13	FIGURE: C-4

APPENDIX D

REGULATORY AGENCIES DATABASE LISTS

Central Street and Front Street
Central Street and Front Street
Wildomar, CA 92595

Inquiry Number: 03605719.1r
May 14, 2013

FirstSearch Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

TARGET SITE CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	Y	0	0	0	0	0	0	0
NPL Delisted	Y	0	0	0	0	0	0	0
CERCLIS	Y	0	0	0	0	-	0	0
NFRAP	Y	0	0	0	0	-	0	0
RCRA COR ACT	Y	0	0	0	0	0	0	0
RCRA TSD	Y	0	0	0	0	-	0	0
RCRA GEN	Y	0	0	0	-	-	1	1
Federal IC / EC	Y	0	0	0	0	-	0	0
ERNS	Y	0	-	-	-	-	1	1
State/Tribal NPL	Y	0	0	0	0	0	0	0
State/Tribal CERCLIS	Y	0	0	0	0	0	0	0
State/Tribal SWL	Y	0	0	0	0	-	0	0
State/Tribal LTANKS	Y	0	0	0	0	-	0	0
State/Tribal Tanks	Y	0	-	-	-	-	0	0
State/Tribal VCP	Y	0	0	0	0	-	0	0
US Brownfields	Y	0	0	0	0	-	0	0
Other SWF	Y	0	0	0	0	-	0	0
Other Haz Sites	Y	0	-	-	-	-	0	0
Other Tanks	Y	0	0	0	-	-	0	0
Local Land Records	Y	0	-	-	-	-	0	0
Spills	Y	0	-	-	-	-	0	0
Other	Y	0	0	0	-	-	3	3
EDR Exclusive	Y	0	0	0	0	0	0	0
	- Totals --	0	0	0	0	0	5	5

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Search Summary Report

TARGET SITE: CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	02/01/2013	1.000	0	0	0	0	0	0	0
	Proposed NPL	02/01/2013	1.000	0	0	0	0	0	0	0
	NPL LIENS	10/15/1991	TP	0	-	-	-	-	0	0
NPL Delisted	Delisted NPL	02/01/2013	1.000	0	0	0	0	0	0	0
CERCLIS	CERCLIS	02/04/2013	0.500	0	0	0	0	-	0	0
	FEDERAL FACILITY	07/31/2012	0.500	0	0	0	0	-	0	0
NFRAP	CERC-NFRAP	02/05/2013	0.500	0	0	0	0	-	0	0
RCRA COR ACT	CORRACTS	02/12/2013	1.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	02/12/2013	0.500	0	0	0	0	-	0	0
RCRA GEN	RCRA-LQG	02/12/2013	0.250	0	0	0	-	-	1	1
	RCRA-SQG	02/12/2013	0.250	0	0	0	-	-	0	0
	RCRA-CESQG	02/12/2013	0.250	0	0	0	-	-	0	0
Federal IC / EC	US ENG CONTROLS	03/14/2013	0.500	0	0	0	0	-	0	0
	US INST CONTROL	03/14/2013	0.500	0	0	0	0	-	0	0
	LUCIS	12/09/2005	0.500	0	0	0	0	-	0	0
ERNS	ERNS	12/31/2012	TP	0	-	-	-	-	1	1
State/Tribal NPL	RESPONSE	03/13/2013	1.000	0	0	0	0	0	0	0
State/Tribal CERCLIS	ENVIROSTOR	03/13/2013	1.000	0	0	0	0	0	0	0
State/Tribal SWL	SWF/LF	02/18/2013	0.500	0	0	0	0	-	0	0
State/Tribal LTANKS	LUST	03/18/2013	0.500	0	0	0	0	-	0	0
	SLIC	03/18/2013	0.500	0	0	0	0	-	0	0
	INDIAN LUST	09/28/2012	0.500	0	0	0	0	-	0	0
State/Tribal Tanks	UST	03/18/2013	TP	0	-	-	-	-	0	0
	AST	08/01/2009	TP	0	-	-	-	-	0	0
	INDIAN UST	09/28/2012	0.250	0	0	0	-	-	0	0
	FEMA UST	01/01/2010	TP	0	-	-	-	-	0	0
State/Tribal VCP	VCP	03/13/2013	0.500	0	0	0	0	-	0	0

Search Summary Report

TARGET SITE: **CENTRAL STREET AND FRONT STREET**
WILDOMAR, CA 92595

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
	INDIAN VCP	09/28/2012	0.500	0	0	0	0	-	0	0
US Brownfields	US BROWNFIELDS	12/10/2012	0.500	0	0	0	0	-	0	0
Other SWF	ODI	06/30/1985	0.500	0	0	0	0	-	0	0
	DEBRIS REGION 9	01/12/2009	0.500	0	0	0	0	-	0	0
	WMUDS/SWAT	04/01/2000	0.500	0	0	0	0	-	0	0
	SWRCY	03/18/2013	0.500	0	0	0	0	-	0	0
	HAULERS	03/13/2013	TP	0	-	-	-	-	0	0
	INDIAN ODI	12/31/1998	0.500	0	0	0	0	-	0	0
Other Haz Sites	US CDL	03/04/2013	TP	0	-	-	-	-	0	0
	HIST Cal-Sites	08/08/2005	0.125	0	0	-	-	-	0	0
	SCH	03/13/2013	0.250	0	0	0	-	-	0	0
	Toxic Pits	07/01/1995	0.250	0	0	0	-	-	0	0
	CDL	12/31/2012	TP	0	-	-	-	-	0	0
	US HIST CDL	09/01/2007	TP	0	-	-	-	-	0	0
Other Tanks	CA FID UST	10/31/1994	0.250	0	0	0	-	-	0	0
	HIST UST	10/15/1990	0.125	0	0	-	-	-	0	0
	SWEEPS UST	06/01/1994	0.250	0	0	0	-	-	0	0
Local Land Records	LIENS 2	02/06/2013	TP	0	-	-	-	-	0	0
	LIENS	03/15/2013	TP	0	-	-	-	-	0	0
	DEED	03/11/2013	0.500	0	0	0	0	-	0	0
Spills	HMIRS	12/31/2012	TP	0	-	-	-	-	0	0
	CHMIRS	12/06/2012	TP	0	-	-	-	-	0	0
	LDS	03/18/2013	TP	0	-	-	-	-	0	0
	MCS	03/18/2013	TP	0	-	-	-	-	0	0
Other	RCRA NonGen / NLR	02/12/2013	0.250	0	0	0	-	-	0	0
	DOT OPS	07/31/2012	TP	0	-	-	-	-	0	0
	DOD	12/31/2005	1.000	0	0	0	0	0	0	0
	FUDS	12/31/2011	1.000	0	0	0	0	0	0	0
	CONSENT	12/31/2011	1.000	0	0	0	0	0	0	0
	ROD	12/18/2012	1.000	0	0	0	0	0	0	0
	UMTRA	09/14/2010	0.500	0	0	0	0	-	0	0
	US MINES	02/05/2013	0.250	0	0	0	-	-	0	0
	TRIS	12/31/2009	TP	0	-	-	-	-	0	0
	TSCA	12/31/2006	TP	0	-	-	-	-	0	0
	FTTS	04/09/2009	TP	0	-	-	-	-	0	0
	HIST FTTS	10/19/2006	TP	0	-	-	-	-	0	0

Search Summary Report

TARGET SITE: **CENTRAL STREET AND FRONT STREET**
WILDOMAR, CA 92595

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
	SSTS	12/31/2009	TP	0	-	-	-	-	0	0
	ICIS	07/20/2011	TP	0	-	-	-	-	0	0
	PADS	11/01/2012	TP	0	-	-	-	-	0	0
	MLTS	06/21/2011	TP	0	-	-	-	-	0	0
	RADINFO	04/09/2013	TP	0	-	-	-	-	0	0
	FINDS	10/23/2011	TP	0	-	-	-	-	0	0
	RAATS	04/17/1995	TP	0	-	-	-	-	0	0
	RMP	05/08/2012	TP	0	-	-	-	-	0	0
	CA BOND EXP. PLAN	01/01/1989	1.000	0	0	0	0	0	0	0
	UIC	03/05/2013	TP	0	-	-	-	-	0	0
	NPDES	02/18/2013	TP	0	-	-	-	-	3	3
	CUPA Listings		0.125	0	0	-	-	-	0	0
	Notify 65	10/21/1993	0.125	0	0	-	-	-	0	0
	DRYCLEANERS	12/11/2012	TP	0	-	-	-	-	0	0
	WIP	07/03/2009	0.250	0	0	0	-	-	0	0
	ENF	01/08/2013	TP	0	-	-	-	-	0	0
	HAZNET	12/31/2011	TP	0	-	-	-	-	0	0
	EMI	12/31/2008	TP	0	-	-	-	-	0	0
	INDIAN RESERV	12/31/2005	1.000	0	0	0	0	0	0	0
	SCRD DRYCLEANERS	03/07/2011	TP	0	-	-	-	-	0	0
	COAL ASH DOE	12/31/2005	TP	0	-	-	-	-	0	0
	COAL ASH EPA	08/17/2010	0.500	0	0	0	0	-	0	0
	HWT	01/15/2013	0.250	0	0	0	-	-	0	0
	HWP	02/25/2013	1.000	0	0	0	0	0	0	0
	Financial Assurance	03/01/2007	TP	0	-	-	-	-	0	0
	LEAD SMELTERS	01/29/2013	TP	0	-	-	-	-	0	0
	2020 COR ACTION	11/11/2011	0.250	0	0	0	-	-	0	0
	US AIRS	01/23/2013	TP	0	-	-	-	-	0	0
	PRP	12/02/2012	TP	0	-	-	-	-	0	0
	WDS	06/19/2007	TP	0	-	-	-	-	0	0
	EPA WATCH LIST	12/31/2012	TP	0	-	-	-	-	0	0
	US FIN ASSUR	03/04/2013	TP	0	-	-	-	-	0	0
	PCB TRANSFORMER	02/01/2011	TP	0	-	-	-	-	0	0
	PROC	03/18/2013	TP	0	-	-	-	-	0	0
	MWMP	03/06/2013	0.250	0	0	0	-	-	0	0
EDR Exclusive	EDR MGP	08/28/2009	1.000	0	0	0	0	0	0	0
	- Totals --			0	0	0	0	0	5	5

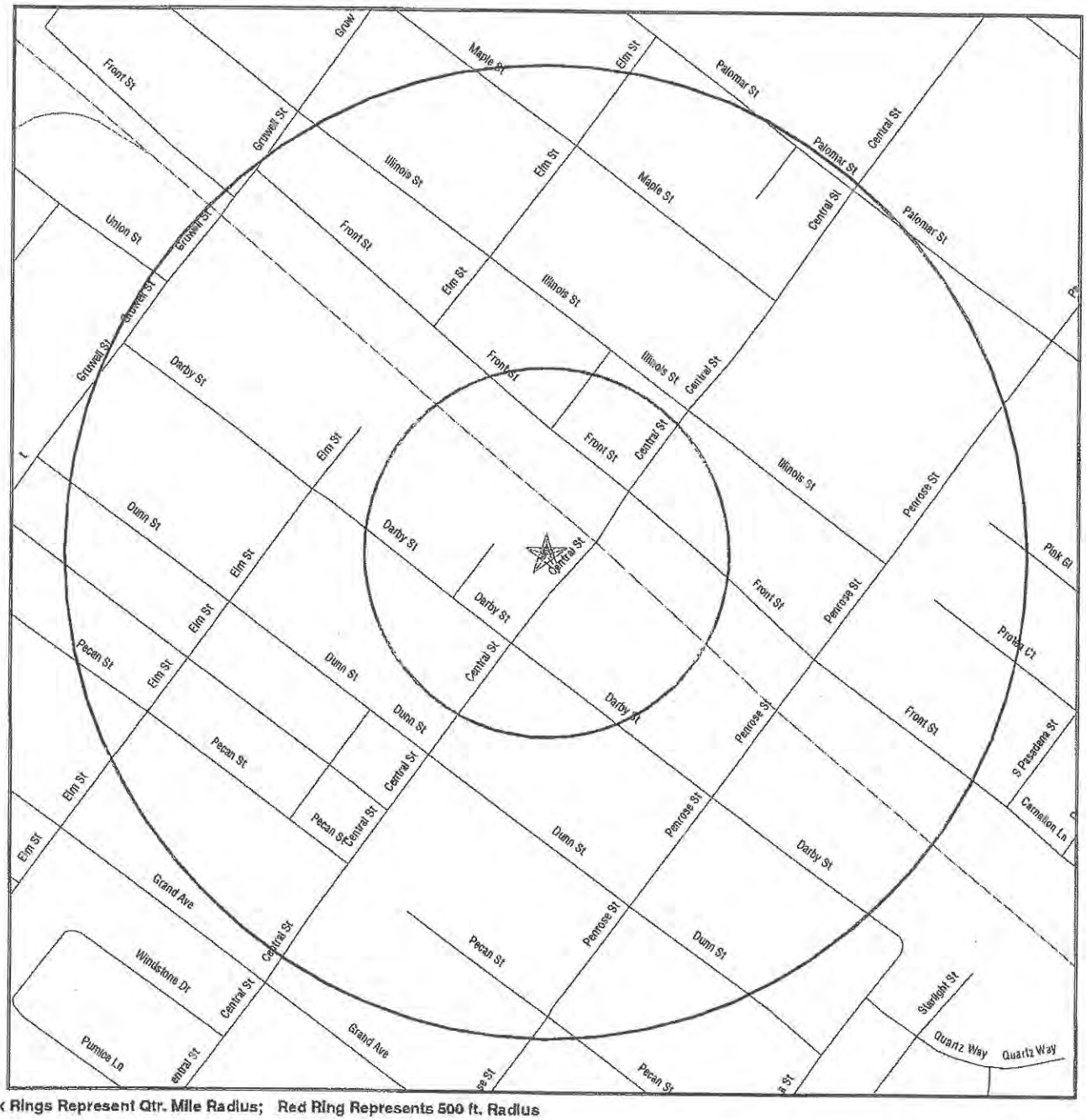
Environmental FirstSearch

0.25 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS

EDR® Environmental Data Resources Inc

CENTRAL STREET AND FRONT STREET WILDOMAR, CA 92595



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 33.601 Longitude: 117.2756)

▲ Identified Sites

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

Areas of Concern

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12-05-2013 10:11:11 Tue

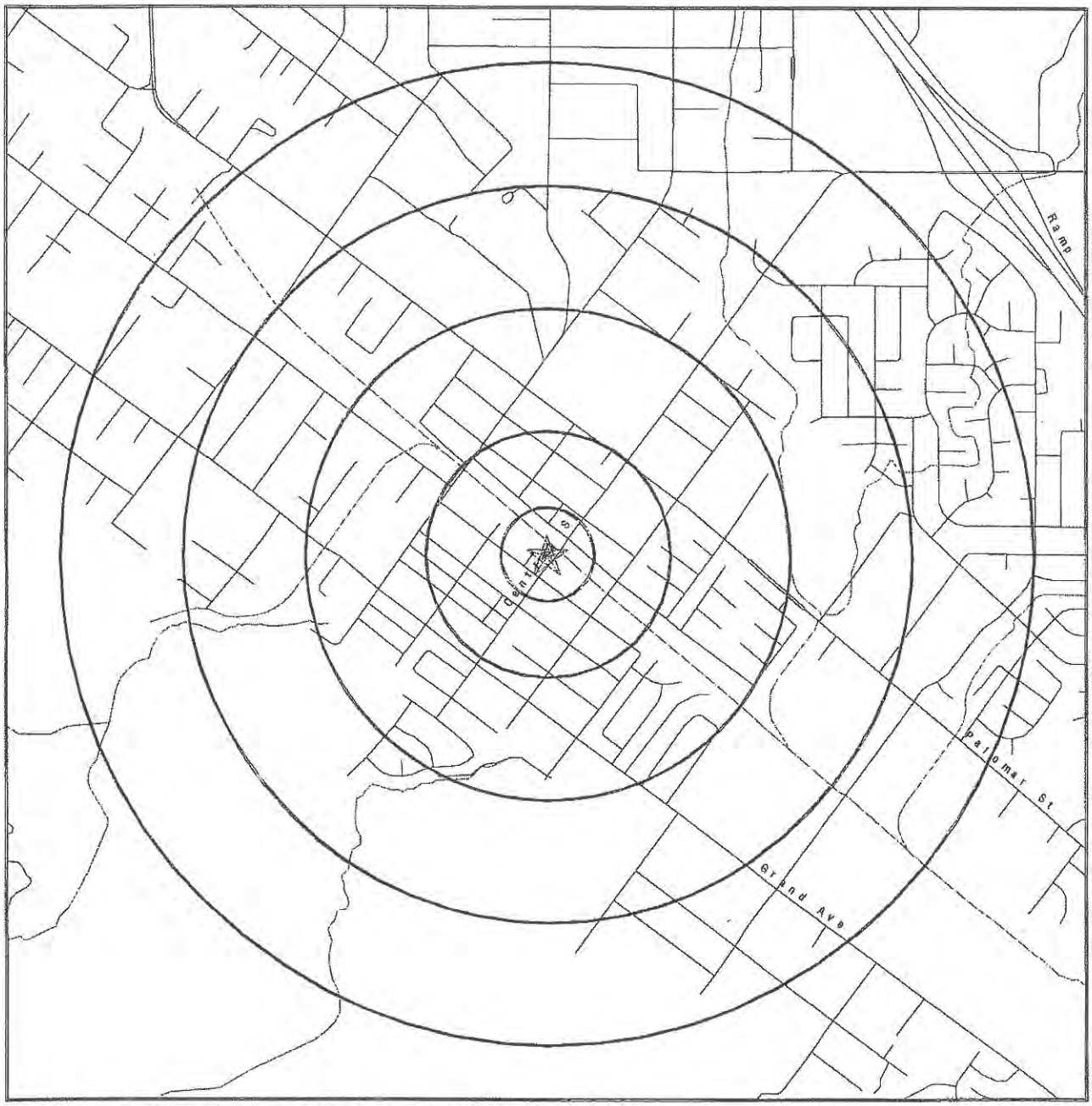
Environmental FirstSearch

1.000 Mile Radius

ASTM MAP: NPL, RCRACOR, STATES Sites

EDR Environmental Data Resources Inc

CENTRAL STREET AND FRONT STREET WILDOMAR, CA 92595



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

* Target Property (Latitude: 33.601 Longitude: 117.2756)

▲ Identified Sites

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

Areas of Concern

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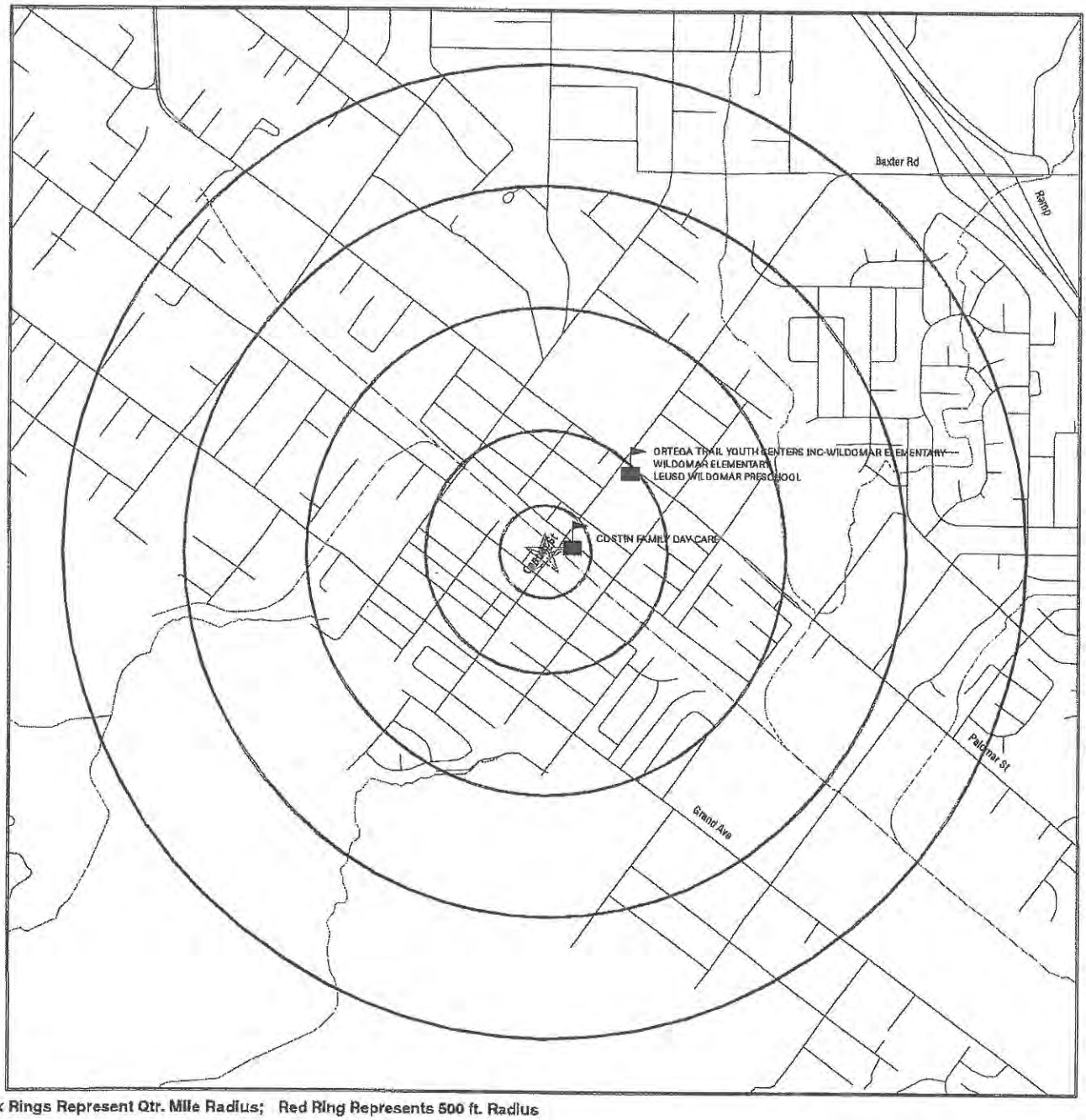
13-05-15 12:59:50 Tue

Environmental FirstSearch

1.000 Mile Radius
Non ASTM Map, Spills, FINDS

EDR Environmental Data Resources Inc

CENTRAL STREET AND FRONT STREET WILDOMAR, CA 92595



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

- ★ Target Property (Latitude: 33.601 Longitude: 117.2756)
- ▲ Identified Sites
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Areas of Concern

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13-06-14 14:01:16 Tue

Environmental FirstSearch

0.500 Mile Radius

ASTM MAP: CERCLIS, RCRATSD, LUST, SWL

EDR® Environmental Data Resources Inc

CENTRAL STREET AND FRONT STREET WILDOMAR, CA 92595

Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 33.601 Longitude: 117.2756)

▲ Identified Sites

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

Areas of Concern

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13-05-14.14:00:20.Tue

RCRA-10719

Site Information Report

Request Date: MAY 14, 2013
Request Name: CHRIS HAYDEN

Search Type: COORD
Job Number: NA

Target Site: CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	117.275600	117.2756000 - 117° 16' 32.16"	Easting:	474429.9
Latitude:	33.601000	33.6010000 - 33° 36' 3.60"	Northing:	3717758.0
Elevation:	1249 ft. above sea level		Zone:	Zone 11

Demographics

Sites: 0 **Non-Geocoded:** 5 **Population:** N/A

RADON:

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

Site Information Report

RADON

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92595	5	0

Target Site Summary Report

Target Property: CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

JOB: NA

TOTAL: 5 GEOCODED: 0 NON GEOCODED: 5

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Sites Summary Report

Target Property: CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

JOB: NA

TOTAL: 5 GEOCODED: 0 NON GEOCODED: 5

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
	NPDES --Terminated	WINCHESTER RD SR 79 STREET IMP	BENTON RD CLINTON KEITH R MURRIETA, CA 92562	NON GC	N/A	N/A
	NPDES --Active	GUAVA STREET IMPROVEMENTS CIP	GUAVA STREET BETWEEN JEFF MURRIETA, CA 92562	NON GC	N/A	N/A
	NPDES --Terminated	FIG STREET CROSSING	NWC JEFFERSON AVE & FIG S MURRIETA, CA 92562	NON GC	N/A	N/A
	ERNS		EAST SIDE OF FILLMORE STR RIVERSIDE COUNTY, CA	NON GC	N/A	N/A
	RCRA-LQG --CAC002612067	RANCHO CALIFORNIA WATER DISTRI	31955 HIGHWAY 79 TEMECULA, CA 92562	NON GC	N/A	N/A

NO SITES FOUND

Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites. NPL LIENS - Federal Superfund Liens.

NPL Delisted: DELISTED NPL 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 NPL - National Priority List Deletions

CERCLIS: CERCLIS CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL. CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System FEDERAL FACILITY - Federal Facility Site Information listing.

NFRAP: CERCLIS-NFRAP Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. 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. CERCLIS-NFRAP - CERCLIS No Further Remedial Action Planned

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-CESQG - RCRA - Conditionally Exempt Small Quantity Generators.

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROL - Sites with Institutional Controls. LUCIS - Land Use Control Information System.

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

Database Descriptions

State/Tribal NPL: RESPONSE Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. RESPONSE - State Response Sites

State/Tribal CERCLIS: ENVIROSTOR The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites. ENVIROSTOR - EnviroStor Database

State/Tribal SWL: SWF/LF (SWIS) Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF (SWIS) - Solid Waste Information System

State/Tribal LTANKS: LUST REG 8 ORANGE CO. LUST - List of Underground Storage Tank Cleanups. LUST REG 1 - Active Toxic Site Investigation. RIVERSIDE CO. LUST - Listing of Underground Tank Cleanup Sites. LUST - Geotracker's Leaking Underground Fuel Tank Report. LUST REG 7 - Leaking Underground Storage Tank Case Listing. LUST REG 3 - Leaking Underground Storage Tank Database. LUST REG 5 - Leaking Underground Storage Tank Database. SONOMA CO. LUST - Leaking Underground Storage Tank Sites. LUST REG 6V - Leaking Underground Storage Tank Case Listing. LUST REG 4 - Underground Storage Tank Leak List. LUST REG 9 - Leaking Underground Storage Tank Report. LUST REG 2 - Fuel Leak List. VENTURA CO. LUST - Listing of Underground Tank Cleanup Sites. LUST REG 6L - Leaking Underground Storage Tank Case Listing. SAN MATEO CO. LUST - Fuel Leak List. LUST SANTA CLARA - LOP Listing. SAN FRANCISCO CO. LUST - Local Oversite Facilities. SOLANO CO. LUST - Leaking Underground Storage Tanks. NAPA CO. LUST - Sites With Reported Contamination. Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties. NAPA CO. LUST - Leaking Underground Storage Tank Database SLIC - Statewide SLIC Cases. SLIC REG 1 - Active Toxic Site Investigations. SLIC REG 2 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 3 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 4 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 5 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6V - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6L - SLIC Sites. SLIC REG 7 - SLIC List. SLIC REG 8 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. Alameda County CS - Contaminated Sites. Sacramento Co. CS - Toxic Site Clean-Up List. SLIC REG 9 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. HIST LUST SANTA CLARA - HIST LUST - Fuel Leak Site Activity Report. SAN DIEGO CO. SAM - Environmental Case Listing. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land.

State/Tribal Tanks: UST Active UST facilities gathered from the local regulatory agencies UST - Active UST Facilities AST - Aboveground Petroleum Storage Tank Facilities. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land. FEMA UST - Underground Storage Tank Listing.

State/Tribal VCP: INDIAN VCP R1 INDIAN VCP R7 - Voluntary Cleanup Priority Lisitng. VCP - Voluntary Cleanup Program Properties. Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. VCP - Voluntary Cleanup Program Properties

Database Descriptions

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: DEBRIS REGION 9 ODI - Open Dump Inventory. An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria. ODI - Open Dump Inventory VENTURA CO. LF - Inventory of Illegal Abandoned and Inactive Sites. SAN DIEGO CO. LF - Solid Waste Facilities. CA LA LF - City of Los Angeles Landfills. LOS ANGELES CO. LF - List of Solid Waste Facilities. WMUDS/SWAT - Waste Management Unit Database. SWRCY - Recycler Database. HAULERS - Registered Waste Tire Haulers Listing. INDIAN ODI - Report on the Status of Open Dumps on Indian Lands.

Other Haz Sites: US CDL A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. US CDL - Clandestine Drug Labs HIST CAL-SITES - Calsites Database. SCH - School Property Evaluation Program. TOXIC PITS - Toxic Pits Cleanup Act Sites. AOCONCERN - San Gabriel Valley Areas of Concern. CDL - Clandestine Drug Labs. SAN DIEGO CO. HMMD - Hazardous Materials Management Division Database. US HIST CDL - National Clandestine Laboratory Register.

Other Tanks: CA FID UST The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data. CA FID UST - Facility Inventory Database ALAMEDA CO. UST - Underground Tanks. KERN CO. UST - Underground Storage Tank Sites & Tank Listing. MARIN CO. UST - Underground Storage Tank Sites. NAPA CO. UST - Closed and Operating Underground Storage Tank Sites. ORANGE CO. UST - List of Underground Storage Tank Facilities. RIVERSIDE CO. UST - Underground Storage Tank Tank List. SAN FRANCISCO CO. UST - Underground Storage Tank Information. SOLANO CO. UST - Underground Storage Tanks. SUTTER CO. UST - Underground Storage Tanks. VENTURA CO. UST - Underground Tank Closed Sites List. YOLO CO. UST - Underground Storage Tank Comprehensive Facility Report. EL SEGUNDO UST - City of El Segundo Underground Storage Tank. LONG BEACH UST - City of Long Beach Underground Storage Tank. UST SAN JOAQUIN - San Joaquin Co. UST. UST MENDOCINO - Mendocino County UST Database. TORRANCE UST - City of Torrance Underground Storage Tank. HIST UST - Hazardous Substance Storage Container Database. SWEEPS UST - SWEEPS UST Listing.

Local Land Records: LIENS 2 A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. LIENS 2 - CERCLA Lien Information LIENS - Environmental Liens Listing. DEED - Deed Restriction Listing.

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System CHMIRS - California Hazardous Material Incident Report System. LDS - Land Disposal Sites Listing. MCS - Military Cleanup Sites Listing. Orange Co. Industrial Site - List of Industrial Site Cleanups.

Database Descriptions

Other: RCRA NonGen / NLR RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste. RCRA NonGen / NLR - RCRA - Non Generators DOT OPS - Incident and Accident Data. DOD - Department of Defense Sites. FUDS - Formerly Used Defense Sites. CONSENT - Superfund (CERCLA) Consent Decrees. ROD - Records Of Decision. UMTRA - Uranium Mill Tailings Sites. US MINES - Mines Master Index File. TRIS - Toxic Chemical Release Inventory System. TSCA - Toxic Substances Control Act. FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). HIST FTTS - FIFRA/TSCA Tracking System Administrative Case Listing. HIST FTTS INSP - FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing. SSTS - Section 7 Tracking Systems. ICIS - Integrated Compliance Information System. PADS - PCB Activity Database System. MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. FINDS - Facility Index System/Facility Registry System. RAATS - RCRA Administrative Action Tracking System. RMP - Risk Management Plans. BRS - Biennial Reporting System. CA BOND EXP. PLAN - Bond Expenditure Plan. UIC - UIC Listing. NPDES - NPDES Permits Listing. CUPA - CUPA Resources List. CUPA IMPERIAL - CUPA Facility List. CUPA MONO - CUPA Facility List. SAN JOSE HAZMAT - Hazardous Material Facilities. CONTRA COSTA CO. SITE LIST - Site List. CUPA SANTA BARBARA - CUPA Facility Listing. CUPA MONTEREY - CUPA Facility Listing. CUPA SANTA CRUZ - CUPA Facility List. CUPA MERCED - CUPA Facility List. CUPA SAN LUIS OBISPO - CUPA Facility List. CUPA SHASTA - CUPA Facility List. CUPA HUMBOLDT - CUPA Facility List. CUPA INYO - CUPA Facility List. CUPA FRESNO - CUPA Resources List. PLACER CO. MS - Master List of Facilities. CUPA DEL NORTE - CUPA Facility List. CUPA SONOMA - Cupa Facility List. CUPA TUOLUMNE - CUPA Facility List. CUPA LAKE - CUPA Facility List. CUPA SANTA CLARA - Cupa Facility List. CUPA CALVERAS - CUPA Facility Listing. CUPA AMADOR - CUPA Facility List. CUPA KINGS - CUPA Facility List. CUPA MADERA - CUPA Facility List. CUPA NEVADA - CUPA Facility List. CUPA BUTTE - CUPA Facility Listing. CUPA COLUSA - CUPA Facility List. CUPA YUBA - CUPA Facility List. CUPA EL DORADO - CUPA Facility List. NOTIFY 65 - Proposition 65 Records. LA Co. Site Mitigation - Site Mitigation List. DRYCLEANERS - Cleaner Facilities. VENTURA CO. BWT - Business Plan, Hazardous Waste Producers, and Operating Underground Tanks. WIP - Well Investigation Program Case List. LOS ANGELES CO. HMS - HMS: Street Number List. ENF - Enforcement Action Listing. San Mateo Co. BI - Business Inventory. Sacramento Co. ML - Master Hazardous Materials Facility List. San Bern. Co. Permit - Hazardous Material Permits. HAZNET - Facility and Manifest Data. EMI - Emissions Inventory Data. INDIAN RESERV - Indian Reservations. SCRD DRYCLEANERS - State Coalition for Remediation of Drycleaners Listing. FEDLAND - Federal and Indian Lands. WDS - Waste Discharge System. LEAD SMELTER 2 - Lead Smelter Sites. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. US FIN ASSUR - Financial Assurance Information. EPA WATCH LIST - EPA WATCH LIST. PRP - Potentially Responsible Parties. 2020 COR ACTION - 2020 Corrective Action Program List. MWMP - Medical Waste Management Program Listing. COAL ASH DOE - Steam-Electric Plan Operation Data. Financial Assurance 1 - Financial Assurance Information Listing. Financial Assurance 2 - Financial Assurance Information Listing. LEAD SMELTER 1 - Lead Smelter Sites. MED WASTE VENTURA - Medical Waste Program List. COAL ASH EPA - Coal Combustion Residues Surface Impoundments List. HWP - EnviroStor Permitted Facilities Listing. HWT - Registered Hazardous Waste Transporter Database. PROC - Certified Processors Database. PCB TRANSFORMER - PCB Transformer Registration Database.

EDR Exclusive: EDR MGP The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination. EDR MGP - EDR Proprietary Manufactured Gas Plants

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Annually

State/Tribal NPL: Department of Toxic Substances Control

Updated Quarterly

State/Tribal CERCLIS: Department of Toxic Substances Control

Updated Quarterly

State/Tribal SWL: Department of Resources Recycling and Recovery

Updated Quarterly

State/Tribal LTANKS: California Regional Water Quality Control Board Victorville Branch Office (6)

No Update Planned

Database Sources

State/Tribal Tanks: SWRCB

Updated Semi-Annually

State/Tribal VCP: Department of Toxic Substances Control

Updated Quarterly

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: EPA, Region 9

No Update Planned

Other Haz Sites: Drug Enforcement Administration

Updated Quarterly

Other Tanks: California Environmental Protection Agency

No Update Planned

Local Land Records: Environmental Protection Agency

Varies

Spills: U.S. Department of Transportation

Updated Annually

Other: Environmental Protection Agency

Varies

EDR Exclusive: EDR, Inc.

No Update Planned

Street Name Report for Streets near the Target Property

Target Property: CENTRAL STREET AND FRONT STREET
WILDOMAR, CA 92595

JOB: NA

Street Name	Dist/Dir	Street Name	Dist/Dir
Alley	0.06 North		
Central St	0.02 SE		
Darby St	0.05 SW		
Driveway	0.21 NNE		
Dunn St	0.12 SW		
Elm St	0.12 WNW		
Front St	0.05 NE		
Gruwell St	0.24 NW		
Illinois St	0.10 NE		
Maple St	0.18 NE		
Palomar St	0.25 NE		
Pecan St	0.19 SW		
Penrose St	0.14 SE		
Pink Ginger Ct	0.23 East		
Protea Ct	0.20 East		
Union St	0.24 NW		

APPENDIX E

STATEMENT OF QUALIFICATIONS FOR HEI CORPORATION

HEI CORPORATION

HEI Corporation or Hayden Environmental was established in 1992 to respond to a need that exists in the environmental industry. There were many outstanding "full service" environmental firms in Southern California. Very few, however, specialized in performing Phase I Environmental Site Assessments (ESA's). For many firms, the ESA was and is approached as a way of positioning themselves to get any additional work recommended therein. This had led many to recognize the inherent conflict of interest that this represents. Hayden Environmental eliminates this potential conflict in that no other environmental services are offered.

Hayden Environmental recognizes the importance of an ESA. The company was formed with the expressed purpose of providing the best, most complete, most thoroughly researched report available. At Hayden Environmental, our fees are always competitive. Also, because we are not in the business of conducting Site Investigations (phase II's) there is no undue incentive to recommend them.

Our assessments are grounded in a solid understanding of the primary function of an ESA. Liability for environmental contamination can be expensive and time consuming in the extreme. While there is no guarantee that it will, an ESA is designed to allow a party coming into possession of real property, either as a tenant, buyer or lender forced to foreclose, to avail themselves of the "innocent landowner" defense. ESA's can also be a very valuable tool for an owner or tenant to establish a baseline condition of a property proper to the commencement of a lease.

Hayden Environmental has researched the law and has a complete understanding of the appropriate inquiry needed to utilize this defense. Additionally, Hayden Environmental adheres to the standards for environmental assessments promulgated by the ASTM Designation E 1527-05.

All Hayden Environmental Phase I assessments will include these five basic components:

- Subject property inspection and surrounding property observation
- Federal and state environmental database review
- County and /or local government record review
- Historical use (aerial photograph, Sanborn maps, archive cross directories) review
- Interviews with the current and former owners and occupants of the subject property

Hayden Environmental is fully insured, with policy coverage of $2,000,000 for Professional Liability and $1,000,000 for General Liability.

CHRISTOPHER M. HAYDEN

Chris Hayden, REA, has been in the environmental field since 1991. He began with a large multinational firm as the regional sales and marketing representative for Western U.S. He dealt primarily with firms in the energy, mining and real estate development fields. Seeking to broaden his "hands on" experience, he began working with a local firm in 1992. While there, he had the opportunity to work on a variety of projects, including environmental site assessments and site investigations. Seeing the need for a firm that specialized in conducting reliable, thorough and reasonably priced environmental site assessments while avoiding potential conflicts of interest, he formed Hayden Environmental in 1992. Hayden, through his years of experience, has earned the designation of Environmental Professional (EP) as defined in Section 40 C.F.R. § 312.10(b).

Mr. Hayden also serves on the ASTM E50 Committee which reviews, revises and enforces the standards for environmental assessments currently promulgated by the ASTM Designation E 1527-05.

Prior to 1991 Hayden had been in the real estate industry for twelve years. He last worked as an industrial real estate broker with Grubb & Ellis in Newport Beach, CA.

Hayden has a Bachelors of Arts in Biology from Humboldt State University in Arcata, California. He has taken several classes in the Environmental Site Investigation and Remediation Certificated program at the University of California at Irvine.

ENVIRONMENTAL COURSES/SEMINARS COMPLETED

40 Hour HazMat Health and Safety Training

ASTM Standards Technology Training in Phase I Site Assessments for Environmental Professionals

Principles of Hazardous Materials Management

Regulatory Framework of Hazardous and Toxic Substances

Groundwater Hydrology: Monitoring, Protection and Clean-up

The Site Investigation and Remedial Feasibility Process

The Site Remediation Process for Hazardous Substance Impacts

Environmental Aspects of Souls Engineering and Geology

Innovative Soils Gas Monitoring and Remediation Applications

A Partial List of Clients Includes:

CLIENT	CLIENT
Commerce National Bank	First California Bank
Bank of America	Comerica Bank
Bank of Internet/Apartmentbank	U. S. Trust Co.
Orange County Business Bank	FDIC as Receiver for 1st Centennial Bank
First Security Bank	Bank of Orange County
Pacific Enterprise Bank	PFF Bank & Trust
Community Bank	Southland EDC
American Security Bank	Wells Fargo
California Bank & Trust	Investment Building Group (IBG)
Farmers & Merchants Trust	Messenger Investment Company
Spectrum Commercial Lending	The Koll Company
City National Bank	Steadfast Companies
Palm Desert National Bank	Shaw Properties
1st Capital Bank	Rexco Real Estate Development
California Statewide CDC	Cardinal Development Company
First American Bank	Lord Constructors
Hamni Bank	Caribou Industries
First Foundation Bank	Western National Realty Advisors
Sun Country Bank	Sares-Regis Group
Union Bank of California	Gilmore Associates
Bank of China	Aardex Corporation
Foothill Independent Bank	Arlen Capital
Dynex Financial, Inc.	Martin Building Company
Silvergate Bank	NPL Construction Co.
Finova Corporation	Carmenita Investment Properties
ARCS Commercial Mortgage	The Davidson Group
GE Financial Corporation	National Golf Properties
Sanwa Bank	Nextel Communications
BBVA Compass	Coca Cola Enterprises
First Union Small Business Capital	General Telephone Company
California Republic Bank	Intuit
Bank One	Rockwell International
Sun Life of America	Pacific Sales
Kansas City Life Insurance	University of Southern California
City of Los Angeles CRA	Pepperdine University

REFERENCES

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OP ID: MT

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/26/12

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Van Oppen & Co. 2, Inc.
P.O. Box 793
Teton Village, WY 83025
Phone: 800-746-0048
Fax: 303-232-6738

CONTACT NAME: Marlyse Taylor
PHONE (A/C, No, Ext): 800-746-0048 FAX (A/C, No): 303-232-6738
E-MAIL ADDRESS: service@vanoppenco2.com
PRODUCER CUSTOMER ID #: HEICO-1

INSURED
HEI Corporation
1805 Peninsula Pl
Costa Mesa, CA 92627

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Westchester Surplus Lines	10172
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X CPL GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC			G24331337 001	11/04/12	11/04/14	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS			G24331337 001	11/04/12	11/04/14	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DEDUCTIBLE RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $
A	Professional Liab "Claims Made"			G24331337 001 SUBJECT TO GL AGGREGATE	11/04/12	11/04/14	EachClaim Aggregate	1,000,000 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

General Info

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

F. van Oppen

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APPENDIX 7: PRELIMINARY HYDROLOGY STUDY

PRELIMINARY
HYDROLOGY STUDY

FOR

TR 33840

CITY OF WILDOMAR

PREPARED BY

RDS And Associates

Civil Engineering
Project Management
Construction Management

RICH SOLTYSIAK

RCE NO. 37233

MAY 7, 2013

30519 Wailea Court **Temecula, California 92592** **(951) 691-7706**

I. BACKGROUND

TR 33840 proposes to subdivide 4.07 acres into 15 residential lots under R-1 Zoning requirements. The project site is located in the City of Wildomar and bordered by Wildomar Channel to the northeast, Gruwell Street to the nortwest, Central Street to the southeast, and existing homes to the southwest. The site is presently zoned rural residential, vacant, and unimproved.

Existing Drainage

The project site is currently vacant, unimproved, and covered with natural vegetation. The site drains by overland flow generally from the northeast border of Gruwell Street to the southwest to Central Street. Central Street in turn drains directly into Wildomar Channel. For information purposes, the existing drainage flows discharged off site for the undeveloped condition was calculated to be 3.5 cfs and 6.1 cfs for the 10-year and 100-year storms respectively.

Proposed Drainage

The storm run off from the developed residential site will be directed to the proposed internal private street, "A" Street. "A" Street will convey flows via rolled curb and gutter southwesterly to the cul-de-sac adjacent to Central Street. Flows within the cul-de-sac will be directed to a low point fronting lot 15 adjacent to the property line with lot 14. The low point within Street "A" will be conveyed thorough a vegetated swale BMP within lot 15. The filtered flows from the vegetated swale will then outlet to Wildomar Channel via a grated inlet and 24" RCP. The existing drainage flows discharged into Wildomar Channel for the developed condition was calculated to be 5.3 cfs and 8.7 cfs for the 10-year and 100-year storms respectively.

Private Street "A", the vegetated swale, and the outlet to Wildomar Channel will be owned and maintained by the projects Home Owner Association.

Drainage from the Project will be discharged directly to a publicly-owned, operated and maintained MS4; the discharge will be in full compliance with Riverside County Flood Control requirements for connections and discharges to the MS4; the discharge will not significantly impact stream habitat in proximate; and the discharge will be authorized by

the Flood Control District via encroachment permit. Therefore detention of the developed flows versus existing flows will not be required by the Riverside County Flood Control District as part of this project.

II. PURPOSE OF STUDY

This hydrology report is intended to support the approval of TR 33840 from a drainage perspective.

III. METHODOLOGY

The hydrology report incorporates a CivilCADD/Civil Design Computer Program based on the Riverside County Flood Control and Water Conservation Rational Method Hydrology. This computer program requires input data for rainfall, soil type, type of development, and topographic data for the study area.
The Riverside County Flood Control District Hydrology Manual establishes drainage criteria as follows and as depicted in the attached exhibit:

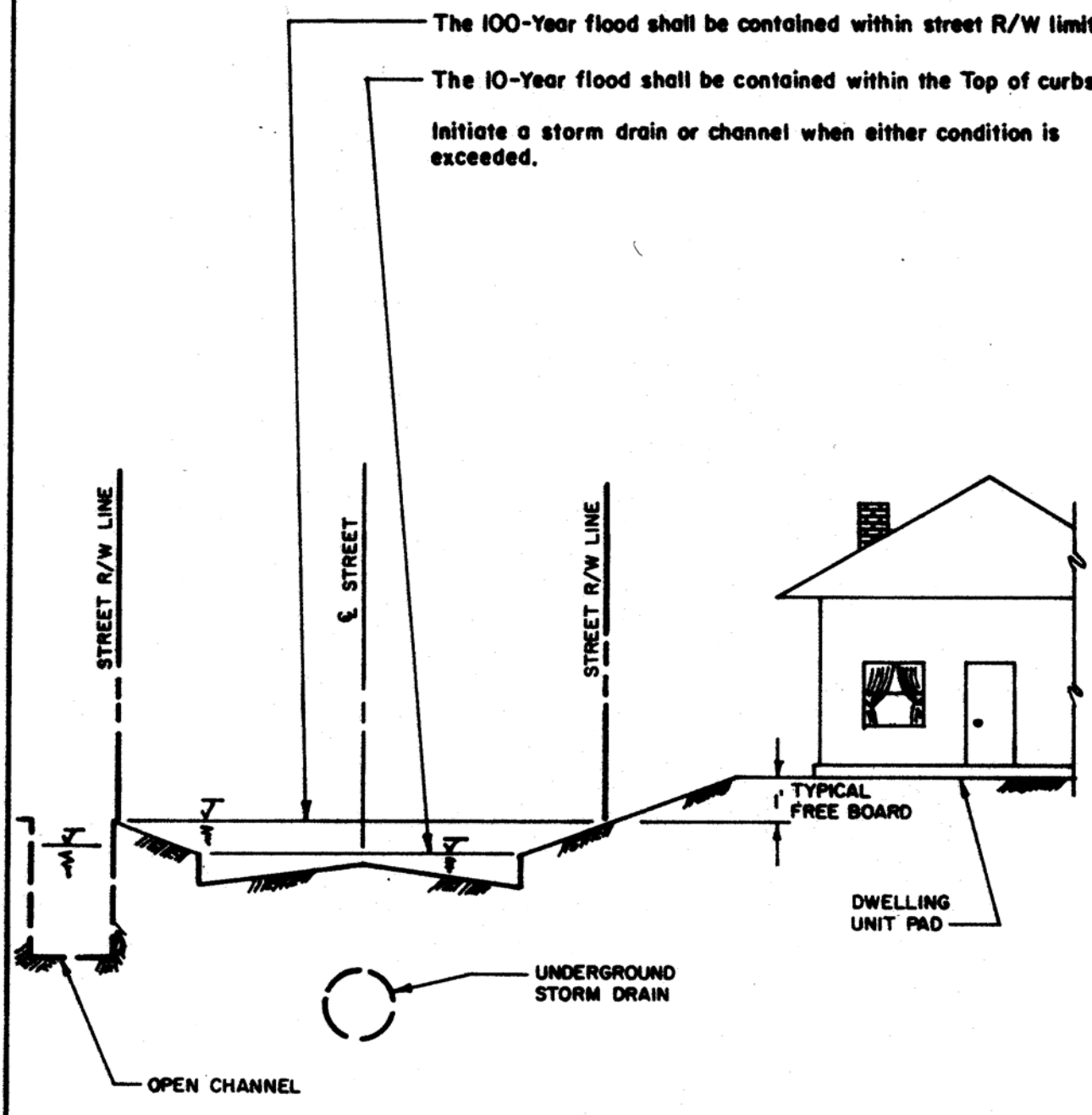
- 10-yr storm to be contained in curb and gutter.
- 100-yr storm to be contained within road right-of way

Rainfall Data: Standard intensity-duration curve data generated from Plate D-4.1 of the Riverside County Flood Control and Water Conservation Rational Hydrology Manual for the Lake Elsinore-Wildomar area was used.

Soil Type Data: The soil type was obtained from the Hydrologic Soils Group Map within the Riverside County Flood Control and Water Conservation Rational Hydrology Manual. A copy of this map (Plate 1.51) is included within this report. The soil type obtained from the Hydrologic Soils Group Map was determined to be type B.

Type of Development: The project site is planned for R-1 residential development. Therefore the hydrology report incorporates factors that generate discharges representing single family residential type development.

Topographic Data: The Hydrology Map, Exhibit defines the subareas and contains information used as the basis of generating the project hydrology study.



NOTES:

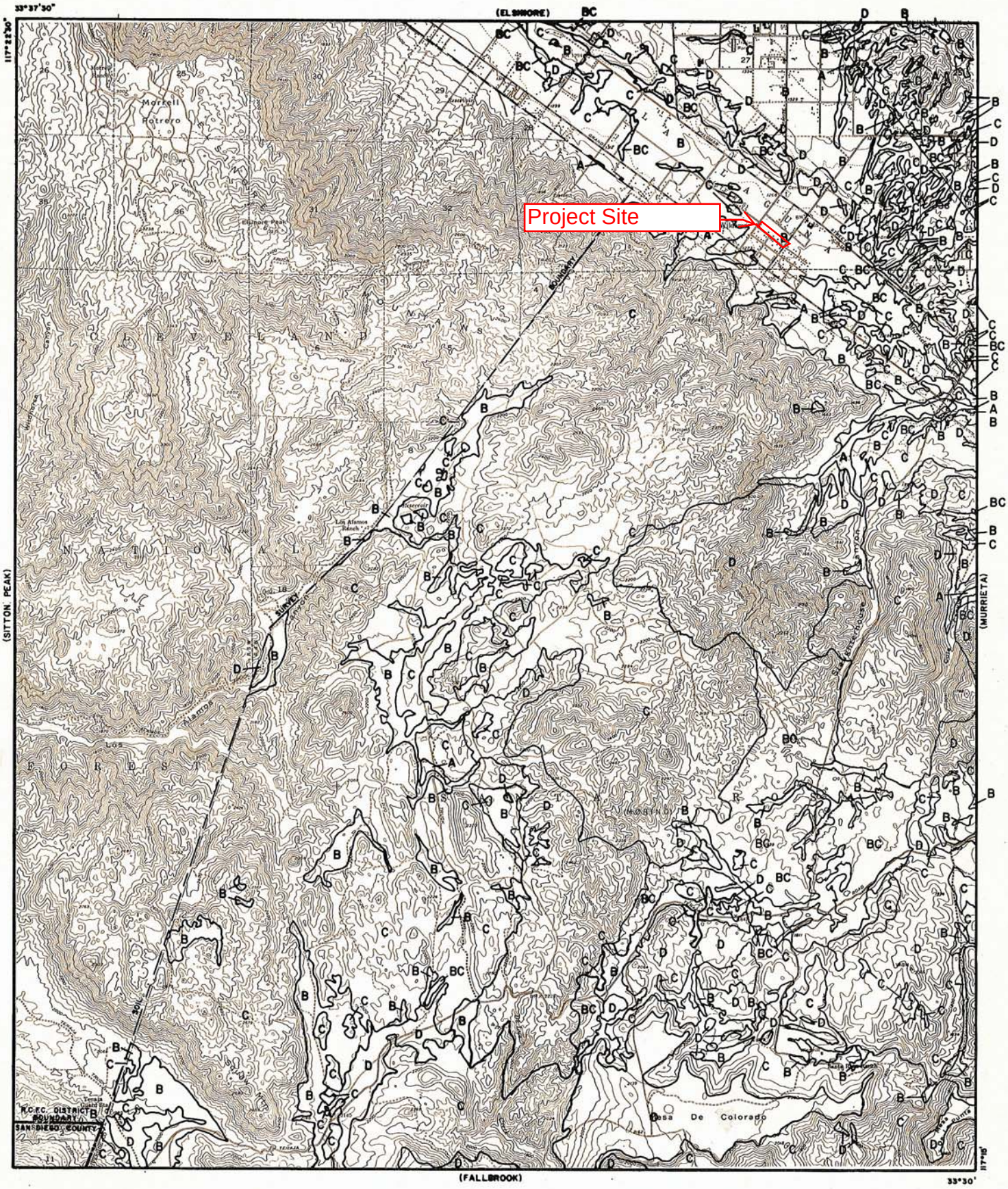
Protection criteria shown are the Districts typical minimum requirments. Special conditions, or other authorities may require stricter controls; ie; for reasons of traffic or pedestrian safety, maintenance problems behind curbs, etc., lower maximum depths of flow in streets may be required. Also see Riv. Co. Ord. No. 460.

RCFC & WCD

HYDROLOGY MANUAL

FLOOD PROTECTION CRITERIA

PLATE A-2



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

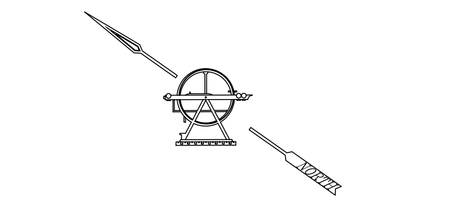
N

0 FEET 5000

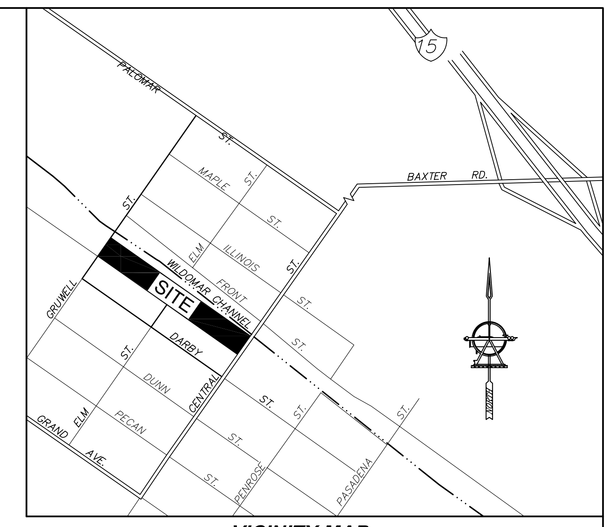
HYDROLOGIC SOILS GROUP MAP FOR WILDOMAR

PLATE C-1.51

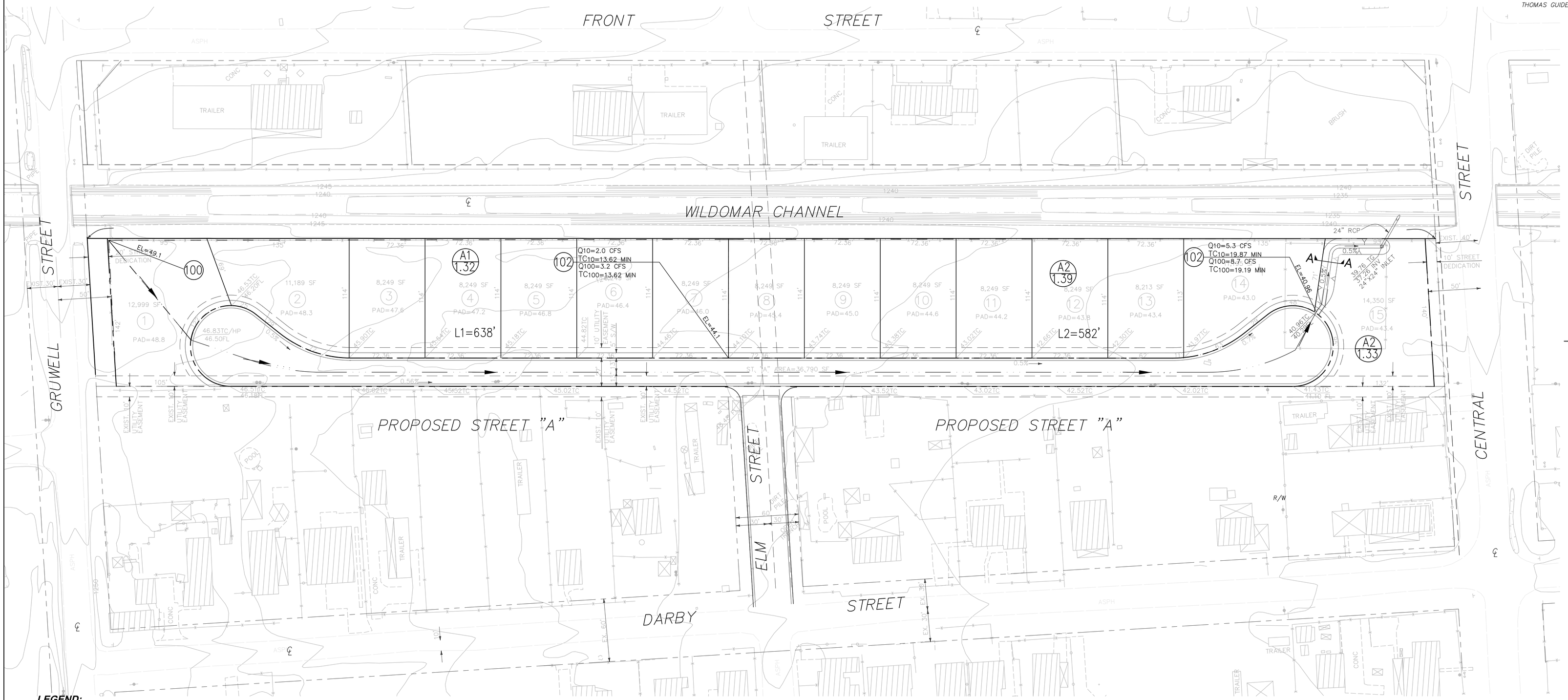
TENTATIVE TRACT MAP NO. 33840
HYDROLOGY MAP



GRAPHIC SCALE
1"=40'



VICINITY MAP:
NO SCALE
RIVERSIDE & ORANGE COUNTY
THOMAS GUIDE 2006 PAGE 897, B-7

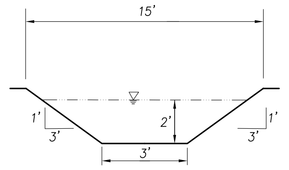


APPLICANT/OWNERS:
ZAREH HOOKASIAN
31713 VER VALLEY ROAD
FRANKLIN, TN 37064
TEL: (615) 838-4820
FAX: (909) 768-4401

ENGINEER:
RDS AND ASSOCIATES
30519 WAILEA COURT
TEMECULA, CA. 92592
PH.# (951)691-7706

SITE ADDRESS:
ELM ST
WILDOMAR CA

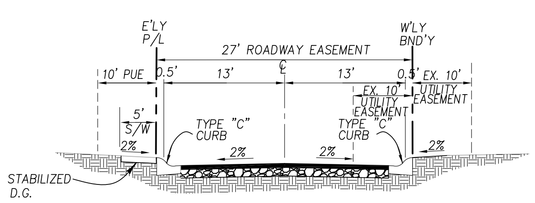
A.P.N:
376-043-027



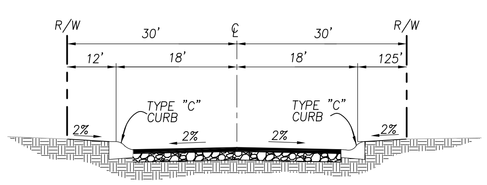
SECTION A-A
(VEGETATED SWALE AND DRAINAGE OUTLET)
NOT TO SCALE

LEGEND:

- A1 / 1.32 — SUBAREA DESIGNATION; SUBAREA ACREAGE
- 100 — NODE NUMBER DESIGNATION
- SUBAREA BOUNDARY
- FLOWPATH DIRECTION
- L1=638' — FLOWPATH LENGTH THROUGH SUBAREA



STREET "A"(PRIVATE)
(TYPICAL CROSS SECTION)
NOT TO SCALE



ELM STREET (ACCESS ROAD)
PER STD. NO 94
NOT TO SCALE

TO WILDOMAR CHANNEL
Q10 = 5.3 CFS
Q100 = 8.7 CFS

DATE	REVISIONS

RDS & ASSOCIATES
30519 Wailea Ct.
Temecula, CA. 92592
PH: 951.691.7706

CITY OF WILDOMAR
HYDROLOGY MAP
TENTATIVE TRACT MAP 33840
APN# 376-043-027

SERV. AREA
W.O. 1019-01
C.O.
COORD.
SHT 1 of 1
MAY 2013

10 YEAR STORM

ULTIMATE CONDITIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 05/02/13 File:hookdevc10.out

Wildomar Tr 33840
Preliminary Hydrology
10-yr Rational Method
Developed Condition

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

English (in-lb) Units used in input data file

RDS Associates, Temecula, CA - S/N 936

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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 = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.980(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 638.000(Ft.)
Top (of initial area) elevation = 49.100(Ft.)
Bottom (of initial area) elevation = 44.100(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00784 s(percent)= 0.78
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.620 min.
Rainfall intensity = 1.997(In/Hr) for a 10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.745
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 1.964(CFS)
Total initial stream area = 1.320(Ac.)
Pervious area fraction = 0.500

++
Process from Point/Station 101.000 to Point/Station 102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____
Top of street segment elevation = 44.100(Ft.)
End of street segment elevation = 40.960(Ft.)
Length of street segment = 582.000(Ft.)
Height of curb above gutter flowline = 4.0(In.)
Width of half street (curb to crown) = 13.000(Ft.)
Distance from crown to crossfall grade break = 11.250(Ft.)
Slope from gutter to grade break (v/hz) = 0.150
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [2] 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 = 1.750(Ft.)
Gutter hike from flowline = 1.000(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 = 3.021(CFS)
Depth of flow = 0.241(Ft.), Average velocity = 1.551(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 9.651(Ft.)
Flow velocity = 1.55(Ft/s)
Travel time = 6.25 min. TC = 19.87 min.
Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.726
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 1.666(In/Hr) for a 10.0 year storm
Subarea runoff = 1.718(CFS) for 1.420(Ac.)
Total runoff = 3.682(CFS) Total area = 2.740(Ac.)
Street flow at end of street = 3.682(CFS)
Half street flow at end of street = 1.841(CFS)
Depth of flow = 0.257(Ft.), Average velocity = 1.627(Ft/s)
Flow width (from curb towards crown)= 10.435(Ft.)

++
Process from Point/Station 200.000 to Point/Station 102.000
**** SUBAREA FLOW ADDITION ****

SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.726
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Time of concentration = 19.87 min.
Rainfall intensity = 1.666(In/Hr) for a 10.0 year storm
Subarea runoff = 1.609(CFS) for 1.330(Ac.)
Total runoff = 5.291(CFS) Total area = 4.070(Ac.)
End of computations, total study area = 4.07 (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 = 56.0

10 YEAR STORM

EXISTING CONDITIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 04/26/13 File:hook10undeveloped.out
---
Wildomar Tr 33840
Preliminary Hydrology
10-yr Rational Method
Undeveloped Condition

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

English (in-lb) Units used in input data file

RDS Associates, Temecula, CA - S/N 936

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

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 = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.980(In/Hr)
Slope of intensity duration curve = 0.4800

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 750.000(Ft.)
Top (of initial area) elevation = 48.900(Ft.)
Bottom (of initial area) elevation = 43.000(Ft.)
Difference in elevation = 5.900(Ft.)
Slope = 0.00787 s(percent)= 0.79
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 26.432 min.
Rainfall intensity = 1.453(In/Hr) for a 10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.637
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.221(CFS)
Total initial stream area = 2.400(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 101.000 to Point/Station 102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____
Top of natural channel elevation = 43.000(Ft.)
End of natural channel elevation = 41.000(Ft.)
Length of natural channel = 550.000(Ft.)
Estimated mean flow rate at midpoint of channel = 2.994(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 = 1.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0036
Corrected/adjusted channel slope = 0.0036
Travel time = 8.10 min. TC = 34.53 min.

Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.613
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.278(In/Hr) for a 10.0 year storm
Subarea runoff = 1.307(CFS) for 1.670(Ac.)
Total runoff = 3.529(CFS) Total area = 4.070(Ac.)
End of computations, total study area = 4.07 (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 = 69.0

100 YEAR STORM

ULTIMATE CONDITIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 05/02/13 File:hookdevc100.out

Wildomar TR33840
Preliminary Hydrology
100-yr Rational Method
Developed Condition

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

English (in-lb) Units used in input data file

RDS Associates, Temecula, CA - S/N 936

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

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 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 638.000(Ft.)
Top (of initial area) elevation = 49.100(Ft.)
Bottom (of initial area) elevation = 44.100(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00784 s(percent)= 0.78
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.620 min.
Rainfall intensity = 3.056(In/Hr) for a 100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.785
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Initial subarea runoff = 3.168(CFS)
Total initial stream area = 1.320(Ac.)
Pervious area fraction = 0.500

++
Process from Point/Station 101.000 to Point/Station 102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
_____
Top of street segment elevation = 44.100(Ft.)
End of street segment elevation = 40.960(Ft.)
Length of street segment = 582.000(Ft.)
Height of curb above gutter flowline = 4.0(In.)
Width of half street (curb to crown) = 13.000(Ft.)
Distance from crown to crossfall grade break = 11.250(Ft.)
Slope from gutter to grade break (v/hz) = 0.150
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [2] 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 = 1.750(Ft.)
Gutter hike from flowline = 1.000(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 = 4.871(CFS)
Depth of flow = 0.281(Ft.), Average velocity = 1.743(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 11.642(Ft.)
Flow velocity = 1.74(Ft/s)
Travel time = 5.57 min. TC = 19.19 min.
Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.771
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Rainfall intensity = 2.593(In/Hr) for a 100.0 year storm
Subarea runoff = 2.837(CFS) for 1.420(Ac.)
Total runoff = 6.004(CFS) Total area = 2.740(Ac.)
Street flow at end of street = 6.004(CFS)
Half street flow at end of street = 3.002(CFS)
Depth of flow = 0.301(Ft.), Average velocity = 1.834(Ft/s)
Flow width (from curb towards crown)= 12.627(Ft.)

++
Process from Point/Station 200.000 to Point/Station 102.000
**** SUBAREA FLOW ADDITION ****

SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.771
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 56.00
Pervious area fraction = 0.500; Impervious fraction = 0.500
Time of concentration = 19.19 min.
Rainfall intensity = 2.593(In/Hr) for a 100.0 year storm
Subarea runoff = 2.657(CFS) for 1.330(Ac.)
Total runoff = 8.661(CFS) Total area = 4.070(Ac.)
End of computations, total study area = 4.07 (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 = 56.0

100 YEAR STORM

EXISTING CONDITIONS

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2001 Version 6.4
Rational Hydrology Study Date: 04/26/13 File:hook100undeveloped.out
---
Wildomar TR 33840
Preliminary Hydrology
100-yr Rational Method
Undeveloped Condition

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

English (in-lb) Units used in input data file

RDS Associates, Temecula, CA - S/N 936

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

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 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
Initial area flow distance = 750.000(Ft.)
Top (of initial area) elevation = 48.900(Ft.)
Bottom (of initial area) elevation = 43.000(Ft.)
Difference in elevation = 5.900(Ft.)
Slope = 0.00787 s(percent)= 0.79
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 26.432 min.
Rainfall intensity = 2.223(In/Hr) for a 100.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.709
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 3.783(CFS)
Total initial stream area = 2.400(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 101.000 to Point/Station 102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
_____
Top of natural channel elevation = 43.000(Ft.)
End of natural channel elevation = 41.000(Ft.)
Length of natural channel = 550.000(Ft.)
Estimated mean flow rate at midpoint of channel = 5.099(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 = 1.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0036
Corrected/adjusted channel slope = 0.0036
Travel time = 7.17 min. TC = 33.60 min.

Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.691
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 1.981(In/Hr) for a 100.0 year storm
Subarea runoff = 2.286(CFS) for 1.670(Ac.)
Total runoff = 6.069(CFS) Total area = 4.070(Ac.)
End of computations, total study area = 4.07 (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 = 69.0

APPENDIX 8: PRELIMINARY WATER QUALITY MANAGEMENT PLAN

Preliminary Project Specific
Water Quality Management Plan

For: Tentative Tract Map No. 33840

DEVELOPMENT NO. **TENTATIVE TRACT MAP NO. 33840**
DESIGN REVIEW NO.

Prepared for:

Zareh Hookasian
3173 Vera Valley Road, Franklin, TN 37064
Telephone: (615) 838-4820

Prepared by:
Rich Soltysiak
RDS and Associates
30519 Wailea Ct
Temecula, Ca 92592
Telephone: (951) 691-7706

WQMP Preparation/Revision Date: May 7, 2013

OWNER'S CERTIFICATION

This project-specific Water Quality Management Plan (WQMP) has been prepared for:

Zareh Hookasian Owner/Developer

by RDS and Associates for the project known as TR 33840 at Wildomar, Ca.

This WQMP is intended to comply with the requirements of the City of Wildomar, Ca for TR 33840, which includes the requirement for the preparation and implementation of a preliminary 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 the City of Wildomar Water Quality Ordinance and San Diego Regional Water Quality Control Board MS-4 permit dated July 14, 2004 (Order No. R9-2012-0016).

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

Zareh Hookassian
3173 Vera Valley Road
Franklin, TN 37064
Telephone: (615) 838-4820

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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 (IF APPLICABLE)

D. EDUCATIONAL MATERIALS

E. SOILS REPORT (IF APPLICABLE)

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 Site Address: TR 33840
City of Wildomar, CA, 92595

Planning Area/
Community Name/
Development Name: Wildomar California

APN Number(s): APN 376-043-027

Thomas Bros. Map: Page 897 Grid B7

Project Watershed: Santa Margarita

Sub-watershed: 902.31 Wildomar HSA

Project Site Size: 4.07 Acres

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)* Riverside County Flood Control and Water Conservation District City of Wildomar	Encroachment Permit Grading Permit

This Preliminary Project-Specific Water Quality Management Plan is for a future residential tract in the City of Wildomar, Riverside County, Ca. The development presently consists of subdividing an existing vacant 4.07 acre parcel into 15 individual single family residential lots.

The site is located adjacent to Wildomar Channel to the northeast, Gruwell Street to the nortwest, Central Street to the southeast, and existing houses to the southwest. The site is presently zoned rural residential, vacant, and unimproved.

Appendix A of this preliminary project-specific WQMP will include a complete copy of the final Conditions of Approval when available. Appendix B of this preliminary 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 preliminary 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 when available.

Project Owner: Zareh Hookasian
3173 Vera Valley Drive
Franklin, TN 36064
Telephone: 615-838-4820

WQMP Preparer: Rich Soltysiak/RDS and Associates
30519 Wailea Ct
Temecula, Ca, 92592
Telephone: 951-691-7706

II. Site Characterization

Land Use Designation or Zoning: MDR/R-R existing to be rezoned MDR/R-1

Current Property Use: Vacant and Unimproved

Proposed Property Use: R-1 Residential Tract

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
2.31 Wildomar Channel	Iron, Manganese, Nitrogen	(MUN), (AGR), (IND), (PROC), (REC-2), (WARM), (WILD)	50′
2.32 Murrieta Creek	Iron, Manganese, Nitrogen	(MUN), (AGR), (IND), (PROC), (REC-2), (WARM), (WILD)	1 Mile
2.22 Santa Margarita River	Phosphorous	(MUN), (AGR), (IND), (REC-1) (REC-2), (WARM), (COLD),(WILD), (RARE)	12 Miles

III. Pollutants of Concern

Urban Runoff Pollutants:

Type of Development (Land Use)	Sediment/ Turbidity	Nutrients	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Bacteria & Viruses	Oil & Grease	Pesticides	Metals
Detached Residential Development	E	E	N	E	E	E	E	E	N
Streets, Highways & Freeways	P	P(1)	P(4)	P	P(1)	P(6)	P	P(1)	P

E = Expected P = Potential N = Not Expected

(1) A potential pollutant if landscaping or open area exists on the project site
(2) A potential pollutant if the project includes uncovered parking areas
(3) A potential pollutant if land use involves animal waste
(4) Specifically, petroleum hydrocarbons
(5) Specifically, solvents
(6) Bacterial indicators are routinely detected in pavement runoff

A description of Urban Runoff Pollutants of Concern Expected per the table above:

Sediments – Sediments are soils or other surficial materials eroded and then transported or deposited by the action of wind, water, ice or gravel. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.

Nutrients – Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary sources of nutrients in Urban Runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms.

Organic Compounds – Pesticides and PCBs are toxic organic compounds that are particularly dangerous in the aquatic environment. Excessive application of insecticides, herbicides, fungicides, and rodenticides, or application of any of these shortly before a storm can result in toxic pesticide chemicals being carried from agricultural lands, construction sites, parks, golf courses, and residential lawns to receiving waters. Many pesticide compounds are extremely toxic to aquatic organisms and can cause fish kills. PCBs are a similar class of toxic organic compounds. Then can contaminate stormwater through leaking electrical transformers. PCBs can settle on sediments of receiving waters and like pesticide compounds present a serious toxic threat to aquatic organisms that come in contact with them. Many other toxic organic compounds can also affect receiving waters. These toxic compounds include phenols, glycol ethers, esters, nitrosamines, and other nitrogen compounds. Common sources of these compounds include wood preservatives, antifreeze, dry cleaning chemicals, cleansers, and a variety of other chemical products. Like pesticides and PCBs these other organic compounds can be lethal to aquatic organisms.

Trash and Debris – Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash and debris may have a significant impact on the recreational value of water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lover its water quality. In addition, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

Oxygen-Demanding Substances – This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins carbohydrates and fats are examples of biodegradable organic compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions.

Pathogens – Pathogens (bacteria and viruses) are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bateria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.

Oil and Grease – Oil and grease are characterized as high-molecular weight organic compounds. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the water bodies are very possibly due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality.

Pesticides – Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive or improper application of a pesticide may result in runoff containing toxic levels of its active ingredient.

Metals – The primary source of metal pollution in Urban Runoff is typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lean and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. Metals are also raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. At low concentrations naturally occurring in soil, metals may not be toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

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 **is not required** to address the issue of Hydrologic Conditions of Concern because Condition A applies in that the site discharges to Wildomar Channel:

- **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 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

Therefore, supporting engineering studies, calculations, and reports are not required to be included in Appendix C.

	2 year – 24 hour		10 year – 24 hour	
	Precondition	**Post-condition**	**Precondition**	**Post-condition**
Discharge (cfs)				
Velocity (fps)				
Volume (cubic feet)				
Duration (minutes)				

V. Best Management Practices

V.1 SITE DESIGN BMPS

TR 33840 consists of 15 lots accessed by a private street. The property is bordered to the east by Wildomar Channel, the upstream portion of Murrieta Creek. The project site plan incorporates a vegetated swale as a structural BMP as well as the various non-structural BMP's as required as part of this WQMP. All 15 lots and the private street drain into the vegetated swale BMP prior to discharging directly to Wildomar Channel.

In addition to the vegetated swale BMP, the following site design concepts have been incorporated to achieve the following:

1) Urban Runoff has been minimized by incorporating decomposed granite sidewalks and minimizing the private street configuration to meet minimum Riverside County Fire Department access requirements for a project of this type.

2) This residential project attempts to minimize impervious footprints by incorporating lot sizes larger than the R-1 7,100 square foot minimums. In addition the project incorporates decomposed granite sidewalks and a minimum private street configuration allowed by the Riverside County Fire Department.

3) Natural areas will be conserved as practical, but the undeveloped site has been disturbed over the years as railroad property and by adjacent development and disposal of earth materials.

4) The site has been designed to discharge through a vegetated swale BMP and thereby minimize directly connected impervious areas (DCIAs).

Table 1. Site Design BMPs

			Included		
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**	**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.	☐	☐	☒
		Where soils conditions are suitable, use perforated pipe or gravel filtration pits for low flow 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.)

			Included		
Design Concept	**Technique**	**Specific BMP**	**Yes**	**No**	**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.	☒	☐	☐
		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.	☐	☐	☒
		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.	☐	☐	☒
		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.	☒	☐	☐
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to vegetated swale/biofilter.	☒	☐	☐
		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.	☒	☐	☐
		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.	☐	☒	☐
		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.	☐	☒	☐
		Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.	☐	☐	☒
		Overflow parking (parking stalls provided in excess of the Co-Permittee's minimum parking requirements) may be constructed with permeable paving.	☐	☐	☒
		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).	☐	☐	☒

<u>Non-applicable Site Design BMPs:</u>

The project is a residential tract and therefore BMP's relating to commercial/industrial site features are not applicable.

.

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	☐	☒	Residential Project
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
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	☐	☒	Residential Project
Properly Design:	☒	☐	
Fueling Areas	☐	☒	Residential Project
Air/Water Supply Area Drainage	☐	☒	Residential Project
Trash Storage Areas	☐	☒	Residential Project
Loading Docks	☐	☒	Residential Project
Maintenance Bays	☐	☒	Residential Project
Vehicle and Equipment Wash Areas	☐	☒	Residential Project
Outdoor Material Storage Areas	☐	☒	Residential Project
Outdoor Work Areas or Processing Areas	☐	☒	Residential Project
Provide Wash Water Controls for Food Preparation Areas	☐	☒	Residential Project

TR 33840 consists of 15 lots accessed by a private street. The property is bordered to the east by Wildomar Channel, the upstream portion of Murrieta Creek. The project site plan incorporates a vegetated swale as a structural BMP as well as the various non-structural BMP's as required as part of this WQMP. All 15 lots and the private street drain into the vegetated swale BMP prior to discharging directly to Wildomar Channel.

In addition to the vegetated swale BMP, the following site design concepts have been incorporated to achieve the following:

- Urban Runoff has been minimized by incorporating decomposed granite sidewalks and minimizing the private street configuration to meet minimum Riverside County Fire Department access requirements for a project of this type.
- This residential project attempts to minimize impervious footprints by incorporating lot sizes larger than the R-1 7,100 square foot minimums. In addition the project incorporates decomposed granite sidewalks and a minimum private street configuration allowed by the Riverside County Fire Department.
- Natural areas will be conserved as practical, but the undeveloped site has been disturbed over the years as railroad property and by adjacent development and disposal of earth materials.
- The site has been designed to discharge through a vegetated swale BMP and thereby minimize directly connected impervious areas (DCIAs).

Appendix D includes copies of the educational materials that will be used in implementing this project-specific WQMP.

V.3 TREATMENT CONTROL BMPS

TR 33840 consists of 15 lots accessed by a private street. The property is bordered to the east by Wildomar Channel, the upstream portion of Murrieta Creek. The project site plan incorporates a vegetated swale as a structural BMP as well as the various non-structural BMP's as required as part of this WQMP. All 15 lots and the private street drain into the vegetated swale BMP with Lot 15 and adjacent to the side yard property line with Lot 14 prior to discharging directly to Wildomar Channel.

The vegetated swale filtering the site has been designed to convey the flow base QBMP of 0.4 cfs as well as the 100-yr design storm flow of 8.7 cfs. The vegetated swale was designed in conformance with the Riverside County Stormwater Quality Best Management Practice Design Handbook.

Maintenance Program of Vegetated Swale by Homeowner's Association

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth (0.4'), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fe1tilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

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 Y ☐ N ☐	H/M ☒	M ☐	H/M ☐	H/M ☐	H/M ☐	L ☐	H/M (L for turbidity) ☐	U ☐
Nutrients Y ☐ N ☐	L ☒	M ☐	H/M ☐	H/M ☐	L/M ☐	L ☐	L ☐	U ☐
Organic Compounds Y ☐ N ☐	U ☒	U ☐	U ☐	U ☐	H/M ☐	L ☐	L ☐	U ☐
Trash & Debris Y ☐ N ☐	L ☒	M ☐	U ☐	U ☐	H/M ☐	M ☐	H/M ☐	U ☐
Oxygen Demanding Substances Y ☐ N ☐	L ☒	M ☐	H/M ☐	H/M ☐	H/M ☐	L ☐	L ☐	U ☐
Bacteria & Viruses Y ☐ N ☐	U ☒	U ☐	H/M ☐	U ☐	H/M ☐	L ☐	L ☐	U ☐
Oils & Grease Y ☐ N ☐	H/M ☒	M ☐	U ☐	U ☐	H/M ☐	M ☐	L/M ☐	U ☐
Pesticides (non-soil bound) Y ☐ N ☐	U ☒	U ☐	U ☐	U ☐	U ☐	L ☐	L ☐	U ☐
Metals Y ☐ N ☐	H/M ☒	M ☐	H ☐	H ☐	H ☐	L ☐	L ☐	U ☐

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

TR 33840 consists of 15 lots accessed by a private street. The property is bordered to the east by Wildomar Channel, the upstream portion of Murrieta Creek. The project site plan incorporates a vegetated swale as a structural BMP as well as the various non-structural BMP's as required as part of this WQMP. All 15 lots and the private street drain into the vegetated swale BMP with Lot 15 and adjacent to the side yard property line with Lot 14 prior to discharging directly to Wildomar Channel.

The vegetated swale filtering the site has been designed to convey the flow base QBMP of 0.4 cfs as well as the 100-yr design storm flow of 8.7 cfs. The vegetated swale was designed in conformance with the Riverside County Stormwater Quality Best Management Practice Design Handbook.

Maintenance Program of Vegetated Swale by Homeowner's Association

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth (0.4'), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fe1tilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating in channels should be removed when it builds up to 75 mm (3 in.) at any

spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

VII. Funding

The funding source for the operation and maintenance of thr project's vegetated swale shall be a Homeowner's Association.

Appendix A

Conditions of Approval

Planning Commission Resolution _____

Dated _____

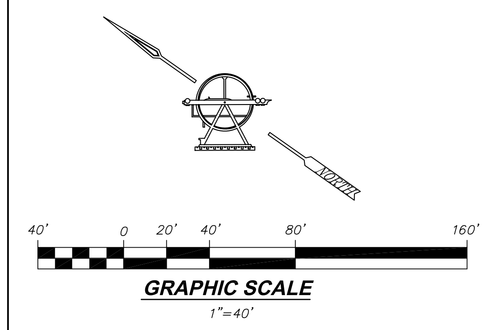
Appendix B

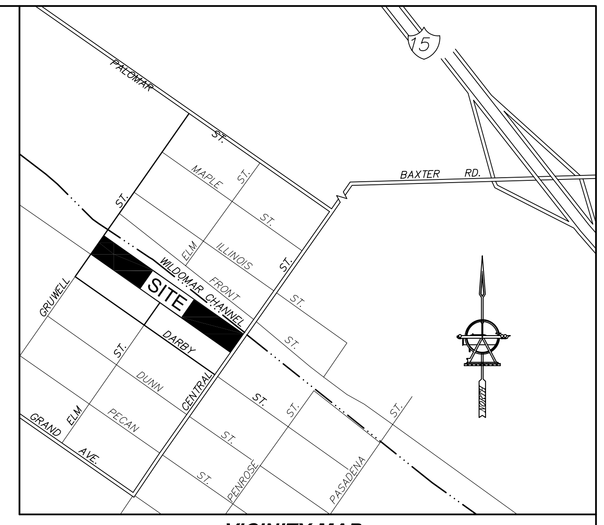
Vicinity Map, WQMP Site Plan, and Receiving Waters Map

TENTATIVE TRACT MAP NO. 33840

WQMP

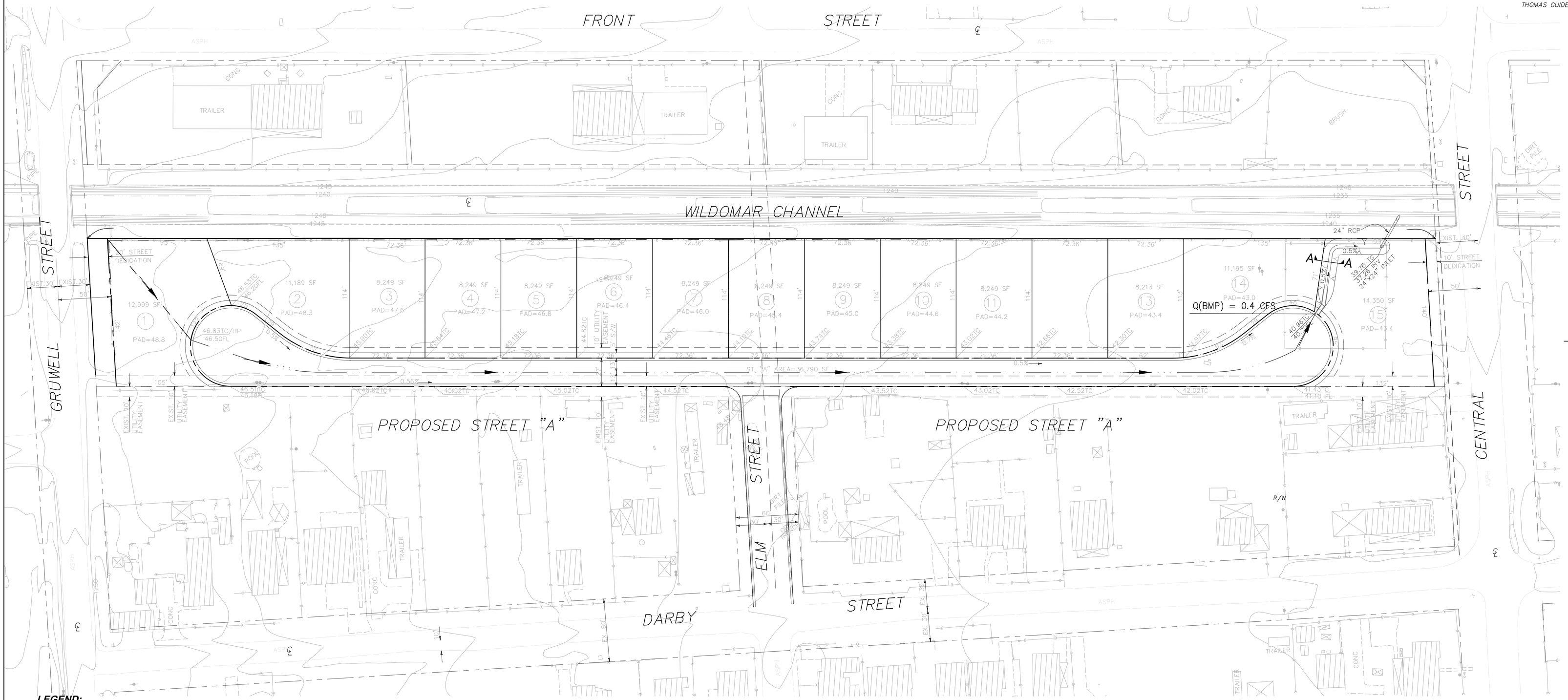
VICINITY MAP, SITE PLAN AND RECEIVING WATERS MAP





VICINITY MAP:

NO SCALE
RIVERSIDE & ORANGE COUNTY
THOMAS GUIDE 2006 PAGE 897, B-7



APPLICANT/OWNERS:

ZAREH HOOKASIAN
31173 VER VALLEY ROAD
FRANKLIN, TN 37064
TEL: (615) 838-4820
FAX: (909) 768-4401

ENGINEER:

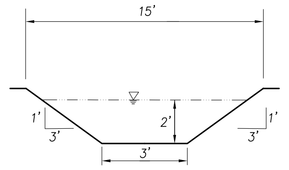
RDS AND ASSOCIATES
30519 WAILEA COURT
TEMECULA, CA. 92592
PH.# (951)691-7706

SITE ADDRESS:

ELM ST
WILDOMAR CA

A.P.N:

376-043-027

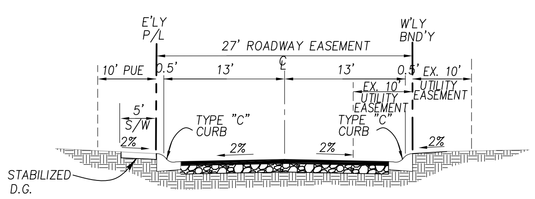


SECTION A-A
(VEGETATED SWALE AND DRAINAGE OUTLET)
NOT TO SCALE

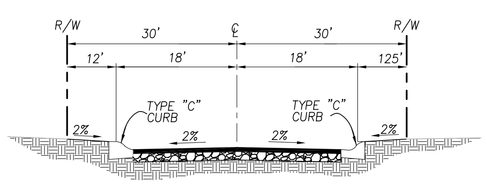
LEGEND:

SUBAREA BOUNDARY

FLOWPATH DIRECTION



STREET "A"(PRIVATE)
(TYPICAL CROSS SECTION)
NOT TO SCALE



ELM STREET (ACCESS ROAD)
PER STD. NO 94
NOT TO SCALE

DATE	REVISIONS

RDS & ASSOCIATES
30519 Wailea Ct.
Temecula, CA. 92592
PH: 951.691.7706

CITY OF WILDOMAR

WQMP SITE PLAN
TENTATIVE TRACT MAP 33840
APN# 376-043-027

SERV. AREA
W.O. 1019-01
C.O.
COORD.
SHT 1 of 1

MAY 2013

Appendix C

Supporting Detail Related to Hydraulic Conditions of Concern

Appendix D

Educational Materials

For Information:

Local Sewering Agencies in Riverside County:

City of Beaumont	(909) 769-8520
Belair Homeowners Association	(909) 277-1414
City of Banning	(909) 922-3130
City of Blythe	(760) 922-6161
City of Coachella	(760) 391-5008
Coachella Valley Water District	(760) 398-2651
City of Corona	(909) 736-2259
Desert Center, CSA #51	(760) 227-3203
Eastern Municipal Water District	(909) 928-3777
Elsinore Valley MWD	(909) 674-3146
Farm Mutual Water Company	(909) 244-4198
Idyllwild Water District	(909) 659-2143
Jurupa Community Services Dist.	(909) 685-7434
Lake Hemet MWD	(909) 658-3241
Lee Lake Water District	(909) 277-1414
March Air Force Base	(909) 656-7000
Mission Springs Water District	(760) 329-6448
City of Palm Springs	(760) 323-8242
Rancho Caballero	(909) 780-9272
Rancho California Water Dist.	(909) 676-4101
Ripley, CSA #62	(760) 922-4909
Rubidoux Community Services Dist.	(909) 684-7580
City of Riverside	(909) 782-5341
Silent Valley Club, Inc	(909) 849-4501
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(909) 780-4170

Spill Response Agency:
Haz-Mat: (909) 358-5055
Hazardous Waste Disposal: (909) 358-5055
To Report Illegal Dumping or a Clogged Storm Drain: 1-800-506-2555

StormWater CleanWater PROTECTION PROGRAM

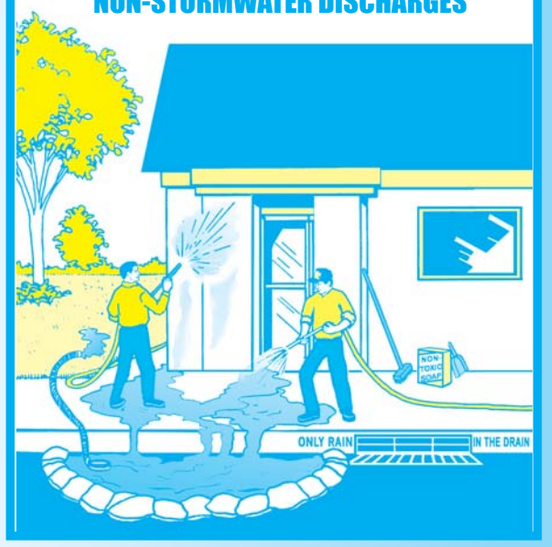
Riverside County gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

StormWater Pollution

What you should know for...

OUTDOOR CLEANING ACTIVITIES

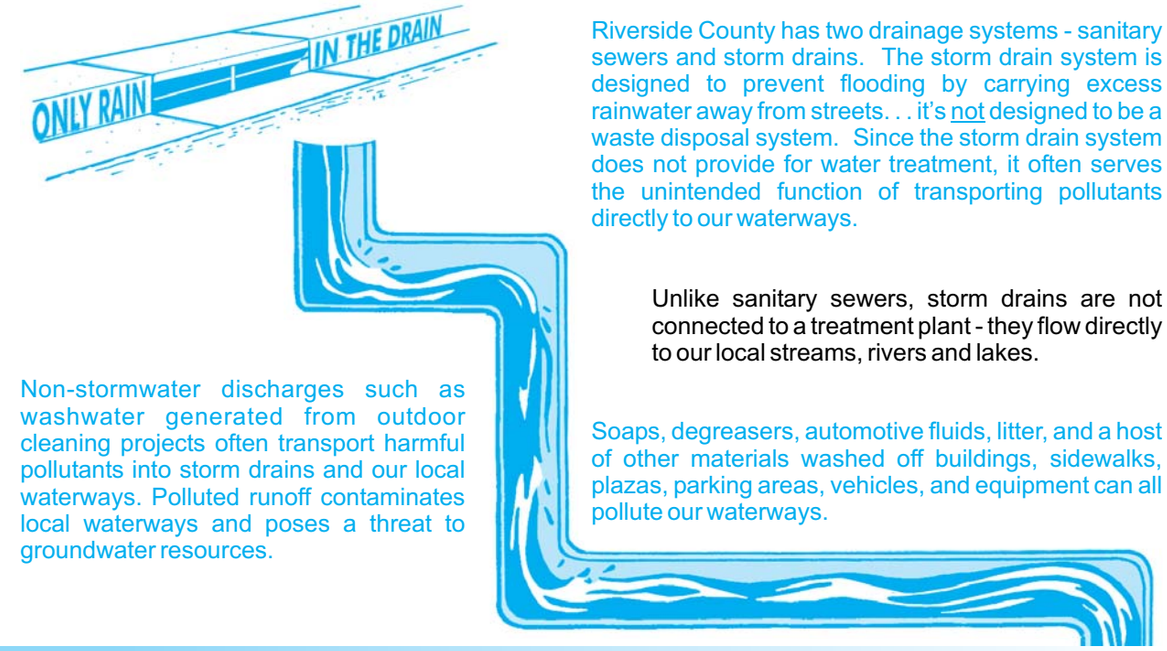
NON-STORMWATER DISCHARGES



GUIDELINES for disposal of washwater from:

- Sidewalk, plaza or parking lot cleaning
- Vehicle washing or detailing
- Building exterior cleaning
- Waterproofing
- Equipment cleaning or degreasing

Do you know . . . where the water should go?



Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to prevent flooding by carrying excess rainwater away from streets. . . it's not designed to be a waste disposal system. Since the storm drain system does not provide for water treatment, it often serves the unintended function of transporting pollutants directly to our waterways.

Unlike sanitary sewers, storm drains are not connected to a treatment plant - they flow directly to our local streams, rivers and lakes.

Non-stormwater discharges such as washwater generated from outdoor cleaning projects often transport harmful pollutants into storm drains and our local waterways. Polluted runoff contaminates local waterways and poses a threat to groundwater resources.

Soaps, degreasers, automotive fluids, litter, and a host of other materials washed off buildings, sidewalks, plazas, parking areas, vehicles, and equipment can all pollute our waterways.

The Cities and County of Riverside StormWater/CleanWater Protection Program

Since preventing pollution is much easier, and less costly than cleaning up "after the fact," the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses of pollution prevention activities such as those described in this pamphlet.

The Cities and County of Riverside have adopted ordinances for stormwater management and discharge control. In accordance with state and federal law, these local stormwater ordinances **prohibit** the discharge of wastes into the storm drain system or local surface waters. This includes non-stormwater discharges containing oil, grease, detergents, degreasers, trash, or other waste materials.

PLEASE NOTE: The discharge of pollutants into the street, gutters, storm drain system, or waterways - without a Regional Water Quality Control Board permit or waiver - is ***strictly prohibited*** by local ordinances and state and federal law.

Help Protect Our Waterways!

Use These Guidelines For Outdoor Cleaning Activities and Washwater Disposal

DO . . . Dispose of **small amounts** of **washwater from cleaning building exteriors, sidewalks, or plazas** onto landscaped or unpaved surfaces provided you have the owner's permission and the discharge will not cause flooding or nuisance problems, or flow into a storm drain.

DO NOT . . . Discharge **large amounts** of these types of washwater onto landscaped areas or soil where water may run to a street or storm drain. Wastewater from exterior cleaning may be pumped to a sewer line with specific permission from the local sewering agency.

DO . . . Check with your local sewering agency's policies and requirements concerning waste water disposal. **Water from many outdoor cleaning activities** may be acceptable for disposal to the sewer system. See the list on the back of this flyer for phone numbers of the sewering agencies in your area.

DO NOT . . . Pour **hazardous wastes** or toxic materials into the storm drain or sewer system . . . properly dispose of it instead. When in doubt, contact the local sewering agency! The agency will tell you what types of liquid wastes can be accepted.

DO . . . Understand that **water (without soap) used to remove dust from clean vehicles** may be discharged to a street or storm drain. **Washwater from sidewalk, plaza, and building surface cleaning** may go into a street or storm drain if ALL of the following conditions are met:

1) The surface being washed is free of residual oil stains, debris and similar pollutants by using dry cleanup methods (sweeping, and cleaning any oil or chemical spills with rags or other absorbent materials before using water).
2) Washing is done with water only - no soap or other cleaning materials.
3) You have not used the water to remove paint from surfaces during cleaning.

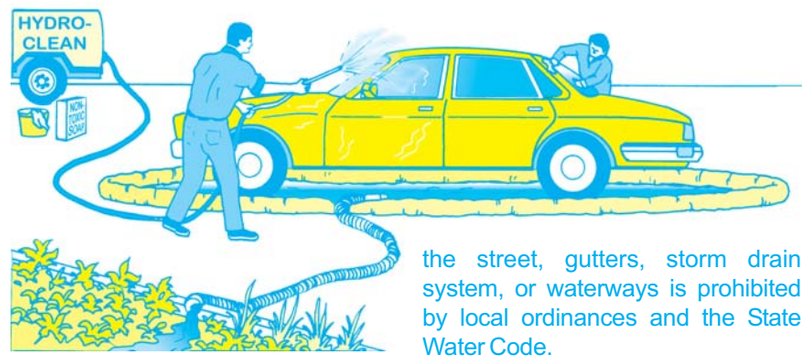
DO NOT . . . Dispose of water containing **soap or any other type of cleaning agent** into a storm drain or water body. This is a direct violation of state and/or local regulations. Because **wastewater from cleaning parking areas or roadways** normally contains metallic brake pad dust, oil and other automotive fluids, it should never be discharged to a street, gutter, or storm drain.

DO . . . Understand that **mobile auto detailers** should divert washwater to landscaped or dirt areas. Note: Be aware that soapy washwater may adversely affect landscaping; consult with the property owner. Residual washwater may remain on paved surfaces to evaporate; sweep up any remaining residue. If there is sufficient water volume to reach the storm drain, collect the runoff and obtain permission to pump it into the sanitary sewer. Follow local sewering agency's requirements for disposal.

DO NOT . . . Dispose of left over cleaning agents into the gutter, storm drain or sanitary sewer.

Regarding Cleaning Agents:

If you must use soap, use biodegradable/phosphate free cleaners. Avoid use of petroleum based cleaning products. Although the use of nontoxic cleaning products is strongly encouraged, ***do*** understand that these products can still degrade water quality and, therefore, the discharge of these products into



the street, gutters, storm drain system, or waterways is prohibited by local ordinances and the State Water Code.

Note: When cleaning surfaces with a high pressure washer or steam cleaning methods, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning, as compared to the use of a low pressure hose, can remove additional materials that can contaminate local waterways.

Other Tips to Help Protect Our Water . . .

Screening Wash Water

A thorough dry cleanup before washing (without soap) surfaces such as building exteriors and decks without loose paint, sidewalks, or plaza areas, *should be sufficient to protect storm drains.* **However**, if any debris (solids) could enter storm drains or remain in the gutter or street after cleaning, washwater should first pass through a "20 mesh" or finer screen to catch the solid material, which should then be disposed of in the trash.

Drain Inlet Protection/ Containing & Collecting Wash Water

- Sand bags can be used to create a barrier around storm drain inlets.
- Plugs or rubber mats can be used to temporarily seal storm drain openings.
- You can also use vacuum booms, containment pads, or temporary berms to keep wash water away from the street, gutter, or storm drain.

Equipment and Supplies

Special materials such as absorbents, storm drain plugs and seals, small sump pumps, and vacuum booms are available from many vendors. For more information check catalogs such as New Pig (800-468-4647), Lab Safety Supply (800-356-0783), C&H (800-558-9966), and W.W. Grainger (800-994-9174); or call the Cleaning Equipment Trade Association (800-441-0111) or the Power Washers of North America (800-393-PWNA).

Appendix E

Soils Report

Appendix F

Treatment Control BMP Sizing Calculations and Design Details

Vegetated Swale TC-30

Design Considerations

- Tributary Area
- Area Required
- Slope
- Water Availability

Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems.

Targeted Constituents

☑	Sediment	▲
☑	Nutrients	●
☑	Trash	●
☑	Metals	▲
☑	Bacteria	●
☑	Oil and Grease	▲
☑	Organics	▲

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

California Experience

Caltrans constructed and monitored six vegetated swales in southern California. These swales were generally effective in reducing the volume and mass of pollutants in runoff. Even in the areas where the annual rainfall was only about 10 inches/yr, the vegetation did not require additional irrigation. One factor that strongly affected performance was the presence of large numbers of gophers at most of the sites. The gophers created earthen mounds, destroyed vegetation, and generally reduced the effectiveness of the controls for TSS reduction.

Advantages

- If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible.

Limitations

- Can be difficult to avoid channelization.
- May not be appropriate for industrial sites or locations where spills may occur
- Grassed swales cannot treat a very large drainage area. Large areas may be divided and treated using multiple swales.
- A thick vegetative cover is needed for these practices to function properly.
- They are impractical in areas with steep topography.
- They are not effective and may even erode when flow velocities are high, if the grass cover is not properly maintained.
- In some places, their use is restricted by law: many local municipalities require curb and gutter systems in residential areas.
- Swales are mores susceptible to failure if not properly maintained than other treatment BMPs.

Design and Sizing Guidelines

- Flow rate based design determined by local requirements or sized so that 85% of the annual runoff volume is discharged at less than the design rainfall intensity.
- Swale should be designed so that the water level does not exceed 2/3rds the height of the grass or 4 inches, which ever is less, at the design treatment rate.
- Longitudinal slopes should not exceed 2.5%
- Trapezoidal channels are normally recommended but other configurations, such as parabolic, can also provide substantial water quality improvement and may be easier to mow than designs with sharp breaks in slope.
- Swales constructed in cut are preferred, or in fill areas that are far enough from an adjacent slope to minimize the potential for gopher damage. Do not use side slopes constructed of fill, which are prone to structural damage by gophers and other burrowing animals.
- A diverse selection of low growing, plants that thrive under the specific site, climatic, and watering conditions should be specified. Vegetation whose growing season corresponds to the wet season are preferred. Drought tolerant vegetation should be considered especially for swales that are not part of a regularly irrigated landscaped area.
- The width of the swale should be determined using Manning's Equation using a value of 0.25 for Manning's n.

Construction/Inspection Considerations

- Include directions in the specifications for use of appropriate fertilizer and soil amendments based on soil properties determined through testing and compared to the needs of the vegetation requirements.
- Install swales at the time of the year when there is a reasonable chance of successful establishment without irrigation; however, it is recognized that rainfall in a given year may not be sufficient and temporary irrigation may be used.
- If sod tiles must be used, they should be placed so that there are no gaps between the tiles; stagger the ends of the tiles to prevent the formation of channels along the swale or strip.
- Use a roller on the sod to ensure that no air pockets form between the sod and the soil.
- Where seeds are used, erosion controls will be necessary to protect seeds for at least 75 days after the first rainfall of the season.

Performance

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height.

Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients.

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

Only 9 studies have been conducted on all grassed channels designed for water quality (Table 1). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorus.

Table 1 Grassed swale pollutant removal efficiency data							
Removal Efficiencies (% Removal)							
Study	TSS	TP	TN	NO_3	Metals	Bacteria	Type
Caltrans 2002	77	8	67	66	83-90	-33	dry swales
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although some swales appear to export soluble phosphorus (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils.

Siting Criteria

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system (Schueler et al., 1992). In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. Use of natural topographic lows is encouraged and natural drainage courses should be regarded as significant local resources to be kept in use (Young et al., 1996).

Selection Criteria (NCTCOG, 1993)

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

The topography of the site should permit the design of a channel with appropriate slope and cross-sectional area. Site topography may also dictate a need for additional structural controls. Recommendations for longitudinal slopes range between 2 and 6 percent. Flatter slopes can be used, if sufficient to provide adequate conveyance. Steep slopes increase flow velocity, decrease detention time, and may require energy dissipating and grade check. Steep slopes also can be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

Additional Design Guidelines

Most of the design guidelines adopted for swale design specify a minimum hydraulic residence time of 9 minutes. This criterion is based on the results of a single study conducted in Seattle, Washington (Seattle Metro and Washington Department of Ecology, 1992), and is not well supported. Analysis of the data collected in that study indicates that pollutant removal at a residence time of 5 minutes was not significantly different, although there is more variability in that data. Therefore, additional research in the design criteria for swales is needed. Substantial pollutant removal has also been observed for vegetated controls designed solely for conveyance (Barrett et al, 1998); consequently, some flexibility in the design is warranted.

Many design guidelines recommend that grass be frequently mowed to maintain dense coverage near the ground surface. Recent research (Colwell et al., 2000) has shown mowing frequency or grass height has little or no effect on pollutant removal.

Summary of Design Recommendations

1) The swale should have a length that provides a minimum hydraulic residence time of at least 10 minutes. The maximum bottom width should not exceed 10 feet unless a dividing berm is provided. The depth of flow should not exceed 2/3rds the height of the grass at the peak of the water quality design storm intensity. The channel slope should not exceed 2.5%.

2) A design grass height of 6 inches is recommended.

3) Regardless of the recommended detention time, the swale should be not less than 100 feet in length.

4) The width of the swale should be determined using Manning's Equation, at the peak of the design storm, using a Manning's n of 0.25.

5) The swale can be sized as both a treatment facility for the design storm and as a conveyance system to pass the peak hydraulic flows of the 100-year storm if it is located "on-line." The side slopes should be no steeper than 3:1 (H:V).

6) Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible. If flow is to be introduced through curb cuts, place pavement slightly above the elevation of the vegetated areas. Curb cuts should be at least 12 inches wide to prevent clogging.

7) Swales must be vegetated in order to provide adequate treatment of runoff. It is important to maximize water contact with vegetation and the soil surface. For general purposes, select fine, close-growing, water-resistant grasses. If possible, divert runoff (other than necessary irrigation) during the period of vegetation

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

Cost

Construction Cost

Little data is available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately \$0.25 per ft^2. This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most stormwater management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately \$0.50 per ft^2, which compares favorably with other stormwater management practices.

Table 2 Swale Cost Estimate (SEWRPC, 1991)

Component	Unit	Extent	Unit Cost			Total Cost		
			Low	Moderate	High	Low	Moderate	High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b].....	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c].....	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General Excavation[d].....	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e].....	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil Seed, and Mulch[f]..	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Sod[g].....	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Subtotal	--	–	--	–	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	–	--	–	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right) \times$ swale length (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

Table 3 Estimated Maintenance Costs (SEWRPC, 1991)

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	$0.85 / 1,000 ft^2/ mowing	$0.14 / linear foot	$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	$9.00 / 1,000 ft^2/ year	$0.18 / linear foot	$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	$0.10 / linear foot / year	$0.10 / linear foot	$0.10 / linear foot	–
Grass Reseeding with Mulch and Fertilizer	$0.30 / yd^2	$0.01 / linear foot	$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	$0.15 / linear foot / year, plus $25 / inspection	$0.15 / linear foot	$0.15 / linear foot	Inspect four times per year
Total	--	**$0.58 / linear foot**	**$ 0.75 / linear foot**	--

Maintenance Cost

Caltrans (2002) estimated the expected annual maintenance cost for a swale with a tributary area of approximately 2 ha at approximately $2,700. Since almost all maintenance consists of mowing, the cost is fundamentally a function of the mowing frequency. Unit costs developed by SEWRPC are shown in Table 3. In many cases vegetated channels would be used to convey runoff and would require periodic mowing as well, so there may be little additional cost for the water quality component. Since essentially all the activities are related to vegetation management, no special training is required for maintenance personnel.

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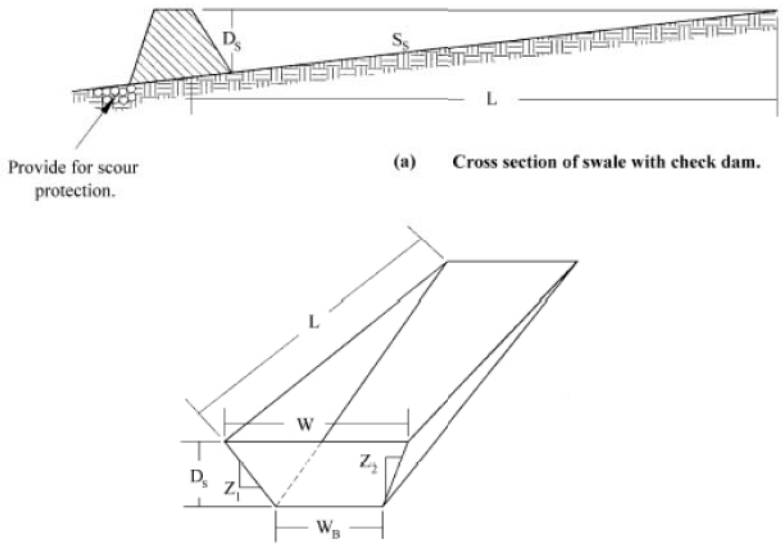


(a) Cross section of swale with check dam.

(b) Dimensional view of swale impoundment area.

Notation:

L = Length of swale impoundment area per check dam (ft)
D_S = Depth of check dam (ft)
S_S = Bottom slpe of swale (ft/ft)
W = Top width of check dam (ft)
W_B = Bottom width of check dam (ft)
$Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)

Flow Based BMPs

General

Flow based BMPs are sized to treat flows up to the design flow rate, which will remove pollutants to the MEP. This handbook bases the design flow rate on a uniform rainfall intensity of 0.2 inches per hour, as recommended by the California BMP Handbook. The flow rate is also dependent on the type of soil and percentage of impervious area in the development.

Uniform Intensity Approach

The Uniform Intensity Approach is where the Design Rainfall Intensity, I is specified as:

$$I = 0.2\ {}^{in}/_{hr}$$

That Intensity is then plugged into the Rational Equation to find the BMP design flow rate (Q).

$$Q_{BMP} = CIA$$

Where
- A = Tributary Area to the BMP
- C = Runoff Coefficient, based upon a Rainfall Intensity = 0.2 $^{in}/_{hr}$
- I = Design Rainfall intensity, 0.2 $^{in}/_{hr}$

A step-by-step procedure for calculating the design flow rate is presented on Worksheet 2. Table 4 shows runoff coefficient values pertaining to the type of soils and percent imperviousness.

Table 4. Runoff Coefficients for an Intensity = 0.2 $^{in}/_{hr}$ for Urban Soil Types*

Impervious %	A Soil RI =32	B Soil RI =56	C Soil RI =69	D Soil RI =75
0 (Natural)	0.06	0.14	0.23	0.28
5	0.10	0.18	0.26	0.31
10	0.14	0.22	0.29	0.34
15	0.19	0.26	0.33	0.37
20 (1-Acre)	0.23	0.30	0.36	0.40
25	0.27	0.33	0.39	0.43
30	0.31	0.37	0.43	0.47
35	0.35	0.41	0.46	0.50
40 (1/2-Acre)	0.40	0.45	0.50	0.53
45	0.44	0.48	0.53	0.56
50 (1/4-Acre)	0.48	0.52	0.56	0.59
55	0.52	0.56	0.60	0.62
60	0.56	0.60	0.63	0.65
65 (Condominiums)	0.61	0.64	0.66	0.68
70	0.65	0.67	0.70	0.71
75 (Mobilehomes)	0.69	0.71	0.73	0.74
80 (Apartments)	0.73	0.75	0.77	0.78
85	0.77	0.79	0.80	0.81
90 (Commercial)	0.82	0.82	0.83	0.84
95	0.86	0.86	0.87	0.87
100	0.90	0.90	0.90	0.90

*Complete District's standards can be found in the Riverside County Flood Control Hydrology Manual

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: _____

Company: _____

Date: _____

Project: _____

Location: _____

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = _____ acres	***(1)***
b. Determine Impervious %	i = _____ %	***(2)***
2. Determine Runoff Coefficient Values Use **Table 4** and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a = _____	***(3)***
b. B Soil Runoff Coefficient	C_b = _____	***(4)***
c. C Soil Runoff Coefficient	C_c = _____	***(5)***
d. D Soil Runoff Coefficient	C_d = _____	***(6)***
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / ***(1)*** =	A_a = _____	***(7)***
b. Area of B Soil / ***(1)*** =	A_b = _____	***(8)***
c. Area of C Soil / ***(1)*** =	A_c = _____	***(9)***
d. Area of D Soil / ***(1)*** =	A_d = _____	***(10)***
4. Determine Runoff Coefficient		
a. C = ***(3)***x***(7)*** + ***(4)***x***(8)*** + ***(5)***x***(9)*** + ***(6)***x***(10)*** =	C = _____	***(11)***
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = ***(11)*** x 0.2 x ***(1)***	Q_{BMP} = _____ $\frac{ft^3}{s}$	***(12)***

Grassed Swales

General

A Grass swale is a wide, shallow densely vegetated channel that treats stormwater runoff as it is slowly conveyed into a downstream system. These swales have very shallow slopes in order to allow maximum contact time with the vegetation. The depth of water of the design flow should be less than the height of the vegetation. Contact with vegetation improves water quality by plant uptake of pollutants, removal of sediment, and an increase in infiltration. Overall the effectiveness of a grass swale is limited and it is recommended that they are used in combination with other BMPs.

This BMP is not appropriate for industrial sites or locations where spills occur. Important factors to consider when using this BMP include: natural channelization should be avoided to maintain this BMP's effectiveness, large areas must be divided and treated with multiple swales, thick cover is required to function properly, impractical for steep topography, and not effective with high flow velocities.

Grass Swale Design Criteria:

Design Parameter	Unit	Design Criteria
Design Flow	cfs	Q_{BMP}
Minimum bottom width	ft	2 ft [2]
Maximum channel side slope	H:V	3:1 [2]
Minimum slope in flow direction	%	0.2 (provide underdrains for slopes < 0.5) [1]
Maximum slope in flow direction	%	2.0 (provide grade-control checks for slopes >2.0) [1]
Maximum flow velocity	ft/sec	1.0 (based on Manning n = 0.20) [1]
Maximum depth of flow	inches	3 to 5 (1 inch below top of grass) [1]
Minimum contact time	minutes	7 [1]
Minimum length	ft	Sufficient length to provide minimum contact time [1]
Vegetation	-	Turf grass or approved equal [1]
Grass height	inches	4 to 6 (mow to maintain height) [1]

1 Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures
2 City of Modesto's Guidance Manual for New Development Stormwater Quality Control Measures
3 CA Stormwater BMP Handbook for New Development and Significant Redevelopment
4 Riverside County DAMP Supplement A Attachment

Grass Swale Design Procedure

1. Design Flow
   Use Worksheet 2 - Design Procedure Form for Design Flow Rate, Q_{BMP}.

2. Swale Geometry
   a. Determine bottom width of swale (must be at least 2 feet).
   b. Determine side slopes (must not be steeper than 3:1; flatter is preferred).
   c. Determine flow direction slope (must be between 0.2% and 2%; provide underdrains for slopes less than 0.5% and provide grade control checks for slopes greater than 2.0%

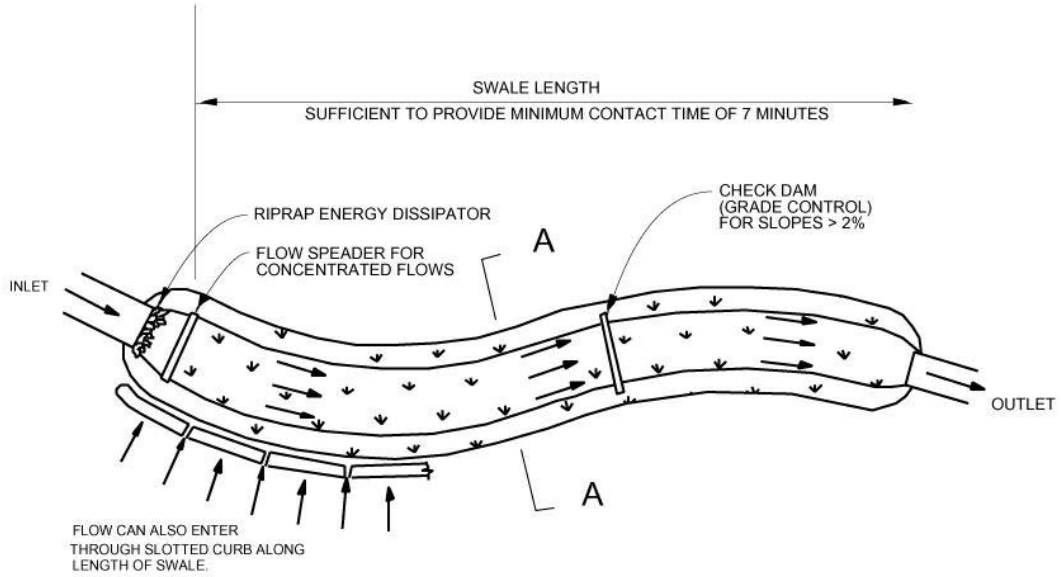
3. Flow Velocity
   Maximum flow velocity should not exceed 1.0 ft/sec based on a Mannings n = 0.20

4. Flow Depth
   Maximum depth of flow should not exceed 3 to 5 inches based on a Manning n = 0.20

5. Swale Length
   Provide length in the flow direction sufficient to yield a minimum contact time of 7 minutes.
   L = (7 min) x (flow velocity ft/s) x (60 sec/min)

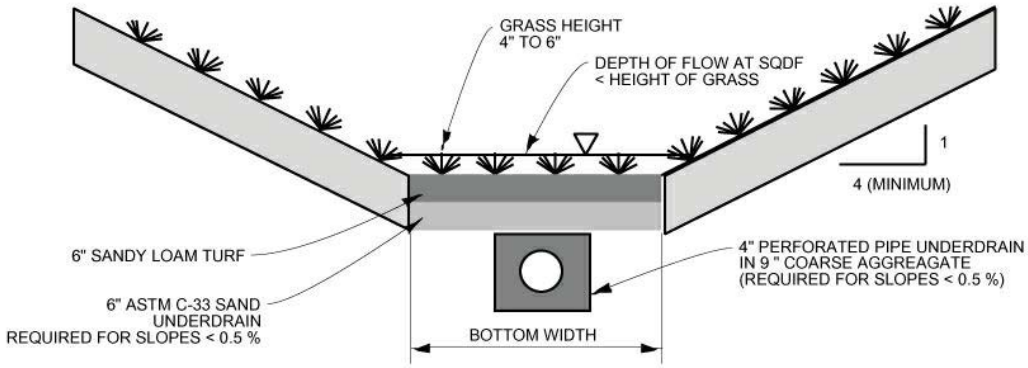
6. Vegetation
   Provide irrigated perennial turf grass to yield full, dense cover. Mow to maintain height of 4 to 6 inches.

7. Provide sufficient flow depth for flood event flows to avoid flooding of critical areas or structures.



TRAPEZOIDAL GRASS SWALE PLAN

NOT TO SCALE



TRAPEZOIDAL GRASS SWALE SECTION

NOT TO SCALE

Figure 11: Grassed Swale

Source: Ventura County Guidance Manual

Worksheet 9

Design Procedure Form for Grassed Swale

Designer:_____
Company:_____
Date:_____
Project:_____
Location:_____

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = _____ cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	 b = _____ ft z = _____ s = _____ %
3. Design flow velocity (Manning n = 0.2)	v = _____ ft/s
4. Depth of flow (D)	D = _____ ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = _____ ft
6. Vegetation (describe)	_____ _____
8. Outflow Collection (check type used or describe “other”)	___ Grated Inlet’ ___ Infiltration Trench ___ Underdrain ___ Other_____

Notes:

_____
_____
_____
_____
_____
_____

Worksheet 2

Design Procedure Form for Design Flow

Uniform Intensity Design Flow

Designer: Rich Soltysiak
Company: RDS and Associates
Date: May 9, 2013
Project: Wildomar TR 33840
Location:

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 4.07 acres	***(1)***
b. Determine Impervious %	i = 0.42 %	***(2)***
2. Determine Runoff Coefficient Values Use **Table 4** and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a =	***(3)***
b. B Soil Runoff Coefficient	C_b = 0.48	***(4)***
c. C Soil Runoff Coefficient	C_c =	***(5)***
d. D Soil Runoff Coefficient	C_d =	***(6)***
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / ***(1)*** =	A_a =	***(7)***
b. Area of B Soil / ***(1)*** =	A_b= 1.0	***(8)***
c. Area of C Soil / ***(1)*** =	A_c =	***(9)***
d. Area of D Soil / ***(1)*** =	A_d =	***(10)***
4. Determine Runoff Coefficient		
a. C = ***(3)***x***(7)*** + ***(4)***x***(8)*** + ***(5)***x***(9)*** + ***(6)***x***(10)*** **=**	C = 0.48	***(11)***
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = ***(11)*** x 0.2 x ***(1)***	Q_{BMP} = 0.4 $\frac{ft^3}{s}$	***(12)***

LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR WILDOMAR

PLATE C-1.51

Worksheet 9

Design Procedure Form for Grassed Swale

Designer: Rich Soltysiak
Company: RDS and Associates
Date: May 9, 2013
Project: Wildomar TR 33840
Location: _____

1. Determine Design Flow (Use Worksheet 2)	Q_{BMP} = 0.4 cfs
2. Swale Geometry a. Swale bottom width (b) b. Side slope (z) c. Flow direction slope (s)	 b = 3 ft z = 3 s = 3 %
3. Design flow velocity (Manning n = 0.2)	v = 0.24 ft/s
4. Depth of flow (D)	D = 0.4 ft
5. Design Length (L) L = (7 min) x (flow velocity, ft/sec) x 60	L = 101 ft
6. Vegetation (describe)	_____ _____
8. Outflow Collection (check type used or describe "other")	X Grated Inlet' ___Infiltration Trench ___Underdrain ___Other_____

Notes: $Q = 1.49(0.2)(AR^{2/3})S^{1/2}$

FHWA Urban Drainage Design Program, HY-22
HYDRAULIC PARAMETERS OF OPEN CHANNELS

Trapezoidal, Rectangular, or Triangular X-Section
Date: 04/05/2013

Project No. :
Project Name.:Wildomar TR33840
Computed by :Rich Soltysiak

Project Description
Grass Swale BMP Hydraulics

INPUT PARAMETERS

1.	Channel Slope (ft/ft)	0.0050
2.	Channel Bottom Width (ft)	3.00
3.	Left Side Slope (Horizontal to 1)	3.00
4.	Right Side Slope (Horizontal to 1)	3.00
5.	Manning's Coefficient	0.200
6.	Discharge (cfs)	0.40
7.	Depth of Flow (ft)	0.40

OUTPUT RESULTS

Cross Section Area (Sqft)	1.68
Average Velocity (ft/sec)	0.24
Top Width (ft)	5.40
Hydraulic Radius (ft)	0.30
Froude Number	0.08

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

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

APPENDIX 9:
ELM STREET NOISE CONTOUR - EXISTING CONDITIONS

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 28-0047C 018 03
Project Name: ELM STREET

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Abrams Associates Traffic Engineering
Community Noise Descriptor: L_{dn}: _____ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

				Design		Vehicle Mix		Distance from Centerline of Roadway				
Existing Condition		Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
Roadway, Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
Central Street												
West of Palomar Street	2	0	9,700	40	0.5	1.8%	0.7%	59.9	-	46	98	211
East of Palomar Street	2	0	10,300	40	0.5	1.8%	0.7%	60.1	-	47	102	220

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.